

LNCS 4331

Geyong Min
Beniamino Di Martino
Laurence T. Yang
Minyi Guo
Gudula Ruenger (Eds.)

Frontiers of High Performance Computing and Networking – ISPA 2006 Workshops

ISPA 2006 International Workshops
FHPCN, XHPC, S-GRACE, GridGIS, HPC-GTP
PDCE, ParDMCom, WOMP, ISDF, and UPWN
Sorrento, Italy, December 2006, Proceedings

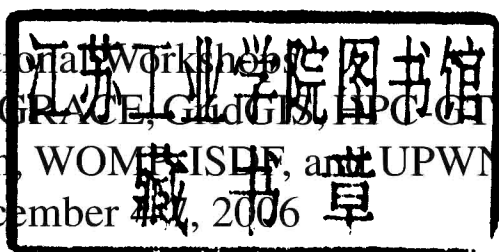


Springer

Geyong Min Beniamino Di Martino
Laurence T. Yang Minyi Guo
Gudula Ruenger (Eds.)

Frontiers of High Performance Computing and Networking – ISPA 2006 Workshops

ISPA 2006 International Workshops
FHPCN, XHPC, S-GRACE, GridGIS, HPC-GTP
PDCE, ParDMCom, WOMP-ISDF, and UPWN
Sorrento, Italy, December 4-8, 2006
Proceedings



Volume Editors

Geyong Min

University of Bradford, Bradford, UK

E-mail: g.min@brad.ac.uk

Beniamino Di Martino

Seconda Università di Napoli, Roma, Italy

E-mail: beniamino.dimartino@unina.it

Laurence T. Yang

St. Francis Xavier University, Antigonish, Canada

E-mail: lyang@stfx.ca

Minyi Guo

University of Aizu, Fukushima 965-8580, Japan

E-mail: minyi@u-aizu.ac.jp

Gudula Ruenger

Chemnitz University of Technology, Chemnitz, Germany

E-mail: ruenger@informatik.tu-chemnitz.de

Library of Congress Control Number: 2006937143

CR Subject Classification (1998): F.1, F.2, D.1, D.2, D.4, C.2, C.4, H.4, J.3

LNCS Sublibrary: SL 1 – Theoretical Computer Science and General Issues

ISSN 0302-9743

ISBN-10 3-540-49860-5 Springer Berlin Heidelberg New York

ISBN-13 978-3-540-49860-5 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

springer.com

© Springer-Verlag Berlin Heidelberg 2006

Printed in Germany

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

Printed on acid-free paper SPIN: 11942634 06/3142 5 4 3 2 1 0

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

University of California, Los Angeles, CA, 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

Preface

This proceedings volume contains the refereed and revised papers presented at the ten workshops held in conjunction with the 4th International Symposium on Parallel and Distributed Processing and Applications (ISPA 2006), in Sorrento, Italy, December 4-6, 2006. The objective of the workshops is to provide an outstanding international forum for academics, educators, engineering, and industrial professionals to contribute and to disseminate innovative and state-of-the-art research, to report, discuss and exchange experimental or theoretical results, experience, work-in-progress, and case studies on high-performance computing and networking. These workshops are:

- FHPCN 2006: Workshop on Frontiers of High-Performance Computing and Networking
- XHPC 2006: Workshop on XEN in HPC Cluster and Grid Computing Environments
- S-GRACE 2006: Workshop on Semantic Grid Applications in Computing and Engineering
- GridGIS 2006: Workshop on Fertilization of Grid Computing and Geographic Information Systems
- HPC-GTP 2006: Workshop on High-Performance Computing in Genomic Proteomics and Transcriptomics
- PDCE 2006: Workshop on Parallel and Distributed Computing in Engineering
- ParDMCom 2006: Workshop on Parallel and Distributed Multimedia Computing
- WOMP 2006: Workshop on Middleware Performance
- ISDF 2006: Workshop on Information Security and Digital Forensics
- UPWN 2006: Workshop on Ubiquitous Processing for Wireless Networks

The FHPCN 2006 workshop constituted 40 papers that were carefully selected from manuscripts submitted for potential publication at the conference. These papers are organized in four special tracks: System Architectures; Middleware and Cooperative Computing; Techniques, Algorithms and Applications; and Advanced Networking. Each of the additional nine workshops focused on a particular theme of high-performance computing and networking and complemented the spectrum of the main conference and FHPCN workshop.

