

John F. Roddick V. Richard Benjamins  
Samira Si-Saïd Cherfi Roger Chiang  
Christophe Claramunt Ramez Elmasri  
Fabio Grandi Hyoil Han Martin Hepp  
Miltiadis Lytras Vojislav B. Mišić  
Geert Poels Il-Yeol Song Juan Trujillo  
Christelle Vangenot (Eds.)

# Advances in Conceptual Modeling – Theory and Practice

ER 2006 Workshops BP-UML, CoMoGIS  
COSS, ECDM, OIS, QoIS, SemWAT  
Tucson, AZ, USA, November 6-9, 2006  
Proceedings

# Table of Contents

## ER 2006 Tutorials

|                                                                           |   |
|---------------------------------------------------------------------------|---|
| Conceptual Modeling for Emerging Web Application Technologies . . . . .   | 1 |
| <i>Dirk Draheim, Gerald Weber</i>                                         |   |
| State-of-the-Art in Modeling and Deployment of Electronic Contracts . . . | 3 |
| <i>Kamalakar Karlapalem, P. Radha Krishna</i>                             |   |

## ER 2006 Workshops

### BP-UML 2006 - 2nd International Workshop on Best Practices of UML

|                                    |   |
|------------------------------------|---|
| Preface to BP-UML 2006 . . . . .   | 5 |
| <i>Juan Trujillo, Il-Yeol Song</i> |   |

## Adopting UML 2.0

|                                                                                                                             |   |
|-----------------------------------------------------------------------------------------------------------------------------|---|
| Extending the UML 2 Activity Diagram with Business Process Goals and Performance Measures and the Mapping to BPEL . . . . . | 7 |
| <i>Birgit Korherr, Beate List</i>                                                                                           |   |

|                                                                                           |    |
|-------------------------------------------------------------------------------------------|----|
| UN/CEFACT'S Modeling Methodology (UMM): A UML Profile for B2B e-Commerce . . . . .        | 19 |
| <i>Birgit Hofreiter, Christian Huemer, Philipp Liegl, Rainer Schuster, Marco Zapletal</i> |    |

|                                                                                                             |    |
|-------------------------------------------------------------------------------------------------------------|----|
| Capturing Security Requirements in Business Processes Through a UML 2.0 Activity Diagrams Profile . . . . . | 32 |
| <i>Alfonso Rodríguez, Eduardo Fernández-Medina, Mario Piattini</i>                                          |    |

## Modeling and Transformations

|                                                                                                           |    |
|-----------------------------------------------------------------------------------------------------------|----|
| Finite State History Modeling and Its Precise UML-Based Semantics . . .                                   | 43 |
| <i>Dirk Draheim, Gerald Weber, Christof Lutteroth</i>                                                     |    |
| A UML Profile for Modeling Schema Mappings . . . . .                                                      | 53 |
| <i>Stefan Kurz, Michael Guppenberger, Burkhard Freitag</i>                                                |    |
| Model to Text Transformation in Practice: Generating Code from Rich Associations Specifications . . . . . | 63 |
| <i>Manoli Albert, Javier Muñoz, Vicente Pelechano, Óscar Pastor</i>                                       |    |

# CoMoGIS 2006 - 3rd International Workshop on Conceptual Modeling for Geographic Information Systems

|                                                  |    |
|--------------------------------------------------|----|
| Preface for CoMoGIS 2006 .....                   | 73 |
| <i>Christelle Vangenot, Christophe Claramunt</i> |    |

## Keynote

|                                                                |    |
|----------------------------------------------------------------|----|
| Large-Scale Earth Science Services: A Case for Databases ..... | 75 |
| <i>Peter Baumann</i>                                           |    |

## Spatial and Spatio-temporal Data Representation

|                                                                    |    |
|--------------------------------------------------------------------|----|
| Time-Aggregated Graphs for Modeling Spatio-temporal Networks ..... | 85 |
| <i>Betsy George, Shashi Shekhar</i>                                |    |

|                                                                                                                                   |     |
|-----------------------------------------------------------------------------------------------------------------------------------|-----|
| An ISO TC 211 Conformant Approach to Model Spatial Integrity Constraints in the Conceptual Design of Geographical Databases ..... | 100 |
| <i>Alberto Belussi, Mauro Negri, Giuseppe Pelagatti</i>                                                                           |     |

|                                                        |     |
|--------------------------------------------------------|-----|
| Access Control in Geographic Databases .....           | 110 |
| <i>Liliana Kasumi Sasaoka, Claudia Bauzer Medeiros</i> |     |

