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Synapse Mobility V7.1

DICOM Conformance Statement

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1. Overview

This DICOM conformance statement specifies the behavior and functionality of the Synapse Mobility application. Synapse Mobility is a computer software product used for the anytime and anywhere validated display and analysis of medical images. It is a server-based application that is accessed from zero-footprint browser based web clients (accessible using Desktop computers or iOS and Android mobile devices) or a mobile smartphone client running on iOS devices. The application conforms to aspects of the DICOM 3.0 standard to allow interoperability with other DICOM 3.0 compliant systems. Synapse Mobility takes advantage of several network services defined in PS3.7 of the DICOM standards for the purpose of loading and rendering the images. Images are not permanently stored within Synapse Mobility. Synapse Mobility can be integrated with other DICOM-compliant PACS (Picture Archiving and Communication System) in order to enable users to display DICOM medical images and is able to save modified versions of those images back to a PACS.

Starting with release 7.0.0, it is now possible to use a subset of RESTful web services, QIDO-RS and WADO-RS protocols, as specified in the DICOM PS3.18 2018a - Web Services standard. Refer to section 8 Conformance Statement QIDO-RS and WADO-RS Service for more details.

Table 1
SOP Classes Overview

SOP Classes	User of Service (SCU)	Provider of Service (SCP)	Display
Transfer			
Basic Text SR	Yes	Yes	Yes
Computed Radiology Image Storage	No	Yes	Yes
CT Image Storage	No	Yes	Yes
Digital Mammography X-Ray Image Storage – for Presentation	No	Yes	Yes
Digital Mammography X-Ray Image Storage – for Processing	No	Yes	Yes
Digital X-Ray Image Storage - for Presentation	No	Yes	Yes
Digital X-Ray Image Storage - for Processing	No	Yes	Yes
Encapsulated PDF Storage	No	Yes	Yes
Enhanced CT Image Storage	No	Yes	Yes
Enhanced MR Image Storage	No	Yes	Yes

Grayscale Softcopy Presentation State (GSPS) Storage	No	Yes	Yes
Color Softcopy Presentation State (CSPS) Storage	No	**Yes**	**Yes**
MR Image Storage	No	Yes	Yes
Nuclear Medicine Image Storage	No	Yes	Yes
Positron Emission Tomography Image Storage	No	Yes	Yes
Secondary Capture Image Storage	Yes	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	No	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	No	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	No	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	No	Yes	Yes
Ultrasound Image Storage	No	Yes	Yes
Ultrasound Multi-Frame Image Storage	No	Yes	Yes
X-Ray Angiographic Image Storage	No	Yes	Yes
X-Ray Radio Fluoroscopic Image Storage	No	Yes	Yes
VL Endoscopic Image Storage	No	Yes	Yes
VL Photographic Image Storage	No	Yes	Yes
Ophthalmic Photographic 8 Bit Image Storage	No	Yes	Yes
Ophthalmic Photographic 16 Bit Image Storage	No	Yes	Yes
Digital Intra-Oral X-Ray Image Storage - For Presentation	No	Yes	Yes
Digital Intra-Oral X-Ray Image Storage - For Processing	No	Yes	Yes
Ophthalmic Tomography Image	No	Yes	Yes
Key Object Selection	No	Yes	Yes
Radiation Therapy Image Storage	No	Yes	Yes

Query / Retrieve			
Patient Root Query / Retrieve IM - Find	Yes	No	
Patient Root Query / Retrieve IM - Move	Yes	No	
Study Root Query / Retrieve IM - Find	Yes	No	
Study Root Query / Retrieve IM - Move	Yes	No	
Composite Instance Root Retrieve - GET	Yes	No	
Composite Instance Retrieve Without Bulk Data - GET	Yes	No	
MITRA Report	Yes	No	Yes

2. Table of Contents

3. Introduction

Synapse Mobility provides interactive, high-quality visualization and display of DICOM medical images. It reads and displays 2D images and transforms them into reconstructed 2D or 3D volumes to display a high-definition, interactive view of medical data. It includes a medical image viewer application and may include an optional specialized Vessel Analysis application module. Synapse Mobility supports several image formats, specifically DICOM version 3.0 image files. Synapse Mobility reads and displays DICOM images of all major modalities and image SOP classes and can request that modified versions of DICOM objects be stored in an external PACS using the DICOM Storage Service Class.

