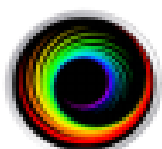


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**SHOWCASE[®] Image Center
DICOM Conformance Statement**

**Revision 2.0
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Image Center version 2.5.0 and higher

Revision History

Revision	Date	Author	Reason for Change
1.0	8/23/16	PJM	Initial version for marketed release of Image Center 2.0
2.0	4/28/23	PJM	Image Center 2.5, inclusion of SCU behaviors.

DICOM Conformance Statement	1
1 Introduction	4
1.1 Purpose of this Document	4
1.2 References and Definitions	4
1.3 Acronyms and Abbreviations	4
2 Network Conformance Statement	5
2.1 Introduction	5
2.2 Implementation Model	5
2.2.1 Application Data Flow Diagram	5
2.2.2 Functional Definition of Application Entity	6
2.2.3 Sequencing of Real World Activities	6
2.3 Application Entity Specifications	6
2.3.1 ShowCase Image Center acting as a Storage SCP	6
2.3.1.1 Association Establishment Policies	7
2.3.1.2 Association Initiation by Real-World Activity	7
2.3.1.3 Association Acceptance Policies	7
2.3.2 ShowCase Image Center acting as a Query/Retrieve SCU	7
2.3.2.1 Association Establishment Policies	7
2.3.2.2 Association Initiation by Real-World Activity	7
2.3.2.3 Association Acceptance Policies	9
2.3.3 ShowCase Image Center acting as a Store SCU	9
2.3.3.1 Association Establishment Policies	10
2.3.3.2 Association Initiation by Real-World Activity	10
2.3.3.3 Association Acceptance Policies	11
2.3.3.4 Corrective Behaviors During Storage	11
2.4 Communication Profiles	11
2.4.1 Supported Communications Stacks	11
2.4.2 OSI Stack	11
2.4.3 TCP/IP Stack	11
2.4.3.1 Physical Media Support	11
2.4.4 Point-to-Point Stack	11
2.5 Extensions/Specializations/Privatizations	11
2.6 Configuration	11
2.6.1 AE Title/Presentation Address Mapping	11
2.6.2 Configurable Parameters	12
2.7 Support of Extended Character Sets	12

1 Introduction

1.1 Purpose of this Document

This document is the DICOM Conformance Statement for the ShowCase Image Center software developed by Trillium Technology, Inc, Ann Arbor, Michigan, USA. Image Center software running on a server, personal computer or laptop, provides the ability to store DICOM images and other DICOM objects and access these objects through the ShowCase Premier Viewer or ShowCase Viewer for iPad.

Image Center can also function as a DICOM SCU to query DICOM nodes for images and structured reports and retrieve them. It can send images to DICOM nodes (CSTORE).

Part 2 of this conformance statement contains a detailed description of the **network** interactions between ShowCase and other imaging devices that conform to the DICOM 3.0 standard. ShowCase implements DICOM messaging using the Merge Technologies MergeCOM3 toolkit. Their conformance information is available to the public on their web site.

1.2 References and Definitions

Digital Imaging and Communications in Medicine (DICOM) standard, parts 1 through 17 (NEMA PS 3.1-3.17).

1.3 Acronyms and Abbreviations

Symbols and abbreviations used in this conformance statement are defined in Digital Imaging and Communications in Medicine (DICOM) standard, parts 1 through 17 (NEMA PS 3.1- 3.17).

2 Network Conformance Statement

2.1 Introduction

This section describes the DICOM network interactions of the ShowCase Image Center SCP running on a computer.

2.2 Implementation Model

The ShowCase Image Center software, specifically the ShowCase Image Center SCP Windows Service, functions as a storage SCP.

2.2.1 Application Data Flow Diagram

The following diagram shows the implementation model of ShowCase Image Center.

