

Realization of Conceptual Modeling Tools for Value Creation: A Case Study on EKD concepts

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Five Line Abstract:

A growing number of individual conceptual modeling methods are designed not only for the use of software generation but also for information value creation. This tutorial focuses on the conceptualization of modeling tools considering the entire spectrum from language artifacts to dedicated functionality. It addresses the realization of full-fledged modeling tools on meta-modeling platforms in different application domains by providing foundations, a case study and a hands-on session.

Full Abstract:

Concept models are commodity in IT-science, hence a growing number of groups around the world design their individual modeling methods, in addition to existing standard ones for a variety of application domains. Models are therefore not only used for schema or software generation but enable information value creation. Hence modeling methods need to provide the necessary concepts and functionality to perform value creation within the application domain. The construction of such applicable modeling methods is complex, especially when considering the entire spectrum from language artifacts to dedicated functionality in terms of platform mechanism. Today, different approaches, guidelines and practices for the development of modeling tools are available and promoted by different communities in research as well as practice. This tutorial concentrates on the conceptualization like the early development- and prototyping phases of a modeling tool and reflects contemporary concepts and challenges for meta modeling platforms. In this way, the aim of the tutorial is to bring together researchers and practitioners mainly from two areas: (1) In realizing full-fledged modeling tools in different application domains and (2) In dealing with method engineering on meta-modeling platforms.

1. Detail outline and timetable:

1.1 Conceptual Modeling Tools based on Meta Models

Foundational part of the tutorial introduces the conceptualisation of modelling methods based on meta models to realise modelling tools [1]. In order to demonstrate that models can not exclusively be used for software generation but can also create information value, use cases are reflected coming from (a) the Open Models Initiative [1] like the projects Japanese Creative Services concerned with modelling cultural aspects, Secure Tropos modelling software security, or i* modelling non-functional software goals; (b) selected EU-projects research results like ComVantage [3] concerned with Virtual Enterprises for mobile machine maintenance, Akogrimo [4] modelling eHealth applications in mobile Grids or plugIT [5] extracting knowledge for business and IT alignment; as well as (c) referring to last year's tutorial on information value and the relationship with concept models [6]. Hence this tutorial elaborates on foundational paradigms and concepts such as the Generic Modeling Method Specification Framework [7], enabling to use models not only for code or schema generation like MDA approaches but also enables an externalization of knowledge for a variety of application domains. In this sense models are seen as conceptually structured knowledge that creates value via human or computational interpretation.

1.2. Conceptual Modeling Languages and Mechanisms

Conceptual part considers domain orientation that allows modelers to express models in a terminology that belongs to the specific application domain which they address. To gain true benefits of domain-specific modeling and in particular of developed models as part of such efforts, dedicated tool support is required, which means that full-fledged modeling tool cover domains like visualization, query, transformation and simulation; provide management features like repository management, versioning, security and user management as well as finally enable domain specific configuration. The full conceptualisation of a modelling method in a format that can be used to realise modelling tools is very complex and requires high effort.

A show case of the Enterprise Knowledge Development (EKD) method [8] is introduced showing the full modeling method life cycle from conceptualization, implementation to deployment to finally result in a public downloadable modelling tool [1]. Lessons learned on the conceptualisation of the modelling approach will be addressed.

1.3. Implementation Approaches for Conceptual Modeling Tools

Individualization as an alternative to standardization raises requirements for a development platform that enables the realization of full-fledged modeling tools. Such

requirements are elaborated in the practical hands-on part of the tutorial applying (a) the meta modeling approach for the realization of domain specific modeling languages and (b) the script approach for functionalities such as mechanisms and algorithms. Challenges for modeling tool development are identified on the Generic Modeling Method Specification Framework and argue for appropriate IT support for each development phase. The hands on session introduce the open platform ADOxx [9], by elaborating how aforementioned theoretical concepts have been realized in a platform that is successfully used in model-driven business applications and in applied research.

1.4. Evaluation, Summary and Outlook

Last part of the tutorial evaluates the introduced approaches by an interactive question and answer session, summaries the key concepts for the realization of modeling tools and provides an outlook how each tutorial participant can join appropriate development communities to be supported in its work on conceptual modeling tools.

2. Scope and novelty of the tutorial:

The tutorial focuses on the realisation of domain-specific conceptual modelling tools. Domain-specific modelling method development includes conceptualisation, implementation and deployment and distinguishes between (a) modelling language – including syntax, semantic and notation, (b) modelling methods and (c) functionality in form of mechanisms and algorithms that are not only used for software or schema generation but enable the use of conceptual modelling for value creation.

Focus is the specification and realisation of domain-specific modelling tools using concept models for information value creation.

3. Expected Audience and Their Background:

The tutorial is targeted at researchers and practitioners in the field of conceptual modelling, domain-specific or application specific modelling language, method or tool development with a background in computer science and/or business informatics.

4. Level and Length of the Tutorial:

This tutorial is designed for 4 hours, and the level is intermediate as knowledge about conceptual knowledge is required.

5. Material Provided

The attendees get access to:

- tutorial material in form of slides and relevant papers,
- a public downloadable meta-modelling platform ADOxx to develop their own modelling tool,
- sample solutions and modelling tools as well as further training material to support the individual realisation of conceptual modelling tools as well as
- entry points to communities for conceptual modelling and their realisation on meta modelling platforms.

6. Short Bio of Presenters

Hans-Georg Fill holds a master degree in international business administration and a PhD in business informatics both from the University of Vienna, Austria. In 2013 he was awarded the *venia docendi* (habilitation) in business informatics from the University of Vienna. He is currently working as an assistant professor in the Research Group Knowledge Engineering at the University of Vienna. In 2010 he was awarded an Erwin-Schrodinger fellowship for conducting a one year research project at Stanford University in the area of semantic based modeling for information systems. He regularly teaches courses in business informatics on the bachelor and master level at the University of Vienna and at the Ecole Nationale Supérieure des Mines St. Etienne, France. His research interests include meta-modelling for enterprise information systems, business process management, visualization and semantic information systems.

Pericles Loucopoulos is professor of Information Systems and joined the Business School at Loughborough University at the end of 2006 in the Management Science and Information Systems (MSIS) research group following 23 years at University of Manchester where he held the Chair of Information Systems Engineering. He began his professional career in industry working in the City, one of the world's major financial centres and developing some of the earliest on-line real-time UMIST brokering IT systems.

Robert Woitsch is responsible for the Innovation Group at BOC with focus on modelling and knowledge management. He holds a PhD in business informatics and is involved in commercial and European research projects dealing with conceptual modelling as a cross-domain issue. Recently BOC started the *adoxx.org* open platform, under the guidance of the innovation group.

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