DICOM Conformance Statement

Philips IntraSight 1.0

HSDPCPF-T-030001.09(Rev B) Corresponds to HSDPCPF-W-030001.02

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1 DICOM CONFORMANCE STATEMENT OVERVIEW

Philips IntraSight 1.0 is an image acquisition modality.

The Intended medical applications of the Philips IntraSight 1.0 product are the following:

- The IVUS Modality is intended for the qualitative and quantitative evaluation of vascular morphology in the coronary arteries and vessels of the peripheral vasculature. It is also indicated as an adjunct to conventional angiographic procedures to provide an image of vessel lumen and wall structures.
- The FFR/iFR Modality is intended to be used in all blood vessels, including coronary and peripheral arteries, to measure intravascular blood pressure during diagnostic angiography and/or interventional procedures. The FFR/iFR Modality is intended to be used in conjunction with currently marketed Philips pressure wires.

It provides the following DICOM data exchange features: (see Figure 1):

- Query the RIS for a Modality Worklist (MWL)
- Transfer of DICOM Images to the Remote Node (PACS)
- Store images to Media (DVD/Blu-ray).

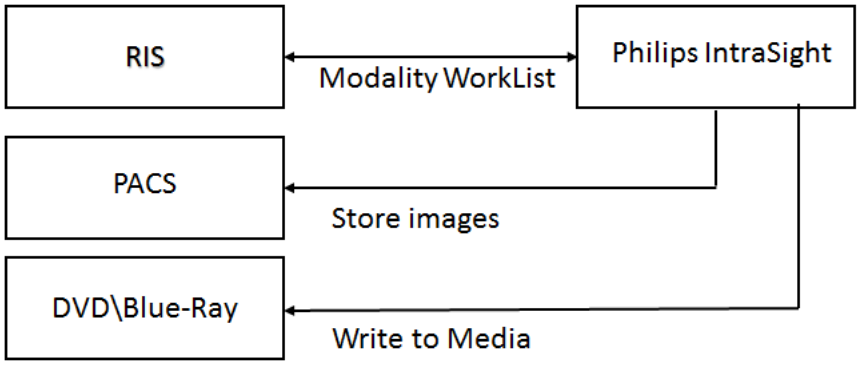

Figure 1: Data Flow in a DICOM network

Table 1 presents an overview of all supported by Philips IntraSight 1.0 networking DICOM Service (SOP) Classes with roles (User/Provider), organized in two categories:

- Transfer
- Workflow Management

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Other			
Verification SOP Class	1.2.840.10008.1.1	Yes	No
Transfer			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
Workflow Management			
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No

Table 2: Media Services

Media Storage Application Profile	File-set Creator (FSC)	File-set Updater (FSU)	File-set Reader (FSR)
DVD			
General Purpose DVD Interchange with JPEG (STD-GEN-DVD and STD-GEN-DVD-JPEG)	Yes	No	No

Note: Philips IntraSight 1.0 can only read the media created by Philips IntraSight 1.0 system.

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3 INTRODUCTION

3.1 Revision History

Table 3: Revision History

Document Version	Date of Issue	Status	Description
00	17-Oct-2018	Approved	Final version of Philips IntraSight 1.0

3.2 Audience

This Conformance Statement is intended for:

- Potential customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3 Remarks

This contained in chapter 4 through 8 and follows the contents and structuring requirements of [DICOM] PS 3.2.

This by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment. It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.
- **Validation**
  Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement. Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.
- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery.

The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4 Definitions, Terms and Abbreviations

Table 4: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
ACN	Application Context Name
AE	Application Entity
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
EBE	Explicit VR Big Endian
ELE	Explicit VR Little Endian
FM	IT uses iFR and FFR to measure the ratio of blood flow through the blockage w.r.t the blood flow distal to the blockage
FFR	Fractional Flow Reserve, a method of assessing ischemia in a coronary artery by calculating a pressure differential across a stenosis under hyperemic conditions
FSC	File Set Create
iFR	Instant Wave-Free Ratio, a method of assessing ischemia in a coronary artery by calculating a pressure differential in the wave-free period, without inducing hyperemia
IHE	Integrating the Healthcare Enterprise
ILE	Implicit VR Little Endian
IOD	Information Object Definition
ISO	International Organization for Standardization
IVUS	Intravascular Ultrasound, a method of imaging a blood vessel using ultrasound imaging
JPEG	Joint Photographic Experts Group
MWL	Modality Worklist Management
NEMA	National Electrical Manufacturers Association
N.A	Not Applicable
PACS	Picture archiving and Communication System
PDU	Protocol Data Unit
RIS	Radiology Information System
RWA	Real-World Activity
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
TLS	Transport Layer Security
UID	Unique Identifier
USMF	Ultrasound Multiframe

3.5 References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 21 (NEMA PS 3.1- PS 3.21), National Electrical Manufacturers Association (NEMA) Publication Sales 1300 N. 17th Street, Suite 900 Rosslyn, Virginia. 22209, United States of America

Internet: https://www.dicomstandard.org/

4 NETWORKING

This section contains the networking related services

4.1 Implementation model

The Philips IntraSight 1.0 system DICOM feature incorporates the DICOM 3.0 standard for the store image functions. Images are transferred from the Philips IntraSight 1.0 (both IVUS and FM) system using standard network connections to be processed on a DICOM compatible storage device.

The Philips IntraSight 1.0 system allows only one remote Worklist and multiple storage devices to be configured. Worklist is queried from the configured Worklist server.
Images are transferred to the default remote DICOM storage server.

After a successful Image Export operation, the transferred cases are marked as Archived and are subject to automatic deletion based on the configuration.

Verification status is obtained from storage servers using DICOM Verify (C-ECHO).

4.1.1 Application Data Flow

Philips IntraSight 1.0 has one Application Entity in its implementation, namely Local Application Entity. Figure 2 shows the Networking application data flow as a functional overview of this application entity. On the left-hand side, the local Real-World Activities are presented, whereas on the right-hand side, the remote Real-World Activities are presented.

As depicted in Figure 2, the Philips IntraSight 1.0 incorporate the following functionality:

- The Verification as SCU real-world activity occurs when the user selects the Test connection dialog. A C-ECHO operation is performed on the currently selected remote DICOM Storage Server.
- Modality Worklist as SCU real-world activity occurs when the user selects the Search button located in the Worklist dialog. A list of matching Worklist items are returned from the current selected Worklist server.
- Image Export real-world activity occurs when the user selects one or more cases in the Philips IntraSight 1.0 system Archive page and then initiates the Image Export function. Each image is transferred to the remote storage server in a separate DICOM Association. Images are transferred to the remote storage server, which is selected through the “Archive” button in the UI. The user can also select an alternate server in the UI.

