Lecture Notes in Computer Science 2910 Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

Springer Berlin

Berlin Heidelberg New York Hong Kong London Milan Paris Tokyo Maria E. Orlowska Sanjiva Weerawarana Michael P. Papazoglou Jian Yang (Eds.)

Service-Oriented Computing – ICSOC 2003

First International Conference Trento, Italy, December 15-18, 2003 Proceedings



Series Editors

Gerhard Goos, Karlsruhe University, Germany Juris Hartmanis, Cornell University, NY, USA Jan van Leeuwen, Utrecht University, The Netherlands

Volume Editors

Maria E. Orlowska University of Queensland, School of ITEE Brisbane Qld 4072, Australia E-mail: maria@itee.uq.edu.au

Sanjiva Weerawarana University of Moratuwa, Sri Lanka and IBM TJ Watson Research Center 19 Skyline Drive, Hawthorne, NY 10532, USA E-mail: sanjiva@us.ibm.com

Michael P. Papazoglou Tilburg University, Computer Science Department, INFOLAB Room 711, P.O. Box 90153, 5000 LE Tilburg, The Netherlands E-mail: mikep@uvt.nl

Jian Yang
Tilburg University, INFOLAB
P.O. Box 90153, 5000 LE, Tilburg, The Netherlands
E-mail: Jian.Yang@uvt.nl

Cataloging-in-Publication Data applied for

A catalog record for this book is available from the Library of Congress.

Bibliographic information published by Die Deutsche Bibliothek Die Deutsche Bibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data is available in the Internet at http://dnb.ddb.de>.

CR Subject Classification (1998): C.2, D.2, D.4, H.4, H.3, K.4.4

ISSN 0302-9743

ISBN 3-540-20681-7 Springer-Verlag Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer-Verlag. Violations are liable for prosecution under the German Copyright Law.

Springer-Verlag is a part of Springer Science+Business Media springeronline.com

© Springer-Verlag Berlin Heidelberg 2003 Printed in Germany

Typesetting: Camera-ready by author, data conversion by PTP-Berlin, Protago-TeX-Production GmbH Printed on acid-free paper SPIN: 10972267 06/3142 5 4 3 2 1 0

Preface

Welcome to the proceedings of the inaugural International Conference on Service-Oriented Computing (ICSOC 2003). This was the first of a series of events that will evolve over the coming years, and we were happy to hold the event in Trento, where the idea for this conference was born. Trento is a lovely city with many Renaissance buildings, testimony to its great medieval past, and has a bustling modern university ready to master the future.

The participants visited Trento at the beginning of the winter season, with excellent opportunities for skiing and hiking. The city offers many other tourist attractions, some of which, we hope, the participants took the opportunity to enjoy.

Service Oriented Computing (SOC) is the new emerging paradigm for distributed computing and e-business processing which has evolved from object-oriented and component computing to one that enables us to build agile networks of collaborating business applications distributed within and across organizational boundaries.

ICSOC aims to become the flagship conference in the area of service-oriented computing, which is attracting more and more researchers and practitioners from both academia and industry. The beginnings are extremely promising, beyond our most optimistic expectations. We were deluged by requests for further information from all parts of the world and by a very high number of submissions. In fact, the success of a conference depends on the quality of the papers and on the organizational efforts of the conference officers and secretariat.

On the research side, exciting new areas in service computing, including service modeling, composition, business transactions and collaborations, service development and management, P2P and Grid computing, mobile computing, and security, were reported in the conference, in conjunction with keynote addresses and informative tutorials offered by leaders in the field.

We received an impressive collection of 181 papers in response to the call for papers. This shows a growing community of researchers addressing this challenging field. The program committee members considered all the papers very carefully. Each paper was reviewed by at least three (and in many cases four) reviewers. The reviews concentrated primarily on originality, high quality and relevance to the theme of the conference. In the end, 38 outstanding papers (about 20 % of the submissions) were accepted for presentation. The reasons for choosing so few were not only to make sure that the papers presented were of the highest quality, but, just as important, we wanted to avoid parallel sessions and thus facilitate interaction and exchange of ideas among participants.

