

# Preface

As information modeling takes a more prominent role in organizations and the implications become more widespread, researchers, practitioners and academicians alike will need to have access to the most up-to-date research and practice in information modeling techniques and applications. The chapters in this book address the timely topics of unified modeling language, enterprise resource planning and ontological design and other relevant applications and technologies related to modern information modeling techniques. The authors represent a wide variety of perspectives and provide insights from many different cultures and organizational and industry backgrounds.

Chapter 1 entitled, “Evaluating an ISD Methodology for Software Packages” by Kees van Slooten and Marcel Bruins of the University of Twente (Netherlands) compares the Software Package Development Methodology (SPDM) to a method engineering framework, which is a discipline used to construct new methods from parts of existing methods by considering situational factors. The chapter also reports the results of a questionnaire which asked users of SPDM their opinions on the problems and quality of SPDM

Chapter 2 entitled, “Modelling Molecular Biological Information: Ontologies and Ontological Design Patterns” by Jacqueline Renee Reich of the University of Manchester (United Kingdom) describes the use of ontologies and ontological design patterns to model molecular biological information. The chapter describes the useful features of ODPs and provides a concrete example of one, namely the Terminological Hierarchy ODP which is related to the informal ontology of immunology.

Chapter 3 entitled, “Concept Acquisition Modeling for E-commerce Ontology” by Maria Lee of CSIRO Mathematical and Information Science (Australia), Kwang Mong Sim of Hong Kong Polytechnic University and Paul Kwok of The Open University of Hong Kong presents a concept acquisition modeling approach to facilitate the acquisition, classification and representation of e-commerce concepts. The authors propose a systematic way to make comparisons between concepts based upon an understanding of their semantics.

Chapter 4 entitled, “An Object-Oriented Approach to Conceptual Hypermedia Modeling” by Wilfried Lemahieu of Katholieke Universiteit Leuven (Belgium) introduces the Maintainable, End user Friendly, Structured Hypermedia (MESH) approach to hypermedia modeling and navigation. This approach avoids the typical

problems of poor maintainability and user disorientation. The chapter focuses on the data model, which combines established entity-relationship and object-oriented abstractions with proprietary concepts into a formal hypermedia model. Additionally, the chapter briefly discusses the data model's support for a context-based navigation paradigm and a platform-independent implementation framework.

Chapter 5 entitled, "Conceptual Modeling of Large Web Sites" by Bernhard Strauch and Robert Winter of the University of St. Gallen (Switzerland) proposes a Meta model comprising several classes of information objects, various types of associations, design rules and quality checks. The model is applied to an existing Web site. The authors analyze commercial Web site development tools with regard to the extent to which they support conceptual Web site modeling.

Chapter 6 entitled, "A Method to Ease Schema Evolution" by Lex Wedemeijer of ABP (Netherlands) proposes a method to address the problem of Conceptual Schema evolution in an early phase and introduces the notion of Majorant Schema to support the application of the method. The authors discuss the advantages of the approach, namely a more graceful schema evolution is ensured because a broader range of design alternatives is investigated. The chapter concludes that this method is primarily suited to minor changes.

Chapter 7 entitled, "A Three Layered Approach for General Image Retrieval" by Richard Chbeir, Youssef Amghar and André Flory of LISI – INSA (France) addresses the problem of having no global approach to resolve retrieving images in complex domains (such as medical ones) when the content is multifaceted. The chapter presents a framework to retrieve medical images through a three-dimensional approach. The authors further present the required elements for both the knowledge base and the retrieval process. The proposed approach offers all possibilities to describe an image within a multifaceted content (context, physical and semantic).

Chapter 8 entitled, "Is There A Life After Objects?" by Jean Bezivin of the University of Nantes (France) discusses aspects of the emerging field, model engineering. The chapter looks specifically at meta-modeling and uniform representation of meta-models. Through a discussion of the history of classes and objects from the early eighties to the current languages like CORBA and associated IDL language, the chapter outlines the history of modeling and looks at the need for an evolving framework to deal with the increasing complexity of models.

Chapter 9 entitled, "A Systemic Approach to Define Agents" by Andy Y. Cheung and Stephen L. Chan of Hong Kong Baptist University surveys the definitions of software agents and proposes a definition which is based upon the Soft Systems Methodology (SSM) used to understand, define and model agents systematically. The chapter first reviews 12 definitions from current literature and then applies SSM to define agents by structuring the involved problem to cover the central characteristics of agents.

Chapter 10 entitled, "Modeling of Coordinated Planning and Allocation of Resources" by Alexey Bulatov and Atakan Kurt of Faith University (Turkey)

proposes a method for the formal description of enterprises as complex human-technical systems. The method proposed is aimed at the analysis of parallel planning and allocation of resources from different points of view and is valid for every hierarchical level of enterprise subdivision. The method allows for the design of decision-making systems for various tasks of coordinated planning and allocation of resources.

Chapter 11 entitled, “Tacit Knowledge Acquisition and Processing Within the Computing Domain: An Exploratory Study” by Peter Anthony Busch of Macquarie University and C.N.G. Kit Dampney of the University of Newcastle (Australia) discusses the codification of tacit knowledge as a reality. The authors argue that codification is more prevalent today due to the need for organizations to be more accountable. According to the chapter, accountability requires accurate reporting and quantitative interpretations of information which demands codified knowledge not tacit ambiguities.

Chapter 12 entitled, “Modelling Business Rules Using Defeasible Logic” by G. Antoniou and M. Arief of Griffith University (Australia) describes problems with modeling regulations and business rules. The authors then outline what defeasible logic is and explain the advantages of it in solving the problems with modeling regulations and business rules. The chapter concludes with a discussion of current research and future directions.