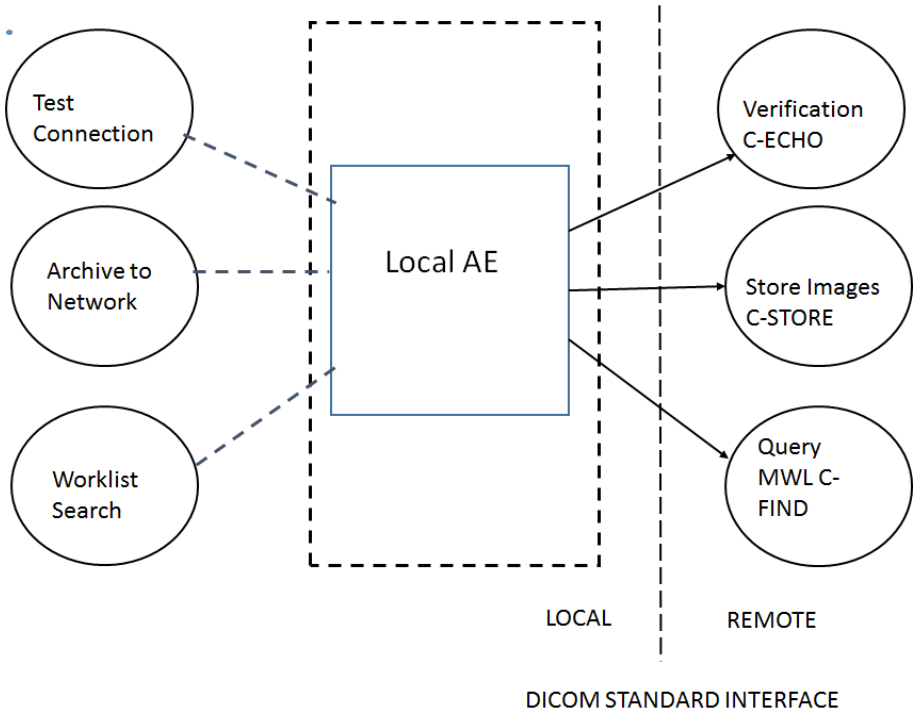

Figure 2: Philips IntraSight 1.0 application data flow diagram

4.1.2 Functional Definition of AE's

This section describes in general terms the functions performed by Application Entities.

4.1.2.1 Functional Definition of Local AE

Verification Service Class

The Local AE provides the verification service as SCU. The Philips IntraSight 1.0 system sends an association request to the configured MWL and Remote systems. After accepting the association responds to the verification request and releases the association when requested.

Storage Service Class

The Local AE provides the Storage service as SCU. The Local AE stores the IVUS images and FM save frames to a remote storage server. An association request is sent to the remote storage AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, an error is reported to the user and the transfer fails. The Storage AE will not try to initiate another association for this transfer automatically.

Basic Worklist Management Service Class

The Local AE provides the basic worklist as SCU. The Local AE queries the remote Modality Worklist server, worklist search attempts to download a list of Scheduled Procedure Steps from a remote Modality Worklist server. If the Local AE establishes an association to a worklist server, it will transfer all worklist items via the open Association. During receiving, the Worklist response items are counted and the query processing is canceled if the configurable maximum limit of items is exceeded. The results will be displayed in a list, which will be cleared with the next Worklist Search operation. Worklist query is initiated every time the Patient Information screen is accessed. All subsequent queries must be initiated manually by the user. The current Worklist is persisted between system power cycles to allow Worklist access in the event that a network connection is not available.

4.1.3 Sequencing of Real World Activities

All real world activities that initiate communication to remote AE's operate synchronously with respect to each other and other Philips IntraSight 1.0 system operations.

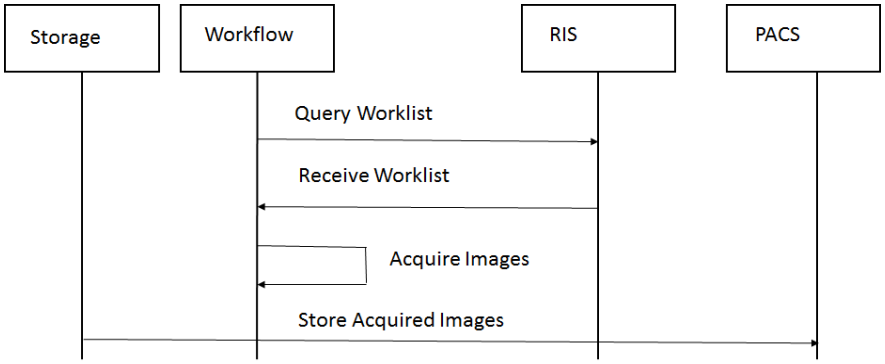

Figure 3: Philips IntraSight 1.0 sequencing diagram

4.2 AE Specifications

4.2.1 Local AE

4.2.1.1 SOP Classes

The Local AE provides Standard Conformance to the SOP Classes presented in Table 5

Table 5: SOP Classes for Local AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No

4.2.1.1.1 General

The Philips IntraSight 1.0 system uses TCP/IP. The Maximum Length PDU negotiation is included in all association establishment requests. The maximum length PDU offered for an association initiated by the Philips IntraSight 1.0 system is 64234 bytes.

The following DICOM Application Context Name UID is proposed and recognized:

Table 6: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.1.2 Number of Associations

Table 7: Number of Associations as an Association Initiator

Maximum number of simultaneous associations	1

4.2.1.1.3 Asynchronous Nature

The Storage AE will not use asynchronous operations.

4.2.1.1.4 Implementation Identifying Information

The value supplied for Implementation Class UID is presented in 8.

Table 8: DICOM Implementation Class and Version Name

Implementation Class UID	1.3.46.670589.59.1.5.0.1
Implementation Version Name	IntraSight50

4.2.1.2 Association Initiation Policy

The Local AE will open an association to the currently selected remote systems and worklist server device in response to the following real-world activities; Modality Worklist as SCU, Image Export and Verification as SCU.

4.2.1.2.1 (Real-World) Activity – Verification as SCU

4.2.1.2.1.1 Description and Sequencing of Activities

The Verification as SCU real-world activity will cause the Local AE to open associations with the current selected worklist server or remote systems using the test connection button.

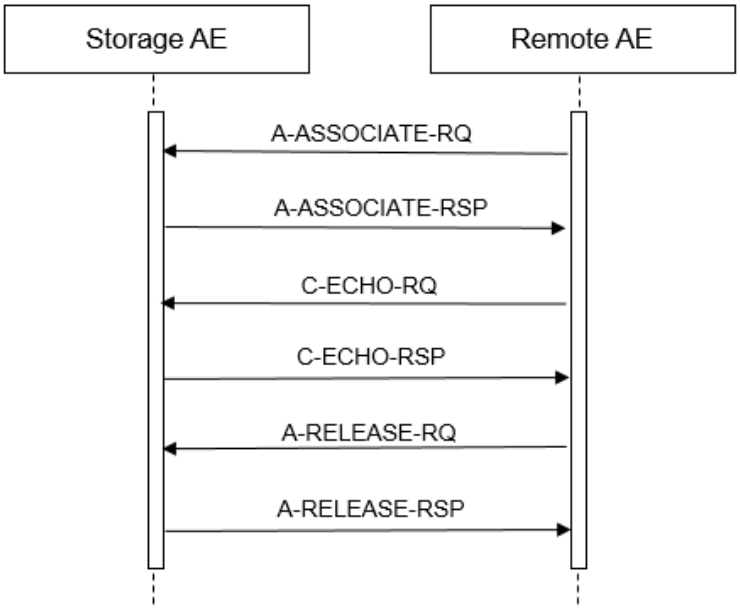

Figure 4: Real World Activity- Verification as SCU

4.2.1.2.1.2 Proposed Presentation Contexts

The presentation context proposed by the Local AE for Verification as SCU is defined in Table 9.

