

**Institute of Systems Science
National University of Singapore**

**GRADUATE CERTIFICATE
INTELLIGENT REASONING SYSTEMS**

Workshop Project Guide

Subject: Machine Reasoning

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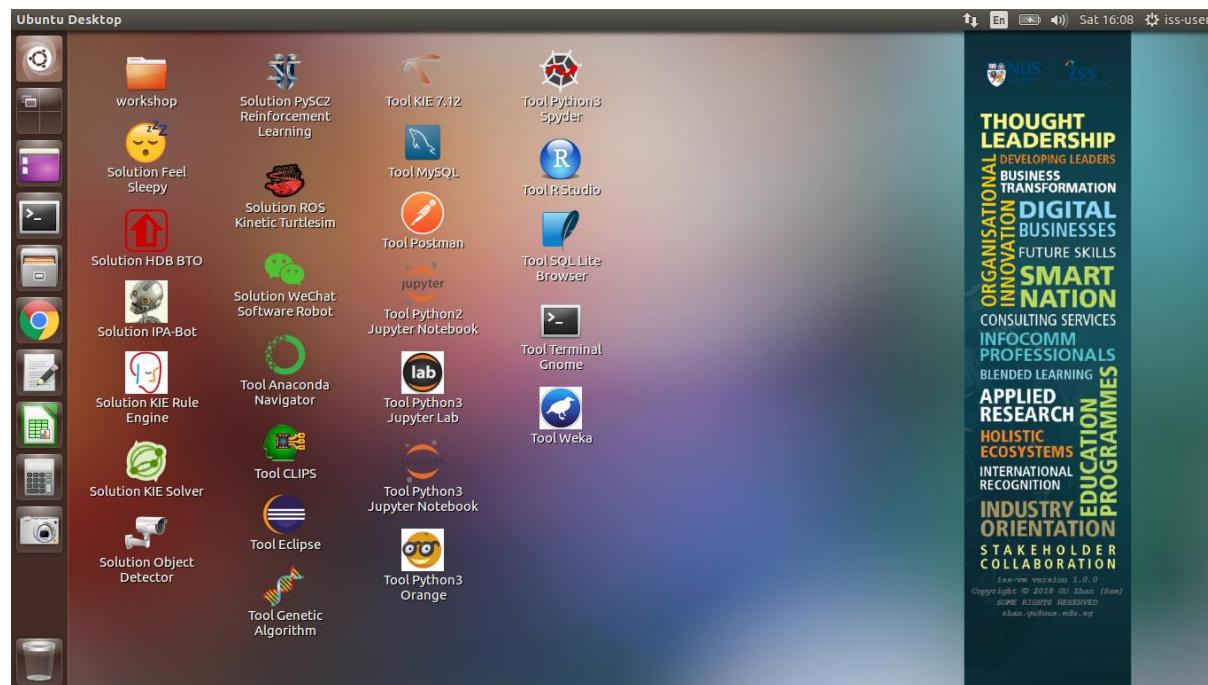
No description, website, or topics provided.

Branch: master New pull request

This branch is 11 commits ahead of telescopeuser:master.

File	Description	Last Commit
telescopeuser Merge pull request #14 from telescopeuser/master	Merge pull request #14 from telescopeuser/master	... (11 days ago)
S-MR-Workshop1	S-MR Workshop Guide Enhanced	11 days ago
S-MR-Workshop2	S-MR Workshop Guide Enhanced	3 months ago
S-MR-Workshop3	S-MR Workshop Guide Enhanced	2 months ago
S-MR-Workshop4	S-MR Workshop Guide Enhanced	11 days ago
LICENSE	S-MR-Workshop1/project-io/getting-started.zip	3 months ago
README.md	uploaded S-MR Workshop Guide.pdf	2 months ago
README.md		

Workshops & References <https://github.com/IRS-MR/S-MR-Workshop>



Virtual Machine Workstation <http://bit.ly/iss-vm>

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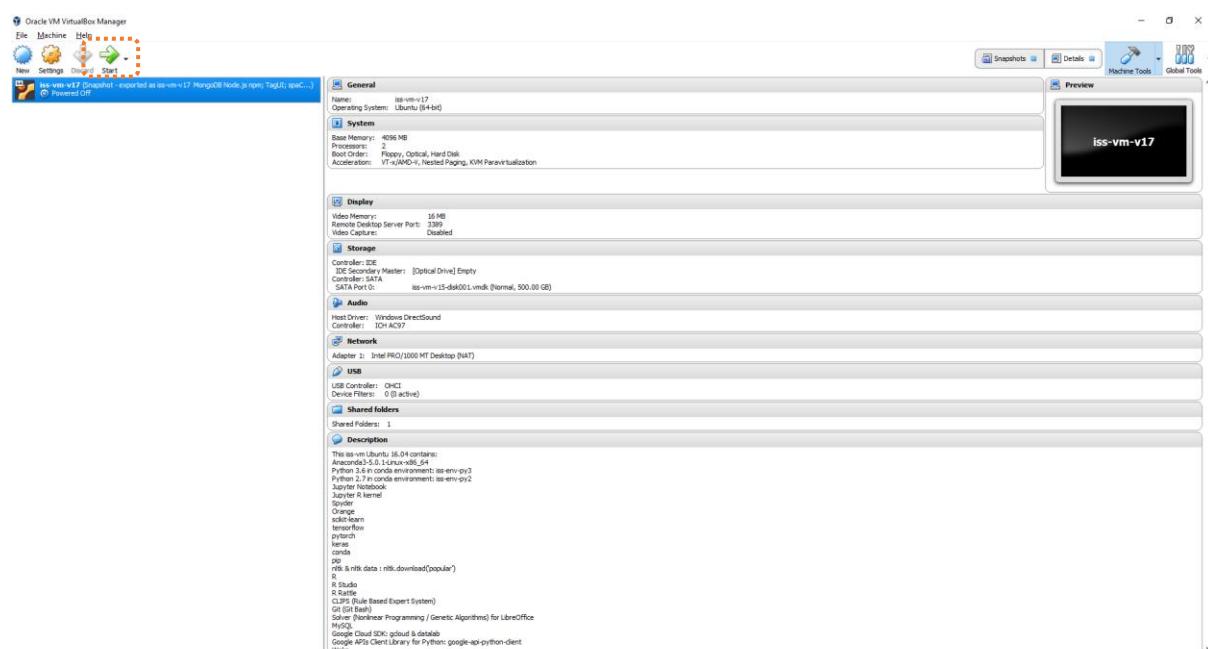
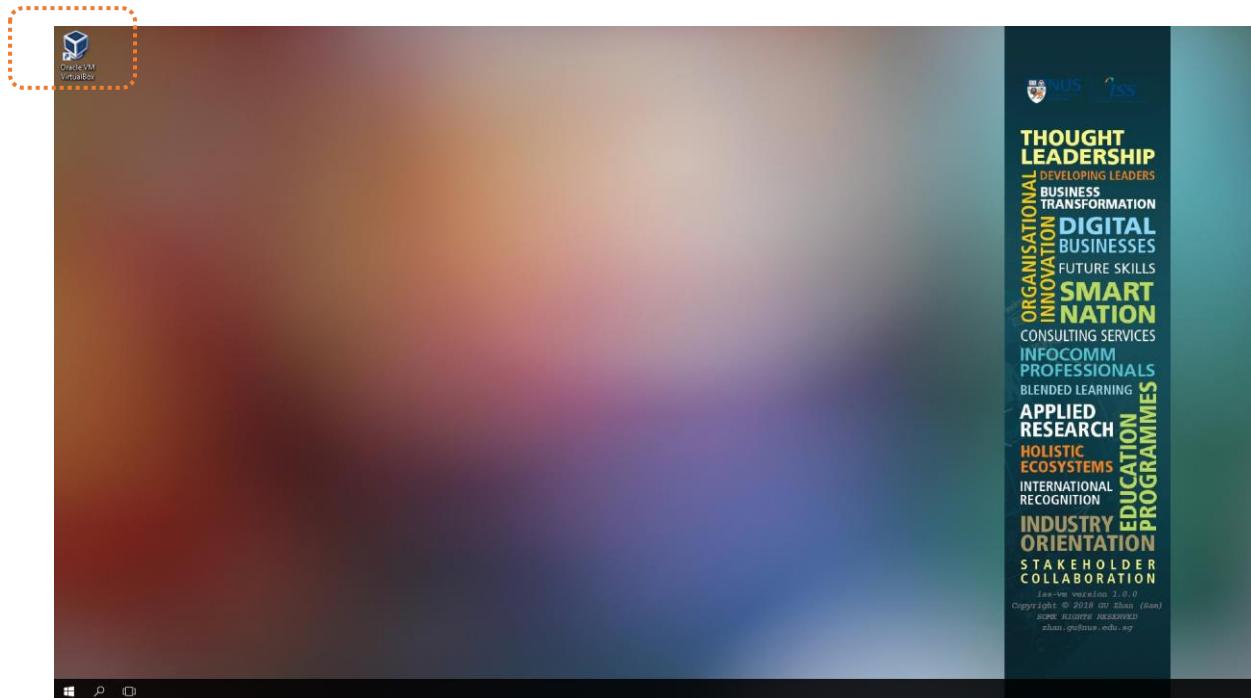
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1. Workshop 1 – Rule/Process Reasoning System

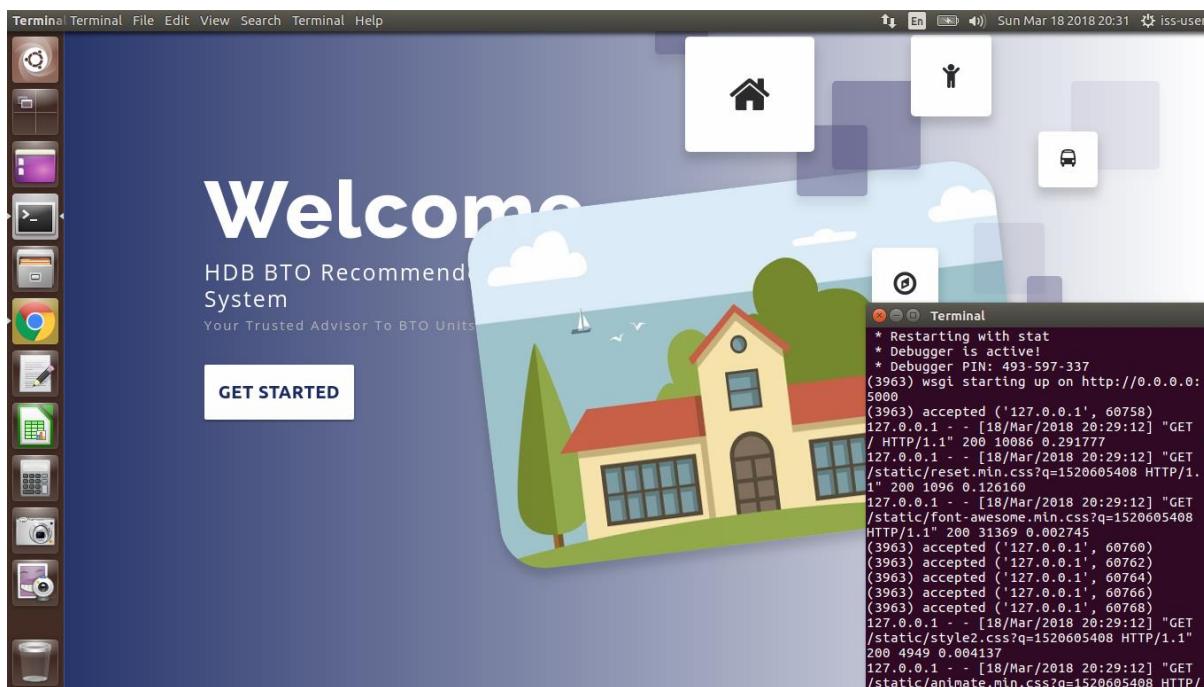
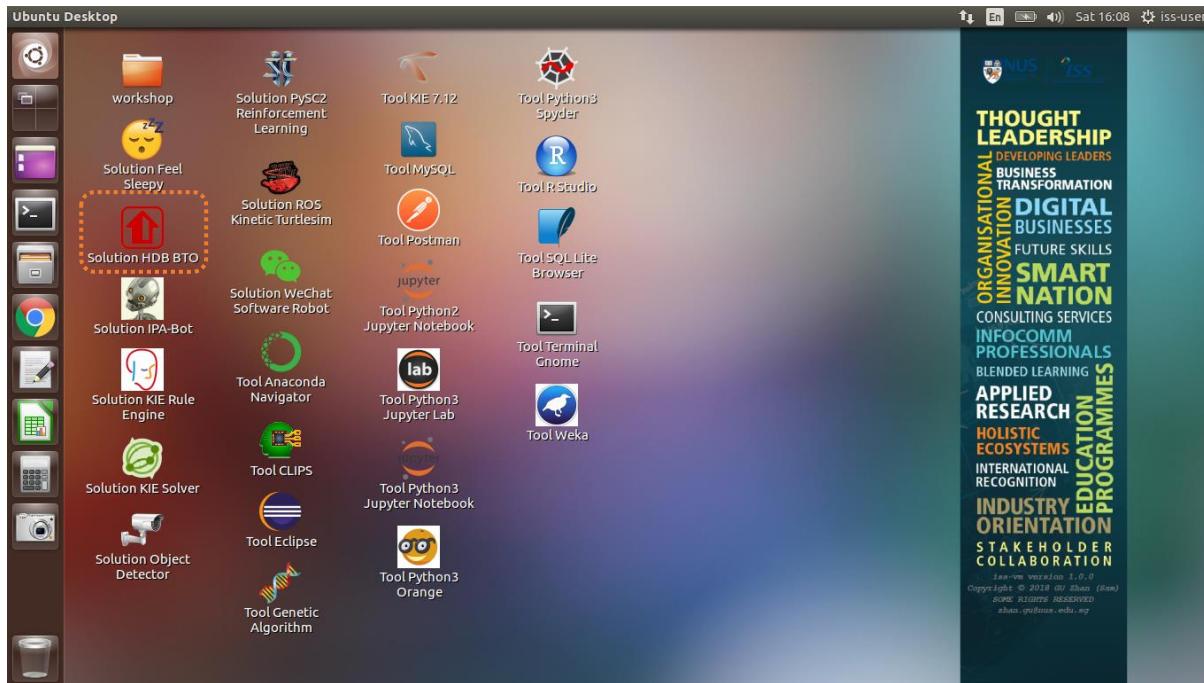
1.1. Case Study of HDB BTO Recommender

1.1.1. Use case demo

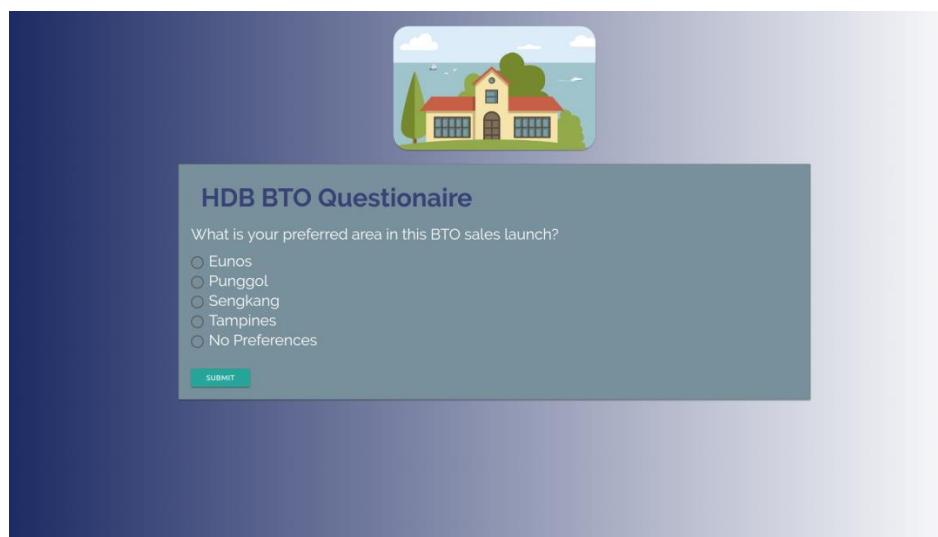
- 1) Start host computer → Oracle VM VirtualBox → iss-vm virtual machine



2) From iss-vm (Ubuntu Linux) desktop, start 'Solution HDB BTO'



- 3) Use the system by keying in user (your) preferences to receive recommendations.



HDB BTO Questionnaire

Our recommendations:
We recommend you a high level 5-room flat facing North/South near an MRT, childcare facilities and a hawker centre.
Here are the closest available units that fit your budget of \$480,000

Project	Address	Block	Level	Unit	Price	Room Type	Direction	Floor Area	Completion Date
FERNVALE GLADES	SENGKANG WEST WAY	460A	14	77	\$402,000	5-room	N-S	113 Sqm	30-Apr-21
FERNVALE GLADES	SENGKANG WEST WAY	460B	14	103	\$402,000	5-room	N-S	113 Sqm	30-Apr-21
FERNVALE GLADES	SENGKANG WEST WAY	461B	14	133	\$402,000	5-room	N-S	113 Sqm	30-Jun-21

Alternatives which may interest you (based on top result)
5-room Units for Block 460A in Project FERNVALE GLADES:
Available Booked

Level / Unit	77	79	87	89
14	\$402,000	\$402,000	\$402,000	\$402,000
13	\$396,500	\$396,500	\$396,500	\$396,500
12	\$391,000	\$391,000	\$391,000	\$391,000
11	\$385,500	\$385,500	\$385,500	\$385,500
10	\$380,000	\$380,000	\$380,000	\$380,000
9	\$374,500	\$374,500	\$374,500	\$374,500
8	\$369,000	\$369,000	\$369,000	\$369,000
7	\$363,500	\$363,500	\$363,500	\$363,500
6	\$358,000	\$358,000	\$358,000	\$358,000
5	\$352,500	\$352,500	\$352,500	\$352,500
4	\$347,000	\$347,000	\$347,000	\$347,000
3	\$341,500	\$341,500	\$341,500	\$341,500
2	\$336,000	\$336,000	\$336,000	\$336,000

1.1.2. System analysis & exploration

- 1) Go to website:

<https://github.com/IRS-PM/Workshop-Project-Submission-Template>

No description, website, or topics provided.

Branch: master		New pull request	Find file	Clone or download
This branch is 1 commit ahead of telescopeuser:master.		Clone with HTTPS <small>(?)</small> Use Git or checkout with SVN using the web URL. https://github.com/IRS-PM/Workshop-Project-Submission-Template		
Miscellaneous	Initial	Open in Desktop Download ZIP <small>23 days ago</small>		
ProjectReport	Initial			
SystemCode/clips	Initial			
UserGuide	Initial			
README.md	updated readme			
		23 days ago		
		9 days ago		

- 2) Read SECTION 1, 2, 3, 5, 6, 7 to understand knowledge based HDB BTO recommender system.
- 3) Sign up a GitHub account for yourself if you haven't have one.



{ Tips } Workshop Project Submission Template: Github Repository & Zip File

[Naming Convention] CourseCode-StartDate-BatchCode-Group_or_Individual-TeamName_or_PersonName-ProjectName.zip

- [MTech Group Project Naming Example] IRS-MR-2019-01-19-IS01PT-GRP-AwsomeSG-HDB_BTO_Recommender.zip
- [MTech Individual Project Naming Example] IRS-MR-2019-07-01-IS01FT-IND-SamGuZhan-HDB_BTO_Process.zip
- [EEP Group Project Naming Example] IRS-MR-2019-03-13-EEP-GRP-AwsomeSG-HDB_BTO_Recommender.zip
- [EEP Individual Project Naming Example] IRS-MR-2019-08-22-EEP-IND-SamGuZhan-HDB_BTO_Process.zip

1.2. KIE BPMS/BRMS Suite Tutorial

1.2.1. Access/Install KIE “Knowledge Is Everything”

{ Objective } Install BPMS/BRMS product suite to develop and deploy a business machine reasoning system.

The screenshot shows the KIE Group website with a dark background featuring a grid of white squares. At the top, there's a navigation bar with the KIE GROUP logo, followed by links for DROOLS, OPTAPLANNER, JBPM, APPFORMER, and a redhat logo. The main content area is titled "DROOLS" and contains a brief description of what Drools is: "Drools is a business rule management system with a forward-chaining and backward-chaining inference based rules engine, allowing fast and reliable evaluation of business rules and complex event processing. A rule engine is also a fundamental building block to create an expert system which, in artificial intelligence, is a computer system that emulates the decision-making ability of a human expert."

DROOLS

Drools is a business rule management system with a forward-chaining and backward-chaining inference based rules engine, allowing fast and reliable evaluation of business rules and complex event processing.

[Read more →](#)

OPTAPLANNER

OptaPlanner is a constraint solver that optimizes use cases such as employee rostering, vehicle routing, task assignment and cloud optimization.

[Read more →](#)

JBPM

JBPM is a flexible Business Process Management suite allowing you to model your business goals by describing the steps that need to be executed to achieve those goals.

[Read more →](#)

APPFORMER

AppFormer is a low code platform to develop modern applications. It's a powerful tool for developers that can easily build applications by mashing up components and connect them to other Red Hat modules and software.

We make building apps looks easy.

[Read more →](#)

KIE / Business Central

<http://www.kiegroup.org/>

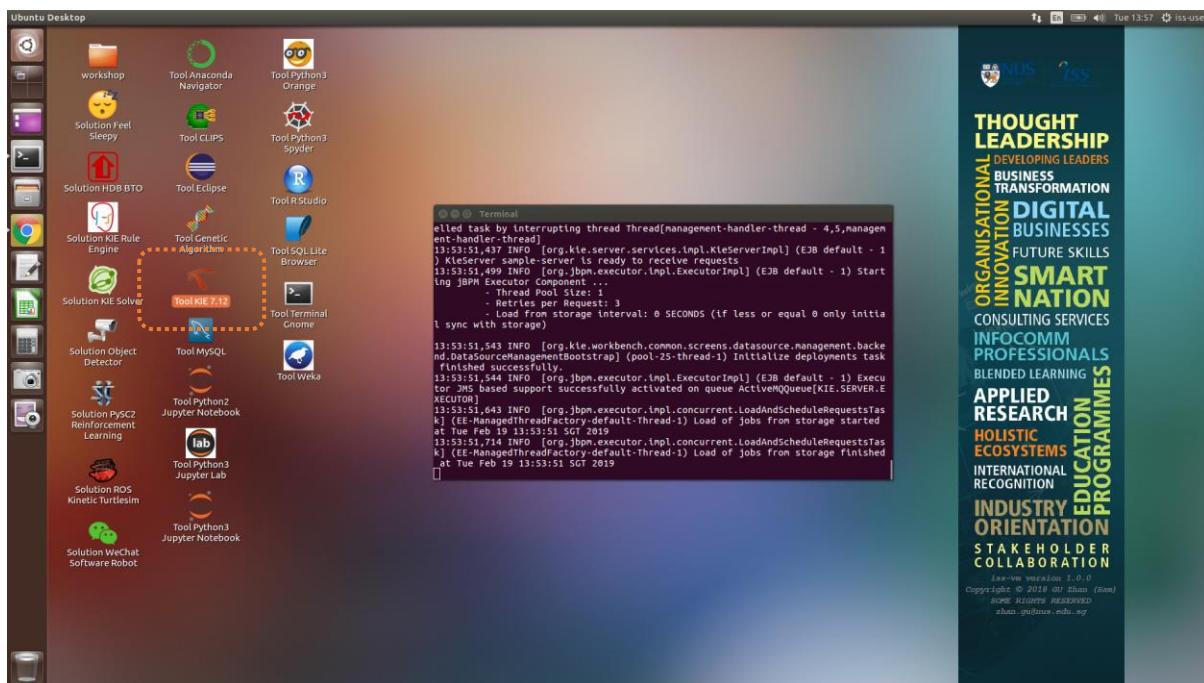
KIE BRMS: Drools

<http://www.drools.org/>

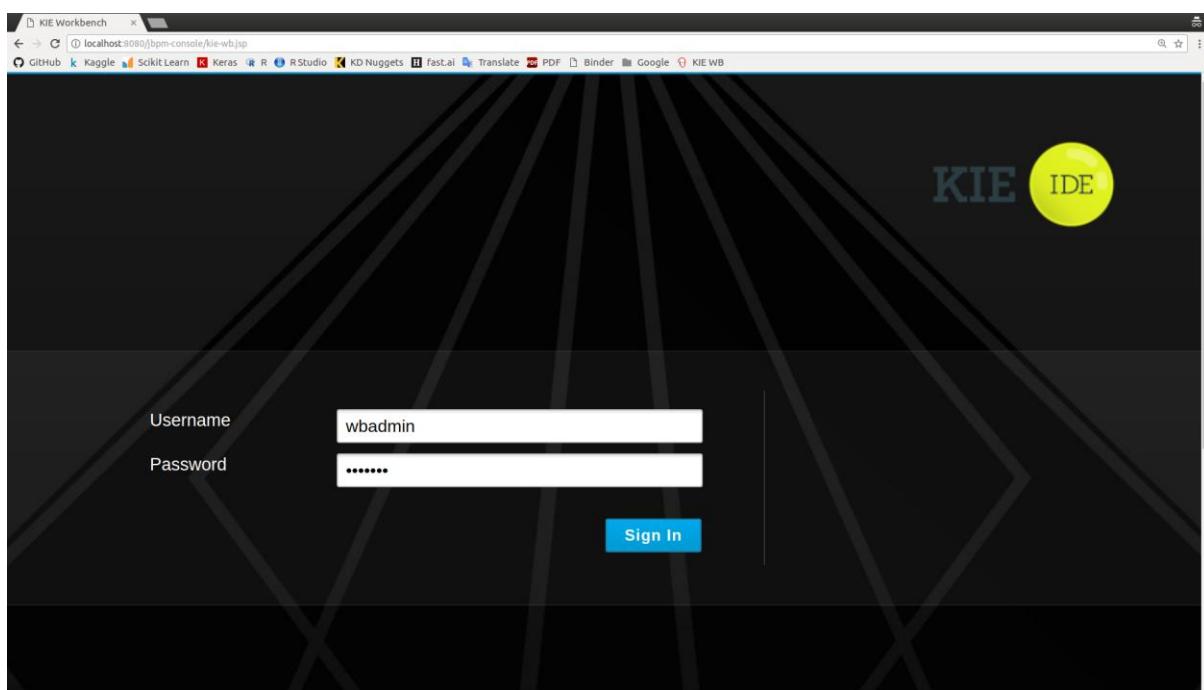
KIE BPMS: jBPM

<http://www.jbpm.org/>

- From desktop, start 'Tool KIE' (It takes several minutes to start KIE server).



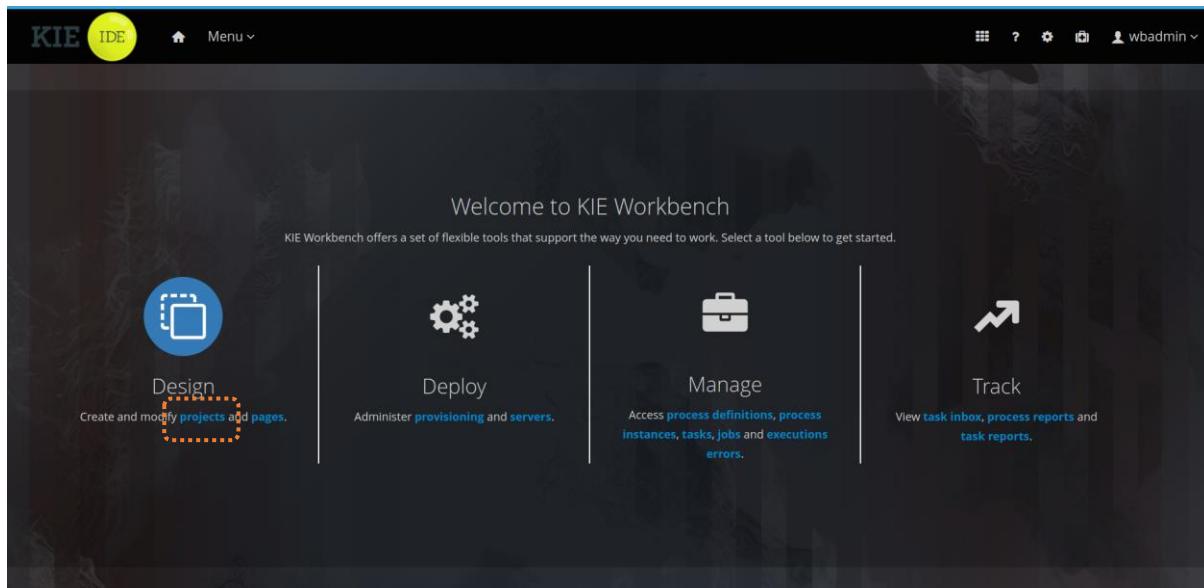
- Start 'Chrome' web browser; Go to web link:
<http://localhost:8080/jbpn-console>



- Login using:

Username : **wbadmin**
Password : **wbadmin**

4) Below KIE Workbench should be displayed in web browser:



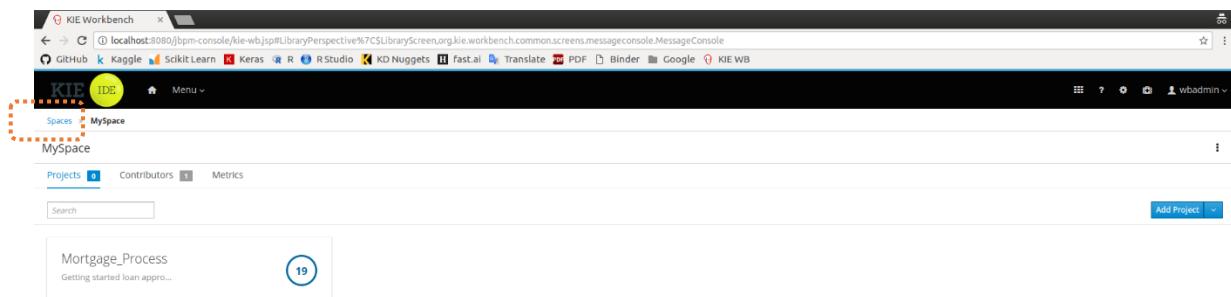
5) Click **projects** under Design

A screenshot of the KIE Workbench MySpace page. The URL in the address bar is "localhost:8080/bpm-console/kie-wb.jsp#LibraryPerspective%7C\$LibraryScreen.org.kie.workbench.common.screens.message.console.MessageConsole". The page header includes the KIE IDE logo, a home icon, a menu, and a user account (wbadmin). Below the header, it says "Spaces > MySpace". Under "MySpace", there are tabs for "Projects" (which is selected and highlighted in blue), "Contributors", and "Metrics". A search bar is present. A single project card for "Mortgage_Process" is shown, with the subtext "Getting started loan appro...". To the right of the project card is a circular badge with the number "19". At the bottom of the page, there's an "Alerts" section with a table showing one alert: "Completed indexing of MySpace/example-Mortgage_Process/master". The alert table has columns for "Level", "Text", "File", "Column", and "Line".

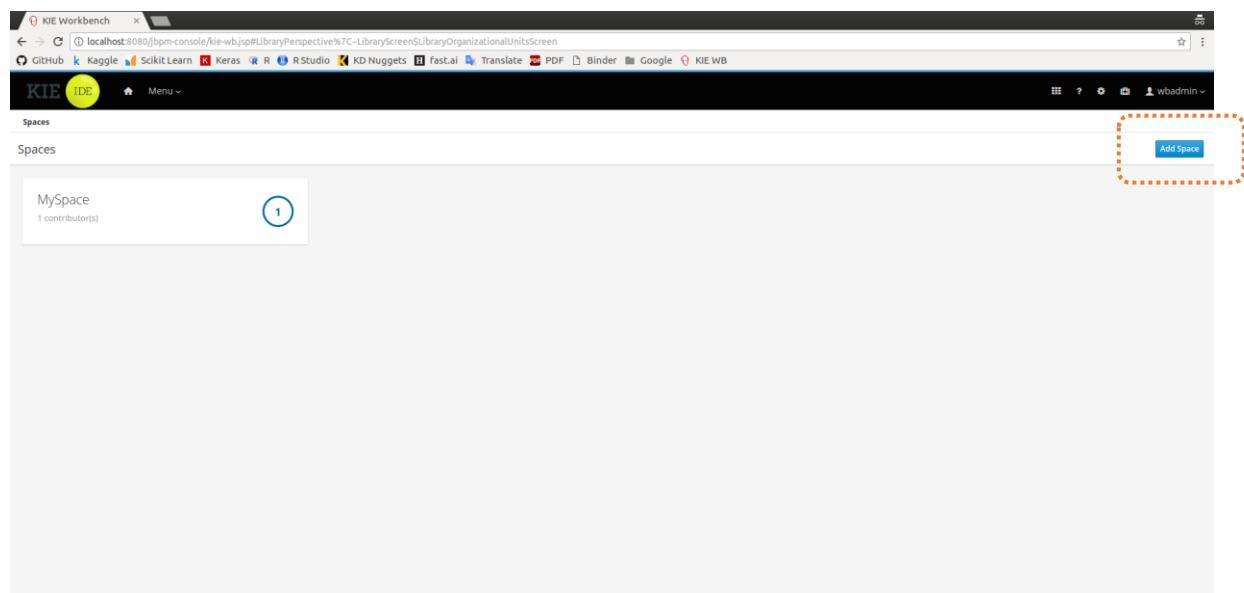
1.2.2. Business system: Mortgage application approval [Deploy] v2.0.0

{ Objective } Deploy a mortgage application BPMS/BRMS system for business use.

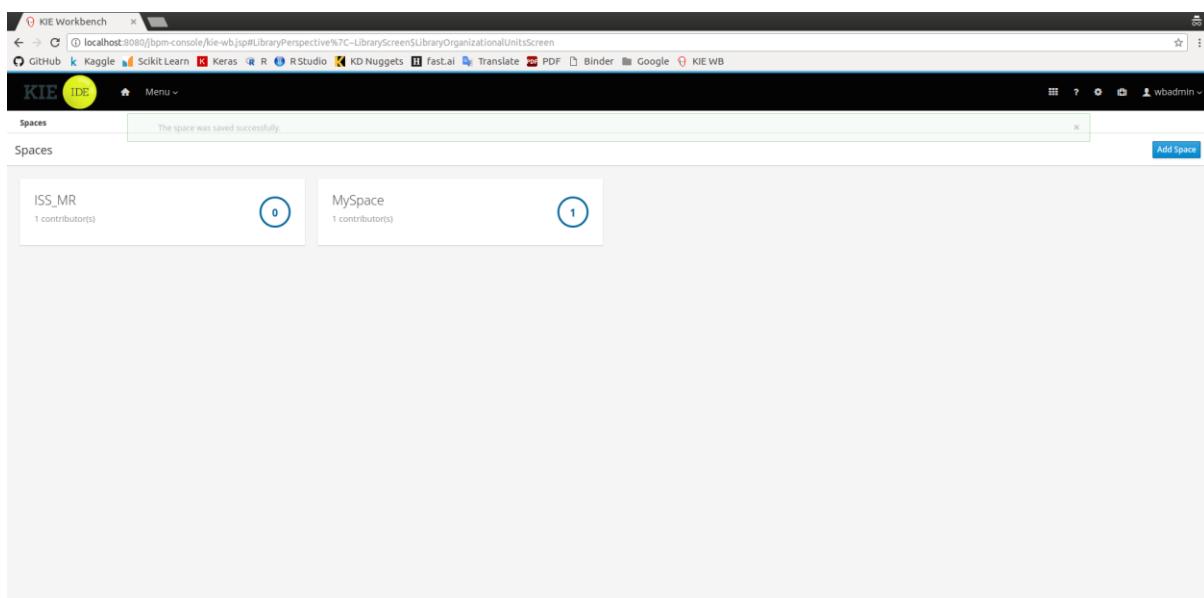
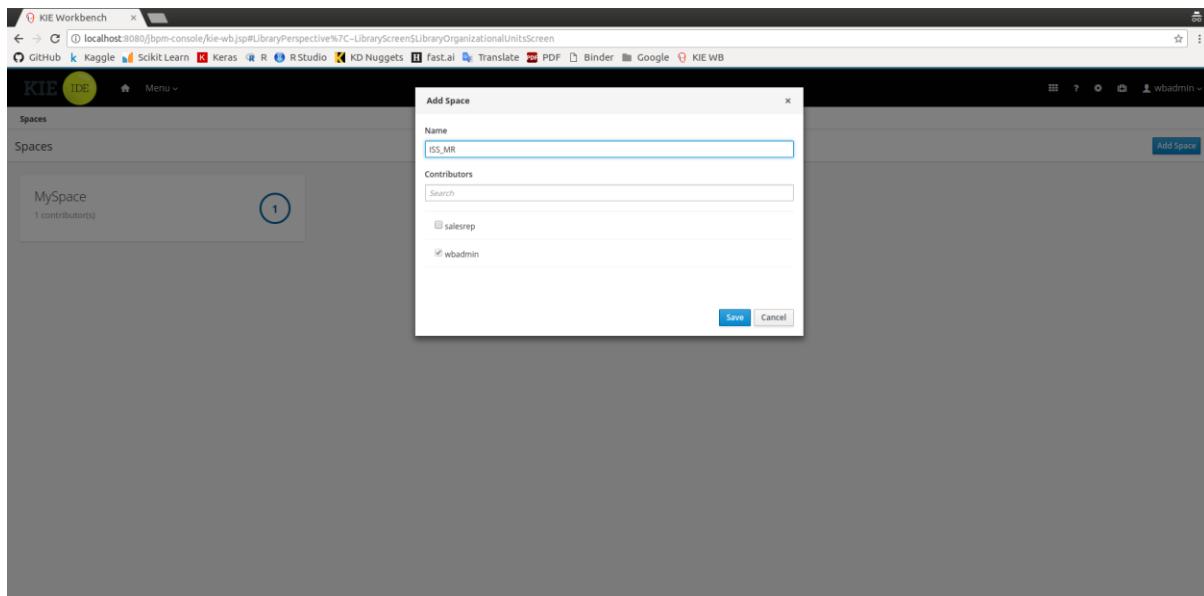
1) Click Spaces



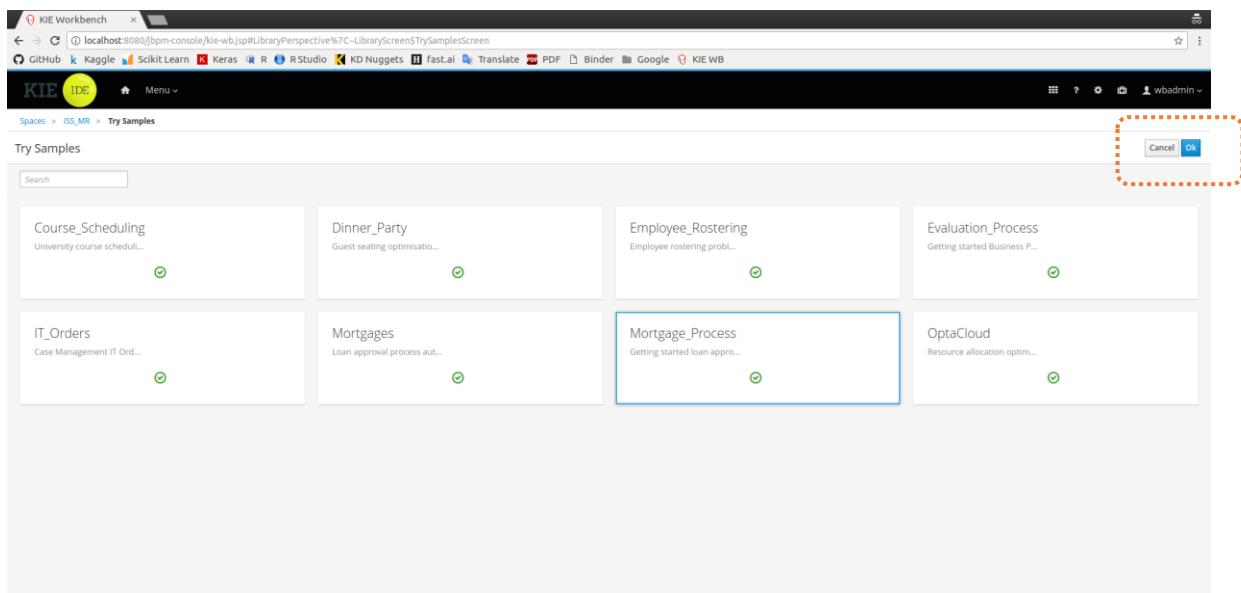
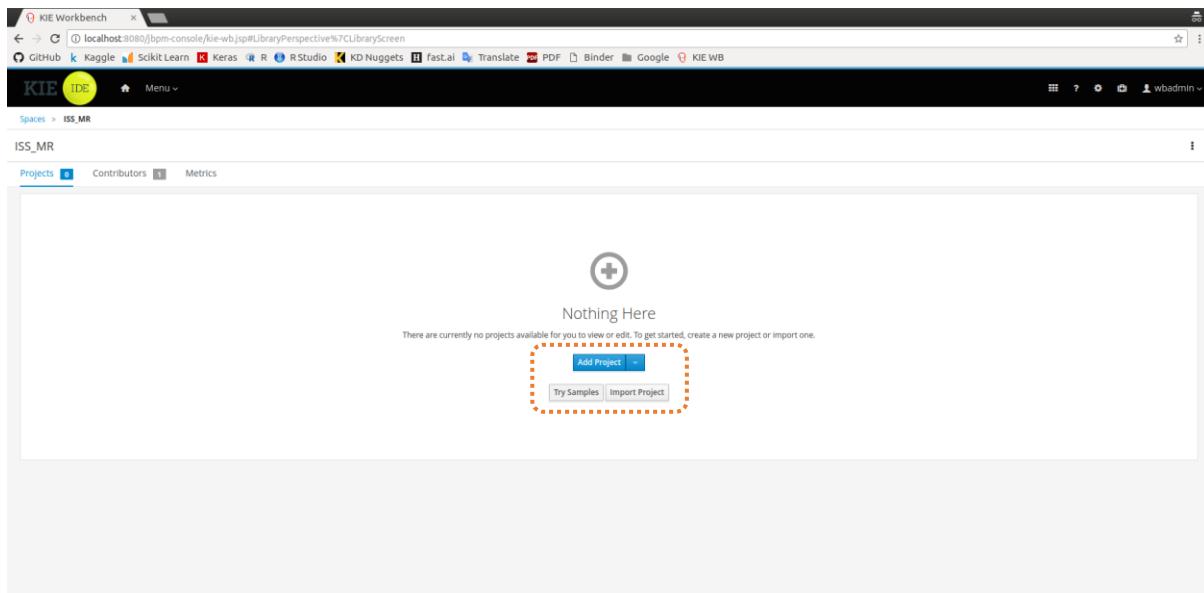
2) Create a new space: Click blue button: **Add Space**; Key in field Name: **ISS_MR**



3) Enter Space Name: *ISS_MR*



- 4) Click button: **Try Samples**, Select ‘**Mortgage_Process**’, Click blue button: **OK**



The screenshot shows the KIE Workbench interface running in a browser window. The title bar indicates it's on the 'localhost:9080/bpm-console/kie-wb.jsp#LibraryPerspective%7C-LibraryScreen\$ProjectScreen' page. The top navigation bar includes links for GitHub, Kaggle, Scikit Learn, Keras, R, R Studio, KD Nuggets, fast.ai, Translate, PDF, Binder, Google, and KIE WB. The user is logged in as 'wbadmin'. The main content area is titled 'Mortgage_Process' and shows a list of assets:

Asset Type	Count	Last Modified	Created
Forms	22	Today	Today
Data Objects	2	Today	Today
Forms	2	Today	Today
Data Objects	2	Today	Today
Forms	1	Today	Today
Forms	1	Today	Today

Buttons at the bottom right include 'Build', 'Deploy', 'View Alerts', and 'Add Asset'.

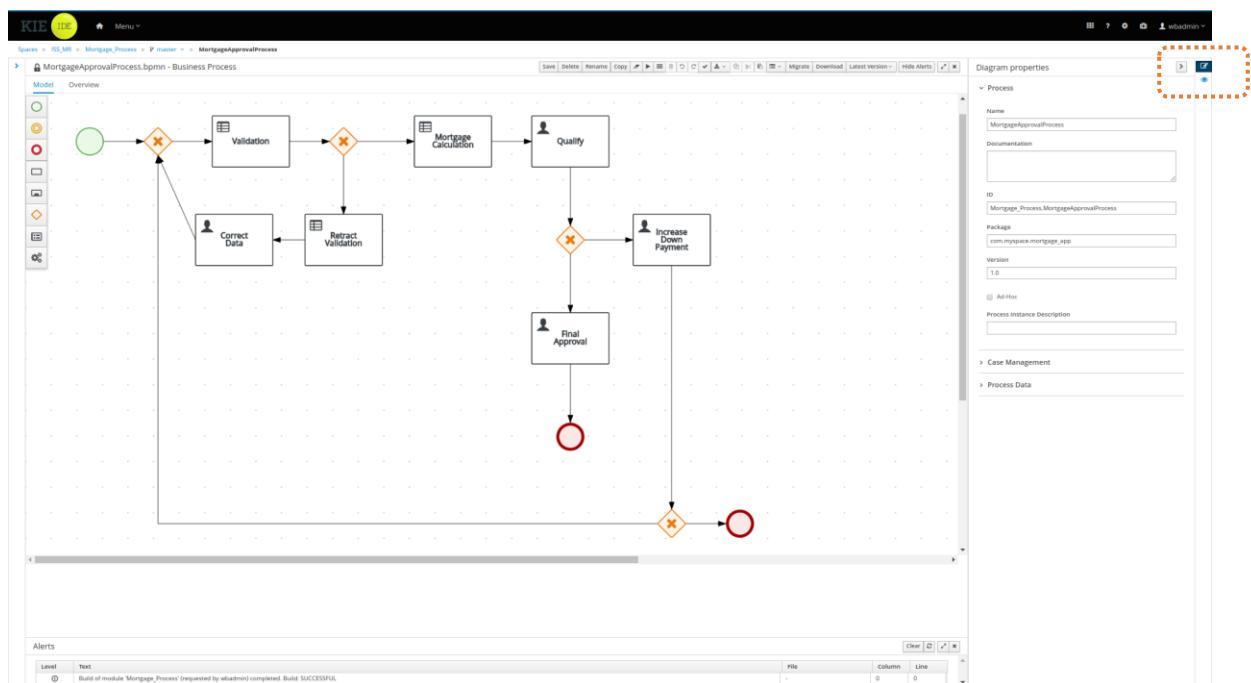
5) Scroll down Assets list; Click to edit **Business Processes: MortgageApprovalProcess**

KIE Workbench

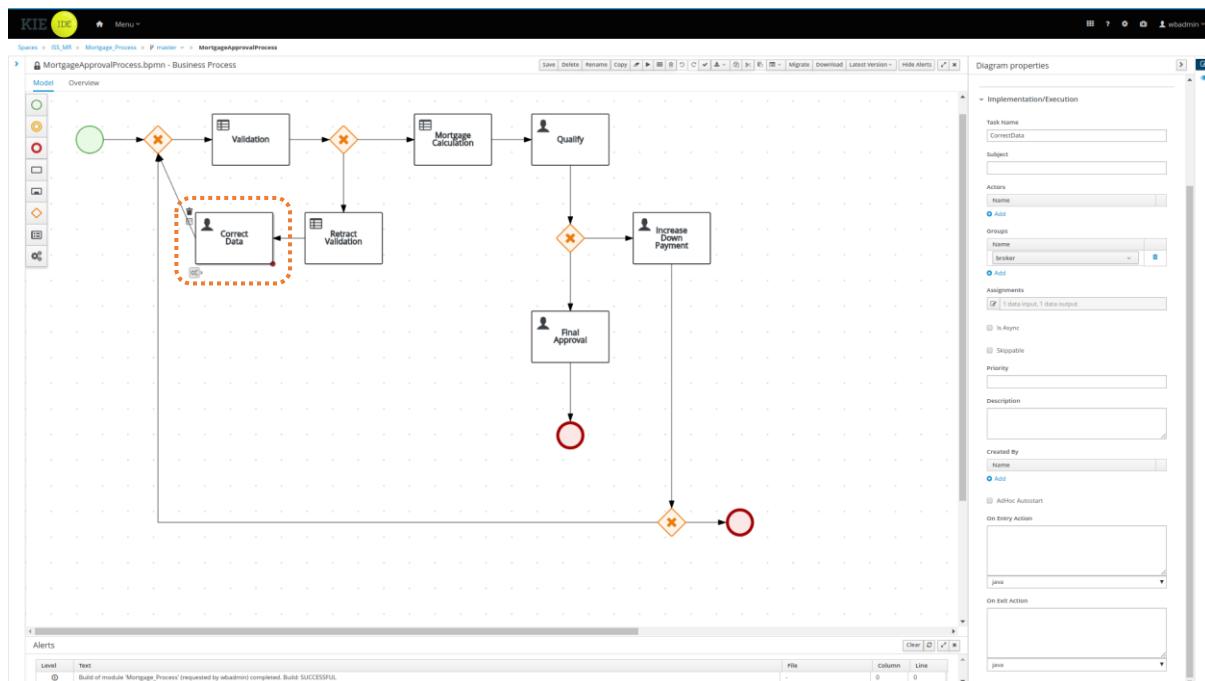
Spaces > ISS_MR > Mortgage_Process > master >

Name	Type	Last modified	Created
ApplicationMortgage	Forms	Last modified today	Created today
CorrectData-taskform	Forms	Last modified today	Created today
FinalApproval-taskform	Forms	Last modified today	Created today
IncreaseDownPayment-taskform	Forms	Last modified today	Created today
mortgage-app.MortgageApprovalProcess-taskform	Forms	Last modified today	Created today
Mortgage_Process.MortgageApprovalProcess-taskform	Forms	Last modified today	Created today
MortgageApprovalProcess src/main/resources/com/myspace/mortgage_app/MortgageApprovalProcess.bpmn	Business Processes	Last modified today	Created today
MortgageDecisionTable	Guided Decision Tables	Last modified today	Created today
Property	Forms	Last modified today	Created today

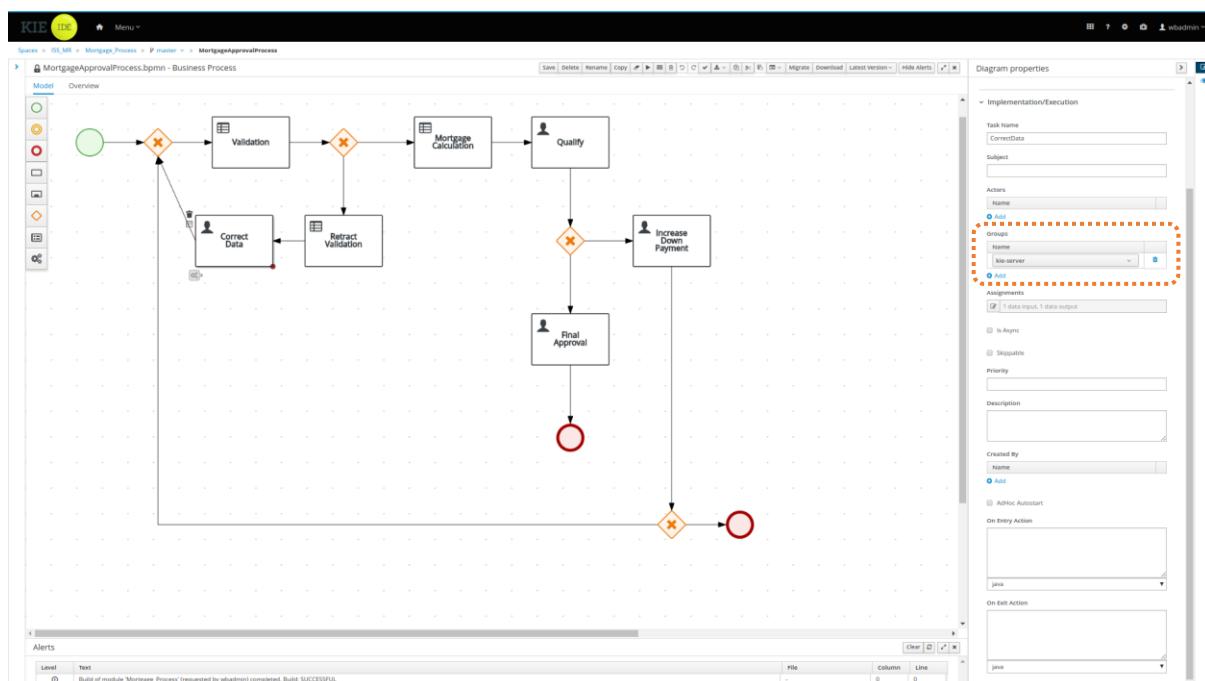
6) Click upper right corner icon: **Diagram properties**



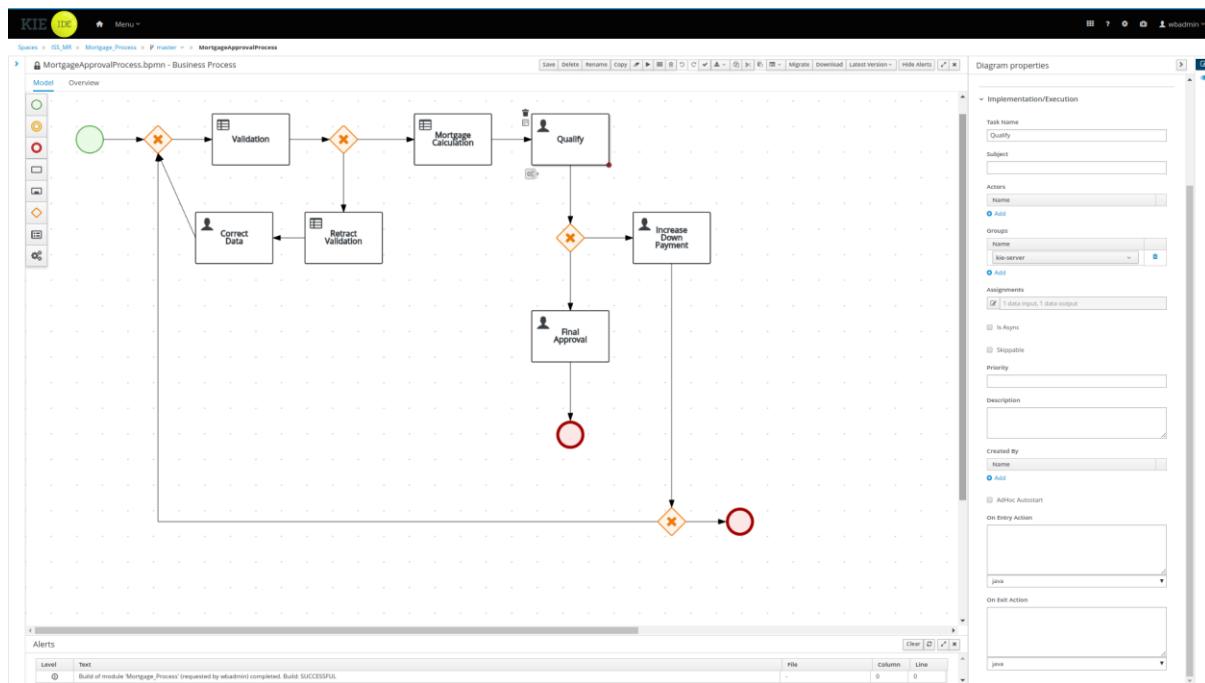
- 7) Click Business User Task: **Correct Data**; then expand Implementation/Execution at the right Diagram properties panel.



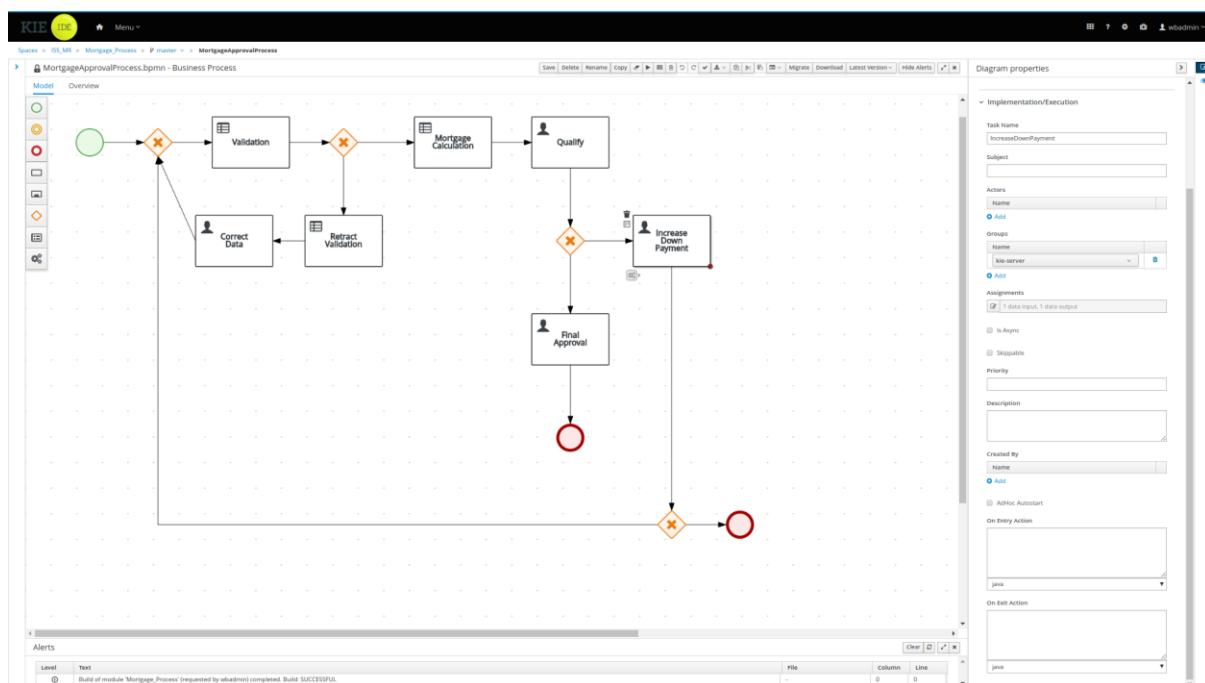
- 8) Update Groups: Name field value from: **broker** to: **kie-server**



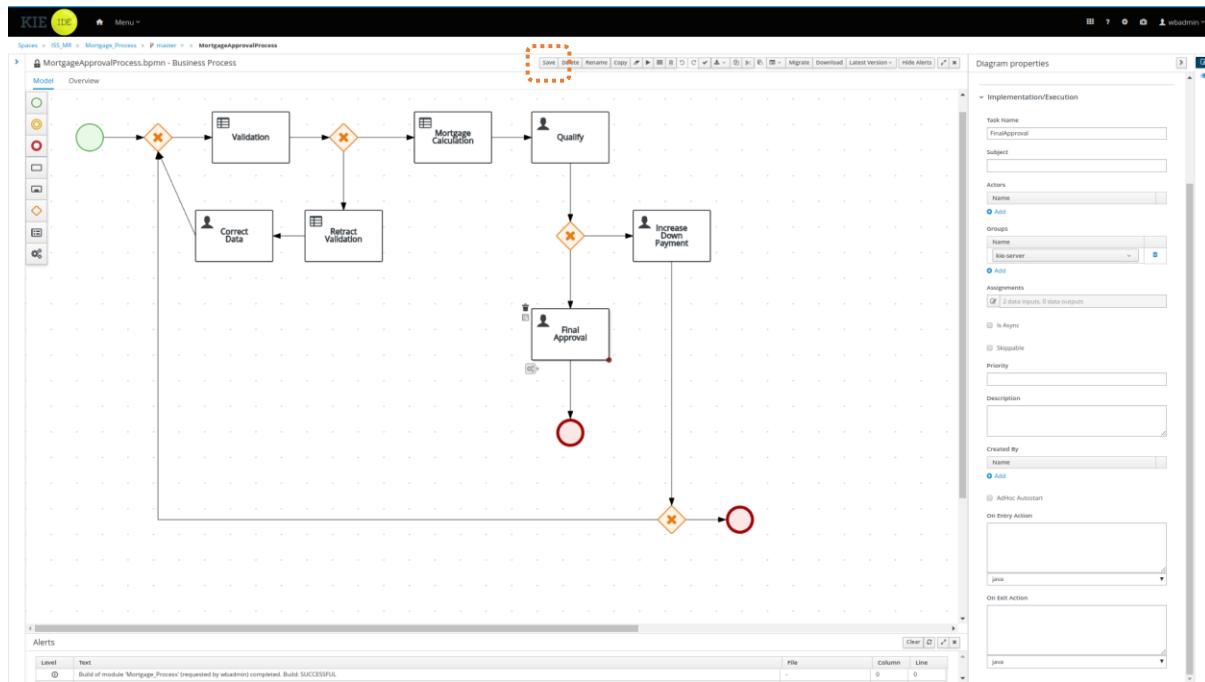
9) Repeat the Groups: Name update for Business User Task: *Quality*



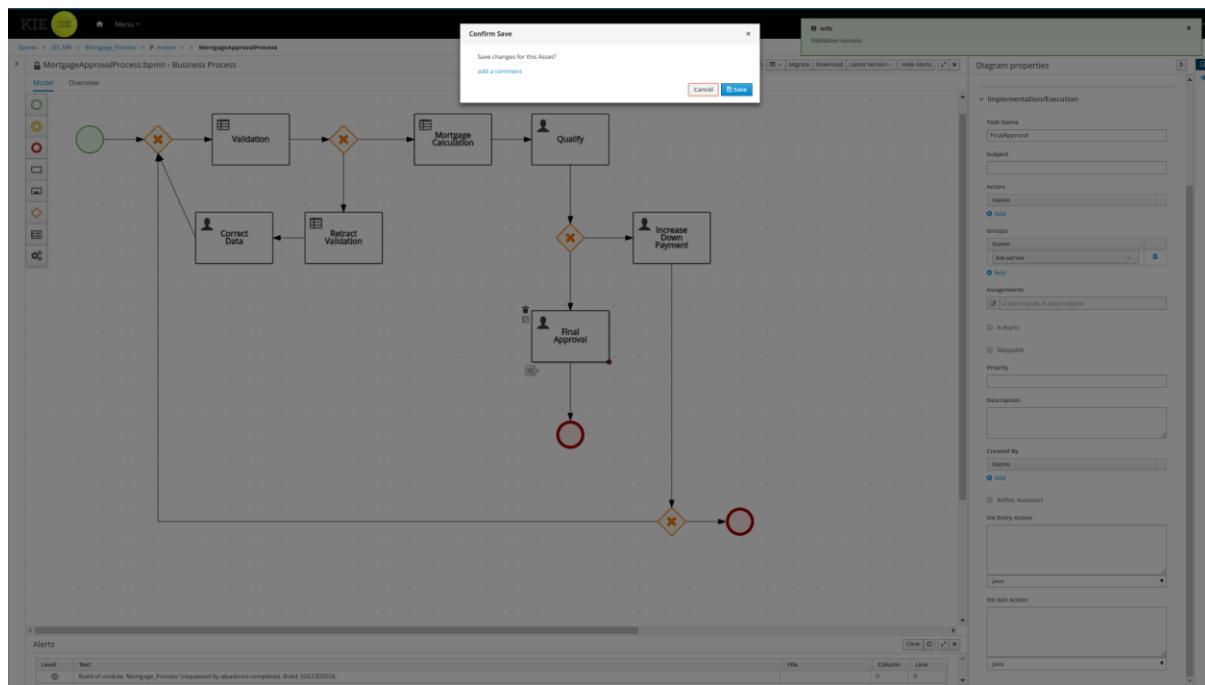
10) Repeat the Groups: Name update for Business User Task: *Increase Down Payment*

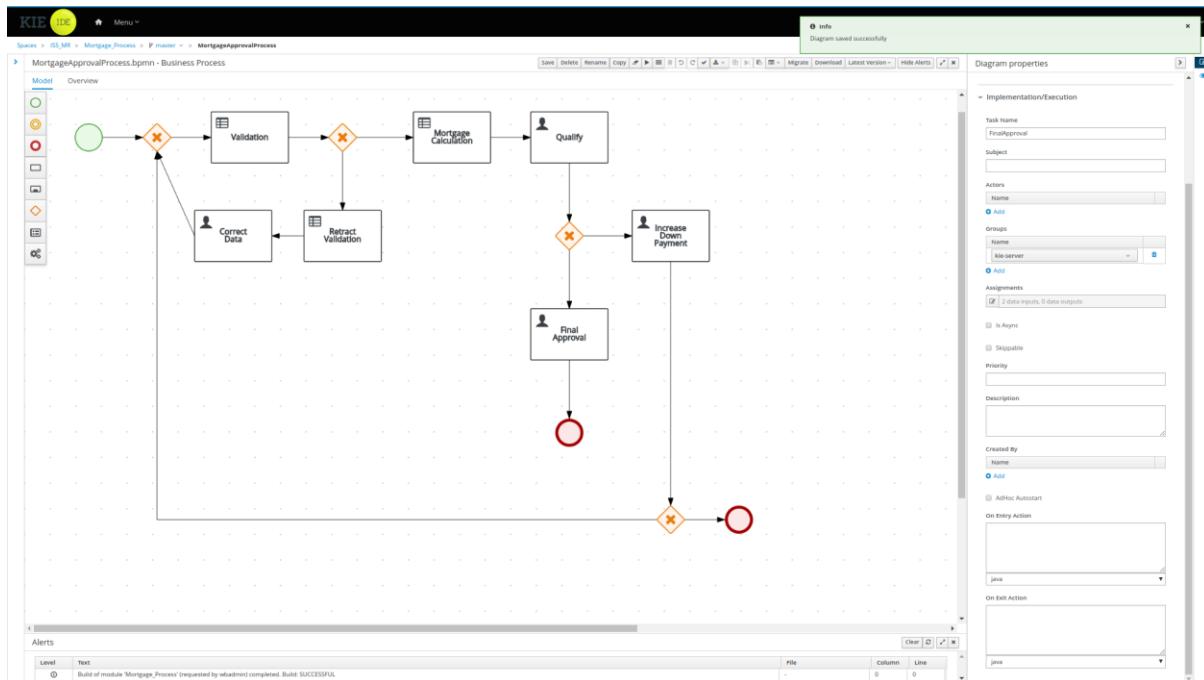


11) Repeat the Groups: Name update for Business User Task: *Final Approval*

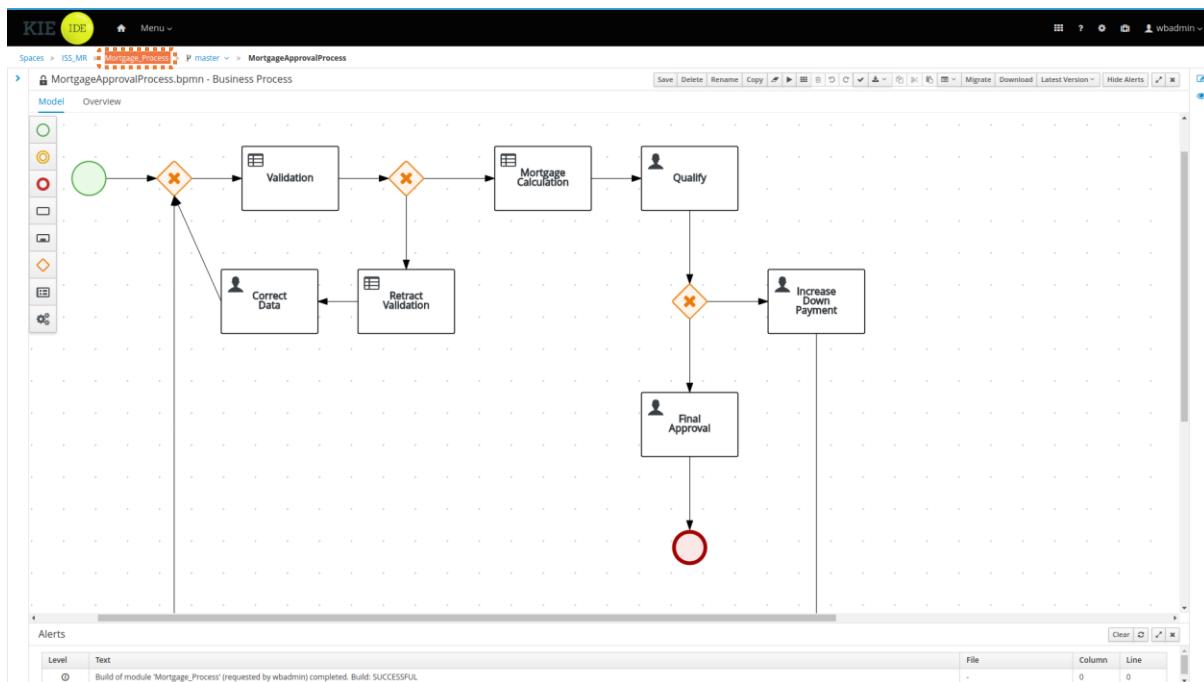


12) Click button: **Save**; Followed by clicking confirmation blue button: **Save**

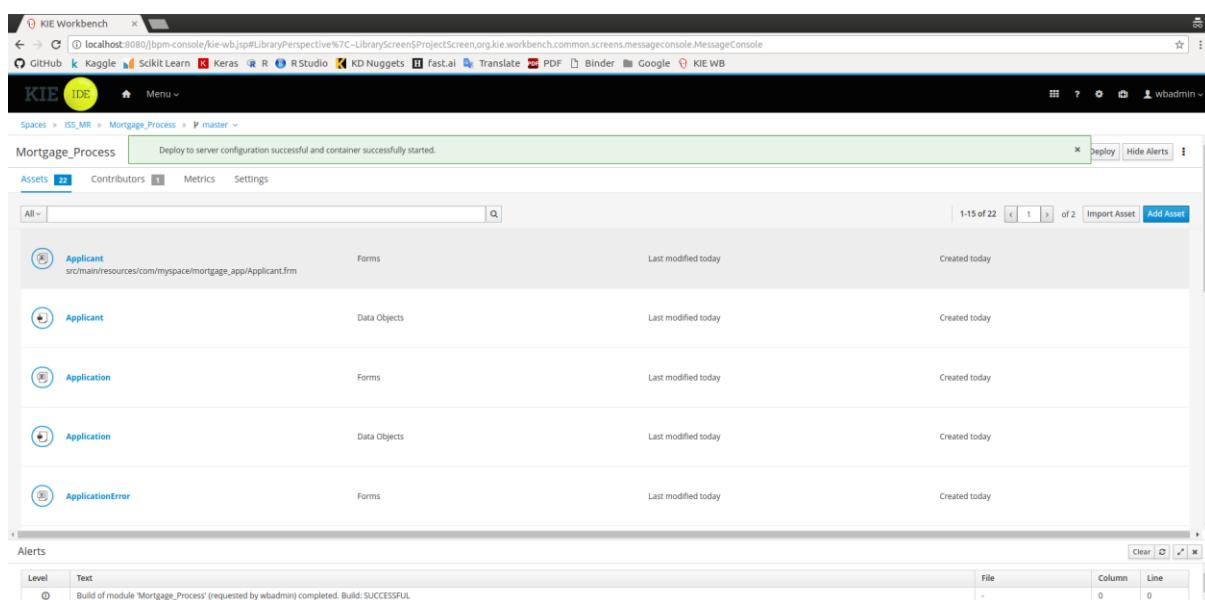
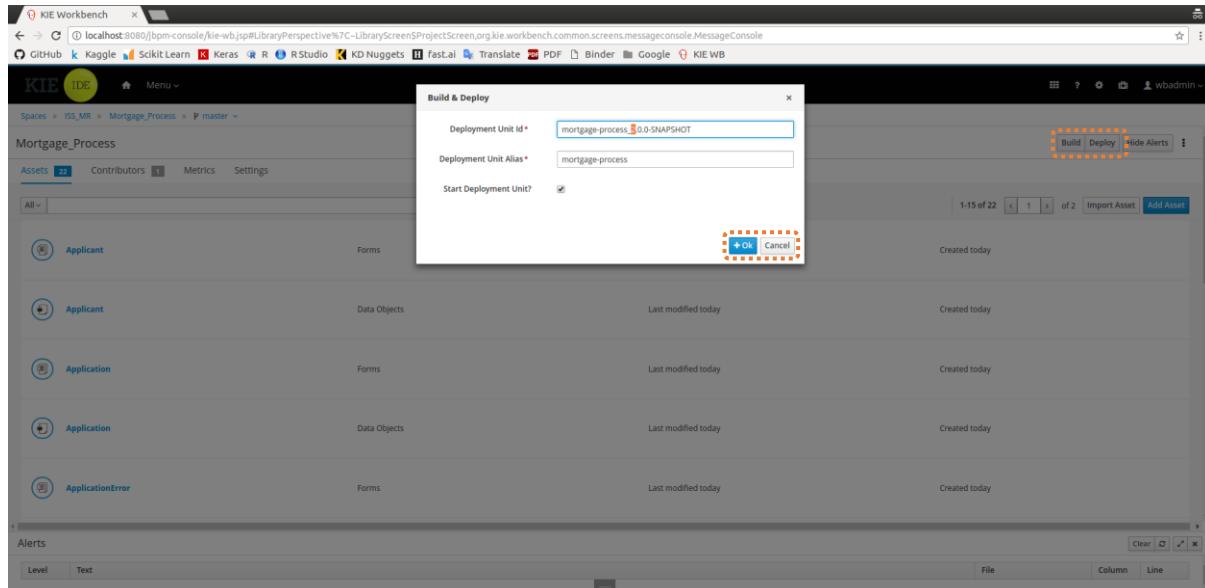




13) Click **Mortgage_Process** link to go back to **Assets** list view.



