DICOM Conformance Statement

Vitrea View 7.7

September 15, 2020
Document ID: VLC-10683 A

Vital Images, Inc.
5850 Opus Parkway, Suite 300
Minnetonka, MN, 55343
USA

support@vitalimages.com

Prepared By: Vital Images

www.vitalimages.com

Table of Contents

1. Document History

Release	Date	Author	Changes
7.6	June 23, 2020	Jarrod Robran	Initial Version
7.7	September 15, 2020	Jarrod Robran	Added support for Endoscopy

2. Conformance Statement Overview

Vitrea® View implements the necessary DICOM services to query, retrieve and display CR, CT, DX, MG, MR, PT, RF, SC, US, ES, and XA images.

The DICOM Networking Services supported by Vitrea View are listed in Table 1.

SOP Class	SOP Class UID
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.51.4.1.1.1.1
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Intra-Oral X-Ray Image Storage – For Processing	1.2.840.10008.51.4.1.1.1.3.1
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130
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

SOP Class	SOP Class UID
Enhanced Ultrasound Volume Storage	1.2.840.10008.5.1.4.1.1.6.2
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
Ophthalmic Photography 8-Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3
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
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radio fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1

SOP Class	SOP Class UID
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1

Table 1: Viewable SOP Classes

Network Service	User of Service (User Agent)	Provider of Service (Origin Server)
WADO-RS		
Retrieve Study	Yes	No
Retrieve Study Metadata	Yes	No
Retrieve Frames	Yes	No
Retrieve Bulk Data	Yes	No
QIDO-RS		
Search for Studies	Yes	No
STOW-RS		
Store Instances	Yes	No

Table 2: DICOMWeb Services

3. Introduction

3.1 Audience

This document is written for the people that need to understand how Vitrea View 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. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, 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

The scope of this DICOM Conformance Statement is to facilitate integration between Vitrea View and other DICOM products. 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.

Vitrea View products participate in an industry-wide testing program sponsored by Integrating the Healthcare Enterprise (IHE). The IHE Integration Statement for Vitrea View, together with the IHE Technical Framework, may facilitate the process of validation testing.

3.3 Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard. A list of abbreviations and terms can be seen in Table 3.

Term	Description
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.
AE	DICOM Application Entity. An end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.
AET	Application Entity Title. The externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.
Application Context	The specification of the type of communication used between Application Entities. Example: DICOM network protocol.
Association	A network communication channel set up between Application Entities.
BSPS	Blending Softcopy Presentation State.
CAD	Computer Aided Diagnostics.
CD-R	CD Recordable.
CR	Computed Radiography.
CT	Computed Tomography.
DICOM	Digital Imaging and Communications in Medicine. DICOM is a global Information-Technology standard used in all hospitals worldwide.
DIMSE	DICOM Message Service Element
DX	Digital X-Ray
FSC	File Set Creator
FSU	File Set Updater
FSR	File Set Reader
GSDF	Grayscale Standard Display Function
GSPS	Grayscale Presentation State
HIS	Hospital Information System
HL7	Health Level 7. A set of international standards for transfer of clinical and administrative data between software applications used by various healthcare providers.
IHE	Integrating the Healthcare Enterprise. IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical need in support of optimal patient care.

Term	Description
IOD	Information Object Definition. The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
JPEG	Joint Photographic Experts Group. A set of standardized image compression techniques, available for use by DICOM applications.
Media Application Profile	The specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs).
MG	Mammography
Module	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.
MSPS	Modality Scheduled Procedure Step
MR	Magnetic Resonance
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.
NM	Nuclear Medicine
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit. A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
Presentation Context	The set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.
PT or PET	Positron Emission Tomography
QIDO	Query by ID for DICOM Objects
RF	X-Ray Radiofluoroscopic
RS	RESTful Services
SC	Secondary Capture
SCP	DICOM Service Class Provider (DICOM Server). 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).
SCU	DICOM Service Class User (DICOM Client). 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).
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.
SOP	DICOM Service-Object Pair Class. The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Term	Description
SPS	Schedule Procedure Step
SR	Structured Report
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].
TCP/IP	Transmission Control Protocol / Internet Protocol
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.
UID	Unique Identifier. 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.
US	Ultrasound
VA	Vitrea Advanced (Including Vitrea Workstation)
VIMS	Vital Image Management System
VL	Visible Light
VR	Value Representation. 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.
WADO	Web Access to DICOM Objects
XA	X-Ray Angiographic

Table 3: Abbreviations and Terms.

