

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

Peter M.A. Sloot Alfons G. Hoekstra
Thierry Priol Alexander Reinefeld
Marian Bubak (Eds.)

Advances in Grid Computing – EGC 2005

European Grid Conference
Amsterdam, The Netherlands, February 14-16, 2005
Revised Selected Papers



Springer

Volume Editors

Peter M.A. Sloot

Alfons G. Hoekstra

University of Amsterdam, Institute for Informatics, Section Computational Science

Laboratory for Computing, Systems Architecture and Programming

Kruislaan 403, 1098 SJ Amsterdam, The Netherlands

E-mail: {sloot, alfons}@science.uva.nl

Thierry Priol

IRISA/INRIA, Campus de Beaulieu

35042 Rennes Cedex, France

E-mail: thierry.priol@irisa.fr

Alexander Reinefeld

Zuse Institute Berlin (ZIB)

Takustr. 7, 14195 Berlin, Germany

E-mail: ar@zib.de

Marian Bubak

AGH University of Science and Technology

Institute of Computer Science and Academic Computer Centre CYFRONET

al. Mickiewicza 30, 30-059 Krakow, Poland

E-mail: bubak@uci.agh.edu.pl

Library of Congress Control Number: 2005928161

CR Subject Classification (1998): C.2.4, D.1.3, D.2.7, D.2.12, D.4, F.2.2, G.2.1

ISSN 0302-9743

ISBN-10 3-540-26918-5 Springer Berlin Heidelberg New York

ISBN-13 978-3-540-26918-2 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: 11508380 06/3142 5 4 3 2 1 0

Preface

“When the network is as fast as the computer’s internal links, the machine disintegrates across the net into a set of special purpose appliances.” (George Gilder)

We are proud to present to you the proceedings of the European Grid Conference 2005, held at the Science Park Amsterdam during February 14–16.

The aim of the European Grid Conference was to be the premier event on Grid computing in Europe in 2005, focusing on all aspects of Grid computing and bringing together participants from research and industry. EGC 2005 was a follow-up of the Across Grids Conferences held in Santiago de Compostela, Spain (2003) and in Nicosia, Cyprus (2004).

We decided to have three main tracks during this conference: one with peer-reviewed scientific contributions, one with presentations from business and industry, and one event track with presentations from European and national Grid projects.

In order to guarantee high-quality proceedings, we put extensive effort into reviewing the scientific papers and processing the proceedings. We received over 180 papers from which, after peer review by 2–3 reviewers each, we selected 70 for oral presentations and 52 for poster presentations during the scientific tracks. In this book you find the final versions of these accepted papers.

After the conference opening by the Dean of the Faculty of Science of the University of Amsterdam, Prof. Dr. K.J.F. Gaemers, we enjoyed a series of inspiring keynote lectures and two parallel scientific tracks over three days.

The keynote addresses were given by:

- Domenico Laforenza “Towards a Next Generation Grid: Learning from the Past, Looking into the Future”
- Bob Hertzberger “e-Science and Grid”
- Wolfgang Boch “Moving Grids from Science into Industry and Business – Challenges of EU Grid Research”
- Peter Coveney “Real Science on Computational Grids”
- Thierry Priol “Objects, Components, Services for Grid Middleware: Pros and Cons”
- Malcom Atkinson “Lessons Learned Building OGSA-DAI — Middleware for Distributed Data Access”
- Carol Goble “Semantic(Grid services)+(Semantic Grid)Services”
- Carl Kesselman “Managing Work Across Virtual Organizations: The GriPhyN Virtual Data System”

We would like to express our sincere thanks to the invited speakers who delivered such high-quality lectures at EGC 2005.

The scientific programme of the conference was organized along the following tracks:

- Applications
- Architecture and Infrastructure
- Resource Brokers and Management
- Grid Services and Monitoring
- Performance
- Security
- Workflow
- Data and Information Management
- Scheduling Fault-Tolerance and Mapping

This conference would not have been possible without the support of many people and organizations that helped in various ways to make it a success.

First of all we would like to thank the authors who took the effort to submit so many high-quality papers. We thank the Programme Committee for their excellent job in reviewing the submissions and thus guaranteeing the quality of the conference and the proceedings. We thank Lodewijk Bos and his staff for their practical assistance and support. Many thanks go to Coco van der Hoeven for her secretarial work. Dick van Albada, Berry Vermolen, Dennis Kaarsemaker and Derek Groen are acknowledged for their punctuality in preparing the proceedings.

We thank our sponsors for their financial support: the Board of the University of Amsterdam, the Science Faculty and the Institute for Informatics. Finally we thank the Dutch Science Foundation NWO, Section Exact Sciences.

February 2005

P.M.A. Sloot, A.G. Hoekstra, T. Priol, A. Reinefeld and M. Bubak

Organization

Overall Event Chair

- Prof. Dr. P.M.A. Sloot, University of Amsterdam, The Netherlands

Scientific Committee

- Dr. A.G. Hoekstra (chair), University of Amsterdam, The Netherlands
- Dr. M. Bubak, AGH, Cracow, Poland
- Dr. Th. Priol, IRISA, Paris, France

Industrial and Business Board

- Drs. A. Emmen (chair), Genias Benelux, The Netherlands
- Dr. A. Osseyran, Sara Computing and Networking Services, Amsterdam, The Netherlands
- Dr. W. Boch, European Commission, Brussels
- Dr. A. Reuver, IBM, The Netherlands

Special Events Board

- Drs. L. Bos (chair), MC-Consultancy, The Netherlands
- Prof. Dr. L.O. Hertzberger, University of Amsterdam, The Netherlands
- Prof. Dr. M. Turala, Institute of Nuclear Physics, Cracow, Poland
- Dr. K. Baxevanidis, European Commission, Brussels

