Graphnet Feed Spec – Radiology HL7 - Generic

Author: Graphnet

Version: 1.0

Created: May 2019

Updated:

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Name	Role	Date	Comments
Graphnet	Author	May 2019	
S Latif / B Keown	Reviewer		

Amendment record

Issue status	Version	Date	Actioned by	Description
Final	1.0	01/05/2019	Qaez Anwar	Radiology content migrated from Acute HL7 Specification and placed in separate document. Tile updated to new design standard.

Table of contents

1 Purpose

The purpose of this document is to describe how CareCentric receives and displays Radiology data through HL7 v2.4 messages.

1.1 Document Scope and Limitations

Any internal implementation details, XML Schemas and specifications defined by Graphnet within this document are subject to change without further notice. The CareCentric Highway Integration Engine is beyond the scope of this document and any reference to the actual internal components or workings of this product in any form (e.g. visual, written) are subject to change without notice.

1.2 General Information / Reference Documents

The Graphnet interface specification is guided by the requirements of the following specifications and standards:

ANSI/HL7 V2.4-2000 (This is a revision of ANSI/HL7 V2.3.1-1999)

This document requires that the reader has a good understanding of HL7 messages, rules and format. Further information can be acquired from the following website:

http://www.hl7.org.uk/version2group/HL72UK.asp

1.3 Definitions

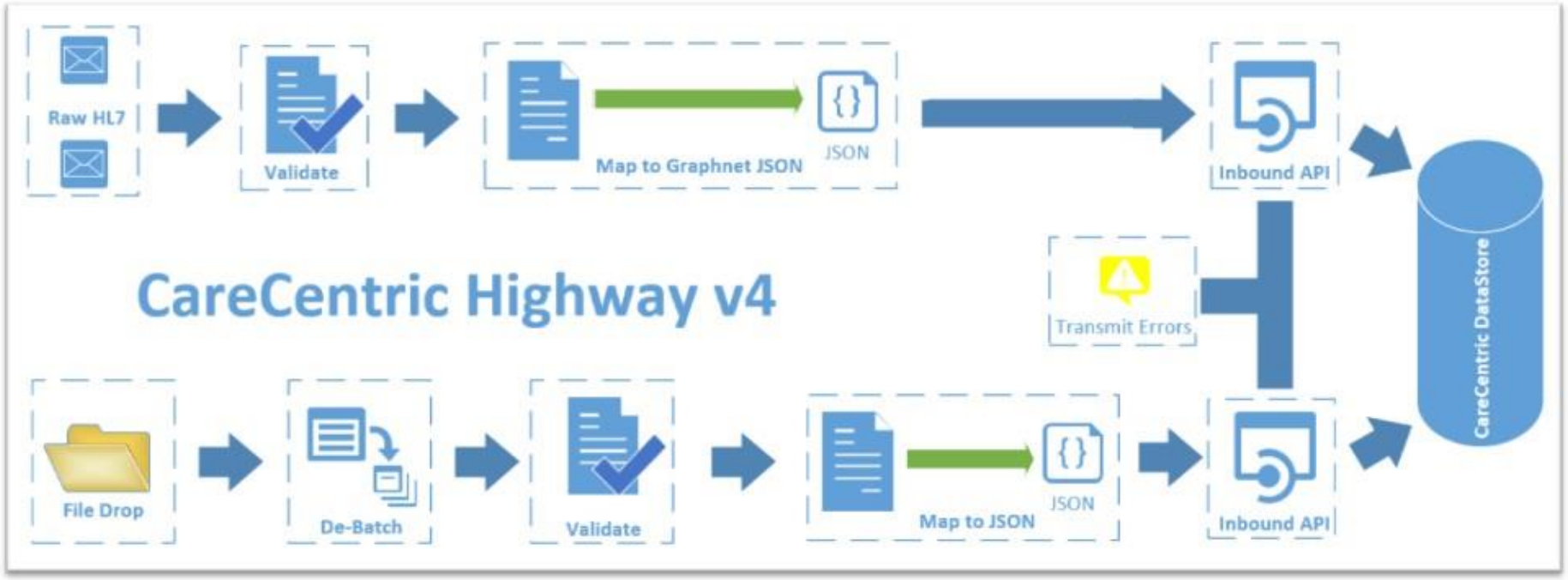
Term/Abbreviation	Description
ACK	Acknowledgement
EHR	Electronic Health Record
HL7	Health Level Seven
MLLP	Minimum Lower Layer Protocol
Tenancy	CareCentric is a multi-tenancy system which is able to receive demographics information from more than one source and has the ability to link patient records based on specific patient matching criteria.
NAK	Negative Acknowledgement

2 CareCentric Highway Integration Engine

CareCentric Highway v4 is a cloud-based service where processing takes place in the Microsoft Azure platform. The service can also be deployed locally on premise. Data is sent to Highway using secure protocols HTTPS/FTPS. Azure meets a set of international and industry-specific compliance standards such as ISO/IEC 27001/27002:2013, HIPAA and FedRAMP.

