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**REVISION HISTORY**

| <b>Rev</b> | <b>Date</b>                  | <b>Reason for change</b>  |
|------------|------------------------------|---|
| A          | July 1 <sup>st</sup> , 2005  | Release AW4.3_03A   |
| 0          | July 15 <sup>th</sup> , 2005 | Update for release AW4.3_03A  |
| 1          | Oct 4 <sup>th</sup> , 2005   | Update description of Image Color support<br>Add description of patient de-identification   |
| 2          | Jan 16 <sup>th</sup> , 2006  | Update the supported transfer syntaxes for the RWA<br>“Restore Media” and “Create Media” for MOD and<br>CD/DVD.<br>Update SOP Common Module in enhanced SR<br>Information Object Implementation |

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# 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 GEMS equipment compliance to the DICOM requirements for the implementation of networking features.

**Section 3 (Media Storage Conformance Statement)** specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Media Storage features

**Section 4 (Network Print SCU Conformance Statement)** specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Network Print features.

**Section 5 (Network Print Management SOP Class definition)** specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Network Print Management SOP Class.

**Section 6 (SC Information Object Implementation)** specifies the GEMS equipment compliance to the DICOM requirements for the implementation of SC Information Object Implementation feature.

**Section 7 (ENHANCED SR Object Implementation)** specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Enhanced SR Information Object Implementation feature.

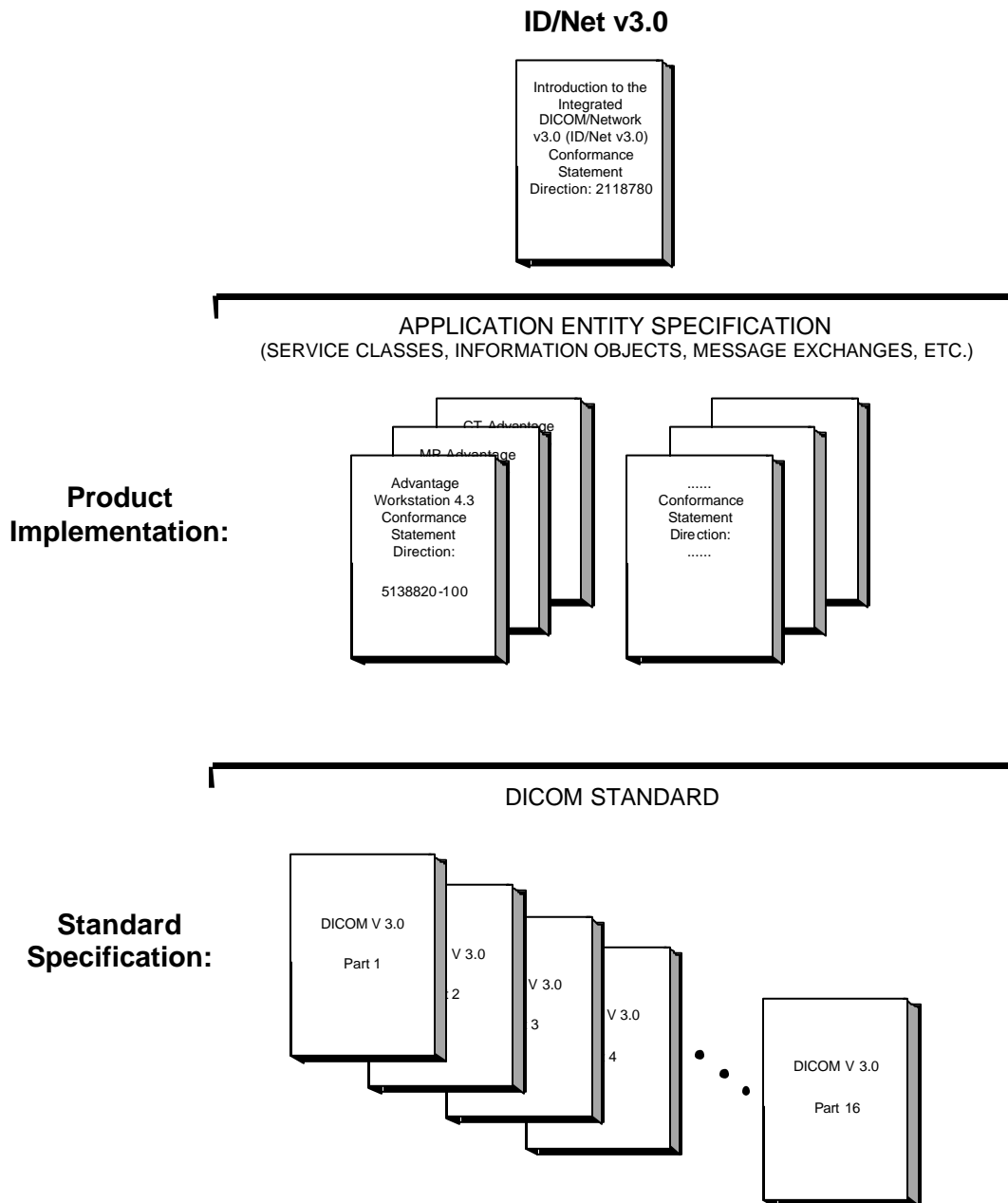
**Section 8 (DPO Information Object Implementation)** specifies the GEMS equipment compliance to the DICOM requirements for the implementation of the private DPO Information Object Implementation feature. (DPO stands for DICOM Private Object)

**Section 9 (XA Downscan Information Object Implementation)** specifies the DICOM attributes that are modified when reducing the resolution of GE XA Cardiac images to 512x512.

**Section 10 (Tool to modify first and last name of patients)** specifies the DICOM attributes that are modified to create anonymous images from existing images.

### 1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEMS Conformance Statements and their relationship with the DICOM Conformance Statements is shown in the Illustration below.



This document specifies the DICOM implementation. It is entitled:

*Advantage Workstation 4.3  
Conformance Statement for DICOM  
Direction 5138820-100*

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to interoperate with the GEMS network interface. Introductory information, which is applicable to all GEMS Conformance Statements, is described in the document:

*Introduction to the Integrated DICOM/Network (ID/Net v3.0)  
Conformance Statement  
Direction: 2118780.*

This Introduction familiarizes the reader with DICOM terminology and general concepts. It should be read prior to reading the individual products' GEMS Conformance Statements.

The GEMS 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 including Network Architecture and basic DICOM concepts, please refer to the Introduction.

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 North 17th Street, Suite 1847  
Rosslyn, VA 22209 USA

### 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 Standards and with the terminology and concepts, which are used in those Standards.

If readers are unfamiliar with DICOM terminology they should first refer to the document listed below, then read the DICOM Standard itself, prior to reading this DICOM Conformance Statement document.

*Introduction to the Integrated DICOM/Network (ID/Net v3.0)  
Conformance Statement  
Direction: 2118780*

### 1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document, in conjunction with the *Introduction to the Integrated DICOM/Network (ID/Net v3.0) Conformance Statement, Direction: 2118780*, to provide an unambiguous specification for GEMS implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GEMS medical data exchanged using DICOM. The GEMS Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEMS devices are capable of using different Information Object Definitions. For example, a GEMS 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 GEMS implementation. If the user encounters unspecified private data elements while parsing a GEMS 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 GEMS 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), 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 GEMS 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) reflected on 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. Failures 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

A list of references, which is applicable, to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

The information object implementation refers to DICOM PS 3.3 (Information Object Definition) - year 2004.

**1.7 DEFINITIONS**

A set of definitions which is applicable to all GEMS Conformance Statements is included in *the Introduction to the Integrated DICOM/Network (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

**1.8 SYMBOLS AND ABBREVIATIONS**

A list of symbols and abbreviations which is applicable to all GEMS Conformance Statements is included in *the Introduction to the Integrated DICOM/Network (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

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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 GEMS product. Note that the format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

The Advantage Workstation 4.3 is a Networked Medical Imaging Console dedicated to Examination Review and Diagnosis on film. The workstation uses DICOM services to import images for possible further analysis or processing and to export images to other DICOM implementations, DICOM printers or DICOM Interchange media. 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 station 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.

This DICOM conformance statement refers to other DICOM conformance statements for formal descriptions of IODs created by added applications:

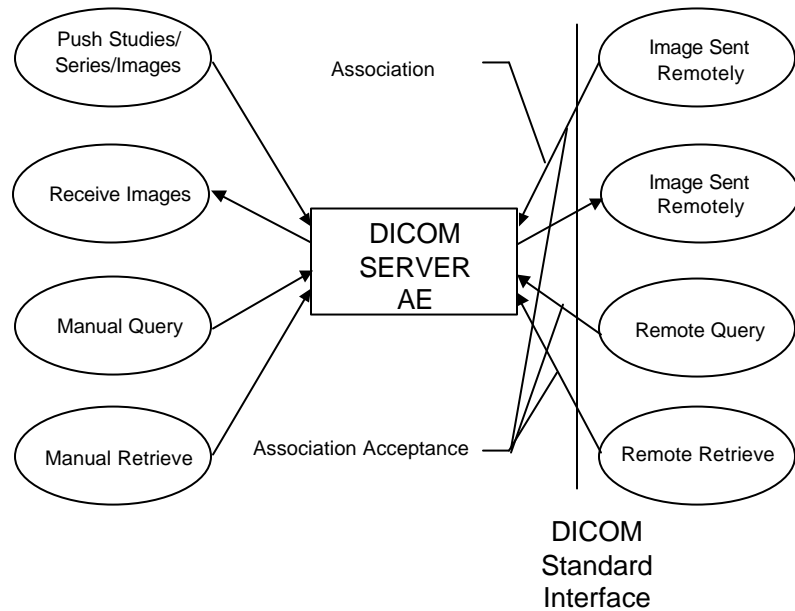
- GE Private 3D Model Objects are described in the Advantage Windows Voxtool 2.0 DICOM Conformance Statement (Direction Number: 2198583-100)
- GE Private DICOM RT Plan are described in the Advantage SIM 3.0 DICOM Conformance Statement (Direction Number: 2192581-100)
- GE private DICOM NM images are described in the GENIE™ Processing & Review R2.6 DICOM Conformance Statement (Direction number: 2260424-100)
- GE private DICOM PET images are described in the Advance 4.05 DICOM Conformance Statement (Direction number: 2270669-100 Rev. 0.3)

### 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



**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 Advantage Workstation 4.3 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 console 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.
- a set of studies of the same patient and launches the end of review. A set of series of the patient will be then sent to a set of declared remote DICOM AEs following user defined rules.

The transfer activity is displayed on a specific icon.

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

- 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 Advantage Workstation 4.3 from the remote DICOM AE. The data can be retrieved at the Study, Series and Image levels.

- Receive images from a Remote DICOM AE

When images are installed in the local database, the local Patient List displays the content of the Advantage Workstation 4.3 local database.

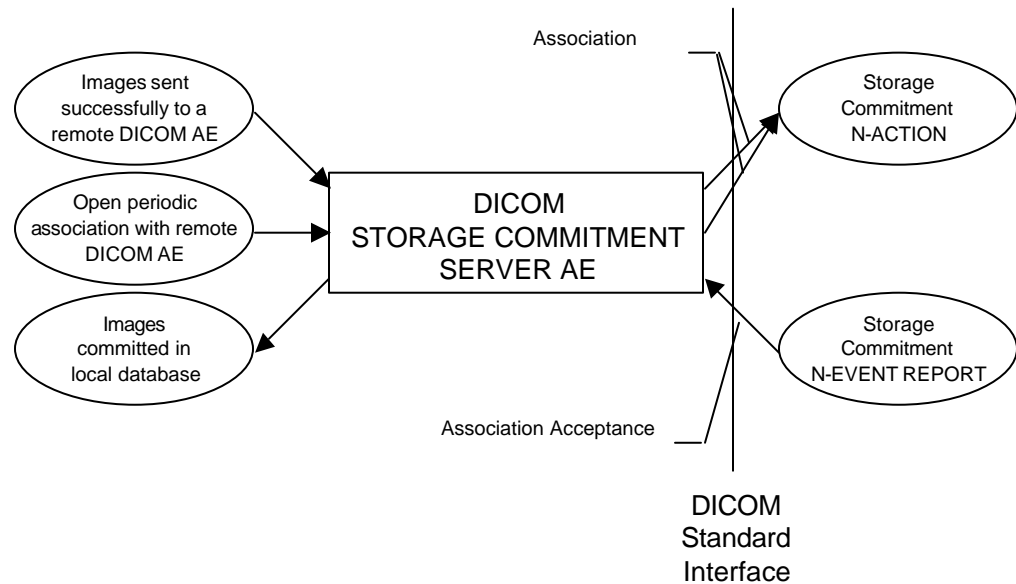
- Remote Query

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

- Remote Retrieve

For this operation, a remote DICOM AE asks to send data at Patient/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 Advantage Workstation 4.3 at the Patient/Study/Series/Image level. The Remote DICOM AE shall be declared locally on the Advantage Workstation 4.3. The declaration of remote DICOM AE is done through a specific application (known as NETWORK MANAGEMENT).

DICOM STORAGE COMMITMENT SERVER AE APPLICATION MODEL



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

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

- Initiate Storage Commitment to a Remote DICOM AE.
- Listen to remote Storage Commitment SCP.
- Open periodic associations.

### 2.2.2 Functional Definition of AE's

#### DICOM SERVER AE

The DICOM SERVER AE initiates the following operations:

- 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 Classes to a remote DICOM AE.
- Initiate a DICOM association to ask for remote patient demographics.
- Initiate a DICOM association to ask for transmitting images from a remote DICOM AE to Advantage Workstation 4.3.

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

- Answer to DICOM associations transmitting DICOM SOP Classes to be stored on the Advantage Workstation 4.3.
- Answer to DICOM associations transmitting Verification SOP Class to the Advantage Workstation 4.3.

#### STORAGE COMMITMENT SERVER AE:

The STORAGE COMMITMENT SERVER AE initiates the following operations:

- 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 STORAGE COMMITMENT 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

#### DICOM SERVER AE:

Not applicable.

#### DICOM STORAGE COMMITMENT SERVER AE:

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, displays a pop-up and stops.
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

8. The Storage Commitment AE opens periodic association with all the DICOM AE that have been declared as Storage Commitment Provider on the station. The time between these associations is configurable.

**2.3 AE SPECIFICATIONS**

**2.3.1 DICOMSERVER 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 Image Storage   | 1.2.840.10008.5.1.4.1.1.481.1 |
| RT Structure Set Storage                                   | 1.2.840.10008.5.1.4.1.1.481.3 |
| 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           |

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|  |                               |
|--|-------------------------------|
| 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 |
| Mammography CAD SR                                 | 1.2.840.10008.5.1.4.1.1.88.50 |
| 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   |

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

**Note:** The Advantage Workstation 4.3 is able to push the GSPS SOP Class 1.2.840.10008.5.1.4.1.1.11.1.

**Note:** Please also refer to sections 6 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     |
| Standalone Overlay Storage                                 | 1.2.840.10008.5.1.4.1.1.8     |
| 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   |

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|--|-------------------------------|
| 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 Image Storage   | 1.2.840.10008.5.1.4.1.1.481.1 |
| RT Structure Set Storage                                 | 1.2.840.10008.5.1.4.1.1.481.3 |
| 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 |
| Mammography CAD SR                                       | 1.2.840.10008.5.1.4.1.1.88.50 |
| Study Root Query/Retrieve Information Model - FIND       | 1.2.840.10008.5.1.4.1.2.2.1   |
| Patient Root Query/Retrieve Information Model - MOVE     | 1.2.840.10008.5.1.4.1.2.1.2   |
| 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             |

**Note :** The Advantage Workstation 4.3 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 | 28672 Bytes |
|--------------------|-------------|

**Note :** The SOP Class Extended Negotiation is not supported.

**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 4 open DICOM associations at a time to perform a DICOM operation as a SCP.

#### 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:

|  |                      |
|--|----------------------|
| Advantage Workstation 4.3 Implementation UID | 1.2.840.113619.6.181 |
|--|----------------------|

#### 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/Images) to be sent. Then, the user can either drag and drop the selection on the icon representing then Remote DICOM AE, or click on the “Push” icon and select a Remote DICOM AE in the LIST OF REMOTE HOST.

The operator can select in the BROWSER one or several studies of the same patient and launch the end of review. A set of series of the patient will be then sent to a set of declared remote DICOM AEs following user defined rules.

This operation will cause the following actions:

- The DICOM SERVER AE will initiate a DICOM association, negotiate with the Remote AE an appropriate Abstract and Transfer Syntax.

- The Advantage Workstation 4.3 will load a DICOM image from its database.
- The DICOM SERVER AE will emit a CSTORE command to send the image, if the negotiation is successful.

**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.

| <b>Presentation Context Table- Proposed</b> |                               |                           |                     |             |                             |
|---|-------------------------------|---------------------------|---------------------|-------------|-----------------------------|
| <b>Abstract Syntax</b>                      |                               | <b>Transfer Syntax</b>    |                     | <b>Role</b> | <b>Extended Negotiation</b> |
| <b>Name</b>                                 | <b>UID</b>                    | <b>Name List</b>          | <b>UID List</b>     |             |                             |
| 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            | 1.2.840.10008.5.1.4.1.1.1.2.1 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU         | None                        |

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|--|-------------------------------|---------------------------|---------------------|-----|------|
| X-Ray Angiographic Image Storage                           | 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 |
| X-Ray Angiographic Image Storage                           | 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 |
| X-Ray Radiofluoroscopic Image Storage                      | 1.2.840.10008.5.1.4.1.1.1.2.2 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| X-Ray Radiofluoroscopic Image Storage                      | 1.2.840.10008.5.1.4.1.1.1.2.2 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| X-Ray Radiofluoroscopic Image Storage                      | 1.2.840.10008.5.1.4.1.1.1.2.2 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | 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   | 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                                  | 1.2.840.10008.5.1.4.1.1.1.1   | Explicit VR Little        | 1.2.840.10008.1.2.1 | SCU | None |

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|--|--------------------------------|---------------------------|---------------------|-----|------|
| Image Storage - For Processing                           | 2.1                            | Endian                    |                     |     |      |
| 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                           | 1.2.840.10008.5.1.4.1.1.2.0    | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| Nuclear Medicine Image Storage                           | 1.2.840.10008.5.1.4.1.1.2.0    | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Nuclear Medicine Image Storage                           | 1.2.840.10008.5.1.4.1.1.2.0    | 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               | 1.2.840.10008.5.1.4.1.1.1.28   | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| Positron Emission Tomography Image Storage               | 1.2.840.10008.5.1.4.1.1.1.28   | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Positron Emission Tomography Image Storage               | 1.2.840.10008.5.1.4.1.1.1.28   | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | None |
| Standalone PET Curve Storage                             | 1.2.840.10008.5.1.4.1.1.1.29   | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| Standalone PET Curve Storage                             | 1.2.840.10008.5.1.4.1.1.1.29   | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Standalone PET Curve Storage                             | 1.2.840.10008.5.1.4.1.1.1.29   | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | None |
| RT Image Information Storage                             | 1.2.840.10008.5.1.4.1.1.4.81.1 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| RT Image Information Storage                             | 1.2.840.10008.5.1.4.1.1.4.81.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| RT Image Information Storage                             | 1.2.840.10008.5.1.4.1.1.4.81.1 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | None |
| RT Structure Set Information Storage                     | 1.2.840.10008.5.1.4.1.1.4.81.3 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| RT Structure Set Information Storage                     | 1.2.840.10008.5.1.4.1.1.4.81.3 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| RT Structure Set Information Storage                     | 1.2.840.10008.5.1.4.1.1.4.81.3 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | None |

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|---|-----------------------------------|------------------------------|---------------------|-----|------|
| RT Plan Information Storage             | 1.2.840.10008.5.1.4.1.1.4<br>81.5 | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCU | None |
| RT Plan Information Storage             | 1.2.840.10008.5.1.4.1.1.4<br>81.5 | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCU | None |
| RT Plan Information Storage             | 1.2.840.10008.5.1.4.1.1.4<br>81.5 | 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<br>Endian | 1.2.840.10008.1.2   | SCU | None |
| GE Private DICOM RT Plan                | 1.2.840.113619.4.5.249            | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCU | None |
| 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<br>Endian | 1.2.840.10008.1.2   | SCU | None |
| NM Genie Private Data                   | 1.2.840.113619.4.27               | Explicit VR Little<br>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<br>Endian | 1.2.840.10008.1.2   | SCU | None |
| PET Advance Private Data                | 1.2.840.113619.4.30               | Explicit VR Little<br>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<br>Object           | 1.2.840.113619.4.26               | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCU | None |
| GE Private DICOM 3D<br>Object           | 1.2.840.113619.4.26               | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCU | None |
| GE Private DICOM 3D<br>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.<br>1   | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCU | None |
| Ultrasound Image Storage                | 1.2.840.10008.5.1.4.1.1.6.<br>1   | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Ultrasound Image Storage                | 1.2.840.10008.5.1.4.1.1.6.<br>1   | Explicit VR Big Endian       | 1.2.840.10008.1.2.2 | SCU | None |
| Ultrasound Multi-frame<br>Image Storage | 1.2.840.10008.5.1.4.1.1.3.<br>1   | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCU | None |
| Ultrasound Multi-frame<br>Image Storage | 1.2.840.10008.5.1.4.1.1.3.<br>1   | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Ultrasound Multi-frame<br>Image Storage | 1.2.840.10008.5.1.4.1.1.3.<br>1   | Explicit VR Big Endian       | 1.2.840.10008.1.2.2 | SCU | None |
| Ultrasound Image Storage<br>(Retired)   | 1.2.840.10008.5.1.4.1.1.6         | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCU | None |

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| 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 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 |
| Basic Text SR                                 | 1.2.840.10008.5.1.4.1.1.8.8.11 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| Basic Text SR                                 | 1.2.840.10008.5.1.4.1.1.8.8.11 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Basic Text SR                                 | 1.2.840.10008.5.1.4.1.1.8.8.11 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | None |
| Enhanced SR                                   | 1.2.840.10008.5.1.4.1.1.8.8.22 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| Enhanced SR                                   | 1.2.840.10008.5.1.4.1.1.8.8.22 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Enhanced SR                                   | 1.2.840.10008.5.1.4.1.1.8.8.22 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | None |
| Comprehensive SR                              | 1.2.840.10008.5.1.4.1.1.8.8.33 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| Comprehensive SR                              | 1.2.840.10008.5.1.4.1.1.8.8.33 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Comprehensive SR                              | 1.2.840.10008.5.1.4.1.1.8.8.33 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | None |
| Mammography CAD SR                            | 1.2.840.10008.5.1.4.1.1.8.8.50 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| Mammography CAD SR                            | 1.2.840.10008.5.1.4.1.1.8.8.50 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Mammography CAD SR                            | 1.2.840.10008.5.1.4.1.1.8.8.50 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCU | None |
| Grayscale Softcopy Presentation State Storage | 1.2.840.10008.5.1.4.1.1.1.1.1  | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCU | None |
| Grayscale Softcopy Presentation State Storage | 1.2.840.10008.5.1.4.1.1.1.1.1  | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Grayscale Softcopy Presentation State Storage | 1.2.840.10008.5.1.4.1.1.1.1.1  | 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 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 30 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 180 seconds.

