ImageGrid®

ImageGrid PACS

Conformance Statement

Software Version 4.1.7

CANDELiS®

1. Conformance Statement Overview

ImageGrid provides transfer and storage service of DICOM objects. It also supports query and retrieval of DICOM objects across the network with other DICOM PS 3 compliant systems.

All storage *SOP Classes* defined as of DICOM 2016 can be received, stored, and transmitted by ImageGrid.

Table 1-1: Overview for Network Services

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
All SOP Classes of the Storage Service Class	Yes	Yes
Query/Retrieve		
Patient Root Query/Retrieve Information Model - FIND	Yes	Yes
Patient Root Query/Retrieve Information Model - MOVE	No	Yes
Study Root Query/Retrieve Information Model - FIND	Yes - Relational by Default	Yes
Study Root Query/Retrieve Information Model - MOVE	Yes - Relational by Default	Yes
Patient/Study Only Query/Retrieve Information Model - FIND (Retired)	No	Yes
Patient/Study Only Query/Retrieve Information Model - MOVE (Retired)	No	Yes
Worklist Management		
Modality Worklist Information Model - FIND	Yes	Yes
Modality Performed Procedure Step SOP Class	No	Yes
Storage Commitment Push Model SOP Class	Yes	Yes
Candelis Study Status Change SOP Class	Yes	Yes

Table 1-2: Overview for Media Services

Media Storage Application Profile	Write Files (FSC)	Read Files (FSR)
Compact Disk - Recordable		
General Purpose CD-R	Yes	Yes
DVD		
General Purpose DVD-R, DVD-RW	Yes	Yes

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3. Introduction

3.1. Revision History

<p align="center">**Table 3-1: Conformance Statement Revision History**</p>

Document Version	Date of Issue	Author	Description
1.1	April 3, 2013	Jamie Ma	Version of Final Text
1.2	May 5, 2016	Luis Ortiz	Minor updates for 2.2.7
1.3	October 31, 2016	Luis Ortiz	Reformatted DICOM Conformance Statement (DCS) to follow the structure of *PS 3.2-A DICOM Conformance Statement Template (Normative)*. Updated DCS for version 2.2.8. Renamed STORAGE-SCU AE, FIND-SCU AE, MOVE-SCU AE, ECHO-SCU AE, MWL-FIND-SCU AE, STORAGE-SCP AE, FIND-SCP AE, ECHO-SCP AE, MWL-FIND-SCP AE, MPPS-SCP AE, AND STORAGE-COMMIT-SCP AE to DS AE to simplify structure the document, consolidate information, reduce duplicate content, and reflect the real implementation, which is a single application entity running as an appliance. Consolidated Supported SOP Classes into a single table for easy reference. Created new diagrams for DS AE that reflect real-world activities and correspond to the sections in Association Initiation Policy and Association Acceptance Policy. Added missing functionality that was added in recent releases. Added Breast Projection X-Ray Image Storage for Presentation and Storage SOP Classes. Assigned more meaningful names to some Supported Private SOP Classes and Retired SOP Classes. Fixed inconsistent wording when referring to SOP Classes. Fixed mismatched real world activities in Media Interchange.
1.4	June 21, 2018	Luis Ortiz	Minor updates for 3.1.5
1.5	April 24, 2024	Luis Ortiz	Updated list of SOP Classes supported for storage and transfer purposes. Clarified maximum PDU size and maximum simultaneous number of associations accepted. Updated document for version 4.1.7.

3.2. Audience

This document is written for the people that need to understand how ImageGrid will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how the functionality integrates with other devices that support compatible DICOM features.

3.3. Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between ImageGrid and other DICOM products. The Conformance Statement should be read and understood in conjunction with DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

The Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statement is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.4. Terms and Definitions

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

Table 3-2: Terms and Definitions

Term	Definition
Abstract Syntax	The information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.
Application Entity (AE)	An endpoint of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.
Application Entity Title	The externally known name of an Application Entity, used to address a DICOM application to other DICOM applications on the network.
Application Context	The specification of the type of communication used between Application Entities. Example: DICOM network protocol.
Association	A network communication channel set up between Application Entities.
Attribute	A unit of information in an object definition; a data element identified by a Tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).
Information Object Definition (IOD)	The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
Joint Photographic Experts Group (JPEG)	A set of standardized image compression techniques, available for use by DICOM applications.
Media Application Profile	The specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs).
Module	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient's Name, Patient ID, Patient's Birth Date, and Patient's Sex.
Negotiation	First phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.
Presentation Context	The set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.
Protocol Data Unit (PDU)	A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Term	Definition
Security Profile	A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.
Service Class Provider (SCP)	Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
Service Class User (SCU)	Role of an Application Entity that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU).
Service/Object Pair (SOP) Class	The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
Service/Object Pair (SOP) Instance	An information object; a specific occurrence of information exchanged in a SOP Class. Examples: a specific x-ray image.
Tag	A 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the Tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,1010) [private data element].
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.
Unique Identifier (UID)	A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
Value Representation (VR)	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5. Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in *italics* below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network "handshake". One of the two devices must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*).

DICOM specifies a number of network services and types of information objects, each of which is called an *Abstract Syntax* for the *Negotiation*. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The *Negotiation* allows the initiating *Application Entity* to propose combinations of *Abstract Syntax* and *Transfer Syntax* to be used on the *Association*; these combinations are called *Presentation Contexts*. The receiving *Application Entity* accepts the *Presentation Contexts* it supports.

For each *Presentation Context*, the *Association Negotiation* also allows the devices to agree on *Roles* – which one is the *Service Class User* (*SCU* – client) and which is the *Service Class Provider* (*SCP* -server). Normally the device initiating the connection is the *SCU*, i.e., the client system calls the server, but not always.

The *Association Negotiation* finally enables exchange of maximum network, packet (*PDU*) size, security information, and network service options (called *Extended Negotiation* information).

The *Application Entities*, having negotiated the *Association* parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate *Information Object Definition*, and sent using the negotiated *Transfer Syntax*. There is a *Default Transfer Syntax* that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is

explicitly acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in progress.

Two *Application Entities* may also communicate with each other by exchanging media (such as a CD-R). Since there is no *Association Negotiation* possible, they both use a *Media Application Profile* that specifies "pre-negotiated" exchange media format, *Abstract Syntax*, and *Transfer Syntax*.

3.6. Definitions, Terms and Abbreviations

Table 3-3: Definitions, Terms, and Abbreviations

Abbreviations / Terms	Definition
AE	Application Entity
AET	Application Entity Title
CD-R	Compact Disk Recordable
DICOM	Digital Imaging and Communications in Medicine
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
HL7	Health Level 7 Standard
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
ISO	International Organization for Standards
JPEG	Joint Photographic Experts Group
MPPS	Modality Performed Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
O	Optional (Key Attribute)
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
R	Required (Key Attribute)
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
U	Unique (Key Attribute)
VR	Value Representation

3.7. References

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

4. Networking

4.1. Implementation Model

ImageGrid provides DICOM Standard services as well as private services as the following DICOM Application Entity:

- DICOM Server (DS) AE
  - Storage
  - Storage Commitment
  - Information Query and Data Retrieve
  - Modality Worklist
  - MPPS
  - Private Workflow-Related Services

The DICOM Server (DS) is a collection of software modules that run in the ImageGrid. "DS AE" refers to the DICOM Application Entity and its supported services.

4.1.1. Application Data Flow

4.1.1.1. Application Data Flow Diagram for DS AE – SCU
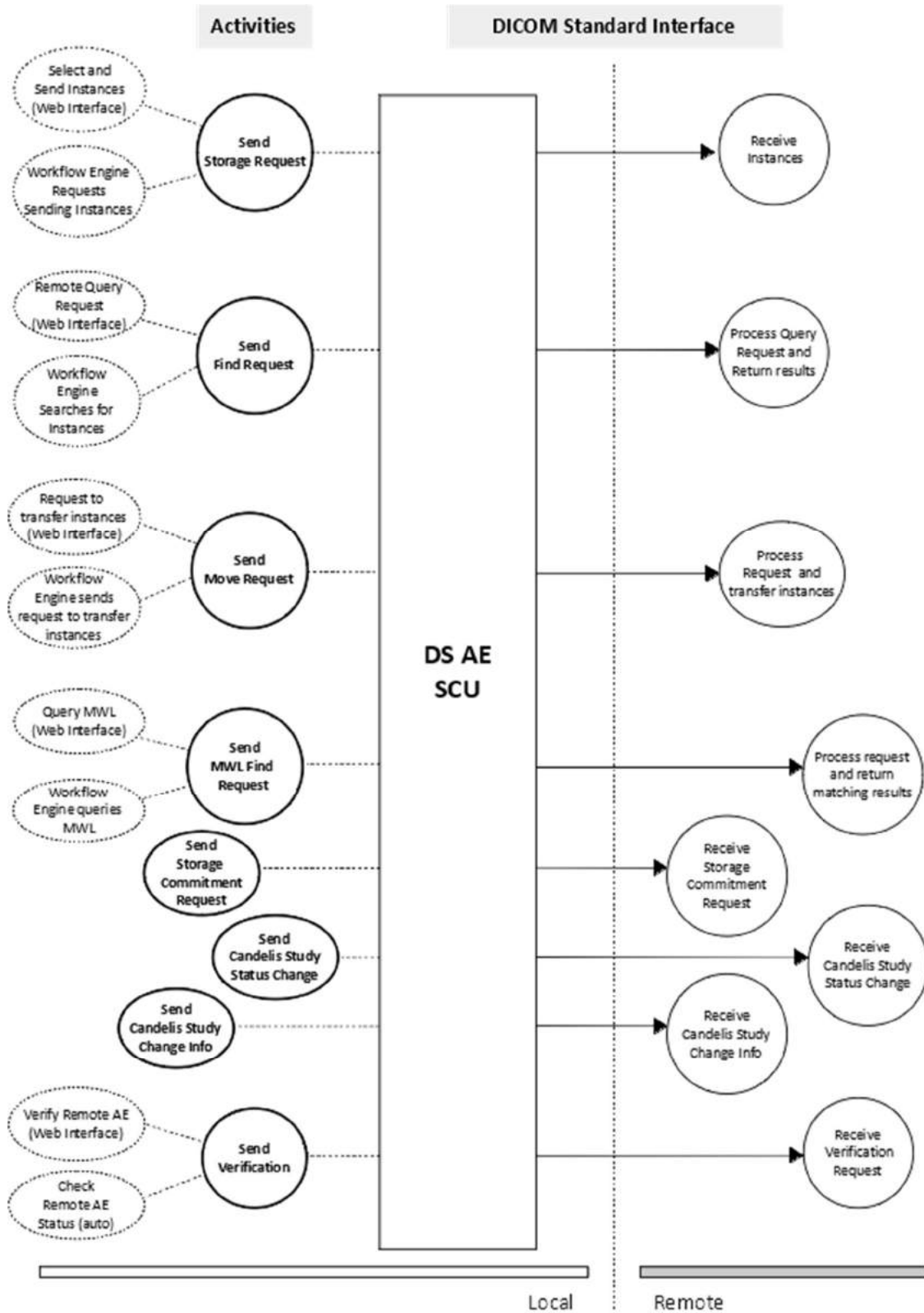
Figure 4-1: SCU Implementation Model

4.1.1.2. Application Data Flow Diagram for DS AE - SCP
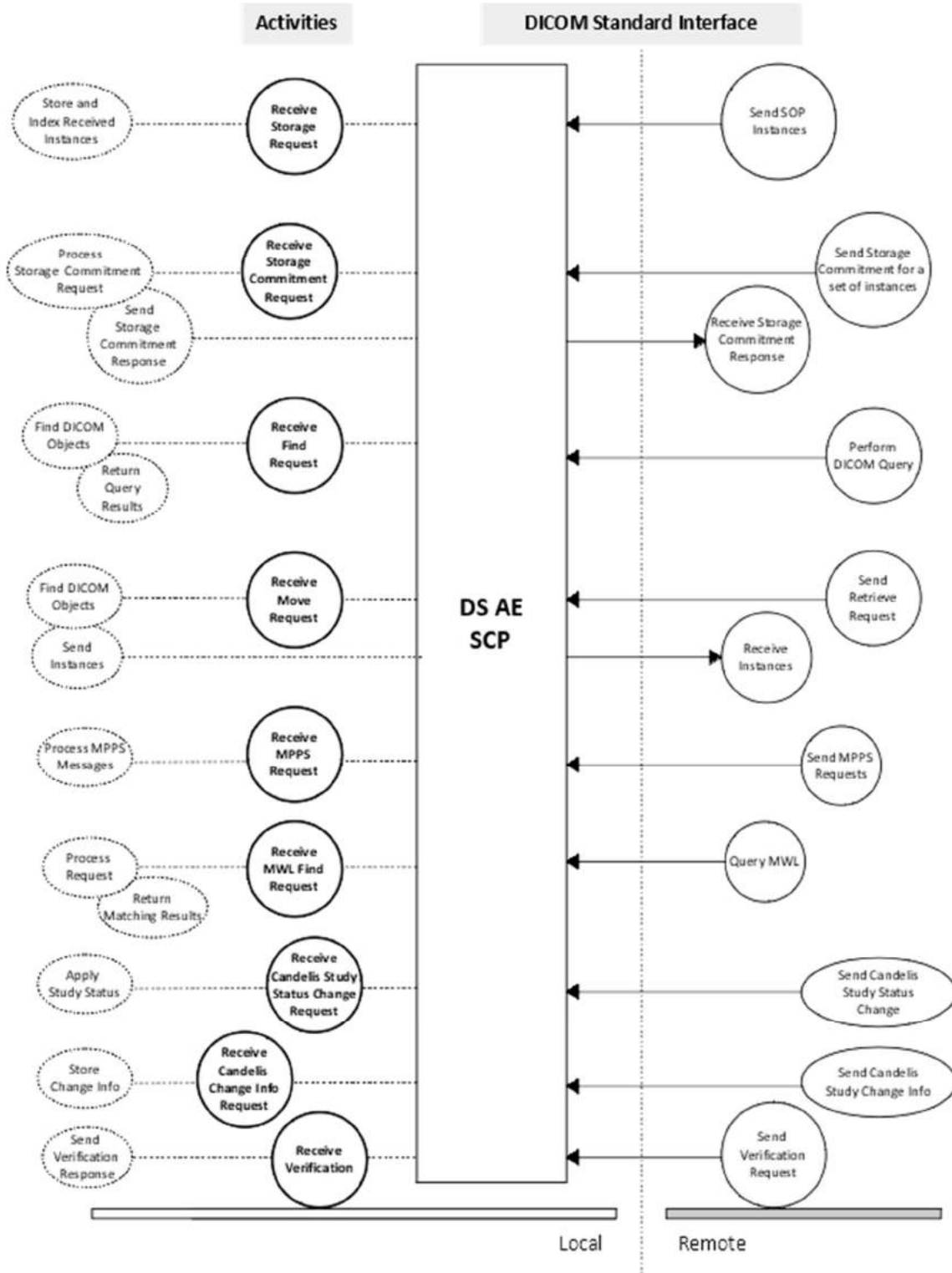
Figure 4-2: SCP Implementation Model

4.1.2. Functional Definitions of AEs

4.1.2.1. DICOM Server (DS) AE

The DS AE acts as multiple *Application Entities.* One or more user-defined AE titles can be configured from the administration web interface. The DS AE can be addressed with any of the user-defined AE titles.

Each Local AE Title has its own storage space and access controls. All Local AE Titles share the same the single PACS database.

The DS AE supports DICOM *Storage Class Provider (SCP)* for Storage, Query/Retrieve, MWL, MPPS, Verification, and Storage Commitment. All the operations are available for all DS AE titles.

The DS AE automatically starts and listens for external requests for Association when the operating system has booted.

The DS listens for external requests for *Association* from a peer DICOM-conformant *Application Entity*. The request is first vetted against a *Local* AE title configuration for access privileges. If the request is accepted the peer may request storing, querying, and retrieving images, or other workflow management.

Configuration for DS AE can be set from the administration web interface. There, *Application Entity Titles* of its peer *AEs* and other DICOM network parameters can be configured.

The DS AE performs operations on the administration web interface's behalf for application-level tasks:

- Sending verification request to a remote AE (C-ECHO).
- Querying a remote AE (C-FIND).
- Querying a remote modality worklist (MWL C-FIND).
- Sending images to a remote AE (C-STORE).
- Retrieving images from a remote AE (C-MOVE).
- Requesting sending images from one remote AE to another remote AE (C-MOVE).

The DS AE has a Workflow Engine, which automates the transfer of DICOM SOP instances under various scenarios.

4.1.3. Sequencing of Real World Activities

Real world activities, as depicted in Figure 4-1 and Figure 4-2, may take place independent of each other and there are no sequencing constraints.

4.2. AE Specifications

4.2.1. DICOM Server (DS) AE

4.2.1.1. SOP Classes

The DS AE provides Standard Conformance to the following SOP Classes:

Table 4-1: SOP Classes (Transfer) Supported by DS AE.

