Red Hat Decision Manager 7.1

Getting started with decision services

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Red Hat Decision Manager 7.1 Getting started with decision services

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Abstract

In this tutorial, you will create and test a driver's license suspension scenario.

Table of Contents

PREFACE 3

CHAPTER 1. CREATING THE TRAFFIC VIOLATIONS PROJECT 4

CHAPTER 2. DATA OBJECTS 5
2.1. CREATING THE VIOLATION DATA OBJECT 6
2.1.1. Adding the Violation data object constraints 6
2.2. CREATING THE DRIVER DATA OBJECT 8
2.2.1. Adding the Driver data object constraints 9

CHAPTER 3. GUIDED RULES 12
3.1. CREATING THE DRIVER LICENSE SUSPENSION RULE 12
3.2. SETTING THE SUSPENSION RULE CONDITIONS 13
3.3. SETTING THE SUSPENSION RULE ACTIONS 15

CHAPTER 4. GUIDED DECISION TABLES 17
4.1. CREATING A TRAFFIC VIOLATION GUIDED DECISION TABLE 17
4.1.1. Inserting Violation Type columns 18
4.1.2. Inserting Fine Amount and Points columns 22
4.1.3. Inserting guided decision table rows 23

CHAPTER 5. TEST SCENARIOS 25
5.1. TESTING THE SPEED LIMIT SCENARIO 25
5.2. TESTING THE DRIVER LICENSE SUSPENSION SCENARIO 27
5.3. TESTING THE MULTIPLE VIOLATIONS SCENARIO 29

APPENDIX A. VERSIONING INFORMATION 31

PREFACE

As a business analyst or rules developer, you can use Decision Central in Red Hat Decision Manager to design a variety of decision services. In this tutorial, you will create and test a driver's license suspension scenario.

Prerequisites

- Red Hat JBoss Enterprise Application Platform 7.1.0 is installed. For details, see *Red Hat JBoss EAP 7.1.0 Installation Guide*.
- Red Hat Decision Manager is installed and configured with Decision Server. For more information, see *Installing and configuring Red Hat Decision Manager on Red Hat JBoss EAP 7.1* .
- Red Hat Decision Manager is running and you can log in to Decision Central with the **developer** role. For more information, see *Planning a Red Hat Decision Manager installation* .

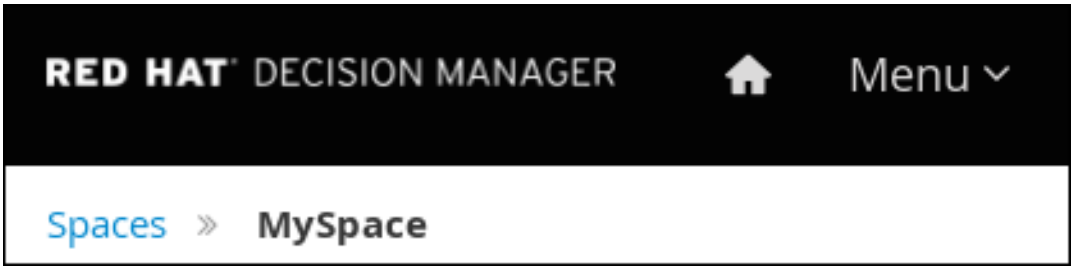
CHAPTER 1. CREATING THE TRAFFIC VIOLATIONS PROJECT

A project is the container for assets such as data objects, guided decision tables, and guided rules. For this tutorial, you will create the **Driver_department_traffic_violations** project.

Procedure

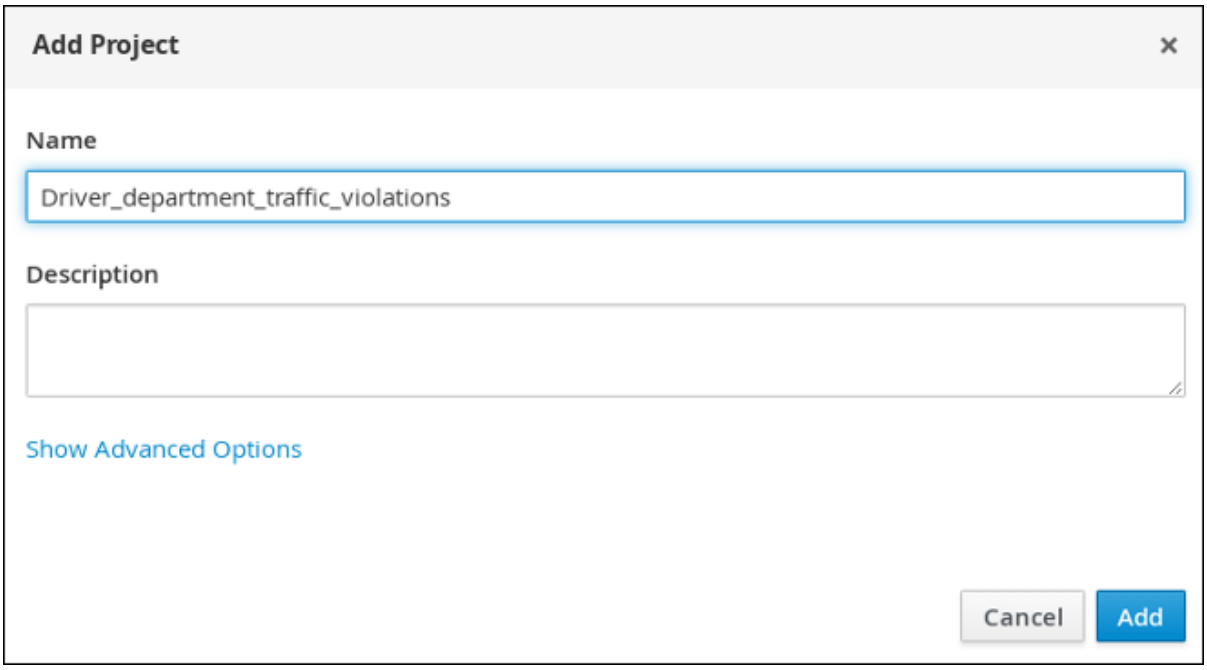
1. Log in to Decision Central.
2. Go to **Menu → Design → Projects**.
   Tip: Red Hat Decision Manager provides a default space called **MySpace**, as shown in the following image. You can use the default space to create and test example projects.

   Figure 1.1. Default spaces



3. Click **Add Project**.
4. Enter **Driver_department_traffic_violations** in the **Name** field.
5. Click **Add**.

   Figure 1.2. Add Project window



The Assets view of the project opens.

CHAPTER 2. DATA OBJECTS

Data objects are the building blocks for the rule assets that you create. Data objects are custom data types implemented as Java objects in specified packages of your project. For example, you might create a **Person** object with data fields **Name**, **Address**, and **DateOfBirth** to specify personal details for loan application rules. These custom data types determine what data your assets and your decision services are based on.

The following tables show the **Violation** and **Driver** data objects that you will create in this tutorial.

Table 2.1. Violation data object

ID	Label	Type
code	Code	String
points	Points	Integer
violationDate	Violation Date	Date
type	Type	String
fineAmount	Fine Amount	Double
speedLimit	Speed Limit	Integer
actualSpeed	Actual Speed	Integer

Table 2.2. Driver data object

ID	Label	Type
name	Name	String
age	Age	Integer
state	State	String
city	City	String
violations	Violations	Violation (org.jboss.example.traffic_violations.Violation) Note: The violations field is set to "List" to hold multiple items for the given type.
fineAmount	Fine Amount	Double
totalPoints	Total Points	Integer

ID	Label	Type
reason	Reason	String

2.1. CREATING THE VIOLATION DATA OBJECT

The **Violation** data object contains data fields based on violation details, such as **Violation Date**, **Fine Amount**, and **Speed Limit**.

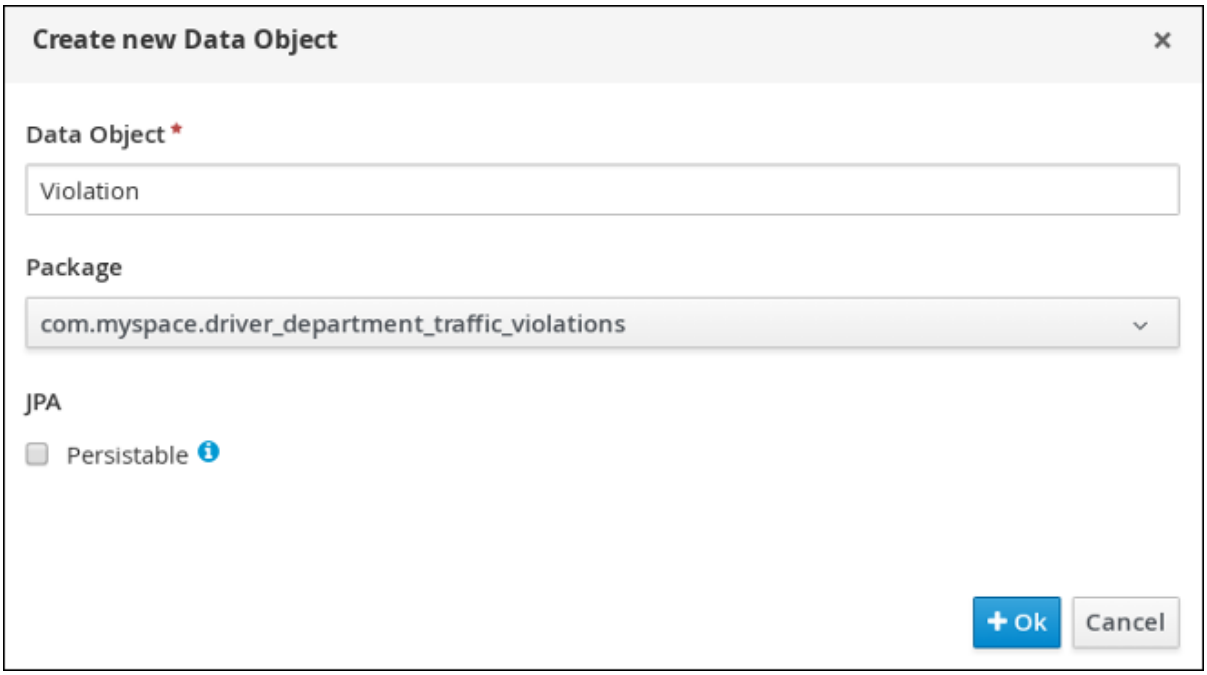
Prerequisites

You have created the **Driver_department_traffic_violations** project.

Procedure

1. Click **Add Asset → Data Object**.
2. In the **Create new Data Object** wizard, enter the following values:
   - **Data Object**: **Violation**
   - **Package**: select **com.myspace.driver_department_traffic_violations**
3. Click **Ok**.

Figure 2.1. Create new Data Object window



2.1.1. Adding the Violation data object constraints

Populate the **Violation** data object fields with the constraints that you will select when you define your rules.