14) Click button: **Deploy**; Update Deployment Unit Id*: **mortgage-process_2.0.0-SNAPSHOT**; Click blue button **OK**



15) To verify successfully deployed **Mortgage_Process** business application, click: **Menu → Execution Servers**

The screenshot shows the KIE Workbench interface. At the top, there's a navigation bar with links like GitHub, Kaggle, Skit Learn, Keras, R, R Studio, KD Nuggets, fast.ai, Translate, PDF, Binder, Google, and KIE WB. Below the navigation bar is a header with 'KIE IDE' and a 'Menu' button. The main area has three main sections: 'Design' (Projects, Pages), 'Deploy' (Provisioning, Execution Servers, highlighted with a red box), and 'Manage' (Process Definitions, Process Instances, Tasks, Jobs, Execution Errors). On the right, there's a 'Track' section with links to Task Inbox, Process Reports, and Task Reports. Below these sections is a table listing various entities: 'Applicant' (Data Objects, Last modified today, Created today), 'Application' (Forms, Last modified today, Created today), 'Application' (Data Objects, Last modified today, Created today), and 'ApplicationError' (Forms, Last modified today, Created today). At the bottom, there's an 'Alerts' section with a table showing a single entry: 'Build of module 'Mortgage_Process'' completed with a status of 'SUCCESSFUL'.

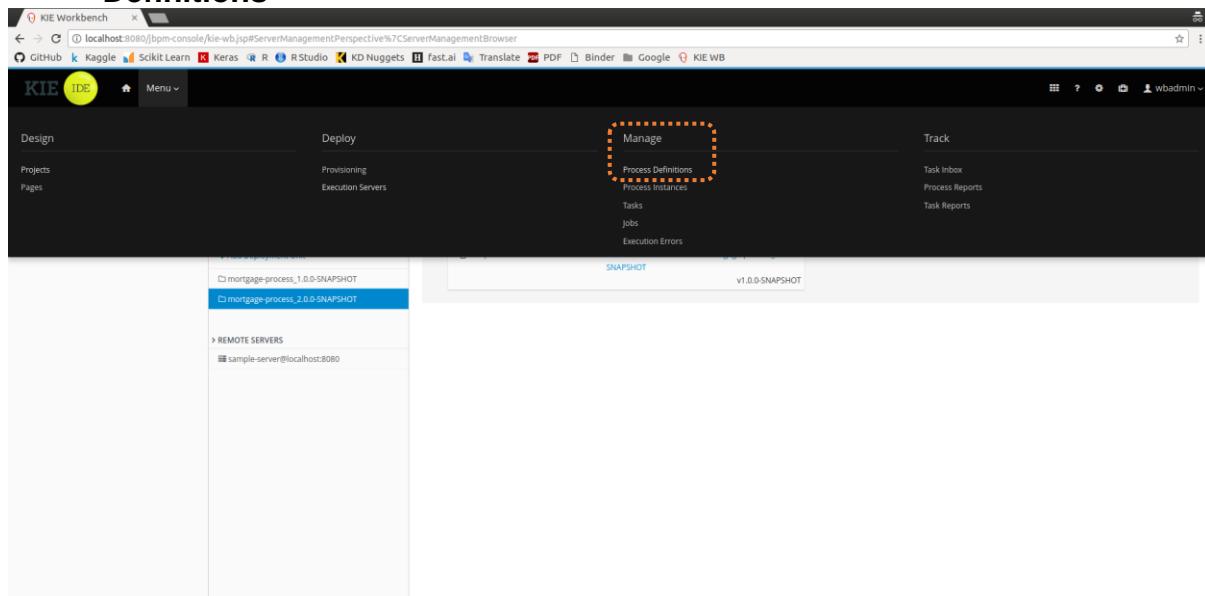
This screenshot shows the 'Server Management' perspective in KIE Workbench. The left sidebar shows 'SERVER CONFIGURATIONS' with a 'New Server Configuration' button and a 'sample-server' entry which is selected and highlighted with a red box. Under 'sample-server', there are sections for 'Capabilities' (Decision, Process, Planner, checked), 'DEPLOYMENT UNITS' (Add Deployment Unit, mortgage-process_1.0.0-SNAPSHOT, mortgage-process_2.0.0-SNAPSHOT, both highlighted with a red box), and 'REMOTE SERVERS' (sample-server@localhost:8080). The main panel shows the 'mortgage-PROCESS' group with 'Status' (sample-server@localhost:8080, green status), 'Version Configuration' (http://localhost:8080/kie-server/services/rest/server/containers/mortgage-process_2.0.0-SNAPSHOT), and 'Process Configuration' (v1.0.0-SNAPSHOT).

{ Tips } Above shows: ***mortgage-process_2.0.0-SNAPSHOT*** is successfully deployed onto KIE web server: http://localhost:8080/kie-server/services/rest/server/containers/mortgage-process_2.0.0-SNAPSHOT

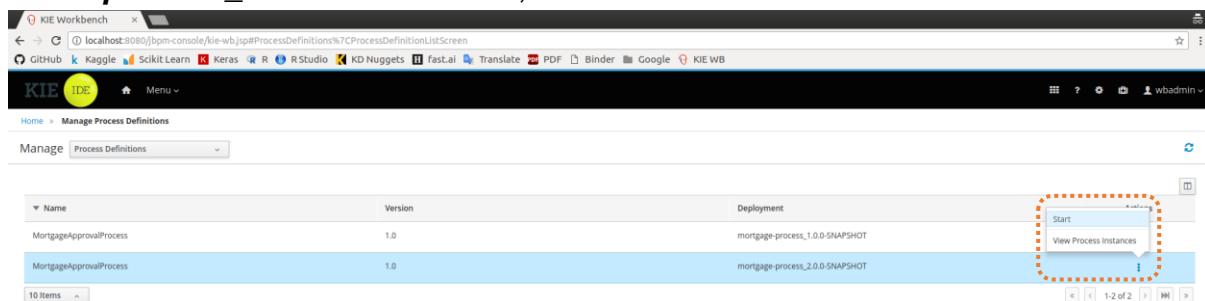
1.2.3. Business system: Smooth mortgage application

{ Objective } Create a mortgage application: Start a new mortgage application, fill in application form to trigger business process. Observe the business flow.

- 1) To use the system by filling in a new mortgage application form (start new process instance under process definition, click: **Menu → Process Definitions**



- 2) Select the mortgage system with intended version, e.g., **mortgage-process_2.0.0-SNAPSHOT**, then click: **Start**



KIE IDE

Home > Manage Process Definitions

Manage Process Definitions

MortgageApprovalProcess

Correlation key

Form

Application

Down Payment Years of amortization

Down Payment Years of amortization

Applicant

Name

Annual Income

SSN

Property

Age of property

Address of property

Locale

Sale Price

Submit

3) Fill in the mortgage form as shown below; Then click blue button: **Submit**

KIE IDE

Home > Manage Process Definitions

Manage Process Definitions

MortgageApprovalProcess

Correlation key

Form

Application

Down Payment Years of amortization

50000 20

Applicant

Name

Annual Income

SSN

Property

Age of property

Address of property

Locale

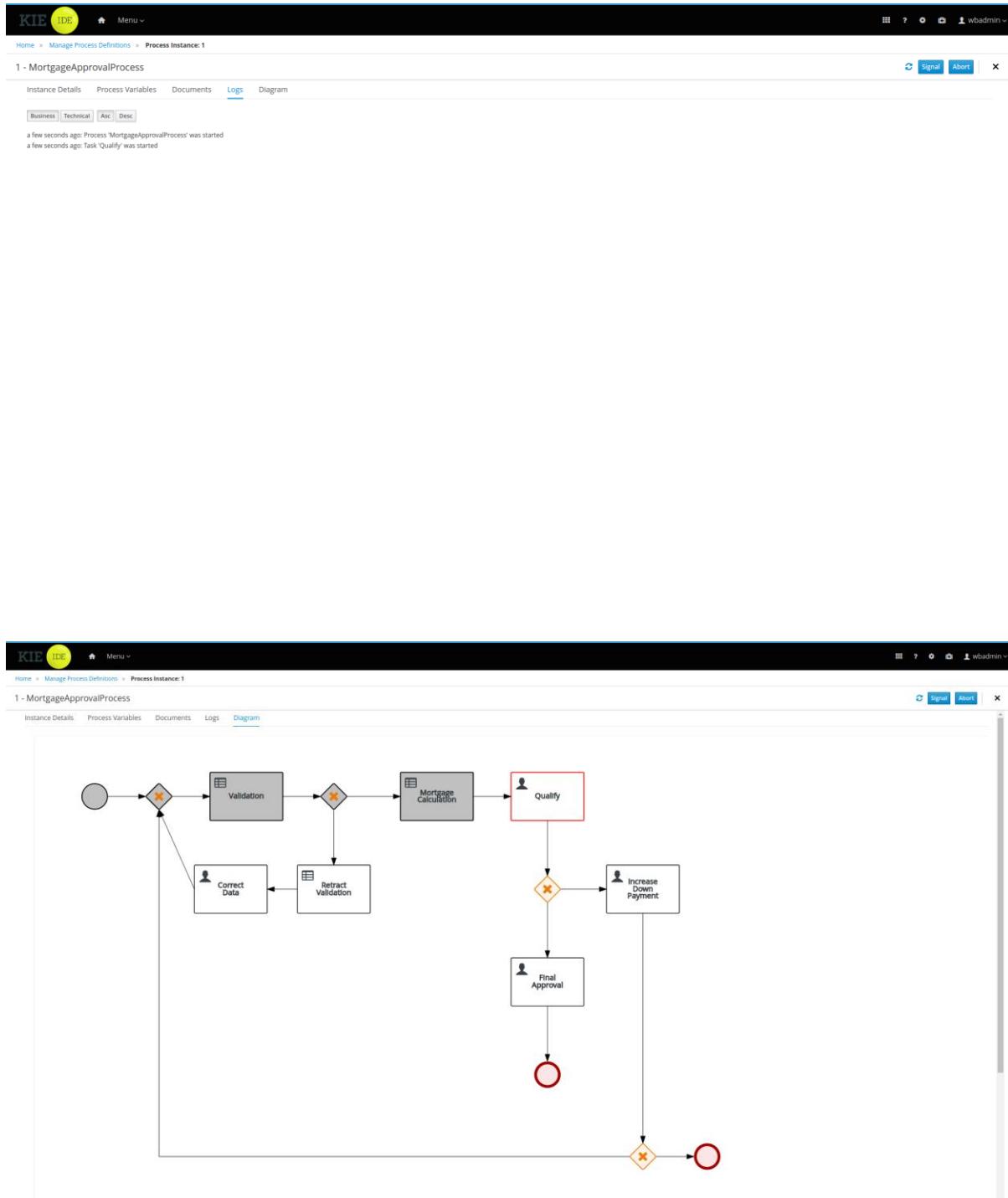
Sale Price

Submit

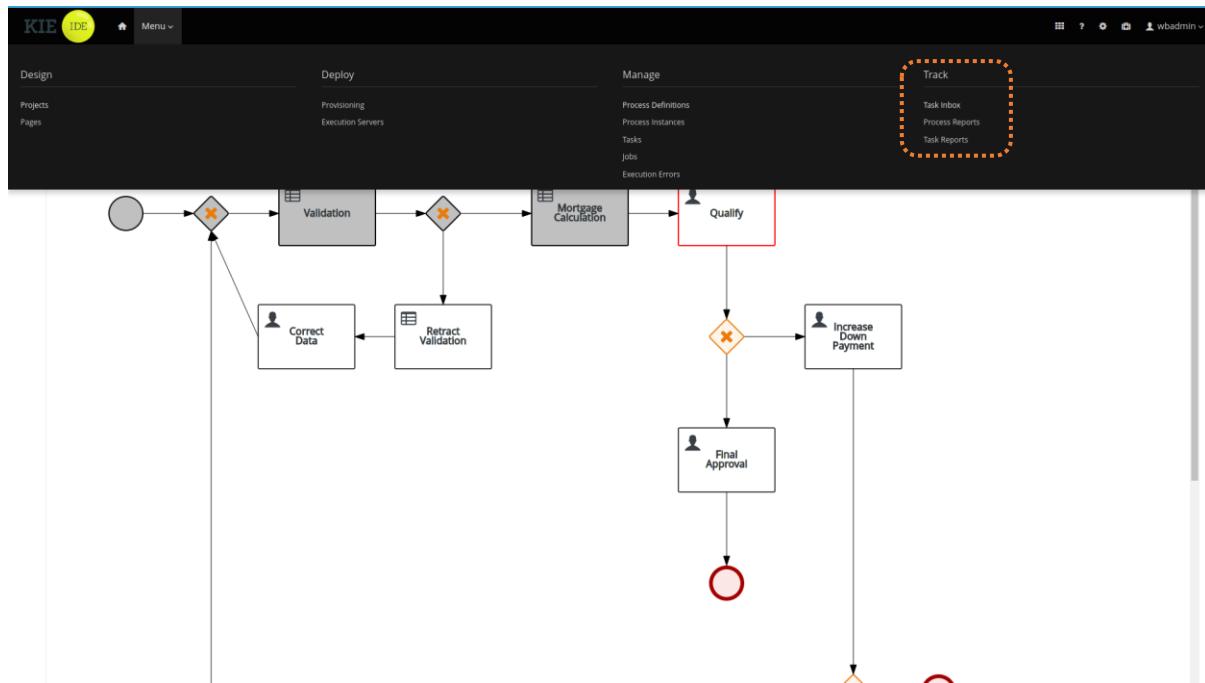
The screenshot shows the KIE IDE interface for managing process definitions. The current view is 'Process Instance: 1' for the '1 - MortgageApprovalProcess'. The 'Instance Details' tab is selected, highlighted with a red dashed border. Other tabs include 'Process Variables', 'Documents', 'Logs', and 'Diagram'. The page displays various details about the process instance, such as its definition ID, state, deployment, version, and active tasks. A 'Signal' and 'Abort' button are located at the top right.

The screenshot shows the 'Process Variables' tab for the same process instance. This tab lists the variables defined for the process, including their names, values, types, and last modification dates. The variables listed are 'initiator' (value: wbadmin), 'application' (value: com.myspace.mortgage_app.Application@1749d8aa), 'inlimit' (value: Boolean), and 'incdownpayment' (value: Boolean). Each variable has an 'Edit' and 'History' link under the 'Actions' column. Navigation controls like '10 Items' and a page number '1-4 of 4' are visible at the bottom.

Name	Value	Type	Last Modification	Actions
initiator	wbadmin		19-Feb-2019 16:06:31	Edit History
application	com.myspace.mortgage_app.Application@1749d8aa	com.myspace.mortgage_app.Application	19-Feb-2019 16:06:32	Edit History
inlimit		Boolean	19-Feb-2019 16:06:54	Edit History
incdownpayment		Boolean	19-Feb-2019 16:06:54	Edit History



- 4) To review (pending user task: ***Qualify***) the mortgage application, click: **Menu** → **Task Inbox**



Task	Process Definition Id	Status	Created On	Actions
Qualify	Mortgage_Process.MortgageApprovalProcess	Ready	19-Feb-2019 16:06:32	[View]

- 5) [Task Inbox: **Qualify**] Click to view the task details. The purpose of this business task is for credit risk controller to manually verify: **Is mortgage application in limit?** (Property Sale Price – Down Payment <= Mortgage amount?)

The screenshot shows the KIE IDE interface with the title 'Task Details' for task 1: Qualify. The page is divided into sections for Inputs, Applicant, Property, and Outputs.

Inputs:

- Application:
 - Mortgage amount: \$200000
 - Down Payment: \$50000
 - Years of amortization: 20
- Applicant:
 - Name: D. Di
 - Annual Income: \$124000
 - SSN: 0
- Property:
 - Age of property: 3
 - Address of property: #5 HWT, Singapore
 - Locale: Urban
 - Sale Price: \$250000

Outputs:

- Is mortgage application in limit?

{ Quiz } Check whether: $\$250,000 - \$50,000 \leq \$200,000$?

The answer is: **TRUE / FALSE** (Please select the correct answer)

- 6) [Task Inbox: **Qualify**] Let's accept/claim the task to update the **Inlimit (Is mortgage application in limit?)** control/check; Firstly click blue button: **Claim**

KIE IDE | Home > Task Inbox > Task: 1

1 - Qualify

Work Details Assignments Comments Admin Logs

Inputs:

Application

Mortgage amount: 200000

Down Payment: 50000

Years of amortization: 20

Applicant

Name: D Di

Annual Income: 123456

SSN: 0

Property

Age of property: 3

Address of property: 25 HDBT, Singapore

Locale: Urban

Sale Price: 200000

Outputs:

Is mortgage application in limit?

Release Start Save

- 7) [Task Inbox: **Qualify**] Click blue button: **Start**; Check checkbox 'Is mortgage application in limit?'; Click blue button: **Complete**;

KIE IDE | Home > Task Inbox > Task: 1

1 - Qualify

Work Details Assignments Comments Admin Logs

Inputs:

Application

Mortgage amount: 200000

Down Payment: 50000

Years of amortization: 20

Applicant

Name: D Di

Annual Income: 123456

SSN: 0

Property

Age of property: 3

Address of property: 25 HDBT, Singapore

Locale: Urban

Sale Price: 200000

Outputs:

Is mortgage application in limit?

Save Release Complete

The screenshot shows a KIE Task Inbox interface. At the top, there are navigation links for 'Home' and 'Task Inbox'. On the right, there are icons for search, refresh, and user 'wbadmin'. Below the header is a toolbar with a magnifying glass icon, a dropdown menu, and a save/clear filters button. The main area is titled 'Task Inbox' and displays a table of tasks. The table has columns: 'Task', 'Process Definition Id', 'Status', 'Created On', and 'Actions'. One row is visible, representing a task named 'Final Approval' from the process 'Mortgage_Process.MortgageApprovalProcess' with a status of 'Ready' created on '21-Feb-2019 12:00:11'. The bottom of the table shows a pagination control with '10 Items' and '1 of 1'.

- 8) [Task Inbox: **Final Approval**

This screenshot is identical to the one above, showing the KIE Task Inbox. The 'Final Approval' task row is now highlighted in blue, indicating it is selected or being viewed. The rest of the interface and data are the same.

- 9) [Task Inbox: **Final Approval**] Click blue button: **Claim**; Click blue button: **Start**; Click blue button: **Complete**;

KIE IDE Home > Task Inbox > Task: 2
2 - Final Approval

Work Details Assignments Comments Admin Logs

Inputs:

Application

Mortgage amount: 200000

Down Payment: 50000 Years of amortization: 20

Applicant

Name: D. Di

Annual Income: 123456

SSN: 0

Property

Age of property: 3

Address of property: 25 HDBT, Singapore

Locale: Urban

Sale Price: 250000

Intimit

Claim

KIE IDE Home > Task Inbox > Task: 2
2 - Final Approval

Work Details Assignments Comments Admin Logs

Inputs:

Application

Mortgage amount: 200000

Down Payment: 50000 Years of amortization: 20

Applicant

Name: D. Di

Annual Income: 123456

SSN: 0

Property

Age of property: 3

Address of property: 25 HDBT, Singapore

Locale: Urban

Sale Price: 250000

Intimit

Release **Start**

The screenshot shows a KIE Task Detail view for '2 - Final Approval'. The page has a header with 'KIE IDE' and a user menu. Below the header, the URL is 'Home > Task Inbox > Task: 2'. The main content area is titled '2 - Final Approval' and contains tabs for 'Work', 'Details', 'Assignments', 'Comments', 'Admin', and 'Logs'. The 'Work' tab is selected. The form fields include:

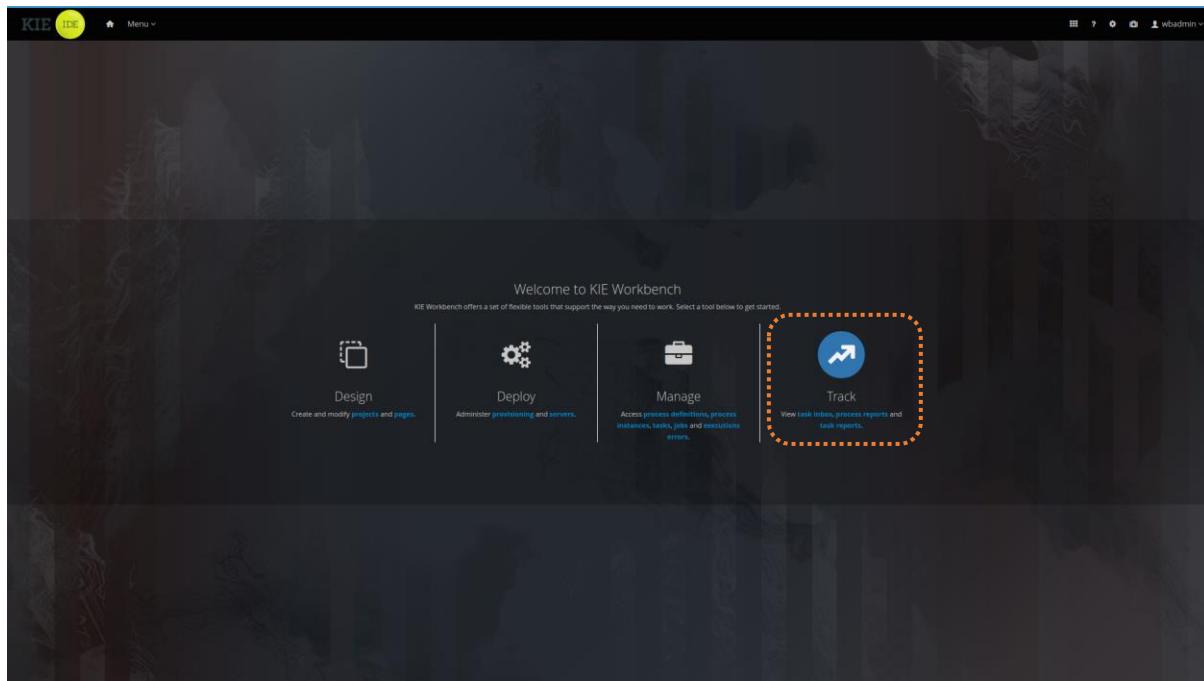
- Inputs:**
 - Application:**
 - Mortgage amount:** 200000
 - Down Payment:** 50000
 - Years of amortization:** 20
- Applicant:**
 - Name:** D. Di
 - Annual Income:** 123456
 - SSN:** 0
- Property:**
 - Age of property:** 3
 - Address of property:** A HNKLT, Singapore
 - Locale:** Urban
 - Sale Price:** 250000
- Initiator:**
- Buttons:** Save, Release, Complete.

The screenshot shows a KIE Task Inbox view. The page has a header with 'KIE IDE' and a user menu. Below the header, the URL is 'Home > Task Inbox'. The main content area is titled 'Task Inbox' and includes a sidebar with filters and a search bar. The table displays task details:

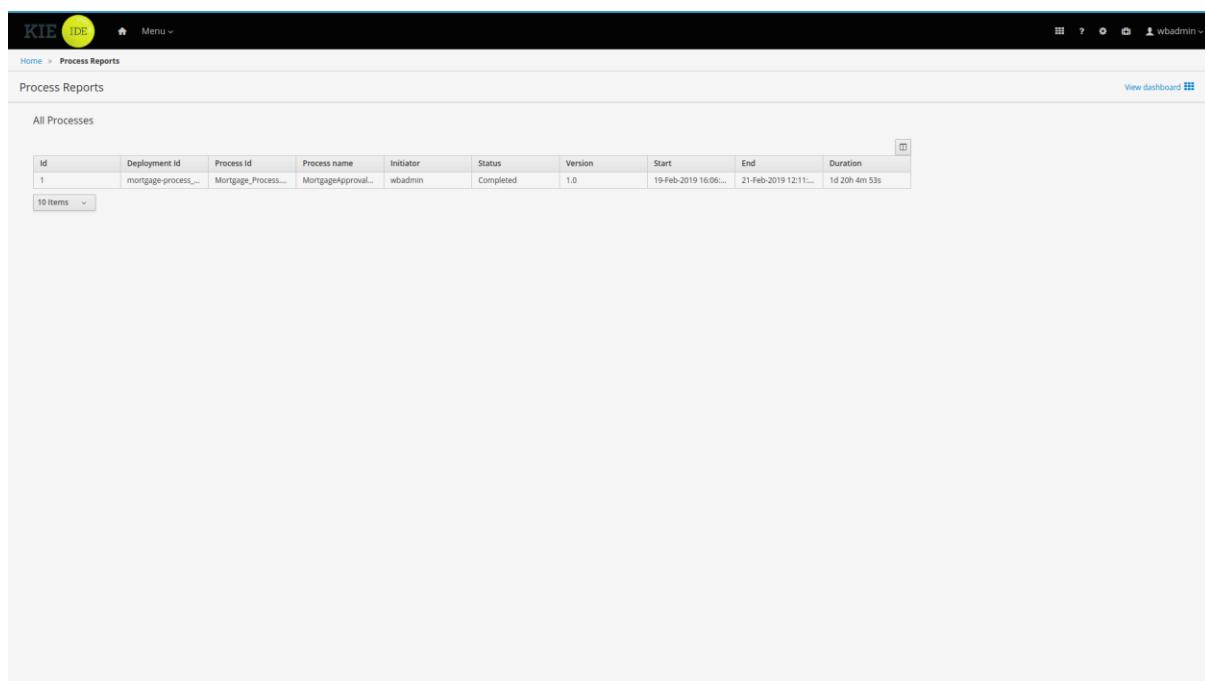
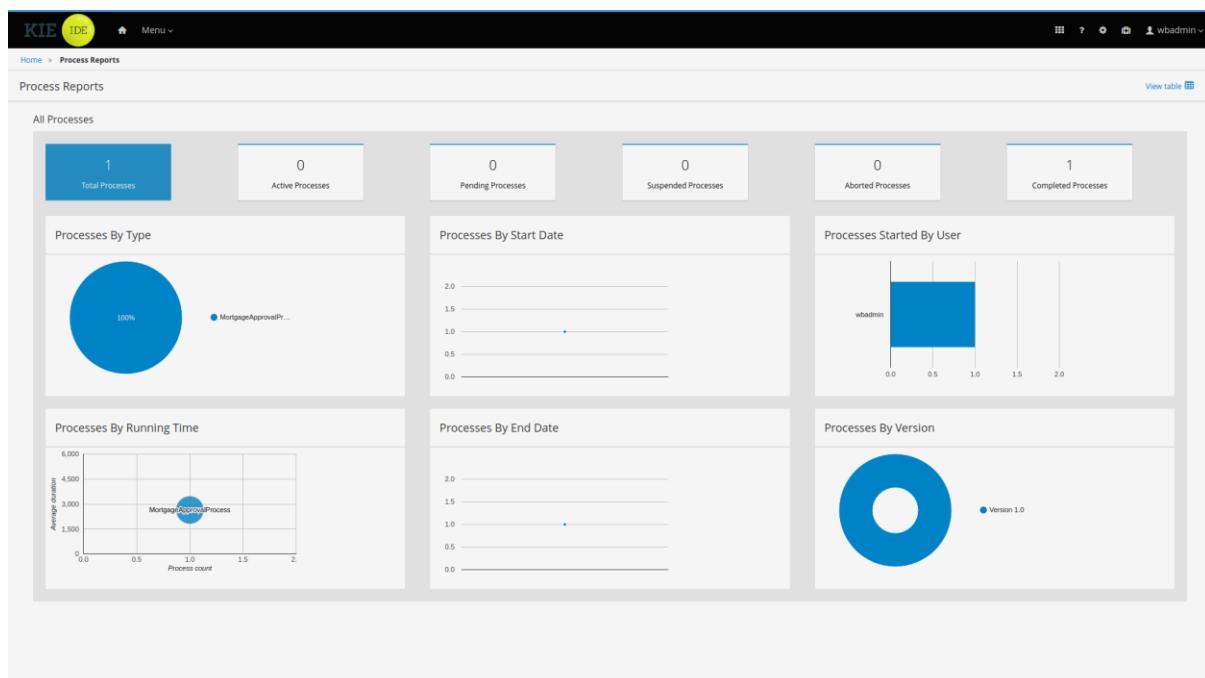
Task	Process Definition Id	Status	Created On	Actions
No tasks found.				

At the bottom, there are pagination controls: 10 items, a dropdown, and a footer with 'Save Filters | Clear All'.

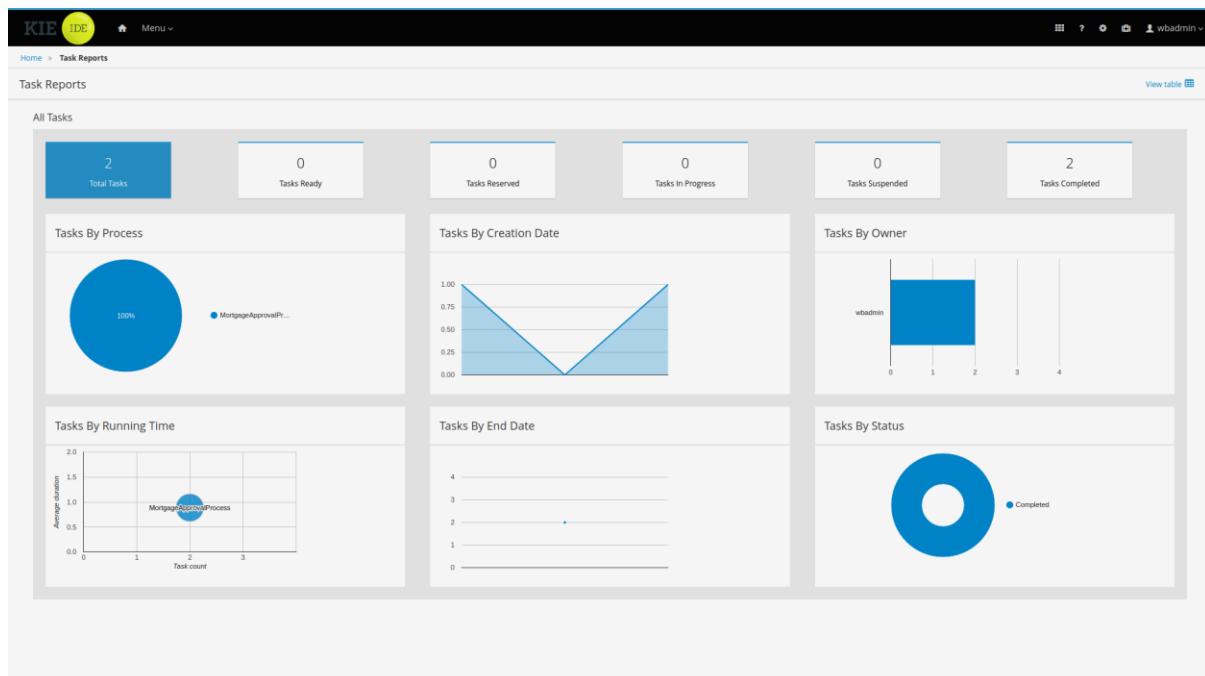
10) Go back to main menu; Let's look at: **Track**



11)[Process Reports] Click **Process Reports under **Track**.**



12)[Task Reports] Click **Task Reports** under **Track**.



The screenshot shows the KIE IDE Task Reports dashboard. Below the charts, there is a table titled "All Tasks" listing completed tasks:

ID	Process	Process Instance Id	Task	Owner	Status	Start	End	Duration	Deployment Id
2	MortgageApproval...	1	Final Approval	wbadmin	Completed	21-Feb-2019 12:00...	21-Feb-2019 12:11...	11m 13s	mortgage-process_...
1	MortgageApproval...	1	Qualify	wbadmin	Completed	19-Feb-2019 16:06...	21-Feb-2019 12:00...	1d 19h 53m 38s	mortgage-process_...

1.2.4. Business system: Erroneous mortgage application [Rule]

Create an erroneous mortgage application: Start a new mortgage application, fill in form with **Down Payment \$0**, keep remaining fields same values as before. Observe the business flow change.

- 1) Fill in the mortgage form as shown below (**Down Payment \$0**); Then click blue button: **Submit**

The screenshot shows the KIE IDE interface with the 'MortgageApprovalProcess' form open. The 'Down Payment' field is highlighted with a red dashed box. The 'Submit' button is located at the bottom right of the form. The rest of the form fields contain placeholder or default values.

Field	Value
Down Payment	0
Years of amortization	20
Name	D. D.
Annual Income	123456
SSN	SSN
Property	
Age of property	3
Address of property	25 HMT, Singapore
Locale	Urban
Sale Price	250000

KIE JBoss BPM Server Home > Manage Process Definitions > Process Instance: 2

2 - MortgageApprovalProcess

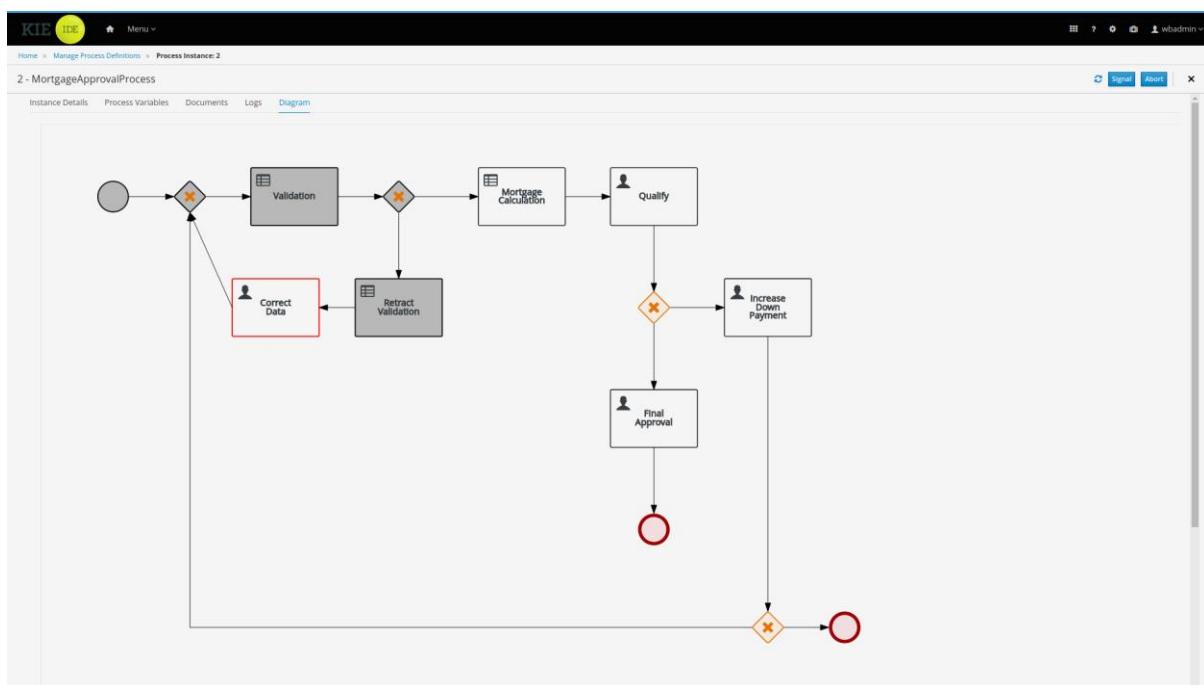
Instance Details Process Variables Documents Logs Diagram

Definition Id: Mortgage_Process.MortgageApprovalProcess
 Instance State: Active
 Deployment: mortgage-process_2.0.0-SNAPSHOT
 Definition Version: 1.0
 SLA Compliance: N/A
 Correlation key: 2

Parent Process Instance: No Parent Process Instance

Active user tasks: Correct Data (Ready owner: wbadmin)

Current Activities: Thu Feb 21 12:41:37 SGT 2019:5 - Correct Data (HumanTaskNode)



2) [Task Inbox: **Correct Data**]

The screenshot shows the KIE IDE interface with the title bar "KIE IDE". The main area is titled "Task Inbox". On the left, there is a "Filters" panel with a "Status" section containing checkboxes for "Completed", "Created", "Error", "Exited", "Failed", "InProgress" (unchecked), "Obsolete" (unchecked), "Ready" (checked), "Reserved" (checked), and "Suspended" (unchecked). Below this is a "Filter By" section with fields for "Id" and "Filter By Id...", and a "Process Definition Id" dropdown set to "Select". The main "Task Inbox" table has columns: "Task", "Process Definition Id", "Status", "Created On", and "Actions". A single row is listed: "Correct Data", "Mortgage_Process.MortgageApprovalProcess", "Ready", "21-Feb-2019 12:41:37", and an "Actions" button. At the bottom, it says "10 Items" and "1 of 1".

3) [Task Inbox: **Correct Data**] Click blue button: **Claim**; Click blue button: **Start**;

The screenshot shows the "3 - Correct Data" task details page. The top navigation bar includes "Home", "Task Inbox", and "Task: 3". Below the title, there are tabs for "Work" (which is selected), "Details", "Assignments", "Comments", "Admin", and "Logs". The "Work" tab displays several sections: "Outputs" (Application), "Error details" (with a red box around the "Error and Cause" field which contains the message "Down payment cannot be 0, greater than, or equal to the property sale price."), "Years of amortization" (set to 20), "Applicant" (Name: "Li Li", Annual Income: "123456", SSN: "0"), "Property" (Age of property: "10 years", Address of property: "25 HMT, Singapore", Location: "Urban", Sale Price: "250000"), and a "Claim" button at the bottom.

The screenshot shows a web-based application interface for 'KIE'. The top navigation bar includes 'Home', 'Task Index', 'Task: 3', 'Menu', and user information 'wadmin'. Below the menu is a sub-navigation bar with tabs: 'Work' (selected), 'Details', 'Assignments', 'Comments', 'Admin', and 'Logs'. The main content area is titled '3 - Correct Data'.

Outputs: Application

Error details

Error and cause: Down payment cannot be 0, greater than, or equal to the property sale price.

Down Payment: 0 **Years of amortization:** 20

Applicant

Name: D. Di **Annual Income:** 123456

SSN: 0

Property

Age of property: 3 **Address of property:** 25 HMTK, Singapore

Locale: Urban **Sale Price:** 250000

Release:

- 4) [Task Inbox: **Correct Data**] Review the error message; Update **Down Payment** to **\$60,000**; Click blue button: **Complete**:

KIE IDE

Home > Task Inbox > Task: 3

3 - Correct Data

Work Details Assignments Comments Admin Logs

Outputs:
Application

Error details
Down payment cannot be 0, greater than, or equal to the property sale price.

Down Payment: 0 Years of amortization: 20

Applicant
Name: Di Di
Annual Income: 123456
SSN: 0

Property
Age of property: 3
Address of property: 25 HDBT, Singapore
Locale: Urban
Sale Price: 250000

Save | Release | Complete

KIE IDE

Home > Task Inbox > Task: 3

3 - Correct Data

Work Details Assignments Comments Admin Logs

Outputs:
Application

Error details
Down payment cannot be 0, greater than, or equal to the property sale price.

Down Payment: 60000 Years of amortization: 20

Applicant
Name: Di Di
Annual Income: 123456
SSN: 0

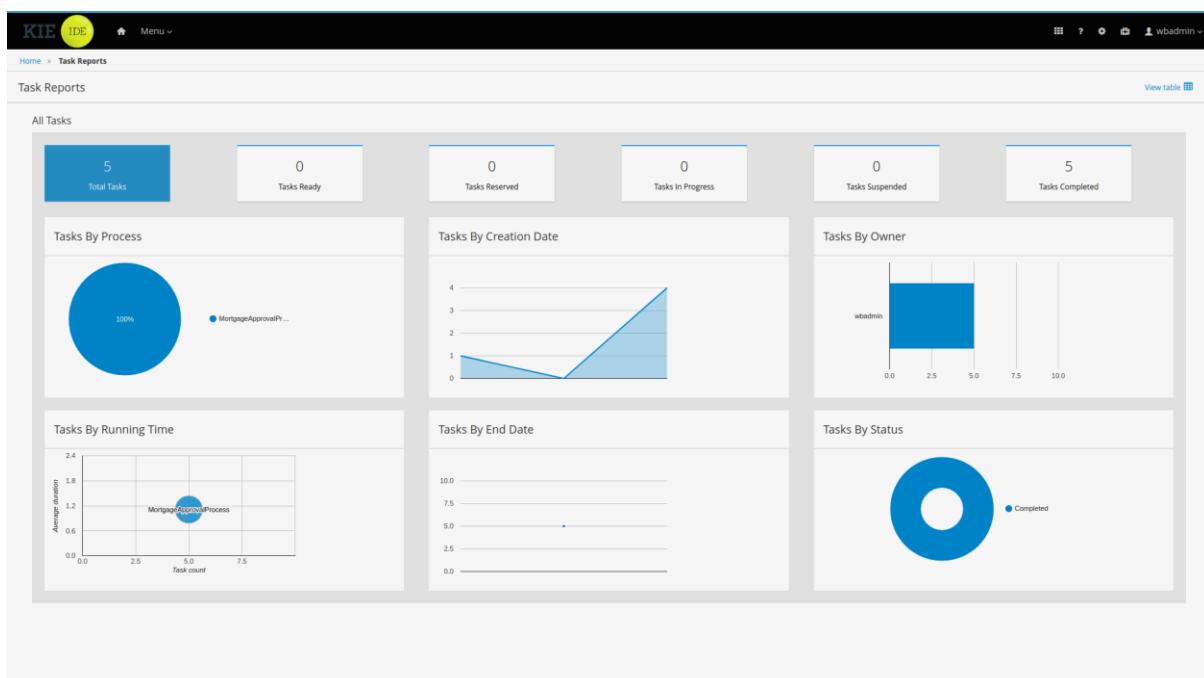
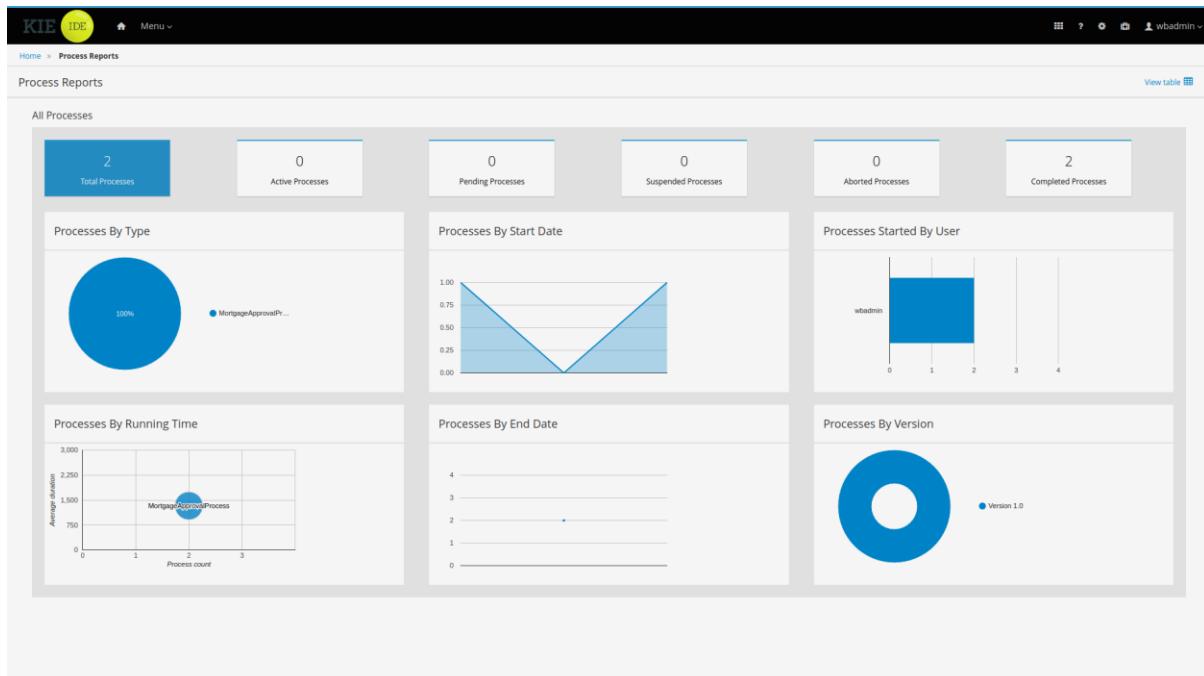
Property
Age of property: 3
Address of property: 25 HDBT, Singapore
Locale: Urban
Sale Price: 250000

Save | Release | Complete

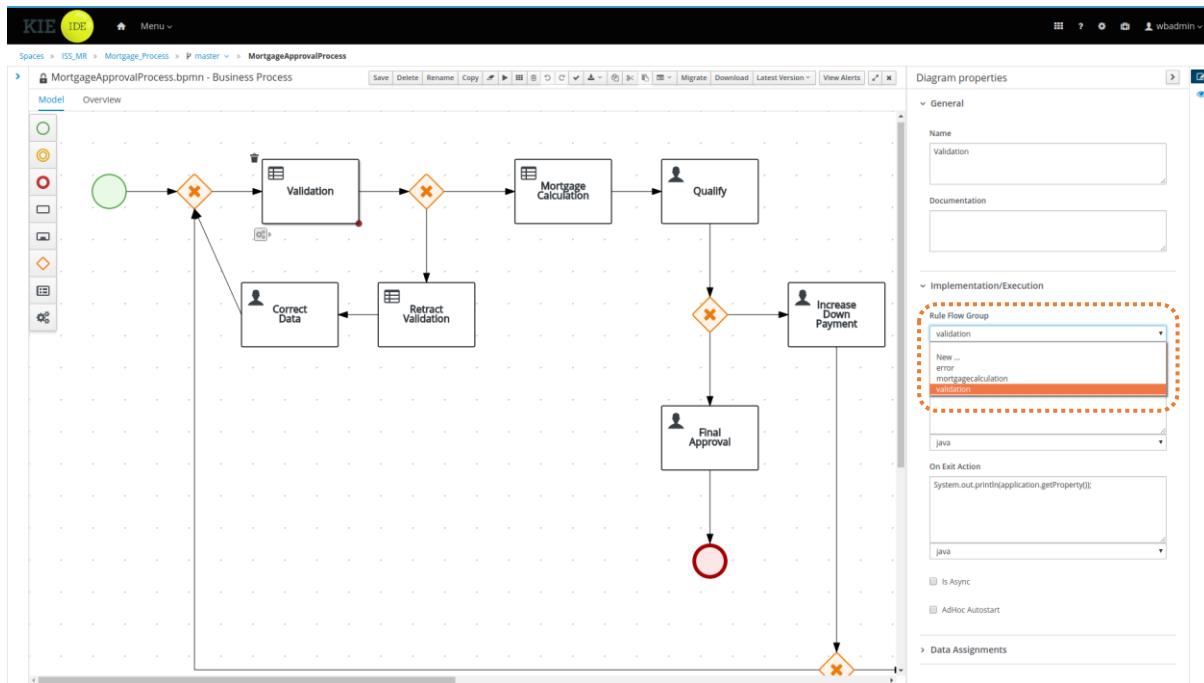
5) Continue to complete Task: **Qualify** and Task: **Final Approval**;

The screenshot shows the KIE IDE Task Inbox interface. The title bar includes the KIE IDE logo and a user menu. The main area displays a table of tasks. A single row is visible, representing the task 'Qualify'. The columns in the table are: Task, Process Definition Id, Status, Created On, and Actions. The 'Task' column shows 'Qualify', 'Process Definition Id' shows 'Mortgage_Process.MortgageApprovalProcess', 'Status' shows 'Ready', 'Created On' shows '21-Feb-2019 12:49:03', and the 'Actions' column contains a small icon. At the top of the table, there are filters set to 'Status: Ready, InProgress, Reserved'. Below the table, there is a pagination control showing '10 Items' and '1 of 1'.

The screenshot shows the KIE IDE Task Inbox interface, identical to the one above but with a different task listed. The table now shows a single row for the task 'Final Approval'. The columns are the same: Task, Process Definition Id, Status, Created On, and Actions. The 'Task' column shows 'Final Approval', 'Process Definition Id' shows 'Mortgage_Process.MortgageApprovalProcess', 'Status' shows 'Ready', 'Created On' shows '21-Feb-2019 12:52:04', and the 'Actions' column contains a small icon. The filters at the top remain the same, and the pagination control shows '10 Items' and '1 of 1'.



- 6) Let's dive deep into **User Task: Correct Data**: What has happened during automatic data validation (**Business Rule Task: Validation**)?



- 7) It is **Rule Flow Group**: **validation**, that did decision automation to validate data on all mortgage application form;

{ Tips } **Rule Flow Group** is the bridge linking jBPM **Business Rule Task** and Drools **Rule Set**; The (guided) rule file name is '**Validate Down Payment.rdrl**';

```

1 package com.myspace.mortgage_app;
2 import java.lang.Number;
3
4 rule "Validate Down Payment"
5 dialect "mvel"
6 ruleFlow-group "validation"
7 when
8   app : Application( downpayment == 0 || downpayment >= app.property.saleprice )
9 then
10   ValidationException fact0 = new ValidationException();
11   fact0.setError("Down payment cannot be 0, greater than, or equal to the property sale price.");
12   insert( fact0 );
13   System.out.println("Executed Rule: " + drools.getRule().getName() );
14   app.setErrors( fact0 );
15 end
16
17

```

The screenshot shows the KIE IDE interface with the 'Data Objects' tab selected. The left sidebar shows a tree view of business processes, data objects, forms, guided decision tables, guided rules, and others. The main panel displays a list of data objects with their types:

Type		Remove
com.myspace.mortgage_app.Applicant		
com.myspace.mortgage_app.Application		
com.myspace.mortgage_app.Property		
com.myspace.mortgage_app.ValidationErrorDO		
java.lang.Number		Remove

The screenshot shows the KIE IDE interface with the 'Overview' tab selected. The left sidebar shows a tree view of business processes, data objects, forms, guided decision tables, guided rules, and others. The main panel displays the rule's metadata:

- Type: Guided Rules
- Description: No description yet - what does this asset do?
- Used in projects: Mortgage_Process
- Last modified: By system on 2019-02-19 15:35
- Created on: By system on 2019-02-19 15:35
- Version history: Metadata
- Tags: Add new tag(s)
- Note: (/src/test/resources/com/myspace/mortgage_app/gitkeep)
- URI: git://master@ISS_MR/example/Mortgage_Process/src/main/resources/com/myspace/mortgage_app/Validate%20Down%20Payment.rdr
- Subject:
- Type:
- External link:

{ Quiz } Convert the Drools **Validate Down Payment** rule into two rules:

Rule 1: WHEN

THEN

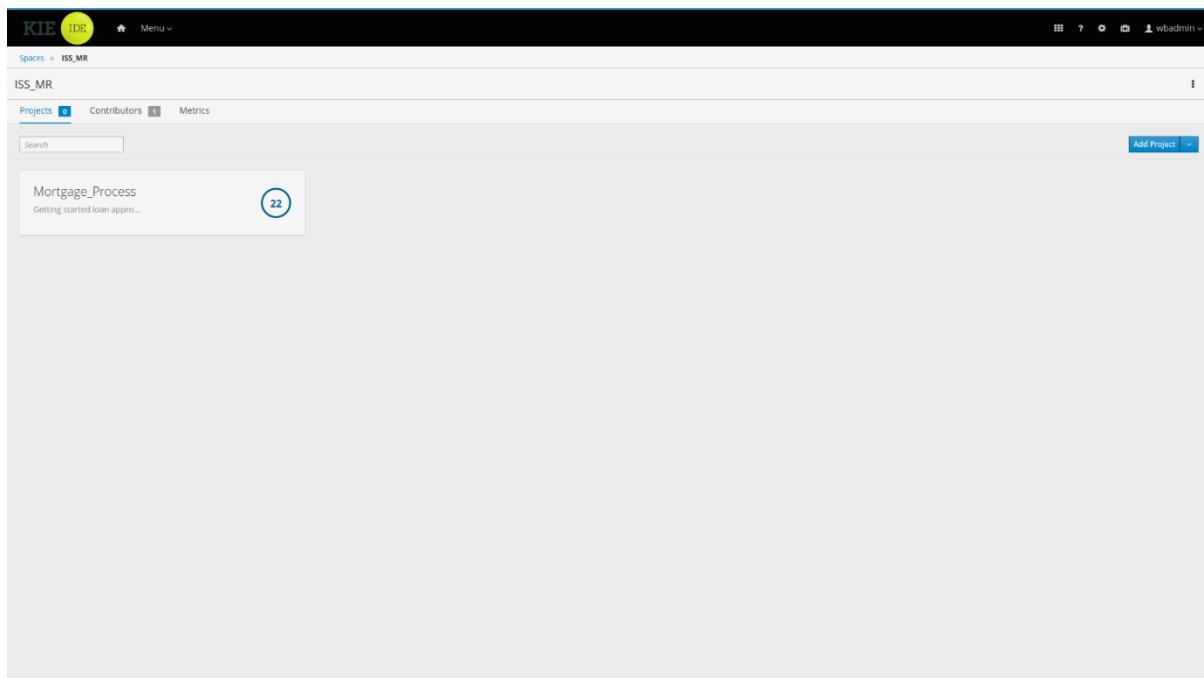
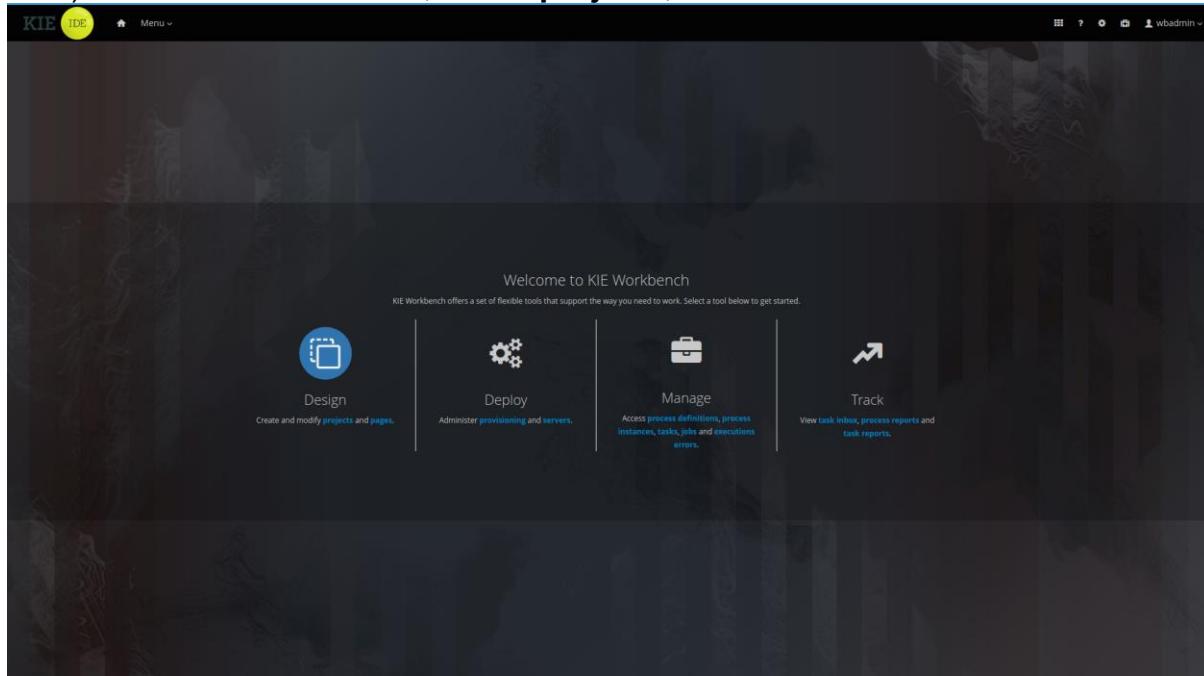
Rule 2: WHEN

THEN

1.2.5. Business system: Mortgage amount calculation [Decision Table] v3.0.0

{ Objective } Verify how the mortgage amount is calculated automatically under machine reasoning. Enhance business rules in guided decision table. Observe changed mortgage amount calculation due to enhanced business rule set.

- 1) Go back to main menu; Select **projects**;



2) [Assets: **Mortgage_Process**] Select **Guided Decision Tables:**
MortgageDecisionTable;

The screenshot shows a list of assets in the KIE IDE. The assets are:

- ApplicationMortgage (Forms, Last modified 1 day ago, Created 1 day ago)
- ApplicationMortgage (Forms, Last modified 1 day ago, Created 1 day ago)
- CorrectData-taskform (Forms, Last modified 1 day ago, Created 1 day ago)
- FinalApproval-taskform (Forms, Last modified 1 day ago, Created 1 day ago)
- IncreaseDownPayment-taskform (Forms, Last modified 1 day ago, Created 1 day ago)
- mortgage-app.MortgageApprovalProcess-taskform (Forms, Last modified 1 day ago, Created 1 day ago)
- Mortgage_Process.MortgageApprovalProcess-taskform (Forms, Last modified 1 day ago, Created 1 day ago)
- MortgageApprovalProcess (Business Processes, Last modified 1 day ago, Created 1 day ago)
- MortgageDecisionTable** (src/main/resources/com/myspace/mortgage_app/MortgageDecisionTable.gdst, Guided Decision Tables, Last modified 1 day ago, Created 1 day ago)
- Property (Forms, Last modified 1 day ago, Created 1 day ago)

The screenshot shows the MortgageDecisionTable.gdst guided decision table in the KIE IDE. The table has the following structure:

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

{ Quiz } In previous mortgage applications, which of the two rules was used for mortgage amount calculation?

The answer is: **Rule 1 / Rule 2** (Please select the correct answer)

- 3) [Guided Decision Tables: **MortgageDecisionTable**] Click 2nd rule's sequence number # 2, right click to select **Insert row below**; Close **Analysis** tab window;

#	Description	ruleflow-group	Applicant Annual Income	Property
1	mortgagecalculation		\$greater 100000	200000 300000
2	mortgagecalculation		\$less_or_equal 50000	99999 100000
3	mortgagecalculation			

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

- 4) [Guided Decision Tables: **MortgageDecisionTable**] Double click 3rd rule's relevant field (decision rule's conditions/actions), key in field values;

{ Tips } This is to introduce a new business rule: For any mortgage application, if his/her annual income is in-between **\$10,000** and **\$49,999**, regardless of other conditions, the bank ought to approve loan amount of **\$50,000**.

