

- 1) First serial job
 - a) Submit a serial job that:
 - i) Is a serial (1 core) job
 - ii) Emails you when it starts, ends and aborts
 - iii) Has a maximum wall time of 2 minutes
 - b) Watch your job run with the following command:
 - i) "qstat -a -u \$USER"
 - c) Did you get the result emailed to your account

- 2) Second serial job
 - a) Submit a serial job that:
 - i) Is a serial (1 core) job
 - ii) Emails you when it starts, ends and aborts
 - iii) Has a maximum walltime of 2 minutes
 - iv) Sleeps for 200 seconds
 - b) Describe what will you think happen when this job runs?
 - c) Run your job and see what happens

- 3) Third serial job (Job Names)
 - a) Submit a serial job that:
 - i) Is a serial (1 core) job
 - ii) Has a maximum wall time of 2 minutes
 - iii) Sleeps for 30 seconds
 - iv) Is named "my-3rd-job"
 - b) Look at your job in the output of the following commands
 - i) "showq -u \$USER"
 - ii) "qstat -a -u \$USER"
 - iii) "jobinfo -j"

- 4) Job Arrays

Submit a serial job array that:

 - a) Has a maximum wall time of 2 minutes
 - b) Sleeps 30 seconds
 - c) Is named "my-array-job"
 - d) Has 12 tasks
 - e) Writes a file to \$PBS_JOBNAME.output
 - f) Look at your job with the following commands
 - i) "showq -u \$USER"
 - ii) "qstat -a -u \$USER"
 - iii) "jobinfo -j"

- 5) (Extra Credit) Job Arrays
Submit a serial job array
- Has a maximum wall time of 2 minutes
 - Sleeps 30 seconds
 - Is named "my-array-job"
 - Has 12 tasks
 - Writes a files to \$PBS_JOBNAME
 - runs at most 2 jobs at once
- 6) (Extra Credit) Job Arrays
Submit a serial job array that
- Sleeps 30 seconds
 - Is named "my-array3-job"
 - Has 4 tasks with indexes of: 1, 2, 7, -13
 - Writes a files \$PBS_JOBNAME
 - Look at your job with the following commands
 - "showq -u \$USER"
 - "qstat -a -u \$USER"
 - "jobinfo -j"
 - Look at the output of the job,
 - Notice that the negative number (-13) is turned positive.
- 7) MPI Jobs
- Edit the start-7.pbs job script replace the email address with your email address
 - Submit the edited script start-7.pbs
 - Look at the job with the following commands:
 - "showq -u \$USER"
 - "qstat -a -u \$USER"
 - "jobinfo -j"
 - "checkjob <jobid>"
 - Note how long it took to run
 - Edit the start-q7.pbs script to user 4 processors
 - Submit the edited script
 - Look at the job with the following commands:
 - "showq -u \$USER"
 - "qstat -a -u \$USER"
 - "jobinfo -j"
 - "checkjob <jobid>"
 - Please list which nodes and cores the job is running on or scheduled to run on and how long it took to run.

- 8) OpenMP jobs
 - a) Submit a job
 - i) Asking for 1 node with 12 cores
 - ii) sleeps 60 seconds
 - iii) Has a maximum walltime of 2 minutes
 - iv) Look at the job with the following commands:
 - “showq -u \$USER”
 - “qstat -a -u \$USER”
 - “jobinfo -j”
 - “checkjob <jobid>”
 - v) Please list which nodes and cores the job is running on or scheduled to run on.

- 9) (Extra Credit) Hybrid Jobs
Submit a job that:
 - a) Asking for 4 nodes with 4 cores
 - b) sleeps 60 seconds
 - c) Has a maximum walltime of 2 minutes
 - d) Look at the job with the following commands:
 - “showq -u \$USER”
 - “qstat -a -u \$USER”
 - “jobinfo -j”
 - “checkjob <jobid>”
 - ii) Please list which nodes and cores the job is running on or scheduled to run on.

- 10) (Extra Credit) Jobs and features
 - a) Submit a serial job
 - i) Asks for older cpus: “L5420” feature
 - ii) Look at the job with the following commands:
 - “showq -u \$USER”
 - “qstat -a -u \$USER”
 - “jobinfo -j”
 - “checkjob <jobid>”
 - b) Is your job taking a long time to be run? Why?

- 11) Jobs and memory (mem,pmem)
 - a) Take the start-q11.pbs script and edit
 - i) ask for: pmem=12000mb
 - ii) replace the email address with your email address
 - b) Submit a job from the script you edited . Look at the job with the following commands:
 - i) “showq -u \$USER”
 - ii) “qstat -a -u \$USER”
 - iii) “jobinfo -j”

- iv) "checkjob <jobid>"
- c) How much memory does this job use?