The following diagram illustrates the concept for receiving data into CareCentric using the Highway Integration Engine to extract and integrate data from a wide range of health and social care IT solutions.

Note - This is not indicative of all physical environments and is provided as a conceptual guide only.



2.1 Transport/Network Security

Real Time HL7 messages are encrypted at socket level using TLS 1.2. Any messages other than HL7 will be encrypted when the files are sent to the Highway v4 server.
The configuration of the network including firewalls, IP addresses and re-routing of data are the responsibility of the sending party (Trust).

2.2 Error Handling

Highway v4 incorporates synchronous ACK/NACK Reponses when HL7 messages are received. If any issues occur during processing, they are logged (as per diagram above) and can be configured to be sent out as Email Notifications.

3 Message Format

3.1 Radiology Results

The following HL7 messages are accepted by CareCentric Highway to display Results information for a patient:

HL7 Message Type	Event/Description
ORU^R01	Results message

4 HL7 Message Details

4.1 Message Details - Key

[ ] - Segment is optional.
{ } - Segment can be repeated.

4.2 Results Feed (ORU^R01)

Radiology results are accepted by Graphnet as Message Type ORU^R01. The expected structure of the message is as follows:

ORU^R01 Message Structure

Segments	Description	Comments
MSH	Message Header	
PID	Patient Identifiable Data	Only used for patient matching
[{ NTE }]	Notes and Comments	Optional section which can repeat
ORC	Common Order	Order (ORC) to Request (OBR) Ratio 1(ORC):1(OBR)
OBR	Observation Request	Request (OBR) to Test (OBX) Ratio 1(OBR):many(OBX)
[{ NTE }]	Notes and Comments	Optional section which can repeat
{	Repeating Section	OBX Repeating Section (Start)
OBX	Observation / Result	
[{ NTE }]	Notes and Comments	Optional section which can repeat
}		OBX Repeating Section (End)

Results are accepted as HL7 message type ORU^R01 then subdivided into radiology result types. This can be done by utilising OBR 4.4.

OBR:4.4 Value	Result Type
RAD	Radiology

4.3 Patient Matching Rules

Patients will be matched based on the Patient Number as defined in PID.3.1 (PID.3.1 is a field within the message). The Tenancy ID is used to accurately match information related to a specific tenancy, distinct from any other tenancy.

The following fields are used by this transaction type for patient and activity matching purposes:

Segment	Field	Description	Comments
PID	3.1	PatientIDList/PatientID	
PID	3.5	Patient Identifier Type	Used to determine whether the number is NHS type or other (see section 4.2)
OBR	3.1 4.1	ExamID Test Code	OBR:3 and OBR:4.1 are used to uniquely identify the result, that is, the specific OBR and it's associated OBX and NTE segments

5 Segment Details

5.1 MSH – Message Header

Seq	Field Name	Opt	Occurs	Comments
1	Field Separator	R	1	
2	Encoding Characters	R	1	
3	Sending Application	R	1	Used to generate document properties
4	Sending Facility	R	1	Used to generate document properties
5	Receiving Application	R	1	
6	Receiving Facility	R	1	
7	Date/Time of Message	R	1	
9.1	Message Type / Message Type	R	1	
9.2	Message Type / Trigger Event	R	1	Used to generate document properties
10.1	Message Control Id	R	1	Used to generate document properties
11	Processing Id	R	1	
12	VersionId	R	1	
18	Character Set	O	1	

5.2 PID

Note: This Radiology feed does not perform any demographic updates, PID is used for the purpose of Patient Matching.

