



DICOM Conformance Statement

FORUM[®] Version 4.4

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1 Conformance Statement Overview

FORUM is a software for managing, archiving, and viewing e.g. patient data, images, videos, and reports provided by computer-controlled diagnostic devices or other documentation systems. FORUM features an extensive document viewer that enables the comprehensive viewing of stored documents. Furthermore, FORUM supports the workflow in practices and clinics. FORUM enables you to centrally schedule patient examinations and forward these to connected devices as orders. FORUM can work with all devices and software products that support the DICOM standard and which are compatible with FORUM in accordance with this DICOM Conformance Statement.

This document is structured as suggested in the DICOM Standard (PS 3.2: Conformance).

Table 1-1 Network Services Supported

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Verification		
Verification	Yes	Yes
Transfer Image Storage SOP Classes*		
Secondary Capture Image Storage	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	Yes	Yes
Visible Light Endoscopic Image Storage	Yes	Yes
Visible Light Microscopic Image Storage	Yes	Yes
Visible Light Photographic Image Storage	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	Yes	Yes
Ophthalmic Tomography Image Storage	Yes	Yes
Transfer Video Image Storage SOP Classes*		
Ophthalmic Photography 8 Bit Image Storage	Yes	Yes
Video Endoscopic Image Storage	Yes	Yes
Video Microscopic Image Storage	Yes	Yes
Video Photographic Image Storage	Yes	Yes
Transfer Other Storage SOP Classes*		
Encapsulated PDF Storage	Yes	Yes
Raw Data Storage	Yes	Yes
Lensometry Measurements Storage	Yes	Yes
Autorefractometry Measurements Storage	Yes	Yes
Keratometry Measurements Storage	Yes	Yes
Subjective Refraction Measurements Storage	Yes	Yes
Visual Acuity Measurements Storage	Yes	Yes
Ophthalmic Axial Measurements Storage	Yes	Yes
Intraocular Lens Calculations Storage	Yes	Yes
Ophthalmic Visual Field Static Perimetry Measurements Storage	Yes	Yes
Grayscale Softcopy Presentation State Storage	Yes	Yes
Color Softcopy Presentation State Storage	Yes	Yes

Corneal Topography Map Storage	Yes	Yes
Basic Text SR Storage	Yes	Yes
Enhanced SR Storage	Yes	Yes
Comprehensive SR Storage	Yes	Yes
Key Object Selection Document Storage	Yes	Yes
Workflow Management		
Storage Commitment Push Model SOP Class	No	Yes
Modality Worklist Information Model - FIND	No	Yes
Query / Retrieve		
Patient Root Query/Retrieve Information Model – FIND	No	Yes
Study Root Query/Retrieve Information Model – FIND	No	Yes
Study Root Query/Retrieve Information Model – MOVE	No	Yes

* The 'Transfer Image Storage SOP Classes', 'Transfer Video Image Storage SOP Classes' and 'Transfer Other Storage SOP Classes' can be extended via the FORUM Admin UI.

FORUM does not support Media Interchange.

2 Table of Contents

1	Conformance Statement Overview	2
2	Table of Contents	4
3	Introduction	6
3.1	Revision History	6
3.2	Audience	6
3.3	Remarks	6
3.4	Definitions and Terms	6
3.5	Abbreviations	8
3.6	References	9
4	Networking	10
4.1	Implementation Model	10
4.1.1	Application Data Flow	10
4.1.2	Functional Definition of AEs	11
4.1.2.1	Functional Definition of FORUM Application Entity	11
4.1.2.2	Functional Definition of FORUM Worklist Application Entity	11
4.1.3	Sequencing of Real-World Activities	12
4.2	AE Specifications	15
4.2.1	FORUM Application Entity Specification	15
4.2.1.1	SOP Classes	15
4.2.1.2	Associations Policies	16
4.2.1.2.1	General	16
4.2.1.2.2	Number of Associations	16
4.2.1.2.3	Asynchronous Nature	16
4.2.1.2.4	Implementation Identifying Information	16
4.2.1.2.5	Activity – User Requests Verification (SCU)	16
4.2.1.2.6	Activity – FORUM Issues Storage Request (SCU)	17
4.2.1.2.7	Activity - Remote AE Requests Storage Commitment (SCP)	18
4.2.1.3	Association Acceptance Policy	19
4.2.1.3.1	Activity – Remote AE Requests Verification (SCP)	19
4.2.1.3.2	Activity - Remote AE issues Storage Request (SCP)	19
4.2.1.3.3	Activity – Remote AE Requests Storage Commitment (SCP)	21
4.2.1.3.4	Activity – Remote AE issues Patient or Study Root Query (SCP)	21
4.2.1.3.5	Activity – Remote AE Issues Retrieve Command (SCP)	26
4.2.1.3.6	Activity – Remote AE sends MWL Query (SCP)	27
4.3	Network Interfaces	30
4.3.1	Physical Network Interface	30
4.3.2	Additional Protocols	30
4.3.3	IPv4 and IPv6 Support	30
4.4	Configuration	30
4.4.1	AE Title/Presentation Address Mapping	30
4.4.1.1	Local AE Titles	30
4.4.1.2	Remote AE Titles	30
4.4.2	Parameters	30
4.4.2.1	General Parameters	30
5	Media Interchange	33
6	Support of Character Sets	34
6.1	Accepted Character Sets	34
6.2	Returned Character Sets	35
7	Security	36
7.1	Security Profiles	36
7.1.1	Security Transport Connection Profiles	36
7.1.2	Basic Application Level Confidentiality Profile	38

7.1.3	Association Level Security	38
7.1.4	Application Level Security	38
8	Annexes	39
8.1	IOD Contents.....	39
8.1.1	Created SOP Instance(s)	39
8.1.1.1	Secondary Capture Image Information Object Definition – File Import	40
8.1.1.2	Encapsulated PDF Information Object Definition	44
8.1.2	Usage of Attributes from Received IOD's	47
8.1.3	Attribute Mapping.....	47
8.1.4	Coerced/Modified Files	47
8.1.4.1	Patient Edit/Merge or Instance Reassign.....	47
8.1.4.2	Patient Information / Patient Matching	48
8.1.4.3	Missing UIDs	49
8.1.4.4	Patient Identification Conflict with Study Instance UID	49
8.2	Data Dictionary of Private Attributes	49
8.3	Coded Terminology and Templates	49
8.4	Greyscale Image Consistency	49
8.5	Standard Extended / Specialized/ Private SOP Classes.....	49
8.6	The following standard extensions are used in the IODs described in chapter 8.1 IOD Contents	49
8.7	Private Transfer Syntaxes	50

3 Introduction

3.1 Revision History

Table 3-1 Revision History

Document Version	Date	Changes
EN_31_200_0109I	2017-10-27	Revision for FORUM v4.2 Deleted Chapter 8.1.1.3 Combined Report: EPDF Information Object Definition
0000055150-01	04.08.2021	Revision for FORUM v4.3 Extended 4.4.2 Parameters with DICOM TLS. Extended Chapter 7 Security to DICOM TLS
0000097385-01	28.10.2022	Revision for FORUM v4.4 New supported SOP Classes: <ul style="list-style-type: none">• Basic Text SR Storage• Enhanced SR Storage• Comprehensive SR Storage• Key Object Selection Document Storage Updated list of supported cipher suites

3.2 Audience

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

3.3 Remarks

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

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

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.4 Definitions and Terms

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

Abstract Syntax

the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class.

Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE)

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

Application Entity Title

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

Application Context

the specification of the type of communication used between Application Entities.

Example: DICOM network protocol.

Association

a network communication channel set up between Application Entities.

Attribute

a unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements.

Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD)

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

Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG)

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

Media Application Profile

the specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs)

Module

a set of Attributes within an Information Object Definition that are logically related to each other.

Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation

first phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context

the set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.

Protocol Data Unit (PDU)

a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Query Key

A input value for a query process. Query Keys denote the set of DICOM tags that are sent from the SCU to SCP and thus control the query result.

Security Profile

a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data

Service Class Provider (SCP)

role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User).

Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU)

role of an Application Entity that uses a DICOM network service; typically, a client.

Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

Service/Object Pair (SOP) Class

the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification.

Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance

an information object; a specific occurrence of information exchanged in a SOP Class.

Examples: a specific x-ray image.

Tag

a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element.

Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax

the encoding used for exchange of DICOM information objects and messages.

Examples: JPEG compressed (images), little endian explicit value representation.

Unique Identifier (UID)

a globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier.

Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR)

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

3.5 Abbreviations

Table 3-2 Abbreviations used in this Document

Abbreviation	Definition
AE	Application Entity
AET	Application Entity Title
DICOM	Digital Imaging and Communications in Medicine
EBE	Explicit Big Endian
ELE	Explicit Little Endian
EMR	Electronic Medical Record
EPDF	Encapsulated Portable Document Format
HL7	Health Level Seven
ILE	Implicit Little Endian
IOD	Information Object Definition
MWL	Modality Worklist

MPEG2	Motion Picture Expert Group 2; Abbreviation and synonym for video encoding and compression transfer syntax.
MPEG4	Motion Picture Expert Group 4; Abbreviation and synonym for video encoding and compression transfer syntax.
MPML	MPEG2 Main Profile @ Main Level (as defined in the MPEG-2 standard)
MP HL	MPEG2 Main Profile @ High Level (as defined in the MPEG-2 standard)
RLE	Run Length Encoding
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair, union of a specific DICOM service and related IOD.
TCP/IP	Transmission Control Protocol / Internet Protocol
UI	User Interface
UID	Unique Identifier
VL	Visible Light
XML	Extensible Markup Language

3.6 References

NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA (available free at <http://medical.nema.org/>).

