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DICOM Conformance Statement

Cirrus HD-OCT 4000 and 400 Instrument and Review Software

Version 6.0

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1 Conformance Statement Overview

This document is structured as suggested in the DICOM Standard (PS 3.2, 2011).

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Encapsulated PDF Storage	Yes	No
Raw Data Storage	Yes	Yes
Workflow Management		
Modality Worklist IM - FIND	Yes	No
Storage Commitment Push Model SOP Class	Yes	No
Query / Retrieve		
Study Root Query/Retrieve IM – FIND	Yes	No
Study Root Query/Retrieve IM – MOVE	Yes	No
Patient Root Query/Retrieve IM – FIND	Yes	No

The Acquisition Modality allows acquisition and storage of scan data and allows creation of reports from reviewed and processed scan data.

Table 1-1 Possible combinations of DICOM Service Providers for an Acquisition Modality

A Review Station is the Cirrus HD-OCT Application software running on a computer other than instrument's computer. A Review Station does not allow acquisition of scan data. A Review Station allows creation of reports from reviewed and processed scan data. It also allows the storage of analysis data.

Modality Worklist SCP	Encapsulated PDF Storage	Raw Data Storage	Storage Commitment Push Model SOP Class	Patient Root Q/R IM-FIND	Study Root Q/R IM - FIND	Study Root Q/R IM - MOVE
X						
X	X					
	X					
		X	X			
X		X	X			
X	X	X	X			
	X	X	X			
	X	X	X	X	X	X
X	X	X	X	X	X	X
X	X	X	X	X		
	X	X	X	X		
	X			X		
		X	X	X		
				X		

Table 1-2 Possible combinations of DICOM Service Providers for a Review Station.

Modality Worklist SCP	Encapsulated PDF Storage	Raw Data Storage	Storage Commitment Push Model SOP Class	Patient RootQ/R IM-FIND	Study Root Q/R IM IM-FIND	Study Root Q/R IM IM-MOVE
	X					
	X	X	X			
	X			X	X	X
	X	X	X	X	X	X

The Cirrus HD-OCT does not support Media Interchange.

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3 Introduction

3.1 Revision History

Document Version	Author	Date
L	Partha Dey	2011-12-01

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 3.2-2011] 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 Worklist
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 Uterque, 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, 2011

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Figure 4-1 Cirrus HD-OCT Application Software as Acquisition Modality

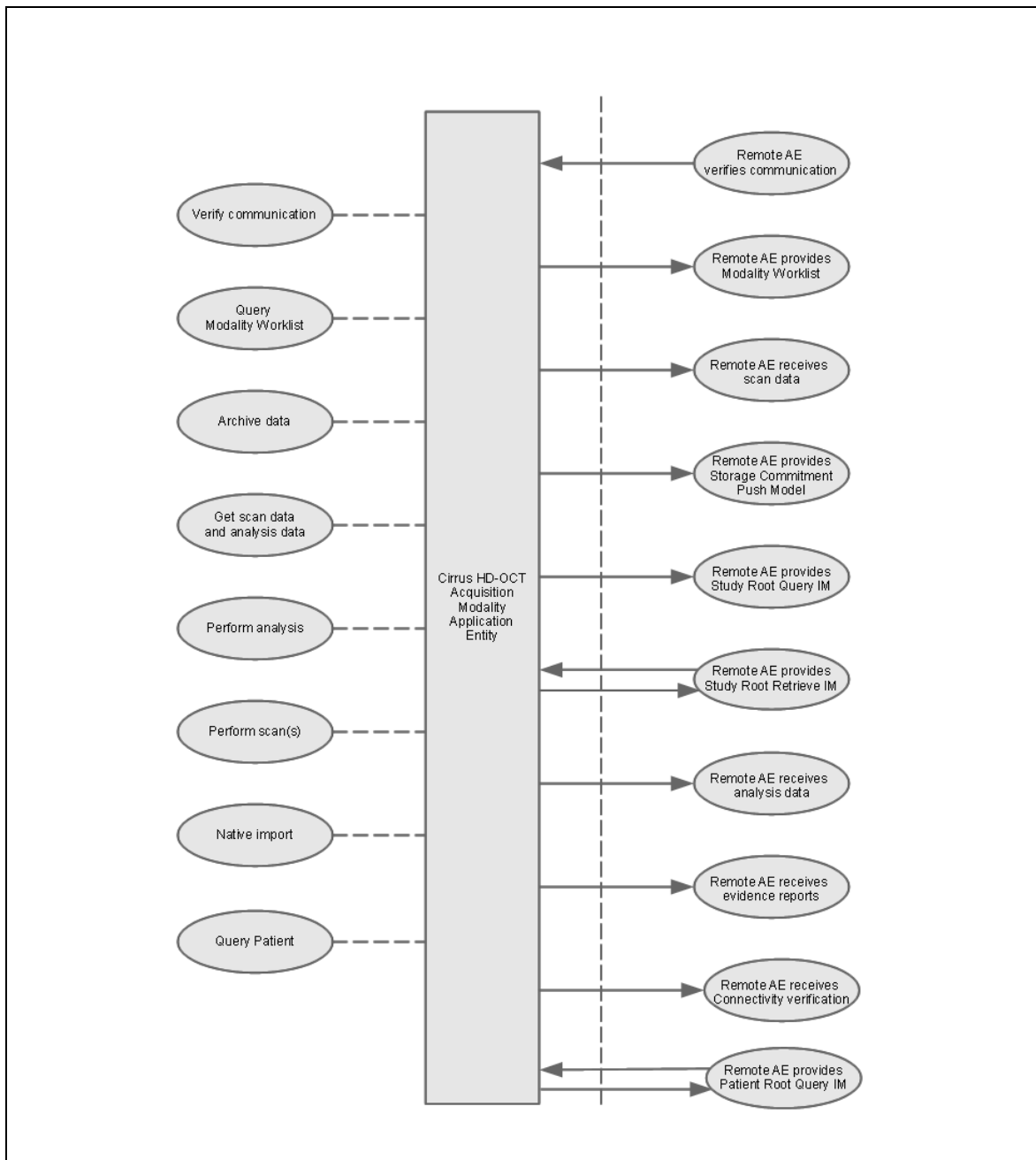
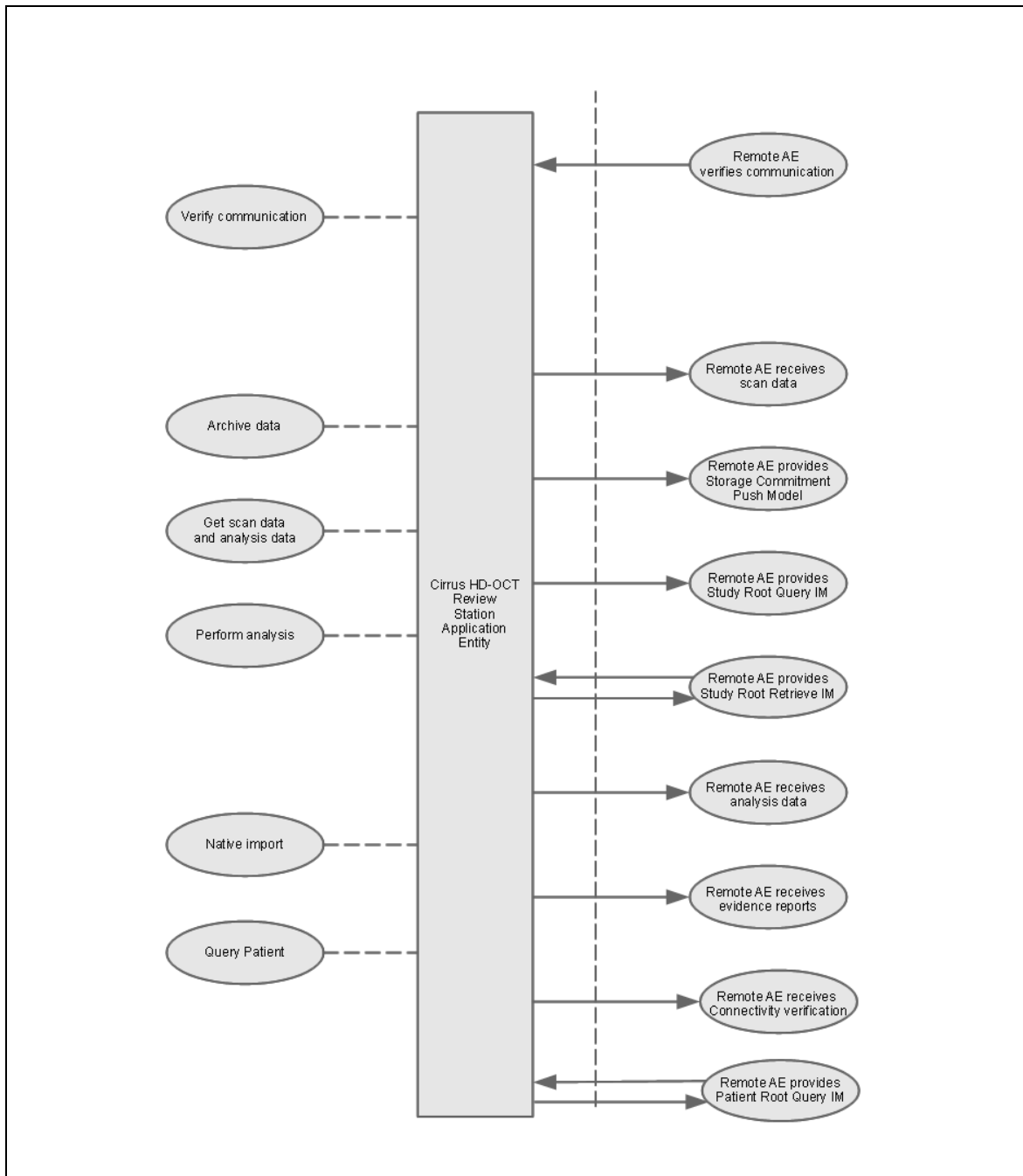


Figure 4-2 Cirrus HD-OCT Application Software as Review Station



4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of Cirrus OCT

The ZEISS Cirrus HD-OCT is an image acquisition modality and review application. These acquisition modalities enable examination of patient's eye, while Cirrus HD-OCT Review Software enables you to view, analyze and manage Cirrus OCT data on a personal computer. It provides all the Cirrus OCT instrument functionality, except scan acquisition, in a remote location.

