



Medstrat PACS IHE Technical Framework Compliant HL7 Inbound Interface

Functional Specification



Introduction

This document serves as a functional specification and technical requirements for integrating other products with a Medstrat PACS via Health Level 7 (HL7).

This document adheres to the [IHE Technical Framework \(1\)](#). Please refer to the [HL7 specification \(2\)](#) for further details concerning HL7.

Implementation Type

The Medstrat echoes™ Server implements standard TCP/IP HL7 network interface. Batch-file submission of HL7 messages via a Network File System is not supported at this time.

The echoes™ Server is set to receive HL7 on port 5555 by default.

Filtering

Please note that per the IHE Technical Framework, “[t]he Image Manager and the Report Manager do not receive all Patient Registration events from the ADT System because it is not necessary for the Image Manager and Report Manager to be aware of all patients in the enterprise (since most will never have an imaging procedure).”

This means that only ORM or SIU messages scheduling a patient for a study are acceptable by the echoes™ server (Image Manager) and that echoes™ will instead reject any other message type. ADT messages are ONLY acceptable if the message exactly follows the conventions of an SIU message in that it sets a schedule for a patient to have an imaging study.

HL7 Acknowledgements

echoes™ sends an HL7 ACK message (MSA) after receiving a valid HL7 message and it sends a Negative ACK message (MSA) after receiving an invalid HL7 message.



HL7 Messages: Supported

ORM

This corresponds to Transaction RAD-4 of the [IHE Technical Framework \(1\)](#).

Events: An order for an image of a patient to be taken by a specific Application Entity on a given date.

NOTE: The PV1 segment may be omitted; in which case, today's date and a time of 23:45 will be used as default values.

ORM	Segment Meaning	Chapter in HL7 2.5
MSH	Message Header	2
PID	Patient Identification	3
PV1	Patient Visit	3
ORC	Common Order	4
OBR	Order Detail	4

SIU

This corresponds to Transaction RAD-48 of the [IHE Technical Framework \(1\)](#).

Events: A scheduled appointment for an image of a patient to be taken on a given date.

SIU	Segment Meaning	Chapter in HL7 2.3
MSH	Message Header	2
SCH	Scheduling Information	10
PID	Patient Identification	3
PV1	Patient Visit	3



ADT

This is maintained for backwards compatibility and must follow this exact specification to be considered acceptable. An ORM or an SIU message should be preferred over of an ADT message.

Events: A scheduled appointment for an image of a patient to be taken on a given date.

NOTE: The PV2 segment may be omitted; in which case, today's date and a time of 23:45 will be used as default values.

ADT	Segment Meaning	Chapter in HL7 2.3
MSH	Message Header	2
PID	Patient Identification	3
PV1	Patient Visit	3
PV2	Patient Visit (scheduling info)	3



Data Mapping

Partial determined by table 4.4-6 in the [IHE Technical Framework \(1\)](#)

Field Name	DICOM Tag	HL7 Segment: ORM	HL7 Segment: SIU	HL7 Segment: ADT
Study Date	(0008, 0020)	PV1-7[0..7]	SCH-11:3[0..7]	PV2-8[0..7]
Study Time	(0008, 0030)	PV1-7[8..11]	SCH-11:3[8..11]	PV2-8[8..11]
Accession Number	(0008, 0050)	ORC-2	SCH-2	PV1-1
CPT Code -or- Study Description	(0008, 1030)	OBR-31	SCH-7	PV2-31
Patient Name	(0010, 0010)	PID-5	PID-5	PID-5
Patient ID	(0010, 0020)	PID-3	PID-3	PID-3
Date of Birth	(0010, 0030)	PID-7	PID-7	PID-7
Patient Sex	(0010, 0040)	PID-8	PID-8	PID-8
Modality	(0008, 0060)	OBR-24	SCH-8	PV2-13
AE Title	(0040, 0001)	OBR-19		
Referring Physician	(0008, 0090)	PV1-8	PV1-8	PV1-8
Requesting Physician	(0032, 1032)	PV1-9	PV1-9	PV1-9

The DICOM tag value equivalents are taken from the HL7 message using the translation mapping above. The sender must make every attempt to provide an appropriate value for every DICOM field listed in this table for that message type.

The DICOM tag data in the table are formatted in big-endian byte order.

The HL7 mapping data in the table are formatted as SEGMENT-POSITION where SEGMENT is an HL7 message segment and POSITION is the index and subindices within that message segment where the actual value will be obtained. Some values of POSITION do not represent an individual position, but rather are a nested position or a range. Nested positions are represented as A:B where A is the main index and B is the subindex. Ranges are represented as [M..N] where the range M to N is the applied after having applied the previous indices. All



index values are zero-indexed (they start counting from zero). Segment names, such as “PID”, are included in the indexing and are always at index zero (0).

Data Formatting

The separators and special characters within the HL7 message are as follows:

Name	Character	Meaning
Field Separator		Separates message fields within a segment
Component Separator	^	Separates components within a field
Repetition Separator	~	Separates repeated items
Quote Char	“	Quotes values within a field
Subcomponent Separator	&	Separates subcomponents within a component

Workflow

When an HL7 message creates an appointment, the Accession Number is stored for future reference as the index to be used by future messages that wish to modify or cancel that same appointment.

If a modify or cancel message is received and there is no appointment in the worklist with a matching Accession Number, then the message is ignored.