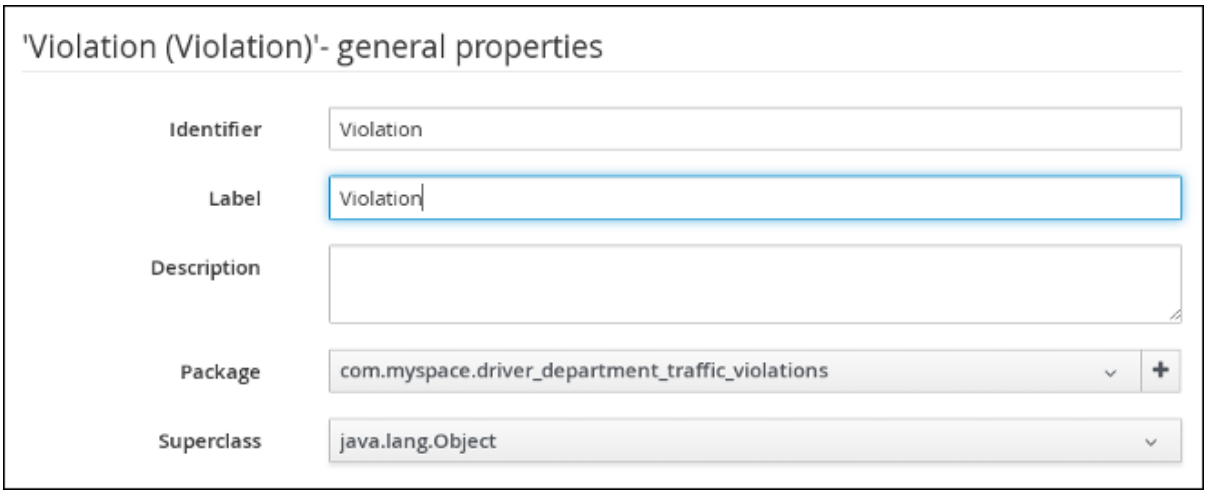
Prerequisites

You have created the **Violation** data object.

Procedure

1. In the **'Violation'-general properties** section, enter **Violation** in the **Label** field.

   Figure 2.2. General properties

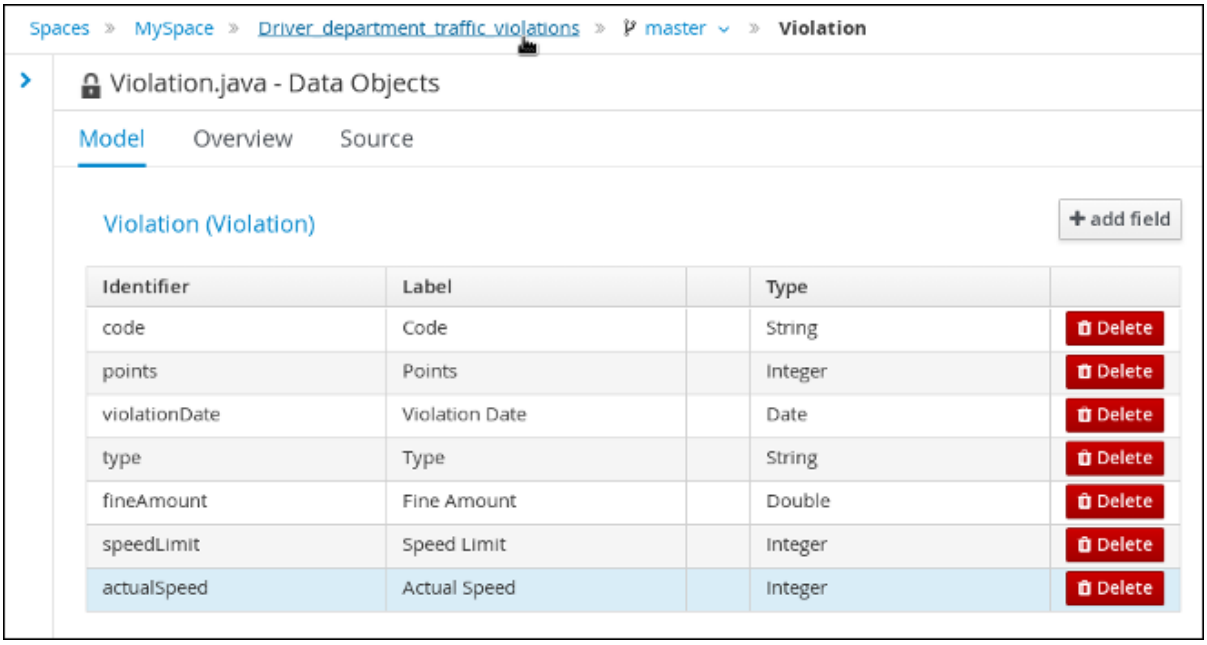


2. Click **+ add field**.
3. Enter the following values:
   - Id: **code**
   - Label: **Code**
   - Type: **String**
4. Click **Create and continue**, then enter the following values:
   - Id: **points**
   - Label: **Points**
   - Type: **Integer**
5. Click **Create and continue**, then enter the following values:
   - Id: **violationDate**
   - Label: **Violation Date**
   - Type: **Date**
6. Click **Create and continue**, then enter the following values:
   - Id: **type**
   - Label: **Type**
   - Type: **String**
7. Click **Create and continue**, then enter the following values:
   - Id: **fineAmount**

- Label: **Fine Amount**
- Type: **Double**

8. Click **Create and continue**, then enter the following values:
   - Id: **speedLimit**
   - Label: **Speed Limit**
   - Type: **Integer**
9. Click **Create and continue**, then enter the following values:
   - Id: **actualSpeed**
   - Label: **Actual Speed**
   - Type: **Integer**
10. Click **Create**.
11. Click **Save**, and then click **Save** to confirm your changes.
12. Click the **Driver_department_traffic_violations** label to return to the **Assets** view of the project.

Figure 2.3. Violation data object fields



2.2. CREATING THE DRIVER DATA OBJECT

The **Driver** data object contains data fields based on driver details, such as **Name**, **Age**, and **Total Points**.

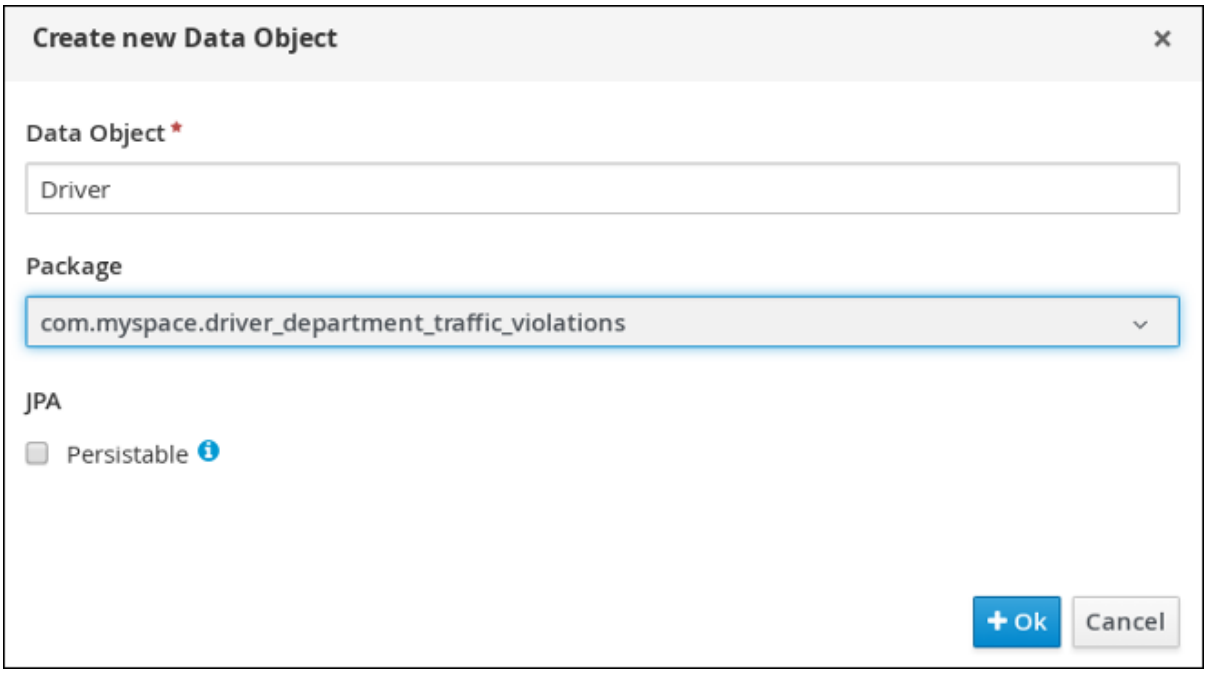
Prerequisites

You have created the **Driver_department_traffic_violations** project.

Procedure

1. Click **Add Asset → Data Object**.
2. In the **Create new Data Object** wizard, enter the following values:
   - **Data Object**: **Driver**
   - **Package**: select **com.myspace.driver_department_traffic_violations**
3. Click **Ok**.

Figure 2.4. Create new Data Object window



2.2.1. Adding the Driver data object constraints

Populate the **Driver** data object fields with the constraints that you will select when you define your rules.

Prerequisites

You have created the **Driver** data object.

