

DICOM Conformance Statement

AquariusAPS 4.4

Rev. 05B 21- Mar-2019

1 Conformance Statement Overview

The AquariusAPS server is a 2D/ 3D/4D image post-processing server. This server receives DICOM messages from modalities or other DICOM devices and processes the messages to derive processed images and meta-information such as centerlines, bone masks or spherical objects in a lung. It then routes the processed images and meta-information wrapped in a secondary captured image with private tags to other devices, optionally with the original incoming DICOM messages. AquariusAPS is designed to communicate with other devices on the network using DICOM 3.0.

This version of DICOM conformance statement is applicable to following products:

- AquariusAPS Server (AqAPS).

The AquariusAPS supports the following listed SOP class:

SOP Class Name	SOP Class UID	SCU	SCP
Network			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
Digital X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes
Digital X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
US Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
IVUS (Volcano) Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
X-Ray Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
X-Ray Angiographic BiPlane Image Storage	1.2.840.10008.5.1.4.1.1.12.3	Yes	Yes
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes
Digital Mammography X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes
Digital Mammography X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes
Panoramic X-Ray Image Storage	1.2.840.10008.5.1.4.1.1.1.3	Yes	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
Key Object Selection Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes
Radiation Therapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes
Query/Retrieve			
Patient Root Query/Retrieve IM - Find	1.2.840.10008.5.1.4.1.2.1.1	Yes	Yes
Patient Root Query/Retrieve IM - Move	1.2.840.10008.5.1.4.1.2.1.2	Yes	Yes
Study Root Query/Retrieve IM - Find	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes
Study Root Query/Retrieve IM -Move	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes



AquariusAPS DICOM Conformance Statement

Note:

The above list of supported SOP Class is the system default. Additional SOP Class can be added to the AquariusAPS server via a configurable dynamic service list.

2 Table of Contents

	<i>DICOM Conformance Statement</i>	1
1	CONFORMANCE STATEMENT OVERVIEW	2
2	TABLE OF CONTENTS	ERROR! BOOKMARK NOT DEFINED.
3	INTRODUCTION	5
3.1	REVISION HISTORY	5
3.2	AUDIENCE.....	5
3.3	REMARKS	5
3.4	DEFINITION, TERMS AND ABBREVIATION	6
3.5	REFERENCES.....	6
4	NETWORKING	7
4.1	IMPLEMENTATION MODEL	7
4.1.1	<i>Application Data Flow</i>	7
4.1.2	<i>Functional Definitions of AE's</i>	8
4.1.2.1	<i>Network related functions</i>	8
4.1.3	<i>Sequencing Real World Activity</i>	8
4.2	AE SPECIFICATION.....	9
4.2.1	<i>AE Specifications</i>	9
4.2.1.1	<i>Storage SOP Classes</i>	9
4.2.1.2	<i>Query / Retrieve SOP Classes</i>	9
4.2.1.3	<i>Transfer Syntaxes</i>	9
4.2.2	<i>Association Establishment Policies</i>	10
4.2.2.1	<i>General</i>	10
4.2.2.2	<i>Number of Associations</i>	10
4.2.2.3	<i>Asynchronous Nature</i>	10
4.2.2.4	<i>Implementation Identifying Information</i>	10
4.2.3	<i>Association Initiation by real-world activity</i>	11
4.2.3.1	<i>Real-world activity: ADS AE as C-STORE SCU</i>	11
4.2.3.2	<i>Real-world activity: ADS AE as C-STORE SCU</i>	12
4.2.3.3	<i>Association Initiation by real-world activity: ADS AE as C-FIND, C-MOVE SCU</i>	12
4.2.4	<i>Association Acceptance by real-world activity</i>	13
4.2.4.1	<i>Real-world activity: ADS as C-ECHO SCP</i>	13
4.2.4.2	<i>Real-world activity: ADS as C-STORE SCP</i>	13
4.2.4.3	<i>Real-world activity: ADS as C-FIND and C-MOVE SCP</i>	15
4.2.4.4	<i>Real-world activity: ADS as C-STORE SCP</i>	15
4.3	NETWORK INTERFACES	16
4.4	CONFIGURATION	16
5	MEDIA INTERCHANGE	17
6	SUPPORT OF CHARACTER SETS	17
7	SECURITY	17
8	ANNEXES	18
8.1	DATA DICTIONARY OF PRIVATE ATTRIBUTE.....	18

