

DICOM Conformance Statement

CALLISTO eye

Version 2.5

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1 Conformance Statement Overview

This document is structured as suggested in the DICOM Standard (PS 3.2, 2008).

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Ophthalmic Photography 8 Bit Image Storage	Yes	Yes
Encapsulated PDF Storage	Yes	Yes
Query/Retrieve		
Study Root Information Model – FIND	Yes	No
Study Root Information Model – MOVE	Yes	No
Workflow Management		
Modality Worklist Information Model – FIND	Yes	No

The CALLISTO eye does not support Media Interchange.

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3 Introduction

3.1 Revision History

Document Version	Author	Date
1.0	Robert Hien, Jörg König	24.11.2008
2.5	Robert Hien	06.08.2009

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 3.2-2008] 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.

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

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
MWL	Modality Work List
J2K	JPEG 2000 Image Compression
J2K-LO	JPEG 2000 Image Compression (Lossless Only)
MPG2	Motion Picture Expert Group 2; Abbreviation and synonym for video encoding and compression transfer syntax.
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

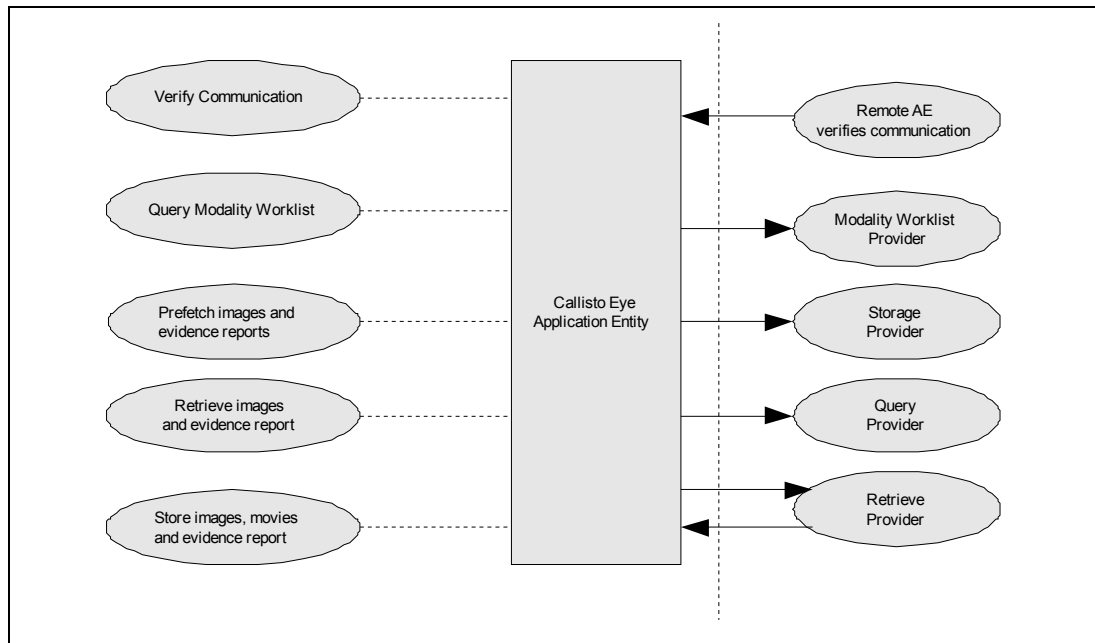
3.6 References

Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2008

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow



4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of CALLISTO eye AE

The DICOM functionality is offered by the CALLISTO eye Client Software.

The CALLISTO eye Client Software allows to:

- query modality worklist
- import patient demographic data
- import images and evidence reports
- export acquired images, videos and evidence reports of the performed surgery

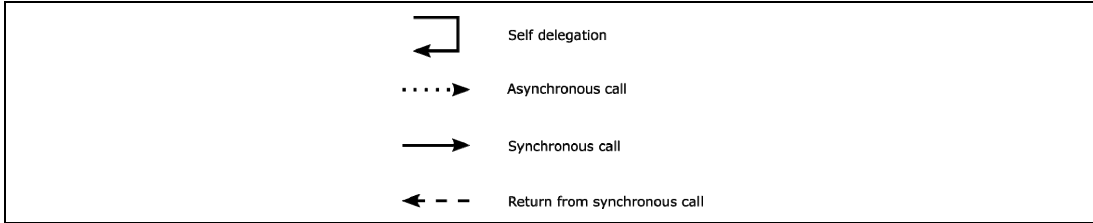
CALLISTO eye AE runs several DICOM Services, as Service Class User and as Service Class Provider. All DICOM related activities are triggered manually by operator.

The CALLISTO eye Client Software allows performing a verification of the configured AEs. The result of this verification contains information about the supported SOP Classes and Transfer Syntaxes.

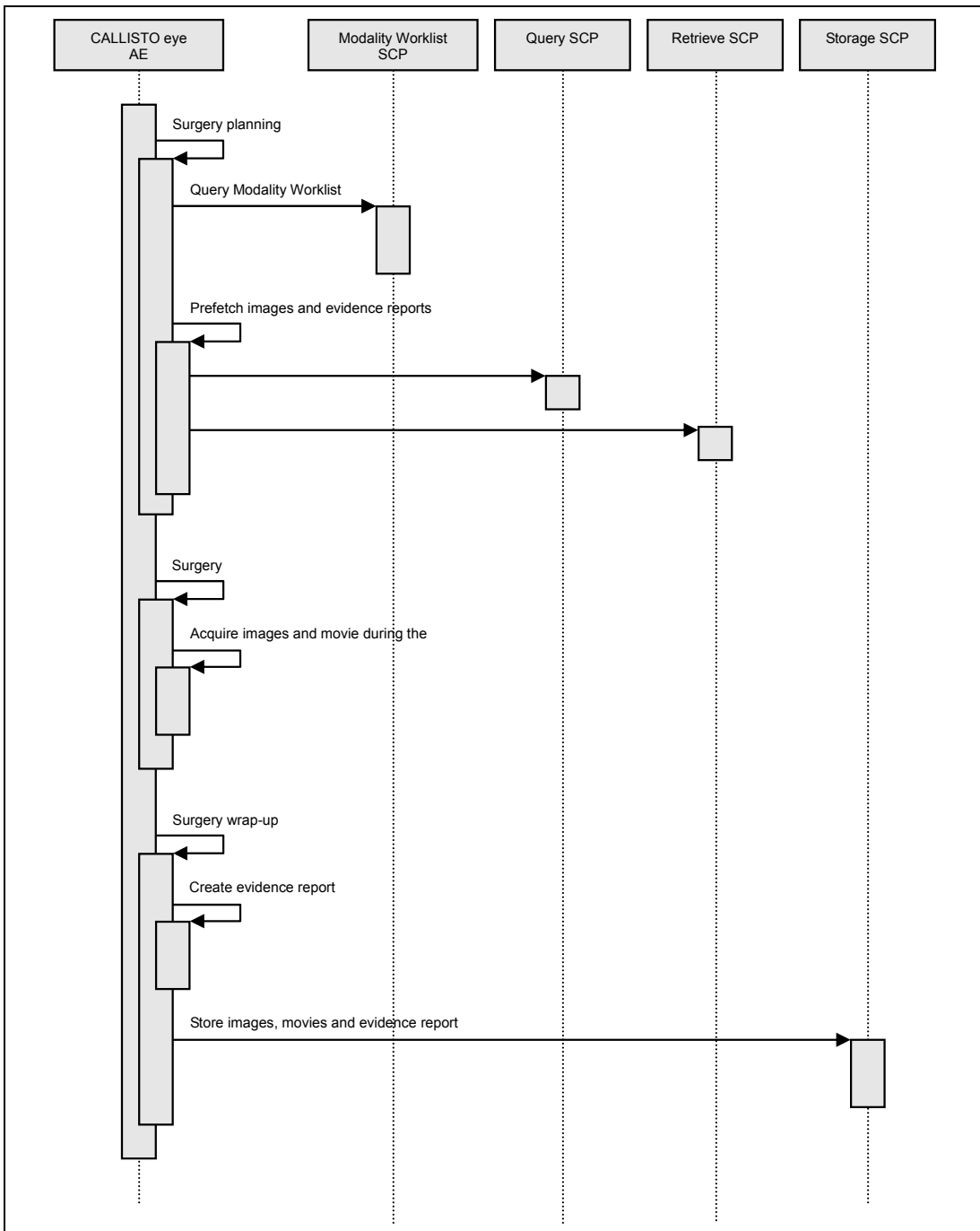
The CALLISTO eye Client Software logs extensive information about the DICOM operations to its log file.

