In the networked society people, knowledge, devices, and information are networked for the growth of society, life and business.

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Master Thesis: Energy optimization for embedded telecom applications

Description
Today's computing platforms (e.g. Linux-based laptops and servers) have a built-in mechanism for adapting the energy consumption during computations, by switching to low power modes with lower frequency or voltage (so called frequency/voltage scaling). These mechanisms have been created to run with arbitrary applications and are thereby only partially adapting to what is going on during a computation. In an embedded system, e.g. a telecom base station controller, the program running on a platform is a dedicated program. Its code is well-known and one can parameterize and optimize its "duty cycle" depending on load, where in the control flow the program is currently running, and its expected near time computational needs.

The goal of this Master thesis project to study how a new layer of energy optimization can be placed over the generic Linux mechanism and (preferably) without changing a telecom application code, e.g. written in the language Erlang. This project will be done in cooperation with the Real-time Systems Laboratory in Dept. of Computer science at Linköping University.

The work consists of:
. Study Linux built-in frequency and voltage scaling mechanism
. Study Erlang runtime system.
. Choice of application to study for performance versus energy consumption
. Implementation of energy optimizations in Erlang runtime system
. Evaluate effects on running application

Qualifications
The candidate student needs to have taken a concurrent programming or operating systems course, and have programming capabilities needed to create a layer that interacts between the Erlang run-time environment and Linux frequency/voltage scaling mechanisms.

Size:
30 hp, this is for one or two students of a master of science program.

Contacts
Patrik Sandahl, Software Designer, patrik.sandahl@ericsson.com, +46725298495
Monika Steinvall, Section Manager, monika.steinvall@ericsson.com, +46107115613

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