3 Introduction

AquariusAPS is a fully integrated hardware and software system for serving 2D, 3D and 4D images over a network in real time. It is designed to communicate with other machines on the network, such as AquariusNET clients, DICOM clients and DICOM servers. As a complete product, AquariusAPS has a DICOM server. The purpose of this document is to describe the conformance of the AquariusAPS DICOM Server (ADS) to the DICOM Standard as described by the NEMA in the year 2001.

3.1 Revision History

Following table provides revision history of this DICOM conformance statement:

Revision #	Description	Date of Release
1	Initial draft based on AquariusNet Server Conformance	Dec. 15, 2010
2	Added Tomosynthesis and updated Enhanced MR	Mar. 17, 2014
3	Documented GSPS and Dynamic Service List	Aug. 17, 2014
4	Documented KOS, OPT, Encapsulated PDF and others	April 3, 2015
5	Remove Explicit Big Endian	Mar. 22, 2018
6	Documented Segmentation Storage SOP class	Oct. 29, 2018

3.2 Audience

This DICOM conformance statement is intended for following audiences:

- Hospital staff or Customer
- System integrator of medical equipment
- DCIOM Software engineer or designer
- Marketing or Sales personal with DICOM knowledge

3.3 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements

3.4 Definition, Terms and Abbreviation

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

Abbreviations and terms are as follows:

ADS	AquariusAPS DICOM Server
AE	DICOM Application Entity
AET	Application Entity Title
ASCE	Association Control Service Element
IOD	Information Object Definition
ISO	International Standard Organization
SCU	Service Class User (DICOM client)
SCP	Service Class Provider (DICOM server)
SOP	Service-Object Pair
U	Unique Key Attribute

3.5 References

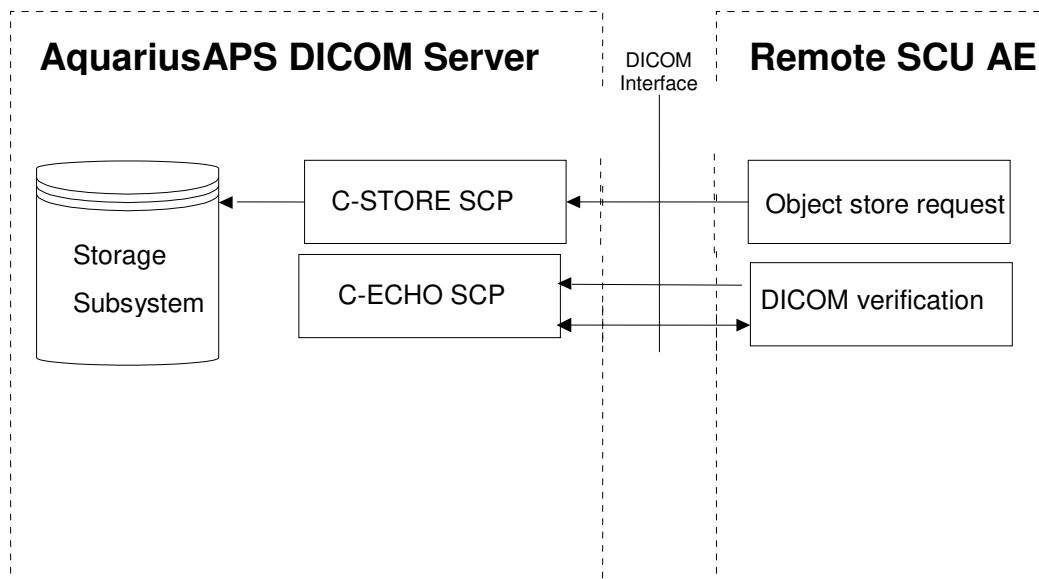
[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.20, 2016e

