Lecture Notes in Computer Science

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison
Lancaster University, UK

Takeo Kanade
Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler
University of Surrey, Guildford, UK

Jon M. Kleinberg
Cornell University, Ithaca, NY, USA

Friedemann Mattern
ETH Zurich, Switzerland

John C. Mitchell
Stanford University, CA, USA

Moni Naor
Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz
University of Bern, Switzerland

C. Pandu Rangan
Indian Institute of Technology, Madras, India

Bernhard Steffen
University of Dortmund, Germany

Madhu Sudan
Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos
University of California, Los Angeles, CA, USA

Doug Tygar
University of California, Berkeley, CA, USA

Moshe Y. Vardi
Rice University, Houston, TX, USA

Gerhard Weikum
Max-Planck Institute of Computer Science, Saarbruecken, Germany
Preface

This volume contains the proceedings of the 4th International Conference on Service-Oriented Computing (ICSOC 2006), which took place in Chicago, USA, December 4–7, 2006. ICSOC 2006 followed on the success of three previous editions of the International Conference on Service-Oriented Computing in Amsterdam, Netherlands (2005), New York City, USA (2004) and Trento, Italy (2003). ICSOC is recognized as the main conference for service-oriented computing research that covers the entire spectrum from theoretical and foundational results to empirical evaluations as well as practical and industrial experiences. ICSOC 2006 built on that foundation while introducing several innovations in furthering this goal.

Service-oriented computing brings together ideas and technologies from many different fields in an evolutionary manner to address research challenges such as service composition, discovery, integration, monitoring and management of services, service quality and security, methodologies for supporting service development, governances in their evolution, as well as their overall life-cycle management. ICSOC 2006 strengthened the link to two important communities, Software Engineering and Grid Computing, with well-known leaders from these communities serving in important organizing roles such as general chairs in shaping the conference.

In order to provide a balanced coverage and equal emphasis on all SOC topics, these topics are divided into six major areas. They include Business Service Modeling, Service Assembly, Service Deployment, and Management – covering the research issues in the four primary life-cycle phases of a service, modeling, assembly, deployment, and management. Additionally, the runtime architectural issues are covered by the SOA Runtime, and quality of service issues – spanning all life-cycle stages, i.e., specification to autonomic management – are covered by the Quality of Service area. Finally, the Grid Services area covers application of service-oriented computing in managing infrastructural resources.

Organizationally, for each of these areas, respective Area Coordinators have the key role of defining topics, reaching out to the scientific communities and supporting the evaluation and selection of papers related to the diverse communities.

The paper selection process was very thorough. Matching diversity of paper topics and reviewer expertise is definitely a challenge. Therefore, we worked closely with the Area Coordinators, i.e., two experts representing each of the areas, to assign reviewers to submitted papers, and also to sort out the differences in opinions from different reviewers by weighing in their expert opinion. Since the content of a paper may be identified by multiple areas, reviewers were drawn from all the associated areas. Overall in the selection process, we sought a diversity of papers and balance across the areas while selecting the top papers in each of the areas. ICSOC 2006 received over 200 contributions in the research track, accepting only 34 full and 16 short papers.
This year we also enhanced the industrial track by attracting many industry leaders – representing the gamut of software middleware vendors, consulting analysts, solution integrators and practitioners of service-oriented architecture (SOA) – both to serve on the Program Committee and to submit papers sharing valuable hands-on experiences and key challenges in practicing service-oriented computing. The industrial papers highlight lessons learned, analysis of technology gap, methodology used in practice, noteworthy and innovative application scenarios, need for new standardization, and major improvements to the state of practice. The industry track received more than 60 submissions, out of which only 9 full papers were selected. It also features two invited vision papers discussing the evolution of service-oriented computing.

In addition to the regular, industry, and short presentations, the ICSOC 2006 conference featured three tutorials, two panels examining the role of open-source software and research challenges, and – as customary in ICSOC conferences – top-notch keynotes, given by leaders in the industrial and academic community.

