# Leveraging Executable Language Engineering for Domain-Specific Transformation Languages (Position Paper)

EXE 2016, Saint-Malo, France

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# Observations

- **Domain Specific Transformation Language (DSTL)** = model transformation language tailored for specific tasks (*eg.* strings renaming, code generation)

- DSTLs more and more common:
  - Two papers on DSTLs at *ICMT'16* in a dedicated "*Model Transformation Languages*" session
  - This year *TTC'16* use case: data-flow based DSTL
  - **Increasing need for methods to develop DSTLs**

- Progress in executable Domain-Specific Modeling language (xDSML) engineering:
  - Generic *syntactic* services (eg. editors using Xtext or Sirius)
  - Generic *runtime* services (eg. debugger using GEMOC studio)
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# Questions

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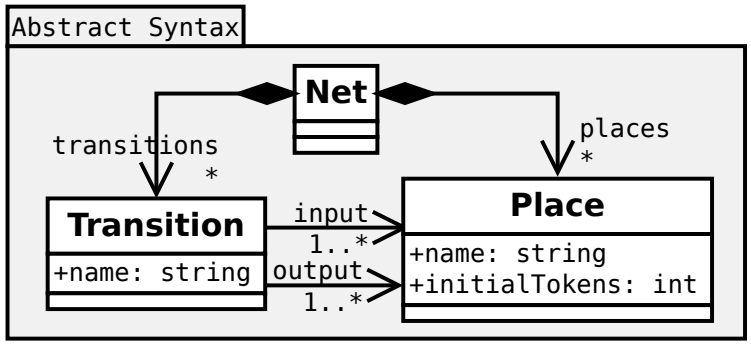
# Example of Petri nets xDSML and model



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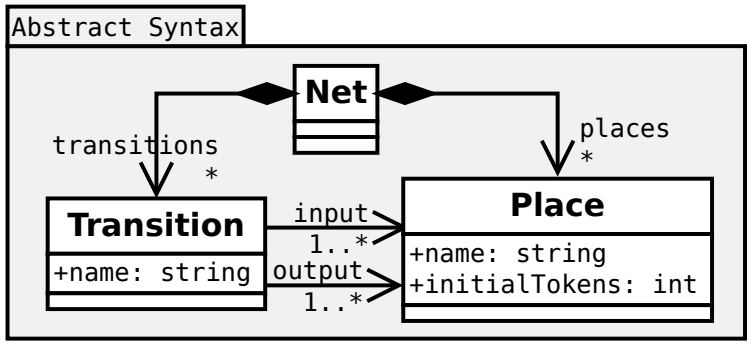


Petri net model

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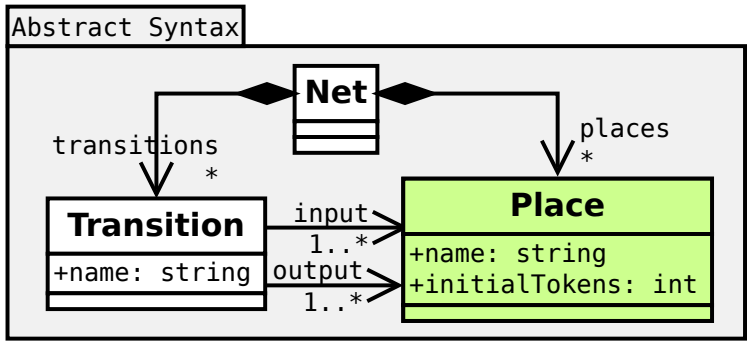


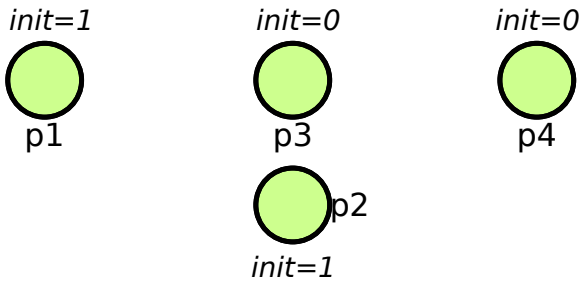


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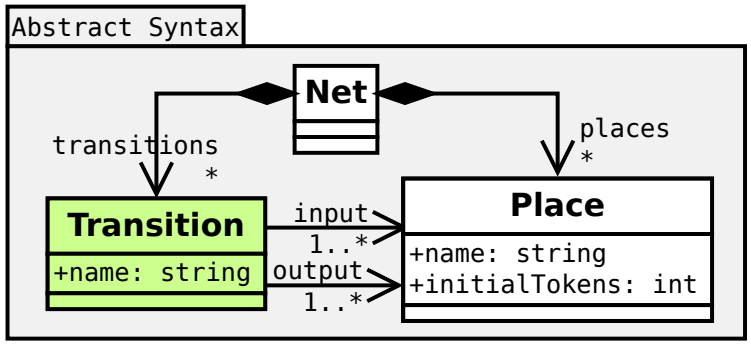


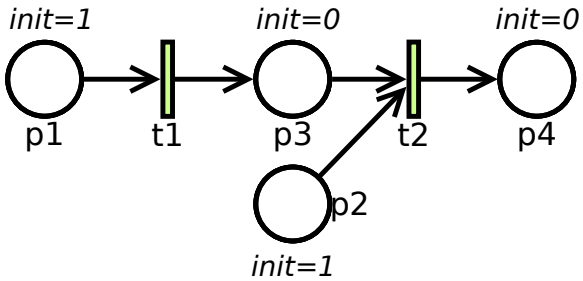


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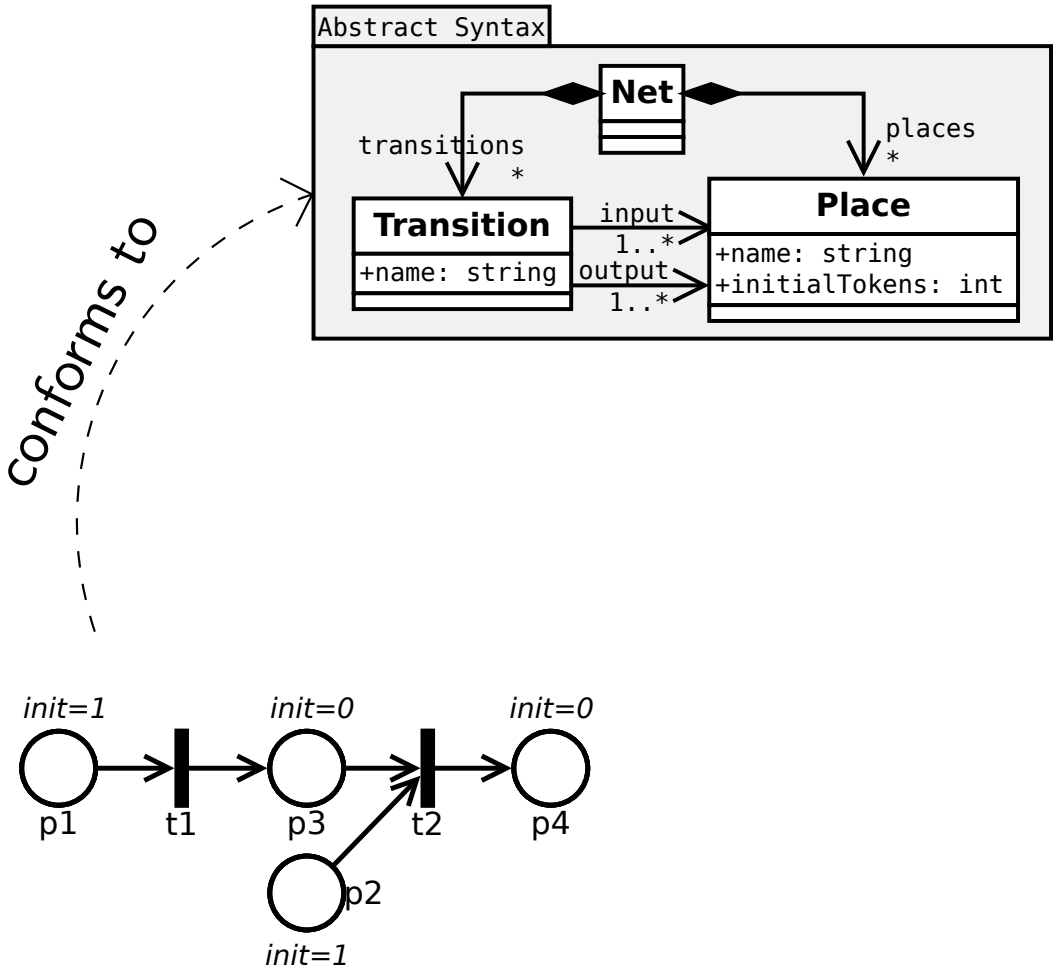


