

HIGH PERFORMANCE RESEARCH COMPUTING

HPRC Primers

Introduction to Linux

With Demonstrations through the HPRC OpenOn Demand Portal



High Performance
Research Computing

DIVISION OF RESEARCH

High Performance Research Computing Resources

FASTER

184-node Intel cluster from Dell with HDR-100 InfiniBand.
A100, A10, A30, A40 and T4 NVIDIA GPUs are distributed and
composable via Liquid PCIe fabrics.
All nodes are based on the Intel Ice Lake processor.



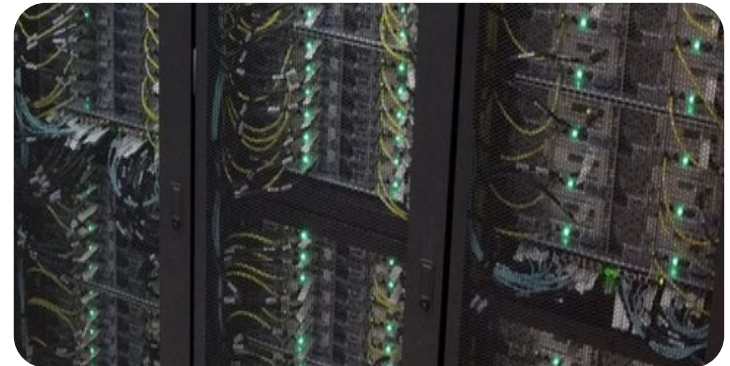
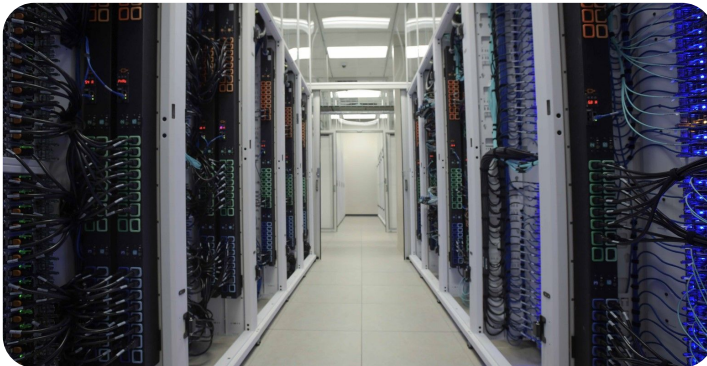
High Performance Research Computing Resources

Grace

925-node Intel cluster from Dell with an InfiniBand HDR-100 interconnect, A100 GPUs, RTX 6000 GPUs and T4 GPUs. All nodes are based on the Intel Cascade Lake processor.

Terra

320-node hybrid Intel cluster from Lenovo with an Omni-Path Architecture (OPA) interconnect and 48 NVIDIA K80 dual-GPU accelerators. 304 nodes based on the Intel Broadwell processor & 16 nodes based on the Intel Knights Landing processor. 4 nodes with Skylake processors, 192 GB of memory, and dual V100 GPUs.



Your Login Password

- Do NOT share your password
- Do NOT share your account
- Texas law and TAMU regulations prohibit the sharing and/or illegal use of computer passwords and accounts

Accessing the HPRC Portal

- HPRC webpage: hprc.tamu.edu
 - TAMU: portal-faster.hprc.tamu.edu
 - ACCESS: portal-faster-access.hprc.tamu.edu

AT&M TEXAS A&M HIGH PERFORMANCE RESEARCH COMPUTING

Home User Services Resources Research Policies Events About Portal

Terra Portal
Grace Portal
FASTER Portal
FASTER Portal (ACCESS)

Quick Links
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Using the Portal - Shell Access

TAMU HPRC OnDemand (FASTER)

Files ▾

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>_faster Shell Access

Starts an in-browser
Linux terminal on
FASTER

Convenient
shell access
anywhere
with a web
browser

OnDemand provides an integrated, single access point for all of your HPC resources.

