



# DICOM Conformance Statement

## FORUM

Version 2.6

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## 1 Conformance Statement Overview

This document is structured as suggested in the DICOM Standard (PS 3.2, 2009).

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
<b>Verification</b>		
Verification	Yes	Yes
<b>Transfer Image Storage Classes</b>		
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
Raw Data 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
<b>Transfer Video Image Storage Classes</b>		
Video Endoscopic Image Storage	Yes	Yes
Video Microscopic Image Storage	Yes	Yes
Video Photographic Image Storage	Yes	Yes
<b>Transfer Other Storage Classes</b>		
Encapsulated PDF Storage	Yes	Yes
<b>Query/Retrieve</b>		
Study Root Query/Retrieve Information Model - FIND	No	Yes
Study Root Query/Retrieve Information Model - MOVE	No	Yes
<b>Workflow Management</b>		
Modality Worklist Information Model - FIND	No	Yes
Storage Commitment Push Model	No	Yes

FORUM does not support Media Interchange.

## 2 Table of Contents

1	Conformance Statement Overview .....	2
2	Table of Contents.....	3
3	Introduction .....	4
3.1	Revision History.....	4
3.2	Audience.....	4
3.3	Remarks .....	4
3.4	Definitions, Terms and Abbreviations.....	4
3.5	References.....	4
4	Networking .....	5
4.1	Implementation Model.....	5
4.1.1	Application Data Flow .....	5
4.1.2	Functional Definition of AEs .....	6
4.1.2.1	Verification.....	6
4.1.2.2	Receive Images .....	6
4.1.2.3	Storage Commitment .....	6
4.1.2.4	Query from other devices.....	6
4.1.2.5	Retrieve to other devices .....	6
4.1.2.6	Store to other devices .....	6
4.1.2.7	Modality Worklist .....	6
4.2	AE Specifications .....	7
4.2.1	FORUM Application Entity Specification .....	7
4.2.1.1	SOP Classes .....	7
4.2.1.2	Associations Policies .....	7
4.2.1.2.1	General.....	7
4.2.1.2.2	Number of Associations.....	7
4.2.1.2.3	Asynchronous Nature .....	7
4.2.1.2.4	Implementation Identifying Information.....	7
4.2.1.3	Association Initiation Policy .....	8
4.2.1.3.1	Activity – Verification (SCU) .....	8
4.2.1.3.2	Activity – Store Objects (SCU).....	8
4.2.1.4	Association Acceptance Policy .....	9
4.2.1.4.1	Activity – Verification (SCP).....	9
4.2.1.4.2	Activity – Store Objects (SCP) .....	9
4.2.1.4.3	Activity – Request Storage Commitment (SCP) .....	10
4.2.1.4.4	Activity – Find Objects (SCP).....	11
4.2.1.4.5	Activity – Move Objects (SCP) .....	16
4.2.1.4.6	Activity – Query Modality Worklist (SCP) .....	17
4.3	Network Interfaces.....	19
4.3.1	Physical Network Interface .....	19
4.3.2	Additional Protocols.....	19
4.4	Configuration .....	20
4.4.1	AE Title/Presentation Address Mapping .....	20
4.4.1.1	Local AE Titles .....	20
4.4.1.2	Remote AE Titles.....	20
5	Media Interchange .....	21
6	Support Of Character Sets .....	22
6.1	Accepted Character Sets.....	22
6.2	Returned Character Sets.....	22
7	Security.....	23
8	Annexes .....	24
8.1	IOD Contents .....	24
8.1.1	Created SOP Instance(s).....	24
8.1.2	Usage of Attributes from Received IODs .....	24
8.1.3	Attribute Mapping .....	24
8.1.4	Coerced/Modified Files.....	24
8.1.4.1	Patient Information .....	24
8.1.4.2	Missing UIDs .....	25
8.1.4.3	Patient Identification Conflict with Study Instance UID.....	25
8.2	Data Dictionary of Private Attributes.....	25
8.3	Private Transfer Syntaxes .....	25