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

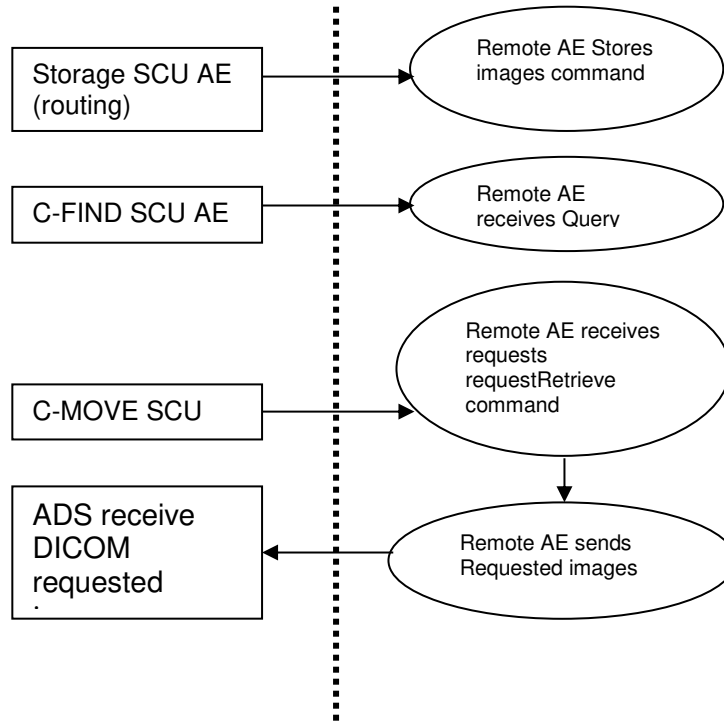
The diagram below depicts communications as they might occur between an SCU AE and an ADS AE.



ADS also implements an Application Entity (AE) which acts as a Query / Retrieve Service Class User (SCU).

Following diagram provide information about AquariusAPS SCU communication with remote server.

AquariusAPS SCU



4.1.2 Functional Definitions of AE's

4.1.2.1 *Network related functions*

- 1) Storage of received SOP instances sent to ADS by a remote SCU AE.
- 2) ADS responds to queries about stored instances from a remote SCU AE.
- 3) ADS transmits of stored instances to a remote SCU AE triggered by a retrieve request.
- 4) SendImage transmits the stored instances to a remote SCU AE triggered by an auto-routing rule (in response to a storage request made to a specific AE).
- 5) ADS responds to verification requests for the purpose of troubleshooting connectivity problems.
- 6) ADS acts as an SCU for the C-Find, C-Move and C-Store services.
- 7) ADS also acts as an SCP of the C-Store service during sub-operations of C-Move requests.

4.1.3 Sequencing Real World Activity

No assumptions are made about the sequencing of real-world activities.

4.2 AE Specification

4.2.1 AE Specifications

4.2.1.1 Storage SOP Classes

ADS supports standard conformance to the following storage SOP classes as SCU and SCP.

SOP Class Name	SOP Class UID
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
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic BiPlane Image Storage	1.2.840.10008.5.1.4.1.1.12.3
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
IVUS (Volcano) Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Ultrasound (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-Frame (retired)	1.2.840.10008.5.1.4.1.1.3
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
Digital Mammography X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Panoramic X-Ray Image Storage	1.2.840.10008.5.1.4.1.1.1.3
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Key Object Selection Storage	1.2.840.10008.5.1.4.1.1.88.59
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4
Radiation Therapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3

4.2.1.2 Query / Retrieve SOP Classes

ADS provides standard conformance to the following SOP Classes as a Query / Retrieve SCU.

SOP Class Name	SOP Class UID
Patient Root Query/Retrieve – Find	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve – Move	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve – Find	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve – Move	1.2.840.10008.5.1.4.1.2.2.2

4.2.1.3 Transfer Syntaxes

ADS supports the transfer syntaxes listed below. For a given SOP, the supported syntax list name (which refers to one of the names listed in the table below) can be found in one of the presentation context tables

found later in this document. When ADS is acting as SCP, the syntax selection policy is from top down as listed below.