Seq	Field Name	Opt	Occurs	Comments
3.1	PatientIdentifierList\PatientID	R	1-n	Used to retrieve NHS number and/or Other number type (to be used with identifier type)
3.4	PatientIdentifierList\PatientID	O	1-n	
3.5	PatientIdentifierList\PatientID	R	1-n	Used to identify number type NHS Number = NHS or NH Hospital Number = PI or HOSP Master Record Number = MRN Other number types can be specified
5.1	Surname	R	1-n	
5.2	Forename	R	1-n	
5.3	Middle Name(s)	O	1-n	
5.4	Suffix	O	1-n	
5.5	Prefix	R	1-n	e.g. Master ,Mr, Mrs
5.7	Name Type Code	O	1-n	e.g. L – Legal Name
7	Date of Birth	R	1	As YYYYMMDDHHMM
8	Administrative Sex	R	1	Code values accepted: F- Female M-Male O or U-Unknown

5.3 ORC - Common Order

Seq	Field Name	Opt	Occurs	Comments
1	Order Control	R	1	
7.4	Examination Date/Time	O	1	Shown on screen D15, D16
13.1	Order Ward Location	O	1	Shown on screen D8

5.4 OBR - Observation Request

Seq	Field Name	Opt	Occurs	Comments
1	Set ID	R	1	
3	Filler Order Number	R	1	ID of the order OBR:3 and OBR:4.1 are used to uniquely identify the result in this OBR and it's OBX and NTE segments
3.1	Exam ID	R	1	OBR:3 used to uniquely identify the result in this OBR and it's OBX and NTE segments
4.1	Test Code	R	1	OBR:3 used to uniquely identify the result in this OBR and it's OBX and NTE segments
4.2	Exam Description	R	1	Shown on screen D2, D14
4.4	Alternate Identifier	R	1	Must be set to "RAD" – used to show this is a Radiology result
6.1	Collected Date / Time	O	1	Shown on screen D4, D5
7	Observation Date / Time	R	1	Shown on screen D9, D10
16.2	Ordering Provider Surname	O	1	Shown on screen D7
16.3	Ordering Provider Given Name	O	1	Shown on screen D7

16.4	Ordering Provider Middle Name	O	1	Shown on screen D7
25	Result Status	R	1	Shown on screen D11
32.1	ReportedByDescription	R	1	Shown on screen D12

5.5 OBX- Observation / Result

Seq	Field Name	Opt	Occurs	Comments
1	Set Id	R	1	
5.1	Result Value	R	1	Shown on screen D18
8.1	Abnormal Flag	O	1	Shown on screen D20 i.e. Result out of range

5.6 NTE- Notes and Comments

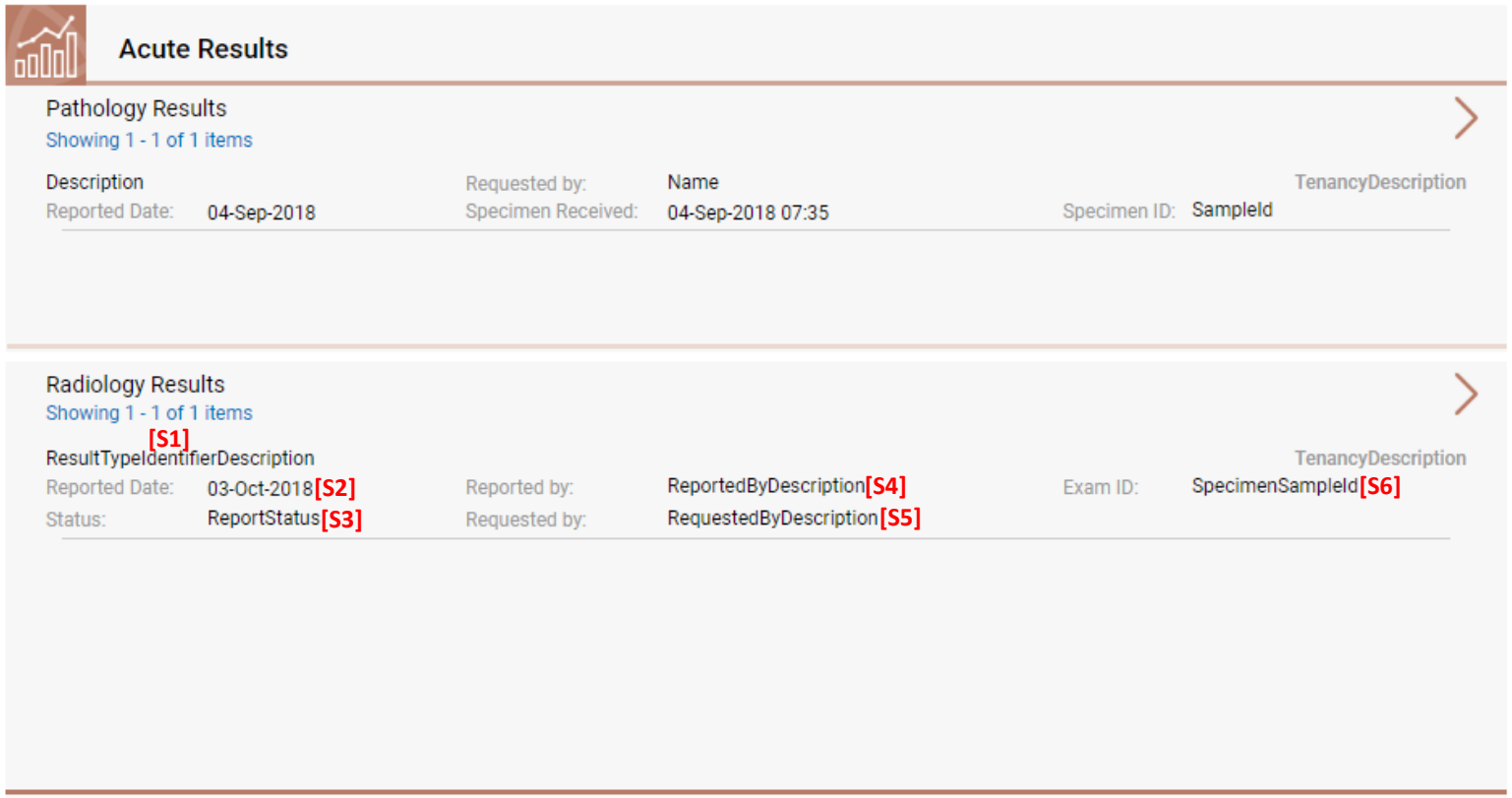
Seq	Field Name	Opt	Occurs	Comments
3.1	Comments	R	1	Shown on screen D17, D19

