Crib Sheet: ARCHER2 MPI Exercises

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1 Logging on

Use your username and password to access ARCHER2: `ssh -XY username@login2.archer.ac.uk`

You should then change directory to the `/work/` filesystem: `cd /work/ta020/ta020/username/`.

2 Obtaining source code

The source code is stored on github alongside the slides and other documentation. See the "Course materials" link from the main MPI course page on the ARCHER2 website.

To copy a file directly to ARCHER2 (rather than clicking a link and downloading to your laptop, or cloning the repo), issue "wget" on ARCHER2, e.g. for `MPP-templates.tar` from March 2021:

```
wget https://github.com/EPCCed/archer2-MPI-2021-03-17/raw/master/exercises/MPP-templates.tar
```

Note that, due to peculiarities with github, this is **not** the link you get if you "copy link location" from your browser on github. To use `wget`, you must replace `blob` in the URL with `raw`.

Now unpack the tar file: `tar -xvf MPP-templates.tar` and change directory into it: `cd MPP-templates`

3 Compiling code

You can compile the C, C++ and Fortran codes directly:

```
cc  -o hello hello.c
CC  -o hello hello.cc
ftn -o hello hello.f90
```

or using the supplied Makefiles

```
make -f Makefile_c
make -f Makefile_cc
make -f Makefile_f90
```

4 Running

To submit a job to the SLURM batch system: `sbatch archer2mpi.job`

This is set up to submit to the reserved queue for the first day of the course, and to run on 4 processes.

The batch system will respond with a unique ID for your job, e.g: `Submitted batch job 123456`

You can monitor the progress of your job with `sbatch -u $USER`. The letters “PD" indicates the job is queued (i.e. pending), “R” that it is running, and no listing that it has finished.

When the job has finished, the output will appear in a file called `hello-123456.out`

You can kill a queued or running job using: `scancel 123456`

To change the number of MPI processes, or to use the reserved queue for a later day, you will need to edit the SLURM batch file.

5 Interactive Access

It is possible to submit an interactive job to SLURM. Your job may still wait for resources to become available, but screen output will appear in your terminal in real time rather than being redirected to a file.

```
srun --time=00:01:00 --reservation=ta020_129 \
--qos=standard --partition=standard --unbuffered --cpu-bind=cores \
--nodes=1 --tasks=4 ./hello
```