Integrating the Healthcare Enterprise (IHE) EYECARE Technical Framework, rev 3.7, 2010 (available free at http://www.ihe.net/Technical_Framework/index.cfm)

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Figure 4-1 FORUM Archive - Functional Overview

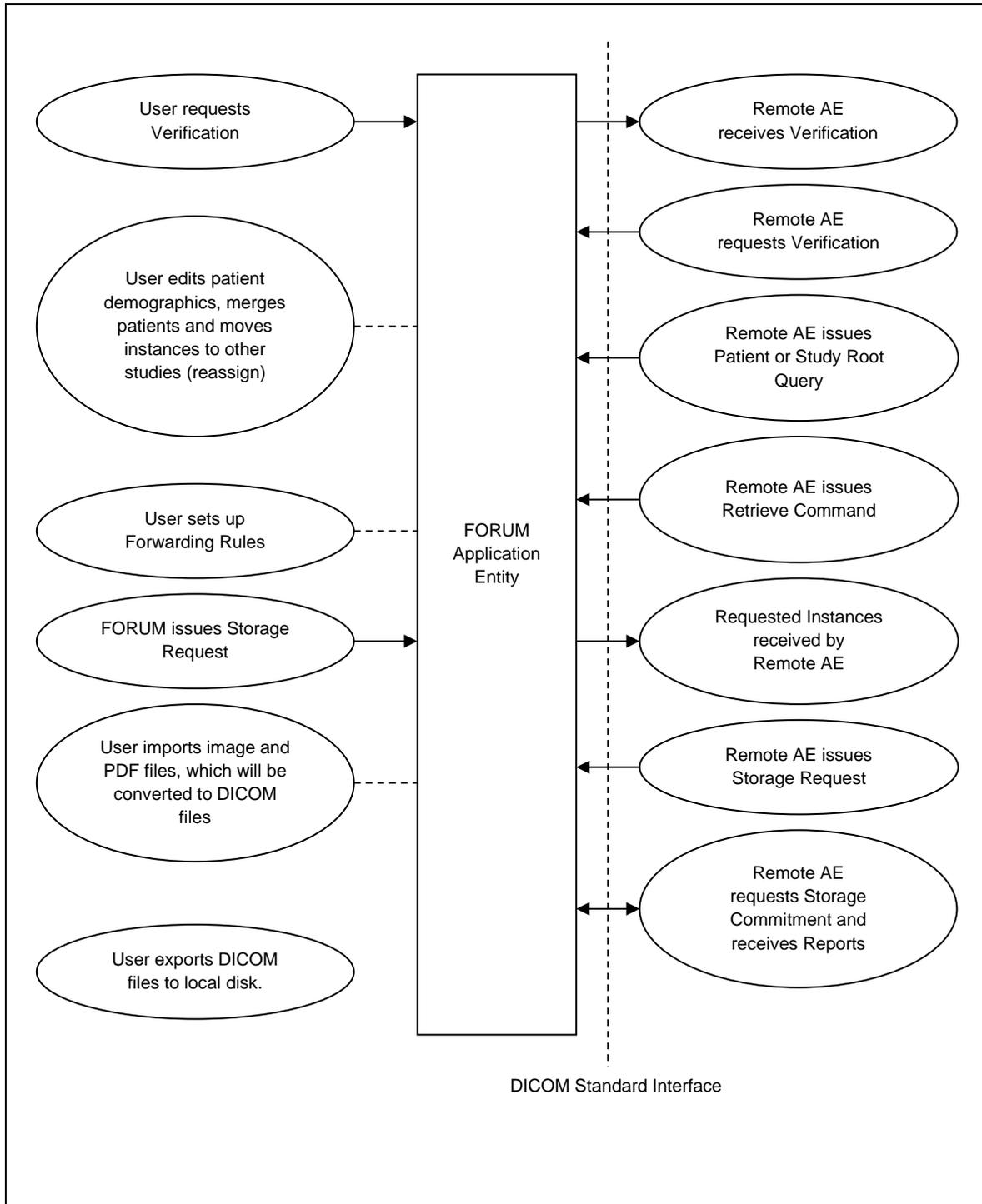
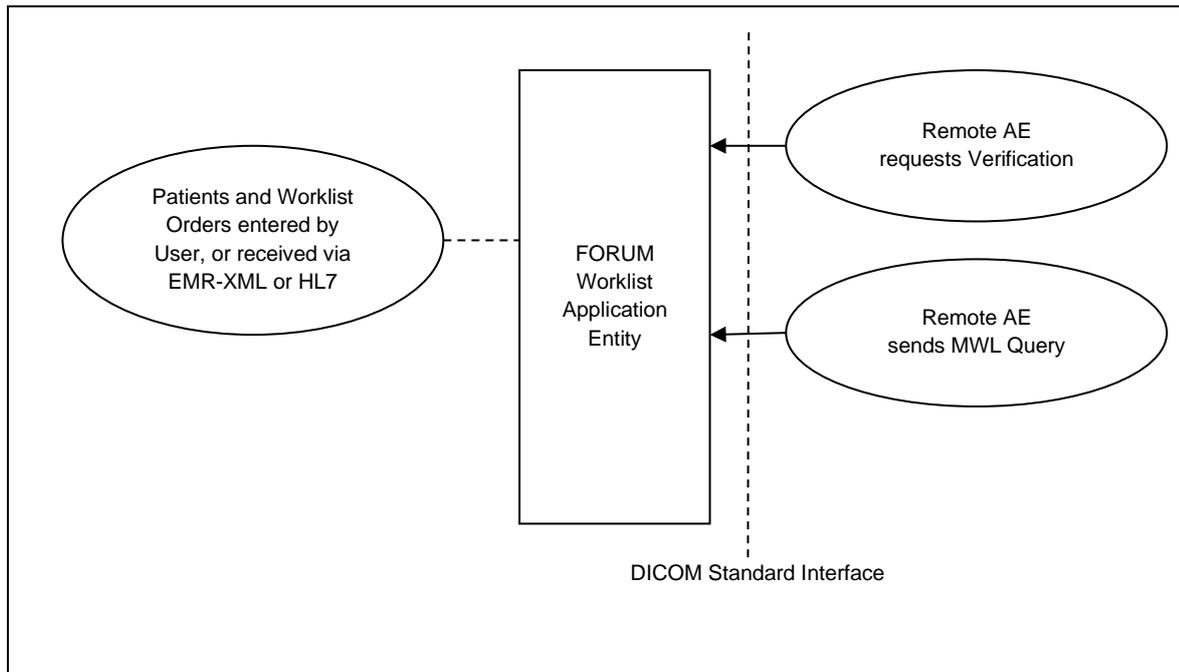


Figure 4-2 FORUM Worklist Provider - Functional Overview



The FORUM application can be configured in a way that the complete functionality is covered by one AE. The diagram above shows the configuration where Storage related activities and Worklist related activities are separate AEs.

4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of FORUM Application Entity

FORUM is a software for managing, archiving, and viewing e.g. patient data, images, videos, and reports provided by computer-controlled diagnostic devices or other documentation systems.

The FORUM AE initiates an association and requests verification to a remote AE.

The FORUM AE waits in the background for connections, and

- Answers Verification requests
- Responds to C-FIND queries
- Stores Instances
- Processes Storage Commitment requests, and therefore initiates an association and sends reports.
- Processes Retrieve Command, and therefore initiates an association and sends storage requests.

4.1.2.2 Functional Definition of FORUM Worklist Application Entity

FORUM allows the scheduling of certain procedures with connected devices for every patient contained in the database. This is performed with the Worklist.

The FORUM Worklist AE waits in the background for connections, and

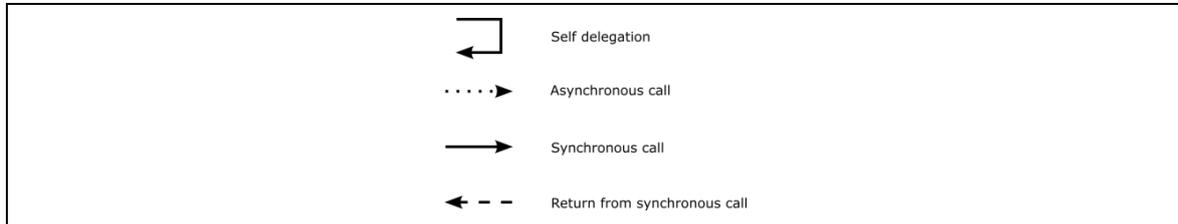
- Answers Verification requests
- Responds to C-FIND queries

Worklist items to be returned, can be created

- Manually using the FORUM MWL Scheduler UI
- Automatically through the EMR XML interface
- Automatically through the HL7 interface

4.1.3 Sequencing of Real-World Activities

To realize the real world activities, the different entities work together. The sequence diagrams shall depict the intended workflow.



The diagrams use slightly modified UML symbols. The asynchronous call is not depicted as suggested in UML. Some objects do have more than one dashed line. It symbolizes more than one thread.

The only sequencing constraint that exists across FORUM and the corresponding Application Entities, is the fact that a Composite SOP Instance must be received by FORUM before Storage Commitment Push Model or Query-Retrieve Requests related to this SOP Instance can be successfully handled.

