MOMENT-OCL: Algebraic Specifications of OCL 2.0 within the Eclipse Modeling Framework [1]

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Abstract

Model-Driven Development is a field in Software Engineering that, for several years, has been representing software artifacts as models in order to improve productivity, quality, and economic incomes. Models provide a more abstract description of a software artifact than the final code of the application. Interest in this field has grown in software development companies such as the Model-Driven Architecture (MDA), supported by OMG, and the Software Factories, supported by Microsoft, ensuring a model-driven technology stock for the near future.

Model-Driven Development has evolved to the Model-Driven Engineering field, where not only design and code generation tasks are involved, but also traceability, model management, meta-modeling issues, model interchange and persistence, etc. To fulfill these tasks, model transformations and model queries are relevant tasks that must be solved. In the MDA context, they are dealt from an open-standard point of view. The standard Meta-Object Facilities (MOF) provides a way to define meta-models. The standard proposal Query/Views/Transformations (QVT) indicates how to provide support for both transformations and queries. In QVT, while new languages are provided for model transformation, the Object Constraint Language (OCL) remains as the best choice for queries.

OCL is a textual language that is defined as a standard "add-on" to the UML standard. It is used to define constraints and queries on UML models, allowing the definition of more precise and more useful models. It can also be used to provide support for meta-modeling (MOF-based and Domain Specific Meta-modeling), model transformation, Aspect-Oriented Modeling, support for model testing and simulation, ontology development and validation for the Semantic Web, among others. Despite its many advantages, while there is wide acceptance for UML design in CASE tools, OCL lacks a well-suited technological support.

In this demo, we present the MOMENT-OCL tool, which integrates an algebraic specification of the operational semantics of part of the OCL 2.0 standard into the Eclipse Modeling Framework (EMF). EMF is a modeling environment that is plugged into the Eclipse platform and that provides a sort of implementation of the MOF. EMF enables the automatic importation of software artifacts from heterogeneous data sources: UML models, relational schemas, and XML schemas. In MOMENT-OCL, OCL queries and invariants can be executed over instances of EMF models in Maude. An interesting feature of this algebraic specification of the OCL 2.0 is the use of the parameterization to reuse the OCL specification for any meta-model/model and the simulation of higher-order functions for the sake of the reuse of collection operator definitions.

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