Marios D. Dikaiakos (Ed.)

LNCS 3165

Grid Computing

Second European AcrossGrids Conference, AxGrids 2004
Nicosia, Cyprus, January 2004
Revised Papers

Springer

TP30-53
A187
2004

Marios D. Dikaiakos (Ed.)

Grid Computing

Second European AcrossGrids Conference, AxGrids 2004
Nicosia, Cyprus, January 28-30, 2004
Revised Papers

Springer

Volume Editor

Marios D. Dikaiakos
University of Cyprus, Department of Computer Science
P.O. Box 20537, CY 1678, Nicosia, Cyprus
E-mail: mdd@ucy.ac.cy

Library of Congress Control Number: 2004113302

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 3-540-22888-8 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 2004
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Olgun Computergrafik
Printed on acid-free paper SPIN: 11314103 06/3142 5 4 3 2 1 0

Lecture Notes in Computer Science 3165

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

Lecture Notes in Computer Science

For information about Vols. 1–3175

please contact your bookseller or Springer

Vol. 3293: C.-H. Chi, M. van Steen, C. Wills (Eds.), Web Content Caching and Distribution. IX, 283 pages. 2004.

Vol. 3274: R. Guerraoui (Ed.), Distributed Computing. XIII, 465 pages. 2004.

Vol. 3273: T. Baar, A. Strohmeier, A. Moreira, S.J. Mellor (Eds.), <<UML>> 2004 - The Unified Modelling Language. XIII, 454 pages. 2004.

Vol. 3271: J. Vicente, D. Hutchison (Eds.), Management of Multimedia Networks and Services. XIII, 335 pages. 2004.

Vol. 3270: M. Jeckle, R. Kowalczyk, P. Braun (Eds.), Grid Services Engineering and Management. X, 165 pages. 2004.

Vol. 3266: J. Solé-Pareta, M. Smirnov, P.V. Mieghem, J. Domingo-Pascual, E. Monteiro, P. Reichl, B. Stiller, R.J. Gibbens (Eds.), Quality of Service in the Emerging Networking Panorama. XVI, 390 pages. 2004.

Vol. 3265: R.E. Frederking, K.B. Taylor (Eds.), Machine Translation: From Real Users to Research. XI, 392 pages. 2004. (Subseries LNAI).

Vol. 3264: G. Paliouras, Y. Sakakibara (Eds.), Grammatical Inference: Algorithms and Applications. XI, 291 pages. 2004. (Subseries LNAI).

Vol. 3263: M. Weske, P. Liggesmeyer (Eds.), Object-Oriented and Internet-Based Technologies. XII, 239 pages. 2004.

Vol. 3261: T. Yakhno (Ed.), Advances in Information Systems. XIV, 617 pages. 2004.

Vol. 3260: I. Niemegeers, S.H. de Groot (Eds.), Personal Wireless Communications. XIV, 478 pages. 2004.

Vol. 3258: M. Wallace (Ed.), Principles and Practice of Constraint Programming – CP 2004. XVII, 822 pages. 2004.

Vol. 3257: E. Motta, N.R. Shadbolt, A. Stutt, N. Gibbins (Eds.), Engineering Knowledge in the Age of the Semantic Web. XVII, 517 pages. 2004. (Subseries LNAI).

Vol. 3256: H. Ehrig, G. Engels, F. Parisi-Presicce, G. Rozenberg (Eds.), Graph Transformations. XII, 451 pages. 2004.

Vol. 3255: A. Benczúr, J. Demetrovics, G. Gottlob (Eds.), Advances in Databases and Information Systems. XI, 423 pages. 2004.

Vol. 3254: E. Macii, V. Paliouras, O. Koufopavlou (Eds.), Integrated Circuit and System Design. XVI, 910 pages. 2004.

Vol. 3253: Y. Lakhnech, S. Yovine (Eds.), Formal Techniques, Modelling and Analysis of Timed and Fault-Tolerant Systems. X, 397 pages. 2004.