Figure 4-3 Verification

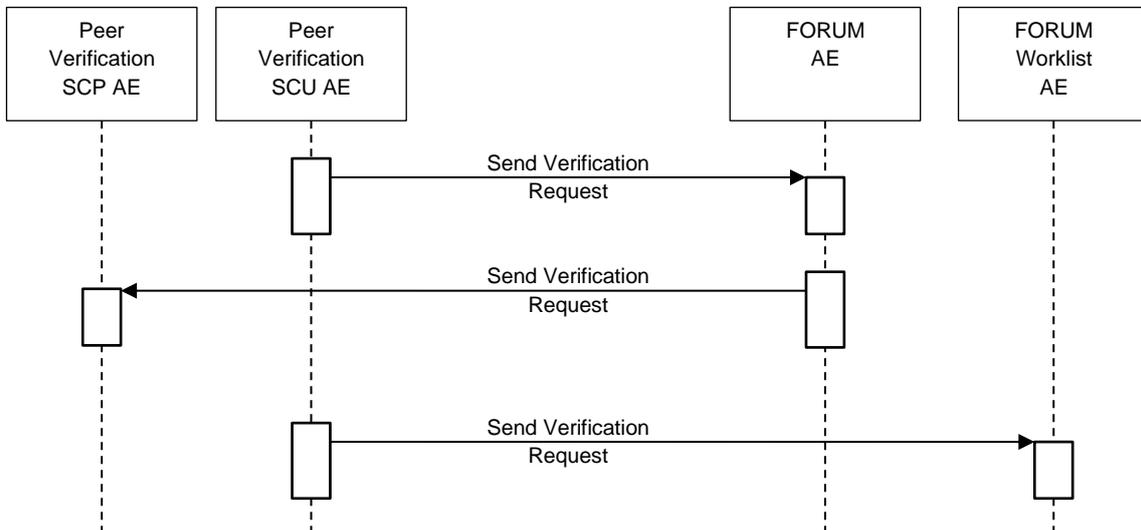


Figure 4-4 FORUM Archive

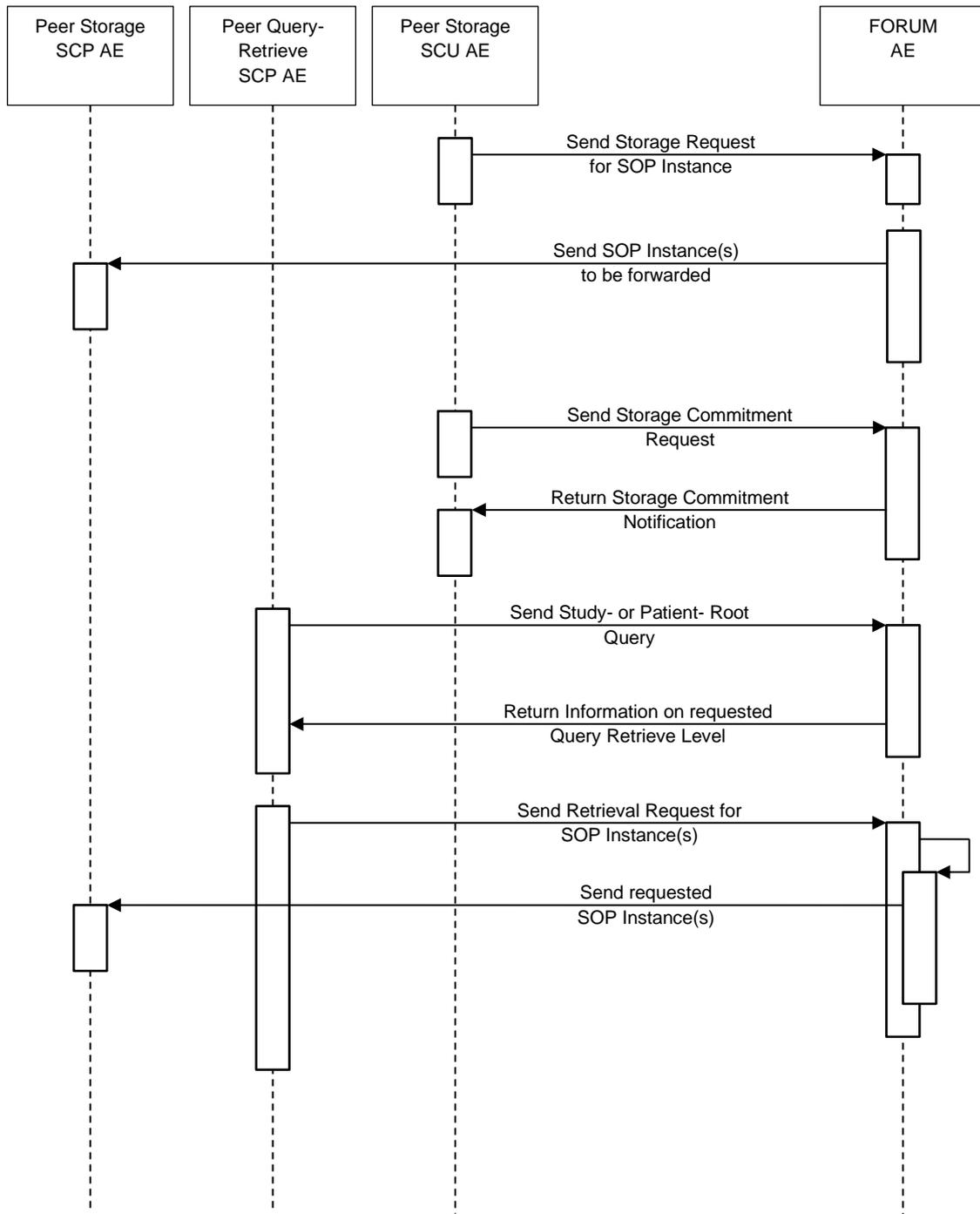
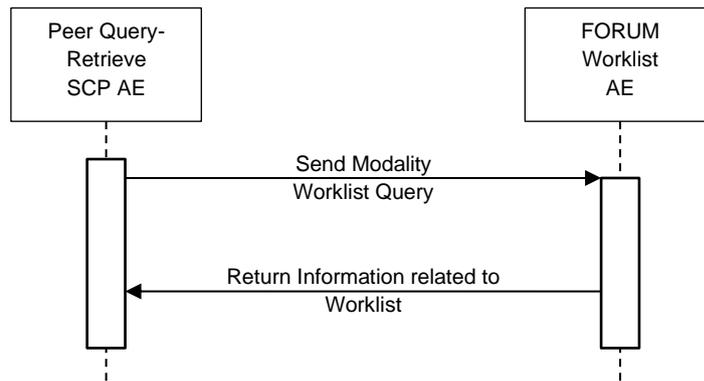


Figure 4-5 FORUM Modality Worklist Provider



4.2 AE Specifications

4.2.1 FORUM Application Entity Specification

4.2.1.1 SOP Classes

Table 4-1 SOP Classes for FORUM AE and FORUM MWL AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	Yes
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	No	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	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 True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2	Yes	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Yes	Yes
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	Yes
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	Yes
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	Yes
Wide Field Ophthalmic Photography Stereographic Projection Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.5	Yes	Yes
Wide Field Ophthalmic Photography 3D Coordinates Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.6	Yes	Yes
Ophthalmic Optical Coherence Tomography En Face Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.7	Yes	Yes
Ophthalmic Optical Coherence Tomography B-scan Volume Analysis Storage	1.2.840.10008.5.1.4.1.1.77.1.5.8	Yes	Yes
Lensometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.1	Yes	Yes
Autorefraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.2	Yes	Yes
Keratometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.3	Yes	Yes
Subjective Refraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.4	Yes	Yes
Visual Acuity Measurements Storage	1.2.840.10008.5.1.4.1.1.78.5	Yes	Yes
Ophthalmic Axial Measurements Storage	1.2.840.10008.5.1.4.1.1.78.7	Yes	Yes
Intraocular Lens Calculations Storage	1.2.840.10008.5.1.4.1.1.78.8	Yes	Yes
Ophthalmic Visual Field Static Perimetry Measurements Storage	1.2.840.10008.5.1.4.1.1.80.1	Yes	Yes
Ophthalmic Thickness Map Storage	1.2.840.10008.5.1.4.1.1.81.1	Yes	Yes
Corneal Topography Map Storage	1.2.840.10008.5.1.4.1.1.82.1	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
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes
Patient Root Q/R Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Study Root Q/R Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Study Root Q/R Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	No	Yes
Storage Commitment Push Model	1.2.840.10008.1.20.1	No	Yes

4.2.1.2 Associations Policies

4.2.1.2.1 General

The DICOM standard Application Context Name for DICOM 3.0 is always proposed:

Table 4-2 DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

4.2.1.2.2 Number of Associations

The FORUM SW can be configured to use either one AE or two separate AEs for Storage and Worklist related activities. The maximum number of association applies per AE.

Table 4-3 Number of associations

Maximum number of simultaneous associations	50 per AE
---	-----------

4.2.1.2.3 Asynchronous Nature

FORUM Application Software does not support asynchronous communication (multiple outstanding transactions over a single Association).

4.2.1.2.4 Implementation Identifying Information

Table 4-4 DICOM implementation class and version

Implementation Class UID	1.2.276.0.75.2.5.30
Implementation Version Name	"FORUM" + the current application version, e.g. "FORUM 4.4"

4.2.1.2.5 Activity – User Requests Verification (SCU)

4.2.1.2.5.1 Description and Sequencing of Activities

The FORUM AE sends DICOM Verification requests when the user requests a test of validity of a DICOM connection through the GUI.

4.2.1.2.5.2 Proposed Presentation Contexts

Table 4-5 Proposed Presentation Contexts for Activity “User Requests Verification”

Presentation Context Table			
Abstract Syntax	Transfer Syntax	Role	Ext. Neg.

Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	ILE	1.2.840.10008.1.2	BOTH	No

4.2.1.2.5.3 SOP Specific Conformance for Verification SOP Class

The FORUM Application Software provides standard conformance to the DICOM Verification Service Class as an SCU.

4.2.1.2.6 Activity – FORUM Issues Storage Request (SCU)

4.2.1.2.6.1 Description and Sequencing of Activities

The FORUM AE will transmit instances either driven by an automated forwarding mechanism, or as reaction to a received C-MOVE request. The automatic forwarding can be configured by the user through the UI. An association is established when the user or the forwarding mechanism initiates a transmit request.

The FORUM AE will establish an association automatically in response to a C-MOVE request.

4.2.1.2.6.2 Proposed Presentation Contexts

The FORUM AE may request any of the Presentation Contexts listed in the following table for Storage. The FORUM AE will only propose the transfer syntax, which was used when the object was initially accepted by the server.

Table 4-6 Proposed Presentation Contexts for Activity “FORUM Issues Storage Request”

Presentation Context Table				
Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Name / UID	Name List	UID List		
All SOP classes listed in section "Transfer Image Storage SOP Classes"	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian RLE Lossless JPEG Baseline JPEG Lossless JPEG 2000 (Lossless Only) JPEG 2000	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2.5 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.4.90 1.2.840.10008.1.2.4.91	BOTH	No
All SOP classes listed in section "Transfer Video Image Storage SOP Classes"	MPEG2 MPML MPEG2 MPHL MPEG4 AVC/H.264 High Profile / Level 4.1 MPEG4 AVC/H.264 BD-compatible High Profile / Level 4.1 MPEG4 AVC/H.264 High Profile / Level 4.2 For 2D Video MPEG4 AVC/H.264 High Profile / Level 4.2 For 3D Video MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2	1.2.840.10008.1.2.4.100 1.2.840.10008.1.2.4.101 1.2.840.10008.1.2.4.102 1.2.840.10008.1.2.4.103 1.2.840.10008.1.2.4.104 1.2.840.10008.1.2.4.105 1.2.840.10008.1.2.4.106	BOTH	No
All SOP classes listed in section "Transfer Other Storage SOP Classes"	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	BOTH	No

4.2.1.2.6.3 SOP Specific Conformance – Store Objects

The FORUM AE provides limited standard conformance to the DICOM Storage Service Class as an SCU:

Neither is it guaranteed that the DICOM Default Transfer Syntax (Implicit VR Little Endian) is always proposed in a presentation context. Nor is an “on-the-fly” transcoding to the DICOM Default Transfer Syntax supported for instances received and stored in lossless compression.

A successful C-Store response status will not generate any actions.

Table 4-7 C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Other than SUCCESS		> 0000	For C-MOVE Requests they will be reported in the C-STORE-RESPOND under "Number Of Failed Sub-Operations" (0000,1022)
Duplicate SOP Instance		0111	For Forwarding jobs this job will be marked with "SUCCESS" and this job is done.
Other than SUCCESS and Duplicate SOP Instance		> 0000 < 0111 > 0111	For Forwarding jobs this job will be marked with "FAILED" failed and this job is pending. Also the Error Comment (0000,0902) will be saved with this job.

4.2.1.2.7 Activity - Remote AE Requests Storage Commitment (SCP)

4.2.1.2.7.1 Description and Sequencing of Activities

The FORUM AE will respond to N-ACTION requests, and initiate an N-EVENT-REPORT.

4.2.1.2.7.2 Proposed Presentation Contexts

The FORUM AE may request the following Presentation Contexts listed in the following table.

Table 4-8 Proposed Presentation Contexts for Activity “Remote AE Requests Storage Commitment”

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Storage Commitment Push Model	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	SCP	No

4.2.1.2.7.3 SOP Specific Conformance – Storage Commitment

The FORUM AE provides conformance to the DICOM Storage Commitment Service Class as an SCP. The N-EVENT-REPORT contains the following Failure Reasons in the Failed SOP Sequence:

Table 4-9 Storage Commitment Failure Reasons

Service Status	Further Meaning	Failure Reason	Behavior
Failure	No such object instance	0112	The SOP instance is not available in FORUM.
Failure	Class / Instance conflict	0119	The SOP instance is stored with another SOP class UID in FORUM

Failure	Referenced SOP Class not supported	0122	The SOP instance is not available in FORUM and the SOP Class is not supported by FORUM.
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4.2.1.3 Association Acceptance Policy

FORUM accepts only associations from registered AE titles.