Procedure

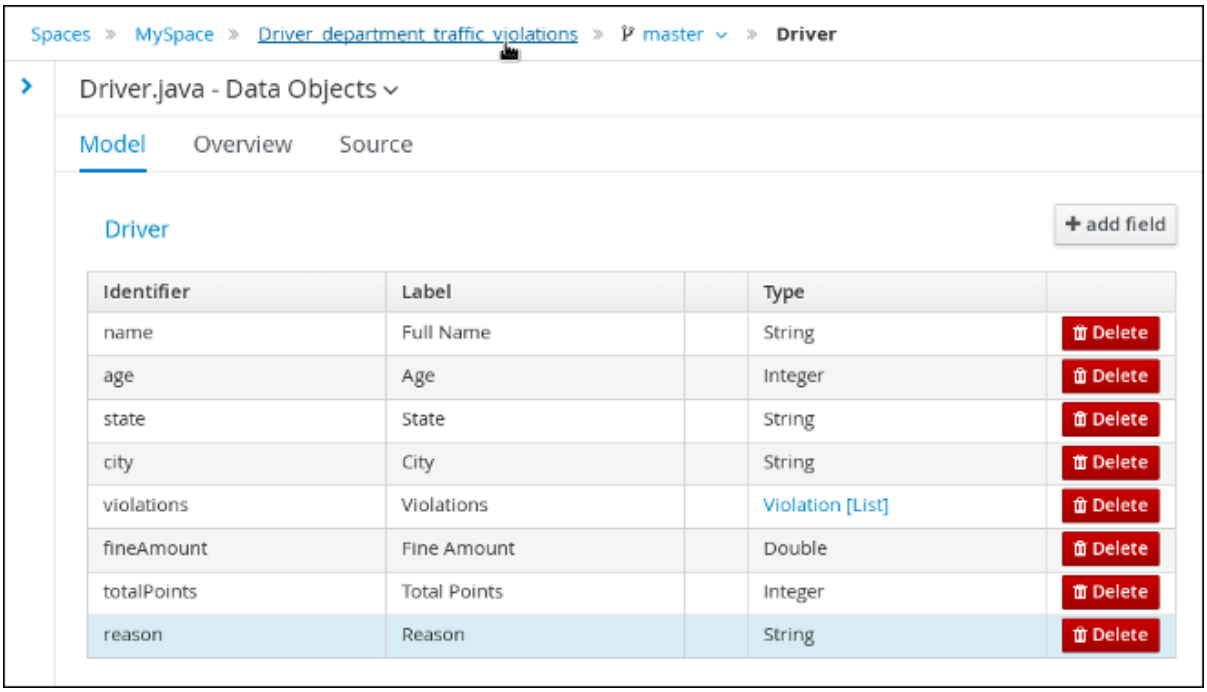
1. In the **'Driver'-general properties** section, enter **Driver** in the **Label** field.
2. Click **+ add field**.
3. Enter the following values:
   - **Id**: **name**
   - **Label**: **Full Name**
   - **Type**: **String**
4. Click **Create and continue**, then enter the following values:

- Id: **age**
- Label: **Age**
- Type: **Integer**

5. Click **Create and continue**, then enter the following values:
   - Id: **state**
   - Label: **State**
   - Type: **String**
6. Click **Create and continue**, then enter the following values:
   - Id: **city**
   - Label: **City**
   - Type: **String**
7. Click **Create and continue**, then enter the following values:
   - Id: **violations**
   - Label: **Violations**
   - Type: **Violation(com.myspace.driver_department_traffic_violations.Violation)**
   - **List**: Select this check box to enable the field to hold multiple items for the specified type.
8. Click **Create and continue**, then enter the following values:
   - Id: **fineAmount**
   - Label: **Fine Amount**
   - Type: **Double**
9. Click **Create and continue**, then enter the following values:
   - Id: **totalPoints**
   - Label: **Total Points**
   - Type: **Integer**
10. Click **Create and continue**, then enter the following values:
    - Id: **reason**
    - Label: **Reason**
    - Type: **String**
11. Click **Create**.
12. Click **Save**, and then click **Save** to confirm your changes.

13. Click the **Driver_department_traffic_violations** label to return to the **Assets** view of the project.

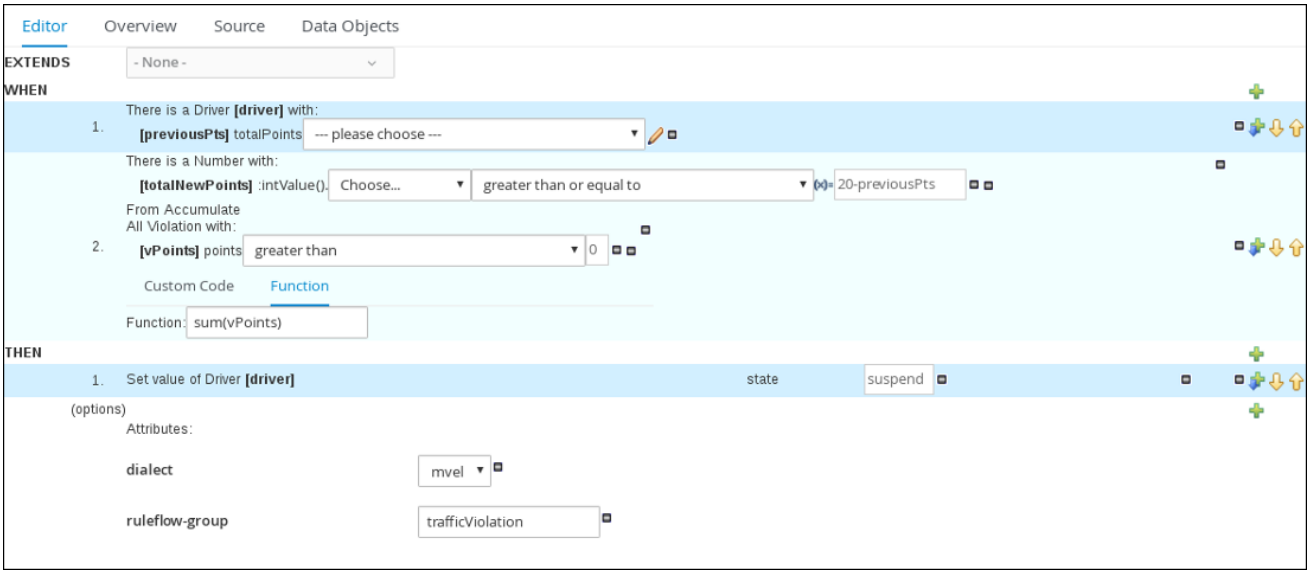
Figure 2.5. Driver data object fields



CHAPTER 3. GUIDED RULES

Guided Rules are business rules that you can create in a UI-based Guided Rules designer that leads you through the rule creation process. The rule designer provides fields and options for acceptable input based on the object model of the rule being edited. All data objects related to the rule must be in the same project package as the rule. Assets in the same package are imported by default. You can use the **Data Objects** tab of the rule designer to verify that all required data objects are listed or to import any other needed data objects.

Figure 3.1. The Guided Rule designer



3.1. CREATING THE DRIVER LICENSE SUSPENSION RULE

Create the Driver license suspension rule using the Guided Rule wizard.

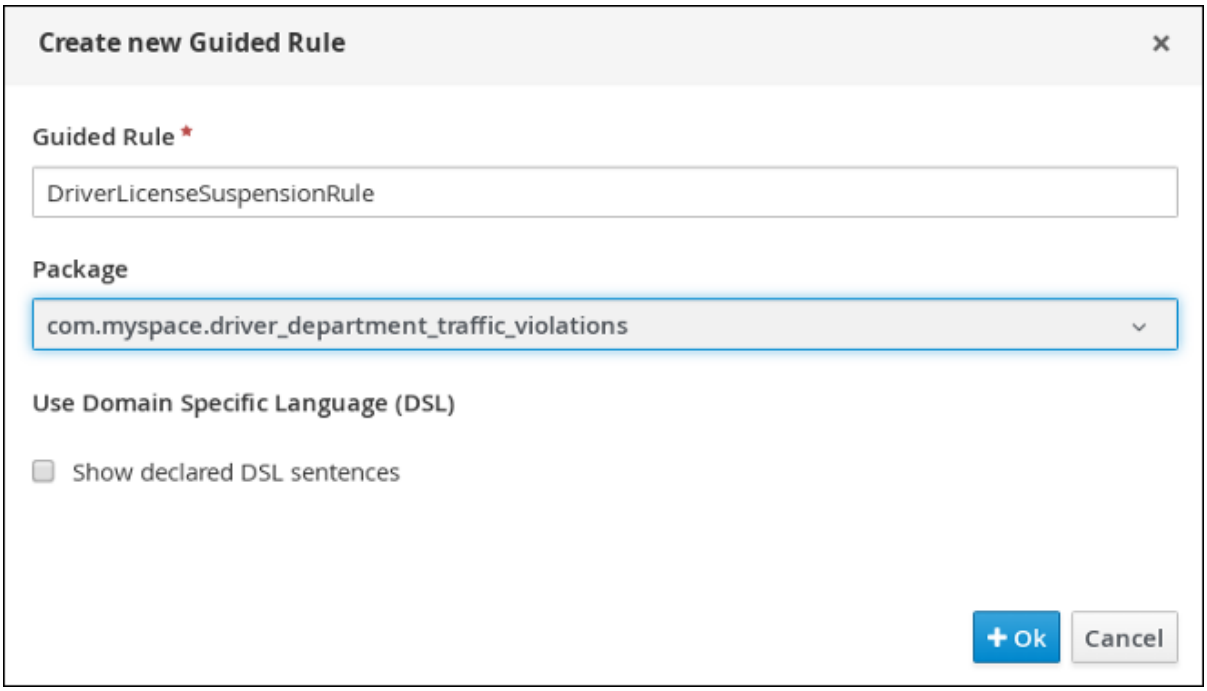
Prerequisite

You have created both the **Violation** and **Driver** data objects.

Procedure

1. Log in to Decision Central.
2. Click **Menu → Design → Projects**, then **Driver_department_traffic_violations**.
3. Click **Add Asset → Guided Rule**, then enter:
   - Guided Rule: **DriverLicenseSuspensionRule**
   - Package: **com.myspace.driver_department_traffic_violations**
4. Click **Ok** to open the **Guided Rule designer**.

Figure 3.2. Create new Guided Rule window



3.2. SETTING THE SUSPENSION RULE CONDITIONS

Set the **Suspension** rule conditions that are used to determine the driver's violation.