Vol. 3250: L.-J. (LJ) Zhang, M. Jeckle (Eds.), Web Services. X, 301 pages. 2004.

Vol. 3249: B. Buchberger, J.A. Campbell (Eds.), Artificial Intelligence and Symbolic Computation. X, 285 pages. 2004. (Subseries LNAI).

Vol. 3246: A. Apostolico, M. Melucci (Eds.), String Processing and Information Retrieval. XIV, 332 pages. 2004.

Vol. 3245: E. Suzuki, S. Arikawa (Eds.), Discovery Science. XIV, 430 pages. 2004. (Subseries LNAI).

Vol. 3244: S. Ben-David, J. Case, A. Maruoka (Eds.), Algorithmic Learning Theory. XIV, 505 pages. 2004. (Subseries LNAI).

Vol. 3243: S. Leonardi (Ed.), Algorithms and Models for the Web-Graph. VIII, 189 pages. 2004.

Vol. 3242: X. Yao, E. Burke, J.A. Lozano, J. Smith, J.J. Merelo-Guervós, J.A. Bullinaria, J. Rowe, P. Tiňo, A. Kabán, H.-P. Schwefel (Eds.), Parallel Problem Solving from Nature - PPSN VIII. XX, 1185 pages. 2004.

Vol. 3241: D. Kranzlmüller, P. Kacsuk, J.J. Dongarra (Eds.), Recent Advances in Parallel Virtual Machine and Message Passing Interface. XIII, 452 pages. 2004.

Vol. 3240: I. Jonassen, J. Kim (Eds.), Algorithms in Bioinformatics. IX, 476 pages. 2004. (Subseries LNBI).

Vol. 3239: G. Nicosia, V. Cutello, P.J. Bentley, J. Timmis (Eds.), Artificial Immune Systems. XII, 444 pages. 2004.

Vol. 3238: S. Biundo, T. Frühwirth, G. Palm (Eds.), KI 2004: Advances in Artificial Intelligence. XI, 467 pages. 2004. (Subseries LNAI).

Vol. 3236: M. Núñez, Z. Maamar, F.L. Pelayo, K. Pousttchi, F. Rubio (Eds.), Applying Formal Methods: Testing, Performance, and M/E-Commerce. XI, 381 pages. 2004.

Vol. 3235: D. de Frutos-Escrig, M. Nunez (Eds.), Formal Techniques for Networked and Distributed Systems – FORTE 2004. X, 377 pages. 2004.

Vol. 3232: R. Heery, L. Lyon (Eds.), Research and Advanced Technology for Digital Libraries. XV, 528 pages. 2004.

Vol. 3231: H.-A. Jacobsen (Ed.), Middleware 2004. XV, 514 pages. 2004.

Vol. 3230: J.L. Vicedo, P. Martínez-Barco, R. Muñoz, M.S. Noeda (Eds.), Advances in Natural Language Processing. XII, 488 pages. 2004. (Subseries LNAI).

Vol. 3229: J.J. Alferes, J. Leite (Eds.), Logics in Artificial Intelligence. XIV, 744 pages. 2004. (Subseries LNAI).

Vol. 3225: K. Zhang, Y. Zheng (Eds.), Information Security. XII, 442 pages. 2004.

Vol. 3224: E. Jonsson, A. Valdes, M. Almgren (Eds.), Recent Advances in Intrusion Detection. XII, 315 pages. 2004.

此为试读,需要完整PDF请访问: www.ertongbook.com

Vol. 3223: K. Slind, A. Bunker, G. Gopalakrishnan (Eds.), Theorem Proving in Higher Order Logics. VIII, 337 pages. 2004.

Vol. 3222: H. Jin, G.R. Gao, Z. Xu, H. Chen (Eds.), Network and Parallel Computing. XX, 694 pages. 2004.

Vol. 3221: S. Albers, T. Radzik (Eds.), Algorithms – ESA 2004. XVIII, 836 pages. 2004.

Vol. 3220: J.C. Lester, R.M. Vicari, F. Paraguaçu (Eds.), Intelligent Tutoring Systems. XXI, 920 pages. 2004.

