DICOM Conformance Statement

Philips Hemodynamic Application R1.4

1. Overview

The Philips Hemodynamic application R1.4 is a software medical device that enables invasive investigation of cardiac and vascular diseases. When combined with a compatible patient monitoring device, the combination provides full patient monitoring and hemodynamic analysis functionality.

It provides the following DICOM data exchange features:

- Query a Radiology information system for a modality worklist.

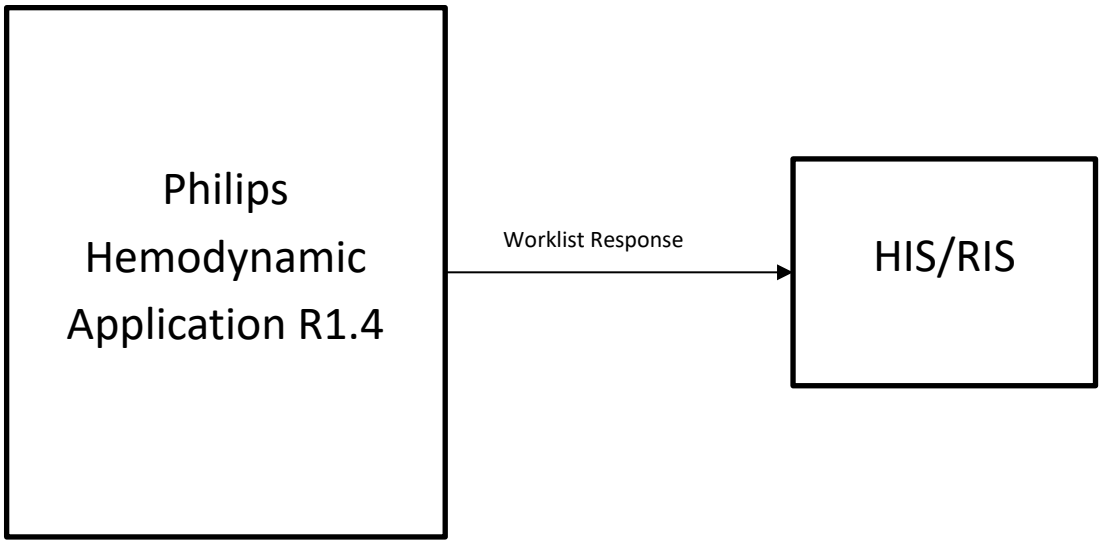

Figure 1-1: Overview of Implemented Services

1.1. Content and Transfer

The "Transfer Syntax Set" column lists the sets of Transfer Syntaxes defined in Table 1-1.

Table 1-1: Supported Transfer Syntaxes

Transfer Syntax Set	Transfer Syntax Name	Transfer Syntax UID	DICOM Web Service Bulkdata Media Type
Non-Image Transfer Syntax Set (NI)	Implicit VR Little Endian	1.2.840.10008.1.2	N/A
	Explicit VR Little Endian native	1.2.840.10008.1.2.1	N/A
	Explicit VR Big Endian	1.2.840.10008.1.2.2	N/A

1.1.1. Structured Reporting Root Template IDs – N/A

Not Applicable.

1.2. DIMSE Services

1.2.1. Verification

Table 1-2 lists support for the Verification SOP Class.

Table 1-2 Verification SOP Class

SOP Classes		Transfer Syntax		SCU	SCP
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	Yes	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Yes	No

1.2.2. Storage – N/A

Not Applicable.

1.2.3. Workflow Management

Table 1-3 lists all supported Workflow Management SOP Classes.

Table 1-3 Workflow Management SOP Classes

SOP Classes		Transfer Syntax		SCU	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	Yes	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Yes	No

1.2.4. Query/Retrieve – N/A

Not Applicable.

1.2.5. Printing – N/A

Not applicable.

1.3. DICOM Web Services – N/A

Not Applicable.

1.4. Media Services – N/A

Not Applicable.

1.5. Real Time Video Service – N/A

Not Applicable.

1.6. De-identification Profiles – N/A

Not Applicable.

1.7. Specific Character Sets

Table 1-4 Supported Specific Character Sets

Defined Term	IANA	Description
Multi-Byte Character Sets without Code Extensions		
ISO_IR 192	ISO_IR 192	Unicode in UTF-8

2. Table of Contents

3. Introduction

3.1. Revision History

The revision history provides dates and differences of the different releases.

Table 3-1: Revision History

Revision	Date	Product Version(s)	Change
01	11-DEC-2023	R1.4	First release of Philips Hemodynamic Application R1.4

3.2. Audience

This document is intended for the audience listed below. It is assumed that the reader has a working knowledge of the DICOM Standard.

The document structure was designed for easier access to relevant information for different user groups:

- Clinical Users, who want to get an overview of the implemented interoperability features of the system can see Section 4 Implementation Model.
- Personnel involved in Sales can use the information in Section 1 to assess the compatibility between different systems involved in a sales situation.
- System Integrators can use information in Section 6 during system installation and also information from Section 5 Service and Interoperability Description for details regarding the implemented services.
- Field Service Engineers can use the details from Section 5 Service and Interoperability Description and from Section 7 Network and Media Communication Details for troubleshooting.
- Hospital IT staff focusing on security can use the details provided in Section 8 Security regarding implemented Security features.
- Research Personnel may be interested in using information provided in Annexes Information Object Definitions (IODs) or Appendix B Structured Report Content Encoding to get detailed imaging and measurement information.

