DICOM Conformance Statement

IM-DCS-RevC

ImageMover Enterprise Platform 1.1.3+

Issued by:

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1. DICOM Conformance Statement Overview

This conformance statement refers to the ImageMover™ Server, hereafter referred to as "ImageMover," which is used in conjunction with the ImageMover client-side applications. Client applications can reside on a mobile devices or stationary computers. The server software discussed herein resides in a dedicated LINUX operating system environment. This version of DICOM Conformance Statement applies to ImageMover version 1.1.3 and above.

ImageMover software from ImageMoverMD allows seamless workflow integration to bring patient photos from mobile devices directly into the organization's imaging archive and medical record. ImageMover imports and converts various image and video formats to DICOM, and also imports DICOM-formatted medical images. DICOM files can then be sent to the organization's imaging archive system.

This conformance statement will predominantly utilize the formatting and terminology as specified in the DICOM standard specification: "DICOM PS3.2 2016e - Conformance."

The following table presents an overview of all network services and the applicable SOP Classes supported by ImageMover. Most of these classes are supported in a "pass-through" manner since ImageMover reads and forwards DICOM files, with optional demographics coercion. Several SOP Classes are also supported in a "create" role within ImageMover via conversion from media to DICOM formats, as denoted by an asterisk within Table 1. They are detailed in Table 6 and section 8.

Table 1: Network Services

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Stored Print Storage SOP Class	1.2.840.10008.5.1.1.27	Yes	No
Hardcopy Grayscale Image Storage SOP Class	1.2.840.10008.5.1.1.29	Yes	No
Hardcopy Color Image Storage SOP Class	1.2.840.10008.5.1.1.30	Yes	No
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No
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 (Retired)	1.2.840.10008.5.1.4.1.1.3	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	1.2.840.10008.5.1.4.1.1.4.3	Yes	No
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Yes	No
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	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
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	Yes	No
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	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
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
General Audio Waveform	1.2.840.10008.5.1.4.1.1.9.4.2	Yes	No
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	Yes	No
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	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 SOP Class	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 X-Ray Angiographic 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 X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	No
X-Ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	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
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	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 Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.77.1	Yes	No
VL Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.77.2	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No

VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	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 Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	No
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	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
Structured Report Text Storage (Retired)	1.2.840.10008.5.1.4.1.1.88.1	Yes	No
Structured Report Detail Storage (Retired)	1.2.840.10008.5.1.4.1.1.88.3	Yes	No
Structured Report Comprehensive Storage (Retired)	1.2.840.10008.5.1.4.1.1.88.4	Yes	No
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
Comprehensive SR	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	1.2.840.10008.5.1.4.1.1.88.50	Yes	No
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Yes	No
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Yes	No
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Yes	No
Colon CAD SR	1.2.840.10008.5.1.4.1.1.88.69	Yes	No
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
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Yes	No
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	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
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	Yes	No
RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9	Yes	No
Hanging Protocol Storage	1.2.840.10008.5.1.4.38.1	Yes	No

Note: ImageMover is **not** a storage class provider (SCP) because it does not accept C-STORE requests. In general, it is not association-based regarding data import. ImageMover acts only as a storage class user (SCU).

ImageMover can send DICOM messages to either a DICOM listener or upload DICOM files to the Nuance PowerShare Network. For the purposes of this statement, only the sending to a DICOM listener is applicable.

2. Table of Contents

3. Introduction

3.1 Revision History

Table 2: Revision History

Document Version	Date of Issue	Description
0.1	January 20, 2017	Initial draft for review
A	January 26, 2017	Reviews done and mods made. Ready for distribution.
B	February 14, 2017	Addition of SOP classes to Table 1 that are read into and then sent out from ImageMover, and not just the created classes that were previously indicated. Corrected footer year. Corrected Table 4.
C	February 27, 2017	Update to 1.1.3 by adding Lossy Image Compression, Image Type, Institution Name, Issuer of Patient ID, and several physician related and coercion related tags. Also added support for encapsulated MPEG via Video Photographic Image Storage SOP class.

3.2 Audience

This Conformance Statement is intended for:

- Customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first level validation for interoperability between different applications supporting the same DICOM functionality. This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. However, by itself it is not guaranteed to ensure the desired interoperability and successful interconnectivity with existing DICOM systems.

The user (or user's agent) should be aware of the following issues:

• Interoperability

Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability. It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates ImageMover equipment with non-ImageMover equipment.

• Validation

ImageMover equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement. Where ImageMover equipment is linked to non-ImageMover equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

• New versions of the DICOM Standard

The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. ImageMover reserves the right to make changes to its solutions as required.

3.4 Definitions, Terms and Abbreviations

Table 3: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
AES	Advanced Encryption Standard. A symmetric block cipher used by the U.S. government to protect classified information and is also used worldwide to encrypt sensitive data.
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.
Application Entity Title (AET)	The externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.
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), Photometric Interpretation (0028,0004).
DICOM	Digital Imaging and Communications in Medicine
HIS/RIS	Hospital Information System / Radiology Information System
HL7	Health Level-7. A set of international standards for transfer of clinical and administrative data between software applications used by various healthcare providers.
IHE	Integrating the Healthcare Enterprise
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.
ISO	International Standard Organization
Module	A set of Attributes within an Information Object Definition that are logically related to each other. For example the Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex attributes.
MRN	Medical Record Number
PACS	Picture Archiving and Communication System
PHI	Protected Health Information
RC4	Rivest Cipher 4. A shared key stream cipher algorithm requiring a secure exchange of a shared key.
Service Class Provider (SCP)	Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another AE.
Service Class User (SCU)	Role of an Application Entity that uses a DICOM network service; typically, a client.
Service/Object Pair (SOP)	The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification.
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages.
Type	The specification that an attribute is mandatory and must have a value (Type 1), required but its value can be empty if unknown (Type 2), or completely optional (Type 3). There may also be conditions associated with the use of an attribute (Types 1C and 2C).
Unique Identifier (UID)	A globally unique “dotted decimal” string that identifies a specific object or a class of objects.

VNA	Vender Neutral Architecture
Value Representation (VR)	The data format of an individual DICOM data element. These are defined in the DICOM part 5 specification. Examples include date (DA), person name (PN), and code string (CS).

3.5 References

Table 4: Document References

Title	Location
Digital Imaging and Communications in Medicine, Parts 1 - 20	http://medical.nema.org/
DICOM PS3.2 2016e - Conformance	http://dicom.nema.org/medical/dicom/current/output/pdf/part02.pdf
DICOM PS3.3 2016e - Information Object Definitions	http://dicom.nema.org/medical/dicom/current/output/pdf/part03.pdf
DICOM PS3.5 2016e - Data Structures and Encoding	http://dicom.nema.org/medical/dicom/current/output/pdf/part05.pdf
DICOM PS3.6 2016e - Data Dictionary	http://dicom.nema.org/medical/dicom/current/output/pdf/part06.pdf

4. Networking

4.1 Implementation Model

The implementation model consists of three sections:

- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or RealWorld Activities,
- A functional description of each Application Entity, and
- The sequencing constraints among them.

4.1.1 Application Data Flow

The ImageMover server can accept files from various sources. Those currently are the ImageMover phone apps, ImageMover web apps (e.g. ImageMover Uploader), and third party integrations via our API.

ImageMover can upload the following data types:

- DICOM
- GIF
- JPEG (baseline)
- MPEG (.mpg, .mp4, .mov)
- PDF
- PNG
- TIFF

Uploaded image and video data are converted to new DICOM SOP instances and sent to a DICOM storage SCP listener (i.e., PACS or VNA system). That use case and the affected attributes are discussed in the "8.1.1 Created SOP Instances" section.

