Model-Driven Development and Evolution of Semantic Infrastructures

Problems & Goals

- Problems in Semantic Infrastructure (SI) Development and Evolution:
  - Inadequate Abstraction Mechanisms
  - Change-Agnostic Development Editors
  - Limited Co-Evolution Support

- Goal is to provide an Extensible Framework by:
  - Basing on Model-Driven Semantic Infrastructure Development
  - Enabling a Change-Aware Development Environment
  - Supporting Semi-Automated Co-Evolution

Approach

SI Development Toolkit
- Providing means for modeling SI:
  - Schemas (UML class diagrams)
  - Queries (graph patterns and OCL)
  - Inferences (graph transformations)
  - Integrations (model-to-model transformations)

Change Management Framework
- Extending SI Development toolkit:
  - Change Operation Editor and Optimization Rule Editor are utilized by admin enabling the
    - Change Detector and Change Log Optimizer creating an optimized Change Log for the
    - Incremental Transformation Engine

Co-Evolution Framework
- Enabling semi-automated co-evolution:
  - Adaptation Wizard used by modeler employs
  - Adaptation Recommendations from
  - Adaptation Recommender maintained by Adaptation Rule Editor used by admin for
    co-evolving artifacts with the Triple Adaptation Engine

Evaluation

- Case-Study-Based evaluation of SI Development Toolkit
  - Modeling reference applications of demonstrators

- Experimental evaluation of Incremental Generation
  - Propagating changes from external Model Mutation Framework to SI with Incremental Transformation Engine

- Empirical evaluation of Development & Co-Evolution Support
  - Evaluating DARWIN in “Model Engineering” master course

Partners

- Department of Cooperative Information Systems
  - Johannes Kepler University Linz
  - http://www.cis.jku.at

- Business Informatics Group
  - Vienna University of Technology
  - http://www.big.tuwien.ac.at

Team

- Prof. Dr. Werner Retschberger
- Prof. Dr. Wolfram Schuingler
- Prof. Dr. Elisabeth Kapsammer
- Dr. Johannes Schönbeck
- Dr. Angelika Kael
- Dr. Stefan Mitsch
- Dr. Manuel Wimmer
- Prof. Dr. Martin Wössner
- Jürgen Etzkorn, MSc

Project Facts

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