

# Gridengine Basics

*James Owers*

*27 June 2016*

## Contents

<b>1</b>	<b>Who is this for</b>	<b>1</b>
1.1	Useful references . . . . .	1
<b>2</b>	<b>Getting started</b>	<b>2</b>
<b>3</b>	<b>Basic SGE commands</b>	<b>2</b>
3.1	Interactive session on a node (just like <code>ssh</code> ) . . . . .	2
3.2	Submit a script to the queue . . . . .	3
3.3	View status of your subitted jobs . . . . .	3
3.4	Deleting Jobs . . . . .	3
3.5	Viewing Node Status . . . . .	3
<b>4</b>	<b>Example: Running an IPython Notebook and accessing it from outside DICE</b>	<b>4</b>
<b>5</b>	<b>Current issues</b>	<b>4</b>
<b>6</b>	<b>Tips</b>	<b>5</b>

**TL;DR:** To use `James` or `Charles` servers as if you were `ssh`ing into them as before, just `ssh renown` then `qlogin`.

## 1 Who is this for

People who use the `James` or `Charles` servers. Until now we have `ssh`'d into the servers but now `ssh` access has been removed from all but a few. Now in place is Son of a Grid Engine (**SGE**) to control access to servers. This guide shows you how to continue much like before and how to use basic **SGE** commands.

Son of a Grid Engine is an open source version of Univa Grid Engine (née Oracle Grid Engine (née Sun Grid Engine))

### 1.1 Useful references

- [SGE project site](#)
- [SGE documentation](#)
- `man qsub` from within `renown`
- [MIT SGE introduction](#)
- Informatics guide to [connecting from outside the university](#)

## 2 Getting started

Log in to the gridengine machine `renown`. If you're outside the forum you will need to set up [AFS](#) and [Kerberos](#) first. See the informatics guide to [connecting from outside the University](#) and [external login via ssh](#)

```
## If not on a dice machine
kinit s0816700
aklog
ssh -K s0816700@staff.ssh.inf.ed.ac.uk
# ssh -K s0816700@student.ssh.inf.ed.ac.uk
ssh renown
```

You will be in your home directory, in my case, `/home/s0816700`. We can see that lots of space has been added to the `/home/` directory (`/mnt/cdt_gridengine_home`)

```
df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/vda1	24G	5.1G	18G	23%	/
devtmpfs	2.0G	0	2.0G	0%	/dev
tmpfs	2.0G	0	2.0G	0%	/dev/shm
tmpfs	2.0G	9.4M	2.0G	1%	/run
tmpfs	2.0G	0	2.0G	0%	/sys/fs/cgroup
/etc/glusterfs/gv0.vol	147G	84G	57G	60%	/disk/glusterfs/gv0
charles11.inf.ed.ac.uk:/cdt-gridengine-common	385G	264M	365G	1%	/mnt/cdt_gridengine_common
anne.inf.ed.ac.uk:/cdt-gridengine-home	2.7T	432G	2.2T	17%	/mnt/cdt_gridengine_home
/dev/vda4	7.6G	65M	7.1G	1%	/var/cache/afs
AFS	2.0T	0	2.0T	0%	/afs
tmpfs	396M	0	396M	0%	/run/user/656624
tmpfs	396M	0	396M	0%	/run/user/28328
tmpfs	396M	0	396M	0%	/run/user/1559549
tmpfs	396M	0	396M	0%	/run/user/1421660

*Not covered here:* how to run parallel jobs and writing to the distributed file system 'Gluster'. For information on running parallel jobs using SGE, see the latter half of the [MIT SGE introduction](#).

## 3 Basic SGE commands

### 3.1 Interactive session on a node (just like sshing)

```
qlogin
```

Useful options:

- specify a specific node

```
qlogin -l h=charles14
```

- specify resource must have a GPU

```
qlogin -l gpu=1
```

### 3.2 Submit a script to the queue

```
qsub myscript.sh
```

OUTPUT two files containing the stdout and stderr [script-name].o[jobnr] and [script-name].e[jobnr], and whatever files or directories your script creates

### 3.3 View status of your subitted jobs

