DICOM Conformance Statement

HealthMyne QIDS

2017 System Release 1.6

HealthMyne Inc.

1 CONFORMANCE STATEMENT OVERVIEW

HealthMyne QIDS (HM or QIDS) is a networked computer system used for the management, display and analysis of medical images, more specifically for measurement and characterization of solid and semi solid tumors in thoracic CT data sets.

HM manages content from many different DICOM SOP Classes in addition to storage and display of primary images such as CT and MR. These additional SOP Classes include:

- RTSTRUCT, SEG: DICOM structures representing both normal organs and tumors are stored and displayed using the RTSTRUCT (Radiotherapy Structure Set) and SEG (Surface Segmentation) object formats. Nodules and lesions are displayed as contours in 2D planar views (including MPR views) and surfaces in 3D views.
- PR: Grayscale Presentation state objects are used to store and display window/level settings, VOILUT settings, annotations, and displayed area on primary images.
- REG: The set of rigid transformations (translation and rotation operations) used to relate different DICOM frame of references are stored and managed using the REG (Spatial Registration) SOP Class. HM has automated methods for performing rigid registration by alignment of bony tissue as well as manual tools for translation and rotation. The full set of translation and rotation operations are represented as a 4 x 4 transformation matrix within the REG instance.
- SR: The SR (Structured Report) document is used to capture relevant study level information that is needed to interpret the study in addition to information contained in objects such as primary images, presentation state, and structures. This study level information includes:
    - Whether the interpretation is final or preliminary
    - The identification of relevant priors as a subset of all prior studies used in interpreting a current study
    - The final LUNG RADS rating including modifiers

HM is designed to work with a primary storage archive. When HM becomes aware of a new study either from an HL7 scheduling message (see HL7 comformance statement) or storage of an acquired image, it performs a C-Find query of the primary archive to ascertain all other prior studies that exist for the patient. These studies initially appear as “remote” studies in the system and are retrieved asynchronously from the primary archive from a C-Move operation. HM sends RTSTRUCT, SEG, PR, REG, and SR content generated from its analysis to the primary archive on a periodic basis.

In general, the HM system conforms to the DICOM 3.0 standard to allow the sharing of medical information with other digital imaging systems.

1.1 NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Storage Service Class	Yes	Yes
Computed Radiography Image Storage	Stored and Viewed	Yes
Digital X-Ray Image Storage – For Presentation	Stored Only	Yes
Digital X-Ray Image Storage – For Processing	Stored Only	Yes

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Digital Mammography X- Ray Image Storage – For Presentation	Stored Only	Yes
Digital Mammography X- Ray Image Storage – For Processing	Stored Only	Yes
Digital Intra-oral X-Ray Image Storage – For Presentation	Stored Only	Yes
Digital Intra-oral X-Ray Image Storage – For Processing	Stored Only	Yes
CT Image Storage	Stored and Viewed	Yes
Enhanced CT Image Storage	Stored Only	Yes
Ultrasound Multi-frame Image Storage	Stored Only	Yes
MR Image Storage	Stored and Viewed	Yes
Enhanced MR Image Storage	Stored Only	Yes
MR Spectroscopy Storage	Stored Only	Yes
Enhanced MR Color Image Storage SOP Class	Stored Only	Yes
Ultrasound Image Storage	Stored Only	Yes
Enhanced US Volume Storage	Stored Only	Yes
Secondary Capture Image Storage	Stored and Viewed	Yes
Multi-frame Single Bit Secondary Capture Image Storage	Stored Only	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	Stored Only	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	Stored Only	Yes
Multi-frame True Color Secondary Capture Image Storage	Stored Only	Yes
12-lead ECG Waveform Storage	Stored Only	Yes
General ECG Waveform Storage	Stored Only	Yes
Ambulatory ECG Waveform Storage	Stored Only	Yes
Hemodynamic Waveform Storage	Stored Only	Yes
Cardiac Electrophysiology Waveform Storage	Stored Only	Yes
Basic Voice Audio Waveform Storage	Stored Only	Yes
General Audio Waveform Storage	Stored Only	Yes
Arterial Pulse Waveform Storage	Stored Only	Yes
Respiratory Waveform Storage	Stored Only	Yes
Grayscale Softcopy Presentation State Storage SOP Class	Stored and Viewed	Yes
Color Softcopy Presentation State Storage SOP Class	Stored Only	Yes
Pseudo-Color Softcopy Presentation State Storage SOP Class	Stored Only	Yes
Blending Softcopy Presentation State Storage SOP Class	Stored Only	Yes
XA/XRF Grayscale Softcopy Presentation State Storage	Stored Only	Yes

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
X-Ray Angiographic Image Storage	Stored and Viewed	Yes
Enhanced XA Image Storage	Stored Only	Yes
X-Ray Radiofluoroscopic Image Storage	Stored Only	Yes
Enhanced XRF Image Storage	Stored Only	Yes
X-Ray 3D Angiographic Image Storage	Stored Only	Yes
X-Ray 3D Craniofacial Image Storage	Stored Only	Yes
Breast Tomosynthesis Image Storage	Stored Only	Yes
Intravascular Optical Coherence Tomography Image Storage – For Presentation	Stored Only	Yes
Intravascular Optical Coherence Tomography Image Storage – For Processing	Stored Only	Yes
Nuclear Medicine Image Storage	Stored Only	Yes
Raw Data Storage	Stored Only	Yes
Spatial Registration Storage	Stored and Viewed	Yes
Spatial Fiducials Storage	Stored Only	Yes
Deformable Spatial Registration SOP Class	Stored Only	Yes
Segmentation SOP Class	Stored Only	Yes
Surface Segmentation Storage	Stored Only	Yes
Real World Value Mapping Storage	Stored Only	Yes
VL Endoscopic Image Storage	Stored Only	Yes
Video Endoscopic Image Storage	Stored Only	Yes
VL Microscopic Image Storage	Stored Only	Yes
Video Microscopic Image Storage	Stored Only	Yes
VL Slide-Coordinates Microscopic Image Storage	Stored Only	Yes
VL Photographic Image Storage	Stored Only	Yes
Video Photographic Image Storage	Stored Only	Yes
Ophthalmic Photography 8 Bit Image Storage	Stored Only	Yes
Ophthalmic Photography 16 Bit Image Storage	Stored Only	Yes
Stereometric Relationship Storage	Stored Only	Yes
Ophthalmic Tomography Image Storage	Stored Only	Yes
VL Whole Slide Microscopy Image Storage	Stored Only	Yes
Lensometry Measurements Storage	Stored Only	Yes
Autorefraction Measurements Storage	Stored Only	Yes
Keratometry Measurements Storage	Stored Only	Yes
Subjective Refraction Measurements Storage	Stored Only	Yes
Visual Acuity Measurements Storage	Stored Only	Yes
Spectacle Prescription Report Storage	Stored Only	Yes
Ophthalmic Axial Measurements Storage	Stored Only	Yes
Intraocular Lens Calculations Storage	Stored Only	Yes

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Macular Grid Thickness and Volume Report Storage SOP Class	Stored Only	Yes
Ophthalmic Visual Field Static Perimetry Measurements Storage	Stored Only	Yes
Basic Text SR	Stored and Viewed	Yes
Enhanced SR	Stored Only	Yes
Comprehensive SR	Stored Only	Yes
Procedure Log Storage	Stored Only	Yes
Mammography CAD SR	Stored Only	Yes
Key Object Selection Document	Stored Only	Yes
Chest CAD SR	Stored Only	Yes
X-Ray Radiation Dose SR	Stored Only	Yes
Colon CAD SR	Stored Only	Yes
Implantation Plan SR Document Storage	Stored Only	Yes
Encapsulated PDF Storage SOP Class	Stored Only	Yes
Encapsulated CDA Storage SOP Class	Stored Only	Yes
Positron Emission Tomography Image Storage	Stored Only	Yes
Enhanced PET Image Storage	Stored Only	Yes
Basic Structured Display Storage	Stored Only	Yes
RT Image Storage	Stored Only	Yes
RT Dose Storage	Stored Only	Yes
RT Structure Set Storage	Stored and Viewed	Yes
RT Beams Treatment Record Storage	Stored Only	Yes
RT Plan Storage	Stored Only	Yes
RT Brachy Treatment Record Storage	Stored Only	Yes
RT Treatment Summary Record Storage	Stored Only	Yes
Query/Retrieve		
Study Root Query/Retrieve Information Model – FIND	Yes	No
Study Root Query/Retrieve Information Model – MOVE	Yes	No

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3 INTRODUCTION

3.1 REVISION HISTORY

Revision	Date	DICOM Version	Notes
Submission	June 1,2015	3, 3.1	Initial Revision
1.4	May 26,2016	3,3.1	For release 1.4
1.5	July 12, 2016	3, 3.1	For release 1.5, added 8.3.12
1.6	March 31, 2017	3, 3.1	For release 1.6, added RTSTRUCT information

3.2 AUDIENCE

This document is written for the people that need to understand how HM 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 that 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 HM and other DICOM products. The Conformance Statement should be read and understood in conjunction with the 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.

This 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 Statements 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.

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

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

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

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

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

Attribute – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD) – the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly

unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 work lists 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 process.

