



Red Hat Process Automation Manager 7.8

Getting started with business processes

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Red Hat Customer Content Services
brms-docs@redhat.com

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Abstract

This document describes how to create and test an example mortgage application project in Red Hat Process Automation Manager 7.8. The procedures in this document are based on the Mortgage_Process sample project included in Business Central.

Table of Contents

PREFACE	3
CHAPTER 1. OVERVIEW	4
CHAPTER 2. SAMPLE PROJECTS AND BUSINESS ASSETS IN BUSINESS CENTRAL	5
2.1. ACCESSING SAMPLE PROJECTS AND BUSINESS ASSETS IN BUSINESS CENTRAL	5
CHAPTER 3. CREATING THE MORTGAGE-PROCESS PROJECT	7
CHAPTER 4. CREATING USERS	8
CHAPTER 5. CREATING THE MORTGAGE-PROCESS DATA OBJECTS	10
5.1. CREATING THE APPLICANT DATA OBJECT	10
5.2. CREATING THE PROPERTY DATA OBJECT	11
5.3. CREATING THE VALIDATIONERRORDO DATA OBJECT	11
5.4. CREATING THE APPLICATION DATA OBJECT	12
CHAPTER 6. BUSINESS PROCESSES IN BUSINESS CENTRAL	14
6.1. CREATING THE BUSINESS PROCESS	14
6.1.1. Creating outgoing connections and exclusive gateways	15
6.1.2. Defining the validation data	18
6.1.3. Calculating the mortgage	22
6.1.4. Increasing the down payment	27
CHAPTER 7. GUIDED RULES	32
7.1. VIEWING THE MORTGAGE_PROCESS BUSINESS RULES	32
7.1.1. Viewing the Validate Down Payment guided rule	32
7.1.2. Viewing the RetractValidationErr guided rule	32
CHAPTER 8. GUIDED DECISION TABLES	34
8.1. VIEWING THE MORTGAGE DECISION TABLE	34
CHAPTER 9. FORMS IN BUSINESS CENTRAL	35
9.1. VIEWING THE MORTGAGE_PROCESS FORMS	35
CHAPTER 10. DEPLOYING THE MORTGAGEAPPROVALPROCESS PROCESS APPLICATION	38
CHAPTER 11. EXECUTING THE MORTGAGEAPPROVALPROCESS PROCESS APPLICATION	39
CHAPTER 12. MONITORING THE MORTGAGEAPPROVALPROCESS PROCESS APPLICATION	41
12.1. FILTERING PROCESS INSTANCES USING DEFAULT OR ADVANCED FILTERS	41
12.1.1. Filtering process instances using default filters	41
12.1.2. Filtering process instances using advanced filters	42
CHAPTER 13. ADDITIONAL RESOURCES	44
APPENDIX A. VERSIONING INFORMATION	45

PREFACE

As a business rules and processes developer, you can use Business Central in Red Hat Process Automation Manager to design business processes to meet specific business requirements. Red Hat Process Automation Manager provides sample projects in Business Central that contain business assets for reference purposes. This document describes how to create a new mortgage process project, data objects, and business process to familiarize yourself with Business Central and the process designer.

You will then refer to the **Mortgage_Process** sample project included in Business Central to review the sample project's business rules, decision tables, and forms. You will build and deploy the **Mortgage_Process** sample project and execute the project's defined functionality.

Prerequisites

- Red Hat JBoss Enterprise Application Platform 7.3 is installed. For details, see the [Red Hat JBoss Enterprise Application Platform 7.3 Installation Guide](#).
- Red Hat Process Automation Manager is installed and configured with KIE Server. For more information, see [Installing and configuring Red Hat Process Automation Manager on Red Hat JBoss EAP 7.3](#).
- Red Hat Process Automation Manager is running and you can log in to Business Central with the **developer** role. For more information, see [Planning a Red Hat Process Automation Manager installation](#).

CHAPTER 1. OVERVIEW

Business Central enables you to automate your business processes. A business process is a diagram that describes the order in which a series of steps must be executed and consists of predefined nodes and connections. Each node represents one step in the process while the connections specify how to transition from one node to another.

For example, a bank offers a housing mortgage loan service. Using Business Central, the housing mortgage department of the bank creates a complete business process for the mortgage loan.

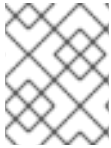
When a customer wants to buy a new property using credit, the following steps occur:

1. The customer contacts a broker at the bank who assists in filing for a mortgage loan.
2. The broker collects information about the property and the customer, such as the salary of the customer, social security number, the property sale price, and the requested loan amount.
3. The broker then submits a request on behalf of the customer.

Whenever a customer submits a request, a new process instance is created. This ensures consistency in the quality of evaluating each request, provides complete visibility into the status of each request, and makes the process efficient and effective.

CHAPTER 2. SAMPLE PROJECTS AND BUSINESS ASSETS IN BUSINESS CENTRAL

Business Central contains sample projects with business assets that you can use as a reference for the rules, processes, or other assets that you create in your own Red Hat Process Automation Manager projects. Each sample project is designed differently to demonstrate process automation, decision management, or business optimization assets and logic in Red Hat Process Automation Manager.



NOTE

Red Hat does not provide support for the sample code included in the Red Hat Process Automation Manager distribution.

The following sample projects are available in Business Central:

- **Evaluation_Process:** (Process automation) Evaluation process using business process assets. Evaluates employees based on performance.
- **Mortgage_Process:** (Process automation) Loan approval process using business process and decision assets. Determines loan eligibility based on applicant data and qualifications.
- **IT_Orders:** (Process automation and case management) Ordering case using business process and case management assets. Places an IT hardware order based on needs and approvals.
- **Traffic_Violation:** (Decision management with DMN) Traffic violation decision service using a Decision Model and Notation (DMN) model. Determines driver penalty and suspension based on traffic violations.
- **Mortgages:** (Decision management with rules) Loan approval process using rule-based decision assets. Determines loan eligibility based on applicant data and qualifications.
- **Employee_Rostering:** (Business optimization) Employee rostering optimization using decision and solver assets. Assigns employees to shifts based on skills.
- **OptaCloud:** (Business optimization) Resource allocation optimization using decision and solver assets. Assigns processes to computers with limited resources.
- **Course_Scheduling:** (Business optimization) Course scheduling and curriculum decision process. Assigns lectures to rooms and determines a student's curriculum based on factors, such as course conflicts and class room capacity.
- **Dinner_Party:** (Business optimization) Guest seating optimization using guided decision tables. Assigns guest seating based on each guest's job type, political beliefs, and known relationships.

2.1. ACCESSING SAMPLE PROJECTS AND BUSINESS ASSETS IN BUSINESS CENTRAL

You can use the sample projects in Business Central to explore business assets as a reference for the rules or other assets that you create in your own Red Hat Process Automation Manager projects.

Prerequisites

- Business Central is installed and running. For installation options, see [Planning a Red Hat Process Automation Manager installation](#).

Procedure

1. In Business Central, go to **Menu → Design → Projects**. If there are existing projects, you can access the samples by clicking on the **MySpace** default space and selecting **Try Samples** from the **Add Project** pull-down menu. If there are no existing projects, click **Try samples**.
2. Review the descriptions for each sample project to determine which project you want to explore. Each sample project is designed differently to demonstrate process automation, decision management, or business optimization assets and logic in Red Hat Process Automation Manager.
3. Select one or more sample projects and click **Ok** to add the projects to your space.
4. In the **Projects** page of your space, select one of the sample projects to view the assets for that project.
5. Select each asset to explore how the project is designed to achieve the specified goal or workflow. Some of the sample projects contain more than one page of assets. Click the left or right arrows in the upper-right corner to view the full asset list.

Figure 2.1. Asset page selection



6. In the upper-right corner of the project **Assets** page, click **Build** to build the sample project or **Deploy** to build the project and then deploy it to KIE Server.



NOTE

You can also select the **Build & Install** option to build the project and publish the KJAR file to the configured Maven repository without deploying to a KIE Server. In a development environment, you can click **Deploy** to deploy the built KJAR file to a KIE Server without stopping any running instances (if applicable), or click **Redeploy** to deploy the built KJAR file and replace all instances. The next time you deploy or redeploy the built KJAR, the previous deployment unit (KIE container) is automatically updated in the same target KIE Server. In a production environment, the **Redeploy** option is disabled and you can click **Deploy** only to deploy the built KJAR file to a new deployment unit (KIE container) on a KIE Server.

To configure the KIE Server environment mode, set the **org.kie.server.mode** system property to **org.kie.server.mode=development** or **org.kie.server.mode=production**. To configure the deployment behavior for a corresponding project in Business Central, go to project **Settings → General Settings → Version**, toggle the **Development Mode** option, and click **Save**. By default, KIE Server and all new projects in Business Central are in development mode. You cannot deploy a project with **Development Mode** turned on or with a manually added **SNAPSHOT** version suffix to a KIE Server that is in production mode.

To review project deployment details, click **View deployment details** in the deployment banner at the top of the screen or in the **Deploy** drop-down menu. This option directs you to the **Menu → Deploy → Execution Servers** page.

CHAPTER 3. CREATING THE MORTGAGE-PROCESS PROJECT

A project is a container for assets such as data objects, business processes, guided rules, decision tables, and forms. The project that you are creating is similar to the existing **Mortgage_Process** sample project in Business Central.

Procedure

1. In Business Central, go to **Menu → Design → Projects**.
Red Hat Process Automation Manager provides a default space called **MySpace**, as shown in the following image. You can use the default space to create and test example projects.

Figure 3.1. Default space



2. Click **Add Project**.
3. Enter **mortgage-process** in the **Name** field.
4. Click **Configure Advanced Options** and modify the GAV fields with the following values:
 - **Group ID: com.myspace**
 - **Artifact ID: mortgage-process**
 - **Version: 1.0.0**
5. Click **Add**.

The **Assets** view of the project opens.


CHAPTER 4. CREATING USERS

You can create as many Business Central users as you require. User privileges and settings are controlled by the roles assigned to a user and the groups that a user belongs to. For this example, you must create two new users: **Katy** who will act as the bank's loan manager and approver, and **Bill** who will act as the broker requesting the loan. For more information on creating users, see the **Creating users** chapter of *Installing and configuring Red Hat Process Automation Manager on Red Hat JBoss EAP 7.3*.




In Business Central, you can use groups and roles to control permissions for a collection of users. You can create as many groups and roles as you want but a group must have at least one user.

- For this example, the user or users working on the tasks must be assigned to one or more of the following groups and roles:
 - **approver** group: For the **Qualify** task
 - **broker** group: For the **Correct Data** and **Increase Down Payment** tasks
 - **manager** role: For the **Final Approval** task

Procedure

1. Click the gear icon  in the upper-right corner, and click **Users**.



2. Click , enter **Katy**, click **Next**, and click **Create**.
3. Click **Yes** to set a password and enter **Katy** in both fields, and click **Change**.
4. Enter **Bill**, click **Next**, and click **Create**.
5. Click **Yes** to set a password and enter **Bill** in both fields, and click **Change**.
6. Click the **Groups** tab and click , enter **approver**, and click **Next**.
7. Select **Katy** from the user list, and click **Add selected users**.
8. Click , enter **broker**, and click **Next**.
9. Select **Bill** from the user list, and click **Add selected users**.
10. Click **Users**, select **Katy**, and click **Edit** → **Roles** → **Add roles**.
11. Select **manager**, click **Add to selected roles**, and click **Save**.
12. Click the **Groups** tab and click **Add to groups**.
13. Select **approver** and **kie-server**, and click **Add to selected groups**.
14. Click **Save**.
15. Select **Bill** from the user list, click **Edit** → **Roles** → **Add roles**.

