Canon

HL7
Conformance Claim

Vitrea Connection 8.5

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Overview

Vitrea Connection is a self-contained networked information system used for querying and retrieving of diagnostic medical images and reports. The system conforms to the HL7 Version 2.5 standard to allow the sharing of medical information with other digital information systems.

NETWORK SERVICES

HL7 Message Type	Sending Application	Receiving Application
Admissions, Discharges, Transfers	Yes	Yes
Pharmacy Orders	No	Yes
Order	Yes	Yes
Results	Yes	Yes
Study Content Notification	Yes	No

Table of Contents

1   Introduction

1.1   Revision History

Document Version	Date	Author	Description
0.1	March 13, 2020	Joshua Thomas	Initial Draft. Document adapted from Rialto 7.5 HL7 Conformance Claim.
1.0	March 23, 2020	Joshua Thomas, Paul Steinbach	Reviewed and updated sections for consistency. Corrections and updates for Vitrea Connection 8.0.
1.1	March 25, 2020	Paul Steinbach	Corrections and consistency fixes to tables describing sub-component fields.
1.2	March 26, 2020	Paul Steinbach	Corrections after document review.
1.3	May 27, 2020	Judith Olivares	Updated for the VC 8.1 release.
1.4	October 16, 2020	Joshua Thomas	Reviewed and updated for the VC 8.2 release.
1.5	March 23, 2021	Joshua Thomas	Reviewed and updated for the VC 8.3 release.
1.6	June 23, 2021	Joshua Thomas	Reviewed and updated for the VC 8.4 release.
1.7	February 3, 2022	John McMullen	Company name and logo updated to read Canon Medical instead of Vital Images.
1.8	October 24, 2022	Jim Kleefman	Reviewed and updated for VC 8.5 (version number and reference updates)

1.2   Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader is familiar with the terminology and concepts that are used in the HL7 Version v2.3 and v2.5 standards and the appropriate IHE Profiles.

1.3　Remarks

HL7, by itself, does not guarantee interoperability. However, the Conformance Claim facilitates a first level validation for interoperability between different applications supporting the same HL7 functionality.

This Conformance Claim is not intended to replace validation with other HL7 equipment to ensure proper exchange of information intended.

The scope of this Conformance Claim is to facilitate communication with Vitrea Connection and other vendors' medical equipment. The Conformance Claim should be read and understood in conjunction with the HL7 2.5 standard, with backward compatibility to version 2.3 of the standard. However, it is not guaranteed to ensure the desired interoperability and successful interconnectivity with existing HL7 systems.

The user should be aware of the following important issues:

- The comparison of different conformance claims is the first step towards assessing interconnectivity between Vitrea Connection and another vendors' equipment.

- Test procedures should be defined to validate the desired level of connectivity.

- The HL7 2.5 standard will evolve to meet the users' future requirements. Canon Medical reserves the right to make changes to its products or to discontinue its delivery.

1.4　Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the HL7 standard.

Abbreviations and terms are as follows:

GUI	Graphical User Interface
HIS/RIS	Hospital Information System / Radiology Information System
HL7	Health Level 7
IHE	Integrating the Healthcare Enterprise
IHE-TF	Integrating the Healthcare Enterprise Technical Framework
ISO	International Standard Organization
TCP/IP	Transmission Control Protocol/Internet Protocol
TLS	Transport Layer Security

1.5　References

- [HL7] Health Level Seven, Version 2.5 (HL7), 2003

- [IHE-TF] IHE Radiology Technical Framework, HIMSS/RSNA, Vol. I – IV, Revision 20.0, March 10, 2022

- [IHE-TF] IHE IT Infrastructure Technical Framework, HIMSS/RSNA, Vol. I – IV, Revision 19.0, June 17, 2022

2   Networking

2.1   Implementation Model

2.1.1   Application Data Flow

Vitrea Connection can be used as a middleware solution facilitating the sharing of clinical information (such as patient data and reports). Vitrea Connection can receive and store patient demographics, census lists, physician patient lists and detailed clinical data published from a number of different clinical information systems. Vitrea Connection can then be queried for this information. Vitrea Connection can also be configured to notify clinical information systems about the availability of data within Vitrea Connection.

Vitrea Connection can be used as a report repository. Vitrea Connection can receive and store reports from different clinical information systems. Systems can query and retrieve reports from Vitrea Connection using HL7 FHIR.

Application Data Flow Diagram
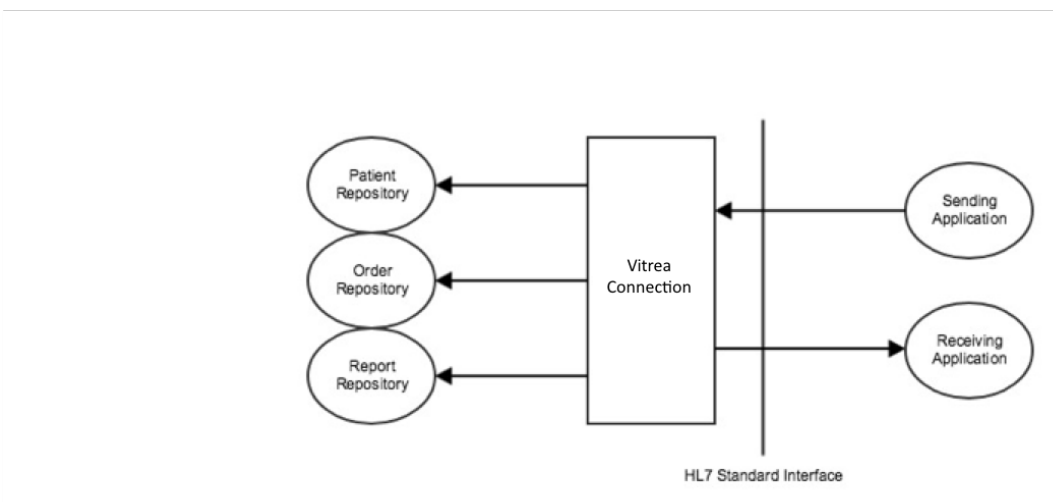
2.1.2   Functional Definitions

2.1.2.1   Functional Definition of Vitrea Connection

Vitrea Connection waits for another application to connect at the presentation address configured. When another application connects, Vitrea Connection expects it to be a HL7 application.

Vitrea Connection will accept Admissions, Discharges, and Transfers from an application.

Vitrea Connection will accept Orders from an application.

Vitrea Connection will accept Reports from an application.

Vitrea Connection will send Study Content Notifications to an application.

Vitrea Connection will send Admissions, Discharges, and Transfers to an application.

Vitrea Connection will send Orders to an application.

Vitrea Connection will send Reports to an application.

Vitrea Connection can be configured to convert HL7 messages into JSON documents that are then sent as messages to 3rd party systems.

Vitrea Connection can be configured to convert reports embedded in HL7 ORU messages into DICOM Structured Reports.

2.2 Specifications

2.2.1 Vitrea Connection Specification

2.2.1.1 Message Types

Vitrea Connection provides Standard Conformance to the following HL7 message types:

HL7 Message Type	Sending Application	Receiving Application
Admissions, Discharges, Transfers (ADTs)	Yes	Yes
Pharmacy Orders	No	Yes
General Order Message (ORM)	Yes	Yes
Observation Reporting (ORU)	Yes	Yes

2.2.1.2 Message Receiving Policy

2.2.1.2.1 Activity - Receive ADTs, Orders, Pharmacy Orders, Reports

Description and Sequencing of Activities

Vitrea Connection can be configured to receive a number of different clinical messages. These messages can be used to update information about the patient, order, study or report that is persisted by Vitrea Connection.

