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Conceptual Modeling for Novel Application Domains

ER 2003 Workshops ECOMO, IWCMQ, AOIS, and XSDM
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Preface

ER 2003, the 22nd International Conference on Conceptual Modeling in Chicago, Illinois, hosted four workshops on emerging and maturing aspects of conceptual modeling. While the entity-relationship approach is used to address data (base) modeling, the increasingly connected information infrastructure demands answers that can handle complexity and can develop models about systems that are maintainable. We received seven excellent proposals for workshops to be held at ER 2003, out of which we selected the following four based on peer reviews:

- Conceptual Modeling Approaches for E-Business (eCOMO 2003) brought together researchers and practitioners interested in conceptual modeling techniques for e-business.
- The International Workshop on Conceptual Modeling Quality (IWCMQ 2003) concentrated on approaches to quality assurance in the modeling process.
- The International Bi-Conference Workshop on Agent-Oriented Information Systems (AOIS 2003) was devoted to investigating the agent paradigm for information systems development.
- Finally, the International Workshop on XML Schema and Data Management (XSDM 2003) addressed the impact of XML on topics like data integration, change management, and the Semantic Web.

All four workshops highlighted relatively new viewpoints on conceptual modeling. Conceptual modeling as such has been greatly influenced and shaped by the entity-relationship model of Peter Chen. However, new developments like object-orientation and the World-Wide Web require adaptations and new techniques. No longer can developers assume that they can completely understand or model the information system. The new developments create challenges in various directions; some of these were discussed in detail in the four ER 2003 workshops:

E-Business and E-Commerce. The rise of the Internet has created new opportunities for defining and enacting business relations between partners. The question is how information systems can help in finding business partners, creating new services, and enacting those new services. Any lack of information about some business partners or their products and services needs to be compensated for using some kind of trust-building institution or mechanism. Moreover, services for e-business are not necessarily linked tightly together, as used to be the case for information systems developed for single enterprises. Can a service be modeled independently from the provider of the service who is selected at run time? Last but not least, one has to take into account different business (process) models, business contracts, and their monitoring. Hence, the field of e-business stresses the need for comprehensive modeling and analysis techniques.

Model Quality. Conceptual models are products of modeling processes undertaken by a group of human experts. Industrial quality management has shifted

from quality tests at the end of the production process to quality assurance over all product development steps, including the early stages of requirements analysis. The same idea is being applied to improving or at least assessing the quality of conceptual models and the related modeling processes that create them. The more that such models are abstracted from the final implementation, the more difficult it appears to be to assess and control their quality. What constitutes an error in a model? Can we distinguish useful parts of a conceptual model from not so useful parts? Certainly, a team of modelers who are aware of the quality of their products has better opportunities to improve than a team of modelers who are not assessing quality aspects at all. Still, the questions are: what aspects to measure, with which methods, and how frequently?

Agent Orientation. Object-orientation is a programming and modeling paradigm that aims at encapsulation (hiding internal details) and re-use (of code and models). While this paradigm is still successful and valid, the lack of information about some components of an information system makes it less applicable to loosely coupled system, like Web services or complex factories that are under constant evolution. Agent orientation provides a promising approach to deal with the increased complexity by including a flavor of autonomy into the components of an agent-oriented system: the co-operating agents have goals and they govern over multiple possible strategies to achieve their goals. The challenge from a conceptual modeling perspective is to represent agent systems in a way that makes them subject to analysis. Suitable languages from agent communication, goal representation, etc., are still under development.

XML Data and Schema. The last, but not least, topic covered by the ER 2003 workshops is XML. XML was, after the revolutionary rise of the Internet, in particular the World-Wide Web, an attempt to bring some order into the Web by tagging data elements with labels that indicate their interpretation (or schema). In a way, it is the global representation of interoperable data and perhaps processes. But does XML solve the problems of data/schema integration or does it just shift the problem to a new (yet uniform) syntax? XML databases are already on the market, including XML-based query languages. So, what parts of the traditional data modeling theory can be translated for the XML case?

The ER 2003 workshops addressed these issues and created a forum for fruitful discussions. The fact that three of the four workshops have already a long history shows that such discussions are long-term, and convincing answers will only appear after some time.

We thank our colleagues in the ER 2003 organization committee for their support. In particular, we thank the organizing chairs of the four workshops who came up with the ideas and imagination that made the workshop program at ER 2003 possible. Last but not least, our special thanks go to the paper authors and the reviewers who created the content of this volume and ensured its high quality.

October 2003

Manfred Jeusfeld
Óscar Pastor

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