

DICOM Conformance Statement

Philips DICOM Store 1.8



Issued by:

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1. DICOM Conformance Statement Overview

Table 1: Web Services

Web Services	User Agent	Origin Server
Retrieve Transaction (WADO-RS)	No	Yes
Store Transaction (STOW-RS)	No	Yes
Search Transaction (QIDO-RS)	No	Yes

Table 2: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	UID		
Query Retrieve			
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.1.2.2.1	Yes	No
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.1.2.2.2	Yes	No
Transfer			
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	No	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	No	Yes
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	No	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	No	Yes
Radiation Therapy Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
Keratometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.3	No	Yes
Ophthalmic Axial Measurements Storage	1.2.840.10008.5.1.4.1.1.78.7	No	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	Yes
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Digital X-Ray – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital Mammography X-Ray – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes
Intraocular Lens Calculations Storage	1.2.840.10008.5.1.4.1.1.78.8	No	Yes
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	No	Yes

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	UID		
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	No	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital Mammography X-Ray Image Storage – Proc. SOP	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Multi-frame Single Bit Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
12-Lead ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
Ambulatory ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
Enhanced MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
MR Spectroscopy Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.2	No	Yes
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	No	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	No	Yes
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
Hemodynamic Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	No	Yes
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	No	Yes
Philips Private Grayscale Softcopy Presentation State Storage	1.3.46.670589.2.2.1.1	No	Yes
Philips Private X-Ray Image Storage	1.3.46.670589.2.3.1.1	No	Yes
Philips Private Xray MF Image	1.3.46.670589.7.8.1618510091	No	Yes
Philips Private Stent Boost WorkItem	1.3.46.670589.7.8.16185100912	No	Yes
Philips Private Live Run WorkItems	1.3.46.670589.7.8.1618510092	No	Yes
Philips Private Run WorkItems	1.3.46.670589.7.8.16185100129	No	Yes
Philips Private Reco WorkItems	1.3.46.670589.7.8.16185100130	No	Yes
Philips Private Three DCA WorkItem	1.3.46.670589.7.8.16185100913	No	Yes
Embedded Document	1.3.46.670589.2.8.1.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes

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3. Introduction

HSDP DICOM Store Release 1.8 service provides cloud-based storage for Digital Imaging and Communications in Medicine (DICOM) Data as part of the HSDP Store theme. It enables standards-based interoperability between apps and devices with third-party systems via DICOMweb standard interfaces. DICOM Store is integrated with the HSDP's Identity and Access Management (IAM), Clinical Data Repository (CDR) and Audit Services to enable seamless secure and compliant clinical workflows.

The DICOM Store Release 1.8 service supports DICOMweb services. It supports Studies Service and Resources for Store, Search and Retrieve Transactions (previously referred as the WADO-RS, STOW-RS, and QIDO-RS services).

The DICOM Store service supports the following native (TCP/IP based) connectivity services specified in the DICOM PS3.7 - C-STORE Service SCP standard (commonly referred as DICOM Message Service Element (DIMSE)). The C-STORE service is used by a DIMSE Service User to store a composite SOP Instance on a peer DIMSE Service User.

The Import service supports Query and Retrieve from external DICOM systems at Study and Series hierarchy level as defined in DICOM PS3.7 - C-FIND SCU and DICOM PS3.7 - C-MOVE SCU respectively. These transactions can be achieved using RESTful web APIs provided by Import service.

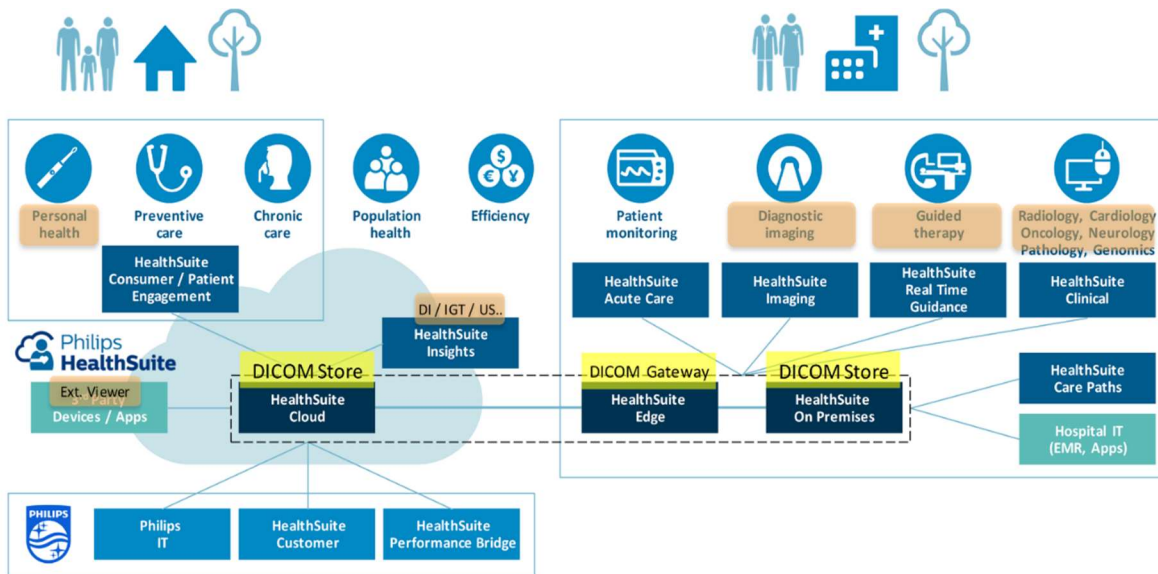


Figure 1 DICOM Store Release 1.8 Workflow

3.1 Revision History

Table 3: Revision History

Document Version	Date of Issue	Description
01	15-Sep-2021	First Release for DICOM Store 1.8

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

The DICOM Conformance Statement is contained in chapter 4 through 7 and follows the contents and structuring requirements of DICOM PS 3.2.

This DICOM Conformance Statement 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
AE	Application Entity
ANSI	American National Standard Institute
DICOM	Digital Imaging and Communications in Medicine
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
HIS	Hospital Information System
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
PDU	Protocol Data Unit
RF	X-Ray Radiofluoroscopic
RWA	Real-World Activity
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier

3.5 References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 22 (NEMA PS 3.1- PS 3.22),
 National Electrical Manufacturers Association
 1300 North 17th Street
 Suite 900
 Arlington, Virginia 22209
 Internet: <https://www.dicomstandard.org/current>

Note that at any point in time the official standard consists of the most recent yearly edition of the base standard (currently 2021) plus all the supplements and correction items that have been approved as Final Text.

