DICOM
Standard
Interface

DICOM Conformance Statement
for Advanced Workflow Manager
Software Version 1.6

SELENIA®
Dimensions®

HOLOGIC®

MAN-02949

DICOM Conformance Statement
for Advanced Workflow Manager
Software Version 1.6

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1.0 Overview

The Hologic Advanced Workflow Manager implements the necessary DICOM services to:

- Retrieve Hologic Digital Mammography For Processing images, any DICOM conformant Digital Mammography For Presentation images, Hologic Tomosynthesis Raw Projections, Processed Projections, Reconstructed Slices, Secondary Capture images and Hologic Grayscale Softcopy Presentation State objects from a networked storage device or removable media, and

- Store Hologic Digital Mammography For Processing images, any DICOM conformant Digital Mammography For Presentation images, Hologic Tomosynthesis Raw Projections, Processed Projections, Reconstructed Slices, Secondary Capture images and Hologic Grayscale Softcopy Presentation State objects received from an external device.

Note: Hologic Tomosynthesis Raw Projections, Processed Projections and Reconstructed Slices are encapsulated within Secondary Capture Image Storage objects in a proprietary format. Hologic Tomosynthesis Reconstructed Slices may also be received as DICOM Breast Tomosynthesis Image.

Table 1-1 provides an overview of the network services supported by the Advanced Workflow Manager.

Table 1-1
NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Digital Mammography X-Ray Image Storage – For Presentation	No	Yes
Digital Mammography X-Ray Image Storage – For Processing	No	Yes
Secondary Capture Image Storage	No	Yes
Breast Tomosynthesis Image Storage	No	Yes
Grayscale Softcopy Presentation State Storage	No	Yes
Retrieve		
Study Root Query/Retrieve Information Model – MOVE	Option	No

2.0   Introduction

Hologic, Inc. develops and markets a full line of mammography products including the Selenia Dimensions full-field digital mammography Tomography capable system. The Advanced Workflow Manager (AWM) enhances the workflow between multiple Selenia Dimensions within a local area network that are configured within an Advanced Workflow Manager cluster.

2.1.   Audience

This document contains the DICOM conformance claim for the Advanced Workflow Manager. This document is intended to aid in connecting the Advanced Workflow Manager to other components that make use of the DICOM standard for interconnecting networked imaging devices.

The information within this document applies to Advanced Workflow Manager Software version 1.6. The reader of this document should be familiar with the DICOM standard and PACS components that utilize the standard.

2.2.   Remarks

A DICOM conformance statement, the structure and content of which are stipulated by the DICOM standard, is intended to aid in determining the suitability of interconnecting digital imaging devices. References to specific functionality in a conformance statement are not sufficient to guarantee interoperability between components. The following should be considered when evaluating interoperability:

- The Advanced Workflow Manager conformance statement provides a starting point for ascertaining whether the product can communicate with other systems.

- The only way to know for certain whether the Advanced Workflow Manager can interoperate with other systems is to perform connectivity testing.

- This document represents a best effort to document the functionality of commercial versions of the Advanced Workflow Manager and is not a functional specification of any Hologic component or product. Hologic reserves the right to make changes at any time to the functionality of the DICOM components described herein, and is committed to following the evolution of the DICOM standard.

2.3.   Definitions, Terms and Abbreviations

ACR: American College of Radiology

AE: Application Entity

AWM: Advanced Workflow Manager

DICOM: Digital Imaging and Communications in Medicine

DIMSE: DICOM Message Service Element

GSPS: Grayscale Softcopy Presentation State

IOD: Information Object Definition

JPEG: Joint Photographic Experts Group (data compression techniques)

NEMA: National Electrical Manufacturers Association

PACS: Picture Archive and Communications System (image management and long-term storage)