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 uses 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.



All activities are initiated by an operator. The sequence diagram shows different phases. An operator triggers the DICOM activities in the planning phase and wrap-up phase. Both phases run outside the operating room.

Query Modality Worklist

This is an optional activity.

Prefetch images and evidence reports

This is an optional activity.

The operator queries for data that was acquired as preparation for patients surgery. The operator can enter search criteria. The operator can select a patient or a study.

The operator can instruct CALLISTO eye AE to create an internal patient file according to the selected patient.

CALLISTO eye AE requires the query SCP to support relational queries. All queries performed by the CALLISTO eye AE are relational queries.

The AE also retrieves image instances and evidence reports of the selected study. After transmitting the image instances and reports to the CALLISTO eye Server, they are available for the surgeon when needed during the surgery.

Acquire images and movie during surgery

The surgeon can take movies or still images during the surgery.

Create an evidence report

This is an optional activity.

The operator creates an evidence report after the surgery, the report contains images which have been taken during the surgery.

Store images, movies and evidence report

This is an optional activity.

The operator selects the studies which should be exported on a pick list.

The selected images, movies and evidence reports are sent to the configured Storage Provider. The storage progress is reflected in a dialog.

4.1.4 CALLISTO eye Application Entity Specification

4.1.4.1 SOP Classes

SOP Classes actually in use by CALLISTO eye AE:

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	Yes
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
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
Study Root Q/R Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Q/R Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

4.1.4.2 Associations Policies

4.1.4.2.1 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
--------------------------	-----------------------

4.1.4.2.2 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
---	---

4.1.4.2.3 Asynchronous Nature

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

4.1.4.2.4 Implementation Identifying Information

Implementation Class UID	1.2.40.0.13.1.1
Implementation Version Name	dcm4che-2.0

4.1.4.3 Association Initiation Policy

4.1.4.3.1 Activity – Verify Communciation

4.1.4.3.1.1 Description and Sequencing of Activities

The CALLISTO eye enables the operator to execute a verification request of the configured remote AEs. This activity is available from the configuration dialog of the CALLISTO eye software.

4.1.4.3.1.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
	1.2.840.10008. ...		1.2.840.10008. ...		
Study Root Q/R IM - FIND	...5.1.4.1.2.2.1	ILE	1.2	SCU	No
Study Root Q/R IM - MOVE	...5.1.4.1.2.2.2	ILE	1.2	SCU	No
Verification	...1.1	ILE	1.2	SCU	No
Storage Commitment Push Model	...1.20.1	ILE	1.2	SCU	No
Encapsulated PDF Storage	...5.1.4.1.1.104.1	ILE	1.2	SCU	No
Raw Data Storage	...5.1.4.1.1.66	ILE	1.2	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-LO	1.2.4.90	SCU	No
OPT Image Storage		J2K	1.2.4.91	SCU	No
		J2K-LO	1.2.4.90	SCU	No
Modality Worklist IM - FIND	...5.1.4.31	ILE	1.2	SCU	No

Only the Verification Presentation Context is actually used for this activity. The result of the association negotiation (accepted presentation contexts) is presented to the user.

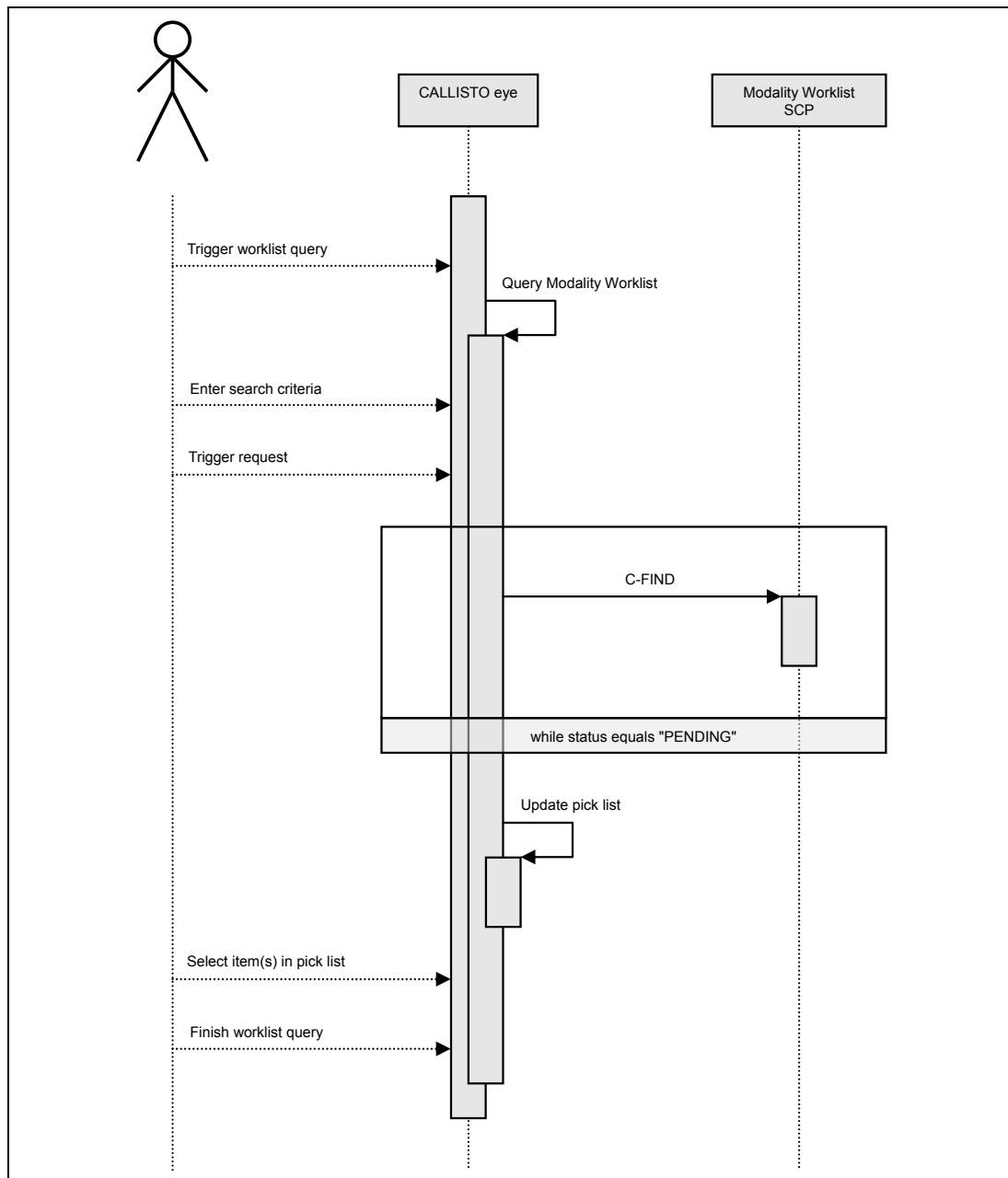
4.1.4.3.1.3 SOP Specific Conformance for SOP Class Verification

The CALLISTO eye AE provides standard conformance.

4.1.4.3.2 Activity - Query Modality Worklist

This is an optional activity.

