Editorial

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1 Introduction

This issue presents extended versions of five papers selected from WETICE 2013/PROMASC Track and addressed different challenges and requirements in the field of SOA and cloud computing. Provisioning and management of SOA and cloud presents a new set of emerging issues and challenges that are expected to be identified and resolved by the research community. It includes issues of the proposed approaches at several levels: modelling, composition, collaboration, planning, scheduling, monitoring and analysis. In the first paper, Grolinger et al. propose a collaborative knowledge as a service (CKaaS) architecture, with the objective of satisfying consumer knowledge needs by integrating disparate cloud knowledge through collaboration among distributed KaaS entities. In the second paper, Rak et al. present an approach to evaluate the compromise between costs and performance of cloud applications by means of benchmarks and simulation. For a cloud-aware application developed through the mOSAIC framework, the authors show how to predict performance indexes and resource consumption under generic workloads. The paper of Rekik et al. highlights the need for the development of a context-aware decision method for cloud adoption to enable enterprises to understand, self assess, select and adopt an appropriate cloud computing service type that is aligned to their business context. The use of game theory is investigated in the paper of Jebalia et al. as a potential solution to model the resource allocation problem in clouds. In fact, game theory adapts well to the context of cloud computing since a set of actors having conflicting objectives can be considered. Moreover, the richness of game models allows the consideration of different cloud architectures and topologies. The SOA design patterns context is addressed in the fifth paper. Design patterns have become increasingly popular. Nevertheless, most of them are presented in an informal way, which can give rise to ambiguity and may lead to their incorrect usage. SOA design patterns are described with informal visual notations. Modelling these patterns with a standard formal notation is the main goal of this work. It contributes to avoid misunderstanding by software architects and helps endowing design methods with refinement approaches for mastering system architectures complexity. In this paper, Tounsi et al. present a refinement-based approach that aims, to model message-oriented SOA design patterns with the SoaML standard language, and to formally specify these patterns at a high level of abstraction using the Event-B method.

2 Content of the issue

In the paper of Grolinger et al., a CKaaS architecture is proposed. In fact, in the knowledge as a service (KaaS) approach requests presented by consumers are answered by knowledge providers through knowledge services. On the other hand, cloud computing promises to meet increasing computing demands using a large number of networked resources; it is associated with service provisioning in which computer-based services are offered to consumers over the network. However, data quantity and heterogeneity remain major obstacles for achieving data interoperability and integration. Consequently, this paper proposed a CKaaS, a generic architecture that integrates disparate cloud knowledge through collaboration among distributed knowledge providers with the goal of satisfying consumer knowledge needs. To integrate diverse sources of data stored in a cloud environment, the NIST cloud computing reference architecture is

extended by adding aKaaS layer. The proposed CKaaS is applied to the disaster management domain to provide a collaborative disaster knowledge management solution. The presented case study demonstrates CKaaS behaviour in inter-cloud and intracloud environments: behaviour in an inter-cloud environment shows collaboration of the distributed KaaS cloud providers while CKaaS in an intra-cloud environment demonstrates how a KaaS cloud provider operates with simulation models.

The paper of Rak et al. presents a technique to evaluate the trade-off between costs and performance of cloud applications through the use of benchmarks and simulation. The execution of applications in the cloud implies costs that depend on the usage of the leased resources and on the resource pricing model adopted by the providers. Given a mOSAIC cloud application, it is possible to predict performance indexes and resource consumption under generic workloads. This makes it possible to choose the deployment on the resources of the provider that guarantees the desired performance levels and minimises the costs for executing the application.

In the paper of Rekik et al., the outsourcing business process is addressed. In fact, enterprises should be always aware of the emergent and prominent technologies. Indeed, every innovation may present a way for them to sustain their position in every competitive context. The cloud computing, considered as a new paradigm, knows a more and more interest by enterprises due to benefits it presents in different fields. More specifically, outsourcing business process to this environment is considered as an interesting way for small and medium enterprises (SME) to enhance their added value. However, although it is potential benefits, adopting cloud computing may negatively affect the strategies of enterprises. Thus, when deciding to outsource and/or deploy part of its business process to the cloud, an SME should examine several factors that define its specific context. The decision should examine whether SMEs' vision and goals reveals the need of outsourcing to cloud computing. Moreover, if an outsourcing decision is taken, a deep analysis of the business process should be done to reveal the most profitable part to be outsourced. Given the multiple factors on which depends the business process outsourcing (BPO) to the cloud environment, an enterprise obviously needs a decision-making method. This paper highlights the need for the development of a context-aware decision method for cloud adoption to enable enterprises to understand, self assess, select and adopt an appropriate cloud computing services (software as a service, platform as a service, infrastructure as a service) aligned to their business context. Thus, the enterprise context is firstly presented detailing elements and factors affecting outsourcing to the cloud decision. Then the authors demonstrate how the business motivation model (BMM) enhances the decision by taking into account the business plans and vision of the enterprise. Finally, they present the decision method based on the analytic hierarchy process (AHP) to decide whether to outsource business process to cloud or not and on which service.

The contribution presented in the paper of Jebalia et al. is two-fold: first, authors prove through a comparative study that resource allocation in cloud computing environments is a multi-constrained problem where cloud providers have to take into account not only QoS requirements but also security requirements because lack of security is currently a barrier for increased adoption of cloud services. Consequently, security issues have to be considered while defining the optimisation problem for resource allocation. Second, they focus on defining an optimisation model for resource allocation in cloud computing environment. The authors propose a coalitional game

approach which targets to maximise the overall revenue and compensates for losses generated by the adoption of security mechanisms. As an extension to this work, they will provide numerical results to show the impact of coalition forming on maximising cloud providers revenues.

The paper of Tounsi et al. presents a formal refinement-based approach that aims, first, to model message-oriented SOA design patterns with the SoaML standard language, and second to formally specify these patterns at a high level of abstraction using the Event-B method. These two steps are performed before undertaking the effective coding of a design pattern providing correct by construction pattern-based software architectures. The proposed approach is experimented through an illustrative example presented in this paper. It is implemented under the Rodin platform, which is used to prove the model consistency.

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