Enterprise Messaging Infrastructure

Veteran Interoperability and Integrations

Vista Exchange Message Flow

Service Integration Design Document



Department of Veterans Affairs

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Version 1.0

Revision History

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# Introduction

The eMI VistA Exchange Message Flow is to replace several point-to-point connections between multiple data sources of the Enterprise Health Management Platform (eHMP) application by routing messages through the Enterprise Messaging Infrastructure (eMI). The migration will be multi-phased; current phase includes connections to two separate information service providers: Defense Medical Information Exchange Data Exchange Service (DMIX DES), and the Virtual Lifetime Electronic Record (VLER) eHealth Exchange service (eHx).

## Purpose

The purpose of this document is to describe the integration specifications of eMI’s interface to the DES and eHx. This document provides the detailed design of the eMI message flow and includes protocol, transformation, broker patterns, happy path, and exception details.

## Scope

The scope of this Service Integration Design Document (SIDD) is to address interoperability between eMI VistA Exchange Message Flow, VLER eHx, and DMIX DES.

The scope items include, but are not limited to:

1. Message Types
2. Validation
3. Ports and Protocol
4. Transformation
5. Error Handling
6. Routing
7. Security

The details of the above are described in the following sections. The common architectural specifications, such as security, logging, exception handling, etc. are defined in the eMI Software Design Document. However, the definitions of the DMIS DES REST API, VLER eHx API, and details of eMI architecture, physical addresses, and system specification are not in the scope of this document.

## Audience

This document provides implementation details for project owners and serves as a blueprint for managers, architects, developers, and testers building the system. It is assumed that the readers have a moderate knowledge of Message Broker, RESTful services and SOAP services.

## References

eMI Software Design Document is accessible on the VA eMI SharePoint site.

# Interface Requirements

Table 1 lists the software interfaces that are implemented.

Table 1- Logical High-Level Message Transmission Flows

| Application | Interface |
| --- | --- |
| VistaExchange to DES | Utilizes REST web service over HTTPS transport with payload conforming to DES API. |
| VistaExchange to eHx | Utilizes SOAP web service over HTTPS transport with payload conforming to eHx WSDL. |

## Business Unit

Data moves from the VA applications such as eHMP, VLER eHX, to DMIX DES. Table 2 and Table 3 list the point of contact (POC) information for those systems. For DMIX DES POC, refer to BHIE Message Flow SIDD.

Table 2 - eHx Business Unit

| eHx Business Unit | |
| --- | --- |
| Agency | Veteran’s Administration |
| Receiving Application | eHx |
| POC Name |  |
| Title | Health Information Specialist |
| Address |  |

Table 3 - eHMP Business Unit

| eHMP Business Unit | |
| --- | --- |
| Agency | Veteran’s Administration |
| Sending Application | Vista Exchange/eHMP |
| POC Name |  |
| Title | Principal Architect and Manager |
| Address |  |

## Service Level Agreement Metrics

Table 4 lists the Service Level Agreement (SLA) metrics for the Vista Exchange message flow that are expected to be met.

Table 4 – SLA Metrics

| SLA Type | SLA Data |
| --- | --- |
| Number of messages/day | TBD |
| Average Message size | TBD |
| Data Type | JSON |
| Throughput | TBD |

## Message Type Metrics

Table 5 lists the message metrics based on message types.

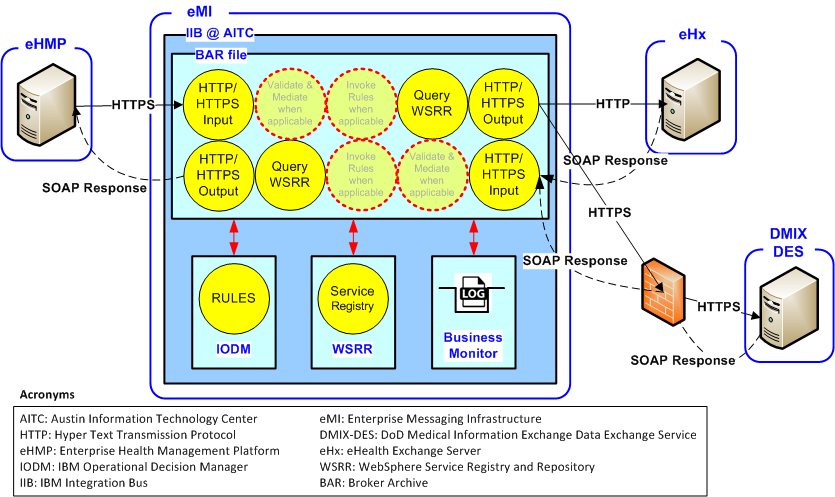
Table 5 – Message Type Metrics

| Message Type | Estimated Message Size in kb |
| --- | --- |
| XML for VLER eHx | TBD |
| JSON for DMIX DES | TBD |