4. Networking

This section contains the networking related services (vs. the media related ones).

4.1 Implementation model

4.2 Application Data flow

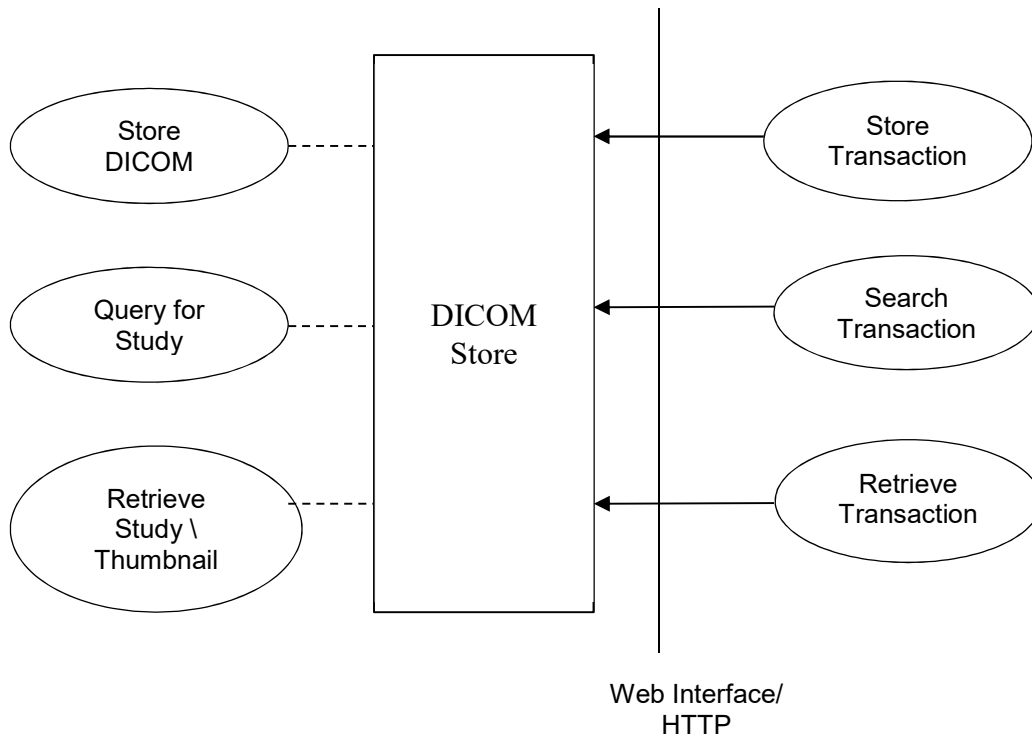


Figure 2 Data Flow Diagram 1

DICOM Store 1.8 enables standards-based interoperability between enabled apps and devices with third-party systems via DICOMweb standard services for

- STORE - Store DICOM objects (STOW-RS)
- QUERY - Search for DICOM objects (QIDO-RS)
- RETRIEVE - Retrieve DICOM objects and Thumbnail (WADO-RS)

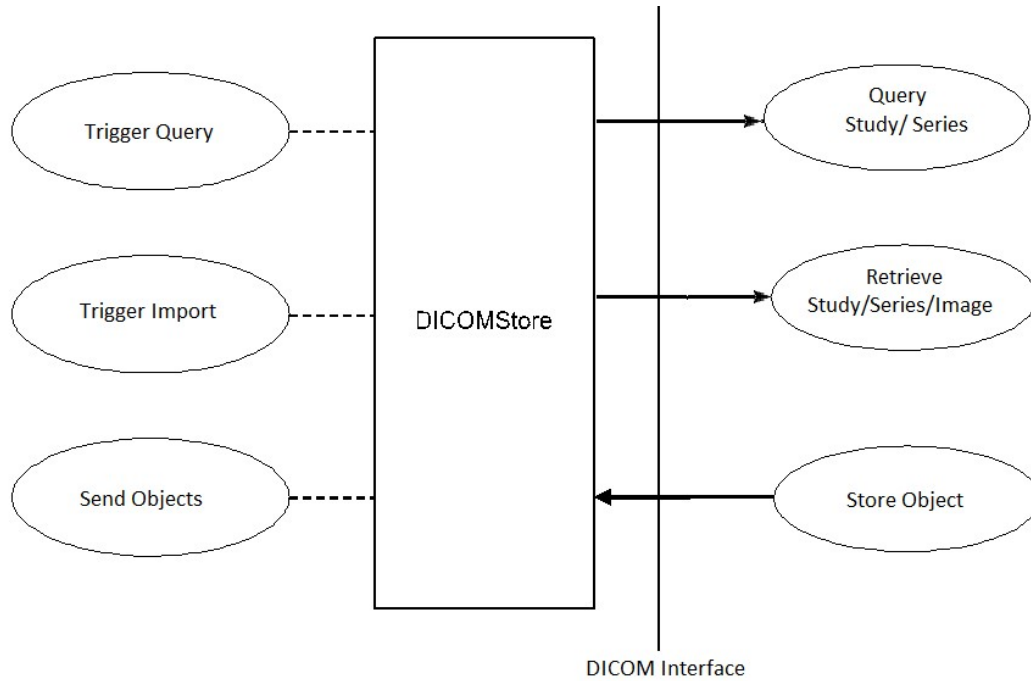


Figure 3 Data Flow Diagram 2

4.3 Functional Definition of AE

4.3.1 Functional Definition of DICOM Store Web AE

The DICOM Store AE implements the following DICOMweb Services

- Retrieve Transaction (WADO-RS)
- Store Transaction (STOW-RS)
- Search Transaction (QIDO-RS)

