	DICOM Conformance Statement	Doc. Ref. : CONF-EZDSERVDICOM-EN
	Ez Dicom Server	Version : 3.0.1.x



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Ez Dicom Server




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1 FOREWORD

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

Meaning of symbols:

Symbol	Symbol Title
	Manufacturer
	CE-Mark
	Medical device
	Unique Device ID
	Date of manufacture <u>Note:</u> 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.
	Consult 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 Dicom Server Software of MPTronic. This document describes how the Ez Dicom Server 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 Dicom Server 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 Dicom Server and any equipment and/or applications offered by other vendors.


Integration of Ez Dicom Server 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 Dicom Server 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 Dicom Server. MPTronic reserves the right to modify the Ez Dicom Server 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	11-03-2006	Gustavo Echenique	Initial Version
1.1	08-04-2007	Gustavo Echenique Michael Melloff	
1.2	08-07-2007	Michael Melloff	
1.3	18-05-2010	Michael Melloff	
2.1.8	01-01-2020	Michael Melloff	New layout
3.0	28-07-2021	Michael Melloff	
3.0	11-10-2022	Michael Melloff	
3.0.1	02-04-2024	Carole Tchikaya	Update of section 1, document date and version

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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
GSPP	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 Dicom Server software. This software provides the following capabilities:

- Reads and displays uncompressed and compressed (RLE, JPEG) DICOM images of all modalities and image SOP classes.
- Sends and receives DICOM objects via the DICOM Storage Service Class.
- Allows to send DICOM Query, Retrieve and Move requests to remote DICOM AEs