16. Select **user**, and click **Add to selected roles**
17. Click the **Groups** tab, select **kie-server**, and click **Add to selected groups**
18. Click **Save**.

CHAPTER 5. CREATING THE MORTGAGE-PROCESS DATA OBJECTS

Data objects are the building blocks for the rule assets that you create. Data objects are custom data types implemented as Java classes in specified packages of your project. These custom data types determine what data your assets and your decision services are based on.

The mortgage process project uses the following data objects:

- **Applicant**
- **Property**
- **ValidationErrorDO**
- **Application**

5.1. CREATING THE APPLICANT DATA OBJECT

Follow these steps to create the **Applicant** data object, which contains information about the applicant. This is the basic information required to apply for the loan in this tutorial.

Procedure

1. In Business Central, click on the **MySpace** default space.
2. Click **Menu** → **Design** → **Projects** and click **mortgage-process**.
3. Click **Add Asset** and select **Data Object**.
4. Enter **Applicant** in the **Data Object** field of the **Create new Data Object** window.
5. Select **com.myspace.mortgage_process** from the **Package** pull-down menu and click **Ok**.
6. Enter **Applicant** in the **Label** field of the '**Applicant**'- **general properties** section.
7. Click **+add field** and input the following **Applicant** data object values. Click **Create and continue** after each addition. For the last addition, click **Create**.

Figure 5.1. Applicant data object field values

Identifier	Label	Type	
address	Address	String	Delete
annualincome	Annual Income	Integer	Delete
creditrating	Credit Rating	Integer	Delete
name	Name	String	Delete
ssn	SSN	Integer	Delete

8. Click **Save**.

5.2. CREATING THE PROPERTY DATA OBJECT

Follow these steps to create the **Property** data object, which contains information about the property details, such as the property age and price.

Procedure

1. In Business Central, click on the **MySpace** default space.
2. Click **Menu** → **Design** → **Projects** and click **mortgage-process**.
3. Click **Add Asset** and select **Data Object**.
4. Enter **Property** in the **Data Object** field of the **Create new Data Object** window.
5. Select **com.myspace.mortgage_process** from the **Package** pull-down menu and click **Ok**.
6. Enter **Property** in the **Label** field of the '**Property**'- **general properties** section.
7. Click **+add field** and input the following **Property** data object values. Click **Create and continue** after each addition. For the last addition, click **Create**.

Figure 5.2. Property data object field values



Identifier	Label	Type	
address	Address of property	String	Delete
age	Age of property	Integer	Delete
locale	Locale	String	Delete
saleprice	Sale Price	Integer	Delete

8. Click **Save**.

5.3. CREATING THE VALIDATIONERRORDO DATA OBJECT

Follow these steps to create the **ValidationErrorDO** data object, which specifies the cause of an application error.

Procedure

1. In Business Central, click on the **MySpace** default space.
2. Click **Menu** → **Design** → **Projects** and click **mortgage-process**.
3. Click **Add Asset** and select **Data Object**.
4. Enter **ValidationErrorDO** in the **Data Object** field of the **Create new Data Object** window.
5. Select **com.myspace.mortgage_process** from the **Package** pull-down menu and click **Ok**.

6. Enter **ValidationErrorDO** in the **Label** field of the 'ValidationErrorDO'- general properties section.
7. Click **+add field** and input the following **ValidationErrorDO** data object values. Click **Create and continue** after each addition. For the last addition, click **Create**.

Figure 5.3. ValidationErrorDO data object field values

Validation Error (ValidationErrorDO) + add field

Identifier	Label	Type	
error	Error and cause	String	Delete

8. Click **Save**.

5.4. CREATING THE APPLICATION DATA OBJECT

Follow these steps to create the **Application** data object, which contains information about the mortgage details, such as the down payment and the mortgage amount.

Procedure

1. In Business Central, click on the **MySpace** default space.
2. Click **Menu** → **Design** → **Projects** and click **mortgage-process**.
3. Click **Add Asset** and select **Data Object**.
4. Enter **Application** in the **Data Object** field of the **Create new Data Object** window.
5. Select **com.myspace.mortgage_process** from the **Package** pull-down menu and click **Ok**.
6. Enter **Application** in the **Label** field of the 'Application'- general properties section.
7. Click **+add field** and input the following **Application** data object values. Click **Create and continue** after each addition. For the last addition, click **Create**.

Figure 5.4. Application data object field values

Application + add field

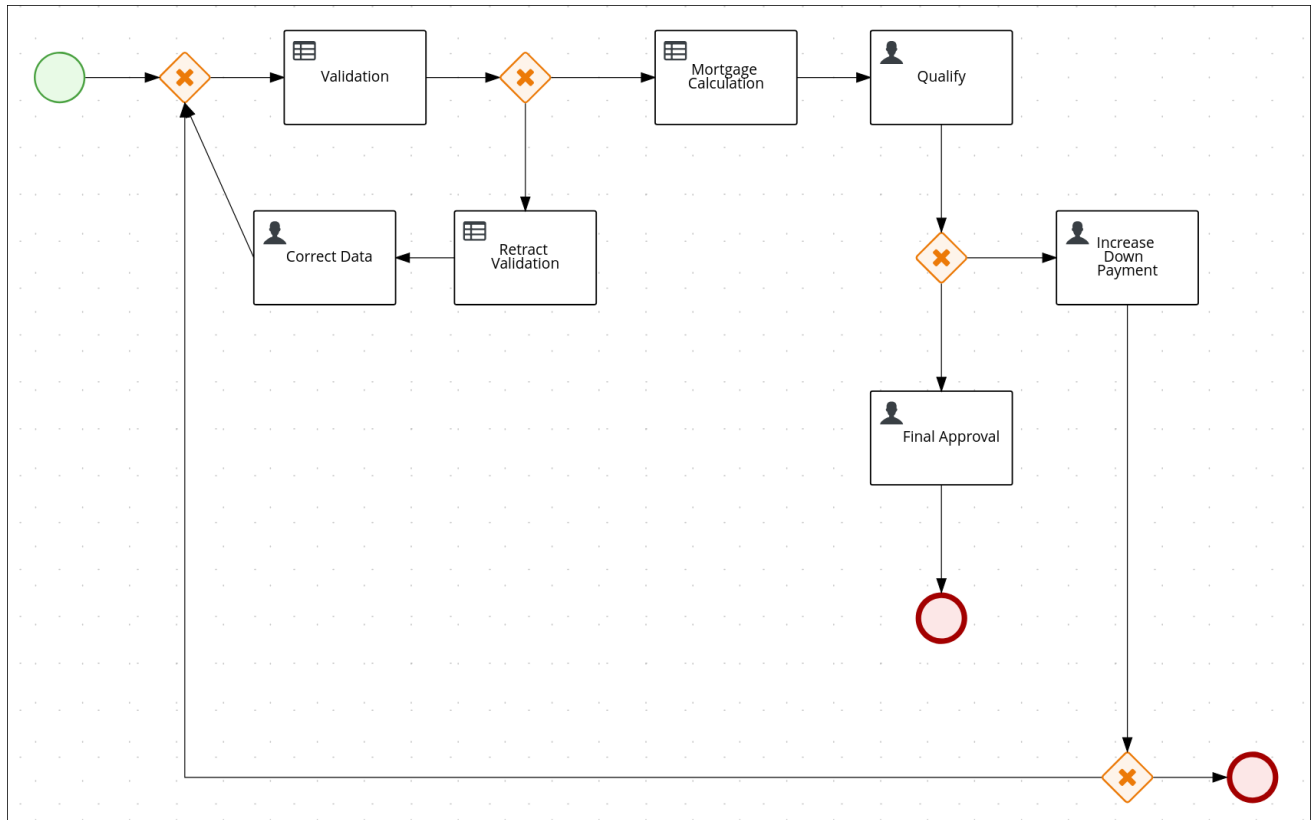
Identifier	Label	Type	
amortization	Years of amortization	Integer	Delete
applicant	Applicant	Applicant	Delete
downpayment	Down Payment	Integer	Delete
errors	Error details	Validation Error	Delete
mortgageamount	Mortgage amount	Integer	Delete
property	Property	Property	Delete

8. Click **Save**.

CHAPTER 6. BUSINESS PROCESSES IN BUSINESS CENTRAL

A business process is a diagram that describes the order in which a series of steps must be executed using a flow chart. A business process consists of a collection of nodes that are linked to each other using connections. Each of the nodes represents one step in the overall process while the connections specify how to transition from one node to the other.

The sample **Mortgage_Process** contains the following predefined **MortgageApprovalProcess** business process.





6.1. CREATING THE BUSINESS PROCESS

The following procedures guide you through the creation of tasks, connections, and gateways that make up the **MortgageApprovalProcess** business process. The mortgage validation business process determines whether a mortgage application contains all required data. If the specified data requirements are met, the application proceeds on to the mortgage calculation business process.

Procedure

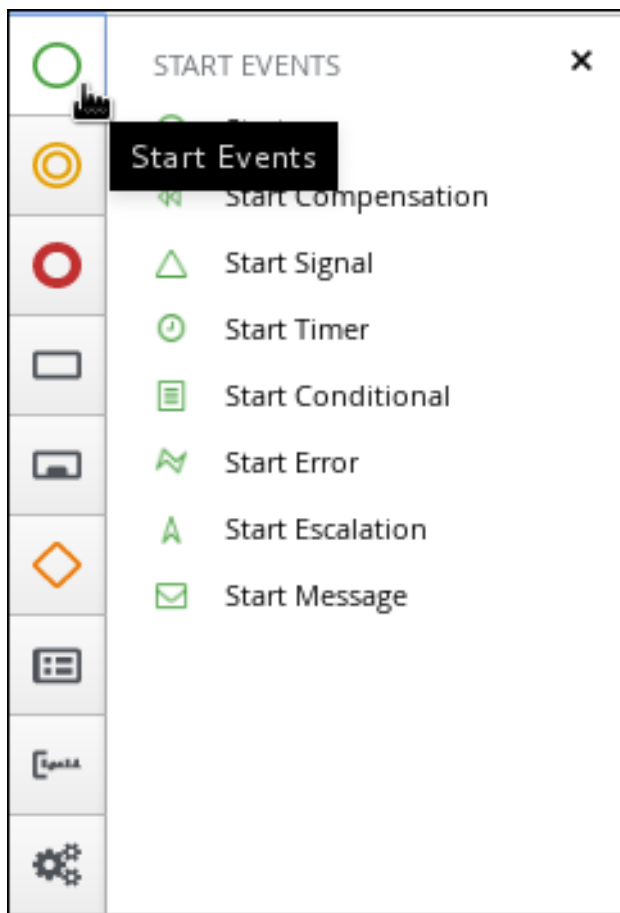
1. In Business Central, go to **Menu → Design → Projects → mortgage-process**.
2. Click **Add Asset → Business Process**.
3. Enter the following values:
 - **Business Process: MortgageApprovalProcess**
 - **Package: Select com.myspace.mortgage_process**
The **Package** specifies the location inside the existing project where the asset will be created. In this example, it is created in **com/myspace/mortgage_process**.