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

### 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 by choosing "Get Exam" or "Get Series" or "Get Image" from the displayed REMOTE BROWSER (drag on drop the selection on the icon representing the Advantage Workstation 4.3 or click on the "Get" icon).

**Note:** The SCU will cancel the C-FIND by issuing a GFIND-CANCEL request after the reception of 500 studies. This number is configurable by the GE Field Engineer.

**Note:** The REMOTE BROWSER is able to display up to 1500 studies at a time when querying a set of remote DICOM AEs. This number is configurable by the GE Field Engineer.

#### 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

|   |
|---|
| <b>Presentation Context Table- Proposed</b> |
|---|

| Abstract Syntax                                    |                             | Transfer Syntax           |                     | Role | Extended Negotiation |
|--|-----------------------------|---------------------------|---------------------|------|----------------------|
| Name   | UID                         | Name List                 | UID List            |      |                      |
| 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 GFIND SCU supports an “Association Timer” and an “Operation Inactivity Timer”. These timers are defaulted to 30 and 90 seconds.

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

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 (current filter)          |
| Study Time                 | 0008,0030 | R    | Study times (current filter)          |
| Accession Number           | 0008,0050 | R    | Accession Number (current filter)     |
| Patient’s Name             | 0010,0010 | R    | Patient’s name (current filter)       |
| Patient ID                 | 0010,0020 | R    | Patient ID (current filter)           |
| Study ID                   | 0020,0010 | R    | Zero length                           |
| Study Instance UID         | 0020,000D | U    | Zero length                           |
| Modalities in Study        | 0008,0061 | O    | Requested modalities (current filter) |
| Referring Physician’s Name | 0008,0090 | O    | Zero length                           |
| Study Description          | 0008,1030 | O    | Zero length                           |
| Patient’s Birth Date       | 0010,0030 | O    | Zero length                           |
| Patient’s Sex              | 0010,0040 | O    | Zero length                           |

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       |
|---------------------|-----------|------|-------------|
| 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 |

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   |
| Content Date                   | 0008,0023 | O    | Zero length | All   |
| Content Time                   | 0008,0033 | O    | Zero length | All   |
| Operator's Name                | 0008,1070 | O    | Zero length | RTIMAGE<br>RTPLAN<br>RTSTRUCT                       |
| Recommended Display Frame Rate | 0008,2144 | O    | Zero length | RF  |
| Body Part Examined             | 0018,0015 | O    | Zero length | DX<br>MG  |
| Sequence Variant               | 0018,0021 | O    | Zero length | MR  |
| Slice Thickness                | 0018,0050 | O    | Zero length | CT<br>MR  |
| Repetition Time                | 0018,0080 | O    | Zero length | MR  |
| Echo Time                      | 0018,0081 | O    | Zero length | MR  |
| Inversion Time                 | 0018,0082 | O    | Zero length | MR  |
| Echo Number(s)                 | 0018,0086 | O    | Zero length | MR  |
| Spacing Between Slices         | 0018,0088 | O    | Zero length | MR  |
| Data Collection Diameter       | 0018,0090 | O    | Zero length | CT  |
| Trigger Time                   | 0018,1060 | O    | Zero length | MR  |
| Reconstruction Diameter        | 0018,1100 | O    | Zero length | CT<br>MR  |
| Gantry Detector Tilt           | 0018,1120 | O    | Zero length | CT  |
| Radiation Setting              | 0018,1155 | O    | Zero length | RF  |
| Convolution Kernel             | 0018,1210 | O    | Zero length | CT  |
| Flip Angle                     | 0018,1314 | O    | Zero length | MR  |
| Image Orientation (Patient)    | 0020,0037 | O    | Zero length | CT  |
| Image Laterality               | 0020,0062 | O    | Zero length | DX<br>MG  |
| Slice Location                 | 0020,1041 | O    | Zero length | CT<br>MR  |
| Image Comments                 | 0020,4000 | O    | Zero length | CR<br>All in case of<br>Secondary<br>Capture images |
| Number of Frames               | 0028,0008 | O    | Zero length | RF<br>NM<br>PT<br>US<br>XA                          |
| Rows                           | 0028,0010 | O    | Zero length | CT<br>MR<br>RF<br>NM<br>PT<br>US<br>XA              |

| Description                | Tag       | Type | Value       | Modality                               |
|----------------------------|-----------|------|-------------|--|
| Columns                    | 0028,0011 | O    | Zero length | CT<br>MR<br>RF<br>NM<br>PT<br>US<br>XA |
| Completion Flag            | 0040,A491 | O    | Zero length | SR                                     |
| Verification Flag          | 0040,A493 | O    | Zero length | SR                                     |
| Content Label              | 0070,0080 | O    | Zero length | PR                                     |
| Content Description        | 0070,0081 | O    | Zero length | PR                                     |
| Presentation Creation Date | 0070,0082 | O    | Zero length | PR                                     |
| Presentation Creation Time | 0070,0083 | O    | Zero length | PR                                     |
| Content Creator's Name     | 0070,0084 | O    | Zero length | PR                                     |
| RT Image Label             | 3002,0002 | O    | Zero length | RTIMAGE                                |
| RT Image Name              | 3002,0003 | O    | Zero length | RTIMAGE                                |
| Structure Set Label        | 3006,0002 | O    | Zero length | RTSTRUCT                               |
| Structure Set Name         | 3006,0004 | O    | Zero length | RTSTRUCT                               |
| RT Plan Label              | 300A,0002 | O    | Zero length | RTPLAN                                 |
| RT Plan Name               | 300A,0003 | O    | Zero length | RTPLAN                                 |

**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 and Images. Once the list of list of Studies, Series and Images is retrieved, the operator can invoke the “Retrieve” operation by choosing “Get Exam” or “Get Series” or “Get Image” from the displayed REMOTE BROWSER (drag on drop the selection on the icon representing the Advantage Workstation 4.3 or click on the “Get” icon).

**2.3.1.1.7.2 Association Initiation Policy**

The DICOM SERVER AE initiates a new association for retrieving Studies, Series and Images 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 “Get Study” or “Get Series” or “Get Image”, 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 GMOVE SCU supports an “Association Timer” and an “Operation Inactivity Timer”. These timers are defaulted to 30 and 600 seconds.

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.

When receiving a Cancel request response (0xFE00), the DICOM Server AE will release the association.

**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 Advantage Workstation 4.3 and the declaration of the images in the database of the same station.

**2.3.1.1.8.2 Association Initiation Policy**

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

**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 Negotiation |
| Name                                 | UID                       | Name List                 | UID List            |      |                      |
| 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                 |
| 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                 | 1.2.840.10008.5.1.4.1.1.1 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCP  | None                 |

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|--|-------------------------------|---------------------------|---------------------|-----|------|
| Image Storage                                  |                               |                           |                     |     |      |
| 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               | 1.2.840.10008.5.1.4.1.1.1.2.1 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| X-Ray Angiographic Image Storage               | 1.2.840.10008.5.1.4.1.1.1.2.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| X-Ray Angiographic Image Storage               | 1.2.840.10008.5.1.4.1.1.1.2.1 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCP | None |
| X-Ray Radiofluoroscopic Image Storage          | 1.2.840.10008.5.1.4.1.1.1.2.2 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| X-Ray Radiofluoroscopic Image Storage          | 1.2.840.10008.5.1.4.1.1.1.2.2 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| X-Ray Radiofluoroscopic Image Storage          | 1.2.840.10008.5.1.4.1.1.1.2.2 | 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 - 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 | SCP | 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 | SCP | None |

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|--|-------------------------------|---------------------------|---------------------|-----|------|
| 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                             | 1.2.840.10008.5.1.4.1.1.2.0   | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| Nuclear Medicine Image Storage                             | 1.2.840.10008.5.1.4.1.1.2.0   | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Nuclear Medicine Image Storage                             | 1.2.840.10008.5.1.4.1.1.2.0   | 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                 | 1.2.840.10008.5.1.4.1.1.1.28  | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| Positron Emission Tomography Image Storage                 | 1.2.840.10008.5.1.4.1.1.1.28  | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Positron Emission Tomography Image Storage                 | 1.2.840.10008.5.1.4.1.1.1.28  | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCP | None |
| Standalone PET Curve Storage                               | 1.2.840.10008.5.1.4.1.1.1.29  | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| 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 |

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|   |                                   |                              |                     |     |      |
|---|-----------------------------------|------------------------------|---------------------|-----|------|
| Storage                                 | 29                                |                              |                     |     |      |
| RT Image Information Storage            | 1.2.840.10008.5.1.4.1.1.4<br>81.1 | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCP | None |
| RT Image Information Storage            | 1.2.840.10008.5.1.4.1.1.4<br>81.1 | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCP | None |
| RT Image Information Storage            | 1.2.840.10008.5.1.4.1.1.4<br>81.1 | Explicit VR Big Endian       | 1.2.840.10008.1.2.2 | SCP | None |
| RT Structure Set Information<br>Storage | 1.2.840.10008.5.1.4.1.1.4<br>81.3 | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCP | None |
| RT Structure Set Information<br>Storage | 1.2.840.10008.5.1.4.1.1.4<br>81.3 | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCP | None |
| RT Structure Set Information<br>Storage | 1.2.840.10008.5.1.4.1.1.4<br>81.3 | Explicit VR Big Endian       | 1.2.840.10008.1.2.2 | SCP | None |
| RT Plan Information Storage             | 1.2.840.10008.5.1.4.1.1.4<br>81.5 | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCP | None |
| RT Plan Information Storage             | 1.2.840.10008.5.1.4.1.1.4<br>81.5 | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCP | None |
| RT Plan Information Storage             | 1.2.840.10008.5.1.4.1.1.4<br>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<br>Endian | 1.2.840.10008.1.2   | SCP | None |
| GE Private DICOM RT Plan                | 1.2.840.113619.4.5.249            | Explicit VR Little<br>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<br>Endian | 1.2.840.10008.1.2   | SCP | None |
| NM Genie Private Data                   | 1.2.840.113619.4.27               | Explicit VR Little<br>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<br>Endian | 1.2.840.10008.1.2   | SCP | None |
| PET Advance Private Data                | 1.2.840.113619.4.30               | Explicit VR Little<br>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<br>Object           | 1.2.840.113619.4.26               | Implicit VR Little<br>Endian | 1.2.840.10008.1.2   | SCP | None |
| GE Private DICOM 3D<br>Object           | 1.2.840.113619.4.26               | Explicit VR Little<br>Endian | 1.2.840.10008.1.2.1 | SCP | None |
| GE Private DICOM 3D<br>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.        | Implicit VR Little           | 1.2.840.10008.1.2   | SCP | None |

|                                      |                                |                           |                     |     |      |
|--------------------------------------|--------------------------------|---------------------------|---------------------|-----|------|
|                                      | 1                              | Endian                    |                     |     |      |
| 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 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 |
| Basic Text SR                        | 1.2.840.10008.5.1.4.1.1.8.8.11 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| Basic Text SR                        | 1.2.840.10008.5.1.4.1.1.8.8.11 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Basic Text SR                        | 1.2.840.10008.5.1.4.1.1.8.8.11 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCP | None |
| Enhanced SR                          | 1.2.840.10008.5.1.4.1.1.8.8.22 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| Enhanced SR                          | 1.2.840.10008.5.1.4.1.1.8.8.22 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Enhanced SR                          | 1.2.840.10008.5.1.4.1.1.8.8.22 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCP | None |
| Comprehensive SR                     | 1.2.840.10008.5.1.4.1.1.8.8.33 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| Comprehensive SR                     | 1.2.840.10008.5.1.4.1.1.8.8.33 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Comprehensive SR                     | 1.2.840.10008.5.1.4.1.1.8.8.33 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCP | None |
| Mammography CAD SR                   | 1.2.840.10008.5.1.4.1.1.8      | Implicit VR Little        | 1.2.840.10008.1.2   | SCP | None |

|                    |                                   |                           |                     |     |      |
|--------------------|-----------------------------------|---------------------------|---------------------|-----|------|
|                    | 8.50                              | Endian                    |                     |     |      |
| Mammography CAD SR | 1.2.840.10008.5.1.4.1.1.8<br>8.50 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Mammography CAD SR | 1.2.840.10008.5.1.4.1.1.8<br>8.50 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCP | None |

**Note:** The SCP does not have a default acceptance policy if more than one acceptable transfer syntax is proposed by the SCU. It is the responsibility of the SCU to make a selection from more than one presentation context accepted.

**Note:** The Grayscale Softcopy Presentation State Storage abstract syntax is accepted but the basic Advantage Workstation 4.3 applications do not manage this object.

**2.3.1.1.8.3.1 SOP Specific Conformance to Storage SOP Classes**

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 605 seconds.

**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 Advantage Workstation 4.3.

In the event of a successful C-STORE operation, the image has successfully been written to disk, but may not have been declared in the database. Indeed, **the successful status code is returned before the image declaration since it is assumed that if the image is written on the disk it has no reason not to be declared. Thus, if the declaration failed the association is aborted.**

The image will then be accessed in the same manner as any other image by the applications on the Advantage Workstation 4.3.

Images may be deleted when instructed to do so by the user. The users of the Advantage Workstation 4.3 determine the duration of the storage of the image.

When a C-STORE operation returns Error, a message will appear in the browser informing the user of a failure.

**Image Declaration phase:**

**Note:** To be displayed in the Viewer an image containing overlay planes defined in the high bits of the pixels (7FE0,0010) must fulfill the following conditions:

- the pixels are unsigned integers (0028,0103),
- the pixel allocated bits is equal to 16 (0028,0100)
- the overlay sizes, (60xx,0010) and (60xx,0011), are equal to the image size, (0028,0010) and (0028,0011)
- the overlay origins (60xx,0050) are equal to  $x=1$ ,  $y=1$ ,
- if the pixels have the same bit ordering than the image (0002,0010) or the overlay allocated bits (60xx,0100) are equal to the pixel allocated bits (0028,0100) i.e. 16, see above

**Note:** To be displayed in the Viewer an image containing overlay planes defined in the header fields (60xx, 3000) must fulfill the following conditions:

- the file contains a single frame (0028,0008),
- the overlay origins (60xx,0050) are equal to  $x=1$ ,  $y=1$ ,
- the sizes of all overlays, (60xx,0010) and (60xx,0011), are equal to the image size, (0028,0010) and (0028,0011)

**Note:** Only the 8 first overlay planes can be displayed in the Viewer.

**Note:** The Viewer does not support multi-frame overlays ((60xx, 0015) and (60xx, 0051))

**Note:** Images that have the fields Patient's Name (0010,0010) and Patient ID (0010,0020) empty are accepted into the local database.

**Note:** If the pixel size is available measurement algorithm uses:

- either because defined in the image header
  - (0008,2111) for combined images
  - (0018,1164) or (0028,0030) if the first one is undefined, for CR images
  - (0018,1164) for Senovision, DX and MG images
  - (0028,0030) for other images
  - (no header field is used for XA and RF images)
- either because the end user has calibrated the image, measurements shall be indicated in millimeters for distance or square millimeters for areas. Otherwise, they shall be indicated in pixels or square pixels.

**Note:** Standalone Overlay Storage SOP Class instances will be formatted into Secondary Capture SOP Class instances when installed on the Advantage Workstation 4.3.

**Note:** All kind of color images are stored by the Advantage Workstation 4.3, but only images that have a photometric interpretation (0028,0004) equal to "MONOCHROME 1",

“MONOCHROME 2”, “PALETTE COLOR” or “RGB” with planar configuration (0028,0006) equal to 0 (color by pixel) or 1 (color by plane) are displayable.

- Note:** Modality LUT will be ignored by the Advantage Workstation 4.3.
- Note:** Images with non-square pixels are not handled correctly by the Advantage Workstation 4.3.
- Note:** No optional data elements (Type 3) or filled data elements (Type 2) are required to be declared on the Advantage Workstation 4.3.
- Note:** When 2 images have the same DICOM Instance UID, the latest image received will overwrite the first received image if it has the same patient/study/series identifiers. It will be refused otherwise.
- Note:** AW annotates the contrast agent “+C” on the CT and MR images with the following algorithm:

If the manufacturer is “GE Medical Systems” then if the Contrast Agent (0018,0010) is valued and has a value different from “NONE” and if the Contrast Route (0018,0040) is valued and contains “IV” then “+C”

Otherwise if the manufacturer is not “GE Medical Systems” then, if the Contrast Agent (0018,0010) is valued and has a value different from “NONE” then “+C”.

#### **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 syntax 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 CFIND response message with a status of

“pending” for each matching entry and send a CFIND 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 Initiation Policy**

The DICOM SERVER AE refuses the association if they are too many opened connections.

**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 Negotiation |
| Name   | UID                         | Name List                 | UID List            |      |                      |
| 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 605 seconds. This timer corresponds to the number of seconds to wait when data between TCP/IP packets are transferred.

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 |
|--------------|-------------|---|----------|

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                   |
|----------------------------|--------------|------|----------|----------------------------|
| SOP Class UID              | (0008,0016)  | R    | Matched  | All                        |
| Instance Number            | (0020,0013)  | R    | Matched  | All                        |
| SOP Instance UID           | (0008,0018)  | U    | Matched  | All                        |
| Image Date                 | (0008,0023)  | O    | Returned | All                        |
| Image Time                 | (0008,0033)  | O    | Returned | All                        |
| Number of Frames           | (0028,0008)  | O    | Returned | RF<br>NM<br>PT<br>US<br>XA |
| Completion Flag            | (0040,A491)  | O    | Matched  | SR                         |
| Verification Flag          | (0040, A493) | O    | Matched  | SR                         |
| Content Label              | (0070,0080)  | O    | Returned | PR                         |
| Content Description        | (0070,0081)  | O    | Returned | PR                         |
| Presentation Creation Date | (0070,0082)  | O    | Returned | PR                         |
| Presentation Creation Time | (0070,0083)  | O    | Returned | PR                         |
| Content Creator's Name     | (0070,0084)  | O    | Returned | PR                         |

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. Therefore, the C-FIND SCP will not perform any extended negotiation.

During the C-FIND SCP, the DICM 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 too many connections are open at the same time.
- 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 Initiation 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 Advantage Workstation 4.3.

**2.3.1.1.10.3 Presentation Context Table**

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

| Presentation Context Table                         |                             |                           |                     |      |                      |
|--|-----------------------------|---------------------------|---------------------|------|----------------------|
| 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   | SCP  | 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 | SCP  | 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 | SCP  | None                 |

|  |                             |                           |                     |     |      |
|--|-----------------------------|---------------------------|---------------------|-----|------|
| Patient Root Query/Retrieve Information Model - MOVE | 1.2.840.10008.5.1.4.1.2.1.2 | Implicit VR Little Endian | 1.2.840.10008.1.2   | SCP | None |
| Patient Root Query/Retrieve Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.1.2 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Patient Root Query/Retrieve Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.1.2 | Explicit VR Big Endian    | 1.2.840.10008.1.2.2 | SCP | None |

**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 and Patient-root C-MOVE Service Class SCP.

Each C-MOVE SCP operation supports an “Operation Inactivity Timer” with a time out value of 605 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 every seven seconds.

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  |
| 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 Image Information Storage                               | 1.2.840.10008.5.1.4.1.1.481.1 |

|  |                               |
|--|-------------------------------|
| RT Structure Set Information Storage           | 1.2.840.10008.5.1.4.1.1.481.3 |
| RT Plan Information 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 |
| Mammography CAD SR                             | 1.2.840.10008.5.1.4.1.1.88.50 |
| Grayscale Softcopy Presentation State          | 1.2.840.10008.5.1.4.1.1.11.1  |

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

- 0xFE00: (C-Move Cancel Request Received) when the CMOVE 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**

All protocols detailed above in the tables are supported, no priority selection is given.

**2.3.2 DICOM STORAGE COMMITMENT SERVER AE Specification**

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

| SOP Class Name                | SOP Class UID        |
|-------------------------------|----------------------|
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 |

**2.3.2.1 Association Establishment Policies**

**2.3.2.1.1 General**

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

|                                 |                              |
|---------------------------------|------------------------------|
| <b>Application Context Name</b> | <b>1.2.840.10008.3.1.1.1</b> |
|---------------------------------|------------------------------|

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:

|                           |                    |
|---------------------------|--------------------|
| <b>Maximum Length PDU</b> | <b>28672 Bytes</b> |
|---------------------------|--------------------|

The SOP Class Extended Negotiation is not supported.

The maximum number of Presentation Context Items that will be proposed is 1

The user information Items sent by this product are:

- Maximum PDU Length
- Implementation UID

**2.3.2.1.2 Number of Associations**

The DICOM STORAGE COMMITMENT SERVER AE will initiate only one DICOM association at a time to perform a DICOM storage commitment operation as a SCU to a Remote DICOM AE.

The DICOM STORAGE COMMITMENT SERVER AE can have a maximum of 2 open DICOM associations at a time to perform a DICOM storage commitment operation as a SCU during Role/selection negotiation.

**2.3.2.1.3 Asynchronous Nature**

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

**2.3.2.1.4 Implementation Identifying Information**

The Implementation UID for this DICOM Implementation is:

|   |                             |
|---|-----------------------------|
| <b>Advantage Workstation 4.3.Implementation UID</b> | <b>1.2.840.113619.6.181</b> |
|---|-----------------------------|

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

**2.3.2.1.5.1 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 icon representing then Remote DICOM

AE, or click on the “Push” icon and select a Remote DICOM AE in the LIST OF REMOTE HOST. The user can also decide to use the ‘end review’ paradigm to send a set of series of the same patient.

This operation will cause the following actions:

- The Advantage Workstation 4.3 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 asks the DICOM STORAGE COMMITMENT SERVER AE to commit all the images that have been successfully sent.
- The DICOM STORAGE COMMITMENT SERVER AE initiates a DICOM association, negotiates with the Remote AE an appropriate Abstract and Transfer Syntax.
- If the negotiation is successful, the DICOM STORAGE COMMITMENT SERVER AE emits a N-ACTION request. Only one N-ACTION request is sent for all images to be committed.
- If the DICOM STORAGE COMMITMENT SERVER AE receives a successful N-ACTION RSP, the server waits a configurable period of time (default = 10s) for the reception of a N\_EVENT\_REPORT. (See section *Real-World Activity “Listen to remote Storage Commitment SCP”*)

**2.3.2.1.5.2 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”

**2.3.2.1.5.3 Proposed Presentation Context**

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

**2.3.2.1.5.3.1 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 and a pop-up is displayed to the user.

If the received N-ACTION Response from the Storage Commitment Provider has a success status, the DICOM STORAGE COMMITMENT SERVER AE waits for an N-EVENT-REPORT during a configurable period of time. This period is set to 10s by default.