Synapse Mobility is primarily intended as an image display and viewing solution. The Synapse Mobility server is able to act as an SCU for the purposes of saving modified image series or secondary captures back to a DICOM image storage system. It is recommended that users leverage their existing PACS system or third party systems such as DCM4Chee to act as a C-Store provider or to provide DICOM Query/Retrieve functionality in conjunction with Synapse Mobility.

3.1 Revision History

Revision	Document Date	Reason for Change
A	August 2019	Initial document release

3.2 Audience

This conformance statement is intended to evaluate interoperability between Synapse Mobility and other DICOM applications.

This document is written for the people that need to understand how Synapse Mobility will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. Integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.2 Remarks

This DICOM Conformance Statement documents the conformance of Synapse Mobility software with the Digital Imaging and Communications in Medicine (DICOM) standard. This document is essential in order to evaluate whether or not another DICOM compliant device can communicate with this software product. This statement is conformant with the recommended format as described in PS 3.2 of the DICOM standard.

The Conformance Statement should be read and understood in conjunction with the DICOM Standard. 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 is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.

- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.3 Definitions, Terms and Abbreviations

Abbreviations and terms are as follows:

AE DICOM Application Entity
CSPS Color Softcopy Presentation State
GSPS Grayscale Softcopy Presentation State
O Optional Key Attribute
R Required Key Attribute
SCU DICOM Service Class User (DICOM client)
SCP DICOM Service Class Provider (DICOM server)
SOP DICOM Service-Object Pair
U Unique Key Attribute
VL Visible Light
WADO-RS DICOM RESTful retrieval

QIDO-RS DICOM RESTful retrieval

4. Networking

4.1 Implementation Model

### 4.1.1 Application Data Flow Diagram

Synapse Mobility implements an Application Entity (AE) which acts either as a Storage Service Class User (SCU), a C-FIND / C-MOVE Service Class User (SCU) or a C-STORE Service Class Provider (SCP). This AE sends queries (C-FIND) initiated from Synapse Mobility users to specific or all DICOM servers (Remote AE) identified within Synapse Mobility configuration. The query results are returned to Synapse Mobility from the Remote and displayed to the requesting user.

When a user requests images for retrieval (C-MOVE), Synapse Mobility sends a move request to a specific AE or all Configured Remote AEs. Synapse Mobility then acts as the SCP to receive the requested images (C-STORE) into Synapse Mobility server memory and displays to the users 2D, 3D or MIP/ MPR representations of the images. No DICOM data is transferred to the end user device accessing the Synapse Mobility server application and image data is never stored persistently on the user device or on the Synapse Mobility server.

Synapse Mobility also provides a Storage SCU capability when Synapse Mobility manipulated images and reports are saved back to a PACS system.

The application data flow for Synapse Mobility can be seen in Figure 1.