4. Click **Ok**. The diagram editor opens.
5. In the upper-right corner, click the **Properties**  icon.
6. Scroll down and expand **Process Data** and click  in the **Process Variables** section.
7. Enter the following values:
 - **Name: application**
 - **Data Type: Application [com.myspace.mortgage_process]**

6.1.1. Creating outgoing connections and exclusive gateways

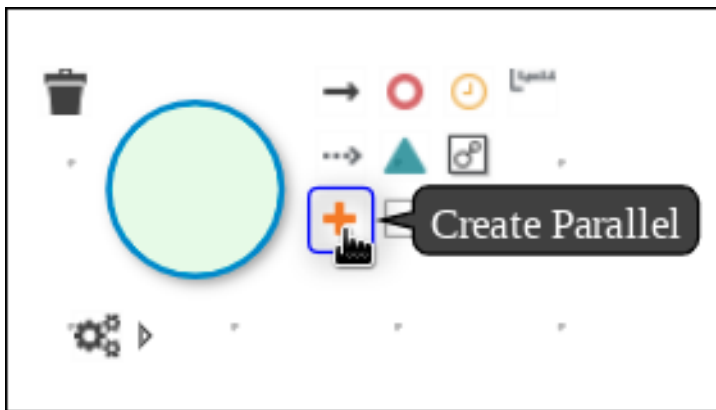
This section shows you how to create outgoing connections, exclusive gateways, and business rule tasks. Use exclusive gateways to make decisions and react to events based on the available data.


Red Hat Process Automation Manager contains a predefined selection of node types to simplify business process creation. The predefined node panel is located on the left side of the diagram editor.

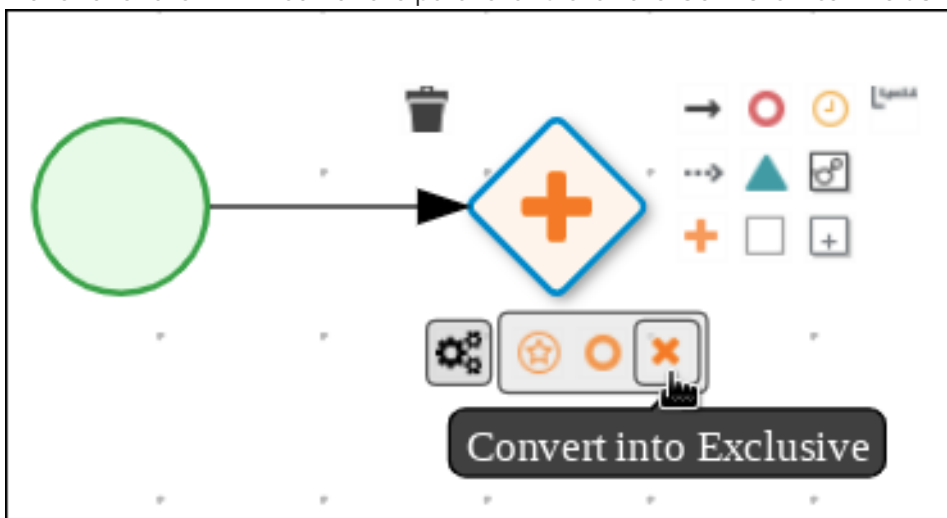


Procedure

1. Drag a start event node on to the canvas.
2. Create an outgoing connection from the start event to an exclusive gateway:
 - a. On the canvas, click the start event node and click the **Create Parallel** icon.

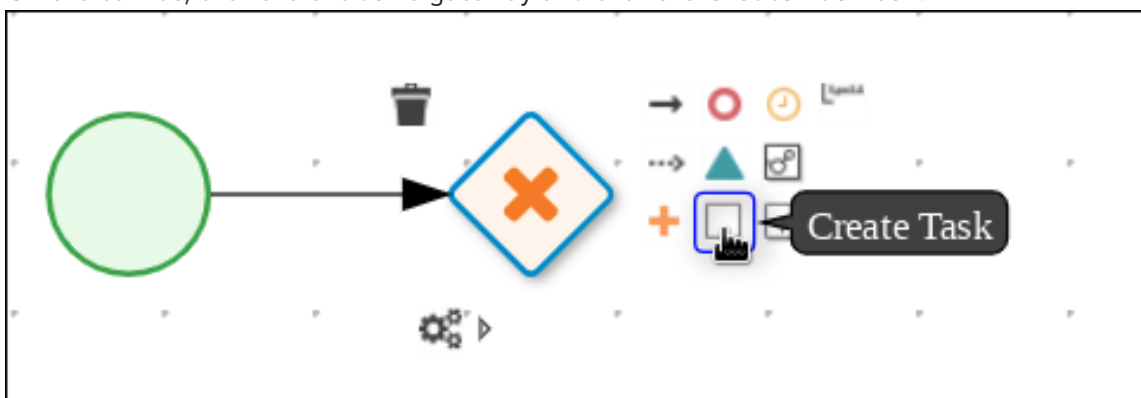



- b. Hover over the  icon of the parallel and click the **Convert into Exclusive** icon.

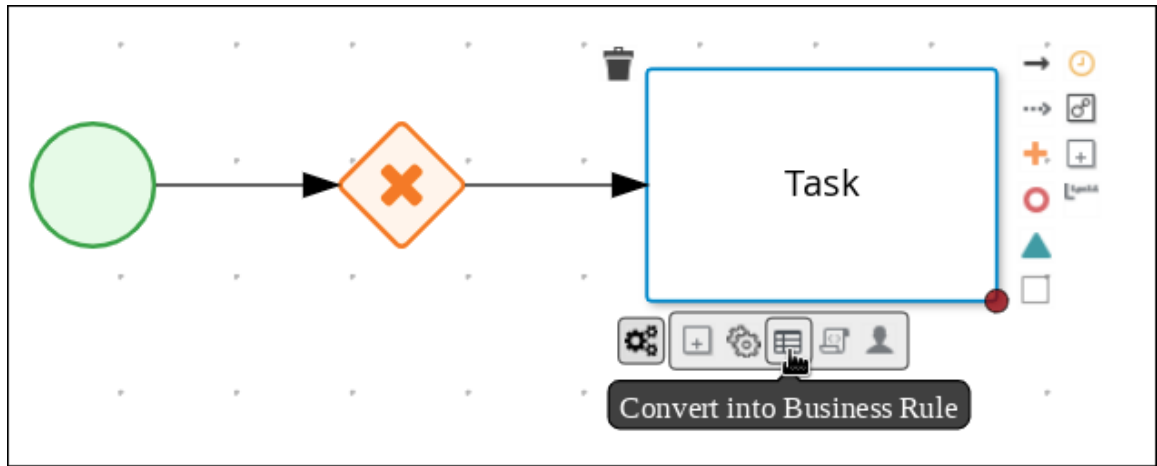


3. Create an outgoing connection from the exclusive gateway to a business rule task:


- a. On the canvas, click the exclusive gateway and click the **Create Task** icon.



- b. Hover over the  icon of the task and click the **Convert into Business Rule** icon.



4. Configure the business rule task:

- a. Click the business rules task.
- b. If the **Properties** panel is not open, in the upper-right corner click the **Properties**  icon.
- c. In the **Properties** panel, enter **Validation** in the **Name** field.
- d. Expand **Implementation/Execution**, select **New** from the **Rule Flow Group** menu, and input **validation**.
- e. In the **On Exit Action** field, enter the following Java expression:

```
System.out.println(application.getProperty());
```


- f. Expand **Data Assignments** and click  next to **Assignments**.
- g. In the **Validation Data I/O** window, click **Add** and create the following assignments:
 - Data Inputs and Assignments
 - Name: application
 - Data Type: Application [com.myspace.mortgage_app]
 - Source: application
 - Data Outputs and Assignments
 - Name: application
 - Data Type: Application [com.myspace.mortgage_app]
 - Target: application

Figure 6.1. Validation Data I/O assignments

Validation Data I/O
✕

Data Inputs and Assignments + Add

Name	Data Type	Source	
<input type="text" value="application"/>	Application [com.] ▼	application ▼	✕

Data Outputs and Assignments + Add

Name	Data Type	Target	
<input type="text" value="application"/>	Application [com.] ▼	application ▼	✕

Cancel Save

5. Above the canvas, click **Save** to confirm your changes.

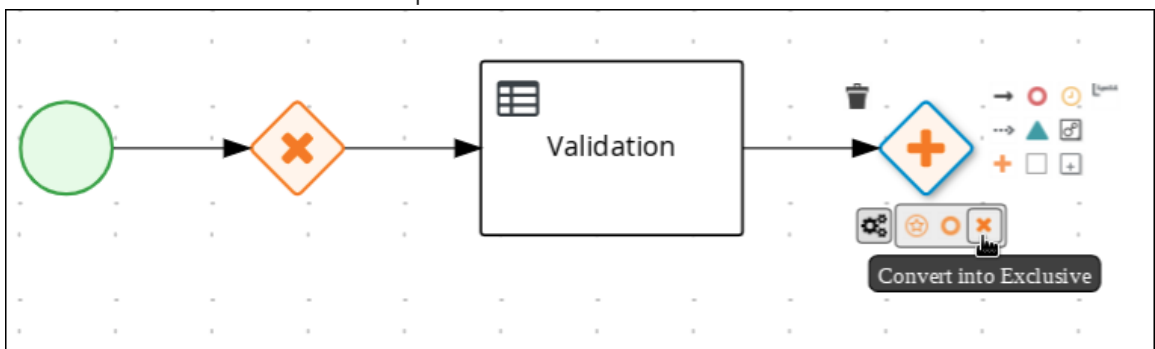
6.1.2. Defining the validation data


This section shows you how to define the validation data that determines whether the application data is correct, contains an error, or has missing information.

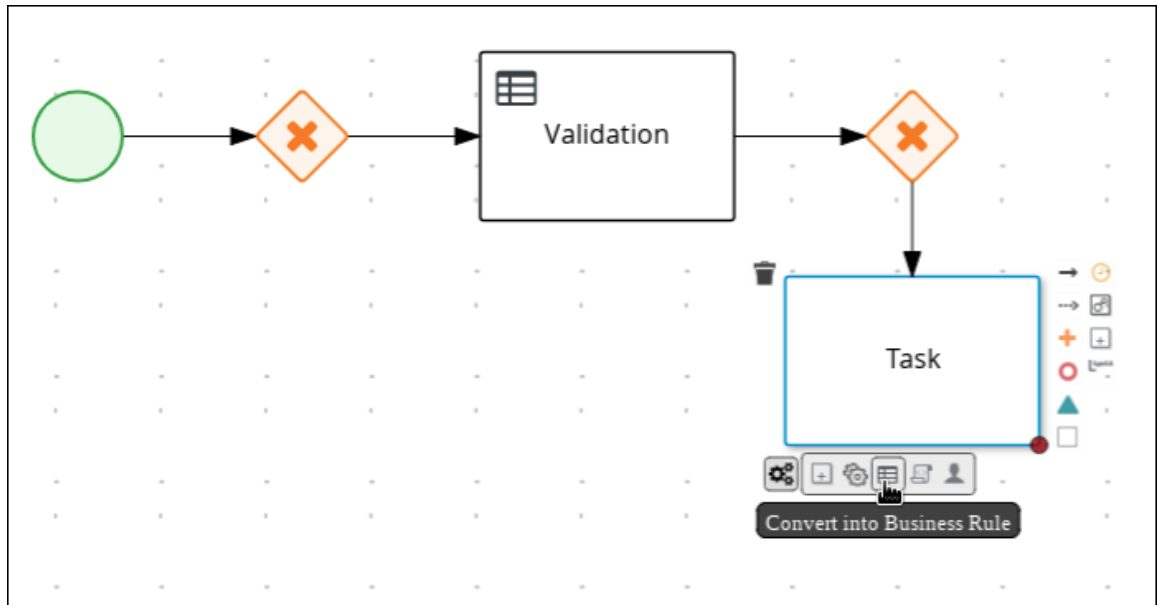
Procedure


1. Create an outgoing connection from the **Validation** task to an exclusive gateway:
 - a. Click the **Validation** task and click the **Create Parallel** icon.