SOP Class Name	SOP Class UID	SCU	SCP
Stored Print Storage (Retired)	1.2.840.10008.5.1.1.27	Yes	Yes
Hardcopy Grayscale Image Storage (Retired)	1.2.840.10008.5.1.1.29	Yes	Yes
Hardcopy Color Image Storage (Retired)	1.2.840.10008.5.1.1.30	Yes	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
Digital X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes
Digital X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes
Digital Mammography X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes
Digital Mammography X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes
Digital Intra Oral X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	Yes
Digital Intra Oral X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes

SOP Class Name	SOP Class UID	SCU	SCP
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes
Legacy Converted Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.2	Yes	Yes
Ultrasound Multiframe Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	Yes
Legacy Converted Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.4	Yes	Yes
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Yes	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Enhanced US Volume Storage	1.2.840.10008.5.1.4.1.1.6.2	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multiframe Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes
Multiframe True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes
Standalone Overlay Storage (Retired)	1.2.840.10008.5.1.4.1.1.8	Yes	Yes
Standalone Curve Storage (Retired)	1.2.840.10008.5.1.4.1.1.9	Yes	Yes
Waveform Storage - Trial (Retired)	1.2.840.10008.5.1.4.1.1.9.1	Yes	Yes
Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	Yes
General Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.2	Yes	Yes
Arterial Pulse Waveform Storage	1.2.840.10008.5.1.4.1.1.9.5.1	Yes	Yes
Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.1	Yes	Yes
Multichannel Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.2	Yes	Yes
Routine Scalp Electroencephalogram Waveform Storage	1.2.840.10008.5.1.4.1.1.9.7.1	Yes	Yes
Electromyogram Waveform Storage	1.2.840.10008.5.1.4.1.1.9.7.2	Yes	Yes
Electrooculogram Waveform Storage	1.2.840.10008.5.1.4.1.1.9.7.3	Yes	Yes
Sleep Electroencephalogram Waveform Storage	1.2.840.10008.5.1.4.1.1.9.7.4	Yes	Yes
Body Position Waveform Storage	1.2.840.10008.5.1.4.1.1.9.8.1	Yes	Yes
Standalone Modality LUT Storage (Retired)	1.2.840.10008.5.1.4.1.1.10	Yes	Yes
Standalone VOI LUT Storage (Retired)	1.2.840.10008.5.1.4.1.1.11	Yes	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2	Yes	Yes
Pseudo Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Yes	Yes
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Yes	Yes
XAX RF Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.5	Yes	Yes
Grayscale Planar MPR Volumetric Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.6	Yes	Yes
Compositing Planar MPR Volumetric Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.7	Yes	Yes
Advanced Blending Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.8	Yes	Yes
Volume Rendering Volumetric Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.9	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	Yes
X-Ray Angiographic Bi Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Yes	Yes

SOP Class Name	SOP Class UID	SCU	SCP
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	Yes	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes
Breast Projection X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.13.1.4	Yes	Yes
Breast Projection X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.13.1.5	Yes	Yes
Intravascular Optical Coherence Tomography Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.14.1	Yes	Yes
Intravascular Optical Coherence Tomography Image Storage for Processing	1.2.840.10008.5.1.4.1.1.14.2	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes
Parametric Map Storage	1.2.840.10008.5.1.4.1.1.30	Yes	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Yes	Yes
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Yes	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Yes	Yes
Tractography Results Storage	1.2.840.10008.5.1.4.1.1.66.6	Yes	Yes
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	Yes	Yes
Surface Scan Mesh Storage	1.2.840.10008.5.1.4.1.1.68.1	Yes	Yes
Surface Scan Point Cloud Storage	1.2.840.10008.5.1.4.1.1.68.2	Yes	Yes
VL Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.77.1	Yes	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	Yes
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	Yes
Ophthalmic Photography 8Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes
Ophthalmic Photography 16Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	Yes
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	Yes	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	Yes
Wide Field Ophthalmic Photography Stereographic Projection Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.5	Yes	Yes
Wide Field Ophthalmic Photography 3D Coordinates Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.6	Yes	Yes
Ophthalmic Optical Coherence Tomography En Face Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.7	Yes	Yes
Ophthalmic Optical Coherence Tomography B-scan Volume Analysis Storage	1.2.840.10008.5.1.4.1.1.77.1.5.8	Yes	Yes
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	Yes	Yes
Dermoscopic Photography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.7	Yes	Yes
VL Multi Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.77.2	Yes	Yes
Lensometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.1	Yes	Yes
Autorefraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.2	Yes	Yes
Keratometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.3	Yes	Yes
Subjective Refraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.4	Yes	Yes
Visual Acuity Measurements Storage	1.2.840.10008.5.1.4.1.1.78.5	Yes	Yes
Spectacle Prescription Report Storage	1.2.840.10008.5.1.4.1.1.78.6	Yes	Yes
Ophthalmic Axial Measurements Storage	1.2.840.10008.5.1.4.1.1.78.7	Yes	Yes
Intraocular Lens Calculations Storage	1.2.840.10008.5.1.4.1.1.78.8	Yes	Yes
Macular Grid Thickness and Volume Report Storage	1.2.840.10008.5.1.4.1.1.79.1	Yes	Yes
Ophthalmic Visual Field Static Perimetry Measurements Storage	1.2.840.10008.5.1.4.1.1.80.1	Yes	Yes
Ophthalmic Thickness Map Storage	1.2.840.10008.5.1.4.1.1.81.1	Yes	Yes
Corneal Topography Map Storage	1.2.840.10008.5.1.4.1.1.82.1	Yes	Yes
Text SR Storage - Trial (Retired)	1.2.840.10008.5.1.4.1.1.88.1	Yes	Yes
Audio SR Storage - Trial (Retired)	1.2.840.10008.5.1.4.1.1.88.2	Yes	Yes

SOP Class Name	SOP Class UID	SCU	SCP
Detail SR Storage - Trial (Retired)	1.2.840.10008.5.1.4.1.1.88.3	Yes	Yes
Comprehensive SR Storage - Trial (Retired)	1.2.840.10008.5.1.4.1.1.88.4	Yes	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34	Yes	Yes
Extensible SR Storage	1.2.840.10008.5.1.4.1.1.88.35	Yes	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	Yes
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	Yes	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes
Radiopharmaceutical Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.68	Yes	Yes
Colon CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.69	Yes	Yes
Implantation Plan SR Document Storage	1.2.840.10008.5.1.4.1.1.88.70	Yes	Yes
Acquisition Context SR Storage	1.2.840.10008.5.1.4.1.1.88.71	Yes	Yes
Simplified Adult Echo SR Storage	1.2.840.10008.5.1.4.1.1.88.72	Yes	Yes
Patient Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.73	Yes	Yes
Planned Imaging Agent Administration SR Storage	1.2.840.10008.5.1.4.1.1.88.74	Yes	Yes
Performed Imaging Agent Administration SR Storage	1.2.840.10008.5.1.4.1.1.88.75	Yes	Yes
Content Assessment Results Storage	1.2.840.10008.5.1.4.1.1.90.1	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	Yes	Yes
Encapsulated STL Storage	1.2.840.10008.5.1.4.1.1.104.3	Yes	Yes
Encapsulated OBJ Storage	1.2.840.10008.5.1.4.1.1.104.4	Yes	Yes
Encapsulated MTL Storage	1.2.840.10008.5.1.4.1.1.104.5	Yes	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes
Legacy Converted Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.128.1	Yes	Yes
Standalone PET Curve Storage (Retired)	1.2.840.10008.5.1.4.1.1.129	Yes	Yes
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	Yes	Yes
Basic Structured Display Storage	1.2.840.10008.5.1.4.1.1.131	Yes	Yes
CT Defined Procedure Protocol Storage	1.2.840.10008.5.1.4.1.1.200.1	Yes	Yes
CT Performed Procedure Protocol Storage	1.2.840.10008.5.1.4.1.1.200.2	Yes	Yes
Protocol Approval Storage	1.2.840.10008.5.1.4.1.1.200.3	Yes	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Yes	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	Yes
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	Yes	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Yes	Yes
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	Yes	Yes
RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9	Yes	Yes
RT Physician Intent Storage	1.2.840.10008.5.1.4.1.1.481.10	Yes	Yes
RT Segment Annotation Storage	1.2.840.10008.5.1.4.1.1.481.11	Yes	Yes
RT Radiation Set Storage	1.2.840.10008.5.1.4.1.1.481.12	Yes	Yes
C-Arm Photon-Electron Radiation Storage	1.2.840.10008.5.1.4.1.1.481.13	Yes	Yes
Tomotherapeutic Radiation Storage	1.2.840.10008.5.1.4.1.1.481.14	Yes	Yes
Robotic-Arm Radiation Storage	1.2.840.10008.5.1.4.1.1.481.15	Yes	Yes
RT Radiation Record Set Storage	1.2.840.10008.5.1.4.1.1.481.16	Yes	Yes
RT Radiation Salvage Record Storage	1.2.840.10008.5.1.4.1.1.481.17	Yes	Yes
Tomotherapeutic Radiation Record Storage	1.2.840.10008.5.1.4.1.1.481.18	Yes	Yes

SOP Class Name	SOP Class UID	SCU	SCP
C-Arm Photon-Electron Radiation Record Storage	1.2.840.10008.5.1.4.1.1.481.19	Yes	Yes
Robotic Radiation Record Storage	1.2.840.10008.5.1.4.1.1.481.20	Yes	Yes
RT Beams Delivery Instruction Storage	1.2.840.10008.5.1.4.34.7	Yes	Yes
RT Brachy Application Setup Delivery Instruction Storage	1.2.840.10008.5.1.4.34.10	Yes	Yes
Hanging Protocol Storage	1.2.840.10008.5.1.4.38.1	Yes	Yes
Generic Implant Template Storage	1.2.840.10008.5.1.4.43.1	Yes	Yes
Implant Assembly Template Storage	1.2.840.10008.5.1.4.44.1	Yes	Yes
Implant Template Group Storage	1.2.840.10008.5.1.4.45.1	Yes	Yes
DICOS CT Image Storage	1.2.840.10008.5.1.4.1.1.501.1	Yes	Yes
DICOS Digital X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.501.2.1	Yes	Yes
DICOS Digital X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.501.2.2	Yes	Yes
DICOS Threat Detection Report Storage	1.2.840.10008.5.1.4.1.1.501.3	Yes	Yes
DICOS 2D AIT Storage	1.2.840.10008.5.1.4.1.1.501.4	Yes	Yes
DICOS 3D AIT Storage	1.2.840.10008.5.1.4.1.1.501.5	Yes	Yes
DICOS Quadrupole Resonance Storage	1.2.840.10008.5.1.4.1.1.501.6	Yes	Yes
DICONDE Eddy Current Image Storage	1.2.840.10008.5.1.4.1.1.601.1	Yes	Yes
DICONDE Eddy Current Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.601.2	Yes	Yes
RT Beams Delivery Instruction Storage - Trial (Retired)	1.2.840.10008.5.1.4.34.1	Yes	Yes
RT Beams Delivery Instruction Storage	1.2.840.10008.5.1.4.34.7	Yes	Yes
RT Brachy Application Setup Delivery Instruction Storage	1.2.840.10008.5.1.4.34.10	Yes	Yes
Generic Implant Template Storage	1.2.840.10008.5.1.4.43.1	Yes	Yes
Implant Assembly Template Storage	1.2.840.10008.5.1.4.44.1	Yes	Yes
Implant Template Group Storage	1.2.840.10008.5.1.4.45.1	Yes	Yes
Varian Private Storage - LT Archive RT Treatment Record	1.2.246.352.70.1.10	Yes	Yes
GE Private Storage - RT Plan	1.2.840.113619.4.5.249	Yes	Yes
GE Private Storage	1.2.840.113619.4.25.1	Yes	Yes
GE Private Storage - DICOM 3D Object	1.2.840.113619.4.26	Yes	Yes
GE Private Storage - NM Genie	1.2.840.113619.4.27	Yes	Yes
GE Private Storage - PET Advance	1.2.840.113619.4.30	Yes	Yes
Siemens Private CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Yes	Yes
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Yes	Yes
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Yes	Yes

Table 4-2: SOP Classes (Other) Supported by DS AE.

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Query/Retrieve			
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	Yes
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes
Patient/Study Only Query/Retrieve Information Model - FIND (Retired)	1.2.840.10008.5.1.4.1.2.3.1	No	Yes
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes
Patient/Study Only Query/Retrieve Information Model - MOVE (Retired)	1.2.840.10008.5.1.4.1.2.3.2	No	Yes
Workflow Management			
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	No	Yes
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	Yes
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	Yes
Candelis Private SOP Classes			
Candelis Private Study Status Change SOP Class	1.3.6.1.4.1.2820.228466.1	Yes	Yes
Candelis Private Study Change Info Object	1.3.6.1.4.1.2820.228466.2	Yes	Yes

4.2.1.2. Association Policies

4.2.1.2.1. General

Table 4-3: DICOM Application Context

| Application Context Name | 1.2.840.10008.3.1.1.1 |

Table 4-4: Maximum PDU Size Received for DS AE

| Maximum PDU size received | Default 16384 Bytes (configurable up to 131072 Bytes) |

4.2.1.2.2. Number of Associations

The number of *Associations* are shared among all AE's equally on a first come first serve basis. There is a limitation on the overall number of *Associations* across all the AE's. But there is no constraint on any particular AE.

Table 4-5: Number of Associations as an Initiator for DS AE

| Maximum number of simultaneous associations | Unlimited |

Table 4-6: Number of Associations as an Acceptor for DS AE

| Maximum number of simultaneous associations | Default: 16 associations. Configurable to a higher number depending on the server CPU and memory resources. |

4.2.1.2.3. Asynchronous Nature

DS AE will only allow a single outstanding operation on an *Association*. Therefore, DS AE will not perform asynchronous operations window *Negotiation*.

Table 4-7: Asynchronous Nature for DS AE

| Maximum number of outstanding asynchronous transactions | 1 |

4.2.1.2.4. Implementation Identifying Information

Table 4-8: DICOM Implementation Class and Version for DS AE

| Implementation Class UID | 1.3.6.1.4.1.2820.0.3.0.0 |
| Implementation Version Name | IGPACS_v3.2.0 |

4.2.1.2.5. Association Acceptance

When DS AE receives a connection, the association *Called* AE Title and *Calling* AE Title will be checked as follows:

- When the *Called* AE Title does not match any of the configured local AE Titles, the *Association* will be rejected.
- When the *Called* AE Title matches one of the configured local AE Titles…
  - If the local AE Title is not configured as *promiscuous mode* and the *Calling* AE Title is not configured as a remote AE Title, the *Association* will be rejected.
  - If the *Calling* AE Title is configured as a remote AE, but the AE Title is not granted *permission to access* the *Called* AE Title, the *Association* will be rejected.

Local AE Titles are *promiscuous* by default; permitting any Remote AE to create an association with DS AE.

Permission to access is defined as *read*, *write*, or *read and write*. Each local AE Title can be configured with their own permissions for Remote AE Titles.

4.2.1.3. Association Initiation Policy

4.2.1.3.1. Activity – Send Verification

4.2.1.3.1.1. Description and Sequencing of Activities

Verification requests (C-ECHO) may be user-initiated or automatic.

A user may initiate a verification request by performing a Remote AE verification in the Administration Web interface. The DS AE will send one verification request to the selected Remote AE for each configured Local AE Title.

DS AE may periodically send verification requests to a Remote AE as part of the *Availability Sensing* feature.

4.2.1.3.1.2. Proposed Presentation Contexts

Table 4-9: Proposed Presentation Context for DS AE as an C-ECHO SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

DS AE proposes only one *Presentation Context* for the Verification *SOP Class*, with the above three native *Transfer Syntaxes*.

4.2.1.3.1.3. SOP Specific Conformance

4.2.1.3.1.3.1. SOP Specific Conformance to Verification SOP Class

DS AE provides standard conformance to the Verification Service Class.

Table 4-10: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged.
Association Aborted	The association is released and the reason is logged.

4.2.1.3.1.3.2. Transfer Syntax Selection Policies

Since DS AE only proposes one *Presentation Context* for the Verification *SOP Class*, it will use any of the *Transfer Syntaxes* accepted by the remote C-ECHO SCP.

4.2.1.3.2. Activity – Send Storage Request

4.2.1.3.2.1. Description and Sequencing of Activities

C-STORE requests for instances can be user-initiated or automatic. The DS AE has the ability to send DICOM objects at as a study, series, or a single instance.

A user may send a study, series, or a single instance in the Administration Web Interface.

DS AE may automatically send a study, series or a single instance when initiated by the Workflow Engine's routing, prefetching, and post-fetching services.

If the first attempt of the send fails, multiple retries will be performed. The maximum number of retries is configurable.

Via the web interface it is possible to attach a PDF. This will result in an *Encapsulated PDF*. Upon the creation of this object, it will be stored and become part of its corresponding study. Subsequently, its metadata will be evaluated by the Workflow Engine using routing policies, which may result in the object being transferred to a remote *AE*.

If the ImageGrid's HL7 Service is active, *Basic Text SR* may be created when receiving certain types of HL7 messages. Upon the creation of this object, its metadata will be evaluated against the routing policies and may be transferred to a remote *AE*. HL7 Service for ImageGrid is beyond the scope of this document.