Figure 1: *Synapse Mobility Data Flow for DICOM QR*

Synapse Mobility **DICOM** **Remote AE**

Mutual SSL
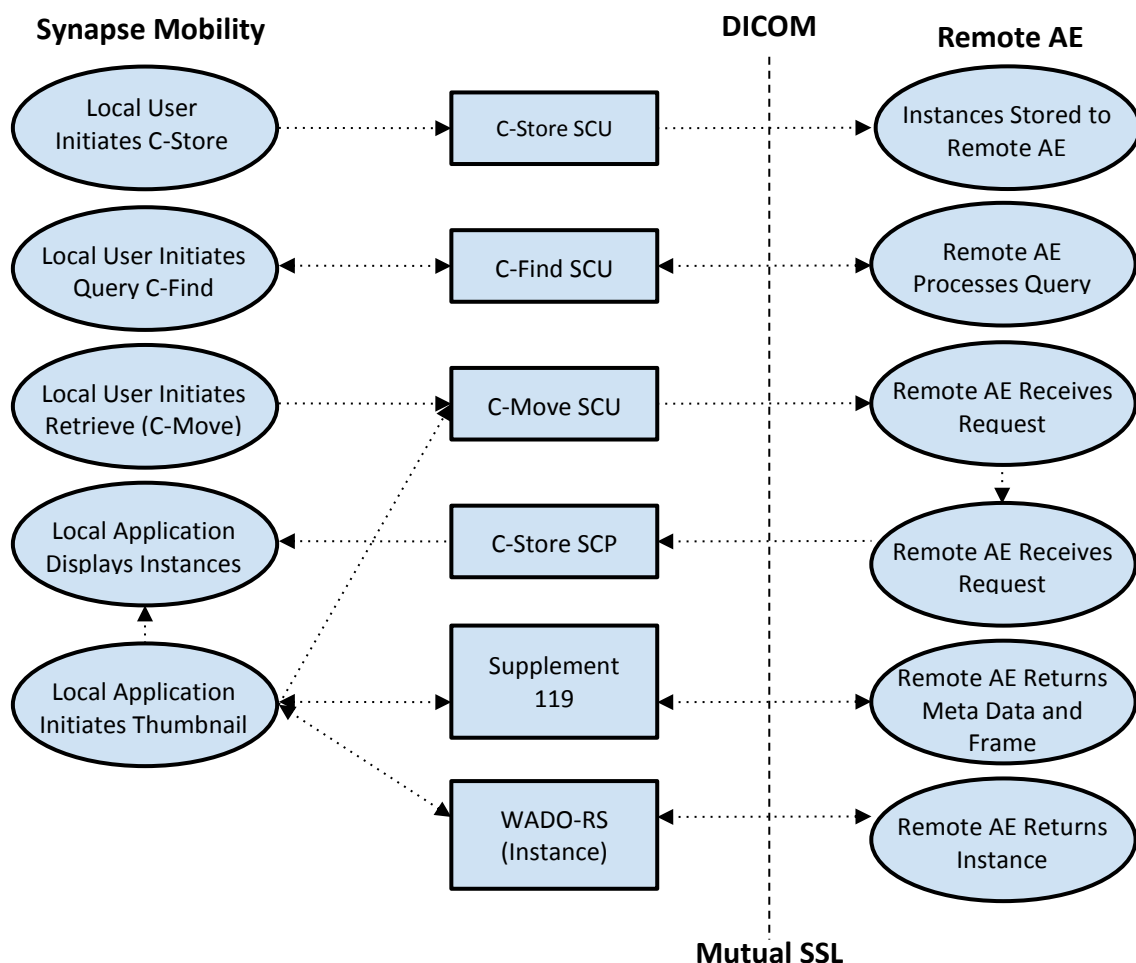
NOTE: Refer to Figure 2 in Section 8 for full DICOMweb Application Workflow.

4.1.2 Function Definition of Application Entities

4.1.2.1 Network Related Functions
1) Synapse Mobility supports storage of received SOP instances from remote SCU AE.
2) Synapse Mobility storage SCU transmits the stored instances to a remote AE triggered following a user initiated storage request to a pre-programmed remote AE.
3) Synapse Mobility acts as an SCU for the C-Find and C-Move.
4) Synapse Mobility acts as an SCP for the C-Store service.
5) Synapse Mobility support Supplement 119 for frame level thumbnail retrieval
6) Synapse Mobility support WADO-RS instance retrieval of thumbnails over SSL

4.1.3 Sequencing of Real World Activities
As shown in Figure 1, the local user must initiate the retrieve C-Move before the C-Store.

4.2 AE Specification

4.2.1 Application Entity Specifications
This section outlines the specifications for each of the Application Entities that are relevant to Synapse Mobility.