The DICOM STORAGE COMMITMENT 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”*).

**2.3.2.1.6 Real-World Activity: Listen to remote Storage Commitment SCP**

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

**2.3.2.1.6.1 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.

**2.3.2.1.6.2 Association Initiation Policy**

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

**2.3.2.1.6.3 Proposed Presentation Context**

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

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

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 STORAGE COMMITMENT 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.

**2.3.2.1.7 Real-World Activity: Open periodic association**

**2.3.2.1.7.1 Associated Real-World Activity**

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

The system periodically scans the configuration file and opens an “empty” association with all the Remote DICOM AE declared as Storage Commitment Provider.

This periodic association enables a Storage Commitment Provider to send an N\_EVENT\_REPORT during a standard association negotiation.

This operation will cause the following actions:

- The DICOM STORAGE COMMITMENT SERVER AE initiates a DICOM association, negotiates with the Remote AE an appropriate Abstract and Transfer Syntax.
- If the negotiation is successful, the DICOM STORAGE COMMITMENT SERVER AE waits a configurable period of time (default = 10s) for the reception of a N\_EVENT\_REPORT. (See section *Real-World Activity “Listen to remote Storage Commitment SCP”*)

**2.3.2.1.7.2 Association Initiation Policy**

After the association negotiation, the DICOM STORAGE COMMITMENT SERVER AE waits for an incoming N\_EVENT\_REPORT.

2.3.2.1.7.3 Proposed Presentation Context

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

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

If the received NACTION Response from the Storage Commitment Provider has a failure status, an error file is logged, the Storage Commitment is abandoned and a pop-up is displayed to the user.

If the received N-ACTION Response from the Storage Commitment Provider has a success status, the DICOM STORAGE COMMITMENT SERVER AE waits for an N-EVENT-REPORT during a configurable period of time. This period is set to 10s by default.

The DICOM STORAGE COMMITMENT 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"*).

2.4 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 Advantage Workstation 4.3, 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**

Some Private SOP Classes can be used by this product but are not exported outside of the station and so are not described below.

##### **2.5.1.1 Private SOP Class GE DICOM Private 3D object**

This SOP Class is described in document with Direction Number: 2198583-100

##### **2.5.1.2 Private SOP Class GE DICOM RT Plan**

This SOP Class is described in document with Direction Number 2180316-100.

##### **2.5.1.3 Extended Enhanced SR object**

The extension of this SOP Class is described in paragraph 7 - ENHANCED SR INFORMATION OBJECT IMPLEMENTATION.

The Enhanced DICOM SR does not implement the TID 2000 but the private ELECTRONIC FILM TID. Refer to §7.

##### **2.5.1.4 Extended Secondary Capture object**

The extension of this SOP Class is described in paragraph 6 - SC INFORMATION OBJECT IMPLEMENTATION.

#### **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.

##### **DICOM.SERVER.AE**

The Local AE Title is set to hostname.

##### **DICOM.STORAGE.COMMITMENT.SERVER.AE**

The Local AE Title is set to SCU\_hostname.

**Note :** The GE Field Engineer can update the DICOM STORAGE COMMITMENT SERVER AET in a configuration file.

### 2.6.2 Configurable Parameters

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

- Local AET
- 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 the DICOM STORAGE COMMITMENT 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 configurable and set to **4008**.

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

**Note :** A GE Field Engineer must perform all configurations.

### 2.7 SUPPORT OF EXTENDED CHARACTER SETS

The Advantage Workstation 4.3 will support only the ISO\_IR 100 (ISO 8859-1:1987 Latin alphabet N 1. supplementary set) as extended character sets.

### 3. MEDIA STORAGE CONFORMANCE STATEMENT

#### 3.1 INTRODUCTION

This section of the conformance statement (CS) specifies the Advantage Workstation 4.3 compliance to DICOM Media Interchange. It details the DICOM Media Storage Application Profiles and roles that are supported by this product.

This station provides capabilities to DICOM interchange on MODs (Magneto Optical Disk), CD-Rs (Compact Disc-Recordable) and DVDs (Digital Versatile Disc) with different application profiles supported. The Advantage Workstation 4.3 Core Software provides the DICOM interchange capability for all the applications that may be used on the Advantage Workstation 4.3 basis. Please, refer to the DICOM conformance statement of each added application for a complete description of their compliance to DICOM.

**Note:** Due to technology issues, it is possible that some types of DVDs cannot be read or burnt on the Advantage Workstation 4.3. The function of reading and generating DICOM interchange DVDs is also dependent of the hardware on which the Advantage Workstation 4.3 release is installed.

**Note:** The format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

#### 3.2 IMPLEMENTATION MODEL

##### 3.2.1 Application Data Flow Diagram

The Basic and Specific Application models for the CD and DVD devices are shown in the following Illustrations:

##### SPECIFIC AE APPLICATION MODEL FOR THE CD/DVD DEVICE

- Description of the data Flow Diagram for the CD and DVD devices.

The CD/DVD DICOM Media Server Application Entity (AE) handles the DICOM CREATE CD/RESTORE CD functionality for the CD-R device as well as the DICOM CREATE DVD/RESTORE DVD functionality for the DVD+/-RW device. The CD/DVD DICOM Media Server Application Entity (AE) is commanded by the user to perform DICOM services operating on the DICOM media through the use of buttons and menu selections on the graphical user interface of the station.

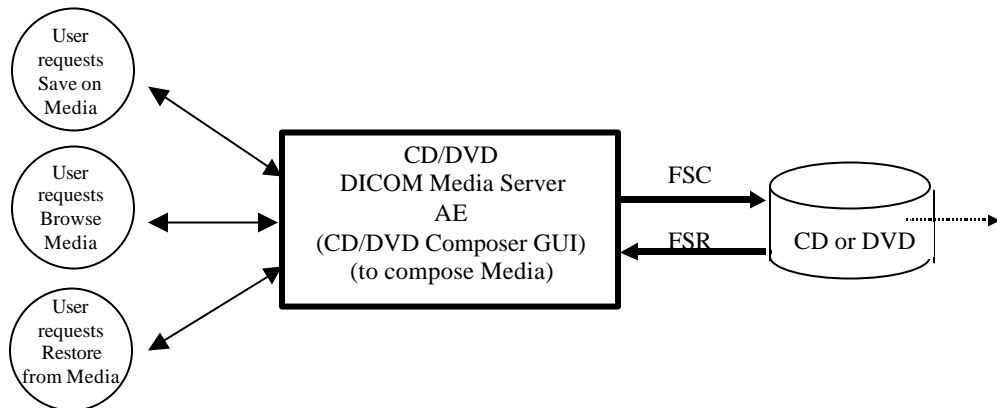
The user selects the type of media (either CD or DVD) and then requests the creation of a DICOM File Set and the writing of this DICOM File Set on blank media by selecting images in the local Browser and inserting them in the Media Composer. Then, the images of the different media to burn will be generated. Once the generation has been done, the user can ask to burn the complete set of data on one or more media of the same type (CD or DVD)

The user can request the reading of a DICOM file set written on an interchange media by selecting the CD/DVD drive as the active device, and browsing the media using the "Query" Item of the device drop down menu, and then restore the selected items by a dragand drop on the local browser icon or by clicking on the suitable restore buttons.

The Application models for the CD/DVD device are shown in illustration 3.1:

CD/DVD DICOM Media Server AE Model

Illustration 3.1



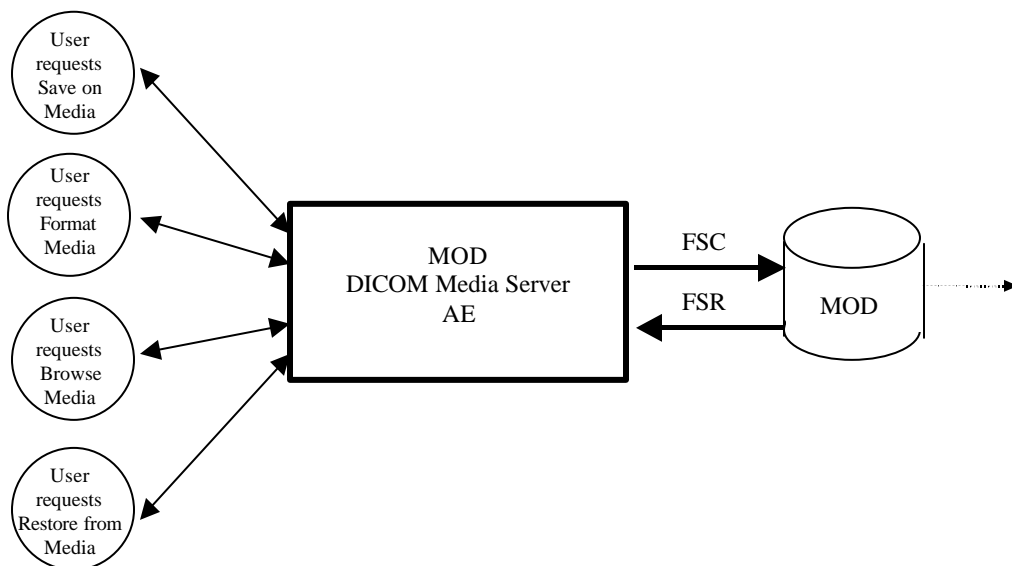
- Description of the data Flow Diagram for the MOD device.

The MOD DICOM Media Server Application Entity (AE) handles the DICOM RESTORE MOD functionality for the MOD device. The MOD DICOM Media Server Application Entity (AE) is commanded by the user to perform DICOM services operating on the DICOM media through the use of buttons and menu selections on the graphical user interface of the station.

The user can request the reading of a DICOM file set written on a MOD by selecting the MOD drive and browsing the media using the “Query” Item of the Media pull down menu, and then restore the selected items by a drag and drop on the local browser icon or by clicking on the suitable restore buttons

MOD DICOM Media Server AE Model

Illustration 3-2



**3.2.2 Functional Definition of AE's**

**3.2.3 Functional Definition of the DICOM Media Server AE**

**3.2.3.1 Functional definition of the CD/DVD DICOM Media Server AE**

The CD/DVD DICOM Media Server Application Entity supports the following functions:

- Has access to patient demo graphics and pixel data in the local database.
- Can generate a DICOM File Set (FSC) in a one shot activity.
- Can write a DICOM File Set (FSC) on a CD-R, DVD-R, DVD+R, DVD+RW
- Can read a DICOM File Set (FSR) on CD-R, CDROM, DVD-R, DVD+R, DVD-RW, DVD+RW, DVDROM

**Note :** Due to technology issues, it is possible that some types of DVDs cannot be read or burnt on the Advantage Workstation 4.3. The function of reading and generating DICOM interchange DVDs is also dependent of the hardware on which the Advantage Workstation 4.3 release is installed.

**3.2.3.2 Functional definition of the MOD DICOM Media Server AE**

The MOD DICOM Media Server Application Entity supports the following functions:

- Has access to patient demographics and pixel data in the local database.
- Can generate a DICOM File Set (FSC) for CT, MR and Secondary Capture that has the CT or MR modality.
- Can write a DICOM File Set (FSC) on a MOD. The write can empty the DICOM File Set that corresponds to a format of the MOD media or can add new Patient Folders/Studies/Series/Images.
- Can read a DICOM File Set (FSR) on a MOD.

**3.2.4 Sequencing Requirements**

For writing on empty MODs, it is necessary to format the MOD before the user can request for writing images on MOD.

For writing on CD or DVD, it is necessary to use blank media. The support of media depends of the hardware that is used.

**3.3 AE SPECIFICATIONS**

**3.3.1 DICOM CD/DVD SERVER AE Specification**

The DICOM CD/DVD SERVER Application Entity provides standard conformance to DICOM Interchange Option of the Media Storage Service Class. The application Profiles and roles are listed below.

| Supported Application Profile          | Real World Activity | Role | Description |
|--|---------------------|------|-------------|
| STD-GEN-CD<br>AUG-XABC-CD, STD-XABC-CD | Browse CD           | FSR  | Interchange |

|  |            |     |             |
|--|------------|-----|-------------|
| STD-GEN-CD<br>AUG-XABC-CD, STD-XABC-CD | Restore CD | FSR | Interchange |
| STD-GEN-CD<br>AUG-XABC-CD              | Create CD  | FSC | Interchange |
| STD-GEN-DVD-JPEG                       | Browse DVD | FSR | Interchange |
| STD-GEN-DVD-JPEG                       | Create DVD | FSC | Interchange |

**Note:** The DICOM CD/DVD Media Server AE is able to create CDRoms following the AUG-XABC-CD profile. This profile is obtained by augmenting the STD-XABC-CD application profile (See §3.4.1.1).

**Note:** Advantage Workstation 4.3 does not support some compression algorithms yet, so it is not strictly compliant with the File Set Reader activities for DVDs although it is able to read the DVD created by itself.

**3.3.1.1 File Meta Information for the DICOM CD/DVD Application Entity**

Following are the values set in the File Meta Information for this AE Title:

|  |   |
|--|---|
| <b>Implementation Class UID</b>        | <b>1.2.840.113619.6.181</b>   |
| <b>Implementation Version Name</b>     | <b>The Implementation Version Name is set dynamically through an environment variable</b> |
| <b>Source Application Entity Title</b> | <b>The Source Application Entity Title is derived from the hostname</b>                   |

**3.3.1.2 Real-World Activities for the DICOM CD/DVD Application Entity**

**3.3.1.2.1 Real-World Activity (RWA) "Browse Media"**

The CD/DVD DICOM Media Server AE acts as an FSR using the interchange option when requested to browse the media.

When the CD/DVD DICOM Media Server AE is requested to provide a directory listing, it reads the File-set and displays the DICOMDIR directory entries, according to the PATIENT, STUDY, SERIES, IMAGE paradigm.

If the DICOMDIR file is not found in the File-set, the media is ejected of the drive.

**3.3.1.2.1.1 Media Storage Application Profile for the RWA "Browse Media":**

For the list of Application Profiles that invoke this AE for the Browse Media RWA, see the Table in Section 3.3.1

**3.3.1.2.1.1.1 Options:**

Following are the SOP Classes supported by the RWA "Browse Media":

| Information Object Definition   | SOP Class UID        | Transfer Syntax           | Transfer Syntax UID |
|---------------------------------|----------------------|---------------------------|---------------------|
| Media Storage Directory Storage | 1.2.840.10008.1.3.10 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |

**3.3.1.2.2 Real-World Activity (RWA) "Restore Media"**

The CD/DVD DICOM Media Server AE acts as an FSR using the interchange option when requested to copy SOP instances from the media to the local database.

The user selects the SOP instances that he wants the CD/DVD DICOM Media Server AE to copy on the local database by a drag and drop on the local browser icon or by clicking on the suitable restore buttons. Once selected, the SOP instances are copied from the media to the local database.

Only, the SOP classes supported by the station are declared to the database in a transfer syntax supported by the station.

**3.3.1.2.2.1 Media Storage Application Profile for the RWA "Restore Media":**

For the list of Application Profiles that invoke this AE for the Restore Media RWA, see the Table in Section 3.3.1.

**3.3.1.2.2.1.1 Options:**

Following are the SOP Classes supported by the RWA "Restore Media":

| Information Object Definition       | SOP Class UID             | Transfer Syntax   | Transfer Syntax UID    |
|-------------------------------------|---------------------------|---|------------------------|
| Computed Radiographic Image Storage | 1.2.840.10008.5.1.4.1.1.1 | Explicit VR Little Endian                                       | 1.2.840.10008.1.2.1    |
|                                     |                           | JPEG Lossless Process 14 (selection value 1)                    | 1.2.840.10008.1.2.4.70 |
|                                     |                           | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) | 1.2.840.10008.1.2.4.50 |
|                                     |                           | JPEG Lossy Extended (Process 2 & 4)                             | 1.2.840.10008.1.2.4.51 |
| CT Image Storage                    | 1.2.840.10008.5.1.4.1.1.2 | Explicit VR Little Endian                                       | 1.2.840.10008.1.2.1    |
|                                     |                           | JPEG Lossless Process 14 (selection value 1)                    | 1.2.840.10008.1.2.4.70 |
|                                     |                           | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) | 1.2.840.10008.1.2.4.50 |
|                                     |                           | JPEG Lossy Extended (Process 2 & 4)                             | 1.2.840.10008.1.2.4.51 |
| MR Image Storage                    | 1.2.840.10008.5.1.4.1.1.4 | Explicit VR Little Endian                                       | 1.2.840.10008.1.2.1    |

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|  |                              |   |
|--|------------------------------|---|
|  |                              | <p>JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70</p> <p>JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50</p> <p>JPEG Lossy Extended (Process 2 &amp; 4) 1.2.840.10008.1.2.4.51</p>  |
| Xray Angiographic Image Storage                | 1.2.840.10008.5.1.4.1.1.12.1 | <p>Explicit VR Little Endian 1.2.840.10008.1.2.1</p> <p>JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70</p> <p>JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50</p> <p>JPEG Lossy Extended (Process 2 &amp; 4) 1.2.840.10008.1.2.4.51</p> |
| Xray Radiofluoroscopic Image Storage           | 1.2.840.10008.5.1.4.1.1.12.2 | <p>Explicit VR Little Endian 1.2.840.10008.1.2.1</p> <p>JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70</p> <p>JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50</p> <p>JPEG Lossy Extended (Process 2 &amp; 4) 1.2.840.10008.1.2.4.51</p> |
| Secondary Capture Image Storage                | 1.2.840.10008.5.1.4.1.1.7    | <p>Explicit VR Little Endian 1.2.840.10008.1.2.1</p> <p>JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70</p> <p>JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50</p> <p>JPEG Lossy Extended (Process 2 &amp; 4) 1.2.840.10008.1.2.4.51</p> |
| Digital X-Ray Image Storage - For Presentation | 1.2.840.10008.5.1.4.1.1.1.1  | <p>Explicit VR Little Endian 1.2.840.10008.1.2.1</p> <p>JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70</p> <p>JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50</p>   |

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|  |                               |  |
|--|-------------------------------|--|
|  |                               | JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4)  |
| 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<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)<br><br>JPEG Lossy, Baseline 1.2.840.10008.1.2.4.50<br>Sequential with Huffman<br>Coding (process 1)<br><br>JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4) |
| 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<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)<br><br>JPEG Lossy, Baseline 1.2.840.10008.1.2.4.50<br>Sequential with Huffman<br>Coding (process 1)<br><br>JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4) |
| 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<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)<br><br>JPEG Lossy, Baseline 1.2.840.10008.1.2.4.50<br>Sequential with Huffman<br>Coding (process 1)<br><br>JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4) |
| 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<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)<br><br>JPEG Lossy, Baseline 1.2.840.10008.1.2.4.50<br>Sequential with Huffman<br>Coding (process 1)<br><br>JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4) |
| Standalone Curve Storage                                   | 1.2.840.10008.5.1.4.1.1.9     | Explicit VR Little Endian 1.2.840.10008.1.2.1  |

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|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| 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  |  |
|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| 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  |  |
|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| 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  |  |
|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| RT Structure Set Storage                   | 1.2.840.10008.5.1.4.1.1.481.3 | Explicit VR Little Endian 1.2.840.10008.1.2.1  |  |
|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |

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|                            |                               | JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4)  |
| 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<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)<br><br>JPEG Lossy, Baseline 1.2.840.10008.1.2.4.50<br>Sequential with Huffman<br>Coding (process 1)<br><br>JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4) |
| GE Private DICOM RT Plan   | 1.2.840.113619.4.5.249        | Explicit VR Little Endian 1.2.840.10008.1.2.1<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)<br><br>JPEG Lossy, Baseline 1.2.840.10008.1.2.4.50<br>Sequential with Huffman<br>Coding (process 1)<br><br>JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4) |
| NM Genie Private Data      | 1.2.840.113619.4.27           | Explicit VR Little Endian 1.2.840.10008.1.2.1<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)<br><br>JPEG Lossy, Baseline 1.2.840.10008.1.2.4.50<br>Sequential with Huffman<br>Coding (process 1)<br><br>JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4) |
| PET Advance Private Data   | 1.2.840.113619.4.30           | Explicit VR Little Endian 1.2.840.10008.1.2.1<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)<br><br>JPEG Lossy, Baseline 1.2.840.10008.1.2.4.50<br>Sequential with Huffman<br>Coding (process 1)<br><br>JPEG Lossy Extended 1.2.840.10008.1.2.4.51<br>(Process 2 & 4) |
| GE Private DICOM 3D object | 1.2.840.113619.4.26           | Explicit VR Little Endian 1.2.840.10008.1.2.1<br><br>JPEG Lossless Process 14 1.2.840.10008.1.2.4.70<br>(selection value 1)  |

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|--|-------------------------------|--|--|
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| 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  |  |
|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| 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  |  |
|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| 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  |  |
|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| 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  |  |
|  |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |  |
|  |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |  |
|  |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |  |
| 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  |  |

|                    |                               |  |
|--------------------|-------------------------------|--|
|                    |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |
|                    |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |
|                    |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |
| Enhanced SR        | 1.2.840.10008.5.1.4.1.1.88.22 | Explicit VR Little Endian 1.2.840.10008.1.2.1  |
|                    |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |
|                    |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |
|                    |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |
| Comprehensive SR   | 1.2.840.10008.5.1.4.1.1.88.33 | Explicit VR Little Endian 1.2.840.10008.1.2.1  |
|                    |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |
|                    |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |
|                    |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |
| Mammography CAD SR | 1.2.840.10008.5.1.4.1.1.88.50 | Explicit VR Little Endian 1.2.840.10008.1.2.1  |
|                    |                               | JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70                    |
|                    |                               | JPEG Lossy, Baseline Sequential with Huffman Coding (process 1) 1.2.840.10008.1.2.4.50 |
|                    |                               | JPEG Lossy Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51                             |

**Note:** SOP instances encoded with an encapsulated Transfer Syntax and which contain encapsulated Pixel Data (7FE0,0010) nested within a Sequence Data element are not copied on the local database.

**Note:** SOP instances encoded with an encapsulated Transfer Syntax and which contain the Digital Signatures Sequence (FFFA,FFFA) or the Data Set Trailing Padding attribute (FFFC,FFFC) are not copied on the local database.

**Note:** When copying on the local database a SOP instance encoded with a lossy encapsulated Transfer Syntax on the media, the SOP instance is copied using a non encapsulated Transfer Syntax and the Lossy Image Compression attribute (0028,2110) is added and set to "01".

