Srinivas Aluru
Manish Parashar
Ramamurthy Badrinath
Viktor K. Prasanna (Eds.)

High Performance Computing – HiPC 2007

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14th International Conference
Goa, India, December 2007
Proceedings

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Message from the Program Chair

Welcome to the 14th International Conference on High-Performance Computing (HiPC 2007), which took place amidst the rich culture and pristine beaches of exotic Goa! Continuing in the tradition of HiPC, this year's conference featured a high-quality peer-reviewed technical program, five keynote talks by leading experts, four workshops, two tutorials, industrial and research exhibits, mini symposium on high-performance computing, and a poster session.

We received 253 submissions from 31 countries, reflecting the international character of this conference. A majority of the submissions came from India (52%) and the USA (20.1%), but contributions came from all corners of the world including the Asia/Pacific region, Europe, Middle East, Africa, North America and Latin America. A preliminary review process was carried out by the Program Vice Chairs and myself to identify manuscripts that lacked original content. The remaining 221 submissions were put through a rigorous peer-review process. Each paper was reviewed by three Program Committee members. In some cases, external reviews were solicited. Each paper was then assessed in the context of reviews in an on-line Program Committee meeting that generated a week of lively discussion. Particular attention was paid to understanding the contribution of manuscripts that received divergent initial reviews. A decision on each manuscript was taken based on the results of this discussion, taking into account constraints imposed by the conference schedule. Only 53 out of the total 253 submissions (20.95%) were eventually accepted for presentation and publication in the proceedings. These submissions reflect the efforts of authors spanning 13 countries. Fifty-two of these papers were presented in ten technical sessions spanning the three days of the conference.

The conference featured a separate plenary session for presenting best paper and best poster awards. One outstanding paper was selected for the best paper award based on the following procedure: A pool of six papers was initially identified based on high ratings and review scores. These papers were carefully studied and discussed by the six Program Vice Chairs and myself. The final selection was based on originality and novelty of the contribution, importance of the results, likely impact on the field, interest to a diverse audience, and clarity of presentation. The paper "Distributed Ranked Search," authored by Vijay Gopalakrishnan from AT&T Research, Ruggero Morselli from Google, and Samrat Bhattacharjee, Peter Keheler and Aravind Srinivasan from University of Maryland was selected for the award. The authors presented an efficient algorithm using random sampling to rank documents in a distributed search where the documents are spread over a peer-to-peer network. The best paper award was sponsored by Infosys Corporation and the best poster awards were sponsored by the IEEE Technical Committee on Parallel Processing (TCPP).

Inspiring keynote speeches by leading experts has been a tradition at HiPC. This year, we were fortunate to have five distinguished talks: Michael Flynn on the

dawn of the "parallel" future, David Keyes on petaflop computing, Vipin Kumar on high-performance data mining, Yale Patt on the era of multi-cores, and Prabhakar Raghavan on Web search.

The high-quality technical program was the highlight of the conference, and was the result of the hard work of many individuals. I would like to thank authors of all submitted papers, for choosing this conference for disseminating their technical work. The program and proceedings in your hands (or on your computer drive!) would not be possible without their hard work, and I look forward to their continued patronage in the coming years. To evaluate these contributions, we assembled a team of 98 Program Committee members, a diverse team of experts that cover the many areas of interest to the conference. It is their hard work and timely review submissions that allowed us to assemble the program. The selection of PC members and individual review assignments were handled by an able and dedicated team of six Program Vice Chairs overseeing the six tracks of the conference: Peter Sanders (Algorithms), Sivan Toledo (Applications), Peter J. Varman (Architecture), Dhabaleswar K. (DK) Panda (Communication Networks), Ahmed Helmy (Mobile and Sensor Computing), and Manish Gupta (Systems Software). They made tremendous contributions in helping me craft the technical program by leading discussions on contributed papers beyond the initial reviews, in a week-long Program Committee deliberation.

Several organizers and volunteers worked tirelessly to make the conference a successful and productive meeting and I would like to take this opportunity to express my gratitude: Manimaran Govindarasu for organizing the workshops, Rajeev Sivaram for organizing the tutorials, Rajeev Thakur for organizing the poster session, Sushil K. Prasad for putting together the proceedings and providing us with an excellent archival record, and Viraj Bhat for maintaining the conference Web site on a continual basis.

Finally, I would like to thank the primary leadership group of this year's conference: General Co-chairs Manish Parashar and Badrinath Ramamurthy, Vice General Co-chairs Rajendra V. Boppana and Rajeev Muralidhar, and Steering Committee Chair Viktor K. Prasanna. I relied on their advice and guidance throughout the process. I want to thank Viktor Prasanna for giving me the opportunity to serve you as the Program Chair. Not only did he direct the overall effort and always found time when I needed his counsel and advice, he also obliged my Vice Chair Ahmed Helmy and served as a Program Committee member in the Mobile and Sensor Computing track! It is through his dedication and continued leadership from the inception of the conference that we have this highly regarded international conference to publish our ideas and learn from each other. Please join me in learning from the keynote speakers and authors of contributed papers. I hope you enjoyed all that Goa had to offer during the breaks and conference organized events, and that you had a productive and enjoyable meeting.