## 3 Introduction

### 3.1 Revision History

Document Version	Author	Date	Change
1.0	Gunther Wiest	2011-01-11	Initial revision for FORUM v2.6
1.1	Gunther Wiest	2011-03-15	Added further Information to chapter "SOP Specific Conformance – Find Objects". Added to chapter "SOP Specific Conformance – Storage Commitment"
1.2	Gunther Wiest	2011-04-26	Added C-FIND-RSP Status "Too Many Results"

### 3.2 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. The reader should have a basic understanding of DICOM.

### 3.3 Remarks

If another device matches this conformance statement based on the comparison with its own conformance statement, there is a chance, but no guarantee, that they interoperate. DICOM only deals with communication; it does not specify what is needed for certain applications to run on a device.

### 3.4 Definitions, Terms and Abbreviations

Abbreviation	Definition
AE	Application Entity
AET	Application Entity Title
DICOM	Digital Imaging and Communications in Medicine
ILE	Implicit Little Endian
IOD	Information Object Definition
JPG-1	JPEG Coding Process 1 transfer syntax; JPEG Baseline; ISO 10918-1
MWL	Modality Work List
MPG2	Motion Picture Expert Group 2; Abbreviation and synonym for video encoding and compression transfer syntax.
NB	Network Broker
RLE	Run Length Encoding
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair, pair of user and provider.
SW	Software
TCP/IP	Transmission Control Protocol / Internet Protocol
UID	Unique Identifier
VL	Visible Light

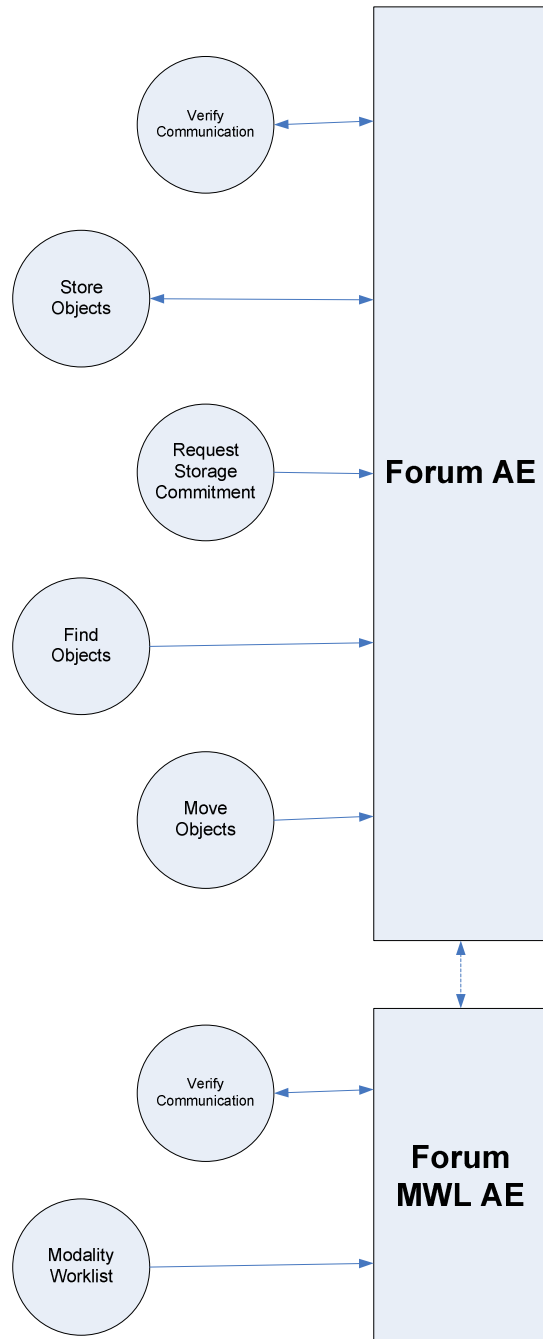
### 3.5 References

Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2009

## 4 Networking

### 4.1 Implementation Model

#### 4.1.1 Application Data Flow



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 Verification**

Both the FORUM AE and the FORUM MWL AE will respond to a DICOM C-Echo request from a remote AE in order to verify the communication.

The FORUM AE can also initiate an association and request verification to a remote AE.

