



Grant ANR-12-INSE-0011

# GEMOC

***ANR Project, Program INS***

# D4.3.1 - Animation engine Eclipse-based plugins, v1, OBEO (software)
# Task 4.3.1

**Version 1.0**

# Document Control

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# 1. Introduction

## 1.1 Purpose

This documentation aims to describe Eclipse plugins composing the animation engine component of the GEMOC Studio.

## 1.2 Perimeter

Source code of the animation engine can be found in the Gemoc git repository:

git+ssh://scm.gforge.inria.fr/gitroot/gemoc-dev/gemoc-dev.git

in the following folder:

fr/obeo/dsl/sirius/animation

## 1.3 Definitions, Acronyms and Abbreviations

**API**: Application Programming Interface.

**Eclipse Plugin**: an Eclipse plugin is a Java project with associated metadata that can be bundled and deployed as a contribution to an Eclipse-based IDE.

**EMF**: Eclipse Modeling Framework.

**Language Workbench**: a language workbench offers the facilities for designing and implementing modeling languages.

**Language Designer**: a language designer is the user of the language workbench.

**Modeling Workbench**: a modeling workbench offers all the required facilities for editing and animating domain specific models according to a given modeling language.

## 1.4 Summary

The Document will cover the general design and software aspects of the animation engine. The document will provide information about integration of the animation engine with the Gemoc execution engine, the EMF tree editors and finally with Sirius modeler.

# 2. General design

The global architecture of Gemoc is shown in Figure 1. The debugger and animator are configured and the Concrete Syntax Configurator. A generic part is connected with the MSE Engine for MSE capturing and runtime data updates. Finally those information are presented in the Modeling workbench using the Model Animator.

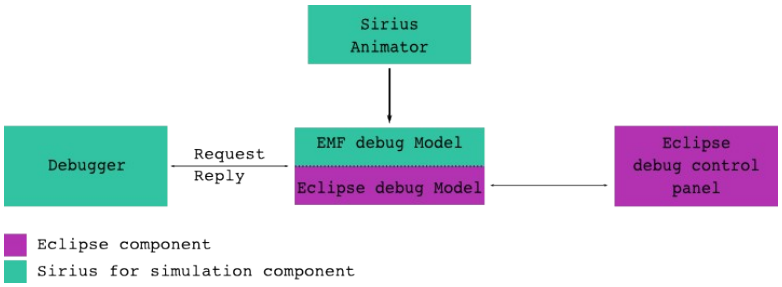



*Figure 1 : General design*

The debugger is a layer on top of the Eclipse debugging framework for EMF integration. It will use EObject as instruction representation. It will also include an other component on top of it dedicated to the animation of Sirius models according to the debugger state and runtime data. The Figure 2 shows the general architecture of the GEMOC Studio.

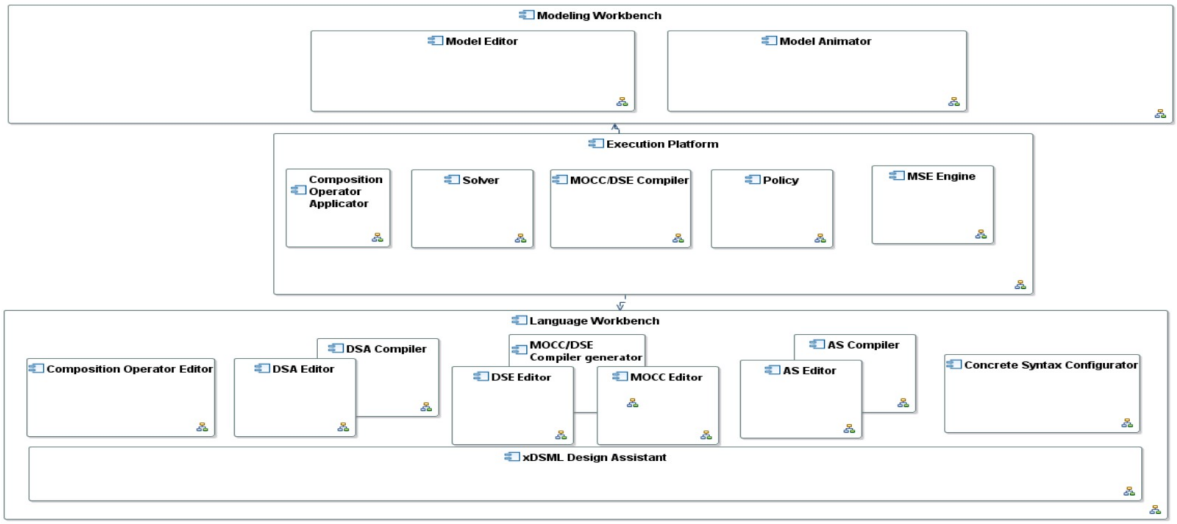



*Figure 2 : Architecture of the GEMOC Studio*

The central component is a model representing the debugger state. One part belongs to the Eclipse debug framework and is used by Eclipse debug control panel to drive the debugger execution and also display data about the debugger state. The second part is an EMF layer for modeling integration. The communication between the Eclipse debug model and the Eclipse debug control panel is part of the Eclipse debug framework. It is asynchronous but will not be discussed here.

On top of this Eclipse debug model we added an EMF representation of the Eclipse debug model. This EMF model will be used by the Sirius animator component. It could also be used by other EMF tools.

The communication between the debugger and the model is done asynchronously using events. The debugger controls the execution of the underlying execution engine and peeks meaningful data about its internal state.

Sirius Animator is used to present runtime data while the model is being executed. It comes on top of the model presentation when the presentation is done using Sirius.

## 2.1 EMF debug model

The model is an EMF representation of the Eclipse debug model. It also includes information about the state of the debugger. States are checked by utility methods allowing the modification of the model.

## 2.2 Communication

This section presents the communication between the debugger and the Eclipse debugging framework.

### *2.2.1 Debugger state communication*

The debug target and its threads implements the following state automata:

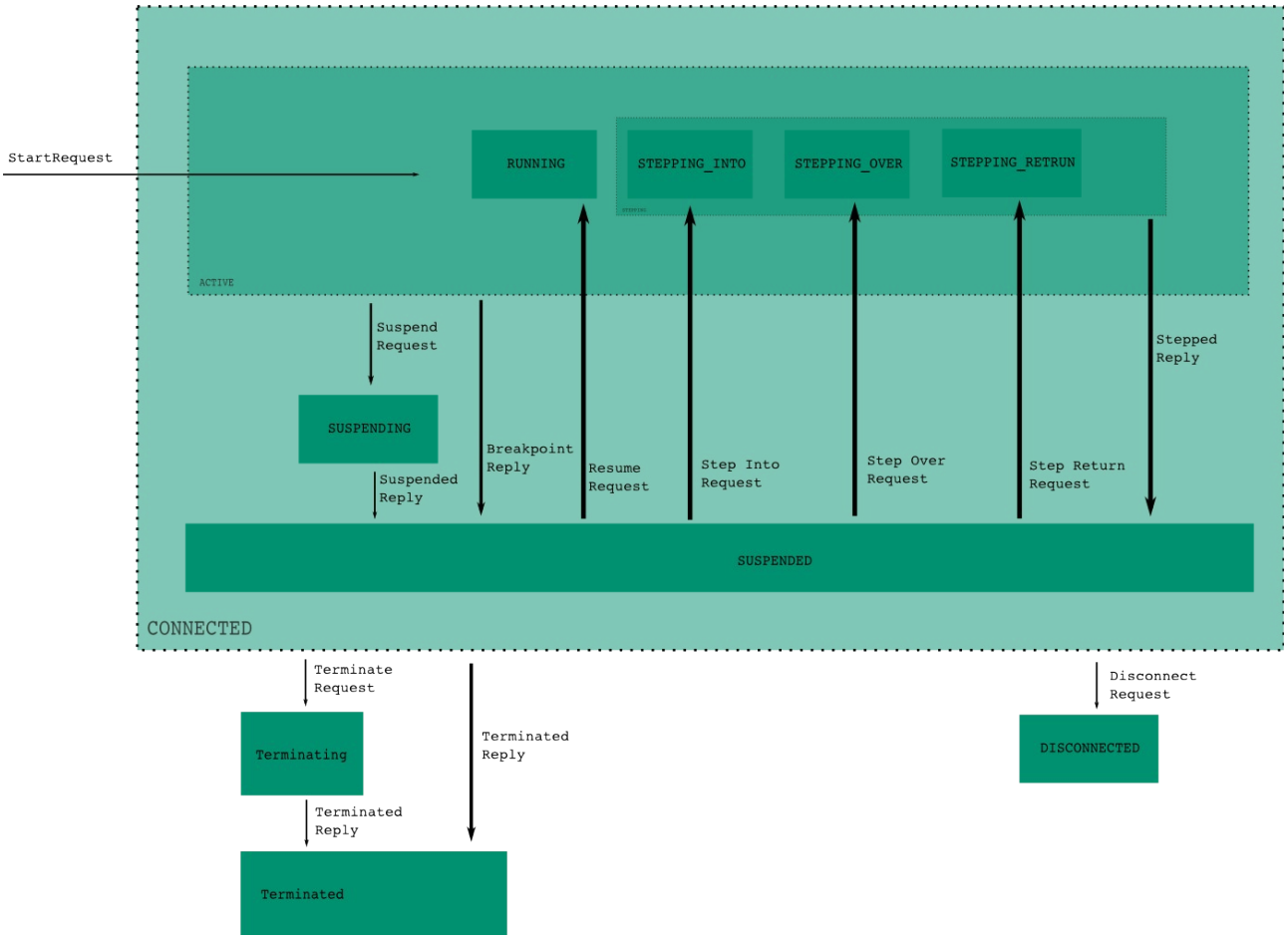



*Figure 3 : debugger state automata*

The communication is event based. Events from the Eclipse debug framework to the debugger are called "Request" and event from the debugger to the Eclipse debug framework are called "Reply". As described in the previous section the communication is asynchronous and handled by DSLDebugEventDispatcher.

Requests:

- DisconnectRequest
- StartRequest
- ResumeRequest
- SuspendRequest
- StepIntoRequest
- StepOverRequest
- StepReturnRequest
- TerminateRequest

Replies:

- BreakPointReply
- ResumingReply (ResumeRequest acknowledgement after a thread wake up)
- StepIntoResumingReply (StepIntoRequest acknowledgement after a thread wake up)
- StepOverResumingReply (StepOverRequest acknowledgement after a thread wake up)
- StepReturnResumingReply (StepReturnRequest acknowledgement after a thread wake up)
- SteppedReply
- SuspendedReply
- TerminatedReply

#### *2.2.2 Data communication*

Data communication is made by the debugger to provide information about the process being debugged. Basically threads existing in the debugged process and stack frame structure. It also includes more specific information like variable attached to each stack frame. This part of the communication is driven by the debugger and is specific to the debugged process /language.

Replies:

- DeleteVariableReply
- PopStackFrameReply
- PushStackFrameReply
- SetCurrentInstructionReply
- SpawnRunningThreadReply
- VariableReply

# 3. Execution engine implementation and integration

This section will deal with the execution engine implementation and integration with a specific language debugger implementation. It will introduce the default debugger implementation and what parts of the debugger should be implemented by a specific language debugger developer. The implementation and integration has been done for the Gemoc execution engine. For more details on the Gemoc execution engine see D4.2.1.

## 3.1 Execution engine sample implementation

When running in debug mode the execution engine should be ran in an other thread. A sample implementation is as follow:

```
public void run() {
  EObject currentInstruction = someInit(...);
  if (getDebugger() != null) {
    getDebugger().spawnRunningThread(Thread.currentThread().getName(),
currentInstruction);
  }
  while (!terminated) {
    if (getDebugger() != null) {
```

```
      terminated = getDebugger().control(Thread.currentThread().getName(),
currentInstruction);
    }
    if (!terminated) {
      currentInstruction = evaluate(currentInstruction);
      terminated = currentInstruction == null;
    }
  }
  if (getDebugger() != null && !
getDebugger().isTerminated(Thread.currentThread().getName())) {
    getDebugger().terminated(Thread.currentThread().getName());
  }
}
```

The debugger is first asked to spawn a running thread. Then, in the main loop, it controls the execution of the thread according to command passed via the Eclipse debug control panel. It may suspend or resume the thread execution. Finally the debugger is asked to terminate the thread spawned at the beginning.

Since the evaluate() method might be split across many classes, the call to the control() method can be located at the beginning of each evaluate() method.

### 3.2 Default debugger/animation implementation

The default AbstractDSLDebugger take care of the communication with the Eclipse debug framework. It also implements a default behavior:

- suspend/resume/terminate on the debug target apply the command to all threads
- terminate on the last thread terminate the debug target

The default implementation also deals with the data and feature communication. But it should be driven by the debugger implementation for a specific language in order to provide specfic runtime data. See the next section for more details.

### 3.3 Specific language debugger/animation implementation

Some parts of the debugger are related to the language being debugged. For instance the threads, stack frames, and variables. Feature support should also be defined by the specific debugger implementation.

The thread can be manipulated by using:

- IDSLDebugger.spawnRunningThread(String threadName, EObject context)
- IDSLDebugger.terminate(String threadName)

The stack frame and variable manipulation must be done by implementing IDSLDebugger.updateData(String threadName, EObject instruction). The stack frame can be manipulated by using:

- IDSLDebugger.pushStackFrame(String threadName, EObject context, EObject instruction)
- IDSLDebugger.popStackFrame(String threadName)
- IDSLDebugger.setCurrentInstruction(String threadName, EObject instruction)

The variable can be manipulated by using:

- IDSLDebugger.variable(String threadName, String declarationTypeName, String name, Object value)
- IDSLDebugger.deleteVariable(String threadName, String name)

# 4. EMF integration

This section describes the integration needed to be able to follow the execution process in the Eclipse IDE. This integration is based on the default EMF tree editor. It could be adapted to fit your own editor.

## 4.1 Launch configuration

The launch configuration is used to execute a program from the Eclipse IDE. Detailed documentation on launch configuration can be found in this article. This section will only cover specific aspects for our case.

### *4.1.1 Launch configuration delegate*

In the plugin.xml file declares a new extension in order to activate the launch action set (run/debug action in the tool bar) in all perspective:

```
<extension point="org.eclipse.ui.perspectiveExtensions">
	<perspectiveExtension targetID="*">
		<actionSet id="org.eclipse.debug.ui.launchActionSet">
		</actionSet>
	</perspectiveExtension>
</extension>
```

Next we want our own launch configuration type to debug our DSL:

```
<extension point="org.eclipse.debug.core.launchConfigurationTypes">
	<launchConfigurationType
		delegate="com.example.dsl.ui.launch.Delegate"
		id="com.example.dsl.ui.launchConfiguration"
		modes="debug"
		name="My DSL launch configuration"
		sourceLocatorId="fr.obeo.dsl.debug.ide.sourceLocator">
	</launchConfigurationType>
</extension>
```

Note that you can add modes for instance “run”.

