High Performance Computing (HPC) Club Training Session

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Outline

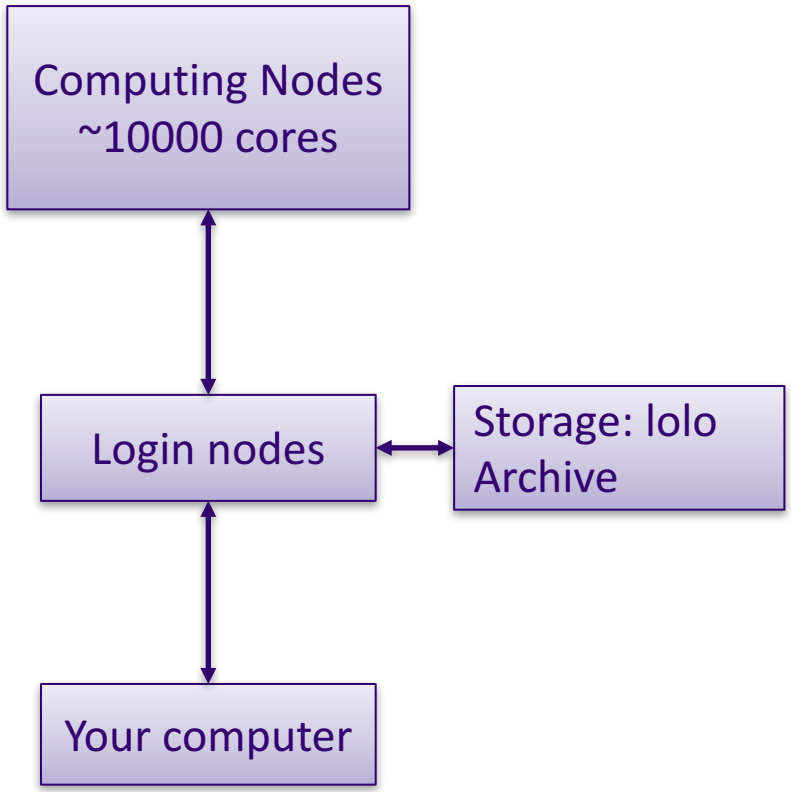
- Hyak and HPCC
- Logging in to Hyak
- Basic Linux Commands
- Transferring Files Between Your PC and Hyak
- Submitting Your Jobs

Hyak Overview

- **~10000 nodes in total**
- **STF has access to 1024 cores**
- **ikt.hyak**
  - 16 processors
  - 64GB memory
  - CentOS 6 Linux
- **mox.hyak**
  - 28 processors
  - 128GB memory
  - CentOS 7 Linux

Hyak Overview

- **Node type:**
  - **Computing nodes**
    - Production job
    - ikt 'n012'
  - **Login nodes**
    - Job submitting
    - Files transferring
    - 'ikt2'
- **Never run job on login nodes!**
- **Hyak wiki:**
  - http://wiki.cac.washington.edu/display/hyakusers/WIKI+for+Hyak+users



Logging in to Hyak

- **This is essentially remote-accessing a Linux System via SSH protocol**
- **Linux & Mac**
  - Mac: application->utilities->terminal
  - Ubuntu: Search for “terminal” in your applications
- **Windows:**
  - SSH client alternatives
  - Putty http://www.putty.org/
  - cmder http://cmder.net/
  - xshell
- **More info here:**
  - http://wiki.cac.washington.edu/display/hyakusers/Logging+In

HPC Club

- **High Performance Computing Club (HPCC):**
  - http://students.washington.edu/hpcc/
- **As a club member, you can have access to thousands of CPU cores on UW Hyak supercomputer.**
- **Become a member:**
  - http://students.washington.edu/hpcc/getting-started-on-hyak/

Logging in to hyak

- **To connect to ikt.hyak**
  - ssh -X yourUWnetid@ikt.hyak.uw.edu
- **To connect to mox.hyak**
  - ssh -X yourUWnetid@mox.hyak.uw.edu
- **Enter your uwid password**

```
D-10-18-220-168:~ maomoke$ ssh maomoke@ikt.hyak.uw.edu
Password:
Enter passcode or select one of the following options:

 1. Duo Push to phone (XXX-XXX-4968)
 2. Phone call to phone (XXX-XXX-4968)

Duo passcode or option [1-2]:
```