PDU: Protocol Data Unit

SCP: Service Class Provider

SCU: Service Class User

SOP: Service Object Pair

TCP/IP: Transmission Control Protocol/Internet Protocol

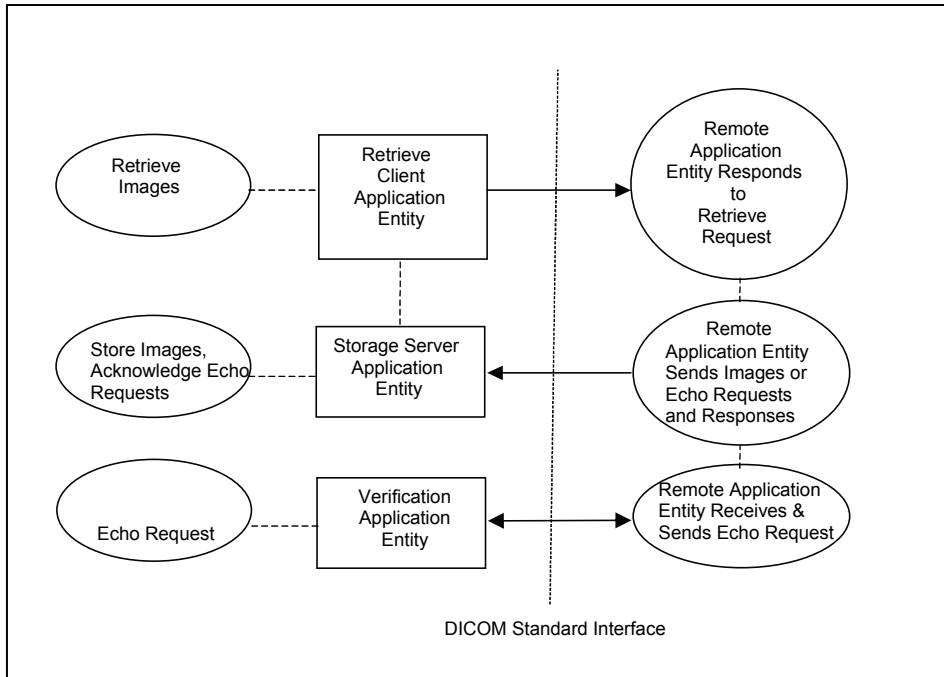**UID:** Unique Identifier

2.4.   References

- NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA (available free at http://medical.nema.org/)

3.0   Networking

3.1.   Implementation Model

3.1.1 Application Data Flow

DICOM Standard Interface

- The Retrieve Client Application Entity retrieves images. "Retrieve Images" is performed upon the Advanced Workflow Manager receiving a Hologic Grayscale Softcopy Presentation State object whose Study Instance UID is not in the Advanced Workflow Manager database. The Retrieve Client requests a remote AE for the corresponding study making the objects of the study accessible to Selenia Dimensions within the Advanced Workflow Manager cluster.

- The Storage Server Application Entity receives echo requests, images, and/or GSPS objects from a remote AE. The Storage Server Application Entity is available whenever the Advanced Workflow Manager application is running.

- The Verification Application Entity sends an echo request to a remote AE. The Verification Application Entity can also receive a request from a remote AE. The Verification Application Entity is available as part of the Advanced Workflow Manager Service Tool utility.

3.1.2 Functional Definition of AE's

Multiple local Application Entities may be active simultaneously.

3.1.2.1 Functional Definition of Retrieve Client Application Entity

The Retrieve Client AE is activated when the Advanced Workflow Manager receives a Hologic Grayscale Softcopy Presentation State object whose Study Instance UID is not in its database. An association request is sent to the remote AE and upon successful negotiation, a retrieve request is sent to the remote AE. The Storage Server

AE is active whenever the application is running and will receive the study. If an association cannot be opened or retrieve request fails, an error is generated and the retrieve job is deleted.

3.1.2.2 Functional Definition of Storage Server Application Entity

The Storage Server AE is active (i.e., listen port is active) to accept echo and storage requests whenever the Advanced Workflow Manager application is running. The received Instances are stored to a temporary directory and then imported to the database.

3.1.2.3 Functional Definition of Verification Application Entity

The Verification AE is available to the user as a DICOM troubleshooting tool in the Service Tool utility. It is available to test all remote SCP devices.

3.1.3 Sequencing of Real World Activities

The Advanced Workflow Manager (AWM) enhances workflow among Selenia Dimensions within its local area network cluster by providing information requested by Selenia Dimensions as to where a patient's studies are located within its cluster.   Once the information is provided to the Selenia Dimensions, the Selenia Dimensions will request the system where the study is located within the AWM cluster to send the study to its Storage Server Application Entity.

