HL7 CONFORMANCE HL7 PROXY 1.3.2

REVISION 05

HL7 CONFORMANCE STATEMENT

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1 INTRODUCTION

Purpose and intended audience

This document is the HL7 Conformance Statement for the HL7 component of the Brainlab HL7 Proxy. It gives a compact view of the HL7 interface provided by the HL7 Proxy to create DICOM worklist from inbound HL7 message and send HL7 messages out for successful data export.

The intended audience of the document is involved with system integration and/or software design. The intended audience is assumed to have a basic understanding of HL7, its terminology and concepts.

Related Documents

- HL7 Messaging Standard, Versions 2.7.1, 2.5.X, 2.3.1 see www.hl7.org
- HL7 Proxy service documentation

Abbreviations and Acronyms

Abbreviation	Meaning
ACK	Acknowledgement
ADT	Admission, Discharge, Transfer
DICOM	Digital Imaging & Communication in Medicine
HIS	Hospital Information System
HL7	Health Level Seven
MLLP	Minimum Lower Layer Protocol
MSH	Message Header segment
MWL	DICOM Modality Worklist
ORM	Order Request Message
ORU	Observation Results – Unsolicited message
PID	Patient Identifier

Table 1: Abbreviations

2 IMPLEMENTATION DETAILS

HL7 Version

The HL7 Proxy 1.3.2 supports the HL7 messaging standards 2.7.1, 2.5.X and 2.3.X

General message syntax

The HL7 Proxy 1.3.2 supports the definition of control characters in the first two sections of the Message Header (MSH) segment of a message. The typical values of the separator characters are given in table 2.

Separator Characters	Suggestion
Segment Terminator	<cr>
Field Separator	|
Component Separator	^
Subcomponent Separator	&
Repetition Separator	~
Escape Character	\

Table 2: HL7 message separator characters

Sending and receiving HL7 messages (MLLP)

HL7 messages can be sent to the HL7 Proxy via the Minimal Lower Layer Protocol, defined in the HL7 standard. The MLLP uses TCP/IP to receive and send messages. The predefined port for the MLLP communication is port 2575, the predefined character encoding format is ISO 8859/1.
The values of the Port and character encoding can be changed in the HL7 Proxy configuration.

3 INBOUND MESSAGES

Supported Trigger Events

The HL7 interface of the HL7 Proxy supports receiving ADT, SIU and ORM messages. The supported trigger events and mapping of the HL7 fields can be configured in the settings of the Brainlab HL7 Proxy.

Supported ADT Events

Per default, the Brainlab HL7 Proxy supports the following ADT message types:

Message type	Description
ADT^A08	Update patient information
ADT^A40	Merge patient by ID

Table 3: Supported ADT message types

3.1.1 ADT^A08: Update patient information

If the data of an existing patient is changed (e.g. a name change), an ADT^A08 message is sent. All existing worklist jobs for the related patient ID will be updated accordingly.
Per default, the Brainlab HL7 Proxy uses the following message fields:

Segment	Description
MSH-1	Field separator
MSH-2	Separator characters
MSH-9	Identification of message type
PID-3^1	Patient ID (used for identification, cannot be changed)
PID-5	Patient Name
PID-7	Patient date of birth
PID-8	Patient sex

Table 4: ADT^A08 message fields

3.1.2 ADT^A40: Merge patient by ID

If two patients are merged, which is also the case if the ID of an existing patient is changed, an ADT^A40 message is sent.
Per default, the Brainlab HL7 Proxy uses the following message fields:

Segment	Description
MSH-1	Field separator
MSH-2	Separator characters
MSH-9	Identification of message type
PID-3^1	New Patient ID
PID-5	New Patient Name
PID-7	New Patient date of birth
PID-8	New Patient sex
MRG-1^1	Old Patient ID

Table 5: ADT^A40 Merge patient by ID

Supported ORM Events

Per default, the Brainlab HL7 Proxy supports the following ORM message type:

Message type	Description
ORM^O01	Order message

Table 6: Supported ORM message type

3.1.3 ORM^O01: Order message

If an order is placed to the Brainlab system with the HL7 Proxy in order to create a worklist entry or remove a worklist entry, an ORM^O01 message is sent. The default documentation study of a created worklist entry is named after the requested procedure description.
Per default, the Brainlab HL7 Proxy uses the following message fields:

