

DICOM Conformance Statement

iNtuition 4.4

Rev. 02 29-Mar-2019

1 Conformance Statement Overview

iNtuition is a 2D / 3D / 4D enterprise client-server solution. The primary functions of iNtuition are to receive, transmit, post-process, display and manipulate reports and medical images to / from acquisition and other DICOM devices. iNtuition solution as a complete product comprises of AquariusNet server and the iNtuition client image viewing applications, as well as AquariusAPS server, AquariusGate server, other associated tools and binaries to deliver the above functions. Each of these servers delivers a distinct set of functions.

- AquariusNet server is a central processing 2D/3D/4D image server streaming real-time interactively rendered images to networked computers running the iNtuition client application.
- AquariusAPS server is a post-processing server. It processes the DICOM messages received from modalities or other DICOM devices 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.
- AquariusGATE (AG) server receives DICOM messages over a network, and re-transmit those messages to one or more targets, potentially using a different transfer syntax. Additionally, AG also implements query / retrieve functions to obtain data from other DICOM nodes (for pre-fetching purposes).

As such, all these servers communicate with other machines on the network using DICOM 3.0. The purpose of this document is to describe the conformance of these servers to the DICOM 3.1 Standard as described by the NEMA in the edition 2016e. Thus, this DICOM conformance statement is applicable to iNtuition server.

The iNtuition server supports 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
Print			
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No

Note:

The above list of supported SOP Class is the system default. Additional SOP Classes can be added to the iNtuition server via the configurable dynamic service list at run time.

2 Table of Contents

	<i>DICOM Conformance Statement</i>	1
1	CONFORMANCE STATEMENT OVERVIEW	2
2	TABLE OF CONTENTS	4
3	INTRODUCTION	6
3.1	REVISION HISTORY	6
3.2	AUDIENCE	6
3.3	REMARKS	7
3.4	DEFINITION, TERMS AND ABBREVIATION	7
3.5	REFERENCES	7
4	NETWORKING	8
4.1	IMPLEMENTATION MODEL	8
4.1.1	Application Data Flow	8
4.1.2	Functional Definitions of AE's	10
4.1.2.1	AIS / ADS Network related functions	10
4.1.2.2	AGS Network related functions	10
4.1.3	Sequencing Real World Activity	10
4.2	AE SPECIFICATION	11
4.2.1	AE Specifications	11
4.2.1.1	Storage SOP Classes	11
4.2.1.2	Query / Retrieve SOP Classes	11
4.2.1.3	Transfer Syntaxes	11
4.2.2	Association Establishment Policies	12
4.2.2.1	General	12
4.2.2.2	Number of Associations	12
4.2.2.3	Asynchronous Nature	13
4.2.2.4	Implementation Identifying Information	13
4.2.3	Association Initiation by real-world activity	13
4.2.3.1	Real-world activity: ADS AE as C-STORE SCU	13
4.2.3.2	Real-world activity: AIS AE as C-STORE SCU	14
4.2.3.3	Real-world activity: AIS AE as C-FIND, C-MOVE SCU	15
4.2.3.4	Real-world activity: AGS AE as C-STORE, C-FIND, C-Move SCU	15
4.2.4	Association Acceptance by real-world activity	16
4.2.4.1	Real-world activity: ADS as C-ECHO SCP	16
4.2.4.2	Real-world activity: ADS as C-STORE SCP	16
4.2.4.3	Real-world activity: ADS as C-FIND and C-MOVE SCP	18
4.2.4.4	Real-world activity: AIS as C-STORE SCP	18
4.2.5.1	Real-world activity: AGS as C-ECHO SCP	19
4.2.5.2	Real-world activity: AGS as C-STORE SCP	19
4.2.5.3	Real-world activity: AGS as C-FIND SCP	19
4.2.5.4	Real-world activity: AGS as C-MOVE SCP	20
4.3	NETWORK INTERFACES	20
4.4	CONFIGURATION	20
5	MEDIA INTERCHANGE	21
6	PRINTING	22
6.1	IMPLEMENTATION MODEL	22

