Transformations on Petri Nets in Color

**Problem**

- Model transformation languages are the crucial prerequisite for Model-Driven Engineering (MDE) allowing, in a first phase, the specification of transformations from elements of a source metamodel to elements of a target metamodel and, in a second phase, the automatic execution thereof on the underlying models.
- The specification phase, on the one hand, is often supported by rather low-level language concepts leading to time-consuming and faulty transformation specifications.
- In the execution phase, on the other hand, the operational semantics of model transformations often remains unclear since the execution takes place on a considerable lower level of abstraction than specification leading to non-transparent transformation executions.

**Goals**

- The specification phase should be supported by appropriate abstraction mechanisms and reuse facilities to increase productivity of transformation development and to ensure the quality of the resulting transformations.
- The execution phase should be facilitated by a suitable representation of the runtime characteristics of a transformation together with debugging services to enhance understandability of transformations and to improve their correctness.
- The concepts developed for the execution phase should be applicable to certain selected existing model transformation languages such as OMG’s Query/View/Transformation (QVT) standard to benefit from the debugging services of our approach.

**Approach**

- The specification phase will be supported by a dedicated mapping view offering generic mapping operators organized in an extensible mapping operator library derived from diverse model transformation scenarios.
- The execution phase will be supported by an explicit runtime model based on a variant of Coloured Petri Nets called Transformation Nets, providing an integrated view on all the artefacts involved in a model transformation.
- A dedicated framework called TROPIC will be provided allowing the specification and usage of mapping operators for certain model transformation scenarios as well as the actual execution and debugging of transformations, either in a standalone manner or as a front-end for other model transformation languages.

**Project Facts**

- Start: 03/2009
- End: 02/2012
- Project No.: P21374-N13
- Personnel: 2 PhD students

**Project Partners**

- Vienna University of Technology, Austria
- Johannes Kepler University Linz, Austria

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**Evaluation**

- Case Studies from diverse modeling domains (e.g., structural and behavioral) will be carried out for evaluating the expressivity of the mapping operators provided by the TROPIC library.
- Empirical Studies will be conducted with 200 master students of our MDE courses for evaluating the non-functional characteristics of TROPIC.
- Collaborative Studies with three international project partners, being the inventors of other model transformation languages (Prof. Dr. Jean Bézivin, Prof. Dr. Andy Schürr) as well as of Coloured Petri Nets (Prof. Dr. Kurt Jensen), will be performed in the form of dedicated workshops, thereby evaluating the features of TROPIC.

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