BRIT Systems

HL7 Conformance Statement

Roentgen Works

Release 5.0

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Revision History

Date	Release Number	Revised By	Sections Affected	Comments
08/23/2013	2.0	Kyle A Boyd	All	Initial Release
10/05/2015	2.1	Kyle A Boyd	ADT and Image Availability	Added Image Availability
03/01/2017	2.2	Kyle A Boyd	Message Structure	Updated examples and comments for various message fields.
07/18/2019	2.3	Kyle A Boyd	Supported Messages	Updated supported messages
10/11/2019	2.4	Kyle A Boyd	Supported Messages	Complete Message
03/20/2020	3.0	Kyle A Boyd	ADT, ORM, ORU Messages Message Structure	Updated Message Segments, Optional Message Segments Add Insurance Segment
09/28/2020	4.0	Kyle A Boyd	Message Structure	Update OBR definitions, comments Update ORC comments Added Guarantor Segment Update IN1 definitions, comments
10/05/2020	4.1	Kyle A Boyd	Message Structure	Added FT1 Segment Updated PV1 definitions, comments Updated Message Segments
07/22/2020	5.0	Kyle A Boyd	Message Structure	Updated INS Segments Updated GT1 Segments

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1 Conformance Statement Overview

Table 1 – Supported Messages

Message	Definition	Inbound	Outbound
Admission Discharge and Transfer			
ADT^A01	Admit / Visit Notification	Yes	
ADT^A02	Transfer a patient	Yes	
ADT^A03	Discharge/End visit	Yes	
ADT^A04	Register a patient	Yes	Yes
ADT^A05	Pre-admit a patient	Yes	
ADT^A06	Change an outpatient to an inpatient	Yes	
ADT^A07	Change an inpatient to an outpatient	Yes	
ADT^A08	Update patient information	Yes	Yes
ADT^A11	Cancel admit/visit notification	Yes	
ADT^A12	Cancel transfer	Yes	
ADT^A13	Cancel discharge/end visit	Yes	
ADT^A35	Merge patient information	Yes	
ADT^A38	Cancel pre-admit	Yes	
ADT^A40	Merge patient - patient identifier list	Yes	Yes
ADT^A41	Merge patent/account information	Yes	
ADT^A44	Move account information	Yes	
ADT^A47	Change patient identifier	Yes	Yes
Order Message			
ORM^O01	Order message	Yes	Yes
ORM^O01	Complete message	Yes	Yes
Observation Result			
ORU^R01	Observation message	Yes	Yes
Image Availability			
ORU^R01	Image Availability		Yes
ORM^O01	Image Availability		Yes

2 Introduction

This document is intended to illustrate how BRIT System's Roentgen Works uses HL7 interfaces. BRIT Systems recognizes that every health care institution is unique and has a unique workflow suited to that institution's environment. Therefore, this specification should only be used as a guideline.

This specification addresses HL7 message types ADT, ORM-O01, and ORU-R01. These messages were chosen for discussion because they represent the message types typically used in a PACS environment. BRIT Systems is not limited to these messages. The HL7 ACK message is not discussed here because it is assumed and must be supported in all HL7 messaging environments.

The BRIT Systems HL7 interface uses the lower layer TCP/IP protocol recommended by the HL7 specification to transfer messages.

This specification illustrates both inbound and outbound HL7 message types. The inbound messages are typically received from a HIS / RIS. The outbound messages are typically sent to a HIS / RIS, dictation system, PACS, and CD burners.

Prior to any HL7 implementation in a PACS environment, BRIT recommends that a planning period be scheduled so that all interested parties can help define workflow, message content, and message usage. Interested parties may include radiologists, radiology technicians, IS, and BRIT. If an institution does not have an HL7 specification, a useful exercise would be to generate one. Developing such a specification enhances awareness of what information may be available, what information is needed, and when and how that information is used.

2.1 Acronyms and Abbreviations

Definitions, terms, and abbreviations used in this document are defined within the HL7 standard. Abbreviations and terms are as follows:

Table 2 – Acronyms and Abbreviations

Abbreviations	Definition
ADT	Admission, Discharge, and Transfer message
AL1	Patient Allergy Information segment
EVN	Event Type segment
GT1	Guarantor segment
HL7	Health Level 7
IHE	Integrating the Healthcare Enterprise
MRG	Merge Patient Information segment
MSH	Message Header segment
NTE	Notes and comments segment
OBR	Observation Request segment
OBX	Observation/Result segment
ORC	Common Order segment
ORM	Order Request message
ORU	Observation Results - Unsolicited message
PID	Patient ID segment
PV1	Patient Visit segment
QRD	Query Definition segment
ROL	Role segment
RIS	Radiology Information System
TCP / IP	Transmission Control Protocol / Internet Protocol
ZDS	IHE DICOM Study

2.2 Version Information

The HL7 engine supports version 2.2, 2.3, 2.4, and 2.5 of the HL7 standard.

2.3 Related Documents

- HL7 Standard version 2.5 (see www.hl7.org)
- IHE Radiology Technical Framework Revision 10.0, Feb, 2011 (see www.ihe.net)

3 Inbound Messages

The Roentgen Works server accepts ADT, ORM, and ORU message types. The message types are used to add and update patient demographics, order information, and radiology reports.