6.1.1. Application Data Flow Diagram	22
6.1.2 Functional Definition of Application Entities	22
6.1.3 Sequencing Real World Activity	23
6.2 AE SPECIFICATION	23
6.2.1 AE Specifications	23
6.2.1.1 Print Management SOP Classes	23
6.2.1.2 Transfer Syntaxes	23
6.2.2 ASSOCIATION ESTABLISHMENT POLICIES	23
6.2.2.1 Number of Associations	23
6.2.2.2 Asynchronous Nature	23
6.2.2.3 Implementation Identifying Information	24
6.2.3 Association Initiation by real-world activity	24
6.2.3.1 Real-world activity: Client viewers initiate Filming request	24
6.2.3.2 Real-world activity: iNtuition DICOM Server initiates Printing request	25
6.2.4 Configuration	25
7 SUPPORT OF CHARACTER SETS	26
8 SECURITY	26
9 ANNEXES	27
9.1 DATA DICTIONARY OF PRIVATE ATTRIBUTE	27

3 Introduction

iNtuition is a 2D / 3D / 4D enterprise client-server solution. The primary functions of iNtuition are to receive, post-process, transmit, display and manipulate reports and medical images from acquisition and other DICOM devices. iNtuition solution as a complete product comprises of AquariusNet server and the iNtuition client image viewing applications, AquariusAPS server, AquariusGate server, other associated tools and binaries to deliver the above functions. Each of these servers delivers a distinct set of functions.

- AquariusNet server is a central 2D/3D/4D image server streaming real-time interactively rendered images to networked computers running the iNtuition client application. AquariusNet server has an AquariusNet Image Server (AIS) and AquariusNet DICOM Server (ADS) components.
- AquariusAPS server is an image post-processing server. It processes the DICOM messages received from modalities or other DICOM devices 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 server has an AquariusNet DICOM Server (ADS) component.
- AquariusGATE server receives DICOM messages over a network, and re-transmit those messages to one or more targets, potentially using a different transfer syntax. Additionally, it also implements query/retrieve functions to obtain data from other DICOM nodes (for pre-fetching purposes). AquariusGATE server has an AquariusGATE DICOM Server (AGS) component.

As such, all these servers communicate with other machines on the network using DICOM 3.0. The purpose of this document is to describe the conformance of the AquariusNet Image Server (AIS), AquariusNet DICOM Server (ADS), AquariusGATE DICOM Server (AGS) to the DICOM Standard as described by the NEMA.

3.1 Revision History

Following table provides revision history of this DICOM conformance statement:

Revision #	Description	Date of Release
1	Initial draft for iNtuition server	2018-07-09
2	Added Segmentation Storage and Radiation Therapy Structure Set Storage	2019-03-29
3	Formatting changes	2019-4-4

3.2 Audience

This DICOM conformance statement is intended for following audiences:

- Hospital staff or Customer
- System integrator of medical equipment
- DICOM 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:

AE	DICOM Application Entity
AET	Application Entity Title
ADS	AquariusNet DICOM Server
AGS	AquariusGate DICOM Server
AIS	AquariusNet Image Server
ASCE	Association Control Service Element
FSC	File-Set Creator
IOD	Information Object Definition
ISO	International Standard Organization
PDU	Protocol Data Unit
SCU	Service Class User (DICOM client)
SCP	Service Class Provider (DICOM server)
SOP	Service-Object Pair
U	Unique Key Attribute