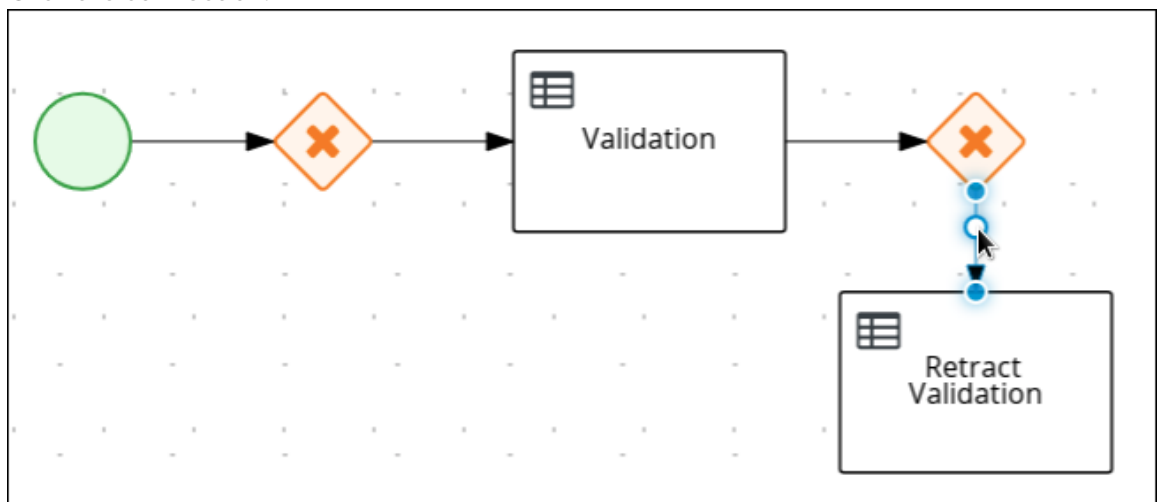
- b. Hover over the  icon of the parallel and click the **Convert into Exclusive** icon.




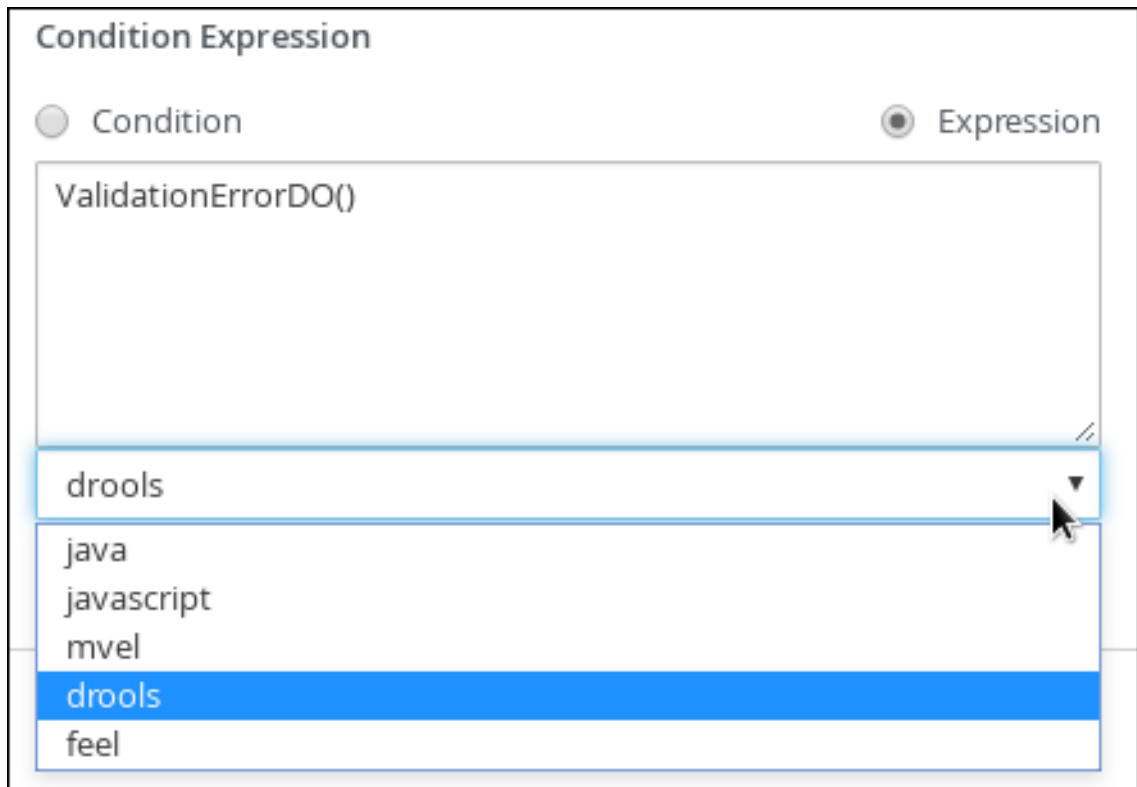
2. Create an outgoing connection from the exclusive gateway to a new business rule task:
 - a. Click the exclusive gateway and click the **Create Task** icon.
 - b. Drag the new task below the exclusive gateway as shown below.
 - c. Hover over the  icon of the task and click the **Convert into Business Rule** icon.



- d. If the **Properties** panel is not open, in the upper-right corner click the **Properties**  icon.
 - e. In the **Properties** panel, enter **Retract Validation** in the **Name** field.
 - f. Expand **Implementation/Execution**, select **New** from the **Rule Flow Group** menu, and input **error**.
3. Configure the connection between the exclusive gateway and the business rule task:
 - a. Click the connection.




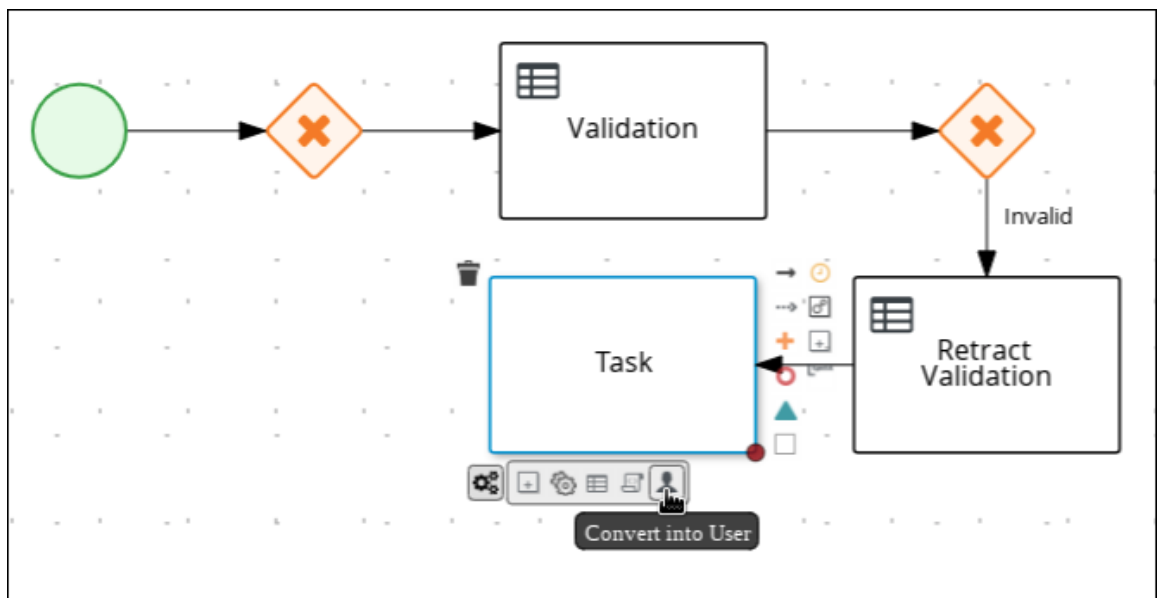
- b. If the **Properties** panel is not open, in the upper-right corner click the **Properties**  icon.
- c. In the **Properties** panel, enter **Invalid** in the **Name** field.
- d. Expand **Implementation/Execution** and select **Expression** in the **Condition Expression** section.
- e. From the list, select **drools** and enter **ValidationErrorDO()** in the **Condition Expression** field.



4. Create an outgoing connection from the **Retract Validation** task to a new user task:

- Click the **Retract Validation** task and click the **Create Task** icon.
- Drag the new task below the **Validation** task as shown below.

c. Hover over the  icon of the task and click the **Convert into User** icon.



- Click on the new user task and in the **Properties** panel, enter **Correct Data** in the **Name** field.
- Expand **Implementation/Execution** and enter **CorrectData** in the **Task Name** field.
- Select **New** from the **Groups** menu, and input **broker**.


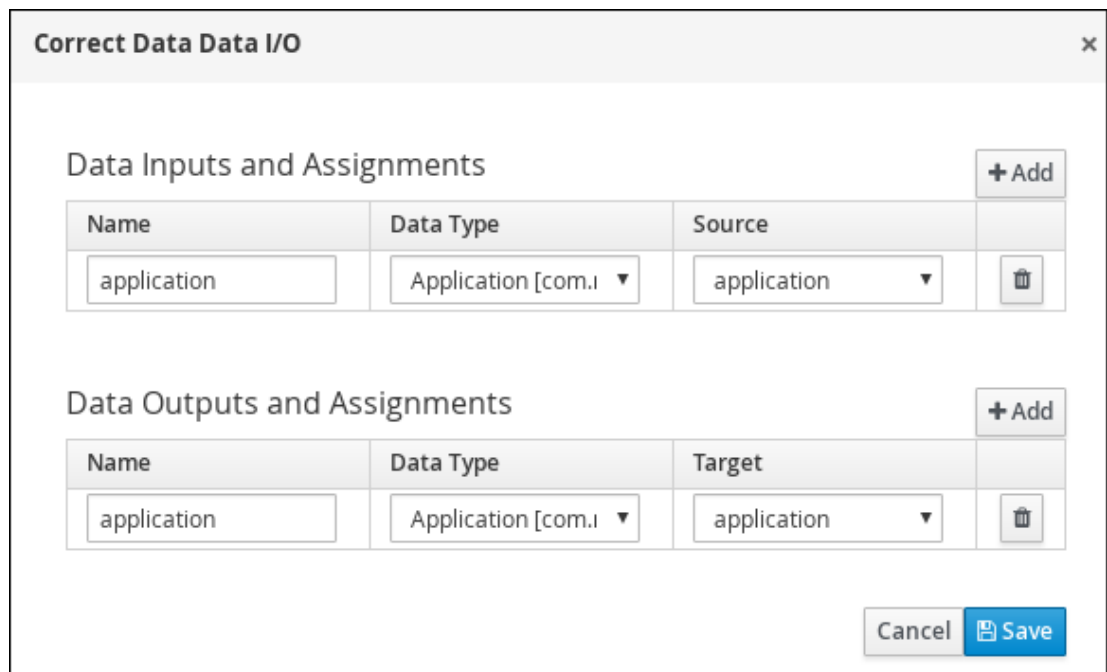

- g. Click  next to **Assignments**.
- h. In the **Correct Data Data I/O** window, click **Add** and create the following assignments:
- Name: application
 - Data Type: Application [com.myspace.mortgage_app]
 - Source: application
 - Data Outputs and Assignements
 - Name: application
 - Data Type: Application [com.myspace.mortgage_app]
 - Target: application

Figure 6.2. Correct Data Data I/O assignments




The screenshot shows a window titled "Correct Data Data I/O" with a close button (X) in the top right corner. The window is divided into two main sections: "Data Inputs and Assignments" and "Data Outputs and Assignments".