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 ABBREVIATIONS

AE	Application Entity
AET	Application Entity Title
CAD	Computer Aided Detection
CR	Computed Radiography
CT	Computed Tomography
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DIT	Directory Information Tree (LDAP)
DN	Distinguished Name (LDAP)
DNS	Domain Name System
DX	Digital X-ray
GSDF	Grayscale Standard Display Function
GSPS	Grayscale Softcopy Presentation State
HIS	Hospital Information System
HL7	Health Level 7 Standard
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standards
IO	Intra-oral X-ray
JPEG	Joint Photographic Experts Group
LDAP	Lightweight Directory Access Protocol LDIF
LDAP	Data Interchange Format
LUT	Look-up Table
MG	Mammography (X-ray)
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance Imaging
MSPS	Modality Scheduled Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Work list
NM	Nuclear Medicine
NTP	Network Time Protocol
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDU	Protocol Data Unit R Required (Key Attribute)
RDN	Relative Distinguished Name (LDAP)
RF	Radiofluoroscopy
RIS	Radiology Information System.
RT	Radiotherapy

SC Secondary Capture
SCP Service Class Provider
SCU Service Class User
SOP Service-Object Pair
SPS Scheduled Procedure Step
SR Structured Reporting
TCP/ IP Transmission Control Protocol/Internet Protocol
U Unique (Key Attribute)
UL Upper Layer
US Ultrasound
VL Visible Light
VR Value Representation
XA X-ray Angiography

3.7 REFERENCES

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

4 NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow

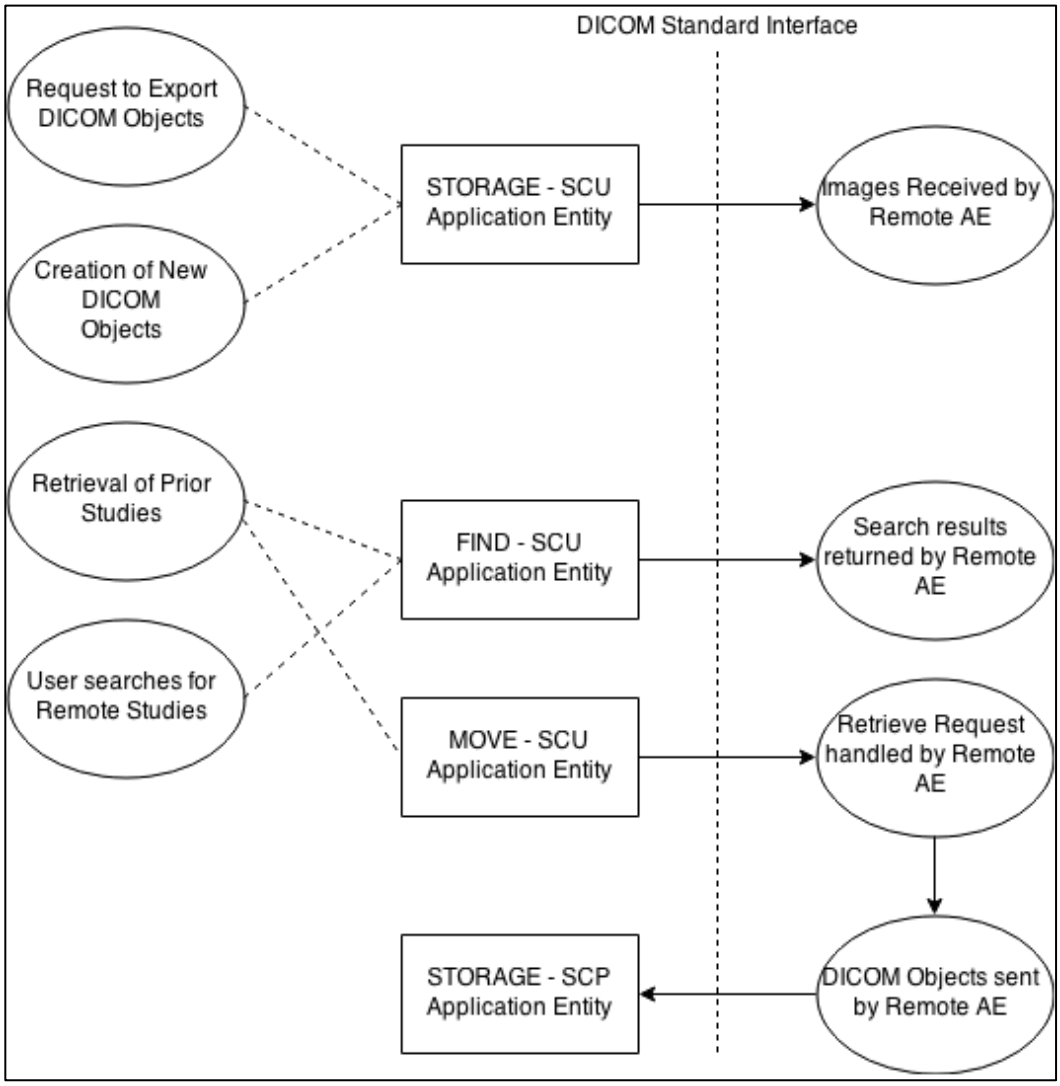

Figure 1: Functional Overview

All Application Entities shown in the diagram above operate under a single AE Title, which is configurable.

- ECHO-SCU, is used to verify connectivity with remote AEs. (omitted from Diagram)
- STORAGE-SCU, allows DICOM Objects to be exported to remote AEs
- FIND-SCU, allows a user to query remote AEs for studies not present locally.
- MOVE-SCU, allows retrieval of studies not currently stored locally.
- STORAGE-SCP, receives DICOM Objects routed from remote AEs.

4.1.2 Functional Definition of Application Entities

4.1.2.1 ECHO-SCU

The ECHO-SCU Application Entity allows a user to verify that they've properly configured connectivity with a Remote AE and that the remote system is currently active.

4.1.2.2 STORAGE-SCU

The STORAGE-SCU Application Entity allows a user to export selected DICOM Objects to remote AEs. An association is opened per SERIES of DICOM Objects to be exported. Displayable images will be decompressed from JPEG 2000 Lossless if it is not supported by the receiving AE.

4.1.2.3 FIND-SCU

The FIND-SCU Application Entity allows a user or application to search for studies that reside on a remote AE. Queries are initiated at the STUDY level on a new association. Each study result will initiate a new association and request for SERIES level information

4.1.2.4 MOVE-SCU

The MOVE-SCU Application Entity allows a user to retrieve studies from a remote AE.

4.1.2.5 STORAGE-SCP

The STORAGE-SCP Application Entity will accept associations with Presentation Contexts for SOP Classes of the Verification and Storage Service Classes. All accepted DICOM Objects will have its metadata parsed and indexed in the database. Displayable images will be compressed with JPEG 2000 Lossless.

4.1.3 Sequencing of Real World Activities

All SCP activities are performed asynchronously in the background and not dependent on any sequencing.

When the user searches for exams in the Admin Console, FIND-SCU operations are executed synchronously, one association per request per user session. FIND-SCU, MOVE-SCU and STORAGE-SCU operations can be executed as background tasks, and are limited only by the number of configured background task workers.

4.2 AE SPECIFICATIONS

4.2.1 Application Entity: ECHO-SCU

4.2.1.1 SOP Classes

ECHO-SCU provides Standard Conformance to the following SOP Class(es):

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	No

Table 1: SOP Class(es) for ECHO-SCU

4.2.1.2 Association Policies

4.2.1.2.1 General

ECHO-SCU only initiates outbound associations, and does not accept incoming associations.

Application Context Name	1.2.840.10008.3.1.1.1
Maximum PDU Length	Unlimited

Table 2: DICOM Application Context

4.2.1.2.2 Number of Associations

Maximum number of simultaneous outbound associations	Unlimited

Table 3: Number of Associations as an Association Initiator for ECHO-SCU

4.2.1.2.3 Asynchronous Nature

Only one outstanding operation is allowed per association.

Maximum number of outstanding asynchronous associations	1

Table 4: Asynchronous Nature of ECHO-SCU

4.2.1.2.4 Implementation Identifying Information

Implementation Class UID	1.2.40.0.13.1.1
Implementation Version Name	dcm4che-3.3.6-SN

Table 5: DICOM Implementation Class and Version for ECHO-SCU

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity: Verify AE Connectivity

4.2.1.3.1.1 Description and Sequencing of Activities

The user requests the application attempt to connect to a configured remote AE, only one association and one attempt are made per request.

4.2.1.3.1.2 Proposed Presentation Contexts

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

Table 6: Proposed Presentation Contexts for Verify AE Connectivity

4.2.1.3.1.3 SOP Specific Conformance for SOP Class(es)

The success or failure of the operation is reported to the user.

4.2.1.4 Association Acceptance Policy

ECHO-SCU does not accept incoming associations.

4.2.2 Application Entity: STORE-SCU

4.2.2.1 SOP Classes

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

SOP Class Name	SOP Class UID	SCU	SCP
Storage Service Class	1.2.840.10008.4.2	Yes	No
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	No
Digital Mammography X- Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	No
Digital Mammography X- Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	No
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	No
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	No
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	No
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	No
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	No
Enhanced MR Color Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.3	Yes	No
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
Enhanced US Volume Storage	1.2.840.10008.5.1.4.1.1.6.2	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	No
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	No
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	No
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	No
General Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.2	Yes	No
Arterial Pulse Waveform Storage	1.2.840.10008.5.1.4.1.1.9.5.1	Yes	No
Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.1	Yes	No
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2	Yes	No
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3	Yes	No
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4	Yes	No
XA/XRF Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.5	Yes	No
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	No
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	No
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	No
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	No
Intravascular Optical Coherence Tomography Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.14.1	Yes	No
Intravascular Optical Coherence Tomography Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.14.2	Yes	No
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	No
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes	No
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	No
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Yes	No
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Yes	No
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	No
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Yes	No
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	No
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	No
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	No
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	No
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	No
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	No
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	No
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	No
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	Yes	No
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	No
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	Yes	No
Lensometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.1	Yes	No
Autorefraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.2	Yes	No
Keratometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.3	Yes	No
Subjective Refraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.4	Yes	No
Visual Acuity Measurements Storage	1.2.840.10008.5.1.4.1.1.78.5	Yes	No
Spectacle Prescription Report Storage	1.2.840.10008.5.1.4.1.1.78.6	Yes	No
Ophthalmic Axial Measurements Storage	1.2.840.10008.5.1.4.1.1.78.7	Yes	No
Intraocular Lens Calculations Storage	1.2.840.10008.5.1.4.1.1.78.8	Yes	No
Macular Grid Thickness and Volume Report Storage	1.2.840.10008.5.1.4.1.1.79.1	Yes	No
Ophthalmic Visual Field Static Perimetry Measurements Storage	1.2.840.10008.5.1.4.1.1.80.1	Yes	No
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	No
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	No
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	No
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	No
Colon CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.69	Yes	No
Implantation Plan SR Storage	1.2.840.10008.5.1.4.1.1.88.70	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	Yes	No
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	No
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	Yes	No
Basic Structured Display Storage	1.2.840.10008.5.1.4.1.1.131	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	No
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	No
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	Yes	No
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Yes	No

Table 7: SOP Classes for STORE-SCU

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.2.2 Association Policies

4.2.2.2.1 General

STORE-SCU only initiates outbound associations, and does not accept incoming associations.