3.5 References

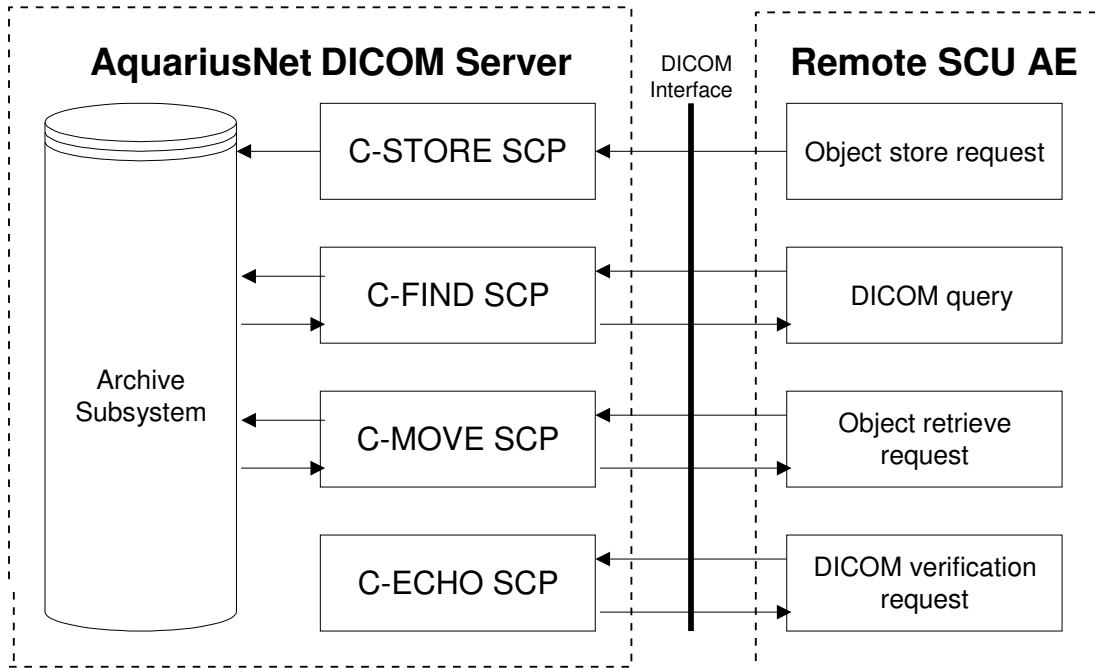
[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.20, 2016e

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

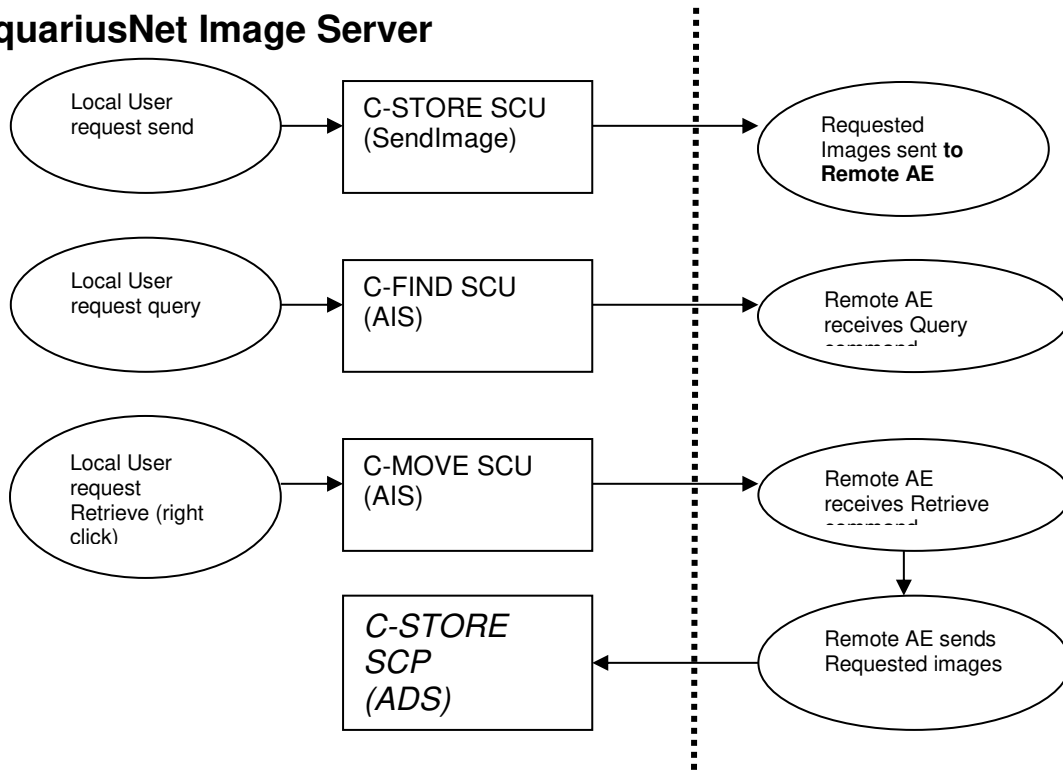
ADS implements an Application Entity (AE) which acts as C-STORE / C-FIND / C-MOVE / C-ECHO SCP. The diagram below depicts communications as they might occur between an SCU AE and an ADS AE.