4.2.1.3.1 Activity – Remote AE Requests Verification (SCP)

4.2.1.3.1.1 Description and Sequencing of Activities

Both the FORUM AE and the FORUM MWL AE will respond to Verification requests from a Verification SCU. This way the requesting SCU can determine whether the respective FORUM AEs are able to receive and handle incoming DICOM requests.

4.2.1.3.1.2 Accepted Presentation Contexts

Table 4-10 Acceptable Presentation Context for Activity “Remote AE Requests Verification”

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	ILE	1.2.840.10008.1.2	BOTH	No

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class as SCP

FORUM provides standard conformance to the DICOM Verification Service Class as an SCP. One of the following status codes are returned:

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	Operation performed properly.

Both the FORUM AE and the FORUM MWL AE will always accept a Presentation Context for the Verification SOP Class with the default DICOM transfer syntax.

4.2.1.3.2 Activity - Remote AE issues Storage Request (SCP)

4.2.1.3.2.1 Description and Sequencing of Activities

The FORUM AE will store DICOM instances that are sent to it from a remote SCU. All storage objects received by the FORUM AE can be retrieved at a later time from the FORUM AE.

4.2.1.3.2.2 Accepted Presentation Contexts

Table 4-11 Acceptable Presentation Context for Activity “Remote AE issues Storage Request”

Presentation Context Table				
Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Name / UID	Name List	UID List		
All SOP classes listed in section "Transfer Image Storage SOP Classes"	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian RLE Lossless JPEG Baseline JPEG Lossless	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2.5 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70	BOTH	No

	JPEG 2000 (Lossless Only) JPEG 2000	1.2.840.10008.1.2.4.90 1.2.840.10008.1.2.4.91		
All SOP classes listed in section "Transfer Video Image Storage SOP Classes"	MPEG2 MPML MPEG2 MPHL MPEG4 AVC/H.264 High Profile / Level 4.1 MPEG4 AVC/H.264 BD-compatible High Profile / Level 4.1 MPEG4 AVC/H.264 High Profile / Level 4.2 For 2D Video MPEG4 AVC/H.264 High Profile / Level 4.2 For 3D Video MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2	1.2.840.10008.1.2.4.100 1.2.840.10008.1.2.4.101 1.2.840.10008.1.2.4.102 1.2.840.10008.1.2.4.103 1.2.840.10008.1.2.4.104 1.2.840.10008.1.2.4.105 1.2.840.10008.1.2.4.106	BOTH	No
All SOP classes listed in section "Transfer Other Storage SOP Classes"	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	BOTH	No

4.2.1.3.2.3 SOP Specific Conformance – Store Objects

The FORUM AE conforms to the DICOM Storage Service Class as a Level 2 (Full) SCP. No elements are discarded. Certain Attribute will be coerced, see 8.1.4 Coerced/Modified Files. All Type 1, Type 2 and Type 3 attributes will be retained. Private attributes will be stored and included when the object is sent out later to a remote AE.

In case an instance is rejected, one of the following status codes is returned by the FORUM AE:

Table 4-12 Storage C-STORE Response Status Codes

Service Status	Further Meaning	Status Code	Behavior
Refused	Out Of Resources	A700	Error while storage space is less than 3GB. Missing license for MPEG
	No Such SOP class	0118	If a SOP Class is used, that was not negotiated.
	Unrecognized Operation	0211	Unrecognized value in Command Filed
Error	Invalid Attribute Value	0106	Unsupported SOP Instance UID prefix. MpegFormatException
	Processing Failure	0110	Unexpected internal errors.
	Duplicate SOP instance	0111	SOP Instance UID is already present in this archive while a new C-STORE request is being processed.
	Invalid Object Instance	0117	The series of an incoming C-STORE request is already attached to another study.
	Missing Attribute Value	0121	An Instance UID is missing.
	SOP class Not Supported	0122	Incoming SOP Class is not supported by FORUM
	Unable To Process	C000	Unexpected internal errors.
Success	Success	0000	Operation performed properly.

The FORUM AE will accept any number of Presentation Contexts per association request. Any single Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

Explicit VR Little Endian is preferred over Implicit VR Little Endian as the accepted Transfer Syntax when both Transfer Syntaxes are offered in a Presentation Context in an Associate Request. FORUM AE will only accept association requests for known (configured) remote AEs.

4.2.1.3.3 Activity – Remote AE Requests Storage Commitment (SCP)

4.2.1.3.3.1 Description and Sequencing of Activities

When FORUM receives a storage commitment request, it checks whether the requested SOP instances are present in FORUM and sends an N-EVENT report. FORUM accepts a list of references to one or more DICOM SOP instances.

4.2.1.3.3.2 Accepted Presentation Contexts

Table 4-13 Acceptable Presentation Context for Activity “Remote AE Requests Storage Commitment”

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Storage Commitment Push Model	1.2.840.10008.1.20.1	ILE	1.2.840.10008.1.2	SCP	No

4.2.1.3.3.3 SOP Specific Conformance – Storage Commitment

The FORUM AE provides conformance to the DICOM Storage Commitment Service Class as an SCP. The number of referenced instances within one request is limited to 500. The N-EVENT-REPORT message is always sent in a separate association from the N-ACTION operation.

For Storage Commitment operations, the FORUM AE will only accept association requests for known (configured) remote AEs.

One of the following Status codes is returned by the FORUM AE in an N-ACTION response:

Table 4-14 Storage Commitment N-ACTION-RSP Status Codes

Service Status	Further Meaning	Status Code	Behavior
Error	Processing Failure	0110	Unexpected internal errors or too many items in the Referenced SOP Sequence (at least more than 500)
Success	Success	0000	Operation performed properly

4.2.1.3.4 Activity – Remote AE issues Patient or Study Root Query (SCP)

4.2.1.3.4.1 Description and Sequencing of Activities

The FORUM AE will respond to query requests that are sent to it by a remote SCU.

4.2.1.3.4.2 Accepted Presentation Contexts

Table 4-15 Acceptable Presentation Context for Activity “Remote AE issues Patient or Study Root Query”

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Patient Root Q/R Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	ILE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	Yes

Study Root Q/R Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	ILE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	Yes
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C-Find Extended Negotiation is supported: For the fields "Relational-queries" and "Date-time matching", the value "1" is returned, meaning that those are supported by the FORUM AE.

4.2.1.3.4.3 SOP Specific Conformance – Find Objects

The FORUM AE provides standard conformance to the DICOM Query/Retrieve Service Class as an SCP. The FORUM AE supports both Hierarchical Queries and the Relational-queries extended SCP behavior. Matching for attributes with VR PN (Person Name) is always done case-insensitive.

The following tables contain detailed information on matching and return keys.

Table 4-16 Matching Types

Abbreviation	Description
U	Universal Matching
S	Single Value Matching
*	Wildcard Matching
R	Range Matching
CDT	Combined Date Time Matching
UNIQUE	Unique query key for the respective level

Table 4-17 Patient Root / Patient Level Attributes

Description	Tag	Matching Type
Patient's Name	(0010,0010)	U S * (*1)
Patient ID	(0010,0020)	U S *, UNIQUE together with Issuer of Patient ID
Issuer of Patient ID	(0010,0021)	U S *, UNIQUE together with Patient ID
Other Patient IDs	(0010,1000)	U S *
Patient's Birth Date	(0010,0030)	U S R
Patient's Sex	(0010,0040)	U S
Ethnic Group	(0010,2160)	U S
Patient Comments	(0010,4000)	U S *

Table 4-18 Patient Root / Study Level Attributes

Description	Tag	Matching Type
Study Instance UID	(0020,000D)	U S, UNIQUE
Study ID	(0020,0010)	U S
Accession Number	(0008,0050)	U S *
Study Date	(0008,0020)	U CDT
Study Time	(0008,0030)	U CDT
Modalities in Study (*5)	(0008,0061)	U S
Referring Physician's Name	(0008,0090)	U S *
Study Description	(0008,1030)	U S *
Admitting Diagnoses Description	(0008,1080)	U S *

Table 4-19 Study Root / Study Level Attributes

Description	Tag	Matching Type
Study Instance UID	(0020,000D)	U S, UNIQUE
Study ID	(0020,0010)	U S
Accession Number	(0008,0050)	U S *
Study Date	(0008,0020)	U CDT
Study Time	(0008,0030)	U CDT
Modalities in Study (*5)	(0008,0061)	U S
Referring Physician's Name	(0008,0090)	U S *
Study Description	(0008,1030)	U S *
Admitting Diagnoses Description	(0008,1080)	U S *
Patient's Name	(0010,0010)	U S * (*1)
Patient ID	(0010,0020)	U S *
Issuer of Patient ID	(0010,0021)	U S *
Other Patient IDs	(0010,1000)	U S *
Patient's Birth Date	(0010,0030)	U S R
Patient's Sex	(0010,0040)	U S
Ethnic Group	(0010,2160)	U S
Patient Comments	(0010,4000)	U S *

Table 4-20 Series Level Attributes

Description	Tag	Matching Type
Modality	(0008,0060)	U S
Series Number	(0020,0011)	U S
Series Instance UID	(0020,000E)	U S, UNIQUE
Series Date	(0008,0021)	U CDT
Series Time	(0008,0031)	U CDT
Series Description	(0008,103E)	U S *
Laterality	(0020,0060)	U S
Number of Series Related Instances	(0020,1209)	return key only
Performing Physicians' Name	(0008,1050)	U S *
Manufacturer's Model Name	(0008,1090)	U S *
Performed Procedure Step Start Date	(0040,0244)	U CDT
Performed Procedure Step Start Time	(0040,0245)	U CDT
Request Attributes Sequence	(0040,0275)	
Requested Procedure ID	(0040,1001)	U S
Scheduled Procedure Step ID	(0040,0009)	U S

Table 4-21 Instance Level Attributes

Description	Tag	Matching Type
Image Type (*4)	(0008,0008)	U S *
Instance Number	(0020,0013)	U S

SOP Instance UID	(0008,0018)	U S, UNIQUE
SOP Class UID	(0008,0016)	U S
Instance Creation Date	(0008,0012)	U CDT
Instance Creation Time	(0008,0013)	U CDT
Acquisition Date Time (*2)	(0008,002A)	U CDT
Icon Image Sequence	(0088,0200)	return key only
Image Laterality (*6)	(0020,0062)	U S
Measurement Laterality (*6)	(0024,0113)	U S
Document Title	(0042,0010)	U S *
Creator-Version UID	(0008,9123)	U S
Referenced Image Sequence (*3)	(0008,1140)	
›Referenced SOP Instance UID	(0008,1155)	U S
›Referenced SOP Class UID	(0008,1150)	U S
›Purpose Of Reference Code Sequence	(0040,A170)	
››Coding Scheme Designator	(0008,0102)	U S
››Coding Scheme Version	(0008,0103)	U S
››Code Value	(0008,0100)	U S
Referenced Instance Sequence (*3)	(0008,114A)	
›Referenced SOP Instance UID	(0008,1155)	U S
›Referenced SOP Class UID	(0008,1150)	U S
›Purpose Of Reference Code Sequence	(0040,A170)	
››Coding Scheme Designator	(0008,0102)	U S
››Coding Scheme Version	(0008,0103)	U S
››Code Value	(0008,0100)	U S
Source Instance Sequence (*3)	(0042,0013)	
›Referenced SOP Instance UID	(0008,1155)	U S
›Referenced SOP Class UID	(0008,1150)	U S
›Purpose Of Reference Code Sequence	(0040,A170)	
››Coding Scheme Designator	(0008,0102)	U S
››Coding Scheme Version	(0008,0103)	U S
››Code Value	(0008,0100)	U S
Referenced Refractive Measurements Sequence (*3)	(0046,0145)	
›Referenced SOP Instance UID	(0008,1155)	U S
›Referenced SOP Class UID	(0008,1150)	U S
›Purpose Of Reference Code Sequence	(0040,A170)	
››Coding Scheme Designator	(0008,0102)	U S
››Coding Scheme Version	(0008,0103)	U S
››Code Value	(0008,0100)	U S

Remark (*1):

Patients Name matching:

FORUM uses the first non-empty component group of the matching key attribute as a query key. A component group in this context is empty if it contains only one or more of the characters "^" or "*". FORUM matches always all component groups. For Example "Wem*" returns all Patients, whose last name starts with "Wem" regardless in which component group.