6 CareCentric Radiology Documents

6.1 Rad Results (ORU^R01)

HL7 Message Type: ORU^R01
OBR-4.4 starts with RAD

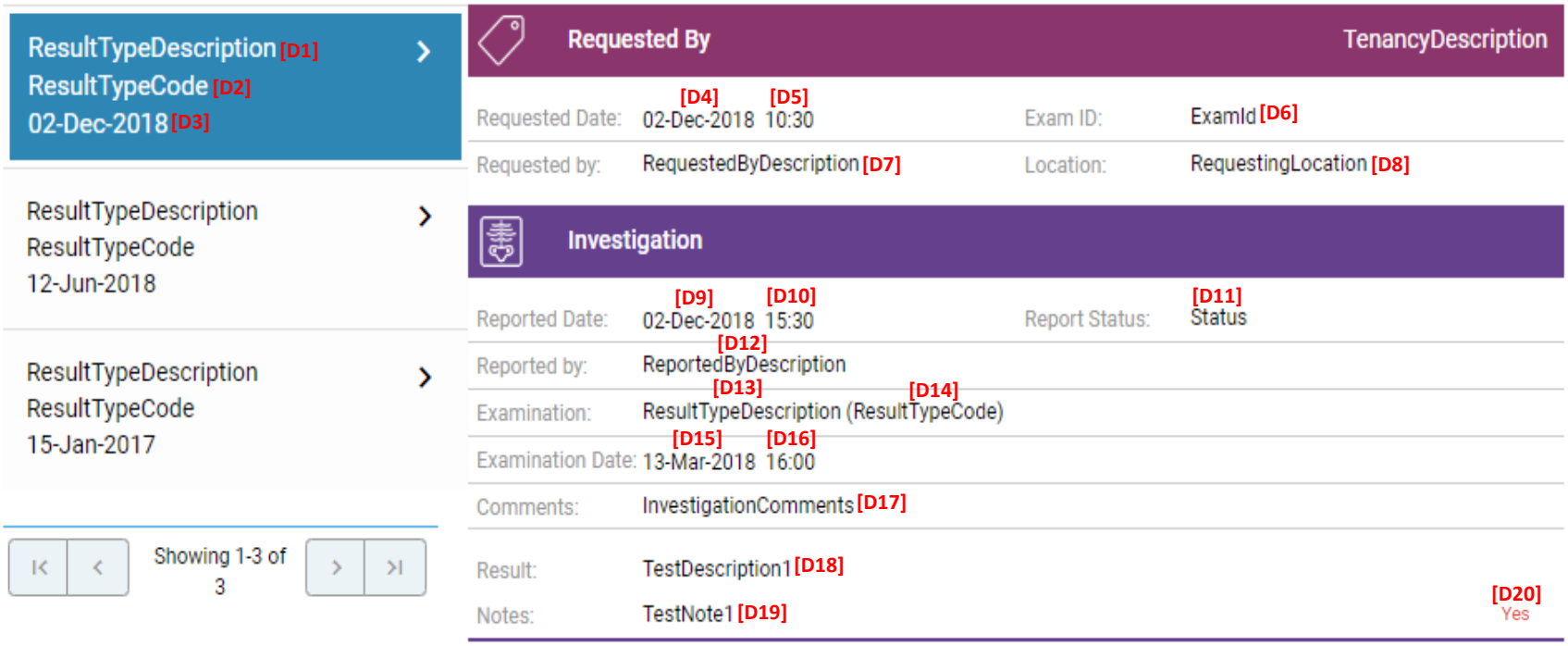
6.1.1 Summary View (cc0092)



