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Recent Advances in Parallel Virtual Machine and Message Passing Interface

15th European PVM/MPI Users' Group Meeting
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Preface

Current thinking about state-of-the-art infrastructure for computational science is dominated by two concepts: computing clusters and computational grids. Cluster architectures consistently hold the majority of slots on the list of Top 500 supercomputer sites, and computational Grids, in both experimental and production deployments, have become common in academic, government and industrial research communities around the world. The message passing is the dominant programming paradigm for high-performance scientific computing on these architectures. MPI and PVM have emerged as standard programming environments in the message-passing paradigm. The EuroPVM/MPI conference series is the premier research event for high-performance parallel programming in the message-passing paradigm. Applications using parallel message-passing programming, pioneered in this research community, are having significant impact in the areas of computational science, such as bioinformatics, atmospheric sciences, chemistry, physics, astronomy, medicine, banking and finance, energy, etc.

EuroPVM/MPI is a flagship conference for this community, established as the premier international forum for researchers, users and vendors to present their latest advances in MPI and PVM. EuroPVM/MPI is the forum where fundamental aspects of message passing, implementations, standards, benchmarking, performance and new techniques are presented and discussed by researchers, developers and users from academia and industry.

EuroPVM/MPI 2008 was organized by the UCD School of Computer Science and Informatics in Dublin, September 7–10, 2008. This was the 15th issue of the conference, which takes place each year at a different European location. Previous meetings were held in Paris (2007), Bonn (2006), Sorrento (2005), Budapest (2004), Venice (2003), Linz (2002), Santorini (2001), Balatonfured (2000), Barcelona (1999), Liverpool (1998), Krakow (1997), Munich (1996), Lyon (1995), and Rome (1994).

The main topics of the meeting were formal verification of message passing programs, collective operations, parallel applications using the message passing paradigm, one-sided and point-to-point communication, MPI standard extensions or evolution, tools for performance evaluation and optimization, MPI-I/O, mutli-core and multithreaded architectures, and heterogeneous platforms.

For this year's conference, the Program Committee Co-chairs invited seven outstanding researchers to present lectures on different aspects of the message-passing and multithreaded paradigms: George Bosilca, one of the leading members of OpenMPI, presented "The Next Frontier," Franck Cappello, one of the leading experts in the fault-tolerant message passing, presented "Fault Tolerance for PetaScale Systems: Current Knowledge, Challenges and Opportunities," Barbara Chapman, the leader of the OpenMP community, presented "Managing Multi-core with OpenMP," Al Geist, one of the authors of PVM, presented

"MPI Must Evolve or Die," William Gropp, one of the leaders of MPICH, presented "MPI and Hybrid Programming Models for Petascale Computing," Rolf Rabenseifner, one of the leading experts in optimization of collective operations, presented "Some Aspects of Message Passing on Future Hybrid Systems," and Vaidy Sunderam, one of the authors of PVM, presented "From Parallel Virtual Machine to Virtual Parallel Machine: The Unibus System."

In addition to the conference main track, the meeting featured the seventh edition of the special session "ParSim 2008 - Current Trends in Numerical Simulation for Parallel Engineering Environments." The conference also included a full-day tutorial on "Using MPI-2: A Problem-Based Approach" by Ewing Rusty Lusk and William Gropp.

The response to the call for papers was very good: we received 55 full papers submitted to EuroPVM/MPI from 22 countries including Italy, Thailand, China, Germany, India, Greece, Spain, Japan, Switzerland, Ireland, Canada, Poland, Russia, Brazil, Denmark, Belgium, Mexico, Austria, Israel, Iran, France, and USA. Out of the 55 papers, 29 were selected for presentation at the conference. Each submitted paper was assigned to four members of the Program Committee (PC) for evaluation. The PC members either reviewed the papers themselves, or solicited external reviewers. The reviewing process went quite smoothly, and almost all reviews were returned, providing a solid basis for the Program Chairs to make the final selection for the conference program. The result was a well-balanced, focused and high-quality program. Out of the accepted 29 papers, four were selected as outstanding contributions to EuroPVM/MPI 2008, and were presented at special, plenary sessions:

- "Non-Data-Communication Overheads in MPI: Analysis on Blue Gene/P" by Pavan Balaji, Anthony Chan, William Gropp, Rajeev Thakur and Ewing Lusk
- "Architecture of the Component Collective Messaging Interface" by Sameer Kumar, Gabor Dozsa, Jeremy Berg, Bob Cernohous, Douglas Miller, Joseph Ratterman, Brian Smith and Philip Heidelberger
- "X-SRQ - Improving Scalability and Performance of Multi-Core InfiniBand Clusters" by Galen Shipman, Stephen Poole, Pavel Shamis and Ishai Rabinovitz
- "A Software Tool for Accurate Estimation of Parameters of Heterogeneous Communication Models" by Alexey Lastovetsky, Maureen O'Flynn and Vladimir Rychkov

Information about the conference can be found at the conference website: `http://pvmmpi08.ucd.ie`, which will be kept available.

The EuroPVM/MPI 2008 logo was designed by Alexander Kourinniy.

The Program and General Chairs would like to thank all who contributed to making EuroPVM/MPI 2008 a fruitful and stimulating meeting, be they technical paper or poster authors, PC members, external referees, participants or sponsors. We would like to express our gratitude to all the members of the PC and the additional reviewers, who ensured the high quality of Euro PVM/MPI 2008 with their careful work.

Finally, we would like to thank the University College Dublin and the UCD School of Computer Science and Informatics for their support and efforts in organizing this event. In particular, we would like to thank Vladimir Rychkov (UCD), Alexander Ufimtsev (UCD), Angela Logue (UCD), An Nhien LeKhac (UCD) and Clare Comerford (UCD). Special thanks go to all the School of Computer Science and Informatics PhD students who helped in the logistics of the conference.

September 2008

Alexey Lastovetsky
Tahar Kechadi
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Organization

EuroPVM/MPI 2008 was organized by the School of Computer Science and Informatics, Univeristy College Dublin.

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