4.3.2 Sequencing of Real World Activities

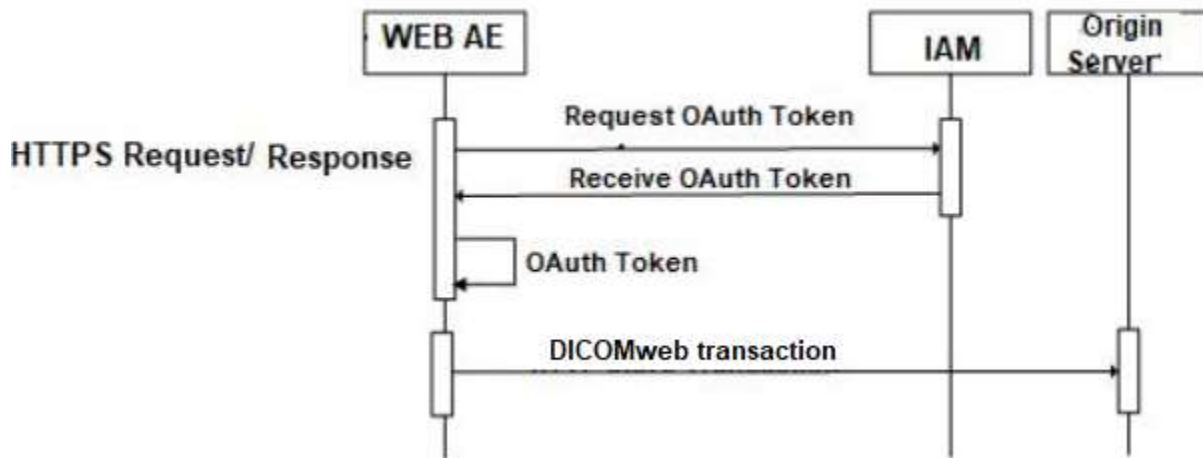


Figure 4 Sequencing of Real world activities

4.4 AE Specifications

4.4.1 HSDP DICOM Store Web AE

Detail of this specific DICOM Store is specified in this section.

The following services are described here

- DICOMweb Retrieve Transaction
- DICOMweb Store Transaction
- DICOMweb Query Transaction

4.4.1.1 Retrieve Transaction (WADO-RS) as Origin Server

The following target resources for Retrieve transaction types are supported:

4.4.1.1.1 DICOM resources

The Philips DICOMStore 1.8 service supports retrieval of DICOM data in application/DICOM format at the following levels:

- Study
- Series
- Instances

4.4.1.1.2 Metadata resources

The Philips DICOMStore 1.8 service shall retrieve DICOM metadata at the following levels

- Study
- Series
- Instance

The system supports retrieval of content of bulk data element based on the bulkdata URI in the request in application/octet-stream format.

4.4.1.1.3 Thumbnail resources at Series and Instance Level. Study and Frame level are not supported.

The Philips DICOMStore 1.8 service shall retrieve thumbnail resources at the following levels

- Study
- Series
- Instance
- Frame

Table 5: General Parameters

Parameters	Options
WADO	
Data Types Supported (Accept Type)	Application/dicom Application/dicom+json
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	See Table 16 & 17
Query Parameters	-
Header Fields	WADO request Header --header 'Accept: multipart/related; type="application/dicom"' \ --header 'api-version: 1' \ --header 'Authorization: Bearer 796821bc-5dcc-4fe4-bac2-d890ac1c470c' WADO response header Content-Type Date X-Vcap-Request-Id transfer-encoding Connection
WADO Thumbnail	
Media Types for Thumbnail	Image/jpeg Note: Image/png, Image/gif are not supported
SOP restrictions	See Table 8
Minimum and maximum Sizes for thumbnails	Max 1024x1024, min 128x128

4.4.1.1.4 Status Code Behavior

Table 6: Status Code Behaviour

Service Status	HTTP Status Code	Condition
Success	200_Success	Requested operation was processed without error.
	206_Partial Content	The Origin server tries to retrieve study has pixel and non-pixel data together

Service Status	HTTP Status Code	Condition
Failure	401_Unauthorized	When unauthorized/Expired Oauth token present in the request
	403_Forbidden	When the insufficient grant access is present in the request
	404_Gone	When the target resource is not available/deleted
	406_Not Acceptable	When unsupported media type is present in the request
	500_Internal Server Error	The origin server cannot process the request because of errors in the request header or parameters.

Table 5: Below are the SOP Class and Transfer Syntax combinatio which are supported for Thumbnail

SOP Class	Transfer Syntax
Enhanced MR Image Storage SOP Class (1.2.840.10008.5.1.4.1.1.4.1)	Implicit VR Endian (1.2.840.10008.1.2)
MR Image Storage (1.2.840.10008.5.1.4.1.1.4)	Explicit VR Little Endian (1.2.840.10008.1.2.1)
	Explicit VR Big Endian (1.2.840.10008.1.2.2)
	Implicit VR Endian (1.2.840.10008.1.2)
Secondary Capture Image Storage (1.2.840.10008.5.1.4.1.1.7)	Explicit VR Little Endian (1.2.840.10008.1.2.1)

4.4.1.2 Search Transaction (QIDO-RS) as Origin Server

4.4.1.2.1 Supported Search Transactions

The following Search transaction types are supported:

- Search for all Studies
- Search for all Series
- Search for all Series belonging to a Study
- Search for all Instances belonging to a particular Series and Study

Table 8: General Parameters

Options	Restrictions
Data Types Supported (Accept Type)	Application/dicom+json

4.4.1.2.2 Supported Search keys

The following table lists the matching and return keys are supported at the Study level.

Table 6: Supported Matching and Return keys for Study Level

Attributes Name	Tag	Matching	Return	Type of Matching	Comments
Study Date	(0008,0020)	Y	Y	Single Value and Range matching	
Study Time	(0008,0030)	N	Y	N/A	
Accession Number	(0008,0050)	Y	Y	Single Value matching	
Patient Name	(0010,0010)	Y	Y	Wildcard	
Patient ID	(0010,0020)	Y	Y	Single Value matching	
Study ID	(0020,0010)	Y	Y	Single Value matching	
Study Instance UID	(0020,000D)	Y	Y	Single Value matching	
Modalities in Study	(0008,0061)	Y	Y	Single Value matching	
Patient's Birth Date	(0010,0030)	N	Y	N/A	
Patient's Sex	(0010,0040)	N	Y	N/A	
Time Zone Offset from UTC	(0008,0201)	N/A	Y	N/A	
Number of Study Related Series	(0020,1206)	N/A	Y	N/A	
Number of Study Related Instances	(0020,1208)	N/A	Y	N/A	

The following table lists the matching and return keys shall be supported at the Series level.