### 3.3.1.2.3 Real-World Activity (RWA) "Create Media"

The CD/DVD DICOM Media Server AE acts as an FSC using the interchange option when requested to copy SOP Instances from the local database to one or multiple interchange media.

The user selects the entries in the local database that he wants the CD/DVD DICOM Media Server AE to copy onto interchange media.

The graphic interface (CD/DVD Composer) allows the user to select the entries in the local database to be copied onto one or more interchange media. He/she may

- Add patients, studies, series or images from the local database onto the CD/DVD Composer
- Remove patients, studies, series or images from the CD/DVD Composer.

The CD/DVD Composer will create one File Set per generated interchange media.

The user has the opportunity to choose some options before composing the interchange media:

- The type of interchange media: to create: CD or DVD
- The DICOM profile used for writing the interchange media. The user has the opportunity to choose:
  - the "General Purpose option" (STD-GEN-CD for CDs and STD-GEN-DVD-JPEG for DVDs). If the type of interchange media is "CD", all the selected items will be saved using the STD-GEN-CD profile. If the type of interchange media is "DVD", all the selected items will be saved using the STD-GEN-DVD-JPEG profile.
  - the "Compress XA 512 Cardiac option" (AUG-XABC-CD for CDs and STD-GEN-DVD-JPEG for DVDs: If the type of interchange media is "CD", all the selected XA 512x512 (8 bits) images will be saved using the STD-XABC-CD profile and all the other items will be saved on the Interchange media using the STD-GEN-CD profile. If the type of interchange media is "DVD", all the selected items will be saved using the STD-GEN-DVD-JPEG profile – the XA 512x512 (8 bits) being saved compressed.
  - the "Portable Disk option". (STD-GEN-CD for CDs and STD-GEN-DVD-JPEG for DVDs). If the type of interchange media is "CD", the CD generated will be conformant with the "DICOM only" IHE PDI requirements. If the type of interchange media is "DVD", the same information will be burnt on the media while using the STD-GEN-DVD-JPEG profile without compressed images

**Note:** The IHE PDI profile is not intended to work with DVDs, but only with CDs.

- Burn a DICOM Image Viewer along with the images.
- Burn a DICOM SR Viewer along with the images
- Reduce the resolution of XA Cardiac images to 512x512x8bits. This procedure is the *downscan processing* and it manages images of the following resolutions: 1000x1000x8bits, 864x864x8bits, 800x800x8bits, 736x736x8bits, and 608x608x8bits. The CD/DVD DICOM Media Server AE will generate new images from the input images.

The user has the opportunity to choose some options after composing the interchange media:

- Read after write mode to check the binary integrity of what is written on the interchange media.
- Update the number of copies to generate.

The user has to insert blank media into the drive. Before writing the disc, the CD/DVD DICOM Media Server AE checks for the following condition:

- The inserted media is blank and writable. If the condition is not met, an error is displayed and the disc is ejected.

**Note:** The corresponding SOP instances have to be encoded with the ISO\_IR 100 Specific Character Set or DICOM Default Character Set.

**Note:** The corresponding SOP instances are set to the transfer syntax defined by the application and copied to the interchange media. Unknown Private Data Elements are encoded with the DICOM unknown Value Representation.

**3.3.1.2.3.1 Media Storage Application Profile for the RWA “Create Media”:**

This AE can use the following profiles for the RWA “Create Media”:

- STD-GEN-CD
- AUG-XABC-CD
- STD-GEN-DVD-JPEG

Please refer to the Table in Section 3.3.1.

**3.3.1.2.3.1.1 Options:**

Following are the SOP Classes supported by the RWA “Create Media”:

| Information Object Definition        | SOP Class UID                | Transfer Syntax   | Transfer Syntax UID  |
|--------------------------------------|------------------------------|---|--|
| Media Storage Directory Storage      | 1.2.840.10008.1.3.10         | Explicit VR Little Endian   | 1.2.840.10008.1.2.1  |
| Computed Radiographic Image Storage  | 1.2.840.10008.5.1.4.1.1.1    | Explicit VR Little Endian   | 1.2.840.10008.1.2.1  |
| CT Image Storage                     | 1.2.840.10008.5.1.4.1.1.2    | Explicit VR Little Endian   | 1.2.840.10008.1.2.1  |
| MR Image Storage                     | 1.2.840.10008.5.1.4.1.1.4    | Explicit VR Little Endian   | 1.2.840.10008.1.2.1  |
| Xray Angiographic Image Storage      | 1.2.840.10008.5.1.4.1.1.12.1 | Explicit VR Little Endian<br><br>JPEG lossless Process 14<br>(selection value 1) for<br>images 512x512 (8bits). | 1.2.840.10008.1.2.1<br><br>1.2.840.10008.1.2.4.70 for<br>images 512x512 (8bits). |
| Xray 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  |
| 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  |

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| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| Standalone Curve Storage                                   | 1.2.840.10008.5.1.4.1.1.9     | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| 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 |
| 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 |
| 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 |
| RT Structure Set Storage                                   | 1.2.840.10008.5.1.4.1.1.481.3 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| 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 |
| GE Private DICOM RT Plan                                   | 1.2.840.113619.4.5.249        | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| NM Genie Private Data                                      | 1.2.840.113619.4.27           | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| PET Advance Private Data                                   | 1.2.840.113619.4.30           | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| GE Private DICOM 3D object                                 | 1.2.840.113619.4.26           | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| Enhanced SR  | 1.2.840.10008.5.1.4.1.1.88.22 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| Comprehensive SR   | 1.2.840.10008.5.1.4.1.1.88.33 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| Mammography CAD SR   | 1.2.840.10008.5.1.4.1.1.88.50 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |

**Note:** If the “Compress XA 512 Cardiac option” (AUG-XABC-CD for CDs and STD-GEN-DVD-JPEG for DVDs) has been chosen by the user, Xray Angiographic Instances

which contain Pixel Data (7FE0,0010) nested within a Sequence Data element are not copied onto the CD/DVD.

**Note :** If the “Compress XA 512 Cardiac option” (AUG-XABC-CD for CDs and STD-GEN-DVD-JPEG for DVDs) has been chosen by the user, Xray Angiographic Instances which contain the Data Set Trailing Padding attribute (FFFC,FFFC) are not copied onto the CD/DVD.

**3.3.2 DICOMMODSERVER AE Specification**

The DICOM MOD SERVER Application Entity provides standard conformance to DICOM Interchange Option of the Media Storage Service Class. The application Profiles and roles are listed below.

| Supported Application Profile                      | Real World Activity | Role | Description |
|--|---------------------|------|-------------|
| STD-CTMR-MOD12<br>STD-CTMR-MOD23<br>PRI-CTMR-MOD12 | Browse MOD          | FSR  | Interchange |
| STD-CTMR-MOD12<br>STD-CTMR-MOD23                   | Restore MOD         | FSR  | Interchange |
| STD-CTMR-MOD12<br>STD-CTMR-MOD23                   | Create MOD          | FSC  | Interchange |
| STD-CTMR-MOD12<br>STD-CTMR-MOD23                   | Format              | FSC  | Interchange |

**3.3.2.1 File Meta Information for the DICOM MOD Application Entity**

Following are the values set in the File Meta Information for this AE Title:

|                                    |   |
|------------------------------------|---|
| <b>Implementation Class UID</b>    | <b>1.2.840.113619.6.181</b>   |
| <b>Implementation Version Name</b> | <b>The Implementation Version Name is set dynamically through an environment variable</b> |

**3.3.2.2 Real-World Activities for the DICOM MOD Application Entity**

**3.3.2.2.1 Real-World Activity (RWA) ”Browse MOD”**

The MOD DICOM Media Server AE acts as an FSR using the interchange option when requested to browse the MOD.

When the MOD DICOM Media Server AE is requested to provide a directory listing, it reads the File-set and displays the DICOMDIR directory entries, according to the PATIENT, STUDY, SERIES, IMAGE paradigm.

If the DICOMDIR file is not found in the File-set, the MOD is considered as not formatted.

Only a DICOMDIR that conforms strictly to the DICOM Standard PS3.11 Annex E or the GE Private Profile (PRI-CTMR-MOD12) will be considered as readable.

**3.3.2.2.1.1 Media Storage Application Profile for the RWA “Browse MOD”:**

For the list of Application Profiles that invoke this AE for the Browse MOD RWA, see the Table in Section Note:.

**3.3.2.2.1.1.1 Options:**

Following are the SOP Classes supported by the RWA “Browse MOD”:

| Information Object Definition   | SOP Class UID        | Transfer Syntax           | Transfer Syntax UID |
|---------------------------------|----------------------|---------------------------|---------------------|
| Media Storage Directory Storage | 1.2.840.10008.1.3.10 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |

**3.3.2.2.2 Real-World Activity (RWA) ”Restore MOD”**

The MOD DICOM Media Server AE acts as an FSR using the interchange option when requested to copy SOP instances from the MOD to the local database.

The user selects the SOP instances that he wants the DICOM Media Server AE to copy on the local database by a drag and drop on the local browser icon or by clicking on the suitable restore buttons. Once selected, the SOP instances are copied from the media to the local database.

Only, the SOP classes supported by the station are declared to the database in a transfer syntax supported by the station.

**3.3.2.2.2.1 Media Storage Application Profile for the RWA “Restore MOD”:**

For the list of Application Profiles that invoke this AE for the Restore CD RWA, see the Table in Section Note:.

**3.3.2.2.2.1.1 Options:**

Following are the SOP Classes supported by the RWA “Restore MOD”:

| Information Object Definition | SOP Class UID             | Transfer Syntax                              | Transfer Syntax UID    |
|-------------------------------|---------------------------|--|------------------------|
| CT Image Storage              | 1.2.840.10008.5.1.4.1.1.2 | Explicit VR Little Endian                    | 1.2.840.10008.1.2.1    |
| CT Image Storage              | 1.2.840.10008.5.1.4.1.1.2 | JPEG Lossless Process 14 (selection value 1) | 1.2.840.10008.1.2.4.70 |
| MR Image Storage              | 1.2.840.10008.5.1.4.1.1.4 | Explicit VR Little Endian                    | 1.2.840.10008.1.2.1    |
| MR Image Storage              | 1.2.840.10008.5.1.4.1.1.4 | JPEG Lossless Process 14 (selection value 1) | 1.2.840.10008.1.2.4.70 |

|  |                           |   |                        |
|--|---------------------------|---|------------------------|
| Secondary Capture Image Storage<br>(CT or MR modality) | 1.2.840.10008.5.1.4.1.1.7 | Explicit VR Little Endian                       | 1.2.840.10008.1.2.1    |
| Secondary Capture Image Storage<br>(CT or MR modality) | 1.2.840.10008.5.1.4.1.1.7 | JPEG Lossless Process 14<br>(selection value 1) | 1.2.840.10008.1.2.4.70 |

**Note :** SOP Instances encoded with the JPEG Lossless Process 14 Transfer Syntax and which contain encapsulated Pixel Data (7FE0,0010) nested within a Sequence Data element are not copied on the local database.

**3.3.2.2.3 Real-World Activity (RWA) "Create MOD"**

The MOD DICOM Media Server acts as an FSC using the interchange option when requested to copy SOP Instances from the local database to the MOD.

The user has to insert a formatted MOD into the MOD drive. Then, the user selects the entries in the local database that he wants the MOD DICOM Media Server to copy onto the MOD.

Before writing the MOD, the MOD DICOM Media Server checks for the following conditions:

- The selected SOP Classes can be saved on the media. If the condition is not met, an error is displayed.
- The corresponding SOP instances have been encoded with the ISO\_IR 100 Specific Character Set or the DICOM Default Character Set.

The corresponding SOP instances are set to the transfer syntax defined by the application and copied to the MOD. Unknown Private Data Elements are encoded with the DICOM unknown Value Representation.

**3.3.2.2.3.1 Media Storage Application Profile for the RWA "Create MOD":**

This AE will use the STD-CTMR-MOD12 or STD-CTMR-MOD23 profiles for the RWA "Create MOD".

The JPEG Lossless Process 14 - selection value 1 (1.2.840.10008.1.2.4.70) is chosen as the Transfer Syntax UID of objects stored on MODs. However, when icons are present in the header of the images, the Transfer Syntax UID of the image written on the MOD will be Explicit Little Endian (1.2.840.10008.1.2.1).

Please refer to the Table in Section Note:

**3.3.2.2.3.1.1 Options:**

Following are the SOP Classes supported by the RWA "Create MOD":

| Information Object Definition   | SOP Class UID             | Transfer Syntax                                 | Transfer Syntax UID    |
|---------------------------------|---------------------------|---|------------------------|
| Media Storage Directory Storage | 1.2.840.10008.1.3.10      | Explicit VR Little Endian                       | 1.2.840.10008.1.2.1    |
| CT Image Storage                | 1.2.840.10008.5.1.4.1.1.2 | JPEG Lossless Process 14<br>(selection value 1) | 1.2.840.10008.1.2.4.70 |

|                                 |                           |   |                        |
|---------------------------------|---------------------------|---|------------------------|
| CT Image Storage                | 1.2.840.10008.5.1.4.1.1.2 | Explicit VR Little Endian                       | 1.2.840.10008.1.2.1    |
| MR Image Storage                | 1.2.840.10008.5.1.4.1.1.4 | JPEG Lossless Process 14<br>(selection value 1) | 1.2.840.10008.1.2.4.70 |
| MR Image Storage                | 1.2.840.10008.5.1.4.1.1.4 | Explicit VR Little Endian                       | 1.2.840.10008.1.2.1    |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | JPEG Lossless Process 14<br>(selection value 1) | 1.2.840.10008.1.2.4.70 |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Explicit VR Little Endian                       | 1.2.840.10008.1.2.1    |

**Note :** SOP Instances which contain Pixel Data (7FE0,0010) nested within a private Sequence Data element are not copied onto the MOD.

**3.3.2.2.4 Real-World Activity (RWA) ”Format MOD”**

The MOD DICOM Media Server acts as an FSC using the interchange option when requested to format (operation known as LABEL) MOD.

The user has to insert a blank or an already formatted MOD into the MOD drive. Then, the user clicks on the icon representing the MOD drive and selects the “Label” entry in the drop down menu.

The MOD DICOM Media Server AE then returns the current parameters of the MOD, and the user can confirm the LABEL.

Before erasing the data on the MOD, the MOD DICOM Media Server AE checks for the following conditions:

- The media is not “write protected”.

The RWA “Format MOD” will format a DOS file system on the MOD and an empty dicomdir.

**3.3.2.2.4.1 Media Storage Application Profile for the RWA “Format MOD”:**

This AE will use the STD-CTMR-MOD12 or STD-CTMR-MOD23 profiles for the RWA “Format MOD”.

Please refer to the Table in Section Note:.

**3.3.2.2.4.1.1 Options:**

Following are the SOP Classes supported by the RWA “Format MOD”:

| Information Object Definition   | SOP Class UID        | Transfer Syntax           | Transfer Syntax UID |
|---------------------------------|----------------------|---------------------------|---------------------|
| Media Storage Directory Storage | 1.2.840.10008.1.3.10 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |

After the DOS format of the MOD, an empty DICOMDIR will be written on the MOD.

**3.4 AUGMENTED AND PRIVATE APPLICATION PROFILES**

One augmented profile is defined to create a CD of XA 512x512 (8bits) images along with other SOP Classes. This profile is defined as the AUG-XA-CD Application Profile.

**3.4.1 Augmented Application Profiles**

**3.4.1.1 Augmented Application Profile AUG-XA-CD**

The AE defines the augmented profile AUG-XA-CD derived from the STD-XA-CD profile.

**3.4.1.1.1 SOP Class Augmentations**

| <b>Information Object Definition</b>                       | <b>SOP Class UID</b>          | <b>Transfer Syntax</b>  | <b>Transfer Syntax UID</b>  |
|--|-------------------------------|---|---|
| Computed Radiographic Image Storage                        | 1.2.840.10008.5.1.4.1.1.1     | Explicit VR Little Endian   | 1.2.840.10008.1.2.1   |
| CT Image Storage   | 1.2.840.10008.5.1.4.1.1.2     | Explicit VR Little Endian   | 1.2.840.10008.1.2.1   |
| MR Image Storage   | 1.2.840.10008.5.1.4.1.1.4     | Explicit VR Little Endian   | 1.2.840.10008.1.2.1   |
| XRay Angiographic Image Storage                            | 1.2.840.10008.5.1.4.1.1.12.1  | JPEG lossless Process 14 (selection value 1) for images 512x512 (8bits).<br><br>Explicit VR Little Endian for other XA images | 1.2.840.10008.1.2.4.70 for images 512x512 (8bits).<br><br>1.2.840.10008.1.2.1 for other XA images |
| Xray 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   |
| 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   |
| 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   |
| 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   |
| 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   |
| 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   |
| 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   |
| Standalone Curve Storage                                   | 1.2.840.10008.5.1.4.1.1.9     | Explicit VR Little Endian   | 1.2.840.10008.1.2.1   |
| 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   |
| 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   |
| 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   |

|  |                               |                           |                     |
|--|-------------------------------|---------------------------|---------------------|
| RT Structure Set Storage                       | 1.2.840.10008.5.1.4.1.1.481.3 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| 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 |
| GE Private DICOM RT Plan                       | 1.2.840.113619.4.5.249        | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| NM Genie Private Data                          | 1.2.840.113619.4.27           | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| PET Advance Private Data                       | 1.2.840.113619.4.30           | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| GE Private DICOM 3D object                     | 1.2.840.113619.4.26           | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| Enhanced SR                                    | 1.2.840.10008.5.1.4.1.1.88.22 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| Comprehensive SR                               | 1.2.840.10008.5.1.4.1.1.88.33 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| Mammography CAD SR                             | 1.2.840.10008.5.1.4.1.1.88.50 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |

**3.4.1.1.2 Directory Augmentations**

No Directory Augmentation is implemented.

**3.4.1.1.3 Other Augmentations**

No Other Augmentations are implemented.

**3.4.2 Private Application Profiles**

The GE Private DICOM Profile PRI-CTMR-MOD12 is implemented for the “Browse RWA” of the DICOM MOD Media Server AE.

The description of the private DICOM Profile PRI-CTMR-MOD12 can be found in the SIGNA HORIZON LX8.1 CONFORMANCE STATEMENT (Direction Number: 2171143-100).

**3.5 EXTENSIONS, SPECIALIZATIONS, PRIVATIZATIONS OF SOP CLASSES AND TRANSFER SYNTAXES**

This section describes the extension of SOP Classes used in the scope of the STD-GEN-CD and AUG-XA-CD Application Profiles.

**3.5.1 Extensions, Specializations, and Privatizations of SOP Classes**

**3.5.1.1 SOP Specific Conformance Statement for SOP Media Storage Directory**

The following keys are added as Type 3 data elements in the Basic Directory IOD for the STD-GEN-CD and AUG-XA-CD Application Profiles.

| Key Attribute                  | Tag          | Directory Record Type  |
|--------------------------------|--------------|------------------------|
| Patient's Birth Date           | (0010,0030)  | PATIENT                |
| Patient's Sex                  | (0010,0040)  | PATIENT                |
| Series Description             | (0008,103E)  | SERIES                 |
| Manufacturer                   | (0008,1090)  | SERIES                 |
| Institution Name               | (0008,0080)  | SERIES                 |
| Institution Address            | (0008,0081)  | SERIES                 |
| Attending Physician's Name     | (0008,1050)  | SERIES                 |
| Image Type                     | (0008,0008)  | IMAGE                  |
| Image Date                     | (0008,0023)  | IMAGE                  |
| Image Time                     | (0008, 0033) | IMAGE                  |
| Recommended Display Frame Rate | (0008,2144)  | IMAGE                  |
| Radiation Settings             | (0018,1155)  | IMAGE (See Note below) |
| Image Comments                 | (0020,4000)  | IMAGE                  |
| Number Of Frames               | (0028,0008)  | IMAGE                  |
| Rows                           | (0028,0010)  | IMAGE                  |
| Columns                        | (0028,0011)  | IMAGE                  |

**Note :** Radiation Settings can be valued for XA and RF images only.

The following keys are added as Type 3 data elements in the Basic Directory IOD for the STD-GEN-CD, AUG-XA-CD and STD-GEN-DVD-JPEG Application Profiles when the option to create the media is not set to "Portable Media".

| Key Attribute | Tag         | Directory Record Type  |
|---------------|-------------|------------------------|
| Angle Value 1 | (0019,xx01) | IMAGE (See Note below) |
| Angle Value 2 | (0019,xx02) | IMAGE (See Note below) |
| Angle Value 3 | (0019,xx03) | IMAGE (See Note below) |

|               |             |                        |
|---------------|-------------|------------------------|
| Angle Label 1 | (0019,xx04) | IMAGE (See Note below) |
| Angle Label 2 | (0019,xx05) | IMAGE (See Note below) |
| Angle Label 3 | (0019,xx06) | IMAGE (See Note below) |

**Note:** Private group 19 is written in the IMAGE record of the SOP Media Storage Directory if it is present in the original image from the GEMS DLX acquisition machine, Private Creator Identification is DLX\_SERIE\_01 and the media is not created with the option “Portable Media”

The XA images having the following attributes can be *downscanned* to 512x512x8bits:

- SOP Class UID (0008,0016) is “1.2.840.10008.5.1.4.1.1.12.1”.
- The “Can Downscan 512” private attribute (0019,xxAA, GEMS\_DL\_IMG\_01) can be found in the data set, and its value is “YES”

or

the “Can Downscan 512” private attribute (0019,xxAA, GEMS\_DL\_IMG\_01) cannot be found in the data set

and Manufacturer (0008,0070) is “GE MEDICAL SYSTEMS” and the Manufacturer’s Model Name (0008,1090) is “DL”

- Bits Allocated (0028,0100) is equal to 8.
- Bits Stored (0028,0101) is less than or equal to 8.
- Rows (0028,0010) and Columns (0028,0011) attributes have the following values: 1000 x 1000 or 864 x 864 or 800 x 800 or 736 x 736 or 608x608.

All other images cannot be processed. Please refer to section 0 for more information about the downscan.

**Note:** The meaning of (0019,xxAA, GEMS\_DL\_IMG\_01) is the private element (0019,xxAA) associated with the Private Creator Identification is GEMS\_DL\_IMG\_01.

3.5.1.2 Private data dictionary

TABLE 3.5-1  
PRIVATE CREATOR IDENTIFICATION (DLX\_SERIE\_01)

| Attribute Name | Tag         | VR | VM |
|----------------|-------------|----|----|
| Angle Value 1  | (0019,xx01) | DS | 1  |
| Angle Value 2  | (0019,xx02) | DS | 1  |
| Angle Value 3  | (0019,xx03) | DS | 1  |
| Angle Label 1  | (0019,xx04) | CS | 1  |
| Angle Label 2  | (0019,xx05) | CS | 1  |
| Angle Label 3  | (0019,xx06) | CS | 1  |

**3.5.2 Private Transfer Syntax Specification**

No private Transfer Syntax is written on media by the described CD/DVD DICOM SERVER AE of Advantage Workstation 4.3.

