Technical Publications

Direction 5367884-100
Revision 1

AW Server generation 2

CONFORMANCE STATEMENT
for DICOM

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REVISION HISTORY

ENGINEERING REVISION HISTORY

Engineering revisions and master for this document are archived in the MyWorkshop system under **DOC0805744**

Revision	Version	Date	Reason for change
1	1	06/05/2010	Initial Release
1	2	07/15/2010	Update after review 1
1	3	08/02/2010	Update after review 2
1	4	08/11/2010	Update after review 3

TECHNICAL PUBLICATION REVISION HISTORY

M3 release of this document is referenced in the Part Data Management (PDM) system and archived in the Common Document Library as Direction **5367884-100**

Revision	Date	Reason for change

CONFORMANCE STATEMENT OVERVIEW

AW Server 2 is a DICOM platform supporting in its database and in networking the most used DICOM IODs. It uses as well some DICOM printing services. The DICOM media is not supported.

Table 0.1 provides an overview of the network services supported by AW Server 2.

Table 0.1 – NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Computed Radiography Image Storage	Yes	Yes
Digital X-Ray Image Storage – For Presentation	Yes	Yes
Digital X-Ray Image Storage – For Processing	Yes	Yes
Digital Mammography X-Ray Image Storage – For Presentation	Yes	Yes
Digital Mammography X-Ray Image Storage – For Processing	Yes	Yes
CT Image Storage	Yes	Yes
Ultrasound Multi-frame Image Storage	Yes	Yes
MR Image Storage	Yes	Yes
Ultrasound Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	Yes	Yes
Nuclear Medicine Image Storage	Yes	Yes
Spatial Registration Storage	Yes	Yes
Basic Text SR	Yes	Yes
Enhanced SR	Yes	Yes
Comprehensive SR	Yes	Yes
Key Object Selection Document	Yes	Yes
Positron Emission Tomography Image Storage	Yes	Yes
Standalone PET Curve Storage	Yes	Yes
RT Image Storage	Yes	Yes
RT Structure Set Storage	Yes	Yes
RT Plan Storage	Yes	Yes
Query/Retrieve		
Study Root Query/Retrieve Information Model – FIND	Yes	Yes
Study Root Query/Retrieve Information Model – MOVE	Yes	Yes
Print Management		
Basic Film Session SOP Class	Yes	No
Basic Film Box SOP Class	Yes	No
Basic Grayscale Image Box SOP Class	Yes	No
Basic Color Image Box SOP Class	Yes	No
Basic Grayscale Print Management Meta SOP Class	Yes	No

Basic Color Print Management Meta SOP Class	Yes	No
Printer SOP Class	Yes	No
Workflow Management		
Storage Commitment Push Model SOP Class	Yes	No

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:

Section 1 (Introduction) describes the overall structure, intent, and references for this Conformance Statement

Section 2 (Network Conformance Statement) specifies the GEHC equipment compliance to the DICOM requirements for the implementation of networking features.

Section 3 (Network Print SCU Conformance Statement) specifies the GEHC equipment compliance to the DICOM requirements for the implementation of Network Print features.

Section 4 (Network Print Management SOP Class definition) specifies the GEHC equipment compliance to the DICOM requirements for the implementation of Network Print Management SOP Class.

Section 5 (SC Information Object Implementation) specifies the GEHC equipment compliance to the DICOM requirements of SC Information Object produced by this implementation.

Section 6 (Enhanced SR Object Implementation) specifies the GEHC equipment compliance to the DICOM requirements of Enhanced SR Information Object produced by this implementation.

Section 7 (Key Object Selection Object Implementation) specifies the GEHC equipment compliance to the DICOM requirements of Key Object Selection produced by this implementation.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEHC DICOM Conformance Statements is shown in the Illustration below.

GEHC DICOM Conformance Statements

@

http://www.ge.com/DICOM

APPLICATION ENTITY SPECIFICATION
(SERVICE CLASSES, INFORMATION OBJECTS, MESSAGE EXCHANGES, ETC.)

Product Implementation:

CT Advantage

MR Advantage

AW Server 2 Conformance Statement Direction: 5367884-100

...... Conformance Statement Direction: ......

DICOM STANDARD

Standard Specification:

DICOM Part 1

DICOM Part 2

DICOM Part 3

DICOM Part 4

DICOM Part 16

This document specifies the DICOM implementation. It is entitled:

AW Server 2
Conformance Statement for DICOM

Direction 5367884-100

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to interoperate with the GEHC network interface.

The GEHC Conformance Statement, contained in this document, also specifies the Lower Layer communications, which it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM Part 8 standard.

For more information regarding DICOM, copies of the Standard may be obtained on the Internet at http://medical.nema.org. Comments on the Standard may be addressed to:

> DICOM Secretariat
> NEMA
> 1300 N. 17th Street, Suite 1752
> Rosslyn, VA 22209
> USA
> Phone: +1.703.841.3200

1.3 INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM Standard and with the terminology and concepts, which are used in that Standard.

1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document to provide an unambiguous specification for GEHC implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GEHC medical data exchanged using DICOM. The GEHC Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEHC devices are capable of using different Information Object Definitions. For example, a GEHC CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions, which define all data elements, used by this GEHC implementation. If the user encounters unspecified private data elements while parsing a GEHC Data Set, the user is well advised to ignore those data elements (per the DICOM standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements, which are sent by GEHC devices.

1.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM v3.0), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non–GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.

- **Validation** - Testing the complete range of possible interactions between any GE device and non–GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non–GE device and the stability of the image data for the intended applications.

  Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

- **Future Evolution** - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM Standard. DICOM will incorporate new features and technologies and GE may follow the evolution of the Standard. The GEHC protocol is based on DICOM as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices, which have implemented DICOM. **In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) described by these DICOM Conformance Statements**. The **user** should ensure that any non–GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.

- **Interaction** - It is the sole responsibility of the **non–GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

1.6 REFERENCES

NEMA PS3   Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/

1.7 DEFINITIONS

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples : Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title – the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.

Application Context – the specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.

Association – a network communication channel set up between *Application Entities*.

Attribute – – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level

data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD) – the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.

Media Application Profile – the specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs)

Module – a set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation – first phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context – the set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.

Protocol Data Unit (PDU) – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Security Profile – a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data

Service Class Provider (SCP) – role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU) – role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

Service/Object Pair (SOP) Class – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance – an information object; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.

Tag – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: *JPEG* compressed (images), little endian explicit value representation.

Unique Identifier (UID) – a globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

1.8 SYMBOLS AND ABBREVIATIONS

AE	Application Entity
AET	Application Entity Title
CR	Computed Radiography
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
DX	Digital X-ray
GEHC	General Electric HealthCare
GSPS	Grayscale Softcopy Presentation State
IOD	Information Object Definition
KO	Key Object Selection
LUT	Look-up Table
MG	Mammography (X-ray)
MR	Magnetic Resonance Imaging
NM	Nuclear Medicine
O	Optional (Key Attribute)
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
R	Required (Key Attribute)
RF	Radiofluoroscopy
RT	Radiotherapy
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair

SR   Structured Reporting

U   Unique (Key Attribute)

US   Ultrasound

VR   Value Representation

XA   X-ray Angiography

SR   Structured Reporting

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2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the compliance to DICOM conformance requirements for the relevant **Networking** features on this GEHC product.

The AW Server is a Networked Medical Imaging Console dedicated to Examination Review and Diagnosis on film. The system uses DICOM services to import images for possible further analysis or processing and to export images to other DICOM implementations, DICOM printers. It also uses the DICOM Storage Commitment service to transfer ownership of images to a remote workstation supporting storage commitment such as an archive system.

The system provides a basis for applications built on top of it. These applications can create specific Information Object Definitions that will be described in the conformance statement of the added applications. The added applications can benefit the network facilities provided by the station.

This DICOM conformance statement refers to the DICOM standard PS3.3 for the description of standard IODs.

2.2 IMPLEMENTATION MODEL

2.2.1 Application Data Flow Diagram

The Basic and Specific Application models for this station are shown in the following Illustration:

DICOM SERVER AE APPLICATION MODEL
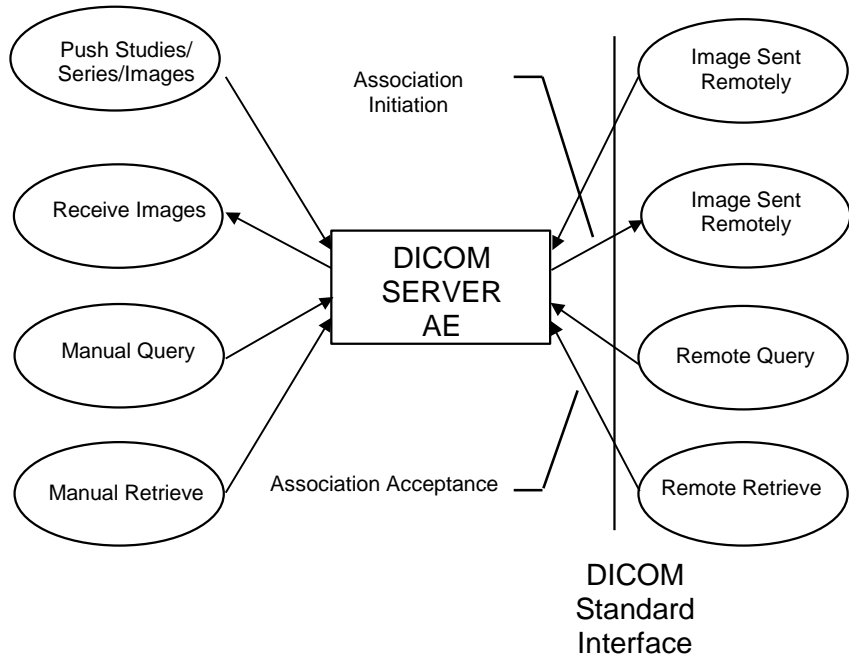
DICOM SERVER AE APPLICATION MODEL FOR STORAGE COMMITMENT
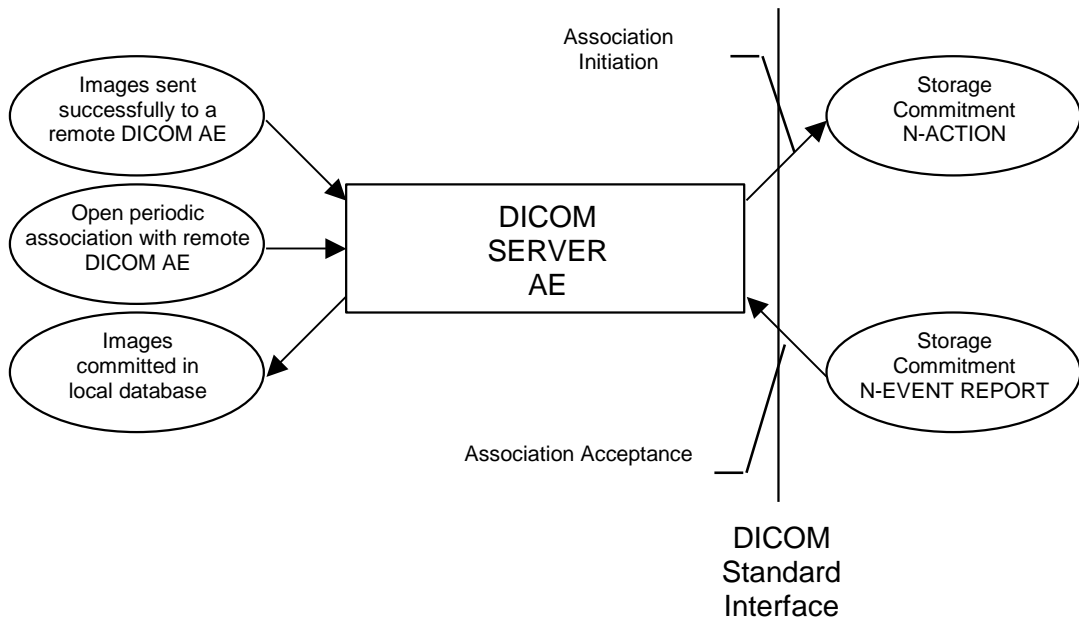
Note: The DICOM SERVER AE accepts also the DICOM Verification SOP class as a SCP. It is not indicated on the illustration above.

The DICOM SERVER Application Entity (AE) is an application that handles DICOM protocol communication. The DICOM SERVER AE is automatically brought up when the AW Server is powered on.

The DICOM SERVER AE is invoked by the following Real World Activities:

- Push Studies/Series/Images.

For this operation, the operator selects:

- Some studies, series or images on the AW Server browser and then sends the selected studies, series or images on one or several remote DICOM AE by a drag and drop on the icon that represents the wanted remote DICOM AE.

The transfer activity is displayed on a specific icon.

The declaration of remote DICOM AE is done through a specific application (known as Service Tools).

- In case the storage commitment is configured, initiate Storage Commitment N-Action to a Remote DICOM AE.

- Manual Query

For this operation, the operator queries one or a set of remote DICOM databases to obtain a list of data at Study/Series/Image level by clicking on the icon that represents the wanted remote DICOM AE. The query is selective based on criteria described below in the document.

- Manual Retrieve

Once the remote browser is displayed (Manual Query), the operator can retrieve the SOP Classes supported by the AW Server from the remote DICOM AE. The data can be retrieved at the Study and Series levels.

- Receive images from a Remote DICOM AE

When images are installed in the local database, the Patient List displays the content of the AW Server local database.

Note1: this function is disabled in case of full integration of AW Server with a remote system

Note2: in case the storage commitment is configured, listen to remote Storage Commitment SCP

- Remote Query

For this operation, a remote DICOM AE asks to obtain the list of data at Study/Series/Image level.

Note: this function is disabled in case of full integration of AW Server with a remote system

- Remote Retrieve

For this operation, a remote DICOM AE asks to send data at Study/Series/Image level from the local AE to another DICOM Remote AE. The remote DICOM AE can ask to move the SOP Classes supported by the AW Server at the Study/Series/Image level. The Remote DICOM AE shall be declared locally on the AW Server. The declaration of remote DICOM AE is done through a specific application (known as Service Tools).

Note1: this function is disabled in case of full integration of AW Server with a remote system

Note2: in case the storage commitment is configured, listen to remote Storage Commitment SCP

- Periodic association for storage commitment N-EVENT REPORT

For this operation, the DICOM SERVER AE is contacting periodically the Storage Commitment SCP (if this one is declared in the AWS Service Tools) to retrieve any new N-EVENT REPORT. In case there is new report, a flag is updated in the DICOM SERVER AE database and the patient list as well.

Note: this function is disabled in case of full integration of AW Server with a remote system

2.2.2 Functional Definition of AE

<u>DICOM SERVER AE</u>

The DICOM SERVER AE initiates the following operations:

Remote query/Push:

- Access to patient demographics and pixel data in the local database.

- Build a DICOM format data set.

- Initiate a DICOM association to send DICOM SOP Instances to a remote DICOM AE.

Query/Retrieve:

- Initiate a DICOM association to ask for remote patient demographics.

Retrieve:

- Initiate a DICOM association to ask for transmitting images from a remote DICOM AE to AW Server.

The DICOM SERVER AE waits for association requests from Remote AE:

- Answer to DICOM associations transmitting DICOM SOP Instances to be stored on the AW Server.

- Answer to DICOM associations transmitting Verification SOP Instance to the AW Server.

The DICOM SERVER AE initiates the following operations for storage commitment (in case the storage commitment is configured for this host):

- Initiate a DICOM association to ask for the storage commitment of specific images and wait for a Storage Commitment Notification (N-EVENT-REPORT)

- Initiate a DICOM association and wait for a Storage Commitment Notification (N-EVENT-REPORT)

The DICOM SERVER AE waits for association requests from Remote Storage Commitment AE:

- Answer to DICOM associations transmitting Storage Commitment Notification (N-EVENT-REPORT)

2.2.3 Sequencing of Real-World Activities

<u>DICOM SERVER AE:</u>

This sequence applies in case the storage commitment is configured

1. The user selects the images and sends them to a remote host.

2. If the remote DICOM AE is associated with a Storage Commitment Provider AE and if the images are successfully sent to the DICOM AE, then a N-ACTION-RQ request is sent automatically to the associated Storage Commitment Provider AE.

3. Waits for N-ACTION-RSP from a remote Storage Commitment Provider AE.

4. On reception of failure in N-ACTION-RSP, the Storage Commitment AE logs the error.

5. On reception of success, Storage Commitment AE is ready to receive at any time from Storage Commitment Provider the N-EVENT-REPORT-RQ notification.

6. On reception of a successful N-EVENT-REPORT-RQ notification from Storage Commitment Provider, the images are flagged as committed in the database.

7. The Storage Commitment AE sends a N-EVENT-REPORT-RSP to the Storage Commitment Provider

2.3 AE SPECIFICATIONS

2.3.1 DICOM SERVER AE Specification

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as a **SCU**:

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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 Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
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
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
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
GE Private DICOM RT Plan	1.2.840.113619.4.5.249
NM Genie Private Data	1.2.840.113619.4.27
PET Advance Private Data	1.2.840.113619.4.30

SOP Class Name	SOP Class UID
GE Private DICOM 3D Object	1.2.840.113619.4.26
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
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Storage Commitment Push Model	1.2.840.10008.1.20.1
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1

Note: C-FIND is done using Study Root Information Model.

Note: The AW Server is able to push the GSPS SOP Class 1.2.840.10008.5.1.4.1.1.11.1.

Note: Please also refer to section 3 for Network Print Management SCU Conformance Statement.