3.4 References

Reference ID	Description
NEMA PS3	DICOM Standard, available free at http://medical.nema.org/
Karos 2020.03.26	Vitrea Connection 8.0 DICOM Conformance
IHE	IHE, further information available at http://www.ihe.net/
VLC-09634	Vitrea Data Stream 2.1 DICOM Conformance
All Vital conformance documents available at: http://www.vitalimages.com/customer-success-support-program/compliance-documents	

3.5 Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in italics below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two Application Entities (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network "handshake". One of the two devices must initiate an Association (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (Negotiation).

DICOM specifies several network services and types of information objects, each of which is called an Abstract Syntax for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted Transfer Syntaxes. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called Presentation Contexts. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on Roles – which one is the Service Class User (SCU - client) and which is the Service Class Provider (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (PDU) size, security information, and network service options (called Extended Negotiation information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate Information Object Definition, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a Response Status indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a CD-R). Since there is no Association Negotiation possible, they both use a Media Application Profile that specifies "pre-negotiated" exchange media format, Abstract Syntax, and Transfer Syntax.

4. Networking

4.1 Implementation Model

The implementation consists of a set of applications which provide a user interface, internal database and network listeners that spawn additional threads or processes as necessary to handle incoming connections.

Conceptually the network services may be modeled as the following separate AEs, though in fact some AEs share (configurable) AE Titles:

- FIND-SCU, which queries remote entities for lists of studies, series and instances
- QIDO-RS User Agent, which queries remote entities for lists of studies, series and instances
- STOW-RS User Agent, which uploads DICOM studies to remote entities
- MOVE-SCU, which retrieves studies, series and instances from remote entities
- WADO-RS User Agent, which retrieves studies, series and instances from remote entities
- STORAGE-SCP (external), which receives images and other composite instances from remote entities

4.1.1 Application Data Flow

Application data flow diagram for Vitrea View can be seen on Figure 1.