Now add an image to our launch configuration:

```
<extension point="org.eclipse.debug.ui.launchConfigurationTypeImages">
	<launchConfigurationTypeImage
		configTypeID="com.example.dsl.ui.launchConfiguration"
		icon="icons/launch.png"
		id="com.example.dsl.ui.launchConfigurationImage">
	</launchConfigurationTypeImage>
</extension>
```

At this point we need to have a look at the implementation of com.example.dsl.ui.launch.Delegate. This class extends the default implementation provided by the DSL debugger framework: fr.obeo.dsl.debug.ide.ui.launch.AbstractDSLLaunchConfigurationDelegateUI. You will have to implement the following methods:

```
@Override
protected IDSLDebugger getDebugger(ILaunchConfiguration configuration,
		DSLDebugEventDispatcher dispatcher, EObject firstInstruction,
		IProgressMonitor monitor) {
```

```
        MyEngine engine = new MyEngine();
        engine.init(firstInstruction, ...);
        MyDebugger res = new MyDebugger(dispatcher, engine);
        engine.setDebugger(res);
        return res;
}
```

This method instantiates the execution engine and the debugger and connect them to the DSLDebugEventDispatcher.

When creating a new launch configuration we need to get the first instruction either form an ISelection or an IEditorPart:

```
@Override
protected EObject getFirstInstruction(ISelection selection) {
        final IResource resource = getLaunchableResource(selection);
        return ...;
}

@Override
protected EObject getFirstInstruction(IEditorPart editor) {
        final EObject res;

        ISelection selection = PlatformUI.getWorkbench().getActiveWorkbenchWindow().
                getSelectionService().getSelection();
        if (selection instanceof IStructuredSelection
                && ((IStructuredSelection) selection).getFirstElement() instanceof EObject
                        && is...(((EObject) ((IStructuredSelection) selection)
                                        .getFirstElement()))) {
                res = (EObject) ((IStructuredSelection) selection)
                                .getFirstElement();
        } else {
                final IResource resource = getLaunchableResource(editor);
                res = ...;
        }

        return res;
}
```

This is only a sample code. If null is returned then the launch configuration tab group will be shown in order to prompt the user for the first instruction. For more details about the tab group see the next section.

### 4.1.2 Launch configuration tab group

The launch configuration tab group configures tabs shown in the launch configuration dialog. This part is highly related to the initialization of the debug engine, but the DSL debugger framework provide a default implementation as a starting point.

First declare a new extension:

```
<extension point="org.eclipse.debug.ui.launchConfigurationTabGroups">
        <launchConfigurationTabGroup
                class="com.example.dsl.ui.launch.TabGroup"
                id="com.example.dsl.ui.launchConfigurationTabGroup"
                type="com.example.dsl.ui.launchConfiguration">
                <launchMode
```

```
                        mode="debug"
                        perspective="org.eclipse.debug.ui.DebugPerspective">
                </launchMode>
        </launchConfigurationTabGroup>
</extension>
```

A default implementation of com.example.dsl.ui.launch.TabGroup extending AbstractLaunchConfigurationTabGroup:

```
@Override
public void createTabs(ILaunchConfigurationDialog dialog, String mode) {
        setTabs(new ILaunchConfigurationTab[] { new DSLLaunchConfigurationTab(new String[]
                {"ext",}), new CommonTab(), });
}
```

“ext” should be replaced by the extension file corresponding to your DSL.

#### *4.1.3 Short cuts*

This section is optional but ease the use of the debugger launch configuration. It adds shortcuts to the launch configuration.

Add the following extension:

```
<extension point="org.eclipse.debug.ui.launchShortcuts">
        <shortcut
                class="com.example.dsl.ui.launch.Delegate"
                description="My debug"
                icon="icons/launch.png"
                id="com.example.dsl.ui.shortcut"
                label="My debug"
                modes="debug">
                        <contextualLaunch>
                                <enablement>
                                <count value="1">
                                </count>
                                <iterate>
                                        <test property="org.eclipse.debug.ui.matchesPattern"
                                                value="ext">
                                        </test>
                                </iterate>
                                </enablement>
                        </contextualLaunch>
                <configurationType id="com.example.dsl.ui.launchConfiguration">
                </configurationType>
        </shortcut>
</extension>
```

“ext” should be replaced with the extension file corresponding to your DSL. And of course the selection strategy can be changed.

### 4.2 Model presentation

The debug model presentation is responsible for GUI representation of the debug model. It provides icons and labels. It also opens editor when a breakpoint is hit, or an instruction must be displayed for a given stack frame The DSL debugger provides a default implementation for generated EMF editors integration.

It can be used via the following extension:

```
<extension point="org.eclipse.debug.ui.debugModelPresentations">
	<debugModelPresentation
		class="fr.obeo.dsl.debug.ide.ui.DSLDebugModelPresentation"
		id="com.example.dsl.ui.debugModel">
	</debugModelPresentation>
</extension>
```

It can also be extended for specific needs.

## 4.3 Breakpoints

This section will present the breakpoint action and feedback in order to improve the debugging experience.

### *4.3.1 Toggling breakpoints*

Then we need to add a command to the popup menu:

```
<extension point="org.eclipse.ui.menus">
	<menuContribution
		allPopups="false"
		locationURI="popup:com.example.dsl.editor.presentation.MyDSLEditorID">
		<command commandId="com.example.dsl.ui.toggleBreakpointCommand"
			icon="icons/breakpoint.gif"
			id="com.example.dsl.ui.toggleBreakpointCommand"
			label="Toggle My DSL breakpoint"
			style="push"
			tooltip="Toggle a My DSL breakpoint">
		</command>
	</menuContribution>
</extension>
<extension point="org.eclipse.ui.handlers">
	<handler
		class="com.example.dsl.ui.command.ToggleBreakpointHandler"
		commandId="com.example.dsl.ui.toggleBreakpointCommand">
	</handler>
</extension>
<extension point="org.eclipse.ui.commands">
	<command id="com.example.dsl.ui.toggleBreakpointCommand"
		name="Toggle My DSL breakpoint">
	</command>
</extension>
```

Now lets have a look at the com.example.dsl.ui.command.ToggleBreakpointHandler:

### *4.3.2 Breakpoint feedback*

The visual feedback of installed breakpoints is done by decorating ILabelProvider:

```
final AdapterFactoryLabelProvider labelProvider = new
AdapterFactoryLabelProvider(adapterFactory);
viewer.setLabelProvider(new DecoratingColumLabelProvider(labelProvider, new
DSLLabelDecorator(editingDomain.getResourceSet(), Delegate.MODEL_ID)));
```

The decorator reacts to added and removed breakpoints as well as enable and disable breakpoints. The ResourceSet is used to retrieve instruction from the URI in the editor context.

# 5. Sirius Integration

This section covers the integration for Sirius editors. Most aspects are the same as the previous section but will also be presented here. This will allow to use this section with no knowledge of the previous section.

## 5.1 Launch configuration

The launch configuration is used to execute a program from the Eclipse IDE. Detailed documentation on launch configuration can be found in this article. This section will only cover specific aspects for our case.

### *5.1.1 Launch delegate*

In the plugin.xml file declare a new extension in order to activate the launch action set (run/debug action in the tool bar) in all perspective:

```
<extension point="org.eclipse.ui.perspectiveExtensions">
	<perspectiveExtension targetID="*">
		<actionSet id="org.eclipse.debug.ui.launchActionSet">
		</actionSet>
	</perspectiveExtension>
</extension>
```

Next we want our own launch configuration type to debug our DSL:

```
<extension point="org.eclipse.debug.core.launchConfigurationTypes">
	<launchConfigurationType
		delegate="com.example.dsl.sirius.ui.launch.MokaDelegate"
		id="com.example.dsl.sirius.ui.launchConfiguration"
		modes="debug"
		name="Moka Sirius launch configuration"
		sourceLocatorId="fr.obeo.dsl.debug.ide.sourceLocator">
	</launchConfigurationType>
</extension>
```

Note that you can add modes for instance “run”. The source locator is the same for all DSL debugger.

