



Med X Change DRSHD – Digital Recording System High Definition

DICOM Conformance

Statement Document Version:

U5001-38, 1.6

1.OVERVIEW

This document provides the DICOM Conformance Statement for the Digital Documentation System product (MED X CHANGE DRSHD).

Table 1- 1 Network Services

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
SC Image Storage	Yes	No
Multi-frame SC Image Storage	Yes	No
VL Endoscopic Image Storage	Yes	No
Video Endoscopic Image Storage	Yes	No
Workflow Management		
Modality Worklist	Yes	No
Storage Commit Push Model	Yes	No

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2. INTRODUCTION

2.1. General Information

This document specifies the DICOM conformance of the MED X CHANGE Digital Documentation System (DRSHD), which provides acquisition, study documentation and archive capabilities for endoscopic surgery applications.

2.2. Revision History

Revision	Date	Comment	Author
1.0	6/16/2008	Initial Release Version	Citius Tech
1.1	7/1/2009	MPEG2 Support	Citius Tech
1.2	7/8/2009	Modified worklist request identifier table for display attributes and multi-frame supported transfer syntax	Citius Tech
1.3	3/25/2010	Modified worklist request identifier table attributes to conformant with VA requirement	Citius Tech
1.4	12/30/2010	Removed Query/Retrieve functionality and also made changes related to DICOM and application functionality	Citius Tech
1.5	8/18/2011	Modified status code tables for storage, worklist and commitment modules	Citius Tech
1.6	1/28/2015	Added ability to disable Auto Send	Chris Trout

2.3. Audience

This document is intended for hospital IT personnel and users of MED X CHANGE DRSHD. It is assumed that the reader has a working understanding of DICOM.

2.4. Remarks

The intent of any DICOM conformance statement is to provide a knowledgeable user with the information required in determining whether and to what extent independent DICOM implementations may be able to inter-operate. However, the information contained in a DICOM conformance statement is not sufficient to ensure independent implementations will, in fact, be able to inter-operate.

The user or system integrator must be aware of the following potential issues related to inter-operation:

- Using only the information provided by this Conformance Statement does not guarantee interoperability of Med X Change equipment with non-Med X Change. 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 with non-Med 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 equipment with non-Med X Change equipment are regression tested to verify that new software releases have not adversely impacted the ability to inter-operate.

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3. 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
AE	DICOM Application Entity
AET	Application Entity Title
AET	Application Entity Title
ASCE	Association Control Service Element
EBE	Explicit Big Endian
ELE	Explicit Little Endian
ILE	Implicit Little Endian
IOD	(DICOM) Information Object Definition
IM	Information Model
ISO	International Standard Organization
JPG	JPEG Coding Process 1 (Lossy)
LJPG	JPEG Lossless, Non-Hierarchical, First-Order Prediction
MPEG2	MPEG2 Main Profile @ Main Level
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
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

3.1. References

- [DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2007
- DICOM Basics 2nd edition, OTech, ISBN

