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Preface

The purpose of the 11th International Conference on Software Engineering Research, Management and Applications (SERA 2012) held on August 7 – August 9, 2013 in Prague, Czech Republic, was to bring together scientists, engineers, computer users, and students to share their experiences and exchange new ideas and research results about all aspects (theory, applications and tools) of Software Engineering Research, Management and Applications, and to discuss the practical challenges encountered along the way and the solutions adopted to solve them. The conference organizers selected the best 17 papers from those papers accepted for presentation at the conference in order to publish them in this volume. The papers were chosen based on review scores submitted by members of the program committee and underwent further rigorous rounds of review.

In chapter 1, Haeng-Kon Kim proposes the XML security model for mobile commerce services based electronic commerce system to guarantee the secure exchange of trading information. To accomplish the security of XML, the differences of XML signature, XML encryption and XML key management scheme respect to the conventional system should be provided. The new architecture is proposed based on unique characteristics of mobile commerce on XML

In chapter 2, Benjamin Aziz presents a formal model of VOs using the Event-B specification language. Grid computing is a global-computing paradigm focusing on the effective sharing and coordination of heterogeneous services and resources in dynamic, multi-institutional Virtual Organisations (VOs). They have followed a refinement approach to develop goal-oriented VOs by incrementally adding their main elements: goals, organisations and services.

In chapter 3, Omar Badreddin, Andrew Forward, and Timothy C. Lethbridge present modeling characteristics of attributes from first principles and investigate how attributes are handled in several open-source systems. They look at code-generation of attributes by various UML tools and present their

own Umple language along with its code generation patterns for attributes, using Java as the target language.

In chapter 4, Cagla Atagoren and Oumout Chouseinoglou conduct a case study in one of the leading, medium sized software companies of Turkey by utilizing the root cause analysis (RCA) method. The collected defect data has been analyzed with Pareto charts and the root causes for outstanding defect categories have been identified with the use of fishbone diagrams and expert grading, demonstrating that these techniques can be effectively used in RCA. The main root causes of the investigated defect items have been identified as lack of knowledge and extenuation of the undertaken task, and corrective actions have been proposed to upper management.

In chapter 5, Amina Magdich, Yessine Hadj Kacem, and Adel Mahfoudhi propose through their paper an extension of MARTE/GRM sub-profile to consider the modeling of information needed for the half-partitioned and global scheduling step. The recent extension of Unified Modeling Language (UML) profile for Modeling and Analysis of Real-Time Embedded systems (MARTE) is enclosing a lot of stereotypes and sub-profiles providing support for designers to beat the shortcomings of complex systems development. In particular, the MARTE/GRM (Generic Resource Modeling) package offers stereotypes for annotating class diagrams with the needed information which will be extracted to fulfill a scheduling phase.

In chapter 6, Iakovos Ouranos and Petros Stefanias sketch some first steps towards the definition of a protocol algebra based on the framework of behavioural algebraic specification. Following the tradition of representing protocols as state machines, we use the notion of Observational Transition System to express them in an executable algebraic specification language such as CafeOBJ.

In chapter 7, Sébastien Salva and Tien-Dung Cao propose a model-based testing approach which combines two monitoring methods, runtime verification and passive testing. Starting from ioSTS (input output Symbolic Transition System) models, this approach generates monitors to check whether an implementation is conforming to its specification and meets safety properties. This paper also tackles the trace extraction problem by reusing the notion of proxy to collect traces from environments whose access rights are restricted.

In chapter 8, Donghwoon Kwon, Young Jik Kwon, Yeong-Tae Song, and Roger Lee investigate how user characteristics affect quality factors for an effective Shopping mall websites implementation. User characteristics consist of gender, age, school year, department, experience, and purchasing experience during a specified period. They also selected a total of 14 quality factors from the literature review such as design, customer satisfaction, etc. As a proof of their hypothesis to investigate how those user characteristics and quality factors are interrelated, they have used 6 hypotheses. To verify them, the results have analyzed the SAS 9.2 statistic package tool and they have asked 519 participants to fill out a questionnaire for 5 Chinese and 8 Korean websites.

In chapter 9, Omar Badreddin, Andrew Forward, and Timothy C. Lethbridge introduce a syntax for describing associations using a model-oriented language called Umple. They show source code from existing code-generation tools and highlight how the issues above are not adequately addressed. They outline code generation patterns currently available in Umple that resolve these difficulties and address the issues of multiplicity constraints and referential integrity.