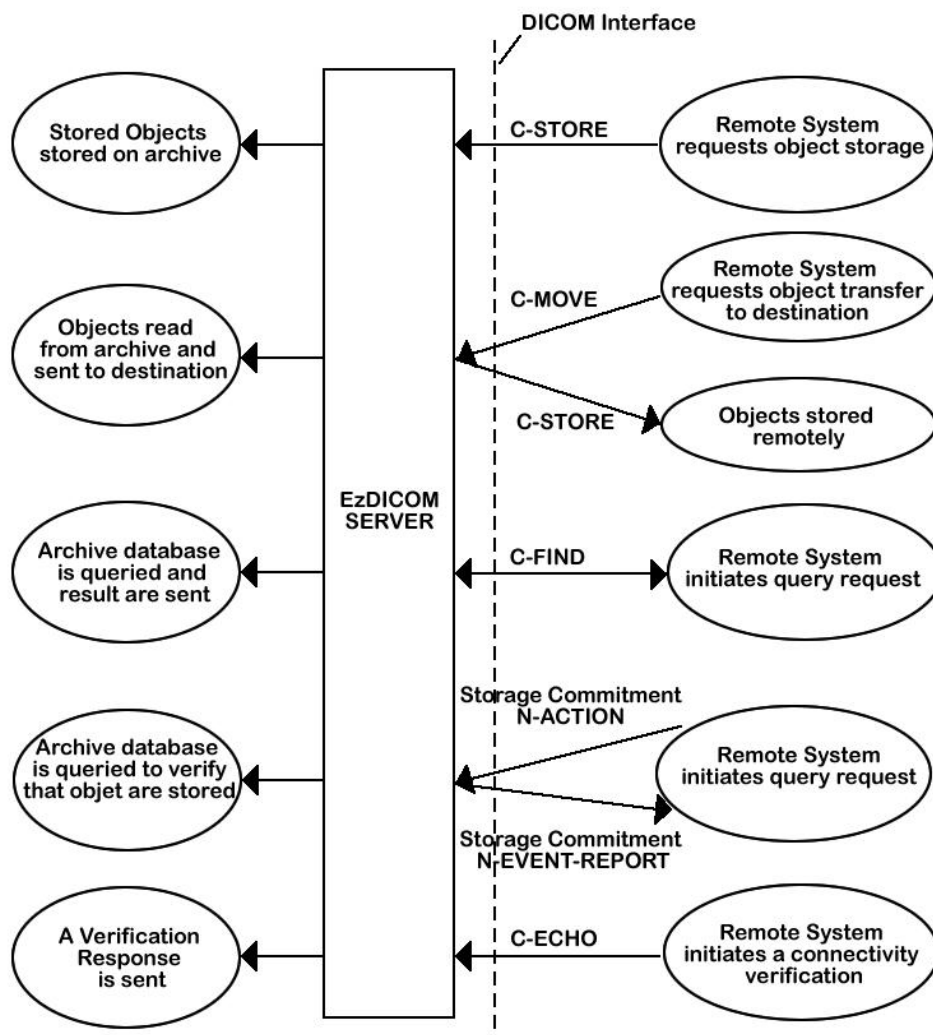



Image 1: Application data flow diagram as SCP

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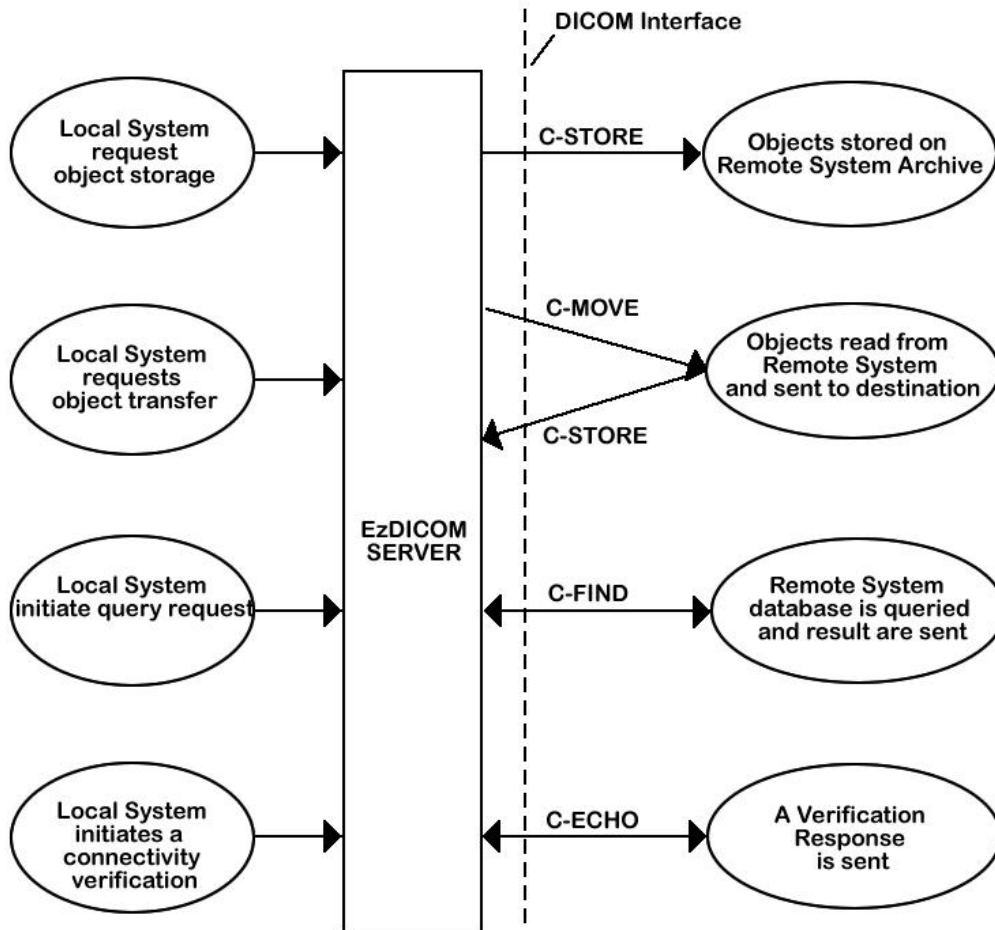



Image 2: Application data flow diagram as SCU

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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 Dicom Server software:

SCU	SCP
Connectivity verification	Connectivity verification
Storage	Storage
Query/Retrieve	Query/Retrieve
	Images Storage Verification – Only Storage Commitment Push Instance


The DICOM Server will accept associations with Presentation Contexts for Service Object Pair (SOP) classes of Storage, Query/Retrieve and Verification Service Classes

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

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

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

- Verification Service Class (C-ECHO) to verify the connectivity to a remote AE.
- Query/Retrieve Service Class (C-FIND) to query a remote DICOM AE.
- Query/Retrieve Service Class (C-MOVE) to request the transfer of images from a remote DICOM AE.
- Storage Service Class (C-STORE) to transfer images to remote DICOM AE.