4.NETWORKING

4.1. Implementation Model

4.1.1. Application Data Flow

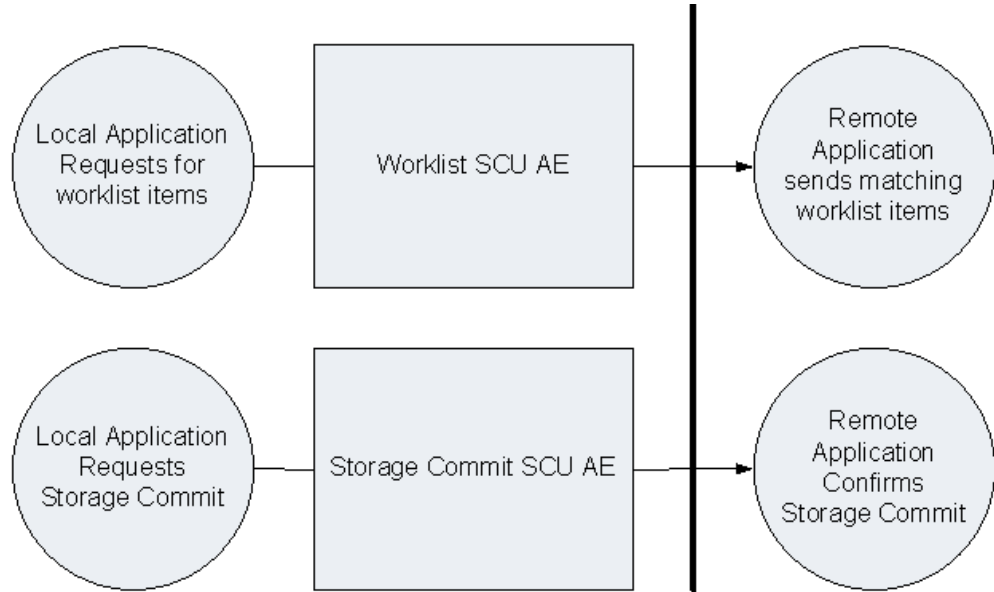


Figure 4.1.1 - 1: Implementation Model

The Med X Change DRSHD System exports Images and Video using DICOM Export Service. The following AE's describe the DICOM implementation of the MED X CHANGE DRSHD:

The Worklist Application Entity queries an external workflow management system for work items to be performed on the MED X CHANGE DRSHD.

The Storage Commitment Application Entity is responsible for transferring the ownership of the exported media to the receiving application before the images and/or other objects are permanently deleted from the local physical storage at the MED X CHANGE DRSHD.

4.1.2. Functional Definition of AE's

4.1.2.1. Worklist AE

The worklist AE is responsible to retrieve worklist items. Upon user action, a query is performed to an external worklist manager. The results are stored in the local database and are used for building the internal worklist queue.

4.1.2.2. Storage Commit AE

Users may enable the storage commit feature in the event the PACS requires storage commitment. There is no notification to the user regarding commitment. A storage commit is performed automatically when a 'case is closed'. The Storage Commit AE sends a Storage Commit Request to an external application in order to 'transfer the ownership' of the DICOM objects so it can be permanently deleted from the local physical storage device.

4.1.3. Sequencing of Real World Activities

A typical sequence is as follows:

1. A Worklist Query is initiated at launch of software or manually by a user
2. The worklist is received, patient demographics and order information is stored in the local database and displayed
3. For unscheduled exams, the patient information will be entered manually
4. Still images, and/or video segments are acquired
5. The acquired data is sent to a DICOM destination
6. Instances are stored on the external application.

4.2. AE Specifications

4.2.1. Export AE Specifications

4.2.1.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

Table 4.2.1.1 - 1
SOP Classes for Export AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Multiframe SC Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	No

4.2.1.2. Association Policies

4.2.1.2.1. General

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

Table 4.2.1.2.1 - 1
Maximum PDU Size Received as a SCP for STORAGE-SCP

Maximum PDU size proposed	16384
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4.2.1.2.2. Number of Associations

Table 4.2.1.2.2 - 1

Number of Associations as association acceptor for STORAGE-SCP

Maximum number of simultaneous associations	1
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4.2.1.2.3. Asynchronous Nature

The AE does not support multiple outstanding transactions.

4.2.1.2.4. Implementation Identifying Information

Table 4.2.1.2.4 - 1

DICOM Implementation Class and Version for STORAGE-SCP

Implementation Class UID	2.16.124.113543.6019.0.2.0.1
Implementation Version Name	MedXDRS-HD_1.0

4.2.1.3. Association Initiation Policies

4.2.1.3.1. Activity – Send Images

4.2.1.3.2. Description and Sequencing of Events

This activity is performed when the device is initiating the image transfer

4.2.1.3.3. Proposed Presentation Contexts

Table 4.2.1.3.3 – 1

Proposed Presentation Contexts for Activity Send Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg
Name	UID	Name	UID		
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1		
		JPG	1.2.840.10008.1.2.4.50		
		LJPG	1.2.840.10008.1.2.4.70		
Multiframe SC Image Storage	1.2.840.10008.5.1.4.1.1.7.4	MPEG2	1.2.840.10008.1.2.4.100	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1		
		JPG	1.2.840.10008.1.2.4.50		
		LJPG	1.2.840.10008.1.2.4.70		

Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	MPEG2	1.2.840.10008.1.2.4.100	SCU	None
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Transfer syntax rules:

- The device proposes different transfer syntaxes for single and multiframe images.
- For single frame images MED X CHANGE DRSHD proposes Implicit VR Little Endian, Explicit VR Little Endian, JPEG Coding Process 1 (Lossy) and JPEG Lossless, Non-Hierarchical, First-Order Prediction.
- For multiframe images, the device proposes MPEG2 Main Profile@Main Level... *Note: "Not all DICOM video players support this format. Please consult with your DICOM administrator to determine if this video format is supported. In all cases the video files sent to DICOM may be viewed with a compatible media player such as the VideoLAN - VLC media player."*
- If compression transfer syntax is accepted in addition to uncompressed transfer syntaxes, the images will be sent compressed. Whether lossy or lossless compression is proposed, is configurable, if both are accepted by a SCP, configured compression will be used.
- If both Implicit and Explicit VR are accepted, the device will use configured transfer syntax.