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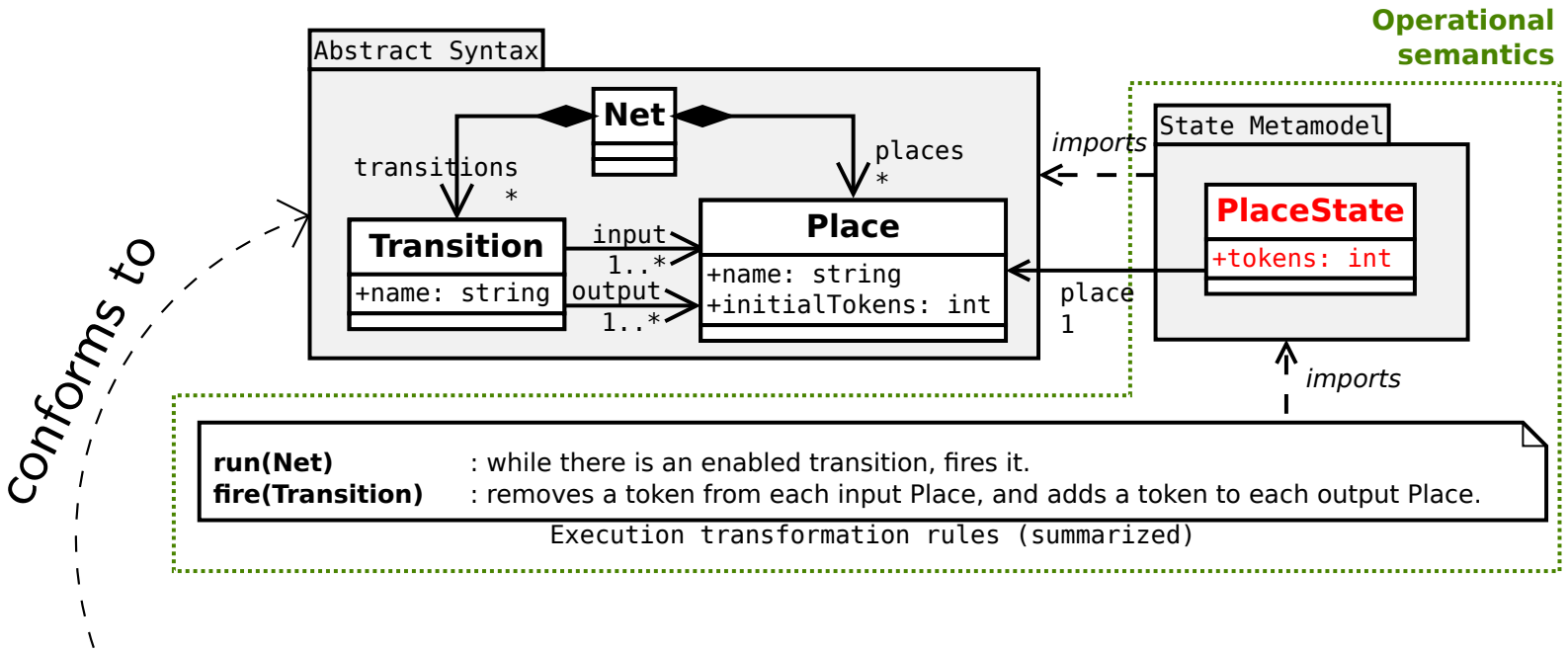


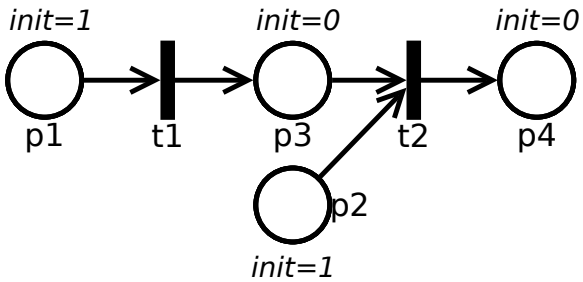


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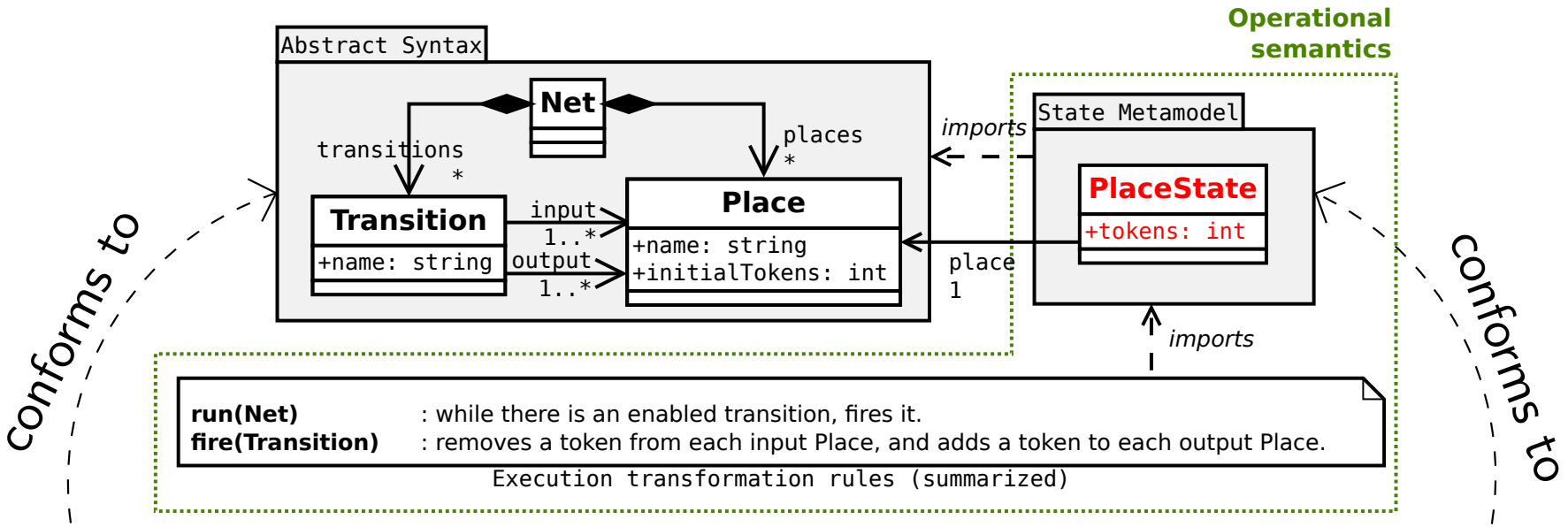
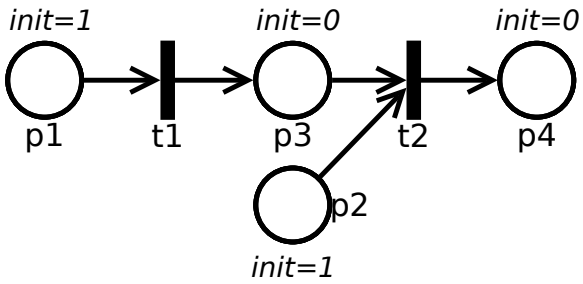
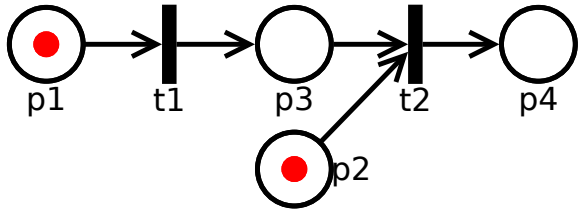



