Master Thesis –
Performance Profiling and Optimization in a Multi-process Virtual Platform

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 regression testing during production software development. We use C++ for our simulator development, together with Linux as host operating system.

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.

Thesis Description
In this master thesis, tools for Linux-based profiling and monitoring shall be used to evaluate the performance of the overall simulation, and to propose modifications that can lead to improved execution time. An overview of methodologies and available tools, such as BPF, perf and callgrind, 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 shall be implemented and evaluated.

Qualifications
You have strong interest in software engineering and software performance improvement. You are knowledgeable in Linux-based systems, and in Linux tools for inter-process communication. You are familiar with C and C++, and you have a practical interest in scripting, for example using Python or bash.

Extent
1-2 students, 30hp each

Location
Ericsson AB, Kista

Preferred Starting Date
Spring 2021

Keywords
Software performance, profiling, Linux, C++, scripting

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