Our special thanks go to the authors for submitting their papers to the conference, to the program committee members, and to the numerous reviewers who did an excellent job in guaranteeing that the articles in this volume are of very high quality. We also would like to acknowledge the keynote speakers,

VI Preface

panelists and tutorial speakers for their excellent contributions to the program of this vibrant conference.

On the organization side, we are indebted to all the conference officers and to the conference secretariat of the University of Trento for their generous, invaluable help and support in all aspects of the organization of this conference. In particular, the local arrangements team, led by Vincenzo D'Andrea and Marco Aiello, did an outstanding job under great time pressure. Fabrizio Sannicoló also did an excellent job programming and maintaining the automated conference system.

If you attended the conference we are sure that you will remember it and the excellent social program that was arranged. Special thanks are also due to all of our kind sponsors: IBM, Springer-Verlag, and the University of Trento.

September 2003

Fabio Casati Bernd Krämer Maria Orlowska Mike Papazoglou Sanjiva Weerawarana

ICSOC 2003 Conference Organization

ICSOC 2003 was organized by the Department of Computer Science, University of Trento.

Conference Chairs

Conference Chairs Fabio Casati, HP Labs, Palo Alto, USA

Bernd Krämer, FernUniversität, Hagen,

Germany

Program Chairs Maria E. Orlowska, DSTC/Univ. of

Queensland, Australia

Mike P. Papazoglou, Tilburg Univ.,

Netherlands

Saniiva Weerawarana, IBM, TJ Watson

Research Center, USA

Tutorial Chair Barbara Pernici, Politecnico di Milano, Italy

Panel Chairs Paul Grefen, Eindhoven University of

Technology, Netherlands

Colette Rolland, Univ. of Paris, France

Awards Chair Stefan Tai, IBM TJ Watson Research Center,

USA

Industrial Papers Chair Christoph Bussler, Digital Enterprise Research

Institute, Ireland

Publicity Chairs Athman Bouguettaya, Virginia Tech., USA

Willem-Jan van den Heuvel, Tilburg Univ,

Netherlands

Proceedings Chair Jian Yang, Tilburg Univ, Netherlands

International Liaison Chairs Charles Petrie, Stanford Univ., USA

Thomas Risse, Fraunhofer, IPSI, Germany Makoto Takizawa, Tokyo Denki Univ., Japan

A. II II C. T. I

Organizing Chairs Marco Aiello, Univ. of Trento, Italy

Vincenzo D'Andrea, Univ. of Trento, Italy

Program Committee

Nabil AdamRutgers Univ., USAMarco AielloUniv. of Trento, ItalyMikio AoyamaNanzan Univ., JapanGrigoris AntoniouUniv. of Crete, Greece

Carlo Batini AIPA, Italy
Boualem Benatallah UNSW, Australia
M. Brian Blake Georgetown Univ., USA

Sjaak Brinkkemper Triffit, and Vrije Univ., Netherlands

Tiziana Catarci Univ. of Rome, Italy
Vincenzo D'Andrea Univ. of Trento, Italy
Valeria de Antonellis Univ. of Brescia, Italy
Alex Delis Univ. of Athens, Greece

Schahram Dustdar Vienna Univ. of Technology, Austria

David Edmond QUT, Australia

Ian Foster Univ. of Chicago, USA

Brent Hailpern IBM TJ Watson Research Center, USA Jos van Hillegersberg Erasmus Univ., Rotterdam, Netherlands

Paul Johannesson Stockholm Univ., Sweden

Rania Khalaf IBM TJ Watson Research Center, USA
Craig Knoblock Univ. of Southern California, USA
Manolis Koubarakis Technical Univ. of Crete, Greece

Winfried Lamersdorf Hamburg Univ., Germany

Paul Layzell UMIST, UK

Doug Lea SUNY Oswego, USA

Frank Leymann IBM Software Group, Germany

Oscar Pastor López Universidad Politècnica de València, Spain

Maurizio Marchese
Univ. of Trento, Italy
Fabio Massacci
Univ. of Trento, Italy
Massimo Mecella
Univ. of Rome, Italy
Giacomo Piccinelli
Univ. College London, UK
Dimitris Plexousakis
Univ. of Crete, Greece