Vol. 3219: M. Heisel, P. Liggesmeyer, S. Wittmann (Eds.), Computer Safety, Reliability, and Security. XI, 339 pages. 2004.

Vol. 3217: C. Barillot, D.R. Haynor, P. Hellier (Eds.), Medical Image Computing and Computer-Assisted Intervention – MICCAI 2004. XXXVIII, 1114 pages. 2004.

Vol. 3216: C. Barillot, D.R. Haynor, P. Hellier (Eds.), Medical Image Computing and Computer-Assisted Intervention – MICCAI 2004. XXXVIII, 930 pages. 2004.

Vol. 3215: M.G.. Negoita, R.J. Howlett, L.C. Jain (Eds.), Knowledge-Based Intelligent Information and Engineering Systems. LVII, 906 pages. 2004. (Subseries LNAI).

Vol. 3214: M.G.. Negoita, R.J. Howlett, L.C. Jain (Eds.), Knowledge-Based Intelligent Information and Engineering Systems. LVIII, 1302 pages. 2004. (Subseries LNAI).

Vol. 3213: M.G.. Negoita, R.J. Howlett, L.C. Jain (Eds.), Knowledge-Based Intelligent Information and Engineering Systems. LVIII, 1280 pages. 2004. (Subseries LNAI).

Vol. 3212: A. Campilho, M. Kamel (Eds.), Image Analysis and Recognition. XXIX, 862 pages. 2004.

Vol. 3211: A. Campilho, M. Kamel (Eds.), Image Analysis and Recognition. XXIX, 880 pages. 2004.

Vol. 3210: J. Marcinkowski, A. Tarlecki (Eds.), Computer Science Logic. XI, 520 pages. 2004.

Vol. 3209: B. Berendt, A. Hotho, D. Mladenic, M. van Someren, M. Spiliopoulou, G. Stumme (Eds.), Web Mining: From Web to Semantic Web. IX, 201 pages. 2004. (Subseries LNAI).

Vol. 3208: H.J. Ohlbach, S. Schaffert (Eds.), Principles and Practice of Semantic Web Reasoning. VII, 165 pages. 2004.

Vol. 3207: L.T. Yang, M. Guo, G.R. Gao, N.K. Jha (Eds.), Embedded and Ubiquitous Computing. XX, 1116 pages. 2004.

Vol. 3206: P. Sojka, I. Kopecek, K. Pala (Eds.), Text, Speech and Dialogue. XIII, 667 pages. 2004. (Subseries LNAI).

Vol. 3205: N. Davies, E. Mynatt, I. Siio (Eds.), UbiComp 2004: Ubiquitous Computing. XVI, 452 pages. 2004.

Vol. 3203: J. Becker, M. Platzner, S. Vernalde (Eds.), Field Programmable Logic and Application. XXX, 1198 pages. 2004.

Vol. 3202: J.-F. Boulicaut, F. Esposito, F. Giannotti, D. Pedreschi (Eds.), Knowledge Discovery in Databases: PKDD 2004. XIX, 560 pages. 2004. (Subseries LNAI).

Vol. 3201: J.-F. Boulicaut, F. Esposito, F. Giannotti, D. Pedreschi (Eds.), Machine Learning: ECML 2004. XVIII, 580 pages. 2004. (Subseries LNAI).

Vol. 3199: H. Schepers (Ed.), Software and Compilers for Embedded Systems. X, 259 pages. 2004.

Vol. 3198: G.-J. de Vreede, L.A. Guerrero, G. Marín Raventós (Eds.), Groupware: Design, Implementation and Use. XI, 378 pages. 2004.

Vol. 3196: C. Stary, C. Stephanidis (Eds.), User-Centered Interaction Paradigms for Universal Access in the Information Society. XII, 488 pages. 2004.

Vol. 3195: C.G. Puntonet, A. Prieto (Eds.), Independent Component Analysis and Blind Signal Separation. XXIII, 1266 pages. 2004.

