

DICOM Conformance Statement

HFA II – *i* series Instrument

Version 5.1

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1 Conformance Statement Overview

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

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Encapsulated PDF Storage	Option DICOM-1	No
Raw Data Storage	Option DICOM-2	Option DICOM-2
Workflow Management		
Modality Worklist IM - FIND	Option DICOM-1	No
Storage Commitment Push Model SOP Class	Option DICOM-2	No
Query / Retrieve		
Study Root Query/Retrieve IM – FIND	Option DICOM-2	No
Study Root Query/Retrieve IM – MOVE	Option DICOM-2	No

Options can be activated by licenses.

Meaningful combinations of DICOM Service Providers for an Acquisition Modality. The Acquisition Modality allows acquisition of scan data and allows creation of reports from reviewed and processed scan data.

Table 1-1 Combinations of DICOM Service Providers that allow HFA to integrate

Modality Worklist SCP	Encapsulated PDF Storage	Raw Data Storage	Commitment Push Model SOP	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	
		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		X	X	X	X
	X	X	X	X	X
X	X	X	X	X	X

The HFA does not support Media Interchange.

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3 Introduction

3.1 Revision History

Document Version	Author	Date
B	Chendra Garikipati	2011-09-14

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.

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
HFA	Humphrey Field Analyzer
IOD	Information Object Definition
JPG-1	JPEG Coding Process 1 transfer syntax; JPEG Baseline; ISO 10918-1
J2K	JPEG 2000 Image Compression
J2K-LL	JPEG 2000 Image Compression (Lossless Only)
MWL	Modality Work List
MPG2	Motion Picture Expert Group 2; Abbreviation and synonym for video encoding and compression transfer syntax.
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair, union of a specific DICOM service and related IOD.
TCP/IP	Transmission Control Protocol / Internet Protocol
UID	Unique Identifier
IM	Information Model

3.6 References

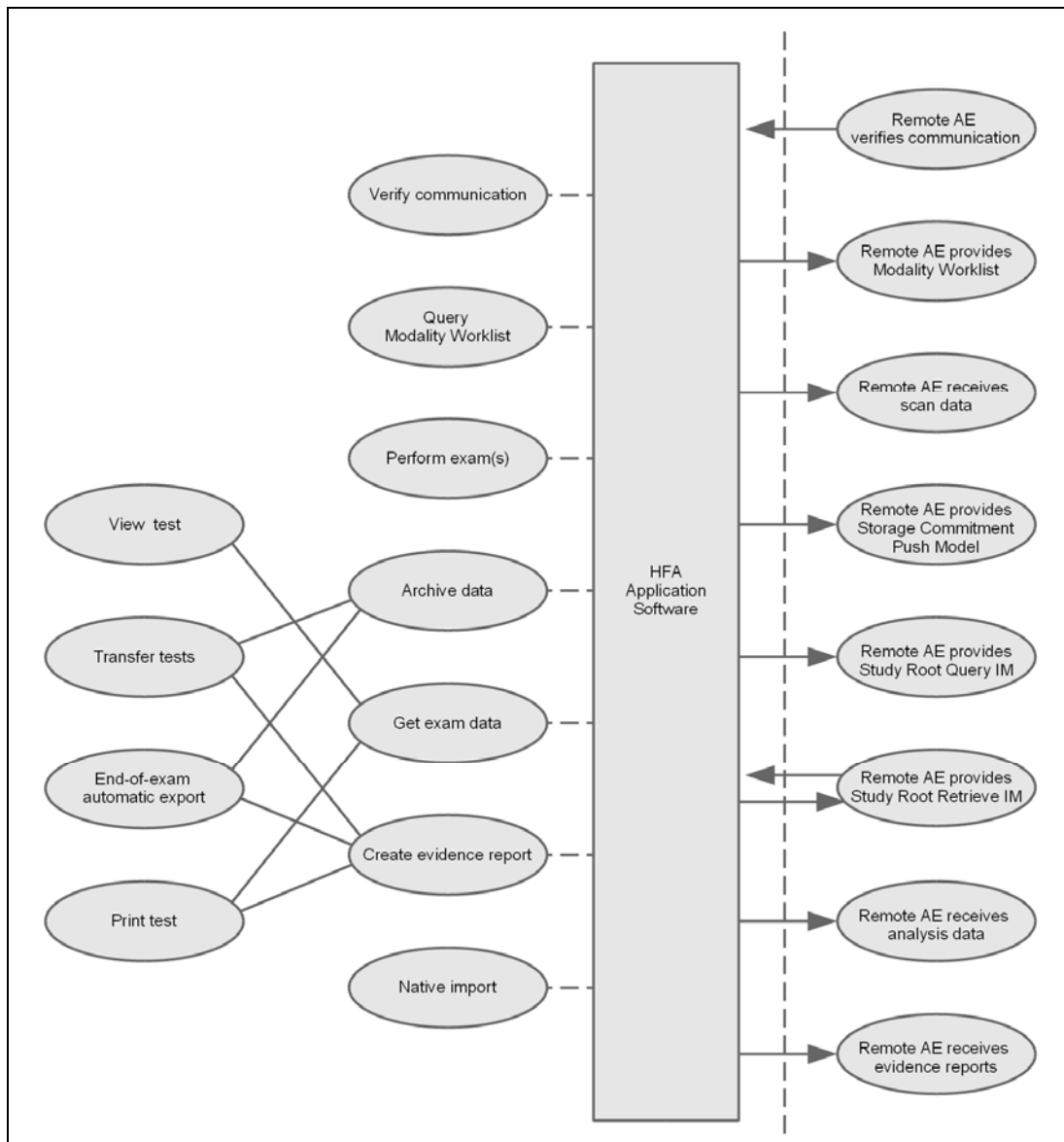
Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2009

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Figure 4-1 HFA Application Software



4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of HFA II i

The HFA V5.1 Application provides visual field testing capability.

The HFA Application Software allows to:

- query modality worklist

- export evidence reports
- archive patient record data
- retrieve record data
- retrieve patient demographics

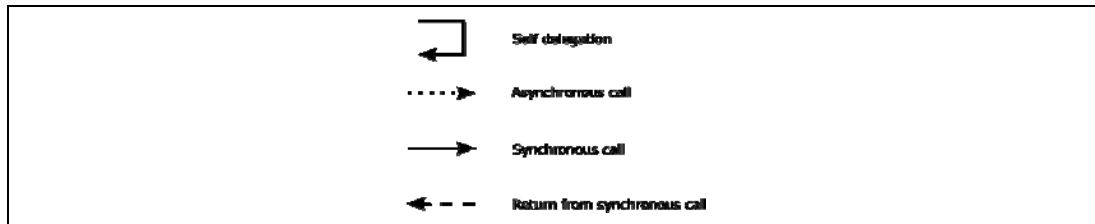
HFA Application Software AE runs several DICOM Services, as Service Class User and as Service Class Provider for Verification. All DICOM related activities are triggered manually by operator.

The HFA Application 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 HFA Application Software logs extensive information about the DICOM operations to its log file.

