

ParCo 2009 Mini-Symposium

Parallel Programming Tools for Multi-core Architectures

Abstract:

The improvement of the processor performance by increasing the clock rate has reached its technological limits. Increasing the number of processor cores rather than clock rates can give better performance and reduce problems such as energy consumption, heat dissipation and design complexity. We are witnessing the emergence of multi-core processors in all markets - from laptops and game consoles to servers and supercomputers. At the same time, architectures are becoming more heterogeneous and memory hierarchies and interconnection networks are increasingly complex.

Multi-core architectures present new opportunities as well as challenges to software that will run on computer systems built up on such multi-core chips. To keep pace with the evolution from dual-, quad-, to large many-core systems, the keys to unleashing significant performance enhancements for such multi-core systems are well-defined parallel programming models and robust, easy-to-use tools supporting the parallelization process. Compared to sequential applications, software engineers require a more powerful, well matched repertoire of development tools and methods for cost effectively achieving highly optimized, reliable, fault tolerant and robust parallel applications.

The purpose of this symposium is to bring together researchers and practitioners with diverse backgrounds in order to advance the state of the art in software engineering for multi-core parallel applications.

Organizers:

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Background:

The organizers are all involved in various national and European projects on enhancing the state-of-the-art in programming tools for parallel programming among them:

- EU ITEA2 Project "Parallel Programming for Multi-core Architectures" (ParMA)
- Helmholtz "Virtual Institute High-Productivity Supercomputing" (VI-HPS)
- BMBF Project "Scalable Infrastructure for the Automated Performance Analysis of Parallel Codes" (SILC)

The organizers will invite experts from these projects and from international organizations collaborating with them. We expect 6-8 presentations.

The partners of the ParMA project will present a consistent collection of papers among the following:

1. The ParMA project - Parallel programming for Multicore Architectures
2. Performance analysis with Vampir and Scalasca
3. Distributed application debugging and MPI correctness checking with Marmot and DDT
4. An integrated interface for MPI correctness checking and performance analysis
5. Improving HPC applications using ParMA tools at RECOM, GNS, Magma, ...
6. How to optimize HPC applications with MAQAO
7. ocMPI (on-chip MPI), an MPI library for embedded systems
8. STEP, a tool to transform OpenMP programs into hybrid MPI / OpenMP programs
9. Using Vampir to analyze performances of embedded real-time applications
10. Peruse, a performance-revealing extensions interface to MPI