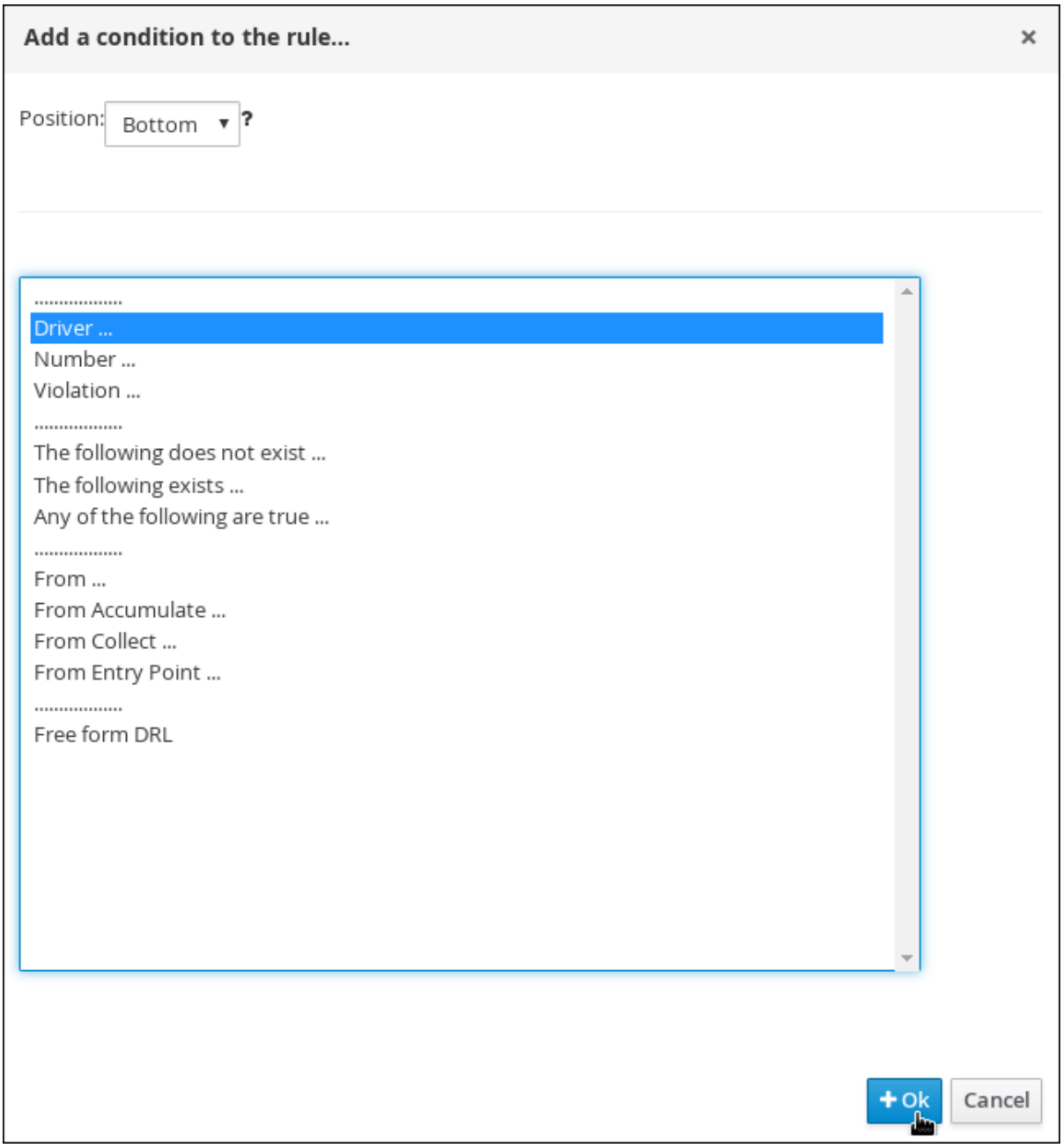
Prerequisite

You have created the Driver License Suspension rule.

Procedure

1. Click ( ) next to the **WHEN** label to open the **Add a condition to the rule**window.
2. Select **Driver** and click **Ok**.

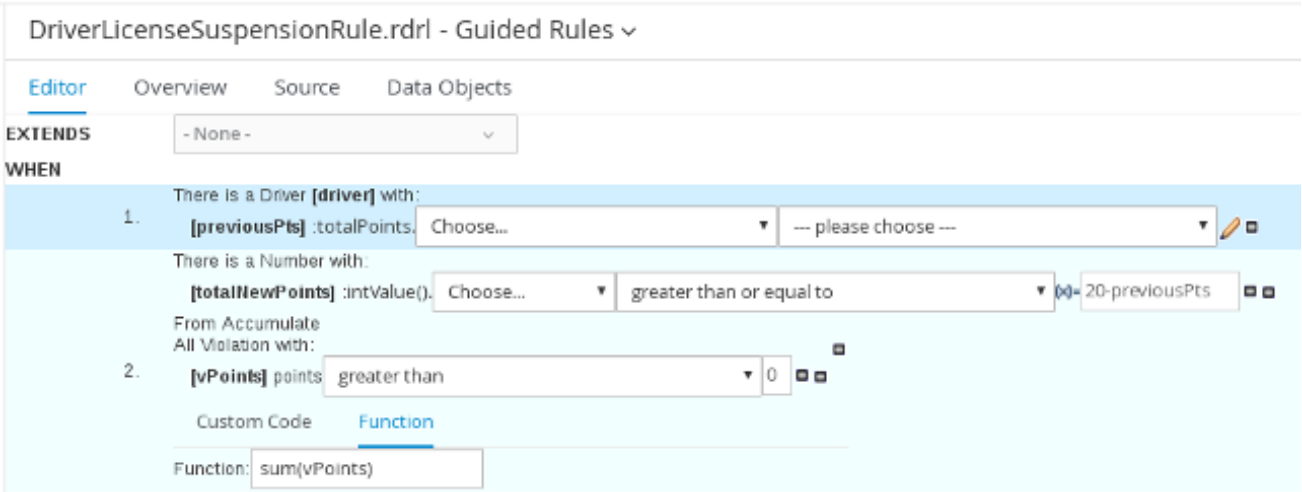
Figure 3.3. Create new Guided Rule window



3. Click the **There is a Driver** label to open the **Modify constraints for Driver** window.
4. Enter **driver** in the **Variable name** field and click **Set**.
5. Click **There is a Driver[driver]** and click **Expression editor**.
6. Click **[not bound]** to open the **Expression editor**.
7. In the **Bind the Expression to a new variable** field, enter: **previousPts** and click **Set**.
8. From the **Choose** menu, select **totalPoints**.
9. Click ( ) next to line 1 (the **previousPts** label) to open the **Add a condition to the rule** window.
10. Select **From Accumulate** and click **Ok**.

11. Click **click to add pattern** above the **From Accumulate** label and select **Number** from the **choose fact type** menu.
12. Click **There is a number** label to open the **Modify contraints for Driver** window.
13. Click **Expression editor** and select **intValue()** from the **[not bound]: Choose** menu.
14. Click **[not bound]** to open the **Expression editor**.
15. In the **Bind the Expression to a new variable** field, enter: **totalNewPoints** and click **Set**.
16. Click **click to add pattern** and select **Violation** from the **choose fact type** menu.
17. Click **All Violation with:** to open the **Modify contraints for Violation** window and select **points** from the **Add a restriction on a field** menu.
18. Click **please choose** next to the **points** label and select **greater than**.
19. Click ( ), and then click **Literal value**.
20. Click the **points** label to open the **Add a field** window.
21. Enter **vPoints** and click **Set**.
22. In the **Function** field, enter **sum(vPoints)**.
23. Select **greater than or equal to** from the **totalNewPoints → please choose** menu.
24. Click ( ), click **New formula**, and enter **20-previousPts** in the new field.
25. Click **Save**, and then click **Save** to confirm your changes.

Figure 3.4. Suspension Rule conditions



3.3. SETTING THE SUSPENSION RULE ACTIONS

Set the **Suspension** rule actions that are used to determine a driver's resulting penalties, including points and fine amounts, based on the Suspension rule conditions.

Prerequisite

You have set the Suspension rule conditions.

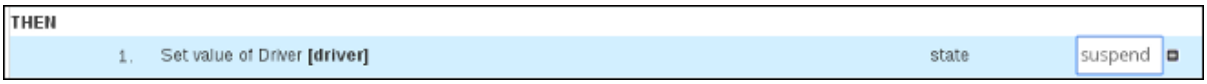
Procedure

1. Click **(show options...)**.

   Figure 3.5. show options selection

2. Click ( ) next to the **THEN** label and select **Change field values of driver**, and click **Ok**.
3. Click the **Set value of Driver [driver]**field and select **state** from the **Add field** menu.
4. Click ( ) next to **state** in the **Set value of Driver [driver]**section to open the **Field value** window.
5. Click **Literal value** and enter **suspend** in the new field.

   Figure 3.6. New field

6. Click ( ) next to the **(options)** label below the **Set value of Driver [driver]**section.
7. From the **Add an option to the rule**window, select the **ruleflow-group** option from the **Attribute** menu.
8. Enter **trafficViolation** in to the **ruleflow-group** field.
9. Click **Save**, and then click **Save** to confirm your changes.

   Figure 3.7. Suspension rule actions

CHAPTER 4. GUIDED DECISION TABLES

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

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

4.1. CREATING A TRAFFIC VIOLATION GUIDED DECISION TABLE

Use the Guided Decision Table designer to create the traffic violation guided decision table, which specifies the driver's specific violation and the resulting fine and points.

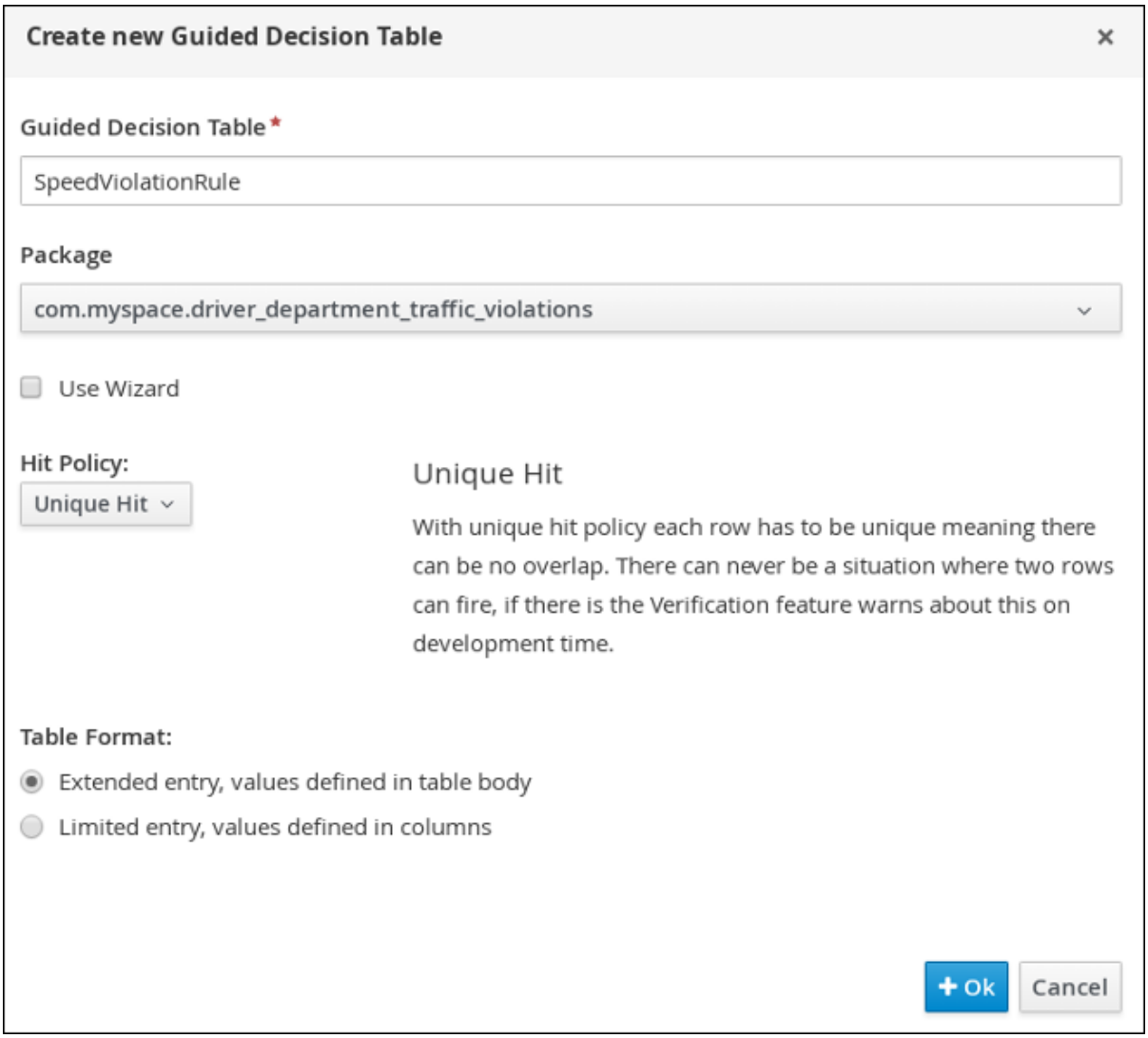
Prerequisite

You have created both the **Violation** and **Driver** data objects.