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as a **SCP**:

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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 Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
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
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2

SOP Class Name	SOP Class UID
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
GE Private DICOM RT Plan	1.2.840.113619.4.5.249
NM Genie Private Data	1.2.840.113619.4.27
PET Advance Private Data	1.2.840.113619.4.30
GE Private DICOM 3D Object	1.2.840.113619.4.26
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
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Verification SOP Class	1.2.840.10008.1.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1

Note: The AW Server is able to store the GSPS SOP Class 1.2.840.10008.5.1.4.1.1.11.1 in its local database.

2.3.1.1 Association Establishment Policies

2.3.1.1.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	1.2.840.10008.3.1.1.1

The maximum length PDU negotiation is included in all association establishment requests.

The maximum length PDU for an association initiated by the DICOM SERVER AE is:

Maximum Length PDU	64234 Bytes

Note: The SOP Class Extended Negotiation is not supported.

Note: This length is not configurable

Note: The user information Items sent by this product are:

- Maximum PDU Length
- Implementation UID

2.3.1.1.2 Number of Associations

The DICOM SERVER AE will initiate only one DICOM association at a time to perform a DICOM store operation as a SCU to a Remote Host AE.

The DICOM SERVER AE will initiate only one DICOM association at a time to perform a DICOM Query/Retrieve operation as a SCU with a Remote Host AE.

The DICOM SERVER AE can have a maximum of 10 open DICOM associations at a time to perform a DICOM operation as a SCP.

Note: The number of associations is not configurable

2.3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

2.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM Implementation is:

AW Server Implementation UID	1.2.840.113619.6.263

2.3.1.1.5 Real-World Activity: Push Studies/Series/Images to Remote AE

2.3.1.1.5.1 Associated Real-World Activity

The operator can select in the BROWSER one or several Studies (or Series, or Images) to be sent. Then, the user, by right clicking onto the selection, can select the Remote DICOM AE on which the selection will be sent. The user can also decide to use the 'end review' paradigm to send a set of series of the same patient (to be configured in the AWS service tools).

2.3.1.1.5.2 Association Initiation Policy

The DICOM SERVER AE initiates a new association with a remote DICOM AE for each job selected by the operator. The operator can select to push to a remote DICOM AE:

- a study, a series, an image or

- a set of several images that belong to the same patient through the end review paradigm

Each association corresponds to the Real World Activities:

- Push manually Studies/Series/Images to a remote DICOM AE

- Push the selection or a subset of the selection to a set of remote DICOM AEs through the end review paradigm

2.3.1.1.5.3 Proposed Presentation Context

The following table shows the proposed presentation contexts for the DICOM Server AE after Real-World Activity "Push" Operation has been performed.

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
X-Ray Radiofluoroscopic	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Image Storage	2.2				
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
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	SCU	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
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	SCU	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
RT Structure Set Information Storage	1.2.840.10008.5.1.4.1.1.481.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
RT Structure Set Information Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
RT Structure Set Information Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
GE Private DICOM RT Plan	1.2.840.113619.4.5.249	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
GE Private DICOM RT Plan	1.2.840.113619.4.5.249	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
GE Private DICOM RT Plan	1.2.840.113619.4.5.249	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
NM Genie Private Data	1.2.840.113619.4.27	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
NM Genie Private Data	1.2.840.113619.4.27	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
NM Genie Private Data	1.2.840.113619.4.27	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
PET Advance Private Data	1.2.840.113619.4.30	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
PET Advance Private Data	1.2.840.113619.4.30	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
PET Advance Private Data	1.2.840.113619.4.30	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
GE Private DICOM 3D Object	1.2.840.113619.4.26	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
GE Private DICOM 3D Object	1.2.840.113619.4.26	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
GE Private DICOM 3D Object	1.2.840.113619.4.26	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

Presentation Context Table - Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
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	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

2.3.1.1.5.3.1 SOP Specific DICOM Conformance Statement for C-MOVE SOP Classes

The C-MOVE-RQ will use the AE Title of the AW Server Application Entity as the Move Destination AE Title.

A C-MOVE CANCEL will be sent if the operation is canceled from AWS service tools

Following are the status codes that are more specifically processed when receiving messages from a **Retrieve** SCP equipment:

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A701	Refused: Out of resources - Unable to calculate number of matches	Error displayed in the Network status, in AWS service tools
	A702	Refused: Out of resources - Unable to perform sub-operations	Error displayed in the Network status, in AWS service tools
	A801	Refused: Move Destination Unknown	Error displayed in the Network status, in AWS service tools
	A900	Error: Identifier does not match SOP Class	Error displayed in the Network status, in AWS service tools
	C000-CFFF	Error: Unable to process	Error displayed in the Network status, in AWS service tools
	0122	SOP Class Not Supported	Error displayed in the Network status, in AWS service tools
Cancel	FE00	Sub-operations terminated due to a Cancel indication	Error displayed in the Network status, in AWS service tools
Warning	B000	Sub-operations Complete - One or more Failures.	Log-files updated
Success	0000	Sub-operations Complete - No Failure.	Success status displayed in the Network status, in AWS service tools
Pending	FF00	Sub-operations are continuing -	No action
*	*	Any other status code.	No action

2.3.1.1.5.3.2 SOP Specific DICOM Conformance Statement for Image Storage SOP Classes

This implementation can perform multiple C-STORE operations over a single association.

Upon receiving a C-STORE confirmation containing a successful status, this implementation will perform the next C-STORE operation. The association will be maintained if possible.

Upon receiving a C-STORE confirmation containing a Refused status, this implementation will terminate the association.

Upon receiving a C-STORE confirmation containing any status that is not Success or Refused, this implementation will consider the current request to be a failure and will terminate the association except if the C-STORE is invoked from a C-MOVE SCP. In this case it will continue to attempt to send the remaining images in the request on the same association.

Each C-STORE operation supports an "Association Timer". This timer starts when the association request is sent and stops when the association is established. Default time-out is 60 seconds.

Each C-STORE operation supports an "Operation Inactivity Timer". This timer starts when a C-STORE request is emitted and is reset each time a C-STORE response has been received, or when subsequent C-STORE are received. Default time-out is 300 seconds.

If any of the two timers mentioned above expires, the connection is aborted and the operation is considered as failed.

Following are the status codes that are more specifically processed when receiving N-Action responses from Storage Commitment SCP equipment:

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	0119	Class-instance conflict	Appropriate error message is logged in nwscp.log file. If the error message contains failed sop instance uid's those will logged in the log file Example error message: depending on the error code following message will be logged. "0x0110 (Processing Failure)"; "0x0112 (No Such Object Instance)"; "0x0213 (Resource Limitation)"; "0x0122 (Referenced SOP Class Not Supported)"; "0x0119 (Class/Instance Conflict)"; "0x0131 (Duplicate Transaction UID)";
	0210	Duplicate invocation	Same as above
	0115	Invalid argument value	Same as above
	0117	Invalid SOP Instance	Same as above
	0212	Mistyped argument	Same as above
	0123	No such action	Same as above
	0114	No such argument	Same as above
	0118	No such SOP Class	Same as above
	0112	No such SOP Instance	Same as above
	0110	Processing failure	Same as above
	0213	Resource limitation	Same as above
	0211	Unrecognized operation	Same as above
Success	0000		Same as above

*	*	Any other status code.	Same as above

If a Storage Commitment N-EVENT-REPORT is received on the Association initiated by this Application Entity, it will be processed as described for Association initiated by the Storage Commitment SCP (see Section 2.3.1.3.1.2.6).

2.3.1.1.6 Real-World Activity: Manual Query

2.3.1.1.6.1 Associated Real-World Activity

The operator queries a Remote database or a set of Remote databases by clicking on the corresponding icon. A new BROWSER (known as the REMOTE BROWSER) appears on the screen(s) upon successful query.

The *"Query"* operation will cause the DICOM Server AE to initiate an association to the selected Remote AE. Once a list of Study/Series/Image has been queried, the operator can invoke the *"Retrieve"* operation from the displayed REMOTE BROWSER (drag and drop the selection on the icon representing the local database of AW Server or click on the "Copy To AW Server" button).

2.3.1.1.6.2 Association Initiation Policy

The DICOM SERVER AE initiates a new association for querying Study Folders (or Series/Images) on a remote DICOM AE. This association corresponds to one Real World Activity.

2.3.1.1.6.3 Proposed Presentation Context Table

Presentation Context Table – Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

2.3.1.1.6.3.1 SOP Specific DICOM Conformance Statement for C-FIND-SCU

The C-FIND SCU will only perform hierarchical query (No extended negotiation supported)

Each C-FIND SCU supports an "Association Timer" and an "Operation Inactivity Timer". These timers are defaulted to 30 and 300 seconds.

The DICOM SERVER AE will parse each matching C-FIND-RSP reply and will abort the association if an entry does not contain a valid dataset.

During C-FIND SCU AW Server is able to generate a C-FIND-CANCEL.

Several filters type can be applied for the query, here is the list of the supported filter type:

Filter type	Filter description
Single Value Matching	This is to obtain an exact match on the value contained in a Key Attribute
List of UID Matching	This is to obtain a match on any of the UID items present in a list of UIDs in a Key Attribute.
Wild Card Matching	This is to obtain a match on any sequence of characters contained in a Key Attribute. "*" or "?" characters present in the Key Attribute, where "*" shall match any sequence of characters and "?" matches against a single character.

Range Matching	This is to obtain a match on values of date and time contained in the Key Attributes
	  "<date1> - <date2>" to match against all values that fall in this date range
	  "-<date>" to match against all values that are before this date
	  "<date> -" to match against all values that are after this date

Following table shows the various fields that are requested at the Study level of the C-FIND request:

Description	Tag	Type	Value
Study Date	0008,0020	R	Study dates (supported filter: single value matching, range matching)
Study Time	0008,0030	R	Study times (supported filter: single value matching, range matching))
Accession Number	0008,0050	R	Accession Number (supported filter: single value matching, wild card matching)
Patient's Name	0010,0010	R	Beginning of the patient's name: a "*" is automatically added at the end of the user query. If the user needs to do a query onto a criterion (last name, first name), s/he will have to put a caret between the last and the first name. (Supported filter: single value matching, wild card matching)
Patient ID	0010,0020	R	Patient ID (supported filter: single value matching, wild card matching)
Study ID	0020,0010	R	Zero length
Study Instance UID	0020,000D	U	Zero length
Modalities in Study	0008,0061	O	Requested modalities (supported filter: single value matching)
Study Description	0008,1030	O	Zero length
Patient's Birth Date	0010,0030	O	Zero length
Patient's Sex	0010,0040	O	Zero length
Patient's Birth Time	0010,0032	O	Zero length
Station Name	0008,1010	O	Zero length

Note: During C-FIND SCU AW Server requires setting up a filter before sending a query. At refresh the currently set filter will be applied.

Following table shows the various fields that are requested at the Series level of the C-FIND request when building the list of series of a given study.

Description	Tag	Type	Value

Description	Tag	Type	Value
Series Number	0008,0011	R	Zero length
Modality	0008,0060	R	Zero length
Series Instance UID	0020,000E	U	Zero length
Series Description	0008,103E	O	Zero length
Series Date	0008,0021	O	Zero Length
Series Time	0008,0031	O	Zero length
Number Of Series Related Instances	0020,1209	O	Zero length
Image Type (for legacy systems)	0008,0008	O	Zero length

Following table shows the various fields that are requested at the Image level of the C-FIND request when building the list of instances of a given series. The list of requested fields depends on the value returned for the Modality (0008,0060) in the C-FIND-RSP response at series level given by the remote AE.

Description	Tag	Type	Value	Modality
Instance Number	0020,0013	R	Zero length	All
SOP Instance UID	0008,0018	U	Zero length	All
SOP Class UID	0008,0016	O	Zero length	All
Image ID	0054,0400	O	Zero length	All
Modality	0008,0060	O	Zero length	All
Contrast Bolus Agent	0018,0010	O	Zero length	All
Slice Thickness	0018,0050	O	Zero length	All
Repetition Time	0018,0080	O	Zero length	All
Echo Time	0018,0081	O	Zero length	All
Inversion Time	0018,0082	O	Zero length	All
Number Of Averages	0018,0083	O	Zero length	All
Echo Number	0018,0086	O	Zero length	All
Spacing Between Slices	0018,0088	O	Zero length	All
Data Collection Diameter	0018,0090	O	Zero length	All
Trigger Time	0018,1060	O	Zero length	All
Reconstruction Diameter	0018,1100	O	Zero length	All
Gantry Detector Tilt	0018,1120	O	Zero length	All
Convolution Kernel	0018,1210	O	Zero length	All
Flip Angle	0018,1314	O	Zero length	All
Slice Location	0020,1041	O	Zero length	All
Rows	0028,0010	O	Zero length	All
Columns	0028,0011	O	Zero length	All

During the C-FIND SCU, the following status values supported by AW Server:

- 0xFF00: Study/Series/Image items contained in identifier is collected for later display or further processing and wait for the next response from the remote host.

- 0xFF01: Study/Series/Image items contained in identifier is collected for later display or further processing and wait for the next response from the remote host.

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A700	Refused: Out of resources	Nuevo platform throws error: "No Resource error"
	A900	Error: Identifier does not match SOP Class	Nuevo platform throws error: "Identifier does not match sop error"

	C000-CFFF	Error: Unable to process	Nuevo platform throws error: "Processing failure"
	0122	SOP Class Not Supported	Ignored
Cancel	FE00	Matching terminated due to cancel	Ignored
Success	0000	Matching is complete - No final identifier is supplied	
Pending	FF00	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	Ignored
	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier	Ignored
*	*	Any other status code.	Ignored

2.3.1.1.7 Real-World Activity: Manual Retrieve

2.3.1.1.7.1 Associated Real-World Activity

The operator then has to perform the Real-World activity *"Query"* to get a list of Studies, Series. Once the list of list of Studies, Series is retrieved, the operator can invoke the *"Retrieve"* operation from the displayed REMOTE BROWSER (drag and drop the selection on the icon representing the local database of AW Server or click on the "Copy To AW Server" button).

2.3.1.1.7.2 Association Initiation Policy

The DICOM SERVER AE initiates a new association for retrieving Studies and Series on a remote DICOM AE. This association corresponds to one Real World Activity.

2.3.1.1.7.3 Proposed Presentation Context Table

When the remote DICOM AE is declared as a Study Root Provider or the invoked operation is "Copy To AW Server", the presentation context shown in following table is proposed.

Presentation Context Table – Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
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
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

2.3.1.1.7.3.1 SOP Specific DICOM Conformance Statement for the Study Root Query/Retrieve Information Model - MOVE SOP Classes

When the operator starts a *Move* operation at any level (Study, Series, Image) the DICOM Server AE will initiate a C-MOVE-RQ request to the Remote AE with the DICOM Server AE as the Destination AE. The Storage SCP ("Receive Images from Remote AE") will handle the incoming images.

Each C-MOVE SCU supports an "Association Timer" and an "Operation Inactivity Timer". These timers are defaulted to 60 and 300 seconds. These timers are not configurable.

If the C-MOVE SCU receives a status different from success (0x0000) or pending (0xFF00) during the association, the DICOM Server AE will release the association. This information will be logged in the system log files; in AWS service tools, the network queue will be updated accordingly.

During C-MOVE SCU AW Server is able to generate a C-MOVE-CANCEL (from AWS service tools).

When receiving a Cancel request response (0xFE00), the DICOM Server AE will release the association. This information will be logged in the system log files.

2.3.1.1.8 Real-World Activity: Receive Images from Remote AE

This AE is indefinitely listening for associations. No operator action is required to receive an image.

2.3.1.1.8.1 Associated Real-World Activity

The Real-World Activity associated with the Receive Images operation is the storage of the images on the disk drive of the AW Server and the declaration of the images in the database of the same station.

2.3.1.1.8.2 Association Acceptance Policy

The DICOM SERVER AE refuses the association if they are too many open connections. Sends the association rejection error. Status will be "transient rejection".

2.3.1.1.8.3 Presentation Context Table

Acceptable Presentation Contexts for DICOM Server AE and Real-World Activity Receive Images from Remote AE.

Presentation Context Table - Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
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
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital X-Ray Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
- For Processing	.1.1				
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
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
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
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
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.1 29	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.1 29	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
RT Structure Set Information Storage	1.2.840.10008.5.1.4.1.1.4 81.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Structure Set Information Storage	1.2.840.10008.5.1.4.1.1.4 81.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
RT Structure Set Information Storage	1.2.840.10008.5.1.4.1.1.4 81.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.4 81.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.4 81.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.4 81.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.4 81.5	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.4 81.5	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.4 81.5	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
GE Private DICOM RT Plan	1.2.840.113619.4.5.249	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
GE Private DICOM RT Plan	1.2.840.113619.4.5.249	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
GE Private DICOM RT Plan	1.2.840.113619.4.5.249	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
NM Genie Private Data	1.2.840.113619.4.27	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
NM Genie Private Data	1.2.840.113619.4.27	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
NM Genie Private Data	1.2.840.113619.4.27	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
PET Advance Private Data	1.2.840.113619.4.30	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
PET Advance Private Data	1.2.840.113619.4.30	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
PET Advance Private Data	1.2.840.113619.4.30	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
GE Private DICOM 3D Object	1.2.840.113619.4.26	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
GE Private DICOM 3D Object	1.2.840.113619.4.26	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
GE Private DICOM 3D Object	1.2.840.113619.4.26	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Presentation Context Table - Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
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
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

Note: The Grayscale Softcopy Presentation State Storage abstract syntax is accepted but the basic AW Server applications do not manage this object.

2.3.1.1.8.3.1   SOP Specific Conformance to Storage SOP Classes

AW Server is Storage Level 2.

Private elements are not discarded from the image when receiving images containing non-GE private data elements.

Each C-STORE SCP operation supports an "Operation Inactivity Timer" with time out values of 15-seconds. This timer is not configurable.

Image Reception phase:

In case of failure, the image will not be installed in the local database and the DICOM Server AE will return one of the following status codes for the C-STORE:

- C000 (Cannot understand) indicates that the processing failed during the reception of the image.