The AWM will also retrieve a study from a remote AE upon receiving a Hologic Grayscale Softcopy Presentation State object whose Study Instance UID is not in the AWM database.

In cases where error(s) occur during transmission, the affected job(s) will be retried if the error condition is temporary; otherwise it will be stopped.
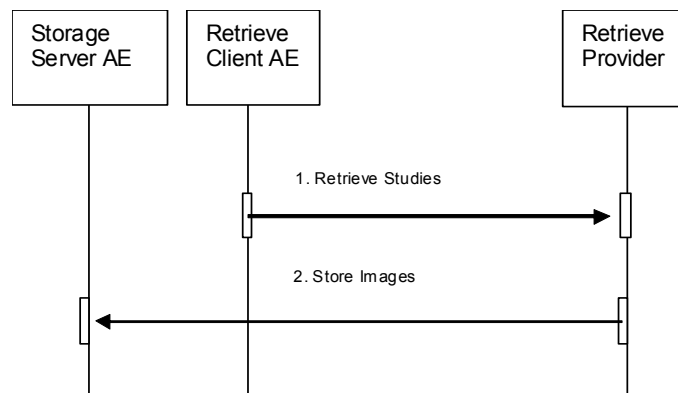

Figure 3.1-1: Retrieve Sequence Diagram

A Storage Client AE initiates a DICOM store request to the AWM Storage Server AE. The AWM accepts the request and receives the studies/images sent by the Storage Client AE, via the Storage Server AE.
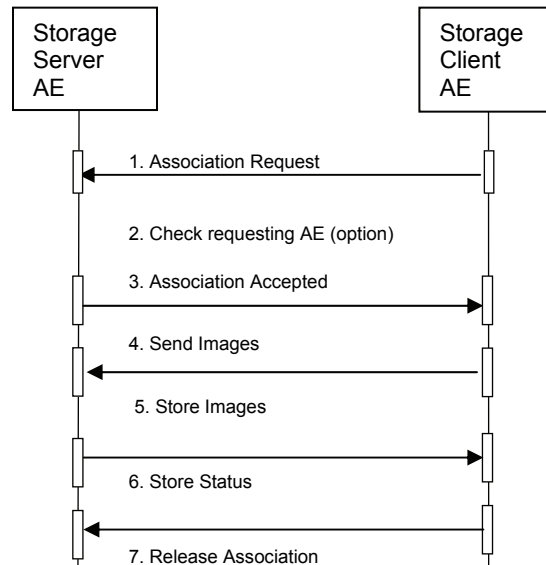
Figure 3.1-2: Storage Sequence Diagram

3.2. AE Specifications

3.2.1 Retrieve Client AE

3.2.1.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

Table 3.2.1-1
SOP CLASSES FOR RETRIEVE CLIENT AE

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

3.2.1.2 Association Policies

3.2.1.2.1 General

The DICOM standard Application context shall be specified.

Table 3.2.1-2
DICOM APPLICATION CONTEXT

Application Context Name	1.2.840.10008.3.1.1.1

3.2.1.2.2 Number of Associations

One association is initiated at a time for the Retrieve Client AE.

3.2.1.2.3 Asynchronous Nature

The Advanced Workflow Manager does not support asynchronous operations (multiple outstanding transactions over a single Association).

3.2.1.2.4 Implementation Identifying Information

Table 3.2.1-3
DICOM IMPLEMENTATION CLASS AND VERSION FOR RETRIEVE CLIENT

Implementation Class UID	1.2.840.114089.1.0.0.3.3.12
Implementation Version Name	DCF 3.3.12c

3.2.1.3 Association Initiation Policy

3.2.1.3.1 Retrieve Images

3.2.1.3.1.1 Description and Sequencing of Activities

The Retrieve Client attempts to establish an association with a remote Retrieve AE upon receiving a Hologic Grayscale Softcopy Presentation State object whose Study Instance UID is not in its database. A C-MOVE is requested to a remote Retrieve AE. The Retrieve Client releases the association after receiving the final C-MOVE response from the remote Retrieve AE.

3.2.1.3.1.2 Proposed Presentation Contexts

The Retrieve Client attempts to establish associations using the following presentation contexts:

Table 3.2.1-4
PROPOSED PRESENTATION CONTEXTS FOR RETRIEVE IMAGES

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	Implicit VR, Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR, Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.1.3.1.3 SOP Specific Conformance for Retrieve

The behavior of the Advanced Workflow Manager when encountering status codes in a C-MOVE response is summarized in the Table below.