Segment	Description
MSH-1	Field separator
MSH-2	Separator characters
MSH-9	Identification of message type
PID-3^1	Patient ID
PID-5	Patient Name
PID-7	Patient date of birth
PID-8	Patient sex
PV1-10	Hospital Service: Optional, only required if routing present is used from HL7
ORC-1	Determine action: “NW” -> create worklist entry, “XO” -> create/update worklist entry, “CA” -> remove worklist entry
ORC-2	Accession Number
ORC-5	Order Status: Optional, only required if Patient/Exam Status mapping is to be done.
ORC-7^4	Start date & time of treatment (required only for “XO”)
ORC-13^2	Station name and AET (required only for “XO”)
ORC-13^6	Requested procedure description (required only for “XO”)
OBR-34	Technician: Optional, only to use when required mapping for Performing Physician.

Table 7: ORM^O01 message fields

Supported SIU Events

Per default, the Brainlab HL7 Proxy supports the following SIU message types:

Message type	Description
SIU^S12	Notification of new appointment booking
SIU^S13	Notification of appointment rescheduling
SIU^S14	Notification of appointment modification
SIU^S15	Notification of appointment cancellation

Table 8: Supported SIU message types

3.1.4 SIU^S12: Notification of new appointment booking

If an order is placed to the Brainlab system with the HL7 Proxy in order to create a worklist entry, an SIU^S12 message is sent. The default documentation study of a created worklist entry is named after the requested procedure description.
Per default, the Brainlab HL7 Proxy uses the following message fields:

Segment	Description
MSH-1	Field separator
MSH-2	Separator characters
MSH-9	Identification of message type
SCH-2	Accession number
SCH-11^4	Start date & time of treatment
PID-3^1	Patient ID (used for identification, cannot be changed)
PID-5	Patient Name
PID-7	Patient date of birth
PID-8	Patient sex
PV1-2	Patient Class: optional, only required if Patient or Exam Status mapping is used. if value of the field is “E” or “I” status will be set to Active, else to Scheduled.
PV1-10	Hospital Service: Optional, only required if routing preset is used from HL7
PV1-11	Temporary Location: Optional, only Used if User Groups mapping is used.
AIL-3^2	Station name and AET
AIS-3^2	Requested procedure description
AIP-3	Personnel Resource ID – Can be used for Mapping Performing Physician

Table 9: SIU^S12, SIU^S13 and SIU^S14 message fields

3.1.5 SIU^S13: Notification of appointment rescheduling

If an order is placed to the Brainlab system with the HL7 Proxy in order to reschedule a worklist entry, an SIU^S13 message is sent. The default documentation study of a created worklist entry is named after the requested procedure description.
Per default, the Brainlab HL7 Proxy uses the message fields as in Table 9: .

3.1.6 SIU^S14: Notification of appointment update

If an order is placed to the Brainlab system with the HL7 Proxy in order to update a worklist entry, an SIU^S14 message is sent. The default documentation study of a created worklist entry is named after the requested procedure description.
Per default, the Brainlab HL7 Proxy uses the message fields as in Table 9: .

3.1.7 SIU^S15: Notification of appointment cancellation

If an order is placed to the Brainlab system with the HL7 Proxy in order to remove all worklist entries with a specific requested procedure ID, an SIU^S15 message is sent. Per default, the Brainlab HL7 Proxy uses the following message fields:

Segment	Description
MSH-1	Field separator
MSH-2	Separator characters
MSH-9	Identification of message type
SCH-2	Requested procedure ID to remove

Table 10: SIU^S15 message fields

Acknowledgment Behavior

The Brainlab HL7 Proxy reacts with an HL7 acknowledgement (ACK) message to all received messages.

If HL7 messages unsupported by the Brainlab HL7 Proxy are received, the unsupported message is stored on the system and an acknowledgement message is sent in order not to block the HL7 message queue.

4 OUTBOUND MESSAGES

Supported Trigger Events

The HL7 interface of the HL7 Proxy supports sending ORU messages. The supported trigger event for sending HL7 messages is the export of patient data by the DICOM Proxy, e.g. storing documentation data like videos or screenshots to a PACS archive system of the hospital. The mapping of the DICOM fields to HL7 fields can be configured in the settings of the HL7 Proxy.