4.2.1.1 Storage SOP Classes
Synapse Mobility Application Entity provides Standard Conformance to the following Storage SOP Classes:

Table 2
Storage SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes
Computed Radiology Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Digital X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital X-Ray Image Storage - for Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Color Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.2	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes

Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	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
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
Video Endoscopic Image Storage*****	1.2.840.10008.5.1.4.1.1.77.1.1.1	No	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
Video Photographic Image Storage*****	1.2.840.10008.5.1.4.1.1.77.1.4.1	No	Yes
Ophthalmic Photographic 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	Yes
Ophthalmic Photographic 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	No	Yes
Ophthalmic Tomography Image	1.2.840.10008.5.1.4.1.1.77.1.5.4	No	Yes
Digital Intra-Oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes
Digital Intra-Oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	No	Yes

| Key Object Selection | 1.2.840.10008.5.1.4.1.1.88.59 | No | Yes |
| Radiation Therapy Image Storage | 1.2.840.10008.5.1.4.1.1.481.1 | No | Yes |

NOTE: *For MPEG-4 videos, only files using an H.264 video encoding are fully supported. If the video uses a different encoding, we cannot guarantee that the web browser being used by the user supports those codecs, and the user may be unable to load and view the video.

4.2.1.2 Query/Retrieve SOP Classes
Synapse Mobility Application Entity provides Standard Conformance to the following Query/Retrieve SOP Classes:

Table 3
Query/Retrieve SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Patient Root Query / Retrieve IM – Find	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root Query / Retrieve IM - Move	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root Query / Retrieve IM – Find	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query / Retrieve IM – Move	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Composite Instance Root Retrieve - GET	1.2.840.10008.5.1.4.1.2.4.3	Yes	No
Composite Instance Retrieve Without Bulk Data - GET	1.2.840.10008.5.1.4.1.2.5.3	Yes	No
MITRA Report	1.2.840.113532.3500.8	Yes	No

4.2.1.3 Query Parameters
Synapse Mobility uses DICOM QR to gather patient demographics and object UIDs. Synapse Mobility was designed to work with older PACS that may not support Instance Level operations. These PACS must at least support the notion of Number Of Series Related Instances at the Series Level in order for Synapse Mobility to determine if all instances of a series have been received or it must be able to return a list of SOP Instance UIDs from a Series Level Request.   Query parameters are configurable per repository and level.

Synapse Mobility uses study level attributes to determine accessibility to images based on the logged in user, this is known as mandated access.

Synapse Mobility has the ability to find all studies related to a given patient based on configurable study level metadata attributes.

Query Keys are configurable but by default Synapse Mobility will conform as follows:

Table 4
Patient Level Parameters

Patient Level Parameters		
Key	Wild Cards	Input/Output
Specific Character Set	No	Input
Patient Name	Yes	Input/Output
Patient ID	Yes	Input/Output
Issuer Of Patient ID	No	Output
Number of Patient related Studies	No	Output
Number of Patient Related Series	No	Output
Number of Patient Related Instances	No	Output
Patient Sex	No	Output
Patient Date Of Birth	Range [-]	Input/Output

Table 5
Study *Level Parameters*

Study Level Parameters		
Key	Wild Cards	Input/Output
Specific Character Set	No	Input
Study Instance UID	No	Input / Output
Study ID	No	Output
Study Date	Range [-]	Input / Output
Study Time	No	Output
Accession Number	Yes	Input / Output
Modalities In Study	No	Output

Referring Physicians Name	No	Output
Study Description	No	Output
Reading Physicians Name	No	Output
Patient Name	Yes	Input / Output
Patient ID	No	Input / Output
Issuer of Patient ID	No	Input / Output
Patient Birth Date	No	Input / Output
Patient Sex	No	Input / Output
Institution Name	No	Output
Number Of Study Related Series	No	Output
Number Of Study Related Instances	No	Output

Table 6
Series *Level Parameters*

Series Level Parameters		
Key	**Wild Cards**	**Input / Output**
Specified Character Set	No	Input
Study Instance UID	No	Input
Study Date	Range [-]	Input / Output
Study Time	No	Output
Series Date	No	Output
Series Time	No	Output
Modality	Yes	Input / Output
Series Description	No	Output
Series Instance UID	No	Input