Table 3.2.1-5
C-MOVE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Matching or sub-operations are complete	0000	The SCP has successfully completed all sub-operations.
Warning or Failure	Any	Any	AWS aborts association.

The behavior of the Advanced Workflow Manager during communication failure is summarized in the Table below.

Table 3.2.1-6
C-MOVE COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The Association is aborted and an error message is logged: "Retrieve not acknowledged in the allotted time."
Association aborted by SCP	When an Association is aborted for a C-MOVE, an error is logged: "There were error(s) when pulling back the image(s): Cannot open socket to specified host/port, a network error has occurred, or received abort from remote system."

The Retrieve Client provides standard conformance to the Study Root Information Model. The hierarchical method is used. A Study level move request is sent, containing the Study Instance UID of the study to retrieve.

3.2.1.4 Association Acceptance Policy

The Retrieve Client AE does not accept associations.

3.2.2 Storage Server AE

3.2.2.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

Table 3.2.2-1
SOP CLASSES FOR STORAGE SERVER AE

SOP Class Name	SOP Class UID	SCU	SCP
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	No	Yes

3.2.2.2 Association Policies

3.2.2.2.1 General

The DICOM standard Application context shall be specified.

Table 3.2.2-2
DICOM APPLICATION CONTEXT

Application Context Name	1.2.840.10008.3.1.1.1

3.2.2.2.2 Number of Associations

One association is accepted at a time for the Storage Server AE.

3.2.2.2.3 Asynchronous Nature

The Advanced Workflow Manager does not support asynchronous operations (multiple outstanding transactions over a single Association).

3.2.2.2.4 Implementation Identifying Information

Table 3.2.2-3
DICOM IMPLEMENATION CLASS AND VERSION FOR STORAGE SERVER

Implementation Class UID	1.2.840.114089.1.0.0.3.3.12
Implementation Version Name	DCF 3.3.12c

3.2.2.3 Association Initiation Policy

The Storage Server AE does not initiate associations.

3.2.2.4 Association Acceptance Policy

When the Storage Server AE accepts an association, it will respond to storage requests.

3.2.2.4.1 Activity – Receive Images

3.2.2.4.1.1 Description and Sequencing of Activities

The Storage Server AE starts upon launching the AWM application. The Storage Server AE stores images and GSPS objects that are received so they can be made available to Selenia Dimensions within the AWM cluster. When the AWM application receives a request to shutdown, the Storage Server AE stops running after the configurable time (in seconds) assigned to the Shutdown Wait Seconds parameter has elapsed. As a default, if a received Instance is a duplicate of an existing stored Instance, the received Instance is ignored, and the AWM sends a status of storage success in the C-STORE-RSP. However, the Storage Server AE can be configured to delete the first imported Instance of a stored object and import the duplicate Instance of the stored object.

3.2.2.4.1.2 Accepted Presentation Contexts

The Storage Server accepts associations using the following presentation contexts. Note: Implicit VR Little Endian is the Transfer Syntax AWM will accept as a default when more than one transfer syntax is proposed within a presentation context.

Table 3.2.2 -4
ACCEPTABLE PRESENTATION CONTEXTS FOR
STORAGE SERVER AND RECEIVE IMAGES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR, Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70		
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR, Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR, Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70		
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Implicit VR, Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70		
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR, Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.2.4.1.3 SOP Specific Conformance for Storage SOP Classes

The Storage Server AE provides standard conformance to the Storage Service Class.

The AWM will store only Grayscale Softcopy Presentation State instances created on a SecurView 6-x and greater workstation, and a Selenia Dimensions workstation.

The Storage Server AE will behave as described in the Table below when generating the C-STORE response.

Table 3.2.2-5
STORAGE C-STORE RESPONSE STATUS

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	Image is stored locally and made available to the Selenia Dimensions in the cluster.
Failure	Refused: Out of Resources	A7xx	There is not enough local storage capacity to store the image. Error Comment (0000,0902) is sent.
	Processing failure	0110	Any other failure. Error Comment (0000,0902) is sent containing explanation.