Double Wildcard Search "*":**

If the last name of the first non-empty component group contains "***", then all other components of this component group of the matching key are ignored, and this last name query key matches all components of all component groups. For example "Wem***" returns all patients, who have any name part starting with "Wem" regardless in which component group they occur. "Wem**" returns names like "Wemmer^Peter", "Bauer^Wemam" or "xxx^yyy=a^b^wemu".

Remark (*2):

The responses are sorted descending by Acquisition Date Time.

Remark (*3):

Only one of "Referenced Image Sequence", "Referenced Instance Sequence", "Source Instance Sequence" or "Referenced Refractive Measurements Sequence" is supported in one C-FIND request.

Remark (*4):

Although "Image Type" has a value multiplicity of greater than one, FORUM only returns valid matches if the order of the values in the query key matches the order of the values in the FORUM data objects.

Example: "aaa\xxx\yyy\ddd" in FORUM is matched by "xxx" or "xxx\yyy" or "x*\yy*", but NOT by "yyy\xxx" and not by "aaa\yyy"

Remark (*5):

"Modalities in Study" is supported ONLY on STUDY LEVEL.

Remark (*6):

Only one of "Image Laterality" or "Measurement Laterality" is supported in one C-FIND request.

The FORUM AE returns one of the following status codes in a C-FIND response:

Table 4-22 Storage C-FIND Response Status Codes

Service Status	Further Meaning	Error Code	Behavior
Refused	No Such SOP class	0118	If a SOP Class is used, that was not negotiated.
	Unrecognized Operation	0211	Unrecognized value in Command Filed
Failed	Invalid Attribute Value	0106	Wrong query retrieve level
	Processing Failure	0110	Unexpected internal errors.
	Unable To Process	C000	Unexpected internal errors.
Cancel		FE00	The original requester canceled this operation.

Pending	Pending	FF00	All Optional Keys are supported in the same manner as Required Keys.
Warning	Too Many Results	C001	If the received request leads to more than 5000 responses then these 5000 responses will be returned followed by this status. On Query Retrieve Level "IMAGE" the most recent SOP instances according to Acquisition Date Time will be returned.
Success	Success	0000	Operation performed properly.

For C-FIND operations, the FORUM AE will only accept association requests for known (configured) remote AEs.

A Patient Root Query in FORUM returns only patients who are not flagged as conflicted patients. See 8.1.4.2 Patient Information / Patient Matching for details on conflicted patients.

A Study Root Query in FORUM returns all patients.

4.2.1.3.5 Activity – Remote AE Issues Retrieve Command (SCP)

4.2.1.3.5.1 Description and Sequencing of Activities

The FORUM AE will respond to C-MOVE requests that are sent to it by a remote SCU.

The FORUM AE will establish a new association with the remote AE specified in the move destination for the C-STORE sub operation. The FORUM AE will always only propose the transfer syntax used when the object was initially sent to the FORUM server.

4.2.1.3.5.2 Accepted Presentation Contexts

Table 4-23 Acceptable Presentation Context for Activity “Remote AE Issues Retrieve Command”

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Study Root Q/R Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	ILE	1.2.840.10008.1.2	SCP	Yes

C-MOVE Extended Negotiation is supported: For the fields "Relational-retrieval", the value "1" is returned, meaning that those are supported by the FORUM AE.

4.2.1.3.5.3 SOP Specific Conformance – Move Objects

The FORUM AE will establish an association with the destination specified in the C-MOVE request. One or more of the Presentation Contexts listed in chapter 4.2.1.3.2 “Activity - Remote AE issues Storage Request (SCP)” may be negotiated in this association.

The FORUM AE supports also the Relational-retrieval extended SCP behavior.

The following tables contain detailed information on supported matching keys:

Table 4-24 Study Root / Study Level Attributes

Description	Tag	Matching Type
Study Instance UID	(0020,000D)	List of UID Matching

Table 4-25 Series Level Attributes

Description	Tag	Matching Type
Series Instance UID	(0020,000E)	List of UID Matching

Table 4-26 Instance Level Attributes

Description	Tag	Matching Type
SOP Instance UID	(0008,0018)	List of UID Matching

The Query/Retrieve Level is identified implicitly by the key used.

If a non-empty SOP Instance UID is present, then those will be retrieved, else if a non-empty Series Instance UID is present, then those will be retrieved, else if a non-empty Study Instance UID is present, then those will be retrieved.

The FORUM AE returns one of the following status codes in a C-MOVE response:

Table 4-27 Possible C-MOVE response status codes

Service Status	Further Meaning	Error Code	Behavior
Refused	No Such SOP class	0118	If a SOP Class is used, that was not negotiated.
	Unrecognized Operation	0211	Unrecognized value in command field
Error	Processing Failure	0110	Unexpected internal errors
	No Such Object Instance	0112	C-MOVE request for non-existing SOP instance
	Unable To Process	C000	Unexpected internal errors
Success	Success	0000	Operation performed properly

4.2.1.3.6 Activity – Remote AE sends MWL Query (SCP)

4.2.1.3.6.1 Description and Sequencing of Activities

The FORUM MWL AE will respond to DICOM C-FIND requests in response to a remote AE querying for a Modality Worklist.

4.2.1.3.6.2 Accepted Presentation Context

Table 4-28 Acceptable Presentation Context for Activity “Remote AE sends MWL Query”

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	ILE	1.2.840.10008.1.2	SCP	Yes

4.2.1.3.6.3 SOP Specific Conformance for Modality Worklist SOP Class as SCP

The FORUM MWL AE provides standard conformance to the DICOM Basic Worklist Management Service Class.

The FORUM application can be configured to use only one AE for MWL and all the other described transactions.

Table 4-29 Matching Types

Abbreviation	Description
U	Universal Matching
S	Single Value Matching

*	Wildcard Matching
R	Range Matching
CDT	Combined Date Time Matching
UNIQUE	Unique query key for the respective level

The following table contains detailed information on matching keys:

Table 4-30 Modality Worklist - Matching Keys

Description	Tag	Matching Type
Accession Number	(0008,0050)	U S
Requested Procedure ID	(0040,1001)	U S
Scheduled Procedure Step Sequence	(0040,0100)	
›Scheduled Station AE Title	(0040,0001)	U S
›Scheduled Procedure Step Start Date	(0040,0002)	U CDT
›Scheduled Procedure Step Start Time	(0040,0003)	U CDT
›Modality	(0008,0060)	U S
Patient's Name	(0010,0010)	U S *
Patient ID	(0010,0020)	U S *
Issuer of Patient ID	(0010,0021)	U S *
Patient's Birth Date	(0010,0030)	U S R
Patient's Sex	(0010,0040)	U S
Patient Comments	(0010,4000)	U S *

The following table contains the supported return keys:

Table 4-31 Modality Worklist - Return Keys

Description	Tag
Scheduled Procedure Step Sequence	(0040,0100)
>Scheduled Station AE Title	(0040,0001)
>Scheduled Procedure Step Start Date	(0040,0002)
>Scheduled Procedure Step Start Time	(0040,0003)
>Modality	(0008,0060)
>Scheduled Performing Physician's Name	(0040,0006)
>Scheduled Procedure Step Description	(0040,0007)
> Scheduled Protocol Code Sequence	(0040,0008)
>> Code Meaning	(0008,0104)
>> Code Value	(0008,0100)
>> Coding Scheme Designator	(0008,0102)
>> Coding Scheme Version	(0008,0103)
>Scheduled Procedure Step ID	(0040,0009)
Requested Procedure ID	(0040,1001)
Requested Procedure Comments	(0040,1400)
Requested Procedure Description	(0032,1060)
Study Instance UID	(0020,000D)
Study Date (=Scheduled Procedure Step Start Date)	(0008,0020)

Study Time (=Scheduled Procedure Step Start Time)	(0008,0030)
Accession Number	(0008,0050)
Requesting Physician	(0032,1032)
Requested Procedure Code Sequence (=Scheduled Protocol Code Sequence)	(0032,1064)
> Code Meaning	(0008,0104)
> Code Value	(0008,0100)
> Coding Scheme Designator	(0008,0102)
> Coding Scheme Version	(0008,0103)
Referring Physician's Name	(0008,0090)
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Issuer of Patient ID	(0010,0021)
Patient's Birth Date	(0010,0030)
Patient's Sex	(0010,0040)
Other Patient IDs	(0010,1000)
Ethnic Group	(0010,2160)

The FORUM MWL AE returns one of the following status codes in a C-FIND response:

Table 4-32 Modality Worklist C-FIND response status codes

Service Status	Further Meaning	Error Code	Behavior
Refused	No Such SOP class	0118	If a SOP Class is used, which was not negotiated.
	Unrecognized Operation	0211	Unrecognized value in command field
Failed	Processing Failure	0110	Unexpected internal errors
	Unable To Process	C000	Unexpected internal errors
Cancel		FE00	The original requester canceled this operation.
Pending	Pending	FF00	All optional keys are supported in the same manner as required keys.
Warning	Too Many Results	C001	If the received request leads to more than 1000 responses then these 1000 responses will be returned followed by this status.
Success	Success	0000	Operation performed properly.

FORUM assigns a different Study Instance UID to each Requested Procedure.

FORUM supports only one Scheduled Procedure Step per Requested Procedure.

If the Scheduled Protocol Code Sequence (0040,0008) or the Requested Procedure Code Sequence (0032,1064) is requested as a return key, and there are no items in a response, then this sequence will be returned without items instead of being removed.

MWL entries (Scheduled Procedure Steps) are removed from the FORUM MWL AE as soon as the first SOP Instance with the Study Instance UID from the respective Requested Procedure is received.

Furthermore MWL entries (Scheduled Procedure Steps) which are created via the "Automatic Order Functionality" or via the EMR Gateway are removed from the FORUM MWL AE at midnight.

