Certificate

Aurora Capobianco

has successfully passed the final examination of the course

Parallel Programming with MPI

held at the High-Performance Computing Center Stuttgart (HLRS) on December 05, 2024. The ability to independently and successfully apply the acquired skills has been demonstrated. The participant attended 40 hours of lectures and exercises during the course, which took place from 04 November – 06 December, 2024 , covering the following topics:

Week1: The Beginners' MPI

- MPI overview
- Its process model
- Point-to-point communication
- Nonblocking communication
- Optionally the Fortran module `mpi_f08`

Week2: Beginner and Intermediate MPI

- Collective communication
- Error handling
- Derived datatypes
- Groups and communicators
- Virtual topologies

Week3: Intermediate and advanced MPI, part 1

- One-sided communication
- Shared memory communication
- Memory models and synchronization rules
- The heat example

Week4: Advanced MPI, part 2

- Advanced collective communication
- Advanced topics on groups & communicators
- Neighborhood communication, `MPI_BOTTOM`
- Optimized re-numbering with virtual topologies
- Advanced topics on derived datatypes
- Parallel file I/O (short tour + optional detailed section)
- A short tour through
  - MPI and threads
  - Probe, cancel, persistent requests
  - Process creation and management
  - Other MPI features, including MPI-4 and MPI-4.1
- Best practice and pitfalls

The lecturer and trainer was Dr. Rolf Rabenseifner (HLRS, member of the MPI forum).

Stuttgart, December 20, 2024

Prof. Dr.-Ing. Michael M. Resch
Director

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