We would like to thank the ISPA 2006 General Co-chairs, Beniamino Di Martino, Jack Dongarra, and Laurence T. Yang for their guidance and vision, and the Program Co-chairs, Minyi Guo and Hans Zima, for their support and encouragement. We deeply appreciate the tremendous efforts and contributions of the Chairs of individual workshops. Our thanks also go to all authors for their valuable contributions and to all Program Committee members and reviewers for providing timely and in-depth reviews. Last but not least, we deeply appreciate

Lan Wang, Shihang Yan, Xiaolong Jin, and Mimmo Di Sivo for their great help and hard work with editing the proceedings.

Geyong Min
Gudula Rünger
ISPA 2006 Workshop Co-chairs
Beniamino Di Martino
Jack Dongarra
Laurence T. Yang
ISPA 2006 General Co-chairs
Minyi Guo
Hans Zima
ISPA 2006 Program Co-chairs

International Workshop on XEN in HPC Cluster and Grid Computing Environments (XHPC 2006)

The XEN virtual machine monitor is reaching wide spread adoption in a variety of operating systems as well as scientific, educational and operational usage areas. With its low overhead, XEN allows for concurrently running large numbers of virtual machines, providing each with encapsulation, isolation and network-wide CPU migratability. XEN offers a network-wide abstraction layer of individual machine resources to OS environments, thereby opening options for new cluster- and grid high-performance computing (HPC) architectures and HPC services. With XEN finding applications in HPC environments, this workshop brought together researchers and practitioners active on XEN in high-performance cluster and grid computing environments.

XHPC 2006 also provided a forum for scientists, engineers, and researchers to discuss and exchange their new ideas, novel results, work in progress and experience on all aspects of virtualization in HPC environments. It covered a wide range of theoretical and applied topics in the area of virtualization including XEN in cluster environments, compute job entry and scheduling, MPI on virtual machines, system sizing, network architectures for XEN clusters, XEN on large SMP machines, performance measurements, management of XEN clusters, dynamic scheduling and load-leveling, and power management in HPC clusters.

We are very proud to have received many high-quality submissions. We conducted a rigorous peer review process for each submission, with the great support of all Program Committee members. Based on the reviews, we selected 11 papers to be included in this program. We congratulate the authors of accepted papers, and regret that many quality submissions could not be included due to the time and space limit.

Finally, we would like to take this opportunity to thank the authors of all the submissions for their contribution. We would also like to thank the Program Committee members for their efforts in reviewing the submissions. Finally, we would like to thank Gudula Rünger and Geyong Min for their guidance in the organization of this workshop.

Hope you all enjoy the workshop proceedings.

Michael Alexander
XHPC 2006 Workshop Organizers

Workshop Chair

Michael Alexander WU Vienna, Austria

Program Committee

Franck Cappello	INRIA, France
Stephen Childs	Trinity College, Ireland
Claudia Eckert	Fraunhofer Institute, Germany
Bill Gardner	University of Guelph, Canada
Rob Gardner	HP Labs, USA
Marcus Hardt	Forschungszentrum Karlsruhe, Germany
Klaus Ita	WU Vienna, Austria
Sverre Jarp	CERN, Switzerland
Thomas Lange	University of Cologne, Germany
Ronald Luijten	IBM Research Laboratory, Zurich, Switzerland
Franco Travostino	Nortel CTO Office, USA
Andreas Unterkircher	CERN, Switzerland

International Workshop on Semantic GRid Applications in Computing and Engineering (S-GRACE 2006)

As an extension of current computing grids, a semantic grid is characterized as an open system in which information, computing resources and services are given well-defined meaning in standard ways. This approach helps bring resources virtually together and makes it easier for resources to be discovered and processed automatically. It also opens research opportunities for scientists and engineers. This workshop aims to provide a forum for researchers to discuss and share their findings and ideas in semantic grid applications in computing and engineering, and to envision the future work in this area. This year we are very proud to have received many high-quality submissions. We conducted a rigorous peer review process for each submission, with the great support of all Program Committee members. Based on the reviews, we selected nine papers to be included in the program. We congratulate the authors of accepted papers, and regret that many quality submissions could not be included due to the time and space limit. Taking this opportunity, we would like to thank all the authors for their contributions to the program. We would also like to thank the Program Committee members for their efforts in reviewing the submissions. In conclusion, we would like to thank the ISPA Workshop Chairs Geyong Min and Gudula Rünger for their excellent work in driving and supporting us in the various phases of workshop development.