Table 9: Proposed Presentation Contexts for Storage AE for Verification as SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.1.2.1.3 SOP Specific Conformance for SOP Classes

The behavior of the Storage AE for status codes in a verification response is summarized in Table 10.

Table 10: Verification C-ECHO Response Status Handling Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	No error codes are displayed to the user either for Success or failure. The codes are only available in trace files.
*	Any other status code	*	No error codes are displayed to the user either for Success or failure. The codes are only available in trace files.

The behavior of the Storage AE during communication failure is summarized in Table 11

Table 11: Verification Communication Failure Behavior

Exception	Behavior
Timeout	The association is aborted using A-ABORT. The reason is logged and reported to the user.
Association aborted	The reason is logged and failure is reported to the user.
Association rejected	The reason is logged and failure is reported to the user.

4.2.1.3 Association Acceptance Policy

The Local AE does not accept associations.

4.2.1.3.1 (Real-World) Activity – Image Export

4.2.1.3.1.1 Description and Sequencing of Activities

The Image Export real-world activity will cause the Local AE to open an association with the current selected remote storage server. The default network storage node is selected in DIOCM configuration settings. Archive dialog provide a mechanism to send to any other network node configured other than the default network node. In the Philips IntraSight 1.0 system Archive page, the user can select one or more images (Studies) for transfer to a single DICOM Storage destination. A separate association is opened for each Study/Series transferred. If the Study/Series contains multiple images then multiple C-STORE requests will be issued over the same association and it also opens a new association for each image.

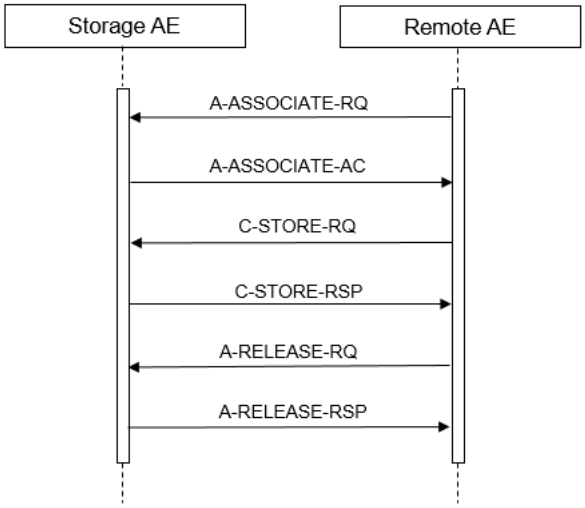

Figure 5: Real World Activity- Image Export

4.2.1.3.1.2 Proposed Presentation Contexts

Each time an association is initiated, the Local AE proposes one presentation contexts to be used on that association. The presentation context proposed by the Local AE is defined in Table 12.

Table 12: Proposed Presentation Contexts for Image Export

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Secondary Capture Image Storage*	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		

*Note: Secondary Capture Image Storage SOP Class is proposed during an association request. It is used to store the FM save frames.

4.2.1.3.1.3 SOP Specific Conformance for SOP Classes

The behavior of the Storage AE for status codes in a verification response is summarized in Table 13.

Table 13: Verification C-STORE Response Status Handling Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	Continue without user notification
Refused	A7xx	Out of Resources	Failure message is displayed. The codes are only available in trace files.

Service Status	Error Code	Further Meaning	Behavior
Error	A9xx	Data Set does not match SOP Class	Failure message is displayed. The codes are only available in trace files.
	Cxxx	Cannot understand	Failure message is displayed. The codes are only available in trace files.
	B000	Coercion of data elements	Failure message is displayed. The codes are only available in trace files.
Warning	B007	Data set does not match SOP class	Failure message is displayed. The codes are only available in trace files.
	B006	Elements discarded	Failure message is displayed. The codes are only available in trace files.

The behavior of the Storage AE during communication failure is summarized in Table 14.

Table 14: Storage Communication Failure Behavior

Exception	Behavior
Timeout	The association is aborted using A-ABORT. The reason is logged and reported to the user.
Association aborted	The reason is logged and failure is reported to the user.
Association rejected	The reason is logged and failure is reported to the user.

4.2.1.4 Association Acceptance Policy

The Local AE does not accept associations.

4.2.1.4.1 (Real-World) Activity – Modality Worklist as SCU

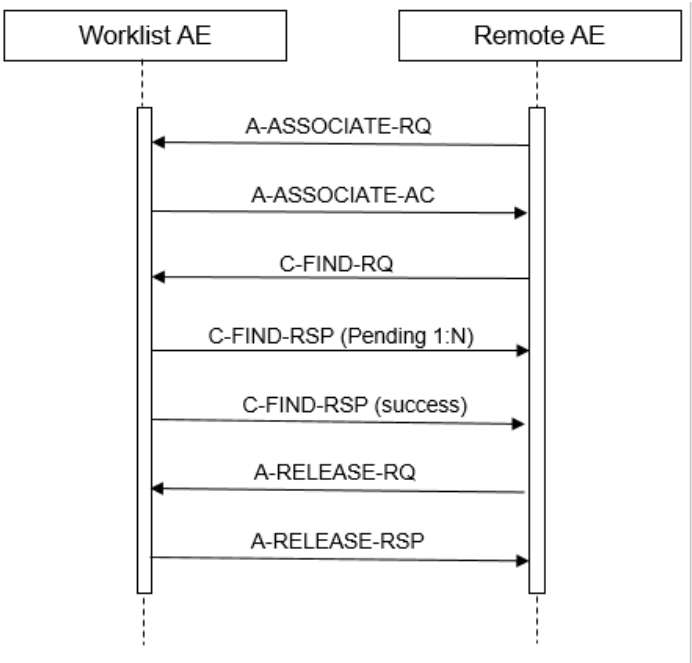

Figure 6: Real World Activity- Modality Worklist as SCU

4.2.1.4.1.1 Description and Sequencing of Activities

The Modality Worklist real-world activity will cause the Local AE to open an association with the default worklist server.
A possible sequence of interactions between the Local AE and a remote AE is illustrated in the figure 6:

1. The Philips IntraSight 1.0 system Local AE opens an association with the remote AE (e.g. RIS).
2. The Philips IntraSight 1.0 system Local AE sends a C-FIND request to the remote AE (RIS) containing the Worklist Query attributes.
3. The remote AE (RIS) returns a C-FIND response containing the requested attributes of the first matching Worklist Item.
4. The Remote AE (RIS) returns another C-FIND response containing the requested attributes of the second matching Worklist Item.
5. The Remote AE (RIS) returns another C-FIND response with status Success indicating that no further matching Worklist Items exist. This example assumes that only 2 Worklist items match the Worklist Query.
6. The Philips IntraSight 1.0 system Local AE closes the association with the Remote AE (RIS).
7. The user selects a Worklist Item from the Worklist and prepares to acquire new images.

4.2.1.4.1.2 Proposed Presentation Contexts

Each time an association is initiated, the Local AE proposes one presentation contexts to be used on that association. The presentation context proposed by the Worklist SCU AE defined in Table 15.