Vol. 3194: R. Camacho, R. King, A. Srinivasan (Eds.), Inductive Logic Programming. XI, 361 pages. 2004. (Subseries LNAI).

Vol. 3193: P. Samarati, P. Ryan, D. Gollmann, R. Molva (Eds.), Computer Security – ESORICS 2004. X, 457 pages. 2004.

Vol. 3192: C. Bussler, D. Fensel (Eds.), Artificial Intelligence: Methodology, Systems, and Applications. XIII, 522 pages. 2004. (Subseries LNAI).

Vol. 3191: M. Klusch, S. Ossowski, V. Kashyap, R. Unland (Eds.), Cooperative Information Agents VIII. XI, 303 pages. 2004. (Subseries LNAI).

Vol. 3190: Y. Luo (Ed.), Cooperative Design, Visualization, and Engineering. IX, 248 pages. 2004.

Vol. 3189: P.-C. Yew, J. Xue (Eds.), Advances in Computer Systems Architecture. XVII, 598 pages. 2004.

Vol. 3188: F.S. de Boer, M.M. Bonsangue, S. Graf, W.-P. de Roever (Eds.), Formal Methods for Components and Objects. VIII, 373 pages. 2004.

Vol. 3187: G. Lindemann, J. Denzinger, I.J. Timm, R. Unland (Eds.), Multiagent System Technologies. XIII, 341 pages. 2004. (Subseries LNAI).

Vol. 3186: Z. Bellahsène, T. Milo, M. Rys, D. Suciu, R. Unland (Eds.), Database and XML Technologies. X, 235 pages. 2004.

Vol. 3185: M. Bernardo, F. Corradini (Eds.), Formal Methods for the Design of Real-Time Systems. VII, 295 pages. 2004.

Vol. 3184: S. Katsikas, J. Lopez, G. Pernul (Eds.), Trust and Privacy in Digital Business. XI, 299 pages. 2004.

Vol. 3183: R. Traunmüller (Ed.), Electronic Government. XIX, 583 pages. 2004.

Vol. 3182: K. Bauknecht, M. Bichler, B. Pröll (Eds.), E-Commerce and Web Technologies. XI, 370 pages. 2004.

Vol. 3181: Y. Kambayashi, M. Mohania, W. Wöß (Eds.), Data Warehousing and Knowledge Discovery. XIV, 412 pages. 2004.

Vol. 3180: F. Galindo, M. Takizawa, R. Traunmüller (Eds.), Database and Expert Systems Applications. XXI, 972 pages. 2004.

Vol. 3179: F.J. Perales, B.A. Draper (Eds.), Articulated Motion and Deformable Objects. XI, 270 pages. 2004.

Vol. 3178: W. Jonker, M. Petkovic (Eds.), Secure Data Management. VIII, 219 pages. 2004.

Vol. 3177: Z.R. Yang, H. Yin, R. Everson (Eds.), Intelligent Data Engineering and Automated Learning – IDEAL 2004. XVIII, 852 pages. 2004.

Vol. 3176: O. Bousquet, U. von Luxburg, G. Rätsch (Eds.), Advanced Lectures on Machine Learning. IX, 241 pages. 2004. (Subseries LNAI).

General Chairs' Message

As conference co-chairs, we have great pleasure in writing this short foreword to the proceedings of the 2nd European AcrossGrids Conference (AxGrids 2004). The conference clearly demonstrated the need in Europe for an annual event that brings together the grid research community to share experiences and learn about new developments. This year, in addition to the large number of attendees from across the 25 member states of the European Union, we were especially pleased to welcome fellow researchers from the Americas and the Asia – Pacific region. Only by talking and working together will we realize our vision of building truly global grids.

In addition to the main AxGrids 2004 conference, and thanks to the large number of researchers from European Commission-funded projects who were present, we were able to run a series of GRIDSTART Technical Working Group meetings and we are indebted to the conference organizers for helping with the logistics of this parallel activity.