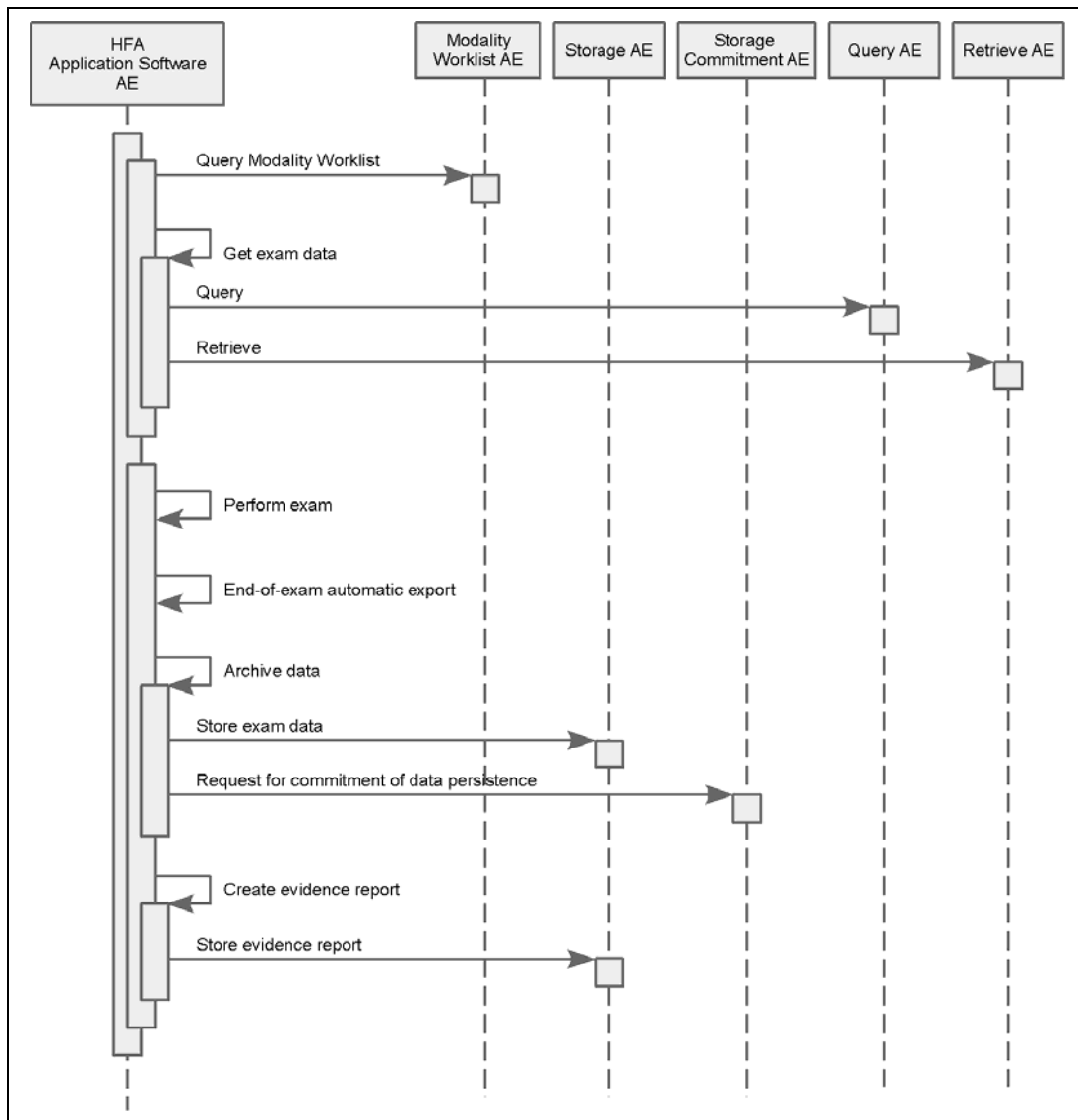
4.1.3 Sequencing of Real-World Activities

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 – Automatic Export



Query Modality Worklist

When the patient arrives at the HFA, the operator queries the work list. He types in search criteria and gets matching modality worklist items back. The matches are listed in a table, from which the operator can select the correct work item.

Perform exam

The operator selects a test type and performs visual field tests. The Application Software allows the user to review the visual field data before permanently saving the test results. This activity creates exam data.

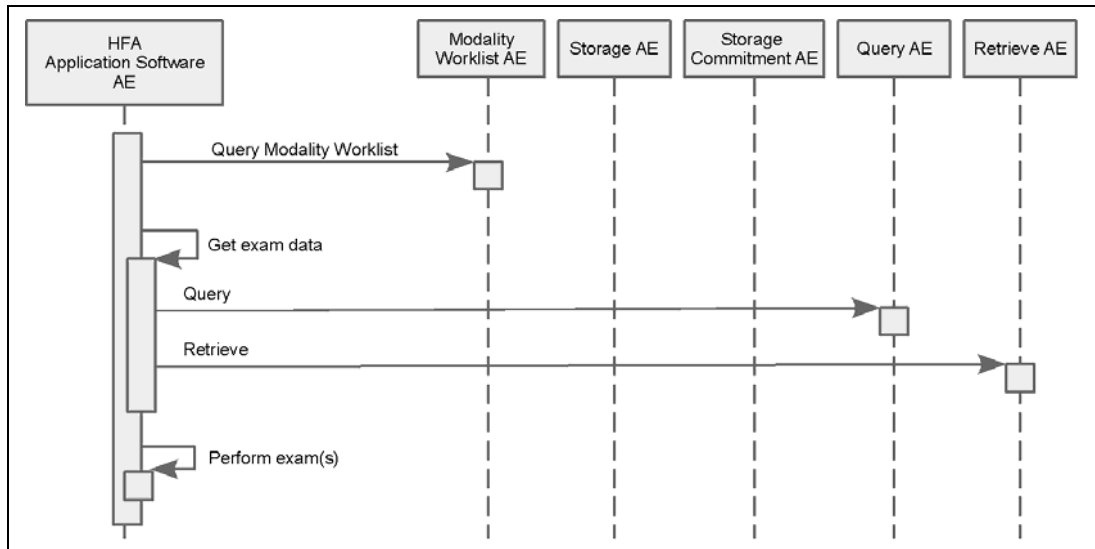
End-of-exam automatic export

This activity is performed automatically right after examining patient. The Application Software processes all required steps to create a test result as evidence report.

This activity calls sub-operations in a defined order. It calls “Archive data” and “Create evidence report”.

4.1.3.2 Scheduled Case - Manual

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



All listed activities can be triggered by the operator. 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.

Query Modality Worklist

When the patient arrives at the HFA, the operator queries the work list. He types in search criteria and gets matching modality worklist items back. The matches are listed in a table, from which the operator can select the correct work item.

The operator can then select the exam type and eye. Then the operator can perform the test(s).

Get exam data

When the operator retrieves a work item or patient demographics via unscheduled query, HFA automatically retrieves all the exam data belonging to the selected patient that is not present in the instrument local database. This activity only occurs if HFA is configured to export exam data automatically at the end of performing a visual field test.

Perform exam

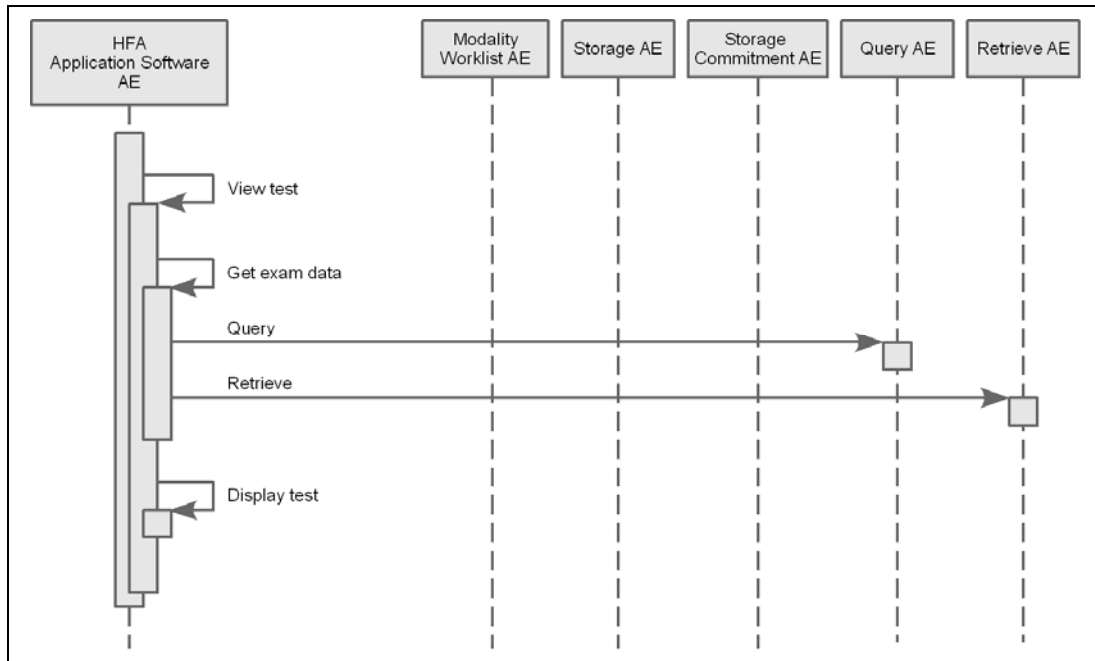
The operator selects a scan acquisition protocol and performs then the examination of the patient. The Application Software allows the user to review the acquired scan data before permanently saving the scan result.

This activity creates scan data and analysis data.

After these activities, the operator can trigger activities that include sub-operations. The set of sub-operations of the different activities may overlap. The next paragraphs explain the connection from real world activities of the operator to sub-operations that interact with DICOM Service Class Providers.

