



**Red Hat Reference Architecture Series**

# **JBoss Business Rules Management System (BRMS) Quickstart Guide**

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## **JBoss Business Rules Management System (BRMS) Quickstart Guide**

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# Table of Contents

1 Executive Summary.....	4
2 System Setup.....	5
2.1 x.....	5
2.1.1 x.....	5
3 Running the Examples.....	6
3.1 Starting the BRMS Console.....	6
3.2 The Main Console.....	8
3.3 The Search Feature.....	8
3.4 Exploring the Sample Repository.....	10
3.5 QA Testing.....	20
3.6 Package/Version Control.....	35
4 What Now?.....	38



# 1 Executive Summary

The JBoss Business Rules Management System (BRMS) is a web-based tool to help author, create, manage and test rules. This quickstart guide will help you get started using the BRMS to author, test, package, and publish rules. It will also walk you through system setup, running the examples, plus authoring new rules, test cases, etc.

SectionError: Reference source not foundpresents some commonly used definitions of cloud computing.

SectionError: Reference source not founddiscusses the phased adoption of cloud computing by enterprises from the use of virtualization, to the deployment of internal clouds and leading to full-functional utility computing using private and public clouds.

SectionError: Reference source not founddescribes the software infrastructure for Red Hat Cloud Foundations.

SectionError: Reference source not founddescribes the software, server, storage, network configuration used for this proof-of-concept.

SectionError: Reference source not foundis a quick overview of Red Hat Cloud Foundation, edition One: Private IaaS Cloud published in a separate reference architecture paper.

SectionsError: Reference source not found,Error: Reference source not foundandError: Reference source not founddescribe the detailed steps for deploying Red Hat Cloud Foundations, Edition One: Hybrid IaaS Clouds.

SectionError: Reference source not foundprovides an overview of Amazon's Elastic Compute Cloud (EC2) including procedures to configure an AWS account, configure an EC2 environment, and start EC2 instances.

SectionError: Reference source not founddefines the workload used.

SectionError: Reference source not foundlists referenced documents.

Future versions of the Red Hat Cloud Reference Architecture will take these concepts further:

- Red Hat Cloud Reference Architecture: Adding self-service
- Red Hat Cloud Reference Architecture: Managing mixed private clouds
- Red Hat Cloud Reference Architecture: Adding public clouds
- Red Hat Cloud Reference Architecture: Creating large-scale clouds



## 2 System Setup

x

### 2.1 x

x

#### 2.1.1 x

x

#### 2.1.2



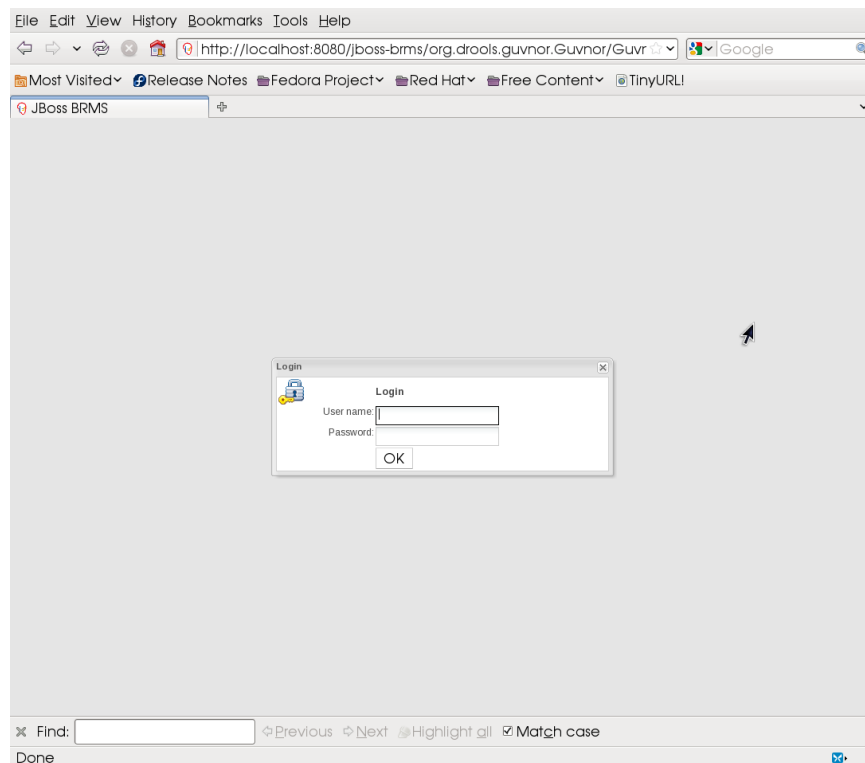
## 3 Running the Examples

### 3.1 Starting the BRMS Console

To start the BRMS console, open up a web browser and connect to the following URL:

**`http://localhost:8080/jboss-brms`**

You will be redirected to the BRMS login page:



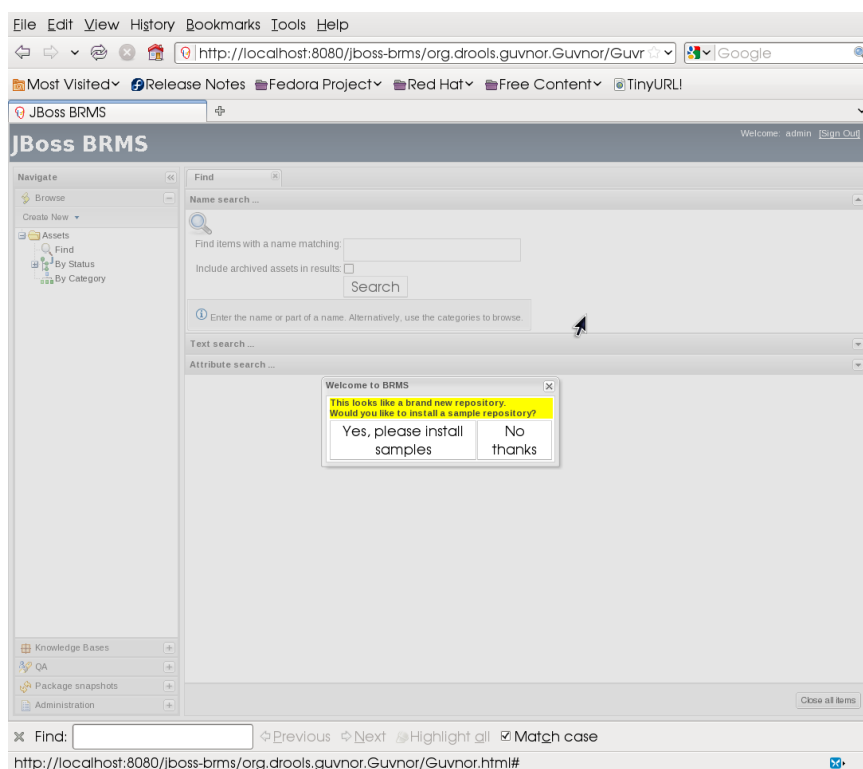
Enter the following credentials:

Username: **admin**

Password: **admin**

Select **OK**.

When you first login to the BRMS console, you will be prompted whether to install a sample repository to acquaint you with BRMS functionality:

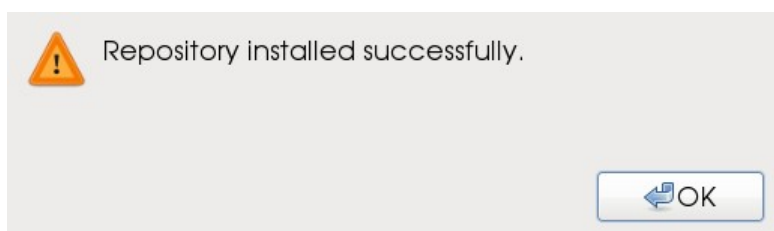


Select **Yes, please install samples**. You will then be asked to confirm your decision:



Select **OK**.