Supported ORU Events

Per default, the Brainlab HL7 Proxy supports the following ORU message types:

Message type	Description
ORU^R01	Observation Result Unsolicited

Table 11: Supported ORU message

4.1.1 ORU^R01: Observation Result Unsolicited

If the DICOM Proxy exports patient documentation, e.g. videos or screenshots to a PACS, an ORU^R01 message is sent. Per default, the message contains the following fields:

Segment	Description	Default Content
MSH-1	Field separator	'|'
MSH-2	Separator characters	'^~\&'
MSH-3	Sending Application	'BLAB'
MSH-4	Sending Facility	'KOMSRV'
MSH-7	Date/Time Of Message	YYYYMMDDHHMMSS
MSH-9	Identification of message type	'ORU^R01'
MSH-10	Message Control ID	
MSH-11	ProcessingID *(has to be changed to 'P' by service)*	'D'
MSH-12	VersionID	'2.7.1'
PID-3^1	Patient ID (used for identification, cannot be changed)	Exported from DICOM patient ID
PID-5	Patient Name	Exported from DICOM patient Name
PID-7	Patient date of birth	Exported from DICOM patient Date of birth
PID-8	Patient sex	Exported from DICOM patient sex
PV1	Per default, the PV1 segment of the received ORM message is resent. If no ORM message was received, the following applies:	
PV1-1	Set ID	'1'
PV1-2	Patient Class ID	'E'
OBR-1	Set ID	'1'
OBR-2	Placer Order Number	Exported DICOM study accession number
OBR-3	Placer Filler Number	Exported DICOM study accession number
OBR-4	Universal Service Identifier	'IMGDOC^Intraop.Bilddokumentation'
OBR-7	Observation Date/Time	YYYYMMDDHHMMSS
OBX-1	Set ID	'1'
OBX-2	Value Type	'TX'
OBX-5	Observation Value	Exported DICOM study description
OBX-11	Observation Result Status	'F'

Table 12: ORU^R01 message fields

Expected Acknowledgment Behavior

The Brainlab HL7 Proxy expects an HL7 acknowledgement (ACK) message for all sent messages.

5 APPENDIX: EXAMPLE HL7 MESSAGES

ADT

5.1.1 ADT^A08

```
MSH|^~\&|ISH|0015|SUBSYS||20130201114517||ADT^A08|201302011453200834581|P|2.7.1||NP12
I0|AL|NE|DE|8859/1
EVN|A08|20111122143434||02
PID||160356186|0031007513^2^M11||DOE^JOHN^^^^||19990316|M
PV1||T|OR^01^^XYZ|R||^^|^^^^^^|^^^^^^^^&&^^^^^|^^^^^^^^&&^^^^^|||||0000042000|||||0051
008500^4^M11||K|||K||||||||||||||||||||20111122143434|||||00001|AU
```

5.1.2 ADT^A40

```
MSH|^~\&|ISH|0015|SUBSYS||20130201114517||ADT^A40|201302011453200834581|P|2.7.1||NP12
I0|AL|NE|DE|8859/1
EVN|A40|20141122143435||02
PID|||123456^^^||DOE^JANE||20101109|F
MRG|0031007513^2^M11
PV1||T|OR^01^^XYZ|R||^^|^^^^^^|^^^^^^^^&&^^^^^|^^^^^^^^&&^^^^^|||||0000042000|||||0051
008500^4^M11||K|||K||||||||||||||||||||20111122143434|||||00001|AU
```

ORM

```
MSH|^~\&|OPS|004^0015|ANAE||20120702110548||ORM^O01|20120702110548248320|P|2.5.1||||||

PID|||0021002035||Doe^Jane|Doe|19901010|F|||^^Berlin^^12345^DE||||||||||||||||||
PV1||T|OR^01^^XYZ|R||^^|^^^^^^|^^^^^^^^&&^^^^^|^^^^^^^^&&^^^^^|||||0000042000|||||0051
008500^4^M11||K|||K||||||||||||||||||||20111122143434|||||00001|AU
ORC|XO|0000053031|0000053031|2010002369|IP||^^^20120704||20120702110548|||M00815^
Doe^John|CG^00^02^20120704080000^Diagnose^Operation GH Allgemeine Chirurgie||||||
```