Application Context Name	1.2.840.10008.3.1.1.1
Maximum PDU Length	Unlimited

Table 8: DICOM Application Context

4.2.2.2.2 Number of Associations

Maximum number of simultaneous outbound associations	Unlimited

Table 9: Number of Associations as an Association Initiator for STORAGE-SCU

4.2.2.2.3 Asynchronous Nature

Only one outstanding operation is allowed per association.

Maximum number of outstanding asynchronous associations	1

Table 10: Asynchronous Nature as an Association Initiator for STORAGE-SCU

4.2.2.2.4 Implementation Identifying Information

Implementation Class UID	1.2.40.0.13.1.1
Implementation Version Name	dcm4che-3.3.6-SN

Table 11: DICOM Implementation Class and Version for STORAGE-SCU

4.2.2.3 Association Initiation Policy

4.2.2.3.1 Activity: Send DICOM Objects to Remote Entity

4.2.2.3.1.1 Description and Sequencing of Activities

A user requests a study stored internally be transmitted to a remote Application Entity.

4.2.2.3.1.2 Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
See Table 7	See Table 7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91		

Table 12: Proposed Presentation Contexts for STORE-SCU

The Storage Transfer Syntax will be selected if it belongs to one of the accepted Presentation Contexts, otherwise it will fall back to Explicit VR Little Endian and lastly the Implicit VR Little Endian

4.2.2.3.1.3 SOP Specific Conformance for SOP Class(es)

Image data is compressed using Lossless JPEG 2000 internally. Images will be uncompressed if sent using a non JPEG 2000 Transfer Syntax.

The behavior of the AE during communication failure is summarized in a table as follows:

Exception	Behavior
Timeout	The Association is released using A-RELEASE-RQ and the send task is marked as failed. The reason is logged and reported to the user.
Association aborted	The send task is marked as failed. The reason is logged and reported to the user.

Table 13: DICOM Command Communication Failure Behavior

4.2.2.4 Association Acceptance Policy

Associations are not accepted by STORAGE-SCU.

4.2.3 Application Entity: FIND-SCU

4.2.3.1 SOP Classes

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

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No

Table 14: SOP Class(es) for FIND-SCU

4.2.3.2 Association Policies

4.2.3.2.1 General

FIND-SCU only initiates outbound associations, and does not accept incoming associations.

Application Context Name	1.2.840.10008.3.1.1.1
Maximum PDU Length	Unlimited

Table 15: DICOM Application Context

4.2.3.2.2 Number of Associations

Maximum number of simultaneous outbound associations	Unlimited

Table 16: Number of Associations as an Association Initiator for FIND-SCU

4.2.3.2.3 Asynchronous Nature

Only one outstanding operation is allowed per association.

Maximum number of outstanding asynchronous associations	1

Table 17: Asynchronous Nature as an Association Initiator for FIND-SCU

4.2.3.2.4 Implementation Identifying Information

Implementation Class UID	1.2.40.0.13.1.1
Implementation Version Name	dcm4che-3.3.6-SN

Table 18: DICOM Implementation Class and Version for FIND-SCU

4.2.3.3 Association Initiation Policy

4.2.3.3.1 Query Remote AE

4.2.3.3.1.1 Description and Sequencing of Activities

A search is performed against a remote AE, in response to a user activity or an automatic search for prior studies. Queries are initiated at the STUDY level and for each study result, a SERIES level query will be initiated on a separate association.

4.2.3.3.1.2 Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
See Table 14	See Table 14	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 19: Proposed Presentation Contexts for FIND-SCU

4.2.3.3.1.3 SOP Specific Conformance for SOP Class(es)

Name	**Tag**	**Matching Keys**	**Return Keys**
STUDY Level			
Patient ID	(0010,0020)	Yes	Yes
Patient Name	(0010,0010)	Yes	Yes
Patient Birth Date	(0010,0030)	Yes	Yes
Patient Sex	(0010,0040)	Yes	Yes
Study Instance UID	(0020,000D)	Yes	Yes
Study Date	(0008,0020)	Yes	Yes
Study Time	(0008,0030)	Yes	Yes
Study Description	(0008,1030)	Yes	Yes
Modalities In Study	(0008,0061)	Yes	Yes
Referring Physicians Name	(0008,0090)	Yes	Yes
Name of Physician(s) Reading Study	(0008,1060)	Yes	Yes
Accession Number	(0008,0050)	Yes	Yes
Number of Study Related Series	(0020,1206)	No	Yes
Number of Study Related Instances	(0020,1208)	No	Yes
SERIES Level			
Modality	(0008,0060)	No	Yes
Series Number	(0020,0011)	No	Yes
Series Date	(0008,0021)	No	Yes

Name	Tag	Matching Keys	Return Keys
Series Time	(0008,0031)	No	Yes
Series Instance UID	(0020,000E)	No	Yes
Series Description	(0008,103E)	No	Yes
Number of Series Related Instances	(0020,1209)	No	Yes
Request Attribute Sequence	(0040,0275)	No	Yes
>Requested Procedure ID	(0040,1001)	No	Yes
>Scheduled Procedure Step ID	(0040,0009)	No	Yes
Performed Procedure Step Start Date	(0040,0244)	No	Yes
Performed Procedure Step Start Time	(0040,0245)	No	Yes

Table 20: Query and Return Keys for FIND-SCU

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The SCP has successfully returned all matching information.
Pending	Matches returned	FF00	Current match returned.
	Matches returned – Incomplete Key set	FF01	Current match returned.
Refused	Out of Resources	A700	Current query will end, any matches will be returned.
Error	Identifier does not match SOP Class, Unable to Process	A900,Cxxx	Current query will end.

Table 21: DICOM Command Response Status Handling Behavior

The behavior of the AE during communication failure is summarized in a table as follows:

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the error is logged. No results are turned to user.
Association aborted	The reason/error is logged, no results returned to user.

Table 22: DICOM Command Communication Failure Behavior

4.2.3.4 Association Acceptance Policy

FIND-SCU does not accept associations.

4.2.4 Application Entity: MOVE-SCU

4.2.4.1 SOP Classes

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

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

Table 23: SOP Class(es) for MOVE-SCU

4.2.4.2 Association Policies

4.2.4.2.1 General

Application Context Name	1.2.840.10008.3.1.1.1
Maximum PDU Length	Unlimited

Table 24: DICOM Application Context

4.2.4.2.2 Number of Associations

Maximum number of simultaneous associations	Unlimited

Table 25: Number of Associations as an Association Initiator for MOVE-SCU

4.2.4.2.3 Asynchronous Nature

Maximum number of outstanding asynchronous associations	1

Table 26: Asynchronous Nature as an Association Initiator for MOVE-SCU

4.2.4.2.4 Implementation Identifying Information

Implementation Class UID	1.2.40.0.13.1.1
Implementation Version Name	dcm4che-3.3.6-SN

Table 27: DICOM Implementation Class and Version for MOVE-SCU

4.2.4.3 Association Initiation Policy

4.2.4.3.1 Activity: Retrieve from Remote AE

4.2.4.3.1.1 Description and Sequencing of Activities

Based on the results of a C-FIND match, a request is made to retrieve the study. Retrieve tasks are made at the series level.

4.2.4.3.1.2 Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
See Table 23	See Table 23	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 28: Proposed Presentation Contexts for MOVE-SCU

4.2.4.3.1.3 SOP Specific Conformance for SOP Class(es)

Service Status	**Further Meaning**	**Error Code**	**Behavior**
Success	Sub-operations Complete	0000	Series successfully retrieved
Warning	Some sub-operations failed	B000	Series incomplete, task marked incomplete and available to be retried.
Cancel	Some sub-operations incomplete	FE00	Series incomplete, task marked incomplete and available to be retried. Retried only if cancelled externally.
Pending	Sub-operations continuing	FF00	Task ongoing.

Table 29: DICOM Command Response Status Handling Behavior

The behavior of the AE during communication failure is summarized in a table as follows:

Exception	Behavior
Timeout	Task marked incomplete and available to be retried, error logged
Association aborted	Task marked incomplete and available to be retried, error logged

Table 30: DICOM Command Communication Failure Behavior

4.2.4.4 Association Acceptance Policy

MOVE-SCU does not accept incoming associations.

