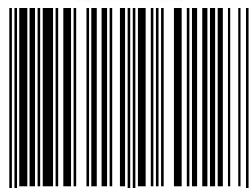
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CE

MD

Ez RDM (Radiation
Dose Monitor)



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1 FOREWORD

This software is a Class I medical device in the EU. It is "CE" marked, in compliance with the applicable requirements of European regulation 2017/745.

Meaning of symbols:

Symbol	Symbol Title
	Manufacturer
	CE-Mark
	Medical device
	Unique Device ID
	Date of manufacture <i>Note:</i> This symbol is accompanied by a date indicating the date of manufacture, expressed as four digits for the year and two digits for the month: YYYY-MM. This symbol is displayed on the Ez RDM web interface.
	See the instructions for use

Note: Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

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2 INTRODUCTION

2.1 Scope and field of application

This document is the DICOM conformance statement for the Ez RDM Software of MPTronic. This document describes how the Ez RDM Software collaborates in a DICOM network with other Medical Imaging applications that conform to the DICOM 3.0 Standard.

This DICOM Conformance Statement documents the conformance of the Ez RDM Software with the Digital Imaging and Communications in Medicine standard (DICOM). This document is essential in order to evaluate whether or not another DICOM compliant device can communicate with this software product. This statement is conformant with the recommended format as described in PS 3.2 of the DICOM standard.

2.2 Important Considerations for the Reader

This document on its own should not be interpreted as a guarantee of connectivity between Ez RDM and any equipment and/or applications offered by other vendors.


Integration of Ez RDM with the equipment and/or applications of different vendors, including MPTronic Systems, are outside the scope of the DICOM 3.0 standard and product conformance statements. Integration and interoperability of different equipment/applications are the sole responsibility of the user.

In the case of any possible connectivity inferred by a user to exist between Ez RDM and another product, the user is responsible for testing and verifying the inferred connectivity.

Future changes to the DICOM 3.0 standard may require alterations to be made to Ez RDM. MPTronic reserves the right to modify the Ez RDM architecture as needed, in order to meet changing standards.


The user should ensure that any existing DICOM equipment also changes with the future developments of the DICOM standards. Failure to keep pace with any alterations in the DICOM standards may result in decreased or lost connectivity.

All trade names mentioned in this document are recognized.

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2.3 Revision History

Version	Date	Author	Description
1.0	9-25-2012	Gustavo Echenique	Initial Version
1.1	5-30-2013	Gustavo Echenique Michael Melloff	
1.4	5-2-2016	Michael Melloff	
1.4.4	01-01-2020	Ghinassi Laurent	New layout
1.4.5	03-06-2020	Michael Melloff	Updated Chapter 4.1 and Chapter 4.1.3.2 accordingly
1.4.6	15/12/2021	Ghinassi Laurent	Updated Chapter 1 Updated Chapter 4.1 and Chapter 4.1.3.2 accordingly (MR Image Storage)
1.4.7	02/05/2023	Gustavo Echenique	Update section 2.3
1.4.8	20/08/2024	Ghinassi Laurent	Update section 2.3

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2.4 Abbreviations and Acronyms

ASCII	American Standard Code for Information Interchange
AE	Application Entity
AE-Title	name of an AE
ANSI	American National Standards Institute
CR	Computed Radiography
CT	Computed Tomography
ISDN	Integrated Service Digital Network
DICOM	Digital Imaging and Communications in Medicine
ECR	European Congress of Radiology
GPRS	General Packet Radio Service
GSPS	Grayscale Softcopy Presentation State
HIMSS	Healthcare Information and Management Systems Society
IE	Information Entity
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
ISO	International Standards Organization
NEMA	National Electrical Manufacturers Association
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
RSNA	Radiological Society of North America
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol / Internet Protocol
TLS	Transport Layer Security
UID	Unique Identifier
VM	Value Multiplicity
VR	Value Representation


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3 IMPLEMENTATION MODEL

3.1 Application Data Flow Diagram

This DICOM conformance statement specifies the behaviour and functionality of the Ez RDM software. This software provides the following capabilities:

- Reads uncompressed and compressed (RLE, JPEG) DICOM instances for CT, CR, DX, MG, MR, RF, XA, NM, PT modalities.
- Sends and receives DICOM objects via the DICOM Storage Service Class.
- Can Query and Retrieve Images and Doses from remote DICOM AEs
- Responds to Query and Retrieve requests for Doses from remote DICOM AEs
- Receives /Sends Dose reports by MPPS messages (Modality Performed Procedure Step)
- Responds to connectivity verification messages
- Retrieves DICOM Modality Worklist from remote DICOM AEs
- Responds to Storage Commitment queries from remote DICOM AEs