Table 10: Supported Matching and Return keys for Series Level

Attributes Name	Tag	Matching	Return	Type of Matching	Comments
Modality	(0008,0060)	Y	Y	Single Value matching	
Series Number	(0020,0011)	Y	Y	Single Value matching	
Series Instance UID	(0020,000E)	Y	Y	Single Value matching	
Number of Series Related Instances	(0020,1209)	N/A	Y	N/A	
Time Zone Offset from UTC	(0008,0201)	N/A	Y	N/A	
>Requested Procedure ID	(0040,1001)	C*	Y	Single Value matching	

The following table lists the matching and return keys shall be supported at the Instance level.

Table 71: Supported Matching and Return keys for Instance Level

Attributes Name	Tag	Matching	Return	Type of Matching	Comments
SOP Class UID	(0008,0016)	Y	Y	Single Value matching	
SOP Instance UID	(0008,0018)	Y	Y	Single Value matching	
Available Transfer Syntax UID	(0008,3002)	N/A	Y	N/A	
Instance Number	(0020,0013)	Y	Y	Single Value matching	

Table 12: General Parameters

Options	Restrictions
Query parameter 'limit' and 'offset'	none
Optional Attributes supported	No optional attributes supported, only the ones that are mentioned in the RS.

4.4.1.2.3 Status Code Behavior

Table 13: Status Code Behaviour

Service Status	HTTP Status Code	Condition
Success	200_Success	Requested operation was processed without error.
	204_No Content	The search completed successfully, but there were zero results.
Failure	400_Bad Request	When the request is Incorrect
	401_Unauthorized	When unauthorized/Expired Oauth token present in the request
	403_Forbidden	When the insufficient grant access is present in the request
	500_Internal Server error	The server cannot process the request because of an internal error.

4.4.1.3 Store Transaction (STOW-RS) as Origin Server

4.4.1.3.1 Supported Store Transactions

The following Study transaction are supported:

- Store Part 10 Objects

Table 14: General Parameters

Options	Restrictions
Data Types Supported (Content Type)	application/dicom
Accept Type Supported	application/dicom+json

Notes:-

1. DICOM Store does not support processing of VRs (SV, UC, UR, UT)
2. If the imported data contain Other Patient Name, the value will be appended to the Patient Name Tag value as a different component on saving to DICOM Store.

4.4.1.3.2 Supported DICOM Objects for Store Transaction

Table 15: Supported SOP class

SOP Class Name	SOP class UID
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
Radiation Therapy Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Keratometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.3
Ophthalmic Axial Measurements Storage	1.2.840.10008.5.1.4.1.1.78.7
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Digital X-Ray – For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital Mammography X-Ray – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67
Intraocular Lens Calculations Storage	1.2.840.10008.5.1.4.1.1.78.8
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20

SOP Class Name	SOP class UID
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital Mammography X-Ray Image Storage – Proc. SOP	1.2.840.10008.5.1.4.1.1.1.2.1
Multi-frame Single Bit Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7.1
12-Lead ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.3
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1
Enhanced MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.1
MR Spectroscopy Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.2
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1
Enhanced SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22
Hemodynamic Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.2.1
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65
Philips Private Grayscale Softcopy Presentation State Storage	1.3.46.670589.2.2.1.1
Philips Private X-Ray Image Storage	1.3.46.670589.2.3.1.1
Philips Private Xray MF Image	1.3.46.670589.7.8.1618510091
Philips Private Stent Boost WorkItem	1.3.46.670589.7.8.16185100912
Philips Private Live Run WorkItems	1.3.46.670589.7.8.1618510092
Philips Private Run WorkItems	1.3.46.670589.7.8.16185100129
Philips Private Reco WorkItems	1.3.46.670589.7.8.16185100130
Philips Private Three DCA WorkItem	1.3.46.670589.7.8.16185100913
Embedded Document	1.3.46.670589.2.8.1.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4

Table 86: Supported Transfer Syntaxes

Transfer Syntax Name	Transfer Syntax UID
Deflated Explicit VR Little Endian	1.2.840.10008.1.2.1.99
JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression (Process 4 only)	1.2.840.10008.1.2.4.51
JPEG Extended (Process 3 & 5) (Retired)	1.2.840.10008.1.2.4.52
JPEG Spectral Selection, Non-Hierarchical (Process 6 & 8) (Retired)	1.2.840.10008.1.2.4.53
JPEG Spectral Selection, Non-Hierarchical (Process 7 & 9) (Retired)	1.2.840.10008.1.2.4.54

Transfer Syntax Name	Transfer Syntax UID
JPEG Full Progression, Non-Hierarchical (Process 10 & 12) (Retired)	1.2.840.10008.1.2.4.55
JPEG Full Progression, Non-Hierarchical (Process 11 & 13) (Retired)	1.2.840.10008.1.2.4.56
JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57
JPEG Lossless, Non-Hierarchical (Process 15) (Retired)	1.2.840.10008.1.2.4.58
JPEG Extended, Hierarchical (Process 16 & 18) (Retired)	1.2.840.10008.1.2.4.59
JPEG Extended, Hierarchical (Process 17 & 19) (Retired)	1.2.840.10008.1.2.4.60
JPEG Spectral Selection, Hierarchical (Process 20 & 22) (Retired)	1.2.840.10008.1.2.4.61
JPEG Spectral Selection, Hierarchical (Process 21 & 23) (Retired)	1.2.840.10008.1.2.4.62
JPEG Full Progression, Hierarchical (Process 24 & 26) (Retired)	1.2.840.10008.1.2.4.63
JPEG Full Progression, Hierarchical (Process 25 & 27) (Retired)	1.2.840.10008.1.2.4.64
JPEG Lossless, Hierarchical (Process 28) (Retired)	1.2.840.10008.1.2.4.65
JPEG Lossless, Hierarchical (Process 29) (Retired)	1.2.840.10008.1.2.4.66
JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70
JPEG-LS Lossless Image Compression	1.2.840.10008.1.2.4.80
JPEG-LS Lossy (Near-Lossless) Image Compression	1.2.840.10008.1.2.4.81
JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91
JPEG 2000 Part 2 Multi-component Image Compression (Lossless Only)	1.2.840.10008.1.2.4.92
JPEG 2000 Part 2 Multi-component Image Compression	1.2.840.10008.1.2.4.93
JPIP Referenced	1.2.840.10008.1.2.4.94
JPIP Referenced Deflate	1.2.840.10008.1.2.4.95
MPEG2 Main Profile / Main Level	1.2.840.10008.1.2.4.100
MPEG2 Main Profile / High Level	1.2.840.10008.1.2.4.101
MPEG-4 AVC/H.264 High Profile / Level 4.1	1.2.840.10008.1.2.4.102
MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	1.2.840.10008.1.2.4.103
MPEG-4 AVC/H.264 High Profile / Level 4.2 For 2D Video	1.2.840.10008.1.2.4.104
MPEG-4 AVC/H.264 High Profile / Level 4.2 For 3D Video	1.2.840.10008.1.2.4.105
MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2	1.2.840.10008.1.2.4.106

Note that conversion between transfer syntaxes is only supported for the transfer syntaxes mentioned in table 17.

