Lecture Notes in Computer Science 2893
Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

Springer
Berlin
Heidelberg
New York
Hong Kong
London
Milan
Paris
Tokyo

Jean-Bernard Stefani Isabelle Demeure
Daniel Hagimont (Eds.)

Distributed Applications and Interoperable Systems

4th IFIP WG 6.1 International Conference, DAIS 2003
Paris, France, November 17-21, 2003
Proceedings

Springer

Series Editors

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

Volume Editors

Jean-Bernard Stefani
Daniel Hagimont
INRIA Rhône-Alpes
655, avenue de l'Europe, Montbonnot, 38334 St Ismier Cedex, France
E-mail: {Jean-Bernard.Stefani,Daniel.Hagimont}@inrialpes.fr

Isabelle Demeure
Ecole Nationale Supérieure de Télécommunications
46, rue Barrault, 75634 Paris Cedex 13, France
E-mail: isabelle.demeure@enst.fr

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): D.2, C.2.4, I.2.11, D.4, H.4

ISSN 0302-9743
ISBN 3-540-20529-2 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

© 2003 IFIP International Federation for Information Processing, Hofstraße 3, 2361 Laxenburg, Austria
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Olgun Computergrafik
Printed on acid-free paper SPIN: 10968130 06/3142 5 4 3 2 1 0

Preface

This volume contains the proceedings of DAIS 2003, the 4th IFIP WG 6.1 International Conference on Distributed Applications and Interoperable Systems. The conference was held in Paris on November 17–21, 2003. The event was the fourth meeting of this conference series, which is held roughly every two years. Previous editions were held in 1997 in Cottbus (Germany), in 1999 in Helsinki (Finland), and in 2001 in Krakow (Poland).

Following the evolution of the field, DAIS 2003 focused on models, technologies and platforms for reconfigurable, scalable and adaptable distributed applications. In keeping with this focus, the call for papers especially encouraged original unpublished papers addressing the following topics:

- new/extended software architectures and frameworks for reconfiguration and adaptation including component-based approaches (e.g., CORBA Components, EJB, .NET),
- modelling, specifying, monitoring and management of context-aware and adaptive applications,
- support for reconfiguration, self-organization and autonomic behavior in new/existing distributed platforms (e.g., CORBA, J2EE, .NET, WebServices),
- integration of multi-agent distributed decision-making,
- application environments that exploit characteristics of specific technologies (e.g., grid computing, mobile and wireless),
- issues in enterprise-wide and large-scale application reconfiguration,
- semantic interoperability and semantic web services.

We organized a program committee composed of 31 experts of the field. The program committee agreed on a call for papers and reviewed 88 submitted papers, 76 long papers (12 pages) and 12 short papers (5 pages). The program committee selected 21 long papers and 2 short papers; 4 long papers were accepted as short papers. Overall, the acceptance rate was less than 1 in 3.

The DAIS 2003 technical program covered many aspects that reflect the evolution of the field. Among the selected papers, we identified the following topics, each of which corresponded to a session of the conference technical program:

- adaptation, separation of concerns,
- deployment,
- security and transactions,
- replication,
- networking and routing,
- discovery, context-awareness and ontologies,
- asynchronous messaging.

We would like to express our deepest appreciation to the authors of all submitted papers and to the program committee members and external reviewers who did an outstanding job in selecting the best papers for presentation. For the first time, the DAIS conference was held as a joint event in federation with the 6th IFIP WG 6.1 International Conference on Formal Methods for Open Object-based Distributed Systems (FMOODS 2003). The co-location of the 2003 vintages of the FMOODS and DAIS conferences provided an excellent opportunity to the participants for a wide and comprehensive exchange of ideas within the domain of distributed systems and applications. Both FMOODS and DAIS address this domain, the former with its emphasis on formal approaches, the latter on practical solutions. Their combination in a single event meant that both theoretical foundations and practical issues were presented and discussed. Also due to the federation of the two conferences, the topics of reconfigurability and component-based design were particularly emphasized this year, along with the many open issues related to openness and the interoperability of distributed systems and applications. To further the interaction between the two communities, participants at the federated event were offered a single registration procedure and were entitled to choose freely between DAIS and FMOODS sessions. Also several invited speakers were explicitly scheduled in joint sessions. As another novelty, this year's conference included a two-day tutorial and workshop session, the latter again explicitly held as a joint event.

We would like to thank the members of the executive committee, with special thanks to Fabrice Kordon and Laurent Pautet for help with running the electronic submission system.