The Cirrus HD-OCT Application Software allows to:

- query modality worklist
- query patients
- export evidence reports

- archive scan data and analysis data
- retrieve scan data

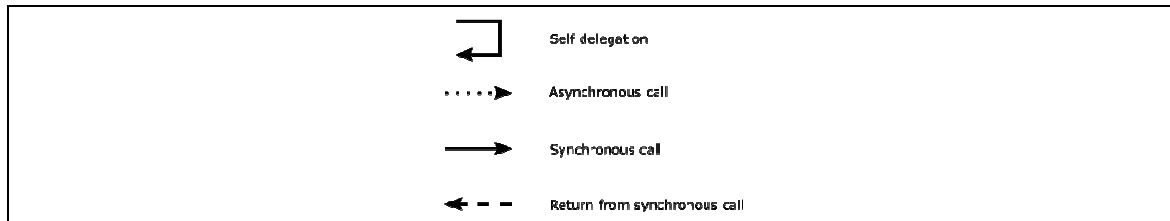
Cirrus HD-OCT AE runs several DICOM Services as Service Class User and as Service Class Provider for Verification and Raw Data Storage.

The Cirrus HD-OCT 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 Cirrus HD-OCT 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 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. There could be two possibilities at this point: The examination can be schedule for the instrument in advance or the patient information will be entered directly in the instrument during the scan.

In either case all patient and study related information is available at the day the examination takes place. This information can then be used to take the examination. The operator can trigger all activities listed below. An activity can be triggered if no other activity is currently active. The shown order of the activities is the recommended order. Details on DIMSE level will be explained in chapters after this.

Cirrus 6.0 order of activities:

Query Modality Worklist

When the patient arrives at the Cirrus HD-OCT, the operator queries the worklist. The user can invoke this from the menu of the application software – “Search Worklist Patients”.

He types in search criteria and gets matching items back from modality worklist. The matches are listed in a table, from which the operator can select the correct item. According to the transferred data Cirrus HD-OCT creates an entry in the local database (Patient, Study).

The operator can then select the patient for data acquisition or analysis.

Query

The user has three application based options here. The user can use the find existing patient interface to (Last Name, Patient ID) or View Today’s Patients or DICOM Retrieve option from the menu.

Based on option used by the operator along with the search criterion provided, he gets matching items back from archive and studies stored on remote AE. As mentioned above, the operator also has the option of clicking on "Today's Patient" tab to quickly get to the patients based on today's date. The matches are listed in a table, from which the operator can select the correct item. According to the transferred data Cirrus HD-OCT creates an entry in the local database (Patient, Study).

The operator can then select the patient for data acquisition or analysis.

Get scan data and analysis data

This activity is optional.

With this activity the operator can query and consequently retrieve patient scan and analysis data from archive. The user achieves this by the DICOM retrieve menu item from the application software.

The user can then select a particular patient from the query result and press OK to retrieve all scan and analysis data. It is to be noted here that Evidence documents cannot be retrieved.

The user can then analyze the patient just retrieved as explained above.

A slight distinction need to be made here. When the user queries data, selects the patient from the list and clicks analyze. Relevant analysis data is retrieved when a particular analysis is selected from the analysis explorer.

Native import

This activity is optional.

The native import takes data in the system that has been created by other Application Software instances.

Perform scan(s)

The operator selects a scan acquisition protocol and then performs the scan on patient's eye. The Application Software allows the user to review the acquired scan data before permanently saving the scan result.

This activity creates scan data and analysis data.

Save

Based on the choices driven by the user for auto archive the scanned data and analysis data will be sent to the configured storage provider, followed by a storage commitment request to the storage commitment provider. This happens only when the user has the auto archive option checked along with "Archive Current Exam after Saving" option checked. This allows the user to initiate auto-archive immediate after performing a scan.

Perform analysis

The operator can trigger this activity by selecting a specific analysis protocol. The applicable analysis depends on the available scan data. The user can adjust parameters to optimize the analysis result.

Analysis data that has been created within the analysis activity will first be stored locally. During a later "Archive data"-activity, they will be transferred to the configured Storage Provider.

Alternatively, based on the choices driven by the user for auto-archive, the scanned data and analysis data will be sent to the configured storage provider, followed by a storage commitment request to the storage commitment provider. This happens only when the user has the auto-archive option checked along with "Archive Today's Exams after Finishing Analysis" option checked. This allows the user to initiate auto-archive only when the user has reviewed the scanned data.

Export Report

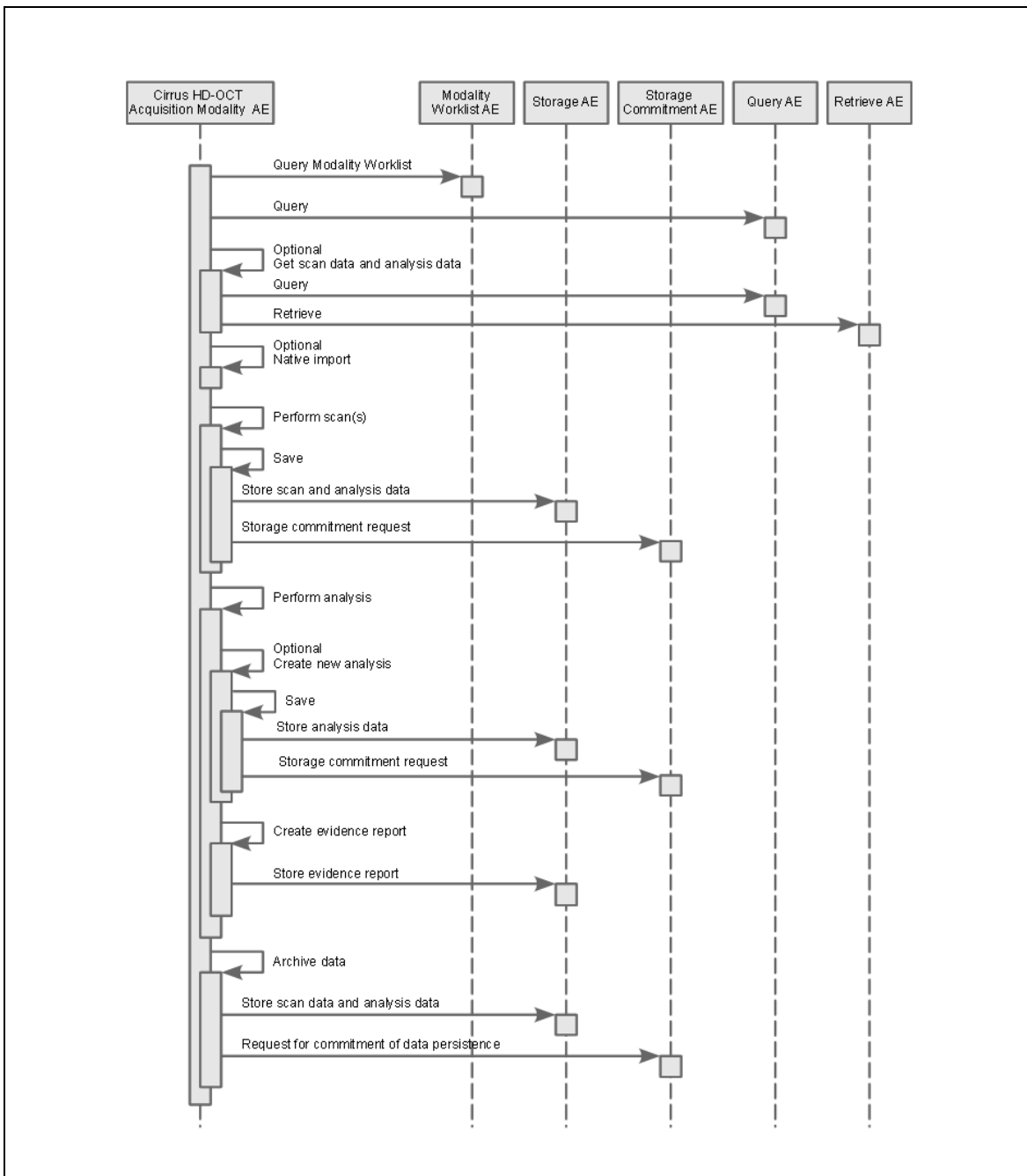
The operator can invoke the creation of an evidence report by using the "Export to DICOM" option at any time within the analysis activity. Thus he or she can export several evidence reports during the analysis activity.

Archive data

This activity refers to the manual archive and does not allude to automatic archive.

The activity can be triggered if no other activity is in progress.