3.1 Supported Events

Table 3 – Supported Inbound Messages

Message	Definition	Comments
Admission Discharge and Transfer		
ADT^A01	Admit / Visit Notification	
ADT^A02	Transfer a patient	
ADT^A03	Discharge / End visit	
ADT^A04	Register a patient	May auto add physician information from ROL.
ADT^A05	Pre-admit a patient	
ADT^A06	Change an outpatient to an inpatient	
ADT^A07	Change an inpatient to an outpatient	
ADT^A08	Update patient information	May auto add physician information from ROL.
ADT^A11	Cancel admit / visit notification	
ADT^A12	Cancel transfer	
ADT^A13	Cancel discharge / end visit	
ADT^A35	Merge patient information	
ADT^A38	Cancel pre-admit	
ADT^A40	Merge patient - patient identifier list	Is treated like a change patient identifier message if the patient you are merging into does not exist.
ADT^A41	Merge patent/account information	
ADT^A44	Move account information	
ADT^A47	Change patient identifier	
Order Message		
ORM^O01	Order message	May auto add physician information from ROL.
ORM^O01	Complete message	May auto complete study and place it on the radiologist worklist
Observation Result		
ORU^R01	Observation message	May auto add physician information from ROL.

3.2 ADT Messages

The Roentgen Works server accepts a range of ADT messages shown in Table 3. These messages typically add or update patient demographics and visit information.

3.2.1 Message Segments

ADT	**Patient Admit/Discharge/Transfer**
MSH	Message Header
EVN	Event Type
PID	Patient Identification
PV1	Patient Visit
[{ROL}]	Role Information
[{AL1}]	Allergy Information

3.2.2 Optional Message Segments

Both the ROL and AL1 segments are optional. A ROL segment may be included for the primary physician in field PV1-17.

3.2.3 Message Example

```
MSH|^~\&|BRIT_RF|HOPITAL ABC|BRIT_RW|HOSPITAL
XYZ|20130821144423.060-
0500||ADT^A04|1377114263060|P|2.3|||AL|AL|||
PID|1||PID005920||PATIENT4^LA^||19620508110000|F||H|444
MERCURY ST^^DALLAS^TX^75207^||222-333-5555~222-333-
5555|666-55-9999|||||111-22-3444|||||||||||
PV1|1|||||||^|^|^|||||||||RF-
PRIMARY^|||||||||||||||||||||||||
ROL|RF-PRIMARY^BRIT|UP|Admitting^Admitting|RF-
PRIMARY^PHYSICIAN^PRIMARY^B||||PRIMARY
PHYSICIAN|^|^||213-654-1111^Office^^PRIMARY@BRIT.COM|
```

3.3 ORM Messages

The Roentgen Works server accepts ORM^O01 to add, update, or cancel an order.

3.3.1 Message Segments

ORM	General Order Message
MSH	Message Header
PID	Patient Identification
PV1	Patient Visit
[{IN1}]	Insurance Information
[{GT1}]	Guarantor Information
[{AL1}]	Allergy Information
ORC	Common Order Segment
OBR	Observation/Result
[{OBX}]	Observation Text
[{NTE}]	Notes and Comments
[{ROL}]	Role Information

3.3.2 Optional Message Segments

- IN1 – Used to pass insurance information
- GT1 – Used to pass guarantor information
- AL1 – Used to pass allergy information
- OBX – May include various data from EMR/RIS. (may be custom mapping)
- NTE – May include various data from EMR/RIS. (may be custom mapping)
- ROL – May include additional information about the physician in ORC-12

3.3.3 Message Example

```
MSH|^~\&|BRIT_RF|HOPITAL ABC|BRIT_RW|HOSPITAL
XYZ|20130821145923.788-
0500||ORM^O01|1377115163788|P|2.3|||AL|AL|||
PID|1||PID005920||PATIENT4^LA^S||19620508110000|F||H|444 MERCURY
ST^^DALLAS^TX^75207^||222-333-5555~222-333-5555|666-55-
9999|||||111-22-3444|||||||||||
PV1|1||ER^^^ HOPITAL ABC|||||^|RF-
REFERRING^PHYSICIAN^REFERRING^A|^|||||||||RF-
PRIMARY^PHYSICIAN^PRIMARY^B||||||||||||||||||||||ASTHMA||
ROL|RF-PRIMARY^BRIT|UP|Admitting^Admitting|RF-
PRIMARY^PHYSICIAN^PRIMARY^B||||PRIMARY PHYSICIAN|^|^||213-654-
1111^Office^^PRIMARY@BRIT.COM|
ORC|XO|OID000163||||SC||^^^20130822100000^^||20130821145908|||RF-
REFERRING^PHYSICIAN^REFERRING^A|MAIN_US||20130822100000|||||
OBR|1|OID000163||76700^76700-US ABDOMEN; COMPLETE^CPT^^US
ABDOMEN; COMPLETE^|R||20130822100000|||||||HAD SURGERY FOR
APPENDICITIS^||^ABDOMEN|RF-
PERFORMING^PHYSICIAN^PERFORMING^C||OID000163|||^|||US|||1^^15
minutes^^^R|||||^STOMACH ULCER|||RF-
PERFOMINGTECH||20130822100000||||
ROL|RF-REFERRING^BRIT|UP|Referring^Referring|RF-
REFERRING^PHYSICIAN^REFERRING^A||||REFERRING PHYSICIAN|^|^||214-
564-0000^Office^^REFERRING@BRIT.COM|
ZDS|1.2.840.113797.10.255.1.48.20130821145908039.0^^Application^
DICOM||
```

3.4 ORU Messages

The Roentgen Works server accepts ORU^R01 to store and addend radiologist reports.

3.4.1 Message Segments

ORU   Observational Results (Unsolicited)

MSH	Message Header
PID	Patient Identification
PV1	Patient Visit
ORC	Order common
OBR	Observations Report ID
OBX	Observation/Result
[{ROL}]	Role Information
[{NTE}]	Notes and comments

3.4.2 Optional Message Segments

The ROL and NTE segments are optional. A ROL segment may be included for additional physician information to support fields PV1-17 and OBR-32. The NTE may also be included, but the mappings from the NTE segments are considered custom.

