First International Workshop on Global Integrated Model Management

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WORKSHOP SUMMARY

Categories and Subject Descriptors

D.2.0 [**Software engineering**]: Generic –, *methodologies.*

General Terms

Design, Experimentation, Standardization, Languages, Theory.

Keywords

Model-Driven Engineering, MDA, DSL Engineering, Megamodeling, Modeling-in-the-Large.

1. INTRODUCTION

The aim of the First International Workshop on Global Integrated Model Management is to bring together researchers working on outstanding model driven engineering issues, with a view to discussing them, comparing their approaches, techniques or ideas, and letting these researchers take advantage of different perspectives on these issues. More particularly we are now see the second-generation modeling environments coming up, where the focus is no more on one unique general purpose modeling language (like UML 2.1 for example), but on a large family of more or less related domain specific languages (DSLs) corresponding to different corporations, different needs, different levels of abstraction, etc. First generation tools were mainly based on one unique metamodel (e.g. UML) while most recent tools are metamodel agnostic and able to deal with various kinds of metamodels or DSLs. The advantages of using a set of DSLs instead of one unique General Purpose Language (GPL) are easy to understand, but we also need to cope with the corresponding drawbacks. The resulting fragmentation may be addressed by the existence of a unique metametamodel (like OMG's MOF) to which all DSLs may conform. They are however various proposal for this

"unique" metametamodel (e.g. EMF ECORE, Microsoft DSL/Tools, etc.). Another solution is to use precisely defined and semantically sound model transformation and composition operators between the various DSLs. However these solutions alone are not sufficient to handle the complex situation arising from the use of a high number of artifacts of different types like models, metamodels, model transformations, model weaving, etc. This is true when various technical spaces [1] as well as different domains are taken into account. The notion of metamodel takes different incarnations in each technical space (e.g. grammars in Grammarware, ontologies in Ontologyware, schemas in XMLware, etc.). The fragmentation problem remain however the same. Therefore we need to devise general and solid solutions to global integrated model management in situations where the various artifacts are distributed as general resources available in a web based distributed system. As a consequence global model management is bringing a set of new research challenges that we have to address on the short to medium term. To solve these open problems, it will be interesting to apply the same kind of methods that have originated them, i.e. model engineering solutions and consequently we need to invent these new "integrated" methods to global model management. These new engineering techniques need to be based on a solid modeling theory, dealing wth composition, refinement, abstraction and other useful semantic based development relationships between models.

2. MODEL DRIVEN ENGINEERING

More than five years ago, the OMG has proposed the MDA™ approach to deal with the separation of platform dependent and independent aspects in information systems [5]. Today the situation has much evolved and Model Driven Engineering (MDE) is being increasingly promoted to handle separation and combination of various kinds of concerns in software engineering. MDE is more general than the set of standards and practices recommended by the OMG's MDA standards. The main idea is to consider models as first class entities, corresponding to various artifacts and operations used or created in the software development and maintenance phases like processes or transformations. Applying MDE to the design, running, administration, and maintenance of complex computer systems means that we need to cope with an important number of well defined and precisely focused independent metamodels, each one corresponding to a given DSL (Domain Specific Language). The

resulting fragmentation problem may be considered as an important research issue for second-generation MDE platforms. As a consequence of this evolution, we have to solve the new problem of coordinating all these various DSLs and managing the interplay of the various kinds of models. This new model coordination problem may take a number of forms that need to be investigated.

This comes as no surprise because the present situation in modeling languages and environments parallels the past evolution in programming languages and environments. Following de Remer and Kron [3] we can target "Modeling-in-the-Small versus Modeling-in-the-Large" [2]. Following Wiederhold, Wegner and Ceri [7] we can target "Megamodeling" [4]. In any case we need to address global coordination between MDE resources (models, metamodels, transformations, correspondences, etc.) located anywhere, for example on Web repositories. We want to apply integrated MDE techniques to help solving this problem. We call global integrated model management the corresponding research field. Global integrated model management intends to apply MDE solutions to face geographical dispersion and logical fragmentation of various MDE artifacts.

