



DICOM Conformance Statement

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Image Works

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Revision History

Version	Date	Author/revised by:	Description
1.0 Draft	04/11/2008	Lance C Paulose	Initial draft of the Dicom conformance statement for the ViewAll software.
0.0	04/21/2008	Lance C Paulose	Updated the document with review comments.
0.1	07/09/2008	Lance C Paulose	Updated the SOP Class Information and SOP Specific Conformance – Storage SCU attributes.
0.2	07/23/2008	Lance C Paulose	Updated the Implementation Class UID value of dcm4che-1.4.11
0.3	07/10/2009	Elena daSilva Feroe	Added the Modality Worklist SCU and DICOM Receiver.
0.4	06/24/2011	J Johnson	Update Company Name and Logos. Replaced ViewAll Vet with ViewAll. Added Verification C-Echo. Updated Worklist functionality

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1 INTRODUCTION

1.1 Intended Audience

The reader of this document is involved with system integration and/or software design.

We assume that the reader is familiar with the terminology and concepts that are used in the DICOM 3.0 standard. Readers not familiar with DICOM 3.0 terminology should first read the appropriate parts of the DICOM standard itself, prior to reading this conformance statement.

1.2 Purpose of This Document

This document is the DICOM Conformance Statement for the DICOM services of ViewAll as an acquisition modality. Its purpose is to specify compliance with the DICOM standard on the following ViewAll supported service classes:

- Digital X-Ray Image Storage – For Presentation Service Class as an SCU
- DICOM Receiver
- Modality Worklist Service Class as an SCU

1.3 Sources for This Document

- ❖ Digital Imaging and Communications in Medicine (DICOM) V3.0, ACR-NEMA

2 IMPLEMENTATION MODEL

The ViewAll is a point-to-point image acquisition device for image transmission, storage between DICOM modalities and the DICOM network. Basic Worklist Management service is used to get patient demographic data from an existing server. The DICOM Receiver allows ViewAll to store images that are sent from other Application Entities (AE).

2.1 Application Data Flow Diagram

The Basic and Specific Application models for this device are shown in the following illustrations:

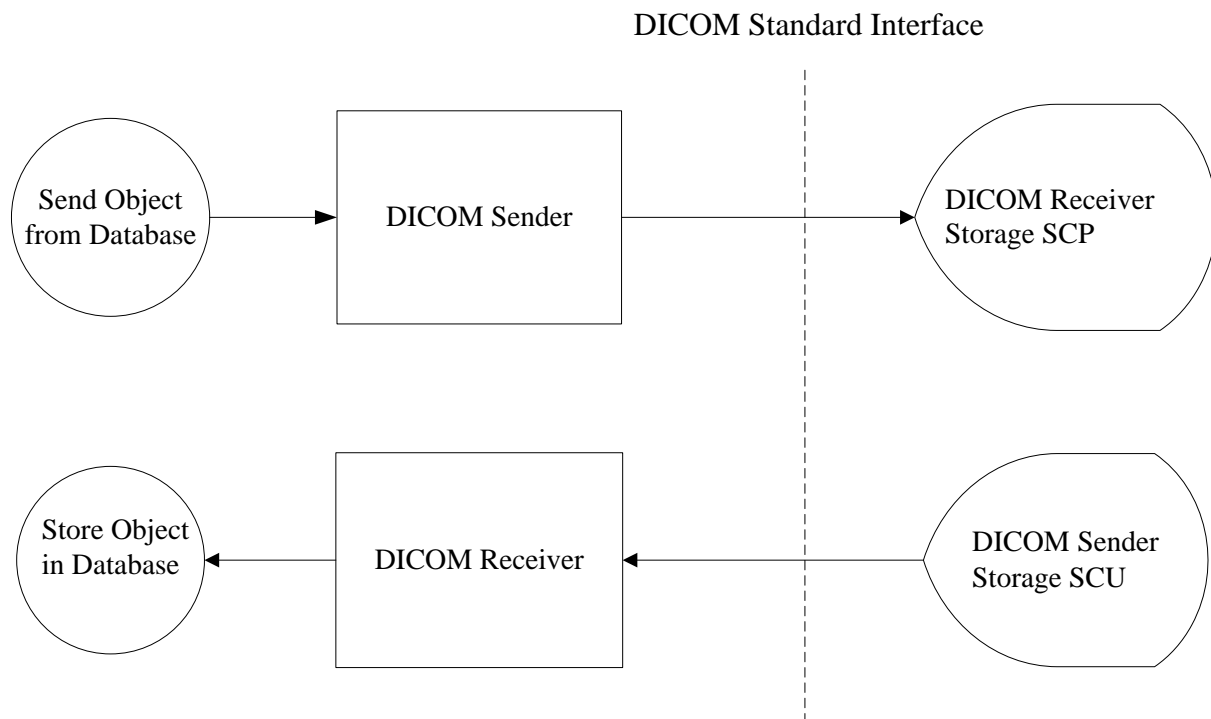


Figure 2.1 Application Data Flow Diagram

The DICOM Receiver is a Microsoft Windows (Windows 7, Vista and XP) application for the transfer of DICOM images. It is executed on OS startup as a separate application process for all Windows operating systems.

