

# UML State Machine Simulation/Model Checking with Maude

## Project Overview

Responsible:

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## UML State Machine Simulation and Model Checking with Maude

### Topics

- [Standalone UML Maude](#)
- [Overview](#)
- [Installation](#)
- [Simulating and Model Checking of UML State Machines](#)
- [Links](#)

### Standalone UML Maude

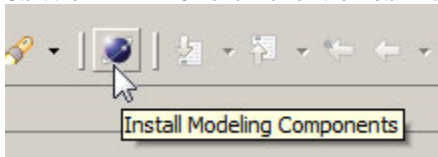
You can download a standalone version of the UML Maude implementation here: [UML\\_SM\\_Maude.zip](#)

### Overview

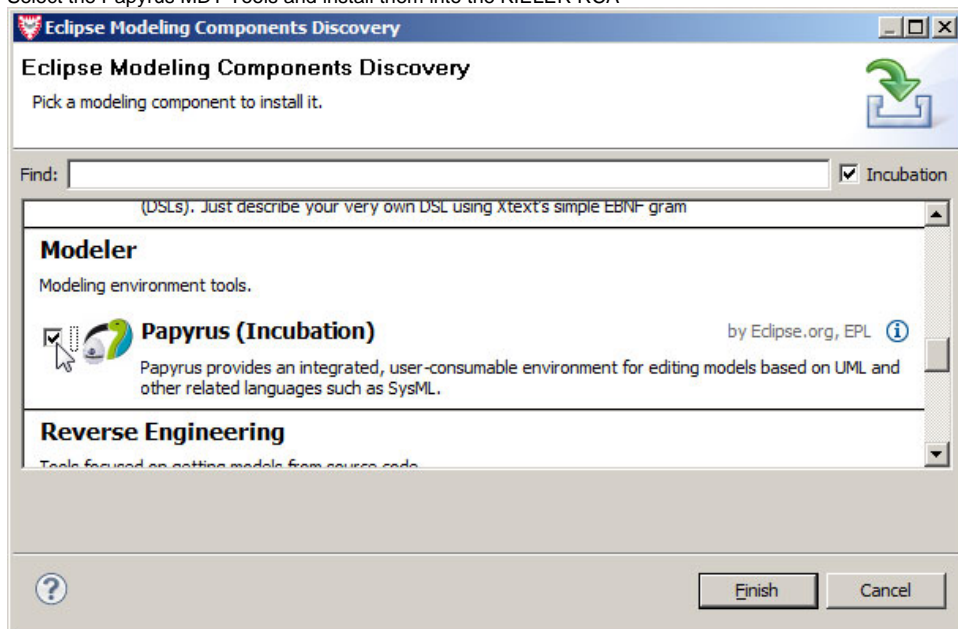
This subproject integrates the [Papyrus MDT](#) UML State Machine editor into KIELER. It also integrates the [Maude System](#) into Eclipse/KIELER and additionally uses KIELER technologies and a special generic Maude state machine backend to offer simulation and model checking based on state machines modeled in Papyrus. The editor, the [DataTable](#) and [KIEM](#) are used as a GUI and I/O facility for modeling, simulating and model checking.

### Installation

1. Download and install the [Maude System](#)
2. Download and unpack the [KIELER Rich Client Applications nightly builds](#)
3. Install Papyrus
  - Start the KIELER RCA and click on the *Install Modeling Components* button