Recent undertakings in the MDE community recognize that dramatic increases in complexity of systems need new solutions. Second generation MDE environments may help answering these problems if they are able to scale up in the presence of a rapidly growing number of modeling artifacts representing different concern facets, different stakeholder views, different development states of composite complex systems while offering a regular management interface to them.

3. THEMES AND GOALS

The goal of this workshop is to bring together researchers and practitioners with interest and experience in the development of techniques for global integrated model management, and to explore the potential for integration and interoperability in model engineering research. Specific areas of interest include:

- Taxonomy of MDE resources (models, metamodels, transformations, metadata, etc.)
- Taxonomy and precise definitions of global model relationships (conformance, correspondences, matching, composition, etc.)
- MDE repositories and issues related to establishing, maintaining and using various relationships between MDE resources
- Coordination and synchronization between different MDE resources
- Higher-level abstractions and tool support for model coordination
- Comparing semantic frameworks for model coordination
- Scalability and extensibility of compositional model abstractions
- Model composition or weaving techniques
- Model annotation or decoration techniques
- Automatic checking of composite model consistency
- Reasoning about correctness of model compositions
- Prediction of properties of compositions from properties of the involved components
- Expression and verification of global constraints
- Formal semantics and type systems for model composition
- Domain-specific versus general composition languages

- Using existing components in model-centric approaches
- MDE support for the specification of architectural assets
- Automatic or semi-automatic model extraction from legacy software
- MDE network-centric development. Distributed model repositories.
- Similar operations on DB schemas, XML or RDF schemas, Ontologies, etc.
- Co-evolution of domain-specific modeling languages and of models using these languages
- Consistency and management of MDE viewpoints

4. FORMAT AND EXPECTED OUTCOME

A very competent and representative program committee has selected several papers that can serve as the basis for fruitful discussions. These papers were chosen so that a broad range of stakeholders from across the whole domain is represented in the workshop. There will be an introductive talk and a wrap-up session at the end of the day to set goals for further research in the area of global model management. Presentations will be short with strict time limits to ensure ample discussion periods.

The results obtained by discussion will be summarized and published electronically on the workshop web site (http://www.planetmde.org/gamma2006/). The aim is to highlight outstanding issues that should form a start of the forthcoming research agenda.

In addition to defining a manifesto for global integrated model management, this workshop will also try to identify sources of experimental data that may be used in applied research in the field, like grammars, XML schemas, ontologies or metamodel public repositories similar to the KM3 metamodel repository available from [6].

5. ACKNOWLEDGEMENTS

6. REFERENCES

[1] Aksit, M. Kurtev, I., Bézivin, J. Technological Spaces: an Initial Appraisal. (DOA, ODBASE, CoopIS), Industrial Track, Los Angeles, 2002.

[2] Bézivin, J., Jouault, F., Rosenthal, P., Valduriez, P. Modeling in the Large and Modeling in the Small. MDAFA'2004, Springer-Verlag LNCS 3599, pages 33-46.

[3] DeRemer, F., Kron, H. Programming-in-the-Large Versus Programming-in-the-Small, IEEE Trans. on Soft. Eng. 2(2), (1976)

[4] Favre, J.M., Towards a Basic Theory to Model Driven Engineering, WiSME 2004, Lisbon 2004, http://www.metamodel.com/wisme-2004/papers.html

[5] Soley, R., and the OMG staff. The Model Driven Architecture Whitepaper, OMG document,.

[6] The ATL Group, The Atlantic metamodel zoo in KM3, http://www.eclipse.org/gmt/am3/zoos/atlanticZoo/

[7] Wiederhold, G., Wegner, P., Ceri, S. Toward Megaprogramming CACM, Volume 35, Issue 11, Pages 89–99, November 1992