A confirmation dialog will appear:



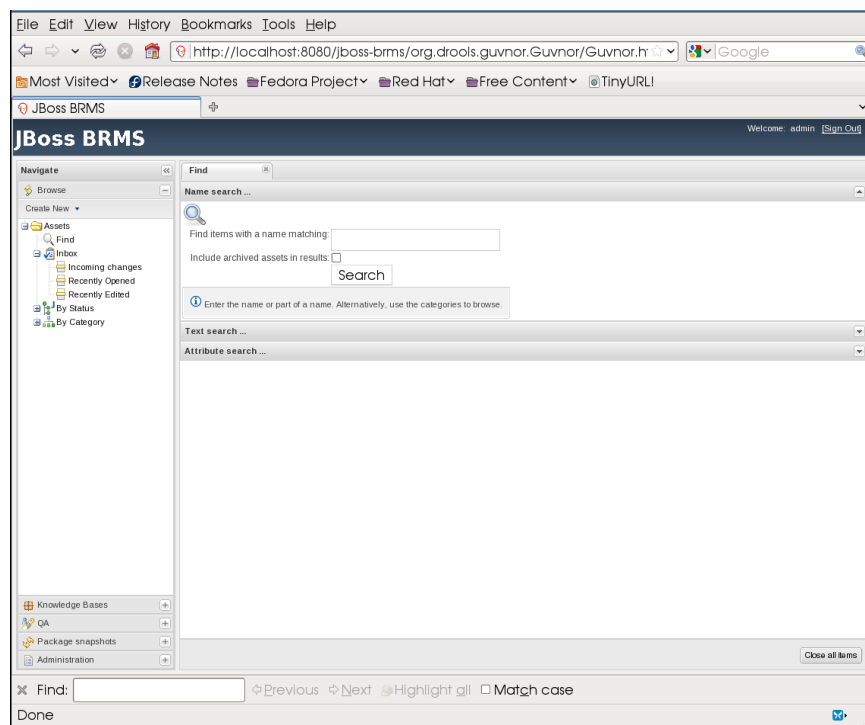


Select **OK**.

## 3.2 The Main Console

You should now see the BRMS main console. The console is comprised of two basic sections:

- The left-hand pane, comprised of vertical tabs that provide links to model components, QA tooling, package management, etc.
- The main pane, comprised of horizontal tabs that appear whenever an item is selected from the left-hand pane.

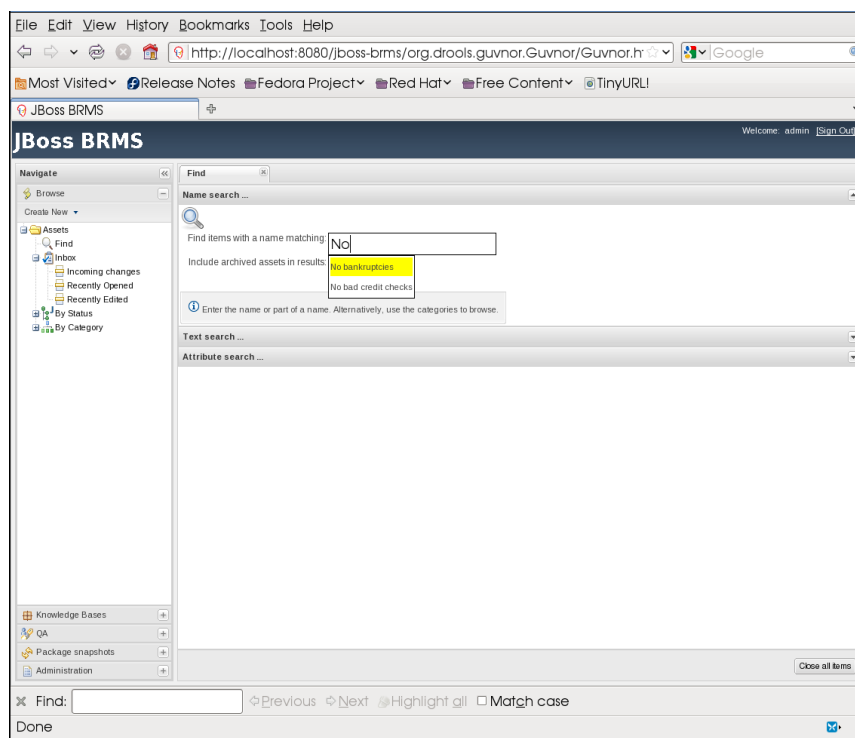


Navigate across the various left-hand pane tabs to familiarize yourself with the BRMS console. Select various components within the tabs to view the results in the main pane. You may want to close each new tab in the main pane to reduce clutter.

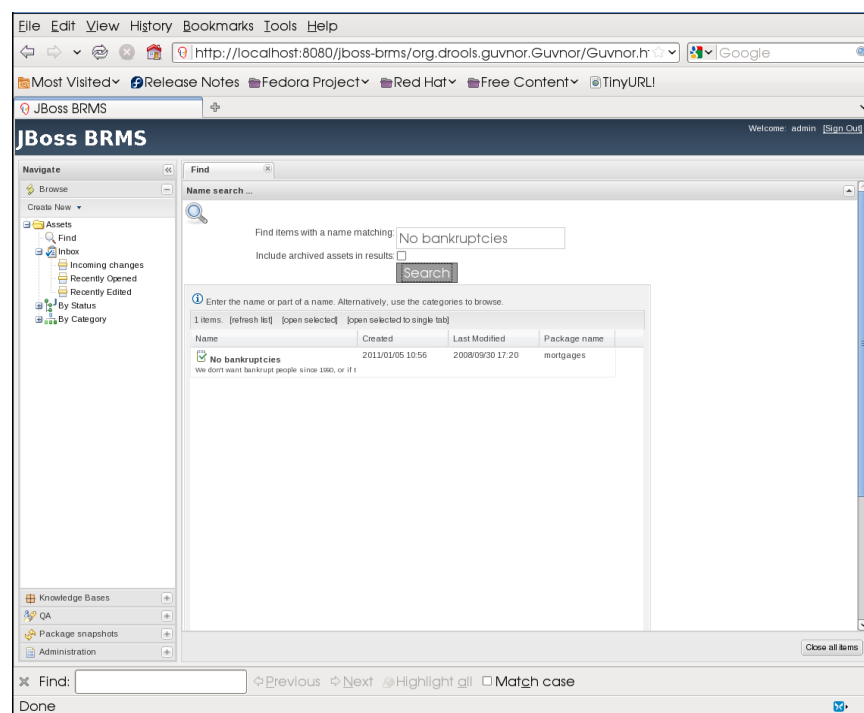
## 3.3 The Search Feature

The first tab to appear in the BRMS console main pane is the Find tab. Enter the string **No** in the **Find items with matching** field of the Find tab:





Notice how the field resolves results that match the given string. Select **No bankruptcies** then **Search** to view the following results:

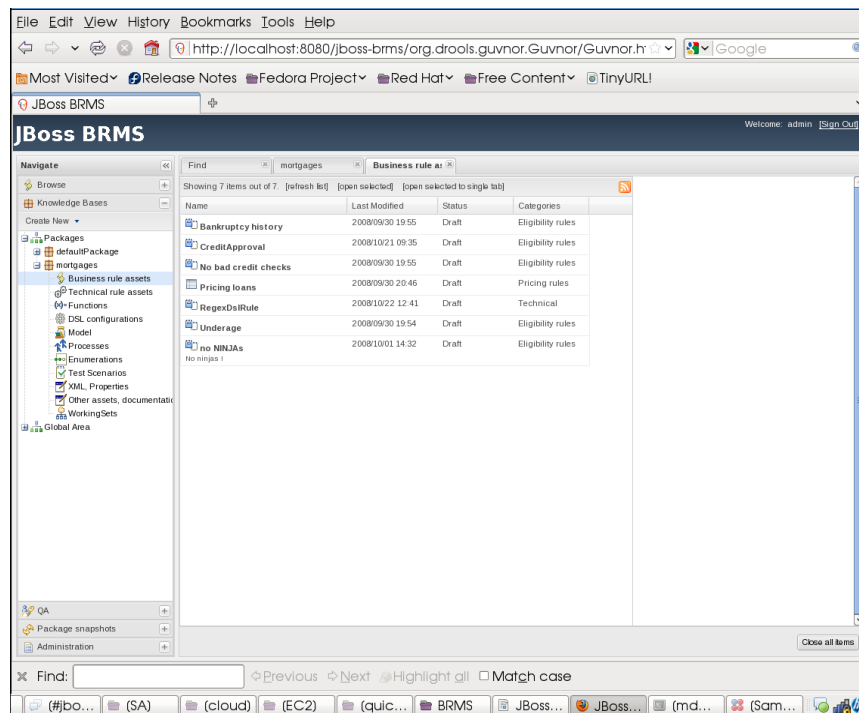




Close the results tab by selecting the 'x' on the tab's upper right corner.

### 3.4 Exploring the Sample Repository

You are now ready to explore the sample repository. From the left-hand pane, go to the **Knowledge Bases** tab and expand the **mortgages** package. Select the **Business rules assets** asset:



Double-click on **Pricing loans**. The following will appear:



The screenshot shows the JBoss BRMS web interface. The browser address bar displays `http://localhost:8080/jboss-brms/org.drools.guvnor.Guvnor/Guvnor.htm`. The page title is "JBoss BRMS". The left sidebar shows a navigation tree with "Business rule assets" selected. The main content area displays a "Decision table" for "mortgages". The table has columns: "Row Num", "Des", "amount min", "amount max", "period", "income", "deposit max", "Loan approved", "LMI", and "rate". The table contains three rows of data, grouped under "Income: Asset (1 Item)" and "Income: Job (2 Items)".