4.2.1.3.3.1.SOP Specific Conformance for Storage SOP Classes

The types of SOP classes that will be sent are determined according to destination AE title. Each destination may be defined by configuration so that either single-frame images or video loops or both will be sent. For example, if a study contains video loops but the destination is marked as accepting only single-frame images, then instances that hold video-loops will not be sent.

Table 4.2.1.3.3.1 - 1
C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Success	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 complete in the queue
Refused	Out of Resources	A700-A7FF	The Association is released. An status meaning is logged
Error	Data Set does not match SOP Class	A900-A9FF	The Association is released. The status meaning is logged,
Error	Cannot Understand	C000-CFFF	The Association is released. The status meaning is logged
Warning	Coercion of Data Elements	B000	Image transmission is considered successful but the status is logged.

Warning	Data Set does not match SOP Class	B007	Image transmission is considered successful but the status is logged.
Warning	Elements Discarded	B006	Image transmission is considered successful but the status is logged.
*	*	Any other status code.	The status meaning is logged.

The behavior of Export AE during communication failure is summarized in the Table below:

Table 4.2.1.3.3.1 - 2

Export AE Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT. The status is logged
Association aborted by the SCP or network layers	The Association is aborted using A-ABORT. The status meaning is logged

4.2.1.4. Association Acceptance Policy

4.2.1.4.1.1.SOP Specific Conformance for Verification SOP Class

The Export AE provides standard conformance to the Verification SOP Class as an SCU. If the C-ECHO request was successfully received, 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.

4.2.2.Workflow AE Specifications

4.2.2.1.SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

Table 4.2.2.1 - 1
SOP Classes for Workflow AE

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

4.2.2.2. Association Policies

4.2.2.2.1. General

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

Table 4.2.2.2 - 1
Maximum PDU Size for Workflow AE

Maximum PDU size proposed	16384
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4.2.2.2.2. Number of Associations

Table 4.2.2.2.2 - 1
Number of Associations as association initiator for Workflow AE

Maximum number of simultaneous associations	1
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The Workflow AE initiates association with an external AE in response to user action in the application GUI

4.2.2.2.3. Asynchronous Nature

The Workflow AE does not support multiple outstanding transactions.

4.2.2.2.4. Implementation Identifying Information

Table 4.2.2.2.4 - 1
DICOM Implementation Class and Version for STORAGE-SCP

Implementation Class UID	2.16.124.113543.6019.0.2.0.1
Implementation Version Name	MedXDRS-HD_1.0

4.2.2.3. Association Initiation Policies

4.2.2.3.1. Activity – Query Worklist

4.2.2.3.2. Description and Sequencing of Events

This activity is performed in response to a user action.

4.2.2.3.3. Proposed Presentation Contexts

Table 4.2.2.3.3 – 1
Proposed Presentation Contexts for Activity Query Worklist

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg
Name	UID	Name	UID		
Modality Worklist Information Model - Find	1.2.840.10008.5.1.4.31	ILE	1.2.840.10008.1.2	SCU	None

4.2.2.3.3.1.SOP Specific Conformance Statement for MWL SOP Class

The worklist query is initiated at the launch of the woftware or manually by the user. In the following table, an S in the M column means single value matching, W means wild card matching. An 'x's in the Q column indicates a matching key that the user can interactively set. An 'x's in the D column means display in the MED X CHANGE DRSHD worklist, and an 'x's in the IOD column indicates the value that is returned in the response is used in the image instances created by MED X CHANGE DRSHD for that procedure.

