Ensight™ HL7 Conformance Statement

v2.0

Contents

1 Introduction

1.1 Revision History

Date	Revision	Description
30 April 2024	01	Initial release of statement for Ensight v2.0. The following changes have been made since the release of the Curie v1.3 HL7 Conformance Statement: - Added details on Outbound HL7 messages. - Updated Product name.

1.2 Purpose

This document is an HL7 conformance statement describing the message structures supported by Ensight. The reader should have a working understanding of the HL7 standard, and this document should be read in conjunction with the standard.

1.3 Terms and Definitions

Informal definitions are provided for the following terms used in this Conformance Statement.
HL7: Health Level 7 – a set of standards for the exchange of clinical and administrative information among software applications used in healthcare settings.
MLLP: Minimal Lower Layer Protocol – defines the delimiters used to ensure the correct encapsulation of an HL7 message for exchange among software applications.
ORM: Order Request Message – the HL7 message used to convey the scheduling of orders in a healthcare institution.
ORU: Order Request Message – the HL7 message used to convey observation results.
TCP/IP: The industry standard Transmission Control Protocol / Internet Protocol widely used in computer networking.

2 Communication Profiles

2.1 TCP/IP Communications

Ensight receives HL7 messages over TCP/IP, using the Minimal Lower-Level Protocol (MLLP).

3 Overview

HL7 Message	HL7 version	Sender	Receiver
ORM/ACK - General Order Message (Event O01)	2.3+	No	Yes
ORU/ACK - Unsolicited Observation Message (Event R01)	2.3	Yes	No

4 Inbound Messages

4.1 Supported Events

4.1.1 Supported ORM Events

The ORM^O01 is the only code supported for an order message. The message is used by Ensight to drive prefetch of relevant prior studies.

Functional Area	Event Code	ORM Trigger Event
ORM	O01	General order message

The following segments are processed when Ensight receives an ORM message:

- PID
- OBR

4.2 Attribute Mappings

The following segments and fields are required for Ensight to handle ORM messages for prefetch.

4.2.1 PID Segment Mappings

Field	Field Name	Notes
PID-3	Patient ID	Used to indicate patient for prefetching relevant priors.

4.2.2 OBR Segment Mappings

Field	Field Name	Notes
OBR-5	Priority	Used to indicate a STAT exam for prioritizing prefetch jobs.
OBR-6	Requested Date / Time	Used for estimated exam date/time for scheduling prefetch jobs.
OBR-24	Diagnostic Service Section ID	Used as modality of exam for filtering prior exams for prefetch.

5 Outbound Messages

5.1 HL7 Standardized Results Notification Message

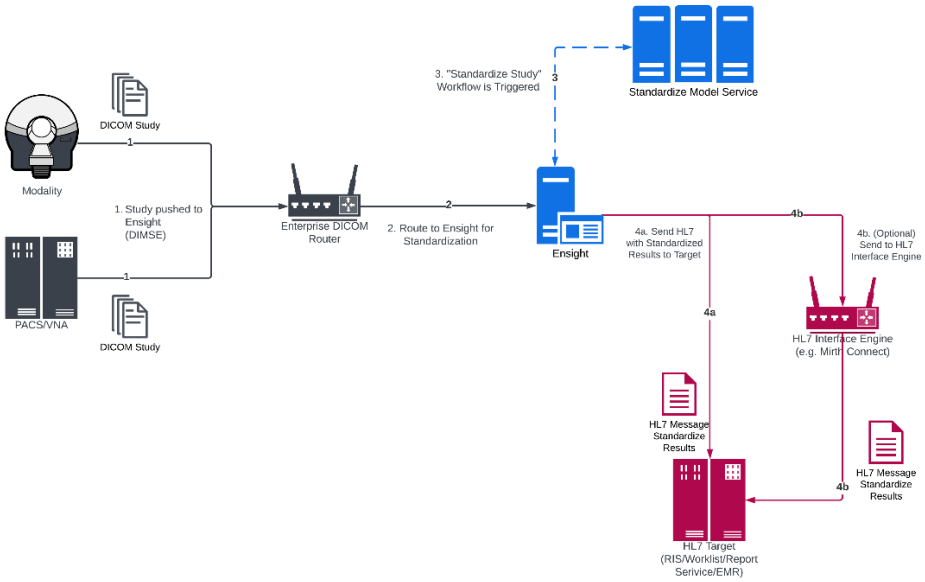
The Unsolicited Observation Message (ORU) is used for transmitting results from standardizing the associated DICOM study.

