CARL ZEISS MEDITEC

DICOM Conformance Statement

FORUM LINK net

Version 1.0

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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)
Verification		
Verification	Yes	Yes
Transfer		
Encapsulated PDF Storage	Yes	No
Multi-Frame True Color SC Image Storage	Yes	No
Workflow Management		
Modality Worklist IM - FIND	Yes	No
Query		
Patient Root Query/Retrieve IM – FIND	Yes	No

The FORUM LINK net does not support Media Interchange.

2 Table of Contents

3 Introduction

3.1 Revision History

Document Version	Author	Date
1.0	Susanne Hornauer	2011-05-31

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 deals only with communication; it does not specify what is needed for certain applications to run on a device.

3.4 Definitions and Terms

[PS 3.2-2009] 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 3-1 Abbreviations used in this document

Abbreviation	Definition
AE	Application Entity
AET	Application Entity Title
DICOM	Digital Imaging and Communications in Medicine
ILE	Implicit Little Endian
ELE	Explicit Little Endian
IOD	Information Object Definition
JPG-1	JPEG Coding Process 1 transfer syntax; JPEG Baseline; ISO 10918-1
J2K	JPEG 2000 Image Compression

J2K-LL	JPEG 2000 Image Compression (Lossless Only)
MWL	Modality Work List
MPG2	Motion Picture Expert Group 2; Abbreviation and synonym for video encoding and compression transfer syntax.
OD	Oculus Dexter, the right eye
OS	Oculus Sinister, the left eye
OU	Oculus Uturque, both eyes
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
UID	Unique Identifier
IM	Information Model

3.6 References

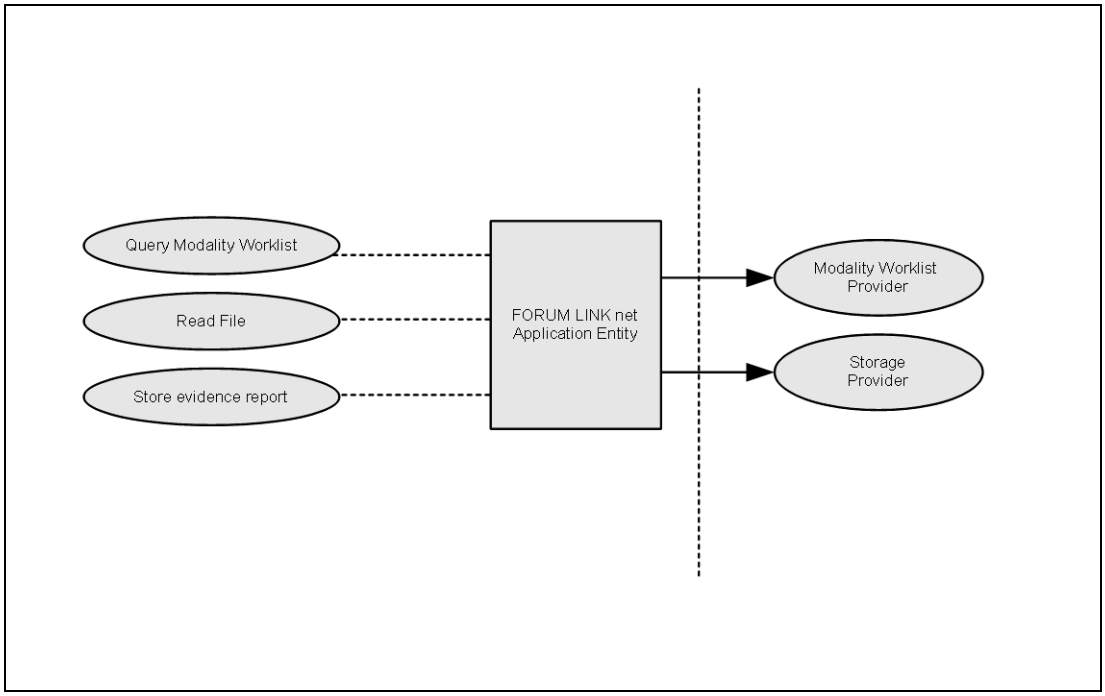
Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2009

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Figure 4-1 FORUM LINK net Application Software as Acquisition Modality



4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of FORUM LINK net

FORUM LINK net is an application which helps integrating ophthalmic devices without DICOM interface into a DICOM network with the data management system FORUM Archive & Viewer. The FORUM LINK net converts PDF and JPG files coming from the ophthalmic device into a DICOM compliant format. These DICOM files can then be imported into FORUM Archive & Viewer .

FORUM LINK net allows to connect up to four devices and supports the following functions:

- Query for modality worklist
- Query for patient demographic data
- Store evidence reports
- Store secondary capture images

FORUM LINK net AE runs several DICOM Services, as Service Class User and as Service Class Provider for Verification. All DICOM related activities are triggered manually by the operator.

FORUM LINK net allows performing a verification of the configured AEs. The result of this verification contains information about the supported SOP Classes and Transfer Syntaxes.

Depending on the log level, which can be adjusted via Graphical User Interface, extensive information about the DICOM communication can be written to the log file.

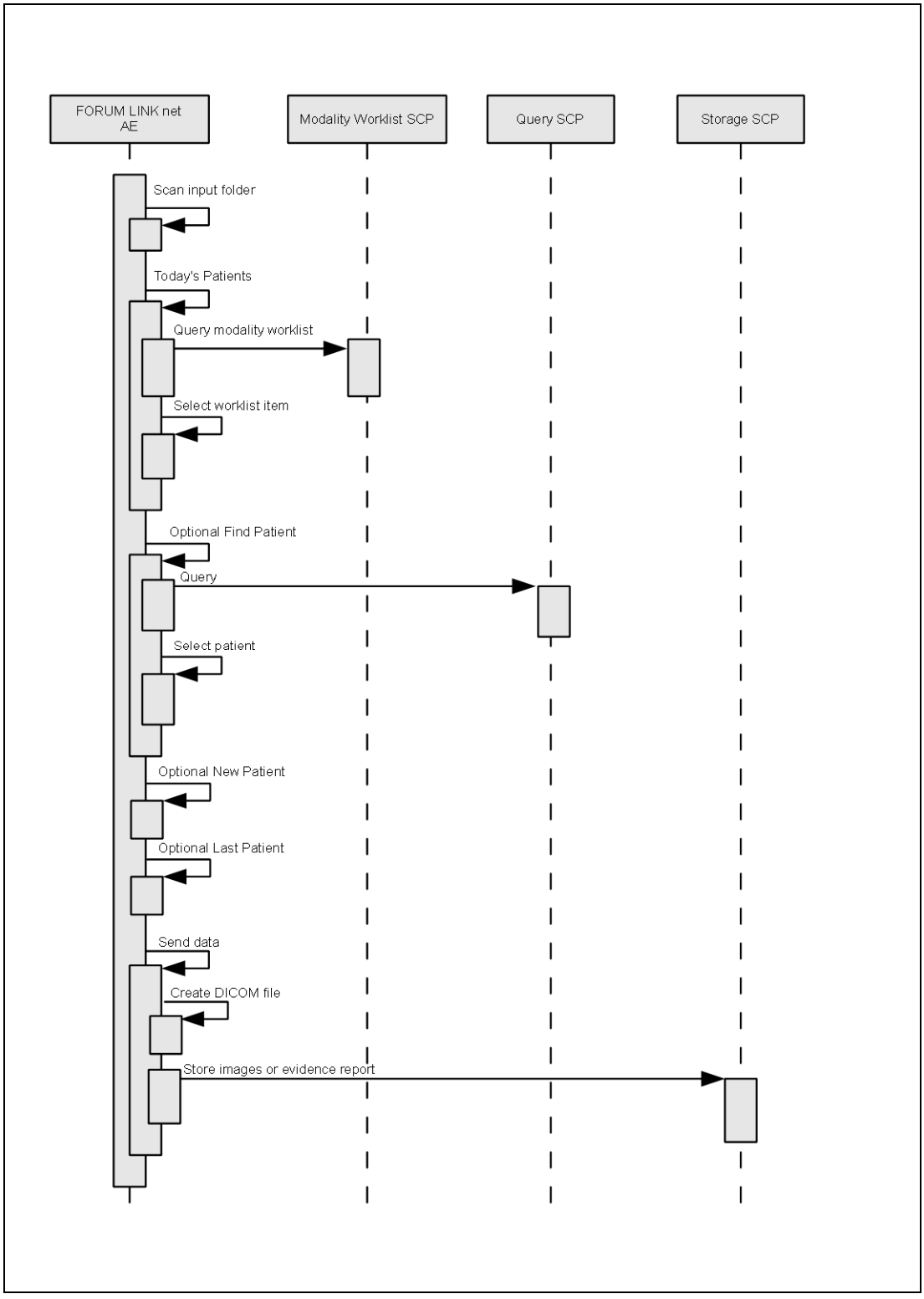
4.1.3 Sequencing of Real-World Activities

