DICOM Conformance Statement

LARA PACS Server

Software Release 1.4.1

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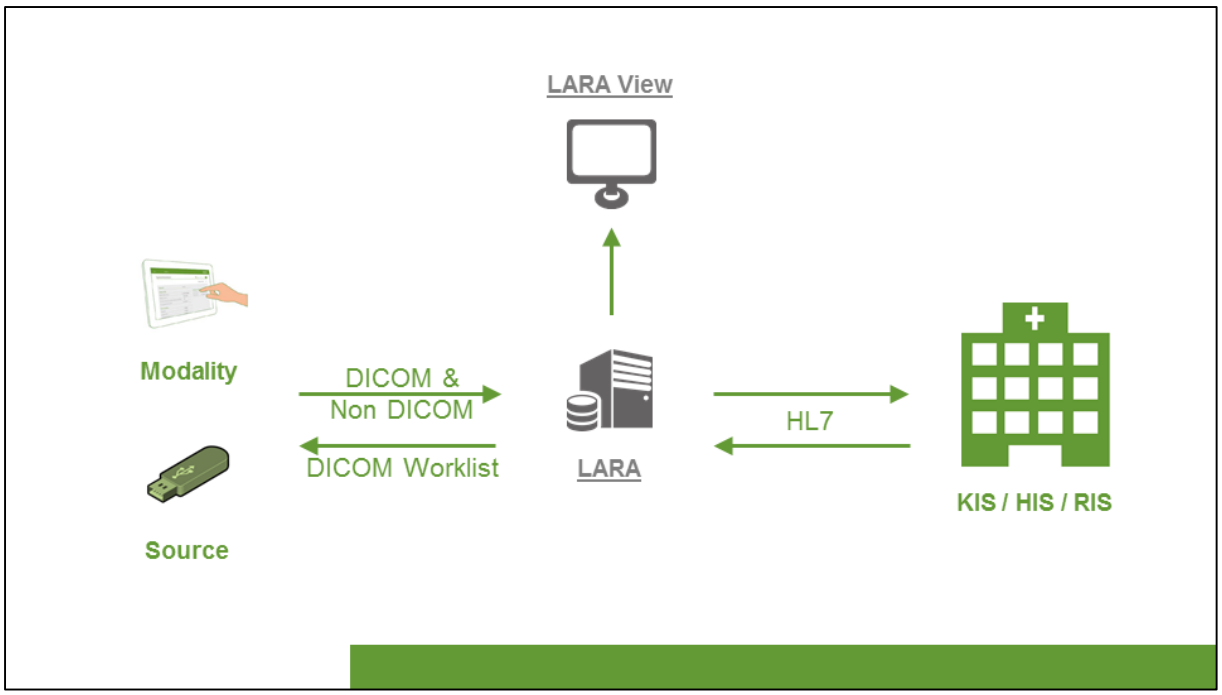
Status: released

DEKOM MEDICAL



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1 Conformance Statement Overview

LARA is an Easy to use cross-device PACS and Archive to store, manage and distribute medical imaging studies and documents.
LARA PACS is the successor to the application DicomNetOffice.

This DICOM conformance statement specifies the behavior and functionality of the LARA PACS Server application.
This software provides the following DICOM capabilities:

- Receive and store DICOM instances.
- Provide DICOM Query and Retrieve functionality.
- Automatically forward received instances to DICOM destinations based on configurable rules.
- Export DICOM instances in leading system based on configurable rules

Table 1 presents an overview of the DICOM network services supported by LARA PACS Server.

Table 1: Network Services

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
General			
Verification	1.2.840.10008.5.1.1	Yes	Yes
Transfer			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	Yes
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	Yes	Yes
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2	Yes	Yes
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3	Yes	Yes
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	Yes	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	Yes	Yes
IntravaSCUlar Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1	Yes	Yes
IntravaSCUlar Optical Coherence Tomography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.14.2	Yes	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	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	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Yes	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	Yes
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	Yes
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	Yes	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	Yes
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	Yes	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	Yes
Query / Retrieve			
Patient Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Patient Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Study Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Study Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Workflow Management			
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	No	Yes

- Note:
  The above list contains the factory set of supported SOP Classes.
  LARA PACS Server can be optional configured to support additional Storage SOP Classes on customer's request, e.g. specific Private Storage SOP Classes.

2 Contents:

3 Introduction

3.1 Revision History

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

Version	Date	Author	Chapter	Remarks
1	22.07.2002	Edgar Lenz	All	Initial version for DicomNet Office
1.1	17.05.2011	Iddo Lev	All	Cosmetics only
2.0	17.10.2016	Edgar Lenz	All	Revision for LARA PACS Server 1.1
2.1	05.10.2018	S Landree	All	Revision for LARA PACS Server 1.4

3.2 Audience

This Conformance Statement is intended for:

- (potential) customers,
- marketing staff interested in system and data exchange functionality,
- support engineers and system integrators of medical equipment,
- software designers and implementers of DICOM interfaces.
- It is assumed that the reader is familiar with the DICOM standard.

3.3 Remarks

This Conformance Statement by itself does not guarantee successful interoperability with other equipment. The user (or user's agent) should be aware of the following issues:

Interoperability

Integration of (networked) systems may require application functions that are not specified within the scope of DICOM.

It is the user's (or a user's agent) responsibility to analyze the application requirements and to specify a solution that integrates different vendor's equipment.

Validation

If the comparison of Conformance Statements indicate that the required information exchange should be possible, additional validation tests will be necessary.

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.

3.4 Contents and structure

The DICOM Conformance Statement is contained in chapter 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2-2014.

3.5 Used definitions and terms

For a description of these, see NEMA PS 3.3-2014 and PS 3.4-2014.

3.6 Abbreviations

The following acronyms and abbreviations are used in the document.

ACR	American College of Radiology
AE	Application Entity
ANSI	American National Standard Institute
CD-R	Compact Disk Recorder
DICOM	Digital Imaging and Communication in Medicine
FSC	File Set Creator
GUI	Graphical User Interface
HIS	Hospital Information System
IOD	Image Object Definition
MWL	Modality Worklist Query/Retrieve
N.A.	Not applicable
NEMA	National Electric Manufacturers Association
NM	Nuclear Medicine
OS	Operating System
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
RIS	Radiology Information System
RWA	Real World Activity
SC	Secondary Capture/Service Class
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet protocol
UID	Unique Identifier
US	Ultra Sound
VR	Value Representation

3.7 References

[DICOM] The Digital Imaging and Communications in Medicine (DICOM) standard:
NEMA PS 3.X.
National Electrical Manufacturers Association (NEMA) Publication Sales
1300 N. 17th Street, Suite 1847
Rosslyn, Va. 22209, United States of America

[DicomNet] DEKOM ENGINEERING DicomNet Systems Product Line
DEKOM ENGINEERING GmbH (see address at page ii)

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Four Application Entities (AE), Image Server AE, Transfer AE, Commitment AE and the Deep Archive AE represent the LARA PACS Server system.

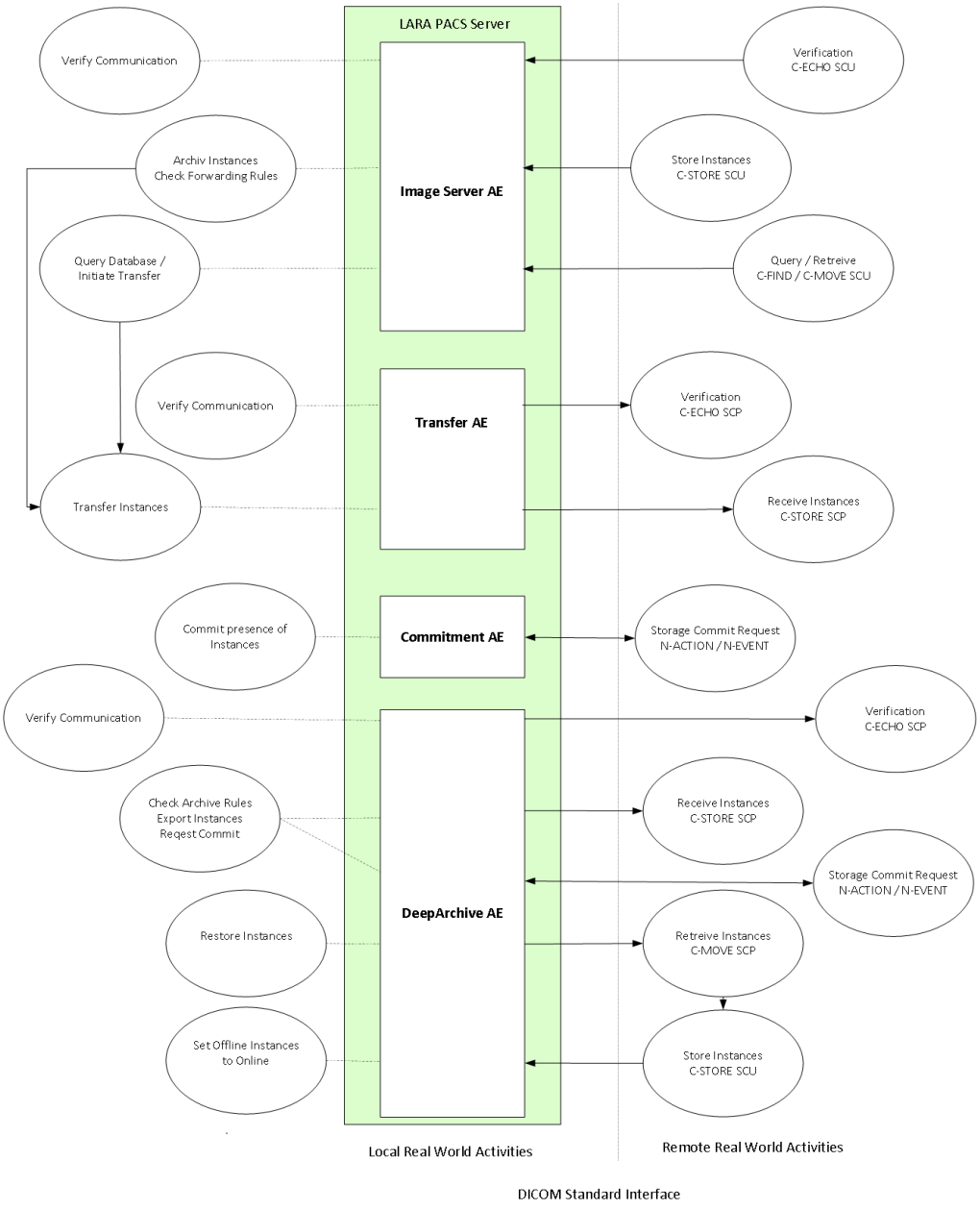

Figure 1:The LARA PACS Server Application Data Flow Diagram

4.1.2 Functional definition of Application Entities

This section describes in general terms the functions performed by Image Server AE, Transfer AE, Commitment AE and Deep Archive AE. For SOP specific conformance see related chapters later in this document.

