Introduction to Mount Moran

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Mt. Moran Overview

• 284 node high performance computing (hpc) cluster (4544 cores) with 68 GPUs
• Condo Model: researchers are welcome to buy into the cluster
• Redhat Enterprise Linux 6 Operating System
• Mellanox Infiniband Fourteen Data Rate [FDR] interconnect = 14 Gbps/lane
• GPFS Parallel Filesystem

   Bighorn offers over 400 TB of raw storage
Getting an Account on Mount Moran:

Principle investigator for your project needs to request that you be added to the project using the form found at:

arcc.uwyo.edu -> Getting Started -> ARCC Access Request Forms

Your username will be the same as your UWYO domain username but with a different password.

If you don't have a UWYO domain username, you'll need to get an External Collaborator user account here:

https://arcc.uwyo.edu/guides/external-collaborator-account

Getting a Project on Mount Moran:

To add a new project, the principle investigator must fill out the same form as they would to create an account, be sure to fill out the section:
Rules for using Mt. Moran:

Users do not and will never have root, or sudo privileges.

Do not give your user account credentials to anyone else.

Do not run jobs on the login nodes.

Mt. Moran is a shared resource. Please be mindful of others as you work on it and consider the consequences of your actions.

Issues with users who are unable to abide by these rules or ARCC policies will be handled on a case by case basis.

For more on ARCC policies visit the ARCC Policies Page
Logging In

Secure Shell (SSH) Access:

Linux and Mac users can use built in SSH

```bash
ssh <username>@mtmoran.uwyo.edu
```

Windows users will need to use an SSH client such as PuTTY

**Off-Campus Access:**

Use a VPN session to access Mt. Moran if your machine is not on the campus network

Check out the message of the day when you login. It will provide info and tips for using Mt. Moran
Under Session:
- Set Host Name (or IP address) to mtmoran.uwyo.edu
Logging In PuTTY

Under Session:
- Set Host Name (or IP address) to mtmoran.uwyo.edu

Under Connection -> Data:
- Set Auto-login username to <username>
Logging In PuTTY

Under Session:
- Set Host Name (or IP address) to mtmoran.uwyo.edu

Under Connection -> Data:
- Set Auto-login username to <username>

Under Connection -> SSH -> X11:
- Check Enable X11 forwarding

To utilize X11 forwarding, you will need to install an X Server for Windows like Xming
Under Session:
- Set Host Name (or IP address) to mtmoran.uwyo.edu

Under Connection -> Data:
- Set Auto-login username to <username>

Under Connection -> SSH -> X11:
- Check Enable X11 forwarding

Under Session:
- Type a name under Saved Session
- Click Save button
- You can now select this session and click load in the future
Logging In PuTTY

Under Session:
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Click open to begin the PuTTY session
Under Session:
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Click open to begin the PuTTY session
Red Hat Enterprise Linux 6

SLURM Workload Manager
All jobs must be submitted to the job scheduler to run on the cluster

Lmod Dynamic Environment (i.e., modules)
Modules make it easy to customize your environment

Multiple Shells Supported
bash, csh, tcsh,..

Modules can be saved into collections to automatically load by default or quickly switch environments
Modules are used to load compilers and other software:

module spider : lists all currently available modules
module spider <keyword> : lists the <keyword> module and dependencies
module load <module> : loads the <module> module

Modules must be loaded each session:

module list : lists the currently loaded modules
module save <name> : save the list of currently loaded modules
module restore <name> : load all modules in the module list <name>

module --help
For additional module options
Loading the ARCC module will provide additional commands:

- `module load arcc/1.0.0` loads the ARCC module
- `arccinfo` Display user information
- `arccjobs` List resource utilization by project and user
### Compilers and Packages

<table>
<thead>
<tr>
<th>Compilers:</th>
<th>Select Packages and Libraries:</th>
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<tbody>
<tr>
<td>Intel</td>
<td>Allinea</td>
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<tr>
<td>GNU</td>
<td>Gaussian</td>
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<td>PGI</td>
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<td>R</td>
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Three main filesystem spaces:

Home: /home/<username>

Project: /project/<project_name>/<username>

Global Scratch: /gscratch/<project_name>/<username>

Quotas:

Home 15 GB This is your personal storage space for profile settings, personal scripts, inactive/personal source code, etc.

Project 5-15 TB This is shared storage with members of the project. Use this space for large active datasets, active code being used by the project, shared input files, etc.

Global Scratch This can be used for short term storage and does not have a space limit. This space will be cleaned out at the end of 9 days (max job walltime + 2 days).
Three Types of Jobs

batch (sbatch)
interactive (salloc)
steps (srun)

sbatch:
Submit a script containing job task(s) and return later for results.

salloc:
Interactive computing and development/debugging.

srun:
Used to launch job steps which are usually contained in either batch jobs or interactive jobs. An srun on directly will submit a job and perform a single job step. The srun command is also used as a parallel launcher for MPI and other parallel libraries and language extensions.
SBATCH script, key components:

#!/bin/bash

### Job Name
#SBATCH --job-name=my_job

### Declare an account for the job to run under.
#SBATCH --account=<account_name>

### Set max walltime (days-hours:minutes:seconds)
### NOTE: Mt. Moran enforces a 7 day maximum walltime
#SBATCH --time=01:00:00

### Specify Resources
### 2 nodes, 16 processors (cores) each node
#SBATCH --nodes=2
#SBATCH --ntasks-per-node=16

srun <your_application>

Using sbatch, submit the job to the scheduler:

    sbatch my_job_script.sh

For more on submitting jobs, go to the ARCC site:

Submitting Jobs
There are many ways to view the status of a submitted job (see ARCC Modules):

- `squeue -u <username>`: Shows the jobs you have recently submitted
- `squeue -A <acctname>`: Shows the jobs your project account has recently submitted
- `scontrol show job <job_id>`: Shows details about the job submitted
- `squeue`: displays information about active, eligible, blocked, and other recently completed jobs

You can control and diagnose jobs with mjobctl:

- `scancel <job_id>`: cancel the job <job_name>
- `scontrol requeue <job_id>`: requeue the job
- `scontrol update`: modify attributes of a job

You can find more information about these commands in the man pages or online
Globus Online (arcc#bighorn):

Research level GridFTP
High performance multistream transfers
Web interface

SCP/SFTP:
Standard SCP/SFTP

CIFS:
Mount drives on another machine via CIFS

For detailed instructions to mount a CIFS directory go to: https://arcc.uwyo.edu/guides/cifs
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