2.2 Functional Definitions of AE's

2.2.1 Storage SCU

ViewAll Store SCU is implemented as an application entity for transmitting DX images.

The DICOM Storage Service of DX image is used to send demographic information and pixel data to an external image manager.

- Initiate a DICOM association to send the SC IOD
- Issue a C-STORE service
- Send the IOD with the pixel data processed as defined in the configuration of the external user
- Access the local database to update the exam information.
- Close the Association

The DICOM Receiver waits for other Application Entities (AEs) to initiate DICOM storage requests. Then it informs the user that a Store request was received. The user must acknowledge and approve the Store, in order for the patient to be added and the images to be saved in the ViewAll image management database.

2.2.2 Modality Worklist SCU

ViewAll Modality Worklist SCU is implemented as an application entity for retrieving the Modality Worklist from any DICOM Server SCP. The DICOM C-Find Service of MWL is used to request the scheduled procedure steps.

- Initiate a DICOM association to request the Modality Worklist
- Issue a C-FIND request with the requested attributes IOD
- Send the IOD to the DICOM Server SCP
- Access the local database to add or update the scheduled objects
- Close the Association

2.2.3 Verification (Echo) SCU

ViewAll will automatically respond to a Verification request when the DICOM Receiver is enabled. Verification requests from ViewAll to other DICOM AE are initiated manually with user dialog indicating success or failure.

3 AE SPECIFICATIONS

3.1 Supported Services

ViewAll provides Standard Conformance to the DICOM V3.0 SOP Classes as an SCU .

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Media Storage SOP Class	1.2.840.10008.5.1.4.1.1.1.1
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31

Table 3.1 SOP Classes Supported as an SCU

3.1.1 Association Establishment Policies

3.1.1.1 General

Before any SOP Classes can be exchanged between the ViewAll (SCU) and the SCP, an association stage takes place to negotiate the capabilities of the SCU and SCP.

3.1.1.2 Number of Associations

The ViewAll opens only one association at a time.

3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

3.1.1.4 Implementation Identifying Information

The ViewAll SCU will respond with the following implementation identifying parameters:

Implementation Class UID	Implementation Version Name
1.2.40.0.13.1.1	dcm4che-1.4.11

3.1.2 Association Initiation Policy

ViewAll attempts to initiate a new association for every service.

3.1.2.1 Presentation Context Table

Presentation Context Table - Proposed				
Abstract Syntax		Transfer Syntax		Role
SOP Class Name	SOP Class UID	Transfer Syntax Name	UID	
Verification	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Digital X-ray Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Modality Worklist Information Model	1.2.840.10008.5.1.4.31	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU

Table 3.2 Presentation Context List

3.1.2.2 Called/Calling AE-Titles

This can be modified during configuration via a configuration setting. The calling AE Title is case sensitive. The calling AE- Title is “VIEWALLVET” and can be modified by the user.

3.1.2.3 Association Initiation by Real World Activity

3.1.2.3.1 Storage

The ViewAll Digital X-ray Presentation AE initiates a new association for each set of images it needs to transfer. The status of the image transfer is displayed by the status bar available at the bottom left corner of the software. If the SCP AE rejects the Association, then the ViewAll will explicitly notify the user.

When the DICOM Receiver receives images to be stored, it prompts the user to select the appropriate patient, based on the Tag information found in the image. Only then will it proceed with adding the patient and images to the database.

3.1.2.3.2 Modality Worklist

The ViewAll Worklist SCU AE initiates a separate Association for each Worklist of items to be obtained. If the SCP AE rejects the Association, then ViewAll issues a warning message.

3.1.3 SOP Specific Conformance

3.1.3.1 SOP Specific Conformance – Storage SCU

3.1.3.1.1 Supported attributes

Attribute Name	Tag	VR	VM	Remark
Patient's Name	(0010,0010)	PN	1	Configurable
Patient ID	(0010,0020)	LO	1	Configurable
Patient's Sex	(0010, 0040)	LO	1	Configurable
Patient's Sex Neutered	(0010, 2203)	CS	1	Configurable
Patient's Birth Date	(0010, 0030)	DA	1	Configurable
Patient's Weight	(0010, 1030)	DS	1	Configurable
Patient's Size	(0010, 1020)	DS	1	Configurable
Patient's Telephone Numbers	(0010,2154)	SH	1-n	Configurable
Patient's Comment	(0010, 4000)	LT	1	Configurable
Patient Species Description	(0010, 2201)	LO	1	
Other Patient's IDs	(0010, 1000)	LO	1-n	
Institution Name	(0008, 0080)	LO	1	Configurable
Institution Address	(0008, 0081)	ST	1	Configurable
Performing Physician Name	(0008,1050)	PN	1-n	Configurable
Responsible Person	(0010,2297)	PN	1	Configurable
Responsible Person Role	(0010, 2298)	CS	1	Configurable
Responsible Organization	(0010, 2299)	LO	1	Configurable
Breed Registration Number	(0010, 2295)	LO	1	Configurable
Issuer Of Patient ID	(0010, 0021)	LO	1	
Type Of Patient ID	(0010, 0022)	CS	1	
Study Date	(0008, 0020)	DA	1	
Study ID	(0020, 0010)	SH	1	