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.

4.1.3.1 Scheduled case with Acquisition Modality

The normal case is that the patient arrives at the front desk and the examination gets scheduled in advance. All patient and study related information is available at the day the examination shall be taken.



The activities can be triggered by the operator with one exception. The scan input folder activity is an activity happening automatically in the background, no user interaction is required. The shown order of the activities is the expected order. Details on DIMSE level will be explained in chapters after this.

Query Modality Worklist
With FORUM LINK net the operator can query for modality worklist. The user can specify which station the modality worklist shall be queried for in case more than one station has been configured in FORUM LINK net. The matches are listed in a table, where the operator can select the correct item.

Find Patient (s)
In case the Modality Worklist Provider is not available or the patient has not been scheduled in advance, the operator can also search for patients existing at the Query SCP. The operator specifies the search criteria by entering either parts of the patient's last name or the patient id.

New Patient
In an unscheduled case a new patient can be created manually. This is not recommended and should only be used as a fallback.

Last Patient
In case more than one file for the same patient exists in the input folder, the operator can select the last patient processed.

Send data
The activity can be triggered after input file(s) and corresponding patient information have been selected.

This activity converts the input data into a DICOM compliant format and stores it to the configured Storage Provider. The transferred files are moved into a "transmitted" folder, which gets automatically created in the configured station's source folder.

4.1.3.2 Unscheduled case

In the unscheduled case the patient arrives immediately at the instrument without being scheduled in advance. Thus no Modality Worklist information for the examination is available. In this case the operator has two alternatives:

- Search for patient information by querying the Query Service Class Provider.
- Create a new patient in FORUM LINK net by entering relevant patient demographic information.

Both scenarios shall only be used as fallback as the approach is much more error prone than the scheduled case.

4.2 AE Specifications

4.2.1 FORUM LINK net Acquisition Modality AE 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	Yes	No
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No

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:

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

The number of simultaneous associations can be two. At a time there may be one outgoing association and one incoming association.

Maximum number of simultaneous associations	2

4.2.1.2.3 Asynchronous Nature

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

4.2.1.2.4 Implementation Identifying Information

Implementation Class UID	1.2.276.0.75.2.5.20
Implementation Version Name	NIM-2.2.1

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Verify Communication

4.2.1.3.1.1 Description and Sequencing of Activities

This activity is available during the configuration phase. It facilitates the set up and management of the DICOM Application Entities.

The user can test the application level communication between the configured stations' Application Entity and its peer DICOM Application Entities. During one test call, all peer DICOM Application Entities are contacted.

In the association request FORUM LINK net proposes not only Verification SOP Class, but also all other SOP Classes as supported by FORUM LINK net DICOM interface.

The association is established when the peer DICOM entity accepts the Verification related presentation context. In a sub-sequent step a C-ECHO message is exchanged.

The results of the "Verify Communication" activity are shown to the user as success or failure. For e. g. a Storage Provider not only the Verification information is evaluated, but also the response regarding the proposed Storage SOP Classes.

4.2.1.3.1.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- "Verification" with Transfer Syntax ILE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	UID **1.2.840.10008. ...**	**Name List**	UID List **1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	SCU	No
Modality Worklist IM - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Q/R IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes
Study Root Q/R IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Q/R IM – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	No
		MPEG2	1.2.4.100	SCU	No
		J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
OPT Image Storage	5.1.4.1.1.77.1.5.4	J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	RLE	1.2.5	SCU	No
		JPG-1	1.2.4.50	SCU	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

The FORUM LINK net Application Software provides standard conformance.

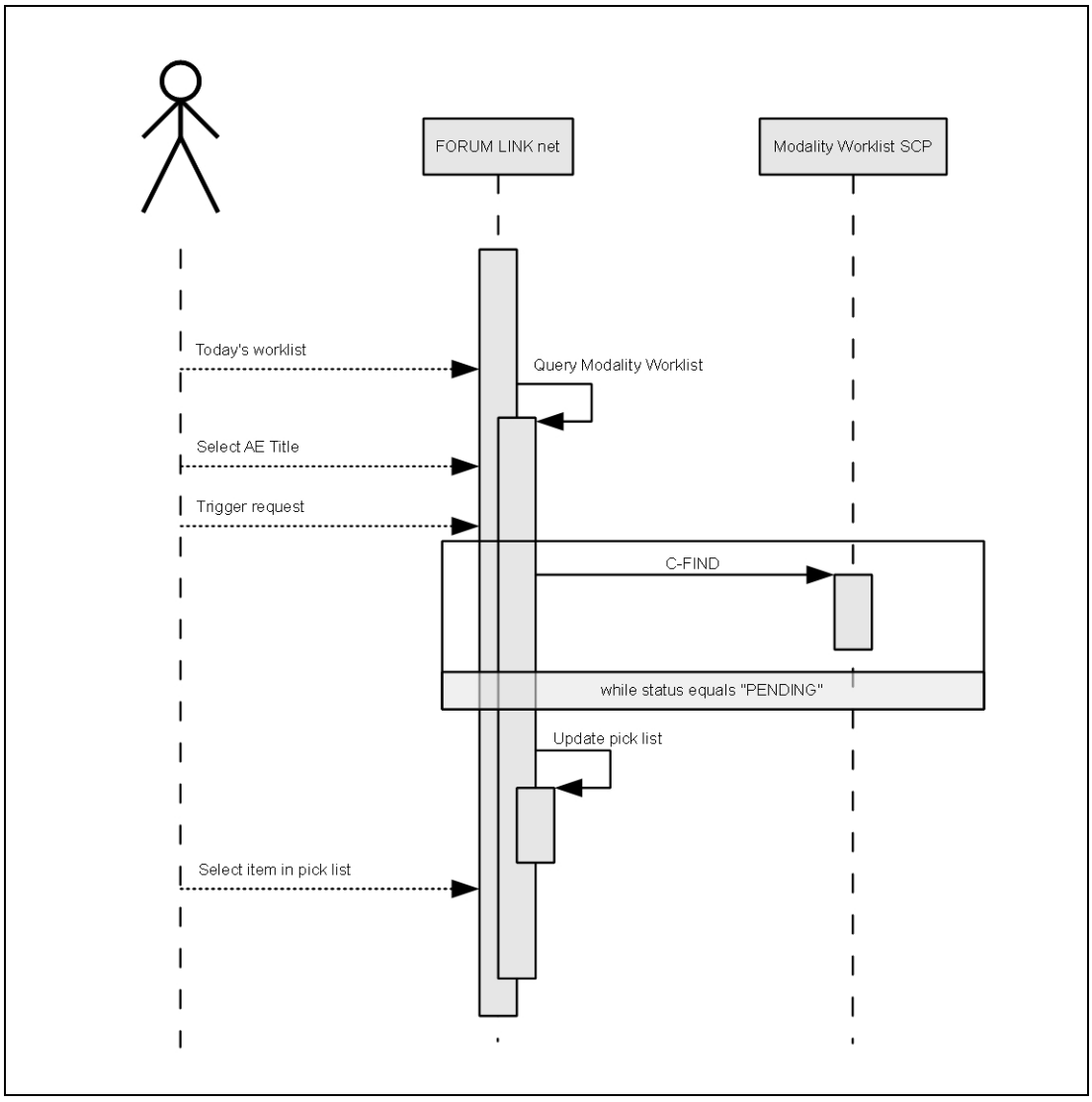
4.2.1.3.2 Activity – Query Modality Worklist

