Evolution4K / 4Klear DICOM Conformance Statement

Overview

This document provides the details of the DICOM conformance statement for the Med X Change Evolution4K and 4Klear. This document is structured as suggested in the DICOM Standard (PS 3.2, 2011)

Table: Network Services

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Secondary Capture Image Storage	Yes	No
Multi-frame Secondary Capture Image Storage	Yes	No
Video Endoscopic Image Store	Yes	No
Video Photographic Image Storage	Yes	No
VL Endoscopic Image Storage	Yes	No
Workflow		
Modality Worklist Information Model - FIND	Yes	No
Other		
Verification	Yes	No

Introduction

This document specifies the DICOM conformance statement of Med X Change Evolution4K and 4Klear products providing acquisition, study documentation, and archive capabilities.

Scope

This document applies to Med X Change Evolution4K and 4Klear products with software version 1.6.2 and higher

Audience

This document is intended for hospital staff, health system integrators, software designers, and implementers of Med X Change Evolution4K and 4Klear products. It is assumed that the reader has a working understanding of DICOM.

How to Use This Document

This statement consists of 5 important features that one should compare with other devices to determine connectivity:

1. **Implementation Model**: The Implementation model describes the functional relationship between the device, the so-called “real-world activities” which initiate a certain DICOM functionality, and the DICOM services. A DICOM service is implemented on a device by a software process, which is called an “Application Entity” (AE). Each AE has a unique name

called the AE Title, which is used to identify it to other AE's. The AE Title is configurable to avoid two devices with the same name on a network. The "bubble diagram" (Application Data Flow Diagram) shows the interaction of the AE with the outside world across the dashed line, i.e. the DICOM interface. The "sequencing of real world activities" describes the interaction using a timescale, i.e. showing the sequence of events.

2. **AE Specifications**: Each AE supports one or more Service-Object-Pair (SOP) classes, which define the basic functionality. A SOP class consists of a combination of an Object or Information model with specific DICOM services. An example of such a SOP class is the VL Image Storage class, which consists of the combination of the DICOM C_STORE command with the VL Image object. Each of these classes is uniquely identified by a unique identification number (UID), which is issued by the NEMA. In addition, the "role" of the AE is specified, i.e. User or Provider, which can be compared with acting as a Client or Server. In DICOM terms, this is called a Service Class User (SCU) or Service Class Provider (SCP). To interconnect with another device, the SOP classes as well as their role (SCU or SCP) have to be matched, i.e. a SCU has to match a SCP at another device with an identical SOP class. Make sure to compare the SOP Class UID itself, not the description because there are SOP classes which have the same name, but support a different (newer) Object, which is identified by a different SOP Class UID.

3. **Presentation Context**: Each SOP class supports a particular presentation context, which is the combination of the SOP class as specified in AE Specifications and the Transfer Syntax. The Transfer Syntax defines the encoding of the DICOM basic elements, i.e. its attributes and how the data is represented e.g. with a data type definition. The encoding of the data type as part of the message, or value representation (VR), can be done in two ways - implicitly or explicitly. If a device supports explicit VR transfer syntax, it means that the transmitted data will include the VR information along with data and attribute tags. Implicit VR means that the VR information will not be included, and the receiving application must determine the VR type from the Attribute tag. For example, when receiving the Attribute "Patient Name" in explicit transfer syntax, there is an additional "Person Name" ("PN") field to identify the Value Representation. In the case of an implicit VR, this is assumed to be known by the receiver and not explicitly specified that this field has a type of "Person Name". Lastly, compression can be applied, such as JPEG, which is specified in the transfer syntax. The Transfer syntax of two devices has to match in order for them to communicate.

4. **Communication Profiles**: This section specifies the communication options. In practice, each device always supports application level interface to the OSI level 4 (Transport layer), i.e. TCP/IP stack. However, the physical media of two devices have to match for connectivity. Note that matching physical media can be achieved by standard off the shelf devices. For example, if one device supports standard Ethernet 100BaseT, it can be bridged to a Gigabit Ethernet, or whatever is supported.

5. **Supported Attributes**: Many devices specify which DICOM attributes they require and/or store in their internal database. It is important to compare these against the source of the information, particularly if a device requires certain attributes to accomplish specific functionality such as 3-D viewing, image processing, etc. A mismatch could have the effect that certain functionality or applications might fail.

Warning Regarding Connectivity

The DICOM conformance statement provides a knowledgeable user with the information required in determining whether and to what extent independent DICOM implementations may be able to interoperate. However, the information contained in a DICOM conformance statement is not sufficient to ensure independent implementations will, in fact, be able to interoperate. The user or system integrator must be aware of the following potential issues related to interoperability:

- Using only the information provided by this conformance statement does not guarantee interoperability of Med X Change equipment with non-Med X Change equipment. It is the user's (or system integrator's) responsibility to analyze thoroughly the application requirements and objectives to determine if they can be met by the connection of Med X Change equipment to nonMed X Change equipment.

- Med X Change equipment has been tested to assure that the actual implementation of the DICOM interface corresponds with this conformance statement. It is the responsibility of the user (or system integrator) to specify and carry out additional validation testing, which covers a

broad spectrum of potential interactions between the independent implementations.