## Optimizing Representation and Access to Spatial Data

|                                                                                        |     |
|----------------------------------------------------------------------------------------|-----|
| VTPR-Tree: An Efficient Indexing Method for Moving Objects with Frequent Updates ..... | 120 |
| <i>Wei Liao, Guifen Tang, Ning Jing, Zhinong Zhong</i>                                 |     |

|                                                                                              |     |
|----------------------------------------------------------------------------------------------|-----|
| New Query Processing Algorithms for Range and k-NN Search in Spatial Network Databases ..... | 130 |
| <i>Jae-Woo Chang, Yong-Ki Kim, Sang-Mi Kim, Young-Chang Kim</i>                              |     |

|                                                  |     |
|--------------------------------------------------|-----|
| A ONCE-Updating Approach on Moving Objects ..... | 140 |
| <i>Hoang Do Thanh Tung, Keun Ho Ryu</i>          |     |

## Spatio-temporal Data on the Web

|                                                                                                                                      |     |
|--------------------------------------------------------------------------------------------------------------------------------------|-----|
| A Progressive Transmission Scheme for Vector Maps in Low-Bandwidth Environments Based on Device Rendering .....                      | 150 |
| <i>David Cavassana Costa, Anselmo Cardoso de Paiva, Mario Meireles Teixeira, Cláudio de Souza Baptista, Elvis Rodrigues da Silva</i> |     |

|                                                                                  |     |
|----------------------------------------------------------------------------------|-----|
| Map2Share – A System Exploiting Metadata to Share Geographical Information ..... | 160 |
| <i>Luca Paolino, Monica Sebillo, Genny Tortora, Giuliana Vitiello</i>            |     |

## **CoSS 2006 - International Workshop on Conceptual Modeling of Service-Oriented Software Systems**

|                                                                                                                 |     |
|-----------------------------------------------------------------------------------------------------------------|-----|
| Preface for CoSS 2006 .....                                                                                     | 171 |
| <i>Roger Chiang, Vojislav B. Mišić</i>                                                                          |     |
| Building Semantic Web Services Based on a Model Driven Web Engineering Method .....                             | 173 |
| <i>Victoria Torres, Vicente Pelechano, Óscar Pastor</i>                                                         |     |
| Choreographies as Federations of Choreographies and Orchestrations ....                                         | 183 |
| <i>Johann Eder, Marek Lehmann, Amirreza Tahamtan</i>                                                            |     |
| Designing Web Services for Supporting User Tasks: A Model Driven Approach .....                                 | 193 |
| <i>Marta Ruiz, Vicente Pelechano, Óscar Pastor</i>                                                              |     |
| Designing Service-Based Applications: Teaching the Old Dogs New Tricks ... or Is It the Other Way Around? ..... | 203 |
| <i>Vojislav B. Mišić</i>                                                                                        |     |

## **ECDM 2006 - 4th International Workshop on Evolution and Change in Data Management**

|                             |     |
|-----------------------------|-----|
| Preface for ECDM 2006 ..... | 207 |
| <i>Fabio Grandi</i>         |     |

### **Keynote**

|                                                                                                     |     |
|-----------------------------------------------------------------------------------------------------|-----|
| Reduce, Reuse, Recycle : Practical Approaches to Schema Integration, Evolution and Versioning ..... | 209 |
| <i>John F. Roddick, Denise de Vries</i>                                                             |     |

### **Accepted Papers**

|                                                                                   |     |
|-----------------------------------------------------------------------------------|-----|
| A DAG Comparison Algorithm and Its Application to Temporal Data Warehousing ..... | 217 |
| <i>Johann Eder, Karl Wiggisser</i>                                                |     |
| Handling Changes of Database Schemas and Corresponding Ontologies .....           | 227 |
| <i>Andreas Kupfer, Silke Eckstein, Karl Neumann, Brigitte Mathiak</i>             |     |

Evolving the Implementation of ISA Relationships in EER Schemas ..... 237  
*Eladio Domínguez, Jorge Lloret, Ángel L. Rubio, María A. Zapata*

Schema Change Operations for Versioning Complex Objects Hierarchy  
in OODBs ..... 247  
*Sang-Won Lee*