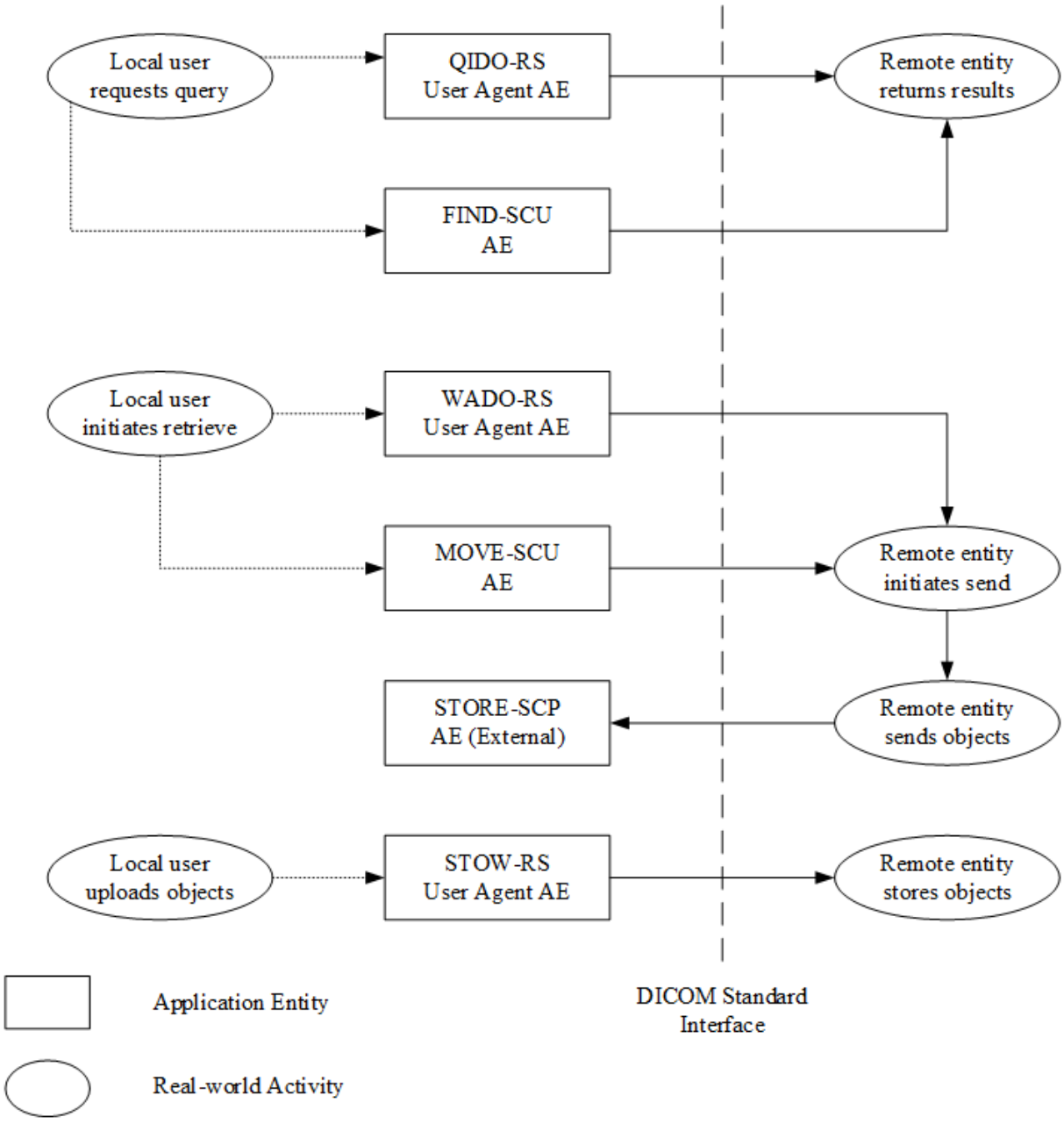

Figure 1: Application Data Flow Diagram.

4.1.2 Functional Definitions of Vitrea View AE's

The Vitrea View Application Entity interacts with one of the following Storage AEs:

- Vitrea Data Stream AE (see VLC-09634)
- Vitrea Connection Storage Server AE (see Karos 2018.04.014)
- VIMS AE (see VLC-10105)
- 3rd party AEs

The Vitrea View AE allows a user to view DICOM instances stored on one of the associated AEs.

The Vitrea View AE includes support for the following DICOM AEs:

4.1.2.1 Functional Definition: WADO-RS User Agent

WADO-RS is activated through the user interface when a user selects a study or series for retrieval. A connection to the WADO-RS Origin Server is established to retrieve the selected instances.

4.1.2.2 Functional Definition: QIDO-RS User Agent

QIDO-RS is activated through the user interface when a user selects a QIDO-RS Origin Server to query (from a pre-configured list), then initiates a query. Queries are performed at the study level. A user can further expand each result in the query, which then initiates a series level query.

4.1.2.3 Functional Definition: STOW-RS User Agent

STOW-RS is activated through the user interface when a user imports data from media. Imported data is sent to a configured STOW-RS Origin Server.

4.1.2.4 Functional Definition: FIND-SCU

FIND-SCU is activated through the user interface when a user selects a remote AE to query (from a pre-configured list), then initiates a query. Queries are performed at the study level. A user can further expand each result in the query, which then initiates a series level query.

4.1.2.5 Functional Definition: MOVE-SCU

MOVE-SCU is activated through the user interface when a user selects a study or series for retrieval. A connection to the remote AE is established to initiate and monitor the retrieval while the associated Storage AE receives the retrieved instances.

4.1.2.6 Functional Definition: Storage SCP

The Storage SCP Application Entity provides DICOM Services to receive images and other DICOM Instances from remote DICOM Application Entities.

4.1.2.6.1.1 The Storage SCP Application Entity Provides DICOM Services to:

Receive DICOM Instances from remote DICOM Application Entities using a number of DICOM Image Storage SOPs (Acting as SCP).

4.2 Vitrea View AE

4.2.1 Vitrea View AE SOP Classes

The Vitrea View AE provides access to the SOP Classes found in Table 1: Viewable SOP Classes.

4.2.2 SOP Specific Conformance

This section describes any limitations to Vitrea View's ability to display standard SOP Classes.

The following modules are not supported:

- Overlay Plane

It is not possible to fully display instances containing these modules.

When displaying an image, a Grayscale Softcopy Presentation State or Color Softcopy Presentation State containing references to the image will be automatically applied in the following priority order:

1. A Presentation State referenced by the newest Key Object Selection instance referencing the image
2. The newest Grayscale Softcopy Presentation State or Color Softcopy Presentation State containing references to the image

The Vitrea View user has the option to select any other Presentation State that also references the image. If no Presentation State references the image then no Presentation State will be applied by default.

