

**Veterans Health Administration
Office of Informatics and Analytics (OIA) Innovation Program**

OneVA Pharmacy

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1 Introduction

1.1 Overview

The Veterans Health Administration (VHA) has a requirement to allow Veterans travelling across the United States to get their active VA prescriptions refilled at any VA pharmacy regardless of where the prescription originated. The “idea” is to expand currently available pharmacy information in Veterans Health Information Systems and Technology Architecture (VistA) to provide pharmacists direct access to any active and refillable prescription from any VA Healthcare System. The OneVA Pharmacy Innovation Project’s goal is to create a working prototype that satisfies the requirement and uses the “idea” as the basis for implementation.

1.1 Scope

This Software Design Description (SDD) is based on the IEEE 2016-2009, Systems Design / Software Design Descriptions guidelines. This SDD will define the high level design for the OneVA Pharmacy Innovation Project objectives. It defines and describes system components, architectural views, system constraints and design rationale.

1.1 Reference Material

Reference material used in the preparation of this document is:

- IEEE 2016-2009, Systems Design / Software Design Descriptions – <http://standards.ieee.org/findstds/standard/1016-2009.html>
- HL7 Messaging Standard v2.5.1 - http://www.hl7.org/implement/standards/product_brief.cfm?product_id=144
- VA118-13-R-0445, B.3 Performance Work Statement issued 2013-07-26
- Medical Domain Web Services (MDWS) documentation - <http://va.gov/vdl/application.asp?appid=192>
- HL7 (VistA Messaging) documentation - <http://va.gov/vdl/application.asp?appid=8>
- My HealtheVet documentation - <http://va.gov/vdl/application.asp?appid=153>

2 Design Description Information

2.1 Introduction

The software architecture follows the client-server architectural model, where client systems send and receive data to and from a server. The server component further embodies an enterprise service bus model providing HL7 message routing and coordination of multiple service implementations exposed from one minimal lower layer protocol (MLLP) service endpoint.

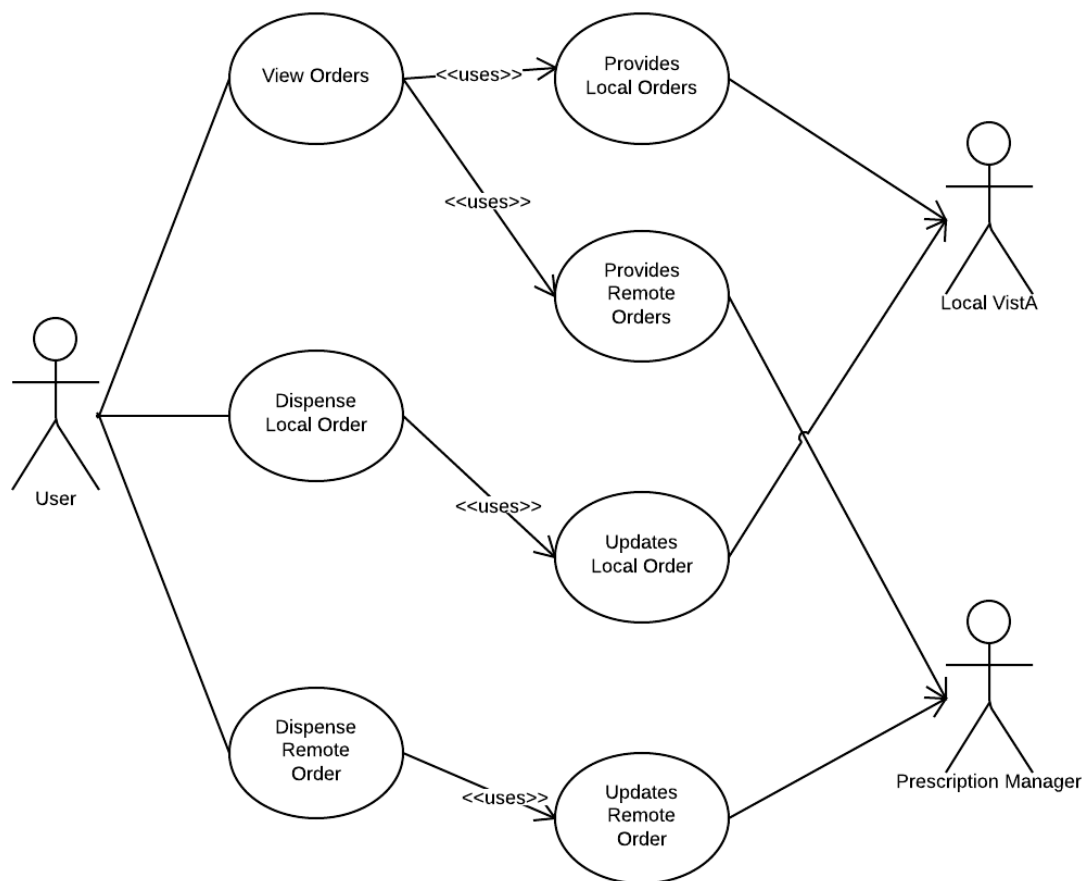
2.2 Design Entities

High-level design entities are defined below:

- Veterans Health Information Systems and Technology Architecture (VistA): the user interface for initiating prescription queries and requesting prescription refills from remote VistAs.
- VistA RESTful web services: a set of RESTful web services that use Intersystems Cache Global API to read and write data to the VistA data store as well call MUMPS functions.
- Prescription Manager Server: the backed exposing an MLLP HL7 endpoint that routes messages, orchestrates VistA RESTful web service calls and aggregates remote VistA prescription information. This server is composed of
 - MLLPListener: lightweight MLLP service to handle HL7 routing, orchestration and aggregation

3 Context View

The following use cases have the pre-condition that the veteran is known and registered in one or more VistAs. The act of registering a veteran in a VistA triggers an ADT registration message to be sent to the Master Veteran Index (MVI) located in the Austin Information Technology Center (AITC). For each new patient, the MVI creates and assigns an Integration Control Number (ICN) and sends this number among other information to the initiating VistA in response to the ADT message. Further the MVI stores and correlates the local VistA patient identifiers (DFNs) with the national ICN. One national patient ICN is correlated to (among other systems' patient identifiers) many local VistA patient identifiers. The ICN enables the sharing of patient data between operationally diverse systems.



