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Recent Advances in the Message Passing Interface

19th European MPI Users' Group Meeting
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Preface

Extended message-passing style parallel programming with MPI remains the most important and successful paradigm for programming hybrid, distributed memory parallel systems and achieving high application efficiency. MPI, the Message-Passing Interface, introduced more than 20 years ago, has been an extremely efficient and productive interface (both in qualitative and quantitative terms), and proven surprisingly robust in the face of very radical changes in systems configurations, capabilities, and scale over the past decades. This has entailed an immense amount of work, both in improvement of the implementations of MPI, mostly done by research labs and in academic environments, but also in part by commercial vendors (that often base their developments on open implementations from labs and academe), and in exploration and extension of the standard itself often as driven by application needs. The EuroMPI conference series has provided and will continue to provide an important forum for MPI developers, researchers in message-passing parallel programming, application developers, users, and students to meet and discuss specific issues related to MPI; always with a look towards new trends and developments of related or alternative interfaces for high-performance parallel programming, and often in quite close interaction with important HPC vendors. In the past five years the MPI Forum has been active in revising and extending the MPI standard, addressing among others issues of scalability, and has brought out consolidated versions of MPI 2, as well as drafts for more significant extensions to go into an upcoming MPI 3.0 version of the standard. In this process EuroMPI has played a role in testing new proposals for MPI 3, for example on fault-tolerance, collective communication, interaction with threads, and other matters. EuroMPI is one of the few meetings where these kinds of specific explorations related to the concrete MPI standard can be discussed, and should be used also in the future for more such research. It is a community conviction that other paradigms and interfaces for highly parallel distributed memory programming must do as well as MPI in order to be successful, and that there is consequentially much to learn from MPI and ongoing research activities as presented at the EuroMPI conference.

EuroMPI 2012 featured 22 technical presentations on MPI implementation techniques and issues, benchmarking and performance analysis, programming models and new architectures, run-time support, fault-tolerance, message-passing algorithms, and applications. A special session on Improving MPI User and Developer Interaction (IMUDI), introduced with EuroMPI 2011, was dedicated to intensifying interaction between users and implementors of MPI, in particular to

make user expectations and desiderata regarding the standard (and its implementations) explicit. The conference also featured four invited talks on MPI 3 and beyond (Gropp), the Fujitsu petaflop K computer and its MPI (Sumimoto), the impact of MPI on design of efficient interconnect hardware (Brüning), and the prospects of applying advanced compiler optimizations to MPI programs (Danalis), as well as two tutorials on advanced MPI and performance engineering. The conference was rounded off with a vendor session, a report from the MPI Forum, discussion slots, and a poster exhibition. Papers and abstracts can be found on the following pages. The meeting program and (most of) the talks can be found at `www.eurompi2012.org`.

EuroMPI is the successor to the EuroPVM/MPI user group meeting series (since 2010), making EuroMPI 2012 the 19th event of this kind. EuroMPI takes place each year at a different European location; the 2012 meeting was held in Vienna, Austria, organized jointly by Vienna University of Technology (TU Wien) and the University of Vienna. Previous meetings were held in Santorini (2011), Stuttgart (2010), Espoo (2009), Dublin (2008), Paris (2007), Bonn (2006), Sorrento (2005), Budapest (2004), Venice (2003), Linz (2002), Santorini (2001), Balatonfüred (2000), Barcelona (1999), Liverpool (1998), Cracow (1997), Munich (1996), Lyon (1995), and Rome (1994). The meeting took place at the Austrian Academy of Sciences, during September 23–26, 2012.

In reaction to the call for papers that was first published late 2011, we received a total of 47 submissions by the (extended) submission deadline on May 16th, clearly fewer than hoped for. The low number of submissions possibly reflects the universally more difficult funding situation for conference travel. EuroMPI has so far had a very good record with respect to attendance and presentation with as good as no no-shows; potential contributors who knew in advance that they might not be able to travel may have chosen to submit to geographically closer forums. It might also reflect the (positive) fact that good MPI work, whether in implementations or applications, can also be presented at broader parallel processing conferences. All 47 submissions were in scope, and were reviewed by program committee members (with only relatively few external referees) with each paper getting between 3 and 5 reviews. An effort was made to provide informative and helpful feedback to authors. Based on the reviews, the program chairs selected 22 submissions as regular papers, and 7 papers for presentation as posters. Regular papers were allotted 10 pages in the proceedings, and a 30 minute slot for presentation. Among the regular papers, a handful of the strongest and best presented are invited for a Special Issue of the Springer "Computing" journal. These extended papers will again be reviewed by members of the EuroMPI 2012 program committee as well as by new external reviewers.

The program chairs and general chair would like to thank all authors who submitted their contributions to EuroMPI 2012; the program committee members for their work in getting the submissions reviewed, mostly in time and with good-quality, informative reviews; our sponsors who contributed significantly toward making the conference feasible; and all who attended the meeting in Vienna. We hope that the EuroMPI 2012 conference had something to offer for all, and will remain a solid forum for high-quality MPI-related work as it goes into its third decade.

September 2012

EUROMPI
VIENNA AUSTRIA 2012

Jesper Larsson Träff
Siegfried Benkner
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EuroMPI 2012 was organized jointly by Vienna University of Technology (TU Wien) and the University of Vienna, in association with the Innovative Computing Laboratory of the University of Tennessee.

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The conference would not have been possible without financial support from sponsors, and we therefore gratefully acknowledge the support and contribution of this years' sponsors to a successful meeting. Platinum and Gold sponsors also contributed with technically oriented talks in the vendor session, an important part of the conference for getting technically oriented information from relevant HPC and interconnect vendors and software developers.

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