Now add an image to our launch configuration:

```
<extension point="org.eclipse.debug.ui.launchConfigurationTypeImages">
	<launchConfigurationTypeImage
		configTypeID="com.example.dsl.sirius.ui.launchConfiguration"
		icon="icons/launch.png"
		id="com.example.dsl.sirius.ui.launchConfigurationImage">
	</launchConfigurationTypeImage>
</extension>
```

At this point we need to have a look at the implementation of com.example.dsl.sirius.ui.launch.Delegate. This class extends the default implementation provided by the DSL debugger framework: fr.obeo.dsl.debug.ide.sirius.ui.launch.AbstractDSLLaunchConfigurationDelegateUI. You will have to implement the following methods:

```
@Override
protected IDSLDebugger getDebugger(ILaunchConfiguration configuration,
		DSLDebugEventDispatcher dispatcher, EObject firstInstruction,
		IProgressMonitor monitor) {
	MyEngine engine = new MyEngine();
	engine.init(firstInstruction, ...);
	MyDebugger res = new MyDebugger(dispatcher, engine);
	engine.setDebugger(res);
```

```
        return res;
}
```

This method instantiates the execution engine and the debugger and connect them to the DSLDebugEventDispatcher.

When creating a new launch configuration we need to get the first instruction either form an ISelection or an IEditorPart:

```
@Override
protected EObject getFirstInstruction(ISelection selection) {
        final IResource resource = getLaunchableResource(selection);
        return ...;
}

@Override
protected EObject getFirstInstruction(IEditorPart editor) {
        final EObject res;

        ISelection selection = PlatformUI.getWorkbench().getActiveWorkbenchWindow().
getSelectionService().getSelection();
        if (selection instanceof IStructuredSelection
                && ((IStructuredSelection) selection).getFirstElement() instanceof EObject
                        && is...(((EObject) ((IStructuredSelection) selection)
                                        .getFirstElement()))) {
                res = ((EObject) ((IStructuredSelection) selection)
                                .getFirstElement());
        } else {
                final IResource resource = getLaunchableResource(editor);
                res = ...;
        }

        return res;
}
```

This is only a sample code. If null is returned then the launch configuration tab group will be shown in order to prompt the user for the first instruction. For more details about the tab group see the next section.

### 5.1.2 Launch configuration tab group

The launch configuration tab group configure tabs shown in the launch configuration dialog. This part is highly related to the initialization of the debug engine, but the DSL debugger framework provide a default implementation as a starting point.

First declare a new extension:

```
<extension point="org.eclipse.debug.ui.launchConfigurationTabGroups">
        <launchConfigurationTabGroup
                class="com.example.dsl.sirius.ui.launch.MokaTabGroup"
                id="com.example.dsl.sirius.ui.launchConfigurationTabGroup"
                type="com.example.dsl.sirius.ui.launchConfiguration">
        <launchMode
                mode="debug"
                perspective="org.eclipse.debug.ui.DebugPerspective">
        </launchMode>
        </launchConfigurationTabGroup>
```

```
</extension>
```

A default implementation of com.example.dsl.sirius.ui.launch.TabGroup extending AbstractLaunchConfigurationTabGroup:

```
@Override
public void createTabs(ILaunchConfigurationDialog dialog, String mode)
{
	setTabs(new ILaunchConfigurationTab[] { new
DSLLaunchConfigurationTab(new String[]{"ext",}), new CommonTab(), });
}
```

“ext” should be replaced by the extension file corresponding to your DSL.

#### *5.1.3 Launch from Sirius*

In order to be able to launch the debugger , our DSL debug framework provides a IExternalJavaAction that creates or reuse a launch configuration and then launch it in debug mode. You should extends the fr.obeo.dsl.debug.ide.sirius.ui.action.AbstractDebugAsAction class. The method getFirstInstruction() should be implemented in order to retrieve the first instruction from the current selection. If null is returned then the launch configuration tab group will be shown in order to prompt the user for the first instruction.

You instance of IExternalJavaAction must be declared via the following extension point in order to be used in your view point description:

```
<extension point="org.eclipse.sirius.externalJavaAction">
	<javaActions actionClass="com.example.dsl.sirius.ui.action.MyDSLDebugAs"
		id="com.example.dsl.sirius.ui.action.mokaDebugAs">
	</javaActions>
</extension>
```

You can then use it in a tool or a popup menu action. Check the Sirius documentation for further details.

### 5.2 Model presentation

#### *5.2.1 Eclipse*

The debug model presentation is responsible for GUI representation of the debug model. It provides icons and labels. It also opens editor when a breakpoint is hit, or an instruction must be displayed for a given stack frame The DSL debugger provide a default implementation for generated EMF editors integration.

It can be used via the following extension:

```
<extension point="org.eclipse.debug.ui.debugModelPresentations">
	<debugModelPresentation
		class="fr.obeo.dsl.debug.ide.sirius.ui.DSLDebugModelPresentation"
		id="com.example.dsl.sirius.ui.debugModel">
	</debugModelPresentation>
</extension>
```

It can also be extended for specific needs.

#### *5.2.2 Sirius*

Sirius allows you to visualize models with a wide range of visual features. In order to make in possible for debugger feedback, a java service class can be extended. Your implementation of fr.obeo.dsl.debug.ide.sirius.ui.services.AbstractDSLDebuggerServices can then be imported and used to customize the style of the instruction being debugged. The service method to use is isCurrentInstruction(EObject instruction). Check the Sirius documentation for further details.

## 5.3 Breakpoints

This section will present the breakpoint action and feedback in order to improve the debugging experience.

### *5.3.1 Toggling breakpoints*

The DSL debug framework provides an IExternalJavaAction to toggle breakpoints. You should extends fr.obeo.dsl.debug.ide.sirius.ui.action.AbstractToggleBreakpointAction and declare the action via the following extension:

```
<extension point="org.eclipse.sirius.externalJavaAction">
	<javaActions
		actionClass="com.example.dsl.sirius.ui.action.MyDSLToggleBreakpointAction"
		id="com.example.dsl.sirius.ui.action.MyDSLToggleBreakpointAction">
	</javaActions>
</extension>
```

You can then use it in a tool or a popup menu action. Check the Sirius documentation for further details.