SIU

5.1.3 SIU^S12

```
MSH|^~\&|OPTIME|SWE|PYXSUP|SWE|20140916160657|DOE|SIU^S12|482|T|2.7.1|||||||||
SCH||368486|||||||6060|S|^^^20140917100500|||||||||DOE^DOE^JANE^J^|||||Sch^Scheduled^S
CHEDULING||
PID|1||1001870569^^^EPICMRN^||DOE^JANE||20111223|F|||123 DOE AVE
ROAD^^SEATTLE^WA^12345^US^^^KING|KING|(312)555-5555^^H||ENG|UNKNOWN|51||111-11-
1111|||UNKNOWN|||||||N||
PV1||O|||||||||||||||||200045463|||||||||||||||||||||||||||||||
RGS|1||1
AIS|1||1680^CORRECTION BUNION|20140917102000|900|S|4260|S||||
AIL|1||^F SDS  1^^F SDS
AIP|1||120734^DOE^JANE^A^|1.1^Primary||20140917102000|900|S|4260|S
```

5.1.4 SIU^S13

```
MSH|^~\&|OPTIME|SWE|PYXSUP|SWE|20140916160657|DOE|SIU^S13|482|T|2.7.1|||||||||
SCH||368486|||||||6060|S|^^^20140917100500|||||||||DOE^DOE^JANE^J^|||||Sch^Scheduled^S
CHEDULING||
PID|1||1001870569^^^EPICMRN^||DOE^JANE||20111223|F|||123 DOE AVE
ROAD^^SEATTLE^WA^12345^US^^^KING|KING|(312)555-5555^^H||ENG|UNKNOWN|51||111-11-
1111|||UNKNOWN|||||||N||
PV1||O|||||||||||||||||200045463|||||||||||||||||||||||||||||||
RGS|1||1
AIS|1||1680^CORRECTION BUNION|20140917102000|900|S|4260|S||||
AIL|1||^F SDS  1^^F SDS
AIP|1||120734^DOE^JANE^A^|1.1^Primary||20140917102000|900|S|4260|S
```

5.1.5 SIU^S14

```
MSH|^~\&|OPTIME|SWE|PYXSUP|SWE|20140916160657|DOE|SIU^S14|482|T|2.7.1|||||||||
SCH||368486|||||||6060|S|^^^20140917100500|||||||||DOE^DOE^JANE^J^|||||Sch^Scheduled^S
CHEDULING||
PID|1||1001870569^^^EPICMRN^||DOE^JANE||20111223|F|||123 DOE   AVE
ROAD^^SEATTLE^WA^12345^US^^^KING|KING|(312)555-5555^^H||ENG|UNKNOWN|51||111-11-
1111|||UNKNOWN|||||||N||
PV1||O|||||||||||||||||200045463|||||||||||||||||||||||||||||||
RGS|1||1
AIS|1||1680^CORRECTION BUNION|20140917102000|900|S|4260|S||||
AIL|1||^F SDS  1^^F SDS
AIP|1||120734^DOE^JANE^A^|1.1^Primary||20140917102000|900|S|4260|S
```

5.1.6 SIU^S15

```
MSH|^~\&|OPTIME|SWE|PYXSUP|SWE|20140916160722|DOE|SIU^S15|483|T|2.7.1||||||||
SCH||368486|||||||6060|S|^^^20140917100500|||||||||DOE^DOE^JANE^J^|||||Not Sch^Not
Scheduled^SCHEDULING||
PID|1||1001870569^^^EPICMRN^||DOE^JANE||20111223|F|||123 DOE AVE
ROAD^^SEATTLE^WA^12345^US^^^KING|KING|(312)555-5555^^H||ENG|UNKNOWN|51||111-11-
1111|||UNKNOWN||||||||N||
PV1||O|||||||||||||||||200045463|||||||||||||||||||||||||||||
RGS|1||1
AIS|1||1680^CORRECTION BUNION|20140917102000|900|S|4260|S||||
AIL|1||^F SDS  1^^F SDS
AIP|1||120734^DOE^JANE^A^|1.1^Primary||20140917102000|900|S|4260|S
```

ORU

```
MSH|^~\&|BLAB|KOMSRV|KUM||20140617113413||ORU^R01|20140617113413393559|D|2.7.1||||||88
59/1
PID|||Patient_20140617_1_ID||Patient_20140617_1||20140205|M
PV1|1|I|ST^Room23||||M23342^Attending^Doctor^^^^Dr.med.||||||||n|||||||||||||||||||||
|||||||||||||||
OBR|1|201406171|201406171|IMGDOC^Intraop.Bilddokumentation|||20140618000000
OBX|1|TX|||Requested: Patient_20140617_1||||||F
```