Procedure

1. Log in to Decision Central.
2. Click **Menu → Design → Projects**, then **Driver_department_traffic_violations**.
3. Click **Add Asset → Guided Decision Table**, then enter:
   - Guided Decision Table: **SpeedViolationRule**
   - Package: **com.myspace.driver_department_traffic_violations**
4. Select **Unique Hit** from the **Hit Policy** menu.
5. Select **Extended entry, values defined in table body** in the **Table format** section.
6. Click **Ok** to open the **Guided Decision Tables** designer.

Figure 4.1. Guided Decision Tables designer



4.1.1. Inserting Violation Type columns

The **Violation Type** column contains the violation details such as the the driver's speed and if the driver was under the influence of drugs or alcohol.

Prerequisite

You have created the traffic violation guided decision table.

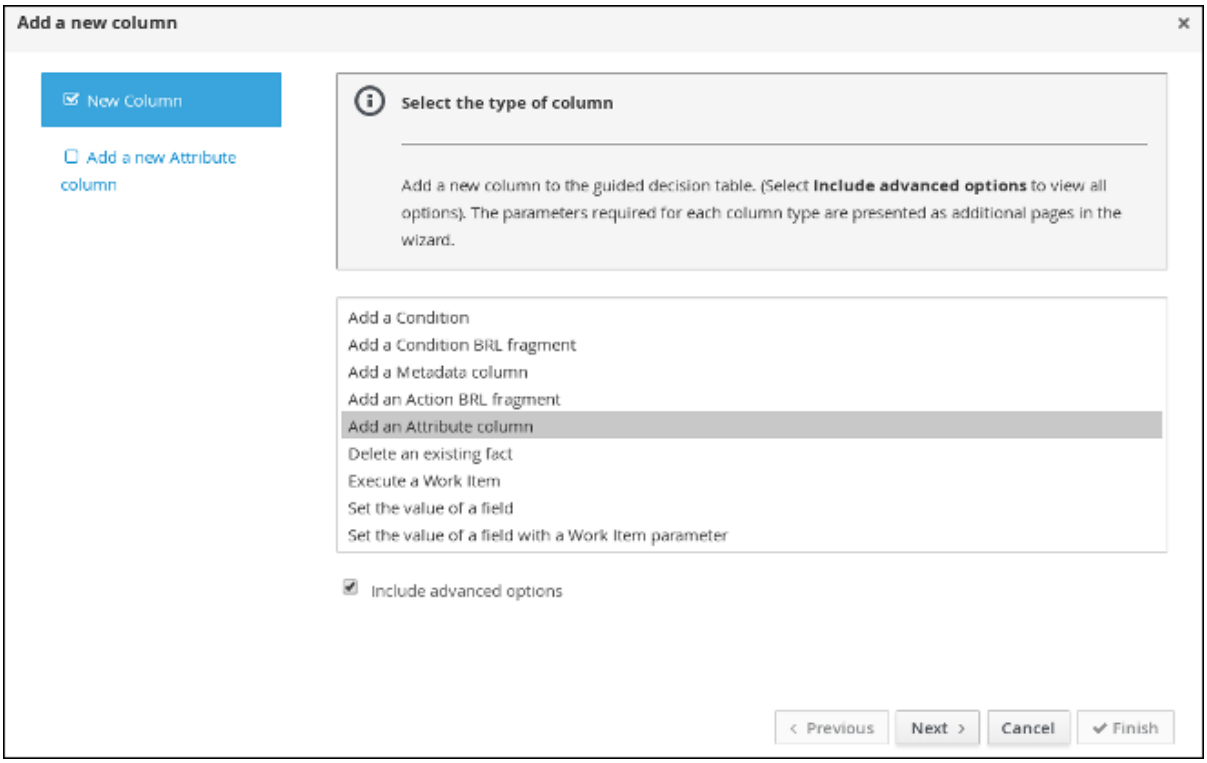
Procedure

1. Click **Columns → Insert Column** and then select **Include advanced options**.

Figure 4.2. Column tab

2. Select **Add an Attribute column**and click **Next**.

Figure 4.3. Add a new column window



3. Select **Ruleflow-group** and click **Finish**.

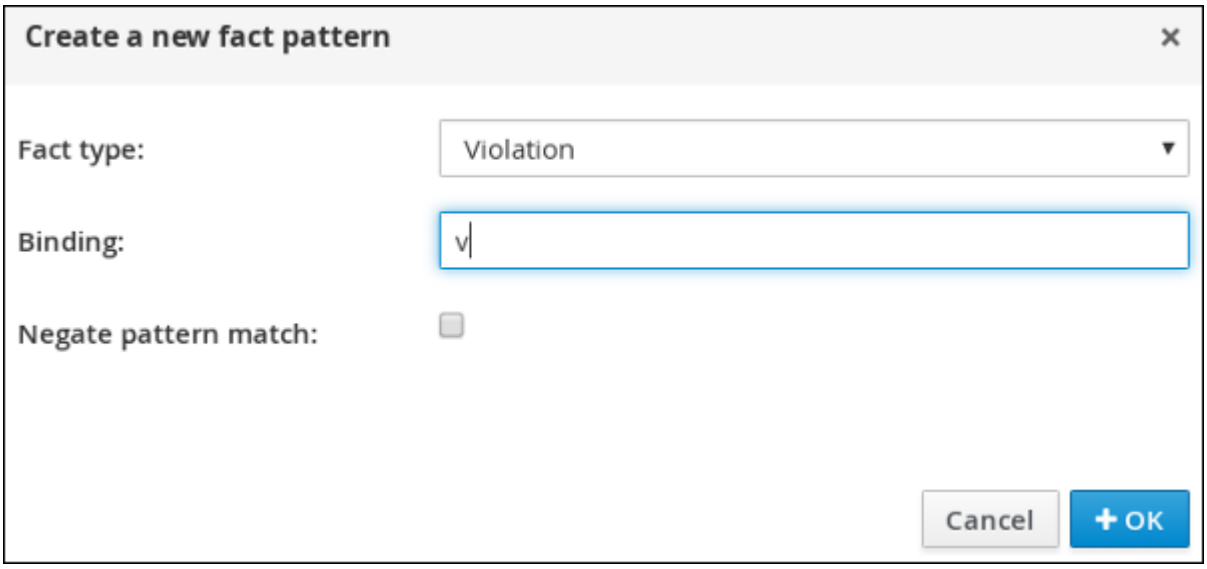
4. Expand **Attribute columns** and enter **trafficViolation** in the **Default value** field.

Figure 4.4. Attribute columns window

5. Click **Insert Column**, select **Add a Condition → Pattern → +Create a new Fact Pattern**

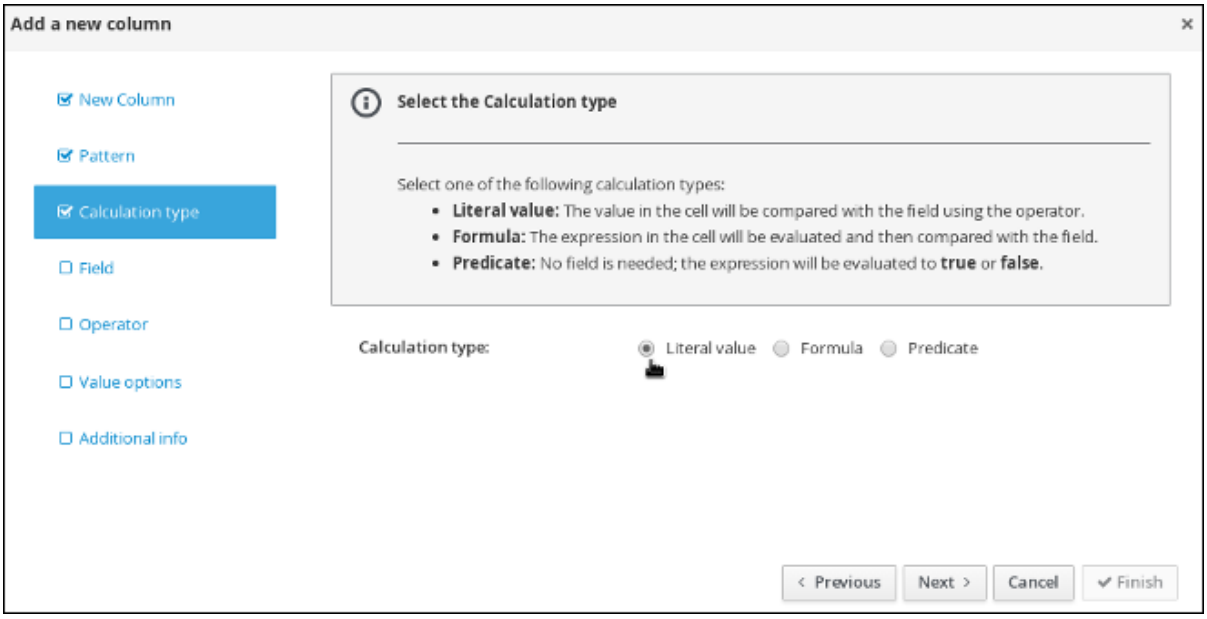
6. Select **Violation** from the **Fact type** menu, enter **v** in the **Binding** field, and click **OK**.