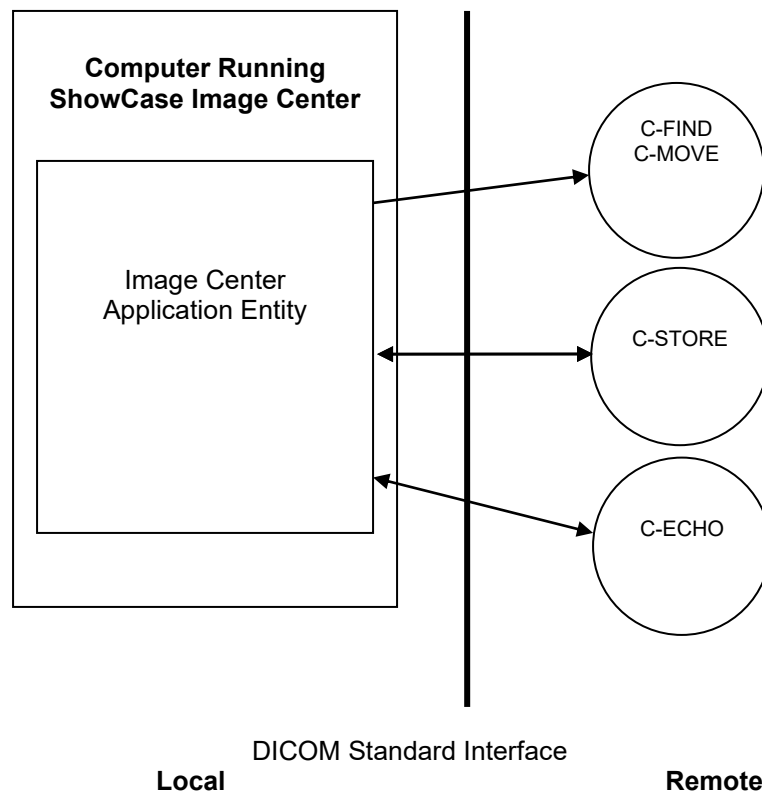


Figure 2.2-1 Image Center Implementation Model

2.2.2 Functional Definition of Application Entity

All communications with remote DICOM applications is accomplished using the DICOM protocol over a network using the TCP/IP protocol stack.

Image Center supports the following functions.

SCU	SCP
Echo	Echo
Query/Retrieve	
Storage	Storage

Image Center:

- Responds to or initiates a DICOM Echo
- Accepts a DICOM association to store images
- Initiates a DICOM association in order to query a remote AE and request a C-FIND and C-MOVE.
- Initiates a DICOM association to store to a remote AE using C-STORE.

2.2.3 Sequencing of Real World Activities

Typically, a user might send a study to the Image Center (Store SCP) and view these studies using ShowCase Premier or ShowCase Viewer for iPad. More complex scenarios include auto-forwarding incoming studies (C-STORE) to another DICOM node, or Query/Retrieve from a remote DICOM node.

2.3 Application Entity Specifications

2.3.1 ShowCase Image Center acting as a Storage SCP

The ShowCase Image Center Application provides standard conformance to the following DICOM V3.0 SOP Classes as a Store SCP.

ShowCase Image Center Supported SOP Classes for Image Store		
Function	SOP Class UID	SOP Class Name
Storage	1.2.840.10008.5.1.4.1.1.7	Secondary Capture Image Storage
Storage	1.2.840.10008.5.1.4.1.1.6.1	Ultrasound Image Storage
Storage	1.2.840.10008.5.1.4.1.1.3.1	Ultrasound Multi-Frame Image Storage
Storage	1.2.840.10008.5.1.4.1.1.20	Nuclear Medicine Image Storage
Storage	1.2.840.10008.5.1.4.1.1.12.1	X-Ray Angiographic Image Storage
Storage	1.2.840.10008.5.1.4.1.1.12.2	X-Ray Radiofluoroscopic Image Storage
Storage	1.2.840.10008.5.1.4.1.1.1.1	Digital X-Ray Image Storage - For Presentation
Storage	1.2.840.10008.5.1.4.1.1.1.1.1	Digital X-Ray Image Storage - For Processing
Storage	1.2.840.10008.5.1.4.1.1.1.2	Digital Mammography Image Storage - For Presentation
Storage	1.2.840.10008.5.1.4.1.1.1.2.1	Digital Mammography Image Storage - For Processing
Storage	1.2.840.10008.5.1.4.1.1.4	MR Image Storage
Storage	1.2.840.10008.5.1.4.1.1.1	Computed Radiography Image Storage
Storage	1.2.840.10008.5.1.4.1.1.2	CT Image Storage
Storage	1.2.840.10008.5.1.4.1.1.66	Raw Data
Storage	1.2.840.10008.5.1.4.1.1.128	Positron Emission Tomography Image Storage
Storage	1.2.840.10008.5.1.4.1.1.88.11	Basic Text Structured Report
Storage	1.2.840.10008.5.1.4.1.1.88.33	Comprehensive Structured Report
Storage	1.2.840.10008.5.1.4.1.1.88.22	Enhanced Structured Report

2.3.1.1 Association Establishment Policies

ShowCase Image Center does not initiate associations when acting as a Store SCP. It accepts associations from any DICOM node for image storage.

