NATIONAL INTEGRATED CYBERINFRASTRUCTURE SYSTEM
CHPC

WINTER SCHOOL 2020

Monitoring: qstat, ssh, htop

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Summary of commands used in this demonstration along with their meanings

Command	Meaning
ssh	Secure Shell login to remote servers
pwd	Present working directory
qsub	Used to submit a job to PBS
qstat	Check the status of running
qdel	Remove a job from the queue
htop	Check processors status on a node
cat	Concatenate a file/s

- As with most of the demonstrations thus far you first need to log into the cluster, by typing **ssh username@lengau.chpc.ac.za** (where username is your cluster username).

- Go to your directory from the previous section (**/mnt/lustre/users/username/demo/first**).

```
 21/07/2020  14:00.16  /home/mobaxterm  ssh krishna@lengau.chpc.ac.za
krishna@lengau.chpc.ac.za's password:
Last login: Tue Jul 21 13:53:22 2020 from 102.252.65.124

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 ~]$ cd /mnt/lustre/users/krishna/demo/first/
[krishna@login2 first]$
```

- Check that you have the file **submit.pbs** from the previous section

```
[krishna@login2 first]$ ls
submit.pbs
[krishna@login2 first]$
```

- If you do not see **submit.pbs** then please go back to the section first job script and create the file

- You will need to make some changes to the **submit.pbs** file before submitting it as a job to the cluster. This is the contents of my file and you will need to edit yours accordingly based on the information contained in the first job script section (you should only need to make changes to the options that appear at **#PBS -P** and **#PBS -M**, respectively.

```
[krishna@login2 first]$ cat submit.pbs
#!/bin/bash
#PBS -P CHEM0792
#PBS -N demo
#PBS -l select=1:ncpus=1
#PBS -l walltime=0:20:00
#PBS -q serial
#PBS -m abe
#PBS -M youremailaddress
#PBS -o out
#PBS -e err

pushd /mnt/lustre/users/krishna/demo/first
echo “This is the date and time when this script first starts”
date
sleep 5m
echo “This is the date and time after 5 minutes”
date
sleep 5m
echo “This is the date and time after 10 minutes”
date
echo “This is the end of the script”
popd
[krishna@login2 first]$
```

- Once your file is setup you are ready to submit this as a job to the cluster. You can do this with the following commands:

qsub submit.pbs

qstat -u username -n1

```
[krishna@login2 first]$ qsub submit.pbs
2956957.sched01
[krishna@login2 first]$ qstat -u krishna -n1

sched01:
                                                            Req'd  Req'd   Elap
Job ID          Username Queue    Jobname    SessID NDS TSK Memory Time  S Time
--------------- -------- -------- ---------- ------ --- --- ------ ----- - -----
2956957.sched01 krishna  serial   demo          --    1   1    --  00:20 Q   --   --
[krishna@login2 first]$
```

- Once you submit a job you should find a JOBID appear. In the case above the JOBID for the job is 2956957.sched01. Each job should have their own unique JOBID.

- Should for some reason you need to delete a job you can use **qdel JOBID**. So for the above case if we wished to kill the job we would use **qdel 2956957.sched01** and this would remove the job from PBS.

- If your job is in the queue you should see a screen like the one above. To keep checking the job you can continue using **qstat -u username -n1**
  When the job does start running you should find something that looks like:

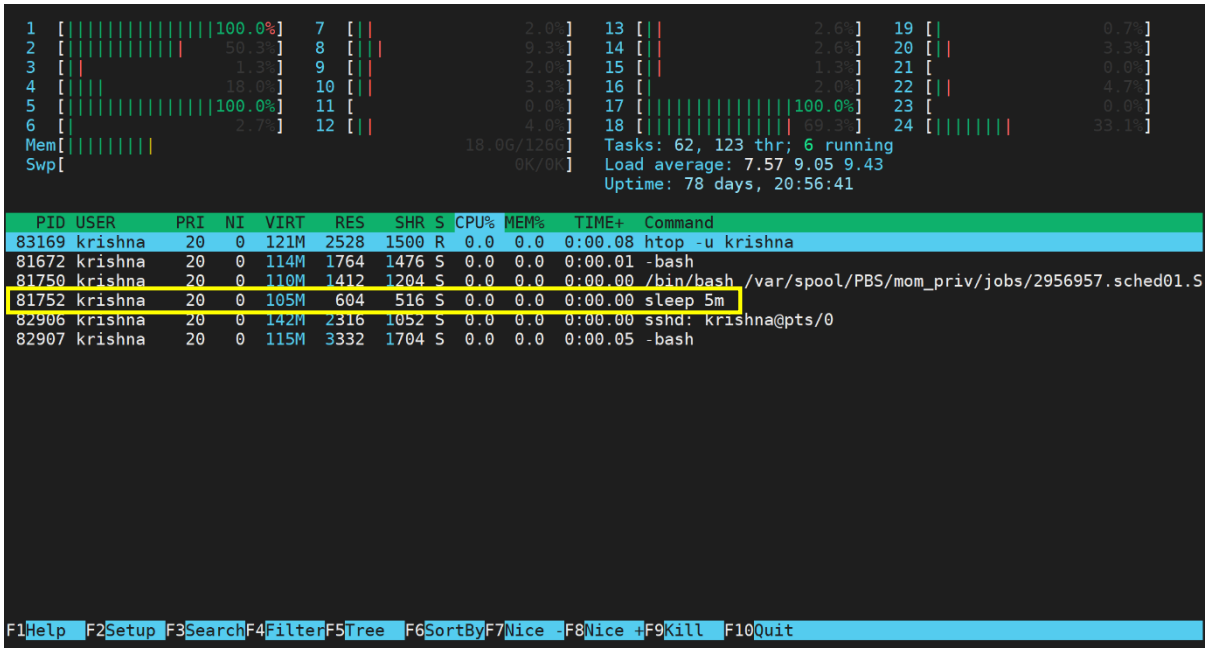
```
[krishna@login2 first]$ qstat -u krishna -n1

sched01:
                                                            Req'd  Req'd   Elap
Job ID          Username Queue    Jobname    SessID NDS TSK Memory Time  S Time
--------------- -------- -------- ---------- ------ --- --- ------ ----- - -----
2956957.sched01 krishna  serial   demo        81672   1   1    --  00:20 R 00:00 cnode0005/4
```

- Since this job is running on a specific compute node (in this case cnode0005) we can ssh to the node and monitor the CPU usage of our job:

```
[krishna@login2 first]$ ssh cnode0005
[krishna@cnode0005 ~]$ htop -u krishna
```

- Once you are on the node you can type **htop -u username** and you should find a screen that looks like:



- You should find a sleep 5m process running like the one I have highlighted in yellow above. You will notice that a sleep process does not really use much CPU, hence the % CPU is 0.0

- Once you are happy that the process is on the compute node you can exit htop by hitting **q** (for quit) which will take you back to the terminal. From there you can **exit** back to the login node

```
[krishna@login2 first]$ ssh cnode0005
[krishna@cnode0005 ~]$ htop -u krishna
[krishna@cnode0005 ~]$ exit
logout
Connection to cnode0005 closed.
[krishna@login2 first]$
```

- When the job is complete typing **qstat -u username** should produce nothing

```
[krishna@login2 first]$ qstat -u krishna
[krishna@login2 first]$
```

- Since the job is complete let's have a look at the files that got produced from the running this simulation. We can do this by listing the items in our current directory with **ls**

```
[krishna@login2 first]$ ls
err  out  submit.pbs
[krishna@login2 first]$
```

- There are now two additional files in the folder which were not there before we ran the job, that being the **err** and **out** files. Let's have a look at the what is contained in these files:

cat err

cat out

```
[krishna@login2 first]$ cat err
[krishna@login2 first]$ cat out
/mnt/lustre/users/krishna/demo/first ~
"This is the date and time when this script first starts"
Fri Jul 31 09:05:45 SAST 2020
"This is the date and time after 5 minutes"
Fri Jul 31 09:10:45 SAST 2020
"This is the date and time after 10 minutes"
Fri Jul 31 09:15:45 SAST 2020
"This is the end of the script"
~
[krishna@login2 first]$
```

- There is nothing contained in the **err** file which indicates that where no errors during this simulation.

  The **out** file has all the information that would have been printed to the screen when the simulation ran. First it shows the directory that we move into (**/mnt/lustre/users/username/demo/first**), followed by the various **echo** statement outputs as well as the **date** at different intervals. You will notice 5-minute gaps between each time due to the sleep of 5 minutes that we had between each **date** command.

- This concludes your first job script submission and monitoring.