4.2.1.3.2.1 Description and Sequencing of Activities

In this case, the Application Software performs a query with predefined query keys. The operator cannot change the query key values. The applied query keys are:

Tag	Attribute Name	Description
(0040,0100)	Scheduled Procedure Step Sequence	
>(0040,0001)	Scheduled Station Application Entity Title	Uses the value as selected from the configured devices.
>(0040,0002)	Scheduled procedure Step Start Date	Uses the date of today as date range.

All matching worklist items are listed in the pick list.



Today's Worklist
The activity "Today's Worklist" can be triggered when no other activity is currently performed. It is meaningful to select this activity when files are available in one of the scan directories.

Select AE Title
FORUM LINK net allows configuration of up to four stations. Therefore the Modality Worklist GUI allows the operator to select the station's AE title the Modality Worklist query shall get executed for.

Trigger query
When a file is available in one of the configure scan directories, a worklist request for the corresponding station is sent automatically. The operator may trigger a worklist refresh manually The Application Software sends a DICOM C-FIND request, which contains the search criteria. The Application Software waits for the

response from the partner Application Entity. Application Software will accept up to a configurable number of matches. If the number of matches oversteps this limit, a message is displayed. A worklist request can not be refined. Despite this warning, the operator gets result in the pick-list.
After receiving the response, the pick-list is updated.

Select item in pick-list
The operator can select one worklist item in the pick-list. The information from the selected item becomes subject to be used for DICOM header creation.

4.2.1.3.2.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- "Modality Worklist IM - FIND" with Transfer Syntax ILE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	SCU	No
Modality Worklist IM – FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Q/R IM – FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes
Study Root Q/R IM – MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Q/R IM – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	No
		MPEG2	1.2.4.100	SCU	No
		J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
OPT Image Storage	5.1.4.1.1.77.1.5.4	J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	RLE	1.2.5	SCU	No
		JPG-1	1.2.4.50	SCU	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

4.2.1.3.2.3 SOP Specific Conformance for Modality Worklist SOP Class

Table 4-1 Modality Worklist C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The Software Application stops receiving worklist items. It finally updates the pick list.
Pending	Matches are continuing	FF00, FF01	The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ and then A-RELEASE-RQ to the service provider.
*	*	Any other status code	The user gets an error message.

Table 4-2 Attributes involved in Modality Worklist C-FIND request and response

Tag	Tag Name	Query Key	Displayed	SOP Instance
Scheduled Procedure Step (SPS)				
(0040,0100)	Scheduled Procedure Step Sequence			
>(0040,0001)	Scheduled Station Application Entity Title	DEF	Yes	
>(0040,0003)	Scheduled Procedure Step Start Time			
>(0040,0002)	Scheduled Procedure Step Start Date	DEF		
>(0008,0060)	Modality			
>(0040,0006)	Scheduled Performing Physicians Name		Yes	
>(0040,0007)	Scheduled Procedure Step Description			X
>(0040,0010)	Scheduled Station Name			
>(0040,0011)	Scheduled Procedure Step Location			
>(0040,0008)	Scheduled Protocol Code Sequence			X
>>(0008,0100)	Code Value			X
>>(0008,0102)	Coding Scheme Designator			X
>>(0008,0103)	Coding Scheme Version			X
>>(0008,0104)	Code Meaning			X
>(0040,0012)	Pre-Medication			
>(0040,0009)	Scheduled Procedure Step ID			X
>(0032,1070)	Requested Contrast Agent			
Requested Procedure				
(0040,1001)	Requested Procedure ID			X
(0032,1060)	Requested Procedure Description		Yes	X
(0032,1064)	Requested Procedure Code Sequence			X
>(0008,0100)	Code Value			X
>(0008,0102)	Coding Scheme Designator			X
>(0008,0103)	Coding Scheme Version			X
>(0008,0104)	Code Meaning			X
(0020,000D)	Study Instance UID			X
(0008,1110)	Referenced Study Sequence			
>(0008,1150)	Referenced SOP Class UID			
>(0008,1155)	Referenced SOP Instance UID			
(0040,1003)	Requested Procedure Priority			
(0040,1004)	Patient Transport Arrangements			
(0040,1400)	Requested Procedure Comments			
(0008,0050)	Accession Number		Yes	X
(0032,1032)	Requesting Physician		Yes	
(0008,0090)	Referring Physicians Name		Yes	X
Visit Identification				
(0038,0010)	Admission ID			
Visit Status				
(0038,0300)	Current Patient Location			
Visit Relationship				
(0008,1120)	Referenced Patient Sequence			
>(0008,1150)	Referenced SOP Class UID			
>(0008,1155)	Referenced SOP Instance UID			
Patient Identification				
(0010,0010)	Patients Name		Yes	X
(0010,0020)	Patients ID		Yes	X
(0010,0021)	Issuer of Patient ID		Yes	X

(0010,1000)	Other Patient IDs			X
Patient Demographic				
(0010,0030)	Patients Birth Date		Yes	X
(0010,0040)	Patients Sex		Yes	X
(0010,1030)	Patients Weight			
(0040,3001)	Confidentiality Constraint on Patient Data Description			
(0010,4000)	Patient Comments			X
Patient Medical				
(0038,0500)	Patient State			
(0010,21C0)	Pregnancy Status			
(0010,2000)	Medical Alerts			
(0038,0050)	Special Needs			

Values of column "Query Key":

DEF
A tag that is marked with DEF has a value assigned when the Modality Worklist request is sent.

Values of column "Imported":

X
The value gets imported in the application. Thus this value may have influence in Information Objects which will be created as a result of the performed examination.