Chapter 13 entitled, “EE-Cat: Extended Electronic Catalog for Dynamic and Flexible Electronic Commerce” by Jihye Jung, Dongkyu Kim, Sang-goo Lee, Chisu Wu and Kapsoo Kim of Seoul National University (Korea) proposes data and query models for electronic catalogs which offer effective search and management facilities to customize the electronic catalog system. The proposed model separates the management of product information and the visual presentation and extends the range of electronic catalogs from product information to Web documents.

Chapter 14 entitled, “Enforcing Modeling Guidelines in an ORDBMS-based UML Repository” by N. Ritter and H.-P. Steiert of the University of Kaiserslautern (Germany) presents an approach used to enforce guidelines in Unified Modeling Language (UML)-based software development processes. The authors discuss their implementation of a UML repository on top of an object-relational database management system (ORDBMS). The chapter discusses the advantages of using ORDBMS query facilities of rechecking guidelines by automated mapping.

Chapter 15 entitled, “Simulation for Business Engineering of Electronic Markets” by Marijn Janssen and Henk G. Sol of Delft University of Technology (Netherlands) presents and evaluates the concept of an interactive, discrete-event, agent-based simulation approach for the analyses and design of electronic markets. This chapter presents the information needed to derive and evaluate a business engineering approach for electronic markets.

Chapter 16 entitled, “Representing and Reasoning with Scenarios within Information Systems Modeling” by Choong-ho Yi of Karlstad University (Sweden)

addresses the need for a formal approach within information systems modeling (ISM) that is designed not only for representation but is also connected to the phase of reasoning. The authors show how reasoning, though strait in the form of a prediction for a given scenario, can become connected in the proposed framework based on the semantics introduced.

Chapter 17 entitled, “From Object-Oriented Modeling to Agent-Oriented Modeling: An Electronic Commerce Application” by Sooyong Park of Sogang University (Korea) and Vijayan Sugumaran of Oakland University (USA) focuses on the modeling phase of agent-oriented software lifecycle and presents an approach for agent modeling consisting of Agent Elicitation, Intra and Inter Agent modeling methods. The chapter discusses agent characteristics and modeling methods and describes the first two phases of the lifecycle modeling. Finally, the authors apply their approach to a simple agent-based application.

Chapter 18 entitled, “Web-Based Cooperative Information Systems Modeling” by Youcef Baghdadi of the United Arab Emirates University presents an example of modeling for Web-Based Cooperative Information Systems (WBCIS). The model presented considers WBIS as an artifact that must mainly allow information exchange, coordination and cooperation as well as a mechanism which allows data restructuring and reengineering. The author discusses the interactions based upon metadata that describes all the components of WBCIS architecture.

Chapter 19 entitled, “EMC – A Modeling Method for Developing Web-Based Applications” by Peter Rittgen of the University Koblenz-Landau (Germany) suggests a modeling method for the IS layer, the Event-driven method Chain (EMC). The method is based on the Event-driven Process Chain (EPC) by Scheer. The authors adapt this method to fit the Multi-perspective Enterprise Modeling (MEMO) methodology and the object-oriented paradigm thus making it suitable for the development of Web-based applications. The model is then applied to a software trading company.

Chapter 20 entitled, “A UML Representation of U.S. Mutual Fund Servicing as an Iconic Model for Servicing the New EU Equivalent – UCITS” by Patrick Leamy, an Offshore Fund Consultant, George Ballester of Mellon Trust and Thomas Wright, a Data Modeling Consultant, (USA) presents a unified modeling language (UML) representation of United States mutual fund servicing. This model is a practical, iconic model for beginning the design of a service model for the new European Union equivalent known as Undertakings for Collective Investment in Transferable Securities of UCITS.

Chapter 21 entitled, “Relationships Between Relationships: An Empirical Study” by C. Calero and M. Piattini of the Universidad de Castilla-La Mancha and E. Marcos of the Universidad Rey Juan Carlos uses a modeling example and discusses the benefits of this approach as a model to a simple conceptual schemata. The chapter also presents an empirical study used to determine if modeling with relationships between relationships is more difficult than not for novice designers.

Chapter 22 entitled, “Informationbase—A New Information System Layer” by Dragan Kovach of SUPER-KING, Inc. and Kresimir Fertilj of the University of Zagreb (Croatia) describes the concept of an informationbase. The informationbase is a top layer of the information system and uses information systems databases as existing application programs to provide a structured set of reports and graphs making them directly and permanently available to the user. The described informationbase acts as an intelligent and agile information manager.

Chapter 23 entitled, “A Comparison of Stochastic Models for the Interarrival Times of Packets in a Computer Network” by Dennis Guster, Semyon Litvinov, Mary Richardson and David Robinson of St. Cloud University (USA) compares two modeling techniques, the power law process and Markov chains, to the exponential and actual data taken from a ten minute segment. The results reveal that the exponential and power law models are a poor match to the actual data, but the Markov model yielded some promising results.

Chapter 24 entitled, “A Methodology for Adaptive Workflows” by Liu Shuzhou and Angela Goh Eck Soong of Nanyang Technological University (Singapore) proposes a methodology to unify business process modeling and workflow automation. The chapter further identifies the information system and organization perspectives of workflow within each development phase. Finally, the authors provide an analysis of the domain and an object notation in the methodology with the goal of building a stable system.

The chapters of this book provide insightful theoretical discussion as well as practical examples and case studies illustrating the concepts discussed. Researchers, academicians and students will find the information contained herein invaluable as a starting point or supplement to further their research and discussions related to modern information modeling techniques. The theoretical discussions will enrich understanding of the complex concepts discussed and the practical information will improve even the best practices in information systems modeling. This book is a must-have for all those interested in understanding information modeling and better applying and utilizing it within their organization.