Technische Universität Bergakademie Freiberg
Institut für Numerische Mathematik und Optimierung
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04.12.2024

# Introduction to High Performance Computing and Optimization

PVL part II - MPI basic communication

To get points for the parts of the PVL, the C++ code, the job scripts and, depending on the task, the times achieved must be submitted. The submission takes place via the upload in OPAL in the corresponding course element. Copying or typing code from fellow students is not permitted. You must write and submit your own code. The specified submission deadline must be adhered to. Your code will be tested. Faulty code and code that delivers significantly different times than specified will result in zero points for the PVL part. So make sure that the code has been compiled on the cluster and executed on the compute nodes.

**Exercise 9**

The goal of this task is to write a program in MPI that measure the time of a message passing from one rank to another.

(a) Write a program in MPI that sends a message from rank 0 to rank 1 and back. The message is a single double. Loop over the process 50 times. No more that 2 MPI ranks are needed.

(b) Use `MPI_Wtime()` to measure the duration of the $2 \cdot 50$ messages. Compute the time of a single message in milliseconds, e. g.:

```
(t_end - t_start)/(2 * numberOfMessages) * 1e6
```

**Submission deadline is 23:59 18.12.2024.**