Computing in SGE Environment

Vijay Peddinti
with support from CLSP sys-admin
What is SGE?

- Sun Grid Engine is a queuing system useful for efficient sharing computing resources among several users.

- Advantages
  - Scheduling jobs
  - Load Balancing
  - Monitoring/Accounting
Submitting jobs : qsub

qsub -V -e my_job.err -o my_job.out -b n -cwd my_job.sh

- **-V** : states that the job should have the same environment variables as the shell executing `qsub`
- **-b** : states that the command being executed could be a single binary executable or a bash script
- **-cwd** : specifies that the job should be executed in the same directory that `qsub` was called.
- **-e/-o** : paths to the log files
Specifying resource usage

```bash
qsub -l mem_free=10G,ram_free=10G my_job.sh
```

• It is necessary to declare the resources required by your job like
  ```
  – mem_free: peak memory usage of your job
  ```
• These are strictly enforced on our cluster where a process monitors the usage and kills jobs violating their memory declarations

------------------------------------------

Killed process MATLAB (PID: 12156) of user vijay
User was using total 14615744 kB, the process we killed was using 9110292
Output of top (after killing it) follows.
Multi-threaded processes

qsub -pe smp 5 foo.sh

This declaration suggests that the script will launch a process which consumes 5 cpu cores or launches 5 processes which consume a cpu core each.
Dependencies among jobs

qsub -hold_jid 19841,19842 foo.sh

foo.sh will not be executed until jobs 19841 and 19842 are completed
Array jobs

qsub -t 219,242,1-100:2 -tc 10 array.sh

#!/bin/bash
#$ -N testarray
#$ -M afs_id@nd.edu
#$ -m ae
#$ -r y

setenv MATLABPATH
directory_path_to_your_files.m:other_user_contribution_directory_path

matlab -nodisplay -nosplash -nojvm -r "myFunction(${SGE_TASK_ID});exit"
Monitoring jobs: `qstat`

```
qstat

```

```
vi
```
Deleting your jobs: qdel

qdel 19841

• Simple scripts to delete multiple jobs

qstat –u vijay | \ awk '{print $1}' | xargs –n1 qdel
Allocating GPUs

qsub -q gpu.q job.sh

We maintain separate queues for CPU and GPU resources (all.q and gpu.q). To consume a GPU allocate a job to that queue.
Easily configurable scripts..

- Kaldi uses SGE extensively. It uses queue.pl for efficient configuration of jobs across clusters.
Rules of cluster usage

• Rules of WS15 cluster usage

• Lot of online tutorials describing more complex scripting structure in SGE
I want to build my own cluster on EC2