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	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 <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.
	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

The Ez Dicom Server Software is a universal solution for managing the archiving and communication of medical images with integrated workflow control. In order to offer these services Ez Dicom Server Software utilizes and supports different medical communication standards. Apart from DICOM services, which are described in a dedicated Conformance Statement [DICOM CS] Ez Dicom Server uses HL7 [HL7 V2.3] services to communicate with other medical systems.

Ez Dicom Server supports several HL7 messages in order to provide the following capabilities:


- Allow systems like HIS or RIS to update patient information on Ez Dicom Server.
- Allow the reception, extraction and storage of reports.

For more information about the system, visit <http://www.mptronic.com/>

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2.2 Revision History

Version	Date	Author	Description
1.0	25-11-2007	Gustavo Echenique	Initial Version
2.1.8	01-01-2020	Michael Melloff	New layout
3.0	28/07/2021	Michael Melloff	New software version
3.0.1	02/04/2024	Carole Tchikaya	Update of section 1, document date and version

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2.3 Audience

This HL7 conformance statement is targeted at people who are involved in integrating the Ez Dicom Server with complementary products, e. g. hospital or radiological information systems. A reader of this document should possess working knowledge of the HL7 standard [HL7 V2.3] and the IHE Radiology Technical Framework [IHE RTF 8.0].

2.4 Remarks

The HL7 standard neither requires manufacturers of HL7-compliant software or hardware vendors to provide a conformance statement nor describes what information should be included into such a statement. This document utilizes or modifies some notations of a DICOM conformance statement and adds additional content if necessary.


The fact that a product X has a HL7 conformance statement which is complementary to that of Ez Dicom Server does not automatically guarantee interoperability between said product X and Ez Dicom Server. A comparison of two complementary conformance statements is only one step towards determining whether two applications are interoperable; aside from this comparison other steps are inevitable, e. g. the analysis of interoperability requirements for the communicating applications, the creation of a test scheme to verify interoperability and the execution of this test scheme.

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2.5 Definitions, Terms and Abbreviations

The following list illustrates all terms and abbreviations which are used in this document. For an extensive definition of these terms and abbreviations, please refer to the HL7 or DICOM standard.

ADT	Admission – Discharge - Transfer
DICOM	Digital Imaging and Communications in Medicine
HL7	Health Level Seven
HIS	Hospital Information System
IHE	Integrating the Healthcare Enterprise
MWL	DICOM Modality Worklist
ORM	Order Request Message
ORU	Unsolicited Transmission of an Observation
RIS	Radiological Information System
TCP/IP	Transmission Control Protocol / Internet Protocol
[DICOM 2006]	NEMA Standards Publication PS 3.1-18: Digital Imaging and Communications in Medicine (DICOM), National Electrical Manufacturers Association, Rosslyn VA, 1992-2006
[DICOM CS]	MPTronic Software: Ez Dicom Server DICOM Conformance Statement, Version: 1.2, 2006, http://www.mptronic.com/downloads/EzDicomServerDicomConformance_en.pdf
[HL7 IG]	Health Level Seven: Health Level Seven Implementation Support Guide for HL7 Standard Version 2.3, 1998
[HL7 V2.3]	Health Level Seven: Application Protocol for Electronic Data Exchange in Healthcare Environments. ANSI Standard 2.3.1, Ann Arbor MI, USA, 1999
[IHE RTF 8.0]	Integrating the Healthcare Enterprise, IHE Radiology Technical Framework, Revision 8.0, 2007, http://www.ihe.net/Technical_Framework/

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3 NETWORKING

3.1 HL7 Protocol Support

Ez Dicom Server uses the HL7 protocol options as required by IHE. This includes the Minimal Lower Layer Protocol defined in Appendix C of the HL7 Implementation Support Guide [HL7 IG] and the Original Acknowledgement Mode defined in the HL7 standard [HL7 V2].

Several transfer modes are implemented: Socket communication based on TCP/IP and file based communication where files are transferred to specific directories.

3.2 Notations

The networking capabilities of the Ez Dicom Server are presented separately for each Ez Dicom Server component and for each HL7 message it supports. Every HL7 message is mainly described using tables that list all segments and fields of the message Ez Dicom Server is able to process. The column "OPT" in these tables uses some abbreviations listed in Table 1.

