IBM Integration Bus Services, APIs, Applications, & Libraries

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InterConnect 2015

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IBM Integration Bus – Session Highlights



- Monday
 - 11.00am: What's New in IIB (Mandalay Ballroom B)
 - 12.15pm: WESB Conversion (Surf C)
 - 2.00pm: Meet The IIB Experts (Forum 1)
 - 2.00pm: Intro The Business Value of IIB (Surf C)
 - 3.30pm: Technical Introduction to IIB (Surf C)
 - 5.00pm: Integration in Healthcare (Surf C)
- Tuesday
 - 8.00am: IIB and Cast Iron (Surf C)
 - 9.30am: IIB in the Cloud (Surf C)
 - 9.30am: IIB Customer Feedback Roundtable (Tropics A)
 - 11.00am: Effective Administration in IIB (Surf C)
 - 12.30pm: IIB Designing for Performance (Mandalay Ballroom B)
 - 2.00pm: Integration Keynote
 - 3.30pm: Effective Application Development (Surf D)
 - 5.30pm: Flexible MQ Topologies (Surf C)
 - 5.30pm: IIB Customer Feedback Roundtable (Tropics A)
- Wednesday
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 - 9.30am: Connecting to Software-as-a-Service (Surf C)
 - 11.00am: Integration in Manufacturing (Surf C)
 - 12.30pm: Integration Your Way (Surf C)
 - 2.00pm: IBM Integration Bus Lab (South Seas G)
- Thursday
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#IIBSMILE or #IIBFROWN ?



Applications and Libraries Integration Services Rest API



Applications and Libraries Integration Services REST API

Applications and Libraries

 Applications and Libraries are a means of developing, deploying and managing your integration solutions:



Application

- means of encapsulating resources to solve a specific connectivity problem
- application can reference one or more libraries



Library

- a logical grouping of related routines and/or data
- libraries help with reuse and ease of resource management
- library can reference one or more libraries
- These concepts span all aspects of the product, and are designed to make the development and management of IIB solutions easier.

Features of Applications and Libraries



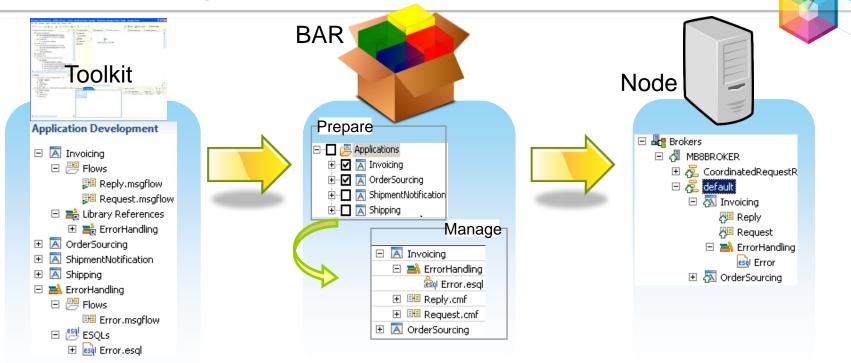


- Applications promote encapsulation and isolation
 - Typically contain "main" message flows and dependent resources
 - ESQL, Java, Maps, Message models, subflows, Adapter files, etc.
 - dependent resources could live in referenced libraries
 - Multiple applications can be packaged into a single BAR
 - Multiple applications can be deployed to an Integration server
 - Visibility of resource restricted to containing application



- Libraries facilitate re-use and simplify resource management
 - Multiple applications can reference the same library
 - Shared libraries are deployed separately from application
 - Same instance of the library can be referenced by multiple applications
 - Optionally, each application can contain a separate copy of the library
 - Typically contain reusable helper routines and resources
 - Subflows, ESQL, Java, Maps, Message models, Adapter files, etc.
 - Use multiple libraries to group related resources (e.g. by type or function)
 - Library can reference other Libraries

Solution Lifecycle



- Applications and libraries span the Toolkit, BAR and Runtime.
- Manifested as existing well-known container formats (ZIPs)
- One can work without applications and libraries if preferred
 - No need to change existing project structure or deployment processes
 - But these features will make your lives easier consistent develop, deploy, manage experience!



Quick Starts

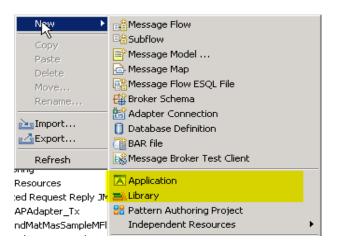
Start building your application with one of the following tasks.

Start by creating an application

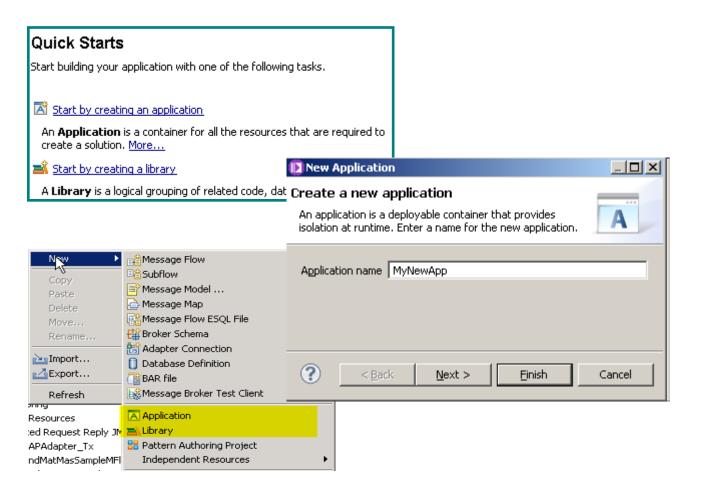
An **Application** is a container for all the resources that are required to create a solution. <u>More...</u>

🎫 Start by creating a library

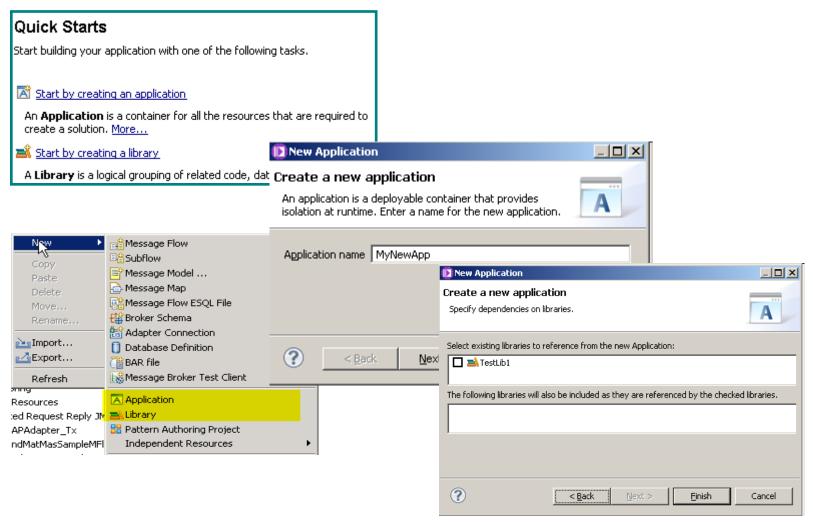
A Library is a logical grouping of related code, data, or both. More...