Values of column "Displayed":

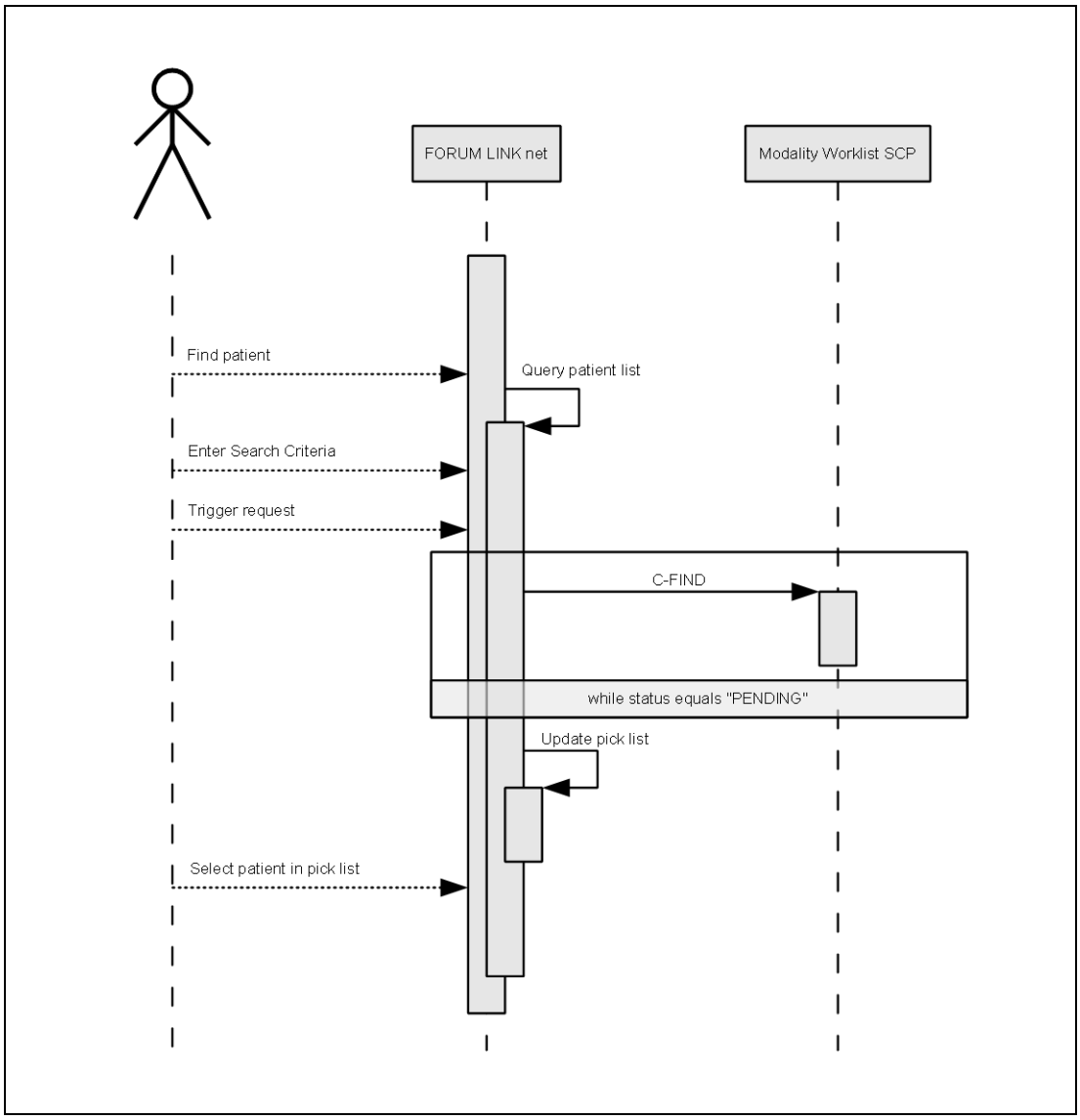
Yes
Values of this tag are visible in the pick list.

Values of column SOP Instance:

X
Values of marked tags will be stored in created SOP Instances. See also table "mapping of attributes" in 8.1.3 Attribute Mapping.

4.2.1.3.3 Activity – Find Patient

4.2.1.3.3.1 Description and Sequencing of Activities



Find Patient
The activity "Find Patient" can be triggered by the operator at any time if no other activity is in progress.

Enter Search Criteria
The operator can interactively query for patients. The GUI allows the user to enter patient name or patient id in a search field.

Trigger request
After specifying the query keys he or she triggers the query. All query keys apply on patient level. Thus, all results are about matching patients. The number of matches is limited to a configurable number. If the number of matches oversteps that limit, the Application Software sends a C-CANCEL-RQ and then an A-RELEASE-RQ to the service provider. A message is displayed notifying the operator that more specific query keys may be used.

Select patient in pick-list
The resulting list of patients is shown to the operator. He can then select one single patient. If the operator cannot find the patient he or she is looking for, he or she can immediately repeat the query, using other values as search criteria.

4.2.1.3.3.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- "Patient Root Q/R IM - FIND" with Transfer Syntax ILE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	SCU	No
Modality Worklist IM - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Q/R IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes
Study Root Q/R IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Q/R IM – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	No
		MPEG2	1.2.4.100	SCU	No
		J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
OPT Image Storage	5.1.4.1.1.77.1.5.4	J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	RLE	1.2.5	SCU	No
		JPG-1	1.2.4.50	SCU	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

4.2.1.3.3.3 SOP Specific Conformance for Patient Root Query/Retrieve SOP Class as SCU

Table 4-3 Query C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete No final Identifier is supplied.	0000	The Application Software finishes receiving query results. It finally updates the pick list.
Pending	Matches are continuing	FF00, FF01	The Application Software checks whether the number of received responses overstepped the configurable limit. If the number of received responses overstepped the limit, then the Application Software sends a C-CANCEL-RQ and then an A-RELEASE-RQ to the service provider.
Refused	Out of Resources	A700	An error message is shown to the operator. The Application Software logs this event and gives up. The pick-list is then empty.
Failure	Identifier does not match SOP Class	A900	
Failure	Unable to process	C000 - CFFF	
Cancel	Matching terminated due to Cancel request	FE00	
*	*	Any other status code	

Table 4-4 Attributes involved in Query C-FIND request and response

Tag	Tag Name	Query Key	Displayed in pick-list
Study			
(0010,0010)	Patient's Name	X	X
(0010,0020)	Patient ID	X	X
(0010,0021)	Issuer of Patient ID		X
(0010,0030)	Patient's Birth Date		X
(0010,0040)	Patient's Sex		X
(0010,1000)	Other Patient IDs		
(0010,2160)	Ethnic Group		
(0010,4000)	Patient Comments		

Values for column "Query key":

X
The attribute is used as query key. The operator can assign values to that attribute. When the operator triggers the query, the values of the query keys are transferred to the Query Service Provider. How the Query Service Provider interprets the given value is out of scope of this document.

Values for column "Displayed in pick-list":

X
After receiving query results, the value of this attribute is shown in the pick-list.

Table 4-5 Query key details

Tag	Tag Name	Description
(0010,0010)	Patient's Name	The default value is empty string. Only family name can be used as query key. A trailing wildcard "*" is automatically added if not specified by the operator. If given name shall be used as query key the DICOM component delimiter "^" is required in front of the given name component (hidden feature). This is a DICOM Standard query key on Patient level.
(0010,0020)	Patient ID	The default value is empty string. The operator can enter each value that conforms to the Value Representation LO. This is a DICOM Standard query key on Patient level.

4.2.1.3.4 Activity – New Patient

The activity "New Patient" can be triggered by operator at any time if no other activity is in progress.

This activity has no direct effect on DICOM messaging.

During this activity, the Application Software allows the operator to enter patient demographics. The patient created by this operation is subject to fill the DICOM header of the DICOM file created during the next "Send data" activity.

This activity corresponds to the unscheduled case and shall only be used as fallback as the approach is much more error prone than the scheduled case (Today's Patients).

4.2.1.3.5 Activity – Last Patient

The activity "Last Patient" can be triggered by operator at any time if no other activity is in progress.