### **4.1.2.2 Receive Images**

The FORUM AE stores a received image in its internal data storage. The FORUM AE stores each image with the File Meta Information attached to it.

The FORUM AE extracts the query information with respect to the patient, study, series, and instance, and stores this information in its internal index database.

### **4.1.2.3 Storage Commitment**

The FORUM AE acts as an SCP for Storage Commitment to take over the responsibility explicitly for storing received DICOM instances.

### **4.1.2.4 Query from other devices**

The FORUM AE responds to queries based on the information stored in its index database.

When a DICOM query request is received, the FORUM AE converts the request into a corresponding database query. The results of the database query are then returned to the remote AE.

### **4.1.2.5 Retrieve to other devices**

The FORUM AE acts as an SCP for C-Move requests to retrieve DICOM instances.

### **4.1.2.6 Store to other devices**

The FORUM AE acts as an SCU for C-Store requests to transmit DICOM instances to a remote DICOM AE.

### **4.1.2.7 Modality Worklist**

The FORUM MWL AE returns a Modality Worklist item in response to a request from a remote AE. In order to return a worklist item, the user of the FORUM MWL AE must schedule a patient using the MWL Scheduler UI. This information is cached in the local database.

When a DICOM MWL request is received, the FORUM MWL AE converts the request into a database query. The results of the database query are then returned via DICOM (as a MWL response) to the remote AE.

## 4.2 AE Specifications

### 4.2.1 FORUM Application Entity Specification

#### 4.2.1.1 SOP Classes

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
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	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
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

DICOM standard Application Context Name is DICOM 3.0.

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.

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

##### 4.2.1.2.3 Asynchronous Nature

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

##### 4.2.1.2.4 Implementation Identifying Information

Implementation Class UID	1.2.276.0.75.2.5.30
Implementation Version Name	FORUM 2.6

### 4.2.1.3 Association Initiation Policy

#### 4.2.1.3.1 Activity – Verification (SCU)

##### 4.2.1.3.1.1 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.

##### 4.2.1.3.1.2 Proposed Presentation Contexts

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	SCU	No

##### 4.2.1.3.1.3 SOP Specific Conformance – Verification

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

#### 4.2.1.3.2 Activity – Store Objects (SCU)

##### 4.2.1.3.2.1 Description and Sequencing of Activities

The FORUM AE will transmit instances either driven by user requests through the UI, 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.

##### 4.2.1.3.2.2 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 used when the object was initially accepted by the server.

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 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 MPEG2 MPML MPEG2 MPHL	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 1.2.840.10008.1.2.4.100 1.2.840.10008.1.2.4.101	SCU	No
All SOP classes listed in section "Transfer Video Image Storage Classes"	MPEG2 MPML MPEG2 MPHL	1.2.840.10008.1.2.4.100 1.2.840.10008.1.2.4.101	SCU	No
All SOP classes listed in section "Transfer Other Storage 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	SCU	No

##### 4.2.1.3.2.3 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.

## 4.2.1.4 Association Acceptance Policy

### 4.2.1.4.1 Activity – Verification (SCP)

#### 4.2.1.4.1.1 Description and Sequencing of Activities

Both the FORUM AE and the FORUM MWL AE will respond to Verification requests to provide an SCU with the ability to determine if the respective AEs are able to receive and handle DICOM requests.

#### 4.2.1.4.1.2 Accepted Presentation Contexts

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	SCP	No

#### 4.2.1.4.1.3 SOP Specific Conformance – Verification

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.

### 4.2.1.4.2 Activity – Store Objects (SCP)

#### 4.2.1.4.2.1 Description and Sequencing of Activities

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

#### 4.2.1.4.2.2 Accepted Presentation Contexts

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 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 MPEG2 MPML MPEG2 MPHL	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 1.2.840.10008.1.2.4.100 1.2.840.10008.1.2.4.101	SCP	No
All SOP classes listed in section "Transfer Video Image Storage Classes"	MPEG2 MPML MPEG2 MPHL	1.2.840.10008.1.2.4.100 1.2.840.10008.1.2.4.101	SCP	No
All SOP classes listed in section "Transfer Other Storage 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	SCP	No

#### 4.2.1.4.2.3 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 or coerced by the FORUM AE. 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 received with an SOP Instance UID (0008,0018) that is equal to an instance that is already present on the FORUM AE, the object will not be accepted.

