Crib Sheet: ARCHER2 MPI Exercises for Online Course

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1 ARCHER2 account

This document assumes you have already been given access to a login account on ARCHER2. In the instructions below, you should replace `username` with your own login, and the project `taXXX` with your own project (e.g. `ta012`).

2 Logging on

Use your username and password to access ARCHER2: `ssh -XY username@login.archer2.ac.uk`

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

3 Obtaining source code

Any source code will be available as tar files from the relevant Learn pages. This includes sample solutions and various files required for the Case Study. Here we will use the `MPP-templates.tar` file as an example, which is in available under "Exercise Material" at the bottom of "Block 1".

Click on `MPP-templates.tar` and download to your local machine, then copy to ARCHER2 using
`scp MPP-templates.tar username@login.archer2.ac.uk:/work/taXXX/taXXX/username/`

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

4 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
```

5 Running

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

This submits to the short queue for rapid turnaround, and will run the program `hello` 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 username`. 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, run a different program or use a different queue then you will need to edit the SLURM script `archer2mpi.job`.

6 Interactive Access

It is possible to submit an interactive job to SLURM. Your job will still have to 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 --partition=standard --qos=short --reservation=shortqos \
--time=00:01:00 --unbuffered --cpu-bind=cores --nodes=1 --tasks=4 ./hello
```