Table 15: Proposed Presentation Contexts for Modality Worklist as SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.1.4.1.3 SOP Specific Conformance for SOP Classes

Table 18 provides a description of the Philips IntraSight 1.0 system Modality Worklist Request Identifier and specifies the attributes that are copied into the images. If Philips IntraSight 1.0 receives a worklist entry with missing Type 1 tags or with tags that have invalid data it ignores that worklist entry and does not save it in the list.
Acquired images will always use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally.

Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored. No attempt is made it filter out possible duplicate entries.

The behavior of the Local AE for status codes in a verification response is summarized in Table 16.

Table 16: Verification C-FIND Response Status Handling Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The SCP has completed the matches. Worklist items are available for display.

Service Status	Error Code	Further Meaning	Behavior
Failure	A700	Out of resources	The Association is aborted using A-ABORT and the Worklist query is marked as incomplete. The status meaning is logged and the error is reported to the user.
	A900	Identifier does not match SOP class	The Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged and the error is reported to the user
	C001	Unable to process	The Association is aborted using A-ABORT and the Worklist query is marked as incomplete. The status meaning is logged and the error is reported to the user.
Cancel	FE00	Matching terminated due to cancel request	The query may be cancelled by the user, or due to the maximum number of Worklist results being exceeded. Worklist items received prior to the cancel are available for display and further processing. The Association is closed and the Worklist query is marked as incomplete. The status is logged.
Pending	FF00	Matching is continuing	The Worklist item contained in the Identifier is collected for later display or further processing.
	FF01	Matching is continuing – Current match is supplied and any optional keys were supported in the same matter as required keys	The Worklist item contained in the Identifier is collected for display or further processing. The status meaning is logged only once for each C-FIND operation
*	*	Any other status code.	The Association is aborted using A-ABORT and the Worklist is marked as incomplete. The status meaning is logged and the error is reported to the user.

The behavior of the Local AE during communication failure is summarized in Table 17.

Table 17: Verification Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the Worklist query marked as incomplete. The reason is logged and reported to the user.
Association aborted by the SCP or network layers	Worklist query marked as incomplete. The reason is logged and reported to the user.

4.2.1.4.1.3.1 Dataset Specific Conformance for Modality Worklist Information Model - FIND SOP Class C-FIND-SCU

The table 18 should be read as follows:

Attribute Name: Attributes supported to build a Modality Worklist Request Identifier.
Tag: DICOM tag for this attribute.
VR: DICOM VR for this attribute.
M: Matching Keys for (automatic) Worklist Update.
R: Return Keys. An “X” will indicate that Modality will supply this attribute as Return Key with zero length for Universal Matching.

Q: Interactive Query Key. An “X” will indicate that this attribute as matching key can be used.

D: Displayed Keys. An “X” indicates that this Worklist attribute is displayed to the user during a patient registration dialog.
IOD: An “X” indicates that the value of this Worklist attribute will be used

in the created Instances of this Performed Procedure Step.

Type of matching: The following types of matching exists:
Single Value Matching
List of UID Matching
Wild Card Matching
Range Matching
Sequence Matching
Universal Matching

Table 18: Worklist Request Identifier

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
SOP Common Module									
Specific Character Set	0008,0005	CS		X					
Patient Identification Module									
Patient ID	0010,0020	LO	X	X	X	X	X	Single Value	
Patient's Name	0010,0010	PN	X	X	X	X	X	Wildcard	
Other Patient IDs	0010,1000	LO		X					
Issuer of Patient ID	0010,0021	LO		X					
Patient Demographic Module									
Patient's Birth Date	0010,0030	DA		X	X		X		
Patient's Sex	0010,0040	CS		X	X		X		
Patient's Birth Date	0010,0030	DA		X					
Patient's Weight	0010,1030	DS		X					
Patient's Size	0010,1020	DS		X					
Ethnic Group	0010,2160	SH		X					
Patient Comments	0010,4000	LT		X					
Patient Medical Module									
Pregnancy Status	0010,21C0	US		X					
Medical Alerts	0010,2000	LO		X					
Allergies	0010,2110	LO		X					
Additional Patient History	0010,21B0	LT		X					
				X					
Scheduled Procedure Step Module									
Scheduled Procedure Step Sequence	0040,0100	SQ		X					
>Modality	0008,0060	CS	X	X		X		Single Value, Universal	May be set to either IVUS, XA, US, CT, MR or zero length (universal matching)
>Scheduled Procedure Step Description	0040,0007	LO		X		X	X		Copied to Request Attributes Code Sequence & Study Description.
>Scheduled Procedure Step ID	0040,0009	SH		X			X		Copied to Request Attributes Code Sequence.
>Scheduled Procedure Step Start Date	0040,0002	DA	X	X		X		Single Value, Universal	Set to user specified date range: Today, 3 days, or All Dates (universal matching)
>Scheduled Procedure Step Start Time	0040,0003	TM		X		X			

>Scheduled Station AE Title	0040,0001	AE	X	X		X		Single Value, Universal	Set to either Philips IntraSight 1.0 system AE Title or zero length (universal matching)
>Scheduled Performing Physician's Name	0040,0006	PN		X	X		X		Copied to Performing Physician's Name.
Requested Procedure Module									
Requested Procedure Description	0032,1060	LO		X			X		Copied to Study Description if SPS Description in not available
Requested Procedure ID	0040,1001	SH	X	X	X	X	X	Single Value	Copied to Request Attributes Code Sequence & Study ID
Study Instance UID	0020,000D	UI		X			X		
Referenced Study Sequence	0008,1110	SQ	X			X	X		Shall be absent when a procedure is unscheduled
Requested Procedure Code Sequence	0032,1064	SQ		X			X		Copied to Procedure Code Sequence.
Study Date	0008,0020	DA		X					
Study Time	0008,0030	TM		X					
Imaging Service Request Module									
Accession Number	0008,0050	SH	X	X	X	X	X	Single Value	
Referring Physician's Name	0008,0090	PN		X			X		
Visit Identification Module									
Institution Name	0008,0080	LO		X					
Institution Address	0008,0081	ST		X					
Visit Relationship Module									
Referenced Patient Sequence	0008,1120	SQ		X					

4.2.1.4.2 Patient Based Modality Worklist Query Attributes

The values for the attributes listed in table 19 below may be entered in the Worklist dialog to facilitate Patient Based Modality Worklist queries. Corresponding values from the Patient Information dialog are copied into the query fields when the Worklist dialog is entered. Valid data must be entered in at least one Patient Based query field if universal matching is used for all Broad query parameters.

Table 19: Patient Based Query Attributes

Attribute Name	Tag	Description
Patient's Name	0010,0010	A wildcard "*" is appended to the end of each component of the structured Patient Name to facilitate matching with both structured and unstructured Patient Names
Patient ID	0010,0020	Single Value Matching only
Requested Procedure ID	0040,1001	Single Value Matching only
Accession Number	0008,0050	Single Value Matching only

4.2.1.4.3 Broad Modality Worklist Query Attributes

The attributes listed in table 20 may be configured in the Worklist dialog to facilitate Broad Modality Worklist queries. Changes made to these Broad query parameters persist between power cycles.

