DICOM Conformance Statement
Aquarius Workstation

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Introduction

This document is the DICOM Conformance Statement for the Aquarius Workstation.

The Aquarius Workstaiton is able to receive DICOM CT and MR image data from the Remote systems, and stores them in the local disks.

The Aquarius Workstation is able to originate associations for Query and Retrieve of DICOM CT and MR image data stored in the Remote systems.

The Aquarius Workstation is able to transmit DICOM Secondary Capture image data to the Remote systems.

1 Implementation Model

The Aquarius Workstation Application Entity (AE) is a SCP of the DICOM Storage Service Class that accepts an association initiated by the Remote Application Entity (AE) for receiving the DICOM CT and MR image data sent by the Remote AE, and stores them in the local disks.

The Aquarius Workstation AE is a SCU of the DICOM Query/Retrieve Service Class that initiates an association to the Remote AE that stores DICOM CT and MR image data.

The Aquarius Workstation AE is a SCU of the DICOM Storage Service Class that starts an association to transmit DICOM Secondary Capture image data to the remote AE.

1.1 Application Data Flow Diagram

A Remote AE initiates an association for the DICOM Storage Service Class with the Aquarius Workstation AE. Upon acceptance of the association by the Aquarius Workstation AE, the Remote AE sends the DICOM CT and MR image data to the Aquarius Workstation AE. The Aquarius Workstation AE receives the DICOM CT and MR image data sent by the Remote AE, and stores them in the local disks.

The Aquarius Workstation AE initiates an association for the DICOM Query/Retrieve Service Class with the Remote AE that stores DICOM CT and MR image data. Upon acceptance of the association by the Remote AE, the Aquarius Workstation AE sends a C-FIND request to the Remote AE, and the Remote AE generates a C-FIND response. The Aquarius Workstation AE sends a C-MOVE request to the Remote AE supplying Unique Key values to the Remote AE, and the Remote AE initiates C-STORE sub-operations for the corresponding the DICOM CT and MR image data identified by Unique Key values. The Aquarius Workstation AE receives the DICOM CT and MR image data sent by the Remote AE, and stores them in the local disks.

The Aquarius Workstation AE initiates an association for the DICOM Storage Service Class with a Remote AE. Upon acceptance of the association by the Remote AE, the Aquarius Workstation AE sends the DICOM Secondary Capture image data to the Remote AE.