3.3. Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between Philips Hemodynamic Application R1.4 and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1]. DICOM by itself does not guarantee interoperability.

- The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.
- This Conformance Statement should not replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, it is the user's responsibility to perform the following validation activities:
  - The comparison of Conformance Statements from Philips Hemodynamic Application R1.4 and other DICOM conformant equipment is the first step towards assessing interconnectivity and interoperability between those systems.
  - Test procedures should be defined and executed to validate the required level of interoperability with specific DICOM conformant equipment, as established by the healthcare facility.

3.4. Terms and Definitions

The following list includes DICOM Terms, that are used throughout this Conformance Statement:

Table 3-2: Terms and Definitions

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)	A representation of the external behavior of an application process in terms of DICOM Network Services, Web Services and/or media exchange capabilities implemented in one or more roles. A single device may have multiple Application Entities.
Application Entity Title (AET)	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 Information 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).
Data Element	A unit of information as defined by a single entry in the data dictionary. An encoded Information Object Definition (IOD) Attribute that is composed of, at a minimum, three fields: a Data Element Tag, a Value Length, and a Value Field. For some specific Transfer Syntaxes, a Data Element also contains a VR Field where the Value Representation of that Data Element is specified explicitly
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. Examples: MR Image IOD, CT Image IOD, Print Job IOD. The Attributes within an IOD 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).
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's Name, Patient ID, Patient' Birth Date, and Patient's 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.
NEMA	National Electrical Manufacturers Association
Origin Server	Refers to the program that can originate authoritative responses to HTTP requests for a given Target Resource. The term "server" refers to any implementation that receives a web service request message from a user agent.
Presentation Context	The set of DICOM Network Services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.
Private SOP Class	A SOP Class that is not defined in the DICOM Standard but is published in an implementation's Conformance Statement.

Protocol Data Unit (PDU)	A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
Security Profile	A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.
Service Class Provider (SCP)	Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
Service Class User (SCU)	Role of an Application Entity that uses a DICOM Network Service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU).
Service/Object Pair Class (SOP Class)	The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of a DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
Service/Object Pair Instance (SOP Instance)	An information object; a specific occurrence of information exchanged in a SOP Class. E.g., a specific X-ray image.
Specialized SOP Class	A SOP Class that is derived from the Standard that is specialized by additional type 1, 1C, 2, 2C, or 3 Attributes, by enumeration of specific permitted Values for Attributes, or by enumeration of specific permitted Templates. The additional Attributes may either be drawn from the Data Dictionary in PS3.6 or may be Private Attributes.
Standard SOP Class	A SOP Class defined in the Standard, and that is implemented and used without any modifications.
Standard Extended SOP Class	A SOP Class that is defined in the standard, and that is extended by additional type 3 Attributes. The additional Attributes may either be drawn from the DICOM Data Dictionary in PS3.6 or may be Private Attributes.
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.
TCP/IP	Transmission Control Protocol/Internet Protocol
TLS-Secured Port	TCP port on which an implementation accepts TLS connections to exchange DICOM information.
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.
User Agent	A client in a network protocol used in communications within a client-server distributed computing system. In particular, the Hypertext Transfer Protocol

	(HTTP) identifies the client software originating the request, using a user-agent header, even when the client is not operated by a user.
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

Abbreviations that are used in this DICOM Conformance Statement are listed here.

Table 3-3: Abbreviations

AE	Application Entity
AET	Application Entity Title
CR	Computed Radiography
CT	Computed Tomography
DCS	DICOM Conformance Statement
DICOM	Digital Imaging and Communications in Medicine
ELE	Explicit VR Little Endian
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
HD	Hemodynamics
HIS	Hospital Information System
IANA	Internet Assigned Numbers Authority
IHE	Integrating the Healthcare Enterprise
ILE	Implicit VR Little Endian
IOD	Information Object Definition
ISO	International Organization for Standardization
MPPS	Modality Performed Procedure Step
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
OS	Origin Server
PDU	Protocol Data Unit
PHI	Protected Health Information
PPS	Performed Procedure Step

PHA	Philips Hemodynamic Application
RWA	Real World Activity
SCP	Service Class Provider
SCU	Service Class User
SDP	Service Description Protocol
SOP	Service-Object Pair
SPS	Scheduled Procedure Step
SR	Structured Reporting
TCP/IP	Transmission Control Protocol/Internet Protocol
UA	User Agent
UI	User Interface
UID	Unique Identifier
UL	Upper Layer
VR	Value Representation

3.6. References

[1] National Electrical Manufacturers Association (NEMA), Rosslyn, VA USA. *PS3 / ISO 12052 Digital Imaging and Communications in Medicine (DICOM) Standard*. http://www.dicomstandard.org.

4. Implementation Model

The implementation model consists of below section:

- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities,
- A functional description of each Application Entity, and
- The sequencing constraints among them.

4.1. Application Entities and Data Flow

PHA R1.4 system has a single Application Entity in its implementation, namely PHA R1.4 Application Entity.

Figure 4-1 shows the relationship between the Local and Remote Real World Activities.