Table 20: Broad Query Attributes

Attribute Name	Tag	Description
Modality	0008,0060	May be configured to use either IVUS, XA, US, CT, MR or zero length (universal matching).
Scheduled Station AE Title	0040,0001	May be configured to use either Philips IntraSight 1.0 system Local AE Title or zero length (universal matching). The Philips IntraSight 1.0 system Worklist SCU AE Title is configured in the DICOM / Networking configuration dialog.
Scheduled Procedure Step Start Date	0040,0002	May be configured to use the following date ranges: - Today - 3 Days (yesterday, today and tomorrow) - All dates (universal matching)

4.3 Network Interfaces

4.3.1 Physical Network Interface

Standard representations of IEEE 802.3 10BaseT/100BaseT (“twisted pair”) are supported

4.3.2 Communication Profiles

All Philips IntraSight system application entities utilize the DICOM 3.0 TCP/IP communication support as defined in PS3.8 (Part 8) of the DICOM 3.0 Standard.

4.3.3 TCP/IP Stack Supported

The TCP/IP protocol is used. Extensions/Specializations/Privatizations

4.3.4 Standard Extended/Specialized/Private SOPs

The Philips IntraSight system extends the Ultrasound Multi-frame Image IOD to include the attributes listed in table 21.

Table 21 Philips IntraSight 1.0 Extended and Private Elements

Type	Attribute name	Tag	VR	Description
Extended	Pixel Spacing	(0028,0030)	DS	In millimeters
Private	Private Creator	(0029,0010)	LO	Set to "PHILIPS INTRASIGHT-PCDE 1.0:
	Pullback Rate	(0029,1000)	DS	Set to 0.5 or 1.0 mm/Second. Only Included if IVUS Acquisition is a Motorized Pullback.
	B Gain	(0029,1001)	FD	In dB
	B Persistence Index	(0029,1002)	US	
	B ROI Diameter	(0029,1003)	FD	In mm.
	CF Sensitivity Index	(0029,1004)	US	Only included in ChromaFlo is on.
	CF ROI Diameter	(0029,1005)	FD	In mm. Only included in ChromaFlo is on.
	Frame Capture Interleave Rate	(0029,1006)	US	1 - 3
	Ringdown Subtraction	(0029,1007)	US	0 = Disabled, 1 = Manual, 2 = Adaptive
	Graticule Spacing	(0029,1008)	US	in mm.
	Revo Enhanced Mode	(0029,1009)	US	0 = Not Used, 1 = OFF, 2 = MEDIUM, 3 = HIGH
	Measurement Data	(0029,1012)	UT	XML encoded Measurement data. Only included if Modality (0008, 0060) is IVUS.
	Annotation Data	(0029,1013)	UT	XML encoded Annotation data. Only included if Modality (0008, 0060) is IVUS.
	Still Image Number	(0029,1015)	US	Still Image number, from live or VL. Not included if image is a video loop.
	Video Loop Number	(0029,1016)	US	VL number or source VL number for Still Images from VL. Not included if image is a still from live.
	Catheter Boot Mode	(0029,1030)	SS	1 – 5

Pixel Spacing (0028, 0030) information is included to allow measurements on DICOM review stations that do not support Ultrasound Region of Calibration.

Note: The Philips IntraSight 1.0 Extended and Private attributes are standard extended SOP Class attributes and are not part of the US Multi-Frame Image IOD. As such, these attributes are optional (Type 3), and their support is not required by SCPs.

4.3.5 Private Transfer Syntaxes

None

4.4 Configuration

4.4.1 AE Title/Presentation Address Mapping

The Philips IntraSight system AE Title and networking parameters are configurable in DICOM/Network Configuration menu

4.4.1.1 Local AE Titles

The local AE title mapping and configuration are presented in Table 22.

Table 22: AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
Local AE	Configurable	NA

4.4.1.2 Remote AE Title/Presentation Address Mapping

Every storage server device that the Philips IntraSight 1.0 system is setup to communicate with has a set of parameters that are configurable in Philips IntraSight 1.0 system DICOM/Network Configuration menu.

4.4.2 Parameters

The parameters that apply to each Application Entity are specified in separate sections specific to each AE

Table 23: Configuration Parameters table

Parameter	Configurable	Default Value
Remote systems		
AE title	Yes	
Port number	Yes	
IP host name/address	Yes	
Network timeout	Yes	15
Quality	Yes	Medium
US Modality	Yes	Not checked Sets Modality (0008, 0060) attribute to US when checked. Otherwise set to IVUS. Also will remove all IVUS specific tags
Modality Worklist		
AE title	Yes	
Port number	Yes	
IP host name/address	Yes	
Network timeout	Yes	15
Default Modality	Yes	XA
Auto query scheduled date	Yes	All dates
Scheduled-this system only	Yes	No Selected
Max SPS results	Yes	500

Table 4.4-24 Compression Settings

Compression Setting	Photometric Interpretation	Transfer Syntax	Compression Ratio (approx.)
No Compression	PALETTE COLOR or RGB	ILE / ELE	N/A
JPEG High Quality	YBR_FULL_422	JPEG Baseline (Process 1)	9:1
JPEG High Compression	YBR_FULL_422	JPEG Baseline (Process 1)	30:1

5 MEDIA INTERCHANGE

The Philips IntraSight 1.0 system is a device that generates Intravascular Ultrasound images and FM images that can be saved to Blu-ray Optical Media: BD-R (SL): 25 GB, BD-R DL: 50 GB.

DVD Optical Media: DVD-R (SL): 4.7 GB,DVD-R DL: 8.5 GB ,DVD+R (SL): 4.7 GB,DVD+R DL: 8.5 GB,DVD-RW: 4.7 GB and DVD+RW: 4.7 GB media using DICOM standard protocols and definitions.

The applications described refer to the Philips IntraSight 1.0 system DICOM off-line media storage implementation acting as FSC for the specific application profiles and the related SOP Class instances..

After a successful Archive to DVD operation, the transferred cases are marked as Archived and are subject to automatic deletion.

5.1 Implementation Model

5.1.1 Application Data Flow Diagram

The diagram in Figure 7 represents the relationship between the Philips IntraSight 1.0 system's real-world activities (circles on the left), the local AE's built into Philips IntraSight 1.0 system (boxes in the center), and the DICOM Exchange Media that the Philips IntraSight 1.0 system creates.

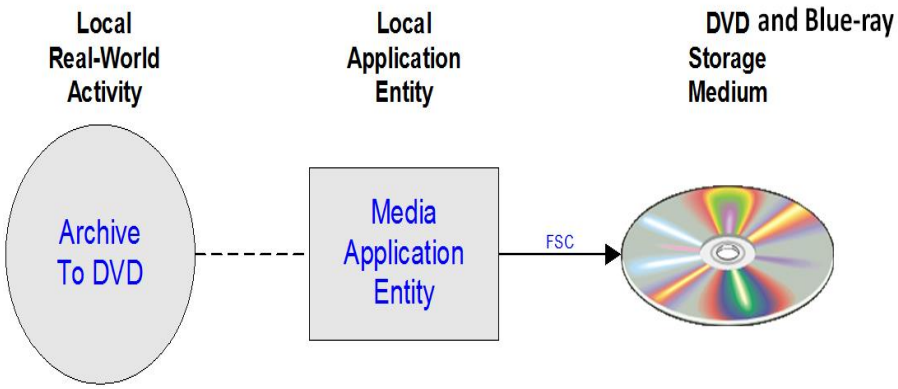

Figure 7: Media Interchange

5.1.2 Functional definitions of AE's

5.1.3 Sequencing of Real World Activities

Multiple cases may be archived to DVD Exchange Media at a time. The operator must have inserted a new (blank) DVD media before invocation of the "Archive to DVD" function. If no DVD media is available the Optical media option should be enabled in PSC, the inserted media is not DVD\blue-ray, or the media is not blank, the export job cannot be started.