In particular we would like to express our gratitude to Marios Dikaiakos and his team for working tirelessly over many months to make the conference the smooth-running success that it was. Of course, no conference is complete without speakers and an audience and we would like to thank everyone for their interest and engagement in the many sessions over the three days of the event.

AxGrids 2004 once again demonstrated the need in Europe for an event to bring together the research community. As we move forward into Framework 6 we look forward to its continuation and expansion to represent all of the grid research community in Europe.

June 2004

Mark Parsons
Michal Turala

Editor's Preface

The 2nd European AcrossGrids Conference (AxGrids 2004) aimed to examine the state of the art in research and technology developments in Grid Computing, and provide a forum for the presentation and exchange of views on the latest grid-related research results and future work. The conference was organized by CrossGrid, a European Union-funded project on Grid research, GRIDSTART, the EU-sponsored initiative for consolidating technical advances in grids in Europe, and the University of Cyprus. It continued on from the successful 1st European Across Grids Conference, held in Santiago de Compostela, Spain, in February 2003. AxGrids 2004 was run in conjunction with the 2nd IST Concertation Meeting on Grid Research, which brought together representatives from all EU-funded projects on Grid research for an exchange of experiences and ideas regarding recent developments in European grid research.

The conference was hosted in Nicosia, the capital of Cyprus, and attracted authors and attendees from all over Europe, the USA, and East Asia. The Program Committee of the conference consisted of 37 people from both academia and industry, and there were 13 external reviewers. Overall, AxGrids 2004 attracted 57 paper submissions (42 full papers and 15 short posters). Papers underwent a thorough review by several Program Committee members and external reviewers. After the review, the Program Chair decided to accept 26 papers (out of 42) for regular presentations, 8 papers for short presentations, and 13 papers for poster presentations. Accepted papers underwent a second review for inclusion this postproceedings volume, published as part of Springer's Lecture Notes in Computer Science series. Eventually, we decided to include 27 long and 3 short papers, which cover a range of important topics of grid research, from computational and data grids to the Semantic Grid and grid applications.

Here, we would like to thank the Program Committee members, the external reviewers, and the conference session chairs for their excellent work, which contributed to the high-quality technical program of the conference. We would also like to thank the University of Cyprus, IBM, GRIDSTART, and the Cyprus Telecommunications Authority (CYTA) for making possible the organization of this event through their generous sponsorship. Special thanks go to Maria Poveda for handling organizational issues, to Dr. Pedro Trancoso for setting up and running the Web management system at the Computer Science Department at the University of Cyprus, and to Kyriacos Neocleous for helping with the preparation of the proceedings.

I hope that you find this volume interesting and useful.

Nicosia, Cyprus, June 2004 — Marios D. Dikaiakos

Organizing Committee

Conference General Chairs

Michal Turala	ACC Cyfronet & INP, Krakow, Poland
Mark Parsons	EPCC, Univ. of Edinburgh, UK

Program Committee Chair

Marios Dikaiakos	University of Cyprus

Posters and Demos Chair

Jesus Marco	CSIC, Santander, Spain

Website Chair

Pedro Trancoso	University of Cyprus

Publicity Chair

George Papadopoulos	University of Cyprus

Local Organizing Committee

Marios Dikaiakos	University of Cyprus
Nikos Nikolaou	Cyprus Telecom. Authority
Maria Poveda	University of Cyprus

Steering Committee

Bob Bentley	University College London, UK
Marian Bubak	Inst. of Comp. Science & ACC Cyfronet, Poland
Marios Dikaiakos	Univ. of Cyprus
Dietmar Erwin	Forschungszentrum Jülich GmbH, Germany
Fabrizio Gagliardi	CERN, Geneva, Switzerland
Max Lemke	European Commission
Jesus Marco	CSIC, Spain
Holger Marten	Forschungszentrum Karlsruhe GmbH, Germany
Norbert Meyer	PSNC, Poland
Matthias Mueller	HLRS, Germany
Jarek Nabrzyski	PSNC, Poland
Mark Parsons	EPCC, Univ. of Edinburgh, UK
Yannis Perros	Algosystems, Greece
Peter Sloot	Univ. of Amsterdam, The Netherlands
Michal Turala	ACC Cyfronet & INP, Poland