**3.6 CONFIGURATION**

The source AE Title encoded in the File Meta-Information cannot be modified.

**3.7 SUPPORT OF EXTENDED CHARACTERSETS**

The Advantage Workstation 4.3 will support only the ISO\_IR 100 (ISO 8859-1:1987 Latin alphabet N 1. supplementary set) as extended character sets. Any incoming SOP instance that is encoded using another extended character set will not be installed in the local database.

## 4. NETWORK PRINT SCU CONFORMANCE STATEMENT

### 4.1 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 GEMS product. Note that the format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

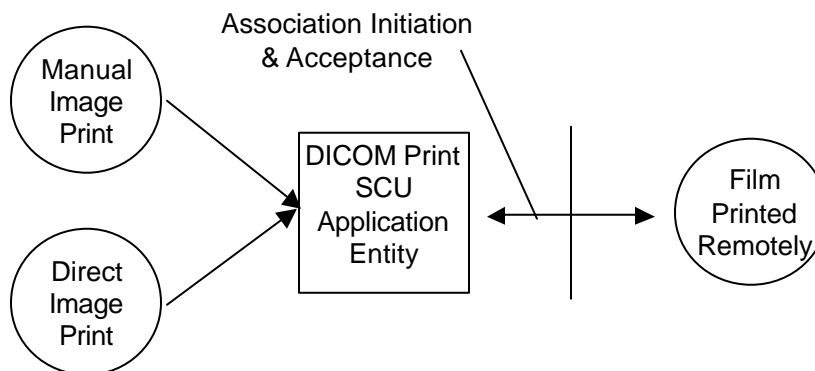
The Advantage Workstation 4.3 has the ability to compose films through the use of an application known as FILMER. The Advantage Workstation 4.3 uses DICOM Print Management Service Class to send images to hard copy printers. The films can then be used for possible further analysis.

### 4.2 IMPLEMENTATION MODEL

#### 4.2.1 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 MANAGER*.

- Direct Image Print

For this operation, the operator displays the images in the VIEWER and sends the images directly to the *PRINTMANAGER*.

In both cases, the PRINT MANAGER receives the “Simple print” request, composes a film then sends the film to the selected Remote DICOM Printer

#### **4.2.2 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

#### **4.2.3 Sequencing of Real-World Activities**

##### **4.2.3.1 Manual Image Print**

The user selects the remote DICOM Printer from Print Manager 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 MANAGER receives the “Simple print” request, composes a film then activates the DICOM Print SCU AE that initiates the following actions.
3. The PRINT MANAGER 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-DELETEDs 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

**4.3 AE SPECIFICATIONS**

**4.3.1 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.

**4.3.1.1 Association Establishment Policies**

**4.3.1.1.1 General**

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

|                                 |                              |
|---------------------------------|------------------------------|
| <b>Application Context Name</b> | <b>1.2.840.10008.3.1.1.1</b> |
|---------------------------------|------------------------------|

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:

|                           |                    |
|---------------------------|--------------------|
| <b>Maximum Length PDU</b> | <b>28672 Bytes</b> |
|---------------------------|--------------------|

The Print Management Service Class does not support extended negotiation.

The user information Items sent by this product are:

- Maximum PDU Length
- Implementation UID

**4.3.1.1.2 Number of Associations**

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

**4.3.1.1.3 Asynchronous Nature**

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

**4.3.1.1.4 Implementation Identifying Information**

The Implementation UID for this DICOM Implementation is:

|   |                             |
|---|-----------------------------|
| <b>Advantage Workstation 4.3 Implementation UID</b> | <b>1.2.840.113619.6.181</b> |
|---|-----------------------------|

**4.3.1.1.5 Association Initiation Policy**

**4.3.1.1.6 Real-World Activity “Manual Image Print”**

**4.3.1.1.6.1 Associated Real-World Activity**

The user has the possibility to drag and drop images from the VIEWER to the FILMER application. The Print Manager application allows to define, suppress and select different REMOTE DICOM printers and to manipulate some print parameters like the number of copies. 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.

**4.3.1.1.6.2 Proposed Presentation Context Table**

| <b>Presentation Context Table – Proposed</b>    |                        |                           |                   |             |                             |
|---|------------------------|---------------------------|-------------------|-------------|-----------------------------|
| <b>Abstract Syntax</b>                          |                        | <b>Transfer Syntax</b>    |                   | <b>Role</b> | <b>Extended Negotiation</b> |
| <b>Name</b>                                     | <b>UID</b>             | <b>Name List</b>          | <b>UID List</b>   |             |                             |
| Basic Grayscale Print Management Meta SOP Class | 1.2.840.10008.5.1.1.9  | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU         | None                        |
| Basic Color Print Management Meta SOP Class     | 1.2.840.10008.5.1.1.18 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU         | None                        |

**4.3.1.1.6.2.1 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 5.

**4.3.1.1.7 Real-World Activity “Direct Image Print”**

**4.3.1.1.7.1 Associated Real-World Activity**

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

**4.3.1.1.7.2 Proposed Presentation Context Table**

| <b>Presentation Context Table – Proposed</b>    |                        |                           |                   |             |                             |
|---|------------------------|---------------------------|-------------------|-------------|-----------------------------|
| <b>Abstract Syntax</b>                          |                        | <b>Transfer Syntax</b>    |                   | <b>Role</b> | <b>Extended Negotiation</b> |
| <b>Name</b>                                     | <b>UID</b>             | <b>Name List</b>          | <b>UID List</b>   |             |                             |
| Basic Grayscale Print Management Meta SOP Class | 1.2.840.10008.5.1.1.9  | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU         | None                        |
| Basic Color Print Management Meta SOP Class     | 1.2.840.10008.5.1.1.18 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU         | None                        |

**4.3.1.1.7.2.1 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 Annex.

**4.4 COMMUNICATION PROFILES**

**4.4.1 Supported Communication Stacks (PS 3.8, PS 3.9)**

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

**4.4.2 OSI Stack**

OSI stack not supported

**4.4.3 TCP/IP Stack**

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

**4.4.3.1 API**

Not applicable to this product.

#### **4.4.3.2 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 Advantage Workstation 4.3, please refer to the Product Data Sheet.

#### **4.4.4 Point-to-Point Stack**

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

### **4.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS**

#### **4.5.1 Standard Extended /Specialized/Private SOP Classes**

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

#### **4.5.2 Private Transfer Syntaxes**

No Private Transfer Syntaxes are managed by this product.

#### **4.5.3 CONFIGURATION**

##### **4.5.3.1 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 setting a new AET in the file ~sdc/app-defaults/dicom\_print/dprint.cfg.

##### **4.5.3.2 Configurable Parameters**

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

~sdc/app-defaults/dicom\_print/dprint.cfg:

- 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 Print Manager application allow the user 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.

#### **4.6 SUPPORT OF EXTENDED CHARACTER SETS**

The Advantage Workstation 4.3 will support only the ISO\_IR 100 (ISO 8859-1:1987 Latin alphabet N 1. supplementary set) as extended character sets.

## **5. PRINT MANAGEMENT SOP CLASS DEFINITION**

### **5.1 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:

5.2.1- Basic Film Session SOP Class

5.2.2 - Basic Film Box SOP Class

5.2.3 - Image Box SOP Classes

5.2.4 - Printer SOP Class

5.2.5 - Print Job SOP Class

5.2.6- Basic Annotation Box SOP Class

5.2.7 - Image Overlay Box SOP Class

### **5.2 PRINT MANAGEMENT SOP CLASS DEFINITIONS**

#### **5.2.1 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.

**5.2.1.1 IOD Description**

**5.2.1.1.1 IOD modules**

| Module                                 | Reference | Module Description                              |
|--|-----------|---|
| SOP Common                             |           | Contains SOP Common information                 |
| Basic Film Session Presentation Module | 5.2.1.1.2 | Contains Film Session presentations information |
| Basic Film Session Relationship        | 5.2.1.1.3 | References to related SOPs                      |

**5.2.1.1.2 Basic Film Session Presentation Module**

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

**Note:** Default configuration can be modified during the installation of the Advantage Workstation 4.3.

**5.2.1.1.3 Basic Film Session Relationship Module**

| Attribute Name               | Tag         | Attribute Description |
|------------------------------|-------------|-----------------------|
| Referenced Film Box Sequence | (2000,0500) | Empty                 |
| >Referenced SOP Class UID    | (0008,1150) | Empty                 |
| >Referenced SOP Instance UID | (0008,1155) | Empty                 |

**5.2.1.2 DIMSE Service Group**

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



**5.2.1.2.1 N-CREATE**

**5.2.1.2.1.1 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 Allocation  | (2000,0060) | Not Used                |

**5.2.1.2.1.2 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 |

**5.2.1.2.1.3 Behavior**

No specific behavior

**5.2.1.2.2 N-SET**

This service is not used.

**5.2.1.2.3 N-DELETE**

This service is not used.

**5.2.1.2.4 N-ACTION**

This service is not used.

**5.2.2 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.

5.2.2.1 IOD Description

5.2.2.1.1 IOD modules

| Module                             | Reference | Module Description                         |
|------------------------------------|-----------|--|
| SOP Common                         |           | Contains SOP Common information            |
| Basic Film Box Presentation Module | 5.2.2.1.2 | Contains Film Box presentation information |
| Basic Film Box Relationship        | 5.2.2.1.3 | References to related SOPs                 |

5.2.2.1.2 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]<br>SLIDE<br>SUPERSLIDE<br>Default value: STANDARD (Depending of configuration of associated remote DICOM printer).   |
| Annotation Display Format ID<br>Film Orientation | (2010,0030)<br>(2010,0040) | Not sent.<br>PORTRAIT<br>LANDSCAPE<br>Default value: PORTRAIT (Depending of configuration of associated remote DICOM printer).  |
| Film Size ID                                     | (2010,0050)                | 8INX10IN<br>8_5INX11IN(Letter)<br>10INX12IN<br>10INX14IN<br>11INX14IN<br>11INX17IN<br>14INX14IN<br>14INX17IN<br>24CMX24CM<br>24CMX30CM<br>A4(210mmx297mm)<br>A3(297mm x 420mm)<br><br>(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:<br><br>REPLICATE<br>BILINEAR<br>CUBIC<br>NONE<br>Default value: CUBIC (Depending of configuration set by user when declaring the printer).   |
| Smoothing Type                                   | (2010,0080)                | Sent if Magnification type = CUBIC<br>Default value: "" (Depending of configuration set by user when declaring the printer).  |

|                                      |             |   |
|--------------------------------------|-------------|---|
| Border density                       | (2010,0100) | BLACK or WHITE depending of default configuration.<br>Default value: BLACK  |
| Empty Image Density                  | (2010,0110) | BLACK or WHITE depending of default configuration.<br>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.<br>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.   |

**5.2.2.1.3 Basic Film Box Relationship Module**

| Attribute Name                           | Tag         | Attribute Description |
|--|-------------|-----------------------|
| Referenced Film Session Sequence         | (2010,0500) | Empty                 |
| >Referenced SOP Class UID                | (0008,1150) | Empty                 |
| >Referenced SOP Instance UID             | (0008,1155) | Empty                 |
| Referenced Image Box Sequence            | (2010,0510) | Empty                 |
| >Referenced SOP Class UID                | (0008,1150) | Empty                 |
| >Referenced SOP Instance UID             | (0008,1155) | Empty                 |
| Referenced Basic Annotation Box Sequence | (2010,0520) | Empty                 |
| >Referenced SOP Class UID                | (0008,1150) | Empty                 |
| >Referenced SOP Instance UID             | (0008,1155) | Empty                 |

**5.2.2.2 DIMSE Service Group**

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

**5.2.2.2.1 N-CREATE**

**5.2.2.2.1.1 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) | Not used   |
| >Referenced SOP Class UID                | (0008,1150) | Not used   |
| >Referenced SOP Instance UID             | (0008,1155) | Not used   |
| 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                               |

**5.2.2.2.1.2 Status**

There are no specific status codes. Warning B605 not taken into account (min/max density outside of printer range)

**5.2.2.2.1.3 Behavior**

There is no specific behavior.

**5.2.2.2.2 N-DELETE**

**5.2.2.2.2.1 Behavior**

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

5.2.2.2.3 N-ACTION

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

5.2.2.2.3.1 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  |

5.2.2.2.3.2 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.<br>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.<br>Association is aborted.                         |
|                | C604         | Image position collision: multiple images assigned to single image position           | Appropriate message is returned to the user.<br>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.<br>Association is aborted.                         |

5.2.2.2.3.3 Behavior

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

5.2.3 Image Box SOP Classes

5.2.3.1 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.

**5.2.3.1.1 IOD description**

**5.2.3.1.1.1 IOD modules**

| Module                              | Reference   | Module Description                          |
|-------------------------------------|-------------|---|
| SOP Common                          |             | Contains SOP Common information             |
| Image Box Pixel Presentation Module | 5.2.3.1.1.2 | Contains Image Box presentation information |
| Image Box Relationship Module       | 5.2.3.1.1.3 | References to related SOPs                  |

**5.2.3.1.1.2 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)<br>REVERSE = pixels shall be printed with the opposite polarity as specified by the Photometric Interpretation (0028,0004)<br>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) | Not sent   |
| Requested Decimate/Crop Behavior | (2020,0040) | Not sent   |
| 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.<br>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   |

5.2.3.1.1.3 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              |

5.2.3.1.2 DIMSE Service Group

| DIMSE Service Element | Usage SCU |
|-----------------------|-----------|
| N-SET                 | M         |

5.2.3.1.2.1 N-SET

5.2.3.1.2.1.1 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  |
| Referenced Overlay Sequence           | (0008,1130) | Not used  |
| >SOP Class UID                        | (0008,1150) | Not used  |
| >SOP Instance UID                     | (0008,1155) | Not used  |
| Magnification Type                    | (2010,0060) | Used  |
| Smoothing Type                        | (2010,0080) | Used, not sent if magnification is different of CUBIC |
| Configuration Information             | (2010,0150) | Used, not sent if empty                               |
| Requested Image Size                  | (2020,0030) | Not used  |

5.2.3.1.2.1.2 Status

| Service Status | Status Codes | Further Meaning                                   | Application Behavior When receiving Status Codes                        |
|----------------|--------------|---|---|
| Failure        | C605         | Insufficient memory in printer to store the image | Appropriate message is returned to the user.<br>Association is aborted. |

5.2.3.1.2.1.3 Behavior

There is no specific behavior.

5.2.3.2 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.

**5.2.3.2.1 IOD description**

**5.2.3.2.1.1 IOD modules**

| Module                              | Reference   | Module Description                          |
|-------------------------------------|-------------|---|
| SOP Common                          |             | Contains SOP Common information             |
| Image Box Pixel Presentation Module | 5.2.3.1.1.2 | Contains Image Box presentation information |
| Image Box Relationship Module       | 5.2.3.1.1.3 | References to related SOPs                  |

**5.2.3.2.1.2 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   |

**5.2.3.2.1.3 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 |

**5.2.3.2.2 DIMSE Service Group**

| DIMSE Service Element | Usage SCU |
|-----------------------|-----------|
| N-SET                 | M         |

**5.2.3.2.2.1 N-SET**

**5.2.3.2.2.1.1 Attributes**

| Attribute Name                    | Tag         | Usage SCU   |
|-----------------------------------|-------------|---|
| Image Position                    | (2020,0010) | M   |
| Preformatted 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  |
| Referenced Overlay Sequence       | (0008,1130) | Not used  |
| >SOP Class UID                    | (0008,1150) | Not used  |
| >SOP Instance UID                 | (0008,1155) | Not used  |
| Magnification Type                | (2010,0060) | Used  |
| Smoothing Type                    | (2010,0080) | Used. Not sent if magnification is different of CUBIC |
| Configuration Information         | (2010,0150) | Used, not sent if empty                               |
| Requested Image Size              | (2020,0030) | Not used  |

**5.2.3.2.2.1.2 Status**

| Service | Status | Further Meaning | Application Behavior When receiving Status |
|---------|--------|-----------------|--|
|         |        |                 |  |

| Status  | Codes |   | Codes   |
|---------|-------|---|---|
| Failure | C605  | Insufficient memory in printer to store the image | Appropriate message is returned to the user.<br><br>Association is aborted. |

**5.2.3.2.2.1.3 Behavior**

There is no specific behavior.

**5.2.4 Printer SOP Class**

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

The NEVENT\_REPORT DIMSE Service element sent by the DICOM Print SCP to the local DICOM Print SCU AE. The DICOM Print SCU handles the Printer Status and Printer Status Info fields. All other received data are ignored.

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

**5.2.4.1 IOD Description**

**5.2.4.1.1 IOD modules**

| Module         | Reference | Module Description                                 |
|----------------|-----------|--|
| SOP Common     |           | Contains SOP Common information                    |
| Printer Module | 5.2.4.1.2 | Contains status information to monitor the printer |

**5.2.4.1.2 Printer Module**

| Attribute Name           | Tag         | Attribute Description  |
|--------------------------|-------------|--|
| Printer Status           | (2110,0010) | The behaviour defined for the following term<br><br>NORMAL: Association goes on.<br>FAILURE: Association is aborted.<br>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  |

5.2.4.2 DIMSE Service Group

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

5.2.4.2.1 N-EVENT-REPORT

5.2.4.2.1.1 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      |

5.2.4.2.1.2 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

5.2.4.2.2 N-GET

5.2.4.2.2.1 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<br>by he printer |
|------------------|-------------|---------------------------------|

**5.2.4.2.2.2 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

**5.2.5 Print Job SOP Class**

This SOP Class is not supported by this implementation.

**5.2.6 Basic Annotation Box SOP Class**

This SOP Class is not supported by this implementation.

**5.2.7 Image Overlay Box SOP Class**

This SOP Class is not supported by this implementation.

## 6. SC INFORMATION OBJECT IMPLEMENTATION

### 6.1 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:

6.2- SC Entity-Relationship Model

6.3- SC-IOD MODULE TABLE

6.4- SC-INFORMATION MODULE DEFINITIONS

6.5- SC-PRIVATE data dictionary

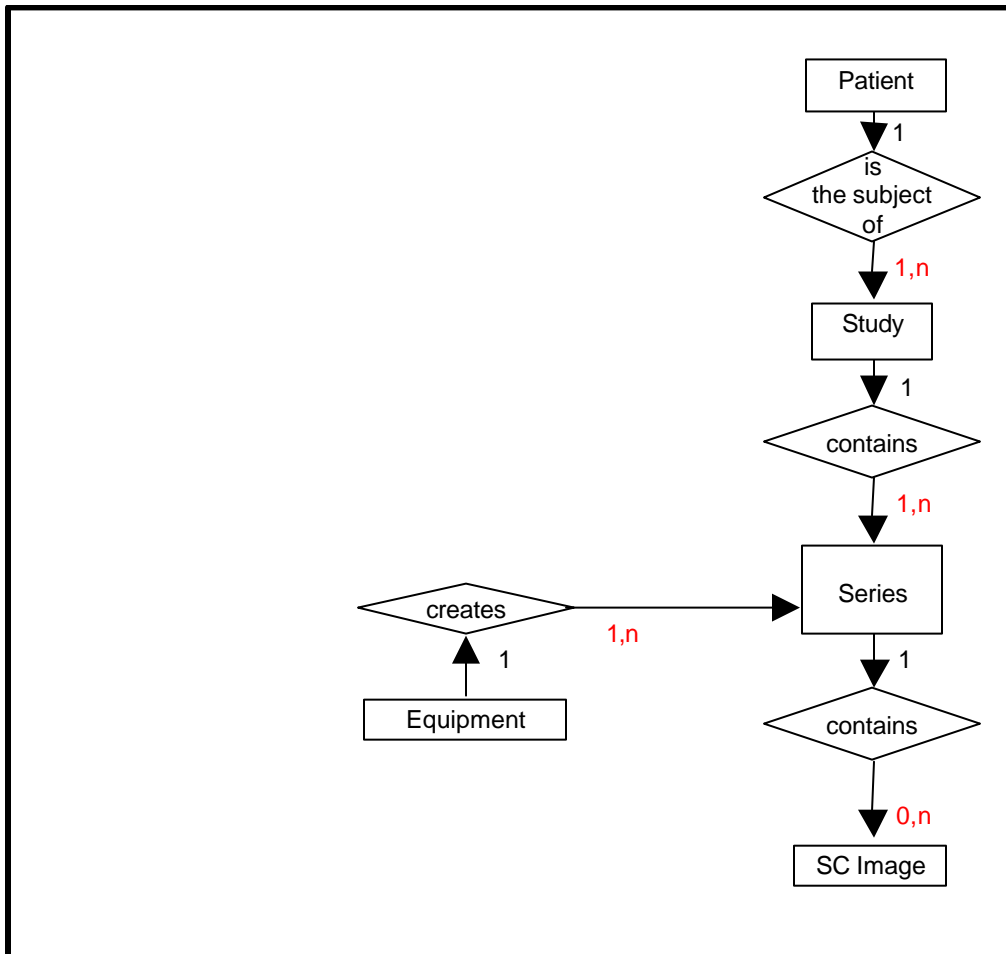
### 6.2 SC ENTITY-RELATIONSHIP MODEL

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 Patient to Study relationship has 1 Study for each Patient (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  
 SC 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 SC Information Object.

6.2.2 Advantage Workstation 4.3 Mapping of DICOM entities

TABLE 6.2-1  
 MAPPING OF DICOM ENTITIES TO ADVANTAGE WORKSTATION 4.3 ENTITIES

| DICOM   | Advantage Workstation 4.3 Entity |
|---------|----------------------------------|
| Patient | Patient                          |
| Study   | Exam                             |
| Series  | Series                           |
| Image   | Image                            |

**6.3 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 6.3-1  
 SC IMAGE IOD MODULES**

| <b>Entity Name</b> | <b>Module Name</b> | <b>Reference</b>  |
|--------------------|--------------------|-------------------|
| Patient            | Patient            | <b>6.4.1.1</b>    |
| Study              | General Study      | <b>6.4.2.1</b>    |
|                    | Patient Study      | <b>6.4.2.2</b>    |
| Series             | General Series     | <b>6.4.3.1</b>    |
|                    | Equipment          | General Equipment |
|                    | SC Equipment       | <b>6.4.9.1</b>    |
| Image              | General Image      | <b>6.4.5.1</b>    |
|                    | Image Pixel        | <b>6.4.5.2</b>    |
|                    | SC Image           | <b>6.4.9.2</b>    |
|                    | Overlay Plane      | <b>6.4.5.2.1</b>  |
|                    | Modality LUT       | <b>6.4.7.2</b>    |
|                    | VOI LUT            | <b>6.4.7.1</b>    |
|                    | SOP Common         | <b>6.4.8.1</b>    |

**6.4 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).

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.