4.2.5 Application Entity: STORAGE-SCP

4.2.5.1 SOP Classes

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

SOP Class Name	SOP Class UID	SCU	SCP
Storage Service Class	1.2.840.10008.4.2	No	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
Digital Mammography X- Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X- Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	No	Yes
Enhanced MR Color Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.3	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Enhanced US Volume Storage	1.2.840.10008.5.1.4.1.1.6.2	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	No	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	No	Yes

SOP Class Name	SOP Class UID	SCU	SCP
General Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.2	No	Yes
Arterial Pulse Waveform Storage	1.2.840.10008.5.1.4.1.1.9.5.1	No	Yes
Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.1	No	Yes
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2	No	Yes
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3	No	Yes
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4	No	Yes
XA/XRF Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.5	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	No	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	No	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	No	Yes
Intravascular Optical Coherence Tomography Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.14.1	No	Yes
Intravascular Optical Coherence Tomography Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.14.2	No	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	No	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	No	Yes
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	No	Yes
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	No	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	No	Yes
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	No	Yes
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	No	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	No	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	No	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	No	Yes
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	No	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	No	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	Yes
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	No	Yes
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	No	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	No	Yes
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	No	Yes
Lensometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.1	No	Yes
Autorefraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.2	No	Yes
Keratometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.3	No	Yes
Subjective Refraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.4	No	Yes
Visual Acuity Measurements Storage	1.2.840.10008.5.1.4.1.1.78.5	No	Yes
Spectacle Prescription Report Storage	1.2.840.10008.5.1.4.1.1.78.6	No	Yes

SOP Class Name	SOP Class UID	SCU	SCP
Ophthalmic Axial Measurements Storage	1.2.840.10008.5.1.4.1.1.78.7	No	Yes
Intraocular Lens Calculations Storage	1.2.840.10008.5.1.4.1.1.78.8	No	Yes
Macular Grid Thickness and Volume Report Storage	1.2.840.10008.5.1.4.1.1.79.1	No	Yes
Ophthalmic Visual Field Static Perimetry Measurements Storage	1.2.840.10008.5.1.4.1.1.80.1	No	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	No	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	No	Yes
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	No	Yes
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	No	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes
Colon CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.69	No	Yes
Implantation Plan SR Storage	1.2.840.10008.5.1.4.1.1.88.70	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	No	Yes
Basic Structured Display Storage	1.2.840.10008.5.1.4.1.1.131	No	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	No	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	No	Yes
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	No	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	No	Yes

Table 31: SOP Class(es) for STORAGE-SCP

4.2.5.2 Association Policies

4.2.5.2.1 General

Application Context Name	1.2.840.10008.3.1.1.1
Maximum PDU Length	Unlimited

Table 32: DICOM Application Context

4.2.5.2.2 Number of Associations

Maximum number of simultaneous associations	Unlimited

Table 33: Number of Associations as an Association Acceptor for STORAGE-SCP

4.2.5.2.3 Asynchronous Nature

Maximum number of outstanding asynchronous associations	1

Table 34: Asynchronous Nature as an Association Initiator for STORAGE-SCP

4.2.5.2.4 Implementation Identifying Information

Implementation Class UID	1.2.40.0.13.1.1
Implementation Version Name	dcm4che-3.3.6-SN

Table 35: DICOM Implementation Class and Version for STORAGE-SCP

4.2.5.3 Association Initiation Policy

STORAGE-SCP does not initiate associations.

4.2.5.4 Association Acceptance Policy

4.2.5.4.1 Activity: Receive Storage Request

4.2.5.4.1.1 Description and Sequencing of Activities

DICOM Objects are sent to HM from a remote AE. Meta data is parsed and stored in a database, and if the object is a supported image, it will be compressed using lossless JPEG 2000.

4.2.5.4.1.2 Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
See Table 31	See Table 31	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70		
		JPEG Lossless, Non-Hierarchical	1.2.840.10008.1.2.4.57		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91		

Table 36: Proposed Presentation Contexts for STORAGE-SCP

4.2.5.4.1.3 SOP Specific Conformance for SOP Class(es)

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

Images are stored in JPEG 2000 Lossless format. If an image is sent that is already compressed in JPEG 2000, it will be recompressed. 8 bit images that are sent using JPEG Lossless transfer syntaxes are not currently displayable.

When viewing images referenced in Grayscale Softcopy Presentation States:

- If the Compound Graphic Sequence (0070,0209) is present in a Grayscale Softcopy Presentation State, it is not supported for viewing.
- If the Modality LUT is present in the image but not the Presentation State, the Modality LUT contained in the image will be applied.

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The SCP has successfully stored and indexed the DICOM Object.
Error	Cannot Understand	C000	This is used as a generic failure status. The DICOM Object was not accepted.

Table 37: DICOM Command Response Status Handling Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and is logged.
Association aborted	Aborted association is logged.

Table 38: DICOM Command Communication Failure Behavior

4.3 NETWORK INTERFACES

4.3.1 Physical Network Interface

The application is indifferent to the physical medium over which TCP/IP executes, which is dependent on the underlying operating system and hardware.

4.3.2 Additional Protocols

When host names rather than IP addresses are used in the configuration properties to specify presentation addresses for remote AEs, the application is dependent on the name resolution mechanism of the underlying operating system.

4.3.3 IPv4 and IPv6 Support

This product supports both IPv4 and IPv6. It does not utilize any of the optional configuration identification or security features of IPv6.

4.4 CONFIGURATION

4.4.1 AE Title/ Presentation Address Mapping

Note: There does not necessarily have to be a one to one relationship between AE titles and Application Entities. If so, this should be made clear in the tables.

4.4.1.1 Local AE Titles

The local AE title mapping and configuration shall be specified. The following table shall be used:

Application Entity	Default AE Title	Default TCP/IP Port
ECHO-SCU	HEALTHMYNE	N/A
STORE-SCU	HEALTHMYNE	N/A
FIND-SCU	HEALTHMYNE	N/A
MOVE-SCU	HEALTHMYNE	N/A
STORE-SCP	HEALTHMYNE	1040

Table 39: AE Title Configuration

4.4.1.2 Remote AE Title/ Presentation Address Mapping

Remote AE's can be added and configured using the HM Admin Console.

4.4.2 Parameters

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	No	None
General DIMSE level time-out values	No	None

Parameter	Configurable (Yes/No)	Default Value
Time-out waiting for response to TCP/IP connect request. (Low-level timeout)	No	None
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	No	None
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	No	None
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	None
AE Specific Parameters		
Size constraint in maximum object size	No	
Maximum PDU size the AE can receive	No	16kb
Maximum PDU size the AE can send	No	16kb
AE specific DIMSE level time-out values	No	None

Table 40: Configuration Parameters

5 MEDIA INTERCHANGE

HM PACS does not support Media Interchange.

6 SUPPORT OF CHARACTER SETS

Code	Description
ISO_IR 100	Latin alphabet #1
ISO_IR 101	Latin alphabet #2
ISO_IR 109	Latin alphabet #3
ISO_IR 110	Latin alphabet #4
UTF-8	Unicode
ISO_IR 192	Unicode
ISO_IR 127	Arabic
ISO_IR 144	Cyrillic
ISO_IR 126	Greek
ISO_IR 138	Hebrew
GB18030	Chinese
ISO 2022 IR 149	Korean
ISO 2022 IR 13	Japanese
ISO_IR 13	Japanese
ISO 2022 IR 87	Japanese

Table 41: Supported Character Sets

7 SECURITY

7.1 SECURITY PROFILES

None Supported.

7.2 ASSOCIATION LEVEL SECURITY

None Supported.

7.3 APPLICATION LEVEL SECURITY

None Supported.

8 ANNEXES

8.1 IOD CONTENTS

8.1.1 Significant Elements in Received Images

The following DICOM attributes are parsed and stored internally within HM

Module	Name of relation containing attribute
GE	DICOM Group Element Number (group,element) in hexadecimal
Type	1 = Mandatory 2 = Can be empty 3 = Can be null
VR	DICOM Value representation
Attribute Name	Name of the DICOM attribute
Attribute Description	Description of the attribute meaning

Note: GE values with odd group element numbers represent private tags. Private tags with VR=UL signify database keys that are generated to uniquely identify database rows.

Module	GE	Type	VR	Attribute Name	Attribute_Description
DCM_PATIENT	11,20	1	UL	Internal Patient ID	Internal descriptor for patient within system
DCM_PATIENT	11,10	2	PN	Patients Last Name	Patient last name only
DCM_PATIENT	10,10	2	PN	Patients Name	Patient full name.
DCM_PATIENT	10,20	2	LO	Patient ID	Primary hospital identification number or code for the patient.
DCM_PATIENT	10,21	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority (system, organization, agency, or department) that issued the Patient ID.
DCM_PATIENT	10,30	2	DA	Patients Birth Date	Birth date of the patient.
DCM_PATIENT	10,40	2	CS	Patients Sex	Sex of the named patient. Enumerated: M,F,O

DCM_PATIENT	10,32	3	TM	Patients Birth Time	Birth time of the Patient.
DCM_PATIENT	10,2160	3	SH	Ethnic Group	Ethnic group or race of the patient.
DCM_PATIENT	10,4000	3	LT	Patient Comments	User-defined additional information about the patient.
DCM_PATIENT	10,2201	1C	LO	Patient Species Desc	The species of the patient. Required if the patient is an animal.
DCM_PATIENT	10,2297	2C	PN	Responsible Person	Name of person with medical decision making authority for the patient.
DCM_PATIENT	10,2298	1C	CS	Responsible Person Role	Relationship of Responsible Person to the patient.
DCM_PATIENT	10,2299	2C	LO	Responsible Organization	Name of organization with medical decision making authority for the patient.
DCM_PATIENT	12,62	3	CS	Patient Identity Removed	The true identity of the patient has been removed from the attributes and the pixel data. Enumerated: YES,NO
DCM_CLINICAL_TRIAL_SUBJECT	11,20	1	UL	Internal Patient ID	Internal descriptor for patient within system
DCM_CLINICAL_TRIAL_SUBJECT	12,20	1	LO	Clin Trial Protocol ID	Identifier for the noted protocol.
DCM_CLINICAL_TRIAL_SUBJECT	12,10	2	LO	Clin Trial Sponsor Name	The name of the clinical trial sponsor.
DCM_CLINICAL_TRIAL_SUBJECT	12,21	2	LO	Clin Trial Protocol Name	The name of the clinical trial protocol
DCM_CLINICAL_TRIAL_SUBJECT	12,30	2	LO	Clin Trial Site ID	The identifier of the site responsible for submitting clinical trial data
DCM_CLINICAL_TRIAL_SUBJECT	12,31	2	LO	Clin Trial Site Name	Name of the site responsible for submitting clinical trial data
DCM_CLINICAL_TRIAL_SUBJECT	12,40	1C	LO	Clin Trial Subject ID	The assigned identifier for the clinical trial subject.
DCM_CLINICAL_TRIAL_SUBJECT	12,42	1C	LO	Clin Trial Subject Read ID	Identifies the subject for blinded evaluations.
DCM_CLINICAL_TRIAL_SUBJECT	12,81	1C	LO	CTP Ethics Comm Name	Name of the Ethics Committee or Institutional Review Board (IRB) responsible for approval of the Clinical Trial.
DCM_CLINICAL_TRIAL_SUBJECT	12,82	3	LO	CTP Ethics Comm Number	Approval number issued by committee.
DCM_GENERAL_STUDY	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system

