Oracle® Retail Integration Cloud Service

Third Party Integration Guide

Release 21.0.000

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Oracle Retail Integration Cloud Service Third Party Integration Guide, Release 21.0.000

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Preface

This guide provides an overview of third party integration with Oracle Retail Integration Cloud Service.

Audience

This guide is intended for administrators.

This guide describes the administration tasks for Oracle Retail Integration Cloud Services.

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- Exact error message received
- Screen shots of each step you take

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Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1 Introduction and Executive Summary

The Retail Integration Cloud Service (RICS) is the SaaS Cloud deployment of the full Retail Technology's Integration Product Suite and the out-of-box GA application integration flows.

- All of the integration styles and products supported (RIB, RSB, BDI) are deployed in the RICS SaaS Cloud and are accessible to on-premise applications and other cloud applications through service APIs.
- Functionality has been added to round out the integration styles and available flows to support customers of the RICS SaaS offering.
- RICS assumes and supports hybrid cloud topologies; cloud-to-cloud, cloud-to-premise and premise-to-cloud.
- All of the integration styles and products and the applications supported by RICS are integrated via REST web services, with SOAP still available but not recommended.

The RICS Integration Infrastructure products provide standards and guidance and remove the complexity from the business applications and provide accepted solutions to recurring problems within a given integration context. Around these styles and patterns, Oracle Retail has developed a set of Integration Infrastructure products and supporting tools.

These products expose hundreds of Oracle Retail Application API's as contract driven integration points exposed for integrations between Oracle Retail applications and customer 3rd Party and Legacy applications.

- Retail Integration Bus (RIB) - Asynchronous JMS Messaging
- Bulk Data Integration (BDI) - Bulk Data Movement
- Retail Financial Integration (RFI) - Integration to Oracle Financial Products (EBS, People Soft Financials, Oracle Cloud Financials)
- Oracle Warehouse Management Cloud Service integration using the Universal Service Mapper product.

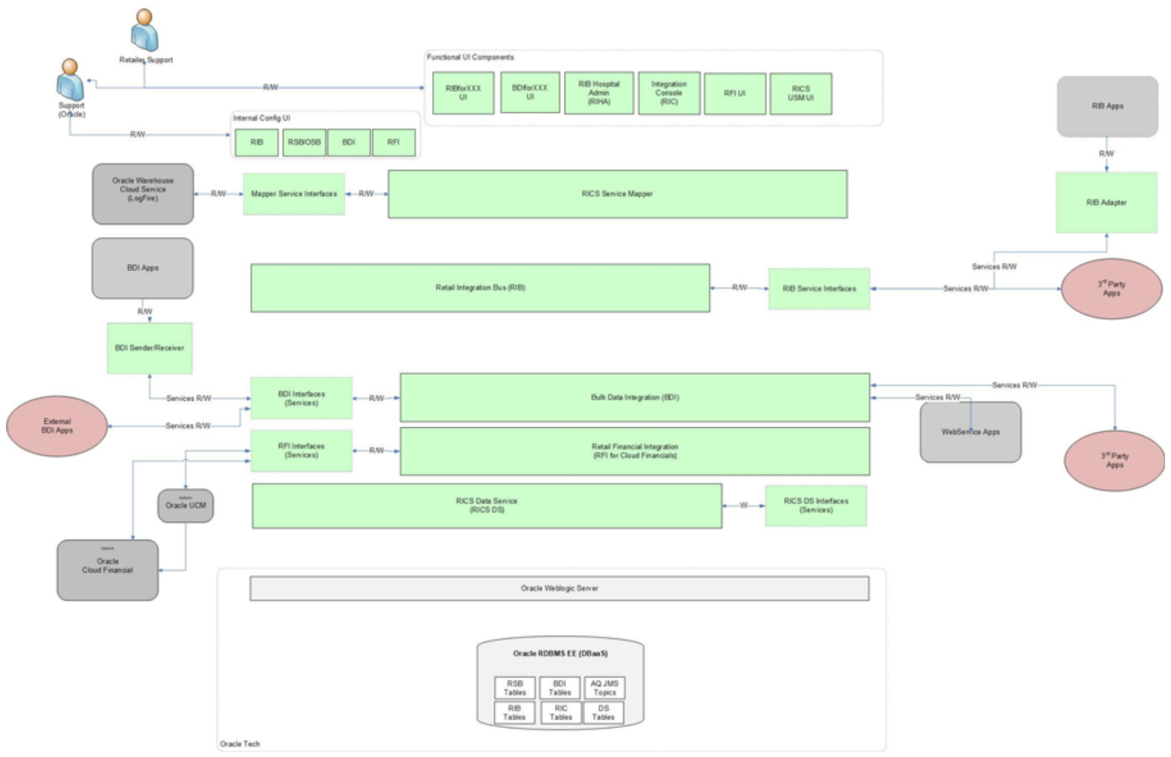
Note: All Integration Infrastructure products are fully cloud enabled and will be deployable as the Oracle Retail Integration Cloud Services and existing integration APIs work without modification for Cloud, Hybrid-Cloud and On-Premise installations.

As used in this document; RICS third party integrations is the common term used generically for any customer's custom legacy systems and/or customer purchased third party applications.

The list of these are as great as the customer list and RICS integration applications have evolved to make those integrations easier and to follow our contracts and integration styles by providing defined endpoints, guidelines, best practices, and support tooling.

Retail Integration Cloud Services Architecture

Figure 1–1 RICS Functional Architecture



2 Retail Integration Cloud Service Components

Retail Integration Bus (RIB)

The Retail Integration Bus (RIB) is a fire-and-forget, asynchronous messaging backbone and designed as a "Pub/Sub" JMS messaging architecture, with additional application functionality added such as intelligent transformation, routing and error handling.

The RIB has been designed, and proven to handle retail volumes of messages, typically millions during a Tier 1 -Tier 1+ retailer's business day.

The design and architecture of the RIB infrastructure and the Oracle Retail Applications API's are based on two key requirements driven by the Oracle Retail Application's Business process models.

- *Preservation of Publication Sequence*. The business event (message) must be delivered to all the subscribing applications in the order (FIFO) the business event (messages) was published by the publishing application.
- *Guaranteed Once-and-only-once Successful Delivery*. The RIB must preserve and persist all business events (messages) until all applications (Subscribers) have looked at the message and have successfully consumed it or decided they do not care about that event (message).

The RIB is designed as an asynchronous publication and subscription messaging integration architecture.

The RIB interfaces are organized by message family. Each message family contains information specific to a related set of operations on a business entity or related business entities. The publisher is responsible for publishing messages in response to actions performed on these business entities in the same sequence as they occur.

Each message family has specific message payloads based on agreed upon business elements between the Oracle Retail applications.

RIB-EXT

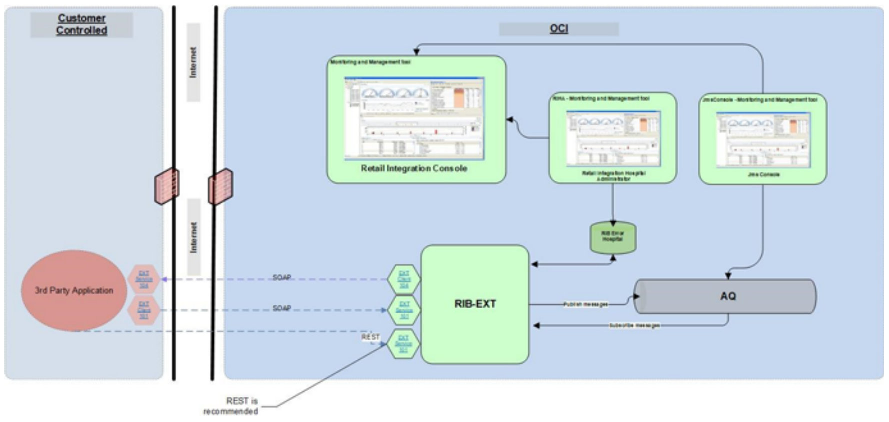
Third Party and Legacy Integration has been the corner stone of the Enterprise Integration components. To that end there are cloud focused enhancements to RIB; RIB-EXT and FileIO.

RIB-EXT completes the ability of the Integration Cloud Service to expose the RIB as REST and SOAP services to 3rd Party deployed on-prem or in other cloud deployments.

RIB-EXT is a deployment time configurable component that supports pub/sub to/from the RIB and an external application by exposing the RIB as SOAP services to Retail Applications and third party deployed on-premises or in other cloud deployments.

- RIB-EXT has all of the RIB flows available for the deployment time configuration based on the customer use cases.
- RIB-EXT configuration is performed based on the customers use cases for data to and from the RIB.

Figure 2–1 RIBforEXT Information Flow


Customer Controlled
OCI
Internet
Internet
Monitoring and Management tool
Retail Integration Console
RIHA - Monitoring and Management tool
Retail Integration Hospital Administrator
JmsConsole - Monitoring and Management tool
Jms Console
RIB Error Hospital
3rd Party Application
SOAP
SOAP
REST
RIB-EXT
AQ
Publish messages
Subscribe messages
REST is recommended

FILEIO

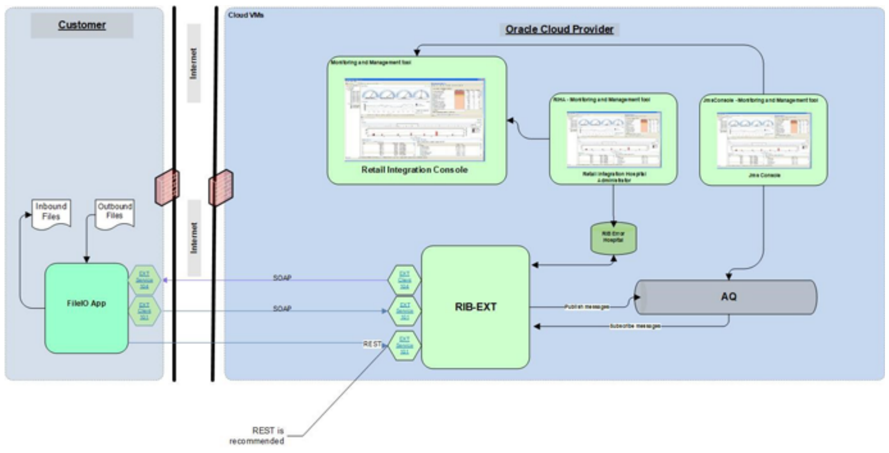
The FileIO app has been enhanced to fill a gap by exposing customer facing REST and SOAP Web Service APIs to FileIO that publishes and subscribes flat files to RIB-EXT that then pub/subs to the RIB's JMS.

FileIO works in conjunction with the RIB-EXT component. The RIB-EXT server side component exposes customer facing REST and SOAP Web Service APIs.

FileIO publishes or subscribes using flat files to RIB-EXT that then pub/subs to the RIB's JMS.

The files are not moved by ftp. RICS transmits the data via web services.

Figure 2–2 FILEIO Information Flow



Oracle Retail Bulk Data Infrastructure (BDI)

Batch (Bulk) data is still a predominant integration style within Oracle Retail and its customers. The movement of bulk data remains important because some work is best suited to being performed in bulk. Batch processing was there in the early days; it is still here today; and it will still be here tomorrow. What has changed is the approach to batch processing.

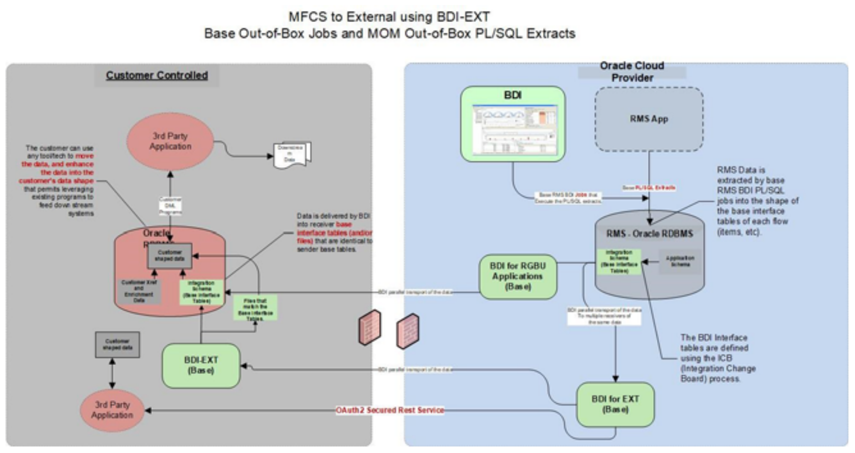
- BDI Architecture and Design is to be On-Premise and Hybrid Cloud ready.
  - Lightweight UI's and services provide full coverage and are both customer facing and operations facing.
- BDI Provides a fully service enabled, fault tolerant, concurrent, high throughput infrastructure
- BDI Transport layer moves data via services, not files.
- Provides integration job process scheduling and is fully instrumented to provide end-to-end visibility and re-startability.
- Automated restart recovery at a granular level.