A Screen Save image is a DICOM Secondary Capture generated by Advantage Workstation 4.3.

TABLE 6.4-1  
PATIENT MODULE ATTRIBUTES

| Attribute Name       | Tag         | Type | Attribute Description  |
|----------------------|-------------|------|--|
| Patient's Name       | (0010,0010) | 2    | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>Original if No Mix Mode or Mix Mode = Study<br>User defined if Mix Mode = Patient             |
| Patient ID           | (0010,0020) | 2    | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>Original if No Mix Mode or Mix Mode = Study<br>Function of pid and time if Mix Mode = Patient |
| Patient's Birth Date | (0010,0030) | 2    | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>Original if No Mix Mode or Mix Mode = Study<br>Empty if Mix Mode = Patient                    |
| Patient's Sex        | (0010,0040) | 2    | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>Original if No Mix Mode or Mix Mode = Study<br>Empty if Mix Mode = Patient                    |

6.4.2 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.

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    | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>Original if No Mix Mode<br>Generated if Mix Mode = Patient or Mix Mode = Study   |
| Study Date                 | (0008,0020) | 2    | <u>Screen Save image</u><br>Original (Empty if does not exist)<br><u>Filmer</u><br>Original (Empty if does not exist) if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study |
| Study Time                 | (0008,0030) | 2    | <u>Screen Save image</u><br>Original (Empty if does not exist)<br><u>Filmer</u><br>Original (Empty if does not exist) if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study |
| Referring Physician's Name | (0008,0090) | 2    | Screen Save image<br>Original (Empty if does not exist)<br><u>Filmer</u><br>Original (Empty if does not exist) if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study        |
| Study ID                   | (0020,0010) | 2    | <u>Screen Save image</u><br>Original (Empty if does not exist)<br><u>Filmer</u><br>Original (Empty if does not exist) if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study |

|                   |             |   |  |
|-------------------|-------------|---|--|
| Accession Number  | (0008,0050) | 2 | <u>Screen Save image</u><br>Original (Empty if does not exist)<br><u>Filmer</u><br>Original (Empty if does not exist) if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study        |
| Study Description | (0008,1030) | 3 | <u>Screen Save image</u><br>Original (Empty if does not exist)<br><u>Filmer</u><br>Original (Empty if does not exist) if No Mix Mode<br>User defined 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    | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>Original if No Mix Mode<br>Not present if Mix Mode = Patient or Mix Mode = Study |
| Patient's Size   | (0010,1020) | 3    | <u>Screen Save image</u><br>Original<br>Filmer<br>Original if No Mix Mode<br>Not present if Mix Mode = Patient or Mix Mode = Study        |
| Patient's Weight | (0010,1030) | 3    | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>Original if No Mix Mode<br>Not present if Mix Mode = Patient or Mix Mode = Study |

**6.4.3 Common Series Entity Modules**

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

**6.4.3.1 General Series Module**

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

**TABLE 6.4-4  
GENERAL SERIES MODULE ATTRIBUTES**

| Attribute Name      | Tag         | Type | Attribute Description  |
|---------------------|-------------|------|--|
| Modality            | (0008,0060) | 1    | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>OT (Other)  |
| Series Instance UID | (0020,000E) | 1    | Generated  |
| Series Number       | (0020,0011) | 2    | Generated  |
| Laterality          | (0020,0060) | 2C   | Screen Save image<br>Original<br><u>Filmer</u><br>Original if the generated Screen Save is composed of one original image<br>Not Present if the generated Screen Save is a composition of multiple images        |
| Series Description  | (0008,103E) | 3    | <u>Screen Save image</u><br>Screen Save<br><u>Filmer</u><br>AW Electronic film   |
| Operator's Name     | (0008,1070) | 3    | Name of the current user logged on the station   |
| Patient Position    | (0018,5100) | 2C   | <u>Screen Save image</u><br>Original<br><u>Filmer</u><br>Original if the generated Screen Save is composed of one original image<br>Not Present if the generated Screen Save is a composition of multiple images |

**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    | Derived from original image   |
| Institution Name          | (0008,0080) | 3    | <u>Screen Save image</u><br>Derived from original image<br><u>Filmer</u><br>Derived from original image if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study |
| Institution Address       | (0008,0081) | 3    | <u>Screen Save image</u><br>Derived from original image<br><u>Filmer</u><br>Derived from original image if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study |
| Station Name              | (0008,1010) | 3    | Derived from original image   |
| Manufacturer's Model Name | (0008,1090) | 3    | Derived from original image   |
| Software Versions         | (0018,1020) | 3    | Derived from original image   |

6.4.4.1.1 General Equipment Attribute Descriptions

6.4.4.1.1.1 Pixel Padding Value

Not used

6.4.5 Common Image Entity Modules

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

6.4.5.1 General Image Module

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

TABLE 6.4-6  
GENERAL IMAGE MODULE ATTRIBUTES

| Attribute Name       | Tag          | Type | Attribute Description       |
|----------------------|--------------|------|-----------------------------|
| Instance Number      | (0020,0013)  | 2    | Generated                   |
| Patient Orientation  | (0020,0020)  | 2C   | See 6.4.5.1.1.1.            |
| Content Date         | (0008,0023)  | 2C   | Derived from original image |
| Content Time         | (0008,0033)  | 2C   | Derived from original image |
| Image Type           | (0008,0008)  | 3    | See 6.4.5.1.1.2.            |
| Burned In Annotation | (0028, 0301) | 3    | YES                         |

**6.4.5.1.1 General Image Attribute Descriptions**

**6.4.5.1.1.1 Patient Orientation**

Derived from original if Screen Save.

Empty if Filmer

**6.4.5.1.1.2 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, then the image type is set to:

DERIVED\SECONDARY\SCREEN SAVE

**6.4.5.1.1.3 Derivation Description and Source Image Sequence**

This sequence is not encoded

**6.4.5.2 Image Pixel Module**

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

**TABLE 6.4-7  
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<br>3 - if image is displayed in full colors  |
| Photometric Interpretation | (0028,0004)  | 1    | Set to MONOCHROME1 if the pixels of the image were inverted and the element (0x0028, 0x0002) is set to the value 1.<br>Set to MONOCHROME2 if the pixels of the image were inverted and the element (0x0028, 0x0002) is set to the value 1.<br>Set to RGB If the element (0x0028, 0x0002) is set to the value of 3. |
| Planar Configuration       | (0028, 0006) | 1C   | 0, if element (0x0028, 0x0002) is 3<br>Not present otherwise   |
| Pixel Aspect Ratio         | (0028, 0034) | 1C   | Indicated even if the pixel aspect ratio of the generated image is: 1\1.   |

|                      |             |   |   |
|----------------------|-------------|---|---|
| Rows                 | (0028,0010) | 1 | <p><u>Screen Save image</u></p> <p>If original image rows &lt; 512, then 512</p> <p>If 512&lt;= original image rows &lt;= 2560, then original image rows</p> <p>If 2560 &lt; original image rows, then 2560</p> <p><u>Filmer</u></p> <p>If original image rows &lt; 256, then 256</p> <p>If 256 &lt;= original image rows &lt;= 2560, then original image rows</p> <p>If 2560 &lt; original image rows, then 2560</p>                         |
| Columns              | (0028,0011) | 1 | <p><u>Screen Save image</u></p> <p>If original image columns &lt; 512, then 512</p> <p>If 512&lt;= original image columns &lt;= 2560, then original image columns</p> <p>If 2560 &lt; original image columns, then 2560</p> <p><u>Filmer</u></p> <p>If original image columns &lt; 256, then 256</p> <p>If 256 &lt;= original image columns &lt;= 2560, then original image columns</p> <p>If 2560 &lt; original image columns, then 2560</p> |
| Bits Allocated       | (0028,0100) | 1 | Copy of original image <i>Bits Allocated</i> value or 8 if the element (0028, 0002) has value 3.  |
| Bits Stored          | (0028,0101) | 1 | Copy of original image <i>Bits Stored</i> 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 <i>Pixel Representation</i> value or 0000h if the element (0028, 0002) has value 3   |
| Pixel Data           | (7FE0,0010) | 1 | Derived from original pixel data  |

**6.4.5.2.1 Image Pixel Module Augmentation**

This section specified the DICOM tags added for the Secondary Captures in the Image Pixel Module.

|               |             |   |  |
|---------------|-------------|---|--|
| Pixel Spacing | (0028,0030) | 3 | <p>Copy of the original image <i>Pixel Spacing</i> if present in original image</p> <p>Not Present if field is not present in original image</p> |
|---------------|-------------|---|--|

**6.4.6 Overlay Plan Modules**

This module is not implemented for this IOD.

6.4.7 Lookup Table Modules

6.4.7.1 VOILUT module

This section specifies the Attributes that describe the VOI LUT.

TABLE 6.4-8  
VOILUT MODULE ATTRIBUTES

| Attribute Name   | Tag          | Type | Attribute Description  |
|------------------|--------------|------|--|
| VOI LUT Sequence | (0028, 3010) | 3    | Present when the image displayed uses a private VOI LUT or when present in the original image.   |
| > LUT Descriptor | (0028, 3002) | 1C   | Refer to § 6.4.7.1.1   |
| > LUT Data       | (0028, 3006) | 1C   | The VOI LUT Data in the item.<br>If the number of data is $< 2^{16}-1$ , then the Value Representation is set to US.<br>If the number of data is $> 2^{16}-1$ , then the Value Representation is set to OW.  |
| Window Center    | (0028,1050)  | 3    | Current <i>Window Center (WL)</i> + value of element (0x0028,0x1052) of original image if found in the original image header. This element is applicable only with <i>Photometric Interpretation</i> (0x0028,0x0004) value of MONOCHROME1 and MONOCHROME2 otherwise this element is <i>Not Present</i> |
| Window Width     | (0028,1051)  | 1C   | If <i>Window Width</i> (0x0028,0x1050) value is stored a window width value is stored in this element. This element is written only with <i>Photometric Interpretation</i> (0x0028,0x0004) value of MONOCHROME1 and MONOCHROME2 otherwise this element is <i>Not Present</i>                           |

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

6.4.7.1.1 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.

6.4.7.2 Modality LUT module

This section specifies the Attributes that describe the Modality LUT.

TABLE 6.4-9  
MODALITY LUT MODULE ATTRIBUTES

| Attribute Name    | Tag         | Type | Attribute Description   |
|-------------------|-------------|------|---|
| Rescale Intercept | (0028,1052) | 1C   | If original image header contains <i>Rescale intercept</i> value then the SC image contains its copy or the element is <i>Not applicable</i> if the element (0028, 0002) has value 3 or, if neither condition can be satisfied this element is <i>Not Present</i> . |
| Rescale Slope     | (0028,1053) | 1C   | If original image header contains <i>Rescale slope</i> value then the SC image contains its copy or the element is <i>Not applicable</i> if the element (0028, 0002) has value 3 or, if neither condition can be satisfied this element is <i>Not Present</i> .     |
| Rescale Type      | (0028,1054) | 1C   | If the element (0028, 0002) has value of 3 or if the image header does not contain <i>Rescale intercept</i> , this element is not present, otherwise it is set to US.   |

6.4.8 General Modules

The SOP Common Module is mandatory for all DICOM IODs.

6.4.8.1 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 6.4-10  
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   | A copy of original image character set or default ISO_IR 100 character set if the character set cannot be found in original image (ISO_IR 100 character set is always used).<br><b>IMPORTANT:</b> if one of the following notation is encountered in this field of the original image: iso ir 100, iso-ir 100 the creation of secondary capture cannot be refused and correct character set must be used for this field instead.<br><b>NOTE:</b> The process of generation of the secondary capture image does not support escape sequences like following: ISO 2022 IR 100\ISO 2022 IR 109. If an escape sequence is used in the original image the creation of the secondary capture can be refused. |

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

**6.4.9.1 SC Equipment Module**

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

**TABLE 6.4-11  
SC IMAGE EQUIPMENT MODULE ATTRIBUTES**

| Attribute Name                                     | Tag         | Type | Attribute Description  |
|--|-------------|------|--|
| Conversion Type                                    | (0008,0064) | 1    | WSD  |
| Modality   | (0008,0060) | 3    | Original if Screen Save Image<br>OT if Filmer Image  |
| Secondary Capture Device ID                        | (0018,1010) | 3    | Real UNIX station host name  |
| Secondary Capture Device Manufacturer              | (0018,1016) | 3    | GE MEDICAL SYSTEMS   |
| Secondary Capture Device Manufacturer's Model Name | (0018,1018) | 3    | AW 4.3   |
| Secondary Capture Device Software Version          | (0018,1019) | 3    | Derived from the <software version build identifier>. It is truncated at the first character “_” or at 64 bytes. |

**6.4.9.2 SC Image Module**

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

**TABLE 6.4-12  
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 |

**6.5 SC-PRIVATE DATA DICTIONARY**

This section describes the private attributes of this IOD.

**TABLE 6.5-1  
PRIVATE CREATOR IDENTIFICATION: GEMS AWSOFT SB1**

| Attribute Name                        | Tag         | Type | VR | VM | Attribute Description                                   |
|---------------------------------------|-------------|------|----|----|---|
| Reference to Study UID                | (0039,XX50) | 3    | UI | 1  | Reference of the original Study UID if applicable       |
| Reference to Series UID               | (0039,XX51) | 3    | UI | 1  | Reference of the original Series UID if applicable      |
| Reference to Original Instance Number | (0039,XX52) | 3    | IS | 1  | Reference of the original Instance Number if applicable |

**TABLE 6.5-2  
PRIVATE CREATOR IDENTIFICATION: GEMS IDEN 01**

| Attribute Name | Tag         | Type | VR | VM | Attribute Description          |
|----------------|-------------|------|----|----|--------------------------------|
| Full fidelity  | (0009,XX01) | 3    | LO | 1  | Refer to SM2162114. Appendix B |
| Suite id       | (0009,XX02) | 3    | SH | 1  | Refer to SM2162114. Appendix B |
| Product id     | (0009,XX04) | 3    | SH | 1  | Refer to SM2162114. Appendix B |

|                               |             |   |    |   |                                |
|-------------------------------|-------------|---|----|---|--------------------------------|
| Image actual date             | (0009,XX27) | 3 | SL | 1 | Refer to SM2162114. Appendix B |
| Service id                    | (0009,XX30) | 3 | SH | 1 | Refer to SM2162114. Appendix B |
| Mobile location number        | (0009,XX31) | 3 | SH | 1 | Refer to SM2162114. Appendix B |
| Equipment UID                 | (0009,XXE3) | 3 | UI | 1 | Refer to SM2162114. Appendix B |
| Genesis Version - now         | (0009,XXE6) | 3 | SH | 1 | Refer to SM2162114. Appendix B |
| Exam Record checksum          | (0009,XXE7) | 3 | UL | 1 | Refer to SM2162114. Appendix B |
| Series Suite Id               | (0009,XXE8) | 3 | SH | 1 | Refer to SM2162114. Appendix B |
| Actual series data time stamp | (0009,XXE9) | 3 | SL | 1 | Refer to SM2162114. Appendix B |

**TABLE 6.5-3  
PRIVATE CREATOR IDENTIFICATION: GEMS RELA 01**

| Attribute Name               | Tag         | Type | VR | VM | Attribute Description          |
|------------------------------|-------------|------|----|----|--------------------------------|
| Series from which Prescribed | (0021,XX03) | 3    | SS | 1  | Refer to SM2162114. Appendix B |
| Genesis Version - now        | (0021,XX05) | 3    | SH | 1  | Refer to SM2162114. Appendix B |
| Series Record checksum       | (0021,XX07) | 3    | UL | 1  | Refer to SM2162114. Appendix B |
| Screen Format                | (0021,XX37) | 3    | SS | 1  | Refer to SM2162114. Appendix B |

**TABLE 6.5-4  
PRIVATE CREATOR IDENTIFICATION: GEMS SERS 01**

| Attribute Name                  | Tag         | Type | VR | VM | Attribute Description          |
|---------------------------------|-------------|------|----|----|--------------------------------|
| Images in Series                | (0025,XX07) | 3    | SL | 1  | Refer to SM2162114. Appendix B |
| Last Instance Number used       | (0025,XX19) | 3    | SL | 1  | Refer to SM2162114. Appendix B |
| Primary Receiver Suite and Host | (0025,XX1A) | 3    | SH | 1  | Refer to SM2162114. Appendix B |

**TABLE 6.5-5  
PRIVATE CREATOR IDENTIFICATION: GEMS IMPS 01**

| Attribute Name            | Tag         | Type | VR | VM | Attribute Description          |
|---------------------------|-------------|------|----|----|--------------------------------|
| Version of the hdr struct | (0029,XX26) | 3    | SS | 1  | Refer to SM2162114. Appendix B |
| Advantage comp. Overflow  | (0029,XX34) | 3    | SL | 1  | Refer to SM2162114. Appendix B |
| Advantage comp. Underflow | (0029,XX35) | 3    | SL | 1  | Refer to SM2162114. Appendix B |

**TABLE 6.5-6  
PRIVATE CREATOR IDENTIFICATION: GEMS PARM 01**

| Attribute Name          | Tag         | Type | VR | VM | Attribute Description          |
|-------------------------|-------------|------|----|----|--------------------------------|
| Decon kernel parameters | (0043,XX13) | 3    | SS | 5  | Refer to SM2162114. Appendix B |

**Note:** These elements are present in the generated Secondary Capture if these elements were present in the original images

## 7. ENHANCED SR INFORMATION OBJECT IMPLEMENTATION

### 7.1 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:

7.2- ENHANCED SR Entity-Relationship Model

7.3- ENHANCED SR-IOD MODULE TABLE

7.4- ENHANCED SR -INFORMATION MODULE DEFINITIONS

7.5- ENHANCE SR – PRIVATE DATA DICTIONARY

7.6- ENHANCE SR – TEMPLATE IDENTIFICATION

7.7- ENHANCE SR - Private Coded Entries

**Note :** The Enhanced DICOM SR produced by this implementation is also named: “Electronic Film”

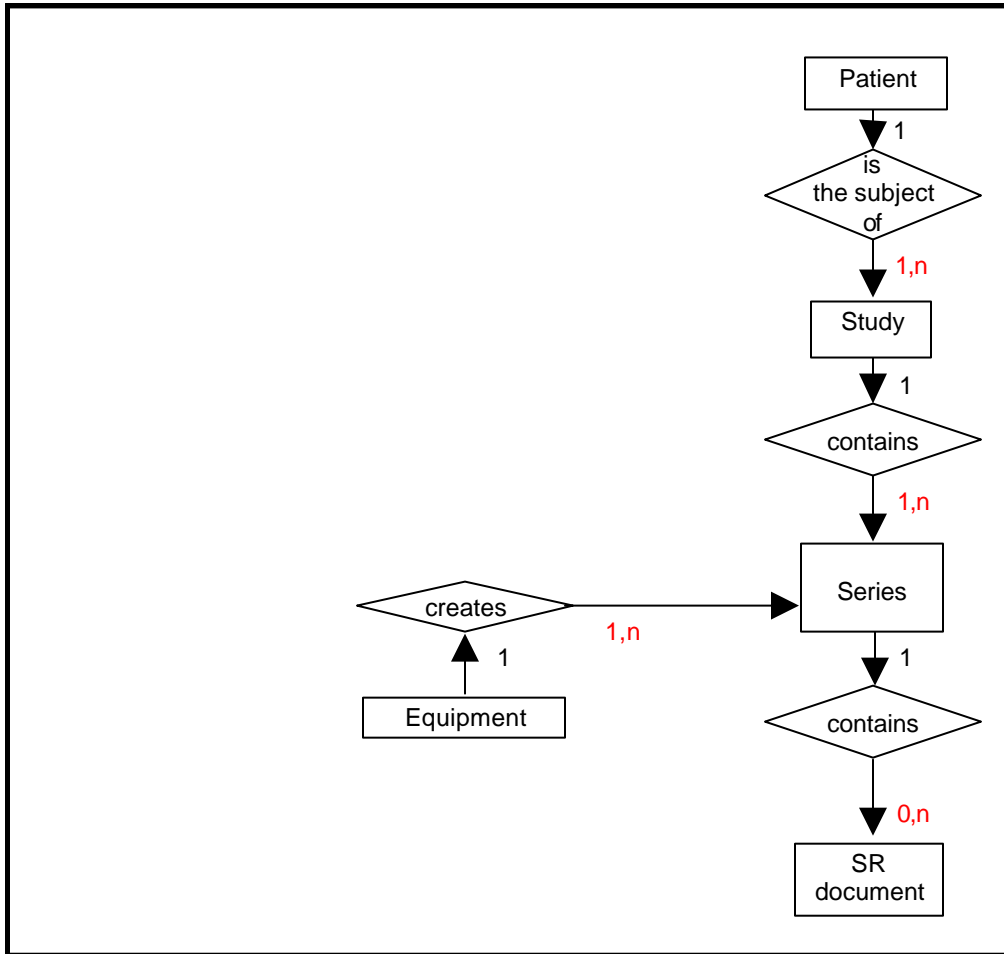
### 7.2 ENHANCED SR ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the ENHANCED SR 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 Patient to Study relationship has 1 Study for each Patient (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  
ENHANCED SR 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 ENHANCED SR Information Object.

**7.2.2 Advantage Workstation 4.3 Mapping of DICOM entities**

**TABLE 7.2-1  
 MAPPING OF DICOM ENTITIES TO ADVANTAGE WORKSTATION 4.3 ENTITIES**

| DICOM       | Advantage Workstation 4.3 Entity |
|-------------|----------------------------------|
| Patient     | Patient                          |
| Study       | Exam                             |
| Series      | Series                           |
| SR document | SR document                      |

**7.3 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 7.3.1 identifies the defined modules within the entities which comprise the DICOM SC 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  
 ENHANCED SR DOCUMENT IOD MODULES**

| Entity Name | Module Name             | Reference |
|-------------|-------------------------|-----------|
| Patient     | Patient                 | 7.4.1.1   |
|             | Specimen Identification | N/A       |
| Study       | General Study           | 7.4.2.1   |
|             | Patient Study           | 7.4.2.2   |
| Series      | SR document Series      | 7.4.3.1   |
| Equipment   | General Equipment       | 7.4.4.1   |
| Document    | SR document General     | 7.4.5.1   |
|             | SR document Content     | 7.4.5.2   |
|             | SOP Common              | 7.4.6.1   |

**7.4 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 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).

An Electronic Film is a DICOM ENHANCED SR IOP generated by the application 'Filmer' of Advantage Workstation 4.3.