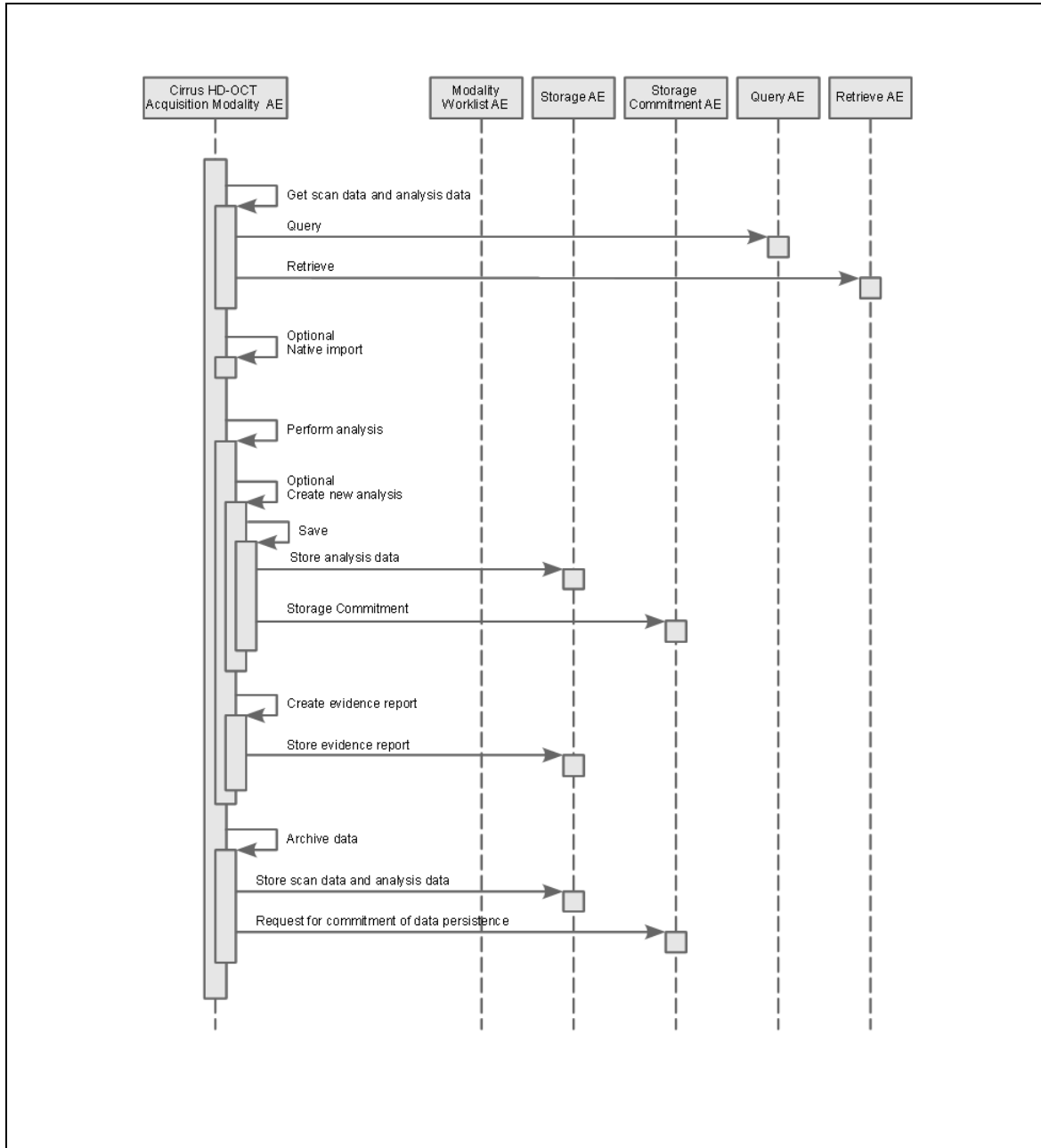
This activity transfers acquired scan data and analysis data to the configured Storage Provider. After that, the Application Software asks the configured Storage Commitment Provider to take over responsibility on data persistence for the transferred scan data and analysis data.



4.1.3.2 Scheduled case with Acquisition Modality and Review Station

Acquisition of scan data and its analysis can be performed separately in different locations. As before, the Acquisition Modality would be used to acquire scan data. The analysis can then be done at a separate Review Station. The Review Station is the Cirrus HD-OCT Application Software installed on a computer, other than the Acquisition Modality. The Review Station needs access to the Application Entity, to which the Acquisition Modality archives scan data and default analysis parameters.

The Acquisition Modality would work as described in the chapter before. In the following, the focus is on functionality of the Review Station. The preferred orders are shown below:



4.1.3.3 Unscheduled case

In the unscheduled case the patient arrives immediately at the instrument, so that the patient was not registered at the front desk. Thus the examination is not scheduled in the Modality Worklist. Patient demographics, study information and scheduling information has to be generated at the point of origin. The situation is akin to the case if the Modality Worklist AE could not be reached due to network issues.

Patient demographics can be queried from the Query Service Class Provider.

4.2 AE Specifications

4.2.1 Cirrus HD-OCT 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
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	No	No
Modality Performed Procedure Step Notification SOP Class	1.2.840.10008.3.1.2.3.5	No	No
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	No
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	No	No
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	No
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	No
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	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

Cirrus HD-OCT 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

Description and Sequencing of Activities

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

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

In the association request Cirrus HD-OCT Application Software proposes not only Verification SOP Class, but also all other SOP Classes as supported by the instrument's DICOM interface.

The association is established when the peer DICOM entity accepts the verification related presentation context. In a sub-subsequent 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 acceptance of the the proposed presentation context comprising the respective Storage SOP Classes.

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
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

4.2.1.3.1.1 SOP Specific Conformance for Verification SOP Class

The Cirrus HD-OCT 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

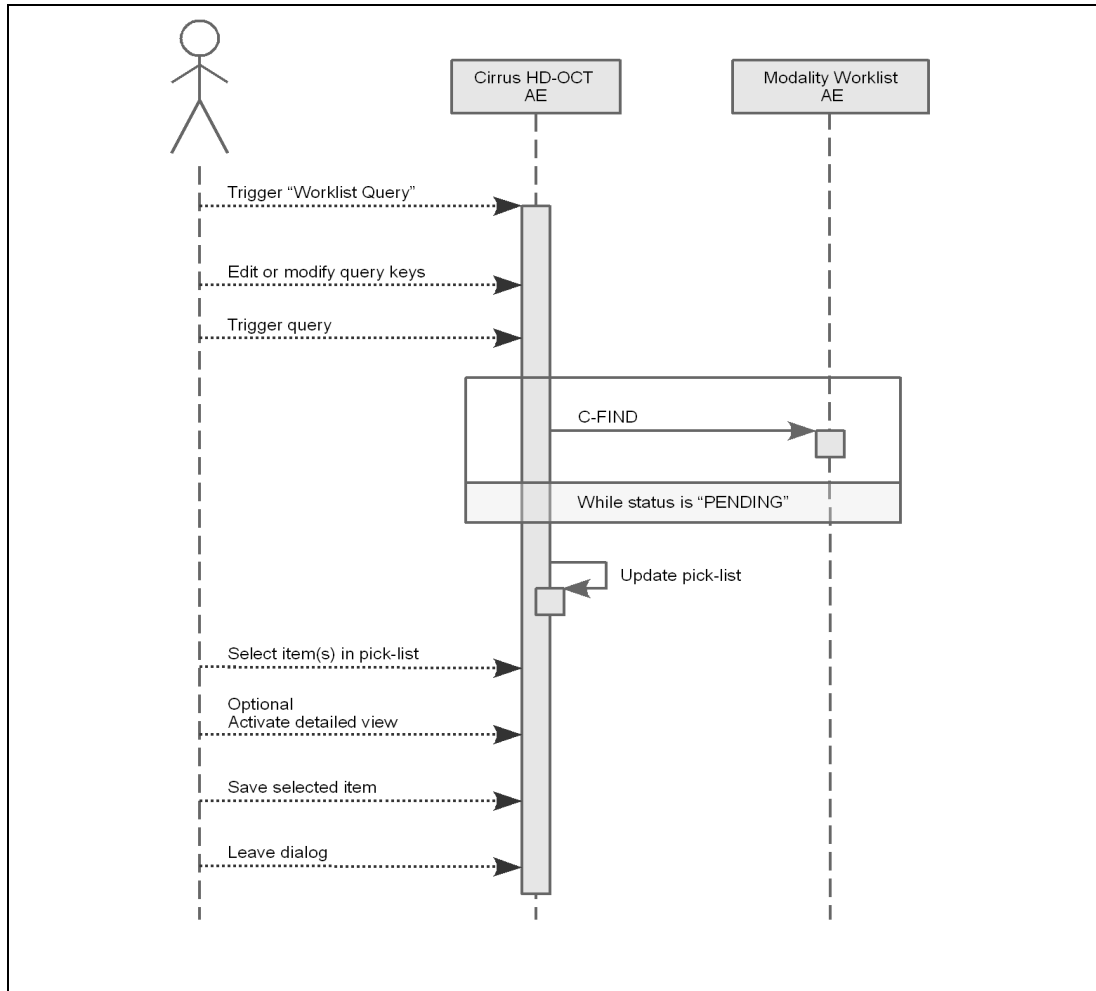
Option “Todays Patients query”

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 configured for the Cirrus instrument.
>(0040,0002)	Scheduled procedure Step Start Date	Uses the date of today.

All matching worklist items are subject to be imported into the local database.

Option “Interactive query”



Trigger "Modality Worklist"

The activity "Query Modality Worklist" can be triggered by operator at any time if no other activity is in progress. It is meaningful to perform the query when the patient arrives at the modality. Then the worklist contains latest information.

Edit or modify query keys

The Modality Worklist query offers a GUI for interactive query. The GUI offers two sets of query keys. One set belongs to the so called "Patient Based Query", the other one belongs to the "Broad Query".

The operator can change or fill in search criteria in the shown dialog. For instance, the incomplete patient name or the patient ID can be used.

Trigger query

The operator triggers the search after he or she filled in search criteria. 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. 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, then an A-RELEASE-RQ to the service provider and a message is displayed. Despite this warning, the operator gets result in the pick-list.

After receiving the response, the pick-list is updated. The pick-list provides the most important information for a quick overview (see section 4.2.1.3.2.3 for the supported set of tags).

The operator can start over, redefine query keys and trigger the query again. This can be performed as often as required, until he or she finds the correct worklist item.

Select item in pick-list

The operator can select one worklist item in the pick-list. The selected item becomes subject for a detailed view or it can be imported into the Application Software.

Activate detailed view

The detailed view allows a closer look to the currently selected worklist item. Thus the operator can see more information about patient information and schedule information.

Save selected item

The operator can take over the selected item at any time. The data is stored in the list of today's patients.