3.2.3 Verification AE

3.2.3.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Class:

Table 3.2.3-1
SOP CLASS FOR VERIFICATION SCP AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes

3.2.3.2 Association Policies

3.2.3.2.1 General

The DICOM standard Application context shall be specified.

Table 3.2.3-2
DICOM APPLICATION CONTEXT

Application Context Name	1.2.840.10008.3.1.1.1

3.2.3.2.2 Number of Associations

One association is initiated at a time for the Verification SCU. One association is accepted at a time for the Verification SCP AE.

3.2.3.2.3 Asynchronous Nature

The Advanced Workflow Manager does not support asynchronous operations (multiple outstanding transactions over a single Association).

3.2.3.2.4 Implementation Identifying Information

Table 3.2.3-3
DICOM IMPLEMENTATION CLASS AND VERSION FOR VERIFICATION SCP

Implementation Class UID	1.2.840.114089.1.0.0.3.3.12
Implementation Version Name	DCF 3.3.12c

3.2.3.3 Association Initiation Policy

The Verification SCU AE does initiate associations. The Verification SCP AE does not initiate associations.

3.2.3.3.1 Activity - C-ECHO

3.2.3.3.1.1 Description and Sequencing of Activities

The Advanced Workflow Manager provides the user with the capability to C-ECHO any remote Service Class Provider configured on the system as a virtual device.

3.2.3.3.1.2 Proposed Presentation Contexts

The SCU AE attempts to establish associations Presentation Contexts using the following Presentation Contexts.

Table 3.2.3-4
PROPOSED PRESENTATION CONTEXTS FOR ECHO REQUESTS

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR, Little Endian	1.2.840.10008.1.2	SCU	None

3.2.3.3.1.3 SOP Specific Conformance for Verification SOP Class

Verification SCU provides standard conformance to the Verification Service Class. The behavior of the Advanced Workflow Manager when encountering status codes in a C-ECHO response is summarized in the Table below.

Table 3.2.3-5
VERIFICATION C_ECHO RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	Indicate a status of success to the user.

3.2.3.4 Association Acceptance Policy

The Verification SCU AE does not accept associations. When the Verification SCP AE accepts an association, it will respond to the verification request.

3.2.3.4.1 Activity – Receive Echo Request

3.2.3.4.1.1 Description and Sequencing of Activities

The Verification SCP is available as a service tool.

3.2.3.4.1.2 Accepted Presentation Contexts

The Verification SCP accepts associations using the following presentation contexts:

Table 3.2.3-6
ACCEPTABLE PRESENTATION CONTEXTS FOR
VERIFICATION SCP AND RECEIVE ECHO REQUEST

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR, Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.3.4.1.3 SOP Specific Conformance for Verification SOP Class

Verification SCP provides standard conformance to the Verification Service Class. The Verification SCP AE will behave as described in the Table below when generating the C-ECHO response.

Table 3.2.3-7
C-ECHO RESPONSE STATUS

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	Upon accepting the DICOM ASSOCIATE-RQ associated with the Verification SOP Class a status of success is sent to the Verification SCU.

3.3.   Network Interfaces

3.3.1 Physical Network Interface

The Advanced Workflow Manager is tested and supports using 10-BaseT, 100-BaseT and 1000-BaseT Ethernet media.

3.3.2 Additional Protocols

None.

3.4.   Configuration

The DICOM Retrieve Client is configured during site installation.

A Verification SCU, used primarily as a troubleshooting tool, is made available through a service tool utility. It attempts to establish an association with a remote Verification SCP when invoked by a service tool utility.

The Verification SCP is available when the Storage Server AE is active. It can accept associations as a promiscuous Server or be configured to only accept the association based on the AE Title of the Verification SCU.

3.4.1 AE Title/Presentation Address Mapping

3.4.1.1 Local AE Titles

Table 3.4-1
AE TITLE CONFIGURATION TABLE

Application Entity	Default AE Title	Default TCP/IP Port
Retrieve Client	DIRECT_DIGXRAY	N/A
Local Storage Server	DIRECT_DIGXRAY	104
Verification SCU	DIRECT_DIGXRAY	N/A
Verification SCP	DIRECT_DIGXRAY	104

The default AE Title and TCP/IP Port number may be modified.