We are grateful to Bertrand Meyer, Andrew Herbert, Bart Jacobs, Alan Cameron Wills and David Chambliss for agreeing to present invited talks at the conference.

We would also like to thank the DAIS steering committee (Kurt Geihs, Guy Leduc, Hartmut Koenig and Kerry Raymond) for their advice, and the sponsors for their contribution.

November 2003

Jean-Bernard Stefani, General Chair
Isabelle Demeure and Daniel Hagimont, Program Chairs
DAIS 2003

Organization

DAIS 2003 was organized by ENST (École Nationale Supérieure des Télécommunications), Paris. DAIS 2003 was held in conjunction with FMOODS 2003.

Executive Committee

General Chair	Jean-Bernard Stefani (INRIA, France)
Program Chairs	Isabelle Demeure (ENST, France)
	Daniel Hagimont (INRIA, France)
Publicity Chair	Kurt Geihs (Technical University of Berlin)
Workshops Chair	Lynne Blair (University of Lancaster)
Tutorial Chair	Sylvie Vignes (ENST)
Local Organization Chair	Laurent Pautet (ENST)

Sponsoring Institutions

At the time of writing, we had received sponsorship from CNRS-ARP, GET, EDF, ENST, and INRIA. Other contributors were also expected. We extend our thanks to all of them.

Program Committee

M. Ahamed (Georgia Tech, USA)
N. Alonistioti (University of Athens, Greece)
S. Baker (IONA, Ireland)
Y. Berbers (Katholieke Universiteit Leuven, Belgium)
A. Beugnard (ENST Brittany, France)
V. Cahill (Trinity College Dublin, Ireland)
R. Campbell (UIUC, USA)
N. Davies (Lancaster University, UK and University of Arizona, USA)
F. Eliassen (University of Oslo, Norway)
K. Geihs (Technical University of Berlin, Germany)
P. Honeyman (CITI, University of Michigan, USA)
J. Indulska (University of Queensland, Australia)
E. Jul (DIKU, Denmark)
H. Koenig (BTU Cottbus, Germany)
F. Kordon (LIP6, France)
S. Krakowiak (University of Grenoble, France)
H. Krumm (University of Dortmund, Germany)
L. Kutvonen (University of Helsinki, Finland)
W. Lamersdorf (University of Hamburg, Germany)
D. Lea (SUNY Oswego, USA)
P. Linington (University of Kent, UK)
C. Linnhoff-Popien (University of Munich, Germany)
P. Merle (INRIA, France)
G. Muller (École des Mines de Nantes, France)
E. Najm (ENST, France)
L. Pautet (ENST, France)
K. Raymond (DSTC, Australia)
A. Schill (Technical University of Dresden, Germany)
D. Schmidt (University of California, Irvine, USA)
S. Shrivastava (University of Newcastle, UK)
J.-J. Vandewalle (GemPlus, France)

External Reviewers

S. Amundsen
T. Baier
P. Barron
G. Biegel
P. Boddupalli
L. Braubach
T. Buchholz
Z. Choukair
P. Cointe
M. Covington
R. Cunningham
F. Dagnat
V. Danciu
J. Dowling
A. Hanemann
K. Henricksen
K. Herrmann
I. Hochstatter
B. Hughes
C. Efstratiou
M. Jaeger
S. Jun
R. Kalckloesch
C. Kunze
K. Li
T. McFadden
R. Meier
J.-M. Menaud
G. Morgan
G. Muehl
A. Nedos
A. Opitz
S. Parastatidis
A. Pokahr
V. Reynolds
R. Robinson
G. Rojec-Goldmann
E. Saint-James
M. Schiffers
D. Schmitz
S. Schulz
L. Seinturier
R. Staehli
O. Storz
T. Strang
A. Tanner
A. Ulbrich
R. Vishwanath
V. Vold Eide
T. Weis
S. Wheater
C. Zirpins

Table of Contents

Session I: Adaptation – Separation of Concerns

Towards a Framework for Self-adaptive Component-Based Applications .. 1
Pierre-Charles David and Thomas Ledoux
(Ecole des Mines de Nantes, France)

A Scheme for the Introduction of 3rd Party,
Application-Specific Adaptation Features in Mobile Service Provision 15
Nikos Houssos, Nancy Alonistioti, and Lazaros Merakos
(University of Athens, Greece)

Brenda: Towards a Composition Framework
for Non-orthogonal Non-functional Properties 29
Mikaël Beauvois (France Télécom R&D, France)

Meta-programming Middleware for Distributed Object Computing
(Short Paper) 41
Peter Breitling (Technische Universität München, Germany)