## Logical System Overview

The eMI system provides connectivity for service consumers and producers within and outside the Veteran’s Administration. Figure 1 shows the DMIX DES/eHx/eMI logical system overview. The high-level flow is described following the figure:

Figure 1 - eHMP - eHx - eMI Logical System Overview

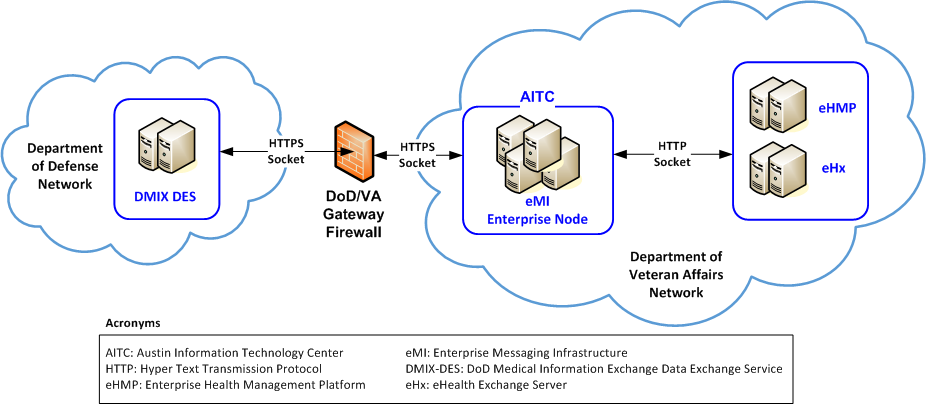


1. eHMP initiates a data request over HTTPS to eMI VistA Exchange message flow hosted on eMI instance at AITC. For a DMIX DES service call, a data request is a REST Web Service call with data in JSON format. For a eHx service call, a data request is a SOAP Web Service call with data in XML format.
2. When applicable, the eMI VistA Exchange message flow validates input data for data compliance when applicable.
3. When applicable, the eMI VistA Exchange message flow mediates input data if necessary to conform to DMIX DES REST API v4.0 and VLER eHx.
4. When applicable, the eMI VistA Exchange message flow invokes routing rules to route to DMIX DES or eHx
5. The eMI VistA Exchange message flow queries WebSphere Service Registry and Repository (WSRR) for DMIX DES REST Web Service endpoint and eHx SOAP Web Service end port.
6. The eMI VistA Exchange message flow invokes DMIX DES REST Web Service or eHx SOAP Web Service
7. The data return from DMIX DES or eHx Web service follow the reversed code path in the same HTTP session.

## Deployment Overview

The eMI message broker hosts the message flow that listens on a configurable port for REST and SOAP Web Service call from eHMP and routes the call to DMIX DES, and eHX over Hyper Text Transmission Protocol (HTTP). Figure 2 shows the boundaries, gateway, and locations of sending and receiving systems.

Figure 2 - Deployment Overview



## VistA Exchange - eMI Interface Requirements

1. The eMI system shall interface with eHx and DMIX DES for its VistA Exchange message flow
2. The eMI system shall receive outbound data request via HTTP from eHMP and eHX system inside the VA network.
3. The eMI system shall receive inbound data response via HTTPS from DMIX DES system
4. The eMI system shall interface with DMIX DES system through its VistA Exchange Message Flow using DMIX DES REST API v4.0
5. The eMI system shall ensure a secured connection with DMIS DES system by means of two-way Secure Sockets Layer (SSL) encryption.

# Nominal VistA Exchange Message Flow

Figure 3 below presents an activity diagram with a high level, logical view of the VistA Exchange message flow implementation for eHx. For DES, refer to BHIE SIDD. A textual description follows:

Figure 3 - Activity Diagram of Nominal Flow for eHx Resources



Vista Exchange will invoke eMI with an HTTPS SOAP request to the hosted eHx resource. The request will conform to the URI description in the eMI-updated eHx ICD, and include all required parameters. eMI will return a XML-formatted response containing the complex data requested by Vista Exchange. The response will conform to the eHx ICD’s description of the resource response.

# VistA Exchange Message Flow Design

The following section refers to the VistA Exchange design aspects.

## Architecture Deviations

There are no architectural deviations.

## Pattern

The VistA Exchange proxy message flows are loosely based on the IBM Service Proxy pattern. See section 5 for a detailed explanation of the flow.

## Protocol

The eHx integration service uses the protocols described in Table 6 and Table 7.