6.1.2 Summary View Mapping Reference

Reference	Description	HL7 Message Location	Label
S1	Exam Description	OBR 4.2	-
S2	Report Date	OBR-7.1	Reported Date
S3	Report Status	OBR-25	Status
S4	Reported By	OBR-32.1	Reported By
S5	Ordered By	ORC-12.2	Requested By
S6	Exam ID	OBR-3.1	Exam ID

6.1.3 Detail View (cc0028)



6.1.4 Detail View Mapping Reference

Reference	Description	HL7 Message Location	Label
D1, D2	Type of Result Document / Exam Description	OBR-4.1 / OBR 4.2	-
D3	Reported Date	OBR-7.1	-
D4, D5	Requested Date and Time	OBR-6.1	Requested Date
D6	Exam ID	OBR-3.1	Exam ID
D7	Ordering provider first name / Ordering provider middle name / Ordering provider Surname	OBR 16.3 / OBR 16.4 / OBR 16.2	Requested By
D8	Order Ward Location	ORC-13.1	Location
D9, D10	Reported Date and Time	OBR-7.1	Reported Date
D11	Report Status	OBR-25	Report Status
D12	Reported by	OBR-32.1	Reported by
D13, D14	Type of Result Document - Exam Description	OBR-4.1 / OBR 4.2	Examination
D15, D16	Examination Date and Time	ORC-7.4	Examination Date
D17	Investigation Comments	NTE-3.1(with preceding OBR segment)	Comments
D18	Test Results – Value	OBX-5.1	Result
D19	Test Result Notes	NTE-3.1(with preceding OBX segment)	Notes
D20	Test Results - Flag	OBX-8.1	-

7 Mapping Considerations

7.1 CareCentric Document Version Control

Version control is required for all messages

7.2 CareCentric Business Rules

The following business rules will be used when processing the data for creating, updating and deleting records.

Rad Result Documents	
Create	New records based on the key **Exam ID (OBR:3.1) & Test Code (OBR:4.1)** must be detected and added. The identifier will be retained in the *UniqueID* column of the Graphnet record table.
Update	Existing records based on the key **Exam ID (OBR:3.1) & Test Code (OBR:4.1)** must be detected and the inbound records will be made a newer version of the existing record. The date from OBR.7 will be used for ordering the versions.
Delete	Documents will not be permanently deleted. Deletions will hide documents from the patient record (soft delete).

8 Frequently Asked Questions

- Q. Why isn't the display order done on the Exam Performed Date and Time (clinically significant date)?
    - The feed sorts by the Reported Date as this generic feed is designed to receive data from all well known Radiology Systems and the Reported Date is the only mandatory field which these systems can always supply.

- Q. Why doesn't the text make full use of the width of the display in the results?
    - In order to enable textual results to be displayed in a clinically safe way the system uses a mono-spaced font and prevents the display from wrapping the text automatically. This is to preserve any formatting associated with the text to ensure that it displays as intended. There will be occasions where text is sent through that could have been displayed in a more condensed format but in order to maintain a clinically safe display the text will be displayed as it has been received within the message. This will also mean the user will occasionally see a scroll bar when the preserved formatting causes the text to exceed the width of the display area. This is particularly relevant where textual tables are included as part of the result.

- Q. Why are there are empty fields being displayed in the tile?
    - The radiology tile within CareCentric is designed to accept feeds from multiple radiology systems and as such there might be a field that a particular radiology system doesn't or cannot send. In this case the field will display but no data will be shown. If this is problematic, we can set the tile to display 'data not provided' as a default text.