- Med X Change reserves the right to make changes to its products or to discontinue their delivery. Therefore, the user (or system integrator) should ensure that any future versions of Med X Change or non-Med X Change equipment are regression tested to verify that new software releases have not adversely impacted the ability to interoperate.

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Definitions, Terms, and Abbreviations

Definitions, terms, and abbreviations used in this document are defined within the different parts of the DICOM standard. Abbreviations and terms are as follows:

AE DICOM Application Entity

AET Application Entity Title

ELE Explicit Little Endian

ILE Implicit Little Endian

EBE Explicit Big Endian

IBE Implicit Big Endian

IOD (DICOM) Information Object Definition

IM Information Model

ISO International Organization for Standardization

O Optional Key Attribute

PDU DICOM Protocol Data Unit

R Required Key Attribute

SC Secondary Capture

SCP DICOM Service Class Provider (DICOM server)

SCU DICOM Service Class User (DICOM client)

SOP DICOM Service-Object Pair

U Unique Key Attribute

VL Visible Light

References

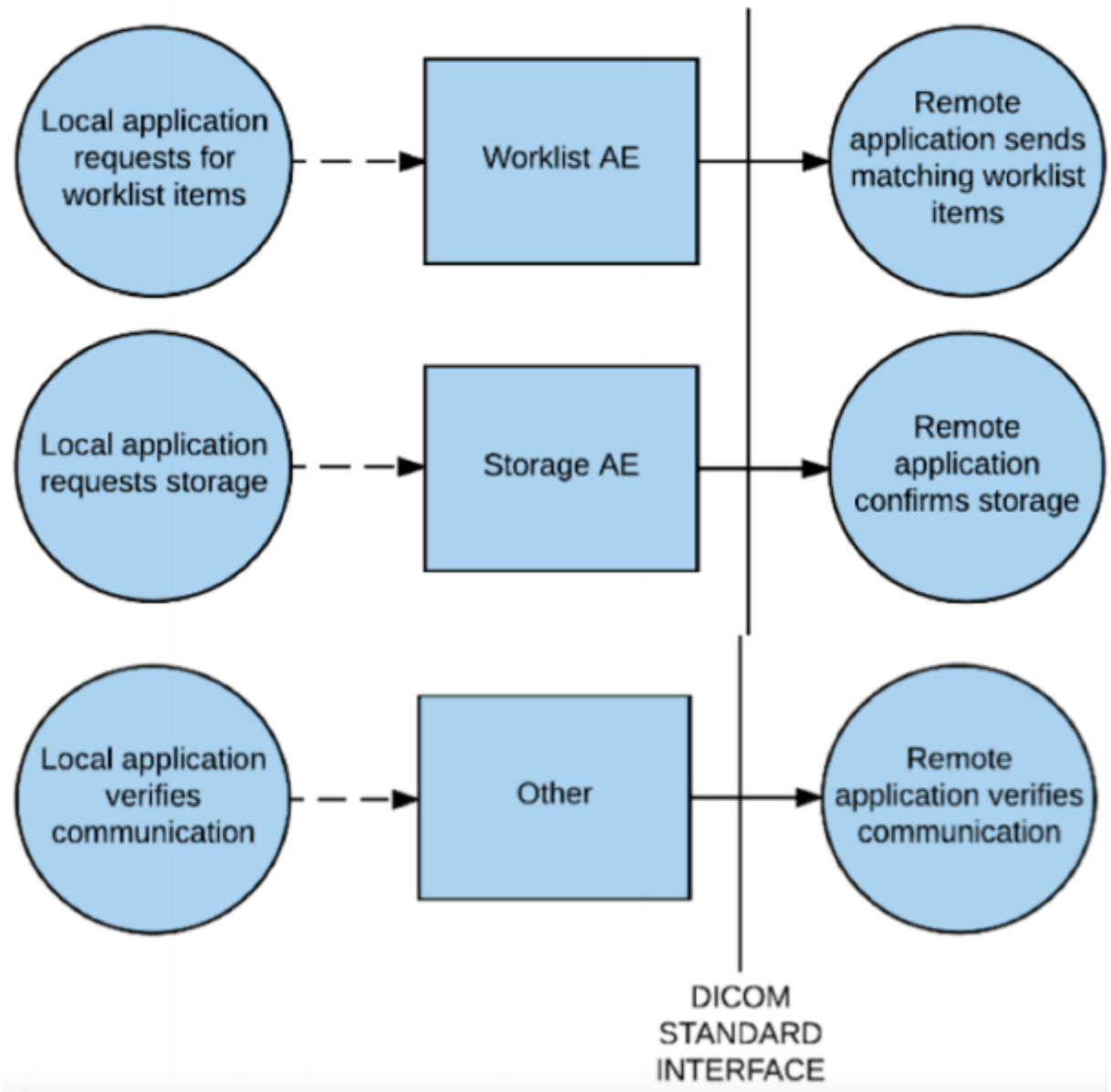
[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2011

Networking

Implementation Model

Application Data Flow

Figure 1 Application Data Flow



Evolution4K / 4Klear exports images using DICOM Store Service. The following AE's describe the DICOM implementation of the Evolution4K / 4Klear:

- The Worklist AE queries an external workflow management system for work items to be performed on the Evolution4K / 4Klear.
- The Storage AE is responsible for storing the information created by the system (image) to other applications either automatically or upon operator commands.