Proposed Message

The messages can have the following segments present:

Message Semantics

Segment	Description	Optionality	Comments
MSH	Message Header	Required	
PID	Patient Identification Segment	Required	
PV1 / PV2	Patient Visit Information	Optional	
PD1 / ZPV	Patient Demographic Information	Optional	
DG1	Diagnosis Information	Optional	
NK1	Next of Kin Information	Optional	
GT1	Guarantor Information	Optional	
IN1 / IN2	Insurance Information	Optional	
ORC	Order Control	Required	
OBR	Observation Request Segment	Required	
OBX	Observation/Result Segment	Required	

AL1	Patient Allergy Information	Optional	
MRG	Merge Patient Information	Optional	
RXE	Pharmacy Encoded Order	Required	
RXO	Pharmacy Prescription Order	Optional	
ZOM	Optional Report Information	Optional	
NTE	Notes and Comments	Optional	

MSH Segment

Field	Description	Optionality	Comments
MSH-1	Field Separator	Required	|
MSH-2	Encoding Characters	Required	^~\&
MSH-3	Sending Application	Required	
MSH-4	Facility ID	Required	
MSH-5	Receiving Application	Required	The name of the Referring Site application.
MSH-6	Receiving Facility	Required	The name of the Referring Site facility.
MSH-7	Updated Date	Required	
MSH-9	Message Type	Required	ADT, ORM, ORU
MSH-10	Message Control Id	Required	
MSH-11	Processing Id	Required	P (Production)
MSH-12	Version Id	Required	2.3, 2.3.1, 2.4, 2.5

PID Segment

Field	Description	Optionality	Comments
PID-3	Patient Identifier List	Required	A list of patient identifiers.
PID-5	Patient Name	Required	
PID-6	Mother's Maiden Name	Optional	
PID-7	Date/Time of Birth	Optional	Date/Time of Birth for Patient
PID-8	Administrative Sex	Optional	
PID-10	Race	Optional	

PID-13	Home Phone Number	Optional	
PID-14	Business Phone Number	Optional	
PID-15	Primary Language	Optional	
PID-16	Marital Status	Optional	
PID-17	Religion	Optional	
PID-19	Patient SSN	Optional	
PID-29	Date/Time of Death	Optional	
PID-30	Patient Death Indicator	Optional	

PID-3 Subcomponents

Field	Description	Optionality	Comments
PID-3-1	ID	Required	Identification number for the patient
PID-3-4	Assigning Authority	Optional	Also known as the "Issuer of Patient ID". Made up of a combination of namespace ID, universal ID and universal ID type. If not provided, the local domain is assumed.
PID-3-4-1	Namespace ID	Optional	ID of the Assigning Authority that issued the patient ID
PID-3-4-2	Universal ID	Optional	Unique ID for the Issuer
PID-3-4-3	Universal ID Type	Optional	Only supported value: ISO

PID-5 Subcomponents

Field	Description	Optionality	Comments
PID-5-1	Patient's Family/Last Name	Optional	
PID-5-2	Patient's Given/First Name	Optional	
PID-5-3	Second And Further Given Names Or Initials Thereof	Optional	

PID-6 Subcomponents

Field	Description	Optionality	Comments
PID-6-1	Family Name	Optional	

PID-11 Subcomponents

Field	Description	Optionality	Comments
PID-11-1	Street Address	Optional	

Field	Description	Optionality	Comments
PID-11-3	City	Optional	
PID-11-4	State/Province	Optional	
PID-11-5	Zip/Postal Code	Optional	
PID-11-6	Country	Optional	

PID-13 Subcomponents

Field	Description	Optionality	Comments
PID-13-1	Telephone Number	Optional	Home

PID-14 Subcomponents

Field	Description	Optionality	Comments
PID-14-1	Telephone Number	Optional	Business

PV1 Segment

Field	Description	Optionality	Comments
PV1-2	Patient Class	Required	May be classification for Patient or Visit. For example I, E, O, R (series), P (pre-admit patient).
PV1-3	Assigned Patient Location	Optional	
PV1-7 PV1-8 PV1-9 PV1-17	Doctors	Optional	Since each of these fields can have more than one doctor, all doctors will be included in the list. A special field is added for each doctor that represents the type of relationship. It will contain one of five values, either FAMILY, ATTENDING, REFERRING, CONSULTING or ADMITTING
PV1-10	Service ID	Optional	
PV1-14	Source of Admission	Optional	
PV1-16	Confidentiality Flag VIP Flag	Optional	
PV1-19	Visit ID Encounter ID	Required	Encounter Date for Labs, Blood Bank Products, Microbiology Tests.
PV1-20	Financial Class	Optional	
PV1-36	Disposition at the time of discharge	Optional	
PV1-44	Encounter Date	Optional	ER Date will only be populated when 'E' is the

	Admit Date ER Date Service Date		Status ID (PV1-2).
PV1-45	Discharge Date	Optional	

PV1-3 Subcomponents

Field	Description	Optionality	Comments
PV1-3-1	Point of Care	Optional	
PV1-3-2	Room Number	Optional	
PV1-3-3	Bed number	Optional	
PV1-3-4	Patient's Facility ID	Optional	

PV1-7 Subcomponents

Field	Description	Optionality	Comments
PV1-7-1	Attending Physician ID ER Physician ID	Optional	ER Physician ID populated when 'E' is found in the Status ID (PV1-2).

PV1-8 Subcomponents

Field	Description	Optionality	Comments
PV1-8-1	Referring Physician ID	Optional	
PV1-8-2 PV1-8-3	Referring Physician Name (Family Name, Given Name)	Optional	

PV1-9 Subcomponents

Field	Description	Optionality	Comments
PV1-9-1	Physician ID	Optional	

PV1-17 Subcomponents

Field	Description	Optionality	Comments
PV1-17-1	Admitting Physician ID	Optional	

PV2 Segment

Field	Description	Optionality	Comments
PV2-3	Admit Reason	Optional	

PV2-25	Visit Priority Code	Optional	

PV2-3 Subcomponents

Field	Description	Optionality	Comments
PV2-3-2	Textual description of admit reason	Optional	Based on information in PV2-1 – coded ID

PD1 Segment

Field	Description	Optionality	Comments
PD1-4	Patient Primary Care Provider Name and ID	Optional	

PD1-4 Subcomponents

Field	Description	Optionality	Comments
PD1-4-1	Family Physician ID Primary Care Provider ID	Optional	
PD1-4-2 PD1-4-3	Physician Family Name Physician Given Name	Optional	

ZPV-3 Subcomponents

Field	Description	Optionality	Comments
ZPV-3-1	Last hospital of the patient	Optional	

DG1 Segment

Field	Description	Optionality	Comments
DG1-1	Transaction ID	Required	
DG1-4	Admit Diagnosis Discharge Diagnosis Principal Diagnosis	Optional	For Admit Diagnosis, ensure DG1-6 is 'A'. For Discharge Diagnosis, ensure DG1-6 is 'F'. For Principle Diagnosis, ensure DG1-6 is 'W'.
DG1-6	Diagnosis Type	Required	

NK1 Segment

Field	Description	Optionality	Comments
NK1-1	ID	Required	
NK1-2 NK1-3 NK1-5 NK1-6	List of emergency contacts	Optional	"EP" (HL7v2.3) or "E" (HL7v2.5) is required in NK1-7-1 for an entry to be included in this list.

NK1-7 Subcomponents

Field	Description	Optionality	Comments
NK1-7-1	Must be "E" for entries to be in emergency contacts	Optional	

GT1 Segment

Field	Description	Optionality	Comments
GT1-1	Guarantor ID	Required	
GT1-2	Guarantor Number	Optional	Primary identifier assigned to the guarantor
GT1-3	Guarantor Name	Required	

GT1 Subcomponents

Field	Description	Optionality	Comments
GT1-2-1 GT1-3-1 GT1-3-1 GT1-3-2	A list of the person or organizations with financial responsibility for the payment of the patient's account.	Optional	Each GT1 segment will represent a different entry in the list. Only the id and name of the guarantor will be presented.

IN1 Segment

Field	Description	Optionality	Comments
IN-1-2 IN-1-3	Insurer ID and Company Name	Required	
IN1-4 IN1-6 IN1-7 IN1-8 IN1-9	Insurer Contact Details & Group information	Optional	

IN1 Subcomponents

Field	Description	Optionality	Comments
IN1-2-1 IN1-3-1	A list of insurer information.	Optional	Each entry in the list is represents one IN1 segment.

Field			
IN1-4-1 IN1-6-1 IN1-6-2 IN1-6-3 IN1-7-1 IN1-8 IN1-9-1			

IN2 Segment

Field	Description	Optionality	Comments
IN2-70	Insured Employer Organisation Name and ID	Optional	

IN2 Subcomponents

Field	Description	Optionality	Comments
IN2-70-1	Organisation Name	Optional	

ORC Segment

Field	Description	Optionality	Comments
ORC-1	Order Control	Required	
ORC-2	Placer Order Number	Optional	
ORC-4	Placer Group Number	Optional	
ORC-7	Quantity/Timing	Optional	
ORC-12	Ordering Provider	Optional	

ORC-4 Subcomponents

Field	Description	Optionality	Comments
ORC-4-1	Entity Identifier	Optional	

ORC-7 Subcomponents

Field	Description	Optionality	Comments
ORC-7-4	Start Date/Time	Required	Earliest date or time at which services should be started.