Petri net model

initialization




Executed model

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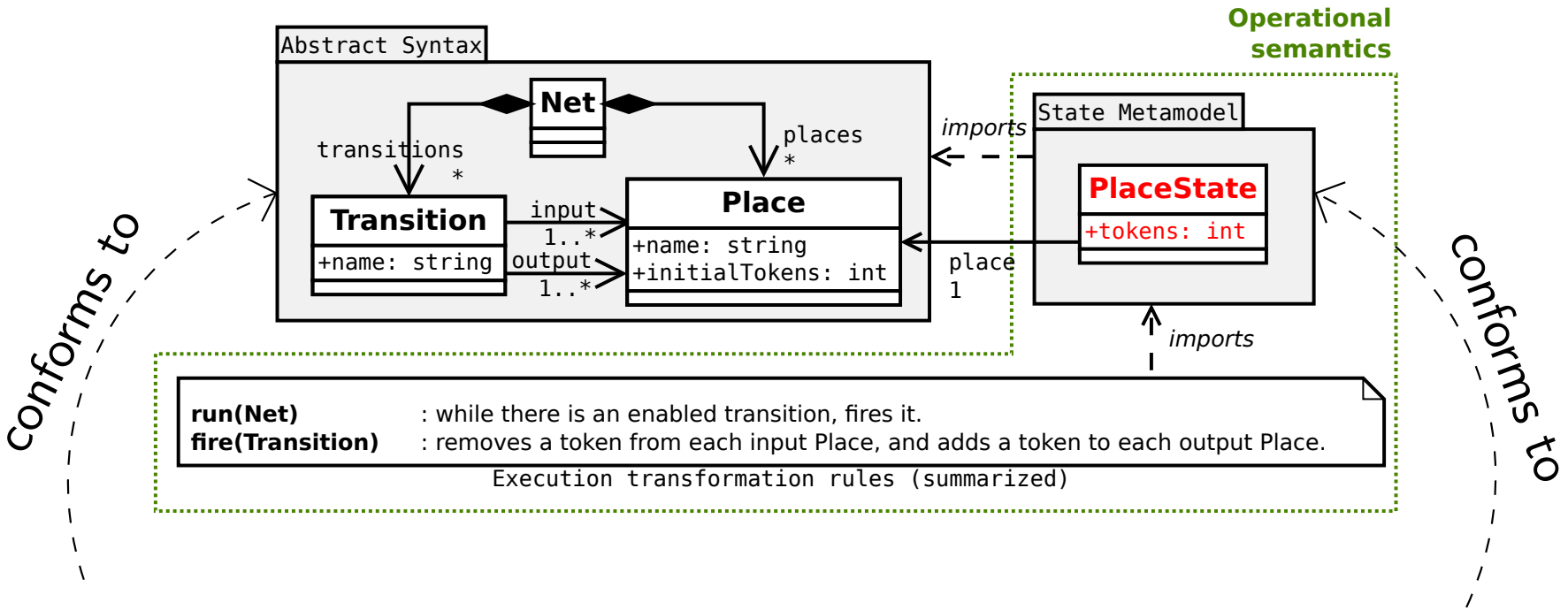


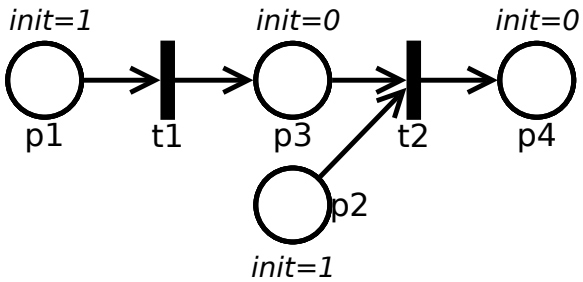


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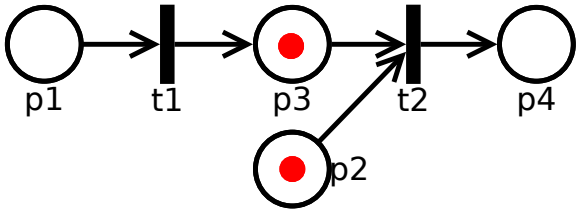


Executed model

*(t1 fired)*

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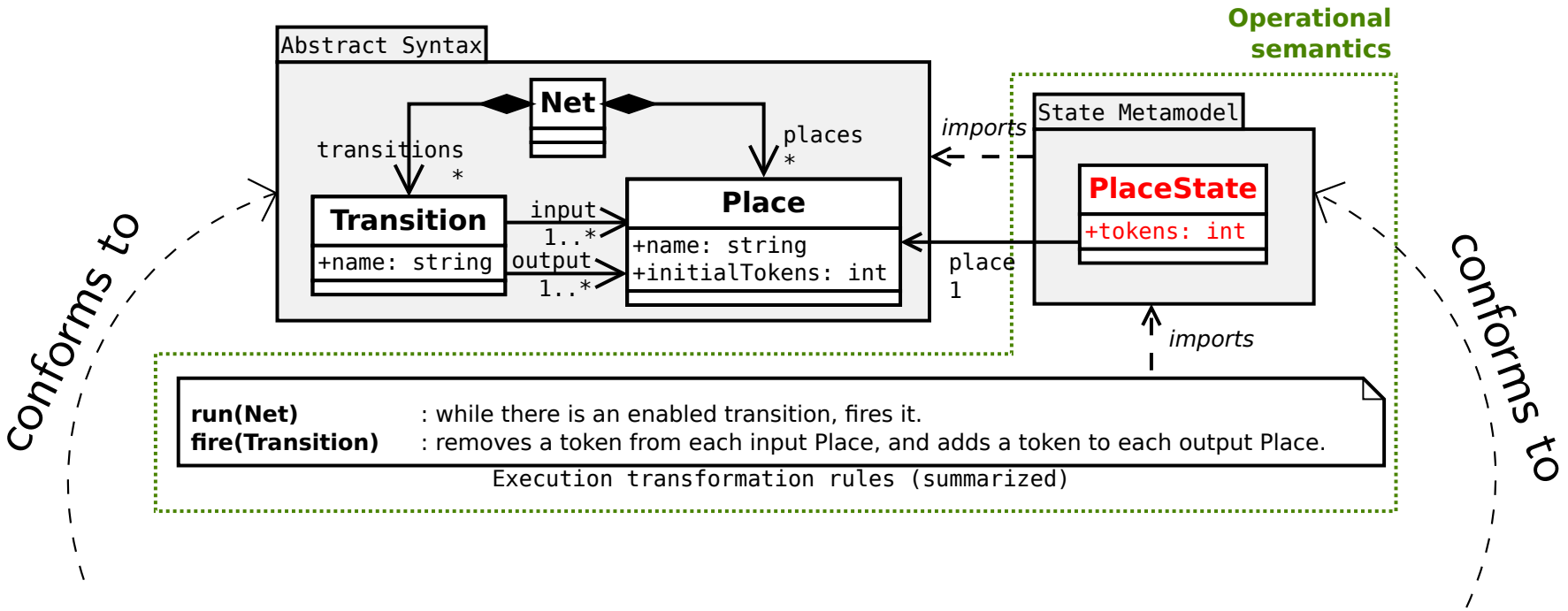