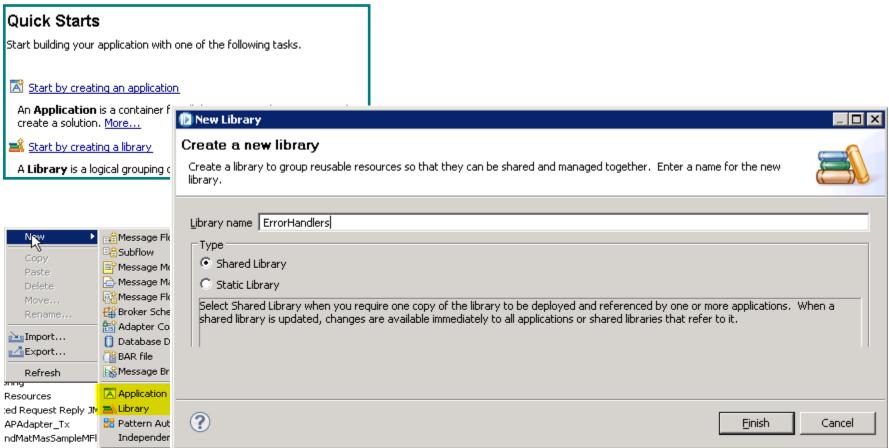




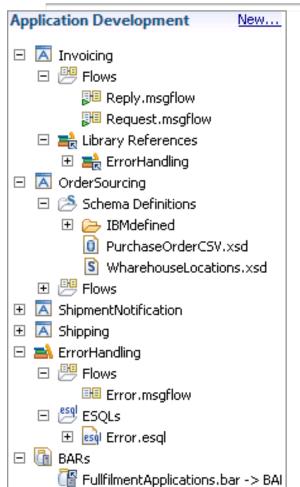








Applications and Libraries in the Toolkit Navigator

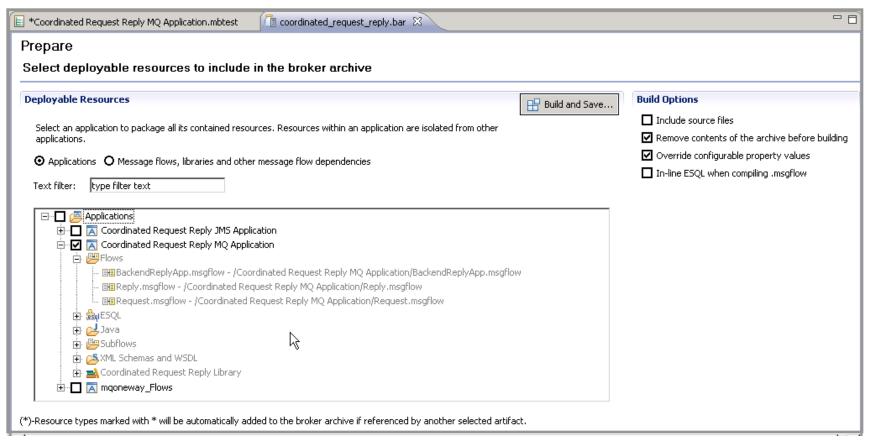


- Applications and libraries are shown in the Application Development view
- Each application and/or library is an Eclipse project (with a special nature) that contains artefacts, such as: flows, XSDs, Maps, ESQL, etc.
- Referenced libraries show up twice for ease of navigation:
 - 1. as children of the referencing application/library
 - 2. as top-level containers in the Navigator both entries refer to the same physical resources
- Libraries not referenced by any application, show up only as toplevel containers in the Navigator
- Application/library project can reference JCN and Java projects. Artefacts in referenced JCN/Java projects are rendered as part of application/library and deployed to the runtime as part of corresponding container.
- Application and/or library can reference other libraries. Artefacts in referenced libraries are visible to the referencing application/library. Referenced libraries are deployed to the runtime as part of the referencing container.



Applications and Libraries in the BAR Editor – Prepare

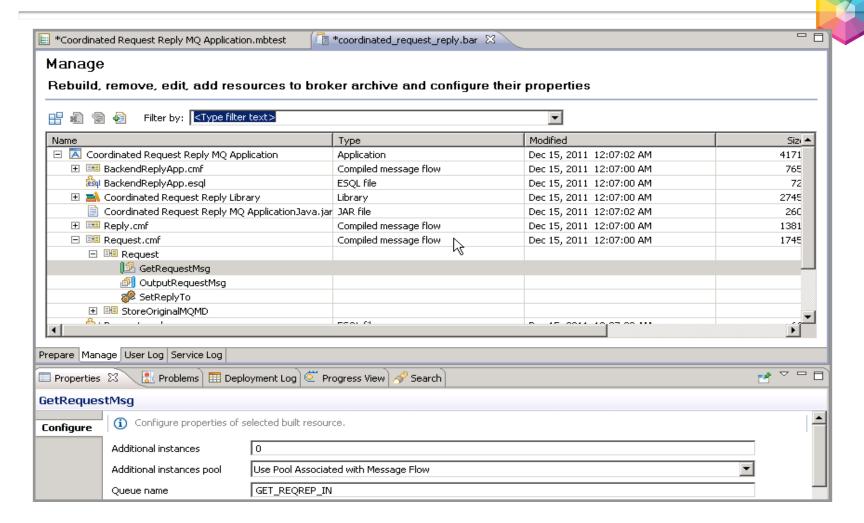




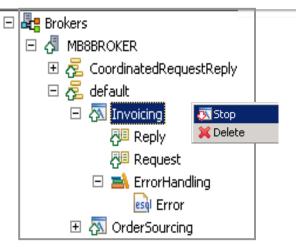
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Applications and Libraries in the BAR editor - Manage



Applications and Libraries on the Node



- Deployed applications are displayed directly below server in the Toolkit and IBX
- Each application is an independent container within execution group - it contains list of resource (e.g. flows).
- Referenced libraries are listed as children of the referencing application container
- Deployed library resources appear as children of that library
- If multiple applications reference the same library, each application gets its own copy of the library
- GUI, command line and CMP tools updated to expose operations that are applicable to libraries and applications
 - Starting and stopping applications
 - Starting an application implicitly starts all containing message flows
 - Delete deletes all containing resources (including referenced libraries) and remove application container

Shared Libraries

- 'Static' Libraries introduced in V8 and V9
 - Enhanced to fulfil most popular user requests
 - Libraries can now be shared across multiple applications for a broad range of assets
 - Sub-flows are now independent artefacts, significant storage reduction, consistency

Shared Libraries

- Libraries can now be referenced by one or more applications
 - Libraries deployed independently of applications "shared"!
 - Applications will not get "own copy"
 - Libraries can still reference other libraries
- Artefact disambiguation features exist: {shlib} qualifier
- Shared Library is the default library type
- Assets in multiple libraries within application are shared
 - Notably schemas, also Maps, ESQL, Java, PHP etc



Flows

SharedLibrary1

SharedLibrary2

■ warehouse.msgflow

■ Referenced Libraries

→ SharedLibrary1

■ Referenced Libraries

→ SharedLibrary1

Schema Definitions

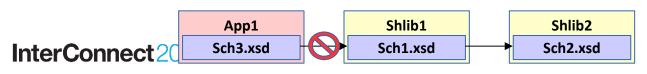
■ Referenced Libraries

→ SharedLibrary2

Schema Definitions

Shared Library Restrictions

- Most notable restriction is that schema imports cannot occur across shared libraries
 - Same for PHP, XML, XSL and other cross library source imports
- Subflows but not message flows are allowed in shared libraries, other minor subflow restrictions
- Minor restrictions for ESQL (e.g. empty schema)