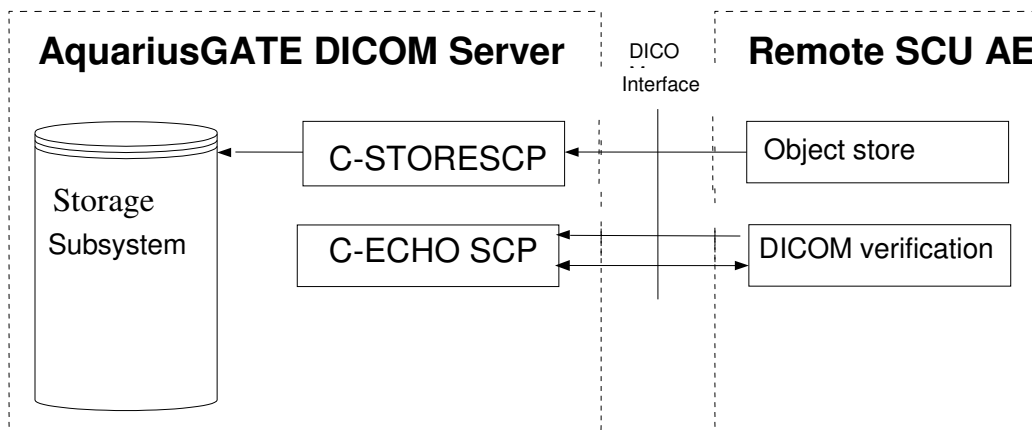
AIS implements an Application Entity (AE) which acts as a Query / Retrieve Service Class User (SCU). This AE sends queries originating from AIS clients to all known DICOM servers on the network and returning the query results to the clients. When a client requests images for retrieval, AIS sends a move request to one of the DICOM servers, loads the retrieved images and supplies the client with 2D, 3D and 4D representations of the images through an interactive rendering session. When the images are received, they are not stored permanently. AIS also has Storage SCU capability.

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

AquariusNet Image Server



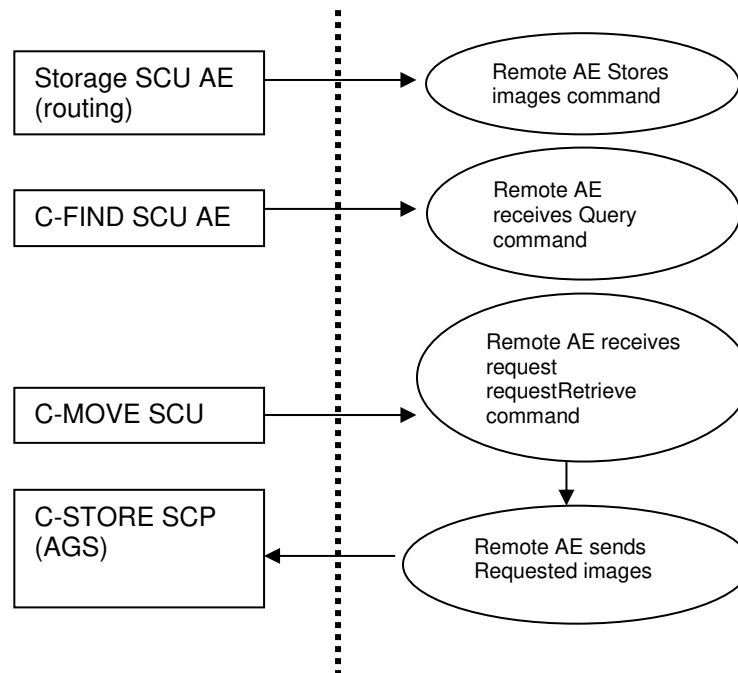
The diagram below depicts communications as they might occur between an SCU AE and an AGS AE.



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

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

AquariusGATE SCU



4.1.2 Functional Definitions of AE's

4.1.2.1 **AIS / ADS 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 SCP 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 troubleshooting connectivity problems.
- 6) AIS acts as an SCU for the C-Find, C-Move and C-Store services.
- 7) AIS also acts as an SCP of the C-Store service during sub-operations of C-Move requests.