The Application Software checks the local database for patient data with same combination of Patient ID and Issuer of Patient ID. If there is matching data, then the Application Software checks for differences in Patient's Name, Patient's Birth Date and Patient's Sex. In case of a difference, the Application Software presents the differences to the operator and asks whether to overwrite the data in the local database with the data from the Modality Worklist. The operator can also deny overwriting.

For patients who do not relate to existing data, the Application Software prepares new data sets.

After saving the selected item, the operator can start over. By repeating this process the operator can take over several worklist items into the local database.

After all that, the operator can start the examination of the patient and acquire scan data.

Leave dialog

The operator finally finishes the worklist query by leaving the dialog.

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					
Name	Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
	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
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, then an A-RELEASE-RQ to the service provider and a message is displayed.
Failure	Too Many Results	C001	If there are too many results the cirrus application software throws a warning message "DICOM search returned too many records. Please narrow search" to the user and the status box is changed to yellow.
*	*	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	Imported	Displayed	Modifiable	SOP Instance
Scheduled Procedure Step (SPS)						
(0040,0100)	Scheduled Procedure Step Sequence					
>(0040,0001)	Scheduled Station Application Entity Title	BRQ, DEF		PLD		
>(0040,0003)	Scheduled Procedure Step Start Time			PLD		
>(0040,0002)	Scheduled Procedure Step Start Date	BRQ, DEF		PL, PLD		
>(0008,0060)	Modality	BRQ, DEF		PLD		
>(0040,0006)	Scheduled Performing Physicians Name					
>(0040,0007)	Scheduled Procedure Step Description			PL, PLD		
>(0040,0010)	Scheduled Station Name					
>(0040,0011)	Scheduled Procedure Step Location					
>(0040,0008)	Scheduled Protocol Code Sequence					
>>(0008,0100)	Code Value					
>>(0008,0102)	Coding Scheme Designator					
>>(0008,0103)	Coding Scheme Version					
>>(0008,0104)	Code Meaning			PLD		
>(0040,0012)	Pre-Medication					
>(0040,0009)	Scheduled Procedure Step ID					
>(0032,1070)	Requested Contrast Agent					
Requested Procedure						
(0040,1001)	Requested Procedure ID	PBQ	X	PL, PLD		X
(0032,1060)	Requested Procedure Description		X	PLD		X

(0032,1064)	Requested Procedure Code Sequence					
>(0008,0100)	Code Value					
>(0008,0102)	Coding Scheme Designator					
>(0008,0103)	Coding Scheme Version					
>(0008,0104)	Code Meaning			PLD		
(0020,000D)	Study Instance UID		X			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			PLD		
Visit Identification						
(0008,0050)	Accession Number	PBQ	X	PL, PLD		X
(0032,1032)	Requesting Physician					
(0008,0090)	Referring Physicians Name		X	PLD		X
Visit Status						
(0038,0010)	Admission ID					
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	PBQ	X	PL, PLD, APP		X
(0010,0020)	Patients ID	PBQ	X	PL, PLD, APP		X
(0010,0021)	Issuer of Patient ID		X			X
(0010,1000)	Other Patient IDs					X
Patient Demographic						
(0010,0030)	Patients Birth Date		X	PLD, APP		X
(0010,0040)	Patients Sex		X	PLD, APP		X
(0010,1030)	Patients Weight					
(0040,3001)	Confidentiality Constraint on Patient Data Description					
(0010,4000)	Patients Comments		X			X
Patient Medical						
(0038,0500)	Patient State					
(0010,21C0)	Pregnancy Status					
(0010,2000)	Medical Alerts					
(0038,0050)	Special Needs					

Values of column "Query Key":

PBQ

A tag that is marked with PBQ is used as query key in the Patient Based Query mode of the interactive Modality Worklist Query Dialog.

BRQ

A tag that is marked with BRQ is used as query key in the Broad Query mode of the interactive Modality Worklist Query Dialog.

DEF

A tag that is marked with DEF has a value assigned when the interactive Modality Worklist Query Dialog is shown the first time or when the Reset button is pushed.

Default values can get modified. The modifications will be stored for next use of Modality Worklist Query Dialog.

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":

PL

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

PLD

Values of this tag are visible in the details dialog of the current selected pick list item.

APP

Values of this tag are visible in the application.

Values of column "Modifiable":

X

A value which has been imported to the application might be modified inside the application.

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.

Following set of tags can be used as query key in the so called "**Patient Based Query**". The Patient Based Query is a working mode of the Modality Worklist Query Dialog.

Table 4-3 Modality Worklist query key details - Patient Based Query

Tag	Tag Name	Description
(0010,0010)	Patients Name	The Cirrus HD-OCT Application Software supports family name and given name only. The operator can use '*' or '?' as wild cards.
(0010,0020)	Patient ID	The operator can enter a string which conforms to the Value Representation LO.
(0008,0050)	Accession Number	The operator can enter a string which conforms to the Value Representation SH.
(0040,1001)	Requested Procedure ID	The operator can enter a string which conforms to the Value Representation SH.

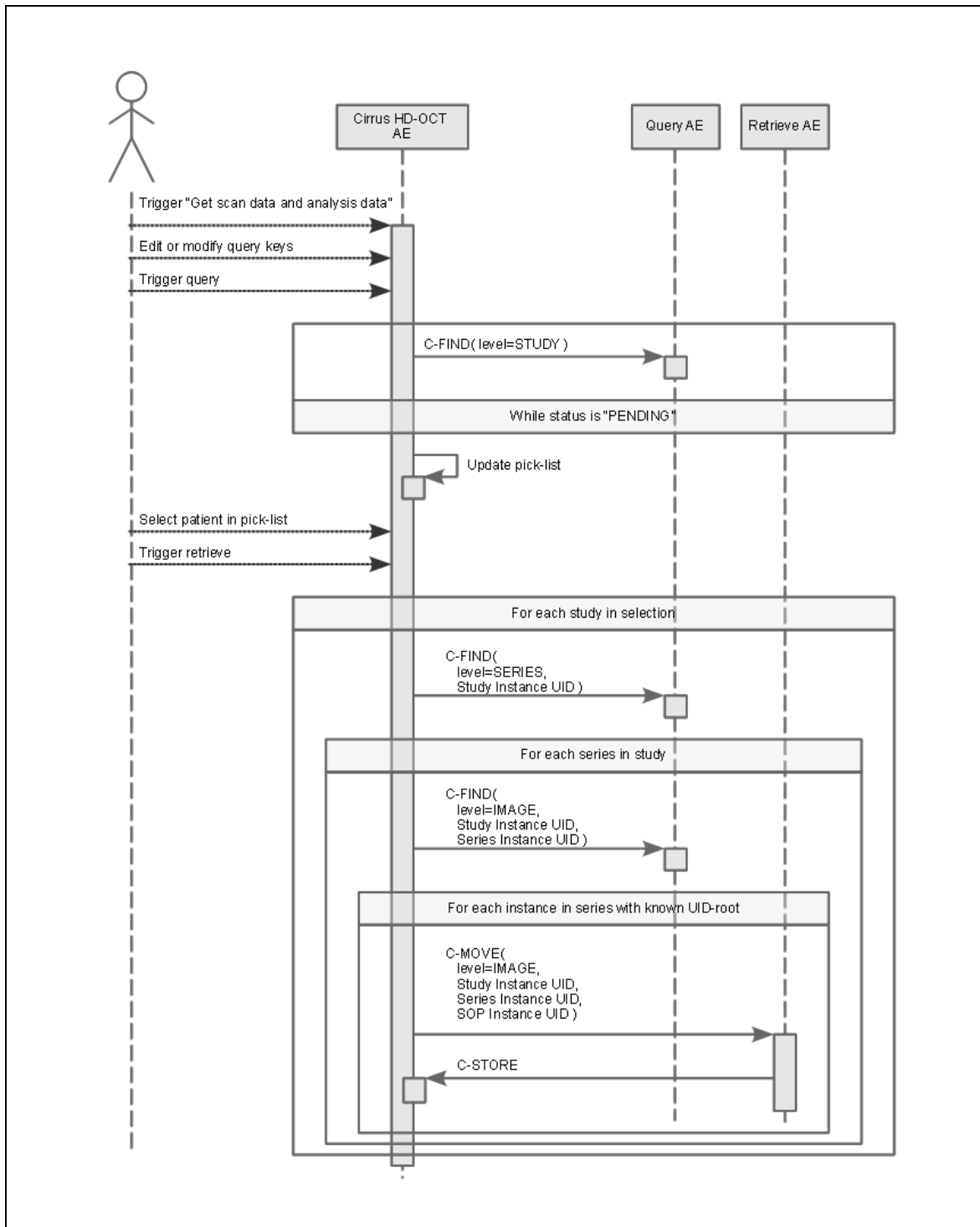
Following set of tags can be used as query key in the so called "**Broad Query**". The Broad Query is a working mode of the Modality Worklist Query Dialog.

Table 4-4 Modality Worklist query key details - Broad Query

Tag	Tag Name	Description
(0040,0100)	Scheduled Procedure Step Sequence	This attribute is the container for the tags as listed below. The sequence contains one item.
>(0040,0002)	Scheduled Procedure Step Start Date	The default value is today's date. The operator can change the value and can even enter date ranges. It is also possible to search for all dates if the operator activates a check box.
>(0008,0060)	Modality	The default value is "OPT". The operator can change the value and select one value of a predefined set of values including an empty string. Possible values are "OP", "OPM", "OPT", "OPV", "OT" and empty string.
>(0040,0001)	Scheduled Station AE Title	The default value is set by configuration. The operator can enter the AE Title of another device or leave the field empty.

4.2.1.3.3 Activity - Get scan data and analysis data

4.2.1.3.3.1 Description and Sequencing of Activities



Trigger "Get scan data and analysis data"

The activity "Get scan data and analysis data" can be triggered by operator at any time if no other activity is in progress.

Edit or modify query keys

This activity offers a GUI for interactive query. The GUI allows the user to specify values for the query keys other than the default values.

Trigger query

After specifying the query keys he or she triggers the query. All query keys apply on study level. Thus, all results are about matching studies. 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, then an A-RELEASE-RQ and a dialog shows up, notifying the operator about this limitation.

