Memory & Resource Estimation

Specifying the right amount of memory is important. Too little and your job fails with OOM. Too much and you block resources from other users.

Memory Directives

```
#SBATCH --mem=4G           # Total memory for the entire job
#SBATCH --mem-per-cpu=2G   # Memory per CPU core (use one or the other, not both)
```

Prefer `--mem-per-cpu` when your job scales with CPU count. Use `--mem` for fixed memory requirements.

Checking Memory Usage of Past Jobs

```
sacct -j job_id --format=JobID,JobName,MaxRSS,Elapsed
```

`MaxRSS` is the peak memory used. Use this to tune future submissions.

Monitoring a Running Job

```
#!/bin/bash
#SBATCH --job-name=memory_test
#SBATCH --account=public-users_v2
#SBATCH --partition=power-general-shared-pool
#SBATCH --qos=public
```

```
#SBATCH --time=01:00:00
#SBATCH --ntasks=1
#SBATCH --cpus-per-task=1
#SBATCH --mem=4G
#SBATCH --output=memory_test.out

echo "Memory before:"
free -m

./your_application

echo "Memory after:"
free -m
```

Tips for Estimating Memory

- Start conservative, check `MaxRSS` via `sacct`, tune upward
- Check application documentation for memory recommendations
- Run a small test job first before scaling up
- Use `free -m`, `top`, or `htop` inside an interactive job to observe live usage
- Plan for peak usage — memory spikes during data loading or processing

OOM Error

If your job fails with out-of-memory, you'll see:

```
sacct -j job_id -o JobID,JobName,State%20

JobID    JobName               State
-------- -------------------- --------------------
71       my_job        OUT_OF_MEMORY
```

Resubmit with a higher `--mem` or `--mem-per-cpu` value.

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