- After RWA Verify Application Level Communication, the PHA as SCU uses the remote Request Verification SCP functionality to verify communication.
- After RWA Modality Worklist, the PHA as SCU uses the remote Modality Worklist Information Model SCP functionality to query for Modality Worklist.

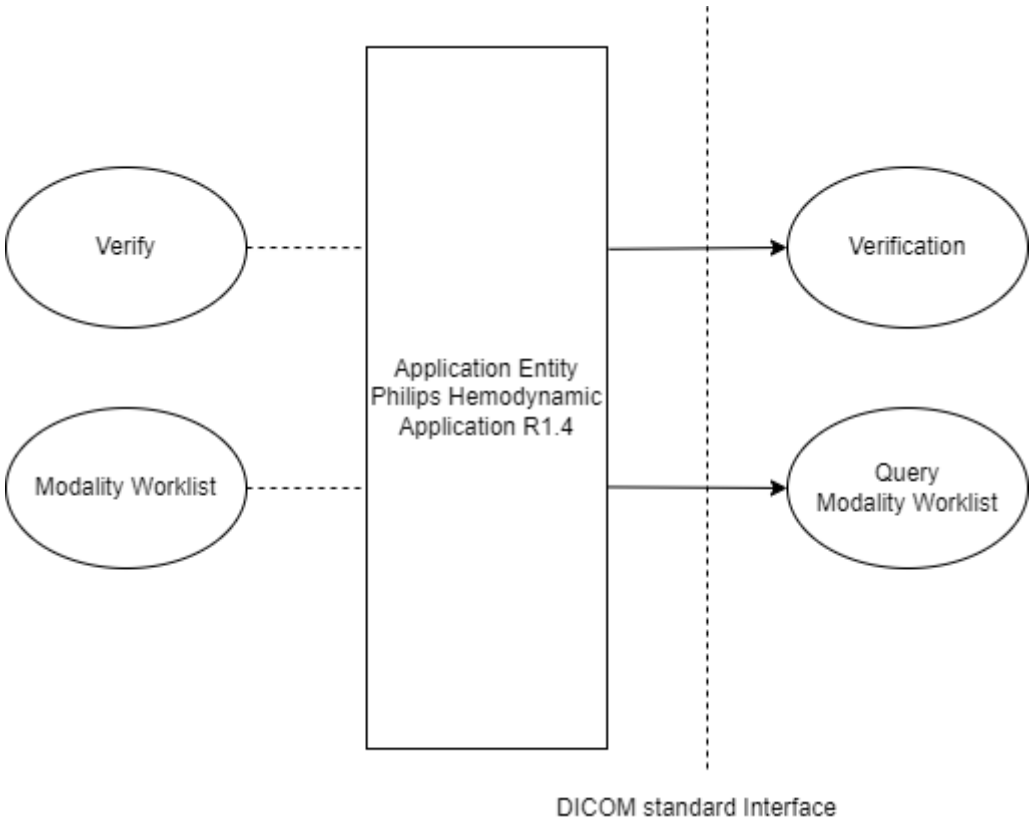

Figure 4-1: Philips Hemodynamic Application R1.4 Data Flow Diagram

This section describes the organization of the supported Services into Application Entities based on the default configuration of the system. This may change based on the actual setup at the customer site. See Section 6 for details about the configurability of Services into AEs.

4.1.1. Functional Definition of Philips Hemodynamic Application R1.4

This section contains a functional definition for each individual local Application Entity.

Verification Service Class

PHA provides the Verification service as SCU. PHA can request an association to a remote node for Verification SOP class. After receiving the response for the Verification request from the remote SCP system, it releases the association.

Basic Worklist Management Service Class

PHA uses the Basic Worklist Management service as SCU. After initiating a worklist query, PHA requests an association with the configured remote Basic Worklist Management SCP. After accepting the association PHA shall send the find request, wait for response, and then release the association. The system shall be updated with the query results.

The following sequence of Real World activities are supported by PHA:

- The clinical user queries the MWL SCP for a (specific) Worklist representing the list of Scheduled Procedure Steps (with demographic information). Based on that query entered at PHA, it sends the C-FIND-RQ message with the query criteria.

