

HPRC - Improve efficiency by parallelising your computing jobs

HPRC systems vary in their hardware configuration.

- 24 CPU cores (2.3GHz AMD opteron), 128GB of memory - general access
- 48 CPU cores (2.3GHz AMD opteron), 256GB of memory - general access
- 32 CPU cores (2.8GHz AMD opteron), 256GB of memory - limited access
- 32 CPU cores (2.6GHz Intel Xeon), 1TB of memory - permission from owner required
- Virtual systems with up to 4 CPU cores (Intel) and 32GB of memory *maybe* provisioned - only if the requirement cannot be met on existing HPRC infrastructure.

There are multiple ways to increase your research computing productivity through parallelism:

1. Run more than 1 job at a time. This is the easiest form of parallelism. Jobs need to be submitted to our job management system (using the `qsub` command).
2. Identify/use software that has been parallelised using OpenMP or MPI libraries. You can still run multiple parallelised jobs at one time. This form of parallelism can significantly reduce the time it takes for a single job to run to completion. If HPC doesn't already have the software, put in a request to have it installed. Note that HPC do not have budget for the licensing of research software (except for MATLAB).
3. **For guru programmers only:** Parallelise the software yourself using OpenMP or MPI libraries. Do not expect this to happen quickly - it could take years, depending on the complexity of your software. Make sure you will be able to realise future benefits before proceeding down this path.

Notes:

- Finding the most efficient software to perform the task you want performed is always best, regardless whether the application can run on multiple CPU cores or not.
- The JCU HPC job management system will generally reject jobs that require more than 1 server. Generally speaking, if your job requires more than 24 CPU cores, you will need to investigate using QCIF or NCI facilities.