5.1.1 Trigger Event

Unsolicited Transmission of an observation message – ORU^R01

This message is sent after a DICOM study is pushed into Ensight, and a Standardization workflow is triggered. If an HL7 template is associated with that trigger, an HL7 message is generated based on the configured templated and sent unsolicited to the configured HL7 endpoint.

5.1.2 Workflow Overview



5.1.3 General Message Format

The following table details the general (default) message semantics:

Segments	Segment Name	Reference
MSH	Message Header	See *MSH Segment*
PID	Patient Identification	See *PID Segment*
PV1	Patient Visit	See *PV1 Segment*
OBR	Observations Request	See *OBR Segment*
OBX	Observation / Result	See *OBX Segment*

Note 1: The default ORU^R01 message can be adjusted through configuration.
Note 2: PV1 segment should not be used to update any information.

5.1.3.1.1 MSH Segment

Field	Field Name	Value
MSH-1	Field Separator	|
MSH-2	Encoding Characters	^~\&
MSH-3	Sending Application	Ensight
MSH-4	Sending Facility	*Configurable*
MSH-5	Receiving Application	*Configurable*
MSH-6	Receiving Facility	*Configurable*
MSH-7	Date / Time of Message	*Time when message is generated*
MSH-9.1	Message Type – Message Type	ORU
MSH-9.2	Message Type – Trigger Event	R01
MSH-10	Message Control ID	
MSH-11	Processing ID	P
MSH-12	Version ID	2.4

5.1.3.1.2 PID Segment

Field	Field Name	Value
PID-3	Patient ID	*Patient ID derived from the DICOM header.*
PID-5	Patient Name	*Patient Name derived from the DICOM header.*
PID-7	Patient Birth Date	*Patient Birth Date derived from the DICOM header.*
PID-8	Patient Sex	*Patient Birth Date derived from the DICOM header.*

5.1.3.1.3 PV1 Segment

Field	Field Name	Value
PV1-1	Set ID	
PV1-2	Patient Class	I Note: Arbitrary value to adhere to HL7 v2.3 specification. Do not use.

5.1.3.1.4 OBR Segment

Field	Field Name	Value
OBR-1	Set ID	
OBR-2	Place Order Number	*Accession Number derived from the DICOM header.*
OBR-3	Filter Order Number	*Accession Number derived from the DICOM header.*
OBR-8	Observation End Date/Time	*Date of Study Standardization*
OBR-25	Result Status	F

5.1.3.1.5 OBX Segment

5.1.3.1.6 OBX – Device Observer UID

Field	Field Name	Value
OBX-1	Set ID	
OBX-2	Value Type	ST
OBX-3.1	Observation Identifier – Identifier DICOM Code Value	121012
OBX-3.2	Observation Identifier – Text DICOM Code Meaning	Device Observer UID
OBX-3.3	Observation Identifier – Name of Coding System DICOM Coding Scheme Designator	DCM
OBX-8	Observation Value	1.2.826.0.1.3680043.9.7296.00860002304557
OBX-11	Observation Result Status	F

5.1.3.1.7 OBX – Device Observer Name

Field	Field Name	Value
OBX-1	Set ID	
OBX-2	Value Type	ST
OBX-3.1	Observation Identifier – Identifier DICOM Code Value	121013
OBX-3.2	Observation Identifier – Text DICOM Code Meaning	Device Observer Name
OBX-3.3	Observation Identifier – Name of Coding DICOM Coding Scheme Designator	DCM
OBX-8	Observation Value	Ensight
OBX-11	Observation Result Status	F

5.1.3.1.8 OBX – Device Observer Manufacturer

Field	Field Name	Value
OBX-1	Set ID	
OBX-2	Value Type	ST
OBX-3.1	Observation Identifier – Identifier DICOM Code Value	121014