4.1.2.2 **AGS Network related functions**

- 1) Storage of received SOP instances sent to AGS by a remote SCU AE.
- 2) 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).
- 3) AGS responds to verification requests for troubleshooting connectivity problems.
- 4) AGS acts as an SCU for the C-Find, C-Move and C-Store services.
- 5) AGS 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 and AGS support standard conformance to the following storage SOP classes as SCU and SCP. AIS supports storage of instances of the SOP classes listed in the table below when servicing C-Store requests as sub-operations during a move operation, and when storing SOP instances on remote AEs.

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

AIS provides standard conformance to the following SOP Classes as a Query / Retrieve SCU. ADS support standard conformance to the following storage SOP classes as SCU and SCP. AGS 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

AIS 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 AIS is acting as SCP, the syntax selection policy is from top down as listed below.

ADS support 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.

AGS support 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 AGS 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)	1.2.840.10008.1.2.4.70
	JPEG Baseline	1.2.840.10008.1.2.4.50
	JPEG Extended (2 & 4)	1.2.840.10008.1.2.4.51
	JPEG 2000 Lossless Only	1.2.840.10008.1.2.4.90
	JPEG 2000	1.2.840.10008.1.2.4.91
	RLE	1.2.840.10008.1.2.4.5
	Implicit VR Little Endian	1.2.840.10008.1.2
Uncompressed Syntax List	Explicit VR Little Endian	1.2.840.10008.1.2.1
	Implicit VR Little Endian	1.2.840.10008.1.2
JPEG 2000 Syntax List	Explicit VR Little Endian	1.2.840.10008.1.2.1
	JPEG 2000 Lossless	1.2.840.10008.1.2.4.90
	JPEG 2000	1.2.840.10008.1.2.4.91
	Implicit VR Little Endian	1.2.840.10008.1.2

4.2.2 Association Establishment Policies

4.2.2.1 General

ADS, AGS and AIS always propose the DICOM Application Context Name listed 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 can 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 25. ADS initiates associations only when acting in the SCU role while servicing C-MOVE requests, or when sending storage requests.

AGS is designed for multi-threaded operation and can 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 25. ADS initiates associations only when acting in the SCU role when sending storage requests.

AIS is designed for multi-threaded operation and can handle requests from multiple users at the same time. The maximum number of simultaneous associations initiated by AIS is determined by the maximum number of AIS clients, and the maximum number of sessions per client, both of which are configurable at run-time.

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.

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

AGS 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, AGS, and AIS 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 initiates 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.

AIS initiates an association when performing query and retrieve operations and when sending the SOP instances on remote AE's.

AIS initiates C-STORE associations as SCU 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 initiates a C-Store association as SCU when attempting to send SOP Instances to remote AE's. The proposed transfer syntaxes that can be proposed are normally determined using table 4.2.3.1.2. However, they may also propose the transfer syntax that was used to store an instance on disk; that is, any of the transfer syntaxes for that storage class as listed in table 262727955.....04.2.4.2.2. 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 Name	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: AIS AE as C-STORE SCU*

4.2.3.2.1 Associated Real-world activity: Store

AIS will initiate a C-Store association as SCU when attempting to send secondary capture 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 *Real-world activity: AIS AE as C-FIND, C-MOVE SCU*

4.2.3.3.1 Associated Real-world activity: Find and Move

AIS 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 *Real-world activity: AGS AE as C-STORE, C-FIND, C-Move SCU*

4.2.3.4.1 Associated Real-world activity: Store

AGS initiates 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.....51379204.2.3.1.2. However, they may also propose the transfer syntax that was used to store an instance on disk; that is, any of the transfer syntaxes for that storage class as listed in table 262727955.....04.2.4.2.2. If this transfer syntax is accepted by the SCP, AGS 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.

4.2.3.4.2 Associated Real-world activity: Find and Move

AGS initiates C-FIND and C-MOVE requests as SCU in response to tag filter configurations in the pre-fetch use cases. The proposed Presentation Contexts are as per the table 4.2.3.3.2.

4.2.3.4.3 SOP Specific Conformance

No extended negotiation is supported for any of the storage, query and retrieve service classes.

4.2.4 Association Acceptance by real-world activity

ADS will accept associations for Verification, Storage, and Query / Retrieve requests. AIS will accept C-Store association requests as C-STORE SCP as sub-operations during a C-Move. AGS will accept associations for Verification and Storage requests.