Select patient in pick-list

During updating the pick-list, studies are collated so that the operator can select a patient rather than studies. 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.

Trigger retrieve

By clicking on "Retrieve", the operator tells the Software Application to retrieve studies of the current selected patient.

The Software Application checks the local database for a patient data with same combination of Patient ID and Issuer of Patient ID. If there is matching data, then the Application Software checks for differences in Patient's Name, Patient's Birth Date and Patient's Sex. In case of a difference, the Application Software presents the differences to the operator and asks whether to overwrite the data in the local database with the data from the Query. The operator can also deny overwriting. In this case, the retrieve process is aborted.

If there was no matching data for the combination of Patient ID and Issuer of Patient ID, the Application Software checks whether the local database contains data that matches the Study of the selected patient. The value of Study Instance UID is used as identifier by Software Application. In case of a match, the Application Software prompts whether to overwrite the patient data in the local database with the data as given by the Query. The operator can also deny overwriting.

After checking the patient demographics, the Application Software explores each study for its Series, then each Series for its Instances. By doing so, the Application Software gathers all SOP Instance UIDs that relate to the patient.

The Application Software filters the Instances for supported SOP Class UIDs and SOP Instance UIDs with a known UID-root.

The Application Software filters SOP Instances ...

- ... for SOP Class UIDs
1.2.840.10008.5.1.4.1.1.66 - Raw Data Storage
- ... for the UID-roots
1.2.276.0.75.2.2.40 – UID-root of Cirrus HD-OCT Model 4000
1.2.276.0.75.2.2.41 – UID-root of Cirrus HD-OCT Model 400
1.2.826.0.1.3680043.2.139.3.6 – UID-root of legacy Cirrus data

Instances that match these filters are finally retrieved.

Since the algorithm works hierarchical, it is not required that the Query SCP supports relational queries.

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

- Study Root Q/R IM - FIND" with Transfer Syntax ILE
- Study Root Q/R IM - MOVE" with Transfer Syntax ILE
- Raw Data Storage" with Transfer Syntax ELE or 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
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 Study Root Query/Retrieve SOP Class as SCU

Table 4-5 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, then an A-RELEASE-RQ to the service provider and a message is displayed.
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 4-6 Retrieve C-MOVE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Sub-operations Complete No Failures	0000	The Application Software returns from this activity.
Pending	Sub-operations are continuing	FF00	This is not expected since the Application Software calls C-MOVE instance by instance.

Refused	Out of Resources Unable to calculate number of matches	A701	An error message is shown to the operator. The Application Software logs this event and continues with processing next C-MOVE operation.
Refused	Out of Resources Unable to perform sub-operations	A702	
Refused	Move Destination unknown	A801	
Failure	Identifier does not match SOP Class	A900	
Failure	Unable to process	C000 - CFFF	
Success	Sub-operations Complete One or more Failures	B000	
Cancel	Sub-operations terminated due to Cancel Indication	FE00	
*	*	Any other status code	

The following table lists attributes, which are in use during this activity. The table also explains how the attributes are involved.

Table 4-7 Attributes involved in Query C-FIND request and response

Tag	Tag Name	Query Key	Displayed in pick-list	Displayed in details
Study				
(0008,0020)	Study Date	X, DEF, RNG		X
(0008,0050)	Accession Number	X		X
(0020,0010)	Study ID	X		X
(0010,0010)	Patient's Name	X	X	X
(0010,0020)	Patient ID	X	X	X
(0010,0021)	Issuer of Patient ID		X	X
(0010,0030)	Patient's Birth Date		X	X
(0010,0040)	Patient's Sex			X
(0008,0090)	Referring Physician's Name	X		X
(0008,1030)	Study Description			X
(0008,0061)	Modalities in Study	X, DEF, SEL		X

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.

DEF

A default value other than empty string is defined for this attribute.

RNG

The operator can apply a range as value for the query key.

SEL

The operator can select a value from a given list of values.

Values for column "Displayed in pick-list":

X

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

Values for column "Displayed in detail dialog":

X

The value of this attribute becomes visible in the detail dialog. The detail dialog shows attributes of the current selected item in the pick-list.

Table 4-8 Query key details

Tag	Tag Name	Description
(0008,0050)	Accession Number	The default value is empty string. The operator can enter each value that conforms to the Value Representation SH. This is a DICOM Standard query key on Study level.
(0008,0020)	Study Date	By default, this query key is disabled, thus, the resulting DICOM query key value is empty string. When enabled, the default value is today's date. The operator can enable or disable this query key and can change the value. Date ranges can be applied too. This is a DICOM Standard query key on Study level.
(0020,0010)	Study ID	The default value is empty string. The operator can enter each value that conforms to the Value Representation SH. This is a DICOM Standard query key on Study level.
(0010,0010)	Patient's Name	The default value is empty string. Only family name and given name can be used as query key. This is a DICOM Standard query key on Study 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 Study level.
(0008,0090)	Referring Physician's Name	The default value is empty string. Only family name and given name can be used as query key. The effect of this query key on the query depends on Service Provider implementation since this query key is an optional query key.
(0008,0061)	Modalities in Study	Default value is 'OPT'. The operator can select a value from a drop-down-box. The effect of this query key on the query depends on Service Provider implementation since this query key is an optional query key.

4.2.1.3.4 Activity – Native import

Operator can trigger "Native import" 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 imports scan data and analysis data that has been created in Application Software instances other than this instance. The imported data is subject to be archived within next "Archive data"-activity call.

4.2.1.3.5 Activity – Perform scan(s)

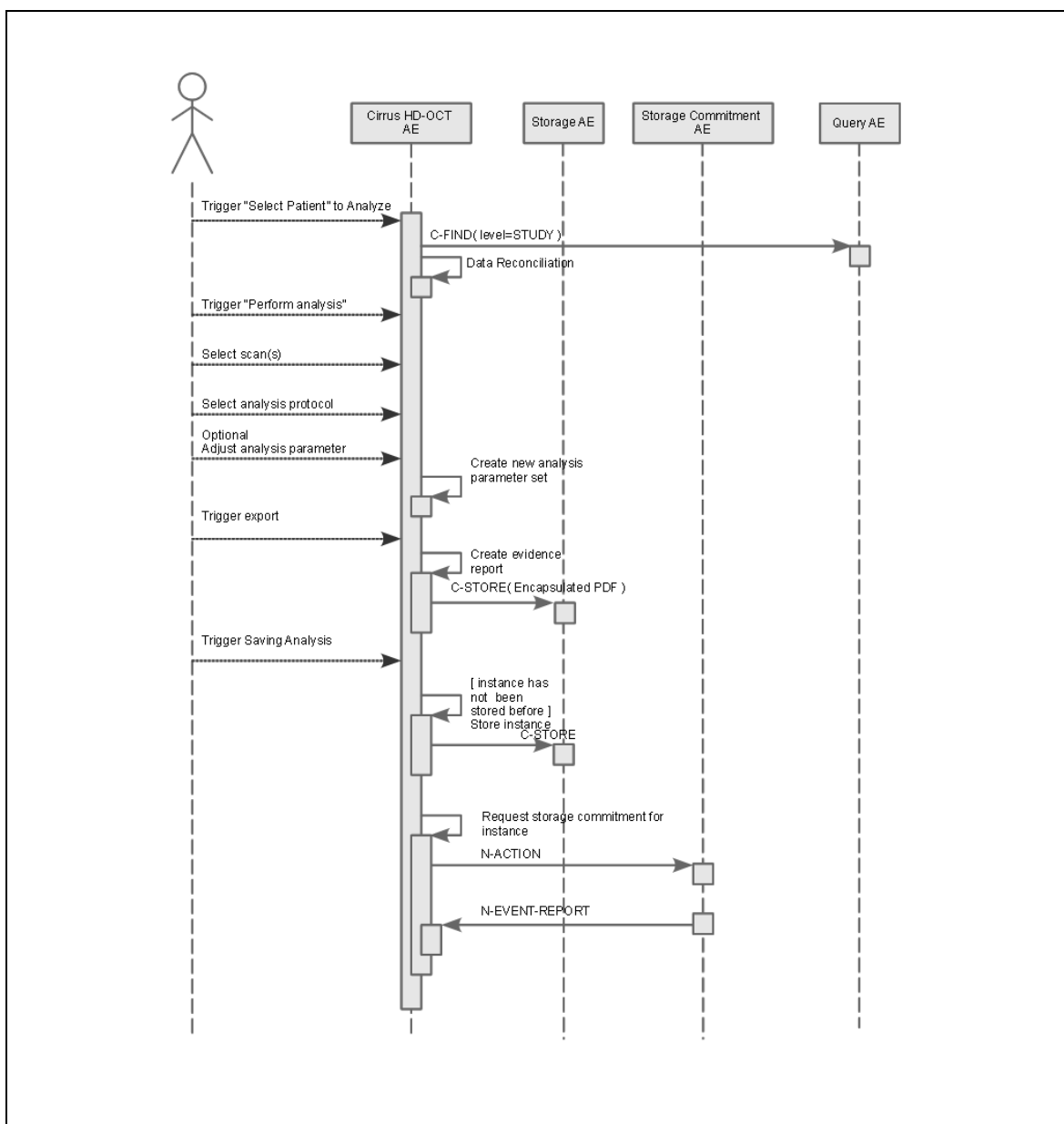
Operator can trigger "Perform scan(s)" at any time if no other activity is in progress. This activity has no direct relation to DICOM messaging.

During this activity, the Application Software creates scan data. It also creates default parameters for an analysis. Scan data and Analysis parameters will be stored as Raw Data SOP Instances. The created data is subject to be archived within next "Archive data"-activity call.

4.2.1.3.6 Activity – Perform analysis

Operator can trigger "Perform analysis" at any time if no other activity is in progress.

4.2.1.3.6.1 Description and Sequencing of Activities (Analysis)



Trigger "Select Patient" to Analyze

The activity can be triggered by selecting a patient from the pick-up list and clicking the analyze button. This results in a study level query call for that particular patient.