DCM_GENERAL_STUDY	11,20	1	UL	Internal Patient ID	Internal descriptor for patient within system
DCM_GENERAL_STUDY	20,0D	1	UI	Study Instance UID	Unique identifier for the Study.
DCM_GENERAL_STUDY	8,20	2	DA	Study Date	Date the Study started.
DCM_GENERAL_STUDY	8,30	2	TM	Study Time	Time the Study started.
DCM_GENERAL_STUDY	8,90	2	PN	Ref Physicians Name	Name of the Patient referring physician
DCM_GENERAL_STUDY	20,10	2	SH	Study ID	User or equipment generated Study identifier
DCM_GENERAL_STUDY	8,50	2	SH	Accession Number	A RIS generated number that identifies the order for the Study.
DCM_GENERAL_STUDY	8,1030	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed.
DCM_GENERAL_STUDY	8,1048	3	PN	Physicians of Record	Name of the Physicians who are responsible for overall patient care at time of Study.
DCM_GENERAL_STUDY	8,1060	3	PN	Phys Name Reading Study	Name of the Physicians reading the Study.
DCM_GENERAL_STUDY	40,1003	3	SH	Request Procedure Priority	Requested Procedure Type Urgency. Defined Terms: STAT, HIGH, ROUTINE, MEDIUM, LOW
DCM_GENERAL_STUDY	40,1009	3	SH	Reporting Priority	Requested Reporting Priority. Defined Terms: HIGH, ROUTINE, MEDIUM, LOW
DCM_STUDY_LOCATION	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_STUDY_LOCATION	9,20	1	ST	Study Location	UNC Path of the location of the study within an archive
DCM_SOURCE	9,56	1	UL	Internal App Entity ID	Internal descriptor for a dicom source location
DCM_SOURCE	9,54	1	AE	Remote AE Title	AE Title of remote source
DCM_SOURCE	9,55	1	LO	Remote Host	Internet address of remote host
DCM_STUDY_SOURCE	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_STUDY_SOURCE	9,56	1	UL	Internal App Entity ID	Foreign key to the remote application entity
DCM_PATIENT_STUDY	11,20	1	UL	Internal Patient ID	Internal descriptor for patient within system
DCM_PATIENT_STUDY	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_PATIENT_STUDY	8,1080	3	LO	Admitting Diagnoses	Description of the admitting diagnosis (diagnoses)

				Desc	
DCM_PATIENT_STUDY	10,1010	3	AS	Patients Age	Age of the Patient.
DCM_PATIENT_STUDY	10,1020	3	DS	Patients Size	Length or size of the Patient in meters
DCM_PATIENT_STUDY	10,1030	3	DS	Patients Weight	Weight of the Patient in kilograms.
DCM_PATIENT_STUDY	10,2180	3	SH	Occupation	Occupation of the Patient.
DCM_PATIENT_STUDY	10,21B0	3	LT	Additional Patient History	Additional information about the Patient medical history.
DCM_PATIENT_STUDY	38,10	3	LO	Admission ID	Identifier of the visit as assigned by the healthcare provider
DCM_PATIENT_STUDY	38,60	3	LO	Service Episode ID	Identifier of the Service Episode as assigned by the healthcare provider.
DCM_PATIENT_STUDY	38,62	3	LO	Service Episode Description	Description of the type of service episode
DCM_PATIENT_STUDY	10,2203	2C	CS	Patients Sex Neutered	Whether or not a procedure has been performed in an effort to render the patient sterile. Enumerated: ALTERED,UNALTERED
DCM_CLIN_TRIAL_STUDY	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_CLIN_TRIAL_STUDY	11,20	1	UL	Internal Patient ID	Internal descriptor for patient within system
DCM_CLIN_TRIAL_STUDY	12,60	2	LO	Clin Trial Coord Center Name	The name of the institution that is responsible for coordinating the medical imaging data for the clinical trial. See C.7.3.2.1.1.
DCM_CLIN_TRIAL_STUDY	12,50	1	LO	Clin Trial Time Point ID	An identifier specifying the one or more studies that are grouped together as a clinical time point or submission in a clinical trial.
DCM_CLIN_TRIAL_STUDY	12,51	3	ST	Clin Trial Time Point Desc	A description of a set of one or more studies that are grouped together to represent a clinical time point or submission in a clinical trial.
DCM_GENERAL_SERIES	21,000E	1	UL	Internal Series ID	Internal sequence number for series
DCM_GENERAL_SERIES	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_GENERAL_SERIES	11,20	1	UL	Internal Patient ID	Internal descriptor for patient within system
DCM_GENERAL_SERIES	8,60	1	CS	Modality	Type of equipment that originally acquired the data used to create the images in this Series.
DCM_GENERAL_SERIES	20,000E	1	UI	Series Instance UID	Unique identifier of the Series.
DCM_GENERAL_SERIES	20,11	2	IS	Series	A number that identifies this Series.

				Number	
DCM_GENERAL_SERIES	20,60	2C	CS	Laterality	Laterality of (paired) body part examined.
DCM_GENERAL_SERIES	8,21	3	DA	Series Date	Date the Series started.
DCM_GENERAL_SERIES	8,31	3	TM	Series Time	Time the Series started.
DCM_GENERAL_SERIES	8,1050	3	PN	Performing Physicians Name	Name of the Physicians administering the Series.
DCM_GENERAL_SERIES	18,1030	3	LO	Protocol Name	User-defined description of the conditions under which the Series was performed.
DCM_GENERAL_SERIES	8,103E	3	LO	Series Description	Description of the series
DCM_GENERAL_SERIES	8,1070	3	PN	Operators Name	Name(s) of the operator(s) supporting the Series.
DCM_GENERAL_SERIES	18,15	3	CS	Body Part Examined	Text description of the part of the body examined.
DCM_GENERAL_SERIES	18,5100	2C	CS	Patient Position	Patient position descriptor relative to the equipment.
DCM_GENERAL_SERIES	20,52	3	UI	Frame of Reference UID	Uniquely identifies the frame of reference for a Series.
DCM_GENERAL_SERIES	9,103	3	LO	Creator ID	Unique identifier for the content creator
DCM_PPS	21,0	1	UL	Internal Study ID	Foreign key to Internal study ID
DCM_PPS	40,253	3	SH	PPS ID	User or equipment generated identifier of that part of a Procedure that has been carried out with this step.
DCM_PPS	40,244	3	DA	PPS Start Date	Date on which the Performed Procedure Step started.
DCM_PPS	40,245	3	TM	PPS Start Time	Time on which the Performed Procedure Step started.
DCM_PPS	40,254	3	LO	PPS Description	Institution-generated description or classification of the Study (component) performed.
DCM_PPS	40,280	3	ST	Comments PPS	User-defined comments on the Performed Procedure Step
DCM_CLIN_TRIAL_SERIES	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_CLIN_TRIAL_SERIES	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_CLIN_TRIAL_SERIES	11,20	1	UL	Internal Patient ID	Internal descriptor for patient within system
DCM_CLIN_TRIAL_SERIES	12,71	3	LO	Clin Trial Series ID	An identifier of the series in the context of a clinical trial.
DCM_CLIN_TRIAL_SERIES	12,72	3	LO	Clin Trial Series Desc	A description of the series in the context of a clinical trial.
DCM_PLAIN_FILM_SERIES	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_PLAIN_FILM_SERIES	18,15	2	CS	Body Part Examined	Text description of the part of the body examined.

DCM_PLAIN_FILM_SERIES	18,5101	2	CS	View Position	Radiographic view associated with Patient Position
DCM_PLAIN_FILM_SERIES	18,1160	3	SH	Filter Type	Label for the type of filter inserted into the x-ray beam
DCM_PLAIN_FILM_SERIES	18,1180	3	SH	Collimator_grid Name	Label describing any grid inserted.
DCM_PLAIN_FILM_SERIES	18,1190	3	DS	Focal Spot	Size of the focal spot in mm. For devices with variable focal spot or multiple focal
DCM_SYNCHRONIZATION	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_SYNCHRONIZATION	20,200	1	UI	Synchronization Frame Ref UID	UID of common synchronization environment.
DCM_SYNCHRONIZATION	18,106A	1	CS	Synchronization Trigger	Data acquisition synchronization with external equipment Enumerated Values: SOURCE - this equipment provides synchronization channel or trigger to other equipment EXTERNAL - this equipment receives synchronization channel or trigger from other equipment PASSTHRU - this equipment receives synchronization channel or trigger and forwards it NO TRIGGER - data acquisition not synchronized by common channel or trigger
DCM_SYNCHRONIZATION	18,1061	3	LO	Trigger Source or Type	Specifies equipment ID of trigger source and/or type of trigger
DCM_SYNCHRONIZATION	18,106C	1C	US	Synchronization Channel	Identifier of waveform channel that records the synchronization channel or trigger
DCM_SYNCHRONIZATION	18,1800	1	CS	Acq Time Synchronized	Acquisition DateTime
DCM_SYNCHRONIZATION	18,1801	3	SH	Time Source	ID of equipment or system providing time reference
DCM_PET_SERIES	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_PET_SERIES	54,1001	1	CS	Units	Pixel value units.
DCM_PET_SERIES	54,1006	3	CS	SUV Type	Type of Standardized Uptake Value (SUV)
DCM_PET_SERIES	54,1002	1	CS	Counts Source	The primary source of counts
DCM_PET_SERIES	54,1000	1	CS	Series Type	A multi-valued indicator of the type of Series. Enumerated: STATIC DYNAMIC GATED WHOLE BODY, IMAGE REPROJECTION
DCM_SOP_COMMON	9,18	1	UL	SOP Internal ID	Primary key for a DICOM instance
DCM_SOP_COMMON	21,00	1	UL	Internal	Internal Series ID