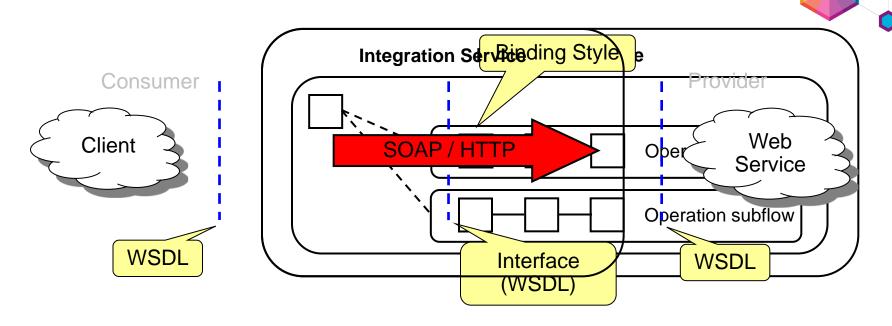


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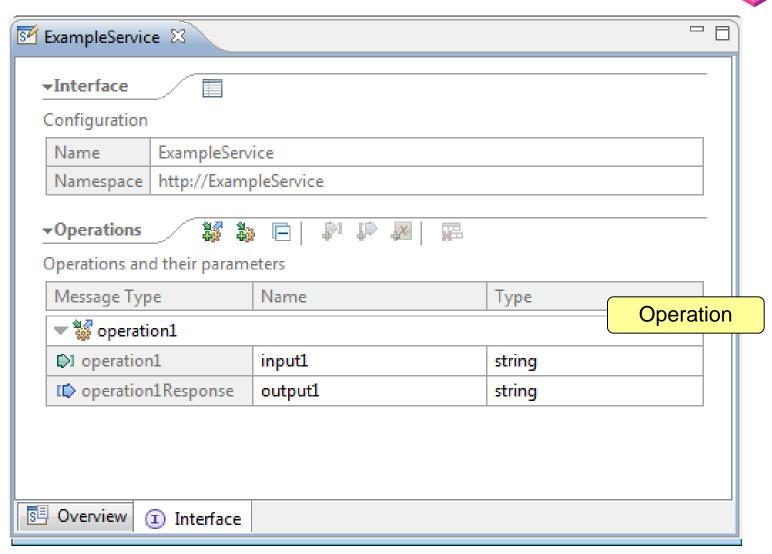
Applications and Libraries Integration Services REST API

Integration Services: Interfaces, Operations and Bindings



- An interface is described using a WSDL document
- An interface consists of one or more operations and a binding style.
- The binding style specifies the protocol and data format of the operation.
- An *operation* is a description of an action implemented by the service.
- Each operation in the interface defines the data that is passed between the Consumer and the Provider when the operation is invoked.
- Each operation may have one or more faults to handle error conditions.

Creating an Integration Service

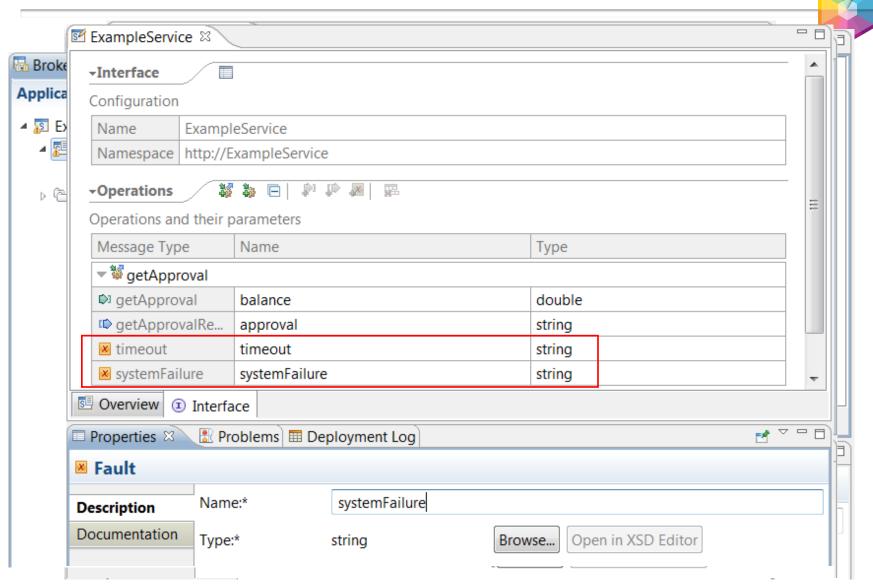


Generated Resources **₽** □ \$ Broker Development ♡ Ratterns Explorer **Application Development** New.. ■ Is a Example Service ■ Is a Example Se Service Service Description Descriptor operation1 ■ Resources Schema Definitions (default namespace) soap.xsd ▲ Http://ExampleService XML Schema ExampleService.xsd S ExampleService_InlineSchema1.xsd http://schemas.xmlsoap.org/soap/envelope/ soapenv11.xsd WSDL Definitions WSDL ▲ Http://ExampleService ExampleService.wsdl ■ P Flows Message Flow [▲] □ gen ExampleService.msgflow Subflows [▲] □ gen **Subflows** ExampleServiceInputCatchHandler.subflow ExampleServiceInputFailureHandler.subflow ExampleServiceInputHTTPTimeoutHandler.subflow Other Resources ▲ Iog/exampleservice Log file ExampleService.wsdl.report.txt

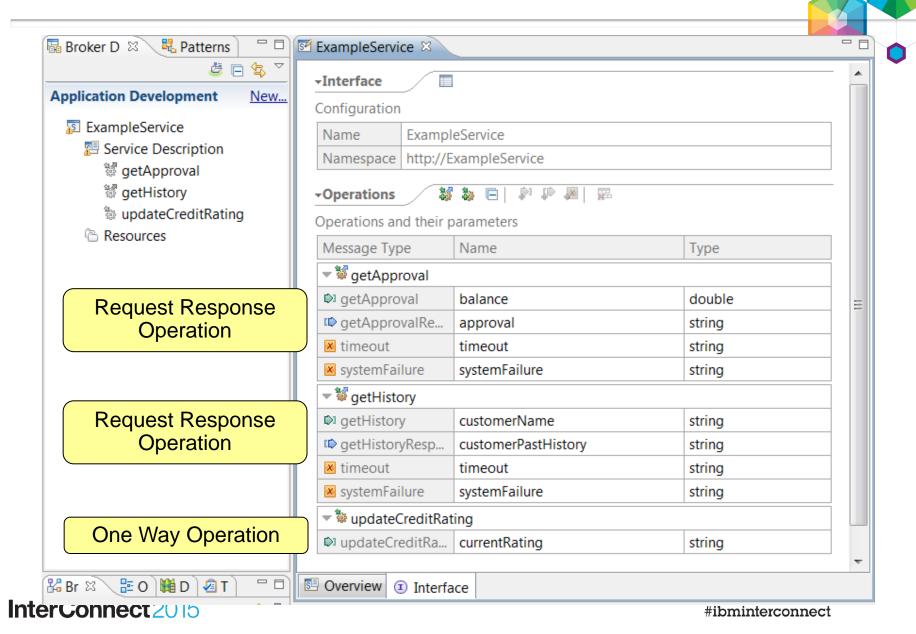
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Editing an Integration Service