4.2.1.3.2.2. Proposed Presentation Contexts

Table 4-11: Proposed Presentation Contexts for DS AE as a C-STORE SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Table 4-1	See Table 4-1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Preferred Transfer Syntax of the Transfer (see Table 4-12)		SCU	None

Table 4-12: Acceptable Preferred Transfer Syntax of a Transfer

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Table 4-1	See Table 4-1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		RLE Lossless	1.2.840.10008.1.2.5	SCU	None
		Deflated Explicit VR Little Endian	1.2.840.10008.1.2.1.99	SCU	None
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCU	None
		JPEG Extended (Process 3 & 5)	1.2.840.10008.1.2.4.52	SCU	None
		JPEG Spectral Selection, Non-Hierarchical (Process 6 & 8)	1.2.840.10008.1.2.4.53	SCU	None
		JPEG Spectral Selection, Non-Hierarchical (Process 7 & 9)	1.2.840.10008.1.2.4.54	SCU	None
		JPEG Full Progression, Non-Hierarchical (Process 10 & 12)	1.2.840.10008.1.2.4.55	SCU	None
		JPEG Full Progression, Non-Hierarchical (Process 11 & 13)	1.2.840.10008.1.2.4.56	SCU	None
		JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57	SCU	None
		JPEG Lossless, Non-Hierarchical (Process 15)	1.2.840.10008.1.2.4.58	SCU	None
		JPEG Extended, Hierarchical (Process 16 & 18)	1.2.840.10008.1.2.4.59	SCU	None
		JPEG Extended, Hierarchical (Process 17 & 19)	1.2.840.10008.1.2.4.60	SCU	None

		JPEG Spectral Selection, Hierarchical (Process 20 & 22)	1.2.840.10008.1.2.4.61	SCU	None
		JPEG Spectral Selection, Hierarchical (Process 21 & 23)	1.2.840.10008.1.2.4.62	SCU	None
		JPEG Full Progression, Hierarchical (Process 24 & 26)	1.2.840.10008.1.2.4.63	SCU	None
		JPEG Full Progression, Hierarchical (Process 25 & 27)	1.2.840.10008.1.2.4.64	SCU	None
		JPEG Lossless, Hierarchical (Process 28)	1.2.840.10008.1.2.4.65	SCU	None
		JPEG Lossless, Hierarchical (Process 29)	1.2.840.10008.1.2.4.66	SCU	None
		JPEG Lossless, Non-Hierarchical, (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	SCU	None
		JPEG-LS Lossless	1.2.840.10008.1.2.4.80	SCU	None
		JPEG-LS Lossy (Near-Lossless)	1.2.840.10008.1.2.4.81	SCU	None
		JPEG 2000 (Lossless Only)	1.2.840.10008.1.2.4.90	SCU	None
		JPEG 2000 (Lossless or Lossy)	1.2.840.10008.1.2.4.91	SCU	None
		JPEG 2000 Part 2 Multi-component (Lossless Only) *	1.2.840.10008.1.2.4.92	SCU	None
		JPEG 2000 Part 2 Multi-component (Lossless or Lossy) *	1.2.840.10008.1.2.4.93	SCU	None
		JPIP Referenced *	1.2.840.10008.1.2.4.94	SCU	None
		JPIP Referenced Deflate *	1.2.840.10008.1.2.4.95	SCU	None
		MPEG2 Main Profile @ Main Level *	1.2.840.10008.1.2.4.100	SCU	None
		MPEG2 Main Profile @ High Level *	1.2.840.10008.1.2.4.101	SCU	None
		MPEG-4 AVC/H.264 High Profile / Level 4.1 *	1.2.840.10008.1.2.4.102	SCU	None
		MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1 *	1.2.840.10008.1.2.4.103	SCU	None

DS AE proposes *Presentation Contexts* only for the *SOP Classes* of the instances that are to be transferred.

For each *SOP Class*, DS AE proposes multiple *Presentation Contexts* to determine which *Transfer Syntaxes* the remote C-STORE SCP supports: one *Presentation Context* for the three native *Transfer Syntaxes*, one *Presentation Context* for the *Transfer Syntax* in which the *SOP* is received, and one separate *Presentation Context* for each encapsulated *Transfer Syntax* from the preferred *Transfer Syntaxes*.

DS AE will not propose the three native *Transfer Syntaxes*, if decompression of the *Transfer Syntax* in which the *SOP* is received is not supported.

DS AE will not propose any encapsulated *Transfer Syntax*, if the AE of the remote C-STORE-SCP is configured to disable encapsulated *Transfer Syntax*.

4.2.1.3.2.3. SOP Specific Conformance

4.2.1.3.2.3.1. SOP Specific Conformance to Storage SOP Class

DS AE provides standard conformance to the Storage Service Class.

Table 4-13: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Status Codes	Reason
Success	Storing instances completed.	0000	Information message is written to the log files.
Failure, Refused	Any	Any	Error message is written to the log file. If the request was initiated by the Workflow Engine, the request may be retried at a later time.

Service Status	Further Meaning	Status Codes	Reason
Warning	Any	Any	Warning message is written to the log file. If one or more instances could not be sent and the request was initiated by the Workflow Engine, the request may be retried at a later time.

Table 4-14: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged.
Association Aborted	The association is released and the reason is logged.

4.2.1.3.2.3.2. Transfer Syntax Selection Policies

If both native *Transfer Syntax* and encapsulated *Transfer Syntax* are accepted by the remote C-STORE SCP, DS AE will attempt to use the encapsulated *Transfer Syntax* over the native *Transfer Syntax*. Among the encapsulated *Transfer Syntaxes* that are accepted, DS AE will attempt to use the most preferred *Transfer Syntax* configured.

The preferred *Transfer Syntaxes* can be configured from the routing service settings, routing policies, and pre/post-fetching policies. The preferred *Transfer Syntaxes* in the policies have higher priority than the one from the routing service settings.

4.2.1.3.3. Activity – Send Find Request

4.2.1.3.3.1. Description and Sequencing of Activities

A Find Request (C-FIND request) can be user-initiated or automatic.

The user may initiate a remote query to a remote AE from the Administration Web Interface. The query can be performed on different levels in the hierarchy, depending on the object the user chooses to query.

DS AE may also send a C-FIND request when required by the Workflow Engine's prefetching or post-fetching. The parameters for the C-FIND request will be determined by the settings in the prefetching or post-fetching policy. The C-FIND request is used to find prior studies or series for patients in one or more remote AE Titles designated as *fetching sources*. There is no limit on the number of matching responses that will be processed.

The PACS' *DICOM Import Reconciliation* uses the Patient Root Query/Retrieve Information Model to get a list of patients from a remote AE.

All other features use the Study Root Query/Retrieve Information Model for general queries on study, series, and instance levels.

4.2.1.3.3.2. Proposed Presentation Contexts

Table 4-15: Proposed Presentation Contexts for DS AE as a C-FIND SCU

Presentation Context Table						
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
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	See 4.2.1.3.3.2.1
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	

DS AE proposes only one *Presentation Context* in each *Association* with one supported *SOP Class* and the *Transfer Syntaxes* listed above.

4.2.1.3.3.2.1. Extended Negotiation

Relational queries may be used when using the Study Root Query/Retrieve Information Model.

4.2.1.3.3.3. SOP Specific Conformance

4.2.1.3.3.3.1. SOP Specific Conformance to FIND SOP Class

DS AE provides standard conformance to the supported C-FIND SOP Classes.

DS AE never issues C-FIND-CANCEL requests.

A query can be initiated from any level given the appropriate criteria.

Requested return *Attributes* not returned by the remote C-FIND SCP are ignored. Non-matching responses returned by the remote C-FIND SCP due to unsupported matching keys are not filtered locally by DS AE; therefore, non-matching responses will still be presented in the query results. No attempt is made to filter out duplicate responses.

Specific Character Set will always be included in each query request. If present in the response, Specific Character Set will be used to identify character sets other than the default character set for application processing and display purpose. The character set to be used by DS AE can be configured from the Administration Web Interface.

Table 4-16: Patient Root Request Identifier for DS AE as a C-FIND SCU

Name	Tag	Types of Matching
Patient Level		
Patient ID	(0010,0020)	S, W, U
Patient's Name	(0010,0010)	S, W, U
Patient's Birth Date	(0010,0030)	U
Patient's Sex	(0010,0040)	S, U
Specific Character Set	(0008,0005)	S, U

Table 4-17: Study Root Request Identifier for DS AE as a C-FIND SCU

Name	Tag	Types of Matching
Study Level		
Patient ID	(0010,0020)	S, W, U
Patient's Name	(0010,0010)	S, W, U
Patient's Birth Date	(0010,0030)	U
Patient's Sex	(0010,0040)	U
Study Instance UID	(0020,000D)	UNIQUE
Accession Number	(0008,0050)	S, W, U
Study Date	(0008,0020)	S, R, U
Study Time	(0008,0030)	U
Modalities in Study	(0008,0061)	S, U
Institution Name	(0008,0080)	S, W, U
Study ID	(0020,0010)	U
Study Description	(0008,1030)	S, W, U
Requested Procedure Description	(0032,1060)	U
Admitting Diagnoses Description	(0008,1080)	U
Referring Physician's Name	(0008,0090)	S, W, U

Name	Tag	Types of Matching
Name of Physicians Reading Study	(0008,1060)	S, W, U
Number of Study Related Series	(0020,1206)	U
Name of Study Related Instances	(0020,1208)	U
Retrieve AE Title	(0008,0054)	U
Instance Availability	(0008,0056)	U
Series Level		
Patient ID	(0010,0020)	S, W, U
Patient's Name	(0010,0010)	S, W, U
Study Description	(0008,1030)	S, W, U
Study Date	(0008,0020)	S, R, U
Accession Number	(0008,0050)	S, W, U
Referring Physician's Name	(0008,0090)	S, W, U
Name of Physicians Reading Study	(0008,1060)	S, W, U
Institution Name	(0008,0080)	S, W, U
Study Instance UID	(0020,000D)	S, U
Series Instance UID	(0020,000E)	UNIQUE
Series Date	(0008,0021)	U
Series Time	(0008,0031)	U
Modality	(0008,0060)	S, U
Series Number	(0020,0011)	U
Series Description	(0008,103E)	S, W, U
Protocol Name	(0018,1030)	U
Body Part Examined	(0018,0015)	S, W, U
Operator's Name	(0008,1070)	U
Performing Physician's Name	(0008,1050)	U
Performed Procedure Step Description	(0040,0254)	U
Performed Procedure Step ID	(0040,0253)	U
Performed Procedure Step Start Date	(0040,0244)	U
Performed Procedure Step Start Time	(0040,0245)	U
Number of Series Related Instances	(0020,1209)	U
Image Level		
Series Instance UID	(0020,000E)	S, U
SOP Instance UID	(0008,0018)	UNIQUE
SOP Class UID	(0008,0016)	U
Acquisition Date Time	(0008,002A)	U
Instance Number	(0020,0013)	U
Image Comments	(0020,4000)	U
Rows	(0028,0010)	U
Columns	(0028,0011)	U
Bits Allocated	(0028,0100)	U
Number of Frames	(0028,0008)	U
Content Date	(0008,0023)	U
Content Time	(0008,0033)	U
Content Label	(0070,0080)	U

Name	Tag	Types of Matching
Content Description	(0070,0081)	U
Content Creator's Name	(0070,0084)	U
Presentation Creation Date	(0070,0082)	U
Presentation Creation Time	(0070,0083)	U
Observation Date Time	(0040,A032)	U
Completion Flag	(0040,A491)	U
Verification Flag	(0040,A493)	U
Common to all query levels		
Specific Character Set	(0008,0005)	S, U

The types of matching supported by DS AE as a C-FIND SCU are described as follows:

- "S" indicates the identifier *Attribute* uses Single Value Matching
- "R" indicates Range Matching
- "W" indicates Wildcard Matching
- "U" indicates Universal Matching (i.e. a return key).
- "UNIQUE" indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

The identifiers listed for each level are not necessarily all included for all the Study Root Query/Retrieve Information Model C-FIND requests. Different applications may use different subsets to issue the C-FIND requests, depending on what *Attributes* that they are interested in.

Table 4-18: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Status Codes	Reason
Success	Matching completed	0000	Information message is written to the log files.
Failure, Refused	Any	Any	Error message is written to the log file. If the request was initiated by the Workflow Engine, the request may be retried at a later time. If the request was initiated from the Administration Web Interface, the user will be notified of the failure.
Warning	Any	Any	Warning message is written to the log file.
Pending	Any	FF00 and FF01	Waits for the next matches. There is no limit for the number of matching responses handled.

Table 4-19: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged.
Association Aborted	The association is released and the reason is logged.

4.2.1.3.3.3.2. Transfer Syntax Selection Policies

Since DS AE only proposes one *Presentation Context* for a supported *SOP Class*, it will use any of the *Transfer Syntaxes* accepted by the remote C-FIND SCP.

4.2.1.3.4. Activity – Send Move Request

4.2.1.3.4.1. Description and Sequencing of Activities

A Move Request (C-MOVE) can be user-initiated or automatic.

A user can initiate a retrieve from the Administration Web Interface. The retrieval can be executed on different levels in the hierarchy, depending on what object the user chooses to retrieve.

DS AE can also issue a C-MOVE request initiated by Workflow Engine's prefetching or post-fetching. The C-MOVE is utilized to forward or retrieve priors for particular patients.

4.2.1.3.4.2. Proposed Presentation Contexts

Table 4-20: Proposed Presentation Contexts for DS AE as a C-MOVE SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
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	See 4.2.1.3.4.2.1
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	See 4.2.1.3.4.2.1

4.2.1.3.4.2.1. Extended Negotiation

Relational retrievals are supported.

4.2.1.3.4.3. SOP Specific Conformance

4.2.1.3.4.3.1. SOP Specific Conformance to MOVE SOP Class

DS AE provides standard conformance to the supported C-MOVE SOP Classes.

Only Study Root Query/Retrieve Information Model is supported by MOVE-SCU.

A retrieval will be performed at the STUDY, SERIES or IMAGE level depending on what level of entity has been selected if the retrieval is initiated by the user, or what pre/post-fetching policies have been configured if the retrieval is initiated by these policies.

No C-MOVE-CANCEL requests are ever issued.

The instances are retrieved to a local or remote move destination by specifying the destination as the AE Title of the DS AE. This implies that the remote C-MOVE SCP must be pre-configured to determine the presentation address corresponding to the DS AE, and the DS AE must accept storage requests addressed to it from the remote C-MOVE SCP.

Table 4-21: Study Root Request Identifier for DS AE as a C-MOVE SCU

Name	Tag	Unique, Matching or Return Key
Study Level		
Study Instance UID	(0020,000D)	U
Series Level		
Series Instance UID	(0020,000E)	U
Image Level		
SOP Instance UID	(0008,0018)	U

Table 4-22: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Status Codes	Reason
Success	Move completed	0000	Information message is written to the log files.
Failure, Refused	Any	Any	Error message is written to the log file. If the request was initiated by the Workflow Engine, the request may be retried at a later time.
Warning	Any	Any	Warning message is written to the log file.
Pending	Any	FF00 and FF01	Waits for the next C-MOVE response.

Table 4-23: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged.
Association Aborted	The association is released and the reason is logged.

4.2.1.3.4.3.2. Transfer Syntax Selection Policies

Since DS AE only proposes one *Presentation Context* for the supported *SOP Class*, it will use any of the *Transfer Syntaxes* accepted by the remote C-MOVE SCP.

4.2.1.3.4.3.3. Sub-operation dependent behavior

Since the C-MOVE operation is dependent on completion of C-STORE sub-operations that are occurring on a separate *Association*, the question of failure of operations on the other *Association* must be considered.

DS AE is completely independent of whatever activities are taking place in relation to the C-STORE SCP AE that is receiving the retrieved instances. The only status update of the move operation is from the response status returned by the remote C-MOVE SCP. There is no attempt by DS AE to confirm that instances have actually been successfully received or stored.

Whether or not the remote AE attempts to retry any failed C-STORE sub-operations is beyond the control of DS AE.

If the *Association* from DS AE to the C-MOVE SCP AE is aborted for any reason, whether the C-STORE sub-operations continue or not is dependent on the remote C-MOVE SCP AE.

4.2.1.3.5. Activity – Send MWL Find Request

4.2.1.3.5.1. Description and Sequencing of Activities

DS AE issues a MWL Find Request (a C-FIND using the Modality Worklist Information Model) initiated by the Workflow Engine's prefetching to track scheduled exams in a certain time frame using criteria specified in the prefetching policies. There is no limit on the number of matching responses that will be processed.

4.2.1.3.5.2. Proposed Presentation Contexts

Table 4-24: Proposed Presentation Contexts for DS AE as an MWL C-FIND SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

DS AE proposes only one *Presentation Context* in each *Association* with one supported *SOP Class* and two native *Transfer Syntaxes*.

4.2.1.3.5.3. SOP Specific Conformance

4.2.1.3.5.3.1. SOP Specific Conformance to Modality Worklist SOP Class

DS AE provides standard conformance to the supported Modality Worklist SOP Class.

DS AE never issues C-FIND-CANCEL requests.

Requested *Attributes* not returned by the remote MWL C-FIND SCP are ignored. Non-matching responses returned by the C-FIND SCP due to unsupported matching can be filtered locally by DS AE. No attempt is made to filter out duplicate responses.

Specific Character Set will always be included in each query request. If present in the response, Specific Character Set will be used to identify character sets other than the default character set for application processing. The character set to be used by DS AE can be configured from the Administration Web Interface.

Table 4-25: Request Identifier for DS AE as an MWL C-FIND SCU

Name	Tag	Types of Matching
Patient ID	(0010,0020)	U
Patient's Name	(0010,0010)	U
Accession Number	(0008,0050)	U
Institution Name	(0008,0080)	U
Referring Physician's Name	(0008,0090)	U
Referenced Study Sequence	(0008,1110)	U
Referenced Patient Sequence	(0008,1120)	U
Study Instance UID	(0020,000D)	U
Requested Procedure Description	(0032,1060)	U
Requested Procedure Code Sequence	(0032,1064)	U
Admission ID	(0038,0010)	U
Scheduled Procedure Step Sequence	(0040,0100)	Q
> Modality	(0008,0060)	S, U
> Scheduled Station AE Title	(0040,0001)	S, U
> Scheduled Procedure Step Start Date	(0040,0002)	R, U
> Scheduled Procedure Step Start Time	(0040,0003)	R, U
> Scheduled Procedure Step Description	(0040,0007)	U
Requested Procedure ID	(0040,1001)	U
Reason for The Requested Procedure	(0040,1002)	U
Requested Procedure Priority	(0040,1003)	U
Specific Character Set	(0008,0005)	S, U

The types of matching supported by the DS AE are as follows:

- "S" indicates the identifier *Attribute* uses Single Value Matching.
- "R" indicates Range Matching.
- "U" indicates Universal Matching.
- "Q" indicates Sequence Matching.

The Administration Web Interface permits specifying tags and sequences in the *Prefetching Policy* that are not listed in the table. The matching type for those tags will correspond to their value type and the MWL C-FIND SCP's conformance to the Modality Worklist SOP Class.

Table 4-26: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Status Codes	Reason
Success	Matching completed	0000	Information message is written to the log files.
Failure, Refused	Any	Any	Error message is written to the log file. If the request was initiated by the Workflow Engine, the request may be retried later.
Warning	Any	Any	Warning message is written to the log file.
Pending	Any	FF00 and FF01	Waits for the next matches. There is no limit for the number of matching responses handled.

