Monitoring Jobs

Careful examination of running times, memory usage and output files will allow you to ensure the job completed correctly and give you a good idea of what memory and time limits to request in the future.

Monitoring Completed Jobs:

To see the runtime and memory usage of a job that has completed, use the `sacct` command:

```
sacct
```

Lists all jobs by the current user and displays information such as JobID, JobName, State, and ExitCode.

![sacct output example]

Coupling this command with the `--format` flag will allow you to see more than the default information about a job. Fields to display should be listed as a comma separated list after the `--format` flag (without spaces). For example, to see the Elapsed time and Maximum used memory by a job, this command can be used:

```
sacct --format JobID,JobName,Elapsed,MaxRSS
```

![sacct output example]

Additional arguments and format field information can be found in the SLURM documentation.

Monitoring Running Jobs:

There are two ways to monitor running jobs, the `top` command and monitoring the cgroup files. `Top` is helpful when monitoring multi-process jobs, whereas the cgroup files provide information on memory usage. Both of these tools require the use of an interactive job on the same node as the job to be monitored.

If the job to be monitored is using all available resources for a node, the user will not be able to obtain a simultaneous interactive job.

After the job to be monitored is submitted and has begun to run, request an interactive job on the same node using the `srun` command:
Here is the output of the `top` command on the node:

```
PID USER      PR NI VIRT  RES   SHR S %CPU %MEM    TIME+ COMMAND
192391 cathrine 20  0 2310m 117m 70m S 94.5  0.2   0:02.86 MATLAB
192386 cathrine 20  0 2305m 105m 67m S 92.5  0.2   0:02.80 MATLAB
192383 cathrine 20  0 2231m  89m 61m S 90.2  0.1   0:02.73 MATLAB
192384 cathrine 20  0 2227m  81m 56m S 90.2  0.1   0:02.73 MATLAB
192382 cathrine 20  0 2227m  78m 55m S 88.8  0.1   0:02.69 MATLAB
192385 cathrine 20  0 2466m 140m 76m S 87.2  0.2   0:02.64 MATLAB
192389 cathrine 20  0 2232m  90m 61m S 85.9  0.1   0:02.60 MATLAB
192387 cathrine 20  0 2449m 125m 74m S 83.6  0.2   0:02.53 MATLAB
192390 cathrine 20  0 2468m 140m 77m S 80.9  0.2   0:02.45 MATLAB
192388 cathrine 20  0  685m  57m 46m S 42.3  0.1   0:01.28 MATLAB
```

Output for `top` displays each running process on the node. From the above image, we can see the various MATLAB processes being run by user cathrine98. To filter the list of processes, you can type `u` followed by the username of the user who owns the processes. To exit this screen, press `q`.

During a running job, the cgroup folder is created which contains much of the information used by `sacct`. These files can provide a live overview of resources used for a running job. To access the cgroup files, you will need to be in an interactive job on the same node as the monitored job. To view specific files, and information, use one of the following commands:

To view current memory usage:

```
less /cgroup/memory/slurm/uid_<UID>/job_<SLURM_JOB_ID>/memory.usage_in_bytes
```

Where `<UID>` is replaced by your UID and `<SLURM_JOB_ID>` is replaced by the monitored job’s Job ID as assigned by Slurm.
To view maximum memory usage from start of job to current point:

```
cat /cgroup/memory/slurm/uid_${UID}/job_${SLURM_JOBID}/memory.max_usage_in_bytes
```