Table 4.2.2.3.3.1 -1
Worklist Request Identifier

Module Name Attribute Name	Tag	M	Q	D	IOD
Scheduled Procedure Step					
Scheduled Procedure Step Sequence	(0040,0100)				
> Scheduled Station AET	(0040,0001)	S		x	
> Scheduled Procedure Step Start Date	(0040,0002)	S		x	
> Scheduled Procedure Step Start Time	(0040,0003)				
> Modality	(0008,0060)	S		x	x
> Scheduled Procedure Step Description	(0040,0007)			x	
> Scheduled Station Name	(0040,0010)				x
> Scheduled Procedure Step Location	(0040,0011)				
> Scheduled Protocol Code Sequence	(0040,0008)				
Code Value >>	(0008,0100)				
>> Coding Scheme Version	(0008,0103)				
>> Coding Scheme Designator	(0008,0102)				
>> Code Meaning	(0008,0104)				
> Scheduled Procedure Step ID	(0040,0009)				

Requested Procedure Requested Procedure ID Requested Procedure Description Study Instance UID	(0040,1001) (0032,1060) (0020,000D)	S		x	x x x
Imaging Service Request Accession Number Referring Physician's Name Performing Physician's Name	(0008,0050) (0008,0090) (0008,1050)	S S		x x x	x x x
Visit Admission Admitting Diagnosis Description	(0008,1080)				
Patient Identification Patient Name Patient ID	(0010,0010) (0010,0020)	W/S S		x x	x x
Patient Demographic Patient Birth Date Patient Sex Patient Comments	(0010,0030) (0010,0040) (0010,4000)			x x	x x

Table 4.2.2.3.3.1 - 2
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 is reported to the user.
Failed	Identifier does not match SOP Class	A900	The Association is released and the worklist query is marked as failed. The status meaning is reported to the user if an interactive query.
Failed	Unable to Process	C000 –CFFF	The Association is released and the worklist query is marked as failed. The status meaning is reported to the user if an interactive query...

Cancel	Matching terminated due to Cancel request	FE00	If the query was cancelled due to too many worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is released and the worklist query is marked as failed. The status meaning is reported to the user if an interactive query.
Pending	Matches are continuing	FF00	The worklist item contained in the Identifier is collected for later display or 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.
*	*	Any other status	The Association is released and the worklist is marked as failed. The status meaning is reported to the user if an interactive query.

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

Table 4.2.2.3.3.1 - 3
Modality Worklist Communication Failure Behavior

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

4.2.3.Storage Commitment AE Specifications

4.2.3.1.SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

Table 4.2.3.1 - 1
SOP Classes for Workflow AE

SOP Class Name	SOP Class UID	SCU	SCP
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No

4.2.3.2. Association Policies

4.2.3.2.1. General

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

Table 4.2.3.2.1 - 1
Maximum PDU Size for Workflow AE

Maximum PDU size proposed	16384
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4.2.3.2.2. Number of Associations

The Storage Commit SCU AE initiates association with an external AE for the purpose of sending a commit request.

The Storage Commit SCU AE accepts associations for receiving storage commit results.

The device will either listen for the reply on the same Association or close the Association and wait for it at a separate Association. The SCU should therefore in the latter case be able to support Role Reversal (accept an Association). Whether or not the answer comes on a separate Association or on the same Association is configurable.

Table 4.2.3.2.2 - 1
Number of Associations as association initiator for Storage Commit AE

Maximum number of simultaneous associations	1
---	---

Table 4.2.3.2.2 - 2
Number of Associations as association acceptor for Storage Commit AE

Maximum number of simultaneous associations	1
---	---

4.2.3.2.3. Asynchronous Nature

The Workflow AE does not support multiple outstanding transactions.

4.2.3.2.4. Implementation Identifying Information

Table 4.2.3.2.4 - 1
DICOM Implementation Class and Version for Storage Commit AE

Implementation Class UID	2.16.124.113543.6019.0.2.0.1
Implementation Version Name	MedXDRS-HD_1.0

4.2.3.3. Association Initiation Policies

4.2.3.3.1. Activity – Commit request

4.2.3.3.1.1. Description and Sequencing of Events

This activity is performed upon closing the case at the device.

4.2.3.3.1.2. Proposed Presentation Contexts

Table 4.2.3.3.1.2 – 1
Proposed Presentation Contexts for Storage Commit

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg
Name	UID	Name	UID		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	ILE	1.2.840.10008.1.2	SCU	None

4.2.3.3.1.3.SOP Specific Conformance Storage Commit SOP Class

4.2.3.3.1.3.1.Storage Commitment Operations (N-ACTION)

The Storage Commit AE will consider Storage Commitment failed if no N-EVENT-REPORT is received for a Transaction UID after receiving a successful N-ACTION response

The behavior of Storage Commit AE when encountering status codes in an N-ACTION response is summarized in the Table below:

Table 4.2.3.4.1.2.1 - 1
Storage Commitment N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The request for storage comment is considered successfully sent.