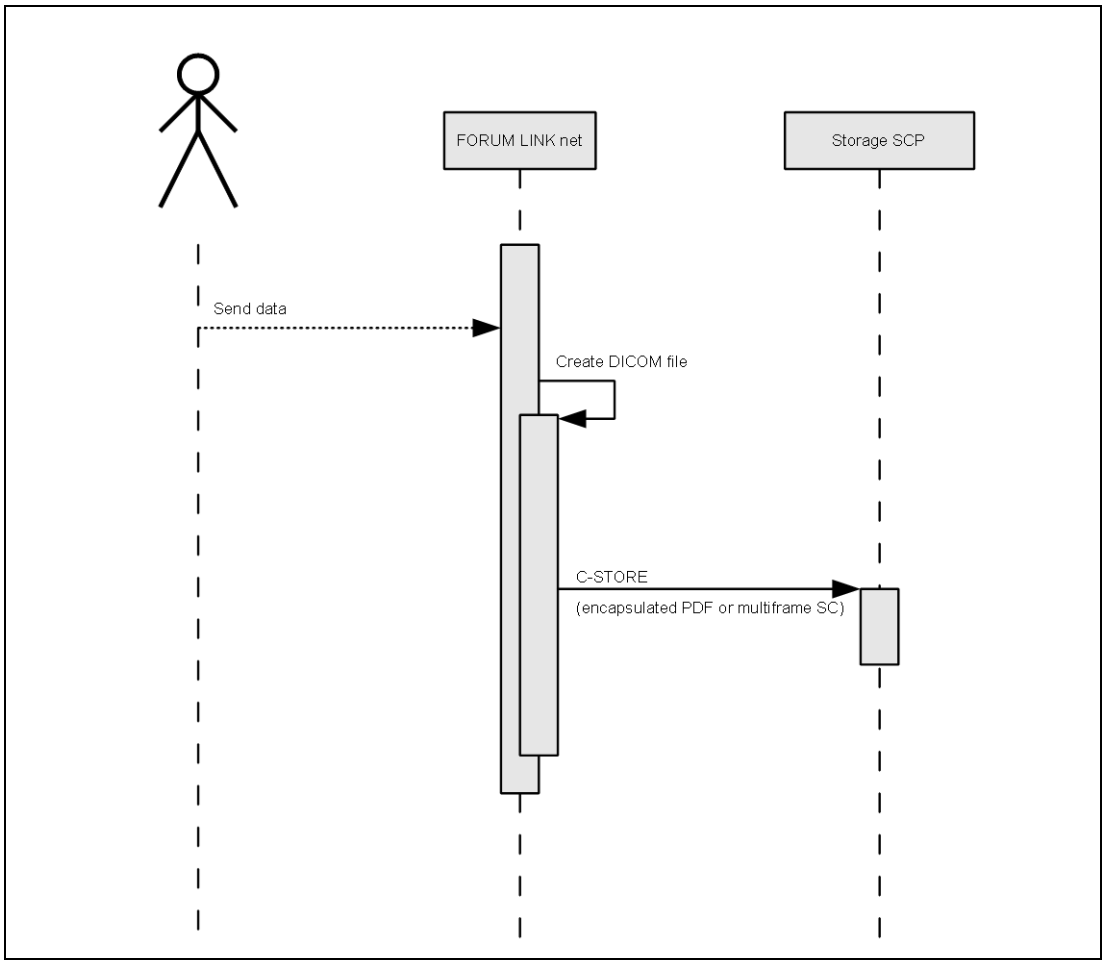
This activity has no direct relation to DICOM messaging.

During this activity, the Application Software reuses the patient demographic information applied during the last "Send data" activity. The same patient information is then subject to fill the DICOM header of the DICOM file created during the next "Send data" activity.

4.2.1.3.6 Activity – Send data

The activity "Send data" can be triggered by operator at any time if no other activity is in progress.

4.2.1.3.6.1 Description and Sequencing of Activities



Trigger "Send data"

The activity "Send data" can be triggered by the operator as soon as a file is available in one of the scan directories and the corresponding patient information has been selected. The patient information can result from the following activities: Today's Patients, Find Patient, New Patient or Last Patient.

The currently active patient information is then subject to fill the DICOM header created during the "Send data" activity.

In case the input file is a PDF document, the "Send data" activity creates an encapsulated PDF DICOM object. If the input file is a JPG image, the application creates a Multi-frame True Color Secondary Capture DICOM object.
The newly created DICOM object is sent to the configured Storage Provider.

4.2.1.3.6.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- Encapsulated PDF with Transfer Syntax ELE
- Encapsulated PDF with Transfer Syntax ILE as fallback
- Multi-frame True Color Secondary Capture with Transfer Syntax JPG-1

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	SCU	No
Modality Worklist IM - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Q/R IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes
Study Root Q/R IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Q/R IM – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	No
		MPEG2	1.2.4.100	SCU	No
		J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
OPT Image Storage	5.1.4.1.1.77.1.5.4	J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	RLE	1.2.5	SCU	No
		JPG-1	1.2.4.50	SCU	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

4.2.1.3.6.3 SOP Specific Conformance for Storage SOP Class as SCU

Table 4-6 Storage C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The Application Software returns from this activity, prompting a success message.
Refused	Out of Resources	A700 – A7FF	An error message is shown to the operator. The Application Software logs this event and returns.
Error	Data Set does not match SOP Class	A900 – A9FF	
Error	Cannot Understand	C000 – CFFF	
Warning	Coercion of Data Elements	B000	
Warning	Data Set does not match SOP Class	B007	
Warning	Elements Discarded	B006	
*	*	Any other status value	

4.2.1.4 Association Acceptance Policy

4.2.1.4.1 Activity – Verify Communication

The activity can be performed at any time. The service is available as soon as the Application Software has been started.

4.2.1.4.1.1 Description and Sequencing of Activities

The Software AE responds to verification requests made by remote AEs.

4.2.1.4.1.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Verification	… 1.1	ILE	… 1.2	SCP	No

4.2.1.4.1.3 SOP Specific Conformance for Verification SOP Class as SCP

The Application Software AE provides standard conformance.

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

No additional protocols are supported.

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 set at the time of installation by Installation Personnel.

4.4.1.1 Local AE Titles

The IP is not configurable by the Configuration Tool. The IP is administrated by the Operating System. The Application Entity Title as well as the port number is configurable. The default port number is 11113.

4.4.1.2 Remote AE Titles

The mapping of external AE Titles to TCP/IP addresses and ports is configurable. The FORUM LINK net Application Software allows setting up a remote Application Entity for Storage/Query and for Modality Worklist services. For all Application Entities, the host name or IP, the Port and the Application Entity Title must be known.

4.4.2 Parameters

4.4.2.1 General Parameters

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

The socket timeout (Network Timeout) is configurable. Default is 20 seconds. It affects association opening and association closing.

The service timeout (DIMSE RSP Timeout) is configurable. Default is 20 seconds. It defines for how long the Application Software waits after sending a service request for the belonging service response from the remote AE.

The max. association idle time is configurable. Default is 30 seconds.

Also the Application Software allows the configuration of

- (0008,0080) Institution Name
- (0008,0081) Institution Address
- (0008,1010) Station Name as configured in the institution section of the application software.
- (0008,0060) Modality
- (0008,0070) Manufacturer
- (0008,1090) Manufacturer's Model Name
- (0008,1040) Institutional Department Name
- (0008,1030) Study Description
- (0042,0010) Document Title (ePDF only)
- (22A1,1001) Document Type (ePDF only)

4.4.2.2 Verification SCU Parameters

No specific configuration is required.

4.4.2.3 C-FIND Parameters

There is a limit configurable for the number of matching C-FIND responses ('Maximum Query Responses'). Default limit is set to 100 matching items. It affects Modality Worklist service and Query service.

4.4.2.4 Storage SCU Parameters

No specific configuration is required.

