

# Interacting with Moab/Torque using PBS directives

Michael Carlise  
Graduate Research Assistant  
Doctoral Candidate (Biology)



# Outline

- (1) What is Torque, Moab and PBS?
- (2) Batch Computer Systems
- (3) Basic Job Flow within a Batch System
- (4) Creating PBS scripts [Exercise]
- (5) Checking on a Job/Canceling a Job [Exercise]
- (6) Where to find Additional Information



# What is Torque, Moab and PBS?

## Torque is a Resource Manager

“...Provides low-level functionality to start, hold, cancel and monitor jobs.”

- Torque v4.1.7 Manual  
Adaptive Computing



# What is Torque, Moab and PBS?

Moab is a Work-load Manager (job scheduler)

“The scheduler tracks resources and dedicates requested resources to a particular jobs, which prevents use of such resources by other jobs.”

- Moab v7.1.6 Manual  
Adaptive Computing



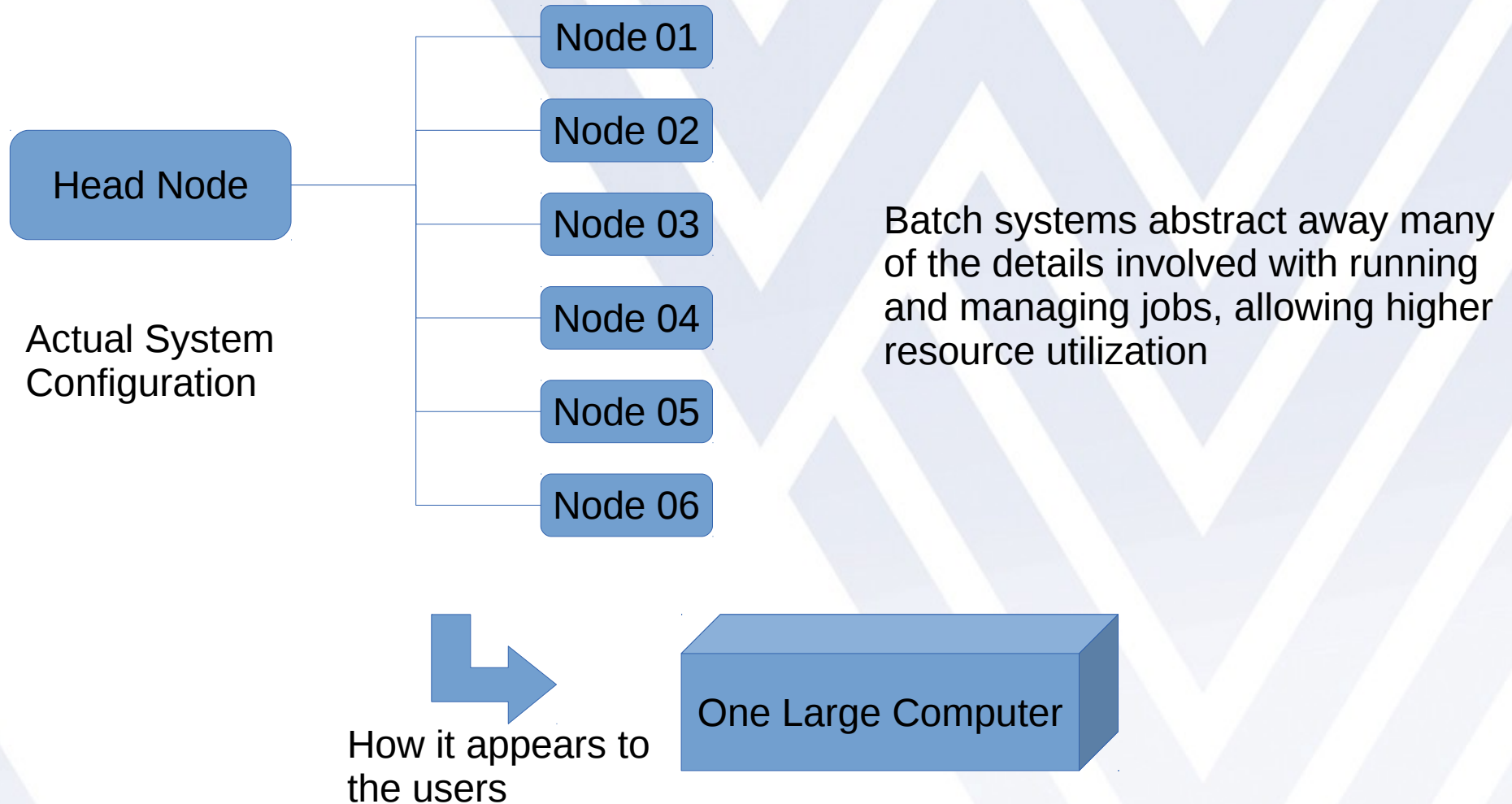
# What is Torque, Moab and PBS?