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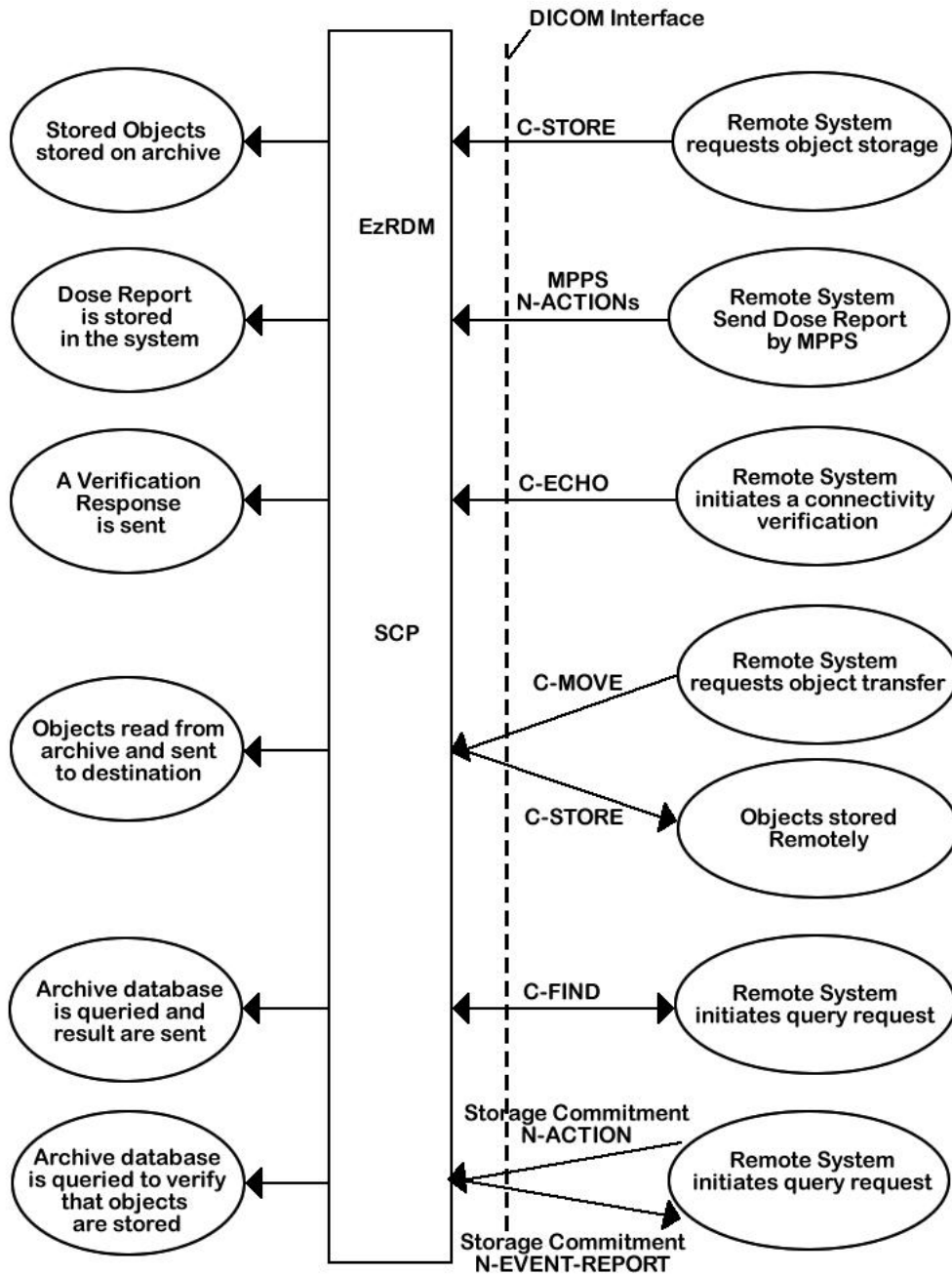