Michael Rosemann

Matti Rossi

Wasim Sadiq

Karsten Schultz

QUT, Australia

Helsinki School of Economics, Finland

SAP Corporate Research, Australia

SAP Corporate Research, Australia

Santosh Shrivastava Univ. of Newcastle, UK

Maarten Steen Telematica Instituut, Netherlands Patrick Strating Telematica Instituut, Netherlands

Eleni Stroulia Univ. of Alberta, Canada

Zahir Tari RMIT, Australia Paolo Traverso IRST, Italy

Aad van Moorsel
Carlos Varela
Benkt Wangler
Roel Wieringa
Andreas Wombacher

Hewlett-Packard, USA
Rensselaer Poly. Inst. USA
Univ. of Skövde, Sweden
Twente Univ., Netherlands
Fraunhofer Inst., Germany

Steve Vinoski Iona, USA

Yanchun Zhang Univ. of Southern Queensland, Australia

Table of Contents

Service Description	
Capabilities: Describing What Services Can Do	1
Representing Web Services with UML: A Case Study	17
A Peer-to-Peer Advertising Game	28
Service Composition	
Automatic Composition of E-services That Export Their Behavior D. Berardi, D. Calvanese, G. De Giacomo, M. Lenzerini, M. Mecella	43
Service Discovery and Orchestration for Distributed Service Repositories . ${\it I.~Fikouras,~E.~Freiter}$	59
Model Driven Service Composition	75
Quality of Service Models	
Automating the Procurement of Web Services	91
A Quality of Service Management Framework Based on User Expectations	104
Reflective Architectures for Adaptive Information Systems	115
Service Personalization	
E-healthcare via Customized Information Services: Addressing the Need for Factually Consistent Information	132
"Everything Personal, Not Just Business:" Improving User Experience through Rule-Based Service Customization	149

VINCA – A Visual and Personalized Business-Level Composition Language for Chaining Web-Based Services	165
Service Semantics	
Stepwise Refinable Service Descriptions: Adapting DAML-S to Staged Service Trading	178
Semantic Structure Matching for Assessing Web-Service Similarity $Y.\ Wang,\ E.\ Stroulia$	194
Preliminary Report of Public Experiment of Semantic Service Matchmaker with UDDI Business Registry	208
Business Processes and Transactions	
Comparing WSDL-Based and ebXML-Based Approaches for B2B Protocol Specification	225
A Model-Driven Architecture for Electronic Service Management Systems	241
The Business Grid: Providing Transactional Business Processes via Grid Services	256
Business Collaborations	
An Architectural Pattern to Extend the Interaction Model between Web-Services: The Location-Based Service Context	271
PANDA: Specifying Policies for Automated Negotiations of Service Contracts	287
Model Checking Correctness Properties of Electronic Contracts E. Solaiman, C. Molina-Jimenez, S. Shrivastav	303
Service Request and Coordination	
Supporting Dynamic Changes in Web Service Environments	319

Planning and Monitoring the Execution of Web Service Requests	335
WS-Workspace: Workspace Versioning for Web Services	351
Service Security and Reliability	
Secure Service Provision in Ad Hoc Networks	367
Single Sign-On in Service-Oriented Computing	384
Tracking Service Availability in Long Running Business Activities \hdots $W.\hdots$ Vogels	395
Infrastructure for Service Delivery	
A Broker Architecture for Integrating Data Using a Web	400
Services Environment	409
Design and Implementation of the Multilingual Product Retrieval Agent through XML and the Semantic Networks in EC	423
SpaceGlue: Linking Spaces for Adaptive and Situational Service Location	434
Service P2P and Grid Computing	
Organizing Service-Oriented Peer Collaborations	451
Service-Based Distributed Querying on the Grid	467
Peer-to-Peer Process Execution with Osiris	483
Service and Mobile Computing	
Disconnected Operation Service in Mobile Grid Computing	499

XIV Table of Contents

A Policy Propagation Model Using Mobile Agents in Large-Scale Distributed Network Environments	514
Location-Based Services in Ubiquitous Computing Environments $\dots I. Satoh$	527
Service Computing and Applications	
Service Oriented Internet	543
Service-Oriented Device Ecology Workflows	559
Author Index	575