#	Description	ruleflow-group	Applicant Annual Income	Property	application
1	mortgagecalculation	mortgagecalculation	\$100000	200000	300000
2	mortgagecalculation	mortgagecalculation	\$50000	99999	100000
3	mortgagecalculation	mortgagecalculation	\$10000	49999	50000

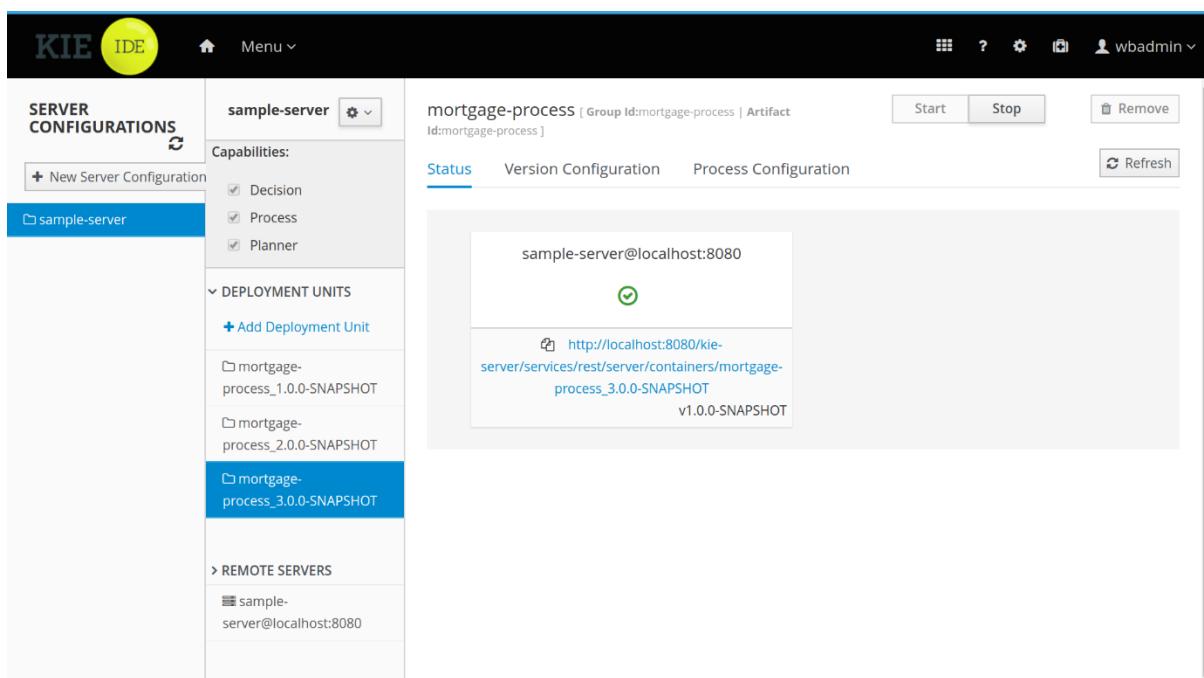
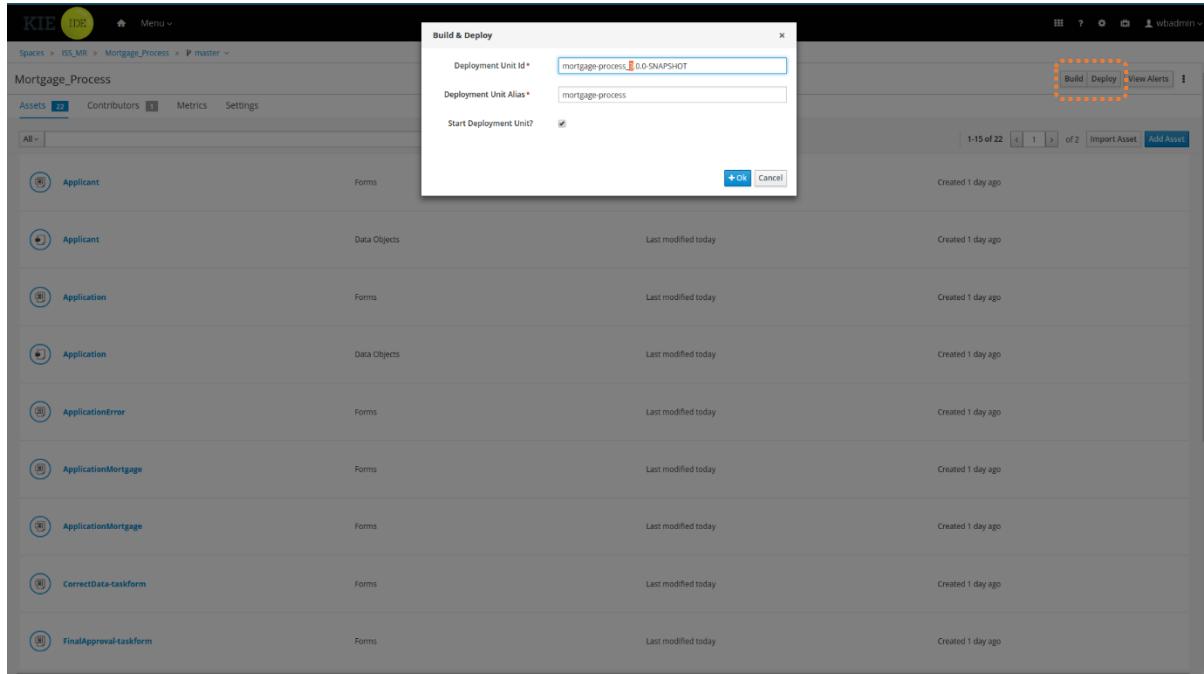
#	Description	ruleflow-group	Applicant Annual Income	Property	application
1	mortgagecalculation	mortgagecalculation	\$100000	200000	300000
2	mortgagecalculation	mortgagecalculation	\$50000	99999	100000
3	mortgagecalculation	mortgagecalculation	\$10000	49999	50000

- 5) [Guided Decision Tables: **MortgageDecisionTable**] Save the rule in decision table;

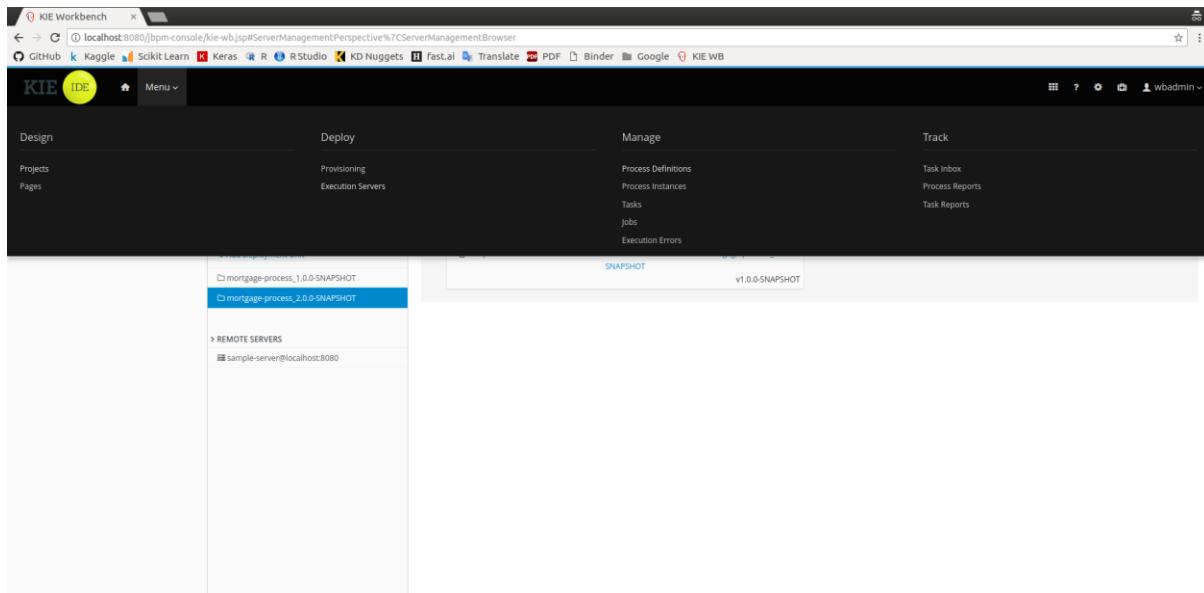
#	Description	ruleflow-group	Applicant Annual Income	Property	application			
1	mortgagecalculation	\$greater	100000	200000	300000	5	Urban	200000
2	mortgagecalculation	\$less_or_equal	50000	99999	100000	10	Rural	100000
3	mortgagecalculation	\$saleprice_less	10000	49999				50000

#	Description	ruleflow-group	Applicant Annual Income	Property	application			
1	mortgagecalculation	\$greater	100000	200000	300000	5	Urban	200000
2	mortgagecalculation	\$less_or_equal	50000	99999	100000	10	Rural	100000
3	mortgagecalculation	\$saleprice_less	10000	49999				50000

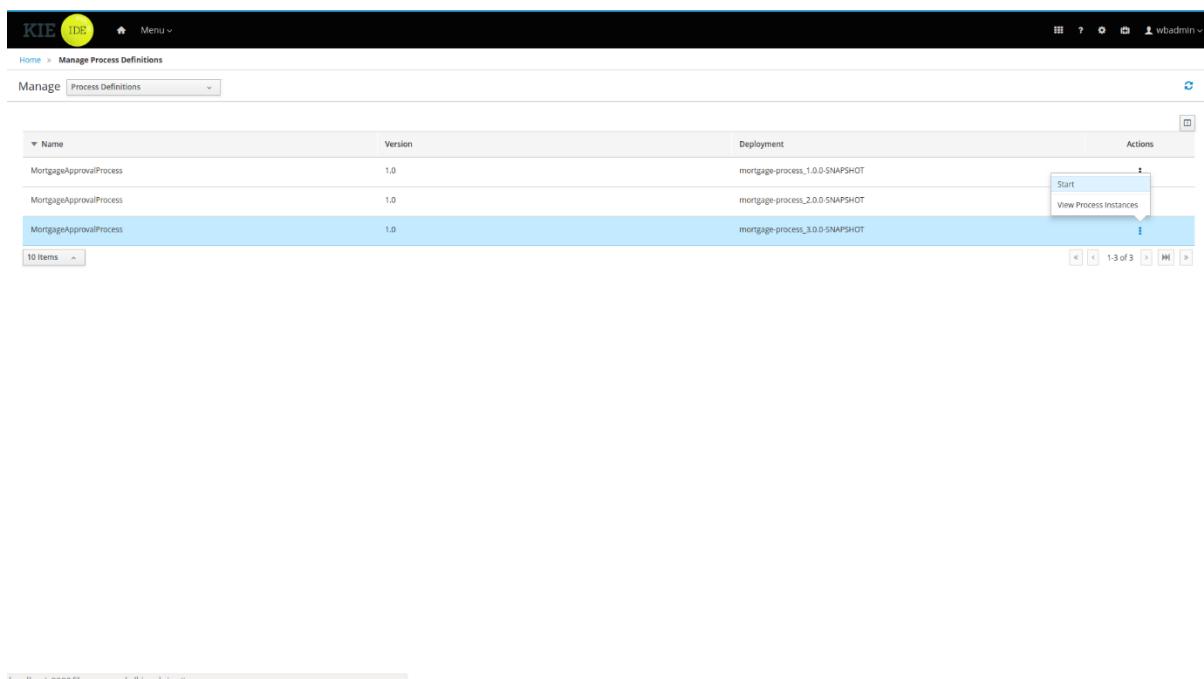
- 6) Go back to asset list view; Click button: **Deploy**; Update Deployment Unit Id*: **mortgage-process_3.0.0-SNAPSHOT**; Click blue button **OK**



- 7) To use the updated system by filling in a new mortgage application form (start new process instance under process definition, click: **Menu → Process Definitions**



- 8) Select the mortgage system with intended version, e.g., ***mortgage-process_3.0.0-SNAPSHOT***, then click: **Start**



The screenshot shows the KIE IDE interface with the 'MortgageApprovalProcess' form open. The form contains the following data:

Field	Value
Down Payment	50000
Years of amortization	20
Name	Di Di
Annual Income	20000

- 9) Fill in the mortgage form as shown below, with **Annual Income: \$20,000**; Then click blue button: **Submit**

The screenshot shows the KIE IDE interface with the 'MortgageApprovalProcess' form open. The form contains the following data:

Field	Value
Down Payment	50000
Years of amortization	20
Name	Di Di
Annual Income	20000

KIE IDE

Home > Manage Process Definitions > Process Instance: 3

3 - MortgageApprovalProcess

Instance Details Process Variables Documents Logs Diagram

Definition Id: Mortgage_Process.MortgageApprovalProcess
 Instance State: Active
 Deployment: mortgage-process_3.0.0-SNAPSHOT
 Definition Version: 1.0
 SLA Compliance: N/A
 Correlation key: 3
 Parent Process Instance: No Parent Process Instance
 Active user tasks: Qualify (Ready) owner: --
 Current Activities: Thu Feb 21 15:36:09 SGT 2019:5 - Qualify (HumanTaskNode)

Signal Abort X

KIE IDE

Home > Manage Process Definitions > Process Instance: 3

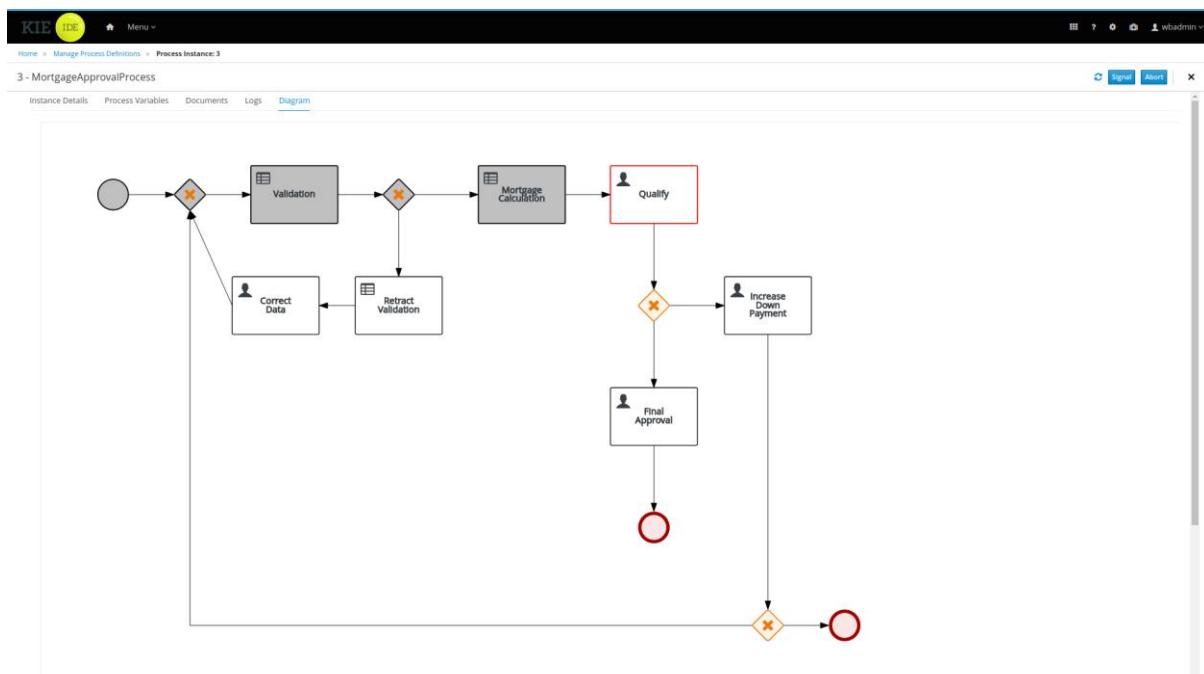
3 - MortgageApprovalProcess

Instance Details Process Variables Documents Logs Diagram

Process Variables:

Name	Value	Type	Last Modification	Actions
initiator	wbadmin		21-Feb-2019 15:36:09	Edit History
application	com.myspace.mortgage_app.Application@13c39906	com.myspace.mortgage_app.Application	21-Feb-2019 15:36:09	Edit History
inlimit		Boolean	21-Feb-2019 15:36:23	Edit History
incdownpayment		Boolean	21-Feb-2019 15:36:23	Edit History

10 Items < < > >> 1-4 of 4



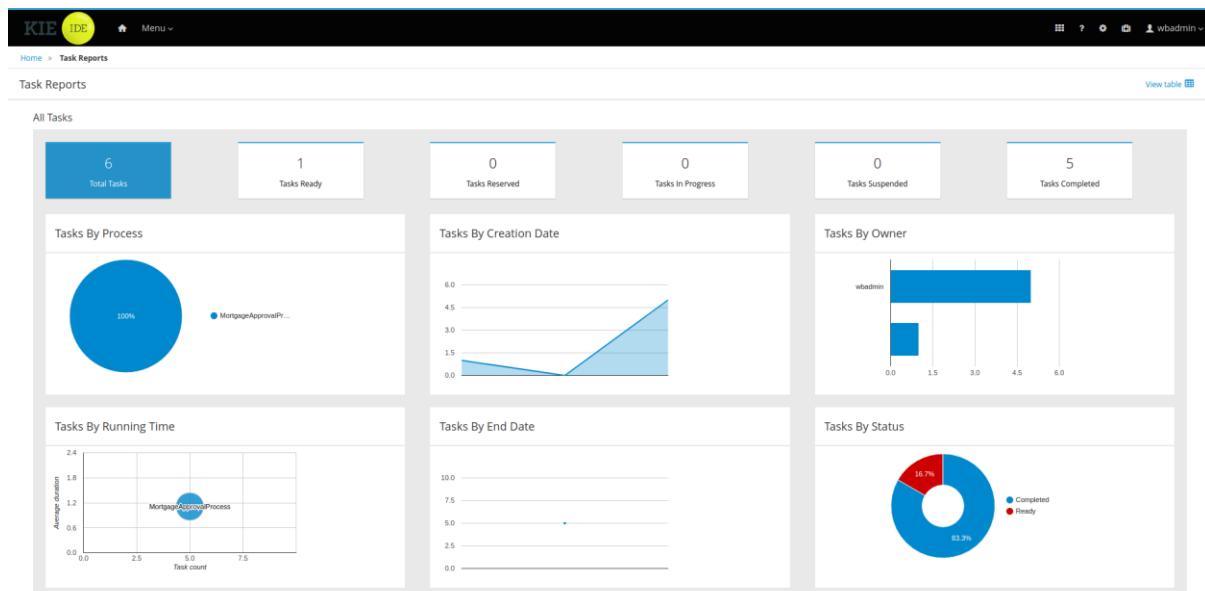
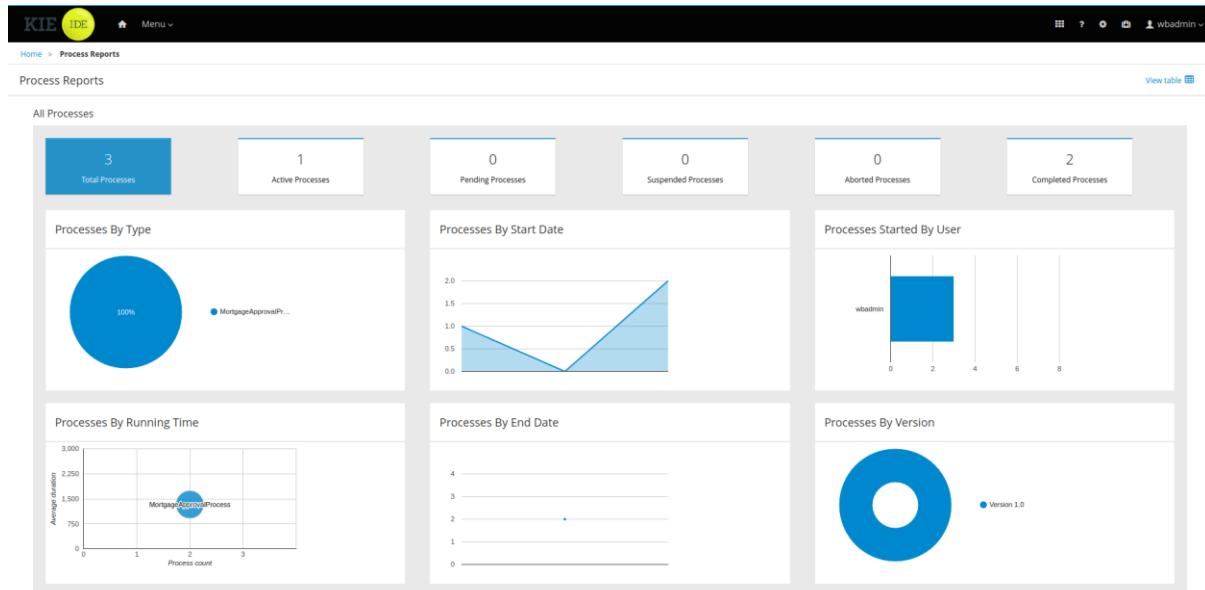
10) To review (pending user task: ***Qualify***) the mortgage application, click: **Menu** → **Task Inbox**

The screenshot shows the KIE Task Inbox interface. On the left, there is a sidebar with 'Filters' containing dropdown menus for 'Status' (with 'InProgress' selected), 'Filter By' (with 'Id' selected), and other fields like 'Process Definition Id' and 'Created On'. The main area is titled 'Task Inbox' and shows a table with one row. The table columns are 'Task', 'Process Definition Id', 'Status', 'Created On', and 'Actions'. The single row contains 'Qualify', 'Mortgage_Process.MortgageApprovalProcess', 'Ready', '21-Feb-2019 15:36:09', and a small icon for actions. At the bottom right of the table, it says '10 items' and '1 of 1'.

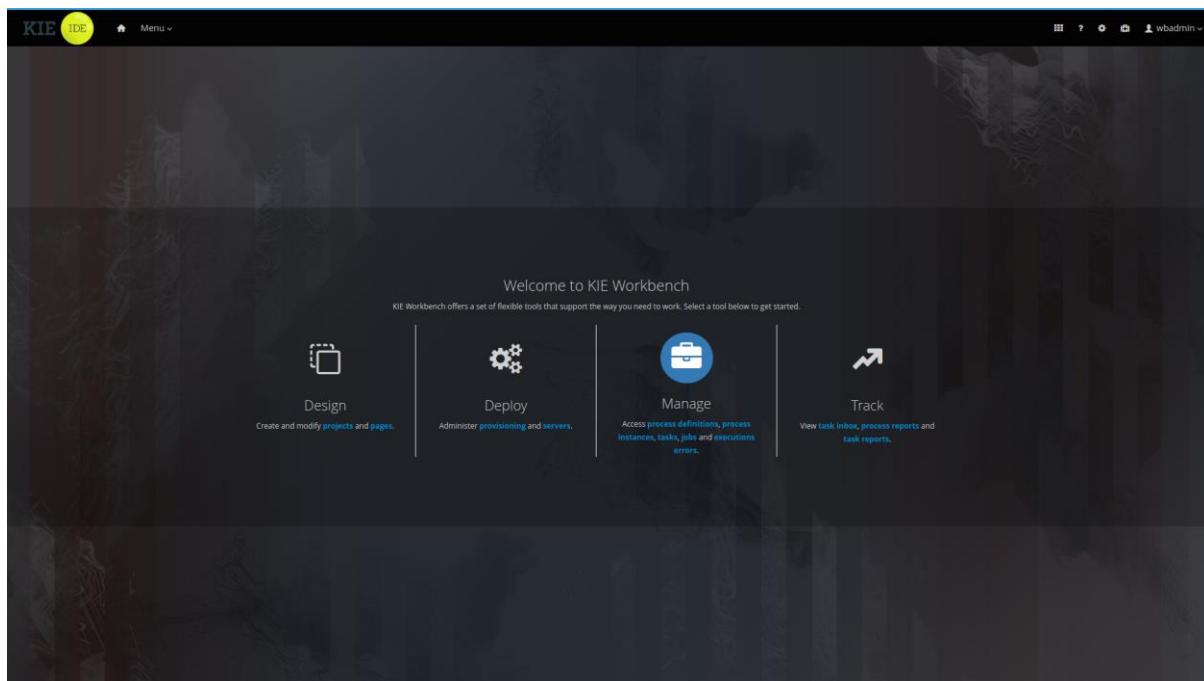
11)[Task Inbox: ***Qualify***] Click to view the task details. Notice the **Mortgage amount** is now calculated as **\$50,000**.

The screenshot shows the task details for 'Qualify'. At the top, it says '6 - Qualify'. Below that, there are tabs for 'Work', 'Details', 'Assignments', 'Comments', 'Admin', and 'Logs'. The 'Work' tab is active. The form is divided into sections: 'Inputs:' and 'Outputs:'. In the 'Inputs:' section, under 'Application', there is a field for 'Mortgage amount' with the value '50000' highlighted by a red dotted box. Other application inputs include 'Down Payment' (50000). Under 'Applicant', there is a field for 'Name' with 'D. Di' entered. Under 'Property', there is a field for 'Age of property' with '3' entered. In the 'Outputs:' section, there is a checkbox for 'Is mortgage application in limit?' which is checked, and a 'Claim' button below it.

12) Have a look at **Process Reports** and **Task Reports**

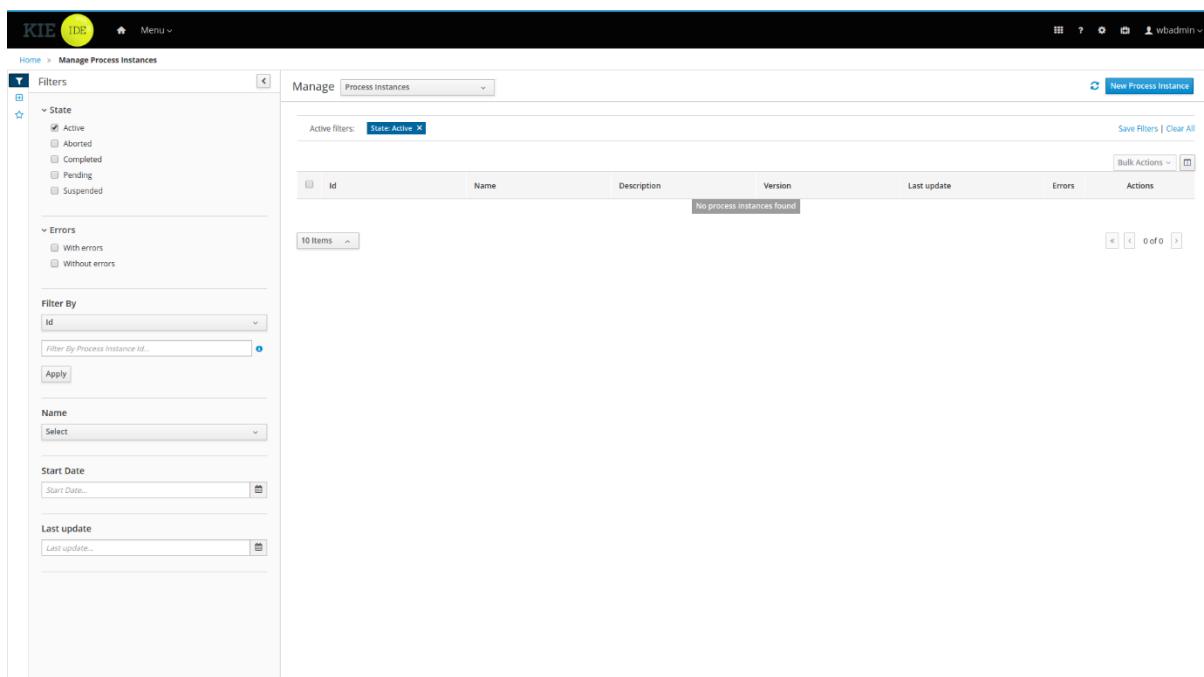
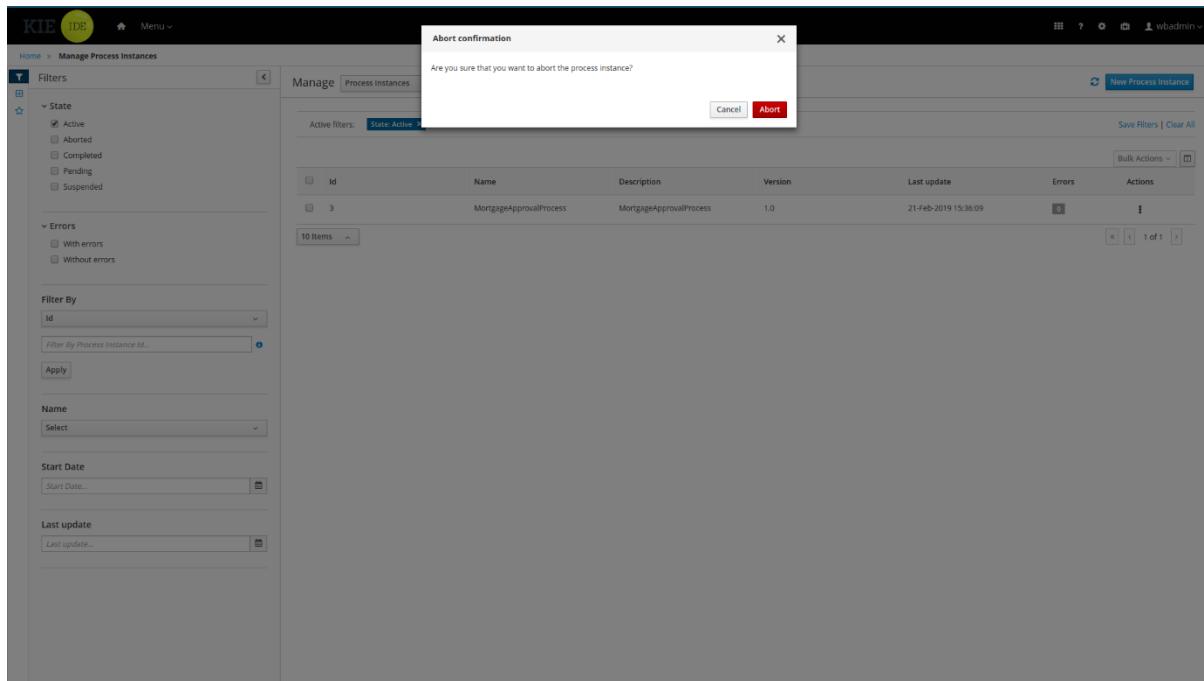


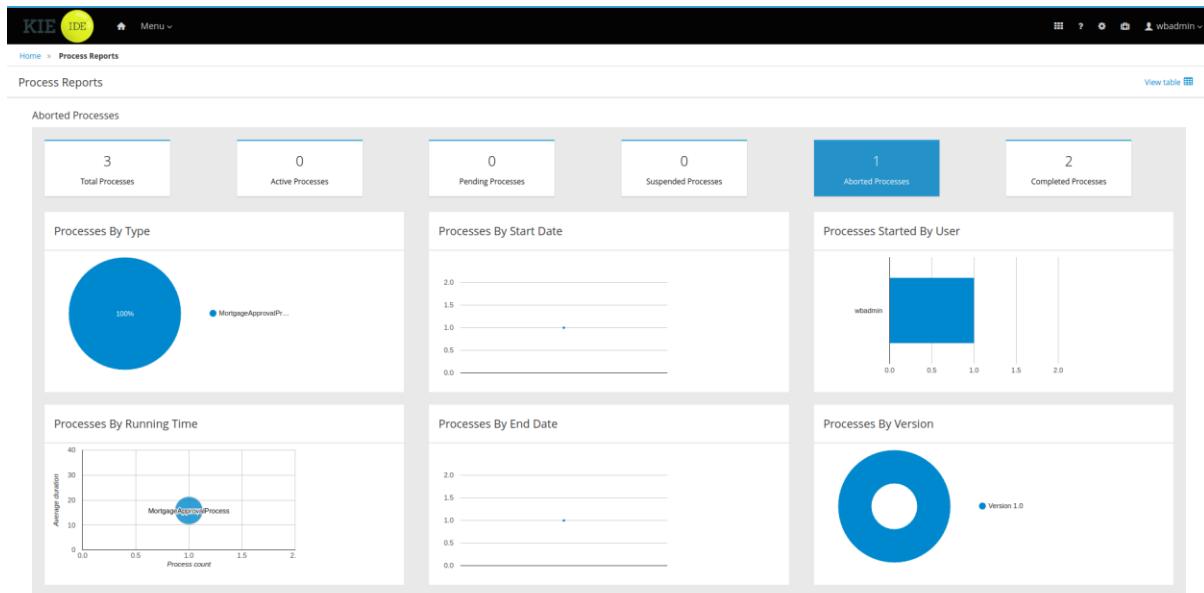
13) Abort/Cancel a process and its tasks: Go to main menu; Click **process instances**



This screenshot shows the "Manage Process Instances" screen within the KIE Workbench. On the left, there's a sidebar with filter options for "State" (Active, Aborted, Completed, Pending, Suspended) and "Errors" (With errors, Without errors). Below that are "Filter By" fields for "Id", "Name", "Start Date", and "Last update". The main area is titled "Manage" with a dropdown set to "Process Instances". It shows a table with one item: Id 3, Name MortgageApprovalProcess, Description MortgageApprovalProcess, Version 1.0, Last update 21-Feb-2019 15:36:09. To the right of the table are buttons for "Signal", "Abort", "View jobs", and "View tasks". A status bar at the bottom indicates the URL: localhost:8080/jbpm-console/kie-wb.jsp#.

14)[Process Instances: **MortgageApprovalProcess**] Click Abort; Confirm Abort;

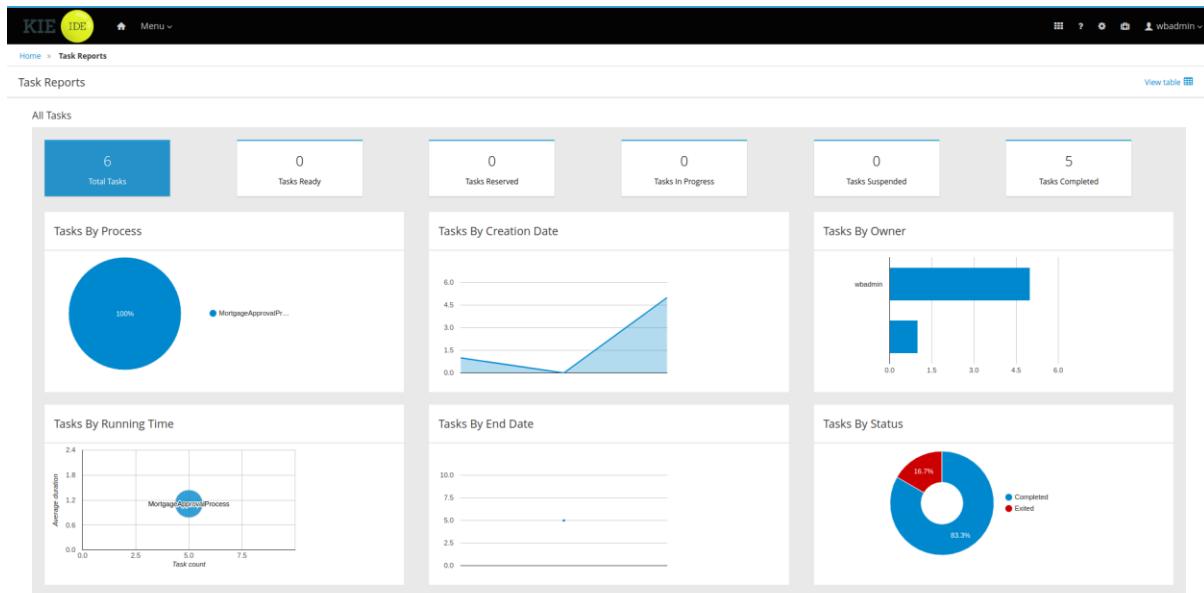




The table lists the following processes:

ID	Deployment Id	Process Id	Process name	Initiator	Status	Version	Start	End	Duration
3	mortgage-process_...	Mortgage_Process...	MortgageApproval...	wbadmin	Aborted	1.0	21-Feb-2019 15:36:...	21-Feb-2019 15:51:...	15m 47s
2	mortgage-process_...	Mortgage_Process...	MortgageApproval...	wbadmin	Completed	1.0	21-Feb-2019 12:41:...	21-Feb-2019 12:53:...	11m 39s
1	mortgage-process_...	Mortgage_Process...	MortgageApproval...	wbadmin	Completed	1.0	19-Feb-2019 16:06:...	21-Feb-2019 12:11:...	1d 20h 4m 53s

10 Items



The table view shows a list of process instances:

ID	Process	Process Instance Id	Task	Owner	Status	Start	End	Duration	Deployment Id
6	MortgageApprov...	3	Qualify	wbadmin	Exited	21-Feb-2019 15:3...	—	17m 16s	mortgage-process,3.0.0-SNAPSHOT
5	MortgageApprov...	2	Final Approval	wbadmin	Completed	21-Feb-2019 12:5...	21-Feb-2019 12:5...	1m 12s	mortgage-process,2.0.0-SNAPSHOT
4	MortgageApprov...	2	Qualify	wbadmin	Completed	21-Feb-2019 12:4...	21-Feb-2019 12:5...	3m	mortgage-process,2.0.0-SNAPSHOT
3	MortgageApprov...	2	Correct Data	wbadmin	Completed	21-Feb-2019 12:4...	21-Feb-2019 12:4...	7m 25s	mortgage-process,2.0.0-SNAPSHOT
2	MortgageApprov...	1	Final Approval	wbadmin	Completed	21-Feb-2019 12:0...	21-Feb-2019 12:1...	11m 13s	mortgage-process,2.0.0-SNAPSHOT
1	MortgageApprov...	1	Qualify	wbadmin	Completed	19-Feb-2019 16:0...	21-Feb-2019 12:0...	1d 19h 53m 38s	mortgage-process,2.0.0-SNAPSHOT

😊 Congratulations!

You have completed today's challenging workshop!

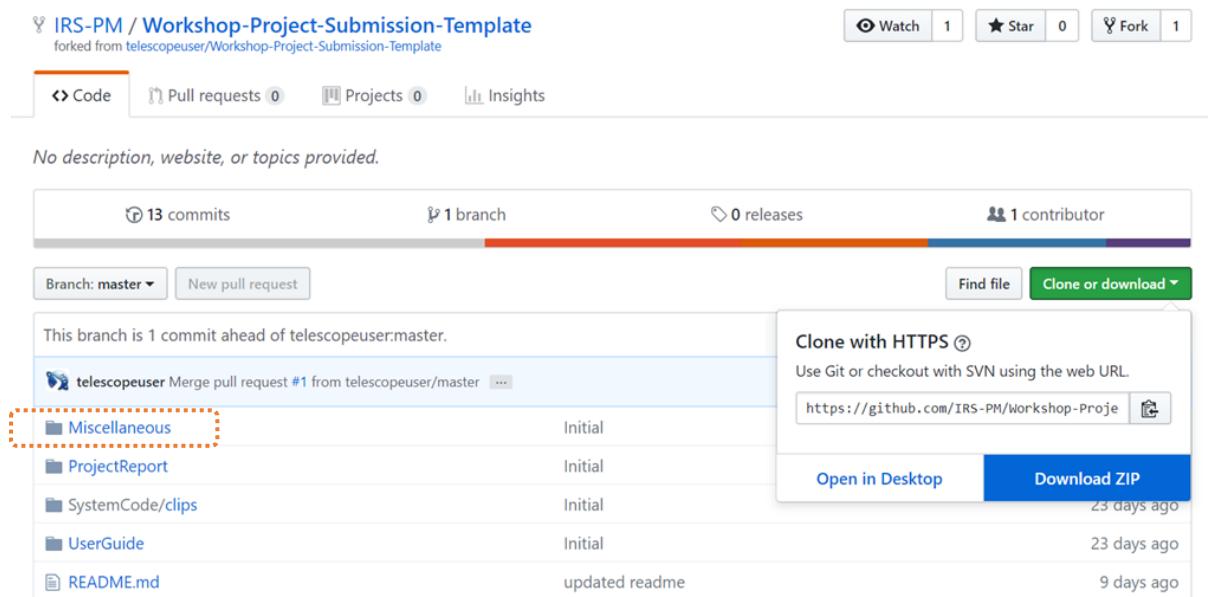
2. Workshop 2 – Knowledge Modelling

2.1. { Optional } Knowledge Representation and Acquisition

Construct knowledge models:

- Identify a business opportunity to use reasoning system.
- Study online documented knowledge source as knowledge acquisition.
- Compose relevant knowledge models in spreadsheets, e.g. Excel.
- { Optional } After completion, save to **Miscellaneous** project folder.

😊 Candidate Project: HDB BTO; Airport Gate Assignment System (AGAS); DoReMi



The screenshot shows a GitHub repository page. At the top, it displays the repository name 'IRS-PM / Workshop-Project-Submission-Template' and a link to its parent repository 'forked from telescopeuser/Workshop-Project-Submission-Template'. To the right are buttons for 'Watch' (1), 'Star' (0), and 'Fork' (1). Below this is a navigation bar with tabs for 'Code', 'Pull requests (0)', 'Projects (0)', and 'Insights'. A note below the tabs states 'No description, website, or topics provided.' Under the 'Code' tab, there are summary statistics: '13 commits', '1 branch', '0 releases', and '1 contributor'. A dropdown menu shows 'Branch: master' and a 'New pull request' button. On the right, there are buttons for 'Find file' and 'Clone or download'. A 'Clone with HTTPS' section provides the URL <https://github.com/IRS-PM/Workshop-Proje>. Below these are buttons for 'Open in Desktop' and 'Download ZIP'. The main content area lists files in the repository:

File	Last Commit
Miscellaneous	Initial
ProjectReport	Initial
SystemCode/clips	Initial
UserGuide	Initial
README.md	updated readme

One of the files, 'Miscellaneous', is highlighted with a red dashed box.

2.2. KIE BPMS/BRMS Business System Enhancement

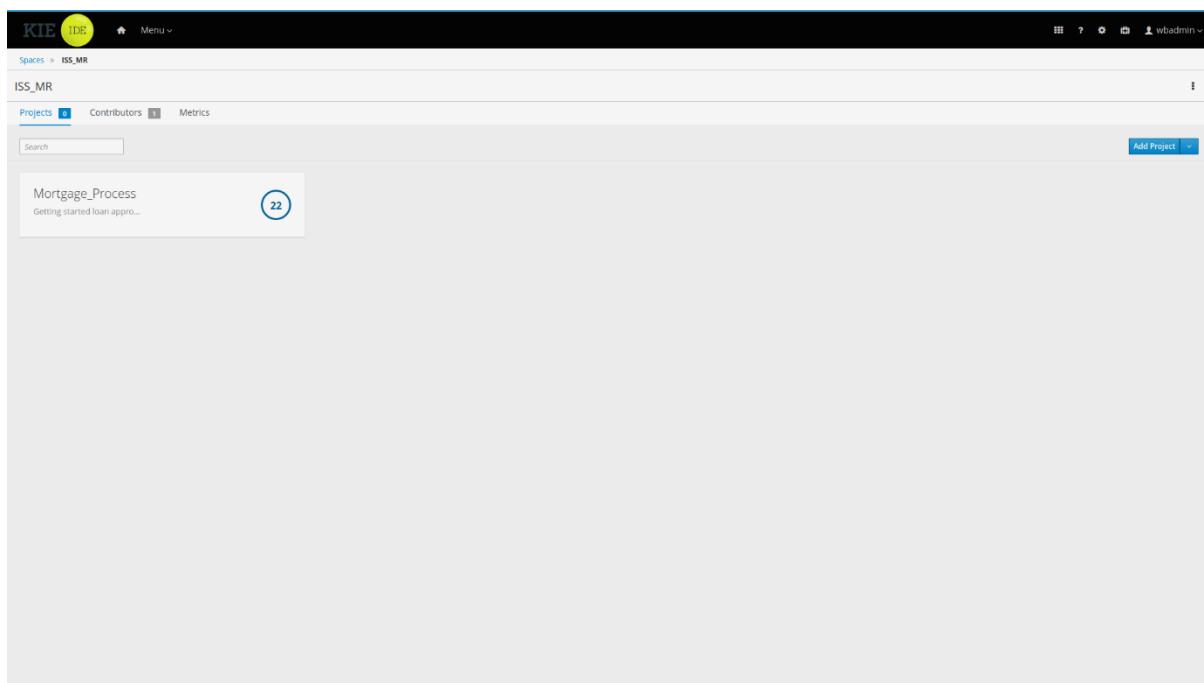
{ Objective } To enhance **Mortgage_Process** system by adding new machine reasoning **Business Rule Task**, to automate the decision of **User Task: Qualify**;

Enhancements involve: Data Model: Objects; Fields; Data Types; When-Then Guided Rules; Business Process, Task, Form

Core enhancement: [Task] Create a new '**MortgageMachineReasoning**' Business Rule Task to replace '**Qualify**' User Task for automated mortgage loan **Inlimit** checking.

2.2.1. Business system enhancement [Data Objects]

- 1) Go to asset list of project **Mortgage_Process**



2) Select [Data Objects: **Application**] from **Assets**:

The screenshot shows the KIE IDE interface with the 'Assets' tab selected. A list of data objects is displayed, including:

- Applicant (Forms, Last modified today, Created 2 days ago)
- Applicant (Data Objects, Last modified today, Created 2 days ago)
- Application (Forms, Last modified today, Created 2 days ago)
- Application** (Data Objects, Last modified today, Created 2 days ago) - This item is highlighted.
- ApplicationError (Forms, Last modified today, Created 2 days ago)
- ApplicationMortgage (Forms, Last modified today, Created 2 days ago)
- ApplicationMortgage (Forms, Last modified today, Created 2 days ago)
- CorrectData-taskform (Forms, Last modified today, Created 2 days ago)
- FinalApproval-taskform (Forms, Last modified today, Created 2 days ago)

3) [Data Objects: **Application**] Click button: + add filed; Fill in the new field **Id***: **InlimitMR**; **Label**: **Inlimit Machine Reasoning**; **Type***: **Boolean**; Click blue button: **Create**

The screenshot shows the KIE IDE interface with the 'Data Objects' view open. A modal window titled 'New Field' is displayed, showing the configuration for a new field:

- Id**: InlimitMR
- Label**: Inlimit Machine Reasoning
- Type**: Boolean

At the bottom of the modal, there are three buttons: 'Cancel', 'Create', and 'Create and continue'. The 'Create' button is highlighted in blue. The background shows the 'Application.java - Data Object' code editor with other fields listed.

Identifier	Label	Type
amortization	Years of amortization	Integer
applicant	Applicant	Applicant
downpayment	Down Payment	Integer
errors	Error details	Validation Error
mortgageamount	Mortgage amount	Integer
property	Property	Property
inlimitMR	Inlimit Machine Reasoning	Boolean

4) [Data Objects: **Application**] Remember to click button: **Save**;

2.2.2. Business system enhancement [Business Processes]

- From left Project Explorer panel, click to edit **Business Processes: MortgageApprovalProcess**

KIE IDE

Spaces > ISS_MR > Mortgage_Process > F master > Application

Project Explorer

Application.java - Data Objects

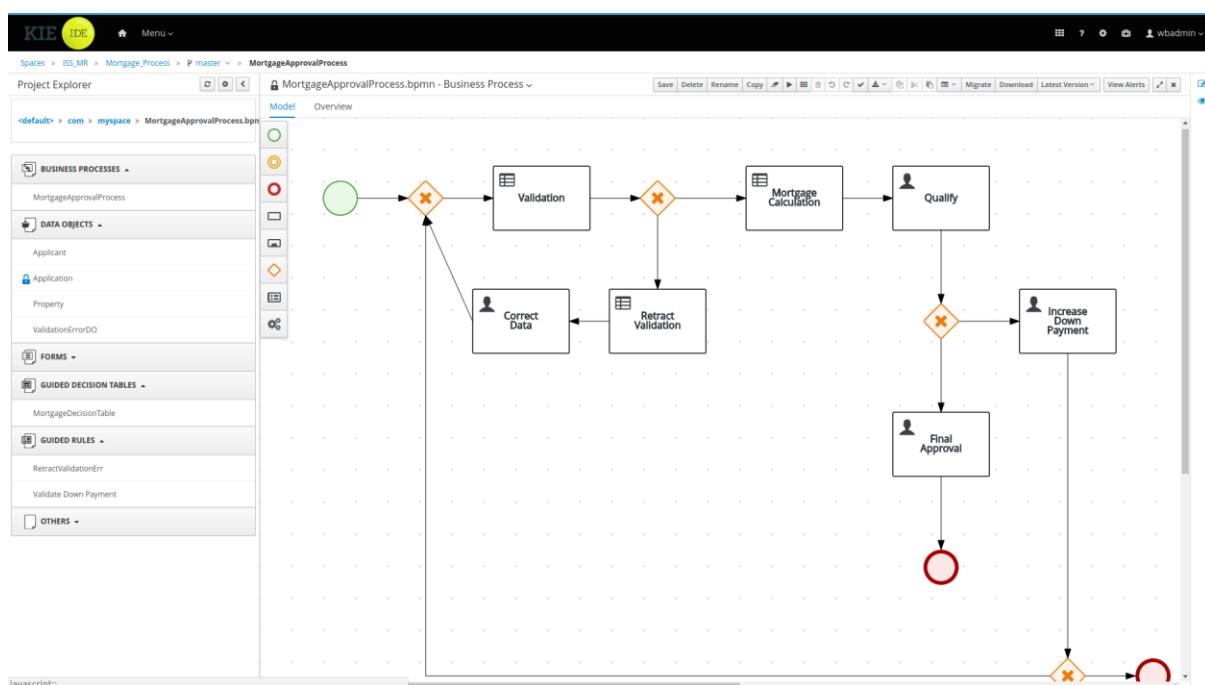
Model Overview Source

Application

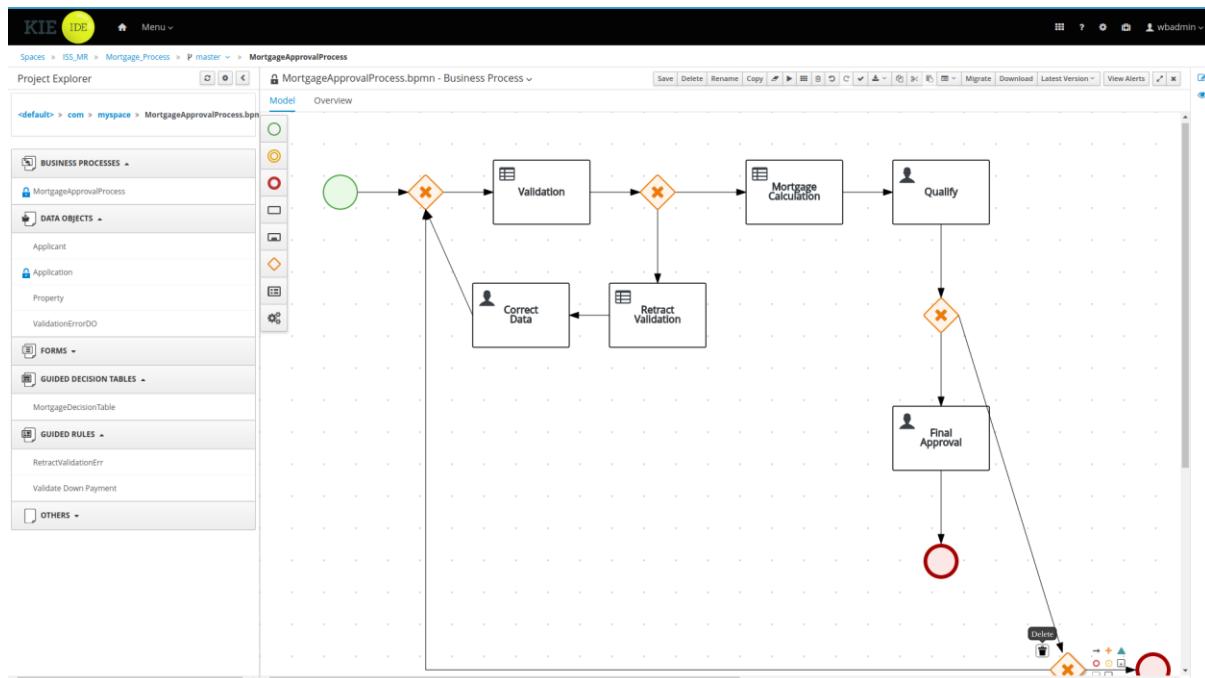
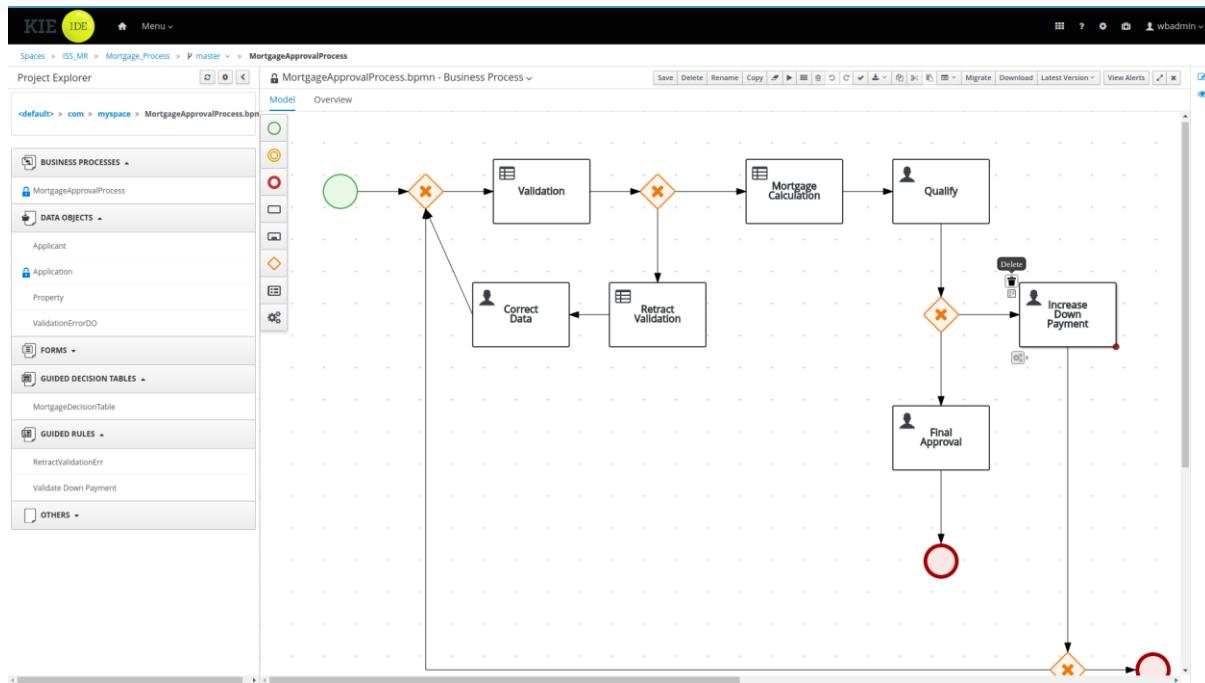
Identifier	Label	Type	Actions
amortization	Years of amortization	Integer	<input type="button" value="Delete"/>
applicant	Applicant	Applicant	<input type="button" value="Delete"/>
downpayment	Down Payment	Integer	<input type="button" value="Delete"/>
errors	Error details	Validation Error	<input type="button" value="Delete"/>
mortgageamount	Mortgage amount	Integer	<input type="button" value="Delete"/>
property	Property	Property	<input type="button" value="Delete"/>
inlimitMR	Inlimit Machine Reasoning	Boolean	<input type="button" value="Delete"/>

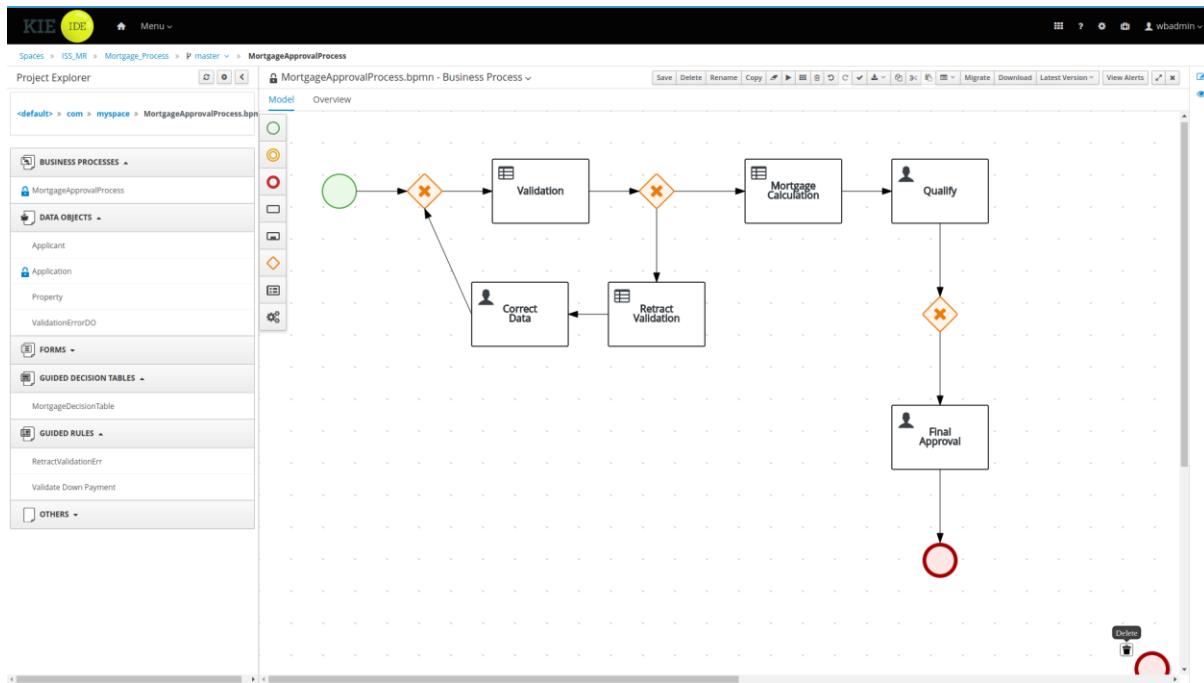
'inlimitMR'- general properties

- Identifier: inlimitMR
- Label: Inlimit Machine Reasoning
- Description:
- Type: Boolean
- List:

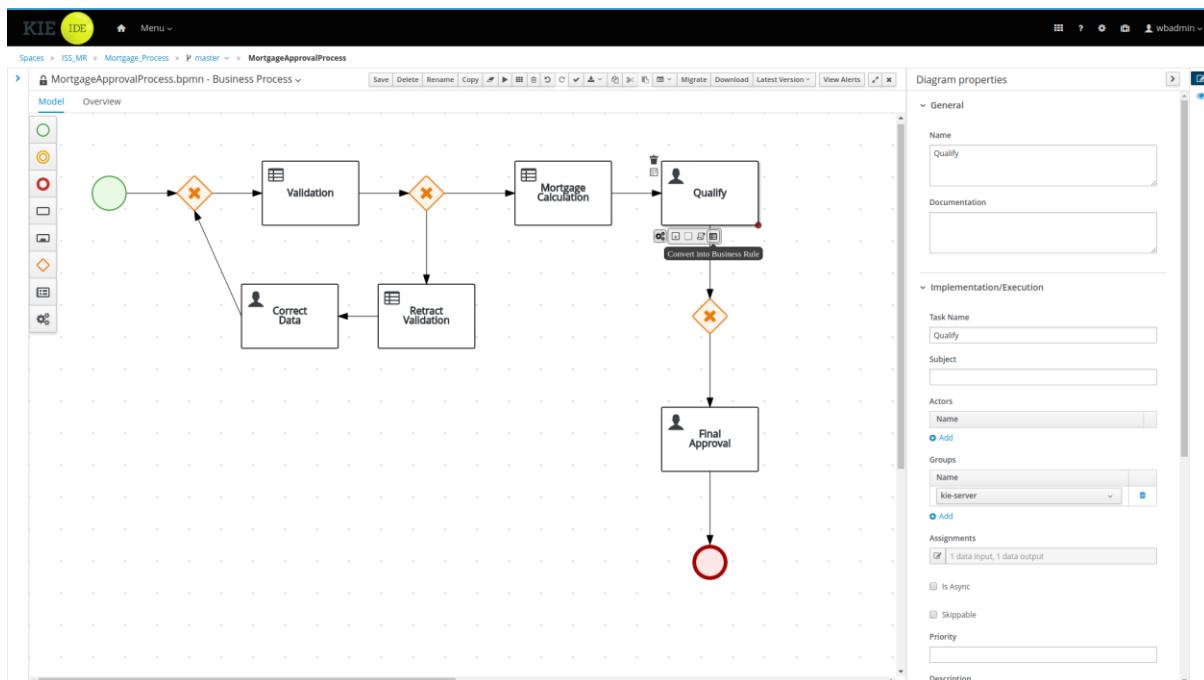


- 2) Edit business process: Delete ***Increase Down Payment*** and few other not to be used process nodes, e.g. end node, links;

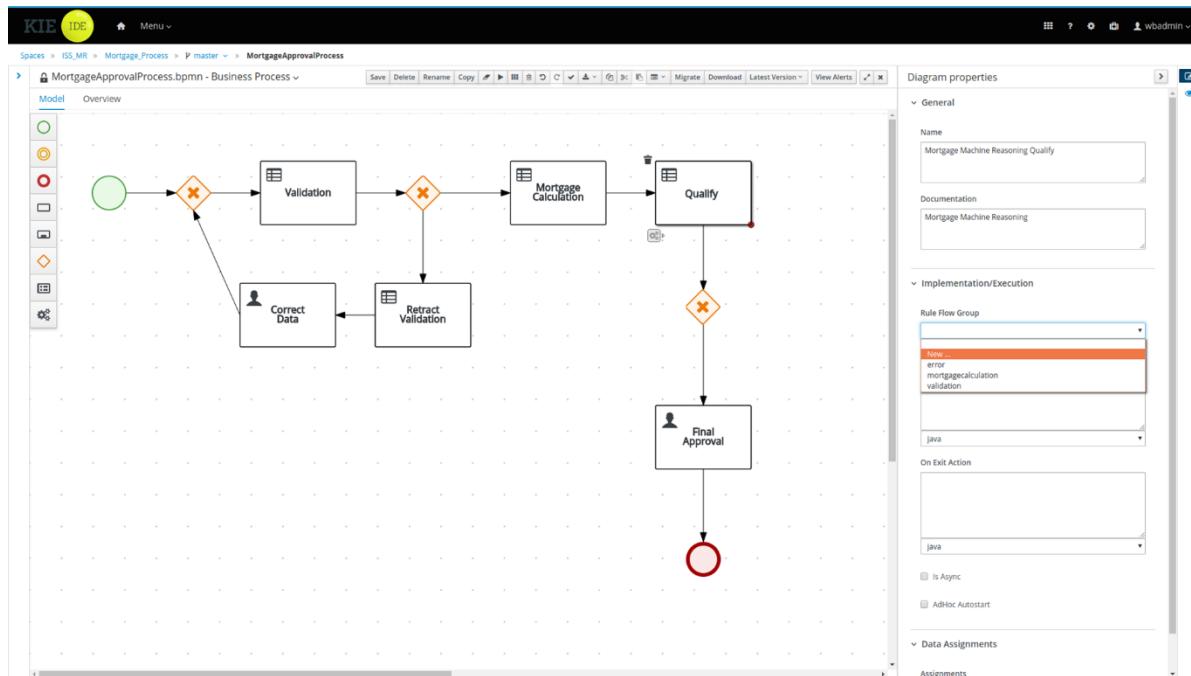




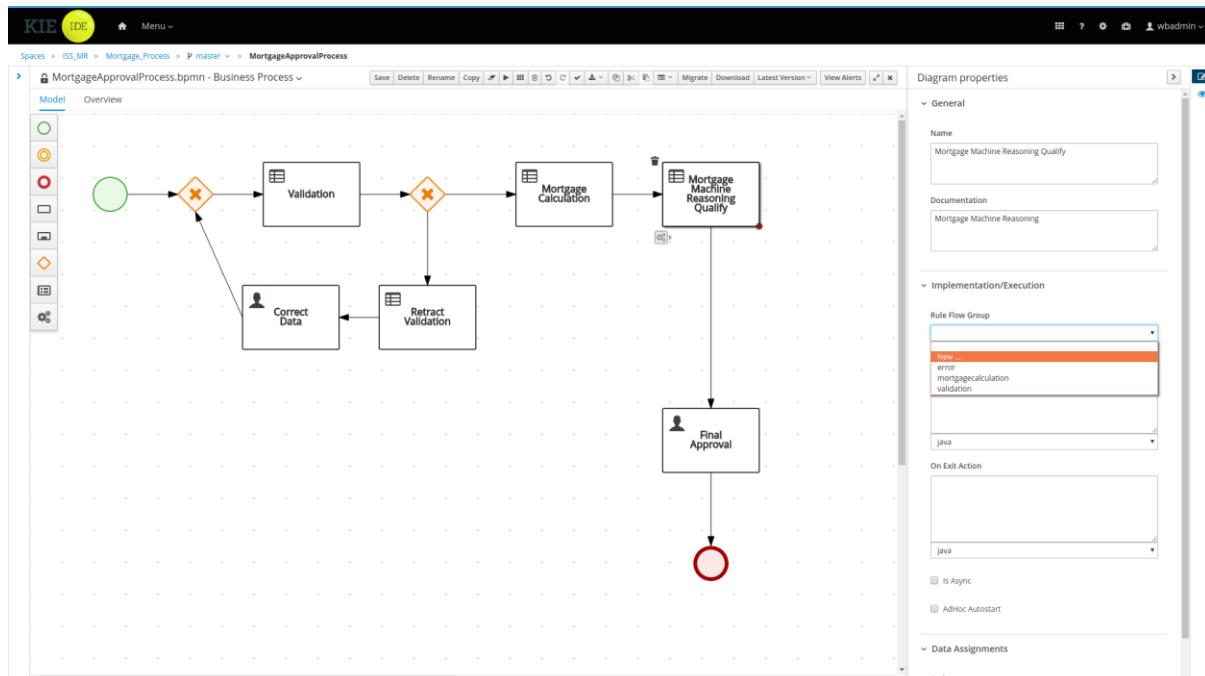
3) Convert User Task: **Qualify** into Business Rule Task;



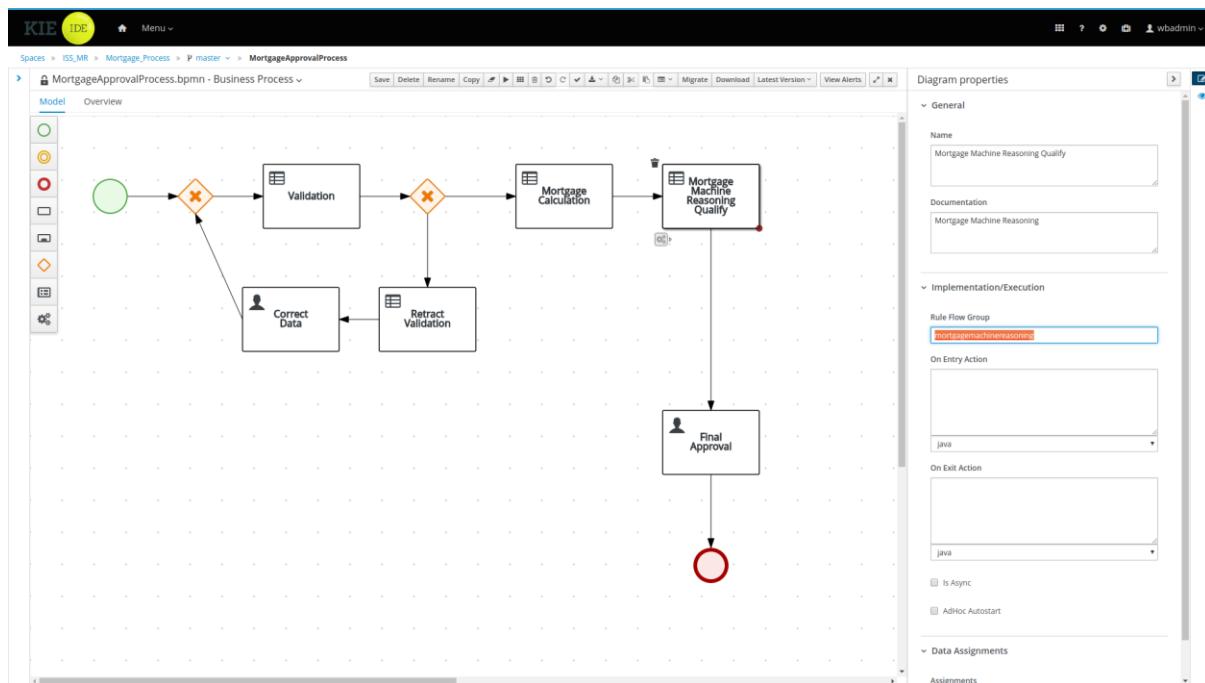
- 4) Remove  in-between **Qualify** and **Final Approval**



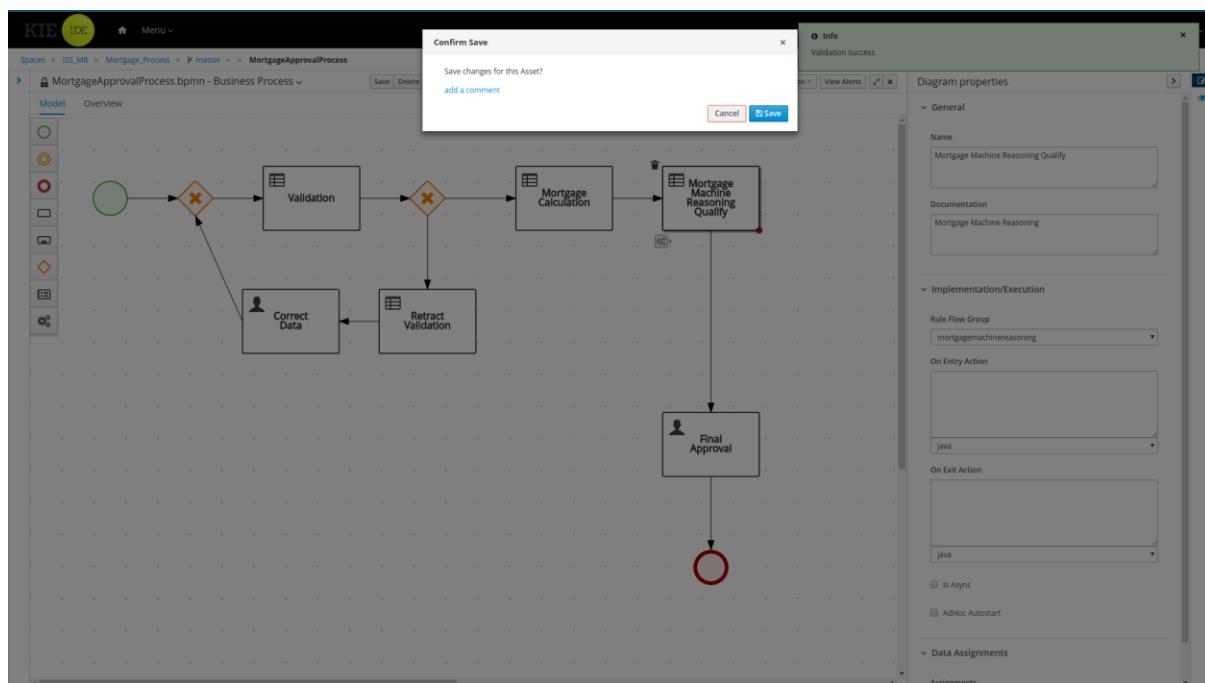
- 5) Update fields: **Name: Mortgage Machine Reasoning Qualify** and **Documentation: Mortgage Machine Reasoning** fields using its **Diagram properties**



6) Key in new Rule Flow Group name: ***mortgagemachineReasoning***

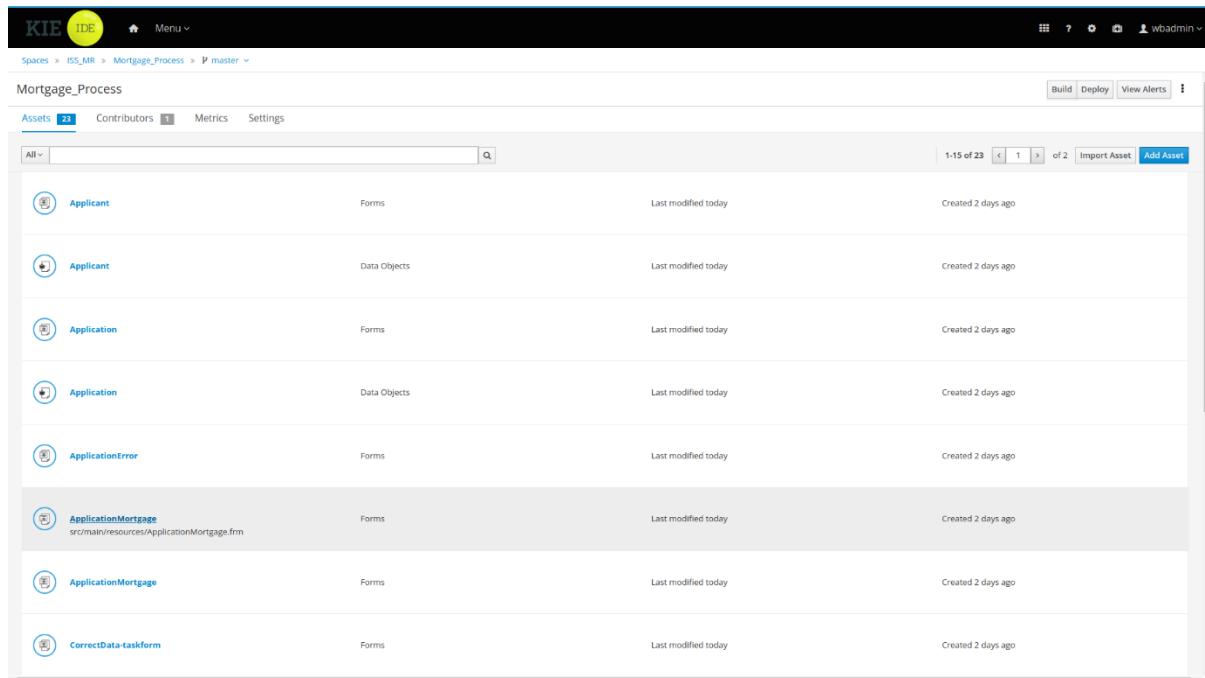


7) **Save** the changes;



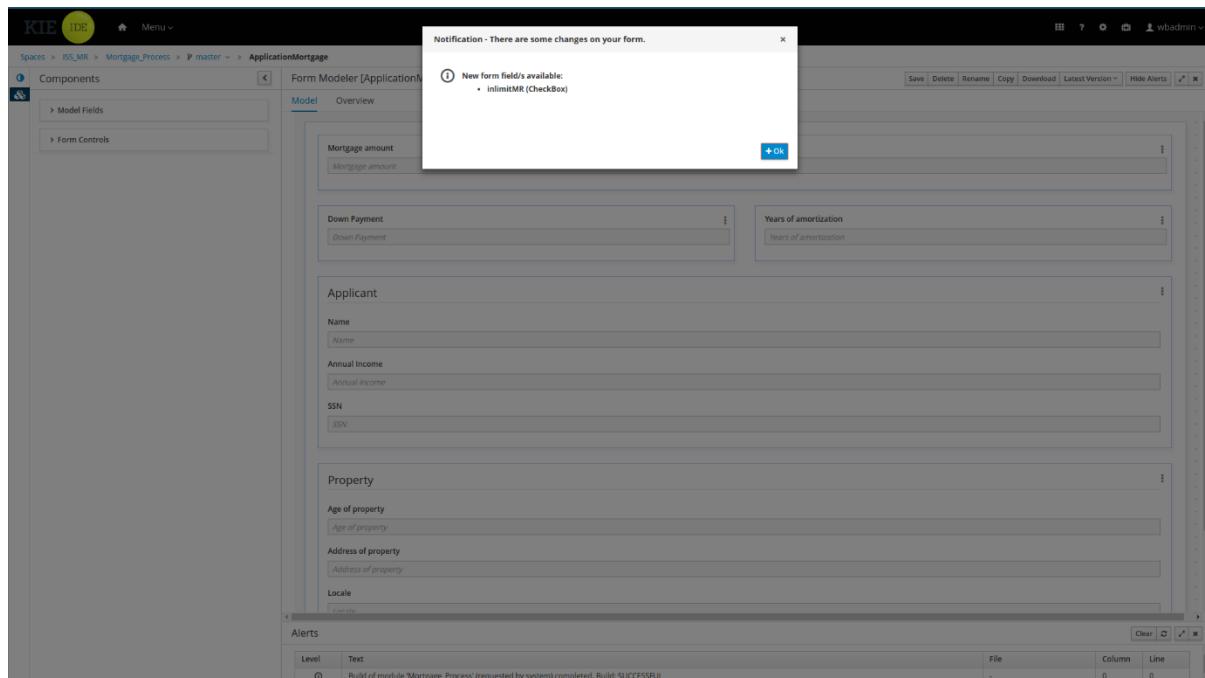
2.2.3. Business system enhancement [Forms]

- From Assets list view, click to edit **Forms: ApplicationMortgage.frm**
 src/main/resource/ApplicationMortgage.frm



The screenshot shows the KIE IDE Assets list view for the Mortgage_Process module. The list includes the following items:

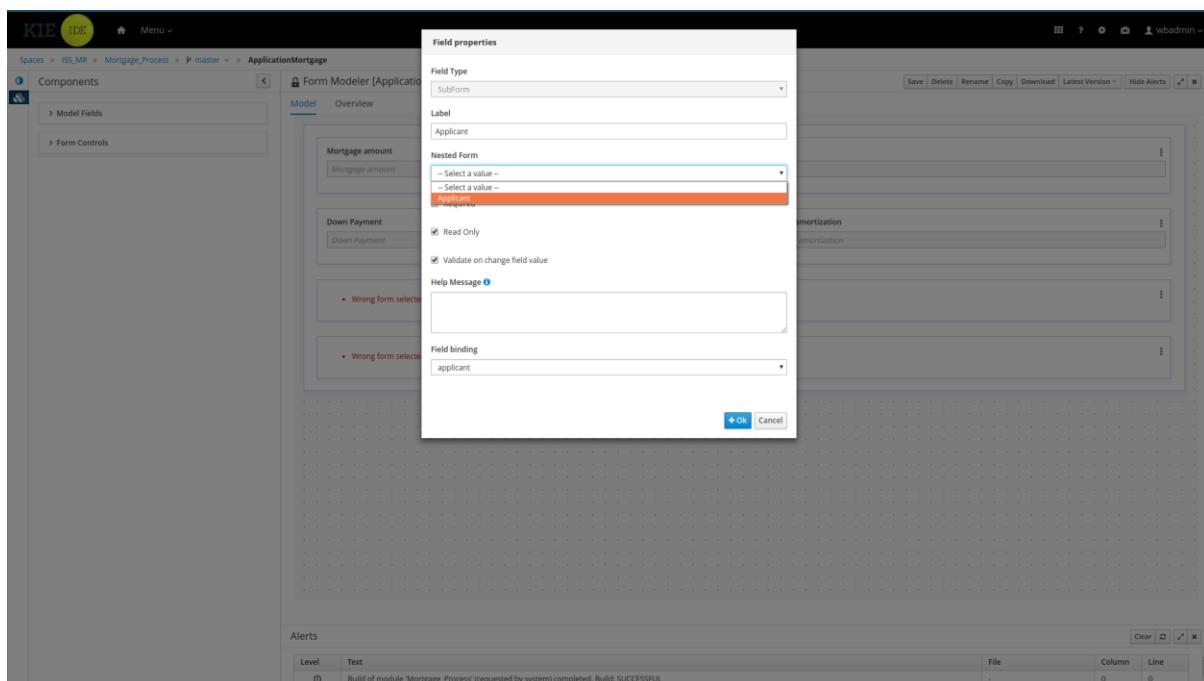
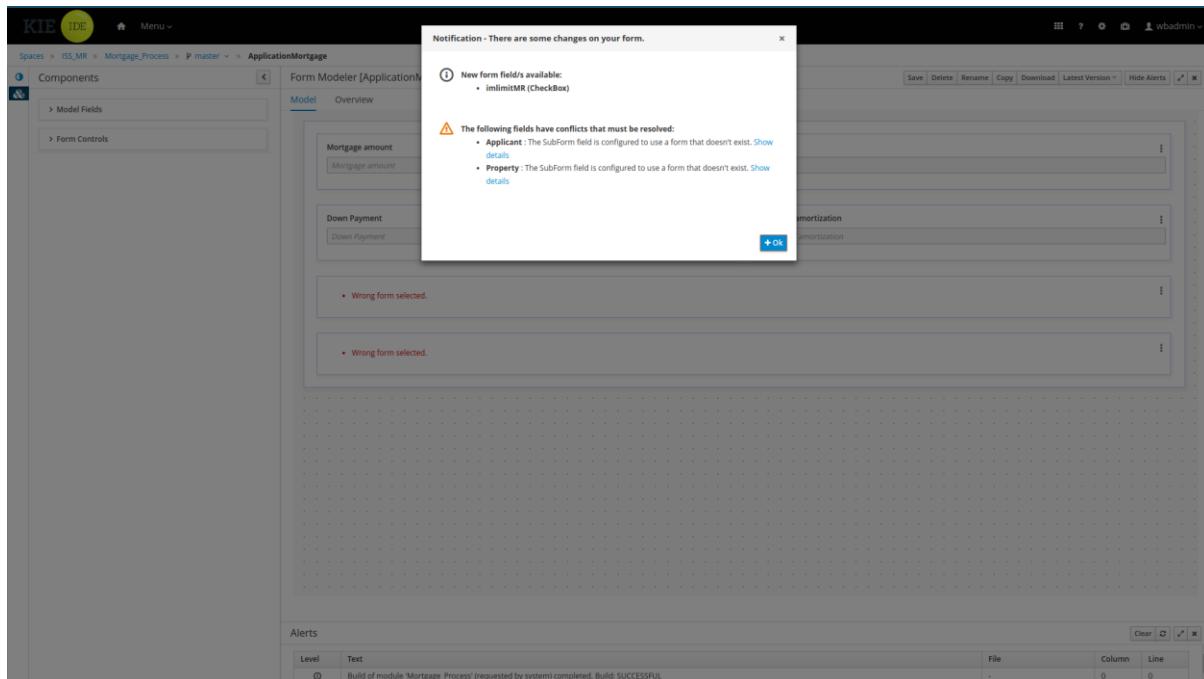
- Applicant (Forms, Last modified today, Created 2 days ago)
- Applicant (Data Objects, Last modified today, Created 2 days ago)
- Application (Forms, Last modified today, Created 2 days ago)
- Application (Data Objects, Last modified today, Created 2 days ago)
- ApplicationError (Forms, Last modified today, Created 2 days ago)
- ApplicationMortgage (Forms, Last modified today, Created 2 days ago)
- CorrectData-taskform (Forms, Last modified today, Created 2 days ago)



The screenshot shows the KIE IDE Form Modeler for the ApplicationMortgage form. A notification dialog box is open, stating: "Notification - There are some changes on your form." It lists a new form field available: "inlimitMR (CheckBox)". The dialog has an "Ok" button.