- A700 (No Resources) Indicates that probably there was not enough disk space to store the image. The user should attempt recovery by removing some images from the AW Server.

In the event of a successful C-STORE operation, the image has successfully been declared in the database.

The image will then be accessed in the same manner as any other image by the applications on the AW Server.

Images may be deleted when instructed to do so by the user. The users of the AW Server determine the duration of the storage of the image.

When a C-STORE operation returns Error, the network status indicator icon will change in the browser informing the user of a failure. The details of the problem can be checked in the DICOM Queue tool of Service Tools.

2.3.1.1.8.4 Presentation Context Acceptance Criterion

Only known SOP Classes are accepted.

2.3.1.1.8.5 Transfer Syntax Selection Policies

The transfer syntax selection policy is the following:

- Only the following transfer syntaxes are accepted: Implicit VR Little Endian (1.2.840.10008.1.2), Explicit VR Little Endian (1.2.840.10008.1.2.1), Explicit VR Big Endian (1.2.840.10008.1.2.2)

- Among all the remaining proposed transfer syntaxes, the explicit transfer syntaxes are chosen first.

- Among all the remaining proposed transfer syntaxes, the little endian transfer syntaxes are chosen first.

2.3.1.1.9 Real-World Activity: Query Request from Remote AE

This AE is indefinitely listening for associations. No operator action is required to respond to a *query* request.

2.3.1.1.9.1 Associated Real-World Activity

The Real-World Activity associated with the query request is to search the local database for entries that match the request and send a C-FIND response message with a status of "pending" for each matching entry and send a C-FIND response message with a status of "success" after the last "pending" response.

If the C-FIND SCP receives a C-FIND-CANCEL request, it sends a C-FIND response message with a status of "cancel".

2.3.1.1.9.2 Association Acceptance Policy

The DICOM SERVER AE refuses the association if they are too many opened connections. Sends the association rejection error. Status will be "transient rejection".

2.3.1.1.9.3 Presentation Context Table

Acceptable Presentation Contexts for DICOM Server AE and Real-World Activity Query Request.

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

2.3.1.1.9.3.1 SOP Specific Conformance to C-FIND SCP

Each C-FIND SCP operation supports an "Operation Inactivity Timer" with a time out value of 15 seconds. This timer corresponds to the number of seconds to wait when data between TCP/IP packets are transferred. It is not configurable.

All Required (R) and Unique (U) study, series, and image level keys for the Study-Root Query/Retrieve information model are supported. Some optional (O) keys are also supported as described in the following tables.

Following is the supported study level keys:

Description	Tag	Type	Usage
Study Date	(0008,0020)	R	Matched
Study Time	(0008,0030)	R	Matched
Accession Number	(0008,0050)	R	Matched
Patient's Name	(0010,0010)	R	Matched
Patient ID	(0010,0020)	R	Matched
Study ID	(0020,0010)	R	Matched
Study Instance UID	(0020,000D)	U	Matched
Modalities In Study	(0008,0061)	O	Matched
Referring Physicians Name	(0008,0090)	O	Matched
Study Description	(0008,1030)	O	Returned
Patients Sex	(0010,0040)	O	Returned

Note: Patient Name matching is case sensitive.

Note: Wildcard query is supported for Patient's Name, Patient ID and Accession Number.

Note: Range matching is supported on Date & time

Following is the supported series level keys:

Description	Tag	Type	Usage
Modality	(0008,0060)	R	Matched
Series Number	(0020,0011)	R	Matched
Series Instance UID	(0020,000E)	U	Matched
Series Description	(0008,103E)	O	Returned

Following is the supported image level keys:

Description	Tag	Type	Usage	Modality
Instance Number	(0020,0013)	R	Matched	All
SOP Instance UID	(0008,0018)	U	Matched	All
Rows	(0028,0010)	O	Returned	All
Columns	(0028,0011)	O	Returned	All

Only keys with Usage type *Matched* will be matched against values in the database.

Values in keys of type *Returned* will be ignored and will be filled in with data from the database.

If an optional key is requested that does not appear in any of the tables above, that key will be ignored and no corresponding element will be returned.

If the database does not have a value corresponding to any requested optional key a zero-length element will be returned.

Sequence matching is not supported.

Range matching is supported for attributes of type date and time.

Only hierarchical query is supported. The C-FIND SCP will not perform any extended negotiation.

During the C-FIND SCP, the DICOM Server AE can send the following status:

- 0xFE00 when the DICOM remote AE sent a DICOM C-FIND CANCEL request

- 0xFF00: for pending messages

- 0xFF01: for pending messages when the DICOM remote AE asked for optional key

- 0xA700 when refused due to unavailable resources.

- 0xA900 when the DICOM Server AE processes an invalid data set.

- 0xC001 when the DICOM Server AE processes an internal error or a decoding error

- 0x0000 in case of success

2.3.1.1.10 Real-World Activity: Retrieve Request From Remote AE

This AE is indefinitely listening for associations. No operator action is required to respond to a *retrieve* request.

2.3.1.1.10.1 Associated Real-World Activity

The Real-World Activity associated with the Retrieve Request is to send all images corresponding to the C-MOVE request to the destination AE through a separate association.

If the C-MOVE SCP receives a C-MOVE-CANCEL request, it closes the separate association.

2.3.1.1.10.2 Association Acceptance Policy

The DICOM SERVER AE rejects the association if they are too many open connections.

The DICOM SERVER AE rejects the association if the Remote DICOM AE is not declared on the local AW Server.

The DICOM SERVER AE sends the association rejection error. Status will be "transient rejection".

2.3.1.1.10.3 Presentation Context Table

Acceptable Presentation Contexts for DICOM Server AE and Real-World Activity Retrieve Request.

<table>
<tr><th colspan="6">Presentation Context Table</th></tr>
<tr><th colspan="2">Abstract Syntax</th><th colspan="2">Transfer Syntax</th><th>Role</th><th>Extended</th></tr>
<tr><th>Name</th><th>UID</th><th>Name List</th><th>UID List</th><th></th><th>Negotiation</th></tr>
<tr><td>Study Root Query/Retrieve Information Model - MOVE</td><td>1.2.840.10008.5.1.4.1.2.2.2</td><td>Implicit VR Little Endian</td><td>1.2.840.10008.1.2</td><td>SCP</td><td>None</td></tr>
<tr><td>Study Root Query/Retrieve Information Model - MOVE</td><td>1.2.840.10008.5.1.4.1.2.2.2</td><td>Explicit VR Little Endian</td><td>1.2.840.10008.1.2.1</td><td>SCP</td><td>None</td></tr>
<tr><td>Study Root Query/Retrieve Information Model - MOVE</td><td>1.2.840.10008.5.1.4.1.2.2.2</td><td>Explicit VR Big Endian</td><td>1.2.840.10008.1.2.2</td><td>SCP</td><td>None</td></tr>
</table>

2.3.1.1.10.3.1 SOP Specific Conformance to C-MOVE SCP

The DICOM Server AE provides standard conformance to the baseline Study-root C-MOVE Service Class SCP.

Each C-MOVE SCP operation supports an "Operation Inactivity Timer" with a time out value of 15 seconds. This timer corresponds to the number of seconds to wait when data between TCP/IP packets are transferred.

All images requested in a C-MOVE-RQ will be sent over a single association. A C-MOVE-RSP with a "pending" status will be returned to the requester after every C-STORE request sub-operation.

Note: Move destination AE can be different than the AE requesting the C-MOVE

The C-MOVE SCP will invoke C-STORE requests for the following SOP classes:

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2

SOP Class Name	SOP Class UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
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
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
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
RT Structure Set Information Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
GE Private DICOM RT Plan	1.2.840.113619.4.5.249
NM Genie Private Data	1.2.840.113619.4.27
PET Advance Private Data	1.2.840.113619.4.30
GE Private DICOM 3D Object	1.2.840.113619.4.26
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
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1

During the C-MOVE SCP, the DICOM Server AE can send the following status:

- 0xFE00: (C-Move Cancel Request Received) when the C-MOVE SCU cancelled the operation

- 0xA702: when the association with the C-STORE SCP was rejected

- 0xA801: when the destination unknown

- 0xA900: when the dataset is invalid

- 0xFF00: for pending messages.

- 0xB000 when one or more failure occurred

- 0x0000 when the whole C-MOVE operation was successful

2.3.1.1.10.4 Presentation Context Acceptance Criteria

No criterion.

2.3.1.1.10.5 Transfer Syntax Selection Policy

The transfer syntax selection policy is the following:

- Only the following transfer syntaxes are accepted: Implicit VR Little Endian (1.2.840.10008.1.2), Explicit VR Little Endian (1.2.840.10008.1.2.1), Explicit VR Big Endian (1.2.840.10008.1.2.2)

- Among all the remaining proposed transfer syntaxes, the explicit transfer syntaxes are chosen first.

Among all the remaining proposed transfer syntaxes, the little endian transfer syntaxes are chosen first.

2.3.1.1.11 Real-World Activity: Initiate Storage Commitment to a Remote AE

2.3.1.1.11.1 Associated Real-World Activity

The operator can associate a DICOM Storage Commitment Provider AE to a Remote AE.

The user selects in the BROWSER one or several studies, series or images to be sent. Then, the user can either drag and drop the selection on the button representing then Remote DICOM AE, or click on the "Copy to <REMOTE AE Name>" button.

This operation will cause the following actions:

- The AW Server retrieves the appropriate DICOM images to push from its database.

- The DICOM SERVER AE initiates a DICOM association, negotiates with the Remote AE an appropriate Abstract and Transfer Syntax.

- If the negotiation is successful, the DICOM SERVER AE emits C-STORE command to send the images to the Remote AE.

- When the images have been sent, the DICOM SERVER AE emits a N-ACTION request (immediately after the C-STORE request) to ask for a commitment on images previously sent. Only one N-ACTION request is sent for all images to be committed. N-ACTION is on different association than the C-STORE request

2.3.1.1.11.2 Association Initiation Policy

Only one N-ACTION request is sent for all images that have been sent during the Real World Activity: "Push Studies/Series/images to Remote AE"

2.3.1.1.11.3 Proposed Presentation Context

Presentation Context Table – Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.3.1.1.11.3.1 SOP Specific DICOM Conformance Statement for the Storage Commitment Push Model SOP Class (N-ACTION)

If the received N-ACTION Response from the Storage Commitment Provider has a failure status, an error file is logged, the Storage Commitment is abandoned. The Network activity icon will change in order to show the error condition.

If the received N-ACTION Response from the Storage Commitment Provider has a success status, the DICOM SERVER AE waits for an N-EVENT-REPORT during a configurable period of time. This period is set to 10s by default. There is no other timeout. This timeout is not configurable.

The DICOM SERVER AE can receive a N-EVENT-REPORT from the Storage Commitment Provider at any time (See section *Real-World Activity "Listen to remote Storage Commitment SCP"*).

2.3.1.1.12 Real-World Activity: Listen to remote Storage Commitment SCP

The DICOM SERVER AE is indefinitely listening for associations. No operator action is required to receive a Storage Commitment notification (N-EVENT-REPORT).

2.3.1.1.12.1 Associated Real-World Activity

The Real-World Activity associated consists into:

- Flag the images that have been committed (transfer of ownership) in the database.

- Pop up an error when some images of a patient existing in the database have not been committed.

2.3.1.1.12.2 Association Acceptance Policy

The Storage Commitment Provider initiating the association must use the role selection negotiation.

2.3.1.1.12.3 Proposed Presentation Context

Presentation Context Table – Proposed			
Abstract Syntax	Transfer Syntax	Role	Extended

Name	UID	Name List	UID List		Negotiation
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.3.1.1.12.3.1 SOP Specific DICOM Conformance Statement for the Storage Commitment Push Model SOP Class (N-EVENT-REPORT)

When receiving a N-Event-Report request with a Event Type ID equal to 2, meaning that Storage Commitment is complete, but failure exists, following is the set of value that this Storage Commitment SCU AE is able to process:

Failure Reason	Meaning	Application Behavior When Receiving Reason Code
0110H	Processing failure	Log file updated: Processing Failure
0112H	No such object instance	Log file updated: No such object instance
0213H	Resource limitation	Log file updated: resource limitation
0122H	Referenced SOP Class not supported	Log file updated: reference SOP class not supported
0119H	Class / Instance conflict	Log file updated: class/instance conflict
0131H	Duplicate transaction UID	Log file updated: duplicate transaction UID
*	Other Failure Reason code values	Log file updated: unknown failure

Following are the status codes the Application may send back to the SCP Equipment after receiving the N-EVENT-REPORT:

Service Status	Status Codes	Further Meaning	Status Code sending explanation	Related Fields sent back to the SCU
Error	0110	Processing Failure	Indicates that an internal error occurs while processing.	None
Success	0000			None

The DICOM SERVER AE parses all the items present in the N-EVENT-REPORT.

For each image successfully committed, the image is flagged as "Committed" into the database. An error is logged for any image that cannot be committed and a pop up is displayed to the user when the image still exists in the database.

There is no timeout related to this module: the DICOM SERVER AE is listening indefinitely the N-EVENT-REPORT event. If such event is received, some processing is immediately executed.

2.4 COMMUNICATION PROFILES

2.4.1 Supported Communication Stacks (PS 3.8, PS 3.9)

DICOM Upper Layer (PS 3.8) is supported using TCP/IP.

2.4.2 OSI Stack

OSI stack not supported

2.4.3 TCP/IP Stack

The TCP/IP stack is inherited from a UNIX Operating System.

2.4.3.1 API

Not applicable to this product.

2.4.3.2 Physical Media Support

DICOM is indifferent to the Physical medium over which TCP/IP executes (e.g. Ethernet V2.0, IEEE 802.3, ATM, FDDI, Ethernet 100Mb)

Note: For more information about the Physical Media available for AW Server, please refer to the Product Data Sheet.

2.4.4 Point-to-Point Stack

A 50-pin ACR-NEMA connection is not applicable to this product.

2.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

2.5.1 Standard Extended /Specialized/Private SOPs

2.5.1.1 Extended Enhanced SR object

The extension of this SOP Class is described in section 6

The Enhanced DICOM SR implements the private ELECTRONIC FILM TID. Refer to section 6.

2.5.2 Private Transfer Syntaxes

No private Transfer Syntax is negotiated.

2.6 CONFIGURATION

2.6.1 AE Title/Presentation Address Mapping

The GE Field Engineer must configure the hostname of the station during installation. The hostname will then be used for the AET address mapping.

The local DICOM SERVER AE Title is set to the first 16 bytes of the hostname.

2.6.2 Configurable Parameters

The following fields are configurable for the DICOM SERVER AE (local):

- Local AE Title

- Local IP Address (defined by the station)

- Local IP Netmask (defined by the station)

The Local Listening Port Number is not configurable and set to **4006**.

The following fields are configurable for every remote DICOM AE:

- Remote AE Title

- Remote IP Address

- Listening TCP/IP Port Number

A **default router** IP Address for **all remote nodes** can be configured as well as some specific routes.

The following fields are configurable:

- Association Establishment Timer

- Store, Find, Move, Timers

- Inactivity Timers

- Maximum Length PDU

The following fields are configurable for the **storage commitment**:

- STC Host name

- STC AE title

- STC TCP/IP address

- STC Port

Note: A GE Field Engineer must perform all configurations.

2.7 SUPPORT OF EXTENDED CHARACTER SETS

The AW Server will support fully only the ISO_IR 100 (ISO 8859-1:1987 Latin alphabet N 1. supplementary set) as extended character sets.

For other extended character sets, they will be supported for DICOM data exchange and in the database (as currently described in the DICOM 2008 standard). But applications, which will load and manipulate these data, may have a restrictive behavior.

2.8 CODES AND CONTROLLED TERMINOLOGY

The product uses coded terminology in SR (Structure Report objects) and KO (Key Object Selection object).

2.9 SECURITY PROFILES

The product does not conform to any defined DICOM Security Profiles.

It is assumed that the product 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 the product.
2. Firewall or router protections to ensure that the product only has network access to approved external hosts and services.

Any communications with external hosts and services outside the locally secured environment use appropriate secure network channels (such as a Virtual Private Network (VPN))

3. NETWORK PRINT SCU CONFORMANCE STATEMENT

3.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the compliance to DICOM conformance requirements for the relevant Grayscale and Color **Network Printing** features on this GEHC product.

The AW Server has the ability to compose films through the use of an application known as FILMER. The AW Server uses DICOM Print Management Service Class to send images to hard copy printers. The films can then be used for possible further analysis.

3.2 IMPLEMENTATION MODEL

3.2.1 Application Data Flow Diagram

The Basic and Specific Application models for this device are shown in the following Illustration

DICOM Print SCU Application Entity Model
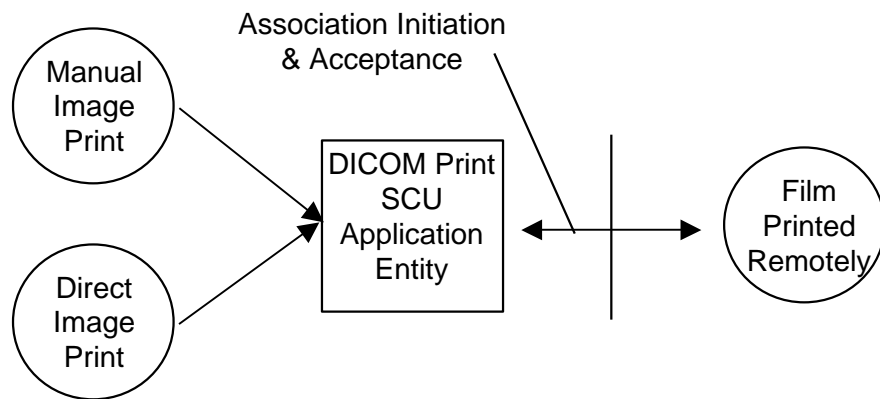
The DICOM Print SCU Application Entity (AE) is an application that handles the DICOM protocol communication with Remote DICOM Printers. The DICOM Print SCU AE is activated when the user requests for a print.

