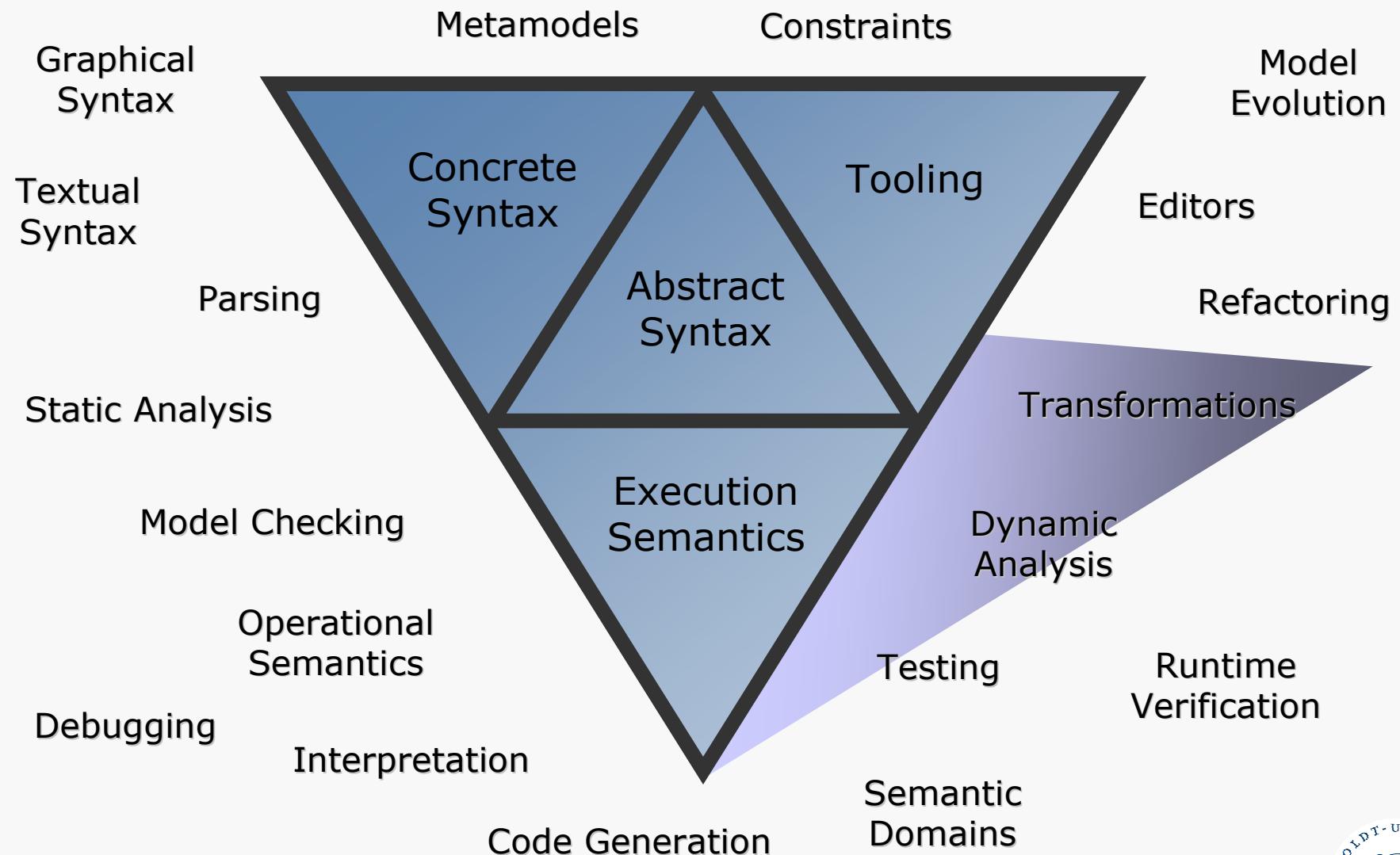


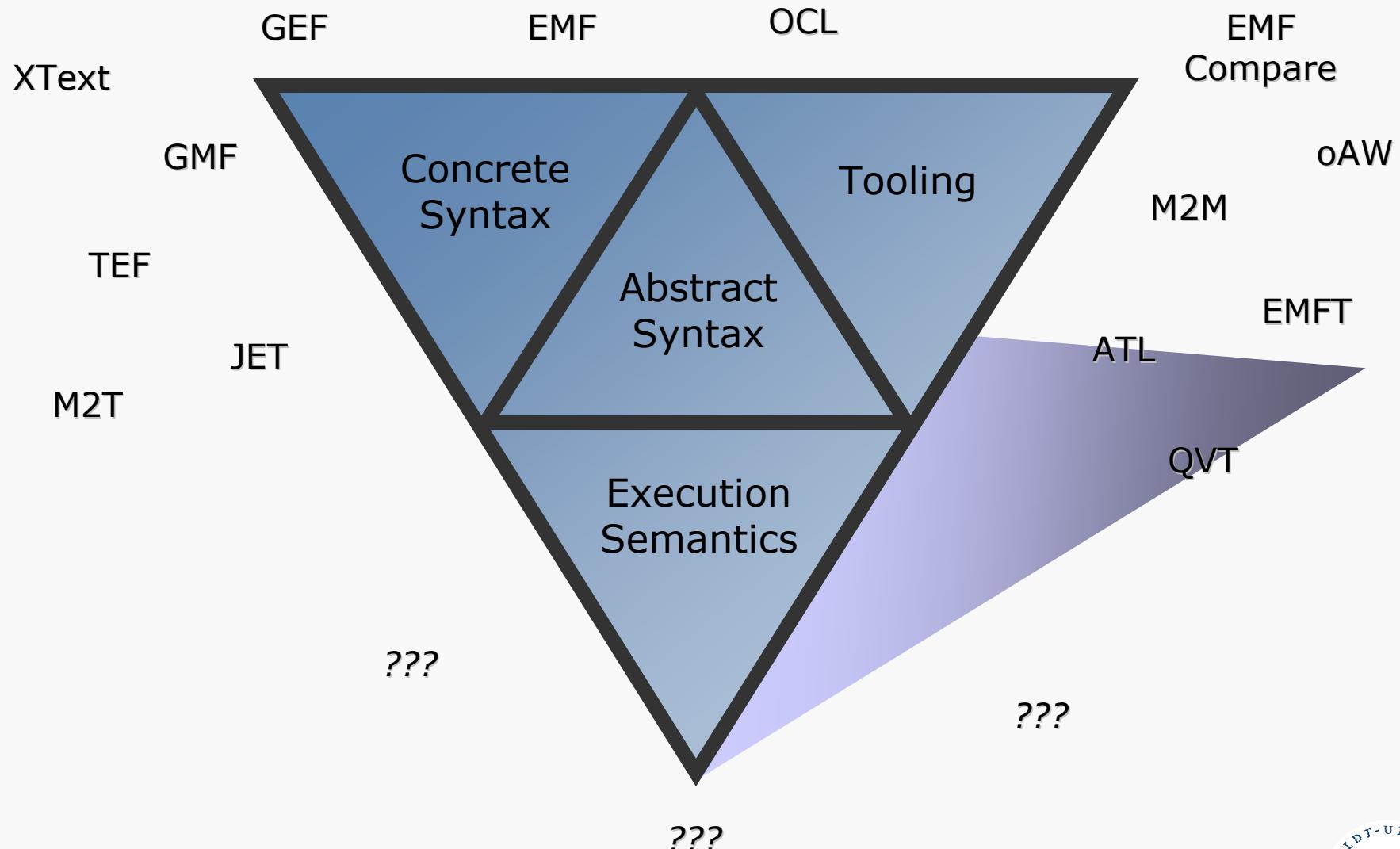
Executable Models and the Eclipse Modeling Project

Hajo Eichler, Michael Soden
[eichler|soden@metamodels.de]

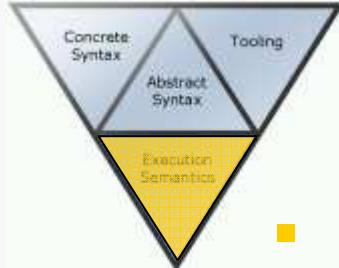
Languages, Models, Metamodels...