ORC-12 Subcomponents

Field	Description	Optionality	Comments
ORC-12-1	Order Physician ID	Optional	
ORC-12-2	Order Physician Name	Optional	

ORC-12-3			

OBR Segment

Field	Description	Optionality	Comments
OBR-2	Placer Order Number	Required	See ORC-2.
OBR-3	Filler Order Number	Required	Identifier for an order and its associated observations
OBR-4	Universal Service ID	Required	Vitrea Connection can be configured to use these values to update the procedure code and meaning for a study. Vitrea Connection can also be configured to map these values from any HL7 attribute.
OBR-7	Observation Date/Time	Required	Collected Date for Labs, Microbiology and Pathology Tests Product Date for Blood Bank Products
OBR-13	Relevant Clinical Information	Optional	
OBR-14	Specimen Received Date/Time	Optional	
OBR-22	Results reported or Status Changed (Date/Time)	Optional	Signed or Transcribed Date for Transcriptions, Radiology, Pathology Completed Date for Labs and Microbiology Tests.
OBR-24	Diagnostic Services Section ID	Optional	
OBR-25	Result Status	Optional	
OBR-27	Quantity/Timing	Optional	
OBR-32	Principal Result Interpreter	Optional	
OBR-34	Technician	Optional	
OBR-35	Transcriptionist	Optional	
OBR-39	Collector's Comment	Optional	

OBR-4 Subcomponents

Field	Description	Optionality	Comments
OBR-4-1	Identifier code for requested observation	Required	
OBR-4-2	Textual description	Optional	Description is based on code in OBR4-1
OBR-4-3	Coding Scheme	Optional	

OBR-7 Subcomponents

Field	Description	Optionality	Comments
OBR-7-1	Time	Required	

OBR-15 Subcomponents

Field	Description	Optionality	Comments
OBR-15-1-1	Coded ID	Optional	
OBR-15-1-2	Textual Description of coded request	Optional	

OBR-27 Subcomponents

Field	Description	Optionality	Comments
OBR-27-4	Start Time	Optional	
OBR-27-5	End Time	Optional	
OBR-27-6	Order Priority	Optional	

OBR-32 Subcomponents

Field	Description	Optionality	Comments
OBR-32-1-1	Service Performer ID	Optional	
OBR-32-1-2 OBR-32-1-3	Family Name Given Name	Optional	Dictated By in Transcriptions, Radiology and Pathology Tests. Signed By in Transcription Details
OBR-32-2	Start Date/Time	Optional	
OBR-32-3	End Date/Time	Optional	

OBR-34 Subcomponents

Field	Description	Optionality	Comments
OBR-34-1-1	Technologist ID	Optional	
OBR-34-1-2 OBR-34-1-3	Technologist Name	Optional	

OBR-35 Subcomponents

Field	Description	Optionality	Comments
OBR-35-1-1	Transcribed By ID	Optional	
OBR-35-1-2 OBR-35-1-3	Family Name Given Name	Optional	

Field	Description	Optionality	Comments
OBR-35-2	Start Date	Optional	
OBR-35-2	End Date	Optional	

OBR-39 Subcomponents

Field	Description	Optionality	Comments
OBR-39-2	Order Comments	Optional	

OBX Segment

Field	Description	Optionality	Comments
OBX-3	Observation Identifier	Required	
OBX-5	Observation Value	Optional	For Report Text, each OBX-5 value is output on a different line (form a new paragraph). OBX-5 is a repeating field. Lab Results used for Labs Blood Type / Product ID / Product Name / Result Status ID / Unit Number used for Blood Bank Products – Field is dependent on value in OBX-3-2 Specimen Source for Microbiology Test
OBX-6	Unit of Measure	Optional	
OBX-7	References Range	Optional	
OBX-8	Abnormal Flag for Test Results	Optional	Every OBX-8 field will be checked. If "L", "LL", "H", or "HH" (ignoring case) is found, this field will be set to "A". Otherwise, this field will be empty.
OBX-11	Result Status ID	Required	

OBX-3 Subcomponents

Field	Description	Optionality	Comments
OBX-3-1	Coded ID	Optional	Specific coded identifier for observation
OBX-3-2	Textual description	Optional	For Blood Bank Report Text, Each OBX-3-2 value will be prepended to its corresponding OBX-5 value. Each OBX segment will be output on a different line (form a new paragraph).

AL1 Segment

Field	Description	Optionality	Comments
AL1-1	ID	Required	

AL1-2	Type of Allergy	Optional	
AL1-3	Allergen Code/Description	Required	
AL1-4	Allergy Severity Code	Optional	
AL1-5	Allergic Reaction Code	Optional	
AL1-6	Date Allergy was Recorded	Optional	

AL1-3 Subcomponents

Field	Description	Optionality	Comments
AL1-3-1	Allergy ID	Optional	
AL1-3-2	Allergy Text	Optional	

MRG Segment

Field	Description	Optionality	Comments
MRG-1	Prior Patient Identifier List	Required	
MRG-5	Prior Visit Number	Optional	

MRG1 Subcomponents

Field	Description	Optionality	Comments
MRG-1-1	ID	Required	For ADT^A40: This field specifies the source patient to be merged into the patient represented in PID-3. For ADT^A45: This field represents the incorrect patient ID from which an accession number in MRG-5 should be removed.
MRG-1-4	Assigning Authority	Optional	
MRG-1-4-1	Namespace ID	Optional	
MRG-1-4-2	Universal Entity ID	Optional	
MRG-1-4-3	Universal ID Type	Optional	
MRG-1-4-5	Identifier Type Code	Optional	

MRG5 Subcomponents

Field	Description	Optionality	Comments
MRG-5-1	ID	Required	For ADT^A45: This field specifies an accession number that should be moved from the patient

			specified in MRG-1 to the patient in PID-3.

RXE Segment

Field	Description	Optionality	Comments
RXE-1	Quantity/Timing	Optional	
RXE-2	Give Code	Required	
RXE-3	Give Amount - Minimum	Required	
RXE-5	Give Units	Required	
RXE-15	Pharmacy Reference Number (RX Number)	Optional	
RXE-21	Dispensing Instructions	Optional	
RXE-23 RXE-24	Give Rate Amount Give Rate Units	Optional	

RXE-1 Subcomponents

Field	Description	Optionality	Comments
RXE-1-4	Medication Start Date	Optional	
RXE-1-5	Medication End Date	Optional	
RXE-1-7	Condition	Optional	Describes under what conditions said medication ought to be taken.

RXE-2 Subcomponents

Field	Description	Optionality	Comments
RXE-2-1	Coded Medication ID	Required	

RXO Segment

Field	Description	Optionality	Comments
RXO-2 RXO-3 RXO-4	Medication Dosage – Min Medication Dosage – Max Medication Dosage – Unit	Optional	The min (RXO-2) and max (RXO-3) amounts are separated by a dash character. A space character separates the amount from the units (RXO-4). If the min and max values are the same, the value is presented once instead of showing a range.
RXO-5	Requested Dosage Form	Optional	

RXO-1 Subcomponents

Field	Description	Optionality	Comments
RXO-1-2	Medication Name/Description	Optional	

ZOM Segment

Field	Description	Optionality	Comments
ZOM-5	Lab Specimen ID	Optional	

NTE Segment

Field	Description	Optionality	Comments
NTE-3	Comments	Optional	

Acceptable Response

The message should be responded to as follows:

Message Semantics

Segment	Description	Optionality	Comments
MSH	Message Header	Required	
MSA	Message Acknowledgement	Required	
ERR	Error	Optional	Only present if an error occurred while processing the message.

MSH Segment

Field	Description	Optionality	Comments
MSH-1	Field Separator	Required	|
MSH-2	Encoding Characters	Required	^~\&
MSH-3	Sending Application	Required	The name of the Referring Site application.
MSH-4	Sending Facility	Required	The name of the Reading Site facility.
MSH-5	Receiving Application	Required	VITREA CONNECTION

MSH-6	Receiving Facility	Required	The name of the Reading Site facility.
MSH-7	Date/Time of Message	Required	The date and time that the message was constructed and sent.
MSH-9	Message Type	Required	ACK
MSH-10	Message Control Id	Required	Generated by Vitrea Connection.
MSH-11	Processing Id	Required	P
MSH-12	Version Id	Required	2.5

MSA Segment

Field	Description	Optionality	Comments
MSA-1	Acknowledgement Code	Required	See "Acknowledgement Codes" below for details.
MSA-2	Message Control Id	Required	Copied from MSH-10 (Message Control Id) of the original message.

Acknowledgement Codes

Value	Description	Comments
AA	Application Accept	The message was accepted.
AE	Application Error	The message contained errors. More details will be contained in the ERR segment.
AR	Application Reject	The message was rejected

ERR Segment

Field	Description	Optionality	Comments
ERR-2	Error Location	Optional	This field is populated except when the error is not within an HL7 field. See "Error Location" below for details.
ERR-3	Error Code	Required	See "Error Code" below for details.
ERR-4	Severity	Required	See "Error Severity" below for details.