Figure 4.5. Create a new fact pattern window



7. Select **Calculation type** → **Literal value**.

Figure 4.6. Calculation type options



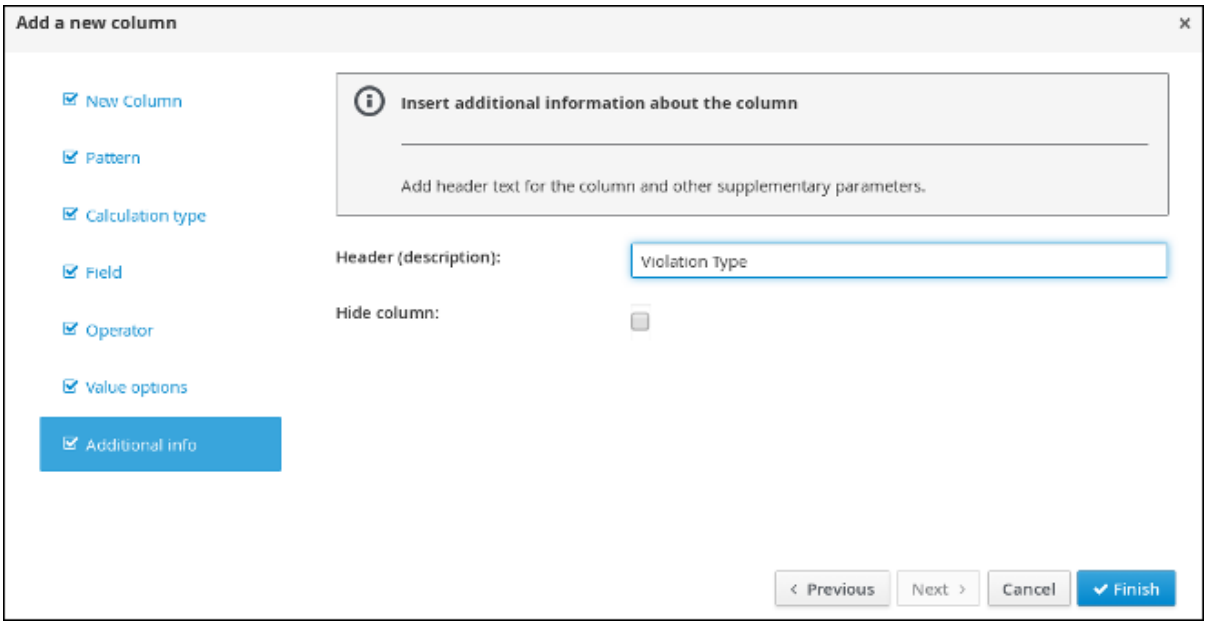
8. Select **Field** and then select **type** from the **Field** menu.

9. Select **Operator** and then **equal to** from the **Operator** menu.

10. Select **Value options** and enter **Speed,Driving while intoxicated,DWI=Driving while under the influence of drugs** in the **Value list (optional)** field.

11. Select **Additional info**, enter **Violation Type** in the **Header (description)** field, and click **Finish**.

Figure 4.7. Violation Type header



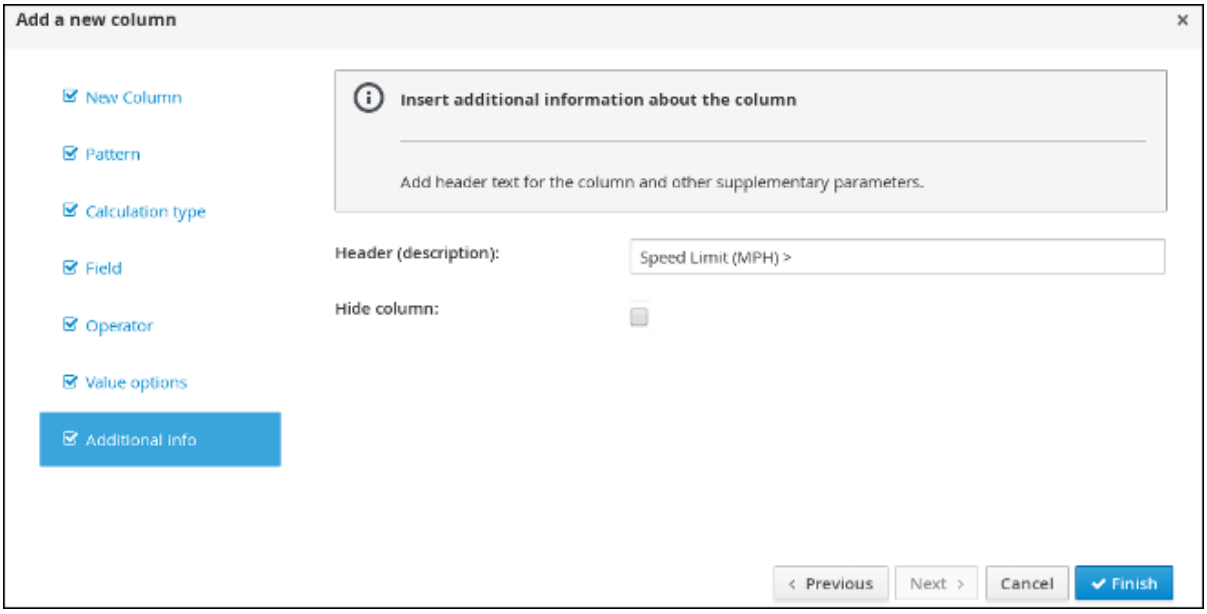
12. Click **Insert Column**, select **Add a Condition → Pattern**, and select **Violation[v]** from the **Pattern** menu.

13. Select **Calculation type → Predicate → Field** and enter **actualSpeed-speedLimit > $param**.

14. Select **Value options**, then select **Additional info** and enter **Speed Limit (MPH) >** in the **Header (description)** field.

15. Click **Finish**.

Figure 4.8. Speed Limit (MPH) > header



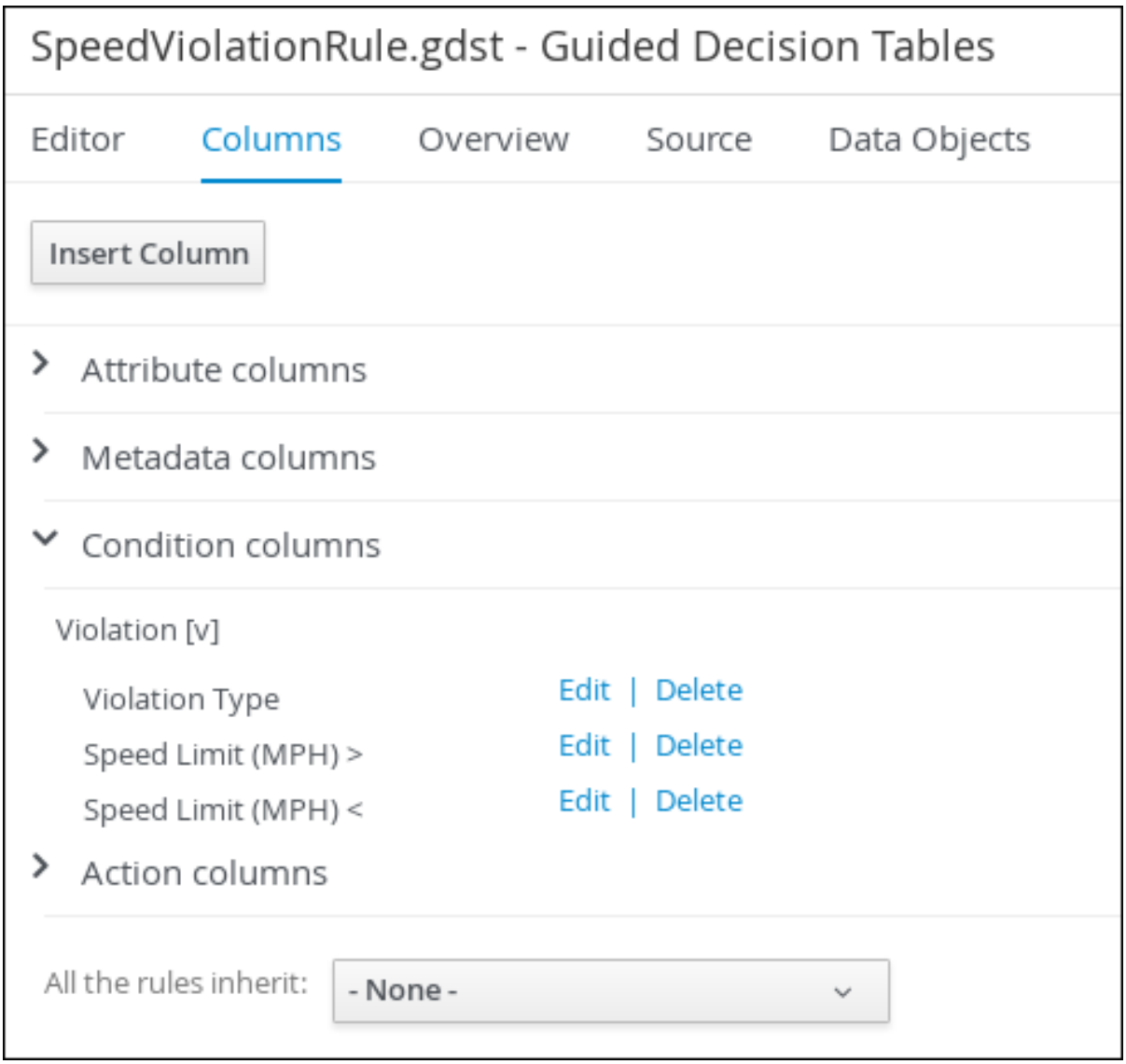
16. Click **Insert Column**, select **Add a Condition → Pattern**, and select **Violation[v]** from the **Pattern** menu.

17. Select **Calculation type → Predicate**.

18. Select **Field** and enter **actualSpeed-speedLimit < $param** in the **Field** field.

19. Select **Operator**, select **Value options**, then select **Additional info**.
20. Enter **Speed Limit (MPH) <** in the **Header (description)** field and click **Finish**.

Figure 4.9. Condition columns



4.1.2. Inserting Fine Amount and Points columns

The **Fine Amount*** and **Points** columns contain the fines and points based on the corresponding **Violation Type** field values.

Prerequisite

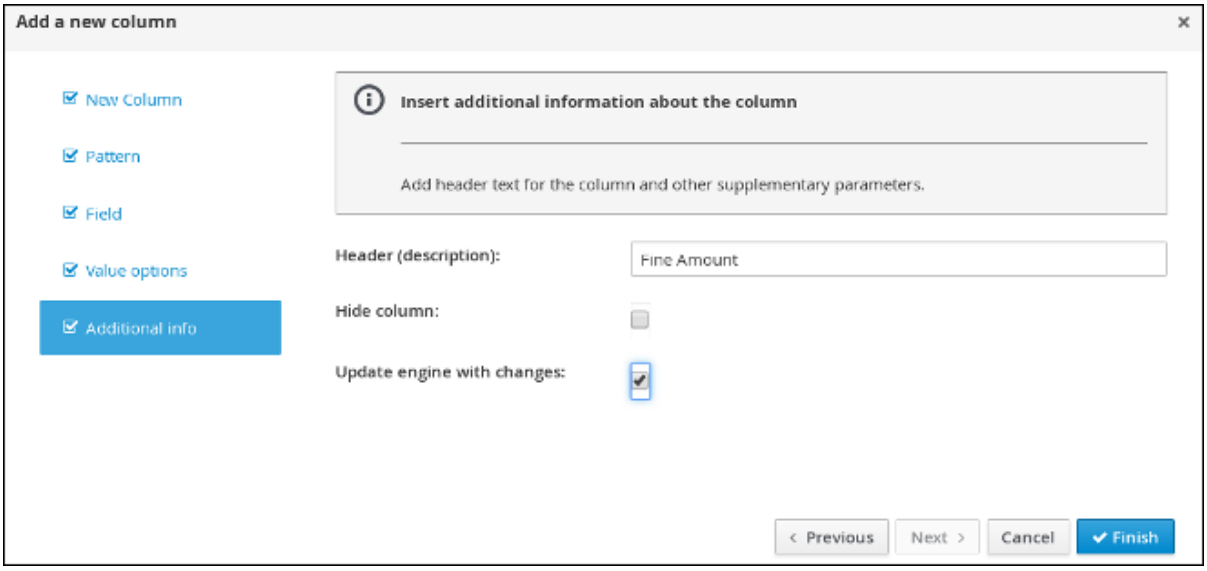
You have inserted the **Violation Type** column in to the traffic violation guided decision table.