The following Grayscale Softcopy Presentation State / Color Softcopy Presentation State modules are not supported by Vitrea View:

- Presentation State Shutter
- Presentation State Mask
- Mask
- Display Shutter
- Bitmap Display Shutter
- Graphic Group
- Softcopy Presentation LUT

It is not possible to fully display Presentation States containing these modules.

The following Grayscale Softcopy Presentation State / Color Softcopy Presentation State attributes are supported by Vitrea View with some limitations:

- Presentation Size Mode (0070,0100): restricted to "SCALE TO FIT" and "MAGNIFY"
- Presentation Pixel Aspect Ratio (0070,0102): restricted to "1\1"
- Fill Mode (0070,0257): restricted to "SOLID"

It is not possible to fully display Presentation States containing other values for these attributes.

All Image Storage SOP Classes listed Table 1 are supported as references from instances of the Grayscale Softcopy Presentation State Storage SOP Class or of the Color Softcopy Presentation State.

4.2.3 AE Specification: FIND-SCU

4.2.3.1 SOP Classes

The FIND-SCU provides Standard Conformance to the SOP Classes listed in Table 4.

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Q/R Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No

Table 4: FIND-SCU: Supported SOP Classes.

4.2.3.2 Association Policies

4.2.3.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed: see Table 5.

Application Context Name	1.2.840.10008.3.1.1.1

Table 5: FIND-SCU: DICOM Application Context.

Maximum PDU size sent	Unlimited, default is 65536

Table 6: FIND-SCU: Maximum PDU Size sent

4.2.3.2.2 Number of Associations

The FIND-SCU does not support multiple simultaneous associations, see Table 7.

Maximum number of simultaneous associations	1

Table 7: FIND-SCU: Number of simultaneous associations.

4.2.3.2.3 Asynchronous Nature

FIND-SCU will only allow a single outstanding operation on an Association. Therefore, FIND-SCU will not perform asynchronous operations window negotiation, see Table 8.

Maximum number of outstanding asynchronous transactions	1

Table 8: FIND-SCU: Asynchronous nature.

4.2.3.2.4 Implementation Identifying Information

The identifying information for the FIND-SCU can be seen in Table 9.

Implementation Class UID	1.3.6.1.4.1.25403.1.1.1
Implementation Version Name	Dicom 0.1

Table 9: FIND-SCU: DICOM Implementation Class and Version.

4.2.3.3 Association Initiation Policy

FIND-SCU attempts to initiate a new association when the user initiates a query or searches a remote AE for priors.

4.2.3.3.1 Activity: Query Remote AE

4.2.3.3.1.1 Description and Sequencing of Activities

A single attempt will be made to query the remote AE. If the query fails, for whatever reason, no retry will be performed and the user is visually notified of the failure.

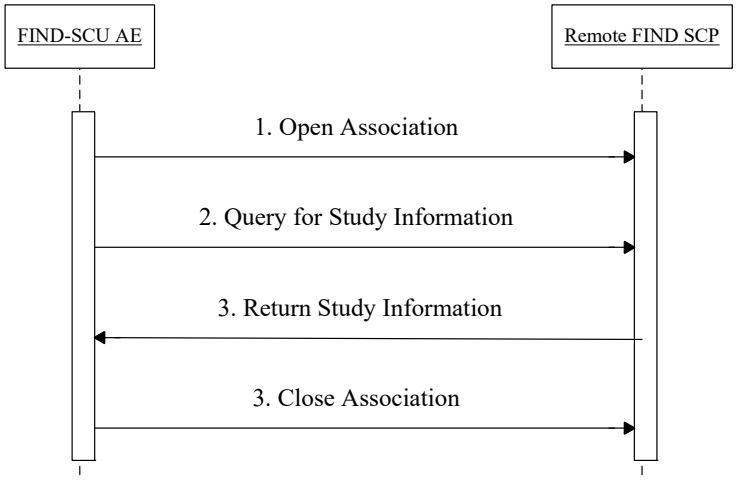

Figure 2: Sequencing of Activity – Query Remote AE

4.2.3.3.1.2 Proposed Presentation Contexts

The FIND-SCU will propose a single Presentation Context, specified in Table 10.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Study Root Q/R Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian MPEG-4 AVC/H.264 High Profile / Level 4.1 MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2.4.102 1.2.840.10008.1.2.4.103	SCU	Fuzzy Semantic Matching (optional)

Table 10: FIND-SCU: Proposed Presentation Contexts for the Query Instances activity.