Error Location

Component	Description	Sample Value
ERR-2-1	Segment Id	PID
ERR-2-2	Sequence	1
ERR-2-3	Field Position	3
ERR-2-4	Field Repetition	1
ERR-2-5	Component Number	1
ERR-2-6	Sub-component Number	1

Error Code

Value	Description	Comments
0	Message accepted.	Success. Optional, as AA conveys success.
100	Segment sequence error.	Error. The message segments were not in the proper order or required segments were missing.
101	Required field missing.	Error. A required field is missing from a segment.
102	Data type error.	Error. A field contained data of the wrong type.
103	Table value not found.	Error. A field of data type ID or IS was compared against a corresponding table and no match was found.
200	Unsupported Message Type.	Rejection. The Message Type is not supported.
201	Unsupported Event Code.	Rejection. The Event Code is not supported.
202	Unsupported Processing Id.	Rejection. The Processing Id is not supported.
203	Unsupported Version Id.	Rejection. The Version Id is not supported.
204	Unknown key identifier.	Rejection. The Id of the patient was not found.
205	Duplicate key identifier.	Rejection. The Id of the patient already exists.
206	Application record locked.	Rejection. The transaction could be performed at the application storage level.
207	Application internal error.	Rejection. A catchall for internal errors not explicitly covered by other codes.

2.2.1.2.2 Activity – Accept ORU Messages for Linking Studies

Description and Sequencing of Activities

Vitrea Connection can be configured to accept HL7 ORU message for the purposes of linking studies.

Proposed Message

The messages can have the following segments present:

Message Semantics

HL7 Element Name	HL7 2.3 ORU Element	Reqd/ Opt	HL7 2.5 OMI Element	Reqd/ Opt	Notes
Field Separator	MSH-1	R			
Encoding Characters	MSH-2	R			
Sending Application	MSH-3	R			The name of the application sending the message.
Sending Facility	MSH-4	R			The name of the facility sending the message. May be used to infer the Assigning Authority for the MRN.
Receiving Application	MSH-5	R			Assumed to be "VITREA CONNECTION".
Receiving Facility	MSH-6	R			
Date/Time of Message	MSH-7	R			
Message Type	MSH-9	R			Assumed to be "ORM^O01" or "OMI^O23".
Message Control ID	MSH-10	R			
Processing ID	MSH-11	R			Assumed to be "P".
Version ID	MSH-12	R			Assumed to be "2.3.x" if ORM or "2.5.x" if OMI. Only verify that this field begins with "2."
Character Set	MSH-18	R			Assumed to be "8859/1", if not sent.
Set ID – PID	PID-1	R			Assumed to be "1", if not sent.
Patient Identifier List - ID	PID-3.1	R			The local (primary) PID/MRN.
Patient Identifier List – Assigning Authority – Universal ID	PID-3.4.2	R			The Assigning Authority used by the Facility that generated the PID/MRN. Note that there may be multiple Assigning Authorities within a single institution (e.g., The HIS and an EMR.) or within a multi-institution site. This important for MPI later.
Patient Identifier List – Assigning Authority – Universal ID Type	PID-3-4-3	O			If present, must be "ISO".
Order Control Code	ORC-1	R			The order control. This defines what to do with the order. Should be set to "IA".
Filler Order Number	ORC-3	R		R	A repeated list of the accession numbers identifying studies that should be linked together
Filler Order Number.Entity Identifier	ORC-3-1	R		R	The accession number.
Filler Order Number.Namespace ID	ORC-3-2	R		R	The issuer of accession number.

Upon receipt of an ORU, Vitrea Connection attempts to parse the message. If the message is a valid message and contains the required elements, Vitrea Connection will continue to process the message. If not, Vitrea Connection will send a negative acknowledgement to the sender of the message.

Vitrea Connection will then cause the studies identified by the accession numbers to be linked together, so that any subsequent request to query for or retrieve any one of the linked studies will return results for all and only all the linked studies.

2.2.1.3 Message Sending Policy

2.2.1.3.1 Activity – Send Study Content Notification

Description and Sequencing of Activities

Vitrea Connection can be configured to send messages to notify other systems when a DICOM study or XDS document has been stored, updated or deleted.

Proposed Message

The messages can have the following segments present:

Message Semantics

Segment	Description	Optionality	Comments
MSH	Message Header	Required	
PID	Patient Identification Segment	Required	
ORC	Order Control	Required	
OBR	Observation Request Segment	Required	
OBX	Observation/Result Segment	Required	

MSH Segment

Field	Description	Optionality	Comments
MSH-1	Field Separator	Required	|
MSH-2	Encoding Characters	Required	^~\&
MSH-3	Sending Application	Required	Configurable. Will be set to "VITREA CONNECTION" by default.
MSH-4	Sending Facility	Required	Configurable. Will be set to the ID of the sending facility.
MSH-5	Receiving Application	Required	Will be set to the name of the application that the message is being sent to.
MSH-6	Receiving Facility	Required	Will be set to the name of the facility that the message is being sent to.
MSH-7	Date/Time of Message	Required	Generated by Vitrea Connection.
MSH-9	Message Type	Required	Will be set to "ORM^O01".
MSH-10	Message Control Id	Required	Generated by Vitrea Connection.
MSH-11	Processing Id	Required	P
MSH-12	Version Id	Required	2.5

PID Segment

Field	Description	Optionality	Comments

PID-3	Patient Identifier List	Required	See below for details.
PID-5	Patient Name	Optional	Configurable. By default, will be copied from the DICOM attribute (0010,0010) Patient's Name.

PID-3 Subcomponents

Field	Description	Optionality	Comments
PID-3-1	Patient Identifier List – ID Number	Required	Configurable. By default, will be copied from the DICOM attribute (0010,0020) Patient's ID.
PID-3-4	Patient Identifier List – Assigning Authority	Required	Will be set to the assigning authority of the receiving facility.
PID-3-5	Patient Identifier List – Identifier Code Type	Required	Will be set to the identifier code type of the receiving facility.

ORC Segment

Field	Description	Optionality	Comments
ORC-1	Order Control	Required	Will be set to any one of several supported status codes based on desired workflow.

OBR Segment

Field	Description	Optionality	Comments
OBR-1	Set ID – OBR	Required	Will be set to "1".
OBR-3	Filler Order Number	Required	Configurable. By default, will be copied from the DICOM attribute (0008,0050) Accession Number.
OBR-4	Universal Service Identifier	Required	See below for details.
OBR-16	Ordering Provider	Required	See below for details.
OBR-25	Result Status	Required	Will be set to any one of several supported status codes based on desired workflow.

OBR-4 Subcomponents

Field	Description	Optionality	Comments
OBR-4-1	Universal Service Identifier – Identifier	Required	Configurable. By default, will be set to DICOM attribute (0040,1001) Requested Procedure ID.
OBR-4-2	Universal Service Identifier – Text	Required	Configurable. By default, will be set to DICOM attribute (0008,1030) Study Description.
OBR-4-3	Universal Service Identifier – Name of Coding System	Required	Configurable. By default, will be set to "RMH".

OBR-16 Subcomponents

Field	Description	Optionality	Comments
OBR-16-2	Ordering Provider – Family Name	Required	Configurable. By default, will be copied from the second component of the DICOM attribute (0008,0090) Referring Physician's Name.
OBR-16-3	Ordering Provider – Given Name	Required	Configurable. By default, will be copied from the third component of the DICOM attribute (0008,0090) Referring Physician's Name.
OBR-16-9	Ordering Provider – Assigning Authority	Required	Configurable. By default, set to "SMART".
OBR-16-13	Ordering Provider – Identifier Type Code	Required	Configurable. By default, set to "PROV".

OBX Segment

Field	Description	Optionality	Comments
OBX-1	Set ID – OBX	Required	Will be set to "1".
OBX-2	Value Type	Required	Will be set to "TX".
OBX-3	Observation Identifier	Required	See below for details.
OBX-5	Observation Value	Required	Will be set to "Y".
OBX-9	Probability	Required	Configurable. By default, will be copied from DICOM attribute (0020,000D Study Instance UID.

OBX-3 Subcomponents

Field	Description	Optionality	Comments
OBX-3-1	Observation Identifier – Identifier	Required	Will be set to "GDT".

Acceptable Response

The message should be responded to as follows:

Message Semantics

Segment	Description	Optionality	Comments
MSH	Message Header	Required	
MSA	Message Acknowledgement	Required	
ERR	Error	Optional	Only set if an error occurred while processing the message.