2.3.1.2 Association Initiation by Real-World Activity

ShowCase Image Center does not initiate associations in its role as an image Store SCP.

2.3.1.3 Association Acceptance Policies

ShowCase Image Center accepts associations from any DICOM node for storing images.

2.3.1.3.1 Image Storage**2.3.1.3.1.1 Associated Real World Activity**

ShowCase Image Center accepts images from remote DICOM nodes and stores the IODs.

2.3.2 ShowCase Image Center acting as a Query/Retrieve SCU

The ShowCase Image Center Application Entity provides standard conformance to the following DICOM V3.0 SOP Classes as an SCU.

ShowCase Supported SOP Classes for Query / Retrieve		
Function	SOP Class UID	SOP Class Name
Query/Retrieve	1.2.840.10008.5.1.4.1.2.2.1	Study Root Query/Retrieve Model - FIND
Query/Retrieve	1.2.840.10008.5.1.4.1.2.2.2	Study Root Query/Retrieve Model - MOVE

2.3.2.1 Association Establishment Policies

The ShowCase Image Center Application initiates an association with a configured DICOM query node. It does not accept query/retrieve associations.

2.3.2.1.1 General

The DICOM Application Context Name that is proposed by ShowCase is 1.2.840.10008.3.1.1.1. The services offer a maximum PDU size of 64234 bytes upon association initiation. There is no limit on the number of Presentation Context Items that will be proposed.

2.3.2.1.2 Number of Associations

The ShowCase Image Center Application opens one association at a time as a Query/Retrieve SCU.

2.3.2.1.3 Asynchronous Nature

The ShowCase Image Center Application does not support asynchronous query operations.

2.3.2.1.4 Implementation Identifying Information

The Implementation Class UID is: "1.2.840.113857.5".
The Implementation Version String is: "TriIDCM 1.0.0".

2.3.2.2 Association Initiation by Real-World Activity

The ShowCase Image Center Application acting in its Query/Retrieve role initiates associations for the following activities:

- Querying a remote DICOM node for available series.
- Retrieval of series from a remote DICOM node.
- Testing that it can establish an association with a remote DICOM node for Query/Retrieve.
- Storage to a remote Dicom node.

2.3.2.2.1 Real-World Activity – DICOM Query

2.3.2.2.1.1 Associated Real World Activity - DICOM Query

The user selects a configured worklist tab and then sets the selection criteria to use in the query request. The user interface displays the results of the query by showing one line of description for each series that matches the criteria.

2.3.2.2.1.2 Proposed Presentation Contexts - DICOM Query

The ShowCase Image Center Application proposes the Presentation Contexts shown below.

ShowCase Image Center Proposed Presentation Contexts - Query					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Study Root Query Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR, Little Endian; Explicit VR, BE; Explicit VR, LE;	1.2.840.10008.1.2	SCU	None

2.3.2.2.1.3 SOP Specific Conformance to Study Root Query Retrieve SOP Class

The ShowCase Image Center Application uses a Study Root C-Find as defined in DICOM 3.0 Part 4 to query for images. All Required(R) and Unique (U) and some Optional (O) Study and Series level keys are used as shown in the following table.

Data Level	Description	Tag	Type
Study	Patient Name	(0010,0010)	R
Study	Patient ID	(0010,0020)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0020,000D)	U
Study	Accession Number	(0008,0050)	R
Study	Study Date	(0008,0020)	R
Study	Referring Physician	(0008,0090)	O
Series	Series Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Number of Series Related Instances	(0020,1209)	O

2.3.2.2.2 Real-World Activity – Retrieve Study

2.3.2.2.2.1 Associated Real World Activity - Retrieve Study

The user selects one or more studies that were listed from a Query and retrieves the selected study from the remote DICOM node.