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4 AE SPECIFICATIONS

4.1 Application DICOM Services AE Specifications

The Ez Dicom Server 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 Dicom Server.

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

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
Patient Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Patient Root Query/Retrieve Model - GET	1.2.840.10008.5.1.4.1.2.1.3
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
Study Root Query/Retrieve Model – GET	1.2.840.10008.5.1.4.1.2.2.3
Patient Study Only Query/ Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient Study Only Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2
Patient Study Only Query/Retrieve Model – GET	1.2.840.10008.5.1.4.1.2.3.3
Storage Commitment Push Model	1.2.840.10008.1.20.1

Storage SOP Class	
SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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 Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
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	1.2.840.10008.5.1.4.1.1.1.3.1




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Processing	
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
RETIRED Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
RETIRED Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Positron Emission Tomography Image 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
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
GE Private DICOM 3D Object	1.2.840.113619.4.26
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Key Object Selection	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 Dicom Server is 1.2.840.10008.3.1.1.

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

The Ez Dicom Server 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. Any physical media supporting TCP/IP may be used to connect to Ez Dicom Server Software. Ez Dicom Server 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 Dicom Server is limited only by the kernel parameters of the underlying TCP/IP implementation. Ez Dicom Server will spawn a new process for each connection request it receives.


Therefore, Ez Dicom Server can have multiple simultaneous connections, and there are no inherent limitations on the number of simultaneous associations which the Application Entity represented by Ez Dicom Server 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 Dicom Server initiates associations for the following activities:

- DICOM communication verification between Ez Dicom Server and a remote system (4.1.2.1).
- Sending images from the local Ez Dicom Server database to a remote system (4.1.2.2).
- Queries of remote database contents (4.1.2.3).
- Retrieval of images from a remote system to the local Ez Dicom Server database (4.1.2.4).

4.1.2.1 VERIFICATION COMMUNICATION WITH A REMOTE SYSTEM

4.1.2.1.1 ASSOCIATED REAL WORLD ACTIVITY


The Ez Dicom Server DICOM Server will answer the request if running. Verification as SCU is initiated by the user when adding/modifying a remote server and clicking the “ECHO” button.

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 Dicom Server provides standard conformance for DICOM communication verification.

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4.1.2.2 SEND IMAGES TO A REMOTE SYSTEM

4.1.2.2.1 ASSOCIATED READ-WORLD ACTIVITY


The user selects the corresponding AE Tab from the Search Page, queries the AE and then clicks the "Retrieve" button.

OR

A schedule triggers the action.

4.1.2.2.2 PROPOSED PRESENTATION CONTEXTS

Presentation Context Table			
Abstract Syntax	UID	Role	Extended Negotiation
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	SCU	None
Digital Mammography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	SCU	None
Digital Mammography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	SCU	None
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	SCU	None
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	SCU	None
RETIRED Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	SCU	None
RETIRED Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	SCU	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	SCU	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	SCU	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	SCU	None

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Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	SCU	None
GE Private DICOM 3D Object	1.2.840.113619.4.26	SCU	None
Key Object Selection	1.2.840.10008.5.1.4.1.1.88.59	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
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

4.1.2.2.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS STORAGE

Ez Dicom Server provides full (level 2) conformance. This means that upon sending an image received via DICOM on to another DICOM compliant system it will send out all attributes that it received (this includes private attributes from other vendors).

Images stored in the Ez Dicom Server database that are to be sent to remote systems are converted to instances of the corresponding SOP Storage class(es). Images are then sent sequentially to the remote system(s).

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4.1.2.3 QUERY A REMOTE DATABASE

4.1.2.3.1 ASSOCIATED REAL WORLD ACTIVITY

The user selects the corresponding AE Tab from the Search Page, queries the AE and then press the “Search” button.