Transfer Syntax Table		
Syntax List Name	Transfer Syntax	
Full Syntax List	JPEG Lossless (Hier. 14) JPEG Baseline JPEG Extended (2 & 4) JPEG 2000 Lossless Only JPEG 2000 RLE Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.90 1.2.840.10008.1.2.4.91 1.2.840.10008.1.2.4.5 1.2.840.10008.1.2 1.2.840.10008.1.2.1
Uncompressed Syntax List	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1
JPEG 2000 Syntax List	JPEG 2000 Lossless JPEG 2000 Implicit VR Little Endian	1.2.840.10008.1.2.4.90 1.2.840.10008.1.2.4.91 1.2.840.10008.1.2

4.2.2 Association Establishment Policies

4.2.2.1 General

ADS always propose the DICOM Application Context Name listed in in the table below during the establishment of all associations.

Name	UID
DICOM 3.0 Application Context	1.2.840.10008.3.1.1.1

4.2.2.2 Number of Associations

ADS is designed for multi-threaded operation, and is able to handle requests from multiple remote AE's at the same time. The maximum number of simultaneous inbound associations is configurable at runtime, but defaults to 10. ADS will initiate associations only when acting in the SCU role while servicing C-MOVE requests, or when sending storage requests.

4.2.2.3 Asynchronous Nature

ADS only supports a single outstanding transaction over an existing association. As such, it does not support asynchronous communication.

4.2.2.4 Implementation Identifying Information

ADS will respond with the following implementation identifying parameters:

Implementation Version Name	Implementation Class UID	Platform
AQNET44B-470	2.16.840.1.113669.632.21.1	32 Bit Server
AQNET44B-470	2.16.840.1.113669.632.21.1	64 Bit Server

4.2.3 Association Initiation by real-world activity

ADS will initiate C-STORE associations as SCU in response to C-MOVE requests, or when sending storage requests due either to a triggered auto-routing rule, or at a user's request.

4.2.3.1 Real-world activity: ADS AE as C-STORE SCU

4.2.3.1.1 Associated Real-world activity: Store

ADS will initiate a C-Store association as SCU when attempting to send SOP Instances to remote AE's. The transfer syntaxes that can be proposed are normally determined using table 262727955.....04.2.3.1.2. However, ADS may also propose the transfer syntax that was used to store an instance on disk; i.e. any of the transfer syntaxes for that storage class as listed in table 262727955.....72348164.2.4.2.2. If this transfer syntax is accepted by the SCP, ADS may send using it if: (1) the SOP instance has a value not equal to 1 for (0028, 0002) Samples Per Pixel, (2) the SOP instance has number of frames > 1, (3) there is a problem sending using the first choice of transfer syntax. Otherwise, it will choose one of the syntaxes negotiated based on the compression settings in the routing configuration.