Functional Definition of AE's

Worklist AE

The Worklist AE acts as an SCU of the Basic Worklist Management Service Class. On user action, a query is performed to an external worklist manager and a set of worklist items matching the query is received. The received data is displayed on the user interface. A worklist item is selected for examination by the user and all the data for that item along with the captures images is stored in the local database within the Evolution4K / 4Klear.

Storage AE

The Storage AE is responsible for receiving images and video from the Evolution4K / 4Klear via DICOM Store. DICOM Instances are sent to the external application using DICOM Storage Service.

Other AE

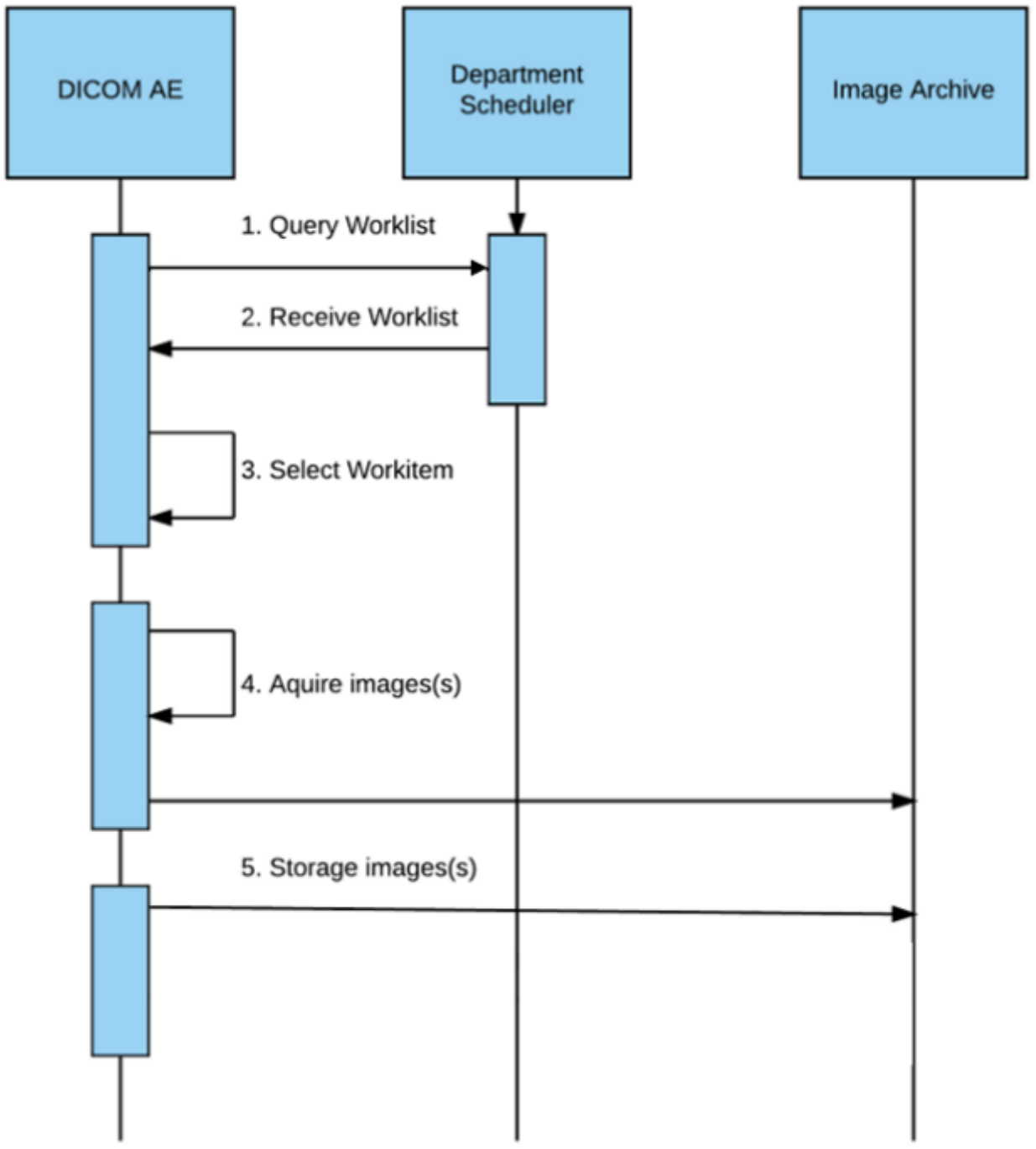
The device also supports sending C-ECHO to endpoints for testing communication between AEs.

Sequencing of Real Work Activities

A typical sequence is as follows:

Figure 2 Sequence of Real World Activities

Sequence of Real World Activities



1. A Worklist query is initiated manually by a user.
2. The worklist is received. Patient demographics and order information is stored in the local database and displayed to the user upon request.
3. For unscheduled exams, the patient information will be entered manually; otherwise the work item (worklist entry) will be selected.
4. Still images and videos are acquired.
5. The acquired data is sent to a DICOM destination automatically or initiated by the user

AE Specifications

Workflow AE Specifications

SOP Classes

This AE provies standard conformance to the following SOP Classes

Table: SOP Classes for Worklist AE

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Query	1.2.840.10008.5.1.4.31	Yes	No

Association Policies

General

The DICOM standard application context name for DICOM 3.0 is always proposed.

