JiveX

Conformance Statement
Version 5.8

DICOM Conformance Statement

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Product: JiveX
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Used symbols:

Note:
This symbol indicates special information for easier product operation or it provides other important information.

Warning:
This warning symbol indicates important safety-related information, like warnings and precautions which cannot be placed on the product itself.

Regulatory:

CE 0482 JiveX is a class IIa medical device in accordance with regulation (EU) 2017/745.

Notice to users in the European Union: Any serious incident that has occurred in relation to the medical device should be reported to the manufacturer and the competent authority.

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1 Conformance Statement Overview

JiveX is a suite of applications that implements a full-featured PACS. The JiveX Server allows storing, querying and retrieving images. If requested, the server confirms to the modality that a certain set of images has correctly been stored. The server accepts messages indicating that a modality has performed certain procedure steps and is able to forward these messages to another system (such as a RIS). The server can notify another system (such as a RIS) about the content of new studies that have been stored. The JiveX Client, which uses various services documented in this Conformance Statement, allows querying and retrieving images from multiple archives, to send images to a remote system and to print to a DICOM printer via the JiveX Server.

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Hardcopy Grayscale Image Storage	Yes	Yes
Hardcopy Color Image Storage (RETIRED)	Yes	Yes
Computed Radiography Image Storage	Yes	Yes
Digital X-Ray Image Storage – For Presentation	Yes	Yes
Digital X-Ray Image Storage – For Processing	Yes	Yes
Digital Mammography Image Storage – For Presentation	Yes	Yes
Digital Mammography Image Storage – For Processing	Yes	Yes
Digital Intra-oral X-Ray Image Storage – For Presentation	Yes	Yes
Digital Intra-oral X-Ray Image Storage – For Processing	Yes	Yes
CT Image Storage	Yes	Yes
Enhanced CT Image Storage	Yes	Yes
Ultrasound Multiframe Image Storage (RETIRED)	Yes	Yes
Ultrasound Multiframe Image Storage	Yes	Yes
MR Image Storage	Yes	Yes
Enhanced MR Image Storage	Yes	Yes
Nuclear Medicine Image Storage (RETIRED)	Yes	Yes
Ultrasound Image Storage (RETIRED)	Yes	Yes
Ultrasound Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	Yes	Yes
Multiframe Grayscale Byte Secondary Capture Image Storage	Yes	Yes
Multiframe Grayscale Word Secondary Capture Image Storage	Yes	Yes
Multiframe Grayscale True Color Secondary Capture Image Storage	Yes	Yes
12-Lead ECG Waveform Storage	Yes	Yes
General ECG Waveform Storage	Yes	Yes

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Grayscale Softcopy Presentation State Storage	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
Enhanced XA Image Storage	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	Yes	Yes
Enhanced XRF Image Storage	Yes	Yes
X-Ray Angiographic Bi-Plane Image Storage (RETIRED)	Yes	Yes
Breast Tomosynthesis Image Storage	Yes	Yes
Nuclear Medicine Image Storage	Yes	Yes
VL Endoscopic Image Storage	Yes	Yes
Video Endoscopic Image Storage	Yes	Yes
VL Microscopic Image Storage	Yes	Yes
Video Microscopic Image Storage	Yes	Yes
VL Slide-Coordinates Microscopic Image Storage	Yes	Yes
VL Photographic Image Storage	Yes	Yes
Video Photographic Image Storage	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	Yes	Yes
Ophthalmic Photography 16 Bit Image Storage	Yes	Yes
Ophthalmic Tomography Image Storage	Yes	Yes
Basic Text SR	Yes	Yes
Mammography CAD SR	Yes	Yes
Key Object Selection Document	Yes	Yes
X-Ray Radiation Dose SR Storage	Yes	Yes
Encapsulated PDF Storage	Yes	Yes
Positron Emission Tomography (PET) Image Storage	Yes	Yes
Enhanced PET Image Storage	Yes	Yes
RT Image Storage	Yes	Yes
RT Dose Storage	Yes	Yes
RT Structure Set Storage	Yes	Yes
RT Beams Treatment Record Storage	Yes	Yes
RT Plan Storage	Yes	Yes
Spatial Registration Storage	Yes	Yes
VISUS Internal Capture	Yes	Yes
VISUS Internal Presentation State	Yes	Yes
VISUS Internal Key Object	Yes	Yes
VISUS Internal Structured Report	Yes	Yes

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Notes, Reports, Measurements Transfer		
Key Object Selection Document	Yes	Yes
Query/Retrieve		
Study Root Query/ Retrieve Model - FIND	Yes	Yes
Study Root Query/ Retrieve Model - MOVE	Yes	Yes
Patient Root Query/ Retrieve Model - FIND	No	Yes
Patient Root Query/ Retrieve Model - MOVE	Yes	Yes
Workflow Management		
Modality Worklist Information Model – FIND	No	Yes
Basic Study Content Notification	Yes	No
Modality Performed Procedure Step	Yes	Yes
Storage Commitment Push Model	No	Yes
Print Management		
Basic Grayscale Print Management	Yes	No
Basic Color Print Management	Yes	No
Basic Annotation Box	Yes	No
Presentation LUT	Yes	No
Network Services		
WADO - URI - Retrieve Imaging Document	No	Yes
WADO - URI - Retrieve Rendered Imaging Document	No	Yes

Table 1: Network Services

2 Introduction

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

2.1 Revision History

Version	Author/s	Date	Comments/Notes
3.0	Kleber/Ströter/Martin	2001–01–01	Draft for official review
3.0	Kleber/Ströter/Martin	2001–03–01	Final version
3.1	Kleber/Ströter/Martin	2001–04–01	Changes for official review
3.1	Kleber/Ströter/Martin	2001–04–30	Final version
3.6	Kleber/Ströter/Martin	2003–05–26	Changes for official review
3.6	Kleber/Ströter/Martin	2003–07–30	Final version
3.6	Kleber/Ströter/Martin	2004–02–10	Changes for official review
4.0	Eichelberg/Stroeter	2004–11–29	Adapted to PS3.2:2004
4.2	Martin/Schneider	2007–06–15	Changes for official review
4.2	Martin	2007–06–21	Final version
4.4	Kessel	2010–11–05	Media Interchange changes
4.4.1	Kessel	2011–01–21	Media Interchange changes
4.6	Schwarz	2013–01–24	Added Spatial Registration Storage and Breast Tomosynthesis Image Storage
4.7	Schwarz	2014–09–30	Added MPEG–4 AVC/H.264 Transfer Syntaxes
5.0	Derks	2015–12–30	Documented that only TCP/IPv4 is supported.
5.0	Schwarz	2016–10–14	Integrated DICOM Worklist Conformance to this document
5.0.5	Heller	2018.01.19	Added WADO-URI Service

2.2 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has understood the DICOM specifications.

2.3 Remarks

If another device matches this Conformance Statement when compared with its own Conformance Statement, there is a chance but no guarantee that they might interoperate. DICOM only deals with communication; it is not a standard which specifies what is needed for certain applications to run on a device.

2.4 Definitions, Terms and Abbreviations

- ASCII American Standard Code for Information Interchange
- AE Application Entity
- ANSI American National Standards Institute
- CR Computed Radiography
- CT Computed Tomography
- DICOM Digital Imaging and Communications in Medicine
- ECG Echocardiography
- IE Information Entity
- IOD Information Object Definition
- ISO International Standards Organization
- MG Mammography
- MR Magnet Resonance (Tomography)
- NEMA National Electrical Manufacturers Association
- OSI Open Systems Interconnection
- PDU Protocol Data Unit
- SC Secondary Capture
- SCP Service Class Provider
- SCU Service Class User
- SOP Service Object Pair
- SR Structured Report
- TCP/IP Transmission Control Protocol / Internet Protocol
- UID Unique Identifier
- US Ultra Sound
- VL Visible Light
- VM Value Multiplicity
- VR Value Representation
- XA X-RAY Angiography

3 Networking

3.1 Implementation Model

3.1.1 Application Data Flow

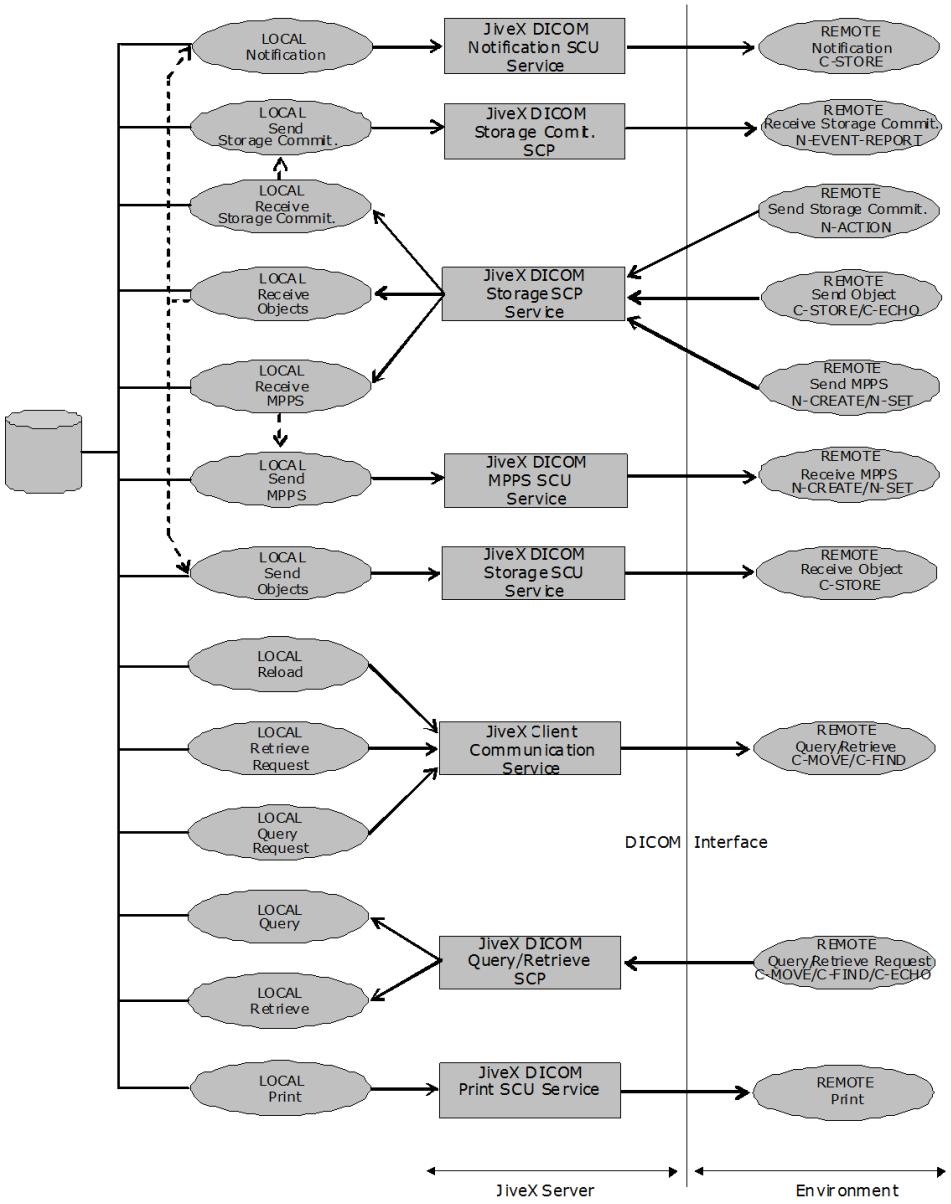

Fig. 3.1: Application Data Flow Diagram

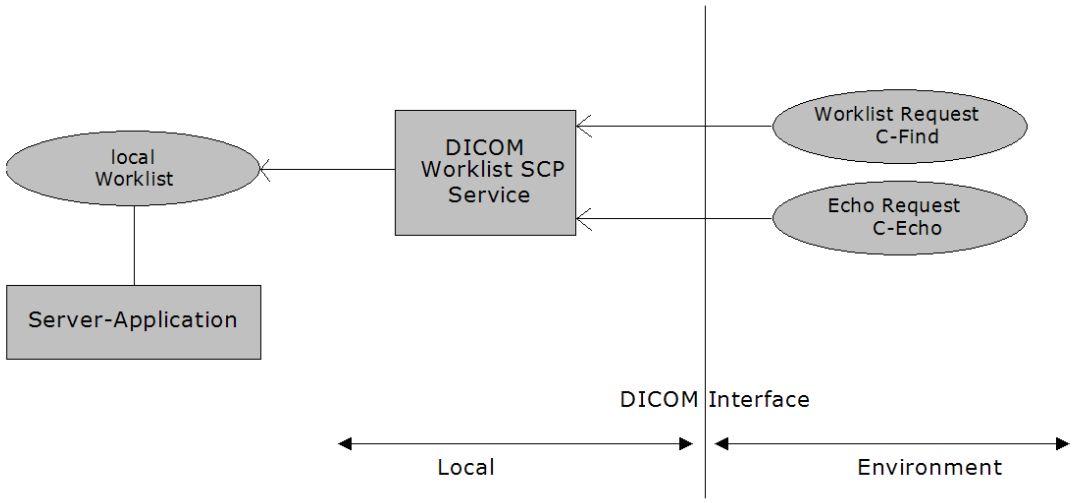

Fig. 3.2: Application Data Flow Diagram DICOM Worklist

3.1.2 Functional Definition of AEs

The JiveX Server consists of a set of parallel communicating, but independent JiveX Services (implemented as threads) that deal with the DICOM communication.

3.1.2.1 Functional Definition of JiveX DICOM Storage SCP Service

Within the JiveX Server, there is at least one "JiveX DICOM Storage SCP Service" that takes care of receiving the images, softcopy presentation states, key image objects and Basic Text Structured Reports and storing them in the database. Also, Storage Commitment and MPPS requests will be accepted. This application entity acts as a SCP for the Verification class, the Storage classes, the MPPS class and the Storage Commitment SOP class.

3.1.2.2 Functional Definition of JiveX DICOM Storage SCU Service

Within the JiveX Server, there may be one or more "JiveX DICOM Storage SCU Services" that are able to send the images, softcopy presentation states and key image objects on request. This application entity acts as a SCU for the Storage SOP classes.

3.1.2.3 Functional Definition of JiveX Client Communication Service

Within the JiveX Server, there may be one or more "JiveX Client Communication Services" that allow users to send queries and request DICOM objects from a remote system. The requested objects will be received by the "JiveX DICOM Storage SCP Service" and can be visualized. This application entity acts as a SCU for the Query/Retrieve SOP classes.

3.1.2.4 Functional Definition of JiveX DICOM Query/Retrieve SCP Service

There is one "JiveX DICOM Query/Retrieve SCP Service" that handles queries and requests from remote applications. The requested objects will be sent by a "JiveX DICOM Storage SCP Service". This application entity acts as a SCP for the Query/Retrieve SOP classes.

3.1.2.5 Functional Definition of JiveX DICOM Notification SCU Service

Within the JiveX Server, there may be one "JiveX Notification Service" that can send notifications to remote applications. This application entity acts as a SCU for the Basic Study Content Notification Service Class.

3.1.2.6 Functional Definition of JiveX DICOM Storage Commitment SCP Service

Within the JiveX Server, there may be one "JiveX DICOM Storage Commitment SCP Service" that is able to send N-Event-Report messages to remote applications. The Storage Commitment N-Action messages are received by a DICOM Storage SCP Service. This application entity acts as a SCP for the DICOM Storage Commitment SCP Class.

3.1.2.7 Functional Definition of JiveX DICOM MPPS SCU Service

Within the JiveX Server, there may be one "JiveX DICOM MPPS SCU Service" that sends MPPS messages to remote applications. This application entity acts as a SCU for the Modality Performed Procedure Step Service Class.

3.1.2.8 Functional Definition of JiveX DICOM Print SCU Service

Within the JiveX Server there is one "JiveX Print SCU Service" that sends print requests to remote DICOM printers. This application entity acts as a SCU for the DICOM Print Management Service Classes.

3.1.2.9 Functional Definition of JiveX WADO-URI Service

Within the JiveX Server there may be one "WADO-URI Service" that allows other Systems to retrieve DICOM Objects in origin or as rendered Images and Documents via a HTTP request.

3.1.3 Sequencing of Real World Activities

It is possible to configure an auto-routing mechanism. In this case, the "JiveX DICOM Storage SCU Service" forwards all objects received by the "JiveX DICOM Storage SCP Service" to a predefined remote system.

It is possible to configure an auto-routing mechanism for MPPS messages. In this case, the "JiveX DICOM MPPS SCU Service" forwards the N-CREATE and N-SET messages received by the "JiveX DICOM Storage SCP Service" to a predefined remote system.

It is possible to configure a notification mechanism. Each time the "JiveX DICOM Storage SCP Service" receives a set of objects, a remote system can be notified by an instance of the "JiveX Notification Service".