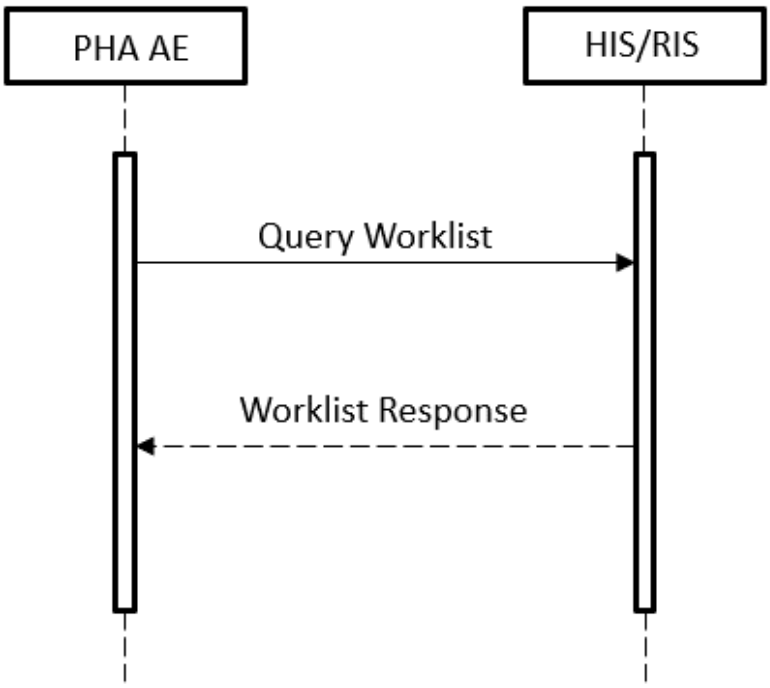

Figure 4-2: PHA R1.4 Sequence diagram

5. Service and Interoperability Description

5.1. Mapping of Services to Application Entities

Table 5-1 provides an overview of the Application Entities and the Services supported by each AE.

Table 5-1: Service to AE Mapping

Application Entity	Supported Services	Role								
		DIMSE		DICOM Web		DICOM Media			Real-Time Video	
		SCU	SCP	Origin Server	User Agent	FSC	FSU	FSR	SCU	SCP
Philips Hemodynamic Application R1.4	Modality Worklist	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	MPPS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Storage	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Storage Commitment	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Verification	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Unified Worklist and Procedure Step Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Instance Availability Notification Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Query/Retrieve Service Class	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Print Management Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

5.2. Supported DIMSE Services

5.2.1. Basic Worklist Management Service

5.2.1.1. SCU of the Modality Worklist Information Model - FIND SOP Class

The figure below shows sequencing of RWA for MWL as SCU.

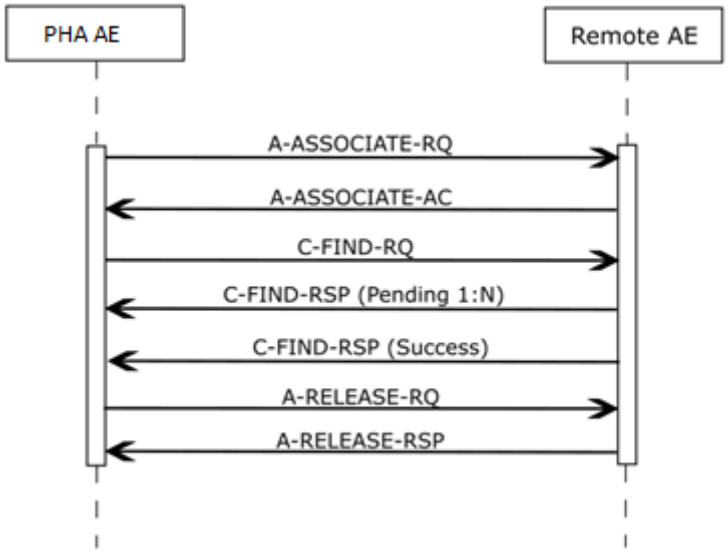

Figure 5-1: Real World Activity – Modality Worklist as SCU

- When responses with missing mandatory attributes are received, PHA R1.4 system displayed that particular study.

- When responses with empty values for mandatory attributes are received, empty value for patient id & patient name is displayed.
- When Mandatory return key violation is sent in response, PHA R1.4 system continued querying for further studies without any error.
- When Mandatory value missing is sent in response, PHA R1.4 system continued querying for further studies without any error.

As a Service Class User of the Modality Worklist Information Model - FIND SOP Class, the Philips Hemodynamic Application R1.4 uses the C-FIND-RQ message to query the SCP. It supports the Query Keys listed in Table 5-2.

In the "Matching Type" column, the following Values can be used:

- SINGLE_VALUE: SCU can request single Value matching on this Attribute.
- UID: SCU can request List of UID matching on this Attribute.
- WILDCARD: SCU can request Wildcard matching on this Attribute.
- RANGE: SCU can request Range matching on this Attribute.
- SEQUENCE: SCU can request sequence matching on this Attribute.
- UNIVERSAL: SCU can request that the Attribute be a return Value (universal matching).

In the "Query Value Source" column, the following Values can be used:

- FIXED: The query Value cannot be modified by the user or by configuration.
- GENERATED: The query Value is generated by the system (e.g. current date as the study date).
- CONFIGURATION: The query Value is dependent on system configuration.
- USER: The query Value is entered by the user.
- SCANNED: The query Value is read from a barcode scanner or similar device.
- EMPTY: The query Value is sent with a zero-length Value to indicate it is a return key only.

In the "Display on UI" column the following Values can be used:

- D: the return Value is displayed on the main UI by default.

- C: the return Value is displayed on the main UI if configured.
- N: the return Value is never displayed.