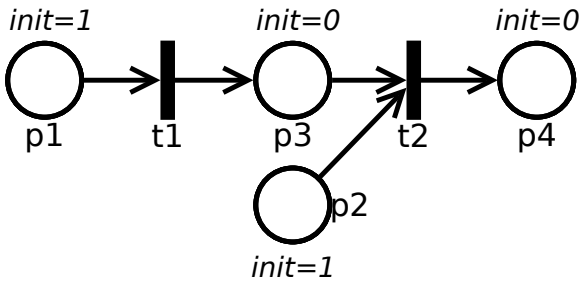


Petri net model

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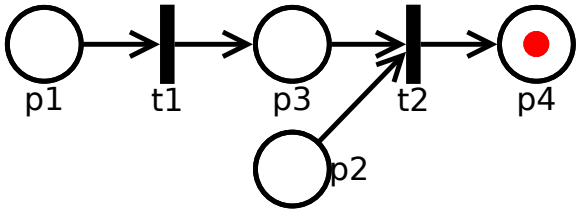
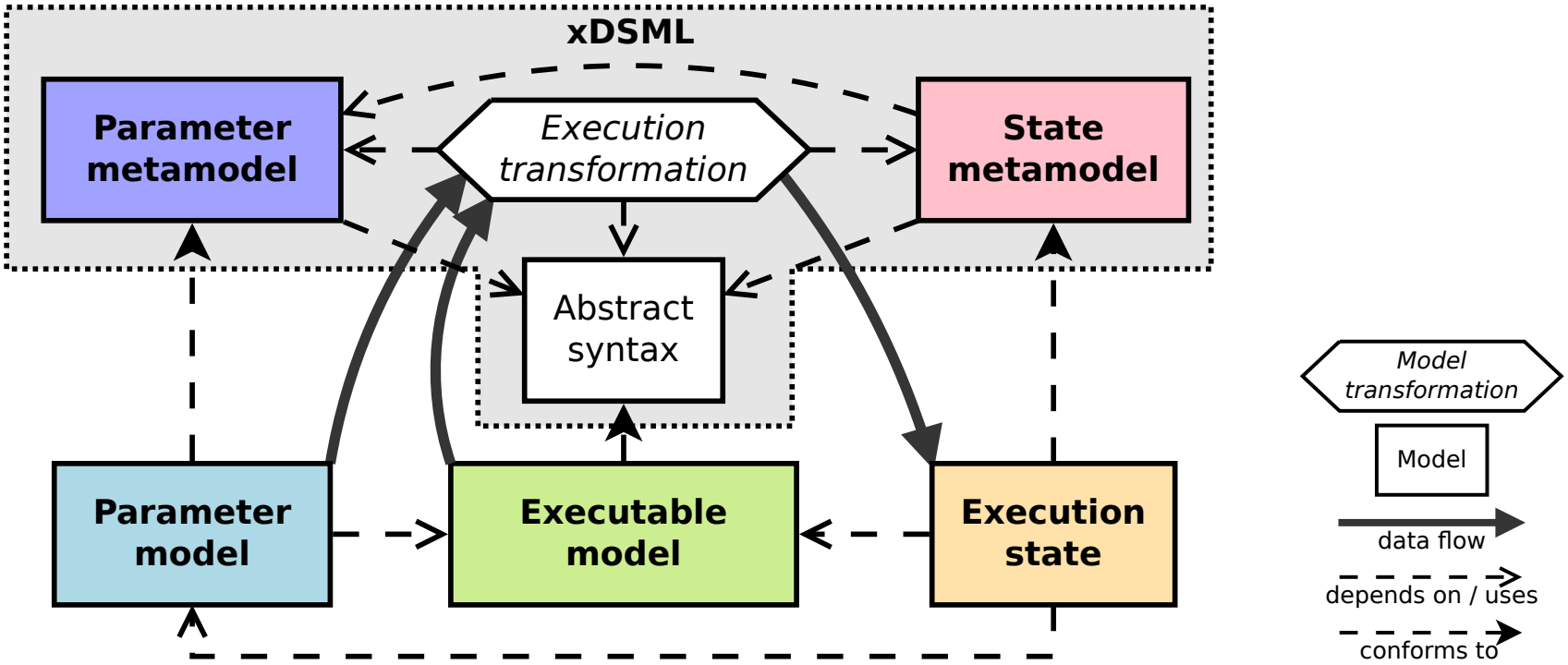


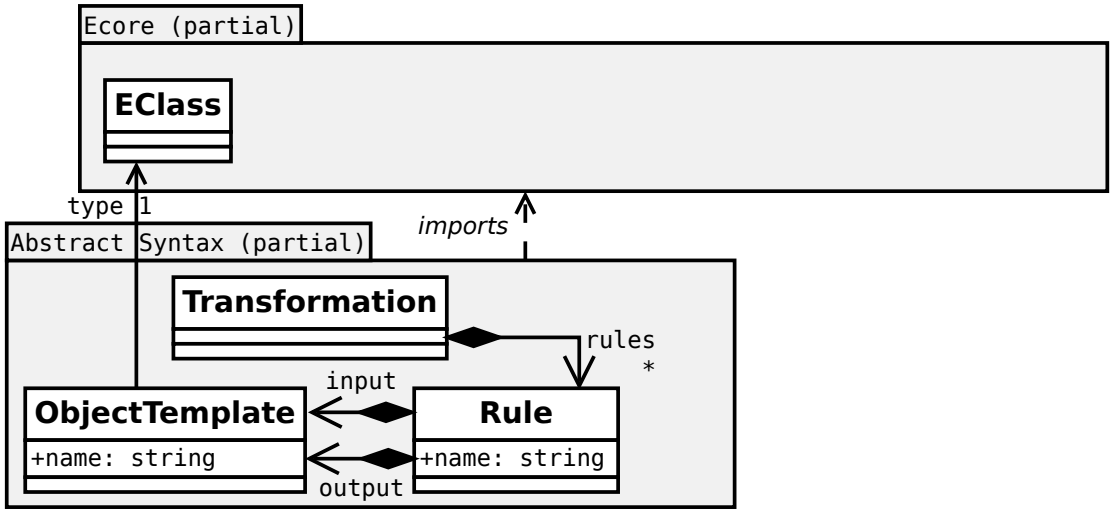

Executed model

*(t1 fired) (t2 fired)*

# Generalizing xDSMLs



# Example of MiniTL DSTL and model



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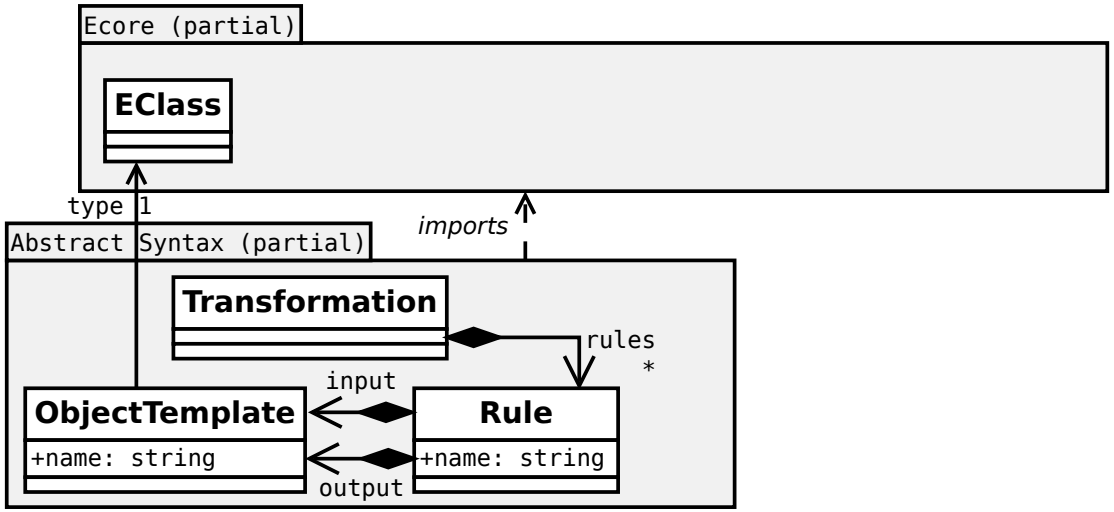