3.4.3 Message Example

```
MSH|^~\&| BRIT_RF|HOPITAL ABC|BRIT_RW|HOSPITAL
XYZ|TESTAPP|20130821151700.926-
0500||ORU^R01|1377116220926|P|2.3|||AL|AL|||
PID|1||PID005920||PATIENT4^LA^S||19620508110000|F||H|444
MERCURY ST^^DALLAS^TX^75207^||222-333-5555~222-333-5555|666-55-
9999||||||111-22-3444||||||||||||
PV1|1||ER^^^ HOPITAL ABC||||^|RF-
REFERRING^PHYSICIAN^REFERRING^A|^||||||||RF-
PRIMARY^PHYSICIAN^PRIMARY^B|||||||||||||||||||||||||||
ROL|RF-PRIMARY^BRIT|UP|Admitting^Admitting|RF-
PRIMARY^PHYSICIAN^PRIMARY^B||||PRIMARY PHYSICIAN|^|^||213-654-
1111^Office^^PRIMARY@BRIT.COM|
ORC|RE|OID000163||||CM||^^^20130822100000^^||20130821145908||||RF
-REFERRING^PHYSICIAN^REFERRING^A|MAIN_US||20130822100000|||||
OBR|1|OID000163||76700^76700-US ABDOMEN; COMPLETE^CPT^^US
ABDOMEN; COMPLETE^|R||20130822100000|||||||HAD SURGERY FOR
APPENDICITIS^|20130821151659|^ABDOMEN|RF-
PERFORMING^PHYSICIAN^PERFORMING^C||OID000163|||^|20130821151659
||US|P^1||1^^15 minutes^20130822100000^^R|||NONE|^STOMACH
ULCER|KAVITHARAD^RADIOLOGIST^KAVITHA|^|RF-
PERFOMINGTECH|KAVITHARAD|20130822100000||||
ZDS|1.2.840.113797.10.255.1.48.20130821145908039.0^^Application
^DICOM||
ROL|KAVITHARAD^BRIT|UP|Principal Radiologist^Principal
Radiologist|KAVITHARAD^RADIOLOGIST^KAVITHA|||||^|^||^^^|
OBX|1|TX|R^RESULT^L|||||||||P|||20130821151659|||||2013082115165
9||1|
OBX|2|TX|R^RESULT^L||ULTRASOUND OF THE
ABDOMEN:|||||||P|||20130821151659|||||20130821151659||1|
```

```
OBX|3|TX|R^RESULT^L||Songraphic evaluation of the abdominal
contents demonstrates a normal
biliary||||||P|||20130821151659|||||20130821151659||1|
OBX|4|TX|R^RESULT^L||system with a normal gallbladder without
inflammation or calculi.  The
common||||||P|||20130821151659|||||20130821151659||1|
OBX|5|TX|R^RESULT^L||duct measures          mm in diameter
which is within normal limits.
Both||||||P|||20130821151659|||||20130821151659||1|
OBX|6|TX|R^RESULT^L||kidneys, spleen, aorta and pancreas are
imaged and are normal.  There is
no||||||P|||20130821151659|||||20130821151659||1|
OBX|7|TX|R^RESULT^L||ascites.||||||P|||20130821151659|||||20130
821151659||1|
OBX|8|TX|R^RESULT^L||||||||||P|||20130821151659|||||2013082115165
9||1|
OBX|9|TX|R^RESULT^L||IMPRESSION:||||||P|||20130821151659|||||20
130821151659||1|
OBX|10|TX|R^RESULT^L||Negative abdominal
ultrasound.||||||P|||20130821151659|||||20130821151659||1|
OBX|11|TX|R^RESULT^L||||||||||P|||20130821151659|||||201308211516
59||1|
```

4 Outbound Messages

The Roentgen Works may send ADT, ORM, and ORU message types. The message types are used to notify other systems about changes or additions to patient demographics, order information, and radiology reports.

4.1 Supported Events

Table 4 – Supported Inbound Messages

Message	Definition	Comments
Admission Discharge and Transfer		
ADT^A04	Register a patient	
ADT^A08	Update patient information	
ADT^A40	Merge patient - patient identifier list	
ADT^A47	Change patient identifier	
Order Message		
ORM^O01	Order message	
ORM^O01	Complete message	
Observation Result		
ORU^R01	Observation message	Outbound may include Critical Results history.
Image Availability		
ORU^R01	Image Availability	
ORM^O01	Image Availability	

4.2 ADT Messages

The Roentgen Works server sends out ADT messages after a patient record has been created or updated.

4.2.1 Message Segments

ADT	Patient Admit/Discharge/Transfer
MSH	Message Header
EVN	Event Type
PID	Patient Identification
PV1	Patient Visit
[{IN1}]	Insurance Information
[{AL1}]	Allergy Information

4.2.2 Optional Message Segments
  o   IN1 – Used to pass insurance information
  o   AL1 – Used to pass allergy information

4.2.3 Message Example

```
MSH|^~\&|BRIT|HOSPITAL
XYZ|||20130821111333.0692||ADT^A04|20130821111333.0692.152|P|2
.3.1|||||||||
EVN|A04|20130821111333.0692|||||
PID|1|PID005915|PID005915^^^^||PATIENT1^EVENS|La|1987050400000
0.0000|F|||547 Main St^^Dallas^TX^75207||333-222-
1111^^^evens@abcd.com|666-777-8888||S||1377101613693|333-22-
9999|||^A|||||^US
PV1|1|I
AL1|1||^Head Aches|MO||
AL1|2|DA|^Nasal Congestion|MI||
```

4.3 ORM Messages

The Roentgen Works server accepts ORM^O01 to add, update, or cancel an order.

