

Thesis proposal

Versioning and Compiler Library

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Size of the project: 1 student

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Abstract

libVersioningCompiler is a C++ library developed at Politecnico di Milano. The goal of the thesis is to extend this library to exploit the compiler-as-a-library paradigm and implement new optimizations.

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

- LLVM
- Clang
- 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.

Current implementation of the library performs a system call to the host compiler and creates a shared object with the target compilation unit. It later dynamically loads the function symbol from the shared object.

The goal of the thesis is to provide the same APIs using a LLVM/Clang compiler-as-a-library paradigm. Once reached this point, it will be possible to extend the thesis with several library enhancement. The effort spent there and the obtained results will make the difference between short/full thesis. Possible enhancements are:

- Modifying the optimization passes order (in the pass-manager) to support phase-ordering
- Support for OpenCL
- Custom optimization passes

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.