Table: General DICOM for Worklist AE

Application Context Name	Maximum PDU Size Proposed
1.2.840.10008.3.1.1.1	131072

Number of Associations

Table: Number of Associations

Maximum number of simultaneous associations
1

The Workflow AE initiates association with an external AE in response to a user action in the application GUI.

Asynchronous Nature

The Workflow AE does not support multiple outstanding transactions

Implementation Identifying Information

Table: DICOM Implementation Class and Version for Worklist AE

Implementation Class UID	Implementation Version Name
1.2.276.0.7230010.3.0.3.6.4	OFFIS_DCMTK_3.6.4

Association Initiation Policies

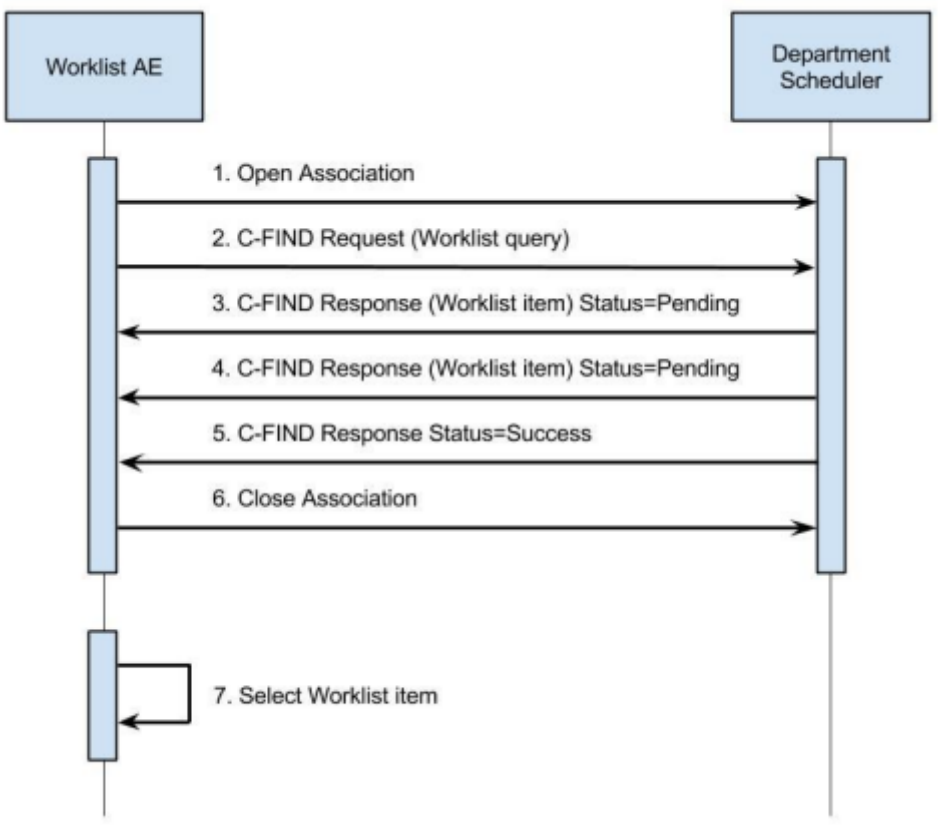
Activity: Query Worklist

Description and Sequence of Events

The worklist query is initiated automatically when the user visits the search MWL page and can also be initiated with filters applied. A search dialog is present on the GUI for entering the data as search criteria. When the query is initiated on user request, the data from the dialog will be inserted as matching keys into the query. On initiation of a request, Evolution4K / 4Klear will build an identifier for the C-FIND request; this will initiate an association to send the request and will wait for worklist responses. After retrieval of all responses, the application will access the internal worklist queue to display all the responses on the GUI and allow the user to select a specific patient/study for examination. All worklist records retrieved will be displayed. The Evolution4K / 4Klear will initiate an association to issue a C-FIND request according to the Modality Worklist Information Model.

Figure 3 Sequence of Events: Worklist Query

Sequence of Events: Worklist Query



A possible sequence of interactions between the Worklist AE and the Departmental Scheduler (e.g. a device such as a RIS or HIS which supports the Modality Worklist SOP Class as an SCP) is illustrated in the figure above:

1. The Worklist AE opens an association with the Departmental Scheduler.
2. The Worklist AE sends a C-FIND request to the Departmental Scheduler containing the Worklist query attributes.

3. The Departmental Scheduler returns a C-FIND response containing the requested attributes of the first matching worklist item.
4. The Departmental Scheduler returns another C-FIND response contained the requested attributes of the second matching worklist item.
5. The Departmental Scheduler returns a final C-FIND response with Success status indicating that no further matching worklist items exist.
6. (This example assumes only 2 worklist items match the requested query).
7. The Worklist AE closes the association with the Departmental Scheduler.
8. The user selects a worklist item from the received responses to add to the local worklist and prepares to acquire new images for the selected item.