OBX-3.2	Observation Identifier – Text DICOM Code Meaning	Device Observer Manufacturer
OBX-3.3	Observation Identifier – Name of Coding System DICOM Coding Scheme Designator	DCM
OBX-8	Observation Value	Enlitic
OBX-11	Observation Result Status	F

5.1.3.1.9 OBX – Study Instance UID

Field	Field Name	Value
OBX-1	Set ID	
OBX-2	Value Type	ST
OBX-3.1	Observation Identifier – Identifier DICOM Code Value	113014
OBX-3.2	Observation Identifier – Text DICOM Code Meaning	DICOM Study
OBX-3.3	Observation Identifier – Name of Coding System DICOM Coding Scheme Designator	DCM
OBX-8	Observation Value	*Study Instance UID derived from the DICOM header.*
OBX-11	Observation Result Status	F

5.1.3.1.10 OBX – Standardized Study Description

Field	Field Name	Value
OBX-1	Set ID	
OBX-2	Value Type	TX
OBX-3.1	Observation Identifier – Identifier DICOM Code Value	STUDYDESC
OBX-3.2	Observation Identifier – Text DICOM Code Meaning	ENDEX Study Description
OBX-3.3	Observation Identifier – Name of Coding System DICOM Coding Scheme Designator	99ENLITIC
OBX-8	Observation Value	*Standardized Study Description*
OBX-11	Observation Result Status	F

5.1.3.1.11 OBX – ENDEX Results (JSON)

Field	Field Name	Value
OBX-1	Set ID	
OBX-2	Value Type	TX
OBX-3.1	Observation Identifier – Identifier DICOM Code Value	RESULTSJSON
OBX-3.2	Observation Identifier – Text	ENDEX Results

	DICOM Code Meaning	
OBX-3.3	Observation Identifier – Name of Coding System DICOM Coding Scheme Designator	99ENLITIC
OBX-8	Observation Value	*A JSON representation of standardized results.* See Standardized Result Attributes – JSON Wrapped section (template: {ResultsFullJSON}
OBX-11	Observation Result Status	F

5.1.4 Examples

5.1.4.1.1 Example ORU^R01 for a standardized MR Study

MSH|^~\&|Ensight|HOSPITAL_SENDING|MIRTH|HOSPITAL_RECEIVING|202404271330||ORU^R01|22222222|P|2.3
PID|||PID1234||DOE^JOHN^A||19820719|M
PV1|1|I
OBR|1|ACC1234|ACC1234|ENDEXRESULTS^Endex Results^99ENLITIC|||||||||||||||||||||F
OBX|1|ST|121012^Device Observer UID^DCM|| 1.2.826.0.1.3680043.9.7296.00860002304557|||||F
OBX|2|ST|121013^Device Observer Name^DCM||Ensight|||||F
OBX|3|ST|121014^Device Observer Manufacturer^DCM||Enlitic|||||F
OBX|4|ST|113014^DICOM Study^DCM||1.2.826.0.1.3680043.9.7296.111.222.333.999|||||F
OBX|5|TX|STUDYDESC^Endex Study Description^99ENLITIC|1|MR ABDOMEN NONCON|||||F
OBX|6|TX|RESULTSJSON^Endex Results
Json^99ENLITIC|1|{"CdmStudyType":"DIAG","CdmStudyModality":"MR","CdmStudyModalities":"MR","CdmStudyAnatomy":"ABDOMEN","CdmStudyLaterality":"UNPAIRED","CdmStudyAngiogramFlag":"F","CdmStudyBinaryContrastFlag":"F","CdmStudyContrastDescriptor":"NonCon","CdmStudyPhaseCount":"0","CdmStudyViewCount":"2","CdmStudyGroupCount":"17","StandardizedSeriesCount":"17","StandardizedInstanceCount":"436","StandardizedStudyDescription":"MR ABDOMEN NONCON","OriginalStudyDescription":"MR ABDOMEN
NONCON","ContrastPresent":"false","CdmObjectImageWeightings":"STIR,T1,T2","CdmObjectAnatomies":"ABDOMEN","ObjectMRImageWeightings":"STIR,T1,T2","CdmObjectStandardViews":"CORONAL,SAGITTAL","ObjectMRContrastDescriptors":"NONE","OriginalSeriesDescriptions":"ABDOMEN T1 CORONAL C- THICK,ABDOMEN T2 SAGITTAL C- THICK,ABDOMEN STIR CORONAL C- THICK,ABDOMEN T1 SAGITTAL C-
THICK","ObjectAnatomies":"ABDOMEN","StandardizedSeriesDescriptions":"ABDOMEN T1 CORONAL C- THICK,LOCALIZER,ABDOMEN T2 SAGITTAL C-
THICK,ABDOMEN STIR CORONAL C- THICK,ABDOMEN T1 SAGITTAL C-
THICK","ObjectViews":"CORONAL,SAGITTAL","CdmObjectModalities":"MR","CdmObjectSliceThicknessDescriptors":"THICK","CdmObjectTypes":"SCOUT,VOLUME","ObjectImagePlanes":"CORONAL,SAGITTAL","ObjectModalities":"MR","ObjectMRSliceThicknessDescriptors":"THICK"}||||||F