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 responds 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
Ultrasound (retired)	1.2.840.10008.5.1.4.1.1.6	Full Syntax List	SCP	None

Presentation Context Table				
Abstract Syntax		Transfer Syntax List Name	Role	Extended Negotiation
Name	UID			
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	Uncompressed 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 0.

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

4.2.4.3.1 Associated Real-world activity: Find and Move

ADS will accept C-Find and C-Move association requests as SCP. ADS will service move requests at the IMAGE, SERIES and STUDY levels as specified in attribute (0008,0052). PATIENT level move is not supported.

4.2.4.3.2 Acceptable 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	Uncompressed Syntax List		SCP	None
Study Root Query/Retrieve - Find	1.2.840.10008.5.1.4.1.2.2.1	Uncompressed Syntax List		SCP	None
Patient Root Query/Retrieve - Move	1.2.840.10008.5.1.4.1.2.1.2	Uncompressed Syntax List		SCP	None
Study Root Query/Retrieve - Move	1.2.840.10008.5.1.4.1.2.2.1	Uncompressed Syntax List		SCP	None

4.2.4.3.3 SOP Specific Conformance for all Query / Retrieve Service Classes

No extended negotiation is supported.

4.2.4.4 Real-world activity: AIS as C-STORE SCP

AIS 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.....51379204.2.4.4.2 will be accepted.

4.2.4.4.1 Associated Real-world activity: Store

While AIS 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 AIS acts as a C-STORE SCP for this purpose. However, AIS is not responsible for storing the received instances for any length of time. In fact, the stored instances are discarded almost immediately, once their pixels and other relevant attributes have been extracted and prepared for viewing.

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

Presentation Context Table				
Abstract Syntax		Transfer Syntax List	Role	Extended Negotiation
Name	UID	Name		
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

AIS supports standard conformance to the storage SOP Classes listed above. AIS returns status of Success (0000) upon successful completion of storage. AIS 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

AIS will accept any of the presentation contexts listed in table 262727955.....51379204.2.4.4.2.

4.2.4.4.5 Transfer Syntax selection policies for Storage

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

4.2.5 *Real-world activity: AGS as C-ECHO, C-STORE, C-FIND and C-MOVE SCP*

4.2.5.1 Real-world activity: AGS as C-ECHO SCP

AGS will accept associations for requests using the Verification Service. The association will be closed either by the initiator or aborted by AGS if certain error conditions arise. AGS will respond to an echo request with an echo response. AGS supports standard conformance to the Verification Service Class. AGS will accept any of the presentation contexts listed in the table 4.2.4.1.2.

4.2.5.2 Real-world activity: AGS as C-STORE SCP

AGS will accept associations for Storage Service requests. The association will be closed either by the initiator or aborted by AGS if certain error conditions arise. AGS will accept C-Store association requests as SCP. Received instances are stored to disk for subsequent routing operations. Some attributes of the stored instances will be kept in a database. AGS will accept any of the presentation contexts listed in the table 4.2.4.2.2.

4.2.5.3 Real-world activity: AGS as C-FIND SCP

AGS does not act as C-FIND SCP.

4.2.5.4 Real-world activity: AGS as C-MOVE SCP

AGS does not act as C-MOVE SCP.

4.3 Network Interfaces

AIS 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

AquariusNet, AquariusGate and AquariusAPS servers are configured by login onto the Web administration page hosted by the respective servers. It is password protected and intended to be used by iNtuition service engineers or authorized and trained customers. The detailed configuration information is available in the configuration page of web.

5 Media Interchange

AquariusNet DICOM media exchange applications support the following Application Profiles

Supported Application Profile	Identifier	Role	Real World Activity	SC Option
CT/MR Studies on CD-R	STD-CTMR-CD	FSC	Write Images	Interchange
		FSR	Read Images	Interchange
CT/MR Studies on DVD Media	STD-CTMR-DVD	FSC	Write Images	Interchange
		FSR	Read Images	Interchange
General Purpose CD-R Interchange	STD-GEN-CD	FSC	Write Images	Interchange
		FSR	Read Images	Interchange

For application profile class STD-GEN, the following storage SOP classes are supported

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
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

This section is not applicable to AGS as this is a DICOM routing device.