Row Num	Des	amount min	amount max	period	income	deposit max	Loan approved	LMI	rate
1	Income: Asset (1 Item)	121000	200000	30	Asset	20000	true	0	2
2	Income: Job (2 Items)	10000	100000	20	Job	2000	true	0	4
3		100001	130000	20	Job	3000	true	10	6

This is a decision table, which is essentially a spreadsheet for storing tabular data used by the rule engine. In this case, it maps incomes, the loan requested, down payments, etc. pertinent to a list of loans.

Select the downward facing arrow in the upper right corner of the decision table. (You might need to move the horizontal scrollbar on the bottom of the table toward the right.) This will display the Java objects mapped to this table.



JBoss BRMS interface showing the Decision table editor. The 'Condition columns' section is expanded, showing a list of columns: amount min, amount max, period, income, deposit max, Loan approved, LMI, and rate. The 'amount min' column is selected, and a pencil icon is visible next to it.

Locate the **Condition columns** section, then the **amount min** column. Click on the pencil icon located next to the **amount min** and note the resulting pop up:

JBoss BRMS interface showing the Decision table editor. The 'Condition column configuration' dialog box is open, showing the configuration for the 'amount min' column. The dialog box includes fields for Pattern, Calculation type, Field, Operator, (optional) value list, Column header (description), and Default value. The 'amount min' column is selected, and the 'amount min' column header is visible in the table below.



This describes how the **amount min** column configuration.

Select the 'x' to close the pop up box. Click the upward facing arrow in the upper right corner of the decision table. (You might need to move the horizontal scrollbar on the bottom of the table toward the right.)

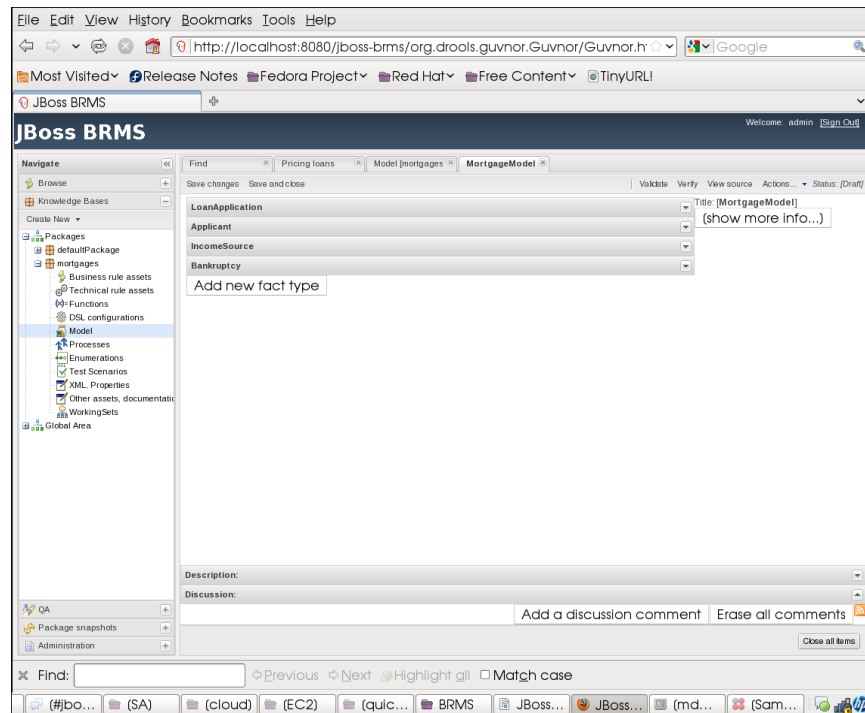
Under the **Income: Job** section, select row 2. (Note the row is highlighted.) Double-click on the **20** value under the **period** column. The following pop up will appear:

The screenshot shows the JBoss BRMS web interface. The left-hand pane displays a tree view of packages, with 'mortgages' selected. The main pane shows a 'Decision table' for 'Pricing loans'. The table has columns: Row Num, Del, amount min, amount max, period, income, deposit max, Loan approved, LMI, and rate. There are three rows of data. Row 2 is highlighted. A pop-up dialog box is open over the '20' value in the 'period' column of row 2, showing a dropdown menu with '20' selected and an 'OK' button.

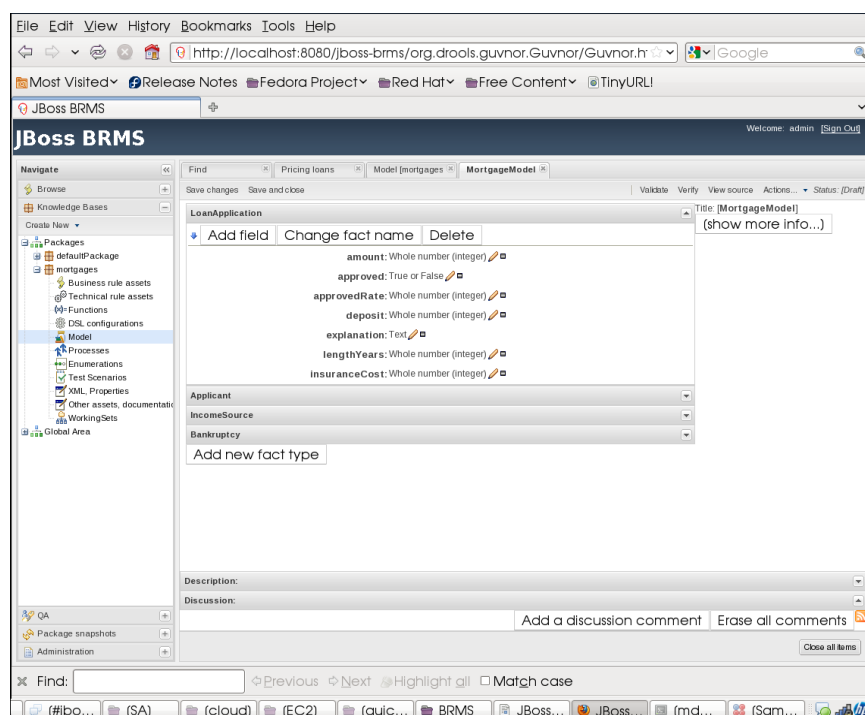
Row Num	Del	amount min	amount max	period	income	deposit max	Loan approved	LMI	rate
1		131000	200000	30	Asset	20000	true	0	2
2		10000	100000	20	Job	2000	true	0	4
3		100001	130000	20	Job	3000	true	10	6

Using the enumerated droplist, change the period value from '20' to '25', then select **OK**. Note the change in the loan period. (You might want to close some tabs at this point to reduce clutter.)

Return to the **mortgages** package on the left-hand pane and select on **Model**. On the resultant pane is a 'domain model' called **MortgageModel**. Double click on **MortgageModel** domain model. The following will appear:

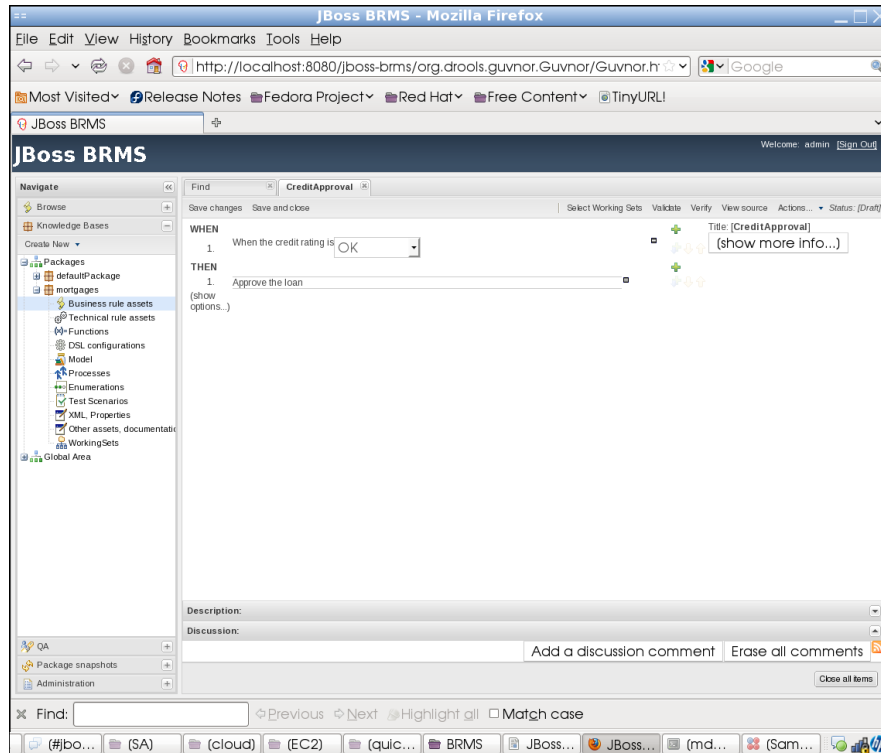


The resultant tab displays a set of 'facts' associated with this domain model. A fact is analogous to a Java object. Select the downward facing arrow to the right of the **LoanApplication** fact. The following will appear:



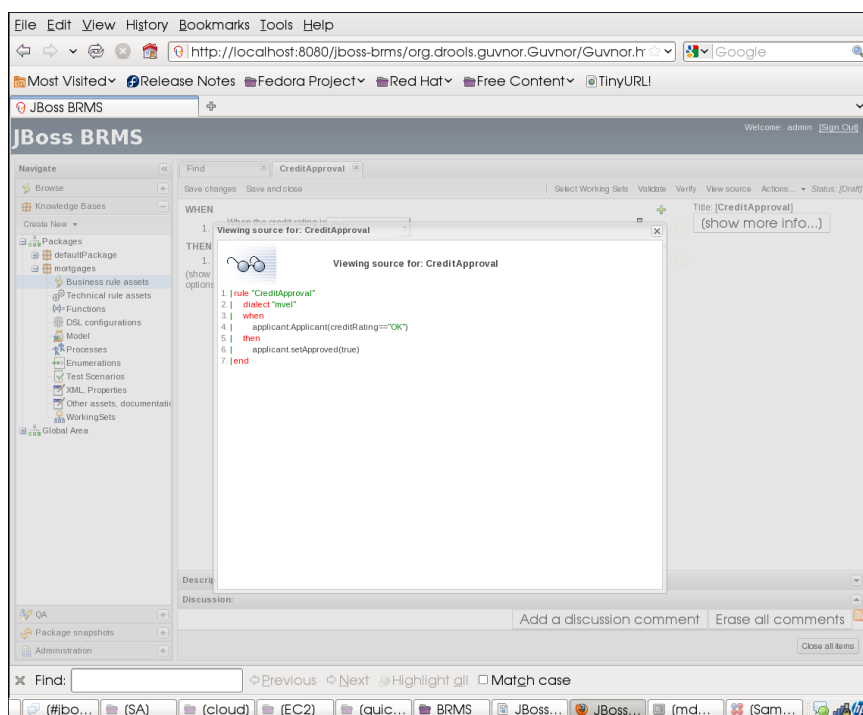
You will now see the member fields of the **LoanApplication** object. Select the other facts in the domain model to gain a better understanding of how facts can be represented.

Select the **Business rule assets** located under the **mortgages** package and double-click on the **CreditApproval** business rule.



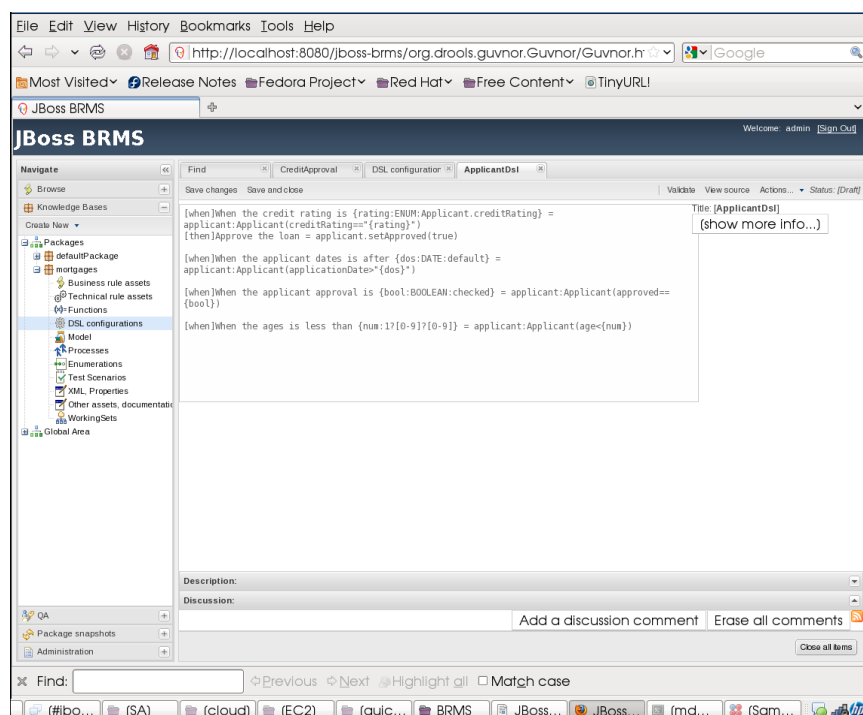
This is an example of the Domain Specific Language (DSL)-based rule. A DSL is used to guide a business user or analyst in writing rules. Note that the technical language typically associated with a rule is replaced with terms such as **When the credit rating is** and **Approve the loan**. To view the technical equivalent of this rule, select the **View source** button on the menu bar:





Close the rule source by selecting the 'x' in the upper-right.

You can also view the DSL configuration file used to create this DSL-based rule. Select **DSL configurations** under the **mortgages** package, then double click on the **ApplicantDsl** DSL configuration file:

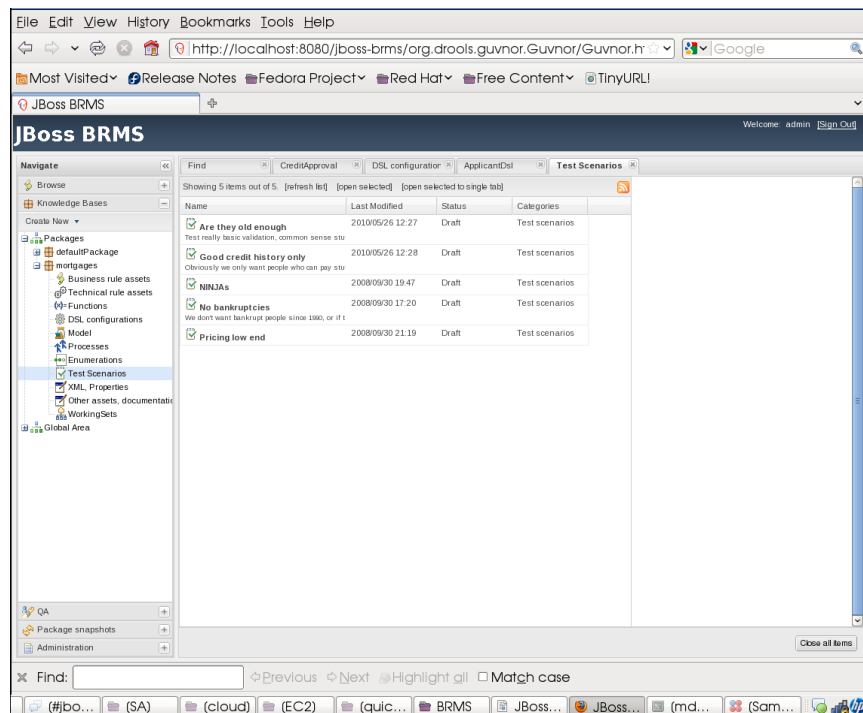




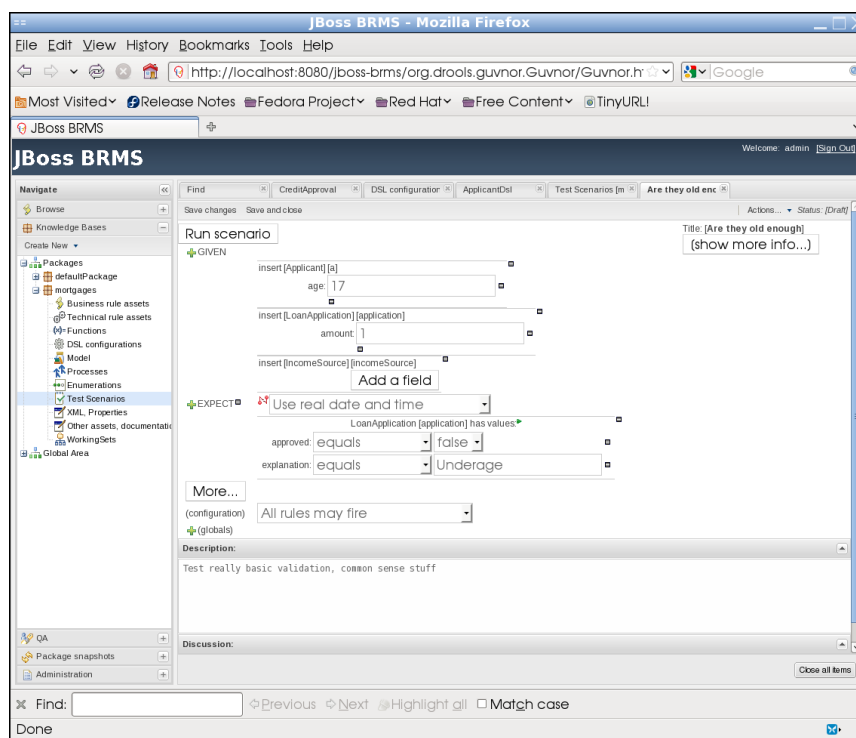
## 3.5 QA Testing

We have explored some of the assets that make up rules. We will now explore how to test rules.