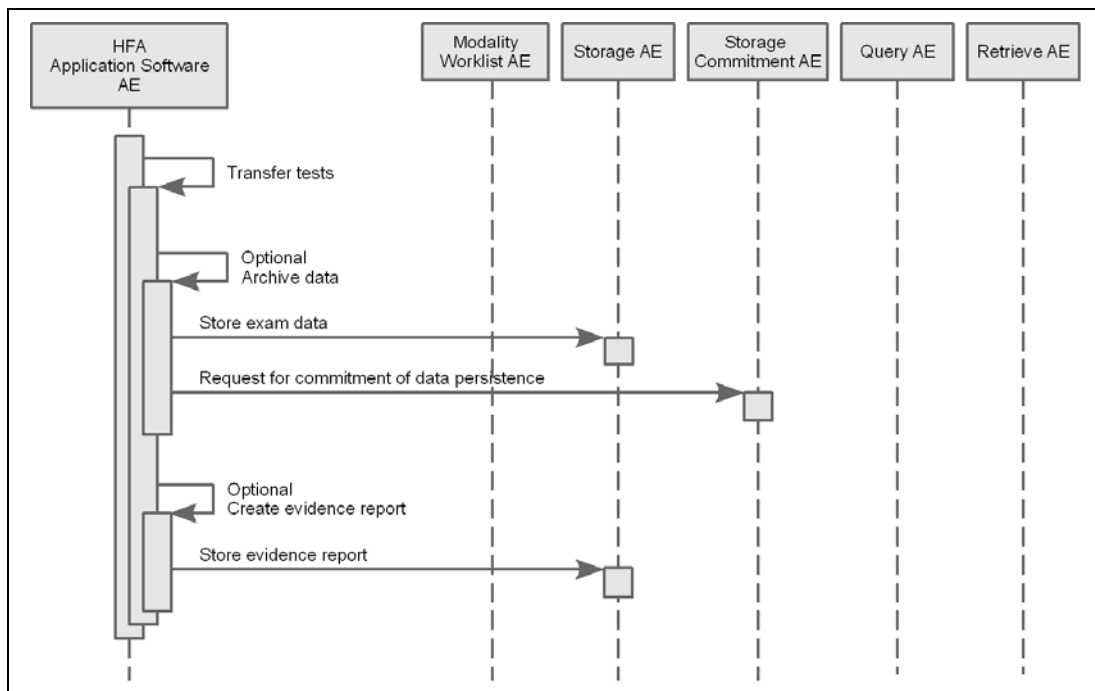
Sub-operations and their interaction with Service Class Providers will be described in detail in chapters below.

- See 4.2.1.3.3 for sub-operation "Get exam data"
- See 4.2.1.3.7 for sub-operation "Archive data"
- See 4.2.1.3.6 for sub-operation "Create evidence report"



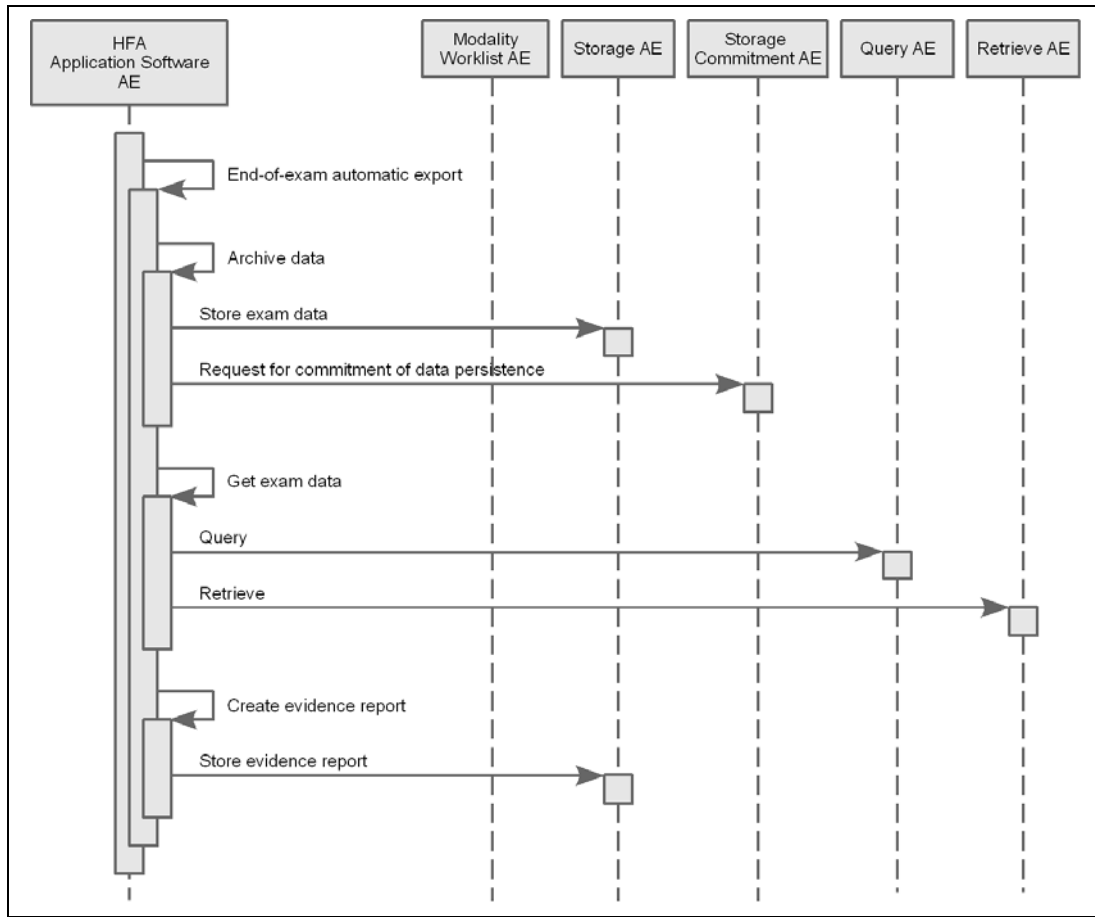
View test

This activity triggers sub-operation “Get exam data”. After that activity, the data is displayed to the operator.



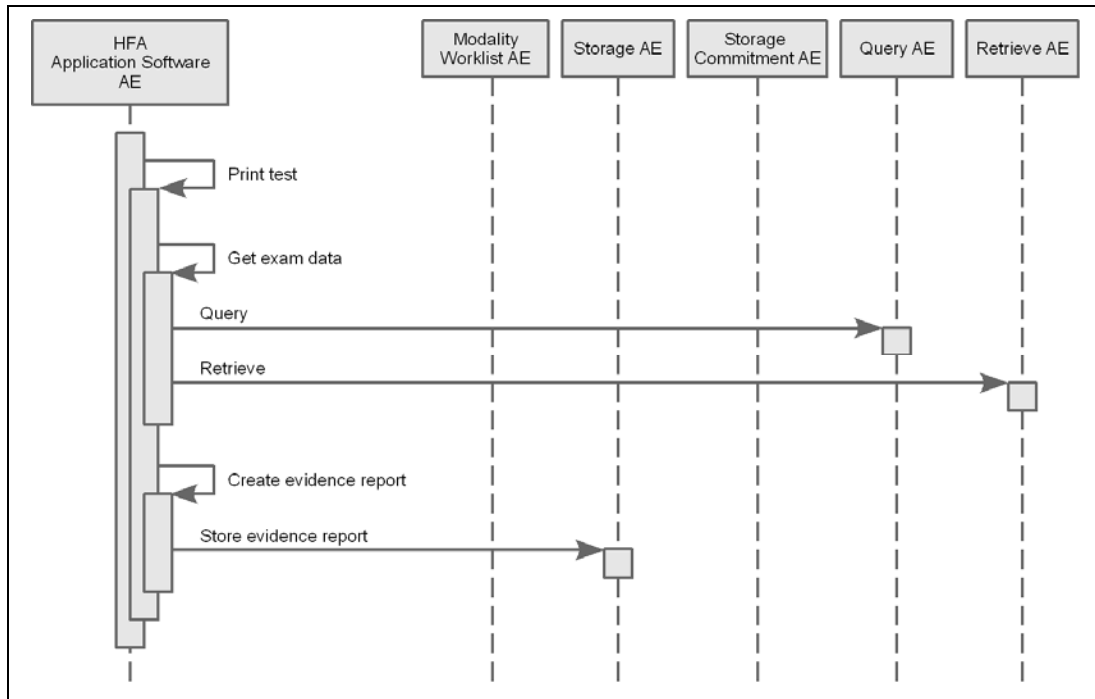
Transfer tests

In this activity, the operator can trigger sub-operation “Archive data” and “Create evidence report” as needed.



End-of-exam automatic export

This activity is described in the chapter before. See 4.1.3.1



Print test

This activity calls sub-operations in a defined order. It calls first "Get exam data" and then "Create evidence report".