MiniTL model

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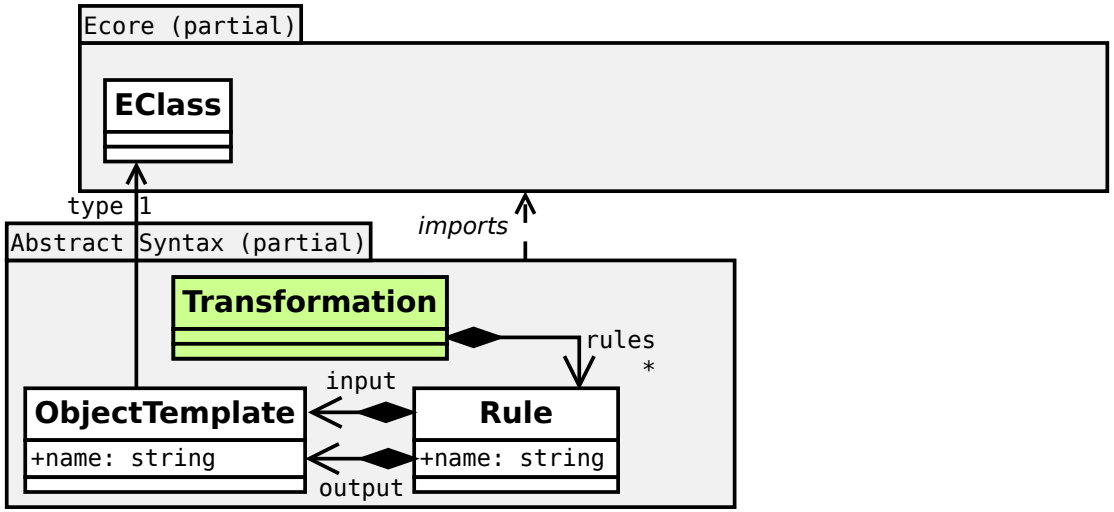


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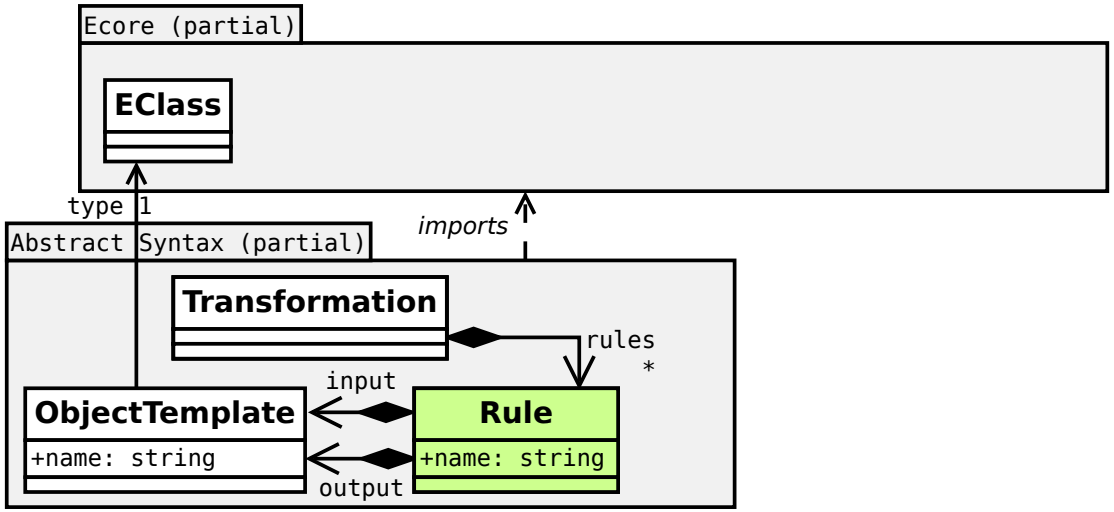


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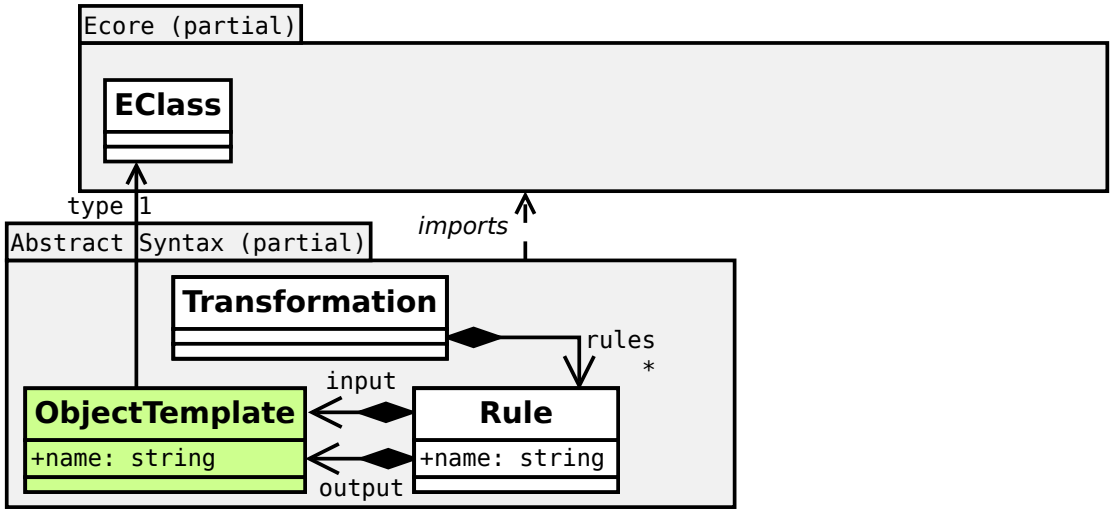


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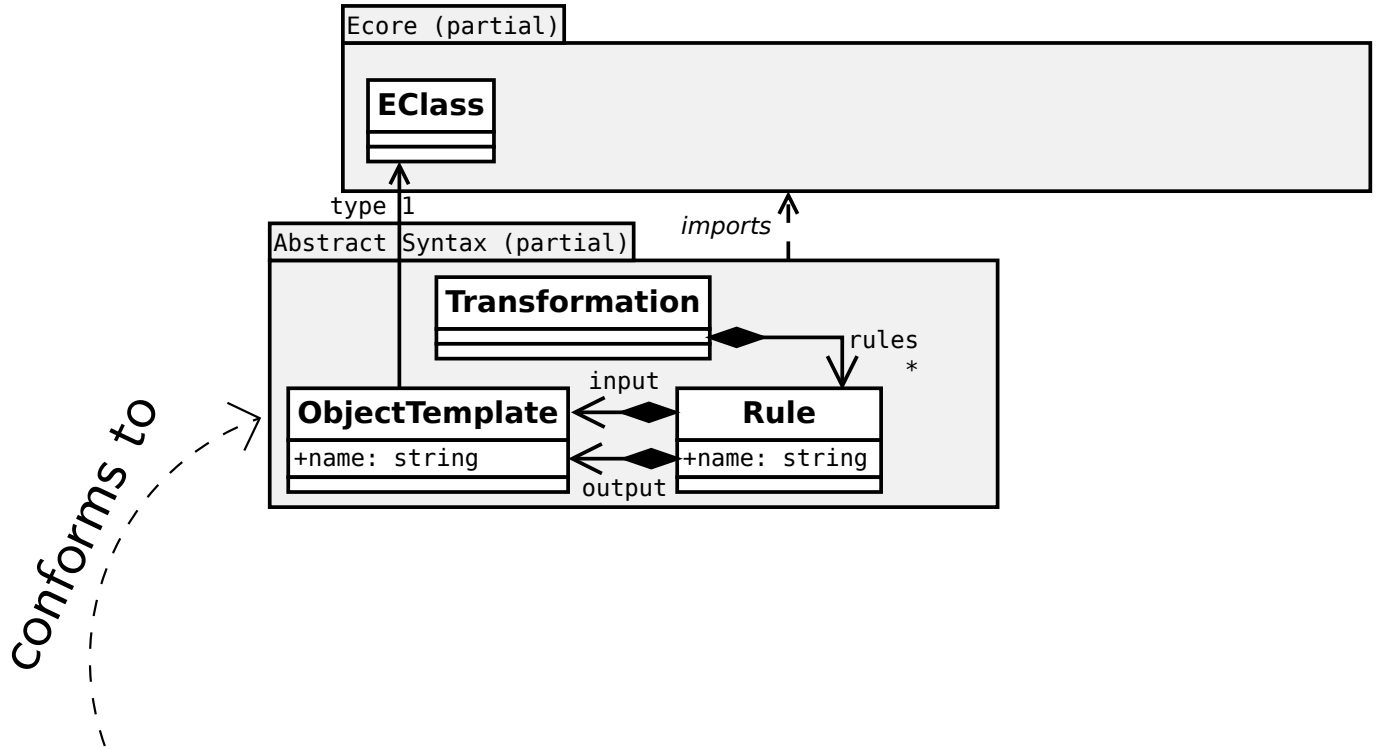


