Thesis proposal

Benchmark Characterization

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`Size of the project:  1 student (short thesis)`

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Abstract

`The goal of the thesis is to analyze applications from a benchmark suite, identify and expose`
`meaningful application-dependent software knobs.  Those applications will then be integrated`
`with an autotuning framework.`

Pre-requirements

- `basic/intermediate knowledge of C++11 language and idioms`

- `basic Linux skills`

- `basic understanding of the software compilation process`

Involved Technologies and Frameworks

- `C++11`

Detailed description

libVersioningCompiler is a C++ library developed at Politecnico di Milano. Its purpose is to allow easy runtime compilation and versioning of specific functions with different compiler options. The library provides APIs to setup and run the compiler over different source files with custom compiler options.

argo is an application-oriented autotuning framework developed at Politecnico di Milano. It can adjust application knobs according to application performance measured at runtime. Its rule are defined by an application expert.

The goal of the thesis is to analyze a benchmark suite, identify possible software knobs and expose them. Then the benchmark suite should be integrated with argo and libVersioningCompiler to characterize the performance of every application with respect to each identified parameter.

Possible Benchmark suite to be analized are PolyBench/C[1], Rodinia[2], PERFECT[3].

This thesis is in cooperation with the ANTAREX research project, an international collaboration including supercomputing centers like CINECA (Italy) and IT4i (Czech Republic), universities (ETH Zuerich, University of Porto), research centers (INRIA Rennes), and industries in the software and biotechnology sectors.

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[1] http://web.cse.ohio-state.edu/~pouchet/software/polybench/
[2] https://www.cs.virginia.edu/~skadron/wiki/rodinia/index.php/Rodinia:Accelerating_Compute-Intensive_Applications_with_Accelerators
[3] http://hpc.pnl.gov/PERFECT/