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Service-Oriented Computing

15th International Conference, ICSOC 2017
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Preface

Welcome to the Proceedings of ICSOC 2017, the 15th International Conference on Service-Oriented Computing. ICSOC is the premier international forum for academics, industry researchers, developers, and practitioners to report and share ground-breaking work 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, cyber-physical systems, networking, scientific workflows, services science, data science, management science, and software engineering.

ICSOC 2017, the 15th event in this series, took place in Málaga, Spain, during November 13–16, 2017. Following on the ICSOC tradition, it featured three keynote presentations, a research and industry presentations track, as well as workshops, tool demonstrations, tutorials, and a PhD track.

Since its beginnings, services have become a core principle in software development. They provide perfect mechanisms for modularization, encapsulation, and for designing, analyzing, and deploying the architecture of large software systems, at the right level of abstraction, and in terms of loosely coupled, independent, and reusable parts with well-defined interfaces. Recently, services have gained rapid popularity across most software disciplines, showing all their benefits for building complex and critical applications in domains such as cloud computing, the Internet of Things (IoT), cyber-physical systems, mobile computing, and so on. This pervasive use of services has become industrially accepted best practice in all these application areas.

The increased success of using services in software and systems engineering has also raised new challenges, requiring collaborative research across multiple disciplines, groups, companies, and centers. As with previous editions, this year's call for papers generated substantial interest from the community. A total of 179 full research and industry submissions were received from 23 countries across six 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 (153 PC members and 19 senior PC members) from 28 different countries. The ICSOC 2017 program featured 33 full papers (acceptance rate of 18%) and 20 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 modelling and management, economics of service-systems engineering, as well as services on the cloud, social networks, IoT, and data analytics.

We would like to express our gratitude to all individuals, institutions, and sponsors that supported ICSOC 2017. 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. We are also grateful for the guidance of the General Chair, Carlos Canal, the untiring efforts of external reviewers, and the complete ICSOC Steering Committee. All of them helped make ICSOC 2017 a great success. Finally, we would like to thank all the 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.

August 2017

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Keynote Papers

A Research Agenda for the Programmable World: Software Challenges for IoT Era

Tommi Mikkonen

University of Helsinki, Gustav Hällströmin katu 2b, Helsinki, Finland
tommi.mikkonen@helsinki.fi

Abstract. The Internet of Things (IoT) represents the next significant step in the evolution of the connectivity and programmability. While the majority of research work in the IoT area today is about data acquisition, real-time and offline analytics, machine learning, data visualization and other fashionable big data topics, in this keynote we argue that there is in fact even more profound change that we are facing – the programmability aspect that is intimately associated with all IoT systems. Advances in computing hardware development are making it feasible to introduce full-fledged operating systems in even smallest devices; advances in radio and battery technologies are enabling constant connectivity in the Global scale. This new world that is populated by programs of various degree of complexity requires programming skills in various fields that we now typically consider distinct, including in particular web and mobile development on the surface, and embedded and distributed software development at the core. Combining the characteristics of these fields will also force us to reconsider some of the fundamentals of software engineering in the process.

Keywords: Internet of Things · Programmable world · Software engineering · Embedded software · Web programming

Semantic Search

Ricardo Baeza-Yates

NTENT, USA & Spain
ricardo.baeza@upf.edu

Abstract. Semantic search lies in the cross roads of information retrieval and natural language processing and is the current frontier of search technology. The first part consist in building a semantically annotated index with the help of a knowledge base. For this we first need to predict the language of each document and parse it accordingly to that language. Second, we need to extract all entities and concepts mentioned in the document with the help of the knowledge base. All the knowledge base infrastructure needs to be independent of the language and we instantiate each language in the lexicon of the knowledge base.