### *5.3.2 Breakpoint feedback*

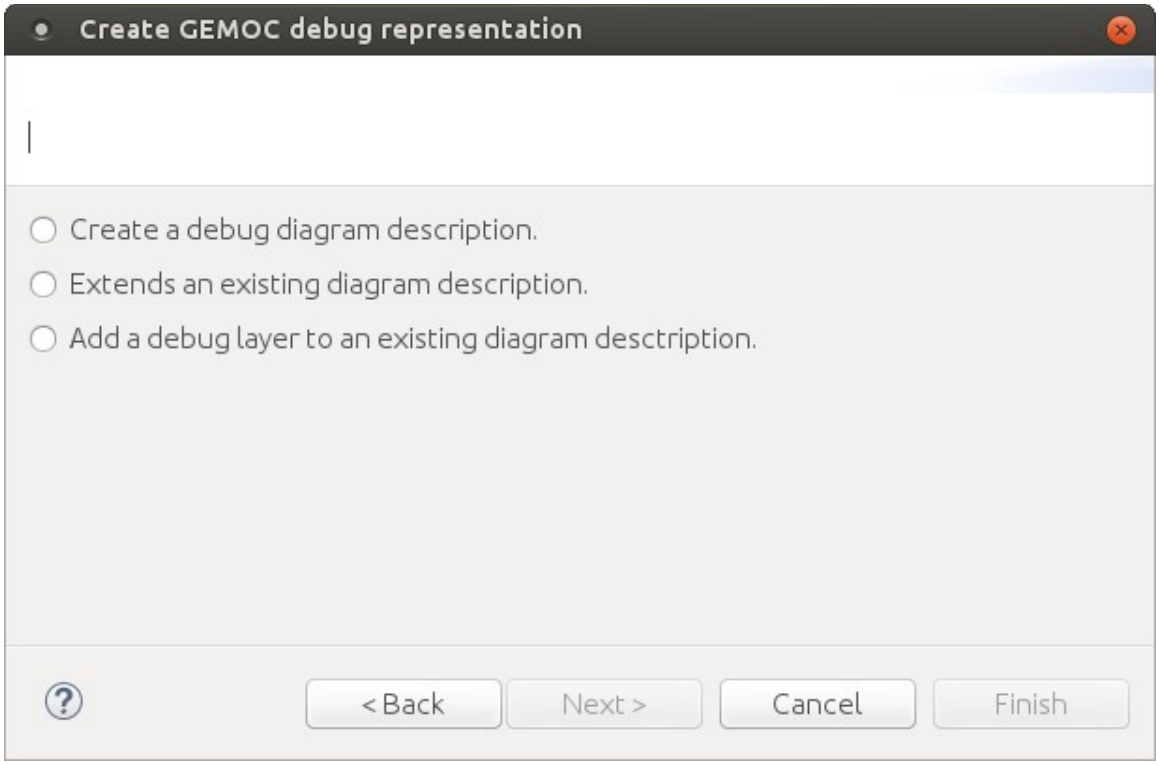
As we changed the style of the current instruction we might want to change the style of instructions used as breakpoints. This is done the same way via the same service class. Extend the fr.obeo.dsl.debug.ide.sirius.ui.services.AbstractDSLDebuggerServices if not already done and import it in your representation description. You can then use hasEnabledBreakpoint(EObject instruction) and hasDisabledBreakpoint(EObject instruction) to add a decorator for instance or change the style of the instruction in any way you want. Check the Sirius documentation for further details.

# 6. Gemoc debug representation wizard

This wizard creates a layer to represent the current instruction and add commands in order to manage breakpoints and launch a simulation in debug mode. This is a default implementation, it can be customized to represent runtime data for instance. The customization uses the Sirius description definition, see the Sirius Specifier Manual for more details.

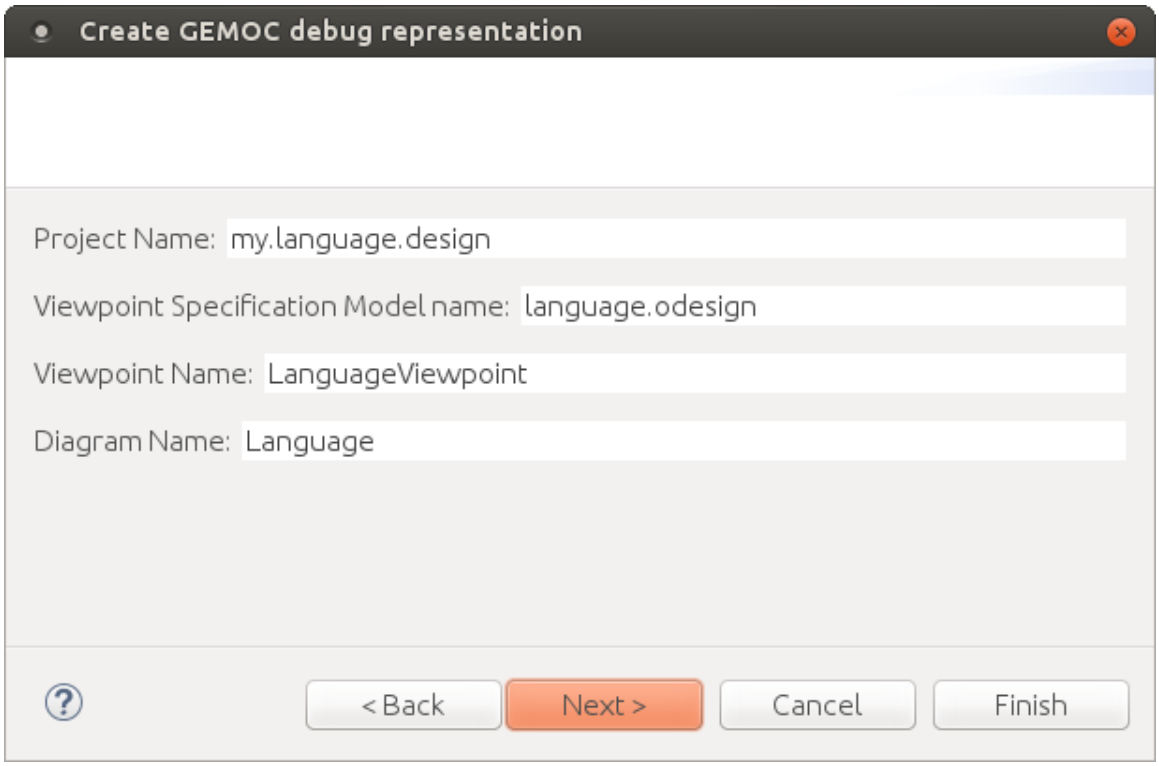
The wizard presents three ways to implement this layer:

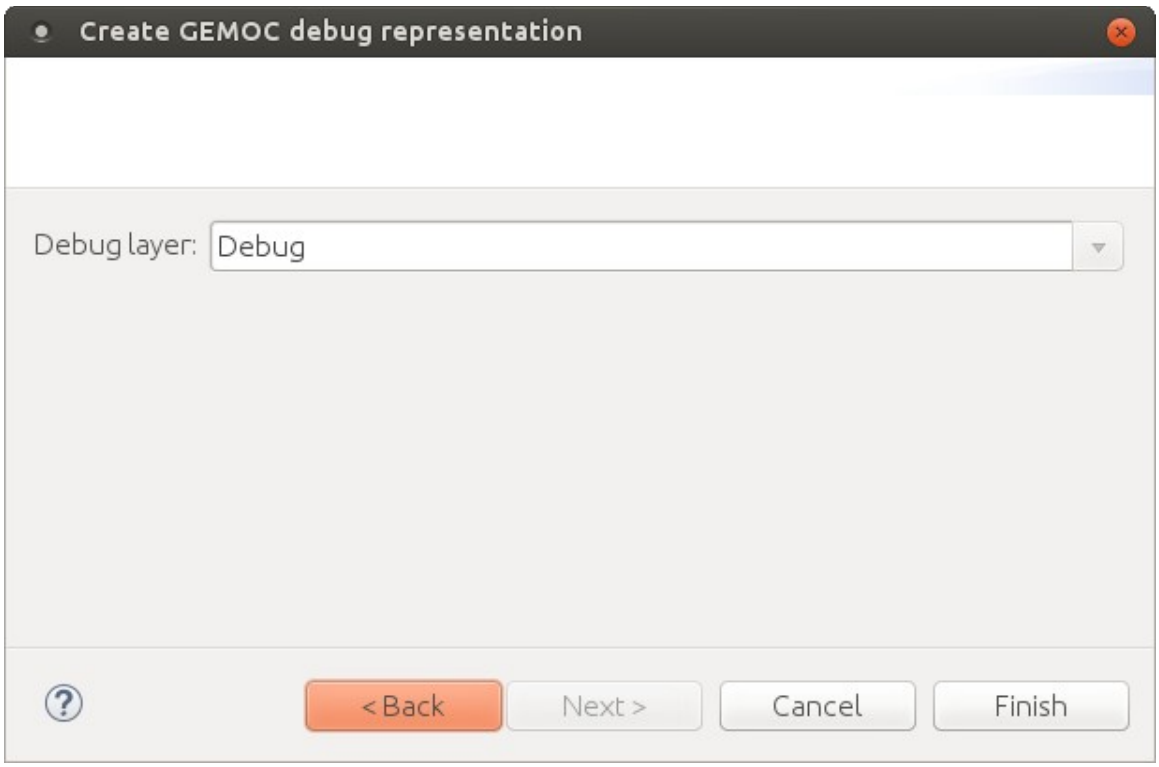
- Create a debug diagram description
- Extend an existing diagram description
- Add a debug layer to an existing diagram description