Data Inputs and Assignments section:

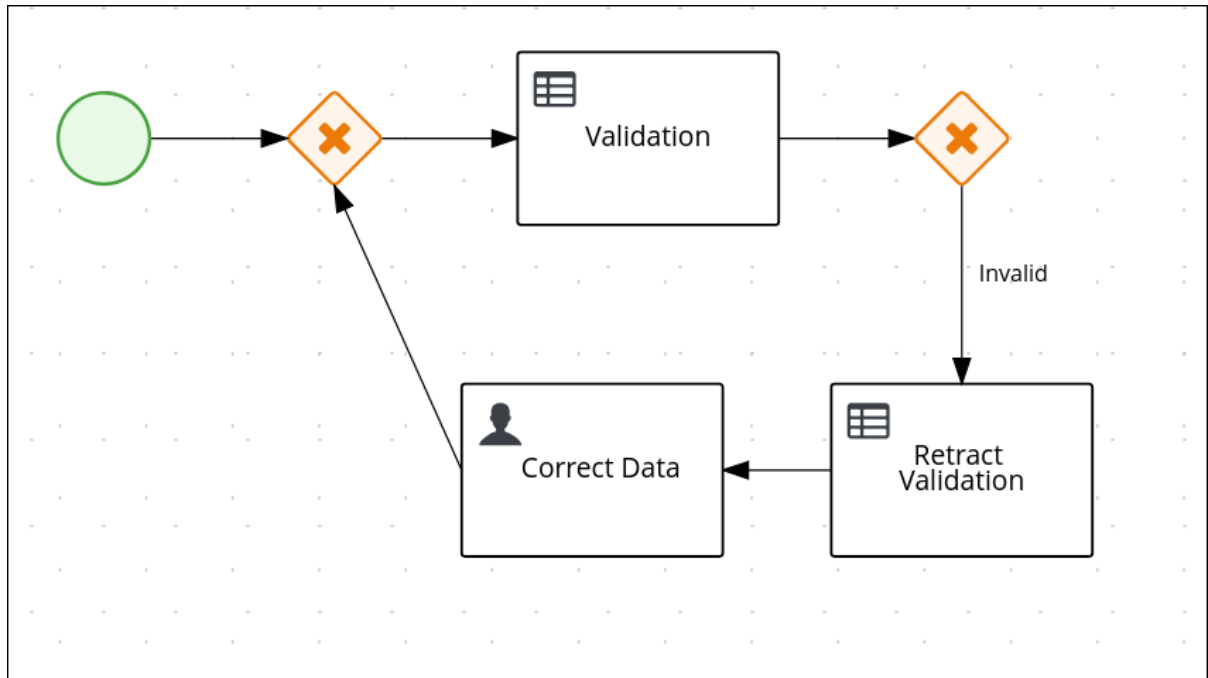
Name	Data Type	Source	
application	Application [com.i ▼]	application ▼	

Data Outputs and Assignments section:

Name	Data Type	Target	
application	Application [com.i ▼]	application ▼	

At the bottom right of the window, there are two buttons: "Cancel" and "Save".

- i. Above the canvas, click **Save** to confirm your changes.
5. Click on the **Correct Data** user task, then click the **Create sequence Flowicon** and drag it back to the first exclusive gateway. Your workflow should look similar to the following diagram:

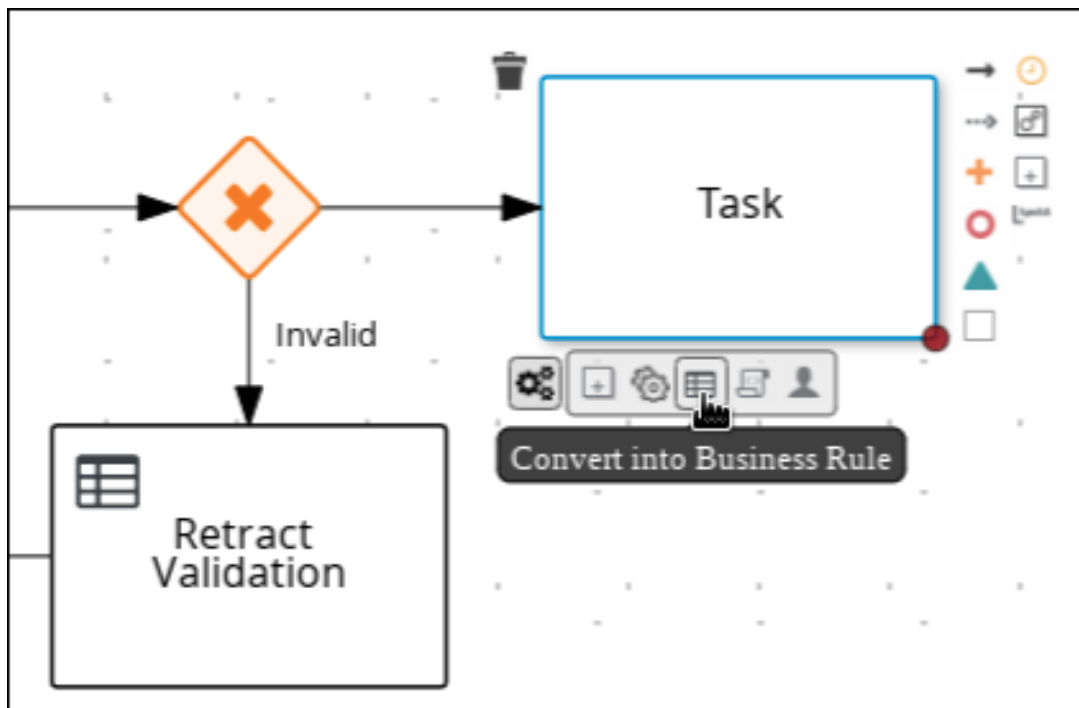


6.1.3. Calculating the mortgage

The mortgage calculation business process determines the applicant's mortgage borrowing limit.

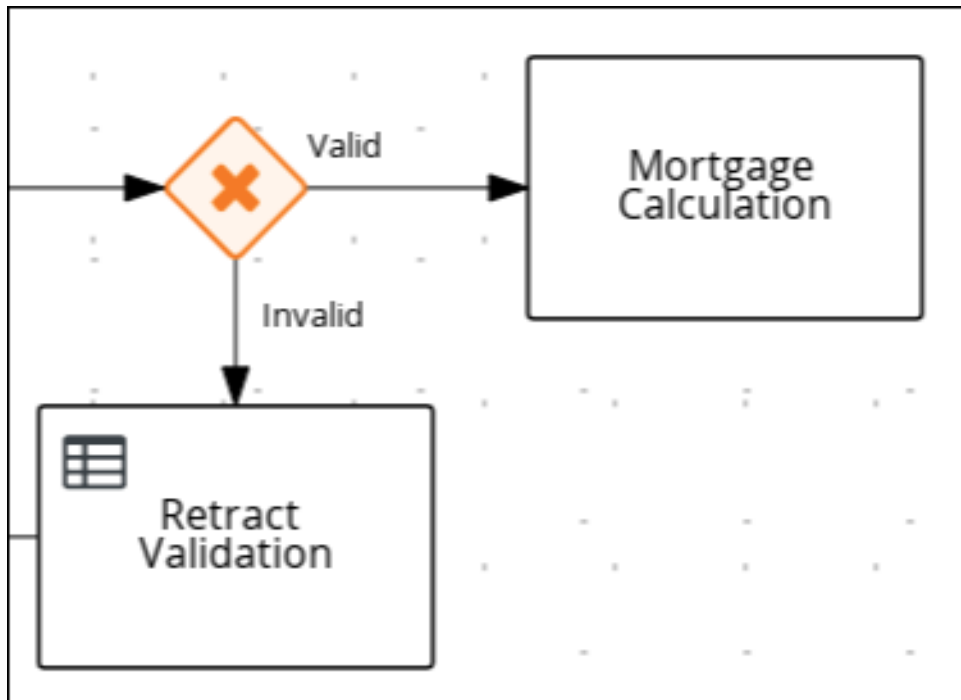
Procedure

1. Return to the second exclusive gateway and create an outgoing connection to a new business rule task.



2. Click the created connection and in the **Properties** panel, input **Valid** in the **Name** field.
 - a. Expand **Implementation/Execution** and select **Expression** in the **Condition Expression** section.
 - b. From the list, select **drools** and enter **not ValidationErrorDO()** in the **Condition Expression** field.

- Click the new business rule task and in the **Properties** panel, input **Mortgage Calculation** in the **Name** field.




- Expand **Implementation/Execution**, select **New** from the **Rule Flow Group** menu, and input **mortgagecalculation**.
- Expand **Data Assignments** and click  next to **Assignments**.
 - In the **Mortgage Calculation Data I/O** window, click **Add** to create the following assignments and click **Save**.

Figure 6.3. Mortgage Calculation Data I/O assignments

Mortgage Calculation Data I/O ✕


Data Inputs and Assignments + Add

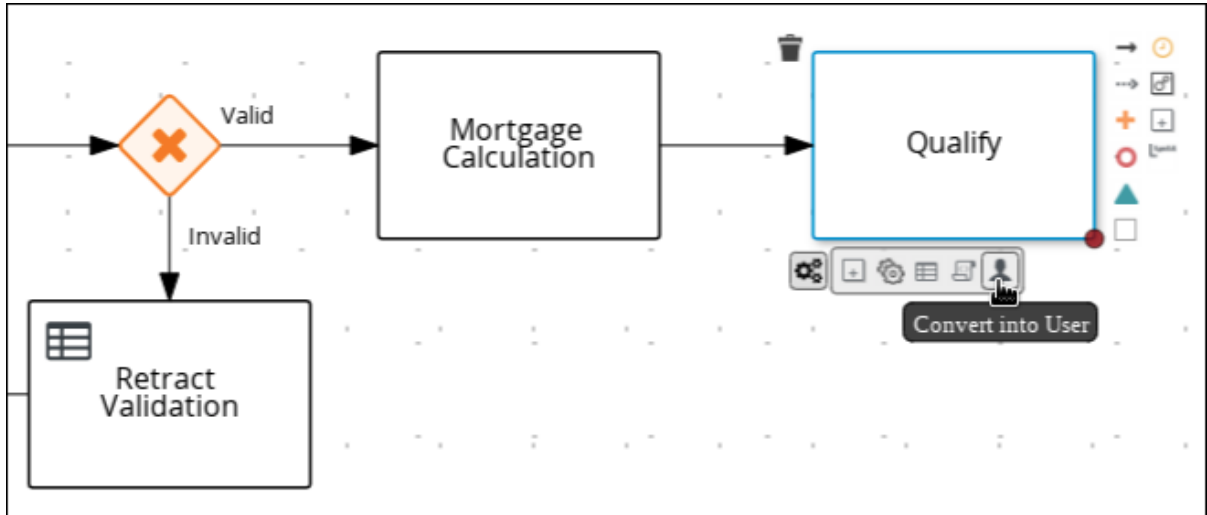
Name	Data Type	Source	
application	Application [com.i ▼]	application ▼	✕

Data Outputs and Assignments + Add

Name	Data Type	Target	
application	Application [com.i ▼]	application ▼	✕

Cancel Save

6. Click an empty space on the canvas, scroll down, expand **Process Data**, and click  next to **Process Variables**. Enter the following values:
 - **Name: inlimit**
 - **Data Type: Boolean**
7. Create an outgoing connection from the **Mortgage Calculation** task to a new user task.
8. Click the user task, enter **Qualify** in the **Name** field.