4.1.2.1 Functional Definition of Image Server AE

The Image Server AE is an integrated service of the LARA PACS Server. The service starts as part of the Operation System. It will wait for connection attempts of other DICOM applications at the configured presentation address. It will accept associations for the following Service Classes and respond to request.

4.1.2.1.1 Verification Service Class

The Image Server AE will respond to C-ECHO request to verify the communication.

4.1.2.1.2 Storage Service Classes

The Image Server AE will accept C-STORE requests and store related instances to its instance archive and register them in the LARA PACS Server's data base.
The configured Forwarding RuleSet will be checked for any rules applicable for each instance received. If any rule matches, the Image Server AE will trigger the Transfer AE to store matching instances to the configured destination.

4.1.2.1.3 Query / Retrieve Service Classes

The Image Server AE will accept C-FIND / C-MOVE requests, look up related data from the LARA PACS Servers data base and respond accordingly.
In the case of C-MOVE requests it will trigger the Transfer AE to store matching instances to the requested destination (if configured).

4.1.2.2 Functional Definition of Transfer AE

4.1.2.2.1 Verification Service Class

The Transfer AE can perform the Verification Service as SCU to configured destinations. This is triggered by the operator in the service mode.

4.1.2.2.2 Storage Service Classes

The Transfer AE acts as a SCU of the Storage Service Class. When the transfer is initiated through the local RWA "Transfer Images" the Transfer AE will open an association to the configured remote system and store the related instances. The local RWA "Transfer Images" is triggered by either the Forwarding Rule processing or the C-MOVE processing of the Image Server AE.
The RWA "Transfer Images" can as well be triggered by the LARA Viewing Application in a proprietary manner which is out of scope here.

4.1.2.3 Functional Definition of Commitment AE

The Commitment AE is an integrated service of the LARA PACS Server. The service starts as part of the Operation System. It will wait for connection attempts of other DICOM applications at the configured presentation address. It will accept associations for the Storage Commit Service Class.
Note: Storage Commitment is not supported if LARA PACS Server operates in "Cache - Mode" (see chapter 4.2.1.4.2.3).

4.1.2.3.1 Storage Commitment Service Class

After handling of the received storage commitment request Commitment AE will initiate an association with the SCU and report the status of the instance storage.

4.1.2.4 Functional Definition of Deep Archive AE

The Deep Archive AE is an integrated service of the LARA PACS Server. The service starts as part of the Operation System. It is for archiving patient studies either in an additional LARA PACS Server or other external Archive. Based on archive rule image storage as SCU, request the Storage Commitment to the DICOM Archive and retrieve the studies from the DICOM Archive whenever they are needed.
Patient / Study are always updates with the latest information in the DICOM Archive.

4.1.2.4.1 Verification Service Class

The Deep Archive AE can perform the Verification Service as SCU to configured destinations. This is triggered by the operator in the service mode.

4.1.2.4.2 Storage Service Classes

The Deep Archive AE acts as a SCU of the Storage Service Class. When the archiving is initiated through the local RWA "Export Instances" the Deep Archive AE will open an association to the configured remote system and store the related instances. The local RWA "Export Instances" is triggered by archive rule processing.

4.1.2.4.3 Storage Commitment Class

The Deep Archive AE can perform the Storage Commitment Class as SCU to verify the archiving in configured destinations. This is triggered directly after the storage.

4.1.2.4.4 Retrieve Service Class

The Deep Archive AE acts as a SCU of the Retrieve Service Class. When the retrieving is initiated through the local RWA "Restore Instances" the Deep Archive AE will open an association to the configured remote system and uses C-MOVE as service element. The RWA "Restore Images" can be triggered by the LARA Viewing Application in a proprietary manner which is out of scope here.

4.2 AE Specifications

4.2.1 LARA PACS Server Image Server AE

4.2.1.1 SOP Classes

The LARA PACS Server's Image Server AE provides Standard Conformance to the following DICOM V 3.0 SOP classes as an SCP.

Table 2: Supported SOP Classes for Image Server AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.5.1.1	No	Yes
Transfer			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	No	Yes
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2	No	Yes
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3	No	Yes
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	No	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	No	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	No	Yes
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	No	Yes
IntravaSCUlar Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1	No	Yes
IntravaSCUlar Optical Coherence Tomography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.14.2	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	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	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	No	Yes

SOP Class Name	SOP Class UID	SCU	SCP
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	No	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	No	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	No	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	No	Yes
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	No	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	No	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	Yes
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	No	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	No	Yes
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	No	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	No	Yes
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	No	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	No	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	No	Yes
Query / Retrieve			
Patient Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Patient Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Study Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Study Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	Yes

- Note:
  The above list contains the factory set of accepted SOP Classes.
  LARA PACS Server can be optional configured to support additional Storage SOP Classes on customer's request, e.g. specific Private Storage SOP Classes.
- SOP specific Behavior is specified later in the SOP specific conformance section

4.2.1.2 Association Policies

4.2.1.2.1 General

The LARA PACS Serves Image Server AE will accept associations for DICOM Verification, Storage and Query / Retrieve.
The DICOM standard application context name for DICOM 3.0 is always proposed as presented in Table 3.

Table 3: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

Table 4: Number of Associations as an Association Initiator for Image Server AE

Maximum number of simultaneous associations	N.A

Image Server AE will not initiate associations.

Table 5: Number of Associations as an Association Acceptor for Image Server AE

Maximum number of simultaneous associations	Limited by the system or configuration

4.2.1.2.3 Asynchronous Nature

Image Server AE does not support asynchronous operations and will not perform asynchronous window negotiation.

Table 6: Asynchronous Nature as an Association Initiator for Image Serve AE

Maximum number of outstanding asynchronous transactions	N.A.

4.2.1.2.4 Implementation Identifying Information

The implementation information for Image Server AE is:

Table 7: DICOM Implementation Class and Version for Image Server AE

Implementation Class UID	2.16.840.1.113669.632.16
Implementation Version Name	QDICNET_3X *

* X identifies the version number of the DICOM module.

4.2.1.3 Association Initiation Policy

Image Server AE will not initiate associations.

4.2.1.4 Association Acceptance Policy

The Image Server AE accepts association attempts for the (Real-World) Activities Verification, Archive Instances and Find / Move Requests.

4.2.1.4.1 (Real-World) Activity – Verification as SCP

4.2.1.4.1.1 Description and Sequencing of Activities

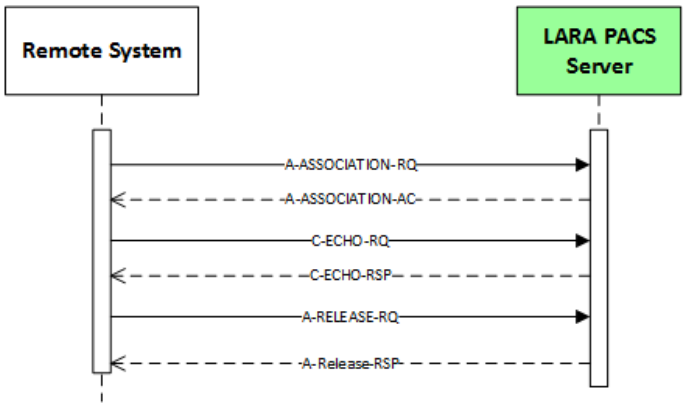

Figure 2: (Real-World) Activity – Verification as SCP

4.2.1.4.1.2 Accepted Presentation Contexts

Table 8: Acceptable Presentation Contexts (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	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

4.2.1.4.1.3 SOP Specific Conformance for Verification SOP Class

The possible status responses and communication failures during a C-ECHO-RQ are described in this section

4.2.1.4.1.3.1 Dataset Specific Conformance for (Real-World) Activity – Verification as SCP

Possible status responses are shown in the following table:

Table 9: Status Response (Real-World) Activity – Verification as SCP

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	C-ECHO request accepted

4.2.1.4.2 (Real World) Activity – Archive Instances

4.2.1.4.2.1 Description and Sequencing of Activities

Remote systems can open associations with LARA PACS Server: If presentation contexts match and the maximum number of associations has not been reached LARA PACS Server will accept the association and the remote system may start

sending its C-STORE requests. When the instance has been received and made persistent in the local file system LARA PACS Server will send the C-STORE response. The remote system may continue sending instances or release the association.