Image 1: Application data flow diagram as SCP

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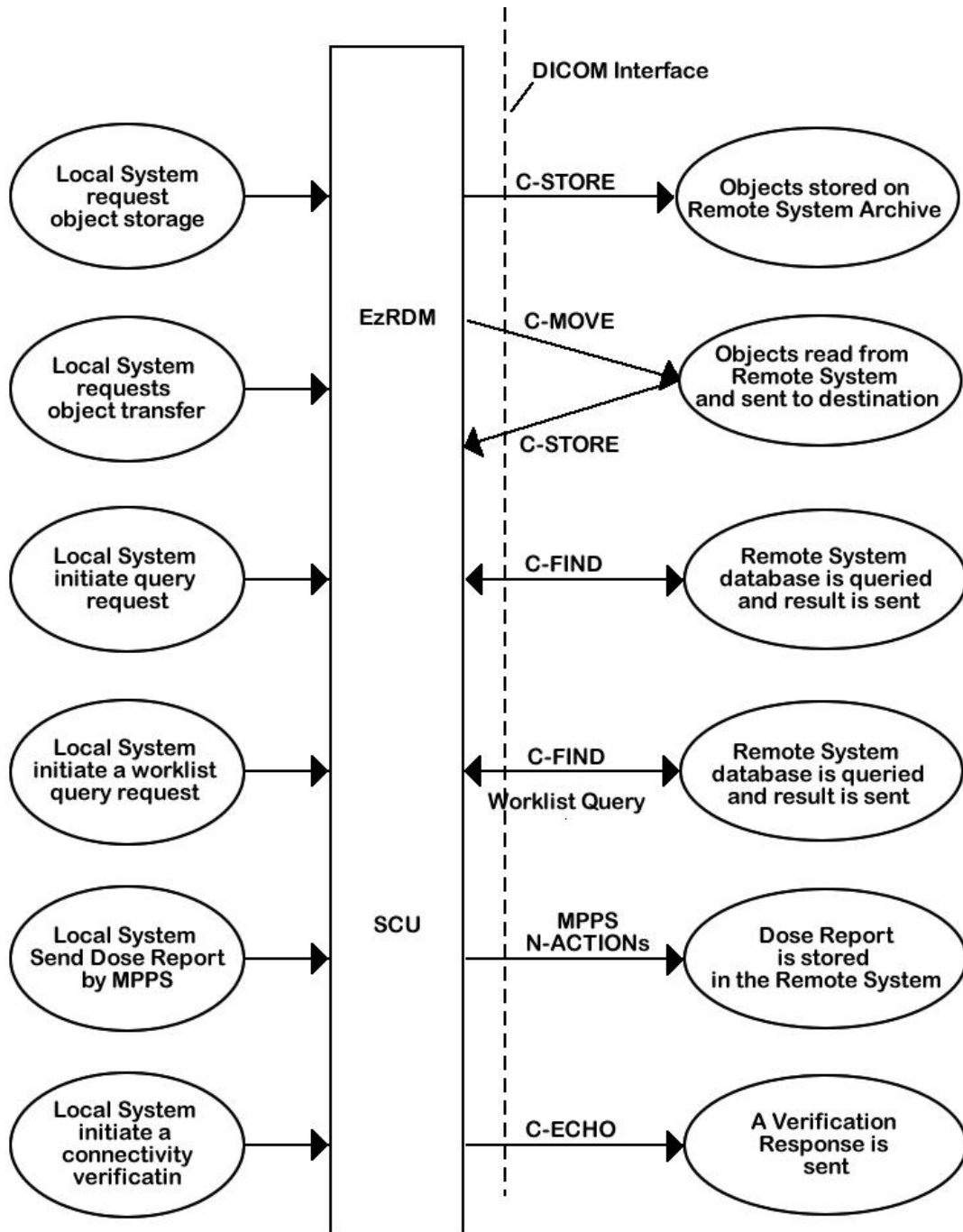



Image 2: Application data flow diagram as SCU

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3.2 Functional Definitions

All communications and image transfer with the remote application is accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack.

Below is a table of the functions supported by Ez RDM software:

SCU	SCP
Connectivity Verification	Verification
Storage	Storage
Query/Retrieve	Query/Retrieve
Modality Performed Procedure Step	Modality Performed Procedure Step
Modality Worklist	Image Storage Verification – Only Storage Commitment Push Instance


The DICOM Server will accept associations with Presentation Contexts for Service Object Pair (SOP) classes of Storage, Modality Performed Procedure Step and Verification Service Classes

Acting as a Service Connection Client (SCU), Ez RDM can use the following services:

- Verification Service Class (C-ECHO) to verify the connectivity to a remote AE.
- Storage Service Class (C-STORE) to transfer Doses to remote DICOM AE.
- Query/Retrieve Service Class (C-FIND) to query a remote DICOM AE.
- Query/Retrieve Service Class (C-MOVE) to request the transfer of instances from a remote DICOM AE.
- Modality Worklist Service Class (C-FIND) to query Worklist Servers.
- Modality Performed Procedure Step Service Class (N-ACTIONS) to route MPPS Messages to remote DICOM AE.

Acting as a Service Class Provider (SCP), Ez RDM provides the following services:

- When performing as a Verification Service Class Provider (C-ECHO), Ez RDM will respond to incoming connectivity requests from Remote DICOM AEs.
- When performing as a Storage Service Class Provider (C-STORE), Ez RDM will receive DICOM instances and store them into the database
- When performing a Query/Retrieve Service Class Provider (C-FIND), Ez RDM will query its archive database according to the request's parameters, and will send the results to the issuer.
- When performing a Query/Retrieve Service Class Provider (C-MOVE), Ez RDM will issue a C-STORE to a corresponding remote AE for every instance in the request.
- When performing as a Modality Performed Procedure Step Service Class Provider (N-ACTION), Ez RDM will receive Dose reports and store them into the database
- Ez RDM can respond to a Storage Commitment query and therefore allow a remote AE to verify the presence of the specified instances in the archive (Storage Commitment N-ACTION / Storage Commitment N-EVENT REPORT).

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4 AE SPECIFICATIONS


4.1 Application DICOM Services AE Specifications

The Ez RDM Software - AE provide standard conformance to the following DICOM V3.0 SOP classes. The SOP classes in the following table can be processed/stored/displayed by Ez RDM.


SOP Classes as SCU	
SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Default Storage Application SOP Classes	See table below
Study Root Query/Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

SOP Classes as SCP	
SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Default Storage Application SOP Classes	See table below
Study Root Query/Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3
Storage Commitment – N-ACTION / N-EVENT REPORT	1.2.840.10008.1.20.1

Storage SOP Class	
SOP Class Name	SOP Class UID
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67
Radiopharmaceutical Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.68
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
CR Image Storage	1.2.840.10008.5.1.4.1.1.1
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radio Fluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2
Digital X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.2.1

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Digital Intra – Oral X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra – Oral X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography Curve Storage	1.2.840.10008.5.1.4.1.1.128
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
GE Private DICOM 3D Object	1.2.840.113619.4.26
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59

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4.1.1 Association Establishment Policies

4.1.1.1 GENERAL

The DICOM Application Context Name (ACN) proposed by Ez RDM is 1.2.840.10008.3.1.1.