BDI-EXT

BDI is an integration infrastructure product which can integrate Oracle Retail applications to third party applications. BDI external application is designed to address the complexities for third party integration with Oracle Retail application. In BDI, bulk data movement happens between sender and receiver application. External application can only be a receiver.

Please refer to the *Oracle Retail Bulk Data Integration Guide – Concepts* for the details

Figure 2–3 BDI Third Party Integrations


MFCS to External using BDI-EXT
Base Out-of-Box Jobs and MOM Out-of-Box PL/SQL Extracts
Customer Controlled
3rd Party Application
The customer can use any tool/tech to move the data, and enhance the data into the customer's data shape that permits leveraging existing programs to feed down stream systems
Oracle RDBMS
Customer shaped data
Customer Xref and Enrichment Data
Integration Schema (Base Interface Tables)
Files that match the Base Interface Tables.
Data is delivered by BDI into receiver base interface tables (and/or files) that are identical to sender base tables.
Customer shaped data
BDI-EXT (Base)
3rd Party Application
OAuth2 Secured Rest Service
Oracle Cloud Provider
BDI
RMS App
Base PL/SQL Extracts
RMS Data is extracted by base RMS BDI PL/SQL jobs into the shape of the base interface tables of each flow (items, etc).
RMS - Oracle RDBMS
Integration Schema (Base Interface Tables)
Application Schema
BDI for RGBU Applications (Base)
The BDI Interface tables are defined using the ICB (Integration Change Board) process.
BDI for EXT (Base)

The technology used by the sender application and the receiver application to extract and fill the interface tables and to upload the data from the interface tables is a decision made by each of the applications. There are templates and hooks provided to the application's teams to assist in development.

The BDI Infrastructure for each application is an application (BDIforApp) that is built and supplied by the integration team. There is one dedicated to each application and it is responsible for transforming the data to and from the BDI Transport to the integration interface tables or files that are transported to each of the configured receivers.

All BDI Infrastructure components are service enabled.

Installation Details

Please refer to the *Oracle Retail Bulk Data Integration Installation Guide* for the details.

Retail Financial Integration (RFI)

The Oracle Retail Financial Integration (RFI) for E-Business Suite (EBS) / PeopleSoft Financials / CFIN provides integration to a robust enterprise financial system to complement the Oracle Retail Merchandising system in a retail customer environment.

Retail Financial Integration (RFI) Products

On-Premise Merchandising to On-Premise Financial Applications

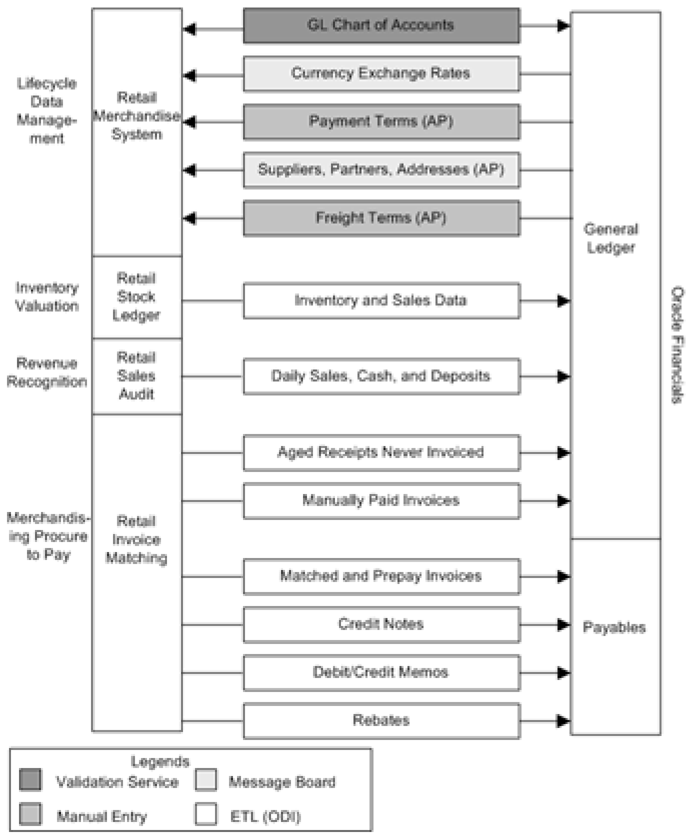
- RFI for PeopleSoft (On-premise)
- RFI for EBS (On-premise)

Merchandise Foundation Cloud Service (MFCS) to Financial Applications

- RFI for MFCS to On-Premise EBS
- RFI for MFCS to Oracle Cloud Financials

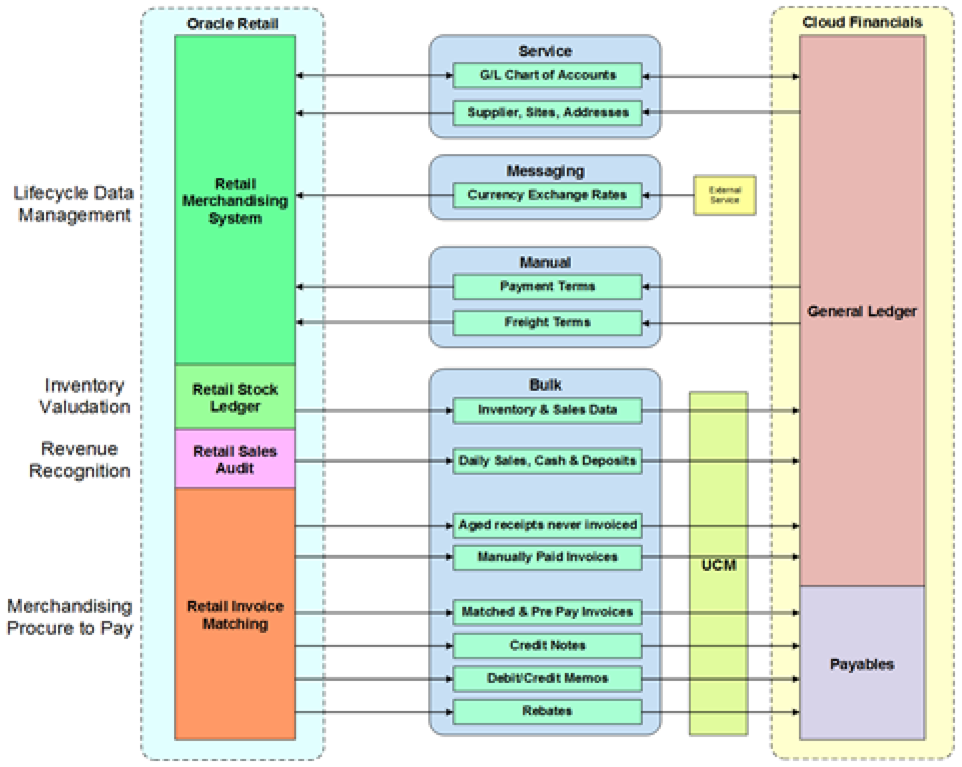
Oracle Retail To Financials Application (EBS/PeopleSoft) RFI Process Flow

Figure 2–4 Oracle Retail To Financials Application (EBS/PeopleSoft) RFI Process Flow



RFI for Oracle Cloud Financials

Figure 2–5 RFI for Oracle Cloud Financials



Universal Service Mapper (USM)

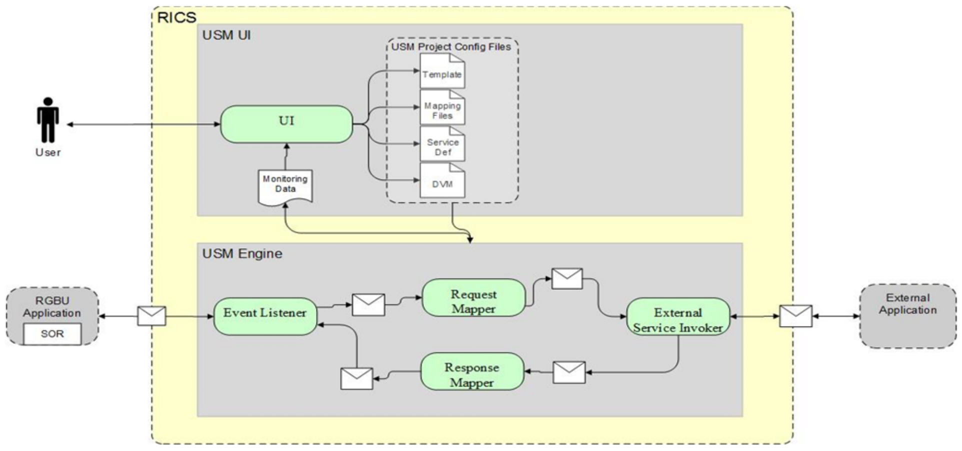
The Universal Service Mapper (USM) is an application component of Retail Integration Cloud Service (RICS) that allows the definition, mapping, and configurations needed to support the integration between two heterogeneous applications. Typically this would be an Oracle Retail Application such as RMS, found in the Merchandise Foundation Cloud Service, and an application external to Oracle Retail such as Oracle Warehouse Management CS.

RICS USM supports two of the styles of integration used within Oracle Retail; message-based and service-based as inputs. Within the RGBU applications the message-based flows are across the RIB. It is typical that external applications are predominately service-based so the output of USM is a call is to an external service.

Service calls from an external service are transformed to the correct style and format of the internal application.

The functional requirement for the USM is to act as the place to transform the Oracle Retail application data style and the data format into the data format expected by the external application, and then to perform the transformations of the external application's response.

Figure 2–6 USM Process Flow



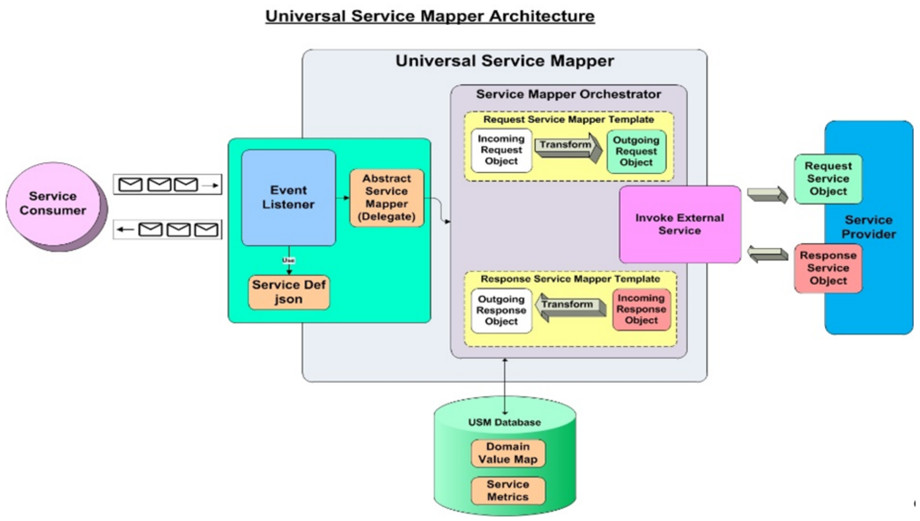
The USM User Interface provides the ability to create and manage Projects in USM and to view app statistics, metrics about the message flow and the system Logs

The USM Engine is the logic part of the system where the data is received from one application, mapped to other data and the mapped data is sent to other applications. Data is communicated through service calls.

- USM hosts all the necessary web-services that are required by both the participating sender and the receiver applications.
- USM has a configuration file of the service URLs to the participating applications.
- USM has templates that contains the mapping information, the code that does the mapping and other configuration files to make the application work.

USM Architecture

Figure 2–7 USM Architecture



Universal Service Mapper has three major components:

- Event Listener [Abstract Service Mapper, Service Def JSON]

- Service Mapper Orchestration [Orchestrator, Template and DVM]
- External Service Invocation and Service Provider

Event Listener

The Event listener is a service hosted by the USM application which is open to receiving data from any application that is connected to it. The application here is either RIB-LGF or WMS Cloud. The applications have the following URL pattern set in their target for USM.

http://<host>:<port>

When application sends data, the event listener internally calls the abstract service mapper which determines family, message type and the operation(s) from the message received by referring to the Service Def JSON file.

Service Mapper Orchestration

The abstract service mapper in turn now calls the Service mapper orchestrator which decides which what data is to be populated in the mapper templates. The orchestrator does the mapping, field by field, from the source application to destination application. Certain key-value pairs in the DVM in order to maintain context between the applications.