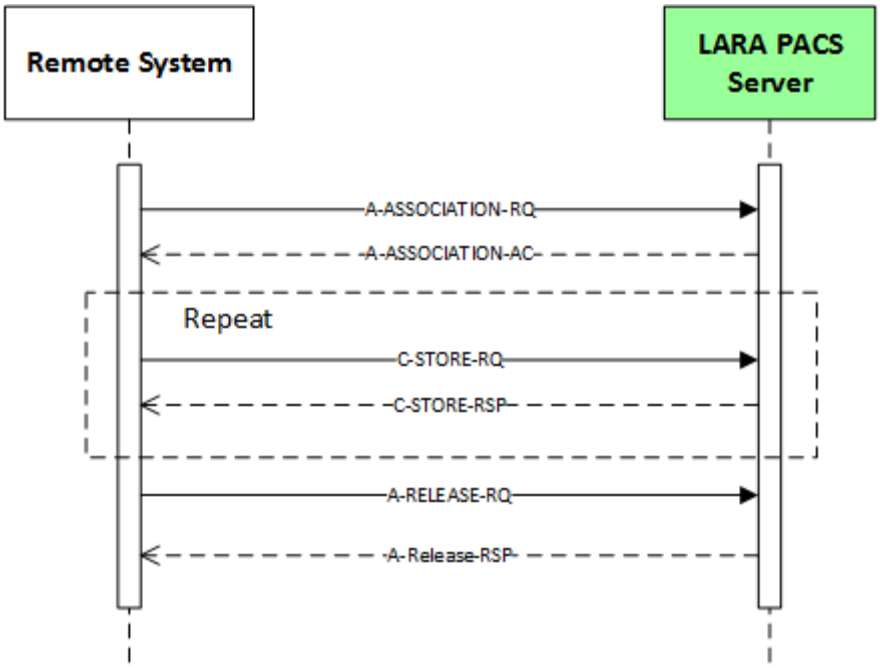

Figure 3: (Real-World) Activity – Archive Instances

4.2.1.4.2.2 Accepted Presentation Contexts

Table 10: Acceptable Presentation Contexts (Real-World) Activity – Archive Instances as SCP

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
All Abstract Syntax items from Table 2: Supported SOP Classes for Image Server AE, section “Transfer”. Non image storage SOP Classes.		ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
All Abstract Syntax items from Table 2: Supported SOP Classes for Image Server AE, section “Transfer” containing literally “Image Storage” in its Abstract Syntax Name. Image Storage SOP Classes		ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None
		RLE lossless	1.2.840.10008.1.2.5	SCP	None
		JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCP	None
		JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	SCP	None
		JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCP	None

	JPEG LS, lossless	1.2.840.10008.1.2.4.80	SCP	None
	JPEG LS, lossy	1.2.840.10008.1.2.4.81	SCP	None
	JPEG 2000, lossless	1.2.840.10008.1.2.4.90	SCP	None
	JPEG 2000, lossy	1.2.840.10008.1.2.4.91	SCP	None
All Abstract Syntax items from Table 2: Supported SOP Classes for Image Server AE, section "Transfer" containing literally "Video" and "Image Storage" in its Abstract Syntax Name. Video Image Storage SOP Classes	ILE	1.2.840.10008.1.2	SCP	None
	ELE	1.2.840.10008.1.2.1	SCP	None
	EBE	1.2.840.10008.1.2.2	SCP	None
	RLE lossless	1.2.840.10008.1.2.5	SCP	None
	JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCP	None
	JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	SCP	None
	JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCP	None
	JPEG LS, lossless	1.2.840.10008.1.2.4.80	SCP	None
	JPEG LS, lossy	1.2.840.10008.1.2.4.81	SCP	None
	JPEG 2000, lossless	1.2.840.10008.1.2.4.90	SCP	None
	JPEG 2000, lossy	1.2.840.10008.1.2.4.91	SCP	None
	MPEG-4 AVC/H.264 High Profile/Level 4.1 *	1.2.840.10008.1.2.4.102	SCP	None
	MPEG-4 AVC/H.264 BD-compatible, High Profile/Level 4.1 *	1.2.840.10008.1.2.4.103	SCP	None

* MPEG-4 TransferSyntaxes are optional and not supported on all systems.

- Note:
  The above list contains the factory set of accepted Presentation Contexts. LARA PACS Server can be optional configured to support e.g. specific Private Storage SOP Classes or modify the presentation contexts list.

4.2.1.4.2.3 SOP Specific Conformance for Storage SOP Classes

LARA PACS Server conforms to the SOP Classes of the Storage Service Class as a Level 2 (Full) SCP. No data elements are discarded or coerced.

During the DICOM C-STORE operation no value of any attribute is checked for its presence or value. Thus, the intended archiving may fail although the C-STORE operation itself was stated successful.
In the case any of the following Type 1 attributes turn out to be missing or does not provide a value, the instance will not be archived, details will be logged.

- Study Instance UID
- Series Instance UID
- SOP Instance UID
- SOP Class UID

If any communication error occurs, network or DICOM related, all successful received instances within the association will be tried to be archived.

After an association has finished, successful received instances are sorted and merged by Study Instance UID and Series Instance UID. They are registered into the LARA PACS Server data base and moved into the final archive's file system location. In the case of a duplicate Instance UID the instance will either be overwritten or discarded based on the configuration of the LARA PACS Server.

If instances are not received or processed successfully they are placed in the error folder.

If the LARA PACS Server is configured for "Cache - Mode", images will be deleted when the configured watermark is reached. The deletion process is based on a "last accessed study" strategy. Studies having the lowest probability will be deleted.

The following demographic attribute may be modified either by manual edits or information received from HIS / RIS systems ADT or Order Entry messages.

Table 11: Attributes that may be modified by LARA PACS Server

Attribute Name	Tag
Accession Number	(0008, 0050)
Referring Physician	(0008,0090)
Patient Name	(0010, 0010)
Patient ID	(0010, 0020)
Patient Birth Date	(0010, 0030)
Patient Sex	(0010, 0040)
Requesting Physician	(0010,1032)

Any change of DICOM attributes will lead to a new revision of the related instances within the data base as well as within the file system.
Any DICOM export operation will work on the latest revision.
Nevertheless, using the user interface an authorized user may roll a revision back to its previous state.

4.2.1.4.2.3.1 Dataset Specific Conformance for C-STORE-RSP

Possible status responses are shown in the following table:

Table 12: Status Response (Real-World) Activity – C-STORE as SCP

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	Continue, the instance has been succesfully received.
Refused		SCP is not licensed	Details are logged, the association is aborted.
Error		Abort by remote system.	Details are logged.
		Time-out reached	Details are logged, the association is aborted.
	0110	Internal Error	Details are logged, the association is aborted.
	A700	Refused, out of resources	Insufficient storage. Details are logged, the association is aborted

4.2.1.4.3 (Real World) Activity – Query FIND as SCP

4.2.1.4.3.1 Description and Sequencing of Activities

Image Server AE will accept associations from remote systems that want to query the LARA PACS Server database.

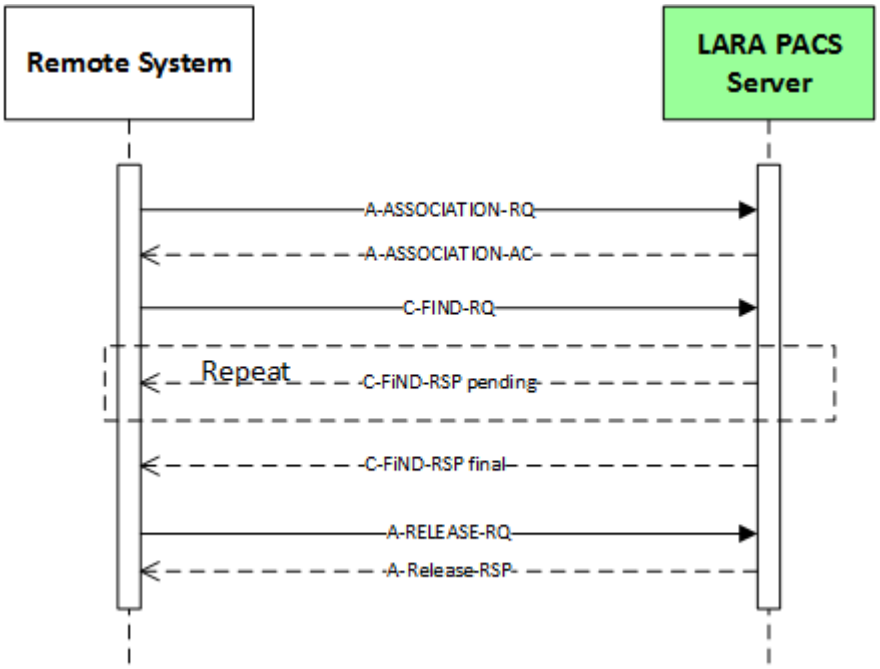

Figure 4: (Real-World) Activity – Query FIND as SCP

4.2.1.4.3.2 Accepted Presentation Contexts for (Real World) Activity – Query FIND as SCP

Table 13: Acceptable Presentation Contexts (Real-World) Activity – Query FIND as SCP

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
Study Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

4.2.1.4.3.3 SOP Specific Conformance for Patient Root QR Information Model – FIND SOP Class

The Query/Retrieve as SCP provides standard conformance.

4.2.1.4.3.3.1 Dataset Specific Conformance for Patient Root QR Information Model – FIND SOP Class

Table 14: Requested Query Keys for Patient Root Information Model – FIND SOP Class

Patient Root Information Model				
Attribute Name	**Tag**	**VR**	**Type of Matching**	**Comment**
Query / Retrieve Level	0008,0052	CS		Patient, Study, Series, Image
Specific Character Set	0008,0005	CS		
Q/R Patient level (Patient Root)				
Patient Name	0010,0010	PN	Single Value, Wildcard, Universal	
Patient ID	0010,0020	LO	Single Value, Wildcard, Universal	
Patient Birth Date	0010,0030	DA	Single Value, Range, Universal	Optional
Patient Sex	0010,0040	CS	Single Value, Wildcard, Universal	Optional
Q/R Study level (Patient Root)				
Study Date	0008,0020	DA	Single Value, Range, Universal	
Study Time	0008,0030	TM	Single Value, Range, Universal	
Accession Number	0008,0050	SH	Single Value, Wildcard, Universal	
Modalities in Study	0008,0061	CS	Single Value, Universal	Optional
Referring Physicians Name	0008,0090	PN	Single Value, Wildcard, Universal	Optional
Study Description	0008,1030	LO	Universal	Optional
Patient Name	0010,0010	PN	Single Value, Wildcard, Universal	
Patient ID	0010,0020	LO	Single Value, Wildcard, Universal	
Study Instance UID	0020,000D	UI	Single Value, List of UID, Universal	
Study ID	0020,0010	SH	Single Value, Universal	
Number of Study Related Series	0020,1206	IS	Universal	Optional
Number of Study Related Instances	0020,1208	IS	Universal	Optional
Q/R Series level (Patient Root)				
Modality	0008,0060	CS	Single Value, Universal	
Patient ID	0010,0020	LO	Single Value, Wildcard, Universal	
Study Instance UID	0020,000D	UI	Single Value	
Series Instance UID	0020,000E	UI	Single Value, List of UID, Universal	
Series Number	0020,0011	IS	Universal	Optional
Q/R Instance level (Patient Root)				
Image Type	0008,0008	CS	Universal	
SOP Instance UID	0008,0018	UI	Single Value, List of UID, Universal	
Patient ID	0010,0020	LO	Universal	
Series Instance UID	0020,000E	UI	Single Value	
Study Instance UID	0020,000D	UI	Single Value	
Instance Number	0020,0013	IS	Universal	

Table 15: Status Response for Patient Root Information Model – FIND SOP Class

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success ,Matching is complete	Continue
Pending	FF00	Current match is supplied	Matches are continuing.
Cancel	FE00	Matching terminated due to a Cancel Request	Details are logged.
Refused		SCP is not licensed	Details are logged, the association is aborted.
Error		Abort by remote system.	Details are logged.
		Time-out reached	Details are logged, the association is aborted.
	A700	Out of resources	Details are logged, the association is aborted.
	C000	Unable to processes	Details are logged, the association is aborted

4.2.1.4.3.4 SOP Specific Conformance for Study Root QR Information Model – FIND SOP Class

The Query/Retrieve as SCP provides standard conformance.