Uploaded DICOM data files are sent to the destination PACS or VNA system, although several attributes are impacted along the way. Those attributes are discussed in the "8.1.2. Usage of Attributes from received IODs" section.

Uploaded DICOM data files can also have several of their attributes coerced, discussed in the "8.1.4 Coerced/Modified Fields" section.

GIF, JPEG, PNG, and TIFF files are converted into DICOM Secondary Capture Image Storage SOP instances.

PDF files can be converted into either DICOM Encapsulated PDF Storage or DICOM Multi-frame True Color Secondary Capture Image Storage SOP instances.

MPEG files are converted into DICOM Multi-frame True Color Secondary Capture Image Storage or Video Photographic Image Storage SOP instances.

4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of the ImageMover SCU

The ImageMover application SCU will use the configured calling AET and the PACS AET, Host and Port to communicate with a remote SCP (i.e., DICOM AE) using the DICOM protocol. The calling AET is set to "IMAGEMOVER" by default to indicate 'ImageMover.'

An association is established with the SCP as defined in the configuration file just prior to sending a DICOM request to that AE. The association will remain open for additional send requests until a configurable timeout has occurred. That timeout is set to four minutes by default.

Note: The association will close immediately after a send operation for Video Photographic Image Storage since it is sent via a different mechanism than the other SOP classes due to its transfer syntax.

4.1.3 Sequencing of Real World Activities

The ImageMover Server accepts files that are converted to DICOM, if not already in that format. These files can originate from the ImageMover mobile app, ImageMover Media (DICOM media import), integrated EHR systems, etc.

The received files will temporarily be stored onto disk.

The non-DICOM files will be converted to DICOM.

If the files originated as DICOM then coercion can optionally be applied.

The DICOM files will then be sent to the remote AE.

The received file and all intermediately created files will be deleted from disk.

If an unrecoverable error occurs in the DICOM generation or sending process then the associated files will be stowed in a specific directory.

4.2 AE Specifications

The Network capabilities of the system consist of one DICOM Application Entity:

- A Send Secondary Capture, Encapsulated PDF, Multi-frame Secondary Capture and Video Photographic Image Storage AE (SCU)

Throughout this document "ImageMover SCU" is used to represent the AE.

4.2.1 ImageMover SCU

4.2.1.1 SOP Classes

See Table 1 for the list of SOP Classes supported by ImageMover.

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

4.2.1.2 Association Policies

4.2.1.2.1 General

The ImageMover SCU Network AE always proposes the following a DICOM Application Context Name (ACN) of: 1.2.840.10008.3.1.1.1.

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

4.2.1.2.2 Number of Associations

The ImageMover SCU application entity opens a single association that is utilized for one to many requested transfers.

4.2.1.2.3 Asynchronous Nature

DICOM asynchronous mode is not supported meaning that only one transaction may be outstanding over an association at any given point in time.

4.2.1.2.4 Implementation Identifying Information

The values supplied for Implementation Class UID and version name are documented in the following table.

Table 5: DICOM Implementation Class and Version for the ImageMover SCU

Attribute	Value	Note
Implementation Class UID	1.2.40.0.13.1.1	This attribute is hardcoded for sending to the PACS or VNA.
Implementation Version Name	dcm4che-1.4.35 for all SOPs except 'Video Photographic Image Storage', which will be dcm4che-2.0	This attribute is hardcoded for sending to the PACS or VNA.

4.2.1.2.5 Communication Failure Handling

All communications are handled within the sending process. ImageMover handles all related failures, including communication failures, as a general send failure. See 4.2.1.4.1.3.1 for the handling of sending issues.

4.2.1.3 Association Initiation Policy

We utilize the dcm4che processes for DICOM association initiation, communication, responses, and closing.

4.2.1.4 Association Acceptance Policy

4.2.1.4.1 (Real-World) Activity - Send to PACS (or VNA)

4.2.1.4.1.1 Description and Sequencing of Activities

ImageMover utilizes a dcm4che process to send DICOM messages to the remote AE. The current implementation is to keep the association open for the timeout period and send one or multiple messages.

Note: The exception is that the association will close immediately after a send operation for Video Photographic Image Storage since it is sent via a different mechanism than the other SOP classes due to its transfer syntax.

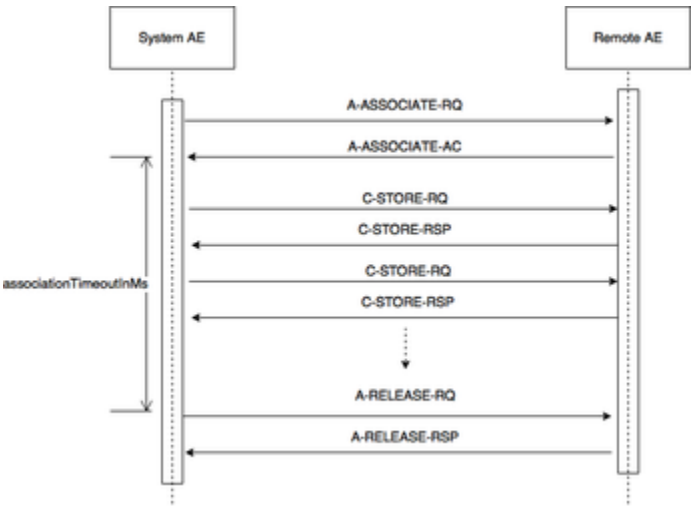

Figure 1. (Real World) Activity - Send

4.2.1.4.1.2 Proposed Presentation Contexts

The following table represents the SOP UIDs that are created by and sent from ImageMover.

Table 6. Proposed Presentation Contexts for (Real-World) Activity - Send to PACS or VNA

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Endian	1.2.840.10008.1.2	SCU	None
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	MPEG-4 AVC/H.264 High Profile / Level 4.1	1.2.840.10008.1.2.4.102	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

4.2.1.4.1.3 SOP Specific Conformance for Storage SOP Classes

Not applicable.

4.2.1.4.1.3.1 Dataset Specific Conformance for C-STORE-RQ

This section details the Dataset Specific response behavior. This includes error codes, error and exception handling, time-outs, etc.

Table 7: Status Response

Service Status	Error Code	Further Meaning	Behavior
OK	"OK"	operation succeeded completely	n/a
FAIL	"FAIL"	operation failed	see notes below

Notes:

1. The send will be re-attempted three times during normal processing.
2. Once the session expires per the defaultSessionTimeoutExtensionPeriod setting, the expired cleanup processing and if none of the send operations resulted in status = "OK," then retries will occur as defined by the server variable, maxProcessingRetries.
3. If the status is still not "OK," then an error will be logged and all relevant files will be moved to the directory defined by the server variable, sendFailureDir.
4. An optional configuration flag named "logFileFailurePHI" is available to indicate that detailed PHI information is to be logged into a specialized log file for the purpose of reconciliation. This flag is normally set to "false."

4.3 Network Interfaces

4.3.1 Physical Network Interfaces

The System provides only DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8 of the standard.

TCP/IP is the only protocol stack supported.

4.3.2 Additional Protocols

Additional protocols such as used for network management are not applicable.

4.4 Configuration

Any implementation's DICOM conformance may be dependent upon configuration, which takes place at the time of installation. Issues concerning configuration are addressed in this section.

4.4.1 AE Title/Presentation Address Mapping

4.4.1.1 Local AE Titles

The Source Application Entity Title will be set to the configured defaultCallingAet for all SOP classes except 'Video Photographic Image Storage', for which it will be "DCMSND".

4.4.1.2 Remote AE Titles

One AE can be configured.