The maximum PDU size which can be transmitted by Ez RDM is fixed at 16 Kbytes (16384 bytes). The maximum PDU size which can be received by the Ez RDM is up to 16 Kbytes (16384 bytes).

The Ez RDM Software accepts incoming association requests on a single port number defined in the configuration file. It accepts association request if at least one presentation context of the association is accepted.

The access rights are checked by the AE-Title and the IP-address of the calling device.

Extended negotiations are not supported for any of the supported service classes.

The only supported network protocol is TCP/IP. Ez RDM Software uses the TCP/IP stack of the under laying operating system.

4.1.1.2 NUMBER OF ASSOCIATIONS

The number of simultaneous associations which will be accepted by Ez RDM is limited only by the kernel parameters of the underlying TCP/IP implementation. Ez RDM will spawn a new process for each connection request it receives.


Therefore, Ez RDM can have multiple simultaneous connections, and there are no inherent limitations on the number of simultaneous associations which the Application Entity represented by Ez RDM can maintain.

4.1.1.3 ASYNCHRONOUS NATURE

Asynchronous operations on an association are supported.

4.1.1.4 IMPLEMENTATION IDENTIFYING INFORMATION

Image processing and management systems provide a single Implementation Class Unique Identifier (UID) which is "1.2.826.0.1.3680043.2.1065" and the implementation version is "MPTronic".

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4.1.2 Association Initiation Policy

Ez RDM initiates associations for the following activities:

- DICOM communication verification between Ez RDM and a remote system (4.1.2.1).
- Sending a Report Dose (as RDSR) from the local Ez RDM database to a remote system (4.1.2.2).
- Query and retrieve of remote database contents (4.1.2.3).
- Query of a remote Worklist server (4.1.2.4).
- Sending MPPS Messages to remote system (4.1.2.5).

4.1.2.1 VERIFICATION COMMUNICATION WITH A REMOTE SYSTEM

4.1.2.1.1 ASSOCIATED REAL WORLD ACTIVITY


A verification of connectivity to a Remote System is performed before any Query/Retrieve Action

4.1.2.1.2 PROPOSED PRESENTATION CONTEXTS

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

4.1.2.1.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP VERIFICATION CLASS

Ez RDM provides standard conformance for DICOM communication verification.

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4.1.2.2 SENDING A REPORT DOSE TO A REMOTE SYSTEM

4.1.2.2.1 ASSOCIATED READ-WORLD ACTIVITY


When new Dose Report is created in its database, Ez RDM creates a Radiation Dose Structured Report and send it to each configured remote system.

Ez RDM also sends Radiation Dose Structured Reports in response to a C-MOVE request from a Remote System.

4.1.2.2.2 PROPOSED PRESENTATION CONTEXTS

Presentation Context Table			
		Role	Extended Negotiation
Abstract Syntax	UID		
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	SCU	None

Transfer Syntax	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

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4.1.2.2.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS STORAGE

Ez RDM provides standard conformance.

4.1.2.3 QUERING AND RETRIEVING DICOM INSTANCE FROM REMOTE SYSTEM

4.1.2.3.1 ASSOCIATED REAL WORLD ACTIVITY


Ez RDM will query a remote system in the following situations:

- When a new Dose Report is created in its database, it queries the remote system for one additional image and retrieves it in order to add missing information.
- When Sync-Client functionality is configured, Ez RDM will query and retrieve Dose Reports from a remote system periodically. This functionality is used when the remote system cannot be configured to automatically send dose data to Ez RDM.
- When Ez RDM is configured to fetch the Dose History of a patient. Ez RDM queries the PACS in order to retrieve older Dose Reports for the patient.

4.1.2.3.2 PROPOSED PRESENTATION CONTEXTS

Abstract Syntax		Role	Extended Negotiation
Name	UID		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	SCU	None
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCU	None

Transfer Syntax for FIND	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

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Transfer Syntax for MOVE	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

4.1.2.3.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP QUERY CLASS

Ez RDM supports C-Find request values as defined in DICOM v.3.0 Part 4. All Required (R) and Unique (U) Study, Series, and Image level keys are supported for the Study Root information model. In addition, certain Optional (O) keys are supported.


For a Study Root request the following keys are supported:

Study Root Request identifiers for FIND-SCU			
Level	Description	Tag	Type
Study	Specific Character Set	(0008,0005)	S
Study	Query Retrieve Level	(0008,0052)	S
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	NONE
Study	Patient's Name	(0010,0010)	NONE
Study	Patient's ID	(0010,0020)	S
Study	Patient's Birth Date	(0010,0030)	NONE
Study	Patient's Sex	(0010,0040)	NONE
Study	Study ID	(0020,0010)	NONE
Study	Modalities in Study	(0008,0061)	NONE
Study	Referring Physician Name	(0008,0090)	NONE
Study	Patient's Age	(0010,1010)	NONE
Study	Performing Physician Name	(0008,1050)	NONE
Study	Accession Number	(0008,0050)	NONE
Study	Study Instance UID	(0008,000D)	NONE
Study	Study Description	(0008,1030)	NONE
Series	Specific Character Set	(0008,0005)	S
Series	Query Retrieve Level	(0008,0052)	S
Series	Study Instance UID	(0008,000D)	S
Series	Series Instance UID	0020,000E)	S
Series	Modality	(0008,0060)	NONE
Series	Series Description	(0008,0060)	NONE
Series	Series Number	(0020,0011)	NONE
Series	Series Date	(0008,0021)	NONE
Series	Series Time	(0008,0031)	NONE