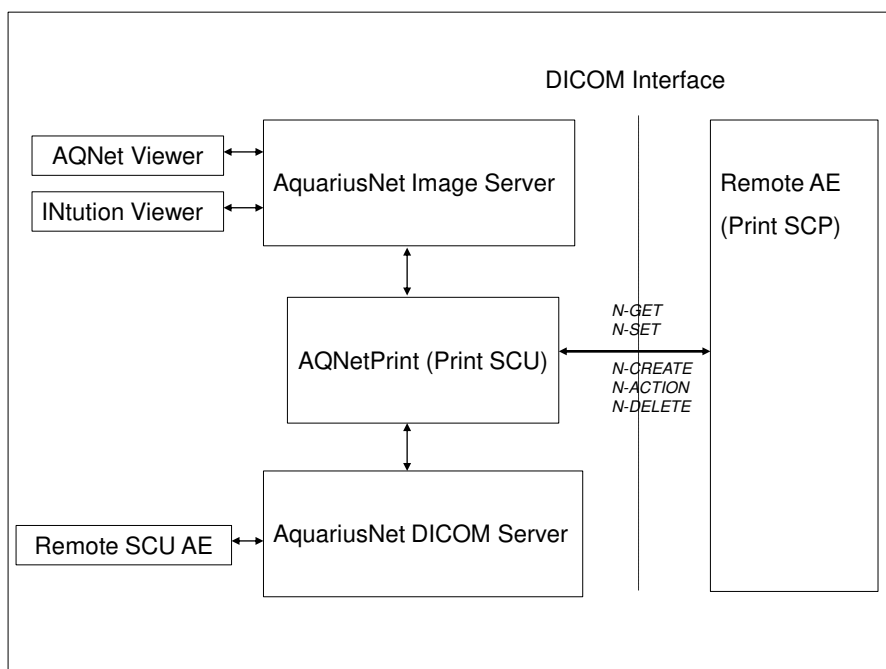
6 Printing

6.1 Implementation Model

The Print Management Service Classes define an application-level class of services to support printing of images on a hardcopy medium. The print management SCU and management SCP are peer DICOM print management application entities. The AquariusNet print application supports the print management DIMSE services to act as SCU.

6.1.1. Application Data Flow Diagram

The Print SCU is implemented using the module AQNetPrint. ADS, AGS and AIS can initiate the printing functions using this module. The data flow and the possible use cases are depicted in the following diagram.



6.1.2 Functional Definition of Application Entities

AQNetPrint is invoked by the client viewers through AqNet Image Server whenever an image is ready to be printed on film. The client viewers send the image data along with necessary configuration information viz. layout, image size etc. to AQNetPrint, which is needed to compile a film-sheet. The Print SCU in-turn forwards the request to the Print SCP Remote AE. A printing job queue is maintained and would be re-tried in the event of failures.

AQNetPrint would also be invoked by AqNet DICOM Server (ADS) or AGS whenever the server is configured to send print requests to Print SCP Remote AE automatically if the tag filter conditions are met.

6.1.3 Sequencing Real World Activity

No assumptions are made about the sequencing of real-world activities except that the printer information should need to be pre-configured into AquariusNet Server before invoking the print function.

6.2 AE Specification

6.2.1 AE Specifications

6.2.1.1 Print Management SOP Classes

AquariusNet Server provides Standard Conformance to the following DICOM V3.1 Print Management Meta SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
- Printer SOP Class	1.2.840.10008.5.1.1.16

SOP Class Name	SOP Class UID
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
- Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1
- Printer SOP Class	1.2.840.10008.5.1.1.16

6.2.1.2 Transfer Syntaxes

The Print SCU supports all the two uncompressed transfer syntaxes ***Uncompressed Syntax List*** as listed in 4.2.1.3.

6.2.2 Association Establishment Policies

6.2.2.1 Number of Associations

The Print SCU application initiates one association at a time for each different print device configured.

6.2.2.2 Asynchronous Nature

Print SCU as such does not support asynchronous communication.

6.2.2.3 Implementation Identifying Information

Print SCU will respond with the following implementation identifying parameters:

Implementation Version Name	Implementation Class UID
TERARECONDEC01	1.2.840.113654.2.3.1995.2.10.2

6.2.3 Association Initiation by real-world activity

The AQNetPrint (Print SCU) establishes a DICOM association with Print SCP either in response to filming requests from the client viewers or when it is required to send filming requests automatically based on tag filter rules. Upon completing the printing, the images are deleted and the association is closed.

