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Euro-Par 2010 Parallel Processing Workshops

HeteroPar, HPPC, HiBB, CoreGrid, UCHPC, HPCF,
PROPER, CCPI, VHPC
Ischia, Italy, August 31 – September 3, 2010
Revised Selected Papers

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Preface

Euro-Par is an annual series of international conferences dedicated to the promotion and advancement of all aspects of parallel and distributed computing. Euro-Par 2010 was the 16th edition in this conference series. The conference took place at the congress Center of Hotel Continental Terme, on the beautiful island of Ischia, Italy. The success of the conference series has provided a convenient venue for many workshops to meet and discuss. The focus of these workshops is on specialized topics in parallel and distributed computing, with the aim of bringing together a community on research themes in early stages of development.

The 2009 experience was quite successful, and it was extended to a larger size in 2010, where 11 events were co-located with the main Euro-Par Conference. With respect to the 2009 edition, seven out of nine workshops confirmed their presence at Euro-Par 2010 from the previous edition, while four new workshops were organized on emerging aspects. HiBB (High-Performance Bioinformatics and Biomedicine), UCHPC (UnConventional High-Performance Computing), HPCF (High-Performance Computing applied to Finance) and CCPI (Cloud Computing Projects and Initiatives) are newcomers, while ROIA (Real-Time Online Interactive Applications) and UNICORE were discontinued. Here follows a brief description of the workshops:

HeteroPar 2010 is a workshop on Algorithms, Models and Tools for Parallel Computing on Heterogeneous Platforms. HeteroPar 2010 was the eighth edition of this workshop, and the second edition co-located with the Euro-Par conference. The workshop intends to be a forum for people working with heterogeneous platforms and trying to find efficient problem solutions on heterogeneous systems. The 2010 edition started with an invited talk by Marco Danelutto, who discussed *structured programming models targeting heterogeneous architectures*.

HPPC—Highly Parallel Processing on a Chip workshop—is a forum for presentation and discussion of new research into parallel single-chip/node (multi/many-core) architectures, programming models, languages, libraries, algorithms, and software tools, including the efficient use of highly parallel special-purpose architectures for efficient general-purpose parallel processing. The workshop aims to attract new and tentative work that seriously addresses the problems of managing significant amounts of on-chip parallelism at the levels mentioned. To be able to relate to the parallel processing community at large, the workshop is organized in conjunction with Euro-Par, the main European (but international) conference on all aspects of parallel processing. The format of the workshop is to sandwich a selection of contributed, thoroughly reviewed papers between two prominent invited talks providing a broader outlook.

HiBB 2010 was the First Workshop on High-Performance Bioinformatics and Biomedicine (HiBB). This workshop aimed to bring together scientists in the fields of high-performance computing, computational biology and medicine to discuss the parallel implementation of bioinformatics algorithms, the application of high-performance computing in biomedical applications, as well as the organization of large-scale databases in biology and medicine. Furthermore, the use of novel parallel architectures and dedicated hardware to implement bioinformatics and biomedical algorithms was discussed.

CoreGRID/ERCIM provided a forum for discussing the latest developments in the field of large-scale grid, cloud and peer-to-peer computing. The original goal of CoreGRID was strengthening and advancing technological excellence in the areas of grid and peer-to-peer technologies. However, the interests of the network have evolved and now additionally embrace the emerging service-based cloud computational model. The 2010 CoreGRID meeting followed on from previous meetings held in Pisa (2005), Krakow (2006), Heraklion (2007), Gran Canaria (2008) and Delft (2009).

UCHPC 2010 was the Third Workshop on UnConventional High-Performance Computing 2010. As the word “UnConventional” in the title suggests, the workshop focuses on hardware or platforms used for HPC, that were not intended for HPC in the first place. Reasons could be raw computing power or especially low cost. Thus, UCHPC tries to capture solutions for HPC which are unconventional today but perhaps conventional tomorrow. For example, the computing power of platforms for games recently grew rapidly. This motivated the use of GPUs for computing (GPGPU), or building computational grids from game consoles. Other examples for “unconventional” hardware would be embedded, low-power processors, FPGAs or DSPs. Only imagination sets the limit for their usage for HPC. The goal of the workshop is to present the latest research in how hardware and software (yet) unconventional for HPC is or can be used to reach goals such as best performance per watt. UCHPC also covers programming models, compiler techniques, and tools.