The excellent program that we assembled for presentation at the conference is a reflection of the hard and dedicated work of numerous people. We would like to thank the members of the Program Committee and the reviewers for their great efforts in selecting the papers, and the Area Coordinators in making an extra effort in looking over the reviews and sorting out differences in opinions. We also acknowledge the great contributions of Julie Wulf-Knoerzer in the local organization, of Vincenzo D’Andrea for handling finances, of Matei Ripeanu in handling the publicity, of Boualem Benatallah for handling publication of the conference proceedings, and of Martin Swany for handling registration. We also thank Dimitrios Georgakopoulos, Norbert Ritter (Workshop Chairs), Frank Leymann and Heiko Ludwig (Tutorial Chairs) for organizing associated workshops and tutorials. We would also like to thank some individuals for their special help and contributions: Sonja Zaplata for assisting the Program Chairs in tracking various issues that arose throughout the review process, and for being prompt in responding to queries from authors, reviewers and other conference chairs, Harald Weinreich, who created and adapted the conftool for us several times – often without anyone really noticing—and Anne Awizen for her support. And last but not the least, we would like to thank the Steering Committee members, Fabio Casati, Paco Curbera, Mike Papazoglou, and Paolo Traverso, for their guidance, and our partners, ACM SIGWeb and SIGSoft.

We hope you find the papers in this volume interesting and stimulating.

December 2006
Ian Foster and Carlo Ghezzi (General Chairs)
Asit Dan and Winfried Lamersdorf (Program Chairs)
Robert Johnson, and Jeff Mischkinsky (Industrial Track Chairs)
Organization

ICSOC 2006 Conference Chairs

General Chairs
- Ian Foster, University of Chicago, USA
- Carlo Ghezzi, Politecnico di Milano, Italy

Program Chairs
- Asit Dan, IBM, USA
- Winfried Lamersdorf, Hamburg University, Germany

Industrial Track Chairs
- Robert Johnson, IBM, USA
- Jeff Mischkinsky, Oracle, USA

Workshop Coordination
- Dimitrios Georgakopoulos, Telcordia, USA
- Norbert Ritter, Hamburg University, Germany

Tutorial Chairs
- Frank Leymann, University of Stuttgart, Germany
- Heiko Ludwig, IBM, USA

Local Arrangements Chair
- Julie Wulf, Univa Corporation, USA

Financial Chair
- Vincenzo D’Andrea, University of Trento, Italy

Registration Chair
- Martin Swany, University of Delaware, USA

Publicity Chair
- Matei Ripeanu, University of British Columbia, Canada

Publication Chair
- Boualem Benatallah, UNSW, Australia

Steering Committee
- Fabio Casati, Hewlett-Packard Labs, USA
- Paco Curbera, IBM Research, Hawthorne, UK
- Mike Papazoglou, Tilburg University, Netherlands
- Paolo Traverso, ITC-IRST, Italy

Area Coordinators

Service Modeling
- Wolfgang Emmerich, UCL, UK
- Mathias Weske, University of Potsdam, Germany

Service Assembly
- Barbara Pernici, Politecnico di Milano, Italy
- Munindar Singh, North Carolina State University, USA

Service Management
- Luciano Baresi, Politecnico di Milano, Italy
- Hiro Kishimoto, Jujitsu, Japan

SOA Runtime
- Douglas Schmidt, Vanderbilt University, USA
- Steve Vinoski, Iona, USA

Quality of Service
- Priya Narasimhan, CMU, USA
- Jim Pruyn, HP, USA

Grid Services
- Dennis Gannon, Indiana University, USA
- Paul Watson, Univ. of Newcastle upon Tyne, UK
**Program Committee**