4.3.1 Message Segments

ORM   General Order Message

MSH	Message Header
PID	Patient Identification
PV1	Patient Visit
[{IN1}]	Insurance Information
[{GT1}]	Guarantor Information
[{AL1}]	Allergy Information
ORC	Common Order Segment
OBR	Observation/Result
[{ROL}]	Role Information
[{ZDS}]	IHE DICOM Study
[{FT1}]	Financial Transaction

4.3.2 Optional Message Segments

- IN1 – Used to pass insurance information
- GT1 – Used to pass guarantor information
- AL1 – Used to pass allergy information
- ROL - Provides more information about the physician in ORC-12
- ZDS – Used to pass the study UID
- FT1 – Used to pass financial transition information

4.3.3 Message Example

```
MSH|^~\&|BRIT|HOSPITAL
ABC|||20130821143344.0437||ORM^O01|20130821143344.0437.16
5|P|2.3.1|||||||||||
PID|1|PID005916|PID005916^^^^||PATIENT3^ADAM||19590306000
000.0000|M|||||321-555-1111^^^adam@abcd.com|333-666-
0000|||||||||||||||||
PV1|1|||||||||||||||||||||||||||||||||||||||||||||||||||||||
ORC|NW|OID002535||||SC||^^S3600^1377122400000^137712600000
0|||||RW-Primary^PHYSICIAN^PRIMARY^A|||||||||
OBR|1|OID002535||71550^MRI CHEST WITHOUT
CONTRAST^CPT|R||||||||Middle Lobe collapse||^CHEST|RW-
Primary^PHYSICIAN^PRIMARY^A||OID002535|RP-102551124-
1377113624395-35|^KYLE_MR^^ER||||MR|||||||Test study^Test
study|||||20130821170000.0000||||||||
ROL|RW-Primary^PHYSICIAN|UP|Referring^Referring|RW-
Primary^PHYSICIAN^PRIMARY^A|||||PHYSICIAN^Referring^BRIT|
Kyles Site||214-654-0000^office^^primary@abc.com~214-654-
0000^mobile^^primary@abc.com~^home^^primary@abc.com~
ZDS|1.2.840.113797.10.255.1.124.1377113624390.69^^Applica
tion^DICOM||
```

4.4 ORU Messages

The Roentgen Works server may send ORU^R01 messages for preliminary, signed, or both to other interfaces. If configured, the server can include the Urgent Finding history with all outgoing signed reports and a URL link to the images.

4.4.1 Message Segments

ORU   Observational Results (Unsolicited)

MSH	Message Header
PID	Patient Identification
PV1	Patient Visit
[{IN1}]	Insurance Information
[{GT1}]	Guarantor Information
[{AL1}]	Allergy Information
ORC	Order common
OBR	Observations Report ID
OBX	Observation/Result
[{ROL}]	Role Information
[{ZDS}]	IHE DICOM Study
[{FT1}]	Financial Transaction

4.4.2 Optional Message Segments

o   IN1 – Used to pass insurance information

o   GT1 – Used to pass guarantor information

o   AL1 – Used to pass allergy information

o   ROL - Provides more information about the radiologist in OBR-32 and the physician in ORC-12

o   ZDS – Used to pass the study UID

o   FT1 – Used to pass financial transition information

4.4.3 Configuration Options

The ORU message may contain an image URL link to view the study.

4.4.4 Message Example

```
MSH|^~\&|BRIT|HOSPITAL
ABC||||20130821122629.0688||ORU^R01|20130821122629.0688.160|P|2.
3.1|||||||||
PID|1|PID005915|PID005915^^^^||PATIENT1^EVENS|La|19870504000000
.0000|F|||547 Main St^^Dallas^TX^75207||333-222-
1111^^^evens@abcd.com|666-777-8888||S|||333-22-
9999|00001122||^A||||^US||||
PV1|1||||||||||||||||||||||||||||||||||||||||||||||||||||||||
ORC|RE|KAV=A0013||||CM||||20130821121358.0000|||RW-
Primary^PHYSICIAN^PRIMARY^A|CLIENT_SCU||||||||
OBR|1|KAV=A0013||71010^CHEST; SINGLE VIEW^CPT^^CHEST; SINGLE
VIEW|R|||||||||^CHEST|RW-
Primary^PHYSICIAN^PRIMARY^A||KAV=A0013|RP-102551124-
1377105053316-
33|||20130821122629.0621||CR|P^2013.08.21.12.20.42.788||||||Rou
tine checkup^Routine
checkup|kavitharad^RADIOLOGIST^KAVITHA|||||||||||||
OBX|1|TX|1:RPT^Radiology Report||Techniques:|||||||
OBX|2|TX|1:RPT^Radiology Report|||||||||
OBX|3|TX|1:RPT^Radiology Report||Findings:|||||||
OBX|4|TX|1:RPT^Radiology Report||Examination of the chest in
the posteroanterior projections fails to reveal|||||||
OBX|5|TX|1:RPT^Radiology Report||infiltration, consolidation,
pleural effusion or pneumothorax.  The cardiac|||||||
```

```
OBX|6|TX|1:RPT^Radiology Report||silhouette is normal in size
and contour.  The aorta and remainder of the|||||||
OBX|7|TX|1:RPT^Radiology Report||mediastinal structures are
within normal limits as is the pulmonary vascular|||||||
OBX|8|TX|1:RPT^Radiology Report||pattern.  The visualized
osseous structures are intact.|||||||
OBX|9|TX|1:RPT^Radiology Report|||||||||
OBX|10|TX|1:RPT^Radiology Report|||||||||
OBX|11|TX|1:RPT^Radiology Report||Impressions:|||||||
OBX|12|TX|1:RPT^Radiology Report||No abnormalities
found.|||||||
ROL|RW-Primary^PHYSICIAN|UP|Referring^Referring|RW-
Primary^PHYSICIAN^PRIMARY^A|||||PHYSICIAN^Referring^BRIT|Kyles
Site||214-654-0000^office^^primary@abc.com~214-654-
0000^mobile^^primary@abc.com~^home^^primary@abc.com~
ROL|kavitharad^RADIOLOGIST|UP|Principal^Principal|kavitharad^RA
DIOLOGIST^KAVITHA|||||RADIOLOGIST^Principal
radiologist^BRIT|Kyles
Site||^office^^kavitha@brit.com~^mobile^^kavitha@brit.com~^home
^^kavitha@brit.com~
ZDS|1.2.840.113797.10.255.1.124.1377104833763.67^^Application^D
ICOM||
```