Service Provider and External Services

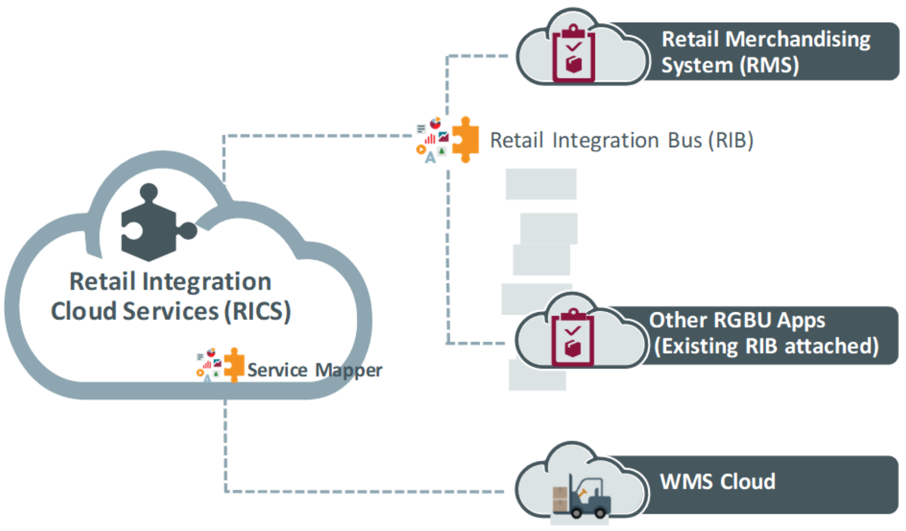
The Service Mapper Orchestrator calls the services hosted by the service providers after the mapping operations are completed. The service providers here are either RIB-LGF or WMS Cloud, which consume these services via USM. The calls are REST calls. USM holds the information necessary for it to call these services in a file with the prefix "external_env_json" for the respective application. These are stored as key-value pairs in JSON file

Oracle Warehouse Management CS (Logfire) Integration

Retail Integration Cloud Service (RICS) is used to integrate MFCS to Oracle Warehouse Management Cloud (WMS - LogFire).

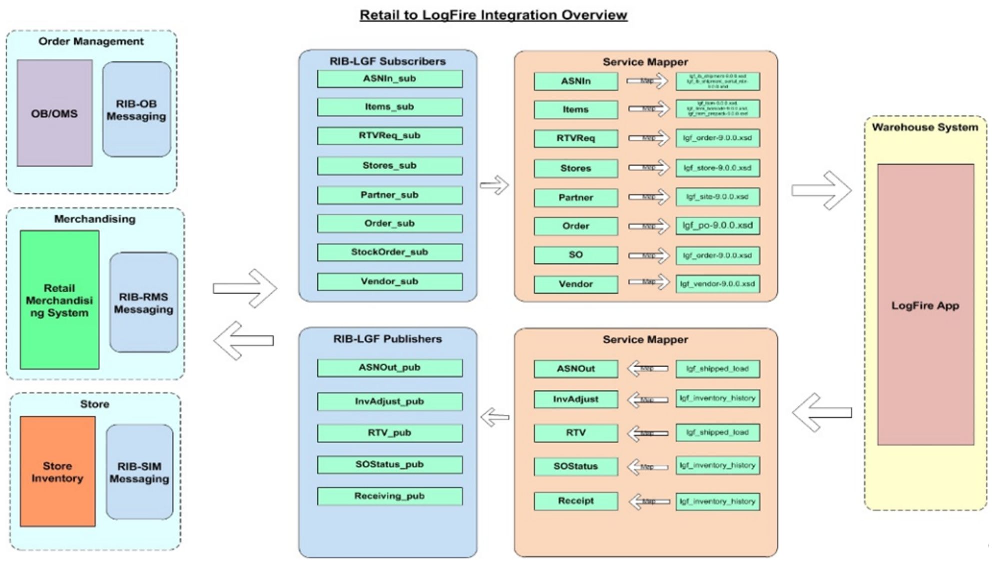
RICS uses Universal Service Mapper (USM) to perform the mappings required to connect RICS payloads/services to LogFire interfaces. USM is used to transform and manage the integration flows in both directions.

Figure 2–8 WMS-RICS Mappings


Retail Merchandising System (RMS)
Retail Integration Bus (RIB)
Retail Integration Cloud Services (RICS)
Service Mapper
Other RGBU Apps (Existing RIB attached)
WMS Cloud

RICS OWMS Integration Flows

Figure 2–9 Retail to LogFire Integration Overview



Pre-defined flows between Oracle WMS Cloud and Oracle Retail Applications.

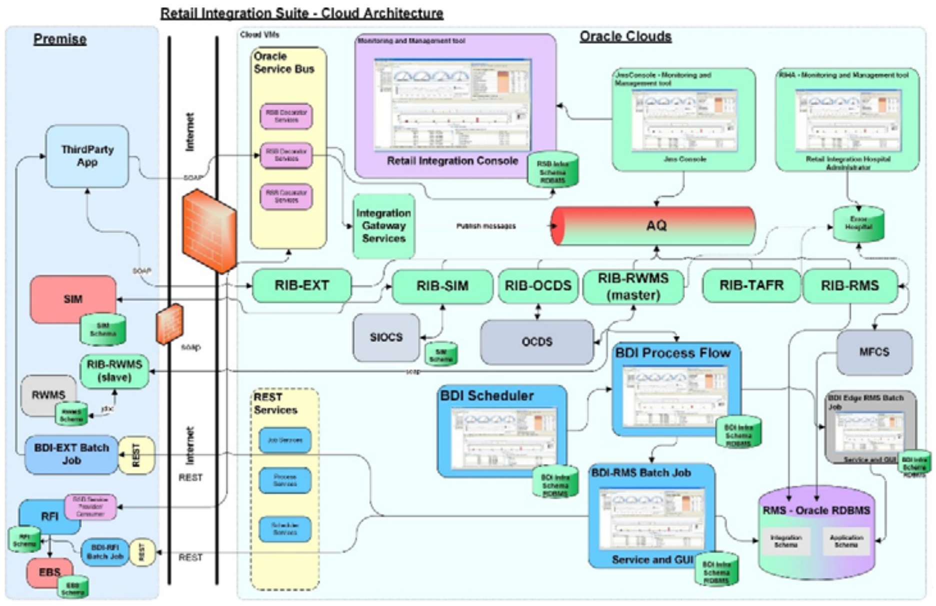
3 RICS Operations Support, Management, and Monitoring

RICS exposes UI's for the customer and for the Oracle Support Team that provide configuration and run time information as well as logs for operational insights and troubleshooting. This section introduces the primary tools.

Customer Access to RICS Operation

RICS is fully instrumented and exposes metrics via UI's for full operational visibility.

Figure 3–1 Customer Access to RICS Operation



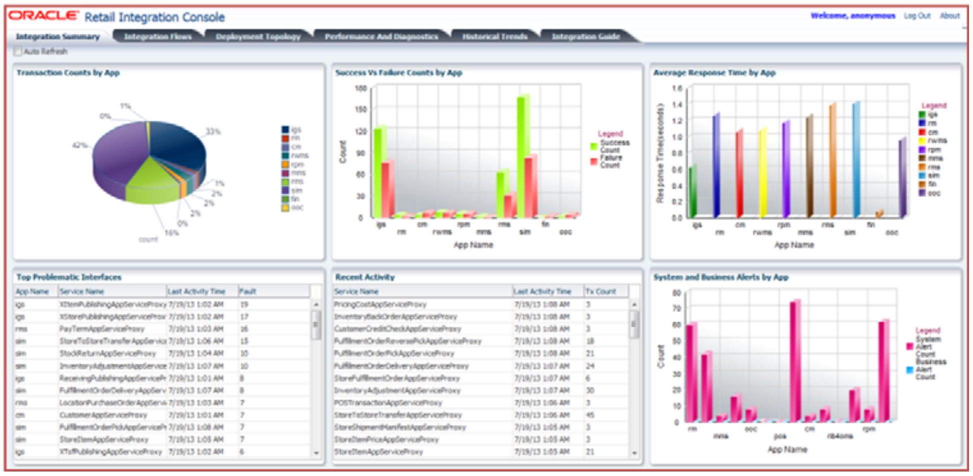
Retail Integration Console (RIC) Overview

RIC is the consolidated Enterprise Integration Monitoring tool and provides full visibility to the Oracle Retail Integration System in a unified view. The audiences for the tool are business analysts, operations people, and integration administrators.

Data is presented in graphical and tabular forms along with business context, so it is more easily understood by business analysts and technical personnel.

RIC directly integrates with the Integration Guide via contextual hyperlinks.

Figure 3–2 Retail Integration Console


ORACLE Retail Integration Console
Welcome, anonymous
Log Out
About
Integration Summary
Integration Flows
Deployment Topology
Performance And Diagnostics
Historical Trends
Integration Guide
Auto Refresh
Transaction Counts by App
Success Vs Failure Counts by App
Average Response Time by App
System and Business Alerts by App
App Name

Top Problematic Interfaces

App Name	Service Name	Last Activity Time	Fault
igs	XItemPublishingAppServiceProxy	7/19/13 1:02 AM	19
igs	XStorePublishingAppServiceProx	7/19/13 1:02 AM	17
rms	PayTermAppServiceProxy	7/19/13 1:03 AM	16
sim	StoreToStoreTransferAppServic	7/19/13 1:06 AM	15
sim	StockReturnAppServiceProxy	7/19/13 1:04 AM	10
sim	InventoryAdjustmentAppService	7/19/13 1:07 AM	10
igs	ReceivingPublishingAppServicePr	7/19/13 1:01 AM	8
sim	FulfillmentOrderDeliveryAppServ	7/19/13 1:07 AM	8
rms	LocationPurchaseOrderAppServi	7/19/13 1:03 AM	7
cm	CustomerAppServiceProxy	7/19/13 1:01 AM	7
sim	FulfillmentOrderPickAppServicePr	7/19/13 1:08 AM	7
sim	StoreItemAppServiceProxy	7/19/13 1:05 AM	7
igs	XTsfPublishingAppServiceProxy	7/19/13 1:02 AM	6

Recent Activity

Service Name	Last Activity Time	Tx Count
PricingCostAppServiceProxy	7/19/13 1:08 AM	3
InventoryBackOrderAppServiceProxy	7/19/13 1:08 AM	3
CustomerCreditCheckAppServiceProxy	7/19/13 1:08 AM	3
FulfillmentOrderReversePickAppServiceProxy	7/19/13 1:08 AM	18
FulfillmentOrderPickAppServiceProxy	7/19/13 1:08 AM	21
FulfillmentOrderDeliveryAppServiceProxy	7/19/13 1:07 AM	24
StoreFulfillmentOrderAppServiceProxy	7/19/13 1:07 AM	6
InventoryAdjustmentAppServiceProxy	7/19/13 1:07 AM	30
POSTransactionAppServiceProxy	7/19/13 1:06 AM	3
StoreToStoreTransferAppServiceProxy	7/19/13 1:06 AM	45
StoreShipmentManifestAppServiceProxy	7/19/13 1:05 AM	3
StoreItemPriceAppServiceProxy	7/19/13 1:05 AM	3
StoreItemAppServiceProxy	7/19/13 1:05 AM	21

JMS Console

The JMS Console is an administration tool to monitor and manage the RIB's JMS Servers.

Figure 3–3 JMS Console Architecture

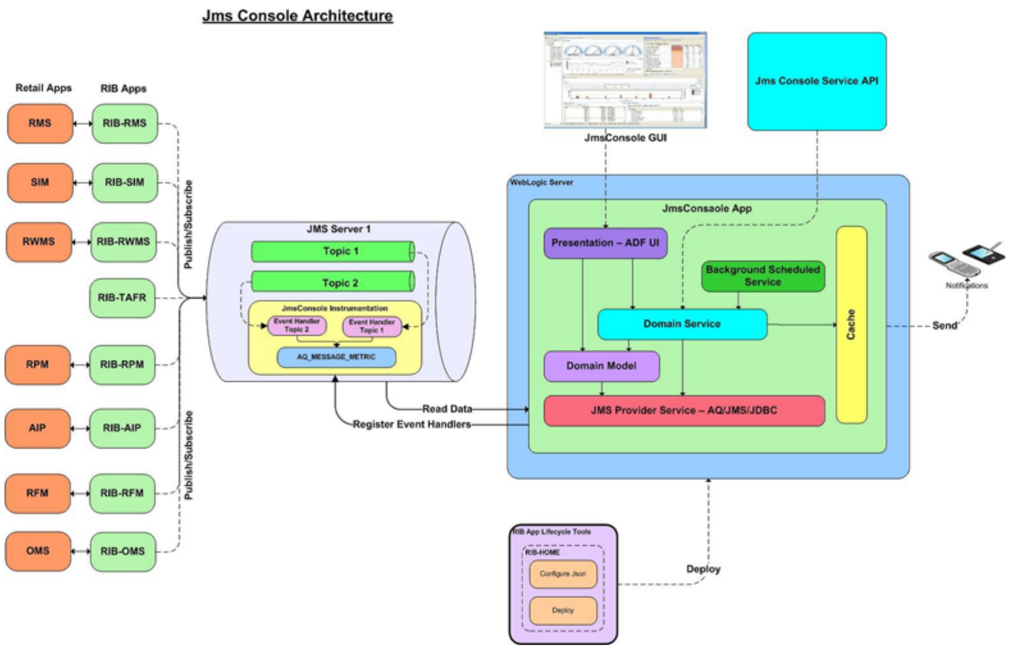
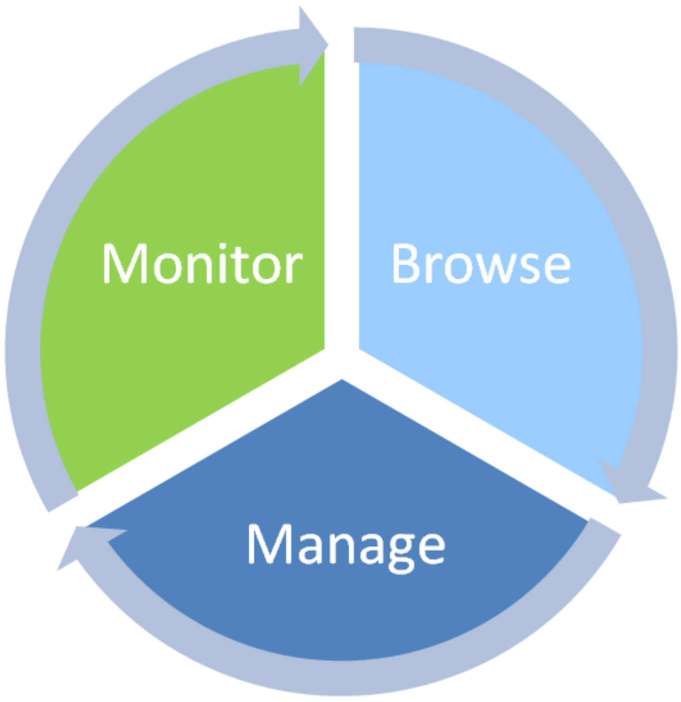