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Series	Transfer Syntax	(0002,0010)	NONE
Image	Specific Character Set	(0008,0005)	S
Image	Query Retrieve Level	(0008,0052)	S
Image	Study Instance UID	(0008,000D)	S
Image	Series Instance UID	(0020,000E)	S
Image	SOP Instance UID	(0008,0018)	NONE
Image	Instance Number	(0020,0013)	NONE

Type	Further meaning
S	Indicates the identifier attribute uses Single Value Matching
R	Indicates Range matching
*	Indicates wildcard matching
U	Indicates Universal matching
L	Indicates that UID lists are sent
NONE	Indicates that no matching is supported
UNIQUE	Indicates that this is the Unique Key for that query level (in which case Universal matching or Single Value matching is used depending on the query level)
SEQ	Indicates Sequence matching

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4.1.2.4 QUERING A WORKLIST SERVER


4.1.2.4.1 ASSOCIATED REAL WORLD ACTIVITY

Ez RDM makes periodically queries to configured Worklist servers. Ez RDM retrieves the list of today studies.

4.1.2.4.2 PROPOSED PRESENTATION CONTEXTS

Abstract Syntax		Role	Extended Negotiation
Name	UID		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	SCU	None

Transfer Syntax	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

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4.1.2.4.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS QUERY

Ez RDM supports C-Find response values as defined in DICOM v.3.0 Part 4. All Required (R) and Unique (U) Study, Series, and Image level keys are supported for the Study Root information models. In addition, certain Optional (O) keys are supported. For a Study Root Query/Retrieve the following keys are supported:

For a Modality Worklist request the following keys are supported:

Modality Worklist Request identifiers for FIND-SCU		
Description	Tag	Type
Specific Character Set	(0008,0005)	S
Accession Number	(0008,0050)	None
Patient's Name	(0010,0010)	None
Patient's ID	(0010,0020)	None
Patient's Birth Date	(0010,0030)	None
Patient's Sex	(0008,000D)	None
Scheduled Procedure Step Sequence	(0040,0100)	SEQ
> Scheduled Procedure Step Start Date	(0040,0002)	S
> Scheduled Procedure Step Start Time	(0040,0003)	R
> Modality	(0008,0060)	S
Study Instance UID	(0020,000D)	None
Requested Procedure Description	(0032,1060)	None

Type	Further meaning
S	Indicates the identifier attribute uses Single Value Matching
R	Indicates Range matching
*	Indicates wildcard matching
U	Indicates Universal matching
L	Indicates that UID lists are sent
NONE	Indicates that no matching is supported
UNIQUE	Indicates that this is the Unique Key for that query level (in which case Universal matching or Single Value matching is used depending on the query level)
SEQ	Indicates Sequence matching

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4.1.2.5 ROUTING MPPS MESSAGES TO A REMOTE SYSTEM

4.1.2.5.1 ASSOCIATED REAL WORLD ACTIVITY

When Ez RDM receives an MPPS message, it sends it back to the configured MPPS Servers.

4.1.2.5.2 PROPOSED PRESENTATION CONTEXTS


Presentation Context Table			
Abstract Syntax		Role	Extended Negotiation
Name	UID		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	SCU	None

Transfer Syntax	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

Extended negotiation is not supported.

4.1.2.5.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR MPPS SOP CLASS

The MPPS messages are relayed in their original state without Ez RDM making any modification.

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	<h3>Ez RDM</h3>	Version : 1.4.8.x

4.1.3 Association Acceptance Policy

Ez RDM accepts associations for the activities listed below:

- DICOM communication verification (4.1.3.1).
- DICOM instance transfer from a Remote System to Ez RDM (4.1.3.2).
- Receiving Dose Report from Remote System through MPPS messages (4.1.3.3).
- Query the Ez RDM Database (4.1.3.4).
- Retrieve from Ez RDM (4.1.3.5).
- Storage Commitment (4.1.3.6).

4.1.3.1 VERIFICATION SCP

4.1.3.1.1 ASSOCIATED REAL-WORLD ACTIVITY

Verification as SCP is initiated by an external DICOM AE wishing to verify the existence of a DICOM communication channel.

4.1.3.1.2 ACCEPTED PRESENTATION CONTEXTS


The Ez RDM Software implements the verification service class as SCP.

Presentation Context Table			
Abstract Syntax		Role	Extended Negotiation
Name	UID		
Verification	1.2.840.10008.1.1	SCP	None

Transfer Syntax	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

4.1.3.1.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS VERIFICATION

Ez RDM provides standard conformance.

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	Ez RDM	Version : 1.4.8.x


4.1.3.2 DICOM INSTANCE TRANSFER FROM A REMOTE SYSTEM TO EZ RDM

4.1.3.2.1 ASSOCIATED READ-WORLD ACTIVITY


A remote system sends instances to Ez RDM. Once the transfer is completed the new instances are stored in the local database.