...as eclipse projects

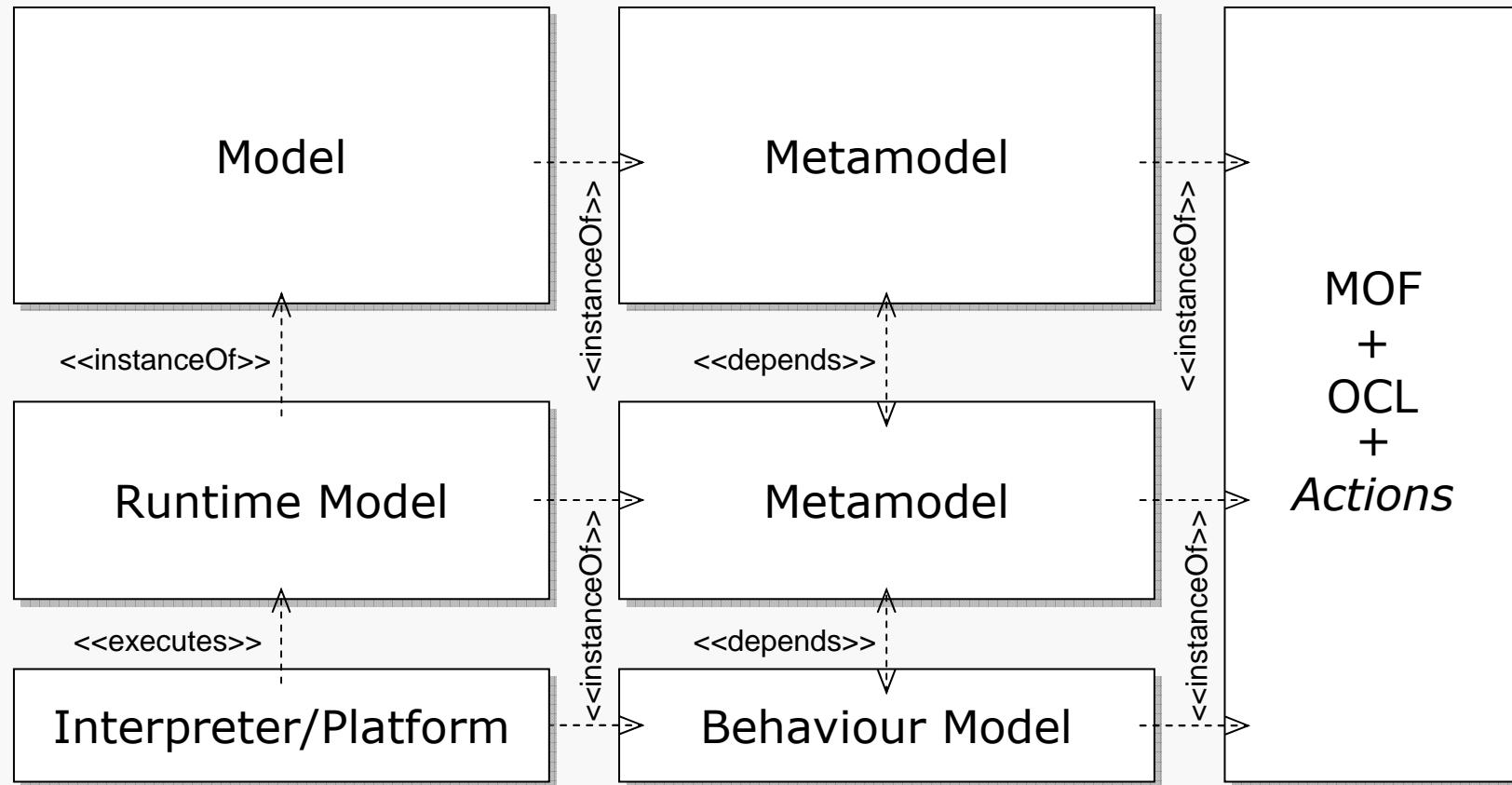


Model Execution Semantics

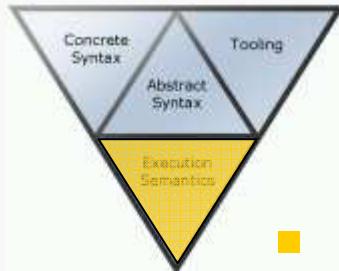


- Model transformations
 - not adequate for operational semantics
 - focus on (stepwise) model manipulation
- Existing approaches
 - ...either not based on EMF (AsmL, Kermeta, Xocl, etc.)
 - ...or not under the EMP umbrella
- No model analysis framework based on EMF
 - no common runtime, debugger, analysis tools, etc.