Table 4-27: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged.
Association Aborted	The association is released and the reason is logged.

4.2.1.3.5.3.2. Transfer Syntax Selection Policies

Since DS AE only proposes one *Presentation Context* for the supported *SOP Class*, it will use any of the *Transfer Syntaxes* accepted by the remote MWL C-FIND SCP.

4.2.1.3.6. Activity – Send Storage Commitment Request

4.2.1.3.6.1. Description and Sequencing of Activities

This activity only occurs when Storage Commitment is enabled. The configuration is per Remote AE Title and is accessible in the Administration Web Interface.

DS AE issues a Storage Commitment N-ACTION request when a study is sent or routed to a Remote AE. DS AE will include a list of SOP Instance UIDs and a Transaction ID. DS AE expects a N-ACTION response acknowledging the receipt of the request. After this, the remote Storage Commitment SCP may close the association and send the N-EVENT-REPORT back in a separate association immediately or at a later time. DS AE is also able to handle the scenario where the Storage Commitment SCP holds open the *association* where the N-ACTION was sent.

DS AE receives the N-EVENT-REPORT message and handles the success and failure of the commit by updating a transaction record in the PACS database.

4.2.1.3.6.2. Proposed Presentation Contexts

Table 4-28: Proposed Presentation Contexts for DS AE as a Storage Commitment SCU

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

DS AE proposes only one *Presentation Context* in each *Association* with one supported *SOP Class* and two native *Transfer Syntaxes*.

4.2.1.3.6.3. SOP Specific Conformance

4.2.1.3.6.3.1. SOP Specific Conformance to Storage Commitment Push Model SOP Class

DS AE provides standard conformance to the supported Storage Commitment Push Model SOP Class.

Table 4-29: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Status Codes	Reason
Success	Storage Commitment N-ACTION completed	0000	Information message is written to the log files.
Failure, Refused	Any	Any	Error message is written to the log file. If the request was initiated by the Workflow Engine, the request may be retried at a later time.
Warning	Any	Any	Warning message is written to the log file.

Table 4-30: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged.
Association Aborted	The association is released and the reason is logged.

4.2.1.3.6.3.2. Transfer Syntax Selection Policies

Since DS AE only proposes one *Presentation Context* for the supported *SOP Class*, it will use any of the *Transfer Syntaxes* accepted by the remote Storage Commitment Request SCP.

4.2.1.3.7. Activity – Send Candelis Study Status Change

4.2.1.3.7.1. Description and Sequencing of Activities

The study status is not a standard DICOM *Attribute*. It is maintained internally by the ImageGrid for workflow management purpose. Between ImageGrid systems, this state information can be exchanged using the private Candelis Private Study Status Change *SOP Class* through the N-ACTION DIMSE transaction.

When a study is transferred by the routing service, this private *SOP Class* is always proposed along with other Storage *SOP Classes* in the *Presentation Context Negotiation*. If accepted, the study status data set will be sent on the same *Association* after all the C-STORE requests are finished.

If a replication routing policy is configured, the study status change transaction can also be initiated from any user triggered study status change event. Such study status change transaction does not involve any C-STORE operations of the study.

4.2.1.3.7.2. Proposed Presentation Contexts

Table 4-31: Proposed Presentation Contexts for DS AE as a CANDELIS-STUDY-STATUS-CHANGE SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Candelis Private Study Status Change SOP Class	1.3.6.1.4.1.2820.228466.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

DS AE proposes only one *Presentation Context* in each *Association* with one supported *SOP Class* and the listed *Transfer Syntaxes*.

4.2.1.3.7.3. SOP Specific Conformance

4.2.1.3.7.3.1. SOP Specific Conformance to Candelis Private Study Status Change SOP Class

DS AE provides conformance to the Candelis Private Study Status Change SOP Class.

Table 4-32: Request Identifier for DS AE as a CANDELIS-STUDY-STATUS-CHANGE SCU

Name	Tag
Study Instance UID	(0020,000D)
Study Status ID (Retired)	(0032,000A)

The following table contains the allowed coded values in the Study Status ID *Attribute* and its meaning.

Table 4-33: Coded Study Status ID Values

Study Status ID Value	Meaning
0x00	Pending
0x01	Read
0x02	Dictated
0x04	Transcribed
0x08	Signed
0x10	Reported

Table 4-34: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Status Codes	Reason
Success	Study Status Change Status N-ACTION completed	0000	Information message is written to the log files.
Failure, Refused	Any	Any	Error message is written to the log file.
Warning	Any	Any	Warning message is written to the log file.

Table 4-35: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged.
Association Aborted	The association is released and the reason is logged.

4.2.1.3.7.3.2. Transfer Syntax Selection Policies

Since DS AE only proposes one *Presentation Context* for the supported *SOP Class*, it will use any of the *Transfer Syntaxes* accepted by the remote CANDELIS-STUDY-STATUS-CHANGE SCP.

4.2.1.3.8. Activity – Send Candelis Study Change Info

4.2.1.3.8.1. Description and Sequencing of Activities

When a study is modified, the changes to attributes are saved as a document and the modification is deferred until the instances leave the PACS. DICOM Modification can be performed from the Administration Web Interface.

If *Sending Study Change Info* is enabled, when a study is transferred by DS AE, this private *SOP Class* is proposed along with other Storage *SOP Classes* in the *Presentation Context Negotiation*. If accepted, the study will be sent *unaltered* and after all the C-STORE requests are finished a study change info document will be sent on the same *Association*.

The Remote C-STORE SCP (another ImageGrid) will be able to store the study *unaltered* and the study change info document.

The study change info document is sent using an N-SET request.

4.2.1.3.8.2. Proposed Presentation Contexts

Table 4-36: Proposed Presentation Contexts for DS AE as a CANDELIS-STUDY-CHANGE-INFO SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Candelis Private Study Change Info SOP Class	1.3.6.1.4.1.2820.228466.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

DS AE proposes only one *Presentation Context* in each *Association* with one supported *SOP Class* and the listed *Transfer Syntaxes*.

4.2.1.3.8.3. SOP Specific Conformance

4.2.1.3.8.3.1. SOP Specific Conformance to Candelis Private Status Change Info SOP Class

DS AE provides conformance to the Candelis Study Change Info SOP Class.

Table 4-37: Request Identifier for DS AE as CANDELIS-STUDY-CHANGE-INFO SCU

Name	Tag
Study Instance UID	(0020,000D)
Image Comments	(0020,4000)

Table 4-38: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Status Codes	Reason
Success	Study Change Info N-SET completed	0000	Information message is written to the log files.
Failure, Refused	Any	Any	Error message is written to the log file.
Warning	Any	Any	Warning message is written to the log file.

Table 4-39: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The association is released and the reason is logged.
Association Aborted	The association is released and the reason is logged.

4.2.1.3.8.3.2. Transfer Syntax Selection Policies

Since DS AE only proposes one *Presentation Context* for the supported *SOP Class*, it will use any of the *Transfer Syntaxes* accepted by the remote CANDELIS-STUDY-CHANGE-INFO SCP.

4.2.1.4. Association Acceptance Policy

4.2.1.4.1. Activity – Receive Verification

4.2.1.4.1.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When DS AE receives a verification (C-ECHO) request, it will respond to the remote C-ECHO SCU.

4.2.1.4.1.2. Accepted Presentation Contexts

Table 4-40: Acceptable Presentation Contexts for DS AE as a C-ECHO SCP

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

4.2.1.4.1.3. Extended Negotiation

No extended *Negotiation* is performed.

4.2.1.4.1.4. SOP Specific Conformance

4.2.1.4.1.4.1. SOP Specific Conformance to Verification SOP Class

DS AE provides standard conformance to the Verification Service Class.

4.2.1.4.1.4.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the Verification SOP Class with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether or not it is the same as another *Presentation Context*.

4.2.1.4.1.4.3. Transfer Syntax Selection Policies

DS AE prefers explicit *Transfer Syntax*. If offered a choice of *Transfer Syntaxes* in a *Presentation Context*, it will apply the following priority to the choice of *Transfer Syntax*:

Table 4-41: Default Priority of Transfer Syntax Selection for DS AE as a C-ECHO SCP

Priority	Transfer Syntax Name
1	Explicit VR Little Endian
2	Explicit VR Big Endian
3	Implicit VR Little Endian

DS AE will accept duplicate *Presentation Contexts*, that is, if it is offered multiple *Presentation Contexts*, each of which offers acceptable *Transfer Syntax*, it will accept all *Presentation Contexts*, applying the same priority for selecting a *Transfer Syntax* for each.

4.2.1.4.2. Activity – Receive Storage Request

4.2.1.4.2.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When the DS AE receives a C-STORE request, it processes and stores the DICOM instances and responds to the remote C-STORE-SCU.

As instances are received, they are copied to the local file system and corresponding records are created in the PACS database. If the received instance is a duplicate of a previously received instance, the duplicate policy for the DS AE will apply.

4.2.1.4.2.2. Accepted Presentation Contexts

Table 4-42: Acceptable Presentation Contexts for DS AE as a C-STORE SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Table 4-1	See Table 4-1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		RLE Lossless	1.2.840.10008.1.2.5	SCP	None

		Deflated Explicit VR Little Endian	1.2.840.10008.1.2.1.99	SCP	None
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCP	None
		JPEG Extended (Process 3 & 5)	1.2.840.10008.1.2.4.52	SCP	None
		JPEG Spectral Selection, Non-Hierarchical (Process 6 & 8)	1.2.840.10008.1.2.4.53	SCP	None
		JPEG Spectral Selection, Non-Hierarchical (Process 7 & 9)	1.2.840.10008.1.2.4.54	SCP	None
		JPEG Full Progression, Non-Hierarchical (Process 10 & 12)	1.2.840.10008.1.2.4.55	SCP	None
		JPEG Full Progression, Non-Hierarchical (Process 11 & 13)	1.2.840.10008.1.2.4.56	SCP	None
		JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57	SCP	None
		JPEG Lossless, Non-Hierarchical (Process 15)	1.2.840.10008.1.2.4.58	SCP	None
		JPEG Extended, Hierarchical (Process 16 & 18)	1.2.840.10008.1.2.4.59	SCP	None
		JPEG Extended, Hierarchical (Process 17 & 19)	1.2.840.10008.1.2.4.60	SCP	None
		JPEG Spectral Selection, Hierarchical (Process 20 & 22)	1.2.840.10008.1.2.4.61	SCP	None
		JPEG Spectral Selection, Hierarchical (Process 21 & 23)	1.2.840.10008.1.2.4.62	SCP	None
		JPEG Full Progression, Hierarchical (Process 24 & 26)	1.2.840.10008.1.2.4.63	SCP	None
		JPEG Full Progression, Hierarchical (Process 25 & 27)	1.2.840.10008.1.2.4.64	SCP	None
		JPEG Lossless, Hierarchical (Process 28)	1.2.840.10008.1.2.4.65	SCP	None

		JPEG Lossless, Hierarchical (Process 29)	1.2.840.10008.1.2.4.66	SCP	None
		JPEG Lossless, Non-Hierarchical, (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	SCP	None
		JPEG-LS Lossless	1.2.840.10008.1.2.4.80	SCP	None
		JPEG-LS Lossy (Near-Lossless)	1.2.840.10008.1.2.4.81	SCP	None
		JPEG 2000 (Lossless Only)	1.2.840.10008.1.2.4.90	SCP	None
		JPEG 2000 (Lossless or Lossy)	1.2.840.10008.1.2.4.91	SCP	None
		JPEG 2000 Part 2 Multi-component (Lossless Only) *	1.2.840.10008.1.2.4.92	SCP	None
		JPEG 2000 Part 2 Multi-component (Lossless or Lossy) *	1.2.840.10008.1.2.4.93	SCP	None
		JPIP Referenced *	1.2.840.10008.1.2.4.94	SCP	None
		JPIP Referenced Deflate *	1.2.840.10008.1.2.4.95	SCP	None
		MPEG2 Main Profile @ Main Level *	1.2.840.10008.1.2.4.100	SCP	None
		MPEG2 Main Profile @ High Level *	1.2.840.10008.1.2.4.101	SCP	None
		MPEG-4 AVC/H.264 High Profile / Level 4.1 *	1.2.840.10008.1.2.4.102	SCP	None
		MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1 *	1.2.840.10008.1.2.4.103	SCP	None

* *Transfer syntax* will be accepted when accepting unprocessable *Transfer Syntaxes* is enabled for the DS AE. However, no compression, decompression, or *Transfer Syntax* conversion is supported.

4.2.1.4.2.2.1. Extended Negotiation

No extended *Negotiation* is performed.

4.2.1.4.2.3. SOP Specific Conformance

4.2.1.4.2.3.1. SOP Specific Conformance to Storage SOP Class

STORAGE-SCP provides standard conformance to the Storage Service Class.

DS AE is a Level 2 Storage *SCP* (Full – does not discard any data elements).

DS AE does not support digital signatures.

DS AE does not coerce any received data elements when processing C-STORE requests.

DICOM *Attributes* may be modified during inbound C-STORE or outbound C-STORE if enabled and configured by the user.

DICOM *Attributes* may be modified manually in the Administration Web Interface.

Modifications to DICOM *Attributes* are applied only when the instances leave the system.

For a list of DICOM *Attributes* that can be modified, see *Table 8-22: Modifiable DICOM Attributes for Storage SOP Classes*.

4.2.1.4.2.3.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the supported *SOP Classes* with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether or not it is the same as another *Presentation Context*.

4.2.1.4.2.3.3. Transfer Syntax Selection Policies

When multiple *Transfer Syntaxes* are proposed in a *Presentation Context*, DS AE will choose a *Transfer Syntax* in the following priority:

Table 4-43: Default Priority of Transfer Syntax Selection for DS AE as a C-STORE SCP

Priority	Transfer Syntax Name
1	JPEG 2000 (Lossless Only)
2	JPEG-LS Lossless
3	JPEG Lossless, Non-Hierarchical, (Process 14 [Selection Value 1])
4	JPEG Lossless, Non-Hierarchical (Process 14)
5	RLE Lossless
6	Deflated Explicit VR Little Endian
7	Explicit VR Little Endian
8	Explicit VR Big Endian
9	Implicit VR Little Endian
10	JPEG 2000 (Lossless or Lossy)
11	JPEG-LS Lossy (Near-Lossless)
12	JPEG Lossless, Hierarchical (Process 29)
13	JPEG Lossless, Hierarchical (Process 28)
14	JPEG Full Progression, Hierarchical (Process 25 & 27)
15	JPEG Full Progression, Hierarchical (Process 24 & 26)
16	JPEG Spectral Selection, Hierarchical (Process 21 & 23)
17	JPEG Spectral Selection, Hierarchical (Process 20 & 22)
18	JPEG Extended, Hierarchical (Process 17 & 19)
19	JPEG Extended, Hierarchical (Process 16 & 18)
20	JPEG Lossless, Non-Hierarchical (Process 15)
21	JPEG Lossless, Non-Hierarchical (Process 14)
22	JPEG Full Progression, Non-Hierarchical (Process 11 & 13)
23	JPEG Full Progression, Non-Hierarchical (Process 10 & 12)
24	JPEG Spectral Selection, Non-Hierarchical (Process 7 & 9)
25	JPEG Spectral Selection, Non-Hierarchical (Process 6 & 8)
26	JPEG Extended (Process 3 & 5)
27	JPEG Extended (Process 2 & 4)
28	JPEG Baseline (Process 1)
29	MPEG-4 AVC/H.264 High Profile / Level 4.1 *
30	MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1 *

Priority	Transfer Syntax Name
31	MPEG2 Main Profile @ Main Level *
32	MPEG2 Main Profile @ High Level *
33	JPEG 2000 Part 2 Multi-component (Lossless Only) *
34	JPEG 2000 Part 2 Multi-component (Lossless or Lossy) *
35	JPIP Referenced *
36	JPIP Referenced Deflate *

* *Transfer syntax* will be accepted when accepting unprocessable *Transfer Syntaxes* is enabled for the DS AE.

4.2.1.4.2.3.4. Response Status

DS AE will behave as described in the table below when generating the C-STORE response message.

Table 4-44: Response Status for DS AE as a C-STORE SCP and Receive Storage Request

Service Status	Further Meaning	Status Codes	Reason
Failure	Out of Resources	A7xx	Error message is written to the log file
		A701	Unable to store the DICOM file as it is
		A702	Database error
		A703	Failure before the importing the DICOM file
		A704	Failure after importing the DICOM file
		A705	Reject duplicate image
		A706	Failure to acquire study lock
	SOP Class is not Supported	A8xx	SOP Class is not supported
	Data Set does not match SOP Class	A900	Request and data set do not match on SOP Class
	Data Set does not match SOP Instance UID	A901	Request and data set do not match on SOP Instance UID
	Cannot understand	C0xx	Cannot understand data set
		C001	File cannot be read in DICOM format
		C002	DICOM file is missing required field
Warning	Coercion of Data Elements	B000	Duplicate image is overwritten with warning
	Elements Discarded	B006	Duplicate image is ignored with warning
Success	Store is complete	0000	Current store is terminated; remaining stores continue

4.2.1.4.3. Activity – Receive Find Request

4.2.1.4.3.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When DS AE receives a C-FIND request, it responds to the remote C-FIND SCU.

4.2.1.4.3.2. Accepted Presentation Contexts

Table 4-45: Acceptable Presentation Contexts for DS AE as a C-FIND SCP

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See 4.2.1.4.3.2.1
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	
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	
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	
Patient/Study Only Query/Retrieve Information Model - FIND (Retired)	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	

4.2.1.4.3.2.1. Extended Negotiation

Extended negotiation for C-FIND is supported.

DS AE supports relational queries, date range matching, time range matching, combined date and time matching, and wild card matching.

Fuzzy matching is supported only when wild card matching is used and is only for case insensitivity.