Data reconciliation is achieved in the following manner:

- Go through scan list of in patient Database
- Check if particular scan in committed and exists on Forum
- Delete locally if it doesn't exist on Forum

Thus synchronization can be maintained with archived Forum data with local data.

Trigger "Perform analysis"

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

Select scan(s)

The operator selects one or more scans to include in the report. The Application Software enables applicable analysis types.

Select analysis protocol

The Application Software performs an analysis, based on the default analysis parameters.

Adjust analysis parameter

The operator can adjust the parameters and thus, modify the analysis. Adjusting the parameters causes the creation of a new set of parameters. That set of parameters will be stored as instance of Raw Data IOD.

Trigger export

At any time the operator can create an evidence report. The Application Software sends evidence reports to the configured Storage Application Entity.

Evidence reports won't be stored or archived on the instrument itself.

The created evidence report contains the information that was presented on screen when the operator triggered the export. The page orientation of the created report is portrait. Usually the evidence report contains one to three pages.

Trigger save analysis

At any time the operator can save analysis. The application software sends the data IOD to the configured storage application entity automatically only when "Enable Auto-Archive" is enabled through application preference. If this option is turned off, analysis data is achieved only during manual archive.

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
- Raw Data Storage with Transfer Syntax ELE
- Storage Commitment Push Model 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	5.1.4.3.1	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
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 Encapsulated PDF Storage SOP Class as SCU

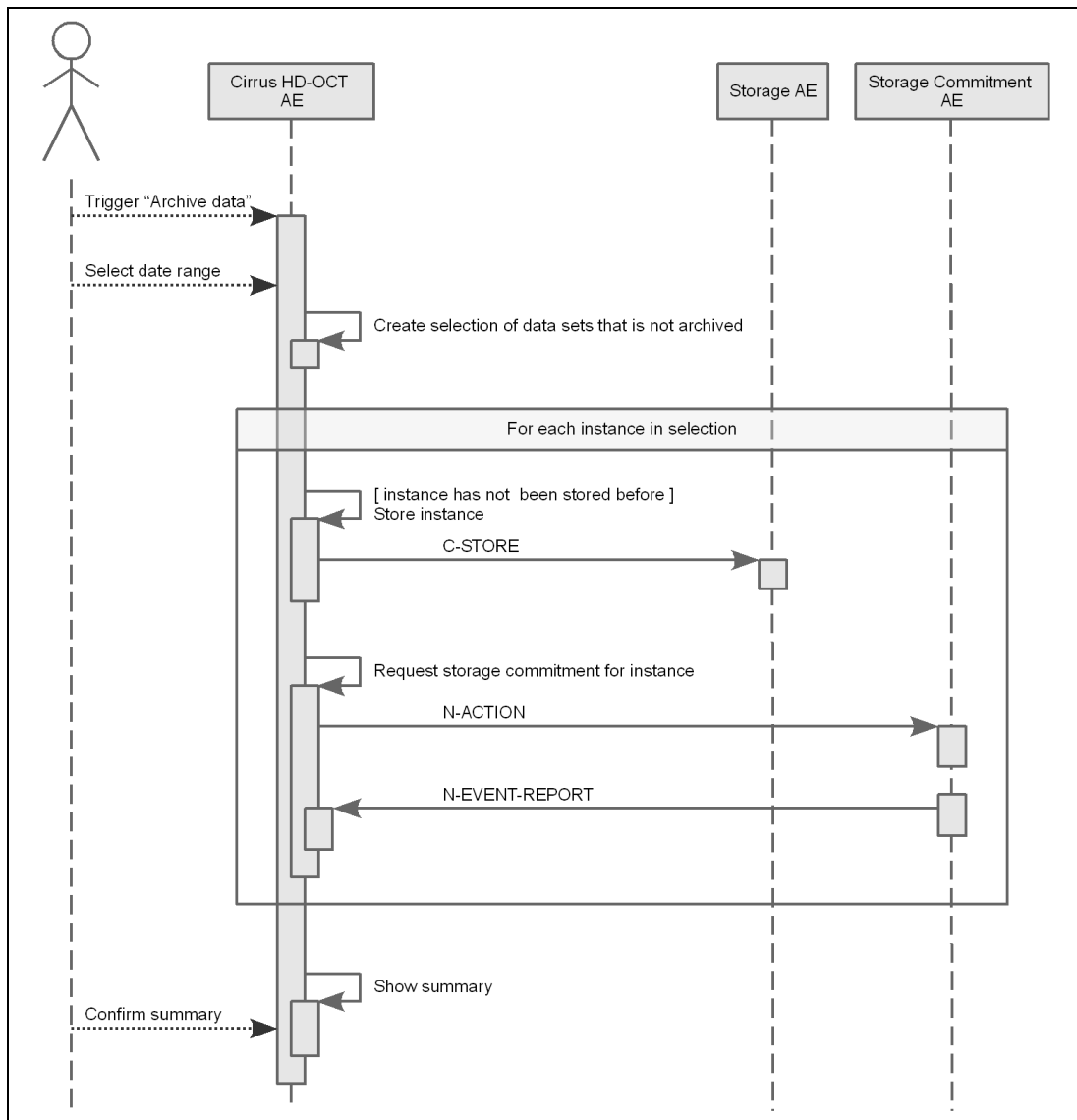
Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The Application Software returns from this activity, prompting a success message.
Refused	Out of Resources	A700 – A7FF	An error message is shown to the operator. The Application Software logs this event and returns.
Error	Data Set 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	

4.2.1.3.7 Activity – Archive data

Operator can trigger the activity "Archive data" at any time if no other activity is in progress. Archiving data can also happen in the background automatically (automatic archiving is described in the respective sections describing perform scan or analysis and is not part of the description of manual archiving).

Based on the users preferences, the local data is deleted either after a successful archive for current patient after finishing analysis or after a successful archive of all patients during shutdown, depending which option is selected. However the database is only flagged when none of these options are selected by the user.

4.2.1.3.7.1 Description and Sequencing of Activities



Trigger "Archive data"

Operator can trigger the activity "Archive data" at any time if no other activity is in progress.

Select date range

The operator can specify a date range on study date. Studies within the range become subject to be archived. If the operator does not specify a date range, then all studies become subject to be archived. As default there is no defined date range.

After the operator decided about the date range, the Application Software creates a selection of data that has not been archived. The state "not archived" addresses data that has been stored locally and has not been transferred to the configured storage provider. It also addresses data that has been transferred to the configured storage provider before and the storage commitment has not been negotiated successfully.

The operator can cancel this activity. The activity does not stop immediately; instead, the loop will be exited as if the end criteria for the loop had been fulfilled.

To verify that the data has been archived, the Application Software asks the configured Storage Commitment Provider to commit storage.

Data that has been successfully archived is subject to be deleted. The Application Software checks frequently for free disk space. When free disk space runs under a configurable threshold, the Application Software checks for data that has been archived and not been accessed for 30 days. The operator can also manually trigger the cleaning process.

Confirm summary

The summary lists the number of successful transferred instances. It also lists the number of errors.

4.2.1.3.7.1.1 Proposed Presentation Contexts

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

- Raw Data Storage with Transfer Syntax ELE
- Storage Commitment Push Model 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
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

4.2.1.3.7.2 SOP Specific Conformance for Storage SOP Classes

Table 4-9 Storage C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The Application Software continues storing next instance if there is at least one instance left in the set of instances.
Refused	Out of Resources	A700 – A7FF	An error message is shown to the operator. The Application Software logs this event and gives up.
Error	Data Set does not match SOP Class	A900 – A9FF	An error message is shown to the operator. The Application Software logs this event and continues storing next instance if there is at

Error	Cannot Understand	C000 – CFFF	least one instance left in the set of instances.
Warning	Coercion of Data Elements	B000	
Warning	Data Set does not match SOP Class	B007	
Warning	Elements Discarded	B006	
*	*	Any other status value	

4.2.1.3.7.3 SOP Specific Conformance for Storage Commitment SOP Class

Storage Commitment Operations (N-ACTION)

The Storage Commitment Request addresses always only one SOP Instance.

Table 4-10 Storage Commitment N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Failure	No such attribute	0105	The SOP Instance is considered as not being archived. The SOP Instance is subject of a future Storage Commitment service call. It will be included again within next call of this activity.
Failure	Invalid attribute value	0106	
Failure	Processing failure	0110	
Failure	Duplicate SOP instance	0111	
Failure	No such object instance	0112	
Failure	No such event type	0113	
Failure	No such argument	0114	
Failure	Invalid argument value	0115	
Failure	Invalid object instance	0117	
Failure	No such SOP class	0118	
Failure	Class-instance conflict	0119	
Failure	Missing attribute	0120	
Failure	Missing attribute value	0121	
Refused	SOP class not supported	0122	
Failure	No such action type	0123	
Failure	Duplicate invocation	0210	
Failure	Unrecognized operation	0211	
Failure	Mistyped	0212	

	argument		
Failure	Resource limitation	0213	
Success	Success	0000	The Application Software will wait for an incoming N-EVENT-REPORT within a configurable time.
*	*	Any other status value	The SOP Instance is considered as not being archived. The SOP Instance is subject of a future Storage Commitment service call. It will be included again within next call of this activity.

4.2.1.3.7.4 Storage Commitment Communication Failure Behavior

If the Application Software runs in a timeout or if the association is aborted by the provider or network layer, or if waiting duration for Storage Commitment N-EVENT-REPORT oversteps a configurable time limit then the related SOP Instance is considered as not being archived. Then the SOP Instance is subject of a future Storage Commitment service call. It will be included again within next call of this activity.

In addition to that, the Application Software writes the SOP Instance UID to the log file, together with the failure reason.