Table 97: Transfer Syntaxes supported for conversion

Transfer Syntax Name	Transfer Syntax UID
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian (Retired)	1.2.840.10008.1.2.2
JPEG Baseline (Process 1): Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50
RLE Lossless	1.2.840.10008.1.2.5

4.4.1.3.3 Status Code Behavior

Table 18: Status Code Behaviour

Service Status	HTTP Status Code	Condition
Success	200_Success	Requested operation was processed without error.
	202_Accepted	The request is accepted but on failure on warning on some Instances Additional information is present in the response body
Failure	409 (Conflict)	Study Instance UID mismatch
	415 (Unsupported Media type)	The origin server does not support the media type specified in the Content-Type header field of the request
	500_Internal Server Error	The server cannot process the request because of an internal error.

4.4.2 HSDP DICOM Store AE

4.4.2.1 Association Policies

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.4.2.1.1 General

The DICOM standard application context is specified below.

Table 19: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.4.2.1.2 Number of Associations

The number of simultaneous associations that an Application Entity may support as an Initiator or Acceptor is specified here.

Table 20: Number of associations as an Association Initiator for this AE

Description	Value
Maximum number of simultaneous associations	Configurable / limited by system resources

Table 21: Number of associations as an Association Acceptor for this AE

Description	Value
Maximum number of simultaneous associations	Configurable / limited by system resources

4.4.2.1.3 Asynchronous Nature

The DICOM Store does not support asynchronous operations.

Table 22: Asynchronous nature as an Association Initiator for this AE

Description	Value
Maximum number of outstanding asynchronous transactions	n/a

4.4.2.1.4 Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented here.

- Implementation Class UID : 1.3.46.670589.54.2.21.6
- Implementation Version Name : 21.6.0.0

4.4.2.1.5 Communication Failure Handling

The behavior of the AE during communication failure is summarized in the next table.

Table 23: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The association setup fails; the reason is logged and reported to the user.

4.4.2.2 Association Initiation Policy

The Application Entity will respond to a received Association Rejection as shown in the next table.

Table 24: Association Rejection response

Result	Source	Reason/Diagnoses	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	Association is not established. The following error is logged. Association rejected by peer 1: REJECT_RESULT_permanent, 1: REJECT_SOURCE_dul_user, 1: REJECT_REASON_no_reason_given

Result	Source	Reason/Diagnoses	Behavior
		2 - application-context-name-not supported	Association is not established. The following error is logged. Association rejected by peer 1: REJECT_RESULT_permanent, 1: REJECT_SOURCE_dul_user, 2: REJECT_REASON_application_context_not_support
		3 - calling-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer 1: REJECT_RESULT_permanent, 1: REJECT_SOURCE_dul_user, 3: REJECT_REASON_calling_aetitle_not_recognized
		7 - called-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer 1: REJECT_RESULT_permanent, 1: REJECT_SOURCE_dul_user, 7: REJECT_REASON_called_aetitle_not_recognized
	2 - DICOM UL service-provide (ACSE related function)	1 - no-reason-given	Association is not established. The following error is logged. Error: UserRecoverable: impl.dicom.access.PEER: Associationrejected by peer 1: REJECT_RESULT_permanent, 2: REJECT_SOURCE_dul_provider (acse), 1: REJECT_REASON_no_reason_given
		2 - protocol-version-not-supported	Association is not established. The following error is logged. Association rejected by peer 1: REJECT_RESULT_permanent, 2: REJECT_SOURCE_dul_provider (acse), 2: REJECT_REASON_application_context_not_support
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	Association is not established. The following error is logged. Association rejected by peer 1: REJECT_RESULT_permanent, 3: REJECT_SOURCE_dul_provider (presentation), 1: REJECT_REASON_no_reason_given)
		2 - local-limit-exceeded	Association is not established. The following error is logged. Association rejected by peer 1: REJECT_RESULT_permanent, 3: REJECT_SOURCE_dul_provider (presentation), 2: REJECT_REASON_application_context_not_support

Result	Source	Reason/Diagnoses	Behavior
2 - rejected-transient	1 - DICOM UL service-user	1 - no-reason-given	Association is not established. The following error is logged. Association rejected by peer 2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 1: REJECT_REASON_no_reason_given
		2 - application-context-name-not-supported	Association is not established. The following error is logged. Association rejected by peer 2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 2: REJECT_REASON_application_context_not_support
		3 - calling-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer 2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 3: REJECT_REASON_calling_aetitle_not_recognized
		7 - called-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer 2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 7: REJECT_REASON_called_aetitle_not_recognized
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	Association is not established. The following error is logged. Association rejected by peer 2: REJECT_RESULT_transient, 2: REJECT_SOURCE_dul_provider (acse), 1: REJECT_REASON_no_reason_given
		2 - protocol-version-not-supported	Association is not established. The following error is logged. Association rejected by peer 2: REJECT_RESULT_transient, 2: REJECT_SOURCE_dul_provider (acse), 2: REJECT_REASON_application_context_not_support
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	Association is not established. The following error is logged. Association rejected by peer 2: REJECT_RESULT_transient, 3: REJECT_SOURCE_dul_provider (presentation), 1: REJECT_REASON_no_reason_given
		2 - local-limit-exceeded	Association is not established. The following error is logged. Association rejected by peer 2: REJECT_RESULT_transient, 3: REJECT_SOURCE_dul_provider (presentation), 2: REJECT_REASON_application_context_not_support

The behavior of the AE on receiving an Association abort is summarized in the next table.