5.1.4.1.2 Example ORU^R01 using Custom Message Format

An example ORU^R01 message (from section *Example ORU^R01 for a standardized MR Study*) recreated using templated values. For templated variable definitions see: *Custom Message Format*

```
MSH|^~\&|{PlatformName}|SendingFacility|{ReceiverApplication}|ReceivingFacility|{DateTime}||ORU^R01|{MessageControlID}|P|2.3
PID|||{PatientID}||{PatientName}||{PatientBirthDate}|{PatientSex}
PV1|1|I
OBR|1|{AccessionNumber}|{AccessionNumber}|ENDEXRESULTS^Endex Results^99ENLITIC|||||||||||||||||||F
OBX|1|ST|121012^Device Observer UID^DCM||{PlatformUID}|||||F
OBX|2|ST|121013^Device Observer Name^DCM||{PlatformName}|||||F
OBX|3|ST|121014^Device Observer Manufacturer^DCM||Enlitic|||||F
OBX|4|ST|113014^DICOM Study^DCM||{StudyInstanceUID}|||||F
OBX|5|TX|STUDYDESC^Endex Study Description^99ENLITIC|1|{StandardizedStudyDescription}|||||F
OBX|6|TX|RESULTSJSON^Endex Results Json^99ENLITIC|1|{ResultsFullJson}|||||F
```

5.1.5 Custom Message Format

In lieu of the default HL7 ORM^R01 notification message provided as part of a default installation of Ensight, a site may wish to construct a custom HL7 message using the templating capabilities of the platform.

This section describes available configuration

5.1.5.1.1 Available Template Variable for Mapping

5.1.5.1.2 General Attributes

5.1.5.1.3 DICOM Attributes

Any Patient and Study level attribute from the Study which triggered the workflow is available to be mapped to the outbound HL7 message.

5.1.5.1.3.1 DICOM Attributes – Tag Examples

Template Variable	DICOM Tag	Description
{PatientID}	Patient ID – (0010, 0020)	Example of picking out a Patient/Study-level tag using DICOM Tag keyword
{00100020}	Patient ID – (0010, 0020)	Patient/Study-level tags – tag id based addition.

5.1.5.1.3.2 DICOM Attributes – Tag Sequence Examples

Template Variable	DICOM Sequence Tag	Description
{ReferencedImageSequence .ReferencedSOPInstanceUID}	• Referenced Image Sequence – (0008, 1140) • Referenced SOP Instance UID – (0008, 1155)	Example of picking out the first value of Referenced SOP Instance UID tag within Referenced Image Sequence
{ReferencedImageSequence[2] .ReferencedSOPInstanceUID}	• Referenced Image Sequence – (0008, 1140) • Referenced SOP Instance UID – (0008, 1155)	Example of picking out the third value of Referenced SOP Instance UID tag within Referenced Image Sequence. Note: Item indexes follow zero-based numbering. That is, ReferencedImageSequence[2] refers to the third element.
{OriginalAttributesSequence[0] .ModifiedAttributesSequence[0] .PatientID}	• Original Attributes Sequence - (0400, 0561) • Modified Attributes Sequence - (0400, 0550) • PatientID - (0010, 0020)	Example of picking out a value from a multi-level DICOM Sequence.