Proposed Presentation Contexts

The Evolution4K / 4Klear will propose Presentation Contexts as shown in the following table:

Table: Proposed Presentation Contexts for Activity Query Worklist

Abstract Syntax Name (UID)	Transfer Syntax	Role	Ext Neg.
Modality Worklist Information Model - Find (1.2.840.10008.5.1.4.31)	ELE (1.2.840.10008.1.2.1)	SCU	None
Modality Worklist Information Model - Find (1.2.840.10008.5.1.4.31)	EBE (1.2.840.10008.1.2.2)	SCU	None
Modality Worklist Information Model - Find (1.2.840.10008.5.1.4.31)	ILE (1.2.840.10008.1.2)	SCU	None

SOP Specific Conformance Statement for MWL SOP Class

The attributes listed below are sent with the Modality Worklist Query. In the following table, an S in the M (Matching) column means single value matching, W means wild card matching, and R means Range matching. An X in the Q (Query) column indicates a matching key that the user can interactively set. An X in the D (Display) column means that item is displayed in the Evolution4K / 4Klear worklist, and an X in the IOD (Information Object Definition) column indicates the value that is returned in the response is used in the image instances created by the Evolution4K / 4Klear for that procedure.

Table: Worklist Request Identifier

Attribute Name	Tag	VR	M	Q	D	IOD
Scheduled Procedure Step						
Scheduled Procedure Step Sequence	(0040,0100)	SQ				
Modality	(0008, 0060)	CS	S	X	X	X
Scheduled Procedure Step Start Date	(0040, 0002)	DA	R	X	X	X
Scheduled Procedure Step Start Time	(0040, 0003)	TM			X	X
Scheduled Station AE Title	(0040, 0001)	CS	S	X		X
Scheduled Station Name	(0040, 0010)	SH			X	X
Scheduled Performing Physician Name	(0040, 0006)	PN	S	X	X	X
Requested Procedure						
Study Instance UID	(0020, 000D)	UI				X
Requested Procedure ID	(0040, 1001)	SH			X	X

Attribute Name	Tag	VR	M	Q	D	IOD
Requested Procedure Description	(0032, 1060)	LO			X	X
Image Service Request						
Accession Number	(0008, 0050)	SH	S	X		X
Referring Physician Name	(0008, 0090)	PN			X	X
Admission ID	(0038, 0010)	LO	S	X	X	X
Patient Identification						
Patient Name	(0010, 0010)	PN			X	X
Patient ID	(0010, 0020)	LO	S	X	X	X
Patient Demographic						
Patient Birth Date	(0010, 0030)	DA			X	X
Patient Sex	(0010, 0040)	CS			X	X

The response behavior is described as below

Table: MWL C-Find Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The SCP has completed the matches. Worklist items are available for display or further processing.
Refused	Out of Resources	A700	The Association is released and the worklist query is marked as failed. The status meaning will be logged. Any additional error information in the Response will be logged.
Failed	Identifier does not match SOP Class	A900	The Association is released and the worklist query is marked as failed. The status meaning is logged. Any additional error information in the Response will be logged.
Failed	Unable to Process	C000 – CFFF	The Association is released and the worklist query is marked as failed. The status meaning is logged. Any additional error information in the Response will be logged.
Pending	Matches are continuing	FF00	The worklist item contained in the Identifier is collected for further processing.
Pending	Matches are continuing Warning that one or more Optional Keys were not supported	FF01	The worklist item contained in the Identifier is collected for later display or further processing. The status meaning is logged only once for each C-FIND operation.

Service Status	Further Meaning	Error Code	Behavior
*	*	Any other status	The Association is released and the worklist is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.

The behavior of the Workflow AE during communication failure is summarized in the table below.

Table: MWL Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the worklist query marked as failed. The reason is logged and reported to the user if an interactive query
Association aborted by the SCP or network layers	The worklist query is marked as failed. The reason is logged and reported to the user if an interactive query.

Storage AE Specifications

SOP Classes

This AE provides standard conformance to the following SOP classes.

Table: SOP Classes for Storage AE

SOP Class Name	SOP Class UID	SCU	SCP
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No
Multi-frame True Color SC Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	No
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	No

Association Policies

General

The DICOM standard application context name for DICOM 3.0 is always proposed.

Table: SOP Classes for Storage AE

Application Context Name	Maximum PDU Size Proposed
1.2.840.10008.3.1.1.1	131072

Number of Associations

Table: Number of Associations

Maximum number of simultaneous associations
1

Asynchronous Nature

The Storage AE does not support asynchronous communication (multiple outstanding transactions over a single association).

Implementation Identifying Information

Table: DICOM Implementation Class and Version for Storage AE

Implementation Class UID	Implementation Version Name
1.2.276.0.7230010.3.0.3.6.4	OFFIS_DCMTK_3.6.4

Association Initiation Policies

Activity - Send Images

Description and Sequencing of Events

This activity is performed when the device is initiating an image or video transfer.

The user can select a patient case or individual media items and request it / them to be sent to the configured destination. Each request is forwarded to a job queue and processed individually.

The Auto Store option allows the user to automatically send a patient case to a pre-configured destination without user interaction. The option to enable or disable the Auto Store feature is configurable by admins from the GUI. When Auto Store option is enabled, the captured patient cases get automatically marked for storage. Each marked instance or marked set of instances stored in the database will be forwarded to the network job queue for a pre-configured target destination. The Auto Store option is triggered when the user closes the opened patient case. When the Auto Store feature is disabled, the user can manually send the patient cases to the destination from the review screen.