One of the following Status codes is returned by the FORUM AE:

Service Status	Further Meaning	Error Code	Description
Refused	Out Of Resources	A700	Error while allocating enough storage space. 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.

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

#### 4.2.1.4.3 Activity – Request Storage Commitment (SCP)

##### 4.2.1.4.3.1 Description and Sequencing of Activities

The FORUM AE stores instances that are sent to it from a remote SCU. The request for Storage Commitment may then be transmitted to the FORUM AE together with a list of references to one or more DICOM SOP instances.

##### 4.2.1.4.3.2 Accepted Presentation Contexts

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	1.2.840.10008.1.2	SCP	No

#### 4.2.1.4.3.3 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:

Service Status	Further Meaning	Error Code	Description
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.

The N-EVENT-REPORT contains the following Failure Reasons in the Failed SOP Sequence:

Failure Reason	Further Meaning	Error Code	Description
Error	No such object instance	0112	The SOP instance is not available in FORUM.
	Class / Instance conflict	0119	The SOP instance is stored with another SOP class UID in FORUM
	Referenced SOP Class not supported	0122	The SOP instance is not available in FORUM and the SOP Class is not supported by FORUM.

#### 4.2.1.4.4 Activity – Find Objects (SCP)

##### 4.2.1.4.4.1 Description and Sequencing of Activities

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

##### 4.2.1.4.4.2 Accepted Presentation Contexts

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	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	SCP	Yes

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.

#### 4.2.1.4.4.3 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 PN VR attributes is always done case-insensitive.

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

##### **Patient Root / Patient Level Attributes:**

<b>Description</b>	<b>Tag</b>	<b>Matching Type</b>
Patient's Name	(0010,0010)	U S *
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 *

##### **Patient Root / Study Level Attributes:**

<b>Description</b>	<b>Tag</b>	<b>Matching Type</b>
Study Instance UID	(0020,000D)	U S
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	(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 *

**Study Root / Study Level Attributes:**

Description	Tag	Matching Type
Study Instance UID	(0020,000D)	U S
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	(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 *
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 *

**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
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

**Instance Level Attributes:**

Description	Tag	Matching Type
Image Type	(0008,0008)	U S *
Instance Number	(0020,0013)	U S
SOP Instance UID	(0008,0018)	U S
SOP Class UID	(0008,0016)	U S
Instance Creation Date	(0008,0012)	U CDT
Instance Creation Time	(0008,0013)	U CDT
Acquisition Date Time	(0008,002A)	U CDT
Icon Image Sequence	(0088,0200)	return key only
Image Laterality	(0020,0062)	U S
Document Title	(0042,0010)	U S *
Referenced Image Sequence (*)	(0008,1140)	
>Referenced SOP Instance UID	(0008,1155)	U S
>Referenced SOP Class UID	(0008,1150)	return key only
>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 (*)	(0008,114A)	
>Referenced SOP Instance UID	(0008,1155)	U S
>Referenced SOP Class UID	(0008,1150)	return key only
>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 (\*): Only one of "Referenced Image Sequence" or "Referenced Instance Sequence" is supported in one C-FIND\_REQUEST

**Matching Types:**

- U – Universal Matching
- S – Single value Matching
- \* - Wildcard Matching
- R – Range Matching
- CDT – Combined Date Time Matching
- UNIQUE – Unique query key for that level

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

Service Status	Further Meaning	Error Code	Description
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 1000 responds than theses 1000 responds will be returned followed by this status.
Success	Success	0000	Operation performed properly.

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

A conflicted patient in FORUM will be generated, if an incoming C-STORE dataset:

- contains no patient id.
- contains an existing combination of issuer of patient id and a patient id and this existing patient is not a "corresponding patient" as defined in "8.1.4.1 Patient Information".



A Patient Root Query in FORUM returns only unconflicted patients.  
A Study Root Query in FORUM returns all patients.