Table 6 - eHx to eMI Interface (Layer 7)

| eHx to eMI | |
| --- | --- |
| Protocol: | HTTPS |
| Message Type: | SOAP per WSDL |
| eHx hostname: | TBD |
| eMI hostname: | Austin Information Technology Center (AITC) Load balancer |

Table 7 - eMI Interface to eHx

| eMI To eHx | |
| --- | --- |
| Protocol: | HTTPS |
| Message Type: | SOAP per WSDL |
| eMI hostname: | AITC Message brokers |
| VA VistA hostname: | Redacted |

## Message Routing

Requests to the eMI VistA Exchange Message Flow are routed by means of dynamic WSRR REST Service endpoint lookup. The destination URL for the DMIX/DES, and eHx service providers are obtained from the WSRR governance repository. Subsequently, the message flow uses the destination URL to route the inbound request to the proper REST endpoint within the DMIX/DES service provider and to the proper SOAP endpoint within the eHx service provider.

## Transformation

The following sections document the various transformations for the eMI VistA Exchange message flow.

**Protocol Transformation**

Protocol transformation is not applicable to the eMI VistA Exchange message flow.

**Data Transformation**

Data transformation is not applicable to the eMI VistA Exchange message flow.

# Implementation Details

Detailed sequence diagrams in support of eHx message flows are provided in the following sections. For DES, refer to the BHIE SIDD. One minor change is that Layer 7 will use port to receive REST messages. The standard secured port is. However, the eMI load balancer uses port for internal purposes, so it is necessary to use port for HTTPS transactions.

Figure 4 - Sequence Diagram for Complex Resource

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WMB receives a request from Layer 7.

If mutual SSL authentication fails, return error to service consumer.

WMB retrieves endpoint information from WSRR, or a cached version of the result.

If error reaching WSRR, or no endpoint retrieved, or any IIB internal error, return error to service consumer.

WMB retrieves results from eHx.

If error reaching eHx, retry until maximum number of retries reached. If reach maximum number of retries, return error to service consumer.

WMB returns response to VistaExchange via HTTPS.

## VistA Exchange Message Flow

The eMI VistA Exchange Message Flow is implemented using one primary message flow and several sub flows from the eMI Services Library.

Figure 5 - VistA Exchange Message Flow

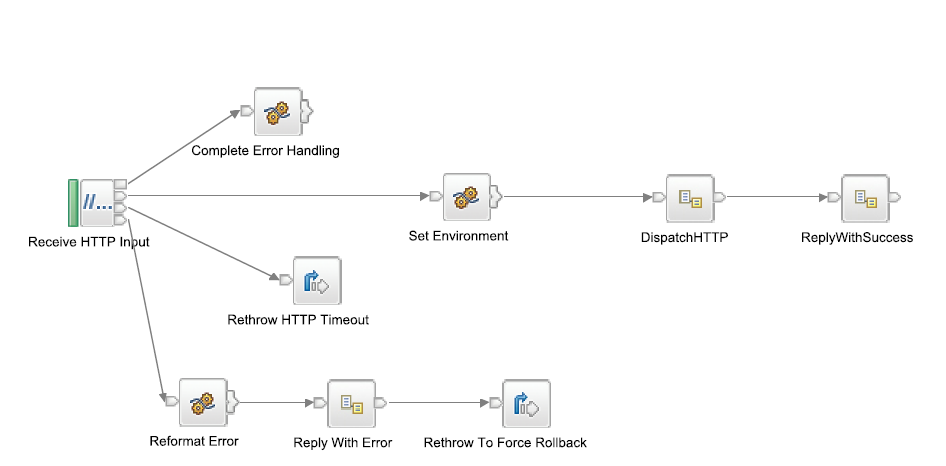
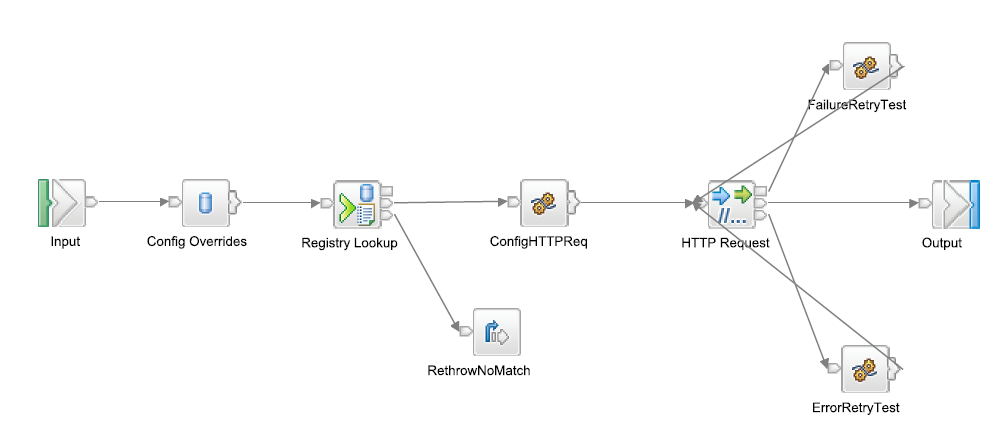
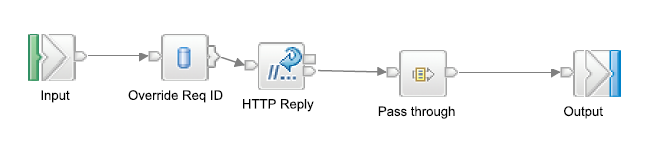