{ Tips } If the new form field **InlimitMR** is not automatically shown, try to log out **wbadmin** and log in again to refresh.

- 2) { Optional } The system may send warning, regarding embedded sub-forms not found, in this case, update the sub-forms: **Applicant** and **Property**,



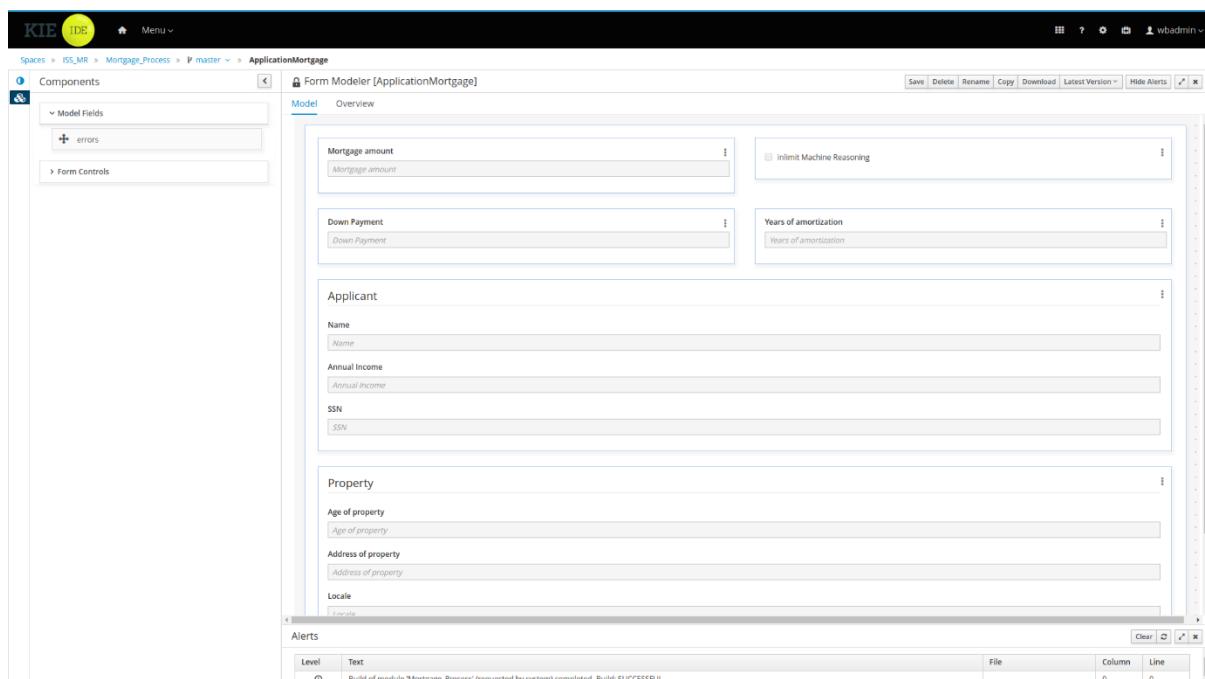
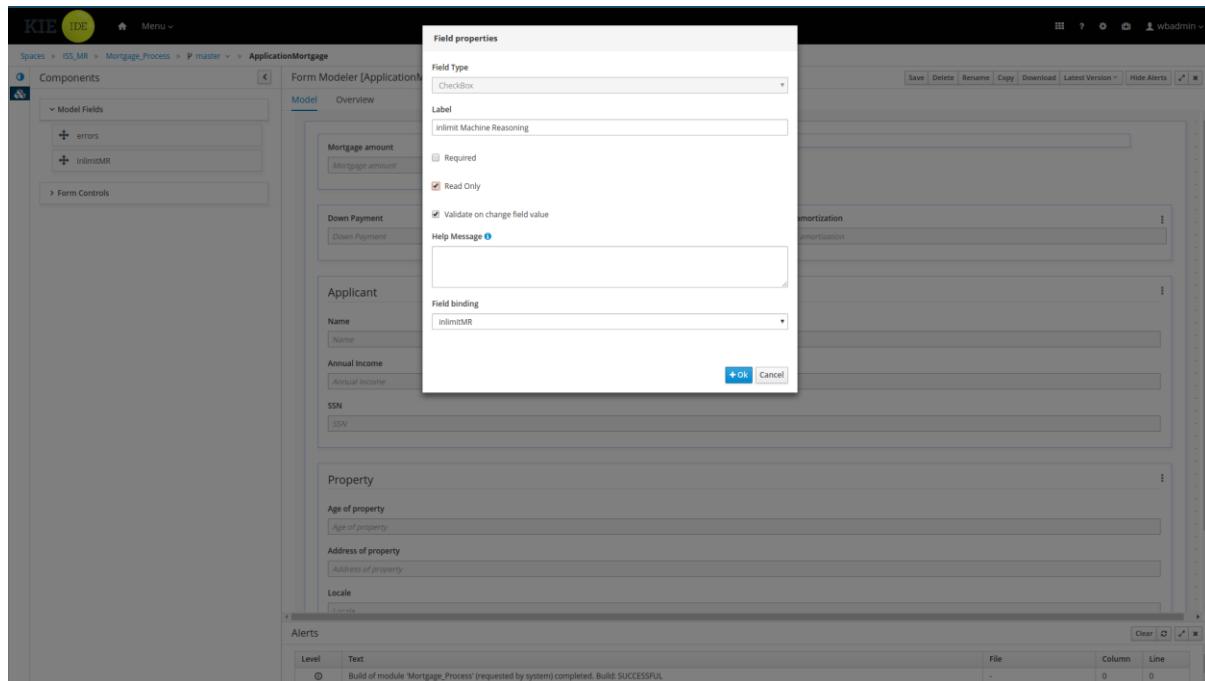
The screenshot shows the KIE IDE interface with the 'Form Modeler [ApplicationMortgage]' selected. A 'Field properties' dialog box is open over the main form editor. The 'Field Type' dropdown is set to 'SubForm'. The 'Label' field contains 'Property'. The 'Nested Form' dropdown is expanded, showing three options: '- Select a value -', '- Select a value -', and 'Property'. The 'Property' option is highlighted with a red background. Other visible settings include 'Read Only' checked, 'Validate on change field value' checked, and a 'Help Message' input field. The main form editor shows sections for 'Mortgage amount', 'Down Payment', 'Applicant' (with fields for Name, Annual Income, and SSN), and 'Property' (with fields for Age of property, Address of property, and Locale). An alert at the bottom left says 'Wrong form selected.' The top right of the screen shows the user 'wbadmin'.

This screenshot shows the KIE IDE interface with the 'Form Modeler [ApplicationMortgage]' selected. The main form editor displays the 'ApplicationMortgage' form with the following fields and sections:

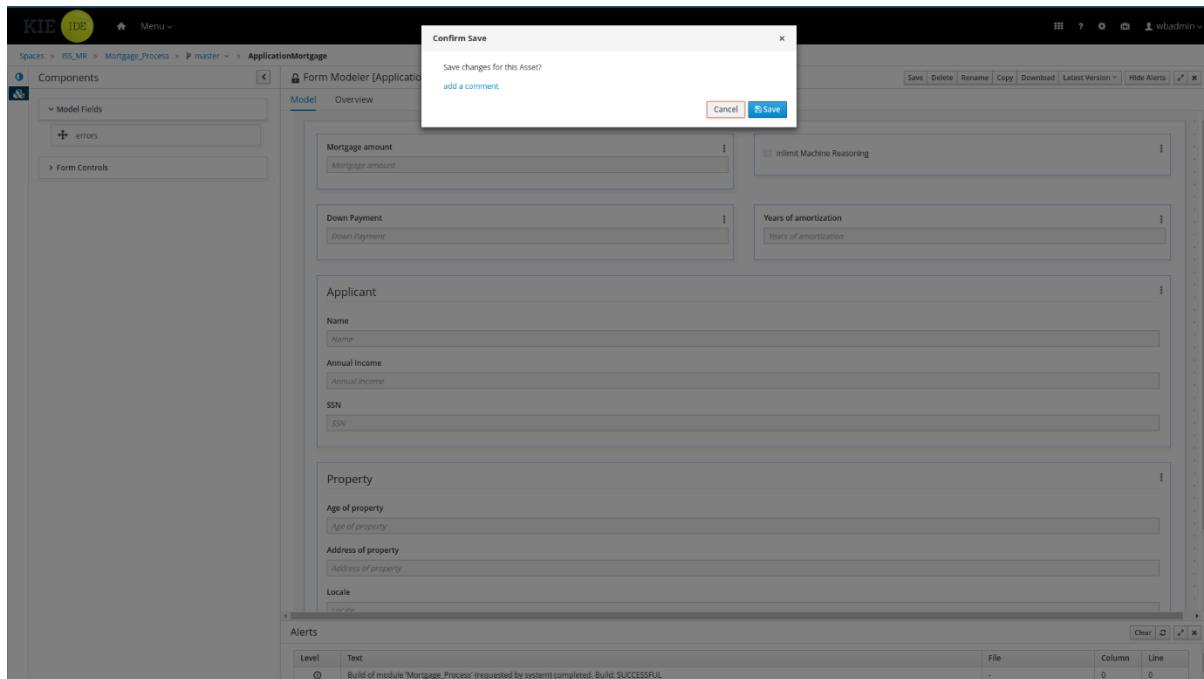
- Mortgage amount:** Mortgage amount
- Down Payment:** Down Payment
- Years of amortization:** Years of amortization
- Applicant:**
 - Name
 - Annual Income
 - SSN
- Property:**
 - Age of property
 - Address of property
 - Locale

An alert at the bottom left says 'Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.' The top right of the screen shows the user 'wbadmin'.

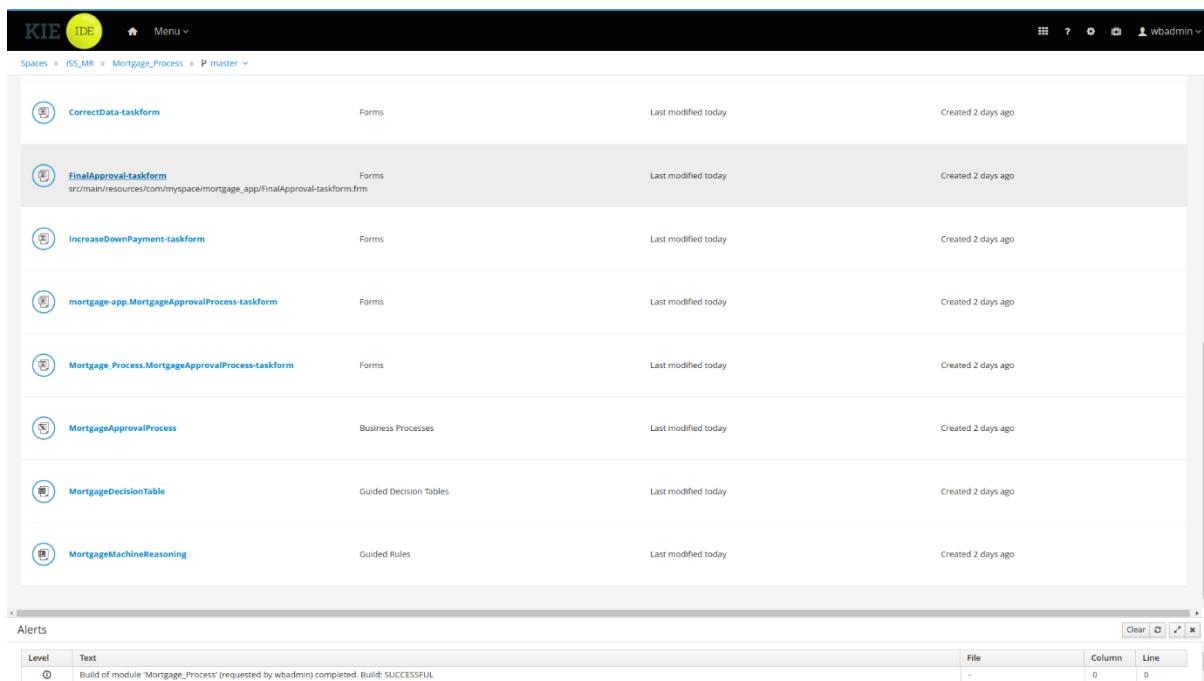
- 3) Add new field **InlimitMR** from left panel: **Model Fields** to actual form; Drag it next to **Mortgage amount** field;



4) **Save** the form changes;



5) Open form: ***FinalApproval-taskform***; Ensure the '**Inlimit Machine Reasoning**' checkbox is visible;



KIE IDE

Project Explorer

Form Modeler [FinalApproval-taskform]

Model Overview

Inputs:

Application

Mortgage amount

Down Payment

Years of amortization

Applicant

Name

Annual Income

SSN

Property

Age of property

Address of property

Alerts

Level	Text	File	Column	Line
Info	if module 'Mortgage_Process' (requested by wbadmin) completed. Build: SUCCESSFUL.	-	0	0

2.2.4. Business system enhancement [Guided Rules]

- 1) Click blue button **Add Asset**; Select Guided Rule (Decision Automation);

KIE IDE

Mortgage_Process

Assets Contributors Metrics Settings

	Applicant	Forms	Last modified today Created 2 days ago
	Applicant	Data Objects	Last modified today Created 2 days ago
	Application	Forms	Last modified today Created 2 days ago
	Application	Data Objects	Last modified today Created 2 days ago
	ApplicationError	Forms	Last modified today Created 2 days ago
	ApplicationMortgage	Forms	Last modified today Created 2 days ago
	ApplicationMortgage	Forms	Last modified today Created 2 days ago
	CorrectData-taskform	Forms	Last modified today Created 2 days ago

Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL	-	0	0

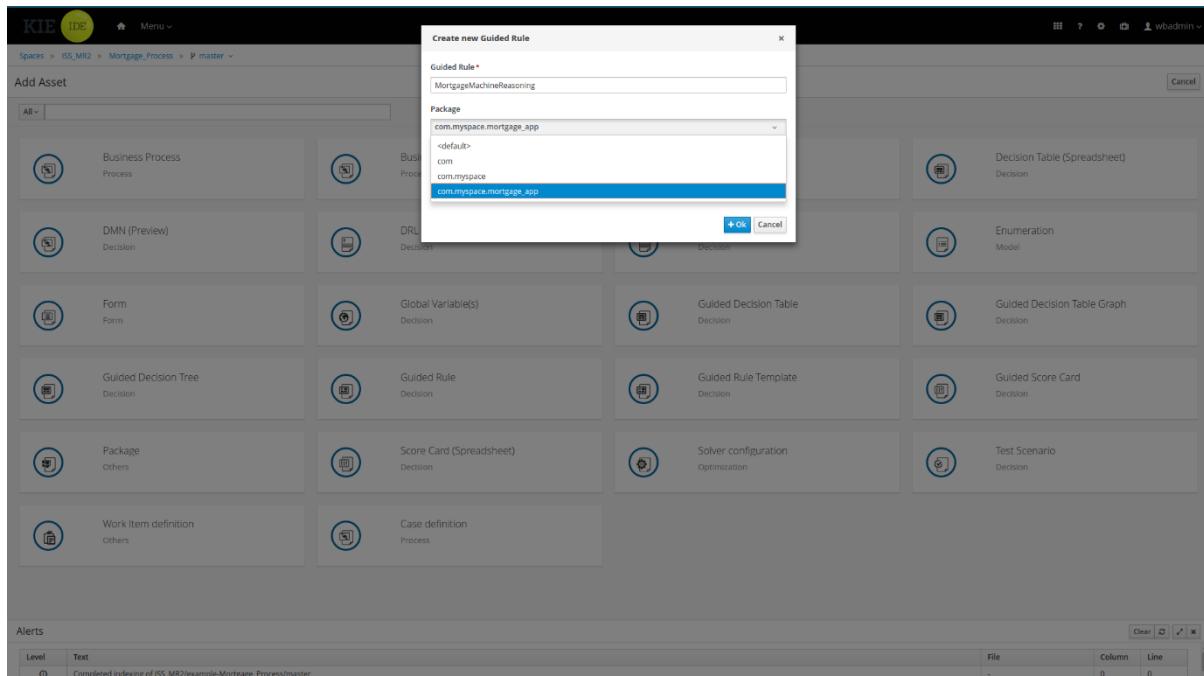
Add Asset

Business Process Process	Business Process (legacy) Process	Data Object Model	Decision Table (Spreadsheet) Decision
DMN (Preview) Decision	DRL file Decision	DSL definition Decision	Enumeration Model
Form Form	Global Variable(s) Decision	Guided Decision Table Decision	Guided Decision Table Graph Decision
Guided Decision Tree Decision	Guided Rule Decision	Guided Rule Template Decision	Guided Score Card Decision
Package Others	Score Card (Spreadsheet) Decision	Solver configuration Optimization	Test Scenario Decision
Work Item definition Others	Case definition Process		

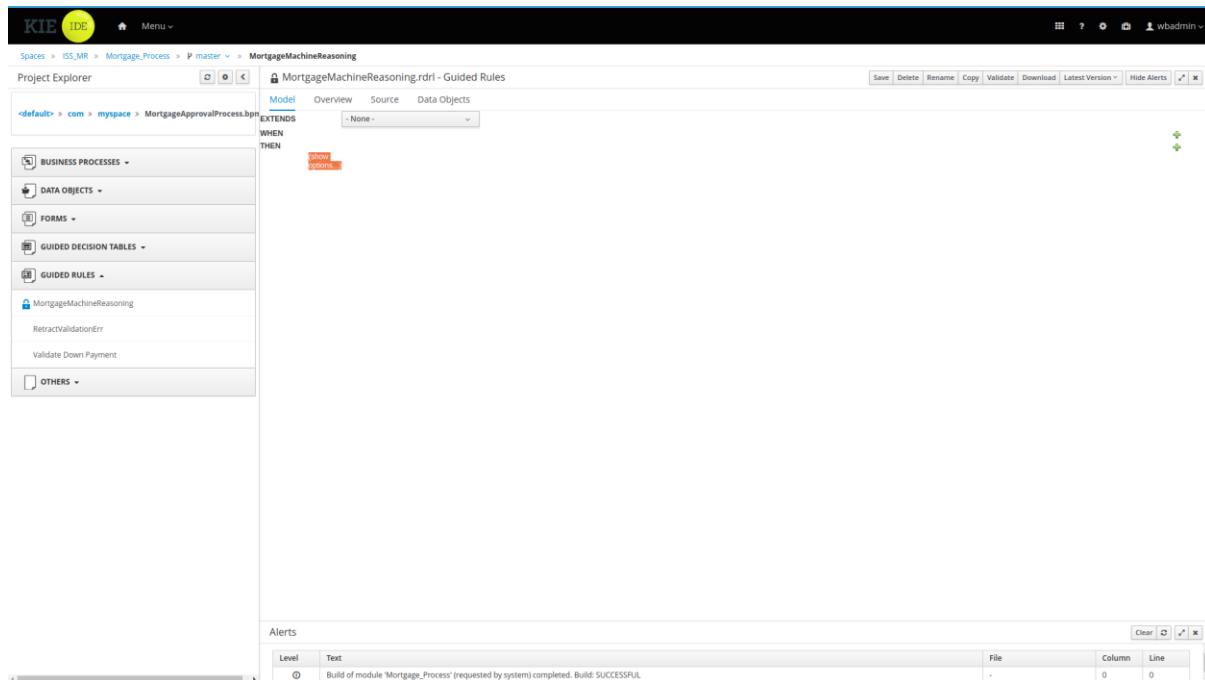
Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL	-	0	0

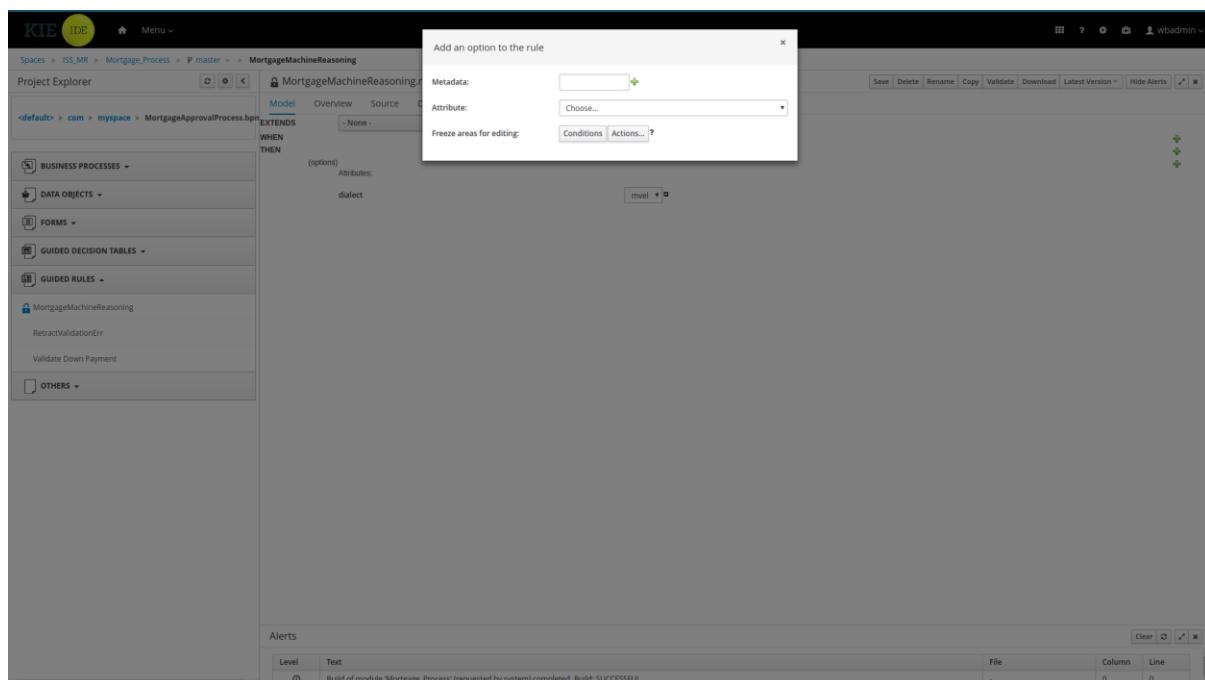
- 2) Fill in rule (file) name: **MortgageMachineReasoning**; Select Package: **com.myspace.mortgage_app**



3) Click (**show options...**); Then click the lowest 3rd button: 

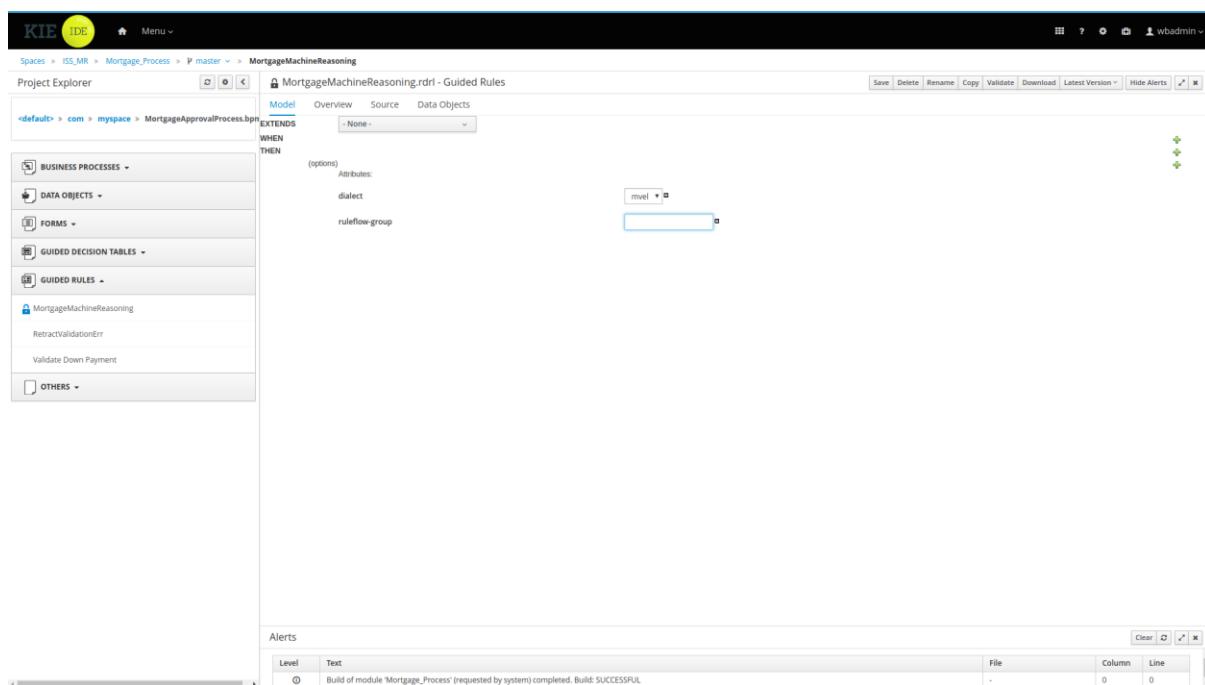
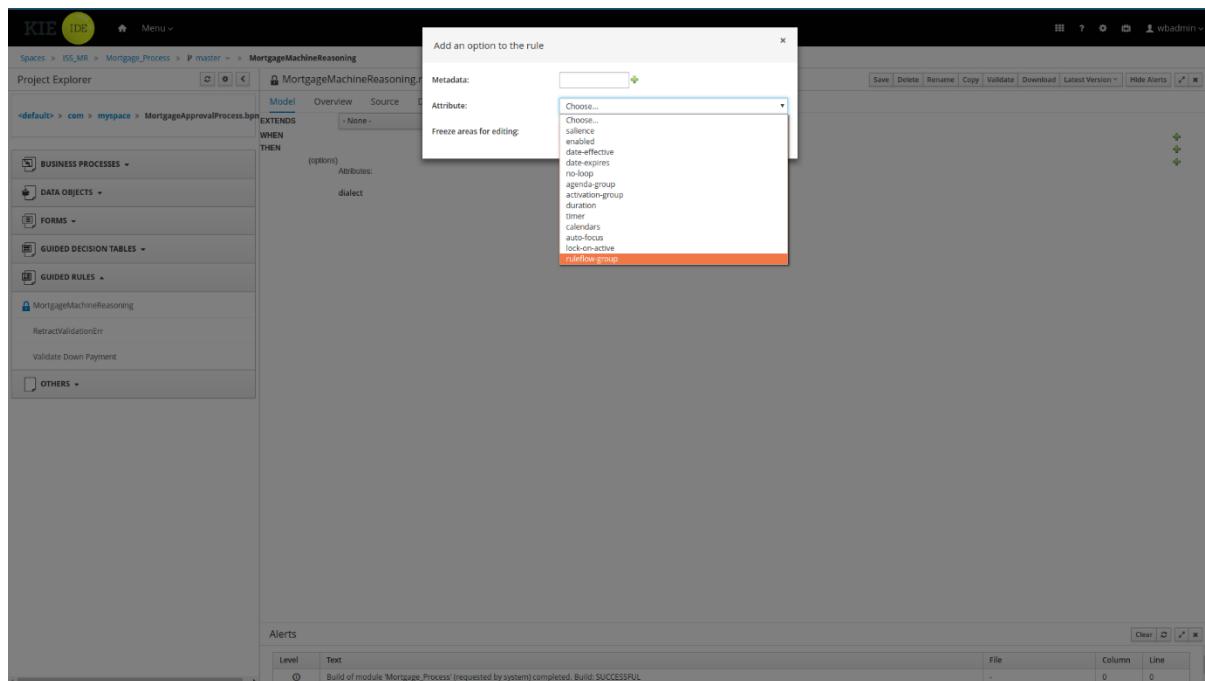


The screenshot shows the KIE IDE interface for managing guided rules. The main window displays the 'MortgageMachineReasoning.rdrl - Guided Rules' model. The 'Model' tab is active. A context menu is open over the 'WHEN THEN' section, with the 'show options...' option highlighted. The 'Alerts' panel at the bottom right shows a successful build message: 'Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.' with file, column, and line details.



The screenshot shows the 'Add an option to the rule' dialog box. The 'Attributes' tab is selected. The 'Metadata' field is empty, and the 'Attribute' dropdown is set to 'Choose...'. The 'Freeze areas for editing:' section contains 'Conditions' and 'Actions...' buttons. The background shows the same 'MortgageMachineReasoning.rdrl' model as the previous screenshot.

4) Choose ruleflow-group



{ Quiz } What value should be filled in the **ruleflow-group** field?

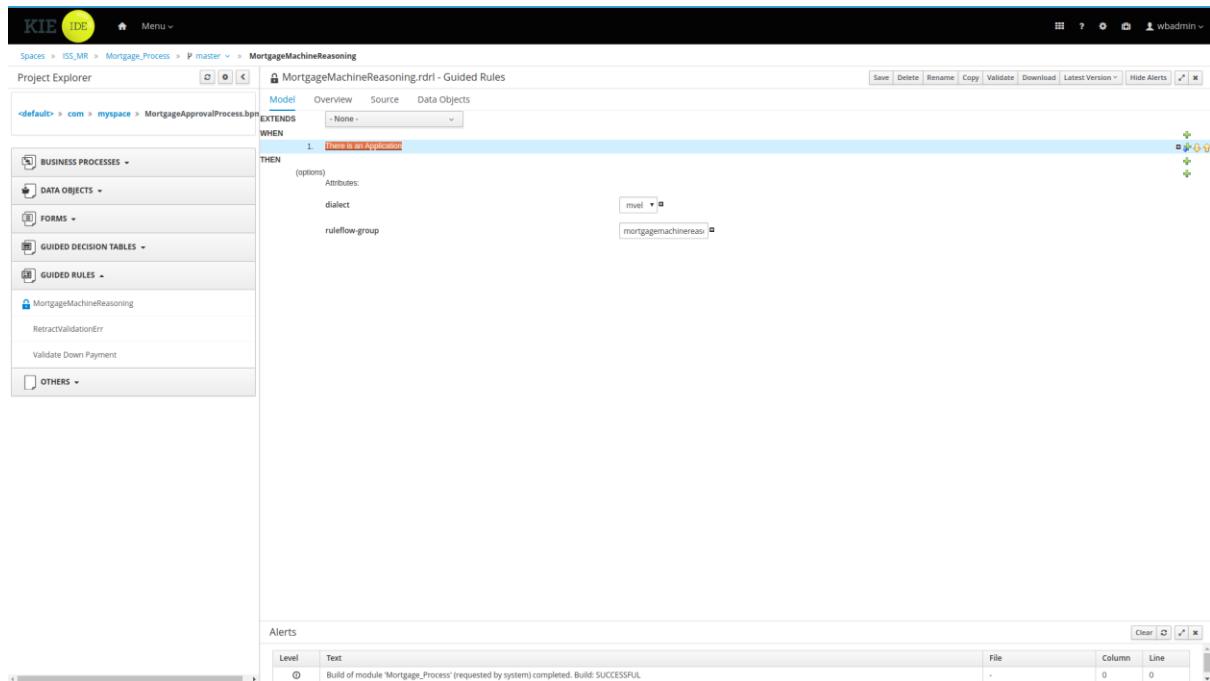
- 5) Key in the **Rule Flow Group** name we defined earlier at **Business Process [Business Rule Task: Mortgage Machine Reasoning Qualify]**; The name is **mortgagemachineReasoning**

The screenshot shows the KIE IDE interface for managing guided rules. The left sidebar lists various project components like Business Processes, Data Objects, and Guided Rules. The main area displays the 'MortgageMachineReasoning.rdrl - Guided Rules' model. In the 'Model' tab, under the 'WHEN THEN' section, there is a 'ruleflow-group' field where the value 'mortgagemachineReasoning' is entered. The bottom right corner of the interface shows the user 'wbadmin'.

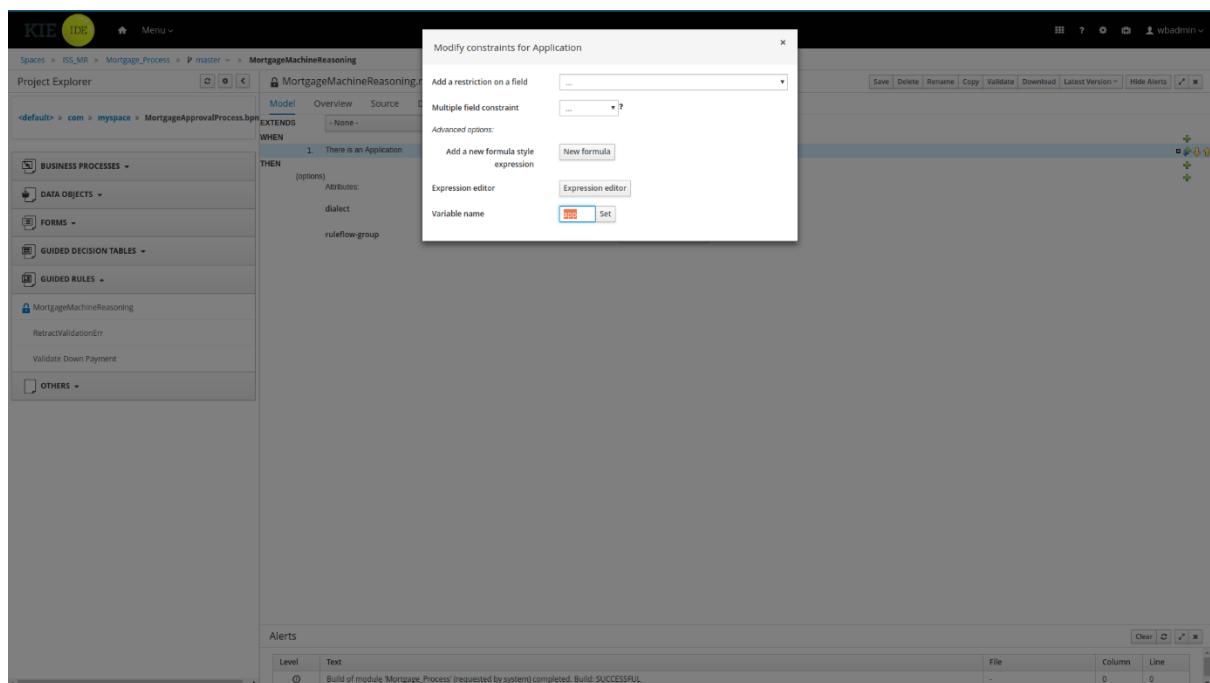
- 6) Click the highest 1st button: +

This screenshot shows the 'Add a condition to the rule...' dialog box overlaid on the KIE IDE. The dialog has a 'Position' dropdown set to 'Bottom'. The 'Condition' text area contains the partially typed text 'Applicant...'. At the bottom of the dialog are 'OK' and 'Cancel' buttons. The background of the IDE shows the same guided rules interface as the previous screenshot, with the user 'wbadmin' visible in the bottom right.

7) Click 'There is an Application'



8) Update Variable name: *app*; Click button Set;



The screenshot shows the KIE IDE interface with the 'MortgageMachineReasoning.rdrl - Guided Rules' editor open. A rule is defined:

```

WHEN
  1. There is an Application [app]
THEN
  (options)
    Attributes:
      dialect: mvel
      ruleflow-group: mortgagemachinereasoning
  
```

The 'mortgageamount' field is highlighted in orange, indicating it is selected or being edited.

- 9) Click click 'There is an Application'; From drop down “Add a restriction on a field”, select ***mortgageamount***,

The screenshot shows the 'Modify constraints for Application' dialog box. The 'mortgageamount' field is selected in the dropdown menu under 'Add a restriction on a field'.

The screenshot shows the KIE IDE interface with the project 'MortgageMachineReasoning' selected. In the center, the 'Guided Rules' editor is open, showing a rule definition. The 'WHEN' clause is defined as 'There is an Application [app] with: mortgageamount -- please choose --'. The 'THEN' clause includes attributes 'mvrl' and 'ruleflow-group' with the value 'mortagagemachinereason'. At the bottom right, the 'Alerts' panel displays a message: 'Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.'

{ Tips } The purpose of this new rule: Is mortgage application in limit?

WHEN ***Mortgage amount >= Property Sale Price – Down Payment***
 THEN Set ***InLimitMR*** to 'TRUE'

10) Update rule's WHEN part:

The screenshot shows the 'WHEN' condition expanded, revealing a dropdown menu with various comparison operators. The 'greater than or equal to' option is highlighted. The 'Alerts' panel at the bottom right shows a successful build message: 'Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.'

The screenshot shows the KIE IDE interface for editing a guided rule. The left sidebar lists project components like Business Processes, Data Objects, Forms, Guided Decision Tables, and Guided Rules. The main area displays the 'MortgageMachineReasoning.rdrl - Guided Rules' model. A rule is being edited with the following structure:

```

WHEN
  1. There is an Application [app] with:
     mortgageamount greater than or equal to
THEN
  (options)
  Attributes:
  dialect: mvrl
  ruleflow-group: mortgagemachineeasy
  
```

The 'THEN' section includes dropdowns for 'Attributes', 'dialect' set to 'mvrl', and 'ruleflow-group' set to 'mortgagemachineeasy'. Below the editor is an 'Alerts' panel showing a successful build message.

This screenshot shows the 'Field value' dialog box from the KIE IDE. The 'Advanced options' section is expanded, revealing a dropdown menu with three items: 'A formula' (highlighted with a red box), 'New formula', and 'Expression editor' (also highlighted with a red box). The 'Expression editor' option is currently selected. The background shows the same guided rule editor as the previous screenshot.

The screenshot shows the KIE IDE interface for editing guided rules. The main workspace displays a rule definition:

```

    WHEN
      1. There is an Application [app] with:
          mortgageamount greater than or equal to app.property.saleprice - app.downpayment
    THEN
      (options)
        Attributes:
        dialect: mvrl
        ruleflow-group: mortgagemachine reason
  
```

The Project Explorer on the left lists various project components like Business Processes, Data Objects, Forms, Guided Decision Tables, and Guided Rules. The Guided Rules section contains the MortgageMachineReasoning rule.

The Alerts panel at the bottom shows a single successful build message:

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.	-	0	0

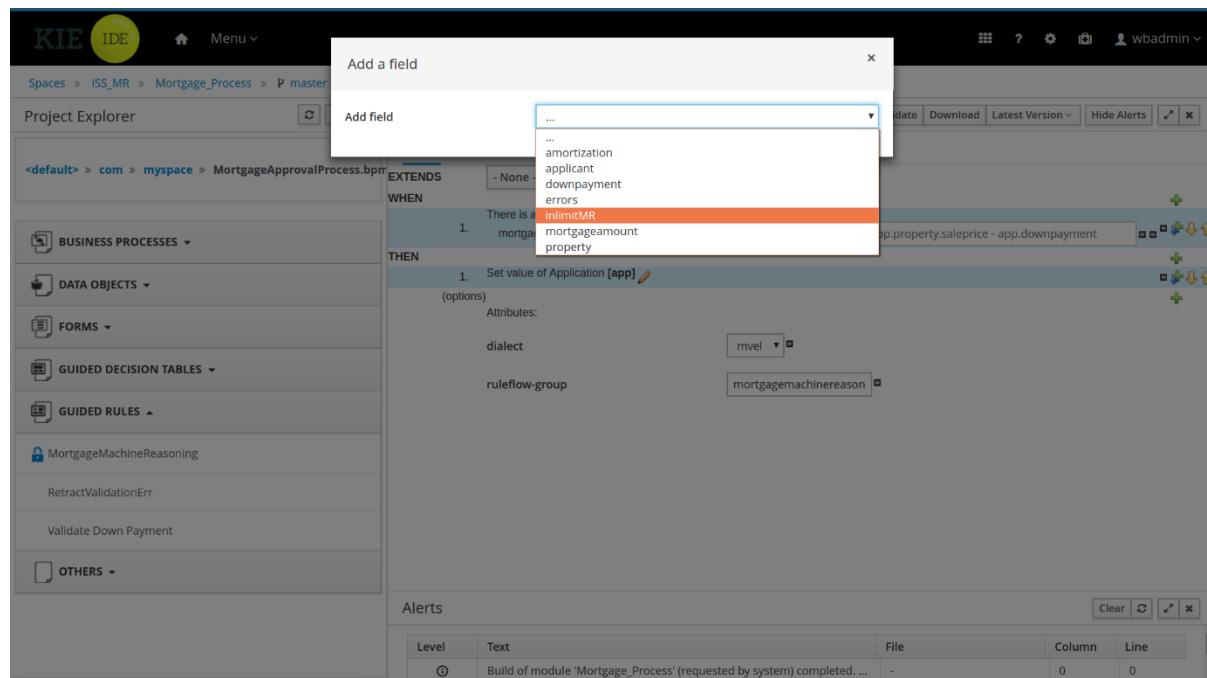
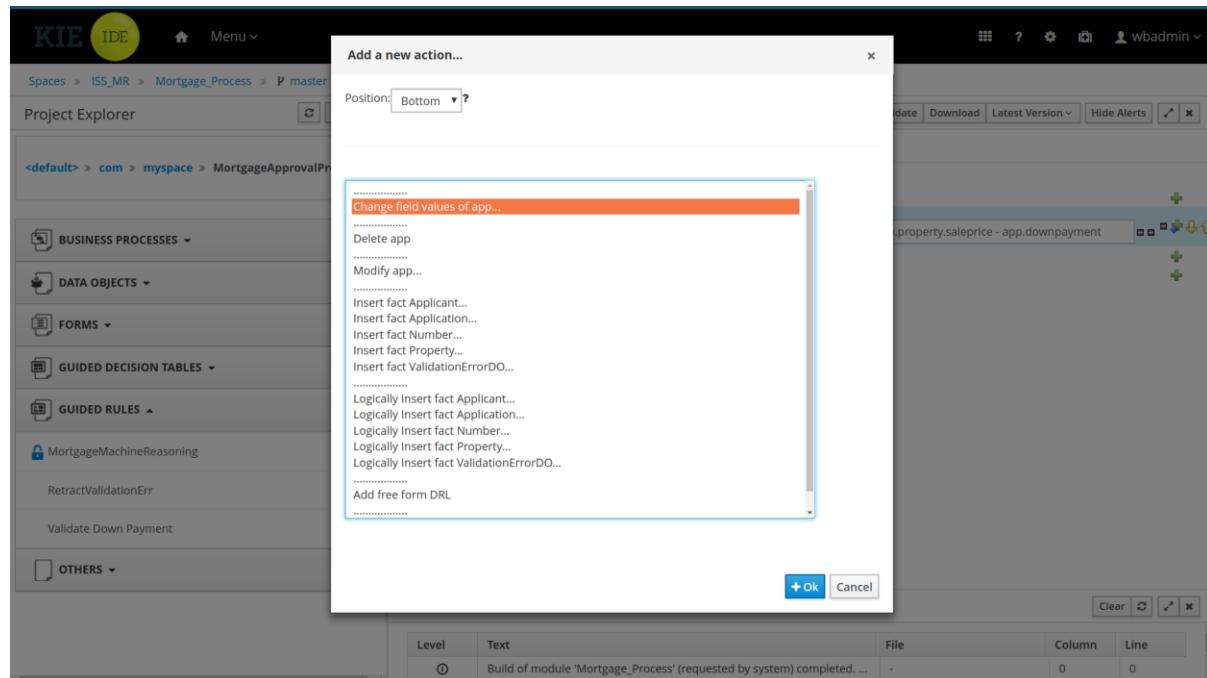
This screenshot is nearly identical to the one above, showing the same guided rule definition and interface elements. The rule definition is:

```

    WHEN
      1. There is an Application [app] with:
          mortgageamount greater than or equal to app.property.saleprice - app.downpayment
    THEN
      (options)
        Attributes:
        dialect: mvrl
        ruleflow-group: mortgagemachine reason
  
```

The Project Explorer and Alerts panel are also identical, displaying the same list of project components and the successful build message.

11) Update rule's THEN part: Click the middle button: 



Project Explorer

Model Overview Source Data Objects

EXTENDS - None -

WHEN

1. There is an Application [app] with:
mortgageamount greater than or equal to app.property.saleprice - app.downpayment

THEN

1. Set value of Application [app] **inlimitMR**

(options)

Attributes:

dialect mvel

ruleflow-group mortgagemachine reason

Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed.	-	0	0

Field value

Literal value

Advanced

Formula

Set value of Application [app]

(options)

Attributes:

dialect mvel

ruleflow-group mortgagemachine reason

Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed.	-	0	0

The screenshot shows the KIE IDE interface with the following details:

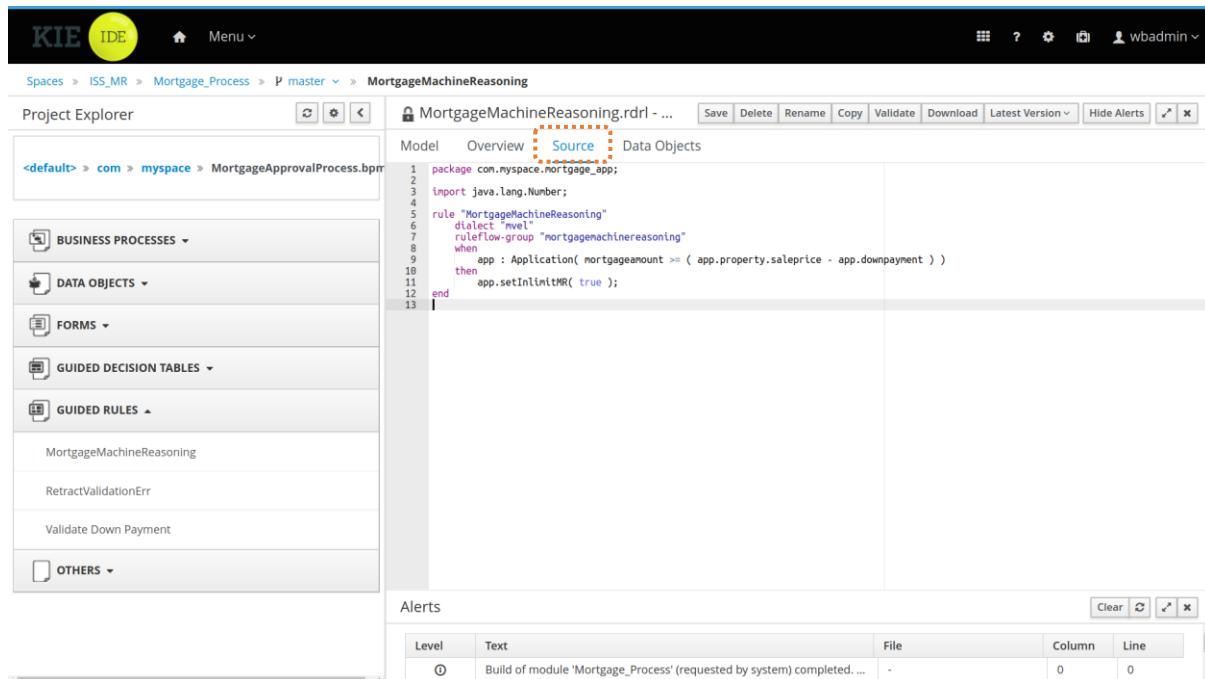
- Project Explorer:** Shows the file structure: <default> > com > myspace > MortgageApprovalProcess.bpmn.
- Model Tab:** Active tab, showing the rule definition.
- Rule Definition:**
 - WHEN:** There is an Application [app] with:
 - 1. mortgageamount greater than or equal to app.property.saleprice - app.downpayment
 - THEN:** Set value of Application [app] iniflmtMR to true (selected option).
 - Attributes: dialect mvel, ruleflow-group mortgagemachine reason
- Alerts:** A table showing one alert: "Build of module 'Mortgage_Process' (requested by system) completed."

12) Save the rule;

The screenshot shows the KIE IDE interface with a 'Confirm Save' dialog box overlaid:

- Confirm Save Dialog:** Asks "Save changes for this Asset?" with 'Cancel' and 'Save' buttons.
- Background:** Shows the same rule editor interface as the previous screenshot, with the rule definition visible.

13){ Optional } The rule in its original source code form can be found at tab:
[Source](#)



The screenshot shows the KIE IDE interface with the following details:

- Project Explorer:** Shows a tree structure with nodes like <default>, com, myspace, MortgageApprovalProcess.bpmn, BUSINESS PROCESSES, DATA OBJECTS, FORMS, GUIDED DECISION TABLES, GUIDED RULES, and OTHERS.
- MortgageMachineReasoning.rdrl - ...**: The current file is displayed in the main editor area.
- Source Tab:** The tab is highlighted with a red dashed box. The code content is as follows:

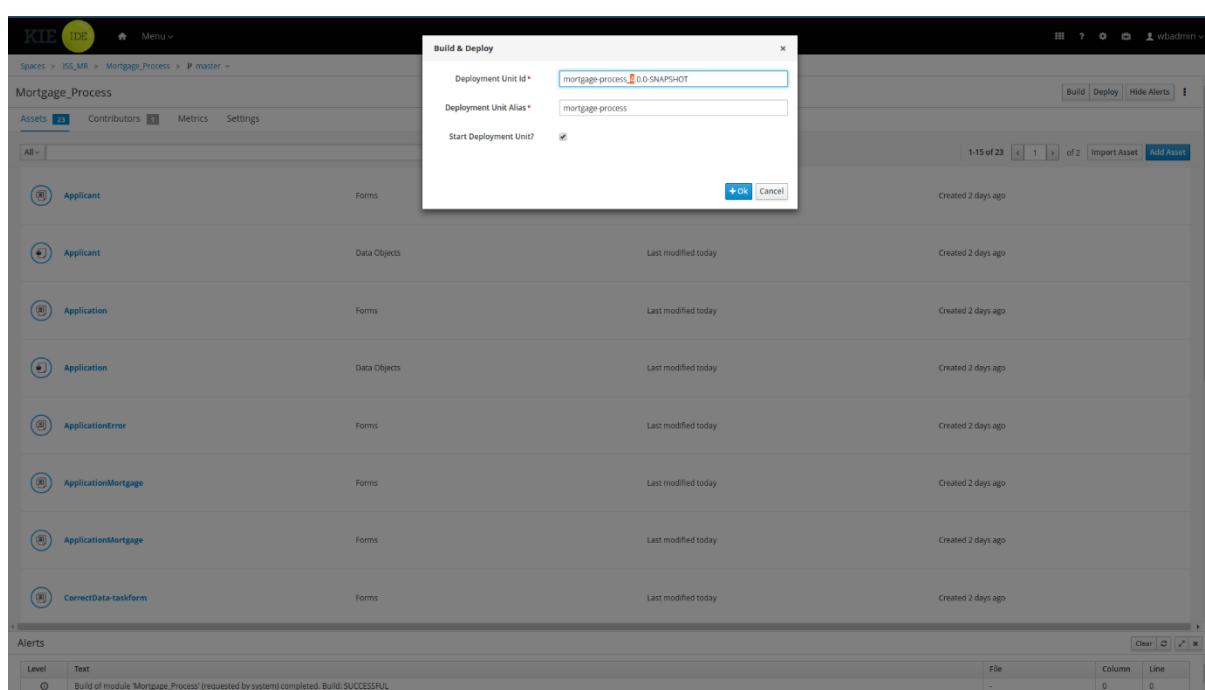
```
1 package com.myspace.mortgage_app;
2
3 import java.lang.Number;
4
5 rule "MortgageMachineReasoning"
6 dialect "mvel"
7 ruleFlow-group "mortgagemachineReasoning"
8 when
9     app : Application( mortgageamount >= ( app.property.saleprice - app.downpayment ) )
10 then
11     app.setInLimitMR( true );
12 end
13 |
```

- Alerts:** A table showing one alert: "Build of module 'Mortgage_Process' (requested by system) completed."

2.2.5. Business system enhancement [Deploy] v4.0.0

{ Objective } Deploy enhanced mortgage application: Start a new mortgage application, fill in application form to trigger business process and **InLimitMR** decision automation.

- 1) Deploy enhanced system onto KIE web server: **mortgage-process_4.0.0-SNAPSHOT**



The screenshot shows the KIE IDE interface. On the left, the 'SERVER CONFIGURATIONS' sidebar is open, showing a tree structure with 'sample-server' selected. Under 'DEPLOYMENT UNITS', 'mortgage-process_4.0.0-SNAPSHOT' is also selected. The main panel displays the deployment status for 'sample-server@localhost:8080'. It shows a green checkmark icon and the URL http://localhost:8080/kie-server/services/rest/server/containers/mortgage-process_4.0.0-SNAPSHOT. Below the URL, it says 'v1.0.0-SNAPSHOT'.

- 2) Select the mortgage system with intended version, e.g., ***mortgage-process_4.0.0-SNAPSHOT***, then click: **Start**

The screenshot shows the 'Manage Process Definitions' page. A context menu is open over the first row of the table, with 'Start' highlighted. The table lists four entries for 'MortgageApprovalProcess' at different versions (1.0, 1.0, 1.0, 1.0) and their corresponding deployment units ('mortgage-process_4.0.0-SNAPSHOT', 'mortgage-process_1.0.0-SNAPSHOT', 'mortgage-process_2.0.0-SNAPSHOT', 'mortgage-process_3.0.0-SNAPSHOT').

Name	Version	Deployment
MortgageApprovalProcess	1.0	mortgage-process_4.0.0-SNAPSHOT
MortgageApprovalProcess	1.0	mortgage-process_1.0.0-SNAPSHOT
MortgageApprovalProcess	1.0	mortgage-process_2.0.0-SNAPSHOT
MortgageApprovalProcess	1.0	mortgage-process_3.0.0-SNAPSHOT

3) Fill in the mortgage form as shown below; Then click blue button: **Submit**

KIE IDE

MortgageApprovalProcess

Application

Down Payment: 50000 | Years of amortization: 20

Applicant

Name: Sam GU
Annual Income: 123456
SSN: SSN

Property

Age of property: 3
Address of property: 25 HMT, Singapore
Locale: Urban
Sale Price: 250000

Submit

KIE IDE

Home > Manage Process Definitions > Process Instance: 5

5 - MortgageApprovalProcess

Instance Details Process Variables Documents Logs Diagram

Definition Id: Mortgage_Process.MortgageApprovalProcess

Instance State: Active

Deployment: mortgage-process_4.0.0-SNAPSHOT

Definition Version: 1.0

SLA Compliance: N/A

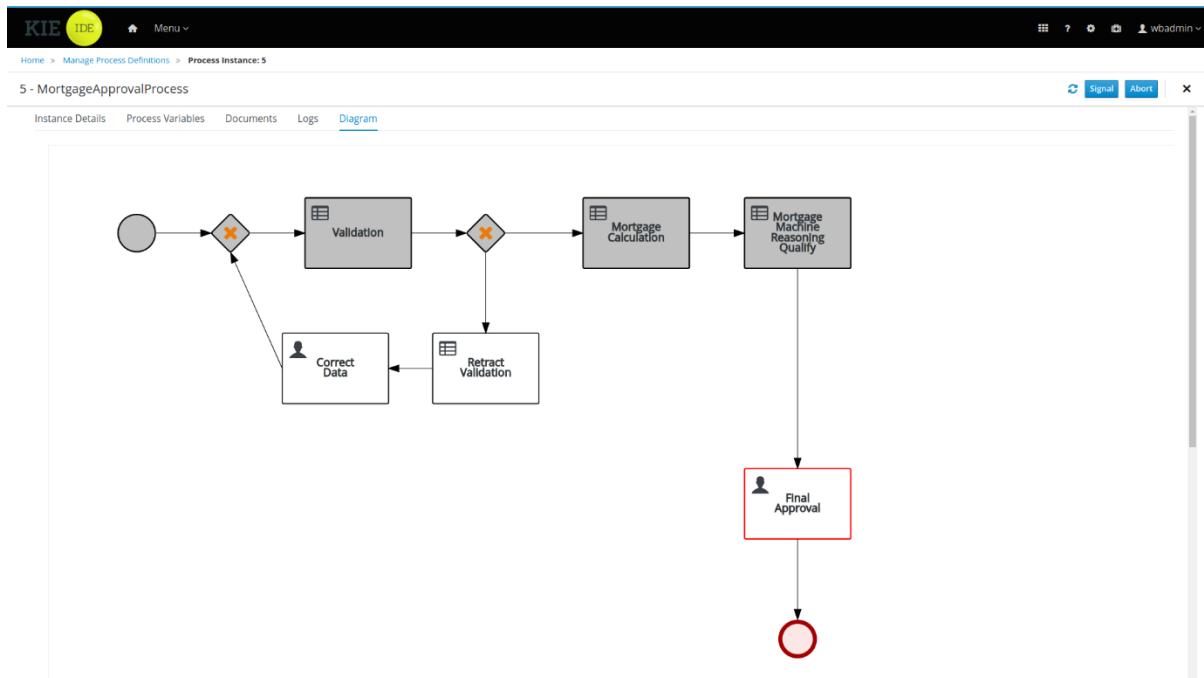
Correlation key: 5

Parent Process Instance: No Parent Process Instance

Active user tasks: Final Approval (Ready) owner: ---

Current Activities: Thu Feb 21 20:24:37 SGT 2019: 6 - Final Approval (HumanTaskNode)

Signal Abort



- 4) To review (pending user task: ***Final Approval***) the mortgage application, click: **Menu → Task Inbox**

The screenshot shows the KIE Task Inbox interface. On the left, there is a sidebar with 'Filters' expanded, showing various status options like Completed, Created, Error, etc., with 'InProgress' and 'Ready' checked. Below the filters are sections for 'Filter By' (Id), 'Process Definition Id' (Select), and 'Created On' (date input). The main area is titled 'Task Inbox' and displays a table with one row. The row contains the task name 'Final Approval', the process definition id 'Mortgage_Process.MortgageApprovalProc...', the status 'Ready', and the creation date '21-Feb-2019 20:24:37'. There are also 'Actions' and pagination controls.

The screenshot shows the KIE Task details page for the '8 - Final Approval' task. The top navigation bar includes 'Home', 'Task Inbox', and 'Task: 8'. The main content area has tabs for 'Work' (which is selected), 'Details', 'Assignments', 'Comments', 'Admin', and 'Logs'. The 'Work' tab shows several input fields grouped by category: 'Application' (Mortgage amount: 200000, Down Payment: 50000), 'Applicant' (Name: Sam GU, Annual Income: 23456, SSN: 0), and 'Property' (Age of property: 3, Address of property: 25 IMM, Singapore, Locale: Urban, Sale Price: 250000). A note 'Inlimit Machine Reasoning' is highlighted with a red dotted box. At the bottom of the form is a 'Claim' button.

- 5) Start a new mortgage application with a lower **Down Payment** of **\$40,000**,
What's the result of **InLimitMR** ?

MortgageApprovalProcess

Application

Down Payment	Years of amortization
40000	20

Applicant

Name	Sam GU
Annual Income	123456
SSN	SSN

Property

Age of property	3
Address of property	25 HMKT, Singapore
Locale	Urban
Sale Price	250000

Submit

9 - Final Approval

Inputs:

Application

Mortgage amount	<input type="checkbox"/> InLimit Machine Reasoning
200000	
Down Payment	Years of amortization
40000	20

Applicant

Name	Sam GU
Annual Income	123456
SSN	0

Property

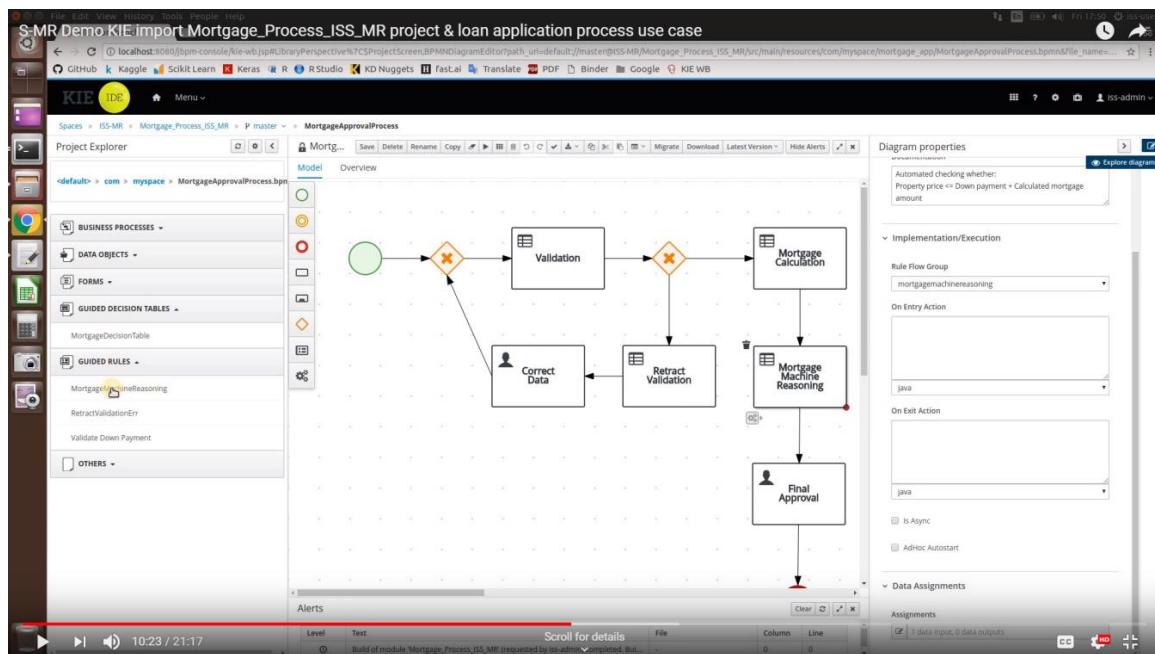
Age of property	3
Address of property	25 HMKT, Singapore
Locale	Urban
Sale Price	250000

InLimit

Claim

{ Quiz } Check whether: $\$200,000 \geq \$250,000 - \$40,000$?