Figure 3–4 JMS Console Workflow

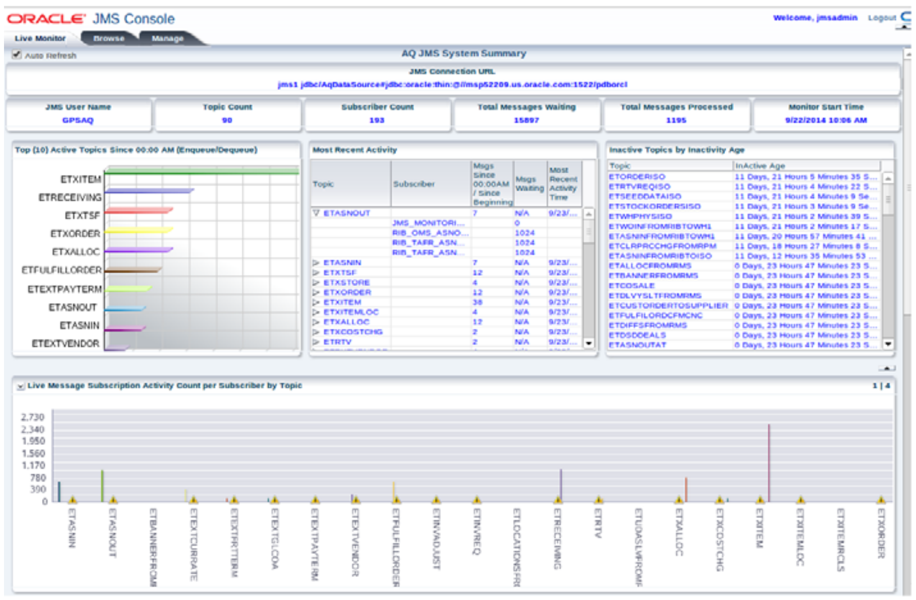


The JMS Admin provides an operational view point of RIB's JMS server.

- **Monitor** - Unattended view of the JMS system.
- **Browse** - Discover and Drill down into various aspects of the JMS Server.
- **Manage** - Provide JMS Server operation management functionality.

JMS Admin – Live Monitoring

Figure 3–5 JMS Console



AQ JMS System Summary

JMS Connection URL

jms1 jdbc/AqDataSource#jdbc:oracle:thin:@//msp52209.us.oracle.com:1522/pdborcl

JMS User Name	Topic Count	Subscriber Count	Total Messages Waiting	Total Messages Processed	Monitor Start Time
GPSAQ	90	193	15897	1195	9/22/2014 10:06 AM

Most Recent Activity

Topic	Subscriber	Msgs Since 00:00AM / Since Beginning	Msgs Waiting	Most Recent Activity Time
▽ ETASNOUT		7	N/A	9/23/...
	JMS_MONITORI...		0	
	RIB_OMS_ASNO...		1024	
	RIB_TAFR_ASN...		1024	
	RIB_TAFR_ASN...		1024	
▷ ETASNIN		7	N/A	9/23/...
▷ ETXTSF		12	N/A	9/23/...
▷ ETXSTORE		4	N/A	9/23/...
▷ ETXORDER		12	N/A	9/23/...
▷ ETXITEM		38	N/A	9/23/...
▷ ETXITEMLOC		4	N/A	9/23/...
▷ ETXALLOC		12	N/A	9/23/...
▷ ETXCOSTCHG		2	N/A	9/23/...
▷ ETRTV		2	N/A	9/23/...

Inactive Topics by Inactivity Age

Topic	InActive Age
ETORDERISO	11 Days, 21 Hours 5 Minutes 35 S...
ETRTVREQISO	11 Days, 21 Hours 4 Minutes 22 S...
ETSEEDDATAISO	11 Days, 21 Hours 4 Minutes 9 Se...
ETSTOCKORDERSISO	11 Days, 21 Hours 3 Minutes 9 Se...
ETWHPHYSISO	11 Days, 21 Hours 2 Minutes 39 S...
ETWOINFROMRIBTOWH1	11 Days, 21 Hours 2 Minutes 17 S...
ETASNINFROMRIBTOWH1	11 Days, 20 Hours 57 Minutes 41 ...
ETCLRPRCCHGFROMRPM	11 Days, 18 Hours 27 Minutes 8 S...
ETASNINFROMRIBTOISO	11 Days, 12 Hours 35 Minutes 53 ...
ETALLOCFROMRMS	0 Days, 23 Hours 47 Minutes 23 S...
ETBANNERFROMRMS	0 Days, 23 Hours 47 Minutes 23 S...
ETCOSALE	0 Days, 23 Hours 47 Minutes 23 S...
ETDLVYSLTFROMRMS	0 Days, 23 Hours 47 Minutes 23 S...
ETCUSTORDERTOSUPPLIER	0 Days, 23 Hours 47 Minutes 23 S...
ETFULFILORDCFMCNC	0 Days, 23 Hours 47 Minutes 23 S...
ETDIFFSFROMRMS	0 Days, 23 Hours 47 Minutes 23 S...
ETDSDDEALS	0 Days, 23 Hours 47 Minutes 23 S...
ETASNOUTAT	0 Days, 23 Hours 47 Minutes 23 S...

The Live Monitor tab is the landing page of the JMS Console Application. It provides an unattended high-level view of the JMS Server.

Live Monitoring also provides

- Current message volume information.
- Provides most recent activity details.
- Identify problematic JMS topics and bring to user notice.
- Display a full view of all message activities on all topics.
- Generate alerts based on set thresholds.
- Show visual clues on problematic topics.
- Gives an aggregated view of the system.

The Browse and Manage Tabs provide more specific data metrics and ability to manage messages on the JMS topics.

JMS Browse

The Browse Tab allows you to discover and drill into the internals of JMS Servers.

- Discover all topics and get a listing of them from the server.
- Drill into each topic and discover all subscribers.
- Drill into each subscriber and get message count information.
- Browse message content inside JMS server
- Browse message headers inside JMS server

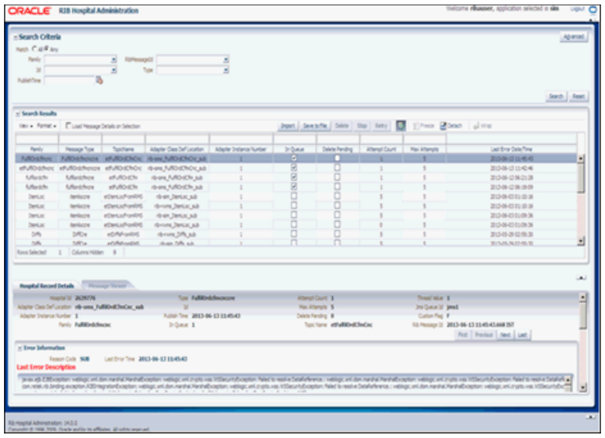
JMS Manage

The Manage tab allows you to interact with the JMS server with some core messaging system functionality.

- Publish messages to JMS topics easily
- Dump messages to files from topics
- Drain messages from topics
- Configure preference for threshold and alerts

RIB Hospital Administrator (RIHA)

Figure 3–6   RIB Hospital Administrator



Oracle Retail Integration Bus Hospital Administration or RIB Hospital Administration (RIHA) is a tool to manage RIB messages in the RIB hospital error tables.

RIHA can search for hospital records, stop a message from being retried, retry a message for which maximum system-set retries have been tried, and delete a message from the tables. RIHA can insert new records into Hospital tables. You can also update existing Hospital records and message payloads.

Using RIHA is the recommended way to perform all RIB Hospital error table operations.

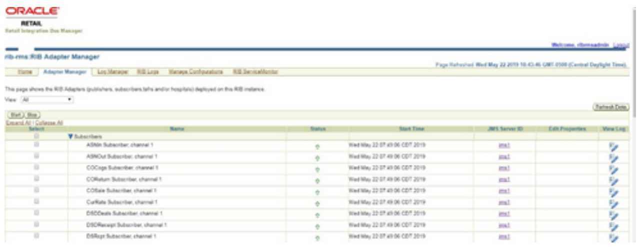
RIHA Operations

- Delete a Message
- Stop a Message
- Retry a Message
- View and Edit a Message
- Save a Message Locally
- Import a New Hospital Record to Hospital Tables
- Update an Existing Hospital Record

RIBForXXX Administrator User Interface

Each of the RIB components (RIB-RMS, RIB-LGF, and so on) has its own UI that exposes run-time and configuration details. The Administrator UI provides operations to turn on or off RIB adapters, control logging levels and to see logs.

Figure 3–7 RIBForXXX Administrator User Interface



rib-rms:RIB Adapter Manager

Page Refreshed Wed May 22 2019 10:43:46 GMT-0500 (Central Daylight Time).

This page shows the RIB Adapters (publishers, subscribers tafrs and/or hospitals) deployed on this RIB instance.

View: All

Select	Name	Status	Start Time	JMS Server ID	Edit Properties	View Log
☐	▼ Subscribers					
☐	ASNIn Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎
☐	ASNOut Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎
☐	COCogs Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎
☐	COReturn Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎
☐	COSale Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎
☐	CurRate Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎
☐	DSDDeals Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎
☐	DSDReceipt Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎
☐	DSRcpt Subscriber, channel 1	↑	Wed May 22 07:49:06 CDT 2019	jms1		✎

4 Implementing RIB-EXT

RIB-EXT is an Oracle Retail Integration Application that provides necessary communication channel for external applications to publish and consume message from RIB's JMS on cloud and premise.

> **Note:** For more information on WDSL's, see the *Oracle Retail Cloud Service Integration Guide* and for information on plugable jar, see the Client Connector For Oracle Retail Integration Cloud Service 21.0.000 (Patch) available on My Oracle Support.

External Application as a Publisher (soap-app)

For external applications to publish to the RIB JMS on cloud, it needs to use a publishing webservice provided by rib-ext .The WSDL URL of publishing service is as follows:

http://<rib-ext-host>:<port>/ApplicationMessagePublishingServiceBean/ApplicationMessagePublishingService?wsdl

An external application can publish messages using the above webservice only when rib-ext is configured as a soap-app.

External Application as a Subscriber (soap-app)

For an external application to consume the message from the RIB's JMS on cloud, it has to host the Injector Service. Injector Service is a SOAP webservice that is made available as a pluggable jar.

Subscriber adapters in rib-ext makes a SOAP call to Injector service to send the message to the external application. The WSDL URL of injector service is as follows:

http://<external-app-host>:<port>/ApplicationMessageInjectorBean/InjectorService?wsdl

The following example describes the steps to configure an external application to publish and subscribe using RIB on cloud:

- Include rib-private-app-plugin-21.0.000.jar in to the external application deployable file for example, ext-app.ear/lib.
- In the rib-deployment-env-info.xml file, configure the EXT application to be of type "soap-app". Under <app-in-scope-for-integration>, change EXT from javaee-app to soap-app:

  <app id="ext" type="soap-app" />

- Replace the existing rib-app section for rib-ext with a copy of the rib-app section for rib-sim (an existing soap-app). Edit the properties so that they apply for rib-ext.