Select **Test Scenarios** under the **mortgage** package:

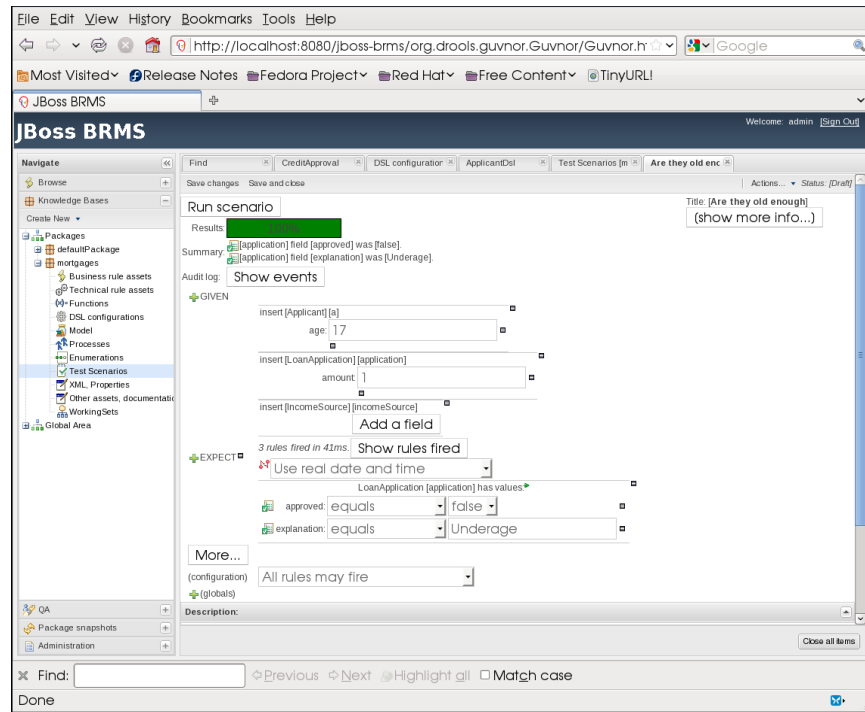


You will see five different test scenarios used to test the existing rule base. Double-click on the **Are they old enough** scenario:



This scenario tests how the rules will fire against an underage (17-year old) applicant. The expected result of the test is that the **approved** value will be **false** and the explanation will be **Underage**.

Select the **Run Scenario** button. The result of the test should return as 'successful' (that is, the result matched the expected results mentioned previously).

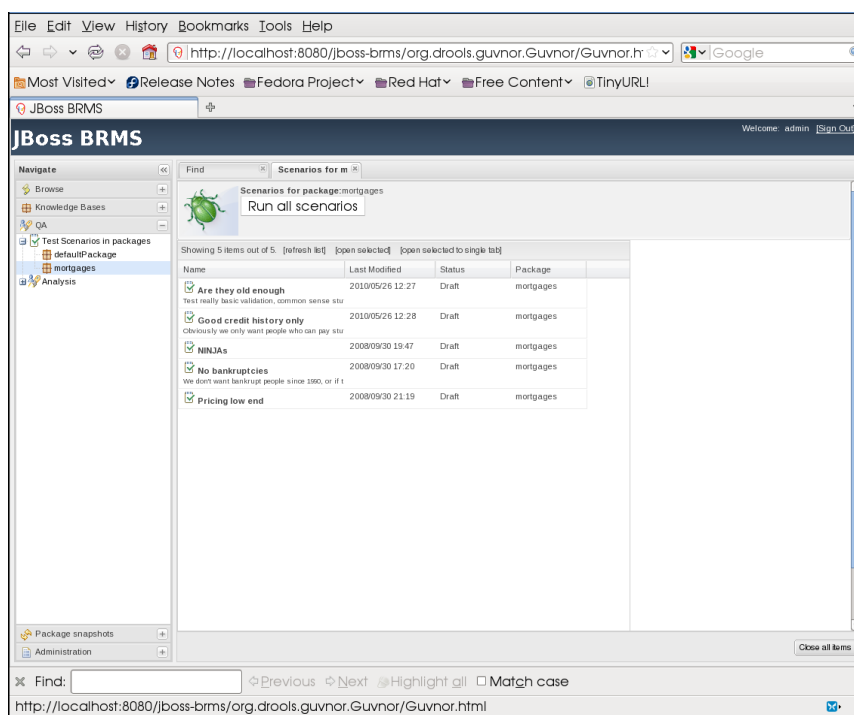


Note the green bar (indicating that all rules fired successfully) and the results of the rule firings below the bar.

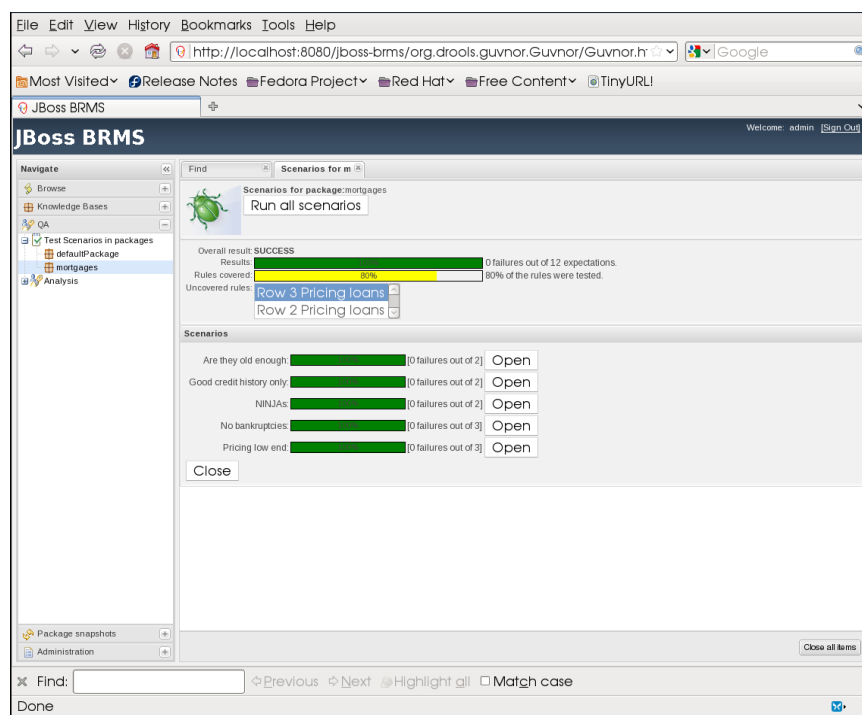
You may directly modify the test scenario conditions and re-execute **Run scenario** to test against similar conditions. For instance, try the following:

- Change the age to 22. Notice that the bar turned to 50% red. This is because the expected result of **Underage** was not found. (Note: Select the **Show events** button to see a more detailed explanation of how the rules fired.)
- Change the age back to 17, but set the **approved** value to **true**.

You can also execute test scenarios by select the **QA** left-hand tab, then selecting the **mortgages** package under **Test Scenarios in packages**:



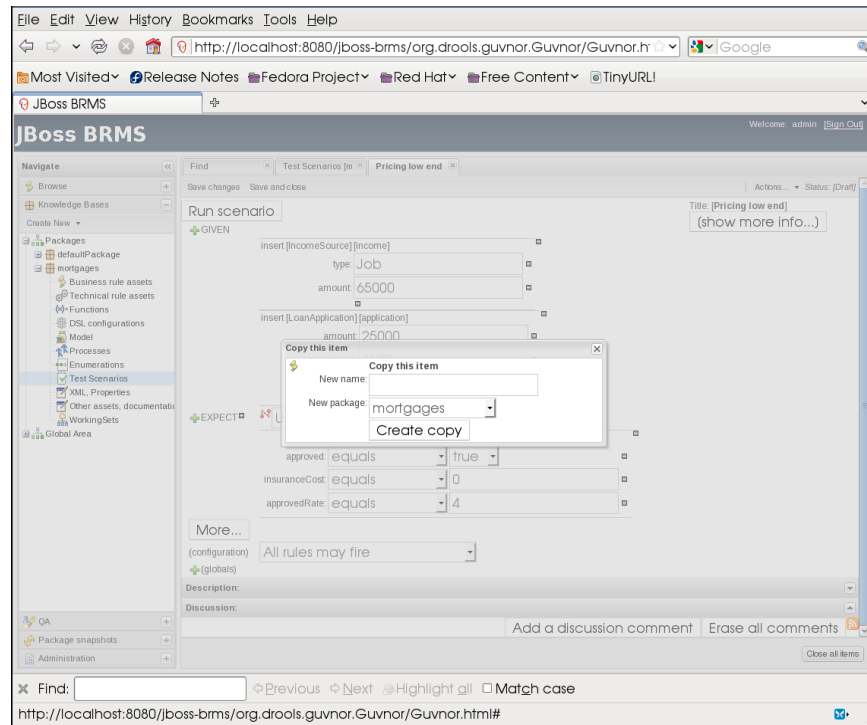
From this screen, you have the option of executing all test scenarios. Select the **Run all scenarios** button:



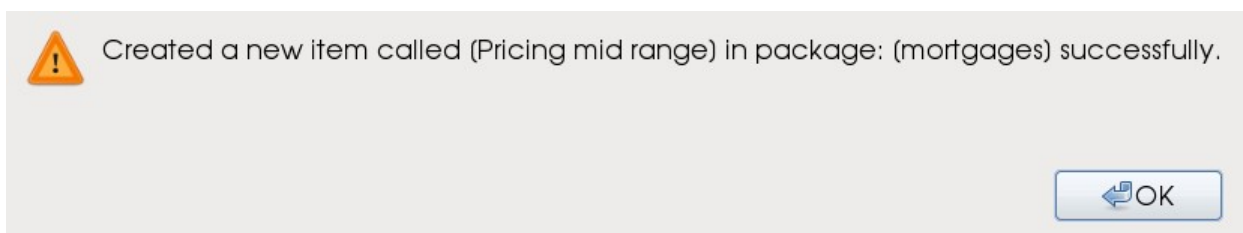


Notice that there were no errors in executing the test scenarios (the green bar), but only 80% of the rules were actually fired (the yellow bar). Below the yellow bar, there are two uncovered rules: **Row 3 Pricing loans** and **Row 2 Pricing loans**. Let's create some test scenarios to cover both rules.

Select the **Knowledge Bases** left-hand tab, then **mortgages** and **Test Scenarios**. Double-click on the **Pricing low end** test scenario. In the upper right corner, select the **Actions** droplist, then select **Copy**:



Name this copy as **Pricing mid range** and select the **Create copy** button. You will see the following confirmation:



Select OK. Close the recently opened tabs (including **Test Scenarios**), and reselect the **Test Scenarios** asset under **mortgages**. (You may also instead select the **refresh list** link near the upper left-hand corner of the test scenario.) You will now see the new **Pricing mid range** test scenario:



The screenshot shows the JBoss BRMS web interface. The left sidebar contains a 'Navigate' menu with options like 'Browse', 'Knowledge Bases', 'Create New', 'Packages', 'defaultPackage', 'mortgages', 'Business rule assets', 'Technical rule assets', 'Functions', 'DSL configurations', 'Model', 'Processes', 'Enumerations', 'Test Scenarios', 'XML Properties', 'Other assets, documentation', 'WorkingSets', and 'Global Area'. The main area displays a table of test scenarios:

Name	Last Modified	Status	Categories
Are they old enough <small>Test really basic validation, common sense stu</small>	2010/05/26 12:27	Draft	Test scenarios
Good credit history only <small>Obviously we only want people who can pay stu</small>	2010/05/26 12:28	Draft	Test scenarios
NINJAs	2008/09/30 19:47	Draft	Test scenarios
No bankruptcies <small>We don't want bankrupt people since 1980, or if i</small>	2008/09/30 17:20	Draft	Test scenarios
Pricing low end	2008/09/30 21:19	Draft	Test scenarios
Pricing mid range	2011/01/05 11:57	Draft	Test scenarios

At the bottom, there is a search bar with 'Find:' and buttons for 'Previous', 'Next', 'Highlight all', and 'Match case'.

Double click on the **Pricing mid range** test scenario:

The screenshot shows the JBoss BRMS web interface with the 'Pricing mid range' test scenario selected. The main area displays the configuration for this scenario:

**Run scenario**

**GIVEN**

- insert [IncomeSource] [income]
  - type: Job
  - amount: 65000
- insert [LoanApplication] [application]
  - amount: 25000
  - deposit: 1500
  - lengthYears: 20

**EXPECT**

- Use real date and time
  - LoanApplication [application] has values
    - approved: equals true
    - insuranceCost: equals 0
    - approvedRate: equals 4

**More...**

(configuration)  
All rules may fire

**Description:**

Discussion: Add a discussion comment Erase all comments



Modify the copied scenario with the following changes:

- Under the **GIVEN** section, change the **amount** field of the **LoanApplication** fact to **110000**
- Under the **EXPECT** section, change the **insuranceCost** value to **10**
- Under the **EXPECT** section, change the **approvedRate** value to **6**

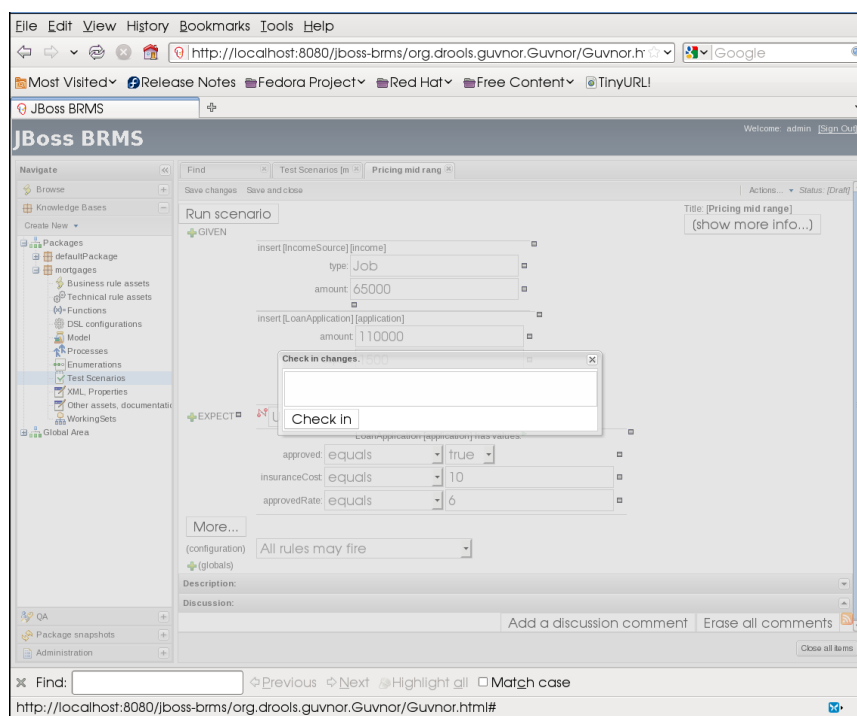
Your scenario should now look like this:

The screenshot shows the JBoss BRMS web interface in a Mozilla Firefox browser. The browser address bar shows the URL `http://localhost:8080/jboss-brms/org.drools.guvnor.Guvnor.h`. The page title is "JBoss BRMS". The left sidebar contains a "Navigate" menu with options like "Browse", "Knowledge Bases", "Create New", "Packages", "defaultPackage", "mortgages", "Business rule assets", "Technical rule assets", "Functions", "DSL configurations", "Model", "Processes", "Enumerations", "Test Scenarios", "XML Properties", "Other assets, documentation", and "WorkingSets". The main content area is titled "Run scenario" and shows a configuration for a scenario named "Pricing mid range". The "GIVEN" section contains two "insert" actions: "insert [IncomeSource] [income]" with type "Job" and amount "65000", and "insert [LoanApplication] [application]" with amount "110000", deposit "1500", and lengthYears "20". The "EXPECT" section contains a "Use real date and time" action and a "LoanApplication [application] has values" action. The "approved" field is set to "equals" and "true", the "insuranceCost" field is set to "equals" and "10", and the "approvedRate" field is set to "equals" and "6". The "More..." section shows a configuration for "All rules may fire". The "Description" section is empty. The bottom of the page has a "Find" field and navigation buttons: "Previous", "Next", "Highlight all", and "Match case".