Did the decision automation correctly set the value for **InLimitMR** ?



Reference https://www.youtube.com/watch?v=s_8rct45b84

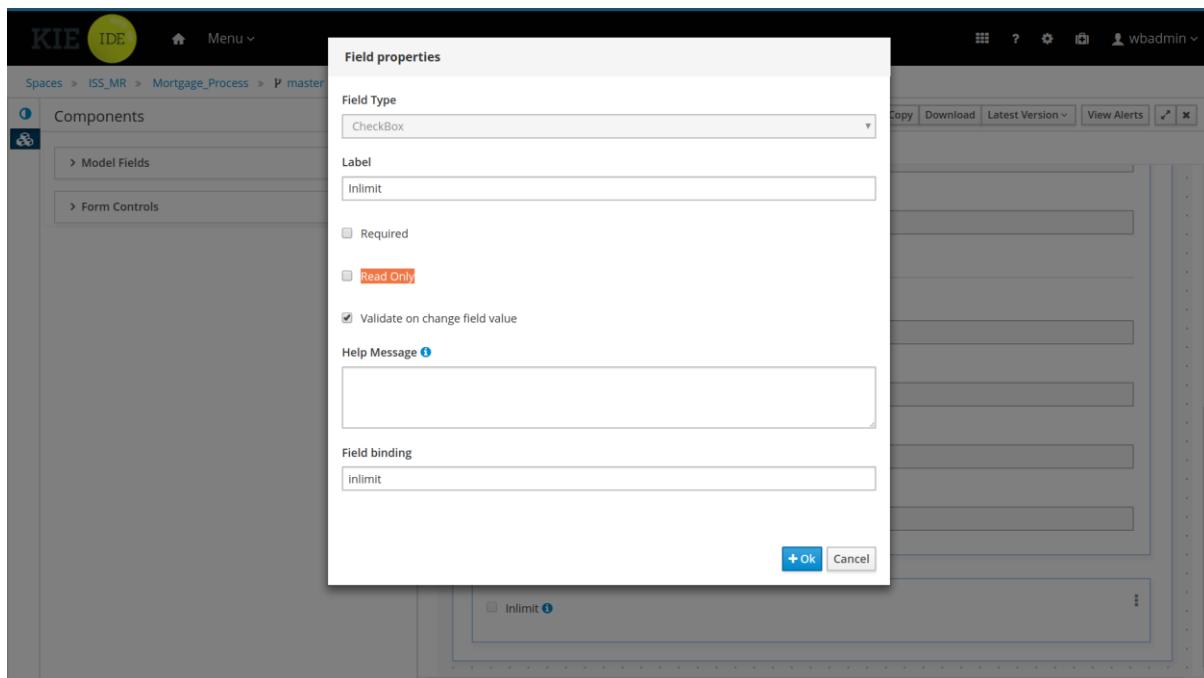
2.2.6. Business system enhancement [User Task] v5.0.0 [Optional]

{ Exercise Challenge }

{ Objective } Add human control to '**Inlimit**' checkbox, for { **User Task: Final Approval** } ; This is to enable human decision having the 'final say', which could overwrite the automated machine decision '**InlimitMR**';

{ Tips }

- 1) Identify the relevant user interface (Form);
- 2) Update '**Inlimit**' field property: uncheck '**Read Only**';
- 3) Save changes;
- 4) Re-deploy enhanced system onto KIE web server: **mortgage-process_5.0.0-SNAPSHOT**
- 5) Verify by starting a new mortgage application;



KIE IDE

Home > Manage Process Definitions

Manage Process Definitions

MortgageApprovalProcess

MortgageApprovalProcess

Correlation key

Form

Application

Down Payment: 50000 Years of amortization: 20

Applicant

Name: Sam GU
Annual Income: 123456
SSN: 123456

Property

Age of property: 3
Address of property: 25 HMTT, Singapore
Locale: Urban
Sale Price: 250000

Submit

KIE IDE

Home > Task Inbox > Task: 10

10 - Final Approval

Work Details Assignments Comments Admin Logs

Inputs:

Application

Mortgage amount: 200000 Inlimit Machine Reasoning

Down Payment: 50000 Years of amortization: 20

Applicant

Name: Sam GU
Annual Income: 123456
SSN: 123456

Property

Age of property: 3
Address of property: 25 HMTT, Singapore
Locale: Urban
Sale Price: 250000

Inlimit

Save | Release | Complete

😊 Congratulations!

You have completed today's challenging workshop!

3. Workshop 3 – Knowledge Discovery

{ Objective } Enhance mortgage process using techniques of Data mining / Rule induction / Orange3 Decision Tree

- Extract business rules from data using inductive reasoning: historic bank loan approval data; Use tool: **Orange3** (Python)
- Update **Mortgage_Process** system using the discovered knowledge: business rules; Use tool: **KIE BPMS/BRMS**

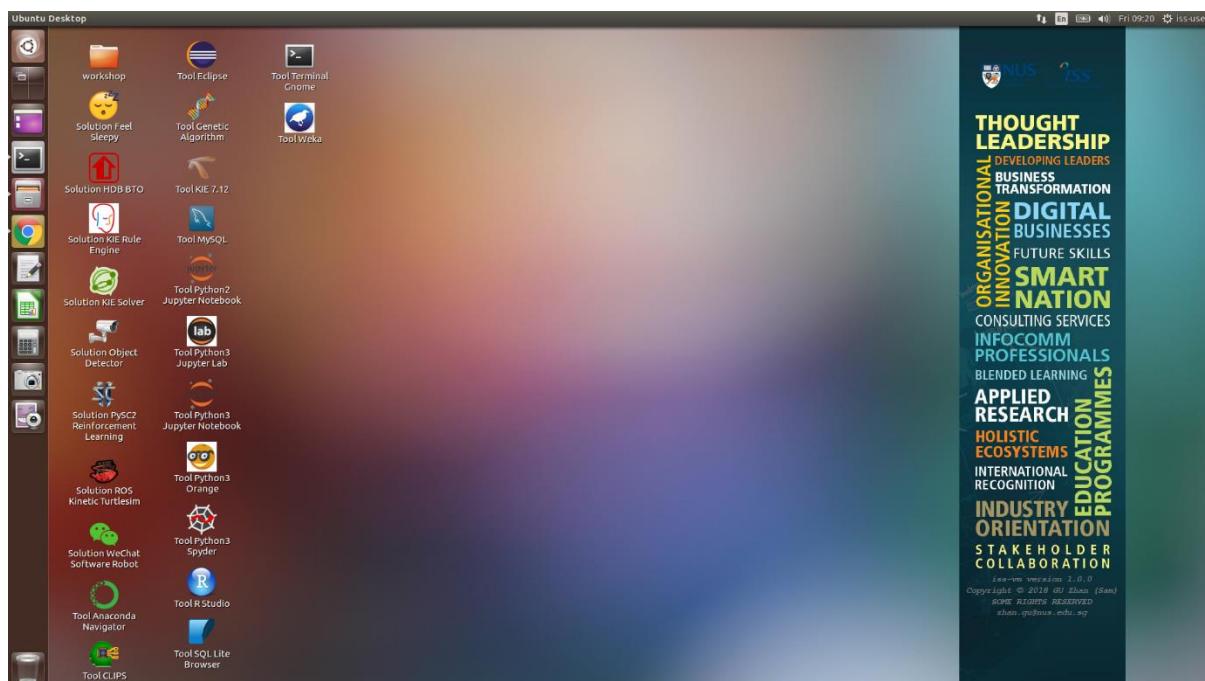


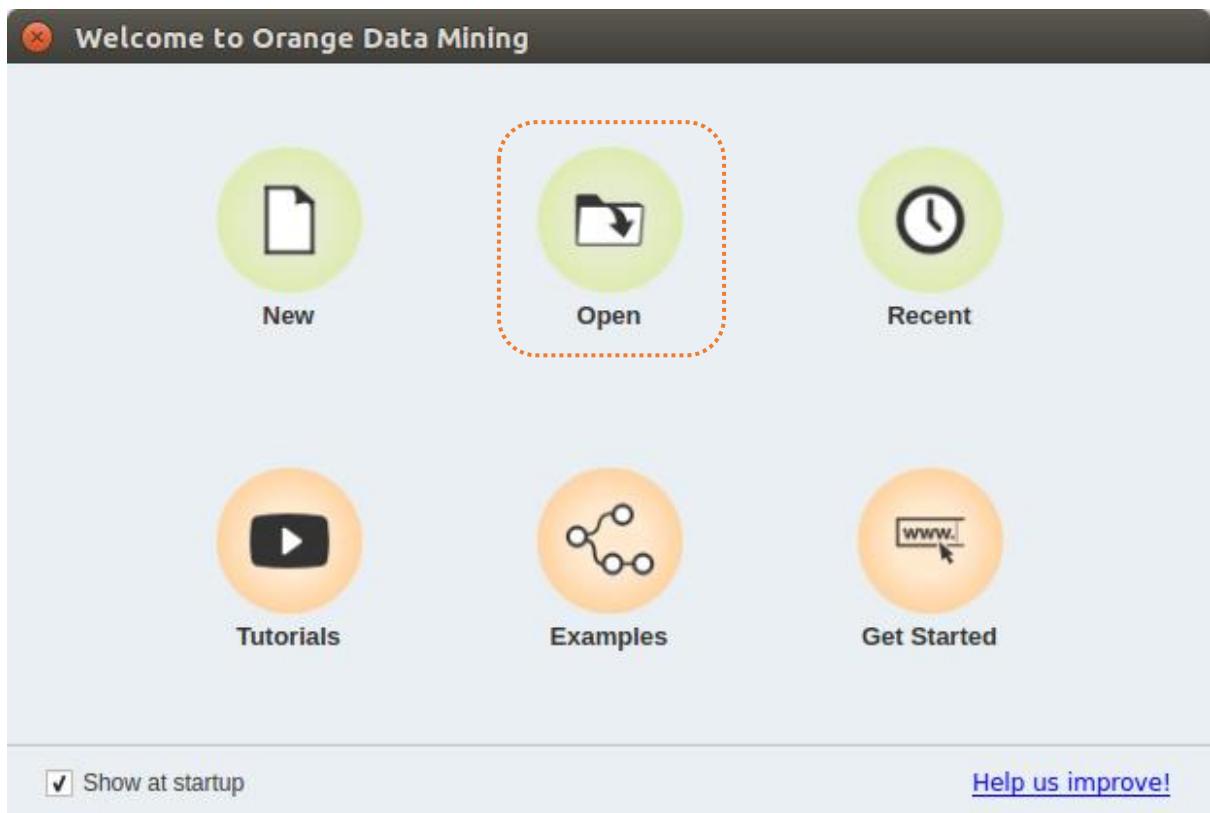
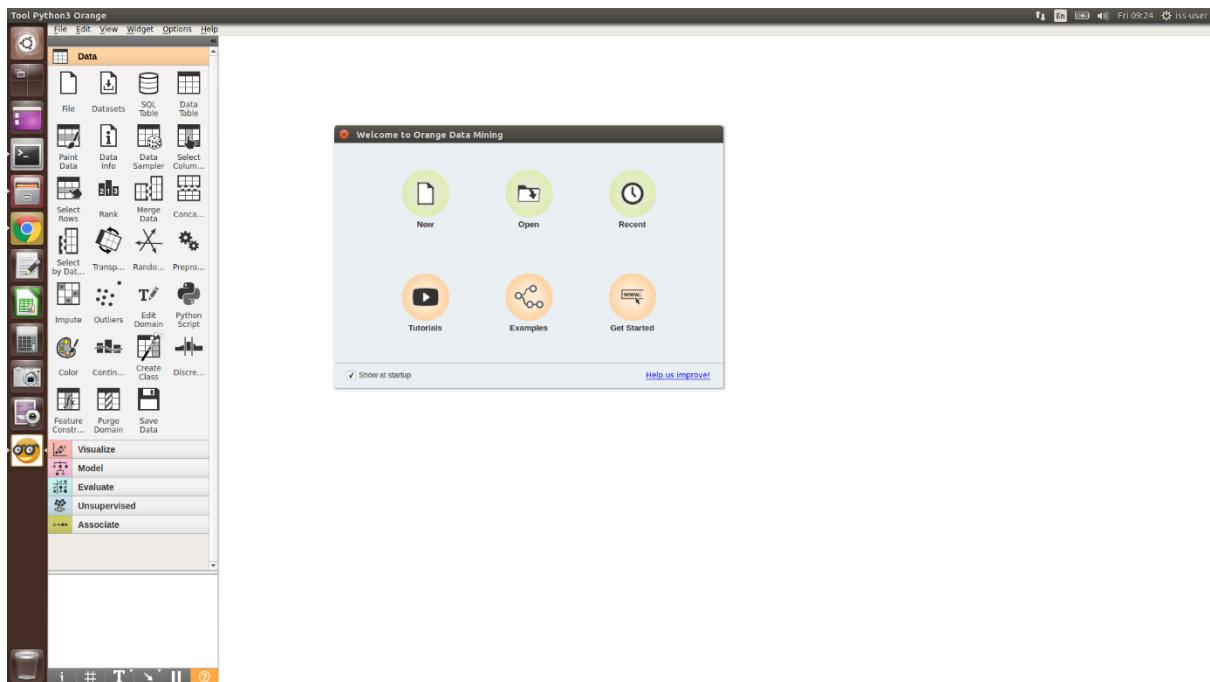
3.1. Knowledge Discovery [Orange3]

{ Objective } Enhance mortgage process using techniques of Data mining / Rule induction / Orange3 Decision Tree

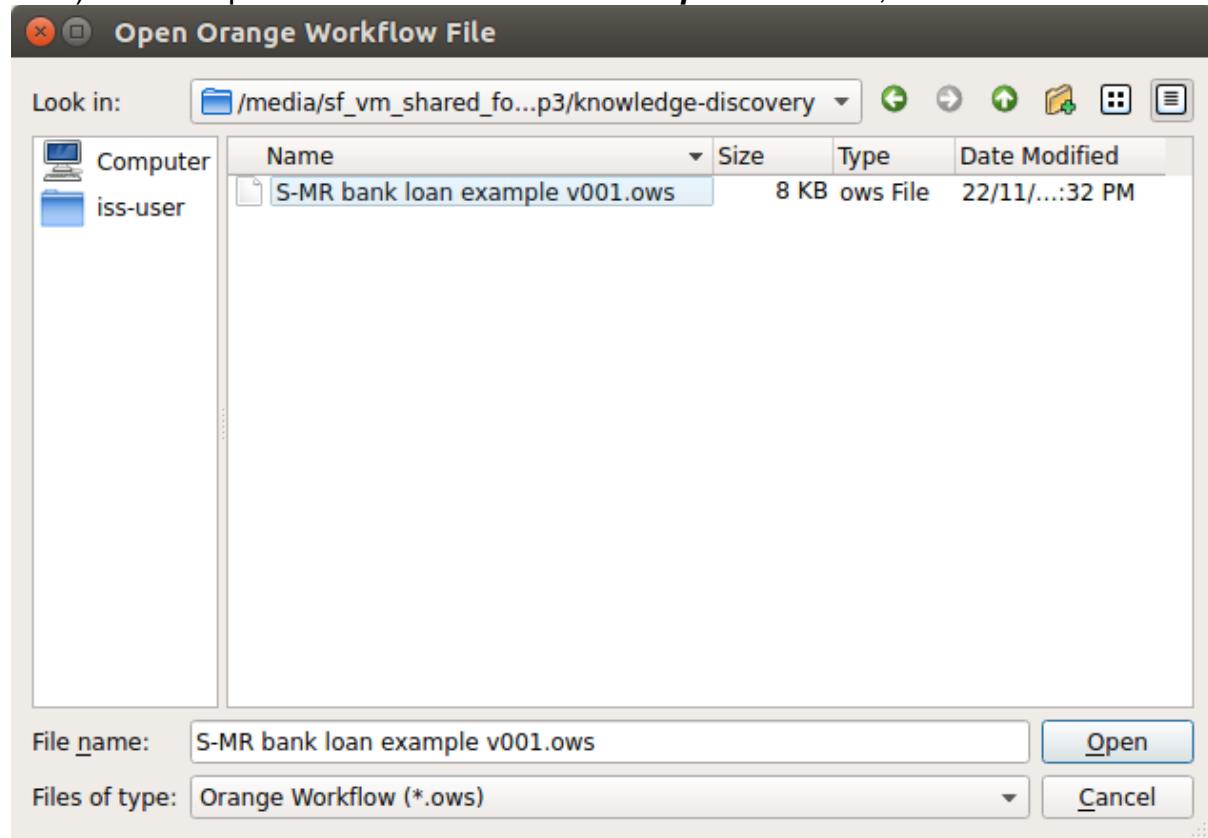
- Extract business rules from data using inductive reasoning: historic bank loan approval data; Use tool: **Orange3** (Python)
- Update **Mortgage_Process** system using the discovered knowledge: business rules; Use tool: **KIE BPMS/BRMS**

1) From desktop, start **Tool Python3 Orange**:

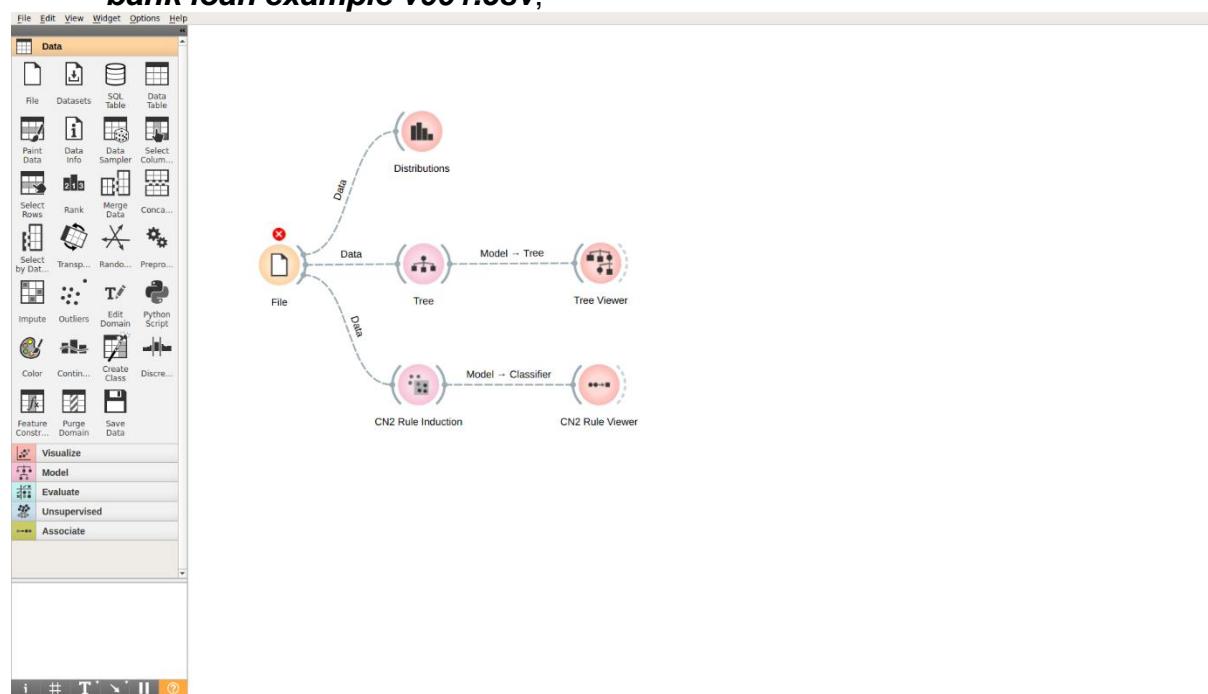


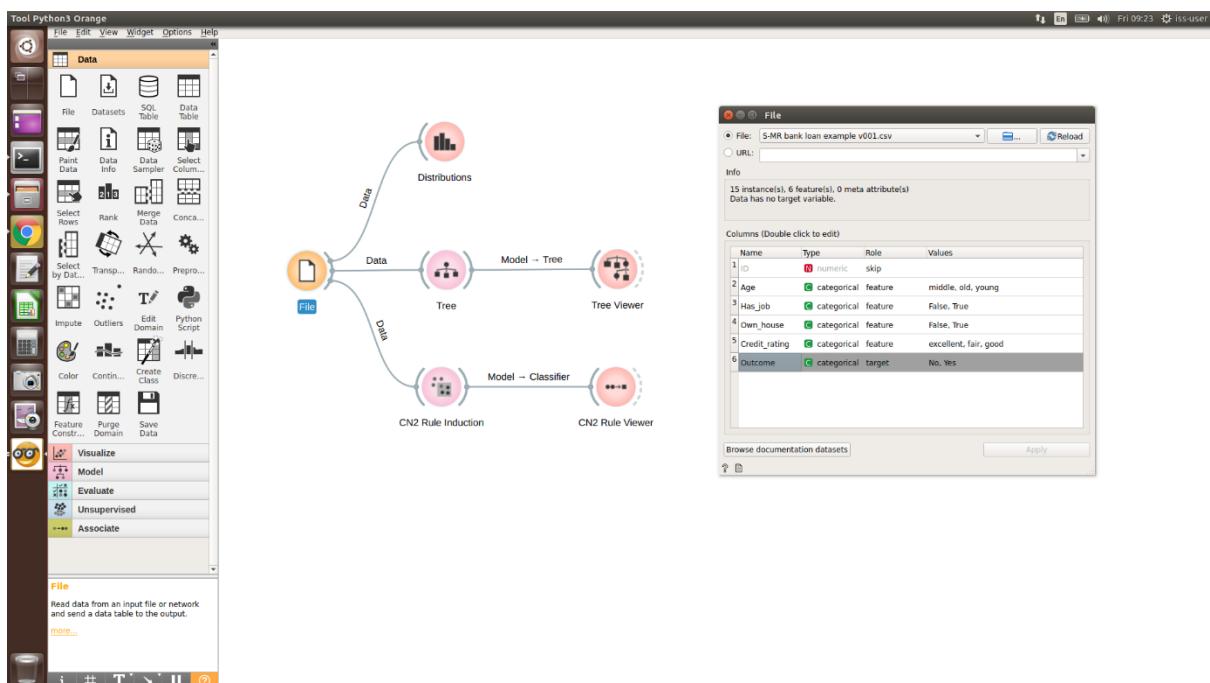
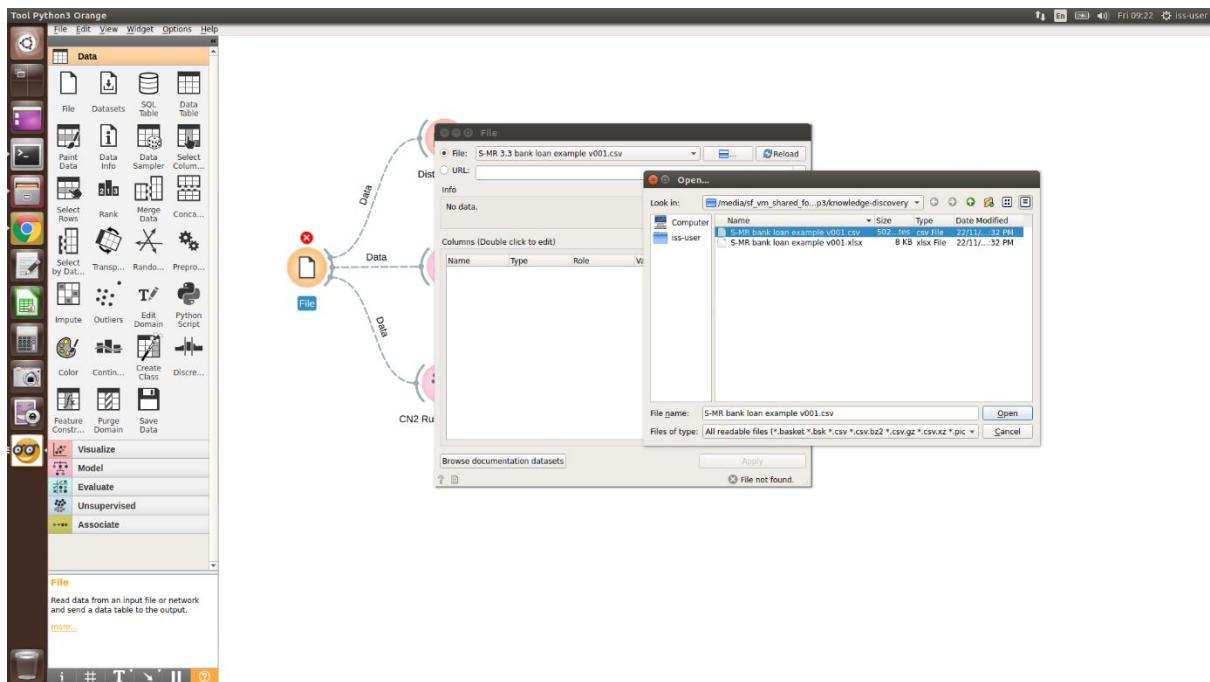


2) Select/Open file: **S-MR bank loan example v001.ows**;

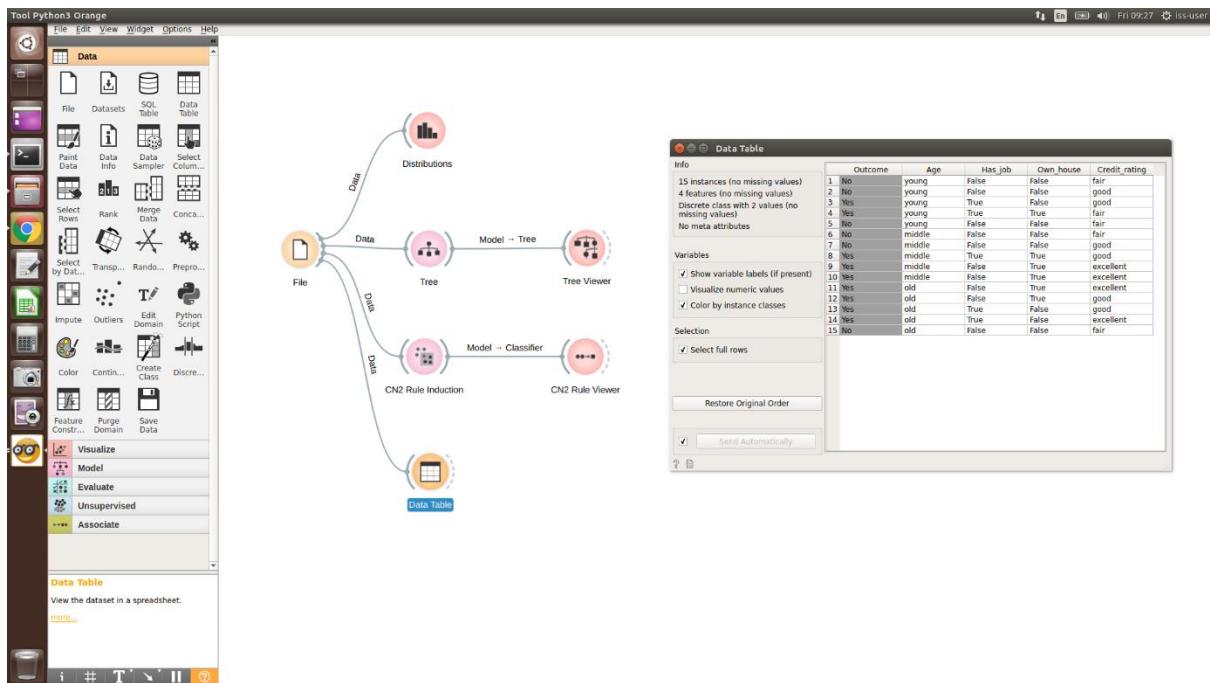


3) If **File** indicates error, click the **File** icon to locate the required data file: **S-MR bank loan example v001.csv**,

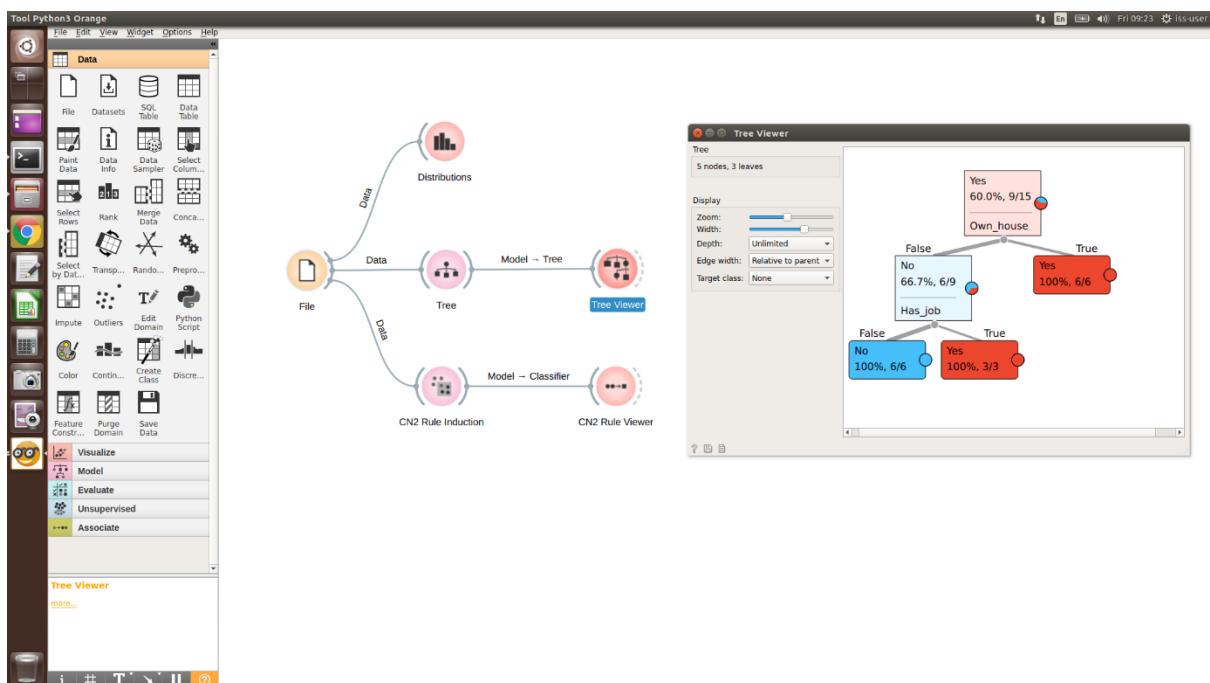




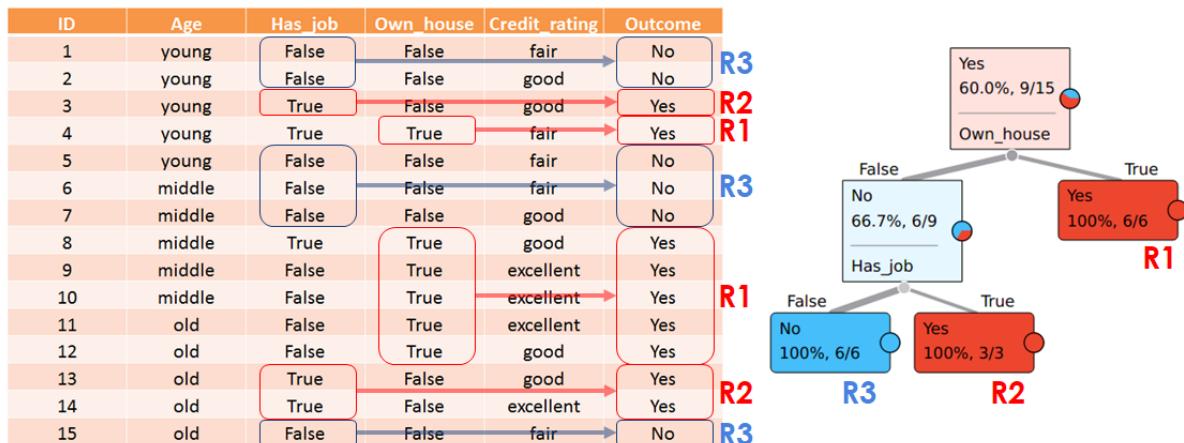
- 4) Optionally, add a **Data Table** node to view the input data table/file;



- 5) Open Tree Viewer to view the Decision Tree generated via knowledge discovery;



6) The Decision Tree's Leaf Nodes represent the discovered business rules;



{ Quiz } Write down the business rules:

Rule 1: WHEN

THEN

Rule 2: WHEN

THEN

Rule 3: WHEN

THEN

3.2. KIE BPMS/BRMS Business System Enhancement

{ Objective } Enhance mortgage process using techniques of Data mining / Rule induction / Orange3 Decision Tree

- Extract business rules from data using inductive reasoning: historic bank loan approval data; Use tool: **Orange3** (Python)
- Update **Mortgage_Process** system using the discovered knowledge: business rules; Use tool: **KIE BPMS/BRMS**

3.2.1. Business system enhancement [Decision Table]

[Reference Solution] Data-Mining Enhanced Mortgage loan application process

- Update **Data Object** : **Applicant**
- New **Business Rule Task** : **Mortgage Machine Reasoning DT**
- New **Guided Decision Table** : **MortgageMachineReasoningDT**

- 1) Go to **Assets** list of project **Mortgage_Process**; Edit [**Data Objects: Applicant**];

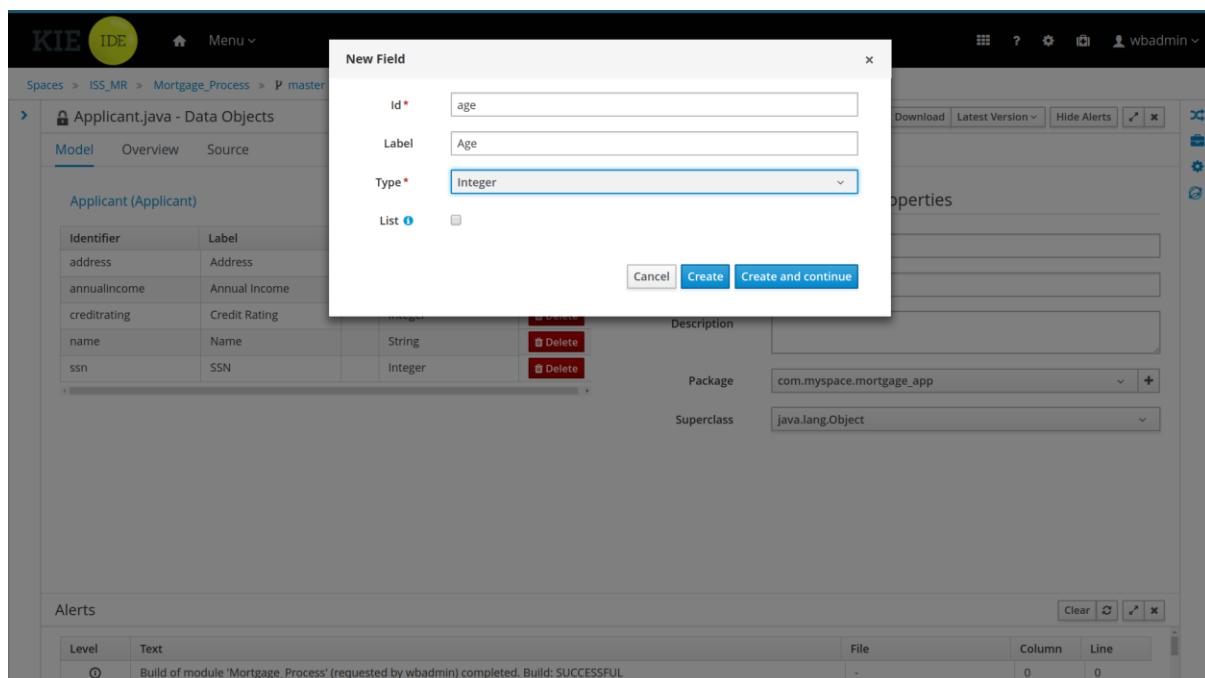
Identifier	Label	Type
address	Address	String
annualincome	Annual Income	Integer
creditrating	Credit Rating	Integer
name	Name	String
ssn	SSN	Integer

Identifier	Applicant
Label	Applicant
Description	(empty)
Package	com.myspace.mortgage_app
Superclass	java.lang.Object

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by wbadmin) completed. Build: SUCCESSFUL.	-	0	0

2) Add below new fields;

Identifier	Label	Type
age	Age	Integer
hasJob	Has Job	Boolean
ownHouse	Own House	Boolean



The screenshot shows the KIE IDE interface for creating a new field. A modal dialog titled "New Field" is open, prompting for the following details:

- Id ***: hasJob
- Label**: Has job
- Type ***: Boolean

Below the input fields are buttons for **Cancel**, **Create**, and **Create and continue**. The background shows a table of existing fields for the "Applicant" entity, including address, annualincome, creditrating, name, ssn, and age. At the bottom, there is an "Alerts" section with one entry: "Build of module 'Mortgage_Process' (requested by wbadmin) completed. Build: SUCCESSFUL".

The screenshot shows the KIE IDE interface for creating a new field. A modal dialog titled "New Field" is open, prompting for the following details:

- Id ***: ownHouse
- Label**: Own House
- Type ***: Boolean

Below the input fields are buttons for **Cancel**, **Create**, and **Create and continue**. The background shows a table of existing fields for the "Applicant" entity, including address, annualincome, creditrating, name, ssn, age, and hasJob. At the bottom, there is an "Alerts" section with one entry: "Build of module 'Mortgage_Process' (requested by wbadmin) completed. Build: SUCCESSFUL".

KIE IDE

Spaces > ISS_MR > Mortgage_Process > master > Applicant

Model Overview Source

Applicant.java - Data Objects

Applicant (Applicant)

Identifier	Label	Type	
address	Address	String	
annualincome	Annual Income	Integer	
creditrating	Credit Rating	Integer	
name	Name	String	
ssn	SSN	Integer	
age	Age	Integer	
hasJob	Has Job	Boolean	
ownHouse	Own House	Boolean	

+ add field

'Applicant (Applicant)- general properties'

Identifier	Applicant
Label	Applicant
Description	
Package	com.myspace.mortgage_app
Superclass	java.lang.Object

Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by wbadmin) completed. Build: SUCCESSFUL	-	0	0

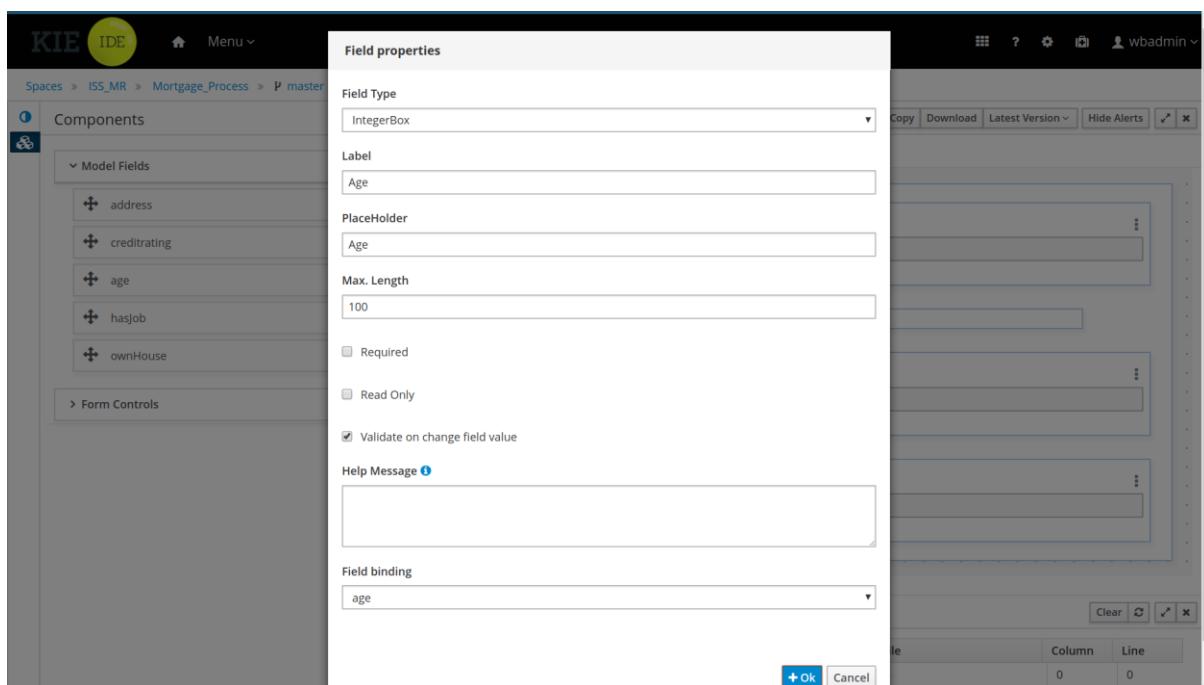
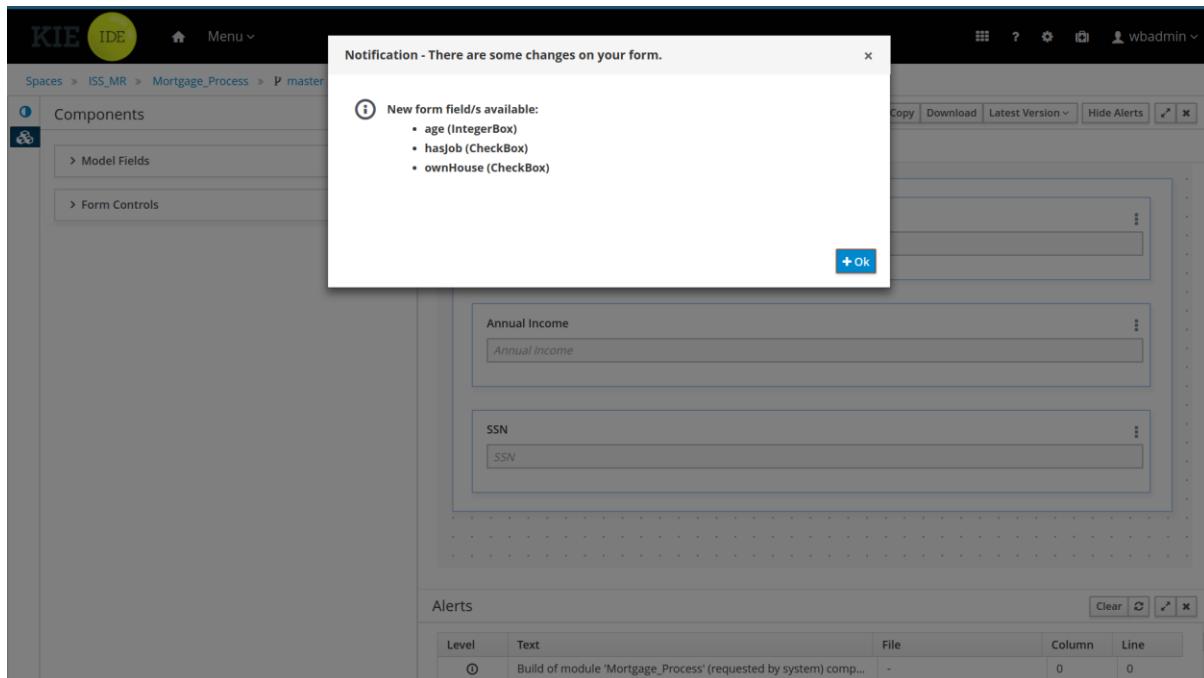
Clear

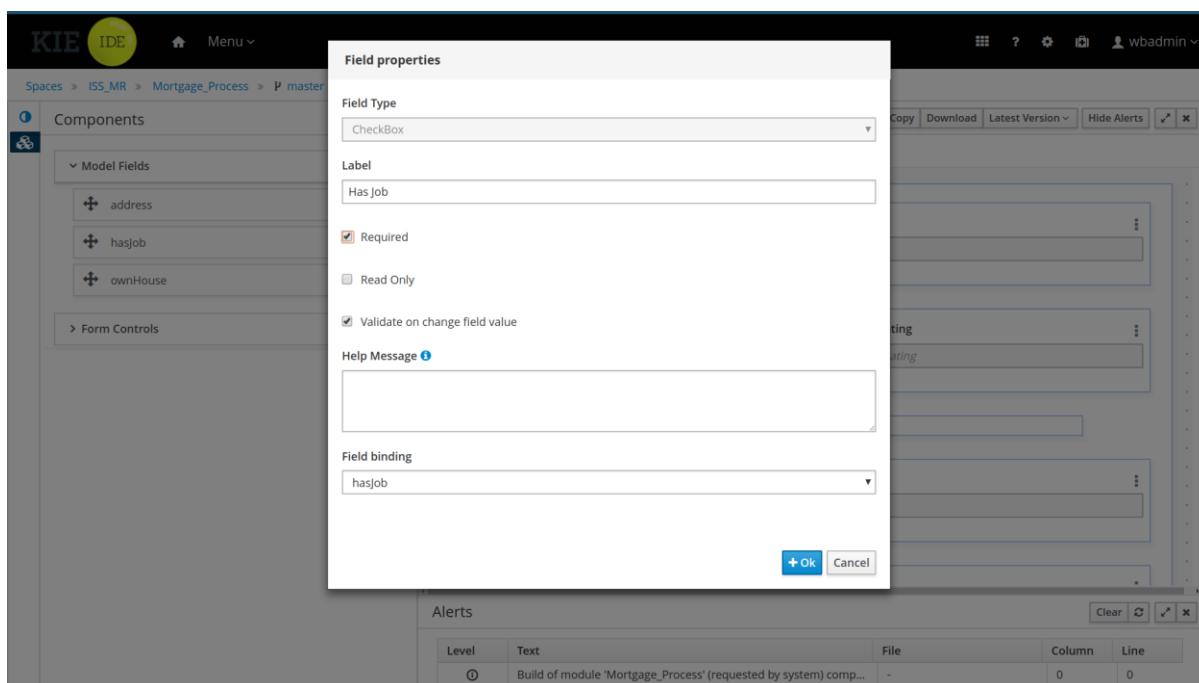
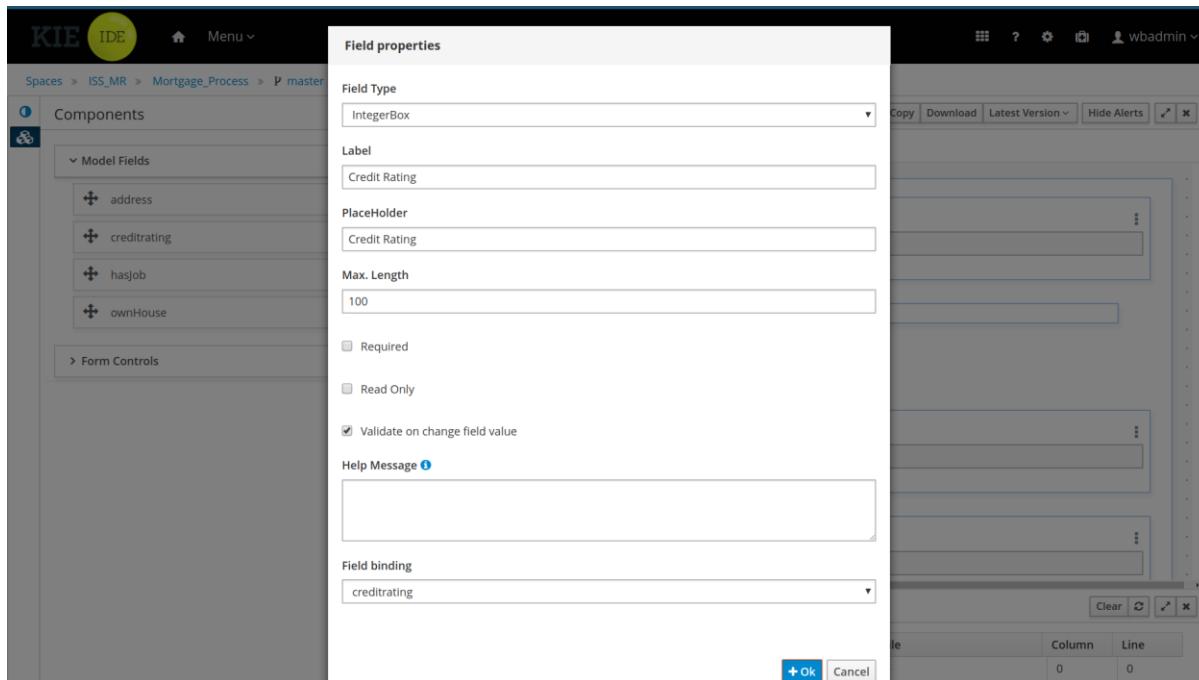
3) **Save** changes;

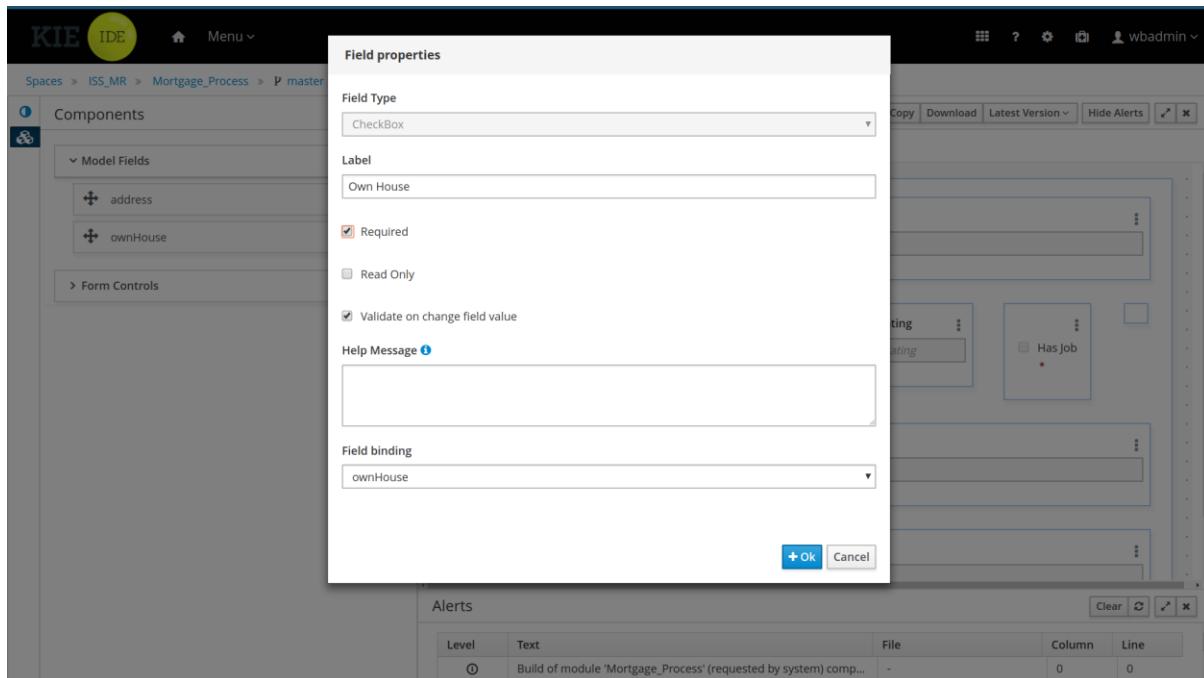
The screenshot shows the KIE IDE interface. A 'Confirm Save' dialog box is open in the center. It contains the question 'Save changes for this Asset?' and two buttons: 'Cancel' and 'Save'. In the background, the 'Applicant.java - Data Objects' editor is visible. It displays a table of fields with columns for Identifier, Label, and Type. Fields include address (String), annualIncome (Integer), creditRating (Integer), name (String), ssn (Integer), age (Integer), hasJob (Boolean), and ownHouse (Boolean). To the right of the table, there is a panel for 'Applicant (Applicant)- general properties' with fields for Identifier (Applicant), Label (Applicant), Description, Package (com.myspace.mortgage_app), and Superclass (java.lang.Object). At the bottom of the screen, there is an 'Alerts' section showing a single build log entry.

4) Go to **Assets** list of project **Mortgage_Process**; Edit [Forms: *Applicant*]; Add new fields onto the form;

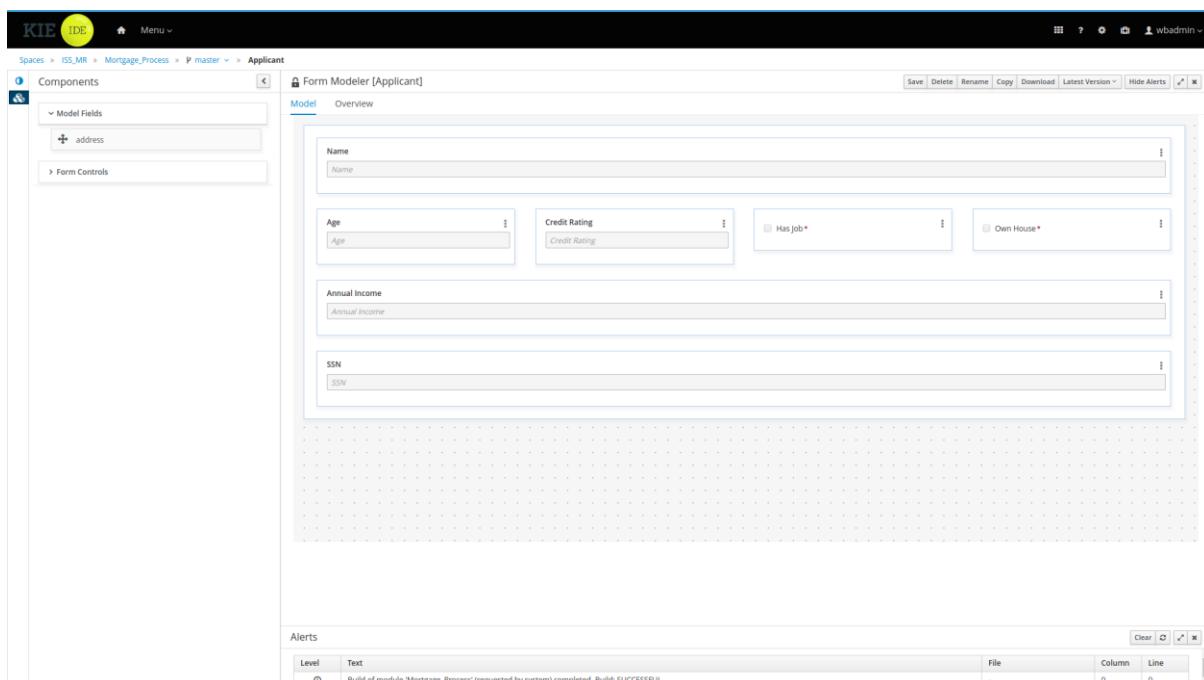
The screenshot shows the 'Assets' list for the 'Mortgage_Process' project in the KIE IDE. There are four assets listed: 'Applicant' (Forms), 'Applicant' (Data Objects), 'Application' (Forms), and 'Application' (Data Objects). Each asset was last modified today and created 2 days ago. At the top right of the list, there are buttons for 'Build', 'Deploy', and 'Hide Alerts'. Below the list, there is an 'Alerts' section with a single build log entry.



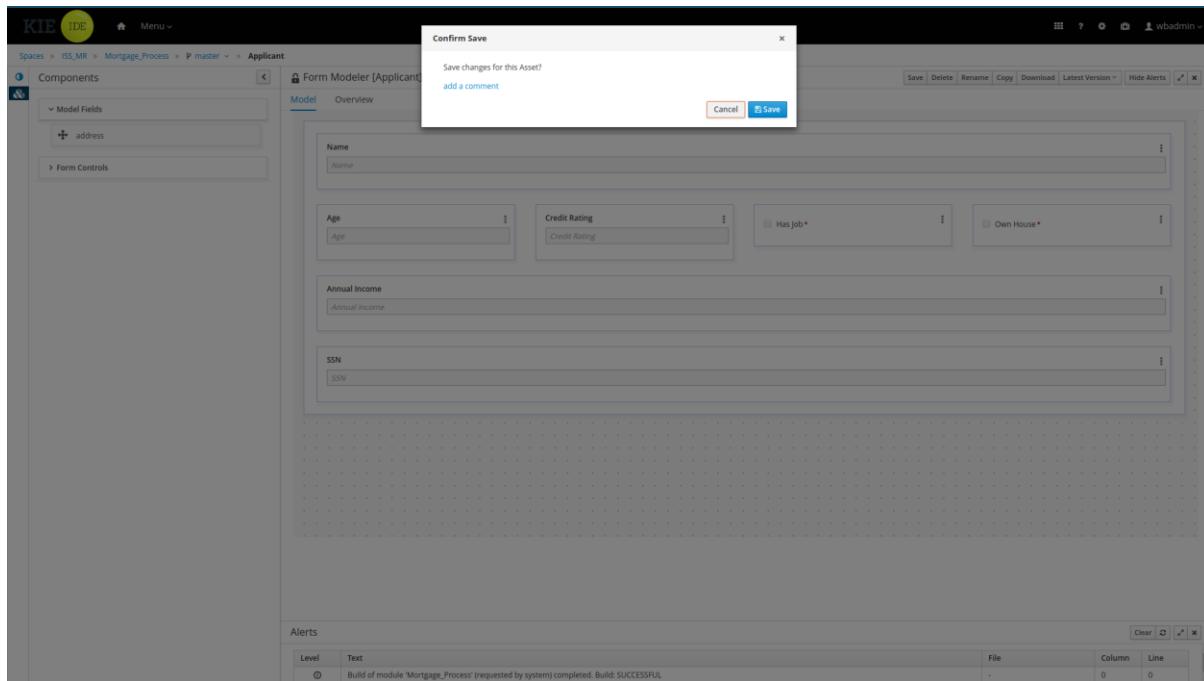




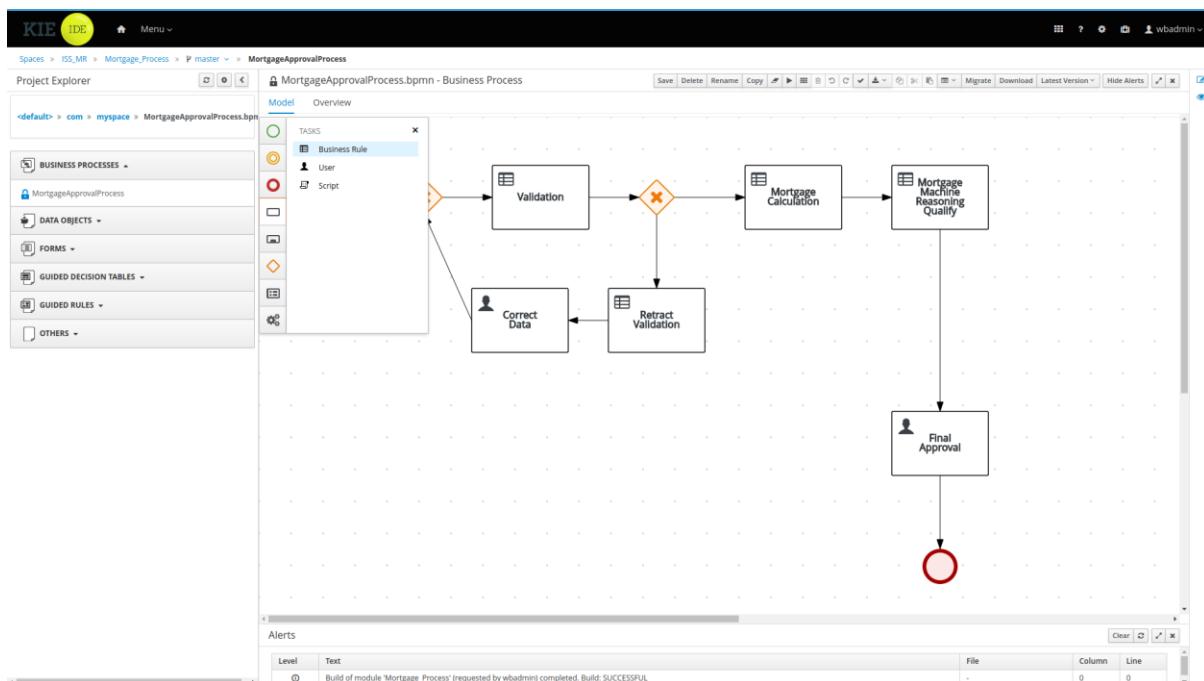
5) Adjust field width aesthetically;

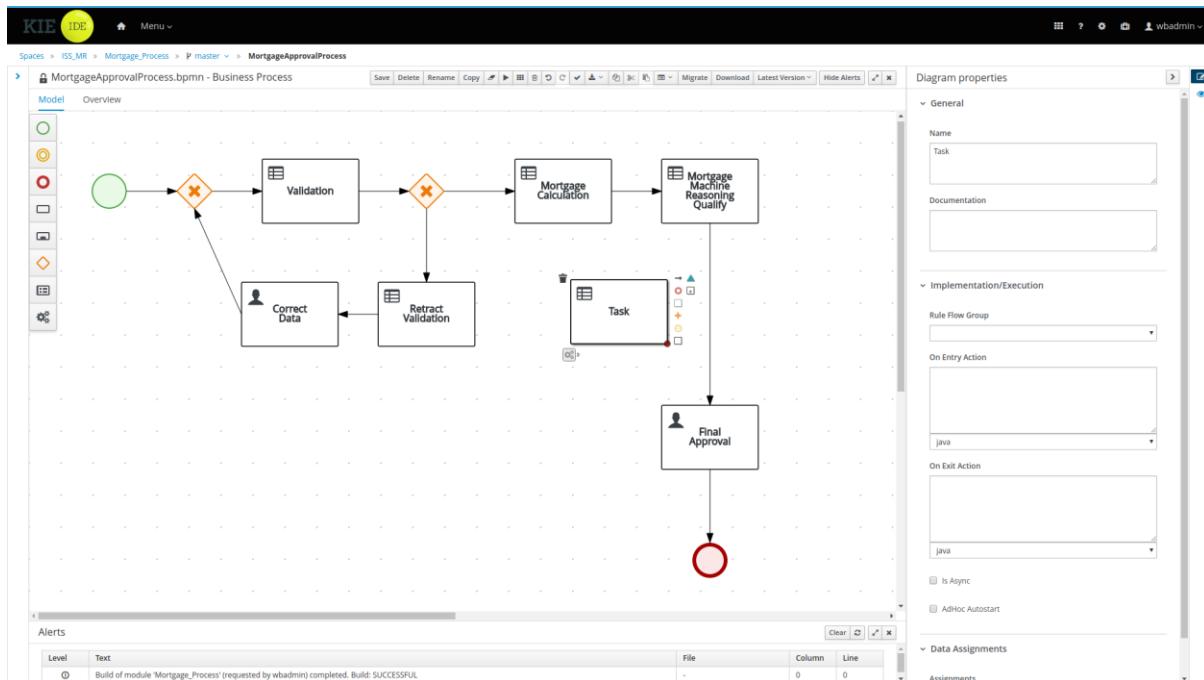


6) **Save** changes of **Form** updates;

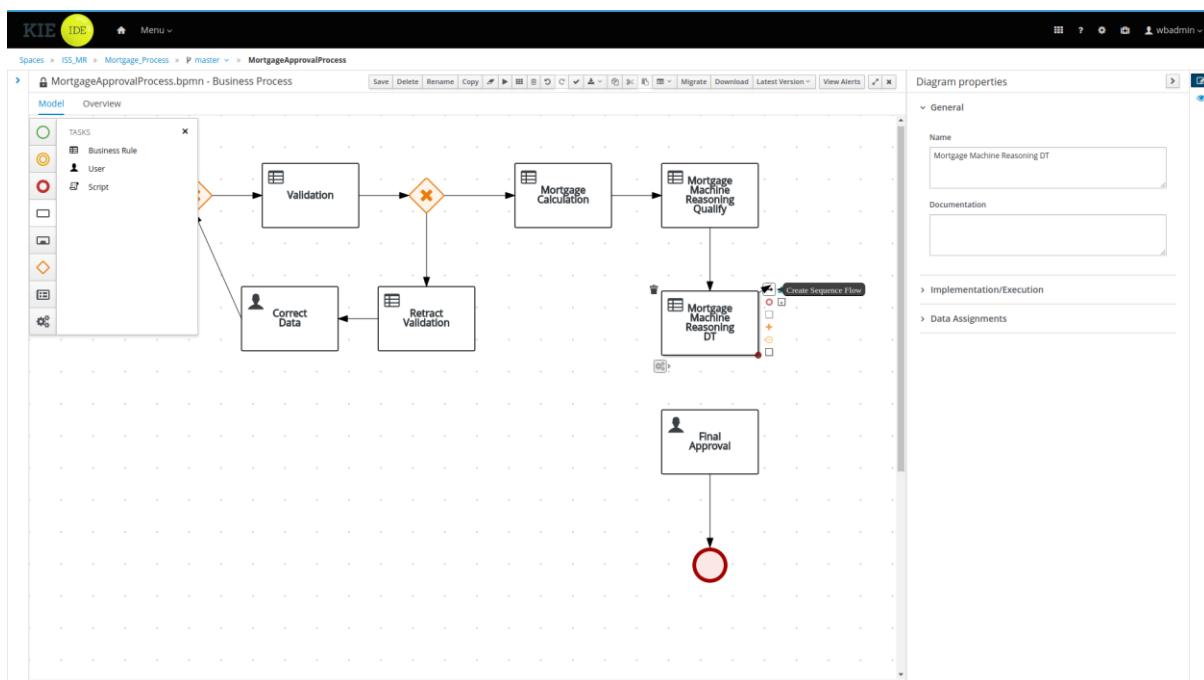


7) Go to **Assets** list of project **Mortgage_Process**; Edit [Business Processes: **MortgageApprovalProcess**]; Add a **Business Rule** process task;

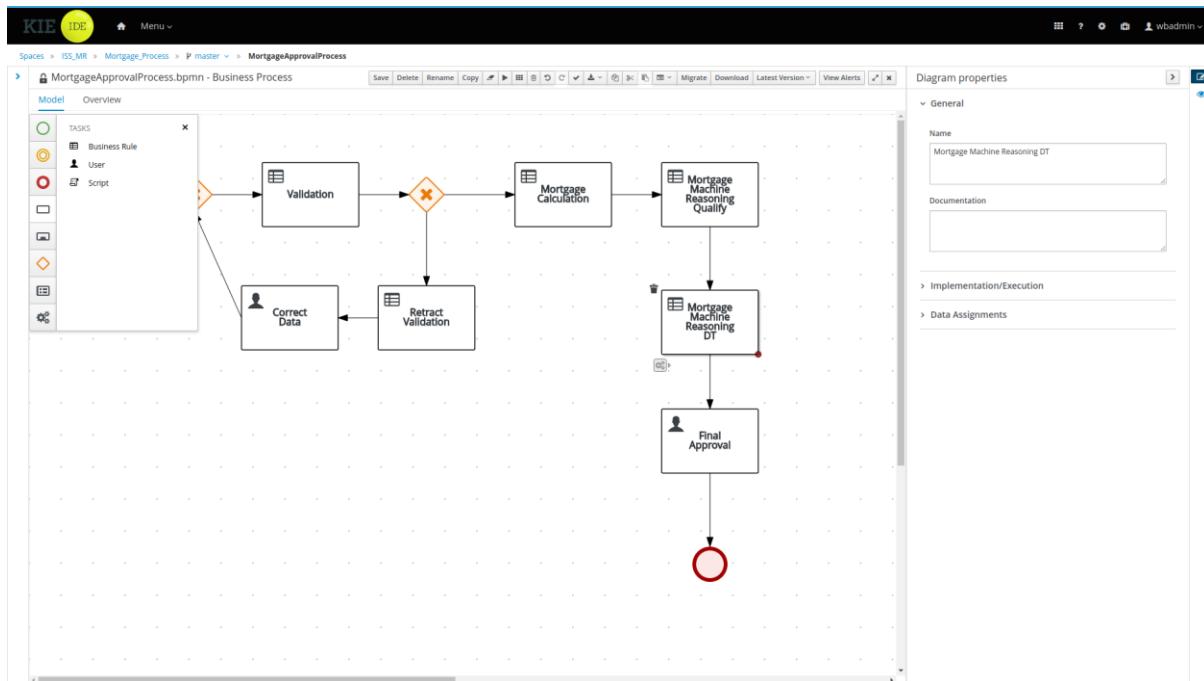




8) Rename the task name to ***Mortgage Machine Reasoning DT***;