In chapter 10, Damla Aslan, Ayça Tarhan, and Onur Demirörs report a case study that aimed to investigate the effect of process enactment data on product defectiveness in a small software organization. They carried out the study by defining and following a methodology that included the application of Goal-Question-Metric (GQM) approach to direct analysis, the utilization of a questionnaire to assess usability of metrics, and the application of machine learning methods to predict product defectiveness. The results of the case study showed that the accuracy of predictions varied according to the machine learning method used, but in the overall, about 3% accuracy improvement was achieved by including process enactment data in the analysis.

In chapter 11, Javier Berrocal, José García-Alonso and Juan Manuel Murillo study implicit relationships that often exist between different types of elements that subsequently have to be identified and explicitly represented during the design of the system. This requires an in-depth analysis of the generated models on behalf of the architect in order to interpret their content. Misunderstandings that take place during this stage can lead to an incorrect design and difficult compliance with the business goals. They present a series of profiles that explicitly represent these relationships during the initial development phases, and which are derived to the system design. They are reusable by the architect, thereby decreasing the risk of their misinterpretation.

In chapter 12, Oumout Chouseinoglou and Semih Bilgen analyze traditional approaches in software engineering education (SEEd), which are mostly inadequate in equipping students with these unusual and diverse skills. Their study, as part of a larger study aiming to develop a model for assessing organizational learning capabilities of software development organizations and teams, proposes and implements a novel educational approach to SEEd combining different methodologies, namely lecturing, project development and critical thinking. The theoretical background and studies on each approach employed in this study are provided, together with the rationales of applying them in SEEd.

In chapter 13, Étienne André, Christine Choppy, and Gianna Reggio propose activity diagram patterns for modeling business processes, devise a modular mechanism to compose diagram fragments into a UML activity diagram, and propose semantics for the produced activity diagrams, formalized by colored Petri nets. Our approach guides the modeler task (helping to avoid common mistakes), and allows for automated verification.

In chapter 14, Barbara Gallina, Karthik Raja Pitchai and Kristina Lundqvist propose S-TunExSPEM, an extension of Software & Systems

Process Engineering MetaModel 2.0 (SPEM 2.0) to allow users to specify safety-oriented processes for the development of safety-critical systems in the context of safety standards according to the required safety level. Moreover, to enable exchange for simulation, monitoring, execution purposes, S-TunExSPEM concepts are mapped onto XML Process Definition Language 2.2 (XPDL 2.2) concepts. Finally, a case-study from the avionics domain illustrates the usage and effectiveness of the proposed extension.

In chapter 15, Martin Babka, Tomáš Balyo, and Jaroslav Kezníkl describe an application in the code performance modeling domain, which requires SMT-solving with a costly decision procedure. Then they focus on the problem of finding minimum-size satisfying partial truth assignments. They describe and experimentally evaluate several methods how to solve this problem. These include reduction to partial maximum satisfiability – PMAXSAT, PMINSAT, pseudo-Boolean optimization and iterated SAT solving. They examine the methods experimentally on existing benchmark formulas as well as on a new benchmark set based on the performance modeling scenario.

In chapter 16, Jacob Geisel, Brahim Hamid, and Jean-Michel Bruel deal with a specification language for development methodologies centered around a model-based repository, by defining both a metamodel enabling process engineers to represent repository management and interaction and an architecture for development tools. The modeling language they propose has been successfully evaluated by the TERESA project for specifying development processes for trusted applications centered around a model-based repository of security and dependability (S&D) patterns.

In chapter 17, Haeng-Kon Kim and Roger Lee discuss some of the problems of the current mobile service applications development and show how the introduction of CBD (Component Based Development) provides flexible and extensible solutions to it. Mobile service applications resources become encapsulated as components, with well defined interfaces through which all interactions occur. Builders of components can inherit the interfaces and their implementations, and methods (operations) can be redefined to better suit the component. New characteristics, such as concurrency control and persistence, can be obtained by inheriting from suitable base classes, without necessarily requiring any changes to users of these resources. They describe the MSA (Mobile Service Applications) component model, which we have developed, based upon these ideas, and show, through a prototype implementation, how we have used the model to address the problems of referential integrity and transparent component (resource) migration.

It is our sincere hope that this volume provides stimulation and inspiration, and that it will be used as a foundation for works to come.

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