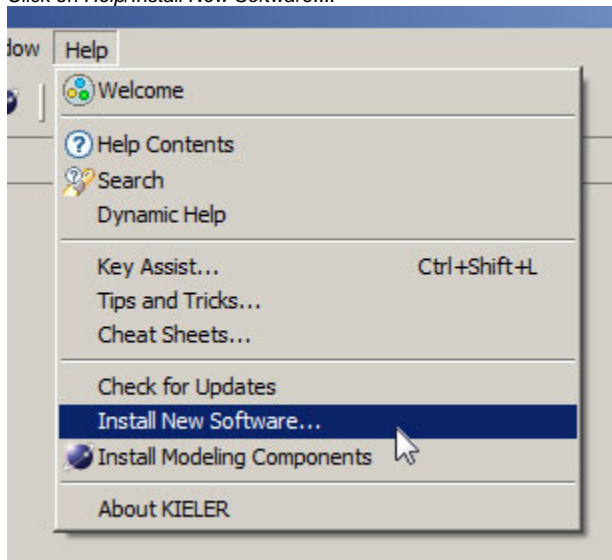
- Select the Papyrus MDT Tools and install them into the KIELER RCA



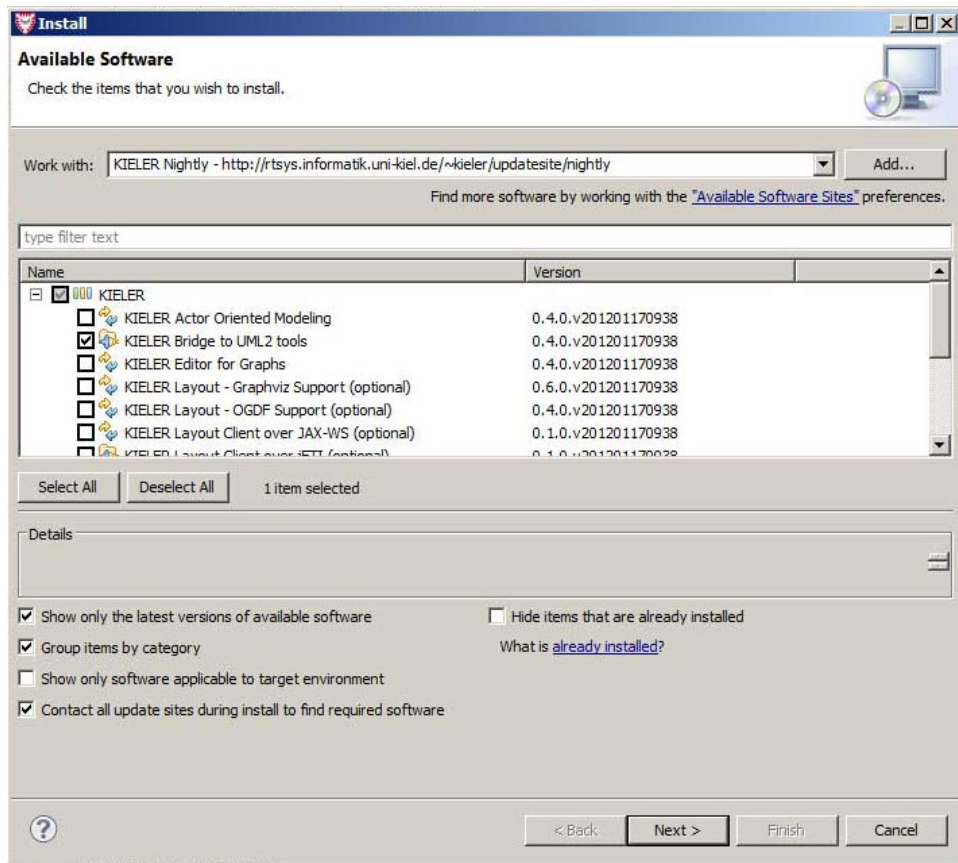
- Eclipse should now ask you to restart the KIELER RCA. Click the *Restart Now* button.