3.4.1.2 Remote AE Title/Presentation Address Mapping

3.4.1.2.1 Remote Retrieve SCP

The following are some of the relevant configurable items for the Remote Retrieve SCP:

Table 3.4-2
REMOTE RETRIEVE SCP CONFIGURATION

Parameter description	Range
Application Entity Title (Called AE)	The Advanced Workflow Manager supports one AE acting as a Retrieve provider.
Remote Host/IP Address	IP address and hostname associated with the Retrieve provider AE.
Port Number	Port number to use when establishing TCP/IP connection to the Retrieve provider AE. Range = 1 to 65,535
Transfer Syntax	• Implicit VR Little Endian or • Explicit VR Little Endian or • Explicit VR Big Endian
Information Model	• Study Root

3.4.2 Configuration Parameters for Local AEs

The following are some of the relevant configurable items for the local AEs:

Table 3.4-3
CONFIGURATION PARAMETERS

Parameter	Configurable (Yes/No)	Default Value
Number of seconds to wait for response to TCP/IP connect request (operating system controlled)	No	~220
ACSE PDU read timeout: Number of seconds to wait for response to an Association Open or Close Request.	Yes	30
ARTIM timeout: Number of seconds for acting SCP to wait from socket accept until Association request is read	Yes	30
Association Idle Timeout: Number of seconds of idle time allowed before an acting SCP automatically terminates an association. The idle timer runs until a complete DIMSE message is received.	Yes	180
Maximum PDU size the AE can receive	Yes, per local SCU	32,768
Maximum PDU size the AE can send (used if not negotiated). Range = 1,024 to 65,535	Yes, per local SCU	32,768

Parameter	Configurable (Yes/No)	Default Value
Retrieve Client		
C-MOVE Timeout: Number of seconds to wait for C-MOVE response	Yes	600
Storage Server		
Host: The IP address of the Storage Server. When it is set to 0.0.0.0 the system default IP will be used.	Yes	0.0.0.0
AE Title: The AE Title of the Storage Server	Yes	DIRECT_DIGXRAY
TCP port: Port on which the Advanced Workflow Manager Association Manager listens.	Yes	104
Check Calling AE Title: Will check the list of known remote AE's.	Yes	No
Maximum Concurrent Associations	Yes	8
AE Title Case Sensitive	Yes	No
Duplicate UID: determines how a duplicate SOP Instance is handled	Yes	Ignore

4.0 Media Interchange

N/A

5.0 Support of Character Sets

The Advanced Workflow Manager supports the following character sets for the values of Data Elements with a VR of SH, LO, ST, PN or LT:

- Default:ISO-IR 6

- Latin Alphabet No. 1: ISO-IR 100

6.0 Security

The Advanced Workflow Manager does not support any specific DICOM security measures.

It is assumed that the AWM is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to the AWM.

- Firewall or router protections to ensure that the AWM only has network access to approved external hosts and services.

- 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.

7.0 Annexes

7.1. IOD Contents

N/A

7.1.1 Usage of Attributes from Received IODs

The following attributes are required to be present with a non-zero length value for successful interpretation of received Digital Mammography X-Ray Image SOP Instances:

- (0008,0016) SOP Class UID: one of the supported values

- (0008,0068) Presentation Intent Type

- (0008,1030) Study Description

- (0010,0020) Patient ID

- (0020,0011) Series Number

- (0020,0013) Instance Number

- (0028,0010) Rows

- (0028,0011) Columns

- At least one of the following:

    - (0008,0050) Accession Number

    - (0020,0010) Study ID

    - (0040,1001) Requested Procedure ID

- At least one attribute that identifies the mammography view

7.1.2 Coerced/Modified Attributes

The Advanced Workflow Manager can be configured to add, edit, or remove specific attributes in received SOP Instances. By default, the AWM will attempt to add missing attributes that are required for interpretation by the Selenia Dimensions display module, such as the Private Attributes (0019) of Hologic Digital Mammography X-Ray images.

7.2. Data Dictionary of Private Attributes

N/A

7.3. Coded Terminology and Templates

N/A

7.4. Grayscale Image Consistency

N/A

7.5. Standard Extended/Specialized/Private SOP Classes

N/A

7.6. Private Transfer Syntaxes

None.