Series Number	No	Output
SOP Instance UID	No	Output
Number Of Series Related Instances	No	Expected

Table 7
Instance Level Parameters

Instance Level Parameters		
Key	**Wild Cards**	**Input / Output**
Study Instance UID	No	Input
Series Instance UID	No	Input
SOP Instance UID	No	Input / Output
SOP Class UID	No	Output
Instance Number	No	Input / Output

Care should be taken when using instance level operation to ensure that they are fully supported and cached by the connected PACS/VNA.

4.2.1.4 Transfer Syntaxes
Synapse Mobility supports the following transfer syntaxes in the listed order for each SOP class:

Synapse Mobility's 'preferred' transfer syntax is JPEG Lossless Non-Hierarchical 1st Order Prediction

Table 8
Transfer Syntaxes for DICOM SOP classes unrelated to DICOM video

Full Syntax List	
JPEG Lossless Non-Hierarchical 1st Order Prediction	1.2.840.10008.1.2.4.70
JPEG Lossless Non-Hierarchical (14)	1.2.840.10008.1.2.4.57
JPEG-LS Lossless	1.2.840.10008.1.2.4.80
JPEG-LS Lossy (near lossless)	1.2.840.10008.1.2.4.81
JPEG 2000 Lossless Only	1.2.840.10008.1.2.4.90

JPEG 2000	1.2.840.10008.1.2.4.91
JPEG Baseline	1.2.840.10008.1.2.4.50
JPEG Extended (2 & 4)	1.2.840.10008.1.2.4.51
Deflated Explicit VR Little Endian	1.2.840.10008.1.2.1.99
Explicit VR Big Endian	1.2.840.10008.1.2.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Implicit VR Little Endian	1.2.840.10008.1.2

Table 9
Transfer Syntaxes for DICOM video SOP classes

Full Syntax List	
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

NOTE: *DICOM video files transferred using transfer syntax 1.2.840.10008.1.2.4.103 are only fully supported on the iOS native app.

4.2.2 Association Establishment Policies

Association acceptance and establishment policies are described below for Synapse Mobility.

4.2.2.1 General

4.2.2.2 Number of Associations

There is no upper limit on the number of simultaneous associations Synapse Mobility can make. Synapse Mobility services many users and each request can create one or more associations. The number of simultaneous active associations is limited only by the specifications of the machine running Synapse Mobility and by the limits of performance on the network to which it is attached. Synapse Mobility can be configured to re-use associations. Reusing associations is an optimization to minimize the number of simultaneous operations and minimize the number of association requests generated by the server to the PACS.

4.2.2.3 Asynchronous Nature

The Query / Retrieve function does support multiple outstanding transactions to the defined AE. Only one outstanding synchronous operation is permitted over each association, of which many can exist both as SCU or as SCP.

4.2.2.4 Implementation Identifying Information

Currently, the Synapse Mobility DICOM uses both the OFFIS DCMTK and dcm4che 2.0.29. as a baseline toolkits to support DICOM functionality. We are also using parts of dcm4che versions 3.3.8 and 5.14.1. The following are the versions and classes of these libraries and utilities.

Table 10
DICOM Implementation Class and Version for Synapse Mobility

Implementation Class UID	1.2.40.0.13.1.1
Implementation Version Name	dcm4che-2.0
Implementation Class UID	1.2.276.0.7230010.3.0.3.6.1
Implementation Version Name	OFFIS_DCMTK_361

4.2.3 Association Acceptance Policy

This real world activity is used when Synapse Mobility wishes to verify connectivity between the Synapse Mobility Application Entity and a remote Application Entity. Synapse Mobility's Store SCP is promiscuous and does not reject associations from unknown AETs or IPs. Synapse Mobility will accept storage requests, but if the stored SOP instance is not one that was solicited by Synapse Mobility then the instance is discarded and a warning is issued in the logs.