#### 4. Finally, install KIELER UML Simulation and Model Checking components

- Click on *Help/Install New Software....*



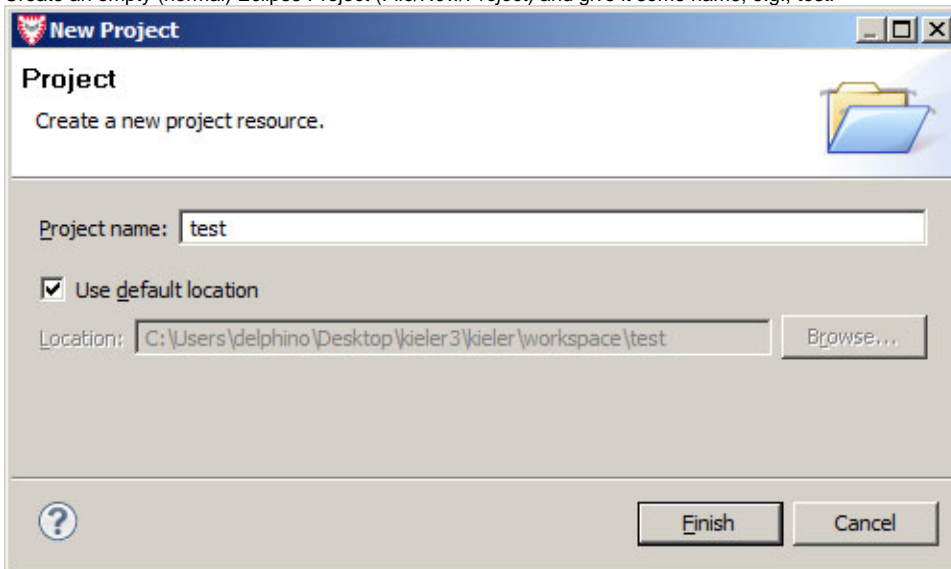
- Choose the *KIELER nightly* - <http://rtsys.informatik.uni-kiel.de/~kieler/updatesite/nightly> Update Site from the drop down list.
- Select the *KIELER Bridge to Papyrus and UML Simulation* feature and continue installation with *Next*. If that does not work you might have an older version of the nightly build and you should select the whole [x] KIELER category for installation/update.



- Eclipse should again ask you to restart the KIELER RCA. Click the *Restart Now* button.
5. Congratulations! You have now installed everything you need to simulate and model check UML state machines with KIELER.

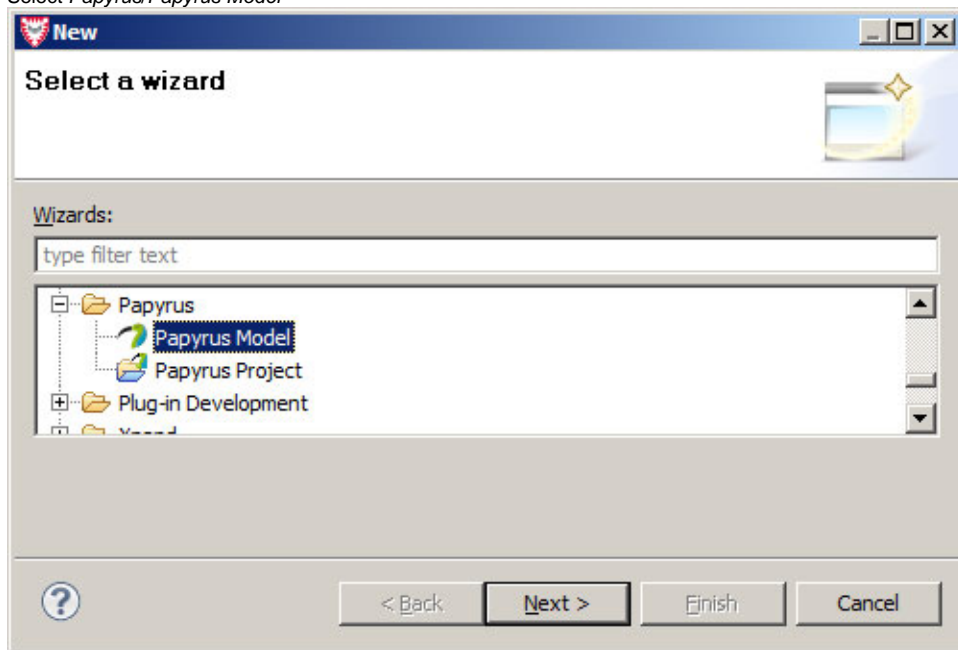
## Simulating and Model Checking of UML State Machines

- Close the *Outline* Eclipse View because it may produce errors with this early version of Papyrus MDT.
- Create an empty (normal) Eclipse Project (*File/New/Project*) and give it some name, e.g., *test*.