Local Steering Committee

- Prof. Dr. W. Hoogland, Dean of the Faculty of Science, University of Amsterdam
- Prof. Dr. B. Noordam, Director of the FOM Institute for Atomic and Molecular Physics AMOLF, Amsterdam, The Netherlands
- Prof. Dr. J.K. Lenstra, Director of the Center for Mathematics and Computer Science, Amsterdam, The Netherlands
- Prof. Dr. K. Gaemers, Director of the National Institute for Nuclear Physics and High Energy Physics, Amsterdam, The Netherlands
- Prof. Dr. E. P.J. van de Heuvel, Director of the Astronomical Institute “Anton Pannekoek”, University of Amsterdam, The Netherlands

Programme Committee

- Albada, G.D. van — University of Amsterdam, The Netherlands
- Abramson, D. — Monash University, Australia
- Andrzejak, A. — ZIB Berlin, Germany

- Badia, R. — Technical University of Catalonia, Spain
- Baker, M. — University of Portsmouth, UK
- Bal, H. — Free University Amsterdam, The Netherlands
- Baraglia, R. — ISTI-CNR, Italy
- Beco, S. — DATAMAT S.p.A., Italy
- Benkner, S. — University of Vienna, Austria
- Bilas, A. — ICS-FORTH, Greece
- Breton, V. — Laboratoire de Physique Corpusculaire de Clermont-Ferrand, France
- Brezany, P. — University of Vienna, Austria
- Bubak, M. — Inst. of Comp. Sci., and Cyfronet, Poland
- Buyya, R. — University of Melbourne, Australia
- Chun-Hsi Huang — University of Connecticut, USA
- Corbalan, J. — Technical University of Catalonia, Spain
- Cunha, J. — New University of Lisbon, Portugal
- Danelutto, M. — University of Pisa, Italy
- Deelman, E. — ISI, Univ. of Southern California, USA
- Dikaiakos, M. — Univ. of Cyprus, Cyprus
- DiMartino, B. — Second University of Naples, Italy
- Epema, D. — Delft University of Technology, The Netherlands
- Erwin, D. — Forschungszentrum Jülich GmbH, Germany
- Fisher, S. — RAL, UK
- Foster, I. — Argonne National Laboratory
- Fox, G. — Univ. of Indiana, USA
- Fusco, L. — ESA, Italy
- Gomez, A. — CESGA, Spain
- Gorlatch, S. — University of Muenster, Germany
- Guisset, P. — CETIC, Belgium
- Hluchy, L. — Slovak Academy of Science, Slovakia
- Hoekstra, A. — Univ. of Amsterdam, The Netherlands
- Houstis, E. — University of Thessaly, Greece
- Jones, R. — CERN, Switzerland
- Kesselman, C. — USC/Information Sciences Institute, USA
- Kielmann, Th. — Free University Amsterdam, The Netherlands
- Kornmayer, H. — KZK, Germany
- Kranzlmüller, D. — Johannes Kepler University Linz, Austria
- Kunszt, P. — CERN, Switzerland
- Laat, C. de — University of Amsterdam, The Netherlands
- Laforenza, D. — ISTI-CNR, Italy
- Marco, J. — CSIC, Santander, Spain
- Markatos, E. — ICS-FORTH, Greece
- Marten, H. — Forschungszentrum Karlsruhe GmbH, Germany
- Matyska, L. — Masary University, Czech Republic
- Meyer, N. — Poznan Supercomputing Center, Poland
- Moreau, L. — Univ. of Southampton, UK
- Morin, C. — IRISA/INRIA, France

- Nemeth, Z. — MTA SZTAKI Computer and Automation Research Institute, Hungary
- Novotny, J. — MPI für Gravitationsphysik, Germany
- Orlando, S. — University of Venice, Italy
- Pazat, J.-L. — IRISA, France
- Perez, C. — INRIA, France
- Perrott, R. — Queen's University Belfast, UK
- Pflug, G. — University of Vienna, Austria
- Priol, T. — INRIA/IRISA, France
- Rana, O. — Cardiff University, UK
- Reinefeld, A. — ZIB Berlin, Germany
- Rodero, I. — Technical University of Catalonia, Spain
- Romberg, M. — Forschungszentrum Jülich GmbH, Germany
- Sakellariou, R. — Univ. of Manchester, UK
- Senar, M. — Univ. Autònoma de Barcelona, Spain
- Sloot, P. — Univ. of Amsterdam, The Netherlands
- Szymanski, B. — Rensselaer Polytechnic Institute, USA
- Talia, D. — Università della Calabria
- Trancoso, P. — Univ. of Cyprus, Cyprus
- Turner, S.J. — Nanyang Technological University, Singapore
- Wismüller, R. — TU München, Germany
- Ziegler, W. — Fraunhofer Institute for Algorithms and Scientific Computing, Germany

Sponsoring Organizations

- University of Amsterdam, The Netherlands
- Dutch Science Foundation NWO, Section Exact Sciences, The Netherlands
- SciencePark Amsterdam, The Netherlands

Local Organizing Committee

- Coco van der Hoeven (University of Amsterdam, The Netherlands)
- Dick van Albada (University of Amsterdam, The Netherlands)
- Berry Vermolen (University of Amsterdam, The Netherlands)
- Derek Groen (University of Amsterdam, The Netherlands)
- Dennis Kaarsemaker (University of Amsterdam, The Netherlands)
- Lodewijk Bos (MC-Consultancy, The Netherlands)