4.3 Network Interfaces

4.3.1 Physical Network Interface

The physical network interface is not visible for the instrument application. The instrument application uses the communication stack as offered by the Operating System.

4.3.2 Additional Protocols

Both IP addresses and host names are supported and get resolved. Else no additional protocols are supported.

4.3.3 IPv4 and IPv6 Support

FORUM is released only for IPv4.

4.4 Configuration

Local application entity and remote application entity information can be configured with the Networking Configuration Tool. It is also possible to configure timeout, institution, and worklist item limit parameters via Application Software, configuration tool, and configuration file.

4.4.1 AE Title/Presentation Address Mapping

The mapping from AE Title to TCP/IP addresses and ports is configurable and is stored in the local database. Along with this mapping, the database stores those AE titles that are allowed to communicate with the FORUM AE and the FORUM MWL AE.

4.4.1.1 Local AE Titles

The IP is not configurable by the FORUM UI. The IP is administrated by the Operating System. The AE titles for the FORUM AE and the FORUM MWL AE are configurable. The FORUM application can be configured to use only one AE for all transactions. The default port number is 11119.

4.4.1.2 Remote AE Titles

The mapping of remote AE Titles to TCP/IP addresses and ports is configurable. FORUM supports a proprietary auto configuration for corresponding external DICOM devices. The number of AE Titles is limited according to the available licenses. Two types of licenses are available to distinguish between connected "Zeiss Devices" and "3rd Party Devices". In addition the user can configure whether the respective remote AE title can act as Modality Worklist User.

4.4.2 Parameters

4.4.2.1 General Parameters

The general parameters are shared for associations to any of the configured AE.

Table 4-33 Configuration Parameters Table

Parameter	Configurable (Yes/No)	Default Value
General Networking Connection Parameters		
DICOM TLS Parameters		
tls.secureMode	Yes Is set to true, ALL devices use TLS without any exception. The ports in the AE Title Administration UI of FORUM will be the secure ports in this case	false

tls.useAdditionalSecureServerPorts	Yes Applicable only for 'secureMode = false' Indicates, whether to open secure server ports	true
tls.additionalSecureServerPort	Yes Applicable only for 'secureMode = false' Sets the secure server port	set during installation, 2762 (if available)
tls.additionalSecureWorklistPort	Yes Applicable only for 'secureMode = false' Sets the secure server worklist port	set during installation, 2762 (if available)
tls.secureCalledAeTitles	Yes Applicable only for 'secureMode = false' A comma separated list of AE-Titles, which will communicate secure with forum	
tls.tlsNeedClientAuth	Yes Indicates, whether the client has to be authenticated via a certificate	true
tls.tlsProtocols	Yes The supported TLS Protocols	"TLSv1.2", "TLSv1.3"
tls.tlsCipherSuites	Yes The supported cipher suites	"TLS_DHE_RSA_WITH_AES_128_GCM_SHA256", "TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256", "TLS_DHE_RSA_WITH_AES_256_GCM_SHA384", "TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384", "TLS_AES_128_GCM_SHA256", "TLS_AES_256_GCM_SHA384"
Verification SCU/SCP Parameters		
No specific configuration required.		

The configuration of port number and Application Entity Title are part of the Local Application Entity setup (see 4.4.1.1 Local AE Titles).		
Modality Worklist SCP Parameters		
Maximum Query Responses (Modality Worklist IM)	No	1000
Scheduled Station AE Title		
Patient Root Q/R and Study Root Q/R SCP Parameters		
Maximum Query Responses (Patient Root Q/R IM and Study Root Q/R IM)	No	5000
Extended Negotiation – relational query support negotiation (Patient Root Q/R IM and Study Root Q/R IM)	No	"Relational-queries" and "Date-time matching" are supported.
Storage SCP Parameters		
No specific configuration required The configuration of port number and Application Entity Title are part of the Local Application Entity setup (see 4.4.1.1 Local AE Titles).		

5 Media Interchange

Media Interchange is not scope of this document since Media Interchange is not supported by FORUM.

6 Support of Character Sets

6.1 Accepted Character Sets

Table 6-1 Supported Character Set

Supported Specific Character Set	
Character Set Description	Defined Term
US-ASCII	
ISO-8859-1	ISO_IR 100
ISO-8859-2	ISO_IR 101
ISO-8859-3	ISO_IR 109
ISO-8859-4	ISO_IR 110
ISO-8859-5	ISO_IR 144
ISO-8859-6	ISO_IR 127
ISO-8859-7	ISO_IR 126
ISO-8859-8	ISO_IR 138
ISO-8859-9	ISO_IR 148
JIS_X0201	ISO_IR 13
TIS-620	ISO_IR 166
US-ASCII	ISO 2022 IR 6
ISO-8859-1	ISO 2022 IR 100
ISO-8859-2	ISO 2022 IR 101
ISO-8859-3	ISO 2022 IR 109
ISO-8859-4	ISO 2022 IR 110
ISO-8859-5	ISO 2022 IR 144
ISO-8859-6	ISO 2022 IR 127
ISO-8859-7	ISO 2022 IR 126
ISO-8859-8	ISO 2022 IR 138
ISO-8859-9	ISO 2022 IR 148
JIS_X0201	ISO 2022 IR 13
TIS-620	ISO 2022 IR 166
JIS0208	ISO 2022 IR 87
JIS0212	ISO 2022 IR 159
cp949	ISO 2022 IR 149
UTF-8	ISO_IR 192
GB18030	GB18030

Within C-FIND queries, FORUM supports all these character sets. The response will be encoded in the same character set as in the request. Characters which are not covered by this character set will be returned as a question mark '?'. Example: If a client submits a C-FIND request for Patient Name with character set ISO_IR 100, and the name in FORUM is saved as 'Müller', then it would be returned as 'M?ller'.

6.2 Returned Character Sets

DICOM files will be returned as they are. In case of a modified DICOM file it will be changed to UTF-8 and will be returned with this character set.

No transcoding will be done with one exception: UTF-8 files will be returned as "ISO_IR 100" if the C-MOVE destination AE title contains the string "IR100".

7 Security

7.1 Security Profiles

7.1.1 Security Transport Connection Profiles

The DICOM capabilities of FORUM supports Non-Downgrading BCP 195 TLS Secure Transport Connection Profile by default. Optionally, FORUM also supports configurable TLS Secure Transport Connection Profile through selection of transport protocol(s) and cipher suite(s).

Table 7-1 Transport Protocols

Transport Protocol	Supported
TLS 1.0	Y
TLS 1.1	Y
TLS 1.2	Y – Default
TLS 1.3	Y – Default

Table 7-2 Default Secure Transport Connection Profile

Profile	Creator/Sender	Consumer/Receiver
Non-Downgrading BCP 195 TLS Secure Transport Connection	Y	Y

Table 7-3 Supported Cipher Suites

Profile	Cipher Suites	Default
Non-Downgrading BCP 195 TLS Secure Transport Connection	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	Y
	TLS_DHE_RSA_WITH_AES_256_GCM_SHA384	
	TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	
	TLS_DHE_RSA_WITH_AES_128_GCM_SHA256	
	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	
	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	
Configurable TLS Secure Transport Connection on FORUM.	TLS_AES_128_GCM_SHA256	
	TLS_AES_256_GCM_SHA384	
	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	
	TLS_CHACHA20_POLY1305_SHA256	
	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	
	TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256	
	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	
	TLS_RSA_WITH_AES_256_GCM_SHA384	
	TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256	
	TLS_ECDH_ECDSA_WITH_AES_256_GCM_SHA384	
	TLS_ECDH_RSA_WITH_AES_256_GCM_SHA384	
	TLS_DHE_RSA_WITH_AES_256_GCM_SHA384	

Profile	Cipher Suites	Default
	TLS_DHE_RSA_WITH_CHACHA20_POLY1305_SHA256	
	TLS_DHE_DSS_WITH_AES_256_GCM_SHA384	
	TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	
	TLS_RSA_WITH_AES_128_GCM_SHA256	
	TLS_ECDH_ECDSA_WITH_AES_128_GCM_SHA256	
	TLS_ECDH_RSA_WITH_AES_128_GCM_SHA256	
	TLS_DHE_RSA_WITH_AES_128_GCM_SHA256	
	TLS_DHE_DSS_WITH_AES_128_GCM_SHA256	
	TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384	
	TLS_RSA_WITH_AES_256_CBC_SHA256	
	TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA384	
	TLS_ECDH_RSA_WITH_AES_256_CBC_SHA384	
	TLS_DHE_RSA_WITH_AES_256_CBC_SHA256	
	TLS_DHE_DSS_WITH_AES_256_CBC_SHA256	
	TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA	
	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA	
	TLS_RSA_WITH_AES_256_CBC_SHA	
	TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA	
	TLS_ECDH_RSA_WITH_AES_256_CBC_SHA	
	TLS_DHE_RSA_WITH_AES_256_CBC_SHA	
	TLS_DHE_DSS_WITH_AES_256_CBC_SHA	
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256	
	TLS_RSA_WITH_AES_128_CBC_SHA256	
	TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA256	
	TLS_ECDH_RSA_WITH_AES_128_CBC_SHA256	
	TLS_DHE_RSA_WITH_AES_128_CBC_SHA256	
	TLS_DHE_DSS_WITH_AES_128_CBC_SHA256	
	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	
	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	
	TLS_RSA_WITH_AES_128_CBC_SHA	
	TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA	
	TLS_ECDH_RSA_WITH_AES_128_CBC_SHA	
	TLS_DHE_RSA_WITH_AES_128_CBC_SHA	
	TLS_DHE_DSS_WITH_AES_128_CBC_SHA	

The Private Key and the Certificate used by FORUM to identify itself in the TLS negotiation with remote application have to be provided in a local keystore file in PKCS12 or JKS (Java Key Store) format on the application host. Certificates of Certificate Authorities (CA) to validate Certificates received from remote applications during the TLS negotiation can also be provided in a local keystore file in JKS format or PKCS12 format.

7.1.2 Basic Application Level Confidentiality Profile

Not supported.

7.1.3 Association Level Security

FORUM accepts only associations from configured remote AE Titles.

7.1.4 Application Level Security

The DICOM capabilities of FORUM allows the use of either a conventional (non-secure) DICOM communication or a secure DICOM communication based on the Transport Layer Security (TLS) protocol.

Additionally,

- It is assumed that FORUM is used within a secured environment. It is assumed that a secured environment includes at a minimum Firewall or router protections to ensure that only approved external hosts have network access to FORUM
- Firewall or router protections to ensure that FORUM only has network access to approve 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 a 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.

8 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instance(s)

FORUM creates new instances for manually imported image or PDF files.

The prefixes for the created UIDs are:

Study Instance UID: 1.2.276.0.75.2.5.30.25.1.

Series Instance UID: 1.2.276.0.75.2.5.30.25.2.

SOP Instance UID: 1.2.276.0.75.2.5.30.25.3.

Abbreviations used for presence of values:

VNAP

Value Not Always Present (attribute sent zero length if no value is present) – Applicable for Type 2, 2C.