4.2.3.1.2 Proposed Presentation Contexts: Store

Presentation Context Table				
Abstract Syntax		Transfer Syntax List	Role	Extended Negotiation
Name	UID			
Computed Radiography	1.2.840.10008.5.1.4.1.1.1	JPEG 2000 Syntax List	SCU	None
Digital X-Ray - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	JPEG 2000 Syntax List	SCU	None
Digital X-Ray - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	JPEG 2000 Syntax List	SCU	None
CT	1.2.840.10008.5.1.4.1.1.2	JPEG 2000 Syntax List	SCU	None
MR	1.2.840.10008.5.1.4.1.1.4	JPEG 2000 Syntax List	SCU	None
Secondary Capture	1.2.840.10008.5.1.4.1.1.7	JPEG 2000 Syntax List	SCU	None
X-Ray Angiographic	1.2.840.10008.5.1.4.1.1.12.1	JPEG 2000 Syntax List	SCU	None
X-Ray Fluoroscopic	1.2.840.10008.5.1.4.1.1.12.2	JPEG 2000 Syntax List	SCU	None
X-Ray Angiographic BiPlane	1.2.840.10008.5.1.4.1.1.12.3	JPEG 2000 Syntax List	SCU	None
Ultrasound	1.2.840.10008.5.1.4.1.1.6.1	JPEG 2000 Syntax List	SCU	None
Ultrasound Multi-Frame	1.2.840.10008.5.1.4.1.1.3.1	JPEG 2000 Syntax List	SCU	None
IVUS (Volcano) Multi-Frame	1.2.840.10008.5.1.4.1.1.3.1	JPEG 2000 Syntax List	SCU	None
Ultrasound (retired)	1.2.840.10008.5.1.4.1.1.6	JPEG 2000 Syntax List	SCU	None
Ultrasound Multi-Frame (retired)	1.2.840.10008.5.1.4.1.1.3	JPEG 2000 Syntax List	SCU	None
PET	1.2.840.10008.5.1.4.1.1.128	JPEG 2000 Syntax List	SCU	None
Nuclear Medicine	1.2.840.10008.5.1.4.1.1.20	JPEG 2000 Syntax List	SCU	None
Enhanced CT	1.2.840.10008.5.1.4.1.1.2.1	JPEG 2000 Syntax List	SCU	None
Mammography – for Presentation	1.2.840.10008.5.1.4.1.1.1.2	JPEG 2000 Syntax List	SCU	None
Mammography – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	JPEG 2000 Syntax List	SCU	None
Panoramic X-Ray Image Storage	1.2.840.10008.5.1.4.1.1.1.3	JPEG 2000 Syntax List	SCU	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	JPEG 2000 Syntax List	SCU	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	JPEG 2000 Syntax List	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Uncompressed Syntax List	SCU	None
Key Object Selection Storage	1.2.840.10008.5.1.4.1.1.88.59	Uncompressed Syntax List	SCU	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	JPEG 2000 Syntax List	SCU	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	JPEG 2000 Syntax List	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Uncompressed Syntax List	SCU	None
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Uncompressed Syntax List	SCU	None

Radiation Therapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Uncompressed Syntax List	SCU	None
---	-------------------------------	--------------------------	-----	------

4.2.3.1.3 SOP Specific Conformance for all Storage Service Classes

No extended negotiation is supported.

4.2.3.2 **Real-world activity: ADS AE as C-STORE SCU**

4.2.3.2.1 Associated Real-world activity: Store

ADS will initiate a C-Store association as SCU when attempting route images to remote AE's.

4.2.3.2.2 Proposed Presentation Contexts: Store

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

4.2.3.2.3 SOP Specific Conformance for all Storage Service Classes

No extended negotiation is supported.

4.2.3.3 **Association Initiation by real-world activity: ADS AE as C-FIND, C-MOVE SCU**

4.2.3.3.1 Associated Real-world activity: Find and Move

ADS will initiate C-FIND and C-MOVE requests as SCU in response to client requests.

4.2.3.3.2 Proposed Presentation Contexts: Find and Move

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/Retrieve - 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 - Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient Root Query/Retrieve - 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 - Move	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.3.3.3 SOP Specific Conformance for all Query / Retrieve Service Classes

No extended negotiation is supported.

4.2.3.4.3

No extended negotiation is supported.

4.2.4 Association Acceptance by real-world activity

ADS will accept associations for Verification and Storage. ADS will accept C-Store association requests as C-STORE SCP as sub-operations during a C-Move.

4.2.4.1 Real-world activity: ADS as C-ECHO SCP

ADS will accept associations for requests using the Verification Service. The association will be closed either by the initiator, or aborted by ADS if certain error conditions arise.

4.2.4.1.1 Associated Real-world activity: Echo

ADS will respond to an echo request with an echo response.

4.2.4.1.2 Acceptable Presentation Contexts: Echo

Presentation Context Table				
Abstract Syntax		Transfer Syntax List Name	Role	Extended Negotiation
Name	UID			
Verification	1.2.840.10008.1.1	Uncompressed Syntax List	SCP	None

4.2.4.1.3 SOP Specific Conformance to Verification Service Class

ADS supports standard conformance to the Verification Service Class.

4.2.4.1.4 Presentation Context acceptance criterion for Verification

ADS will accept any of the presentation contexts listed in the table above.