Wild card matching on a value of "*" is equivalent to universal matching.

4.2.1.4.3.3. SOP Specific Conformance

4.2.1.4.3.3.1. SOP Specific Conformance to C-FIND SOP Classes

DS AE provides standard conformance to the supported C-FIND SOP Classes.

Unsupported matching keys are ignored by DS AE, they will not be used as return keys in the response, and success will be returned in the response. Unsupported return keys are returned as empty by DS AE.

DS AE supports both hierarchical and relational queries.

Character set conversion may be performed by DS AE to provide responses as specified by the Specific Character Set in the C-FIND request. If the character set conversion is not possible on certain results, these results will be filtered from the C-FIND responses, while other results will still be returned normally in the requested character set. If the results returned by DS AE are incomplete, a failure status will be returned in the response at the end.

There is no limitation on the number of C-FIND responses that the DS AE can return.

Table 4-46: Patient Root Response Identifier for DS AE as a C-FIND SCP

Name	Tag	Types of Matching
Patient Level		
Patient ID	(0010,0020)	S, W
Issuer of Patient ID	(0010,0021)	S, W
Patient's Name	(0010,0010)	S, W
Patient's Birth Date	(0010,0030)	S, R
Patient's Birth Time	(0010,0032)	S, R
Patient's Sex	(0010,0040)	S, W

Name	Tag	Types of Matching
Other Patient IDs	(0010,1000)	S, W
Other Patient Names	(0010,1001)	S, W
Medical Alerts	(0010,2000)	S, W
Allergies	(0010,2110)	S, W
Patient Telephone Numbers	(0010,2154)	S, W
Ethnic Group	(0010,2160)	S, W
Patient Species Description	(0010,2201)	S, W
Patient Breed Description	(0010,2292)	S, W
Responsible Person	(0010,2297)	S, W
Number of Patient Related Studies	(0020,1200)	U
Number of Patient Related Series	(0020,1202)	U
Number of Patient Related Instances	(0020,1204)	U
Study Level		
Study Instance UID	(0020,000D)	S, L
Accession Number	(0008,0050)	S, W
Study Date	(0008,0020)	S, R
Study Time	(0008,0030)	S, R
Modalities in Study	(0008,0061)	U
Institution Name	(0008,0080)	S, W
Study ID	(0020,0010)	S
Study Description	(0008,1030)	S, W
Requested Procedure Description	(0032,1060)	S, W
Admitting Diagnoses Description	(0008,1080)	S, W
Referring Physician's Name	(0008,0090)	S, W
Name of Physicians Reading Study	(0008,1060)	S, W
Number of Study Related Series	(0020,1206)	U
Name of Study Related Instances	(0020,1208)	U
Procedure Code Sequence > (All)	(0008,1032)	Q
Patient Age	(0010,1010)	S
Patient Size	(0010,1020)	S
Patient Weight	(0010,1030)	S
Occupation	(0010,2180)	S, W
Instance Availability	(0008,0056)	U
Series Level		
Series Instance UID	(0020,000E)	S, L
Series Date	(0008,0021)	S, R
Series Time	(0008,0031)	S, R
Modality	(0008,0060)	S
Series Number	(0020,0011)	S
Series Description	(0008,103E)	S, W
Protocol Name	(0018,1030)	S, W
Body Part Examined	(0018,0015)	S, W
Operator's Name	(0008,1070)	S, W

Name	Tag	Types of Matching
Performing Physician's Name	(0008,1050)	S, W
Performed Procedure Step Description	(0040,0254)	S, W
Performed Procedure Step ID	(0040,0253)	S
Performed Procedure Step Start Date	(0040,0244)	S, R
Performed Procedure Step Start Time	(0040,0245)	S, R
Number of Series Related Instances	(0020,1209)	U
Request Attributes Sequence > (All)	(0040,0275)	Q
Image Level		
SOP Instance UID	(0008,0018)	S, L
SOP Class UID	(0008,0016)	S, L
Image Type	(0008,0008)	S, W
Acquisition Date Time	(0008,002A)	S, R
Instance Number	(0020,0013)	S
Image Comments	(0020,4000)	S, W
Rows	(0028,0010)	S
Columns	(0028,0011)	S
Bits Allocated	(0028,0100)	S
Number of Frames	(0028,0008)	S
Content Date	(0008,0023)	S, R
Content Time	(0008,0033)	S, R
Content Label	(0070,0080)	S, W
Content Description	(0070,0081)	S, W
Content Creator's Name	(0070,0084)	S, W
Presentation Creation Date	(0070,0082)	S, R
Presentation Creation Time	(0070,0083)	S, R
Observation Date Time	(0040,A032)	S, R
Completion Flag	(0040,A491)	S
Verification Flag	(0040,A493)	S
Referenced Series Sequence > (All)	(0008,1115)	Q
Referenced Image Sequence > (All)	(0008,1140)	Q
Concept Name Code Sequence > (All)	(0040,A043)	Q
Verifying Observer Sequence > (All)	(0040,A073)	Q
Referenced Request Sequence > (All)	(0040,A370)	Q
Content Template Sequence > (All)	(0040,A504)	Q
Common to all query levels		
Specific Character Set	(0008,0005)	S

Table 4-47: Study Root Response Identifier for DS AE as a C-FIND SCP

Name	Tag	Types of Matching
Study Level		
Patient ID	(0010,0020)	S, W
Issuer of Patient ID	(0010,0021)	S, W
Patient's Name	(0010,0010)	S, W
Patient's Birth Date	(0010,0030)	S, R
Patient's Birth Time	(0010,0032)	S, R
Patient's Sex	(0010,0040)	S, W
Other Patient IDs	(0010,1000)	S, W
Other Patient Names	(0010,1001)	S, W
Medical Alerts	(0010,2000)	S, W
Allergies	(0010,2110)	S, W
Patient Telephone Numbers	(0010,2154)	S, W
Ethnic Group	(0010,2160)	S, W
Patient Species Description	(0010,2201)	S, W
Patient Breed Description	(0010,2292)	S, W
Responsible Person	(0010,2297)	S, W
Number of Patient Related Studies	(0020,1200)	U
Number of Patient Related Series	(0020,1202)	U
Number of Patient Related Instances	(0020,1204)	U
Study Instance UID	(0020,000D)	S, L
Accession Number	(0008,0050)	S, W
Study Date	(0008,0020)	S, R
Study Time	(0008,0030)	S, R
Modalities in Study	(0008,0061)	U
Institution Name	(0008,0080)	S, W
Study ID	(0020,0010)	S
Study Description	(0008,1030)	S, W
Requested Procedure Description	(0032,1060)	S, W
Admitting Diagnoses Description	(0008,1080)	S, W
Referring Physician's Name	(0008,0090)	S, W
Name of Physicians Reading Study	(0008,0060)	S, W
Number of Study Related Series	(0020,1206)	U
Name of Study Related Instances	(0020,1208)	U
Procedure Code Sequence > (All)	(0008,1032)	Q
Patient Age	(0010,1010)	S
Patient Size	(0010,1020)	S
Patient Weight	(0010,1030)	S
Occupation	(0010,2180)	S, W
Instance Availability	(0008,0056)	U
Series Level		
Series Instance UID	(0020,000E)	S, L
Series Date	(0008,0021)	S, R
Series Time	(0008,0031)	S, R

Name	Tag	Types of Matching
Modality	(0008,0060)	S
Series Number	(0020,0011)	S
Series Description	(0008,103E)	S, W
Protocol Name	(0018,1030)	S, W
Body Part Examined	(0018,0015)	S, W
Operator's Name	(0008,1070)	S, W
Performing Physician's Name	(0008,1050)	S, W
Performed Procedure Step Description	(0040,0254)	S, W
Performed Procedure Step ID	(0040,0253)	S
Performed Procedure Step Start Date	(0040,0244)	S, R
Performed Procedure Step Start Time	(0040,0245)	S, R
Number of Series Related Instances	(0020,1209)	U
Request Attributes Sequence > (All)	(0040,0275)	Q
Image Level		
SOP Instance UID	(0008,0018)	S, L
SOP Class UID	(0008,0016)	S, L
Image Type	(0008,0008)	S, W
Acquisition Date Time	(0008,002A)	S, R
Instance Number	(0020,0013)	S
Image Comments	(0020,4000)	S, W
Rows	(0028,0010)	S
Columns	(0028,0011)	S
Bits Allocated	(0028,0100)	S
Number of Frames	(0028,0008)	S
Content Date	(0008,0023)	S, R
Content Time	(0008,0033)	S, R
Content Label	(0070,0080)	S, W
Content Description	(0070,0081)	S, W
Content Creator's Name	(0070,0084)	S, W
Presentation Creation Date	(0070,0082)	S, R
Presentation Creation Time	(0070,0083)	S, R
Observation Date Time	(0040,A032)	S, R
Completion Flag	(0040,A491)	S
Verification Flag	(0040,A493)	S
Referenced Series Sequence > (All)	(0008,1115)	Q
Referenced Image Sequence > (All)	(0008,1140)	Q
Concept Name Code Sequence > (All)	(0040,A043)	Q
Verifying Observer Sequence > (All)	(0040,A073)	Q
Referenced Request Sequence > (All)	(0040,A370)	Q

Name	Tag	Types of Matching
Content Template Sequence	(0040,A504)	Q
> (All)		
Common to all query levels		
Specific Character Set	(0008,0005)	S

Table 4-48: Patient/Study Only Response Identifier for DS AE as a C-FIND SCP

Name	Tag	Types of Matching
Patient Level		
Patient ID	(0010,0020)	S, W
Issuer of Patient ID	(0010,0021)	S, W
Patient's Name	(0010,0010)	S, W
Patient's Birth Date	(0010,0030)	S, R
Patient's Birth Time	(0010,0032)	S, R
Patient's Sex	(0010,0040)	S, W
Other Patient IDs	(0010,1000)	S, W
Other Patient Names	(0010,1001)	S, W
Medical Alerts	(0010,2000)	S, W
Allergies	(0010,2110)	S, W
Patient Telephone Numbers	(0010,2154)	S, W
Ethnic Group	(0010,2160)	S, W
Patient Species Description	(0010,2201)	S, W
Patient Breed Description	(0010,2292)	S, W
Responsible Person	(0010,2297)	S, W
Number of Patient Related Studies	(0020,1200)	U
Number of Patient Related Series	(0020,1202)	U
Number of Patient Related Instances	(0020,1204)	U
Study Level		
Study Instance UID	(0020,000D)	S, L
Accession Number	(0008,0050)	S, W
Study Date	(0008,0020)	S, R
Study Time	(0008,0030)	S, R
Modalities in Study	(0008,0061)	U
Institution Name	(0008,0080)	S, W
Study ID	(0020,0010)	S
Study Description	(0008,1030)	S, W
Requested Procedure Description	(0032,1060)	S, W
Admitting Diagnoses Description	(0008,1080)	S, W
Referring Physician's Name	(0008,0090)	S, W
Name of Physicians Reading Study	(0008,1060)	S, W
Number of Study Related Series	(0020,1206)	U
Name of Study Related Instances	(0020,1208)	U
Procedure Code Sequence	(0008,1032)	Q
> (All)		
Patient Age	(0010,1010)	S

Name	Tag	Types of Matching
Patient Size	(0010,1020)	S
Patient Weight	(0010,1030)	S
Occupation	(0010,2180)	S, W
Instance Availability	(0008,0056)	U
Common to all query levels		
Specific Character Set	(0008,0005)	S

The types of matching supported by DS AE are the following:

- "S" indicates the identifier *Attribute* uses Single Value Matching.
- "R" indicates Range Matching
- "W" indicates Wildcard Matching
- "L" indicates List of UID Matching.
- "Q" indicates Sequence Matching.
- "U" indicates Universal Matching.

4.2.1.4.3.3.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the C-FIND *SOP Class* with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether it is the same as another *Presentation Context* or not.

4.2.1.4.3.3.3. Transfer Syntax Selection Policies

DS AE prefers explicit *Transfer Syntax*. If offered a choice of *Transfer Syntaxes* in a *Presentation Context*, it will apply the following priority to the choice of *Transfer Syntax*:

Table 4-49: Default Priority of Transfer Syntax Selection for DS AE as a C-FIND SCP

Priority	Transfer Syntax Name
1	Explicit VR Little Endian
2	Explicit VR Big Endian
3	Implicit VR Little Endian

DS AE will accept duplicate *Presentation Contexts*, that is, if it is offered multiple *Presentation Contexts*, each of which offers acceptable *Transfer Syntaxes*, it will accept all *Presentation Contexts*, applying the same priority for selecting a *Transfer Syntax* for each.

4.2.1.4.3.3.4. Response Status

DS AE will behave as described in the table below when generating the C-FIND response message.

Table 4-50: C-FIND Response Status for DS AE

Service Status	Further Meaning	Status Codes	Reason
Failure	Out of Resources	A700	Error message is written to the log file
	SOP Class is not Supported	A800	SOP Class is not supported
	Identifier does not match SOP Class	A900	SOP Class and Query/Retrieve level do not match
	Unable to Process	CXXX	Unable to process request
		C001	Unable to read request data set

Service Status	Further Meaning	Status Codes	Reason
		C002	Database error
		C003	Failure before executing the query
		C004	Failure after executing the query
		C005	Missing required field in the request
		C006	Unable to send one or more responses
Warning	Unsupported Optional Keys	FF01	Unsupported optional keys in the request data set
Pending	Matches are continuing - Current Match is supplied	FF00	Any Optional Keys were supported in the same manner as Required Keys
Cancel	Cancel	FE00	Matching terminated due to cancel request
Success	Matching is complete – No final identifier is supplied	0000	Current query is terminated; remaining queries continue

4.2.1.4.4. Activity – Receive Move Request

4.2.1.4.4.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When DS AE receives a C-MOVE requests, DS AE queries the local database to find the UID that was requested to be moved. If the UID requested is found, DS AE responds with pending to the remote C-MOVE SCU. If the UID requested cannot be found, DS AE responds with failure to the remote C-MOVE SCU.

4.2.1.4.4.2. Accepted Presentation Contexts

Table 4-51: Acceptable Presentation Contexts for DS AE as a C-MOVE SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See 4.2.1.4.4.2.1
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	
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	
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	
Patient/Study Only Query/Retrieve Information Model - FIND (Retired)	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	

4.2.1.4.4.2.1. Extended Negotiation

DS AE supports relational retrieve.

4.2.1.4.4.3. SOP Specific Conformance

4.2.1.4.4.3.1. SOP Specific Conformance to C-MOVE SOP Classes

DS AE provides standard conformance to the supported C-MOVE SOP Classes.

The move *destination AE Title* must be pre-configured as a local or remote AE title in DICOM Service's configuration, so that its presentation address can be determined by the DS AE when issuing the C-STORE requests.

Table 4-52: Patient Root Response Identifier for DS AE as a C-MOVE SCP

Name	Tag	Unique, Matching or Return Key
Patient Level		
Patient ID	(0010,0020)	U

Table 4-53: Study Root, Patient/Study Only Response Identifier for DS AE as a C-MOVE SCP

Name	Tag	Unique, Matching or Return Key
Study Level		
Patient ID	(0010,0020)	U
Study Instance UID	(0020,000D)	U
Series Level		
Series Instance UID	(0020,000E)	U
Image Level		
SOP Instance UID	(0008,0018)	U

4.2.1.4.4.3.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the C-MOVE *SOP Class* with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether it is the same as another *Presentation Context* or not.

4.2.1.4.4.3.3. Transfer Syntax Selection Policies

DS AE prefers explicit *Transfer Syntax*. If offered a choice of *Transfer Syntaxes* in a *Presentation Context*, it will apply the following priority to the choice of *Transfer Syntax*:

Table 4-54: Default Priority of Transfer Syntax Selection for DS AE as a C-MOVE SCP

Priority	Transfer Syntax Name
1	Explicit VR Little Endian
2	Explicit VR Big Endian
3	Implicit VR Little Endian

DS AE will accept duplicate *Presentation Contexts*, that is, if it is offered multiple *Presentation Contexts*, each of which offers acceptable *Transfer Syntaxes*, it will accept all *Presentation Contexts*, applying the same priority for selecting a *Transfer Syntax* for each.

4.2.1.4.4.3.4. Sub-operation dependent behavior

Once the sub-association is successfully established from DS AE to the remote C-STORE SCP AE (specified by the *destination AE Title* in the C-MOVE request), DS AE will play the role of C-STORE SCU to send the storage request, based on the standard conformance to the supported Storage SOP Classes.

For each C-STORE response DS AE receives from the C-STORE SCP, DS AE will send a C-MOVE response to the C-MOVE SCU, to update the status of the C-MOVE operation and the sub operations, the Number of Remaining Sub Operations,

Completed Sub Operations, and Failed Sub Operations. These numbers represent the real time progress of the C-STORE, and can be trusted by the C-MOVE SCU.

4.2.1.4.4.3.5. Response Status

DS AE will behave as described in the table below when generating the C-MOVE response message.

Table 4-55: Response Status for DS AE as a C-MOVE SCP and Receive MOVE Request.

Service Status	Further Meaning	Status Codes	Reason
Error	Out of Resources	A701	Unable to locate requested entity
	Out of Resources Sub Operations	A702	Failure in C-STORE sub-association
	SOP Class is not Supported	A800	SOP Class is not supported
	Move Destination Unknown	A801	Destination AE is not configured
	Identifier does not match SOP Class	A900	SOP Class and Query/Retrieve level do not match
	Unable to Process	CXXX	Unable to process request
		C001	Unable to read request data set
		C002	Failure before the retrieval
		C003	Failure after the retrieval
		C004	Missing required field in the request
Warning	Sub Operations Complete One or More Failures	B000	One or more failures in C-STORE sub operations.
Pending	Pending	FF00	Results to be continued
Cancel	Cancel	FE00	Sub Operations Terminated Due to Cancel Indication
Success		0000	

4.2.1.4.5. Activity – Receive MWL Find Request

4.2.1.4.5.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When DS AE receives a MWL Find Request (C-FIND with Modality Worklist Information Model), it responds to the remote MWL C-FIND SCU.