4.1.3.3 Unscheduled Case

The patient arrives at the instrument in the unscheduled case. So the patient has not been registered at the front desk. Thus the examination is not scheduled in the Modality Worklist. Therefore the Application Software can not obtain patient demographics, nor study information and no scheduling information. This is also the case if the Modality Worklist AE could not be reached due to network issues.

As fallback, patient demographics can be queried from the Query Service Class Provider. However, this should be considered as an exceptional way to obtain patient demographics.

If the Query Service Class Provider is not configured or not available, the operator can also type in Patient demographics manually.

4.2 AE Specifications

4.2.1 HFA Acquisition Modality AE Specification

4.2.1.1 SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	Yes
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	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
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No

4.2.1.2 Associations Policies

4.2.1.2.1 General

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

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

4.2.1.2.2 Number of Associations

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

Maximum number of simultaneous associations	2
---	---

4.2.1.2.3 Asynchronous Nature

HFA 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-2.1

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Verify Communication

4.2.1.3.1.1 Description and Sequencing of Activities

This activity is available during the configuration phase. It facilitates the set up of the DICOM Application Entities. From DICOM's perspective, also the HFA Application Software becomes an Application Entity.

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 HFA Application Software proposes not only Verification SOP Class, but also all other SOP Classes as supported by HFA Application Software.

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

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

4.2.1.3.1.2 Proposed Presentation Contexts

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

- "Verification" with Transfer Syntax ILE

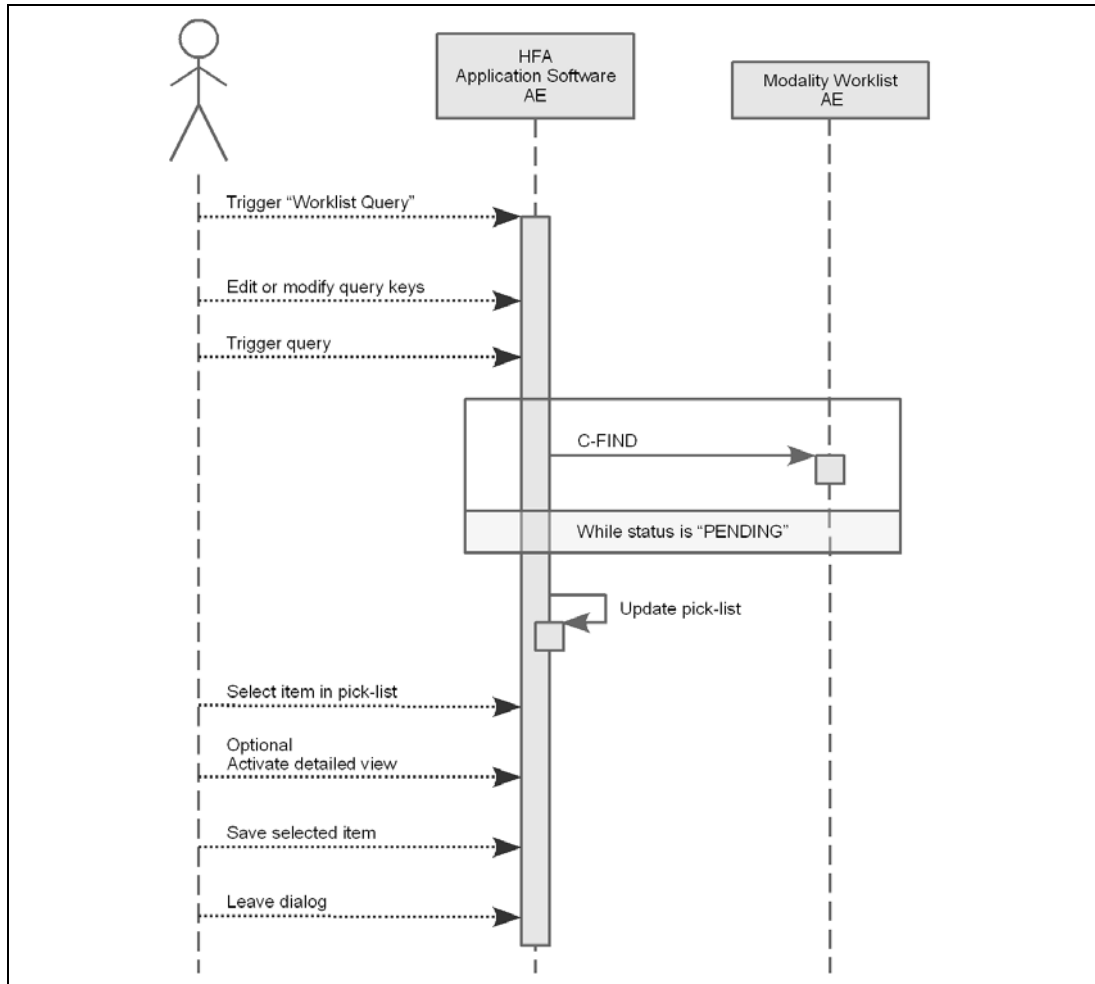
Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Verification	1.1	ILE	1.2	SCU	No
Modality Worklist IM - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Q/R IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes
Study Root Q/R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

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

The HFA 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



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 work list 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. If the number of matches oversteps this limit, the Application Software shows a dialog with a request to apply more specific query keys. Despite this warning, the operator can see the work items 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 4.2.1.3.2.3 SOP Specific Conformance for Modality Worklist SOP Class 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 the correct work item is found.

Select item in pick-list

The operator can select one work item from 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 work item. Thus the operator can see more details about patient information and schedule information.

Save selected item

The operator can save the selected item at any time.

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.

If the operator denies overwriting, a new patient record will be created. This new record will be assigned to a HFA created Patient ID and Issuer of Patient ID.

For work items which do not relate to existing patient records, the Application Software creates new patient records.

After that, the operator can start the examination of the patient.

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					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Verification	1.1	ILE	1.2	SCU	No
Modality Worklist IM - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Q/R IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes
Study Root Q/R IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Q/R IM – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	No
		MPEG2	1.2.4.100	SCU	No
		J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
OPT Image Storage	5.1.4.1.1.77.1.5.4	J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No

Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	RLE	1.2.5	SCU	No
		JPG-1	1.2.4.50	SCU	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

4.2.1.3.2.3 SOP Specific Conformance for Modality Worklist SOP Class

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

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

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

Tag	Tag Name	Query Key	Imported	Displayed	Modifiable	SOP Instance
Scheduled Procedure Step (SPS)						
(0040,0100)	Scheduled Procedure Step Sequence					
>(0040,0001)	Scheduled Station Application Entity Title	BRQ		PLD		
>(0040,0003)	Scheduled Procedure Step Start Time			PLD		
>(0040,0002)	Scheduled Procedure Step Start Date	BRQ		PL, PLD		
>(0008,0060)	Modality	BRQ		PLD		
>(0040,0006)	Scheduled Performing Physicians Name					
>(0040,0007)	Scheduled Procedure Step Description		X	PLD		X
>(0040,0010)	Scheduled Station Name					
>(0040,0011)	Scheduled Procedure Step Location					
>(0040,0008)	Scheduled Protocol Code Sequence		X			X
>>(0008,0100)	Code Value		X			X
>>(0008,0102)	Coding Scheme Designator		X			X
>>(0008,0103)	Coding Scheme Version		X			X
>>(0008,0104)	Code Meaning		X	PLD		X
>(0040,0012)	Pre-Medication					
>(0040,0009)	Scheduled Procedure Step ID		X			X
>(0032,1070)	Requested Contrast Agent					
Requested Procedure						
(0040,1001)	Requested Procedure ID	PBQ	X	PL, PLD		X
(0032,1060)	Requested Procedure Description		X	PL, PLD		X
(0032,1064)	Requested Procedure Code Sequence		X			X
>(0008,0100)	Code Value		X			X
>(0008,0102)	Coding Scheme Designator		X			X
>(0008,0103)	Coding Scheme Version		X			X
>(0008,0104)	Code Meaning		X	PLD		X
(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					
(0008,0050)	Accession Number	PBQ	X	PL, PLD		X
(0032,1032)	Requesting Physician					
(0008,0090)	Referring Physicians Name		X	PLD		X
Visit Identification						
(0038,0010)	Admission ID					
Visit Status						
(0038,0300)	Current Patient Location					
Visit Relationship						
(0008,1120)	Referenced Patient Sequence					
>(0008,1150)	Referenced SOP Class UID					
>(0008,1155)	Referenced SOP Instance UID					
Patient Identification						
(0010,0010)	Patients Name	PBQ	X	PL, PLD	A	X
(0010,0020)	Patients ID	PBQ	X	PL, PLD		X
(0010,0021)	Issuer of Patient ID		X			X
(0010,1000)	Other Patient IDs ¹		X			X
Patient Demographic						
(0010,0030)	Patients Birth Date		X	PLD	A	X
(0010,0040)	Patients Sex		X	PLD	X	X
(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					

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.