*	*	Any other status code.	The Association is released and the request for storage comment is marked as failed. The status meaning is logged and reported to the user.
---	---	------------------------	---

The behavior of Storage Commit AE during communication failure is summarized in the Table below:

Table 4.2.3.4.1.2.1 - 2

Storage Commitment Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.
Association aborted by the SCP or network layers	The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.

4.2.3.3.1.3.2.Storage Commitment Notifications (N-EVENT-REPORT)

The Storage Commit AE is capable of receiving an N-EVENT-REPORT notification if it has successfully negotiated a Presentation Context for the Storage Commitment Push Model (i.e. only associations established with archive devices).

The behavior of Storage Commit AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below.

Table 4.2.3.4.1.2.2 - 1

Storage Commitment N-EVENT-REPORT Behavior

Event Type Name	Event Type ID	Behavior
Storage Commitment Request Successful	1	The Referenced SOP Instances under Referenced SOP Sequence (0008, 1199) are marked within the database as "Stored & Committed (SC)" to the value of Retrieve AE Title (0008, 0054).
Storage Commitment Request Complete – Failures Exist	2	The Referenced SOP Instances under Referenced SOP Sequence (0008,1199) are treated in the same way as in the success case (Event Type 1). The Referenced SOP Instances under Failed SOP Sequence (0008,1198) are marked within the database as "Store & Commit Failed (Sf)". The Failure Reasons are logged and the job failure is reported to the user via the job control application. A send job that failed storage commitment

		will not be automatically restarted but can be restarted by user interaction.
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4.2.3.4. Association Acceptance Policy

4.2.3.4.1. Activity – Receive Storage Commitment Response

4.2.3.4.2. Description and Sequencing of Activities

The Storage Commit AE will accept associations in order to receive responses to a Storage Commitment Request.

The Storage Commit AE may reject association attempts as shown in the Table below. The Result, Source and Reason/Diag columns represent the values returned in the appropriate fields of an ASSOCIATE-RJ PDU (see PS 3.8, Section 9.3.4). The contents of the Source column is abbreviated to save space and the meaning of the abbreviations are:

- a) 1 – DICOM UL service-user
- b) 2 – DICOM UL service-provider (ASCE related function)
- c) 3 – DICOM UL service-provider (Presentation related function)

Table 4.2.3.5.2 - 1
Association Rejection Reasons

Result	Source	Reason/Diag	Explanation
2 – rejected-transient	c	2 – local-limit-exceeded	The (configurable) maximum number of simultaneous associations has been reached. An association request with the same parameters may succeed at a later time.
2 – rejected-transient	c	1 – temporary-congestion	No associations can be accepted at this time due to the real-time requirements of higher priority activities (e.g. during image acquisition no associations will be accepted) or because insufficient resources are available (e.g. memory, processes, threads). An association request with the same parameters may succeed at a later time.
1 – rejected-permanent	a	2 – application-context-name-not-supported	The association request contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time.
1 – rejected-permanent	a	7 – called-AE-title-not-recognized	The association request contained an unrecognized Called AE Title. An association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the association initiator is incorrectly configured and attempts to address the association acceptor using the wrong AE Title.
1 – rejected-permanent	a	3 – calling-AE-title-not-recognized	The association request contained an unrecognized Calling AE Title. An association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the association acceptor has not been configured to recognize the AE Title of

			the association initiator.
1 – rejected-permanent	b	1 – no-reason-given	The association request could not be parsed. An association request with the same format will not succeed at a later time.

4.2.3.4.2.1. Accepted Presentation Contexts

The Storage Commit AE will accept Presentation Contexts as shown in the Table below.

Table 4.2.3.5.2.1 - 1
Acceptable Presentation Contexts for
Activity Receive Storage Commitment Response

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	ILE	1.2.840.10008.1.2	SCU	None

The Storage Commit AE will prefer to select the configured Transfer Syntax if multiple transfer syntaxes are offered. The Storage Commit AE will only accept the SCU role (which must be proposed via SCP/SCU Role Selection Negotiation) within a Presentation Context for the Storage Commitment Push Model SOP Class.

