Job Monitoring on SciNet and Job Efficiency

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compute • calcul CANADA

SciNet

Batch computing

SciNet systems are batch compute clusters

- Computing by submitting batch jobs to the scheduler.
- When you submit a job, it gets placed in a queue.
- Job priority is based on allocation and fairshare.
- When sufficient nodes are free to execute a job, it starts the job on the appropriate compute nodes.
- Jobs remain 'idle' until resources become available.
- Jobs can be temporarily 'blocked' if you submit too much.

Batch computing

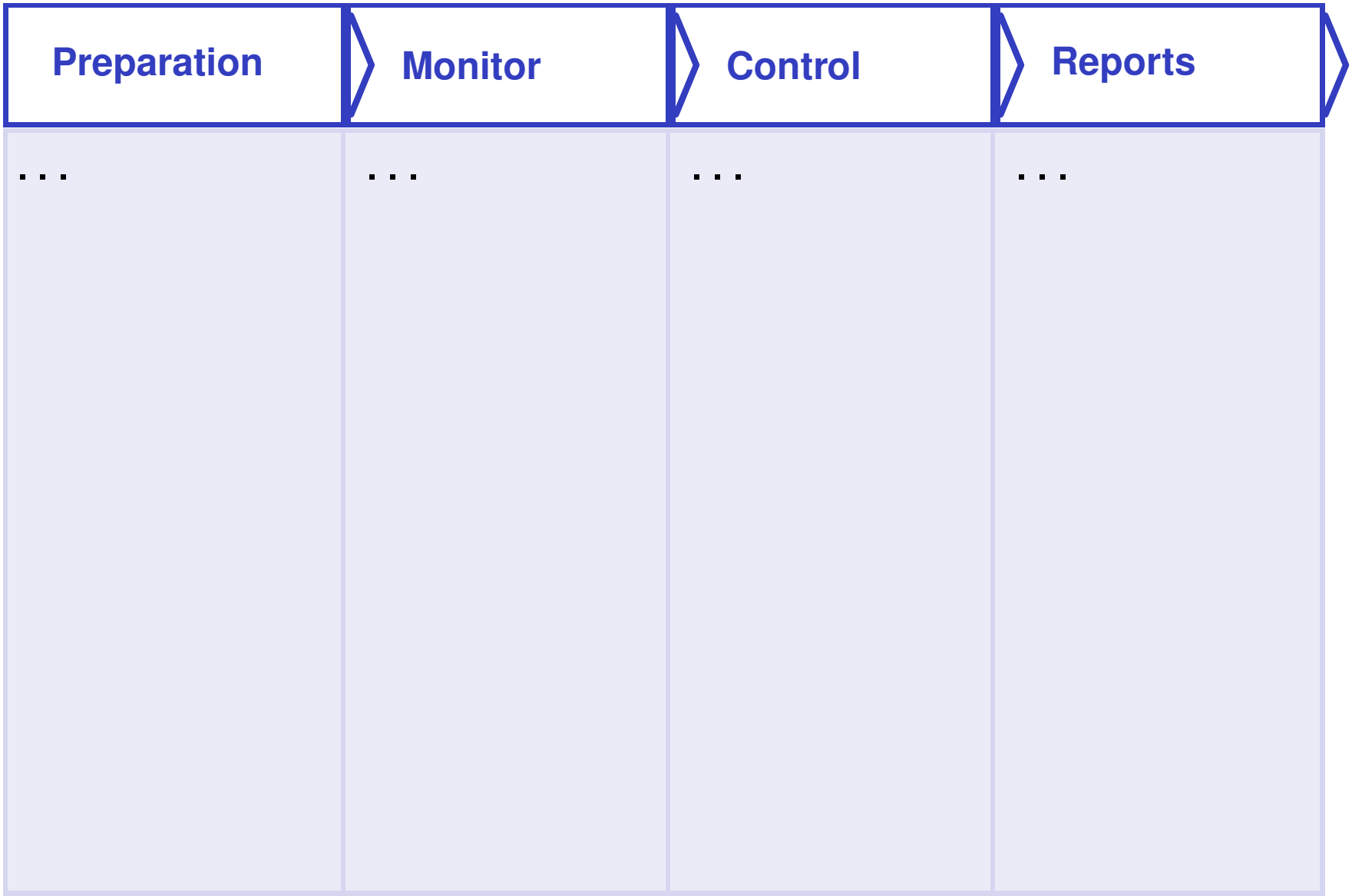
Components

Torque: Resource manager providing control over batch jobs and distributed compute nodes.