Procedure

1. Click **Insert Column**, select **Set the value of a field→ Pattern**, and select **Violation[v]** from the **Pattern** menu.
2. Select **Field** and then **fineAmount** from the **Field** menu.
3. Select **Value options**, and then select **Additional info**, and enter **Fine Amount** in the **Header (description)** field.

4. Select the **Update engine with changes** option and click **Finish**.

Figure 4.10. Fine Amount header



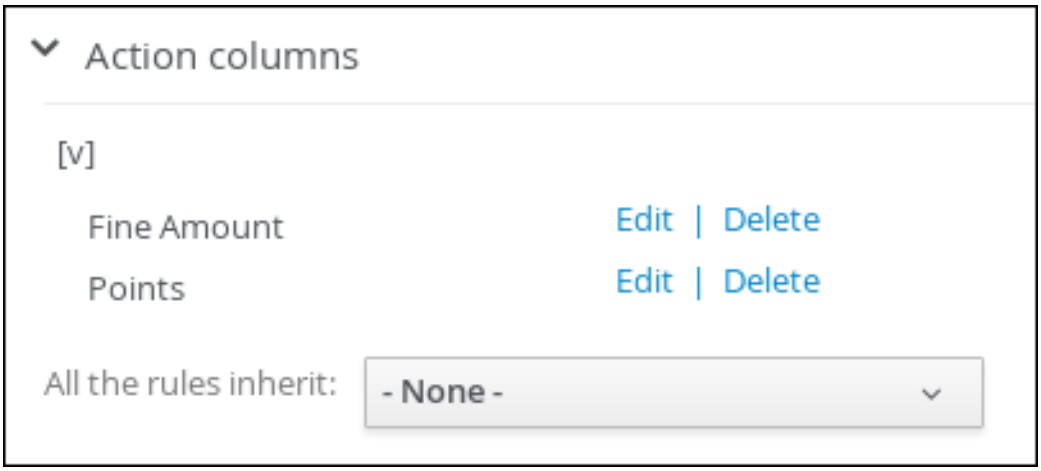
5. Click **Insert Column**, select **Set the value of a field→ Pattern**, and select **Violation[v]** from the **Pattern** menu.

6. Select **Field** and then **points** from the **Field** menu.

7. Select **Value options**, then select **Additional info** and enter **Points** in the **Header (description)** field.

8. Select the **Update engine with changes** option and click **Finish**.

Figure 4.11. Action columns



4.1.3. Inserting guided decision table rows

After you have created your columns in the guided decision table, you can add rows and define rules within the decision table designer.

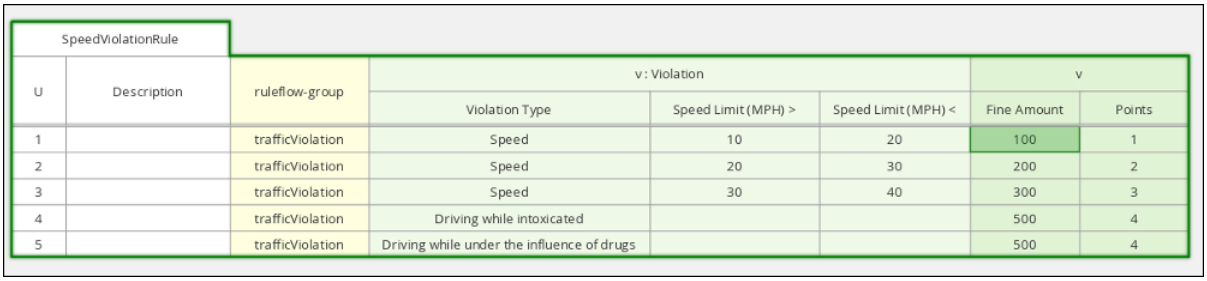
Prerequisite

You have created the **Violation Type**, **Fine Amount**, and **Points** columns in the traffic violation guided decision table.

Procedure

1. Click **Editor → Insert → Append row**. Repeat this step to add a total of five table rows.
2. Fill out the table as shown in the following example:

Figure 4.12. Populated data fields



SpeedViolationRule

U	Description	ruleflow-group	v : Violation			v	
			Violation Type	Speed Limit (MPH) >	Speed Limit (MPH) <	Fine Amount	Points
1		trafficViolation	Speed	10	20	100	1
2		trafficViolation	Speed	20	30	200	2
3		trafficViolation	Speed	30	40	300	3
4		trafficViolation	Driving while intoxicated			500	4
5		trafficViolation	Driving while under the influence of drugs			500	4

3. Click **Save**, and then click **Save** to confirm your changes.

CHAPTER 5. TEST SCENARIOS

Test Scenarios in Red Hat Decision Manager enable you to validate the functionality of rules, models, and events before deploying them into production. A test scenario uses data for conditions that resemble an instance of your fact or project model. This data is matched against a specific set of rules and if the expected results match the actual results, the test is successful. If the expected results do not match the actual results, then the test fails.

After you run all test scenarios, the status of the scenarios is reported in a **Reporting** panel.

Test scenarios can be executed one at a time or as a group. The group execution contains all the scenarios from one package. Test scenarios are independent, so that one scenario cannot affect or modify the other.

5.1. TESTING THE SPEED LIMIT SCENARIO

Test the speed limit scenario using the data that you specified when you created the traffic violation guided decision table.

Prerequisites

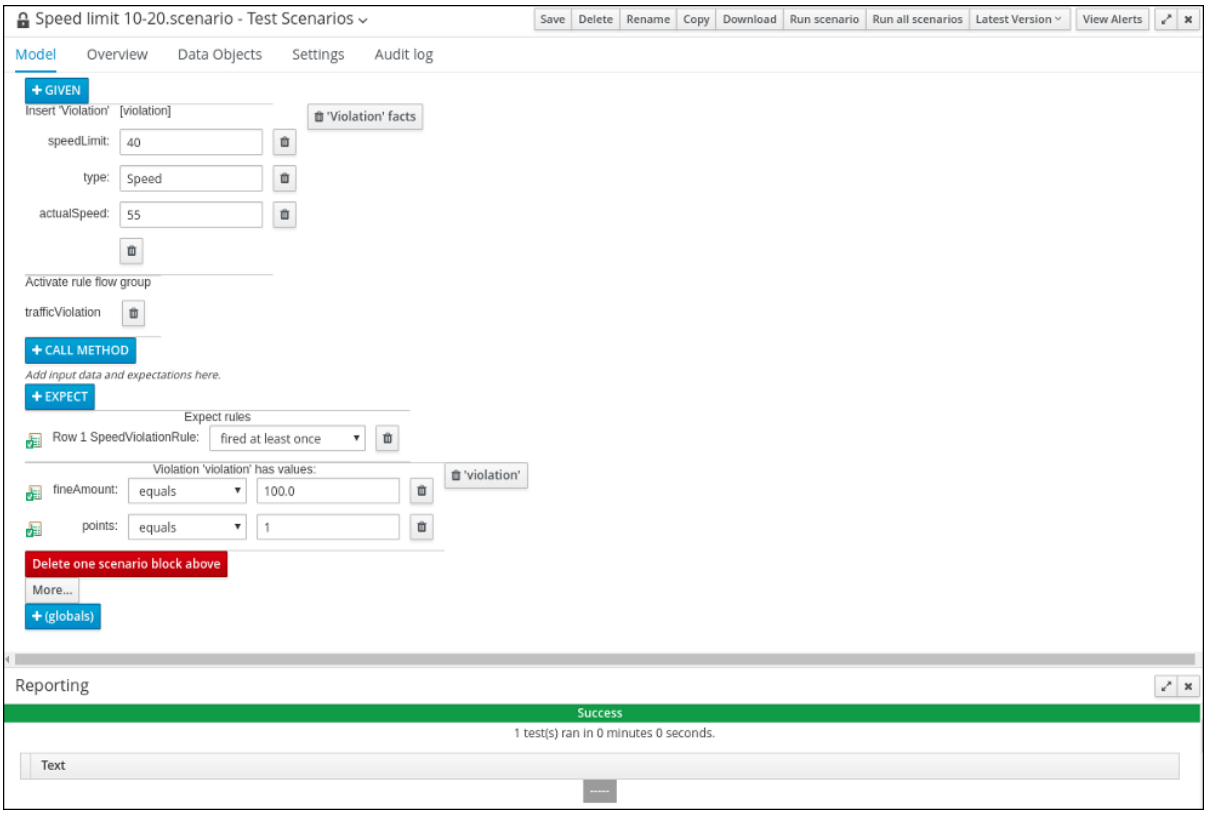
- You have created the **Driver_department_traffic_violations** project.
- You have created the **Violation** and **Driver** data objects.
- You have created the speed violation guided decision table.

Procedure

1. Log in to Decision Central.
2. Click **Menu → Design → Projects**, then **Driver_department_traffic_violations**.
3. Click **Add Asset → Test Scenario**.
4. In the **Create new Test Scenario window** wizard, enter the following values:
   a. **Test Scenario**: **Speed limit 10-20**.
   b. **Package**: select **com.myspace.driver_department_traffic_violations**.
5. Click **Ok**.
6. Click **+GIVEN** to open the **New input** window.
7. Select **Violation** from the **Insert a new fact** menu.
8. Enter **violation** in the **Fact name** field and click **Add**.
9. Click **Add a field** located under **Insert 'Violation'[violation]** to open the **Choose a field to add** window.
10. Select **speedLimit** from the **Choose a field to add** menu and click **OK**.
11. Click ( ), and then click **Literal value** next to **speedLimit**.

