Adding Rule-Based Model Transformation to Modelling Languages in MetaEdit+ [1]

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1. www.metacase.com

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Goals

- Add rule-based operational semantics to the ProductionSystem language in MetaEdit+
  - Create language in MetaEdit+
  - Create rules in MetaEdit+
  - Export rules and model to Python
  - Execute rules in Python using T-Core[2] and receive visual feedback in MetaEdit+

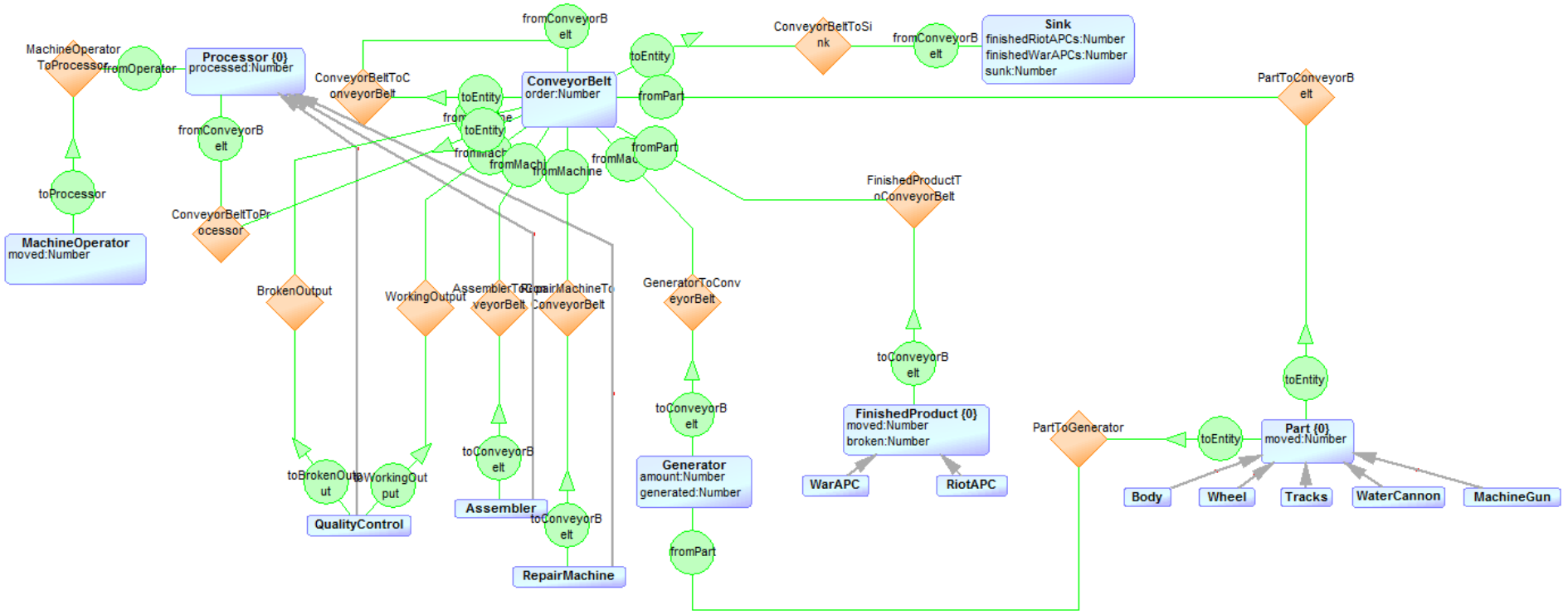
2. Syriani, E., Vangheluwe, H., March 2010. De-/Re-constructing Model Transformation Languages. Electronic Communications of the European Association of Software Science and Technology 29.