4.2.4.2 Real-world activity: ADS as C-STORE SCP

ADS will accept associations for Storage Service requests. The association will be closed either by the initiator or aborted by ADS if certain error conditions arise.

4.2.4.2.1 Associated Real-world activity: Store

ADS will accept C-Store association requests as SCP. Received instances are stored to disk. Some attributes of the stored instances will be kept in a database.

4.2.4.2.2 Acceptable Presentation Contexts: Store

Presentation Context Table				
Abstract Syntax		Transfer Syntax List Name	Role	Extended Negotiation
Name	UID			
Computed Radiography	1.2.840.10008.5.1.4.1.1.1	Full Syntax List	SCP	None
Digital X-Ray - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Full Syntax List	SCP	None
Digital X-Ray - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Full Syntax List	SCP	None
CT	1.2.840.10008.5.1.4.1.1.2	Full Syntax List	SCP	None
MR	1.2.840.10008.5.1.4.1.1.4	Full Syntax List	SCP	None
Secondary Capture	1.2.840.10008.5.1.4.1.1.7	Full Syntax List	SCP	None
X-Ray Angiography	1.2.840.10008.5.1.4.1.1.12.1	Full Syntax List	SCP	None
X-Ray Fluoroscopy	1.2.840.10008.5.1.4.1.1.12.2	Full Syntax List	SCP	None
X-Ray Angiography BiPlane	1.2.840.10008.5.1.4.1.1.12.3	Full Syntax List	SCP	None
Ultrasound	1.2.840.10008.5.1.4.1.1.6.1	Full Syntax List	SCP	None
Ultrasound Multi-Frame	1.2.840.10008.5.1.4.1.1.3.1	Full Syntax List	SCP	None
IVUS (Volcano) Multi-Frame	1.2.840.10008.5.1.4.1.1.3.1	Full Syntax List	SCP	None

Presentation Context Table				
Abstract Syntax		Transfer Syntax List Name	Role	Extended Negotiation
Name	UID			
Ultrasound (retired)	1.2.840.10008.5.1.4.1.1.6	Full Syntax List	SCP	None
Ultrasound Multi-Frame (retired)	1.2.840.10008.5.1.4.1.1.3	Full Syntax List	SCP	None
PET	1.2.840.10008.5.1.4.1.1.128	Uncompressed Syntax List	SCP	None
Nuclear Medicine	1.2.840.10008.5.1.4.1.1.20	Uncompressed Syntax List	SCP	None
Enhanced CT	1.2.840.10008.5.1.4.1.1.2.1	Full Syntax List	SCP	None
Mammography – Presentation	1.2.840.10008.5.1.4.1.1.1.2	Full Syntax List	SCP	None
Mammography – Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Full Syntax List	SCP	None
Panoramic X-Ray Image Storage	1.2.840.10008.5.1.4.1.1.1.3	Full Syntax List	SCP	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Full Syntax List	SCP	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Full Syntax List	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Full Syntax List	SCP	None
Key Object Selection Storage	1.2.840.10008.5.1.4.1.1.88.59	Uncompressed Syntax List	SCP	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	JPEG 2000 Syntax List	SCP	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	JPEG 2000 Syntax List	SCP	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Uncompressed Syntax List	SCP	None
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Uncompressed Syntax List	SCP	None
Radiation Therapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Uncompressed Syntax List	SCP	None

4.2.4.2.3 SOP Specific Conformance for all Storage SOP Classes

ADS supports level 2 (full) conformance to the Storage SOP Classes listed above. ADS stores all attributes, including those that are private or unknown. A runtime configurable option determines if duplicate instances will be rejected, or stored with coercion of (0008,0018) SOP Instance UID.

