



PRACE

DEVELOPING EFFICIENT HPC APPLICATIONS FOR THE LATEST CPU ARCHITECTURES WITH C++ AND FORTRAN (PRACE Training Course)

14–15 January, 2019

VŠB – Technical University of Ostrava
IT4Innovations building, training room

Lecturers

Georg Zitzlsberger (IT4Innovations) | Jakub Beránek (IT4Innovations)
Radim Vavřík (IT4Innovations)

The course is two-fold: It provides an update on the latest state of the art CPU architectures for HPC and connects them to modern programming in C++ and Fortran.

Covered are all major CPU architectures common in HPC such as Intel (Xeon Scalable Processors), AMD (Epyc) and PowerPC (Power 9). These architectures will be explained in terms of needs for software developers and researchers to utilize their full potential, such as SIMD extensions, cache hierarchies, NUMA configurations, multi-core/-threading, memory bandwidth, throughput, etc.

For each of the addressed architectural properties, techniques and software design patterns are discussed that can be leveraged in modern high-level languages C++ and Fortran. Aside from standardized high-level language features, also compiler specific extensions are highlighted for the latest compilers like GCC/GFortran, LLVM Clang/Flang, IBM XL C++ & Fortran compilers, and Intel C++ & Fortran compilers.

Monday 14 January 2019

09:30–10:00 registration
10:00–12:00 Architecture comparison: Intel Xeon Scalable Processor, AMD Epyc & IBM Power9
12:00–13:00 lunch break
13:00–14:30 C++ and Fortran Compilers for Intel & AMD architectures incl. Hands-On
14:30–15:00 coffee break
15:00–16:30 C++ and Fortran Compilers for IBM architectures incl. Hands-On
16:30–17:00 Q&A

Tuesday 15 January 2019

09:00–10:30 C++ and Fortran design patterns for Intel architectures incl. Hands-On
10:30–11:00 coffee break
11:00–12:30 C++ and Fortran design patterns for AMD architectures incl. Hands-On
12:30–13:30 lunch break
13:30–15:00 C++ and Fortran design patterns for IBM architectures incl. Hands-On
15:00–15:30 Q&A



This course was supported by the PRACE-5IP project – the European Union's Horizon 2020 research and innovation programme under grant agreement No. 730913.



More information & registration:
events.prace-ri.eu/e/Arch-2019