Introduction to MetaEdit+

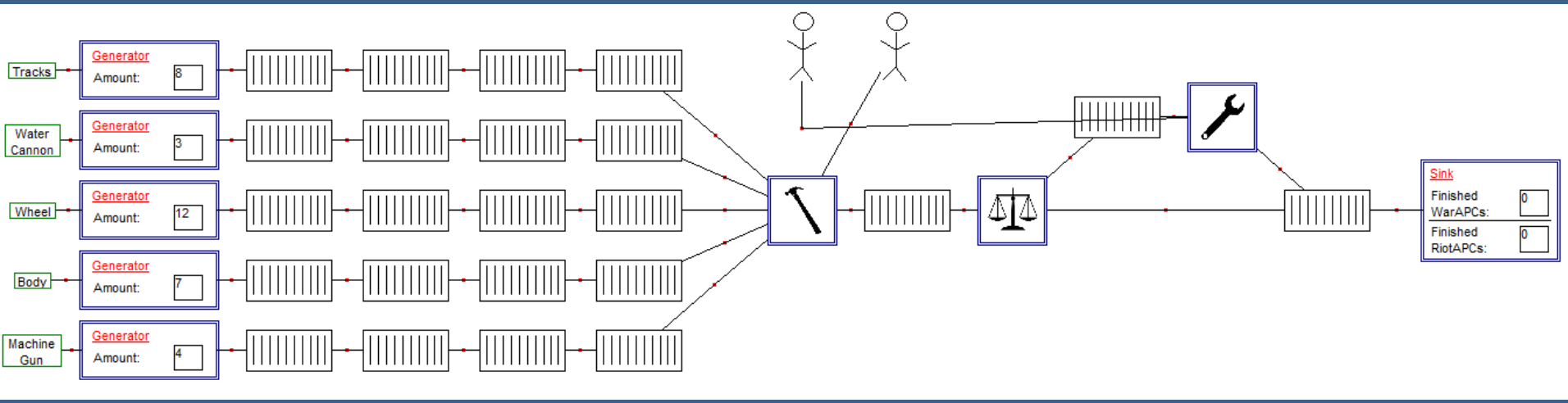
- Define Graphical Languages
  - Metamodelling Language: GOPRR

    Graph, Object, Property, Relationship, Role
  - Forms or Graphically
  - Icon and Symbol Editor
  - Constraints
    - Graphical through Ports
    - Syntactical

Introduction to MetaEdit+



Introduction to MetaEdit+

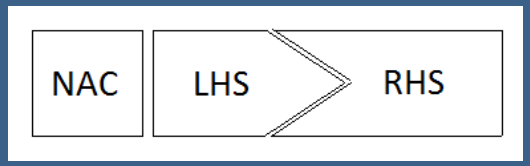


Introduction to MetaEdit+

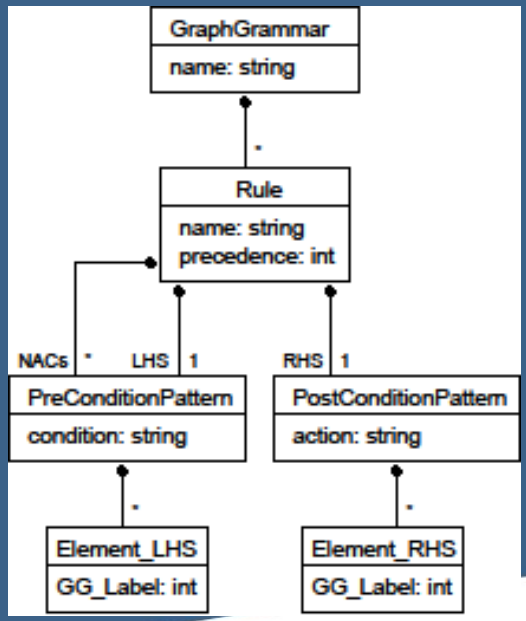
- Generators
  - Generate code from models created in MetaEdit+
  - Example: GOPRR
- SOAP API
  - Modify and query models from outside MetaEdit+

Creating the Rule Editor

- Rule



- Graph Grammar Metamodel[3]



3. Kühne, T., Mezei, G., Syriani, E., Vangheluwe, H., Wimmer, M., 2010. Explicit transformation modeling. In: Ghosh, S. (Ed.), Models in Software Engineering. Vol. 6002 of Lecture Notes in Computer Science. Springer Berlin / Heidelberg, pp. 240-255