4.5 Image Availability

At times it may be necessary for the Roentgen Works server to notify another server when images are available to view. These messages may be sent after the study arrives or after the signed report arrives. Each message will contain an encrypted URL which may be used to open the study for viewing.

4.5.1 Message Segments

ORU	Observational Results (Unsolicited)
MSH	Message Header
PID	Patient Identification
PV1	Patient Visit
ORC	Order common
OBR	Observations Report ID
OBX	Observation/Result
[{IN1}]	Insurance Information
{AL1}]	Allergy Information
{ROL}]	Role Information
[{ZDS}]	IHE DICOM Study

4.5.2 Optional Message Segments

o   IN1 – Used to pass insurance information

o   AL1 – Used to pass allergy information

o   ROL - Provides more information about the radiologist in OBR-32 and the physician in ORC-12

o   ZDS – Used to pass the study UID

4.5.3 Configuration Options

The image availability messages may be sent as either an ORM^O01 or an ORU^R01 message type.

4.5.4 Message Example

```
MSH|^~\&|BRIT|Kyles Site|||20151005153921.0492-
0500||ORM^O01|20151005153921.0492-0500.29|P|2.3.1|||||||||||

PID|1|ZT564648795|ZT564648795^^^^||CTABD
BACTERMIA||19440105000000.0000|M|||||||||||||||||||||||||||

OBR|1|OID0007777||71260^CT CHEST W
CONTRAST|R|||||||||||^CHEST|kylephy^Physician^Kyle|||||^TEST48^^K
YLE_ER||||CT|||||||pain^pain|||||20040312184700.0000-
0600|||||||||

OBX|1|ST|1:RPT^Study
URI||?siteid=KYLE_SITE&rc4auth=CqHzp9BiVNYNUeKWbnaeXinbEXMhwsjD
0yX5%2BFy%2BwRcH4sWaxSQdYQ6QKkmLv12KI%2BxpVGA%3D|||||||
```

5 Message Structure

5.1 MSH – Message Header

Table 5 – MSH Segments

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1	1	1	R	Field Separator	|
2	40	4	R	Encoding Characters	^~&\
3	80	227	R	Sending Application	BRIT
4	80	227	R	Sending Facility	Site name defined in Roentgen Works
5	80	227	O	Receiving Application	
6	80	227	O	Receiving Facility	
7	19	26	O	Date/Time Of Message	yyyyMMddHHmmss.SSSS
8	40	40	O	Security	
9	7	15	R	Message Type	ADT^A01 (See Table 1 for a list of all supported messages.)
10	20	20	O	Message Control ID	
11	3	3	O	Processing ID	D (Debugging) / P (Production) / T (Training)
12	60	60	O	Version ID	2.3
13	15	15	O	Sequence Number	
14		180	O	Continuation Pointer	
15	2	2	O	Accept Acknowledgment Type	
16	2	2	O	Application Acknowledgment Type	
17	2	3	O	Country Code	
18		16	O	Character Set	
19		250	O	Principal Language Of Message	
20		20	O	Alternate Character Set handling Scheme	To specify any special handling scheme
21		427	O	Message Profile Identifier	Entity Identifier ^ Namespace ID ^ Universal ID ^ Universal ID Type

5.2 EVN – Event Type Segment

Table 6 – EVN Segments

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1		3	O	Event Type Code	A04
2	19	26	R	Date/Time Of Message	yyyyMMddHHmmss.SSSS
3		26	O	Date/Time Planned Event	
4		3	O	Event Reason Code	
5		250	O	Operator ID	
6		26	O	Event Occurred	
7		241	O	Event Facility	

5.3 PID – Patient Identification Segment

Table 7 – PID Segment

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1		4	O	Set ID	
2	64	20	R	Patient ID	
3	64	250	R	Patient Identifier List	
4	64	20	R	Alternate Patient ID	
5	64	250	R	Patient Name	last name ^ given name ^ middle initial ^ suffix ^ prefix ^ degree
6		250	O	Mother's Maiden Name	last name ^ given name ^ middle initial ^ suffix ^ prefix ^ degree
7	19	26	R	Date/Time of Birth	yyyyMMddHHmmss.SSSS
8	1	1	R	Sex	M, F, O
9		250	O	Patient Alias	last name ^ given name ^ middle initial ^ suffix ^ prefix ^ degree
10	16	250	O	Race	
11	128	250	O	Patient Address	street address 1 ^ street address 2 ^ city ^ state ^ zip code ^ country
12		4	O	County Code	
13		250	O	Phone Number - Home	home phone ^ ^ ^ email address~mobile phone
14		250	O	Phone Number - Business	work phone
15		250	O	Primary Language	
16		250	O	Marital Status	

