HPPC 2010: 5th Workshop on Highly Parallel Processing on a Chip

Martti Forsell[1] and Jesper Larsson Träff[2]

[1] VTT, Technical Research Centre of Finland,
Oulu, Finland
Martti.Forsell@vtt.fi
[2] Faculty of Computer Science, Department of Scientific Computing,
University of Vienna, Vienna, Austria
traff@par.univie.ac.at

1 Introduction

Despite the processor industry having more or less successfully invested already 10 years to develop better and increasingly parallel multicore architectures, both software community and educational institutions appear still to rely on the sequential computing paradigm as the primary mechanism for expressing the (very often originally inherently parallel) functionality, especially in the arena of general purpose computing. In that respect, parallel programming has remained a hobby of highly educated specialists and is still too often being considered as too difficult for the average programmer. Excuses are various: lack of education, lack of suitable easy-to-use tools, too architecture-dependent mechanisms, huge existing base of sequential legacy code, steep learning curves, and inefficient architectures. It is important for the scientific community to analyze the situation and understand whether the problem is with hardware architectures, software development tools and practices, or both. Although we would be tempted to answer this question (and actually try to do so elsewhere), there is strong need for wider academic discussion on these topics and presentation of research results in scientific workshops and conferences.

The workshop on Highly Parallel Processing on a Chip (HPPC), now in its 5th incarnation, is dedicated to the interface between single-chip/node multi- and manycore architectures and programming paradigms, models, and languages towards supporting parallel algorithms and applications development in an efficient and manageable way. HPPC is intended as a forum for bold, new ideas on architectural organization (general- and special-purpose processors, heterogeneous designs, memory organization, on-chip communication networks, etc.), parallel programming models, languages, and libraries, manycore parallel algorithms, and application studies on both existing and envisaged architectures. In response to the call-for-papers that was issued (late) on April 6, 2011, HPPC 2011 received only a relatively low number of 7 submissions, that were, however, all of relevance to the general workshop themes. Based on relevance and quality

of the submissions as judged by the program committee (which did most of the reviewing with few external reviewers) four papers were selected for presentation by the program chairs. This made for an acceptance rate of 57%. The workshop organizers and program chairs thank sincerely all contributing authors, and hope that they will also find it worthwhile to submit contributions next year (assuming the HPPC workshop series will be continued). All contributions received five reviews, and were thus given an all in all fair consideration. The members of the program committee are likewise all thanked for the time and expertise they put into the reviewing work, and for getting it done within the rather strict time limit.

The Euro-Par 2011 workshop day featured a number of workshops, and was very lively, well-attended and generally well-organized. The HPPC workshop was conducted in an informal atmosphere and gave, hopefully, enough room for interaction and discussion between presenters and audience. HPPC 2011 had a relatively high, cumulative attendance of more than 50. In addition to the four contributed talks, the workshop featured a longer, invited talk by Rick Hetherington on "Extreme Thread-Level-Parallelism on Sparc Processors", which turned out to be very good summary of techniques and architectural issues related to the Ultra SPARC T3 and T4 CMT processors and was well-received by the audience. The workshop organizers thank all attendees, who contributed much to the workshop with questions, comments and discussion, and hope they found something of interest in the workshop, too. We also thank the Euro-Par organization for creating the opportunity to arrange the HPPC workshop in conjunction with the Euro-Par conference, and of course all Euro-Par 2011 organizers for their help and support both before and during the workshop. HPPC sponsors VTT, University of Vienna, and Euro-Par 2011 are warmly thanked for the financial support that made it possible to invite Rick Hetherington, who we sincerely thank for accepting our invitation to speak and for his excellent talk. One of the workshop organizers unfortunately could not make it to the workshop.

These post-workshop proceedings include the final versions of the presented HPPC 2011 papers (accepted papers not presented at the workshop will not be included in the proceedings, but HPPC 2011 had all authors present and presenting), taking the feedback from reviewers and workshop audience into account. In addition to the reviews by the program committee prior to selection, an extra, post-workshop (blind) "reading" of each presented paper by one of the other presenters has been introduced with the aim of getting fresh, uninhibited high-level feedback for the authors to use at their discretion in preparing their final version (no papers would have been rejected at this stage bar major flaws). This idea was introduced with HPPC 2008, and will be continued also for HPPC 2012. The contributed papers are printed in the order they were presented at the workshop. Thematically, the contributed papers cover aspects of high-throughput computing CMPs ("Thermal Management of a Many-Core Processor under Fine-Grained Parallelism" by Keceli, Moreshet and Vishkin)

and programming and optimization of CMPs ("Mainstream Parallel Array Programming on Cell" by Keir, Cockshott and Richards, "Generating GPU Code from a High-level Representation for Image Processing Kernels" by Membarth, Lokhmotov and Teich, "A Greedy Heuristic Approximation Scheduling Algorithm for 3D Multicore Processors" by Xu, Liljeberg and Tenhunen).

This year the number of submissions, only 7, was too low, and unless this can be significantly raised there is no reason to continue the workshop. The organizers are analyzing the reasons, and hope to find reasons and a way to organize HPPC again in conjunction with Euro-Par 2012.

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Martti Forsell, VTT, Finland
Jesper Larsson Träff, University of Vienna, Austria