4.1.4.3.2.1 Description and Sequencing of Activities



The sequence shows a simple work flow. Indeed the operator can repeat querying the work list several times. He or she can even cancel the activity "Query Modality Worklist" at any time. The operator triggers the worklist query by entering the search criteria and pressing the "preview" button. The operator selects the patients / studies to import from a pick list. The CALLISTO eye Application creates patient and study datasets from the imported DICOM instances in its internal database.

4.1.4.3.2.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Study Root Q/R IM - FIND	...5.1.4.1.2.2.1	ILE	1.2	SCU	No
Study Root Q/R IM - MOVE	...5.1.4.1.2.2.2	ILE	1.2	SCU	No
Verification	...1.1	ILE	1.2	SCU	No
Storage Commitment Push Model	...1.20.1	ILE	1.2	SCU	No
Encapsulated PDF Storage	...5.1.4.1.1.104.1	ILE	1.2	SCU	No
Raw Data Storage	...5.1.4.1.1.66	ILE	1.2	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-LO	1.2.4.90	SCU	No
OPT Image Storage		J2K	1.2.4.91	SCU	No
		J2K-LO	1.2.4.90	SCU	No
Modality Worklist IM - FIND	...5.1.4.31	ILE	1.2	SCU	No

4.1.4.3.2.3 SOP Specific Conformance for Modality Worklist SCU

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The Instrument Software finishes receiving worklist items. The application updates the pick list.
Pending	Matches are continuing	FF00, FF01	CALLISTO eye puts received worklist item into the pick list. If the number of received items oversteps a configurable limit then the SCU closes the socket and the operator gets a request to specify query keys more accurate.
*	*	Any other status code	Error message and log entry.

Tags	Tag Name	Query Key	Imported in App from MWL	Displayed	Modifiable	IOD
Scheduled Procedure Step (SPS)						
(0040,0100)	Scheduled Procedure Step Sequence					
>(0040,0001)	Scheduled Station Application Entity Title	Yes, with def.				
>(0040,0003)	Scheduled Procedure Step Start Time		Yes	PL, AP	Yes	Yes
>(0040,0002)	Scheduled Procedure Step Start Date	Yes, with def.	Yes	PL, AP	Yes	Yes
>(0008,0060)	Modality	Yes				
>(0040,0006)	Scheduled Performing Physicians Name					
>(0040,0007)	Scheduled Procedure Step Description		Yes	PL		Yes
>(0040,0010)	Scheduled Station Name					
>(0040,0011)	Scheduled Procedure Step Location					
>(0040,0008)	Scheduled Protocol Code Sequence					
>>	Code Value					
>>	Coding Scheme Designator					
>>	Coding Scheme Version					
>>	Code Meaning					
>(0040,0012)	Pre Medication					
>(0040,0009)	Scheduled Procedure Step ID		Yes			Yes
>(0032,1070)	Requested Contrast Agent					
Requested Procedure						
(0040,1001)	Requested Procedure ID	Yes	Yes	PL		Yes

(0032,1060)	Requested Procedure Description		Yes			
(0032,1064)	Requested Procedure Code Sequence					
>	Code Value					
>	Coding Scheme Designator					
>	Coding Scheme Version					
>	Code Meaning					
(0020,000D)	Study Instance UID		Yes			Yes
(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					
Imaging Service Request						
(0008,0050)	Accession Number	Yes	Yes	PL		Yes
(0032,1032)	Requesting Physician					
(0008,0090)	Referring Physicians Name		Yes	AP	Yes	Yes
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	Yes	PL, AP	Yes	Yes
(0010,0020)	Patients ID	Yes	Yes	PL, AP	Yes	Yes
(0010,0021)	Issuer of Patient ID		Yes			Yes
Patient Demographic						
(0010,0030)	Patients Birth Date		Yes	PL, AP	Yes	Yes
(0010,0040)	Patients Sex		Yes	AP	Yes	Yes
(0010,1030)	Patients Weight					
(0040,3001)	Confidentiality Constraint on Patient Data Description					
(0010,4000)	Patients Comments					
Patient Medical						
(0038,0500)	Patient State					
(0010,21C0)	Pregnancy Status					
(0010,2000)	Medical Alerts					
(0038,0050)	Special Needs					

Defaults:

- Scheduled Station Application Entity Title: defaults to the configured AE title for CALLISTO eye.
- Scheduled Procedure Step Start Date: current date

D – Displayed

- PL – Pick-list: The value is visible in the pick list.
- AP- Application: The value is visible in some details dialog inside the application sw.

Following tags are instantly visible in the pick list.

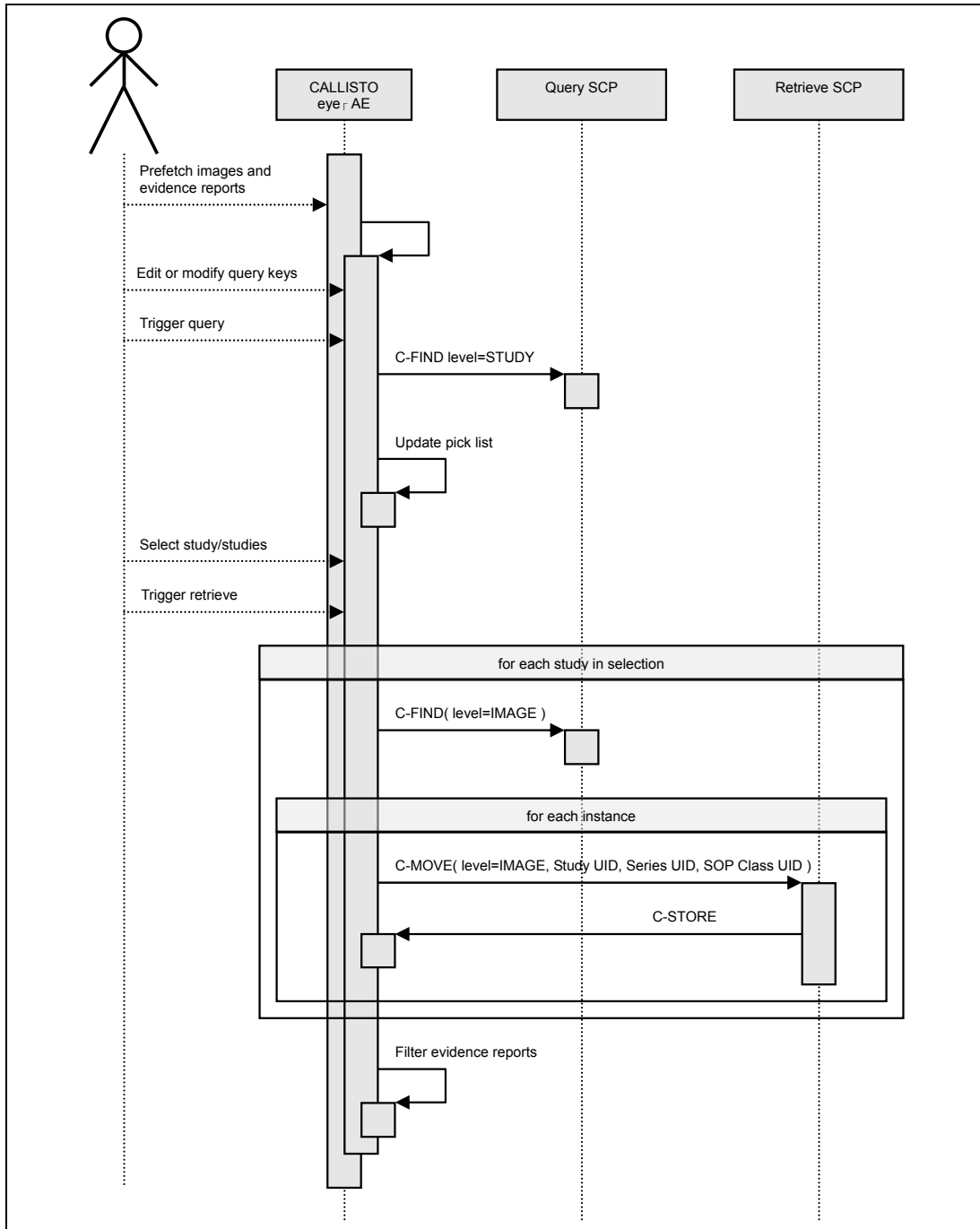
Tag	Description
(0040,0100)	Scheduled Procedure Step Sequence
>(0040,0002)	Scheduled Procedure Step Start Date
>(0040,0003)	Scheduled Procedure Step Start Time
>(0040,0007)	Scheduled Procedure Step Description
>(0040,1001)	Requested Procedure ID
(0008,0050)	Accession Number
(0010,0010)	Patients Name
(0010,0020)	Patient ID
(0010,0030)	Patients Birth Date

4.1.4.3.3 Activity - Prefetch images and evidence reports

This chapter describes the aspect of association initiation of the activity prefetch images and evidence reports.