Program Committee

A. Bogdanov	Inst. for HPCDB, Russian Federation
M. Bubak	Inst. of Comp. Sci. & Cyfronet, Poland
B. Coghlan	Trinity College Dublin, Ireland
M. Cosnard	INRIA, France
Y. Cotronis	Univ. of Athens, Greece
J. Cunha	New University of Lisbon, Portugal
E. Deelman	ISI, Univ. Southern California, USA
M. Delfino	Univ. Autònoma de Barcelona, Spain
M. Dikaiakos	Univ. of Cyprus
B. DiMartino	Second University of Naples, Italy
J. Dongarra	Univ. of Tennessee, USA
T. Fahringer	University of Innsbruck, Austria
I. Foster	ANL and Univ. of Chicago, USA
G. Fox	Univ. of Indiana, USA
W. Gentzsch	Sun Europe, Germany
M. Gerndt	TU Munchen, Germany
A. Gomez	CESGA, Spain
A. Hoekstra	Univ. of Amsterdam, The Netherlands
E. Houstis	University of Thessaly, Greece
B. Jones	CERN, Switzerland
P. Kacsuk	Sztaki, Hungary
J. Labarta	Univ. Polytechnica Catalunya, Spain
D. Laforenza	CNR, Italy
E. Markatos	ICS-FORTH & Univ. of Crete, Greece
L. Matyska	Masaryk University, Czech Republic
N. Meyer	Poznan Supercomputing Center, Poland
B. Miller	Univ. of Wisconsin, USA
L. Moreau	Univ. of Southampton, UK
T. Priol	INRIA/IRISA, France
D. Reed	Univ. of Illinois, Urbana-Champaign, USA
R. Sakellariou	Univ. of Manchester, UK
M. Senar	Univ. Autònoma de Barcelona, Spain
P. Sloot	Univ. of Amsterdam, The Netherlands
L. Snyder	Univ. of Washington, USA
P. Trancoso	Univ. of Cyprus
D. Walker	Univ. of Wales, UK
R. Wismüller	TU Munchen, Germany

此为试读,需要完整PDF请访问: www.ertongbook.com

Referees

Gabriel Antoniu
Vaggelis Floros
Marilena Georgiadou
Anastasios Gounaris
Alexandru Jugravu
Juri Papay
Christian Perez
Norbert Podhorszki
Gergely Sipos
Nicola Tonellotto
Eleni Tsiakkouri
George Tsouloupas
Alex Villazon

Sponsoring Institutions

University of Cyprus
IBM
GRIDSTART
Cyprus Telecommunications Authority

Table of Contents

EU Funded Grid Development in Europe 1
P. Graham, M. Heikkurinen, J. Nabrzyski, A. Oleksiak, M. Parsons, H. Stockinger, K. Stockinger, M. Stroiński, and J. Węglarz

Pegasus: Mapping Scientific Workflows onto the Grid 11
E. Deelman, J. Blythe, Y. Gil, C. Kesselman, G. Mehta, S. Patil, M.-H. Su, K. Vahi, and M. Livny

A Low-Cost Rescheduling Policy for Dependent Tasks on Grid Computing Systems 21
H. Zhao and R. Sakellariou

An Advanced Architecture for a Commercial Grid Infrastructure 32
A. Litke, A. Panagakis, A. Doulamis, N. Doulamis, T. Varvarigou, and E. Varvarigos

Managing MPI Applications in Grid Environments 42
E. Heymann, M.A. Senar, E. Fernández, A. Fernández, and J. Salt

Flood Forecasting in CrossGrid Project 51
L. Hluchy, V.D. Tran, O. Habala, B. Simo, E. Gatial, J. Astalos, and M. Dobrucky

MPICH-G2 Implementation of an Interactive Artificial Neural Network Training 61
D. Rodríguez, J. Gomes, J. Marco, R. Marco, and C. Martínez-Rivero