```
qstat
```

OUTPUT

job-ID	prior	name	user	state	submit/start at	queue	slots
15	0.55500	long_sleep	s0816700	r	06/03/2016 22:54:38	all.q@charles11.inf.ed.ac.uk	1

state = \*qw\*/\*\*r\*\* for \*queued and waiting\*/\*\*running\*\*

### 3.4 Deleting Jobs

```
qdel
```

### 3.5 Viewing Node Status

```
qhost
```

OUTPUT

HOSTNAME	ARCH	NCPU	NSOC	NCOR	NTHR	LOAD	MEMTOT	MEMUSE	SWAPTO	SWAPUS
global	-	-	-	-	-	-	-	-	-	-
anne	lx-amd64	64	4	64	64	0.02	995.6G	8.5G	31.2G	0.0
charles01	lx-amd64	32	2	16	32	1.01	62.7G	8.3G	31.3G	0.0
charles02	lx-amd64	32	2	16	32	0.27	62.7G	3.7G	31.3G	0.0
charles03	lx-amd64	32	2	16	32	0.01	62.7G	3.2G	31.3G	0.0
charles04	lx-amd64	32	2	16	32	0.04	62.7G	2.5G	31.3G	0.0
charles05	lx-amd64	32	2	16	32	13.61	62.7G	6.0G	31.3G	0.0
charles06	-	-	-	-	-	-	-	-	-	-
charles07	-	-	-	-	-	-	-	-	-	-
charles08	-	-	-	-	-	-	-	-	-	-
charles09	-	-	-	-	-	-	-	-	-	-
charles10	-	-	-	-	-	-	-	-	-	-
charles11	lx-amd64	24	2	12	24	0.01	62.8G	2.6G	31.4G	0.0
charles12	lx-amd64	24	2	12	24	0.01	62.8G	2.4G	31.4G	0.0
charles13	lx-amd64	24	2	12	24	0.01	62.8G	2.6G	31.4G	0.0
charles14	lx-amd64	24	2	12	24	0.01	62.8G	2.6G	31.4G	0.0

## 4 Example: Running an IPython Notebook and accessing it from outside DICE

1. Setup python virtual environment with IPython Notebook installed
  - Tip: install it in your home directory on DICE
2. `qlogin` to your server of choice
3. Check GPU use with `nvidia-smi`
4. activate your python virtual environment (you'll need to `kinit` & `aklog` if this is located on your DICE home as recommended)

```
source /afs/inf.ed.ac.uk/user/s08/s0816700/venv/nolearn/bin/activate
```

5. create a password hash using python

```
from IPython.lib import passwd
passwd()
exit
```

6. start the IPython Notebook

```
longjob -28day -c 'ipython notebook --ip="*" --NotebookApp.password=sha1:0880f873e98f:9ddab235858'
```

7. access the notebook

- From within forum simply browse to `http://charles13:1337` (replacing charles13 with where you were)
- Outside the forum either:
  - first `kinit` & `aklog` then, ssh port forward `charles13:1337` back to your computer:  
`ssh -K -L 8889:charles13:1337 s0816700@staff.ss.inf.ed.ac.uk` then go to `http://localhost:8889`
  - or connect to infomatics-via-forum using [OpenVPN](#), find the address of the server to connect to (e.g. by `ssh`ing into informatics and `ping` `charles12`, and navigate to this IP on your computer

**WARNING:** If anyone finds/hacks your password... they have access to your filesystem

**AWESOME WIN:** this `longjob` process allows continual access to your filesystem after the original afs ticket expires

## 5 Current issues

- Automatic resource allocation doesn't appear to take into account GPU use...
- ...working with Charles and Iain Rae on that
- IPython Notebook solution isn't very secure
- If you are running a script containing `longjob` using `qsub`, how is your kerberos ticket handled

## 6 Tips

- when logged in to **renown** type **q** then double tap **tab** to get a list of the commands for use!
- **nvidia-smi** lets you check the GPU use on a server - if the command doesn't work then the server you are on doesn't have a GPU; try to login to another server; you can specify a specific server with **qlogin -l h=charles14**