Concepts



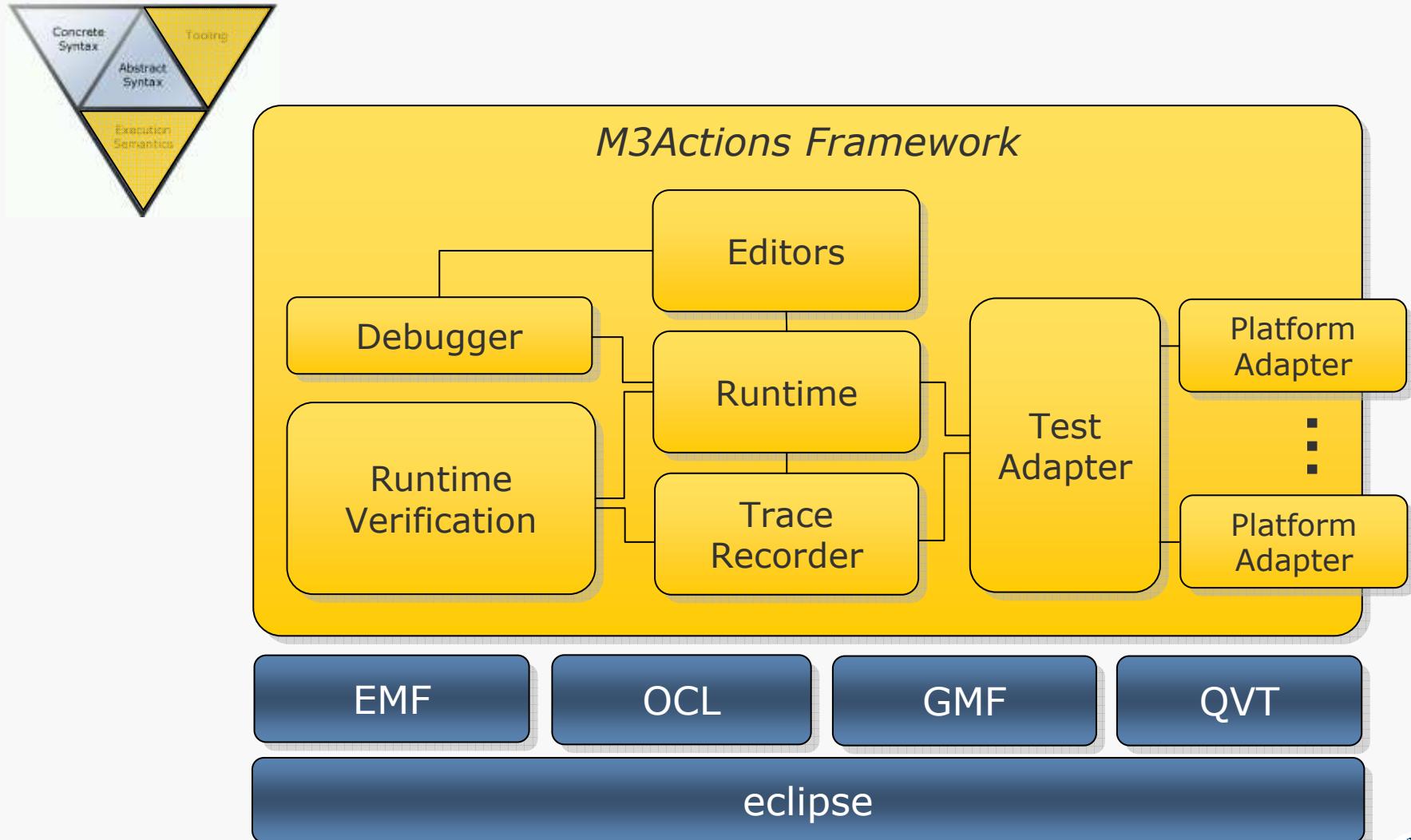
M3Actions: Operational Semantics for EMF



- Metamodels with behavior
 - Graphical Syntax based on UML Actions/Activities and OCL for query/constraints
 - Inline annotation as operations in metamodel
 - Explicit instantiation concept for multiple meta-layers (e.g. runtime model)
 - Formal definition over ASM