## Portable Batch System (PBS)

A job scheduler originally developed by NASA in the early 1990s that Torque/Moab is based on. As such, Torque/Moab uses PBS directives (commands) to receive job requests from users.

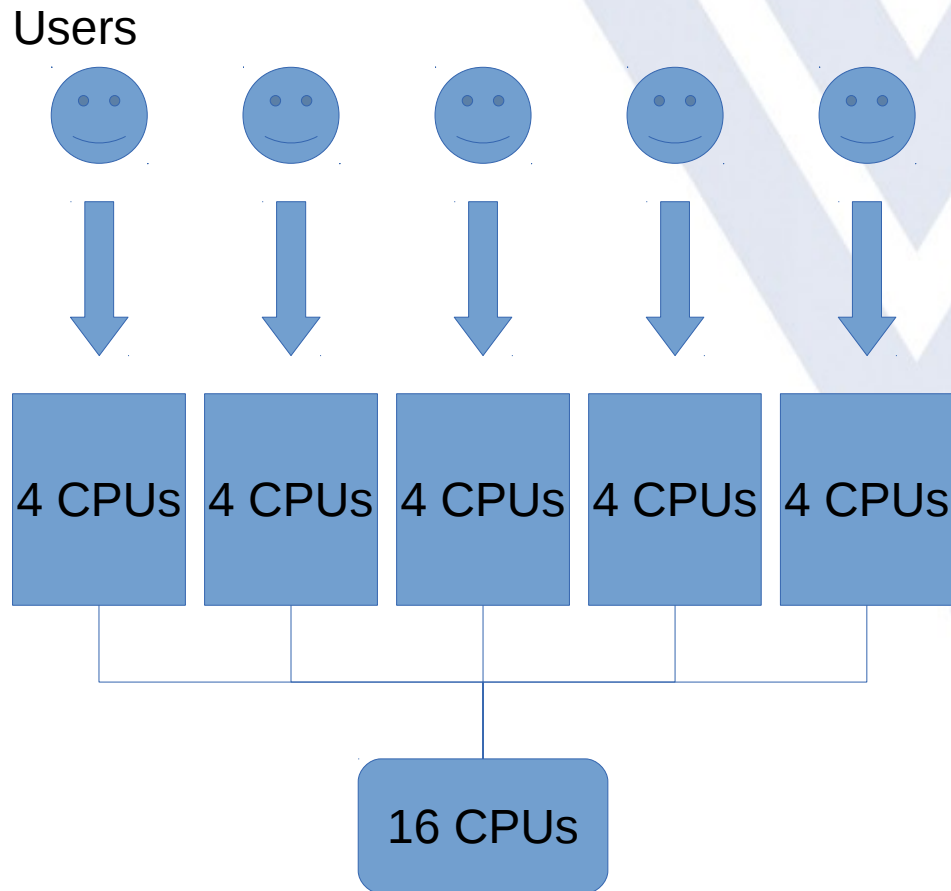


# We Integrate Torque/Moab across computers to create a batch system





## Accounting for User System Resource Requests



Since each user has it's own terminal, a system needs to be in place to ensure two users do not get the same CPUs, or more CPUs than the system total is used at any one time