## 6.1 Create a debug diagram description

It creates a diagram representation with a default debug layer. The representation does not depend on another representation. A typical use case is a language where the runtime data representation is too far from the language graphical syntax.

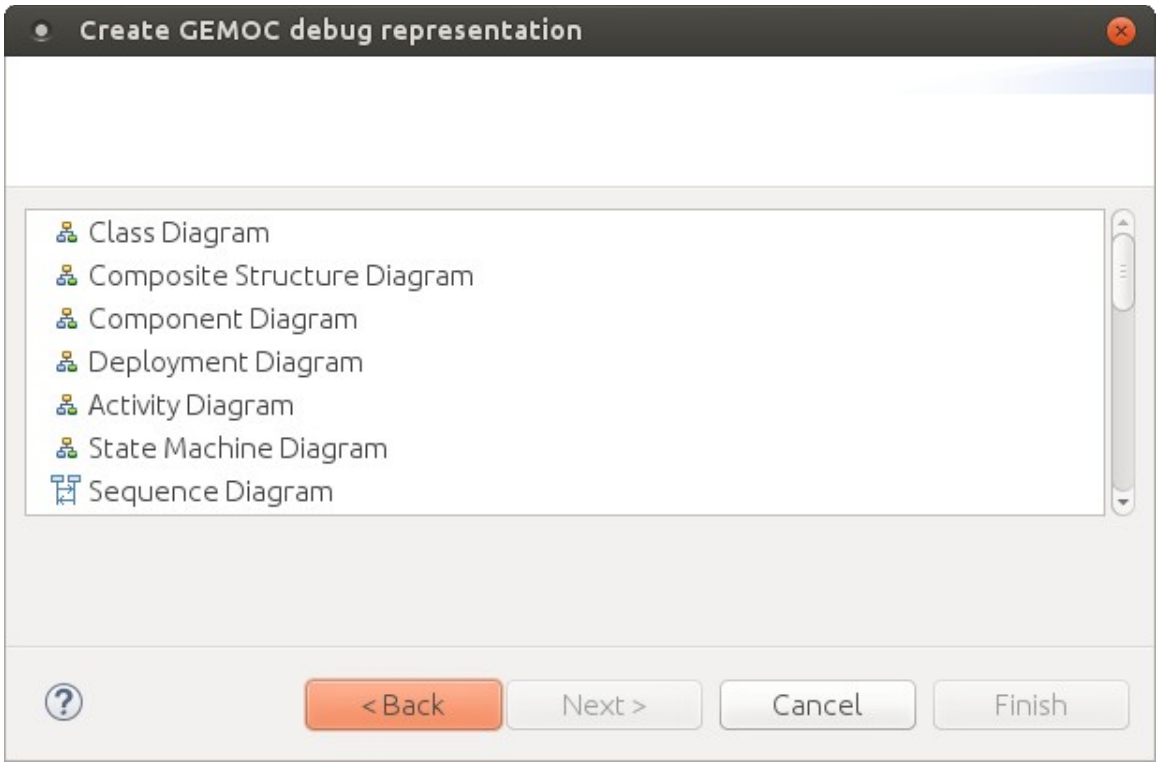

Create GEMOC debug representation
Project Name: my.language.design
Viewpoint Specification Model name: language.odesign
Viewpoint Name: LanguageViewpoint
Diagram Name: Language
< Back
Next >
Cancel
Finish


Create GEMOC debug representation
Debug layer: Debug
< Back
Next >
Cancel
Finish

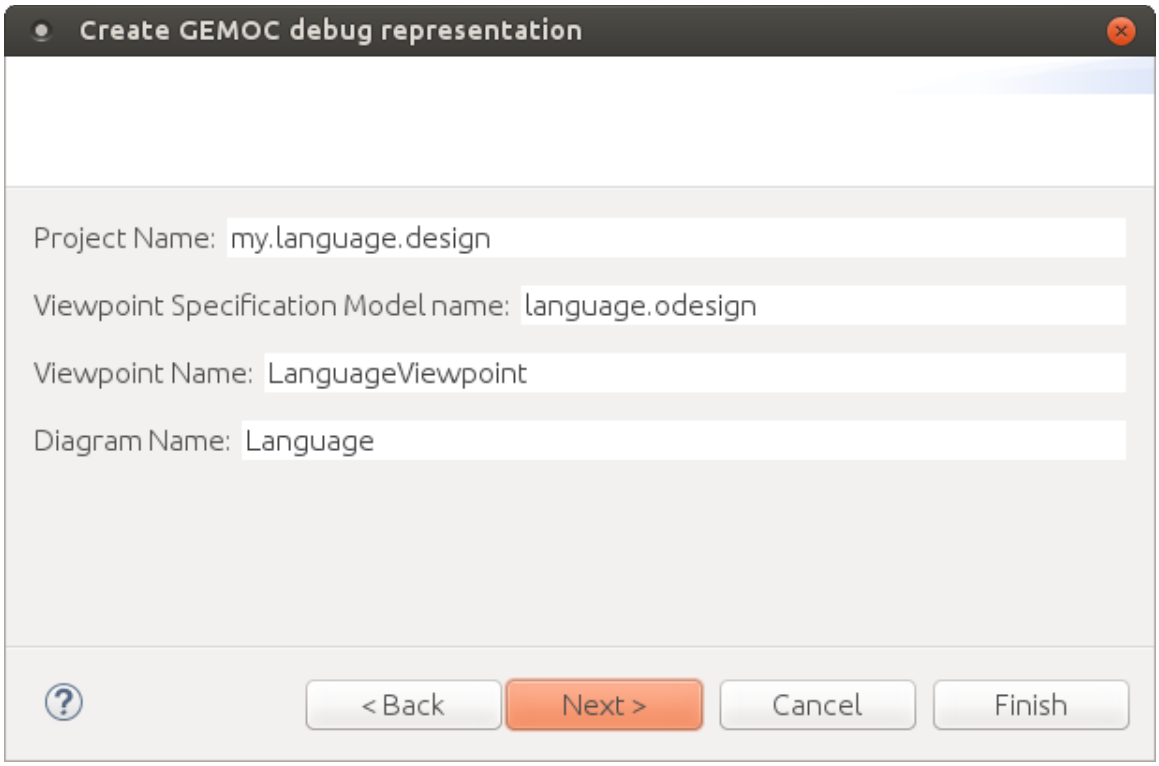
### 6.2 Extends an existing diagram description