4.2.1.4.3.4.1 Dataset Specific Conformance for Study Root QR Information Model – FIND SOP Class

Table 16: Requested Query Keys for Study Root Information Model – FIND SOP Class

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Type of Matching**	**Comment**
Query / Retrieve Level	0008,0052	CS		Study, Series, Image
Specific Character Set	0008,0005	CS		
Q/R Study level (Study Root)				
Study Date	0008,0020	DA	Single Value, Range, Universal	
Study Time	0008,0030	TM	Single Value, Range, Universal	
Accession Number	0008,0050	SH	Single Value, Wildcard, Universal	
Modalities in Study	0008,0061	CS	Single Value, Universal	Optional
Referring Physicians Name	0008,0090	PN	Single Value, Wildcard, Universal	Optional
Study Description	0008,1030	LO	Universal	Optional
Patient Name	0010,0010	PN	Single Value, Wildcard, Universal	
Patient ID	0010,0020	LO	Single Value, Wildcard, Universal	
Patient Birth Date	0010,0030	DA	Single Value, Range, Universal	Optional
Patient Sex	0010,0040	CS	Single Value, Wildcard, Universal	Optional
Study Instance UID	0020,000D	UI	Single Value, List of UID, Universal	
Study ID	0020,0010	SH	Single Value, Universal	
Number of Study Related Series	0020,1206	IS	Universal	Optional
Number of Study Related Instances	0020,1208	IS	Universal	Optional
Q/R Series level (Study Root)				
Modality	0008,0060	CS	Single Value, Universal	
Patient ID	0010,0020	LO	Universal	
Study Instance UID	0020,000D	UI	Single Value	
Series Instance UID	0020,000E	UI	Single Value, List of UID, Universal	
Series Number	0020,0011	IS	Universal	Optional

Q/R Instance level (Study Root)				
Image Type	0008,0008	CS	Universal	
SOP Instance UID	0008,0018	UI	Single Value, List of UID, Universal	
Patient ID	0010,0020	LO	Universal	
Series Instance UID	0020,000E	UI	Single Value	
Study Instance UID	0020,000D	UI	Single Value	
Instance Number	0020,0013	IS	Universal	

Table 17: Status Response for Patient Root Information Model – FIND SOP Class

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success ,Matching is complete	Continue
Pending	FF00	Current match is supplied	Matches are continuing.
Cancel	FE00	Matching terminated due to a Cancel Request	Details are logged.
Refused		SCP is not licensed	Details are logged, the association is aborted.
Error		Abort by remote system.	Details are logged.
		Time-out reached	Details are logged, the association is aborted.
	A700	Out of resources	Details are logged, the association is aborted.
	C000	Unable to processes	Details are logged, the association is aborted

4.2.1.4.4 (Real World) Activity – Query MOVE as SCP

4.2.1.4.4.1 Description and Sequencing of Activities

Image Server AE will accept associations from remote systems that want to retrieve instances from the LARA PACS Server.

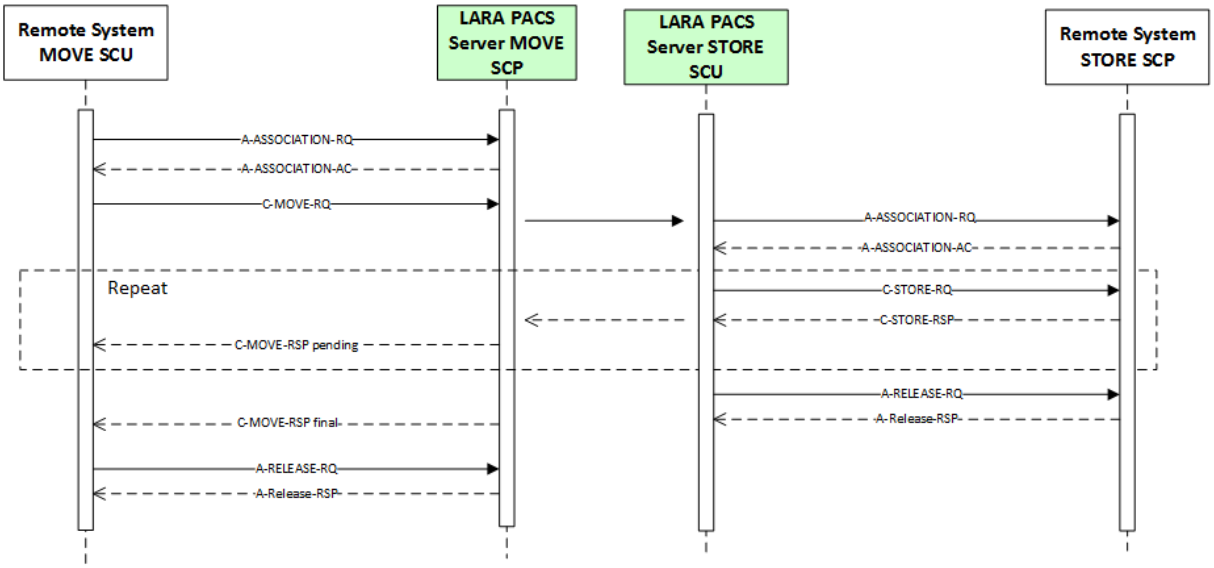

Figure 5: (Real-World) Activity – Query MOVE as SCP

The LARA PACS Server's Image Server AE communicates with its Transfer Image AE to trigger the storage of related instances as well as to update the MOVE status.

4.2.1.4.4.2 Accepted Presentation Contexts

Table 18: Acceptable Presentation Contexts (Real-World) Activity – Query MOVE as SCP

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
Patient Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
Study Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

4.2.1.4.4.3 SOP Specific Conformance for Patient Root QR Information Model – MOVE as SCP

The Image Server AE provides standard conformance the Patient Root Q/R Information Model – MOVE SOP Class.

4.2.1.4.4.3.1 Dataset Specific Conformance for Patient Root QR Information Model – MOVE as SCP

Image Server AE provides Single Value Matching for the Identifiers listed below.

Table 19: Identifiers for Patient Root Information Model – MOVE SOP Class as SCP

Patient Root Information Model				
Attribute Name	Tag	VR	Comment	
Query / Retrieve Level	0008,0052	CS	Patient, Study, Series, Image	
Specific Character Set	0008,0005	CS		
Q/R Patient level (Patient Root)				
Patient ID	0010,0010	PN		
Q/R Study level (Patient Root)				
Study Instance UID	0020,000D	UI		
Q/R Series level (Patient Root)				
Series Instance UID	0020,000E	UI		
Q/R Image level (Patient Root)				
SOP Instance UID	0008,0018	UI		

Table 20: Status Response for Patient Root Information Model – MOVE SOP Class

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete	All related SOP Instances has successfully been sent to the C-MOVE Destination AE.
Pending	FF00	Sub-operations are continuing	This Response is sent when a SOP Instance has successfully has been transferred to the C-MOVE Destination AE.
Cancel	FE00	Operation terminated due to a Cancel Request	The transfer of SOP Instances has been stopped due to a Cancel Request of the C-MOVE SCP.

Refused		SCP is not licensed	Details are logged, the association is aborted.
	A801	Move destination unknown.	Details are logged. The presentation address of the Destination AE is not configured in the LARA PACS Server.
Error		Time-out reached	Details are logged, the association is aborted.
	C001	Unable to process	Details are logged, the association is aborted.

The Warning B000(Sub-operations complete – One or more failure) will not be returned, failed STORE sub-operations will lead to a failure and the Error C001 will be returned.

4.2.1.4.4.4 SOP Specific Conformance for Study Root QR Information Model – MOVE as SCP

The Image Server AE provides standard conformance the Study Root Q/R Information Model – MOVE SOP Class.

4.2.1.4.4.4.1 Dataset Specific Conformance for Study Root QR Information Model – MOVE as SCP

Image Server AE provides Single Value Matching for the Identifiers listed below.

Table 21: Identifiers for Patient Root Information Model – MOVE SOP Class as SCP

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

Table 22: Status Response for Study Root Information Model – MOVE SOP Class

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete	All related SOP Instances has successfully been sent to the C-MOVE Destination AE.
Pending	FF00	Sub-operations are continuing	This Response is sent when a SOP Instance has successfully has been transferred to the C-MOVE Destination AE.
Cancel	FE00	Operation terminated due to a Cancel Request	The transfer of SOP Instances has been stopped due to a Cancel Request of the C-MOVE SCP.
Refused		SCP is not licensed	Details are logged, the association is aborted.
	A801	Move destination unknown.	Details are logged. The presentation address of the Destination AE is not configured in the LARA PACS Server.
Error		Time-out reached	Details are logged, the association is aborted.
	C001	Unable to process	Details are logged, the association is aborted.

The Warning B000(Sub-operations complete – One or more failure) will not be returned, failed STORE sub-operations will lead to a failure and the Error C001 will be returned.

4.2.2 LARA PACS Server Transfer AE

4.2.2.1 SOP Classes Supported by Transfer AE

Table 23: Supported SOP Classes for Transfer AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.5.1.1	Yes	No
Transfer			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	No
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	No
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	No
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	No
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	Yes	No
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2	Yes	No
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3	Yes	No
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4	Yes	No
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	No
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	No
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	No
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	No
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	Yes	No
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	No
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	Yes	No
IntravaSCUlar Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1	Yes	No
IntravaSCUlar Optical Coherence Tomography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.14.2	Yes	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	No
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	No
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	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	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	No
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Yes	No
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	No
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	No
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	No
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	No
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	No
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	No
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	No
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	No
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	No
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	No
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	Yes	No
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	No
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	No
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	No
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	No
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	No
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	No
Query / Retrieve			
Patient Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	No

Note:
The above list contains the factory set of accepted SOP Classes.
LARA PACS Server can be optional configured on customers request to support e.g. specific Private Storage SOP Classes.