3.1 Use Case Name: View Orders

This use case describes the process for users to view prescription orders. This process allows a User to view prescription order information in one place whether the order originated from a local or remote VistA instance.

Actors

- User (Provider, Pharmacist, etc.)
- Local VistA instance
- Prescription Manager System (Proxy to remote VistAs)

Pre-Conditions

- Patient must have an ICN

Flow of Events

1. User enters the Medication Profile screen.
2. The local VistA instance will retrieve the local prescriptions.
3. The local VistA instance will send a request to Prescription Manager System with the patient identifiers of all current and previous treatment facilities.
4. The Prescription Manager system will retrieve the prescriptions from all previous treatment facilities excluding local facility.
5. The Prescription Manager system will translate, aggregate and respond with all remote prescriptions.
6. The local VistA instance will display all prescriptions.

Exceptions

- 3a. Prescription Manager System is not accessible because of a connection timeout or a response timeout.
- 3b. Prescription Manager System responds but one or more VistA systems were not accessible or did not respond; partial data returned.
- 4a. Prescription Manager System is not able to connect to one or more VistA systems.
- 4b. Prescription Manager System does not receive a response from one or more VistA systems.

3.2 Use Case Name: Dispense Local Order

This use case describes the process for users to dispense local order.

Actors

- User (Provider, Pharmacist, etc.)
- Local VistA Instance

Pre-Conditions

- Patient must have an ICN
- Local VistA instance has the required amount of prescribed medication inventory on-hand

Flow of Events

1. User selects RF (Refill) for a local prescription from the Medication Profile screen.
2. The local VistA instance will lock the prescription order.
3. The local VistA will update the prescription; decrement refills, etc.
4. The local VistA will unlock the prescription order.
5. The local VistA will dispense the prescription.

Alternate Flow

1. User selects PF (Partial fill) for a local prescription from the Medication Profile screen.
2. The local VistA instance will lock the prescription order.
3. The local VistA will update the prescription; partial fill date, etc.
4. The local VistA will unlock the prescription order.
5. The local VistA will dispense the prescription.

Exceptions

- 2a. Local VistA is unable to obtain a lock.

3.3 Use Case Name: Dispense Remote Order

This use case describes the process for users to dispense a remote order.

Actors

- User (Provider, Pharmacist, etc.)
- Local VistA Instance
- Prescription Manager System (Proxy to remote VistAs)
- Remote VistA Instance

Pre-Conditions

- Patient must have an ICN
- Local VistA instance has the required amount of prescribed medication inventory on-hand

Flow of Events

1. User selects a remote prescription and RF (Refill) from the Medication Profile screen.
2. The local VistA instance will send a refill order request to the Prescription Manager System.
3. The Prescription Manager System will send refill order request to remote VistA instance.
4. The remote VistA will conduct order checks and lock the order.
5. The remote VistA will update the prescription order; decrement refills without affecting inventory.
6. The remote VistA will unlock the order.
7. The local VistA instance will dispense medication.

Alternate Flow

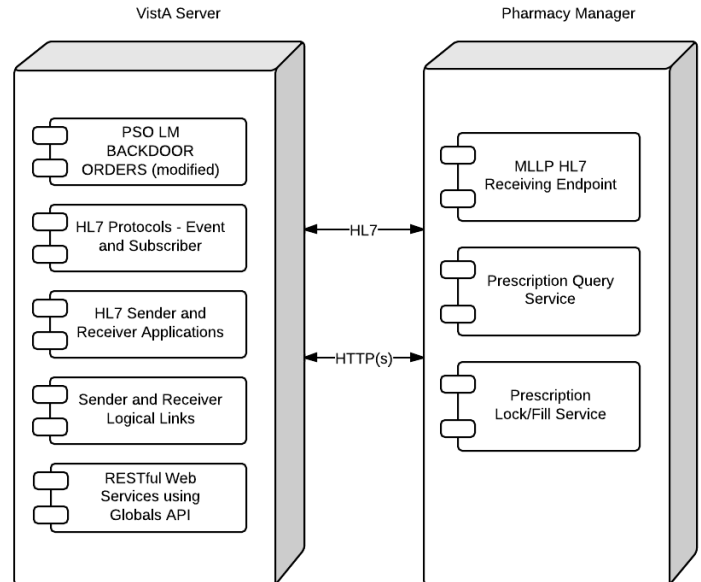
1. User selects a remote prescription and PF (Partial fill) from the Medication Profile screen.
2. The local VistA instance will send a partial fill order request to the Prescription Manager System.
3. The Prescription Manager System will send partial fill order request to remote VistA instance.
4. The remote VistA will conduct order checks and lock the order.
5. The remote VistA will update the prescription order; update partial fill date without affecting inventory.
6. The remote VistA will unlock the order.
7. The local VistA instance will dispense medication.

Exceptions

- 2a. Prescription Manager System is not accessible because of a connection timeout or a response timeout.
- 4a. The remote VistA instance fails the order check or is unable to lock the order.

4 Composition View

The overall design is partitioned into two main components: a VistA Server and a Prescription Manager Server. The VistA Server is the user interface where a pharmacist will use the “Patient Prescription Processing [PSO LM BACKDOOR ORDERS]” menu option to query for and refill, patient’s active and refillable prescriptions; local and remote. The Prescription Manager Server receives requests from VistA to query and refill patient’s active and refillable remote prescriptions. The VistA Server and Prescription Manager Server communicate with each other using HL7 v2.5.1 over MLLP.



5 Decomposition View

5.1 VistA Server

The VistA Server contains the following subcomponents described below.

5.1.1 Patient Prescription Processing

The Patient Prescription Processing [PSO LM BACKDOOR ORDERS] menu option MUMPS code will be modified. The modifications include making a HL7 requests to the Prescription Manager Server for viewing and filling remote prescriptions.