Xubin (Ben) He
Wenbin Jiang
Beniamino Di Martino
Young-Sik Jeong
Laurence T. Yang
S-GRACE 2006 Workshop Organizers

Executive Committee

Steering Chair: Laurence T. Yang, St. Francis Xavier University, Canada
General Co-chairs: Beniamino Di Martino, Second University of Naples, Italy
Xubin He, Tennessee Technological University, USA
Program Co-chairs: Young-Sik Jeong, Wonkwang University, Korea
Wenbin Jiang, Huazhong University of Science
and Technology, China

Program Committee

Huajun Chen	Zhejiang University, China
Xiaowu Chen	Beihang University, China
Christian Engelmann	Oak Ridge National Laboratory, USA
Jizhong Han	Chinese Academy of Sciences, China
Sung-Kook Han	Wonkwang University, Korea
Youn-Hee Han	Korea University of Technology and Education, Korea
Dongwon Jeong	Kunsan National University, Korea
Rodrigo de Mello	University of São Paulo, Brazil
Li Ou	Tennessee Technological University, USA
Stephen Scott	Oak Ridge National Laboratory, USA
Ruppa K. Thulasiram	University of Manitoba, Canada
Juan Tourino	University of A Coruna, Spain
Guojun Wang	Central South University, China
Tao Xie	San Diego State University, USA
Naixue Xiong	JAIST, Japan
Zhiyong Xu	Suffolk University, USA
Pingpeng Yuan	Huazhong University of Science and Technology, China
Yifeng Zhu	University of Maine, USA
Hai Zhuge	Chinese Academy of Sciences, China

International Workshop on Fertilization of Grid Computing and Geographic Information Systems

(GridGIS 2006)

The development of Geographic Information Systems (GIS) sciences and technologies motivates the concern of the next-generation GIS, including multi-resources distributed, high-performance computation and data transfer, and collaborative platform of virtual organization for multiple end users. Grid technology offers the prospect of enabling new types of applications and new ways of working in the area of GIS. Grid computing and geographic information system (GridGIS) is a science at the intersection of grid computing and GIS. It is characterized by modern grid computing technology, by information sharing between geographically distributed sites, and by real-time decisions.

This workshop aims to provide a forum for examining the state of the art of GridGIS. The main objectives are the definitions of theoretical and conceptual fundamentals of GridGIS, the description of applications and the related common fundamental problems as well as the determination of research directions to improve the understanding and applications of GridGIS. It also provides a venue for scientists to network with their peers working in similar fields.

It covers a wide range of theoretical and experimental topics in the area of GridGIS including:

- Definition and Architecture of GridGIS, including spatial information grid theory and technologies
- GridGIS middleware for security, error disposal, and the management of resources, tasks, users, login, messages, duplication, and logging
- Algorithms in GridGIS, including cooperative computing of spatial information, parallel, distributed, and intelligent data processing algorithms, etc.; Security of GridGIS
- Integration of remote sensing and global positioning systems (GPS) with GridGIS
- Data access service, metadata management and information service
- Applications of GridGIS, including online spatial decision support system, location-based service, telegeoprocessing, telemonitoring, Digital Earth, public emergency prevention and monitoring, etc.

We are pleased to have received a number of high-quality submissions. We conducted a rigorous peer-review process for each submission, with the support of all Program Committee members as well as a group of external reviewers. Based on the reviews, we selected five papers to be included in this program. We congratulate the authors of accepted papers, and regret that many excellent submissions could not be included due to the time and space limit.

Taking this opportunity, we would like to thank the authors of all the submissions for their contributions to the program. We would also like to thank the Program Committee members and external reviewers for their efforts in reviewing the papers.

Yong Xue
Chenghu Zhou
GridGIS 2006 Workshop Organizers

Workshop Co-chairs

Yong Xue
Chenghu Zhou

IRSA, Chinese Academy of Sciences, China
IGSNRR, Chinese Academy of Sciences, China

Program Committee

Ken Fisher	London Metropolitan University, UK
James King	London Metropolitan University, UK
Eunjoo Lee	London Metropolitan University, UK
Romas Mikusauskas	London Metropolitan University, UK
Peter Oriogun	London Metropolitan University, UK
Karim Ouazzane	London Metropolitan University, UK
Costas Varotsos	University of Athens, Greece
Yong Xue	IRSA, Chinese Academy of Sciences, China
Chenghu Zhou	IGSNRR, Chinese Academy of Sciences, China
Honglei Zhu	Clarke University, USA

International Workshop on High-Performance Computing in Genomic Proteomics and Transcriptomics (HPC-GTP 2006)

Data mining and machine learning techniques have been widely applied in many practical problems. The ever-increasing growth of data arising in diverse areas has urged the development of high-performance methods, software and tools to extract useful information from data and to derive knowledge.