Table of Contents

Telemedical Applications and Grid Technology <i>Georgi Graschew, Theo A. Roelofs, Stefan Rakowsky, Peter M. Schlag, Sahin Albayrak, Silvan Kaiser</i>	1
Statistical Modeling and Segmentation in Cardiac MRI Using a Grid Computing Approach <i>Sebastian Ordas, Hans C. van Assen, Loic Boisrobert, Marco Laucelli, Jesús Puente, Boudewijn P.F. Lelieveldt, Alejandro F. Frangi</i>	6
A Grid Molecular Simulator for E-Science <i>Oswaldo Gervasi, Cristian Dittamo, Antonio Laganà</i>	16
Application Driven Grid Developments in the OpenMolGRID Project <i>Bernd Schuller, Mathilde Romberg, Lidia Kirtchakova</i>	23
ATLAS Data Challenge 2: A Massive Monte Carlo Production on the Grid <i>Santiago González de la Hoz, Javier Sánchez, Julio Lozano, Jose Salt, Farida Fassi, Luis March, D.L. Adams, Gilbert Poulard, Luc Goossens, DC2 Production TEAM (ATLAS Experiment)</i>	30
High Throughput Computing for Spatial Information Processing (HIT-SIP) System on Grid Platform <i>Yong Xue, Yanguang Wang, Jianqin Wang, Ying Luo, Yincui Hu, Shaobo Zhong, Jiakui Tang, Guoyin Cai, Yanning Guan</i>	40
The University of Virginia Campus Grid: Integrating Grid Technologies with the Campus Information Infrastructure <i>Marty Humphrey, Glenn Wasson</i>	50
M-Grid: Using Ubiquitous Web Technologies to Create a Computational Grid <i>Robert John Walters, Stephen Crouch</i>	59
GLIDE: A Grid-Based Light-Weight Infrastructure for Data-Intensive Environments <i>Chris A. Mattmann, Sam Malek, Nels Beckman, Marija Mikic-Rakic, Nenad Medvidovic, Daniel J. Crichton</i>	68
HotGrid: Graduated Access to Grid-Based Science Gateways <i>Roy Williams, Conrad Steenberg, Julian Bunn</i>	78

Principles of Transactional Grid Deployment

*Brian Coghlan, John Walsh, Geoff Quigley, David O'Callaghan,
Stephen Childs, Eamonn Kenny* 88

Experience with the International Testbed in the CrossGrid Project

*J. Gomes, M. David, J. Martins, L. Bernardo, A. García, M. Hardt,
H. Kornmayer, J. Marco, R. Marco, D. Rodríguez, I. Diaz, D. Cano,
J. Salt, S. Gonzalez, J. Sánchez, F. Fassi, V. Lara, P. Nyczzyk,
P. Lason, A. Ozieblo, P. Wolniewicz, M. Bluj, K. Nawrocki,
A. Padee, W. Wislicki, C. Fernández, J. Fontán, Y. Cotronis,
E. Floros, G. Tsouloupas, W. Xing, M. Dikaiakos, J. Astalos,
B. Coghlan, E. Heymann, M. Senar, C. Kanellopoulos, A. Ramos,
D. Groen* 98

eNANOS Grid Resource Broker

Ivan Rodero, Julita Corbalán, Rosa M. Badia, Jesús Labarta 111

GridARM: Askalon's Grid Resource Management System

Mumtaz Siddiqui, Thomas Fahringer 122

A Super-Peer Model for Building Resource Discovery Services in Grids:
Design and Simulation Analysis

Carlo Mastroianni, Domenico Talia, Oreste Verta 132

Ontology-Based Grid Index Service for Advanced Resource Discovery
and Monitoring

Said Mirza Pahlevi, Isao Kojima 144

Grid Service Based Collaboration for VL-e: Requirements, Analysis
and Design

A. de Ridder, A.S.Z. Belloum, L.O. Hertzberger 154

A Fully Decentralized Approach to Grid Service Discovery Using
Self-organized Overlay Networks

Qi Xia, Weinong Wang, Ruijun Yang 164

Dynamic Parallelization of Grid-Enabled Web Services

Manfred Wurz, Heiko Schuldt 173

Automatic Composition and Selection of Semantic Web Services

*Tor Arne Kvaløy, Erik Rongen, Alfredo Tirado-Ramos,
Peter M.A. Sloot* 184

Grid Application Monitoring and Debugging Using the Mercury
Monitoring System

Gábor Gombás, Csaba Attila Marosi, Zoltán Balaton 193

Interactive Visualization of Grid Monitoring Data on Multiple Client Platforms	
<i>Lea Skorin-Kapov, Igor Pandžić, Maja Matijašević, Hrvoje Komerički, Miran Mošmondor</i>	200
GridBench: A Workbench for Grid Benchmarking	
<i>George Tsouloupas, Marios D. Dikaiakos</i>	211
A Method for Estimating the Execution Time of a Parallel Task on a Grid Node	
<i>Panu Phinjaroenphan, Savitri Bevinakoppa, Panlop Zeephongsekul</i> ...	226
Performance of a Parallel Astrophysical N-Body Solver on Pan-European Computational Grids	
<i>Alfredo Tirado-Ramos, Alessia Gualandris, Simon Portegies Zwart</i> ...	237
Introducing Grid Speedup Γ : A Scalability Metric for Parallel Applications on the Grid	
<i>Alfons G. Hoekstra, Peter M.A. Sloot</i>	245
A Dynamic Key Infrastructure for GRID	
<i>H.W. Lim, M.J.B. Robshaw</i>	255
Experiences of Applying Advanced Grid Authorisation Infrastructures	
<i>R.O. Sinnott, A.J. Stell, D.W. Chadwick, O. Otenko</i>	265
Towards a Grid-wide Intrusion Detection System	
<i>Stuart Kenny, Brian Coghlan</i>	275
International Grid CA Interworking, Peer Review and Policy Management Through the European DataGrid Certification Authority Coordination Group	
<i>J. Aсталos, R. Cecchini, B. Coghlan, R. Cowles, U. Epting, T. Genovese, J. Gomes, D. Groep, M. Gug, A. Hanushevsky, M. Helm, J. Jensen, C. Kanellopoulos, D. Kelsey, R. Marco, I. Neilson, S. Nicoud, D. O'Callaghan, D. Quesnel, I. Schaeffner, L. Shamardin, D. Skow, M. Sova, A. Wäänänen, P. Wolniewicz, W. Xing</i>	285
Grid Enabled Optimization	
<i>Hee-Khiang Ng, Yew-Soon Ong, Terence Hung, Bu-Sung Lee</i>	296
Towards a Coordination Model for Parallel Cooperative P2P Multi-objective Optimization	
<i>M. Mezmaз, N. Melab, E.-G. Talbi</i>	305