  For example:

```
<rib-app id="rib-ext" type="soap-app">
<deploy-in refid="rib-ext-wls1" />
<rib-admin-gui><message-flow id="901">
<web-app-url>https://www.example.com:<port>/rib-ext-appserver-gui/index.jsp</we
b-app-url>
<web-app-user-alias>rib-ext_rib-admin-gui_ user-name-alias</web-app-user-alias>
</rib-admin-gui>
<error-hospital-database>
<hosp-user-alias>rib-ext_error-hospital-database_
user-name-alias</hosp-user-alias>
</error-hospital-database>
<app-database-not-applicable />
<notifications>
<email>
<email-server-host>mail.example.com</email-server-host>
<email-server-port>25</email-server-port>
<from-address>admin@example.com</from-address>
<to-address-list>admin@example.com</to-address-list>
</email>
<jmx />
</notifications>
<app id="ext" type="soap-app">
<end-point>
<url>https://www.example.com:<port>/ApplicationMessageInjectorBean/InjectorServ
ice?WSDL</url>
<ws-policy-name>policyA</ws-policy-name>
<user-alias>rib-ext_ws_security_user-name-alias</user-alias>
</end-point>
</app>
</rib-app>
```

- ws-policy-name should be configured with a value "policyA".
- Make sure the rib-ext_ws_security_user-name-alias user is a member of the ext_integration_users group in the EXT WebLogic domain. Make sure the EXT services are up and running and can be called via the SOAP UI using the credentials that will be entered during RIB compilation.
- Compile and deploy RIB.

External Application as a Publisher (rest-app)

For external applications to publish to the RIB JMS on cloud, it needs to use a publishing webservice provided by rib-ext. The end point of publishing service is as follows:

Table 4–1 APIs and Rest End Points

API	Rest End Point
Application WADL	http://<rib-ext-host>:<port>/rib-<app>-services-web/resources/application.wadl
Ping resource	http://<rib-ext-host>:<port>/rib-<app>-services-web/resources/publisher/ping

Table 4–1 (Cont.) APIs and Rest End Points

API	Rest End Point
Publish resource	http://<rib-ext-host>:<port>/rib-<app>-services-web/resources/publisher/publish

An external application can publish messages using the above webservice only when rib-ext is configured as a rest-app.

External Application as a Subscriber (rest-app)

For an external application to consume the message from the RIB's JMS on cloud, it has to host the Injector Service. Injector Service is a ReST webservice that is made available as a pluggable jar.

Subscriber adapters in rib-ext makes a ReST call to Injector service to send the message to the external application. The End Point of injector service is as follows:

```
http://<external-app-host>:<port>/
rib-injector-services-web/resources/injector/inject
```

The following example describes the steps to configure an external application to publish and subscribe using RIB on cloud:

- n Include rib-injector-services-web-21.0.000.war in to the external application deployable file for example, ext-app.ear/lib.
- n In the rib-deployment-env-info.xml file, configure the EXT application to be of type "rest-app". Under <app-in-scope-for-integration>, change EXT from javaee-app to rest-app:
- n Replace the existing rib-app section for rib-ext with a copy of the rib-app section for rib-rce (an existing rest-app). Edit the properties so that they apply for rib-ext.

  For example:

```
<rib-app id="rib-ext" type="rest-app">
  <deploy-in refid="rib-ext-wls1" />
  <rib-admin-gui><message-flow id="901">
    <web-app-url>https://www.example.com:<port>/rib-ext-appserver-
gui/index.jsp</web-app-url>
    <web-app-user-alias>rib-ext_rib-admin-gui_
user-name-alias</web-app-user-alias>
  </rib-admin-gui>
  <error-hospital-database>

    <hosp-user-alias>rib-ext_error-hospital-database_
user-name-alias</hosp-user-alias>
  </error-hospital-database>
  <app-database-not-applicable />
  <notifications>
    <email>
      <email-server-host>mail.example.com</email-server-host>
      <email-server-port>25</email-server-port>
      <from-address>admin@example.com</from-address>
      <to-address-list>admin@example.com</to-address-list>
    </email>
    <jmx />
  </notifications>
  <app id="ext" type="rest-app">
    <end-point>
```

```
      <url>https://www.example.com:<port>/rib-injector-services-
web/resources/injector/inject" </url>
      <ws-policy-name>policyA</ws-policy-name>
      <user-alias>rib-ext_ws_security_user-name-alias</user-alias>
    </end-point>
  </app>
</rib-app>
```

- ws-policy-name should be configured with a value "policyA".
- Make sure the rib-ext_ws_security_user-name-alias user is a member of the ext_ integration_users group in the EXT WebLogic domain. Make sure the EXT services are up and running and can be called via the SOAP UI using the credentials that will be entered during RIB compilation.
- Compile and deploy RIB.

How to implement ReST Client to Call the Publisher Service

In order to publish messages to RIB via ReST service, a standard JAX-RS client API can be used. We provide a few helper libraries and payload jars (RBO contracts) packaged inside RibExtConnectorServiceImplPak21.0.000_eng_ga.zip to be used on the classpath of a client application. In other words, these libraries should be packaged as part of the application war/ear file.

Required Libraries are as below.

- application-message-publishing-service-consumer-21.0.000.jar
- commons-logging-1.2.jar
- rib-public-api-21.0.000.jar
- retail-private-int-common-util-21.0.000.jar
- retail-public-payload-java-beans-21.0.000.jar
- retail-public-payload-java-beans-base-21.0.000.jar
- retail-rest-service-common-util-21.0.000.jar
- rib-private-common-21.0.000.jar

The following table contains the publisher ReST service endpoint (pattern) exposed by rib-ext for a client to hook to:

Table 4–2 APIs and URLs

API Info	URL
Application WADL	http://<examplehost>:<port>/rib-<app>-services-web/resources/application.wadl
Ping resource	http://<examplehost>:<port>/rib-<app>-services-web/resources/publisher/ping
Publish resource	http://<examplehost>:<port>/rib-<app>-services-web/resources/publisher/publish

See Rest Publisher Pseudo Code for sample code.

How to Implement Injector Service (CONSUME messages from RIB) using ReST

Here is the Rest service contract detail:

1. Keep the path as Injector/inject.

   ```
   @Path("/injector")
   ```

2. Use POST for this service. As the input message object itself has identifier (message type- CRE/MOD) they don't need to use the PUT/PATCH. they can use message type to build the implementation logic.

   ```
   @POST
   @Path("/inject")
   @Consumes({MediaType.APPLICATION_XML})
   ```

3. The input would be MediaType.APPLICATION_XML and the structure would be 'ApplicationMessage' object. (See Appendix A, "Sample Files" xsd).

   ```
   <xs:element name="ApplicationMessage">
     <xs:complexType>
       <xs:sequence>
         <xs:element name="family" type="string25"/>
         <xs:element name="type" type="string30"/>
         <xs:element name="businessObjectId" type="string255" minOccurs="0"/>
         <xs:element ref="ApplicationMessageRoutingInfo" minOccurs="0"
   maxOccurs="unbounded"/>
         <xs:element name="payloadXml" type="xs:string"/>
       </xs:sequence>
     </xs:complexType>
   </xs:element>
   ```

4. Customer can utilize the payload.properties file for validation of message family and type. (See Appendix A, "Sample Files" for sample payload.properties)

5. Return type should be JSON, see below example:

   ```
   String message = "{\"message\": \"Inject successful.\"}";
   return Response.ok(message, MediaType.APPLICATION_JSON).build();
   ```

   For exception response customer needs to follow the structure of exceptionVO.

   ```
   public class ExceptionVo
   {
       public String getStatus()
       {
           return status;
       }
       public void setStatus(String status)
       {
           this.status = status;
       }
       public String getMessage()
       {
           return message;
       }
       public void setMessage(String message)
       {
           this.message = message;
       }
       public String getStackTrace()
       {
           return stackTrace;
       }
       public void setStackTrace(String stackTrace)
       {
   ```

```
        this.stackTrace = stackTrace;
    }
    public int getStatusCode()
    {
        return statusCode;
    }
    public void setStatusCode(int statusCode)
    {
        this.statusCode = statusCode;
    }
    public ExceptionVo(int statusCode, String status, String message, String
stackTrace)
    {
        this.statusCode = statusCode;
        this.status = status;
        this.message = message;
        this.stackTrace = stackTrace;
    }
    public ExceptionVo()
    {
    }
    public String toString()
    {
        return (new
StringBuilder()).append("ExceptionVo{statusCode=").append(statusCode).append(",
status=").append(status).append(", message=").append(message).append(",
stackTrace=").append(stackTrace).append('}').toString();
    }
    int statusCode;
    String status;
    String message;
    String stackTrace;
}
```

See Appendix A, "Sample Files"Appendix for sample files (application.wadl, Resource file, Sample request/response etc.).

Note: A Reference implementation for injector service is provided, See Reference Implementation of Injector Service Using Tomcat for details.

Error Handling

The RIB infrastructure provides a mechanism called RIB error hospital to handle and manage the error messages. When the publishing or subscription of a message fails in the rib-ext for some reason, it lands in error hospital with a reason code. The retry adapters in the rib-ext application are responsible for retrying the messages in error hospital.

Oracle RIB Hospital Administration (RIHA) is a Weblogic application that allows the management of messages in error hospital. Some of the RIHA operations include:

- Viewing error messages
- Editing error messages
- Retrying error messages
- Stopping error messages

For more information, see the *Oracle Retail Integration Bus Hospital Administration Guide*.

5 Reference Implementation of Injector Service Using Tomcat

Introduction

For an external application to consume the message from the RIB's JMS on cloud, it has to host the Injector Service. Subscriber adapters in rib-ext makes a ReST call to Injector service to send the message to the external application. This document contains detailed information that can be used for implementing Rest inject service.

Note: Tomcat is the certified application server here but provided injector service war should work on any standard app server.

Important Notes

- Provided rib-injector-service war (inside RibExtConnectorServiceIm-plPak21.0.000_eng_ga.zip) runs on tomcat and has all the dependencies for rib in order to consume the message as individual application using RIB-EXT flow.
- No container-managed transaction capability is required.
- Authentication and authorization will be adjusted by the consuming application by editing web.xml to match their own requirements.
- rib-injector-services-light-web war works as an standalone utility, this war is provided as a reference implementation for injector service. After the war is deployed, injector service will be made available as ReST End Point. Service contract WADL should be accessible at http://<app-host>:<port>/rib-injector-services-web/resources/application.wadl.
- This pluggable war can be added in to the external application deployable file (for example, ext-app.ear/lib). After deployment, Injector service should be available for access at the following:

  http://<external-app-host>:<port>/rib-injector-services-web/resources/injector/inject
- The customer can choose to write their own injector service implementation without using rib-injector-services war as long as they adhere to the service contract for Injector. Detailed information is documented in How to Implement Injector Service (CONSUME messages from RIB) using ReST.

- The external application has to write their own implementation logic for the injectors. However, an implementation jar (injector-sample-impl-21.1.000.jar) is provided for reference. Customers can write custom implementation logic inside injector-sample-impl-21.1.000.jar or can choose to implement on their own.

Step-by-step guide for testing rib-injector-service war on Tomcat

1. Copy jersey jars into <tomcat>/lib folder. App server used here is tomcat which is a web container and doesn't have Jersey libraries packaged inside. In case of full stack Java EE app server such as weblogic this step is not required.

```
cp <ribExtConnectorPak>/Rest-Injector/rib-injector-services-web/jersey-jars
<tomcat>/lib
```

Note: Jersey jars are packaged inside zip.

Note: Jars packaged here are for reference purpose. You may use different versions of Jersey jars that may be compatible with external application.

Note: application-messages-bo-21.0.000.jar is added with jersey zip in order to make this available inside <tomcat>/lib. This jar contains request/response business object and is needed for injector service to work.

2. Edit <tomcat>/conf/tomcat-users.xml to add the IntegrationRole and users. Only the users with 'IntegrationRole' have access to inject service.

```
<role rolename="IntegrationRole"/>
    <user password="tomcat1" roles="manager-script,admin,IntegrationRole"
username="tomcat"/>
```

3. Deploy the rib-injector-services-light-web-21.1.000.war into tomcat by using the following command.

Note: Change the name to remove the version number and the word light.

```
cp rib-injector-services-light-web-21.1.000.war
<tomcat>/webapps/rib-injector-services-web.war
```

4. Start the application if not already started.
5. Copy injector-sample-impl-21.1.000.jar inside <tomcat-apache>\webapps\rib-injector-services-web\WEB-INF\lib
6. Test ping. Ping should return response as "Got hello from server.".

```
  curl -ivl4 --user tomcat:tomcat1
http://localhost:8080/rib-injector-services-web/resources/injector/ping
```

7. Test inject call using a sample payload data. Create a file called app-message.data with the con-tent as follows.

```
<ApplicationMessage
xmlns="http://www.oracle.com/retail/integration/rib/ApplicationMessages/v1"><fa
```

```
mily>WH</family><type>WHCRE</type><payloadXml>&lt;WHDesc
xmlns=&quot;http://www.oracle.com/retail/integration/base/bo/WHDesc/v1&quot;&lt
;wh&gt;10&lt;/wh&gt;&lt;wh_name&gt;g&lt;/wh_
name&gt;&lt;/WHDesc&gt;</payloadXml></ApplicationMessage>
```

8. Call inject with the above (app-message.data) data. For a successful inject call, response should be "Inject successful." With the implementation jar provided here, message will get written to log.

```
curl -ivl4 --user tomcat:tomcat1 -H 'Content-Type: application/xml' -d
@app-message.data
http://localhost:8080/rib-injector-services-web/resources/injector/inject
```

Approach for Writing Custom Implementation for Injectors

injector-sample-impl-21.1.000.jar is provided as reference implementation for injector service however customer can choose to write their own custom implementation logic. Steps listed here will help customer to write their own injector classes.