4.3 Network Interfaces

Synapse Mobility operates over the TCP/IP protocol stack of the OS on the server on which it is hosted. Synapse Mobility is indifferent to the physical medium over which it operates.

4.4 Configuration

Synapse Mobility Application Entities can be configured for Presentation Addresses and Application Entity Titles within the application. This and all other configuration is accessed via the Synapse Mobility configuration capabilities that are outlined in the Synapse Mobility installation and administration guides.

4.4.1 AE title/Presentation Address Mapping

Synapse Mobility Application Entities can be configured for Presentation Addresses and Application Entity Titles within the application.

5. Media Interchange

None are supported.

6. Support of Character Sets

Synapse Mobility has been released in German, English, Spanish, French, Italian, Japanese, Korean, Portuguese, Russian, Turkish, Simplified Chinese, Traditional Chinese. Configuration of character sets for DICOM QR and metadata display is supported through the use of the Specific Character Set attribute (0008,0005) and the configurator of the application.

Table 11
Supported Specific Character Set attribute values

Character Set Description	Specific Character Set (0008, 0005)
Default repertoire	EMPTY (ASCII)
Latin-1	ISO_IR 100
Latin-2	ISO_IR 101
Latin-3	ISO_IR 109
Latin-4	ISO_IR 110
Cyrillic	ISO_IR 144
Latin-5	ISO_IR 148
Thai	ISO_IR 166
UTF-8	ISO_IR 192
Japanese	ISO_IR 13
Latin-1	ISO 2022 IR 100
Latin-2	ISO 2022 IR 101
Latin-3	ISO 2022 IR 109
Latin-4	ISO 2022 IR 110
Greek	ISO 2022 IR 126
Arabic	ISO 2022 IR 127
Hebrew	ISO 2022 IR 138
Cyrillic	ISO 2022 IR 144
Latin-5	ISO 2022 IR 148
Korean	ISO 2022 IR 149

Japanese	ISO 2022 IR 159
Thai	ISO 2022 IR 166
Default repertoire	ISO 2022 IR 6
Japanese	ISO 2022 IR 13
Japanese	ISO 2022 IR 87
Japanese	ISO 2022 IR 13 \ ISO 2022IR 87
Japanese	ISO 2022 IR 13 \ ISO 2022 IR 6 \ ISO 2022IR 87
Japanese	ISO 2022 IR 100 \ ISO 2022 IR 6 \ ISO 2022 IR 13 \ ISO 2022IR 87
GB18030	GB18030

7. Security

Synapse Mobility supports SSL connections directly between web or mobile clients and the Synapse Mobility application on a centralized server. Organizations should ensure that these as well as other security precautions such as firewalls or virtual private networks are in place to ensure security and privacy of image information. Synapse Mobility should be operated in an environment with strong focus and attention to security and it is the responsibility of the deploying organization to ensure their IT network is secure.

8. Conformance Statement QIDO-RS and WADO-RS Service

8.1 Conformance Statement QIDO-RS and WADO-RS service

Synapse Mobility uses QIDO-RS for the retrieval of DICOM metadata for display in the user interface and supports the following queries:

- PatientID
- Patient Name
- Accession Number
- Study Date
- Referring Physician Name
- Modality
- Patient Birth Date (optional, DICOMweb standard does not require support for searching by this tag)
- Study Description (optional, DICOMweb standard does not require support for searching by this tag)

Synapse Mobility uses WADO-RS for retrieval of DICOM objects for display in the user interface and supports the following queries:

- DICOM instance loading for display
- Images, Videos, Reports, Series Thumbnails, etc.
- DICOM frame level retrieval
- Multiframe Instance Thumbnails

Table 12
WADO-RS for DICOMweb

Options	Restrictions
Data Types Supported	Restricted to application/dicom or jpeg
Transfer Syntaxes Supported (Transfer-syntax Accept parameter)	Implicit VR Little Endian (IVRLE)
SOP Class Restrictions	Refer to Table 2 (Storage SOP Classes)
Size Restrictions	None

For a detailed list of supported SOP classes refer to Table 2.