4.2.3.4.2.2. SOP Specific Conformance for Storage Commit SOP Class

4.2.3.4.2.2.1. Storage Commitment Notifications (N-EVENT-REPORT)

The behavior of Storage Commit AE when receiving Event Types within the N-EVENT-REPORT and the reasons for returning specific status codes in an N-EVENT-REPORT response are the same as if received on the identical Association (see previous chapter).

4.3.Network Interfaces

The Med X Change DRSHD uses TCP/IP as the underlying network implementation.

4.4.Configuration

The following items are configurable:

SCU parameters:

- Calling AETitle

Storage Commitment parameters:

- Enable Y/N
- AETitle
- Separate/Same Association
- SCP port

Worklist parameters:

- Worklist Y/N
- Peer IP address
- Port #
- AE Title

Destination settings:

For destination 1-4:

- IP address
- Port #
- AE Title
 - Auto store Enabled
 - Enable Notification

Proposed presentation context configuration:

- SOP Class
- Transfer syntax

4.4.1.AE Title/Presentation Address Mapping

4.4.1.1.Local AE Titles

User can configure the local AE title. It is configurable from UI and stored in the internal database.

4.4.1.2.Remote AE Titles

Only associations from AE titles configured in the configuration file will be accepted, providing some level of rudimentary security.

4.4.1.3.Filter by AE Titles

Only worklist items created for specified AE title will be loaded into the local database. This filter's value is automatically assigned to the specified SCU Calling AE title value in the MWL parameters with the ability to be altered by user.

4.4.1.4.Filter Worklist

Users can filter worklist items older than 30, 60, 90, or 120 days old and prevent them from being imported into the local database.

5.SUPPORT OF CHARACTER SETS

The Med X Change DRSHD supports ISO-IR 192 (UTF-8) but can be configured to provide ISO-IR 100 instead, in case there might be compatibility issues.

6.SECURITY

6.1.Security Profiles

Med X Change DRSHD does not support any DICOM security profile.

6.2.Association Level Security

Med X Change DRSHD provides association level security.

Only associations with a combination of AE title and host or IP address that are pre-configured in the application internal database will be accepted.

6.3.Application Level Security

The following security and privacy requirements are defined for the Med X Change DRSHD Planning Application Software: The Operating System contains a login function including a password, and only authorized users will be able to login to the system.

7.ANNEXES

7.1.IOD Contents

7.1.1.Secondary Capture IOD

Table 7.1.1
Secondary Capture IOD

Module	Attribute	Tag	Value and/or length, range, and origin
PATIENT	Patient Name	(0010,0010)	From MWL or entered by user;
	Patient ID	(0010,0020)	From MWL or entered by user:
	Patient Sex	(0010,0040)	From MWL or entered by user ; M, F or O
	Patient Birth Date	(0010,0030)	From MWL or entered by user; 8 Bytes
GENERAL STUDY	Study Instance UID	(0020,000D)	From MWL or automatically generated; not visible on UI
	Study ID	(0020,0010)	Auto generated.
	Study Date	(0008,0020)	Automatically generated when study is created; 8 bytes
	Study Time	(0008,0030)	Automatically generated when study is created; 6 Bytes
	Referring Physician's Name	(0008,0090)	From MWL
	Accession Number	(0008,0050)	From MWL or entered by user.
GENERAL SERIES	Modality	(0008,0060)	From MWL Conversion
	Type	(0008,0064)	DI fixed
	Series Number	(0020,0011)	Automatically generated
	Series Instance UID	(0020,000E)	Automatically generated
GENERAL IMAGE	Instance Number	(0020,0013)	Automatically generated
	Patient Orientation	(0020,0020)	Empty, zero length
General Equipment	Manufacturer	(0008,0070)	Fixed, from internal configuration file: MEDXCHANGE
IMAGE PIXEL	Samples per Pixel	(0028,0002)	3
	Photometric Interpretation	(0028,0004)	RGB
	Planar Configuration	(0028,0006)	0
	Rows	(0028,0010)	Depends on the number of rows
	Columns	(0028,0011)	Depends on the number of columns

	Bits Allocated	(0028,0100)	8
	Bits Stored	(0028,0101)	8
	High Bit	(0028,0102)	7
	Pixel Representation	(0028,0103)	Always 0
	Pixel Data	(7FE0,0010)	
SOP COMMON MODULE	SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.7
	SOP Instance UID	(0008,0018)	Automatically generated
	Character Set	(0008,0005)	Configurable from internal configuration file: ISO IR-100 or ISO_IR 192