This activity retrieves image instances and evidence reports of the selected study. The evidence reports are available during the planning phase. The images are then available for the surgeon when needed during the surgery.

4.1.4.3.3.1 Description and Sequencing of Activities



4.1.4.3.3.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Study Root Q/R IM - FIND	...5.1.4.1.2.2.1	ILE	...1.2	SCU	No
Study Root Q/R IM - MOVE	...5.1.4.1.2.2.2	ILE	...1.2	SCU	No
Verification	...1.1	ILE	...1.2	SCU	No
Storage Commitment Push Model	...1.20.1	ILE	...1.2	SCU	No
Encapsulated PDF Storage	...5.1.4.1.1.104.1	ILE	...1.2	SCU	No
Raw Data Storage	...5.1.4.1.1.66	ILE	...1.2	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-LO	...1.2.4.90	SCU	No
OPT Image Storage		J2K	...1.2.4.91	SCU	No
		J2K-LO	...1.2.4.90	SCU	No
Modality Worklist IM - FIND	...5.1.4.31	ILE	...1.2	SCU	No

4.1.4.3.3.3 SOP Specific Conformance

4.1.4.3.3.3.1 C-FIND SCU

Query Keys on query level STUDY.

This query will be triggered by the user in order to fill the pick list.

Tag	Name	Description
(0008,0052)	Query Level	"STUDY"
(0010,0010)	Patients Name	Form GUI component
(0010,0020)	Patient ID	From GUI component
(0008,0050)	Accession Number	From GUI component
(0008,0020)	Study Date	From GUI component, Range
(0008,0030)	Study Time	From GUI component, Range
(0020,0010)	Study ID	From GUI component
(0020,000D)	Study Instance UID	From GUI component
(0008,0061)	Modalities In Study	From GUI component
(0008,0090)	Referring Physician's Name	From GUI component

Query Keys on query level IMAGE

This query will be triggered after selecting studies from the pick list.

Tag	Name	Description
(0008,0052)	Query Level	"IMAGE"
(0020,000D)	Study Instance UID	From selected study in pick list
(0020,000E)	Series Instance UID	-empty-
(0008,0018)	SOP Instance UID	-empty-
(0008,0016)	SOP Class UID	"1.2.840.10008.5.1.4.1.1.77.1.5.1" (OphthalmicPhotography8BitImage-Storage) or "1.2.840.10008.5.1.4.1.1.104.1" (EncapsulatedPDFStorage)

Following tags are visible in the pick list

Tag	Name	Description
(0010,0020)	Patient ID	
(0010,0010)	Patients Name	
(0010,0030)	Patients Birth Date	
(0008,0020)	Study Date	
(0008,0050)	Accession Number	

4.1.4.3.3.3.2 C-MOVE SCU

The preceding C-FIND Response is the source for following tags.

Tag	Name	Description
(0008,0052)	Query Level	"IMAGE"
(0020,000D)	Study Instance UID	From result of preceding C-FIND service
(0020,000E)	Series Instance UID	From result of preceding C-FIND service
(0008,0018)	SOP Instance UID	From result of preceding C-FIND service

4.1.4.3.4 Activity - Acquire images and movie during the surgery

This activity has no DICOM messaging aspect.

The surgeon can take movies or still images during the surgery. Still images are taken from the movie.

4.1.4.3.5 Activity - Create an evidence report

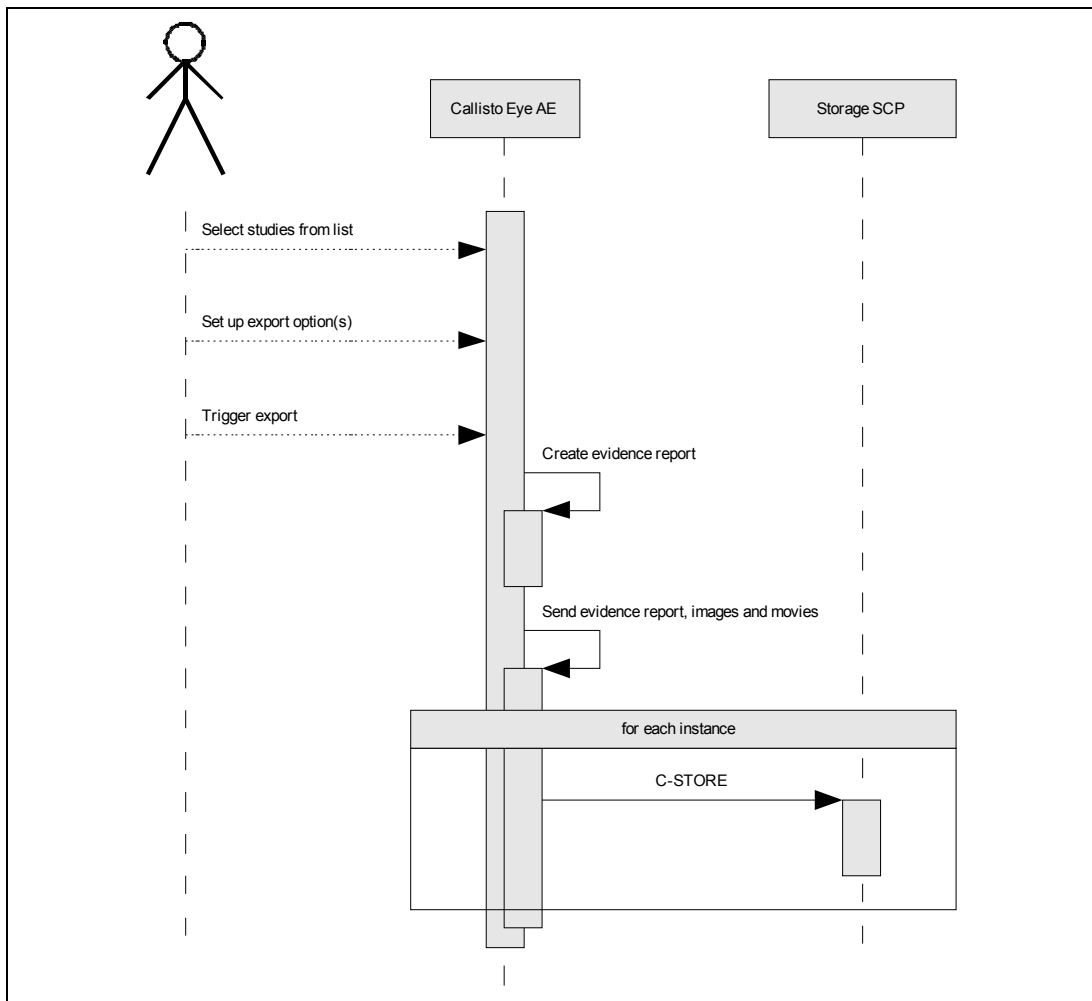
This is an optional activity. This activity is a preceding activity before "Store images, movies and evidence report".

