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Software Components, Architectures and Reuse: Modeling, Customization and Evaluation

J.UCS Special Issue

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The aim of this Special Issue is to report the state of research and practice on the theme of Software Components, Architectures, and Reuse. This Special Issue is comprised of selected articles drawn from submissions from an open international Call for Papers and extended peer-reviewed papers presented at the 5th Brazilian Symposium on Software Components, Architectures, and Reuse (SBCARS 2011), held in São Paulo, SP, Brazil, 26-27 September 2011 (http://www.each.usp.br/cbsoft2011/ingles/sbcars/sbcars_en.html).

The call for this Special Issue received 25 submissions. Moreover, well-known researchers in the area were invited to submit papers. Such submissions were originated from co-authors of 18 countries (Austria, Belgium, Brazil, Chile, China, France, Germany, Iran, Italy, Malaysia, New Zealand, Norway, South Africa, Spain, Sweden, Thailand, The Netherlands, United Kingdom).

Each submission was reviewed by 3 reviewers. The reviewing process was organized in two phases. First submissions were selected to provide revised versions based on the reviewer's recommendations or definitively rejected. The revised versions were then checked by the reviewers and a second selection carried out of which 4 high-quality articles were finally accepted to be included in the Special Issue. In total, 48 reviewers participated in the process.

This Special Issue is composed by these 4 accepted articles. They present high-quality research carried out by co-authors from Brazil, Germany, Italy, and Iran.

Contents of this Special Issue

The first article, entitled "MDD Adoption in a Small Company: Risk Management and Stakeholders' Acceptance" (F. Tomassetti, M. Torchiano, L. Bazzani) discusses the issue of adoption of Model-Driven Development (MDD) techniques in a small company with no prior experience with these techniques. It highlights project constraints, perceived risks, and relative mitigation strategies and evaluates how

different stakeholders perceived the introduction of the MDD approach. A structured questionnaire was the instrument used to reveal and collect the perceptions by different roles involved in the MDD adoption process. The case study considered development of applications conforming to a prescriptive architectural framework addressing a complex multi-tier architecture; the solution describes component composition while avoiding both repeating tasks and writing awkward configurations.

The second article, entitled "Modeling and Verification of Reconfigurable Actor Families" (H. Sabouri, R. Khosravi) addresses the issue of modeling and verification of families of concurrent and distributed systems in the context of Dynamic Product Lines. It introduces the concept of actor family along with its semantics as a basis to model families of concurrent and distributed systems and the notion of variability in actor models to achieve family of run-time reconfigurable actors. It proposes then a methodology to model reconfigurable actors using the Rebeca actor-based modeling language. Using the proposed approach, one can verify an actor family model against behavioral properties. In particular, it gives a set of properties to investigate if all configurations that are obtained when executing the model are consistent with the feature model and conform to the set of predefined reconfiguration rules. The result of applying the proposed approach on a set of case studies shows its effectiveness.

The third article, entitled "Domain-Oriented Customization of Service Platforms: Combining Product Line Engineering and Service-Oriented Computing" (K. Schmid, H. Eichelberger, C. Kröher) addresses the issue of customization of service platforms in the framework of Service-Oriented Architectures. A service platform provides an environment and infrastructure for running service-oriented applications. In particular, it addresses the need to customize these platforms to specific demands of a specific context. Based on Product Lines, this article proposes to solve this problem through the concept of variability management. It introduces the concept of production strategies for variability implementation techniques, provides a reference model for domain-specific service platforms and describes different approaches that provide customization possibilities in a service platform context.

The forth article, entitled "Evaluation of a Systematic Approach to Requirements Reuse" (F. B. V. Benitti, R. C. da Silva) addresses the issue of reuse of requirements. The proposed approach is based on three pillars: (i) requirement writing patterns for structuring knowledge in order to assist reuse; (ii) patterns catalog providing a mechanism to facilitate the selection of a pattern; and (iii) traceability to identify new requirements from a requirement reused. The efficiency and effectiveness of the approach were evaluated using a quasi-experiment in a university in which the authors conducted a quantitative evaluation of the approach, and an assessment of participants' perceptions regarding the use of the approach and the computational tool. Based on an evaluation by the GQM method, indicators were obtained that the approach assists in activities of requirement elicitation and specification from the point of view of experts.

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