ADS sends a response message with one of the following status codes:

Service Status	Status Description	Status Code (0000,0900)	Related Fields
Refused	Out of Resources – There were insufficient resources to process the request. The request was not processed.	A700	None
Error	Data Set does not match SOP Class – A required attribute is not present in the message. The request was not processed.	A900	None
	Cannot understand – The message was not properly encoded. The request was not processed.	C000	None
	Duplicate SOP Instance – An instance with this SOP Instance UID has been stored previously. The request was not processed.	0111	
	Processing failure – A condition arose which prevented the request from being processed.	0110	
Success		0000	None

4.2.4.2.4 Presentation Context acceptance criterion for Storage

ADS will accept any of the presentation contexts listed above

4.2.4.2.5 Transfer Syntax selection policies for Storage

ADS selects from available transfer syntaxes from the top down as listed in 2627279552.44.2.14.2.1.3.

4.2.4.3 *Real-world activity: ADS as C-FIND and C-MOVE SCP*

ADS does not act as C-FIND and C-MOVE SCP.

4.2.4.4 *Real-world activity: ADS as C-STORE SCP*

ADS will accept C-Store association requests as C-STORE SCP as sub-operations during a C-Move. Only association requests that negotiate at least one of the services listed in table 262727955.....04.2.4.4.2 will be accepted.

4.2.4.4.1 Associated Real-world activity: Store

While ADS acts as a C-MOVE SCU, and as such, has the capability to process C-STORE requests as part of a C-MOVE sub-association and ADS acts as a C-STORE SCP for this purpose. However, ADS is not responsible for storing the received instances for any length of time. In fact, the stored instances are routed almost immediately, once all routing is complete to all destinations, the stored instances may be deleted.

4.2.4.4.2 Acceptable Presentation Contexts: Store

Presentation Context Table				
Abstract Syntax		Transfer Syntax List	Role	Extended Negotiation
Name	UID			
Computed Radiography	1.2.840.10008.5.1.4.1.1.1	Full Syntax List	SCP	None
Digital X-Ray - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Full Syntax List	SCP	None
Digital X-Ray - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Full Syntax List	SCP	None
CT	1.2.840.10008.5.1.4.1.1.2	Full Syntax List	SCP	None
MR	1.2.840.10008.5.1.4.1.1.4	Full Syntax List	SCP	None
Secondary Capture	1.2.840.10008.5.1.4.1.1.7	Full Syntax List	SCP	None
X-Ray Angiography	1.2.840.10008.5.1.4.1.1.12.1	Full Syntax List	SCP	None
X-Ray Fluoroscopy	1.2.840.10008.5.1.4.1.1.12.2	Full Syntax List	SCP	None
X-Ray Angiography BiPlane	1.2.840.10008.5.1.4.1.1.12.3	Full Syntax List	SCP	None
Ultrasound	1.2.840.10008.5.1.4.1.1.6.1	Full Syntax List	SCP	None
Ultrasound Multi-Frame	1.2.840.10008.5.1.4.1.1.3.1	Full Syntax List	SCP	None
Ultrasound (retired)	1.2.840.10008.5.1.4.1.1.6	Full Syntax List	SCP	None
Ultrasound Multi-Frame (retired)	1.2.840.10008.5.1.4.1.1.3	Full Syntax List	SCP	None
PET	1.2.840.10008.5.1.4.1.1.128	Uncompressed Syntax List	SCP	None
Nuclear Medicine	1.2.840.10008.5.1.4.1.1.20	Uncompressed Syntax List	SCP	None
Enhanced CT	1.2.840.10008.5.1.4.1.1.2.1	Full Syntax List	SCP	None
Mammography – for Presentation	1.2.840.10008.5.1.4.1.1.1.2	Full Syntax List	SCP	None
Mammography – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Full Syntax List	SCP	None
Panoramic X-Ray Image Storage	1.2.840.10008.5.1.4.1.1.1.3	Full Syntax List	SCP	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Full Syntax List	SCP	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Full Syntax List	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Full Syntax List	SCP	None
Key Object Selection Storage	1.2.840.10008.5.1.4.1.1.88.59	Uncompressed Syntax List	SCP	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Full Syntax List	SCP	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Full Syntax List	SCP	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Uncompressed Syntax List	SCP	None
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Uncompressed Syntax List	SCP	None
Radiation Therapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Uncompressed Syntax List	SCP	None

4.2.4.4.3 SOP Specific Conformance for all Storage SOP Classes

ADS supports standard conformance to the storage SOP Classes listed above. ADS returns status of Success (0000) upon successful completion of storage. ADS closes the C-STORE association if a failure occurs, and does not return status.