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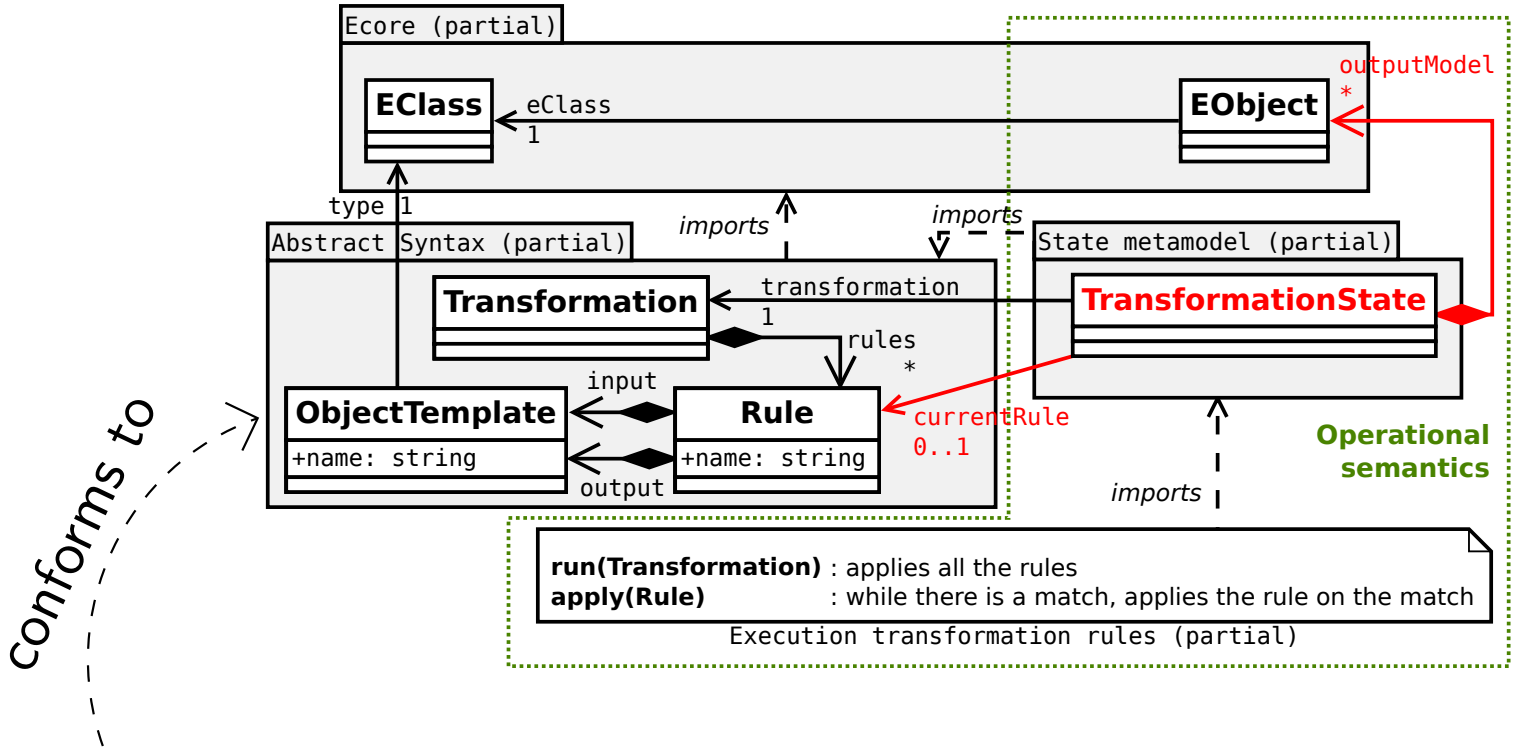


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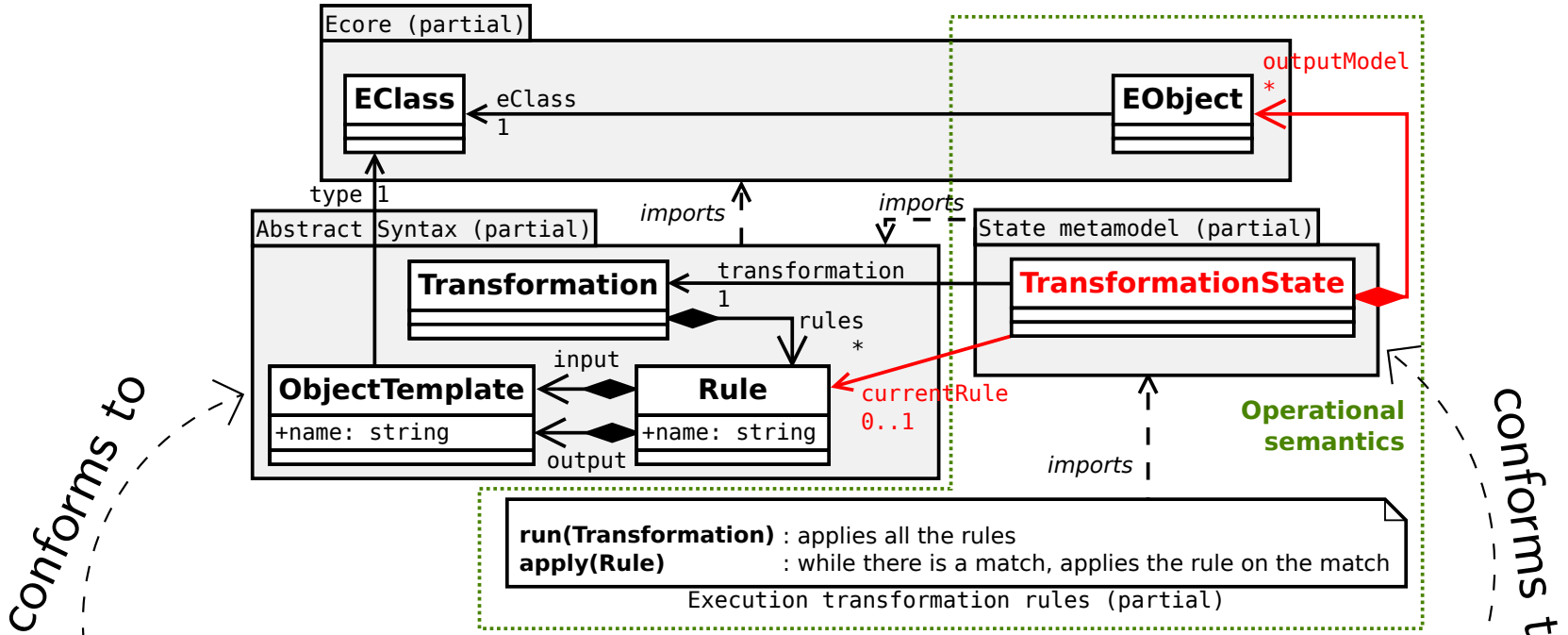