Table 4-11 Storage Commitment N-EVENT-REPORT Request Failure Reasons

Meaning	Failure Reason	Behavior
Processing failure	0110	The SOP Instance is considered as not being archived. The SOP Instance is subject of a future Storage Commitment service call. It will be included again within next call of this activity. In addition, write SOP Instance UID to the log file with the failure reason.
No such object instance	0112	Send the SOP Instance again. In addition, write SOP Instance UID to the log file with a comment to send the instance again.
Resource limitation	0213	The SOP Instance is considered as not being archived. The SOP Instance is subject of a future Storage Commitment service call. It will be included again within next call of this activity. In addition, write SOP Instance UID to the log file with the failure reason.
Referenced SOP Class not supported	0122	
Class / Instance conflict	0119	
Duplicate transaction UID	0131	

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	Name List	UID List		
	1.2.840.10008. ...		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.

4.2.1.4.2 Activity - Get scan data and analysis data

This chapter describes the aspect of association acceptance of the activity "Get scan data and analysis data". The activity retrieves scan data and analysis data belonging to a selected patient.

4.2.1.4.2.1 Description and Sequencing of Activities

The description and sequencing of activities covered by 4.2.1.3.3 Activity - Get scan data and analysis data.

4.2.1.4.2.2 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
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCP	No
		ELE	1.2.1	SCP	No

4.2.1.4.2.3 SOP Specific Conformance for Storage 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. If the Application Software is running on a host with more than one network connection, the user should select the loopback adapter from the list of ip-addresses. The Application Entity Title as well as the port number is configurable. The default port number is 11112.

4.4.1.2 Remote AE Titles

The mapping of external AE Titles to TCP/IP addresses and ports is configurable. The Cirrus HD-OCT Application Software allows setting up a remote Application Entity for each service. 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 10 seconds. It affects association opening and association closing.

The service timeout (DIMSE RSP Timeout) is configurable. Default is 30 seconds and be configured to a maximum of 60 seconds using the gateway configuration tool. It defines for how long the Application Software waits after sending a service request for the belonging service response from the remote AE.

The Application Software allows the configuration of

- (0008,0080) Institution Name by registering the Clinical Site ID
- (0008,1010) Station Name as configured in the Local Application Entity setup (see 4.4.1.1 Local AE Titles)
- (0008,1070) Operator's Name is configured together with the Application Software login credentials

The scheduled station AE title has to be configured via Equipment configuration and can be different from the local AE Title configured in the Gateway configuration dialog.

- (0x0040,0001) Scheduled Station AE Title

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 / Retrieve 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 Cirrus HD-OCT 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 Cirrus HD-OCT Application Software do not support any specific security measures.

It is assumed that Cirrus HD-OCT 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 Cirrus HD-OCT Application Software
- Firewall or router protections to ensure that Cirrus HD-OCT 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, MPPS, etc. - The attribute value is the same as the value received using a DICOM service such as Modality Worklist, Modality Performed Procedure Step, etc.

CONFIG - The attribute value source is a configurable parameter

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

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

SRQ – The attribute value is same as the value received using a DICOM service such as Study Root Query.

8.1.1.1 Encapsulated PDF IOD

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, SRQ
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	MWL, USER, SRQ
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID.	VNAP	MWL, SRQ
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, USER, SRQ
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	VNAP	MWL, USER, SRQ
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	VNAP	MWL
(0010,2160)	3	SH	Ethnic Group	<i>Ethnic group or race of the patient.</i> Always empty.	EMPTY	AUTO
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	VNAP	MWL, USER

Table 8-2 Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	<i>Unique identifier for the Study</i> Uses value as given by the Modality Worklist service in scheduled case. The software creates the UID in the unscheduled case. Then it uses "1.2.276.0.75.2.2.40." as constant prefix for generated UIDs for Model 4000. "1.2.276.0.75.2.2.41." as constant prefix for generated UIDs for Model 400.	ALWAYS	MWL, AUTO
(0008,0020)	2	DA	Study Date	<i>Date the Study started.</i> Date, when procedure step was started.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	<i>Time the Study started.</i> Time, when procedure step was started.	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	<i>Name of the patient's referring physician.</i> Value does not exist in unscheduled case.	VNAP	MWL
(0020,0010)	2	SH	Study ID	Equipment generated Study identifier.	ALWAYS	AUTO
(0008,0050)	2	SH	Accession Number	<i>A RIS generated number that identifies the order for the Study.</i> Value does not exist in unscheduled case.	VNAP	MWL
(0008,1030)	3	LO	Study Description	<i>Institution-generated description or classification of the Study (component) performed.</i> In scheduled case, the source attribute for this value is Requested Procedure Description. Value does not exist in unscheduled case.	VNAP	MWL

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.	ALWAYS	AUTO
(0008,0060)	1	CS	Modality	<i>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</i> Default "OPT", but can be configured to be "OP" for systems that don't support "OPT".	ALWAYS	CONFIG
(0020,000E)	1	UI	Series Instance UID	<i>Unique identifier of the Series.</i> "1.2.276.0.75.2.2.40" or "1.2.276.0.75.2.2.41" extended by machine identifier and time information.	ALWAYS	AUTO
(0020,0011)	1	IS	Series Number	<i>A number that identifies the Series.</i>	ALWAYS	AUTO
(0008,103E)	3	LO	Series Description	<i>User provided description of the Series</i> Always empty	ALWAYS	AUTO
(0040,0244)	3	DA	Performed Procedure Step Start Date	<i>Date on which the Performed Procedure Step started.</i> Date on which this document instance was created.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	<i>Time on which the Performed Procedure Step started.</i> Time on which this document instance was created.	ALWAYS	AUTO
(0040,0254)	3	LO	Performed Procedure Step Description	<i>Institution-generated description or classification of the Procedure Step that was performed.</i> Always empty.	ALWAYS	AUTO

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

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	<i>Manufacturer of the equipment that produced the composite instances</i> Always "Carl Zeiss Meditec"	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	<i>Institution where the equipment that produced the composite instances is located.</i> Value as configured in Institution Edit dialog.	ALWAYS	CONFIG
(0008,1010)	3	SH	Station Name	<i>User defined name identifying the machine that produced the composite instances.</i> As configured in Equipment Edit dialog.	ALWAYS	CONFIG

(0008,1090)	3	LO	Manufacturer's Model Name	<p>Manufacturer's model name of the equipment that produced the composite instances.</p> <p>Always "CIRRUS HD-OCT 4000" or "CIRRUS HD-OCT 400"</p>	ALWAYS	CONFIG
(0018,1000)	3	LO	Device Serial Number	<p>Manufacturer's serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate.</p> <p>The serial number of the instrument in case of an Acquisition Modality.</p> <p>The model number plus license certificate number in case of a Review Station.</p>	ALWAYS	AUTO
(0018,1020)	3	LO	Software Version(s)	<p>Manufacturer's designation of software version of the equipment that produced the composite instances.</p> <p>Always "6.0.0.599", where 599 is the build number.</p>	ALWAYS	AUTO

Table 8-5 Module "SC Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0064)	1	CS	Conversion Type	<p>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</p> <p>Always "SYN" for Synthetic Image</p>	ALWAYS	AUTO

Table 8-6 Module "Encapsulated Document"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	1	IS	Instance Number	<p>A number that identifies this SOP Instance. The value shall be unique within a series.</p> <p>Always "0" since there is always only one instance per series.</p>	ALWAYS	AUTO
(0008,0023)	2	DA	Content Date	<p>The time the document content creation was started.</p> <p>The date the document creation was started.</p>	ALWAYS	AUTO
(0008,0033)	2	TM	Content Time	<p>The time the document content creation was started.</p> <p>The date the document creation was started.</p>	ALWAYS	AUTO
(0008,002A)	2	DT	Acquisition Datetime	<p>The date and time that the original generation of the data in the document started.</p> <p>The date of the data acquisition to which this data belongs to.</p>	ALWAYS	AUTO
(0028,0301)	1	CS	Burned In Annotation	<p>Indicates whether or not the encapsulated document contains sufficient burned in annotation to identify the patient and date the data was acquired. Enumerated Values:</p>	ALWAYS	AUTO

				<p><i>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.</i></p> <p>Always "YES" since there is enough information to identify the patient.</p>		
(0042,0010)	2	ST	Document Title	<p><i>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.</i></p> <p>There are 2 choices available here for Document Title:</p> <ol style="list-style-type: none"> For ANALYSIS_OU_ONH_AND_RNFL and ANALYSIS_OU_RNFL_THICKNESS analysis use the naming convention as shown below : "Cirrus_" + <eye site> + "_" + <analysis name>, where <ul style="list-style-type: none"> <eye site> can be one of values: "OD" "OS" "OU" <analysis name> can be one of the values: "RFNL Thickness OU Analysis" "ONH and RNFL OU Analysis" For all other analysis, use the following naming convention: <eye site>+ "_" + <analysis name>, where <ul style="list-style-type: none"> <eye site> can be one of values: "OD" "OS" "OU" <analysis name> can be one of values: "Advanced Visualization", "Anterior Segment Analysis", "High Definition Images", "Macular Thickness Analysis", "Guided Progression Analysis", "Macular Change Analysis", "3D Visualization", "Single Eye Summary", "Ganglion Cell OU Analysis", "Advanced RPE Analysis" 	ALWAYS	AUTO
(0040,A043)	2	SQ	Concept Name Code Sequence	<p><i>A coded representation of the document title. Zero or one item may be present.</i></p> <p>Always empty.</p>	ALWAYS	AUTO
(0042,0012)	1	LO	MIME Type of Encapsulated Document	<p><i>The type of the encapsulated document stream described using the MIME Media Type (see RFC 2046).</i></p> <p>Always "application/pdf"</p>	ALWAYS	AUTO
(0042,0011)	1	OB	Encapsulated Document	<p>Encapsulated Document stream, containing a document encoded according to the MIME Type.</p>	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	"1.2.276.0.75.2.2.40." or "1.2.276.0.75.2.2.41." 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 Raw Data IOD