The following AE specific information must be available to configure a remote AE:

- SCP (called) AE title via defaultPacsAet
- Hostname or IP address via defaultPacsHost
- Port number via defaultPacsPort

4.4.2 Parameters

The specification of important operational parameters, and if configurable, their default value and range, is specified here. The parameters that apply to all Application Entities are specified in the "General Parameters" section while those specific to particular Application Entities are specified in separate sections specific to each AE. ImageMover has other configurable parameters that relate to other features (HL7, XDS.b) but those indicated here are only those applicable to the overall operation and to DICOM.

Table 8: Configuration Parameters Table

Parameter	Configurable	Default Value	Comments
General			

associationTimeoutInMs	Yes	240,000	Association timeouts in seconds. 4 minutes by default
defaultCallingAet	Yes	"IMAGEMOVER"	
defaultDicomUIDBase	No	"1.2.826.0.1.3680043.9.3574"	
defaultPacsAet	Yes	"SET ME"	
defaultPacsHost	Yes	"SET ME"	
defaultPacsPort	Yes	"SET ME"	
expiredCleanupJob.repeatInterval	No	60,000	How often, in milliseconds, to run the cleanup job
maxProcessingRetries	Yes	10080	Used with expiredCleanupJob.repeatInterval. Default value: 1 week of retries at 1 retry per minute.
AE Specific			
accessionNumberPrefix	Yes	"IM"	
allowStudyDescNotInMappings	Yes	true	If true, allow the setting of Study Description even if not in dicomHL7Mappings. If false, reject it and set it to the default value.
defaultImageSeriesDescription	Yes	"PHOTO"	
defaultImageStudyDescription	Yes	"PATIENT PHOTO"	
defaultVideoSeriesDescription	Yes	"VIDEO"	
defaultVideoStudyDescription	Yes	"PATIENT VIDEO"	
dicomHL7Mappings	Yes	empty	Optional table of mappings of: modality, mode, studyDescription, examCode, searchTerms, overreadStudyDescription, overreadCode.
encapsulateMpeg	Yes	false	If false, then convert MPEG to Multi-frame Secondary Capture. If true, then encapsulate as Video Photographic Image Storage.
institutionName	Yes		
issuerOfPatientID	Yes		
logDicomPatientDataCoercionDetails	Yes	false	
logFileFailurePHI	Yes	false	
manufacturer	Yes	"ImageMoverMD"	
manufacturersModelName	Yes	"ImageMover"	
matchOnlyFirstStudyDesc	Yes	false	If true, only find the 1st match in query. If false, find all matches found in dicomHL7Mappings.
mpegToDicomFramesPerSecond	Yes	15	
mpegToDicomMaxSeconds	Yes	15	
mpegToDicomFileSizeMaxMB	Yes	500	
rasterize	Yes	false	If false, then convert to DICOM Encapsulated PDF. If true, then rasterize to DICOM Multi-frame Secondary Capture.
rasterizeResolution	Yes	150	
rasterizeDontResize	Yes	false	If false, then resize all multi-page PDFs, since they may be mixed size and orientation. Attempts to rasterize such mixed files will fail if this flag is set to true.
returnOnlyStudyDescMatches	Yes	true	If true, return to the client only the query match(es) from dicomHL7Mappings. If false, return the full list with the match(es) moved to the top.

These configurations must be set by ImageMoverMD Support.

5. Media Interchange

ImageMover Media is an media uploader solution that reads DICOM and other file types from various media, including hard drives, CDs/DVDs,

and USB media. This solution is one of several mechanisms (e.g., ImageMover Mobile app, integration with existing EHR systems via API) available to supply files to the ImageMover Server. Since the other ImageMover apps cannot act as SCPs, they are not included in this section.

5.1. Implementation model

5.1.1. Application Data Flow Diagram

Not applicable.

5.1.2. Functional Definitions of AE's

Not applicable.

5.1.3. Sequencing of Real World Activities

Not applicable.

5.2. AE Specifications

Not applicable.

5.2.1. Media AE Media - Specification

Not applicable.

5.2.1.1. File Meta Information for the Media AE

Not applicable.

5.2.1.2. Real-World Activities

Not applicable.

5.2.1.2.1. RWA - Read File-set

Not applicable.

5.2.1.2.1.1. Media Storage Application Profile

Not applicable.

5.2.1.2.1.1.1. Options

Not applicable.

5.2.1.2.2. RWA - Create File-set

Not applicable.

5.2.1.2.2.1. Media Storage Application Profile

Not applicable.

5.2.1.2.2.1.1. Options

Not applicable.

5.3. Augmented and Private Application Profiles

Not applicable.

5.4. Media Configuration

Not applicable.

6. Support of Character Sets

Any support for character sets in Network and Media services is described here.

Table 9: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 100	G1	Supplementary set of ISO 8859

7. Security

The ImageMover Server does not provide any security between its SCU AE and the remote AE to which the data is sent.

The ImageMover architecture does provide several layers of security that are in place prior to this SCU in the workflow:

- Only HTTPS-encrypted traffic is allowed between browsers and mobile clients and the ImageMover Server. The SSL certificate installed on the ImageMover Server must utilize a well recognized certificate authority. ImageMover Mobile client apps will not connect with self-signed SSL certificates.
- A whitelist server allows mobile clients to connect only with servers having fully qualified domain names.

No specific security mechanisms are in scope for this conformance statement. The ImageMover Server should be used within a secured physical environment.

7.1. Security Profiles

Not applicable.

7.2. Association Level Security

Not applicable.

7.3. Application Level Security

Not applicable.

8. Annexes

8.1. IOD Contents

8.1.1 Created SOP Instances

This section specifies each IOD created (including private IODs) by this application.

For each module, the attribute name, tag, VR, and value are specified. The value shows the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values is specified. Whether the value is always present or not is also specified.

Abbreviations used in the IOD tables for the column "Presence of Module" are:

ALWAYS - The module is always present. This must occur for Mandatory ('M') modules, and can occur for User optional ('U') or Conditional ('C') modules as defined in the DICOM specification.

CONDITIONAL - The module is used under specified condition at runtime. This condition will occur for Conditional modules as defined in the DICOM specification.

NEVER - The module is User optional, but is not used within this IOD instance.

The "DICOM Usage" for each module within the IOD, as specified in the DICOM standards, is also indicated for reference and due diligence. However, some tags populated by ImageMover reside in modules that are not part of the IOD. Those are populated for interface with other systems, such as for HL7 compatibility. Those have a usage of 'n/a'.

Abbreviations used in the Module table for the column "Presence of Value" are shown here.

ALWAYS - The attribute is always present with a value.

ANAP - Attribute Not Always Present. The attribute is present under a specified condition. If present, then it will always have a value.

VNAP - Value Not Always Present. The attribute is always present, but its value is not. If the value is unknown, the attribute is sent with a length of zero.

EMPTY - The attribute is always present, but the value is not set.

Note that, for example, an attribute can be of DICOM Type 3 (i.e., optional), but from an ImageMover perspective it may be an "ALWAYS" attribute if the server always populates and sends it. So, the "Presence of Value" must not violate the Type, but the implementation can be more committal than the applicable Type. For the purposes of completeness, this conformance statement also indicates the Type for each attribute.

The abbreviations used in the Module table for the column "Source" are:

AUTO - The attribute value is generated automatically.

CONFIG - The attribute value source is a configurable parameter.

COPY - The attribute value source is another SOP instance.

FIXED - The attribute value is hard-coded in the application.

IMPLICIT - The attribute value source is a user-implicit setting.

USER - The attribute value source is explicit user input.

8.1.1.1. List of created SOP Classes

The following are the SOP classes that are created by ImageMover from image and video data files.

