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1 Introduction

This is a demo to highlight some of the integration possibilities provided by the JBoss SOA Platform and JBoss Business Rules Management System products. This is an application setup guide for a Home Loan Demo. The setup will create a fully installed and configured SOA-P and BRMS environment so that you can demo the project. It will provide you with a JBoss Developer Studio projects for ESB, BPEL and CEP demos. Also provide is a repository that can be imported into BRMS BRM and demo the web tooling and asset manager BRM tooling.

2 Setup and Configuration

2.1 Installation

You first need to extract the demo distribution zip (homeloan-integration-bpm-demo-\$version.zip) to a location of your choosing. Once extracted, you will have the following folder structure:

- \homeloan-integration-bpm-demo
 - \installs – Initially empty, but will contain the SOA-P and BRMS platform downloads.
 - \projects – The three projects that comprise the demo.
 - \support – Additional supporting files used by the demo.
 - \target – Will be created by running init.sh. Contains the fully configured SOA-P and BRMS runtime server.
 - init.sh – Script to install and configure the run time server environment.
 - mavenize.sh – Script to install Maven dependencies for the BPM project into the local repo, this is integrated into the init.sh but left for clarity.
 - Quick Start Guide.odt – This document

Next, download SOA Platform and BRMS Platform from the Red Hat Customer Portal (<https://access.redhat.com/jbossnetwork>).

Download SOA Platform:

1. Under *JBoss Enterprise Platforms*, select the *SOA Platform* product.
2. Select version *5.3.1 GA* in the *Version* field.
3. Download *SOA Platform 5.3.1*

Download BRMS Platform:

1. Under *JBoss Enterprise Platforms*, select the *BRMS Platform* product.
 2. Select version *5.3.1* in the *Version* field.
 3. Download *JBoss BRMS 5.3.1*
- (Please note that this is the deployable distribution, not the standalone one.)

Now copy these two files, `soa-p-5.3.1.GA.zip` and `brms-p-5.3.1.GA-deployable.zip`, to the `homeloan-integration-bpm-demo`'s *installs* folder. Ensure that these files are executable by running:

```
$ chmod +x <path-to-project>/installs/soa-p-5.3.1.GA.zip
```

```
$ chmod +x <path-to-project>/installs/brms-p-5.3.1.GA-deployable.zip
```

Lastly, from the `homeloan-demo` folder, run the *init.sh* script:

```
$ ./init.sh
```

When the script completes you will have a new folder named *jboss-soa-p-5*, in the `homeloan-integration-bpm-demo`'s *target* folder. The *jboss-soa-p-5* folder is a ready to run SOA Platform 5.3 server runtime with the needed BRMS parts deployed into it and the following modifications made:

- The *admin* account enabled (password is *admin*) in the *soa-users.properties* file in *homeloan-integration-bpm-demo/target/jboss-soa-p-5/jboss-as/server/default/conf/props*
- This account is made available for the inserted BRMS applications by inserting the corresponding application policy in the *login-config.xml* file.
- Registered an additional RiftSaw event listener in the *bpel.properties* file (see *bpel.event.listeners*) located in *homeloan-integration-bpm-demo/target/jboss-soa-p-5/jboss-as/server/default/deploy/riftsaw.sar*.
- Copied the custom RiftSaw event listener implementation jar file (*droolsfusion-eventlistener.jar*) to *homeloan-integration-bpm-demo/target/jboss-soa-p-5/jboss-as/server/default/deploy/riftsaw.sar/lib*.
- Deployed the *jboss-brms.war* (Business Rule Manager/Guvnor) to *homeloan-integration-bpm-demo/target/jboss-soa-p-5/jboss-as/server/default/deploy*. This eliminates the need to have two separate servers running.

Caveat: the script creates an *inboundLoanApplications* directory inside the */tmp* directory. When your machine reboots, the latter is cleared. So before you try to start an existing server as prepared during this setup after a reboot, be sure to manually recreate that directory. Failing to do so will cause a deployment error for “*homeloan-origination-esb.esb*”.

2.2 JBoss Developer Studio 5 Configuration

In this section, you will configure JBoss Developer Studio. Specifically you will add the SOA Platform 5.3 server runtime environment and then import the three projects that make up the home loan integration demo.

Important: It is assumed that you already have JBoss Developer Studio installed. This demo has been tested with JBoss Developer Studio 5.0.x.GA.

Launch JBoss Developer Studio

1. Either select or switch to a new workspace by pointing to the *homeloan-integration-bpm-demo/projects* folder.
2. If the Welcome to JBoss Developer Studio screen appears, dismiss it by click the Workbench arrow in the upper right.

Install SOA tools for ESB and BRMS

1. Open the JBoss Central view (*Help → JBoss Central*), open the *Software/Update* tab, check both the *SOA and Data Services Tooling* and *Business Rules Tooling* boxes and hit the Install button at the bottom.
2. Follow the installation dialogue by selecting all features, accepting licenses and approving of warnings. Finally restart JBoss Developer Studio to complete the installation.