The operator creates an evidence report after the surgery. The report contains still images which have been taken during the surgery. The report contains also information about used consumables. The report won't be stored in the CALLISTO eye software.

4.1.4.3.6 Activity - Store images, movies and evidence report

The operator sends the created evidence report to the configured Storage Provider. Optionally she or he can send the still images and movies.

4.1.4.3.6.1 Description and Sequencing of Activities



Select studies from list

The operator selects the studies (one or more) of interest.

Set up export option(s)

The operator can specify

- Whether a evidence report shall be created and sent
- Whether acquired images shall be sent
- Whether acquired movies shall be sent

Trigger export

The operator initiates the export by pressing a dedicated button.

4.1.4.3.6.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. In fact CALLISTO eye sends

- OP 8 Bit Images with Transfer Syntax JPG-1 for images
- OP 8 Bit Images with Transfer Syntax MPEG-2 for videos
- Encapsulated PDF 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. ...		
Study Root Q/R IM - FIND	...5.1.4.1.2.2.1	ILE	...1.2	SCU	No
Study Root Q/R IM - MOVE	...5.1.4.1.2.2.2	ILE	...1.2	SCU	No
Verification	...1.1	ILE	...1.2	SCU	No
Storage Commitment Push Model	...1.20.1	ILE	...1.2	SCU	No
Encapsulated PDF Storage	...5.1.4.1.1.104.1	ILE	...1.2	SCU	No
Raw Data Storage	...5.1.4.1.1.66	ILE	...1.2	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-LO	...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-LO	...1.2.4.90	SCU	No
Modality Worklist IM - FIND	...5.1.4.31	ILE	...1.2	SCU	No

4.1.4.3.6.3 SOP Specific Conformance for Storage SCU

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	No special behavior.
*	*	Any other status code	The users gets an error message.

The CALLISTO eye Client software does not create the attribute Patient Orientation (0020,0020) attribute, though it is required, because the actual patient orientation is unknown to the CALLISTO eye software.

4.1.4.4 Association Acceptance Policy

4.1.4.4.1 Activity – Verify Communication

4.1.4.4.1.1 Description and Sequencing of Activities

The CALLISTO eye will respond to verification request made by remote AEs.

4.1.4.4.1.2 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

4.1.4.4.1.3 SOP Specific Conformance for SOP Class Verification

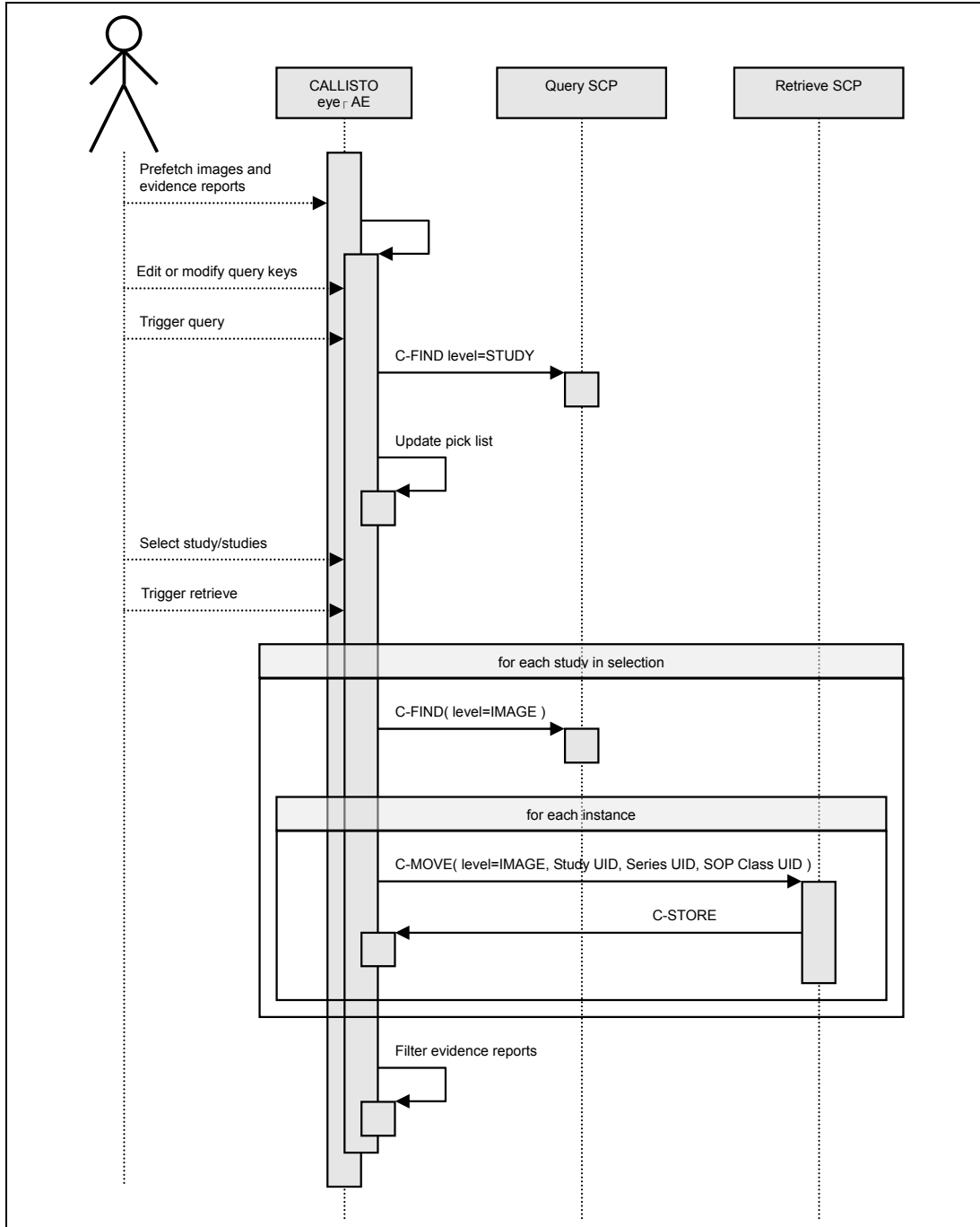
The CALLISTO eye AE provides standard conformance.

4.1.4.4.2 Activity - Prefetch images and evidence reports

This chapter describes the aspect of association acceptance of the activity prefetch images and evidence reports.

This activity retrieves image instances and evidence reports of the selected study. The evidence reports are available during the planning phase. The images are then available for the surgeon when needed during the surgery.

4.1.4.4.2.1 Description and Sequencing of Activities



4.1.4.4.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
OP 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	JPG-1	1.2.840.10008.1.2.4.50	SCP	No
Encapsulated PDF Storage	...5.1.4.1.1.104.1	ILE	...1.2	SCP	No
Verification	...1.1	ILE	...1.2	SCP	No

4.2 Network Interfaces

4.2.1 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.

4.2.2 Additional Protocols

No additional protocols are supported.

4.3 Configuration

4.3.1 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.

4.3.1.1 Local AE Titles

The IP is not configurable by the Configuration Tool. The IP is administrated by the Operating System. The calling AET and the local port is configurable.

4.3.1.2 Remote AE Titles

The mapping of external AE Titles to TCP/IP addresses and ports is configurable. The CALLISTO eye Client software allows setting up a remote AE for each service (Modality Worklist, Storage, Storage Commitment, Query, Retrieve). For all AEs, the host name or IP, the Port and the Application Entity Title must be known.

4.3.2 Parameters

4.3.2.1 General Parameters

No configuration possible.

4.3.2.2 Modality Worklist SCU Parameters

No configuration possible.

4.3.2.3 Storage SCU Parameters

The Station Name attribute (0008,1010) and the Institution Name attribute (0008,0080) may be entered at the DICOM configuration dialog at the CALLISTO eye Client software. They are included in each stored instance.

4.3.2.4 Storage Commitment SCU Parameters

No configuration possible.