Table 5-2: Supported C-FIND Query Parameters for Modality Worklist - SCU

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Scheduled Procedure Step						
Scheduled Procedure Step Sequence	0040,0100	Universal				
>Modality	0008,0060	Universal	USER			
>Station Name	0008,1010	Single Value, Universal, Wild Card				
>Requested Contrast Agent	0032,1070	Universal				
>Scheduled Station AE Title	0040,0001	Universal	CONFIGURATION			
>Scheduled Procedure Step Start Date	0040,0002	Single Value, Universal, Wild Card	USER			
>Scheduled Procedure Step Start Time	0040,0003	Single Value, Universal, Wild Card				
>Scheduled Procedure Step End Date	0040,0004	Universal				
>Scheduled Procedure Step End Time	0040,0005	Universal				
>Scheduled Performing Physician's Name	0040,0006	Universal				
>Scheduled Procedure Step Description	0040,0007	Universal				
>Scheduled Procedure Step ID	0040,0009	Universal			D	
Study Information						
Study Date	0008,0020	Universal	EMPTY			
Study Time	0008,0030	Universal	EMPTY			
Accession Number	0008,0050	Single Value, Universal, Wild Card	USER		D	
Institution Name	0008,0080	Universal	EMPTY			
Institution Address	0008,0081	Universal	EMPTY			

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Referring Physician's Name	0008,0090	Universal	EMPTY			
Referenced Study Sequence	0008,1110	Universal	EMPTY			
Referenced Patient Sequence	0008,1120	Universal	EMPTY			
Patient's Name	0010,0010	Single Value, Universal, Wild Card	USER		D	
Patient ID	0010,0020	Single Value, Universal, Wild Card	USER		D	
Issuer of Patient ID	0010,0021	Universal	EMPTY			
Patient's Birth Date	0010,0030	Universal	EMPTY		D	
Patient's Birth Time	0010,0032	Universal	EMPTY			
Patient's Sex	0010,0040	Universal	EMPTY		D	
Patient's Size	0010,1020	Universal	EMPTY		D	
Patient's Weight	0010,1030	Universal	EMPTY		D	
Medical Alerts	0010,2000	Universal	EMPTY		D	
Allergies	0010,2110	Universal	EMPTY		D	
Ethnic Group	0010,2160	Universal	EMPTY			
Smoking Status	0010,21A0	Universal	EMPTY			
Additional Patient History	0010,21B0	Universal	EMPTY			
Pregnancy Status	0010,21C0	Universal	EMPTY			
Patient Comments	0010,4000	Universal	EMPTY			
Study Instance UID	0020,000D	Universal	EMPTY			
Requesting Service	0032,1033	Universal	EMPTY			
Requested Procedure Description	0032,1060	Universal	EMPTY			
Requested Procedure Code Sequence	0032,1064	Universal	EMPTY			
Requested Procedure ID	0040,1001	Single Value, Universal, Wild Card	USER			

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Placer Order Number / Imaging Service Request	0040,2016	Universal	EMPTY			
Filler Order Number / Imaging Service Request	0040,2017	Universal	EMPTY			

5.2.1.2. SCP of the Modality Worklist Information Model - FIND SOP Class – N/A

Not Applicable.

5.2.2. Modality Performed Procedure Step Service – N/A

Not Applicable.

5.2.3. Unified Worklist and Procedure Step Service – N/A

Not Applicable.

5.2.4. Instance Availability Notification Service- N/A

Not Applicable.

5.2.5. Storage Service – N/A

Not Applicable.

5.2.6. Storage Commitment Service – N/A

Not Applicable.

5.2.7. Query/Retrieve Service Class – N/A

Not Applicable.

5.2.8. Print Management Service – N/A

Not Applicable.

5.2.9. Verification Service

5.2.9.1. SCU of the Verification SOP Class

The Philips Hemodynamic Application AE can send a verification request (C-ECHO) to verify application level communication to a remote system. This verification is initiated on a separate service system by using the “Test” button in the system setting (configuration) tool.

The figure below shows sequencing of Association as SCU.

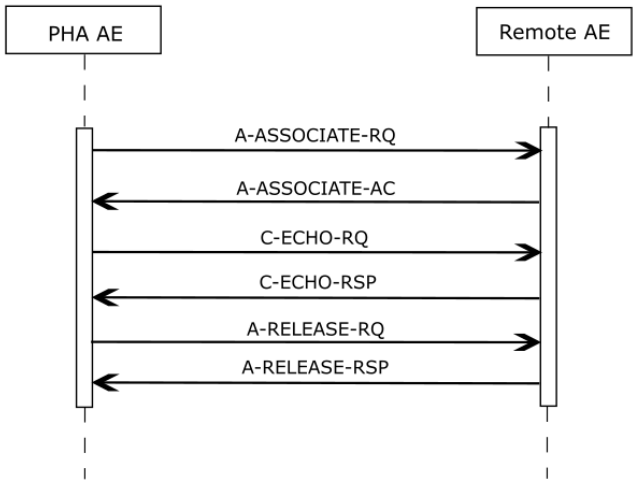

Figure 5-1: Real-World Activities for Verification as SCU

The system sends a DICOM Association request message. After the Association accept is received a C-ECHO message is sent.

Note: The verification as SCU service is verified with the test button present in the PSC-->DICOM configuration in PHA R1.4 system. As per product implementation there are 2 associations established, first to check the Verification Sop check and the second for Modality Worklist check.

5.2.9.2. SCP of Verification SOP Class – N/A

Not Applicable.

5.3. Supported DICOM Web Services – N/A

Not Applicable.

5.4. Media Service – N/A

Not Applicable.

5.5. Real Time Video Service – N/A

Not Applicable.

5.6. Cross Service Considerations - N/A

Not Applicable.