See Figure 1-1

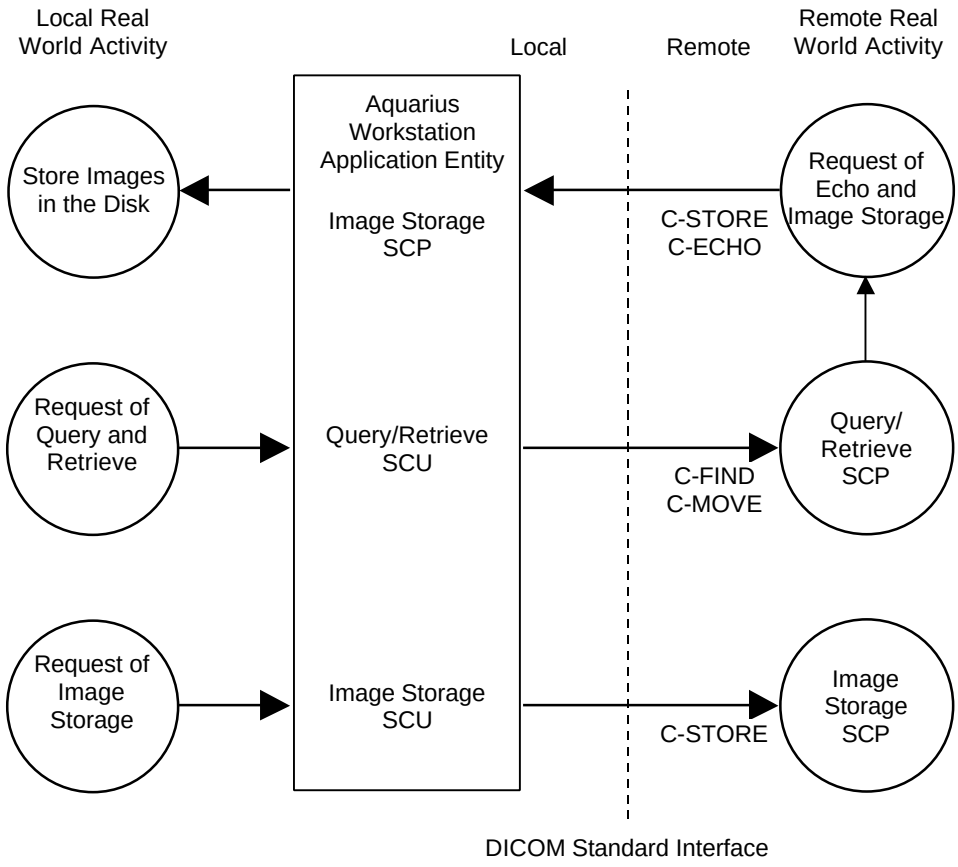

Figure 1-1 Aquarius Workstation AE Implementation Model

1.2 Functional Definitions of the Aquarius Workstation AE

The Aquarius Workstation AE-Image Storage SCP will be started when the Aquarius Workstation DICOM application starts. The Aquarius Workstation AE-Image Storage SCP acting as a SCP of the Storage Service Class is waiting for an association request from a Remote AE (SCU) at the presentation address configured for the AE Title. The Aquarius Workstation AE-Image Storage SCP will accept associations with a Presentation Context for the SOP Classes of the Storage Service Class. The Aquarius Workstation AE-Image Storage SCP will receive image data on this Presentation Context and write them to files in the format specified in DICOM PS 3.10.

The Aquarius Workstation AE-Query/Retrieve SCU initiates an association with a Remote AE (SCP) by a request of the Aquarius Workstation user. Upon acceptance of the association by the Remote AE, the Aquarius Workstation AE-Query/Retrieve SCU sends a C-FIND request to the Remote AE, and the Remote AE generates a C-FIND response. The Aquarius Workstation AE-Query/Retrieve SCU sends a C-MOVE request to the Remote-AE by supplying Unique Key values corresponding to the Study or Series, and the Remote AE initiates C-STORE sub-operations for the Study or Series of the DICOM CT or MR image identified by the Unique Key values. The Aquarius Workstation AE-Query/Retrieve SCU receives the DICOM CT or MR image data sent by the Remote AE, and stores them in its local disks.

The Aquarius Workstation AE-Image Storage SCU initiates an association with a Remote AE (SCP) by a

request of the Aquarius Workstation user. Upon acceptance of the association with a Presentation Context for SOP Classes of the Storage Service Class by the Remote AE, the Aquarius Workstation AE-Image Storage SCU sends DICOM Secondary Capture images to the Remote AE, and the Remote AE will receive image data.

1.3 Sequencing of Real World Activities

Not applicable.

2 Application Entity Specifications

2.1 Aquarius Workstation AE Specification

The Aquarius Workstation AE provides the Standard Conformance to the following DICOM SOP Classes:

SOP Class Name	SCU/SCP	SOP Class UID
Verification	SCP	1.2.840.10008.1.1
CT Image Storage	SCP	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	SCP	1.2.840.10008.5.1.4.1.1.4
Secondary Capture Image Storage	SCU	1.2.840.10008.5.1.4.1.1.7
Study Root Query/Retrieve Information Model - FIND	SCU	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model - MOVE	SCU	1.2.840.10008.5.1.4.1.2.2.2

2.1.1 Association Establishment Policies

2.1.1.1 General

The maximum PDU size is 16384 (16K).

2.1.1.2 Numbers of Association

The Aquarius Workstation AE-Image Storage SCP will accept one association at a time for C-STORE.

The Aquarius Workstation AE-Image Storage SCU initiates one association at a time for the C-STORE.