### Research Track

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nabil R. Adam</td>
<td>Rutgers University, USA</td>
</tr>
<tr>
<td>Jose Luis Ambite</td>
<td>USC/ISI, USA</td>
</tr>
<tr>
<td>Mikio Aoyama</td>
<td>NISE, Japan</td>
</tr>
<tr>
<td>Alistair Barros</td>
<td>SAP, Australia</td>
</tr>
<tr>
<td>Boualem Benatallah</td>
<td>University of New South Wales, Australia</td>
</tr>
<tr>
<td>Walter Binder</td>
<td>EPFL, Switzerland</td>
</tr>
<tr>
<td>Athman Bouguettaya</td>
<td>Virginia Tech, USA</td>
</tr>
<tr>
<td>Sjaak Brinkkemper</td>
<td>Utrecht University, Netherlands</td>
</tr>
<tr>
<td>Tevfik Bultan</td>
<td>UCSB, USA</td>
</tr>
<tr>
<td>Fabio Casati</td>
<td>HP, USA</td>
</tr>
<tr>
<td>Malu Castellanos</td>
<td>HP, USA</td>
</tr>
<tr>
<td>Bruno Crispo</td>
<td>Vrije University Amsterdam, Netherlands</td>
</tr>
<tr>
<td>Paco Curbera</td>
<td>IBM Research, USA</td>
</tr>
<tr>
<td>Vincenzo D'Andrea</td>
<td>Università di Trento, Italy</td>
</tr>
<tr>
<td>Umesh Dayal</td>
<td>HP, USA</td>
</tr>
<tr>
<td>Flavio De Paoli</td>
<td>Università di Milano, Italy</td>
</tr>
<tr>
<td>Tommaso Di Noia</td>
<td>University of Bari, Italy</td>
</tr>
<tr>
<td>Jens-Peter Dittrich</td>
<td>ETH Zurich, Switzerland</td>
</tr>
<tr>
<td>John Domingue</td>
<td>KMI, UK</td>
</tr>
<tr>
<td>Schahram Dustdar</td>
<td>University of Technology Vienna, Austria</td>
</tr>
<tr>
<td>Boi Faltings</td>
<td>EPFL, Switzerland</td>
</tr>
<tr>
<td>Dieter Fensel</td>
<td>University of Innsbruck, Austria</td>
</tr>
<tr>
<td>Gianluigi Ferrari</td>
<td>University of Pisa, Italy</td>
</tr>
<tr>
<td>George Feuerlicht</td>
<td>University of Technology Sydney, Australia</td>
</tr>
<tr>
<td>Ioannis Fikouras</td>
<td>Ericsson, Germany</td>
</tr>
<tr>
<td>Geoffrey Fox</td>
<td>Indiana University, USA</td>
</tr>
<tr>
<td>Alex Galis</td>
<td>UCL, UK</td>
</tr>
<tr>
<td>Dimitrios Georgakopoulos</td>
<td>Telcordia, USA</td>
</tr>
<tr>
<td>Paolo Giorgini</td>
<td>University of Trento, Italy</td>
</tr>
<tr>
<td>Claude Godart</td>
<td>Université Henri Poincaré Nancy, France</td>
</tr>
<tr>
<td>Paul Grefen</td>
<td>Eindhoven University of Technology, Netherlands</td>
</tr>
<tr>
<td>John Grundy</td>
<td>University of Auckland, New Zealand</td>
</tr>
<tr>
<td>Mohand-Said Hacid</td>
<td>Université Lyon, France</td>
</tr>
<tr>
<td>Hakan Hacigumus</td>
<td>Almaden IBM, USA</td>
</tr>
<tr>
<td>Kate Keahey</td>
<td>Argonne National Laboratory, USA</td>
</tr>
<tr>
<td>Alfons Kemper</td>
<td>Technische Universität München, Germany</td>
</tr>
<tr>
<td>Roger Kilian-Kehr</td>
<td>SAP Karlsruhe, Germany</td>
</tr>
<tr>
<td>Jana Koehler</td>
<td>IBM Zurich Research Lab, Switzerland</td>
</tr>
<tr>
<td>Bernd Kraemer</td>
<td>Fernuniversität Hagen, Germany</td>
</tr>
<tr>
<td>Brian LaMacchia</td>
<td>Microsoft, USA</td>
</tr>
<tr>
<td>Frank Leymann</td>
<td>University of Stuttgart, Germany</td>
</tr>
<tr>
<td>Name</td>
<td>Institution</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Ling Liu</td>
<td>Georgia Institute of Technology, USA</td>
</tr>
<tr>
<td>Heiko Ludwig</td>
<td>IBM Research, USA</td>
</tr>
<tr>
<td>Neil Maiden</td>
<td>City University London, UK</td>
</tr>
<tr>
<td>Tiziana Margarina</td>
<td>Potsdam University, Germany</td>
</tr>
<tr>
<td>Ioana Manolescu</td>
<td>INRIA, France</td>
</tr>
<tr>
