

Moving around the file system

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Summary of commands used in this demonstration along with their meanings

Command	Meaning
ssh	Secure Shell login to remote servers
df	Disk free utility
cd	Change directory
pwd	Present working directory
ls	List files and folders in current directory

- As with the previous demonstration the first thing is to make sure you are logged into the cluster, by typing `ssh username@lengau.chpc.ac.za` (where username is your cluster username).

```

23/06/2020 20:43:00 /home/mobaxterm ssh krishna@lengau.chpc.ac.za
krishna@lengau.chpc.ac.za's password:
Welcome to LENGAU

#####
#
# In order to receive notifications via email from the CHPC all users should #
# be subscribed to the CHPC user distribution list. If you are not part of the #
# distribution list you can subscribe at the following link: #
# https://lists.chpc.ac.za/mailman/listinfo/chpc-users #
#
#####
[krishna@login2 ~]$
  
```

- Check the disk space available on the system using:

df -h

```

[krishna@login2 ~]$ df -h
Filesystem                Size      Used Avail Use% Mounted on
/dev/sda2                  259G       27G   219G  11% /
devtmpfs                   63G         0    63G   0% /dev
tmpfs                      63G       2.4G    61G   4% /run
tmpfs                      63G      128K    63G   1% /dev/shm
tmpfs                      63G         0    63G   0% /sys/fs/cgroup
172.19.0.122:/home2         60T       4.0T    56T   7% /home
172.19.0.122:/cmshared     187G       7.2G   180G   4% /cm/shared
172.19.0.122:/apps         3.8T       2.9T   895G  77% /apps
172.19.6.109:/mnt/store    998T     632T   367T  64% /mnt/nrestore
172.19.0.130@o2ib:172.19.0.129@o2ib:/lustre 4.1P       2.6P    1.4P  67% /mnt/lustre
  
```

- There will be a large list that appears, but I have only displayed the first few. From this list the main ones to focus on are **/home** (which displays the home directory of all users on the cluster), **/cm/shared** (for those who need to share their work with other group members), **/apps** (the location where all applications are installed) and **/mnt/lustre** (this is where simulation data is generated)
- Go to the **apps** directory and list the items that appear there:

cd /apps

ls

```
[krishna@login2 ~]$ cd /apps/
[krishna@login2 apps]$ ls
100cpuload.sh      config             hpl                modedown           root_guid.conf
acml               datagram.sh        HPL.dat           mode.sh            root_guids.conf
ALL               dbench             hwloc              mpich               scalapack
allnodes          denyhosts.cfg      ibnetdiscover.txt mpiexec             scripts
auto_killer_data  denyhosts.conf    images             mvapich            sge
bck-nfs01-20170125-101215 deny.sh            imb               mvapich2           shutdown.target
bck-nfs01-20170125-101215.tgz dns                inqababio         my.cnf             slurm
bckoriginal       eric               intel              netcdf             stresscpu
blacs             fftw               intel-cluster-checker netperf            sudo
blas              flexlm             intel-cluster-runtime nfs01-dm-bckup     sudoers
bonnie++          gdb                intel-tbb-oss      open64             test
chassis           globalarrays       io_guid.conf       openblas            tools
chassisdown       halt.target        iotzone            openlava            torque
chassis.sh        hdf5               lapack             openmpi            uge
chpc              hdf5_18            libs               opensm.conf         user
clclck            host-eth           logs               partitions.conf    xhpl
cmbios            hosts              lsf                poweroff.target    xhpl.blas
cmburn            hosts1             main.cf            puppet              zero.dat
cm.cluster.zone.include hosts-eth           man.sh             pythoncm            zzz.txt
cmgui             hostssec           mellanox-hca.sh    reboot.target      roche
compilers         hostssec1          mentester
```