A Grid-Oriented Genetic Algorithm <i>J. Herrera, E. Huedo, R.S. Montero, I.M. Llorente</i>	315
A Probabilistic Approach for Task and Result Certification of Large-Scale Distributed Applications in Hostile Environments <i>Axel Krings, Jean-Louis Roch, Samir Jafar, Sébastien Varrette</i>	323
A Service Oriented Architecture for Decision Making in Engineering Design <i>Alex Shenfield, Peter J. Fleming</i>	334
A Grid Architecture for Comfortable Robot Control <i>Stéphane Vialle, Amelia De Vivo, Fabrice Sabatier</i>	344
The Grid-Ireland Deployment Architecture <i>Brian Coghlan, John Walsh, David O'Callaghan</i>	354
UNICORE as Uniform Grid Environment for Life Sciences <i>Krzysztof Benedyczak, Michał Wroński, Aleksander Nowiński, Krzysztof S. Nowiński, Jarosław Wypychowski, Piotr Bała</i>	364
MyGridFTP: A Zero-Deployment GridFTP Client Using the .NET Framework <i>Arumugam Paventhan, Kenji Takeda</i>	374
On Using Jini and JXTA in Lightweight Grids <i>Kurt Vanmechelen, Jan Broeckhove</i>	384
Ticket-Based Grid Services Architecture for Dynamic Virtual Organizations <i>Byung Joon Kim, Kyong Hoon Kim, Sung Je Hong, Jong Kim</i>	394
Heterogeneity of Computing Nodes for Grid Computing <i>Eamonn Kenny, Brian Coghlan, John Walsh, Stephen Childs, David O'Callaghan, Geoff Quigley</i>	404
Effective Job Management in the Virtual Laboratory <i>Marcin Lawenda, Norbert Meyer, Maciej Stroiński, Tomasz Rajtar, Marcin Okoń, Dominik Stokłosa, Damian Kaliszan</i>	414
Workflow Management in the CrossGrid Project <i>Anna Morajko, Enol Fernández, Alvaro Fernández, Elisa Heymann, Miquel Àngel Senar</i>	424
Workflow-Oriented Collaborative Grid Portals <i>Gergely Sipos, Gareth J. Lewis, Péter Kacsuk, Vassil N. Alexandrov</i> . .	434

Contextualised Workflow Execution in MyGrid

- M. Nedim Alpdemir, Arijit Mukherjee, Norman W. Paton,
 Alvaro A.A. Fernandes, Paul Watson, Kevin Glover,
 Chris Greenhalgh, Tom Oinn, Hannah Tipney* 444

Real World Workflow Applications in the Askalon Grid
Environment

- Rubing Duan, Thomas Fahringer, Radu Prodan, Jun Qin,
 Alex Villazón, Marek Wieczorek* 454

OpenMolGRID: Using Automated Workflows in GRID Computing
Environment

- Sulev Sild, Uko Maran, Mathilde Romberg, Bernd Schuller,
 Emilio Benfenati* 464

Implementation of Replication Methods in the Grid Environment

- Renata Słota, Darin Nikolow, Łukasz Skitał, Jacek Kitowski* 474

A Secure Wrapper for OGSA-DAI

- David Power, Mark Slaymaker, Eugenia Politou,
 Andrew Simpson* 485

XDTM: The XML Data Type and Mapping for Specifying Datasets

- Luc Moreau, Yong Zhao, Ian Foster, Jens Voeckler,
 Michael Wilde* 495

iGrid, a Novel Grid Information Service

- Giovanni Aloisio, Massimo Cafaro, Italo Epicoco, Sandro Fiore,
 Daniele Lezzi, Maria Mirto, Silvia Mocavero* 506

A Grid-Enabled Digital Library System for Natural Disaster
Metadata

- Wei Xing, Marios D. Dikaiakos, Hua Yang, Angelos Sphyris, George
 Eftichidis* 516

Optimising Parallel Applications on the Grid Using Irregular Array
Distributions

- Radu Prodan, Thomas Fahringer* 527

Dynamic Adaptation for Grid Computing

- Jérémy Buisson, Françoise André, Jean-Louis Pazat* 538

Improving Multilevel Approach for Optimizing Collective
Communications in Computational Grids

- Boro Jakimovski, Marjan Gusev* 548

Rough Set Based Computation Times Estimation on Knowledge Grid <i>Kun Gao, Youquan Ji, Meiqun Liu, Jiaxun Chen</i>	557
A Behavior Characteristics-Based Reputation Evaluation Method for Grid Entities <i>Xiangli Qu, Xuejun Yang, Yuhua Tang, Haifang Zhou</i>	567
Dynamic Policy Management Framework for Partial Policy Information <i>Chiu-Man Yu, Kam-Wing Ng</i>	578
Security Architecture for Open Collaborative Environment <i>Yuri Demchenko, Leon Gommans, Cees de Laat, Bas Oudenaarde, Andrew Tokmakoff, Martin Snijders, Rene van Buuren</i>	589
An Experimental Information Grid Environment for Cultural Heritage Knowledge Sharing <i>A. Aiello, M. Mango Furnari, A. Massarotti</i>	600
Implementation of Federated Databases Through Updatable Views <i>Hanna Kozankiewicz, Krzysztof Stencel, Kazimierz Subieta</i>	610
Data Mining Tools: From Web to Grid Architectures <i>Davide Anguita, Arianna Poggi, Fabio Riveccio, Anna Marina Scapolla</i>	620
Fault-Tolerant Scheduling for Bag-of-Tasks Grid Applications <i>Cosimo Anglano, Massimo Canonico</i>	630
The Design and Implementation of the KOALA Co-allocating Grid Scheduler <i>H.H. Mohamed, D.H.J. Epema</i>	640
A Multi-agent Infrastructure and a Service Level Agreement Negotiation Protocol for Robust Scheduling in Grid Computing <i>D. Ouelhadj, J. Garibaldi, J. MacLaren, R. Sakellariou, K. Krishnakumar</i>	651
Towards Quality of Service Support for Grid Workflows <i>Ivona Brandic, Siegfried Benkner, Gerhard Engelbrecht, Rainer Schmidt</i>	661
Transparent Fault Tolerance for Grid Applications <i>Paweł Garbacki, Bartosz Biskupski, Henri Bal</i>	671