Abbreviation	Meaning
R	Required by HL7 standard
R2	Additionally required by IHE
C	Conditional, required under certain conditions
O	Optional


Table 1: Abbreviations for column "OPT"

Some segments or fields are optional in the HL7 standard but marked as "conditional" or "required" in the IHE framework. In such cases the stricter IHE requirement was selected. The corresponding condition for type "C" segments or fields can be found in the HL7 standard or the IHE framework.

3.3 Patient Update

The Patient Update Component reacts to an HL7 Patient Update (ADT^A08) or Patient Merge (ADT^A40) message sent from an external system. Ez Dicom Server processes these messages and updates all affected data (e. g. databases, images and reports) accordingly.

In the IHE profile "Patient Information Reconciliation" [IHE RTF 8.0] the Ez Dicom Server act as Image Manager. It supports the IHE transactions "Patient Update" and "Patient Merge" as Image Manager.

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3.3.1 Inbound Messages

Functional Area	Event Code	ADT Trigger Event
ADT	A08	Update patient information
ADT	A40	Merge patient – patient identifier list

Table 2: Supported ADT Events of the Patient Update Component

3.3.1.1 UPDATE PATIENT INFORMATION (A08)


When receiving an ADT^A08 message, Ez Dicom Server updates the patient demographics information according to the message content.

3.3.1.1.1 SUPPORTED SEGMENTS

The following segments are processed from an incoming ADT^A08 message:

Functional Area	Segment	Segment Name	OPT	Supported by Ez Dicom Server	Notes
ADT	MSH	Message Header	R	Yes	
ADT	EVN	Event Type	R	Not used	
ADT	PID	Patient Identification	R	Yes	
ADT	PV1	Patient Visit	R	Not used	
ADT	{{OBX}}	Observation/ results	C	Not used	
ADT	{{AL1}}	Allergy	C	Not used	

Table 3: Processed segments from ADT^A08

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3.3.1.1.2 SUPPORTED FIELDS

The following tables list the supported fields of each segment.

Supported Fields of the MSH segment

SEQ	OPT	ELEMENT NAME	Supported by Ez Dicom Server
1	R	Field Separator	Yes
2	R	Encoding	Yes
3	R	Sending Application	Yes
4	R	Sending Facility	Yes
5	R	Receiving Application	Yes
6	R	Receiving Facility	Yes
7	O	Date/Time of Message	
8	O	Security	
9	R	Message Type	Yes
10	R	Message Control ID	Yes
11	R	Processing ID	Yes
12	R	Version ID	Yes
13	O	Sequence Number	
14	O	Continuation Pointer	
15	O	Accept Acknowledgement Type	
16	O	Application Acknowledgement Type	
17	O	Country Code	
18	C	Character Set	
19	O	Principal Language of Message	
20	O	Alternate Character Set Handling Scheme	


Table 4: Supported fields of the MSH segment (in reference to [IHE Rad 8.0])

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Supported fields of the PID segment

SEQ	OPT	ELEMENT NAME	Supported by Ez Dicom Server
1	C	Set ID – Patient ID	
2	C	Patient ID	
3	R	Patient Identifier List	Used for identifying the patient. All studies of this patient will be changed.
4	C	Alternate Patient ID	
5	R	Patient Name	Updated
6	C	Mother's Maiden Name	
7	C	Date / Time of Birth	Updated
8	C	Sex	Updated
9	C	Patient Alias	
10	C	Race	
11	C	Patient Address	
12	C	County Code	
13	C	Phone Number – Home	
14	C	Phone Number – Business	
15	C	Primary Language	
16	C	Marital Status	
17	C	Religion	
18	C	Patient Account Number	
19	C	SSN Number – Patient	
20	C	Driver's License Number – Patient	
21	C	Mother's Identifier	
22	C	Ethnic Group	
23	C	Birth Place	
24	C	Multiple Birth Indicator	
25	C	Birth Order	
26	C	Citizenship	
27	C	Veterans Military Status	
28	C	Nationality	
29	C	Patient Death Date and Time	
30	C	Patient Death Indicator	

Table 5: Supported fields of the PID segment (in reference to [IHE Rad 8.0])

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3.3.1.2 MERGE PATIENT – INTERNAL ID (A40)

When Ez Dicom Server receives an ADT^A40 message, it merges two patients according to the patient identifier contained in this message.