Table 13 provides an overview of the network services supported by Synapse Mobility.

Table 13
Network Services

Network Service	SCU	SCP
QIDO-RS	Yes	No
WADO-RS	Yes	No

Synapse Mobility is a service class user of both QIDO-RS and WADO-RS restful calls.
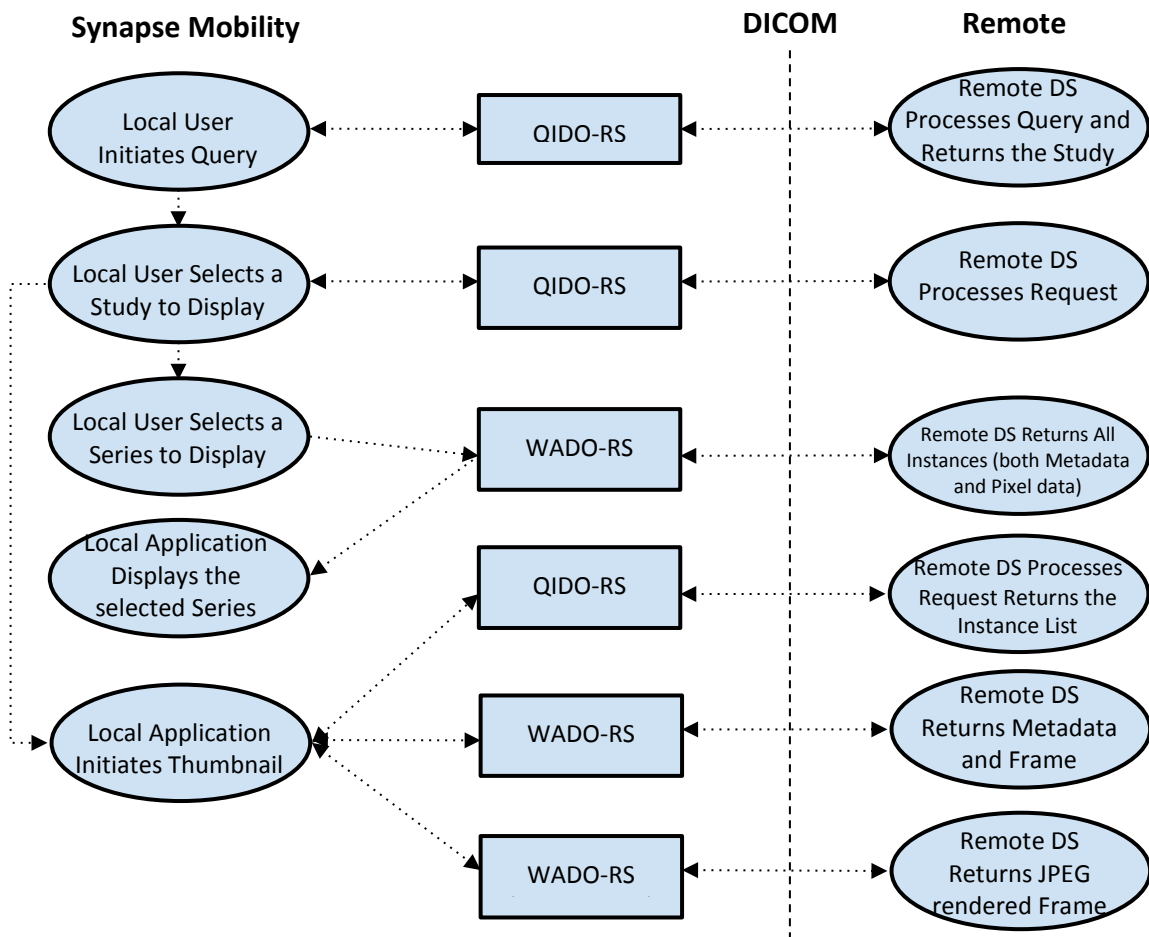
8.1.1 Implementation Model

Synapse Mobility also supports DICOMweb calls, QIDO-RS and WADO-RS for querying and retrieving DICOM datasets from a Datastore capable of responding to QIDO-RS and WADO-RS calls. It requests a DICOM instance using the application/dicom+json (QIDO-RS), application/dicom (WADO-RS), and the rendered jpeg image (WADO-RS Frame Level), all with transfer syntax implicit VR little endian.