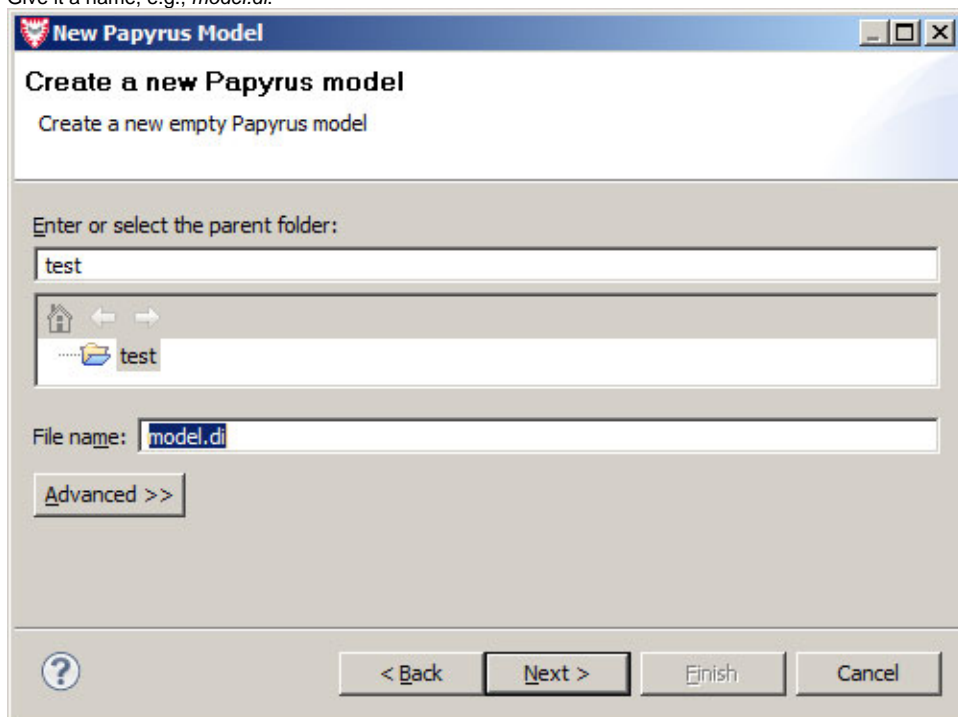


- Create a Papyrus Diagram in this new project:
  - File/New/Other*

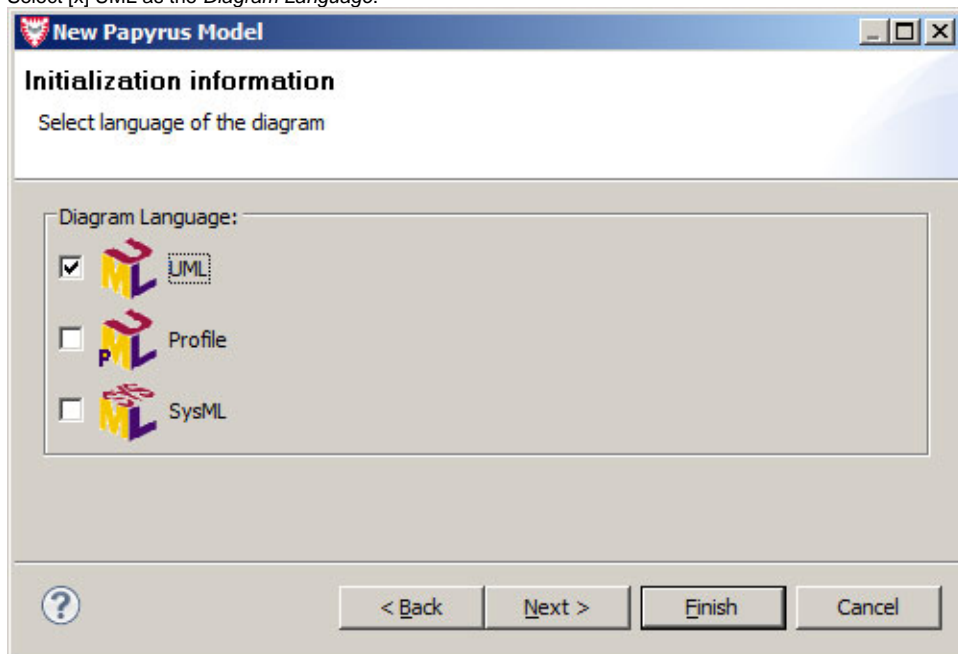
- Select *Papyrus/Papyrus Model*



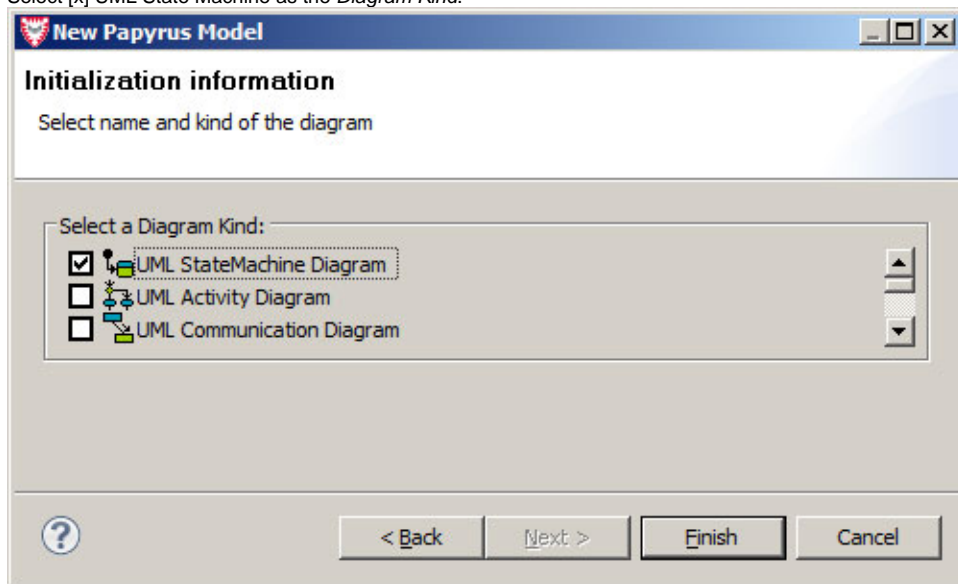
- Give it a name, e.g., *model.di*.