Representing Versions in XML Documents Using Versionstamp ..... 257  
*Luis Jesús Arévalo Rosado, Antonio Polo Márquez,  
Juan María Fernández González*

**OIS 2006 - 1st International Workshop on  
Ontologizing Industrial Standards**

Preface for OIS 2006 ..... 269  
*Martin Hepp, Miltiadis Lytras, V. Richard Benjamins*

**Accepted Papers**

XBRL Taxonomies and OWL Ontologies for Investment Funds ..... 271  
*Rubén Lara, Iván Cantador, Pablo Castells*

A Semantic Transformation Approach for ISO 15926 ..... 281  
*Sari Hakkarainen, Lillian Hella, Darius Strassunskas, Stine Tuxen*

Modeling Considerations for Product Ontology ..... 291  
*Hyunja Lee, Junho Shim, Suekyung Lee, Sang-goo Lee*

Ontologizing EDI Semantics ..... 301  
*Doug Forvog, Christoph Bussler*

WSDL RDF Mapping:Developing Ontologies from Standardized XML  
Languages ..... 312  
*Jacek Kopecký*

**QoIS 2006 - 2nd International Workshop on Quality  
of Information Systems**

Preface for QoIS 2006 ..... 323  
*Samira Si-Saïd Cherfi, Geert Poels*

**Introduction to QoIS06**

Information Quality, System Quality and Information System  
Effectiveness: Introduction to QoIS'06 ..... 325  
*Geert Poels, Samira Si-Saïd Cherfi*

## Information System Quality

|                                                                                               |     |
|-----------------------------------------------------------------------------------------------|-----|
| Quality-Driven Automatic Transformation of Object-Oriented<br>Navigational Models.....        | 329 |
| <i>Cristina Cachero, Marcela Genero, Coral Calero,<br/>Santiago Meliá</i>                     |     |
| HIQM: A Methodology for Information Quality Monitoring,<br>Measurement, and Improvement ..... | 339 |
| <i>Cinzia Cappiello, Paolo Ficiaro, Barbara Pernici</i>                                       |     |
| Evaluating the Productivity and Reproducibility of a Measurement<br>Procedure.....            | 352 |
| <i>Nelly Condori-Fernández, Óscar Pastor</i>                                                  |     |

## Data Quality

|                                                                                                     |     |
|-----------------------------------------------------------------------------------------------------|-----|
| Quality of Material Master Data and Its Effect on the Usefulness<br>of Distributed ERP Systems..... | 362 |
| <i>Gerhard F. Knolmayer, Michael Röthlin</i>                                                        |     |
| Towards Automatic Evaluation of Learning Object Metadata<br>Quality .....                           | 372 |
| <i>Xavier Ochoa, Erik Duval</i>                                                                     |     |
| Expressing and Processing Timeliness Quality Aware Queries: The<br>DQ2L Approach .....              | 382 |
| <i>Chao Dong, Sandra de F. Mendes Sampaio,<br/>Pedro R. Falcone Sampaio</i>                         |     |

## SemWAT 2006 - 1st International Workshop on Semantic Web Applications: Theory and Practice

|                                 |     |
|---------------------------------|-----|
| Preface for SemWAT 2006 .....   | 393 |
| <i>Hyoil Han, Ramez Elmasri</i> |     |

## Semantic Web Applications (I)

|                                                                                                    |     |
|----------------------------------------------------------------------------------------------------|-----|
| Combining Declarative and Procedural Knowledge to Automate<br>and Represent Ontology Mapping ..... | 395 |
| <i>Li Xu, David W. Embley, Yihong Ding</i>                                                         |     |
| Visual Ontology Alignment for Semantic Web Applications.....                                       | 405 |
| <i>Jennifer Sampson, Monika Lanzemberger</i>                                                       |     |

Automatic Creation of Web Services from Extraction Ontologies ..... 415  
    *Cui Tao, Yihong Ding, Deryle Lonsdale*

**Semantic Web Applications (II)**

An Architecture for Emergent Semantics ..... 425  
    *Sven Herschel, Ralf Heese, Jens Bleiholder*

Semantic Web Techniques for Personalization of eGovernment Services... 435  
    *Fabio Grandi, Federica Mandreoli, Riccardo Martoglia,*  
    *Enrico Ronchetti, Maria Rita Scalas, Paolo Tiberio*

Query Graph Model for SPARQL ..... 445  
    *Ralf Heese*

**Author Index** ..... 455