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

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

4.1.2.3.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP QUERY CLASS

Ez Dicom Server 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:

Study Root Query/Retrieve: Supported Keys			
Level	Description	Tag	Type
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	R
Study	Patient's Name	(0010,0010)	R
Study	Patient ID	(0010,0020)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0008,000D)	U
Study	Modalities in Study	(0008,0061)	O




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Study	Referring physician's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Patient's Age	(0010,1010)	O
Study	Number of Patient Related Studies	(0020,1200)	O
Study	Number of Patient Related Series	(0020,1202)	O
Study	Number of Patient Related Instances	(0020,1204)	O
Series	Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Number of Series Related Instances	(0020,1209)	O
Image	Instance Number	(0020,0013)	R
Image	SOP Instance UID	(0008,0018)	O
Image	SOP Class UID	(0008,0016)	U

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4.1.2.4 RETRIEVE FROM A REMOTE SYSTEM

4.1.2.4.1 ASSOCIATED REAL WORLD ACTIVITY

The user selects one or more studies from the Remote System list in the Search Page, then clicks the “Download” button.


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
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
RLELossless	1.2.840.10008.1.2.5

4.1.2.4.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS QUERY

Standard conformance is provided.

	<h2>DICOM Conformance Statement</h2>	Doc. Ref. : CONF-EZDSERVDICOM-EN
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4.1.3 Association Acceptance Policy

Ez Dicom Server accepts associations for the activities listed below:

- DICOM communication verification between Ez Dicom Server and a remote system.
- Image transfer from a remote system to Ez Dicom Server.
- Processing remote system queries.
- Initiation of image transfer to a remote system in response to a request for retrieval.

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 Dicom Server Software implements the verification service class as SCP.

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	SCP	None
Verification	1.2.840.10008.1.1	Explicit VR, Little Endian	1.2.840.10008.1.2.1	SCP	None
Verification	1.2.840.10008.1.1	Explicit VR, Big Endian	1.2.840.10008.1.2.2	SCP	None

4.1.3.1.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS VERIFICATION

Ez Dicom Server provides standard conformance.

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	<h3>Ez Dicom Server</h3>	Version : 3.0.1.x


4.1.3.2 RECEIVE IMAGES FROM A REMOTE SYSTEM

4.1.3.2.1 ASSOCIATED READ-WORLD ACTIVITY

A remote system sends instances to Ez Dicom Server. Once the transfer is completed the new instances are stored in the local database and can be queried for.


4.1.3.2.2 ACCEPTED PRESENTATION CONTEXT

Presentation Context Table			
Abstract Syntax	UID	Role	Extended Negotiation
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	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 Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	SCP	None
Digital Mammography 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
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	SCP	None
RETIRED Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	SCP	None
RETIRED Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	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
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	SCP	None
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	SCP	None
Positron Emission Tomography Image 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
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	SCP	None

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GE Private DICOM 3D Object	1.2.840.113619.4.26	SCP	None
Key Object Selection	1.2.840.10008.5.1.4.1.1.88.59	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
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-EZDSERVDICOM-EN
	<h3>Ez Dicom Server</h3>	Version : 3.0.1.x

4.1.3.2.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS STORAGE

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


The Ez Dicom Server 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 DICOM SERVER DATABASE

4.1.3.3.1 ASSOCIATED READ-WORLD ACTIVITY

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

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	<h3>Ez Dicom Server</h3>	Version : 3.0.1.x

4.1.3.3.2 ACCEPTED PRESENTATION CONTEXTS

Presentation Context Table			
Abstract Syntax		Role	Extended Negotiation
Name	UID		
Patient Root Query/Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	SCP	None
Study Root Query/Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	SCP	None
Patient Study Only Query/ Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	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 dicom Server 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.

Patient Root Query/Retrieve: Supported Keys			
Level	Description	Tag	Type
Patient	Patient's Name	(0010,0010)	R
Patient	Patient ID	(0010,0020)	U
Patient	Patient Birth Date	(0010,0030)	O
Patient	Patient's Sex	(0010,0040)	O
Patient	Number of Patient Related Studies	(0020,1200)	O
Patient	Number of Patient Related Series	(0020,1202)	O
Patient	Number of Patient Related Instances	(0020,1204)	O
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0008,000D)	U
Study	Modalities in Study	(0008,0061)	O
Study	Referring physician's Name	(0008,0090)	O



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Study	Study Description	(0008,1030)	O
Study	Patient's Age	(0010,1010)	O
Study	Number of Study Related Series	(0020,1206)	O
Study	Number of Study Related Instances	(0020,1208)	O
Series	Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Number of Series Related Instances	(0020,1209)	O
Image	Instance Number	(0020,0013)	R
Image	SOP Instance UID	(0008,0018)	O
Image	SOP Class UID	(0008,0016)	U