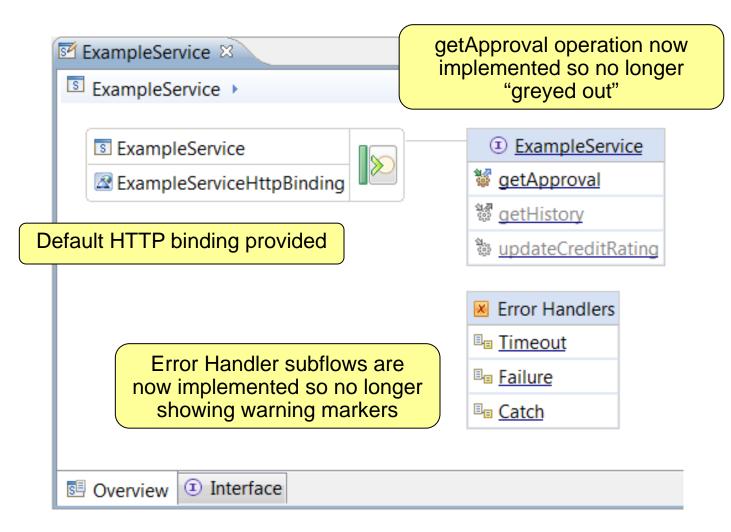


Integration Service Interface



Implemented Integration Service



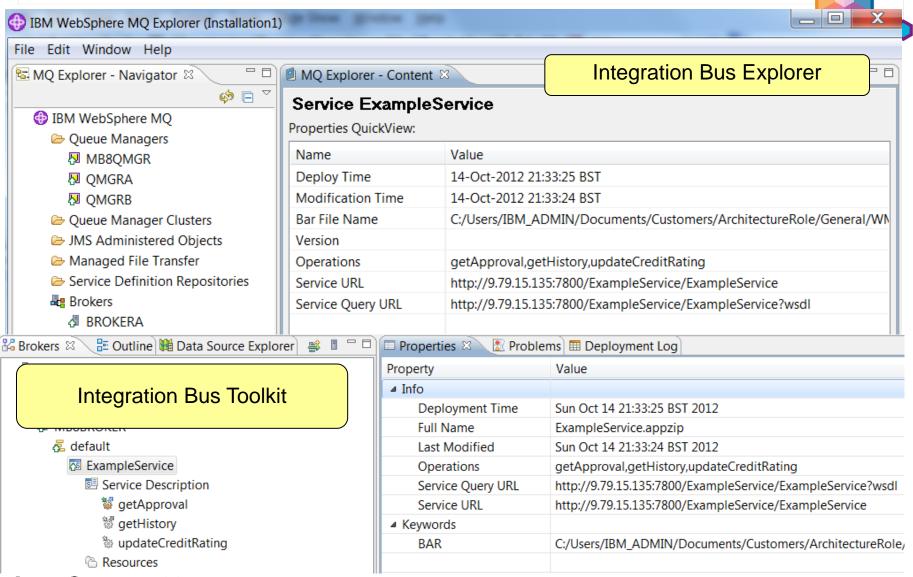


Service Descriptor



```
<?xml version="1.0" encoding="UTF-8"?>
<service:services xmlns:service="http://com.ibm.etools.mft.service">
  <service:service implementation="gen/ExampleService.msgflow"</pre>
                   name="ExampleService"
                                                              Core properties
                   portType="ExampleService"
                   wsdlFileName="ExampleService.wsdl">
    <service:operations>
      <service:operation name="getApproval" type="reguest-response">
        <service:flows>
         <service:flow location="gen/getApproval Request Response.subflow" type="Request Response"/>
        </service:flows>
                                                                      Request_Response subflow
      </service:operation>
      <service:operation name="getHistory" type="request-response"</pre>
        <service:flows/>
      </service:operation>
      <service:operation name="updateCreditRating" type="one-way">
        <service:flows/>
      </service:operation>
    </service:operations>
    <service:errors>
      <service:flows>
        <service:flow location="gen/ExampleServiceInputHTTPTimeoutHandler.subflow" type="Timeout"/>
        <service:flow location="gen/ExampleServiceInputFailureHandler.subflow" type="Failure"/>
        <service:flow location="gen/ExampleServiceInputCatchHandler.subflow" type="Catch"/>
      </service:flows>
    </service:errors>
                                                        Error Flows (subflows)
  </service:service>
</service:services>
```

Service Deployment and Administration



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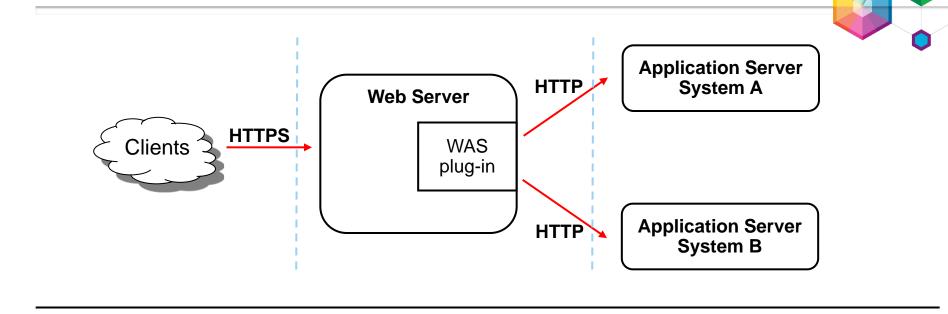
Exporting Web Server Plugin Configuration

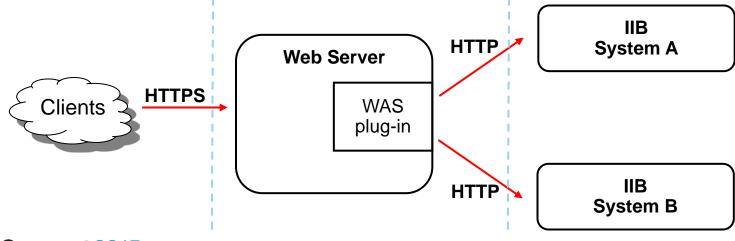




- The WebSphere Application Server plug-in can be used in complex scenarios to:
 - Implement load-balancing
 - Implement clustering for failover
 - Expose application server and web server services and files through a single front end
 - Manage security for all URLs in a single place and in a consistent manner
 - Set up a network dispatcher to multiple web service endpoints

Using an External Web Server





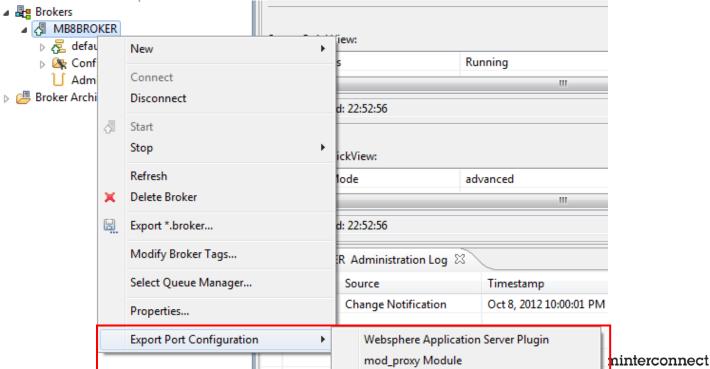
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Exporting Web Server Configuration Data

- Use IIB to help configure your existing topology, by generating appropriate configuration data:
 - Existing topology uses WebSphere Application Server generate a configuration file that can be read by the WAS web server plug-in
 - Existing topology uses an Apache web server (e.g. IBM HTTP Server) generate a configuration file that can be merged into your Apache mod_proxy configuration

 Existing topology uses some other web server configuration – use the IIB API to generate a per-broker list of port and URL data in CSV format



Generated WAS Plugin.xml and Mod_Proxy.conf

```
WASPlugin.xml - Notepad
File Edit Format View Help
k?xml version="1.0" encoding="UTF-8"?><Config>
    <!--PLUGININSTALLROOT MUST BE UNCOMMENTED FOR SSL-->
    <!--Property Name="PluginInstallRoot" Value="SET ME TO YOUR WEBSPHERE PLUGINS DIRECTORY"/-->
    <VirtualHostGroup Name="default host">
        <VirtualHost Name="*:80"/>
    </VirtualHostGroup>
    <ServerCluster LoadBalance="Round Robin" Name="Cluster 0" RetryInterval="60">
        <!--Broker:MB8BROKER Execution Groups: default-->
        <Server Name="R9E9V8K MB8BROKER 7080 http Server">
            <Transport HostName="R9E9V8K" Port="7080" Protocol="http"/>
        </Server>
    </serverCluster>
    <UriGroup Name="Group 0">
        <Uri Name="/Flow1URLFragment"/>
    </UriGroup>
    <Route ServerCluster="Cluster 0" UriGroup="Group 0" VirtualHostGroup="default host"/>
</Config>
```