MSH Segment

Field	Description	Optionality	Comments
MSH-1	Field Separator	Required	|
MSH-2	Encoding Characters	Required	^~\&
MSH-3	Sending Application	Required	The name of the sending application.
MSH-4	Sending Facility	Required	The name of the sending facility.
MSH-5	Receiving Application	Required	VITREA CONNECTION
MSH-6	Receiving Facility	Required	The name of the facility that VITREA CONNECTION is deployed at.
MSH-7	Date/Time of Message	Required	The date and time that the message was constructed and sent.
MSH-9	Message Type	Required	ACK
MSH-10	Message Control Id	Required	
MSH-11	Processing Id	Required	P
MSH-12	Version Id	Required	

MSA Segment

Field	Description	Optionality	Comments
MSA-1	Acknowledgement Code	Required	See "Acknowledgement Codes" below for details.
MSA-2	Message Control Id	Required	Copied from MSH-10 (Message Control Id) of the original message.

Acknowledgement Codes

Value	Description	Comments
AA	Application Accept	The message was accepted.
AE	Application Error	The message contained errors. More details will be contained in the ERR segment.
AR	Application Reject	The message was rejected

ERR Segment

Field	Description	Optionality	Comments

ERR-2	Error Location		Optional	This field is populated except when the error is not within an HL7 field. See "Error Location" below for details.
ERR-3	Error Code		Required	See "Error Code" below for details.
ERR-4	Severity		Required	See "Error Severity" below for details.

Error Location

Component	Description	Sample Value
ERR-2-1	Segment Id	PID
ERR-2-2	Sequence	1
ERR-2-3	Field Position	3
ERR-2-4	Field Repetition	1
ERR-2-5	Component Number	1
ERR-2-6	Sub-component Number	1

Error Code

Value	Description	Comments
0	Message accepted.	Success. Optional, as AA conveys success.
100	Segment sequence error.	Error. The message segments were not in the proper order or required segments were missing.
101	Required field missing.	Error. A required field is missing from a segment.
102	Data type error.	Error. A field contained data of the wrong type.
103	Table value not found.	Error. A field of data type ID or IS was compared against a corresponding table and no match was found.
200	Unsupported Message Type.	Rejection. The Message Type is not supported.
201	Unsupported Event Code.	Rejection. The Event Code is not supported.
202	Unsupported Processing Id.	Rejection. The Processing Id is not

			supported.
203	Unsupported Version Id.		Rejection. The Version Id is not supported.
204	Unknown key identifier.		Rejection. The Id of the patient was not found.
205	Duplicate key identifier.		Rejection. The Id of the patient already exists.
206	Application record locked.		Rejection. The transaction could be performed at the application storage level.
207	Application internal error.		Rejection. A catchall for internal errors not explicitly covered by other codes.

2.2.1.3.2 Activity – Send ORU Messages

Description and Sequencing of Activities

Vitrea Connection can be configured to transform DICOM Structured Reports into HL7 ORU messages and forward them to a receiving application.

Proposed Message

The messages can have the following segments present:

Message Semantics

Segment	Description	Optionality	Comments
MSH	Message Header	Required	
PID	Patient Identification Segment	Required	
ORC	Order Control	Required	
OBR	Observation Request Segment	Required	
OBX	Observation/Result Segment	Required	

MSH Segment

Field	Description	Optionality	Comments
MSH-1	Field Separator	Required		
MSH-2	Encoding Characters	Required	^~\&
MSH-3	Sending Application	Required	Configurable. Will be set to "VITREA CONNECTION" by default.
MSH-4	Sending Facility	Required	Configurable. Will be set to the ID of the sending facility.
MSH-5	Receiving Application	Required	Will be set to the name of the application that the message is being sent to.
MSH-6	Receiving Facility	Required	Will be set to the name of the facility that the

			message is being sent to.
MSH-7	Date/Time of Message	Required	Generated by Vitrea Connection.
MSH-9	Message Type	Required	Will be set to "ORM^O01".
MSH-10	Message Control Id	Required	Generated by Vitrea Connection.
MSH-11	Processing Id	Required	P
MSH-12	Version Id	Required	2.5

PID Segment

Field	Description	Optionality	Comments
PID-3	Patient Identifier List	Required	See below for details.
PID-5	Patient Name	Optional	Configurable. By default, will be copied from the DICOM attribute (0010,0010) Patient's Name.

PID-3 Subcomponents

Field	Description	Optionality	Comments
PID-3-1	Patient Identifier List – ID Number	Required	Configurable. By default, will be copied from the DICOM attribute (0010,0020) Patient's ID.
PID-3-4	Patient Identifier List – Assigning Authority	Required	Will be set to the assigning authority of the receiving facility.
PID-3-5	Patient Identifier List – Identifier Code Type	Required	Will be set to the identifier code type of the receiving facility.

ORC Segment

Field	Description	Optionality	Comments
ORC-1	Order Control	Required	Will be set to "RE".
ORC-3	Accession Number	Required	Configurable. By default, will be copied from the DICOM attribute (0008,0050) Accession Number.

OBR Segment

Field	Description	Optionality	Comments
OBR-1	Set ID – OBR	Required	Will be set to "1".
OBR-3	Filler Order Number	Required	Configurable. By default, will be copied from the DICOM attribute (0008,0050) Accession Number.
OBR-4	Universal Service Identifier	Required	See below for details.
OBR-6	Requested Date/Time	Required	Set to the date and time that the study was scheduled.

OBR-7	Observation Date/Time	Required	Set to the date and time that the study was acquired.
OBR-15	Specimen Source	Required	Site where the specimen should be obtained or where the service should be performed.
OBR-16	Ordering Provider	Required	See below for details.
OBR-19	Placer Field 2	Required	Configurable. By default, will be copied from the DICOM attribute (0008,0050) Accession Number.
OBR-22	Results Rpt/Status Chng – Date/Time	Required	Set to the date and time that the report was made.
OBR-24	Diagnostic Serv Sect ID	Required	Set to the modality or modalities that were used to acquire the study.
OBR-25	Result Status	Required	Will be set to "P" for preliminary and "F" for final.
OBR-27-4	Quantity Timing	Optional	
OBR-32-1-1	Principal Result Interpreter.ID	Optional	Set to the ID of the radiologist reading the study.
OBR-32-1-2	Principal Result Interpreter.Name	Optional	Set to the Name of the radiologist reading the study.
OBR-32-2	Start Date/Time	Optional	

OBR-4 Subcomponents

Field	Description	Optionality	Comments
OBR-4-1	Universal Service Identifier – Identifier	Required	Configurable. By default, will be set to DICOM attribute (0040,1001) Requested Procedure ID.
OBR-4-2	Universal Service Identifier – Text	Required	Configurable. By default, will be set to DICOM attribute (0008,1030) Study Description.
OBR-4-3	Universal Service Identifier – Name of Coding System	Required	Configurable. By default, will b se to "RMH".

OBR-15 Subcomponents

Field	Description	Optionality	Comments
OBR-15-1-1	Specimen Source.ID	Required	Set to the id of the anatomic region of the study.
OBR-15-1-2	Specimen Source.Text	Required	Set to the text description of the anatomic region of the study.
OBR-15-1-3	Specimen Source.Name of Coding System	Required	

OBR-16 Subcomponents

Field	Description	Optionality	Comments
OBR-16-2	Ordering Provider – Family Name	Required	Configurable. By default, will be copied from the second component of the DICOM attribute (0008,0090) Referring Physician's Name.
OBR-16-3	Ordering Provider – Given Name	Required	Configurable. By default, will be copied from the third component of the DICOM attribute (0008,0090) Referring Physician's Name.
OBR-16-9	Ordering Provider – Assigning Authority	Required	Configurable. By default, set to "SMART".
OBR-16-13	Ordering Provider – Identifier Type Code	Required	Configurable. By default, set to "PROV".

OBX Segment

Field	Description	Optionality	Comments
OBX-1	Set ID – OBX	Required	Will be set to "1".
OBX-2	Value Type	Required	Will be set to "TX".
OBX-5	Observation Value	Required	Set to the interpretation. May be multiple instances of the Text Value in the sequence. Some reports include invalid escape sequences in the report. These sequences will be replaced with \X09\. In addition, all carriage returns will be replaced with new lines. Accented characters are treated as the ISO-8859-1 character set requires. The /T/ character string will be sent for a tab character. Character 0x8C and 0x9C will be encoded as "oe" and "OE".
OBX-11	Observation Result Status	Required	Set to "P" for preliminary and "F" for final.