17		250	O	Religion	
18	16	250	O	Patient Account Number	Account Number
19	11	16	O	SSN Number	Social Security Number
20		25	O	Driver's License Number	Driver's License Number
21		250	O	Mother's Identifier	
22		250	O	Ethnic Group	
23		250	O	Birth Place	
24		1	O	Multiple Birth Indicator	
25		2	O	Birth Order	
26		250	O	Citizenship	
27		250	O	Veterans Military Status	
28		250	O	Nationality	
29		26	O	Patient Death Date and Time	
30		1	O	Patient Death Indicator	
31		1	O	Identity Unknown Indicator	
32		20	O	Identity Reliability Code	
33		26	O	Last Update Date/Time	yyyyMMddHHmmss.SSSS
34		241	O	Last Update Facility	yyyyMMddHHmmss.SSSS
35		250	O	Species Code	(Only used for veterinarian office)
36		250	O	Breed Code	(Only used for veterinarian office)
37		80	O	Strain	
38		250	O	Production Class Code	
39		250	O	Tribal Citizenship	

5.4 PV1 – Patient Visit Segment

Table 8 – PV1 Segment

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1		4	O	Set ID	
2		1	R	Patient Class	
3		80	O	Assigned Patient location	ER^Room 102^Bed 3^Hospital ABC
4		2	O	Admission Type	
5		250	R	Pre-admit Number	
6		80	O	Prior Patient Location	

7	64	250	O	Attending Doctor	Attending Physician ID number ^ last name ^ given name ^ middle initial ^ suffix ^ prefix ^ degree
8	64	250	O	Referring Doctor	ID number ^ last name ^ given name ^ middle initial ^ suffix ^ prefix ^ degree
9	64	250	O	Consulting Doctor	ID number ^ last name ^ given name ^ middle initial ^ suffix ^ prefix ^ degree
10		3	O	Hospital Service	
11		80	O	Temporary Location	
12		2	B	Preadmit Test Indicator	
13		2	O	Re-admission Indicator	
14		6	O	Admit Source	
15		2	O	Ambulatory Status	
16		2	O	VIP Indicator	"blank", S, E, ES (Routine, Sensitive, Employee, Sensitive Employee)
17	64	250	O	Admitting Doctor	ID number ^ last name ^ given name ^ middle initial ^ suffix ^ prefix ^ degree
18		2	O	Patient Type	
19		250	B	Visit Number	aka: Encounter
20		50	O	Financial Class	
21		2	O	Charge Price Indicator	
22		2	O	Courtesy Code	
23		2	O	Credit Rating	
24		2	O	Contract Code	
25		8	O	Contract Effective Date	
26		12	O	Contract Amount	
27		3	O	Contract Period	
28		2	O	Interest Code	
29		4	O	Transfer to Bad Debt Code	
30		8	O	Transfer to Bad Debt Date	
31		10	O	Bad Debt Agency Code	
32		12	O	Bad Debt Transfer Amount	
33		12	O	Bad Debt Recovery Amount	
34		1	O	Delete Account Indicator	
35		8	O	Delete Account Date	
36		3	O	Discharge Disposition	
37		47	O	Discharged to Location	
38		250	O	Diet Type	

39		2	O	Servicing Facility	
40		1	B	Bed Status	
41		2	O	Account Status	
42		80	O	Pending Location	
43		80	O	Prior Temporary Location	
44	19	26	O	Admit Date/Time	yyyyMMddHHmmss.SSSS
45	19	26	O	Discharge Date/Time	yyyyMMddHHmmss.SSSS
46		12	O	Current patient Balance	
47		12	O	Total Charges	
48		12	O	Total Adjustments	
49		12	O	Total Payments	
50		250	O	Alternate Visit ID	
51		1	O	Visit Indicator	
52		250	B	Other Healthcare Provider	ID number ^ last name ^ given name ^ middle initial ^ suffix ^ prefix ^ degree

5.5 ORC – Common Order Segment

Table 9 – ORC Segment

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1		2	R	Order Control	• NW – New order • XO – Edit order • CA – Cancel order
2	16	22	R	Placer Order Number	Accession Number
3		22	O	Filler Order Number	
4		22	C	Placer Group Number	
5		2	O	Order Status	• {blank} - Ordered but not scheduled • SC - Scheduled, meaning it has a scheduled date and time • IP - Order is in progress, patient has arrived • CM – Order/Study is completed (Ready to Read) • CD/CA - Order is discontinued or cancelled
6		1	O	Response Flag	
7		200	B	Quantity/Timing	ORC-7.3.= Procedure Length ORC-7.4 = Scheduled date and time

8		200	O	Parent	
9		26	O	Date/Time of Transaction	yyyyMMddHHmmss.SSSS
10	64	250	O	Entered By	
11	64	250	O	Verified By	
12		250	O	Ordering Provider	Ordering physician
13		80	O	Enterer's Location	
14		250	O	Call Back Phone Number	
15		26	O	Order Effective Date/Time	yyyyMMddHHmmss.SSSS
16		250	O	Order Control Code Reason	
17		250	R	Entering Organization	
18		250	O	Entering Device	
19		250	O	Action By	
20		250	O	Advanced Beneficiary Notice Code	
21		250	O	Ordering Facility Name	
22		250	O	Ordering Facility Address	
23		250	O	Ordering Facility Phone Number	
24		250	O	Ordering Provider Address	
25		250	O	Order Status Modifier	
26		60	C	Advanced Beneficiary Notice Override Reason	
27		26	O	Filler's Expected Availability Date/Time	
28		250	O	Confidentiality Code	
29		250	O	Order Type	
30		250	O	Enterer Authorization Mode	
31		250	O	Parent Universal Service Identifier	