The second part is predicting the intention behind the query, which implies doing semantic query understanding. This process implies the same semantic processing as document. After, based on all this information, we have to predict one or more possible intentions with a certain probability, which is particularly important for ambiguous queries. These scores will be one of the inputs for the final semantic ranking. For example, given the query "bond", possible results for query understanding are a financial instrument, the movie character, a chemical reaction, or a term for endearment.

Semantic ranking refers to ranking search results using semantic information. In a standard search engine, a rank is computed by using signals or features coming from the search query, from the documents in the collection being searched and from the search context, such as the language and device being used. In our case we add semantic relations between the entities and concepts found in the query was the same objects in the documents, that will come from different data sources. For this we use machine learning in several stages. The first stage selects the data sources that we should use to answer the query. In the second stage, each data source generates a set of answers using "earning to rank." The third and final stage ranks these data sources, selecting and ordering the intentions as well as the answers inside each intention (e.g., news) that will appear in the final composite answer. All these stages are language independent, but may use language dependent features.

We will cover the process above having in mind a services-based approach, including the data science needed to use as relevance feedback the usage log stream of the semantic search engine.

“Uber Scale”. Stories and Lessons from the History of Scaling Uber SOA

Chritopher Adams

UBER
cadams@uber.com

Abstract. In this talk, Chris will discuss how Uber scaled several key components of its SOA infrastructure, and extrapolate some lessons and useful strategies that other companies can apply as they scale.

Contents

Applications

Similarity Computation Exploiting the Semantic and Syntactic Inherent Structure Among Job Titles 3
Sarthak Ahuja, Joydeep Mondal, Sudhanshu Shekhar Singh, and David Glenn George

RISE: Resolution of Identity Through Similarity Establishment on Unstructured Job Descriptions 19
Rakesh Rameshrao Pimplikar, Kalapriya Kannan, Abhik Mondal, Joydeep Mondal, Sushant Saxena, Gyana Parija, and Chandra Devulapalli

Social-Sensor Cloud Service for Scene Reconstruction. 37
Tooba Aamir, Athman Bouguettaya, Hai Dong, Sajib Mistry, and Abdelkarim Erradi

Quark: A Methodology to Transform People-Driven Processes to Chatbot Services 53
Anup K. Kalia, Pankaj R. Telang, Jin Xiao, and Maja Vukovic

Foundations

Cloud Certification Process Validation Using Formal Methods 65
Maria Krotsiani, Christos Kloukinas, and George Spanoudakis

Validation of Service Blueprint Models by Means of Formal Simulation Techniques. 80
Montserrat Estañol, Esperanza Marcos, Xavier Oriol, Francisco J. Pérez, Ernest Teniente, and Juan M. Vara

Deadlock-Freeness Verification of Business Process Configuration Using SOG 96
Souha Boubaker, Kais Klai, Katia Schmitz, Mohamed Graiet, and Walid Gaaloul

Formally Modeling, Executing, and Testing Service-Oriented Systems with UML and OCL 113
Loli Burgueño and Martin Gogolla

Mining and Analytics

App Update Patterns: How Developers Act on User Reviews in Mobile App Stores 125
Shance Wang, Zhongjie Wang, Xiaofei Xu, and Quan Z. Sheng

Predicting the Evolution of Service Value Features from User Reviews for Continuous Service Improvement 142
Xu Chi, Haifang Wang, Zhongjie Wang, Shiping Chen, and Xiaofei Xu

Confidence-Aware Reputation Bootstrapping in Composite Service Environments 158
Lie Qu, Athman Bouguettaya, and Azadeh Ghari Neiat

Compound Trace Clustering to Generate Accurate and Simple Sub-Process Models 175
Yaguang Sun, Bernhard Bauer, and Matthias Weidlich

An Approach to Modeling and Discovering Event Correlation for Service Collaboration 191
Meiling Zhu, Chen Liu, Jianwu Wang, Shen Su, and Yanbo Han

Energy Efficient Scheduling of Application Components via Brownout and Approximate Markov Decision Process 206
Minxian Xu and Rajkumar Buyya