5.1.2 HL7 Protocols

An HL7 protocol event and subscriber will be configured in VistA to handle sending HL7 requests to the Prescription Manager Server. Protocols will be set up to handle all messages defined in 5.2.1 [MLLP HL7 Endpoint](#). The following is an example configuration of a protocol to handle QBP-Q13 Events:

Cache TRM:3800 (CACHE)

File Edit Help

HL7 INTERFACE SETUP PAGE 1 OF 2

NAME: ZJTH PHARM QBP-Q13 EVENT

DESCRIPTION (wp): (empty)

ENTRY ACTION:

EXIT ACTION:

TYPE: event driver

COMMAND: Press <PF1>H for help Insert

Cache TRM:3800 (CACHE)

File Edit Help

HL7 EVENT DRIVER PAGE 2 OF 2

ZJTH PHARM QBP-Q13 EVENT

SENDING APPLICATION: ZJTH VISTA PHAR

TRANSACTION MESSAGE TYPE: QBP EVENT TYPE: Q13

MESSAGE STRUCTURE: PROCESSING ID: VERSION ID: 2.5.1

ACCEPT ACK CODE: NE APPLICATION ACK TYPE: AL

RESPONSE PROCESSING RTN: SUBSCRIBERS

ZJTH PHARM QBP-Q13 ESUBS

COMMAND: Press <PF1>H for help Insert

Cache TRM:3800 (CACHE)

File Edit Help

HL7 EVENT DRIVER

PAGE 2 OF 2

ZJTH PHARM QBP-Q13 EVENT

Sending Application Edit

T

NAME: ZJTH VISTA PHAR

ACTIVE/INACTIVE: ACTIVE

FACILITY NAME: 2201

COUNTRY CODE: USA

R

HL7 FIELD SEPARATOR: |

HL7 ENCODING CHARACTERS: ^~\&

MAIL GROUP:

COMMAND:

Press <PF1>H for help

Insert

Cache TRM:3800 (CACHE)

File Edit Help

HL7 EVENT DRIVER

PAGE 2 OF 2

HL7 SUBSCRIBER

ZJTH PHARM QBP-Q13 ESUBS

TR

RECEIVING APPLICATION: ZJTH ESB PHARM

RESPONSE MESSAGE TYPE: RTB

EVENT TYPE: K13

SENDING FACILITY REQUIRED?:

RECEIVING FACILITY REQUIRED?:

RE

SECURITY REQUIRED?:

Z

LOGICAL LINK: ZJTHS36500

PROCESSING RTN:

ROUTING LOGIC:

COMMAND:

Press <PF1>H for help

Insert

5.1.3 HL7 Sender and Receiver Applications

Sender and Receiver HL7 applications will be configured in VistA to fill MSH-3, 4, 5 and 6 fields. The Sending Application Facility Name is used to convey the site number of the VistA. The following is an example configuration of applications used in the protocols above:

Cache TRM:3800 (CACHE)

File Edit Help

HL7 APPLICATION EDIT

NAME: **ZJTH ESB PHARM** ACTIVE/INACTIVE: **ACTIVE**

FACILITY NAME: **36500** COUNTRY CODE: **USA**

HL7 FIELD SEPARATOR: **|** HL7 ENCODING CHARACTERS: **^~\&**

MAIL GROUP:

COMMAND: Press <PF1>H for help **Insert**

Figure 1: Receiving HL7 Application Configuration

Cache TRM:3800 (CACHE)

File Edit Help

HL7 APPLICATION EDIT

NAME: **ZJTH VISTA PHAR** ACTIVE/INACTIVE: **ACTIVE**

FACILITY NAME: **2201** COUNTRY CODE: **USA**

HL7 FIELD SEPARATOR: **|** HL7 ENCODING CHARACTERS: **^~\&**

MAIL GROUP:

COMMAND: Press <PF1>H for help **Insert**

Figure 2: HL7 Sending HL7 Application Configuration

5.1.4 Sender and Receiver Logical Links

A client logical link will be configured in VistA with the IP and Port of the Prescription Manager System. Additionally, a server or listening logical link will be added. HL7 messaging will be used to exchange requests between the initiating VistA and the Prescription Manager System. The following is an example configuration of logical links used in the applications above:

Cache TRM:3800 (CACHE)

File Edit Help

HL7 LOGICAL LINK

NODE: ZJTHR39550 DESCRIPTION:

INSTITUTION:

MAILMAN DOMAIN:

AUTOSTART: Disabled

QUEUE SIZE: 10

LLP TYPE: TCP

DNS DOMAIN:

COMMAND: Press <PF1>H for help Insert

Cache TRM:3800 (CACHE)

File Edit Help

HL7 LOGICAL LINK

TCP LOWER LEVEL PARAMETERS

ZJTHR39550

TCP/IP SERVICE TYPE: MULTI LISTENER

TCP/IP ADDRESS:

TCP/IP PORT: 39500

TCP/IP PORT (OPTIMIZED):

ACK TIMEOUT: RE-TRANSMISSION ATTEMPTS:

READ TIMEOUT: EXCEED RE-TRANSMIT ACTION:

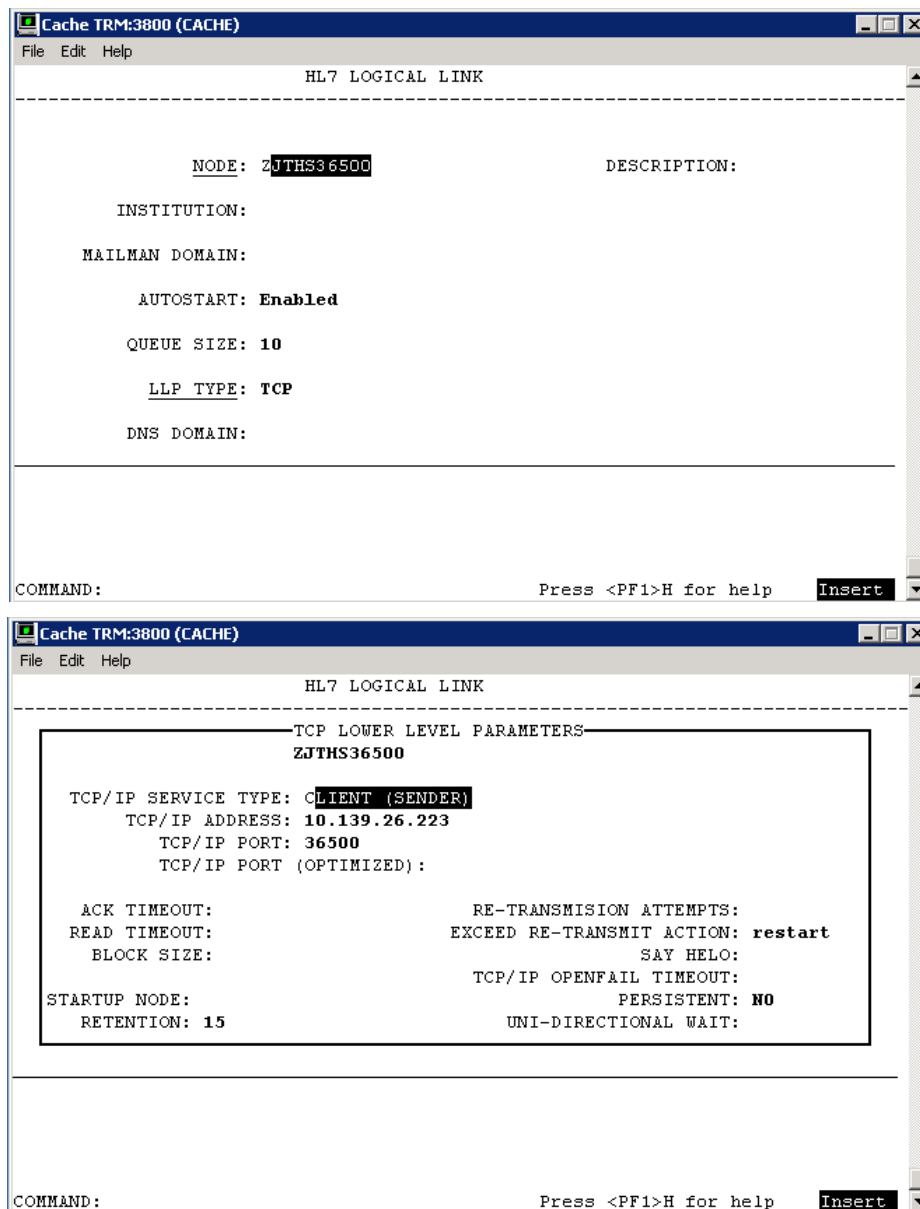
BLOCK SIZE: SAY HELO:

STARTUP NODE: TCP/IP OPENFAIL TIMEOUT:

RETENTION: PERSISTENT:

UNI-DIRECTIONAL WAIT:

COMMAND: Press <PF1>H for help Insert



5.1.5 RESTful Web Services

RESTful web services are required to be installed on the VistA instance server. These services are used to read and write to the VistA Cache database as well as call VistA MUMPS methods.

TODO

5.2 Prescription Manager Server

The Prescription Manager Server contains the following subcomponents described below.

5.2.1 MLLP HL7 Endpoint

An MLLP Service will handle all incoming MLLP HL7 v2.x requests. The requests will be routed based on the message type and trigger event (MSH-10). The MLLP Service will route the following messages to the appropriate service:

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Message	Response	Description	Service Reference
QBP^Q13	KTB^K13	Query by parameter	0 Prescription Query Service
RDS^O13	RRD^O14	Pharmacy/Treatment Dispense Message	5.2.4 Prescription Refill/Partial Service

5.2.2 Prescription Query Service

The Prescription Query Service will handle QBP-Q13 HL7 query requests. The proof of concept flow (without routing and parallel searches) is depicted in the following diagram. The response is an HL7 v2.x RTB-K13 message with tabular data containing aggregated prescription information from the remote VistAs. In the event of an exception, a negative response (NAK) is sent back with an acknowledgement code of AE or AR.

5.2.3 Prescription Lock Service

The Prescription Refill Service will handle RDE^O25 HL7 Pharmacy/Treatment Refill Authorization requests.

5.2.4 Prescription Refill/Partial Service

The Prescription Refill Service will handle RDS^O13 HL7 Pharmacy/Treatment Dispense requests.

6 Interface View

HL7 v2.5.1 messaging is used to communicate between VistA and the Prescription Manager Server. The following codes are provided for reference.

6.1 Acknowledgement Codes

Code	Status	Description
AA	Application Accept	Requested action or operation was successfully performed
AR	Application Reject	Requested action or operation failed due to service errors
AE	Application Error	Requested action or operation failed due to HL7 message or semantic errors

6.2 Order Control Codes

Code	Status
RF	Refill order request
PF	Partial fill order request*
AF	Order refill authorization request approved
DF	Order refill authorization request denied
FU	Order refilled unsolicited at patient's request
OF	Order refilled as requested by placer system

*PF is not an HL7 standard code

6.3 Remote Prescription Query Transaction

The remote prescription query request is a QBP^Q13 message type and the response is a KTB^K13 message type. The “Chapter” reference below refers to the HL7 Standard Version 2.5.1 documentation.

6.3.1 Remote Prescription Query Request

The QBP^Q13 request is defined as follows. Our implementation will ignore RDF and DSC segments. Additionally any segment not shown below is ignored.

QBP^Q13	QBP Message	Chapter
MSH	Message Header Segment	2.15.9
QPD	Query Parameter Definition	5.5.4
PID	Patient Identification	3.4.2
[RDF]	Table Row Definition Segment	5.5.6.6
RCP	Response Control Parameter	5.5.6
[DSC]	Continuation Pointer	2.15.4

QPD Field Description and Commentary

Field Seq	Field Name	HL7 Data Type	Description
1	Message Query Name	CE	Must be Q13^Active Prescriptions^HL70471
2	Query Tag	ST	Unique to each query message instance

PID Field Description and Commentary

Field Seq	Field Name	HL7 Data Type	Description
1			Ignored
2			Ignored
3	MRN	CX	One or more patient identifiers may be sent. Each site provided and configured will be queried for prescriptions.
n			Ignored

RCP Field Description and Commentary

Field Seq	Field Name	HL7 Data Type	Description
1	Query Priority	ST	Must be "I" for Immediate
n			Ignored

6.3.1.1 Sample QBP^Q13 Request

MSH|^~\&|ZJTH VISTA PHARM|2101|ZJTH MIRTH PHARM|36500|20140102125951-0500||QBP^Q13|301|T|2.5.1|||NE|AL|USA

QPD|Q13^Active Prescriptions^HL70471|512123456

PID|||1666000286V397907^^^USVHA^NI^200M~100232^^^USVHA^PI^500~100445^^^USVHA^PI^612~100232^^^USVHA^PI^2204~100232^^^USVHA^PI^2202

RCP|I

6.3.2 Remote Prescription Query Response

The KTB^K13 response is defined as follows.