1. To start with implementation, create a file with name injectors.xml. This file contains mapping for the injector implementation class, which will be looked for the given family and msgType. InjectorFactory looks for the injectors.xml, this should be present in classpath. Look at injec-tor-sample-impl-21.1.000.jar/retail/injectors.xml for reference.

   Sample Code: For Diffs family and DiffCre message type, injector implementation class is Diffs

```
<injector_config>
<family name="Diffs">
<injector class="oracle.retail.rib.javaee.api.stubs.injector.file.impl.Diffs">
<type>DIFFCRE</type>
</injector>
<injector class="oracle.retail.rib.javaee.api.stubs.injector.file.impl.Diffs">
<type>DIFFDEL</type>
</injector>
<injector class="oracle.retail.rib.javaee.api.stubs.injector.file.impl.Diffs">
<type>DIFFMOD</type>
</injector>
</family>
..
.
</injector_config>
```

2. In the given jar, all the injectors class extends SampleInjector. This is the class where logic for handling the payload will be written. You can write your own implementation class and Diffs can extend that class.

   Sample Code:

```
public final class Diffs extends SampleInjector{
..
}
```

3. Custom Implementation class should implement injector interface (contract for inject method).

   Sample code:

```
import oracle.retail.rib.common.exception.RetailBusinessException;
import oracle.retail.rib.common.exception.RetailSystemException;
import com.oracle.retail.integration.payload.Payload;
import com.retek.rib.binding.injector.Injector;
public class SampleInjector implements Injector {


// dummy impl for Injector
public void inject(String type, Payload payload)
throws RetailBusinessException, RetailSystemException {
// Write logic here
System.out.println("Inject executed successfully...");
LOG.info("Inject executed successfully...");
}
}
```

4. Copy custom implementation jar in-side <tomcat-apache>\webapps\rib-injector-services-web\WEB-INF\lib for it to work.

6
Implementing BDI-EXT

BDI External Job Admin as Receiver

For example, sender application is RMS and receiver is a third party application. There will be external application for the integration to happen as External edge application. External edge application organizes all the importer jobs. Ex-ternal edge application provides GUI and CLI tool to manage jobs like start/stop/restart jobs.

The External Importer Job imports data set for an Interface Module from Inbound Interface Tables into application specific transactional tables. Importer jobs are application specific jobs.

External Importer Job

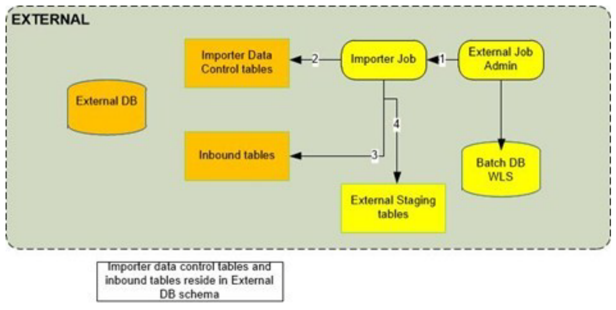
The tables BDI_IMPRTR_IFACE_MOD_DATA_CTL and BDI_IMPORTER_IFACE_DATA_CTL act as a handshake between the receiver service and importer jobs. When the Receiver Service completes processing a data set successfully, it creates an entry in these ta-bles.

An entry in the table BDI_IMPRTR_IFACE_MOD_DATA_CTL indicates to the

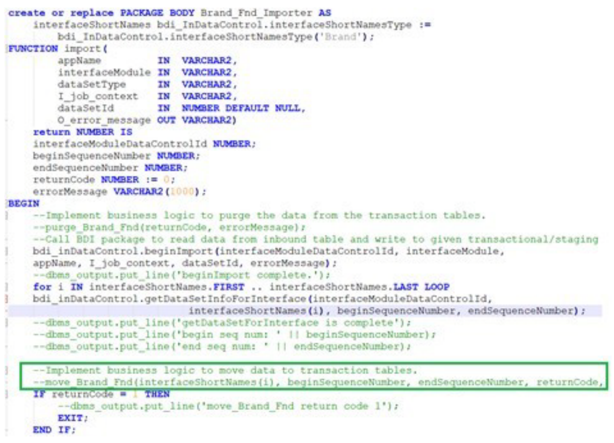
Importer Job that a data set is ready to be imported.

The Importer job imports a data set for an Interface Module from inbound tables into application specific transactional tables. Importer jobs are application (for example SIM/RPAS/EXTERNAL) specific jobs. It uses the Importer Data Control Tables to identify whether a data set is ready for import or not.

Figure 6–1 External importer Job


EXTERNAL
Importer Data Control tables
2
Importer Job
1
External Job Admin
External DB
4
Inbound tables
3
Batch DB WLS
External Staging tables
Importer data control tables and inbound tables reside in External DB schema

For each required interface, implement the logic in the "import" function of the "<Inter-faceModule_Name>_Importer_Body.sql" file as in the indicated section below. The sql file is located in <bdi-edge-external-job-home>/setup-data/ddl/ folder.



```
create or replace PACKAGE BODY Brand_Fnd_Importer AS
    interfaceShortNames bdi_InDataControl.interfaceShortNamesType :=
        bdi_InDataControl.interfaceShortNamesType('Brand');
FUNCTION import(
        appName         IN  VARCHAR2,
        interfaceModule IN  VARCHAR2,
        dataSetType     IN  VARCHAR2,
        I_job_context   IN  VARCHAR2,
        dataSetId       IN  NUMBER DEFAULT NULL,
        O_error_message OUT VARCHAR2)
    return NUMBER IS
    interfaceModuleDataControlId NUMBER;
    beginSequenceNumber NUMBER;
    endSequenceNumber NUMBER;
    returnCode NUMBER := 0;
    errorMessage VARCHAR2(1000);
BEGIN
    --Implement business logic to purge the data from the transaction tables.
    --purge_Brand_Fnd(returnCode, errorMessage);
    --Call BDI package to read data from inbound table and write to given transactional/staging
    bdi_inDataControl.beginImport(interfaceModuleDataControlId, interfaceModule,
    appName, I_job_context, dataSetId, errorMessage);
    --dbms_output.put_line('beginImport complete.');
    for i IN interfaceShortNames.FIRST .. interfaceShortNames.LAST LOOP
    bdi_inDataControl.getDataSetInfoForInterface(interfaceModuleDataControlId,
                            interfaceShortNames(i), beginSequenceNumber, endSequenceNumber);
    --dbms_output.put_line('getDataSetForInterface is complete');
    --dbms_output.put_line('begin seq num: ' || beginSequenceNumber);
    --dbms_output.put_line('end seq num: ' || endSequenceNumber);

    --Implement business logic to move data to transaction tables.
    --move_Brand_Fnd(interfaceShortNames(i), beginSequenceNumber, endSequenceNumber, returnCode,
    IF returnCode = 1 THEN
        --dbms_output.put_line('move_Brand_Fnd return code 1');
        EXIT;
    END IF;
```

External Importer

1. Importer job is run from App B EXTERNAL Job Admin application through REST or UI.
2. Importer job checks for data sets in importer data control tables.
3. If data set is available for import, importer job downloads data from inbound table.
4. Importer job loads data to App B EXTERNAL staging tables.

Configure External Job Admin as Receiver in the Process Flow

System options properties in bdi-process-flow-admin-deployment-env-info.json allow you to configure the available destination apps and appsInScope.

allAvailableDestinationApps property mentions all the applications available as destination.

The appsInScope property mentions the applications that are in scope. Add an external application in the appsInScope property to make it available as a receiver.

```
"SystemOptions":[
{"name":"allAvailableDestinationApps", "value": "SIM, RPAS, EXTERNAL, OCDS, RFI,
RMS"},
{"name":"appsInScope", "value": "SIM, RPAS, OCDS, RFI, EXTERNAL"}
```

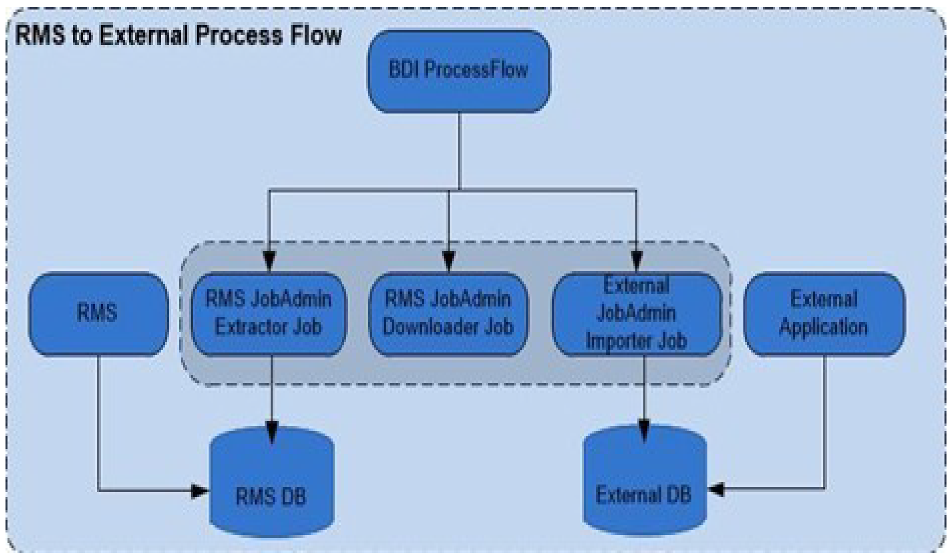
External BDI Process Flow

A process flow is a generic concept and is not limited to BDI. However all the

out-of-box process flows are for data transfers from a retail application to one or more retail applications.

There are process flow dsl files for each interface from RMS to external and External to other applications which have all the activities for the particular interface as depicted in below pictures. Scheduler will trigger the process flow to execute the activities within the dsl file. Process flows are available out of box to move data end to end. The only thing to implement is extractor or importer packages or both.

Figure 6–2 Merchandising to External Process Flow


RMS to External Process Flow
BDI ProcessFlow
RMS
RMS JobAdmin Extractor Job
RMS JobAdmin Downloader Job
External JobAdmin Importer Job
External Application
RMS DB
External DB

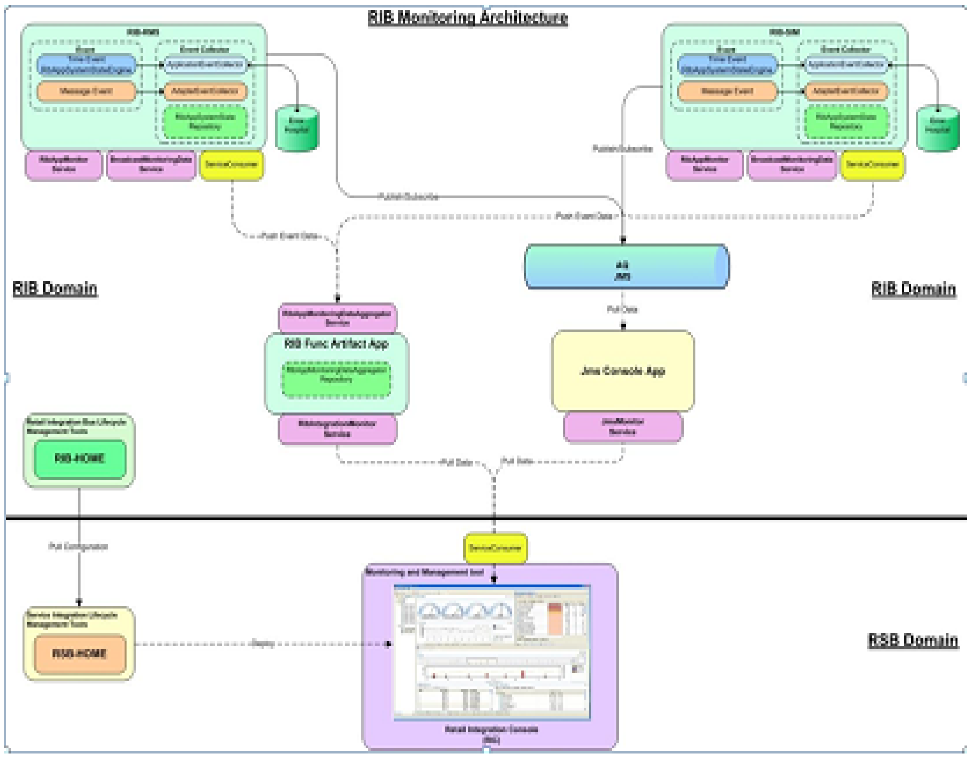
7

Monitoring at Run Time

RIB runtime monitoring enables you to monitor the state and volume of messages running through the RIB system. It also provides the status of various components of the system. The current RIB system and message flows are interrogated transparently to collect useful metrics that immensely enable business users and system administrators to review the state and health of the system. The monitoring enhancement collects application and adapter statuses, message event counts, transaction counts, error hospital statistics, and server resource utilization statistics.