4.2.3.3.1.3 Extended Negotiation

If configured, Fuzzy Semantic Matching will be requested. Relational queries are not supported.

4.2.3.3.1.4 SOP Specific Conformance

4.2.3.3.1.4.1 SOP Specific Conformance to C-FIND SOP Classes

FIND-SCU provides standard conformance to the supported C-FIND SOP Classes. Only a single information model, Study Root, is supported. Queries are initiated at the STUDY level, according to the request generated by the user interface. CANCEL requests are issued when the total number of matches exceeds the configurable limit, to avoid overflow of data, where the default limit is 100 matches. Unexpected attributes returned in a C-FIND response (those not requested) are ignored. Requested return attributes not returned by the SCP will not cause a failure and will be interpreted as empty values, this will be logged for further information. Non-matching responses returned by the SCP due to unsupported (hopefully optional) matching keys are not filtered locally by the FIND-SCU and thus will still be presented in the worklist. Duplicate responses will replace existing entries in the display.

Name	Tag	Types of Matching
Study Level		

Study Date	(0008,0020)	*,U,R
Study Time	(0008,0030)	*,U,R
Accession Number	(0008,0050)	S,*,U
Modalities in Study	(0008,0061)	S,U
Referring Physician's Name	(0008,0090)	U
Study Description	(0008,1030)	U
Patient's Name	(0010,0010)	S,*,U
Patient's ID	(0010,0020)	S,*,U
Study Instance UID	(0020,000D)	UNIQUE
Study ID	(0020,0010)	U
Number of Study Related Instances	(0020,1208)	U

Table 11: FIND-SCU: Study Root Request Identifier for FIND-SCU

Types of Matching:

S Indicates the identifier attribute uses Single Value Matching

R Indicates Range Matching

* Indicates wildcard matching

U Indicates Universal Matching

UNIQUE Indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

4.2.3.3.1.4.2 Presentation Context Acceptance Criterion

FIND-SCU does not accept associations.

4.2.3.3.1.4.3 Transfer Syntax Selection Policies

Refer to Table 11 for transfer syntax selection policies.

4.2.3.3.1.4.4 Response Status

FIND-SCU will behave as described in DICOM PS 3.2 Table D.4.2-24 in response to the status returned in the C-FIND response command message(s).

Service Status	Further Meaning	Status Code	Behavior
Refused	Out of Resources	A700	Current query is terminated; remaining queries continue
Error	Identifier does not match SOP Class	A900	Current query is terminated; remaining queries continue
	Unable to process	Cxxx	Current query is terminated; remaining queries continue
Cancel	Matching terminated due to Cancel request	FE00	Current query is terminated; remaining queries continue
Success	Matching is complete – No final Identifier is	0000	Query is successful

	supplied		
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier used to populate worklist
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this Identifier	FF01	Returned values not overridden

Table 12: FIND-SCU: Response Status for FIND-SCU and Query Remote AE Request

4.2.3.4 Association Acceptance Policy

FIND-SCU does not accept associations.

4.2.4 AE Specification: MOVE-SCU

4.2.4.1 SOP Classes

The MOVE-SCU provides Standard Conformance to the SOP Classes listed in Table 13.

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

Table 13: MOVE-SCU: Supported SOP Classes

4.2.4.2 Association Policies

4.2.4.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1

Table 14: MOVE-SCU: DICOM Application Context.

Maximum PDU size sent	Unlimited, default is 65536

Table 15: MOVE-SCU: Maximum PDU Size sent

4.2.4.2.2 Number of Associations

Maximum number of simultaneous associations	Configurable

Table 16: MOVE-SCU: Number of simultaneous associations.

4.2.4.2.3 Asynchronous Nature

MOVE-SCU will only allow a single outstanding operation on an Association. Therefore, MOVE-SCU will not perform asynchronous operations window negotiation.

4.2.4.2.4 Implementation Identifying Information

The identifying information for the MOVE-SCU can be seen in Table 17.

Implementation Class UID	1.3.6.1.4.1.25403.1.1.1
Implementation Version Name	Dicom 0.1

Table 17: MOVE-SCU: DICOM Implementation Class and Version.

4.2.4.3 Association Initiation Policy

MOVE-SCU attempts to initiate a new association when the user initiates a retrieve from a remote device.