<td>David Martin</td>
<td>SRI, USA</td>
</tr>
<tr>
<td>Eugene M. Maximilien</td>
<td>IBM Almaden, USA</td>
</tr>
<tr>
<td>Massimo Mecella</td>
<td>Università di Roma, Italy</td>
</tr>
<tr>
<td>Brahim Medjahed</td>
<td>Michigan University, USA</td>
</tr>
<tr>
<td>Toshiyuki Nakata</td>
<td>NEC, Japan</td>
</tr>
<tr>
<td>Christos Nikolaou</td>
<td>University of Crete, Greece</td>
</tr>
<tr>
<td>David O'Hallaron</td>
<td>Carnegie Mellon University, USA</td>
</tr>
<tr>
<td>Guadalupe Ortiz</td>
<td>Universidad de Extremadura, Spain</td>
</tr>
<tr>
<td>Mike Papazoglou</td>
<td>Tilburg University, Netherlands</td>
</tr>
<tr>
<td>Anna Perini</td>
<td>ITC-IRST Trento, Italy</td>
</tr>
<tr>
<td>Marco Pistore</td>
<td>Università di Trento, Italy</td>
</tr>
<tr>
<td>Axel Polleres</td>
<td>Universidad Rey Juan Carlos, Spain</td>
</tr>
<tr>
<td>Jean Pierre Prost</td>
<td>IBM Montpellier, France</td>
</tr>
<tr>
<td>Omer Rana</td>
<td>Cardiff University, UK</td>
</tr>
<tr>
<td>Thomas Risse</td>
<td>Fraunhofer Gesellschaft, Germany</td>
</tr>
<tr>
<td>Norbert Ritter</td>
<td>Hamburg University, Germany</td>
</tr>
<tr>
<td>Colette Rolland</td>
<td>Université de Paris I, France</td>
</tr>
<tr>
<td>Rainer Ruggaber</td>
<td>SAP, Germany</td>
</tr>
<tr>
<td>Akhil Sahai</td>
<td>HP, USA</td>
</tr>
<tr>
<td>Volker Sander</td>
<td>Jülich Research Centre, Germany</td>
</tr>
<tr>
<td>Vladimiro Sassone,</td>
<td>University of Southampton, UK</td>
</tr>
<tr>
<td>Dimitrios N. Serpanos</td>
<td>University of Patras, Greece</td>
</tr>
<tr>
<td>Jun Shen</td>
<td>University of Wollongong, Australia</td>
</tr>
<tr>
<td>Santosh Srivastava</td>
<td>University of New Castle, UK</td>
</tr>
<tr>
<td>Maarten Steen</td>
<td>Telematica Enschede, Netherlands</td>
</tr>
<tr>
<td>Tony Storey</td>
<td>IBM, UK</td>
</tr>
<tr>
<td>Jianwen Su</td>
<td>UCSB, USA</td>
</tr>
<tr>
<td>Ravi Subramaniam</td>
<td>Intel, USA</td>
</tr>
<tr>
<td>Angelo Susi</td>
<td>ITC-IRST Trento, Italy</td>
</tr>
<tr>
<td>Katia Sycara</td>
<td>CMU, USA</td>
</tr>
<tr>
<td>Stefan Tai</td>
<td>IBM New York, USA</td>
</tr>
<tr>
<td>Kian-Lee Tan</td>
<td>National University of Singapore, Singapore</td>
</tr>
<tr>
<td>Paolo Tonella</td>
<td>ITC-IRST Trento, Italy</td>
</tr>
<tr>
<td>Farouk Toumani</td>
<td>ISIMA Autiere, France</td>
</tr>
<tr>
<td>Don Towsley</td>
<td>University of Massachusetts, USA</td>
</tr>
<tr>
<td>Paolo Traverso</td>
<td>ITC-RST, Italy</td>
</tr>
<tr>
<td>Aphrodite Tsalgatidou</td>
<td>University of Athens, Greece</td>
</tr>
<tr>
<td>Karthikeyan Umapathy</td>
<td>Penn State University, USA</td>
</tr>
<tr>
<td>Will van der Aalst</td>
<td>Eindhoven University of Technology, Netherlands</td>
</tr>
<tr>
<td>Jos van Hillegersberg</td>
<td>University of Twente, Netherlands</td>
</tr>
<tr>
<td>Aad Van Moorsel</td>
<td>University of Newcastle, UK</td>
</tr>
<tr>
<td>Vijay Varadharajan</td>
<td>Macquarie University, Australia</td>
</tr>
<tr>
<td>John Wilkes</td>
<td>HP Labs Palo Alto, USA</td>
</tr>
<tr>
<td>Martin Wirsing</td>
<td>Technische Universität München, Germany</td>
</tr>
</tbody>
</table>
Jian Yang  Macquarie University, Australia
Arkady Zaslavsky  Monash University Melbourne, Australia
Gianluigi Zavattaro  University of Bologna, Italy
Yanchun Zhang  Victoria University, Australia
Christian Zirpins  University College London, UK