9. Expand **Implementation/Execution** and enter **Qualify** in the **Task Name** field.
10. Select **New** from the **Groups** menu, and input **approver**.
11. Click  next to **Assignments**. In the **Qualify Data I/O** window, click **Add** to create the following assignments:

Figure 6.4. Qualify Data I/O assignments

Qualify Data I/O x

Data Inputs and Assignments + Add

Name	Data Type	Source	
application	Application [com.i ▼]	application ▼	🗑️

Data Outputs and Assignments + Add

Name	Data Type	Target	
inlimit	Boolean ▼	inlimit ▼	🗑️

Cancel
Save

12. Above the canvas, click **Save** to confirm your changes.
13. Click on the **Qualify** user task, click on the **Create parallel** menu icon, and convert it to an exclusive gateway.
14. Drag the new exclusive gateway below the **Qualify** user task.
15. Create an outgoing connection from the exclusive gateway and connect it to a new user task.
16. Click the connection and input **In Limit** in the **Name** field of the **Properties** panel.
17. Expand **Implementation/Execution** and select **Condition** in the **Condition Expression** section.
18. Select **inlimit** from the **Process Variable** drop-down menu and select **Is true** from the **Condition** drop-down menu.

The screenshot displays the configuration interface for a business process. On the left, a workflow diagram shows a 'Qualify' task leading to a decision diamond (marked with an orange 'X'). A path labeled 'In Limit' leads from the diamond to a 'Final Approval' user task. On the right, the configuration panel is expanded to the 'Implementation/Execution' section. The 'Name' field is set to 'In Limit'. The 'Documentation' field is empty. The 'Priority' field is empty. The 'Condition Expression' section has 'Condition' selected. The 'Process Variable' dropdown is set to 'inlimit'. The 'Condition' dropdown is set to 'Is true'.


19. Click the user task, enter **Final Approval** in the **Name** field.
20. Expand **Implementation/Execution** and enter **FinalApproval** in the **Task Name** field.
21. Select **New** from the **Groups** menu, and input **manager**.
22. Click  next to **Assignments**. In the **Final Approval Data I/O** window, click **Add** to create the following assignments:

Figure 6.5. Final Approval Data I/O assignments

Final Approval Data I/O ×

Data Inputs and Assignments + Add

Name	Data Type	Source	
application	Application [com.i ▼	application ▼	🗑️
inlimit	Boolean ▼	inlimit ▼	🗑️

Data Outputs and Assignments + Add

Cancel Save

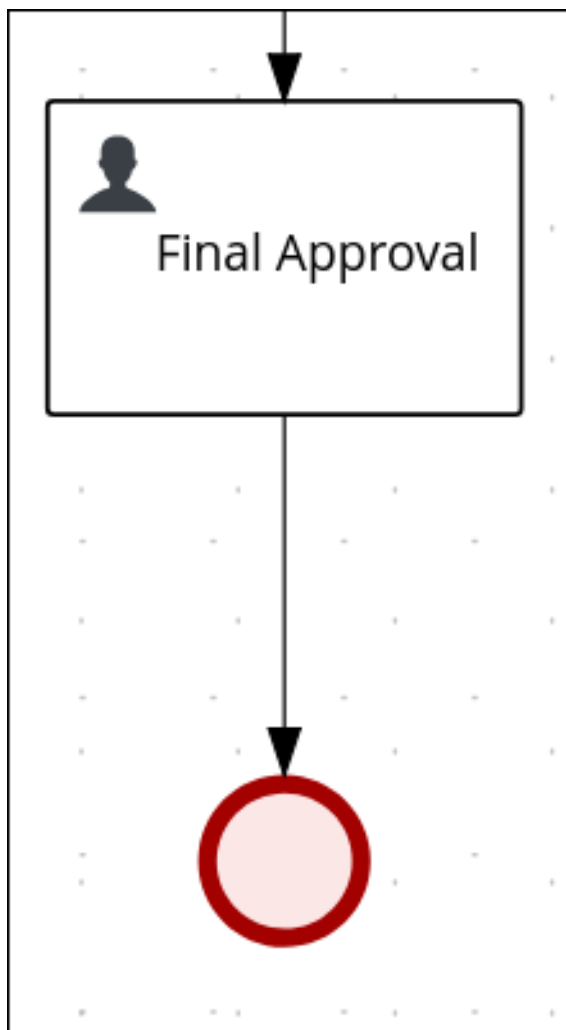
23. Above the canvas, click **Save** to confirm your changes.

6.1.4. Increasing the down payment

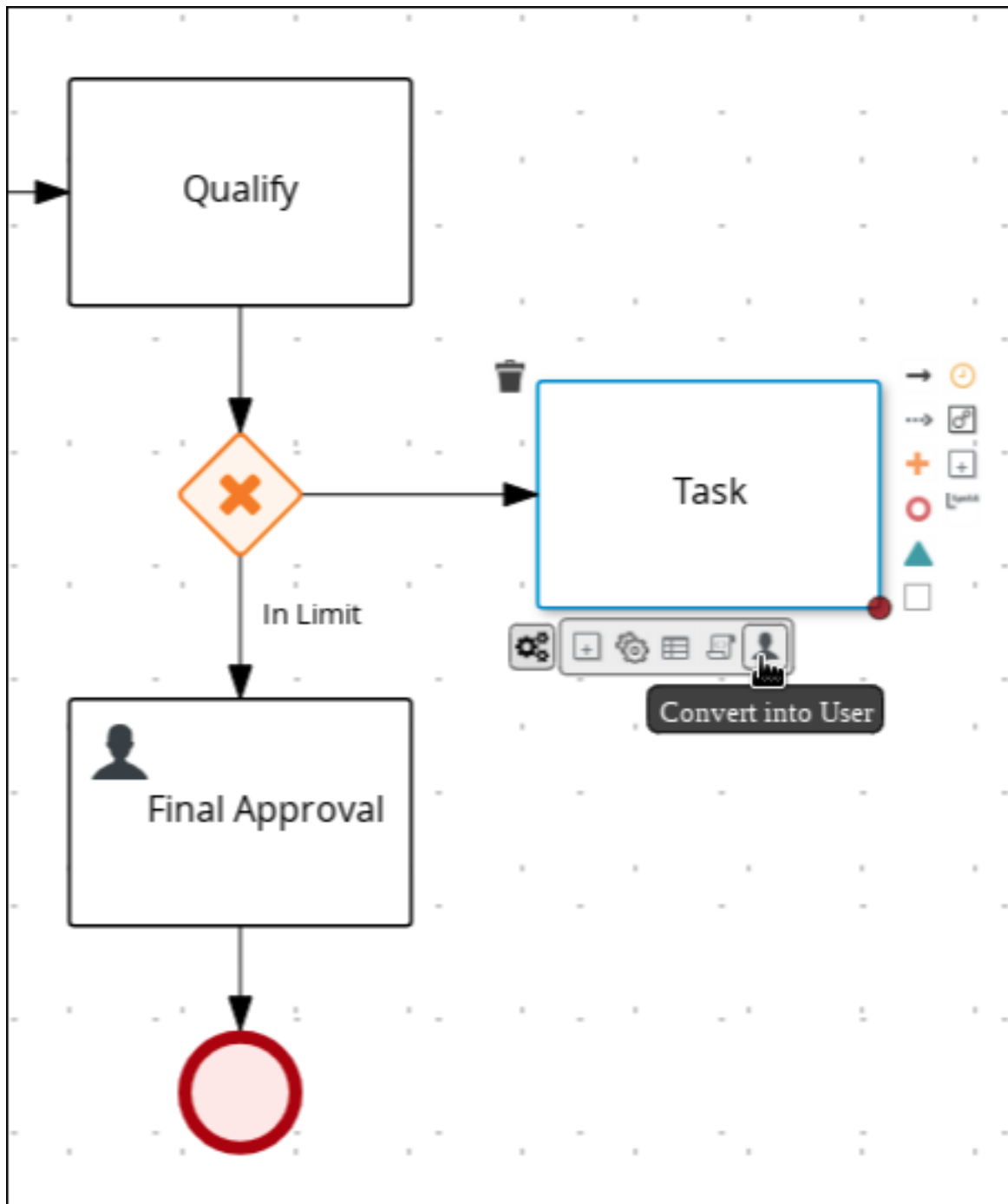
The increasing the down payment business process checks to see if the applicant qualifies for the loan by increasing their down payment. The final result is either the final loan approval, or loan denial based on the applicant's inability to increase the down payment.


Procedure

1. Click on the **Final Approval** user task and select **Create End** from the user task quick menu.
2. Move the end event below the **Final Approval** user task.



3. Return to the exclusive gateway that connects with the **Final Approval** user task. Create a second outgoing connection and connect it to a new user task.



4. Click the connection and input **Not in Limit** in the **Name** field of the **Properties** panel.
5. Expand **Implementation/Execution** and select **Condition** in the **Condition Expression** section.
6. Select **inlimit** from the **Process Variable** drop-down menu and select **Is false** from the **Condition** drop-down menu.
7. Click an empty space on the canvas, scroll down, expand **Process Data**, and click  next to **Process Variables**. Enter the following values:
 - **Name: incdowndpayment**
 - **Data Type: Boolean**

Process Data

Process Variables

Name	Data Type	
application	Application [com.r	+
inlimit	Boolean	🗑️
incdownpayment	Boolean	🗑️


8. Click the new user task and in the **Properties** panel, input **Increase Down Payment** in the **Name** field.
9. Expand **Implementation/Execution** and enter **IncreaseDownPayment** in the **Task Name** field.
10. Select **New** from the **Groups** menu, and input **broker**.
11. Click  next to **Assignments**. In the **Increase Down Payment Data I/O** window, click **Add** to create the following assignments:

Figure 6.6. Increase Down Payment Data I/O assignments

Increase Down Payment Data I/O

Data Inputs and Assignments + Add

Name	Data Type	Source	
application	Application [com.i	application	🗑️

Data Outputs and Assignments + Add

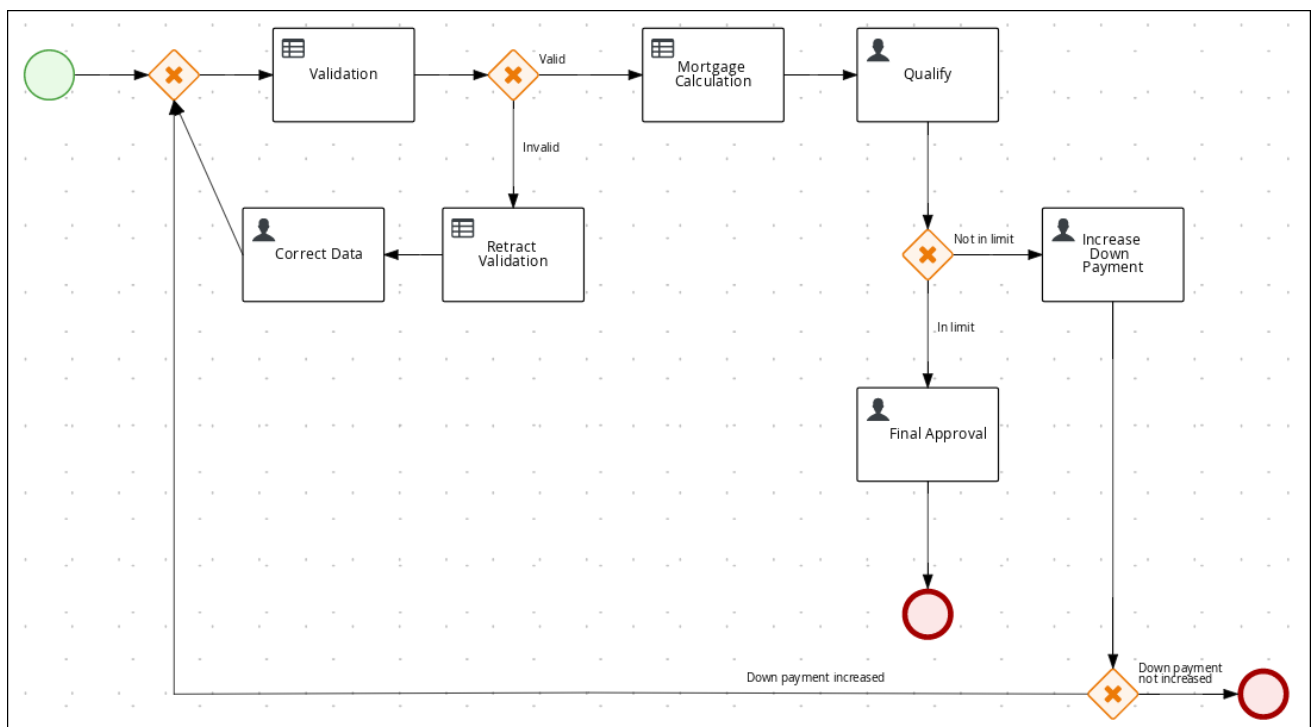
Name	Data Type	Target	
incdownpayment	Boolean	incdownpayment	🗑️

Cancel Save

12. Above the canvas, click **Save** to confirm your changes.
13. Click on the **Increase Down Payment** user task, click on the **Create parallel** menu icon, and convert it to an exclusive gateway.
14. Drag the new exclusive gateway below the **Increase Down Payment** user task.
15. Create an outgoing connection from the exclusive gateway to an end event.