Acceptable Response

The message should be responded to as follows:

Message Semantics

Segment	Description	Optionality	Comments
MSH	Message Header	Required	
MSA	Message Acknowledgement	Required	

Field	Description	Optionality	Comments
ERR	Error	Optional	Only set if an error occurred while processing the message.

MSH Segment

Field	Description	Optionality	Comments
MSH-1	Field Separator	Required	|
MSH-2	Encoding Characters	Required	^~\&
MSH-3	Sending Application	Required	The name of the sending application.
MSH-4	Sending Facility	Required	The name of the sending facility.
MSH-5	Receiving Application	Required	VITREA CONNECTION
MSH-6	Receiving Facility	Required	The name of the facility that VITREA CONNECTION is deployed at.
MSH-7	Date/Time of Message	Required	The date and time that the message was constructed and sent.
MSH-9	Message Type	Required	ACK
MSH-10	Message Control Id	Required	
MSH-11	Processing Id	Required	P
MSH-12	Version Id	Required	

MSA Segment

Field	Description	Optionality	Comments
MSA-1	Acknowledgement Code	Required	See "Acknowledgement Codes" below for details.
MSA-2	Message Control Id	Required	Copied from MSH-10 (Message Control Id) of the original message.

Acknowledgement Codes

Value	Description	Comments
AA	Application Accept	The message was accepted.
AE	Application Error	The message contained errors. More

		details will be contained in the ERR segment.
AR	Application Reject	The message was rejected

ERR Segment

Field	Description	Optionality	Comments
ERR-2	Error Location	Optional	This field is populated except when the error is not within an HL7 field. See "Error Location" below for details.
ERR-3	Error Code	Required	See "Error Code" below for details.
ERR-4	Severity	Required	See "Error Severity" below for details.

Error Location

Component	Description	Sample Value
ERR-2-1	Segment Id	PID
ERR-2-2	Sequence	1
ERR-2-3	Field Position	3
ERR-2-4	Field Repetition	1
ERR-2-5	Component Number	1
ERR-2-6	Sub-component Number	1

Error Code

Value	Description	Comments
0	Message accepted.	Success. Optional, as AA conveys success.
100	Segment sequence error.	Error. The message segments were not in the proper order or required segments were missing.
101	Required field missing.	Error. A required field is missing from a segment.
102	Data type error.	Error. A field contained data of the wrong type.
103	Table value not found.	Error. A field of data type ID or IS was compared against a corresponding table

		and no match was found.
200	Unsupported Message Type.	Rejection. The Message Type is not supported.
201	Unsupported Event Code.	Rejection. The Event Code is not supported.
202	Unsupported Processing Id.	Rejection. The Processing Id is not supported.
203	Unsupported Version Id.	Rejection. The Version Id is not supported.
204	Unknown key identifier.	Rejection. The Id of the patient was not found.
205	Duplicate key identifier.	Rejection. The Id of the patient already exists.
206	Application record locked.	Rejection. The transaction could be performed at the application storage level.
207	Application internal error.	Rejection. A catchall for internal errors not explicitly covered by other codes.

2.2.1.3.3 Activity – Forward ADT, ORM and ORU Messages

Description and Sequencing of Activities

Vitrea Connection can be configured to forward ADT, ORM and ORU messages that it receives. The messages will be forwarded exactly as is, with no changing of the contents.

2.2.1.3.4 Activity - Receive ADTs and Orders for Modality Worklist

Description and Sequencing of Activities

Vitrea Connection can be configured to receive ADTs and Orders. These messages can be used to update information about scheduled orders that are persisted by Vitrea Connection.

Proposed Message

The messages can have the following segments present:

Message Semantics

HL7 Element Name	HL7 2.3 ORM Element	Reqd/ Opt	HL7 2.5 OMI Element	Reqd/ Opt	Notes
Field Separator	MSH-1	R			
Encoding Characters	MSH-2	R			
Sending Application	MSH-3	R			The name of the application sending the message.
Sending Facility	MSH-4	R			The name of the facility sending the message. May be used to infer the Assigning Authority for the MRN.
Receiving Application	MSH-5	R			Assumed to be "VITREA CONNECTION".
Receiving Facility	MSH-6	R			
Date/Time of Message	MSH-7	R			
Message Type	MSH-9	R			Assumed to be "ORM^O01" or "OMI^O23".
Message Control ID	MSH-10	R			
Processing ID	MSH-11	R			Assumed to be "P".

HL7 Element Name	HL7 2.3 ORM Element	Reqd/ Opt	HL7 2.5 OMI Element	Reqd/ Opt	Notes
Version ID	MSH-12	R			Assumed to be "2.3.x" if ORM or "2.5.x" if OMI. Only verify that this field begins with "2."
Character Set	MSH-18	R			Assumed to be "8859/1", if not sent.
Set ID – PID	PID-1	R			Assumed to be "1", if not sent.
Patient Identifier List - ID	PID-2-1	O			External PID, if any. (e.g., different facility)
Patient Identifier List – Assigning Authority – Universal ID	PID-2-4	O			External PID Assigning Authority, if an external PID (PID-2.1) is present.
Patient Identifier List - ID	PID-3-1	R			The local (primary) PID/MRN.
Patient Identifier List – Assigning Authority – Universal ID	PID-3-4-2	R			The Assigning Authority used by the Facility that generated the PID/MRN. Note that there may be multiple Assigning Authorities within a single institution (e.g., The HIS and an EMR.) or within a multi-institution site. This important for MPI later.
Patient Identifier List – Assigning Authority – Universal ID Type	PID-3-4-3	O			If present, must be "ISO".
Patient Name – Family Name	PID-5-1	O			Required, if known.
Patient Name – Given Name	PID-5-2	O			Required, if known. Other PID-5 subfields may also be present.
Date/Time of Birth	PID-7	O			Required, if known.
Administrative Sex	PID-8	O			Required, if known.
Ethnic Group	PID-22	O			HL7 defined value set
Patient Class	PV1-2	O			Typically, one of "E" – Emergency, "I" – Inpatient, or "O" – Outpatient. Additional HL7 codes available if desired. May be useful for routing results later.
Assigned Patient Location	PV1-3	O			Point of care (PV1-3.1), Room (PV1-3.2), and Facility (PV1-3.4) are all subcomponents of Assigned Patient Location, which may be used to derive information about the location where the order is to be filled.
Attending Physician	PV1-7	O			At least one of PV1-7, PV1-8, or PV1-9 is recommended to be included. PV1-7.1 is physician ID, PV1-7.2 is physician name. Both sub-components are recommended, if provided.
Referring Physician	PV1-8	O			At least one of PV1-7, PV1-8, or PV1-9 is recommended to be included. Typically, Referring Physician is the most useful. PV1-8.1 is physician ID, PV1-8.2 is physician name. Both sub-components are recommended, if provided.
Consulting Physician	PV1-9	O			At least one of PV1-7, PV1-8, or PV1-9 is recommended to be included. PV1-9.1 is physician ID, PV1-9.2 is physician name. Both sub-components are recommended, if provided.
Patient Ambulatory Status (Pregnancy Code)	PV1-15	O			HL7 "B6" is "definitely pregnant" (important for radiation exposure). This value is required is true and known. Map this value to DICOM Pregnancy Code. Other patient ambulatory modes are optional and not often used in DMWL.