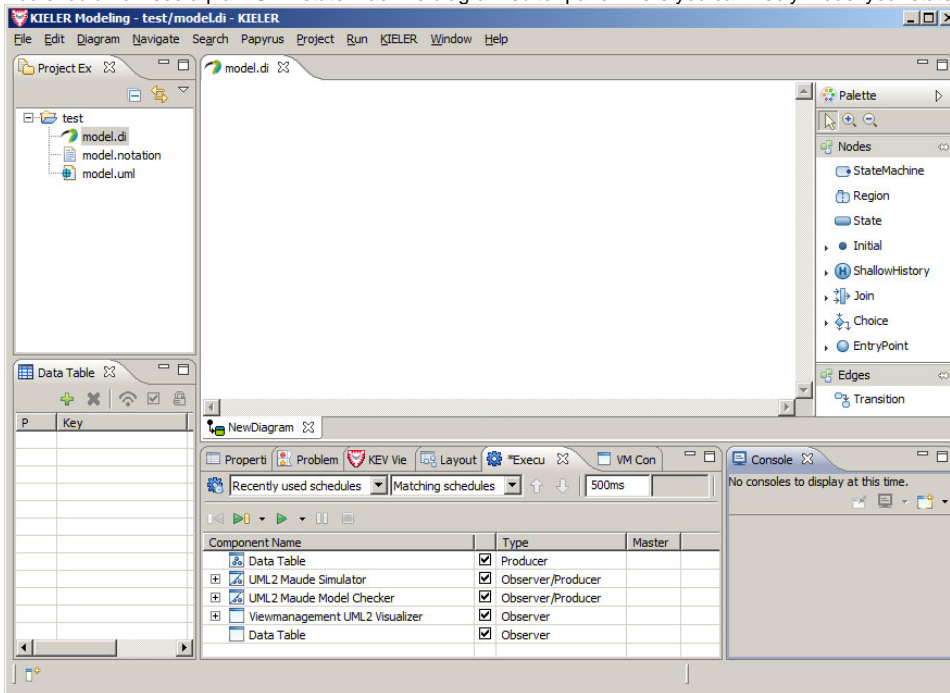
- Select [x] UML as the *Diagram Language*.



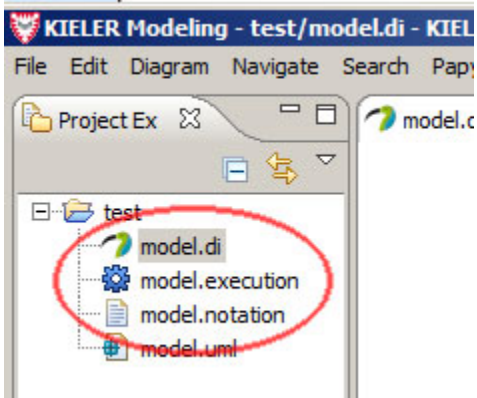
- Select [x] UML State Machine as the *Diagram Kind*.