Table 10: List of created IOD SOP Classes

SOP Class Name	SOP Class UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

In the sections that follow each created IOD will be decomposed. Listed for each IOD will be all the modules that are indicated in the DICOM specification to be required, mandatory, or conditional. They are all listed in the interest of completeness and clarity.

Within each module, each implemented attribute will be described, including attributes required either always or conditionally, and attributes that are not required but are populated regardless. Non-implemented attributes are not shown.

8.1.1.2. Secondary Capture Image Storage SOP Class

The Transfer Syntax UID utilized for this SOP class is always 1.2.840.10008.1.2.4.50 (i.e., JPEG Baseline (Process 1)).

ImageMover converts GIF, PNG and TIFF images to JPEG before they are converted to Secondary Capture, and thus this class applies to uploaded images of type GIF, PNG, TIFF and JPEG.

Note: Images containing an alpha channel are not supported.

Table 11: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	DICOM Usage	Presence Of Module
Patient	Patient	M	ALWAYS
	Clinical Trial Subject	U	NEVER
	Patient Identification	n/a	ALWAYS
Study	General Study	M	ALWAYS
	Patient Study	U	NEVER
	Clinical Trial Study	U	NEVER
	Imaging Service Request	n/a	ALWAYS
Series	General Series	M	ALWAYS
	Clinical Trial Series	U	NEVER
Equipment	General Equipment	U	ALWAYS
	SC Equipment	M	ALWAYS
Image	General Image	M	ALWAYS
	Image Pixel	M	ALWAYS
	Device	U	NEVER
	Specimen	U	NEVER
	SC Image	M	ALWAYS

	Overlay Plane	U	NEVER
	Modality LUT	U	NEVER
	VOI LUT	U	NEVER
	ICC Profile	U	NEVER
	SOP Common	M	ALWAYS
	Common Instance Reference	U	NEVER
Visit	Visit Status	n/a	ALWAYS

ImageMover creates Secondary Capture Image instances from uploaded images. Thus, the "Source" for most will be IMPLICIT since they would originate in an EHR, while others could be generated within ImageMover and hence would be AUTO.

Table 12: Patient Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Patient's Name	0010,0010	PN		2	ALWAYS	IMPLICIT	Via API "lastName," "firstName," and "middleName" parameters.
Patient ID	0010,0020	LO		2	ALWAYS	IMPLICIT	Via API parameter "externalId"(i.e., MRN).
Patient's Birth Date	0010,0030	DA		2	VNAP	IMPLICIT	Via API parameter "dateOfBirth."
Patient's Sex	0010,0040	CS	M, F, or O, or empty	2	VNAP	IMPLICIT	Via API parameter "gender."

Table 13: Patient Identification Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Issuer of Patient ID	0010,0021	LO		3	VNAP	IMPLICIT	Set to configured "issuerOfPatientID"

Table 14: General Study Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Study Date	0008,0020	DA		2	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session date.
Study Time	0008,0030	TM		2	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session time.
Accession Number	0008,0050	SH		2	ALWAYS	IMPLICIT, AUTO	Concatenation of configured "accessionNumberPrefix" and API provided "externalId" (e.g., IM139099876), or can be session ID.
Referring Physician Name	0008,0090	PN		2	VNAP	IMPLICIT	Via API "mdname."
Study Description	0008,1030	LO		3	ALWAYS	IMPLICIT, CONFIG	Value matched in dicomHL7Mappings table, or the configured defaultImageStudyDescription.
Physician Of Record	0008,1048	PN		3	VNAP	IMPLICIT	Via API "mdname."
Name Of Physician Reading Study	0008,1060	PN		3	VNAP	IMPLICIT	Via API "mdname."
Study Instance UID	0020,000D	UI		1	ALWAYS	AUTO, CONFIG	Concatenation of configured defaultDicomUIDBase and serverId and session timestamp (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958)

Table 15: Imaging Service Request Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Requesting Physician	0032,1032	PN		3	VNAP	IMPLICIT	Via API "mdname."

Table 16: General Series Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Series Date	0008,0021	DA		3	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session date.
Series Time	0008,0031	TM		3	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session time.
Modality	0008,0060	CS	VL	1	ALWAYS	CONFIG	
Series Description	0008,103E	LO		3	ALWAYS	IMPLICIT, CONFIG	Body map seriesDescription or configured defaultImageSeriesDescription.
Performing Physicians Name	0008,1050	PN		3	VNAP	IMPLICIT	Via API "mdname."
Operators' Name	0008,1070	PN		3	VNAP	IMPLICIT	Via API "op."
Body Part Examined	0018,0015	CS		3	VNAP	IMPLICIT	Body map bodyPartExamined.
Series Instance UID	0020,000E	UI		1	ALWAYS	AUTO	Concatenation of Study Instance UID and manifest ID (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958.2). If body mapping occured then the bodyPartId is also concatenated.
Series Number	0020,0011	IS		2	ALWAYS	IMPLICIT, AUTO	If body mapping occurred then bodyPartId, else "1".
Laterality	0020,0060	CS	L or R or null	2C	VNAP	IMPLICIT	Derived from body mapping selection.

Table 17: General Equipment Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Manufacturer	0008,0070	LO	ImageMoverMD	2	ALWAYS	CONFIG	
Institution Name	0008,0080	LO		3	VNAP	CONFIG	Configured institutionName
Institutional Department Name	0008,1040	LO		3	VNAP	IMPLICIT	Via API "encDept" parameter.
Manufacturer's Model Name	0008,1090	LO	ImageMover	3	ALWAYS	CONFIG	
Software Version(s)	0018,1020	LO		3	ALWAYS	AUTO	

Table 18: SC Equipment Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Conversion Type	0008,0064	CS	SI	1	ALWAYS	FIXED	SI = Scanned Image.

Table 19: General Image Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Image Type	0008,0008	CS	DERIVED\PRIMARY or ORIGINAL\PRIMARY	3	ALWAYS	AUTO	ORIGINAL\PRIMARY if the original image was JPEG. DERIVED\PRIMARY if the original image was PNG, GIF, or TIFF.
AcquisitionDate	0008,0022	DA		3	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.
Content Date	0008,0023	DA		2C	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.

AcquisitionTime	0008,0032	TM		3	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.
Content Time	0008,0033	TM		2C	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.
Instance Number	0020,0013	IS		2	ALWAYS	AUTO	Generated as sequential within a series, starting at 1.
Lossy Image Compression	0028,2110	CS	01	3	ALWAYS	AUTO	

Table 20: Image Pixel Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Samples per Pixel	0028,0002	US	3	1	ALWAYS	FIXED	
Photometric Interpretation	0028,0004	CS	YBR_FULL_422	1	ALWAYS	FIXED	
Planar Configuration	0028,0006	CS	0	1C	ALWAYS	FIXED	Indicates whether the pixel data are sent color-by-plane (1) or color-by-pixel (0). Required if Samples per Pixel has a value greater than 1.
Rows	0028,0010	US		1	ALWAYS	COPY	
Columns	0028,0011	US		1	ALWAYS	COPY	
Bits Allocated	0028,0100	US	8	1	ALWAYS	FIXED	
Bits Stored	0028,0101	US	8	1	ALWAYS	FIXED	
High Bit	0028,0102	US	7	1	ALWAYS	FIXED	
Pixel Representation	0028,0103	US	0	1	ALWAYS	FIXED	0000H = unsigned integer.
Pixel Data	7FE0,0010	OW		1	ALWAYS	COPY	

Table 21: SC Image Module

None of the SC Image Module attributes are populated or sent because they are Type 3 and not utilized. The module is mandatory for this IOD.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
n/a							

Table 22: SOP Common Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Specific Character Set	0008,0005	CS	ISO_IR 100	1C	ALWAYS	FIXED	
Instance Creation Date	0008,0012	DA		3	ALWAYS	AUTO	Timestamp of the conversion to DICOM.
Instance Creation Time	0008,0013	TM		3	ALWAYS	AUTO	Timestamp of the conversion to DICOM.
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	1	ALWAYS	FIXED	Secondary Capture Image Storage.
SOP Instance UID	0008,0018	UI		1	ALWAYS	AUTO	Concatenation of the Series UID and uploaded file ID (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958.2.123)

Table 23: Visit Status Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Patient's Institution Residence	0038,0400	LO	"Inpatient" or "Outpatient"	3	VNAP	IMPLICIT	Derived from API "mode" (IP or OP). If no mode is provided, the defaults is "Outpatient."