	0E			Series ID	
DCM_SOP_COMMON	21,0	1	UL	Internal Study ID	Internal Study ID
DCM_SOP_COMMON	8,16	1	UI	SOP Class UID	SOP Class UID
DCM_SOP_COMMON	8,18	1	UI	SOP Instance UID	SOP Instance UID
DCM_SOP_COMMON	8,5	1C	CS	Specific Character Set	Specific Character Set
DCM_SOP_COMMON	8,14	3	UI	Instance Creator UID	Instance Creator UID
DCM_SOP_COMMON	20,13	3	IS	Instance Number	Instance Number
DCM_SOP_COMMON	100,410	3	CS	SOP Instance Status	SOP Instance Status
DCM_GENERAL_IMAGE	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_GENERAL_IMAGE	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_GENERAL_IMAGE	20,20	2C	CS	Patient Orientation	Patient Orientation
DCM_GENERAL_IMAGE	8,23	2C	DA	Content Date	Content Date
DCM_GENERAL_IMAGE	8,33	2C	TM	Content Time	Content Time
DCM_GENERAL_IMAGE	8,8	3	CS	Image Type	Image Type
DCM_GENERAL_IMAGE	20,4000	3	LT	Image Comments	Image Comments
DCM_GENERAL_IMAGE	28,2110	3	CS	Lossy Image Compression	Whether or not the image has at some point been lossy compressed
DCM_IMAGE_PLANE	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_IMAGE_PLANE	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_IMAGE_PLANE	28,30	1	DS	Pixel Spacing	Pixel Spacing
DCM_IMAGE_PLANE	20,37	1	DS	Image Orien Pat	Image Orientation (Patient)
DCM_IMAGE_PLANE	20,32	1	DS	Image Pos Pat	Image Position (Patient)
DCM_IMAGE_PLANE	18,50	2	DS	Slice Thickness	Nominal slice thickness in mm.

DCM_IMAGE_PLANE	20,1041	3	DS	Slice Location	Slice Location
DCM_IMAGE_PIXEL	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_IMAGE_PIXEL	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_IMAGE_PIXEL	28,2	1	US	Samples Per Pixel	Samples Per Pixel
DCM_IMAGE_PIXEL	28,4	1	CS	Photometric Interpretation	Photometric Interpretation
DCM_IMAGE_PIXEL	28,10	1	US	IRows	Number of rows in the image
DCM_IMAGE_PIXEL	28,11	1	US	IColumns	Number of columns in the image
DCM_IMAGE_PIXEL	28,100	1	US	Bits Allocated	Bits Allocated
DCM_IMAGE_PIXEL	28,101	1	US	Bits Stored	Bits Stored
DCM_IMAGE_PIXEL	28,102	1	US	High Bit	High Bit
DCM_IMAGE_PIXEL	2,10	1	UI	Transfer Syntax UID	Syntax of the image storage (native, JPEG, JPEG2000, etc.)
DCM_IMAGE_PIXEL	28,103	1C	US	Pixel Representation	Pixel Representation
DCM_IMAGE_PIXEL	7FE1,10	1C	UL	Pixel Offset	Byte offset from start of DICOM stream to first byte of PixelData
DCM_IMAGE_PIXEL	7FE1,11	1C	UL	Pixel Byte Length	Number of total bytes from beginning to end of pixel data element
DCM_IMAGE_PIXEL	28,6	1C	US	Planar Configuration	Planar Configuration
DCM_RGB_IMAGE_PIXEL	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_RGB_IMAGE_PIXEL	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_RGB_IMAGE_PIXEL	28,1101	1	US	Red Palette Color LT Dscrptr	Red Palette Color Lookp Table Descriptor
DCM_RGB_IMAGE_PIXEL	28,1102	1	US	Green Palette Color LT Dscrptr	Green Palette Color Lookp Table Descriptor
DCM_RGB_IMAGE_PIXEL	28,1103	1	US	Blue Palette Color LT Dscrptr	Blue Palette Color Lookp Table Descriptor

DCM_RGB_IMAGE_PIXEL	28,1201	1	OW	Red Palette Color LT Data	Red Palette Color Lookup Table Data
DCM_RGB_IMAGE_PIXEL	28,1202	1	OW	Green Palette Color LT Data	Green Palette Color Lookup Table Data
DCM_RGB_IMAGE_PIXEL	28,1203	1	OW	Blue Palette Color LT Data	Blue Palette Color Lookup Table Data
DCM_MLUT	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_MLUT	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_MLUT	28,1052	3	DS	Rescale Intercept	Rescale Intercept of Modality LUT
DCM_MLUT	28,1053	3	DS	Rescale Slope	Rescale Slope of Modality LUT
DCM_VLUT	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_VLUT	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_VLUT	28,1050	3	DS	Window Center	Window Center
DCM_VLUT	28,1051	3	DS	Window Width	Window Width
DCM_LUT_SEQUENCE	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_LUT_SEQUENCE	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_LUT_SEQUENCE	9,19	1	UL	Internal Item ID	Index of the sequence within this instance
DCM_LUT_SEQUENCE	28,3002	3	UL	LUT Descriptor	Describes format of the LUT data
DCM_LUT_SEQUENCE	28,3003	3	LO	LUT Explanation	
DCM_LUT_SEQUENCE	28,3004	3	LO	Modality LUT Type	
DCM_MULTIFRAME	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_MULTIFRAME	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_MULTIFRAME	28,8	1	IS	Number of Frames	Number of Frames
DCM_MULTIFRAME	28,9	1	AT	Frame Increment Pointer	Frame Increment Pointer

DCM_PLAIN_FILE_IMAGE	9,19	1	UL	Internal Item ID	Primary key used for sequences
DCM_PLAIN_FILE_IMAGE	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_PLAIN_FILE_IMAGE	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_PLAIN_FILE_IMAGE	18,1508	2	CS	Positioner Type	Positioner Type Enumerated: CARM,COLUMN,MAMMOGRAPHIC,PANORAMIC,CEPHALOSTAT,RIGID,NONE
DCM_PLAIN_FILE_IMAGE	20,62	3	CS	Image Laterality	Image Laterality
DCM_PLAIN_FILE_IMAGE	18,1110	3	DS	Distance Source To Detector	Distance Source To Detector (SID)
DCM_PLAIN_FILE_IMAGE	18,1111	3	DS	Distance Source To Patient	Distance Source To Patient (SOD)
DCM_GEN_EQUIP	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_GEN_EQUIP	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_GEN_EQUIP	8,70	3	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances.
DCM_GEN_EQUIP	18,1020	2	LO	Software Versions	Manufacturers designation of software version of the equipment that produced the composite instances.
DCM_GEN_EQUIP	8,80	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located.
DCM_GEN_EQUIP	8,81	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.
DCM_GEN_EQUIP	8,1010	3	SH	Station Name	User defined name identifying the machine that produced the composite instances.
DCM_GEN_EQUIP	8,1040	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.
DCM_GEN_EQUIP	8,1090	3	LO	Manufacturer Model Name	Manufacturers model name of the equipment that produced the composite instances.
DCM_GEN_EQUIP	18,1000	3	LO	Device Serial Number	Manufacturers serial number of the equipment that produced the composite instances.
DCM_OVERLAY	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_OVERLAY	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_OVERLAY	9,19	1	US	Internal Item ID	Item index of the overlay
DCM_OVERLAY	6000,	1	US	Overlay	Number of pixel rows in overlay

	10			Rows	
DCM_OVERLAY	6000,11	1	US	Overlay Columns	Number of pixel columns in overlay
DCM_OVERLAY	6000,40	1	CS	Overlay Type	Indicates whether this overlay represents an ROI or other graphics (G,R)
DCM_SEGMENT	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_SEGMENT	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_SEGMENT	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_SEGMENT	62,4	1	US	Segment Number	Identification number of the segment (unique within segment instance)
DCM_SEGMENT	62,5	1	LO	Segment Label	User-defined label for the segment
DCM_SEGMENT	62,8	1	CS	Segment Alg Type	Type of algorithm used to generate (AUTOMATIC,SEMI-AUTOMATIC,MANUAL)
DCM_SEGMENT	62,9	3	LO	Segment Alg Name	Name of algorithm used to generate the segment (present if algorithm type is not manual)
DCM_SEGMENT	66,2A	1	UL	Surface Count	Number of surfaces in the segment
DCM_SEGMENT	62,6	3	ST	Segment Description	User-defined description of the segment
DCM_SURFACE	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_SURFACE	66,3	1	UL	Surface Number	Identification number of the surface
DCM_SURFACE	66,9	1	CS	Surface Processing	
DCM_SURFACE	66,C	1	FL	Presentation Opacity	
DCM_SURFACE	66,D	1	CS	Presentation Type	
DCM_SURFACE	66,E	1	CS	Finite Volume	
DCM_SURFACE	66,10	1	CS	Manifold	
DCM_SURFACE	66,15	1	UL	Number of Surface Points	
DCM_SEG_SURFACE_LINK	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_SEG_SURFACE_LINK	62,4	1	US	Segment Number	Identification number of the segment
DCM_SEG_SURFACE_LINK	66,2C	1	UL	Ref Surface Number	Identification number of the surface
DCM_SEGMENT_METRIC	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID

