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.

```
[cathrine98@login.crane erik]$ sacct

    JobID  JobName  Partition  Account  AllocCPUS  State  ExitCode
    -------  ---------  ---------  --------  ----------  -----  -------
    7957748  bash     devel      swanson  1          COMPLETED 0:0
    7957751  games    devel      swanson  1          FAILED    1:0
    7957751  .bat+    batch     swanson  1          FAILED    1:0
    7957779  games    devel      swanson  16         COMPLETED 0:0
    7957779  .bat+    batch     swanson  8          COMPLETED 0:0
```

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
```

```
[cathrine98@login.crane erik]$ sacct --format JobID,JobName,Elapsed,MaxRSS

    JobID  JobName  Elapsed  MaxRSS
    -------  --------  -------  ------
    7957748  bash     00:22:22  2448K
    7957751  games    00:00:01  822K
    7957751  .bat+    00:00:01  822K
    7957779  games    00:00:06  822K
    7957779  .bat+    00:00:06  822K
```

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:
srunk --jobid=<JOB_ID> --pty bash

Where <JOB_ID> is replaced by the job id for the monitored job as assigned by SLURM.

Alternately, you can request the interactive job by nodename as follows:

srunk --nodelist=<NODE_ID> --pty bash

Where <NODE_ID> is replaced by the node name that the monitored job is running. This information can be found out by looking at the squeue output under the NODELIST column.

Once the interactive job begins, you can run top to view the processes on the node you are on:

```
PID  USER      PR  NI  VIRT  RES  SHR%CPU %MEM TIME+  COMMAND
192391 cathrine98 20   0   2310m 117m 70m S 94.5%  0.2 0:02.86 MATLAB
192386 cathrine98 20   0   2305m 105m 67m S 92.5%  0.2 0:02.80 MATLAB
192383 cathrine98 20   0   2231m  89m 61m S  90.2%  0.1 0:02.73 MATLAB
192384 cathrine98 20   0   2227m  81m 56m S  90.2%  0.1 0:02.73 MATLAB
192382 cathrine98 20   0   2227m  78m 55m S  88.8%  0.1 0:02.69 MATLAB
192385 cathrine98 20   0   2466m 140m 76m S  87.2%  0.2 0:02.64 MATLAB
192389 cathrine98 20   0   2232m  90m 61m S  85.9%  0.1 0:02.60 MATLAB
192387 cathrine98 20   0   2449m 125m 74m S  83.6%  0.2 0:02.53 MATLAB
192390 cathrine98 20   0   2468m 140m 77m S  80.9%  0.2 0:02.45 MATLAB
192388 cathrine98 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 sact. 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:

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