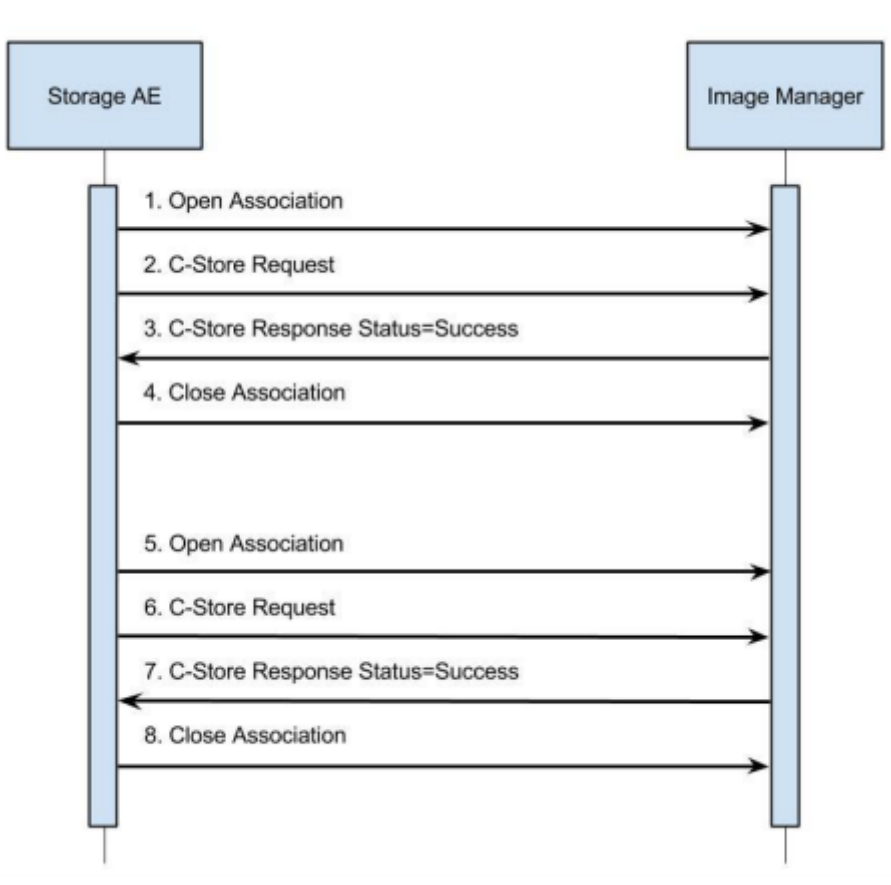
The Storage AE is invoked by the job control interface that is responsible for processing network storage tasks. The job consists of data describing the instances marked for storage, and the destination to which the instances will be sent. The Storage AE attempts to initiate a new association to issue a C-STORE request. If the Storage AE successfully establishes an association with a remote AE, it will transfer the image corresponding to the marked patient case via the open association. If the patient case consists of multiple images or videos, then each of the media items will be transferred over a new association.

If the C-STORE response from the remote application contains a status other than Success or Warning, then the association is released and the related job is switched to a failed state.

The converted DICOM images are converted directly before each association is completed, and are deleted upon closing the association (success or failure).

Figure 4 Sequence of Events: Store Request

Sequence of Events: Worklist Query



A possible sequence of interactions between the Storage AE and an Image Manager (e.g. a storage device supporting the Storage SOP Class as an SCP) is illustrated in Figure 4.

1. The Storage AE opens an association with the Image Manager.
2. An acquired image is transmitted to the Image Manager using a C-STORE request.
3. The Image Manager replies with a C-STORE response (status success).
4. The Storage AE closes the association with the Image Manager.
5. The Storage AE opens a new association with the Image Manager.
6. Another acquired image is transmitted to the Image Manager using a C-STORE request.
7. The Image Manager replies with a C-STORE response (status success).
8. The Storage AE closes the association with the Image Manager.

Proposed Presentation Contexts

Table: DICOM Implementation Class and Version for Storage AE

Abstract Syntax	Transfer Syntax	Role	Ext Neg.
SC 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
SC Image Storage (1.2.840.10008.5.1.4.1.1.7)	JPEG Process 1 Lossy (1.2.840.10008.1.2.4.70)	SCU	None
SC Image Storage (1.2.840.10008.5.1.4.1.1.7)	Explicit VR Little Endian (1.2.840.10008.1.2.1)	SCU	None
SC Image Storage (1.2.840.10008.5.1.4.1.1.7)	Implicit VR Endian (1.2.840.10008.1.2)	SCU	None
VL Endoscopic Image Storage (1.2.840.10008.5.1.4.1.1.77.1.1)	JPEG Baseline Process 1 (1.2.840.10008.1.2.4.50)	SCU	None
VL Endoscopic Image Storage (1.2.840.10008.5.1.4.1.1.77.1.1)	JPEG Process 1 Lossy (1.2.840.10008.1.2.4.70)	SCU	None
VL Endoscopic Image Storage (1.2.840.10008.5.1.4.1.1.77.1.1)	Explicit VR Little Endian (1.2.840.10008.1.2.1)	SCU	None
VL Endoscopic Image Storage (1.2.840.10008.5.1.4.1.1.77.1.1)	Implicit VR Endian (1.2.840.10008.1.2)	SCU	None
Multi-frame True Color SC Image Storage (1.2.840.10008.5.1.4.1.1.7.4)	MPEG4 (1.2.840.10008.1.2.4.103)	SCU	None
Video Endoscopic Image Storage (1.2.840.10008.5.1.4.1.1.77.1.1.1)	MPEG4 (1.2.840.10008.1.2.4.103)	SCU	None
Video Photographic Image Storage (.2.840.10008.5.1.4.1.1.77.1.4.1)	MPEG4 (1.2.840.10008.1.2.4.103)	SCU	None

SOP Specific Conformance for Storage SOP Classes

The Storage AE maintains a job queue for C-STORE commands. If some of the C-STORE commands in a job fail, then the job will need to be sent manually. Failed or successful jobs will never retry.