Study Root Query/Retrieve: Supported Keys			
Level	Description	Tag	Type
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	R
Study	Patient's Name	(0010,0010)	R
Study	Patient ID	(0010,0020)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0008,000D)	U
Study	Modalities in Study	(0008,0061)	O
Study	Referring physician's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Patient's Age	(0010,1010)	O
Study	Number of Patient Related Studies	(0020,1200)	O
Study	Number of Patient Related Series	(0020,1202)	O
Study	Number of Patient Related Instances	(0020,1204)	O
Series	Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Number of Series Related Instances	(0020,1209)	O
Image	Instance Number	(0020,0013)	R
Image	SOP Instance UID	(0008,0018)	O
Image	SOP Class UID	(0008,0016)	U
Patient/Study Only Query/Retrieve: Supported Keys			
Level	Description	Tag	Type
Patient	Patient's Name	(0010,0010)	R
Patient	Patient ID	(0010,0020)	U
Patient	Patient Birth Date	(0010,0030)	O
Patient	Patient's Sex	(0010,0040)	O

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Patient	Number of Patient Related Studies	(0020,1200)	O
Patient	Number of Patient Related Series	(0020,1202)	O
Patient	Number of Patient Related Instances	(0020,1204)	O
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0008,000D)	U
Study	Modalities in Study	(0008,0061)	O
Study	Referring physician's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Patient's Age	(0010,1010)	O
Study	Number of Study Related Series	(0020,1206)	O
Study	Number of Study Related Instances	(0020,1208)	O

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

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

4.1.3.3.4 PRESENTATION CONTEXT ACCEPTANCE CRITERION

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

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4.1.3.4 RETRIEVE FROM EZ DICOM SERVER

4.1.3.4.1 ASSOCIATED REAL WORLD ACTIVITY

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

4.1.3.4.2 ACCEPTED PRESENTATION CONTEXTS

Presentation Context Table			
Abstract Syntax		Role	Extended Negotiation
Name	UID		
Patient Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	SCP	None
Patient Root Query/Retrieve Model - GET	1.2.840.10008.5.1.4.1.2.1.3	SCP	None
Study Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCP	None
Study Root Query/Retrieve Model – GET	1.2.840.10008.5.1.4.1.2.2.3	SCP	None
Patient Study Only Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	SCP	None
Patient Study Only Query/Retrieve Model – GET	1.2.840.10008.5.1.4.1.2.3.3	SCP	None

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4.1.3.4.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS RETRIEVE

Standard conformance is provided.

In addition to this, Ez Dicom Server offers relational retrieve whereby for the Patient Root Query/Retrieve Model all studies of a particular patient can be retrieved by providing a Patient ID. Also, for both Patient Root Query/Retrieve Model and the Study Root Query/Retrieve Model, all images of a study/series can be retrieved by providing a Study/Series Instance UID.

4.1.3.4.4 PRESENTATION CONTEXT ACCEPTANCE CRITERION

Ez Dicom Server 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 STORAGE COMMITMENT SCP


4.1.3.5.1 ASSOCIATED REAL WORLD ACTIVITY

After sending instances to Ez Dicom Server, a remote system wants to confirm the proper storage of these instances in Ez Dicom Server. To this purpose the remote systems sends a storage commit request to Ez Dicom Server.

4.1.3.5.2 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

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


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Standard conformance is provided.

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

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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5 COMMUNICATION PROFILES

5.1 Supported Communication Stacks

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

5.2 OSI Stack


Not supported.

5.3 TCP/IP Stack

The only supported network protocol is TCP/IP. Any physical media supporting TCP/IP may be used to connect to Ez Dicom Server Software. Ez Dicom Server 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

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7 CONFIGURATION

Local AE titles are configurable.

7.1 AE Title / Presentation Address Mapping

The local AE title of the DICOM server (store SCP) can be changed through the “Configuration/Dicom/Local” Web Page. The AET’s of the move SCU and query/retrieve SCU processes can be set through the “Configuration/Dicom/Clients” Web Page. These pages are password protected.