Industry Track

Anne Anderson  Sun, USA
Paul Freemantle  WSO2, UK
Steve Graham  IBM, USA
Frederick Hirsch  Nokia, USA
Kerrie Holley  IBM, USA
Philippe Le Hégaret  W3C, USA
Mark Little  Redhat, USA
Ashok Malhotra  Oracle, USA
Andy Mulholland  CapGemini, UK
Srinivas Narayanan  Tavant, USA
Eric Newcomer  Iona Technology, USA
Mark Nottingham  Yahoo, USA
Sanjay Patil  SAP, USA
Greg Pavlik  Oracle, USA
Harini Srinivasan  IBM, USA
William Vambenepe  HP, USA
Sanjiva Weerawarana  WSO2, Sri Lanka
Bobbi Young  Unisys, USA

Additional Referees

Grigoris Antoniou  Cu Nguyen Duy
Andrei Arion  Paul El-Khoury
George Athanasopoulos  Rik Eshuis
Michael Averstegge  Reza Eslami
Donald Baker  Pascal Fenkm
Venkat Balakrishnan  Eugen Freiter
Piergiorgio Bertoli  Keisuke Fukui
Aliaksandr Birukou  GR Gangadaran
Lars Braubach  Steffen Göbel
Volha Bryl  Jan Goossenaerts
Andrzej Cichocki  Simone Grega
Francesco Colasuonno  Claudio Guidi
Marco Comerio  Michael Harrison
Nick Cook  Martin Husemann
Eugenio Di Sciascio  Hiroshi Igaki
Remco Dijkman  Yuji Imai
Nicola Dragoni  Sarath Indrakanti
Christian Drumm  Marijke Janssen
Rim Samia Kaabi
Raman Kazhamiakin
Natallia Kokash
Jacek Kopecky
Iryna Kozłowa
Kathleen Krebs
Christian P. Kunze
Jens Lemcke
Ching Lin
Xumin Liu
Roberto Lucchi
Matteo Maffei
Daniele Maggiore
Zaki Malik
Manolis Marazakis
Annapaola Marconi
Bogdan Marinoiu
Andrea Maurino
Harald Meyer
Stefano Modafferi
Carlos Molina-Jimenez
Graham Morgan
Enrico Mussi
Marian Nodine
Michael Pantazoglou
Panayiotis Periorellis
Marinella Petrocchi
Christian Platzer
Dimitris Plexousakis
Alexander Pokahr
Stanislav Pokraev
Frank Puhlmann
Azzurra Ragone
Claudia Raibule
Claudia Raibulet
Chun Ruan
Yacine Sam
Andreas Savva
Alberto Siena
Jim Smith
Luca Spalazzi
Alexander Stuckenholz
Ioan Toma
Martin Treiber
Uday Kiran Tupakula
Harald Vogt
Michael von Riegen
Jochem Vonk
Jim Webber
Stuart Wheater
Simon Woodman
Xu Yang
Qi Yu
Nicola Zannone
Sonja Zaplata
Uwe Zdun
Yi Zhang
Weiliang Zhao
George Zheng
# Table of Contents