Genomics, proteomics and transcriptomics are among the most important areas where information obtained from very large datasets can assist medical researchers in understanding the structure and functions of the humane genome, discovering new personalized drugs, and diagnosing genetic diseases.

The problems arising in these areas have some unique characteristics. First, the quantity of data produced is going to exponentially increase in the next few years, leaving a stable gap of two orders of magnitude between known sequences and identified structures. Furthermore, the data are often updated, which, for example, poses problems to the training step of supervised learning techniques. Finally, the data have the unusual feature of comprising a very large number of variables. Indeed, publicly available datasets can contain data with tens of thousands of characteristics, which are updated regularly. This tendency is going to result in the need for algorithms that can handle such complexity in the next few years.

Due to the size and efficiency problems, it is likely that such very large databases will only be processed or mined using loosely connected supercomputers. Since standard data mining and machine learning algorithms do not achieve a good performance in the considered computational paradigm, special algorithms must be designed to exploit that strong computational infrastructure.

The HPC-GTP 2006 workshop, held in conjunction with The International Symposium on Parallel and Distributed Processing and Applications (ISPA 2006), aimed to bring together researchers who use high-performance computing to solve these computationally demanding problems in genomics, proteomics and transcriptomics. It represents a first attempt to collect the existing expertise in the field and engage researchers in this exciting and rapidly growing research area. Finally, special thanks to all authors for their contributions to the program. We would also like to thank the Program Committee members and external reviewers for their efforts in reviewing the submissions.

Mario R. Guarracino

Panos M. Pardalos

Laurence T. Yang

HPC-GTP 2006 Workshop Organizers

General Chairs

Mario R. Guarracino	National Research Council, Italy
Panos M. Pardalos	University of Florida, USA
Laurence T. Yang	St. Francis Xavier University, Canada

Program Committee

Mario Cannataro	University of Catanzaro, Italy
Vipin Chaudhary	Wayne State University, USA
Maria Luisa Chiusano	University of Naples "Federico II," Italy
Claudio Cifarelli	University of Rome "La Sapienza," Italy
Amitava Datta	University of Western Australia, Australia
Ivanoe De Falco	ICAR-CNR, Italy
Andrei Doncescu	LAAS-NCSR, France
Ryoko Hayashi	Kanazawa Institute of Technology, Japan
Chun-Hsi Huang	University of Connecticut, USA
Chokchai Leangsuksun	Louisiana Tech, USA
Tao Li	Int. University of Florida, USA
Wenjun Li	UT Southwestern Medical Center, USA
Yiming Li	National Chiao Tung University, Taiwan
Jun Ni	University of Iowa, USA
Clara Pizzuti	ICAR-CNR, Italy
Oleg Prokopyev	University of Florida, USA
Onur Seref	University of Florida, USA
El-Ghazali Talbi	LIFL, France
Domenico Talia	University of Calabria, Italy
Ernesto Tarantino	ICAR-CNR, Italy
Gerardo Toraldo	University of Naples "Federico II," Italy
Albert Zomaya	University of Sydney, Australia

International Workshop on Parallel and Distributed Computing in Engineering

(PDCE 2006)

This workshop is an international forum for engineers, developers, and researchers to share experiences, discuss new ideas, and present results on all aspects of parallel and distributed computing applied to engineering. It covers contributions from academia and industry applied to all branches of engineering, such as aeronautical, agricultural, automotive, bioengineering, biological, biomedical, chemical, civil, computer, control, electrical, electronics, environmental, forest, industrial, manufacturing, materials, mechanical, mechatronic, metallurgical, naval, nuclear, optical, transportation, petroleum. Papers may describe new architectures, algorithms, methods, techniques, tools and software applications.

Topics of interest include, but are not limited to: methods for parallel and distributed applications development; parallel and distributed algorithms; parallel and distributed application software; parallel and distributed dedicated architectures; parallel and distributed numerical methods; parallel and distributed optimization methods; parallel and distributed reconfigurable computing; parallel and distributed simulations; performance analysis of parallel and distributed applications; real-time parallel and distributed computing; techniques for parallel and distributed applications development; and tools for parallel and distributed applications development.

This year we are very proud to have received 26 high-quality submissions. We conducted a rigorous peer-review process for each submission, with the great support of all Program Committee members as well as a group of external reviewers. Based on the reviews, we selected eight papers to be included in this program. We congratulate the authors of accepted papers, and regret that many quality submissions could not be included due to the time and space limit.