Table 25: Association Abort Handling

Source	Reason/Diagnosis	Behavior when received	Sent when
0 - DICOM UL service-user (initiated abort)	0- reason-not-specified	When received, the DICOM Store terminates the connection with the following log: Association ABORTED by peer 0: ABORT_SOURCE_dul_user, 0: ABORT_REASON_not_specified	<ul style="list-style-type: none"> • Abort is issued to an executing job that utilizes this network connection (ExportNetwork/ArchiveNetwork/DICOMCopy/DICOMMove) • Any other problem than ones specified for HSDP Clinical Platform (CPF) SCU in the rows below. (Examples: Problem while decoding the DICOM stream, SCU was unable to send the Response to SCP, Error writing to SCU stream).
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	When received, the HSDP Clinical Platform (CPF) terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 0: ABORT_REASON_not_specified	<ul style="list-style-type: none"> • There are problems in SCU/SCP role negotiation. • Any other problem than ones specified for HSDP Clinical Platform (CPF) SCU in the rows below. (Example: Problem while decoding the DICOM stream).
	1 - unrecognized-PDU	When received, the HSDP Clinical Platform (CPF) terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 1: ABORT_REASON_unrecognized_pdu.	An unrecognized PDU type is received ⁴ .

Source	Reason/Diagnosis	Behavior when received	Sent when
	2 - unexpected-PDU	When received, The DICOM Store terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 2: ABORT_REASON_unexpected_pdu.	The received PDU type is not expected in the current state of connection ⁵ .
	4 - unrecognized-PDU-parameter	When received, The DICOM Store terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 4: ABORT_REASON_unrecognized_pdu_parameter.	An unrecognized Associate PDU item is received ¹ .
	5 - unexpected-PDU-parameter	When received, The DICOM Store terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURCE_dul_provider, 5: ABORT_REASON_unexpected_pdu_parameter.	<ul style="list-style-type: none"> • One of the Associate PDU items is received more than once². • One of the Associate PDU items is received unexpectedly².

Source	Reason/Diagnosis	Behavior when received	Sent when
	6 - invalid-PDU-parameter-value	When received, The DICOM Store terminates the connection with the following log: Association ABORTED by peer 2: ABORT_SOURC E_dul_provider, 6: ABORT_REASO N_invalid_pdu_pa rameter.	<ul style="list-style-type: none"> • One of the Associate PDU items is received more than once³. • One of the Associate PDU items is not received³. • There is mismatch in the application context names between the SCU and the SCP. • Illegal Asynchronous Operations Window invoke value is received. • Illegal Asynchronous Operations Window perform value is received. • Unknown presentation context id is received. • Unknown abstract syntax is received. • The length or the format of a received PDU item is invalid.

Notes:

1. Associate PDU items that are recognized:

- 0x10 APPLICATION CONTEXT
- 0x20 PRESENTATION CONTEXT (RQ)
- 0x21 PRESENTATION CONTEXT (AC)
- 0x30 ABSTRACT SYNTAX
- 0x40 TRANSFER SYNTAX
- 0x50 USER INFO
- 0x51 MAXIMUM LENGTH
- 0x52 IMPLEMENTATION CLASS UID
- 0x54 SCP/SCU ROLE SELECTION
- 0x55 IMPLEMENTATION VERSION NAME

2. Associate PDU items for Unexpected-PDU parameter received more than once:

- 0x10 APPLICATION CONTEXT (SCU, SCP)
- 0x30 ABSTRACT SYNTAX (SCU, SCP)
- 0x40 TRANSFER SYNTAX (SCU)

Received unexpectedly:

- 0x20 PRESENTATION CONTEXT (RQ) (SCU)

3. Associate PDU items for Invalid-PDU parameter value:

Received more than once (SCU, SCP):

- 0x50 USER INFO
- 0x51 MAXIMUM LENGTH
- 0x52 IMPLEMENTATION CLASS UID
- 0x55 IMPLEMENTATION VERSION NAME

Received illegally:

- 0x21 PRESENTATION CONTEXT (AC) (SCP)

PDU items not received:

- 0x10 APPLICATION CONTEXT (SCU, SCP)
- 0x20 PRESENTATION CONTEXT (RQ) (SCP)
- 0x21 PRESENTATION CONTEXT (AC) (SCU)
- 0x50 USER INFO (SCU, SCP)
- 0x30 ABSTRACT SYNTAX (SCU)
- 0x40 TRANSFER SYNTAX (SCU)
- 0x51 MAXIMUM LENGTH (SCU, SCP)
- 0x52 IMPLEMENTATION CLASS UID (SCU)

4. PDU types that are recognized:

- 0x01 A-ASSOCIATE-RQ

- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

5. Expected PDU's for following states:

STATE_IDLE:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP

STATE_ASSOCIATED:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x06 A-RELEASE-RP

STATE_ASSOCIATING (SCU):

- 0x01 A-ASSOCIATE-RQ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP

STATE_RELEASING:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ

STATE_WAIT_FOR_ASSOCIATE (SCP):

- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

STATE_WAIT_FOR_FINISH:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP

STATE_WAIT_FOR_DISCONNECT:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ

STATE_TIMED_OUT:

- 0x01 A-ASSOCIATE-RQ
- 0x02 A-ASSOCIATE-AC
- 0x03 A-ASSOCIATE-RJ
- 0x04 P-DATA-TF
- 0x05 A-RELEASE-RQ
- 0x06 A-RELEASE-RP
- 0x07 A-ABORT

Table 26: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.

4.4.2.2.1 (Real-World) Activity – FIND as SCU

4.4.2.2.1.1 Description and Sequencing of Activities

HSDP Clinical Platform (CPF) sends associations to systems to query the remote database using the C-FIND command.