**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**

| <b>Attribute Name</b> | <b>Tag</b>  | <b>Type</b> | <b>Attribute Description</b>  |
|-----------------------|-------------|-------------|---|
| Patient's Name        | (0010,0010) | 2           | Original if No Mix Mode or Mix Mode = Study<br>User defined if Mix Mode = Patient             |
| Patient ID            | (0010,0020) | 2           | Original if No Mix Mode or Mix Mode = Study<br>Function of pid and time if Mix Mode = Patient |
| Patient's Birth Date  | (0010,0030) | 2           | Original if No Mix Mode or Mix Mode = Study<br>Empty if Mix Mode = Patient                    |
| Patient's Sex         | (0010,0040) | 2           | Original if No Mix Mode or Mix Mode = Study<br>Empty if Mix Mode = Patient                    |

**7.4.2 Common Study Entity Modules**

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

**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**

| <b>Attribute Name</b>      | <b>Tag</b>  | <b>Type</b> | <b>Notes</b>  |
|----------------------------|-------------|-------------|---|
| Study Instance UID         | (0020,000D) | 1           | Original if No Mix Mode<br>Generated if Mix Mode = Patient or Mix Mode = Study                              |
| Study Date                 | (0008,0020) | 2           | Original (Empty if does not exist) if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study        |
| Study Time                 | (0008,0030) | 2           | Original (Empty if does not exist) if No Mix Mode<br>Empty if Mix Mode = Patient or Mix Mode = Study        |
| Accession Number           | (0008,0050) | 2           | Original (Empty if does not exist) if No Mix Mode<br>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<br>Empty if Mix Mode = Patient or Mix Mode = Study        |
| Study Description          | (0008,1030) | 3           | Original (Empty if does not exist) if No Mix Mode<br>User defined if Mix Mode = Patient or Mix Mode = Study |
| Study ID                   | (0020,0010) | 2           | Original (Empty if does not exist) if No Mix Mode<br>Empty 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    | Original if No Mix Mode<br>Not present if Mix Mode = Patient or Mix Mode = Study |
| Patient's Size   | (0010,1020) | 3    | Original if No Mix Mode<br>Not present if Mix Mode = Patient or Mix Mode = Study |
| Patient's Weight | (0010,1030) | 3    | Original if No Mix Mode<br>Not present if Mix Mode = Patient or Mix Mode = Study |

**7.4.3 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.

**7.4.3.1 SR Document Series Module**

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

**TABLE 7.4-4  
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) | 2    | Generated             |
| Referenced Performed Procedure Step Sequence | (0008,1111) | 2    | Empty                 |

**7.4.3.1.1 SR Document Series Module Augmentation**

This section specified the DICOM tags added for the Electronic Film in the SR Document Series Module.

| Attribute Name     | Tag         | Type | Attribute Description                                    |
|--------------------|-------------|------|--|
| Series Description | (0008,103E) | 3    | User defined filled by default with "AW Electronic Film" |

**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    | Derived from original images                                 |
| Institution Address       | (0008,0081) | 3    | Derived from original images                                 |
| Station Name              | (0008,1010) | 3    | Derived from original images                                 |
| Manufacturer's Model Name | (0008,1090) | 3    | Derived from original images                                 |
| Software Versions         | (0018,1020) | 3    | Application defined<br>(Application Name + Software Version) |

**7.4.5 SR document Entity Modules**

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

**7.4.5.1 SR document General**

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

**TABLE 7.4-6**  
**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 |

|                                 |             |   |                      |
|---------------------------------|-------------|---|----------------------|
| > 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 content

**TABLE 7.4-7  
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                                 |
| 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  |

**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    | 1.2.840.10008.5.1.4.1.1.88.22                                       |
| SOP Instance UID       | (0008,0018) | 1    | Generated from GE Based UID, <station configuration> and timestamp. |
| Specific Character Set | (0008,0005) | 1C   | ISO_IR 100  |

**7.5 ENHANCE SR – PRIVATE DATA DICTIONARY**

This section describes the private attributes of this IOD.

**TABLE 7.5-1  
PRIVATE CREATOR IDENTIFICATION: GEMS\_AWSOFT\_SB1**

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

**7.6 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.

**7.6.1 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            |
| 2 | >  | HAS OBS CONTEXT | INCLUDE   | DTID (1003) "Person observer identifying attributes" | 1   | M        |           |                      |
| 3 | >  | CONTAINS        | INCLUDE   | ETID Page Presentation                               | 1-n | U        |           |                      |

**7.6.2 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        |           |                      |
| 2 | >  | CONTAINS        | INCLUDE   | ETID Slot Group Presentation             | 1-n | U        |           |                      |

**7.6.3 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        |           |                      |
| 2 | >  | CONTAINS        | INCLUDE   | ETID Geometry                                    | 1   | M        |           |                      |
| 3 | >  | CONTAINS        | INCLUDE   | ETID Slot Presentation                           | 1-n | U        |           |                      |

**7.6.4 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        |                        |                      |
| 2 | >  | CONTAINS        | INCLUDE   | ETID Geometry                              | 1  | M        |                        |                      |
| 3 | >  | CONTAINS        | TEXT      | EV(AWVF-0009, 99GEMS, "Notepad")           | 1  | UC       | if row 4 and 5 absents |                      |
| 4 | >  | CONTAINS        | IMAGE     |  | 1  | UC       | if row 3 and 5 absents |                      |

|   | NL | Rel with Parent | VT      | Concept Name       | VM | Req Type | Condition              | Value Set Constraint |
|---|----|-----------------|---------|--------------------|----|----------|------------------------|----------------------|
| 5 | >  | -               | INCLUDE | ETID Cine Sequence | 1  | UC       | if row 3 and 4 absents |                      |

**7.6.5 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(UCUM,s,"second") |
| 2 |    | CONTAINS        | IMAGE |   | 1-n | M        |           |                           |

**7.6.6 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        |           | Value shall be in [0, 1]<br>UNITS=EV(UCUM,%, "percent") |
| 2 |    | -               | NUM | EV(AWVF-0006, 99GEMS, "Relative vertical position of top left corner ")  | 1  | M        |           | Value shall be in [0, 1]<br>UNITS=EV(UCUM,%, "percent") |
| 3 |    | -               | NUM | EV(AWVF-0007, 99GEMS, "Relative horizontal size")                        | 1  | M        |           | Value shall be in [0, 1]<br>UNITS=EV(UCUM,%, "percent") |
| 4 |    | -               | NUM | EV(AWVF-0008, 99GEMS, "Relative vertical size")                          | 1  | M        |           | Value shall be in [0, 1]<br>UNITS=EV(UCUM,%, "percent") |

**7.7 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 7.7-1  
 PRIVATE CODED ENTRIES : 99GEMS**

| Coded Entries                           |                           |                              |
|---|---------------------------|------------------------------|
| Coding Scheme Designator<br>(0008,0102) | Code Value<br>(0008,0100) | Code Meaning<br>(0008,0104)  |
| 99GEMS                                  | AWVF-0001                 | Electronic Film Presentation |
| 99GEMS                                  | AWVF-0002                 | Page Presentation            |
| 99GEMS                                  | AWVF-0003                 | Slot Group Presentation      |
| 99GEMS                                  | AWVF-0004                 | Slot Presentation            |

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|        |           |   |
|--------|-----------|---|
| 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                        |

## 8. PRIVATE OBJECT INFORMATION OBJECT IMPLEMENTATION

### 8.1 INTRODUCTION

This section specifies the use of the (DPO) DICOM Private Object IOD to represent the information included in DPOs produced by this implementation. Corresponding attributes are conveyed using the module construct. The DICOM Private Object is for internal use only. It cannot be networked and archived. It can only be stored into Advantage Workstation Database. The contents of this section are:

8.2- DPO Entity-Relationship Model

8.3- DPO-IOD MODULE TABLE

8.4- DPO-INFORMATION MODULE DEFINITIONS

8.5- DPO-PRIVate data dictionary

**Note:** This private DICOM object does not contain pixels.

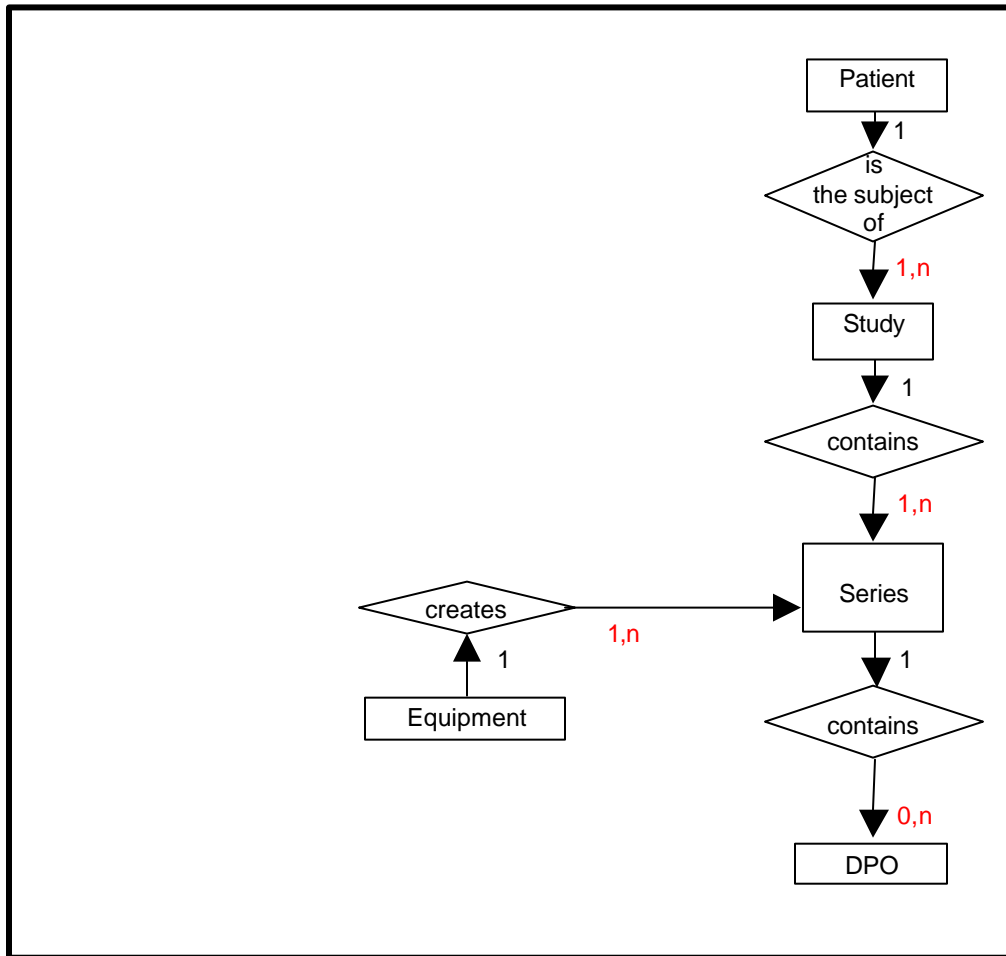
### 8.2 DPO ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the DPO interoperability schema is shown in **Illustration 8.2.1**. 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 Patient to Study relationship has 1 Study for each Patient (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 8.2-1  
DPO ENTITY RELATIONSHIP DIAGRAM



8.2.1 ENTITY DESCRIPTIONS

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

8.2.2 Advantage Workstation 4.3 Mapping of DICOM entities

TABLE 8.2-1  
MAPPING OF DICOM ENTITIES TO ADVANTAGE WORKSTATION 4.3 ENTITIES

| DICOM   | Advantage Workstation 4.3 Entity |
|---------|----------------------------------|
| Patient | Patient                          |
| Study   | Exam                             |
| Series  | Series                           |
| Image   | Image                            |

8.3 DPO-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 8.3.1 identifies the defined modules within the entities which comprise the DICOM SC IOD. Modules are identified by Module Name.

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

**TABLE 8.3-1**  
**DPO IOD MODULES**

| <b>Entity Name</b> | <b>Module Name</b> | <b>Reference</b> |
|--------------------|--------------------|------------------|
| Patient            | Patient            | <b>8.4.4.1</b>   |
| Study              | General Study      | <b>8.4.2.1</b>   |
|                    | Patient Study      | <b>8.4.2.2</b>   |
| Series             | General Series     | <b>8.4.3.1</b>   |
|                    | General Equipment  | <b>8.4.4.1</b>   |
| Equipment          | SOP Common         | <b>8.4.5.1</b>   |
| DPO                | DPO                | <b>8.4.5.2</b>   |

#### **8.4 DPO-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).

**8.4.1 Common Patient Entity Modules**

**8.4.1.1 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 8.4-1**  
**PATIENT MODULE ATTRIBUTES**

| <b>Attribute Name</b> | <b>Tag</b>  | <b>Type</b> | <b>Attribute Description</b>   |
|-----------------------|-------------|-------------|--|
| Patient's Name        | (0010,0010) | 2           | Same as original image if DPO is declared in same patient<br>Application defined |
| Patient ID            | (0010,0020) | 2           | Same as original image if DPO is declared in same patient<br>Application defined |
| Patient's Birth Date  | (0010,0030) | 2           | Same as original image if DPO is declared in same patient<br>Application defined |
| Patient's Sex         | (0010,0040) | 2           | Same as original image if DPO is declared in same patient<br>Application defined |

**8.4.2 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.

**8.4.2.1 General Study Module**

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

**TABLE 8.4-2  
GENERAL STUDY MODULE ATTRIBUTES**

| <b>Attribute Name</b>      | <b>Tag</b>  | <b>Type</b> | <b>Notes</b>   |
|----------------------------|-------------|-------------|--|
| Study Instance UID         | (0020,000D) | 1           | Same as original image if DPO is declared in same study<br>Application defined |
| Study Date                 | (0008,0020) | 2           | Same as original image if DPO is declared in same study<br>Application defined |
| Study Time                 | (0008,0030) | 2           | Empty  |
| Referring Physician's Name | (0008,0090) | 2           | Empty  |
| Study ID                   | (0020,0010) | 2           | Same as original image if DPO is declared in same study<br>Application defined |
| Accession Number           | (0008,0050) | 2           | Empty  |
| Study Description          | (0008,1030) | 3           | Same as original image if DPO is declared in same study<br>Application defined |

**8.4.2.2 Patient Study Module**

Not used

**8.4.3 Common Series Entity Modules**

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

**8.4.3.1 General Series Module**

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

**TABLE 8.4-3**  
**GENERAL SERIES MODULE ATTRIBUTES**

| Attribute Name      | Tag         | Type | Attribute Description |
|---------------------|-------------|------|-----------------------|
| Modality            | (0008,0060) | 1    | OT                    |
| Series Instance UID | (0020,000E) | 1    | Generated             |
| Series Number       | (0020,0011) | 2    | Generated             |
| Series Description  | (0008,103E) | 3    | Application defined   |

**8.4.4 Common Equipment Entity Modules**

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

**8.4.4.1 General Equipment Module**

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

**TABLE 8.4-4**  
**GENERAL EQUIPMENT MODULE ATTRIBUTES**

| Attribute Name            | Tag         | Type | Attribute Description  |
|---------------------------|-------------|------|--|
| Manufacturer              | (0008,0070) | 2    | GE MEDICAL SYSTEMS   |
| Station Name              | (0008,1010) | 3    | Name of the station  |
| Manufacturer's Model Name | (0008,1090) | 3    | Application Name   |
| Software Versions         | (0018,1020) | 3    | Application defined<br>(Application Name + Software Version) |

**8.4.5 DPO Modules**

The SOP Common Module is mandatory for all DICOM IODs.

**8.4.5.1 SOP Common Module**

This section defines the Attributes, which 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 8.4-5**  
**SOP COMMON MODULE ATTRIBUTES**

| Attribute Name | Tag         | Type | Attribute Description |
|----------------|-------------|------|-----------------------|
| SOP Class UID  | (0008,0016) | 1    | 1.2.840.113619.4.25   |

|                        |             |    |   |
|------------------------|-------------|----|---|
| SOP Instance UID       | (0008,0018) | 1  | Generated from GE Based UID, <station configuration> and timestamp. |
| Specific Character Set | (0008,0005) | 1C | ISO_IR 100  |

**8.4.5.2 DPO Module**

This section defines the Attributes, which 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 8.4-6  
DPO MODULE ATTRIBUTES**

| Attribute Name                        | Tag         | Type | Attribute Description                                   |
|---------------------------------------|-------------|------|---|
| Instance Number                       | (0020,5013) | 1    | Number of the DPO                                       |
| Reference to Study UID                | (0039,5065) | 1    | Reference of the original Study UID if applicable       |
| Reference to Series UID               | (0039,5070) | 1    | Reference of the original Series UID if applicable      |
| Reference to Original Instance Number | (0039,5075) | 1    | Reference of the original Instance Number if applicable |
| DPO Number                            | (0039,5080) | 1    | Number of the DPO                                       |
| DPO Date                              | (0039,5085) | 1    | Creation date of the DPO                                |
| DPO Time                              | (0039,5090) | 1    | Creation time of the DPO                                |
| DPO Invocation String                 | (0039,5095) | 1    | Invocation String of the DPO                            |
| DPO type                              | (0039,50AA) | 2    | AWDPO   |
| DPO data                              | (0039,50FF) | 1    | Data of the DPO   |

**8.5 DPO-PRIVATE DATA DICTIONARY**

This section describes the private attributes of this IOD.

**TABLE 8.5-1  
PRIVATE CREATOR IDENTIFICATION: GEMS\_AWSOFT\_CD1**

| Attribute Name                        | Tag         | Type | VR | VM | Attribute Description                                   |
|---------------------------------------|-------------|------|----|----|---|
| Private Element Creator               | (0039,00XX) | 1    | LO | 1  | Identification String. Set to GEMS_AWSOFT_CD1           |
| Reference to Study UID                | (0039,XX65) | 1    | UI | 1  | Reference of the original Study UID if applicable       |
| Reference to Series UID               | (0039,XX70) | 1    | UI | 1  | Reference of the original Series UID if applicable      |
| Reference to Original Instance Number | (0039,XX75) | 1    | IS | 1  | Reference of the original Instance Number if applicable |
| DPO Number                            | (0039,XX80) | 1    | IS | 1  | Number of the DPO                                       |
| DPO Number                            | (0020,XX13) | 1    | IS | 1  | Number of the DPO                                       |
| DPO Date                              | (0039,XX85) | 1    | DA | 1  | Creation date of the DPO                                |
| DPO Time                              | (0039,XX90) | 1    | TM | 1  | Creation time of the DPO                                |
| DPO Invocation String                 | (0039,XX95) | 2    | LO | 1  | Invocation String of the DPO                            |
| DPO type                              | (0039,XXAA) | 1    | CS | 1  | Type of the DPO   |

|          |             |    |    |   |                 |
|----------|-------------|----|----|---|-----------------|
| DPO data | (0039,XXFF) | 1C | OB | 1 | Data of the DPO |
|----------|-------------|----|----|---|-----------------|

## 9. XA DOWNSCAN INFORMATION OBJECT IMPLEMENTATION

### 9.1 INTRODUCTION

This section specifies the modifications of XA images produced by this implementation during the *downscan* processing. This processing consists in modifying an existing XA 8bit image to reduce the resolution of an X-Ray 8bit image to 512x512.

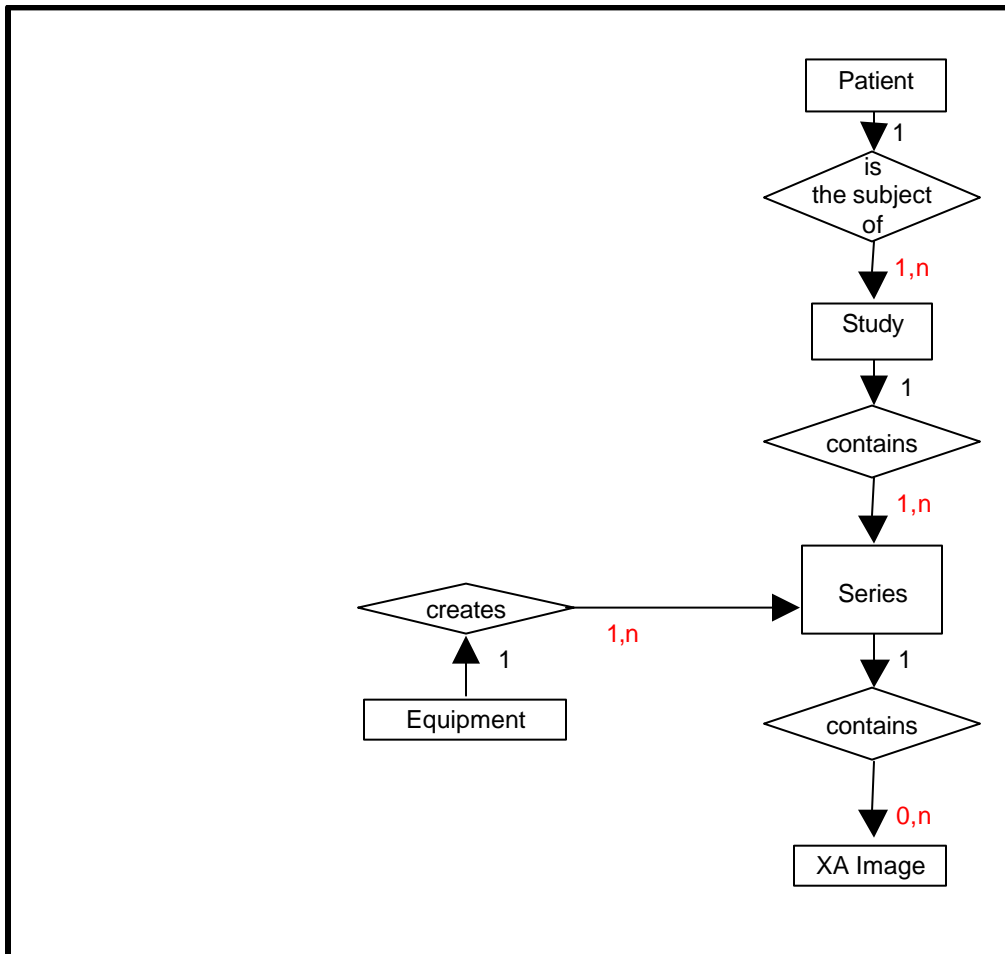
### 9.2 XA ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the XA Image interoperability schema is shown in **Illustration 9.2.1**. 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 Patient to Study relationship has 1 Study for each Patient (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 9.2-1  
XA IMAGE ENTITY RELATIONSHIP DIAGRAM



9.2.1 Entity Descriptions

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

9.2.2 Advantage Workstation 4.3 Mapping of DICOM entities

TABLE 9.2-1  
MAPPING OF DICOM ENTITIES TO ADVANTAGE WORKSTATION 4.3 ENTITIES

| DICOM   | Advantage Workstation 4.3 Entity |
|---------|----------------------------------|
| Patient | Patient                          |
| Study   | Exam                             |
| Series  | Series                           |
| Image   | Image                            |

9.3 XA-DOWNSCANIOD

The conditions to apply the downscan processing are indicated in § 3.5.