8.1.1.3. Multi-frame True Color Secondary Capture Image Storage SOP Class

The Transfer Syntax UID utilized for this SOP class is always 1.2.840.10008.1.2 (i.e., "Implicit VR Endian").

ImageMover can convert PDF and MPEG files to this class.

The configuration parameter "encapsulateMpeg" will determine if MPEG files are converted to this SOP class or to the Video Photographic Image Storage SOP class. If set to "false" then this Multi-frame class will be created.

Note that this SOP class does not support audio, and hence only the video portion of an MPEG will be preserved. If audio is also required, then instead set "encapsulateMpeg" to "true" to create the Video Photographic Image Storage class.

The configuration parameter "rasterize" will determine if PDF files are converted to this SOP class or to DICOM Encapsulated PDF. If set to "true:", then this SOP class will be created and "rasterizeResolution" and "rasterizeDontResize" also apply.

Table 24: IOD of Created Multi-frame True Color Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	DICOM Usage	Presence Of Module
Patient	Patient	M	ALWAYS
	Clinical Trial Subject	U	NEVER
	Patient Identification Module	n/a	ALWAYS
Study	General Study	M	ALWAYS
	Patient Study	U	NEVER
	Clinical Trial Study	U	NEVER
	Imaging Service Request	n/a	ALWAYS
Series	General Series	M	ALWAYS
	Clinical Trial Series	U	NEVER
Frame of Reference	Frame of Reference	U	NEVER
	Synchronization	U	NEVER
Equipment	General Equipment	U	ALWAYS
	SC Equipment	M	ALWAYS
Image	General Image	M	ALWAYS
	Image Pixel	M	ALWAYS
	Cine	C	CONDITIONAL
	Multi-frame	M	ALWAYS
	Frame Pointers	U	NEVER
	Device	U	NEVER
	Multi-frame Functional Groups	U	NEVER
	Multi-frame Dimension	U	NEVER
	Specimen	U	NEVER
	SC Image	U	NEVER
	SC Multi-frame Image	M	ALWAYS
	SC Multi-frame Vector	C	ALWAYS
	ICC Profile	U	NEVER

	SOP Common	M	ALWAYS
	Common Instance Reference	U	NEVER
	Frame Extraction	C	NEVER
Visit	Visit Status	n/a	ALWAYS

Table 25: Patient Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Patient's Name	0010,0010	PN		2	ALWAYS	IMPLICIT	Via API "lastName," "firstName," and "middleName" parameters.
Patient ID	0010,0020	LO		2	ALWAYS	IMPLICIT	Via API parameter "externalId" (i.e., MRN).
Patient's Birth Date	0010,0030	DA		2	VNAP	IMPLICIT	Via API parameter "dateOfBirth."
Patient's Sex	0010,0040	CS	M, F, or O, or empty	2	VNAP	IMPLICIT	Via API parameter "gender."

Table 26: Patient Identification Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Issuer of Patient ID	0010,0021	LO		3	VNAP	IMPLICIT	Set to configured "issuerOfPatientID"

Table 27: General Study Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Study Date	0008,0020	DA		2	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session date.
Study Time	0008,0030	TM		2	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session time.
Accession Number	0008,0050	SH		2	ALWAYS	IMPLICIT, AUTO	Concatenation of configured "accessionNumberPrefix" and API provided "externalId" (e.g., IM139099876), or can be session ID.
Referring Physician Name	0008,0090	PN		2	VNAP	IMPLICIT	Via API "mdname."
Study Description	0008,1030	LO		3	ALWAYS	CONFIG	If MPEG, then set to the defaultVideoStudyDescription. If PDF, then set to the defaultImageStudyDescription.
Physician Of Record	0008,1048	PN		3	VNAP	IMPLICIT	Via API "mdname."
Name Of Physician Reading Study	0008,1060	PN		3	VNAP	IMPLICIT	Via API "mdname."
Study Instance UID	0020,000D	UI		1	ALWAYS	AUTO, CONFIG	Concatenation of configured defaultDicomUIDBase and serverId and session timestamp (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958)

Table 28: Imaging Service Request Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Requesting Physician	0032,1032	PN		3	VNAP	IMPLICIT	Via API "mdname."

Table 29: General Series Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Series Date	0008,0021	DA		3	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session date.
Series Time	0008,0031	TM		3	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session time.
Modality	0008,0060	CS	VL	1	ALWAYS	FIXED	
Series Description	0008,103E	LO		3	ALWAYS	CONFIG	If MPEG, then set to the defaultVideoSeriesDescription. If PDF, then set to the defaultImageSeriesDescription.
Performing Physicians Name	0008,1050	PN		3	VNAP	IMPLICIT	Via API "mdname."
Operators' Name	0008,1070	PN		3	VNAP	IMPLICIT	Via API "op."
Series Instance UID	0020,000E	UI		1	ALWAYS	AUTO	If MPEG, then to ensure that the Series UIDs are unique within a manifest, and hence show up properly in a DICOM viewer, we will set this to the SOP Instance UID. If PDF, then set to the concatenation of Study Instance UID and manifest ID.
Series Number	0020,0011	IS	1	2	ALWAYS	IMPLICIT, AUTO	If body mapping occurred then bodyPartId else "1."

Table 30: General Equipment Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Manufacturer	0008,0070	LO	ImageMoverMD	2	ALWAYS	CONFIG	
Institution Name	0008,0080	LO		3	VNAP	CONFIG	Configured institutionName
Institutional Department Name	0008,1040	LO		3	VNAP	IMPLICIT	Via API "encDept" parameter.
Manufacturer's Model Name	0008,1090	LO	ImageMover	3	ALWAYS	CONFIG	
Software Version(s)	0018,1020	LO		3	ALWAYS	AUTO	

Table 31: SC Equipment Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Conversion Type	0008,0064	CS	WSD	1	ALWAYS	FIXED	WSD = Workstation - The equipment which captured the image from the screen, or which placed the modified image into a DICOM SOP Instance.