KTBA^Q13	QBP Message	Chapter
MSH	Message Header Segment	2.15.9
MSA	Message Acknowledgement	2.15.8
[ERR]	Error	2.15.5
QAK	Query Acknowledgement	5.5.2
ZAK	Z-Segment	Defined below
QPD	Query Definition Segment	5.5.4
RDF	Table Row Definition Segment	5.5.6.6
[[RDT]]	Table Row Data Segment	5.5.6

An ERR segment will be sent when MSA.1 acknowledgement code is AR or AE.

RCP Field Description and Commentary

Field Seq	Field Name	HL7 Data Type	Description
1	Site Number	ST	VistA site number
2	Count returned	NM	Count of rows returned from VistA site

3	Success indicator	NM	1 – success 0 – unknown error -1 – connection failure -2 – response timeout
---	-------------------	----	--

The RDF segment and data in the RDT segment contains the following fields:

1. Site Number
2. Rx Number
3. Drug Name
4. Quantity
5. Refills
6. Days Supply
7. Expiration Date
8. Issue Date
9. Stop Date
10. Last Fill
11. Sig
12. Detail

6.3.2.1 Sample KTB^K13 Response:

MSH|^~\&|ZJTH MIRTH PHARM|36500|ZJTH VISTA PHARM|2101|20140109155138.281-0500||ACK^Q13^ACK|19|T|2.5.1

MSA|AA|50022643

QAK|512123456|OK|Q13^Active Prescriptions^HL70471|2

ZAK|2302|3|1|Success

ZAK|2303|0|-1|Connection timeout.

RDF|12|Site Number~Rx Number~Drug Name~Quantity~Refills~Days Supply~Expiration Date~Issue Date~Stop Date~Last Fill Date~Sig~Detail

RDT|2302|501109|NAPROXEN 250MG

TAB|60|11|30|20150517.000000|20140516.000000|20150517.000000|20140516.000000|TAKE ONE
TABLET BY MOUTH TWICE A DAY|NAPROXEN 250MG TAB Qty: 60 for 30 days

RDT|2302|501110|RANITIDINE HCL 25MG EFFER

TAB|60|6|30|20150517.000000|20140516.000000|20150517.000000|20140516.000000|DISSOLVE 1
MOUTH TWICE A DAY|RANITIDINE HCL 25MG EFFER TAB Qty: 60 for 30 days

RDT|2302|501123|ACETAMINOPHEN 325MG

TAB|240|5|30|20150726.000000|20140725.000000|20150726.000000|20140814.000000|TAKE TWO
TABLETS BY MOUTH EVERY 6 HOURS AS NEEDED |ACETAMINOPHEN 325MG TAB Qty: 240 for 30 days

6.4 Remote Prescription Dispense Transaction

The remote prescription refill dispense request is a RDS^O13 message type and the response is a RRD^O14 message type. This message is used to convey that the requesting system wishes to lock the remote order. The “Chapter” reference below refers to the HL7 Standard Version 2.5.1 documentation.

6.4.1 Remote Prescription Dispense Request

The RDS^O13 request is defined as follows. Additionally any segment not shown below is ignored.

RDS^O13	RDS Message	Chapter
MSH	Message Header Segment	2.15.9
PID	Patient Identification	3.4.2
ORC	Common Order	4.5.1
RXO	Pharmacy/Treatment Prescription Order	4.14.1

PID Field Description and Commentary

Field Seq	Field Name	HL7 Data Type	Description
1			Ignored
2			Ignored
3	MRN	CX	One or more patient identifiers may be sent. Each site provided and configured will be queried for prescriptions.
n			Ignored

ORC Field Description and Commentary

Field Seq	Field Name	HL7 Data Type	Description
1	Order Control	ID	6.2 Order Control Codes
2	Placer Order Number	EI	The originating order prescription number
3			Ignored
4			Ignored
5			Ignored
6			Ignored
7			Ignored
8			Ignored
9	Date/Time Transaction	TS	Date/Time of request

10	Entered By	XCN	Provides pharmacist identifier and name
11			Ignored
12			Ignored
13	Enterer's Location	PL	Provides pharmacist's site number
14	Call Back Phone Number	XTN	Provides pharmacist's callback phone number

RXO Field Description and Commentary

Field Seq	Field Name	HL7 Data Type	Description
1			Ignored
2			Ignored
3			Ignored
4			Ignored
5			Ignored
6			Ignored
7			Ignored
8	Deliver-To Location	LA1	Provides (W)indow, (M)ail and requesting site number

6.4.1.1 Sample RDS^O13 Refill Request

MSH|^~\&|ZJTH VISTA PHARM|2201|ZJTH ESB PHARM|36500|20140415110833-0500||RDS^O13|50024242|T|2.5.1|||NE|AL|USA

PID||||1666000286V397907^^^USVHA^NI^200M~100232^^^USVHA^PI^2202

ORC|RF|500974^2202|||||20140415|1^PROGRAMMER^ONE|||^500|6655544

RXO|||||||W^^^2201

6.4.1.2 Sample RDS^O13 Partial Fill Request

MSH|^~\&|ZJTH VISTA PHARM|2201|ZJTH ESB PHARM|36500|20140716081903-0500||RDS^O13|50030627|T|2.5.1|||NE|AL|USA

PID||||1111000440V046182^^^USVHA^NI^200M~101016^^^USVHA^PI^2202

ORC|PF|501145^2202|||||20140710|10000000225^TERRELL^GAIL|||^500|502-233-2355

RXO|1|10|||||W^^^500|||10

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6.4.2 Remote Prescription Dispense Response

The RRD^O14 response is defined as follows.