4.2.2.2 Association Policies

4.2.2.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed as presented in Table 24.

Table 24: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2 Number of Associations

Transfer AE will establish a maximum of two associations at a time. Based on local activities, one association may perform Application Level Communication Verification, another association may be used for image storage.

Table 25: Number of Associations as an Association Initiator for Transfer AE

Maximum number of simultaneous associations	2

Transfer AE will not handle incoming associations.

Table 26: Number of Associations as an Association Acceptor for Transfer AE

Maximum number of simultaneous associations	N.A.

4.2.2.2.3 Asynchronous Nature

Transfer AE does not support asynchronous operations and will not perform asynchronous window negotiation.

Table 27: Asynchronous Nature as an Association Initiator for Transfer AE

Maximum number of outstanding asynchronous transactions	N.A.

4.2.2.2.4 Implementation Identifying Information

The implementation information for Transfer AE is:

Table 28: DICOM Implementation Class and Version for Transfer AE

Implementation Class UID	2.16.840.1.113669.632.16
Implementation Version Name	QDICNET_3X *

* X identifies the version number.

4.2.2.3 Association Initiation Policy

The Transfer AE initiates associations as a result of the following events:

- A forwarding rule matches on Image Server AE on activity Archive Instances (see 4.1.2.1.2).
- A Remote Systems C-MOVE operation triggers the transfer of instances (see 4.1.2.1.3)
- The user triggers the transfer by the LARA PACS Viewer application.
- In the service mode, the operator verifies application level communication.

4.2.2.3.1 Verify Application Level Communication

4.2.2.3.1.1 Description and Sequencing of Activities

For each Verify Application Level Communication Request Transfer AE initiates an association to the remote system and transmits a C-ECHO request.
After the response is received the association is closed.

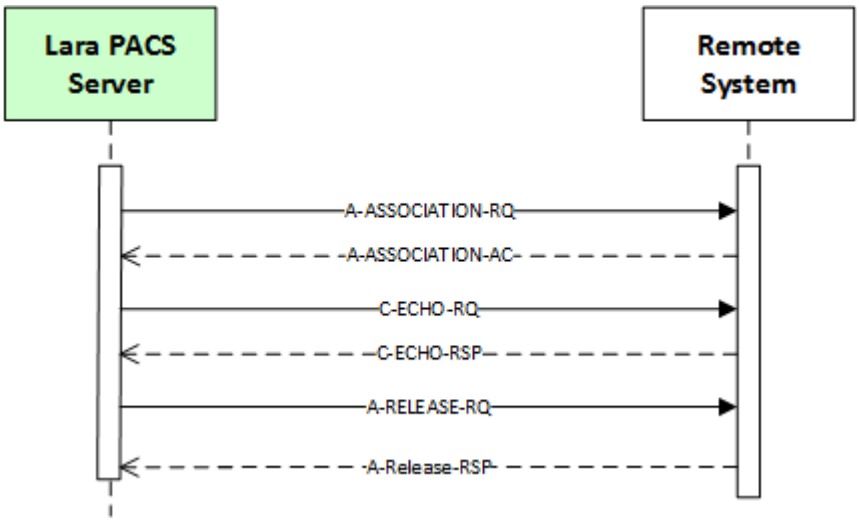

Figure 6:Sequencing of RWA Verify Application Level Communication

4.2.2.3.1.2 Proposed Presentation Contexts

Table 29: Proposed Presentation Contexts for Transfer AE Verify Application Level Communication

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
Verification	1.2.840.10008.5.1.4.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.2.3.1.3 SOP Specific Conformance for Verification SOP Class

Table 30: Response Status Handling Behavior for Transfer AE Verify Application Level Communication

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The success is reported to the user
*	Any other code	*	The failure is reported to the user

Table 31: Communication Failure Behavior for Transfer AE Verify Application Level Communication

Exception	Behavior
Timeout	The reason is logged, a failure status is reported to the user.
Association aborted	The reason is logged, a failure status is reported to the user.
Association rejected	The reason is logged, a failure status is reported to the user.

4.2.2.3.2 Transfer Instances

4.2.2.3.2.1 Description and Sequencing of Activities

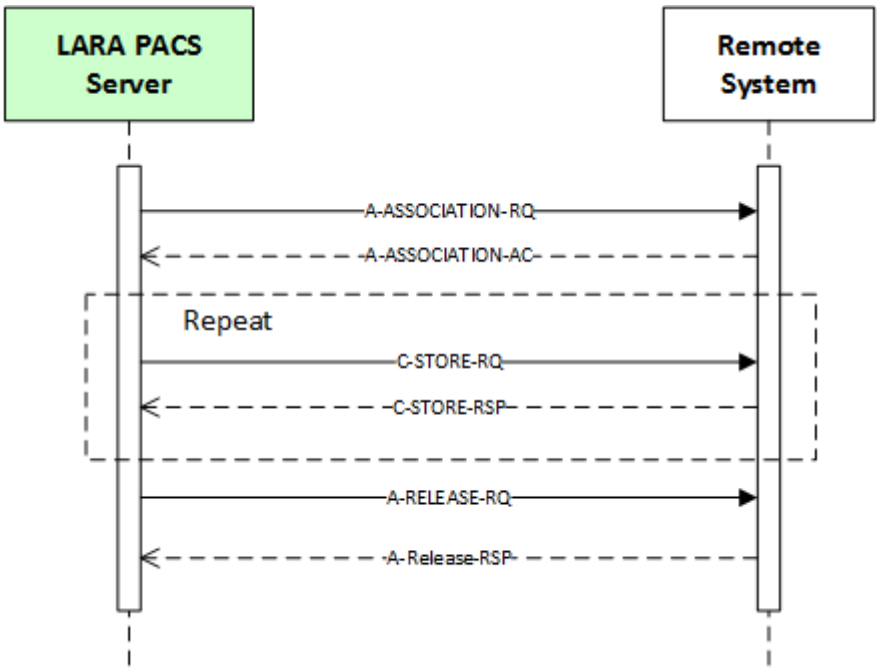

Figure 7: (Real-World) Activity – Transfer Instances

4.2.2.3.2.2 Proposed Presentation Contexts

LARA PACS Server may propose any of the Presentation Contexts listed in Table 32 for Storage Requests.
In standard installations LARA PACS Server will not convert encapsulated transfer syntaxes to other transfer syntaxes.
Conversion of encapsulated transfer syntaxes is optional available on request.

Table 32: Presentation Contexts for Transfer AE Transfer Images

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
All Abstract Syntax items Table 23: Supported SOP Classes for Transfer AE, section “Transfer”. Non image storage SOP Classes.		ILE ELE	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
All Abstract Syntax items from Table 23: Supported SOP Classes for Transfer AE, section “Transfer”		ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		RLE lossless	1.2.840.10008.1.2.5	SCU	None
		JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCU	None

containing literally “Image Storage” in its Abstract Syntax Name. Image Storage SOP Classes	JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	SCU	None
	JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCU	None
	JPEG LS, lossless	1.2.840.10008.1.2.4.80	SCU	None
	JPEG LS, lossy	1.2.840.10008.1.2.4.81	SCU	None
	JPEG 2000, lossless	1.2.840.10008.1.2.4.90	SCU	None
	JPEG 2000, lossy	1.2.840.10008.1.2.4.91	SCU	None
All Abstract Syntax items from Table 23: Supported SOP Classes for Transfer AE, section “Transfer” containing literally “Video” and “Image Storage” in its Abstract Syntax Name. Video Image Storage SOP Classes	ILE	1.2.840.10008.1.2	SCU	None
	ELE	1.2.840.10008.1.2.1	SCU	None
	RLE lossless	1.2.840.10008.1.2.5	SCU	None
	JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCU	None
	JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	SCU	None
	JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCU	None
	JPEG LS, lossless	1.2.840.10008.1.2.4.80	SCU	None
	JPEG LS, lossy	1.2.840.10008.1.2.4.81	SCU	None
	JPEG 2000, lossless	1.2.840.10008.1.2.4.90	SCU	None
	JPEG 2000, lossy	1.2.840.10008.1.2.4.91	SCU	None
	MPEG-4 AVC/H.264 High Profile/Level 4.1 *	1.2.840.10008.1.2.4.102	SCU	None
	MPEG-4 AVC/H.264 BD-compatible, High Profile/Level 4.1 *	1.2.840.10008.1.2.4.103	SCU	None

* MPEG-4 TransferSyntaxes are optional and not supported on all systems.

- Note:
  The above list contains the factory set of proposed Presentation Contexts. LARA PACS Server can be optional configured to support e.g. specific Private Storage SOP Classes or modify the presentation contexts list.

4.2.2.3.2.3 SOP Specific Conformance for Image SOP Classes

All image SOP Classes supported by Transfer AE exhibit the same behavior.
In the case no presentation context for an abstract syntax can be negotiated, instances of this SOP Class will not be sent and the transfer job is marked as failed. The failure is logged.

The behavior of Transfer AE Transfer Images for status codes in a C-STORE response is summarized in Table 33.

Table 33: Response Status Handling Behavior for Transfer AE Transfer Instances

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	If all SOP instances in a transfer job have status success, then the job is marked completed.

			The result is logged.
Refused	A700-A7FF	Out of Resources	The association is aborted using A-ABORT and the job is marked as failed. The result is logged.
Error	A900-A9FF	Data Set does not match SOP Class	The association is aborted using A-ABORT and the job is marked as failed. The result is logged.
	C001-CFFF	Cannot understand	The association is aborted using A-ABORT and the job is marked as failed. The result is logged.
Warning	B000	Coercion of Data Elements	If all SOP instances in a transfer job have status success, then the job is marked completed. The result is logged.
	B006	Elements discarded	If all SOP instances in a transfer job have status success, then the job is marked completed. The result is logged.
	B007	Data Set does not match SOP Class	If all SOP instances in a transfer job have status success, then the job is marked completed. The result is logged.
*	Any other status code	*	The association is aborted using A-ABORT and the job is marked as failed. The result is logged.