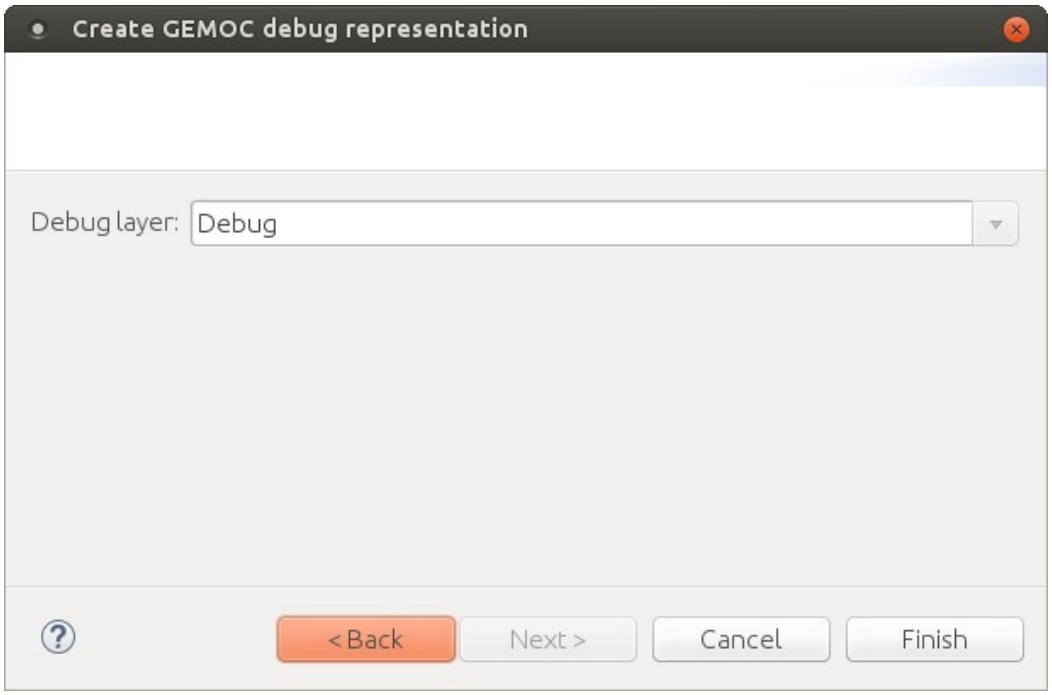
It creates a diagram representation with a default debug layer that extends an existing representation. This allows to have a debug layer based on the representation of the language concrete syntax. The language concrete syntax can be deployed without the debug representation. A typical use case is the reuse of an existing diagram definition that you cannot modify by yourself. For instance if you want to use UML, you can reuse the UML Designer.

You can select any diagram description.



And then define the new diagram description which extends the one you previously selected.

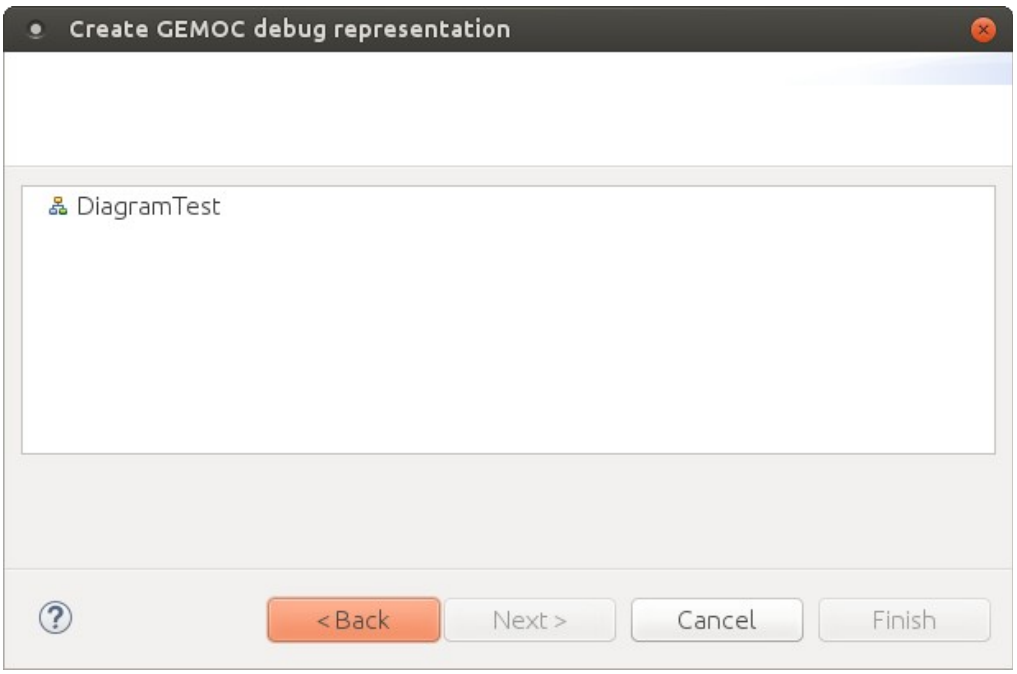


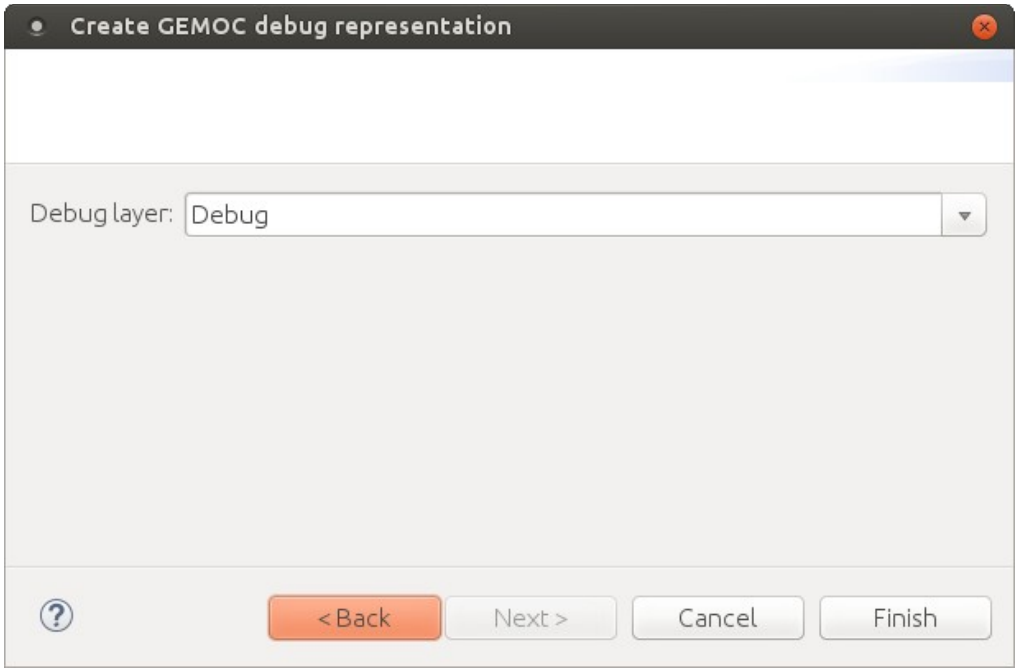



### 6.3 Add a debug layer to an existing diagram description

It creates a default debug layer in an existing diagram representation. This should be used if you are also in charge of the language concrete syntax.

In this case, you can only select a diagram description from the workspace.




Create GEMOC debug representation
Debug layer:
Debug
< Back
Next >
Cancel
Finish

### 6.4 Implementation details

Implementation of the wizard can be found in the sirius extension plugin:

org.gemoc.gemoc_language_workbench.extensions.sirius

The wizard implementation is located in the org.gemoc.gemoc_modeling_workbench.ui.wizards package. The current version of the sirius extension plugin is 0.1.0.