5.7. Specific Character Sets

For Specific Character Sets supported in addition to the default character repertoire, refer to Section 1.7 for the Values for Specific Character Set (0008,0005).

6. Configuration

Throughout all subsections the following Values can be used in the "Configurable" column:

- USER: The parameter is configurable by the user.
- SERVICE: The parameter is configurable by service personnel.
- FIXED: The parameter is not configurable (it has a fixed Value). The Value is required for the configuration of the remote system.
- N/A: The parameter is not applicable for the local or the remote system.

6.1. General Configuration Parameters

Table 6-1 lists general configuration parameters applicable across all supported DICOM Services.

Table 6-1: General Configuration Parameters

Parameter	Configurable	Default Value	Comments
General Parameters			
Timeout waiting for acceptance or rejection Response to an Association Open Request. (Application-Level timeout)	FIXED	70	
Timeout waiting for a response to an Association release request (Application Level Timeout)	FIXED	70	
General DIMSE level timeout Values	FIXED	70	
TCP/IP Settings			
TCP/IP Send Buffer	FIXED	8192	Windows 10 default
TCP/IP Receive Buffer	FIXED	8192	Windows 10 default
DICOM Services Parameters			
Maximum number of simultaneous Associations accepted	FIXED	1	
Specific Character Set	FIXED	ISO_IR 192	
Other parameters	N/A		

6.2. Configuration of DIMSE Services

The tables in the following subsections show the configuration parameters required for DIMSE Services.

In order to identify whether Philips Hemodynamic Application R1.4 is SCP / SCU, the following applies:

- SCP: The (Secured) Local Called AET and Remote Calling AET parameters are present.
- SCU: The (Secured) Local Calling AET and Remote Called AET parameters are present.

6.2.1. Basic Worklist Management Service Configuration

Table 6-2 lists Worklist Service configuration parameters:

Table 6-2: Worklist Service Parameters

Local Worklist Configuration Parameters - Worklist Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Calling AE Title (SCU)	SERVICE	PHS_SCU	
Default Modality type	USER	HD	Used to query the MWL SCP. Possible choices are HD, XA, or 'all'
Default Scheduled Station AE Title	SERVICE	PHS_SCU	Used to query the remote MWL SCP
Remote Configuration Parameters - Worklist Service			
Called AE Title (SCP)	N/A	-	
Port	SERVICE	-	
Host	SERVICE	-	IP number of the host

6.2.2. Modality Performed Procedure Step Service Configuration – N/A

Not Applicable.

6.2.3. Unified Worklist and Procedure Step Service Configuration – N/A

Not Applicable.

6.2.4. Instance Availability Notification Service Configuration – N/A

Not Applicable.

6.2.5. Storage Service Configuration – N/A

Not Applicable.

6.2.6. Storage Commitment Service Configuration – N/A

Not Applicable.

6.2.7. Query/Retrieve Service Configuration – N/A

Not Applicable.

6.2.8. Print Management Service Configuration – N/A

Not Applicable.

6.2.9. Verification as SCU Service Configuration

Table 6-3 lists Worklist Service configuration parameters:

Table 6-3: Verification Service Parameters

Local Verification Configuration Parameters - Verification Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Calling AE Title (SCU)	SERVICE	PHS_SCU	

Remote Configuration Parameters - Verification Service			
Called AE Title (SCP)	N/A	-	
Port	SERVICE	-	
Host	SERVICE	-	IP number of the host

6.3. Configuration of DICOM Web Services – N/A

Not Applicable.

6.4. Configuration of Media Storage Service – N/A

Not Applicable.

6.5. Configuration of Real Time Video Service – N/A

Not applicable.

6.6. Configuration of Audit Trail – Syslog – N/A

Not applicable.

7. Network and Media Communication Details

7.1. General

The cross interaction between the AE's is depicted in the diagrams below.

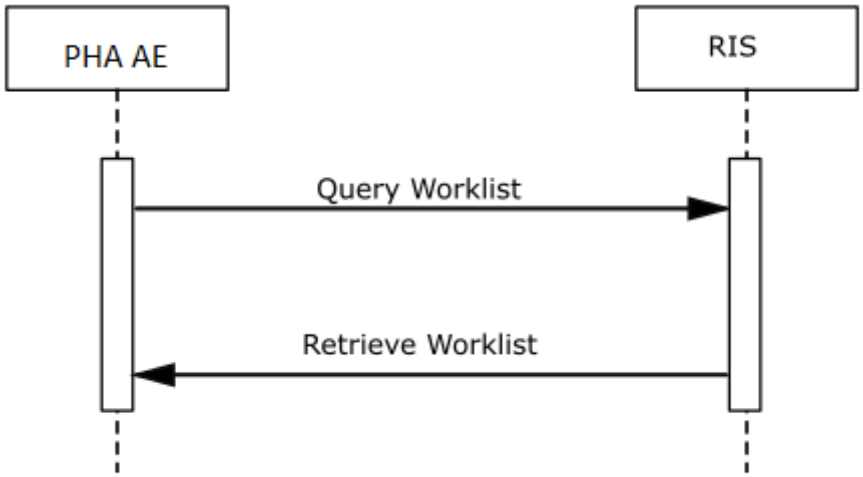

Figure 7-1: Real-World Activity and Cross PHA AE interaction

7.1.1. General Association Parameters

Table 7-1 lists Association parameters applicable to all AEs on the system.