- Background
 - Research and experience in language engineering

M3Actions framework: Overview



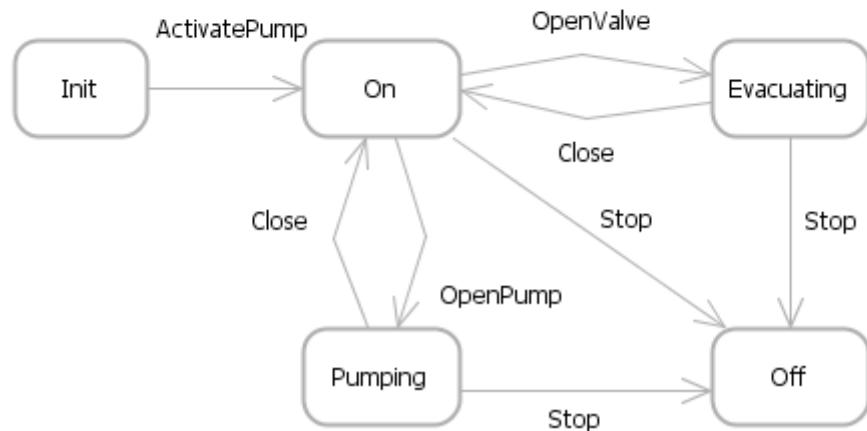
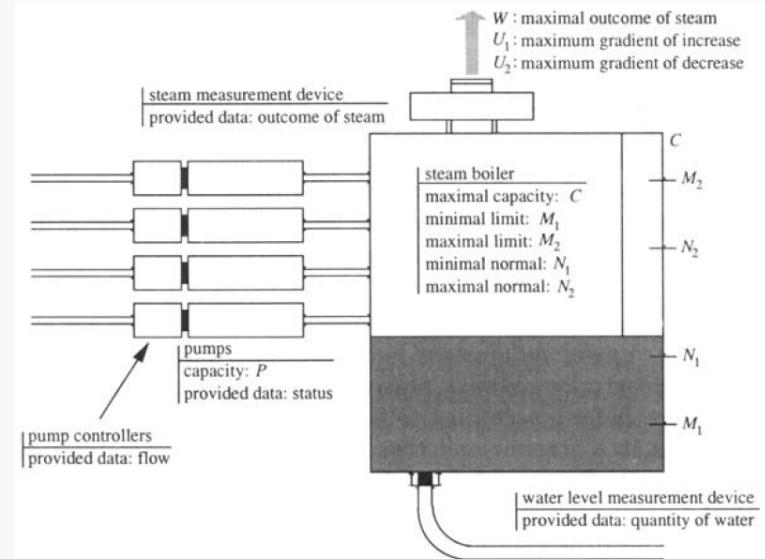
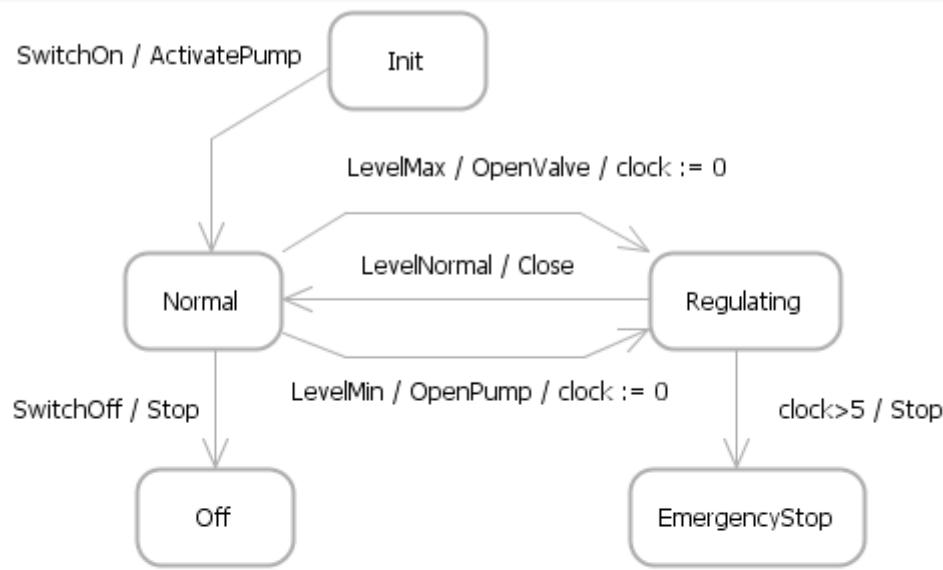
M3Actions @ www.metamodels.de