The Aquarius Workstation AE-Query/Retrieve SCU initiates one association at a time for C-FIND, and initiates one association at a time for C-MOVE.

2.1.1.3 Asynchronous Nature

The Aquarius Workstation AE does not support asynchronous communication. Therefore, the Aquarius Workstation AE does not perform asynchronous operations of the window negotiation.

2.1.1.4 Implementation Identifying Information

The Aquarius Workstation AE provides an Implementation Class UID of "2.16.840.1.114053.2100.1.101".

The Aquarius Workstation AE provides Implementation Version Name of "TeraRecon 0100".

2.1.2 Association Initiation Policy

The Aquarius Workstation AE attempts to initiate a new association for:

DIMSE-C-FIND service operation

DIMSE-C-MOVE service operation

DIMSE-C-STORE service operation

2.1.2.1 Real-World Activity – Query the Image Database of the Remote AE

2.1.2.1.1 Associated Real-World Activity

The associated Real-World Activity is a C-FIND request initiated by the user of Ivies.

The user specifies some attributes that the Remote AE should use to query the Database.

When the Aquarius Workstation AE-Query/Retrieve SCU establishes an association with the Remote AE, the Aquarius Workstation AE-Query/Retrieve SCU will send a C-FIND request and then remote AE will return the results to the Aquarius Workstation AE-Query/Retrieve SCU.

2.1.2.1.2 Proposed Presentation Contexts

The Aquarius Workstation AE-Query/Retrieve SCU will propose a Presentation Context as shown in the following table.

Table 2-1: Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None

2.1.2.1.3 SOP Specific Conformance

The Aquarius Workstation AE-Query/Retrieve SCU uses Study Root Query/Retrieve Information Model.

The Aquarius Workstation AE-Query/Retrieve SCU queries following attributes. Type R is mandatory attribute and type U is the key attribute.

Table 2-2: Study level Attributes for Study Root Query/Retrieve Information Model

Attributes Name	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R

Patient's Name	(0010,0010)	R
Patient ID	(0010,0020)	R
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U

Table 2-3: Series level Attributes for Study Root Query/Retrieve Information Model

Attributes Name	Tag	Type
Modality	(0008,0060)	R
Series Number	(0020,0011)	R
Series Instance UID	(0020,000E)	U

2.1.2.2 Real-World Activity – Retrieve the Images from the Remote AE

2.1.2.2.1 Associated Real-World Activity

The associated Real-World Activity is a C-MOVE request initiated by the user of Ivies. The user selects Study or Series from the list generated as the result of the previous C-FIND operation.

When the Aquarius Workstation AE-Query/Retrieve SCU establishes an association with the remote AE, the Aquarius Workstation AE-Query/Retrieve SCU sends a C-MOVE request to the Remote-AE by supplying Unique Key values corresponding to the Study or Series, and the Remote AE initiates C-STORE sub-operations for the Study or Series of the DICOM CT and MR image identified by the Unique Key values. The transfer of the Images will be done by a subsequent C-STORE operation.

2.1.2.2.2 Proposed Presentation Contexts

The Aquarius Workstation AE-Query/Retrieve SCU will propose Presentation Context as shown in the following table.

Table 2-4: Proposed Presentation Contexts

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

2.1.2.2.3 SOP Specific Conformance

The Aquarius Workstation AE-Query/Retrieve SCU uses Study Root Query/Retrieve Information Model.

The Aquarius Workstation AE-Query/Retrieve SCU uses following attributes for C-MOVE. Type R is mandatory attribute and type U is the key attribute.

Table 2-5: Study level Attributes for Study Root Query/Retrieve Information Model

Attributes Name	Tag	Type
Study Instance UID	(0020,000D)	U

Table 2-6: Series level Attributes for Study Root Query/Retrieve Information Model

Attributes Name	Tag	Type
Series Instance UID	(0020,000E)	U

2.1.2.3 Real-World Activity – Send Images to the Remote AE

2.1.2.3.1 Associated Real-World Activity

The associated Real-World Activity is to send Images to the Remote AE.

