The **Erlangen National High Performance Computing Center** (NHR@FAU) is looking for a

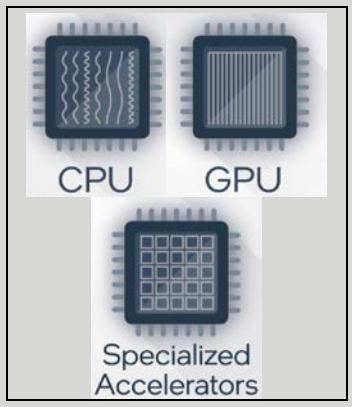
Bachelor/Master thesis student for

Heterogeneous Programming using oneDPL

The thesis will be hosted and supervised by the research division at Erlangen National High Performance Computing Center (NHR@FAU), which is led by Prof. Dr. Gerhard Wellein (Department of Computer Science, FAU).

Tasks

OneAPI Data Parallel C++ Library (oneDPL) is a cross-industry, open standard based unified programming model for heterogeneous computing with separate host and kernel code. Its APIs (function objects, iterators, parallel algorithms) allows explicit use of the standard C++ STL, Parallel STL, Boost.Compute, and SYCL API within accelerated DPC++ kernels. To simplify the implementation of data parallel algorithms, it extends the support for data parallelism and offloading to devices. This thesis evaluates the performance of such modern parallel codes on multiple cluster systems.



Within the bachelor/master thesis, the focus will be in the following areas:

- Getting familiar with the OneAPI Data Parallel C++ (DPC++) Library
- Port benchmarks to OneAPI and DPC++
- Performance analysis of heterogeneous parallelism with oneDPL vs. adopting OpenCL or CUDA
- (Master thesis) Explore performance of MPI parallel algorithms for variant scenarios: single node intranode, multi-node internode, vs. collective communication.

Required skills

- Student of (computational) engineering or computer science
- Profound knowledge of C/C++ and the Linux OS
- Basic knowledge of code parallelization with MPI and OpenMP
- Basic knowledge of both node- and cluster-level performance engineering is preferable
- Nature of work: Theory (30%), Conception (25%), Implementation (45%)

Please direct any inquiries or applications to

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