The following modifications are done to the XA image during the downscan processing:

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| Attribute Name                               | Tag         | Private Creator | VR     | VM   | Downscan image description  |
|--|-------------|-----------------|--------|------|---|
| Referenced Performed Procedure Step Sequence | (0008,1111) | n/a             | SQ     | 1    | Removed   |
| Performed Procedure Step ID                  | (0040,0253) | n/a             | SH     | 1    | Removed   |
| Performed Procedure Step Start Date          | (0040,0244) | n/a             | DA     | 1    | Removed   |
| Performed Procedure Step Start Time          | (0040,0245) | n/a             | T<br>M | 1    | Removed   |
| Performed Procedure Step Description         | (0040,0254) | n/a             | LO     | 1    | Removed   |
| Performed Protocol Code Sequence             | (0040,0260) | n/a             | SQ     | 1    | Removed   |
| Calibration Factor                           | (0019,xx84) | GEMS_DL_IMG_01  | FL     | 1    | Removed   |
| Calibration Accuracy                         | (0019,xx87) | GEMS_DL_IMG_01  | US     | 1    | Removed   |
| Calibration Points Row                       | (0019,xx8C) | GEMS_DL_IMG_01  | US     | 1-n  | Removed   |
| Calibration Points Column                    | (0019,xx8D) | GEMS_DL_IMG_01  | US     | 1-n  | Removed   |
| Series Instance UID                          | (0020,000E) | n/a             | UI     | 1    | Generated with root UID: 1.2.840.113619.6.163   |
| SOP Instance UID                             | (0008,0018) | n/a             | UI     | 1    | Copied from 0019, xx29, GEMS_DL_IMG_01 or Generated with root UID: 1.2.840.113619.6.163 |
| Rows   | (0028,0010) | n/a             | IS     | 1    | 512   |
| Columns                                      | (0028,0011) | n/a             | IS     | 1    | 512   |
| Can Downscan 512                             | (0019,xxAA) | GEMS_DL_IMG_01  | CS     | 1    | NO  |
| FOV Dimension(s)                             | (0018,1149) | n/a             | IS     | 2    | No change (both Horizontal and Vertical dimensions)                                     |
| fov_dim_double                               | (0019,xx0B) | GEMS_DL_IMG_01  | DS     | 2    | No change (both Horizontal and Vertical dimensions)                                     |
| Imager Pixel Spacing                         | (0018,1164) | n/a             | DS     | 2    | Updated to match new size of 512x512  |
| FOV Origin                                   | (0018,7030) | n/a             | DS     | 2    | Updated to match new size of 512x512  |
| Detector Origin                              | (0019,xx4B) | GEMS_DL_IMG_01  | IS     | 2    | Updated to match new size of 512x512  |
| Collimator Left Vertical Edge                | (0018,1702) | n/a             | IS     | 1    | Updated to match new size of 512x512  |
| Collimator Right Vertical Edge               | (0018,1704) | n/a             | IS     | 1    | Updated to match new size of 512x512  |
| Collimator Upper Horizontal Edge             | (0018,1706) | n/a             | IS     | 1    | Updated to match new size of 512x512  |
| Collimator Lower Horizontal Edge             | (0018,1708) | n/a             | IS     | 1    | Updated to match new size of 512x512  |
| Vertices of the Polygonal Collimator         | (0018,1720) | n/a             | IS     | 2-2n | Updated to match new size of 512x512  |
| Center of Circular Collimator                | (0018,1710) | n/a             | IS     | 2    | Updated to match new size of 512x512  |
| Radius of Circular Collimator                | (0018,1712) | n/a             | IS     | 1    | Updated to match new size of 512x512  |
| Vertices of the Polygonal Collimator         | (0018,1720) | n/a             | IS     | 2-2n | Updated to match new size of 512x512  |
| Shutter Left Vertical Edge                   | (0018,1602) | n/a             | IS     | 1    | Updated to match new size of 512x512  |
| Shutter Right Vertical Edge                  | (0018,1604) | n/a             | IS     | 1    | Updated to match new size of 512x512  |
| Shutter Upper Horizontal Edge                | (0018,1606) | n/a             | IS     | 1    | Updated to match new size of 512x512  |
| Shutter Lower Horizontal Edge                | (0018,1608) | n/a             | IS     | 1    | Updated to match new size of 512x512  |

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| Attribute Name                       | Tag         | Private Creator  | VR | VM   | Downscan image description  |
|--------------------------------------|-------------|------------------|----|------|---|
| Center of Circular Shutter           | (0018,1610) | n/a              | IS | 2    | Updated to match new size of 512x512<br>Note: This attribute is not present in actual DL images   |
| Radius of Circular Shutter           | (0018,1612) | n/a              | IS | 1    | Updated to match new size of 512x512<br>Note: This attribute is not present in actual DL images.  |
| Vertices of the Polygonal Shutter    | (0018,1620) | n/a              | IS | 2-2n | Updated to match new size of 512x512<br>Note: This attribute is not present in actual DL images.  |
| X Zoom                               | (0019,xx19) | DLX_SERIE_01     | IS | 1    | Updated to match new size of 512x512  |
| Y Zoom                               | (0019,xx1A) | DLX_SERIE_01     | IS | 1    | Updated to match new size of 512x512  |
| Mask Sub-pixel Shift                 | (0028,6114) | n/a              | FL | 2    | Updated to match new size of 512x512<br>Note: This attribute is found in an item of the Mask Substraction sequence (0028,6100).   |
| FOV Origin                           | (0025,xx33) | GEMS_DL_FRAME_01 | IS | 2    | Updated to match new size of 512x512<br>Note: This attribute is found in an item of the frame_sequence sequence (0025,xx0A,GEMS_DL_FRAME_01).   |
| FOV Dimensions                       | (0025,xx30) | GEMS_DL_FRAME_01 | IS | 2    | No change (both Horizontal and Vertical dimensions)<br>Note: This attribute is found in an item of the frame_sequence sequence (0025,xx0A,GEMS_DL_FRAME_01).                          |
| Collimator Left Vertical Edge        | (0025,xx34) | GEMS_DL_FRAME_01 | IS | 1    | Updated to match new size of 512x512<br>Note: This attribute is found in an item of the frame_sequence sequence (0025,xx0A,GEMS_DL_FRAME_01).   |
| Collimator Right Vertical Edge       | (0025,xx35) | GEMS_DL_FRAME_01 | IS | 1    | Updated to match new size of 512x512<br>Note: This attribute is found in an item of the frame_sequence sequence (0025,xx0A,GEMS_DL_FRAME_01).   |
| Collimator Upper Horizontal Edge     | (0025,xx36) | GEMS_DL_FRAME_01 | IS | 1    | Note: This attribute is found in an item of the frame_sequence sequence (0025,xx0A,GEMS_DL_FRAME_01).<br><br>Updated to match new size of 512x512                                     |
| Collimator Lower Horizontal Edge     | (0025,xx37) | GEMS_DL_FRAME_01 | IS | 1    | Note: This attribute is found in an item of the frame_sequence sequence (0025,xx0A,GEMS_DL_FRAME_01).   |
| Vertices of the Polygonal Collimator | (0025,xx38) | GEMS_DL_FRAME_01 | IS | 2-2n | Updated to match new size of 512x512<br>Note: This attribute is found in an item of the frame_sequence sequence (0025,xx0A,GEMS_DL_FRAME_01).<br>Updated to match new size of 512x512 |
| Pixel Length                         | (7FE0,0000) | n/a              | LO | 1    | This group length depends of the transfer syntax and of the length of the pixel data  |
| Pixel Data                           | (7FE0,0010) | n/a              | OB | 1    | Updated to match new size of 512x512  |

**9.3.1.1.1 Implementation Identifying Information**

The Implementation UID for this DICOM downscan implementation is:

|                                       |                             |
|---------------------------------------|-----------------------------|
| <b>AW Downscan Implementation UID</b> | <b>1.2.840.113619.6.163</b> |
|---------------------------------------|-----------------------------|

## 10. TOOL TO MODIFY FIRST AND LAST NAME OF PATIENTS

### 10.1 INTRODUCTION

This section describes the use of the tool that enables to modify the first and last name of the selected study. This tool is available on AW4.3. This implementation is intended to create new DICOM images from original DICOM images by removing and modifying specific elements that will be listed in 10.3.

### 10.2 DESCRIPTION

This implementation is conformant to the Basic Application Level Confidentiality Profile as a de-identifier (described in DICOM PS 3.15 – Annex E) but this conformance does not guarantee a complete de-identification of the generated objects.

The user is invited to check that the created DICOM objects are conformant to local regulations and hospital regulations.

### 10.3 REAL WORLD ACTIVITY

The user is able to modify the Patient Name and Patient ID and to select the following preferences when de-identifying a set of DICOM images.

- Keep or not Accession Number
- Keep or not Study ID
- Keep or not Institution Name
- Keep or not Study Description
- Keep or not Series Description
- Keep or not Protocol Name
- Keep or not Patient's Sex
- Keep or not Patient's Age
- Keep or not Patient's Size, Patient's Weight
- Keep the original dates or modify all dates relatively to a user defined reference date

**Note:** No option shall be kept in order to be compliant with the Basic Application Level Confidentiality Profile Attributes modifications as indicated in DICOM PS 3.15 – Annex E.

### 10.4 PROCESSING OF IODS

The following IODs are never processed:

|               |                               |
|---------------|-------------------------------|
| 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 |
| Mammography CAD SR | 1.2.840.10008.5.1.4.1.1.88.50 |

The following IODs are processed but a warning message is displayed to the user when such an IOD is processed.

|   |                              |
|---|------------------------------|
| Secondary Capture Image Storage               | 1.2.840.10008.5.1.4.1.1.7    |
| Grayscale Softcopy Presentation State Storage | 1.2.840.10008.5.1.4.1.1.11.1 |

The IODs containing the DICOM fields indicated in the table below are processed but a warning message is displayed to the user.

|          |             |
|----------|-------------|
| Curves   | (50xx,xxxx) |
| Overlays | (60xx,xxxx) |

**Note :** A warning may also be displayed to the user when some private DICOM fields generated by GE Medical Systems devices are present in the original IOD.

**Table 10.1  
MODIFIED ATTRIBUTES DESCRIPTION**

| Attribute Name                  | Tag         | Private Creator | VR | VM | Description  |
|---------------------------------|-------------|-----------------|----|----|--|
| Media SOP Instance UID          | (0002,0003) | n/a             | UI | 1  | Generated from GE Based UID: <station configuration> and timestamp<br>The generated UID is identical to the generated SOP Instance UID                           |
| Implementation Class UID        | (0002,0012) | n/a             | UI | 1  | 1.2.840.113619.6.181   |
| Implementation Version Name     | (0002,0013) | n/a             | SH | 1  | dynamically set through an environment variable  |
| Source AET                      | (0002,0016) | n/a             | AE | 1  | Removed attribute  |
| Private Information Creator UID | (0002,0100) | n/a             | UI | 1  | Removed attribute  |
| Instance Creator UID            | (0008,0014) | n/a             | UI | 1  | Removed attribute  |
| SOP Instance UID                | (0008,0018) | n/a             | UI | 1  | Generated from GE Based UID: <station configuration> and timestamp<br>The generated UID is identical to the generated Media SOP Instance UID                     |
| Accession Number                | (0008,0050) | n/a             | SH | 1  | Following user preferences <ul style="list-style-type: none"> <li>• Original Value</li> <li>• If present in the original image, set to an empty value</li> </ul> |

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|   |             |     |    |     |   |
|---|-------------|-----|----|-----|---|
| Institution Name                        | (0008,0080) | n/a | LO | 1   | Following user preferences<br><ul style="list-style-type: none"> <li>Original Value</li> <li>If present in the original image, set to an empty value</li> </ul> |
| Institution Address                     | (0008,0081) | n/a | ST | 1   | Removed attribute   |
| Referring Physician's Name              | (0008,0090) | n/a | PN | 1   | If present in the original image, set to an empty value   |
| Referring Physician's Address           | (0008,0092) | n/a | ST | 1   | Removed attribute   |
| Referring Physician's Telephone Numbers | (0008,0094) | n/a | SH | 1-N | Removed attribute   |
| Station Name                            | (0008,1010) | n/a | SH | 1   | Removed attribute   |
| Study Description                       | (0008,1030) | n/a | LO | 1   | Following user preferences<br><ul style="list-style-type: none"> <li>Original Value</li> <li>If present in the original image, set to an empty value</li> </ul> |
| Series Description                      | (0008,103E) | n/a | LO | 1   | Following user preferences<br><ul style="list-style-type: none"> <li>Original Value</li> <li>Removed Attribute</li> </ul>                                       |
| Institutional Department Name           | (0008,1040) | n/a | LO | 1   | Removed attribute   |
| Physician(s) of Record                  | (0008,1048) | n/a | PN | 1-N | Removed attribute   |
| Performing Physicians' Name             | (0008,1050) | n/a | PN | 1-N | Removed attribute   |
| Name of Physician(s) Reading Study      | (0008,1060) | n/a | PN | 1-N | Removed attribute   |
| Operators' Name                         | (0008,1070) | n/a | PN | 1-N | present in the original image, set to an empty value  |
| Admitting Diagnoses Description         | (0008,1080) | n/a | LO | 1-N | Removed attribute   |
| Referenced SOP Instance UID             | (0008,1155) | n/a | UI | 1   | Generated from GE Based UID: <station configuration> and timestamp  |
| Derivation Description                  | (0008,2111) | n/a | ST | 1   | Removed attribute   |
| Patient's Name                          | (0010,0010) | n/a | PN | 1   | User defined value  |
| Patient ID                              | (0010,0020) | n/a | LO | 1   | Set to a random value for all images  |
| Patient's Birth Date                    | (0010,0030) | n/a | DA | 1   | If present in the original image, set to an empty value   |
| Patient's Birth Time                    | (0010,0032) | n/a | TM | 1   | Removed attribute   |
| Patient's Sex                           | (0010,0040) | n/a | CS | 1   | Following user preferences<br><ul style="list-style-type: none"> <li>Original Value</li> <li>If present in the original image, set to an empty value</li> </ul> |
| Other Patient Ids                       | (0010,1000) | n/a | LO | 1-N | Removed attribute   |
| Other Patient Names                     | (0010,1001) | n/a | PN | 1-N | Removed attribute   |
| Patient's Birth Name                    | (0010,1005) | n/a | PN | 1   | Removed attribute   |

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|  |             |     |    |     |   |
|--|-------------|-----|----|-----|---|
| Patient's Age                          | (0010,1010) | n/a | AS | 1   | Following the user preference<br><ul style="list-style-type: none"> <li>Original Value</li> <li>Removed Attribute</li> </ul>                                    |
| Patient's Size                         | (0010,1020) | n/a | DS | 1   | Following the user preference<br><ul style="list-style-type: none"> <li>Original Value</li> <li>Removed Attribute</li> </ul>                                    |
| Patient's Weight                       | (0010,1030) | n/a | DS | 1   | Following the user preference<br><ul style="list-style-type: none"> <li>Original Value</li> <li>Removed Attribute</li> </ul>                                    |
| Patient's Address                      | (0010,1040) | n/a | LO | 1   | Removed attribute   |
| Patient's Mother Birth Name            | (0010,1060) | n/a | PN | 1   | Removed attribute   |
| Military Rank                          | (0010,1080) | n/a | LO | 1   | Removed attribute   |
| Branch of Service                      | (0010,1081) | n/a | LO | 1   | Removed attribute   |
| Medical Record Locator                 | (0010,1090) | n/a | LO | 1   | Removed attribute   |
| Region of Residence                    | (0010,2152) | n/a | LO | 1   | Removed attribute   |
| Patient's Telephone numbers            | (0010,2154) | n/a | SH | 1-N | Removed attribute   |
| Ethnic Group                           | (0010,2160) | n/a | SH | 1   | Removed attribute   |
| Occupation                             | (0010,2180) | n/a | SH | 1   | Removed attribute   |
| Additional Patient's History           | (0010,21B0) | n/a | LT | 1   | Removed attribute   |
| Patient Comments                       | (0010,4000) | n/a | LT | 1   | Removed attribute   |
| Device Serial Number                   | (0018,1000) | n/a | LO | 1   | If present in the original image, set to an empty value   |
| Protocol Name                          | (0018,1030) | n/a | LO | 1   | Following the user preference<br><ul style="list-style-type: none"> <li>Original Value</li> <li>Removed Attribute</li> </ul>                                    |
| Study Instance UID                     | (0020,000D) | n/a | UI | 1   | Generated from GE Based UID: <station configuration> and timestamp  |
| Series Instance UID                    | (0020,000E) | n/a | UI | 1   | Generated from GE Based UID: <station configuration> and timestamp  |
| Study ID                               | (0020,0010) | n/a | SH | 1   | Following user preferences<br><ul style="list-style-type: none"> <li>Original Value</li> <li>If present in the original image, set to an empty value</li> </ul> |
| Frame of Reference UID                 | (0020,0052) | n/a | UI | 1   | If present in the original image, generated from GE Based UID: <station configuration> and timestamp  |
| Synchronization Frame of Reference UID | (0020,0200) | n/a | UI | 1   | If present in the original image, generated from GE Based UID: <station configuration> and timestamp  |
| Image Comments                         | (0020,4000) | n/a | LT | 1   | Removed attribute   |

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|   |             |     |    |     |  |
|---|-------------|-----|----|-----|--|
| Concatenation UID                                   | (0020,9161) | n/a | UI | 1   | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Dimension Organization UID                          | (0020,9164) | n/a | UI | 1   | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Palette Color Lookup Table UID                      | (0028,1199) | n/a | UI | 1   | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Requesting Physician                                | (0032,1032) | n/a | PN | 1   | Removed attribute  |
| Requesting Service                                  | (0032,1033) | n/a | LO | 1   | Removed attribute  |
| Scheduled Performing Physician's Name               | (0040,0006) | n/a | PN | 1   | Removed attribute  |
| Scheduled Station Name                              | (0040,0010) | n/a | SH | 1-N | Removed attribute  |
| Scheduled Procedure Step Location                   | (0040,0011) | n/a | SH | 1   | Removed attribute  |
| Performed Station Name                              | (0040,0242) | n/a | SH | 1   | Removed attribute  |
| Performed Location                                  | (0040,0243) | n/a | SH | 1   | Removed attribute  |
| Request Attributes Sequence                         | (0040,0275) | n/a | SQ | 1   | Removed attribute  |
| Names of Intended Recipients of Results             | (0040,1010) | n/a | PN | 1-N | Removed attribute  |
| Order Entered By                                    | (0040,2008) | n/a | PN | 1   | Removed attribute  |
| Order Enterer's Location                            | (0040,2009) | n/a | SH | 1   | Removed attribute  |
| Order Callback Phone Number                         | (0040,2010) | n/a | SH | 1   | Removed attribute  |
| Scheduled Station Name Code Sequence                | (0040,4025) | n/a | SQ | 1   | Removed attribute  |
| Scheduled Station Geographic Location Code Sequence | (0040,4027) | n/a | SQ | 1   | Removed attribute  |
| Performed Station Geographic Location Code Sequence | (0040,4030) | n/a | SQ | 1   | Removed attribute  |
| Human Performer's Organization                      | (0040,4036) | n/a | LO | 1   | Removed attribute  |
| Human Performer's Name                              | (0040,4037) | n/a | PN | 1   | Removed attribute  |
| Verifying Observer's Name                           | (0040,A075) | n/a | PN | 1   | If present in the original image, set to an empty value  |
| Person Name   | (0040,A123) | n/a | PN | 1   | If present in the original image, set to an empty value  |
| UID   | (0040,A124) | n/a | UI | 1   | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Content Sequence                                    | (0040,A730) | n/a | SQ | 1   | Removed attribute  |

**ADVANTAGE WORKSTATION 4.3  
CONFORMANCE STATEMENT**

**GE MEDICAL SYSTEMS**

DIR 5138820-100 REV 2

|                                    |             |     |    |   |  |
|------------------------------------|-------------|-----|----|---|--|
| Presentation Creator's Name        | (0070,0084) | n/a | PN | 1 | If present in the original image, set to an empty value  |
| Fiducial UID                       | (0070,031A) | n/a | UI | 1 | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Storage Media File-set UID         | (0088,0140) | n/a | UI | 1 | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Topic Author                       | (0088,0910) | n/a | LO | 1 | If present in the original image, set to an empty value  |
| Digital Signature UID              | (0400,0100) | n/a | UI | 1 | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Radiation Machine Name             | (3002,0020) | n/a | SH | 1 | If present in the original image, set to an empty value  |
| Referenced Frame of Reference UID  | (3006,0024) | n/a | UI | 1 | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| ROI Interpreter                    | (3006,00A6) | n/a | PN | 1 | If present in the original image, set to an empty value  |
| Related Frame of Reference UID     | (3006,00C2) | n/a | UI | 1 | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Dose Reference UID                 | (300A,0013) | n/a | UI | 1 | If present in the original image, generated from GE Based UID: <station configuration> and timestamp |
| Treatment Machine Name             | (300A,00B2) | n/a | SH | 1 | If present in the original image, set to an empty value  |
| Brachy Accessory Device Name       | (300A,0266) | n/a | LO | 1 | Removed attribute  |
| Source Applicator Name             | (300A,0294) | n/a | LO | 1 | Removed attribute  |
| Receiver Name                      | (300E,0008) | n/a | PN | 1 | If present in the original image, set to an empty value  |
| Interpretation Recorder            | (4008,0102) | n/a | PN | 1 | Removed attribute  |
| Interpretation Transcriber         | (4008,010A) | n/a | PN | 1 | Removed attribute  |
| Interpretation Author              | (4008,010C) | n/a | PN | 1 | If present in the original image, set to an empty value  |
| Physician Approving Interpretation | (4008,0114) | n/a | PN | 1 | Removed attribute  |
| Distribution Name                  | (4008,0119) | n/a | PN | 1 | Removed attribute  |
| Distribution Address               | (4008,011A) | n/a | LO | 1 | Removed attribute  |

**Note:** Fields which are used for DICOM encoding but have no semantics, for example a group length field, may be also modified.

**Note:** GE Medical Systems Private fields are specifically managed. However, this management is not described in this document.

**Note:** Unknown private and standard DICOM attributes are removed.