Table: C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Storage is complete	0000	The SCP has successfully stored the SOP instance. If all SOP Instances in a send job have status success then the job is marked as completed in the queue and the media item is marked as stored in the application.
Refused	Out of Resources	A700-A7FF	The Association is released and the send job is marked as failed. The status meaning and an error code is logged in the log file and the job failure is reported in the application logs.
Error	Data Set does not match SOP Class	A900-A9FF	The Association is released and the send job is marked as failed. The status meaning and an error code is logged in the log file and the job failure is reported in the application logs.
Error	Cannot Understand	C000-CFFF	The Association is released and the send job is marked as failed. The status meaning and an error code is logged in the log file and the job failure is reported in the application logs.
*	*	Any other status	The Association is released and the worklist is marked as failed. The status meaning and an error code is logged in the log file and the job failure is reported in the application logs.

Association Policies

General

The DICOM standard application context name for DICOM 3.0 is always proposed.

Implementation Identifying INformation

Implementation Class UID	Implementation Version Name
1.2.276.0.7230010.3.0.3.6.4	OFFIS_DCMTK_3.6.4

Association Initiation Policies

Proposed Presentation Contexts

Other AE

SOP Classes

This Other AE provides standard conformance to the following SOP classes.

Table: SOP Classes for Other AE

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

Number of Associations

Table: Number of Associations for verification AE

Maximum number of simultaneous associations
1

Asynchronous Nature

The Other AE does not support multiple outstanding transactions

Implementation Identifying Information

Table: DICOM Implementation Class and Version for Other AE

Implementation Class UID	Implementation Version Name
1.2.276.0.7230010.3.0.3.6.4	OFFIS_DCMTK_3.6.4

Association Initiation Policies

Activity: Verify Communications

Description and Sequence of Events

The Other AE sends DICOM verification requests when the user requests a test of validity of a DICOM connection through the GUI.

Proposed Presentation Contexts

The Evolution4K / 4Klear will propose Presentation Contexts as shown in the following table:

Table: Proposed Presentation Contexts for Activity Verify Communication

Abstract Syntax Name (UID)	Transfer Syntax	Role	Ext Neg.
Verification (1.2.840.10008)	ILE (1.2.840.10008.1.2)	SCU	None
Verification (1.2.840.10008)	ELE (1.2.840.10008.1.2.1)	SCU	None
Verification (1.2.840.10008)	EBE (1.2.840.10008.1.2.2)	SCU	None

SOP Specific Conformance – Verification SOP Class

The unit provides standard conformance to the Verification SOP Class as an SCU. If the C-ECHO request was successfully received by external verification SCP, a 0000 (Success) status code will be returned in the C-ECHO response. Otherwise, a C000 (Error – Cannot Understand) status code will be returned in the C-ECHO response.

Network Interfaces

Evolution4K / 4Klear uses TCP/IP as the underlying network implementation.

Configuration

The following items are configurable:

SCU parameters

- Calling AE Title
- Called AE Title
- IP Address
- Port
- Use TLS

Worklist parameters

- Worklist enabled Y/N
- Default Filters
    - Case date (Range)
    - Modality
    - Scheduled AE Title

Storage parameters

- Storage enabled Y/N
- Store Videos
- Auto Store
- Single Frame Mode
- Single Frame SOP
- Multi Frame SOP

Media Interchange

Evolution4K / 4Klear does not support media interchange.

Support of Character Sets

Evolution4K / 4Klear supports ISO-IR 192

Security

Security Profiles

Evolution4K / 4Klear can be configured to use secure DICOM communication in conformance with the Basic TLS Secure Transport Connection Profile. The Evolution4K / 4Klear may communicate using the following Cipher Suites:

- TLS1_TXT_RSA_WITH_AES_128_SHA
- SSL3_TXT_RSA_DES_192_CBC3_SHA

Application Level Security

The following security and privacy requirements are defined for Evolution4K / 4Klear: The GUI contains a login function, including a password, and only authorized users will be able to login to the system. Users may be either Admin users or Standard users. Standard users can only view / modify cases assigned to them, and Admins can view / modify all cases.