Message of the Day

IMPORTANT POLICY INFORMATION

- **Unauthorized use of HPRC resources is prohibited and subject to criminal prosecution.**
- **Use of HPRC resources in violation of United States export control laws and regulations is prohibited. Current HPRC staff members are US citizens and legal residents.**
- **Sharing HPRC account and password information is in violation of State Law. Any shared accounts will be DISABLED.**
- **Authorized users must also adhere to ALL policies at: <https://hprc.tamu.edu/policies>**

TAMU: Using SSH (on a Linux Client)

```
ssh -X NetID@faster.hprc.tamu.edu
```

You may see something like this the first time you connect:

```
Host key not found from the list of known hosts.  
Are you sure you want to continue connecting (yes/no)?
```

Type **yes**, hit enter and you will then see the following:

```
Host faster.hprc.tamu.edu' added to the list of known hosts.  
NetID@faster.tamu.edu's password:
```

Mac users may need to use `ssh -Y` to enable X11 so you can view images and use GUI software

```
ssh -Y NetID@faster.hprc.tamu.edu
```

To use the HPRC clusters, you must apply for an HPRC account.

Where Am I?

pwd command (print working directory)

Linux commands in green for you to type

```
pwd
```

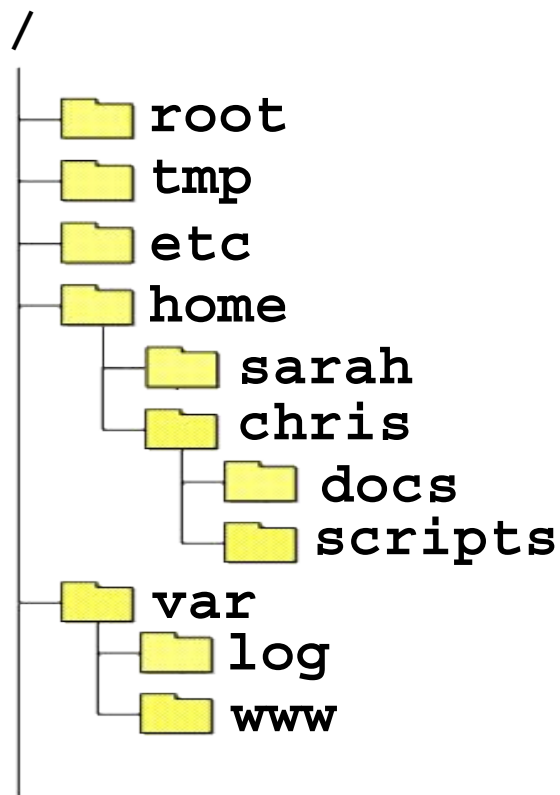
command output in blue

```
/home/username
```

list contents of your working directory

```
ls
```


Finding your way around the Linux directory structure



```
/  
/root  
/tmp  
/etc  
/home  
/home/sarah  
/home/chris  
/home/chris/docs  
/home/chris/scripts  
/var  
/var/log  
/var/www
```

Linux Commands Have Options

Leave a space between the command and the options

double dash means there is a single option

```
ls --all
```

--all show all files including
hidden files which begin with .

single dash means each character is an option

```
ls -a -l
```

-a show all files including hidden
-l show file details

most options can be combined behind one dash

```
ls -al
```

-a show all files including hidden
-l show file details

. current working directory
.. parent directory

Search for Linux Commands Options

Search the manual page for the Linux command `ls`

```
man ls
```

Page up

Move up one page

Page down

Move down one page

Spacebar

Move down one page

Mouse scroll wheel

Move up and down

```
/all
```

search the man page for the text 'all'

```
n
```

search forward for next found match

```
N
```

search backwards next found match

```
g
```

go to first line

```
G
```

go to last line

```
q
```

quit

Common Directory Commands

`mkdir` command to make a new directory:

```
mkdir my_dir
```

`cd` to change to another directory:

```
cd my_dir
```

`rmdir` to remove an empty directory:

```
rmdir my_dir
```

UNIX Terminal Attributes

File and directory names are colored based on their attributes such as permissions and extension (file type)

```
AAF -> AAF.py
AAF.py
aaf_tip.py
data.gz
image.jpg
phylip_src
phylokmer
README
run_aaf.sh
```

TURQUOISE	Symbolic link
GREEN	Executable file
RED	Compressed files
PURPLE	Image files
BLUE	Directories
WHITE	Text files

Changing Directories: the `cd` cmd

Return to your home directory

```
cd
cd ~
cd ~/
```

Switch to the parent directory
of the current directory:

```
cd ..
```

Return to previous directory

```
cd -
```

```
cd
mkdir temp
mkdir temp/hg19
cd temp
pwd
cd hg19
pwd
cd ../..
pwd
cd -
pwd
cd ..
pwd
cd
pwd
```

Absolute vs. Relative Path

```
/  
/root  
/tmp  
/etc  
/home  
/home/sarah  
/home/chris/project  
/home/chris/docs/README  
/var  
/var/log  
/var/www
```