The DICOM Print SCU AE is invoked by the following Real World Activities:

- Manual Image Print

For this operation, the operator uses the *FILMER* application to prepare a layout of images and send the pages to the *PRINT UILDER.*

The PRINT BUILDER receives the "Simple print" request, composes a film then sends the film to the selected Remote DICOM Printer

3.2.2 Functional Definition of AE'S

The DICOM Print SCU AE supports the following functions:

- Access to pixel data

- Initiate a DICOM association to send DICOM SOP Classes (corresponding to the DICOM Print Management service class) to a remote DICOM Printer

3.2.3 Sequencing of Real-World Activities

3.2.3.1 Manual Image Print

The user selects the remote DICOM Printer from Print Builder Graphical User Interface.

1. The images to be printed shall be dragged and drop into the FILMER application either manually or automatically.

2. The PRINT BUILDER receives the "Simple print" request, composes a film then activates the DICOM Print SCU AE that initiates the following actions.

3. The PRINT BUILDER Initiates a DICOM association and selects a Presentation Context.

4. N-GETs printer status from the Printer SOP Instance
    a. If the Printer Status is FAILURE
        i. The failure is displayed to the user
        ii. The association is aborted
    b. Else
        i. The warning is displayed to the user
        ii. The Print goes on
    c. Endif

5. N-CREATEs a Basic Film Session SOP Instance

6. N-CREATEs a Basic Film Box SOP Instance for the current film

7. N-SETs the Basic Film Box SOP Instance with the Image Box SOP Instance for each image on the film

8. N-ACTIONs on the Basic Film Box SOP Instance

9. N-DELETEs on the Basic Film Box SOP Instance

10. Releases the DICOM association after printing is successful or failure has been signaled to the user

Note: If DICOM_PRINT_WAIT_SCP_EVENT environment variable is set, then the DICOM print SCU handles the N-EVENT-REPORT sent by the printer but does not read the message content except Printer Status and Printer Status Info fields.

3.3 AE SPECIFICATIONS

3.3.1 DICOM Print SCU AE Specification

This Application Entity provides Standard Conformance to the following DICOM 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 Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18

Note: Support of the Basic Grayscale Print Management Meta SOP Class as an SCU mandates support for the Basic Film Session, Basic Film Box, Basic Grayscale Image Box and Printer SOP Classes as an SCU.

Note: Support of the Basic Color Print Management Meta SOP Class as an SCU mandates support for the Basic Film Session, Basic Film Box, Basic Color Image Box and Printer SOP Classes as an SCU.

3.3.1.1 Association Establishment Policies

3.3.1.1.1 General

The DICOM Application Context Name (ACN) that is always proposed is:

Application Context Name	**1.2.840.10008.3.1.1.1**

The Maximum Length PDU negotiation is included in all association establishment requests.

The maximum length PDU for an association initiated by the DICOM Print SCU is:

Maximum Length PDU	**28672 Bytes**

The Print Management Service Class does not support extended negotiation.

The user information Items sent by this product are:

- Maximum PDU Length

- Implementation UID

Note: The Maximum length PDU is not configurable

3.3.1.1.2 Number of Associations

The DICOM Print SCU AE supports only one association at a time. The printing requests are internally queued.

3.3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

3.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM Implementation is:

AW Server Filmer Implementation UID	**1.2.840.113619.6.246**

3.3.1.1.5 Association Initiation Policy

3.3.1.1.6 Real-World Activity "Manual Image Print"

3.3.1.1.6.1 Associated Real-World Activity

> The user has the possibility to drag and drop images from Volume Viewer applications to the FILMER application. When the user requests for a print by pushing the "Print" button, the DICOM Print SCU tries to establish the association with the requested printer and sends the images for printing.

> Note: The Print Builder application allows to select different REMOTE DICOM printers and to manipulate some print parameters like the number of copies.

> Note: The Service Tools manage the declaration and suppression of REMOTE DICOM printers.

3.3.1.1.6.2 Proposed Presentation Context Table

<table>
<tr><th colspan="6">Presentation Context Table – Proposed</th></tr>
<tr><th colspan="2">Abstract Syntax</th><th colspan="2">Transfer Syntax</th><th rowspan="2">Role</th><th>Extended</th></tr>
<tr><th>Name</th><th>UID</th><th>Name List</th><th>UID List</th><th>Negotiation</th></tr>
<tr><td>Basic Grayscale Print Management Meta SOP Class</td><td>1.2.840.10008.5.1.1.9</td><td>Implicit VR Little Endian</td><td>1.2.840.10008.1.2</td><td>SCU</td><td>None</td></tr>
<tr><td>Basic Color Print Management Meta SOP Class</td><td>1.2.840.10008.5.1.1.18</td><td>Implicit VR Little Endian</td><td>1.2.840.10008.1.2</td><td>SCU</td><td>None</td></tr>
</table>

3.3.1.1.6.2.1 SOP Specific DICOM Conformance Statement for Print Management SOP Classes

> The DICOM Print SCU AE initiates one association with the selected REMOTE DICOM Printer. The DICOM Print SCU AE will not open another association while the current one is active.

> The Basic Grayscale Print Management Meta SOP Class and the Color Grayscale Print Management Meta SOP Class are never negotiated simultaneously.

> For each of the supported Print Management SOP and Meta SOP Classes, the optional attributes and service elements supported, the valid range of values for mandatory and optional attributes, and the status code behavior are described in Section 4.

3.3.1.1.7 Real-World Activity "Direct Image Print"

3.3.1.1.7.1 Associated Real-World Activity

> The user has the possibility to directly send images from Volume Viewer applications to the Print Builder application. The Print Builder application will launch the DICOM Print SCU that tries to establish the association with the default printer and sends the images for printing.

3.3.1.1.7.2 Proposed Presentation Context Table

<table>
<tr><td colspan="6" align="center">Presentation Context Table – Proposed</td></tr>
<tr><td colspan="2" align="center">Abstract Syntax</td><td colspan="2" align="center">Transfer Syntax</td><td align="center">Role</td><td align="center">Extended</td></tr>
<tr><td align="center">Name</td><td align="center">UID</td><td align="center">Name List</td><td align="center">UID List</td><td></td><td align="center">Negotiation</td></tr>
<tr><td>Basic Grayscale Print Management Meta SOP Class</td><td>1.2.840.10008.5.1.1.9</td><td>Implicit VR Little Endian</td><td>1.2.840.10008.1.2</td><td>SCU</td><td>None</td></tr>
<tr><td>Basic Color Print Management Meta SOP Class</td><td>1.2.840.10008.5.1.1.18</td><td>Implicit VR Little Endian</td><td>1.2.840.10008.1.2</td><td>SCU</td><td>None</td></tr>
</table>

3.3.1.1.7.2.1 SOP Specific DICOM Conformance Statement for Print Management SOP Classes

The DICOM Print SCU AE initiates one association with the selected REMOTE DICOM Printer. The DICOM Print SCU AE will not open another association while the current one is active.

The Basic Grayscale Print Management Meta SOP Class and the Color Grayscale Print Management Meta SOP Class are never negotiated simultaneously.

For each of the supported Print Management SOP and Meta SOP Classes, the optional attributes and service elements supported, the valid range of values for mandatory and optional attributes, and the status code behavior are described in Chapter 4.

3.4 COMMUNICATION PROFILES

3.4.1 Supported Communication Stacks (PS 3.8, PS 3.9)

DICOM Upper Layer (PS 3.8) is supported using TCP/IP.

3.4.2 OSI Stack

OSI stack not supported

3.4.3 TCP/IP Stack

The TCP/IP stack is inherited from a UNIX Operating System.

3.4.3.1 API

Not applicable to this product.

3.4.3.2 Physical Media Support

DICOM is indifferent to the Physical medium over which TCP/IP executes (e.g. Ethernet V2.0, IEEE 802.3, ATM, FDDI)

For more information about the Physical Media available on AW Server, please refer to the Product Data Sheet.

3.4.4 Point-to-Point Stack

A 50-pin ACR-NEMA connection is not applicable to this product.

3.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

3.5.1 Standard Extended /Specialized/Private SOP Classes

No Standard Extended, no Specialized, no Private SOP Classes are managed by this application.

3.5.2 Private Transfer Syntaxes

No Private Transfer Syntaxes are managed by this product.

3.5.3 CONFIGURATION

3.5.3.1 AE Title/Presentation Address Mapping

The local DICOM Print SCU AE Title is: "PR_Hostname" where Hostname is the system hostname defined at installation. The default AET PR_Hostname can be overwritten by GE Field Engineer if the length of Local DICOM Print SCU AE Title exceeds 16 characters.

3.5.3.2 Configurable Parameters

For this AE (local) the following fields are configurable in the file:

~sdc/AIA/bin/configure.printAET

- Local AE Title

Note: The Local IP address and the local IP netmask are the ones of the workstation

Note: No local Port Number is defined because the product is never responding to an association request.

The following fields are configurable for every remote DICOM AE:

- Remote AE Title

- Remote IP Address

- Listening TCP/IP Port Number

The Service Tools allow the administrator to add, delete, or update the Remote DICOM Printers parameters described above.

A default router IP Address for all DICOM remote nodes (including printers, Storage SCP Workstations...) can be configured as well as some specific routes.

The following fields are configurable:

- Message report timeout (default=60s)

- Event report timeout (default=3600s)

- Maximum PDU Length

The GE Field Engineer can update this configuration.

Only one association can be performed at a time by this implementation.

3.6 SUPPORT OF EXTENDED CHARACTER SETS

No extended character set is supported for DICOM Printing

4. PRINT MANAGEMENT SOP CLASS DEFINITION

4.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the supported Print Management SOP and Meta SOP Classes, the optional attributes and service elements supported, the valid range of values for mandatory and optional attributes, and the status code behavior.

This section contains:

4.2.1- Basic Film Session SOP Class

4.2.2 - Basic Film Box SOP Class

4.2.3 - Image Box SOP Classes

4.2.4 - Printer SOP Class

Note: Elements not listed in this section are not supported

4.2 PRINT MANAGEMENT SOP CLASS DEFINITIONS

4.2.1 Basic Film Session SOP Class

The DICOM Print SCU AE supports the N-CREATE DIMSE Service Element for the Basic Film Session SOP Class.

- The N-CREATE DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to create an instance of Basic Film Session.

4.2.1.1 IOD Description

4.2.1.1.1 IOD modules

Module	Reference	Module Description
SOP Common		Contains SOP Common information
Basic Film Session Presentation Module	4.2.1.1.2	Contains Film Session presentations information
Basic Film Session Relationship	4.2.1.1.3	References to related SOPs

4.2.1.1.2 Basic Film Session Presentation Module

Attribute name	Tag	Attribute Description
Number of Copies	(2000,0010)	1 to 10, depending of print builder configuration. Default value: 1
Print Priority	(2000,0020)	HIGH or MED or LOW depending of default configuration Default value: LOW
Medium Type	(2000,0030)	PAPER or CLEAR FILM or BLUE FILM depending of configuration of associated Remote DICOM printer Default value: BLUE FILM
Film Destination	(2000,0040)	MAGAZINE or PROCESSOR depending of configuration of associated Remote DICOM printer Default value:PROCESSOR
Film Session Label	(2000,0050)	Configurable by the Field Engineer Not sent by default

4.2.1.1.3 Basic Film Session Relationship Module

Not Used

4.2.1.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-CREATE	M
N-SET	Not used
N-DELETE	Not used
N-ACTION	Not used

4.2.1.2.1 N-CREATE

4.2.1.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Number of Copies	(2000,0010)	Used
Print Priority	(2000,0020)	Used
Medium Type	(2000,0030)	Used
Film Destination	(2000,0040)	Used
Film Session Label	(2000,0050)	Used, not sent if empty
Memory Alocation	(2000,0060)	Not Used

4.2.1.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Warning	B600	Memory allocation not supported	Association is aborted
Success	0000	Film session successfully created	Next step describe in the sequencing of Real-World Activities paragraph is performed

> **Note:** The association is aborted for all other status.

4.2.1.2.1.3 Behavior

No specific behavior

4.2.1.2.2 N-SET

This service is not used.

4.2.1.2.3 N-DELETE

This service is not used.

4.2.1.2.4 N-ACTION

This service is not used.

4.2.2 Basic Film Box SOP Class

The DICOM Print SCU AE supports the following DIMSE Service Element for the Basic Film Box SOP Class.

- The N-CREATE DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to create an instance of Basic Film Box

- The N-ACTION DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to print the Basic Film Box onto the hard copy printer.

- The N-DELETE DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to release the Basic Film Box instance.

4.2.2.1 IOD Description

4.2.2.1.1 IOD modules

Module	Reference	Module Descripion
SOP Common		Contains SOP Common information
Basic Film Box Presentation Module	4.2.2.1.2	Contains Film Box presentation information
Basic Film Box Relationship	4.2.2.1.3	References to related SOPs

4.2.2.1.2 Basic Film Box Presentation Module

Attribute Name	Tag	Attribute Description
Image Display Format	(2010,0010)	STANDARD\C,R [C 1 to 5] and [R 1 to 4] SLIDE SUPERSLIDE Default value: STANDARD (Depending of configuration of associated remote DICOM printer).
Annotation Display Format ID	(2010,0030)	Not sent.
Film Orientation	(2010,0040)	PORTRAIT LANDSCAPE Default value: PORTRAIT (Depending of configuration of associated remote DICOM printer).
Film Size ID	(2010,0050)	8INX10IN 8_5INX11IN(Letter) 10INX12IN 10INX14IN 11INX14IN 11INX17IN 14INX14IN 14INX17IN 24CMX24CM 24CMX30CM A4 (210mmx297mm) A3 (297mm x 420mm) (Depending of configuration of associated remote DICOM printer). Default value: First selection when declaring printer.
Magnification Type	(2010,0060)	One of the following defined term is sent: REPLICATE BILINEAR CUBIC NONE Default value: CUBIC (Depending of configuration set by user when declaring the printer).
Smoothing Type	(2010,0080)	Sent if Magnification type = CUBIC Default value: "" (Depending of configuration set by user when declaring the printer).
Border density	(2010,0100)	BLACK or WHITE depending of default configuration. Default value: BLACK

Empty Image Density	(2010,0110)	BLACK or WHITE depending of default configuration. Default value: ""
Min Density	(2010,0120)	-1 by default or set to positive integer. Default value depends of configuration set by user when declaring the printer
Max Density	(2010,0130)	-1 by default or set to positive integer. Default value depends of configuration set by user when declaring the printer
Trim	(2010,0140)	Set to YES or NO according to value set by user when declaring the printer. Default value: NO
Configuration Information	(2010,0150)	Empty by default or set to a value defined when declaring the printer.
Illumination	(2010,015E)	Not sent.
Reflected Ambient Light	(2010,0160)	Not sent.
Requested Resolution ID	(2020,0050)	Not sent.
Referenced Presentation LUT Sequence	(2050,0500)	Not sent.

4.2.2.1.3 Basic Film Box Relationship Module

Attribute Name	Tag	Attribute Description
Referenced Film Session Sequence	(2010,0500)	Used (Set)
>Referenced SOP Class UID	(0008,1150)	Used (Set)
>Referenced SOP Instance UID	(0008,1155)	Used (Set)
Referenced Image Box Sequence	(2010,0510)	Used (Received)
>Referenced SOP Class UID	(0008,1150)	Used (Received)
>Referenced SOP Instance UID	(0008,1155)	Used (Received)
Referenced Basic Annotation Box Sequence	(2010,0520)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used

4.2.2.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-CREATE	M
N-ACTION	M
N-DELETE	Used

4.2.2.2.1 N-CREATE

4.2.2.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Image Display Format	(2010,0010)	M
Referenced Film Session Sequence	(2010,0500)	M
>Referenced SOP Class UID	(0008,1150)	M
>Referenced SOP Instance UID	(0008,1155)	M
Referenced Image Box Sequence	(2010,0510)	Used (Received)
>Referenced SOP Class UID	(0008,1150)	Used (Received)
>Referenced SOP Instance UID	(0008,1155)	Used (Received)
Referenced Basic Annotation Box Sequence	(2010,0520)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
Film Orientation	(2010,0040)	Used
Film Size ID	(2010,0050)	Used
Magnification Type	(2010,0060)	Used
Max Density	(2010,0130)	Used. Not sent if -1
Configuration Information	(2010,0150)	Used. Not sent if empty
Annotation Display Format ID	(2010,0030)	Not used
Smoothing Type	(2010,0080)	Used. Not sent if magnification different from CUBIC
Border Density	(2010,0100)	Used Not sent if empty
Empty Image Density	(2010,0110)	Used Not sent if empty
Min Density	(2010,0120)	Used Not sent if -1
Trim	(2010,0140)	Used Not sent if empty

4.2.2.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Success	0000	Film Box successfully created	Association goes on
Warning	B605	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	Treated as Success
Failure	C616	There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported. A new Film Box will not be created when a previous Film Box has not been printed.	Association is aborted

The association is aborted for all other status.

4.2.2.2.1.3 Behavior

There is no specific behavior.

4.2.2.2.2 N-DELETE

4.2.2.2.2.1 Behavior

The SCU uses the N-DELETE to request the SCP to delete the Basic Film Box SOP Instance hierarchy.

4.2.2.2.2.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	0119	Class-instance conflict	Association aborted
	0210	Duplicate invocation	Association aborted
	0117	Invalid SOP instance	Association aborted
	0212	Mistyped argument	Association aborted
	0118	No such SOP Class	Association aborted
	0112	No such SOP Instance	Association aborted
	0110	Processing failure	Association aborted
	0213	Resource limitation	Association aborted
	0211	Unrecognized operation	Association aborted
Success	0000	Film session successfully deleted	Job successfully canceled
*	*	Any other status code.	Ignored

4.2.2.2.3 N-ACTION

N-ACTION is used to print the current film of the film session.