4.2.4.3.1 Activity: Retrieve from Remote AE

4.2.4.3.1.1 Description and Sequencing of Activities

For the entity (study or series) selected from the user interface to be retrieved, an attempt will be made to retrieve it from the selected remote AE.

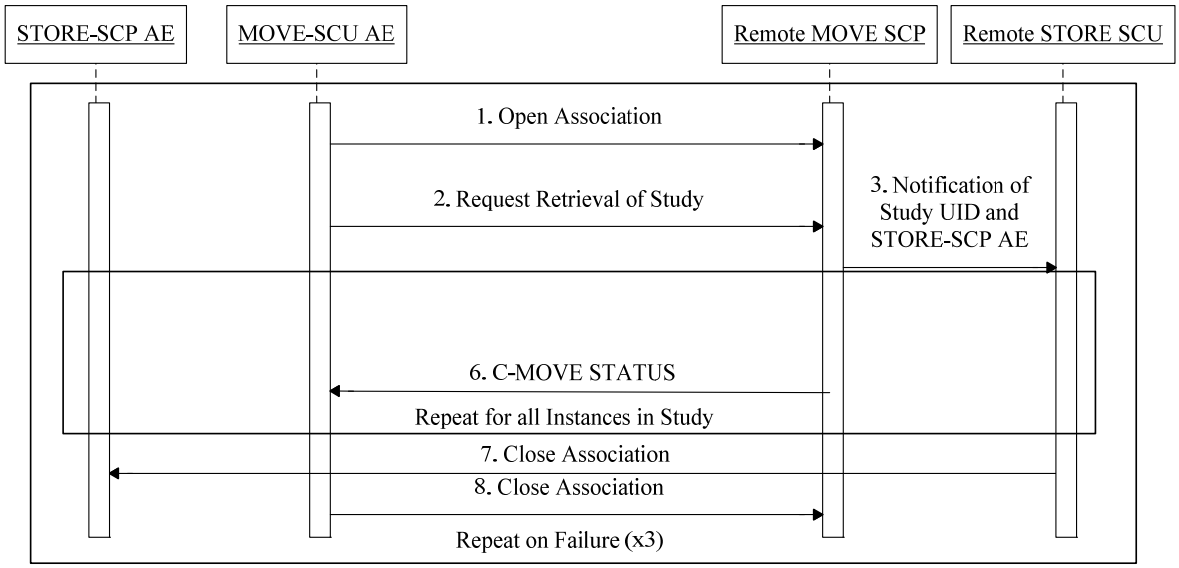

Figure 3: Sequencing of Activity – Retrieve from Remote AE

4.2.4.3.1.2 Proposed Presentation Contexts

MOVE-SCU will propose a single Presentation Context.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 18: MOVE-SCU: Proposed presentation contexts for MOVE-SCU and Retrieve from Remote AE

4.2.4.3.1.3 Extended Negotiation

No extended negotiation is performed. In particular, relational retrievals are not supported.

4.2.4.3.1.4 SOP Specific Conformance

4.2.4.3.1.4.1 SOP Specific Conformance to C-MOVE SOP Classes

MOVE-SCU provides standard conformance to the supported C-MOVE SOP Classes. Only a single information model, Study Root, is supported. Retrieval will be performed at the STUDY or SERIES level depending on what level of entity has been selected by the user in the browser. No CANCEL requests are ever issued.

The retrieval is performed from the AE that was specified in the Retrieve AE attribute returned from the query performed by FIND-SCU. The instances are retrieved to the current application's local database by specifying the destination as the AE Title of the STORE-SCP AE of the local application. This implies that the remote C-MOVE SCP must be preconfigured to determine the presentation address corresponding to the STORE-SCP AE. The STORE-SCP AE will accept storage requests addressed to it from anywhere, so no pre-configuration of the local application to accept from the remote AE is necessary (except to configure the FIND-SCU).

Name	Tag	Types of Matching

Study Level		
Study Instance UID	(0020,000D)	U
Series Level		
Series Instance UID	(0020,000E)	U

Table 19: MOVE-SCU: Study Root Request Identifier for MOVE-SCU

4.2.4.3.1.4.2 Presentation Context Acceptance Criterion

MOVE-SCU does not accept associations

4.2.4.3.1.4.3 Transfer Syntax Selection Policies

MOVE-SCU uses only Implicit Little Endian Transfer Syntax.

4.2.4.3.1.4.4 Response Status

MOVE-SCU will behave as described in the table below in response to the status returned in the C-MOVE response command message(s).