#### 4.2.1.4.5 Activity – Move Objects (SCP)

##### 4.2.1.4.5.1 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 server.

##### 4.2.1.4.5.2 Accepted Presentation Contexts

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	No

##### 4.2.1.4.5.3 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 4.2.1.4.2.2 may be negotiated in this association.

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

Service Status	Further Meaning	Error Code	Description
Refused	No Such SOP class	0118	If a SOP Class is used, that was not negotiated.
	Unrecognized Operation	0211	Unrecognized value in Command Filed
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.

#### 4.2.1.4.6 Activity – Query Modality Worklist (SCP)

##### 4.2.1.4.6.1 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.

Before the FORUM MWL AE can respond to a DICOM Modality Worklist query, the integrated MWL Scheduler UI needs to be used by the user to schedule Procedure Steps.

##### 4.2.1.4.6.2 Accepted Presentation Contexts

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

C-Find Extended Negotiation is supported: For the field "Date-time matching" the value "1" is returned, meaning that this is supported by the FORUM AE.

##### 4.2.1.4.6.3 SOP Specific Conformance – MWL

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.

The following table contains detailed information on matching and returned 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:

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 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:

Service Status	Further Meaning	Error Code	Description
Refused	No Such SOP class	0118	If a SOP Class is used, which was not negotiated.
	Unrecognized Operation	0211	Unrecognized value in Command Filed
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.
Success	Success	0000	Operation performed properly.

Note:

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.

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## **4.3 Network Interfaces**

### **4.3.1 Physical Network Interface**

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

### **4.3.2 Additional Protocols**

No additional protocols are supported.

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## 4.4 Configuration

### 4.4.1 AE Title/Presentation Address Mapping

The translation from Application Entity Title to Presentation Address (TCP/IP address) 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. The IP is administrated by the Operating System. The AE titles for the FORUM AE and the FORUM MWL AE is configurable.

The FORUM application can be configured to use only one AE for all transactions.

#### 4.4.1.2 Remote AE Titles

The mapping of external AE Titles to TCP/IP addresses and ports is configurable.



## 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

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

### 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

The DICOM capabilities of the FORUM Application do not support any specific security measures.

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 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 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 "Combined Reports" either automatically according to certain rules or manually.

#### 8.1.2 Usage of Attributes from Received IODs

FORUM uses the attribute in the following sequence:

If Acquisition DateTime is not filled, then Acquisition Date and Time will be used as FORUM Acquisition DateTime.

If Series Date and Time are not filled, then Study Date and Time will be used as FORUM Series Date and Time.

If FORUM Series Date and Time are still not filled, then Content Date and Time will be used as FORUM Series Date and Time.

If FORUM Acquisition DateTime is still not filled, then FORUM Series Date and Time will be used as FORUM Acquisition DateTime.

If Image Laterality is not filled, then Laterality will be used as FORUM Image Laterality.

#### 8.1.3 Attribute Mapping

#### 8.1.4 Coerced/Modified Files

##### 8.1.4.1 Patient Information

The following terms are defined:

Strict Attributes:

- Patient ID
- Patient's Name Last Name
- Patient's Name First Name
- Patient Birth Date

Lax Attributes:

- Issuer of Patient ID
- Patient's Name Prefix
- Patient's Name Suffix
- Patient's Name Middle Name
- Patient's Sex

Matching Lax Attribute:

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

Corresponding Patient:

- Corresponding patients have equal strict attributes
- Corresponding patients have matching lax attributes

Patient Information Attributes:

- All Strict Attributes
- All lax attributes
- Ethnic Group,
- Other Patient IDs
- Patient Comments

Patient Information will be updated in the Dicom files:

- If the user edits one of the patient information attributes
- If an incoming DICOM File has an existing corresponding patient in FORUM and differences in the patient information attributes

#### **8.1.4.2 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.

#### **8.1.4.3 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 existing patient (different patient = not "corresponding patient", see 8.1.4.1) then a new Study Instance UID will be auto generated.

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### **8.2 Data Dictionary of Private Attributes**

FORUM does not create any private attributes.

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### **8.3 Private Transfer Syntaxes**

No Private Transfer Syntaxes are supported.