New User Guide

Resources:

Information about using HPC systems and what they are:

- HPC-Carpentry.org
- HPC stands for high-performance computing and is the consolidation of computing resources used when more processing power is needed

Logging on to Hellgate:

To log on to the cluster you will need to be using campus internet, whether that be through a vpn (virtual private network) or physically being on campus.

- To request VPN you will fill out a ticket on the Solutions Center found here

Once you are on eduroam you can connect to Hellgate through the command line using one of the apps below:

- Terminal (Mac or Windows)
- PowerShell (pre-installed on most Windows devices)

To connect to Hellgate, open your app of choice and on the command-line and enter the below, making sure to put your netid in.

- **ssh <netid>@login.rci.umt.edu**

You will then be asked for your netid password (be careful as it won't show what characters are being typed). By default, you will be put in your home directory.

- **/mnt/beegfs/hellgate/home/<netid>**

Navigating with the Command Line:

Navigating Hellgate without a user interface can be intimidating but there are a few commands that will help you get around easily.

- **ls** – lists contents in the current directory
- **cd** – used to change directories either one at a time or with absolute paths
    - **cd <directory name>**
    - **cd /mnt/beegfs/projects/<netid>**
    - **cd ..** (moves outside a directory or up one level)
    - **cd ~** (goes to home directory)
- **pwd** – prints absolute path location of where you are
- **nano** – text editor that lets you open a file a file and edit it

- **cat** – lets you read a file in the command line (can't edit) ○ **cat <file name**>
- **mkdir** – makes a directory (folder) in the directory you are in ○ **mkdir <new directory name>**
- **mv** – used to move files between directories or rename files ○ **mv <file name> <directory name**> ○ **mv <current file name> <new file name>**
- **rm** – used to remove files ○ **rm <file name>**
- **cp** – used to copy files ○ **cp <copied file name> <file name>**

Layout of Hellgate:

When you logon on to the cluster you start in your home directory on the logon node, but this is not where you will store any files or data. The projects and scratch spaces are where you can run jobs, store data, and perform any other tasks you may need. Each location has different amounts of storage (if needed more storage can be requested)

- projects – 10TB
- scratch – 5TB
- home directory – 500GB

USER DIRECTORY LAYOUT - HELLGATE CLUSTER

```
/mnt/beegfs/
├─ projects/              ## Projects directory recommend for storing data
│  └── <NetID>/           ## 10TB of storage
│      └── file1          ## Absolute path: /mnt/beegfs/projects/<NetID>/file1
├─ scratch/               ## Scratch directory is faster for processing data
│  └── <NetID>/           ## 5TB of storage
│      └── file2          ## Absolute path: /mnt/beegfs/scratch/<NetID>/file2
└── hellgate/
    └── home/
        └── <NetID>/     ## 500GB of storage - Login directory
```

Moving Files To and From Hellgate Using SFTP:

We recommend that you use SFTP (Secure File Transfer Protocol) to upload and download data from the cluster. In this case uploading would be putting data onto the cluster and downloading would be getting data from the cluster back to your local machine. First you would connect using SFTP, similar to how you would to Hellgate.

- **sftp <netid>@login.rci.umt.edu**

Your prompt should now begin with sftp. To exit type 'exit'

- **sftp> exit**

The commands to move around and perform actions will differ whether you are on your local device or the remote device (hellgate). To navigate it will be the same commands as previously mentioned (Ex: ls, cd). To move around within your local device you will add an 'l' in front of the command.

- **sftp> cd <directory name>**

  This will move you to the directory on your Hellgate

- **sftp> lcd <directory name>**

  This will move you to the directory on your local machine

To upload or download data you will need to be in the directory containing the files or use absolute paths.

To upload files to the cluster you need to be in the directory with the file and use

- **sftp> put <file name>**

To download files from the cluster you would use

- **sftp> get <file name>**

Scripts and Sbatch:

Scripts allow tasks to be automated by saving commands into a file, allowing you to easily re-run multiple commands at once. Scripts are in the form of a shell script and will end with the file extension **.sh**. To run a script there are two options and it doesn't matter which you run.

- **Scripts can be edited using nano**
- **./<script name>.sh**
- **/bin/sh <script name>.sh**

On the cluster the most used script will be a sbatch file, which is used to submit batch jobs to SLURM. Sbatch allocates resources for the script to use, making it easy for users to modify what resources they need.

- **Sbatch <script name>.sh**
- You can verify your job is running by looking at your current jobs with the command:
  - **squeue -me**

If you have any questions, please put in a ticket through the Solutions Center at https://umt.teamdynamix.com/TDClient/2032/Portal/Requests/ServiceDet?ID=53470