Learning Automata Based Algorithms for Mapping of a Class of Independent Tasks over Highly Heterogeneous Grids <i>S. Ghanbari, M.R. Meybodi</i>	681
Grid Resource Broker Using Application Benchmarking <i>Enis Afgan, Vijay Velusamy, Purushotham V. Bangalore</i>	691
The Grid Block Device: Performance in LAN and WAN Environments <i>Bardur Arantsson, Brian Vinter</i>	702
WS-Based Discovery Service for Grid Computing Elements <i>Kazimierz Balos, Krzysztof Zielinski</i>	711
Rapid Distribution of Tasks on a Commodity Grid <i>Ladislau Bölöni, Damla Turgut, Taskin Kocak, Yongchang Ji, Dan C. Marinescu</i>	721
Modeling Execution Time of Selected Computation and Communication Kernels on Grids <i>M. Boullón, J.C. Cabaleiro, R. Doallo, P. González, D.R. Martínez, M. Martín, J.C. Mourino, T.F. Pena, F.F. Rivera</i>	731
Parallel Checkpointing on a Grid-Enabled Java Platform <i>Yudith Cardinale, Emilio Hernández</i>	741
Fault Tolerance in the R-GMA Information and Monitoring System <i>Rob Byrom, Brian Coghlan, Andy Cooke, Roney Cordenonsi, Linda Cornwall, Martin Craig, Abdeslem Djaoui, Alastair Duncan, Steve Fisher, Alasdair Gray, Steve Hicks, Stuart Kenny, Jason Leake, Oliver Lyttleton, James Magowan, Robin Middleton, Werner Nutt, David O'Callaghan, Norbert Podhorszki, Paul Taylor, John Walk, Antony Wilson</i>	751
Deployment of Grid Gateways Using Virtual Machines <i>Stephen Childs, Brian Coghlan, David O'Callaghan, Geoff Quigley, John Walsh</i>	761
Development of Cactus Driver for CFD Analyses in the Grid Computing Environment <i>Soon-Heum Ko, Kum Won Cho, Young Duk Song, Young Gyun Kim, Jeong-su Na, Chongam Kim</i>	771
Striped Replication from Multiple Sites in the Grid Environment <i>Marek Ciglan, Ondrej Habala, Ladislav Hluchy</i>	778

The Gridkit Distributed Resource Management Framework <i>Wei Cai, Geoff Coulson, Paul Grace, Gordon Blair, Laurent Mathy, Wai-Kit Yeung</i>	786
Stochastic Approach for Secondary Storage Data Access Cost Estimation <i>Lukasz Dutka, Jacek Kitowski</i>	796
A Cluster-Based Dynamic Load Balancing Middleware Protocol for Grids <i>Kayhan Erciyes, Reşat Ümit Paylı</i>	805
Reconfigurable Scientific Applications on GRID Services <i>Jesper Andersson, Morgan Ericsson, Welf Löwe</i>	813
Geographic Information Systems Grid <i>Dan Feng, Lingfang Zeng, Fang Wang, Degang Liu, Fayong Zhang, Lingjun Qin, Qun Liu</i>	823
Tools for Distributed Development and Deployment on the Grid <i>Ariel García, Marcus Hardt, Harald Kornmayer</i>	831
DNS-Based Discovery System in Service Oriented Programming <i>Maurizio Giordano</i>	840
Experiences with Deploying Legacy Code Applications as Grid Services Using GEMICA, <i>A. Goyeneche, T. Kiss, G. Terstyanszky, G. Kecskemeti, T. Delaitre, P. Kacsuk, S.C. Winter</i>	851
A Framework for Job Management in the NorduGrid ARC Middleware <i>Henrik Thostrup Jensen, Josva Kleist, Jesper Ryge Leth</i>	861
Data Management in Flood Prediction <i>Ondrej Habala, Marek Ciglan, Ladislav Hluchy</i>	872
Adaptive Task Scheduling in Computational GRID Environments <i>Manuel Hidalgo-Conde, Andrés Rodríguez, Sergio Ramírez, Oswaldo Trelles</i>	880
Large-Scale Computational Finance Applications on the Open Grid Service Environment <i>Ronald Hochreiter, Clemens Wiesinger, David Wozabal</i>	891

Localized Communications of Data Parallel Programs on Multi-cluster Grid Systems <i>Ching-Hsien Hsu, Tzu-Tai Lo, Kun-Ming Yu</i>	900
VIRGO: Virtual Hierarchical Overlay Network for Scalable Grid Computing <i>Lican Huang</i>	911
A Monitoring Architecture for Control Grids <i>Alexandru Iosup, Nicolae Tăpuș, Stéphane Vialle</i>	922
Mobile-to-Grid Middleware: Bridging the Gap Between Mobile and Grid Environments <i>Hassan Jameel, Umar Kalim, Ali Sajjad, Sungyoung Lee, Taewoong Jeon</i>	932
Role of N1 Technology in the Next Generation Grids Middleware <i>Krzysztof Zielinski, Marcin Jarzab, Jacek Kosinski</i>	942
Optimizing Grid Application Setup Using Operating System Mobility <i>Jacob Gorm Hansen, Eric Jul</i>	952
GridLeS Enhancements and Building Virtual Applications for the GRID with Legacy Components <i>Jagan Kommineni, David Abramson</i>	961
Application Oriented Brokering in Medical Imaging: Algorithms and Software Architecture <i>Mario Rosario Guarracino, Giuliano Laccetti, Almerico Murli</i>	972
A Performance Contract System in a Grid Enabling, Component Based Programming Environment <i>Pasquale Caruso, Giuliano Laccetti, Marco Lapegna</i>	982
A WSRF Based Shopping Cart System <i>Maozhen Li, Man Qi, Masoud Rozati, Bin Yu</i>	993
Grid Access Middleware for Handheld Devices <i>Saad Liaquat Kiani, Maria Riaz, Sungyoung Lee, Taewoong Jeon, Hagbae Kim</i>	1002
An Extendable GRID Application Portal <i>Jonas Lindemann, Göran Sandberg</i>	1012