Storage Commitments N-Action requests will be received by the "JiveX DICOM Storage SCP Service". The "JiveX DICOM Storage Commitment SCP Service" handles the delivery of the N-EVENT-REPORT messages.

3.2 Application Entity Specifications

3.2.1 JiveX DICOM Storage SCP Service

The DICOM Storage SCP "JiveX DICOM Storage SCP Service" is an application entity that can either be started automatically together with the JiveX Server or manually by an administrator. When the JiveX Server is terminated, the "JiveX DICOM Storage SCP Service" stops accepting any further associations and aborts all currently active associations. The administrator is allowed to stop the "JiveX DICOM Storage SCP Service". The "JiveX DICOM Storage SCP Service" stops accepting any further associations and terminates as soon as all currently active associations are closed.

3.2.1.1 SOP Classes

This application entity provides Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Storage Commitment Push Model	1.2.840.10008.1.20.1
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage (RETIRED)	1.2.840.10008.5.1.1.30
Computed Radiography Image Storages	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 X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
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
Ultrasound Multiframe Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1
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
Nuclear Medicine Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2

SOP Class Name	SOP Class UID
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multiframe Grayscale True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
12-Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1
X-Ray Radio fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1
X-Ray Angiographic Bi-Plane Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.12.3
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
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1
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
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1
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
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
VL Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.77.2
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structured SR	1.2.840.10008.5.1.4.1.1.88.22
Compressive Structured SR	1.2.840.10008.5.1.4.1.1.88.33
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130
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

SOP Class Name	SOP Class UID
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
VISUS Internal Capture	1.2.276.0.50.1.33
VISUS Internal Presentation State	1.2.276.0.50.1.34
VISUS Internal Key Object	1.2.276.0.50.1.35
VISUS Internal Structured Report	1.2.276.0.50.1.36

Table 3: SOP Classes for the "JiveX DICOM Storage SCP Service"

3.2.1.1.1 Association Policies

General

The DICOM standard application context name, which is always proposed, is as follows:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

The "Implementation Class UID" is "1.2.276.0.50.20100301.5.0". The "Implementation Version Name" is "JIVEX_TK5.0".

3.2.1.2 Association Initiation Policy

"JiveX DICOM Storage SCP Service" does not initiate associations.

3.2.1.3 Association Acceptance Policy

The "JiveX DICOM Storage SCP Service" application entity accepts an association after receiving an association request from a valid SCU. The application entity accepts incoming association requests on a single IP-address and a single port number as defined in the configuration file. It accepts any association for which at least one presentation context is accepted. It creates a new thread for each incoming DICOM association request.

The association remains open until one of the following events occurs:

- The remote application entity closes the application.
- An error condition leading to an association abort occurs.

- A timeout occurs.
- The administrator manually stops the “JiveX DICOM Storage SCP Service”.

Activity: Receive Objects

Description and Sequencing of Activities

This activity is initiated by a remote Storage SCU opening an association in order to transmit images or other DICOM objects to the “JiveX DICOM Storage SCP Service”. The Diagram shows a possible sequence of events for this activity. The remote Storage SCU opens an association and sends one or more DICOM objects using C-STORE request messages. For each C-STORE request, a status is returned in the corresponding response message. Finally, the remote Storage SCU closes the association.

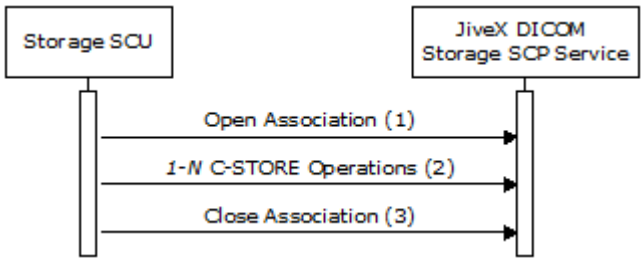

Fig. 3.3: Sequencing Diagram for Activity “Receive Objects”

Accepted Presentation Contexts

SOP Class Name	SOP Class UID	Transfer Syntax	Role	Extended Negotiation
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	See below	SCP	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See below	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See below	SCP	None
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	See below	SCP	None
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	See below	SCP	None
Digital Mammography Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	See below	SCP	None
Digital Mammography Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	See below	SCP	None
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	See below	SCP	None
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	See below	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See below	SCP	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See below	SCP	None
Ultrasound Multiframe Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	See below	SCP	None
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See below	SCP	None

SOP Class Name	SOP Class UID	Transfer Syntax	Role	Extended Negotiation
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See below	SCP	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See below	SCP	None
Nuclear Medicine Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.5	See below	SCP	None
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	See below	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See below	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See below	SCP	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See below	SCP	None
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See below	SCP	None
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See below	SCP	None
Multiframe Grayscale True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See below	SCP	None
12-Lead-ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	See below	SCP	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	See below	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See below	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See below	SCP	None
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	See below	SCP	None
X-Ray Radio fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See below	SCP	None
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	See below	SCP	None
X-Ray Angiographic Bi-Plane Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.12.3	See below	SCP	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See below	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See below	SCP	None
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	See below	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See below	SCP	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See below	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See below	SCP	None
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	See below	SCP	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See below	SCP	None
VL Photograhic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See below	SCP	None
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	See below	SCP	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See below	SCP	None
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	See below	SCP	None

SOP Class Name	SOP Class UID	Transfer Syntax	Role	Extended Negotiation
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	See below	SCP	None
VL Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.77.2	See below	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	See below	SCP	None
Enhanced Structured SR	1.2.840.10008.5.1.4.1.1.88.22	See below	SCP	None
Compressive Structured SR	1.2.840.10008.5.1.4.1.1.88.33	See below	SCP	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	See below	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See below	SCP	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	See below	SCP	None
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128	See below	SCP	None
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	See below	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See below	SCP	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See below	SCP	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See below	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See below	SCP	None
VISUS Internal Capture	1.2.276.0.50.1.33	See below	SCP	None
VISUS Internal Presentation State	1.2.276.0.50.1.34	See below	SCP	None
VISUS Internal Key Object	1.2.276.0.50.1.35	See below	SCP	None
VISUS Internal Structured Report	1.2.276.0.50.1.36	See below	SCP	None

Table 4: Presentation Context Table for Activity "Receive Objects"

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	1.2.840.10008.1.2.2
JPEG Baseline (Lossy)	1.2.840.10008.1.2.4.50
JPEG Extended (Lossy)	1.2.840.10008.1.2.4.51
JPEG Lossless (Process 14)	1.2.840.10008.1.2.4.57
JPEG Lossless	1.2.840.10008.1.2.4.70
JPEG-LS Lossless	1.2.840.10008.1.2.4.80
JPEG-LS Lossy (Near-Lossless)	1.2.840.10008.1.2.4.81
JPEG2000	1.2.840.10008.1.2.4.90
JPEG2000 (Lossy)	1.2.840.10008.1.2.4.91
MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100

Transfer Syntax Name	Transfer Syntax UID
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
RLE Lossless	1.2.840.10008.1.2.5

Table 5: Transfer Syntaxes for Activity "Receive Objects"

The default behavior of the "JiveX DICOM Storage SCP Service" is to accept as SCP for each of the supported SOP classes all presentation contexts containing one or more of the transfer syntaxes as listed above. It is possible to configure the SOP Classes accepted by this application. It is also possible to configure the transfer syntaxes accepted by this application. The application entity will accept all presentation contexts containing one of the supported SOP classes and one of the supported transfer syntaxes. The default behavior for the selection of the transfer syntax is to choose the first supported transfer syntax for each presentation context.

SOP Specific Conformance for Storage SOP Classes The "JiveX DICOM Storage SCP Service" will receive any DICOM objects of a supported SOP Class type transmitted through an open association, if the correct presentation context is used. If the objects have been successfully received, they are stored and registered in the local database. Upon a successful storage of objects, they can automatically be transferred to another system, if auto-routing is configured. The "JiveX DICOM Storage SCP Service" provides full level 2 conformance of the DICOM Storage SCP class. All attributes will be retained. If the "JiveX DICOM Storage SCP Service" receives objects that are already present in the database (the "SOP Instance UID" is already known), the existing objects will be kept and the transmission will be completed successfully. A "lifetime" period for an automated deletion of image objects can be configured. In this case, only references to the sending application are retained in the database. These references can be used to retrieve the objects again, if needed. The following error/warning status codes can be sent in the context of a "C-STORE-RSP" message:

Code	Name	Severity	Description
A700	Refused, out of resources	Failure	Application out of memory. The JiveX database is full and is, therefore, unable to store the object.
C000	Error, cannot understand	Failure	The object cannot be parsed correctly.

Table 6: Error Status of the C-Store-RSP message

Activity: Receive MPPS

Description and Sequencing of Activities

This activity is initiated by a remote MPPS SCU (typically a modality) opening an association in order to transmit MPPS notifications to the "JiveX DICOM Storage SCP Service". *Fig. 3.4: Sequencing Diagram for Activity "Receive MPPS"*↙ shows a possible sequence of events for this activity.

The remote MPPS SCU opens an association, creates one or more MPPS instances using N-CREATE requests, and closes the association again. At a subsequent date, the MPPS SCU opens another association and sends an update to the MPPS instance using an N-SET request. The N-CREATE and N-SET messages may also be sent in the context of a single association.

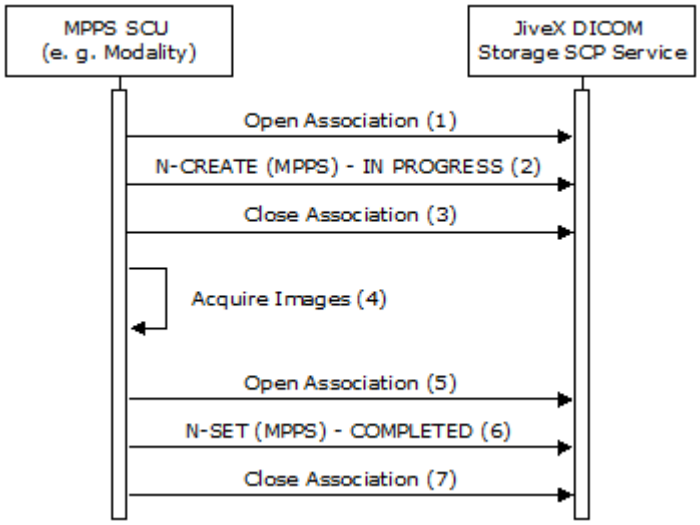

Fig. 3.4: Sequencing Diagram for Activity "Receive MPPS"

Accepted Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 7: Presentation Context Table for Activity "Receive MPPS"

The application entity will accept all presentation contexts containing the supported SOP class and transfer syntax.

SOP Specific Conformance for MPPS SOP Class

This service provides standard conformance to the "Modality Performed Procedure Step SOP Class" as SCP. Incoming MPPS messages can automatically be forwarded to another system (e. g. a departmental information system) via the "JiveX DICOM MPPS SCU Service". Other than MPPS forwarding, no processing of the content of the MPPS notifications is performed. Activity: Receive Storage Commitment Request

Description and Sequencing of Activities

This activity is initiated by a remote "Storage Commitment SCU" (typically a modality) opening an association and delivering a Storage Commitment request to the "JiveX DICOM Storage SCP Service". The following Diagram shows a possible sequence of events for this activity. The remote "Storage Commitment SCU"

opens an association, sends one or more Storage Commitment N-ACTION requests and finally closes the association. The N-EVENT-REPORT messages used to communicate the result of the Storage Commitment operation is always sent in the context of a separate association, initiated by the "JiveX DICOM Storage Commitment SCP Service" application entity. For each incoming N-ACTION request, a job in the Storage Commitment queue is created. This job, which is retrieved later by the "JiveX DICOM Storage Commitment SCP Service", includes all the information of the N-Action RQ.

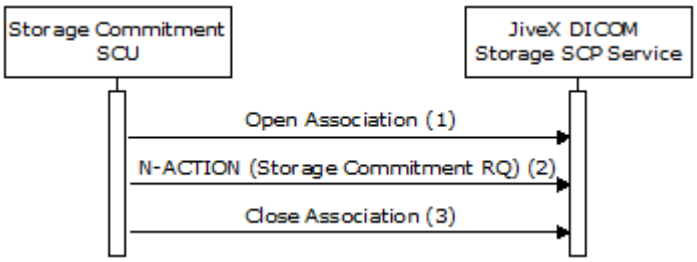

Fig. 3.5: Sequencing Diagram for Activity "Receive Storage Commitment Request"

Accepted Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 8: Presentation Context Table for Activity "Receive Storage Commitment Request"

The application entity will accept all presentation contexts that contain the supported SOP class and transfer syntax.

SOP Specific Conformance for Storage Commitment SOP Class The N-ACTION-RSP will be sent as soon as the Storage Commitment transaction is stored in the Storage Commitment queue. The service will return the standard status codes for N-ACTION-RSP message as specified in DICOM PS 3.7. The Storage Commitment operation itself, including delivery of the N-EVENT-REPORT, will be handled by the "JiveX DICOM Storage Commitment SCP Service" application entity, documented in its own section.

3.2.2 JiveX DICOM Query/Retrieve SCP Service

The *Database* "JiveX DICOM Query/Retrieve SCP Service" is an application entity that can automatically be started together with the JiveX Server or manually by an administrator. When the JiveX Server is terminated, the "JiveX DICOM Query/Retrieve SCP Service" stops transmitting and aborts all active associations. The administrator is allowed to stop the "JiveX DICOM Query/Retrieve SCP Service" manually. The "JiveX DICOM Query/Retrieve SCP Service" terminates as soon as all currently active associations are closed.

3.2.2.1 SOP Classes

This application provides Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Patient Root Query/ Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Patient Root Query/ Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Study Root Query/ Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Study Root Query/ Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	No	Yes

Table 9: SOP Classes for the "JiveX DICOM Query/Retrieve SCP Service"

3.2.2.2 Association Policies

General

The proposed name of the DICOM standard application context is always as follows:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

- The "Implementation Class UID" is "1.2.276.0.50.20100301.5.0".
- The "Implementation Version Name" is "JIVEX_TK5.0".

3.2.2.3 Association Initiation Policy

The "JiveX DICOM Query/Retrieve SCP Service" does not initiate Associations.

3.2.2.4 Association Acceptance Policy

The "JiveX DICOM Query/Retrieve SCP Service" application entity accepts association requests from every valid DICOM Query/Retrieve SCU. The application entity accepts incoming association requests on a single IP-address and a single port number as defined in the configuration file. It accepts any association for which at least one presentation context is accepted. It creates a new thread for each incoming DICOM association request. The association remains open until one of the following events occurs:

- the remote application entity closes the application, or
- an error condition leading to an association abort occurs, or
- a timeout occurs, or

- the administrator manually stops the “JiveX DICOM Query/Retrieve SCP Service”.

Activity: Receive Query

Description and Sequencing of Activities

This activity is initiated by a remote Query/Retrieve SCU opening an association in order to transmit a C-FIND request to the “JiveX DICOM Query/Retrieve SCP Service”.

Fig. 3.6: Sequencing Diagram for Activity “Receive Objects” shows a possible sequence of events for this activity. The remote Query/Retrieve SCU opens an association with the “JiveX DICOM Query/Retrieve SCP Service” and provides a query using a C-FIND request message. The “JiveX DICOM Query/Retrieve SCP” determines objects in its local database matching the query and provides zero or more results in C-FIND response messages with pending status.

The “JiveX DICOM Query/Retrieve SCP” regularly checks for incoming C-FIND-CANCEL requests which cancel the delivery of the remaining matches.

Finally, the “JiveX DICOM Query/Retrieve SCP” provides a single C-FIND response with final status. The Query/Retrieve SCU may then send another query or close the association.

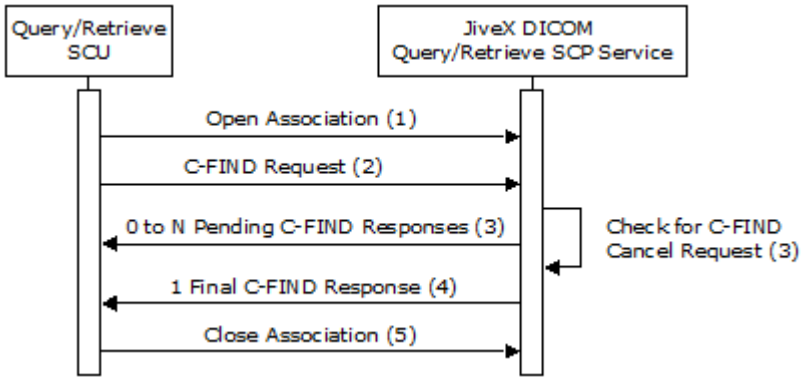

Fig. 3.6: Sequencing Diagram for Activity “Receive Objects”

Accepted Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
Patient Root Query/ Retrieve Model-FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Query/ Retrieve Model-FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 10: Presentation Context Table for Activity “Receive Query”

The application entity will accept all presentation contexts that contain one of the supported SOP classes and the supported transfer syntax.

