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High Performance Computing for Computational Science – VECPAR 2004

6th International Conference
Valencia, Spain, June 28-30, 2004
Revised Selected and Invited Papers

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Preface

VECPAR is a series of international conferences dedicated to the promotion and advancement of all aspects of high-performance computing for computational science, as an industrial technique and academic discipline, extending the frontier of both the state of the art and the state of practice. The audience for and participants in VECPAR are seen as researchers in academic departments, government laboratories and industrial organizations. There is now a permanent website for the series, http://vecpar.fe.up.pt, where the history of the conferences is described.

The sixth edition of VECPAR was the first time the conference was celebrated outside Porto – at the Universitad Politecnica de Valencia (Spain), June 28–30, 2004. The whole conference programme consisted of 6 invited talks, 61 papers and 26 posters, out of 130 contributions that were initially submitted. The major themes were divided into large-scale numerical and non-numerical simulations, parallel and grid computing, biosciences, numerical algorithms, data mining and visualization.

This postconference book includes the best 48 papers and 5 invited talks presented during the three days of the conference. The book is organized into 6 chapters, with a prominent position reserved for the invited talks and the Best Student Paper. As a whole it appeals to a wide research community, from those involved in the engineering applications to those interested in the actual details of the hardware or software implementations, in line with what, in these days, tends to be considered as computational science and engineering (CSE).

Chapter 1 is concerned with large-scale computations; the first paper in the chapter, and in the book, was also the opening talk at the conference. Tetsuya Sato gives an overview of the greatest computations being performed on the Earth Simulator in Japan, followed by a series of 7 papers on equally large problems. Patrick Valduriez authors an invited talk on data management in large P2P systems; the companion to 4 more papers put together in Chapter 2.

The Grid technology in the roughly 5 years since it emerged has become one of the major driving forces in computer and also computational science and engineering. Fabrizio Gagliardi and Vincent Breton in the two first papers (invited talks) in chapter 3 present, respectively, the EGEE European Grid Infrastructure and applications of the Grid technology in medical applications. The 8 remaining papers in the chapter are a further example of the impact that the Grid is making in many areas of application.

Chapter 4 is the largest of all and the 12 papers in this chapter are an indication of the importance of cluster computing. Parallel and distributed computing is the title of chapter 5, which, despite its similarity with the previous chapter, includes papers where the emphasis has been put on the physical modelling and not so much on the strictly computing aspects of the simulations. The invited

talk by Michael Heath opens chapter 5 and is a good example of how complex the computer simulation of real-life engineering systems can be. Since its early editions, linear algebra has occupied a relatively large proportion of the conference programme; linear algebra was the topic we chose to bring this book to a closure – Chapter 6.

Best Student Paper

There were 10 papers of high quality registered for the Best Student Paper competition. The laureate of the prize was German Molto for the paper:

- *Three-Dimensional Cardiac Electrical Activity Simulation on Cluster and Grid Platforms*, by German Molto, and also co-authored by Jose M. Alonso, Jose M. Ferrero, Vicente Hernandez, Marta Monserrat and Javier Saiz, all at Universidad Politecnica de Valencia.

To conclude, we would like to state in writing our gratitude to all the members of the Scientific Committee and the additional referees. Their opinions and comments were essential in the preparation of this book and the conference programme. We hope that the knowledge and the experience of many contributors to this book can be useful to a large number of readers.

December 2004

Michel Daydé,
Jack Dongarra,
Vicente Hernández,
José M.L.M. Palma

VECPAR is a series of conferences organized by the Faculty of Engineering of Porto (FEUP) since 1993

Acknowledgments

The sixth edition of the VECPAR conference brought new organizational challenges. The work was split between people in different countries. While the conference was held in Valencia (Spain), both the Web-based submission systems and the conference page were maintained at the Faculty of Engineering of the University of Porto (Portugal). Vitor Carvalho, once again, was responsible for the conference webpage and did an excellent job. Miguel Caballer, Gemma Cabrelles and Gabriel Garcia at the University of Valencia, under the guidance of Vicente Hernandez, did invaluable work on the Organizing Committee.

João Correia Lopes took care of the VECPAR databases and the Web-based submission systems; his collaboration was precious.

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E. Zapata	Univ. de Malaga, Spain

Invited Lecturers

- Tetsuya Sato
  Earth Simulator Center, Japan

- Patrick Valduriez
  INRIA and IRIN, Nantes, France

- Fabrizio Gagliardi
  EGEE, CERN, Switzerland

- Vincent Breton
  LPC Clermont-Ferrand, CNRS-IN2p3, France

- Michael T. Heath
  Computational Science and Engineering
  University of Illinois at Urbana-Champaign, USA

Sponsoring Organizations

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GVA - Generalitat Valenciana Conselleria de Empresa, Universidad y Ciencia

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