The following graphic describes the architecture of the system:

Figure 7–1 RIB Monitoring ARchitecture



Instance and Central Repository

The monitoring metric data is collected in the rib-<app> instances. The data collected from all rib-<app> instances are consolidated in the central location. Both the collection and consolidation server instances store the data in in-memory repositories.

Various pieces of data are collected at different times based on the nature of data and performance considerations. At any point of time, the repository data shows a complete picture of the state as of the last data collection time.

Monitoring Data as XML

The collected data is reported in a defined format. The monitoring data is exchanged between components that produce and consume in XML format. rib-<app> instances produce the data and the central repository and Retail Integration console (RIC) (or third-party tools) consume the monitoring data.

Push Versus Pull

Sometimes, data is collected by scheduled background jobs. Message related data is collected asynchronously as the messages are consumed/published by adapters. The collected metric data is kept in a local repository in the rib-<app> instance. This information is pushed to a central repository (in memory) on a scheduled frequency (every two minutes). If any rib-<app> is down, the central repository does not receive data from that instance. The Central repository does not poll for data nor pull data from the rib-<app> instances. This way the central repository has no dependency on the rib-<app>s.

While each rib-<app> has its own monitoring data, the central repository holds the consolidated data from all the rib-<app> instances.

Service Interfaces

The monitoring data in the rib-<app> instances and the central repository are made available to RIB monitoring system as well as the third-party tools via SOAP web services running in the respective server instances. For more information, review the sample data and the Web service WSDL URL available at: Appendix B, "Sample Data from RIB App Monitoring Service".

What is an Event?

RIB messages flow from the publishing apps to subscribing apps, TAFRs, and error hospital in the RIB system. Sometimes, messages can be rolled back due to application or system errors. Each attempted delivery, whether successful or not, is called an Event. The RIB monitoring system counts the events which include both successful and failed delivery of messages. Also, any changes in the adapter status, error hospital data, server resource utilization etc. is considered an event.

There are two types of events - Adapter Events and Application Events.

How are Event Count and Messages Count Related?

Event count includes both successful and failed message counts. There is no reliable way of getting the exact successful message count without affecting the performance of the system. Hence, the RIB monitoring system collects event counts instead of message counts. For the most part, they are similar, but not exact.

Adapter Events

Adapter events are adapter level events like message flows (subscription, publishing) and adapter statuses. In the RIB monitoring system, message related adapter events are collected in real-time. Adapter status events are collected by scheduled background threads.

Application Events

Application events are application level events like server resource (CPU, Memory) utilization, application status, error hospital data, etc. These metrics are collected by scheduled background threads.

Event Collection Schedule

Various events in the system are collected at various times.

Note: There is a difference between the collection time and reporting time. For example, even though the event counts are collected in real-time, they are not available in the central repository immediately.

The following is a complete schedule of collection times:

Table 7–1 Schedule of Collection Times

Metric	Event Type	Schedule
Event Count	Adapter	Real time
Adapter Execution Time	Adapter	Real time
API Execution Time	Adapter	Real time
Adapter Status	Adapter	Every three minutes
Application Status	Application	At startup
Error Hospital Statistics	Application	Every five minutes
CPU Utilization	Application	Every five minutes
Memory Utilization	Application	Every five minutes

Publisher Versus Subscriber Events

The publishing event does not collect certain metrics, like the API Execution Time, since it is not possible to find out the API execution time once the message is published. It collects only the Adapter Execution time, which is the time taken to publish the message.

TAFR Instrumentation

TAFRs are monitored for collecting various time metrics. Measuring the time for the TAFR API execution begins as soon as the TAFR starts transforming the inbound message to an outbound message and ends when the message get transformed. Collecting Adapter Execution Time begins as soon as the message is available for the rib-tafr to transform and ends after routing the message to the destination topic.

Data Retention

The monitoring data is collected in rib-<app> repositories and a central repository in the functional artifact app. These are in-memory repositories. The information in the repositories is lost when the application is restarted. Additionally, the repositories are not purged, so the data collects as long as the applications run. The monitoring data is collected in hourly buckets. There can only be a maximum of 24 records per day. This strategy reduces the chances of the system going out of memory.

Metric Definitions

The following sections describe the metrics that are collected by the system.

Event Counts

When a message is subscribed or published, an event is generated to increment the event count for the hour of the day.

Adapter Execution Time

For a subscriber adapter, the time is noted as soon as the message arrives. At the end of the onMessage method the difference is calculated. An Adapter Execution Time event is created, which is used (if applicable) to set the minimum, maximum, and last adapter execution time for the hour of the day.

For a publishing adapter, the time is noted at the beginning and end of the publishing method, and the difference is calculated. An Adapter Execution Time event is created, which is used (if applicable) to set the minimum, maximum, and last adapter execution time for the hour of the day.

API Execution Time

For a subscriber adapter, the time is noted around the API call and the difference is calculated. An API Execution Time event is created, which is used (if applicable) to set the minimum, maximum, and last API execution time for the hour of the day.

For publishing adapter, there is no API execution time.

Adapter Status

A scheduled background job collects the Adapter status and updates the local repository. If the RIB application is down, since the job cannot run the status of the adapter in the central repository will be the last known status until the cache expires. After the cache expiry it will be "Unknown' until the status is reset by the rib-<app>.

Commits and Rollbacks

The commit and rollback count is the same information maintained by WebLogic server for the EJBs transactions. RIB monitoring system interrogates the JMX MBeans for the commit and rollback counts and updates the local repository. A message flow may result in more than one commit and rollback, depending on various scenarios of failures.

Error Hospital Metrics

Error hospital data for the RIB application is queried by a scheduled background thread and the following information is collected:

- Total Messages in Error Hospital: Total number of messages in the Error Hospital for the application
- Total Messages in Error Hospital due to dependency: Total number of dependent messages in the Error Hospital
- Message Family: Message family of the family-vice statistics
- Adapter class Definition: Adapter information for the message family
- Error count: Number of error messages for the message family
- Dependency count: Number of the dependent messages for the message family

RIB Application Status

Status of the RIB application, e.g., RUNNING, STOPPED etc.

A

Sample Files

Sample Application.wadl File

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<ns0:application xmlns:ns0="http://wadl.dev.java.net/2009/02">
<ns0:doc ns1:generatedBy="Jersey: 2.22.4 2016-11-30 13:33:53"
xmlns:ns1="http://jersey.java.net/"/>
<ns0:doc ns2:hint="This is simplified WADL with user and core resources only. To
get full WADL with extended resources use the query parameter detail. Link:
http://abc.us.oracle.com:8003/rib-injector-services-web/resources/application.wadl
?detail=true" xmlns:ns2="http://jersey.java.net/"/>
<ns0:grammars>
<ns0:include href="application.wadl/xsd0.xsd">
<ns0:doc title="Generated" xml:lang="en"/>
</ns0:include>
</ns0:grammars>
<ns0:resources
base="http://abc.us.oracle.com:8003/rib-injector-services-web/resources/">
<ns0:resource path="discover">
<ns0:method id="discoverAllResources" name="GET">
<ns0:response>
<ns0:representation mediaType="application/json"/>
</ns0:response>
</ns0:method>
</ns0:resource>
<ns0:resource path="/injector">
<ns0:resource path="/inject">
<ns0:method id="injectMessage" name="POST">
<ns0:request>
<ns0:representation mediaType="application/xml" element="ns3:ApplicationMessage"
xmlns:ns3="http://www.oracle.com/retail/integration/rib/ApplicationMessages/v1"/>
</ns0:request>
<ns0:response>
<ns0:representation mediaType="*/*"/>
</ns0:response>
</ns0:method>
</ns0:resource>
<ns0:resource path="/ping">
<ns0:method id="ping" name="GET">
<ns0:request>
<ns0:param name="pingMessage" default="hello" type="xsd:string"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" style="query"/>
</ns0:request>
<ns0:response>
```

```
<ns0:representation mediaType="application/json"/>
</ns0:response>
</ns0:method>
</ns0:resource>
</ns0:resource>
</ns0:resources>
</ns0:application>
```

Sample Resource Class

```
package com.oracle.retail.rib.integration.services.applicationmessageinjector;

import javax.annotation.security.RolesAllowed;
import javax.ejb.EJB;
import javax.ejb.Stateless;
import javax.ws.rs.Consumes;
import javax.ws.rs.GET;
import javax.ws.rs.POST;
import javax.ws.rs.Path;
import javax.ws.rs.Produces;
import javax.ws.rs.core.MediaType;
import com.oracle.retail.rib.common.RoleType;
import com.oracle.retail.integration.rib.applicationmessages.v1.*;
import com.retek.rib.binding.exception.InjectorException;
import com.retek.rib.binding.injector.Injector;
import com.retek.rib.binding.injector.InjectorFactory;
import com.retek.rib.domain.payload.PayloadFactory;
import javax.ws.rs.DefaultValue;
import javax.ws.rs.QueryParam;
import javax.ws.rs.core.Response;
import org.apache.commons.logging.Log;
import org.apache.commons.logging.LogFactory;
import com.oracle.retail.integration.payload.Payload;

@Stateless
@Path("/injector")

@RolesAllowed({RoleType.INTEGRATION_ROLE})
public class ApplicationMessageInjectorResource {

    private static Log LOG =
            LogFactory.getLog(ApplicationMessageInjectorResource.class);

    @GET
    @Path("/ping")
    @Produces({MediaType.APPLICATION_JSON})
    public Response ping(@DefaultValue("hello") @QueryParam("pingMessage") String
pingMessage){
        String message = "{\"message\": \"Got " + pingMessage + " from
server.\"}";
        return Response.ok(message, MediaType.APPLICATION_JSON).build();
    }

    @POST
    @Path("/inject")
    @Consumes({MediaType.APPLICATION_XML})
    public Response injectMessage(ApplicationMessage applicationMessage) throws
InjectorException{
        verifyNotNull(applicationMessage, "applicationMessage");


        invokeInjectForMessageType(applicationMessage.getFamily(),
applicationMessage.getType(), applicationMessage.getBusinessObjectId(),
applicationMessage.getPayloadXml());

        String message = "{\"message\": \"Inject successful.\"}";
        return Response.ok(message, MediaType.APPLICATION_JSON).build();
    }


    private void invokeInjectForMessageType(String family, String messageType,
String businessObjectId, String retailPayload)throws InjectorException{

        try {

            verifyNotNull(family, "family");
            verifyNotNull(messageType, "messageType");
            verifyNotNull(retailPayload, "retailPayload");

            Payload payload = PayloadFactory.unmarshalPayload(family, messageType,
retailPayload);

            Injector injector = InjectorFactory.getInstance().getInjector(
      ??             family, messageType);
            if (injector == null) {
                final String eMsg = "Unknown message"
                    + " family/type: " + family + "/" + messageType;
                LOG.error(eMsg);
                throw new InjectorException(eMsg);

            }
            if(LOG.isDebugEnabled()){
                LOG.debug("Received inject call for family("+family+")
type("+messageType+") businessObjectId("+businessObjectId+") with payload:\n" +
payload.toString());
            }

            injector.inject(messageType, businessObjectId, payload);
            LOG.debug("Inject call for family("+family+") type("+messageType+")
businessObjectId("+businessObjectId+") return.");

  ??     } catch (InjectorException e) {
            final String eMsg = "Exception calling inject.";
            LOG.error(eMsg, e);
            throw e;
        }catch (Exception re) {
            final String eMsg = "Exception calling inject.";
            LOG.error(eMsg, re);
            throw new RuntimeException(eMsg, re);
        }

    }

    private void verifyNotNull(Object field, String fieldName){
      if(field == null){
        final String eMsg = fieldName + " cannot be null.";
        LOG.error(eMsg);
        throw new IllegalArgumentException(eMsg);
        }
    }

}
```

ApplicationMessages.xsd

```
<?xml version="1.0" encoding="UTF-8" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"

xmlns="http://www.oracle.com/retail/integration/rib/ApplicationMessages/v1"

xmlns:rib="http://www.oracle.com/retail/integration/rib/ApplicationMessages/v1"
           xmlns:jaxb="http://java.sun.com/xml/ns/jaxb"
           xmlns:xjc="http://java.sun.com/xml/ns/jaxb/xjc"
           jaxb:extensionBindingPrefixes="xjc"
           jaxb:version="2.0"

targetNamespace="http://www.oracle.com/retail/integration/rib/ApplicationMessages/
v1"
           elementFormDefault="qualified" attributeFormDefault="unqualified">

    <xs:annotation>
        <xs:appinfo>

            <jaxb:globalBindings
                fixedAttributeAsConstantProperty="false"
                choiceContentProperty="true"
                enableFailFastCheck="true"
                generateIsSetMethod="true"
                enableValidation="true">
                <!--xjc:javaType name="java.util.Calendar"
                               xmlType="xs:dateTime"
                               adapter="com.oracle.retail.integration.rib.rib_
integration_runtime_info.datatypeadapter.CalendarAdapter"/ -->
                <jaxb:serializable uid="1"/>
            </jaxb:globalBindings>