## Basic Job Flow when using Torque/Moab Batch Systems

Phase	Controlled By	Phase Details
Creation	User	PBS submit script created by user that controls parameters of the job including walltime, CPUs need, memory, etc...
Submission	User	User submission of the PBS submit script
Execution	System	Execution of commands
Finalization	System	Job completion; capture command outputs





## What does a PBS script look like?

```
#!/bin/sh
```

```
#PBS -N localBlast
```

```
#PBS -l nodes=1:ppn=2,walltime=240:00:00
```

```
#PBS -M user@my.organization.com
```

```
#PBS -m ea
```

→ PBS directives

```
source ~/.bashrc  
cd $HOME/work/dir  
sh myBlast.sh -i -v
```

→ User  
Commands



## Exercise: Create a PBS Script

Username on front  
of slide handout  
packet.

Login to Mountaineer (from command line):

**ssh mountaineer.hpc.wvu.edu -l username**

Password: training2014



## Exercise: Create a PBS Script

Write the PBS file:

```
touch pbs_script.sh  
vi pbs_script.sh
```

Enter insert mode by pressing the 'i' key

```
#!/bin/sh
```

```
#PBS -N pbs_trial  
#PBS -l nodes=1:ppn=1,walltime=01:00:00  
#PBS -q training  
#PBS -m ae  
#PBS -M youremail@address.com
```

```
echo "This message will go to standard output file"  
echo "This message will go to standard error file" >&2
```

Save and quit file by hitting esc key, followed by :wq <enter>



## Exercise: Create a PBS Script

Submit Job Script

**qsub pbs\_script.sh**

Should get output response  
something similar to:  
45521.mountaineer



## Exercise: Create a PBS Script

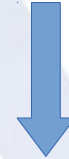
Check Output:

**ls -l**



At the completion of jobs, Moab outputs files as:

JOB\_NAME.oJOBID and JOB\_NAME.eJOBID



Cat both output files (one at a time):

**cat pbs\_trial.oJOBID**

**cat pbs\_trial.eJOBID**



## Exercise: Run a longer job and check job status

Edit PBS file to execute a different set of commands:

**vi pbs\_script.sh**

Using arrow keys place cursor on the first echo line. Press '2dd' in the keyboard. Now enter insert mode with the 'i' key

```
source ~/.bashrc  
cd $HOME  
./infinite_loop
```

Press the 'esc' key to exit insert mode. Type ':wq' to save and exit file.

**qsub pbs\_script.sh**





## Exercise: Run a longer job and check job status

Check to see your job running:

**showq**

often gives too much output, try piping into less

**showq | less**

Use the 'q' key to exit less. Or you can explicitly view just your jobs

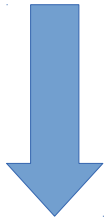
**showq -u <username>**



## Exercise: Run a longer job and check job status

Check your job's status:

**checkjob <jobid>**



This jobs command will never end, it's bugged code that stalls indefinitely. You can cancel the job using:

**Canceljob <jobid>**



## Exercise: Run a longer job and check job status

Just as in slide 13, you should check to see if Moab gave you output files.



## Further Information

Man Pages:

man qsub

man pbs\_resources\_linux

SRF HPC Wiki:

<http://wiki.hpc.wvu.edu>

OsTicket or E-mail:

<http://helpdesk.hpc.wvu.edu>

[helpdesk@hpc.wvu.edu](mailto:helpdesk@hpc.wvu.edu)



Of course, you can always e-mail any of us directly

Nathan Gregg (Systems Administrator)  
[Nathan.gregg@mail.wvu.edu](mailto:Nathan.gregg@mail.wvu.edu)

Don McLaughlin (Technical Manager)  
[Don.mclaughlin@mail.wvu.edu](mailto:Don.mclaughlin@mail.wvu.edu)

Michael Carlise (Biology Graduate Student)  
[mcarlise@mix.wvu.edu](mailto:mcarlise@mix.wvu.edu)

Lisa Sharpe (Director)  
[Lisa.sharpe@mail.wvu.edu](mailto:Lisa.sharpe@mail.wvu.edu)