RRD^O14	RRD Message	Chapter
MSH	Message Header Segment	2.15.9
MSA	Message Acknowledgement	2.15.8
[ERR]	Error	2.15.5
ORC	Common Order	4.5.1
RXD	Pharmacy/Treatment Dispense Segment	4.14.1

An ERR segment will be sent when MSA.1 acknowledgement code is AR or AE.

RXD Field Description and Commentary

Field Seq	Field Name	HL7 Data Type	Description
1			Ignored
2	Dispense/Give Code	CE	National Drug Code (NDC)
3	Date/Time Dispensed	TS	
4	Actual Dispense Units	CE	
5			Ignored
6			Ignored
7	Prescription Number	ST	Format: PSOIEN::REFIEN
8	Number of Refills Remaining	NM	
9			Ignored
10	Dispensing Provider	XCN	
11			
12	Total Daily Dose	CQ	Days Supply

6.4.2.1 Sample RRD^O14 Refill Response

```
MSH|^~\&|ZJTH ESB PHARM|36500|ZJTH VISTA PHARM|2302|20140723091250.151-  
0400||ACK^O13^ACK|12173|T|2.5.1  
MSA|AR|50024459  
PID|||1111000449V272697^^^USVHA^NI^200M~101044^^^USVHA^PI^2303  
ORC|UF|501109^2303|||||20140723|10000000225^TERRELL^GAIL|||^^^500|490-444-5555
```

6.4.2.2 Sample RRD^O14 Partial Fill Response

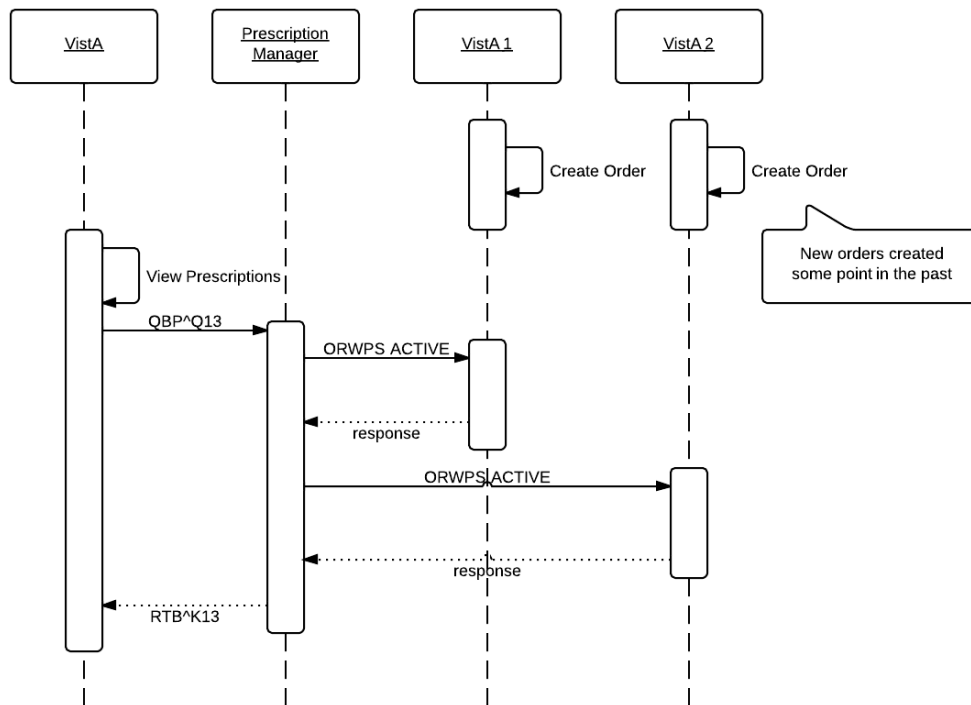
```
MSH|^~\&|ZJTH ESB PHARM|36500|ZJTH VISTA PHARM|2201|20140716081939.298-  
0400||ACK^O13^ACK|10412|T|2.5.1  
MSA|AA|50030627  
NTE|1||Partial complete for RX #501145.  
PID|||1111000440V046182^^^USVHA^NI^200M~101016^^^USVHA^PI^2202  
ORC|OF|501145^2202|||||20140710|10000000225^TERRELL^GAIL|||^^^500|502-233-2355  
RXD|1|^NAPROXEN 125MG/5ML SUSP^NDC|20140710000000-  
0400|10||404366::1||^RADIOLOGIST^ONE^^^^^^^^^^^^2&VEHU SITE^^^20140717162300-0400||10
```

7 Interaction View

The following sequence diagrams show the interactions among key entities as a realization of the Use Case View.

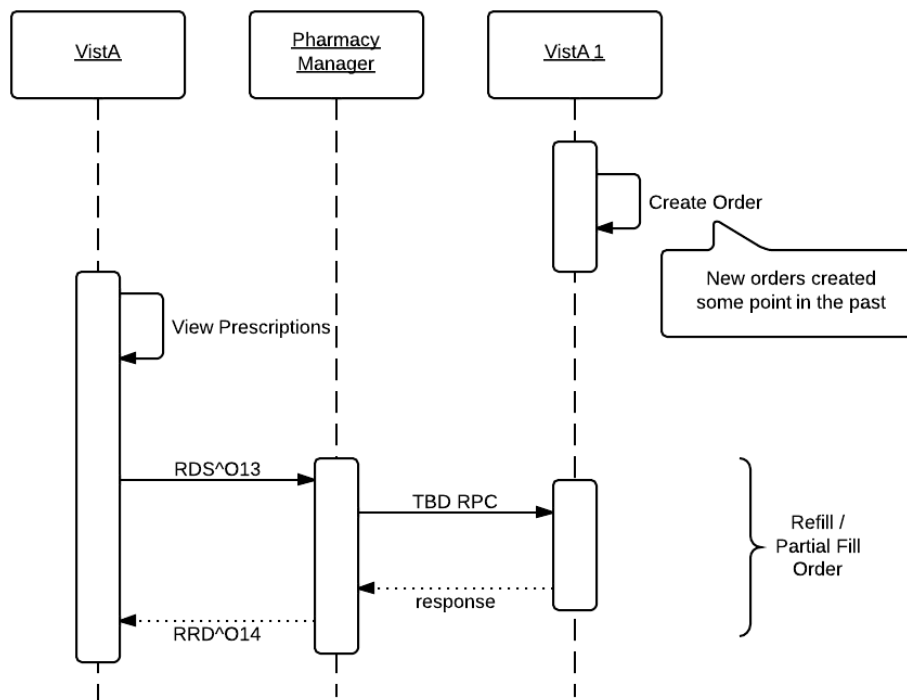
7.1 Use Case - View Orders

The diagram shows three (3) Vistas, two of which create a refillable prescription order at some point in the past. The Vista on the left is depicted as current Vista, the Vista where the patient is physically at the time the refill is requested by the patient.