Predicting the Available Bandwidth on Intra Cloud Network Links for Deadline Constrained Workflow Scheduling in Public Clouds 221
Rachael Shaw, Enda Howley, and Enda Barrett

Inferring Calling Relationship Based on External Observation for Microservice Architecture 229
Shinya Kitajima and Naoki Matsuoka

Quality of Service

A QoS-Aware Resource Allocation Controller for Function as a Service (FaaS) Platform. 241
MohammadReza HoseinyFarahabady, Young Choon Lee, Albert Y. Zomaya, and Zahir Tari

Probabilistic Qualitative Preference Matching in Long-Term IaaS Composition 256
Sajib Mistry, Athman Bouguettaya, Hai Dong, and Abdelkarim Erradi

An Embedding Based Factorization Machine Approach for Web Service QoS Prediction 272
Yaoming Wu, Fenfang Xie, Liang Chen, Chuan Chen, and Zibin Zheng

A Deep Learning Approach for Long Term QoS-Compliant Service Composition 287
Hamza Labbaci, Brahim Medjahed, and Youcef Aklouf

Run-time Service Operation and Management

An Artifact-Driven Approach to Monitor Business Processes Through Real-World Objects 297
Giovanni Meroni, Claudio Di Ciccio, and Jan Mendling

BenchFoundry: A Benchmarking Framework for Cloud Storage Services 314
David Bermbach, Jörn Kuhlenkamp, Akon Dey, Arunmoezhi Ramachandran, Alan Fekete, and Stefan Tai

Automated Analysis of Cloud Offerings for Optimal Service Provisioning . . . 331
José María García, Octavio Martín-Díaz, Pablo Fernandez, Antonio Ruiz-Cortés, and Miguel Toro

Middleware for Dynamic Upgrade Activation and Compensations in Multi-tenant SaaS 340
Dimitri Van Landuyt, Fatih Gey, Eddy Truyen, and Wouter Joosen

Service Adaptation

Risk-Based Proactive Process Adaptation 351
Andreas Metzger and Philipp Bohn

A Debt-Aware Learning Approach for Resource Adaptations in Cloud Elasticity Management 367
Carlos Mera-Gómez, Francisco Ramírez, Rami Bahsoon, and Rajkumar Buyya

Large-Scale and Adaptive Service Composition Using Deep Reinforcement Learning 383
Hongbing Wang, Mingzhu Gu, Qi Yu, Huanhuan Fei, Jiajie Li, and Yong Tao

Service Engineering

ECHO: An Adaptive Orchestration Platform for Hybrid Dataflows across Cloud and Edge 395
Pushkara Ravindra, Aakash Khochare, Siva Prakash Reddy, Sarthak Sharma, Prateeksha Varshney, and Yogesh Simmhan

Ensuring and Assessing Architecture Conformance to Microservice Decomposition Patterns 411
Uwe Zdun, Elena Navarro, and Frank Leymann

Polly: A Language-Based Approach for Custom Change Detection of Web Service Data 430
Elyas Ben Hadj Yahia, Jean-Rémy Falleri, and Laurent Réveillère

Design and Evaluation of a Self-Service Delivery Framework. 445
Constantin Adam, Nikos Anerousis, Muhammed Fatih Bulut, Robert Filepp, Anup Kalia, Brian Peterson, John Rofrano, Maja Vukovic, and Jin Xiao

Automated Generation of REST API Specification from Plain HTML Documentation. 453
Hanyang Cao, Jean-Rémy Falleri, and Xavier Blanc

Efficient Keyword Search for Building Service-Based Systems Based on Dynamic Programming 462
Qiang He, Rui Zhou, Xuyun Zhang, Yanchun Wang, Dayong Ye, Feifei Chen, Shiping Chen, John Grundy, and Yun Yang