ANAP

Attribute is not always present – Applicable for Type 3

ALWAYS

Attribute is always present with a value – Applicable for Type 1

EMPTY

Attribute is sent without a value – Applicable for Type 2

Abbreviations used for sources of data:

USER

The attribute value source is from User input

AUTO

The attribute value is generated automatically

MWL, MPPS, etc.

The attribute value is the same as the value received using a DICOM service such as Modality Worklist, Modality Performed Procedure Step, etc.

CONFIG

The attribute value source is a configurable parameter

ACQUISITION

The sources of data come from data acquisition process. Include Image and data relate to Image

ANALYSIS

The sources of data come from data generate by application or add/edit/update by user when images are analyzed.

SRC

The attribute value is the same as the value in the selected patient or source dataset

Abbreviations used for Type:

PE

Private Extension

8.1.1.1 Secondary Capture Image Information Object Definition – File Import

In FORUM the user has the possibility to import image files for a selected patient. Supported image files are:

- JPEG
- BMP (only 8 Bit and 24 Bit)
- TIFF (only with three samples per pixel/24 Bit)

FORUM creates the following DICOM file as a result of this import operation.

IE	Module	Presence of Module
Patient	Patient	ALWAYS
Study	General Study	ALWAYS
Series	General Series	ALWAYS
Equipment	General Equipment	ALWAYS
	SC Equipment	ALWAYS
Image	General Image	ALWAYS
	Image Pixel	ALWAYS
	Sop Common	ALWAYS

Table 8-1 Secondary Capture Image IOD – File Import – File Meta Information

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0002,0001)	1	OB	File Meta Information Version	00\01	ALWAYS	AUTO
(0002,0002)	1	UI	Media Storage SOP Class UID	1.2.840.10008.5.1.4.1.1.7 (Secondary Capture Image Storage)	ALWAYS	AUTO
(0002,0003)	1	UI	Media Storage SOP Instance UID	The SOP instance UID has a prefix of 1.2.276.0.75.2.5.30.25.3.	ALWAYS	AUTO
(0002,0010)	1	UI	Transfer Syntax UID	1.2.840.10008.1.2.4.50 (JPEG Baseline Process 1, for imported JPG and TIFF Files) 1.2.840.10008.1.2 (Implicit VR Little Endian, for imported BMP Files)	ALWAYS	AUTO
(0002,0012)	1	UI	Implementation Class UID	1.2.276.0.75.2.5.30	ALWAYS	AUTO
(0002,0013)	3	SH	Implementation Version Name	"FORUM" + the current application version, e.g. "FORUM 4.0.1"	ALWAYS	AUTO

Table 8-2 Secondary Capture Image IOD – File Import – Module "Patient"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0010,0010)	2	PN	Patient's Name	Name of selected patient.	VNAP	SRC
(0010,0020)	2	LO	Patient ID	Patient ID of selected patient.	ALWAYS	SRC
(0010,0021)	3	LO	Issuer of Patient ID	Issuer of Patient ID of selected patient.	VNAP	SRC
(0010,0030)	2	DA	Patient's Birth Date	Birth Date of selected patient.	VNAP	SRC
(0010,0040)	2	CS	Patient's Sex	Gender of selected patient.	VNAP	SRC

(0010,1000)	3	LO	Other Patient IDs	Other Patient IDs of selected patient.	VNAP	SRC
(0010,2160)	3	SH	Ethnic Group	Ethnic Group of selected patient.	VNAP	SRC
(0010,4000)	3	LT	Patient Comments	Patient Comments of selected patient.	VNAP	SRC

Table 8-3 Secondary Capture Image IOD – File Import – Module “General Study”

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0020)	2	DA	Study Date	The value entered by the user via GUI as Content Date or if empty the current date.	ALWAYS	USER or AUTO
(0008,0030)	2	TM	Study Time	The value entered by the user via GUI as Content Time or if empty the current date.	ALWAYS	USER or AUTO
(0008,0050)	2	SH	Accession Number	Value entered by the user via GUI. Default: empty.	VNAP	USER
(0008,0090)	2	PN	Referring Physician’s Name	Value entered by the user via GUI (last name, first name, prefix). Default: empty.	VNAP	USER
(0020,000D)	1	UI	Study Instance UID	The study instance UID has a prefix of 1.2.276.0.75.2.5.30.25.1.	ALWAYS	AUTO
(0020,0010)	2	SH	Study ID	1	ALWAYS	AUTO

Table 8-4 Secondary Capture Image IOD – File Import – Module “General Series”

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0021)	3	DA	Series Date	Current date	ALWAYS	AUTO
(0008,0031)	3	TM	Series Time	Current time	ALWAYS	AUTO
(0008,0060)	1	CS	Modality	Possible values : AR, DOC, GM, KER, LEN, OAM, OP, OPM, OPT, OPV, OT, SRF, US, VA, XC	ALWAYS	USER
(0008,103E)	3	LO	Series Description		EMPTY	
(0020,000E)	1	UI	Series Instance UID	The Series instance UID has a prefix of 1.2.276.0.75.2.5.30.25.2.	ALWAYS	AUTO
(0020,0011)	2	IS	Series Number	1	ALWAYS	AUTO
(0020,0060)	2C	CS	Laterality	Optional. The value is selectable from a drop-down list. Possible values are: “L”, “R”, “B”.	ANAP	USER

Table 8-5 Secondary Capture Image IOD – File Import – Module “General Equipment”

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0070)	2	LO	Manufacturer	Carl Zeiss Meditec	EMPTY	
(0008,0080)	3	LO	Institution Name		EMPTY	
(0008,1010)	3	SH	Station Name		EMPTY	
(0018,1020)	3	LO	Software Version(s)	Software Version including patch and build level.	EMPTY	

(0008,1090)	3	LO	Manufacturer's Model Name	FORUM	EMPTY	
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Table 8-6 Secondary Capture Image IOD – File Import – Module “SC Equipment”

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0064)	1	CS	Conversion Type	DI	ALWAYS	AUTO

Table 8-7 Secondary Capture Image IOD – File Import – Module “General Image”

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0008)	3	CS	Image Type	ORIGINAL\PRIMARY ORIGINAL\PRIMARY\\(+ user input, possible values: "COLOR", "REDFREE", "RED", "BLUE", "FA", "ICG")	ALWAYS	AUTO and USER
(0008,0023)	2C	DA	Content Date	The value entered by the user via GUI as Content Date or if empty the current date.	ALWAYS	USER or AUTO
(0008,002A)	3	DT	Acquisition DateTime	The value entered by the user via GUI as Acquisition Date and Time or if empty the current date and time.	ALWAYS	USER or AUTO
(0008,0033)	2C	TM	Content Time	The value entered by the user via GUI as Content Time or if empty the current date.	ALWAYS	USER or AUTO
(0022,000C)	PE	FL	Horizontal Field of View	Value entered by the user via GUI. Default value is empty.	ANAP	USER
(0020,0013)	2	IS	Instance Number	1	ALWAYS	AUTO
(0020,0020)	2C	CS	Patient Orientation		EMPTY	
(0020,4000)	3	LT	Image Comments	Value entered by the user via GUI. Default value is empty.	VNAP	USER
(0028,0301)	3	CS	Burned In Annotation	Value entered by the user via GUI. , Possible values: "YES", "NO"	ALWAYS	USER
(0028,2110)	3	CS	Lossy Image Compression	01 (set for JPEG Baseline only)	ANAP	AUTO

Table 8-8 Secondary Capture Image IOD – File Import – Module "Image Pixel"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0028,0002)	1	US	Samples per Pixel	Value taken from the imported image	ALWAYS	SRC
(0028,0004)	1	CS	Photometric Interpretation	YBR_FULL_422 (for color JPG) RGB (for other color images) MONOCHROME2 (for monochrome images)	ALWAYS	AUTO
(0028,0006)	1C	US	Planar Configuration	0	ALWAYS	AUTO
(0028,0008)	PE	IS	Number of Frames	1 (import of multipage files not supported by FORUM)	ALWAYS	AUTO
(0028,0010)	1	US	Rows	Value taken from the imported image	ALWAYS	SRC
(0028,0011)	1	US	Columns	Value taken from the imported image	ALWAYS	SRC
(0028,0100)	1	US	Bits Allocated	8	ALWAYS	AUTO

(0028,0101)	1	US	Bits Stored	8	ALWAYS	AUTO
(0028,0102)	1	US	High Bit	7	ALWAYS	AUTO
(0028,0103)	1	US	Pixel Representation	0	ALWAYS	AUTO
(7FE0,0010)	1C	OB	Pixel Data	Data taken from the imported image.	ALWAYS	SRC

Table 8-9 Secondary Capture Image IOD – File Import – Module "SOP Common"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0005)	1C	CS	Specific Character Set	ISO_IR 192	ALWAYS	
(0008,0012)	3	DA	Instance Creation Date	Current date	ALWAYS	USER or AUTO
(0008,0013)	3	TM	Instance Creation Time	Current time	ALWAYS	USER or AUTO
(0008,0016)	1	UI	SOP Class UID	1.2.840.10008.5.1.4.1.1.7 (Secondary Capture Image Storage)	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	The SOP instance UID has a prefix of 1.2.276.0.75.2.5.30.25.3.	ALWAYS	AUTO
(0020,0013)	3	IS	Instance Number	1	ALWAYS	AUTO

8.1.1.2 Encapsulated PDF Information Object Definition

In FORUM the user has the option to import PDF files for a selected patient. FORUM creates the following DICOM file as a result of this import operation.

