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Value from Innovation

SYNAPSE® VNA

HL7 Conformance Statement
Synapse VNA Software Version 7.X

REVISION HISTORY

Date	Revision	Revisions
6-January-2020	G	• Synapse VNA version 7.0. • Updated copyright.
16-May-2019	F	• Added FHIR support.
4-January-2019	E	• Updated copyright year.
10-May-2018	D	• Added Patient Worklist Messaging. • Updated copyright year.
9-March-2017	C	• Updated copyright year.

5-December-2016	B	• Updated to reflect current operation.
		   ○ Support for HL7 version 2.5
		   ○ Single and multi-byte character set
		   ○ Ideographic and phonetic name support
		   ○ File Upload Messaging
		   ○ OBX File Upload
		   ○ Non-DICOM Availability Notification

23-July-2015	A	• V6.0.4 General Availability release. • Rebranded with FUJIFILM logo, disclaimer and contact information.
27-May-2015	NA	• V6.0.3 General Availability release.
19-April-2015	NA	• V6.0.2 General Availability release.
07-January-2015	NA	• Updated copyright year. • Added additional copyrights information.
12-August-2014	NA	GA release for 6.0.

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Introduction

PURPOSE

This document describes the HL7 messages supported by Synapse VNA. It is intended for users involved with system integration and/or software design. We assume that the reader is familiar with the terminology and concepts that are used in HL7 and the IHE Technical Framework.

Synapse VNA supports HL7 versions 2.2, 2.3, 2.3.1, 2.4, 2.5. It also supports FHIR v3.0.1.

Although the use of this conformance statement in conjunction with the HL7 standard is intended to facilitate communication with Synapse VNA, it is not sufficient to guarantee, by itself, the inter-operation of the connection between a 3rd party system (such as a HIS/RIS or EMR) and Synapse VNA.

ACRONYMS AND ABBREVIATIONS

Item	Description
ADT	Admission, Discharge and Transfer
EVN	Event Type segment
FHIR	Fast Health Interoperability Resources
HIS	Hospital Information System
HL7	Health Level 7
MRG	Merge Patient Information segment
MSH	Message Header segment
OBR	Observation Request segment
OBX	Observation/Result segment
PMS	Practice Management System
PID	Patient Identifier, also HL7 patient identifier segment
ORM	Order Request message

Inbound Messaging Overview

Synapse VNA listens for messages generated by the ADT system of record, typically the EMR, HIS, departmental information system or a PMS. It processes the message, and issues an (original mode) acknowledgement.

PATIENT DEMOGRAPHICS MESSAGING

Synapse VNA handles the following demographic messages without any additional customization required. Any set of messages with a valid PID segment can be selected for patient demographics messaging. Processing of each is handled identically:

- ADT^A01 – Patient Admit Notification
- ADT^A02 – Patient Transferred
- ADT^A03 – Patient Discharged
- ADT^A04 – Patient Registered
- ADT^A05 – Patient Pre-Admission

These messages can be configured to work identically as above or to not change patient identity (patient ID or MPI).

- ADT^A08 – Update Patient Information
- ADT^A28 – Add Patient Information

Only the MSH and PID segments of these messages are processed, all other segments are ignored.

PATIENT MERGE MESSAGING

Synapse VNA processes the following patient merge messages:

- ADT^A18 – Merge Patient Information
- ADT^A34 – Merge Patients
- ADT^A40 – Merge Patients

Only the MSH, PID and MRG segments of this message are processed, all other segments are ignored.

PATIENT WORKLIST MESSAGING

The Patient Worklist Messaging function is the standard operation to create patient worklist entries for Connext Mobile. This is done using ADT^A14 messaging. A worklist entry is created using the Patient Account Number (PID-18) as the encounter number. If the Patient Account Number is not found, no worklist entry is created.

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The following is the default ADT Worklist message Synapse VNA supports:

- ADT^A14 –Pending Admit – creates a Patient Worklist entry and a patient if one does not exist
- ADT^A03 –Discharge Patient –removes the Patient Worklist entry; does not remove the patient. It creates a patient if no patient exists.

Patient Worklist Messaging uses the MSH and PID segments: all other segments are ignored.

PATIENT CHANGE ID MESSAGING

- The MRG segment identifies the patient to update, and the PID segment contains the new MPI or Patient ID value. ADT^A46 –Change MPI ID
- ADT^A47 – Change Patient ID

Only the MSH, PID and MRG segments of this message are processed, all other segments are ignored.

ORDERS MESSAGING

Synapse VNA can listen for HL7 order messages to change the accession number of studies and optionally validate received DICOM studies against matching orders.

- ORM^O01 – General Order Message

Only the MSH, PID, ORC, OBR, and ZDS segments of these messages are processed. All other segments are ignored. The ORC, OBR segments can repeat as long as they are always in pairs.

SR RESULTS MESSAGING

A results message conveys the interpretation of an imaging study. Internally, Synapse VNA converts the interpretation (or diagnostic report) into a DICOM Structured Report (SR).

- ORU^R01 – Observation Results

Resulting messaging differs for all other HL7 messaging in that it creates a DICOM SR Image.