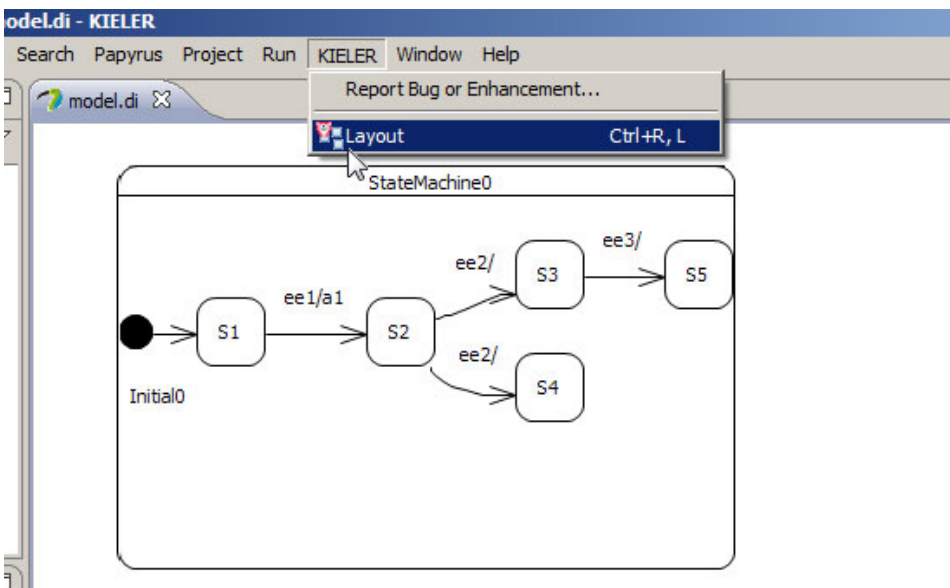
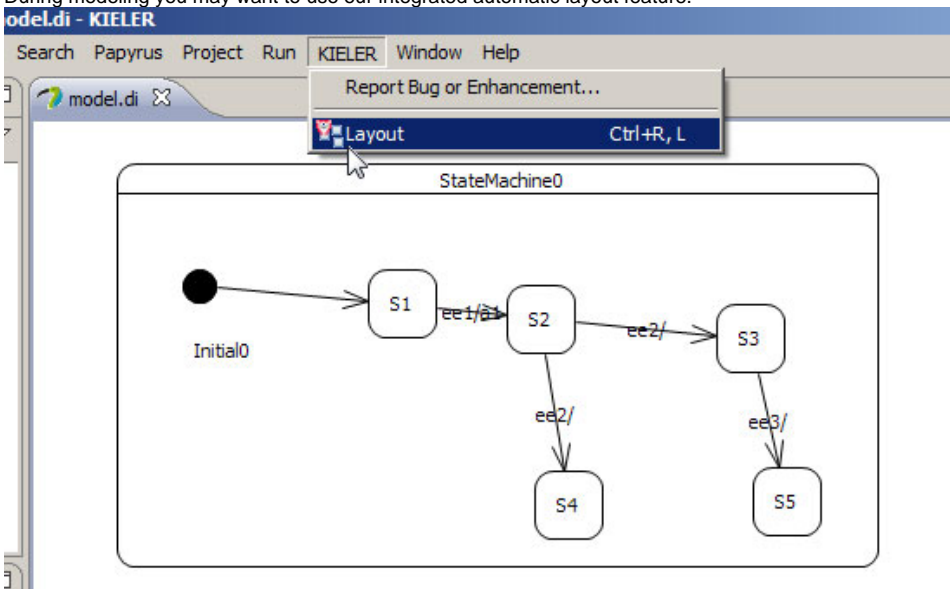
4. You should now see a plain UML state machine diagram editor pane where you can freely model your state machine.