Table 7-1: General Association Parameters

	Name	Value
Networking Services	Application Context Name	1.2.840.10008.3.1.1.1
	Implementation Class UID	1.3.46.670589.64.140
	Implementation Version Name	PHA R1.4
	Maximum PDU Length	Default: 16384
	ARTIM Timeout	Default: 70s
	Maximum number of simultaneous Associations as Association Initiator	1
	Maximum number of simultaneous Associations as Association Acceptor	1
	Maximum number of outstanding asynchronous Transactions	0
Media Services	File Meta Information Version	N/A
	Implementation Class UID	N/A
	Implementation Version Name	N/A
Web Services	Maximum number of connections supported as Server	N/A

7.2. Specifications

7.2.1. Modality Worklist Application Entity

7.2.1.1. Sequencing of Real-World Activities for Modality Worklist

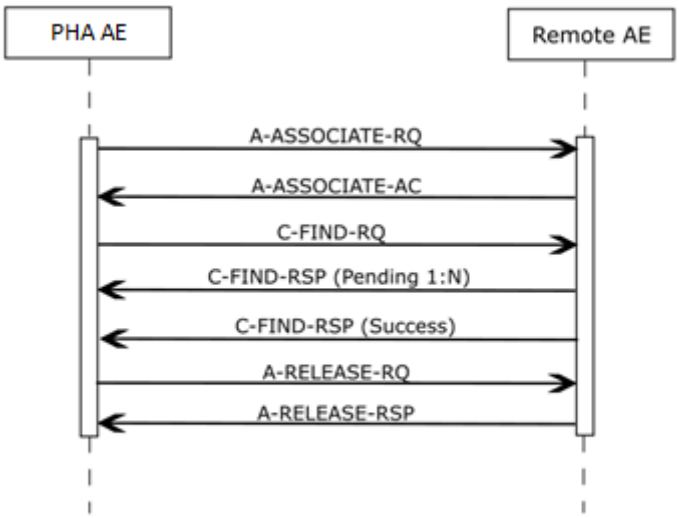

Figure 7-2: Sequencing of Real-World Activities for modality worklist

7.2.1.2. Association Parameters of Modality worklist

Table 7-2 lists Association parameters applicable to modality worklist.

Table 7-2: Association Parameters for Modality Worklist

	Name	Value
Networking Services	Application Context Name	1.2.840.10008.3.1.1.1
	Implementation Class UID	1.3.46.670589.64.140
	Implementation Version Name	PHA R1.4
	Maximum PDU Length	Default: 16384
	ARTIM Timeout	Default: 70s
	Maximum number of simultaneous Associations as Association Initiator	1
	Maximum number of simultaneous Associations as Association Acceptor	1
	Maximum number of outstanding asynchronous Transactions	0
Media Services	File Meta Information Version	N/A
	Implementation Class UID	N/A
	Implementation Version Name	N/A

7.2.1.3. Association Initiation

This section details the Association policies of the Application Entity when it is initiating an Association.

7.2.1.3.1. Real-World Activity Modality Worklist

For each Broad or Specific Worklist request, the PHA opens an association towards the Basic Worklist Management SCP and sends a C-FIND request. After retrieval of all responses containing matching Worklist items, the association is closed (see Figure 7-2). All returned Worklist items are displayed to the operator who can copy one or more items to the internal ‘Scheduled Patients list’ or select an item from the Worklist and perform an examination.
The clinical user may cancel the query to the MWL SCP. As a result, Philips Hemodynamic Application R1.4 ends a C-FIND Cancel Request to the MWL SCP.

7.2.1.4. Association Acceptance – N/A

Not Applicable.

7.2.2. Verification as SCU Application Entity

7.2.2.1. Sequencing of Real-World Activities for Verification as SCU

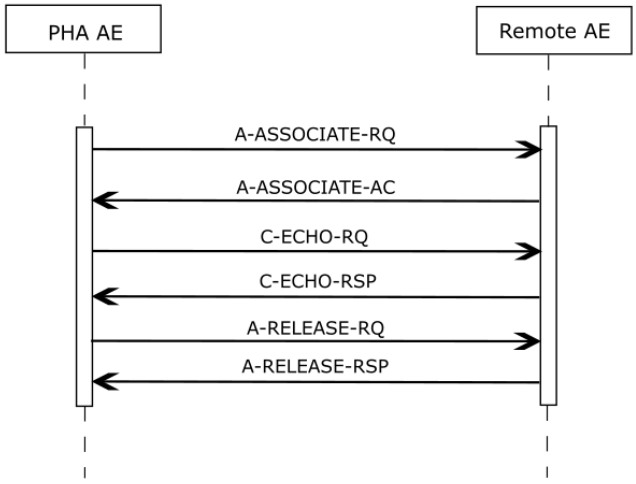

Figure 7-3: Sequencing of Real-World Activities for Verification as SCU

7.2.2.2. Association Parameters of Verification as SCU

Table 7-3 lists Association parameters applicable to *Verification as SCU.*

Table 7-3: Association Parameters for Verification as SCU

	Name	**Value**
Networking Services	Application Context Name	1.2.840.10008.3.1.1.1
	Implementation Class UID	1.3.46.670589.64.140
	Implementation Version Name	PHA R1.4
	Maximum PDU Length	Default: 16384
	ARTIM Timeout	Default: 70s
	Maximum number of simultaneous Associations as Association Initiator	1
	Maximum number of simultaneous Associations as Association Acceptor	1
	Maximum number of outstanding asynchronous Transactions	0
Media Services	File Meta Information Version	N/A
	Implementation Class UID	N/A
	Implementation Version Name	N/A

7.2.2.3. Association Initiation

This section details the Association policies of the Application Entity when it is initiating an Association.