4.1.3.2.2 ACCEPTED PRESENTATION CONTEXT

Presentation Context Table			
Abstract Syntax	UID	Role	Extended Negotiation
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	SCP	None
Radiopharmaceutical Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.68	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	SCP	None
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	SCP	None
Digital X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.1	SCP	None
Digital X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.1.1	SCP	None
Digital Mammography X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.2	SCP	None
Digital Mammography X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	SCP	None
Digital Intra – Oral X-Ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.3	SCP	None
Digital Intra – Oral X-Ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.3.1	SCP	None
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	SCP	None
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	SCP	None
Positron Emission Tomography Curve Storage	1.2.840.10008.5.1.4.1.1.128	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	SCP	None
GE Private DICOM 3D Object	1.2.840.113619.4.26	SCP	None
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	SCP	None

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Transfer Syntax	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2
JPEG Baseline	1.2.840.10008.1.2.4.50
JPEG Extended	1.2.840.10008.1.2.4.51
JPEG Lossless	1.2.840.10008.1.2.4.57
JPEG Lossless FirstOrder	1.2.840.10008.1.2.4.70
JPEG LS Lossless	1.2.840.10008.1.2.4.80
JPEG LS Lossy	1.2.840.10008.1.2.4.81
RLE Lossless	1.2.840.10008.1.2.5

	<h2>DICOM Conformance Statement</h2>	Doc. Ref. : CONF-EZRDMDICOM-EN
	<h3>Ez RDM</h3>	Version : 1.4.8.x

4.1.3.2.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS STORAGE

Ez RDM conforms to the full (level 2) conformance of the Storage SOP class. All Type 1, Type 2 and Type 3 attributes will be retained. In addition private attributes will be stored and included when the instance is sent out again.

If an instance is sent with the same SOP Instance UID (0008, 0018) as one that already exists on the Ez RDM AE, then the new instance will replace the old instance and the database will be updated accordingly.


The Ez RDM AE responds to a C-STORE request with one of the response codes listed below:

C-STORE Response codes			
Service Status	Status Description	Status Code (0000,0900)	Related Fields
Error	Cannot understand: The message was not properly DICOM encoded or the SOP class unrecognized. The request was not processed.	C010	None
Success	Success	0000	None

4.1.3.3 QUERY THE EZ RDM DATABASE

4.1.3.3.1 ASSOCIATED READ-WORLD ACTIVITY

A remote system queries the Ez RDM Database to determine what studies are present on the system.

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4.1.3.3.2 ACCEPTED PRESENTATION CONTEXTS

Presentation Context Table			
Abstract Syntax		Role	Extended Negotiation
Name	UID		
Study Root Query/Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	SCP	None


Transfer Syntax	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

4.1.3.3.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP QUERY CLASS

Ez RDM supports C-Find response values as defined in DICOM v.3.0 Part 4. All Required [®] and Unique (U) Study, Series, and Image level keys are supported for the Patient Root, Study Root and Patient/Study Only information models. In addition, certain Optional (O) keys are supported. The following tables outline the supported keys.

Relational queries are supported.


Study Root Query/Retrieve: Supported Keys				
Level	Description	Tag	Type	Usage
Study	Study Date	(0008,0020)	R	Matched
Study	Study Time	(0008,0030)	R	Matched
Study	Accession Number	(0008,0050)	R	Matched
Study	Admission ID	(0038,0010)	O	Matched
Study	Patient's Name	(0010,0010)	R	Matched
Study	Patient ID	(0010,0020)	U	Matched
Study	Patient DOB	(0010,0030)	O	Matched
Study	Patient Sex	(0010,0040)	O	Matched
Study	Study ID	(0020,0010)	R	Matched
Study	Study Instance UID	(0008,000D)	U	Matched
Study	Modalities in Study	(0008,0061)	O	Matched
Study	Referring physician's Name	(0008,0090)	O	Matched
Study	Performing physician's Name	(0008,1050)	O	Matched
Study	Study Description	(0008,1030)	O	Matched
Study	Patient's Age	(0010,1010)	O	Matched

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Study	Number of Patient Related Studies	(0020,1200)	O	Returned
Study	Number of Patient Related Series	(0020,1202)	O	Returned
Study	Number of Patient Related Instances	(0020,1204)	O	Returned
Series	Modality	(0008,0060)	O	Returned
Series	Series Number	(0020,0011)	O	Returned
Series	Series Date	(0008,0021)	R	Matched
Series	Series Time	(0008,0031)	R	Matched
Series	Series Description	(0008,103E)	O	Returned
Series	Series Instance UID	(0020,000E)	U	Matched
Series	Number of Series Related Instances	(0020,1209)	O	Returned
Image	SOP Class UID	(0008,0016)	R	Matched
Image	SOP Instance UID	(0008,0018)	U	Matched
Image	Content Date	(0008,0023)	O	Returned
Image	Content Time	(0008,0033)	O	Returned
Image	Instance Number	(0020,0013)	O	Returned
Image	Referenced Request Sequence	(040,A370)	O	Returned
Image	> Study Instance UID	(0020,000D)	O	Returned
Image	>Accession Number	(0008,0050)	O	Returned
Image	>Requested Procedure ID	(0040,1000)	O	Returned
Image	>Requested Procedure Code Sequence	(0032,1064)	O	Returned
Image	>> Code Value	(0008,0100)	O	Returned
Image	>> Coding Scheme Designator	(0008,0102)	O	Returned
Image	>> Coding Scheme Version	(0008,0103)	O	Returned
Image	>> Code Meaning	(0008,0104)	O	Returned
Image	Content Template Sequence	(0040,A504)	O	Returned
Image	>Template Identifier	(0040,DB00)	O	Returned
Image	Concept Name Code Sequence	(0040,A043)	O	Returned
Image	>Code Value	(0008,0100)	O	Returned
Image	>Code Scheme Designator	(0008,0102)	O	Returned
Image	>Code Scheme Version	(0008,0103)	O	Returned
Image	>Code Meaning	(0008,0104)	O	Returned