DCM_SEGMENT_METRIC	62,4	1	US	Segment Number	Identification number of the segment
DCM_SEGMENT_METRIC	63,10	1	CS	Segment Metric Type	Code identifying the type of metric
DCM_SEGMENT_METRIC	63,11	1	FL	Segment Metric Value	Scalar value of the metric
DCM_STRUCT_SET	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_STRUCT_SET	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID
DCM_STRUCT_SET	21,0	1	UL	Internal Study ID	Internal descriptor for study within the system
DCM_STRUCT_SET	3006,2	1	SH	Structure Set Label	User-defined label for Structure Set.
DCM_STRUCT_SET	3006,4	3	LO	Structure Set Name	User-defined name for Structure Set.
DCM_STRUCT_SET	3006,6	3	ST	Structure Set Description	User-defined description for Structure Set.
DCM_STRUCT_SET	3006,8	2	DA	Structure Set Date	Date at which Structure Set was last modified.
DCM_STRUCT_SET	3006,9	2	TM	Structure Set Time	Time at which Structure Set was last modified.
DCM_SS_ROI	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_SS_ROI	3006,22	1	US	ROI Number	Identification number of the ROI
DCM_SS_ROI	3006,24	1	UI	Referenced Frame of Ref UID	Uniquely identifies frame of reference of ROI
DCM_SS_ROI	3007,47	1	IS	Number of Contours	Number of contours in ROI
DCM_SS_ROI	3006,46	1	UL	Number of Contour Points	Number of contour points in all contours
DCM_SS_ROI	3006,26	2	LO	ROI Name	User-defined name for ROI
DCM_SS_ROI	3006,36	2	CS	ROI Generation Algorithm	ENUM: AUTOMATIC,SEMIAUTOMATIC,MANUAL
DCM_SS_ROI	3006,28	3	ST	ROI Description	User-defined description for ROI
DCM_SS_ROI	3006,2C	3	DS	ROI Volume	Volume (cc) of the ROI
DCM_SS_ROI	3006,38	3	ST	ROI Generation	User-defined description of technique

				Description	
DCM_SS_ROI	3006,2A	3	IS	ROI Display Color	RGB color of ROI
DCM_ROI_METRIC	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_ROI_METRIC	3006,22	1	US	ROI Number	Identification number of the ROI
DCM_ROI_METRIC	3007,49	1	CS	ROI Metric Type	Code identifying the type of metric
DCM_ROI_METRIC	3007,49	1	FL	ROI Metric Value	Scalar value of the metric
DCM_CODE	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_CODE	9,102	1	LO	Term	Name of the term
DCM_CODE	40,A30A	1	DS	Value	Value of the code
DCM_CODE	9,101	3	SH	Code	ID of the term
DCM_CODE	8,104	3	LO	Units	Units of the code
DCM_SPATIAL_REG	9,18	1	UL	SOP Internal ID	Foreign key to SOP Internal ID
DCM_SPATIAL_REG	3006,24	1	UI	Target Frame of Ref UID	Uniquely identifies frame of reference of target
DCM_SPATIAL_REG	3006,24	1	UI	Source Frame of Ref UID	Uniquely identifies frame of reference of source
DCM_SPATIAL_REG	3006,C6	1	ST	Transformation Matrix	Transformation data in JSON format
DCM_SPATIAL_REG	70,30C	1	CS	Transformation Matrix Type	Enumerated = RIGID,RIGID_SCALE,AFFINE
DCM_SOP_COMMON_DATETIME	8,22	3	DA	Acquisition Date	The date the acquisition of data that resulted in this image started
DCM_SOP_COMMON_DATETIME	8,32	3	TM	Acquisition Time	The time the acquisition of data that resulted in this image started
DCM_SOP_COMMON_DATETIME	8,23	2C	DA	Content date	The date the image pixel data creation started.
DCM_SOP_COMMON_DATETIME	8,33	2C	TM	Content time	The time the image pixel data creation started.
DCM_SOP_COMMON_DATETIME	18,9073	1C	FD	Acquisition Duration	The duration to acquire the image
DCM_SOP_COMMON_DATETIME	19,105A	1C	FL	Acquisition Duration GE	The duration to acquire the image (GE Tag)
DCM_SOP_COMMON_DATETIME	8,12	3	DA	Instance Creation Date	Date the SOP Instance was created.

DCM_SOP_COMMON_DATETIME	8,13	3	TM	Instance Creation Time	Time the SOP Instance was created.
DCM_SOP_COMMON_DATETIME	9,18	1	UL	SOP Internal ID	SOP Internal ID
DCM_SOP_COMMON_DATETIME	21,000E	1	UL	Internal Series ID	Foreign key to Internal series ID

Table 42: DICOM Attributes Stored Internally within HM

8.2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

See entries in Table 42 where the group number is an odd integer.

8.3 CODED TERMINOLOGY AND TEMPLATES

When any DICOM object is created within the system, HM uses certain coded tag sequences to encode the creator information.

8.3.1 Creator Code Sequence

Each object creator is identified with a Person Identification Code Sequence

GE	Attribute Name	VR	Meaning	Value
0040,1101	Person Identification Code Sequence	SQ		
->0008,0100	Code Value	SH	Person ID	"HM:John Smith"
->0008,0102	Coding Scheme Designator	SH	Originator of code	"L-HM"
->0008,0104	Coding Meaning	SH	Semantics of code	"Unique descriptor for person"

8.3.2 Institution Code Sequence

The institution linked to each creator is identified with an Institution Code Sequence

GE	Attribute Name	VR	Meaning	Value
0008,0082	Institution Code Sequence	SQ		
->0008,0100	Code Value	SH		"HM"
->0008,0102	Coding Scheme Designator	SH	Originator of code	"L-HM"
->0008,0104	Coding Meaning	SH	Semantics of code	"HealthMyne Code ID"

8.3.3 Template Tags in PR

GE	Attribute Name	VR	Meaning	Value
0008,0016	SOP Class UID	SQ	Unique identifier of Grayscale Presentation State SOP Class	1.2.840.10008.5.1.4.1.1.11.1
0008,0060	Modality	SH	DICOM code for modality	PR
0008,0070	Manufacturer	SH	Originator of code	HealthMyne_PACS

GE	Attribute Name	VR	Meaning	Value
0008,1070	Operators Name	PN	Operator who created the object	<operator's name>
0008,103E	Series Description	LO	Description of series	PR_SERIES BY HM:<operators name>
0020,0011	Series Number	IS	Integer ID for series within the study	100-199
0020,0013	Instance Number	IS	Integer ID for the instance within the series	1000-1099

8.3.4 Template Tags in RTSTRUCT

GE	Attribute Name	VR	Meaning	Value
0008,0016	SOP Class UID	SQ	Unique identifier of Radiotherapy Structure Set SOP Class	1.2.840.10008.5.1.4.1.1.481.3
0008,0060	Modality	SH	DICOM code for modality	RTSTRUCT
0008,0070	Manufacturer	SH	Originator of code	HealthMyne_PACS
0008,1070	Operators Name	PN	Operator who created the object	<operator's name>
0008,103E	Series Description	LO	Description of series	HM_NODULES_ BY HM:<operators name> HM_NORMAL_ORGANS BY HM:<operators name>
0020,0011	Series Number	IS	Integer ID for series within the study	200-299
0020,0013	Instance Number	IS	Integer ID for the instance within the series	2000-2099

8.3.5 Template Tags in REG

GE	Attribute Name	VR	Meaning	Value
0008,0016	SOP Class UID	SQ	Unique identifier of Spatial Registration SOP Class	1.2.840.10008.5.1.4.1.1.66.1
0008,0060	Modality	SH	DICOM code for modality	REG
0008,0070	Manufacturer	SH	Originator of code	HealthMyne_PACS
0008,1070	Operators Name	PN	Operator who created the object	<operator's name>
0008,103E	Series Description	LO	Description of series	HM_SPATIAL_REGISTRATION BY HM:<operators name>
0020,0011	Series Number	IS	Integer ID for series within the study	400-499
0020,0013	Instance Number	IS	Integer ID for the instance within the	4000-4099

GE	Attribute Name	VR	Meaning	Value
			series	

8.3.6 Template Tags in SEG

GE	Attribute Name	VR	Meaning	Value
0008,0016	SOP Class UID	SQ	Unique identifier of Surface Segmentation SOP Class	1.2.840.10008.5.1.4.1.1.66.5
0008,0060	Modality	SH	DICOM code for modality	SEG
0008,0070	Manufacturer	SH	Originator of code	HealthMyne_PACS
0008,1070	Operators Name	PN	Operator who created the object	<operator's name>
0008,103E	Series Description	LO	Description of series	HM_NODULES_ BY HM:<operators name> HM_NORMAL_ORGANS BY HM:<operators name>
0020,0011	Series Number	IS	Integer ID for series within the study	500-599
0020,0013	Instance Number	IS	Integer ID for the instance within the series	5000-5099

8.3.7 Template Tags in SR

GE	Attribute Name	VR	Meaning	Value
0008,0016	SOP Class UID	SQ	Unique identifier of Basic Text SR SOP Class	1.2.840.10008.5.1.4.1.1.88.22
0008,0060	Modality	SH	DICOM code for modality	SR
0008,0070	Manufacturer	SH	Originator of code	HealthMyne_PACS
0008,1070	Operators Name	PN	Operator who created the object	<operator's name>
0008,103E	Series Description	LO	Description of series	SR_SERIES By HM:<operator's name>
0020,0011	Series Number	IS	Integer ID for series within the study	600-699
0020,0013	Instance Number	IS	Integer ID for the instance within the series	6000-6099

8.3.8 Dataset and Relevant Prior Specification in SR

The data sets and relevant priors used in reporting study level metrics are identified by a Referenced Study Sequence, The fist image of each referenced data set is populated within the component Referenced Series Sequence.