SOP Specific Conformance for Query SOP Classes

The "JiveX Query/Retrieve SCP Service" provides standard conformance for the Query/Retrieve Service Class. Relational Queries are not supported. The following matching types are supported when appropriate:

- Single Value Matching
- Universal Matching
- Wild Card Matching
- Range Matching
- List of UID Matching

Table 11 shows the attributes supported as matching or return keys for the various levels of the DICOM Query Information Model. Attributes of the level "Patient/Study" belong to the "Patient" level except for the Study Root information model which treats them as "Study" attributes.

The "Type" columns specify whether the attribute is supported as a matching key (M) or as return key only (R).

Table 12 shows additional attributes that are supported as matching/return keys for Grayscale Softcopy Presentation State objects at image level.

Table 13 shows additional attributes that are supported as matching/return keys for Key object selection documents at image level.

Level	Description	Tag	Type
Patient/Study	Patient's Name	(0010,0010)	M
Patient/Study	Patient's ID	(0010,0020)	M
Patient/Study	Patient's Birth Date	(0010, 0030)	M
Patient/Study	Patient's Birth Time	(0010, 0032)	M
Patient/Study	Patient's Sex	(0010,0040)	M
Patient/Study	Other Patient's ID	(0010,1000)	M
Patient/Study	Other Patient's Name	(0010,1001)	M
Patient/Study	Number of Patient related Studies	(0020,1200)	M
Study	Study Date	(0008,0020)	M
Study	Study Time	(0008,0030)	M
Study	Accession Number	(0008,0050)	M
Study	Study ID	(0020,0010)	M
Study	Study Instance UID	(0020,000D)	M
Study	Referring Physician's Name	(0008,0090)	M
Study	Study Description	(0008,1030)	M
Study	Number of Study related Series	(0020,1206)	M
Study	Number of Study related Images	(0020,1208)	M
Study	Modalities In Study	(0008,0061)	M

Level	Description	Tag	Type
Series	Modality	(0008,0060)	M
Series	Series Number	(0020,0011)	M
Series	Series Instance UID	(0020,000E)	M
Series	Number of Series related Images	(0020,1209)	M
Series	Request Attribute Sequence	(0040,0275)	M
Series	Requested Procedure ID	(0040,0009)	M
Series	Scheduled Procedure Step ID	(0020,1209)	M
Series	Performed Procedure Step Start Date	(0040,0009)	M
Series	Performed Procedure Step Start Time	(0040,0245)	M
Image	Instance Number	(0020,0013)	M
Image	SOP Instance UID	(0008,0018)	M
Image	SOP Class UID	(0008,0016)	M
Image	Bits Allocated	(0028,0100)	M
Image	Number of Frames	(0028,0008)	M
Image	Rows	(0028,0010)	M
Image	Columns	(0028,0011)	M

Table 11: Supported Query Keys

Level	Description	Tag	Type
Image	Presentation Description	(0070,0081)	M
Image	Presentation Creation Date	(0070,0082)	M
Image	Presentation Creation Time	(0070,0083)	M
Image	Presentation Creator's Name	(0070,0084)	M
Image	Referenced Series Sequence	(0008,1115)	R
Image	Series Instance UID	(0020,000E)	R
Image	Referenced Image Sequence	(0008,1140)	R
Image	Referenced SOP Class UID	(0008,1155)	R
Image	Referenced SOP Instance UID	(0008,1155)	R

Table 12: Additional Image Level Keys for Grayscale Softcopy Presentation States

Level	Description	Tag	Type
Image	Content Date	(0008,0023)	M
Image	Content Time	(0008,0033)	M
Image	Observation Date Time	(0040,A032)	M
Image	Referenced Request Sequence	(0040,A370)	R

Level	Description	Tag	Type
Image	Study Instance UID	(0020,000D)	R
Image	Accession Number	(0008,0050)	R
Image	Requested Procedure ID	(0040,1000)	R
Image	Requested Procedure Code Sequence	(0032,1064)	R
Image	Code Value	(0008,0100)	R
Image	Coding Scheme Designator	(0008,0102)	R
Image	Coding Scheme Version	(0008,0103)	R
Image	Code Meaning	(0008,0104)	M
Image	Concept Name Code Sequence	(0040,A043)	M
Image	Code Value	(0008,0100)	M
Image	Coding Scheme Designator	(0008,0102)	M
Image	Coding Scheme Version	(0008,0103)	R
Image	Code Meaning	(0008,0104)	R

Table 13: Additional Image Level Keys for Key Object Selection Documents

Activity: Receive Retrieve Request

Description and Sequencing of Activities

This activity is initiated by a remote Query/Retrieve SCU opening an association in order to transmit a C-MOVE request to the "JiveX DICOM Query/Retrieve SCP Service".

Fig. 3.7: Sequencing Diagram for Activity "Receive Retrieve Request" shows a possible sequence of events for this activity. The remote Query/Retrieve SCU opens an association with the "JiveX DICOM Query/Retrieve SCP Service" and provides a retrieve request using a C-MOVE request message.

The "JiveX DICOM Query/Retrieve SCP Service" determines objects in its local database matching the retrieved request and schedules a transmission of these objects. The "JiveX DICOM Storage SCU Service" receives the scheduled transmission and opens a storage sub-association to a remote Storage SCP based on the Retrieve AE Title attribute. This attribute is provided in the C-MOVE request, which is mapped to a presentation address according to the system configuration (see "Configuration" chapter for details).

This remote Storage SCP may or may not be identical to the remote Query/Retrieve SCU. For each image delivered by the "JiveX DICOM Storage SCU Service", a status update is provided through a C-MOVE response message sent by the "JiveX DICOM Query/Retrieve SCP Service". The "JiveX DICOM Query/Retrieve SCP Service" also regularly checks for an incoming C-MOVE-CANCEL request, in which case the delivery of the remaining objects is cancelled (not shown in the diagram).

Finally, the "JiveX DICOM Query/Retrieve SCP" provides a single C-MOVE response with final status. The Query/Retrieve SCU may then send another query or close the association.

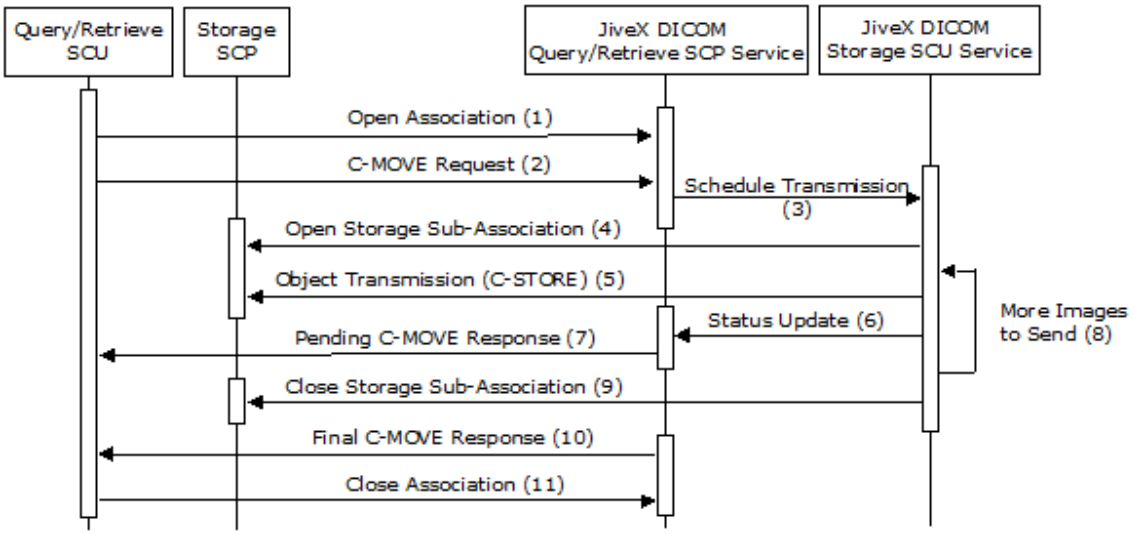

Fig. 3.7: Sequencing Diagram for Activity "Receive Retrieve Request"

Accepted Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/ Retrieve Model-MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Query/ Retrieve Model-MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 14: Presentation Context Table for Activity "Receive Retrieve Request"

The application entity will accept all presentation contexts containing one of the supported SOP classes of the supported transfer syntax.

SOP Specific Conformance for Retrieve SOP Classes

The "JiveX DICOM Query/Retrieve SCP Service" provides standard conformance. The requested level may be "PATIENT", "STUDY", "SERIES" or "IMAGE", depending on the Query/Retrieve Model used.

3.2.3 JiveX DICOM Worklist SCP Service

The "DICOM Worklist SCP Service" is part of the application. It allows modalities to query for worklists of procedures to be performed and for patient and procedure demographics.

3.2.3.1 SOP Classes

This application provides Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	No	Yes

Table 15: SOP Classes for the "JiveX DICOM Worklist SCP Service"

3.2.3.2 Association Policies

General

The proposed name of the DICOM standard application context is always as follows:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

- The "Implementation Class UID" is "1.2.276.0.50.20100301.5.0".
- The "Implementation Version Name" is "JIVEX_TK5.0".

3.2.3.3 Association Initiation Policy

The "JiveX DICOM Worklist SCP Service" does not initiate Associations.

3.2.3.4 Association Acceptance Policy

The "JiveX DICOM Worklist SCP Service" application entity accepts association requests from every valid DICOM Worklist SCU. The application entity accepts incoming association requests on a single IP-address and a single port number as defined in the configuration file. It accepts any association for which at least one presentation context is accepted. It creates a new thread for each incoming DICOM association request. The association remains open until one of the following events occurs:

- the remote application entity closes the application, or
- an error condition leading to an association abort occurs, or
- a timeout occurs, or
- the administrator manually stops the "JiveX DICOM Worklist SCP Service".

Activity: Receive Query

Description and Sequencing of Activities

This activity is initiated by a remote Worklist SCU opening an association in order to transmit a C-FIND request to the "JiveX DICOM Worklist SCP Service".

Fig. 3.8: Sequencing Diagram for Activity "Receive Query" shows a possible sequence of events for this activity. The remote Worklist SCU opens an association with the "JiveX DICOM Worklist SCP Service" and provides a query using a C-FIND request message. The "JiveX DICOM Worklist SCP" determines objects in its local database matching the query and provides zero or more results in C-FIND response messages with pending status.

The "JiveX DICOM Worklist SCP" regularly checks for incoming C-FIND-CANCEL requests which cancel the delivery of the remaining matches.

Finally, the "JiveX DICOM Worklist SCP" provides a single C-FIND response with final status. The Worklist SCU may then send another query or close the association.

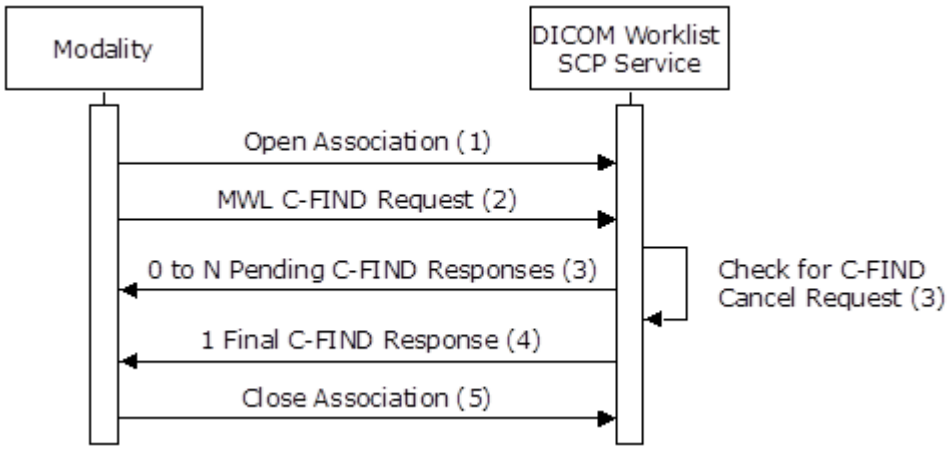

Fig. 3.8: Sequencing Diagram for Activity "Receive Query"

Accepted Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 16: Presentation Context Table for Activity "Receive Query"

The application entity will accept all presentation contexts that contain one of the supported SOP classes and the supported transfer syntax.

SOP Specific Conformance for Query SOP Classes

The "JiveX Worklist SCP Service" provides standard conformance for the Worklist Service Class. Relational Queries are not supported. The following matching types are supported when appropriate:

- Single Value Matching
- Universal Matching

- Wild Card Matching
- Range Matching
- List of UID Matching

The following tables list the supported attributes and their matching and return types.

The “Type” columns specify whether the attribute is supported as a matching key (**M**) or as return key only (**R**).

Description	Tag	Type
Scheduled Procedure Step Sequence	(0040,0100)	
Scheduled Station AE	(0040,0001)	SV
Scheduled Procedure Step Start Date	(0040,0002)	SV/RM
Scheduled Procedure Step Start Time	(0040,0003)	SV/RM
Modality	(0008,0060)	SV
Scheduled Performing Physician’s Name	(0040,0006)	SV
Scheduled Procedure Step Description	(0040,0007)	SV
Scheduled Station Name	(0040,0010)	SV
Scheduled Procedure Step Location	(0040,0011)	
Scheduled Action Item Code Sequence	(0040,0008)	
Code Value	(0008,0100)	
Coding Scheme Version	(0008,0103)	
Coding Scheme Designator	(0008,0102)	
Code Meaning	(0008,0104)	
Scheduled Procedure Step ID	(0040,0009)	
Pre-Medication	(0040,0012)	
Requested Contrast Agent	(0032,1070)	
Requested Procedure ID	(0040,1001)	
Requested Procedure Description	(0032,1060)	SV
Requested Procedure Code Sequence	(0032,1064)	
Scheduled Action Item Code Sequence	(0040,0008)	
Study Instance UID	(0020,000D)	
Requested Procedure Priority	(0040,1003)	
Patient Transport Arrangements	(0040,1004)	
Current Patient Location	(0038,0300)	
Reason for the Requested Procedure	(0040,1002)	
Requested Procedure Location	(0040,1005)	
Accession Number	(0008,0050)	SV/WC

Description	Tag	Type
Requesting Physician	(0032,1032)	
Referring Physician's Name	(0008,0090)	
Requesting Service	(0032,1033)	
Reason for the Imaging Service Request	(0040,2001)	
Issue Time of Imaging Service Request	(0040,2005)	
Placer Order Number Imaging Service Request	(0040,2016)	
Admission ID	(0038,0010)	
Current Patient Location	(0038,0300)	
Visit Status ID	(0038,0008)	
Patient Institution Residence	(0038,0400)	
Visit Comments	(0038,4000)	
Admitting Diagnosis Code Sequence	(0008,1084)	
Admitting Diagnosis Description	(0008,1080)	
Patient's Name	(0010,0010)	SV/WC
Patient ID	(0010,0020)	SV/WC
Other Patient IDs	(0010,1000)	
Patients Birth Date	(0010,0030)	SV
Patient's Sex	(0010,0040)	SV
Confidentiality constraint on patient data	(0040,3001)	
Patient Comments	(0010,4000)	
Patient State	(0038,0500)	
Pregnancy Status	(0010,21C0)	
Medical Alerts	(0010,2000)	
Contrast Allergies	(0010,2110)	
Special Needs	(0038,0050)	

Table 17: Supported Query Keys

3.2.4 JiveX DICOM Storage Commitment SCP Service

The *Storage Commitment Service* "JiveX DICOM Storage Commitment SCP Service" is an application entity that can either be started automatically together with the JiveX Server or manually by an administrator. When the JiveX Server is terminated, the "DICOM Storage Commitment SCP Service" stops transmitting and aborts all active associations. The administrator is entitled to stop the "JiveX DICOM Storage Commitment SCP Service" manually. The "JiveX DICOM Storage Commitment SCP Service" terminates as soon as all currently active associations are closed.

3.2.4.1 SOP Classes

This application entity provides Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Storage Commitment Push Model	1.2.840.10008.1.20.1	No	Yes

Table 18: SOP Classes for the "JiveX DICOM Storage Commitment SCP Service"

3.2.4.2 Association Policies

General

The name of the DICOM standard application context is always proposed and is as follows:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

The "Implementation Class UID" is "1.2.276.0.50.20100301.5.0".

The "Implementation Version Name" is "JIVEX_TK5.0".

3.2.4.3 Association Initiation Policy

Associations are initiated by this application entity if one of the real-world activities occur which are described below.