FILE UPLOAD MESSAGING

This is similar to an SR message, except the OBX segment includes the URL or http location of a file to upload. See the OBX segment (File Upload) from the *HL7 Messaging Specifications.*

Inbound Segment Mappings

MSH SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Field Separator	Yes	Used by Synapse VNA as field separator.
2	Encoding Characters	Yes	Used by Synapse VNA as encoding characters.
3	Sending Application	Optional	Used for MSH-5 in ACK.
4	Sending Facility	Optional	Used for MSH-6 in ACK, used to look up HL7SourceClass object.
5	Receiving Application	Optional	Used for MSH-3 in ACK
6	Receiving Facility	Optional	Used for MSH-4 in ACK
9	Message Type	Yes	Determines type of message. Anything not processed is simply ACK'ed.
10	Message Control ID	Yes	Used for MSH-10, MSA-2 in ACK.
11	Processing ID	Yes	Used for MSH-11 in ACK.
12	Version ID	Yes	2.2, 2.3, 2.3.1, 2.4, or 2.5.
18	Character set	Optional	Specifies single byte or multi-byte character sets found by scanning the HL7 Message for ISO 2022 escape sequences. See tables in the *HL7 Messaging Specifications* for supported character sets.

PID SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
2	Patient ID (External ID)	Optional	If present, is used as the patient's master patient index (MPI).
3	Patient ID (Internal ID)	Yes	Supplies the patient ID. Multiple patient ID's are allowed (~).

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SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
5	Patient Name	Yes	First five subfields of name are stored in LastName, FirstName, MiddleName, Suffix, and Prefix.
			If patient already exists, patient name is always assumed to be complete. Null values in last four subfields will overwrite existing strings.
			For HL7 v2.5 only, we support multi-byte character encodings, which enables ideographic and phonetic writing systems.
7	Date/Time of Birth	Optional	Stored to database.
8	Sex	Optional	Stored to database.
10	Race	Optional	Stored to database.
18	Patient Encounter Number	Optional	Stored to database.

MRG Segment

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Prior Patient ID - Internal	Yes	Supplies the merge from patient ID. Multiple patient IDs are allowed (~).
4	Prior Patient ID - External	Optional	If present, is used as the source patient's master patient index (MPI).

OBR Segment

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
2	Placer Order Number	Optional	Stored in database.
3	Filler Order Number +	Conditional	Stored in database as Accession Number
			Note: While not required per the HL7 standard, this is required by Synapse VNA for proper operation.
4	Universal Service ID	Yes	Stored in database.
6	Requested Date/Time	Optional	Stored in database.

ORC SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Order Control	Yes	NW (Create order), CA (Cancel order), or XO (change study and order accession number).

ZDS SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Study UID	Yes	Used to lookup study for XO operation.

OBX SEGMENT (WHEN USED FOR SR REPORT)

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Set ID - OBX	Optional	Incrementing value starting at 1, one segment for SR results line.
5	Observation Value	Optional	Set to SR text line. Also can use tilde (~) to represent different lines.
11	Observation Result Status	Optional	Set to A if study is complete, C if study is updated.

OBX SEGMENT (WHEN USED FOR FILE UPLOAD)

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Set ID - OBX	Optional	Incrementing value starting at 1, one segment for SR results line.
2	Value Type	Optional	For upload messaging, we only process OBX segments with the type RP.
5	Observation Value	Optional	Filename to upload. Name is either in HTTP notation (string starts with http:// or https://) or UNC notation.

Outbound Messaging Overview

Synapse VNA generates internal events for changes to its archives. These events can be used to trigger a custom outbound HL7 message:

- Study notification
- EMR notification
- Non-DICOM EMR notification
- Delete notification
- Study verification

STUDY AVAILABILITY NOTIFICATION MESSAGING

This message is sent to notify an external system that a study is available:

- ORU^R01 – Observation Results

The following segments are supplied: MSH, PID and OBR and one or more OBX.

EMR VIEWER STUDY AVAILABILITY NOTIFICATION

Synapse VNA can send a URL link to a study's DICOM images or non-DICOM files when they are available for viewing:

- ORU^R01 – Observation Results

The following segments are supplied: MSH, PID and OBR and one or more OBX.

NON-DICOM AVAILABILITY NOTIFICATION

This is based on the EMR Viewer Study Availability Notification. The URL takes you to the study in the non-DICOM mode.

IMAGE DELETE MESSAGING

This message is sent whenever a study, series, or image(s) are deleted:

- ORU^R01 – Observation Results

The following segments are supplied: MSH, PID and OBR and one or more OBX.

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STUDY VERIFICATION MESSAGING

Another way that Synapse VNA interacts with an external Enterprise system is to verify patient and study information. If the verification fails, Synapse VNA marks the study with a QA issue so an administrator can later resolve the discrepancy between the data Synapse VNA received from the DICOM modality and the Enterprise's data:

- OSQ^Q06 – Order Status Query

The following segments are supplied: MSH and QRD.

The response is expected to be an OSR^Q06 with the MSH, MSA, QRD, and PID segments present (which will be parsed).