The behavior of the Transfer AE during communication failure is presented in Table 34.

Table 34: Communication Failure Behavior for Transfer AE Transfer Images

Exception	Behavior
Timeout	The association is aborted using A-ABORT and the job is marked as failed. The failure is logged.
Association aborted	The job is marked as failed. The failure is logged.
Association rejected	The job is marked as failed. The failure is logged.

4.2.2.4 Association Acceptance Policy

LARA PACS Server Transfer AE does not accept associations.

4.2.3 LARA PACS Server Commitment AE

4.2.3.1 SOP Classes Supported by Commitment AE

Table 35: Supported SOP Classes for 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

4.2.3.2 Association Policies

4.2.3.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed as presented in Table 36 :

Table 36: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.3.2.2 Number of Associations

Commitment AE will establish a maximum of one association at a time.

Table 37: Number of Associations as an Association Initiator for Commitment AE

Maximum number of simultaneous associations	1

Commitment AE will handle an amount of incoming associations limited by system resources.

Table 38: Number of Associations as an Association Acceptor for Commitment AE

Maximum number of simultaneous associations	Limited by system resources

4.2.3.2.3 Asynchronous Nature

Commitment AE does not support asynchronous operations and will not perform asynchronous window negotiation.

Table 39: Asynchronous Nature as an Association Initiator for Commitment AE

Maximum number of outstanding asynchronous transactions	N.A.

4.2.3.2.4 Implementation Identifying Information

The implementation information for Commitment AE is:

Table 40: DICOM Implementation Class and Version for Commitment AE

Implementation Class UID	2.16.840.1.113669.632.16
Implementation Version Name	QDICNET_3X *

* X identifies the version number.

4.2.3.3 Association Initiation Policy

Commitment AE will initiate associations as result of a Storage Commitment Request to report the status information.

4.2.3.4 Association Acceptance Policy

The Commitment AE may reject association attempts as shown in the following table.

4.2.3.4.1 (Real World) Activity – Storage Commitment Push Model as SCP

The LARA PACS Server supports the asynchronous mode for storage commitment only.

4.2.3.4.1.1 Description and Sequencing of Activities

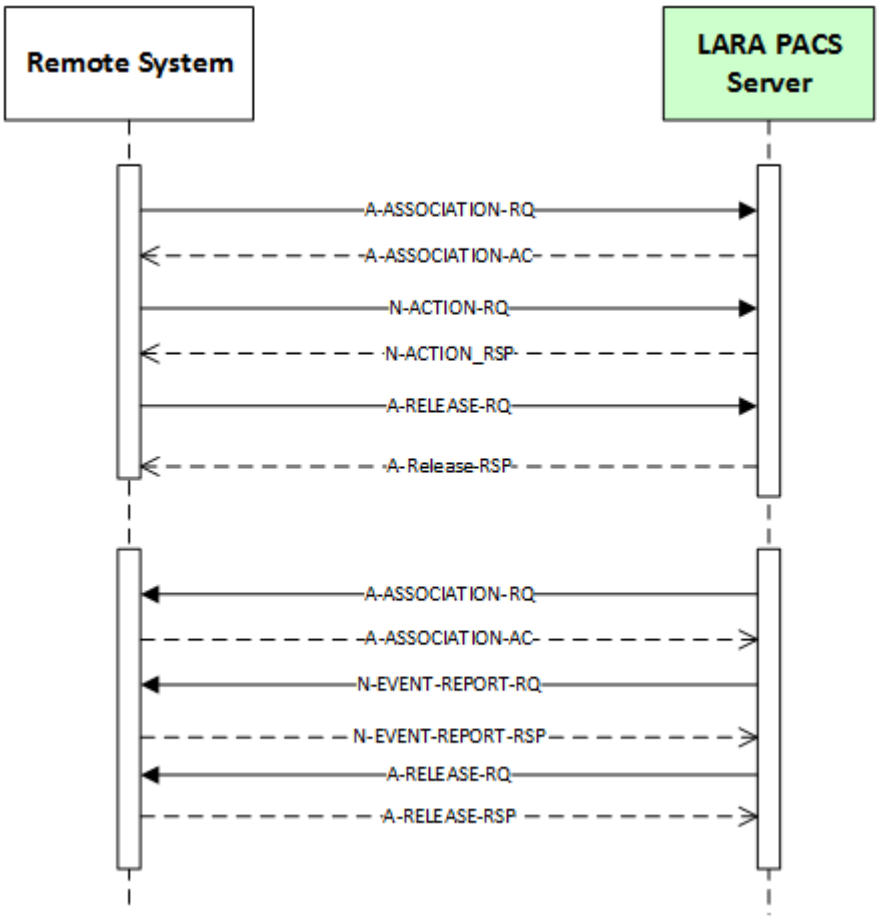

Figure 8: (Real-World) Activity – Storage Commitment Push Model as SCP

4.2.3.4.1.2 Accepted Presentation Contexts

Table 41: Acceptable Presentation Contexts (Real-World) Activity – Storage Commitment Push Model as SCU

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

4.2.3.4.1.3 SOP Specific Conformance for Storage Commitment Push Model as SCU

LARA PACS Server's Commitment AE will take the list of SOP Instance UIDs provided in the N-ACTION Request and check the LARA PACS Server's database for the proper status of the instances to take over the responsibility for their archiving.
Once this has been done, Commitment AE will open an association to the requesting AE to send the N-EVENT-REPORT Request containing the status.
When this notification attempt fails for any reason, it will repeat the notification attempt after an hour again.

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

Table 42: (Real-World) Activity – Storage Commitment Result - Event Information

Action Type Name	Event Type ID	Attribute Name	Tag
Storage Commitment Request Successful	1	Transaction UID	0008,1195
		Referenced SOP Sequence	0008,1199
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155
Storage Commitment Request Complete – Failures Exist	2	Transaction UID	0008,1195
		Referenced SOP Sequence	0008,1199
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155
		Failed SOP Sequence	0008,1198
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155
		>Failure Reason	0008,1197

Table 43: Response Status Handling Behavior for Commitment AE Storage Commitment Result

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The job is marked as completed.
*	Any other code	*	Details are logged. The Job is not marked as completed and thus will be retried.

Table 44: Communication Failure Behavior for Commitment AE Storage Commitment Result

Exception	Behavior
Timeout	Details are logged. The Job is not marked as completed and thus will be retried.
Association aborted	
Association rejected	

4.2.3.4.1.3.2 Dataset Specific Conformance for Storage Commitment Push Model N-ACTION as SCP

Table 45: (Real-World) Activity – Storage Commitment Request – Action Information

Action Type Name	Event Type ID	Attribute Name	Tag
Request Storage Commit	1	Transaction UID	0008,1195
		Referenced SOP Sequence	0008,1199
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155

Table 46: Status Response Behavior for Commitment AE Storage Commitment Request

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The Request has been stored for further processing.
Failed	0110	Operation failed	Details are logged. The Request could not be stored for further processing

Table 47: Communication Failure Behavior for Commitment AE Storage Commitment Request

Exception	Behavior
Timeout	Details are logged.
Association aborted	
Association rejected	

4.2.4 Deep Archive AE

4.2.4.1 SOP Classes Supported by Deep Archive AE

Table 48: Supported SOP Classes for Deep Archive AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.5.1.1	Yes	No
Transfer			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	No
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	No
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	No
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	No
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	Yes	No
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2	Yes	No
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3	Yes	No
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4	Yes	No
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	No
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	No
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	No
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	No
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	Yes	No
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	No
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	Yes	No
IntravaSCUlar Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1	Yes	No
IntravaSCUlar Optical Coherence Tomography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.14.2	Yes	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	No
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	No
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	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	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	No
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Yes	No
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	No
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	No
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	No
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	No
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	No
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	No
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	No
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	No
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	No
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	Yes	No
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	No
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	No
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	No
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	No
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	No
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	No
Storage Commitment			
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No

Note:
The above list contains the factory set of accepted SOP Classes.
LARA PACS Server can be optional configured on customers request to support e.g. specific Private Storage SOP Classes.

4.2.4.2 Association Policies

4.2.4.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed as presented in Table 24.

Table 49: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.4.2.2 Number of Associations

Deep Archive AE will establish a maximum of two associations at a time. Based on local activities, one association may perform Application Level Communication Verification, another association may be used for image storage.

Table 50: Number of Associations as an Association Initiator for Deep Archive AE

Maximum number of simultaneous associations	2

Deep Archive AE will not handle incoming associations.

Table 51: Number of Associations as an Association Acceptor for Deep Archive AE

Maximum number of simultaneous associations	N.A.

4.2.4.2.3 Asynchronous Nature

Deep Archive AE does not support asynchronous operations and will not perform asynchronous window negotiation.

Table 52: Asynchronous Nature as an Association Initiator for Deep Archive AE

Maximum number of outstanding asynchronous transactions	N.A.

4.2.4.2.4 Implementation Identifying Information

The implementation information for Deep Archive AE is:

Table 53: DICOM Implementation Class and Version for Deep Archive AE

Implementation Class UID	2.16.840.1.113669.632.16
Implementation Version Name	QDICNET_3X *

* X identifies the version number.

4.2.4.3 Association Initiation Policy

The Deep Archive AE initiates associations as a result of the configured archiving Rule (see 4.1.2.4.2)

4.2.4.3.1 Verify Application Level Communication

4.2.4.3.1.1 Description and Sequencing of Activities

For each Verify Application Level Communication Request Deep Archive AE initiates an association to the remote system and transmits a C-ECHO request.

After the response is received the association is closed.