IE	Module	Presence of Module
Patient	Patient	ALWAYS
Study	General Study	ALWAYS
Series	Encapsulated Document Series	ALWAYS
Equipment	General Equipment	ALWAYS
	SC Equipment	ALWAYS
Encapsulated Document	Encapsulated Document	ALWAYS
	Sop Common	ALWAYS

Table 8-10 Encapsulated PDF IOD - "File Meta Information"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0002,0001)	1	OB	File Meta Information Version	00\01	ALWAYS	AUTO
(0002,0002)	1	UI	Media Storage SOP Class UID	1.2.840.10008.5.1.4.1.1.104.1 (Encapsulated PDF Storage)	ALWAYS	AUTO
(0002,0003)	1	UI	Media Storage SOP Instance UID	The SOP instance UID has a prefix of 1.2.276.0.75.2.5.30.25.3.	ALWAYS	AUTO
(0002,0010)	1	UI	Transfer Syntax UID	1.2.840.10008.1.2 (Implicit VR Little Endian)	ALWAYS	AUTO
(0002,0012)	1	UI	Implementation Class UID	1.2.276.0.75.2.5.30	ALWAYS	AUTO
(0002,0013)	3	SH	Implementation Version Name	"FORUM" + the current application version, e.g. "FORUM 4.0.1"	ALWAYS	AUTO

Table 8-11 Encapsulated PDF IOD - Module "Patient"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0010,0010)	2	PN	Patient's Name	Name of selected patient.	VNAP	SRC
(0010,0020)	2	LO	Patient ID	Patient ID of selected patient.	ALWAYS	SRC
(0010,0021)	3	LO	Issuer of Patient ID	Issuer of Patient ID of selected patient.	VNAP	SRC
(0010,0030)	2	DA	Patient's Birth Date	Birth Date of selected patient.	VNAP	SRC
(0010,0040)	2	CS	Patient's Sex	Gender of selected patient.	VNAP	SRC
(0010,1000)	3	LO	Other Patient IDs	Other Patient IDs of selected patient.	VNAP	SRC
(0010,2160)	3	SH	Ethnic Group	Ethnic Group of selected patient.	VNAP	SRC
(0010,4000)	3	LT	Patient Comments	Patient Comments of selected patient.	VNAP	SRC

Table 8-12 Encapsulated PDF IOD - Module "General Study"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0020)	2	DA	Study Date	The value entered by the user via GUI as Content Date or if empty the current date.	ALWAYS	USER or AUTO

(0008,0030)	2	TM	Study Time	The value entered by the user via GUI as Content Time or if empty the current date.	ALWAYS	USER or AUTO
(0008,0050)	2	SH	Accession Number	Value entered by the user via GUI. Default: empty	VNAP	USER
(0008,0090)	2	PN	Referring Physician's Name	Value entered by the user via GUI (last name, first name and prefix). Default: empty	VNAP	USER
(0020,000D)	1	UI	Study Instance UID	The study instance UID has a prefix of: 1.2.276.0.75.2.5.30.25.1.	ALWAYS	AUTO
(0020,0010)	2	SH	Study ID	1	ALWAYS	AUTO

Table 8-13 Encapsulated PDF IOD - Module "Encapsulated Document Series"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0021)	PE	DA	Series Date	Current date	ALWAYS	AUTO
(0008,0031)	PE	TM	Series Time	Current time	ALWAYS	AUTO
(0008,0060)	1	CS	Modality	Possible values : AR, DOC, GM, KER, LEN, OAM, OP, OPM, OPT, OPV, OT, SRF, US, VA, XC	ALWAYS	USER
(0008,103E)	3	LO	Series Description		EMPTY	
(0020,000E)	1	UI	Series Instance UID	The Series instance UID has a prefix of 1.2.276.0.75.2.5.30.25.2.	ALWAYS	AUTO
(0020,0011)	1	IS	Series Number	1	ALWAYS	AUTO

Table 8-14 Encapsulated PDF IOD - Module "General Equipment"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0070)	2	LO	Manufacturer	Carl Zeiss Meditec	EMPTY	
(0008,0080)	3	LO	Institution Name		EMPTY	
(0008,1010)	3	SH	Station Name		EMPTY	
(0018,1020)	3	LO	Software Version(s)	Software Version including patch and build level.	EMPTY	
(0008,1090)	3	LO	Manufacturer's Model Name	FORUM	EMPTY	

Table 8-15 Encapsulated PDF IOD - Module "SC Equipment"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0064)	1	CS	Conversion Type	DI	ALWAYS	AUTO

Table 8-16 Encapsulated PDF IOD - Module "Encapsulated Document"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0023)	2	DA	Content Date	The value entered by the user via GUI as Content Date or if empty the current date.	ALWAYS	USER or AUTO
(0008,002A)	2	DT	Acquisition DateTime	The value entered by the user via GUI as Acquisition Date and Time or if empty the current date and time.	ALWAYS	USER or AUTO

(0008,0033)	2	TM	Content Time	The value entered by the user via GUI as Content Time or if empty the current date.	ALWAYS	USER or AUTO
(0020,0013)	1	IS	Instance Number	1	ALWAYS	
(0020,0062)	3	CS	Image Laterality	Optional. The value is selectable from a drop-down list. Possible values are: "L", "R", "B".	ANAP	USER
(0028,0301)	1	CS	Burned In Annotation	Value entered by the user via GUI. , Possible values: "YES", "NO".	ALWAYS	USER
(0042,0010)	2	ST	Document Title	Value entered by the user in the field "PDF Document Title" or file name of the PDF which was chosen by the user for import.	ALWAYS	USER or AUTO
(0040,A043)	2	SQ	Concept Name Code Sequence		EMPTY	
(0042,0011)	1	OB	Encapsulated Document	The bytes of the imported PDF document.	ALWAYS	SRC
(0042,0012)	1	LO	MIME Type of Encapsulated Document	application/pdf	ALWAYS	AUTO

Table 8-17 Encapsulated PDF IOD Module "SOP Common"

Tag	Type	VR	Name	Content (Description)	PoV	Source
(0008,0005)	1C	CS	Specific Character Set	ISO_IR 192	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Current date	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Current time	ALWAYS	AUTO
(0008,0016)	1	UI	SOP Class UID	1.2.840.10008.5.1.4.1.1.104.1 (Encapsulated PDF Storage)	ALWAYS	
(0008,0018)	1	UI	SOP Instance UID	The SOP instance UID has a prefix of 1.2.276.0.75.2.5.30.25.3.	ALWAYS	AUTO

8.1.2 Usage of Attributes from Received IOD's

The acquisition date and time of a document in FORUM is defined by the following rules:

If (0008,002A) Acquisition DateTime is not filled in the DICOM header, then (0008,0022) Acquisition Date and (0008,0032) Acquisition Time will be used as FORUM document acquisition date and time.

If (0008,0022) Acquisition Date is not filled, then (0008,0021) Series Date and (0008,0031) Series Time will be used as FORUM document acquisition date and time.

If (0008,0021) Series Date and (0008,0031) Series Time are not filled, then (0008,0020) Study Date and (0008,0030) Study Time will be used as FORUM document acquisition date and time.

If (0008,0020) Study Date is not filled, then (0008,0023) Content Date and (0008,0033) Content Time will be used as FORUM document acquisition date and time.

The FORUM image laterality is defined by the following rule:

If (0020,0062) Image Laterality is not filled, then Laterality (0020,0060) will be used as FORUM Image Laterality.

The resulting attributes Acquisition DateTime and Image Laterality will be used for display within the FORUM viewer as well as for the C-FIND request (matching/return keys, and sorting by Acquisition DateTime).

8.1.3 Attribute Mapping

Not applicable.

8.1.4 Coerced/Modified Files

8.1.4.1 Patient Edit/Merge or Instance Reassign

The following attributes are updated in the DICOM header of an IOD, in case they are edited in the FORUM Viewer, or if two patients are being merged:

Tag	VR	VM	Name
(0010,0021)	LO	1	Issuer of Patient ID
(0010,0020)	LO	1	Patient ID
(0010,0010)	PN	1	Patient's Name
(0010,0030)	DA	1	Patient's Birth Date
(0010,0040)	CS	1	Patient's Sex
(0010,2160)	SH	1	Ethnic Group
(0010,1000)	LO	1-n	Other Patient IDs
(0010,4000)	LT	1	Patient Comments

If the DICOM Header does not support the changed characters of the changed attributes, then the DICOM File will be transcoded to UTF8. This includes all other String or Text attributes. If there is an unknown VR in the DICOM Header (in case of Implicit VR Little Endian Transfer Syntax with unknown Private Tags), then there will be no transcoding, and the unsupported characters will be replaced by a question mark "?".

All of the above patients attribute (if it is a study of another patient) and the following study and series level attributes are updated in the DICOM header of an IOD, in case a SOP Instance is reassigned to another study.

Tag	VR	VM	Name
(0020,000D)	UI	1	Study Instance UID

(0020,0010)	SH	1	Study ID
(0008,0020)	DA	1	Study Date
(0008,0030)	TM	1	Study Time
(0008,0050)	SH	1	Accession Number
(0008,0090)	PN	1	Referring Physician's Name
(0008,1080)	LO	1-n	Admitting Diagnoses Description
(0008,1030)	LO	1	Study Description
(0020,000E)	UI	1	Series Instance UID
(0008,103E)	LO	1	Series Description

If reassigned to a new Study or Series FORUM generates a new Study- and Series Instance UID. FORUM uses Study Date and Time from the original Study. The user is asked to enter Accession Number, Referring Physician's Name, Admitting Diagnoses Description and Study Description via the GUI.

If reassigned to a new Study or Series, the corresponding values of the destination Study or Series will be used to update the attribute values of the reassigned instance(s).

The SOP Instance UID will not be changed.

8.1.4.2 Patient Information / Patient Matching

The following terms and rules for patient identification are defined:

Strict Attributes:

Patient ID
Patient Birth Date

Lax Attributes:

Issuer of Patient ID
Patient's Sex

Lax Matching:

Lax attributes match if they are equal
Lax attributes match if they are empty on either side

Corresponding Component Name Groups:

Corresponding component group names have equal first- and last name
Corresponding component group names have lax matching middle name, prefix and suffix

Corresponding Patient:

Corresponding patients have equal strict attributes
Corresponding patients have matching lax attributes
Corresponding patients have corresponding component group names regardless of the position of the component group name. Either one of the patients to be compared might have more filled component group names. For example the following two Patient's Names match: "aaa^bbb^dr=ggg^hhh" matches "xxx^yyy=aaa^bbb=ggg^hhh^pref"

Conflicted Patient:

A patient who has no Patient ID.

A patient who contains an existing combination of Issuer of Patient ID and a Patient ID and this existing patient is not a "corresponding patient" as defined above.

Patient Information attributes:

Tag	VR	VM	Name
(0010,0021)	LO	1	Issuer of Patient ID
(0010,0020)	LO	1	Patient ID
(0010,0010)	PN	1	Patient's Name
(0010,0030)	DA	1	Patient's Birth Date
(0010,0040)	CS	1	Patient's Sex
(0010,2160)	SH	1	Ethnic Group
(0010,1000)	LO	1-n	Other Patient IDs
(0010,4000)	LT	1	Patient Comments

Patient Information will be updated in the DICOM files:

If the user edits one of the patient information attributes via the GUI.

If an incoming DICOM file has an existing corresponding patient in FORUM and differences in the patient information attributes.

8.1.4.3 Missing UIDs

Study Instance UID, Series Instance UID and SOP Instance UID will be auto generated if one of those is missing in an incoming DICOM file.

8.1.4.4 Patient Identification Conflict with Study Instance UID

If an incoming DICOM file belongs to an existing study in FORUM and this existing study belongs to a different patient already existing in FORUM (different patient is a "not corresponding patient" according to 8.1.4.2) then a new Study Instance UID will be automatically generated.

8.2 Data Dictionary of Private Attributes

FORUM does not create any private attributes.

8.3 Coded Terminology and Templates

FORUM does not use or create any codes.

8.4 Greyscale Image Consistency

This chapter is not applicable.

8.5 Standard Extended / Specialized/ Private SOP Classes**8.6 The following standard extensions are used in the IODs described in chapter 8.1 IOD Contents**

Created SOP Instance(s).

Table 8-7 Secondary Capture Image IOD – File Import – Module "General Image"

Table 8-8 Secondary Capture Image IOD – File Import – Module "Image Pixel"

Table 8-13 Encapsulated PDF IOD - Module "Encapsulated Document Series"

8.7 Private Transfer Syntaxes

No Private Transfer Syntax is supported.



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