4.4.2.5 Verification SCP Parameters

No specific configuration is 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 LINK net Application Software.

6 Support Of Character Sets

Supported Specific Character Set	
Character Set Description	**Defined Term**
UTF-8 encoded Unicode	ISO_IR 192

7 Security

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

It is assumed that FORUM LINK net Application Software 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 LINK net Application Software.
- Firewall or router protections to ensure that FORUM LINK net Application Software 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)

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, PRQ etc.	the attribute value is the same as the value received using a DICOM service such as Modality Worklist, Patient Root Query, etc.
CONFIG	the attribute value source is a configurable parameter

8.1.1.1 Encapsulated PDF IOD

The tables below show the content of the Encapsulated PDF IOD.

The rows of not supported modules are grey.

IE	Module	Usage
Patient		
	Patient	MANDATORY
	Specimen Identification	OPTIONAL
	Clinical Trial Subject	OPTIONAL
Study		
	General Study	MANDATORY
	Patient Study	OPTIONAL
	Clinical Trial Study	OPTIONAL
Series		
	Encapsulated Document Series	MANDATORY
	Clinical Trial Series	OPTIONAL
Equipment		
	General Equipment	MANDATORY
	SC Equipment	MANDATORY
Encapsulated Document		
	Encapsulated Document	MANDATORY
	SOP Common	MANDATORY

Table 8-1 Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	ALWAYS	MWL, USER, PRQ
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	MWL, USER, PRQ

(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID.	VNAP	MWL, USER, PRQ
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, USER, PRQ
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	ALWAYS	MWL, USER, PRQ
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	VNAP	MWL PRQ
(0010,2160)	3	SH	Ethnic Group	*Ethnic group or race of the patient.*	VNAP	PRQ
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	VNAP	MWL, USER, PRQ

Table 8-2 Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	*Unique identifier for the Study* Uses value as given by the Modality Worklist service in scheduled case. The software creates the UID in the unscheduled case. Then it uses "1.2.276.0.75.2.5.60." as constant prefix for generated UIDs	ALWAYS	MWL, AUTO
(0008,0020)	2	DA	Study Date	*Date the Study started.* Date, when the object was created.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	*Time the Study started.* Time, when the object was created.	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	*Name of the patient's referring physician.* Value does not exist in unscheduled case.	VNAP	MWL
(0020,0010)	2	SH	Study ID	Equipment generated Study identifier.	ALWAYS	EMPTY
(0008,0050)	2	SH	Accession Number	*A RIS generated number that identifies the order for the Study.* Value does not exist in unscheduled case.	VNAP	MWL
(0008,1030)	3	LO	Study Description	*Institution-generated description or classification of the Study (component) performed.* Value can be configured via GUI.	VNAP	CONFIG

Table 8-3 Module "Encapsulated Document Series"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0060)	3	CS	Laterality	Laterality of (paired) body part examined. Enumerated Values: R = right L = left B = both Note: This is a CZM standard attribute extension.	VNAP	USER
(0008,0060)	1	CS	Modality	*The modality appropriate for the encapsulated document. This Type definition shall override the definition in the SC Equipment Module. See section C.7.3.1.1.1 for Defined Terms. Note: SR may be an appropriate value for an Encapsulated CDA document with a structured XML Body* Can be configured via GUI. Possible values are: AR, DOC, GM, KER, LEN, OAM, OP, OPM, OPT, OPV, OT, SRF, US, VA, XC.	ALWAYS	CONFIG
(0020,000E)	1	UI	Series Instance UID	*Unique identifier of the Series.* The software creates the UID with a constant prefix: "1.2.276.0.75.2.5.60." .	ALWAYS	AUTO

Tag	Type	VR	Name	Description	PoV	Source
(0020,0011)	1	IS	Series Number	*A number that identifies the Series.* Value is always 1 (single series study)	ALWAYS	AUTO
(0040,0275)	3	SQ	Request Attributes Sequence	*Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items.* Contains zero or one item.	ANAP	MWL
>(0040,1001)	1C	SH	Requested Procedure ID	*Identifier that identifies the Requested Procedure in the Imaging Service Request. Required if procedure was scheduled. May be present otherwise. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.* Value as given by the Modality Worklist item that was accepted for this examination.	VNAP	MWL
>(0008,0050)	3	SH	Accession Number	An identifier of the Imaging Service Request for this Requested Procedure.	VNAP	MWL
>(0020,000D)	3	UI	Study Instance UID	The unique identifier for the Study provided for this Requested Procedure.	VNAP	MWL
>(0032,1060)	3	LO	Requested Procedure Description	*Institution-generated administrative description or classification of Requested Procedure.* Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	VNAP	MWL
>(0032,1064)	3	SQ	Requested Procedure Code Sequence	A sequence that conveys the Procedure Type of the requested procedure. The Requested Procedure Code Sequence shall contain only a single item.	VNAP	MWL
>>(0008,0100)	1	SH	Code Value	See Section 8.1.	VNAP	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2.	VNAP	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See Section 8.3.	VNAP	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step. Required if procedure was scheduled. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure step was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	VNAP	MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed.	VNAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more Items.	VNAP	MWL
>>(0008,0100)	1	SH	Code Value	See Section 8.1.	VNAP	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2.	VNAP	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.	ANAP	MWL

Tag	Type	VR	Name	Description	PoV	Source
>>(0008,0104)	1	LO	Code Meaning	See Section 8.3.	VNAP	MWL

Table 8-4 Encapsulated PDF - Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)		LO	Manufacturer	*Manufacturer of the equipment that produced the composite instances*	VNAP	CONFIG
(0008,0080)	3	LO	Institution Name	*Institution where the equipment that produced the composite instances is located.* Value as configured in Institution section.	ALWAYS	CONFIG
(0008,0081)	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.	VNAP	CONFIG
(0008,1010)	3	SH	Station Name	*User defined name identifying the machine that produced the composite instances.* As configured in Station configuration section.	ALWAYS	CONFIG
(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.	VNAP	CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	*Manufacturer's model name of the equipment that produced the composite instances.*	VNAP	CONFIG
(0018,1020)	3	LO	Software Version(s)	*Manufacturer's designation of software version of the equipment that produced the composite instances.* Always "FORUM LINK net 1.0 (Build nnn)" where nnn is the build number.	ALWAYS	AUTO

Table 8-5 Encapsulated PDF Module "SC Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0060)	3	CS	Modality	Source equipment for the image. This type definition shall override the definition in the General Series Module. Can be configured via GUI. Possible values are: AR, DOC, GM, KER, LEN, OAM, OP, OPM, OPT, OPV, OT, SRF, US, VA, XC.	ALWAYS	CONFIG
(0008,0064)	1	CS	Conversion Type	*Describes the kind of image conversion. Defined Terms : DV = Digitized Video DI = Digital Interface DF = Digitized Film WSD = Workstation SD = Scanned Document SI = Scanned Image DRW = Drawing SYN = Synthetic Image* Always "*SD" = Scanned Document*	ALWAYS	AUTO