7.2 Use Case - Dispense Remote Order

The diagram shows an original prescription order created at some point in the past and a present date/time VistA attempting to lock (RDE^O25) that order and dispense (RDS^O13) the order.



8 Design Rationale

8.1 HL7 Protocol

The communication protocol used between components is HL7 v2.x. HL7 v2.x is a standard messaging protocol used to communicate among health information systems. Additionally, MyHealthVet, a predecessor VA application, uses an HL7 v2 QBP-Q13 message to query prescriptions from VistA. In fact, the OneVA Pharmacy query for active and refillable prescriptions objective could be solved using the MyHealthVet HL7 v2.x interface and HL7 v2 QBP^Q13 query requests.

9 Human Interface Design

9.1 Overview of User Interface

The Pharmacy Innovations project will utilize existing Vista functionality to the fullest extent possible.

9.1.1 Prescription Display

PSO LM BACKDOOR ORDERS will be modified to display remote rx's in the same screen where the local Rx's are displayed for a patient. The remote prescriptions will occur AFTER any local Rx's and will have a section header '-----SITE NAME (SITE NUMBER)-----' delineation. Leveraging existing functionality means less training, and more immediate familiarity with the process.

Once the user selects to Refill, or partially refill, prompting will occur (yet to be determined fully), to gather the required information for sending a request to the 'originating' system, so that the refill or partial fill may be completed, and the RX data updated.

9.2 Screen Images

9.2.1 Prescription Display

Cache TRM:4708 (CACHE)

File Edit Help

Medication Profile Mar 06, 2014@19:17:24 Page: 1 of 1

TWOHUNDREDEIGHTYSIX, PATIENT <NO ALLERGY ASSESSMENT>

PID: 666-00-0286 Ht (cm): 177.80 (04/05/2003)

DOB: APR 7, 1935 (78) Wt (kg): 79.09 (04/15/2003)

SEX: MALE

CrCL: <Not Found> BSA (m2): 1.97

#	RX #	DRUG	QTY	ST	DATE	ISSUE	LAST REF	FILL	DAY	REM	SUP
-----ACTIVE-----											
1	500971A\$	ACETAMINOPHEN 325MG TAB	360	S>	02-19	03-26	3	90			
-----DISCONTINUED-----											
2	500973\$	IBUPROFEN 200MG TAB	60	DC>	01-16	01-16	0	30			
-----ONEVA PHARMACY GOLDDEV2 (2202) ACTIVE REMOTE-----											
3	500973	PYRIDOXINE 25MG TABS	180	AR	12-30	01-05	3	90			
4	500974	IBUPROFEN 800MG TAB	60	AR	01-21	02-20	10	30			

Enter ?? for more actions

PU Patient Record Update NO New Order

PI Patient Information SO Select Order

Select Action: Quit// so Select Order

Select Orders by number: (1-4): 3

Cache TRM:4708 (CACHE)

File Edit Help

REMOTE OP Medications (ACTIVE) Mar 06, 2014@19:18:50 Page: 1 of 1

TWOHUNDREDEIGHTYSIX, PATIENT <NO ALLERGY ASSESSMENT>

PID: 666-00-0286 Ht (cm): 177.80 (04/05/2003)

DOB: APR 7, 1935 (78) Wt (kg): 79.09 (04/15/2003)

SEX: MALE

CrCL: <Not Found> BSA (m2): 1.97

Site #: 2202 (PHARMACY TESTING)

Rx #: 500973

Drug Name: PYRIDOXINE 25MG TABS

Days Supply: 90

Quantity: 180

Refills: 3

Expiration Date: 12/31/14

Issue Date: 12/30/13

Stop Date: 12/31/14

Last Fill Date: 01/05/14

Detail: PYRIDOXINE 25MG TABS Qty: 180 for 90 days

Sig: TAKE ONE TABLET BY MOUTH EVERY 12 HOURS

Enter ?? for more actions

RF Refill Remote Order PR Partial

Select Action: Quit//

9.3 Screen Objects and Actions

9.3.1 Prescription Display

The 'Select Order' function within PSO LM BACKDOOR ORDERS will be modified to differentiate between the local and remote orders, and pull from the remote order ^XTMP array when needed.

Once the user has selected the order, a new option will be available to either 'refill remote order' or 'partial' refill the remote prescription. The updates to the data will occur on the system of origin. Additional fields will be added to the Prescription file (#52), and have yet to be fully determined. The fields will however include, remote pharmacist name, remote pharmacist phone number, and remote filling site.

