Master thesis - Performance Optimization in a Multi-Process System Simulator

Background
Ericsson develops virtual platforms for hardware simulation of ASICs and boards, for baseband and radio applications. The virtual platforms are used for early software development, but also for regular software testing during production software development.

Thesis Description
We use SystemC and TLM for our development, meaning that our virtual platform is essentially a large C++ application. The software contains many lines of code and hundreds of architectural parts, interacting both within the virtual platform and with external tools, such as target debuggers and software systems for logging and generation of test stimuli. In addition, we have concurrency effects, both from threads within the virtual platform and from interactions between different Linux processes.

The usage of virtual platforms in software regression testing puts high demands on the execution speed of a virtual platform. In this master thesis, tools for profiling and monitoring shall be used to help us identify bottlenecks in the overall simulation, and to propose modifications that can lead to improved execution time.

An overview of recommended methodologies and available tools shall be done. Based on the results of this investigation, practical experiments with production software running on our virtual platform shall be performed, and measurements shall be collected. Data analysis shall be done, for the purpose of finding areas with a potential for optimization. A selection of proposed improvement strategies should be implemented, and evaluated.

Qualifications
We think that you have a strong interest in software engineering, and software systems analysis. You should be knowledgeable in Linux-based systems, and Linux tools for interprocess communication, such as sockets and shared memory. You have an aptitude for C++, and you have a practical interest in scripting, for example using Python, Perl, or bash.

Extent
1-2 students, 30hp each

Location
Ericsson AB Kista, Stockholm

Preferred Starting Date
Spring 2019

Keywords
Software engineering, software performance, C++, profiling, interprocess communication, Linux

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