ETH
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TIK
Institut für Technische Informatik
und Kommunikationsnetze
Computer Engineering and
Networks Laboratory

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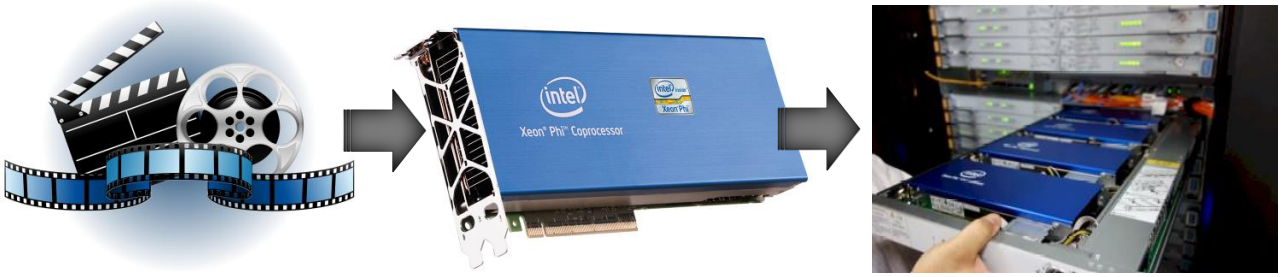
Bachelor / Group / Semester Thesis:

Multimedia applications on the Intel Xeon Phi

Or why the Fastest Supercomputer comprises Xeon Phi Processors

In our lab, we have developed a high-level programming framework called Distributed Application Layer ("DAL") to design and optimize the next generation of embedded and high-performance software. In DAL, applications are specified as Kahn process networks. Process networks are basically a set of processes that communicate through first-in first-out (FIFO) channels. As a large number of streaming applications – such as audio and video codecs, signal processing applications, or networking applications – can be naturally expressed as process networks, they enjoy great popularity in research and industry.



DAL already supports a wide variety of embedded and high-performance computing platforms including the Xeon Phi, Intel's newest co-processor, which integrates 60 cores on a single chip. Recently, other research institutions started to develop software and tools for DAL. For instance, the University of Oulu in Finland developed a tool to automatically translate applications specified in the Cal Actor Language (CAL) to DAL. CAL is a standardized and widely supported high-level programming language; many video, compression, and cryptography applications are available for it – including the H264 codec or the newest video coding standard, HEVC.

Task: The goal of this thesis is to analyze the performance of a handful of real-world applications on Intel's Xeon Phi Processor. This goal is achieved by creating a benchmark suite for many-core systems and includes the following steps:

1. Use the tool from the University of Oulu to port a handful of state-of-the-art benchmark applications from CAL to DAL.
2. Characterize the benchmarks in terms of scalability, by running them on Intel's Xeon Phi processor.
3. Compare the performance of one of the applications automatically ported before to the performance it achieves when natively programmed in DAL.

Interested? Please have a look at http://www.tec.ethz.ch/research.html and contact us for more details!

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