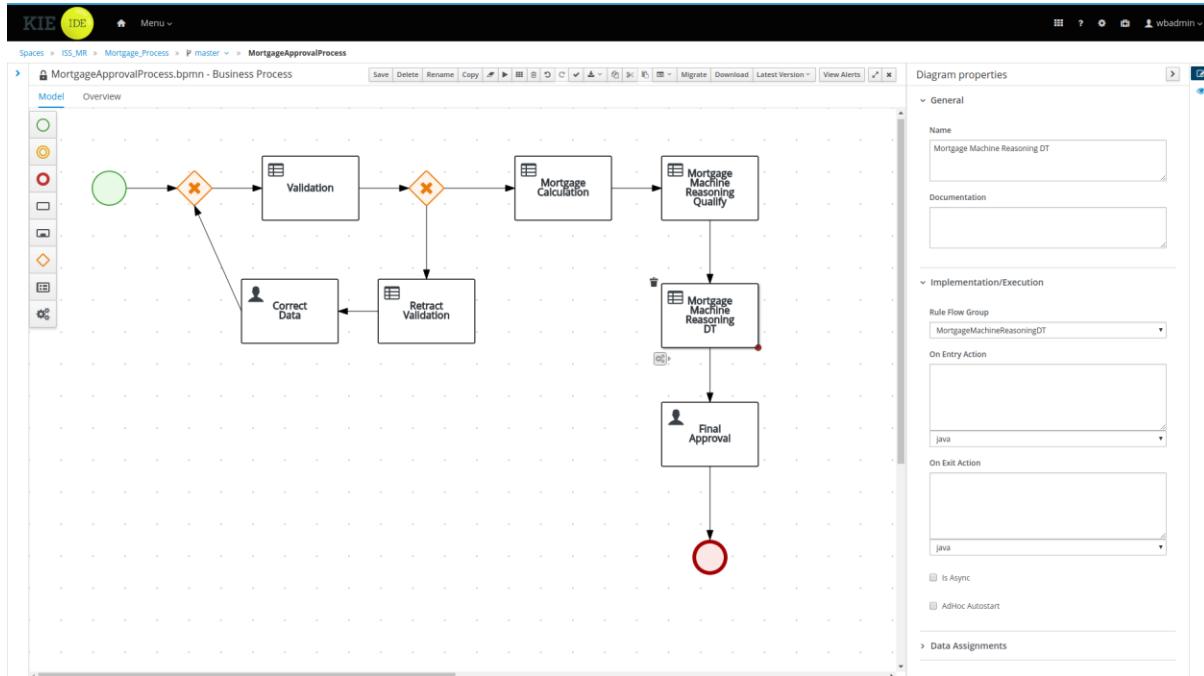
- 9) Update flow link to place the task in between [**Rule Task: Mortgage Machine Reasoning Qualify**] and [**User Task: Final Approval**];



10) In **Diagram properties** panel at right, update values for [Rule Task: **Task**];

Name : **Mortgage Machine Reasoning DT**

Rule Flow Group : **MortgageMachineReasoningDT**

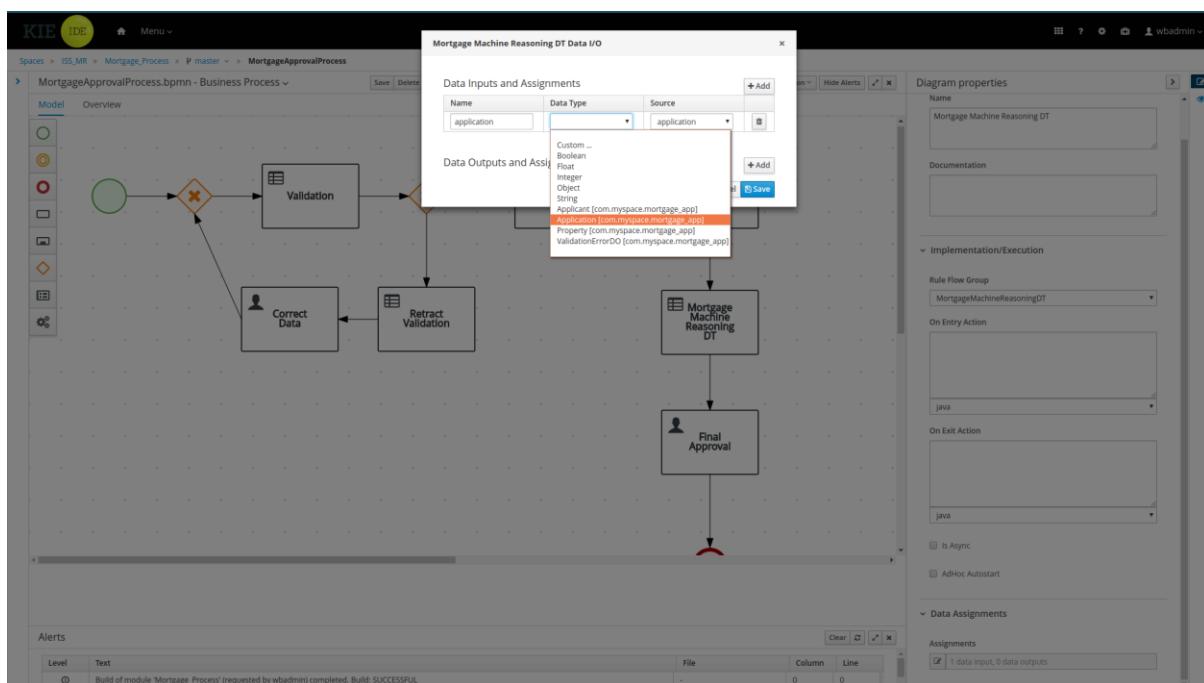
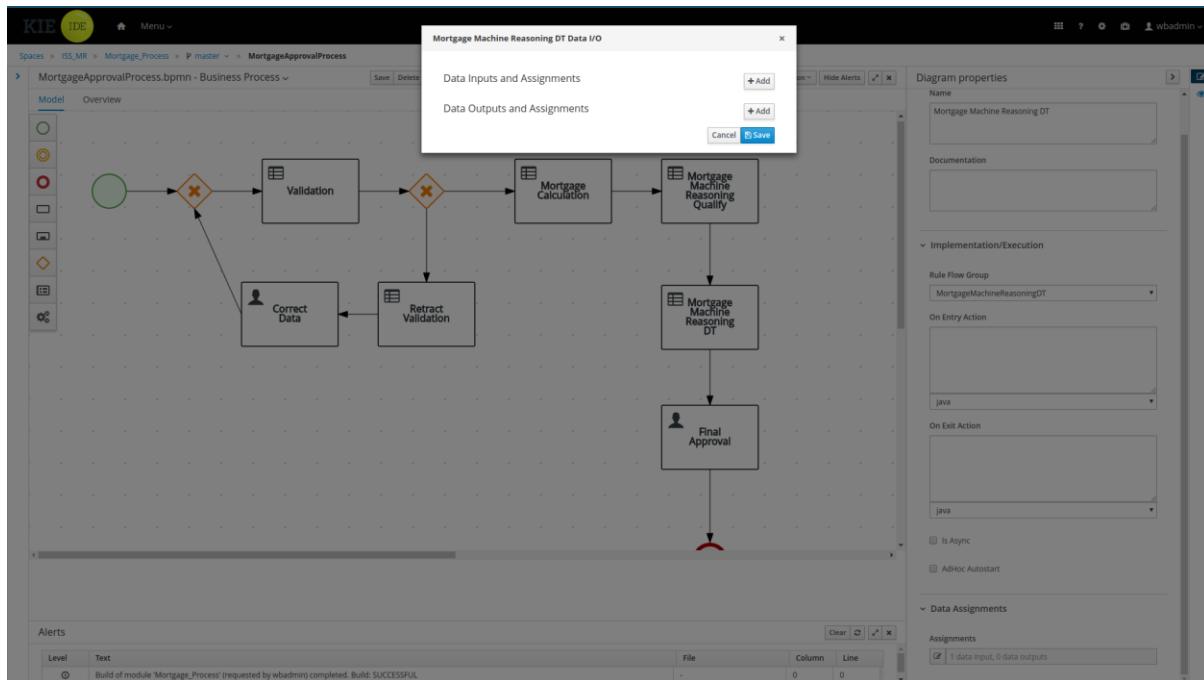


11) In **Diagram properties** panel at right, open **Assignments of Data Assignments**; Key in or select below values from drop down list; **Save**

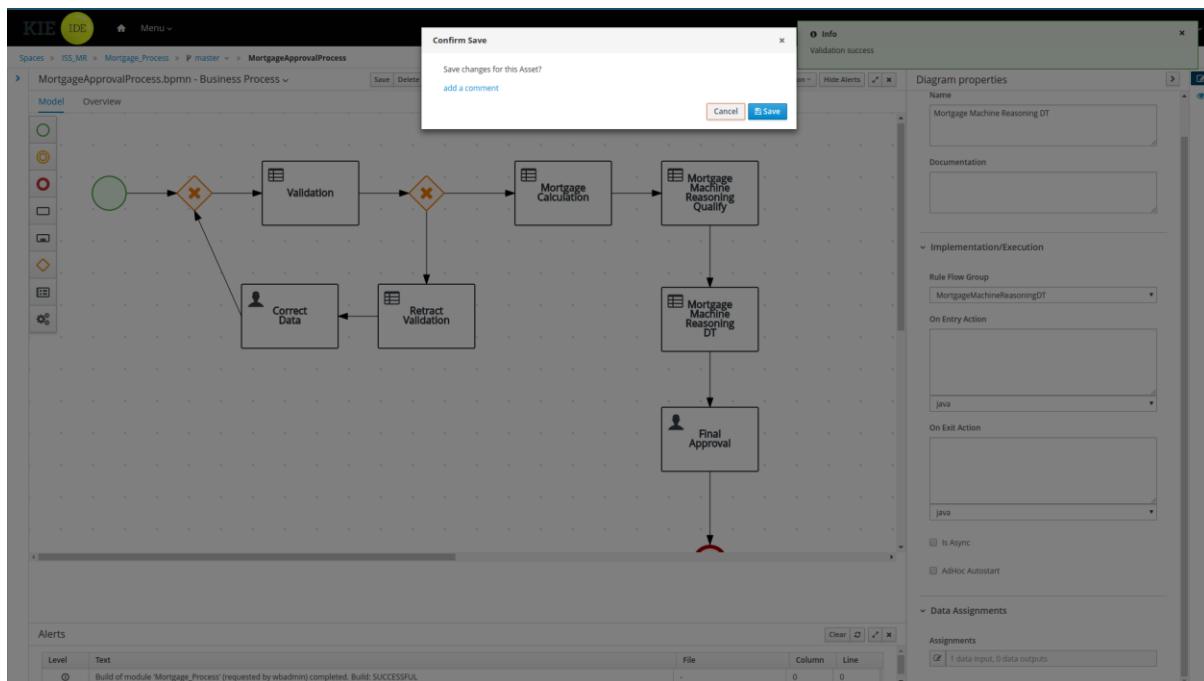
changes at last;

Inputs:

Name : **application**
 Data Type : **Application** [Data Type]
 Source : **applicaiton**



12) Save changes to [Business Processes: **MortgageApprovalProcess**];



13) Go to Assets list of project **Mortgage_Process**; Add Asset Guided Decision Table

(1)	Applicant	Forms	Last modified today	Created 2 days ago
(2)	Applicant	Data Objects	Last modified today	Created 2 days ago
(3)	Application	Forms	Last modified today	Created 2 days ago
(4)	Application	Data Objects	Last modified today	Created 2 days ago
(5)	ApplicationError	Forms	Last modified today	Created 2 days ago
(6)	ApplicationMortgage	Forms	Last modified today	Created 2 days ago
(7)	ApplicationMortgage	Forms	Last modified today	Created 2 days ago

Add Asset

Business Process	Business Process (legacy)	Data Object	Decision Table (Spreadsheet)
DMN (Preview)	DRL file	Global Variable(s)	Enumeration Model
Form	Guided Decision Table	Guided Decision Table Graph	
Guided Decision Tree	Guided Rule	Guided Rule Template	Guided Score Card
Package	Score Card (Spreadsheet)	Solver configuration Optimization	Test Scenario
Work Item definition	Case definition		

Create new Guided Decision Table

Guided Decision Table*

MortgageMachineReasoningDT

Package

com.myspace.mortgage_app

Hit Policy:

None

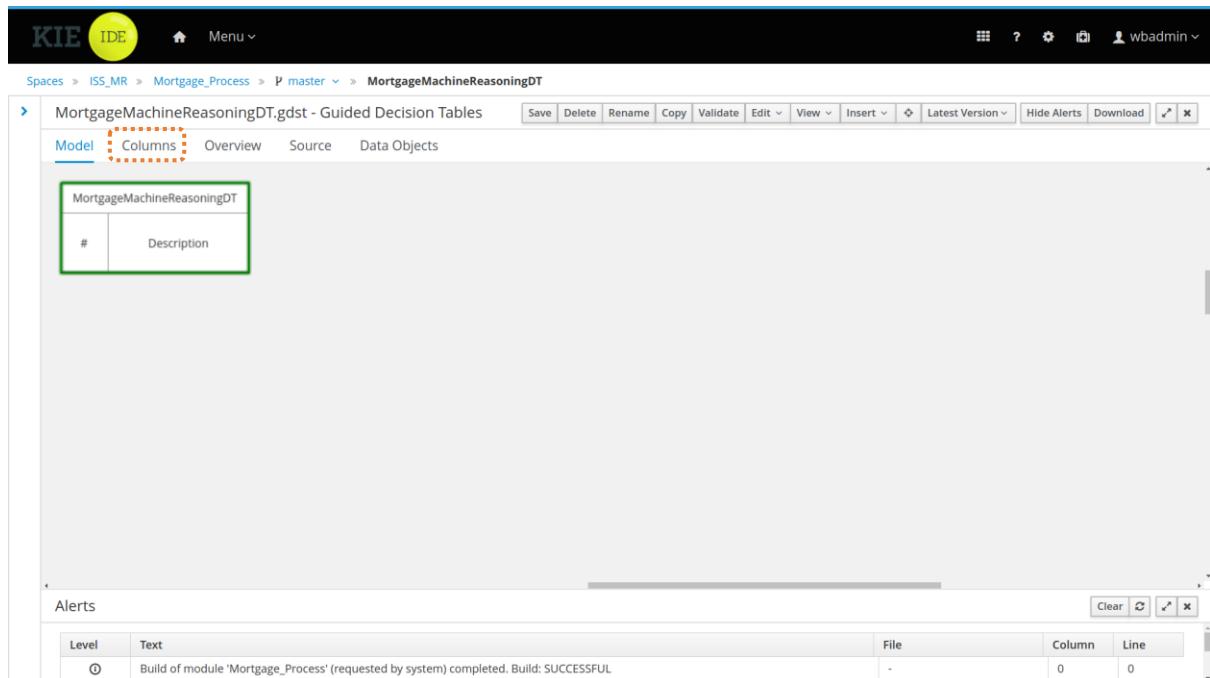
This is the normal hit mode. Old decision tables will use this by default, but since 7.0 uses PHREAK the row order now matters. There is no migration tooling needed for the old tables. Multiple rows can fire. Verification warns about rows that conflict.

Table Format:

Extended entry, values defined in table body

Limited entry, values defined in columns

+ OK Cancel



KIE IDE

Spaces > ISS_MR > Mortgage_Process > master > MortgageMachineReasoningDT

MortgageMachineReasoningDT.gdst - Guided Decision Tables

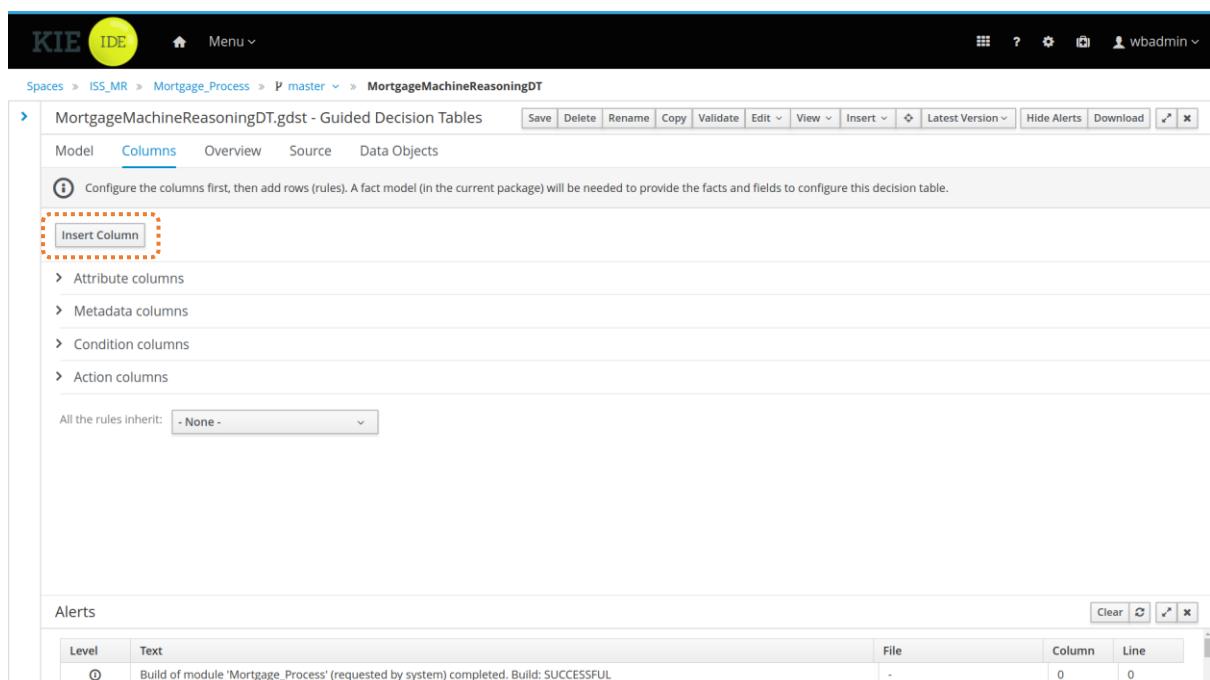
Model Columns Overview Source Data Objects

MortgageMachineReasoningDT

#	Description

Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.	-	0	0



KIE IDE

Spaces > ISS_MR > Mortgage_Process > master > MortgageMachineReasoningDT

MortgageMachineReasoningDT.gdst - Guided Decision Tables

Model Columns Overview Source Data Objects

Configure the columns first, then add rows (rules). A fact model (in the current package) will be needed to provide the facts and fields to configure this decision table.

Insert Column

- Attribute columns
- Metadata columns
- Condition columns
- Action columns

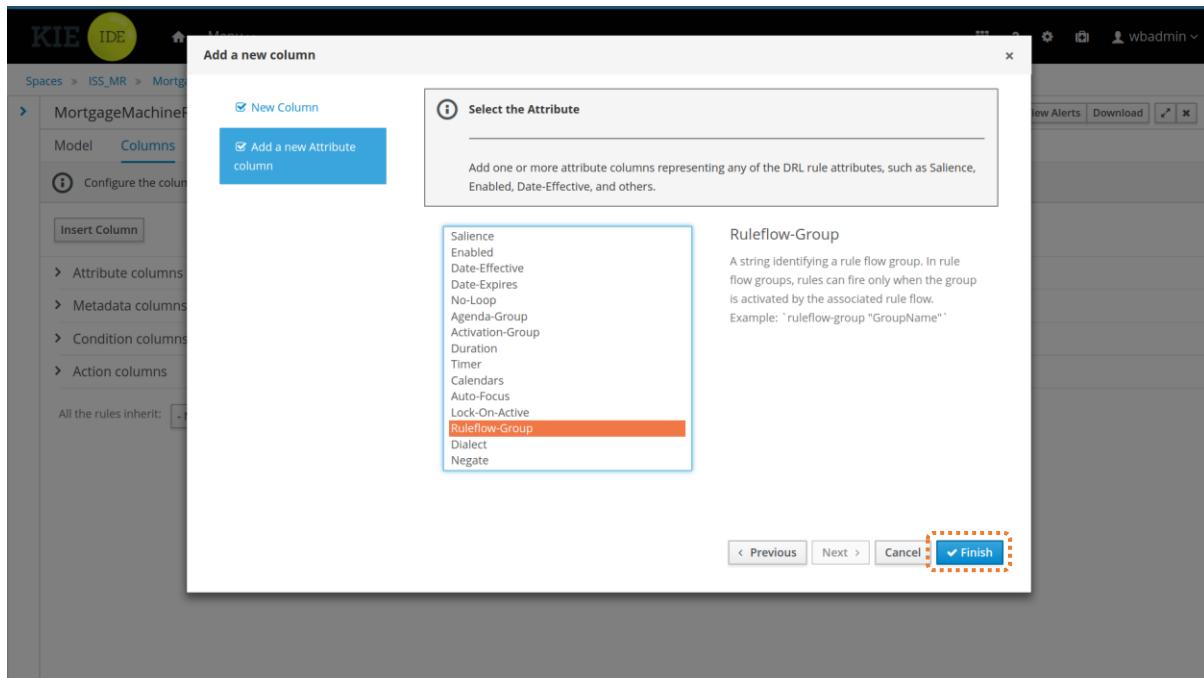
All the rules inherit: - None -

Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.	-	0	0

The screenshot shows the 'Add a new column' wizard in the KIE IDE. The left sidebar shows the project structure: Spaces > ISS_MR > MortgageMachineP. The 'Columns' tab is selected. The main window displays the 'Select the type of column' step. A callout box highlights the 'Include advanced options' checkbox, which is currently unchecked. Other options listed include 'Add a Condition', 'Delete an existing fact', and 'Set the value of a field'. At the bottom of the wizard are buttons for '< Previous', 'Next >', 'Cancel', and 'Finish'.

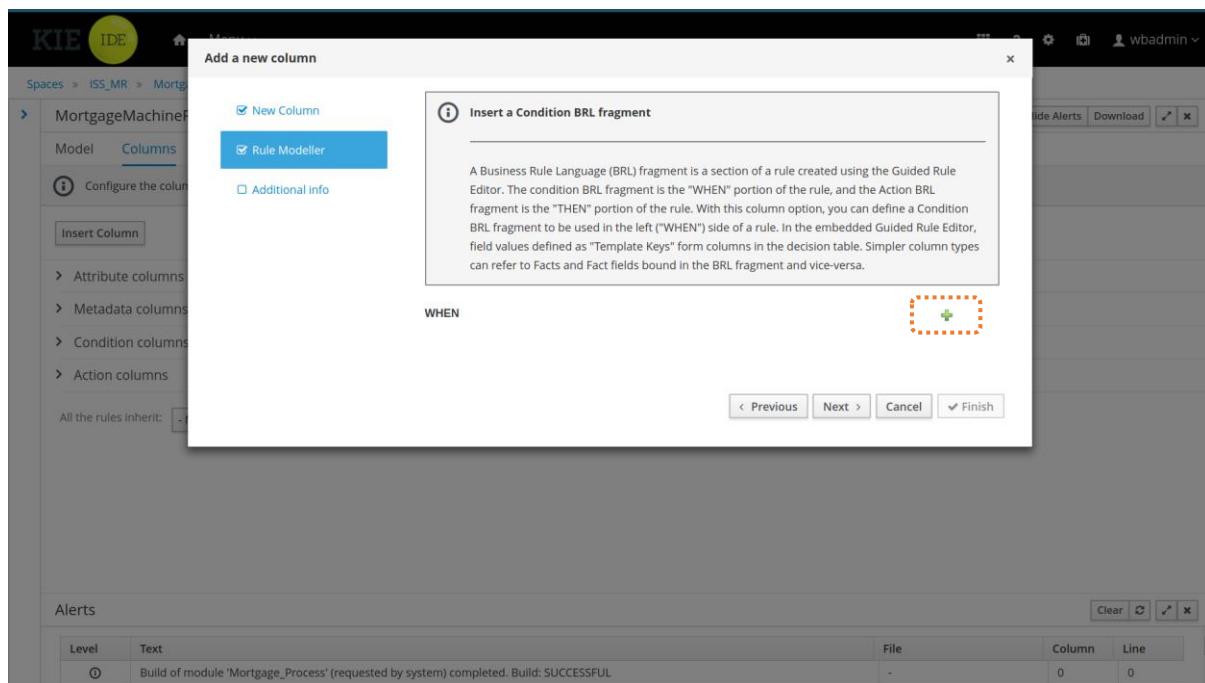
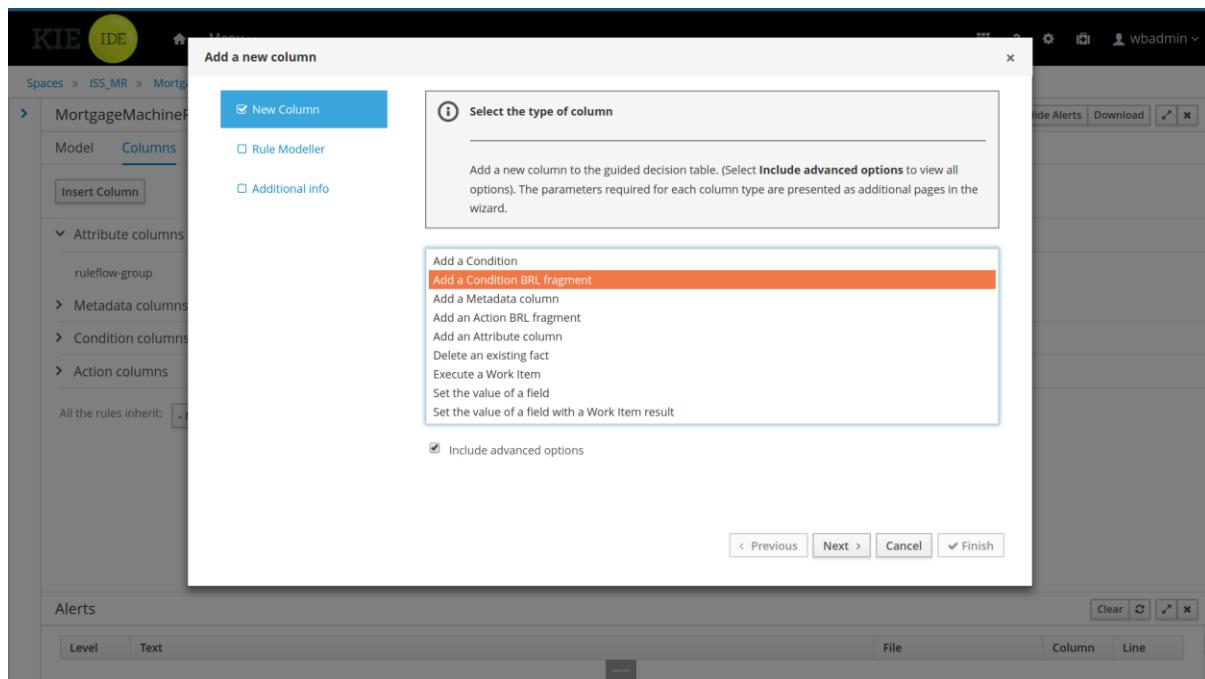
This screenshot shows the 'Add a new column' wizard in the KIE IDE, similar to the previous one but with a different selection. The 'Select the type of column' step is shown, and the 'Add an Attribute column' option is highlighted with a blue selection bar. Other options listed are 'Add a Condition', 'Add a Condition BRL fragment', 'Add a Metadata column', 'Add an Action BRL fragment', 'Delete an existing fact', 'Execute a Work Item', 'Set the value of a field', and 'Set the value of a field with a Work Item result'. The 'Include advanced options' checkbox is checked. The navigation buttons at the bottom are '< Previous', 'Next >', 'Cancel', and 'Finish'.

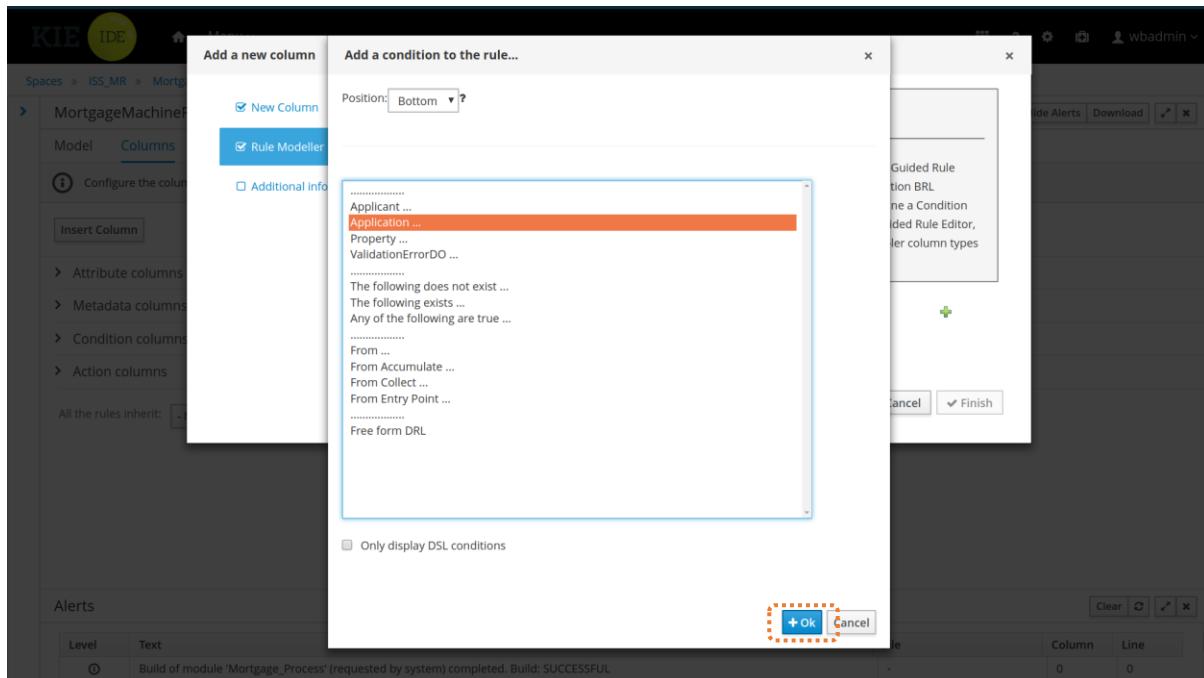


14) Key in Rule Flow Group value: ***MortgageMachineReasoningDT***,

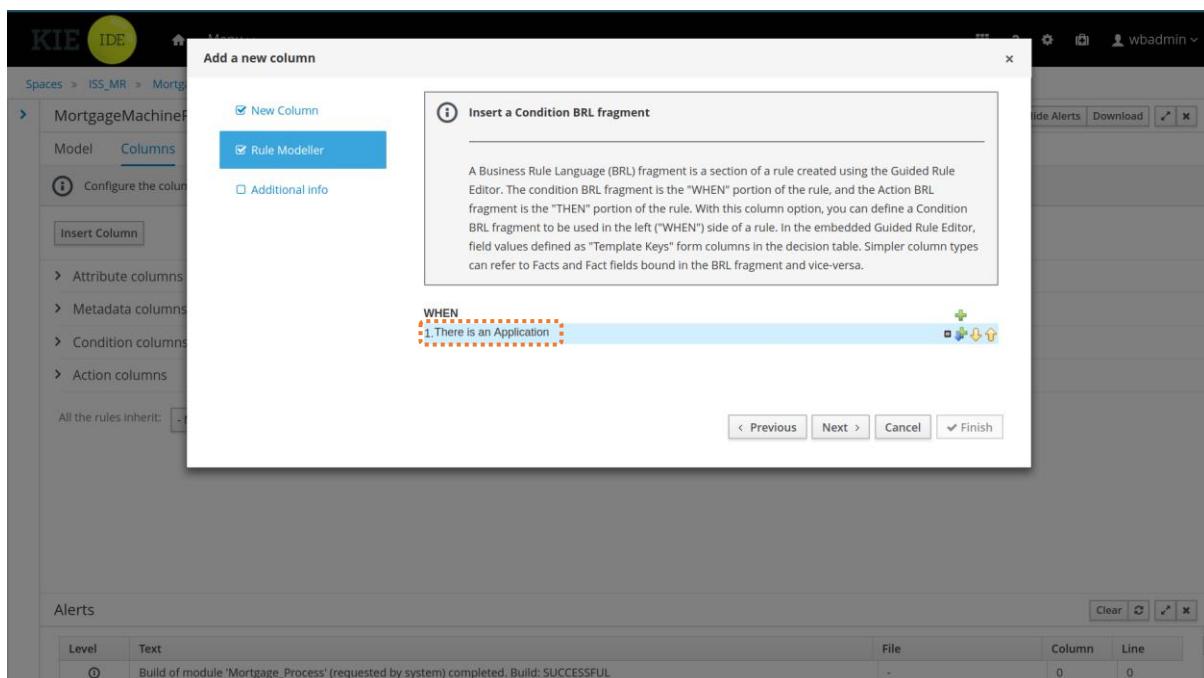
The screenshot shows the KIE IDE interface with the 'MortgageMachineReasoningDT.gdst' table open. The 'Columns' tab is selected. In the 'Attribute columns' section, there is a single column named 'ruleflow-group' with a 'Default value' of 'MortgageMach'. The 'MortgageMach' text is highlighted with a red box. The 'Delete' button next to the default value is also highlighted with a red box.

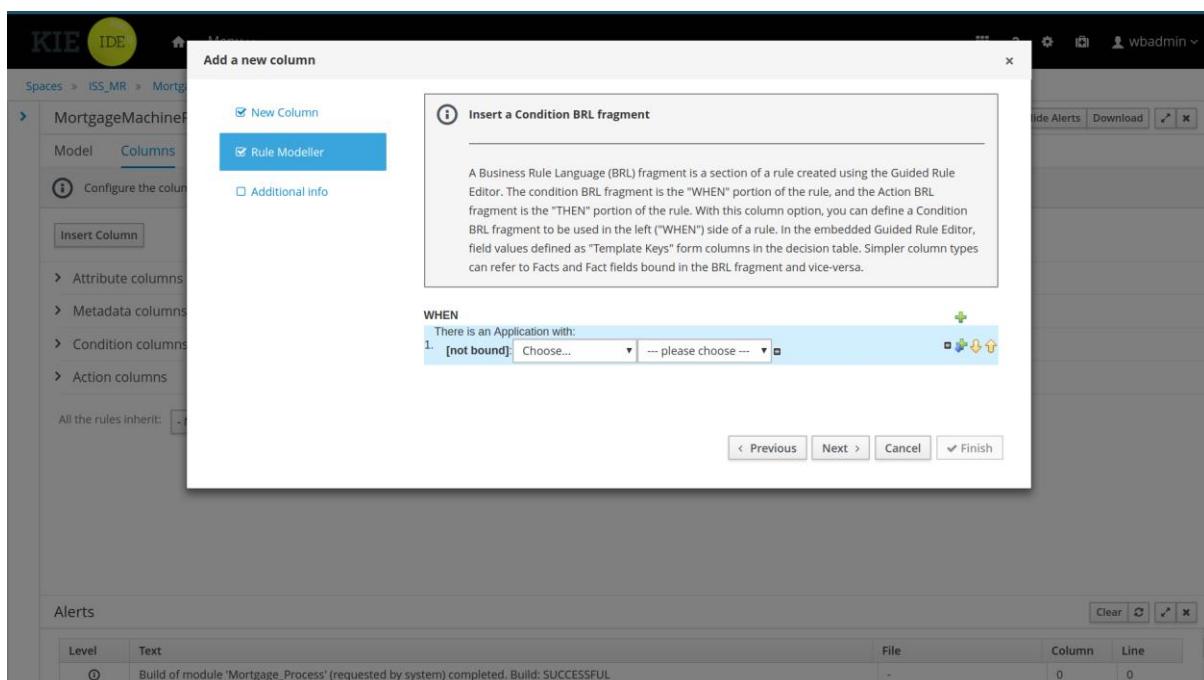
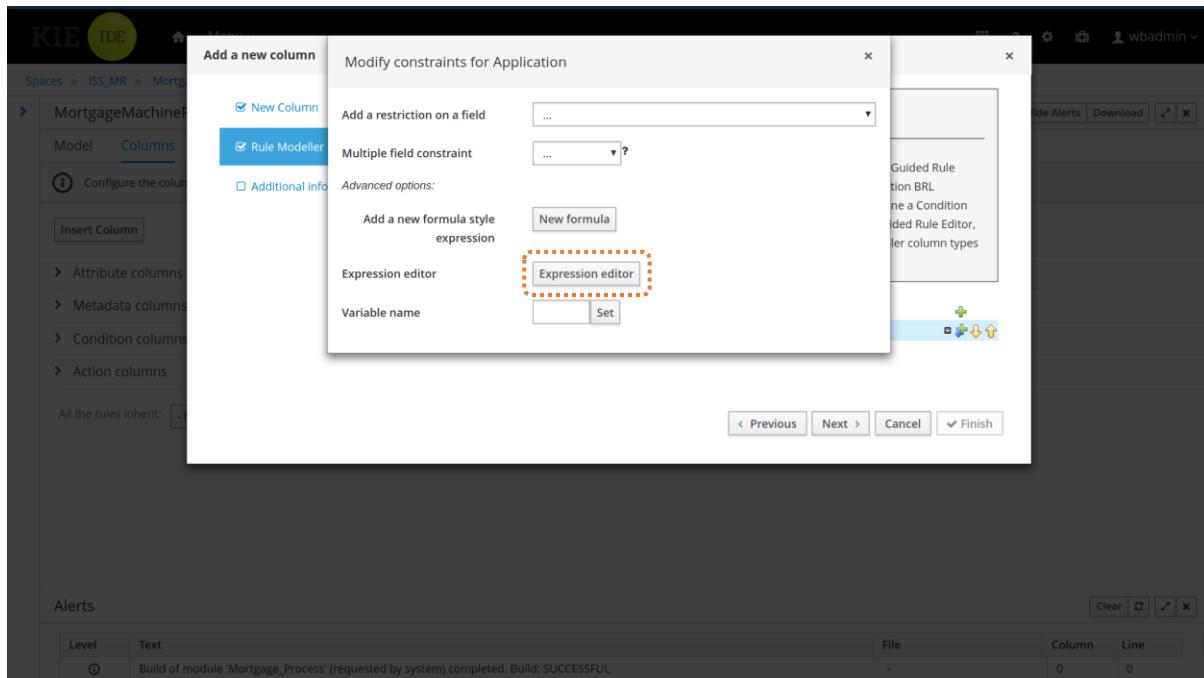
15) Add Decision Table Condition columns for *Applicant.ownHouse*; (WHEN part of Rule)

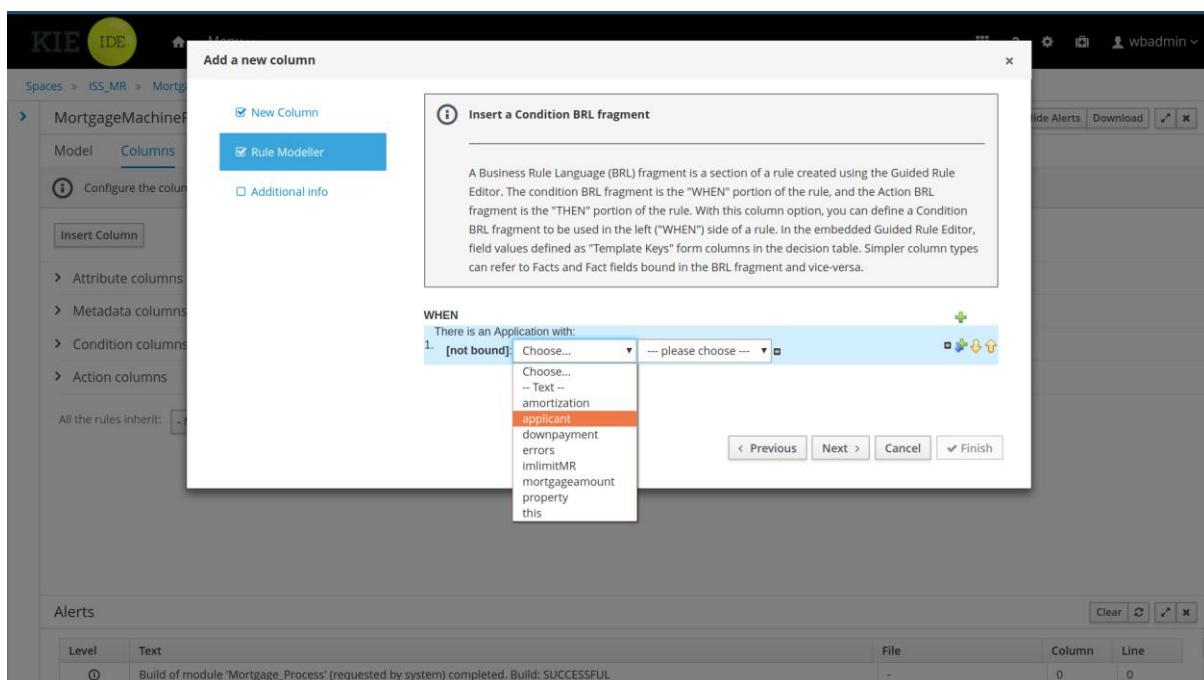
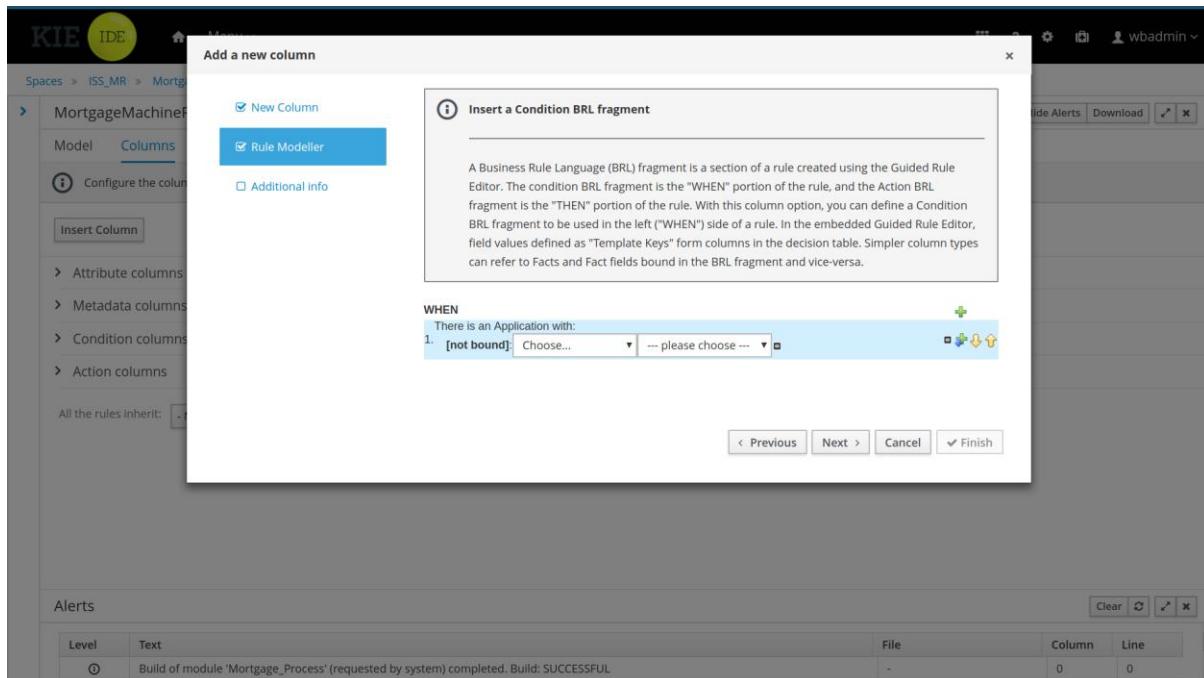




Click 'There is an Application with:'







KIE IDE

Add a new column

New Column

Rule Modeller

Additional info

WHEN

There is an Application with:

1. [not bound] applicant. Choose... --- please choose ---

- Choose...
- <=Delete item.
- Text -- address
- age
- annualincome
- creditrating
- hasJob
- name
- ownHouse**
- ssn

Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.	-	0	0

KIE IDE

Add a new column

New Column

Rule Modeller

Additional info

WHEN

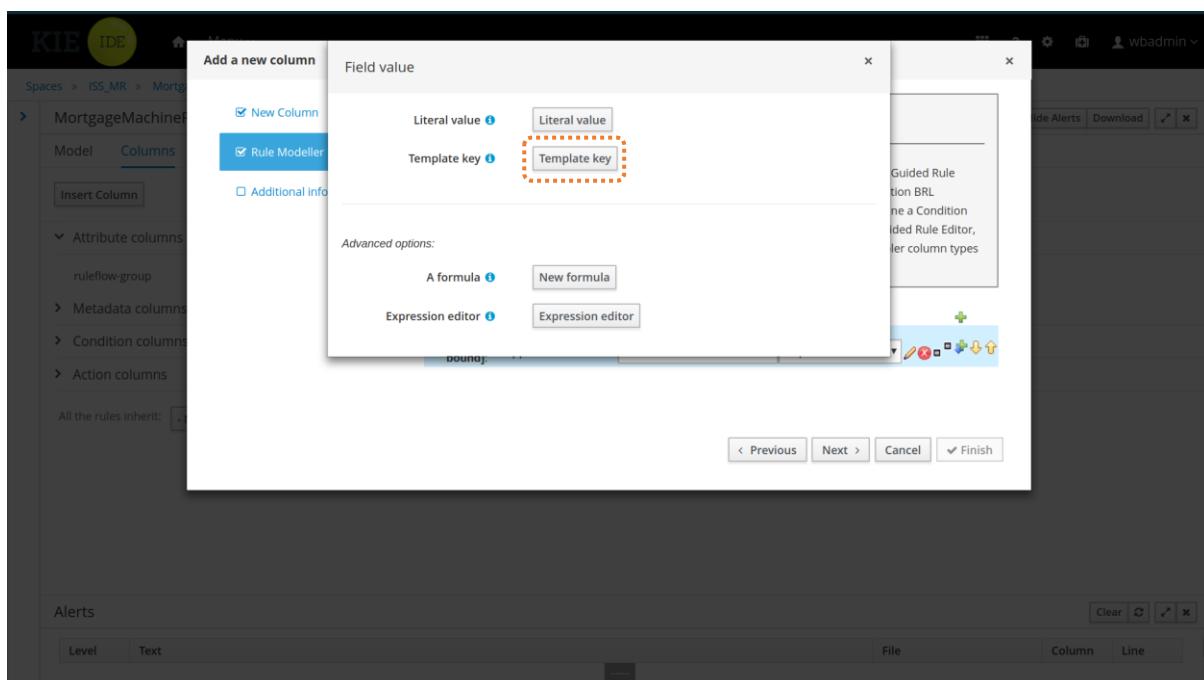
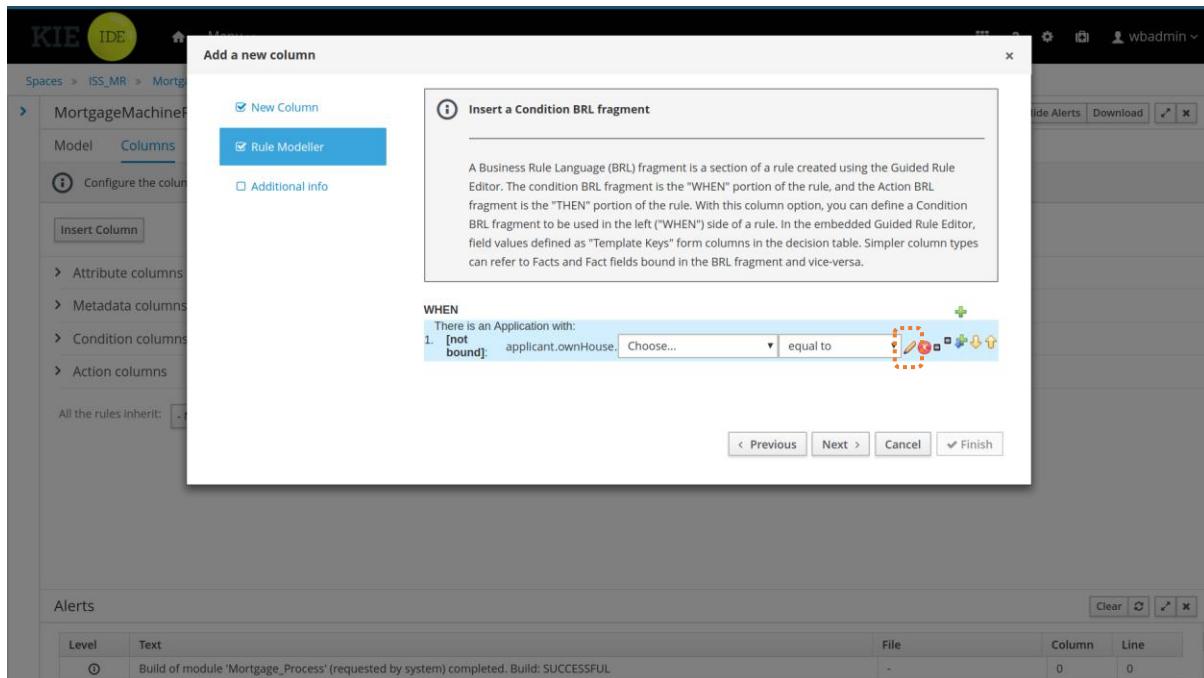
There is an Application with:

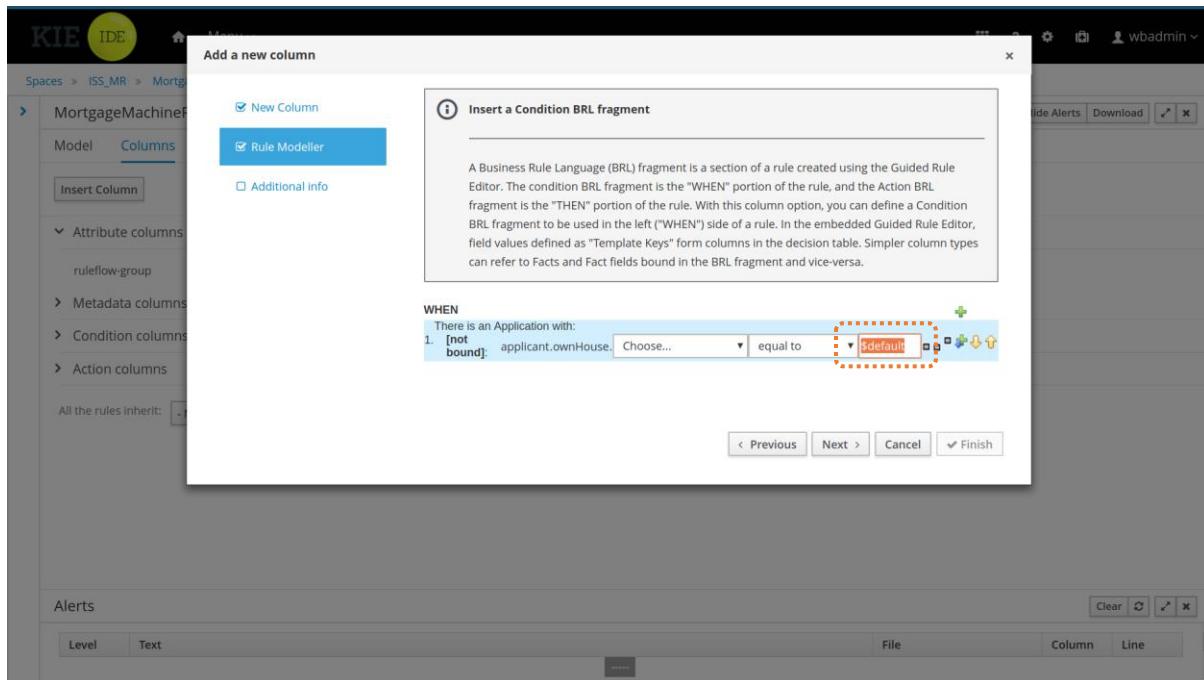
1. [not bound]: applicant.ownHouse. Choose... --- please choose ---

- Choose...
- <=Delete item...
- Text -- address
- age
- annualincome
- creditrating
- hasJob
- name
- ownHouse
 - Choose...
 - ... please choose ...
 - equal to**
 - not equal to
 - is null
 - is not null
- ssn

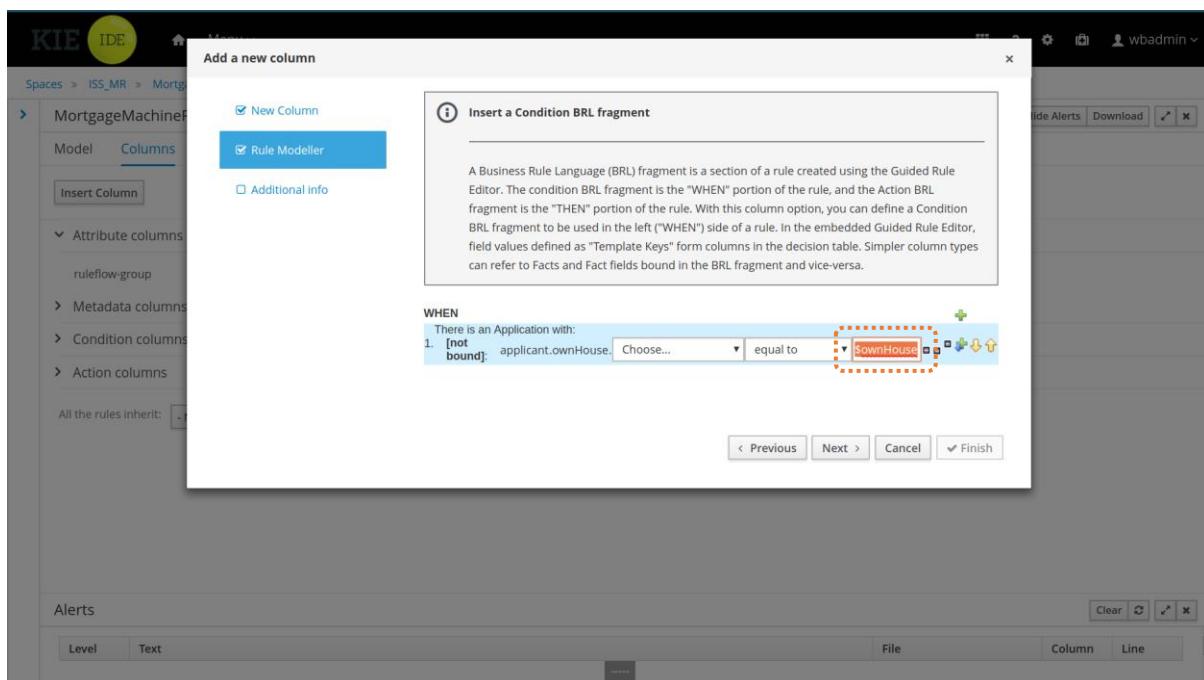
Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by system) completed. Build: SUCCESSFUL.	-	0	0

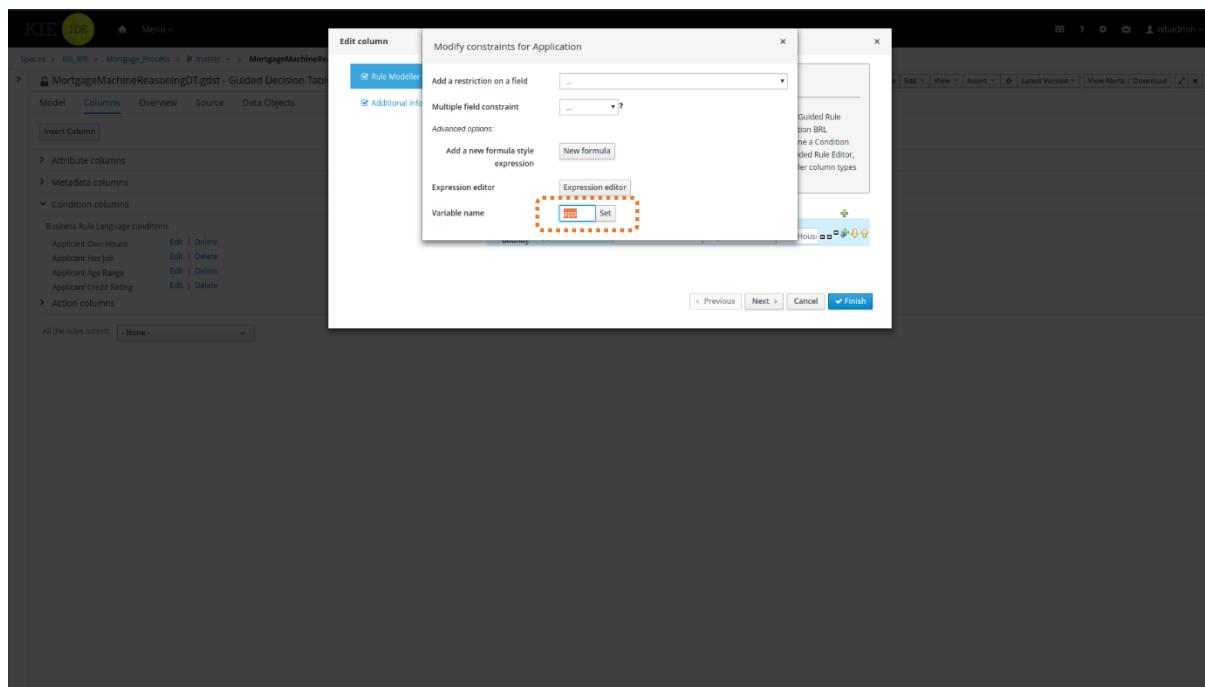
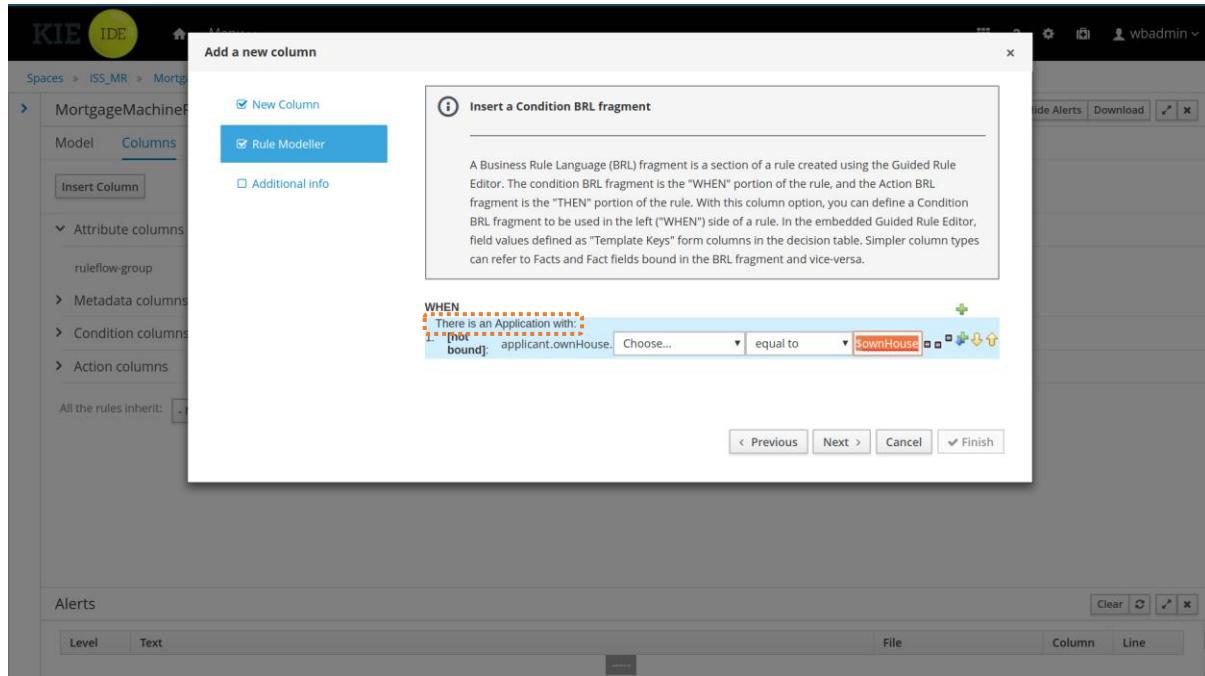


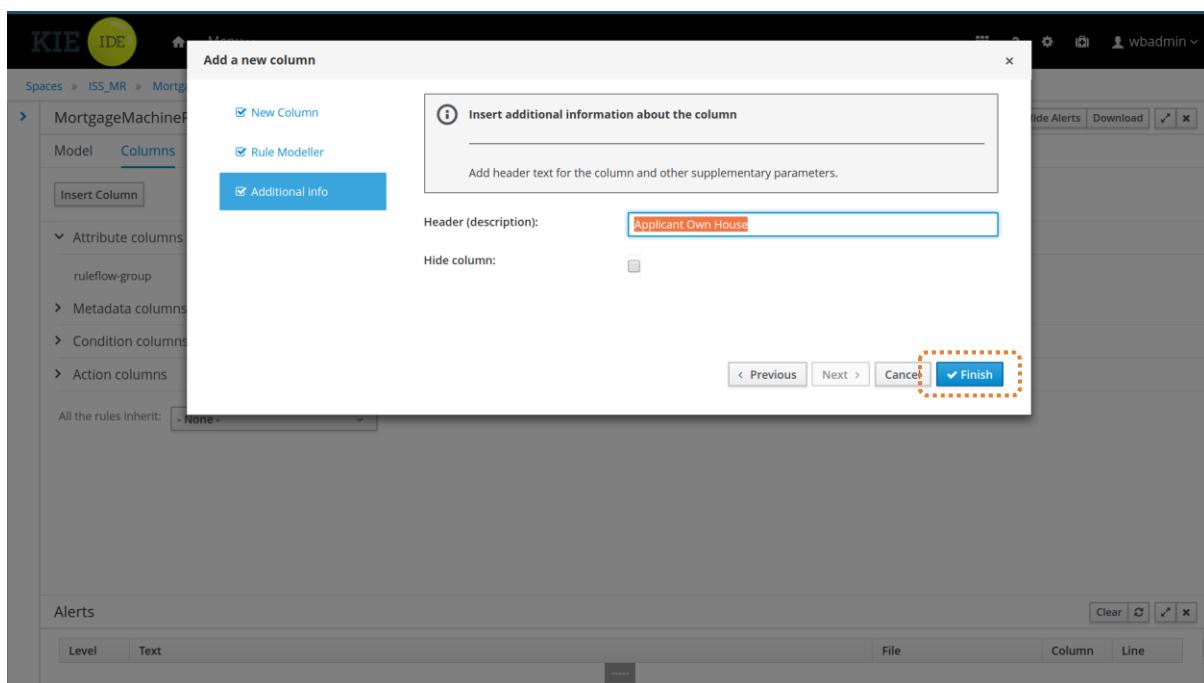
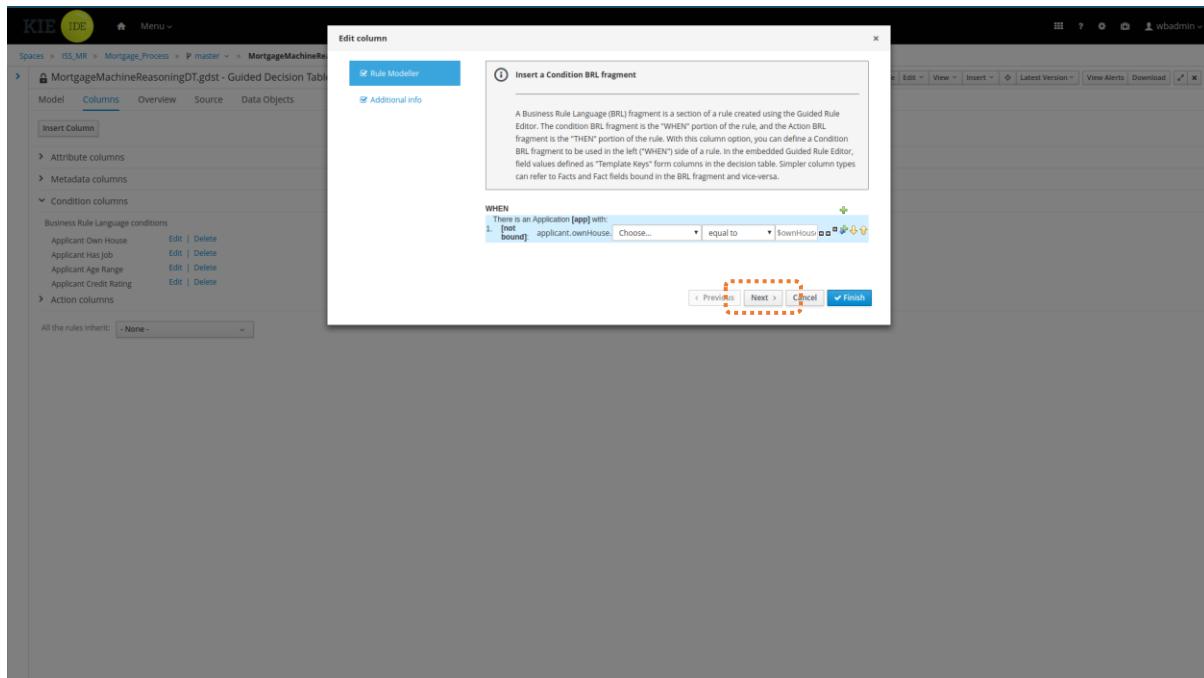


Update filed (**Template key**) value to: **\$ownHouse**



Click ‘**There is an Application with:**’ to assign (bind) the ***Application*** object instance (Java Bean) to Drools rule’s internal variable name: ***app***





Spaces > ISS_MR > Mortgage_Process > master > MortgageMachineReasoningDT

Model Columns Overview Source Data Objects

Insert Column

> Attribute columns
> Metadata columns
Condition columns
Business Rule Language conditions
Applicant Own House Edit | Delete
> Action columns