In addition, Ez RDM also supports the following types of attribute matching:

- Single Value Matching
- Universal Matching
- Wild Card Matching
- Range Matching

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4.1.3.3.4 PRESENTATION CONTEXT ACCEPTANCE CRITERION

Ez RDM will accept all presentation contexts which match those of the preceding tables. No specific acceptance and/or prioritization rules are required.


4.1.3.4 RETRIEVE FROM EZ RDM

4.1.3.4.1 ASSOCIATED REAL WORLD ACTIVITY

A remote system wants to retrieve instances stored on Ez RDM and issues a retrieve command.

4.1.3.4.2 ACCEPTED PRESENTATION CONTEXTS

Presentation Context Table			
Abstract Syntax		Role	Extended Negotiation
Name	UID		
Study Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCP	None

	<h2>DICOM Conformance Statement</h2>	Doc. Ref. : CONF-EZRDMDICOM-EN
	<h3>Ez RDM</h3>	Version : 1.4.8.x

4.1.3.4.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS RETRIEVE

Standard conformance is provided.

4.1.3.4.4 PRESENTATION CONTEXT ACCEPTANCE CRITERION

Ez RDM will only accept requests for retrieval from those systems to which the application has been properly configured, with respect to Application Entity title, IP address and DICOM Port number.

4.1.3.5 RECEIVING DOSE REPORT FROM REMOTE SYSTEM THROUGH MPPS MESSAGES


4.1.3.5.1 ASSOCIATED REAL WORLD ACTIVITY

Remote systems send dose data using Modality Performed Procedure Step messages and Ez RDM store them in the database.

4.1.3.5.2 ACCEPTED PRESENTATION CONTEXTS

Presentation Context Table			
Abstract Syntax		Role	Extended Negotiation
Name	UID		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	SCP	None

Transfer Syntax	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

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4.1.3.5.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS MPPS

The MPPS SCP AE provides conformance to the DICOM MPPS SOP Class as SCP. Table 8 describes the usage of specific attributes in the MPPS SOP Instance.


In case of an N-CREATE message and the modality does not provide a SOP Instance UID for the new Performed Procedure Step the MPPS SCP will create one.

The MPPS SCP responds only with a status code (i.e. no attribute list) and possibly with a failure class instance if an error has occurred

Use of Dicom Data in the MPPS SOP Instance			
Tag	Attribute Name	Req. Type N-CREATE	Req.Type N-SET
(0008, 0005)	Specific Character Set	3	-
(0040, 0270)	Scheduled Step Attribute Sequence	1 -	-
(0020, 000D)	Study Instance UID	C*	-
>(0008,0110)	Referenced Study Sequence	3	-
>>(0008,1150)	Referenced SOP Class UID	3	-
>>(0008,1155)	Referenced SOP Instance UID	3	-
>(0008,0050)	Accession Number	1C*	-
>(0040,2016)	Placer Order Number/Imaging service request	3	-
>(0040,2017)	Filler Order Number/Imaging service request	3	-
>(0040,1001)	Requested Procedure ID	1C*	-
>(0032,1060)	Requested Procedure Description	3	-
>(0040,0009)	Scheduled Procedure Step ID	3	-
>(0040,0007)	Scheduled Procedure Step Description	3	-
>(0040,0008)	Scheduled Protocol Code Sequence	3	-
>>(0008,0100)	Code Value	3	-
>>(0008,0102)	Coding Scheme Designator	3	-
>>(0008,0103)	Coding Scheme Version	3	-
>>(0008,0104)	Code Meaning	3	-
(0010,0010)	Patient's Name	3	-
(0010,0020)	Patient ID	3	-
(0010,0030)	Patient's Birth Date	3	-
(0010,0040)	Patient's Sex	3	-
(0008,1120)	Referenced Patient Sequence	3	-
>(0008,1150)	Referenced SOP Class UID	3C*	-
>(0008,1155)	Referenced SOP Instance UID	3	-
(0040,0253)	Performed Procedure Step ID	1	-
(0040,0241)	Performed Station AE Title	1	-
(0040,0242)	Performed Station Name	3	-
(0040,0243)	Performed Location	3	-
(0040,0244)	Performed Procedure Step Start Date	1	-