The Archive to DVD Real-World Activity operates as a foreground task. No other Philips IntraSight 1.0 system functions are available while the media is being created.

After the media has been created, an optional (configurable) verification step may be performed to ensure that data was successfully written to the media.

5.1.4 Implementation Class and Version

The Philips IntraSight 1.0 system implementation information written to the File Meta Header in each file is:

Table 25: DICOM Implementation Class and Version Name

Implementation Class UID	1.3.46.670589.59.1.5.0.1
Implementation Version Name	IntraSight50

5.2 AE Specification

5.2.1 Media AE Specification

The Philips IntraSight 1.0 system Media Application Entity provides standard conformance to the DICOM Media Storage Service and File Format Class (PS 3.10) and the Media Storage Application Profile (PS 3.11).

The Philips IntraSight 1.0 system Media Application Entity supports the Application Profiles listed in Table 26.

Table 26: Application Profiles, Activities, and Roles

Application Profile	Identifier	Real-World Activity	Role	SC Option
Ultrasound	STD-US-SC-MF-DVD	Archive to DVD	FSC	Interchange
Secondary Capture(HD modality)	STD-GEN-DVD and STD-GEN-DVD-JPEG	Archive to DVD	FSC	Interchange

The Philips IntraSight 1.0 system DVD Media AE supports the IODS, SOP classes and Transfer Syntaxes listed in Table 27.

Table 27: Supported IODS, SOP Classes and Transfer Syntaxes

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
DICOM Media Storage Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian	1.2.840.10008.1.2
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50

5.2.1.1 DICOM File Meta Information

Table 28 denotes the DICOM file meta attributes included in the DICOMDIR and Ultrasound Image and secondary capture objects (DICOM Part 10 files) that are created by the Philips IntraSight 1.0 system. These attribute are stored in addition to the attributes listed in Table 21 Philips IntraSight 1.0 Extended and Private Elements for US-MF SOP instances.

Table 28: DICOM Part 10 File Meta Information

Attribute Name	Tag	Notes
File Preamble	N/A	All bytes are set to 00H
DICOM Prefix	N/A	Set to DICOM Prefix “DICM”
File Meta Information Group Length	(0002,0000)	

File Meta Information Version	(0002,0001)	Set to 0001H
Media Storage SOP Class UID	(0002,0002)	1.2.840.10008.1.3.10
Media Storage SOP Instance UID	(0002,0003)	Philips IntraSight 1.0 system generated UID
Transfer Syntax UID	(0002,0010)	Set to Explicit VR Little Endian 1.2.840.10008.1.2.1
Implementation Class UID	(0002,0012)	Set to " 1.3.46.670589.59.1.5.0.1 "
Implementation Version Name	(0002,0013)	Set to " IntraSight50 "

Table 29: DICOMDIR Attributes

Attribute Name	Tag	Type	Notes
File Set ID	0004,1130	2	
Offset of the First Directory Record of the Root Directory Entity	0004,1200	1	
Offset of the Last Directory Record of the Root Directory Entity	0004,1202	1	
File Set Consistency Flag	0004,1212	1	
Directory Record Sequence	0004,1220	2	
>Offset of the Next Directory Record	0004,1400	1	
>Record In-use Flag	0004,1410	1	
>Offset of Referenced Lower-Level Directory Entity	0004,1420	1	
>Directory Record Type	0004,1430	1	
>Referenced File ID	0004,1500	1C	
>Referenced SOP Class UID in File	0004,1510	1C	
>Referenced Transfer Syntax UID in File	0004,1512		
Patient Keys			
Patient's Name	0010,0010	2	
Patient ID	0010,0020	1	
Patient Birth Date	0010,0030	3	
Patient Sex	0010,0040	3	
Study Keys			
Study Date	0008,0020	1	
Study Time	0008,0030	1	
Accession Number	0008,0050	2	
Study Description	0008,1030	2	
Study Instance UID	0020,000D	1C	
Study ID	0020,0010	1	
Series Keys			
Modality	0008,0060	1	
Series Instance UID	0020,000E	1	
Series Number	0020,0011	1	
Series Description	0008,103E	3	
Body Part Examined	0018,0015	3	
Protocol Name	0018,1030	3	

Image Keys			
Instance Number	0020,0013	1	
Image Type	0008,0008	3	
Instance Creation Date	0008,0012	3	
Instance Creation Time	0008,0013	3	
SOP Class UID	0008,0016	3	
SOP Instance UID	0008,0018	3	
Acquisition Date	0008,0022	3	
Acquisition Time	0008,0032	3	
Acquisition Number	0020,0012	3	
Rows	0028,0010	3	
Columns	0028,0011	3	

5.2.1.2 Real World Activities

5.2.1.2.1 RWA - Create File-set

Create File set real-world activity occurs when the user selects a case in the Philips IntraSight 1.0 system Archive menu and then initiates the Archive to DVD and Blu-ray function. Multiple cases may be archived to a single DVD media at one time. The Philips IntraSight 1.0 system's Media AE will act as a FSC using the Interchange option when storing images and data to DVD media.

5.2.1.2.1.1 Application Profile Specific Conformance

There are no extensions or specializations.

5.3 Augmented and Private Application Profiles

5.3.1 Augmented Application Profiles

None

5.3.2 Private Application Profiles

None

5.4 Media configuration

The compression type used for DVD image storage can be configured through the System/DICOM/Archive menu.

- US Modality – Sets Modality (0008, 0060) attribute to US when checked. Otherwise set to IVUS.

6 Support of Character Sets

Table 30: Supported Specific Character Set

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859

7 SECURITY

Not Applicable

7.1.1 Security use Profiles

Not Applicable

7.1.2 Security Transport Connection Profiles

Not Applicable

7.1.3 Digital Signature Profiles

Not Applicable

7.1.4 Media Storage Security Profiles

Not Applicable

7.1.5 Attribute Confidentiality Profiles

Philips IntraSight 1.0 conforms to the Basic Application Level Confidentiality Profile as de-identifier.

Error! Reference source not found. 31 lists the protected attributes. The terms used to describe the r eplacement value can be read as follows:

Empty The attribute will have a value of zero length.