2.3.2.2.2.2 Proposed Presentation Contexts - Retrieve Study

ShowCase Image Center Proposed Presentation Contexts - Retrieve					
Abstract	Abstract Syntax UID	Transfer	Transfer Syntax	Role	Extended

Syntax Name		Syntax Name	UID		Negotiation
Study Root Query Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR, Little Endian	1.2.840.10008.1.2	SCU	None

2.3.2.2.2.3 SOP Specific Conformance to Study Root Query Retrieve SOP Class

ShowCase Image Center provides standard conformance for a MOVE at the series level.

2.3.2.2.3 Real-World Activity – Test Query/Retrieve Association

2.3.2.2.3.1 Associated Real World Activity - Test Association

To test the DICOM connectivity on the network, the user interacts with UI provided to check whether a Query/Retrieve association can be established with a selected DICOM node. This tests DICOM messaging and establishes whether the remote node is set up to allow Query/Retrieve from ShowCase Image Center.

2.3.2.2.3.2 Proposed Presentation Contexts - Test Association

ShowCase Image Center Proposed Presentation Contexts – Test Query/Retrieve Node					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Study Root Query Retrieve Information 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

2.3.2.2.3.3 SOP Specific Conformance to Study Root Query Retrieve SOP Class

The ShowCase Image Center Application tests that it can successfully establish an association with the remote DICOM node for the purpose of doing a FIND. No actual FIND request is initiated.

2.3.2.3 Association Acceptance Policies

ShowCase Image Center does not accept any associations when acting in its Query/Retrieve SCU role.

2.3.3 ShowCase Image Center acting as a Store SCU

The ShowCase Image Center Application Entity provides standard conformance to the following DICOM V3.0 SOP Classes as an SCU.

ShowCase Image Center Supported SOP Classes for Image Store		
Function	SOP Class UID	SOP Class Name
Storage	1.2.840.10008.5.1.4.1.1.7	Secondary Capture Image Storage
Storage	1.2.840.10008.5.1.4.1.1.7.1	Multiframe Single Bit Secondary Capture Image Storage
Storage	1.2.840.10008.5.1.4.1.1.7.2	Multiframe Grayscale Byte Secondary Capture Image Storage
Storage	1.2.840.10008.5.1.4.1.1.7.3	Multiframe Grayscale Word Secondary Capture Image Storage
Storage	1.2.840.10008.5.1.4.1.1.7.4	Multiframe True Color Secondary Capture Image Storage

Storage	1.2.840.10008.5.1.4.1.1.6	Ultrasound Image Storage (retired)
Storage	1.2.840.10008.5.1.4.1.1.6.1	Ultrasound Image Storage
Storage	1.2.840.10008.5.1.4.1.1.3.1	Ultrasound Multi-Frame Image Storage
Storage	1.2.840.10008.5.1.4.1.1.20	Nuclear Medicine Image Storage
Storage	1.2.840.10008.5.1.4.1.1.12.1	X-Ray Angiographic Image Storage
Storage	1.2.840.10008.5.1.4.1.1.12.2	X-Ray Radiofluoroscopic Image Storage
Storage	1.2.840.10008.5.1.4.1.1.12.3	X-Ray Angiographic Bi-plane Image Storage (retired)
Storage	1.2.840.10008.5.1.4.1.1.14.1	I/OCT Image Storage - For Presentation
Storage	1.2.840.10008.5.1.4.1.1.14.2	I/OCT Image Storage - For Processing
Storage	1.2.840.10008.5.1.4.1.1.1.1	Digital X-Ray Image Storage - For Presentation
Storage	1.2.840.10008.5.1.4.1.1.1.1.1	Digital X-Ray Image Storage - For Processing
Storage	1.2.840.10008.5.1.4.1.1.1.2	Digital Mammography Image Storage - For Presentation
Storage	1.2.840.10008.5.1.4.1.1.1.2.1	Digital Mammography Image Storage - For Processing
Storage	1.2.840.10008.5.1.4.1.1.1.3	Digital Intra – oral X-Ray Image Storage – for Presentation
Storage	1.2.840.10008.5.1.4.1.1.1.3.1	Digital Intra – oral X-Ray Image Storage – for Processing
Storage	1.2.840.10008.5.1.4.1.1.4	MR Image Storage
Storage	1.2.840.10008.5.1.4.1.1.1	Computed Radiography Image Storage
Storage	1.2.840.10008.5.1.4.1.1.2	CT Image Storage
Storage	1.2.840.10008.5.1.4.1.1.66	Raw Data
Storage	1.2.840.10008.5.1.4.1.1.128	Positron Emission Tomography Image Storage
Storage	1.2.840.10008.5.1.4.1.1.88.11	Basic Text Structured Report
Storage	1.2.840.10008.5.1.4.1.1.88.33	Comprehensive Structured Report
Storage	1.2.840.10008.5.1.4.1.1.88.22	Enhanced Structured Report