The tag has no value assigned when the interactive Modality Worklist Query Dialog is shown for the first time.

Values for these keys can be entered by the operator.

Predefined values can be set by the operator using the Default button.

Values for these keys will persist over power cycles.

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.

¹ The Software Application supports one value.

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.

Important note: The operator should not change Patient Demographic information if not absolutely necessary! Patient Demographic information shall always be modified at the Patient Management System Level and changes propagated to the instrument.

A

The value for that attribute can be changed if the operator has administrator permissions.

Values of column IOD:

X

Values of marked tags will be stored in created IODs. 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 HFA 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 "OPV". The operator can change the value and type in any value that is conform to Value Representation CS.
>(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.

configurable number. If the number of matches oversteps that limit, the Application Software sends 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 exams of the current selected patient.

The Application Software uses the data as gathered by Query as patient demographics. Thus, it ignores the patient demographics, that is included in DICOM SOP Instance header. The Application Software 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. 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 Application Software creates a new patient record with a new Patient ID and Issuer of Patient ID.

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.

Find most recent GPA-EPDF by interpreting the date and time stamp part of the UID

The Application Software filters SOP Instances ...

- ... for SOP Class UIDs
 - 1.2.840.10008.5.1.4.1.1.66 - Raw Data Storage
 - 1.2.840.10008.5.1.4.1.1.104.1 – Encapsulated PDF Storage
- ... for the UID-roots
 - 1.2.276.0.75.2.2.30.2.5 – UID-root of HFA
 - 1.2.276.0.75.2.2.30.2.4 - UID-root of EPDF GPAs

Instances matching these filters will finally be retrieved.

Since the algorithm works like this, that is 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

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID 1.2.840.10008. ...	Name List	UID List 1.2.840.10008. ...		
Verification	1.1	ILE	1.2	SCU	No
Modality Worklist IM – FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Q/R IM – FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes
Study Root Q/R IM – MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Q/R IM – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	No

		ELE	1.2.1	SCU	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	No
		MPEG2	1.2.4.100	SCU	No
		J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
OPT Image Storage	5.1.4.1.1.77.1.5.4	J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	RLE	1.2.5	SCU	No
		JPG-1	1.2.4.50	SCU	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

4.2.1.3.3.3 SOP Specific Conformance for 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 an A-RELEASE-RQ to the service provider.
Refused	Out of Resources	A700	An error message is shown to the operator. The Application Software logs this event and gives up. The pick-list is then empty.
Failure	Identifier does not match SOP Class	A900	
Failure	Unable to process	C000 - CFFF	
Cancel	Matching terminated due to Cancel request	FE00	
*	*	Any other status code	

Table 4-6 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 for instance by instance.
Refused	Out of Resources	A701	An error message is shown to the operator.

	Unable to calculate number of matches		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			
(0008,0050)	Accession Number			
(0020,0010)	Study ID			
(0010,0010)	Patient's Name	X	X	X
(0010,0020)	Patient ID	X	X	X
(0010,0021)	Issuer of Patient ID			X
(0010,0030)	Patient's Birth Date			X
(0010,0040)	Patient's Sex			X
(0008,0090)	Referring Physician's Name			
(0008,1030)	Study Description			
(0008,0061)	Modalities in Study	"OPV"		

Values for column "Query key":

X

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

Values for column "Displayed in pick-list":

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

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
(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.

4.2.1.3.4 Activity – Native import

The activity "Native import" can be triggered by operator at any time if no other activity is in progress. This activity has no direct effect on DICOM messaging. During this activity, the Application Software 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.

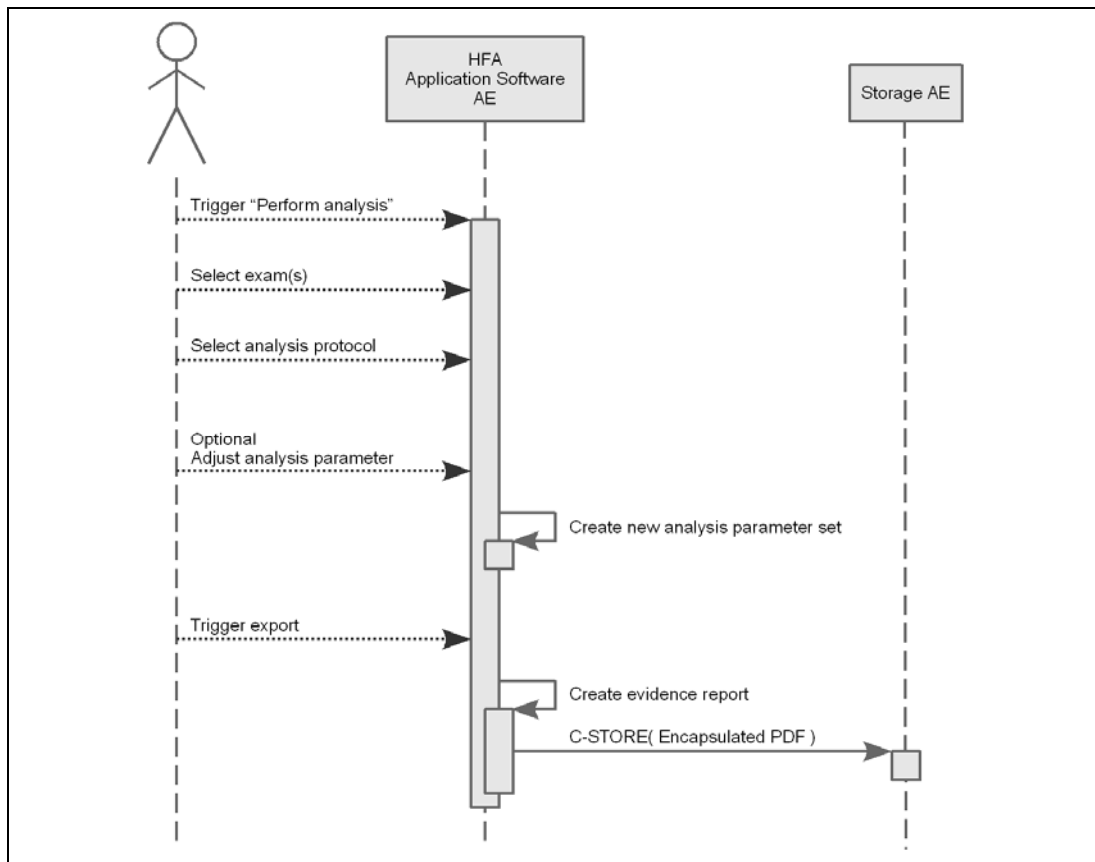
4.2.1.3.5 Activity – Perform exam(s)

The activity "Perform exam(s)" can be triggered by operator at any time if no other activity is in progress. This activity has no direct relation to DICOM messaging. During this activity, the Application Software creates HFA specific exam data. HFA specific data will be stored as Raw Data IOD instances. The created data is subject to be archived within next "Archive data"-activity call.

4.2.1.3.6 Activity – Create evidence report

The activity "Create evidence report" can be triggered by operator at any time if no other activity is in progress. An evidence report created on a day, later than the exam day will reside in a new unscheduled study.

4.2.1.3.6.1 Description and Sequencing of Activities



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 exams to include in the analysis.

Select analysis protocol

The Application Software performs an analysis.

Adjust analysis parameter

The operator can adjust parameters and thus, modify the analysis.

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.