4.2.4.4.4 Presentation Context acceptance criterion for Storage

ADS will accept any of the presentation contexts listed in table 262727955.....72348164.2.4.4.2.

4.2.4.4.5 Transfer Syntax selection policies for Storage

ADS selects from available transfer syntaxes from the top down as listed in table above.

4.3 Network Interfaces

ADS uses the MergeCOM-3 Advanced DICOM Toolkit to communicate over the TCP/IP protocol stack on any physical interconnection media supporting the TCP/IP stack. The Toolkit inherits the TCP/IP stack from the host operating system upon which it executes.

4.4 Configuration

AquariusAPS server is configured by logging to configuration page of AqAPS server using web. It is password protected and intended to be used by AquariusAPS service engineers or authorized and trained customers. The detailed configuration information is available in the configuration page of web.

5 Media Interchange

Not applicable to AquariusGATE, a DICOM routing device.

6 Support of Character Sets

All AquariusNET DICOM applications support following character sets:

Character Set Description	Defined Term
Latin alphabet No. 1	ISO IR 100
Arabic	ISO 2022 IR 127
Chinese	GB18030
Default repertoire	ISO 2022 IR 6
Greek	ISO 2022 IR 126
Hebrew	ISO IR 138
Japanese	ISO 2022 IR 13
Japanese	ISO 2022 IR 87
Japanese	ISO 2022 IR 159
Korean	ISO 2022 IR 149

7 Security

AquariusAPS server does not support any specific security measures.

It is assumed that AquariusAPS server is used within a secured environment. It is assumed that a secured environment includes at a minimum:

1. Firewall or router protections to ensure that only approved external hosts have network access to AqNet server.
2. Firewall or router protections to ensure that AqNet only has network access to approved external hosts and services.
3. Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8 ANNEXES

8.1 Data Dictionary of Private Attribute

ADS may add 'Aquarius Scene' and 'Aquarius COF' private module to Secondary Capture Image IOD for extension. This module contains Study / Series / SOP Instance UIDs and some application specific data.

Private Groups Table				
Module	Tag	Description	Range of Private Tags	
Aquarius Scene	0077,0000	Private	0077, 0000 – 00FF	
Private Tags Table				
Module	Tag	Description	VR	VM
Aquarius Scene	Original Series/Study UID (0077,0010)	Private	UI	1-N
Aquarius Scene	Original SOP UID (0077,0012)	Private	UI	1-N
Aquarius Scene	Referenced Volume ID (0077,0014)	Private	LO	1-N
Aquarius Scene	Binary Data Name SCS (0077,0016)	Private	CS	1
Aquarius Scene	Binary Data Name (0077,0020)	Private	LO	1-N
Aquarius Scene	Number of SOP Instance UID (0077,0022)	Private	CS	1-N
Aquarius Scene	Number of Series Instance UID (0077,0024)	Private	CS	1-N
Aquarius Scene	Number of Binary data (0077,0026)	Private	US	1
Aquarius Scene	Binary Data Type (0077,0028)	Private	CS	1-N
Aquarius Scene	Binary Data Size (0077,0030)	Private	UL	1-N
Aquarius Scene	Binary Data Subtype (0077,0032)	Private	LO	1-N
Aquarius Scene	Additional Information (0077,0040)	Private	LO	1-N
Aquarius Scene	First Binary Data (0077,0050)	Private	OB	1
Aquarius Scene	First Thumbnail (0077,0060)	Private	OB	1
Aquarius Scene	Algorithm ID (0077,0070)	Private	LO	1
Aquarius Scene	Volume ID (0077,0080)	Private	LO	1
Aquarius Scene	COF Object UID (0077,0084)	Private	LO	1-N
Aquarius Scene	Workflow Scene status (0077,0086)	Private	LO	1-N
Aquarius Scene	Reference SOP Instance UIDs (0077,0088)	Private	UI	1-N
Aquarius Scene	COF Refinement Level (0077,0090)	Private	FL	1