16. Click the connection and input **Down payment not increased** in the **Name** field of the **Properties** panel.
17. Expand **Implementation/Execution** and select **Expression** in the **Condition Expression** section.
18. Input **return !incdownpayment;** and select **java** from the drop-down menu.
19. Create an outgoing connection from the exclusive gateway and connect it to the first exclusive gateway.
20. Click the connection and input **Down payment increased** in the **Name** field of the **Properties** panel.
21. Expand **Implementation/Execution** and select **Expression** in the **Condition Expression** section.
22. Input **return incdownpayment;** and select **java** from the drop-down menu.
23. Above the canvas, click **Save** to confirm your changes and save the entire business process.

Figure 6.7. Final version of the business process



CHAPTER 7. GUIDED RULES

Guided rules are business rules that you create in a UI-based guided rules designer in Business Central that leads you through the rule-creation process. The guided rules designer provides fields and options for acceptable input based on the data objects for the rule being defined. The guided rules that you define are compiled into Drools Rule Language (DRL) rules as with all other rule assets.

All data objects related to a guided rule must be in the same project package as the guided rule. Assets in the same package are imported by default. After you create the necessary data objects and the guided rule, you can use the **Data Objects** tab of the guided rules designer to verify that all required data objects are listed or to import other existing data objects by adding a **New item**.

7.1. VIEWING THE MORTGAGE_PROCESS BUSINESS RULES

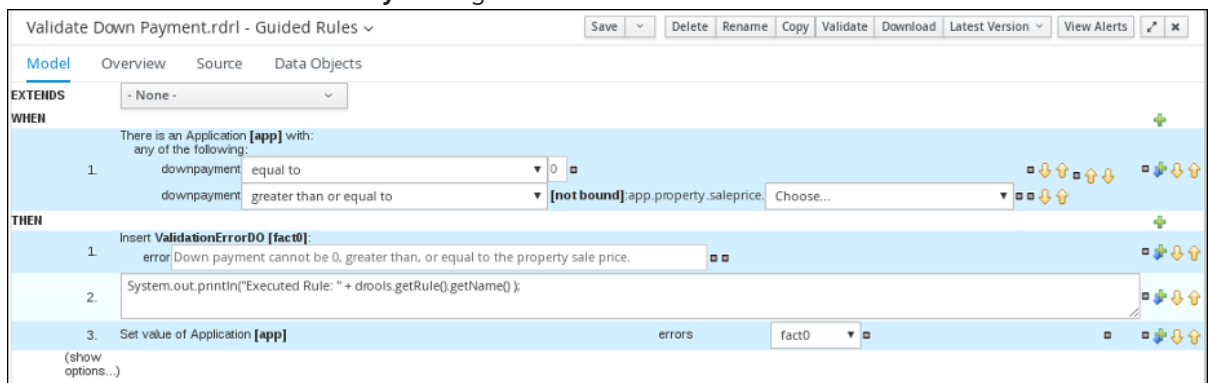
The goal of this chapter is to introduce you to the predefined business rules for the **Mortgage_Process** project. For this tutorial, you do not create and define the business rules. Instead, review the **WHEN** and **THEN** rules that are already defined in the **Mortgage_Process** sample project's preconfigured business rules. For information about creating guided business rules, see [Designing a decision service using guided rules](#).

7.1.1. Viewing the Validate Down Payment guided rule

Review the **WHEN** and **THEN** rules so that you understand how the conditions are set and used later when you run the process.

Procedure

1. Click **Menu** → **Design** → **Projects**, and click **Mortgage_Process**.
2. From the asset list, click the right arrow to view the second page of the asset list and click the **Validate Down Payment** guided rule.
3. Review the **Validate Down Payment** guided rule's **WHEN** and **THEN** conditions and values.



7.1.2. Viewing the RetractValidationErr guided rule

Review the **WHEN** and **THEN** rules so that you understand how the conditions are set and used later when you run the process.

Procedure

1. Click **Menu** → **Design** → **Projects**, and click **Mortgage_Process**.

- From the asset list, click the right arrow to view the second page of the asset list and click the **RetractValidationErr** guided rule.
- Review the **RetractValidationErr** guided rule's **WHEN** and **THEN** conditions and values.

The screenshot displays the configuration interface for the **RetractValidationErr.rdr1** guided rule. The interface includes a top toolbar with buttons for **Save**, **Delete**, **Rename**, **Copy**, **Validate**, **Download**, **Latest Version**, and **View Alerts**. Below the toolbar, there are tabs for **Model**, **Overview**, **Source**, and **Data Objects**. The **EXTENDS** section is set to **- None -**. The **WHEN** section contains one condition: **1. There is a ValidationErrorDO [vdo]**. The **THEN** section contains one action: **1. delete ValidationErrorDO [vdo]**. Under the action, there are two attributes: **dialect** with a dropdown menu set to **mvel**, and **ruleflow-group** with a text input field containing **error**. The interface also features several small icons (plus, minus, arrows) for editing and deleting elements.

CHAPTER 8. GUIDED DECISION TABLES

Guided decision tables are a wizard-led alternative to spreadsheet decision tables for defining business rules in a tabular format. With guided decision tables, you are led by a UI-based wizard in Business Central that helps you define rule attributes, metadata, conditions, and actions based on specified data objects in your project. After you create your guided decision tables, the rules you defined are compiled into Drools Rule Language (DRL) rules as with all other rule assets.

All data objects related to a guided decision table must be in the same project package as the guided decision table. Assets in the same package are imported by default. After you create the necessary data objects and the guided decision table, you can use the **Data Objects** tab of the guided decision tables designer to verify that all required data objects are listed or to import other existing data objects by adding a **New item**.

8.1. VIEWING THE MORTGAGE DECISION TABLE

The goal of this chapter is to introduce you to the **MortgageDecisionTable** decision table. For this tutorial, you do not create and set the decision table conditions. Instead, review the values and the conditions that are already defined in the **Mortgage_Process** sample project's **MortgageDecisionTable** Guided Decision Tables asset. For information about creating decision tables, see [Designing a decision service using guided decision tables](#).

Prerequisites

- The business rules have been defined. For more information, see [Section 7.1, "Viewing the Mortgage_Process business rules"](#).

Procedure

- In Business Central, go to **Menu** → **Design** → **Projects** → **Mortgage_Process**.
- Scroll down and click the **MortgageDecisionTable** Guided Decision Tables asset.

MortgageDecisionTable								
#	Description	ruleflow-group	Applicant Annual Income		Property			application
			\$greater	\$less_or_equal	\$saleprice_less	\$age_less	\$location	Mortgage Amount
1		mortgagecalculation	100000	200000	300000	5	Urban	200000
2		mortgagecalculation	50000	99999	100000	10	Rural	100000

CHAPTER 9. FORMS IN BUSINESS CENTRAL

A form is a layout definition for a page, defined as HTML, that is displayed as a dialog window to the user during process and task instantiation. Task forms acquire data from a user for both the process and task instance execution, whereas process forms take input and output from process variables.

The input is then mapped to the task using the data input assignment, which you can use inside of a task. When the task is completed, the data is mapped as a data output assignment to provide the data to the parent process instance.

9.1. VIEWING THE MORTGAGE_PROCESS FORMS

The goal of this chapter is to introduce you to the **Mortgage_Process** sample project's predefined forms which are used for collecting user data for the mortgage application business process. For this tutorial, you do not create and modify the **Mortgage_Process** forms. Instead, review the predefined sample forms. For information about creating forms, see [Designing business processes in Business Central](#).

Procedure

1. In Business Central, go to **Menu → Design → Projects → Mortgage_Process**.
2. From the asset list, click the right arrow to view the second page of the asset list and select the **Applicant** form.

Figure 9.1. Applicant sample form

The screenshot displays the 'Form Modeler' application window for the 'Applicant' form. The window title is 'Form Modeler [Applicant]'. The toolbar contains buttons for 'Save', 'Delete', 'Rename', 'Copy', 'Download', 'Latest Version', and 'Hide Alerts'. The main area shows the 'Model' tab with three input fields: 'Name', 'Annual Income', and 'SSN'. Each field has a placeholder text and a vertical ellipsis menu icon to its right.

3. Click **Menu → Design → Projects → Mortgage_Process**.
4. From the asset list, select the **Property** form. The **Property** form is shown below:

Figure 9.2. Property sample form

The screenshot shows the Form Modeler [Property] interface. At the top, there is a title bar with the text "Form Modeler [Property]" and a dropdown arrow. To the right of the title bar are several action buttons: "Save" (with a dropdown arrow), "Delete", "Rename", "Copy", "Download", "Latest Version" (with a dropdown arrow), and "View Alerts" (with a checkmark icon and a close icon). Below the title bar, there are two tabs: "Model" (selected) and "Overview". The main area of the form is enclosed in a dashed border and contains four distinct sections, each with a title and a text input field:

- Age of property**: A text input field containing the placeholder text "Age of property".
- Address of property**: A text input field containing the placeholder text "Address of property".
- Locale**: A text input field containing the placeholder text "Locale".
- Sale Price**: A text input field containing the placeholder text "Sale Price".

5. Click **Menu** → **Design** → **Projects** → **Mortgage_Process**.
6. From the asset list, select the **Application** form. The **Application** form is shown below:

Figure 9.3. Application sample form

The screenshot shows the Form Modeler [Application] interface. At the top, there is a title bar with the text "Form Modeler [Application]" and a dropdown arrow. To the right of the title bar are several action buttons: "Save" (with a dropdown arrow), "Delete", "Rename", "Copy", "Download", "Latest Version" (with a dropdown arrow), and "View Alerts" (with a checkmark icon and a close icon). Below the title bar, there are two tabs: "Model" (selected) and "Overview". The main area of the form is enclosed in a dashed border and contains several sections:

- Down Payment**: A text input field containing the placeholder text "Down Payment".
- Years of amortization**: A text input field containing the placeholder text "Years of amortization".
- Applicant**: A section containing three text input fields:
 - Name**: A text input field containing the placeholder text "Name".
 - Annual Income**: A text input field containing the placeholder text "Annual Income".
 - SSN**: A text input field containing the placeholder text "SSN".
- Property**: A section containing four text input fields:
 - Age of property**: A text input field containing the placeholder text "Age of property".
 - Address of property**: A text input field containing the placeholder text "Address of property".
 - Locale**: A text input field containing the placeholder text "Locale".
 - Sale Price**: A text input field containing the placeholder text "Sale Price".