OpenMolGRID, a GRID Based System for Solving Large-Scale Drug Design Problems 69
F. Darvas, Á. Papp, I. Bágyi, G. Ambrus, and L. Ürge

Integration of Blood Flow Visualization on the Grid: The FlowFish/GVK Approach 77
A. Tirado-Ramos, H. Ragas, D. Shamonin, H. Rosmanith, and D. Kranzmueller

A Migration Framework for Executing Parallel Programs in the Grid 80
J. Kovács and P. Kacsuk

Implementations of a Service-Oriented Architecture on Top of Jini, JXTA and OGSI 90
N. Furmento, J. Hau, W. Lee, S. Newhouse, and J. Darlington

Dependable Global Computing with JaWS++ 100
G. Kakarontzas and S. Lalis

Connecting Condor Pools into Computational Grids by Jini 110
G. Sipos and P. Kacsuk

Overview of an Architecture Enabling Grid
Based Application Service Provision 113
S. Wesner, B. Serhan, T. Dimitrakos, D. Mac Randal, P. Ritrovato, and G. Laria

A Grid-Enabled Adaptive Problem Solving Environment 119
Y. Kim, I. Ra, S. Hariri, and Y. Kim

Workflow Support for Complex Grid Applications:
Integrated and Portal Solutions 129
R. Lovas, G. Dózsa, P. Kacsuk, N. Podhorszki, and D. Drótos

Debugging MPI Grid Applications Using Net-dbx 139
P. Neophytou, N. Neophytou, and P. Evripidou

Towards an UML Based Graphical Representation
of Grid Workflow Applications 149
S. Pllana, T. Fahringer, J. Testori, S. Benkner, and I. Brandic

Support for User-Defined Metrics
in the Online Performance Analysis Tool G-PM 159
R. Wismüller, M. Bubak, W. Funika, T. Arodź, and M. Kurdziel

Software Engineering in the EU CrossGrid Project 169
M. Bubak, M. Malawski, G. Młynarczyk, P. Nowakowski, R. Pająk, K. Rycerz, and M. Turała

Monitoring Message-Passing Parallel Applications
in the Grid with GRM and Mercury Monitor 179
N. Podhorszki, Z. Balaton, and G. Gombás

Lhcmaster – A System for Storage and Analysis of Data Coming
from the ATLAS Simulations 182
M. Malawski, M. Wieczorek, M. Bubak, and E. Richter-Wąs

Using Global Snapshots to Access Data Streams on the Grid 191
B. Plale

SCALEA-G: A Unified Monitoring and Performance Analysis System
for the Grid 202
H.-L. Truong and T. Fahringer

Application Monitoring in CrossGrid and Other Grid Projects 212
B. Baliś, M. Bubak, M. Radecki, T. Szepieniec, and R. Wismüller

Grid Infrastructure Monitoring as Reliable Information Service 220
P. Holub, M. Kuba, L. Matyska, and M. Ruda

Towards a Protocol for the Attachment of Semantic Descriptions to Grid Services 230
S. Miles, J. Papay, T. Payne, K. Decker, and L. Moreau

Semantic Matching of Grid Resource Descriptions 240
J. Brooke, D. Fellows, K. Garwood, and C. Goble

Enabling Knowledge Discovery Services on Grids 250
A. Congiusta, C. Mastroianni, A. Pugliese, D. Talia, and P. Trunfio

A Grid Service Framework for Metadata Management in Self-e-Learning Networks 260
G. Samaras, K. Karenos, and E. Christodoulou

Author Index 271

EU Funded Grid Development in Europe

Paul Graham[3], Matti Heikkurinen[1], Jarek Nabrzyski[2], Ariel Oleksiak[2], Mark Parsons[3], Heinz Stockinger[1], Kurt Stockinger[1], Maciej Stroiński[2], and Jan Węglarz[2]

[1] CERN, European Organization for Nuclear Research, Switzerland
[2] PSNC, Poznan Supercomputing and Networking Center, Poland
[3] EPCC, Edinburgh Parallel Computing Centre, Scotland

Abstract. Several Grid projects have been established that deploy a "first generation Grid". In order to categorise existing projects in Europe, we have developed a taxonomy and applied it to 20 European Grid projects funded by the European Commission through the Framework 5 IST programme. We briefly describe the projects and thus provide an overview of current Grid activities in Europe. Next, we suggest future trends based on both the European Grid activities as well as progress of the world-wide Grid community. The work we present here is a source of information that aims to help to promote European Grid development.