5. For simulation and model checking you should modify the DataComponents in the *Execution Manager* View as seen on the above screen shot. You can simply remove the other components. While in the *Execution Manager* View you can press the Save button to save this setting for later usage in your project's folder. Give it some name, e.g., *model.execution*.



- During modeling you may want to use our integrated automatic layout feature.



## Simulating

- Deactivate the DataComponent for model checking as shown below and validate that the path to the Maude executable is set correctly.

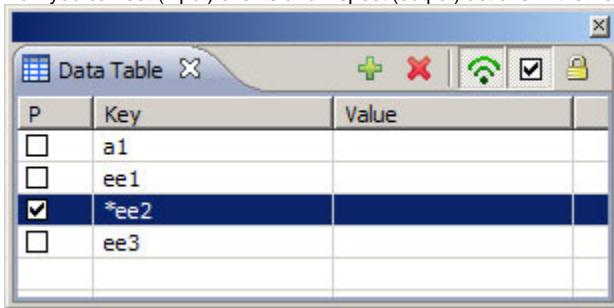
Execution Manager

model[test] Matching schedules 500ms

Component Name / Key	Value	Type	Master
Data Table		<input checked="" type="checkbox"/> Producer	
UML2 Maude Simulator		<input checked="" type="checkbox"/> Observer/Producer	
Model Editor			
Maude Executable	maude		
State Variable	state		
UML2 Maude Model Checker		<input type="checkbox"/> Observer/Producer	
Viewmanagement UML2 Visualizer		<input checked="" type="checkbox"/> Observer	
Data Table		<input checked="" type="checkbox"/> Observer	



2. You must save your changes to the diagram before you can simulate it.
3. You may want to inspect the output of Maude in the *Console* Eclipse View.
4. Start the simulation by pressing the *Step* or *Run* button of the *Execution Manager* View.
5. The state machine's Maude representation will be generated in your projects folder.
6. Now you can set (input) events and inspect (output) actions in the *DataTable* Eclipse View.