2008-11-18

Hajo Eichler, Michael Soden



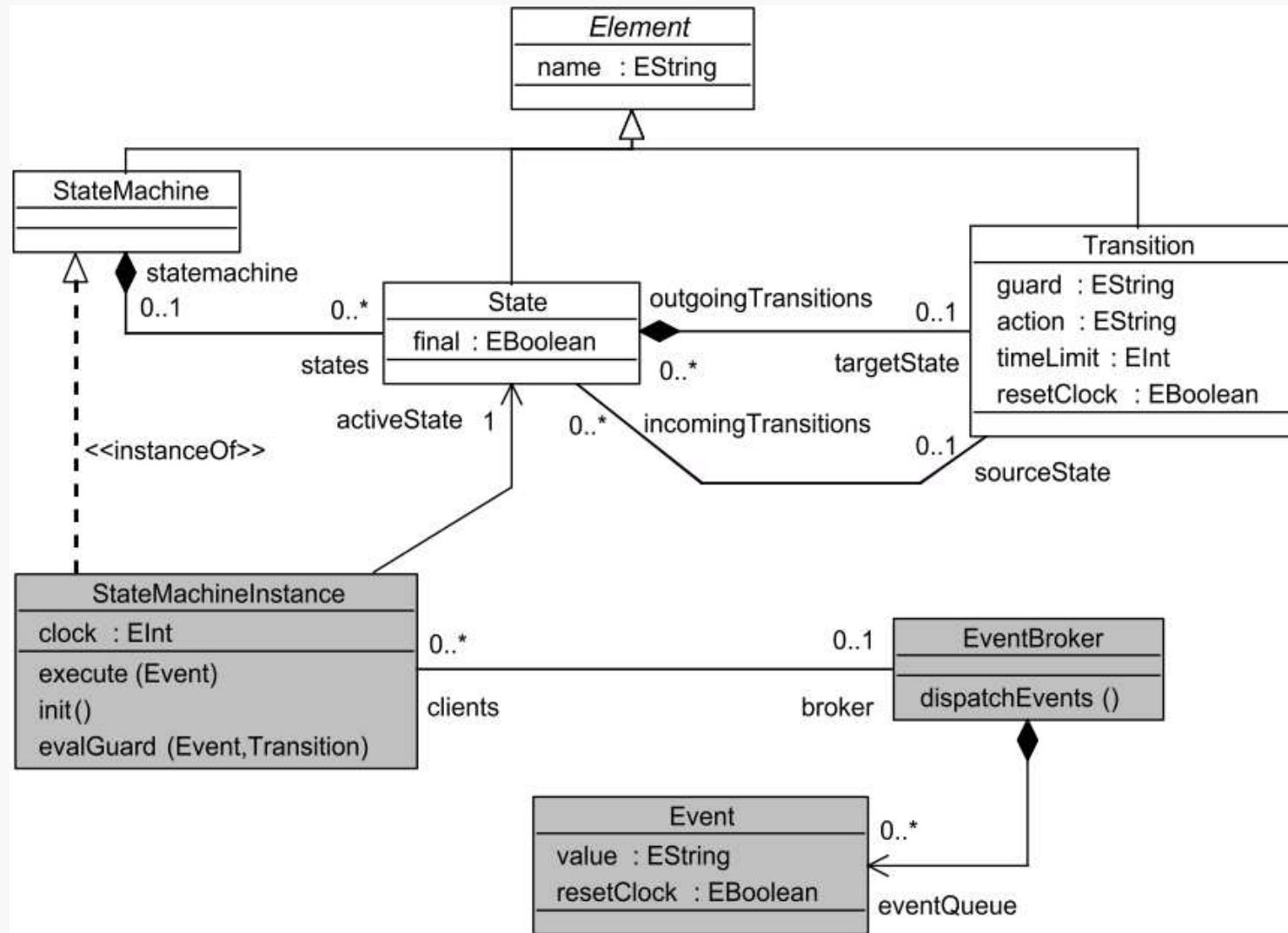
Example: *Timed Automata*



