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Conceptual Modelling of Services
J.UCS Special Issue

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This special issue of the Journal of Universal Computer Science on Conceptual Modelling of Services focusses on disseminating the results of innovative research in conceptual modelling addressing standing challenges in the emerging areas of service computing and service-oriented software engineering. The call for papers for this special issue solicited original work devoted to the general question of how the well established conceptual modelling discipline can provide support for the novel and fast growing paradigms of service orientation to meet the challenges of today's software systems engineering.

In particular we invited the authors of the best presentations at the 2nd International Workshop on Conceptual Modelling of Services (CMS) to submit thoroughly revised versions of their contributions to this special issue. The CMS workshop series provides an annual forum for presenting and discussing trends and novel ideas in the intersection of the rather new, fast growing services computing and services science paradigms with the well established conceptual modelling area. The first CMS workshop was held in November 2010 in Vancouver, Canada in conjunction with the 29th International Conference on Conceptual Modelling (ER 2010). The second CMS workshop was held in September 2011 in Milan, Italy in conjunction with the International Conference on Data and Knowledge Engineering (ICDKE 2011). The goal is to bring together researchers in the areas of conceptual modelling, business process modelling, services computing, and services science.

Following the second CMS workshop the full call of papers for this special issue was published. In addition to the seven full research papers submitted to the workshop it yielded further nine submissions, thus resulting in a total of 16 submissions to be considered for inclusion into this special issue. Each submission was reviewed by two to four international experts. Based on the rigorous reviewing process, the seven papers listed below were selected.

- In *Towards Model-Driven Engineering Support for Service Evolution* by Juan M. Vara, Vasilios Andrikopoulos, and Michael P. Papazoglou, technologies developed for the Eclipse modeling framework EMF are applied to provide a proof of concept of potential synergies between service-oriented and model-driven software engineering. A DSL toolkit for modelling the structural part of abstract service descriptions is presented, and a reasoning mechanism for deciding whether two versions of a service are compatible with respect to its consumers is investigated.
- In *Behavior Alignment and Control Flow Verification of Process and Service Choreographies* by Jorge Roa, Pablo Villareal, and Omar Chiotti, the challenge of aligning choreographies in service-oriented software engineering is addressed. Global interaction nets are introduced to represent process and service choreographies, and to allow formal reasoning on their behavior. A novel transformation pattern is presented that guarantees behavior alignment between process and service choreographies, and an automated verification method for the control flow of choreographies is discussed, with applications to all popular choreography languages.
- In *A Metadirectory of Web Components for Mashup Composition* by José Igancio Fernández-Villamor, Carlos Á. Iglesias, and Mercedes Garijo, the challenge of component selection in service-oriented and mashup-driven software engineering is discussed, and the Linked Mashups Ontology for integrating and sharing mashup information is introduced. Based on this ontology, a centralised meta directory of web components is established and used during mashup development for accessing heterogeneous repositories of web components, with information retrieved from the Linked Data cloud.
- In *A Formal Approach for Risk Assessment in RBAC Systems* by Ji Ma, abstract state machines are used to model and analyse access control decisions and the underlying risk assessment procedures in role-based access control systems. Partial orderings are used for capturing the importance of objects and the criticality of actions, upon which the risk of assigning a specific role to a specific user is determined. Special attention is to applications in permission assignment and delegation assignment.
- In *A Conceptual Model for IT Service Systems* by Ajantha Dahanayake and Bernhard Thalheim, a new conceptual framework for modeling service-

oriented IT systems is presented that recommends a separation of concerns, such as such as service as a product, service as an offer, service request, service delivery, service application, service record, service log, and service exception. The appraoch taken gives rise to a general characterisation of services in terms of their ends, stakeholders, application domain, purpose, and context. It is formally established as a W14H set of questions that generalises the classical W7 rhetorical framework of Hermagoras of Temnos.

– In *Service-Oriented development of Web Information Systems* by Valeria de Castro, Juan Manuel Vara, and Esperanza Marcos, a new methodology for developing service-oriented web applications is presented that addresses standing challenges such as the alignment of business services to implementations, and the placement of business processes into IT systems. A model-driven approach is taken, defining a set of models at different levels of abstraction together with the model transformations between them. A conference management system is used to illustrate the methodology.
– In *A Conceptual Ontology-based Resource Metamodel towards Business-driven Information System Implementation* by Hongming Cai, Boyi Xu, and Fenglin Bu, an ontology-based resource metamodel for seamless business modelling, service transformation, and IT system configuration is presented. Upon this meta model, a configurable approach for developing and implementing enterprise information systems is discussed, with resource arrays serving as the control mechanism for monitoring the systems state of completion.

We would like to thank all authors for preparing and submitting their contributions as well as all referees for their timely expertise in carefully reviewing the contributions.

Hui Ma, Klaus-Dieter Schewe, Bernhard Thalheim, and Qing Wang
(Wellington, August 2012)

List of Referees

Karoly Bosa	Schahram Dustar	Ulrich Frank
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