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Service-Oriented Computing

16th International Conference, ICSOC 2018
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Proceedings

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Preface

The service-oriented computing (SOC) paradigm has established itself as an interdisciplinary methodology that comprehensively addresses modern software development needs. Service orientation combines established best-practice principles of modularization and encapsulation, allowing architectures of large-scale software systems to be designed, analyzed, and deployed successfully. The services paradigm enables the right level of abstraction to achieve loosely coupled, independent, and reusable software artifacts with well-defined interfaces. It has evolved into a technology to embody and express the ubiquity of software that transforms our society from an industrial, production-centric economy into a digital, service-centric economy. The International Conference on Service-Oriented Computing (ICSOC) is the premier international forum for academics, industry researchers, developers, and practitioners on all topics related to services and service-oriented computing. ICSOC fosters cross-community scientific innovation and excellence by gathering experts from various disciplines, such as business process management, distributed systems, computer networks, wireless and mobile computing, cloud computing, IoT and edge computing, cyber-physical systems, networking, scientific workflows, services science, data science, management science, and software engineering. Since the first edition in 2003, the ICSOC conference has grown to become the top international forum in service-oriented computing for academics, industry researchers, developers, and practitioners to report and share the latest research results and innovations.

ICSOC 2018, the 16th event in this series, took place in Hangzhou, Zhejiang, China, during November 12–15, 2018. Following in the ICSOC tradition, it featured three outstanding keynotes given by Schahram Dustdar (Technical University of Vienna, Austria), Liming Zhu (Data61, CSIRO, Australia), and Jeff Zeng (Alibaba Group, China), a research and industry presentations track, a panel session, as well as workshops, tool demonstrations, tutorials, and a PhD track.

This volume contains the proceedings of ICSOC 2018, the 16th International Conference on Service-Oriented Computing. As with previous editions, this year's call for papers generated substantial interest from the community. A total of 273 research and industry paper submissions were received from countries across all continents. Each paper submission was carefully reviewed by at least three members of the Program Committee (PC), followed by discussions moderated by a senior PC member who made a recommendation in the form of a meta-review. The PC consisted of 172 world-class experts in service-oriented computing and related areas (151 PC members and 21 senior PC members). The ICSOC 2018 program featured 40 full papers (acceptance rate of less than 15%) and 23 short papers. The selected papers cover a wide variety of important topics in the area of service-oriented computing, including foundational issues on service discovery and service-systems design, business process modeling and management, economics of service-systems engineering, as well as

emerging concerns such as services in the cloud and edge, social networks, IoT, and data analytics.

We would like to express our gratitude to all individuals, institutions, and sponsors that supported ICSOC 2018. This high-quality program would not have been possible without the expertise and dedication of our PC members, and in particular our senior PC members, as well as the untiring efforts of the external reviewers. We are also grateful for the guidance and commitment of the general chairs, Michael Sheng, Zhaohui Wu and Xiaofei Xu, the workshop chairs (Xiao Liu, Michael Mrissa, Liang Zhang), the PhD symposium chairs (Djamal Benslimane, Aditya Ghose, Zhongjie Wang), the demonstration chairs (Antonio Bucchiarone, Wei Zhang, Ying Zou), the panel chairs (Athman Bouguettaya, Jian Yang), the publicity chairs (Bin Cao, Qiang He, Yanjun Shu, Paul de Vrieze), the publication chair (Qi Yu), the finance chair (Bernd J. Krämer), the industry chairs (Min Fu, Lijie Wen), the sponsorship chairs (Dongjin Yu, Jun Shen), the Web chairs (Hai Dong, Adnan Mahmood), the local organization chair (Shuiguang Deng), and the entire ICSOC Steering Committee. All of them helped make ICSOC 2018 a great success. Finally, we would like to thank in particular all authors who submitted papers to the conference, and we congratulate those authors whose papers appear in these proceedings. These papers reflect the quality of the current state of the art in service-oriented computing research and practice. We hope that you find these papers interesting and stimulating.

November 2018   Claus Pahl
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Abstract of Keynotes

Engineering the Smart Fabric of IoT, Services, and Systems

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Abstract. This presentation explores the integration of people, software services, and things with their data, into a novel resilient ecosystem, which can be modeled, programmed, and deployed on a large scale in an elastic way. This novel paradigm has major consequences on how we view, build, design, and deploy ultra-large scale distributed systems and establishes a novel foundation for an "architecture of value" driven Smart City.