4.2.1.4.5.2. Accepted Presentation Contexts

Table 4-56: Acceptable Presentation Contexts for DS AE as an MWL C-FIND SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

4.2.1.4.5.3. SOP Specific Conformance

4.2.1.4.5.3.1. **SOP Specific Conformance to Modality Worklist SOP Class**

DS AE provides standard conformance to the supported Modality Worklist SOP Class.

Unsupported matching keys are ignored by DS AE.

Unsupported return keys are not returned by DS AE.

Character set conversion may be performed by DS AE to provide responses as specified by the Specific Character Set in the MWL C-FIND request. If the character set conversion is not possible on certain results, these results will be filtered from the MWL C-FIND responses, while other results will still be returned normally in the requested character set.

There is no limitation on the number of responses that the DS AE can return.

Table 4-57: Response Identifier for DS AE as an MWL C-FIND SCP

Name	Tag	Types of Matching
Patient ID	(0010,0020)	S, W
Patient's Name	(0010,0010)	S, W
Patient's Birth Date	(0010,0030)	U
Patient's Sex	(0010,0040)	S
Other Patient IDs	(0010,1000)	U
Confidentiality Constraint On Patient Data Description	(0040,3001)	U
Patient State	(0038,0500)	U
Pregnancy Status	(0010,21C0)	U
Medical Alerts	(0010,2000)	U
Allergies	(0010,2110)	U
Patient's Weight	(0010,1030)	U
Special Needs	(0038,0050)	U
Accession Number	(0008,0050)	S
Admission ID	(0038,0010)	U
Referring Physician's Name	(0008,0090)	S, W
Requesting Physician	(0032,1032)	U
Current Patient Location	(0038,0300)	U
Institution Name	(0008,0080)	U
Requested Procedure ID	(0040,1001)	S
Reason for The Requested Procedure	(0040,1002)	U
Requested Procedure Description	(0032,1060)	U
Requested Procedure Priority	(0040,1003)	U
Requested Procedure Code Sequence	(0032,1064)	U
> Code Value	(0008,0100)	U
> Coding Scheme Designator	(0008,0102)	U
> Coding Scheme Version	(0008,0103)	U
> Code Meaning	(0008,0104)	U
Study Instance UID	(0020,000D)	U
Referenced Study Sequence	(0008,1110)	U
> Referenced SOP Class UID	(0008,1150)	U
> Referenced SOP Instance UID	(0008,1155)	U
Referenced Patient Sequence	(0008,1120)	U

Name	Tag	Types of Matching
> Referenced SOP Class UID	(0008,1150)	U
> Referenced SOP Instance UID	(0008,1155)	U
Scheduled Procedure Step Sequence	(0040,0100)	Q
> Scheduled Station AE Title	(0040,0001)	S
> Scheduled Station Name	(0040,0010)	U
> Modality	(0008,0060)	S
> Scheduled Performing Physician's Name	(0040,0006)	U
> Scheduled Procedure Step Start Date	(0040,0002)	S, R
> Scheduled Procedure Step Start Time	(0040,0003)	S, R
> Scheduled Procedure Step ID	(0040,0009)	U
> Scheduled Procedure Step Description	(0040,0007)	U
> Scheduled Procedure Step Location	(0040,0011)	U
> Scheduled Protocol Code Sequence	(0040,0008)	U
>> Code Value	(0008,0100)	U
>> Coding Scheme Designator	(0008,0102)	U
>> Coding Scheme Version	(0008,0103)	U
>> Code Meaning	(0008,0104)	U
Specific Character Set	(0008,0005)	S

The types of matching supported by DS AE are the following:

- "S" indicates the identifier *Attribute* uses Single Value Matching.
- "R" indicates Range Matching
- "W" indicates Wildcard Matching
- "U" indicates Universal Matching.
- "Q" indicates Sequence Matching.

4.2.1.4.5.3.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the Modality Worklist *SOP Class* with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether or not it is the same as another *Presentation Context*.

4.2.1.4.5.3.3. Transfer Syntax Selection Policies

DS AE prefers explicit *Transfer Syntax*. If offered a choice of *Transfer Syntaxes* in a *Presentation Context*, it will apply the following priority to the choice of *Transfer Syntax*:

Table 4-58: Default Priority Syntax Selection for DS AE as an MWL C-FIND SCP

Priority	Transfer Syntax Name
1	Explicit VR Little Endian
2	Explicit VR Big Endian
3	Implicit VR Little Endian

DS AE will accept duplicate *Presentation Contexts*, that is, if it is offered multiple *Presentation Contexts*, each of which offers acceptable *Transfer Syntaxes*, it will accept all *Presentation Contexts*, applying the same priority for selecting a *Transfer Syntax* for each.

4.2.1.4.5.3.4. Response Status

DS AE will behave as described in the table below when generating the MWL C-FIND response message.

Table 4-59: Response Status for DS AE as an MWL C-FIND SCP and Receive MWL FIND Request

Service Status	Further Meaning	Status Codes	Reason
Failure	Out of Resources	A700	Error message is written to the log file
	SOP Class is not Supported	A800	SOP Class is not supported
	Identifier does not match SOP Class	A900	SOP Class and Query/Retrieve level do not match
	Unable to Process	CXXX	Unable to process request
		C001	Unable to read request data set
		C002	Database error
		C003	Failure before executing the query
		C004	Failure after executing the query
		C005	Missing required field in the request
		C006	Unable to send one or more responses
Warning	Unsupported Optional Keys	FF01	Unsupported optional keys in the request data set
Pending	Matches are continuing - Current Match is supplied	FF00	Any Optional Keys were supported in the same manner as Required Keys
Cancel	Cancel	FE00	Matching terminated due to cancel request
Success	Matching is complete – No final identifier is supplied	0000	Current query is terminated; remaining queries continue

4.2.1.4.6. Activity – Receive MPPS Request

4.2.1.4.6.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When DS AE receives an MPPS N-CREATE or N-SET request, it responds to the remote MPPS-SCU.

4.2.1.4.6.2. Accepted Presentation Contexts

Table 4-60: Acceptable Presentation Contexts for DS AE as an MPPS SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

4.2.1.4.6.3. SOP Specific Conformance

4.2.1.4.6.3.1. SOP Specific Conformance to MPPS SOP Class

DS AE provides standard conformance to the supported MPPS SOP Class.

DS AE uses N-CREATE and N-SET to record the Performed Procedure Step notifications. The Performed Procedure Step contains information about its state. DS AE uses this state to update the corresponding procedure status for the workflow management application.

The following tables contain the identifiers processed by the DS AE for N-CREATE and N-SET Services.

Table 4-61: Identifier for MPPS N-CREATE

Name	Tag	Usage
SOP Instance UID	(0008,0018)	M
Performed Procedure Step Status	(0040,0252)	M
Patient ID	(0010,0020)	M
Patient's Name	(0010,0010)	U
Patient's Birth Date	(0010,0030)	U
Patient's Sex	(0010,0040)	U
Performed Procedure Step ID	(0040,0253)	U
Performed Procedure Step Start Date	(0040,0244)	U
Performed Procedure Step Start Time	(0040,0245)	U
Performed Station AE Title	(0040,0241)	U
Modality	(0008,0060)	U
Performed Procedure Step Description	(0040,0254)	U
Performed Procedure Type Description	(0040,0255)	U
Procedure Code Sequence	(0008,1032)	U
> Code Value	(0008,0100)	U
> Coding Scheme Designator	(0008,0102)	U
> Coding Scheme Version	(0008,0103)	U
> Code Meaning	(0008,0104)	U
Scheduled Step Attributes Sequence	(0040,0270)	U
> Study Instance UID	(0020,000D)	U
> Accession Number	(0008,0050)	U
> Requested Procedure ID	(0040,1001)	U
> Scheduled Procedure Step ID	(0040,0009)	U
> Requested Procedure Description	(0032,1060)	U
> Scheduled Procedure Step Description	(0040,0007)	U
> Scheduled Protocol Code Sequence	(0040,0008)	U
>> Code Value	(0008,0100)	U
>> Coding Scheme Designator	(0008,0102)	U
>> Coding Scheme Version	(0008,0103)	U
>> Code Meaning	(0008,0104)	U

Table 4-62: Identifier for MPPS N-SET

Name	Tag	Usage
SOP Instance UID	(0008,0018)	M

Performed Procedure Step Status	(0040,0252)	M
Performed Procedure Step ID	(0040,0253)	U
Performed Procedure Step End Date	(0040,0250)	U
Performed Procedure Step End Time	(0040,0251)	U
Performed Procedure Step Description	(0040,0254)	U
Performed Procedure Type Description	(0040,0255)	U
Scheduled Step Attributes Sequence	(0040,0270)	U
> Scheduled Procedure Step ID	(0040,0009)	U
> Accession Number	(0008,0050)	U

- "M" indicates the identifier *Attribute* is mandatory for the MPPS data set.
- "U" indicates the identifier *Attribute* is optional for the MPPS data set.

The allowed values for Performed Procedure Step Status are "IN PROGRESS" for N-CREATE request, "DISCONTINUED" and "COMPLETED" for N-SET request.

If any mandatory identifier is missing, or the Performed Procedure Step Status *Attribute* contains invalid value, the DS AE will reject the request.

4.2.1.4.6.3.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the MPPS *SOP Class* with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether or not it is the same as another *Presentation Context*.

4.2.1.4.6.3.3. Transfer Syntax Selection Policies

DS AE prefers explicit *Transfer Syntax*. If offered a choice of *Transfer Syntaxes* in a *Presentation Context*, it will apply the following priority to the choice of *Transfer Syntax*:

Table 4-63: Default Priority of Transfer Syntax Selection for DS AE as an MPPS SCP

Priority	Transfer Syntax Name
1	Explicit VR Little Endian
2	Explicit VR Big Endian
3	Implicit VR Little Endian

DS AE will accept duplicate *Presentation Contexts*, that is, if it is offered multiple *Presentation Contexts*, each of which offers acceptable *Transfer Syntaxes*, it will accept all *Presentation Contexts*, applying the same priority for selecting a *Transfer Syntax* for each.

4.2.1.4.6.3.4. Response Status

DS AE will behave as described in the table below when generating the MPPS N-CREATE or N-SET response message.

Table 4-64: Response Status for DS AE as an MPPS SCP and Receive MPPS Request

Service Status	Further Meaning	Status Codes	Reason
Failure	Processing Failure	0110H	Error message is written to the log file
Success		0000	

4.2.1.4.7. Activity – Receive Storage Commitment Request

4.2.1.4.7.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When DS AE receives a Storage Commitment N-ACTION request, it responds to the remote STORAGE-COMMITMENT SCU.

4.2.1.4.7.2. Accepted Presentation Contexts

Table 4-65: Acceptable Presentation Contexts for Storage Commitment

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

4.2.1.4.7.3. SOP Specific Conformance

4.2.1.4.7.3.1. SOP Specific Conformance to Storage Commitment SOP Class

DS AE provides standard conformance to the supported Storage Commitment SOP Class.

DS AE accepts N-ACTION request from a remote STORAGE-COMMITMENT SCU to get the list of instances to be verified. It creates a separate *Association* to send commitment notifications of the requested instances to the corresponding remote N-EVENT-REPORT SCP. The N-EVENT-REPORT SCP AE is determined from the Responding AE Title in the N-ACTION *Association*, or from the Calling AE Title if the Responding AE Title is not available. This N-EVENT-REPORT SCP AE must be pre-configured as a remote AE because its presentation address needs be determined by DS AE to issue the N-EVENT-REPORT requests.

The following tables contain the identifiers processed by the Storage Commitment for N-ACTION and N-EVENT-REPORT.

Table 4-66: Identifier for Storage Commitment N-ACTION

Name	Tag
Transaction UID	(0008,1195)
Referenced SOP Sequence	(0008,1199)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)

Table 4-67: Identifier for Storage Commitment N-EVENT-REPORT

Name	Tag
Referenced SOP Sequence	(0008,1199)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)
Failed SOP Sequence	(0008,1198)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)
> Failure Reason	(0008,1197)

Name	Tag
Retrieve AE Title	(0008,0054)
Transaction UID	(0008,1195)

The Transaction ID in N-EVENT-REPORT must match the one in N-ACTION for the same Storage Commitment transaction.

4.2.1.4.7.3.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the Storage Commitment *SOP Class* with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether or not it is the same as another *Presentation Context*.

4.2.1.4.7.3.3. Transfer Syntax Selection Policies

DS AE prefers explicit *Transfer Syntax*. If offered a choice of *Transfer Syntaxes* in a *Presentation Context*, it will apply the following priority to the choice of *Transfer Syntax*:

Table 4-68: Default Priority of Transfer Syntax Selection for DS AE as a STORAGE-COMMITMENT SCP

Priority	Transfer Syntax Name
1	Explicit VR Little Endian
2	Explicit VR Big Endian
3	Implicit VR Little Endian

DS AE will accept duplicate *Presentation Contexts*, that is, if it is offered multiple *Presentation Contexts*, each of which offers acceptable *Transfer Syntaxes*, it will accept all *Presentation Contexts*, applying the same priority for selecting a *Transfer Syntax* for each.

4.2.1.4.7.3.4. Response Status

DS AE will behave as described in the table below when generating the Storage Commitment N-ACTION response message.

Table 4-69: Response Status for DS AE as a STORAGE-COMMITMENT SCP and Receive Storage Commitment Request

Service Status	Further Meaning	Status Codes	Reason
Failure	Processing Failure	0110H	Error message is written to the log file
Success		0000	

4.2.1.4.8. Activity – Receive Candelis Study Status Change

4.2.1.4.8.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When DS AE receives a CANDELIS-STUDY-STATUS-CHANGE N-ACTION request, it updates the status of the requested study, and responds to the remote CANDELIS-STUDY-STATUS-CHANGE SCU.

4.2.1.4.8.2. Accepted Presentation Contexts

Table 4-70: Acceptable Presentation Contexts for DS AE as a CANDELIS-STUDY-STATUS-CHANGE SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Candelis Private Study Status Change SOP Class	1.3.6.1.4.1.2820.228466.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

4.2.1.4.8.3. SOP Specific Conformance

4.2.1.4.8.3.1. SOP Specific Conformance to Candelis Study Status Change SOP Class

DS AE provides conformance to the Candelis Private Study Status Change SOP Class.

DS AE reads the study status value from the N-ACTION request from a CANDELIS-STUDY-STATUS-CHANGE SCU.

See *Table 4-33: Coded Study Status ID Values* for allowed values of the study status and their meaning.

4.2.1.4.8.3.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the Candelis Private Study Status Change *SOP Class* with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether or not it is the same as another *Presentation Context*.

4.2.1.4.8.3.3. Transfer Syntax Selection Policies

DS AE prefers explicit *Transfer Syntax*. If offered a choice of *Transfer Syntaxes* in a *Presentation Context*, it will apply the following priority to the choice of *Transfer Syntax*:

Table 4-71: Default Priority of Transfer Syntax Selection for DS AE as a CANDELIS-STUDY-STATUS-CHANGE SCP

Priority	Transfer Syntax Name
1	Explicit VR Little Endian
2	Explicit VR Big Endian
3	Implicit VR Little Endian

4.2.1.4.8.3.4. Response Status

DS AE will behave as described in the table below when generating the Candelis Study Status Change response message.

Table 4-72: Response Status for DS AE and Receive Candelis Study Status Change Request

Service Status	Further Meaning	Status Codes	Reason
Failure	Processing Failure	0110H	Error message is written to the log file.
Success		0000	

4.2.1.4.9. Activity – Receive Candelis Study Change Info

4.2.1.4.9.1. Description and Sequencing of Activities

Refer to *4.2.1.2.5 Association Acceptance* for information about accepting or rejecting associations.

When DS AE receives a CANDELIS-STUDY-CHANGE-INFO N-SET request, it updates the study's change info document, updates the corresponding records in the PACS database, and responds to the remote CANDELIS-STUDY-CHANGE-INFO SCU.

4.2.1.4.9.2. Accepted Presentation Contexts

Table 4-73: Acceptable Presentation Contexts for DS AE as a CANDELIS-STUDY-CHANGE-INFO SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
	1.3.6.1.4.1.2820.228466.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Candelis Private Study Change Info SOP Class		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

4.2.1.4.9.3. SOP Specific Conformance

4.2.1.4.9.3.1. SOP Specific Conformance to Candelis Private Study Change Info SOP Class

DS AE provides conformance to the Candelis Private Study Change Info SOP Class.

DS AE reads the study change info document from the N-SET request sent from a CANDELIS-STUDY-CHANGE-INFO SCU.

4.2.1.4.9.3.2. Presentation Context Acceptance Criterion

DS AE will always accept any *Presentation Context* for the Candelis Private Study Change Info *SOP Class* with the supported *Transfer Syntax*. More than one proposed *Presentation Context* will be accepted for the same *Abstract Syntax* if the *Transfer Syntax* is supported, whether or not it is the same as another *Presentation Context*.

4.2.1.4.9.3.3. Transfer Syntax Selection Policies

DS AE prefers explicit *Transfer Syntax*. If offered a choice of *Transfer Syntaxes* in a *Presentation Context*, it will apply the following priority to the choice of *Transfer Syntax*:

Table 4-74: Default Priority of Transfer Syntax Selection for DS AE as a CANDELIS-STUDY-STATUS-CHANGE SCP

Priority	Transfer Syntax Name
1	Explicit VR Little Endian
2	Explicit VR Big Endian
3	Implicit VR Little Endian

4.2.1.4.9.3.4. Response Status

DS AE will behave as described in the table below when generating the Candelis Study Change Info response message.

