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Workshops Proceedings



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Preface

Service-oriented computing is a cross-disciplinary paradigm for distributed computing that enables the development of networks of collaborating applications distributed within and across organizational boundaries. Service-oriented computing fundamentally changes the way software applications are designed, architected, delivered and consumed. The ICSOC conference series covers the entire spectrum from theoretical results to empirical evaluations and industrial solutions. Due to its broad scope and its dedicated community, ICSOC is currently recognized as one of the leading conferences in the service-oriented computing area.

The 4th International Conference on Service-Oriented Computing (ICSOC 2006) and associated workshops followed on the success of three previous events in Amsterdam, The Netherlands (2005), New York City, USA (2004) and Trento, Italy (2003).

ICSOC 2006 solicited the submission of workshop proposals on any of the conference topics including: Business Service Modeling, Service Assembly, Service Management, SOA Runtime, Quality of Service, and Grid Services. Particularly, workshops on key research challenges with the following properties were encouraged:

- Multidisciplinary: involve synergy between different scientific communities and research disciplines
- Domain specific: focus on complete service-oriented solutions for specific application domains, e.g., healthcare, telecommunications, government and public sector, military, etc.
- Operationally extreme: focus on solutions intended/designed for specific operational environments/requirements, e.g., providing 24x7 services, supporting communities of mobile/partially connected services, etc.
- Collaborative: promote collaboration between academic institutions, industry, and communities of users

Out of six workshop submissions (not including the separately organized PhD symposium), the following two met the specified criteria best and were selected as ICSOC 2006 workshops:

- 2nd International Workshop on Engineering Service-Oriented Applications: Design and Composition (WESOA 2006),
- Modeling the SOA – Business Perspective and Model Mapping (SOAM 2006).

Both ICSOC 2006 workshops were held as one-day workshops on December 4, 2006, i.e., the day before the major conference program of ICSOC 2006 started. This volume contains separate descriptions of both workshops as well as all high-quality paper contributions to these two workshops. In order to reflect the natural concern of scientific workshops as well as to ensure the indispensable high quality of papers to be included into the proceedings it was decided to provide post-workshop proceedings.

Thus, besides the regular reviewing process performed by the two workshop Program Committees in order to invite workshop contributions there was a second quality assurance process performed after the workshops ensuring that all original reviewer comments as well as comments given during the respective workshop were taken into account in order to further improve the papers. This way, as we think, high-quality post-workshop proceedings can be provided in this volume, which we hope all readers will find very interesting and stimulating!

The excellent contributions you will find in this volume reflect the hard work of numerous people involved in preparing, organizing and conducting the workshops and observing high-quality standards. Since a great amount of this work was performed by the Organization Committees of the two workshops, we want to thank all members of the two teams. As representatives we want to mention Christian Zirpins and George Feuerlicht from the WESO 2006 team as well as Marten Schoenherr from the SOAM 2006 team. We also want to acknowledge the contributions of all Program Committee members of the two workshops. A special thanks goes to ICSOC 2006 Local Arrangements Chair Julie Wulf for being continuously supportive and prompt in responding to all kinds of requests. Further we want to thank the ICSOC 2006 General Chairs, Ian Foster and Carlo Ghezzi, for their support. Last but not least we would like to acknowledge the contributions of Hamid R. Motahari-Nezhad in putting together this volume.

May 2007

Dimitrios Georgakopoulos
Norbert Ritter
Boualem Benatallah

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Norbert Ritter, Hamburg University, Germany

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Maximilian Ahrens, Deutsche Telekom Laboratories, Germany

ICSOC 2006 Publication Chair

Boualem Benatallah, The University of New South Wales, Australia

2nd International Workshop on Engineering Service-Oriented Applications: Design and Composition

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1 Workshop Goals and Contents

Growing acceptance of service-oriented computing and an increasing number of large-scale Web service projects raise an urgent need for the research community and industry practitioners to develop comprehensive methodologies that support the entire software development lifecycle (SDLC) of service-oriented applications. To ensure that resulting services are stable, reusable and extendable, such methodologies must be based on sound engineering principles and guide developers through the analysis, design, implementation and deployment phases of the service-oriented SDLC.

A key challenge that needs to be addressed involves the unification of service design and composition methods. Service-oriented design needs to determine what constitutes a service component and decide about the appropriate level of service granularity. It is equally important to correctly define the assembly of complex composite services over multiple levels of abstraction, and to use these aggregated services to construct application systems. The current lack of agreement about basic principles that should guide service design and composition makes it difficult for comprehensive service-oriented SDLC-methodologies to emerge.