3.3.1.2.1 SUPPORTED SEGMENTS

The following segments are processed from an incoming ADT^A40 message:

Functional Area	Segment	Segment Name	OPT	Supported by Ez Dicom Server	Notes
ADT	MSH	Message Header	R	Yes	
ADT	EVN	Event Type	R	Not used	
ADT	PID	Patient Identification	R	Yes	
ADT	PV1	Patient Visit	R	Not used	
ADT	MRG	Merge Information	R	Yes	

Table 6: Processed Segments from ADT^A40


3.3.1.2.2 SUPPORTED FIELDS

The following tables list the supported fields of each segment.

Supported Fields of the MSH segment: See Table 4.


Supported fields of the PID segment

SEQ	OPT	ELEMENT NAME	Supported by Ez Dicom Server
1	O	Set ID – Patient ID	
2	O	Patient ID	
3	R	Patient Identifier List	Updated
4	O	Alternate Patient ID	
5	R	Patient Name	Updated
6	O	Mother's Maiden Name	
7	C	Date / Time of Birth	Updated
8	O	Sex	Updated
9	O	Patient Alias	
10	O	Race	
11	O	Patient Address	
12	O	County Code	

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13	O	Phone Number – Home	
14	O	Phone Number – Business	
15	O	Primary Language	
16	O	Marital Status	
17	O	Religion	
18	O	Patient Account Number	
19	O	SSN Number – Patient	
20	O	Driver’s License Number – Patient	
21	O	Mother’s Identifier	
22	O	Ethnic Group	
23	O	Birth Place	
24	O	Multiple Birth Indicator	
25	O	Birth Order	
26	O	Citizenship	
27	O	Veterans Military Status	
28	C	Nationality	
29	C	Patient Death Date and Time	
30	C	Patient Death Indicator	

Table 7: Supported fields of the PID segment (in reference to [IHE Rad 8.0])

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Supported fields of the MRG segment

SEQ	OPT	ELEMENT NAME	Supported by Ez Dicom Server
1	R	Prior Patient Identifier List	Used for identifying the patient. All studies of this patient will be changed.
2	O	Prior Alternate Patient ID	
3	O	Prior Patient Account Number	
4	R2	Prior Patient ID	
5	O	Prior Visit Number	
6	O	Prior Alternate Visit ID	
7	R2	Prior Patient Name	

Table 8: Supported fields of the MRG segment (in reference to [IHE Rad 8.0])

3.4 Report Management


Ez Dicom Server is able to receive and store reports. In order to accomplish this, Ez Dicom Server uses a java based interface to define:

- How a received report is mapped to a DICOM study. This is usually achieved by using the DICOM "Accession Number"
- If a received report is a "multiline report" (one OBX segment by line) or a "singleline report"(one OBX segment only where lines are separated by a defined character (e.g. ~))

3.4.1 Inbound Messages

HL7 Message	Event Code	Description
ORU	R01	Unsolicited Transmission of an Observation Message

Table 9: Supported ORU message for report inclusion

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3.4.1.1 UNSOLICITED TRANSMISSION OF AN OBSERVATION MESSAGE (R01) – REPORT MESSAGE

3.4.1.1.1 SUPPORTED SEGMENTS

Functional Area	Segment	Segment Name	OPT	Supported by Ez Dicom Server	Notes
ORU	MSH	Message Header	R	Yes	
ORU	PID	Patient Identification	R	Yes	
ORU	PV1	Patient Visit	R	Not used	
ORU	OBR	Observations Report ID	R	Yes	
ORU	OBX	Observation Result	R	Yes	


Table 10: Processed Segments from ORU^R01

3.4.1.1.2 SUPPORTED FIELDS

Supported Fields of the MSH segment: See Table 4.