GE	Attribute Name	VR	Meaning	Value
0008,1110	Referenced Study Sequence	SQ	Start of referenced study sequence	

GE	Attribute Name	VR	Meaning	Value
>0020,000D	Study Instance UID	UI	UID of the referenced study	
>0008,1115	Referenced Series Sequence	SQ	Start of referenced series sequence	
>>0020,000E	Series Instance UID	UI	UID of the referenced series	
>>0008,1140	Referenced Image Sequence	SQ	Start of referenced image sequence	
>>>0008,1155	Referenced SOP Instance UID	UI	UID of first image of data set	
>>>0008,1150	Referenced SOP Class UID	UI	UID of SOP Class	1.2.840.10008.5.1.4.1.1.2

8.3.9 Completion Status in SR

The following tags denote the completion status in SR

GE	Attribute Name	VR	Meaning	Value
0040,A491	Completion Flag	CS	Status of completion	PARTIAL/COMPLETE
0040,A496	Preliminary Flag	CS	Status of read	PRELIMINARY/FINAL

8.3.10 Nodule Records in SR

A record for each relevant nodule is contained in a ContentSequence item embedded within a top-level content sequence item.

Each nodule record is populated as follows with an embedded Concept Name Code Sequence that identifies the record as being a nodule record.

GE	Attribute Name	VR	Meaning	Value
0040,A730	Content Sequence	SQ	Start of top level content sequence	
>0040,A010	Relationship Type	CS		CONTAINS
>0040,A040	Value Type	CS		CONTAINER
>0040,A043	Concept Name Code Sequence	SQ	Start of sequence that identifies the content	
>>0008,0100	Code Value	SH		Nodule
>> 0008,0102	Coding Scheme Designator	SH		L-HM
>> 0008,0104	Code Meaning	LO	Description of code meaning	Nodule specified by user

Within each of these nodule sequences is embedded a similar code sequence as above for each property of a nodule. The enumerated properties are as below:

Relationship Type	Value Type	Concept Name Code Value	Code Meaning	Code Value
HAS_PROPERTIES	TEXT	STRUCTURE_NAME	User defined name of structure	Ex: “Nodule01”
HAS_PROPERTIES	NUMERIC	STRUCTURE_SET_INTERNAL_ID	Internal descriptor for structure set	

8.3.11 Study Metrics in SR

The start of a sequence containing study metrics is identified by a content sequence shown below

GE	Attribute Name	VR	Meaning	Value
>0040,A010	Relationship Type	CS		CONTAINS
>0040,A040	Value Type	CS		CONTAINER
>0040,A043	Concept Name Code Sequence	SQ	Start of sequence that identifies the content	
>>0008,0100	Code Value	SH		STUDY_METRICS
>> 0008,0102	Coding Scheme Designator	SH		L-HM
>> 0008,0104	Code Meaning	LO	Description of code meaning	Study level metrics

Within this sequence appears a code sequence for each study level metric.

Relationship Type	Value Type	Concept Name Code Value	Code Meaning	Code Value
CONTAINS	NUMERIC	LUNG_RADS_FINAL	The LungRADS final score for study (set by either user or system) 1 = 1 2 = 2 3 = 3 4 = 4A 5 = 4B	Ex: 5
CONTAINS	NUMERIC	LUNG_RADS_STUDY	Max LungRADS score of all nodules in study	Ex: 5
CONTAINS	TEXT	LUNG_RADS_USERDEF_MOD_C	The LungRADS "C" modifier set by the user.	True/false
CONTAINS	TEXT	LUNG_RADS_USERDEF_MOD_S	The LungRADS "S" modifier set by the user.	True/false

8.3.12 Contents of Secondary Capture

HM enables certain dialogs for nodule metrics to be saved as a secondary capture. The DICOM Tags are populated as follows when HM creates a secondary capture object

GE	Attribute Name	VR	Meaning	Value
(0008,0060)	Modality	CS	Defines the origin of the image	OT
(0008,0016)	SOP Class UID	UI	Storage class specifier	1.2.840.100008.5.1.4.1.1.7
(0028,0002)	Samples Per Pixel	US	Number of samples (planes) in the image	1
(0028,0004)	Photometric Interpretation	CS	Intended interpretation of the pixel data	RGB

GE	Attribute Name	VR	Meaning	Value
(0028,0010)	Rows	US	Number of rows in the image	Number of rows in each slice
(0028,0011)	Columns	US	Number of columns in the image	Number of columns in each slice
(0028,0100)	Bits Allocated	US	Number of bits allocated for each pixel sample	8
(0028,0101)	Bits Stored	US	Number of bits stored for each pixel sample	8
0008,0070	Manufacturer	SH	Originator of code	HealthMyne_PACS
0008,1070	Operators Name	PN	Operator who created the object	<operator's name>
0020,0011	Series Number	IS	Integer ID for series within the study	700-799
0020,0013	Instance Number	IS	Integer ID for the instance within the series	7000-7999
(0028,0102)	High Bit	US	Most significant bit for pixel sample data	7
(0028,0103)	Pixel Representation	US	Data representation of the pixel samples	0000H (unsigned integer)
(0028,0006)	Planar Configuration	US	Whether pixels are color by pixel or color by plane	0 (Color by pixel)
(7FE0,0010)	Pixel Data	OB	Data stream of the pixel data	Pixel array data in RGB format

8.3.13 Structure Set Identification

RTSTRUCTs are identified as part of a Structure Set using this code sequence:

GE	Attribute Name	VR	Meaning	Value
3006,9215	Derivation Code Sequence	SQ		
->0028,0800	Code Label	CS	Name of code	StructureSetUID
->0008,0104	Code Meaning	LO	Semantics of code	Uniquely identifies this structure set
->0008,0100	Code Value	SH	Structure Set ID	1.2.826.0.1.3680043.9.4183.146.210 3330626.1712633387
->0008,0102	Coding Scheme Designator	SH	Designates private coding	L

8.3.14 Nodule Records in RTSTRUCT

Each HM-created RTSTRUCT series identifies structures with an RTROIObservationSequence. In addition to the standard attributes, HM includes the following coded items:

GE	Attribute Name	VR	Meaning	Value
3006,0086	RT ROI Identification Code Sequence	SQ		
->0028,0800	Code Label	CS	Name of code	RTROIInstanceUID

GE	Attribute Name	VR	Meaning	Value
->0008,0104	Code Meaning	LO	Semantics of code	A unique identifier for the ROI
->0008,0100	Code Value	SH	Identify of ROI	1.2.826.0.1.3680043.9.4183.141.2045951611.1090715481
->0008,0102	Coding Scheme Designator	SH	Designates private coding	L
->0028,0800	Code Label	CS	Name of code	RTReferencedSOPInstanceUID
->0008,0104	Code Meaning	LO	Semantics of code	Uniquely identifies the referenced SOP Instance
->0008,0100	Code Value	SH	Referenced SOP ID	1.2.840.113654.2.55.313937457962710805602118987879764263722
->0008,0102	Coding Scheme Designator	SH	Designates private coding	L
->0062,000F	Segmented Property Type Code Sequence			
->>0028,0800	Code Label	CS	Name of code	RTROILinkUID
->>0008,0104	Code Meaning	LO	Semantics of code	Unique identifier linking the same ROI across studies
->>0008,0100	Code Value	SH	Linking ID for ROI	1.2.826.0.1.3680043.9.4183.141.1557808423.1212212296
->>0008,0102	Coding Scheme Designator	SH	Designates private coding	L

Lesion-type structures include these additional Segmented Property Type coded items:

GE	Attribute Name	VR	Meaning	Value
->0062,000F	Segmented Property Type Code Sequence			
->>0028,0800	Code Label	CS	Name of code	RTROIPresent
->>0008,0104	Code Meaning	LO	Semantics of code	True if the linked ROI is present on this study
->>0008,0100	Code Value	SH	ROI is present	true
->>0008,0102	Coding Scheme Designator	SH	Designates private coding	L
->>0028,0800	Code Label	CS	Name of code	RTROIVerificationStatus
->>0008,0104	Code Meaning	LO	Semantics of code	HealthMyne three-stage verification status
->>0008,0100	Code Value	SH	ROI verification status	VERIFIED
->>0008,0102	Coding Scheme Designator	SH	Designates private coding	L
->>0028,0800	Code Label	CS	Name of code	RTROIToolType
->>0008,0104	Code Meaning	LO	Semantics of code	HealthMyne tool type used to identify this ROI
->>0008,0100	Code Value	SH	Tool type used to identify ROI	LUNG
->>0008,0102	Coding Scheme Designator	SH	Designates private coding	L
->>0028,0800	Code Label	CS	Name of code	RTROIIncidentalFinding

GE	Attribute Name	VR	Meaning	Value
->>0008,0104	Code Meaning	LO	Semantics of code	HealthMyne incidental findings status
->>0008,0100	Code Value	SH	Incidental findings present	YES
->>0008,0102	Coding Scheme Designator	SH	Designates private coding	L

8.3.15 Anatomic Region Sequence

The anatomic location of a lesion is stored in the Anatomic Location Sequence:

GE	Attribute Name	VR	Meaning	Value
0008,2218	Anatomic Region Sequence	SQ		
->0028,0800	Code Label	CS	Name of code	Anatomical Location
->0008,0104	Code Meaning	LO	Semantics of code	Anatomic region associated with structure
->0008,0100	Code Value	SH	ROI anatomic location	Lung, Left Lower Lobe
->0008,0102	Coding Scheme Designator	SH	Designates private coding	L

8.3.16 Surface Segment Structure Set Reference

Surface segments are associated with a specific structure set using this code sequence:

GE	Attribute Name	VR	Meaning	Value
3006,9215	Derivation Code Sequence	SQ		
->0028,0800	Code Label	CS	Name of code	ReferencedStructureUID
->0008,0104	Code Meaning	LO	Semantics of code	Referenced RTSTRUCT unique identifier
->0008,0100	Code Value	SH	ROI Unique ID	1.2.826.0.1.3680043.9.4183.146.2103330626.1712633387
->0008,0102	Coding Scheme Designator	SH	Designates private coding	L

8.4 GRAYSCALE IMAGE CONSISTENCY

The high resolution display monitor attached to the product can be calibrated according to the Grayscale Standard Display Function (GSDF).

8.5 STANDARD EXTENDED/ SPECIALIZED/ PRIVATE SOP CLASSES

None.

8.6 PRIVATE TRANSFER SYNTAXES

None.