IE	Module	Usage
Patient		
	Patient	MANDATORY
	Patient Extended Data	MANDATORY
	Clinical Trial Subject	OPTIONAL
Study		
	General Study	MANDATORY
	Patient Study	OPTIONAL
	Clinical Trial Study	OPTIONAL
Series		
	General Series	MANDATORY
	Clinical Trial Series	OPTIONAL
Frame of Reference		
	Frame of Reference	CONDITIONAL
	Synchronization	CONDITIONAL
Equipment		
	General Equipment	MANDATORY
Raw Data		
	Acquisition Context	MANDATORY
	Specimen	OPTIONAL
	Raw Data	MANDATORY
	SOP Common	MANDATORY

Table 8-8 Raw Data IOD - Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	ALWAYS	MWL, USER, SRQ
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	MWL, USER, SRQ
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID.	VNAP	MWL, SRQ
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, USER, SRQ
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	VNAP	MWL, USER, SRQ
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	VNAP	MWL
(0010,2160)	3	SH	Ethnic Group	Ethnic group or race of the patient.	EMPTY	AUTO
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	VNAP	MWL, USER

Table 8-9 Raw Data IOD - Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	<p><i>Unique identifier for the Study</i></p> <p>Uses value as given by the Modality Worklist service in scheduled case.</p> <p>For Model 4000, the software creates the UID in the unscheduled case. Then it uses "1.2.276.0.75.2.2.40." as constant prefix for generated UIDs.</p> <p>"1.2.276.0.75.2.2.41." as constant prefix for generated UIDs for Model 400.</p>	ALWAYS	MWL, AUTO
(0008,0020)	2	DA	Study Date	<p><i>Date the Study started.</i></p> <p>Date, when procedure step was started.</p>	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	<p><i>Time the Study started.</i></p> <p>Time, when procedure step was started.</p>	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	<p><i>Name of the patient's referring physician.</i></p> <p>Attributes exists but contains no value in unscheduled case.</p>	VNAP	MWL
(0020,0010)	2	SH	Study ID	Equipment generated Study identifier.	ALWAYS	AUTO
(0008,0050)	2	SH	Accession Number	<p><i>A RIS generated number that identifies the order for the Study.</i></p> <p>Value does not exist in unscheduled case.</p>	VNAP	MWL
(0008,1030)	3	LO	Study Description	<p><i>Institution-generated description or classification of the Study (component) performed.</i></p> <p>In scheduled case, the source attribute for this value is Requested Procedure Description.</p> <p>Value does not exist in unscheduled case.</p>	VNAP	MWL

Table 8-10 Raw Data IOD - Module "General Series"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000E)	1	UI	Series Instance UID	<p><i>Unique identifier of the Series.</i></p> <p>"1.2.276.0.75.2.2.40" or "1.2.276.0.75.2.2.41" extended by machine identifier and time information.</p>	ALWAYS	AUTO
(0020,0060)	2C	CS	Laterality	<p><i>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 functional group macro, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined.</i></p> <p>Value is either "R" or "L"</p>	ALWAYS	AUTO
(0008,0021)	3	DA	Series Date	Date the Series started.	ALWAYS	AUTO
(0008,0031)	3	TM	Series Time	Time the Series started.	ALWAYS	AUTO

(0008,103E)	3	LO	Series Description	<i>User provided description of the Series</i> Always empty.	ALWAYS	AUTO
(0008,1070)	3	PN	Operators' Name	Name of the operator who's logged in.	ALWAYS	AUTO
(0040,0275)	3	SQ	Request Attributes Sequence	<i>Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items.</i> Contains zero or one item.	ALWAYS	AUTO
>(0040,1001)	1C	SH	Requested Procedure ID	<i>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.</i> Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	VNAP	MWL
>(0008,0050)	3	SH	Accession Number	An identifier of the Imaging Service Request for this Requested Procedure.	ALWAYS	AUTO
>(0020,000D)	3	UI	Study Instance UID	The unique identifier for the Study provided for this Requested Procedure.	ALWAYS	AUTO
>(0008,1110)	3	SQ	Referenced Study Sequence	Uniquely identifies the Study SOP Instances associated with this SOP Instance. One or more items may be included.	ANAP	AUTO
>>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	AUTO
>>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	AUTO
>(0032,1060)	3	LO	Requested Procedure Description	<i>Institution-generated administrative description or classification of Requested Procedure.</i> Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	VNAP	MWL
(0040,0244)	3	DA	Performed Procedure Step Start Date	<i>Date on which the Performed Procedure Step started.</i> Date when this data was created.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	<i>Time on which the Performed Procedure Step started.</i> Time when this data was created.	ALWAYS	AUTO
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed.	VNAP	MWL
(0040,0260)	3	SQ	Performed	Sequence describing the Protocol	ALWAYS	AUTO

			Protocol Code Sequence	performed for this Procedure Step. One or more Items may be included in this Sequence.		
>(0008,0100)	1	SH	Code Value	Code for the performed protocol	ALWAYS	AUTO
>(0008,0102)	1	SH	Coding Scheme Designator	Identifies the coding scheme in which the code for a term is defined.	ALWAYS	AUTO
>(0008,0103)	1C	SH	Coding Scheme Version	Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	Code meaning are explanation of code value	ALWAYS	AUTO

Table 8-11 Raw Data IOD - Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	<i>Manufacturer of the equipment that produced the composite instances</i> Always "Carl Zeiss Meditec"	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	<i>Institution where the equipment that produced the composite instances is located.</i> Value as configured in Institution Edit dialog.	ALWAYS	CONFIG
(0008,1010)	3	SH	Station Name	<i>User defined name identifying the machine that produced the composite instances.</i> As configured in Equipment Edit dialog.	ALWAYS	CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	<i>Manufacturer's model name of the equipment that produced the composite instances.</i> Always "CIRRUS HD-OCT 4000" or "CIRRUS HD-OCT 400"	ALWAYS	AUTO
(0018,1000)	3	LO	Device Serial Number	<i>Manufacturer's serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate.</i> The serial number of the instrument in case of an Acquisition Modality. The model number plus license certificate number in case of a Review Station.	ALWAYS	CONFIG
(0018,1020)	3	LO	Software Version(s)	<i>Manufacturer's designation of software version of the equipment that produced the composite instances.</i> Always "6.0.0.599", where 599 is the build number.	ALWAYS	AUTO

Table 8-12 Raw Data IOD - Module "Acquisition Context"

Tag	Type	VR	Name	Description	PoV	Source
(0040,0555)	2	SQ	Acquisition Context Sequence	A sequence of Items that describes the conditions present during the acquisition of the data of the SOP Instance. Zero or more items may be included in this sequence. Always empty.	EMPTY	AUTO

Table 8-13 Raw Data IOD - Module "Raw Data"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	2	IS	Instance Number	A number that identifies this image. The value shall be unique within a series. Always "0" since there is always only one instance per series.	ALWAYS	AUTO
(0008,0023)	1	DA	Content Date	The date this DICOM Raw Data instance was created.	ALWAYS	AUTO
(0008,0033)	1	TM	Content Time	The time this DICOM Raw Data instance was created.	ALWAYS	AUTO
(0008,002A)	3	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). Same value as Content Date and Content Time put together.	ALWAYS	AUTO
(0008,9123)	1	UI	Creator-Version UID	Unique identification of the equipment and version of the software that has created the Raw Data information. The UID allows one to avoid attempting to interpret raw data with an unknown format. Always "1.2.276.0.75.2.2.40.5.2.0.210" for model number 4000 and "1.2.276.0.75.2.2.41.5.2.0.210" for model number 400 + <generated software version> Where <ul style="list-style-type: none"> <generated software version> can be one of the following values: "2.0.0.54" "2.0.1.3" "3.0.0.64" "3.0.0.71" "4.0.0.29" "4.0.1.3" "4.5.0.111" "4.5.1.11" "4.6.0.95" "4.6.1.6" "5.0.0.326" "5.1.0.96" "5.1.1.4" "5.1.1.6" "5.2.0.210" "5.2.1.12" "6.0.0.599" 	ALWAYS	AUTO
(0008,114A)	3	SQ	Referenced Instance Sequence	A sequence that provides reference to a set of SOP Class/Instance pairs identifying other Instances significantly related to this Instance. One or more Items may be included in this	ANAP	AUTO

				Sequence.		
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	AUTO
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Describes the purpose for which the reference is made. Only a single Item shall be permitted in this sequence. See C.7.6.16.2.5.1.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	Code for the performed protocol	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	Identifies the coding scheme in which the code for a term is defined.	ALWAYS	AUTO
>>(0008,0103)	1C	SH	Coding Scheme Version	Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	Code meaning are explanation of code value	ALWAYS	AUTO

Table 8-14 Raw Data IOD - Module "SOP Common"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	<i>Uniquely identifies the SOP Class.</i> Always "1.2.840.10008.5.1.4.1.1.66"	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	<i>Uniquely identifies the SOP Instance.</i> "1.2.276.0.75.2.2.40." or "1.2.276.0.75.2.2.41." as constant prefix for generated UIDs	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	<i>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</i> "ISO_IR 192" – Always. UTF-8 encoded Unicode.		
(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

8.1.2 Usage of Attributes from Received IOD's

The usage of attributes of Modality Worklist IODs is described in chapter **Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden..**

The case of patient data collision is outlined in chapter of Study Root Query/Retrieve SOP Class.

8.1.3 Attribute Mapping

In scheduled case, the following attributes are mapped from Modality Worklist to instances of Encapsulated PDF IOD and Raw Data IOD.

Modality Worklist	Instance IOD	Editable
Study Instance UID	Study Instance UID	
Accession Number	Accession Number	
Issuer of Patient ID	Issuer of Patient ID	
Other Patient IDs	Other Patient IDs	
Referring Physicians Name	Referring Physicians Name	
Patients Name	Patients Name	
Patient ID	Patient ID	
Patients Birth Date	Patients Birth Date	
Patients Sex	Patients Sex	
Patient Comments	Patient Comments	

8.1.4 Coerced/Modified Files

Those tags are listed in chapter **Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden..**

Other attributes get lost and are not available in the Cirrus HD-OCT Application Software.

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.