4.2.2.2.3.1 Attributes

Action Type Name	Action Type ID	Attribute	Tag	Usage SCU
Print	1	Referenced Print Job Sequence	(2100,0500)	Not used
		>Referenced SOP Class UID	(0008,1150)	Not used
		>Referenced SOP Instance UID	(0008,1155)	Not used

4.2.2.2.3.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Success	0000	Film accepted for printing.	Next step describe in the sequencing of Real-World Activities paragraph is performed
Warning	B603	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	This case should not happen. This warning is considered as an error. Association is aborted.
Warning	B604	Image size is larger than image box size.	This case should not happen. Image will be demagnified by the printer.
Failure	C602	Unable to create Print Job SOP Instance; print queue is full	Appropriate message is returned to the user. Association is aborted.
	C604	Image position collision: multiple images assigned to single image position	Appropriate message is returned to the user. Association is aborted.
	C603	Image size is larger than image box size (by using the specified magnification value)	Appropriate message is returned to the user. Association is aborted.

Other warning status will suspend the current job

4.2.2.2.3.3 Behavior

SCU uses the N-ACTION to request the SCP to print one or more copies of a single film of the film session.

4.2.3 Image Box SOP Classes

4.2.3.1 Basic Grayscale Image Box SOP Class

The DICOM Print SCU AE supports the following DIMSE Service Element for the Basic Grayscale Image Box SOP Class.

- The N-SET DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to set the attributes of the Basic Grayscale Image Box Instance.

4.2.3.1.1 IOD description

4.2.3.1.1.1 IOD modules

Module	Reference	Module Description
SOP Common		Contains SOP Common information
Image Box Pixel Presentation Module	4.2.3.1.1.2	Contains Image Box presentation information
Image Box Relationship Module	4.2.3.1.1.3	References to related SOPs

4.2.3.1.1.2 Image Box Pixel Presentation Module

Attribute Name	Tag	Attribute Description
Image Position	(2020,0010)	Value depends of the position within the Film box (1-N)
Polarity	(2020,0020)	NORMAL = pixels shall be printed as specified by the Photometric Interpretation (0028,0004) REVERSE = pixels shall be printed with the opposite polarity as specified by the Photometric Interpretation (0028,0004) Default value: NORMAL (Depending of default configuration)
Magnification Type	(2010,0060)	Same value as defined in the Film box
Smoothing Type	(2010,0080)	Same value as defined in the Film box
Configuration Information	(2010,0150)	Same value as defined in the Film Box.
Requested Image Size	(2020,0030)	Used (specified by the application), not sent if empty
Requested Decimate/Crop Behavior	(2020,0040)	Used (specified by the application), not sent if empty
Basic Grayscale Image Sequence	(2020,0110)	This sequence is always included if the Image Box is a Basic Grayscale Image Box
>Samples Per Pixel	(0028,0002)	1
>Photometric Interpretation	(0028,0004)	MONOCHROME1 or MONOCHROME2 depending of default configuration. Default value: MONOCHROME2
>Rows	(0028,0010)	Original image height
>Columns	(0028,0011)	Original image width
>Pixel Aspect Ratio	(0028,0034)	1\1
>Bits Allocated	(0028,0100)	Depends on the image pixel depth (8 or 16)
>Bits Stored	(0028,0101)	Depends on the image pixel depth (8, 12 bits)
>High Bit	(0028,0102)	Depends on the image pixel depth (7, 11)
>Pixel Representation	(0028,0103)	0 (Unsigned Integer)
>Pixel Data	(7FE0,0010)	
Original Image Sequence	(2130,00C0)	Not sent

4.2.3.1.1.3 Image Box Relationship Module

Attribute Name	Tag	Attribute Description
Referenced Image Sequence	(0008,1140)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
>Referenced Frame Number	(0008,1160)	Not used
Referenced Image Overlay Box Sequence	(2020,0130)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
>Referenced Frame Number	(0008,1160)	Not used
Referenced VOI LUT Sequence	(2020,0140)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used

4.2.3.1.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-SET	M

4.2.3.1.2.1 N-SET

4.2.3.1.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Image Position	(2020,0010)	M
Preformatted Grayscale Image Sequence	(2020,0110)	M
>Samples Per Pixel	(0028,0002)	M
>Photometric Interpretation	(0028,0004)	M
>Rows	(0028,0010)	M
>Columns	(0028,0011)	M
>Pixel Aspect Ratio	(0028,0034)	1\1
>Bits Allocated	(0028,0100)	M
>Bits Stored	(0028,0101)	M
>High Bit	(0028,0102)	M
>Pixel Representation	(0028,0103)	M
>Pixel Data	(7FE0,0010)	M
Polarity	(2020,0020)	Used
Magnification Type	(2010,0060)	Used
Smoothing Type	(2010,0080)	Used, not sent if magnfication is different of CUBIC
Configuration Information	(2010,0150)	Used, not sent if empty
Requested Image Size	(2020,0030)	Not used

4.2.3.1.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	C603	Image size is larger than image box size	Appropriate message is returned to the user. Association is aborted.
	C605	Insufficient memory in printer to store the image	Appropriate message is returned to the user. Association is aborted.
	C613	Combined Print Image size is larger than the Image Box size	Appropriate message is returned to the user. Association is aborted.
	0119	Class-instance conflict	Generic error message is returned to the user. Association is aborted.
	0210	Duplicate invocation	Generic error message is returned to the user. Association is aborted.
	0106	Invalid attribute value	Generic error message is returned to the user. Association is aborted.
	0212	Mistyped argument	Generic error message is returned to the user. Association is aborted.
	0117	Invalid SOP instance	Generic error message is returned to the user. Association is aborted.
	0121	Missing attribute value	Generic error message is returned to the user. Association is aborted.
	0105	No such attributes	Generic error message is returned to the user. Association is aborted.
	0118	No such SOP Class	Generic error message is returned to the user. Association is aborted.
	0112	No such SOP Instance	Generic error message is returned to the user. Association is aborted.
	0110	Processing failure	Generic error message is returned to the user. Association is aborted.
	0213	Resource limitation	Generic error message is returned to the user.

			Association is aborted.
	0211	Unrecognized operation	Generic error message is returned to the user. Association is aborted.
Warning	B604	Image size larger than image box size, the image has been demagnified.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
	B605	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	Considered as Success
	B609	Image size is larger than the Image Box size. The Image has been cropped to fit.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
	B60A	Image size or Combined Print Image size is larger than the Image Box size. The Image or Combined Print Image has been decimated to fit.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
Success	0000	Image successfully stored in Image Box	Association goes on
*	*	Any other status code.	Ignored

4.2.3.1.2.1.3 Behavior

There is no specific behavior.

4.2.3.2 Basic Color Image Box SOP Class

The DICOM Print SCU AE supports the following DIMSE Service Element for the Color Image Box SOP Class.

- The N-SET DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to set the attributes of the Color Image Box Instance.

4.2.3.2.1 IOD description

4.2.3.2.1.1 IOD modules

Module	Reference	Module Description
SOP Common		Contains SOP Common information
Image Box Pixel Presentation Module	4.2.3.1.1.2	Contains Image Box presentation information
Image Box Relationship Module	4.2.3.1.1.3	References to related SOPs

4.2.3.2.1.2 Image Box Pixel Presentation Module

Attribute Name	Tag	Attribute Description
Image Position	(2020,0010)	Value depends of the position within the Film box (1-N)
Polarity	(2020,0020)	NORMAL
Magnification Type	(2010,0060)	Same value as defined in the Film box
Smoothing Type	(2010,0080)	Same value as defined in the Film box
Configuration Information	(2010,0150)	Same value as defined in the Film Box.
Requested Image Size	(2020,0030)	Not sent
Requested Decimate/Crop Behavior	(2020,0040)	Not sent
Basic Color Image Sequence	(2020,0111)	This sequence is always included if the Image Box is a Basic Color Image Box
>Samples Per Pixel	(0028,0002)	3
>Photometric Interpretation	(0028,0004)	RGB
>Planar Configuration	(0028,0006)	1
>Rows	(0028,0010)	Original image height
>Columns	(0028,0011)	Original image width
>Pixel Aspect Ratio	(0028,0034)	1\1
>Bits Allocated	(0028,0100)	8
>Bits Stored	(0028,0101)	8
>High Bit	(0028,0102)	7
>Pixel Representation	(0028,0103)	0
>Pixel Data	(7FE0,0010)	
Original Image Sequence	(2130,00C0)	Not sent

4.2.3.2.1.3 Image Box Relationship Module

Attribute Name	Tag	Attribute Description
Referenced Image Sequence	(0008,1140)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
>Referenced Frame Number	(0008,1160)	Not used
Referenced Image Overlay Box Sequence	(2020,0130)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used

>Referenced SOP Instance UID	(0008,1155)	Not used
>Referenced Frame Number	(0008,1160)	Not used
Referenced VOI LUT Sequence	(2020,0140)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used

4.2.3.2.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-SET	M

4.2.3.2.2.1 N-SET

4.2.3.2.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Image Position	(2020,0010)	M
Basic Color Image Sequence	(2020,0111)	M
>Samples Per Pixel	(0028,0002)	M
>Photometric Interpretation	(0028,0004)	M
>Planar Configuration	(0028,0006)	Used
>Rows	(0028,0010)	M
>Columns	(0028,0011)	M
>Pixel Aspect Ratio	(0028,0034)	1\1
>Bits Allocated	(0028,0100)	M
>Bits Stored	(0028,0101)	M
>High Bit	(0028,0102)	M
>Pixel Representation	(0028,0103)	M
>Pixel Data	(7FE0,0010)	M
Polarity	(2020,0020)	Used
Magnification Type	(2010,0060)	Used
Smoothing Type	(2010,0080)	Used. Not sent if magnfication is different of CUBIC
Configuration Information	(2010,0150)	Used, not sent if empty
Requested Image Size	(2020,0030)	Not used

4.2.3.2.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	C603	Image size is larger than image box size	Appropriate message is returned to the user. Association is aborted.
	C605	Insufficient memory in printer to store the image	Appropriate message is returned to the user. Association is aborted.

	C613	Combined Print Image size is larger than the Image Box size	Appropriate message is returned to the user. Association is aborted.
	0119	Class-instance conflict	Generic error message is returned to the user. Association is aborted.
	0210	Duplicate invocation	Generic error message is returned to the user. Association is aborted.
	0106	Invalid attribute value	Generic error message is returned to the user. Association is aborted.
	0212	Mistyped argument	Generic error message is returned to the user. Association is aborted.
	0117	Invalid SOP instance	Generic error message is returned to the user. Association is aborted.
	0121	Missing attribute value	Generic error message is returned to the user. Association is aborted.
	0105	No such attributes	Generic error message is returned to the user. Association is aborted.
	0118	No such SOP Class	Generic error message is returned to the user. Association is aborted.
	0112	No such SOP Instance	Generic error message is returned to the user. Association is aborted.
	0110	Processing failure	Generic error message is returned to the user. Association is aborted.
	0213	Resource limitation	Generic error message is returned to the user. Association is aborted.
	0211	Unrecognized operation	Generic error message is returned to the user. Association is aborted.
Warning	B604	Image size larger than image box size, the image has been demagnified.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
	B605	Requested Min Density or Max Density outside of printer's operating range. The	Considered as Success

		printer will use its respective minimum or maximum density value instead.	
	B609	Image size is larger than the Image Box size. The Image has been cropped to fit.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
	B60A	Image size or Combined Print Image size is larger than the Image Box size. The Image or Combined Print Image has been decimated to fit.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
Success	0000	Image successfully stored in Image Box	Association goes on
*	*	Any other status code.	Ignored

4.2.3.2.2.1.3 Behavior

There is no specific behavior.

4.2.4 Printer SOP Class

The DICOM Print SCU AE supports the following DIMSE Service Element for the Basic Printer SOP Class.

The N-EVENT_REPORT DIMSE Service element sent by the DICOM Print SCP to the local DICOM Print SCU AE is supported in condition that the DICOM_PRINT_WAIT_SCP_EVENT environment variable is set. The DICOM Print SCU handles the Printer Status and Printer Status Info fields. All other received data are ignored.

The N-GET DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to give information on the Remote DICOM Printer.

4.2.4.1 IOD Description

4.2.4.1.1 IOD modules

Module	Reference	Module Description
SOP Common		Contains SOP Common information
Printer Module	4.2.4.1.2	Contains status information to monitor the printer

4.2.4.1.2 Printer Module

Attribute Name	Tag	Attribute Description
Printer Status	(2110,0010)	The behaviour defined for the following term NORMAL: Association goes on. FAILURE: Association is aborted. WARNING: Association is not released
Printer Status Info	(2110,0020)	Printer return value

Printer Name	(2110,0030)	Printer return value
Manufacturer	(0008,0070)	Printer return value if not empty
Manufacturer Model Name	(0008,1090)	Printer return value if not empty
Device Serial Number	(0018,1000)	Printer return value if not empty
Software Versions	(0018,1020)	Printer return value if not empty
Date Of Last Calibration	(0018,1200)	Printer return value if not empty
Time Of Last Calibration	(0018,1201)	Printer return value if not empty

4.2.4.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-EVENT-REPORT	M
N-GET	U

4.2.4.2.1 N-EVENT-REPORT

4.2.4.2.1.1 Attributes

Event Type Name	Event Type ID	Attribute	Tag	Usage SCU
Normal	1	Printer Name	(2110,0030)	Used
		Printer Status Info	(2110,0020)	Used
Warning	2	Printer Name	(2110,0030)	Used
		Printer Status Info	(2110,0020)	Used
Failure	3	Printer Name	(2110,0030)	Used
		Printer Status Info	(2110,0020)	Used

4.2.4.2.1.2 Behavior

On reception Failure status, the Print SCU aborts the association.

If Printer Status is FAILURE
    Signal print failure to the user, association is aborted
Else If Printer Status is WARNING
    Signal print warning to the user
Else
    Signal print success to the user

In all cases, N-EVENT-REPORT_RSP with the status of Success is returned

4.2.4.2.2 N-GET

4.2.4.2.2.1 Attributes

Attribute name	Tag	Usage SCU
Printer Status	(2110,0010)	Used
Printer Status Info	(2110,0020)	Used
Printer Name	(2110,0030)	Used if return by he printer

Manufacturer	(0008,0070)	Used if return by he printer
Manufacturer Model Name	(0008,1090)	Used if return by he printer
Device Serial Number	(0018,1000)	Used if return by he printer
Software Versions	(0018,1020)	Used if return by he printer
Date Last Calibration	(0018,1200)	Used if return by he printer
Last Calibration	(0018,1201)	Used if return by he printer

4.2.4.2.2.2 Behavior

> If Printer Status is FAILURE
>> Signal print failure to the user, association aborted
>
> Else If Printer Status is WARNING
>> Signal print warning to the user
>
> Else
>> Signal print success to the user

In case of FAILURE or WARNING, the Printer Status Info is displayed to user under a readable message.

5. SC INFORMATION OBJECT IMPLEMENTATION

5.1 INTRODUCTION

This section specifies the use of the DICOM SC Image IOD to represent the information included in SC images produced by this implementation. Corresponding attributes are conveyed using the module construct. The contents of this section are:

5.2- SC Entity-Relationship Model

5.3- SC-IOD MODULE TABLE

5.4- SC-INFORMATION MODULE DEFINITIONS

5.5- SC-PRIVATE DATA DICTIONARY

In the following chapter, all new study, series and image instance UID are generated from base UID:

- for Filmer: **1.2.840.113619.2.246**

This chapter covers only the secondary captures generated by the Filmer application. For other applications running onto AWS platform, please refer to the according DICOM conformance statement.

In the Filmer workflow, each secondary capture DICOM field will be filled with value present in the original image, except when a specific rule is applied and described in this chapter.

5.2 SC ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the SC Image interoperability schema is shown in **Illustration 7.2.1.** In this figure, the following diagrammatic convention is established to represent the information organization:

- Each entity is represented by a rectangular box

- Each relationship is represented by a diamond shaped box.

- The fact that a relationship exists between two entities is depicted by lines connecting the corresponding entity boxes to the relationship boxes.

The relationships are fully defined with the maximum number of possible entities in the relationship shown. In other words, the relationship between Series and Image can have up to n Images per Series, but the Study to Patient relationship has 1 Patient for each Study (a Patient can have more than one Study on the system, however each Study will contain all of the information pertaining to that Patient).