Supporting the Decision of Migrating to Microservices Through Multi-layer Fuzzy Cognitive Maps 471
Andreas Christoforou, Martin Garriga, Andreas S. Andreou, and Luciano Baresi

A Tree-Based Reliability Analysis for Fault-Tolerant Web Services Composition 481
Yanjun Shu, Decheng Zuo, Hongwei Liu, Quan Z. Sheng, Wei Emma Zhang, and Jian Yang

Modernization of Information Systems at Red.es: An Approach Based on Gap Analysis and ADM 490
Marcos López-Sanz, Valeria de Castro, Esperanza Marcos, and Jorge Moratalla

Improving Web Services Design Quality Using Dimensionality Reduction Techniques 499
Hanzhang Wang and Marouane Kessentini

Service Recommendation

ARA-Assessor: Application-Aware Runtime Risk Assessment for Cloud-Based Business Continuity. 511
Min Fu, Shiping Chen, Jian Yang, Surya Nepal, and Liming Zhu

Personalized Quality Centric Service Recommendation 528
Yiwen Zhang, Xiaofei Ai, Qiang He, Xuyun Zhang, Wanchun Dou, Feifei Chen, Liang Chen, and Yun Yang

Cataloger: Catalog Recommendation Service for IT Change Requests 545
Anup K. Kalia, Jin Xiao, Muhammed F. Bulut, Maja Vukovic, and Nikos Anerousis

ATLAS: A World-Wide Travel Assistant Exploiting Service-Based Adaptive Technologies. 561
Antonio Bucchiarone, Martina De Sanctis, and Annapaola Marconi

Services in Organizations, Business and Society

A Variability Model for Store-Oriented Software Ecosystems: An Enterprise Perspective 573
Bahar Jazayeri, Olaf Zimmermann, Gregor Engels, and Dennis Kundisch

An Analysis of RESTful APIs Offerings in the Industry 589
Antonio Gamez-Diaz, Pablo Fernandez, and Antonio Ruiz-Cortes

Efficient Influential Individuals Discovery on Service-Oriented Social Networks: A Community-Based Approach 605
Fanghua Ye, Jiahao Liu, Chuan Chen, Guohui Ling, Zibin Zheng, and Yuren Zhou

Empirical Study on REST APIs Usage in Android Mobile Applications. 614
Mohamed A. Oumaziz, Abdelkarim Belkhir, Tristan Vacher, Eric Beaudry, Xavier Blanc, Jean-Rémy Falleri, and Naouel Moha

Services in the Cloud

Revenue-Driven Service Provisioning for Resource Sharing in Mobile Cloud Computing. 625
Hongyue Wu, Shuiguang Deng, Wei Li, Jianwei Yin, Qiang Yang, Zhaohui Wu, and Albert Y. Zomaya

Continuous Learning as a Service for Conversational Virtual Agents. 641
Shivali Agarwal, Shubham Atreja, and Gargi Dasgupta

Costradamus: A Cost-Tracing System for Cloud-Based Software Services . . . 657
Jörn Kuhlenkamp and Markus Klems

An Automatic Approach for Transforming IoT Applications to RESTful Services on the Cloud. 673
Yu Zhao, Ying Zou, Joanna Ng, and Daniel Alencar da Costa

RobOps: Robust Control for Cloud-Based Services 690
Cheng Chen, Jordi Arjona Aroca, and Diego Lugones

Serverless Execution of Scientific Workflows 706
Qingye Jiang, Young Choon Lee, and Albert Y. Zomaya

A Market-Based Approach for Detecting Malware in the Cloud via Introspection 722
Nada Alruhaily, Carlos Mera-Gómez, Tom Chothia, and Rami Bahsoon

Trustless Intermediation in Blockchain-Based Decentralized Service Marketplaces 731
Markus Klems, Jacob Eberhardt, Stefan Tai, Steffen Härtlein, Simon Buchholz, and Ahmed Tidjani

Author Index 741