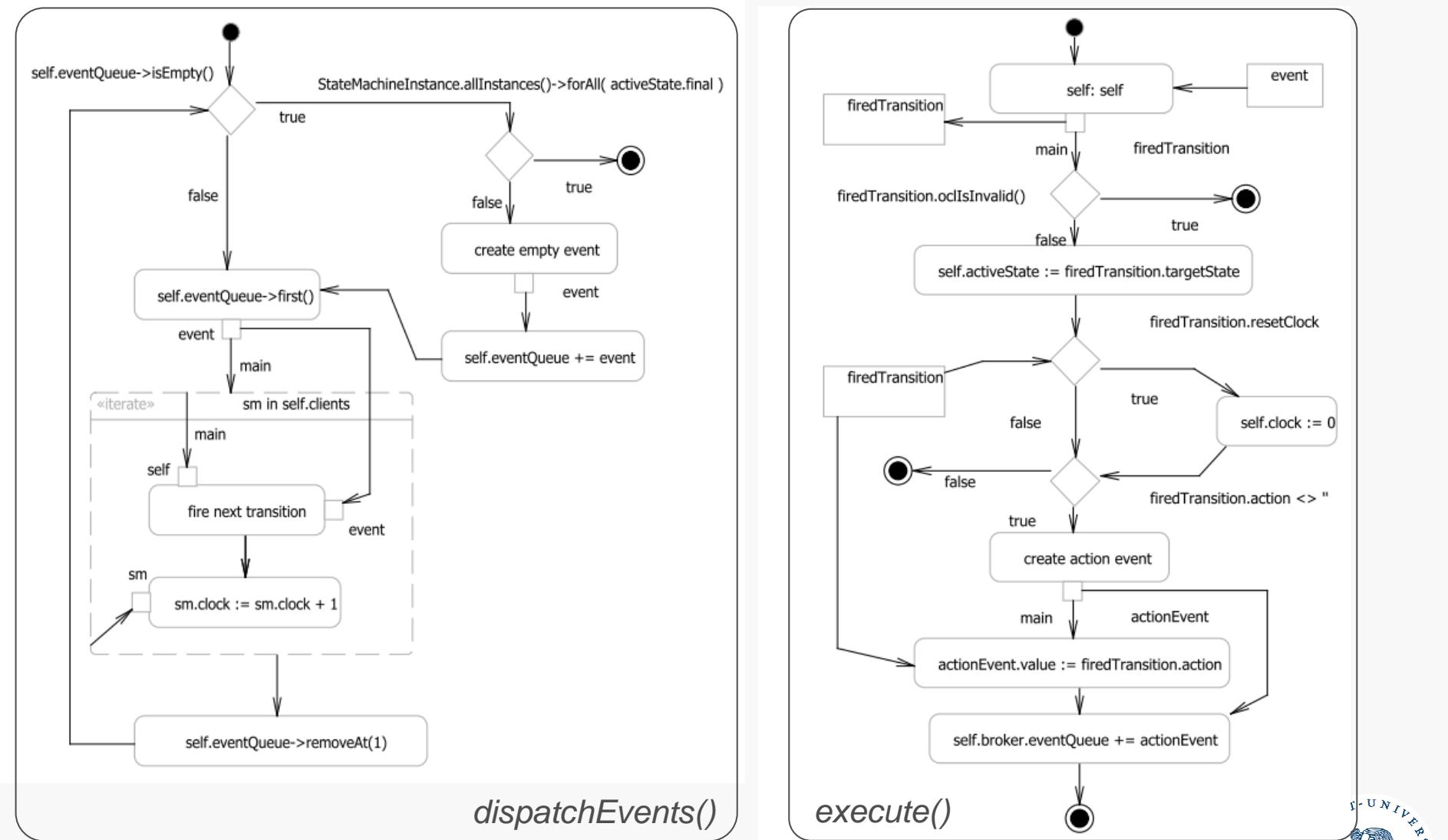
Original problem statement: J.-R. Abrial: Steam-Boiler control specification problem, Dagstuhl, August 1994