Taking this opportunity, we would like to thank the authors of all the submissions for their contributions to the program. We would also like to thank the Program Committee members and external reviewers for their efforts in reviewing the submissions. Finally, we would like to thank Geyong Min and Gudula Rünger, the ISPA 2006 Workshop Co-chairs, for the guidance in the organization of this workshop.

Alvaro L. G. A. Coutinho
Carlos Augusto P. S. Martins
Jairo Panetta
José Eduardo Moreira
José Nelson Amaral
Petr Ya. Ekel
Witold Pedrycz
PDCE 2006 Workshop Organizers

Executive Committee

- General Co-chairs: Carlos Augusto P.S. Martins
Pontifical Catholic University of Minas Gerais, Brazil
Petr Ya. Ekel
Pontifical Catholic University of Minas Gerais, Brazil
- Workshop Co-chairs: Alvaro L. G. A. Coutinho
Federal University of Rio de Janeiro, Brazil
Carlos Augusto P. S. Martins
Pontifical Catholic University of Minas Gerais, Brazil
Jairo Panetta
National Institute for Space Research, Brazil
José Eduardo Moreira
IBM Thomas J. Watson Research Center, USA
José Nelson Amaral
University of Alberta, Canada
Petr Ya. Ekel
Pontifical Catholic University of Minas Gerais, Brazil
Witold Pedrycz
University of Alberta, Canada

Program Committee

- | | |
|------------------------------|--|
| Eugênio Sper Almeida | National Institute for Space Research, Brazil |
| José Nelson Amaral | University of Alberta, Canada |
| Marcelo Cintra | University of Edinburgh, UK |
| Walfredo Cirne | Federal University of Campina Grande, Brazil |
| Alvaro L. G. A. Coutinho | Federal University of Rio de Janeiro, Brazil |
| Tiaraju Asmuz Divério | Federal University of Rio Grande do Sul, Brazil |
| Petr Ya. Ekel | Pontifical Catholic University of Minas Gerais, Brazil |
| Djalma Mosqueira Falcão | Federal University of Rio de Janeiro, Brazil |
| Sergio Takeo Kofuji | University of São Paulo, Brazil |
| Eugene Levner | Holon Academic Institute of Technology, Israel |
| Carlos Augusto P. S. Martins | Pontifical Catholic University of Minas Gerais, Brazil |
| Wagner Meira | Federal University of Minas Gerais, Brazil |
| Rodrigo Fernandes de Mello | University of São Paulo, Brazil |
| Alba Cristina M. A. de Melo | University of Brasília, Brazil |
| José Eduardo Moreira | IBM Thomas J. Watson Research Center, USA |
| Philippe Olivier A. Navaux | Federal University of Rio Grande do Sul, Brazil |
| Jairo Panetta | National Institute for Space Research, Brazil |
| Witold Pedrycz | University of Alberta, Canada |
| Edison Zacarias da Silva | State University of Campinas, Brazil |
| Maria Helena Murta Vale | Federal University of Minas Gerais, Brazil |

International Workshop on Parallel and Distributed Multimedia Computing (ParDMCom 2006)

In recent decades, multimedia computing has emerged as an important technology to generate content based on images, video, audio, graphics, and text. Furthermore, the recent new development represented by high-definition(HD) and interactive television will generate important computing problems connected with the creation, processing, and management of multimedia content. Dealing with HD multimedia content (image, video and sound) will generate a huge volume of data to process, which can lead in a natural way to parallel and distributed computing. Moreover, the inherent data parallelism of multimedia content data makes this type of computing a natural application area for parallel and distributed processing.

This workshop aims to merge the recent research achievements in developing new theories, algorithms, architectures, systems and integrated multimedia platforms that exploit parallel and distributed computing. The papers included in this workshop reflect current trends in the parallel and distributed multimedia computing research areas with topics such as parallel and distributed algorithms for multimedia, parallel and distributed architectures for multimedia, and multimedia content creation, processing, and management using parallel and distributed architectures.

Many people contributed to the success of ParDMCom 2006. We wish to thank the Program Committee members and the external referees for their great work. We would also like to express our gratitude towards the ISPA 2006 organizers for their help in this whole process.

Agustinus Borgy Waluyo
Shu-Ching Chen
Hui Huang Hsu Ma Lin
Sabin Tabirca Laurence T. Yang
Jianhua Ma
ParDMCom 2006 Organizers

Executive Committee

Steering Co-chairs: Laurence T. Yang, St. Francis Xavier University,
Canada
Jianhua Ma, Hosei University, Japan
General Co-chairs: Shu-Ching Chen, Florida International University, USA
Hui-Huang Hsu, Tamkang University, Taiwan