Creating the Rule Editor

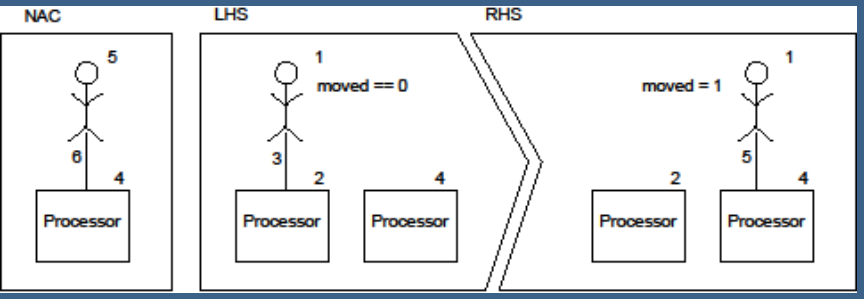
- Use decomposition facility in MetaEdit+
- Pre- and PostConditionPattern Metamodel
  - Copy and modify original ProductionSystem metamodel
    - RAM: Relaxation, Augmentation, Modification
- Modify original metamodel to ensure fairness

Exporting Rules to Python

- Abstract Syntax Graph (ASG)
  - Provides structure to export MetaEdit+ models to
  - Abstraction layer for the SOAP API
- (Py-)T-Core
  - Graph transformation primitives
  - Compile ASG and rules to T-Core data structures
  - Link between ASG and T-Core graph

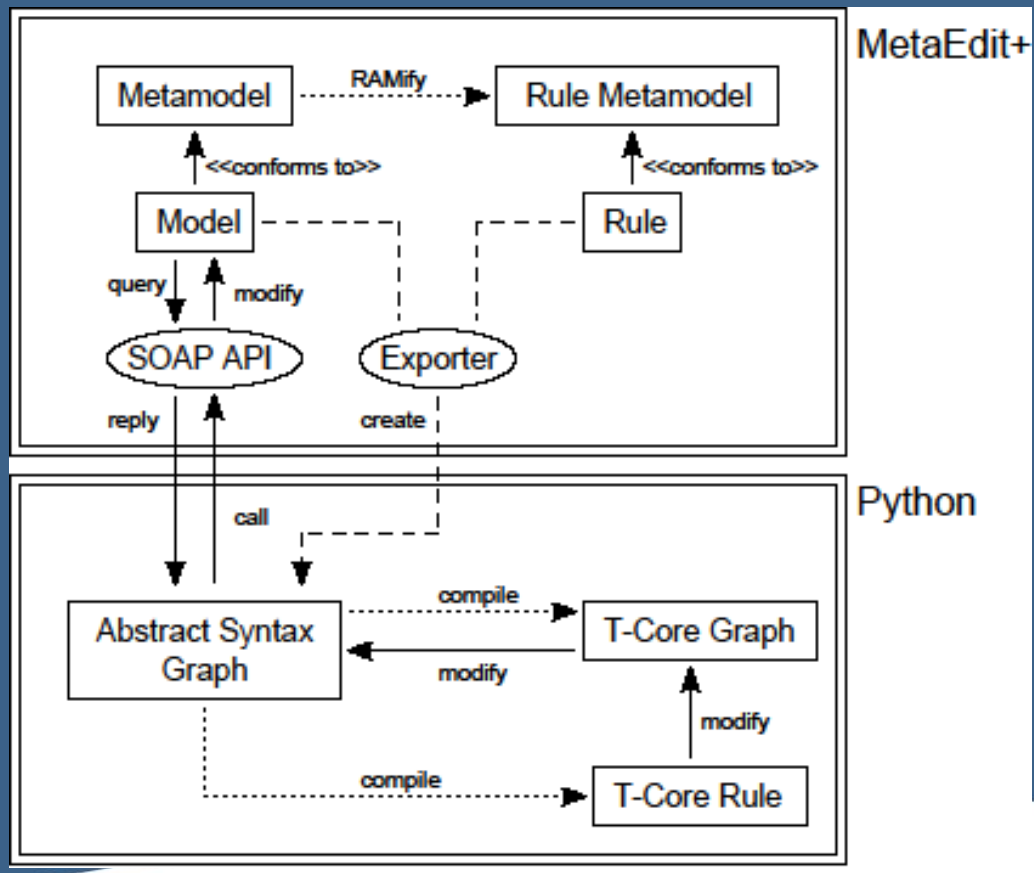
Executing Rules

- Creating the Rule



- Compiling and Executing the Rule

- Modifying the ASG



Demo

DEMO

Future Work

- Denotational Semantics of MetaEdit+ Languages
- Automatic RAMification of Metamodels in MetaEdit+
- Other Environments

Questions

- Are there any questions?