

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

New York University, NY, 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

James Odell Paolo Giorgini
Jörg P. Müller (Eds.)

Agent-Oriented Software Engineering V

5th International Workshop, AOSE 2004
New York, NY, USA, July 19, 2004
Revised Selected Papers



Springer

Volume Editors

James Odell

Agentis

3646 West Huron River Drive, Ann Arbor, MI 48103, USA

E-mail: email@jamesodell.com

Paolo Giorgini

University of Trento, Department of Information and Communication Technology

Via Somamriva, 14, 38050 Provo, Italy

E-mail: paolo.giorgini@dit.unitn.it

Jörg P. Müller

Siemens AG, Corporate Technology, Intelligent Autonomous Systems

Otto-Hahn-Ring 6, 81730 Munich, Germany

E-mail: joerg.p.mueller@siemens.com

Library of Congress Control Number: 2004117070

CR Subject Classification (1998): D.2, I.2.11, F.3, D.1, C.2.4, D.3

ISSN 0302-9743

ISBN 3-540-24286-4 Springer 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. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springeronline.com

© Springer-Verlag Berlin Heidelberg 2005

Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper SPIN: 11375104 06/3142 5 4 3 2 1 0

Preface

The explosive growth of application areas such as electronic commerce, enterprise resource planning and mobile computing has profoundly and irreversibly changed our views on software systems. Nowadays, software is to be based on open architectures that continuously change and evolve to accommodate new components and meet new requirements. Software must also operate on different platforms, without recompilation, and with minimal assumptions about its operating environment and its users. Furthermore, software must be robust and autonomous, capable of serving a naïve user with a minimum of overhead and interference.

Agent concepts hold great promise for responding to the new realities of software systems. They offer higher-level abstractions and mechanisms which address issues such as knowledge representation and reasoning, communication, coordination, cooperation among heterogeneous and autonomous parties, perception, commitments, goals, beliefs, and intentions, all of which need conceptual modelling. On the one hand, the concrete implementation of these concepts can lead to advanced functionalities, e.g., in inference-based query answering, transaction control, adaptive workflows, brokering and integration of disparate information sources, and automated communication processes. On the other hand, their rich representational capabilities allow more faithful and flexible treatments of complex organizational processes, leading to more effective requirements analysis and architectural/detailed design.

As its very successful predecessors, AOSE 2000, AOSE 2001, AOSE 2002, and AOSE 2003 (Lecture Notes in Computer Science, Volumes 1957, 2222, 2585, and 2935), the AOSE 2004 workshop sought to examine the credentials of agent-based approaches as a software engineering paradigm, and to gain an insight into what agent-oriented software engineering will look like.

AOSE 2004 was hosted by the 3rd International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS 2004) held in New York, USA on July 2004. The workshop received 57 submissions, and 15 of them were accepted for presentation (which is an acceptance rate of 26%). These papers were reviewed by at least two members of an international program committee composed of 29 researchers. The submissions followed a call for papers on all aspects of agent-oriented software engineering and showed the range of results achieved in several areas such as methodologies, modeling, architectures, and tools.

The workshop program included an invited talk, a technical session in which the accepted papers were presented and discussed, and a closing plenary session. It congregated more than 50 attendees among researchers, students and practitioners, who contributed to the discussion of research problems related to the main topics in AOSE.

This volume contains revised and improved versions of the 15 papers presented at the workshop, organized in three sections: *Modeling, Design, and Reuse and Platforms*. We believe that this thoroughly prepared volume is of particular value to all readers interested in key topics and the most recent developments in the very exciting field of agent-oriented software engineering.

We thank the authors, the participants, and the reviewers for making AOSE 2004 a high-quality scientific event.