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

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	SCU	No
Modality Worklist IM - FIND	5.1.4.31	ILE	1.2	SCU	No
Study Root Q/R IM - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes
Study Root Q/R IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	No
Patient Root Q/R IM – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	No
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	No
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	No
		MPEG2	1.2.4.100	SCU	No
		J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
OPT Image Storage	5.1.4.1.1.77.1.5.4	J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	RLE	1.2.5	SCU	No
		JPG-1	1.2.4.50	SCU	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

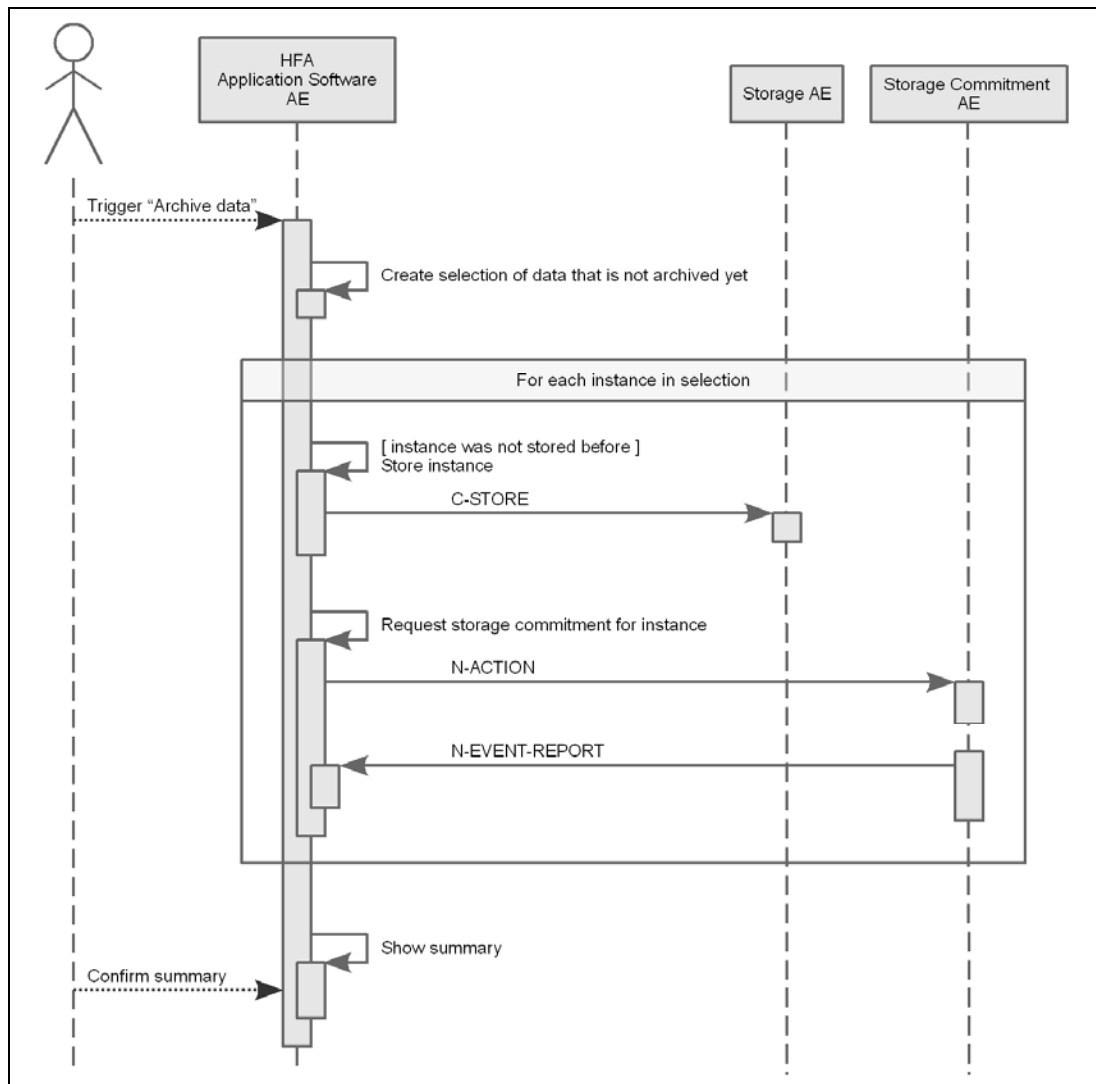
4.2.1.3.6.3 SOP Specific Conformance for Encapsulated PDF Storage SOP Class as SCU

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

The activity “Archive data” can be triggered by operator at any time if no other activity is in progress.

4.2.1.3.7.1 Description and Sequencing of Activities



Trigger "Archive data"

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

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.

Confirm summary

The summary lists the number of successful transferred instances.

4.2.1.3.7.2 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
- Raw Data Storage with Transfer Syntax ILE as fallback
- 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
		ELE	1.2.1	SCU	No
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCU	No
		ELE	1.2.1	SCU	No
OP 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	No
		MPEG2	1.2.4.100	SCU	No
		J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
OPT Image Storage	5.1.4.1.1.77.1.5.4	J2K	1.2.4.91	SCU	No
		J2K-LL	1.2.4.90	SCU	No
Multi-frame True Color Secondary Capture Image Storage	5.1.4.1.1.7.4	RLE	1.2.5	SCU	No
		JPG-1	1.2.4.50	SCU	No
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	No

4.2.1.3.7.3 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 least one instance left in the set of instances.
Error	Cannot Understand	C000 – CFFF	
Warning	Coercion of Data Elements	B000	
Warning	Data Set does not match SOP	B007	

	Class		
Warning	Elements Discarded	B006	
*	*	Any other status value	

4.2.1.3.7.4 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 argument	0212	
Failure	Resource limitation	0213	
Success	Success	0000	

*	*	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.
---	---	------------------------	---

Storage Commitment Communication Failure Behavior

If the Application Software runs in a timeout during N-ACTION, 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.

If the N-EVENT-REPORT has been delivered on time, then the Application Software is going to validate that message according to the event type.

Table 4-11 Storage Commitment N-EVENT-REPORT Behavior

Event Type Name	Event Type ID	Behavior
Storage Commitment Request Successful	1	Referenced SOP Instances as given by ... (0008,1199) Referenced SOP Sequence >(0008,1150) Referenced SOP Class UID >(0008,1155) Referenced SOP Instance UID ... are considered to be "archived".
Storage Commitment Request Complete – Failure Exist	2	Referenced SOP Instances as given by ... (0008,1199) Referenced SOP Sequence >(0008,1150) Referenced SOP Class UID >(0008,1155) Referenced SOP Instance UID ... are considered to be "archived". The handling of referenced SOP Instances as given by ... (0008,1198) Failed SOP Sequence >(0008,1150) Referenced SOP Class UID >(0008,1155) Referenced SOP Instance UID >(0008,1197) Failure Reason ... depends on the value of the Failure Reason (see next table).

Table 4-12 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 exam data

This chapter describes the aspect of association acceptance of the activity "Get exam data". The activity retrieves exam data and evidence reports 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 exam data.

4.2.1.4.2.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
	1.2.840.10008. ...		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
Encapsulated PDF Storage	5.1.4.1.1.104.1	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.

4.2.1.4.3 Activity – Archive data

This chapter describes the aspect of association acceptance of the activity "Archive data". The activity transfers SOP Instances to the configured Storage Provider and communicates with the configured Storage Commitment Provider.

4.2.1.4.3.1 Description and Sequencing of Activities

The description and sequencing of activities is covered by 4.2.1.3.7 Activity – Archive data.

4.2.1.4.3.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	ILE	1.2.840.10008.1.2	SCP	No
Storage Commitment Push Model	1.2.840.10008.1.20.1	ILE	1.2.840.10008.1.2	SCP	No

4.3 Network Interfaces

4.3.1 Physical Network Interface

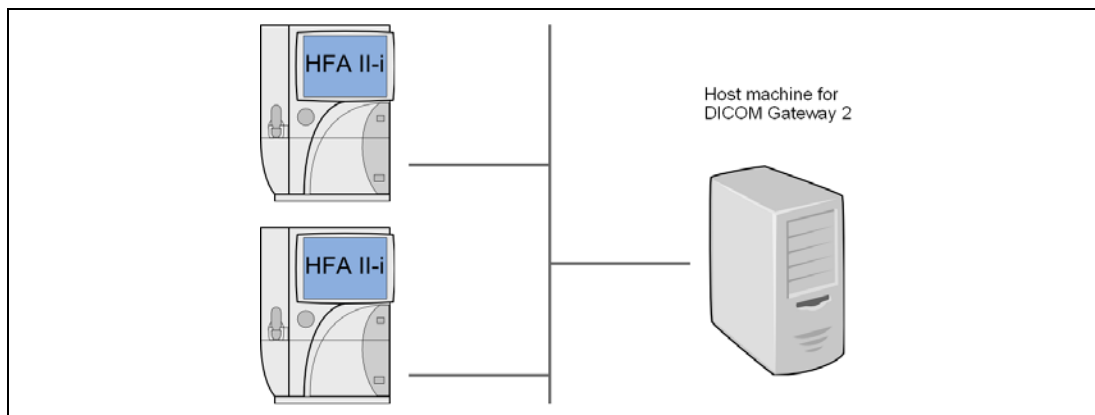
The physical network interface is not visible for the instrument application. The instrument application uses the communication stack as offered by the Operating System.

4.3.2 Additional Protocols

No additional protocols are supported.