Supported fields of the PID segment

SEQ	OPT	ELEMENT NAME	Supported by Ez Dicom Server
1	O	Set ID – Patient ID	
2	O	Patient ID	Used
3	R	Patient Identifier List	
4	O	Alternate Patient ID	
5	R	Patient Name	
6	O	Mother’s Maiden Name	
7	R2	Date / Time of Birth	
8	R2	Sex	
9	O	Patient Alias	
10	R2	Race	
11	O	Patient Address	
12	O	County Code	
13	O	Phone Number – Home	
14	O	Phone Number – Business	
15	O	Primary Language	
16	O	Marital Status	
17	O	Religion	


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18	C	Patient Account Number	
19	O	SSN Number – Patient	
20	O	Driver’s License Number – Patient	
21	O	Mother’s Identifier	
22	O	Ethnic Group	
23	O	Birth Place	
24	O	Multiple Birth Indicator	
25	O	Birth Order	
26	O	Citizenship	
27	O	Veterans Military Status	
28	C	Nationality	
29	C	Patient Death Date and Time	
30	C	Patient Death Indicator	

Table 11: Supported fields of the PID segment (in reference to [IHE Rad 8.0])


Supported fields of the OBR segment

SEQ	OPT	ELEMENT NAME	Supported by Ez Dicom Server
1	R	Set ID - OBR	
2	R	Placer Order Number	
3	R	Filler Order Number	Dicom Accession Number is stored in this field
4	R	Universal Service ID	
5	X	Priority	
6	X	Requested Date/time	
7	R	Observation Date/Time	
8	O	Observation End Date/Time	
9	O	Collection Volume	
10	O	Collector Identifier	
11	O	Specimen Action Code	
12	O	Danger Code	
13	O	Relevant Clinical Info	
14	C	Specimen Received Date/Time	
15	O	Specimen Source	
16	O	Ordering Provider	
17	O	Order Callback Phone Number	
18	O	Placer field 1	
19	O	Placer field 2	
20	O	Filler Field 1	
21	O	Filler Field 2	
22	C	Results Rpt/Status Chng - Date/Time	
23	O	Charge to Practice	

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24	O	Diagnostic Serv Sect ID	
25	R	Result Status	
26	O	Parent Result	
27	O	Quantity/Timing	
28	O	Result Copies To	
29	O	Parent	
30	O	Transportation Mode	
31	O	Reason for Study	
32	O	Principal Result Interpreter	
33	O	Assistant Result Interpreter	
34	O	Technician	
35	O	Transcriptionist	
36	O	Scheduled Date/Time	
37	O	Number of Sample Containers	
38	O	Transport Logistics of Collected Sample	
39	O	Collector's Comment	
40	O	Transport Arrangement Responsibility	
41	O	Transport Arranged	
42	O	Escort Required	
43	O	Planned Patient Transport Comment	

Table 12: Supported fields of the OBR segment (in reference to [IHE Rad 8.0])


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Supported fields of the OBX segment

SEQ	OPT	ELEMENT NAME	Supported by Ez Dicom Server
1	R	Set ID - OBX	
2	R	Value Type	TX value only
3	R	Observation Identifier	
4	C	Observation Sub-ID	
5	R	Observation Value	Report is stored in this field
6	O	Units	
7	O	References Range	
8	O	Abnormal Flags	
9	O	Probability	
10	O	Nature of Abnormal Test	
11	R	Observ Result Status	
12	O	Date Last Obs Normal Values	
13	O	User Defined Access Checks	
14	O	Date/Time of the Observation	
15	O	Producer's ID	
16	O	Responsible Observer	Used if present
17	O	Observation Method	


Table 13: Supported fields of the OBX segment (in reference to [IHE Rad 8.0])

One OBX segment with line separators or multiples OBX segments, one by line, can be used.

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4 SUPPORTED CHARACTER SETS

Ez Dicom Server supports the ISO 8859 character set.

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5 CONFIGURATION

5.1 Default Server Configuration

Listener Type: LLP Listener

Listener Port: 6661

Start of Message Char: 0x0B

End of Message Char: 0x1C

Record Separator Char: 0x0D

End of Segment Char: 0X0D

Successful ACK Code: AA

Error ACK Code: AE (an Error Occurred Processing Message)

Rejected ACK Code: AR (Message Rejected)

All these values can be modified in the java based server configuration.