Activity: Send Storage Commitment Report

Description and Sequencing of Activities

This activity is initiated when the "JiveX DICOM Storage Commitment SCP Service" receives a storage commitment request (see chapter "Activity: Receive Storage Commitment Request") and schedules the delivery of a storage commitment report in the Storage Commitment queue.

The "JiveX DICOM Storage Commitment SCP Service" regularly polls the contents of this queue and initiates a DICOM association in order to deliver the storage commitment report as soon as one of the following events occurs:

All objects referenced in the storage commitment request have successfully been archived in the long-term archiving media.

A pre-configured time-out expires.

Fig. 3.9: Sequencing Diagram for Activity "Send Storage Commitment Report" shows a possible sequence of events for this activity. The "JiveX DICOM Storage Commitment SCP Service" opens an association with the remote Storage Commitment SCU that provided the storage commitment request and negotiates the SCP role using "Extended Negotiation".

It then delivers the storage commitment report using an N-EVENT-REPORT request message. Finally, the "JiveX DICOM Storage Commitment SCP Service" closes the association.

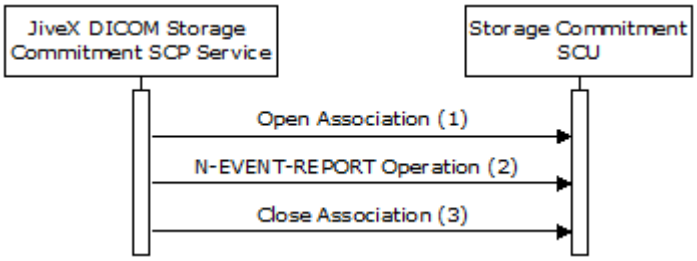

Fig. 3.9: Sequencing Diagram for Activity "Send Storage Commitment Report"

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	SCP/SCU Role negotiation

Table 19: Presentation Context Table for Activity "Send Storage Commitment Report"

SOP Specific Conformance for Storage Commitment

The "JiveX DICOM Storage Commitment SCP Service" provides standard conformance to the "Storage Commitment Push Model SOP Class".

Storage commitment report transfers can be scheduled for specific time. There is a mechanism for retrying a transfer in case a failure occurred at an earlier time.

The following error/warning status codes can be sent in the context of an N-EVENT-REPORT-RQ message (i.e. a storage commitment result):

Code	Name	Severity	Description
0110	Refused, out of resources	Failure	The archiving of the requested SOP Instances failed.
0112	No such object instance	Failure	The requested SOP Instances are not stored in the database.

Table 20: Failure Reasons for Storage Commitment Result

3.2.4.4 Association Acceptance Policy

The “JiveX DICOM Storage Commitment SCP Service” does not accept associations.

3.2.5 JiveX DICOM Storage SCU Service

The DICOM Storage SCU “JiveX DICOM Storage SCU Service” is an application entity that can either be started automatically together with the JiveX Server or manually by an administrator. When the JiveX Server is terminated, the “JiveX DICOM Storage SCU Service” stops transmitting and aborts all currently active associations. The administrator is entitled to stop the “JiveX DICOM Storage SCU Service” manually. The “JiveX DICOM Storage SCU Service” terminates as soon as all currently active associations are closed.

3.2.5.1 SOP Classes

This application entity provides Standard Conformance for the following DICOM SOP Classes:

SOP Class Name	SOP Class UID
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30
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 X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
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
Ultrasound Multiframe Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1
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
Nuclear Medicine Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multiframe Grayscale True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4

SOP Class Name	SOP Class UID
12-Lead-ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1
X-Ray Radio fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1
X-Ray Angiographic Bi-Plane Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.12.3
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
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photograhic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photograhic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1
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
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
VL Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.77.2
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130
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 Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
VISUS Internal Capture	1.2.276.0.50.1.33
VISUS Internal Presentation State	1.2.276.0.50.1.34
VISUS Internal Key Object	1.2.276.0.50.1.35

SOP Class Name	SOP Class UID
VISUS Internal Structured Report	1.2.276.0.50.1.36

Table 21: SOP Classes for the "JiveX DICOM Storage SCU Service"

3.2.5.1.1 Association Policies

General

The DICOM standard application context name is always proposed. It is:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

- The "Implementation Class UID" is "1.2.276.0.50.20100301.5.0".
- The "Implementation Version Name" is "JIVEX_TK5.0".

3.2.5.1.2 Association Initiation Policy

Associations are initiated by this application entity if one of the real-world activities described below is carried out.

Activity: Send Objects

Description and Sequencing of Activities

This activity is initiated when the user of a JiveX Client manually initiates the transfer of objects from the local database to a remote system. Diagram 8 shows a possible sequence of events for this activity.

The "JiveX DICOM Storage SCU Service" application entity opens an association with a selected remote Storage SCP and delivers the objects using one or more C-STORE operations. Finally, the "JiveX DICOM Storage SCU Service" closes the association.

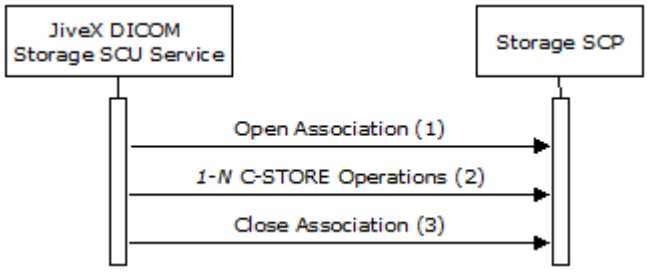

Fig. 3.10: Sequencing Diagram for Activity "Send Objects"

Proposed Presentation Contexts

SOP Class Name	SOP Class UID	Transfer Syntax	Role	Extended Negotiation
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	See below	SCU	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See below	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See below	SCU	None
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	See below	SCU	None
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	See below	SCU	None
Digital Mammography Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	See below	SCU	None
Digital Mammography Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	See below	SCU	None
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	See below	SCU	None
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	See below	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See below	SCU	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See below	SCU	None
Ultrasound Multiframe Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	See below	SCU	None
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See below	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See below	SCU	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See below	SCU	None
Nuclear Medicine Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.5	See below	SCU	None
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	See below	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See below	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See below	SCU	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See below	SCU	None
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See below	SCU	None
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See below	SCU	None
Multiframe Grayscale True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See below	SCU	None
12-Lead-ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	See below	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	See below	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See below	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See below	SCU	None

SOP Class Name	SOP Class UID	Transfer Syntax	Role	Extended Negotiation
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	See below	SCU	None
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See below	SCU	None
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	See below	SCU	None
X-Ray Angiographic Bi-Plane Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.12.3	See below	SCU	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See below	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See below	SCU	None
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	See below	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See below	SCU	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See below	SCU	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See below	SCU	None
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	See below	SCU	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See below	SCU	None
VL Photograhic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See below	SCU	None
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	See below	SCU	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See below	SCU	None
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	See below	SCU	None
Ophthalmic Tomography Storage	1.2.840.10008.5.1.4.1.1.77.1.5.5	See below	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	See below	SCU	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	See below	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See below	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	See below	SCU	None
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128	See below	SCU	None
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	See below	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See below	SCU	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See below	SCU	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See below	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See below	SCU	None
VISUS Internal Capture	1.2.276.0.50.1.33	See below	SCU	None
VISUS Internal Presentation State	1.2.276.0.50.1.34	See below	SCU	None
VISUS Internal Key Object	1.2.276.0.50.1.35	See below	SCU	None
VISUS Internal Structured Report	1.2.276.0.50.1.36	See below	SCU	None

Table 22: Presentation Context Table for Activity “Send Objects”

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	1.2.840.10008.1.2.2
JPEG Baseline (Lossy)	1.2.840.10008.1.2.4.50
JPEG Extended (Lossy)	1.2.840.10008.1.2.4.51
JPEG Lossless	1.2.840.10008.1.2.4.70
JPEG-LS Lossless	1.2.840.10008.1.2.4.80
JPEG-LS Lossy (Near-Lossless)	1.2.840.10008.1.2.4.81
JPEG2000	1.2.840.10008.1.2.4.90
JPEG2000 (Lossy)	1.2.840.10008.1.2.4.91
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
RLE Lossless	1.2.840.10008.1.2.5

Table 23: Transfer Syntaxes for Activity “Send Objects”

The default behavior of the “JiveX DICOM Storage SCU Service” is to provide, for each of the supported SOP classes, a single presentation context containing one of the transfer syntaxes shown above.

SOP Specific Conformance for Storage SOP Classes

The “JiveX DICOM Storage SCU Service” provides full level 2 conformance to the DICOM Storage Service class. All attributes of an object received earlier will be retained in the object transmitted by the “JiveX DICOM Storage SCU Service”.

The “JiveX DICOM Storage SCU Service” allows object transfers to be scheduled for specific times and has mechanisms for retrying a transfer in case of a failure at an earlier time.

3.2.5.1.3 Association Acceptance Policy

“JiveX DICOM Storage SCU Service” does not accept associations.

3.2.6 JiveX Client Communication Service

The *Client Communication Service* “JiveX Client Communication Service” is an application entity that can automatically be started together with the JiveX Server or manually by an administrator. When the JiveX Server is terminated, the “JiveX Client Communication Service” stops transmitting and aborts all active associations. The administrator is allowed to stop the “JiveX Client Communication Service” manually. The “JiveX Client Communication Service” terminates as soon as all active associations are closed.

3.2.6.1 SOP Classes

This application provides Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Patient Root Query/ Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root Query/ Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root Query/ Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/ Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

Table 24: SOP Classes for the "JiveX Client Communication Service"

3.2.6.2 Association Policies

General

The DICOM standard application context name, which is always proposed, is as follows:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

- The "Implementation Class UID" is "1.2.276.0.50.20100301.5.0".
- The "Implementation Version Name" is "JIVEX_TK5.0".

3.2.6.3 Association Initiation Policy

Associations are initiated by this application entity if one of the real-world activities described below is carried out.

Activity: Send Query

Description and Sequencing of Activities

This activity is initiated when a JiveX Client user manually initiates a query in a remote DICOM Query/Retrieve SCP (e. g. image archive or workstation).

Fig. 3.11: Sequencing Diagram for Activity "Send Query" shows a possible sequence of events for this activity.

The "JiveX Client Communication Service" application entity opens an association with a selected remote Query/Retrieve SCP and delivers the query using a C-FIND request. It then accepts zero or more incoming

C-FIND responses with pending status, followed by a single C-FIND response with final status. Finally, the "JiveX Client Communication Service" closes the association.

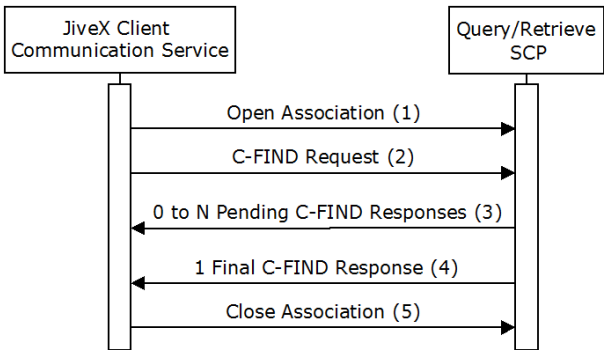

Fig. 3.11: Sequencing Diagram for Activity "Send Query"

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/ Retrieve Model-FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/ Retrieve Model-FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Table 25: Presentation Context Table for Activity "Send Query"					

SOP Specific Conformance for Query SOP Classes

The "JiveX Client Communication Service" provides standard conformance for the Query/Retrieve Service Class. Relational Queries are not supported. The following matching types are supported where appropriate:

- Single Value Matching
- Universal Matching
- Wild Card Matching
- Range Matching
- List of UID Matching

Table 26 shows the attributes supported as matching or return keys for the various levels of the DICOM Query Information Model. Attributes of the "Patient/Study" level belong to the "Patient" level except for the Study Root information model where they are treated as "Study" attributes. The "Type" columns specify whether the attribute is supported as a matching key (M), return key (R) or as an optional return key (O) that can be enabled in the system configuration.

Table 27 shows additional attributes that are supported as matching/return keys for Grayscale Softcopy Presentation State objects at instance level.

Table 28 shows additional attributes that are supported as matching/return keys for Key object selection documents at instance level.

The "JiveX Client Communication Service" may cancel the query (i. e. send a C-FIND-CANCEL message) upon manual user interaction or if the number of C-FIND responses received exceeds a limit defined in the configuration file.

Level	Description	Tag	Type
Patient/Study	Patient's Name	(0010,0010)	M
Patient/Study	Patient' s ID	(0010,0020)	M
Patient/Study	Patient' s Birth Date	(0010,0030)	M
Patient/Study	Patient' s Birth Time	(0010,0032)	M
Patient/Study	Patient's Sex	(0010,0040)	M
Patient/Study	Other Patient's ID	(0010,1000)	M
Patient/Study	Other Patient's Name	(0010,1001)	M
Patient/Study	Number of Patient related Studies	(0020,1200)	M
Study	Study Date	(0008,0020)	M
Study	Study Time	(0008,0030)	M
Study	Accession Number	(0008,0050)	M
Study	Study ID	(0020,0010)	M
Study	Study Instance UID	(0020,000D)	M
Study	Referring Physician's Name	(0008,0090)	M
Study	Study Description	(0008,1030)	M
Study	Number of Study related Series	(0020,1206)	M
Study	Number of Study related Images	(0020,1208)	M
Study	Modalities In Study	(0008,0061)	M
Series	Modality	(0008,0060)	M
Series	Series Number	(0020,0011)	M
Series	Series Instance UID	(0020,000E)	M
Series	Number of Series related Images	(0020,1209)	M
Series	Request Attribute Sequence	(0040,0275)	M
Series	Requested Procedure ID	(0040,0009)	M
Series	Scheduled Procedure Step ID	(0020,1209)	M
Series	Performed Procedure Step Start Date	(0040,0009)	M
Series	Performed Procedure Step Start Time	(0040,0245)	M
Instance	Instance Number	(0020,0013)	M

Level	Description	Tag	Type
Instance	SOP Instance UID	(0008,0018)	M
Instance	SOP Class UID	(0008,0016)	M
Instance	Bits Allocated	(0028,0100)	R
Instance	Number of Frames	(0028,0008)	R
Instance	Rows	(0028,0010)	R
Instance	Columns	(0028,0011)	R

Table 26: Supported Query Keys

Level	Description	Tag	Type
Instance	Presentation Description	(0070,0081)	R
Instance	Presentation Creation Date	(0070,0082)	R
Instance	Presentation Creation Time	(0070,0083)	R
Instance	Referenced Series Sequence	(0008,1115)	R

Table 27: Additional Instance Level Keys for Grayscale Softcopy Presentation States

Level	Description	Tag	Type
Instance	Content Date	(0008,0023)	O
Instance	Content Time	(0008,0033)	O
Instance	Observation Date Time	(0040,A032)	O
Instance	Concept Name Code Sequence	(0040,A043)	M
Instance	Code Value	(0008,0100)	M
Instance	Coding Scheme Designator	(0008,0102)	M
Instance	Coding Scheme Version	(0008,0103)	R
Instance	Code Meaning	(0008,0104)	R

Table 28: Additional Instance Level Keys for Key Object Selection Documents

Activity: Send Retrieve Request

Description and Sequencing of Activities

This activity is initiated when the user of a JiveX Client manually initiates a retrieval of DICOM objects from a remote DICOM Query/Retrieve SCP, following a successful query. *Fig. 3.12: Sequencing Diagram for Activity "Send Retrieve Request"* shows a possible sequence of events for this activity. The "JiveX Client Communication Service" application entity opens an association with the selected remote Query/Retrieve SCP and delivers a C-MOVE request.

The Query/Retrieve SCP will open a separate storage sub-association which is handled by the "JiveX DICOM Storage SCP Service". The Query/Retrieve SCP transmits objects over the storage sub-association and pro-

vides status updates in C-MOVE response messages with a “Pending” status to the “JiveX Client Communication Service”. Finally the Query/Retrieve SCP closes the storage sub-association and provides a final C-MOVE response message. The “JiveX Client Communication Service” then closes the association.