Figure 6 - Dispatch HTTP



The eHx flow utilizes the reusable DispatchSOAP sub-flow to invoke the remote eHx endpoint. It includes prebuilt retry functionality, logging and error handling. The sub-flow also is preconfigured to lookup a rest endpoint in WSRR.

Figure 7 - Reply HTTP



The eHx flow utilizes the Reply HTTP sub-flow to properly format and return an SOAP reply to the original service consumer.

For message flow documentation for DMIX DES flows, refer to the eMI BHIE SIDD.

## Project Configuration File

Table 8 lists the project configuration file details that are either environment specific or control the flow of messages.

Table 8 - Project Configurable Parameters

| Property | Default Value | Purpose |
| --- | --- | --- |
| Number of Retries | 3 | Number of retries to service provider before returning error to service consumer. |
| Retry delay | 1000 | Length of delay between retries. |

## Queue Details

Table 9 lists the queues that the VistA Exchange flow uses when processing incoming eHx request messages.

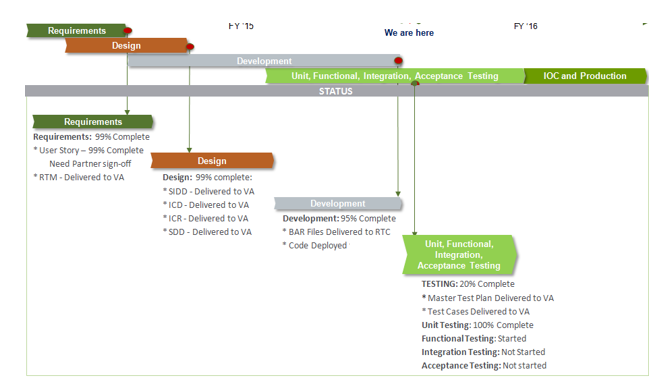
Table 9 - Queues for eHx Message Flow

| Queue Name | Purpose |
| --- | --- |
| VII.VLEREHX.FAILURES.AITC.L | Provides queue to persist error information. |

# Timeline

Figure 8 shows the timeline for the eMI BHIE Message Flow Implementation.

Figure 8 - Implementation Timeline



# Acronyms

Table 10- Acronyms

| Abbreviation/Term | Definition |
| --- | --- |
| ACK | Acknowledgement |
| API | Application Programming Interface |
| AITC | Austin Information Technology Center |
| BDA | Bidirectional Health Information Exchange Data Adapter |
| CHCS | Composite Health Care System |
| eHx | eHealth Exchange |
| DES | Defense Medical Information Exchange Data Service |
| DMIX | Defense Medical Information Exchange |
| DoD | Department of Defense |
| eMI | Enterprise Messaging Infrastructure |
| ESB | Enterprise Service Bus |
| HL7 | Health Level 7 |
| HTTPS | Hypertext Transfer Protocol Secure |
| ICD | Interface Control Document |
| ISF | Internal Services Framework |
| JSON | JavaScript Object Notation |
| LOINC | Logical Observation Identifiers Names and Code |
| REST | Representational State Transfer |
| SLA | Service Level Agreement |
| SOA | Service Oriented Architecture |
| SOAP | Simple Object Access Protocol |
| URI | Uniform Resource Identifier |
| URL | Uniform Resource Locator |
| VA | Department of Veterans Affairs |
| VistA | Veterans Affairs Information Systems and Technology Architecture |
| VLER | Virtual Lifetime Electronic Record |
| WSRR | WebSphere Service Registry and Repository |
| WSDL | Web Service Definition Language |

1. Architecture Design Decisions

The eMI VistA Exchange message flow has not deviated from any recommended or standard patterns defined by IBM or Enterprise Shared Services.

1. Message Flow Documentation

The following PDF attachment contains the documentation generated by the IBM Integration Bus Toolkit for the VistA Exchange message flow:



1. Message Mapping

The DoD DMIX/DES Provider External ICD v0.3 document attached here describes the v4 REST API which the eMI DMIX/DES Proxy Services support.

1. Outstanding Issues

The eMI VistA Exchange Message Flow does not have any outstanding issue

1. Approval Signature

REVIEW DATE:

Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Integrated Project Team (IPT) Chair Date

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IT Program Manager Date

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Project Manager Date