Table 32: General Image Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Image Type	0008,0008	CS	ORIGINAL\PRIMARY	3	ALWAYS	FIXED	
AcquisitionDate	0008,0022	DA		3	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.
Content Date	0008,0023	DA		2C	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.
AcquisitionTime	0008,0032	TM		3	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.
Content Time	0008,0033	TM		2C	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.
Instance Number	0020,0013	IS		2	ALWAYS	AUTO	Generated as sequential within a series, starting at 1.
Lossy Image Compression	0028,2110	CS	00 if PDF 01 if MPEG	3	ALWAYS	AUTO	

Table 33: Image Pixel Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Samples per Pixel	0028,0002	US	3	1	ALWAYS	FIXED	
Photometric Interpretation	0028,0004	CS	YBR_FULL_422	1	ALWAYS	FIXED	
Planar Configuration	0028,0006	CS	0	1C	ALWAYS	FIXED	Indicates whether the pixel data are sent color-by-plane (1) or color-by-pixel (0). Required if Samples per Pixel has a value greater than 1.
Rows	0028,0010	US		1	ALWAYS	COPY	
Columns	0028,0011	US		1	ALWAYS	COPY	
Bits Allocated	0028,0100	US	8	1	ALWAYS	FIXED	
Bits Stored	0028,0101	US	8	1	ALWAYS	FIXED	
High Bit	0028,0102	US	7	1	ALWAYS	FIXED	
Pixel Representation	0028,0103	US	0	1	ALWAYS	FIXED	0000H = unsigned integer.
Pixel Data	7FE0,0010	OW		1	ALWAYS	COPY	

Table 34: Cine Module

This module is only populated for MPEG files, so is not applicable to PDF files.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Frame Time	0018,1063	DS		1C	ANAP	AUTO, CONFIG	Nominal time (in msec) per individual frame. Required if Frame Increment Pointer (0028,0009) points to Frame Time. Computed from the configured mpegToDicomFramesPerSecond.
Recommended Display Frame Rate	0008,2144	IS		3	ANAP	CONFIG	Set to mpegToDicomFramesPerSecond.

Table 35: Multi-frame Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Number of Frames	0028,0008	IS		1	ALWAYS	AUTO	If the resulting size of the DICOM file would exceed the configured mpegToDicomFileSizeMaxMB, based upon computed frame size and the configured mpegToDicomFramesPerSecond and mpegToDicomMaxSeconds, then the Number of Frames will be reduced.
Frame Increment Pointer	0028,0009	AT	0018,1063 if MPEG	1	ALWAYS	FIXED	If MPEG, then points to Frame Time attribute. If PDF, then populated with page number vector.

Table 36: SC Multi-frame Image Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Burned In Annotation	0028,0301	CS	NO	1	ALWAYS	FIXED	Indicates whether or not image contains sufficient burned in annotation to identify the patient and date the image was acquired.

Table 37: SC Multi-frame Vector Module

This mandatory module will be empty since the Frame Increment Pointer (0028,0009) points to Frame Time, and not to any Frame Vectors that are capture in this module.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
n/a							

Table 38: SOP Common Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Specific Character Set	0008,0005	CS	ISO_IR 100	1C	ALWAYS	FIXED	
Instance Creation Date	0008,0012	DA		3	ALWAYS	AUTO	Timestamp of the conversion to DICOM.
Instance Creation Time	0008,0013	TM		3	ALWAYS	AUTO	Timestamp of the conversion to DICOM.
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7.4	1	ALWAYS	FIXED	Multiframe True Color Secondary Capture Image Storage.
SOP Instance UID	0008,0018	UI		1	ALWAYS	AUTO	Concatenation of the Series UID and uploaded file ID (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958.2.123).

Table 39: Visit Status Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Patient's Institution Residence	0038,0400	LO	"Inpatient" or "Outpatient"	3	ANAP	IMPLICIT	Derived from API "mode" (IP or OP). If no mode is provided, then defaults to "Outpatient."

8.1.1.4. Video Photographic Image Storage IOD SOP Class

The Transfer Syntax UID utilized for this SOP class is always 1.2.840.10008.1.2.4.102 (i.e., "MPEG-4 AVC/H.264 High Profile / Level 4.1").

ImageMover can convert MPEG files to this class while preserving both the audio and video portions.

The configuration parameter "encapsulateMpeg" will determine if MPEG files are converted to this SOP class or to Multi-frame True Color Secondary Capture Image Storage. If set to true, then this class is created.

Table 40: IOD of Created Video Photographic Image Storage SOP Class Instances

Information Entity	Module	DICOM Usage	Presence Of Module
Patient	Patient	M	ALWAYS
	Clinical Trial Subject	U	NEVER
	Patient Identification	n/a	ALWAYS
Study	General Study	M	ALWAYS
	Patient Study	U	NEVER
	Clinical Trial Study	U	NEVER
	Imaging Service Request	n/a	ALWAYS
Series	General Series	M	ALWAYS
	Clinical Trial Series	U	NEVER
Equipment	General Equipment	M	ALWAYS
Image	General Image	M	ALWAYS
	Cine	M	ALWAYS
	Multi-frame	M	ALWAYS

	Image Pixel	M	ALWAYS
	Acquisition Context	M	ALWAYS
	Device	U	NEVER
	Specimen	C	NEVER
	VL Image	M	ALWAYS
	ICC Profile	U	NEVER
	SOP Common	M	ALWAYS
	Common Instance Reference	U	NEVER
	Frame Extraction	C	NEVER
Encapsulated Document	Encapsulated Document	n/a	ALWAYS
Visit	Visit Status	n/a	ALWAYS

Table 41: Patient Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Patient's Name	0010,0010	PN		2	ALWAYS	IMPLICIT	Via API "lastName," "firstName," and "middleName" parameters.
Patient ID	0010,0020	LO		2	ALWAYS	IMPLICIT	Via API parameter "externalId" (i.e., MRN).
Patient's Birth Date	0010,0030	DA		2	VNAP	IMPLICIT	Via API parameter "dateOfBirth."
Patient's Sex	0010,0040	CS	M, F, or O, or empty	2	VNAP	IMPLICIT	Via API parameter "gender."

Table 42: Patient Identification Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Issuer of Patient ID	0010,0021	LO		3	VNAP	IMPLICIT	Set to configured "issuerOfPatientID"

Table 43: General Study Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Study Date	0008,0020	DA		2	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session date.
Study Time	0008,0030	TM		2	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session time.
Accession Number	0008,0050	SH		2	ALWAYS	IMPLICIT, AUTO	Concatenation of configured "accessionNumberPrefix" and API provided "externalId" (e.g., IM139099876), or can be session ID.
Referring Physician Name	0008,0090	PN		2	VNAP	IMPLICIT	Via API "mdname."
Study Description	0008,1030	LO		3	ALWAYS	CONFIG	Set to the defaultVideoStudyDescription.
Physician Of Record	0008,1048	PN		3	VNAP	IMPLICIT	Via API "mdname."
Name Of Physician Reading Study	0008,1060	PN		3	VNAP	IMPLICIT	Via API "mdname."
Study Instance UID	0020,000D	UI		1	ALWAYS	AUTO, CONFIG	Concatenation of configured defaultDicomUIDBase and serverId and session timestamp (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958)

Table 44: Imaging Service Request Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Requesting Physician	0032,1032	PN		3	VNAP	IMPLICIT	Via API "mdname."

Table 45: General Series Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Series Date	0008,0021	DA		3	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session date.
Series Time	0008,0031	TM		3	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session time.
Modality	0008,0060	CS	VL	1	ALWAYS	FIXED	
Series Description	0008,103E	LO		3	ALWAYS	IMPLICIT, CONFIG	Body map seriesDescription or configured defaultVideoSeriesDescription.
Performing Physicians Name	0008,1050	PN		3	VNAP	IMPLICIT	Via API "mdname."
Operators' Name	0008,1070	PN		3	VNAP	IMPLICIT	Via API "op."
Body Part Examined	0018,0015	CS		3	VNAP	IMPLICIT	Body map bodyPartExamined.
Series Instance UID	0020,000E	UI		1	ALWAYS	AUTO	Concatenation of Study Instance UID and manifest ID (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958.2). If body mapping occurred, then the bodyPartId is also concatenated.
Series Number	0020,0011	IS		2	ALWAYS	IMPLICIT, AUTO	If body mapping occurred then bodyPartId else "1."
Laterality	0020,0060	CS	L or R or null	2C	VNAP	IMPLICIT	Derived from body mapping selection.