            <!--jaxb:schemaBindings>
                <jaxb:package
name="com.oracle.retail.integration.rib.ribintegrationruntimeinfo" />
            </jaxb:schemaBindings-->
        </xs:appinfo>
    </xs:annotation>

    <xs:element name="ApplicationMessages">
        <xs:complexType>
            <xs:sequence>
                <xs:element ref="ApplicationMessage" maxOccurs="unbounded" />
            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <xs:element name="ApplicationMessage">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="family" type="string25"/>
                <xs:element name="type" type="string30"/>
                <xs:element name="businessObjectId" type="string255"
```

```
minOccurs="0"/>
                <xs:element ref="ApplicationMessageRoutingInfo" minOccurs="0"
maxOccurs="unbounded"/>
                <xs:element name="payloadXml" type="xs:string"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <xs:element name="ApplicationMessageRoutingInfo">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="name" type="string25"/>
                <xs:element name="value" type="string25"/>
                <xs:element ref="ApplicationMessageRoutingInfoDetail"
minOccurs="0" maxOccurs="2"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <xs:element name="ApplicationMessageRoutingInfoDetail">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="name" type="string25"/>
                <xs:element name="value" type="string300"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <xs:simpleType name="string255">
<xs:restriction base="xs:string">
<xs:maxLength value="255" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="string25">
<xs:restriction base="xs:string">
<xs:maxLength value="25" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="string30">
<xs:restriction base="xs:string">
<xs:maxLength value="30" />
</xs:restriction>
</xs:simpleType>

    <xs:simpleType name="string300">
<xs:restriction base="xs:string">
<xs:maxLength value="300" />
</xs:restriction>
</xs:simpleType>


</xs:schema>
```

Rest Publisher Pseudo Code

```
//Import required classes
import com.oracle.retail.integration.base.bo.fulfilorddesc.v1.*
import com.oracle.retail.integration.payload.Payload
import com.retek.rib.domain.payload.PayloadFactory
import
com.oracle.retail.integration.rib.applicationmessages.v1.ApplicationMessage;
import
com.oracle.retail.integration.rib.applicationmessages.v1.ApplicationMessages;
//Create new instance of your FulfilOrdDesc object and populate it.
FulfilOrdDesc fulfilOrdDesc = new FulfilOrdDesc()
fulfilOrdDesc.setCustomerOrderNo(123)
//Get a string version of the payload
String payloadXml = PayloadFactory.marshalPayload(fulfilOrdDesc)

//Prepare the header message section
ApplicationMessages ams = new ApplicationMessages();
ApplicationMessage am = new ApplicationMessage();
am.setFamily("FULFILORD");
am.setType("FULFILORDPOCRE");
am.setBusinessObjectId("abc"); //optional
//Set the payload xml into the message
am.setPayloadXml(payloadXml);
ams.getApplicationMessage().add(am);

//Call rest url with ams

String ribPublisherRestUrl =
"http://<host>:<port>/rib-ext-services-web/resources/publisher/publish"

Client client = ClientBuilder.newClient();
WebTarget webTarget = client.target(ribPublisherRestUrl);

String userName = "user";
char[] password = "passed";

String usernameAndPassword = userName + ":" + new String(password);
String authorizationHeaderValue = "Basic " +
java.util.Base64.getEncoder().encodeToString( usernameAndPassword.getBytes() );

Invocation.Builder invocationBuilder =
webTarget.request().header("Authorization", authorizationHeaderValue);


Response response = invocationBuilder.post(Entity.entity(ams,
MediaType.APPLICATION_XML));

log.debug("Publish call response(" + response + ").");
```

payload.properties

```
ASNIN.ASNINCRE=com.oracle.retail.integration.base.bo.asnindesc.v1.ASNInDesc
ASNIN.ASNINDEL=com.oracle.retail.integration.base.bo.asninref.v1.ASNInRef
ASNIN.ASNINMOD=com.oracle.retail.integration.base.bo.asnindesc.v1.ASNInDesc

WH.WHCRE=com.oracle.retail.integration.base.bo.whdesc.v1.WHDesc
WH.WHDEL=com.oracle.retail.integration.base.bo.whref.v1.WHRef
WH.WHMOD=com.oracle.retail.integration.base.bo.whdesc.v1.WHDesc
```

Sample Request/Response for ReST Injector Service

Table A–1 Sample Request/Response for ReST Injector Service

End Point	Method	Media Type	User/ Password	Request xml	Response	Comments

http://localhost:7001/rib-injector-services-web/resources/injector/inject	POST	application/xml
		Request are xml only and response are json only.
			A valid user that is part of IntegrationGroup.	`<ApplicationMessage xmlns="http://www.oracle.com/retail/integration/rib/ApplicationMessages/v1">`
				
				`<family>SOSTATUS</family>`
				
				`<type>SOSTATUSCRE</type>`
				
				`<payloadXml><![CDATA[<SOStatusDesc`
				
				`xmlns="http://www.oracle.com/retail/integration/base/bo/SOStatusDesc/v1"`
				
				`xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.oracle.com/retail/integration/base/bo/SOStatusDesc/v1 http://www.oracle.com/retail/integration/base/bo/SOStatusDesc/v1/SOStatusDesc.xsd ">`
				`<dc_dest_id>ReLCoqæ±</dc_dest_id>`
				`<loc_type>a</loc_type>`
				`<store_type>a</store_type>`
					`HTTP/1.1 200 OK`
					`Date: Thu, 10 May 2018 16:33:11 GMT`
					`Content-Length: 33`
					`Content-Type: application/json`
					`X-ORACLE-DMS-ECID: 4a8e5d3f-1aae-43d7-ba84-c6b9c60563c7-00000039`
					`X-ORACLE-DMS-RID: 0`
					`Set-Cookie: JSES-SIONID=hsFK5jW4B1QtipC9zhng--or1WL7ywxCuxsJeVwdgPpnv6oNUnde!233126712; path=/; HttpOnly`
					`{"message": "In-ject successful."}`
						Success

Table A–1 (Cont.) Sample Request/Response for ReST Injector Service

End Point	Method	Media Type	User/ Password	Request xml	Response	Comments

				`<stockholding_`
				`ind>a</stockholding_ind>`
				`<item_`
				`id>nbYDUFLqAcTsBUnhYuhpcæ±</ite`
				`m_id>`
				`<origi-nal_item_`
				`id>UxrgzyAgzDgTDbHfMBjbtæ±</ori`
				`ginal_item_id>`
				`<order_line_nbr>3</order_`
				`line_nbr>`
				`<unit_qty>12.4</unit_qty>`
				`<status>a</status>`
				`<us-er_`
				`id>CAswTBGUzTaNjwgDwWXEgqCjEmæ±`
				`</user_id>`
				`<updat-ed_`
				`date>2013-06-13T14:20:35</updat`
				`ed_date>`
				`</SOStatusDtl>`
				`<context_type>vRæ±</context_`
				`type>`
				`<con-text_`
				`value>oDHGRuOeDmvFPytxgiiJyæ±</`
				`context_value>`
				`<inventory_`
				`type>kwæ±</inventory_type>`
				`<cust_order_`
				`nbr>cwFLuXBqFPBvkxVmTSBrhovrROJ`
				`AZYCfYncVEhfub-mAYæ±</cust_`
				`order_nbr>`		

				`<fulfill_order_`
				`nbr>qSzQUPkqbEFboWQFxPSqoZ-NOEJ`
				`otCMnqbWzXTqRVkVkLæ±</fulfill_`
				`order_nbr>`
				`</SOStatusDesc>`
				`]]></payloadXml>`
				`</ApplicationMessage>`		

Table A–1 (Cont.) Sample Request/Response for ReST Injector Service

End Point	Method	Media Type	User/ Password	Request xml	Response	Comments

			If user in not added in IntegrationGroup	`<v1:ApplicationMessage xmlns:v1="http://www.oracle.com/retail/integration/rib/ApplicationMessages/v1">`
				`<v1:family>WH</v1:family>`
				`<v1:type>WHCR</v1:type>`
				`<!--Optional:-->`
				`<v1:businessObjectId>?</v1:businessObjectId>`
				`<!--Zero or more repetitions:-->`
				`<v1:ApplicationMessageRoutingInfo>`
				`<v1:name>?</v1:name>`
				`<v1:value>?</v1:value>`
				`<!--Zero or more repetitions:-->`
				`<v1:ApplicationMessageRoutingInfoDetail>`
				`<v1:name>?</v1:name>`
				`<v1:value>?</v1:value>`
				`</v1:ApplicationMessageRoutingInfoDetail>`
				`</v1:ApplicationMessageRoutingInfo>`
				`<v1:payloadXml>&lt;WHDesc xmlns=&quot;http://www.oracle.com/retail/integration/base/bo/WHDesc/v1&quot;&gt;&lt;wh&gt;10&lt;/wh&gt;&lt;wh_name&gt;g&lt;/wh_name&gt;&lt;/WHDesc&gt;</v1:payloadXml>`
				`</v1:ApplicationMessage>`
					`HTTP/1.1 403 Forbidden`
					`Date: Thu, 05 Aug 2021 10:25:26 GMT`
					`Content-Length: 1166`
					`Content-Type: text/html; char-set=UTF-8`
					`<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Draft//EN">`
					`<HTML>`
					`<HEAD>`
					`<TITLE>Error 403--Forbidden</TITLE>`
					`</HEAD>`
					`<BODY bgcol-or="white">`
					`<FONT FACE=Helvetica><BR CLEAR=all>`
					`<TABLE bor-der=0 cellspac-ing=5><TR><TD><BR CLEAR=all>`
					`<FONT FACE="Helvetica" COL-OR="black" SIZE="3"><H2>Error 403--Forbidden</H2>`
					`</FONT></TD></TR>`
					`</TABLE>`
					`<TABLE bor-der=0 width=100% cellpad-ding=10><TR><TD VALIGN=top WIDTH=100% BGCOL-OR=white><FONT FACE="Courier New"><FONT FACE="Helvetica" SIZE="3"><H3>From RFC 2068 <i>Hypertext Transfer Protocol -- HTTP/1.1</i>:</H3>`
					`</FONT><FONT FACE="Helvetica" SIZE="3"><H4>10.4.4 403 For-bidden</H4>`
					`</FONT>`
						Failure

Table A–1 (Cont.) Sample Request/Response for ReST Injector Service

End Point	Method	Media Type	User/ Password	Request xml	Response	Comments
					`<P><FONT FACE="Courier New">The server understood the request, but is refusing to fulfill it. Authorization will not help and the request SHOULD NOT be repeated. If the request method was not HEAD and the server wishes to make public why the request has not been ful-filled, it SHOULD de-scribe the reason for the refusal in the entity. This status code is commonly used when the server does not wish to reveal exactly why the request has been refused, or when no other response is ap-plica-ble.</FONT></P> </FONT></TD></TR> </TABLE> </BODY> </HTML>`	

Table A–1 (Cont.) Sample Request/Response for ReST Injector Service

End Point	Method	Media Type	User/ Password	Request xml	Response	Comments
			Wrong User/pass	<v1:ApplicationMessage xmlns:v1="http://www.oracle.com/retail/integration/rib/ApplicationMessages/v1"> <v1:family>WH</v1:family> <v1:type>WHCR</v1:type> <!--Optional:--> <v1:businessObjectId>?</v1:businessObjectId> <!--Zero or more repetitions:--> <v1:ApplicationMessageRoutingInfo> <v1:name>?</v1:name> <v1:value>?</v1:value> <!--Zero or more repetitions:--> <v1:ApplicationMessageRoutingInfoDetail> <v1:name>?</v1:name> <v1:value>?</v1:value> </v1:ApplicationMessageRoutingInfoDetail> </v1:ApplicationMessageRoutingInfo> <v1:payloadXml>&lt;WHDesc xmlns=&quot;http://www.oracle.com/retail/integration/base/bo/WHDesc/v1&quot;&gt;&lt;wh&gt;10&lt;/wh&gt;&lt;wh_ name&gt;g&lt;/wh_ name&gt;&lt;/WHDesc&gt;</v1:payloadXml> </v1:ApplicationMessage>	HTTP/1.1 401 WWW-Authenticate: Basic realm="Authentication required" Content-Type: text/html;charset=utf-8 Content-Language: en Content-Length: 669 Date: Thu, 05 Aug 2021 05:08:40 GMT Keep-Alive: timeout=20 Connection: keep-alive <!doctype html><html lang="en"><head><title>HTTP Status 401 â?" Unauthorized</title><style type="text/css">body {font-family:Tahoma,Arial,sans-serif;} h1, h2, h3, b {color:white;background-color:#525D76;} h1 {font-size:22px;} h2 {font-size:16px;} h3 {font-size:14px;} p {font-size:12px;} a {color:black;} .line {height:1px;background-color:#525D76;border:none;}</style></head><body><h1>HTTP Status 401 â?" Unauthorized</h1><hr class="line" /><p><b>Type</b> Status Report</p><p><b>Description</b> The request has not been applied because it lacks valid authentication credentials for the target resource.</p><hr class="line" /><h3>Apache Tomcat/8.5.64</h3></body></html>	Failure