Any HL7 message received is assumed to be concerning an appointment for an imaging procedure. No filtering is ever done. All HL7 messages are assumed to either create, modify, or cancel an appointment and all appointments will show up on the practice’s worklist at the modality. This means that, for example, sending the schedule for the physical therapy office to the othopedic office’s PACS will cause the physical therapy appointments to show up on the X-ray worklist. Be careful to only send HL7 messages concerning the schedule for imaging appointments!

If an appointment should only show up on one, specific modality (e.g., the practice’s MRI worklist), then send an ORM message and specify both the Modality **and** AE Title in the OBR segment.



MSH

The following fields are required:

Seq	Name	Len	Type	Description and Format Information
1	Field Separator	1	ST	
2	Encoding Characters	4	ST	^~\&
3	Sending Application	180	HD	Site specific
4	Sending Facility	180	HD	Site specific
5	Receiving Application	180	HD	Site specific
6	Receiving Facility	180	HD	Site specific
7	Date/Time of Message	26	TS	YYYYMMDDHHMMSS+0000
8	Security	40	ST	Site specific
9	Message Type	7	CM	ORM Create Order SIU^S12 Create Appointment SIU^S14 Update Appointment SIU^S15 Cancel Appointment SIU^S17 Delete Appointment ADT^A05 Create Appointment ADT^A08 Update Appointment ADT^A38 Cancel Appointment
10	Message Control ID	20	ST	Unique number from Interface parameters (First 5 characters)
11	Processing ID	3	PT	Identifier
12	Version ID	60	VID	HL7 Version
13	Sequence Number	15	NM	Unique number from Interface parameters.
15	Accept Ack Type	2	ID	AL

A sample MSH segment:

```
MSH|^~\&|MEDSTRAT ECHOES|MEDSTRAT|||19991206124637+0000^S|
NO SECURITY|ORM^O01|MEDSTRAT000000222|T|2.3|
000000000000222||AL|
```



PID

The following fields are required:

Seq	Name	Len	Type	Description and Format Information
3	Internal Patient ID	20	CX	Patient Identification (Internal)
5	Patient Name	48	XPN	Patient Name as: LAST^FIRST^MI
7	Date of Birth	26	TS	YYYYMMDD
8	Sex	1	IS	One of: M, F, or O

A sample PID segment:

```
PID||16439|+0004808|16439|DOE^JOHN^M||19701204|M||00003|999
NORTH ST^SUITE 3500^RALEIGH^NC^81305-0000||(719) 647-1459|
890-8675X03245||00001||16439|345634562|||||||
```

PV1

The following fields may be required:

Seq	Name	Len	Type	Description and Format Information
1	Visit Number	1	IS	Accession Number (ADT only)
7	Study Datetime	12	TS	YYYYMMDDHHMM (ORM only)
8	Attending Doctor	60	XCN	ID^LAST^FIRST^MI
9	Referring Doctor	60	XCN	ID^LAST^FIRST^MI

A sample PV1 segment from an SIU message:

```
PV1||P|^00705|R||00001||00001^ANDERSON,MD^THOMAS^D|
00002^SHEPHERD,MD^STEVEN^E|||||||00001|||
```




PV2

The following fields may be required:

Seq	Name	Len	Type	Description and Format Information
8	Study Datetime	12	TS	YYYYMMDDHHMM (ADT only)
13	Modality	10	ID	One of: CR, DR, DX, CT, MR, SC, or OT
31	Appointment Reason	200	CE	CPT Code -or- Study Description (ADT only)

A sample PV2 segment from an ADT message:

```
PV2|0002226^00001|||||^200909300230||OV^OFFICE VISIT|||
DX|||CHEST XRAY|||||LOW_LVL|||||71010||
```

SCH

The following fields are required for an SIU message:

Field	Name	Len	Type	Description and Format Information
2	Filler Schedule Request	75	EI	Accession Number (SIU only)
7	Appointment Reason	200	CE	CPT Code -or- Study Description (SIU only)
8	Modality	10	ID	One of: CR, DR, DX, CT, MR, SC, or OT
11	Study Datetime	12	TS	YYYYMMDDHHMM (SIU only)

A sample SCH segment from an SIU message:

```
SCH|0002226^00001|29472904|||||71010|CT|||^200902120330||
```



ORC

The following fields may be required:

Seq	Name	Len	Type	Description and Format Information
1	Order Control	2	ID	NW (New), XO (Update), CA (Cancel), SC (Schedule)
2	Accession Number	60	ST	Accession Number
5	Order Status	2	ID	Site specific
7	Quantity / Timing	200	TQ	^^^YYYYMMDDHHMMSS+000

A sample ORC segment from an ORM message:

```
ORC|NW|9586912|00575||SC||20081225150000+000|||
JOHNSON^SARAH^C||BCBS|1FLR203RM|312-555-1234|||AGH|
```

OBR

The following fields are required:

Seq	Name	Len	Type	Description and Format Information
19	AE Title	60	ST	Modality's Application Entity Title (e.g., MRI2)
24	Modality	10	ID	One of: CR, DR, DX, CT, MR, SC, or OT
31	Reason for Study	300	CE	CPT Code -or Study Description

A sample OBR segment from an ORM message:

```
OBR|01|12|00575|AFSD164|MED|||||411|LOW_LVL|||
ANDERSON^SCOTT^A, MD|312-555-4321|33||MR02|||||MR|||
20081225150000+000|||STND|72195|
```



Works Cited

1. "IHE Technical Framework Volume 2: Transactions", Revision 8.0 Final Text, Aug. 30th, 2007, ACC/HIMSS/RSNA.
2. "HL7 Messaging standard version 2.5.1: An Application Protocol for Electronic Data Exchange in Healthcare Environments", 2007, Health Level Seven, Inc.