8.1.1.1 Application Data Flow

When a user initiates a query Synapse Mobility performs a Study Level QIDO-RS call to all of the integrated datastores to retrieve a list of studies that meet the user-specified query. From the retrieved list, the user can select a desired study for display. When the user selects a specific study, Synapse Mobility performs a series of calls depending on the type of data being requested. First, Synapse Mobility performs a Series Level QIDO-RS call to retrieve the series list for the selected study. Next, Synapse Mobility will perform calls to retrieve the thumbnail information for all the series in the selected study. Synapse Mobility will perform an Instance Level QIDO-RS to find the middle instance of each series, and then a WADO-RS query is performed. If the data being retrieved is a multiframe dataset then Synapse Mobility will perform a Frame Level WADO-RS call, otherwise Synapse Mobility will perform an Instance Level WADO-RS call to fetch the appropriate thumbnail object for each series in the selected study.

The application data flow for Synapse Mobility can be seen in Figure 2.

Figure 2: *Synapse Mobility Data Flow for DICOMweb*

NOTE: Refer to Figure 1 in Section 4 for full DICOM QR Application Workflow.

8.2 WADO-RS Thumbnails with DICOM QR

8.2.1 Implementation Model

Synapse Mobility also supports WADO-RS for retrieving thumbnails for DICOM QR when Standard or Enhanced Repository Type is configured to use it. It requests a DICOM instance using the application/dicom media type, implicit VR little endian.

8.2.1.1 Application Data Flow

The WADO service application generates WADO-RS requests. These requests are over mutual SSL WADO-RS interface. It is associated with the local real-world activity "Retrieve Thumbnails". Standard DICOM QR is used to obtain the necessary UIDs within the request.
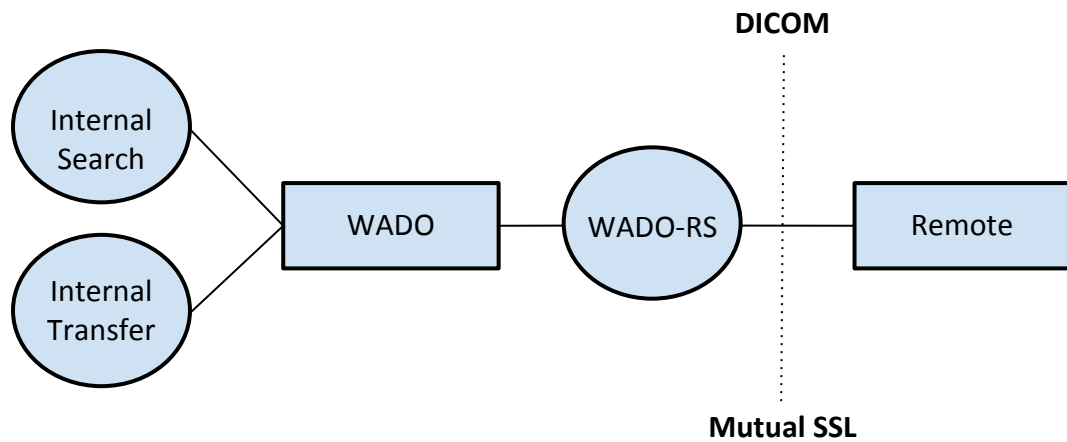
Figure 3: *WADO Application Data Flow*

Table 14
WADO-RS for DICOM QR

Options	Restrictions
Data Types Supported	Restricted to application/dicom or jpeg.
Transfer Syntaxes Supported (Transfer-syntax Accept parameter)	Implicit VR Little Endian (IVRLE)
SOP Class Restrictions	Refer to Table 2 (Storage SOP Classes)
Size Restrictions	None

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