5.1.5.1.4 Standardized Results

The following variables encapsulated various outputs from the Standardization process and can be mapped to the outgoing HL7 message.

5.1.5.1.4.1 Standardized Result Attributes – General Variables

Template Variable	Output Format	Description

{StandardizedStudyDescription}	String	The standardized study description
{StandardizedSeriesDescriptions}	String List (comma delimited)	List of all standardized series description (Chosen series description corresponds to an Object with the most number of instances)
{OriginalStudyDescription}	String	The original study description
{OriginalSeriesDescriptions}	String List (comma delimited)	List of all original series descriptions
{StandardizedSeriesCount}	Integer String	Number of standardized series
{StandardizedInstanceCount}	Integer String	Number of standardized instances
{ContrastPresent}	Boolean String	True if present, false otherwise

5.1.5.1.4.2 Standardized Result Attributes – Standardized Variables

Template Variable	Output Format	Description
{CdmObjectTypes}	String List (comma delimited)	Aggregated {CDM Object Types present in study, example: “VOLUME, SCOUT”
{CdmObjectAnatomies}	String List (comma delimited)	Aggregated {CDM Object Anatomies present in study, example: “WRIST, HAND”
{CdmObjectImageWeightings}	String List (comma delimited)	Aggregated MR {CDM Object Image Weightings, example: “T1, T2”
{CdmObjectImageWeightingQualifiers}	String List (comma delimited)	Aggregated MR {CDM Object Image Weighting Qualifiers, example: “FATSAT”
{CdmObjectModalities}	String List (comma delimited)	Aggregated {CDM Object Modalities, example: “MR, KO”
{CdmObjectSliceThicknessDescriptors}	String List (comma delimited)	Aggregated {CDM Object Modalities, example: “THICK, THIN”
{CdmObjectStandardViews}	String List (comma delimited)	Aggregated {CDM Object Standard Views , example: "CORONAL,AXIAL,SAGITTAL"

5.1.5.1.4.3 Standardized Result Attributes – JSON Wrapped

The template variables listed in:

- 4.1.5.1 Standardized Result Attributes – General Variables
- 4.1.5.2 Standardized Result Attributes – Standardized Variables

are also available wrapped in a JSON Object (and serialized to a string) for convenience.

Template Variable	Output Format	Description
{ResultsShortJson}	JSON String	A JSON object with the following properties: • CdmStudyAnatomy • CdmStudyAngiogramFlag • CdmStudyBinaryContrastFlag

		• CdmStudyContrastDescriptor • CdmStudyGroupCount • CdmStudyLaterality • CdmStudyModalitiesCdmStudyModality • CdmStudyPhaseCount • CdmStudyType • CdmStudyViewCount • ContrastPresent • OriginalStudyDescription • StandardizedInstanceCount • StandardizedSeriesCount • StandardizedStudyDescription
{ResultsFullJson}	JSON String	A JSON object with the following properties: • CdmObjectAnatomies • CdmObjectImageWeightings • CdmObjectModalities • CdmObjectSliceThicknessDescriptors • CdmObjectStandardViews • CdmObjectTypes • CdmStudyAnatomy • CdmStudyAngiogramFlag • CdmStudyBinaryContrastFlag • CdmStudyContrastDescriptor • CdmStudyGroupCount • CdmStudyLaterality • CdmStudyModalities • CdmStudyModality • CdmStudyPhaseCount • CdmStudyType • CdmStudyViewCount • ContrastPresent • ObjectAnatomies • ObjectImagePlanes • ObjectModalities • ObjectMRContrastDescriptors • ObjectMRImageWeightings • ObjectMRSliceThicknessDescriptors • ObjectViews • OriginalSeriesDescriptions • OriginalStudyDescription • StandardizedInstanceCount • StandardizedSeriesCount • StandardizedSeriesDescriptions • StandardizedStudyDescription

5.1.5.1.4.4 Example HL7 Message Template

See *Example ORU^R01 using Custom Message Format* for a sample template.