Table 4-75: Response Status for DS AE and Receive Candelis Study Status Change Request

Service Status	Further Meaning	Status Codes	Reason
Failure	Processing Failure	0110H	Error message is written to the log file.
Success		0000	

4.3. Network Interfaces

4.3.1. Physical Network Interface

ImageGrid supports 10/100/1000 Mb Ethernet.

4.3.2. Additional Protocols

ImageGrid conforms to the System Management Profiles listed in the table below. All requested transactions for the listed profiles and actors are supported. Support for optional transactions are listed.

Table 4-76: Supported System Management Profiles

Profile Name	Actor	Protocol Used	Optional Transactions	Security Support
Network Address Management	DHCP Client	DHCP	N/A	
	DNS Client	DNS	N/A	
Time Synchronization	NTP Client	NTP	N/A	

4.3.2.1. DHCP

DHCP can be used to obtain TCP/IP network configuration information. The network parameters obtainable via DHCP are shown in the table below. The Default Value column of the table shows the default used if the DHCP server does not provide a value. If DHCP is not in use, TCP/IP network configuration information can be manually configured via the Administration Console or Web Interface.

Table 4-77: Supported DHCP Parameters

DHCP Parameter	Default Value
IP Address	None
Hostname	Requested machine name
List of NTP servers	Empty list
List of DNS servers	Empty list
Routers	Empty list
Static routes	None
Domain name	None
Subnet mask	Derived from IP Address
Broadcast address	Derived from IP Address
Default router	None
Time offset	Time zone configuration
MTU	Network Hardware Dependent
Auto-IP permission	No permission

4.3.2.2. DNS

DNS can be used for address resolution. If DHCP is not in use or the DHCP server does not return any DNS server addresses, the identity of a DNS server can be configured via the Administration Console or Web Interface. If a DNS server is not in use, mapping between hostname and IP address cannot be resolved.

4.3.2.3. NTP

The NTP client is used for time synchronization. The NTP server can be configured via the Administration Web Interface. One or more NTP servers can be configured as time references.

4.3.3. IPv4 and IPv6 Support

This product only supports IPv4 connections.

4.4. Configuration

4.4.1. AE Title/Presentation Address Mapping

4.4.1.1. Local AE Titles

Local AE Titles and its corresponding TCP/IP Ports can be configured via the Administration Web Interface. No Default AE Titles are provided. At least one local AE Title must be configured before the DICOM Application can fully function. One AE Title is capable of serving all the local AE applications.

Table 4-78: AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
Storage	No Default	104 (Non-Secure) / 2762 (Secure)

Application Entity	Default AE Title	Default TCP/IP Port
Workflow	No Default	104 (Non-Secure) / 2762 (Secure)

4.4.1.2. Remote AE Titles

The AE Title, host name and port number of remote applications can be configured using the Administration Web Interface. A default Calling AE Title should be identified for each remote AE Title during the configuration. This Calling AE Title might be used by the remote application for permission checking. Whether or not the remote AE Title supports encapsulated *Transfer Syntax* can be configured. If not supported, no encapsulated *Transfer Syntax* will be proposed or accepted during the *Presentation Context Negotiation* between any Local AE Title and this remote AE Title.

The remote AE Titles to be used for different DICOM Applications can be specified at each application's configuration, or can be determined at run time. There is no limitation on what applications the remote AE Titles have to server.

4.4.2. Parameters

A number of parameters related to DICOM communication can be configured using the Administration Web Interface. See ImageGrid User Manual for details on general configuration capabilities.

Table 4-79: Configuration Parameters Table

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
Listening Port	Yes	104
Secure Listening Port	Yes	2762
Maximum PDU Size	Yes	16384 Bytes
Maximum Inbound Associations	Yes	16
Idle Association Timeout	Yes	600 s
Default Character Encoding	Yes	ISO_IR 100 (LATIN1)
Accept Unprocessable Transfer	Yes	No
Storage Parameters		
Duplicate Image Handling Policy	Yes	Overwrite, Success
Send study status	Yes	Yes
Number of times retrying failed send jobs	Yes	8
Minimum delay between retrying failed send jobs	Yes	60 s
Default Transfer Syntax (Global for all the AEs)	Yes	Original Transfer Syntax

5. Media Interchange

5.1. Implementation Model

5.1.1. Application Data Flow
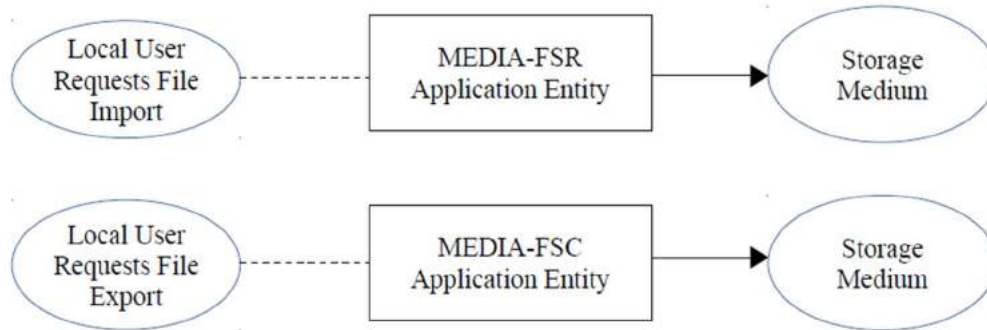
Figure 5-1: Media Interchange Implementation Model

ImageGrid provides media support as a File Set Reader and File Set Creator.

Conceptually it may be modeled as the following single AE:

- MEDIA-FSR, which loads a PS 3.10 compliant DICOMDIR file from PS 3.12 compliant media according to one of the general purpose media application profiles in PS 3.11 (CD-R or DVD).
- MEDIA-FSC, which creates a PS 3.10 compliant DICOMDIR file from PS 3.12 compliant media according to one of the general purpose media application profiles of PS 3.11 (CD-R or DVD).

5.1.2. Functional Definitions of AE's

5.1.2.1. MEDIA-FSR

MEDIA-FSR is activated through the user action of loading a supported media into the system's media reader. The studies on the media are listed in the Import Worklist. The user may select one or multiple studies to import.

5.1.2.2. MEDIA-FSC

MEDIA-FSC is activated through the user action of adding local studies to the Export Worklist. Only studies that belong to one single patient can be exported at a time. Each study is listed as one separate export job in the Export Worklist. A supported blank or rewritable media has to be placed in the system's media writer to further initiate the export action. The SOP instances associated with the export jobs will be written to the media.

5.1.3. Sequencing of Real-World Activities

All FSR and FSC activities are sequentially initiated by the user loading media into the system and operating from the Administration Web Interface. One activity may not be initiated until the prior activity as completed.

5.1.4. File Meta Information for Implementation Class and Version

The implementation information written to the File Meta Header in each file is as follows.

Table 5-1: DICOM Implementation Class and Version for Media Storage

Implementation Class UID	1.3.6.1.4.1.2820.0.3.0.0
Implementation Version Name	IGPACS_v3.2.0

5.2. AE Specifications

5.2.1. MEDIA-FSR

MEDIA-FSR provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed below.

Table 5-2: Application Profiles, Activities, and Roles for MEDIA-FSR

Application Profiles Supported	Real World Activity	Role
STD-GEN-CD	Import from CD media	FSR
STD-GEN-DVD-RAM	Import from DVD media	FSR

5.2.1.1. File Meta Information for the Application Entity

Not applicable, since MEDIA-FSR is not an FSC or FSU.

5.2.1.2. Real World Activities

5.2.1.2.1. Activity – Local User Requests File Import

MEDIA-FSR is activated through the Administration Web Interface. After the user loads a supported media into the system's media reader, if the media contains a valid DICOMDIR, the content of the media will be displayed in the Import Worklist, from where studies can be selected to be imported into the system.

5.2.1.2.1.1. Media Storage Application Profile

The MEDIA-FSR *Application Entity* supports the *SOP Classes* and *Transfer Syntaxes* listed in the tables below.

Table 5-3: SOP Classes for MEDIA-FSR

SOP Class Name	SOP Class UID
See Table 4-1	See Table 4-1
Media Storage Directory Storage	1.2.840.10008.1.3.10

Table 5-4: Transfer Syntaxes for MEDIA-FSR

Transfer Syntax	Transfer Syntax UID
See Table 4-42	See Table 4-42

5.2.2. MEDIA-FSC

MEDIA-FSC provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed below.

Table 5-5: Application Profiles, Activities, and Roles for MEDIA-FSC

Application Profiles Supported	Real World Activity	Role
STD-GEN-CD	Export to CD media	FSC
STD-GEN-DVD-RAM	Export to DVD media	FSC

5.2.2.1. File Meta Information for the Application Entity

The Source *Application Entity Title* is included in the File Meta Header.

5.2.2.2. Real World Activities

5.2.2.2.1. Activity – Local User Requests File Export

MEDIA-FSC is activated through the Administration Web Interface. The user can select studies from local AE Titles and add them to the Export Worklist, from where the export to media operation can be started.

5.2.2.2.1.1. Media Storage Application Profile

The MEDIA-FSC *Application Entity* supports the *SOP Classes* and *Transfer Syntaxes* listed in the tables below.

Table 5-6: SOP Classes for MEDIA-FSC

SOP Class Name	SOP Class UID
See Table 4-1	See Table 4-1
Media Storage Directory Storage	1.2.840.10008.1.3.10

Table 5-7: Transfer Syntaxes for MEDIA-FSC

Transfer Syntax	Transfer Syntax UID
See Table 4-11	See Table 4-11

5.3. Augmented and Private Profiles

5.3.1. Augmented Application Profiles

None.

5.3.2. Private Application Profiles

None.

5.4. Media Configuration

None.

6. Support of Character Sets

6.1. Overview

The application supports all extended character sets defined in the DICOM 2016 standard, including single-byte and multi-byte character sets as well as code extension techniques using ISO 2022 escapes.

Support extends to correctly decoding and displaying the correct symbol for all names and strings found in the DICOMDIR, in storage instances from media and received over the network, and in the local database.

No specific support for sorting of strings other than in the default character set is provided.

6.2. Character Sets

Table 6-1: Supported Specific Character Set and Defined Terms

Character Set Description	Defined Term
Unicode (Default Repertoire)	ISO_IR 192
ASCII Graphic	ISO_IR 6
Latin Alphabet No.1	ISO_IR 100
Latin Alphabet No.2	ISO_IR 101
Latin Alphabet No.3	ISO_IR 109
Latin Alphabet No.4	ISO_IR 110
Cyrillic	ISO_IR_144
Arabic	ISO_IR 127
Greek	ISO_IR 126
Hebrew	ISO_IR 138
Latin Alphabet No.5	ISO_IR 148
Japanese	ISO_IR 13
Thai	ISO_IR 166
Chinese GB18030	GB18030
ASCII Graphic (with Code Extension)	ISO 2022 IR 6
Latin Alphabet No.1 (with Code Extensions)	ISO 2022 IR 100
Latin Alphabet No.2 (with Code Extensions)	ISO 2022 IR 101
Latin Alphabet No.3 (with Code Extensions)	ISO 2022 IR 109
Latin Alphabet No.4 (with Code Extensions)	ISO 2022 IR 110
Cyrillic (with Code Extensions)	ISO 2022 IR 144
Arabic (with Code Extension)	ISO 2022 IR 127
Greek (with Code Extension)	ISO 2022 IR 126
Hebrew (with Code Extension)	ISO 2022 IR 138
Latin Alphabet No.5 (with Code Extension)	ISO 2022 IR 148
Japanese (with Code Extension)	ISO 2022 IR 13
Thai (with Code Extension)	ISO 2022 IR 166
Japanese (KANJI with Code Extension)	ISO 2022 IR 87
Japanese (SUPP KANJI with Code Extension)	ISO 2022 IR 159
Korean (with Code Extension)	ISO 2022 IR 149

6.3. Character Set Configuration

The default character set to be used for DICOM Service can be configured from the Administration Web Interface.

7. Security

7.1. Security Profiles

None supported.

7.2. Association Level Security

The DICOM Service on ImageGrid can be configured to check the following DICOM values when determining whether to accept *Association* Open Requests:

- Calling AE Title
- Called AE Title

Each local AE Title (Called AE Title) can be configured to accept *Association* Requests from only a limited list of Calling AE Titles.

The AE Title and Presentation Address mapping of the requestor is not validated.

The system can be configured to block certain IP Addresses or Ranges. This blacklist is global, and it applies to all the DICOM Services and AEs. *Association* requests coming from the blacklist are not able to reach the DICOM Service.

7.3. Application Level Security

None supported.

8. Annexes

8.1. IOD Contents

8.1.1. Created SOP Instances

ImageGrid system can create instances of Encapsulated PDF Storage and Basic Text SR Storage. Encapsulated PDF Storage instances can be created by the companion viewer application and the Administration Web Interface by attaching PDFs to studies. Basic Text SR Storage instances can be created by the HL7 Service application and when certain types of HL7 messages are received. Further details about the companion viewer application and the HL7 Service is beyond the scope of this document.

Table 8-3 specifies the *Attributes* of an Encapsulated PDF instance created and transmitted by the storage application of ImageGrid.

Table 8-4 specifies the *Attributes* of a Basic Text SR instance created and transmitted by the storage application of ImageGrid.

The following tables use a number of abbreviations:

Table 8-1: Abbreviations

Abbreviation	Definition
Presence of Value	
VNAP	Value not always present (*Attribute* sent zero length if no value is present).
ANAP	*Attribute* not always presentation.
ALWAYS	Always present.
EMPTY	*Attribute* is created without a value.
Source	
USER	The *Attribute* value source is from user input
AUTO	The *Attribute* value is generated automatically
EXISTING	The *Attribute* value source is from existing information
FIXED	The *Attribute* value is hard-coded in the application

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Administration Web Interface.

8.1.1.1. List of Created SOP Classes

Table 8-2: List of Created SOP Classes

SOP Class Name	SOP Class UID
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11

8.1.1.2. Encapsulated PDF Storage SOP Class

Table 8-3: IOD of Created Encapsulated PDF Storage SOP Class Instances

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-5	ALWAYS
Study	General Study	Table 8-6	ALWAYS
	Patient Study	Table 8-7	ALWAYS

IE	Module	Reference	Presence of Module
Series	Encapsulated Document Series	Table 8-8	ALWAYS
Equipment	General Equipment	Table 8-9	ALWAYS
	SC Equipment	Table 8-10	ALWAYS
Encapsulated Document	Encapsulated Document	Table 8-11	ALWAYS
	SOP Common	Table 8-12	ALWAYS
	Private Application	Table 8-13	ALWAYS

8.1.1.3. Basic Text SR Storage SOP Class

Table 8-4: IOD of Created Basic Text SR Storage SOP Class Instances

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-5	ALWAYS
Study	General Study	Table 8-6	ALWAYS
	Patient Study	Table 8-7	ALWAYS
Series	SR Document Series	Table 8-14	ALWAYS
Equipment	General Equipment	Table 8-15	ALWAYS
Document	SR Document General	Table 8-16	ALWAYS
	SR Document Content	Table 8-17	ALWAYS
	SOP Common	Table 8-18	ALWAYS
	Private Application	Table 8-19	ALWAYS

8.1.1.4. Common Modules

Table 8-5: Patient Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Copied from an existing instance of the study	ALWAYS	EXISTING
Patient ID	(0010,0020)	LO	Copied from an existing instance of the study	ALWAYS	EXISTING
Issuer of Patient ID	(0010,0021)	LO	Copied from an existing instance of the study	ANAP	EXISTING
Other Patient IDs	(0010,1000)	LO	Copied from an existing instance of the study	ANAP	EXISTING
Other Patient Names	(0010,1001)	PN	Copied from an existing instance of the study	ANAP	EXISTING
Patient's Birth Date	(0010,0030)	DA	Copied from an existing instance of the study	VNAP	EXISTING
Patient's Birth Time	(0010,0032)	TM	Copied from an existing instance of the study	ANAP	EXISTING
Patient's Sex	(0010,0040)	CS	Copied from an existing instance of the study	VNAP	EXISTING
Ethnic Group	(0010,2160)	SH	Copied from an existing instance of the study	ANAP	EXISTING
Patient Species Description	(0010,2201)	LO	Copied from an existing instance of the study	ANAP	EXISTING
Patient Breed Description	(0010,2292)	LO	Copied from an existing instance of the study	ANAP	EXISTING

Attribute Name	Tag	VR	Value	Presence of Value	Source
Responsible Person	(0010,2297)	PN	Copied from an existing instance of the study	ANAP	EXISTING

Table 8-6: General Study Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	Copied from an existing instance of the study	ALWAYS	EXISTING
Study Date	(0008,0020)	DA	Copied from an existing instance of the study	VNAP	EXISTING
Study Time	(0008,0030)	TM	Copied from an existing instance of the study	VNAP	EXISTING
Referring Physician's Name	(0008,0090)	PN	Copied from an existing instance of the study	VNAP	EXISTING
Referring Physician Identification Sequence	(0008,0096)	SQ	Copied from an existing instance of the study	ANAP	EXISTING
Study ID	(0020,0010)	SH	Copied from an existing instance of the study	VNAP	EXISTING
Accession Number	(0008,0050)	SH	Copied from an existing instance of the study	VNAP	EXISTING
Study Description	(0008,1030)	LO	Copied from an existing instance of the study	ANAP	EXISTING
Name of Physician(s) Reading Study	(0008,1060)	PN	Copied from an existing instance of the study	ANAP	EXISTING
Procedure Code Sequence	(0008,1032)	SQ	Copied from an existing instance of the study	ANAP	EXISTING

Table 8-7: Patient Study Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Age	(0010,1010)	AS	Copied from an existing instance of the study	ANAP	EXISTING
Patient's Size	(0010,1020)	DS	Copied from an existing instance of the study	ANAP	EXISTING
Patient's Weight	(0010,1030)	DS	Copied from an existing instance of the study	ANAP	EXISTING
Occupation	(0010,2180)	SH	Copied from an existing instance of the study	ANAP	EXISTING
Admitting Diagnoses Description	(0008,1080)	LO	Copied from an existing instance of the study	ANAP	EXISTING