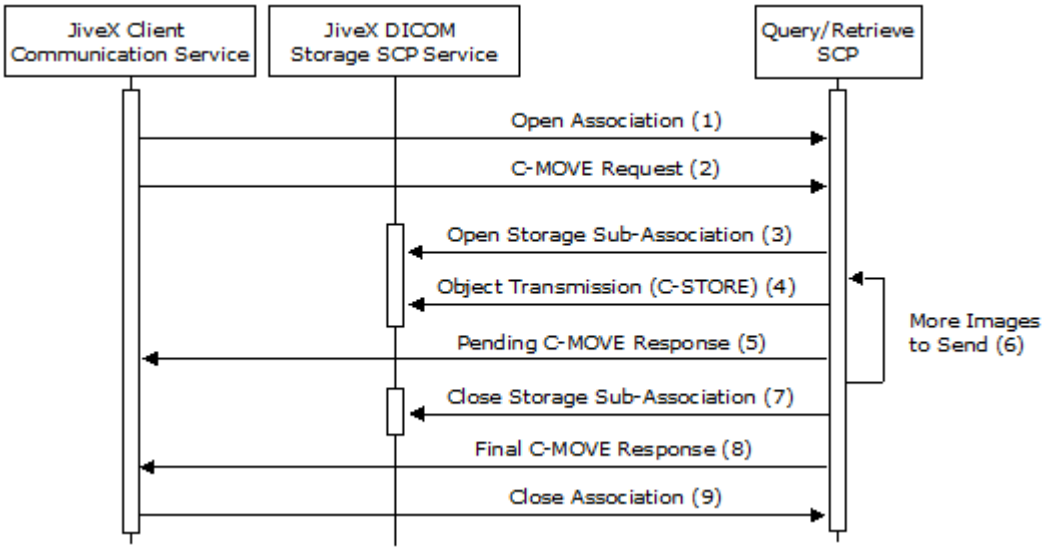

Fig. 3.12: Sequencing Diagram for Activity “Send Retrieve Request”

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/ Retrieve Model-MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/ Retrieve 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 29: Presentation Context Table for Activity “Send Retrieve Request”

The default behavior of the “JiveX Client Communication Service” is to propose for each of the supported SOP classes a single presentation context containing the transfer syntax shown above.

SOP Specific Conformance for Retrieve SOP Classes

The “JiveX Client Communication Service” provides standard conformance for the supported Retrieve SOP classes. The Query/Retrieve Model (i. e. SOP class) and retrieve level is automatically selected based on the result of the association negotiation and the level on which the user has requested object retrieval. The requested level may be one of the following: “PATIENT”, “STUDY”, “SERIES” or “IMAGE”.

The “JiveX Client Communication Service” may cancel the retrieve operation (i. e. send a C-MOVE-CANCEL message) upon manual user interaction.

Activity: Reload Objects

Description and Sequencing of Activities

This activity is initiated when the user of a JiveX Client manually initiates a re-loading of objects that were deleted from the local JiveX database but had earlier been retrieved from a remote DICOM Query/Retrieve SCP. Only objects that were received from a remote system and were deleted from the local database can be reloaded from the same remote system. In this case, the JiveX Server needs to know the exact location of the objects.

Fig. 3.13: Sequencing Diagram for Activity "Reload Objects" shows a possible sequence of events for this activity. The "JiveX Client Communication Service" application entity opens an association with the selected remote Query/Retrieve SCP and delivers a C-MOVE request. The Query/Retrieve SCP will open a separate storage sub-association which is handled by the "JiveX DICOM Storage SCP Service". The Query/Retrieve SCP transmits objects over the storage sub-association and provides status updates in C-MOVE response messages with a "Pending" status to the "JiveX Client Communication Service". Finally the Query/Retrieve SCP closes the storage sub-association and provides a final C-MOVE response message. The "JiveX Client Communication Service" then closes the association.

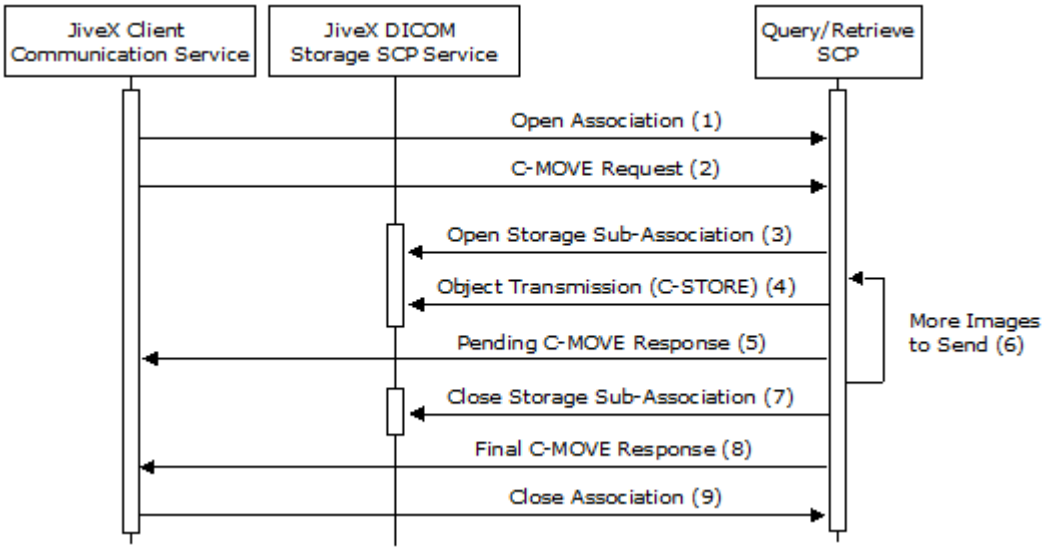

Fig. 3.13: Sequencing Diagram for Activity "Reload Objects"

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/ Retrieve Model-MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/ Retrieve 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

Abstract Syntax	Transfer Syntax	Role	Extended Negotiation

Table 30: Presentation Context Table for Activity "Reload Objects"

The default behavior of the "JiveX Client Communication Service" is to propose a single presentation context containing the supported SOP class and transfer syntax.

SOP Specific Conformance for Retrieve SOP Classes

The "JiveX Client Communication Service" provides standard conformance for the supported Retrieve SOP class. The retrieve level is automatically selected based on the reload request from the user. The requested level may be one of the following: "PATIENT", "STUDY", "SERIES" or "IMAGE".

3.2.6.4 Association Acceptance Policy

The "JiveX Client Communication Service" does not accept associations.

3.2.7 JiveX DICOM MPPS SCU Service

The MPPS SCU Service "JiveX DICOM MPPS SCU Service" is an application entity that can either be started automatically together with the JiveX Server, or, manually by an administrator. When the JiveX Server is terminated, the "JiveX DICOM MPPS SCU Service" stops transmitting and aborts all active associations. The administrator is entitled to stop the "JiveX DICOM MPPS SCU Service" manually. The "JiveX DICOM MPPS SCU Service" terminates as soon as all currently active associations are closed.

3.2.7.1 SOP Classes

This application entity provides Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No

Table 31: SOP Classes for the "JiveX DICOM MPPS SCU Service"

3.2.7.2 Association Policies

General

The name of the DICOM standard application context is always proposed and is as follows:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

- The "Implementation Class UID" is "1.2.276.0.50.20100301.5.0".
- The "Implementation Version Name" is "JIVEX_TK5.0".

3.2.7.3 Association Initiation Policy

Associations are initiated by this application entity if one of the real-world activities occurs (see descriptions below).

Activity: Forward MPPS

Description and Sequencing of Activities

This activity is initiated when the "JiveX DICOM MPPS SCP Service" receives a "Modality Performed Procedure Step" (see chapter "Activity: Receive MPPS") and the system is configured to provide MPPS forwarding. In this case the "JiveX DICOM MPPS SCU Service" application entity is invoked. *Fig. 3.14: Sequencing Diagram for Activity "Forward MPPS"* shows a possible sequence of events for this activity.

Upon receipt of an MPPS N-CREATE or N-SET message from a remote MPPS SCU, the "JiveX DICOM Storage SCP Service" notifies the "JiveX DICOM MPPS SCU Service" application entity which in turn initiates an association with the pre-configured remote "Secondary MPPS SCP".

The "JiveX DICOM MPPS SCU Service" delivers a copy of the MPPS message received from the remote MPPS SCU by the "JiveX DICOM Storage SCP Service" and then closes the association.

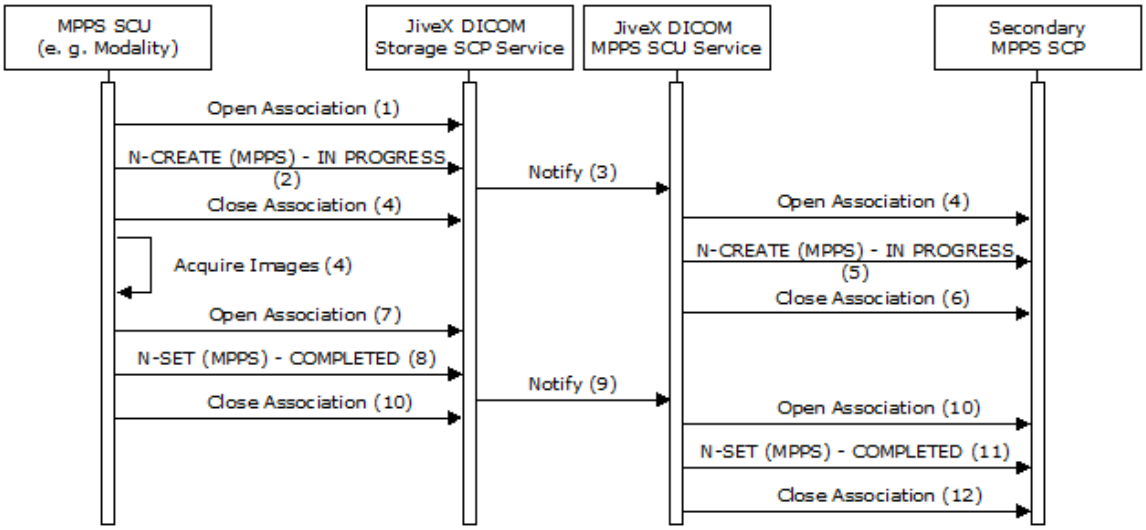

Fig. 3.14: Sequencing Diagram for Activity "Forward MPPS"

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 32: Presentation Context Table for Activity "Forward MPPS"

SOP Specific Conformance for Modality Performed Procedure Step

The "JiveX DICOM MPPS SCU" transmits an exact copy of the original MPPS messages as received by the "JiveX DICOM Storage SCP Service".

The "JiveX DICOM MPPS SCU Service" has a retry mechanism for re-initiating a transfer in case a failure occured at an earlier time.

3.2.7.4 Association Acceptance Policy

The "JiveX DICOM MPPS SCU Service" does not accept associations.

3.2.8 JiveX DICOM Print SCU Service

The *Print SCU Service* "JiveX DICOM Print SCU Service" is an application entity that can be started automatically together with the JiveX Server, or, manually by an administrator. When the JiveX Server is terminated, the "JiveX DICOM Print SCU Service" stops transmitting and aborts all active associations. The administrator is allowed to stop the "JiveX DICOM Print SCU Service" manually. The "JiveX DICOM Print SCU Service" terminates as soon as all active associations are closed.

3.2.8.1 SOP Classes

This application provides Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	Yes	No
Basic Color Print Management	1.2.840.10008.5.1.1.18	Yes	No
Basic Annotation Box	1.2.840.10008.5.1.1.15	Yes	No
Presentation LUT	1.2.840.10008.5.1.1.23	Yes	No

Table 33: SOP Classes for the "JiveX DICOM Print SCU Service"

3.2.8.2 Association Policies

General

The DICOM standard application context name is always proposed and is as follows:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

- The “Implementation Class UID” is “1.2.276.0.50.20100301.5.0”.
- The “Implementation Version Name” is “JIVEX_TK5.0”.

3.2.8.3 Association Initiation Policy

Associations are initiated by this application entity if one of the real-world activities occurs (see descriptions below).

Activity: Print Images

Description and Sequencing of Activities

This activity is initiated when the user of a JiveX Client manually initiates the creation of an image hardcopy on a pre-configured DICOM printer. *Fig. 3.15: Sequencing Diagram for Activity “Print Images”* shows a possible sequence of events for this activity. The “JiveX DICOM Print SCU Service” application entity opens an association with a selected remote Print SCP. It retrieves the printer properties and status using a Printer SOP Class N-GET request. After that, it creates a “Presentation LUT instance” (if negotiated), a “Basic Film Session” and a “Basic Film Box” using N-CREATE requests.

Following this, it fills the image boxes and annotation boxes for each “Basic Film Box” using N-SET requests. The creation of the hardcopy is subsequently triggered by an N-ACTION request. After that, the objects created in the Print SCP are deleted using N-DELETE requests. Finally, the “JiveX DICOM Print SCU Service” closes the association.

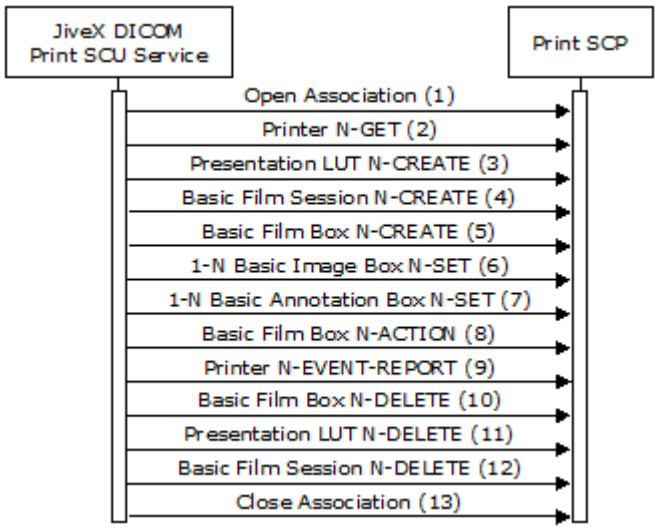

Fig. 3.15: Sequencing Diagram for Activity "Print Images"

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Print Management	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Annotation Box	1.2.840.10008.5.1.1.15	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Presentation LUT	1.2.840.10008.5.1.1.23	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 34: Presentation Context Table for Activity "Print Images"

The default behavior of the "JiveX DICOM Print SCU Service" is to propose for each of the supported SOP classes a single presentation context containing the transfer syntax shown above. The SOP classes proposed can be configured for each peer in the configuration file.

SOP Specific Conformance for Printer SOP Class

Immediately after successful association negotiation, the "JiveX DICOM Print SCU Service" issues an N-GET-RQ message in order to retrieve the contents of the well-known Printer SOP Instance. The attribute identifier list element of the message remains empty which means that the Print SCP is requested to transmit the contents of all attributes of the well-known Printer SOP Instance. If this request fails, the connection with the printer is released.

The “JiveX DICOM Print SCU Service” is able to accept N-EVENT-REPORT requests from the well-known Printer SOP instance at any time (e. g. after sending one of its own requests and before receiving a reply to that request) and immediately confirms with an N-EVENT-REPORT response message. Event reports may or may not be used to notify the user of the software of the event.

SOP Specific Conformance for Basic Film Session

After retrieval of the well-known Printer SOP instance and (optionally) the creation of a “Presentation LUT SOP instance”, the “JiveX DICOM Print SCU Service” creates a Basic Film Session. The following elements may be sent as part of the N-CREATE request:

Attribute Name	Tag	Type	VR	VM	Comment
Number of Copies	(2000,0010)	U/M	IS	1	Sent only if specified by user
Print Priority	(2000,0020)	U/M	CS	1	Sent only if specified by user
Medium Type	(2000,0030)	U/M	CS	1	Sent only if specified by user
Film Destination	(2000,0040)	U/M	CS	1	Sent only if specified by user
Film Session Label	(2000,0050)	U/U	LO	1	Sent only if specified by user
Owner ID	(2100,0160)	U/U	SH	1	Sent only if specified by user
Referenced Presentation LUT Sequence	(2050,0500)	U/MC	SQ	1	Sent if support for the Presentation LUT SOP class was negotiated, a Presentation LUT SOP instance has been successfully created and the service is configured to send the Referenced Presentation LUT SQ on Film Session level.
Referenced SOP Class UID	(0008,1150)	U/MC	UI	1	Sent if sequence is present
Referenced SOP Instance UID	(0008,1155)	U/MC	UI	1	Sent if sequence is present
Illumination	(2010,015E)	U/MC	US	1	Sent if Referenced Presentation LUT Sequence is present
Reflected Ambient Light	(2010,0160)	U/MC	US	1	Sent if Referenced Presentation LUT Sequence is present

If creation of the Basic Film Session fails, the “JiveX DICOM Print SCU Service” releases the association with the printer. After successful completion of the print job, the “JiveX DICOM Print SCU Service” uses an N-DELETE request to delete the Basic Film Session SOP instance before releasing the association. Other requests are never sent. In particular, the “JiveX DICOM Print SCU Service” never sends an N-ACTION request on Basic Film Session level.

SOP Specific Conformance for Basic Film Box

After successful creation of the Basic Film Session SOP instance, the “JiveX DICOM Print SCU Service” creates a Basic Film Box. The following elements may be sent as part of the N-CREATE request:

Attribute Name	Tag	Type	VR	VM	Comment
Image Display Format	(2010,0010)	M/M	ST	1	Possible values: “STANDARD\x,y” where “x,y” combinations can be configured for each target printer.