5.6 OBR – Observation Request Segment

Table 10 – OBR Segment

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1		4	O	Set ID	
2		22	C	Placer Order Number	Accession Number
3		22	C	Filler Order Number	
4		250	R	Universal Service ID	Procedure Code^Meaning^Scheme^Desc
5		2	B	Priority	R, A, S (Routine, ASAP, Stat)

6		26	B	Requested Date/time	yyyyMMddHHmmss.SSSS
7		26	O	Observation Date/Time	• If received ORM with OBR-7 value, then that value is returned. • Study date and time • Format = yyyyMMddHHmmss.SSSS
8		26	O	Observation End Date/Time	• If received ORM with OBR-8 value, then that value is returned. • Format = yyyyMMddHHmmss.SSSS
9		20	O	Collection Volume	
10		250	O	Collector Identifier	
11	20	1	O	Specimen Action Code	
12		250	O	Danger Code	Contrast Agent • OBR-12.1 – NDC Value • OBR-12.2 - Contrast Agent • OBR-12.3 – NDC Label • OBR-12.4 – HCPCS Value • OBR-12.5 – Contrast Description • OBR-12.6 - HCPCS Label • OBR-12.7 – Dose • OBR-12.8 - Waste
13	1024	300	O	Relevant Clinical Info	Patient History
14		26	B	Specimen Received Date/Time	
15		300	B	Specimen Source	• OBR-15.2 = Body Part • OBR-15.5 = Laterality (IHE) o R, L, B (Right, Left, Both) o Blank for unpaired body parts
16		250	O	Ordering Provider	Id^Last^First^Middle^Suf^Pref
17		250	O	Order Callback Phone Number	Order Callback Phone
18		60	O	Placer field 1	Any Value
19		60	O	Placer field 2	Any Value
20		60	O	Filler Field 1	Sched. Procedure Step ID (IHE) OBR-20.2 = Scheduled Modality Name OBR-20.4 = Ordering Location
21		60	O	Filler Field 2	
22		26	C	Results Rpt/Status Chng-Date/Time	Report Date and Time yyyyMMddHHmmss.SSSS
23		40	O	Charge to Practice	
24	16	10	O	Diagnostic Serv Sect ID	Modality Type
25		1	C	Result Status	OBR-25.1 = Report Status (P - Prelim,

						F – Final, C – Continuation/Amended) OBR-25.2 = Report ID
26		400	O	Parent Result		
27		200	B	Quantity/Timing		
28		250	O	Result Copies To		
29		200	O	Parent		
30		20	O	Transportation Mode		
31	64	250	O	Reason for Study		Study Reason
32	64	200	O	Principal Result Interpreter		Signing Radiologist
33	64	200	O	Assistant Result Interpreter		
34	64	200	O	Technician		
35	64	200	O	Transcriptionist		
36	19	26	O	Scheduled Date/Time		Scheduled Date and Time yyyyMMddHHmmss.SSSS
37		4	O	Number of Sample Containers		
38		250	O	Transport Logistics of Collected Sample		
39		250	O	Collector's Comment	OBR-39.2 = Tech Comment	
40		250	O	Transport Arrangement Responsibility		
41		30	O	Transport Arranged		
42		1	O	Escort Required		
43		250	O	Planned Patient Transport Comment		
44		250	O	Procedure Code		
45		250	O	Procedure Code Modifier		
46		250	O	Placer Supplemental Service Information		
47		250	O	Filler Supplemental Service Information		
48		250	C	Medically Necessary Duplicate Procedure Reason		
49		2	O	Result Handling		
50		250	O	Parent Universal Service Identifier		

5.7 OBX – Observation/Result Segment

Table 11 – OBX Segment

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1		4	O	Set ID	
2		2	C	Value Type	• RP – Reference Pointer • ST – String Data • TX – Text Data
3		250	R	Observation Identifier	RPT^Radiology Report
4		20	C	Observation Sub-ID	
5		99999	C	Observation Value	Report
6		250	O	Units	
7		60	O	References Range	
8		5	O	Abnormal Flags	
9		5	O	Probability	
10		2	O	Nature of Abnormal Test	
11		1	R	Observ Result Status	P - Prelim, F - Final
12		26	O	Date Last Obs Normal Values	Effective Date of Reference Range Values
13		20	O	User Defined Access Checks	
14		26	O	Date/Time of the Observation	yyyyMMddHHmmss.SSSS
15		250	O	Producer's ID	Producer's Reference
16		250	O	Responsible Observer	
17		250	O	Observation Method	
18		22	O	Equipment Instance Identifier	
19		26	O	Date/Time of the Analysis	
20				Reserved for harmonization with V2.6	
21				Reserved for harmonization with V2.	
22				Reserved for harmonization with V2.	
23		567	O	Performing Organization Name	
24		631	O	Performing Organization Address	
25		3002	O	Performing Organization Medical Director	