HL7 Element Name	HL7 2.3 ORM Element	Reqd/ Opt	HL7 2.5 OMI Element	Reqd/ Opt	Notes
Visit Number	PV1-19	O			Visit number should be mapped to DMWL, if known. This is useful for re-grouping information at a later date.
Allergy Code	AL1-3	O			Locally defined code. Should be identified for contrast reactions.
Order Control Code	ORC-1	R			The order control. This defines what to do with the order. Can be one of "NW" (new), "CA" (cancel), or "XO" (update).
Placer Order Number	ORC-2	R			Same as OBR-2 – Placer Order Issuer and Number
Filler Order Number	ORC-3	R			Same as OBR-3 – Filler Order Issuer and Number
Order Status	ORC-5	R			The order status. "SC" for Scheduled.
Quantity Timing (Start)	ORC-7-4	R	TQ1-7	R	Scheduled start date and time of procedure. Same as OBR-27
Quantity Timing (Priority)	ORC-7-6	O	TQ1-9	O	Procedure Priority HL7 codes: S (Stat), A (ASAP), R (Routine), P (Pre-op), C (Callback), T (Timing) Note: OBR-5 is preferred location for Priority.
Entered by…	ORC-10	O			Can be useful. If usedm should include ORC-10.1 (ID), 10.2(Family Name), and 10.3(Given Name).
Ordering Provider – ID Number	ORC-12.1	O			The license number of the referring doctor. NPI. Very important in the U.S. for reimbursement.
Ordering Provider – Family Name	ORC-12-2	O			The family name of the referring doctor. Important to determine results distribution.
Ordering Provider - Given name	ORC-12-3	O			The given name of the referring doctor. Other ORC-12 sub-fields may also be present if useful.
Order Callback Phone Number	ORC-14	O			Important for STAT procedures
Order Control Code Reason	ORC-16	O			The order status.
Entering Organization	ORC-17	O			Can be important to identify where the report will go back to
Placer Order Number	OBR-2	R			Same as ORC-2
Filler Order Number	OBR-3	R			Same as ORC-3
Universal Service Identifier - Identifier	OBR-4-1	O			Identifies the exam to be performed (requested procedure code) as a coded value (i.e. procedure code). E.g., "9876-0". Highly recommended, if known.
Universal Service Identifier - Text	OBR-4-2	R			Describes the exam to be performed (requested procedure description) as short text. E.g., "CT Head w/o contrast".
Universal Service Identifier – Code System	OBR-4-3	O			Identifies the coding system to which the code (OBR-4.1) belongs, usually described as an oid. E.g., this may be the oid for the SNOMED or CPT-4 code system, or the oid for an internal hospital code system. Highly recommended, if known.
Universal Service Identifier - Identifier	OBR-4-4	O	IPC-6	O	Protocol Code Value. Usually a locally defined protocol code. Included when protocoling is performed in advance on the RIS or in the EMR (versus by the tech at the scanner; Note: today, protocolling is often performed by the tech at the modality and this value is rarely included in an ORM.)

HL7 Element Name	HL7 2.3 ORM Element	Reqd/ Opt	HL7 2.5 OMI Element	Reqd/ Opt	Notes
Universal Service Identifier - Text	OBR-4-5	O	IPC-6	O	Protocol Code Short Text Description. Included when protocoling is performed in advance on the RIS or in the EMR (versus by the tech at the scanner; Note: today, protocolling is often performed by the tech at the modality and this value is rarely included in an ORM.)
Universal Service Identifier – Code System	OBR-4-6	O	IPC-6	O	Protocol Code System oid. Included when protocoling is performed in advance on the RIS or in the EMR.
Priority	OBR-5	O			Procedure Priority HL7 codes: S (Stat), A (ASAP), R (Routine), P (Pre-op), C (Callback), T (Timing)
Relevant Clinical Information	OBR-13	O			Medical Alerts, if any
Specimen Source - Code	OBR-15-4	O	OBR-46	O	The anatomic region (i.e. body part). Typically a locally defined value.
Specimen Source – Laterality	OBR-15-5	O	OBR-46		Laterality of requested procedure (L – left, r – right, B- bilateral)
Ordering Provider	OBR-16	O			Requesting Physician whom the report is required to be provided. Required to be the same as ORC-12.
Order Call back Number	OBR-17	O			Can be very useful, if known and questions or concerns arise
Placer Field 1	OBR-18	R	IPC-1	R	The order ID/accession number.
Placer Field 2	OBR-19	O	IPC-2	R	The exam ID/requested procedure ID. May not sent from the RIS or EMR and populated by the DMWL SCP server.
Filler Field 1	OBR-20	O			Used for Scheduled Procedure Step ID, which is used for studies with the same accession number and requested procedure id, but is performed in multiple steps (see NM perfusion example in use cases).
Filler Field 2 (Scheduled Procedure Step Location)	OBR-21	O	IPC-8	O	Specific 1 (modality) where the study is to be performed, e.g., "CT4". This may be used to specify a system for an interventionalist or a specific scanner which has additional capabilities. See Note 1 below.
Diagnostic serv sect - ID	OBR-24	O	IPC-5		If present, represents the modality per DICOM CID 29. If not present, may need to be inferred based on some type of resource information or procedure code .
Quantity/Timing	OBR-27-4	R			Same as ORC-7.4
Reason for Study	OBR-31	O			The reason for the study. (Important field for diagnosis.) Highly recommended if available.
Technician (Performing Physician)	OBR-34	O			Used if a specific radiologist or cardiologist is scheduled for a procedure. (Typically for interventional procedures.)
Procedure Code	OBR-44	R			Requested Procedure Code Sequence is in components 1:3; Description is in component 5. Can be redundant or in place of Universal Service ID.
Study Instance UID	ZDS-1	R (see note)	IPC-3	R	The study instance UID. This is unique per exam. (The use of Z segments is not promoted.) NOTE: This field can be assigned by the ordering system or can be generated by the DICOM MWL provider if desired.

HL7 Element Name	HL7 2.3 ORM Element	Reqd/ Opt	HL7 2.5 OMI Element	Reqd/ Opt	Notes
Patient Height:	Repeating OBX sequence				n/a
Observation Identifier	OBX-3.2	O			Text: "BODY HEIGHT" (Note: important in pediatric or obese cases for protocoling.)
Observation Value	OBX-5	O			Height Value (numeric measurement)
Units	OBX-6	O			Required if Patient Height is sent. (Note: important in pediatric cases for protocoling.) "m" or "in"
Patient Weight:	Repeating OBX sequence				n/a
Observation Identifier	OBX-3.2	O			Text: "BODY WEIGHT" (Note: important in pediatric or obese cases for protocoling.)
Patient Weight	OBX-5	O			Weight Value (numeric measurement)
Units	OBX-6	O			Required if Patient Weight is sent. (Note: important in pediatric cases for protocoling.) "kg" or "lb"

Upon receipt of an ORM or OMI, Vitrea Connection attempts to parse the message. If the message is a valid message and contains the required elements, Vitrea Connection will continue to process the message. If not, Vitrea Connection will send a negative acknowledgement to the sender of the message.

Once the order message has been validated, Vitrea Connection will either create a new order or update an existing order in its order repository. After updates are successfully applied to the order repository, Vitrea Connection will return a positive acknowledgment (i.e. ACK) to the sender of the message.

Messages are handled in the order they are received, without any queuing between the reception of the message and the handling of the message. If an order cancelation indicated by Order Control Code (ORC-1 = "CA" (cancel)) is received, after the message has been validated, a positive acknowledgment (ACK) should be returned to sender.   The order should be marked internally as canceled, but not deleted.   It should not be used in DMWL responses going forward.

If an order update indicated by Order Control Code (ORC-1 = "XO" (update)) is received, after the message has been validated, a positive acknowledgment (ACK) should be returned to sender.   The previous order record, based on the Placer Order and Filler Order numbers, should be marked internally as canceled, but not deleted. A new DMWL entry should be created with the updated order information. NOTE: It is assumed that all information in the ORM is resent in an updated ("XO") message. A "differential message" should not be sent from the RIS or EMR in an ORM.

Note 1: Specific modality devices (Scheduled Procedure Location) are to be mutually agreed upon and defined in advance, each as a "resource". Examples of these could be "Hospital A, XA2" or "Imaging Center D, CT3". The Vitrea Connection DMWL SCP then maps that resource to one or more Scheduled Station AE Titles, DICOM Acquisition Modality Types (e.g., CT, MR, XA, etc). Scheduled Station Names, Scheduled Locations, and IP address. The resource configuration is easily accessible to the customer, as they will want to update that on a regular basis.   The intention is that the EMR/HIS/RIS should not be required to know and maintain the DICOM configuration information for each modality.

Vitrea Connection is capable of morphing most attributes in an HL7 order message. It is often the case that Vitrea Connection will use this capability to fill in missing values (e.g. assigning authority for patient ID, assigning authority for accession number) based on other values (e.g. sending application name). When assigning authorities are missing, they will be inferred by a combination of the sending application name and sending facility name for HL7 messages and by the calling AE title for DICOM messages.

Mapping from HL7 Orders to DICOM Scheduled Procedure Steps

This section specifies how an HL7 Order is mapped to DICOM Scheduled Procedure Steps.