If you are in the `project` directory

```
pwd
```

```
/home/chris/project
```

The relative path to the `README` file is `../docs/README`

```
ls ../docs/README
```

The absolute path to the `README` file `/home/chris/docs/README`

```
ls /home/chris/docs/README
```

History of Your Commands

Your commands are saved to a file in your home directory (`.bash_history`)

You can use the up/down arrows to scroll through previous commands

Type **history** to see your previously entered commands

```
history
```

```
History of your commands
```

```
history | tail
```

```
See the last 10 commands
```

Search your command history using `|` and `grep`

```
history | grep wget
```


Redirection Operators

< redirects input

```
program < inputfile
```

> redirects output

```
command > out.txt
```

>> appends output

```
command >> out.txt
```

<< input from *here-document*

```
command << HeredocDelimiter . . .  
HeredocDelimiter
```

2> redirects error

```
command 2> error.txt
```

&> redirects output & error

```
command &> out-error.txt
```

>& redirects output & error

```
command >& out-error.txt
```

2>&1 redirects error to where output is going

1>&2 redirects output to where error is going

Changing Attributes: The `chmod` cmd

```
chmod [options] [permission mode] [target_file]
```

```
cd ~/temp/hg19
```

```
chmod 755 chr_xy.txt ( the permissions will be set to -rwxr-xr-x )
```

```
chmod o-x chr_xy.txt ( the permissions will change to -rwxr-xr-- )
```

```
chmod ug-x chr_xy.txt ( the permissions will change to -rw-r--r-- )
```

```
chmod g+w chr_xy.txt ( the permissions will change to -rw-rw-r-- )
```

u = user

r = read

g = group

w = write

o = other

x = execute

-x = remove executable permissions

+x = enable executable permissions

Using the Portal File Editor

TAMU HPRC OnDemand (FASTER)

Files ▾

Jobs ▾

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Dashboard ▾



>_ Open in Terminal

+ New File

+ New Directory

Upload

Download

Copy/Move

Delete

Home Directory

/scratch/user/saluja.aditi5



/ scratch / user / saluja.aditi5 / DeepLearningExamples /

Change directory

Create a new file and edit

Copy path

Show Owner/Mode

Show Dotfiles

Filter:

Showing 11 of 15 rows - 0 rows selected

	Type	Name		Size	Modified at
<input type="checkbox"/>	Folder	CUDA-Optimized	⋮	-	3/21/2022 11:28:24 AM
<input type="checkbox"/>	Folder	DGLPyTorch	⋮	-	3/21/2022 11:28:25 AM
<input type="checkbox"/>	Folder	FasterTransformer	⋮	-	3/21/2022 11:28:26 AM
<input type="checkbox"/>	Folder	Kaldi	⋮	-	3/21/2022 11:28:26 AM

The *gedit* Graphical Text Editor*

From the Linux terminal command line prompt enter this command to start gedit and edit a file called my_favorite_foods.txt

```
gedit my_favorite_foods.txt &
```

The '**&**' will detach gedit from the terminal so you can continue to use the terminal

Recommendations for naming files:

- Use all lowercase characters

- Separate words with an underscore

- Make the filename concise and very descriptive of the file contents even if the name seems long

* gedit will not work through the HPRC portal terminal

Shell Script Exercise

create a shell script


```
vim my_script.sh &
```

make your shell script executable

```
chmod 755 my_script.sh
```

run your shell script

```
./my_script.sh
```



```
#!/bin/bash
# HPRC shell script exercise

my_name="Dylan"

echo "Howdy $my_name" > names.txt

mkdir script_output

mv names.txt script_output

cd script_output

cat names.txt
```

Exit your terminal

```
exit
```

```
exit the terminal session
```

To fully logout of the FASTER portal, you need to exit the browser



**HIGH PERFORMANCE
RESEARCH COMPUTING**
TEXAS A&M UNIVERSITY

Thank you.

Any questions?



Need Help?

First check the FAQ hprc.tamu.edu/wiki/HPRC:CommonProblems

- FASTER User Guide hprc.tamu.edu/wiki/FASTER
- Email your questions to help@hprc.tamu.edu

Help us, help you -- we need more info

- Which Cluster
- Username
- Job id(s) if any
- Location of your jobfile, input/output files
- Application used if any
- Module(s) loaded if any
- Error messages
- Steps you have taken, so we can reproduce the problem

Continued Learning

[Intro to HPRC Video Tutorial Series](#)

[HPRC's Wiki Page](#)