Table 8-6 Module "Encapsulated Document"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	1	IS	Instance Number	*A number that identifies this SOP Instance. The value shall be unique within a series.*	ALWAYS	AUTO
(0008,0023)	2	DA	Conte nt Date	*The time the document content creation was started.* The date when the object creation started.	ALWAYS	AUTO
(0008,0033)	2	TM	Content Time	*The time the document content creation was started.* The time when the object creation started.	ALWAYS	AUTO
(0008,002A)	2	DT	Acquisition Datetime	*The date and time that the original generation of the data in the document started.* The date and time when the object creation started.	ALWAYS	AUTO
(0028,0301)	1	CS	Burned In Annotation	*Indicates whether or not the encapsulated document contains sufficient burned in annotation to identify the patient and date the data was acquired. Enumerated Values: YES NO Identification of patient and date as text in an encapsulated document (e.g., in an XML attribute or element) is equivalent to "burned in annotation". A de-identified document may use the*	ALWAYS	AUTO

				value NO. Always "YES" .		
(0042,0010)	2	ST	Document Title	*The title of the document. Note: In the case of a PDF encapsulated document, this may be the value of the "Title" entry in the "Document Information Directory" as encoded in the PDF data.* Can be set in Station configuration screen, one Document Title per Station.	VNAP	CONFIG
(0040,A043)	2	SQ	Concept Name Code Sequence	*A coded representation of the document title. Zero or one item may be present.* Always empty.	EMPTY	AUTO
(0042,0012)	1	LO	MIME Type of Encapsulated Document	*The type of the encapsulated document stream described using the MIME Media Type (see RFC 2046).* Always "application/pdf"	ALWAYS	AUTO
(0042,0011)	1	OB	Encapsulated Document	Encapsulated Document stream, containing a document encoded according to the MIME Type.	ALWAYS	AUTO

Table 8-7 Encapsulated PDF - Module "SOP Common"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Always "1.2.840.10008.5.1.4.1.1.104.1"	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	The software uses "1.2.276.0.75.2.5.60." as constant prefix for generated UIDs	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	Always "ISO_IR 192" for UTF-8 encoded Unicode.	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created.	ALWAYS	AUTO

8.1.1.2 Multi-frame True Color SC Image IOD

The tables below show the content of the Multi-frame True Color SC Image IOD.

The rows of not supported modules are grey.

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	General Series	C.7.3.1	M
	Clinical Trial Series	C.7.3.2	U
Frame of Reference	Frame of Reference	C.7.4.1	C - Required if Pixel Measures or Plane Position or Plane Orientation Functional Group Macros Present
	Synchronization	C.7.4.2	U
Equipment	General Equipment	C.7.5.1	U
	SC Equipment	C.8.6.1	M
Image	General Image	C.7.6.1	M
	Image Pixel	C.7.6.3	M
	Cine	C.7.6.5	C - Required if Frame Increment Pointer (0028,0009) is Frame Time (0018,1063) or Frame Time Vector (0018,1065)
	Multi-frame	C.7.6.6	M
	Frame Pointers	C.7.6.9	U
	Device	C.7.6.12	U
	Multi-frame Functional Groups	C.7.6.16	U
	Multi-frame Dimension	C.7.6.17	U
	SC Image	C.8.6.2	U
	SC Multi-frame Image	C.8.6.3	M
	SC Multi-frame Vector	C.8.6.4	C - Required if Number of Frames is greater than 1
	SOP Common	C.12.1	M

Table 8-8 Multi-frame True Color SC Image - Module "Patient"

Tag	VR	Name	Value	PoV	Source
(0010,0010)	PN	Patient's Name	Patient's full name.	ALWAYS	MWL, USER, PRQ
(0010,0020)	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	MWL, USER, PRQ
(0010,0021)	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID.	VNAP	MWL, USER, PRQ
(0010,0030)	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, USER, PRQ

(0010,0040)	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	ALWAYS	MWL, USER, PRQ
(0010,1000)	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	VNAP	MWL, PRQ
(0010,2160)	SH	Ethnic Group	Ethnic group or race of the patient.	VNAP	PRQ
(0010,4000)	LT	Patient Comments	User-defined additional information about the patient.	VNAP	MWL, USER, PRQ

Table 8-9 Multi-frame True Color SC Image - Module "General Study"

Tag	VR	Name	Value	PoV	Source
(0008,0020)	DA	Study Date	Date when the object was created..	ALWAYS	AUTO
(0008,0030)	TM	Study Time	Time when the object was created.	ALWAYS	AUTO
(0008,0050)	SH	Accession Number	A RIS generated number that identifies the order for the Study.	VNAP	MWL
(0008,0090)	PN	Referring Physician's Name	Name of the patient's referring physician	VNAP	MWL
(0020,000D)	UI	Study Instance UID	Unique identifier for the Study. Uses value as given by the Modality Worklist service in scheduled case. The software creates the UID in the unscheduled case. Then it uses "1.2.276.0.75.2.5.60." as constant prefix for generated UIDs	ALWAYS	AUTO, MWL
(0020,0010)	SH	Study ID	User or equipment generated Study identifier.	EMPTY	AUTO

Table 8-10 Multi-frame True Color SC Image - Module "General Series"

Tag	VR	Name	Value	PoV	Source
(0008,1050)	PN	Performing Physicians' Name	Name of the physician(s) administering the Series.	VNAP	MWL
(0020,000E)	UI	Series Instance UID	Unique identifier of the Series. The software creates the UID with a constant prefix: "1.2.276.0.75.2.5.60."	ALWAYS	AUTO
(0020,0011)	IS	Series Number	A number that identifies this Series. Value is always 1 (single series study).	ALWAYS	AUTO
(0020,0060)	CS	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. Enumerated Values: R = right L = left Note: Some IODs support Image Laterality (0020,0062) at the Image level or Frame Laterality(0020,9072) at the Frame level in the Frame Anatomy	VNAP	USER

			functional group macro, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined.		
(0040,0275)	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items. Included macro 'Request Attributes Macro', context 'No Baseline Context IDs defined'	ANAP	MWL
>(0008,0050)	SH	Accession Number	An identifier of the Imaging Service Request for this Requested Procedure.	VNAP	MWL
>(0020,000D)	UI	Study Instance UID	The unique identifier for the Study provided for this Requested Procedure.	VNAP	MWL
>(0032,1060)	LO	Requested Procedure Description	Institution-generated administrative description or classification of Requested Procedure.	VNAP	MWL
>(0032,1064)	SQ	Requested Procedure Code Sequence	A sequence that conveys the Procedure Type of the requested procedure. The Requested Procedure Code Sequence shall contain only a single item. Included macro 'Code Sequence Macro', context 'No Baseline Context ID is defined.'	VNAP	MWL
>>(0008,0100)	SH	Code Value	See Section 8.1. Required if a sequence item is present.	VNAP	MWL
>>(0008,0102)	SH	Coding Scheme Designator	See Section 8.2. Required if a sequence item is present.	VNAP	MWL
>>(0008,0103)	SH	Coding Scheme Version	See Section 8.2. Required if a sequence item is present and the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.	ANAP	MWL
>>(0008,0104)	LO	Code Meaning	See Section 8.3. Required if a sequence item is present.	VNAP	MWL
>(0040,0007)	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed.	VNAP	MWL
>(0040,0008)	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more Items. Included macro 'Code Sequence Macro', context 'Context ID may be defined in the macro invocation.'	VNAP	MWL
>>(0008,0100)	SH	Code Value	See Section 8.1. Required if a sequence item is present.	VNAP	MWL
>>(0008,0102)	SH	Coding Scheme Designator	See Section 8.2. Required if a sequence item is present.	VNAP	MWL
>>(0008,0103)	SH	Coding Scheme Version	See Section 8.2. Required if a	ANAP	MWL

			sequence item is present and the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.		
>>(0008,0104)	LO	Code Meaning	See Section 8.3. Required if a sequence item is present.	VNAP	MWL
>(0040,0009)	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step.	VNAP	MWL
>(0040,1001)	SH	Requested Procedure ID	Identifier that identifies the Requested Procedure in the Imaging Service Request.	VNAP	MWL