Detect and add a SOA-P 5.3 runtime environment

1. Select *Preferences* from the *Window* menu.
2. In the left hand side, expand *JBoss Tools* and then select *JBoss Tool Runtime Detection*
3. Select the Add button and navigate to the *homeloan-integration-bpm-demo/target* folder, then select *OK*.
4. The SOA-P 5.3 runtime created earlier should have been found and selected (it will say 5.1 under the version, though, but that refers to the underlying EAP version). If so, select *OK*.
5. Select *OK* again to close the Preferences dialog window.

Import Projects

1. Select *Import...* from the *File* menu.
2. Expand the *General* folder, and then select *Existing Projects into Workspace*
3. Select the *Browse* button to *Select root directory*, you should be in the *homeloan-integration-bpm-demo* folder (if not, then navigate there) and then select *OK*.
4. Make sure the three projects (*homeloan-origination-bpel*, *homeloan-origination-cep*, and *homeloan-origination-esb*) and then select *Finish*.
5. The projects are now imported. Note that you might see the *Problems* view report 4 errors. This is due to bad build path errors on two of the projects (marked with red exclamation points).
6. Fix errors by right-clicking on *homeloan-origination-cep* project, select *Properties*, select *Java Build Path*, select *Libraries* tab, select *JRE System Library* marked with red star, click button *Edit...*, pop-up listing of JRE System Library appears, select *Workspace default JRE* button and *Finish*. This project will rebuild and be fixed.
7. Fix errors in *homeloan-origination-esb* project by following same process listed in previous step.

2.3 Configure and start the JBoss Enterprise SOA Platform

In this section, you will start the server from within JBoss Developer Studio, but before that you will make sure that the server will get enough memory for the additional BRMS functionality.

1. Select the *Servers* view
If it is currently not open, select *Show View --> Other...* from the *Window* menu and search for the *Servers* view.
2. You should see the *jboss-soa-p* server you created in section 2.2.
3. Double click on *jboss-soa-p* to open the server's overview page. Under *General Information*, click the link *Open launch configuration*.
4. Change the VM arguments from *'-Xms256m -Xmx768m'* to *'-Xms1303m -Xmx1303m'* (leave the rest of the parameters as they are), and close the pop-up with the *OK* button. You can also close the overview page now.
5. Right click on *jboss-soa-p* and select *Start* from the pop-up menu. In a few minutes your JBoss Enterprise SOA Platform with BRMS will be running.

2.4 Importing Rule Repository

In this section, you will import all of the JBoss Enterprise BRMS artifacts into the Business Rules Manager (a.k.a. Guvnor).

1. Open up your Web browser of choice and navigate to <http://localhost:8080/jboss-brms/>.
2. Use the default credentials of *admin/admin*.
3. Upon logging in, you will see the following prompt:

**This looks like a brand new repository.
Would you like to install a sample repository?**

Important: Please be sure to select *No thanks*.

4. Select the *Administration* section on the left hand side.
5. From the *Administration* list select *Import Export*. This will open the *Import Export* window.
6. Now select *Browse...* (or *Choose File*) and navigate to *homeloan-integration-bpm-demo/support* folder and select the *repository_export.zip* file.
7. Lastly, select the *Import* button. Select *OK* to confirm that you want to import the artifacts.

2.5 Deploying Demo Artifacts

The last bit of set-up involves deploying the projects you previously imported.

1. In JBoss Developer Studio, select the *Servers* view.
If it is currently not open, select *Show View --> Other...* from the *Window* menu and search for the *Servers* view.
2. Right click on *jboss-soa-p* and select *Add and Remove...* from the pop-up menu. This will open the *Add and Remove* dialog.
3. Select the *homeloan-origination-bpel* and *homeloan-origination-esb* projects and click the *Add >* button to add them to the *Configured* section. Should a project not be listed, then just right-click on it and mark it as *Deployable*.
4. Now select *Finish* to deploy these projects the JBoss Enterprise SOA Platform

That is it!! You have successfully installed and configured the Home Loan Integration demo application.

3 Running the Demo

3.1 BPEL based demo

3.1.1 Endpoint Addresses

When the demo is fully deployed, three Web service endpoints are published.

- <http://localhost:8080/JBHomeLoans/HomeLoanPreQualification>
 - This endpoint to start a new pre-qualification process via a SOAP Web service and is one of the primary ways to start the demo. There is a sample SOAP message in the *homeloan-origination-esb* project. The file is names *AddApplicationSOAPRequest.xml* and is located in the *esbcontent/resources/sampleMessages* folder.
- <http://localhost:8080/homeloan-origination-esb/ebws/homeloan-origination-demo/PreQualDecisionService>
 - This endpoint is an ESB Web Service (EBWS) and exposes the BRMS knowledge base as a decision service. It is used by the BPEL process but can be called independently if you are just showing the BRMS capabilities. There is a sample SOAP message in the *homeloan-origination-esb* project. The file is names *PreQualificationDecisionRequest.xml* and is located in the *esbcontent/resources/sampleMessages* folder.
- <http://localhost:8080/JBHomeLoans/CreditReport>
 - This is another BPEL process, named *CreditReportProcess.bpel*. It is used by *HomeLoanPreQualification.bpel* to simulate obtaining a credit report from an outside credit agency. There is no reason to call this directly and as such there is no defined sample message for this service.