November 2004

Paolo Giorgini
Jörg P. Müller
James Odell

Organization

Organizing Committee

Paolo Giorgini (Co-chair)
Department of Information and Communication Technology
University of Trento, Italy
Email: paolo.giorgini@dit.unitn.it

Jörg P. Müller (Co-chair)
Siemens AG, Germany
Email: joerg.p.mueller@siemens.de

James Odell (Co-chair)
James Odell Associates, Ann Arbor, MI, USA
Email: email@jamesodell.com

Steering Committee

Paolo Ciancarini, University of Bologna, Italy
Gerhard Weiss, Technische Universitaet Muenchen, Germany
Michael Wooldridge, University of Liverpool, UK

Program Committee

Bernard Bauer (Germany)	Haralambos Mouratidis (UK)
Federico Bergenti (Italy)	Matthias Nickles (Germany)
Paolo Ciancarini (Italy)	Andrea Omicini (Italy)
Scott DeLoach (USA)	Van Parunak (USA)
Marie-Pierre Gervais (France)	Juan Pavon (Spain)
Olivier Gutknecht (France)	Anna Perini (Italy)
Brian Henderson-Sellers (Australia)	Marco Pistore (Italy)
Michael Huhns (USA)	Onn Shehory (Israel)
Carlos Iglesias (Spain)	Paola Turci (Italy)
Nicholas Jennings (UK)	Gerd Wagner (Germany)
Catholijn Jonker (Netherlands)	Gerhard Weiss (Germany)
David Kinny (Australia)	Mike Wooldridge (UK)
Manuel Kolp (Belgium)	Eric Yu (Canada)
Yannis Labrou (USA)	Franco Zambonelli (Italy)
Juergen Lind (Germany)	

Auxiliary Reviewers: Paolo Busetta, Giancarlo Guizzardi, Savas Konur, Viara Popova, Michael Rovatsos, Alexei Sharpanskykh, Arnon Sturm, Angelo Susi, Vera Werneck

Table of Contents

Modeling

Organizational and Social Concepts in Agent Oriented Software Engineering

Xinjun Mao, Eric Yu 1

Representing Agent Interaction Protocols with Agent UML

Marc-Philippe Huget, James Odell 16

AML: Agent Modeling Language Toward Industry-Grade Agent-Based Modeling

Radovan Červenka, Ivan Trenčanský, Monique Calisti, Dominic Greenwood 31

Formal Semantics for AUML Agent Interaction Protocols Diagrams

Lawrence Cabac, Daniel Moldt 47

A Study of Some Multi-agent Meta-models

Carole Bernon, Massimo Cossentino, Marie-Pierre Gleizes, Paola Turci, Franco Zambonelli 62

A Metamodel for Agents, Roles, and Groups

James Odell, Marian Nodine, Renato Levy 78

Design

Bringing the Gap Between Agent-Oriented Design and Implementation Using MDA

Mercedes Amor, Lidia Fuentes, Antonio Vallecillo 93

A Design Process for Adaptive Behavior of Situated Agents

Elke Steegmans, Danny Weyns, Tom Holwoet, Yolande Berbers 109

Evaluation of Agent-Oriented Software Methodologies – Examination of the Gap Between Modeling and Platform

Jan Sudeikat, Lars Braubach, Alexander Pokahr, Winfried Lamersdorf 126

A Formal Approach to Design and Reuse Agent and Multiagent Models

Vincent Hilaire, Olivier Simonin, Abder Koukam, Jacques Ferber 142

An Agent Construction Model for Ubiquitous Computing Devices
Ronald Ashri, Michael Luck 158

Reuse and Platforms

A Framework for Patterns in Gaia: A Case-Study with Organisations
Jorge Gonzalez-Palacios, Michael Luck 174

Enacting and Deacting Roles in Agent Programming
*Mehdi Dastani, M. Birna van Riemsdijk, Joris Hulstijn,
Frank Dignum, John-Jules Ch. Meyer* 189

A Platform for Agent Behavior Design and Multi Agent Orchestration
*G.B. Laleci, Y. Kabak, A. Dogac, I. Cingil, S. Kirbas, A. Yildiz,
S. Sınır, O. Ozdikis, O. Ozturk* 205

A Formal Reuse-Based Approach for Interactively Designing
Organizations
Catholijn Jonker, Jan Treur, Pınar Yolum 221

Author Index 239