Java API Example - getPortConfigAsCsv

```
☑ Service CMP API.java 
☒

  package com.ibm.www;
  import com.ibm.broker.config.proxy.*;
  public class Service CMP API {
      public static void main(String[] args) {
          connectBroker("localhost", 2414, "MB8OMGR");
      public static void connectBroker(String hostname, int port, String qmgr) {
          BrokerProxy b = null;
          try {
              BrokerConnectionParameters bcp = new MQBrokerConnectionParameters(hostname, port, qmqr);
              b = BrokerProxy.getInstance(bcp);
              String brokerName = b.getName();
              System.out.println("Broker '"+brokerName+"' is available!");
              String MB8BROKER PortConfiguration = b.getPortConfigAscSV();
              System.out.println("HTTPNodeApp Port Configuration is:");
              System.out.println(MB8BROKER PortConfiguration);
              b.disconnect();
          } catch (ConfigManagerProxyException ex) {
              System.out.println("Broker is NOT available because "+ex);
             💷 Properties 📳 Problems 🖽 Deployment Log 📮 Console 🖾
             <terminated > Service_CMP_API [Java Application] C:\Program Files (x86)\IBM\WMBT800\i
             Broker 'MB8BROKER' is available!
             HTTPNodeApp Port Configuration is:
             Broker, HTTP/HTTPS, Port, URL, Execution Groups....
             MB8BROKER, HTTP, 7080, /Flow1URLFragment, default
```



Integration Bus JavaScript Web API

- Web APIs are popular technology for simplified access to integration
 - Particular applicability in mobile, browsers, and Node.js program scenarios
 - New feature allows Integration Bus service to be invoked via Web API
 - Builds on existing IB mobile features and service definitions
- Start from new or existing service
 - Design the IB service, creating API is really simple
 - JSON binding generated automatically
 - JavaScript client, documentation likewise
- Access JavaScript and documentation from URL
 - Point browser at IB node to retrieve assets! (HTTP GET)
 - Can program from Browser
 - Node.js

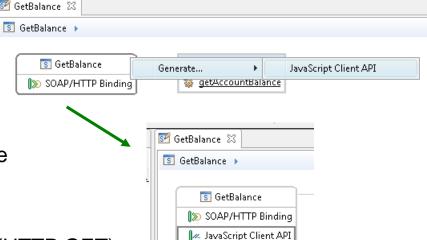


Integration Service: GetBalance

This integration service can be invoked using:







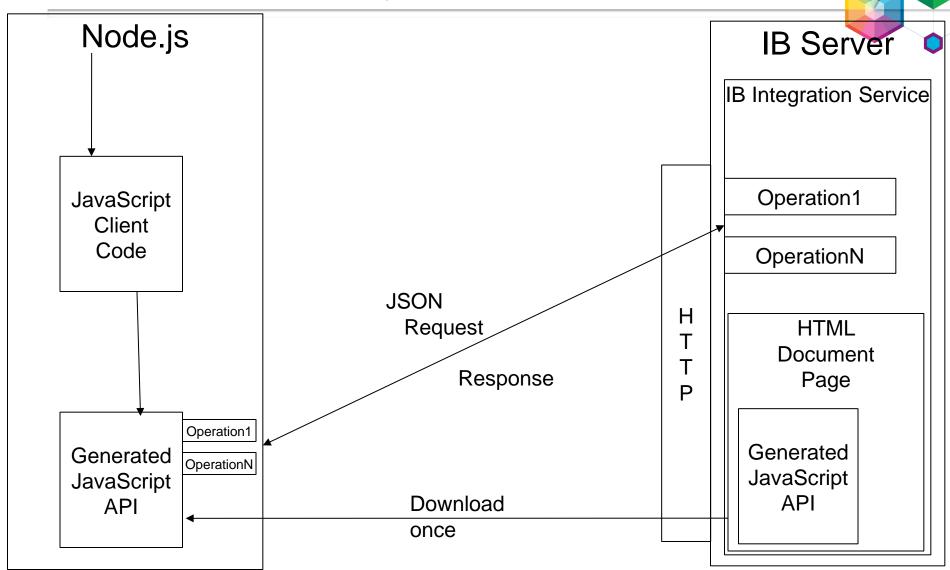
Integration Bus JavaScript Web API



SOAP / HTTP

JavaScript Client API

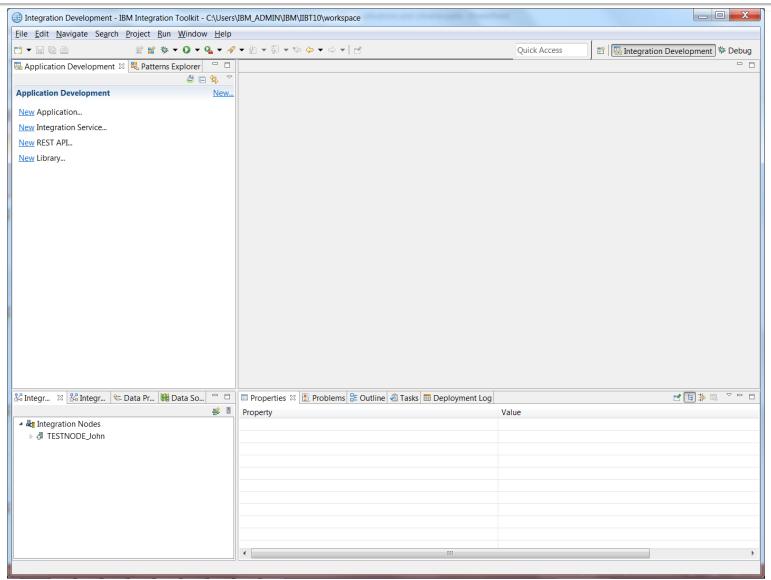
Architecture – Node.js client



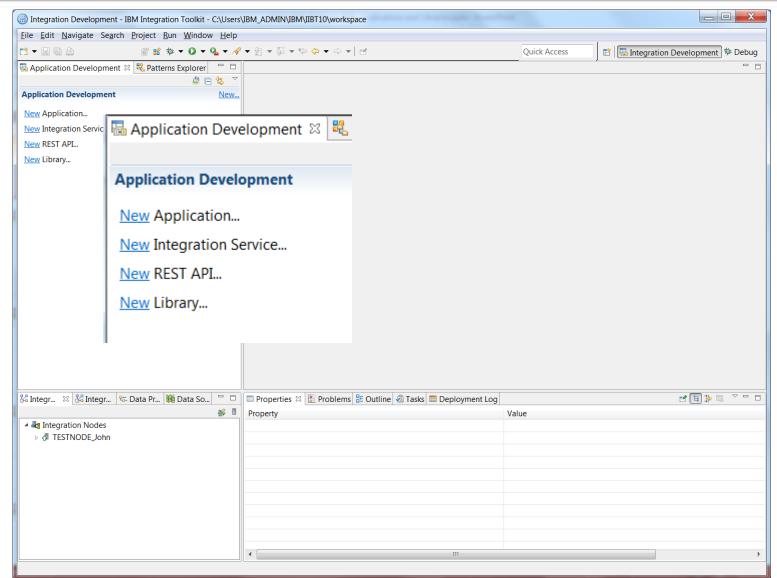


Applications and Libraries Integration Services REST API

