MPI Environment on the RWTH Cluster CLAIX

Before You Start

Before you start, log into one of our Linux cluster frontends:

- **login18-1.hpc.itc.rwth-aachen.de**
- **login18-2.hpc.itc.rwth-aachen.de**

using `ssh` or a corresponding client.

Then, download the MPI lab archive from the PPCES 2022 website (the link is also published in the Slack Channel) and extract it to a suitable location (e.g., in a directory named `PPCES2022/MPI`) using the following commands :

C/C++

```
% mkdir -p ~/PPCES2022/MPI
% cd ~/PPCES2022/MPI
% wget https://tinyurl.com/ppces2022-MPI-labs-C
% tar -xvf ppces2022-MPI-labs-C
```

Fortran

```
% mkdir -p ~/PPCES2022/MPI
% cd ~/PPCES2022/MPI
% wget https://tinyurl.com/ppces2022-MPI-labs-Fortran
% tar -xvf ppces2022-MPI-labs-Fortran
```

The lab archive contains skeleton code for the exercises described below. Intermediate solutions are provided where appropriate. Sample solutions to all problems are also provided in the **solutions** folder. We would advise you to not look at the solutions before you have tried your best to solve each exercise on your own.

Building the example code

The CLAIX shell environment uses the `module` system to provide different versions of specific software. By default the *Intel MPI* and *Intel compiler* modules are loaded. It is easiest to copy the `make.def.intel` for Intel compiler & MPI to `make.def` in the respective `common/` directory of your exercises.

Each problem comes with a Makefile with the following targets:

`default` target

This target build the respective exercise executable.

```
% make
```

`clean` target

This target removes all build files, including the executable itself.

```
% make clean
```

`run` target

This target uses `mpiexec` to start a small MPI job with 4 processes of the given executable.

```
% make run
```