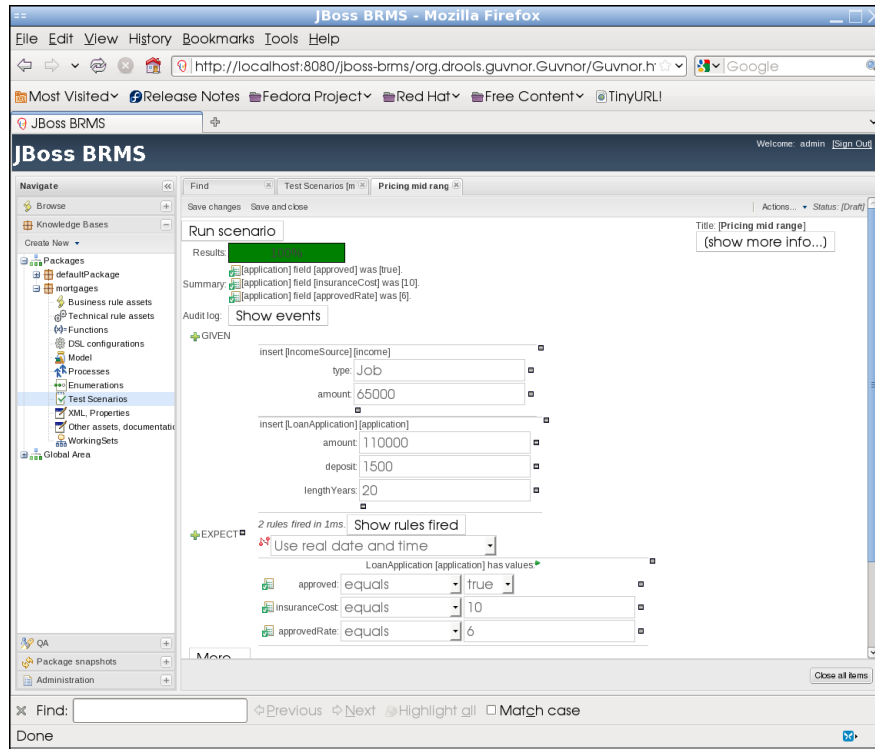




Select the **Save changes** button. You will be asked to enter a reason for checking in your changes. Enter something similar to below and select **Check in**:



Select the **Run scenario** button. You will see that the scenario executes properly (indicated by the green bar):



Now, repeat the same process for another test scenario called **Pricing high end**. (Begin by copying from the newly created test scenario.) Make the following modifications:

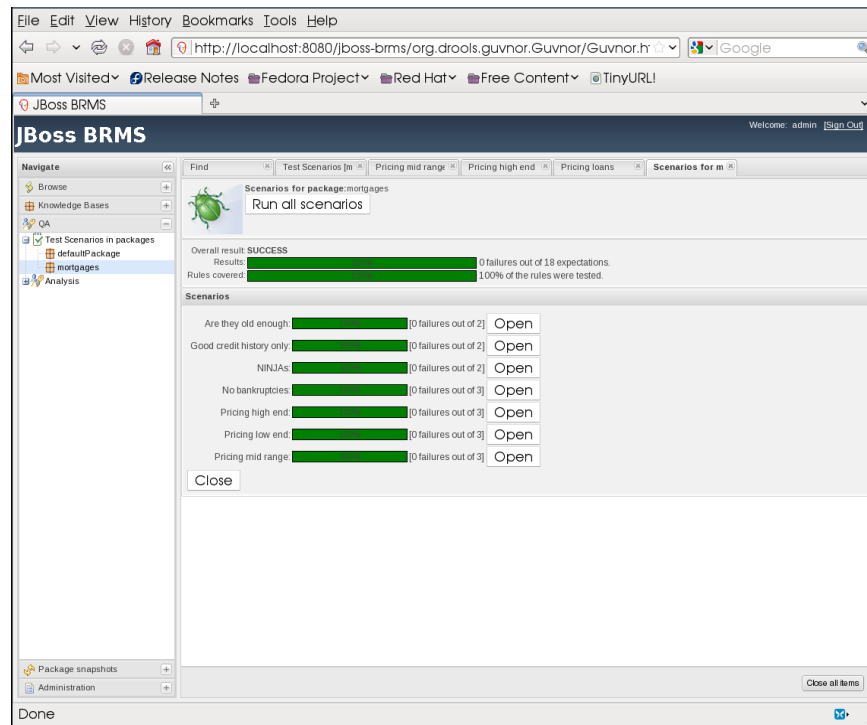
- Under the **GIVEN** section, change the **type** field of the **IncomeSource** fact to **Asset**
- Under the **GIVEN** section, change the **amount** field of the **LoanApplication** fact to **140000**
- Under the **GIVEN** section, change the **lengthYears** field of the **LoanApplication** fact to **30**
- Under the **EXPECT** section, change the **insuranceCost** value to **0**
- Under the **EXPECT** section, change the **approvedRate** value to **2**

Your changes should look like as below:

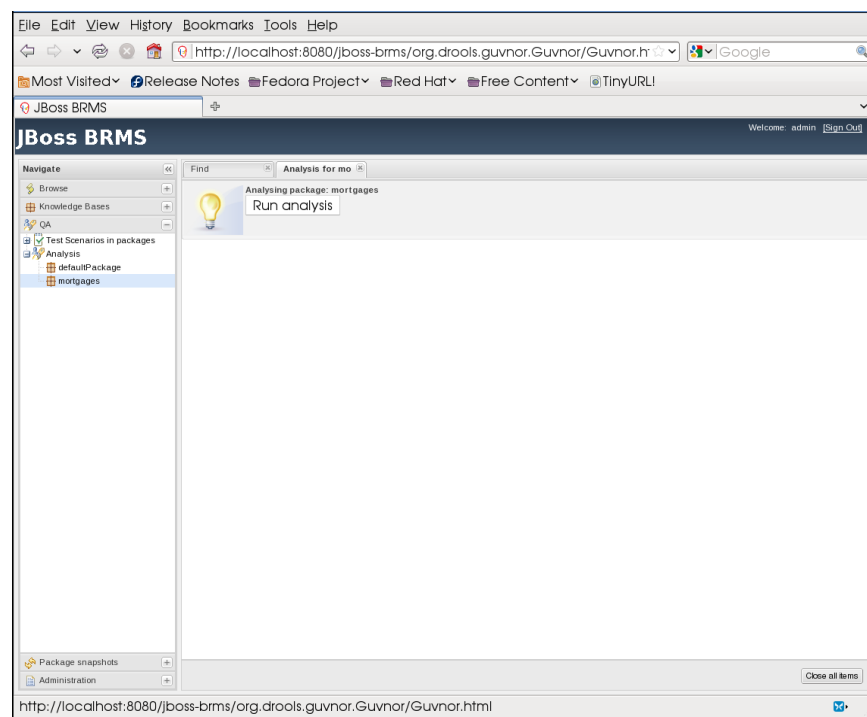


Save the changes, then execute **Run scenario**. You should see the test results return as successful.

Return to the **QA** left-hand tab, select **mortgages**, then select the **Run all scenarios** button. You should now see the test scenarios completely cover all rules in the mortgages package:

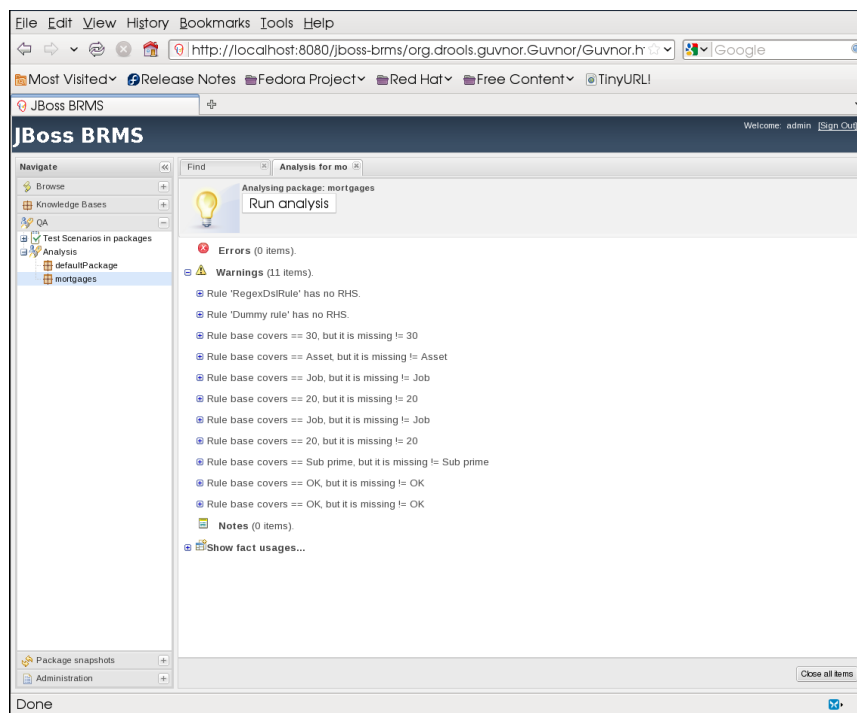


Though you now have complete coverage for your rules, are the testing scenarios themselves adequate for package? To confirm, open the **Analysis** link on the left-hand **QA** tab, and select the **mortgages** link. The following will appear:





Select the **Run analysis** button to execute an analysis of your rule package. The results are below:

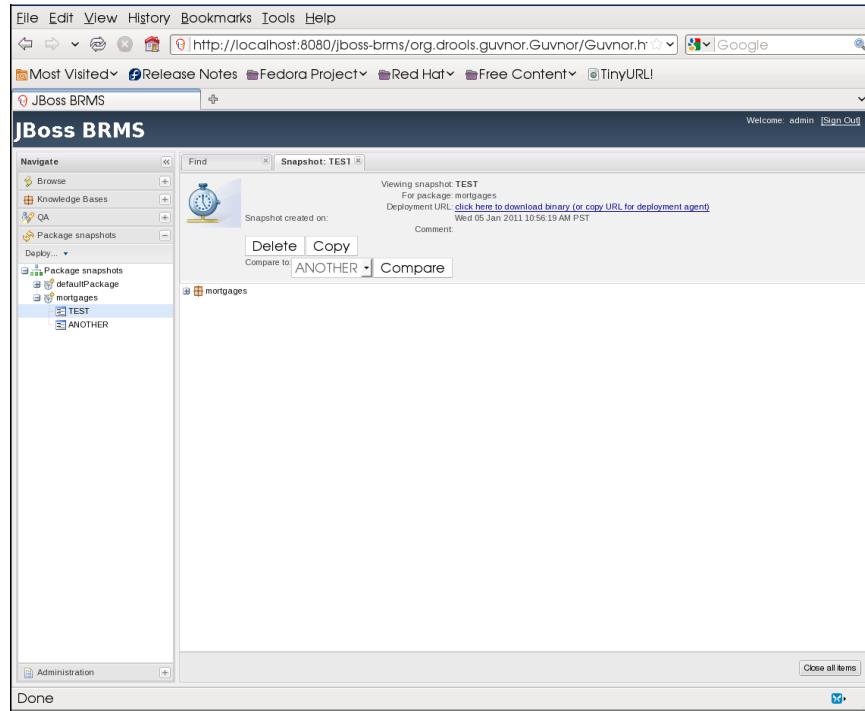


The results provide a detailed description of warnings, notes, and fact usage across your rule package. Peruse the results to familiarize yourself with how this feature can assist in analyzing your rule set.

### 3.6 Package/Version Control

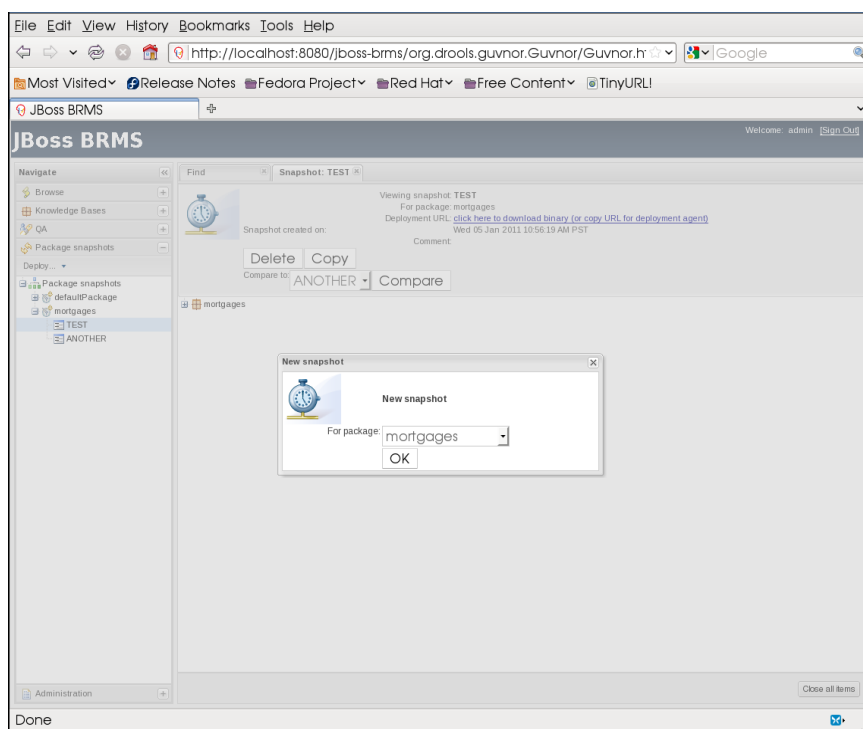
Finally, let's look at BRMS package and version control. Select the **Package snapshots** left-hand tab, and open the **mortgages** link. Two packages will appear (poorly named): **TEST** and **ANOTHER**. These represent snapshots in time of the entire mortgages package. Typically, you would name these packages with either a version and/or date to maintain more fine-grained control.

Select the **TEST** package snapshot. You will see the following:

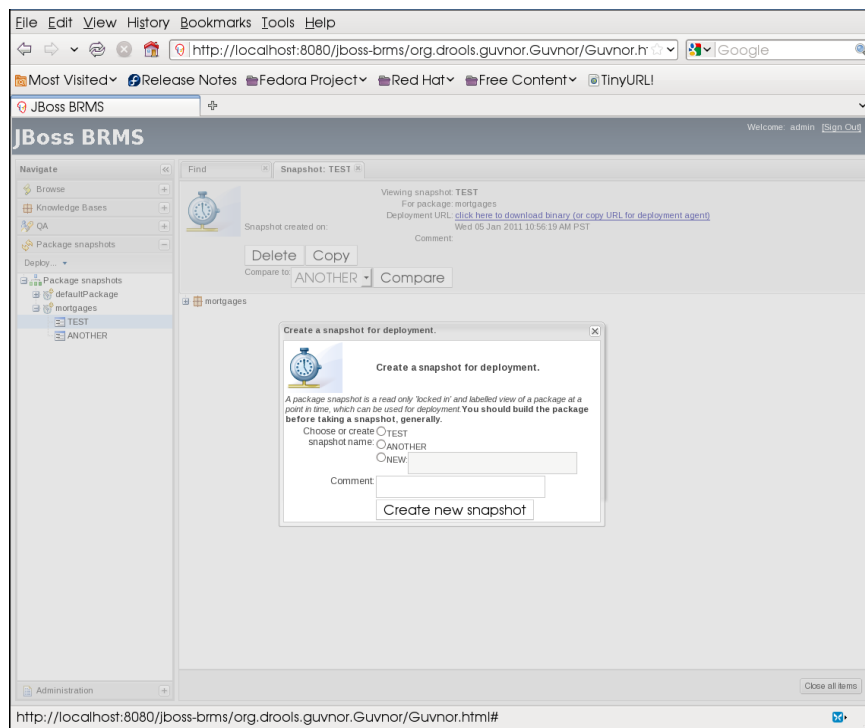


Open the **mortgages** link and peruse the package snapshot. This will allow you to view the mortgages package as it appeared in a particular point in time.

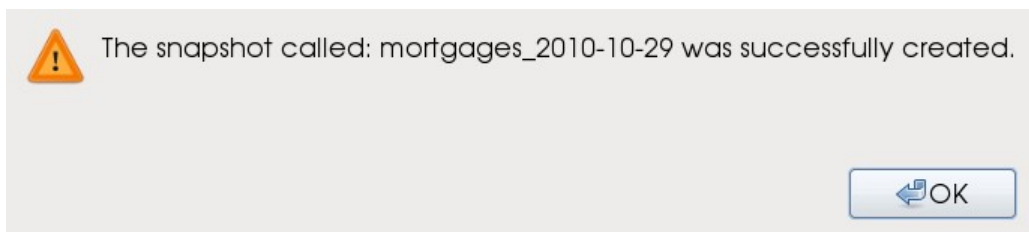
To create a snapshot of your existing package, select the **Deploy...** droplist right below the **Package snapshots** tab name, and select **New Deployment snapshot**. You will see the following:



From the droplist, ensure the **mortgages** should be selected to create a snapshot of the mortgages package, and select the **OK** button. At this point, you will be asked to name the snapshot:



Select the **NEW** radio button, enter an appropriate name (like “mortgages\_2010-10-29”) and optionally enter any comments for this snapshot. Select the **Create new snapshot** button. You will see the following confirmation:



Close and open the **mortgages** link on the left-hand tab (to refresh), and you will see your new package snapshot.

## 4 What Now?

Now that you have completed the BRMS Quickstart guide, you have several resources to assist you in becoming a BRMS professional:

- Call visit <https://www.redhat.com/support> or call 1-888-GO-REDHAT to get assistance from our 24/7 customer support team. You will need an active subscription to the JBoss BRMS to access customer support.





- Visit the BRMS documentation page at <http://docs.redhat.com> and select the JBoss Enterprise BRMS link to the left. This provides user guides and rules reference guides for an in-depth understanding of the BRMS Manager and Rules Engine.
- Visit <http://engage.jboss.com/forms/jboss-contact-sales> to contact a sales representative to assist you in either a subscription or supported evaluation of BRMS.