Annexures

IOD Contents

Module	Attribute	Tag	Value and/or length, range, and origin
Patient	Patient Name	(0010,0010)	From MWL or entered by user
Patient	Patient ID	(0010,0020)	From MWL or entered by user
Patient	Patient Sex	(0010,0040)	From MWL or entered by user; M, F, O or empty
Patient	Patient Birth Date	(0010,0030)	From MWL or entered by user
General Study	Study Instance UID	(0020,000D)	From MWL or automatically generated if not present from MWL; not visible on UI
General Study	Study Date	(0008,0020)	From MWL, entered by user, or automatically created when the study is created
General Study	Study Time	(0008,0030)	From MWL, entered by user, or automatically created when the study is created
General Study	Accession Number	(0008,0050)	From MWL or entered by user
General Study	Referring Physician's Name	(0008,0090)	From MWL or entered by the user
General Study	Admission ID	(0038,0010)	From MWL or entered by user

Module	Attribute	Tag	Value and/or length, range, and origin
General Study	Requested Procedure ID	(0040, 1001)	From MWL or entered by user
General Study	Requested Procedure Description	(0032, 1060)	From MWL or entered by user
General Series	Modality	(0008,0060)	From MWL or entered by the user
General Series	Series Instance UID	(0020,000E)	Automatically generated
General Series	Series Number	(0020,0011)	1
General Series	Performing Physician Name	(0008,1050)	From MWL or entered by the user
General Series	Code Value	(0008,0100)	NA (Tag only sent if SOP Class is VideoPhotographic)
General Series	Code Meaning	(0008,0104)	NA (Tag only sent if SOP Class is VideoPhotographic)
General Series	Coding Scheme Designator	(0008,0102)	DCM (Tag only sent if SOP Class is VideoPhotographic)
General Image	Instance Number	(0020,0013)	Auto generated
General Image	Lossy Image Compression	(0028,2110)	01
General Equipment	Conversion Type	(0008,0064)	WSD
General Equipment	Manufacturer	(0008,0070)	MedXChange
General Equipment	Manufacturer Model Name	(0008,1090)	MedXChange
General Equipment	Station Name	(0008,1010)	From MWL or entered by the user
General Equipment	Software Versions	(0018,1020)	The version of the Evolution4K / 4Klear
Image Pixel	Samples per Pixel	(0028,0002)	3
Image Pixel	Photometric Interpretation	(0028,0004)	From Media
Image Pixel	Planar Configuration	(0028,0006)	0

Module	Attribute	Tag	Value and/or length, range, and origin
Image Pixel	Rows	(0028,0010)	From Media
Image Pixel	Columns	(0028,0011)	From Media
Image Pixel	Bits Allocated	(0028,0100)	8
Image Pixel	Bits Stored	(0028,0101)	8
Image Pixel	High Bit	(0028,0102)	7
Image Pixel	Pixel Representation	(0028,0103)	0
Image Pixel	Pixel Data	(7FE0,0010)	From Media
SOP Common Module	SOP Class UID	(0008,0016)	Based on SOP Class
SOP Common Module	Burned In Annotation	(0028,0301)	NO (Tag only present if SOP Class is MultiframeTrueColorSC or VideoEndoscopic)
SOP Common Module	Number of Frames	(0028,0008)	1 (Tag only present if SOP Class is MultiframeTrueColorSC or VideoPhotographic)
SOP Common Module	FrameTime	(0018,1063)	From Media (Tag only present if SOP Class is VideoPhotographic)
SOP Common Module	Frame Increment Pointer	(0028,0009)	(0018,1063) (Tag only present if SOP Class is VideoPhotographic)
SOP Common Module	Conversion Type	(0028,0064)	SI (Tag only present if SOP Class is MultiframeTrueColorSC)
SOP Common Module	Image Laterality	(0020,0062)	U (Tag only present if SOP Class is MultiframeTrueColorSC or VideoPhotographic)
SOP Common Module	Image Type	(0008,0008)	ORIGINAL\SECONDARY (Tag only present if SOP Class is VideoEndoscopic or VideoPhotographic)
SOP Common Module	SOP Instance UID	(0008,0018)	Automatically generated

Module	Attribute	Tag	Value and/or length, range, and origin
SOP Common Module	Character Set	(0008,0005)	ISO_IR 192

Attribute Mapping

The relationships between attributes received via Modality Worklist and stored in acquired images are summarized in the table below.

Table: Attribute Mapping between Modality Worklist and Image IOD

Field	MWL Tag	Image Tag	Interface
Patient Name	(0010,0010)	(0010,0010)	Y
Patient ID	(0010,0020)	(0010,0020)	Y
Patient Sex	(0010,0040)	(0010,0040)	Y
Patient Birth Date	(0010,0030)	(0010,0030)	Y
Study Instance UID	(0020,000D)	(0020,000D)	N
Scheduled AE Title	(0040, 0001)	(0040, 0001)	N
Study Date	(0040,0002)	(0008,0020)	Y
Study Time	(0040,0003)	(0008,0030)	Y
Accession Number	(0008,0050)	(0008,0050)	Y
Referring Physician's Name	(0008,0090)	(0008,0090)	Y
Modality	(0008,0060)	(0008,0060)	Y
Performing Physician Name	(0040,0006)	(0008,1050)	Y
Station Name	(0040,0010)	(0008,1010)	Y
Admission ID	(0038,0010)	(0038,0010)	Y
Requested Procedure Id	(0040, 1001)	(0040, 1001)	Y
Requested Procedure Description	(0040, 1001)	(0040, 1001)	Y

History

Message	Author	Date	Commit
DICOM Conformance WIP	James Davila	6/10/2019 1:21 PM	4b6d7a9d
Copy form medxstorage dhf	James Davila	6/5/2019 2:21 PM	c03155ee

Source

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