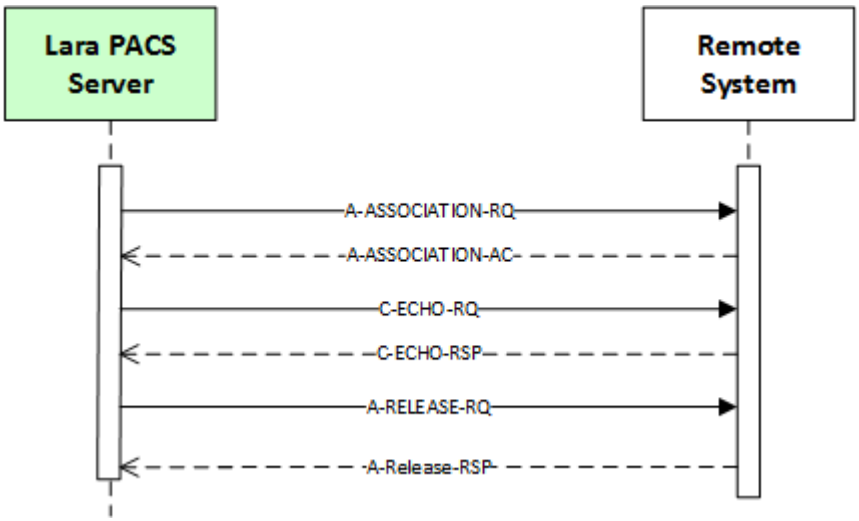

Figure 9:Sequencing of RWA Verify Application Level Communication

4.2.4.3.1.2 Proposed Presentation Contexts

Table 54: Proposed Presentation Contexts for Deep Archive AE Verify Application Level Communication

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.5.1.4.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.4.3.1.3 SOP Specific Conformance for Verification SOP Class

Table 55: Response Status Handling Behavior for Deep Archive AE Verify Application Level Communication

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The success is reported to the user
*	Any other code	*	The failure is reported to the user

Table 56: Communication Failure Behavior for Deep Archive AE Verify Application Level Communication

Exception	Behavior
Timeout	The reason is logged, a failure status is reported to the user.
Association aborted	The reason is logged, a failure status is reported to the user.
Association rejected	The reason is logged, a failure status is reported to the user.

4.2.4.3.2 Export Instances

4.2.4.3.2.1 Description and Sequencing of Activities

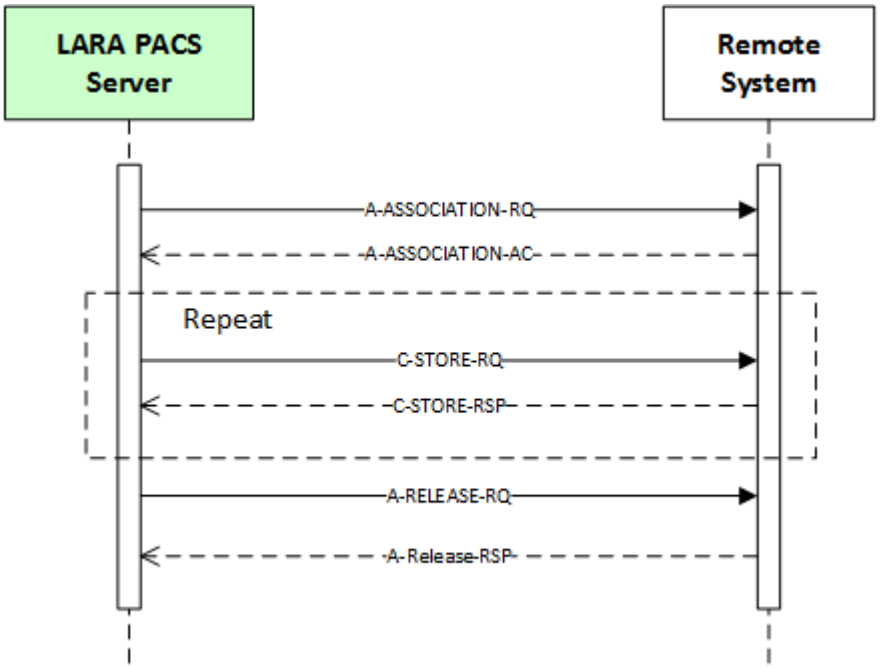

Figure 10: (Real-World) Activity – Export Instances

4.2.4.3.2.2 Proposed Presentation Contexts

LARA PACS Server may propose any of the Presentation Contexts listed in Table 57 for Storage Requests.
In standard installations LARA PACS Server will not convert encapsulated transfer syntaxes to other transfer syntaxes.
Conversion of encapsulated transfer syntaxes is optional available on request.

Table 57: Presentation Contexts for Deep Archive AE Export Images

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
All Abstract Syntax items Table 23: Supported SOP Classes for Transfer AE, section “Transfer”. Non image storage SOP Classes.		ILE ELE	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
All Abstract Syntax items from Table 23: Supported SOP Classes for Transfer AE, section “Transfer” containing literally “Image Storage” in its Abstract Syntax Name. Image Storage SOP Classes		ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		RLE lossless	1.2.840.10008.1.2.5	SCU	None
		JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCU	None
		JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	SCU	None

	JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCU	None
	JPEG LS, lossless	1.2.840.10008.1.2.4.80	SCU	None
	JPEG LS, lossy	1.2.840.10008.1.2.4.81	SCU	None
	JPEG 2000, lossless	1.2.840.10008.1.2.4.90	SCU	None
	JPEG 2000, lossy	1.2.840.10008.1.2.4.91	SCU	None
All Abstract Syntax items from Table 23: Supported SOP Classes for Transfer AE, section "Transfer" containing literally "Video" and "Image Storage" in its Abstract Syntax Name. Video Image Storage SOP Classes	ILE	1.2.840.10008.1.2	SCU	None
	ELE	1.2.840.10008.1.2.1	SCU	None
	RLE lossless	1.2.840.10008.1.2.5	SCU	None
	JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCU	None
	JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51	SCU	None
	JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCU	None
	JPEG LS, lossless	1.2.840.10008.1.2.4.80	SCU	None
	JPEG LS, lossy	1.2.840.10008.1.2.4.81	SCU	None
	JPEG 2000, lossless	1.2.840.10008.1.2.4.90	SCU	None
	JPEG 2000, lossy	1.2.840.10008.1.2.4.91	SCU	None
	MPEG-4 AVC/H.264 High Profile/Level 4.1 *	1.2.840.10008.1.2.4.102	SCU	None
	MPEG-4 AVC/H.264 BD-compatible, High Profile/Level 4.1 *	1.2.840.10008.1.2.4.103	SCU	None

* MPEG-4 TransferSyntaxes are optional and not supported on all systems.

- Note:
  The above list contains the factory set of proposed Presentation Contexts. LARA PACS Server can be optional configured to support e.g. specific Private Storage SOP Classes or modify the presentation contexts list.

4.2.4.3.2.3 SOP Specific Conformance for Image SOP Classes

All image SOP Classes supported by Deep Archive AE exhibit the same behavior. In the case no presentation context for an abstract syntax can be negotiated, instances of this SOP Class will not be sent and the transfer job is marked as failed. The failure is logged.

The behavior of Deep Archive AE Transfer Images for status codes in a C-STORE response is summarized in Table 58.

Table 58: Response Status Handling Behavior for Transfer AE Transfer Instances

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	If all SOP instances in a transfer job have status success, then the job is marked completed. The result is logged.

Refused	A700-A7FF	Out of Resources	The association is aborted using A-ABORT and the job is marked as failed. The result is logged.
Error	A900-A9FF	Data Set does not match SOP Class	The association is aborted using A-ABORT and the job is marked as failed. The result is logged.
	C001-CFFF	Cannot understand	The association is aborted using A-ABORT and the job is marked as failed. The result is logged.
Warning	B000	Coercion of Data Elements	If all SOP instances in a transfer job have status success, then the job is marked completed. The result is logged.
	B006	Elements discarded	If all SOP instances in a transfer job have status success, then the job is marked completed. The result is logged.
	B007	Data Set does not match SOP Class	If all SOP instances in a transfer job have status success, then the job is marked completed. The result is logged.
*	Any other status code	*	The association is aborted using A-ABORT and the job is marked as failed. The result is logged.

The behavior of the Deep Archive AE during communication failure is presented in Table 59.

Table 59: Communication Failure Behavior for Transfer AE Transfer Images

Exception	Behavior
Timeout	The association is aborted using A-ABORT and the job is marked as failed. The failure is logged.
Association aborted	The job is marked as failed. The failure is logged.
Association rejected	The job is marked as failed. The failure is logged.

4.2.4.3.3 (Real World) Activity – Storage Commitment Push Model as SCU

The LARA PACS Server supports the asynchronous mode for storage commitment only.

4.2.4.3.3.1 Description and Sequencing of Activities

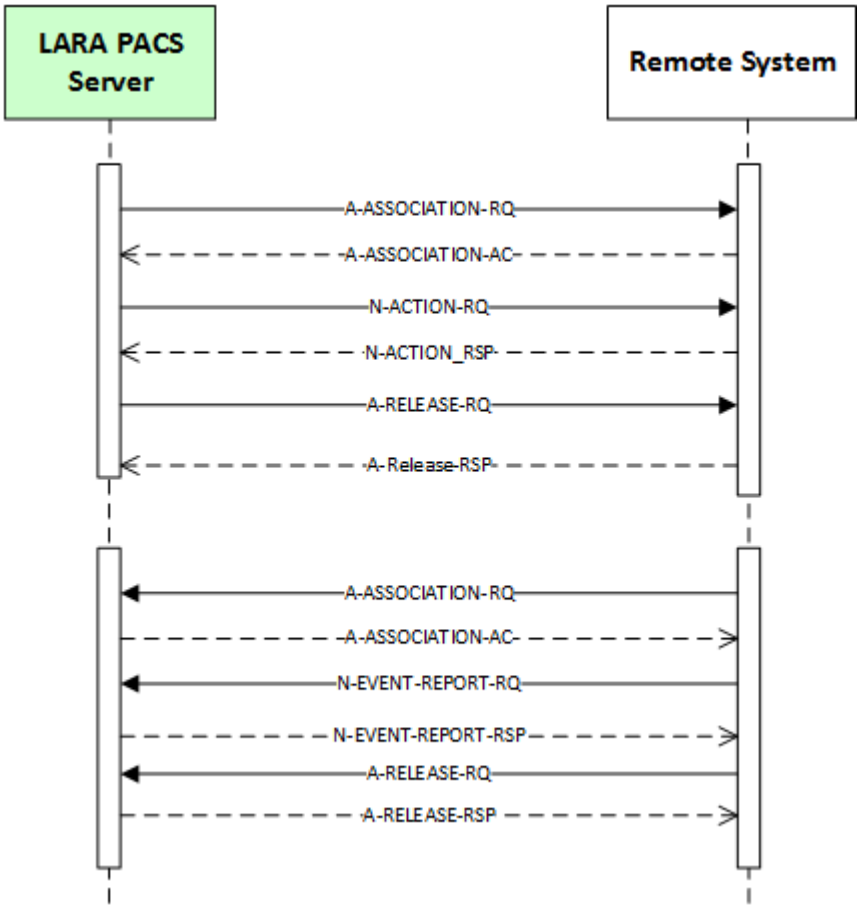

Figure 11: (Real-World) Activity – Storage Commitment Push Model as SCU

4.2.4.3.3.2 Accepted Presentation Contexts

Table 60: Acceptable Presentation Contexts (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	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

4.2.4.3.3.3 SOP Specific Conformance for Storage Commitment Push Model as SCU

LARA PACS Server's Deep Archive AE will sends an N-ACTION-RQ request with the SOP instances that is exported and need to be committed to the export archive, then listens to its local port (which needs to be configured together with the local IP or hostname on the SCP) for N-EVENT-REPORT-Request to receive the commitment result of SOP instances. Then another role can delete the instance. The database entry remains and is marked Archived.

