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1   INTRODUCTION

1.1 Scope and field of application

This document is the DICOM conformance statement for the Ez Dicom Worklist Router Software of MPTronic. This document describes how the Ez Dicom Worklist Router 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 Worklist Router 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.

1.2 Important Considerations for the Reader

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

Integration of Ez Dicom Worklist Router 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 Worklist Router 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 Worklist Router. MPTronic reserves the right to modify the Ez Dicom Worklist Router 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.

1.3 Revision History

Version	Date	Author	Description
1.0	11-10-2022	Michael Melloff	Initial Version

1.4 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
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
ISDN	Integrated Service Digital Network
ISO	International Standards Organization
MWL	Modality Worklist
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

2 IMPLEMENTATION MODEL

2.1 Application Data Flow Diagram

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

- Responds to DICOM MWL Queries from Remote DICOM AEs by querying the corresponding remote MWL Server and routing the results
- Responds to Verification requests
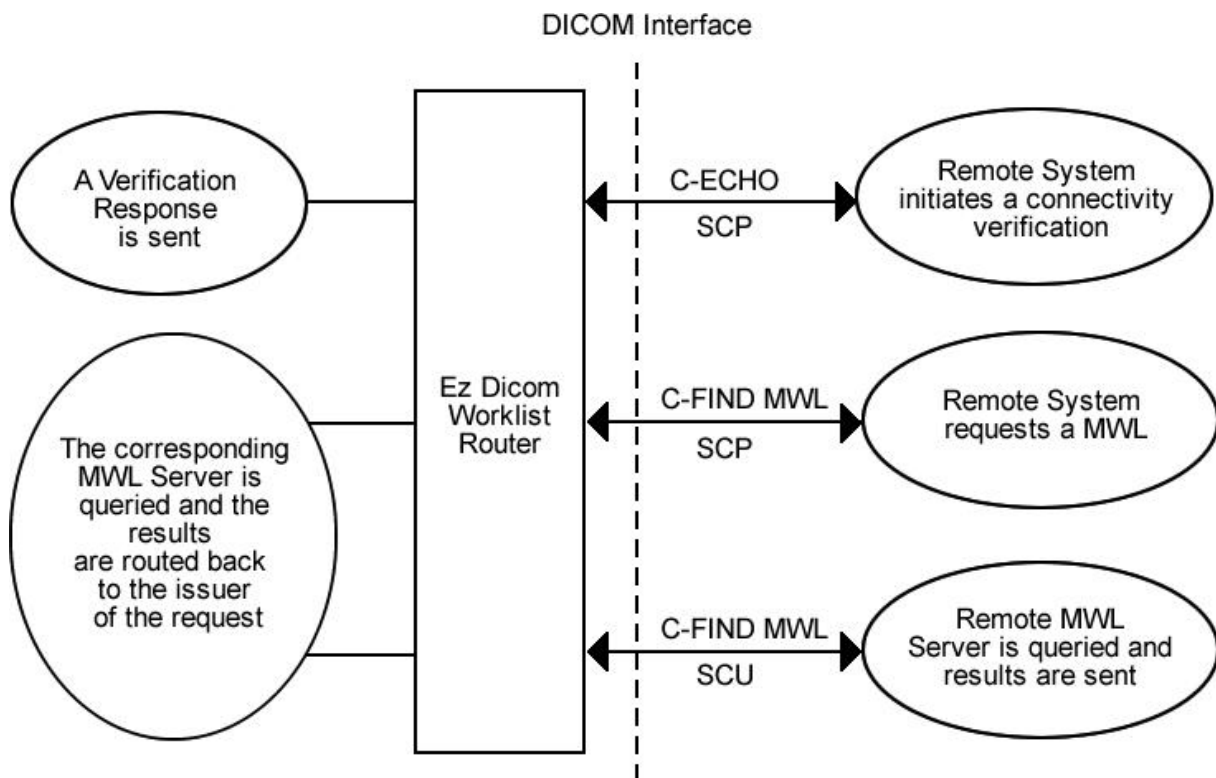
Application data flow diagram as SCP and SCU

2.2 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 Worklist Router software:

SCU	SCP
Query MWL	Connectivity verification
	Query MWL

The DICOM Server will accept associations with Presentation Contexts for Service Object Pair (SOP) classes of Query MWL (C-FIND MWL) and Verification Service Classes

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

● When performing as a Verification Service Class Provider (C-ECHO), Ez Dicom Worklist Router will respond to incoming connectivity requests from Remote DICOM AEs.
● When performing as a Query MWL Class Provider (C-FIND MWL), Ez Dicom Worklist Router will query the corresponding remote MWL Server and route the results to the issuer of the request.

