



DICOM Conformance Statement

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ImageWorks

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Revision History

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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 EVAsoft as an acquisition modality. Its purpose is to specify compliance with the DICOM standard on the following EVAsoft 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

EVAsoft 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 EVAsoft 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 illustration:

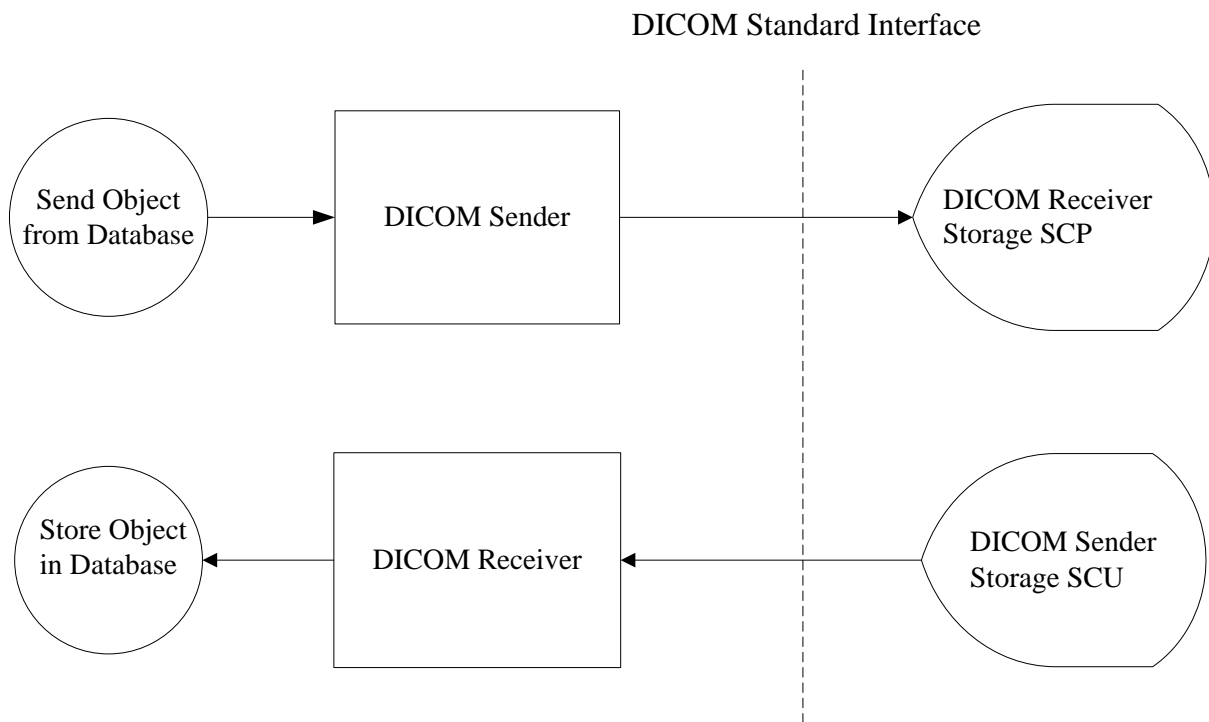


Figure 2.1 Application Data Flow Diagram

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

EVAsoft 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 EVAsoft image management database.

2.2.2 Modality Worklist SCU

EVAsoft 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

3 AE SPECIFICATIONS

3.1 Supported Services

EVAsoft 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 EVAsoft (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

EVAsoft 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 EVAsoft 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

EVAsoft 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 “IMAGEWORKS” and can be modified by the user.

3.1.2.3 Association Initiation by Real World Activity

3.1.2.3.1 Storage

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

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 Birth Date | (0010, 0030) | DA | 1 | Configurable |
| Patient's Telephone Numbers | (0010,2154) | SH | 1-n | Configurable |
| Patient's Comment | (0010, 4000) | LT | 1 | Configurable |
| 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 |
| 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 EVASOFT (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 EVAsoft (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 the EVAsoft User's Manual for configuration.

6.1 AE Title/Presentation Address Mapping

The Local AE Title is configured as "IMAGEWORKS". The title could be viewed in the Tools → DICOM Settings menu.

The Local AE Title of the Receiver is configured as "IMAGEWORKS". 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)

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)