Session II: Deployment

Middleware Support for Resource-Constrained Software Deployment 49
Nicolas Le Sommer and Frédéric Guidec
(University of South Brittany, France)

Rational Server Selection for Mobile Agents 61
Carsten Pils and Stefan Diepolder (RWTH Aachen, Germany)

Facilitating the Portability of User Applications in Grid Environments 73
Paul Z. Kolano (NASA Ames Research Center, USA)

Negotiation as a Generic Component Coordination Primitive 86
Jean Marc Andreoli and Stefania Castellani
(Xerox Research Centre Europe, France)

Session III: Security – Transactions

Jironde: A Flexible Framework for Making Components Transactional 98
Marek Prochazka (INRIA Rhône-Alpes, France)

A Security Architectural Approach for Risk Assessment
Using Multi-agent Systems Engineering 110
Gustavo A. Santana Torrellas (Instituto Mexicano del Petróleo, Mexico)

Middleware Support for Non-repudiable Transactional Information Sharing between Enterprises *(Short Paper)* 125
Nick Cook, Santosh Shrivastava, and Stuart Wheater (University of Newcastle, UK)

Adaptable Access Control Policies for Medical Information Systems *(Short Paper)* 133
Tine Verhanneman, Liesbeth Jaco, Bart De Win, Frank Piessens, and Wouter Joosen (Katholieke Universiteit Leuven, Belgium)

Session IV: Replication

Client-Side Component Caching: A Flexible Mechanism for Optimized Component Attribute Caching 141
Christoph Pohl and Alexander Schill (Technische Universität Dresden, Germany)

A Variable Cache Consistency Protocol for Mobile Systems Using Time Locks 153
Abhinav Vora, Zahir Tari, and Peter Bertok (RMIT University, Australia)

DataWarp: Building Applications Which Make Progress in an Inconsistent World 167
Peter Henderson, Robert John Walters, Stephen Crouch, and Qinglai Ni (University of Southampton, UK)

Hand-Over Video Cache Policy for Mobile Users *(Short Paper)* 179
Damien Charlet, Pascal Chatonnay, and François Spies (Université de Franche-Comté, France)

Session V: Networking and Routing

Planning for Network-Aware Paths 187
Xiaodong Fu and Vijay Karamcheti (New York University, USA)

Integrating the Unreliable Multicast Inter-ORB Protocol in MJaco 200
Alysson Neves Bessani (Universidade Federal de Santa Catarina, Brazil), Lau Cheuk Lung (Pontifical Catholic University of Paraná, Brazil), Joni da Silva Fraga (Universidade Federal de Santa Catarina, Brazil), and Alcides Calsavara (Pontifical Catholic University of Paraná)

A-GATE: A System of Relay and Translation Gateways for Communication among Heterogeneous Agents in Ad Hoc Wireless Environments 212
Leelani Kumari Wickramasinghe, Seng Wai Loke, Arkady Zaslavsky, and Damminda Alahakoon (Monash University, Australia)

Session VI: Discovery – Context-Awareness – Ontology

Scalable Location Management for Context-Aware Systems 224
Jadwiga Indulska, Ted McFadden, Matthias Kind, and Karen Henricksen (University of Queensland, Australia)

CoOL: A Context Ontology Language to Enable Contextual Interoperability 236
Thomas Strang (German Aerospace Center, Germany), Claudia Linnhoff-Popien, and Korbinian Frank (Ludwig-Maximilians-University Munich, Germany)

Discovering Web Services Using Behavioural Constraints and Ontology ... 248
Natenapa Sriharee and Twittie Senivongse (Chulalongkorn University, Thailand)

Requirements for Personal Information Agents in the Semantic Web *(Short Paper)* 260
Wolfgang Woerndl (Technische Universität München, Germany)

Towards an Intuitive Interface for Tailored Service Compositions *(Short Paper)* 266
Steffen Higel, Tony O'Donnell, Dave Lewis, and Vincent Wade (Trinity College Dublin, Ireland)

Session VII: Asynchronous Messaging

Context-Based Addressing: The Concept and an Implementation for Large-Scale Mobile Agent Systems Using Publish-Subscribe Event Notification 274
Seng Wai Loke, Amir Padovitz, and Arkady Zaslavsky (Monash University, Australia)

Exploiting Proximity in Event-Based Middleware for Collaborative Mobile Applications 285
René Meier and Vinny Cahill (Trinity College Dublin, Ireland)

A Flexible Middleware Layer for User-to-User Messaging 297
Jan-Mark S. Wams and Maarten van Steen (Vrije Universiteit Amsterdam, The Netherlands)

Author Index 311