A Task Replication and Fair Resource Management Scheme for Fault Tolerant Grids <i>Antonios Litke, Konstantinos Tserpes, Konstantinos Dolkas, Theodora Varvarigou</i>	1022
CrossGrid Integrated Workflow Management System <i>Martin Maliska, Branislav Simo, Ladislav Hluchy</i>	1032
Load Balancing by Changing the Graph Connectivity on Heterogeneous Clusters <i>Kalyani Munasinghe, Richard Wait</i>	1040
Threat Model for Grid Security Services <i>Syed Naqvi, Michel Riguidel</i>	1048
A Loosely Coupled Application Model for Grids <i>Fei Wu, K.W. Ng</i>	1056
A Locking Protocol for a Distributed Computing Environment <i>Jaechun No, Hyoungwoo Park</i>	1066
Grid-Based SLA Management <i>James Padgett, Karim Djemame, Peter Dew</i>	1076
A Heuristic Algorithm for Mapping Parallel Applications on Computational Grids <i>Panu Phinjaroenphan, Savitri Bevinakoppa, Panlop Zeephonksekul</i> ...	1086
A Bypass of Cohen's Impossibility Result <i>Jan A. Bergstra, Alban Ponse</i>	1097
Mapping Workflows onto Grid Resources Within an SLA Context <i>Dang Minh Quan, Odej Kao</i>	1107
iShare - Open Internet Sharing Built on Peer-to-Peer and Web <i>Xiaojuan Ren, Rudolf Eigenmann</i>	1117
A Service-Based Architecture for Integrating Globus 2 and Globus 3 <i>Manuel Sánchez, Óscar Cánovas, Diego Sevilla, Antonio F. Gómez-Skarmeta</i>	1128
The CampusGrid Test Bed at Forschungszentrum Karlsruhe <i>Frank Schmitz, Olaf Schneider</i>	1139
A Model for Flexible Service Use and Secure Resource Management <i>Ken'ichi Takahashi, Satoshi Amamiya, Makoto Amamiya</i>	1143

Online Performance Monitoring and Analysis of Grid Scientific
Workflows

Hong-Linh Truong, Thomas Fahringer 1154

WebGrid: A New Paradigm for Web System

Liutong Xu, Bai Wang, Bo Ai 1165

Dynamic Failure Management for Parallel Applications on Grids

*Hyungsoo Jung, Dongin Shin, Hyeongseog Kim, Hyuck Han,
Inseon Lee, Heon Y. Yeom* 1175

A Novel Intrusion Detection Method for Mobile Ad Hoc Networks

Ping Yi, Yiping Zhong, Shiyong Zhang 1183

Author Index 1193

Author Index

- Abramson, David 961
 Adams, D.L. 30
 Afgan, Enis 691
 Ai, Bo 1165
 Aiello, A. 600
 Albayrak, Sahin 1
 Alexandrov, Vassil N. 434
 Aloisio, Giovanni 506
 Alpdemir, M. Nedim 444
 Amamiya, Makoto 1143
 Amamiya, Satoshi 1143
 Andersson, Jesper 813
 André, Françoise 538
 Anglano, Cosimo 630
 Anguita, Davide 620
 Arantsson, Bardur 702
 Astalos, J. 98, 285

 Badia, Rosa M. 111
 Bal, Henri 671
 Balaton, Zoltán 193
 Balos, Kazimierz 711
 Bangalore, Purushotham V. 691
 Bała, Piotr 364
 Beckman, Nels 68
 Belloum, A.S.Z. 154
 Benedyczak, Krzysztof 364
 Benfenati, Emilio 464
 Benkner, Siegfried 661
 Bergstra, Jan A. 1097
 Bernardo, L. 98
 Bevinakoppa, Savitri 226, 1086
 Biskupski, Bartosz 671
 Blair, Gordon 786
 Bluj, M. 98
 Boisrobert, Loic 6
 Bölöni, Ladislau 721
 Boullón, M. 731
 Brandic, Ivona 661
 Broeckhove, Jan 384
 Buisson, Jérémy 538
 Bunn, Julian 78
 Byrom, Rob 751

 Cabaleiro, J.C. 731
 Cafaro, Massimo 506
 Cai, Guoyin 40
 Cai, Wei 786
 Cano, D. 98
 Canonico, Massimo 630
 Cánovas, Óscar 1128
 Cardinale, Yudith 741
 Caruso, Pasquale 982
 Cecchini, R. 285
 Chadwick, D.W. 265
 Chen, Jiaxun 557
 Childs, Stephen 88, 404, 761
 Cho, Kum Won 771
 Ciglan, Marek 778, 872
 Coghlan, Brian 88, 98, 275, 285,
 354, 404, 751, 761
 Cooke, Andy 751
 Corbalán, Julita 111
 Cordenonsi, Roney 751
 Cornwall, Linda 751
 Cotronis, Y. 98
 Coulson, Geoff 786
 Cowles, R. 285
 Craig, Martin 751
 Crichton, Daniel J. 68
 Crouch, Stephen 59

 David, M. 98
 DC2 Production Team 30
 de Laat, Cees 589
 de Ridder, A. 154
 De Vivo, Amelia 344
 Delaitre, T. 851
 Demchenko, Yuri 589
 Dew, Peter 1076
 Diaz, I. 98
 Dikaiakos, Marios D. 98, 211, 516
 Dittamo, Cristian 16
 Djaoui, Abdeslem 751
 Djemame, Karim 1076
 Doallo, R. 731
 Dolkas, Konstantinos 1022
 Duan, Rubing 454

- Duncan, Alastair 751
 Dutka, Lukasz 796

 Eftichidis, George 516
 Eigenmann, Rudolf 1117
 Engelbrecht, Gerhard 661
 Epema, D.H.J. 640
 Epicoco, Italo 506
 Epting, U. 285
 Erciyes, Kayhan 805
 Ericsson, Morgan 813