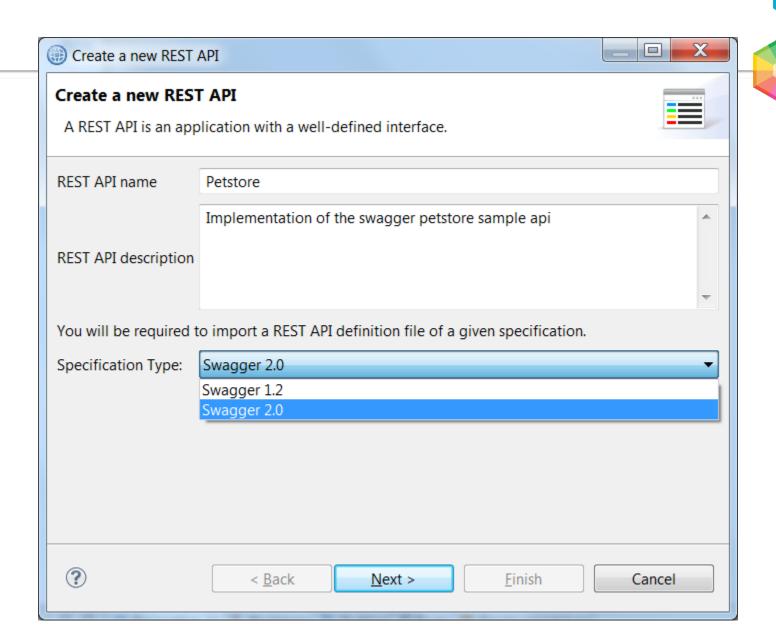
Creating a REST API

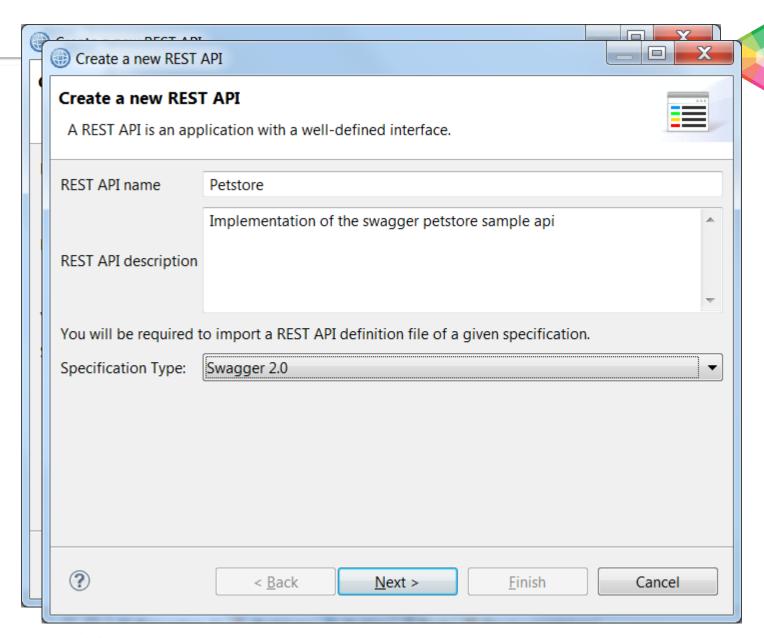


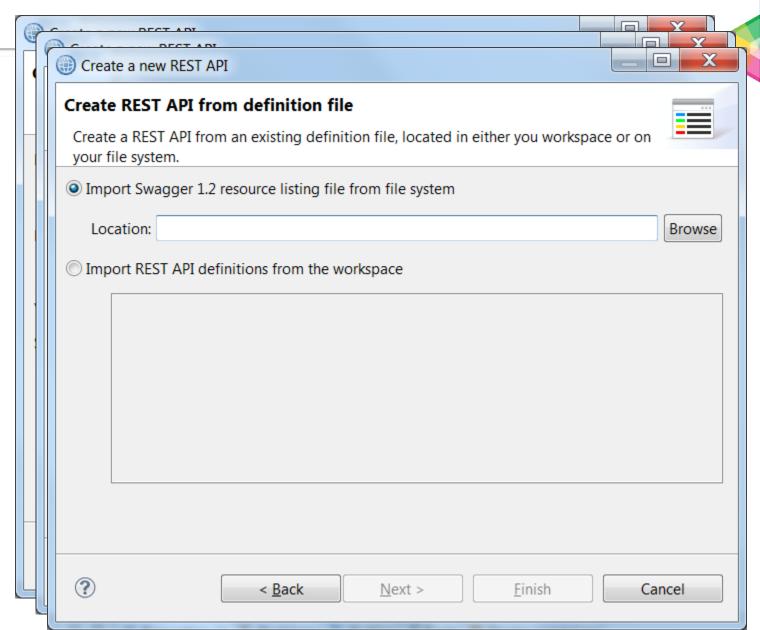
Creating a REST API





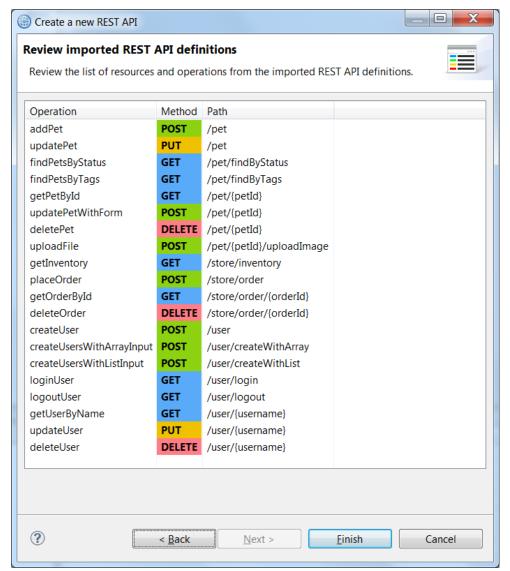


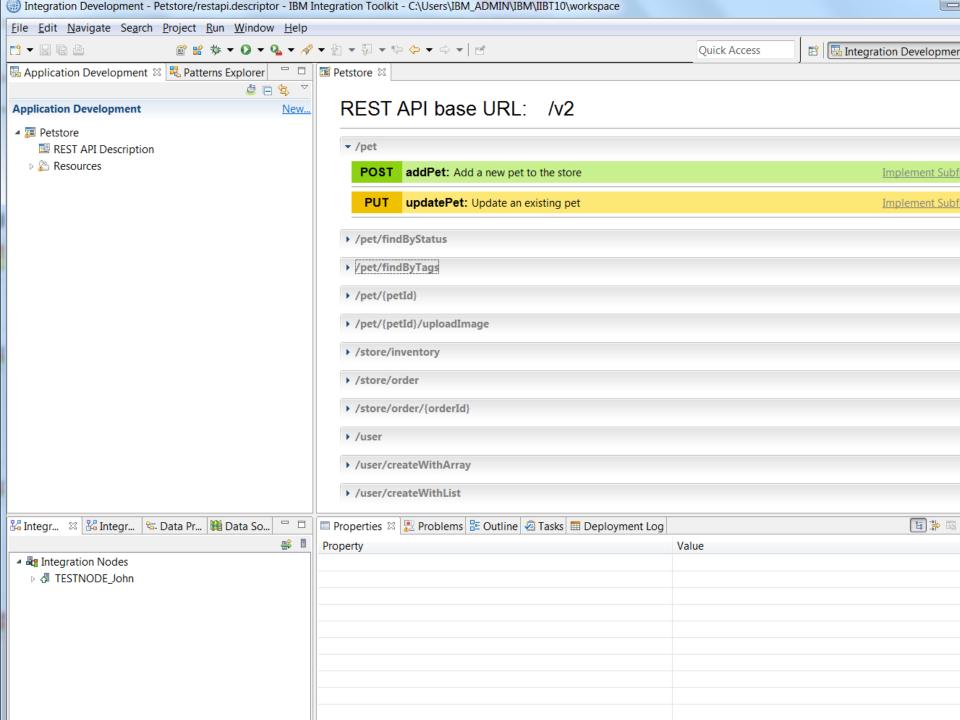


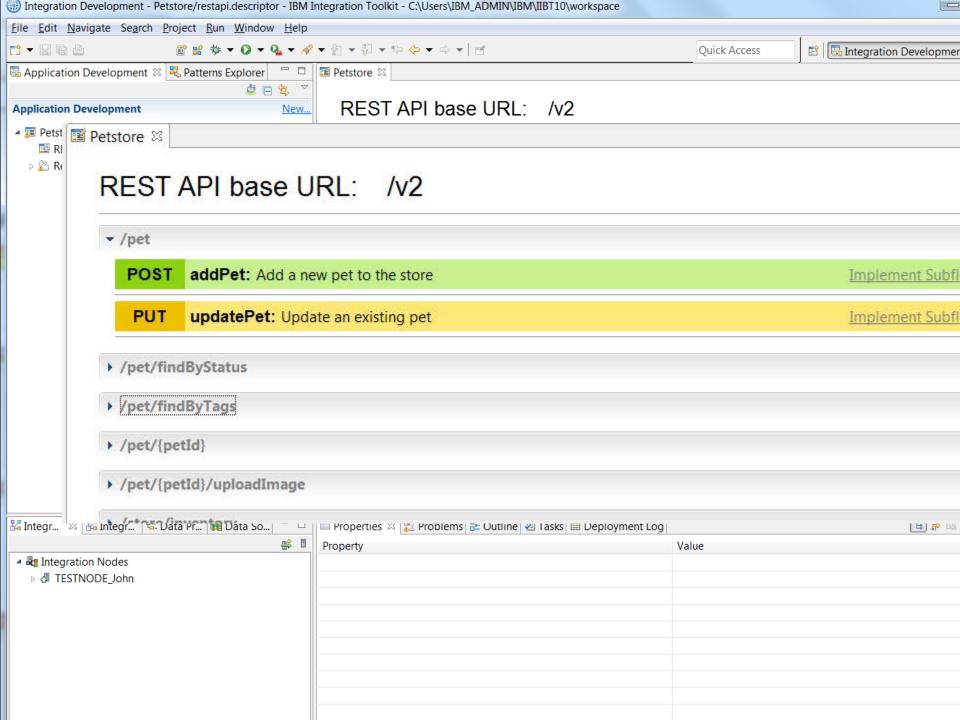


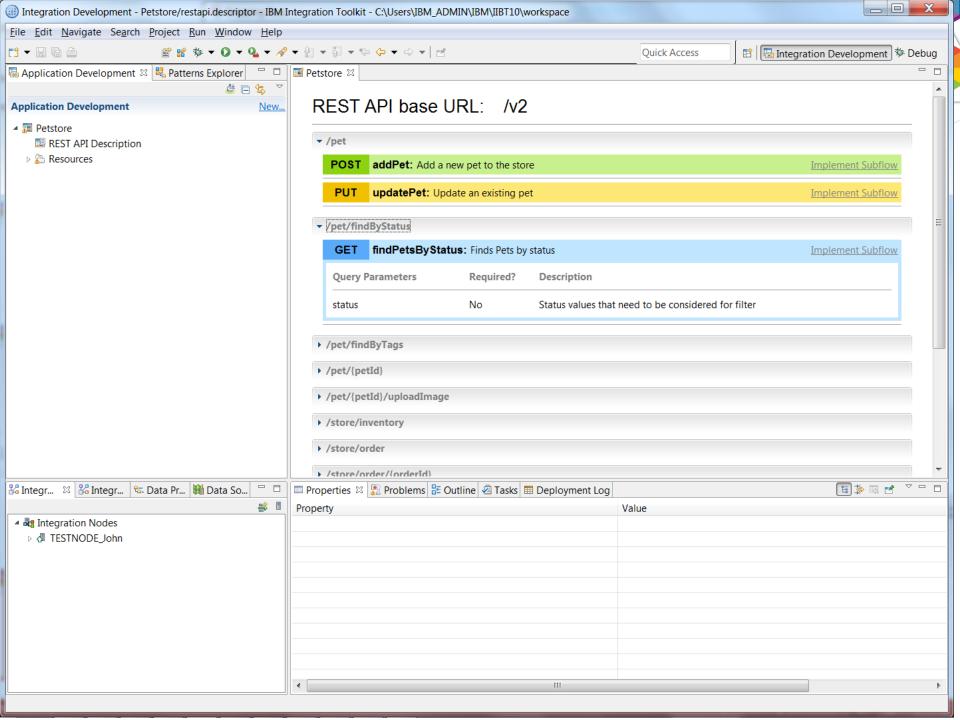