Service Status	Further Meaning	Status Code	Related Fields	Behavior
Refused	Out of Resources - Unable to calculate number of matches	A701	(0000,0902)	Retrieval is terminated; Retries will occur
	Out of Resources - Unable to perform sub-operations	A702	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	
	Move Destination unknown	A801	(0000,0902)	
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)	Retrieval is terminated; Retries will occur
	Unable to process	Cxxx		
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated; Retries will occur
Warning	Sub-operations Complete - One or more Failures	B000	(0000,1020) (0000,1022) (0000,1023)	Retrieval is terminated; Retry will occur
Success	Sub-operations Complete - No Failures	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Success of the retrieve
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval continues

Table 20: MOVE-SCU: Response Status for MOVE-SCU and Retrieve from Remote AE Request

4.2.4.3.1.4.5 Sub-operation dependent behavior

Since the C-MOVE operation is dependent on completion of C-STORE sub-operations that are occurring on a separate association, the question of failure of operations on the other association(s) must be considered.

MOVE-SCU completely ignores whatever activities are taking place in relation to the STORAGE-SCP AE that is receiving the retrieved instances. Once the C-MOVE has been initiated it runs to completion (or failure) as described in the C-MOVE response command message(s). There is no attempt by MOVE-SCU to confirm that instances have been successfully received or locally stored.

Whether or not completely or partially successfully retrievals are made available in the local database to the user is purely dependent on the success or failure of the C-STORE sub-operations, not on any explicit action by MOVE-SCU. If there are any failures that are recoverable, the retrieve will be retried up to a configurable limit, where the default is 3 times on a one-minute interval.

If the association on which the C-MOVE was issued is aborted for any reason, whether or not the C-STORE sub-operations continue is dependent on the remote AE; the local STORAGE-SCP will continue to accept associations and storage operations regardless.

4.2.4.4 Association Acceptance Policy

MOVE-SCU does not accept associations.

4.2.5 QIDO-RS User Agent

4.2.5.1 SOP Classes

QIDO-RS User Agent supports the following transactions:

Transaction	Resource
Search for Studies	{service]/studies?

Table 21: QIDO-RS: Transactions supported by QIDO-RS Origin Server

4.2.5.2 Connection Policies

4.2.5.2.1 General

QIDO-RS User Agent initiates associations based on user actions.

Category	Restrictions
Media Types Supported	multipart/related; type=application/dicom+xml

Table 22: QIDO-RS: QIDO-RS Specification

4.2.5.2.2 Number of Associations

Maximum number of simultaneous associations	1

Table 23: QIDO-RS: Number of simultaneous associations for FIND-SCU

4.2.5.2.3 Asynchronous Nature

QIDO-RS User Agent will only allow a single outstanding operation on an Association. Therefore, FIND-SCU will not perform asynchronous operations window negotiation.

4.2.5.3 Association Initiation Policy

QIDO-RS User Agent attempts to initiate a new association when the user initiates a search from a QIDO-RS Origin Server.

4.2.5.3.1 QIDO-RS Query Parameters

QIDO-RS User Agent supports the following search query keys.

Name	Tag	Types of Matching
Study Level		
Study Date	(0008,0020)	*,U,R
Study Time	(0008,0030)	*,U,R
Accession Number	(0008,0050)	S,*,U
Modalities in Study	(0008,0061)	S,U
Study Description	(0008,1030)	U
Patient's Name	(0010,0010)	S,*,U
Patient's ID	(0010,0020)	S,*,U

Patient's Birth Date	(0010,0030)	U
Issuer of Patient ID	(0010,0021)	S,*,U
Study Instance UID	(0020,000D)	UNIQUE
Study ID	(0020,0010)	U
Number of Study Related Instances	(0020,1208)	U
Other		
Limit	N/A	N/A

Table 24: QIDO-RS: Query Parameters

Types of Matching:

S	Indicates the identifier attribute uses Single Value Matching
R	Indicates Range Matching
*	Indicates wildcard matching
U	Indicates Universal Matching
UNIQUE	Indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

4.2.5.4 Association Acceptance Policy

QIDO-RS User Agent does not accept associations.