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MiniTL model

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Output model

Executed model

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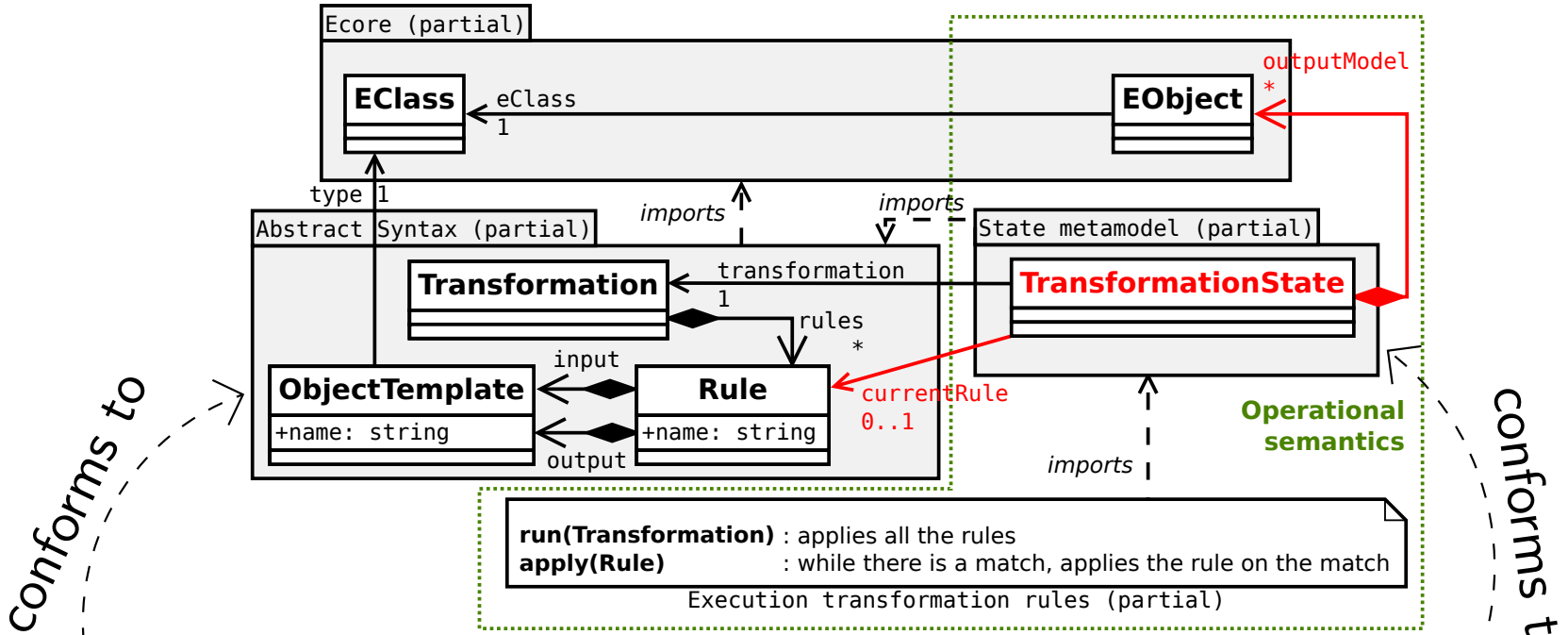


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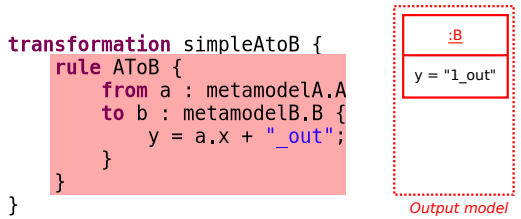
MiniTL model

initialization




Executed model

*(AToB app.)*

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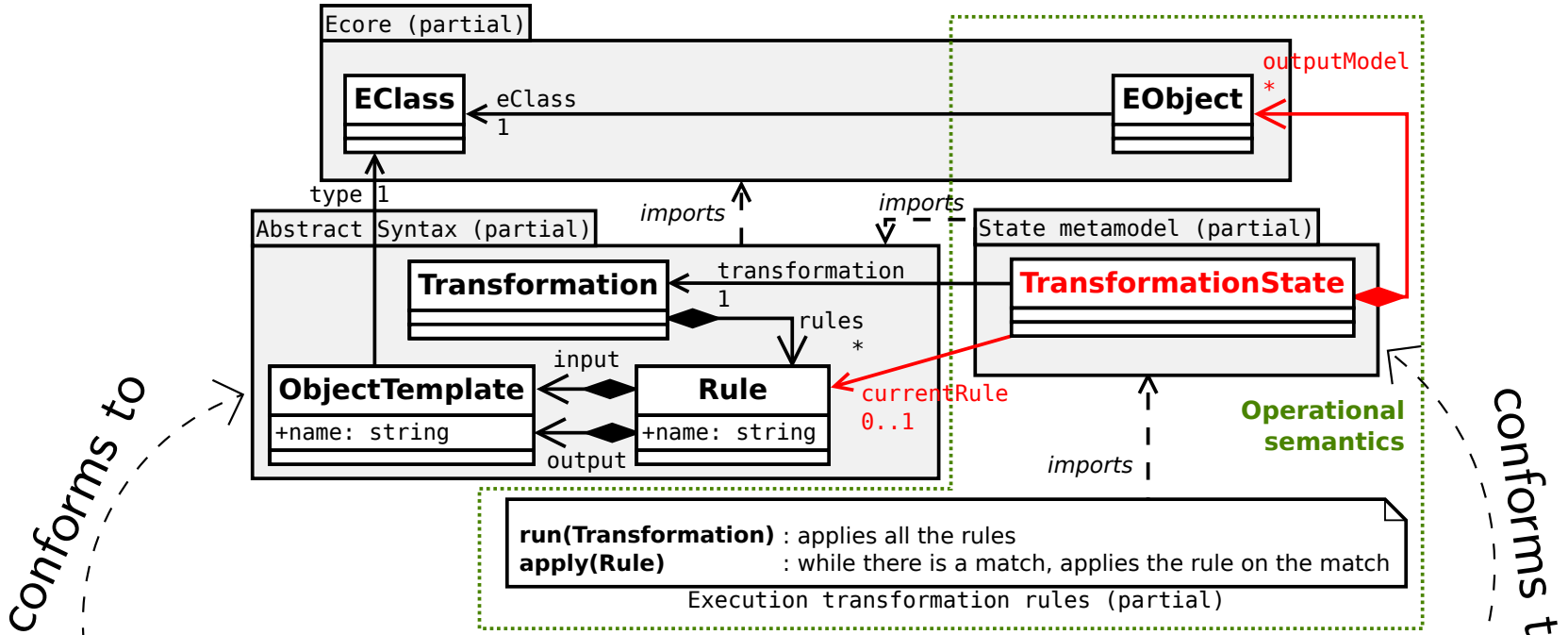