7.2 Configurable Parameters

The following fields are configurable for the local AE:

- Local AE Title
- Listening TCP/IP Port (default 104)

The following fields are configurable for any remote AE:


- Remote AE
- Remote TCP/IP Port
- Remote IP Address

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8 SUPPORT OF EXTENDED CHARACTER SETS

Ez Dicom Server supports " ISO_IR 100"

Ez Dicom Server Software does not support multi byte character sets.

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9 ANNEXES

9.1 Media Storage

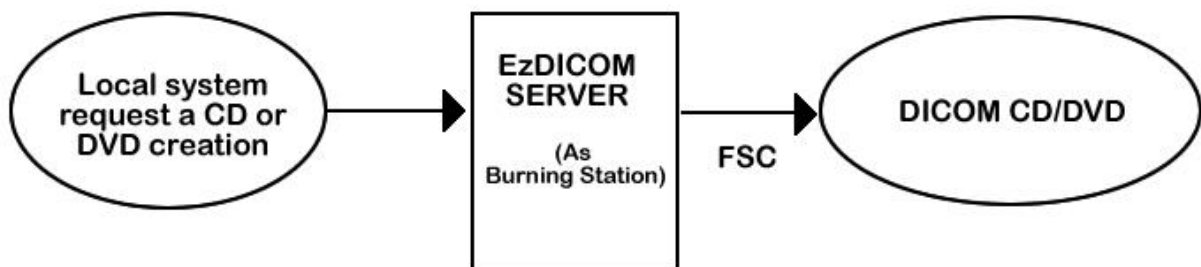
Media storage capabilities can be added to Ez Dicom Server (Ez Dicom Burning Station Product) when used in conjunction with a RImage or Primera Robot.

9.1.1 Implementation Model

Ez Dicom Burning Station product may be configured with CD only, DVD only or CD/DVD combination drives depending on the hardware it is associated with.

9.1.1.1 APPLICATION DATA FLOW

The DICOM interface for the CD-Medical product supports Media Storage implementation of the 120mm CD-R medium, 120 mm DVD-R and 120 mm DVD+R medium.
(Depends on robot hardware)




9.1.1.2 FUNCTIONAL DEFINITIONS OF APPLICATION ENTITIES

9.1.1.3 FUNCTIONAL DEFINITION OF MEDIA CREATION APPLICATION ENTITY

The product initializes a piece of CD/DVD medium, writes on it images (received using Storage or Retrieve Services) and a Media Storage Directory IOD (DICOMDIR) corresponding to the images on the medium.
Note that other, non DICOM files (Viewers, Reports etc.) may also be written on the media.

PS: The resultant Media will be fully compliant, except for the file system used, Joliet extensions will be used to accommodate long file names that are used in non Dicom files (Viewers, Reports etc.)

Multi-session writes are not supported.

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9.1.1.4 SEQUENCING OF REAL WORD ACTIVITIES

The user selects studies from the Local server or a remote server and clicks on the “Burn” button from the Web Interface.


OR

A schedule triggers the action based on a defined rule (delay after reception of a study, defined time of the day, full disc policy)

9.1.1.5 FILE META INFORMATION FOR IMPLEMENTATION CLASS AND VERSION

The attribute “File Meta Information Version” has the values “0,1”.

The attributes “Implementation Class UID” and “Implementation Version Name” have the values as specified in “Implementation Identifying Information ” on chapter 3.1.1.4

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9.2 Application Entity Specifications

9.2.1 CD/DVD Creation Application Entity Specification

CD/DVD Creation AE provides Standard Conformance to the DICOM Interchange Option of the Media Storage Service Class.

9.2.2 Real-World Activities

The Real-World Activities and invoked Application Profiles are listed in following table


Application Profiled			
Supported Application Profile	Real-World Activity	Roles	SC Option
STD-GEN-CD	Create CD-R	FSC	Interchange
STD-GEN-DVD-JPG STD-GEN-DVD-J2K	Create DVD	FSC	Interchange

EZ Dicom Burning Station acts as an FSC using interchange option to export SOP instances form local database to a CD-R or DVD medium.


If the selected studies to be exported don't fit on one media, additional medias are used : each media has it's own DICOMDIR file.