## Part 1: Research Track Full Papers

### Service Mediation

Requirements and Method for Assessment of Service Interoperability .............................. 1  
*Stanislav Pokraev, Dick Quartel, Maarten W.A. Steen, Manfred Reichert*

An Aspect-Oriented Framework for Service Adaptation ........................................... 15  
*Woralak Kongdenfha, Régis Saint-Paul, Boualem Benatallah, Fabio Casati*

Automated Generation of BPEL Adapters ...................................................... 27  
*Antonio Brogi, Razvan Popescu*

### Grid Services and Scheduling

Division of Labor: Tools for Growing and Scaling Grids ........................................... 40  
*T. Freeman, K. Keahey, I. Foster, A. Rana, B. Sotomoayor, F. Wuerthwein*

DECO: Data Replication and Execution CO-scheduling for Utility Grids .......................... 52  
*Vikas Agarwal, Gargi Dasgupta, Koustuv Dasgupta, Amit Purohit, Balaji Viswanathan*

Coordinated Co-allocator Model for Data Grid in Multi-sender Environment .................. 66  
*R.S. Bhuvaneswaran, Yoshiaki Katayama, Naohisa Takahashi*

### Mobile and P2P Services

Adaptive Preference Specifications for Application Sessions .................................. 78  
*Christine Julien*

Mobile Ad Hoc Services: Semantic Service Discovery in Mobile Ad Hoc Networks .......... 90  
*Andronikos Nedos, Kulpreet Singh, Siobhán Clarke*
Discovering Web Services and JXTA Peer-to-Peer Services in a Unified Manner .................................................. 104
  Michael Pantazoglou, Aphrodite Tsalgatidou,
  George Athanasopoulos

Service Composition

A Hierarchical Framework for Composing Nested Web Processes ........ 116
  Haibo Zhao, Prashant Doshi

Using Dynamic Asynchronous Aggregate Search for Quality Guarantees of Multiple Web Services Compositions ............... 129
  Xuan Thang Nguyen, Ryszard Kowalczyk, Jun Han

Service Composition (re)Binding Driven by Application-Specific QoS .... 141
  Gerardo Canfora, Massimiliano Di Penta, Raffaele Esposito,
  Francesco Perfetto, Maria Luisa Villani

Design of Quality-Based Composite Web Services ....................... 153
  F. De Paoli, G. Lulli, A. Maurino

Adaptive Services

AMPol-Q: Adaptive Middleware Policy to Support QoS .................. 165
  Raja Afandi, Jianqing Zhang, Carl A. Gunter

Adaptive Web Processes Using Value of Changed Information .......... 179
  John Harney, Prashant Doshi

SCENE: A Service Composition Execution Environment Supporting Dynamic Changes Disciplined Through Rules ....................... 191
  Massimiliano Colombo, Elisabetta Di Nitto, Marco Mauri

A Self-healing Web Server Using Differentiated Services .............. 203
  Henri Naccache, Gerald C. Gannod, Kevin A. Gary

Data Intensive Services

Quality of Service Enabled Database Applications ...................... 215
  S. Krompass, D. Gmach, A. Scholz, S. Seltzsam, A. Kemper

A Model-Based Framework for Developing and Deploying Data Aggregation Services .............................................. 227
  Ramakrishna Soma, Amol Bakshi, V.K. Prasanna, Will Da Sie
Service Management: Registry, Reliability