The Aquarius Workstation AE-Image Storage SCU initiates an association with a Remote AE (SCP) by a request of the Aquarius Workstation user. Upon acceptance of the association with a Presentation Context for SOP Classes of the Storage Service Class by the Remote AE, Aquarius Workstation AE sends DICOM Secondary Capture images to the Remote AE, and the Remote AE will receive image data.

When the transfer fails, the Remote AE will return an error status.

2.1.2.3.2 Proposed Presentation Contexts

The Aquarius Workstation AE will propose a Presentation Context as shown in the following table.

Table 2-7: Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None

2.1.2.1.3 SOP Specific Conformance

The Aquarius Workstation AE provides the Standard Conformance for DICOM Image Storage Service Class.

2.1.3 Association Acceptance Policy

The Aquarius Workstation AE accepts a new association for:

DIMSE-C-ECHO service operation

DIMSE-C-STORE service operation

2.1.3.1 Real-World Activity – Responds to the C-ECHO Request

2.1.3.1.1 Associated Real-World Activity

The associated Real-World Activity is a C-ECHO Response by the Aquarius Workstation AE.

2.1.3.1.2 Acceptable Presentation Contexts

The Aquarius Workstation AE will accept Presentation Contexts as shown in the following table.

Table 2-8: Acceptable Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	None

2.1.3.1.3 SOP Specific Conformance

The Aquarius Workstation AE provide standard conformance for DICOM Verification service Class.

2.1.3.2 Real-World Activity – Receive Images from the Remote AE

2.1.3.2.1 Associated Real-World Activity

The Aquarius Workstation AE-Image Storage SCP will start when the Aquarius Workstation DICOM Application starts.

The associated Real-World Activity is a C-STORE request received by the Aquarius Workstation AE.

When the Aquarius Workstation AE-Image Storage SCP accepts an association with the Remote AE, the Aquarius Workstation AE-Image Storage SCP will receive image data via the association, and write the image data on the file.

When the transfer fails, the Aquarius Workstation AE-Image Storage SCP returns an error status.

2.1.3.2.2 Acceptable Presentation Contexts

The Aquarius Workstation AE-Image Storage SCP will accept Presentation Context as shown in the following table.

Table 2-9: Acceptable Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	None

2.1.3.2.3 SOP Specific Conformance

The Aquarius Workstation AE-Image Storage SCP conforms to the SOP of the Storage Service Class at Level 2 (Full). No elements are discarded or coerced by the Aquarius Workstation AE-Image Storage SCP. In the event of a successful C-STORE operation, the Aquarius Workstation AE-Image Storage SCP has written images to the disk.

3 Communication Profiles

3.1 Supported Communications Stacks

The Aquarius Workstation AE provides DICOM TCP/IP Network Communication Support as defined in DICOM PS 3.8.

3.2 TCP/IP Stack

The Aquarius Workstation AE uses TCP/IP stack from the Windows system upon which it executes.

3.2.1 Physical Media Support

The Aquarius Workstation AE supports ISO 8802-3 10BASET and IEEE802.3u 100BASE-TX Ethernet over which TCP/IP executes.

4 Extensions/Specializations/Privatizations

Not Applicable.

5 Configuration

5.1 AE Title/Presentation Address Mapping

The Aquarius Workstation maps Application Entity Titles to host name and port number via an internal

configuration method.

The IP address for the host name is determined using standard system calls.

The default host name for shipment is “AQUARIUS”.

The default Application Entity Title for shipment is “aquarius”.

The Port Number for the Storage SCP is 104.

The AE Title and Port Number can be changed with the configuration.

5.2 Configurable Parameters

The following parameters may be configurable: Application Entity Title, host name and port number.

PDU size is set to 16384

Time-out for accepting/rejecting an association request: 120 sec.

Time-out for responding to an association open/close request: 120 sec.

Time-out for accepting a message over the network: 120 sec.

6 Support of Extended Character Sets

None.