Table 46: General Equipment Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Manufacturer	0008,0070	LO	ImageMoverMD	2	ALWAYS	CONFIG	
Institution Name	0008,0080	LO		3	VNAP	CONFIG	Configured institutionName
Institutional Department Name	0008,1040	LO		3	VNAP	IMPLICIT	Via API "encDept" parameter.
Manufacturer's Model Name	0008,1090	LO	ImageMover	3	ALWAYS	CONFIG	
Software Version(s)	0018,1020	LO		3	ALWAYS	AUTO	

Table 47: General Image Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Image Type	0008,0008	CS	DERIVED\PRIMARY	3	ALWAYS	FIXED	
AcquisitionDate	0008,0022	DA		3	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.
Content Date	0008,0023	DA		2C	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.
AcquisitionTime	0008,0032	TM		3	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.
Content Time	0008,0033	TM		2C	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.
Instance Number	0020,0013	IS		2	ALWAYS	AUTO	Generated as sequential within a series, starting at 1.
Lossy Image Compression	0028,2110	CS	01	3	ALWAYS	AUTO	

Table 48: Cine Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Cine Rate	0018,0040	IS	25, 30, 50 or 60	3	ALWAYS	IMPLICIT	Number of frames per sec as specified in Table 8-5 of DICOM spec section "8.2 Native or Encapsulated Format Encoding".
Frame Time	0018,1063	DS	40.0, 33.33, 20.0, or 16.17	1C	ALWAYS	IMPLICIT	Nominal time (in msec) between each frame in accordance with Table 8-5 of DICOM spec section "8.2 Native or Encapsulated Format Encoding".

Table 49: Multi-frame Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Number of Frames	0028,0008	IS		1	ALWAYS	IMPLICIT	
Frame Increment Pointer	0028,0009	AT	0018,1063	1	ALWAYS	FIXED	

Table 50: Image Pixel Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Samples per Pixel	0028,0002	US	3	1	ALWAYS	FIXED	
Photometric Interpretation	0028,0004	CS	YBR_PARTIAL_420	1	ALWAYS	FIXED	
Planar Configuration	0028,0006	CS	0	1C	ALWAYS	FIXED	Indicates whether the pixel data are sent color-by-plane (1) or color-by-pixel (0). Required if Samples per Pixel has a value greater than 1.
Rows	0028,0010	US		1	ALWAYS	COPY	
Columns	0028,0011	US		1	ALWAYS	COPY	
Bits Allocated	0028,0100	US	8	1	ALWAYS	FIXED	
Bits Stored	0028,0101	US	8	1	ALWAYS	FIXED	
High Bit	0028,0102	US	7	1	ALWAYS	FIXED	
Pixel Representation	0028,0103	US	0	1	ALWAYS	FIXED	0000H = unsigned integer.
Pixel Data	7FE0,0010	OW		1	ALWAYS	COPY	

Table 51: Acquisition Context Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Acquisition Context Sequence	0040,0555	SQ		2	EMPTY	FIXED	A sequence of Items that describes the conditions present during the acquisition of the data of the SOP Instance. ImageMover creates a zero item sequence for compliance.

Table 52: VL Image Module

All tags required for this module are already satisfied by population of the General Image and Image Pixel modules. No additional tags specific to this module are utilized.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
n/a							

Table 53: SOP Common Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Specific Character Set	0008,0005	CS	ISO_IR 100	1C	ALWAYS	FIXED	
Instance Creation Date	0008,0012	DA		3	ALWAYS	AUTO	Timestamp of the conversion to DICOM.
Instance Creation Time	0008,0013	TM		3	ALWAYS	AUTO	Timestamp of the conversion to DICOM.
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.77.1.4.1	1	ALWAYS	FIXED	Video Photographic Image Storage
SOP Instance UID	0008,0018	UI		1	ALWAYS	AUTO	Concatenation of the Series UID and uploaded file ID (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958.2.123).

Table 54: Encapsulated Document Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
MIME Type of Encapsulated Document	0042,0012	LO	video/mp4	1	ALWAYS	FIXED	The type of the encapsulated document stream described using the MIME Media Type (see RFC 2046).

Table 55: Visit Status Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Patient's Institution Residence	0038,0400	LO	"Inpatient" or "Outpatient"	3	ALWAYS	IMPLICIT	Derived from API "mode" (IP or OP). If no mode is provided, then defaults to "Outpatient."

8.1.1.5. Encapsulated PDF Storage IOD SOP Class

The Transfer Syntax UID utilized for this SOP class is always 1.2.840.10008.1.2.1 (i.e., "Explicit VR Little Endian").

ImageMover can convert PDF files to this class.

The configuration parameter "rasterize" will determine if PDF files are converted to this SOP class or to Multi-frame True Color Secondary Capture Image Storage.

Table 56: IOD of Created Encapsulated PDF Storage SOP Class Instances

Information Entity	Module	DICOM Usage	Presence Of Module
Patient	Patient	M	ALWAYS
	Clinical Trial Subject	U	NEVER
	Patient Identification	n/a	ALWAYS
Study	General Study	M	ALWAYS
	Patient Study	U	NEVER
	Clinical Trial Study	U	NEVER
	Imaging Service Request	n/a	ALWAYS
Series	Encapsulated Document Series	M	ALWAYS

	Clinical Trial Series	U	NEVER
	General Series	n/a	ALWAYS
Equipment	General Equipment	M	ALWAYS
	SC Equipment	M	ALWAYS
Encapsulated Document	Encapsulated Document	M	ALWAYS
	SOP Common	M	ALWAYS
Visit	Visit Status	n/a	ALWAYS
Image	General Image	n/a	ALWAYS

Table 57: Patient Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Patient's Name	0010,0010	PN		2	ALWAYS	IMPLICIT	Via API "lastName," "firstName," and "middleName" parameters.
Patient ID	0010,0020	LO		2	ALWAYS	IMPLICIT	Via API parameter "externalId" (i.e., MRN).
Patient's Birth Date	0010,0030	DA		2	VNAP	IMPLICIT	Via API parameter "dateOfBirth."
Patient's Sex	0010,0040	CS	M, F, or O, or empty	2	VNAP	IMPLICIT	Via API parameter "gender."

Table 58: Patient Identification Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Issuer of Patient ID	0010,0021	LO		3	VNAP	IMPLICIT	Set to configured "issuerOfPatientID"

Table 59: General Study Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Study Date	0008,0020	DA		2	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session date.
Study Time	0008,0030	TM		2	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session time.
Accession Number	0008,0050	SH		2	ALWAYS	IMPLICIT, AUTO	Concatenation of configured "accessionNumberPrefix" and API provided "externalId" (e.g., IM139099876), or can be session ID.
Referring Physician Name	0008,0090	PN		2	VNAP	IMPLICIT	Via API "mdname."
Study Description	0008,1030	LO		3	ALWAYS	IMPLICIT, CONFIG	Value matched in dicomHL7Mappings table, or the configured defaultImageStudyDescription.
Physician Of Record	0008,1048	PN		3	VNAP	IMPLICIT	Via API "mdname."
Name Of Physician Reading Study	0008,1060	PN		3	VNAP	IMPLICIT	Via API "mdname."
Study Instance UID	0020,000D	UI		1	ALWAYS	AUTO, CONFIG	Concatenation of configured defaultDicomUIDBase and serverId and session timestamp (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958)

Table 60: Imaging Service Request Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note

Requesting Physician	0032,1032	PN		3	VNAP	IMPLICIT	Via API "mdname."

