

=====Installing and Configuring SLURM on Ubuntu 18.04 and 16.04=====

Update package metadata:

```
sudo apt update
```

Locate slurm package (available in Ubuntu repo)

```
sudo apt search slurm
```

Correct package is `slurm-wlm` (SLURM Workload Manager)

```
sudo apt install slurm-wlm
```

Note it will automatically the other packages it requires (`slurmd`, `lua`, `munge`, etc)

Also install `slurm` documentation package. We will need this to generate the `slurm.conf` file.

```
Sudo apt install slurm-wlm-doc
```

Check that `/lib/systemd/system/slurmctld.service` and `slurmd.service` have the correct parameters being set for `slurm` to run (check directory paths exist and are accessible by `slurm` user). Hint: use `systemctl status slurmctld` to show the location of the service file. Look at this service file.

```
sudo vim /lib/systemd/system/slurmctld.service
```

```
sudo vim /lib/systemd/system/slurmd.service
```

The installer will create the directory `/etc/slurm-llnl`. This is the directory we will use to place our `slurm.conf` file.

Check the location of the files that were installed from the `slurm-wlm-doc` package:

```
sudo dpkg -L slurm-wlm-doc
```

The file we want to open with a web browser is

```
/usr/share/doc/slurm-wlm-doc/html/configurator.easy.html
```

```
firefox /usr/share/doc/slurm-wlm-doc/html/configurator.easy.html
```

Note: you can use `slurmd -C` on a node to generate configuration information for that particular node, and add use that to create the `slurm.conf` file.

You can mostly use the defaults for the settings on this page. Make the following adjustments:

- 1) Make sure the hostname of the system is `ControlMachine` and `NodeName`
- 2) State Preservation: set `StateSaveLocation` to `/var/spool/slurm-llnl`
- 3) Process tracking: use `Pgid` instead of `Cgroup`
- 4) Event logging: this is more of a personal preference as to whether you want the logging to be sent to the standard system log (`/var/log/syslog`), or if you would like it saved to its own unique file to keep it clearer to read (e.g. `/var/log/slurm-llnl/SlurmctldLogFile`)

- 5) Process ID logging: set this to `/var/run/slurm-llnl/slurmctld.pid` and `/var/run/slurm-llnl/slurmd.pid`

Click “submit”

Copy what is generated on this page to a new `slurm.conf` file:

```
sudo vim /etc/slurm-llnl/slurm.conf
```

Check the directories specified in `slurm.conf` and make sure they match the paths specified in the service files. Also make sure they exist and have the correct permissions: For example

```
mkdir -p /var/spool/slurm-llnl
chown -R slurm:slurm /var/spool/slurm-llnl
```

Verify munge has been installed and is running

```
systemctl status munge
```

Generate random key for munge (generated automatically by installer, so can usually skip, but good to check permissions of `munge.key` using `ls -l /etc/munge`):

Switch to root:

```
Sudo su -
```

```
dd if=/dev/urandom of=/etc/munge/munge.key bs=1c count=4M
```

Modify permissions of `munge.key` (make readable only by root)

```
Ls -l /etc/munge/munge.key
```

```
chmod a-r /etc/munge/munge.key
```

```
chmod u-w /etc/munge/munge.key
```

```
chmod u+r munge.key
```

Change ownership:

```
sudo chown munge:munge /etc/munge/munge.key
```

Start `slurmctld` and `slurmd` (they are already enabled to start on boot):

```
sudo systemctl start slurmctld
```

```
sudo systemctl start slurmd
```

```
sudo systemctl status slurmctld
```

If `slurmctld` or `slurmd` is giving us problems, let's start it interactively and check the debug output:

```
slurmctld -Dcvvv
```

====Adding support for GPUs in SLURM====

Create `/etc/slurm-llnl/gres.conf` file with definitions of GPUs available on this node

Add `GresTypes=gpu` to `slurm.conf` file

Add gres resources in the node definition:

```
NodeName=ubuntu1804 CPUs=12 RealMemory=64091 Sockets=1 CoresPerSocket=6
```

```
ThreadsPerCore=2 State=UNKNOWN Gres=gpu:TitanRTX:4
```

Restart slurm services to have the changes take effect.

Check the node:

```
scontrol show node
```