4.3.2.5 Query/Retrieve SCU Parameters

No configuration possible.

4.3.2.6 Storage SCP Parameters

No configuration possible.

5 Media Interchange

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

6 Support Of Character Sets

Supported Specific Character Set	
Character Set Description	Defined Term
Unicode	ISO_IR 192

7 Security

The DICOM capabilities of the CALLISTO eye Application do not support any specific security measures. It is assumed that CALLISTO eye Application 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 CALLISTO eye Application.
- ❖ Firewall or router protections to ensure that CALLISTO eye Application 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 Value:

VNAP Value Not Always Present (attribute sent zero length if no value is present)

ANAP Attribute Not Always Present

ALWAYS Always Present with a value

EMPTY Attribute is sent without a value

Abbreviations used for source of the data values:

USER the attribute value source is from User input

AUTO the attribute value is generated automatically

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

CONFIG the attribute value source is a configurable parameter

8.1.1.1 Encapsulated PDF IOD

IE	Module	Usage
Patient		
	Patient	MANDATORY
	SpecimenIdentification	OPTIONAL, Not Used
	ClinicalTrialSubject	OPTIONAL, Not Used
Study		
	GeneralStudy	MANDATORY
	PatientStudy	OPTIONAL, Not Used
	ClinicalTrialStudy	OPTIONAL, Not Used
Series		
	EncapsulatedDocumentSeries	MANDATORY
	ClinicalTrialSeries	OPTIONAL, Not Used
Equipment		
	GeneralEquipment	MANDATORY
	ScEquipment	MANDATORY
EncapsulatedDocument		
	EncapsulatedDocument	MANDATORY
	SopCommon	MANDATORY

Patient				
Tag	Type	VR	Name	Description
(0010,0010)	2	PN	Patient's Name	Patient's full name. Presence: ALWAYS Source: USER or MWL

(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient. Presence: VNAP Source: USER or MWL
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID. Presence: VNAP Source: MWL
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient. Presence: ALWAYS Source: USER or MWL
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other Presence: ALWAYS Source: USER or MWL
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient. Presence: VNAP Source: USER
GeneralStudy				
Tag	Type	VR	Name	Description
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study. Presence: ALWAYS Source: AUTO or MWL "1.2.276.0.75.2.5.40.20.1" as constant prefix (if AUTO)
(0008,0020)	2	DA	Study Date	Date the Study started. Presence: ALWAYS Source: USER or MWL
(0008,0030)	2	TM	Study Time	Time the Study started. Presence: ALWAYS Source: USER or MWL
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician Presence: VNAP Source: USER or MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. Presence: VNAP Source: USER
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. Presence: VNAP Source: MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed. Presence: VNAP Source: USER
EncapsulatedDocumentSeries				
Tag	Type	VR	Name	Description
(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. Presence: ALWAYS Source: AUTO ("DOC")
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. Presence: ALWAYS

				"1.2.276.0.75.2.5.40.20.2" as constant prefix Source: AUTO
(0020,0011)	1	IS	Series Number	A number that identifies the Series. Presence: ALWAYS Source: AUTO ("1")
(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items. Present if study has been imported via 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. Present if study has been imported via MWL. Presence: ANAP Source: 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. Present if study has been imported via MWL. Presence: ANAP Source: MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed. Present if study has been imported via MWL. Presence: ANAP Source: MWL
(0040,0253)	3	SH	Performed Procedure Step ID	User or equipment generated identifier of that part of a Procedure that has been carried out within this step. Presence: VNAP Source: MWL: Set to Requested Procedure ID, if study has been imported via MWL
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started. Presence: VNAP Source: USER
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started. Presence: VNAP Source: USER
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed. Presence: VNAP Source: USER
GeneralEquipment				
Tag	Type	VR	Name	Description
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances. Presence: ALWAYS

				Source: AUTO ("Carl Zeiss Meditec")
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located. Presence: VNAP Source: CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances. Presence: VNAP Source: CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances. Presence: ALWAYS Source: AUTO ("CALLISTO eye")
(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the composite instances. Presence: ALWAYS Source: AUTO
ScEquipment				
Tag	Type	VR	Name	Description
(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 Presence: ALWAYS Source: AUTO ("SYN")
EncapsulatedDocument				
Tag	Type	VR	Name	Description
(0020,0013)	1	IS	Instance Number	A number that identifies this SOP Instance. The value shall be unique within a series. Presence: ALWAYS Source: AUTO ("1")
(0008,0023)	2	DA	Content Date	The date the document content creation was started. Presence: ALWAYS Source: USER
(0008,0033)	2	TM	Content Time	The time the document content creation was started. Presence: ALWAYS Source: USER
(0008,002A)	2	DT	Acquisition Datetime	The date and time that the original generation of the data in the document started. Presence: ALWAYS Source: USER
(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 value NO. Presence: ALWAYS Source: AUTO ("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. Presence: ALWAYS Source: AUTO ("CALLISTO eye")

(0040,A043)	2	SQ	Concept Name Code Sequence	A coded representation of the document title. Zero or one item may be present.
(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). Presence: ALWAYS Source: AUTO ("application/pdf")
(0042,0011)	1	OB	Encapsulated Document	Encapsulated Document stream, containing a document encoded according to the MIME Type. Presence: ALWAYS Source: USER
SopCommon				
Tag	Type	VR	Name	Description
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. Presence: ALWAYS Source: AUTO ("1.2.840.10008.5.1.4.1.1.104.1")
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. Presence: ALWAYS Source: AUTO "1.2.276.0.75.2.5.40.20.3" as constant prefix
(0008,0005)	1C	CS	Specific Character Set	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used. See C.12.1.1.2 for Defined Terms. Presence: ALWAYS Source: AUTO ("ISO_IR 192")
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created. Presence: ALWAYS Source: USER
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created. Presence: ALWAYS Source: USER

8.1.1.2 Ophthalmic Photography 8 Bit IOD

IE	Module	Usage		
Patient				
	Patient	MANDATORY		
	SpecimenIdentification	CONDITIONAL, Not Used		
	ClinicalTrialSubject	OPTIONAL, Not Used		
Study				
	GeneralStudy	MANDATORY		
	PatientStudy	OPTIONAL, Not Used		
	ClinicalTrialStudy	OPTIONAL, Not Used		
Series				
	GeneralSeries	MANDATORY		
	OphthalmicPhotographySeries	MANDATORY		
	ClinicalTrialSeries	OPTIONAL, Not Used		
FrameOfReference				
	Synchronization	MANDATORY		
Equipment				
	GeneralEquipment	MANDATORY		
Image				
	GeneralImage	MANDATORY		
	ImagePixel	MANDATORY		
	EnhancedContrastBolus	CONDITIONAL, Not Used		
	Cine	CONDITIONAL, Not Used		
	MultiFrame	MANDATORY		
	Device	OPTIONAL, Not Used		
	OphthalmicPhotographyImage	MANDATORY		
	OcularRegionImaged	MANDATORY		
	OphthalmicPhotographyAcquisitionParameters	MANDATORY		
	OphthalmicPhotographicParameters	MANDATORY		
	SopCommon	MANDATORY		
Patient				
Tag	Type	VR	Name	Description
(0010,0010)	2	PN	Patient's Name	Patient's full name. Presence: ALWAYS Source: USER or MWL
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient. Presence: VNAP Source: USER or MWL
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID. Presence: VNAP Source: MWL
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient. Presence: ALWAYS Source: USER or MWL