4.4 Configuration

The DICOM integration of HFA Application Software requires a mediating Application Software. More than one HFA II-i Instrument can be connected with one DICOM Gateway 2 Software Instance.



That mediating software requires DICOM specific configuration as well as each of the HFA II-i Instruments. Thus, some configuration must be performed at the Instrument Software itself, some at the mediating Software.

4.4.1 AE Title/Presentation Address Mapping

This description is about the configuration of the DICOM Gateway 2 Application Software.

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 can decide which IP to be used. 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 HFA 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

Some parameters need to be setup at the DICOM Gateway 2 Application Software. Other parameters need to be setup at the instrument itself.

4.4.2.1 General Parameters

4.4.2.1.1 Configuration of the DICOM Gateway 2 Application Software

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

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

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

4.4.2.1.2 Configuration of the HFA II-i Instrument Application Software

Also the Application Software allows the configuration of

- (0008,0080) Institution Name
Created SOP Instances contain this value.
- (0008,1010) Station Name
Created SOP Instances contain this value.
- Application Entity Title
This value might be different from AET of DICOM Gateway 2, especially in the case when more than one HFA II-i Instruments are connected to one DICOM Gateway 2 Software Instance. This value affects the default value for query key Scheduled Station Application Entity Title in a Modality Worklist Query.

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 HFA Application Software.

6 Support of Character Sets

Even though the Application Software supports UTF-8 encoded Unicode, the set of usable characters is limited to the set of Unicode characters, that refers to Latin-1 as well as Katakana.

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

7 Security

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

It is assumed that HFA 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 HFA Application Software.
- Firewall or router protections to ensure that HFA 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 the attribute value is the same as the value received using a DICOM service such as Modality Worklist, Modality Performed Procedure Step, etc.
- SRQ the attribute value is the same as the value received using a DICOM service such as Study Root Query
- CONFIG the attribute value source is a configurable parameter

8.1.1.1 Encapsulated PDF IOD

IE	Module	Usage
Patient		
	Patient	MANDATORY
Study		
	General Study	MANDATORY
Series		
	Encapsulated Document Series	MANDATORY
	CZM-HFA-Series	
Equipment		
	General Equipment	MANDATORY
	SC Equipment	MANDATORY
Encapsulated Document		
	Encapsulated Document	MANDATORY
	SOP Common	MANDATORY
	CZM-HFA-Analysis	

Table 8-1 Encapsulated PDF- 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. If operator creates a patient record at the Application Software, the proposed value is a	ALWAYS	MWL, USER, SRQ, AUTO

				hash of Patient's Name and Patient's Birth Date. The operator can change that value.		
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID. If operator creates a patient record at the Application Software, the value is "1.2.276.0.75.2.2.30.2".	VNAP	MWL, SRQ, AUTO
(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. The Software Application supports a single value.	VNAP	MWL

Table 8-2 Encapsulated PDF - 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 "1.2.276.0.75.2.2.30.2.1." as constant prefix for generated UIDs.	ALWAYS	MWL, AUTO
(0008,0020)	2	DA	Study Date	<i>Date the Study started.</i> Date, when exam was started.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	<i>Time the Study started.</i> Time, when exam 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. "OPV_" + <today's date>	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. Attribute does not exist in unscheduled case.	ANAP	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	<i>A Sequence that conveys the type of procedure performed. One or more Items may be included in this Sequence.</i> May exist in Scheduled Case. Contains the value as given by the MWL item as value of Requested Procedure Code Sequence.	ANAP	AUTO
>(0008,0100)	1	SH	Code Value	Value as given by MWL item.	ANAP	AUTO
>(0008,0102)	1	SH	Coding Scheme	Value as given by MWL item.	ANAP	AUTO

			Designator			
>(0008,0103)	1C	SH	Coding Scheme Version	Value as given by MWL item.	ANAP	AUTO
>(0008,0104)	1	LO	Code Meaning	Value as given by MWL item.	ANAP	AUTO

Table 8-3 Encapsulated PDF - 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> Always "OPV".	ALWAYS	AUTO
(0020,000E)	1	UI	Series Instance UID	<i>Unique identifier of the Series.</i> "1.2.276.0.75.2.2.30.2.2." extended by machine identifier and time information.	ALWAYS	AUTO
(0020,0011)	1	IS	Series Number	<i>A number that identifies the Series.</i> Always "1" since there is only one instance in a series.	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> Attribute does not exist in unscheduled case. Attribute exists and contains one item in scheduled case.	ANAP	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.	ANAP	MWL
>(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).	ANAP	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	<i>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</i>	ANAP	MWL

				<i>(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.</i> Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).		
>(0040,0007)	3	LO	Scheduled Procedure Step Description	<i>Institution-generated description or classification of the Scheduled Procedure Step to be performed.</i> Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	<i>Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more Items.</i> Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL

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.	ALWAYS	CONFIG
(0008,1010)	3	SH	Station Name	<i>User defined name identifying the machine that produced the composite instances.</i> Value as configured.	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 "HFA II-i"	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</i>	ALWAYS	AUTO

				<i>in the imaging chain, such as the generator or gantry or plate.</i> The serial number of the instrument.		
(0018,1020)	3	LO	Software Version(s)	<i>Manufacturer's designation of software version of the equipment that produced the composite instances.</i> The value is "5.1".	ALWAYS	AUTO

Table 8-5 Encapsulated PDF - Module "SC Equipment"

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

Table 8-6 Encapsulated PDF - Module "Encapsulated Document"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	1	IS	Instance Number	<i>A number that identifies this SOP Instance. The value shall be unique within a series.</i> Always "1" since there is always only one instance per series.	ALWAYS	AUTO
(0008,0023)	2	DA	Content Date	<i>The time the document content creation was started.</i> The date the document creation was started. Same date when the document is transferred.	ALWAYS	AUTO
(0008,0033)	2	TM	Content Time	<i>The time the document content creation was started.</i> The date the document creation was started. Same the time when the document is transferred.	ALWAYS	AUTO
(0008,002A)	2	DT	Acquisition Datetime	<i>The date and time that the original generation of the data in the document started.</i> The date of to the most recent exam included in this report.	ALWAYS	AUTO
(0028,0301)	1	CS	Burned In Annotation	<i>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.</i> Always "YES" since the PDF instance contains sufficient information to identify the patient.	ALWAYS	AUTO
(0042,0013)	1C	SQ	Source Instance Sequence	<i>A sequence that identifies the set of Instances that were used to derive the encapsulated document. One or more Items may be included in this Sequence. Required if derived from one or more DICOM Instances. May be present otherwise.</i> Contains always one or more sequence item, depending on the number of exams	ALWAYS	AUTO

				which has been involved for the creation of this evidence report.		
>(0008,1150)	1	UI	Referenced SOP Class UID	<i>Uniquely identifies the referenced SOP Class.</i> Always "1.2.840.10008.5.1.4.1.1.66" for the Raw Data SOP Class.	ALWAYS	AUTO
>(0008,1155)	1	UI	Referenced SOP Instance UID	<i>Uniquely identifies the referenced SOP Instance.</i> The value of the actual referenced SOP Instance.	ALWAYS	AUTO
(0042,0010)	2	ST	Document Title	<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> One of following values: <ul style="list-style-type: none"> • "3N1" • "SFA" • "OVR" • "CHG" • "GCP" • "GPA" • "GPAL3F" • "GPASFA" • "GPASUM" • "SCR" • "SCR_OU" • "THR" • "CMP" • "NUM" • "KIN30" • "KIN80" • "KINTBL" • "INVALID" 	ALWAYS	AUTO
(0040,A043)	2	SQ	Concept Name Code Sequence	<i>A coded representation of the document title. Zero or one item may be present.</i> Always empty.	ALWAYS	AUTO
(0042,0012)	1	LO	MIME Type of Encapsulated Document	<i>The type of the encapsulated document stream described using the MIME Media Type (see RFC 2046).</i> Always "application/pdf"	ALWAYS	AUTO
(0042,0011)	1	OB	Encapsulated Document	Encapsulated Document stream, containing a document encoded according to the MIME Type.	ALWAYS	AUTO

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

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Always "1.2.840.10008.5.1.4.1.1.104.1"	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	"1.2.276.0.75.2.2.30.2.5." as constant prefix for generated UIDs	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	Always "ISO_IR 192" for UTF-8 encoded Unicode. Even though, the characters are of set of Latin-1 and/or Kanji.	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