1 Introduction

Since the term "Grid" was first introduced, the Grid community has expanded greatly in the last five years. Originally, only a few pioneering projects such as Globus, Condor, Legion and Unicore provided Grid solutions. Now, however, many countries have their own Grid projects that provide specific Grid middleware and infrastructure.

In this paper, in order to give a comprehensive overview of existing technologies and projects in Europe, we establish a general taxonomy for categorising Grid services, tools and projects. This taxonomy is then applied to existing projects in Europe. In particular, within the GRIDSTART [5] framework we have analysed 20 representative Grid projects funded by the European Commission in order to highlight current European trends in Grid computing. The guiding principle behind this taxonomy is to enable the identification of trends in European Grid development and to find out where the natural synergies between projects exist.

Since the need for this taxonomy was practical – and relatively urgent – a certain amount of guidance in the form of "pre-classification" was deemed necessary in the information gathering phase. This meant that rather than asking open questions about the activities of the projects and creating the classification based on the answers, the projects themselves were asked to identify which layers and areas (see later) they worked on according to a classification presented to them in a series of questionnaires. Thus, it is likely that this taxonomy will evolve as the contacts and collaboration between projects increases.

M. Dikaiakos (Ed.): AxGrids 2004, LNCS 3165, pp. 1–10, 2004.
© Springer-Verlag Berlin Heidelberg 2004

This taxonomy is based on the IST Grid Projects Inventory and Roadmap [4] (a 215 page document). In this paper we extract the key aspects of the data presented in that document and refer to the original document for further details.

The paper should also prove of interest to the broader distributed computing community since the results presented provide a clear overview of how European Grid activities are evolving. The paper supersedes previous work reported in [7] (describing the initial work towards this survey) and [1] (reporting on a preliminary overview). The more up-to-date overview provided in this paper covers new trends and Grid services which are rapidly evolving from standardisation work as well as benefiting from insight into the latest developments in the various projects, that have occurred since the initial overviews were prepared.

2 Taxonomy

Development of Grid environments requires effort in a variety of disciplines, from preparing sufficient network infrastructure, through the design of reliable middleware, to providing applications and tailored to the end users.

The comparison of Grid projects is made according to three different categorisation schemes. The first is by different technological *layers* [2, 3] that separate the Grid user from the underlying hardware:

- **Applications and Portals.** Applications such as parameter simulations, and grand-challenge problems, often require considerable computing power, access to remote data sets, and may need to interact with scientific instruments. Grid portals offer web-enabled application services, i.e. users can submit and collect results for their jobs on remote resources through a web interface.
- **Application Environment and Tools.** These offer high-level services that allow programmers to develop applications and test their performance and reliability. Users can then make use of these applications in an efficient and convenient way.
- **Middleware (Generic and Application Specific Services).** This layer offers core services such as remote process management, co-allocation of resources, storage access, information (registry), security, data access and transfer, and Quality of Service (QoS) such as resource reservation and trading.
- **Fabric and Connectivity.** Connectivity defines core communication protocols required for Grid-specific network transactions. The fabric comprises the resources geographically distributed and accessible on the Internet.

The second categorisation scheme concerns technical *areas*, which include topics such as dissemination and testbeds and which address the wider issues the impact of Grid technology. All areas with their projects are listed in Figure 2 which categorises different the aspects of Grid projects.

The third main categorisation scheme in this article focuses on the scientific domain of *applications* as well as the computational approaches used (see Section 3.3). Further related work on an earlier taxonomy of Grid resource management can be found in [6].

此为试读,需要完整PDF请访问: www.ertongbook.com