7.1.2.VL Endoscopy IOD

Table 7.1.2
VL Endoscopy IOD

Module	Attribute	Tag	Value and/or length, range, and origin
PATIENT	Patient Name	(0010,0010)	From MWL or entered by user;
	Patient ID	(0010,0020)	From MWL or entered by user:
	Patient Sex	(0010,0040)	From MWL or entered by user; M, F or O
	Patient Birth Date	(0010,0030)	From MWL or entered by user; 8 Bytes
GENERAL STUDY	Study Instance UID	(0020,000D)	From MWL or automatically generated; not visible on UI
	Study ID	(0020,0010)	Auto generated.
	Study Date	(0008,0020)	Automatically generated when study is created; 8 bytes
	Study Time	(0008,0030)	Automatically generated when study is created; 6 Bytes
	Referring Physician's Name	(0008,0090)	From MWL
	Accession Number	(0008,0050)	From MWL or entered by user.
GENERAL SERIES	Modality	(0008,0060)	From MWL
	Conversion Type	(0008,0064)	DI fixed
	Series Number	(0020,0011)	1
	Series Instance UID	(0020,000E)	Automatically generated

	Laterality	(0020,0060)	
GENERAL IMAGE	Image Type	(0008,0008)	ORIGINAL/SECONDARY
	Instance Number	(0020,0013)	Automatically generated
	Patient Orientation	(0020,0020)	Empty, zero length
	Lossy Image Compression	(0028,2110)	00
General Equipment	Manufacturer	(0008,0070)	Fixed, from internal configuration file: MEDXCHANGE
Acquisition Context	Acquisition Context	(0040,0555)	Empty, zero length
IMAGE PIXEL	Samples per Pixel	(0028,0002)	3
	Photometric Interpretation	(0028,0004)	RGB
	Planar Configuration	(0028,0006)	0
	Rows	(0028,0010)	Depends on the number of rows
	Columns	(0028,0011)	Depends on the number of columns
	Bits Allocated	(0028,0100)	8
	Bits Stored	(0028,0101)	8
	High Bit	(0028,0102)	7
	Pixel Representation	(0028,0103)	Always 0
	Pixel Data	(7FE0,0010)	
SOP COMMON MODULE	SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.7
	SOP Instance UID	(0008,0018)	Automatically generated
	Character Set	(0008,0005)	Configurable from internal configuration file: ISO IR-100 or ISO_IR 192

7.1.3.Multiframe True Color Secondary Capture IOD

Table 7.1.3
Multiframe True Color Secondary Capture IOD

Module	Attribute	Tag	Value and/or length, range, and origin
PATIENT	Patient Name	(0010,0010)	From MWL or entered by user;
	Patient ID	(0010,0020)	From MWL or entered by user:
	Patient Sex	(0010,0040)	From MWL or entered by user; M, F or O
	Patient Birth Date	(0010,0030)	From MWL or entered by user; 8 Bytes

GENERAL STUDY	Study Instance UID	(0020,000D)	From MWL or automatically generated; not visible on UI
	Study ID	(0020,0010)	Auto generated.
	Study Date	(0008,0020)	Automatically generated when study is created; 8 bytes
	Study Time	(0008,0030)	Automatically generated when study is created; 6 Bytes
	Referring Physician's Name	(0008,0090)	From MWL
	Accession Number	(0008,0050)	From MWL or entered by user.
GENERAL SERIES	Modality	(0008,0060)	From MWL
	Conversion Type	(0008,0064)	DI fixed
	Series Number	(0020,0011)	1
	Series Instance UID	(0020,000E)	Automatically generated
GENERAL IMAGE	Instance Number	(0020,0013)	Automatically generated
	Patient Orientation	(0020,0020)	Empty, length is zero
	Lossy Image Compression	(0028,2110)	00
	Compression Ratio	(0028,2112)	
	Compression Method	(0028,2114)	ISO_13818_2
General Equipment	Manufacturer	(0008,0070)	Fixed, from internal configuration file: MEDXCHANGE
Multi Frame Module	Number of Frames	(0028,0008)	Automatically generated
	Frame Increment Pointer	(0028,0009)	Points to (0018,1063)
SC Multi Frame Image	Burned in Annotation	(0028,0301)	NO
Cine	Frame Time	(0018,1063)	
IMAGE PIXEL	Samples per Pixel	(0028,0002)	3
	Photometric Interpretation	(0028,0004)	RGB
	Planar Configuration	(0028,0006)	0
	Rows	(0028,0010)	Depends on the number of rows
	Columns	(0028,0011)	Depends on the number of columns
	Bits Allocated	(0028,0100)	8