Attribute Name	Tag	Type	VR	VM	Comment
Referenced Film Session Sequence	(2010,0500)	M/M	SQ	1	
Referenced SOP Class UID	(0008,1150)	M/M	UI	1	
Referenced SOP Instance UID	(0008,1155)	M/M	UI	1	
Film Orientation	(2010,0040)	U/M	CS	1	Will only be sent if specified by the user.
Film Size ID	(2010,0050)	U/M	CS	1	Will only be sent if specified by the user.
Magnification Type	(2010,0060)	U/M	CS	1	Will only be sent if specified by the user.
Max Density	(2010,0130)	U/M	US	1	Will only be sent if specified by the user.
Configuration Information	(2010,0150)	U/M	ST	1	Will only be sent if specified by the user.
Annotation Display Format ID	(2010,0030)	U/U	CS	1	Will only be sent if specified by the user and if the support for the “Basic Annotation Box SOP Class” was successfully negotiated.
Smoothing Type	(2010,0080)	U/U	CS	1	Will only be sent if specified by the user.
Border Density	(2010,0100)	U/U	CS	1	Will only be sent if specified by the user.
Empty Image Density	(2010,0110)	U/U	CS	1	Will only be sent if specified by the user.
Min Density	(2010,0120)	U/U	US	1	Will only be sent if specified by the user.
Trim	(2010,0140)	U/U	CS	1	Will only be sent if specified by the user.
Requested Resolution ID	(2020,0050)	U/U	CS	1	Will only be sent if specified by the user.
Referenced Presentation LUT Sequence	(2050,0500)	U/MC	SQ	1	Sent if support for the “Presentation LUT SOP class” was negotiated, a “Presentation LUT SOP instance” has been created successfully and the service is configured to send the “Referenced Presentation LUT SQ” on “Film Box” level.
Referenced SOP Class UID	(0008,1150)	U/MC	UI	1	Will be sent if sequence is present.
Referenced SOP Instance UID	(0008,1155)	U/MC	UI	1	Will be sent if sequence is present.
Illumination	(2010,015E)	U/MC	US	1	Will be sent if “Referenced Presentation LUT Sequence” is present.
Reflected Ambient Light	(2010,0160)	U/MC	US	1	Will be sent if “Referenced Presentation LUT Sequence” is present.

If creation of the Basic Film Box fails, the “JiveX DICOM Print SCU Service” releases the association with the printer. The “JiveX DICOM Print SCU Service” never creates more than a single Basic Film Box in the context of one association.

The “JiveX DICOM Print SCU Service” uses an N-ACTION request to demand processing of the print job from the Print SCP. After a successful completion of the print job, the “JiveX DICOM Print SCU Service” uses an N-

DELETE request to delete the Basic Film Box SOP instance before deleting the Basic Film Session SOP instance and releasing the association. Other requests are never sent.

SOP Specific Conformance for Basic Grayscale Image Box

For each Basic Grayscale Image Box created as part of the Basic Film Box, the "JiveX DICOM Print SCU Service" issues a single N-SET request for each image box unless there are more image boxes than images to print, in which no N-SET request is sent for the unused image boxes. The following elements may be sent as part of the N-SET request:

Attribute Name	Tag	Type	VR	VM	Comment
Image Position	(2020,0010)	M/M	US	1	
Basic Grayscale Image Sequence	(2020,0110)	M/M	SQ	1	
Samples Per Pixel	(0028,0002)	M/M	US	1	The value is "1".
Photometric Interpretation	(0028,0004)	M/M	CS	1	The value is "MONOCHROME2".
Rows	(0028,0010)	M/M	US	1	
Columns	(0028,0011)	M/M	US	1	
Pixel Aspect Ratio	(0028,0034)	MC/M	IS	2	Sent if pixel aspect ratio is not "1\1".
Bits Allocated	(0028,0100)	M/M	US	1	Value is 16 unless the service has been configured to send 8-bit bitmaps to the printer, in which case the value is 8.
Bits Stored	(0028,0101)	M/M	US	1	Value is 12 if Bits Allocated is 16, 8 otherwise.
High Bit	(0028,0102)	M/M	US	1	The value is "11", if the value of the "Bits Allocated" attribute is set to "16"; otherwise it is "7".
Pixel Representation	(0028,0103)	M/M	US	1	The value is "0".
Pixel Data	(7FE0,0010)	M/M	OW	1	See note below.
Polarity	(2020,0020)	U/M	CS	1	Will only be sent if specified by the user.
Magnification Type	(2010,0060)	U/U	CS	1	Will only be sent if specified by the user.
Smoothing Type	(2010,0080)	U/U	CS	1	Will only be sent if specified by the user.
Configuration Information	(2010,0150)	U/U	ST	1	Will only be sent if specified by the user.
Requested Image Size	(2020,0030)	U/U	DS	1	Will only be sent if specified by the user.
Requested Decimate/Crop Behavior	(2020,0040)	U/U	CS	1	Will only be sent if specified by the user.

If support for the Presentation LUT SOP Class has not been negotiated with the Print SCP, then the "JiveX DICOM Print SCU Service" assumes that the printer uses a display curve related to the DICOM Grayscale Display Standard Function with viewing conditions (illumination and reflection) defined in a proprietary manner outside the print protocol. All images will be sent in P-values, with all Presentation LUTs "burned in" as if a Presentation LUT Shape of "IDENTITY" had been negotiated.

SOP Specific Conformance for Basic Color Image Box

For each Basic Color Image Box created as part of the Basic Film Box, the JiveX DICOM Print SCU Service issues a single N-SET request for each image box unless there are more image boxes than images to print, in which no N-SET request is sent for the unused image boxes. The following elements may be sent as part of the N-SET request:

Attribute Name	Tag	Type	VR	VM	Comment
Image Position	(2020,0010)	M/M	US	1	
Basic Color Image Sequence	(2020,0111)	M/M	SQ	1	
Samples Per Pixel	(0028,0002)	M/M	US	1	The value is “3”.
Photometric Interpretation	(0028,0006)	M/M	CS	1	The value is “RGB”.
Planar Configuration	(0028,0010)	M/M	US	1	The value is “1”.
Rows	(0028,0010)	M/M	US	1	
Columns	(0028,0011)	M/M	US	1	
Pixel Aspect Ratio	(0028,0034)	MC/M	IS	2	Will be sent if the value of the pixel aspect ratio is not “1\1”.
Bits Allocated	(0028,0100)	M/M	US	1	The value is “16”, unless the service has been configured to send 8-bit bitmaps to the printer, in which case the value is “8”.
Bits Stored	(0028,0101)	M/M	US	1	The value is “12”, if the value for the “Bits Allocated” attribute is “16”; otherwise it is “8”.
High Bit	(0028,0102)	M/M	US	1	The value is “11”, if the value for the “Bits Allocated” attribute is “16”; otherwise it is “7”.
Pixel Representation	(0028,0103)	M/M	US	1	The value is “0”.
Pixel Data	(7FE0,0010)	M/M	OW	1	
Polarity	(2020,0020)	U/M	CS	1	Will only be sent if specified by the user.
Magnification Type	(2010,0060)	U/U	CS	1	Will only be sent if specified by the user.
Smoothing Type	(2010,0080)	U/U	CS	1	Will only be sent if specified by the user.
Configuration Information	(2010,0150)	U/U	ST	1	Will only be sent if specified by the user.
Requested Image Size	(2020,0030)	U/U	DS	1	Will only be sent if specified by the user.
Requested Decimate/ Crop Behavior	(2020,0040)	U/U	CS	1	Will only be sent if specified by the user.

SOP Specific Conformance for Basic Annotation Box

If support for the Basic Annotation Box SOP Class has been negotiated and Annotation Boxes have been created as part of the Basic Film Box, the “JiveX DICOM Print SCU Service“ may issue a single N-SET request for each annotation box. The following elements may be sent as part of the N-SET request:

Attribute Name	Tag	Type	VR	VM	Comment
Annotation position	(2030,0010)	M/M	US	1	

Attribute Name	Tag	Type	VR	VM	Comment
Text String	(2030,0020)	U/M	LO	1	

SOP Specific Conformance for Presentation LUT

If support for the Presentation LUT SOP Class has been negotiated, the "JiveX DICOM Print SCU Service" creates a Presentation LUT SOP instance before creating a Basic Film Session. The following elements may be sent as part of the N-CREATE request:

Attribute Name	Tag	Type	VR	VM	Comment
Presentation LUT Sequence	(2050,0010)	MC/M	SQ	1	Will be sent if the Presentation LUT Shape is not present. Only one item is sent.
LUT Descriptor	(0028,3002)	MC/M	US/SS	3	Will be sent if the sequence is present
LUT Explanation	(0028,3003)	U/U	LO	1	
LUT Data	(0028,3006)	MC/M	OW/US/SS	1/1-n/1-n	Will be sent if the sequence is present
Presentation LUT Shape	(2050,0020)	MC/M	CS	1	Will be sent if the Presentation LUT Sequence is not present

The "JiveX DICOM Print SCU Service" never creates more than a single Presentation LUT as part of a single association. If a print job contains images that are to be printed with different Presentation LUTs, then the "JiveX DICOM Print SCU Service" renders the Presentation LUTs into the image data before sending it to the printer and uses a Presentation LUT Shape of IDENTITY for the print job.

The Presentation LUT SOP instance is deleted with an N-DELETE request after completion of the print job and before the release of the association.

3.2.8.4 Association Acceptance Policy

The "JiveX DICOM Print SCU Service" does not accept associations.

3.2.9 JiveX DICOM Notification SCU Service

The Notification Service "JiveX DICOM Notification SCU Service" is an application entity that can either be started automatically together with the JiveX Server or manually by an administrator. When the JiveX Server is terminated, the "JiveX DICOM Notification SCU Service" stops transmitting and aborts all active associations. The administrator is entitled to stop the JiveX Service manually. The "JiveX DICOM Notification SCU Service" terminates as soon as all currently active associations are closed.

3.2.9.1 SOP Classes

This application provides Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Instance Availability Notification	1.2.840.10008.5.1.4.33	Yes	No
Basic Study Content Notification	1.2.840.10008.1.9	Yes	No

Table 35: Classes for the "JiveX DICOM Notification SCU Service"

3.2.9.1.1 Association Policies

General

The proposed name of the DICOM standard application context is always as follows:

Application context name	1.2.840.10008.3.1.1.1

Number of Associations

The number of parallel associations can be configured. It should be limited by the resources of the underlying operating system.

Asynchronous Nature

An asynchronous mode is not supported.

Implementation Identifying Information

- The "Implementation Class UID" is "1.2.276.0.50.20100301.5.0".
- The "Implementation Version Name" is "JIVEX_TK5.0".

3.2.9.1.2 Association Initiation Policy

Associations are initiated by this application entity if one of the real-world activities occurs which are described below.

Activity: Send Study Content Notification

Description and Sequencing of Activities

This activity is initiated when the "JiveX DICOM Storage SCP Service" receives new objects (see chapter "Activity: Receive Objects") and the system is configured to provide Study Content Notifications to a remote Study Content Notification SCP. In this case the "JiveX DICOM Notification SCU Service" application entity is invoked.

Fig. 3.16: Sequencing Diagram for Activity "Send Study Content Notification" shows a possible sequence of events for this activity. The "JiveX DICOM Notification SCU Service" opens an association with the remote Study Content Notification SCP and provides one or more Study Content Notifications using C-STORE request messages. Finally, the "JiveX DICOM Notification SCU Service" closes the association.

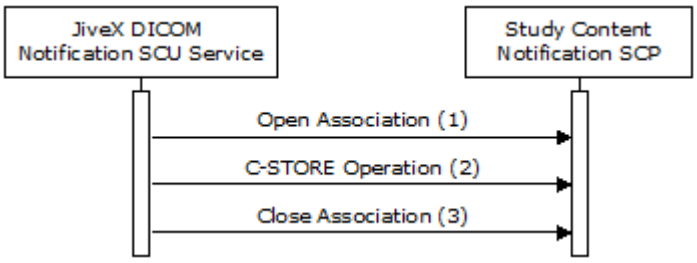

Fig. 3.16: Sequencing Diagram for Activity "Send Study Content Notification"

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Study Content Notification	1.2.840.10008.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 36: Presentation Context Table for Activity "Send Study Content Notification"

SOP Specific Conformance for Basic Study Content Notification

The "JiveX DICOM Query/Retrieve SCP Service" provides standard conformance to the Basic Study Content Notification SOP Class. The "JiveX DICOM Notification SCU Service" notifies the SCP about the successful receipt and storage of new objects. The "JiveX DICOM Notification SCU Service" takes no actions on any answers from the SCP.

The dataset sent in the notification request contains the Type 2C Attribute Retrieve AE Title (0008, 0054) in the Referenced Series Sequence (0008, 1115).

The "JiveX DICOM Notification SCU Service" has a retry mechanism for re-initiating a transfer in case of a failure that has occurred at an earlier time.

3.2.9.1.3 Association Acceptance Policy

"JiveX DICOM Notification SCU Service" does not accept associations.

3.2.10 JiveX WADO-URI Service

The "WADO-URI Service" is an application entity that can automatically be started together with the JiveX Server or manually by an administrator. It allows other Systems to retrieve DICOM Objects or rendered Images and Documents via a HTTP request.

3.2.10.1 WADO-URI Retrieve Imaging Document Set

A DICOM Object on the instance level can be retrieved by this service.

| **Parameter** | **Restrictions** | | Transfer Syntaxes Supported | Default: “Explicit VR Little Endian” Optional Parameter “transferSyntax” (Only supported Transfer Syntaxes). | | SOP Class restrictions | No Restriction to SOP classes. | | Size Restriction | No Restriction to sizes. | | Anonymization | Unsupported | | Table 37: "WADO-URI Retrieve Imaging Document Set”

3.2.10.2 WADO-URI Retrieve Rendered Imaging Document Set

A Rendered Image or a Document on the instance level can be retrieved by this service.

Parameter	Restrictions
Transfer Syntaxes Supported	Default: “Explicit VR Little Endian” Optional Parameter “transferSyntax”.
SOP Class restrictions	Content Type “application/pdf” is restricted to SOP Class “1.2.840.10008.5.1.4.1.1.104.1”. Content Type “application/xml” is restricted to SOP Class “1.2.840.10008.5.1.4.1.1.104.2”.
Content Types available	“application/dicom”, “application/pdf”, “application/xml”, “application/dicom+xml”, “application/octet-stream”, “image/jpeg”, “image/jp2”, “image/png”, “text/xml”
Rendered Formats available	For Image IODs: “image/jpeg”, “image/jp2”, “image/png” For non-Image IODs: “application/pdf”, “application/xml”, “text/xml”
Image Quality restrictions	Must be in range 1 - 100
Anonymization	Unsupported
Table 38: "WADO-URI Retrieve Imaging Document Set”	

3.2.10.3 WADO-URI Connection Policies

The following table describes additional Connection Policies and security aspects.

Parameters	All URI connections are limited to HTTP GET requests. The JiveX-WADO-URI Service ignores all unknown HTTP header parameters.
Authentication/Authorization	The service can be setup to restrict WADO URI requests only on known communication partners by using HTTP Basic Authentication.
Encryption	The service can be setup to encrypt the communication using Transport Layer Security (TLS).
Number of simultaneous HTTP requests	10, 1, 200 (default, min, max)
Table 39: "WADO-URI Connection Policies and Security”	

3.2.10.4 WADO-URI Convert Transfer Syntax

A DICOM Object on the instance level can always be returned with the origin DICOM Object Transfer Syntax. The “Wado-URI Service” can convert the origin DICOM Object Transfer Syntax by using the Parameter “transferSyntax”.

Source Transfer Syntax		**Target Transfer Syntax**	
Name	**UID**	**Name**	**UID**
Implicit VR Little Endian	1.2.840.10008.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
Explicit VR Little Endian	1.2.840.10008.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	Explicit VR Little Endian	1.2.840.10008.1.2.1
JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91	Explicit VR Little Endian	1.2.840.10008.1.2.1
Table 40: Supported encoding schemes for conversion with transfer syntax			

3.3 Network Interfaces

3.3.1 Physical Network Interface

The application is indifferent to the physical medium over which TCP/IP executes.

3.3.2 Additional Protocols

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

3.3.3 IPv4 and IPv6 Support

This product only supports IPv4 connections.

3.4 Configuration

3.4.1 AE Title/Presentation Address Mapping

3.4.1.1 Local AE Titles

The local application entity names can be configured in the configuration file, but not at run time.