12. Click **Literal value** in the **Field value** window, then enter **40** in the **speedLimit** field.
13. Click **Insert 'Violation'[violation]**.
14. Select **type** from the **Choose a field to add**menu in the **Choose a field to add**window, and click **OK**.
15. Click ( ), and then click **Literal value** next to **Literal value**.
16. Enter **Speed** in the **type** field.
17. Click **Insert 'Violation'[violation]**.
18. Select **actualSpeed** from the **Choose a field to add**menu, and click **OK**.
19. Click ( ), and then click **Literal value** next to **Literal value**.
20. Enter **55** in the **actualSpeed** field.
21. Click **+Expect** to open the **New expectation** window.
22. Expand the **Rule** menu, select **Row 1 SpeedViolationRule**, and click **OK**.
23. Click **+GIVEN** to open the **New input** window, enter **trafficViolation** in the **Activate rule flow group** field, and click **Add**.
24. Click **+Expect** to open the **New expectation** window and click **Add** next to **Fact value: violation**.
25. Click **Violation 'violation' has values:** to open the **Choose a field to add**window.
26. Select **fineAmount** from the **Choose a field to add**menu and click **OK**.
27. Enter **100.0** in the **fineAmount: equals** field.
28. Click **Violation 'violation' has values:** to open the **Choose a field to add**window.
29. Select **points** from the **Choose a field to add**menu and click **OK**.
30. Enter **1** in the **points: equals** field.
31. Click **Save**, and then click **Save** to confirm your changes.
32. Click **Run scenario**.

Figure 5.1. Speed test results screen



If the values and conditions set in the test scenario meet the requirements as specified in the speed violation guided decision table, the Reporting section at the bottom of the window displays a Success message.

5.2. TESTING THE DRIVER LICENSE SUSPENSION SCENARIO

Test the driver license suspension scenario using the data that you specified when you set the Driver License Suspension rules and actions.

Prerequisites

- You have created the **Driver_department_traffic_violations** project.
- You have created the **Violation** and **Driver** data objects.
- You have set the Driver License Suspension rules and actions.

Procedure

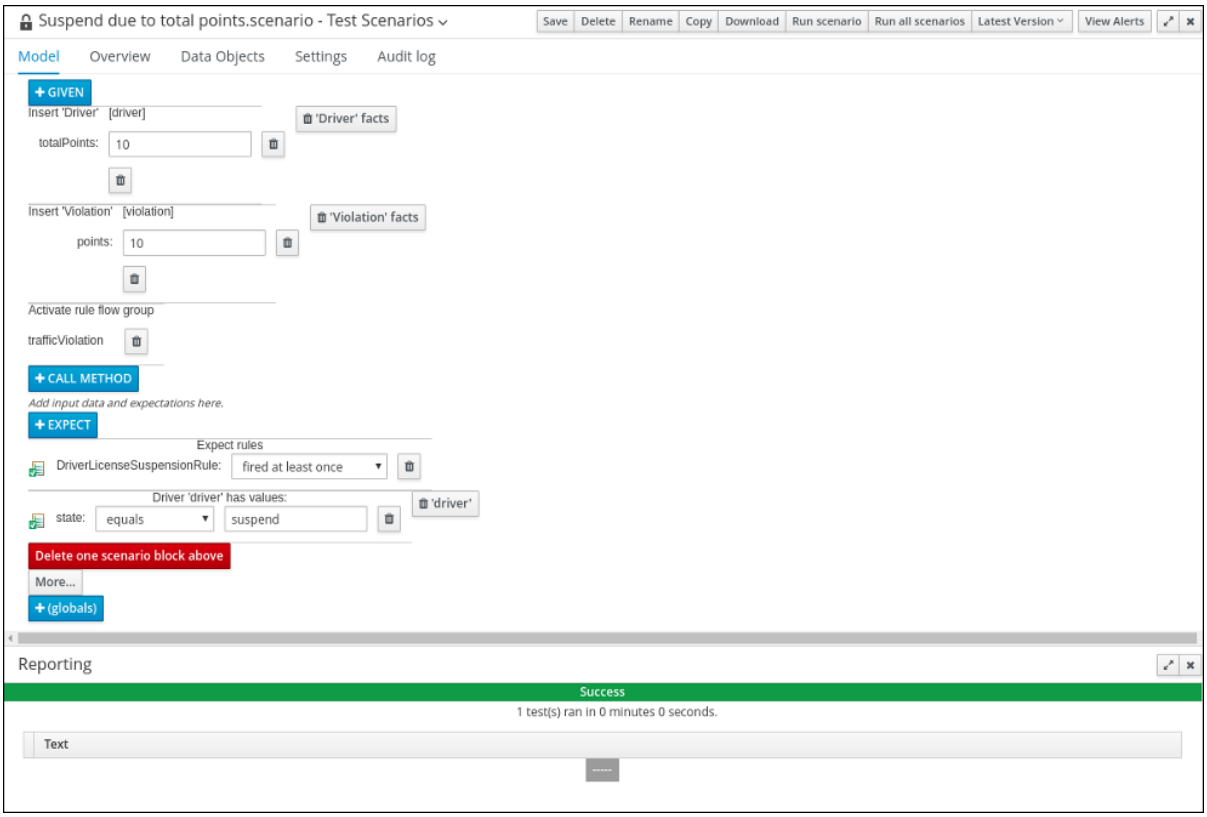
1. Log in to Decision Central.
2. Click **Menu → Design → Projects**, then **Driver_department_traffic_violations**.
3. Click **Add Asset → Test Scenario**.
4. In the **Create new Test Scenario window**wizard, enter the following values:
   a. **Test Scenario**: **Suspend due to total points**.
   b. **Package**: select **com.myspace.driver_department_traffic_violations**.

5. Click **Ok**.
6. Click **+GIVEN** to open the **New input** window.
7. Select **Driver** from the **Insert a new fact** menu.
8. Enter **driver** in the **Fact name** field and click **Add**.
9. Click **Add a field** located under **'Driver'[driver]** to open the **Choose a field to add** window.
10. Select **totalPoints** from the **Choose a field to add** menu and click **OK**.
11. Click ( ) next to **totalPoints**, click **Literal value**, then enter **10** in the **totalPoints** field.
12. Click **+GIVEN** to open the **New input** window.
13. Select **Violation** from the **Insert a new fact** menu.
14. Enter **violation** in the **Fact name** field and click **Add**.
15. Click **Add a field** located under **Insert 'Violation'[violation]** to open the **Choose a field to add** window.
16. Select **points** from the **Choose a field to add** menu and click **OK**.
17. Click ( ), and then click **Literal value** next to **Literal value**.
18. Enter **10** in the **points** field.
19. Click **+Expect** to open the **New expectation** window.
20. Expand the **Rule** menu, select **DriverLicenseSuspensionRule**, and click **OK**.
21. Click **+GIVEN** to open the **New input** window, enter **trafficViolation** in the **Activate rule flow group** field, and click **Add**.
22. Click **+Expect** to open the **New expectation** window and click **Add** next to **Fact value: driver**.
23. Click **Driver 'driver' has values:** to open the **Choose a field to add** window.
24. Select **state** from the **Choose a field to add** menu and click **OK**.
25. Enter **suspend** in the **state: equals** field.
26. Click **Save**, and then click **Save** to confirm your changes.
27. Click **Run scenario**.

Result

The rule is fired and the driver's license is suspended because the total number of points is >= 20.

Figure 5.2. Suspension test results screen



If the values and conditions set in the test scenario meet the requirements that you specified when you set the Driver License Suspension rules and actions, the Reporting section at the bottom of the window displays a Success message.

5.3. TESTING THE MULTIPLE VIOLATIONS SCENARIO

Copy the **Suspend due to total points**asset and modify it to create the driver license suspension scenario for drivers with multiple violations using the data that you specified when you set the Driver License Suspension rules and actions.

Prerequisites

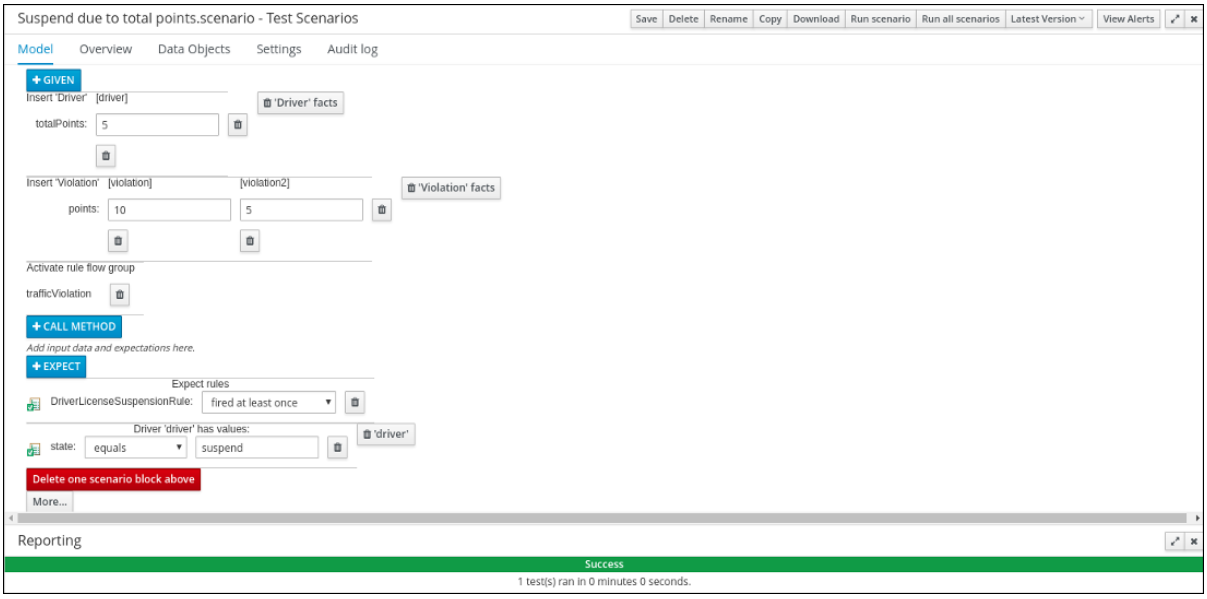
- You have created the **Driver_department_traffic_violations** project.
- You have created the **Violation** and **Driver** data objects.
- You have set the driver license suspension rules and actions.

Procedure

1. Log in to Decision Central.
2. Click **Menu → Design → Projects**, then **Driver_department_traffic_violations**.
3. Click **Suspend due to total points→ Copy**, enter **Suspend due to multiple violations** in the **New Asset Name** field, and click **Make a Copy**.
4. Click **Space → MySpace → Driver_department_traffic_violations**, and then select the **Suspend due to multiple violations** Asset.

5. Click **+GIVEN** to open the **New input** window.
6. Select **Violation** from the **Insert a new fact** menu.
7. Enter **violation2** in the **Fact name** field and click **Add**.
8. Click ( ) next to **points**, click **Literal value**, then enter **5** in the **points → violation2** field.
9. In the **totalPoints** field, change the value from **10** to **5**.
10. Click **Save**, and then click **Save** to confirm your changes.
11. Click **Run scenario**.

Figure 5.3. Suspension test results screen



If the values and conditions set in the test scenario meet the requirements that you specified when you set the Driver License Suspension rules and actions, the Reporting section at the bottom of the window displays a Success message.

APPENDIX A. VERSIONING INFORMATION

Documentation last updated on Friday, May 22, 2020.