HPCF 2010 was the first workshop on the computational issues in the evaluation of financial instruments on advanced architectures. The workshop aims to bring together scientists from finance, statistics, numerical analysis and computer science, decision-makers and strategists from the financial industries in order to discuss recent challenges and results in using high-performance technologies for the evaluation of financial instruments. The workshop was enriched by two invited lectures; the first lecture by Gilberto Castellani and Luca Passalacqua on “Applications of Distributed and Parallel Computing in the Solvency II Framework: The DISAR System”, and the second one by Andreas Grothey on “Massively Parallel Asset and Liability Management”.

The PROPER workshop series on productivity and performance serves as a forum to present novel work on scalable methods and tools for high-performance computing. This covers parallel program development and analysis, debugging, correctness checking, and performance measurement and

evaluation. Furthermore, it is the right place to present experiences and success stories reporting optimization or improvements of parallel scalability achieved using tools. Besides the computing performance, the programmer and user productivity is also addressed. This focuses on the entire process of application development, parallelization, performance optimization, and scalability enhancement. The PROPER workshop is supported by the Virtual Institute—High Productivity Supercomputing (VI-HPS), an initiative to promote the development and integration of HPC programming tools.

CCPI, Cloud Computing Projects and Initiatives workshop, a satellite workshop organized by the European ICT-FP7 Project mOSAIC (<http://www.mosaic-cloud.eu>), gathered together scientists, engineers and industrial users from collaborative international and national projects and initiatives on cloud computing. A number of key projects funded by the European Commission and by National Government and Research Agencies, addressing several issues and challenges of cloud computing were presented at the workshop, and are in these proceedings.

VHPC 2010, the 5th Workshop on Virtualization in High-Performance Cloud Computing, brought together researchers and practitioners presenting their recent results. With the cloud paradigm and its enabling technology of virtualization moving into the mainstream of scientific and commercial large-scale computing, aspects of operational significance were emphasized. In addition, this year's guest speaker, Chris Kemp, IT CIO of NASA, provided an overview of the NASA Nebula cloud platform which is in-use at HPC sites worldwide.

XtreemOS: Large-scale distributed systems like grids and clouds provide means for executing complex scientific and business applications. But they often involve installing and interacting with several layers of middleware, a difficult task for inexperienced users. Tools developed for grid use are demanding and complex, especially because they are based on operating systems that are not designed to manage distributed and versatile resources. The aims of this summit are: to familiarize participants with the usage of the main XtreemOS services (virtual organization management and grid security mechanisms, application execution management, XtreemFS - distributed data storage etc.); to present the XtreemOS Grid system from the user's point of view; to demonstrate some XtreemOS main functionalities; to provide a unique opportunity for people interested in the XtreemOS technology to meet developers, users and researchers who initiated the technology, share experiences and discuss research work.

Gecon 2010: The commercial exploitation of technologies of distributed computing is slowly starting to become popular under the term "cloud computing". These solutions allow selling and buying of resources (i.e., computing resources, network resources, software resources, and data resources) on demand. Existing solutions in this area are diverse, ranging from infrastructure-as-a-service (IaaS) models via platform-as-a-service (PaaS) to software-as-a-service (SaaS) models. Although the economics of these services is not understood yet and the interoperability of the services is still

VIII lacking, a common market for simple computing services is slowly developing. It allows buyers and sellers of computing services to trade easily. However, it is still not possible that any market participant can act as a resource provider or resource seller, depending on the current demand level. Another example of a developing open market is the Web2.0 service system, which enables consumers to create new services. The purpose of this workshop is to gather original work and build a strong community in this increasingly important area of the future economy.

The present volume includes the proceedings of the first nine workshops; the remaining two have separate proceedings. Each workshop had a Program Committee managing the peer-review process. We would like to thank the authors who submitted their papers to the various workshops. Without the contribution of the members of the Program Committees and many reviewers, the organization of the workshops would not have been possible.

Last but not least, we would like to thank all Euro-Par Steering Committee members, and in particular Luc Bougé for the valuable advice and for following all phases of the workshop organization. We also thank Euro-Par 2009 workshop organizer Hai-Xiang Lin for sharing his experience with us. Many other people, institutions and companies supported the organization of the Euro-Par 2010 conference and workshops. Their names and logos can be found on the conference website at <http://www.europar2010.it>.

It was a pleasure and honor to organize and host the Euro-Par 2010 workshops in Ischia. We also thank the Yes Meet people involved in the conference secretariat for the kind and collaborative support they provided during the preparation and actual course of the workshops.

March 2011

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