In particular, this keynote talk addresses three novel paradigms for designing the service-oriented information systems of the future: Elastic Computing, Social Compute Units, and Osmotic Computing. These three paradigms serve as a foundation for future large-scale distributed systems. Furthermore, we will discuss our responsibilities as computer scientists, technologists, and researchers for creating technologies, which benefit society in a positive way, thereby strengthening the new fabric of interconnected people, software services, and things into a novel resilient ecosystem.

Keywords: Internet of Things · Smart Cities · Cloud Computing

Distributed Trust: How Data-Driven Applications, AI and Blockchain is Impacting Service Oriented Computing

Liming Zhu[1,2]

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Abstract. A key premise of service oriented computing is about trusting the computing behind the service interface. This often relies on trusting the entities running the services and the algorithms behind the services. These assumptions are being challenged. Trust in institutions is at its historical low while our life is increasingly decided by complex data-driven algorithmic learnings that humans do not fully understand. This talk will discuss the emerging of distributed trust and how it may help improve trust in services and deal with black-box algorithmic decision making. The talk will also discuss the role of consumer data rights (a new legislation Australian government is introducing with Data61 being the standard setter) in driving new trustworthy service oriented applications.

Deep Insight of End to End E-Commerce Business Management

Abstract. In the context of E-Commerce eco-system, there are hundreds of millions of consumers, thousands of businesses and shops, and hundreds of delivery people. Alibaba Group, as one of the main E-Commerce providers, cooperates with tens of thousands of software vendors to provide all necessary software services to support the business. With the booming of eco-business, more ecological roles in E-Commerce businesses emerge. For instance, Alibaba Group has expanded its business scale from Taobao Software to several business units, with 10000 plus technical staff. Large E-Commerce businesses such as Alibaba Group need to support a large number of applications and business modules, and cater for hundreds of business requirements and independent changes on a daily basis. As such, there are several changes: (1) we lack a requirement management mechanism from a full business chain perspective, resulting in low cooperation efficiency; (2) The business and the platform are not well separated, which makes it unable to support self-development of the business; (3) The business customization is performed from the system's perspective, instead of the full business chain's perspective, thus bringing much inconvenience to developers who need to understand hundreds of systems during one round of business customization; (4) there is a lack of cross-market, highly reusable and transplantable business assets.

In light of the above-mentioned challenges, we develop a product named Halo. The main ideas of Halo are as below:

(1) Separation among businesses. Each business is assigned with a unique "identity mark", which is used for loading and executing the business customization according to its identity, grouping and routing the business sets based on their identities, monitoring and guaranteeing businesses with intended identities. This ensures that the change of a business will not affect another business.
(2) Scenario-based business capability SDKs. Based on the E-Commerce eco-system of Alibaba Group, we extract several business capabilities, each of which is mapped with a business customization SDK from the full business chain's perspective. All developers need to do is to understand and apply these SDKs, which can be automatically deployed into the targeted physical applications.
(3) Dynamic business deployment using containers. For large-scale distributed applications, the use of containers is able to realize the rapid, incremental and dynamic deployment and publishing of business customization packages.

(4) Clear business definitions. Based on the separation of the management domain and execution domain, we can define and present the visualization of the businesses. Based on the same business execution framework, we can realize the dream of "define once, execute at all places", and make sure that the business semantics inside the full business chain are consistently understood by all the staff.

Based on those design ideas and decisions, we started developing Halo since 2015. Until now, Halo has been successfully applied in upgrading the systems of several core business platforms, including the trading platform, the commodity platform, the marketing platform and the fund platform. Compared to the old mechanism, the use of Halo significantly reduces the threshold required for developing the business customization, and increases development efficiency to a large extent. Meanwhile, with the scenario-based business capability SDKs, it is easier to achieve high reusability of business logics (e.g. pre-sale, e-certificate, virtual commodities, payment on arrival of goods, etc.) in a cross-market and cross-region manner.

Short Bio

Jeff Zeng is a senior staff engineer at Alibaba Group. He is now leading the core trade platform which is the foundation of Alibaba's key business. Jeff is also in charge of Alibaba financial platform and business innovation by applying block chain technology. Prior to this, he was a Global development Director of Small and Medium Enterprise at SAP. He has been working on global enterprise product development in the Internet industry for about 10 years. Jeff received his master degree from East China Normal University, and bachelor degree from Shanghai University.

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