Study Instance UID	(0020, 000D)	UI	1	
Image Type	(0008, 0008)	CS	1-n	
Acquisition Date	(0008, 0022)	DA	1	
Modality	(0008, 0060)	CS	1	
Accession Number	(0008, 0050)	SH	1	
Output Power	(0018, 5000)	SH	1-n	
X-Ray Tube Current in mA	(0018, 9330)	FD	1	Configurable
Exposure Time	(0018, 1150)	IS	1	Configurable
Image Comments	(0020, 4000)	LT	1	Configurable
Manufacturer	(0080, 0070)	LO	1	
Device Serial Number	(0018, 1000)	LO	1	
Rows	(0028, 0010)	US	1	
Columns	(0028, 0011)	US	1	
Samples Per Pixel	(0028, 0002)	US	1	
Bits Allocated	(0028, 0100)	US	1	
Bits Stored	(0028,0101)	US	1	
Pixel Representation	(0028, 0103)	US	1	
High Bit	(0028, 0102)	US	1	
Image Type	(0008,0008)	CS	1-n	
Burned In Annotation	(0028, 0301)	CS	1	
Pixel Intensity Relationship	(0028, 1040)	CS	1	
Pixel Intensity Relationship Sign	(0028, 1041)	SS	1	
Rescale Intercept	(0028, 1052)	DS	1	
Rescale Slope	(0028, 1053)	DS	1	
Rescale Type	(0028, 1054)	LO	1	
Lossy Image Compression	(0028, 2110)	CS	1	
Detector Type	(0018,7004)	CS	1	
Device Description	(0050,0020)	LO		Configurable
Imager Pixel Spacing	(0018,1164)	DS	2	
Presentation Intent Type	(0008,0068)	CS	1	
Photometric Interpretation	(0028,0004)	CS	1	

Presentation LUT Shape	(2050,0010)	CS	1	
Anatomic Region Sequence	(0008, 2218)	SQ	1	
Acquisition Context Sequence	(0040, 0555)	SQ	1	
Transfer Syntax UID	(0020, 0010)	UI	1	
Source Application Entity Title	(0020, 0016)	AE	1	
SOP Class UID	(0008, 0016)	UI	1	
Media Storage SOP Class UID	(0002, 0002)	UI	1	
Instance Creation Time	(0008, 0013)	TM	1	
Instance Creation Date	(0008, 0012)	DA	1	
SOP Instance UID	(0008, 0018)	UI	1	
Study Instance UID	(0020, 000D)	UI	1	
Specific Character Set	(0008, 0005)	CS	1-n	
Window Width	(0028, 1051)	DS	1-n	
Window Center	(0028, 1050)	DS	1-n	
Patient Orientation	(0020, 0020)	CS	2	Configurable
Image Laterality	(0020,0062)	CS	1	Configurable

Table 3.3 C-Store SCU Standard DICOM Attributes

3.1.3.2 SOP Specific Conformance – Modality Worklist SCU

3.1.3.2.1 Supported attributes

Attribute Name	Tag	VR	VM	Remark
Modality	(0008,0060)	CS	1	Configurable
Study Date	(0008, 0020)	DA	1	Configurable

Table 3.4 Modality Worklist Information Model Attributes

3.1.4 Association Acceptance Policy

Not applicable, because the VIEWALL (SCU) cannot accept an Association.

4 COMMUNICATION PROFILES

4.1 Supported Communication Stacks

DICOM Upper Layer (PS 3.8) is supported using TCP/IP.

4.2 TCP/IP Stack

The ViewAll (SCU) uses TCP/IP for the protocol stacks.

5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

5.1 Standard Extended/Specialized/Private SOPs

None Supported

5.2 Private Transfer Syntaxes

None Supported

6 CONFIGURATION

See ViewAll User Manual for configuration.

6.1 AE Title/Presentation Address Mapping

The Local AE Title is configured as “VIEWALLVET”. The title could be viewed in the Tools-> DICOM Settings menu.

The Local AE Title of the Receiver is configured as “VAVSER”. The title could be viewed in the Tools-> DICOM Settings menu.

6.2 Configuration Parameters

The following fields are configurable for this Store SCU/SCP and Query and Retrieve SCU:

- Name of the Server
- DICOM Server Address (Remote IP Address)
- Remote AE Title
- DICOM Server Port (Remote TCP Port Number)
- Local AE Title
- Retry Wait Time (ms)

The following fields are configurable for this Receiver:

- DICOM Server Port (Local TCP Port Number)
- Local AE Title

The Following fields are configurable for this Modality Worklist SCU:

- DICOM Server Address (Remote IP Address)
- Remote AE Title
- DICOM Server Port (Remote TCP Port Number)
- Date
- Modality (DX, DR, CR, ALL)