- You will find several files and folders in this directory. The one we want to look further into is the **chpc** directory
- Go to the **chpc** directory and list the items that appear there:

cd chpc

ls

- If for some reason you were not in the **apps** directory, then you can still get directly to the **chpc** directory using:

cd /apps/chpc

ls

- You can also list the items located in **/apps/chpc** from anywhere on the cluster including your **home** directory:

cd ~

pwd

ls /apps/chpc

- No matter which approach you use above you should end up with the same list of files and directories as they all refer to the same location

```
[krishna@login2 apps]$ cd chpc/
[krishna@login2 chpc]$ ls
ai      apps  astro  bowtie2  compmech  cuda  earth  gpu  image  math  pentaho  rttov  space
animation  asr  bio  chem  cs  dlpoly  geosc  hyphy  material  nkiwanel  phys  scripts  visualization
[krishna@login2 chpc]$ cd /apps/chpc/
[krishna@login2 chpc]$ ls
ai      apps  astro  bowtie2  compmech  cuda  earth  gpu  image  math  pentaho  rttov  space
animation  asr  bio  chem  cs  dlpoly  geosc  hyphy  material  nkiwanel  phys  scripts  visualization
[krishna@login2 chpc]$ cd ~
[krishna@login2 ~]$ pwd
/home/krishna
[krishna@login2 ~]$ ls /apps/chpc/
ai      apps  astro  bowtie2  compmech  cuda  earth  gpu  image  math  pentaho  rttov  space
animation  asr  bio  chem  cs  dlpoly  geosc  hyphy  material  nkiwanel  phys  scripts  visualization
[krishna@login2 ~]$
```

- As you can see the **chpc** directory has several additional directories which are domain specific, these include:
 1. astro (astronomy)
 2. bio (bioinformatics)
 3. chem (chemistry)
 4. compmech (computational mechanics)
 5. earth (earth science)
- Going into any of the directories listed above will provide you with a list of applications that are installed on the cluster for that specific domain area.
 There is another way that can be used to find out if your application is available on the system and this shall be covered in the next section of the course.

- Next you need to go to your **lustre** directory:

```
pwd
cd ~
pwd
cd lustre
pwd
cd /apps/chpc
pwd
cd /mnt/lustre/users/username
pwd
```

```
[krishna@login2 chpc]$ pwd
/apps/chpc
[krishna@login2 chpc]$ cd ~
[krishna@login2 ~]$ pwd
/home/krishna
[krishna@login2 ~]$ cd lustre
[krishna@login2 lustre]$ pwd
/home/krishna/lustre
[krishna@login2 lustre]$ cd /apps/chpc/
[krishna@login2 chpc]$ pwd
/apps/chpc
[krishna@login2 chpc]$ cd /mnt/lustre/users/krishna/
[krishna@login2 krishna]$ pwd
/mnt/lustre/users/krishna
[krishna@login2 krishna]$ █
```

- Getting to **lustre** is done in one of two ways above. The first involves going back to your **home** directory, from **/apps/chpc**, and then moving into the **lustre** directory (This was a directory we say in the previous section when we listed all the information that was contained in **home**).

The second involves moving directly to the **lustre** directory from your current directory. Even though the one shows your path as **/home/username/lustre** and the other **/mnt/lustre/users/username**, this is the same directory.

- You can list the items that are in your **lustre** directory with **ls**, but for those of you that are new to the cluster you should see nothing after doing a **ls** since you do not have any information in this location.
- As a means of practice it would be good for you to create a **test** subdirectory in your **lustre** directory together with a file called **myfile.txt** as was done in the CHPC Systems: The Users' View section of this course, with the main difference now being that your present working directory would be **/mnt/lustre/users/username/test** instead of **/home/username/test** once your **test** subdirectory has been created.
- In later sections of this course you will see how to copy files to and from this **lustre** directory and how to run simulations from within this directory and subdirectories therein.
- It is important to take note that **lustre** is not a permanent storage space. Data stored on **lustre** is done so at your own risk.
Should there be failures on the filesystem then you can lose your data.
It is best to copy your data off the cluster and remove it from **lustre** once you have completed your simulations and postprocessing.
- There are numerous other locations on the cluster which you are welcome to explore, but in this part of the course we only focused on the essential directories. In the next section (CHPC Environment and modules) we will focus on making use of environment modules to discover what applications are installed on the cluster.