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

Table 61: (Real-World) Activity – Storage Commitment Result - Event Information

Action Type Name	Event Type ID	Attribute Name	Tag
Storage Commitment Request Successful	1	Transaction UID	0008,1195
		Referenced SOP Sequence	0008,1199
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155
Storage Commitment Request Complete – Failures Exist	2	Transaction UID	0008,1195
		Referenced SOP Sequence	0008,1199
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155
		Failed SOP Sequence	0008,1198
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155
		>Failure Reason	0008,1197

Table 62: Response Status Handling Behavior for Commitment AE Storage Commitment Result

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The job is marked as completed.
*	Any other code	*	Details are logged. The Job is not marked as completed and thus will be retried.

Table 63: Communication Failure Behavior for Commitment AE Storage Commitment Result

Exception	Behavior
Timeout	Details are logged. The Job is not marked as completed and thus will be retried.
Association aborted	
Association rejected	

4.2.4.3.3.3.2 Dataset Specific Conformance for Storage Commitment Push Model N-ACTION as SCU

Table 64: (Real-World) Activity – Storage Commitment Request – Action Information

Action Type Name	Event Type ID	Attribute Name	Tag
Request Storage Commit	1	Transaction UID	0008,1195
		Referenced SOP Sequence	0008,1199
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155

Table 65: Status Response Behavior for Commitment AE Storage Commitment Request

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The Request has been stored for further processing.
Failed	0110	Operation failed	Details are logged. The Request could not be stored for further processing

Table 66: Communication Failure Behavior for Commitment AE Storage Commitment Request

Exception	Behavior
Timeout	Details are logged.
Association aborted	
Association rejected	

4.2.4.3.4 (Real World) Activity – MOVE Study

4.2.4.3.4.1 Description and Sequencing of Activities

For each restore study request, the Deep Archive AE opens an association to the Query Retrieve SCP and sends a C-Move request. After retrieval of all responses the association is closed. The GUI is populated with the returned responses and presented to the user. The Image Server AE receive the Instances and it will set to ONLINE

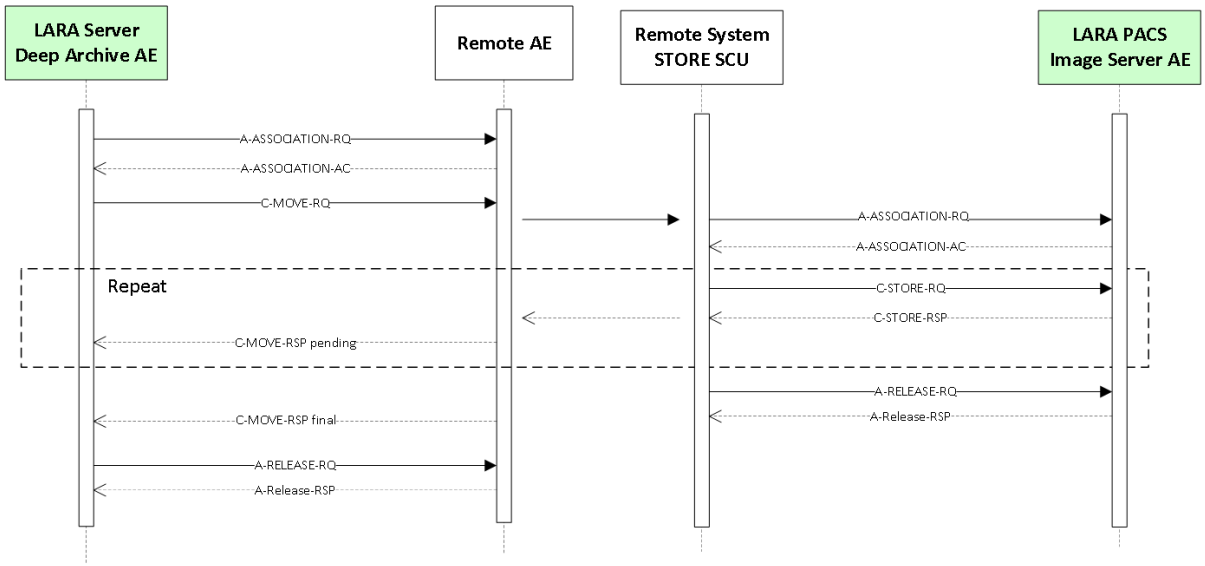

Figure 12: (Real-World) Activity – Query MOVE as SCU

4.2.4.3.4.2 Proposed Presentation Contexts

The presentation context proposed by Deep Archive AE Move Study is defined in Table 67

The implementation will choose ELE transfer syntax in the case multiple transfer syntaxes are accepted by the SCP.

Table 67: Proposed Presentation Contexts for Query AE (Deep Archive AE Move Study)

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

4.2.4.3.4.3 SOP Specific Conformance for (Real-World) Activity Move Study

The behavior of the Query AE for status codes in a SROOT Study Level C-MOVE response is presented in Table 68.

Table 68: Status Response for Study Root Information Model – MOVE SOP Class

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete	All related SOP Instances has successfully been sent to the C-MOVE Destination AE.
Pending	FF00	Sub-operations are continuing	This Response is sent when a SOP Instance has successfully has been transferred to the C-MOVE Destination AE.
Cancel	FE00	Operation terminated due to a Cancel Request	The transfer of SOP Instances has been stopped due to a Cancel Request of the C-MOVE SCP.
Refused		SCP is not licensed	Details are logged, the association is aborted.
	A801	Move destination unknown.	Details are logged. The presentation address of the Destination AE is not configured in the LARA PACS Server.
Error		Time-out reached	Details are logged, the association is aborted.
	C001	Unable to process	Details are logged, the association is aborted.

The Warning B000(Sub-operations complete – One or more failure) will not be returned, failed STORE sub-operations will lead to a failure and the Error C001 will be returned.

Table 69: Communication Failure Behavior for Query AE (Real-World) Activity Move Study

Exception	Behavior
Timeout	The association is aborted using A-ABORT. Related received instances are not processed, the reason is logged, a failure status is reported to the user.
Association aborted	The association is aborted using A-ABORT. Related received instances are not processed, the reason is logged, a failure status is reported to the user.
Association rejected	The reason is logged, a failure status is reported to the user.

4.3 Network Interfaces

4.3.1 Physical Network Interface

The LARA PACS Server provides DICOM V3.0 TCP/IP Network Communication.
The TCP/IP stack is inherited from the Windows operating system.

The LARA PACS Server supports a single network interface: Ethernet ISO.8802-3.
Standard AUI, optional twisted pair 100/1000-BaseT.

4.3.2 Additional Protocols

Additional protocols like DHCP, DNS, NTP may be present in the Windows operating system, its usage is transparent for LARA PACS Server.

4.4 Configuration

The LARA PACS Server Image Server AE, Transfer AE, Commitment AE and Deep Archive AE are configured via the Service / Installation Tool. The Service / Installation Tool is intended to be used by DEKOM Service Engineers only. The configuration is stored in configuration repositories.

4.4.1 AE Title/Presentation Address Mapping

4.4.1.1 Local AE Titles

No default AE Titles are provided; they must be configured during installation.
The Application Entities may be configured to use the same local AE Title.

Application Entity	Default AE Title	Default TCP/IP Port
Image Server AE	No Default	No Default
Transfer AE	No Default	N.A.
Commitment AE	No Default	No Default
Deep Archive AE	No Default	No Default

4.4.1.2 Remote AE Titles/Presentation Address Mapping

The AE Title, host names / IP addresses and port numbers of remote applications are configured using the LARA PACS Server Service/Installation Tool.

4.4.1.2.1 Image Server AE

The AE Title and port number of the local STORE SCU and the Query Retrieve SCU is configured using the LARA PACS Server Service/Installation Tool.
In standard installation both SCUs share the same AE Title and Port.

4.4.1.2.2 Transfer AE

The AE Title, host name / IP address and port number of the remote STORE SCUs is configured using the LARA PACS Server Service/Installation Tool.

An unlimited number of STORE SCUs can be defined.

4.4.1.2.3 Commitment AE

The AE Title and port number of the local Storage Commitment SCU is configured using the LARA PACS Server Service/Installation Tool.
The AE Title, host name / IP address and port number of the remote Storage Commitment SCUs to transfer the Storage Commitment Result asynchronously is configured using the LARA PACS Server Service/Installation Tool
An unlimited number of Storage Commitment SCUs can be defined.

4.4.1.2.4 Deep Archive AE

The AE Title and port number of the local Storage Commitment SCU is configured using the LARA PACS Server Service/Installation Tool.
The AE Title, host name / IP address and port number of the remote Storage SCP to export the Instances is configured using the LARA PACS Server Service/Installation Tool

5 Media Interchange

LARA PACS Server does not support DICOM Media Storage.

6 Support of Character Sets

The following character sets are supported by LARA PACS Server DICOM applications:

ISO_IR 100 (ISO 8859-1 Latin Alphabet No. 1 supplementary set)

7 Security

The DICOM applications of LARA PACS Server do not support any specific security measures.
It is assumed that LARA PACS Server is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- Firewall or routers protections to ensure that only approved external hosts have network access to LARA PACS Server.
- Firewall or router protections to ensure that LARA PACS Server only has network access to approved external hosts and services.
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as Virtual Private Network (VPN)).

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.