	<h2>DICOM Conformance Statement</h2>	Doc. Ref. : CONF-EZRDMDICOM-EN
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(0040,0245)	Performed Procedure Step Start Time	1	-
(0040,0252)	Performed Procedure Step Status	1	3
(0040,0254)	Performed Procedure Step Description	3	3
(0040,0255)	Performed Procedure Type Description	3	3
(0008,1032)	Procedure Code Sequence	3	3
>(0008,0100)	Code Value	3	3
>(0008,0102)	Coding Scheme Designator	3	3
>(0008,0103)	Coding Scheme Version	3	3
>(0008,0104)	Code Meaning	3	3
(0040,0250)	Performed Procedure Step End Date	3	3
(0040,0251)	Performed Procedure Step End Time	3	3
(0040,0280)	Comments on the Performed Procedure Step	3	3
(0040,0281)	Performed Procedure Step Discontinuation Reason Code Sequence	3	3
>(0008,0100)	Code Value	3	3
>(0008,0102)	Coding Scheme Designator	3	3
>(0008,0103)	Coding Scheme Version	3	3
>(0008,0104)	Code Meaning	3	3
(0008,0060)	Modality	3	-
(0020,0010)	Study ID	1C*	-
(0040,0260)	Performed Protocol Code Sequence	3	3
>(0008,0100)	Code Value	3	3
>(0008,0102)	Coding Scheme Designator	3	3
>(0008,0103)	Coding Scheme Version	3	3
>(0008,0104)	Code Meaning	3	3
(0040,0340)	Performed Series Sequence	3	3
>(0008,1050)	Performing Physician's Name	3	3
>(0018,1030)	Protocol Name	3	3
>(0008,1070)	Operator's Name	3	3
>(0020,000E)	Series Instance UID	3	3
>(0008,103E)	Series Description	3	3
>(0008,0054)	Retrieve AE Title	3	3
>(0008,1140)	Referenced Image Sequence	3	3
>>(0008,1150)	Referenced SOP Class UID	3	3
>>(0008,1155)	Referenced SOP Instance UID	3	3
>(0040,0220)	Referenced Non-Image Composite SOP Instance Sequence	3	3
>>(0008,1150)	Referenced SOP Class UID	3	3
>>(0008,1155)	Referenced SOP Instance UID	3	3
	All other attributes from Performed Series Sequence	3	3

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	All other attributes from Billing and Material Code Module	3	3
(0008,2229)	Anatomic Structure, Space or Region Sequence	3	3
>(0008,0100)	Code Value	3	3
>(0008,0102)	Coding Scheme Designator	3	3
>(0008,0103)	Coding Scheme Version	3	3
>(0008,0104)	Code Meaning	3	3
(0040,0300)	Total Time of Fluoroscopy	3	3
(0040,0301)	Total Number of Exposures	3	3
(0018,1110)	Distance Source to Detector (SID)	3	3
(0040,0306)	Distance Source to Entrance	3	3
(0040,0302)	Entrance Dose	3	3
(0040,8302)	Entrance Dose in mGy	3	3
(0040,0303)	Exposed Area	3	3
(0018,115E)	Image Area Dose Product	3	3
(0040,0310)	Comments on Radiation Dose	3	3
(0040,030E)	Exposure Dose Sequence	3	3
>(0018,115A)	Radiation Mode	3	3
>(0018,0060)	KVp	3	3
>(0018,8151)	X-Ray Tube Current in μ A	3	3
>(0018,1150)	Exposure Time	3	3
>(0018,1160)	Filter Type	3	3
>(0018,7050)	Filter Material	3	3
>(0040,0310)	Comments on Radiation Dose	3	3
>(0040,0310)	Organ Dose	3	3

4.1.3.5.4 PRESENTATION CONTEXTS ACCEPTANCE CRITERION

There are no specific rules for acceptance and prioritization of presentation contexts.

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4.1.3.6 STORAGE COMMITMENT SCP

4.1.3.6.1 ASSOCIATED REAL WORLD ACTIVITY

After sending instances to Ez RDM, a Remote System wants to confirm the proper storage of these instances. To this purpose the Remote System sends a storage commit request to Ez RDM.

4.1.3.6.2 ACCEPTED PRESENTATION CONTEXTS

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


4.1.3.6.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS STORAGE COMMITMENT PUSH MODEL

Standard conformance is provided.

Ez RDM will open a new association to the SCU for transmitting the N-EVENT-REPORT response to the storage commit inquirer.

4.1.3.6.4 PRESENTATION CONTEXTS ACCEPTANCE CRITERION

There are no specific rules for acceptance and prioritization of presentation contexts.

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5 COMMUNICATION PROFILES

5.1 Supported Communication Stacks

DICOM Part 8 is supported by Ez RDM through TCP/IP.

5.2 OSI Stack


Not supported.

5.3 TCP/IP Stack

The only supported network protocol is TCP/IP. Ez RDM Software uses the TCP/IP stack of the under laying operating system.

5.4 Point-to-Point Stack

This implementation supports the Point-to-Point protocol that emulates a TCP/IP stack.

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6 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

6.1 Standard Extended/Specialized/Private SOPs

Not applicable

6.2 Private Transfer Syntaxes

Not applicable

7 CONFIGURATION

Local AE titles are configurable.

7.1 AE Title / Presentation Address Mapping

The local AE titles of the DICOM server (store SCP) can be changed through the Configuration XML file. The AET's of the move SCU and query/retrieve SCU processes can be set through the Configuration XML file.

8 SUPPORT OF EXTENDED CHARACTER SETS

Ez RDM supports " ISO_IR 100"

Ez RDM Software does not support multi byte character sets.