Table 8-11 Multi-frame True Color SC Image - Module "General Equipment"

Tag	VR	Name	Value	PoV	Source
(0008,0070)	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances.	VNAP	CONFIG
(0008,0080)	LO	Institution Name	Institution where the equipment that produced the composite instances is located.	ALWAYS	CONFIG
(0008,0081)	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.	VNAP	CONFIG
(0008,1010)	SH	Station Name	User defined name identifying the machine that produced the composite instances.	ALWAYS	CONFIG
(0008,1040)	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.	VNAP	CONFIG
(0008,1090)	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances.	VNAP	CONFIG
(0018,1020)	LO	Software Versions	Manufacturer's designation of software version of the equipment that produced the composite instances. Always "FORUM LINK net 1.0 (Build nnn)" where nnn is the build number.	ALWAYS	AUTO

Table 8-12 Multi-frame True Color SC Image - Module "SC Equipment"

Tag	VR	Name	Value	PoV	Source
(0008,0060)	CS	Modality	Source equipment for the image. This type definition shall override the definition in the General Series Module. Can be configured via GUI. Possible values are: AR, DOC, GM, KER, LEN, OAM, OP, OPM, OPT, OPV, OT, SRF, US, VA, XC.	ALWAYS	CONFIG
(0008,0064)	CS	Conversion Type	*Describes the kind of image conversion. Defined Terms : DV = Digitized Video DI = Digital Interface*	ALWAYS	AUTO

			DF = Digitized Film WSD = Workstation SD = Scanned Document SI = Scanned Image DRW = Drawing SYN = Synthetic Image Always "*SI*" = *Scanned Image*		

Table 8-13 Multi-frame True Color SC Image - Module "General Image"

Tag	VR	Name	Value	PoV	Source
(0008,0023)	DA	Content Date	The date when the object creation started.	ALWAYS	AUTO
(0008,002A)	DT	Acquisition Datetime	The date and time when the object creation started.	ALWAYS	AUTO
(0008,0033)	TM	Content Time	The time when the object creation started.	ALWAYS	AUTO
(0020,0013)	IS	Instance Number	A number that identifies this instance. The value shall be the same for all SOP Instances of a Concatenation, and different for each separate Concatenation and for each SOP Instance not within a Concatenation in a series.	ALWAYS	AUTO

Table 8-14 Multi-frame True Color SC Image - Module "Image Pixel"

Tag	VR	Name	Value	PoV	Source
(0028,0002)	US	Samples per Pixel	"3"	ALWAYS	AUTO
(0028,0004)	CS	Photometric Interpretation	"YBR_FULL_422"	ALWAYS	AUTO
(0028,0006)	US	Planar Configuration	"0"	ALWAYS	AUTO
(0028,0010)	US	Rows	Width of the image.	ALWAYS	AUTO
(0028,0011)	US	Columns	Height of the image.	ALWAYS	AUTO
(0028,0100)	US	Bits Allocated	"8"	ALWAYS	AUTO
(0028,0101)	US	Bits Stored	"8"	ALWAYS	AUTO
(0028,0102)	US	High Bit	"7"	ALWAYS	AUTO
(0028,0103)	US	Pixel Representation	"0"	ALWAYS	AUTO
(7FE0,0010)	OW/ OB	Pixel Data	Contains the image pixel	ALWAYS	AUTO

Table 8-15 Multi-frame True Color SC Image - Module "Multi-frame"

Tag	VR	Name	Value	PoV	Source
(0028,0008)	IS	Number of Frames	Overwrote by Module 'SC Multi-frame Image'		
(0028,0009)	AT	Frame Increment Pointer	Overwrote by Module 'SC Multi-frame Image'		

Table 8-16 Multi-frame True Color SC Image - Module "Multi-frame Functional Groups"

Tag	VR	Name	Value	PoV	Source
(0028,0008)	IS	Number of Frames	1	ALWAYS	AUTO
(5200,9229)	SQ	Shared Functional Groups Sequence	Sequence that contains the Functional Group Macros that are shared for all frames in this SOP Instance and Concatenation. Note: The contents of this sequence are the same in all SOP Instances that comprise a Concatenation. Zero or one Item may be included in this sequence. See section C.7.6.16.1.1 for further explanation.	EMPTY	AUTO
(5200,9230)	SQ	Per-frame Functional Groups Sequence	Sequence that contains the Functional Group Macros corresponding to each frame of the Multi-frame Image. The first Item corresponds with the first frame, and so on. Each Item shall contain the same set of Functional Group Macros. This Sequence shall contain the same number of Items as the number of frames in the Multi-frame image. See Section C.7.6.16.1.2 for further explanation.	EMPTY	AUTO

Table 8-17 Multi-frame True Color SC Image - Module "SC Multi-frame Image"

Tag	VR	Name	Value	PoV	Source
(0028,0301)	CS	Burned In Annotation	Indicates whether or not image contains sufficient burned in annotation to identify the patient and date the image was acquired. Enumerated Values: YES, NO Always "No"	ALWAYS	AUTO

Table 8-18 Multi-frame True Color SC Image - Module "SOP Common"

Tag	VR	Name	Value	PoV	Source
(0008,0005)	CS	Specific Character Set	ISO_IR 192 Character Set that expands or replaces the Basic Graphic Set.	ALWAYS	AUTO
(0008,0016)	UI	SOP Class UID	"1.2.840.10008.5.1.4.1.1.7.4"	ALWAYS	AUTO
(0008,0018)	UI	SOP Instance UID	The software creates the UID with a constant prefix: "1.2.276.0.75.2.5.60."	ALWAYS	AUTO
(0020,0013)	IS	Instance Number	A number that identifies this Composite object instance.	ALWAYS	AUTO

8.1.2 Usage of Attributes from Received IOD's

The usage of attributes of Modality Worklist IODs is described in chapter 4.2.1.3.2 Activity – Query Modality Worklist.

8.1.3 Attribute Mapping

In scheduled case, the following attributes are mapped from Modality Worklist to instances of Encapsulated PDF IOD, Multi-Frame True Color Secondary Capture Image IOD.

Modality Worklist	Instance IOD
Study Instance UID	Study Instance UID
Accession Number	Accession Number
Requested Procedure ID	Request Attributes Sequence > Requested Procedure ID
Requested Procedure Description	Request Attributes Sequence > Requested Procedure Description
Scheduled Procedure Step Sequence > Scheduled Procedure Step ID	Request Attributes Sequence > Scheduled Procedure Step ID
Scheduled Procedure Step Sequence > Scheduled Procedure Step Description	Request Attributes Sequence > Scheduled Procedure Step Description
Scheduled Procedure Step Sequence > Schedule Protocol Code Sequence	Request Attributes Sequence > Scheduled Protocol Code Sequence
Requested Procedure Code Sequence	Procedure Code Sequence
Referring Physicians Name	Referring Physicians Name
Patients Name	Patients Name
Patient ID	Patient ID
Issuer of Patient ID	Issuer of Patient ID
Other Patient IDs	Other Patient IDs
Patients Birth Date	Patients Birth Date
Patients Sex	Patients Sex
Patient Comments	Patient Comments

8.2 Data Dictionary of Private Attributes

The Application Software AE does not define Private Attributes of interest.

8.3 Coded Terminology and Templates

The Application Software AE does not specify a custom coded terminology nor uses codes that are available via the Modality Worklist provider.

8.4 Greyscale Image Consistency

Not applicable.

8.5 Standard Extended / Specialized/ Private SOP Classes

Neither Specialized nor Private SOP Classes are supported.

8.6 Private Transfer Syntaxes

No Private Transfer Syntax is supported.