Table 31: Basic Application Level Confidentiality Profile Attributes

Attribute Name	Tag	Replacement Value
SOP Instance UID	0008,0016	Generate and provide a new ID
Accession Number	0008,0050	empty
Institution Name	0008,0080	empty
Referring Physician's Name	0008,0090	empty
Station Name	0008,1010	empty
Institutional Department Name	0008,1040	empty
Performing Physicians' Name	0008,1050	empty
Referenced SOP Instance UID	0008,1155	Generate and provide a new ID
Patient's Name	0010,0010	Assign user-specified value
Patient ID	0010,0020	Generate and provide a new ID
Patient's Birth Date	0010,0030	empty
Patient's Sex	0010,0040	empty
Patient's Size	0010,1020	Value set to 0
Patient's Weight	0010,1030	Value set to 0
Ethnic Group	0010,2160	empty
Additional Patient's History	0010,21B0	empty
Patient Comments	0010,4000	empty
Device Serial Number	0018,1000	empty
Study Instance UID	0020,000D	Generate and provide a new ID
Series Instance UID	0020,000E	Generate and provide a new ID
Study ID	0020,0010	Make empty

7.1.6 Network Address Management Profiles

Not Applicable

7.1.7 Time Synchronization Profiles

Not Applicable

7.1.8 Application Configuration Management Profiles

Not Applicable

7.1.9 Audit Trail Profiles

Not Applicable

7.2 Association Level Security

Not Applicable

7.3 Application Level Security

Not Applicable

8 IOD CONTENTS

8.1.1 Created SOP Instance

This section specifies each IOD created by this application
This section specifies each IOD created (including private IODs). It specifies the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, configurable parameter, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not shall be specified.

This section specifies each IOD created (including private IOD's). It should specify the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, configurable parameter, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not shall be specified.

Abbreviations used in the IOD tables for the column "Presence of Module" are:
ALWAYS The module is always present
CONDITIONAL The module is used under specified condition

Abbreviations used in the Module table for the column "Presence of Value" are:
ALWAYS The attribute is always present with a value
EMPTY The attribute is always present without any value (attribute sent zero length)
VNAP The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP The attribute is present under specified condition – if present then it will always have a value

The abbreviations used in the Module table for the column "Source" are:
AUTO The attribute value is generated automatically
CONFIG The attribute value source is a configurable parameter
COPY The attribute value source is another SOP instance
FIXED The attribute value is hard-coded in the application
IMPLICIT The attribute value source is a user-implicit setting
MPPS The attribute value is the same as that use for Modality Performed Procedure Step
MWL The attribute value source is a Modality Worklist
USER The attribute value source is explicit user input

8.1.1.1 Ultrasound Multi-frame Image Storage SOP Class

Table 32: IOD of Created Ultrasound Multi-frame Image Storage SOP Class

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
	Image Pixel Module	ALWAYS
	Cine Module	ALWAYS
	Multi-Frame Module	ALWAYS
	US Region Calibration Module	ALWAYS
	US Image Module	ALWAYS
	SOP Common Module	ALWAYS

Synchronization Module	USER OPTION
Frame Pointers Module	USER OPTION
General Reference Module	USER OPTION
Private / Additional Module	ALWAYS

Table 33: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	USER\MWL	-
Patient ID	0010,0020	LO		VNAP	ALWAYS	-
Patient's Birth Date	0010,0030	DA		VNAP	USER\MWL	-
Patient's Sex	0010,0040	CS	F, M, O	VNAP	USER\MWL	-
Patient Comments	0010,4000	LT		ANAP	USER\MWL	

Table 34: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	-
Study Time	0008,0030	TM		VNAP	AUTO	-
Accession Number	0008,0050	SH		VNAP	USER/MWL	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Study ID	0020,0010	SH		VNAP	USER/MWL	-

Table 35: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP	AUTO	-
Series Time	0008,0031	TM		ANAP	AUTO	-
Modality	0008,0060	CS	IVUS	ALWAYS	AUTO	Value is US when checked. Otherwise set to IVUS.
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Series Description	0008,103E	LO		ANAP	USER\MWL	-
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	-
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	-
Performing Physician's Name	0008,1050	PN		ANAP	USER\MWL	-
Operators' Name	0008,1070	PN		ANAP	AUTO	-
Performed Procedure Step End Date	0040,0250	DA		ANAP	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		ANAP	AUTO	

Table 36: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	ALWAYS	-
Institution Name	0008,0080	LO		ANAP	USER	-
Station Name	0008,1010	SH		ANAP	ALWAYS	-
Manufacturer’s Model Name	0008,1090	LO		ANAP	ALWAYS	-
Device Serial Number	0018,1000	LO		ANAP	ALWAYS	-
Software Version(s)	0018,1020	LO		ANAP	ALWAYS	-

Table 37: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\PRIMARY\INTRAVASCULAR\0101	ANAP	AUTO	These values change based on transfer syntax and save frames Value 1: Set to ORIGINAL for original uncompressed images. Set to DERIVED if image has been lossy Compressed. Value 2: Set to PRIMARY for images that were acquired during the case. Set to SECONDARY for images that have been created after the initial case ended (E.g. Retrieved and edited). Value 3: Always set to INTRAVASCULAR Value 4: Constructed as a modality bit map to describe the IVUS imaging sub modality: 0001 = Grayscale (2D Imaging) 0101 = ChromaFlo (2D Imaging with Color Power Mode) 0201 = VH (2D Imaging with Tissue Characterization)
Content Date	0008,0023	DA		VNAP	AUTO	-
Acquisition DateTime	0008,002A	DT		ANAP	AUTO	-
Acquisition Time	0008,0032	TM		ANAP	AUTO	-
Acquisition Date	0008,0022	DA		ANAP	AUTO	-
Content Time	0008,0033	TM		VNAP	AUTO	-
Instance Number	0020,0013	IS		VNAP	AUTO	-
Image Comments	0020,4000	LT		ANAP	USER\MWL	

Table 38: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS	RGB	ALWAYS	AUTO	-
Planar Configuration	0028,0006	US		ALWAYS	AUTO	Set to 0 = color-by-pixel
Rows	0028,0010	US		ALWAYS	AUTO	-
Columns	0028,0011	US		ALWAYS	AUTO	-
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	-
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	-
High Bit	0028,0102	US	7	ALWAYS	AUTO	-
Pixel Representation	0028,0103	US		ALWAYS	AUTO	-
Pixel Data	7FE0,0010	O W/ OB		ALWAYS	AUTO	-

Table 39: Cine Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Start Trim	0008,2142	IS		ANAP	ALWAYS	-
Stop Trim	0008,2143	IS		ANAP	ALWAYS	-
Recommended Display Frame Rate	0008,2144	IS		ANAP	ALWAYS	-

Cine Rate	0018,0040	IS		ANAP	ALWAYS	-
Frame Time Vector	0018,1065	DS		ALWAYS	ALWAYS	-

Table 40: Multi-Frame Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Frames	0028,0008	IS		ALWAYS	AUTO	-
Frame Increment Pointer	0028,0009	AT	00181065	ALWAYS	AUTO	-

Table 41: Frame Pointers Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame Numbers of Interest (FOI)	0028,6020	US		ANAP		Below tags are included if bookmarks are used, Frame of interest type if set to "BOOKMARK"
Frame of Interest Description	0028,6022	LO		ANAP		-
Frame of Interest Type	0028,6023	CS		ANAP		-