ILLUSTRATION 5.2-1
SC IMAGE ENTITY RELATIONSHIP DIAGRAM

```
                                          ┌──────────┐
                                          │ Patient  │
                                          └──────────┘
                                               │ 1
                                               ▼
                                          ◇─────────◇
                                          │    is    │
                                          │the subject│
                                          │    of    │
                                          ◇─────────◇
                                               │ 1,n
                                               ▼
                                          ┌──────────┐
                                          │  Study   │
                                          └──────────┘
                                               │ 1
                                               ▼
                                          ◇─────────◇
                                          │ contains │
                                          ◇─────────◇
                                               │ 1,n
                                               ▼
          ◇─────────◇                     ┌──────────┐
          │ creates │──────1,n──────────▶ │  Series  │
          ◇─────────◇                     └──────────┘
               ▲ 1                             │ 1
               │                               ▼
       ┌──────────┐                       ◇─────────◇
       │ Equipment│                       │ contains │
       └──────────┘                       ◇─────────◇
                                               │ 0,n
                                               ▼
                                          ┌──────────┐
                                          │ SC Image │
                                          └──────────┘
```
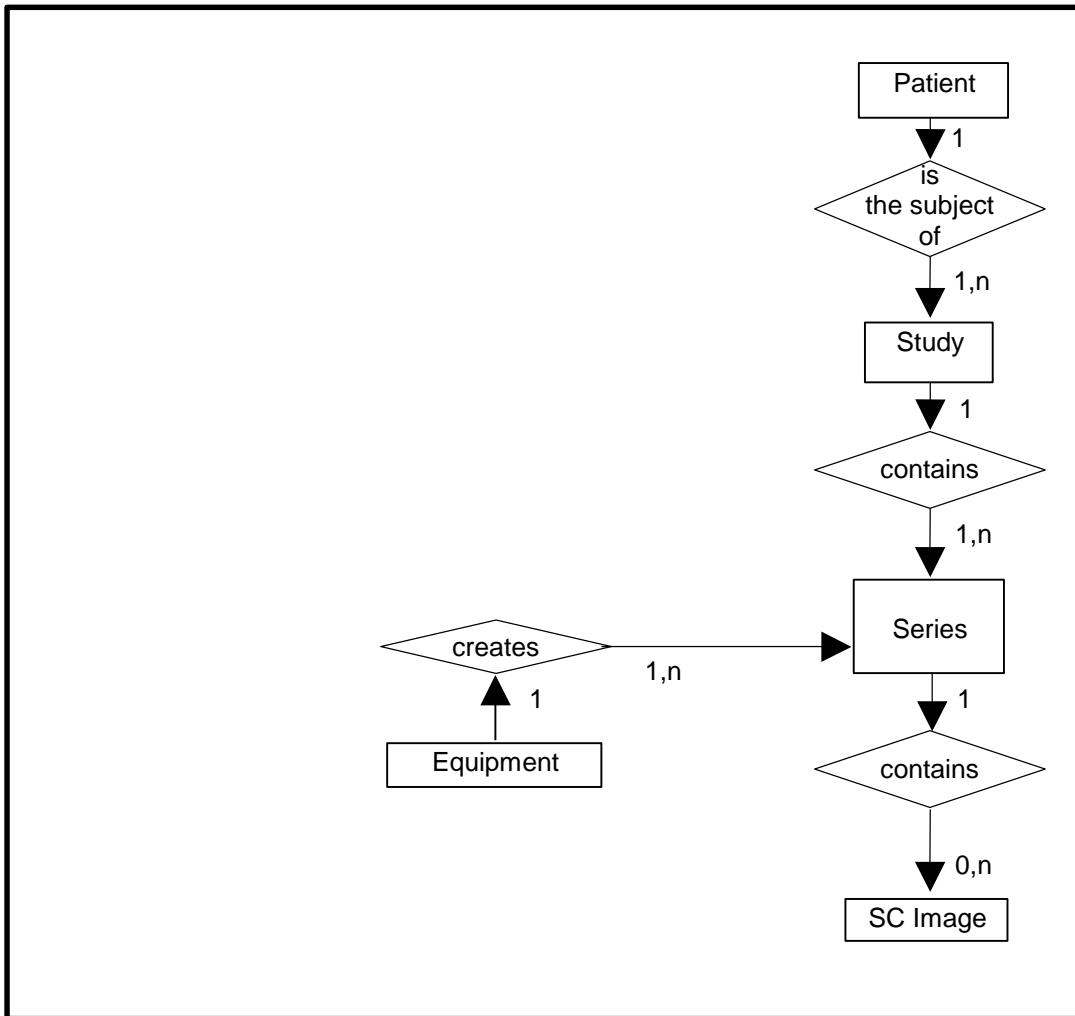
5.2.1 ENTITY DESCRIPTIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the SC Information Object.

5.2.2 AW Server Mapping of DICOM entities

TABLE 5.2-1
MAPPING OF DICOM ENTITIES TO AW SERVER ENTITIES

DICOM	AW Server Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Equipment
Image	Image

5.3 SC-IOD MODULE TABLE

Within an entity of the DICOM SC IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into datasets.

Table 6.3-1 identifies the defined modules within the entities that comprise the DICOM SC IOD. The modules are identified by their Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

TABLE 5.3-1
SC IMAGE IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	**5.4.1.1**
	Clinical Trial Subject	Not used	N/A
Study	General Study	Used	**5.4.2.1**
	Patient Study	Used	**5.4.2.2**
	Clinical Trial Study	Not used	N/A
Series	General Series	Used	**5.4.3.1**
	Clinical Trial Series	Not used	N/A
Equipment	General Equipment	Used	**5.4.4.1**
	SC Equipment	Used	**5.4.9.1**
Image	General Image	Used	**5.4.5.1**
	Image Pixel	Used	**5.4.5.2**
	Device	Not used	N/A
	SC Image	Used	**5.4.9.2**
	Overlay Plane	Not used	N/A
	Modality LUT	Used	**5.4.7.2**
	VOI LUT	Used	**5.4.7.1**
	SOP Common	Used	**5.4.8.1**

5.4 SC-INFORMATION MODULE DEFINITIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the SC Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained from. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

Note: Elements not listed are not supported

5.4.1 Common Patient Entity Modules

5.4.1.1 Patient Module

This section specifies the Attributes of the Patient that describe and identify the Patient who is the subject of a diagnostic Study. This Module contains Attributes of the patient that are needed for diagnostic interpretation of the Image and are common for all studies performed on the patient.

A Screen Save image is a DICOM Secondary Capture generated by AW Server Filmer application.

TABLE 5.4-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Original if No Mix Mode or Mix Mode = Study User defined if Mix Mode = Patient
Patient ID	(0010,0020)	2	Original if No Mix Mode or Mix Mode = Study Function of pid and time if Mix Mode = Patient
Issuer of Patient ID	(0010,0021)	3	Not filled
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	3	Not filled
Patient's Birth Date	(0010,0030)	2	Original if No Mix Mode or Mix Mode = Study Empty if Mix Mode = Patient
Patient's Sex	(0010,0040)	2	Original if No Mix Mode or Mix Mode = Study Empty if Mix Mode = Patient
Other Patient IDs	(0010,1000)	3	Not filled
Other Patient Ids Sequence	(0010,1002)	3	Not filled

5.4.2 Common Study Entity Modules

The following Study IE Modules are common to all Composite Image IODs, which reference the Study IE. These Modules contain Attributes of the patient and study that are needed for diagnostic interpretation of the image.

5.4.2.1 General Study Module

This section specifies the Attributes, which describe and identify the Study performed upon the Patient.

TABLE 5.4-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	Original if No Mix Mode
			Generated if Mix Mode = Patient or Mix Mode = Study
Study Date	(0008,0020)	2	Original (Empty if does not exist) if No Mix Mode
			Empty if Mix Mode = Patient or Mix Mode = Study
Study Time	(0008,0030)	2	Original (Empty if does not exist) if No Mix Mode
			Empty if Mix Mode = Patient or Mix Mode = Study
Referring Physician's Name	(0008,0090)	2	Original (Empty if does not exist) if No Mix Mode
			Empty if Mix Mode = Patient or Mix Mode = Study
Study ID	(0020,0010)	2	Original (Empty if does not exist) if No Mix Mode
			Generated if Mix Mode = Patient or Mix Mode = Study
Accession Number	(0008,0050)	2	Original (Empty if does not exist) if No Mix Mode
			Empty if Mix Mode = Patient or Mix Mode = Study
Study Description	(0008,1030)	3	Original (Empty if does not exist) if No Mix Mode
			User defined if Mix Mode = Patient or Mix Mode = Study

5.4.2.2 Patient Study Module

This section defines Attributes that provide information about the Patient at the time the Study was performed.

TABLE 5.4-3
PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Age	(0010,1010)	3	Original if No Mix Mode
			Not present if Mix Mode = Patient or Mix Mode = Study

Patient's Size	(0010,1020)	3	Original if No Mix Mode
			Not present if Mix Mode = Patient or Mix Mode = Study
Patient's Weight	(0010,1030)	3	Original if No Mix Mode
			Not present if Mix Mode = Patient or Mix Mode = Study

5.4.3   Common Series Entity Modules

The following Series IE Modules are common to all Composite Image IODs, which reference the Series IE.

5.4.3.1   General Series Module

This section specifies the Attributes that identify and describe general information about the Series within a Study.

TABLE 5.4-4
GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	• Original if all Filmer data have the same defined modality • OT (Other) otherwise
Series Instance UID	(0020,000E)	1	Generated
Series Number	(0020,0011)	2	Generated
Series Description	(0008,103E)	3	User defined (AW Electronic film by default)
Operator's Name	(0008,1070)	3	Name of the current user logged on the station. Note: If the name of the user contains non ISO_IR 100 characters, the non ISO_IR 100 are replaced by sign "?"
Series Date	(0008,0021)	3	Not present
Series Time	(0008,0031)	3	Not present

5.4.4 Common Equipment Entity Modules

The following Equipment IE Module is common to all Composite Image IODs that reference the Equipment IE.

5.4.4.1 General Equipment Module

This section specifies the Attributes that identify and describe the piece of equipment that produced a Series of Images.

TABLE 5.4-5
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	Derived from original image if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Institution Name	(0008,0080)	3	Derived from original image if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Institution Address	(0008,0081)	3	Derived from original image if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Station Name	(0008,1010)	3	Host name provided on the platform
Manufacturer's Model Name	(0008,1090)	3	Derived from original image
Software Versions	(0018,1020)	3	Derived from original image

5.4.4.1.1 General Equipment Attribute Descriptions

5.4.4.1.1.1 **Pixel Padding Value**

Not present

5.4.5 Common Image Entity Modules

The following Image IE Modules are common to all Composite Image IODs that reference the Image IE.

5.4.5.1 General Image Module

This section specifies the Attributes that identify and describe an image within a particular series.

TABLE 5.4-6
GENERAL IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020,0013)	2	Generated
Patient Orientation	(0020,0020)	2C	Empty
Content Date	(0008,0023)	2C	Derived from original image
Content Time	(0008,0033)	2C	Derived from original image

Image Type	(0008,0008)	3	See 5.4.5.1.1.1.
Source image Sequence	(0008,2112)	3	Defined by the application that sends the image to the Filmer
>Referenced SOP Class UID	(0008,1150)	1C	Defined by the application that sends the image to the Filmer
>Referenced SOP Instance UID	(0008,1155)	1C	Defined by the application that sends the image to the Filmer
Burned In Annotation	(0028, 0301)	3	YES
Image Comment	(0020,4000)	3	Defined by the application that sends the image to the Filmer

5.4.5.1.1   General Image Attribute Descriptions

5.4.5.1.1.1   Image Type

If a third value is defined in the original DICOM Image Type, then the image type is set to:

DERIVED\SECONDARY\<Originaltype>\SCREEN SAVE

If no third value is defined in the original DICOM Image Type or if the Image Type is empty, then the image type is set to:

DERIVED\SECONDARY\SCREEN SAVE

5.4.5.1.1.2   Derivation Description

This field is not encoded

5.4.5.2   Image Pixel Module

This section specifies the Attributes that describe the pixel data of the image.

TABLE 5.4-7
IMAGE PIXEL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028,0002	1	1 - if image is displayed in levels of gray 3 - if image is displayed in full colors
Photometric Interpretation	(0028,0004)	1	Defined by the application that sends the image to the Filmer. The following values are possible: . MONOCHROME1 . MONOCHROME2 . RGB
Planar Configuration	(0028, 0006)	1C	0, if element (0x0028, 0x0002) is 3 Not present otherwise
Pixel Aspect Ratio	(0028, 0034)	1C	Defined by the application that sends the image to the Filmer
Rows	(0028,0010)	1	If original image rows < 256, then 256 If 256 <= original image rows <= 2560, then original image rows If 2560 < original image rows, then 2560

Columns	(0028,0011)	1	If original image columns < 256, then 256
			If 256 <= original image columns <= 2560, then original image columns
			If 2560 < original image columns, then 2560
Pixel Spacing	(0028,0030)	3	Derived from the original image *Pixel Size* if defined in original image
			Not Present if *Pixel Size* is not defined in original image
Bits Allocated	(0028,0100)	1	Copy of original image *Bits Allocated* value or 8 if the element (0028, 0002) has value 3.
Bits Stored	(0028,0101)	1	Copy of original image *Bits Stored* value or 8 if the element (0028, 0002) has value 3
High Bit	(0028,0102)	1	Bits Stored - 1
Pixel Representation	(0028,0103)	1	Copy of original image *Pixel Representation* value or 0000h if the element (0028, 0002) has value 3
Pixel Data	(7FE0,0010)	1	Derived from original pixel data

5.4.6 Overlay Plan Modules

This module is not implemented for this IOD.

5.4.7 Lookup Table Modules

5.4.7.1 VOI LUT module

This section specifies the Attributes that describe the VOI LUT.

TABLE 5.4-8
VOI LUT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
VOI LUT Sequence	(0028, 3010)	3	Present if the application that sends the image to the Filmer provides a VOI LUT for the image.
> LUT Descriptor	(0028, 3002)	1C	See 5.4.7.1.1
> LUT Data	(0028, 3006)	1C	The VOI LUT Data in the item.
			If the number of data is < 2^16-1, then the Value Representation is set to US.
			If the number of data is > 2^16-1, then the Value Representation is set to OW.
Window Center	(0028,1050)	3	Current *Window Center (WL)* applied in the Filmer when saving is processed. This element is applicable only with *Photometric Interpretation* (0x0028,0x0004) value of MONOCHROME1 and MONOCHROME2 otherwise this element is *Not Present*

Window Width	(0028,1051)	1C	Current *Window Center (WL)* applied in the Filmer when saving is processed. This element is written only with *Photometric Interpretation* (0x0028,0x0004) value of MONOCHROME1 and MONOCHROME2 otherwise this element is *Not Present*

> **Note:**   When the VOI LUT Sequence is present in the image, there is always only one item present in this sequence.

5.4.7.1.1 Description of the LUT descriptor

The first value is set to the number of entries in the look up table. It is set to 0 if the number of entries is equal to 2^{16}.

The second value is set to the first input value mapped.

The third value is always 16.

If the possible range after application of rescale slope/rescale intercept is signed, the Value Representation is set to SS. Otherwise, the Value Representation is set to US.

5.4.7.2 Modality LUT module

This section specifies the Attributes that describe the Modality LUT.

TABLE 5.4-9
MODALITY LUT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Rescale Intercept	(0028,1052)	1C	If the image is saved as a grayscale image and if the original image header contains Rescale intercept value then the SC image contains its copy. If the image is saved as a color image this element is not present.
Rescale Slope	(0028,1053)	1C	If the image is saved as a grayscale image and if the original image header contains Rescale slope value then the SC image contains its copy. If the image is saved as a color image this element is not present.
Rescale Type	(0028,1054)	1C	If the element (0028, 0002) has value of 3 or if the image header does not contain *Rescale intercept*, this element is not present, otherwise it is set to US.

5.4.8   General Modules

The SOP Common Module is mandatory for all DICOM IODs.

5.4.8.1   SOP Common Module

This section defines the Attributes that are required for proper functioning and identification of the associated SOP Instances. They do not specify any semantics about the Real-World Object represented by the IOD.

TABLE 5.4-10
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.7
SOP Instance UID	(0008,0018)	1	Generated from GE Based UID: <station configuration> and timestamp

Specific Character Set	(0008,0005)	1C	• If original field is not present:
			  • Set to ISO_IR 100 if some fields contain non-English characters.
			  • Otherwise the field is not generated
			• If original field is present, original value
			
			NOTE: Multi valued Specific Character Set with first value non-null and Specific Character Set ISO_IR 13 are not supported.

5.4.9   SC Modules

This Section describes SC Equipment, and Image Modules. These Modules contain Attributes that are specific to SC Image IOD.

5.4.9.1   SC Equipment Module

This Module describes equipment used to convert images into a DICOM format.

TABLE 5.4-11
SC IMAGE EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Conversion Type	(0008,0064)	1	WSD
Modality	(0008,0060)	3	Original if all Filmer data have the same defined modality, OT otherwise
Secondary Capture Device ID	(0018,1010)	3	Real station host name
Secondary Capture Device Manufacturer	(0018,1016)	3	GE MEDICAL SYSTEMS
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	3	FILMER_3.0
Secondary Capture Device Software Version	(0018,1019)	3	Software version build identifier

5.4.9.2 SC Image Module

The table in this Section contains IOD Attributes that describe SC images.

TABLE 5.4-12
SC IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Date of Secondary Capture	(0018,1012)	3	Creation date of the Secondary Capture
Time of Secondary Capture	(0018,1014)	3	Creation time of the Secondary Capture

5.5 SC-PRIVATE DATA DICTIONARY

This section describes the private attributes that can be used in this IOD.

TABLE 5.5-1
PRIVATE CREATOR IDENTIFICATION: GEMS_IDEN_01

Attribute Name	Tag	Type	VR	VM
Full fidelity	(0009,XX01)	3	LO	1
Suite id	(0009,XX02)	3	SH	1
Product id	(0009,XX04)	3	SH	1
Image actual date	(0009,XX27)	3	SL	1
Service id	(0009,XX30)	3	SH	1
Mobile location number	(0009,XX31)	3	SH	1
Equipment UID	(0009,XXE3)	3	UI	1
Genesis Version - now	(0009, XXE6)	3	SH	1
Exam Record checksum	(0009, XXE7)	3	UL	1
Series Suite Id	(0009, XXE8)	3	SH	1
Actual series data time stamp	(0009, XXE9)	3	SL	1

TABLE 5.5-3
PRIVATE CREATOR IDENTIFICATION: GEMS_RELA_01

Attribute Name	Tag	Type	VR	VM
Series from which Prescribed	(0021,XX03)	3	SS	1
Genesis Version - now	(0021,XX05)	3	SH	1
Series Record checksum	(0021,XX07)	3	UL	1
Screen Format	(0021,XX37)	3	SS	1

TABLE 5.5-4
PRIVATE CREATOR IDENTIFICATION: GEMS_SERS_01

Attribute Name	Tag	Type	VR	VM
Images in Series	(0025,XX07)	3	SL	1
Last Instance Number used	(0025,XX19)	3	SL	1
Primary Receiver Suite and Host	(0025,XX1A)	3	SH	1

TABLE 5.5-5
PRIVATE CREATOR IDENTIFICATION: GEMS_IMPS_01

Attribute Name	Tag	Type	VR	VM
Version of the hdr struct	(0029,XX26)	3	SS	1
Advantage comp. Overflow	(0029,XX34)	3	SL	1
Advantage comp. Underflow	(0029,XX35)	3	SL	1

TABLE 5.5-6
PRIVATE CREATOR IDENTIFICATION: GEMS_PARM_01

Attribute Name	Tag	Type	VR	VM
Decon kernel parameters	(0043,XX13)	3	SS	5

TABLE 5.5-7
PRIVATE CREATOR IDENTIFICATION: GEMS_DL_IMG_01

Attribute Name	Tag	Type	VR	VM
Acquisition plane	(0019,XXDE)	3	CS	1

Note: These elements are present in the generated Secondary Capture if these elements were present in the images provided by the calling application.