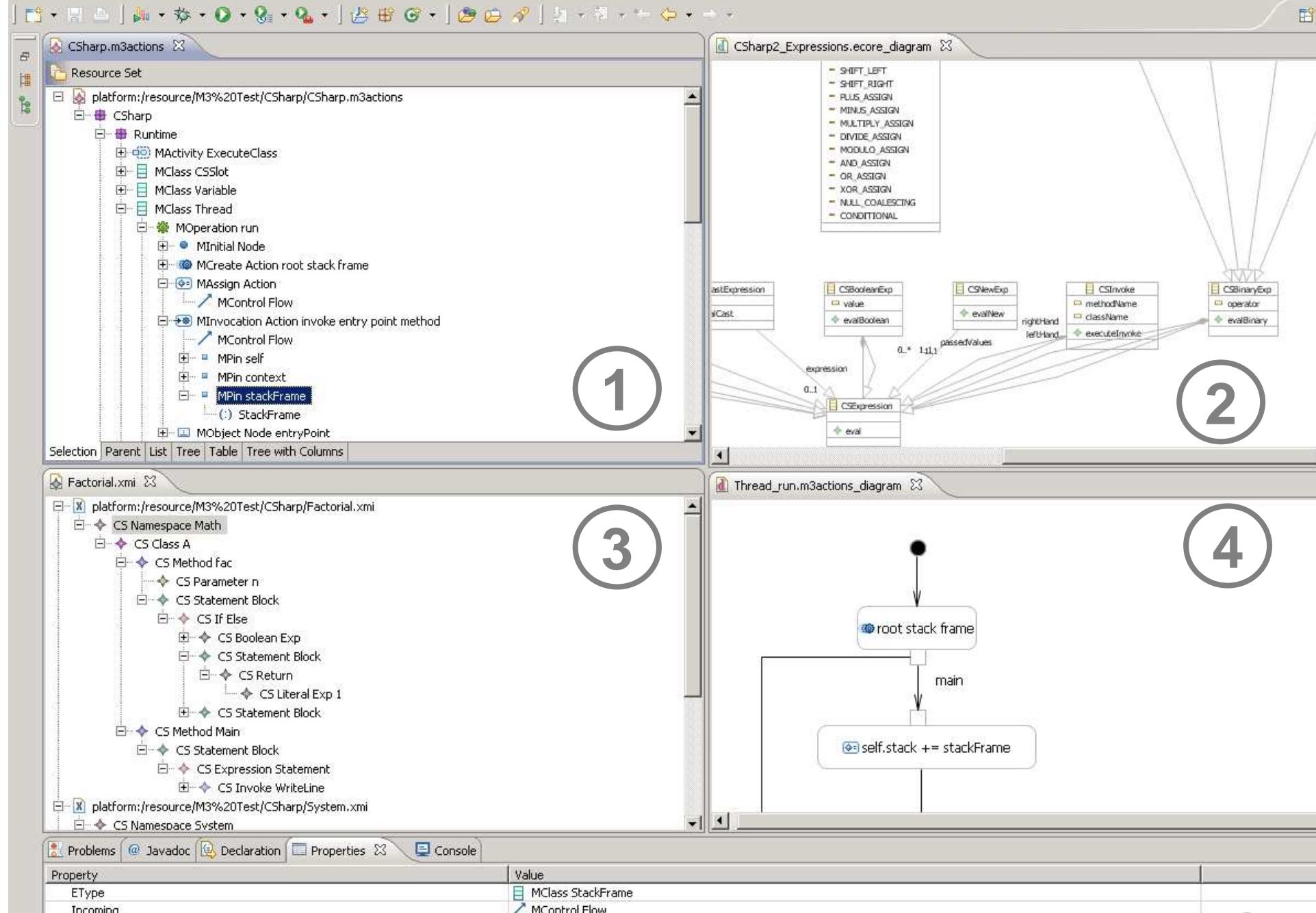
Metamodel: *Timed Automata*



MActions behavior definitions



Java - M3 Test/CSharp/CSharp.m3actions - Eclipse SDK
 File Edit Navigate Search Project Run M3Actions Editor Window Help



1

2

Name	Value
self	[org.eclipse.emf.ecore.impl.DynamicEObjectImpl@1f0afc8 (eClass: org.eclipse.emf.ecore.impl.EClass)]
context	[org.eclipse.emf.ecore.impl.DynamicEObjectImpl@20f19e (eClass: M3Actions.impl.MClassImpl@c2bc...)]

3

```

M3Actions
--- executeExpression (MOperation)
Executing: CSharp::Statements::CSExpressionStatement::executeExpression::self: self.expression
--- executeInvoke (MOperation) ---
Executing: CSharp::Expressions::CSInvoke::executeInvoke::create new stack frame
-- New instance: org.eclipse.emf.ecore.impl.DynamicEObjectImpl@15eac87 (eClass: M3Actions.impl.MClassImpl@c2bc... (name: StackFrame) (instanceClassName: null)
Executing: CSharp::Expressions::CSInvoke::executeInvoke::MAssignAction
-- Assign: 'org.eclipse.emf.ecore.impl.DynamicEObjectImpl@15eac87 (eClass: M3Actions.impl.MClassImpl@c2bc... (name: StackFrame) (instanceClassName: null) (abs...
Executing: CSharp::Expressions::CSInvoke::executeInvoke::CSharp::Core::CSClass.allInstances()>select( class | class.name = self.className ).methods->select( method | method.name = self.methodName )

```

4

Referenzen

- *M3Actions*: <http://www.metamodels.de>
- *eclipse modeling projects*: <http://www.eclipse.org/modeling>
- OMG Standards: *Meta Object Facility and Object Constraint Language*:
<http://www.omg.org>
- Yuri Gurevich: *Abstract State Machines: An Overview of the Project*, *MS Research*, November 2003
- R.Alur, D.L.Dill: *A Theory of Timed Automata*. Stanford University
- J.-R.Abril: *Steam-Boiler control specification problem*, Dagstuhl, August 1994



[?]

Thank you!