SOSOC
System Optimization using a System on Chip

Project Summary

Recently, advances in the design of general purpose System on Chip (SoC) have revolutionized the conception of embedded systems, thanks to the availability of several, most of the time asymmetric, units of calculation. Nevertheless a deep knowledge of the internal hardware architecture of these multi-core SoC is required to efficiently benefit from its large computing performance.

The SOSoC project provides a Linux framework which offers the opportunity to application developers to optimize in a transparent way the execution of algorithms by dispatching tasks, dynamically or statically, among the various available cores to benefit a maximum from the available hardware.

The project focuses on the Texas Instruments DM3730 System on Chip and its three different computation units: an ARM Cortex-A8 processor, a NEON coprocessor and a DSP. Based on timing measurements, the framework is able to dispatch automatically the execution of some algorithms on the best (i.e. most performing) computation unit that is available at the runtime. This behavior can also be overridden with some user specific rules. In order to aid the developer implementing his functions, SOSoC supports an integrated tracing method to ease the analyses and to visualize function performances.

Valorisation

The SOSoC project has been presented in the 26th IEEE International SoC conference in Erlangen, Germany in September 2013 during a poster session and a paper has been published. SOSoC offers a new way of taking advantage of the different computation units that are available in a System on Chip. It allows the developer to compile his applications only once and then to run it on different platforms, the SOSoC library managing to dispatch the execution on the best cores that are available.

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