6. ENHANCED SR INFORMATION OBJECT IMPLEMENTATION

6.1 INTRODUCTION

This section specifies the use of the DICOM Enhanced SR IOD to represent the information included in Enhanced SR produced by this implementation. Corresponding attributes are conveyed using the module construct. The contents of this section are:

6.2- ENHANCED SR Entity-Relationship Model

6.3- ENHANCED SR-IOD MODULE TABLE

6.4- ENHANCED SR -INFORMATION MODULE DEFINITIONS

6.5- ENHANCE SR – PRIVATE DATA DICTIONARY

6.6- ENHANCE SR – TEMPLATE IDENTIFICATION

6.7- ENHANCE SR - Private Coded Entries

Note: The Enhanced DICOM SR produced by this implementation is also named: "Electronic Film"

6.2 ENHANCED SR ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the ENHANCED SR interoperability schema is shown in **Illustration 6.2.1.** In this figure, the following diagrammatic convention is established to represent the information organization:

- Each entity is represented by a rectangular box

- Each relationship is represented by a diamond shaped box.

- The fact that a relationship exists between two entities is depicted by lines connecting the corresponding entity boxes to the relationship boxes.

The relationships are fully defined with the maximum number of possible entities in the relationship shown. In other words, the relationship between Series and Image can have up to n Images per Series, but the Study to Patient relationship has 1 Patient for each Study (a Patient can have more than one Study on the system, however each Study will contain all of the information pertaining to that Patient).

ILLUSTRATION 6.2-1
ENHANCED SR IMAGE ENTITY RELATIONSHIP DIAGRAM
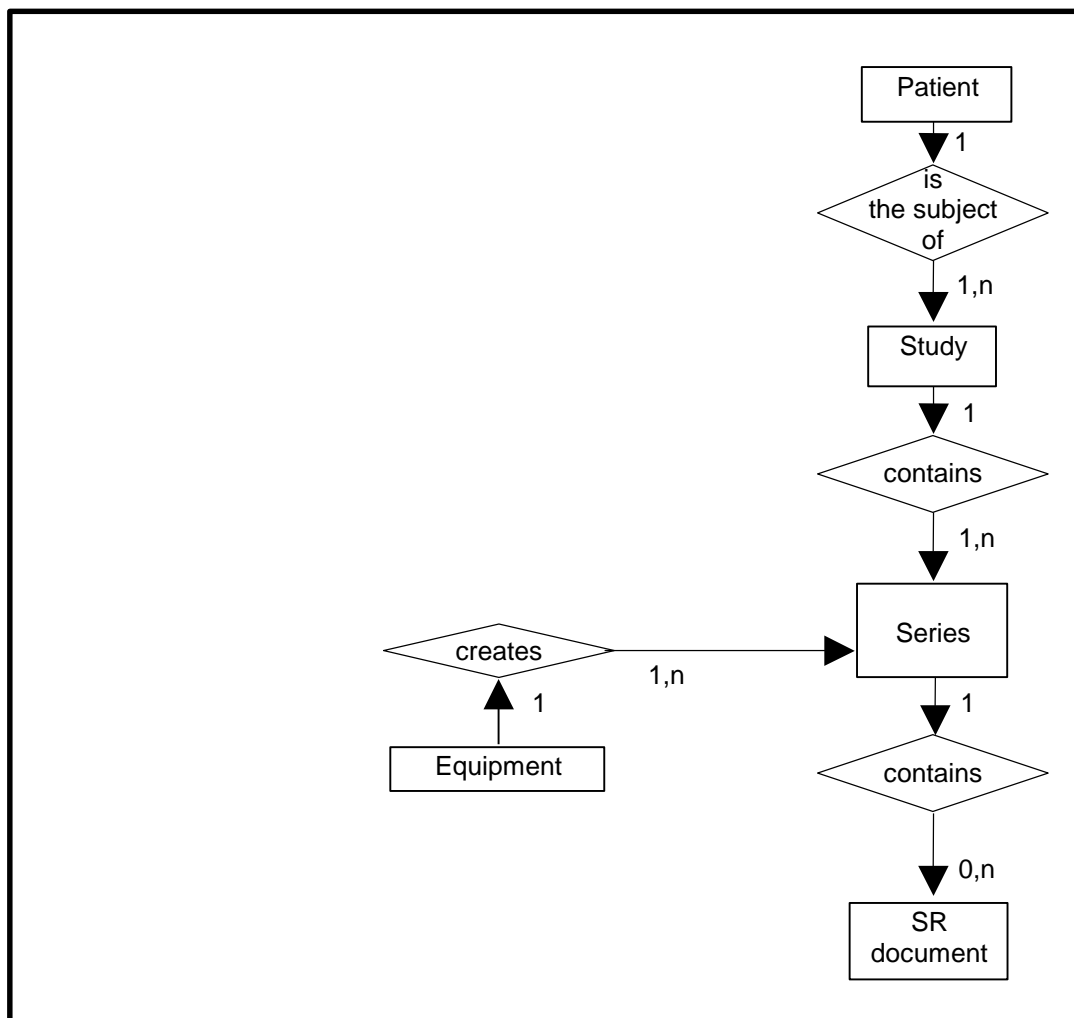
6.2.1 ENTITY DESCRIPTIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the ENHANCED SR Information Object.

6.2.2 AW Server Mapping of DICOM entities

TABLE 6.2-1
MAPPING OF DICOM ENTITIES TO AW SERVER ENTITIES

DICOM	AW Server Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Equipment
SR document	SR document

6.3 ENHANCED SR-IOD MODULE TABLE

Within an entity of the DICOM ENHANCED SR IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into datasets.

Table 6.3.1 identifies the defined modules within the entities which comprise the DICOM SR IOD. Modules are identified by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

TABLE 6.3-1
ENHANCED SR DOCUMENT IOD MODULES

Entity Name	Module Name	Reference
Patient	Patient	**6.4.1.1**
	Specimen Identification	**N/A**
	Clinical Trial Subject	**N/A**
Study	General Study	**6.4.2.1**
	Patient Study	**6.4.2.2**
	Clinical Trial Study	**N/A**
Series	SR document Series	**6.4.3.1**
	Clinical Trial Series	**N/A**
Equipment	General Equipment	**6.4.4.1**
Document	SR document General	**6.4.5.1**
	SR document Content	**6.4.5.2**
	SOP Common	**6.4.6.1**

6.4 ENHANCED SR -INFORMATION MODULE DEFINITIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the ENHANCED SR Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and from where these values are obtained. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

An Electronic Film is a DICOM ENHANCED SR IOD generated by the 'Filmer'.

In the following chapter, all new study, series and image instance UID are generated from Filmer base UID: **1.2.840.113619.2.246**

Note: Elements not listed are not supported

6.4.1 Common Patient Entity Modules

6.4.1.1 Patient Module

This section specifies the attributes of the Patient that describe and identify the Patient who is the subject of a diagnostic Study. This Module contains attributes of the patient that are needed for diagnostic interpretation of the Image and are common for all studies performed on the patient.

TABLE 6.4-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Patient name of first referenced image if No Mix Mode or Mix Mode = Study User defined if Mix Mode = Patient
Patient ID	(0010,0020)	2	Patient ID of first referenced image if No Mix Mode or Mix Mode = Study Function of pid and time if Mix Mode = Patient
Issuer of Patient ID	(0010,0021)	3	Not filled
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	3	Not filled
Patient's Birth Date	(0010,0030)	2	Patient's Birth Date of first referenced image if No Mix Mode or Mix Mode = Study Empty if Mix Mode = Patient
Patient's Sex	(0010,0040)	2	Patient's Sex of first referenced image if No Mix Mode or Mix Mode = Study Empty if Mix Mode = Patient
Other Patient IDs	(0010,1000)	3	Not filled
Other Patient Ids Sequence	(0010,1002)	3	Not filled

6.4.2 Common Study Entity Modules

The following Study IE Modules are common to all Composite Image IODs that reference the Study IE.

6.4.2.1 General Study Module

This section specifies the Attributes, which describe and identify the Study performed upon the Patient.

TABLE 6.4-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	Original if No Mix Mode Generated if Mix Mode = Patient or Mix Mode = Study
Study Date	(0008,0020)	2	Study Date of first referenced image (Empty if does not exist) if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Study Time	(0008,0030)	2	Study Time of first referenced image (Empty if does not exist) if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Accession Number	(0008,0050)	2	Accession Number of first referenced image (Empty if does not exist) if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Referring Physician's Name	(0008,0090)	2	Referring Physician's Name of first referenced image (Empty if does not exist) if No Mix Mode Semantically empty if Mix Mode = Patient or Mix Mode = Study (The content may be empty or contain only ^)
Study Description	(0008,1030)	3	Study Description of first referenced image (Empty if does not exist) if No Mix Mode User defined if Mix Mode = Patient or Mix Mode = Study
Study ID	(0020,0010)	2	Study ID of first referenced image (Empty if does not exist) if No Mix Mode Generated if Mix Mode = Patient or Mix Mode = Study

6.4.2.2 Patient Study Module

This section defines Attributes that provide information about the Patient at the time the Study was performed.

TABLE 6.4-3
PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Age	(0010,1010)	3	Patient's Age of first referenced image if No Mix Mode Not present if Mix Mode = Patient or Mix Mode = Study
Patient's Size	(0010,1020)	3	Patient's Size of first referenced image if No Mix Mode Not present if Mix Mode = Patient or Mix Mode = Study
Patient's Weight	(0010,1030)	3	Patient's Weight of first referenced image if No Mix Mode Not present if Mix Mode = Patient or Mix Mode = Study

6.4.3 SR Document Series Entity Modules

The following SR Document Series IE Modules are common to all Composite Image IODs that reference the SR Document Series IE.

6.4.3.1 SR Document Series Module

This section specifies the attributes that identify and describe general information about the SR Document Series within a Study.

TABLE 6.4-4
SR DOCUMENT SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	SR
Series Instance UID	(0020,000E)	1	Generated
Series Number	(0020,0011)	1	Generated
Referenced Performed Procedure Step Sequence	(0008,1111)	2	Empty
Series Description	(0008,103E)	3	User defined, filled by default with "AW Electronic Film"
Series Date	(0008,0021)	3	Not present
Series Time	(0008,0031)	3	Not present

Note: The series description is also present in the content of the SR. (See AW41 EF TID template description in section 6.6)

6.4.4 Common Equipment Entity Modules

The following Equipment IE Module is common to all Composite Image IODs that reference the Equipment IE.

6.4.4.1 General Equipment Module

This section specifies the attributes that identify and describe the piece of equipment that produced a Series of Images.

TABLE 6.4-5
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	GE MEDICAL SYSTEMS
Institution Name	(0008,0080)	3	Hospital Name provided on the platform (Hospital Name for Filmer)
Station Name	(0008,1010)	3	Host name provided on the platform
Manufacturer's Model Name	(0008,1090)	3	FILMER_3.0
Software Versions	(0018,1020)	3	Software version build identifier

6.4.5 SR document Entity Modules

The following SR document Modules are common to all Composite Image IODs that reference the Image IE.

6.4.5.1 SR document General

This section specifies the attributes that identify and describe the SR document.

TABLE 6.4-6
SR DOCUMENT GENERAL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020, 0013)	1	Generated
Completion flag	(0040, A491)	1	COMPLETE
Verification flag	(0040, A493)	1	VERIFIED
Content Date	(0008, 0023)	1	Generated at the date when the Electronic film is created
Content Time	(0008, 0033)	1	Generated at the time when the Electronic film is created
Verifying Observer Sequence	(0040,A073)	1C	
> Verifying Observer Name	(0040,A075)	1	Name of the user that currently is logged on the station
> Verifying Observer Code Sequence	(0040,A088)	2	Empty
> Verifying Organization	(0040,A027)	1	Institution Name (0008,0080) of General Equipment Module
> Verifying Date Time	(0040,A030)	1	Generated at the time when the Electronic film is created
Performed Procedure Code Sequence	(0040, A372)	2	Empty

Current Requested Procedure Evidence Sequence	(0040,A375)	1C	List of images from all studies considered as input of the Electronic Film: Practically, there will be one study item, one series item and then one image item per image in the Filmer
> Study Instance UID	(0020,000D)	1	Refer to (0040,A375)
> Referenced Series Sequence	(0008,1115)	1	Refer to (0040,A375)
>> Series Instance UID	(0020,000E)	1	Refer to (0040,A375)
>> Referenced SOP Sequence	(0008,1199)	1	Refer to (0040,A375)
>>> Referenced SOP Class UID	(0008,1150)	1	Refer to (0040,A375)
>>> Referenced SOP Instance UID	(0008,1155)	1	Refer to (0040,A375)

6.4.5.2 SR Document Content Module

This section specifies the attributes that identify and describe the SR content

TABLE 6.4-7
SR DOCUMENT CONTENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Content Template Sequence	(0040, A504)	1C	Template that describes the content of the content item
> Mapping Resource	(0008, 0105)	1	PRIVATE
> Template Identifier	(0040, DB00)	1	AW41 EF TID
Content Sequence	(0040, A730)	1C	Content of the DICOM SR (see section 6.6)
Value Type	(0040, A040)	1	CONTAINER
Concept Name code Sequence	(0040, A043)	1C	
> Code Value	(0008, 0100)	1C	AWVF-0001
> Coding Scheme Designator	(0008, 0102)	1C	99GEMS
> Code Meaning	(0008, 0104)	1C	Electronic Film Presentation
Continuity Of Content	(0040, A050)	1C	SEPARATE

6.4.6 General Modules

The SOP Common Module is mandatory for all DICOM IODs.

6.4.6.1 SOP Common Module

This section defines the Attributes that are required for proper functioning and identification of the associated SOP Instances. They do not specify any semantics about the Real-World Object represented by the IOD.

TABLE 6.4-4
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.88.22
SOP Instance UID	(0008,0018)	1	Generated from GE Based UID, <station configuration> and timestamp.

Specific Character Set	(0008,0005)	1C	• ISO_IR 100 if Mix Mode = Patient
			• Otherwise:
			  • ISO_IR 100 if original value is not present and at least one of the Dicom data element contains non-ascii characters.
			  • Original value otherwise
			Note: Multi valued Specific Character Set with first value non-null and Specific Character Set ISO_IR 13 are not supported.

6.5 ENHANCE SR – PRIVATE DATA DICTIONARY

This section describes the private attributes of this IOD.

TABLE 6.5-1
PRIVATE CREATOR IDENTIFICATION: GEMS_ADWSOFT_DPO1

Attribute Name	Tag	Type	VR	VM	Attribute Description
Private Entity Launch Command	(0039,XX95)	3	LO	1	Name of application to launch

6.6 ENHANCE SR – TEMPLATE IDENTIFICATION

This section describes the Electronic Film Presentation Template

This template describes how the SR Document Content Module of the Enhanced SR Information Object Definition is constrained for the purpose of implementing the Electronic Film. This template is non-standard, Mapping Resource (0008,0105) = PRIVATE, Template Identifier (0040,DB00) = AW41 EF TID.

6.6.1 TID Electronic Film Presentation

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV(AWVF-0001,99GEMS, "Electronic Film Presentation")	1	M		Root Node, SEPARATE
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1003) Person observer identifying attributes	1	M		

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
3	>	CONTAINS	INCLUDE	ETID Page Presentation	1-n	U		
4	>	HAS CONCEPT MOD	CODE	EV (113011, DCM, "Document Title Modifier")	1	MC		Present and equal to (0008,103E)

6.6.2 TID Page Presentation

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		-	CONTAINER	EV(AWVF-0002, 99GEMS, "Page Presentation")	1	M		SEPARATE
2	>	CONTAINS	INCLUDE	ETID Slot Group Presentation	1-n	U		

6.6.3 TID Slot Group Presentation

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		-	CONTAINER	EV(AWVF-0003, 99GEMS, "Slot Group Presentation")	1	M		SEPARATE
2	>	CONTAINS	INCLUDE	ETID Geometry	1	M		
3	>	CONTAINS	INCLUDE	ETID Slot Presentation	1-n	U		

6.6.4 TID Slot Presentation

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		-	CONTAINER	EV(AWVF-0004, 99GEMS, "Slot Presentation")	1	M		SEPARATE
2	>	CONTAINS	INCLUDE	ETID Geometry	1	M		
3	>	CONTAINS	TEXT	EV(AWVF-0009, 99GEMS, "Notepad")	1	UC	IF rows 4 and 5 absent	
4	>	CONTAINS	IMAGE		1	UC	IF rows 3 and 5 absent	
5	>	-	INCLUDE	ETID Cine Sequence	1	UC	IF rows 3 and 4 absent	

6.6.5 TID Cine Sequence

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		CONTAINS	NUM	EV(AWVF-0010, 99GEMS, "Time between cine frames")	1	M		UNITS=EV(s, UCUM,"second")
2		CONTAINS	IMAGE		1-n	M		

6.6.6 TID Geometry

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		-	NUM	EV(AWVF-0005, 99GEMS, "Relative horizontal position of top left corner")	1	M		UNITS=EV(1, UCUM, "ratio")

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
2		-	NUM	EV(AWVF-0006, 99GEMS, "Relative vertical position of top left corner")	1	M		UNITS=EV(1, UCUM, "ratio")
3		-	NUM	EV(AWVF-0007, 99GEMS, "Relative horizontal size")	1	M		UNITS=EV(1, UCUM, "ratio")
4		-	NUM	EV(AWVF-0008, 99GEMS, "Relative vertical size")	1	M		UNITS=EV(1, UCUM, "ratio")

6.7　ENHANCE SR - PRIVATE CODED ENTRIES

The private coded entries that are required for implementing the Electronic Film are listed below (these are referred to in the Electronic Film Presentation Template).