(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other Presence: ALWAYS Source: USER or MWL
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient. Presence: VNAP Source: USER
GeneralStudy				
Tag	Type	VR	Name	Description
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study. Presence: ALWAYS Source: AUTO "1.2.276.0.75.2.5.40.20.1" as constant prefix (if AUTO)
(0008,0020)	2	DA	Study Date	Date the Study started. Presence: ALWAYS Source: USER or MWL
(0008,0030)	2	TM	Study Time	Time the Study started. Presence: ALWAYS Source: USER or MWL
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician Presence: VNAP Source: USER or MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. Presence: VNAP Source: USER
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. Presence: VNAP Source: MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed. Presence: VNAP Source: USER
GeneralSeries				
Tag	Type	VR	Name	Description
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. Presence: ALWAYS Source: AUTO "1.2.276.0.75.2.5.40.20.2" as constant prefix
(0020,0011)	2	IS	Series Number	A number that identifies this Series. Presence: ALWAYS Source: AUTO ("1")
(0008,0021)	3	DA	Series Date	Date the Series started. Presence: VNAP Source: USER or MWL
(0008,0031)	3	TM	Series Time	Time the Series started. Presence: VNAP Source: USER or MWL
(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items. Present if study has been imported via MWL.
>(0040,1001)	1C	SH	Requested	Identifier that identifies the Requested Procedure in the

			Procedure ID	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. Present if study has been imported via MWL. Presence: ANAP Source: 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. Present if study has been imported via MWL. Presence: ANAP Source: MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed. Present if study has been imported via MWL. Presence: ANAP Source: MWL
(0040,0253)	3	SH	Performed Procedure Step ID	User or equipment generated identifier of that part of a Procedure that has been carried out within this step. Set to Requested Procedure ID, if study has been imported via MWL. Presence: VNAP Source: MWL: Set to Requested Procedure ID, if study has been imported via MWL
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started. Presence: VNAP Source: USER
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started. Presence: VNAP Source: USER
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed. Presence: VNAP Source: USER
OphthalmicPhotographySeries				
Tag	Type	VR	Name	Description
(0008,0060)	1	CS	Modality	Source equipment that produced the Ophthalmic Photography Series. Presence: ALWAYS Source: AUTO (Enumerated Value: "OP")
Synchronization				
Tag	Type	VR	Name	Description
(0020,0200)	1	UI	Synchronization Frame of Reference UID	UID of common synchronization environment. See C.7.4.2.1.1. Presence: ALWAYS Source: AUTO
(0018,106A)	1	CS	Synchronization	Data acquisition synchronization with external equipment

			Trigger	Enumerated Values: SOURCE - this equipment provides synchronization channel or trigger to other equipment EXTERNAL - this equipment receives synchronization channel or trigger from other equipment PASSTHRU - this equipment receives synchronization channel or trigger and forwards it NO TRIGGER - data acquisition not synchronized by common channel or trigger Presence: ALWAYS Source: AUTO ("NO TRIGGER")
(0018,1800)	1	CS	Acquisition Time Synchronized	Acquisition DateTime (0008,002A) synchronized with external time reference. Enumerated Values: Y, N See C.7.4.2.1.4 Presence: ALWAYS Source: AUTO ("N")
GeneralEquipment				
Tag	Type	VR	Name	Description
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances. Presence: ALWAYS Source: AUTO ("Carl Zeiss Meditec")
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located. Presence: VNAP Source: CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances. Presence: VNAP Source: CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances. Presence: ALWAYS Source: AUTO ("CALLISTO eye")
(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the composite instances. Presence: ALWAYS Source: AUTO
GeneralImage				
Tag	Type	VR	Name	Description
(0008,0022)	3	DA	Acquisition Date	The date the acquisition of data that resulted in this image started Presence: VNAP Source: USER
(0008,0032)	3	TM	Acquisition Time	The time the acquisition of data that resulted in this image started Presence: VNAP Source: USER
(0020,4000)	3	LT	Image Comments	User-defined comments about the image Presence: VNAP Source: USER
ImagePixel				
Tag	Type	VR	Name	Description
(0028,0010)	1	US	Rows	Number of rows in the image. Presence: ALWAYS

				Source: AUTO
(0028,0011)	1	US	Columns	Number of columns in the image Presence: ALWAYS Source: AUTO
(0028,0100)	1	US	Bits Allocated	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated. See PS 3.5 for further explanation. Presence: ALWAYS Source: AUTO ("8")
(0028,0101)	1	US	Bits Stored	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored. See PS 3.5 for further explanation. Presence: ALWAYS Source: AUTO ("8")
(0028,0102)	1	US	High Bit	Most significant bit for pixel sample data. Each sample shall have the same high bit. See PS 3.5 for further explanation. Presence: ALWAYS Source: AUTO ("7")
(7FE0,0010)	1C	OB OW	Pixel Data	A data stream of the pixel samples that comprise the Image. See C.7.6.3.1.4 for further explanation. Required if Pixel Data Provider URL (0028,7FE0) is not present. Presence: ALWAYS Source: USER
Cine				
Tag	Type	VR	Name	Description
(0018,1063)	1C	DS	Frame Time	Nominal time (in msec) per individual frame. See C.7.6.5.1.1 for further explanation. Required if Frame Increment Pointer (0028,0009) points to Frame Time. Presence: ALWAYS Source: AUTO ("0")

MultiFrame

Tag	Type	VR	Name	Description
(0028,0008)	1	IS	Number of Frames	Number of frames in a Multi-frame Image. See C.7.6.6.1.1 for further explanation. Presence: ALWAYS Source: AUTO ("1")
(0028,0009)	1	AT	Frame Increment Pointer	Contains the Data Element Tag of the attribute that is used as the frame increment in Multi-frame pixel data. See C.7.6.6.1.1 for further explanation. Presence: ALWAYS Source: AUTO ("00181063")

OphthalmicPhotographyImage				
Tag	Type	VR	Name	Description
(0008,0008)	1	CS	Image Type	Image identification characteristics. See C.8.17.2.1.4 for specialization. Presence: ALWAYS Source: AUTO ("ORIGINAL", "PRIMARY")
(0020,0013)	1	IS	Instance Number	A number that identifies this image. Presence: ALWAYS Source: AUTO ("1")
(0028,0002)	1	US	Samples per Pixel	Number of samples (planes) in this image. Enumerated values: 1 or 3. See C.8.17.2.1.2 for further explanation.

				Presence: ALWAYS Source: AUTO ("3")
(0028,0004)	1	CS	Photometric Interpretation	Specifies the intended interpretation of the pixel data. See section C.8.17.2.1.3 Presence: ALWAYS Source: AUTO ("YBR_FULL_422")
(0028,0103)	1	US	Pixel Representation	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Values: 0000 = unsigned integer. 0001 = 2's complement Presence: ALWAYS Source: AUTO ("0")
(0028,0006)	1C	US	Planar Configuration	Indicates whether the pixel data are sent color-by-plane or color-by-pixel. Required if Samples per Pixel (0028,0002) has a value greater than 1. Enumerated value shall be 0 (color-by-pixel). Presence: ALWAYS Source: AUTO ("0")
(0008,0033)	1	TM	Content Time	The time the image pixel data creation started. Presence: ALWAYS Source: USER
(0008,0023)	1	DA	Content Date	The date the image pixel data creation started. Presence: ALWAYS Source: USER
(0008,002A)	1C	DT	Acquisition Datetime	The date and time that the acquisition of data started. Note: The synchronization of this time with an external clock is specified in the synchronization Module in Acquisition Time Synchronized (0018,1800). Required if Image Type (0008,0008) Value 1 is ORIGINAL. May be present otherwise. Presence: ALWAYS Source: USER
(0028,2110)	1	CS	Lossy Image Compression	Specifies whether an Image has undergone lossy compression. Enumerated Values: 00 = Image has NOT been subjected to lossy compression. 01 = Image has been subjected to lossy compression. See C.7.6.1.1.5 Presence: ALWAYS Source: AUTO ("01")
(0028,2112)	1C	DS	Lossy Image Compression Ratio	Describes the approximate lossy compression ratio(s) that have been applied to this image. See C.7.6.1.1.5 for further explanation. May be multivalued if successive lossy compression steps have been applied. Notes: 1. For example, a compression ratio of 30:1 would be described in this Attribute with a single value of 30. 2. For historical reasons, the lossy compression ratio should also be described in Derivation Description (0008,2111) Required if Lossy Image Compression (0028,2110) has a value of "01". Presence: ALWAYS Source: USER
(0028,2114)	1C	CS	Lossy Image Compression Method	A label for the lossy compression method(s) that have been applied to this image. See C.7.6.1.1.5 for further explanation. May be multivalued if successive lossy compression steps have been applied; the value order shall correspond to the values of Lossy Image Compression Ratio (0028,2112). Required if Lossy Image Compression (0028,2110) has a value of "01". Note: For historical reasons, the lossy compression method should also be described in Derivation Description (0008,2111). Presence: ALWAYS Source: AUTO ("ISO_10918_1")
(0028,0301)	1	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 Value: YES NO Presence: ALWAYS

