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Special Section on Foundations of Coordination Languages and Software Architectures (Selected Papers from FOCLASA'10)

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Preface: Special Section on Foundations of Coordination Languages and Software Architectures (Selected Papers from FOCLASA'10)

This section contains extended versions of selected papers from the 9th International Workshop on the Foundations of Coordination Languages and Software Architectures (FOCLASA'10).

Computer systems combining concurrent, distributed, mobile and heterogenous components are omnipresent and managing the complexity of their interaction raises challenging problems for system designers and integrators. Coordination languages and software architectures are recognised as fundamental approaches to tackle these problems, improving software productivity, enhancing maintainability, advocating modularity, promoting reusability, and leading to systems that more tractable and more amenable to analysis, validation and verification.

The objective of the FOCLASA workshops is to bring together researchers and practitioners of the aforementioned fields, in order to share and identify common problems, and to devise general solutions in the contexts of coordination languages and software architectures. FOCLASA'10 the was the 9th edition in this series of workshops and was held in Paris (France) on the 4th of September, 2010.

From the eight research paper that were presented at FOCLASA'10, an initial selection of papers was made by the Program Committee, and their authors were invited to submit an extended version to this special section. These extended papers went through a rigorous peer review process; the revised versions of two papers were finally accepted and are included in this special section. We believe that the papers presented here provide key insights into different aspects (quality of service, compositionality, fault-tolerance) of coordination and interaction in concurrent, mobile and distributed systems.

The first article in this special section, *"A Compositional Model to Reason about end-to-end QoS in Stochastic Reo Connectors"*, by Young-Joo Moon *et al.*, presents a compositional semantics for the channel-based coordination language Reo that enables the analysis of quality of service (QoS) properties of service compositions. The authors also propose Stochastic Reo Automata as an extension of Reo automata, in order to compositionally derive a QoS-aware semantics for Reo. A translation of Stochastic Reo Automata to Continuous-Time Markov Chains (CTMCs) is presented in order to allow the use of third-party CTMC verification tools to carry out an end-to-end performance analysis of service compositions. Finally, this article discusses to what extent Interactive Markov Chains (IMCs) can serve as an alternative semantic model for Stochastic Reo.

The second article, *"Formal Development of Wireless Sensor-Actor Networks"*, by Maryam Kamali *et al.*, presents a model of a distributed recovery algorithm in Event-B that addresses the Wireless Sensor and Actor Network (WSAN) partitioning problem caused by actor node failures. They prove, via refinement, that this distributed algorithm is correct and that it terminates in

a finite number of steps. Proofs are carried out using the RODIN platform, an integrated development framework for Event-B. This article also proposes a generalisation of the formal development strategy, which can be reused in the context of a wider class of networks by using the notions of refinement patterns and pattern-driven formal development.

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