Table 42: US Region Calibration Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Sequence of Ultrasound Regions	0018,6011	SQ		ALWAYS	AUTO	-
> Region Spatial Format	0018,6012	US	1	ALWAYS	AUTO	-
> Region Data Type	0018,6014	US	1	ALWAYS	AUTO	-
>Region Flags	0018,6016	UL	2	ALWAYS	AUTO	-
> Region Location Min x0	0018,6018	UL	0	ALWAYS	AUTO	-
> Region Location Min y0	0018,601A	UL	0	ALWAYS	AUTO	-
> Region Location Max x1	0018,601C	UL	511	ALWAYS	AUTO	-
> Region Location Max y1	0018,601E	UL	511	ALWAYS	AUTO	-
> Physical Units X Direction	0018,6024	UL	3	ALWAYS	AUTO	-
>Physical Units Y Direction	0018,6026	UL	3	ALWAYS	AUTO	-
>Physical Delta X	0018,602C	UL	0.001953125	ALWAYS	AUTO	-
>Physical Delta Y	0018,602E	UL	0.001953125	ALWAYS	AUTO	-

Table 43: US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\PRIMARY\INTRAVASCULAR\0101	VNAP	AUTO	These values change based on transfer syntax and save frames Value 1: Set to ORIGINAL for original uncompressed images. Set to DERIVED if image has been lossy compressed. Value 2: Set to PRIMARY for images that were acquired during the case. Set to SECONDARY for images that have been created after the initial case ended (E.g. Retrieved and edited). Value 3: Always set to INTRAVASCULAR Value 4: Constructed as a modality bit map to describe the IVUS imaging sub modality: 0001 = Grayscale (2D Imaging) 0101 = ChromaFlo (2D Imaging with Color Power Mode) 0201 = VH (2D Imaging with Tissue Characterization)
Acquisition Date Time	0008,002A	DT		ALWAYS	AUTO	-
Transducer Data	0018,5010	LO		ANAP	AUTO	Catheter name, model and Serial number
Samples Per Pixel	0028,0002	US		ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS	RGB	ALWAYS	AUTO	-
Planar Configuration	0028,0006	US		ALWAYS	AUTO	-
Frame Increment Pointer	0028,0009	AT	00181065	ALWAYS	AUTO	-
Ultrasound Color Data Present	0028,0014	US		ANAP	AUTO	Set to 1 for ChromaFlo Images, otherwise 0
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	-
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	-
High Bit	0028,0102	US	7	ALWAYS	AUTO	-
Pixel Representation	0028,0103	US		ALWAYS	AUTO	-
IVUS Acquisition	0018,3100	CS	MANUAL_PULLBACK	ALWAYS		Set to MOTOR_PULLBACK, MANUAL_PULLBACK for Video Loops, or SELECTIVE for still images. Only included if Modality (0008, 0060) is IVUS.
Depth of Scan Field	0018,5050	IS		ANAP		Set to 1/2 the grayscale image diameter
Transducer Type	0018,6031	CS	IV_PHASED	ANAP		Set to IV_PHASED for IVUS phased array catheters or IV_ROT XTAL for single crystal rotational catheters

Table 44: Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Synchronization Trigger	0018,106A	PN	NO TRIGGER	ALWAYS	AUTO	-
Acquisition Time Synchronized	0018,1800	CS	N	ALWAYS	AUTO	-
Synchronization Frame of Reference UID	0020,0200	UI	1.3.46.670589.59	ALWAYS	AUTO	-

Note: Synchronization module only included if Modality (0008, 0060) is IVUS

Table 45: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	COPY	
Instance Creation Date	0008,0012	DA		ANAP	AUTO	-
Instance Creation Time	0008,0013	TM		ANAP	AUTO	-
Instance Number	0020,0013	IS		ANAP	AUTO	-
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.3.1	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-
Time zone Offset From UTC	0008,0201	SH		ANAP	AUTO	-

Table 46: Private / Additional Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Pixel Spacing	0028,0030	DS		ANAP	AUTO	-
Philips IntraSight 1.0 Imaging DD 001	2027,0010	LO	Philips	ANAP	AUTO	-
	2027,1001	UN		ANAP	AUTO	
	2027,1003	UN		ANAP	AUTO	-
	2027,1006	UN		ANAP	AUTO	
	2027,1007	UN		ANAP	AUTO	
	2027,1008	UN		ANAP	AUTO	
	2027,1012	UN		ANAP	AUTO	
	2027,1013	UN		ANAP	AUTO	-
	2027,1016	UN		ANAP	AUTO	
	2027,1030	UN		ANAP	AUTO	

8.1.1.2 Secondary Capture Image Storage SOP Class

Table 47: IOD of Created Secondary Capture Image Storage SOP Class

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
	Image Pixel Module	ALWAYS
	SC Image Module	ALWAYS
	SOP Common Module	ALWAYS

Table 48: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	USER\MWL	-
Patient ID	0010,0020	LO		VNAP	USER\MWL	-
Patient's Birth Date	0010,0030	DA		VNAP	AUTO\USER\MWL	-
Patient's Sex	0010,0040	CS	F, M, O	VNAP	USER\MWL	-
Patient Comments	0010,4000	LT		ANAP		

Table 49: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	-
Study Time	0008,0030	TM		VNAP	AUTO	-
Accession Number	0008,0050	SH		VNAP	USER/MWL	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Study ID	0020,0010	SH		VNAP	USER/MWL	-

Table 50: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP	AUTO	-
Series Time	0008,0031	TM		ANAP	AUTO	-
Modality	0008,0060	CS	HD	ALWAYS	USER	Can also be US if set on the system
Series Description	0008,103E	LO		ANAP	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		VNAP	AUTO	-
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	-
Performed Procedure Step End Date	0040,0250	DA		ANAP	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		ANAP	AUTO	-
Operators' Name	0008,1070	PN		ANAP	AUTO	-
Performing Physician's Name	0008,1050	PN		ANAP	USER\MWL	-

Table 51: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	VNAP	AUTO	-
Institution Name	0008,0080	LO		ANAP	USER	-
Station Name	0008,1010	SH		ANAP	AUTO	-
Manufacturer's Model Name	0008,1090	LO		ANAP	AUTO	-
Device Serial Number	0018,1000	LO		ANAP	AUTO	-

Table 52: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	HD	ANAP	AUTO	Can be US also based on user input
Conversion Type	0008,0064	CS	DI	ALWAYS	AUTO	

Table 53: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\PRIMARY	ANAP	AUTO	-
Acquisition Date	0008,0022	DA		ANAP	AUTO	-
Content Date	0008,0023	DA		VNAP	AUTO	-
Acquisition DateTime	0008,002A	TM		ANAP	AUTO	
Acquisition Time	0008,0032	TM		ANAP	AUTO	-

Content Time	0008,0033	TM		VNAP	AUTO	-
Instance Number	0020,0013	IS		VNAP	AUTO	-
Image Comments	0020,4000	LT		ANAP	USER	-

Table 54: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	3	ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS	RGB	ALWAYS	AUTO	-
Planar Configuration	0028,0006	US		ALWAYS	AUTO	-
Rows	0028,0010	US		ALWAYS	AUTO	-
Columns	0028,0011	US		ALWAYS	AUTO	-
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	-
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	-
High Bit	0028,0102	US	7	ALWAYS	AUTO	-
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	-
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	-

Table 55: SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ANAP	AUTO	-
Time of Secondary Capture	0018,1014	TM		ANAP	AUTO	-

Table 56: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	AUTO	
Instance Creation Date	0008,0012	DA		ANAP	AUTO	-
Instance Creation Time	0008,0013	TM		ANAP	AUTO	-
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ANAP	AUTO	-
Time zone Offset From UTC	0008,0201	SH				-