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

● Query MWL (C-FIND MWL) to query a remote MWL Server and route back the results.

3   AE SPECIFICATIONS

3.1 Application DICOM Services AE Specifications

The Ez Dicom Worklist Router Software - AE provide standard conformance to the following DICOM V3.0 SOP classes. The SOP classes in the following table can be processed by Ez Dicom Worklist Router.

SOP Classes as SCU	
SOP Class Name	**SOP Class UID**
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31

SOP Classes as SCP	
SOP Class Name	**SOP Class UID**
Verification	1.2.840.10008.1.1
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31

3.1.1 Association Establishment Policies

3.1.1.1 GENERAL

The DICOM Application Context Name (ACN) proposed by Ez Dicom Worklist Router is 1.2.840.10008.3.1.1.

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

The Ez Dicom Worklist Router 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 Worklist Router Software. Ez Dicom Worklist Router Software uses the TCP/IP stack of the under laying operating system.

3.1.1.2 NUMBER OF ASSOCIATIONS

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

Therefore, Ez Dicom Worklist Router 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 Worklist Router can maintain.

3.1.1.3 ASYNCHRONOUS NATURE

Asynchronous operations on an association are supported.

3.1.1.4 IMPLEMENTATION IDENTIFYING INFORMATION

Ez Dicom Worklist Router provides a single Implementation Class Unique Identifier (UID) which is **"1.2.826.0.1.3680043.2.1065"** and the implementation version is **"MPTronic".**

3.1.2   Association Initiation Policy

Ez Dicom Worklist Router initiates associations for the following activities:

●   Queries of a remote DICOM MWL Server (3.1.2.1)

3.1.2.1 QUERY A REMOTE DICOM MWL SERVER

3.1.2.1.1   ASSOCIATED REAL WORLD ACTIVITY

Ez Dicom Worklist Router receives a MWL Query from a Remote AE system as described in 3.1.3.2.

3.1.2.1.2   PROPOSED PRESENTATION CONTEXTS

Presentation Context Table			
Abstract Syntax	**UID**	**Role**	**Extended Negotiation**
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	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

NOTE: Ez Dicom Worklist Router uses the Request Dicom Dataset from 3.1.3.2 to Query the remote MWL Server.

3.1.3   Association Acceptance Policy

Ez Dicom Worklist Router accepts associations for the activities listed below:

- DICOM communication verification between Ez Dicom Worklist Router and a remote system (3.1.3.1).
- Responding to MWL Queries (3.1.3.2).

3.1.3.1 VERIFICATION SCP

3.1.3.1.1   ASSOCIATED REAL-WORLD ACTIVITY

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

3.1.3.1.2   ACCEPTED PRESENTATION CONTEXTS

The Ez Dicom Worklist Router 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

3.1.3.1.3   SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP CLASS VERIFICATION

Ez Dicom Worklist Router provides standard conformance.

3.1.3.2 RESPONDING TO MWL QUERIES SCP

3.1.3.2.1 ASSOCIATED READ-WORLD ACTIVITY

A remote system issues a MWL C-FIND Query to the Ez Dicom Worklist Router.

3.1.3.2.2 ACCEPTED PRESENTATION CONTEXT

Presentation Context Table			
Abstract Syntax	**UID**	**Role**	**Extended Negotiation**
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	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

NOTE: **Ez Dicom Worklist Router uses results obtained from 3.1.2.1 to respond to the remote system that issued the initial MWL Query.**

4   COMMUNICATION PROFILES

4.1   Supported Communication Stacks

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

4.2 OSI Stack

Not supported.

4.3 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 Worklist Router Software. Ez Dicom Worklist Router Software uses the TCP/IP stack of the under laying operating system.

4.4 Point-to-Point Stack

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

5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

5.1 Standard Extended/Specialized/Private SOPs

Not applicable

5.2 Private Transfer Syntaxes

Not applicable

6   CONFIGURATION

6.1 AE Title / Presentation Address Mapping

The local AE title of the Ez Dicom Worklist Router is configurable in the «Config.xml» (Configuration/Server).

The Remote systems are configurable in the «Config.xml» (Configuration/Server/Clients).

The MWL Servers are also configurable in the «Config.xml» (Configuration/Destinations).

6.2 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 every MWL Server and Remote systems:

● Remote AE
● Remote IP Address
● Remote TCP/IP Port

7   SUPPORT OF EXTENDED CHARACTER SETS

Ez Dicom Worklist Router supports " ISO_IR 100"

Ez Dicom Worklist Router Software does not support multi byte character sets.