
Submitting Jobs with Slurm
Be Boulder.
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Running Jobs

- What is a “job”?

- Batch jobs
  - Submit job that will be executed in background
  - Can create a text file containing information about the job
  - Submit the job file to a queue

- Interactive jobs
  - Work interactively at the command line of a compute node
  - Login to compute node

Job Scheduling

- On a supercomputer, jobs are scheduled rather than just run instantly at the command line
  - Shared system
  - Jobs are put in a queue until resources are available
- Need software that will distribute the jobs appropriately and manage the resources
  - Simple Linux Utility for Resource Management (Slurm)
    - Keeps track of what nodes are busy/available, and what jobs are queued or running
    - Tells the resource manager when to run which job on the available resources

Useful Slurm Commands - sbatch

- **sbatch**: submit a batch job to slurm
- You can use flag options in a batch script or on the command line
- Useful to put in script so have for future use

- Example:

```
sbatch test.sh
```

OR

```
sbatch --time=00:10:00 test.py
```

http://slurm.schedmd.com/sbatch.html

SBATCH Options

http://slurm.schedmd.com/sbatch.html

`#SBATCH <options>` `sbatch <options>`

- Allocation: `--account=<account_no>`
- Partition: `--partition=<partition_name>`
- Sending emails: `--mail-type=<type>`
- Email address: `--mail-user=<user>`
- Number of nodes: `--nodes=<nodes>`
- Number of tasks: `--ntasks=<processes>`
- Quality of service: `--qos=<qos>`
- Wall time: `--time=<wall time>`
- Job Name: `--job-name=<jobname>`

- FYI: You do NOT actually type <> above – this designates something specific you as a user must enter about your job

Slurm Environment Variables

http://slurm.schedmd.com/sbatch.html

- $SLURM_NTASKS
- $SLURM_MEM_PER_CPU

- Can be useful to pass to your script

Another slurm command

- **squeue**
  - View information about jobs located in the slurm scheduling queue
- OPTIONS:
  - User: `-u <user_list>`

- EXAMPLE:

```
squeue --u=mooc
```

http://slurm.schedmd.com/squeue.html


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Your turn

- Submit a slurm job with the following instructions:

1. The job should run first the whoami command, then the Unix "sleep" command for 30 seconds, then the hostname command

```
whoami
sleep 30
hostname
```

1. The job will be submitted from a bash script named sleep.sh
2. The job will run on 1 node
3. Request a 1 minute wall time
4. Name your job `sleep`

Running an external script

- Let's run a Python program
- We will adjust the sleep.sh script to run a Python script
- Submit the job:

```
sbatch python.sh
```

Interactive jobs!

- Sometimes we want to work in program in real time
  - Debugging
  - We like GUIs
  - Establishing workflows
- Might want to work directly on a compute node, or in a programming language
  - For example, Python