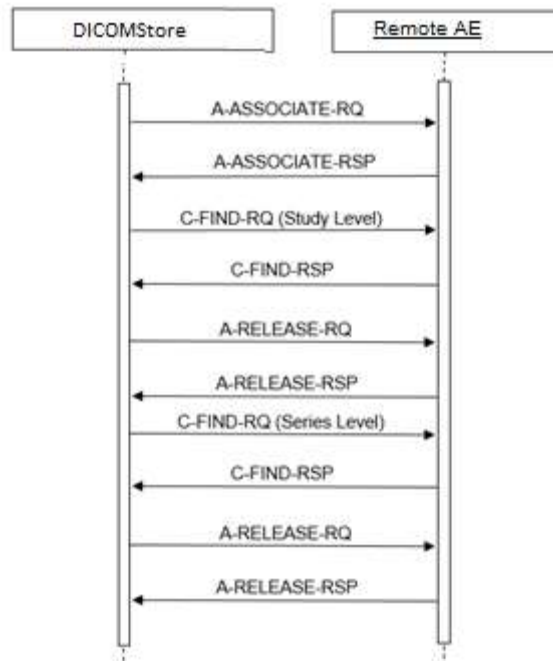


Figure 7: Data Flow Diagram – FIND as SCU

4.4.2.2.1.2 Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 107: Proposed Presentation Contexts for (Real-World) Activity – FIND As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.4.2.2.1.3 SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class

4.4.2.2.1.4 Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-SCU

DICOM Store supports the following Query keys. Image Level is not supported.

Table 118: Supported Query Keys for Study Root Information Model

Study Root Information Model				
Attribute Name	Tag	VR	Type Of Matching	Comment
Study Level Keys				
Query/Retrieve Level	0008,0052	CS	NA	
Study Date	0008,0020	DA	Universal	
Study Time	0008,0030	TM	Universal	
Accession Number	0008,0050	SH	Universal	
Modalities in Study	0008,0061	CS	Universal	
Referring Physician Name	0008,0090	PN	Universal	
Patient's Name	0010,0010	PN	Universal	
Patient ID	0010,0020	LO	Universal	
Study Instance UID	0020,000D	UI	UNIQUE	
Study ID	0020,0010	SH	Universal	
Series Level Keys				
Modality	0008,0060	CS	Universal	
Series Instance UID	0020,000E	UI	UNIQUE	
Series Number	0020,0011	IS	Universal	
Scheduled Procedure Step ID	0040,0009	SH	Universal	
Performed Procedure Step Start Date	0040,0244	DA	Universal	
Performed Procedure Step Start Time	0040,0245	TM	Universal	
Request Attributes Sequence	0040,0275	SQ	Universal	

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 29: Status Response

Service Status	Error Code	Further Meaning	Behavior*
Success	0000	Matching is complete – No final identifier is supplied	Status is logged

Service Status	Error Code	Further Meaning	Behavior*
Failure	A700	Refused – Out of resources	Status is logged
	C000	Failed – Unable to process	Status is logged
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	Status is logged
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	Status is logged

4.4.2.2.2 (Real-World) Activity – MOVE as SCU

4.4.2.2.2.1 Description and Sequencing of Activities

DICOM Store accepts associations from systems that wish to retrieve images using the C-MOVE command.

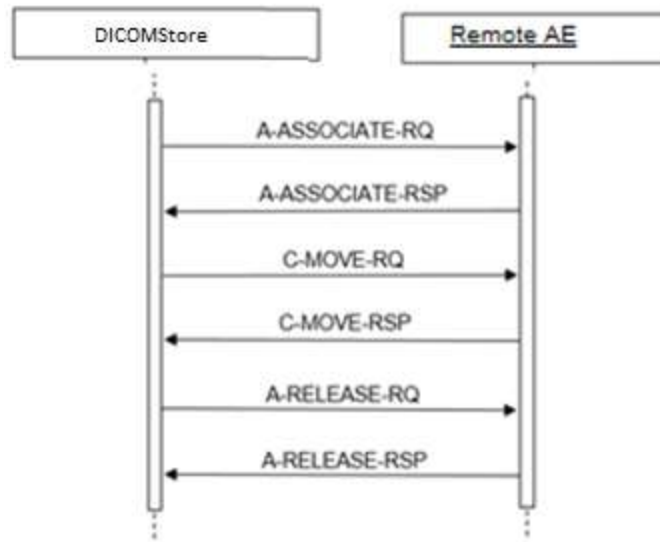


Figure 8: Data Flow Diagram – MOVE as SCU

4.4.2.2.2.2 Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 30: Proposed Presentation Contexts for (Real-World) Activity – MOVE As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2		

Table 121: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete – No failures	Status is logged
Failure	A701	Refused – Out of resources - Unable to calculate number of matches	Status is logged
	C000	Failed – Unable to process	Status is logged
Warning	B000	Sub-operations complete – One or more failures	Status is logged
Cancel	FE00	Sub-operations terminated due to Cancel indication	Status is logged
Pending	FF00	Sub-operations are continuing	Status is logged

4.4.2.3 (Real-World) Activity – Image Import

4.4.2.3.1 Description and Sequencing of Activities

The DICOM Store accepts associations from configured systems that wish to store images in the DICOM Store database using the C-STORE command.

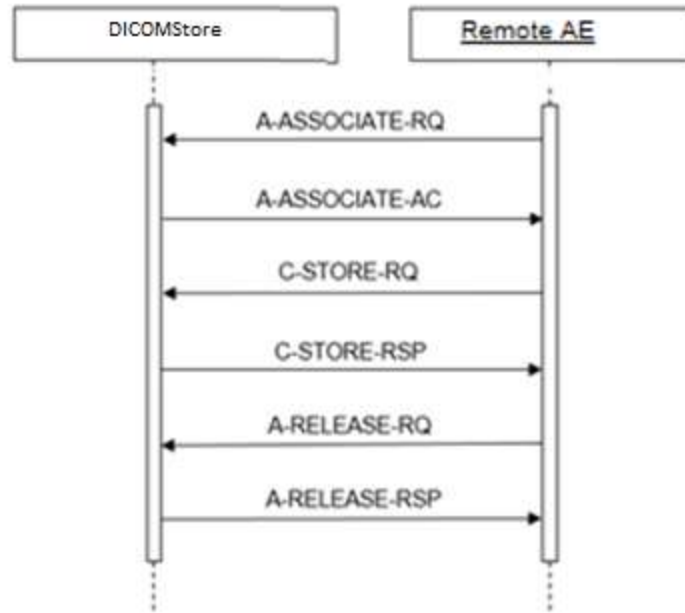


Figure 14: Data Flow Diagram – Store Image – Storage as SCP.

4.4.2.3.2 Accepted Presentation Contexts

The presentation contexts are defined in the next section.