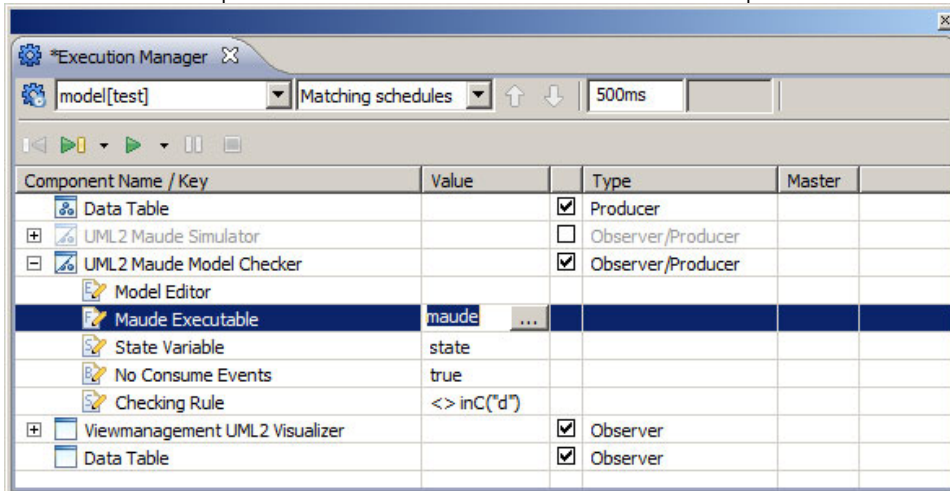


P	Key	Value
<input type="checkbox"/>	a1	
<input type="checkbox"/>	ee1	
<input checked="" type="checkbox"/>	*ee2	
<input type="checkbox"/>	ee3	

7. You can now use the *Step* button to perform a simulation (run-to-completion) step or use the *Run/Pause* buttons.

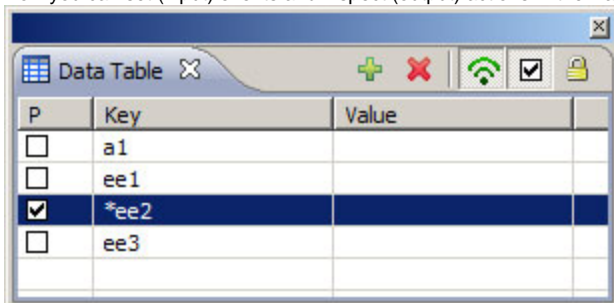
## Model Checking

1. Deactivate the *DataComponent* for simulation as shown below and validate that the path to the Maude executable is set correctly.



Component Name / Key	Value	Type	Master
Data Table		<input checked="" type="checkbox"/> Producer	
UML2 Maude Simulator		<input type="checkbox"/> Observer/Producer	
UML2 Maude Model Checker		<input checked="" type="checkbox"/> Observer/Producer	
Model Editor			
Maude Executable	maude		
State Variable	state		
No Consume Events	true		
Checking Rule	<> inC("d")		
Viewmanagement UML2 Visualizer		<input checked="" type="checkbox"/> Observer	
Data Table		<input checked="" type="checkbox"/> Observer	

2. Set your desired model checking term in the properties of the model check *DataComponent*.
3. You must save your changes to the diagram before you can model check it.
4. You may want to inspect the output of Maude in the *Console* Eclipse View.
5. Start the simulation by pressing the *Step* button of the *Execution Manager* View.
6. The state machine's Maude representation will be generated in your projects folder.
7. Now you can set (input) events and inspect (output) actions in the *DataTable* Eclipse View.



P	Key	Value
<input type="checkbox"/>	a1	
<input type="checkbox"/>	ee1	
<input checked="" type="checkbox"/>	*ee2	
<input type="checkbox"/>	ee3	

8. When you now click on *Step* again, model checking will be performed and you will be prompted the result.
9. If there is a counter example, then you can now use subsequent clicks on *Step* to inspect it.



## Links

- [Papyrus MDT Eclipse Project](#)
- [The Maude System](#)
- [KIELER Execution Manager](#)
- [KIELER DataTable](#)