Table 61: Encapsulated Document Series Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Modality	0008,0060	CS	VL	1	ALWAYS	FIXED	
Series Instance UID	0020,000E	UI		1	ALWAYS	AUTO	Concatenation of Study Instance UID and manifest ID (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958.2). If body mapping occurred then the bodyPartId is also concatenated.
Series Number	0020,0011	IS		1	ALWAYS	IMPLICIT, AUTO	If body mapping occurred, then bodyPartId else "1."
Series Description	0008,103E	LO		3	ALWAYS	IMPLICIT, CONFIG	Body map seriesDescription or configured defaultImageSeriesDescription.

Table 62: General Series Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Series Date	0008,0021	DA		3	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session date.
Series Time	0008,0031	TM		3	ALWAYS	IMPLICIT, AUTO	Via API "clientDateCreated" or session time.
Modality	0008,0060	CS	VL	1	ALWAYS	FIXED	
Series Description	0008,103E	LO		3	ALWAYS	IMPLICIT, CONFIG	Body map seriesDescription or configured defaultImageSeriesDescription.
Performing Physicians Name	0008,1050	PN		3	VNAP	IMPLICIT	Via API "mdname."
Operators' Name	0008,1070	PN		3	VNAP	IMPLICIT	Via API "op."
Body Part Examined	0018,0015	CS		3	VNAP	IMPLICIT	Body map bodyPartExamined.
Series Instance UID	0020,000E	UI		1	ALWAYS	AUTO	Concatenation of Study Instance UID and manifest ID (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958.2). If body mapping occurred, then the bodyPartId is also concatenated.
Series Number	0020,0011	IS		2	ALWAYS	IMPLICIT, AUTO	If body mapping occurred then bodyPartId else "1."
Laterality	0020,0060	CS	L or R or null	2C	VNAP	IMPLICIT	Derived from body mapping selection.

Table 63: General Equipment Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Manufacturer	0008,0070	LO	ImageMoverMD	2	ALWAYS	CONFIG	
Institution Name	0008,0080	LO		3	VNAP	CONFIG	Configured institutionName
Institutional Department Name	0008,1040	LO		3	VNAP	IMPLICIT	Via API "encDept" parameter.
Manufacturer's Model Name	0008,1090	LO	ImageMover	3	ALWAYS	CONFIG	
Software Version(s)	0018,1020	LO		3	ALWAYS	AUTO	

Table 64: SC Equipment Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Conversion Type	0008,0064	CS	SI	1	ALWAYS	FIXED	SI = Scanned Image.

Table 65: Encapsulated Document Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Content Date	0008,0023	DA		2	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.
Content Time	0008,0033	TM		2	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.
Acquisition Datetime	0008,002A	DT		2	EMPTY	FIXED	Not populated.
Instance Number	0020,0013	IS		2	ALWAYS	AUTO	Generated as sequential within a series, starting at 1.
Burned In Annotation	0028,0301	CS	YES	1	ALWAYS	FIXED	Indicates whether or not the encapsulated document contains sufficient burned in annotation to identify the patient and date the data was acquired.
Document Title	0042,0010	ST		2	EMPTY		Not populated.
Encapsulated Document	0042,0011	OB		1	ALWAYS	COPY	Encapsulated Document stream, containing a document encoded according to the MIME Type.
MIME Type of Encapsulated Document	0042,0012	LO	application/pdf	1	ALWAYS	FIXED	The type of the encapsulated document stream described using the MIME Media Type (see RFC 2046).
Concept Name Code Sequence	0040,A043	SQ		2	EMPTY		A coded representation of the document title. Zero items will be included into this sequence.

Table 66: SOP Common Module

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Specific Character Set	0008,0005	CS	ISO_IR 100	1C	ALWAYS	FIXED	
Instance Creation Date	0008,0012	DA		3	ALWAYS	AUTO	Timestamp of the conversion to DICOM.
Instance Creation Time	0008,0013	TM		3	ALWAYS	AUTO	Timestamp of the conversion to DICOM.
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.104.1	1	ALWAYS	FIXED	Encapsulated PDF Storage.
SOP Instance UID	0008,0018	UI		1	ALWAYS	AUTO	Concatenation of the Series UID and uploaded file ID (e.g., 1.2.826.0.1.3680043.9.3574.1.2.17091958.2.123).

Table 67: Visit Status Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Patient's Institution Residence	0038,0400	LO	"Inpatient" or "Outpatient"	3	ANAP	IMPLICIT	Derived from API "mode" (IP or OP). If no mode is provided, then defaults to "Outpatient."

Table 68: General Image Module

This module is not required as part of this IOD, but is populated nonetheless for completeness and for compatibility with other systems.

Attribute Name	Tag	VR	Value	Type	Presence of Value	Source	Note
Image Type	0008,0008	CS	ORIGINAL\PRIMARY	3	ALWAYS	AUTO	
AcquisitionDate	0008,0022	DA		3	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.
Content Date	0008,0023	DA		2C	ALWAYS	AUTO, IMPLICIT	Exif date of the uploaded image, if available. Else API "clientDateCreated" date. Else Study Date.
AcquisitionTime	0008,0032	TM		3	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.
Content Time	0008,0033	TM		2C	ALWAYS	AUTO, IMPLICIT	Exif time of the uploaded image, if available. Else API "clientDateCreated" time. Else Study Time.

Instance Number	0020,0013	IS		2	ALWAYS	AUTO	Generated as sequential within a series, starting at 1.
Lossy Image Compression	0028,2110	CS	00	3	ALWAYS	AUTO	

8.1.2. Usage of Attributes from received IOD's

ImageMover can import and send DICOM files as-is, or can coerce some attributes. Either way, there are several DICOM file attributes that will be modified as indicated below due to the sending process. They are:

- ImplementationClassUID: 1.2.40.0.13.1.1
- ImplementationVersionName: dcm4che-1.4.35
- TransferSyntaxUID: 1.2.840.10008.1.2.1

8.1.3. Attribute Mapping

Not applicable.

8.1.4. Coerced/Modified Fields

ImageMover provides the option to coerce, with API-provided values, the following patient demographics fields of uploaded DICOM files.

Table 36: Coerced Fields

Module Name	Attribute Name	Tag	VR	Value
Patient	Patient's Name	0010,0010	PN	API "lastName," "firstName," and "middleName" parameters.
	Patient ID	0010,0020	LO	API parameter "externalId" (i.e., MRN).
	Patient's Birth Date	0010,0030	DA	API parameter "dateOfBirth."
	Patient's Sex	0010,0040	CS	API parameter "gender."
General Study	Accession Number	0008,0050	SH	API provided "externalId" (e.g., IM139099876) concatenated with the configured "accessionNumberPrefix".

Upon coercion of the above fields, a couple of previous values will be preserved into the following DICOM file fields.

Table 36: Preserved Values

Module Name	Attribute Name	Tag	VR	Value
Patient	Other Patient Names	0010,1001	PN	Patient's Name (0010,0010) before coercion.
	Other Patient IDs	0010,1000	LO	Patient ID (0010,0020) before coercion.

Via the logDicomPatientDataCoercionDetails configuration parameter, the details of all the coercion fields (values before and after) can also be logged. This parameter is normally set to "false" since it logs PHI.

Note that the coercion will not affect the Instance Creation date, time, or UID of the original DICOM file.

8.2. Data Dictionary of Private Attributes

Not applicable.

8.3. Coded Terminology and Templates

Not applicable.

8.3.1. Context Groups

Not applicable.

8.3.2. Template Specifications

Not applicable.

8.3.3. Private code definitions

Not applicable.

8.4. Grayscale Image consistency

Not applicable.

8.5. Standard Extended/Specialized/Private SOPs

Not applicable.

8.6. Private Transfer Syntaxes

Not applicable.