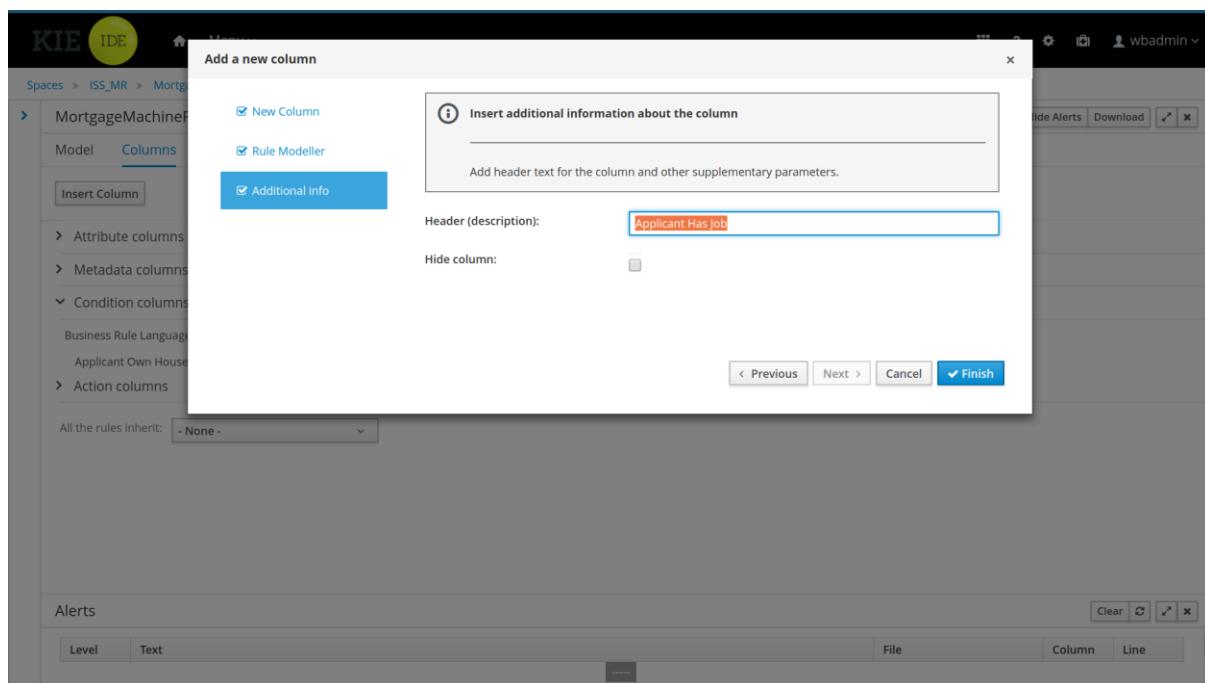
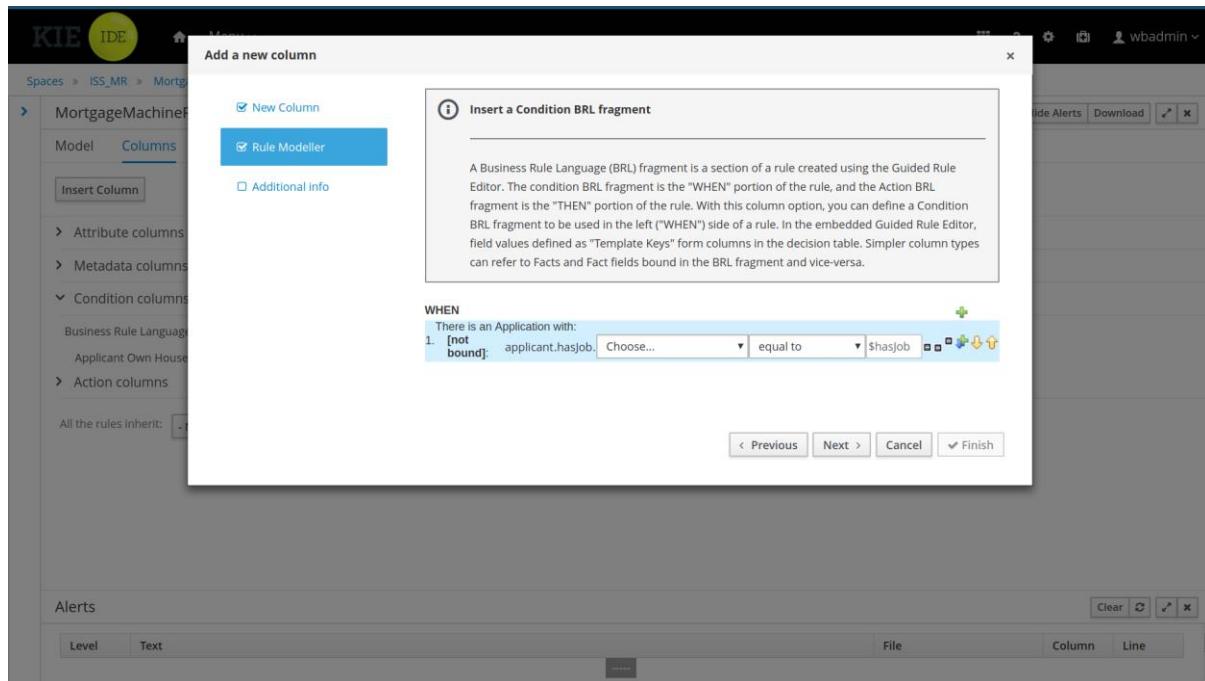
All the rules inherit: - None -

Alerts

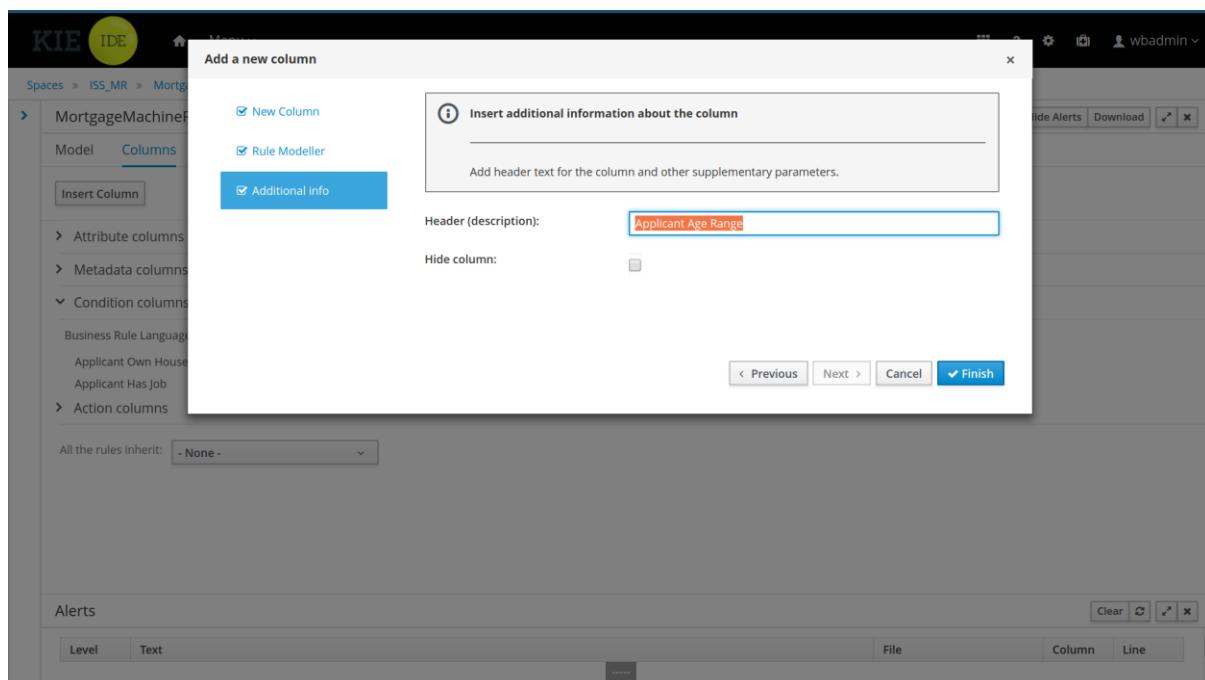
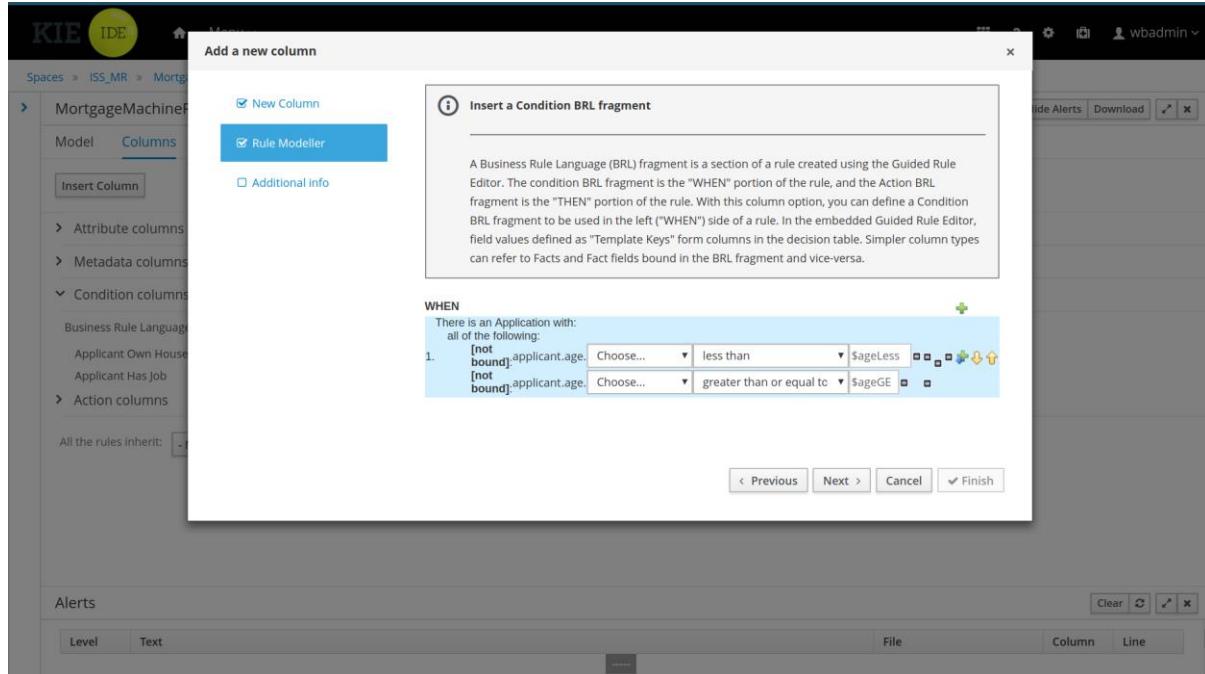
Level Text

File Column Line

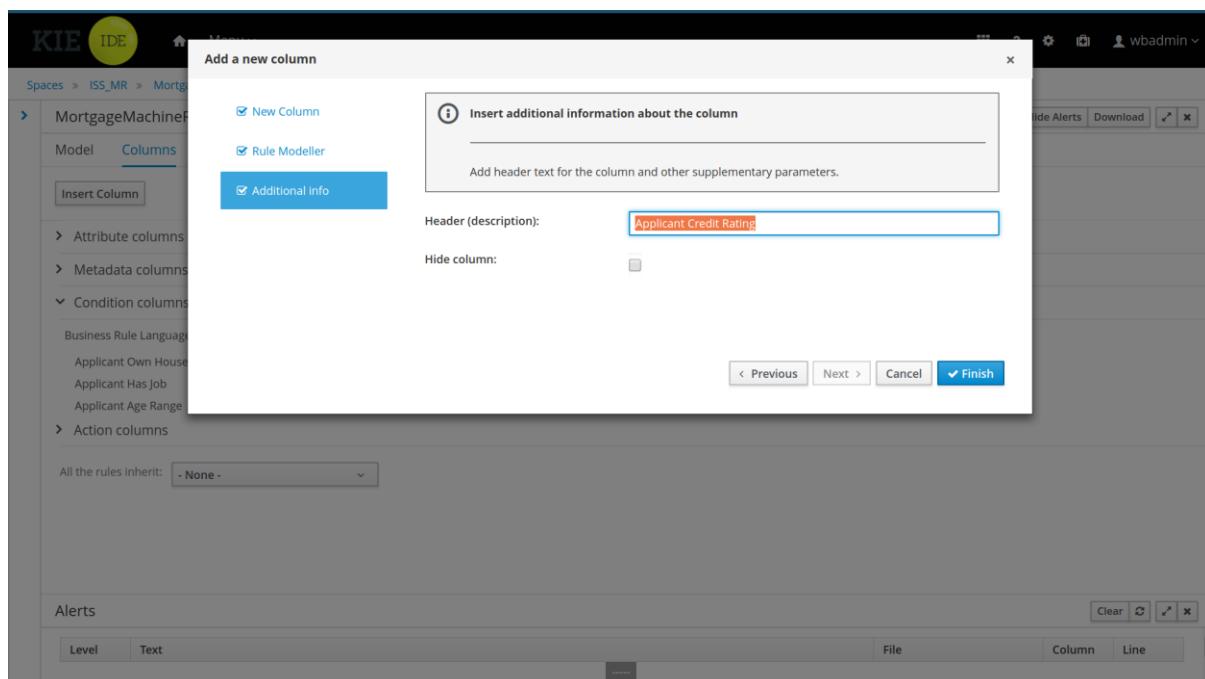
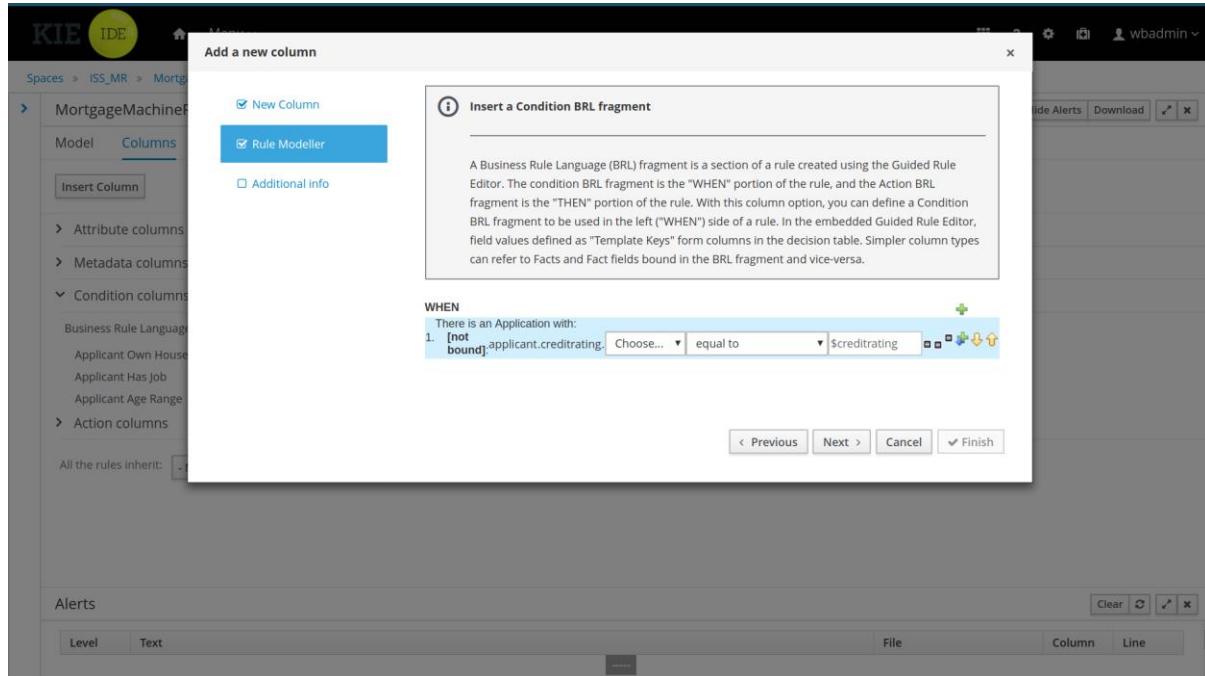
- 16) Similarly, add **Decision Table Condition columns** for ***Applicant.hasJob***; (WHEN part of Rule)
 Update filed (**Template key**) value to: **\$hasJob**



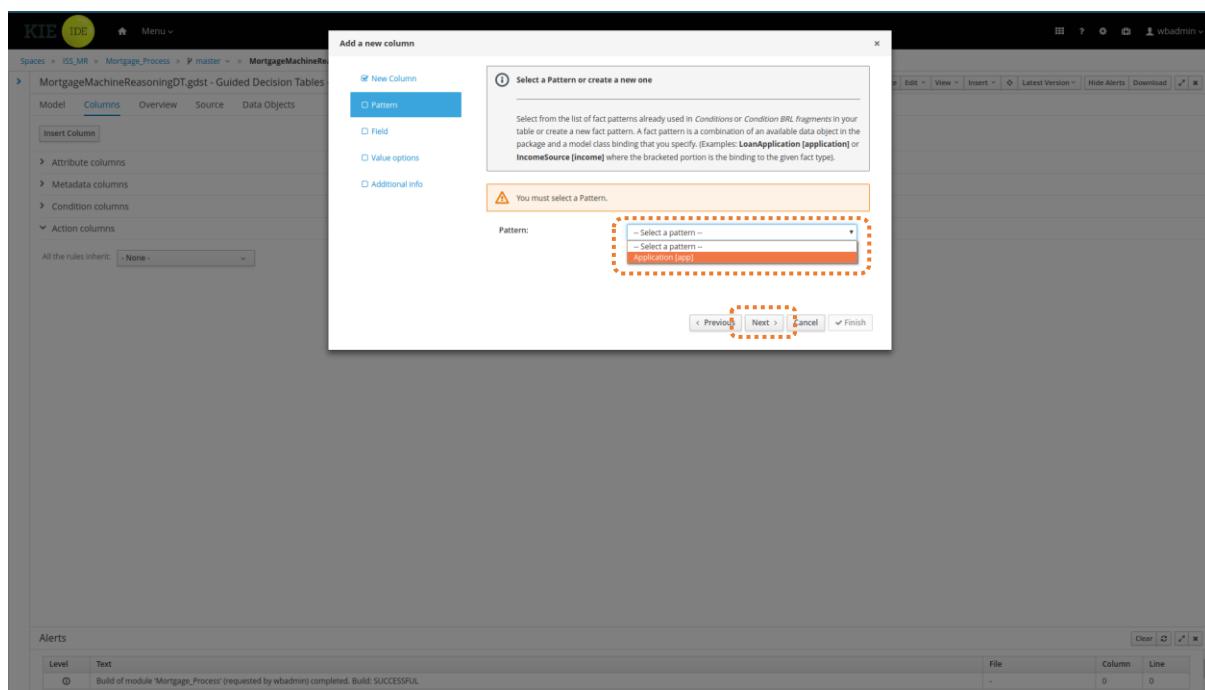
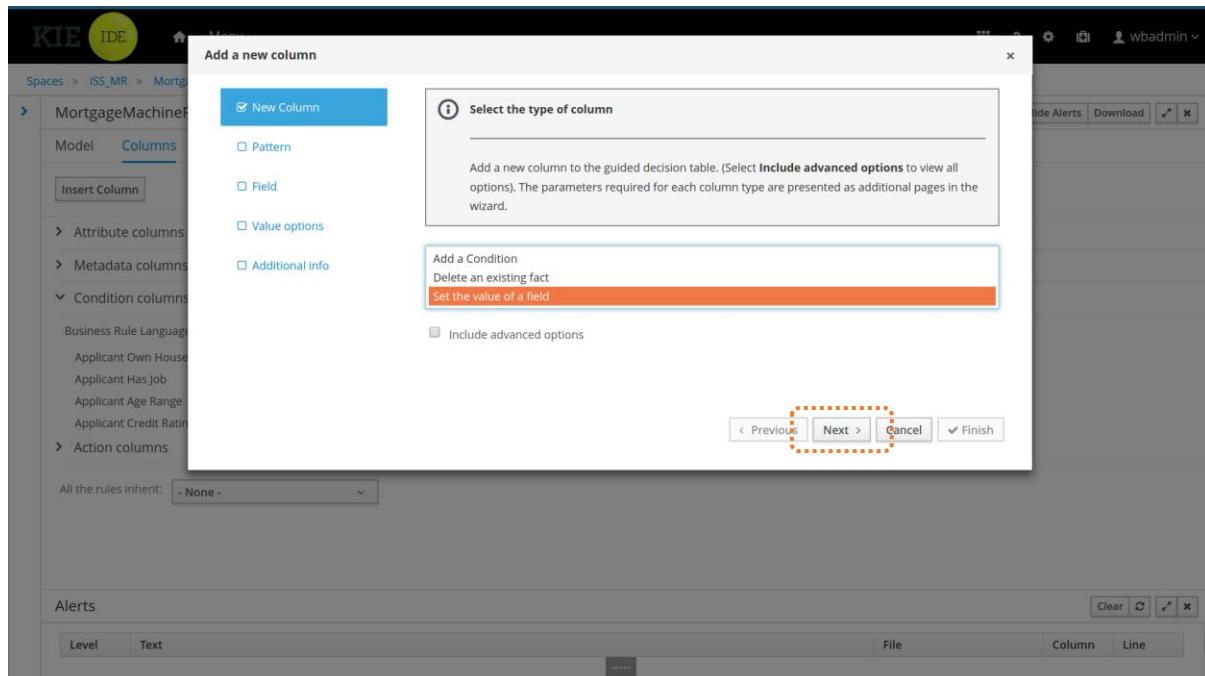
- 17)[Optional] Add **Decision Table Condition columns** for ***Applicant.age***; (WHEN part of Rule)
 Update filed (**Template key**) value to: **\$ageLess**
 Update filed (**Template key**) value to: **\$ageGE**



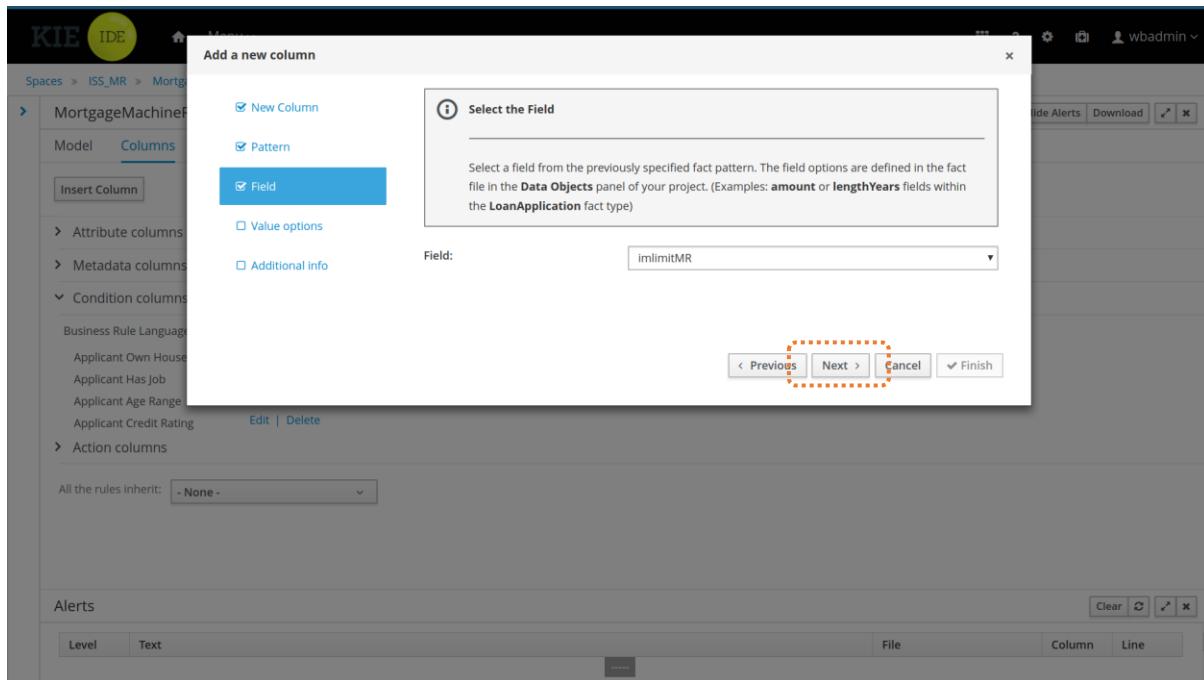
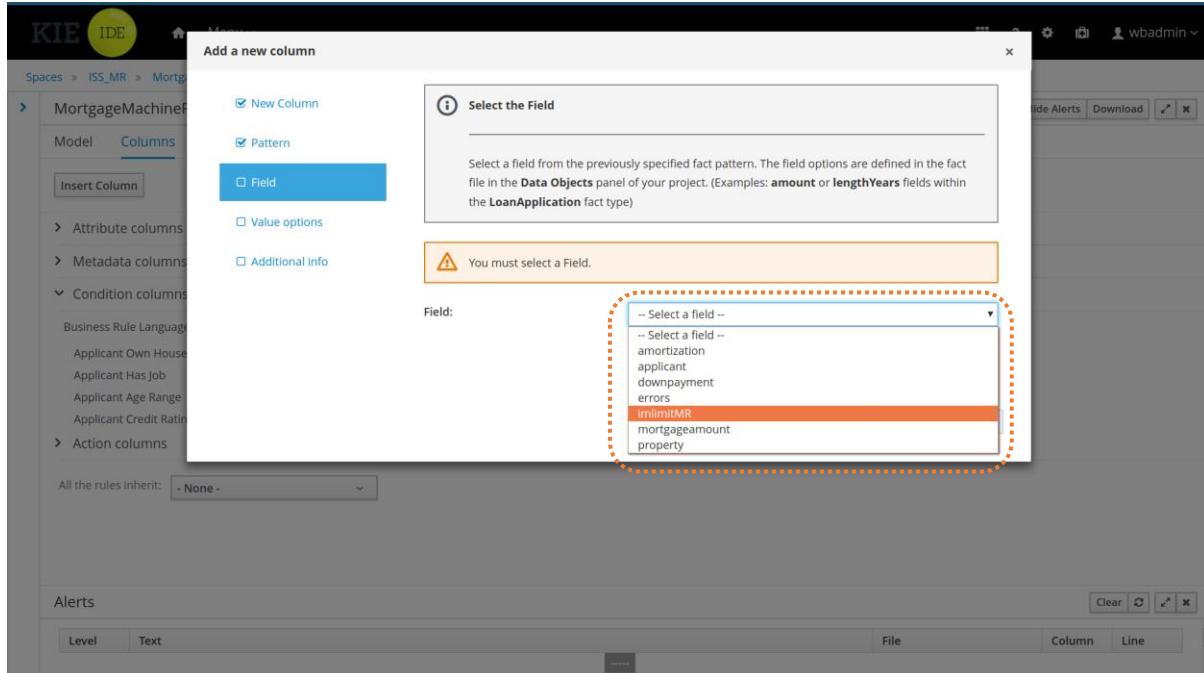
**18)[Optional] Add Decision Table Condition columns for
Applicant.creditrating; (WHEN part of Rule)
 Update filed (Template key) value to: **\$creditrating****

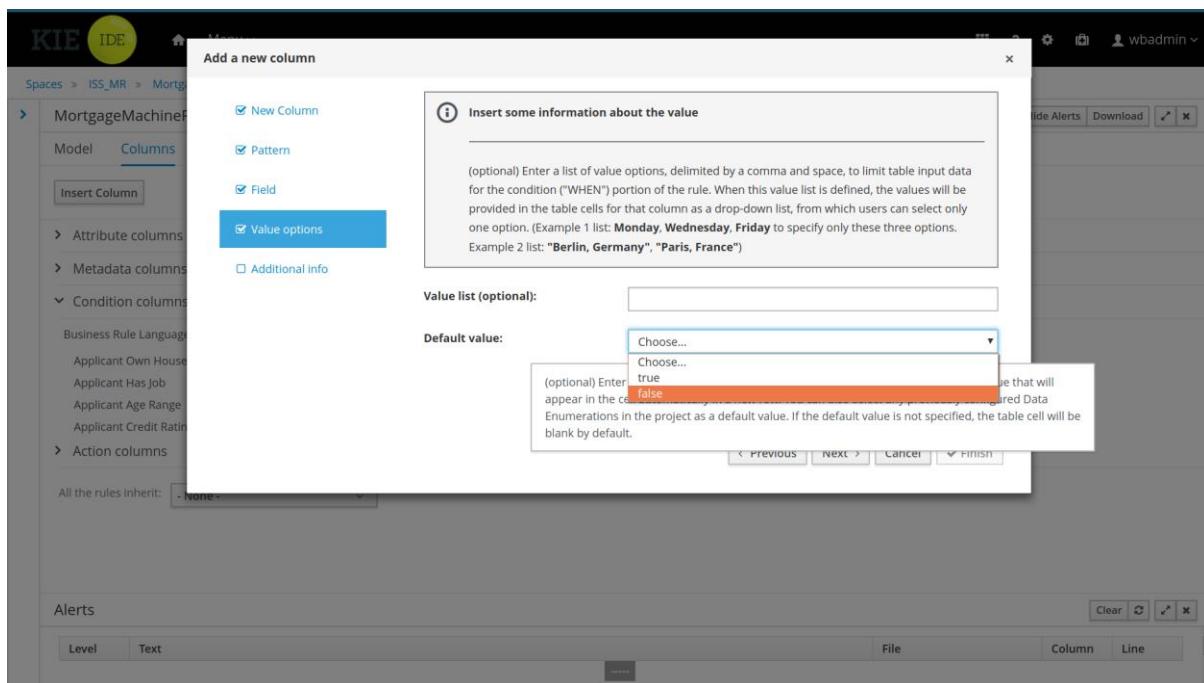
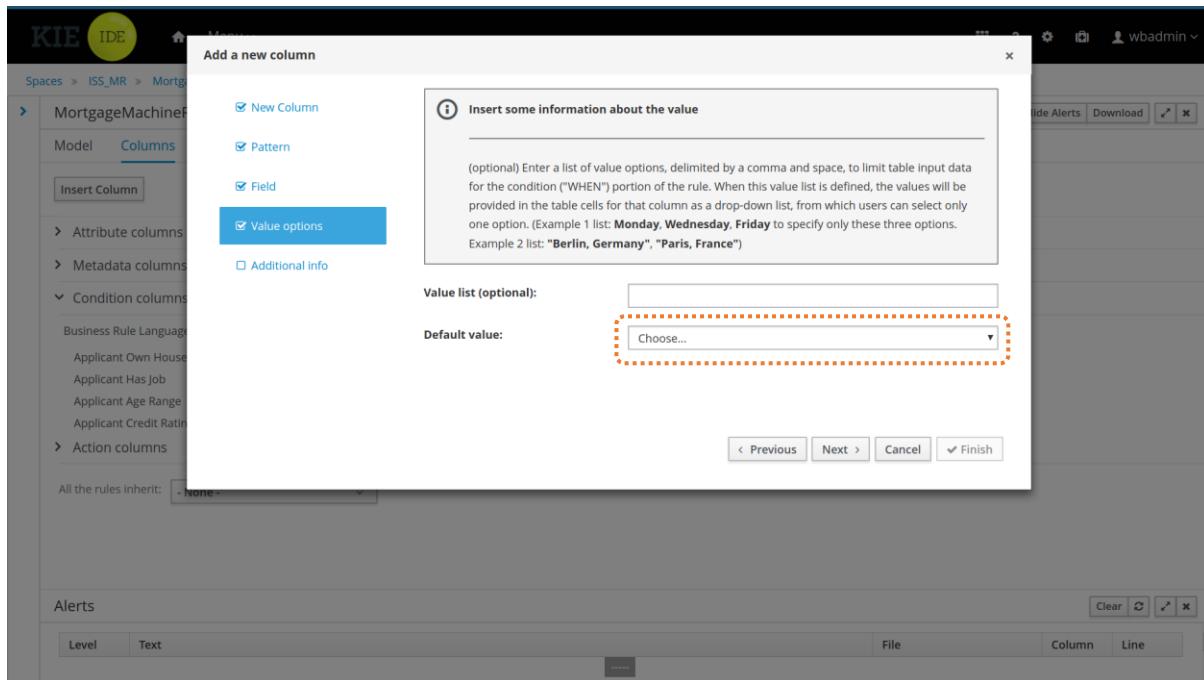


19) Set target decision value for ***Application.inlimitMR***; (THEN part of Rule)

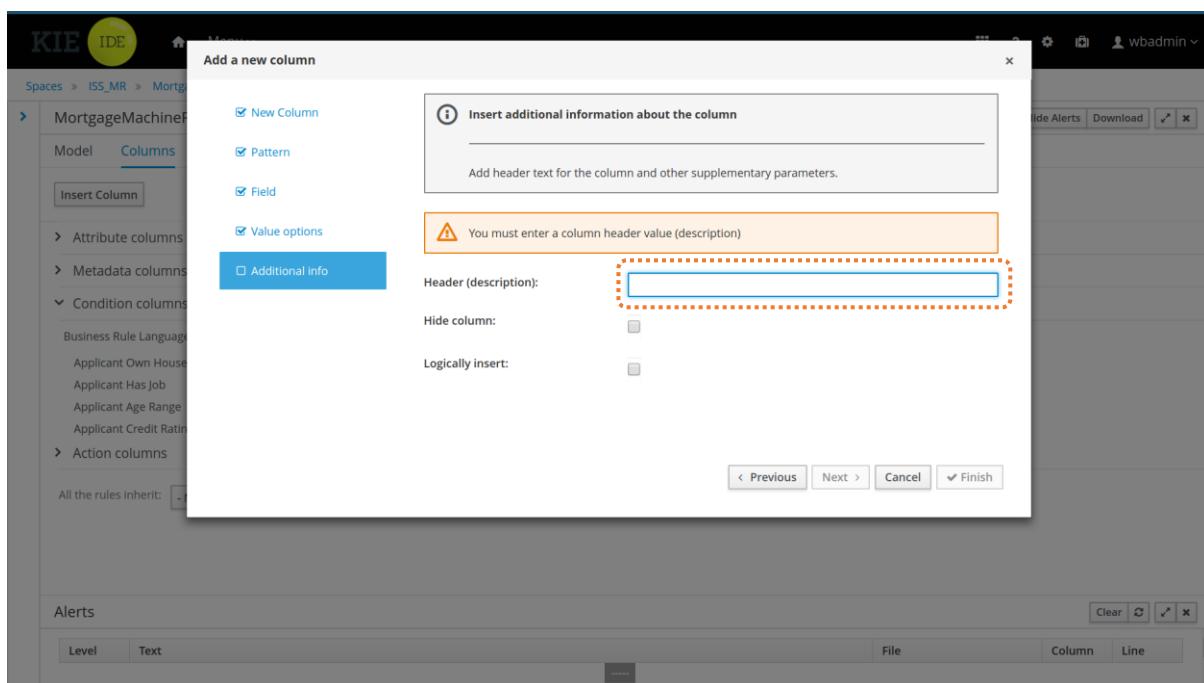
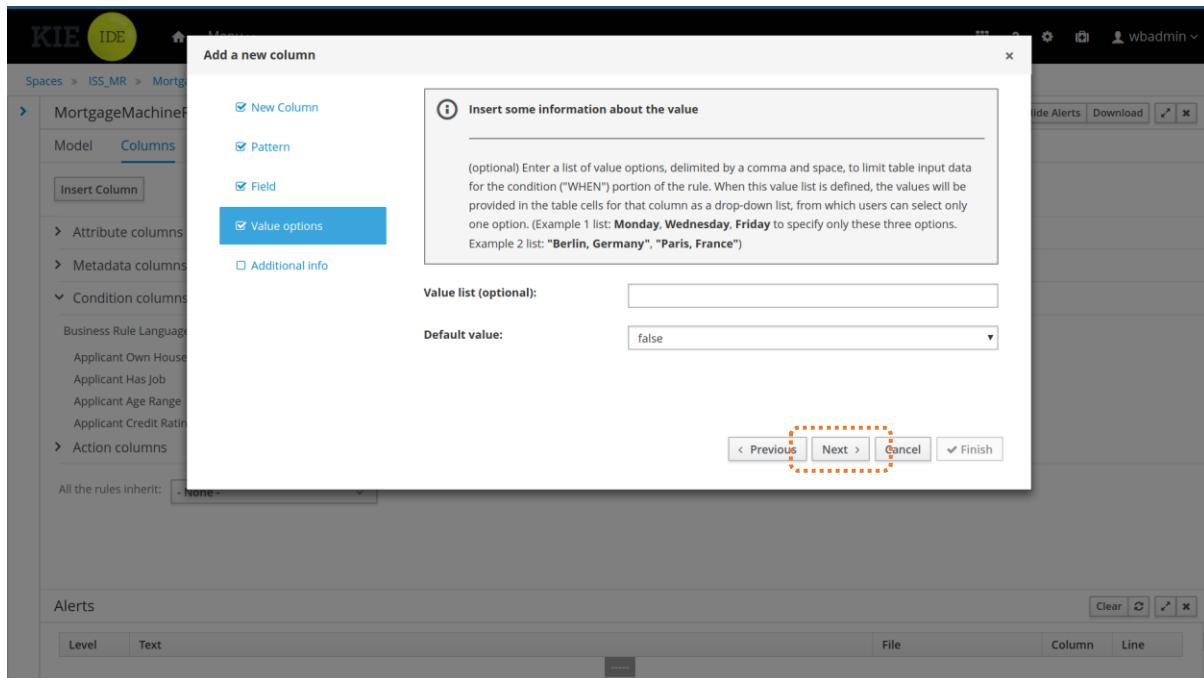


Select: ***inlimitMR***





Select default value: **false**

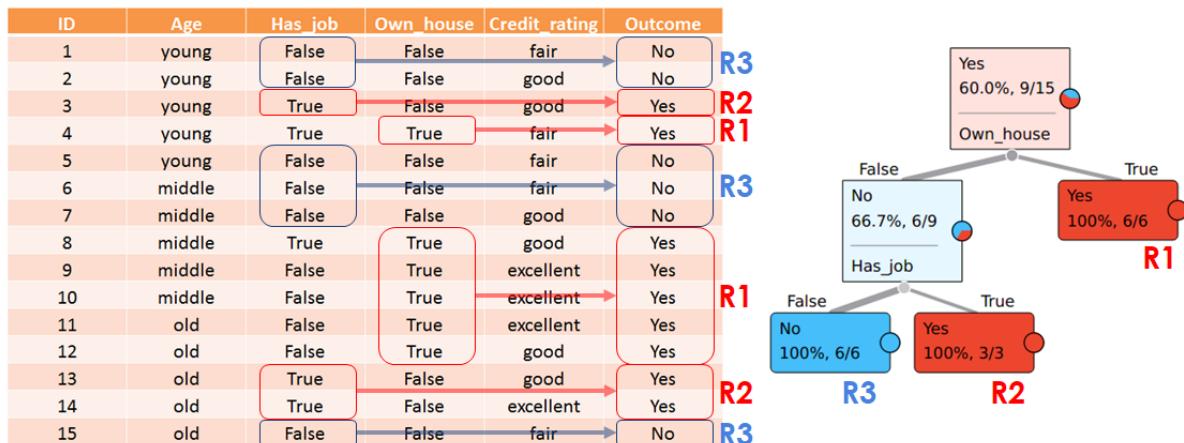


Key in Header (description): Approval In Limit

The screenshot shows the KIE IDE interface with the following details:

- Header:** KIE IDE, Menu, Spaces > ISS_MR > Mortgage_Process > master > MortgageMachineReasoningDT.
- Toolbar:** Save, Delete, Rename, Copy, Validate, Edit, View, Insert, Latest Version, Hide Alerts, Download.
- Table:** MortgageMachineReasoningDT.gdst - Guided Decision Tables. The table has columns: #, Description, ruleflow-group, Applicant Own House, Applicant Has job, Applicant Age Range, Applicant Credit Ratification : Applicant Approval In Limit. The first two columns are merged.
- Context Menu:** Opened over the table, showing options: Append row, Insert row above, Insert row below, Insert column.
- Alerts:** Build of module 'Mortgage_Process' (executed by wbadmin) completed. Build: SUCCESSFUL.

20) Update decision table based on discovered decision tree's rules;



KIE IDE

Spaces > ISS_MR > Mortgage_Process > master > MortgageMachineReasoningDT

MortgageMachineReasoningDT.gdst - Guided Decision Tables

Model Columns Overview Source Data Objects

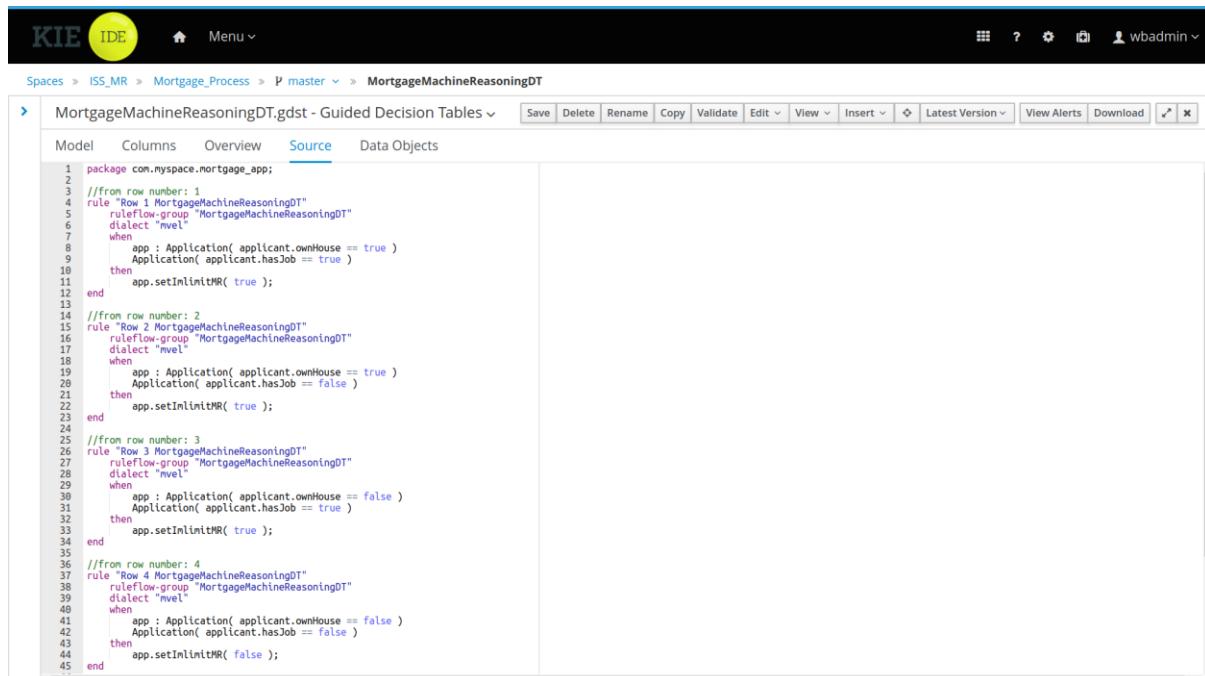
MortgageMachineReasoningDT

#	Description	ruleflow-group	Applicant Own House	Applicant Has Job	Applicant Age Range	Applicant Credit Rating	application : Application	
			\$ownHouse	\$hasjob	\$ageLess	\$ageGE	\$creditrating	Approval In Limit
1	MortgageMachineReasoningDT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/> R1
2	MortgageMachineReasoningDT		<input checked="" type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/> R1
3	MortgageMachineReasoningDT		<input type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/> R2
4	MortgageMachineReasoningDT		<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/> R3

Alerts

Level	Text	File	Column	Line
Info	Build of module 'Mortgage_Process' (requested by wbadmin) completed. Build: SUCCESSFUL	-	0	0

21)[Optional] View rules in source code form;

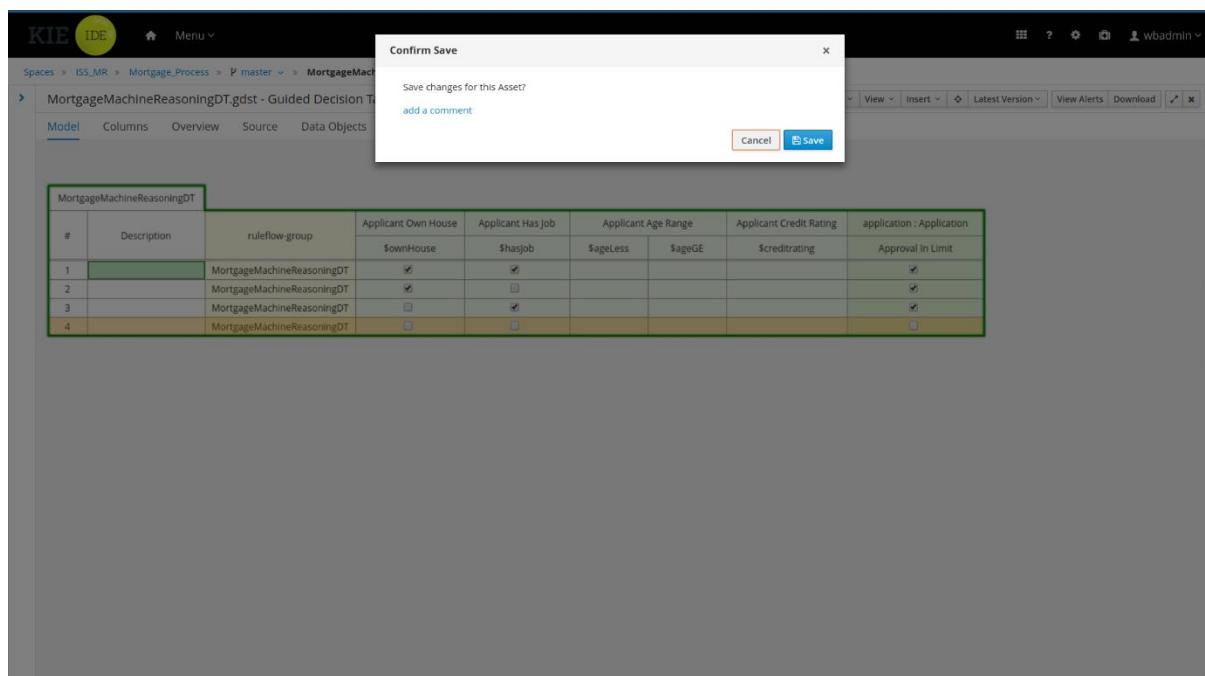


```

1 package com.myspace.mortgage_app;
2
3 //from row number: 1
4 rule "Row 1 MortgageMachineReasoningDT"
5   ruleflow-group "MortgageMachineReasoningDT"
6   dialect "mvel"
7   when
8     app : Application( applicant.ownHouse == true )
9     Application( applicant.hasJob == true )
10    then
11      app.setInLimitMR( true );
12    end
13
14 //from row number: 2
15 rule "Row 2 MortgageMachineReasoningDT"
16   ruleflow-group "MortgageMachineReasoningDT"
17   dialect "mvel"
18   when
19     app : Application( applicant.ownHouse == true )
20     Application( applicant.hasJob == false )
21    then
22      app.setInLimitMR( true );
23    end
24
25 //from row number: 3
26 rule "Row 3 MortgageMachineReasoningDT"
27   ruleflow-group "MortgageMachineReasoningDT"
28   dialect "mvel"
29   when
30     app : Application( applicant.ownHouse == false )
31     Application( applicant.hasJob == true )
32    then
33      app.setInLimitMR( true );
34    end
35
36 //from row number: 4
37 rule "Row 4 MortgageMachineReasoningDT"
38   ruleflow-group "MortgageMachineReasoningDT"
39   dialect "mvel"
40   when
41     app : Application( applicant.ownHouse == false )
42     Application( applicant.hasJob == false )
43    then
44      app.setInLimitMR( false );
45  end

```

22)Save changes;

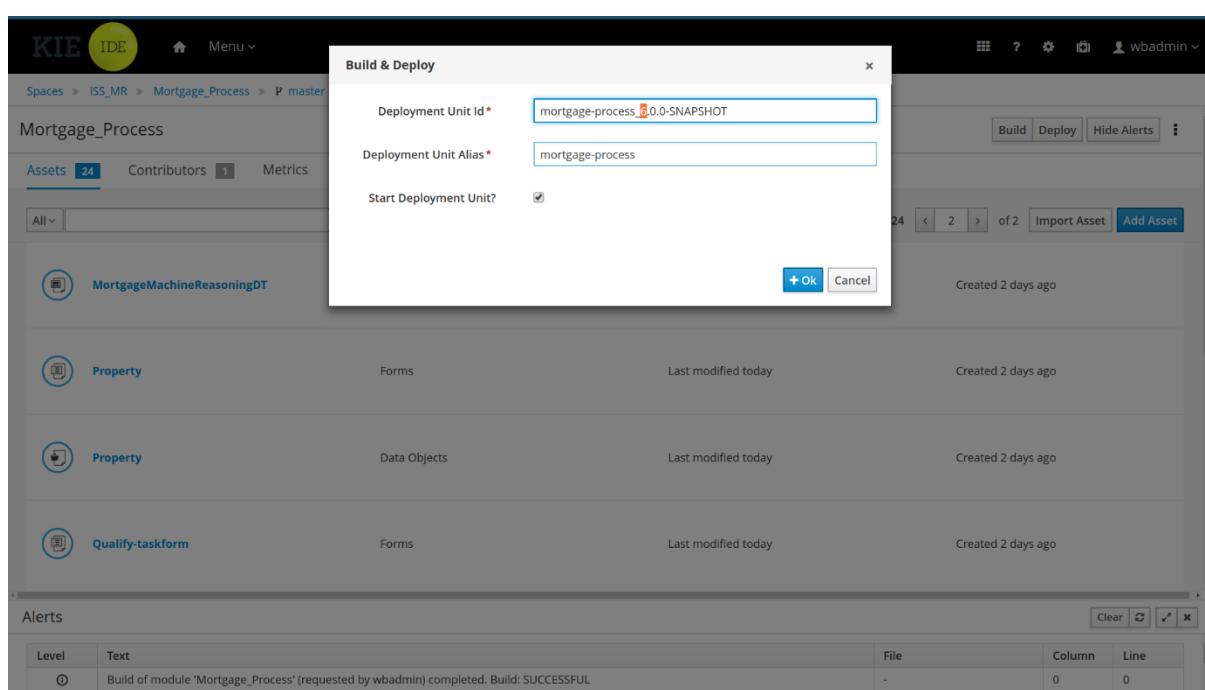


#	Description	ruleflow-group	Applicant Own House	Applicant Has Job	Applicant Age Range	Applicant Credit Rating	application : Application
			\$ownHouse	\$hasJob	\$ageLess	\$ageGE	\$creditrating
1	MortgageMachineReasoningDT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
2	MortgageMachineReasoningDT		<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>
3	MortgageMachineReasoningDT		<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
4	MortgageMachineReasoningDT		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>

3.2.2. Business system enhancement [Deploy] v6.0.0

{ Objective } Deploy enhanced mortgage application: Start a new mortgage application, fill in application form to trigger business process and **InLimitMR** decision automation.

- 1) Deploy enhanced system onto KIE web server: **mortgage-process_6.0.0-SNAPSHOT**



The screenshot shows the KIE IDE interface. On the left, the 'SERVER CONFIGURATIONS' sidebar is open, showing 'sample-server' selected. Under 'DEPLOYMENT UNITS', the 'mortgage-process_6.0.0-SNAPSHOT' entry is highlighted. The main panel displays the deployment status for 'sample-server@localhost:8080', which is marked as 'OK'. Below it, the URL http://localhost:8080/kie-server/services/rest/server/containers/mortgage-process_6.0.0-SNAPSHOT is shown along with the version 'v1.0.0-SNAPSHOT'.

- 2) Select the mortgage system with intended version, e.g., ***mortgage-process_6.0.0-SNAPSHOT***, then click: **Start**

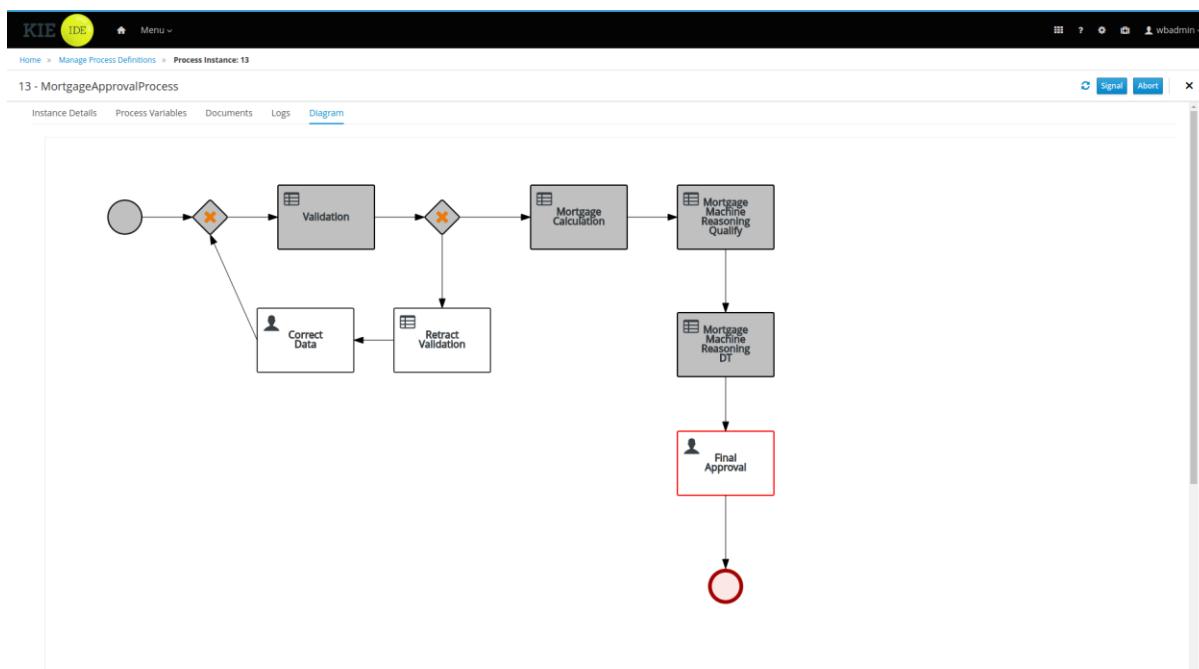
The screenshot shows the 'Manage Process Definitions' page. A context menu is open over the third row of the table, with 'Start' highlighted. The table lists six rows of process definitions, each with a different deployment status:

Name	Version	Deployment	Actions
MortgageApprovalProcess	1.0	mortgage-process_5.0.0-SNAPSHOT	⋮
MortgageApprovalProcess	1.0	mortgage-process_1.0.0-SNAPSHOT	⋮
MortgageApprovalProcess	1.0	mortgage-process_6.0.0-SNAPSHOT	⋮
MortgageApprovalProcess	1.0	mortgage-process_2.0.0-SNAPSHOT	⋮
MortgageApprovalProcess	1.0	mortgage-process_4.0.0-SNAPSHOT	⋮
MortgageApprovalProcess	1.0	mortgage-process_3.0.0-SNAPSHOT	⋮

- 3) To validate the new business rules in [Decision Table], fill in the mortgage application form as shown in below **three** scenarios;

Use/Test Case 1: Applicant has job, but not owning a house.

The screenshot shows the 'MortgageApprovalProcess' form in the KIE IDE. The 'Application' section includes fields for 'Down Payment' (50000), 'Years of amortization' (20), 'Name' (Sam GU), 'Age' (21), 'Credit Rating' (25 HMKT), 'Annual Income' (123456), 'SSN' (SSN), and 'Property' details like 'Age of property' (3), 'Address of property' (25 HMKT), 'Locale' (Urban), and 'Sale Price' (250000). The 'Has job' checkbox is checked, while 'Own House' is unchecked. A 'Submit' button is at the bottom right.



KIE  Menu ▾

Home > Task Index > Task: 14

14 - Final Approval

Work Details Assignments Comments Admin Logs

Inputs:

Application

Mortgage amount

Down Payment

Years of amortization

Applicant

Name

Age Credit Rating Has job Own House

Annual Income

SSN

Property

Age of property

Address of property

Locale

Sale Price

Inlimit Sam

{ Tips }

1st stage Approved: \$200,000 Mortgage Amount: within limit **mortgage amount $200,000 \geq \text{property sale price } 250,000 - \text{down payment } 50,000$**

2nd stage Approved: **inlimitMR** checked: applicant has job

Use/Test Case 2: Applicant is jobless, but owning a house.

KIE IDE | Home > Manage Process Definitions | MortgageApprovalProcess | Correlation key | Form | Application | Applicant | Property | Submit | Actions | 1-8 of 8

Application

Down Payment: 50000 | Years of amortization: 20

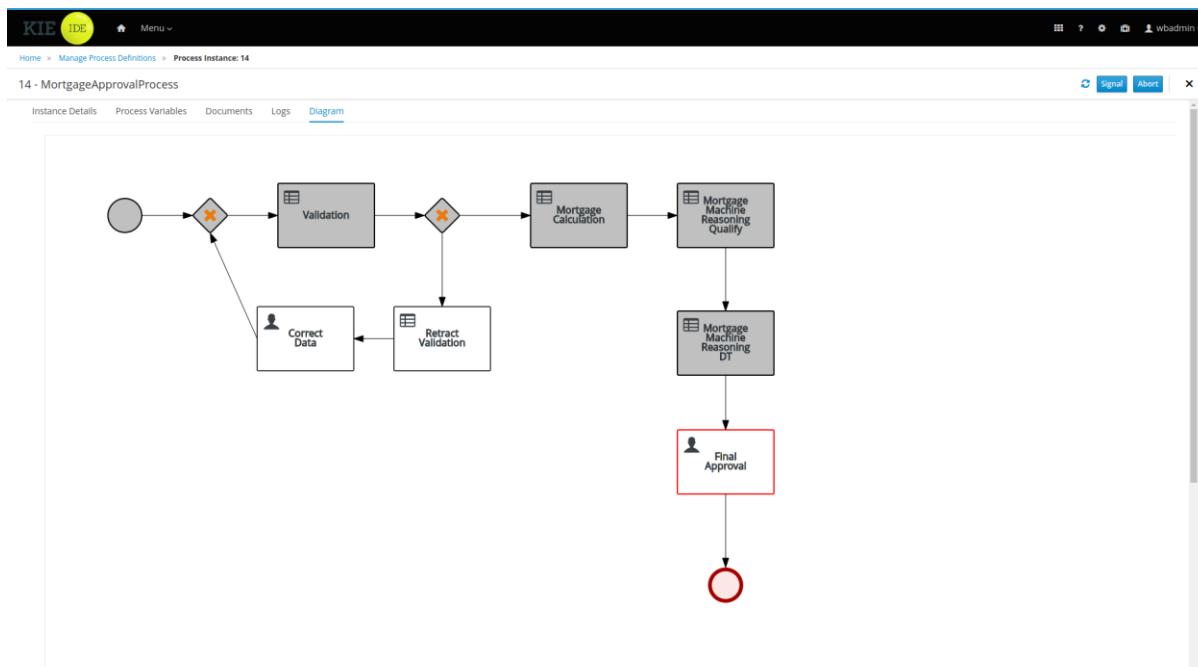
Applicant

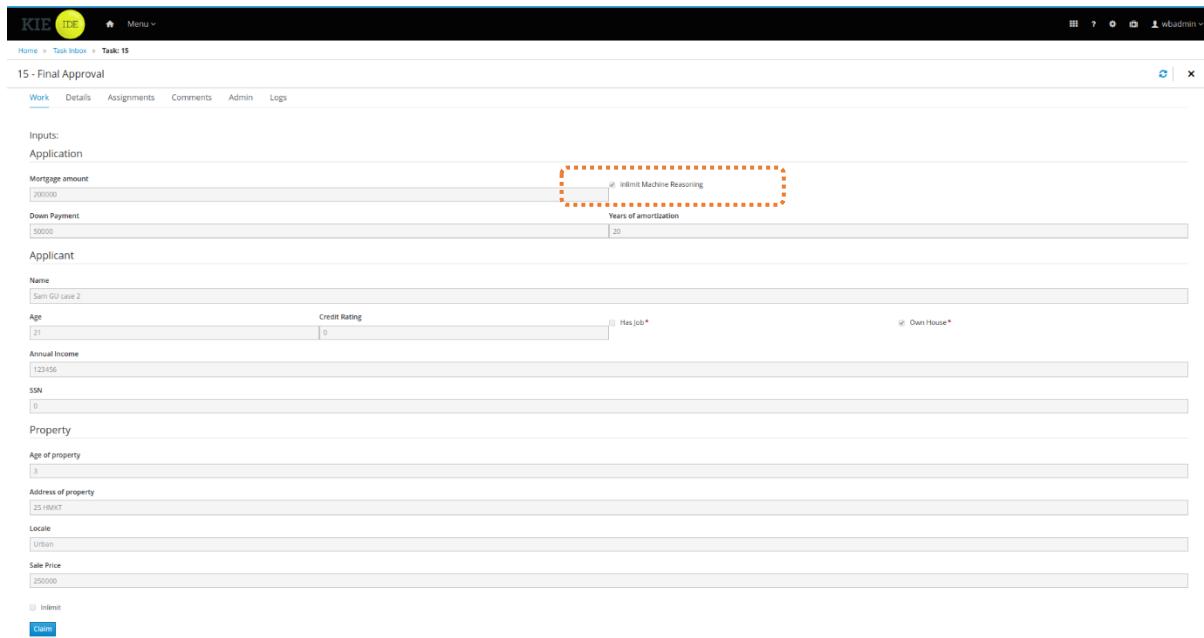
Name: Sam GU case 2 | Age: 21 | Credit Rating: 123456 | Has job* (unchecked) | Own House* (checked)

Annual Income: 123456 | SSN: SSN

Property

Age of property: 3 | Address of property: 25 HMRKT | Locale: Urban | Sale Price: 250000





KIE - Task 15 - Final Approval

Home > Task Index > Task: 15

Work Details Assignments Comments Admin Logs

Inputs:

Application

Mortgage amount: 200000

Down Payment: 50000

Years of amortization: 20

Applicant

Name: Sam GU case 2

Age: 31

Credit Rating: 0

Has job*:

Own House*:

Annual Income: 123456

SSN: 0

Property

Age of property: 3

Address of property: 25 HNK

Locale: Urban

Sale Price: 250000

Inlimit

Sam

{ Tips }

1st stage Approved: \$200,000 Mortgage Amount: within limit **mortgage amount 200,000 >= property sale price 250,000 – down payment 50,000**

2nd stage Approved: **inlimitMR** checked: jobless applicant owning a house

Use/Test Case 3: Applicant has neither a job, nor a house.

KIE IDE

Manage Process Definitions

MortgageApprovalProcess

Application

Down Payment: 50000, Years of amortization: 20

Applicant

Name: Sam GU case 3

Age: 21, Credit Rating: Has job*, Own House*

Annual Income: 123456

SSN: SSN

Property

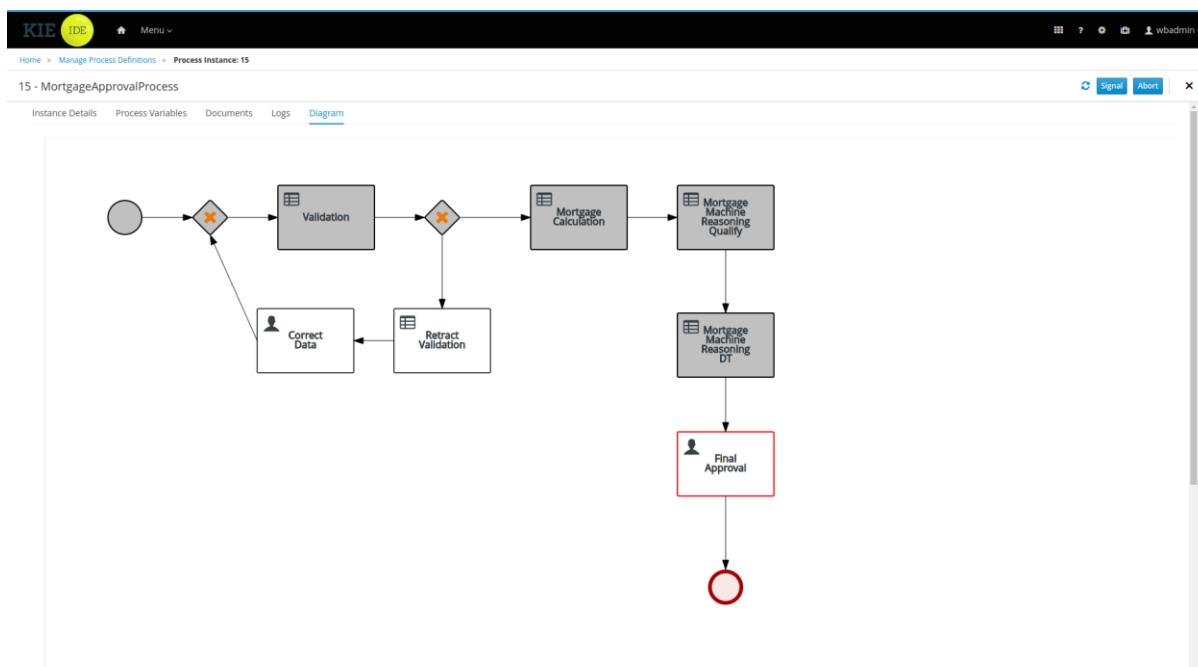
Age of property: 3

Address of property: 25 HMKT

Locale: Urban

Sale Price: 250000

Submit



The screenshot shows a KIE application interface for a 'Mortgage Approval' task. The form includes fields for 'Mortgage amount' (\$200000), 'Down Payment' (\$50000), 'Name' (Sam GU case 3), 'Age' (21), 'Annual Income' (\$123456), 'SSN' (0), 'Address of property' (25 HNKRT), 'Locale' (Urban), 'Sale Price' (\$250000), and checkboxes for 'Inlimit' (checked) and 'Own House' (unchecked). A red dashed box highlights the 'Inlimit Machine Reasoning' checkbox.

{ Tips }

1st stage Approved: \$200,000 Mortgage Amount: within limit **mortgage amount 200,000 >= property sale price 250,000 – down payment 50,000**

2nd stage Disapproved: **inlimitMR** unchecked: jobless applicant not owning a house

😊 Congratulations!

You have completed today's challenging workshop!

4. Workshop 4 – Minimum Viable Product (MVP)

{ Objective } Enhance and deliver bespoke mortgage application system as MVP.

- Define/Control user access for mortgage application system
- Prepare project report, e.g. Knowledge models; Use/Test cases
- Submit project deliverables. Refer to [Project Submission Template](#)
- [MTech Thru-Train group project] Prepare user guide
- [MTech Thru-Train group project] Prepare system demo & video presentation
- [MTech Thru-Train group project] Candidate Project: HDB BTO; Airport Gate Assignment System (AGAS); DoReMi; Or other relevant business domain;

4.1. KIE BPMS/BRMS Business System Enhancement

4.1.1. Access control [User/Group/Role]

The screenshot shows the KIE Workbench interface with a dark header bar. The header includes the KIE logo, 'IDE' status, a 'Menu' dropdown, and a user account 'wbadmin'. A red dashed box highlights the top-right corner of the header. Below the header is a 'Settings' section with three main categories: 'Roles' (6 items), 'Groups' (7 items), and 'Users' (10 items). Each category has a corresponding icon: a padlock for Roles, a group of people for Groups, and a person silhouette for Users. At the bottom of the screen, there are three more icons: a download arrow, a database, and a folder.

Role controls user's access to KIE product suite (Workbench roles);

Group controls user's access to bespoke business system developed by KIE Workbench/product suit (Task roles);

New user creation procedure:

- Step 1 Create all new users, and assign them relevant **Roles** (No new **Group** is ready).
- Step 2 Create new **Group**, and link created new users.

Intended user access levels:

Business system developer	:	iss-admin
Business system user (requester)	:	iss-sam
Business system user (approver)	:	iss-barry
Business system user (manager)	:	iss-mk, iss-hy, iss-cm

Use admin user: **wbadmin** to create new users and control access, based on below table:

Default User Names	Password	Role (Workbench roles)	Group (Task roles)
maciek	maciek	admin, analyst, user	HR, kie-server, PM
jack	jack	analyst	IT, kie-server
wbadmin	wbadmin	process-admin, admin, analyst, user	kie-server
john	john	analyst	Accounting, kie-server, PM
katy	katy	analyst	HR, kie-server
kie-server	kie-server1		kie-server
krisv	krisv	process-admin, admin, analyst, user	kie-server
mary	mary	analyst	HR, kie-server
salaboy	salaboy	admin, analyst	Accounting, rest-all, HR, IT, kie-server
sales-rep	sales-rep	analyst	kie-server, sales
Add-on User Names	Password	Role (Workbench roles)	Group (Task roles)
sales-rep	sales-rep	analyst	iss-group-requester, kie-server, sales
iss-sam	iss-sam	analyst	iss-group-requester, kie-server
iss-barry	iss-barry	analyst, user	iss-group-approver, kie-server
iss-mk	iss-mk	users, manager	iss-group-manager, kie-server
iss-hy	iss-hy	users, manager	iss-group-manager, kie-server
iss-cm	iss-cm	users, manager	iss-group-manager, kie-server
iss-admin	iss-admin	process-admin, admin, analyst, user	iss-group-manager, kie-server

1) [Step 1] Select **Users; New user;**

The screenshot shows the KIE IDE Security management interface. On the left, there is a sidebar with tabs for Roles, Groups, and Users. The Users tab is selected, and the sub-tab 'All users' is also selected. A list of users is displayed, including: maciek, jack, wbadmin, john, katy, kieserver, krisv, mary, salaboy, and sales-rep. At the top of this list, there is a button labeled 'New user+' with a plus sign, which is highlighted with a red box. To the right of the sidebar, the main content area is titled 'Security management' and features a large padlock icon. Below the icon, the title 'Security Management' is centered, followed by the subtitle 'Control who can access the different features and resources available'.