7. Click the **X** icon in the upper-right corner to close the editor.

CHAPTER 10. DEPLOYING THE MORTGAGEAPPROVALPROCESS PROCESS APPLICATION

The following chapter instructs you how to build and deploy a new instance of the `Mortgage_Process` application in Red Hat Process Automation Manager.

Prerequisites

- KIE Server is deployed and connected to Business Central.

Procedure

1. In Business Central, go to **Menu** → **Design** → **Projects** → **Mortgage_Process**.
2. Click **Deploy**.
 - If no KIE container (deployment unit) is included with the project name, a container with default values is automatically created.
 - If an older version of the project is already deployed, go to the project settings and change the project version. When finished, save the change and click **Deploy**. This deploys a new version of the same project with the latest changes in place, alongside the older version(s).



NOTE

You can also select the **Build & Install** option to build the project and publish the KJAR file to the configured Maven repository without deploying to a KIE Server. In a development environment, you can click **Deploy** to deploy the built KJAR file to a KIE Server without stopping any running instances (if applicable), or click **Redeploy** to deploy the built KJAR file and replace all instances. The next time you deploy or redeploy the built KJAR, the previous deployment unit (KIE container) is automatically updated in the same target KIE Server. In a production environment, the **Redeploy** option is disabled and you can click **Deploy** only to deploy the built KJAR file to a new deployment unit (KIE container) on a KIE Server.

To configure the KIE Server environment mode, set the `org.kie.server.mode` system property to `org.kie.server.mode=development` or `org.kie.server.mode=production`. To configure the deployment behavior for a corresponding project in Business Central, go to project **Settings** → **General Settings** → **Version** and toggle the **Development Mode** option. By default, KIE Server and all new projects in Business Central are in development mode. You cannot deploy a project with **Development Mode** turned on or with a manually added **SNAPSHOT** version suffix to a KIE Server that is in production mode.

3. To review project deployment details, click **View deployment details** in the deployment banner at the top of the screen or in the **Deploy** drop-down menu. This option directs you to the **Menu** → **Deploy** → **Execution Servers** page.

CHAPTER 11. EXECUTING THE MORTGAGE APPROVAL PROCESS APPLICATION

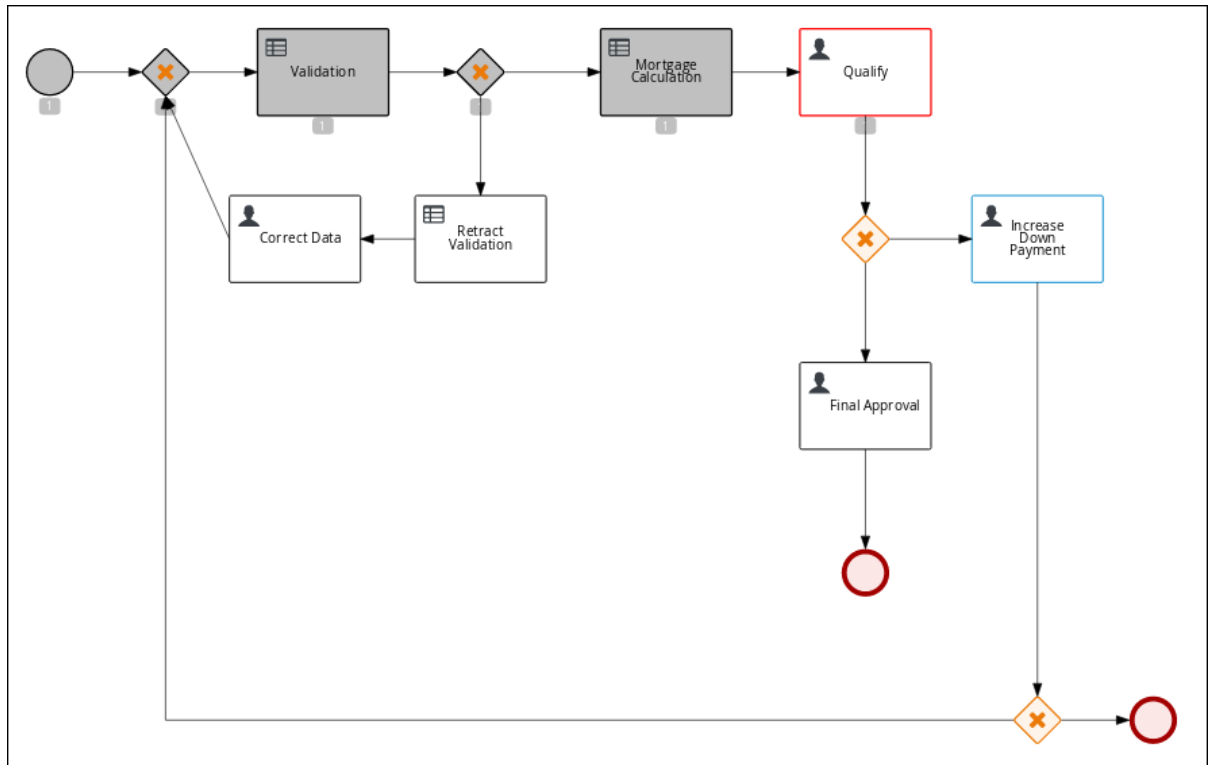
Now that you have deployed the project, you can execute the project's defined functionality. For this tutorial you input data into a mortgage application form acting as the mortgage broker. The **MortgageApprovalProcess** business process runs and determines whether or not the applicant has offered an acceptable down payment based on the decision rules that you defined earlier. The business process either ends the rule testing or requests that the applicant increase the down payment to proceed. If the application passes the business rule testing, the bank's approver reviews the application and either approve or deny the loan.

Prerequisites

- KIE Server is deployed and connected to Business Central.
- The **Mortgage_Process** application has been deployed.
- The users working on the tasks are members of the following groups and roles:
 - **approver** group: For the **Qualify** task
 - **broker** group: For the **Correct Data** and **Increase Down Payment** tasks
 - **manager** role: For the **Final Approval** task

Procedure

1. Log in to Red Hat Process Automation Manager as **Bill** (the broker) and click **Menu → Manage → Process Definitions**.
2. Click the three vertical dots in the **Actions** column and select **Start** to start to open the **Application** form and input the following values in to the form fields:
 - **Down Payment: 30000**
 - **Years of amortization: 10**
 - **Name: Ivo**
 - **Annual Income: 60000**
 - **SSN: 123456789**
 - **Age of property: 8**
 - **Address of property: Brno**
 - **Locale: Rural**
 - **Property Sale Price: 50000**
3. Click **Submit** to start a new process instance. After starting the process instance, the **Instance Details** view opens.
4. Click the **Diagram** tab to view the process flow within the process diagram. The state of the process is highlighted as it moves through each task.



5. Log out of Business Central and log back in as **Katy**.
6. Click **Menu** → **Track** → **Task Inbox**. This takes you to the **Qualify** form.
7. Click the three vertical dots in the **Actions** column and select and click **Claim**. The Qualify task **Status** is now **Reserved**.
8. Click the **Qualify** task row to open and review the task information. Click **Claim** and then **Start** at the bottom of the form.
The application form is now active for approval or denial.
9. To approve the application, select **Is mortgage application in limit?** and click **Complete**.
10. In the **Task Inbox**, click anywhere in the **Final Approval** row to open the **Final Approval** task.
11. In the **Final Approval** row, click the three vertical dots in the **Actions** column and click **Claim**.
12. Click anywhere in the **Final Approval** row to open the **Final Approval** task. Click **Start** at the bottom of the form.
13. Note that the **Inlimit** check box is selected to reflect that that application is ready for final approval. Click **Complete**.



NOTE

The **Save** and **Release** buttons are only used to either pause the approval process and save the instance if you are waiting on a field value, or to release the task for another user to modify.

CHAPTER 12. MONITORING THE MORTGAGEAPPROVALPROCESS PROCESS APPLICATION

The following chapter shows how different bank employees, such as a system administrator or a knowledge worker, might use some of the monitoring capabilities to track an instance of the mortgage approval process.

Prerequisites

- KIE Server is deployed and connected to Business Central.

Procedure

1. Log in to Red Hat Process Automation Manager and click **Menu → Manage → Process Instances**.
2. In the **Manage Process Instances** window, you can set filters, such as **State, Errors, Id**, and so on.
3. Select **Completed** in the **State** filter to view all completed **MortgageApprovalProcess** instances.
4. Click on the completed process instance.
5. Click each of the following tabs to get a feel for what type of information is available to monitor a specific process instance:
 - **Instance Details**
 - **Process Variables**
 - **Documents**
 - **Logs**
 - **Diagram**
6. Click **Menu → Track → Process Reports**. This view contains a variety of charts that can help a senior process manager to gain an overview of all processes based on **Type, Start Date, Running Time**, and so on to assist with task reporting.

12.1. FILTERING PROCESS INSTANCES USING DEFAULT OR ADVANCED FILTERS

Business Central now provides you with default and advanced filters to help you filter and search through running process instances. You can also create custom filters using the **Advanced Filters** option.

12.1.1. Filtering process instances using default filters

Filter processes instances by attributes such as **State, Errors, Filter By, Name, Start Date**, and **Last update**.

Procedure

1. In Business Central, go to **Menu → Manage → Process Instances**.
2. On the **Manage Process Instances** page, click the filter icon on the left of the page to expand the **Filters** pane.
This pane lists the following process attributes which you can use to filter process instances:
 - **State:** Filter process instances based on their state (**Active, Aborted, Completed, Pending,** and **Suspended**).
 - **Errors:** Filter process instances by errors.
 - **Filter By:** Filter process instances based on **Id, Initiator, Correlation Key,** or **Description** attribute.
 - i. Select the required attribute.
 - ii. Enter the search query in the text field below.
 - iii. Click **Apply**.
 - **Name:** Filter process instances based on process definition name.
 - **Start Date:** Filter process instances based on their creation date.
 - **Last update:** Filter process instances based on their last modified date.

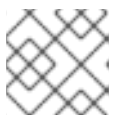
You can also use the **Advanced Filters** option to create custom filters in Business Central.

12.1.2. Filtering process instances using advanced filters

Use the **Advanced Filters** option to create custom process instance filters. The newly created custom filter is added to the **Saved Filters** pane, which is accessible by clicking on the star icon on the left of the **Manage Process Instances** page.

Procedure

1. In Business Central, go to **Menu → Manage → Process Instances**.
2. On the **Manage Process Instances** page, click **Advanced Filters** icon.
3. In the **Advanced Filters** pane, enter the name and description of the filter, and click **Add New**.
4. Select an attribute from the **Select column** drop-down list, for example, **processName**. The content of the drop-down changes to **processName != value1**.
5. Click the drop-down again and choose the required logical query. For the **processName** attribute, choose **equals to**.
6. Change the value of the text field to the name of the process you want to filter.



NOTE

The name must match the value defined in the business process of the project.

7. Click **Save** and the processes are filtered according to the filter definition.

8. Click the star icon to open the **Saved Filters** pane.
In the **Saved Filters** pane, you can view all the saved advanced filters.

CHAPTER 13. ADDITIONAL RESOURCES

- *Designing business processes in Business Central*

APPENDIX A. VERSIONING INFORMATION

Documentation last updated on Tuesday, July 21, 2020.