Both service design and service composition are active research areas at present. However, the problem areas overlap and can benefit from interchange of ideas and unification of approaches. To reflect on dependencies and synergies between service design and service composition, the WESOA 2006 workshop aimed to discuss unified design and composition methods for reusable service components. Moreover, we sought a multidisciplinary perspective to address the challenges of service design and composition in the context of various domains and to bring together researchers and practitioners for exchange of ideas.

Our call for papers led to 32 submissions. Each paper was comprehensively reviewed by at least 3 reviewers, resulting in acceptance of 11 papers for presentation and publication. This corresponds to an acceptance rate of 34%. The outcome is a rich variety of work revolving around design and composition of services. A number of

authors tackled service-oriented SDLC at the level of *business processes* (Schaffner et al.) and *business services* (Werth et al.). QoS-aware design of service composition is another common concern discussed in the context of *requirements specification* (Baligand et al.), *prediction* (Wu et al.), *dynamic verification* (Rouached et al.) and a *reliability study* (Wassermann et al.). Other papers dealt with AI topics including *formal semantics* (Küster et al.) and *effect-based reasoning* (Wang et al.) as well as data engineering approaches (Feuerlicht). Of particular interest are case studies on service-oriented software systems development for *asset management* (Pathak et al.) and *online auctions* (Benyoucef et al.).

2 Workshop Organization

WESOA 2006 was organized by an international group of researchers listed as the authors of this article. The event would not have been possible without the invaluable contribution of the international Program Committee. We would therefore like to thank the Program Committee members that include the following experts:

- Marco Aiello (*University of Trento, Italy*)
- Djamel Benslimane (*LIRIS, France*)
- Andrew Blair (*Biz Integration, Australia*)
- Paul Brebner (*CSIRO Canberra, Australia*)
- Mark Cameron (*CSIRO ICT Centre, Australia*)
- Jen-Yao Chung (*IBM T.J. Watson Research Center, USA*)
- Vincenzo D'andrea (*University of Trento, Italy*)
- Schahram Dustdar (*Technical University of Vienna, Austria*)
- Wolfgang Emmerich (*University College London, UK*)
- Opher Etzion (*IBM Haifa Research Center, Israel*)
- George Feuerlicht (*Sydney University of Technology, Australia*)
- Howard Foster (*Imperial College London, UK*)
- Ian Gorton (*UNSW NICTA, Australia*)
- Paul Greenfield (*CSIRO, Australia*)
- Roy Gronmo (*SINTEF ICT, Norway*)
- John Grundy (*University of Auckland, New Zealand*)
- Manfred Hauswirth (*DERI Galway, Ireland*)
- Juan Hernandez (*University of Extremadura, Spain*)
- Cai Hong (*IBM China Research, China*)
- Winfried Lamersdorf (*University of Hamburg, Germany*)
- Yinsheng Li (*Fudan University, China*)
- Mark Little (*Arjuna, USA*)
- Zheng Lu (*University of Wollongong, Australia*)
- Heiko Ludwig (*IBM Research, USA*)
- E. Michael Maximilien (*IBM Almaden Research, USA*)
- Massimo Mecella (*University of Rome La Sapienza, Italy*)
- Harald Meyer (*HPI Potsdam, Germany*)
- Daniel Moldt (*University of Hamburg, Germany*)

- Josef Noll (*Telenor, Norway*)
- Guadalupe Ortiz Bellot (*University of Extremadura, Spain*)
- Mike Papazoglou (*Tilburg University, The Netherlands*)
- Greg Pavlik (*Oracle, USA*)
- Thomas Risse (*Fraunhofer Society, Germany*)
- Colette Rolland (*University of Paris, France*)
- Dumitru Roman (*DERI Innsbruck, Austria*)
- Subbu N. Subramanian (*Tavant Technologies, USA*)
- Willem-Jan van den Heuvel (*Tilburg University, The Netherlands*)
- Bruno Wassermann (*University College London, UK*)
- Jim Webber (*ThoughtWorks, Australia*)
- Andreas Wombacher (*University of Twente, The Netherlands*)
- Aoying Zhou (*Fudan University, China*)
- Christian Zirpins (*University College London, UK*)

Finally, we would like to thank the ICSOC organizers, especially the Workshop Chairs Dimitrios Georgakopoulos and Norbert Ritter, the Publication Chair Boualem Benatallah and the Local Arrangements Chair Julie Wulf, for their guidance and support.

Ist International Workshop on Modeling Service-Oriented Architectures: Business Perspective and Model Mapping

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1 Workshop Topics and Objectives

In the last few years both scientists and practitioners have been discussing the issue of service-oriented architectures (SOA). Recently, vendors of enterprise information systems presented first releases of their service-enabled system architectures. From the business perspective the paradigm of service orientation promises more flexibility by aligning business requirements and information technology functionalities.