A Distributed Approach for the Federation of Heterogeneous Registries ........................................ 240

Luciano Baresi, Matteo Miraz

I-Queue: Smart Queues for Service Management ...................... 252

Mohamed S. Mansour, Karsten Schwan, Sameh Abdelaziz

XML Processing

Optimizing Differential XML Processing by Leveraging Schema and Statistics............................. 264

Toyotaro Suzumura, Satoshi Makino, Naohiko Uramoto

Optimized Web Services Security Performance with Differential Parsing ......................................... 277

Masayoshi Teraguchi, Satoshi Makino, Ken Ueno, Hyen-Vui Chung

Web Browsers as Service-Oriented Clients Integrated with Web Services ........................................ 289

Hisashi Miyashita, Tatsuya Ishihara

Service Modeling

Interaction Soundness for Service Orchestrations ....................... 302

Frank Puhlmann, Mathias Weske

Modeling Web Services by Iterative Reformulation of Functional and Non-functional Requirements ........................................ 314

Jyotishman Pathak, Samik Basu, Vasant Honavar

SOCK: A Calculus for Service Oriented Computing .................. 327

Claudio Guidi, Roberto Lucchi, Roberto Gorrieri, Nadia Busi, Gianluigi Zavattaro

A Priori Conformance Verification for Guaranteeing Interoperability in Open Environments .................. 339

Matteo Baldoni, Cristina Baroglio, Alberto Martelli, Viviana Patti

Business Services: Transaction, Licensing and SLA Assessment

A Business-Aware Web Services Transaction Model ................. 352

Mike P. Papazoglou, Benedikt Kratz
Licensing Services: Formal Analysis and Implementation ............... 365
G.R. Gangadharan, Vincenzo D’Andrea

QoS Assessment of Providers with Complex Behaviours:
An Expectation-Based Approach with Confidence ..................... 378
Gareth Shercliff, Jianhua Shao, W. Alex Gray, Nick J. Fiddian

Service Discovery and Selection

A QoS-Aware Selection Model for Semantic Web Services ............... 390
Xia Wang, Tomas Vitvar, Mick Kerrigan, Ioan Toma

UML-Based Service Discovery Framework .................................. 402
Andrea Zisman, George Spanoudakis

BPEL-Unit: JUnit for BPEL Processes ..................................... 415
Zhong Jie Li, Wei Sun

Part 2: Research Track Short Papers

Quality of Service (Policy, Transaction and Monitoring)

A User Driven Policy Selection Model .................................... 427
Mariagrazia Fugini, Pierluigi Plebani, Filippo Ramoni

Ting Wang, Paul Grefen, Jochem Vonk

Mohsen Rouached, Claude Godart

Supporting QoS Monitoring in Virtual Organisations ..................... 447
Patrick J. Stockreisser, Jianhua Shao, W. Alex Gray, Nick J. Fiddian

Business Service Modeling

Event Based Service Coordination over Dynamic and Heterogeneous Networks ................................................................. 453
Gianluigi Ferrari, Roberto Guanciale, Daniele Strollo
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implicit vs. Explicit Data-Flow Requirements in Web Service Composition Goals</td>
<td>459</td>
</tr>
<tr>
<td>Annapaola Marconi, Marco Pistore, Paolo Traverso</td>
<td></td>
</tr>
<tr>
<td>Light-Weight Semantic Service Annotations Through Tagging</td>
<td>465</td>
</tr>
<tr>
<td>Harald Meyer, Mathias Weske</td>
<td></td>
</tr>
<tr>
<td>Service-Oriented Model-Driven Development: Filling the Extra-Functional Property Gap</td>
<td>471</td>
</tr>
<tr>
<td>Guadalupe Ortiz, Juan Hernández</td>
<td></td>
</tr>
<tr>
<td>WSMX: A Semantic Service Oriented Middleware for B2B Integration</td>
<td>477</td>
</tr>
<tr>
<td>Thomas Haselwanter, Paavo Kotinurmi, Matthew Moran, Tomas Vitvar, Maciej Zaremba</td>
<td></td>
</tr>
<tr>
<td>Top Down Versus Bottom Up in Service-Oriented Integration: An MDA-Based Solution for Minimizing Technology Coupling</td>
<td>484</td>
</tr>
<tr>
<td>Theo Dirk Meijler, Gert Kruithof, Nick van Beest</td>
<td></td>
</tr>
</tbody>
</table>