6.2.3.1 *Real-world activity: Client viewers initiate Filming request*

6.2.3.1.1 Associated Real-world activity:

AquariusNet Thin Client or iNtuition viewer user captures the images onto output panel, configure the filming layout and send the image data along with configuration to AIS. AIS wraps the data into DICOM files, stores under a preconfigured folder and adds the request to a filming job queue. AQNetPrint is launched upon triggering the job queue.

AQNetPrint checks the printer status using N-GET service request for the Printer SOP Class before printing. Using N-CREATE/N-SET Services for the related Basic Print SOP Classes the film sheet is set up for printing and the images are transferred to the printer device. It issues deletion request on images immediately after the printing is completed and also closes the DICOM association.

6.2.3.1.2 Proposed Presentation Contexts:

Presentation Context Table				
Abstract Syntax		Transfer Syntax List	Role	Extended Negotiation
Name	UID			
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Uncompressed Syntax List	SCU	None
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Uncompressed Syntax List	SCU	None
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Uncompressed Syntax List	SCU	None
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Uncompressed Syntax List	SCU	None
- Printer SOP Class	1.2.840.10008.5.1.1.16	Uncompressed Syntax List	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Uncompressed Syntax List	SCU	None
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Uncompressed Syntax List	SCU	None
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Uncompressed Syntax List	SCU	None
- Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Uncompressed Syntax List	SCU	None
- Printer SOP Class	1.2.840.10008.5.1.1.16	Uncompressed Syntax List	SCU	None

6.2.3.1.3 SOP Specific Conformance for all Print Management Service Classes

No extended negotiation is supported.

6.2.3.2 Real-world activity: iNtuition DICOM Server initiates Printing request

6.2.3.2.1 Associated Real-world activity:

ADS can be configured to send the data to the Remote Print SCP automatically when the incoming data satisfies certain tag filter conditions. AQNetPrint is invoked along with necessary configuration for printing. AquariusNet provides for setting-up the printer configuration using the AquariusNet Web interface.

AQNetPrint checks the printer status using N-GET service request for the Printer SOP Class before printing. Using N-CREATE/N-SET Services for the related Basic Print SOP Classes the film sheet is set up for printing and the images are transferred to the printer device. It issues deletion request on images immediately after the printing is completed and also closes the DICOM association.

6.2.3.2.2 Proposed Presentation Contexts:

Presentation Context Table				
Abstract Syntax		Transfer Syntax List Name	Role	Extended Negotiation
Name	UID			
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Uncompressed Syntax List	SCU	None
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Uncompressed Syntax List	SCU	None
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Uncompressed Syntax List	SCU	None
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Uncompressed Syntax List	SCU	None
- Printer SOP Class	1.2.840.10008.5.1.1.16	Uncompressed Syntax List	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Uncompressed Syntax List	SCU	None
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Uncompressed Syntax List	SCU	None
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Uncompressed Syntax List	SCU	None
- Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Uncompressed Syntax List	SCU	None
- Printer SOP Class	1.2.840.10008.5.1.1.16	Uncompressed Syntax List	SCU	None

6.2.3.2.3 SOP Specific Conformance for all Print Management Service Classes

No extended negotiation is supported.

6.2.4 Configuration:

iNtuition provides for setting-up the printer configuration using the web administration interface. The printer configuration includes printer AE Title, default printer parameters among other information. Default film and image box configuration can be added for supporting auto-filming feature. AQNetPrint burns the annotation onto the image pixels before sending the image data to the Print SCP remote AE. Limited configuration is possible on annotation position on the image. In addition, it is also possible to associate / restrict a printer access only for a given group of users.

7 Support of Character Sets

All iNtuition 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

8 Security

iNtuition servers do not support any specific security measures.

It is assumed that iNtuition servers are 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 iNtuition servers.
2. Firewall or router protections to ensure that iNtuition 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 (for example, 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.

9 ANNEXES

9.1 Data Dictionary of Private attribute

AIS may add 'Aquarius Scene' private module to Secondary Capture Image IOD for extension. This module contains Study / Series / SOP Instance UADS and some application specific data. Data that specifies the patient directly are not included.

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 UADS (0077,0088)	Private	UI	1-N
Aquarius Scene	COF Refinement Level (0077,0090)	Private	FL	1