Multilevel Modeling: Toward a new Paradigm of Developing, Using and Maintaining (Enterprise) Software Systems

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It is widely accepted that the construction of information systems calls for the development of conceptual models. However, the prospects of conceptual models are offset by a number of challenges that compromise their beneficial use in practice. In recent years, research has focused on the development of domain-specific modelling languages (DSMLs). Compared to general-purpose modelling languages (GPMLs) such as the UML they promise to increase modelling productivity and improve the quality of models at the same time. However, the design of DSMLs faces substantial challenges. A further stream of research is aimed at model-driven software development – often based on DSMLs. While respective approaches are suited to clearly improve productivity and software quality, they create the notorious problem of synchronizing code and models. The presentation introduces a novel approach that addresses both challenges. It is based on a language architecture that enables an arbitrary number of classification levels. It is implemented with a recursive metamodel. The respective meta-programming language enables a common presentation of models and code. As a consequence, the synchronization problem can be avoided. It not only promises to improve the economics of developing and using models and respective software systems, but also to foster the empowerment of users by providing them with specific languages that correspond directly to the perspective on a domain they are used to. Furthermore multilevel modelling enables the realization of future self-referential enterprise systems which are integrated with enterprise models at runtime and provide advanced navigation capabilities across various levels of abstraction.

Recommended Reading


Clark T.; Sammut P.; Willans J.: Applied Metamodelling: A Foundation for Language Driven Development

Curriculum Vitae

Ulrich Frank (http://www.wi-inf.uni-due.de/FGFrank/) holds the chair of Information Systems and Enterprise Modelling at the Institute of Computer Science and Business Information Systems at the University of Duisburg-Essen. His main research topic is enterprise modelling, i.e. the development and evaluation of modelling languages, methods and corresponding tools. Further areas of research include research methods, method engineering, models at run time and methods for IT management. He is founder of the international student exchange network IS:link. He is on the editorial boards of the journals Information Systems Architectures, Business & Information Systems Engineering, Journal of Information System Modeling and Design, Software and Systems Modeling and Information Systems and E-Business Management.

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