 Fahringer, Thomas 122, 454,
 527, 1154
 Fassi, Farida 30, 98
 Feng, Dan 823
 Fernández, Alvaro 424
 Fernández, C. 98
 Fernández, Enol 424
 Fernandes, Alvaro A.A. 444
 Fiore, Sandro 506
 Fisher, Steve 751
 Fleming, Peter J. 334
 Floros, E. 98
 Fontán, J. 98
 Foster, Ian 495
 Frangi, Alejandro F. 6

 Gao, Kun 557
 Garbacki, Paweł 671
 García, Ariel 98, 831
 Garibaldi, J. 651
 Genovese, T. 285
 Gervasi, Osvaldo 16
 Ghanbari, S. 681
 Giordano, Maurizio 840
 Glover, Kevin 444
 Gombás, Gábor 193
 Gomes, J. 98, 285
 Gómez-Skarmeta, Antonio F. 1128
 Gommans, Leon 589
 González, P. 731
 González de la Hoz, Santiago 30, 98
 Goossens, Luc 30
 Goyeneche, A. 851
 Grace, Paul 786
 Grasczew, Georgi 1
 Gray, Alasdair 751
 Greenhalgh, Chris 444
 Groen, D. 98

 Groep, D. 285
 Gualandris, Alessia 237
 Guan, Yanning 40
 Guarracino, Mario Rosario 972
 Gug, M. 285
 Gusev, Marjan 548

 Habala, Ondrej 778, 872
 Han, Hyuck 1175
 Hansen, Jacob Gorm 952
 Hanushevsky, A. 285
 Hardt, Marcus 98, 831
 Helm, M. 285
 Hernández, Emilio 741
 Herrera, J. 315
 Hertzberger, L.O. 154
 Heymann, Elisa 98, 424
 Hicks, Steve 751
 Hidalgo-Conde, Manuel 880
 Hluchy, Ladislav 778, 872, 1032
 Hochreiter, Ronald 891
 Hoekstra, Alfons G. 245
 Hong, Sung Je 394
 Hsu, Ching-Hsien 900
 Hu, Yincui 40
 Huang, Lican 911
 Huedo, E. 315
 Humphrey, Marty 50
 Hung, Terence 296

 Iosup, Alexandru 922

 Jafar, Samir 323
 Jakimovski, Boro 548
 Jameel, Hassan 932
 Jarzab, Marcin 942
 Jensen, Henrik Thstrup 861
 Jensen, J. 285
 Jeon, Taewoong 932, 1002
 Ji, Yongchang 721
 Ji, Youquan 557
 Jul, Eric 952
 Jung, Hyungsoo 1175

 Kacsuk, Péter 434, 851
 Kaiser, Silvan 1
 Kalim, Umar 932
 Kaliszan, Damian 414
 Kanellopoulos, C., 98, 285

- Kao, Odej 1107
 Kecskemeti, G. 851
 Kelsey, D. 285
 Kenny, Eamonn 88, 404
 Kenny, Stuart 275, 751
 Kiani, Saad Liaquat 1002
 Kim, Byung Joon 394
 Kim, Chongam 771
 Kim, Hagbae 1002
 Kim, Hyeongseog 1175
 Kim, Jong 394
 Kim, Kyong Hoon 394
 Kim, Young Gyun 771
 Kirtchakova, Lidia 23
 Kiss, T. 851
 Kitowski, Jacek 474, 796
 Kleist, Josva 861
 Ko, Soon-Heum 771
 Kocak, Taskin 721
 Kojima, Isao 144
 Komerički, Hrvoje 200
 Kommineni, Jagan 961
 Kornmayer, Harald 98, 831
 Kosinski, Jacek 942
 Kozankiewicz, Hanna 610
 Krings, Axel 323
 Krishnakumar, K. 651
 Kvaløy, Tor Arne 184
- Labarta, Jesús 111
 Laccetti, Giuliano 972, 982
 Laganà, Antonio 16
 Lapeгна, Marco 982
 Lara, V. 98
 Lason, P. 98
 Laucelli, Marco 6
 Lawenda, Marcin 414
 Leake, Jason 751
 Lee, Bu-Sung 296
 Lee, Inseon 1175
 Lee, Sungyoung 932, 1002
 Lelieveldt, Boudewijn P.F. 6
 Leth, Jesper Ryge 861
 Lewis, Gareth J. 434
 Lezzi, Daniele 506
 Li, Maozhen 993
 Lim, H.W. 255
 Lindemann, Jonas 1012
 Litke, Antonios 1022
 Liu, Degang 823
- Liu, Meiqun 557
 Liu, Qun 823
 Llorente, I.M. 315
 Lo, Tzu-Tai 900
 Löwe, Welf 813
 Lozano, Julio 30
 Luo, Ying 40
 Lyttleton, Oliver 751
- MacLaren, J. 651
 Magowan, James 751
 Malek, Sam 68
 Maliska, Martin 1032
 Mango Furnari, M. 600
 Maran, Uko 464
 March, Luis 30
 Marco, J. 98
 Marco, R. 98, 285
 Marinescu, Dan C. 721
 Marosi, Csaba Attila 193
 Martín, M. 731
 Martínez, D.R. 731
 Martins, J. 98
 Massarotti, A. 600
 Mastroianni, Carlo 132
 Mathy, Laurent 786
 Matijašević, Maja 200
 Mattmann, Chris A. 68
 Medvidovic, Nenad 68
 Melab, N. 305
 Meybodi, M.R. 681
 Meyer, Norbert 414
 Mezmaz, M. 305
 Middleton, Robin 751
 Mikic-Rakic, Marija 68
 Mirto, Maria 506
 Mošmondor, Miran 200
 Mocavero, Silvia 506
 Mohamed, H.H. 640
 Montero, R.S. 315
 Morajko, Anna 424
 Moreau, Luc 495
 Mouriño, J.C. 731
 Mukherjee, Arijit 444
 Munasinghe, Kalyani 1040
 Murli, Almerico 972
- Na, Jeong-su 771
 Naqvi, Syed 1048
 Nawrocki, K. 98

- Neilson, I. 285
 Ng, Hee-Khiang 296
 Ng, Kam-Wing 578, 1056
 Nicoud, S. 285
 Nikolow, Darin 474
 No, Jaechun 1066
 Nowiński, Aleksander 364
 Nowiński, Krzysztof S. 364
 Nutt, Werner 751
 Nyczyk, P. 98