- **Confirm with Duo Mobile on your phone**
  - https://itconnect.uw.edu/security/uw-netids/2fa/

Basic Linux Commands

- **Show current directory:** pwd
  - $HOME directory
- **Show contents in current directory:** ls [options]
- **change current directory:** cd + [path]
  - cd absolute_path
  - cd relative_path
- **Create a new folder:** mkdir folder_name
- **Remove a file/folder:** rm [options]

Transfer files

- **Linux & Mac: SCP**
  - Usage: scp [options] <source directory> <target directory>
- **Windows: WinSCP**
  - Download: https://winscp.net/eng/download.php
- **Upload files to Hyak:**
  - $ scp filename user@ikt.hyak.uw.edu:path/to/destination/directory
- **Download files from Hyak:**
  - scp user@hyak.washington.edu:path/to/file ./
- **Note that these all these commands should be executed on the remote host (your laptop).**
- **More info:** http://wiki.cac.washington.edu/display/hyakusers/Managing+your+Files#Managi

STF Workspace

- ikt
  - gscratch: /gscratch/stf
  - suppscr: /suppscr/stf
  - lolo : /lolo/archive/hyak/stf/
- MOX
  - /gscratch/stf
- File scrubber:
  - http://students.washington.edu/hpcc/using-hyak/scrubber-dont-lose-your-files/

Interactive node usage

- **To get an interactive node in your own group for 2 hours:**
  - qsub -I -l walltime=2:00:00
- **To get 2 nodes for interactive use for 2 hours:**
  - qsub -I -l nodes=2:ppn=16,feature=16core,walltime=2:00:00
- **When the above command runs, then you will have been allocated 2 nodes and you will be on one of the two nodes.**
- **Interactive nodes are computing nodes. Can not transfer file between ikt/mox/lolo on interactive nodes. Can not submit jobs.**

Submitting Batch Jobs

- **qsub:**
  - qsub [options] command-for-running-your-job
  - e.g. qsub -l walltime=2:00:00 -I -V matlab compute_norm.m
- **Use PBS (Portable Batch System) Jobscripts, which:**
  - Include instructions for the scheduler
  - set up the work environment
  - execute your program
- **More info:**
  - http://wiki.cac.washington.edu/display/hyakusers/Hyak+Job+Scheduler#Hy%20akJobScheduler-ImportantInformation

Manage Jobs

- **Check the status of your job checkjob <job_id>**
  - qstat -f <job_id>
- **Queue Status**
  - showq -w qos=<your_group>
  - showq -w user=<your_netid>
  - e.g. showq -w qos=stf
- **To cancel a job:**
  - mjobctl -c <job_id>
  - qdel <job_id>
- **More info:**
  - http://wiki.cac.washington.edu/display/hyakusers/Hyak+Job+Scheduler#HyakJo bScheduler-ManagingJobsinYourQueues

MOX

- **To connect to mox.hyak**
  - ssh -X yourUWnetid@mox.hyak.uw.edu
- **Show queue:** squeue
- **To get an interactive node in your own group for 2 hours:**
- srun -p xyz -A xyz --time=2:00:00 --mem=100G --pty /bin/bash
- **To get 2 nodes for interactive use:**
- srun -N 2 -p xyz -A xyz --time=2:00:00 --mem=100G --pty /bin/bash
- **Submit:** sbatch -p <my short group> -A <my short group> test.sh
- **Use your group's nodes:** squeue -p xyz
- **Show Job Info:** scontrol show job <jobid>
- **Cancel Jobs:** scancel <jobid>; scancel -u <username>
- **More info:**
  - http://wiki.cac.washington.edu/display/hyakusers/Hyak+mox+Overview

Transfer between ikt and mox

- **From ikt to mox**
  - ikt1$ hyakbbcp myfile mox1.hyak.uw.edu:/gscratch/MYGROUP/
  - ikt1$ hyakbbcp -r mydirectory mox1.hyak.uw.edu:/gscratch/MYGROUP/
- **From mox to ikt**
  - mox1$ hyakbbcp myfile ikt1.hyak.uw.edu:/gscratch/MYGROUP/
  - mox1$ hyakbbcp -r mydirectory ikt1.hyak.uw.edu:/gscratch/MYGROUP/
- File scrubber
  - There's a scrubbed temporary filesystem available at /gscratch/scrubbed. Files can be removed at any time, but they will be removed on a periodic basis based on creation date (files created 30 days ago or more).