December 2007 Srinivas Aluru

Message from the General Co-Chairs and the Vice General Co-Chairs

On behalf of the organizers of the 14th International Conference on High-Performance Computing (HiPC), it was our pleasure to welcome you to Goa. I do hope you found the conference exciting and rewarding.

The HiPC call for papers, once again, received an overwhelming response, attracting 253 submissions from 31 countries. Srinivas Aluru, the Program Chair, and the Program Committee worked with remarkable dedication to put together an outstanding technical program consisting of the 53 papers that appear in these proceedings.

Several events, complementing this strong technical program, made HiPC 2007 another special and exciting meeting. The HiPC 2007 keynotes were presented by internationally renowned researchers. The conference featured the mini symposium "High-Performance Computing Technologies, Applications and Experience," which aimed at bringing together the users and providers of HPC. The poster session presented hot off-the-press research results. Finally, there was a dedicated industry session and the industry and research exhibits. The meeting was preceded by a set of tutorials and workshops highlighting new and emerging aspects of the field.

Arranging an exciting meeting with a high-quality technical program is easy when one is working with an excellent and dedicated team and can build on the practices and levels of excellence established by a quality research community. HiPC 2007 would not have been possible without the tremendous efforts of the many volunteers. We would like to acknowledge the critical contributions of each one.

We would like to thank Srinivas Aluru, Program Chair, and the Program Committee for their efforts in assembling such an excellent program, and the authors who submitted the high-quality material from which that program was selected. We would also like to thank the presenters of the keynotes, posters and tutorials, the organizers of the workshops, and all the participants, who complete the program.

We would specially like to thank Viktor Prasanna, Chair of the HiPC Steering Committee, for his leadership, sage guidance, and untiring dedication, which have been key to the continued success of the conference. We would also like to welcome our new volunteers to the team – your efforts are critical to the continued success of this conference. Finally, we would like to gratefully acknowledge

our academic and industry sponsors including IEEE Computer Society, ACM SIGARCH, Infosys, DELL, Google, IBM, Intel, NetApp, Satyam, Yahoo, HP, AMD and Cray.

December 2007

General Co-Chairs
Manish Parashar
Ramamurthy Badrinath

Vice General Co-Chairs
Rajendra V. Boppana
Rajeev Muralidhar

Message from the Steering Chair

It was my pleasure to welcome you to the 14th International Conference on High-Performance Computing.

This conference would not be possible without the dedicated effort of many volunteers over the past year. First, I would like to single out the contributions of Srinivas Aluru, Program Chair, for his outstanding contributions in putting together an excellent technical program. I am indebted to him for his thorough evaluation of the submitted manuscripts and his relentless efforts to further improve the quality of the technical program. Manish Parashar and Ramamurthy Badrinath as General Co-chairs provided the leadership in resolving numerous meeting-related issues and putting together the overall meeting program including the workshops and tutorials. They were ably assisted by Rajeev Muralidhar and Rajendra Boppana, Vice General Co-chairs. The industry track was coordinated by Rama Govindaraju and Raghuram Tupuri. The Poster/presentation session was organized by Rajeev Thakur. The meeting offers scholarships for India-based students. These scholarships were administered by Anu Bourgeois and Madhusudhan Govindaraju. We have several continuing as well as new workshops. These workshops were coordinated by Manimaran Govindarasu. The Web site was maintained by Viraj Bhat. Raghuram Tupuri and Rama Govindaraju coordinated the industry exhibits. Rajeev Sivaram assisted us with the tutorials. The local arrangments were handled by Ch. Kalyana Krishna and Venkatesh Kamat. Sushil Prasad liaised with the authors and Springer to bring out the proceedings. Sumir Chandra, Manisha Gajbe and Rajeev Raje handled the publicity for us. Sally Jelinek acted as the Registration Chair. Ajay Gupta and Thondiyil Venugopalan handled the meeting finances.

Tirumale Ramesh and Raghuram Tupuri with assistance from Santosh Sreenivasan put together the Mini Symposium on High-Performance Computing Technologies, Applications and Experience. They were ably assisted by Haresh Bhatt and Venkat Ramana. The intent of the mini symposium is to provide a forum for vendors as well as HPC users in India to present the technologies and user experiences.

I would like to thank all our volunteers for their tireless efforts. The meeting would not be possible without the enthusiastic commitment of these individuals.

Major financial support for the meeting was provided by several leading IT companies and multinationals operating in India. I would like to acknowledge the following individuals and their organizations for their support:

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December 2007 Viktor K. Prasanna

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