				Source: AUTO ("NO")
OcularRegionImaged				
Tag	Type	VR	Name	Description
(0020,0062)	1	CS	Image Laterality	Laterality of object imaged (as described in Anatomic Region Sequence (0008,2218)) examined. Enumerated Values: R = right eye L = left eye B = both left and right eye Shall be consistent with any laterality information contained in Primary Anatomic Structure Modifier Sequence (0008,2230), if present. Note: Laterality (0020,0060) is a Series level Attribute and must be the same for all Images in the Series. Since most Ophthalmic Photographic Image studies contain images of both eyes, the series level attribute will rarely be present. Presence: ALWAYS Source: AUTO ("B")
(0008,2218)	1	SQ	Anatomic Region Sequence	Sequence that identifies the anatomic region of interest in this Instance (i.e. external anatomy, surface anatomy, or general region of the body). Only a single Item shall be permitted in this sequence.
>(0008,0100)	1	SH	Code Value	See Section 8.1. Presence: ALWAYS Source: AUTO ("T-AA000")
>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2. Presence: ALWAYS Source: AUTO ("SRT")
>(0008,0104)	1	LO	Code Meaning	See Section 8.3. Presence: ALWAYS Source: AUTO ("Eye")
OphthalmicPhotographyAcquisitionParameters				
Tag	Type	VR	Name	Description
(0022,0005)	2	CS	Patient Eye Movement Commanded	Enumerated Values: YES NO Presence: ALWAYS Source: AUTO ("")
(0022,001B)	2	SQ	Refractive State Sequence	The refractive state of the imaged eye at the time of acquisition. Zero or one Item shall be present. Zero length means the refractive state was not measured.
(0022,000A)	2	FL	Emmetropic Magnification	Emmetropic magnification value (dimensionless). Zero length means the emmetropic magnification was not measured. Presence: ALWAYS Source: AUTO ("")
(0022,000B)	2	FL	Intra Ocular Pressure	Value of intraocular pressure in mmHg. Zero length means the pressure was not measured Presence: ALWAYS Source: AUTO ("")
(0022,000D)	2	CS	Pupil Dilated	Enumerated Values: YES NO If this tag is empty, no information is available. Presence: ALWAYS Source: AUTO ("")
OphthalmicPhotographicParameters				
Tag	Type	VR	Name	Description
(0022,0015)	1	SQ	Acquisition Device Type Code	Describes the type of acquisition device. A single item shall be present in the sequence.

				Sequence	
>(0008,0100)	1	SH	Code Value	See Section 8.1. Presence: ALWAYS Source: AUTO ("R-1021B")	
>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2. Presence: ALWAYS Source: AUTO ("SRT")	
>(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. Presence: ALWAYS Source: AUTO ("20040921")	
>(0008,0104)	1	LO	Code Meaning	See Section 8.3. Presence: ALWAYS Source: AUTO ("External Camera")	
(0022,0016)	2	SQ	Illumination Type Code Sequence	Coded value for illumination. Zero or one item shall be present in the sequence.	
(0022,0017)	2	SQ	Light Path Filter Type Stack Code Sequence	Filters used in the light source path. Zero or more items may be present in the sequence.	
(0022,0018)	2	SQ	Image Path Filter Type Stack Code Sequence	Describes stack of filters used in image path. Zero or more items may be present in the sequence.	
(0022,0019)	2	SQ	Lenses Code Sequence	Lenses that were used during the image acquisition. Zero or more items may be present in the sequence.	
(0018,7004)	2	CS	Detector Type	Type of detector used for creating this image. Defined terms: CCD = Charge Coupled Devices CMOS = Complementary Metal Oxide Semiconductor Presence: ALWAYS Source: AUTO ("")	
SopCommon					
Tag	Type	VR	Name	Description	
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. Presence: ALWAYS Source: AUTO ("1.2.840.10008.5.1.4.1.1.77.1.5.1")	
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. Presence: ALWAYS Source: AUTO "1.2.276.0.75.2.5.40.20.3" as constant prefix	
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created. Presence: ALWAYS Source: USER	
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created. Presence: ALWAYS Source: USER	

8.1.2 Usage Of Attributes From Received IOD's

The usage of attributes of Modality Worklist IODs is described in chapter 4.1.4.3.2

CALLISTO eye receives all available Instances of type EncapsulatedPDFStorage or OphthalmicPhotography8BitImageStorage from the selected studies.

Following attributes are used in the CALLISTO eye Client Software:

Tag	Name	Description of Usage
(0008,0020)	Study Date	Displayed in GUI. Modifiable by User.
(0008,0050)	Accession Number	Displayed in GUI.
(0008,0090)	Referring Physician 's Name	Displayed in GUI. Modifiable by User.
(0008,1030)	Study Description	Displayed in GUI. Modifiable by User.
(0008,1080)	Admitting Diagnoses Description	Displayed in GUI. Modifiable by User.
(0010,0010)	Patient 's Name	Displayed in GUI. Modifiable by User.
(0010,0020)	Patient ID	Displayed in GUI. Modifiable by User.
(0010,0021)	Issuer of Patient ID	Included in IODs during storage.
(0010,0030)	Patient 's Birth Date	Displayed in GUI. Modifiable by User.
(0010,0040)	Patient 's Sex	Displayed in GUI. Modifiable by User.
(0010,4000)	Patient Comments	Displayed in GUI. Modifiable by User.
(0020,0010)	Study ID	Displayed in GUI. Modifiable by User.
(0020,4000)	Image Comments	Displayed in GUI. Modifiable by User.
(0040,0007)	Scheduled Procedure Step Description	Included in IODs during storage
(0040,0009)	Scheduled Procedure Step ID	Included in IODs during storage.
(0040,1001)	Requested Procedure ID	Included in IODs during storage.
(0042,0011)	Encapsulated Document	Displayed in GUI.
(7FE0,0010)	Pixel Data	Displayed in GUI.

8.1.3 Attribute Mapping

Modality Worklist	Instance IOD
Study Instance UID	Study Instance UID
Referenced Study Sequence	Referenced Study Sequence
Accession Number	Accession Number
Requested Procedure ID	Request Attributes Sequence > Requested Procedure ID
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
Referring Physicians Name	Referring Physicians Name
Patients Name	Patients Name
Patient ID	Patient ID
Issuer of Patient ID	Issuer of Patient ID
Patients Birth Date	Patients Birth Date
Patients Sex	Patients Sex

8.1.4 Coerced/Modified Files

Those tags are listed in chapter 4.1.4.3.2 (

Activity - Query Modality Worklist) and 8.1.2 (Usage Of Attributes From Received IOD's). Other attributes get lost and are not available in the CALLISTO eye Client Application.

8.2 Data Dictionary of Private Attributes

Not applicable.

8.3 Coded Terminology And Templates

Not applicable.

8.4 Grayscale Image Consistency

Not applicable.

8.5 Standard Extended / Specialized/ Private SOP Classes

No Specialized nor Private SOP Classes are supported.

8.6 Private Transfer Syntaxes

No Private Transfer Syntaxes are supported.