# 7. TFSM example

The TFSM language, provided in the Gemoc studio, uses Sirius editor. This section will present two aspects of the animation in the editor configuration. The first one is the debug control and feedback as described in previous sections. The second one is the presentation of runtime data.

## 7.1 Debug configuration

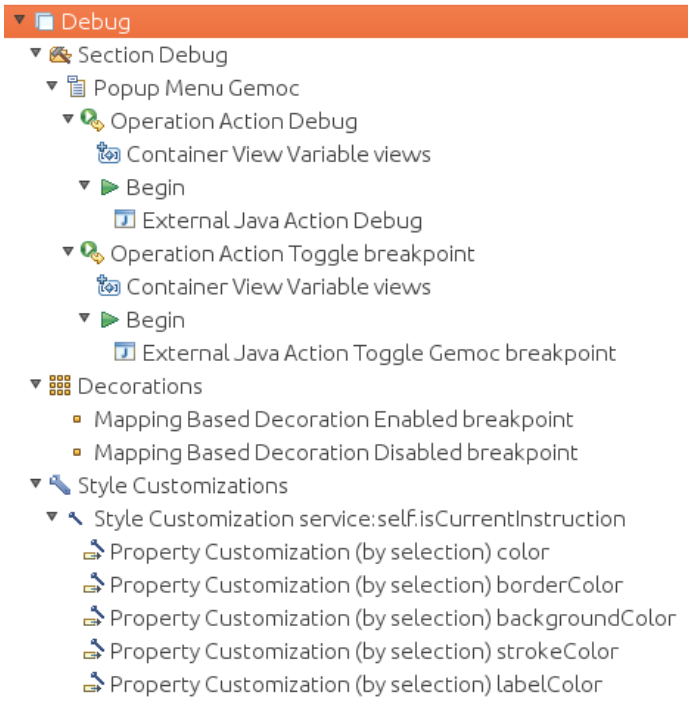



*Figure 4 : Debug configuration*

The configuration of the Figure 4 renders as shown in the Figure 5.

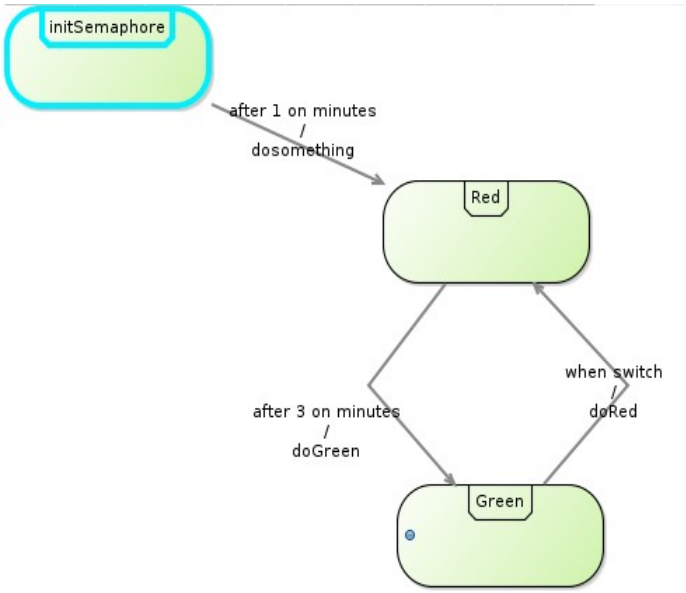



*Figure 5 : Debug in the editor*

As you can see in Figure 5, the initial state is active and there is a breakpoint on the green state.

### 7.2 Runtime data configuration

Runtime data are data manipulated by the engine while executing. It can be interesting to visualize those data. In the TFSM example the current state will be decorated with an arrow as shown on Figure 7.

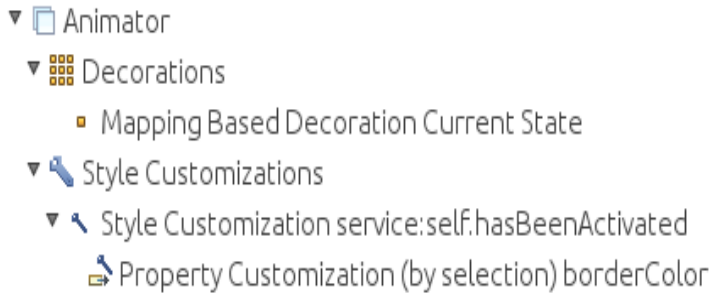



*Figure 6 : Runtime data configuration*

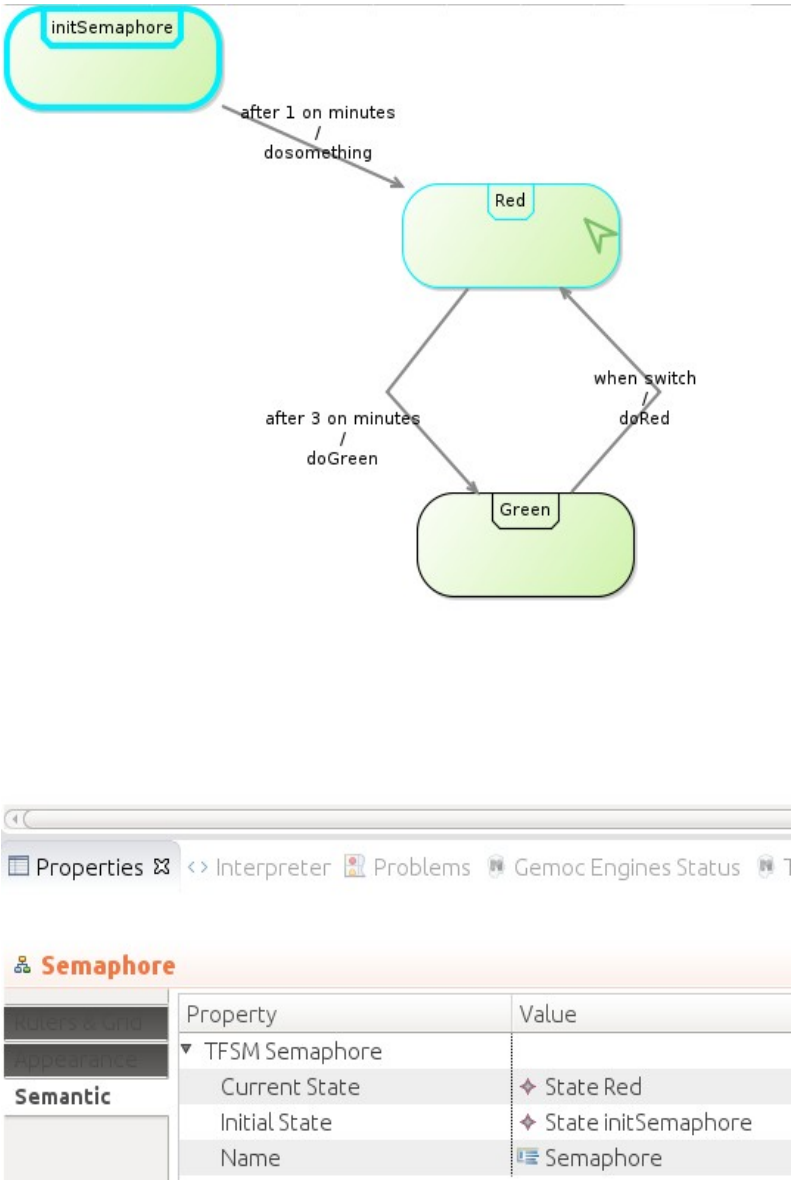



*Figure 7 : Runtime data in the editor*