 O'Callaghan, David 88, 285,
 354, 404, 751, 761
 Oinn, Tom 444
 Okoń, Marcin 414
 Ong, Yew-Soon 296
 Ordas, Sebastian 6
 Otenko, O. 265
 Oudenaarde, Bas 589
 Ouelhadj, D. 651
 Ozieblo, A. 98

 Padee, A. 98
 Padgett, James 1076
 Pahlevi, Said Mirza 144
 Pandžić, Igor 200
 Park, Hyungwoo 1066
 Paton, Norman W. 444
 Paventhan, Arumugam 374
 Payli, Reşat Ümit 805
 Pazat, Jean-Louis 538
 Pena, T.F. 731
 Phinjaroenphan, Panu 226, 1086
 Podhorszki, Norbert 751
 Poggi, Arianna 620
 Politou, Eugenia 485
 Portegies Zwart, Simon 237
 Ponse, Alban 1097
 Poulard, Gilbert 30
 Power, David 485
 Prodan, Radu 454, 527
 Puente, Jesús 6

 Qi, Man 993
 Qin, Jun 454
 Qin, Lingjun 823
 Qu, Xiangli 567
 Quan, Dang Minh 1107
 Quesnel, D. 285
 Quigley, Geoff 88, 404, 761

 Rajtar, Tomasz 414
 Rakowsky, Stefan 1
 Ramírez, Sergio 880
 Ren, Xiaojuan 1117
 Riaz, Maria 1002
 Riguidel, Michel 1048
 Rivera, F.F. 731
 Rivieccio, Fabio 620
 Robshaw, M.J.B. 255
 Roch, Jean-Louis 323
 Rodero, Ivan 111
 Rodríguez, Andrés 880
 Rodríguez, D. 98
 Roelofs, Theo A. 1
 Romberg, Mathilde 23, 464
 Rongen, Erik 184
 Rozati, Masoud 993

 Sabatier, Fabrice 344
 Sajjad, Ali 932
 Sakellariou, R. 651
 Salt, Jose 30, 98
 Sandberg, Göran 1012
 Sánchez, Javier 30, 98
 Sánchez, Manuel 1128
 Scapolla, Anna Marina 620
 Schaeffner, I. 285
 Schlag, Peter M. 1
 Schmidt, Rainer 661
 Schmitz, Frank 1139
 Schneider, Olaf 1139
 Schuldt, Heiko 173
 Schuller, Bernd 23, 464
 Senar, Miquel Àngel 98, 424
 Sevilla, Diego 1128
 Shamardin, L. 285
 Shenfield, Alex 334
 Shin, Dongin 1175
 Siddiqui, Mumtaz 122
 Sild, Sulev 464
 Simo, Branislav 1032
 Simpson, Andrew 485
 Sinnott, R.O. 265
 Sipos, Gergely 434
 Skitał, Łukasz 474
 Skorin-Kapov, Lea 200
 Skow, D. 285
 Slaymaker, Mark 485
 Sloot, Peter M.A. 184, 245
 Snijders, Martin 589

- Song, Young Duk 771
 Sova, M. 285
 Sphyris, Angelos 516
 Steenberg, Conrad 78
 Stell, A.J. 265
 Stencel, Krzysztof 610
 Stokłosa, Dominik 414
 Stroiński, Maciej 414
 Subieta, Kazimierz 610
 Słota, Renata 474
- Takahashi, Ken'ichi 1143
 Takeda, Kenji 374
 Talbi, E.-G. 305
 Talia, Domenico 132
 Tang, Jiakui 40
 Tang, Yuhua 567
 Țăpuș, Nicolae 922
 Taylor, Paul 751
 Terstyanszky, G. 851
 Tipney, Hannah 444
 Tirado-Ramos, Alfredo 98, 184, 237
 Tokmakoff, Andrew 589
 Trelles, Oswaldo 880
 Truong, Hong-Linh 1154
 Tserpes, Konstantinos 1022
 Tsouloupas, George 98, 211
 Turgut, Damla 721
- van Assen, Hans C. 6
 van Buuren, Rene 589
 Vanmechelen, Kurt 384
 Varrette, Sébastien 323
 Varvarigou, Theodora 1022
 Velusamy, Vijay 691
 Verta, Oreste 132
 Vialle, Stéphane 344, 922
 Villazón, Alex 454
 Vinter, Brian 702
 Voeckler, Jens 495
- Wäänänen, A. 285
 Wait, Richard 1040
 Walk, John 751
 Walsh, John 88, 354, 404, 761
 Walters, Robert John 59
- Wang, Bai 1165
 Wang, Fang 823
 Wang, Jianqin 40
 Wang, Weinong 164
 Wang, Yanguang 40
 Wasson, Glenn 50
 Watson, Paul 444
 Wieczorek, Marek 454
 Wiesinger, Clemens 891
 Wilde, Michael 495
 Williams, Roy 78
 Wilson, Antony 751
 Winter, S.C. 851
 Wislicki, W. 98
 Wolniewicz, P. 98, 285
 Wozabal, David 891
 Wroński, Michał 364
 Wu, Fei 1056
 Wurz, Manfred 173
 Wypychowski, Jarosław 364
- Xia, Qi 164
 Xing, Wei 98, 285, 516
 Xu, Liutong 1165
 Xue, Yong 40
- Yang, Hua 516
 Yang, Ruijun 164
 Yang, Xuejun 567
 Yeom, Heon Y. 1175
 Yeung, Wai-Kit 786
 Yi, Ping 1183
 Yu, Bin 993
 Yu, Chiu-Man 578
 Yu, Kun-Ming 900
- Zeepongsekul, Panlop 226, 1086
 Zeng, Lingfang 823
 Zhang, Fayong 823
 Zhang, Shiyong 1183
- Zhao, Yong 495
 Zhong, Shaobo 40
 Zhong, Yiping 1183
 Zhou, Haifang 567
 Zielinski, Krzysztof 711, 942