

GUEST EDITORIAL PREFACE

Special Issue on Complex Service Computing

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Service-oriented architecture (SOA) is a widely accepted and engaged paradigm for the realization of business processes that incorporate several distributed and loosely coupled partners. Today, the development of emerging computing paradigms such as Cloud Computing, Internet-Of-Things, and Mobile Internet has made service-oriented computing more and more complex. The complex services have the characteristics of '3C', which are crossover, convergence, and complex:

1. **Crossover:** Today, with the development of information technology, service providers are able to break through traditional single service mode and provide crossover services. For example, banks are starting to stride over traditional banking business and provide the flight tickets booking service, and Internet enterprises are setting foots in the filed of mobile communication;
2. **Convergence:** Service convergence results from coordination of service providers from different fields. Convergence is a kind of dynamic developing process, consisting of technological convergence, products convergence, services convergence, enterprises convergence, and markets convergence, etc.;
3. **Complex:** Comparing to traditional services, the complex services will be more complicated on aspects of service creation, development and management. For example, data generated by humanities, scientific activities and commercial applications from a diverse range of fields through these new computing paradigms have been increasing exponentially. As a result, the data intensive services are quickly becoming popular, where traditional service-oriented techniques such as XML-based SOAP protocol can hardly meet the communication between data-intensive services. Potentially, this could have a significant impact on the on-going researches for services and data intensive computing. However, the Big Data issue is not the only one factor that makes service-computing issues more complex.

The '3C' characteristics of Complex Service Computing pose a lot of challenges and opportunities to the traditional research issues in service computing. For example, the research of service composition in Complex Service Computing should more consider the composition of services from different fields, and the convergence is another issue should be taken into account. Meanwhile, with the increase of the complexity, the service lifecycle management is becoming more and more important, and the traditional event-based SOA is also not suitable. Further, with the explosive growth of services, traditional service searching system/algorithm should be optimized.

In this special Issue on Complex Service Computing, we present five high quality research articles on complex service computing issues that are prevalent in current and emerging service solutions with a particular focus on service composition, service lifecycle management, service search, event-based SOA, and mobile service. We believe the approaches or systems proposed in these five articles will explore feasibility or provide inspiration to the solutions of these issues in Complex Service Computing. In April, 2013, we launched an open call for submissions to this special issue of the *International Journal of Web Services Research*. We received more than 20 submissions, and the following five articles were selected through a rigorous review process:

1. In the first paper, "Event-driven SOA based District Heating Service System with Complex Event Processing Capability", Xiuquan Qiao et al. propose an event-driven SOA based district heating system architecture, which can easily support the on-demand dissemination and aggregation of monitoring information and realize the event-driven service coordination cross different service domains;
2. In the second paper, "Stakeholder Identification and Analysis for Service Lifecycle Management", Wenge Rong et al. consider the integration of the lifecycle processes with stakeholders, and propose a conceptual stakeholder analysis framework to associate the stakeholders with different lifecycle stages and a case study is presented to show its applicability;
3. In the third paper, "A Trust-aware Search Engine for Complex Service Computing", Mingdong Tang et al. present a trust-aware search engine by integrating service functionalities, QoS (quality of service) and service trustworthiness, aiming at recommending high-quality and trustworthy services in the complex service computing environment;
4. In the fourth paper, "Deploying Data-Intensive Service Composition with a Negative Selection Algorithm", Shuiguang Deng et al. consider the great influence of big data on the overall performance of a composition, and present an optimal deployment method based on a negative selection algorithm for a data-intensive service composition to reduce the cost of the data transmission;
5. In the fifth paper, "Optimizing Concurrency Performance of Complex Services in Mobile Environment", Sudipan Misha et al. identify key factors that affect a system to respond a request, including request related factors, system resource related factors, and context, and address the issue related specifically to concurrency control improvement in mobile web servers to support the mobile deployment of complex services.

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Zhaohui Wu has been engaged in research work on service computing and intelligent systems for a long time; he systematically addressed system architecture and key systems of knowledge service, constructively built pervasive service model, and made important contributions to the innovation and development of China's modern service industry, with significant social and economical benefits and international influence. He was awarded the HLHL prize (2011), 2nd prize of National Science and Technology Achievement Award twice (once ranked the 1st), 1st prize of university natural sciences and Zhejiang Province Science and Technology Award (3 times ranked the 1st); he has published 180+ papers, with 2600+ citations; 9 books (all first-author, 3 of which are English books published by Elsevier and Springer.); he was awarded 97 national patents; he started a series of international conferences, including ICESS, CPSCOM and MSCl.

Jian Wu received his B.S. and Ph.D. Degrees in computer science from Zhejiang University, Hangzhou, China, in 1998 and 2004, respectively. He is currently an associate professor at the College of Computer Science, Zhejiang University, and visiting professor at University of Illinois at Urbana-Champaign. His research interests include service computing and data mining. He is the recipient of the second grade prize of the National Science Progress Award. He is currently leading some research projects supported by National Natural Science Foundation of China and National High-tech R&D Program of China (863 Program).