4.4.2.3.2.1 Acceptable Presentation Contexts for (Real-World) Activity – Image Import

The DICOM Store accepts all presentation contexts in the intersection of supported Transfer Syntax and SOP Classes as described in Table 16 and Table 17. This means that multiple proposed presentation contexts with the same SOP class but different transfer syntaxes are accepted by the DICOM Store as far as those transfer syntaxes are part of the acceptable transfer syntaxes. There is no check for duplicate presentation contexts and these are therefore accepted.

4.4.2.3.3 SOP Specific Conformance for Storage SOP Classes

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

The DICOM Store will only accept associations from configured systems. The DICOM Store may provide level 2 (full) conformances, depending on the implemented database.

Remarks:

- Value Representation 'UN' (Unknown) is supported, and will be used for any attributes not known to DICOM Store and received per implicit transfer (ILE).

4.4.2.3.3.1 Dataset Specific Conformance for C-STORE-RSP

Detail regarding the Dataset Specific response behavior will be reported in this section.

This includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 32: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful command	Successful completion of the store request.
Failure	A700	Refused: out of resources	Not enough resources available to do a store.
	C000	Error: cannot understand	Any other exception generated during the store.

4.5 Network Interfaces

4.5.1 Physical Network Interfaces

DICOM Store support the physical medium as provided by the HSDP Hosting infrastructure

4.5.2 Additional Protocols

4.5.2.1.1 Basic TLS Secure Transport Connection Profile

HSDP infrastructure on the cloud manages this for all hosted services

4.5.2.1.2 Basic Time Synchronization Profile

Time Synchronization is managed by HSDP Hosting infrastructure

4.5.2.1.3 Basic Application Level Confidentiality Profile

Not supported

4.5.2.1.4 IPv4 and IPv6 Support

IPv4 and IPv6 Support managed by HSDP Hosting infrastructure

4.5.3 Configuration

Not Applicable.

5. Media Interchange

Not Supported

6. Support of Character Sets

Any support for character sets in Network and Media services is described here.

Table 33: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Default repertoire	ISO-IR 6				
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 100	G1	Supplementary set of ISO 8859
		-	ISO-IR 6	G0	ISO 646
Latin alphabet No. 2	ISO_IR 101	-	ISO-IR 101	G1	Supplementary set of ISO 8859
		-	ISO-IR 6	G0	ISO 646
Latin alphabet No. 3	ISO_IR 109	-	ISO-IR 109	G1	Supplementary set of ISO 8859
		-	ISO-IR 6	G0	ISO 646
Latin alphabet No. 4	ISO_IR 110	-	ISO-IR 110	G1	Supplementary set of ISO 8859
		-	ISO-IR 6	G0	ISO 646
Cyrillic	ISO_IR 144	-	ISO-IR 144	G1	Supplementary set of ISO 8859
		-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 6	G0	ISO 646
Latin alphabet No. 5	ISO_IR 148	-	ISO-IR 148	G1	Supplementary set of ISO 8859
		-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 14	G0	JIS X 0201: Romaji
Thai	ISO_IR 166	-	ISO-IR 166	G1	TIS 620-2533 (1990)
		-	ISO-IR 6	G0	ISO 646
Korean	ISO 2022 IR 149	ESC 02/04 02/09 04/03	ISO-IR 149	G1	KS X 1001: Hangul and Hanja
Japanese	ISO 2022 IR 87	ESC 02/04 04/02	ISO-IR 87	G0	JIS X 0208: Kanji
UTF - 8	ISO IR 192				

7. Security

7.1 Security Profiles

7.1.1 Security use Profiles

The DICOM Store APIs and underlying platform service components support:

DICOM Store APIs requests are only allowed from secure HTTPS channels. HTTP requests from clients are rejected.

7.1.2 Security Transport Connection Profiles

The DICOM Store APIs are protected using the OAuth2 access mechanism, and OAuth2 access tokens are required for invoking any DICOM Store API. DICOM Store uses IAM as provided on HSDP Cloud Foundry to authenticate & authorize the users accessing the Dicom Services.

The DICOM Store APIs are only allowed over secure HTTPS channels.

Data access security is achieved by using S3 Credentials service as provided by HSDP Cloud Foundry.

7.1.3 Digital Signature Profiles

Not supported by Dicom Store.

7.1.4 Media Storage Security Profiles

Not supported by Dicom Store

7.1.5 Attribute Confidentiality Profiles

Not supported by DICOM Store, DICOM Store stores and retrieves the Dicom content as is.

7.1.6 Network Address Management Profiles

Network Address is managed by the Cloud Foundry or IaaS on which DICOM Store is hosted.

7.1.7 Time Synchronization Profiles

Time Synchronization is managed by HSDP Hosting infrastructure

7.1.8 Application Configuration Management Profiles

Dicom Configuration API's are provided to configure Dicom Services. POST and GET methods are allowed to update and retrieve the Configuration resources.

7.1.9 Audit Trail Profiles

The following Audit events are generated:

Table 34: Audit events

Audit Event	Trigger	Comments
Patient Record	When Patient data is accessed	-
DICOM Instance Accessed	When DICOM objects are accessed i.e. WADO	-
Query	When DICOM data is queried on the DICOM Store i.e. QIDO	-
Data Import	When data is imported to the DICOM Store	-

Audit Event	Trigger	Comments
Delete	When DICOM data is deleted on DICOM Store	-
Security Alert	When there is an attempt for unauthorized access	-

7.2 Association Level Security

Not supported.

7.3 Application Level Security

7.3.1 Authorization

The DICOM Store integrates Authorize – IAM capabilities to provide Organization-Based Access Control (OBAC), in which access to the DICOM Study is protected by a set of access control permissions that allow access based on the role of the logged-in user. Further, the user is also required to have access to the necessary resources such as Patient, Imaging Study in the Clinical Data Repository.

7.3.2 Authentication

The DICOM Store APIs are protected using the OAuth2 access mechanism, and OAuth2 access tokens are required for invoking any DICOM Store API. The authentication flow is as given below:

- The application must first authenticate using the supported grant types through the IAM's OAuth2 API.
- The application must extract the access token from the OAuth2 token response and invoke the DICOM Store API with the access token in the Authorization header as "Authorization: Bearer <access token>"
- The supplied access token is validated for each DICOM Store API using IAM's Introspect API.
- If the access token is expired, the API call is rejected with HTTP Status code 401 Unauthorized. The application may choose to refresh the token through the OAuth2 flow and resubmit the request.

