hpc.bw   dtec.bw

Newsletter 01/2022

Kick-off Newsletter

Welcome to the first newsletter of the dtec.bw project hpc.bw. Newsletters are planned to be published on a quarterly basis. If you want to subscribe to the newsletter, please send a message with subject line "Subscription hpc.bw Newsletter" to info-hpc-bw@hsu-hh.de.

Contents

hpc.bw: Overview

High Performance Computing, or simply HPC, is a branch of Computer Science, which focuses on how to solve very compute-intensive problems efficiently by means of optimal software and hardware, including supercomputers.

In the era of digitization, High Performance Computing represents an essential building block for research and development in various disciplines. Combinatorial optimization in logistics, numerical simulations in engineering or machine learning methods with real-time requirements are only three representative examples, for which HPC plays an important role.

The dtec.bw project hpc.bw strives to support and consolidate HPC research at Helmut Schmidt University/ University of the Armed Forces Hamburg (HSU) and the University of the Armed Forces Munich (UniBw Munich), to transfer HPC know-how into their faculties and disciplines, and to facilitate exchange on HPC topics with enterprises, industrial partners and the armed forces. This will

- strengthen HPC-aware research and development across all relevant disciplines at the universities,
- increase interdisciplinary exchange between groups on HPC-relevant problem settings,
- allow to explore and answer new HPC research questions, given discipline-specific problem settings.

The hpc.bw consortium is led by Prof. Philipp Neumann, chair for High Performance Computing (HSU), who is supported by Jessica Kleinschmidt (researcher at chair for Adult Education and Lifelong Learning, HSU) and an interdisciplinary team of hpc.bw multiplicators:

- Prof. Dr. Alexander Popp/Dr. Matthias Mayr (UniBw Munich)
- Prof. Dr. Marcus Stiemer (Electrical Engineering, HSU)
- Prof. Dr. Sabine Schmidt-Lauff (Humanities and Social Sciences, HSU)
- Prof. Dr. Andreas Fink (Economics and Social Sciences, HSU)

For further information, see: https://dtecbw.de/home/forschung/hsu/projekt-hpcbw and the project-specific website https://www.hsu-hh.de/wb/hpc-bw, which provides more material on the project.

HPC Infrastructure

To provide the universities of the armed forces with a High Performance Computing environment, the procurement of a container-based High Performance Computing Center (CBRZ) has been started in 2021. The company MEGWARE Computer Vertrieb und Service GmbH was awarded the contract to establish the CBRZ, which will be hosted in four 20-feet containers on the Grandplatz of the HSU. It will comprise of more than 580 compute nodes, each equipped with two Intel Ice Lake processors and connected via a fast InfiniBand network, including few nodes with 1TB RAM for large-memory requirements as well as GPU-empowered nodes for, e.g., machine learning applications. The system will enter production in the first half of 2022.

Left: CBRZ containers, freshly delivered to Grandplatz. Right: Prof. Philipp Neumann, presenting the first successful test results, executed on the new CBRZ compute system during a visit at MEGWARE, Chemnitz. The test consisted of a large-scale coupled fluid flow simulation invoking computational fluid dynamics and molecular dynamics solvers.

Innovative HPC Hardware

To keep up with rapid hardware developments, the hpc.bw consortium decides upon the procurement of small-scale HPC test systems. This will help us explore new HPC hardware, monitor respective trends and observe which hardware systems appear most usable by our universities' user groups.
Current hardware systems are comprised of:

- AMD Epyc 7763 compute system, comprising 4 compute nodes, each equipped with 64 cores running at 2.25 GHz and 256 GB RAM
- ARM Fujitsu PRIMEHPC FX700 compute system, comprising 8 compute nodes, each equipped with 48 cores running at 2.00 GHz and 32 GB RAM (high-bandwidth memory)

If you are interested in testing these systems or if you have an application benchmark to try out, please contact Hauke Preuß, preuss@hsu-hh.de. If you have suggestions for novel hardware systems, that could be beneficial for future use by the universities of the armed forces, please contact info-hpc-bw@hsu-hh.de.

Work Group „Competence Center hpc.bw"

Started in October 2021, the work group „Competence Center hpc.bw" develops initial ideas on the structure, concepts and educational components of a to-be-established competence center on HPC. The interdisciplinary team, consisting of Piet Jarmatz (Researcher, High Performance Computing), Hauke Preuß (System Administration, High Performance Computing), Moritz Anton Loreth (Researcher, Geotechnics) and Jessica Kleinschmidt (Researcher, Adult Education and Lifelong Learning), aims to present the first results of their work at the ISC HPC congress in May/June 2022, which will take place in Hamburg.

Collaborations

We are glad to welcome algorithmica technologies GmbH as external partner to our project hpc.bw! algorithmica technologies GmbH will support us in the configuration of an interactive cloud solution for scientific computing and machine learning. Establishing contracts with more external partners is currently in progress.

Project Call on Performance Engineering

We invite all research groups of the universities of the armed forces to submit proposals on performance engineering. Selected projects will be supported by a scientific co-worker from the HPC group to solve compute- or data-intensive problems by means of HPC techniques. The maximum duration of a project is one year, starting from 01.04.2022.

Details on the light-weight project call (including the required application form) are available at https://www.hsu-hh.de/wb/hpc-bw. Inquiries can be sent to info-hpc-bw@hsu-hh.de, or directly to Prof. Philipp Neumann, Tel. +49 40 6541-2723. We look forward to receiving your project ideas until 25.02.2022!

Seminar Computation & Data

We plan to establish a novel seminar series "Computation & Data" at HSU. The goal of this interdisciplinary seminar is to bring together researchers and foster exchange on the development of algorithms, methods and software with regard to (but not necessarily limited to):

- Scientific Computing & Computational Methods: Numerical methods and optimization, code coupling, etc., and their application to challenging discipline-specific problems
- Data science: machine learning, data analysis, statistical methods, etc., and their application to challenging discipline-specific problems
- Computational infrastructure & Hardware-aware programming: code optimization and parallelization, reconfigurable hardware, distributed/cloud/edge computing, etc.

The seminar series is scheduled for the last Thursday every month, 15:00-16:00, with 1-2 presentations, each 25 minutes, per session. If you are interested in joining, please send an e-mail to info-hpc-bw@hsu-hh.de with the subject line „Subscription Seminar Computation & Data". The first session is planned for Thursday, 31.03.2022. The location or online modus will be announced at a later stage.