7.2.2.3.1. Real-World Activity Verification

PHA requests verification to a remote system using the C-ECHO command.

7.2.2.4. Association Acceptance – N/A

Not applicable.

7.3. Status Codes

The following sections describe the Status Codes supported by the system for each implemented service as well as the reason for issuing specific Status codes or the associated behavior when receiving it.

7.3.1. General AE Communication and Failure Behavior and Handling

7.3.1.1. Communication Failure Behavior as Association Initiator

Table 7-4 describes behavior of the AE if a communication failure occurs when it initiated an Association.

Table 7-4: DICOM Communication Failure Behavior as Association Initiator

Failure	Failure Behavior
Timeout	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	
Failed to connect	

7.3.1.2. Communication Failure Handling as Association Acceptor – N/A

Not Applicable.

7.3.2. DIMSE Services

7.3.2.1. Basic Worklist Management Service

7.3.2.1.1. SCU of the Modality Worklist Information Model Find SOP Class - C-FIND

Table 7-5 lists the Status Codes that the SCU of the Modality Worklist Information Model Find SOP Class supports for the C-FIND message and defines the application behavior when encountering the listed Status Codes.

Table 7-5: Status Codes for C-FIND of the Modality Worklist Information Model SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Matching is complete - No final identifier is supplied	0000	The result is reported to the user and is logged.
Failure	Error: Identifier does not match SOP Class	A900	Stops with processing the C-FIND Response(s) from the SCP. The reason is logged, and the failure is reported to the user. Responses displayed to the user.
	Error: Unable to process	C001	
Refused	Out of Resources	A700	Stops with processing the C-FIND Response(s) from the SCP. Responses displayed to the user.
	SOP Class Not Supported	0122H	

Service Status	Further Meaning	Status Code	Behavior
Cancel	Matching terminated due to cancel	FE00	Stops with processing the C-FIND Response(s) from the SCP. No responses displayed to the user.
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	FF00	Continues with processing of the C-FIND Response(s) from the SCP.
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier	FF01	
*	Other status codes	anything else	The association is aborted using A-ABORT. The reason is logged, and the failure is reported to the user. No responses displayed to the user.

7.3.2.1.2. SCP of the Modality Worklist Information Model Find SOP Class - C-FIND- N/A

Not Applicable.

7.3.2.2. Modality Performed Procedure Step Service – N/A

Not Applicable.

7.3.2.3. Unified Worklist und Procedure Step Service – N/A

Not Applicable.

7.3.2.4. Instance Availability Notification Service – N/A

Not Applicable.

7.3.2.5. Storage Service – N/A

Not Applicable.

7.3.2.6. Storage Commitment Service – N/A

Not Applicable.

7.3.2.7. Query/Retrieve Service – N/A

Not Applicable.

7.3.2.8. Print Management Service – N/A

Not Applicable.

7.3.2.9. Verification as SCU

7.3.2.9.1. SCU of Verification

Table 7-6 lists the Status Codes that the SCU of Verification SOP Class supports for the C-ECHO message and defines the application behavior when encountering the listed Status Codes.

Table 7-6: Status Codes for C-ECHO of the Verification as SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Association is established successfully	0000H	"Connection Succeeded" appears
Failure	Refused: SOP Class not supported	0122H	Indicates that a different SOP Class than the Verification SOP class was specified, which was not supported
	Duplicate invocation	0210H	Indicates that the message ID(0000,0110)specified is allocated to another notification or operation
	Mistyped argument	0212H	Indicates that one of the parameters supplied has not been agreed for use on the Association between the DIMSE service users
	Unrecognized operation	0211H	Indicates that the different SOP class than the verification SOP class was specified, which does not recognize a C-ECHO operation

7.3.2.9.2. SCP of the Verification SOP Class - C-ECHO- N/A

Not Applicable

7.3.3. DICOM Web Services – N/A

Not Applicable.

8. Security

8.1. Introduction

The security section describes TCP port configuration details used.

8.2. External Network Requirements – N/A

Not applicable

8.3. TCP Port Configuration

See Section 6 Configuration for information on the usage of ports for DICOM and other protocols. This section contains helpful information for product administrators to configure firewalls, application whitelists, etc.

8.4. DICOM Security Profiles Support – N/A

Not Applicable

8.5. User Identity Negotiation Support – N/A

Not Applicable

8.6. Web Services Security Features – N/A

Not Applicable

8.7. Other Security Features – N/A

Not Applicable

Annexes

A Information Object Definitions (IODs) – N/A

Not Applicable.

B Structured Report Content Encoding – N/A

Not Applicable.

C Security Details – N/A

Not Applicable.

D Mapping of Attributes – N/A

Not Applicable.

E Code Set Usage -N/A

Not Applicable.

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