4.2.6 WADO-RS User Agent

4.2.6.1 SOP Classes

WADO-RS User Agent supports the following transactions:

Transaction	Resource
Retrieve Study	{service}/studies/{StudyInstanceUID}
Retrieve Study Metadata	{service}/studies/{StudyInstanceUID}/metadata
Retrieve Frames	{service}/studies/{StudyInstanceUID}/series/{SeriesInstanceUID}/instances/{SOPInstanceUID}/frames/{frameList}
Retrieve Bulk Data	{bulkDataURL}

Table 24: WADO-RS: Transactions supported by WADO-RS User Agent

4.2.6.2 Connection Policies

4.2.6.2.1 General

WADO-RS User Agent initiates associations based on user actions.

Category	Restrictions
Media Types Supported	multipart/related; type=application/dicom multipart/related; type=application/dicom+xml multipart/related; type=application/octet-stream
Transfer Syntaxes Supported	1.2.840.10008.1.2 (Implicit VR Little Endian) 1.2.840.10008.1.2.1 (Explicit VR Little Endian)
SOP Class Restrictions	Restricted to Storage SOP Classes specified in Table 1 Viewable SOP Classes.

Table 25: WADO-RS: WADO-RS Specification

4.2.6.2.2 Number of Associations

Maximum number of simultaneous associations	Unlimited

Table 26: WADO-RS: Number of associations for WADO-RS User Agent

4.2.6.2.3 Asynchronous Nature

WADO-RS User Agent will only make a single outstanding operation on an association.

4.2.6.2.4 Association Initiation Policy

WADO-RS User Agent attempts to initiate a new association when the user initiates a retrieval from a WADO-RS Origin Server.

4.2.6.3 Association Acceptance Policy

WADO-RS User Agent does not accept associations.

4.2.7 STOW-RS User Agent

4.2.7.1 SOP Classes

STOW-RS User Agent supports the following transactions:

Transaction	Resource
Store Instances	{service]/studies

Table 27: STOW-RS: Transactions supported by STOW-RS User Agent

4.2.7.2 Connection Policies

4.2.7.2.1 General

STOW-RS User Agent initiates associations based on user actions.

Category	Restrictions
Media Types Supported	multipart/related; type=application/dicom
Transfer Syntaxes Supported	1.2.840.10008.1.2 (Implicit VR Little Endian) 1.2.840.10008.1.2.1 (Explicit VR Little Endian)
SOP Class Restrictions	Restricted to Storage SOP Classes specified in Table 1 Viewable SOP Classes.

Table 28: STOW-RS: STOW-RS Specification

4.2.7.2.2 Number of Associations

Maximum number of simultaneous associations	Unlimited

Table 28: STOW-RS: Number of associations for STOW-RS User Agent

4.2.7.2.3 Asynchronous Nature

STOW-RS User Agent will only make a single outstanding operation on an Association.

4.2.7.2.4 Association Initiation Policy

STOW-RS User Agent attempts to initiate a new association when the user initiates an upload to a STOW-RS Origin Server.

4.2.7.3 Association Acceptance Policy

STOW-RS User Agent does not accept associations.

4.3 Network Interfaces

4.3.1 Physical Network Interface

The application is indifferent to the physical medium over which TCP/IP is executed. This is entirely dependent on the underlying operating system and hardware.

4.3.2 Additional Protocols

When host names rather than IP addresses are used in the configuration properties to specify presentation addresses for remote AEs, the application is dependent on the name resolution mechanism of the underlying operating system.

4.4 Configuration

Configuration is performed through the use of an administration tool. Refer to the product documentation for specific details.

4.4.1 AE Title/Presentation Address Mapping

All SCU requests are performed using the "local" AE. Each AE has an alias assigned to allow a user to easily distinguish AEs from each other. Aliases are configurable and are generally human-readable strings. Presentation addresses (IP address and Port) are also configurable for all AEs.

4.4.2 Parameters

Parameter	Configurable	Default Value
AE Specific Parameters (all AEs)		
Number of retries on failure (MOVE-SCU AE, STORE-SCU AE, PRINT-SCU AE only)	Yes	3 (MOVE-SCU AE) 5 (STORE-SCU AE and PRINT-SCU AE)
Supported DIMSE services	Yes	None

Table 29: Configuration Parameters

5. Support of Character Sets

Vitrea View supports ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set). No other character sets are supported.

6. Security

6.1 Network

Vitrea View can use HTTPS for WADO-RS, STOW-RS and QIDO-RS connections.

For DIMSE connections, Vitrea View does not support any specific network security measures. It is assumed the software is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to the software.
- Firewall or router protections to ensure that the software only has network access to approved external hosts and services.
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN)).

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.