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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 4-7, 2006
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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

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Michael Alexander WU Vienna, Austria

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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
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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

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Chenghu Zhou	IGSNRR, Chinese Academy of Sciences, China

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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

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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
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Jairo Panetta
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Witold Pedrycz
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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
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ParDMCom 2006 Organizers

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International Workshop on Middleware Performance

(WOMP 2006)

Middleware technologies consist of various components that form the infrastructure or plumbing of distributed applications. Middleware performance plays a critical role in the end-to-end performance of distributed applications, which are characterized by a constant variation of location and intensity of users and/or their service. Middleware, based on existing and emerging technologies such as CORBA, .Net, EJB, Jini, Grid, Web Services, etc., should provide mechanisms to support applications to handle highly dynamic environments. This relies on awareness about the performance of middleware in order to assure certain degrees of service quality, such as response time or availability.

Ensuring adherence to performance requirements in middleware-based applications demands the characterization of metrics, measurement techniques, evaluation methods and benchmarks. The complexity of the design of such applications makes even more stringent the need for methodologies and tools that help the software designer in evaluating the impact of different alternatives in middleware on the application quality.

WOMP 2006 provided a forum for the growing community of scientists, researchers and software engineers interested in performance of middleware-based distributed applications, including essentially all kinds of measurement, analysis, prediction and testing, from requirements to software architecture, to design, to implementation. Performance analysis is intended in the very broad sense of analyzing nonfunctional quantitative aspects of such applications. This workshop focused on methods, measures, and tools for performance of distributed application developed from middleware. This includes middleware infrastructure, interaction paradigms, communication protocol, software architecture, middleware applications, other nonfunctional quality attributes, etc., and their relationship with performance.

This year we accepted papers that highlighted interesting research issues and provided insightful solutions. We were delighted to see contributions of accepted papers from three aspects. First, the performance evaluation and modeling issues are addressed in the context of emerging middleware domains including grid applications, Web services and context-aware mobile applications. Second, topics cover a wide spectrum including empirical evaluation and studies, analytical modeling, performance management tools and software architecture design. Third, papers address practical needs for methods, tools and models to be applicable to middleware systems.

All these contributions form a basis for inspiring and promoting fruitful discussions on the creation, use and refinement of methods, measures, and tools for

performance of distributed applications developed from middleware. We thank our reviewers who made a considerable effort to review the papers.

We hope you find the workshop proceedings beneficial and enjoyable.

Carlos Juiz
Andrea D'Ambrogio
Yan Liu
WOMP 2006 Workshop Co-chairs

Workshop Co-chairs

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International Workshop on Information Security and Digital Forensics

(ISDF 2006)

During the last few years, the IT community has witnessed the rapid growth of the information security and digital forensics sector with the introduction of many new concepts and technologies. Such developments have been influenced by the growing popularity of the Internet as well as the availability of powerful computers and high-speed networks.

However, modern society is increasingly victimized by the exponential growth of criminal activities in cyberspace. Computers are misused for many illegal activities, such as e-mail espionage, credit card fraud, spam and software piracy, which result in invasion of privacy and disruption of daily lives. As a result, the necessity for prevention and prosecution of cyber-crime is also growing rapidly. This workshop is organized to bring together the international community of researchers and practitioners of information security and digital forensics in order to address this critical issue.

The objective of ISDF 2006 was to serve as a forum to present current and future work as well as to exchange research ideas in the field of information security and digital forensics. The workshop successfully attracted the participation of many researchers and practitioners, resulting in the submission of 45 papers. They were all thoroughly reviewed by the Program Committee members and external reviewers, and they selected 12 papers to be presented at the workshop.

We, the Co-chairs, extend our gratitude to the Program Committee members and external reviewers for their excellent work and their active participation in the creation of this technical program. We also thank all the authors for making this workshop possible. Finally, we extend special thanks to Yunseong Choi, who helped us organizing the workshop.

We hope you enjoy the workshop proceedings.

Kuinam J. Kim
Dong Chun Lee
Sung-Jae Yu
Sangho Lee
ISDF 2006 Workshop Organizers

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	Sangho Lee, Kyonggi University, Korea
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Sangseo Park	The University of Melbourne, Australia
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International Workshop on Ubiquitous Processing for Wireless Networks (UPWN 2006)

Traditionally, wireless systems are considered for voice communication. However, wireless networks are becoming more popular for data processing. Since wireless communication guarantees freedom of movement, it can provide easier access from anywhere. Hence, wireless networks are a vital element for ubiquitous processing. Ubiquitous processing for wireless networks (UPWN) aims for seamless, secure, and intuitive access to the various ubiquitous computing networks for distributed processing. As the need for ubiquity grows, there has been great effort to support ubiquitous computing environments through distributed and parallel processing over networks. This conference provides an international forum for the presentation and showcasing of recent advances in various aspects of ubiquitous processing for wireless networks. It reflects the state of the art in computational methods, involving theory, algorithms, numerical simulation, error and uncertainty analysis and/or novel applications of new processing techniques in engineering, science, and other disciplines related to ubiquitous computing wireless networks. At the conference, discussions on specific themes of interest to the participants were included.

This workshop is a unique opportunity for developers, administrators, researchers, and service providers of ubiquitous computing to meet. It can provide an inside view of new paradigms in parallel and distributed processing for ubiquitous networking.

We are very proud to have received a large number of high-quality submissions. Based on the reviews, with the great support of all Program Committee members as well as a group of external reviewers, we selected 12 papers out of 38 submitted papers to be included in these proceedings. We regret that many quality submissions could not be included. Once again, we would like to thank all the authors of all the submissions for their contribution. We would also like to thank the Program Committee members and the external reviewers who did the peer review for the successful workshop. I owe special thanks to Geyong Min and Gudula Rünger, who served as ISPA 2006 Workshop Co-chairs and proceedings editors, for their guidance in organizing this workshop.

Keecheon Kim
UPWN 2006 Workshop Organizer

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