Application Entity	Default AE Title	Default TCP/IP Port
JiveX DICOM Storage SCP Service	JIVEX	4499
JiveX DICOM Storage SCU Service	JIVEX	Not applicable
JiveX Client Communication Service	JIVEX	Not applicable
JiveX DICOM Query/Retrieve SCP Service	JIVEX	4498
JiveX DICOM Notification SCU Service	JIVEX	Not applicable
JiveX DICOM Storage Commitment SCP Service	JIVEX	Not applicable
JiveX DICOM MPPS SCU Service	JIVEX	Not applicable
JiveX DICOM Print SCU Service	JIVEX	Not applicable

Table 41: AE Title Configuration Table

3.4.1.2 Remote AE Title/Presentation Address Mapping

The AE Title, host names and port numbers of remote applications can be configured in the configuration file (not at run time). All application entities that initiate associations require that the called application entity name must be configured together with the presentation address (TCP/IP address and port number) to be used in the configuration file. This affects the following application entities:

- JiveX DICOM Storage SCU Service
- JiveX Client Communication Service
- JiveX DICOM Notification SCU Service
- JiveX DICOM Storage Commitment SCP Service
- JiveX DICOM MPPS SCU Service
- JiveX DICOM Print SCU Service

The "JiveX DICOM Query/Retrieve SCP Service" requires the move application entity communicated in each retrieve request to be configured together with the presentation address.

The application entities accepting associations ignore the calling and the called application entity titles unless these are explicitly configured. This affects the following application entities:

- JiveX DICOM Storage SCP Service
- JiveX DICOM Query/Retrieve SCP Service

3.4.2 Parameters

The JiveX Server configuration parameters related to DICOM communications are listed below. A blank cell under the 'Default Value' heading indicates that there is no default value for the specific configuration attribute.

Parameter	Configurable	Default Value
General Parameters		

Parameter	Config-urable	Default Value
Time-out waiting for acceptance or rejection response to an Association Open Request (Application Level timeout).	Yes	60 s
General DIMSE level time-out values	No	None
Time-out waiting for response to TCP/IP connect request (Low-level timeout).	Yes	60 s
Time-out waiting for acceptance of a TCP/IP message over the network (Low-level timeout).	Yes	60 s
Time-out for waiting for data between TCP/IP packets (Low-level time-out).	Yes	60 s
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	None
Maximum PDU size the AEs can send	Yes	32 kB
JiveX DICOM Storage SCP Service		
Maximum PDU size the AE can receive	Yes	32 kB
AE specific DIMSE level time-out values	No	None
Number of simultaneous associations	Yes	Unlimited
SOP Class support	Yes	All supported
Transfer Syntax support	Yes, per SOP class	All supported
Attribute coercion	Yes	No coercion
Lifetime period for automatic image deletion	Yes	No deletion
Auto-routing of incoming objects	Yes	No auto-routing
Forwarding of incoming MPPS messages	Yes	No forwarding
Study content notification for incoming objects	Yes	No notification
Other parameters that are configurable	Yes	None
JiveX DICOM Storage SCU Service		
Maximum PDU size the AE can receive	Yes, per peer	32 kB
AE specific DIMSE level time-out values	Yes	60 s
Number of simultaneous associations	Yes	Unlimited
SOP Class support	Yes	see server.xml
Transfer Syntax support	Yes	VR Implicit Little Endian, VR Explicit Little Endian
Schedule object transfer for specific time	Yes, per peer	Immediate send
Retry behavior for failed transmissions	Yes	Try again after one, five, 60 and 360 minute(s)
Other configurable parameters	Yes	None

Parameter	Config-urable	Default Value
JiveX Client Communication Service		
Maximum PDU size the AE can receive	Yes, per peer	32 kB
AE specific DIMSE level time-out values	Yes	None
Number of simultaneous associations	Yes	Unlimited
Optional return keys for queries	Yes	None
Maximum number of “Find” responses before the cancelling	Yes	1000
Other parameters which can be configured	Yes	None
JiveX DICOM Query/Retrieve SCP Service		
Maximum PDU size the AE can receive	Yes	32 kB
AE specific DIMSE level time-out values	Yes	None
Number of simultaneous associations	Yes	Unlimited
Other parameters which can be configured	Yes	None
JiveX DICOM Notification SCU Service		
Maximum PDU size the AE can receive	Yes, per peer	32 kB
AE specific DIMSE level time-out values	No	None
Number of simultaneous associations	Yes	Unlimited
Retry behavior for failed transmissions	Yes	Try again after one, five, 60 and 360 minute(s)
Other parameters which can be configured	No	None
JiveX DICOM Storage Commitment SCP Service		
Maximum PDU size the AE can receive	Yes, per peer	32 kB
AE specific DIMSE level time-out values	No	None
Number of simultaneous associations	Yes	Unlimited
Timeout until unsuccessful Storage Commitment is reported	Yes	1 day, < five days
Retry behavior for failed transmissions	Yes	Try again after one, five, 60 and 360 minute(s)
Schedule transfer for specific time	Yes, per peer	Immediate send
Other parameters that are configurable	No	None
JiveX DICOM MPPS SCU Service		
Maximum PDU size the AE can receive	Yes, per peer	32 kB
AE specific DIMSE level time-out values	No	None
Number of simultaneous associations	Yes	Unlimited
Retry behavior for failed transmissions	Yes	Try again after one, five, 60 and 360 minute(s)

Parameter	Config-urable	Default Value
Other parameters that are configurable	Yes	None
JiveX DICOM Print SCU Service**		
Maximum PDU size the AE can receive	Yes, per peer	32 kB
AE specific DIMSE level time-out values	No	None
Number of simultaneous associations	Yes	Unlimited
SOP Class support	Yes, per peer	No default
Support for optional Film Session attributes	Yes, per peer	No default
Support for optional Film Box attributes	Yes, per peer	No default
Support for optional Image Box attributes	Yes, per peer	No default
Support for combinations of image display format, orientation and film size ID	Yes, per peer	No default
Support for annotation display format IDs	Yes, per peer	No default
Grayscale image transfer 12bit or 8bit/pixel	Yes, per peer	No default
Range of font sizes for textual annotations	Yes, per peer	No default
Support for Print SCPs that use the Film Session Label as annotation	Yes, per peer	No default
Support for Print SCPs that expect the Referenced Presentation LUT SQ on Film Session level instead of Film Box level	Yes, per peer	No default
Automatic re-scaling of very small or very large images during pre-formatting phase	Yes, per peer	No default
Prefer rendering of Presentation LUT on SCU or SCP side	Yes, per peer	No default
Enforce rule that Presentation LUT number of entries matches image bit depth	Yes, per peer	No default
Default values for Illumination and Reflected Ambient Light	Yes, per peer	2000/10

Table 42: Configuration Parameters Table

4 Media Interchange

4.1 Implementation Model

4.1.1 Application Data Flow

Fig. 4.1: Application Data Flow Diagram

The Image Report Service Application Entity exports DICOM instances to a storage medium. It is associated with the local real-world activity “Export to medium”. “Export to medium” is performed upon user request for selected patients, studies, series or instances.

4.1.2 Functional Definition of AE’s

4.1.2.1 Functional Definition of the Image Report Service Application Entity

Activation of the “Create Image Report” icon will pass the currently selected patients, studies, series or instances to the Image Report Service Application Entity. The SOP Instances associated with the selection will be collected into one export job. The contents of each export job will be written to one or more storage media.

4.1.3 Sequencing of Real-World Activities

A user starts the “Export to medium” activity by activating the “Create Image Report” icon. After that, the Image Report Service Application Entity collects all data which will be copied to the medium.

After that, an overview of all medium export jobs will be presented to the user. The user can manually start the writing process. If no matching empty medium is available in the export device, the user will be prompted to insert such a medium.

If more than one medium is required to finish the job, the user will be prompted after each medium which is written. After the creation of each medium, a matching media label will be suggested to the user.

4.1.4 File Meta Information Options

The implementation information written to the File Meta Header in each DICOMDIR file is as follows:

Implementation Class UID	1.2.276.0.50.20100301.5.0	Description
Implementation Version Name	JIVEX_TK5.0	Table : DICOM Implementation Class and Version for Media Storage

Table 43: DICOM Implementation Class and Version for Media Storage

4.2 Application Entity Specifications

4.2.1 Image Report Service Application Entity Specification

The Image Report Service Application Entity provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed below:

Application Profiles Supported	Real World Activity	Role
STD-GEN-CD	Export to medium	FSC
STD-CTMR-CD	Export to medium	FSC
STD-US-ID-SF-CDR	Export to medium	FSC
STD-US-ID-MF-CDR	Export to medium	FSC
STD-US-SC-SF-CDR	Export to medium	FSC
STD-US-SC-MF-CDR	Export to medium	FSC
STD-US-CC-SF-CDR	Export to medium	FSC
STD-US-CC-MF-CDR	Export to medium	FSC
STD-XABC-CD	Export to medium	FSC
STD-XA1K-CD	Export to medium	FSC
STD-XA1K-DVD	Export to medium	FSC
STD-GEN-DVD-JPEG	Export to medium	FSC
STD-GEN-USB-JPEG	Export to medium	FSC
STD-GEN-USB-JP2K	Export to medium	FSC

Table 44: Application Profiles, activities and roles for the Image Report Service

4.2.1.1 File Meta Information for the Application Entity

No File Meta Information is configurable.

4.2.1.2 Real-World Activities

Activity: Export to medium

The Image Report Service Application Entity acts as an FSC when requested to export SOP Instances from the database to a medium.

A dialogue will be presented allowing the user to modify the suggested media label. Also, the dialogue provides control over the archive device to be used. If the contents of the job will not fit on a single media, an automated distribution to multiple export jobs will be suggested which can be adapted by the user.

The user will be prompted to insert an empty medium for each export job. The contents of the export job and a corresponding DICOMDIR will be written to the medium.

If the medium is a disc-based medium (e.g. CD or DVD), the data will be written in single-session mode. Writing in multi-session mode is not supported. The user can cancel an export job in the job queue.

Media Storage Application Profiles

The Image Report Service Application Entity supports the following Media Storage Application Profiles:

- STD-GEN-CD
- STD-CTMR-CD
- STD-US-ID-SF-CDR
- STD-US-ID-MF-CDR
- STD-US-SC-SF-CDR
- STD-US-SC-MF-CDR
- STD-US-CC-SF-CDR
- STD-US-CC-MF-CDR
- STD-XABC-CD
- STD-XA1K-CD
- STD-GEN-DVD-JPEG
- STD-GEN-USB-JPEG
- STD-GEN-USB-JP2K

Options

The Image Report Service supports the SOP Classes listed in the table below:

Information Object Definition	SOP Class UID	Transfer Syntax
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	see below
Hardcopy Color Image Storage (RETIRED)	1.2.840.10008.5.1.1.30	see below
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	see below
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	see below
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	see below
Digital Mammography Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	see below
Digital Mammography Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	see below
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	see below
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	see below
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	see below
Enhanced X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	see below
X-Ray Angiographic Bi-Plane Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.12.3	see below
X-Ray Radio fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	see below
Enhanced X-Ray Radio fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	see below
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128	see below
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	see below
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	see below
Ultrasound Multiframe Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.3	see below

Information Object Definition	SOP Class UID	Transfer Syntax
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	see below
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	see below
Nuclear Medicine Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.5	see below
Ultrasound Image Storage (RETIRED)	1.2.840.10008.5.1.4.1.1.6	see below
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	see below
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	see below
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	see below
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	see below
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	see below
Multiframe Grayscale True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	see below
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	see below
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	see below
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	see below
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	see below
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	see below

Table 45: IODs and SOP Classes for the Image Report Service

Supported Transfer Syntaxes for the Image Report Service AE:

Transfer Syntax Name	Transfer Syntax UID
Explicit VR Little Endian	1.2.840.10008.1.2.1
JPEG Baseline (Lossy)	1.2.840.10008.1.2.4.50
JPEG Extended (Lossy)	1.2.840.10008.1.2.4.51
JPEG Lossless (Process 14)	1.2.840.10008.1.2.4.57
JPEG Lossless	1.2.840.10008.1.2.4.70
JPEG2000	1.2.840.10008.1.2.4.90
JPEG2000 (Lossy)	1.2.840.10008.1.2.4.91

Table 46: Transfer Syntaxes for the Image Report Service AE

4.2.2 Augmented and private Application Profiles

There is none.

4.2.3 Media configuration

The contents of the media may be configured by the user.

5 Support of Character Sets

This application supports the following Character Set:

ISO_IR 100 (ISO 8859–1 Latin–1 Western European)

ISO_IR 101 (ISO 8859–2 Latin–2 Central European)

ISO_IR 109 (ISO 8859–3 Latin–4 South European)

ISO_IR 110 (ISO 8859–4 Latin–3 North European)

ISO_IR 144 (ISO 8859–5 Latin/Cyrillic)

ISO_IR 127 (ISO 8859–6 Latin/Arabic)

ISO_IR 126 (ISO 8859–7 Latin/Greek)

ISO_IR 138 (ISO 8859–8 Latin/Hebrew)

ISO_IR 148 (ISO 8859–9 Latin–5 Turkish)

ISO_IR 13 (Japanese Industrial Standard (JIS) X 0201: Katakana)

ISO_IR 14 (Japanese Industrial Standard (JIS) X 0201: Romaji)

ISO_IR 166 (Thai Industrial Standard (TIS) 620–2533 1990.)

ISO_IR 192 (Unicode in UTF–8)

GB18030 (GB 18030)

6 Security

6.1 Security Profiles

Security Profiles are not supported.

6.2 Association Level Security

A list of calling application entity titles may be configured. If this list is not explicitly configured, any calling application entity title may open an association.

6.3 Application Level Security

The JiveX client supports user authentication using login and password.

7 Annexes

7.1 IOD Contents

7.1.1 Created SOP Instance(s)

7.1.1.1 Grayscale Softcopy Presentation State IOD

The following table specifies the modules of the Grayscale Softcopy Presentation State instances created and transmitted by the JiveX system.

IE	Module	Reference	Presence of Module
Patient	Patient	Table 49	ALWAYS
	Clinical Trial Subject		NEVER
Study	General Study	Table 50	ALWAYS
	Patient Study		NEVER
	Clinical Trial Study		NEVER
Series	General Series	Table 51	ALWAYS
	Clinical Trial Series		NEVER
	Presentation Series	Table 52	ALWAYS
Equipment	General Equipment	Table 53	ALWAYS
Presentation	Presentation State	Table 54	ALWAYS
State	Mask		NEVER
	Display Shutter	Table 55	Only if Shutter is to be applied
	Bitmap Display Shutter		NEVER
	Overlay Plane		NEVER
	Overlay/Curve Activation		NEVER
	Displayed Area	Table 56	ALWAYS
	Graphic Annotation	Table 57	Only if annotations are to be applied
	Spatial Transformation	Table 58	Only if spatial transformations are to be applied
	Graphic Layer	Table 59	Only if annotations are to be applied
	Modality LUT	Table 60	Only if Modality LUT is to be applied
	Softcopy VOI LUT	Table 61	Only if VOI LUT is to be applied
	Softcopy Presentation LUT	Table 62	ALWAYS
	SOP Common	Table 65	ALWAYS

Table 47: IOD of created Grayscale Softcopy Presentation State Instances

7.1.1.2 Key Object Selection Document IOD

Table specifies the modules of the Key Object Selection Document instances created and transmitted by the JiveX system.

The SR Document Content module is not reproduced in section *"Modules"* due to the recursive nature of its definition. Key Object Selection Documents created by this implementation include this module, constructed from TID 2010 Key Object Selection invoked at the root node.

IE	Module	Reference	Presence of Module
Patient	Patient		ALWAYS
	Specimen Identification		NEVER
	Clinical Trial Subject		NEVER
Study	General Study	Table 50	ALWAYS
	Patient Study		NEVER
	Clinical Trial Study		NEVER
Series	Key Object Doc. Series	Table 63	ALWAYS
	Clinical Trial Series		NEVER
Equipment	General Equipment	Table 53	ALWAYS
Document	Key Object Document	Table 64	ALWAYS
	SR Document Content	See above	ALWAYS
	SOP Common	Table 65	ALWAYS

Table 48: IOD of created Key Object Selection Document Instances

7.1.1.3 Modules

The following tables specify the attributes which are sent for the modules which are created as part of the IODs (specified in sections *"Grayscale Softcopy Presentation State IOD"* and *"Key Object Selection Document IOD"*).

The "Value" column specifies the attribute content. If the content is not specified, all values that are legal for this attribute may be sent. The tables use a number of abbreviations. The abbreviations used in the "Presence of ..." column are as follows:

- ALWAYS Always Present
- ANAP Attribute Not Always Present
- VNAP Value Not Always Present (may be zero length)

The abbreviations used in the "Source" column are as follows:

- USER The attribute value source is from the user input.
- AUTO The attribute value is generated automatically.
- CONFIG The attribute value source is a configurable parameter.

- IMG The attribute value is taken over from the source image.