12) Jobs and memory (mem,pmem)

- a) Take the start-q12.pbs script and edit it
 - i) ask for: mem=12000mb
 - ii) replace the email address with your email address
- b) Submit a job from the script you edited . Look at the job with the following commands:
 - i) "showq -u \$USER"
 - ii) "qstat -a -u \$USER"
 - iii) "jobinfo -j"
 - iv) "checkjob <jobid>"
- c) How much memory does this job use?

13) Jobs and memory (mem,pmem)

- a) Take the start-q13.pbs script and edit
 - i) asks for: pmem=3000mb
 - ii) replace the email address with your email address
- b) Submit a job from the script you edited . Look at the job with the following commands:
 - i) "showq -u \$USER"
 - ii) "qstat -a -u \$USER"
 - iii) "jobinfo -j"
 - iv) "checkjob <jobid>"
- c) How much memory does this job use?

14) Jobs and memory (appropriate resources)

- a) Create a job run the "cryptic" program edit the start-q14.pbs script
 - i) Make sure your job emails you when it starts, ends and aborts
 - ii) Make a guess and for enough RAM to run the program
- b) Submit your edited Job script , look at your running Job with the following commands, look at the ,memory used by your job
 - i) "checkjob <jobid>"
 - ii) "qstat -f <jobid>"
- c) Did your job run successfully? Or fail because of a lack of memory?
 - i) If your job failed due to a lack of memory, increase the maximum memory requested and resubmit your job, and go back to point 14b
- d) Look at the email reporting on your job success, how much resources were reported used. Compare the memory used to the reported memory in 14c
- e) Edit job script and request an appropriate amount of memory to run the Job as learned in 11e.
- f) Submit your new job
- g) Verify that the jobs runs successfully.

15) (Extra Credit) Full nodes

- a) Submit a job asking for that asks for
 - i) 4 procs
 - ii) Not to run on any nodes with other users
Useful if you are trying to debug your job
- b) See if you can see which nodes your job is running on.
 - i) "checkjob <jobid>"
 - ii) "qstat -f <jobid>"

16)(Extra Credit) Full nodes

- a) Submit a job asking for that asks for
 - i) 4 procs
 - ii) Not to run on any nodes with other jobs
Useful if you are trying to debug your job
- b) See if you can see which nodes your job is running on.
 - i) "checkjob <jobid>"
 - ii) "qstat -f <jobid>"

17)(Extra Credit) Full nodes

- a) Submit a job asking for that asks for
 - i) 4 procs
 - ii) Each task should run on a separate node.
- b) See if you can see which nodes your job is running on.
 - i) "checkjob <jobid>"
 - ii) "qstat -f <jobid>"

18) (Extra Credit) (Do only If you are part of multiple WestGrid projects)

Multiple accounting groups

- a) Submit a Job to a non default accounting group, that asks for 1 proc
- b) Try to see which accounting group your job belongs to, use the checkjob command:
 - i) "checkjob <jobid>"

19) (Extra Credit) Software licenses and generic resources

- a) Submit a job asking for that asks for
 - i) 1 proc
 - ii) 1 MATLAB license
 - iii) 1 Statistics_Toolbox license
- b) Try to see which accounting group your job belongs to, use the checkjob command:

20) (Extra Credit) Job dependencies

- a) Submit a serial job named 20.a, that has
 - i) Walltime of 2:00
 - ii) Sleeps 120 seconds
- b) Submit a serial job 20b waits until job 15a is done
 - i) Walltime of 2:00
 - ii) Sleeps 120 seconds
- c) Look at job 15.b with checkjob
- d) Run the command “showq -u \$USER”
- e) Verify that Job 15.a complete before 15.b starts

21) (Extra Credit) Job epilogue

- a) look at the epilogue.script file provided
- b) Submit a job that runs the provided epilogue script named “epilogue.script” after the job is done as epilogue.

22) (Extra Credit) Job using temporary directory

- a) Submit a job that runs in the temporary directory used no more than 1000mb of space,

23) (Extra Credit) Job environment variables.

- a) Submit a serial job that prints the queue that the job was ran in.

24) Basic Job info

- a) Use the “jobinfo -j” and “qstat -t -u <username>” commands to find out how many jobs your have running, queued, in hold state or complete.
- b) Use the “showq” command what does active, eligible, blocked jobs mean, how many jobs are in each category
- c) Use the “showq -b” command to see how many jobs are in what state?

25) Examining a job

- a) Start a Job
- b) Examine its priority with “jobinfo -i” or “showq -i”
- c) run qstat -f <jobid > and determine how much RAM the Job asks for/used
- d) run checkjob -v -v <> determine and examine the result , what is its priority

26) Priority, Fairshare, and allocations

- a) Start a Job, what is its priority relative to other jobs.
- b) What is your research groups allocation and usage
- c) Which person in your group has used the most resources, have they used more than their share?
- d) When were the most Jobs ran by your group

27) Cluster info

- a) How many idle nodes are on the cluster "mdiag -n"
- b) How many cpus and memory are not being used on the cluster?
- c) How many cores with 2 GB Ram are not being used on the cluster?
- d) How many nodes are set offline on a cluster.