AutoTune

Project ID: 288038
Funded under: FP7-ICT

Automatic Online Tuning

From 2011-10-15 to 2015-04-14, closed project | AutoTune Website

Project details

| Total cost: | EUR 3 074 602 |
| EU contribution: | EUR 2 348 980 |
| Coordinated in: | Germany |

| Topic(s): | ICT-2011.3.4 - Computing Systems |
| Call for proposal: | FP7-ICT-2011-7 | See other projects for this call |
| Funding scheme: | CP - Collaborative project (generic) |

Description

To develop an automatic online performance analysis tool including energy efficiency tuning for parallel programming that will increase multi-core programming efficiency by orders of magnitude.

Performance analysis and tuning is an important step in programming multi-core-based parallel architectures ranging from small clusters with GPUs (Graphics Processing Units) such as modern high-end servers as used by Google up to supercomputers (HPC) such as the new supercomputer SuperMUC at Leibniz Computing Centre, Garching.

While performance analysis tools exist that help the developer in analyzing the application performance, these tools do not give any recommendations how to tune the code. AutoTune will extend Periscope, an open source automatic online and distributed performance analysis tool developed by Technische Universität München, with automatic online tuning plugins for performance and energy efficiency tuning. The resulting Periscope Tuning Framework will be able to tune serial and parallel codes with or without GPU kernels and will return tuning recommendations that can be integrated into the production version of the code. The whole tuning process, consisting of automatic performance analysis and automatic tuning, will be executed online, i.e. during a single run of the application. This new productivity tool for parallel programming will increase multi-core programming efficiency by orders of magnitude. Moreover, an energy saving up to 10% can be expected.

Objective

Performance analysis and tuning is an important step in programming multicore-based parallel architectures. While performance analysis tools exist that help the developer in analyzing the application performance, these tools do not give any recommendations how to tune the code. AutoTune will extend Periscope, an automatic online and distributed performance analysis tool developed by Technische Universität München, with automatic online tuning plugins for performance and energy efficiency tuning. The resulting Periscope Tuning Framework will be able to tune serial and parallel codes with or without GPU kernels and will return tuning recommendations that can be integrated into the production version of the code. The whole tuning process, consisting of automatic performance analysis and automatic tuning, will be executed online, i.e., during a single run of the application. The research results of AutoTune will be integrated into a commercial development environment of a European SME and validated with real-world codes. Results will be widely disseminated through high-quality publications, workshops and conferences, and the large user-base of a computing center and will influence teaching activities of the academic partners. The consortium unites European experts and comprises world-class universities, a major European supercomputing center, an innovative SME, as well as a major IT company, and has the required expertise to accomplish the aims of AutoTune.
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Subjects

Information and Media

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