Advanced Parallel Computing

Exercise Sheet I

Klaus Naumann & Christoph Klein

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1 Review: The Landscape of Parallel Computing Research

The paper 'The Landscape of Parallel Computing Research: A View from Berkeley' from Asanovic et al. published in December 2006 outlines the need for a naturally parallel programming model, system software and underlying architecture for both, embedded and high performance computing. Although the step to parallel microprocessors illustrates an milestone in computing history it poses new challenges for research and industry due to the fact that conventional wisdoms become outdated. With an increasing number of processors on a chip in mind the Berkeley researchers defined a number of "dwarfs" such as n-body methods, structured grids to discuss future hard- and software requirements.

The Berkeley research group assert that manycore architectures and human-centric programming models independent of the number of processors are necessary to increase both, application efficiency and programmer productivity. In view of interconnected networks and cache coherence the researche group recommends a hybrid interconnect design based on switch circuits with support for fine-grained synchronization and communication constructs. With these requirements it'll be likely to develop efficient applications for manycore architectures.

In our opinion the report from the Berkele research group delivers urgently required designs to increase efficiency and productivity in the process of designing "portable" parallel applications.