9.2.2.1 SUPPORTED SOP CLASSES AND TRANSFER SYNTAXES

IOD	SOP Class UID	Transfer Syntax and UID	FSC
Basic Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	YES
Composite Image & Stand-alone Storage	See table below	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	YES
Detached Patient Management	1.2.840.10008.3.1.2.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	NO

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Storage SOP Class	
SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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 Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
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
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
RETIRED Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
RETIRED Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Positron Emission Tomography Image 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
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
GE Private DICOM 3D Object	1.2.840.113619.4.26 (Stored as Image Directory Record)
Key Object Selection	1.2.840.10008.5.1.4.1.1.88.59

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9.2.2.2 BASIC DIRECTORY SOP CLASS


The following paragraphs describe how a value for the record keys from the various DICOMDIR records is derived.

9.2.2.2.1 PATIENT RECORD KEYS

Directory Record Keys for PATIENT Records			
Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in first Image Instance
Patient's Name	(0010,0010)	2	As in first Image Instance. When absent or empty: set to "NO NAME" value
Patient ID	(0010,0020)	1	As in first Image Instance
Patient's Birth Date	(0010,0030)	1C	As in first Image Instance
Patient's Sex	(0010,0040)	1C	As in first Image Instance

9.2.2.2.2 STUDY RECORD KEYS

Directory Record Keys for STUDY Records			
Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in first Image Instance.
Study Date	(0008,0020)	1	As in first Image Instance. When absent: Reception date for the study.
Study Time	(0008,0030)	1	As in first Image Instance. When absent: Reception Time for the study.
Accession Number	(0008,0050)	2	As in first Image Instance. When absent: insert zero length value.
Study Description	(0008,1030)	2	As in first Image Instance. When absent: insert zero length value.
Study Instance UID	(0020,000D)	1C	As in first Image Instance
Study ID	(0020,0010)	1	As in first Image Instance. When absent or empty: Set to "ABSENT".

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9.2.2.2.3 SERIES RECORD KEYS

Directory Record Keys for SERIES Records			
Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As in first Image Instance.
Modality	(0008,0060)	1	As in first Image Instance. When absent or empty: set to "OT" value.
Series Date	(0008,0021)	3	As in first Image Instance. When absent: Reception date for the Series.
Series Time	(0008,0031)	3	As in first Image Instance. When absent: Reception time for the Series.
Series Description	(0008,103E)	3	As in first Image Instance.
Institution Name	(0008,0080)	1C	As in first Image Instance.
Institution Address	(0008,0081)	1C	As in first Image Instance.
Performing Physicians' Name	(0008,1050)	1C	As in first Image Instance.
Series Instance UID	(0020,000E)	1	As in first Image Instance.
Series Number	(0020,0011)	1	As in first Image Instance. When empty set to "0" value.

9.2.2.2.4 IMAGES RECORD KEYS

Directory Record Keys for IMAGES Records			
Attribute Name	Tag	Type	Value taken from
Specific Character Set	(0008,0005)	1C	As Image Instance.
Image Type	(0008,0008)	1C	As Image Instance if present.
Calibration Image	(0050,0004)	1C	As Image Instance if present.
Referenced Image Sequence	(0008,1140)	1C	As Image Instance if present.
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Lossy Image Compression	(0028,2112)	1C	As Image Instance if present.
Rows	(0028,0010)	1	As Image Instance.
Columns	(0028,0011)	1	As Image Instance.
Frame of Reference UID	(0020,0052)	1C	As Image Instance if present.
Synchronization Frame of Reference UID	(0020,0200)	1C	As Image Instance if present.
Number of Frames	(0028,0008)	1C	As Image Instance if present.
Acquisition Time Synchronized	(0018,1800)	1C	As Image Instance if present.
Acquisition Datetime	(0008,002A)	1C	As Image Instance if present.


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Image Position (Patient)	(0020,0032)	1C	As Image Instance if present.
Image Orientation (Patient)	(0020,0037)	1C	As Image Instance if present.
Pixel Spacing	(0028,0030)	1C	As Image Instance if present.
Image Number	(0020,0013)	1	As in first Image Instance. When absent: set to value "0"

9.2.2.2.5 PRESENTATION STATE AND SR DOCUMENT AND KEY OBJECT DOCUMENT KEYS

For Presentation State Keys see PS 07_3 2007 page 984

For SR Document Keys see PS 07_3 2007 page 986

For Key Object Document Keys see PS 07_3 2007 page 987