Table 8-8 Encapsulated PDF IOD - Specialized Encapsulated Document

Tag	VR	Name	PoV	Source
22A1,xx01	LO	Document Type	ALWAYS	AUTO

8.1.1.2 Raw Data IOD

IE	Module	Usage
Patient		
	Patient	MANDATORY
Study		
	General Study	MANDATORY
Series		
	General Series	MANDATORY
Equipment		
	General Equipment	MANDATORY
Raw Data		
	Acquisition Context	MANDATORY
	Raw Data	MANDATORY
	SOP Common	MANDATORY

Table 8-9 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. If operator creates a patient record at the Application Software, the proposed value is a hash of Patient's Name and Patient's Birth Date. The operator can change that value.	ALWAYS	MWL, USER, SRQ, AUTO
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority that issued the Patient ID. If operator creates a patient record at the Application Software, the value is "1.2.276.0.75.2.2.30.2".	VNAP	MWL, SRQ, AUTO
(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 Can be empty too.	VNAP	MWL, USER, SRQ
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient. The Software Application supports a single value.	VNAP	MWL

Table 8-10 Raw Data IOD - 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 "1.2.276.0.75.2.2.30.2.1." as constant prefix for generated UIDs.	ALWAYS	MWL, AUTO
(0008,0020)	2	DA	Study Date	<i>Date the Study started.</i> Date, when exam was started.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	<i>Time the Study started.</i> Time, when exam 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. "OPV_" + <today's date>	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. Attribute does not exist in unscheduled case.	ANAP	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	<i>A Sequence that conveys the type of procedure performed. One or more Items may be included in this Sequence.</i> May exist in Scheduled Case. Contains the value as given by the MWL item as value of Requested Procedure Code Sequence.	ANAP	AUTO
>(0008,0100)	1	SH	Code Value	Value as given by MWL item.	ANAP	AUTO
>(0008,0102)	1	SH	Coding Scheme Designator	Value as given by MWL item.	ANAP	AUTO
>(0008,0103)	1C	SH	Coding Scheme Version	Value as given by MWL item.	ANAP	AUTO
>(0008,0104)	1	LO	Code Meaning	Value as given by MWL item.	ANAP	AUTO

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

Tag	Type	VR	Name	Description	PoV	Source
(0008,0060)	1	CS	Modality	<i>Type of equipment that originally acquired the data used to create the images in this Series.</i> Always "OPV"	ALWAYS	AUTO
(0020,000E)	1	UI	Series Instance UID	<i>Unique identifier of the Series.</i> "1.2.276.0.75.2.2.40" extended by machine identifier and time information.	ALWAYS	AUTO
(0020,0011)	2	IS	Series	<i>A number that identifies this Series.</i>	ALWAYS	AUTO

			Number	Always "1" since there is always one instance in a series.		
(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" or "".</p> <p>Note: "" represents a Binocular test.</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
(0040,0275)	3	SQ	Request Attributes Sequence	<p><i>Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items.</i></p> <p>Attribute does not exist in unscheduled case. Attribute exists and contains one item in scheduled case.</p>	ANAP	AUTO
>(0040,1001)	1C	SH	Requested Procedure ID	<p><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></p> <p>Value as given by the Modality Worklist item that was accepted for this examination.</p>	ANAP	MWL
>(0032,1060)	3	LO	Requested Procedure Description	<p><i>Institution-generated administrative description or classification of Requested Procedure.</i></p> <p>Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).</p>	ANAP	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	<p><i>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.</i></p> <p>Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).</p>	ANAP	MWL

>(0040,0007)	3	LO	Scheduled Procedure Step Description	<i>Institution-generated description or classification of the Scheduled Procedure Step to be performed.</i> Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	<i>Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more Items.</i> Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	Value as given by the Modality Worklist item that was accepted for this examination (scan and analysis).	ANAP	MWL

Table 8-12 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.	ALWAYS	CONFIG
(0008,1010)	3	SH	Station Name	<i>User defined name identifying the machine that produced the composite instances.</i> Value as configured.	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 "HFA II-i"	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.	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> The value is "5.1" .	ALWAYS	AUTO

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

Tag	Type	VR	Name	Description	PoV	Source
(0040,0555)	2	SQ	Acquisition Context Sequence	<i>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.</i> Always empty.	ALWAYS	AUTO

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

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	2	IS	Instance Number	<i>A number that identifies this image. The value shall be unique within a series.</i> Always "1" since there is always only one instance per series.	ALWAYS	AUTO
(0008,0023)	1	DA	Content Date	The date this Raw Data instance was created.	ALWAYS	AUTO
(0008,0033)	1	TM	Content Time	The time this Raw Data instance was created.	ALWAYS	AUTO
(0008,002A)	3	DT	Acquisition Datetime	<i>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).</i> Same value as Content Date and Content Time put together.	ALWAYS	AUTO
(0008,9123)	1	UI	Creator-Version UID	<i>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.</i> "1.2.276.0.75.2.2.30.2." + serial number of the device.	ALWAYS	AUTO

Table 8-15 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> "1.2.276.0.75.2.2.30.2.3." 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.	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

8.1.2 Usage of Attributes from Received IOD's

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

The case of patient data collision is described 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, Ophthalmic Tomography IOD and Raw Data IOD.

Modality Worklist	Instance IOD	Editable
Study Instance UID	Study Instance UID	
Accession Number	Accession Number	
Requested Procedure ID	Request Attributes Sequence > Requested Procedure ID	
Requested Procedure Description	Request Attributes Sequence > Requested Procedure Description	
Scheduled Procedure Step Sequence > Scheduled Procedure Step ID	Request Attributes Sequence > Scheduled Procedure Step ID	
Scheduled Procedure Step Sequence > Scheduled Procedure Step Description	Request Attributes Sequence > Scheduled Procedure Step Description	
Scheduled Procedure Step Sequence > Schedule Protocol Code Sequence	Request Attributes Sequence > Scheduled Protocol Code Sequence	
Issuer of Patient ID	Issuer of Patient ID	
Other Patient IDs ²	Other Patient IDs	
Requested Procedure Code Sequence	Procedure Code Sequence	
Referring Physicians Name	Referring Physicians Name	
Patients Name	Patients Name	X
Patient ID	Patient ID	X
Patients Birth Date	Patients Birth Date	X
Patients Sex	Patients Sex	X
Patient Comments	Patient Comments	X

8.1.4 Coerced/Modified Files

Those tags are listed in chapter 4.2.1.3.2 Activity – Query Modality Worklist.

Other attributes get lost and are not available in the HFA Application Software.

² The Application Software supports one value.

8.2 Data Dictionary of Private Attributes

Group ID: 0301

Private Creator String: "99CZM_Hfa_VisualField"

Occurs in: Raw Data IOD instances

Tag Name	Element ID	VR
Test Type	00	US
Test Strategy	01	US
Test Pattern	02	US
Screening Mode	03	US
Stimulus Color	04	US
Stimulus Size	05	US
Blue Yellow	06	US
PDB Version	07	US
HFA Raw Data	08	UB

Group ID: 7717

Private Creator String: "99CZM_HFA_EMR_2"

Occurs in: Encapsulated PDF IOD instances

Tag Name	Element ID	VR
Test Name	01	LO
Test Strategy	02	LO
Stimulus Size	03	CS
Stimulus Color	04	SH
Background State	05	SH
Foveal Result	06	CS
Screening Mode	07	LO
Fixation Trials	08	IS
Fixation Errors	09	IS
False Positive Percent	10	DS
False Positive Trials	11	IS
False Positive Errors	12	IS
False Negative Percent	13	DS
False Negative Trials	14	IS
False Negative Errors	15	IS
Mean Deviation	16	DS
Mean Deviation Probability	17	LO
Pattern Standard Deviation	18	DS
Pattern Standard Deviation Probability	19	LO
Short Term Fluctuation	20	DS
Corrected Pattern Standard Deviation	21	DS
Corrected Pattern Standard Deviation Probability	22	LO
Glaucoma Hemifield Test	23	LO
Fixation Monitor	24	LO
Fixation Target	25	LO
Pupil Diameter (in mm)	26	DS
Sphere	27	DS
Cylinder	28	DS
Axis	29	IS
Visual Acuity (can be in Snellen, Metric or Decimal, depending on machine setting)	30	SH
Short Term Fluctuation Probability	31	LO
Test Date	32	DA
Test Time	33	TM
Visual Field Index	34	DS
Gpa Excluded Sequence	35	SQ
Class UID	36	UI

Instance UID	37	UI
VFM Sequence	40	SQ
Section Number	41	IS
Section Value	42	LO

Group ID: 22a1

Private Creator String: "99CZM_SpecializedEncapsulatedDocument"

Occurs in: Encapsulated PDF IOD instances

Tag Name	Element ID	VR
Document Type	01	LO

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.