Modeling the business processes is the first step in formalizing (functional and non-functional) service requirements. There are many methodologies, notations and tools for business process modeling but few which consider the full stack of service orientation specifics. BPEL as an executable model and the dominant standard in the SOA modeling discipline does not cover all aspects of business process modeling. For modeling business processes using notations apart from BPEL, the process models have to be mapped to executable formal models which are necessary to orchestrate services to fulfill defined business requirements. Therefore, different modeling notations need to be combined to fulfill the requirements of a holistic SOA approach. Further aspects such as service life-cycles, roles and service management issues need to be considered.

Main objectives of the workshop were the identification and definition of necessary modeling issues, the introduction of innovative solutions or enhancements for those modeling aspects that are currently not properly supported, and the examination of all aspects of (model) mappings between different SOA model(ing aspect)s. These topics are relevant for research as well as industry practitioners. Thus, the workshop invited important multi-disciplinary contributions in order to start a substantial discussion and finally generate a lasting contact between academic and industrial researchers.

As a result of a double-blind review and an acceptance rate of 40%, the workshop publishes six papers on different issues mentioned above: Modeling of Service Composition (Jaeger), An Approach for QoS Prediction of BPEL Processes (Wu), a Pattern-Based Approach to Business Process Modeling and Implementation in Web Services (Brahe et al.), An Extension of the UN/CEFACT Modeling Methodology and Core Components for Intra-Organizational Service Orchestration (Offermann et

al.), An Integration of Semantic Business Policy into Web Service Composition Meng et al.), and A Model-Driven Approach of Service Domain Analysis(Aier et al.).

2 Workshop Organization

The workshop was organized by the authors of this article. We would like to thank the following Program Committee members:

- Maximilian Ahrens (*Deutsche Telekom Laboratories Berlin, Germany*)
- Stephan Aier (*IWI-HSG, University of St. Gallen, Switzerland*)
- Udo Bub (*Deutsche Telekom Laboratories, Germany*)
- Jens Dietrich (*OSCI, UNCEFACT, Germany*)
- Dirk Draheim (*SCCH, Austria*)
- Mathias Ekstedt (*KTH, Sweden*)
- Michael Elhadad (*Ben Gurion University, Israel*)
- Marten Schoenherr (*Berlin University of Technology, Germany*)
- Johannes Siedersleben (*T-Systems International, Germany*)
- Gerald Weber (*University of Auckland, New Zealand*)

We would like to thank the Workshop Chairs Dimitrios Georgakopoulos and Norbert Ritter, the Publication Chair Boualem Benatallah and the Local Arrangements Chair Julie Wulf.

Table of Contents

Part I: Second International Workshop on Engineering Service-Oriented Applications: Design and Composition

Managing SOA Through Business Services – A Business-Oriented Approach to Service-Oriented Architectures	3
<i>Dirk Werth, Katrina Leyking, Florian Dreifus, Jörg Ziemann, and Andreas Martin</i>	
Reliable Scientific Service Compositions	14
<i>Bruno Wassermann and Wolfgang Emmerich</i>	
A Service-Oriented Architecture for Electric Power Transmission System Asset Management	26
<i>Jyotishman Pathak, Yuan Li, Vasant Honavar, and James McCalley</i>	
A Language for Quality of Service Requirements Specification in Web Services Orchestration	38
<i>Fabien Baligand, Didier Le Botlan, Thomas Ledoux, and Pierre Combes</i>	
A Semi-automated Orchestration Tool for Service-Based Business Processes	50
<i>Jan Schaffner, Harald Meyer, and Cafer Tosun</i>	
Web Service Composition: An Approach Using Effect-Based Reasoning	62
<i>Puweì Wang and Zhi Jin</i>	
Analysis of Composite Web Services Using Logging Facilities	74
<i>Mohsen Rouached and Claude Godart</i>	
QoS Prediction for Composite Web Services with Transactions	86
<i>Jiangxia Wu and Fangchun Yang</i>	
Service Aggregation Using Relational Operations on Interface Parameters	95
<i>George Feuerlicht</i>	
A BPEL Based Implementation of Online Auctions	104
<i>Morad Benyoucef and Ronald Pringadi</i>	
Dynamic Binding for BPEL Processes – A Lightweight Approach to Integrate Semantics into Web Services	116
<i>Ulrich Küster and Birgitta König-Ries</i>	