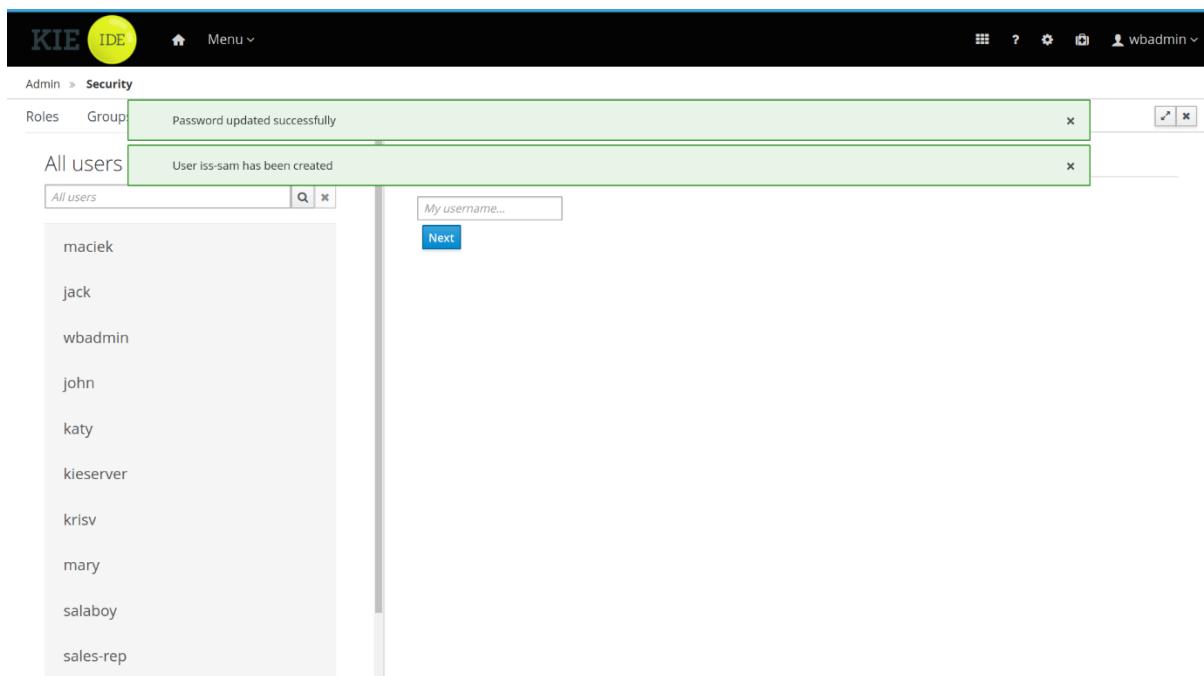
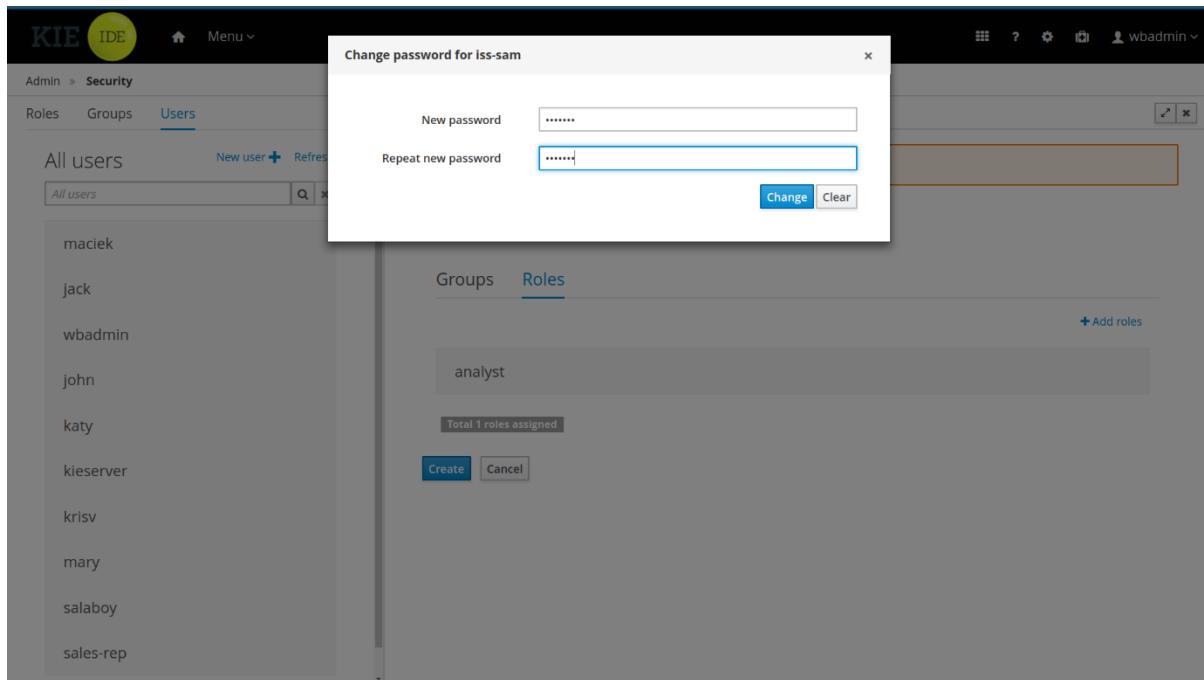
The screenshot shows the 'Create new user' wizard in the KIE IDE. The first step, 'Please introduce the user name', is displayed. In the input field, the user name 'iss-sam' is typed. Below the input field is a blue 'Next' button. The left side of the screen shows the same 'All users' list as the previous screenshot, with the 'New user+' button also highlighted with a red box.

The screenshot shows the KIE IDE Admin interface with the 'Security' tab selected. On the left, a list of users is displayed. In the center, a 'Create new user' dialog is open for a user named 'iss-sam'. The dialog includes a warning message: 'No assignments present, the user could be not able to log into the application'. Below the name, there are tabs for 'Groups' and 'Roles'. Under 'Groups', it says 'There are no entities'. Under 'Roles', there is a '+ Add roles' button and two buttons at the bottom: 'Create' and 'Cancel'.

The screenshot shows the KIE IDE Admin interface with the 'Security' tab selected. A modal dialog titled 'Role selection for iss-sam' is open, displaying a list of roles. The list includes: process-admin, manager, admin, analyst (which is checked), developer, and user. At the bottom of the list, it says 'Total 6 roles'. At the bottom right of the dialog are 'Add to selected roles' and 'Cancel' buttons. The background shows the same user list as the previous screenshot.

The screenshot shows the KIE IDE Security interface. On the left, a sidebar lists users: maciek, jack, wbadmin, john, katy, kieserver, krisv, mary, salaboy, and sales-rep. The main panel is titled "Create new user" and shows a warning message: "User iss-sam has been modified. Please save your changes to apply them". The user "iss-sam" is listed. Below it, under "Groups" and "Roles", the "analyst" role is assigned. Buttons for "Create" and "Cancel" are at the bottom.

The screenshot shows the same KIE IDE Security interface as above. A modal dialog box titled "Please confirm the action" is displayed in the center. It asks, "Do you want to set a password now?". At the bottom right of the dialog are two buttons: "Yes" (blue) and "No" (red).



2) [Step 1] Repeat the above process to create the rest user accounts;

The screenshot shows the KIE IDE Security interface. On the left, there's a search results panel for users starting with 'iss'. A red dashed box highlights the search input field containing 'iss' and the resulting list of users: iss-barry, iss-mk, iss-hy, iss-crm, iss-admin, and iss-sam. Below this list is a button labeled 'Total 6 users'. On the right, a 'Create new user' form is displayed, prompting the user to 'Please introduce the user name' in a text input field. A 'Next' button is visible below the input field.

3) [Step 2] Create new **Group**, and link created new users.

The screenshot shows the KIE IDE Security interface. On the left, a sidebar lists 'All groups' with items like Accounting, rest-all, HR, IT, kie-server, PM, and sales. A 'New group' button is visible. On the right, a 'Create new group' dialog is open, prompting for a group name. The input field contains 'My group...', and the 'Next' button is visible below it. Both the sidebar and the dialog are highlighted with orange dashed boxes.

This screenshot is identical to the one above, but the input field in the 'Create new group' dialog now contains the text 'ss-group-requester'. The entire dialog area is highlighted with an orange dashed box.

The screenshot shows the KIE IDE Security interface. On the left, under 'All groups', there is a list of groups: Accounting, rest-all, HR, IT, kie-server, PM, and sales. A search bar at the top right shows 'sa'. Below it, three users are listed: salaboy, sales-rep, and iss-sam. A button 'Add selected users' is highlighted in blue. At the bottom left, it says 'Total 7 groups'.

The screenshot shows the KIE IDE Security interface. On the left, under 'Users', a search bar shows 'iss'. Below it, six users are listed: iss-barry, iss-mk, iss-hy, iss-cm, iss-admin, and iss-sam. The 'iss-sam' entry is highlighted with a blue background. On the right, the details for 'iss-sam' are shown, including tabs for 'Groups', 'Roles', and 'Permissions'. The 'Groups' tab is selected, showing the group 'iss-group-requester' assigned to the user. A message 'Total 1 groups assigned' is displayed. At the bottom left, it says 'Total 6 users'.

The screenshot shows the KIE IDE Security interface. On the left, a sidebar lists users: iss-barry, iss-mk, iss-hy, iss-cm, iss-admin, and iss-sam. A search bar shows 'iss'. On the right, the 'Editing user iss-sam' screen displays the user 'iss-Sam'. The 'Groups' tab is selected, showing one assigned group: 'iss-group-requester'. Buttons for 'Change password' and 'Delete' are at the top right. Below the groups list are 'Save' and 'Cancel' buttons.

This screenshot shows the 'Group selection for iss-sam' dialog box. It lists all groups: Accounting, HR, IT, sales, iss-group-requester (selected), rest-all, kie-server (selected), and PM. The 'Add to selected groups' button is highlighted with a red dotted box. The background shows the same user editing interface as the previous screenshot.

The screenshot shows the KIE IDE Security interface. On the left, a sidebar lists users: iss-barry, iss-mk, iss-hy, iss-cm, iss-admin, and iss-sam. A search bar at the top of the sidebar shows 'iss'. A message at the top right says 'User iss-sam has been modified. Please save your changes to apply them'. The main panel is titled 'Editing user iss-sam' and shows the user details: 'iss-sam'. Below this are tabs for 'Groups', 'Roles', and 'Permissions'. Under 'Groups', two groups are listed: 'iss-group-requester' and 'kie-server'. A message 'Total 2 groups assigned' is displayed. At the bottom are 'Save' and 'Cancel' buttons, with 'Save' highlighted by a red dashed box.

The screenshot shows the KIE IDE Security interface after saving the user. A green success message 'User iss-sam has been saved' is displayed at the top right. The main panel shows the user details: 'iss-sam' with an edit icon. Below this are tabs for 'Groups', 'Roles', and 'Permissions'. Under 'Groups', two groups are listed: 'iss-group-requester' and 'kie-server'. A message 'Total 2 groups assigned' is displayed. The sidebar on the left remains the same as the previous screenshot.

- 4) [Step 2] Repeat the above process to create the rest new groups, and link user accounts;

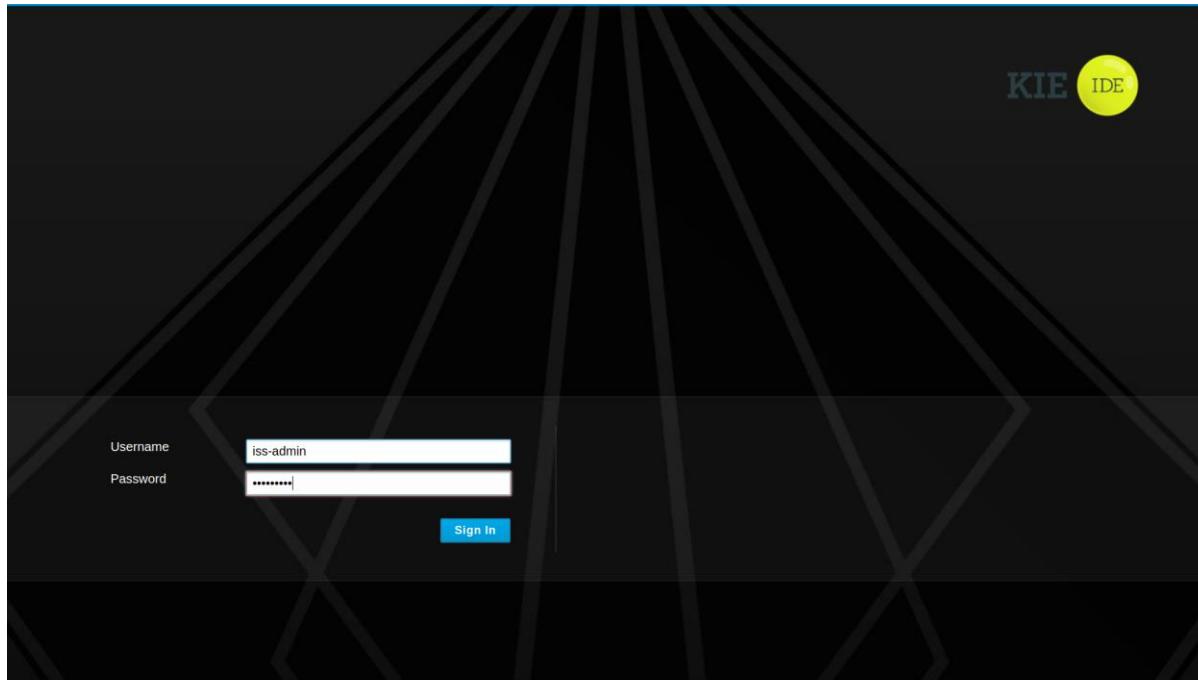
The screenshot shows the KIE IDE Security interface. On the left, under the 'Groups' tab, a search bar contains 'iss'. Below it, three groups are listed: 'iss-group-manager', 'iss-group-requester', and 'iss-group-approver'. A red dotted box highlights this list. On the right, a 'Create new group' form is open, with a text input field containing 'My group...' and a 'Next' button below it.

The screenshot shows the KIE IDE Security interface. On the left, under the 'Users' tab, a search bar contains 'iss-'. Below it, six users are listed: 'iss-barry', 'iss-mk', 'iss-hy', 'iss-cm', 'iss-admin', and 'iss-sam'. A red dotted box highlights this list. On the right, the details for the user 'iss-admin' are shown. Under the 'Groups' tab, two groups are assigned: 'iss-group-manager' and 'kie-server'. A message at the bottom states 'Total 2 groups assigned'.

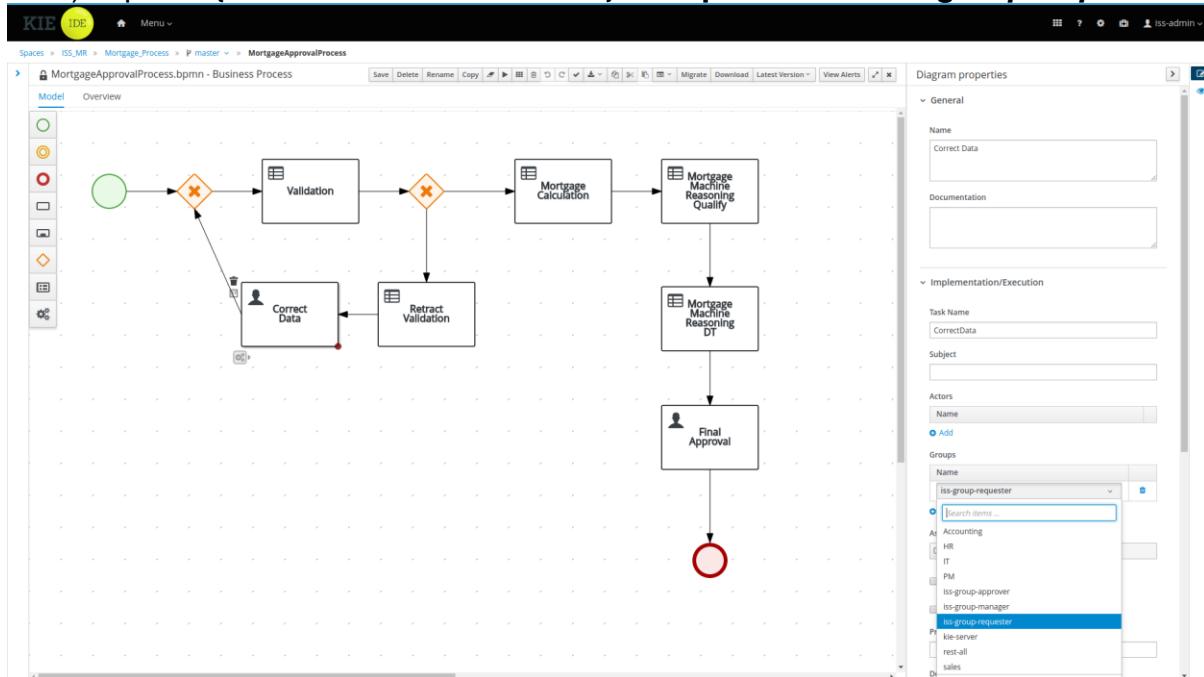
4.1.2. Business system enhancement [Group]

{ Objective } Assign different User Groups to perform different user tasks in Mortgage application process. (Access control)

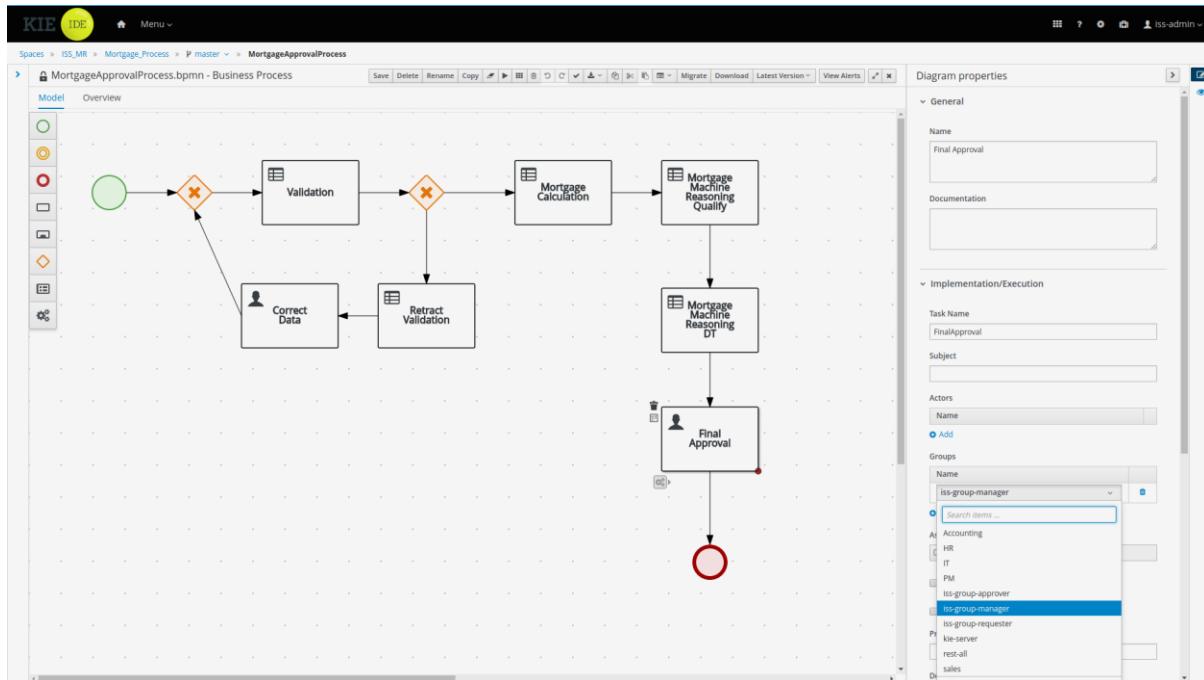
- 1) Re-login as Username : **iss-admin**
Password : **iss-admin**



- 2) Update { User Task: **Correct Data** } Groups name to: **iss-group-requester**



3) Update { User Task: ***Final Approval*** } Groups name to: ***iss-group-manager***



{ Tips } Before decision automation, the **User Task: Qualify** was once performed manually by ***iss-group-approver***, who was ***iss-barry***.

Barry Adrian SHEPHERD

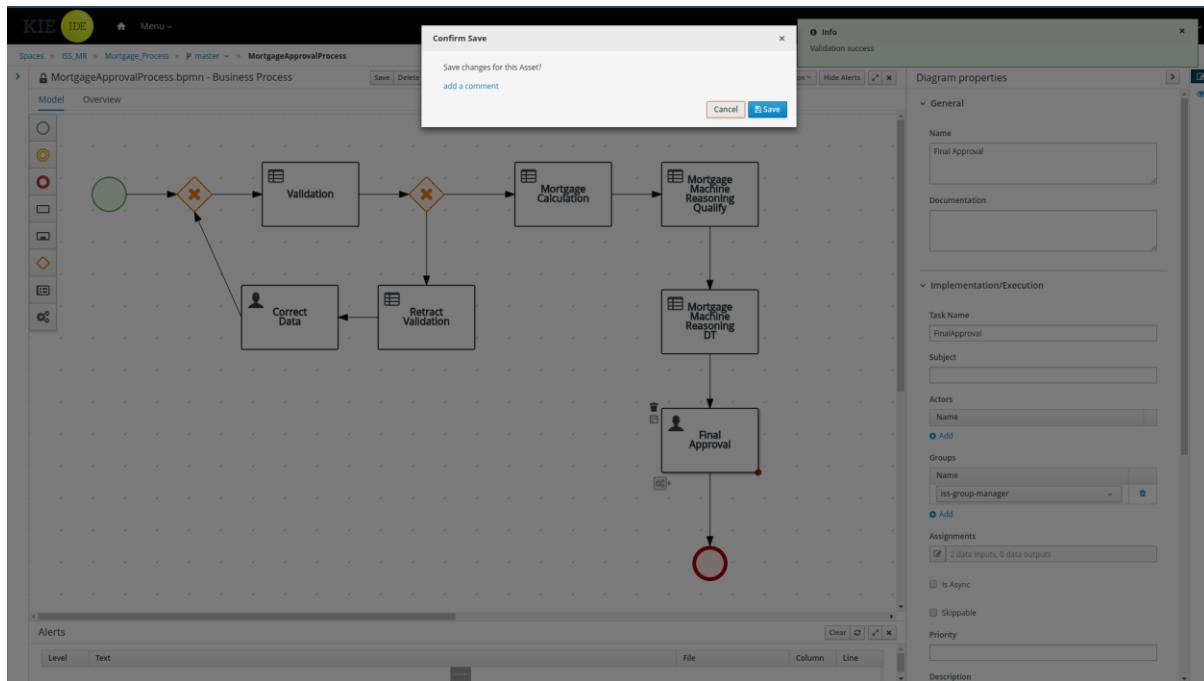


Chief, MTech Knowledge
Engineering Programme /
Chief, MTech Intelligent
Systems Programme

✉ issbas@nus.edu.sg

But since converting **User Task** to **Rule Task**, we have gotten rid of Barry, hence we now enabled Barry to focus on more value-added work.

4) **Save** the changes; Re-Deploy the system;

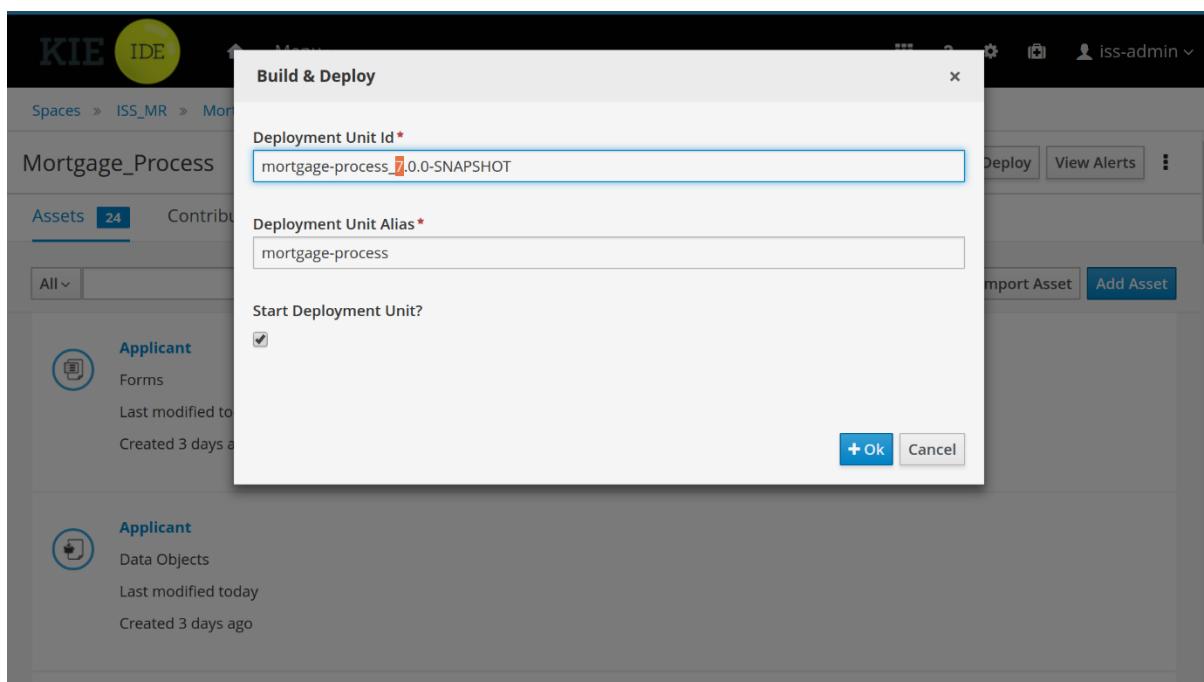


4.1.3. Business system enhancement [Deploy] v7.0.0

{ Objective } Deploy enhanced mortgage application: Start a new mortgage application, fill in application form to trigger business process; Note the visibility/access change in user's **Task Inbox**.

- 1) Use user: **iss-admin** to deploy enhanced system onto KIE web server:

mortgage-process_7.0.0-SNAPSHOT



2) Re-log in as user: **iss-sam**; Start process [case 1] below;

KIE IDE

MortgageApprovalProcess

Correlation key

Form

Application

Down Payment: 50000 | Years of amortization: 20

Applicant

Name: Sam GU 7.0 case 1

Age: 21 | Credit Rating: Credit Rating | Has job: Own House:

Annual Income: 123456

SSN: SSN

Property

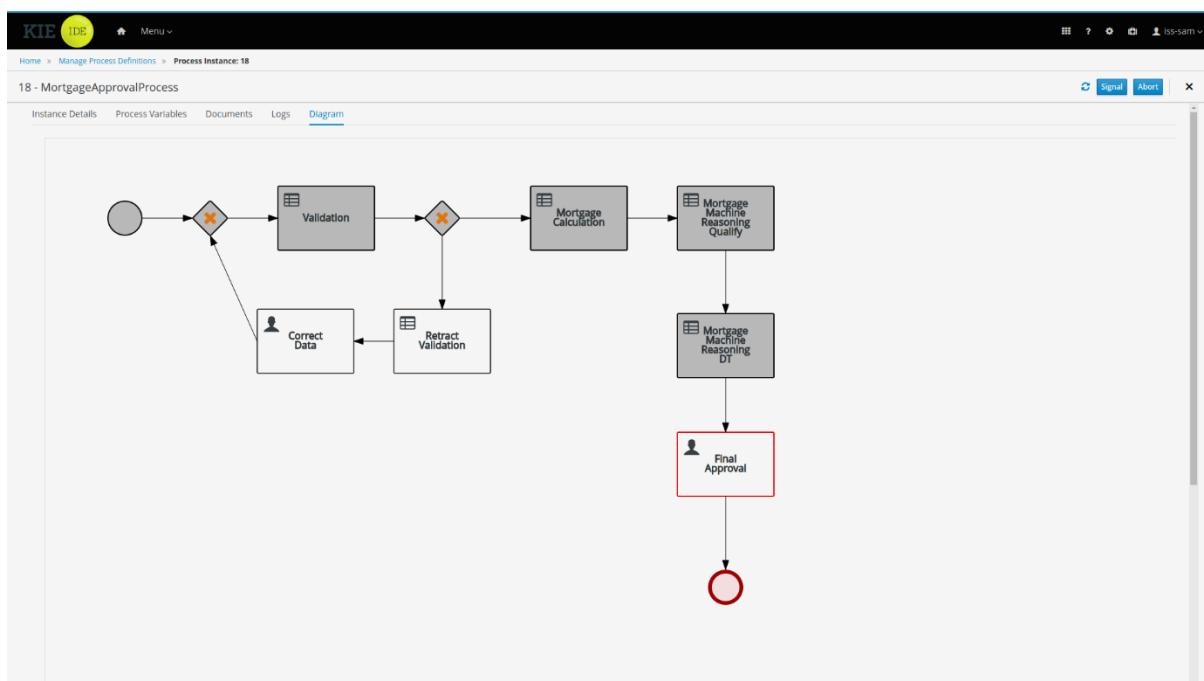
Age of property: 3

Address of property: 25 HMKT

Locale: Urban

Sale Price: 250000

Submit



The screenshot shows the KIE JBoss Task Inbox interface. On the left, there is a sidebar with a 'Filters' section containing a tree view of task statuses: Completed, Created, Error, Failed, InProgress, Obsolete, Ready, Reserved, and Suspended. The 'Ready' status is selected. Below this are sections for 'Filter By' (Id, Filter By Id...), 'Process Definition Id' (Select), and 'Created On' (Created On...). The main area is titled 'Task Inbox' and displays a table with columns: Task, Process Definition Id, Status, Created On, and Actions. A message at the top right says 'No tasks found'. At the bottom right, there are navigation icons and a page number '0 of 0'.

{ Quiz } There is no task in **iss-sam's Task Inbox**. Why?

The reason is:

{ Quiz } Which user could see and claim the task: **Final Approval!**

The user is:

- 5) Re-log in as the user with right access; Complete the task of **Final Approval** for [case 1];

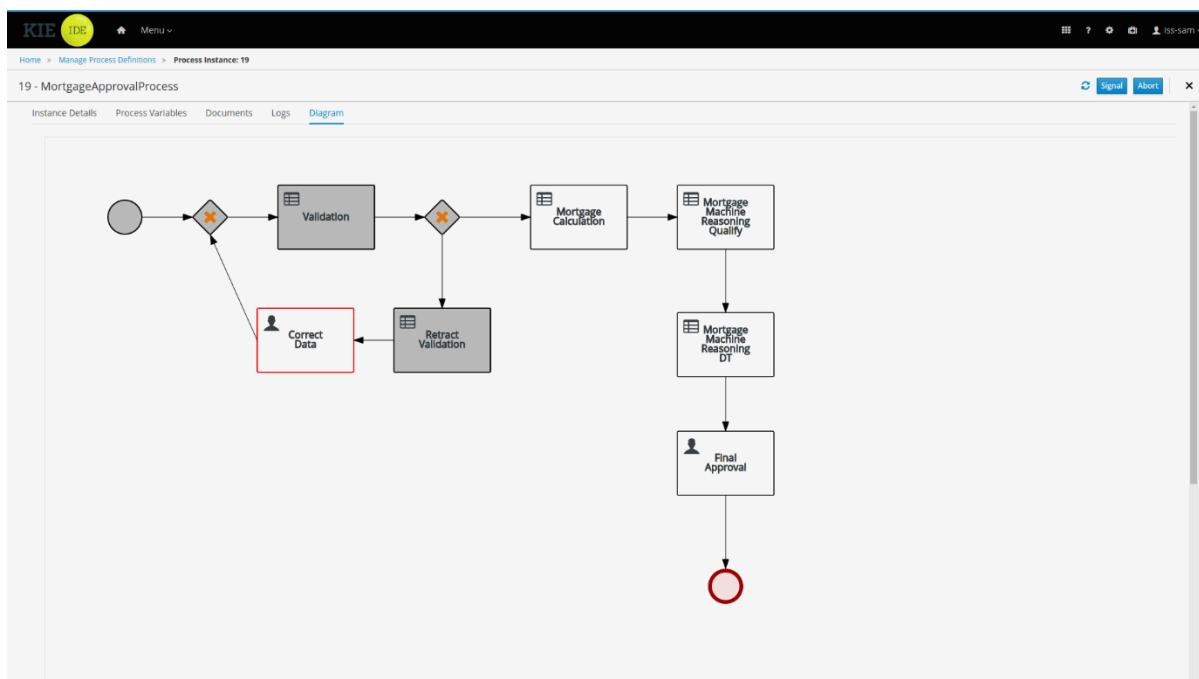
The screenshot shows the KIE IDE Task Inbox interface. On the left, there is a sidebar with 'Filters' expanded, showing various status options like Completed, Created, Error, Exited, Failed, InProgress, Obsolete, Ready, Reserved, and Suspended. Under 'Filter By', there is a dropdown for 'Id' and a text input field 'Filter By Id...'. Below that is a dropdown for 'Process Definition Id' with 'Select' option. The main area is titled 'Task Inbox' with the subtitle 'Active filters: Status: Ready, InProgress, Reserved'. It lists one task:

Task	Process Definition Id	Status	Created On	Actions
Final Approval	Mortgage_Process.M...	Ready	22-Feb-2019 19:11:08	

At the bottom, it says '10 Items' and '1 of 1'.

The screenshot shows the KIE IDE Task details page for '19 - Final Approval'. The page is divided into sections: Application, Applicant, and Property. The 'Application' section contains fields for 'Mortgage amount' (200000), 'Down Payment' (50000), and 'Years of amortization' (20). The 'Applicant' section contains fields for 'Name' (Sam GU 7.0.0 case 1), 'Age' (31), 'Annual Income' (123456), 'SSN' (0), and 'Has job?' (checkbox checked). The 'Property' section contains fields for 'Age of property' (3), 'Address of property' (25 HNK), 'Locale' (Urban), and 'Sale Price' (250000). At the bottom, there are buttons for 'Inlimit' (checkbox checked), 'Save', 'Release', and 'Complete'.

- 6) Re-log in as user: **iss-sam**; Start process [case 2] below; (Down Payment = \$0, which require data correction)



{ Quiz } Which user could see and claim the task: **Correct Data?**

The user is:

- 7) Re-log in as the user with right access; Complete the task of **Correct Data** for [case 2];

The screenshot shows the KIE IDE interface with the title bar "KIE IDE". The main window is titled "Task Inbox". On the left, there is a sidebar with "Filters" expanded, showing various status options like Completed, Created, Error, etc., with some checkboxes checked. Below the filters are sections for "Filter By" (Id, Filter By Id...) and "Process Definition Id" (Select). The main area is titled "Task Inbox" and shows a table with one item:

Task	Process Definition Id	Status	Created On	Actions
Correct Data	Mortgage_Process.M...	Ready	22-Feb-2019 19:21:13	

At the bottom of the table, it says "10 Items" and "1 of 1".

The screenshot shows the KIE IDE interface with the title bar "KIE IDE". The main window is titled "Task: 20" and "20 - Correct Data". The top navigation bar includes "Home", "Task Inbox", "Task: 20", and tabs for "Work" (which is selected), "Details", "Assignments", "Comments", "Admin", and "Logs".

The "Work" tab content includes:

- Outputs:** Application
- Error details**
- Error and cause:** Down payment cannot be 0, greater than, or equal to the property sale price.
- Down Payment**: Value 0
- Years of amortization**: Value 20
- Applicant** section:
 - Name**: Sam GU 7.0.0 case 2
 - Age**: 21
 - Credit Rating**: 0
 - Has Job***: Checked
 - Own House***: Unchecked
- Annual Income**: Value 123456

KIE IDE

Home > Task Inbox > Task: 20

20 - Correct Data

Work Details Assignments Comments Admin Logs

Outputs:

Application

Error details

Error and cause

Down payment cannot be 0, greater than, or equal to the property sale price.

Down Payment	Years of amortization
56789	20

Applicant

Name

Sam GU 7.0.0 case 2

Age	Credit Rating	Has Job*	Own House*
21	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Annual Income

123456

KIE IDE

Home > Task Inbox

Task Inbox

Active filters: Status: Ready, InProgress, Reserved Save Filters | Clear All

Task	Process Definition Id	Status	Created On	Actions
No tasks found				

10 Items ▾ 0 of 0 ▶

- 8) Re-log in as the user with right access; Complete the task of **Final Approval** for [case 2];

The screenshot shows the KIE IDE Task Inbox interface. On the left, there is a sidebar with 'Filters' expanded, showing various status options like Completed, Created, Error, Exited, Failed, InProgress, Obsolete, Ready, Reserved, and Suspended. Under 'Status', 'InProgress' and 'Ready' are checked. Below the filters are sections for 'Filter By' (Id) and 'Process Definition Id' (Select). The main area is titled 'Task Inbox' and shows a table with one item:

Task	Process Definition Id	Status	Created On	Actions
Final Approval	Mortgage_Process.M...	Ready	22-Feb-2019 19:26:04	

At the bottom, it says '10 Items' and has navigation buttons («, <, >, ») and a page indicator '1 of 1'.

The screenshot shows the KIE IDE Task details interface for 'Task: 21 - Final Approval'. It has three main sections: Application, Applicant, and Property.

Application:

- Mortgage amount: 200000
- Down Payment: 56719
- Years of amortization: 20
- Inlimit Machine Reasoning checkbox is checked

Applicant:

- Name: Sam GU 7.0.0 case 2
- Age: 31
- Credit Rating: 0
- Has job: Yes
- Own House: Yes
- Annual Income: 123456
- SSN: 0

Property:

- Age of property: 3
- Address of property: 25 HNK
- Locale: Urban
- Sale Price: 250000
- Inlimit checkbox is checked
- Claim button is visible

4.1.4. Workshop project submission [Export/Import]

- 1) Consolidate the workshop work to create a functional mortgage approval system enhanced by decision automation;
- 2) Refer to Annex 2 to export project from KIE Workbench;
- 3) Compress the exported project folder to a Zip file;
- 4) Refer to Annex 3 to prepare other project deliverable and submission;

😊 Congratulations!

You have completed today's challenging workshop!

We hope you enjoyed the challenging learning and found this course useful!

We also hope to bring your more learning experiences in the near future!

See you soon!

Course Manager



issgz@nus.edu.sg



- GU Zhan 顾瞻 (Sam) lectures Master of Technology programme in the areas of data science, machine intelligence, and soft computing. Prior to joining ISS, he was in New Zealand running start-up, delivering artificial intelligence training programs. Sam had also spent many years in financial and engineering sector wearing versatile hats: data scientist, project manager, consultant, system manager and software engineer.
- He devotes himself into pedagogy, and is very passionate in inspiring next generation of artificial intelligence lovers and leaders.

5. ANNEX

5.1. ANNEX 1 – Workshop Project Candidate

5.1.1. Workshop Project Candidate One

Airport Gate Assignment System (AGAS)

Faced with intense competition from major airports in the region, **The Best Airport (TBA)** needs to enhance the quality and efficiency of its airport services so that planes can have a faster turn-around. This improved throughput will definitely make its customers (the airlines) happy and to be firmly rooted to TBA. With some 5,000 flight arrivals each week, the assignment of aerobridges (or simply “gates”) is becoming increasingly complex and time consuming. Efficiency in gates assignment is crucial for TBA to remain as the airport of choice for all major airlines. You are a TBASU (TBA Strategic Unit) project specialist who is tasked to work on this important assignment.

The following is a transcript from your interview with Mr. Lim, the domain expert in gates scheduling:

You: Mr. Lim, what is the first step in the assignment of a gate to an incoming flight?

Mr. Lim: Well, flight information sends me a schedule of all incoming and outgoing flights for a particular day, at least 24 hours in advance for me to assign gates and service units to all flights. My first step is to prioritize all the flights, according to type - international or domestic, number of passengers and refueling needs. The number of passengers and refueling needs will determine how much time is needed, and thus how long the gate will be occupied. Another constraint is the amount of time before the plane has to depart. The top priority flight will be taken care of first. My job is to match a gate to an incoming flight for disembarkation of passengers and providing services for the aircraft.

You: Is there a systematic procedure that you use for gate assignment?

Mr. Lim: I'm not sure what you mean by systematic, but what I do is, I determine the services required by an aircraft, and assign a service unit (SU) which is able to provide those services, to a gate. Obviously, both the SU and the gate must be free or available. I get this information from the Gates Operation System which is updated in real-time. But this assignment is not as simple as it sounds. Each gate has a max passenger handling capacity, so we need to know the number of passengers coming in. A gate is also reserved for either domestic or international flights. A gate is also limited by its capability of supporting the required services.

You: Could you clarify this further with an example?

Mr. Lim: OK, suppose that an aircraft needs catering and cleaning. Then we must look for a gate that is capable of supporting those 2 services. However, we also try to minimize wastage, in the sense that we do not want to assign a gate which is capable of supporting all 3 services, when only 2 are needed. We should try to save that gate for the time when all 3 services are needed.

You: Let me recap: An SU can provide one or more services, like cleaning, catering and refueling depending on the needs of the aircraft. And the gate must be able to support the chosen SU.

Mr. Lim: Correct.

You: So you are assigning SUs to a gate, and a gate to an aircraft?

Mr. Lim: You got it!

You: Do all aircraft need the same services?

Mr. Lim: No. But if a particular service is needed, then it is mandatory that a gate providing that service is assigned to the aircraft.

You: Can you give me an example?

Mr. Lim: Certainly. Suppose that cleaning, refueling and catering are needed. The ideal situation would be to assign SU-101, for example, which provides all 3 services. But suppose SU-101 is not available, then we need to look for free SU, say SU-104 which provides catering and cleaning, and SU-105 which provides refueling and cleaning. SU-104 would be assigned to provide the catering and cleaning, but refueling can come from SU-105. In this case there is a redundancy, which cannot be avoided. An SU can only be assigned to one flight and hence one gate only at any one time.

You: How do you find out what services are required by an incoming flight?

Mr. Lim: Cleaning is always needed. Refueling is determined by the remaining fuel level, and catering of meals depends on the duration of the next outgoing flight.

You: And how do you compute how much fuel the aircraft needs for the flight out?

Mr. Lim: We have a set of tables (pointing to the laminated papers) to refer to. We also use the tables to determine catering needs as well as to do the prioritization of flights that I mentioned earlier.

You: I think I've taken too much of your time. Can I come back to you tomorrow to verify my understanding of what we discussed today? Thank you, Mr. Lim.

[End of Interview]

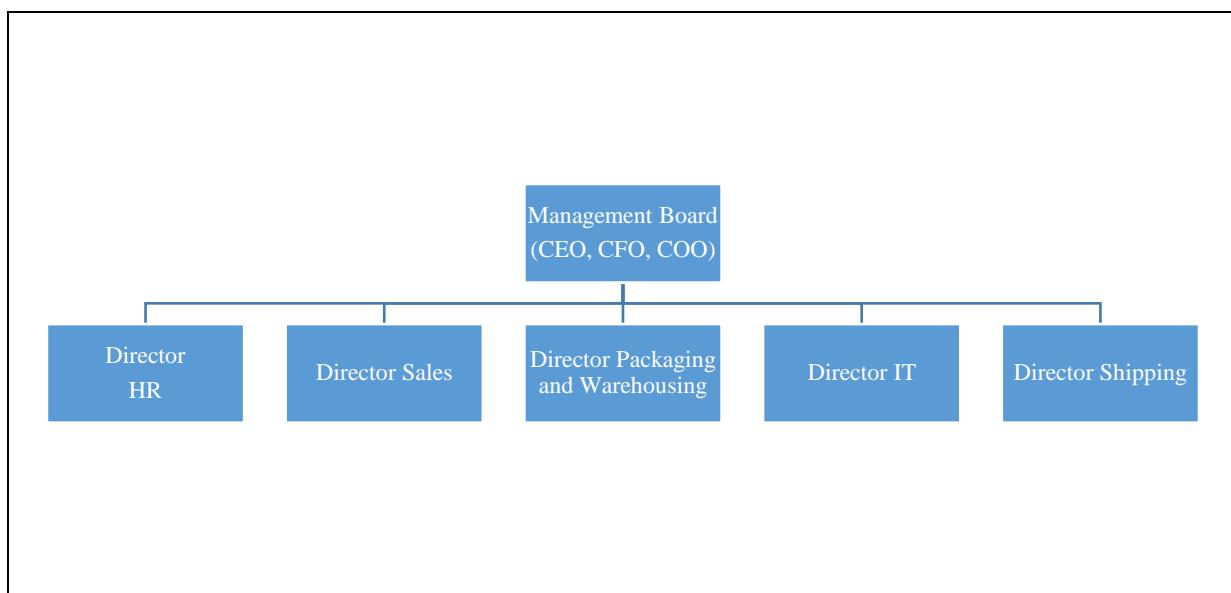
5.1.2. Workshop Project Candidate Two

DoReMi Books Inc.

Background

DoReMi Books is a company that specializes in the supply and sale of classical music scores and music books in the USA with subsidiaries in the major cities of each of the 50 states. An important line of business for the company is the supply of music books to music schools. These schools buy books in bulk for their students and are given special bulk-package discounts. Sales to music schools constitute 30% of the annual revenue of **DoReMi**.

The organization structure of the company is shown below.



Business Process & Improvement

As the company started in 1955 (and is now 57 years old), some of its business processes are manual and rather traditional. The company is now facing strong competition from its competitors (both new and old), who have embraced online and internet sales as the new way of interacting and transacting with their customers.

In response to the new challenges brought on by online sales transactions, the Chief Executive Officer (CEO), Peter Lee, asked a consultant to conduct a business process improvement exercise to revamp their music books sale transaction and order handling process as well as introduce improved stock and inventory planning and management capabilities. One of the key outcomes of this exercise was a new order handling process and the introduction of an internet sales transaction system, including an advanced business intelligence module for optimal stock inventory and warehousing forecasting.

After a period of process analysis and redesign, a new streamline process for online purchase from individual customers were defined. For bulk purchase, an automated workflow with automated inventory checks and approval was also established that can simplify the sales orders from music schools ordering in bulk. The process for handling orders from this client segment is simpler to implement as they have standard needs and also credit facilities already well established with **DoReMi**. The company is now ready to implement the new process and system.

Planning Implementation and Rollout

In considering the plans for the implementation and rollout of the new process and system, the CEO asked all his department heads (Directors) to gather some informal feedback on this major business process change initiative. The following feedback was shared in the weekly management board meeting:

HR Director:	I am sensing some discomfort among the staff. The union has also mentioned about some talk of a rumour going around that the company is going on a down-sizing exercise and people will be made redundant once the new process and system is operationalised. This revamp thing that we are planning needs to be handled with care. I am hearing of head-hunters enquiring about our top-performing sales people.
Director Sales:	I am not aware about the rumour. But in my informal checks with my team leaders, some are asking why are we doing this? We are in the music books industry, and as you know, this is a rather niche area, with our product being mainly in the classical genre and highly specialized stuff. Why should we be bothered with this online talk? Our customers are likely to be in the adult age-group and would not be keen in online transactions anyway.
Director Packaging and Warehousing:	A high proportion of our workers in my department are of the older generations and they are also some of our most loyal and experienced workers. As you know, we do need some classical music background knowledge in our business. The new IT-enable process and business intelligent system may pose a technology challenge to my people. There is worry that the high-tech stuff will actually slow them down.
Director IT:	We have a lean team in our IT department and it is a constant struggle to keep up with the demands and expectations of the business units across the various geographically dispersed subsidiaries. Any introduction of new large IT systems will need to be carefully planned as it may cause a degradation of the IT support service. On a more positive note, the IT staff members are actually looking forward to learning and working with new tools and technologies. They

	are asking how they can find out more on process improvement and redesign concepts and methodologies.
--	---

DoReMi Books Order Handling Process

1. The customer service representative receives a call from the customer.
2. Determine if the customer has an existing account.
 - 2.1. If the customer has an existing account:
 - 2.1.1. Record the account number.
 - 2.1.2. Record the order information.
 - 2.1.3. If the order is not within the auto-approval limit, send the order to Account Department for review. Otherwise, approve the order.
 - 2.2. If the customer does not have an account:
 - 2.2.1. Record customer information.
 - 2.2.2. Assign account number.
 - 2.2.3. Record order information.
 - 2.2.4. If the order is not within the auto-approval limit, send the order to Account Department for review. Otherwise, approve the order.
3. If the order is auto-approved, the followings activities are performed in sequential order.
 - 3.1. Send the order information to the packaging department in warehouse.
 - 3.2. Packaging department packages the goods.
 - 3.3. Packaging department arranges for delivery.
 - 3.4. Packaging department informs the customer service representative.
4. If the order is sent for review:
 - 4.1. Account Department reviews the order manually.
 - 4.2. Determine if the order is an acceptable credit risk.
 - 4.2.1. If the order is an acceptable credit risk:
 - 4.2.1.1. Send the order information to the packaging department in warehouse.
 - 4.2.1.2. Packaging department packages the goods.
 - 4.2.1.3. Packaging department arranges for delivery.
 - 4.2.1.4. Packaging department informs the customer service representative.
 - 4.2.2. If the order is not an acceptable credit risk:
 - 4.2.2.1. Account Department cancels the order.
 - 4.2.2.2. Notify the customer about the cancellation through the customer service representative.

Business Issues to Be Considered in System Design

- A. **DoReMi** have an existing logistics application system but the users are not sure of the details of the process it carries out. This is because the logistics system is a **black box** since there is no documentation and the original IT/user project managers have left the company.
- B. There are many common tasks across the different departments in **DoReMi**. For example, there are common tasks to collect customer particulars, to collect their orders, to check their credit worthiness etc. Currently, the different departments in **DoReMi** do not always carry out these tasks in the same manner. **DoReMi** management would like to standardise and streamline these tasks so that they are carried out in the most productive way.
- C. **DoReMi** have many HR internal forms that need to be automated. Some have simple processes, e.g. fill in by applicant, and review by his supervisor and approval by the supervisor's manager. Others were more complicated, e.g. fill in by applicant, and then route to different approving persons depending on the dollar amount.
- D. **DoReMi** is thinking of implementing a **Print-On-Demand** business process for the school bulk ordering of music scores (e.g. for music band use). This new business process will not need to keep an inventory of music scores. Instead, the Print-on-Demand process will perform high-volume in-house printing of the music scores as and when orders come in. This will help reduce warehouse storage space and costs.
- E. Many of the **DoReMi** managers gave the requirement that they wanted a tool that could help them with delegation of tasks and tracking of the task status for the various small projects that they need to manage.
- F. For music books, **DoReMi** purchases books from many different publishers. The processing of the publisher's invoices currently takes a lot of manual effort and **DoReMi** management is hoping to automate this process.
- G. There are many sales promotions (such as Christmas Sale, New Year Sale etc.) and the price of the books can change often depending on many factors. The IT department currently takes too long to make the changes to the system to cater for the frequent price changes.
- H. During peak hours, the cashier is not able to cope with the large number of customers as each payment takes some time (eg: credit card slip printing and signing) and this adds up when there are many customers.

5.1.3. Workshop Project Candidate Three

Housing & Development Board Build-To-Order Recommender

Convert and implement HDB BTO system using KIE product suite, e.g. Drools, jBPM, Task, Form user interface, and other relevant programming modules.

5.2. ANNEX 2 – Project Code Export & Import Using KIE Workbench

Example: export KIE project **Mortgage_Process_ISS_MR** from work space **MySpace**

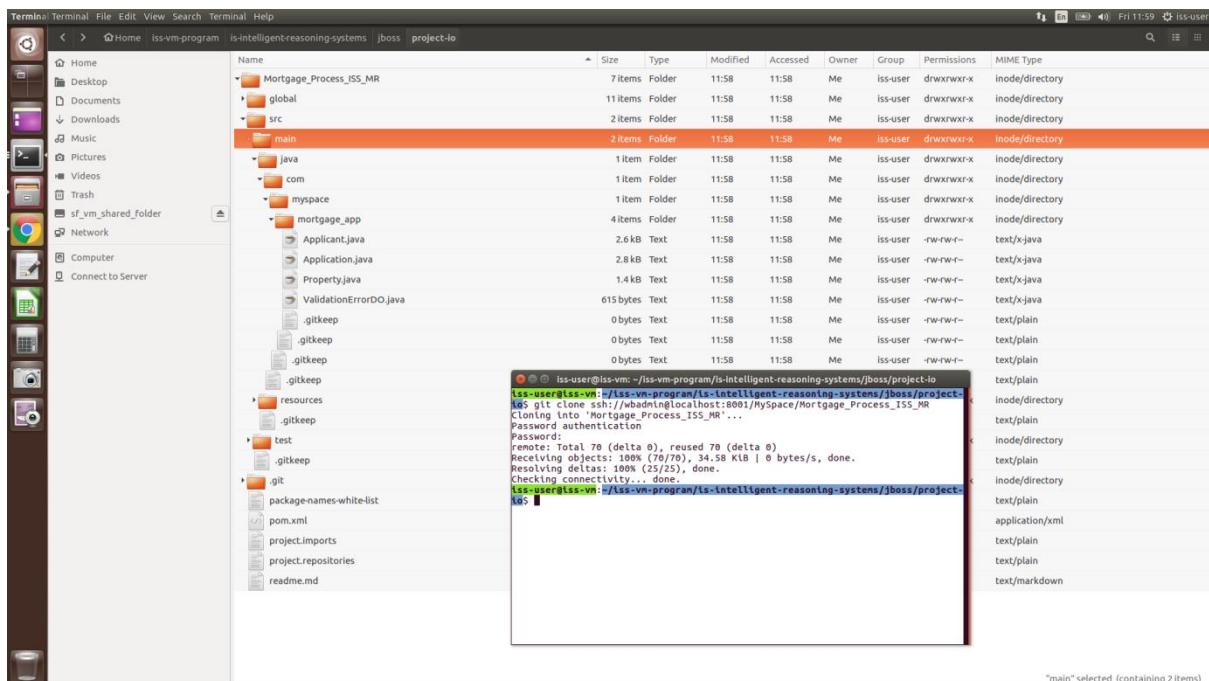
Review project settings to obtain project URL link

The screenshot shows the KIE Workbench interface with the following details:

- Header:** Shows "KIE IDE" and "Menu".
- Breadcrumbs:** "Spaces > MySpace > Mortgage_Process_ISS_MR > master".
- User:** "iss-admin" is logged in.
- Toolbar:** Buttons for "Build", "Deploy", and "View Alerts".
- Left Sidebar:** Navigation tabs: Assets, Contributors, Metrics, and Settings (selected). Sub-options include General Settings, Dependencies, KIE bases, External Data Objects, Validation, Deployments, and Persistence.
- General Settings Tab:**
 - Name:** Mortgage_Process_ISS_MR
 - Description:** Getting started loan approval process in BPMN2, decision table, business rules, and forms.
 - URL:** ssh://localhost:8001/MySpace/Mortgage_Process_ISS_MR
 - checkbox: Disable GAV conflict check
 - checkbox: Allow child GAV edition
 - Group ID:** mortgage-process
 - Artifact ID:** Mortgage_Process_ISS_MR
 - Version:** 1.0.0-SNAPSHOT
- Buttons:** "Save" and "Reset".

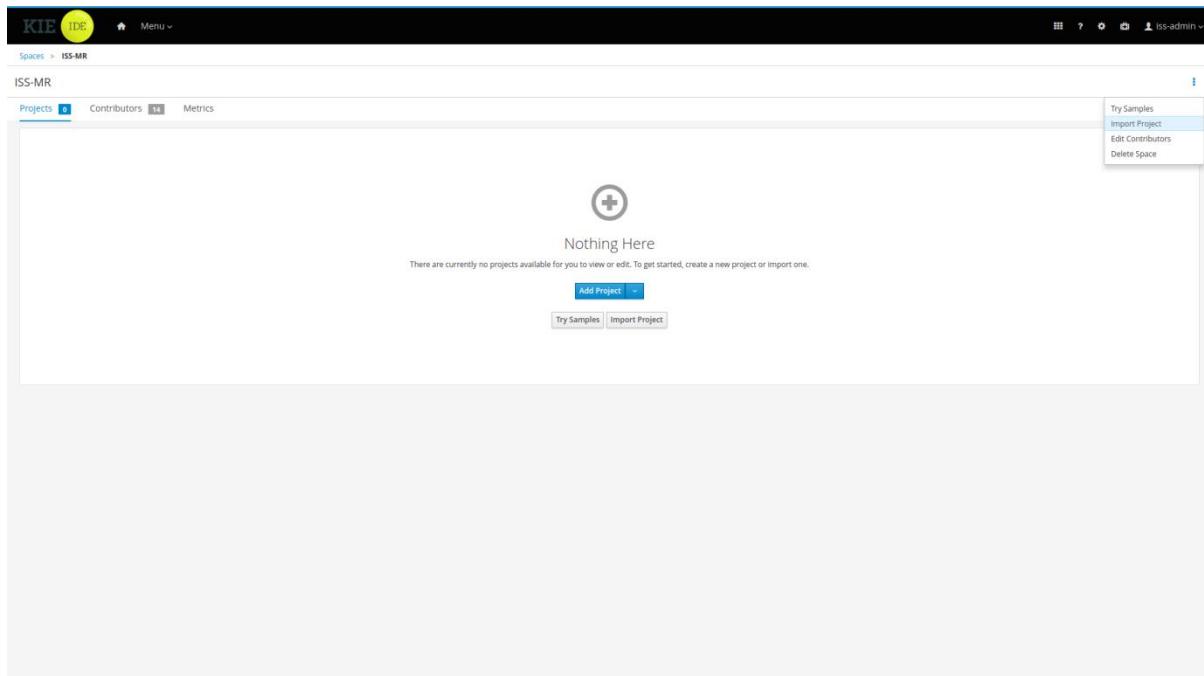
5.2.1. Export project from KIE Workbench

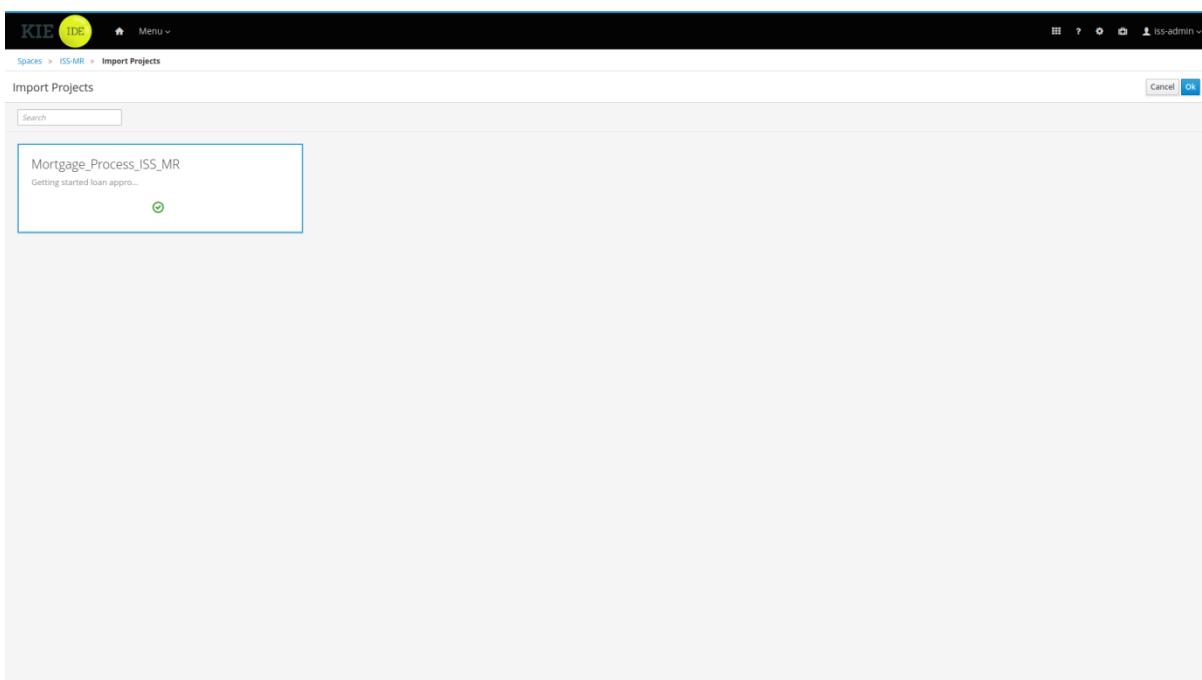
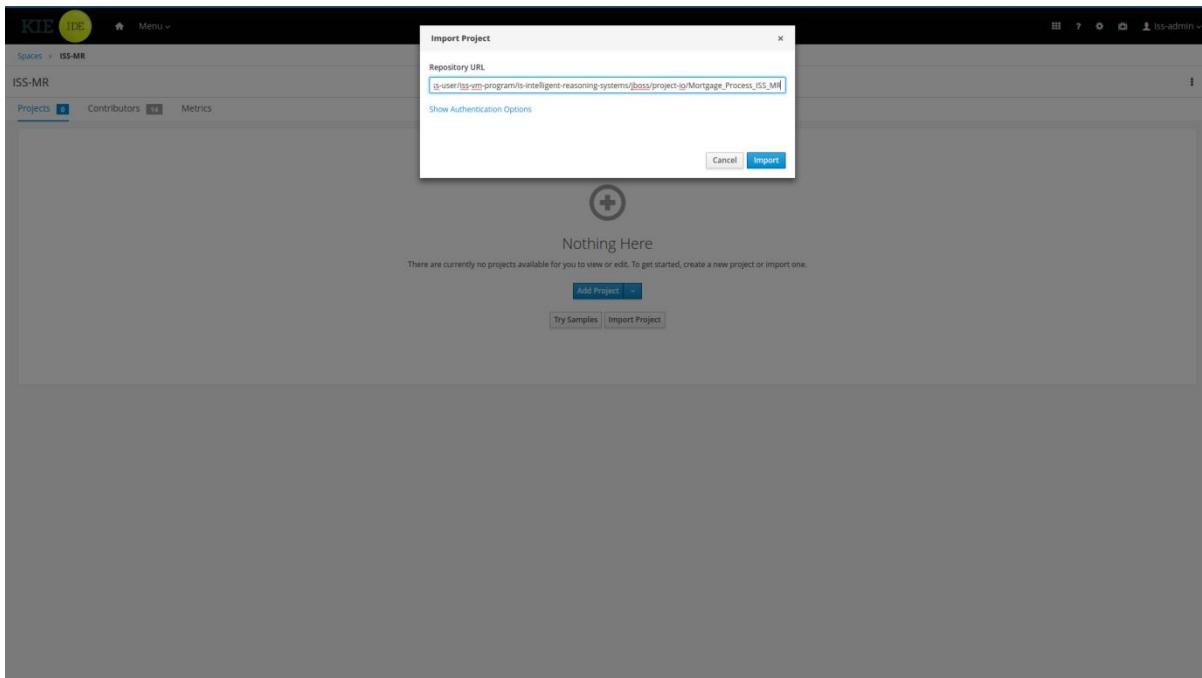
- 1) Select a folder for exporting, example here uses **/home/iss-user/iss-vm-program/is-intelligent-reasoning-systems/jboss/project-io**
- 2) Start a Terminal there, key in command **git clone ssh://wbadmin@localhost:8001/MySpace/Mortgage_Process_ISS_MR**
- 3) Key in password '**wbadmin**' for user wbadmin

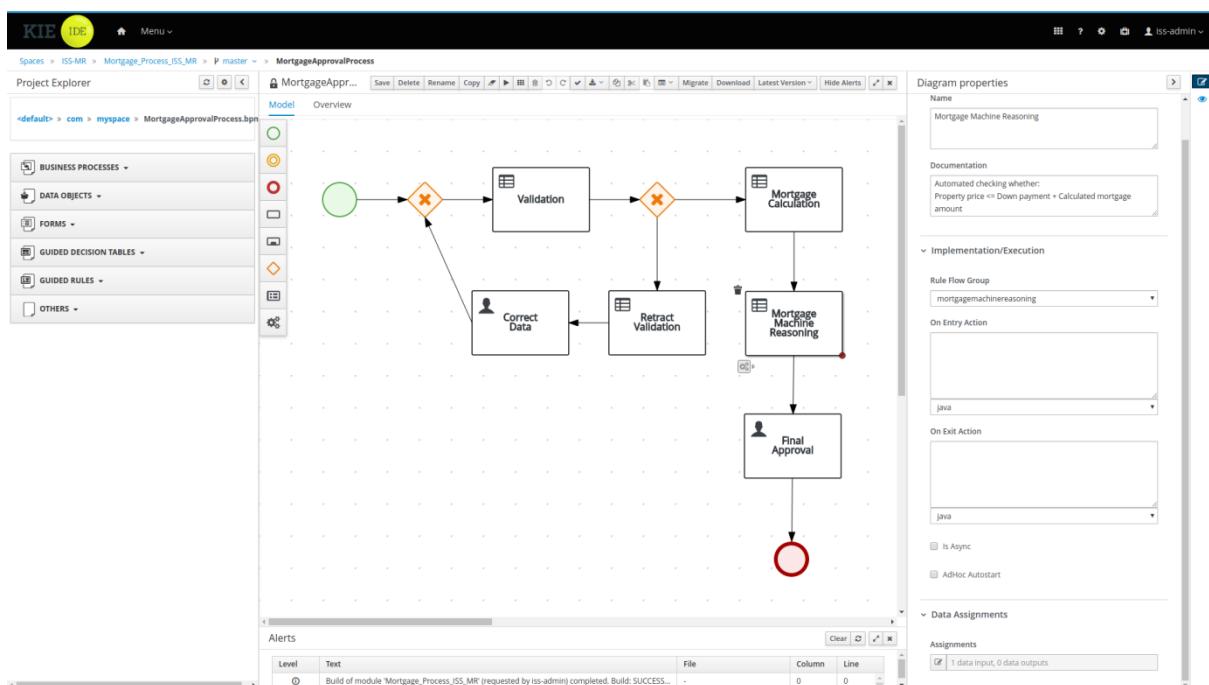
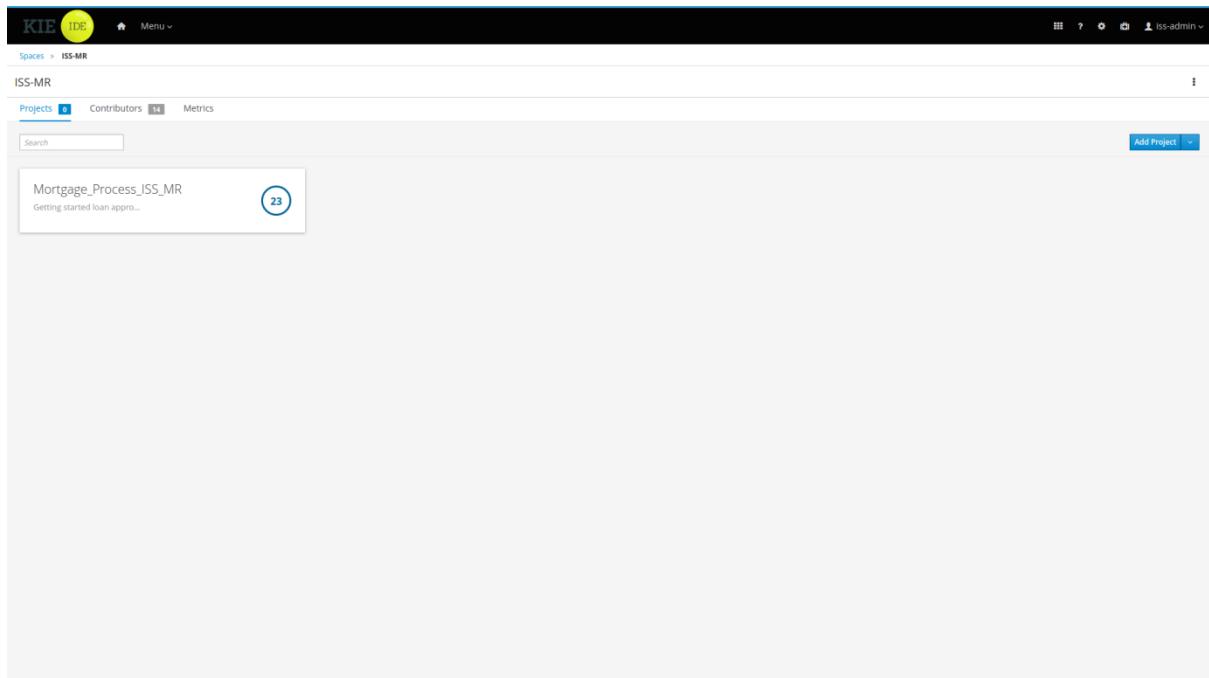


5.2.2. Import project into KIE Workbench

- 1) In KIE workbench, select/create a project Space, example here uses ***ISS-MR***
- 2) Click menu function '***Import Project***'
- 3) For Repository URL, key in ***file:///home/iss-user/iss-vm-program/is-intelligent-reasoning-systems/jboss/project-io/Mortgage_Process_ISS_MR***







Reference

<https://developer.jboss.org/thread/269991>

<https://developer.jboss.org/thread/237411>

<https://developer.jboss.org/thread/252588>

5.3. ANNEX 3 – Workshop Project Submission

- 1) Create Github repository for project submission;
- 2) Download Github repository as a ZIP file, then upload to NUS LumiNUS;

Reference

<https://github.com/IRS-PM/Workshop-Project-Submission-Template>

Machine Reasoning Rule Engines in various programming languages:

CLIPS	http://www.clipsrules.net/
Node.js, Python, Ruby	https://github.com/jruizgit/rules
Python	https://github.com/buguroo/pyknow
Node.js	https://github.com/primaryobjects/knowledgebase

The End of Workshop Project Guide