TABLE 6.7-1
PRIVATE CODED ENTRIES: 99GEMS

Coded Entries		
Coding Scheme Designator (0008,0102)	**Code Value (0008,0100)**	**Code Meaning (0008,0104)**
99GEMS	AWVF-0001	Electronic Film Presentation
99GEMS	AWVF-0002	Page Presentation
99GEMS	AWVF-0003	Slot Group Presentation
99GEMS	AWVF-0004	Slot Presentation
99GEMS	AWVF-0005	Relative horizontal position of top left corner
99GEMS	AWVF-0006	Relative vertical position of top left corner
99GEMS	AWVF-0007	Relative horizontal size
99GEMS	AWVF-0008	Relative vertical size
99GEMS	AWVF-0009	Notepad
99GEMS	AWVF-0010	Time between cine frames

7. KEY OBJECT SELECTION INFORMATION OBJECT IMPLEMENTATION

7.1 INTRODUCTION

This section specifies the use of the DICOM Key Object Selection IOD to represent the information included in KOS produced by this implementation. Corresponding attributes are conveyed using the module construct. The contents of this section are:

7.2 - KEY OBJECT SELECTION Entity-Relationship Model

7.3 - KEY OBJECT SELECTION-IOD MODULE TABLE

7.4 - KEY OBJECT SELECTION -INFORMATION MODULE DEFINITIONS

7.5 - KEY OBJECT SELECTION – TEMPLATE IDENTIFICATION

7.2 KEY OBJECT SELECTION ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the Key Object Selection interoperability schema is shown in **Illustration 7.2.1.** In this figure, the following diagrammatic convention is established to represent the information organization:

- Each entity is represented by a rectangular box

- Each relationship is represented by a diamond shaped box.

- The fact that a relationship exists between two entities is depicted by lines connecting the corresponding entity boxes to the relationship boxes.

The relationships are fully defined with the maximum number of possible entities in the relationship shown. In other words, the relationship between Series and Image can have up to n Images per Series, but the Study to Patient relationship has 1 Patient for each Study (a Patient can have more than one Study on the system, however each Study will contain all of the information pertaining to that Patient).

ILLUSTRATION 7.2-1
KEY OBJECT SELECTION IMAGE ENTITY RELATIONSHIP DIAGRAM
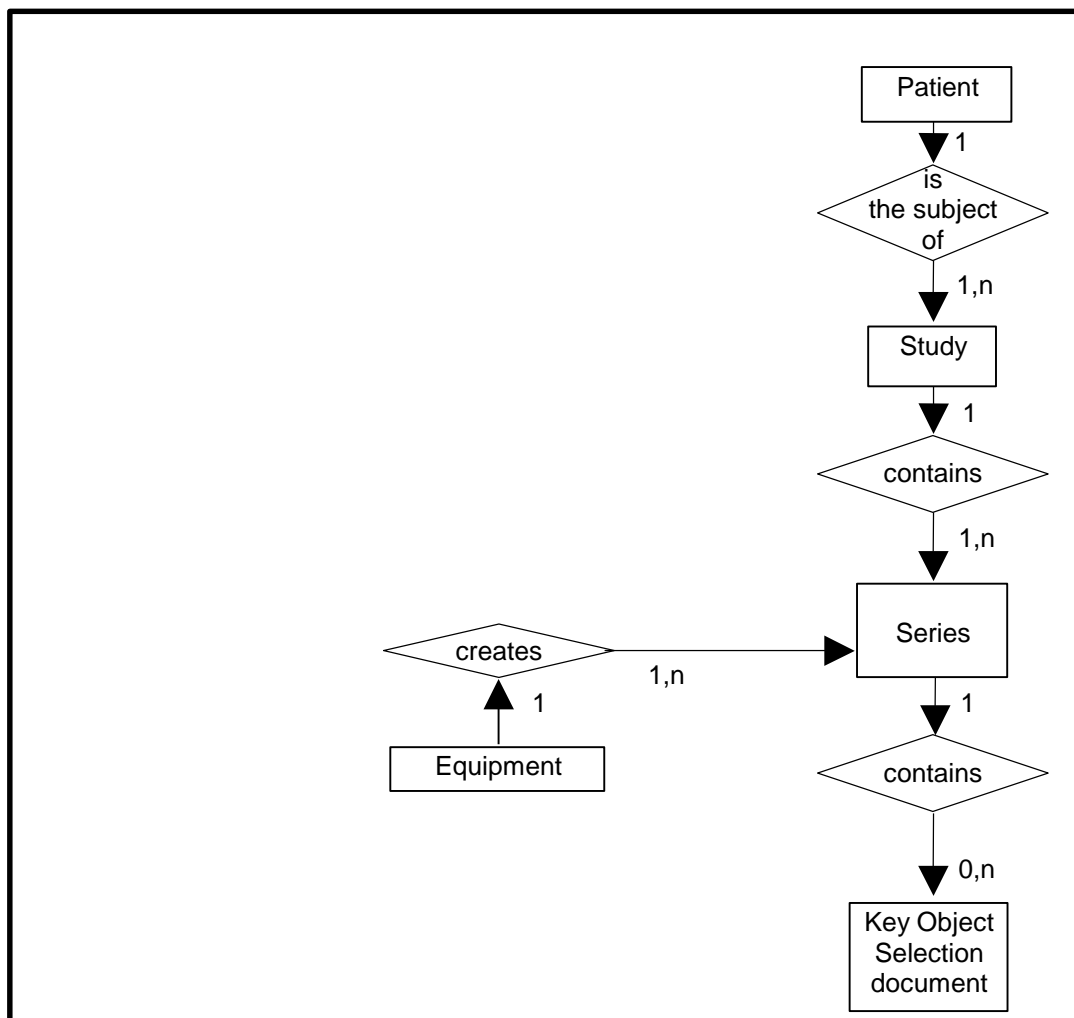
7.2.1 ENTITY DESCRIPTIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the Key Object Selection Information Object.

7.2.2 AW Server Mapping of DICOM entities

TABLE 7.2-1
MAPPING OF DICOM ENTITIES TO AW SERVER ENTITIES

DICOM	AW Server Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Equipment
Key Object Selection document	Key Object Selection document

7.3 KEY OBJECT SELECTION-IOD MODULE TABLE

Within an entity of the DICOM KEY OBJECT SELECTION IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into datasets.

Table 7.3.1 identifies the defined modules within the entities which comprise the DICOM KEY OBJECT SELECTION IOD. Modules are identified by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

TABLE 7.3-1
KEY OBJECT SELECTION DOCUMENT IOD MODULES

Entity Name	Module Name	Reference
Patient	Patient	**7.4.1.1**
	Specimen Identification	**N/A**
	Clinical Trial Subject	**N/A**
Study	General Study	**7.4.2.1**
	Patient Study	**7.4.2.2**
	Clinical Trial Study	**N/A**
Series	Key Object Document Series	**7.4.3.1**
	Clinical Trial Series	**N/A**
Equipment	General Equipment	**7.4.4.1**
Document	Key Object Document	**7.4.5.1**
	SR document Content	**7.4.5.2**
	SOP Common	**7.4.6.1**

7.4 KEY OBJECT SELECTION -INFORMATION MODULE DEFINITIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the KEY OBJECT SELECTION Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and from where these values are obtained. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

The Key Object Selection IOD described here is the one generated by the application 'Filmer' of AW Server.

In the following chapter, all new study, series and image instance UID are generated from Filmer base UID: **1.2.840.113619.2.246**

Note: Elements not listed are not supported

7.4.1   Common Patient Entity Modules

7.4.1.1   Patient Module

This section specifies the attributes of the Patient that describe and identify the Patient who is the subject of a diagnostic Study. This Module contains attributes of the patient that are needed for diagnostic interpretation of the Image and are common for all studies performed on the patient.

TABLE 7.4-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Patient name of first referenced image if No Mix Mode or Mix Mode = Study User defined if Mix Mode = Patient
Patient ID	(0010,0020)	2	Patient ID of first referenced image if No Mix Mode or Mix Mode = Study Function of pid and time if Mix Mode = Patient
Issuer of Patient ID	(0010,0021)	3	Not filled
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	3	Not filled
Patient's Birth Date	(0010,0030)	2	Patient's Birth Date of first referenced image if No Mix Mode or Mix Mode = Study Empty if Mix Mode = Patient
Patient's Sex	(0010,0040)	2	Patient's Sex of first referenced image if No Mix Mode or Mix Mode = Study Empty if Mix Mode = Patient
Other Patient IDs	(0010,1000)	3	Not filled
Other Patient Ids Sequence	(0010,1002)	3	Not filled

7.4.2   Common Study Entity Modules

The following Study IE Modules are common to all Composite Image IODs that reference the Study IE.

7.4.2.1 General Study Module

This section specifies the Attributes, which describe and identify the Study performed upon the Patient.

TABLE 7.4-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	Original if No Mix Mode Generated if Mix Mode = Patient or Mix Mode = Study
Study Date	(0008,0020)	2	Study Date of first referenced image (Empty if does not exist) if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Study Time	(0008,0030)	2	Study Time of first referenced image (Empty if does not exist) if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Accession Number	(0008,0050)	2	Accession Number of first referenced image (Empty if does not exist) if No Mix Mode Empty if Mix Mode = Patient or Mix Mode = Study
Referring Physician's Name	(0008,0090)	2	Referring Physician's Name of first referenced image (Empty if does not exist) if No Mix Mode Semantically empty if Mix Mode = Patient or Mix Mode = Study (The content may be empty or contain only ^)
Study Description	(0008,1030)	3	If No Mix Mode, this is the study Description of first referenced image. It is not present if the original study description is empty. User defined if Mix Mode = Patient or Mix Mode = Study
Study ID	(0020,0010)	2	Study ID of first referenced image (Empty if does not exist) if No Mix Mode Generated if Mix Mode = Patient or Mix Mode = Study

7.4.2.2 Patient Study Module

This section defines Attributes that provide information about the Patient at the time the Study was performed.

TABLE 7.4-3
PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Age	(0010,1010)	3	Patient's Age of first referenced image if No Mix Mode Not present if Mix Mode = Patient or Mix Mode = Study
Patient's Size	(0010,1020)	3	Patient's Size of first referenced image if No Mix Mode Not present if Mix Mode = Patient or Mix Mode = Study
Patient's Weight	(0010,1030)	3	Patient's Weight of first referenced image if No Mix Mode Not present if Mix Mode = Patient or Mix Mode = Study

7.4.3 Key Object Document Series Entity Modules

The following Key Object Document Series IE Modules are common to all Composite Image IODs that reference the Key Object Document Series IE.

7.4.3.1 Key Object Document Series Module

This section specifies the attributes that identify and describe general information about the Key Object Document Series within a Study.

TABLE 7.4-4
KEY OBJECT SELECTION DOCUMENT SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	KO
Series Instance UID	(0020,000E)	1	Generated
Series Number	(0020,0011)	1	Generated
Series Description	(0008,103E)	3	Begin with "Of Interest: ", followed by user description (filled by default with "AW Electronic Film")
Series Date	(0008,0021)	3	Not present
Series Time	(0008,0031)	3	Not present
Referenced Performed Procedure Step Sequence	(0008,1111)	2	Empty

7.4.4 Common Equipment Entity Modules

The following Equipment IE Module is common to all Composite Image IODs that reference the Equipment IE.

7.4.4.1 General Equipment Module

This section specifies the attributes that identify and describe the piece of equipment that produced a Series of Images.

TABLE 7.4-5
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	GE MEDICAL SYSTEMS
Institution Name	(0008,0080)	3	Hospital Name provided on the platform (Hospital Name for Filmer)
Station Name	(0008,1010)	3	Host name provided on the platform
Manufacturer's Model Name	(0008,1090)	3	FILMER_3.0
Software Versions	(0018,1020)	3	Software version build identifier

7.4.5 Key Object document Entity Modules

The following Key Object document Modules are common to all Composite Image IODs that reference the Image IE.

7.4.5.1 Key Object document

This section specifies the attributes that identify and describe the Key Object document.

TABLE 7.4-6
KEY OBJECT DOCUMENT GENERAL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020, 0013)	1	Generated
Content Date	(0008, 0023)	1	Generated at the date when the Key Object is created
Content Time	(0008, 0033)	1	Generated at the time when the Key Object is created
Referenced Request Sequence	(0040,A370)	1C	N/A
Current Requested Procedure Evidence Sequence	(0040,A375)	1C	List of images referenced within the Key Object Selection. Practically, there will be one study item, one series item and then one image item per image in the Filmer
> Study Instance UID	(0020,000D)	1	Refer to (0040,A375)
> Referenced Series Sequence	(0008,1115)	1	Refer to (0040,A375)
>> Series Instance UID	(0020,000E)	1	Refer to (0040,A375)
>> Referenced SOP Sequence	(0008,1199)	1	Refer to (0040,A375)
>>> Referenced SOP Class UID	(0008,1150)	1	Refer to (0040,A375)
>>> Referenced SOP Instance UID	(0008,1155)	1	Refer to (0040,A375)

7.4.5.2 SR Document Content Module

This section specifies the attributes that identify and describe the SR Document content

TABLE 7.4-7
SR DOCUMENT CONTENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Value Type	(0040, A040)	1	CONTAINER
Concept Name code Sequence	(0040, A043)	1C	Describe Title "Of Interest" in DCID(7010) Key Object Selection Document Titles
> Code Value	(0008, 0100)	1C	113000
> Coding Scheme Designator	(0008, 0102)	1C	DCM
> Code Meaning	(0008, 0104)	1C	Of Interest
Continuity Of Content	(0040, A050)	1C	SEPARATE
Content Template Sequence	(0040, A504)	1C	Template that describes the content of the content item
> Mapping Resource	(0008, 0105)	1	DCMR
> Template Identifier	(0040, DB00)	1	2010
Observation Date Time	(0040, A032)	1C	Generated at the date and time when the Key Object is created
Content Sequence	(0040, A730)	1C	Content of the DICOM KEY OBJECT SELECTION – See 7.5

7.4.6 General Modules

The SOP Common Module is mandatory for all DICOM IODs.

7.4.6.1 SOP Common Module

This section defines the Attributes that are required for proper functioning and identification of the associated SOP Instances. They do not specify any semantics about the Real-World Object represented by the IOD.

TABLE 7.4-4
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.88.59
SOP Instance UID	(0008,0018)	1	Generated from GE Based UID, <station configuration> and timestamp.

Specific Character Set	(0008,0005)	1C	• ISO_IR 100 if Mix Mode = Patient
			• Otherwise:
			  • ISO_IR 100 if original value is not present and at least one of the Dicom data element contains non-ascii characters.
			  • Original value otherwise
			Note: Multi valued Specific Character Set with first value non-null and Specific Character Set ISO_IR 13 are not supported.

7.5 KEY OBJECT SELECTION – TEMPLATE IDENTIFICATION

This section describes the Key Object Selection Template – TID 2010

This template describes how the SR Document Content Module of the Key Object Selection Information Object Definition is constrained. This template is the standard TID 2010.

7.5.1 TID 2010 Key Object Selection

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DCID(7010) Key Object Selection Document Title	1	M		Root node
2	>	HAS CONCEPT MOD	CODE	EV (113011, DCM, "Document Title Modifier")	1-n	U		Not used
3	>	HAS CONCEPT MOD	CODE	EV (113011, DCM, "Document Title Modifier")	1	UC	IF Row 1 Concept Name = (113001, DCM, "Rejected for Quality Reasons") or (113010, DCM," Quality Issue")	DCID (7011)
4	>	HAS CONCEPT MOD	CODE	EV (113011, DCM, "Document Title Modifier")	1	MC	IF Row 1 Concept Name = (113013, DCM, "Best In Set")	DCID (7012)
5	>	HAS CONCEPT MOD	INCLUDE	DTID(1204) Language of Content Item and Descendants	1	U		Not used
6	>	HAS OBS CONTEXT	INCLUDE	DTID(1002) Observer Context	1-n	U		Present
7	>	CONTAINS	TEXT	EV(113012, DCM, "Key Object Description")	1	U		User defined, filled by default with "AW Electronic Film"
8	>	CONTAINS	IMAGE	Purpose of Reference shall not be present	1-n	MC		Present

7.5.2 TID 1002 Observer Context

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		HAS OBS CONTEXT	CODE	EV (121005,DCM, "Observer Type")	1	MC		EV (121006,DCM, "Person")
2		HAS OBS CONTEXT	INCLUDE	DTID (1003) Person observer identifying attributes	1	MC		

7.5.3 TID 1003 Person Observer Identifying Attributes

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			PNAME	EV (121008,DCM, "Person Observer Name")	1	M		Name of the current user
2			TEXT	EV (121009,DCM, " Person Observer's Organization Name")	1	U		Hospital Name provided on the platform