Swagger import

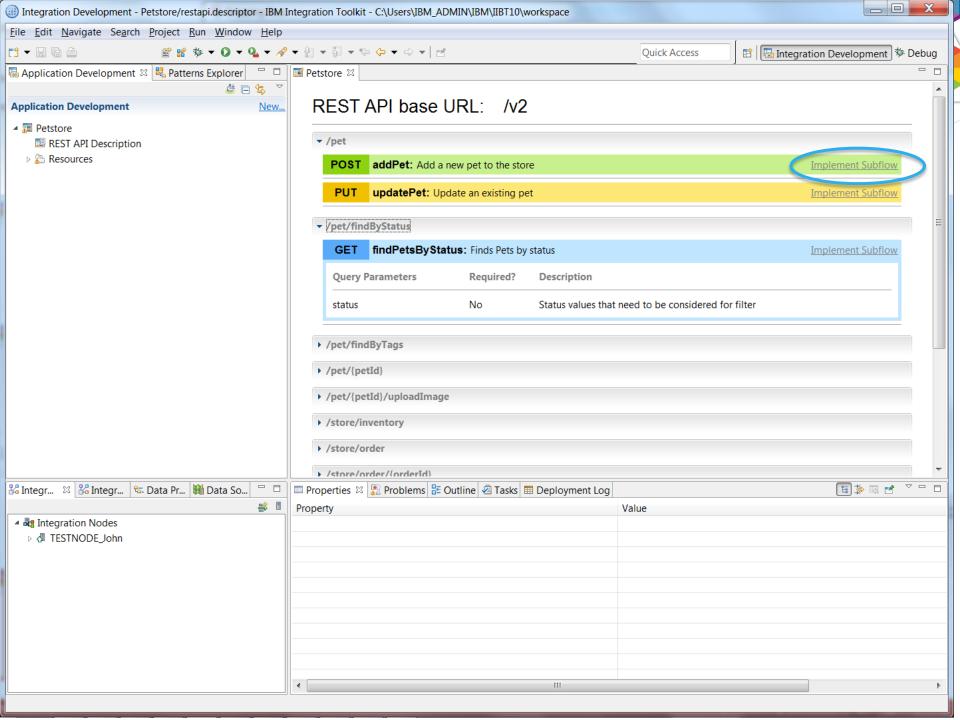


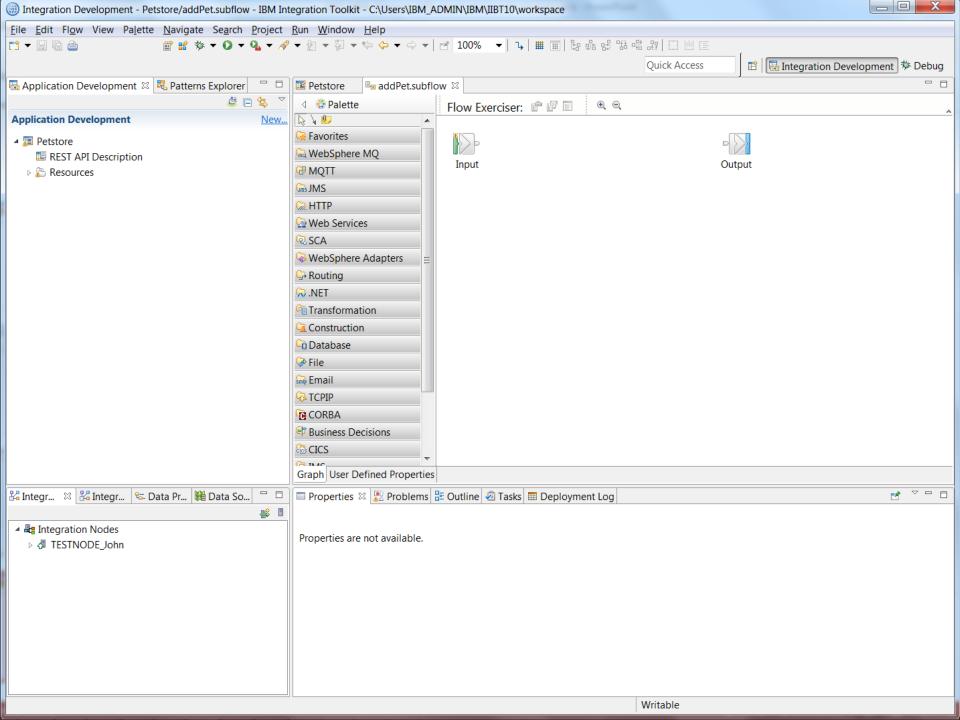


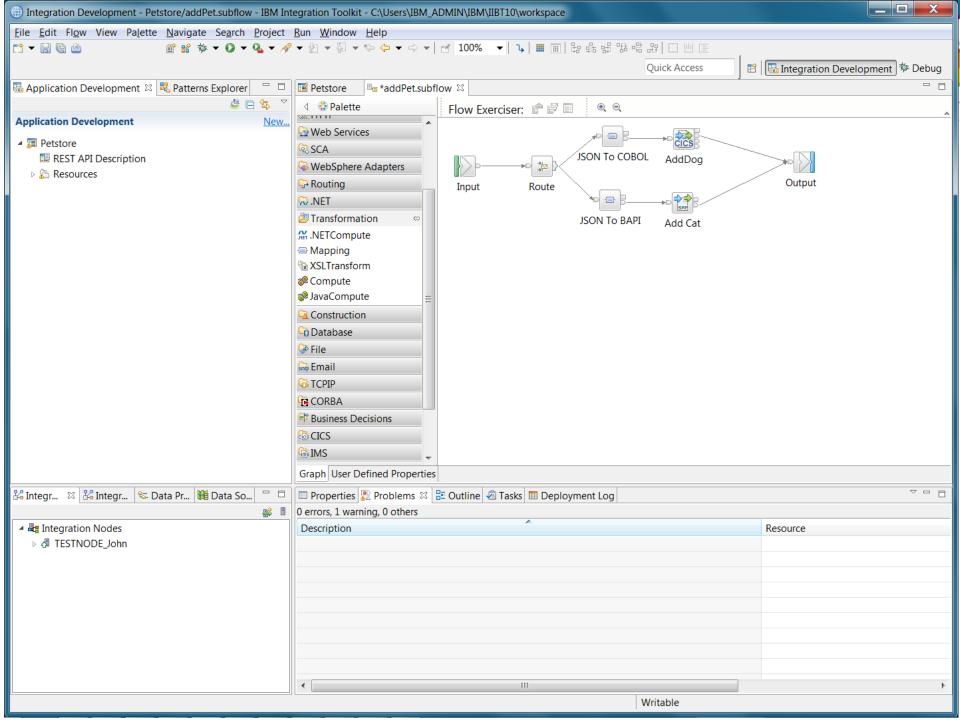


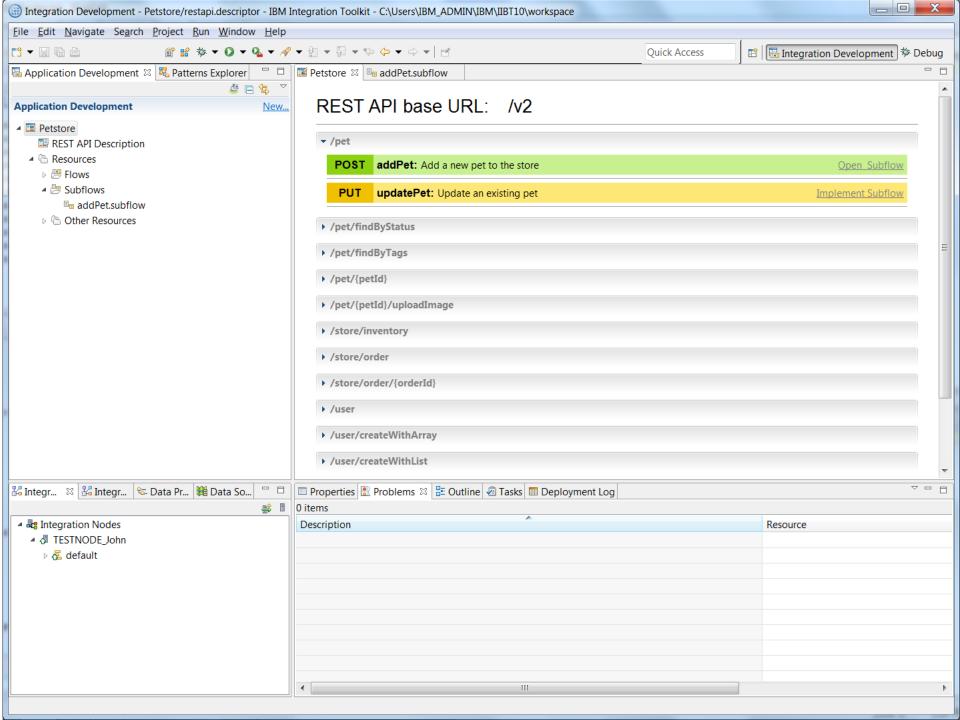


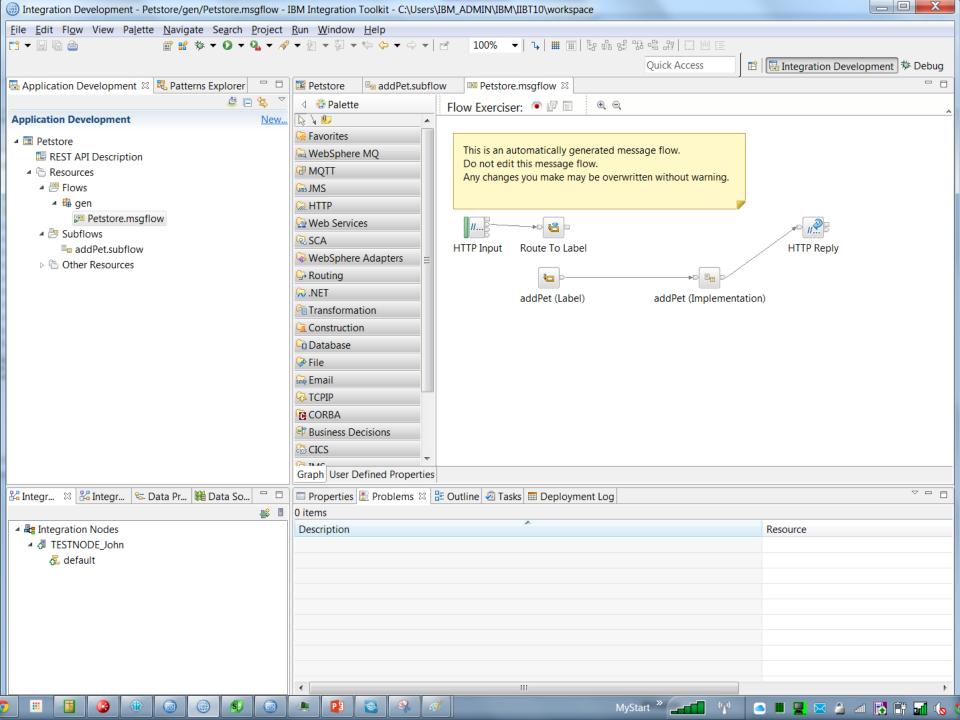














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