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Outbound Segment Mappings

MSH SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Field Separator	Yes	Used by Synapse VNA as field separator.
2	Encoding Characters	Yes	Used by Synapse VNA as encoding characters.
3	Sending Application	Optional	From SendingApplication attribute in the HL7Client object.
4	Sending Facility	Optional	From SendingApplication attribute in the HL7Client object.
5	Receiving Application	Optional	From Receiving Application attribute in the HL7Client object.
6	Receiving Facility	Optional	From Receiving Application attribute in the HL7Client object.
9	Message Type	Yes	Set to ORU^R01.
10	Message Control ID	Yes	Set to incrementing number.
11	Processing ID	Yes	Set to P.
12	Version ID	Yes	2.2, 2.3, 2.3.1, 2.4, or 2.5
15	Accept Acknowledgment Type	Optional	Set to AL.
16	Application Acknowledgment Type	Optional	Set to NE.

PID SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
2	Patient ID (External ID)	Optional	From the database.
3	Patient ID (Internal ID)	Yes	From the database.
5	Patient Name	Yes	From the database. First five subfields of name come from in LastName, FirstName, MiddleName, Suffix, and Prefix. For HL7 v2.5 only, we support multi-byte character encodings, which enables ideographic and phonetic writing systems.
7	Date/Time of Birth	Optional	From the database.
8	Sex	Optional	From the database.
10	Race	Optional	From the database.

OBR SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Set ID--OBR	Optional	Set to 1.
2	Placer Order Number	Optional	From the database.
4	Universal Service ID	Yes	From the database.
7	Observation Date/Time #	Conditional	From the database.
24	Diagnostic Serv Sect ID	Optional	From the database.

OBX SEGMENT (FOR STUDY AVAILABILITY NOTIFICATION)

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Set ID - OBX	Optional	Incrementing value starting at 1.
2	Value Type	Conditional	Set to RP.
3	Observation Identifier	Yes	From the database.

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
4	Observation Sub-ID	Conditional	Incrementing value for study, starting at one.
5	Observation Value	Optional	From the database.
6	Units	Optional	Set to number of images.
7	References Range	Optional	Set to series description.
11	Observation Result Status	Yes	Set to **A** if study is complete, **C** if study is updated, **D** if notification is for deleted images.
13	User Defined Access Checks	Optional	Set to ONLINE if study stored in online storage group. Set to NEARLINE if study stored only in nearline storage group.
14	Date/Time of the Observation	Optional	Set to series created time.
15	Producer's ID	Optional	Set to series station name.
17	Observation Method	Optional	Set to series modality.

OBX SEGMENT (FOR EMR VIEWER STUDY AVAILABILITY NOTIFICATION)

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Set ID - OBX	Optional	Set to 1.
2	Value Type	Conditional	Set to **RP** if configured to send EMR URL, otherwise set to **TX**.
5	Observation Value	Optional	Set to EMR Viewer URL if configured, otherwise '**ONLINE**'.

OBX SEGMENT (FOR IMAGE DELETE NOTIFICATION)

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Set ID - OBX	Yes	Incrementing value starting at one.
2	Value Type	Conditional	Set to RP.
5	Observation Value	Conditional	From the database.

QRD SEGMENT (FOR STUDY VERIFICATION)

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
2	Query Format Code	Optional	Set to R.
3	Query Priority	Optional	Set to I.
4	Query ID	Optional	Set to 1.
8	Who Subject Filter	Yes	Set to patient to be validated.
7	Date/Time of Message	Optional	Set to current date/time.
10	What Department Data Code	Optional	Set to study to be validated, using accession number.

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Outbound Messaging Acknowledgement

The external information systems should respond with the following message segments:

MSA SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
1	Acknowledgement Code	Yes	If set to anything but **AA,** verification failed.
2	Message Control ID	Optional	If failure, text recorded with QA issue.
3	Text Message	Optional	If failure, text recorded with QA issue.

PID SEGMENT

SEQ	HL7 Field Name	Required by HL7	Synapse VNA Usage
2	Patient ID	Optional	Stored to database.
5	Patient Name	Optional	First five subfields of name are stored in LastName, FirstName, MiddleName, Suffix, and Prefix.
7	Date/Time of Birth	Optional	Stored to database.
8	Sec	Optional	Stored to database.
10	Race	Optional	Stored to database.

FHIR Capabilities

Fast Health Interoperability Resources (FHIR) is a standard for healthcare data exchange. It is a global standard published by HL7 International based on RESTful web services. Synapse VNA acts as a FHIR server to enable non-DICOM image storage and retrieval. This section provides a summary of those capabilities. Full details are available from the VNA Capabilities Statement URL below.

FHIR sources are linked to an organization within the VNA. For authentication, FHIR uses the same security model as the non-DICOM RESTful web services use. FHIR supports the HTTP/HTTPS protocol, with HTTPS being the default.

CAPABILITIES STATEMENT URL

<VNA Base URL>/fhir/metadata

RESOURCES

DOCUMENTREFERENCE

Interactions supported:

- Create
- Read
- Update
- Delete

BINARY

Interactions supported:

- Read