8.1.1.5. Encapsulated PDF Modules

Table 8-8: Encapsulated Document Series module of Created Encapsulated PDF SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	"OT"	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Auto generated UID	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Increment the largest existing series number	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Series Description	(0008,103E)	LO	"Attachment"	ALWAYS	AUTO
Request Attributes Sequence	(0040,0275)	SQ	Copied from an existing instance of the study	ANAP	EXISTING
> Requested Procedure Description	(0032,1060)	LO	Copied from an existing instance of the study	ANAP	EXISTING

Table 8-9: General Equipment Module of Created Encapsulated PDF SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Institution Name	(0008,0080)	LO	Copied from an existing instance of the study	VNAP	EXISTING
Manufacturer	(0008,0070)	LO	EMPTY	ALWAYS	FIXED

Table 8-10: SC Equipment Module of Created Encapsulated PDF SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Conversion Type	(0008,0064)	CS	"WSD"	ALWAYS	AUTO

Table 8-11: Encapsulated Document Module of Created Encapsulated PDF SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	"1"	ALWAYS	AUTO
Content Date	(0008,0023)	DA	Date when the instance is created	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Time when the instance is created	ALWAYS	AUTO
Acquisition Date Time	(0008,002A)	DT	Date and time when the instance is created	ALWAYS	AUTO
Burned-in Annotation	(0028,0301)	CS	"YES"	ALWAYS	AUTO
Document Title	(0042,0010)	ST	User input when adding an attachment	ALWAYS	USER
Concept Name Code Sequence	(0040,A043)	SQ	Empty	ALWAYS	AUTO
MIME Type of Encapsulated Document	(0042,0012)	LO	Automatically detected from the attachment file	ALWAYS	AUTO
Encapsulated Document	(0042,0011)	OB	User uploaded attachment file	ALWAYS	USER

Table 8-12: SOP Common Module of Created Encapsulated PDF SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	"1.2.840.10008.5.1.4.1.1.104.1"	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Auto generated UID	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	Copied from an existing instance of the study	ALWAYS	EXISTING
Instance Creation Date	(0008,0012)	DA	Date when the instance is created	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Creation Time	(0008,0013)	TM	Time when the instance is created	ALWAYS	AUTO

Table 8-13: Private Application Module of Created Encapsulated PDF SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Original File Name	(0009,0005)	LO	The original file name of user uploaded attachment	ALWAYS	USER

8.1.1.6. Basic Text SR Modules

Table 8-14: SR Document Series Module of Created SR SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	"SR"	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Auto generated UID	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Empty	EMPTY	AUTO

Table 8-15: General Equipment Module of Created SR SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Institution Name	(0008,0080)	LO	Copied from an existing instance of the study	ANAP	EXISTING

Table 8-16: SR Document General Module of Created SR SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Empty	EMPTY	AUTO
Completion Flag	(0040,A491)	CS	"COMPLETE" or "PARTIAL"	ALWAYS	AUTO
Verification Flag	(0040,A493)	CS	"VERIFIED" or "UNVERIFIED"	ALWAYS	AUTO
Content Date	(0008,0023)	DA	Copied from the triggering HL7 message	VNAP	EXISTING
Content Time	(0008,0033)	TM	Copied from the triggering HL7 message	VNAP	EXISTING
Verifying Observer Sequence	(0040,A073)	SQ		ALWAYS	AUTO
> Verifying Observer Name	(0040,A075)	PN	Copied from the triggering HL7 message	VNAP	EXISTING
Referenced Request Sequence	(0040,A370)	SQ		ALWAYS	AUTO
> Requested Procedure Description	(0032,1060)	LO	Copied from the triggering HL7 message	VNAP	EXISTING

Table 8-17: SR Document Content Module of Created SR SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Value Type	(0040,A040)	CS	"CONTAINER"	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
> Code Value	(0008,0100)	SH	"11528-7"	ALWAYS	AUTO
> Coding Scheme Designator	(0008,0102)	SH	"LN"	ALWAYS	AUTO
> Code Meaning	(0008,0104)	LO	"Radiology Report"	ALWAYS	AUTO
Content Sequence	(0040,A730)	SQ		ALWAYS	AUTO
> Relationship Type	(0040,A010)	CS	"CONTAINS"	ALWAYS	AUTO
> Value Type	(0040,A040)	CS	"TEXT"	ALWAYS	AUTO
> Text Value	(0040,A160)	UT	Copied from the triggering HL7 message	VNAP	EXISTING
> Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>> Code Value	(0008,0100)	SH	"121111"	ALWAYS	AUTO
>> Coding Scheme Designator	(0008,0102)	SH	"DCM"	ALWAYS	AUTO
>> Code Meaning	(0008,0104)	LO	"Summary"	ALWAYS	AUTO
Continuity of Content	(0040,A050)	CS	"SEPARATE"	ALWAYS	AUTO

Table 8-18: SOP Common Module of Created SR SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	"1.2.840.10008.5.1.4.1.1.88.11"	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Auto generated UID	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	Copied from an existing instance of the study	ALWAYS	EXISTING

Table 8-19: Private Application Module of Created SR SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Account Number	(0009,0025)	LO	Copied from the triggering HL7 message	VNAP	EXISTING
Transcriptionist	(0009,0026)	PN	Copied from the triggering HL7 message	VNAP	EXISTING
Transcribed Date	(0009,0027)	DA	Copied from the triggering HL7 message	VNAP	EXISTING
Transcribed Time	(0009,0028)	TM	Copied from the triggering HL7 message	VNAP	EXISTING
Printed Date	(0009,0029)	DA	Copied from the triggering HL7 message	VNAP	EXISTING
Printed Time	(0009,0030)	TM	Copied from the triggering HL7 message	VNAP	EXISTING
Registration Status	(0009,0031)	LO	Copied from the triggering HL7 message	VNAP	EXISTING
Technologist	(0009,0032)	PN	Copied from the triggering HL7 message	VNAP	EXISTING
Result Copied To	(0009,0033)	PN	Copied from the triggering HL7 message	VNAP	EXISTING

Attribute Name	Tag	VR	Value	Presence of Value	Source
Report Header	(0009,0034)	LO	Copied from the triggering HL7 message	VNAP	EXISTING

8.1.2. Usage of Attributes from Received IOD's

ImageGrid makes use of the conventional identification *Attributes* to distinguish patients, studies, series and instances. No *SOP Class* specific attributes for images are required.

Table 8-20: Significant Elements in Received Composite SOP Instances

Module	Attribute Name	Tag	Type	Significance
Patient	Patient ID	(0010,0020)	M	Verification on incoming Patient ID is performed. If the Patient ID *Attribute* is missing or has an empty value, then the Patient's Name will be copied and used as the Patient ID as well. If both the Patient ID and Patient's Name are not available, then a default value "__MISSING_PATIENT_ID__" will be assigned. Patients with the same Patient ID but different name, birth date, or sex will be stored as different patients in the database.
	Patient's Name	(0010,0010)	O	Incoming instances without Patient's Name will be accepted. But this is a key *Attribute* for identifying a patient.
	Patient's Birth Date	(0010,0030)	O	Incoming instances without Patient's Birth Date will be accepted. But this is a key *Attribute* for identifying a patient.
	Patient's Sex	(0010,0040)	O	Incoming instances without Patient's Sex will be accepted. But this is a key *Attribute* for identifying a patient.
General Study	Study Instance UID	(0020,000D)	M	Must be provided.
	Study Date	(0008,0020)	O	This is a key *Attribute* for performing workflow and data management functions.
	Accession Number	(0008,0050)	O	This is a key *Attribute* for matching *SOP Instance* with workflow information provided by HIS/RIS.
General Series	Series Instance UID	(0020,000E)	M	Must be provided.
	Modality	(0008,0060)	O	This is a key *Attribute* for identifying the type of series, and it is utilized by viewing, workflow and data management applications.
SOP Common	SOP Class UID	(0008,0016)	O	Must be provided.
	SOP Instance UID	(0008,0018)	O	Must be provided. If a duplicate *SOP Instance UID* is received, the duplicate handling policy in DICOM Service settings will apply.

"M" indicates the *Attribute* is mandatory, "O" indicates the *Attribute* is optional.

See Table 4-61 and Table 4-62 for *Attributes* in MPPS *IOD* used by MPPS-SCP.

8.1.3. Attribute Mapping

The mapping between *Attributes* received via HL7 from the RIS or HIS and those supplied in the Modality Worklist is configurable. The default mapping is contained in the table below. Empty cells indicate that there is no mapping for the specific *Attribute*.

Table 8-21: Attribute Mapping between HL7 and Modality Worklist

DICOM Attribute	DICOM Tag	HL7 Attribute Name	HL7 Segment	Notes
Scheduled Procedure Step				
Scheduled Procedure Step Sequence	(0040,0100)			
> Scheduled Station AET	(0040,0002)			Generated from HL7 Station configuration that matches OBR-24 on Station Name
> Scheduled Procedure Step Start Date	(0040,0003)	Quantity/Timing	ORC-7.4	
> Scheduled Procedure Step Start Time	(0040,0006)	Quantity/Timing	ORC-7.4	
> Modality	(0008,0060)			Generated from HL7 Station configuration that matches OBR-24 on Station Name
> Scheduled Performing Physician's Name	(0040,0006)	Technician		
> Scheduled Procedure Step Description	(0040,0007)			Generated from Procedure configuration that matches OBR-4.1 on Procedure Code
> Scheduled Station Name	(0040,0010)		OBR-24	
> Scheduled Procedure Step ID	(0040,0009)			Auto generated
> Scheduled Procedure Step Location	(0040,0011)			
> Scheduled Protocol Code Sequence	(0040,0008)			
>> Code Value	(0008,0100)			Generated from Procedure configuration that matches OBR-4.1 on Procedure Code
>> Coding Scheme Designator	(0008,0102)			Generated from Procedure configuration that matches OBR-4.1 on Procedure Code
>> Coding Scheme Version	(0008,0103)			Generated from Procedure configuration that matches OBR-4.1 on Procedure Code
>> Code Meaning	(0008,0104)			Generated from Procedure configuration that matches OBR-4.1 on Procedure Code
Requested Procedure				
Requested Procedure ID	(0040,1001)		OBR-4	
Requested Procedure Description	(0032,1060)		OBR-4.2	
Requested Procedure Code Sequence	(0032,1064)			

DICOM Attribute	DICOM Tag	HL7 Attribute Name	HL7 Segment	Notes
> Code Value	(0008,0100)	Universal Service ID	OBR-4.1	
> Coding Scheme Designator	(0008,0102)			Generated from Procedure configuration that matches OBR-4.1 on Procedure Code
> Coding Scheme Version	(0008,0103)			Generated from Procedure configuration that matches OBR-4.1 on Procedure Code
> Code Meaning	(0008,0104)			Generated from Procedure configuration that matches OBR-4.1 on Procedure Code
Study Instance UID	(0020,000D)			Auto generated
Requested Procedure Priority	(0040,1003)		ORC-7.6	
Reason for the Requested Procedure	(0040,1002)			
Imaging Service Request				
Accession Number	(0008,0050)		ORC-3	
Requesting Physician	(0032,1032)		ORC-12	
Referring Physician's Name	(0008,0090)		PV1-8	
Visit Identification				
Admission ID	(0038,0010)			
Institution Name	(0008,0080)			
Visit Status				
Current Patient Location	(0038,0300)			
Patient Identification				
Patient's Name	(0010,0010)		PID-5	
Patient ID	(0010,0020)		PID-3	
Other Patient IDs	(0010,1000)		PID-4	
Patient Demographics				
Patient's Birth Date	(0010,0030)		PID-7	
Patient's Sex	(0010,0040)		PID-8	
Patient's Weight	(0010,1030)			
Confidentiality Constraint on Patient Data Description	(0040,3001)			
Patient Medical				
Patient State	(0038,0500)	Danger Code		
Pregnancy Status	(0010,21C0)	Filler Field 1		
Medical Alerts	(0010,2000)	Relevant Clinical Information		
Allergies	(0010,2110)			
Special Needs	(0038,0050)			

8.1.4. Coerced/Modified Fields

When the Patient ID *Attribute* is missing from the incoming instances, STORAGE-SCP will automatically assign the Patient's Name *Attribute* value to the Patient ID *Attribute*, and store it in the database. In case the Patient's Name *Attribute* is missing as well, a default value "__MISSING_PATIENT_ID__" will be assigned to the Patient ID *Attribute*, while the Patient's Name *Attribute* is left empty.

When these instances with the coerced Patient ID are transferred by STORAGE-SCU, the original incoming data set without the coerced value will be used, unless a modification of the Patient ID has been performed by the user.

No other coercion by the *SCP* or *SCU* is performed.

Table 8-22: Modifiable DICOM Attributes for Storage SOP Classes

Level	Attributes	Description
PATIENT	(0010,0020)	Patient ID
PATIENT	(0010,0010)	Patient's Name
PATIENT	(0010,0021)	Issuer of Patient ID
PATIENT	(0010,0030)	Patient's Birth Date
PATIENT	(0010,0032)	Patient's Birth Time
PATIENT	(0010,0040)	Patient's Sex
PATIENT	(0010,1000)	Other Patient IDs
PATIENT	(0010,1001)	Other Patient Names
PATIENT	(0010,2000)	Medical Alerts
PATIENT	(0010,2110)	Allergies
PATIENT	(0010,2154)	Patient Telephone Numbers
PATIENT	(0010,2160)	Ethnic Group
STUDY	(0010,1010)	Patient's Age
STUDY	(0010,1020)	Patient's Size
STUDY	(0010,1030)	Patient's Weight
STUDY	(0010,2180)	Patient's Occupation
STUDY	(0008,0020)	Study Date
STUDY	(0008,0030)	Study Time
STUDY	(0008,0050)	Accession Number
STUDY	(0008,0080)	Institution Name
STUDY	(0008,0090)	Referring Physician's Name
STUDY	(0008,1030)	Study Description
STUDY	(0008,1060)	Name of Physicians Reading Study
STUDY	(0008,1080)	Admitting Diagnoses Description
STUDY	(0020,0010)	Study ID
STUDY	(0032,1060)	Requested Procedure Description
SERIES	(0008,0021)	Series Date
SERIES	(0008,0031)	Series Time
SERIES	(0008,0060)	Modality
SERIES	(0008,103E)	Series Description
SERIES	(0008,1050)	Performing Physician's Name
SERIES	(0008,1070)	Operator's Name
SERIES	(0018,0015)	Body Part Examined
SERIES	(0018,1030)	Protocol Name

Level	Attributes	Description
SERIES	(0020, 0011)	Series Number
SERIES	(0040,0253)	Performed Procedure Step ID
SERIES	(0040,0254)	Performed Procedure Step Description
IMAGE	(0008,0023)	Content Date
IMAGE	(0008,0033)	Content Time
IMAGE	(0020,0013)	Instance Number
IMAGE	(0020,4000)	Image Comments
IMAGE	(0070,0080)	Content Label
IMAGE	(0070,0081)	Content Description
IMAGE	(0070,0082)	Presentation Creation Date
IMAGE	(0070,0083)	Presentation Creation Time
IMAGE	(0070,0084)	Content Creator's Name

8.2. Data Dictionary of Private Attributes

The private *Attributes* added to created *SOP Instances* are listed in the table below. ImageGrid reserves blocks of private *Attributes* in group 0009. Further details on usage of these private *Attributes* are contained in Section 8.1.

Note: The private attributes defined in Table 8-23 are not DICOM conformant. The group is not reserved as specified in PS3.5 Section 7.8.1. Private Creator (0009,0010) is missing and the private attributes start at 0090,00xx when they should begin 0090,10xx. These issues will be resolved in a future version.

Table 8-23: Data Dictionary of Private Attributes

Tag	Attribute Name	VR	VM
(0009,0005)	Original File Name	LO	1
(0009,0025)	Account Number	LO	1
(0009,0026)	Transcriptionist	PN	1
(0009,0027)	Transcribed Date	DA	1
(0009,0028)	Transcribed Time	TM	1
(0009,0029)	Printed Date	DA	1
(0009,0030)	Printed Time	TM	1
(0009,0031)	Registration Status	LO	1
(0009,0032)	Technologist	PN	1
(0009,0033)	Result Copied To	PN	1
(0009,0034)	Report Header	LO	1

8.3. Coded Terminology and Templates

Not applicable.

8.4. Grayscale Image Consistency

ImageGrid does not support the Grayscale Standard Display Function.

8.5. Standard Extended/Specialized/Private SOP Classes

8.5.1. Standard Extended/Specialized/Private SOP Classes

8.5.1.1. Extended Basic Text SR Storage SOP Class

Table 8-24: Extended Modules for IOD of Created Basic Text SR Storage SOP Class

IE	Module	Reference	Presence of Module
Visit	Visit Status	Table 8-25	ALWAYS

8.5.1.2. Extended Modules

Table 8-25: Extended Visit Status Module of Created SR SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Current Patient Location	(0038,0300)	LO	Copied from the triggering HL7 message	VNAP	EXISTING

8.5.1.3. Extended DICOM attributes

Table 8-26: Extended DICOM attributes for Patient Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Telephone Numbers	(0010,2154)	SH	Copied from an existing instance of the study	ANAP	EXISTING
Medical Alerts	(0010,2000)	LO	Copied from an existing instance of the study	ANAP	EXISTING
Allergies	(0010,2110)	LO	Copied from an existing instance of the study	ANAP	EXISTING

Table 8-27: Extended DICOM attributes for SR Document Series Module of Created SR SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Request Attributes Sequence	(0040,0275)	SQ	Copied from an existing instance of the study	ANAP	EXISTING

8.5.1.4. Private SOP Classes

Some Private Storage SOP Classes are used by ImageGrid only for recognition and storage purposes.

8.6. Private Transfer Syntaxes

ImageGrid does not employ any Private *Transfer Syntaxes*.