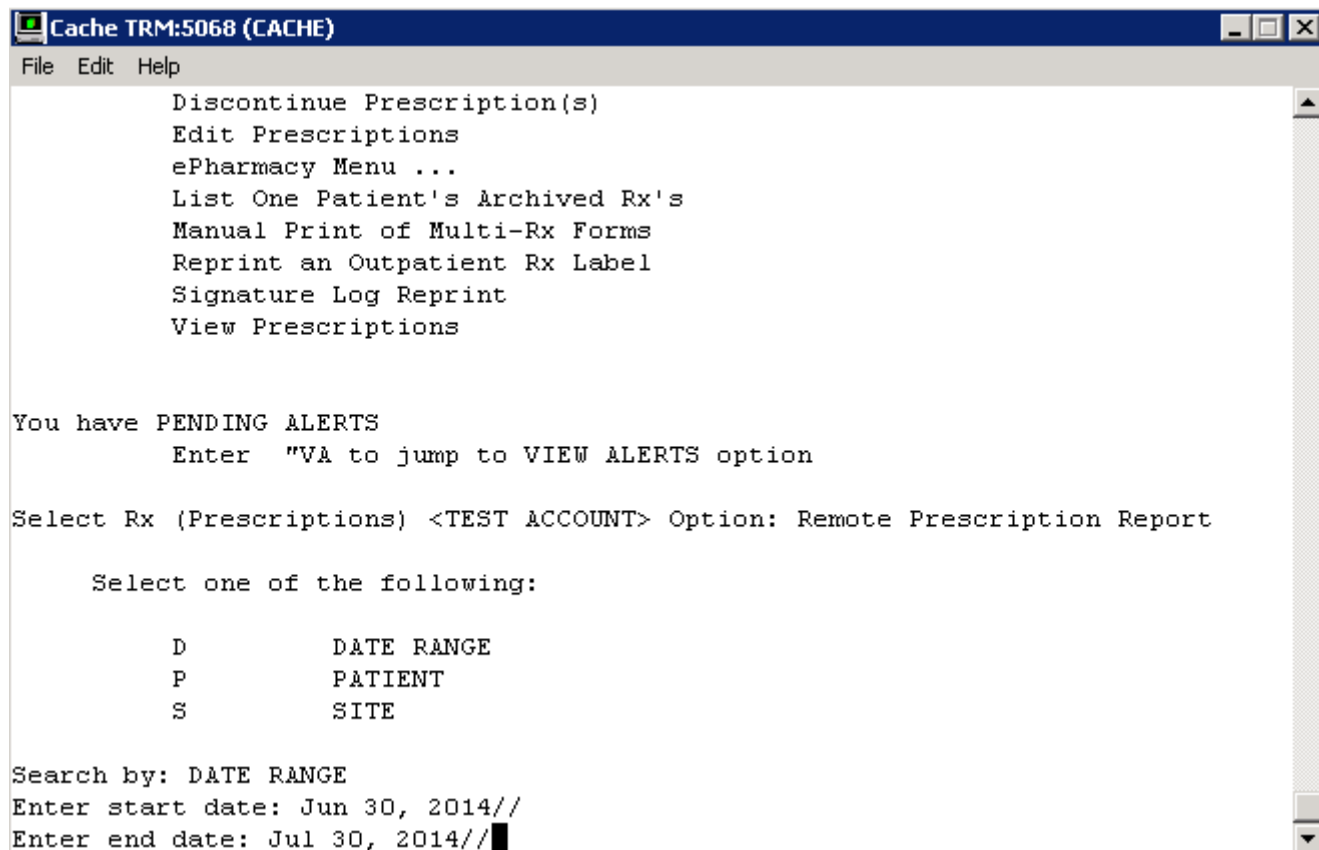
A new local file will be added to hold the information about the remote prescription that has been filled. This file will contain information about the site, rx number, pharmacist who filled the rx, and when it was filled in the 'local' system. This file will be used for reporting and tracking purposes.

Additional options may be made available for reprinting of labels.

9.4 Reports

9.4.1 Remote Prescription Report

The remote prescription report shows all prescriptions that have been filled or partially filled by your facility. These are prescriptions whose originating site is elsewhere, meaning they are not housed in the local system. To get to this report, choose PSO USER 1 -> Rx (Prescriptions) -> Remote Prescription Report. This report allows the user to choose from three different search options. Date range, Patient, or Site.



Cache TRM:5068 (CACHE)

File Edit Help

PSO LM REMOTE RX REPORT Jul 30, 2014@09:57:48 Page: 1 of 1

PSO Report of Remote Rx's refilled or partially filled.

-O--	DATE	PATIENT	DRUG NAME	TYPE	QTY	DSUP
1.	JUN 30, 2014	REID,BRITT	ACETAMINOPHEN 100MG/	PR	45	15
2.	JUL 08, 2014	ROGERS,STEVEN	ACETAMINOPHEN 500MG	RF	90	30
3.	JUL 08, 2014	ROGERS,STEVEN	NAPROXEN 125MG/5ML S	RF	90	30
4.	JUL 10, 2014	KENT,MARVINTEST	ACETAMINOPHEN 160MG/	PR	15	15
5.	JUL 16, 2014	REDTEST,MATTHEW	NAPROXEN 125MG/5ML S	PR	10	10

-----Enter ?? for more actions-----

SI Select Item

Select Action:Quit//

Cache TRM:5068 (CACHE)

File Edit Help

PSO LM REMOTE RX REPORT Jul 30, 2014@09:57:48 Page: 1 of 1

PSO Report of Remote Rx's refilled or partially filled.

-O-	DATE	PATIENT	DRUG NAME	TYPE	QTY	DSUP
1.	JUN 30, 2014	REID,BRITT	ACETAMINOPHEN 100MG/	PR	45	15
2.	JUL 08, 2014	ROGERS,STEVEN	ACETAMINOPHEN 500MG	RF	90	30
3.	JUL 08, 2014	ROGERS,STEVEN	NAPROXEN 125MG/5ML S	RF	90	30
4.	JUL 10, 2014	KENT,MARVINT	ACETAMINOPHEN 160MG/	PR	15	15
5.	JUL 16, 2014	REDTEST,MATTHEW	NAPROXEN 125MG/5ML S	PR	10	10

-----Enter ?? for more actions-----

SI Select Item

Select Action:Quit// SI Select Item

Enter a number (1-5): 1

Cache TRM:5068 (CACHE)

File Edit Help

PSO LM REMOTE REPORT DETAILS Jul 30, 2014@09:58:48 Page: 1 of 0

Remote Refill/Partial Fill Details

Request Date/Time: JUN 30, 2014@16:55:13

Patient: REID,BRITT

RX #: 501088

Site: ONEVA PHARMACY GOLDDDEV2

Request Type: PARTIAL FILL

Requesting Pharmacist: PROGRAMMER,ONE

Dispensed Date: JUN 30, 2014

Drug: ACETAMINOPHEN 100MG/ML (SF) ORAL SUSP

-----Enter ?? for more actions-----

Actions

Select Action:Quit//

9.4.2 Prescriptions Filled by Other Facilities

This report will show which local prescriptions have been acted upon (refill or partial fill) by another 'remote' facility. In essence: "Which of our prescriptions have been actioned by another facility?"

Note: This report is not yet available.