Part II: First International Workshop on Modeling Service-Oriented Architectures: Business Perspective and Model Mapping	
A Model-Driven Approach for QoS Prediction of BPEL Processes <i>Jiangxia Wu and Fangchun Yang</i>	131
Modelling of Service Compositions: Relations to Business Process and Workflow Modelling <i>Michael C. Jaeger</i>	141
Extending the UN/CEFACT Modeling Methodology and Core Components for Intra-organizational Service Orchestration <i>Philipp Offermann, Christian Schröpfer, and Maximilian Ahrens</i>	154
A Pattern-Based Approach to Business Process Modeling and Implementation in Web Services <i>Steen Brahe and Behzad Bordbar</i>	166
Integrating Semantic Business Policy into Web Service Composition <i>Xu Meng and Chen Junliang</i>	178
Model Driven Service Domain Analysis <i>Stephan Aier and Marten Schönherr</i>	190
Author Index	201

Part I

Second International Workshop on Engineering Service-Oriented Applications: Design and Composition

Managing SOA Through Business Services – A Business-Oriented Approach to Service-Oriented Architectures

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Abstract. The idea of more flexible, modular system structures thanks to web service interfaces feed expectations towards a novel degree of business agility. However, the challenge of the information system community consists in developing methods and techniques to vest service-orientation with business concepts that deploy a SOA according to organizational requirements. This paper tackles this challenge by introducing Business Service Management as an interdisciplinary discipline for business-driven deployment of SOA. It approaches this ambitious objective by utilizing business processes as semi-formalized representations of an enterprise's characteristics and requirements towards IT.

Keywords: Business Process, Business process management, Business Services, Service-oriented Architectures, Web Services.

1 Introduction

The current omnipresence of service-oriented architectures (SOA) could lead one to believe in the rise of a new software paradigm that will revolutionize IT landscapes especially in business environments. The idea of more flexible, modular system structures through web service interfaces feed expectations towards a novel degree of business agility. The dream of leveraging and integrating system resources on demand based on market requirements has been dreamed by business already multiple times. SOA shares the concept of flexible, business-driven system architectures with previous approaches such as business components or business objects. Thus, the legitimate question comes up what distinguishes SOA from them. Why should service-orientation become the envisioned panacea for bridging the gap between IT and business which all other concepts failed to be? Whether the SOA vision will turn out as short-dated fad or as durable step towards plug-and-play software architectures is not only a matter of technological progress but also of its seamless applicability to real business situations. In fact, SOA will primarily add complexity to managerial tasks instead of disburden them. Introducing SOA brings about novel unprecedented

challenges for the manageability of the IT landscape. The common business goal of efficient and transparent processes over the whole value chain becomes much fuzzier and very difficult to accomplish. In order to reconcile the conflictive objectives of flexibility promised by a SOA and manageability targeted by business (process) management, a rigorous approach to reduce complexity from service-orientation is needed. Thus, the challenge of the information system community consists in developing methods and techniques to vest service-orientation with business concepts that deploy a SOA according to organizational requirements [1]. This paper tackles this challenge by introducing Business Service Management as a mediating discipline for business-driven deployment of SOA. It approaches this ambitious objective by utilizing business processes as semi-formalized representations of an enterprise's characteristics and requirements towards IT and web services as representatives for the IT application landscape. Due to ever accelerating developments on the market, business processes are all but stable entities. They are subject to changes in the product portfolio, redefinition of core competencies, most innovative production techniques, etc. On the other hand, companies must not only deal with agility of their markets but also manage their constantly aging IT infrastructure characterized by heterogeneity, distribution, and out-dated technology. We define Business Services as the ultimately durable layer between rapidly changing business requirements represented by business processes and steadily evolving system landscape that ought to meet these requirements. The goal is to have a set of business-oriented building blocks that embody core functionalities, executed via composite web services, to be flexibly reused and combined to processes. The paper will finish by indicating the most urgent research questions to consolidate the new discipline of business service management in the context of business process management.

2 On the Relation Between Business Process and Service Orientation

2.1 Business Process Management

In order to design, analyze and control organizational structures as well as business activities companies nowadays are increasingly following the process orientation paradigm [2]. A business process is a "continuous series of enterprise tasks, undertaken for the purpose of creating output" [3]. In line with these efforts Business Process Management (BPM) is widely-used as a framework for having formal and repeatable proceedings in place. Various approaches to adopt BPM in companies have emerged in recent years. Besides approaches such as the Zachman Framework or PROMET the architecture of Integrated Information Systems (ARIS) is accepted as a standard framework for business process (re-)engineering throughout the community. Beyond notation and modeling dimensions the ARIS House of Business Engineering provides an overall BPM methodology which supports the entire BPM life cycle combining process design, process control, workflow control and process application implementation [4]. Generally speaking, concepts of business process management can be identified as requirements engineering approaches that take the needs of the business domain and relate them to implemented information technology (IT).