Guest Editorial: Special Section on Enforcement and Management in Services Computing

Markus Kirchberg, Member, IEEE, and Patrick C.K. Hung, Member, IEEE

Service solutions are typically comprised of rather complex and continuously evolving service-oriented systems. While such systems may be under the sole control of an individual organizational unit, more often than not, they are deployed in interorganizational environments, must comply with various corporate and/or governmental governance regulations, and much more. Security and, in particular, privacy and trust are major concerns in almost all facets of such service solutions. In order to enable individual services or collections of services to easily interact, integrate, or be composed, it is often necessary to establish, manage, maintain, adapt, and enforce various service-level agreements, privacy policies, and/or rules across service and/or organizational boundaries. These tasks become only more challenging during the life-cycle of an evolving service solution.

In this Special Issue on Enforcement and Management in Services Computing, we present seven high quality research articles on enforcement and management issues that are prevalent in current and emerging service solutions with a particular focus on privacy, security, trust, provenance, service solution (design and delivery) management, and service solution integration. Following the 2009 IEEE Asia-Pacific Services Computing Conference (APSCC) in Singapore, we launched an open call for submissions to this special issue of the IEEE Transactions on Services Computing. We received more than 30 submissions; the following seven articles were selected through a rigorous review process:

- In the first paper, “Adaptive SOA Solution Stack,” Krzysztof Zieliński et al. present the concept of an adaptive extension of the SOA Solution Stack (S3). The major contribution of this work is an integrated approach to adaptive SOA system development. By following an integrated approach, adaptability aspects are introduced in a uniform way to each layer of the underlying S3 model; this leads to a multilayer adaptive system.
- In the second paper, “Optimization of Resource Provisioning Cost in Cloud Computing,” Sivadon Chaisiri et al. examine current resource provisioning strategies for cloud consumers. After identifying underprovisioning and overprovisioning problems under the demand and price uncertainty in cloud computing environments, the authors present an optimal cloud resource provisioning algorithm that minimizes the total cost for provisioning resources offered by multiple cloud providers in a certain time period. The presented algorithm can optimally adjust the trade-off between reservation of resources and allocation of on-demand resources.
- In the third paper, “Query Access Assurance in Outsourced Databases,” Wangchao Le and Feifei Li examine the problem of defeating a lazy server for distributed databases under the database-as-a-service model. Authors formalize the concept of query access assurance for IO-bound queries in the context of distributed databases and present two efficient schemes that achieve query access assurance with high success probabilities.
- In the fourth paper, “Runtime Enforcement of Web Service Message Contracts with Data,” Sylvain Hallé and Roger Villemaire address problems arising from the fact that an increasing number of web services exhibit a stateful behavior with constraints on messaging while the nature of web services including prevailing interface specification languages are stateless. The authors present an algorithm for the run-time monitoring of data-aware workflow constraints as well as an on-the-fly run-time monitoring algorithm that enforces such constraints on message sequences.
- In the fifth paper, “TiCoBTx-Net: A Model to Manage Temporal Consistency of Service-Oriented Business Collaboration,” Haiyang Sun et al. consider temporal inconsistency issues in service-oriented business collaborations. The main contribution of this work is the Timed Choreographical Business Transaction Net (TiCoBTx-Net) model that enables individual business participants to specify and manage temporal consistencies/inconsistencies.
- In the sixth paper, “Toward Secure and Dependable Storage Services in Cloud Computing,” Cong Wang et al. investigate data security-related problems in cloud data storage; e.g., loss of control over data. The authors propose an effective and flexible distributed storage verification scheme with explicit dynamic...
data support in order to provide better assurances of cloud data integrity and availability.

- In the seventh and final paper, “Expert Discovery and Interactions in Mixed Service-Oriented Systems,” Daniel Schall et al. consider the need for flexible involvement of software-based services as well as human experts and knowledge workers in distributed activities. The authors propose a context-sensitive, trust-based algorithm, ExpertHITS, which is inspired by the concept of hubs and authorities in web-based environments. The suggested approach takes trust relations and link properties in social networks into account to better estimate the reputation of users; it also utilizes a combination of preplanned process steps and ad hoc activities to solve emerging problems in distributed collaboration environments.

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