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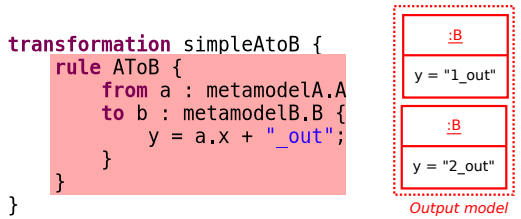
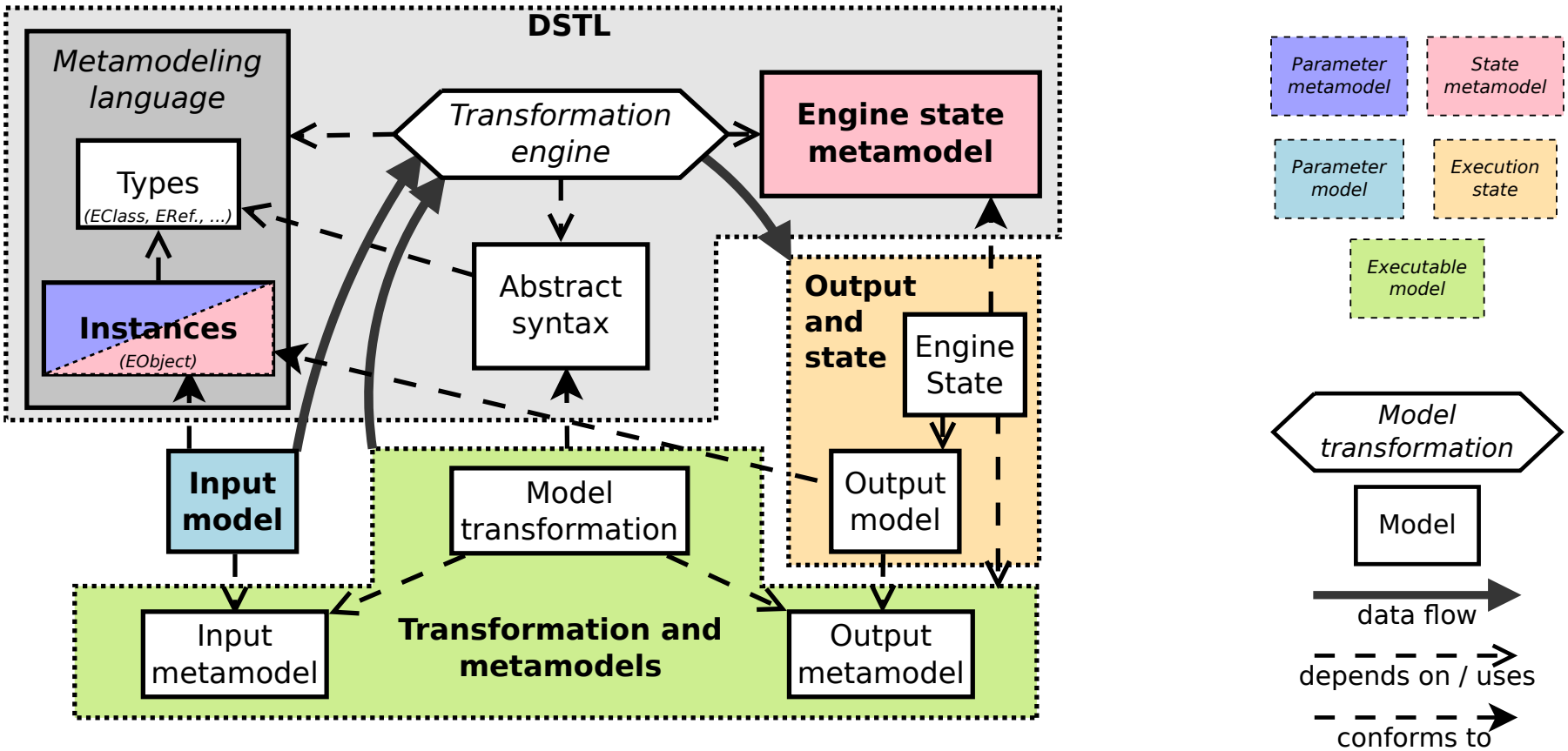



Executed model

*(AToB app.) (AToB app.)*

# Generalizing DSTLs as specific xDSMLs



# Research directions

- Experiment with **generic and generative approaches** for DSTL engineering:
  - Reuse xDSML engineering approaches , *eg.* getting a debugger "for free" for a given DSTL
  - Define/adapt new generic approaches for DSTL engineering
- Evaluate the **implications of DSTL specificities** : *eg.* can we generate a usable/relevant debugger using generic approaches?
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# Conclusion and future work

- Just an observation: **DSTLs are a sort of xDSMLs**, complex and with interesting characteristics
- Prospects:
  - Use state of the art xDSML engineering for DSTL engineering?
  - Consider DSTLs as nice case studies for model execution?

## Future work

- **Short term:** Experiment (more) xDSML engineering on some transformation languages, *eg.* MiniTL
- **Long term:** analyse a DSTL to automatically provide it with a *white-box testing framework* (test model generation, coverage metrics, fault localization, etc.)

# Done!

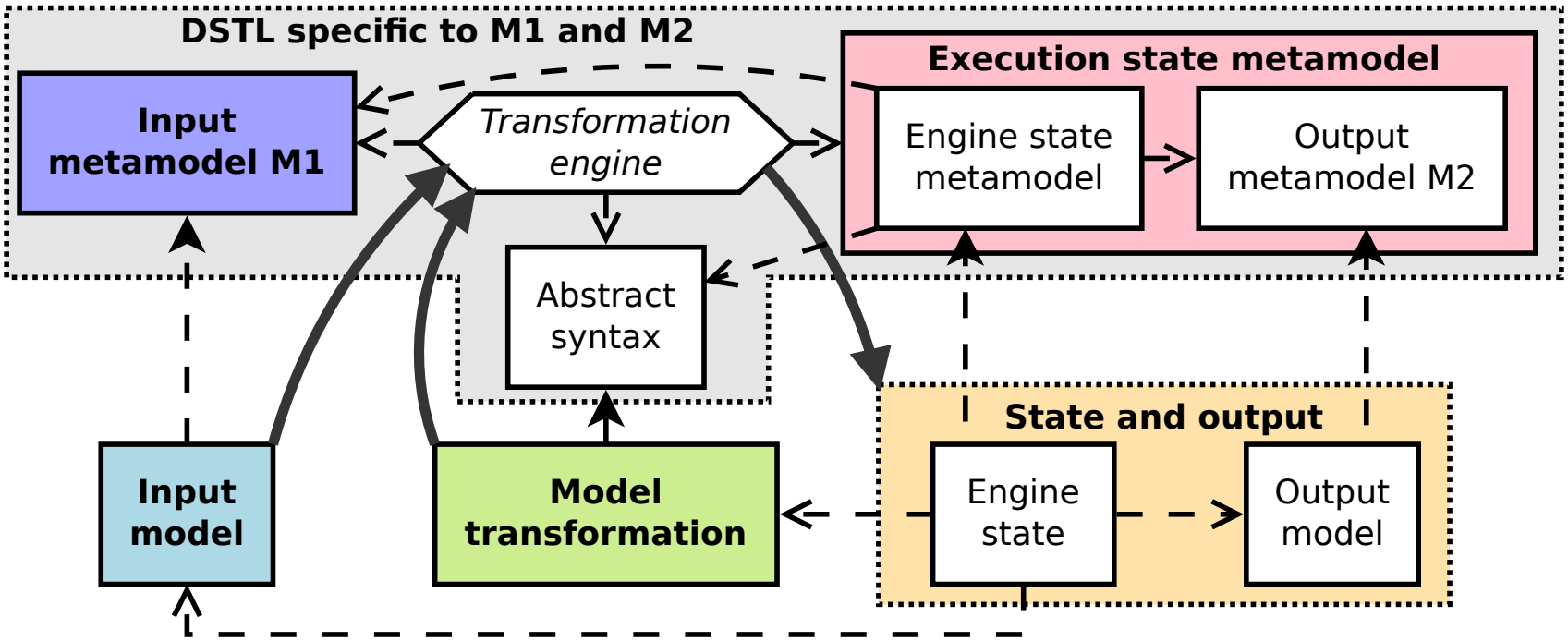
Thank you! ☺

**Implementation of MiniTL example:**
`https://github.com/tetrabox/minitl`

**Contact:**
erwan.bousse@tuwien.ac.at
`http://big.tuwien.ac.at/staff/ebousse`

**Research project:**
TETRA Box: `http://modeltransformation.net/tetrabox/`
*we have funding and an open position for a PhD student!*

# Generalisation of Metamodel-specific DSTLs



# Screenshot of MiniTL debugging session