Special Issue on Service-Oriented Collaborative Computing and Applications

Citation for published version (APA):

DOI:
10.1109/TSC.2017.2764559

Document status and date:
Published: 01/03/2018

Document Version:
Publisher’s PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

• A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher’s website.
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Special Issue on Service-Oriented Collaborative Computing and Applications

Jianming Yong, Giancarlo Fortino, Weiming Shen, Yun Yang, Kuo-Ming Chao, and Wil van der Aalst

Today’s industries and societies require more advanced technologies to address increasingly complex design issues for products, processes, systems, and services while also meeting the high expectation of customers and sellers. Service-oriented collaborative computing provides technological support to meet these requirements and expectations. This special issue of IEEE Transactions on Services Computing intends to involve researchers and practitioners in different but related fields to confront research challenges, issues, as well as research results and solutions in their particular areas of study. The scope of this issue focuses on the research and development of service-oriented collaborative computing technologies and their applications to the design of products, processes, systems, and services in an industrial and social viewpoint.

In the first paper “Live Migration for Multiple Correlated Virtual Machines in Cloud-Based Data Centers”, Sun et al. propose an efficient virtual datacenter migration algorithm to enhance resource utilizations, and guarantee Quality of Service in cloud datacenters for service-oriented collaborations. The simulation results based on American National Science Foundation network as substrate network are very promising. As the service-oriented collaboration has a significant impact not only on datacentres but also on current e-learning systems, the next paper addresses the research challenges for future learning systems. The second paper is titled “MLaaS: A Cloud-Based System for Delivering Adaptive Micro Learning in Mobile MOOC Learning”. Sun et al. propose a dynamic learner model: new educational data mining and learning path optimization techniques are contributed to meet the challenges for massive open online course over the service-oriented cloud environment. A solution of learning path optimization is proposed to assemble a complete MOOC learning experience for better micro learning outcomes. In the third paper “Knowledge-Based Resource Allocation for Collaborative Simulation Development in a Multi-Tenant Cloud Computing Environment”, Peng et al. present a new and improved multi-objective genetic algorithm to optimize the resource allocation over a multi-tenant cloud computing environment for service-oriented collaboration. An improved multi-objective genetic algorithm based on the elitist archive and the K-means approaches is designed to optimize the resource allocation in the service oriented cloud environment. While service-oriented collaborative computing heavily depends on secure communications channels, especially reliable and trust wireless environment, securing the wireless communications channel becomes one of highest priorities. The fourth paper is titled “On Secure Wireless Communications for Service Oriented Computing”. Zhang et al. deliver a new approach on wireless security communications over service oriented computing. The simulation and numerical results clearly illustrate the efficiency of the proposed theoretical framework as well as the eavesdropper tolerance capacity of the concerned network obtained by adopting cooperative jamming and opportunistic relaying in service oriented wireless communications. In the fifth paper “Cloud workflow scheduling with Deadlines and Time Slot Availability”, Li et al propose an iterated heuristic framework to address the workflow scheduling challenge over service-oriented cloud computing environment. An iterated heuristic framework based initial solution construction-improvement- perturbation is designed to better schedule cloud-based workflow tasks. The sixth paper “Service-Oriented Feature-Based Data Exchange for Cloud-Based Design and Manufacturing” from Wu et al. contribute a cloud-based design and manufacturing model for providing cost-effective, flexible and scalable solutions to collaborative partners by sharing the resources over a collaborative service oriented computing infrastructure. Realizing a service-oriented feature-based data exchange under the peer-to-peer computing model is an innovative approach to creating cloud-based smart manufacturing environments which underpin the strong demand for versatile tools and languages to be used to clearly describe and identify the service itself. In the final paper “Cloud Service Description Model: An Extension of USDL for Cloud Services”, Sun et al. propose a unified semantic cloud service description model that extends the basic structure of the Unified Service Description Language (USDL) to provide a new, better way to describe Internet services for all the individuals and businesses that consume the services in a service oriented cloud.
computing environment. The case study in the paper clearly demonstrates the advantage of the proposed unified semantic cloud service description model. In short, the seven papers forge this special issue on service-oriented collaborative computing and applications from different perspectives of current cloud and service infrastructure.

We appreciate the strong support from the Editor-in-Chief, Prof. Ling Liu, the administrator, Ms. Christine Kurzawa, all anonymous dedicated reviewers, and all contributing authors for helping us put together this valuable special issue of IEEE Transactions on Services Computing for the service oriented collaborative computing community.

**Guest Editors**

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