	Bits Stored	(0028,0101)	8
	High Bit	(0028,0102)	7
	Pixel Representation	(0028,0103)	Always 0
	Pixel Data	(7FE0,0010)	
SOP COMMON MODULE	SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.7.4
	SOP Instance UID	(0008,0018)	Automatically generated
	Character Set	(0008,0005)	Configurable from internal configuration file: ISO IR-100 or ISO_IR 192

7.1.4.Video Endoscopy Image IOD

Table 7.1.4
Video Endoscopy Image IOD

Module	Attribute	Tag	Value and/or length, range, and origin
PATIENT	Patient Name	(0010,0010)	From MWL or entered by user;
	Patient ID	(0010,0020)	From MWL or entered by user:
	Patient Sex	(0010,0040)	From MWL or entered by user; M, F or O
	Patient Birth Date	(0010,0030)	From MWL or entered by user; 8 Bytes
GENERAL STUDY	Study Instance UID	(0020,000D)	From MWL or automatically generated; not visible on UI
	Study ID	(0020,0010)	Auto generated.
	Study Date	(0008,0020)	Automatically generated when study is created; 8 bytes
	Study Time	(0008,0030)	Automatically generated when study is created; 6 Bytes
	Referring Physician's Name	(0008,0090)	From MWL
	Accession Number	(0008,0050)	From MWL or entered by user.
GENERAL SERIES	Modality	(0008,0060)	From MWL
	Conversion Type	(0008,0064)	DI fixed
	Series Number	(0020,0011)	1
	Series Instance UID	(0020,000E)	Automatically generated
GENERAL IMAGE	Image Type	(0008,0008)	ORIGINAL/SECONDARY
	Instance Number	(0020,0013)	Automatically generated

	Patient Orientation	(0020,0020)	Field is empty: zero length
	Lossy Image Compression	(0028,2110)	00
	Image Compression Ratio	(0028,2112)	
	Image Compression Method	(0028,2114)	ISO_13818_2
General Equipment	Manufacturer	(0008,0070)	Fixed, from internal configuration file: MEDXCHANGE
Acquisition Context	Acquisition Context	(0040,0555)	Field is empty: zero length
Cine	Frame Time	(0018,1063)	
Multi Frame	Number of Frames	(0028,0008)	Automatically generated
	Frame Increment pointer	(0028,0009)	Points to (0018,1063)
IMAGE PIXEL	Samples per Pixel	(0028,0002)	3
	Photometric Interpretation	(0028,0004)	RGB
	Planar Configuration	(0028,0006)	0
	Rows	(0028,0010)	Depends on the number of rows
	Columns	(0028,0011)	Depends on the number of columns
	Bits Allocated	(0028,0100)	8
	Bits Stored	(0028,0101)	8
	High Bit	(0028,0102)	7
	Pixel Representation	(0028,0103)	Always 0
	Pixel Data	(7FE0,0010)	
SOP COMMON MODULE	SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.77.1.1.1
	SOP Instance UID	(0008,0018)	Automatically generated
	Character Set	(0008,0005)	Configurable from internal configuration file: ISO IR-100 or ISO_IR 192

7.2. Attribute Mapping

The relationships between attributes received via Modality Work list, and stored in acquired images are summarized in the Table 6.2 - 1.

Table 6.2 - 1:
Attribute Mapping between Modality Worklist and Image IOD

Field	Tag	Interface
Patient's Name	(0010,0010)	Y
Patient ID	(0010,0020)	Y
Patient's Birth Date	(0010,0030)	Y
Patient's Sex	(0010,0040)	Y
Study Instance UID	(0020,000D)	Y
Referring Physician's Name	(0008,0090)	Y
Accession Number	(0008,0050)	Y
Modality	(0008,0060)	Y

7.3.Coerced/Modified Fields

The DICOM AE acting as a MWL will not truncate any attribute values received in the response to a Modality Worklist Query if the value length is longer than the maximum length permitted by the attribute's VR. They will not be taken up for further processing and the user will be prompted to edit the values and make them valid.