Attribute Name	Tag	VR	Value	Presence	Source
Patient's Name	(0010,0010)	PN		VNAP	IMG
Patient ID	(0010,0020)	LO		VNAP	IMG
Patient's Birth Date	(0010,0030)	DA		VNAP	IMG
Patient's Sex	(0010,0040)	CS		VNAP	IMG

Table 49: Patient Module

Attribute Name	Tag	VR	Value	Presence	Source
Study Instance UID	(0020,000D)	UI		ALWAYS	IMG
Study Date	(0008,0020)	DA		VNAP	IMG
Study Time	(0008,0030)	TM		VNAP	IMG
Referring Physician's Name	(0008,0090)	PN		VNAP	IMG
Study ID	(0020,0010)	SH		VNAP	IMG
Accession Number	(0008,0050)	SH		VNAP	IMG

Table 50: General Study Module

Attribute Name	Tag	VR	Value	Presence	Source
Modality	(0008,0060)	CS		ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		VNAP	AUTO
Laterality	(0020,0060)	CS		VNAP	IMG

Table 51: General Series Module

Attribute Name	Tag	VR	Value	Presence	Source
Modality	(0008,0060)	CS	PR	ALWAYS	AUTO

Table 52: Presentation Series Module

Attribute Name	Tag	VR	Value	Presence	Source
Manufacturer	(0008,0070)	LO		VNAP	AUTO

Table 53: General Equipment Module

Attribute Name	Tag	VR	Value	Presence	Source
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Presentation Label	(0070,0080)	CS		ALWAYS	User
Presentation Description	(0070,0081)	LO		VNAP	User

Attribute Name	Tag	VR	Value	Presence	Source
Presentation Creation Date	(0070,0082)	DA		ALWAYS	AUTO
Presentation Creation Time	(0070,0083)	TM		ALWAYS	AUTO
Presentation Creator's Name	(0070,0084)	PN		VNAP	AUTO
Referenced Series Sequence	(0008,1115)	SQ		ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Referenced Image Sequence	(0008,1140)	SQ		ALWAYS	AUTO
Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
Referenced Frame Number	(0008,1160)	IS		ANAP	AUTO
Shutter Presentation Value	(0018,1622)	US		ANAP	AUTO

Table 54: Presentation State Module

Attribute Name	Tag	VR	Value	Presence	Source
Shutter Shape	(0018,1600)	CS	RECTANGULAR, CIRCULAR, POLYGONAL	ALWAYS	AUTO
Shutter Left Vertical Edge	(0018,1602)	IS		ANAP	AUTO
Shutter Right Vertical Edge	(0018,1604)	IS		ANAP	AUTO
Shutter Upper Horizontal Edge	(0018,1606)	IS		ANAP	AUTO
Shutter Lower Horizontal Edge	(0018,1608)	IS		ANAP	AUTO
Center of Circular Shutter	(0018,1610)	IS		ANAP	AUTO
Radius of Circular Shutter	(0018,1612)	IS		ANAP	AUTO
Vertices of the Polygonal Shutter	(0018,1620)	IS		ANAP	AUTO
Shutter Presentation Value	(0018,1622)	US		ANAP	AUTO

Table 55: Display Shutter Module

Attribute Name	Tag	VR	Value	Presence	Source
Displayed Area Selection Sequence	(0070,005A)	SQ		ALWAYS	AUTO
Referenced Image Sequence	(0008,1140)	SQ		ANAP	AUTO
Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO
Referenced Frame Number	(0008,1160)	IS		ANAP	AUTO
Displayed Area Top Left Hand Corner	(0070,0052)	SL		ALWAYS	AUTO
Displayed Area Bottom Right Hand Corner	(0070,0053)	SL		ALWAYS	AUTO
Presentation Size Mode	(0070,0100)	CS	SCALE TO FIT, MAGNIFY	ALWAYS	AUTO
Presentation Pixel Spacing	(0070,0101)	DS		ANAP	AUTO
Presentation Pixel Aspect Ratio	(0070,0102)	IS		ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence	Source
Presentation Pixel Magnification Ratio	(0070,0103)	FL		ANAP	AUTO

Table 56: Displayed Area Module

Attribute Name	Tag	VR	Value	Presence	Source
Graphic Annotation Sequence	(0070,0001)	SQ		ALWAYS	AUTO
Referenced Image Sequence	(0008,1140)	SQ		ANAP	AUTO
Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO
Referenced Frame Number	(0008,1160)	IS		ANAP	AUTO
Graphic Layer	(0070,0002)	CS		ALWAYS	AUTO
Text Object Sequence	(0070,0008)	SQ		ANAP	AUTO
Bounding Box Annotation Units	(0070,0003)	CS		ANAP	AUTO
Anchor Point Annotation Units	(0070,0004)	CS		ANAP	AUTO
Unformatted Text Value	(0070,0006)	ST		ANAP	USER
Bounding Box Top Left Hand Corner	(0070,0010)	FL		ANAP	AUTO
Bounding Box Bottom Right Hand Corner	(0070,0011)	FL		ANAP	AUTO
Bounding Box Text Horizontal Justification	(0070,0012)	CS		ANAP	AUTO
Anchor Point	(0070,0014)	FL		ANAP	AUTO
Anchor Point Visibility	(0070,0015)	CS		ANAP	AUTO
Graphic Object Sequence	(0070,0009)	SQ		ANAP	AUTO
Graphic Annotation Units	(0070,0005)	CS		ANAP	AUTO
Graphic Dimensions	(0070,0020)	US	2	ANAP	AUTO
Number of Graphic Points	(0070,0021)	US		ANAP	AUTO
Graphic Data	(0070,0022)	FL		ANAP	AUTO
Graphic Type	(0070,0023)	CS	POINT, POLYLINE, INTERPOLATED, CIRCLE, ELLIPSE	ANAP	AUTO
Graphic Filled	(0070,0024)	CS		ANAP	AUTO

Table 57: Graphic Annotation Module

Attribute Name	Tag	VR	Value	Presence	Source
Image Rotation	(0070,0042)	US	0, 90, 180, 270	ALWAYS	AUTO
Image Horizontal Flip	(0070,0041)	CS		ALWAYS	AUTO

Table 58: Spatial Transformation Module

Attribute Name	Tag	VR	Value	Presence	Source
Graphic Layer Sequence	(0070,0060)	SQ		ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence	Source
Graphic Layer	(0070,0002)	CS		ALWAYS	AUTO
Graphic Layer Order	(0070,0062)	IS		ALWAYS	AUTO
Graphic Layer Recommended Display Grayscale Value	(0070,0066)	US		ANAP	AUTO
Graphic Layer Recommended Display RGB Value	(0070,0067)	US		ANAP	AUTO
Graphic Layer Description	(0070,0068)	LO		ANAP	AUTO

Table 59: Graphic Layer Module

Attribute Name	Tag	VR	Value	Presence	Source
Modality LUT Sequence	(0028,3000)	SQ		ANAP	IMG
LUT Descriptor	(0028,3002)	US/SS		ANAP	IMG
LUT Explanation	(0028,3003)	LO		ANAP	IMG
Modality LUT Type	(0028,3004)	LO		ANAP	IMG
LUT Data	(0028,3006)	US/SS/OW		ANAP	IMG
Rescale Intercept	(0028,1052)	DS		ANAP	IMG
Rescale Slope	(0028,1053)	DS		ANAP	IMG
Rescale Type	(0028,1054)	LO		ANAP	IMG

Table 60: Modality LUT Module

Attribute Name	Tag	VR	Value	Presence	Source
Softcopy VOI LUT Sequence	(0028,3110)	SQ		ALWAYS	AUTO
Referenced Image Sequence	(0008,1140)	SQ		ANAP	AUTO
Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO
Referenced Frame Number	(0008,1160)	IS		ANAP	AUTO
VOI LUT Sequence	(0028,3010)	SQ		ANAP	IMG
LUT Descriptor	(0028,3002)	US/SS		ANAP	IMG
LUT Explanation	(0028,3003)	LO		ANAP	IMG
LUT Data	(0028,3006)	US/SS/OW		ANAP	IMG
Window Center	(0028,1050)	DS		ANAP	AUTO
Window Width	(0028,1051)	DS		ANAP	AUTO
Window Center & Width Explanation	(0028,1055)	LO		ANAP	AUTO

Table 61: Softcopy VOI LUT Module

Attribute Name	Tag	VR	Value	Presence	Source
Presentation LUT Sequence	(2050,0010)	SQ		ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence	Source
LUT Descriptor	(0028,3002)	US/SS		ANAP	AUTO
LUT Explanation	(0028,3003)	LO		ANAP	AUTO
LUT Data	(0028,3006)	US/SS/OW		ANAP	AUTO
Presentation LUT Shape	(2050,0020)	CS	IDENTITY, INVERSE	ANAP	AUTO

Table 62: Softcopy Presentation LUT Module

Attribute Name	Tag	VR	Value	Presence	Source
Modality	(0008,0060)	CS	KO	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		ALWAYS	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ		ANAP	AUTO
Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO

Table 63: Key Object Document Series Module

Attribute Name	Tag	VR	Value	Presence	Source
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO
Referenced Request Sequence	(0040,A370)	SQ		ANAP	IMG
Study Instance UID	(0020,000D)	UI		ANAP	IMG
Referenced Study Sequence	(0008,1110)	SQ		ANAP	IMG
Referenced SOP Class UID	(0008,1150)	UI		ANAP	IMG
Referenced SOP Instance UID	(0008,1155)	UI		ANAP	IMG
Accession Number	(0008,0050)	SH		ANAP	IMG
Placer Order Number / Imaging Service Request	(0040,2016)	LO		ANAP	IMG
Filler Order Number / Imaging Service Request	(0040,2017)	LO		ANAP	IMG
Requested Procedure ID	(0040,1001)	SH		ANAP	IMG
Requested Procedure Description	(0032,1060)	LO		ANAP	IMG
Requested Procedure Code Sequence	(0032,1064)	SQ		ANAP	IMG
Code Value	(0008,0100)	SH		ANAP	IMG
Coding Scheme Designator	(0008,0102)	SH		ANAP	IMG
Coding Scheme Version	(0008,0103)	SH		ANAP	IMG
Code Meaning	(0008,0104)	LO		ANAP	IMG
Current Requested Procedure Evidence Sequence	(0040,A375)	SQ		ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence	Source
Study Instance UID	(0020,000D)	UI		ALWAYS	AUTO
Referenced Series Sequence	(0008,1115)	SQ		ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Retrieve AE Title	(0008,0054)	AE		ANAP	AUTO
Storage Media File-Set ID	(0088,0130)	SH		ANAP	AUTO
Storage Media File-Set UID	(0088,0140)	UI		ANAP	AUTO
Referenced SOP Sequence	(0008,1199)	SQ		ALWAYS	AUTO
Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
Identical Documents Sequence	(0040,A525)	SQ		ANAP	AUTO
Study Instance UID	(0020,000D)	UI		ANAP	AUTO
Referenced Series Sequence	(0008,1115)	SQ		ANAP	AUTO
Series Instance UID	(0020,000E)	UI		ANAP	AUTO
Retrieve AE Title	(0008,0054)	AE		ANAP	AUTO
Storage Media File-Set ID	(0088,0130)	SH		ANAP	AUTO
Storage Media File-Set UID	(0088,0140)	UI		ANAP	AUTO
Referenced SOP Sequence	(0008,1199)	SQ		ANAP	AUTO
Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO

Table 64: Key Object Document Module

Attribute Name	Tag	VR	Value	Presence	Source
SOP Class UID	(0008,0016)	UI		ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI		ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	ISO_IR 100	ANAP	AUTO
Instance Number	(0020,0013)	IS		ANAP	AUTO

Table 65: SOP Common Module

7.1.2 Usage of Attributes from received IODs

The usage of attributes received in the various IODs is described in the sections about SOP specific conformance for the SOP classes supported by this application.

For Grayscale Softcopy Presentation State instances, the same set of modules, attributes and attribute values as documented in section *"Grayscale Softcopy Presentation State IOD"* is supported for display. Modules or attributes not specified in this section will be ignored; attribute values not following the constraints lay out in sections *"Grayscale Softcopy Presentation State IOD"* and *"Modules"* may cause the display of the

Grayscale Softcopy Presentation State to be refused. For attributes where no constraint to supported attribute values is defined, all legal attribute values will be processed correctly.

7.1.3 Attribute Mapping

By default, no attributes are mapped.

If configured, this activity happens when the “JiveX DICOM Storage SCP Service” receives a DICOM object. Mapping shall only be defined for attributes of the VR type “PN”.

7.1.4 Coerced/Modified fields

The “JiveX DICOM Storage SCP Service” can be configured to coerce certain attributes on incoming images. By default, no coercion is performed.

7.1.4.1 Transmission Transfer Syntax Change

The “JiveX DICOM Storage SCU Service” may add or modify the following attributes in DICOM objects that are transmitted if the transmission transfer syntax requires performance of a Lossy Image Compression:

Attribute Name	Tag	VR	Value	Presence	Source
Lossy Compression	(0028,2110)	CS		VNAP	CONFIG
Lossy Image Compression Ratio	(0028,2112)	DS		VNAP	CONFIG
Lossy Image Compression Method	(0028,2114)	CS		VNAP	CONFIG
Planar Configuration	(0028,0006)	US		VNAP	CONFIG
Photometric Interpretation	(0028,0004)	IS		VNAP	CONFIG
Samples Per Pixel	(0028,0002)	US		VNAP	CONFIG
Smallest Image Pixel Value	(0028,0106)	US/SS		VNAP	CONFIG
Largest Image Pixel Value	(0028,0107)	US/SS		VNAP	CONFIG
Pixel Data	(7EF0,0010)	OW/OB		VNAP	CONFIG

Table 66: Fields to be potentially added/modified on transfer syntax change

7.1.4.2 Import of DICOM Files

An import of DICOM files, using the “JiveX Import Gateway” may alter or add the following attributes before sending data to one of the “JiveX DICOM Storage SCP Services”:

Attribute Name	Tag	VR	Value	Presence	Source
Original Attribute’s Sequence	(0400,0561)	SQ		VNAP	CONFIG

Attribute Name	Tag	VR	Value	Presence	Source
Modifying System	(0400,0563)	LO		VNAP	CONFIG
Source of Previous Values	(0400,0564)	LO		VNAP	CONFIG
Reason for the Attribute Modification	(0400,0565)	CS		VNAP	CONFIG
Attribute Modification Date Time	(0400,0562)	DT		VNAP	CONFIG
Modified Attributes Sequence	(0400,0550)	SQ		VNAP	CONFIG
Any Attribute from the main data set that was modified or removed				VNAP	CONFIG

Table 67: Fields to be potentially added/modified by DICOM file importer

7.2 Data Dictionary of Private Attributes

By default, private attributes are not used.

A “patient update” or “patient merge” action may result in adding a sequence of private attributes to store old contents of attribute fields modified. This behavior is subject to change; future versions of JiveX will use the “Original Attributes Sequence” tag for this purpose.

Attribute Name	Tag	VR	Value	Presence	Source
Visus Private Creator Data Element Change	(5533,0055)	LO		VNAP	CONFIG
Visus Data Save Sequence	(5533,5533)	SQ		VNAP	CONFIG
Visus Private Creator Data Element Change	(5533,0055)	LO		VNAP	CONFIG
Visus Data Save Date	(5533,5535)	DA		VNAP	CONFIG
Visus Data Save Originator	(5533,5537)	LO		VNAP	CONFIG
Visus Data Save ID	(5533,5539)	FD		VNAP	CONFIG
Any Attribute from the main data set that was modified or removed				VNAP	CONFIG

Table 68: Private attributes added through patient update/merge

7.3 Coded Terminology and Templates

Codes and Controlled Terminology are not used.

7.4 Grayscale Image Consistency

Support for the Grayscale Standard Display Function (GSDF) is dependent on installation. With suitable hardware, the graphics board or device driver of the underlying operating systems can be calibrated for GSDF conformance. Alternatively, JiveX allows configuring a Characteristic Curve for each specific monitor and computes a correction function for GSDF calibration in software.

7.5 Standard Extended/Specialized/Private SOP Classes

No Standard Extended/Specialized/Private SOP Classes are supported.

7.6 Private Transfer Syntaxes

By default, no Private Transfer Syntaxes are supported.

If a DICOM communication between two JiveX Servers is established, a private VISUS transfer syntax may be used if configured. The private transfer syntaxes support sending ZIP compressed objects and will only be used for communication between JiveX Servers, never to 3rd party “StorageSCPs” or from 3rd party “StorageSCUs”.

Transfer Syntax Name	Transfer Syntax UID
VISUS Implicit VR Little Endian	1.2.276.0.50.1.2
VISUS Explicit VR Little Endian	1.2.276.0.50.1.2.1
VISUS Explicit VR Big Endian	1.2.276.0.50.1.2.2

Table 69: Private Transfer Syntaxes for Activities “Receive Objects / Send Object”