DICOM Attribute	DICOM Tag	HL7 Attribute	HL7 Tag	O/R	Notes
SOP Common					
Specific Character Set	(0008,0005)	Character Set	MSH-18	O	Configurable. Set to "ISO_IR 100" by default.
Scheduled Procedure Step					
Scheduled Procedure Step Sequence	(0040,0100)				
>Scheduled Station AE Title	(0040,0001)			O	This value may be inferred by the modality type, if not provided explicitly in the message. In fact, multiple values may be inferred (e.g. there is a room full of US devices and the RIS doesn't care which US device is used to perform the exam.)
>Scheduled Procedure Step Start Date	(0040,0002)	Scheduled Date/Time	OBR-36/ TQ	R	
>Scheduled Procedure Step Start Time	(0040,0003)	Scheduled Date/Time	OBR-36/ TQ	R	
>Modality	(0008,0060)	Diagnostic Service Section ID	OBR-24	O	From DICOM CID 29 (Acquisition Modality)
>Scheduled Performing Physician's Name	(0040,0006)	Technician	OBR-34	O	
>Scheduled Station Name	(0040,0010)				This value may be inferred by the modality type, if not provided explicitly in the message. In fact, multiple values may be inferred (e.g. there is a room full of US devices and the RIS doesn't care which US device is used to perform the exam.)
>Scheduled Procedure Step Location	(0040,0011)			O	
>Pre-Medication	(0040,0012)				
>Scheduled Procedure Step ID	(0040,0009)	Filler Field 1	OBR-20	O	If not present, use Placer Field 2 (OBR-19).
>Requested Contrast Agent	(0032,1070)				
>Scheduled Procedure Step Status	(0040,0020)				
Requested Procedure					
Requested Procedure ID	(0040,1001)	Placer Field 2	OBR-19	R	
Reason for the Requested Procedure	(0040,1002)	Reason for Study	OBR-31	O	OBR-31 may be a code or text. If a code, then the code meaning should be used. See also Reason for Requested Procedure Code Sequence.
Reason for the Requested Procedure Code Sequence	(0040,100A)				
>>Code Value	(0008,0100)	Reason for Study	OBR-31	O	If OBR-31 is a code, fill in this value.
>>Coding Scheme Designator	(0008,0102)			O	
>>Code Meaning	(0008,0104)	Reason for Study	OBR-31	O	If OBR-31 is text, fill in this value.
Requested Procedure Description	(0032,1060)	Universal Service Identifier – Text or Universal Service Identifier – Identifier	OBR-4-2 or OBR-4-1	O	Use OBR-4.2 if present, otherwise use OBR-4.1
Requested Procedure Code Sequence	(0032,1064)				
>>Code Value	(0008,0100)	Universal Service Identifier – Identifier	OBR-4-1	O	
>>Coding Scheme Designator	(0008,0102)	Universal Service Identifier – Name of Coding System	OBR-4-3	O	

DICOM Attribute	DICOM Tag	HL7 Attribute	HL7 Tag	O/R	Notes
>>Code Meaning	(0008,0104)	Universal Service Identifier – Text	OBR-4-2	O	
Study Instance UID	(0020,000D)	Study Instance UID	ZDS-1-1/ IPC-3	R	It should be possible to configure Vitrea Connection to generate a Study Instance UID if one is not provided.
Requested Procedure Priority	(0040,1003)	Quantity/Timing	ORC-7 or TQ1-9		
Patient Transport Arrangements	(0040,1004)	Transport Arrangement Response	OBR-30		
Imaging Service Request					
Accession Number	(0008,0050)	Placer Field 1	OBR-18	R	
Requesting Physician	(0032,1032)	Ordering Provider	OBR-16	O	
Referring Physician's Name	(0008,0090)	Referring Doctor	PV1-8	O	
Placer Issuer and Number	(0040,2016)	Placer Order #	ORC-2	R	
Filler Issuer and Number	(0040,2017)	Filler Order #	ORC-3	R	
Reason for Imaging Service Request	(0040,2001)	Reason for Study	OBR-31		
Entered by…	(0040,2008)	Entered by…	ORC-10	O	
Order Entering Location	(0040,2009)	Entering Organization	ORC-17	O	
Order Callback Phone Number	(0040,2010)	Order Callback Phone Number	ORC-14	O	
Visit Identification					
Admission ID	(0038,0010)	Patient Account Number of Visit Number	PID-18-1 or PV1-19-1	O	Use PV1-19.1 if present, else use PID-18.1
Issuer of Admission ID	(0038,0011)	Patient Account Number of Visit Number	PID-18-4 or PV1-19-4	O	Use PV1-19.4 if present, else use PID-18.4
Visit Status					
Current Patient Location	(0030,0300)	Assigned Patient Location	PV1-3	O	
Patient Identification					
Patient's Name	(0010,0010)	Patient Name	PID-5	O	
Patient ID	(0010,0020)	External Patient ID	PID-2-1	R	
Issuer of Patient ID	(0010,0021)	External Patient ID	PID-2-4	R	
Ethnic Group	(0010,2016)	Ethnic Group	PID-22	O	
Patient Demographics					
Patient's Birth Date	(0010,0030)	Date/Time of Birth	PID-7	O	
Patient's Sex	(0010,0040)	Sex	PID-8	O	
Confidentiality Constraint on Patient	(0040,3001)	VIP Indicator	PV1-16	O	
Region of Residence	(0010,2152)	Citizenship	PID-26	O	
Military Rank	(0010,1080)	Veteran's Military Status	PID-27	O	
Patient Medical					
Patient State	(0038,0500)	Danger Code	OBR-12	O	
Pregnancy Status	(0010,21C0)	Ambulatory Status	PV1-15	O	
Medical Alerts	(0010,2000)	Relevant Clinical Info	OBR-13	O	
Contrast Allergies	(0010,2110)	Allergy Code	AL1-3	O	

2.3 Network Interfaces

2.3.1 Supported Communication Stacks

Minimum Lower Layer Protocol (MLLP/S) over TCP/IP is supported.

2.3.1.1 TCP/IP Stack

Vitrea Connection inherits its TCP/IP stack from the operating system on which it executes.

2.3.2 Physical Network Interface

Vitrea Connection is indifferent to the physical medium over which TCP/IP executes; it inherits this from the operating system.

2.4 Configuration

2.4.1 Title/Presentation Address Mapping

2.4.1.1 Local Titles

The local Application Name, Facility Name and TCP ports are configurable through the Vitrea Connection configuration interface.

Configuration Table

Application Name	Facility Name	Default TCP/IP Port
VITREA CONNECTION	Configurable	5555

2.4.2 Configuration Parameters

The following table shows the Vitrea Connection configuration parameters relevant to HL7 communication.

Configuration Parameter Table

Parameter	Configurable (Yes/No)	Default Value
General		
Maximum number of simultaneous Associations	No	Unlimited

3 Support of Extended Character Sets

Vitrea Connection supports the following extended character sets:

- ISO_IR 100 (ISO 8859-1)
- ISO_IR 101 (ISO-8859-2)
- ISO_IR 109 (ISO-8859-3)
- ISO_IR 110 (ISO-8859-4)
- ISO_IR 144 (ISO-8859-5)
- ISO_IR 127 (ISO-8859-6)
- ISO_IR 138 (ISO-8859-7)
- ISO_IR 148 (ISO-8859-9)
- ISO_IR 166 (TIS-620)
- ISO 1022 IR 6 (US-ASCII)
- ISO 2022 IR 100 (ISO-8859-1)
- ISO 2022 IR 101 (ISO-8859-2)
- ISO 2022 IR 109 (ISO-8859-3)

- ISO 2022 IR 110 (ISO-8859-4)
- ISO 2022 IR 144 (ISO-8859-5)
- ISO 2022 IR 127 (ISO-8859-6)
- ISO 2022 IR 126 (ISO-8859-7)
- ISO 2022 IR 138 (ISO-8859-8)
- ISO 2022 IR 166 (TIS-620)
- ISO 2022 IR 87 (JIS0208)
- ISO 2022 IR 159 (JIS0212)
- ISO 2022 IR 149 (cp949)
- ISO_IR 192 (UTF-8)
- GB18030 (GB18030)

The default character set for Vitrea Connection is US-ASCII.

4 Security

4.1 Security Profiles

Vitrea Connection supports secure HL7 communication in conformance with the Basic TLS Secure Transport Connection Profile. At default configuration, the TLS option is deactivated. In keeping with current security standards, TLS 1.0 and 1.1 are not supported.

When TLS is activated, the following ciphers are enabled by default:

- TLS_AES_128_GCM_SHA256
- TLS_AES_256_GCM_SHA384
- TLS_CHACHA20_POLY1305_SHA256
- ECDHE-ECDSA-AES128-GCM-SHA256
- ECDHE-RSA-AES128-GCM-SHA256
- ECDHE-ECDSA-AES256-GCM-SHA384
- ECDHE-RSA-AES256-GCM-SHA384
- ECDHE-ECDSA-CHACHA20-POLY1305
- ECDHE-RSA-CHACHA20-POLY1305
- DHE-RSA-AES128-GCM-SHA256
- DHE-RSA-AES256-GCM-SHA384

4.2 Association Level Security

Vitrea Connection can be configured to accept Association Requests from only a limited list of Applications and/or Facilities.

4.3 Application Level Security

Vitrea Connection web based administration module can be configured to require user authentication in order to access the user interface functionalities.