**Service Assembly**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semantic Service Mediation</td>
<td>490</td>
</tr>
<tr>
<td>Liangzhao Zeng, Boualem Benatallah, Guo Tong Xie, Hui Lei</td>
<td></td>
</tr>
<tr>
<td>Examining Usage Protocols for Service Discovery</td>
<td>496</td>
</tr>
<tr>
<td>Rimon Mikhaiel, Eleni Stroulia</td>
<td></td>
</tr>
<tr>
<td>Sliver: A BPEL Workflow Process Execution Engine for Mobile Devices</td>
<td>503</td>
</tr>
<tr>
<td>Gregory Hackmann, Mart Haitjema, Christopher Gill, Gruia-Catalin Roman</td>
<td></td>
</tr>
<tr>
<td>Automated Discovery of Compositions of Services Described with Separate Ontologies</td>
<td>509</td>
</tr>
<tr>
<td>Antonio Brogi, Sara Corfini, José F. Aldana, Ismael Navas</td>
<td></td>
</tr>
<tr>
<td>Dynamic Web Service Selection and Composition: An Approach Based on Agent Dialogues</td>
<td>515</td>
</tr>
<tr>
<td>Yasmine Charif-Djebar, Nicolas Sabouret</td>
<td></td>
</tr>
<tr>
<td>Leveraging Web Services Discovery with Customizable Hybrid Matching</td>
<td>522</td>
</tr>
<tr>
<td>Natallia Kokash, Willem-Jan van den Heuvel, Vincenzo D’Andrea</td>
<td></td>
</tr>
</tbody>
</table>
Part 3: Industrial Track Vision and Full Papers

Vision Papers

Assembly of Business Systems Using Service Component Architecture .................................................. 529
Anish Karmarkar, Mike Edwards

The End of Business as Usual: Service-Oriented Business Transformation .................................................. 540
Andy Mulholland

Experience with Deployed SOA

A Service Oriented Reflective Wireless Middleware ......................... 545
Bora Yurday, Haluk Gumuskaya

Procedures of Integration of Fragmented Data in a P2P Data Grid Virtual Repository ................................................................. 557
Kamil Kuliberda, Jacek Wislicki, Tomasz Kowalski, Radoslaw Adamus, Krzysztof Kaczmarski, Kazimierz Subieta

Towards Facilitating Development of SOA Application with Design Metrics ............................................. 569
Wei Zhao, Ying Liu, Jun Zhu, Hui Su

SOA Architectures

Dynamic Service Oriented Architectures Through Semantic Technology .......................................................... 581
Suzette Stoutenburg, Leo Obrst, Deborah Nichols, Ken Samuel, Paul Franklin

A Service Oriented Architecture Supporting Data Interoperability for Payments Card Processing Systems .................. 591
Joseph M. Bugajski, Robert L. Grossman, Steve Vejcik

Services-Oriented Computing in a Ubiquitous Computing Platform ...... 601
Ji Hyun Kim, Won Il Lee, Jonathan Munson, Young Ju Tak

Early Adoption of SOA Technology

SCA Policy Association Framework ................................................. 613
Michael Beisiegel, Nickolas Kavantzas, Ashok Malhotra, Greg Pavlik, Chris Sharp
A Model-Driven Development Approach to Creating Service-Oriented Solutions ........................................................ 624
Simon K. Johnson, Alan W. Brown

Mariusz Momotko, Michał Gajewski, André Ludwig,
Ryszard Kowalczyk, Marek Kowalkiewicz, Jian Ying Zhang

Author Index ........................................................................................................ 651