2.3.3.1 Association Establishment Policies

The ShowCase Image Center Application initiates an association with a configured DICOM query node. Presentation states are based on the SOP classes it is being asked to store.

2.3.3.1.1 General

The DICOM Application Context Name that is proposed by ShowCase is 1.2.840.10008.3.1.1.1. The services offer a maximum PDU size of 65536 bytes upon association initiation. There is no limit on the number of Presentation Context Items that will be proposed.

2.3.3.1.2 Number of Associations

The ShowCase Image Center Application opens one association at a time as a Storage SCU.

2.3.3.1.3 Asynchronous Nature

The ShowCase Image Center Application does not support asynchronous query operations.

2.3.3.1.4 Implementation Identifying Information

The Implementation Class UID is: “1.2.840.113857.5”.
The Implementation Version String is: “TriIDCM 1.0.0”.

2.3.3.2 Association Initiation by Real-World Activity

The ShowCase Image Center Application acting in its Storage role initiates associations for storage to a remote Dicom node.

2.3.3.2.1 Real-World Activity – DICOM Store

2.3.3.2.1.1 Associated Real World Activity - DICOM Store

The user receives a study on removable media. They view the study and then copy it into a local cache tab for a remote DICOM node. Once in that tab, they press a “Send” button to initiate a DICOM CSTORE of the study to the remote node.

2.3.3.2.1.2 Proposed Presentation Contexts - DICOM Store

The ShowCase Image Center Application proposes the Presentation Contexts based on the presentation contexts of the files that comprise the study it has been asked to send.

2.3.3.3 Association Acceptance Policies

ShowCase Image Center does not accept any associations when acting in its Store SCU role. It will accept associations when acting in its Store SCP role.

2.3.3.4 Corrective Behaviors During Storage

ShowCase Image Center will correct the following issues with outgoing IODs:

- Out of order group/element tags
- Improperly padded strings, e.g. strings padded with 0x00 characters instead of 0x20 characters.

2.4 Communication Profiles

2.4.1 Supported Communications Stacks

ShowCase Image Center provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

2.4.2 OSI Stack

Not supported.

2.4.3 TCP/IP Stack

ShowCase Image Center uses the TCP/IP stack from the Microsoft Windows operating system.

2.4.3.1 Physical Media Support

ShowCase Image Center is not dependent on the physical medium over which the TCP/IP executes.

2.4.4 Point-to-Point Stack

Not Supported.

2.5 Extensions/Specializations/Privatizations

ShowCase Image Center has no extensions, specializations or privatizations of SOP Classes and Transfer Syntaxes.

2.6 Configuration

The configuration of the ShowCase Image Center software is stored in local files. Configuration information can be entered via the graphical user interface provided in setup screens.

2.6.1 AE Title/Presentation Address Mapping

The AE Title for each computer running ShowCase Image Center is configurable through the graphical user interface. The default value is SCP_SHOWCASE.

The following configuration information is required for each DICOM node that acts as a Query or Store SCP for ShowCase Workstation:

- AE Title
- IP Address
- Port Number
- Connection Timeout
- Send Timeout
- Receive Timeout

This information is stored in a DICOM configuration file.

2.6.2 Configurable Parameters

Not Applicable

2.7 Support of Extended Character Sets

ShowCase Image Center supports the following character sets:

- ISO-IR 6 (default) Default repertoire
- ISO-IR 100 Latin Alphabet No. 1

ShowCase Image Center does not support multi-byte characters.

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