5.8 IN1 - Insurance Segment

Table 12 – IN1 Segment

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1		4	R	Set ID – Patient ID	Values are 1,2,3, etc. Set 1 is the primary insurance.
2		60	R	Insurance Plan ID	
3		59	R	Insurance Company ID	
4		130	O	Insurance Company Name	If self-pay, then the insurance is "SELF PAY"
5		106	O	Insurance Company Address	
6		48	O	Insurance Co Contact Person	
7		40	O	Insurance Co Phone Number	
8		12	O	Group Number	
9		130	O	Group Name	
10		12	O	Insured's Group Emp ID	
11		130	O	Insured's Group Emp Name	
12		8	O	Plan Effective Date	
13		8	O	Plan Expiration Date	
14		55	O	Authorization Information	
15		3	O	Plan Type	
16		48	O	Name Of Insured	If self-pay, then patient's name.
17		80	O	Insured's Relationship to Patient	If self-pay, then "SEL^SELF"
18		26	O	Insured's Date of Birth	
19		160	O	Insured's Address	If self-pay, then patient's address.
22			O	Priority Sequence	Priority order: values are 1,2,3, etc. Priority 1 is the primary insurance. Note. Same value/order as IN1-1
43		1	O	Insured's Gender	

5.9 GT1 - Guarantor Segment

<div align="center">**Table 13 – GT1 Segment**</div>

Seq	BRIT Length	HL7 Length	Opt	Element Name	Example
1		4	R	Set ID -	
3		48	R	Guarantor Name	
5		106	O	Guarantor Address	
6		40	O	Guarantor Phone	
8		26	O	Guarantor Birthdate	
9		1	O	Guarantor Gender	
11		80	O	Guarantor Relationship	HL7 2.5 Table 0063
12		11	O	Guarantor SSN	
16		130	O	Guarantor Employer Name	
17		106	O	Guarantor Employer Address	
18		40	O	Guarantor Employer Phone	

5.10 AL1 - Allergy Segment

<div align="center">**Table 14 – AL1 Segment**</div>

Seq	BRIT Length	HL7 Length	Opt	Element Name	Example
1		4	R	Set ID - AL1	
2		250	O	Allergen Type Code	
3		250	R	Allergen Code/Mnemonic/Description	
4		250	O	Allergy Severity Code	
5		15	O	Allergy Reaction Code	
6		8	B	Identification Date	yyyyMMddHHmmss.SSSS

5.11 ROL – Role Segment

Table 15 – ROL Segment

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Examples
1		60	R	Role Instance ID	
2		2	R	Action Code	
3		250	R	Role-ROL	
4	64	250	R	Person Information	Person ID ^ last name ^ first name ^ middle name ^ suffix ^ prefix
5		26	O	Role Begin Date/Time	
6		26	O	Role End Date/Time	
7		250	O	Role Duration	
8		250	O	Role Action Reason	
9.1		250		Provider Type - Identifier	
9.2	16		R	Provider Type – User Role (Text)	User Roles: Primary, Admitting, Referring, Principal radiologist, Assistant radiologist
9.3			O	Provider Type – Name of coding system	BRIT
10		250	O	Organization Unit Type	
11		250	O	Office/Home Address/Birthplace	
12.1	24	250	O	Phone Number	
12.2	24		O	Phone Use (Telecommunication use code)	mobile, office, home, fax, pager
12.3			O	Phone Type (Telecommunication equipment type)	
12.4	64		O	E-mail	

5.12 ZDS – Additional Identification Segment

Table 16 – ZDS Segment

Seq	BRIT Length	IHE Length	Opt	Element Name	Comments and Examples
1	250	200	O	Study Instance UID	Reference pointer ^ Application ID ^ Type of Data ^ Sub Type

5.13 FT1 - Financial Transaction

Table 17 – FT1 Segment

Seq	BRIT Length	HL7 Length	Opt	Element Name	Comments and Example
1		4	O	Set ID – FT1	1 for the for first transaction, 2, 3, and so forth
2		12	O	Transaction ID	unique ID defined by BRIT like an invoice number
4			R	Transaction Date	
6			R	Transaction Type	HL7 Table 0017 – Transaction Type • CO for co-payment • PY for self-payment
7			R	Transaction Code	HL7 Table 0570 - Payment Code • FT1-7.1 = Payment Method • FT1-7.2 = Transaction/Check Number
11			O	Transaction Amount	
17			O	Fee Schedule	• PIF for paid in full • POA for paid on account
19			O	Diagnosis Code	
23			O	Filler Order Number	Accession Number
24			O	Entered By	Person who entered the transaction
25			O	Procedure Code	• FT1-25.1 = Code • FT1-25.2 = Description
26			O	Procedure Code Modifier	Procedure Laterality

6 Security Features

6.1 Association Level Security

The Roentgen Works HL7 engine only accepts HL7 messages or sends HL7 messages to known HL7 devices. The device is considered known if it is defined on the server by an ip address and assigned to a facility within Roentgen Works. If an unknown HL7 device opens a connection and sends data to the server, then the message and connection are logged.

6.2 Application Level Security

The HL7 engine uses conventional (non-secure) TCP/IP communication and is expected to be used within a secure environment:

- Virtual Private Network (VPN) access to devices outside of the secured local network
- Firewall or router protection to ensure only authorized devices have access

6.3 Audit Records

The server only gives authorized users the ability access and change data. A user's actions are recorded in audit records which can be used to answers the following types of questions:

- Who accessed the patient information, order, or report?
- Who exported the order or report and where did they send it?
- Who changed the status of the order or report?
- Who made the change?
- Who deleted the object?

7 Configuration

The Archive has several configurable parameters which can be mixed and matched based on the desired workflow. Some of the configuration options are saved directly in the database while other options are saved in files on the server.

7.1 Inbound Configuration

Here are some examples of inbound configuration:

- Auto add new referring physicians
- Auto add new primary physicians
- Auto add new principal radiologists
- Auto add new site locations

7.2 Outbound Configuration

Here are some examples of outbound configuration:

- Send Urgent Finding history with ORU message
- Only send signed reports to this destination