There is also a file-based listener endpoint used to receive new pre-qualification applications via the file system.

- `/tmp/inboundLoanApplications`
 - Saving a file with a *.loan* extension to this folder will trigger the ESB listener to start a new loan application process. This is similar to the Web service defined above, but using a file location instead of a URL endpoint. There is a sample SOAP message in the *homeloan-origination-esb* project. The file is names *AddApplicationFileRequest.xml* and is located in the *esbcontent/resources/sampleMessages* folder. Results should be a text file *PreApprovalResponse.txt* with an xml reply filled with results data.

3.1.2 Making the demo have different behavior

There are a few pieces of data in the message which cause the demo application to behave differently.

- Applicant's Social Security Number.
 - The first three digits of the applicant's social security number determines their credit score . For Example, if the social security number is 720-55-1234 then they will have a credit score of 720 returned from the credit agency. This is used in the Credit Score Range decision table and normally results in the loan either being approved or not being approved.

- Also, if the credit score is an odd number, it will add a one second delay to completing the pre-qualification process. This is useful when demoing the complex event processing scenario as the extra time will cause this process to typically exceed the threshold and cause an SLA violation to be printed on the console
- Other data in determining the outcome of the pre-qualification process include the loan amount, the deposit amount, if the applicant is self-employed or not, and the length of the loan. Take a look at the Pricing loans decision table to see how this impacts the loan decisions.

3.2 BPM based demo

3.2.1 Running the BPMN demo from Business Central

In this section, you will be running the process from Business Central (a.k.a. the jBPM console). For this to work, we first have to publish the process in Guvnor.

1. Open up your Web browser of choice and navigate to <http://localhost:8080/jboss-brms/>.
2. Use the default credentials of *admin/admin*.
3. Choose *Knowledge Bases* from the menu on the left (bottom), open the *Packages* and select *mortgages*.
4. Select the *Edit* tab, validate the configuration and build the package.

Now the process and its dependencies are available to the jBPM console.

1. In the Web browser, navigate to <http://localhost:8080/business-central>.
2. Use the default credentials of *admin/admin*.
3. Choose *Processes* from the menu on the left (bottom) and select *Process Overview*.
4. Select the *HomeLoan* process, and click *Start*.
5. Click *OK* to confirm that you really want to start a new execution.

Take a look at the server log in the JBDS console view (or the file in the *homeloan-integration-bpm-demo/target/jboss-soa-p-5/jboss-as/server/log/* directory), and see that the process has run its course by checking for *[STDOUT]* comments indicating the path through the nodes and the final approval or rejection.

3.2.2 Running the BPMN demo from JBDS

For running the demo from the IDE, an additional project has to be included. This one is based on a Maven setup; it is assumed Maven itself is already installed.

Start off in the *homeloan-integration-bpm-demo* directory. If you ran the *init.sh* script initially, then the BRMS libraries have been added to your Maven repo. Now change to the *projects/ homeloan-integration-bpm* folder:

```
$ cd projects/homeloan-integration-bpm
```

To prepare for importing the project in Eclipse, run the following too:

```
$ mvn eclipse:eclipse
```

Now the project can be imported into JBoss Developer Studio as the ones in section 2.2:

1. Select *Import...* from the *File* menu.
2. Expand the *General* folder, and then select *Existing Projects into Workspace* and click *Next*.
3. Again, select the *Browse* button to *Select root directory*, you should be in the *homeloan-integration-bpm-demo's projects* folder (if not, then navigate there) and then select *OK*.
4. Select only the *homeloan-integration-bpm* project, and click *Finish*.
5. The project now appears in the Package Explorer (and similar views).

There are two ways to run the process in Jboss Developer Studio (both depend on the BRMS server to run and have at least the BPEL project deployed):

Run the process as a Java application

1. Open the *homeloan-integration-bpm* project, open the *src/main/java* source folder and finally open the *org.jbpm.homeloan* package.
2. Right-click on the *ProcessMain.java* class, hover over *Run As* and select *Java Application*.
3. The console now displays the logging output of the process as it runs.

The outcome of the process can be manipulated by changing the values in the *application.xml* file in the *src/test/resources* directory.

Run the process as a JUnit test

Several (fixed) scenarios are available as JUnit tests. To run them all sequentially:

1. Open the *homeloan-integration-bpm* project, open the *src/test/java* source folder and finally open the *org.jbpm.homeloan* package.
2. Right-click on the *ProcessTest.java* class, hover over *Run As* and select *JUnit Test*.
3. The JUnit view starts to run all tests one after another, and the console displays the logging output of each process as it runs.
4. The JUnit bar is green.