Moab: A policy-based job scheduler and event engine that enables utility-based computing for clusters.

Fairshare: Mechanism using past utilization for prioritization.

Job cycle



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• Compile • Test on devel node • Determine resources • Write job script llsubmit *script* qsub *script* returns *'jobid'*	...	...	...

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Monitoring not-yet-running jobs

qstat and checkjob

- Show torque status right away on GPC: qstat
- Show moab status (better): checkjob *jobid*
- See more details of the job: checkjob -v *jobid*
  (e.g., why is my job blocked?)

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showstart and showbf

- Estimate when a job may start: showbf [-f ib]
- Estimate when a queued job may start: showstart *jobid*

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ssh

- ssh *node* (node name from checkjob)
- top: shows process state, memory and cpu usage

Top example

```
gpc-f103n084-$ ssh gpc-f109n001
gpc-f109n001-$ top
```

```
top - 21:56:45 up  5:56,  1 user,  load average: 5.55, 1.73, 0.88
Tasks: 234 total,   1 running, 233 sleeping,   0 stopped,   0 zombie
Cpu(s): 11.4%us, 36.2%sy,  0.0%ni, 52.2%id,  0.0%wa,  0.0%hi,  0.2%si,  0.0%st
Mem:  16410900k total,  1542768k used, 14868132k free,        0k buffers
Swap:        0k total,        0k used,        0k free,   294628k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  P COMMAND
22479 ljdursi   18   0  108m 4816 3212 S 98.5  0.0   1:04.81  6 gameoflife
22480 ljdursi   18   0  108m 4856 3260 S 98.5  0.0   1:04.85 13 gameoflife
22482 ljdursi   18   0  108m 4868 3276 S 98.5  0.0   1:04.83  2 gameoflife
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22484 ljdursi   18   0  108m 4832 3232 S 98.5  0.0   1:04.80  9 gameoflife
22481 ljdursi   18   0  108m 4856 3256 S 98.2  0.0   1:04.81  3 gameoflife
22485 ljdursi   18   0  108m 4808 3208 S 98.2  0.0   1:04.80  4 gameoflife
22478 ljdursi   18   0  117m 5724 3268 D 69.6  0.0   0:46.07 15 gameoflife
 8042 root       0 -20 2235m 1.1g  16m S  2.3  6.8   0:30.59  8 mmfsd
10735 root      15   0  3792  452  372 S  1.3  0.0   0:16.80  0 cat
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qsub for interactive and debug jobs

- `-I`:
  - Interactive
  - After qsub, waits for jobs to start.
  - Usually combined with:
- -q debug:
  - Debug queue has 10 nodes reserved for short jobs.
  - You can get 1 node for 2 hours, but also
  - 8 nodes, for half an hour.

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```
----------------------------------------
Begin PBS Prologue Tue Sep 14 17:14:48 EDT 2010 1284498888
Job ID:     3053514.gpc-sched
Username:   ljdursi
Group:      scinet
Nodes:      gpc-f134n009 gpc-f134n010 gpc-f134n011 gpc-f134n012
gpc-f134n043 gpc-f134n044 gpc-f134n045 gpc-f134n046 gpc-f134n047 gpc-f134n048
[...]
End PBS Prologue Tue Sep 14 17:14:50 EDT 2010 1284498890
----------------------------------------
[ Your job's output here... ]
----------------------------------------
Begin PBS Epilogue Tue Sep 14 17:36:07 EDT 2010 1284500167
Job ID:     3053514.gpc-sched
Username:   ljdursi
Group:      scinet
Job Name:   fft_8192_procs_2048
Session:    18758
Limits:     neednodes=256:ib:ppn=8,nodes=256:ib:ppn=8,walltime=01:00:00
Resources:  cput=713:42:30,mem=3463854672kb,vmem=3759656372kb,walltime=00:21:07
Queue:      batch_ib
Account:
Nodes:  gpc-f134n009 gpc-f134n010 gpc-f134n011 gpc-f134n012 gpc-f134n043
[...]
Killing leftovers...
gpc-f141n054:   killing gpc-f141n054 12412

End PBS Epilogue Tue Sep 14 17:36:09 EDT 2010 1284500169
----------------------------------------
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Statistics

- Short term: showstats -u *USER*
- Year-to-date: SciNet Portal

  Usage stats for past year, showing a breakdown of TCS, GPC_eth, and GPC_ib usage. Updated every 24 hours.

Note

Most of these work on TCS as well.

Additional tools may become available.

Check https::/support.scinet.utoronto.ca/wiki!