HPC Experiment 2: Familiarization with SLURM Commands

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Batch - A

Objective

To gain practical understanding of basic SLURM commands used for job submission, monitoring, and management in a High-Performance Computing (HPC) environment.

1. Introduction to SLURM

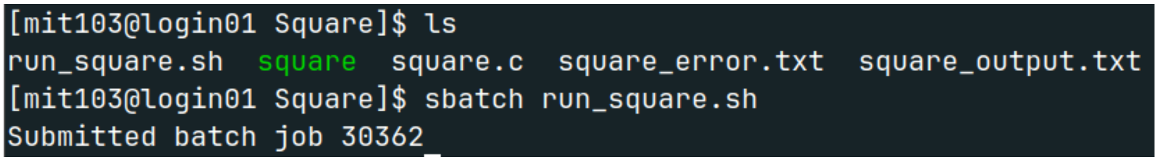
SLURM (Simple Linux Utility for Resource Management) is a workload manager used in HPC clusters to schedule, allocate, and monitor jobs efficiently. It allows users to submit batch jobs, run interactive sessions, and manage resources on a cluster.

2. Basic SLURM Commands

Job Submission (sbatch)

sbatch job_script.sh

Example: sbatch my_job.sh

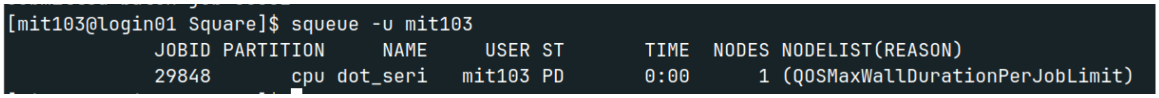


```
[mit103@login01 Square]$ ls
run_square.sh  square  square.c  square_error.txt  square_output.txt
[mit103@login01 Square]$ sbatch run_square.sh
Submitted batch job 30362
```

Job Status (squeue)

squeue

Example with user filter: squeue -u username



```
[mit103@login01 Square]$ squeue -u mit103
             JOBID PARTITION     NAME     USER ST       TIME  NODES NODELIST(REASON)
             29848       cpu dot_seri   mit103 PD       0:00      1 (QOSMaxWallDurationPerJobLimit)
```

Interactive Job (srun)

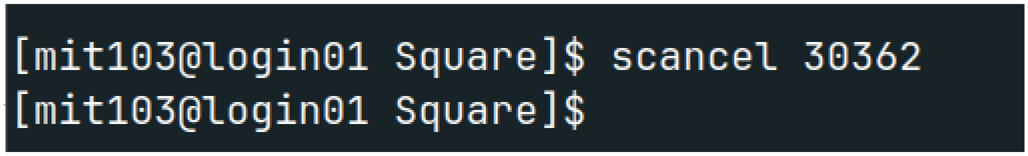
srun --pty bash

Example: srun -n 4 --pty bash

Cancel Job (scancel)

scancel <job_id>

Example: scancel 12345



```
[mit103@login01 Square]$ scancel 30362
[mit103@login01 Square]$
```

Job Information

scontrol show job <job_id>

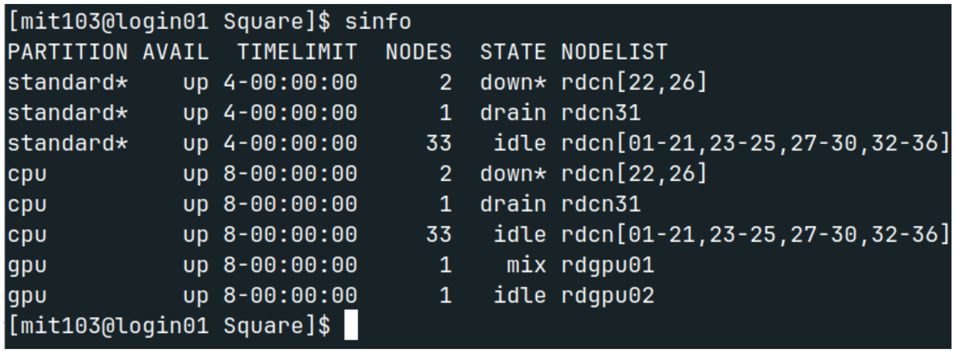
Example: scontrol show job 12345

sacct -j <job_id>

Example: sacct -j 12345

Node Information (sinfo)

sinfo



```
[mit103@login01 Square]$ sinfo
PARTITION AVAIL  TIMELIMIT  NODES  STATE NODELIST
standard*    up 4-00:00:00      2  down* rdcn[22,26]
standard*    up 4-00:00:00      1  drain rdcn31
standard*    up 4-00:00:00     33   idle rdcn[01-21,23-25,27-30,32-36]
cpu          up 8-00:00:00      2  down* rdcn[22,26]
cpu          up 8-00:00:00      1  drain rdcn31
cpu          up 8-00:00:00     33   idle rdcn[01-21,23-25,27-30,32-36]
gpu          up 8-00:00:00      1    mix rdgpu01
gpu          up 8-00:00:00      1   idle rdgpu02
[mit103@login01 Square]$
```

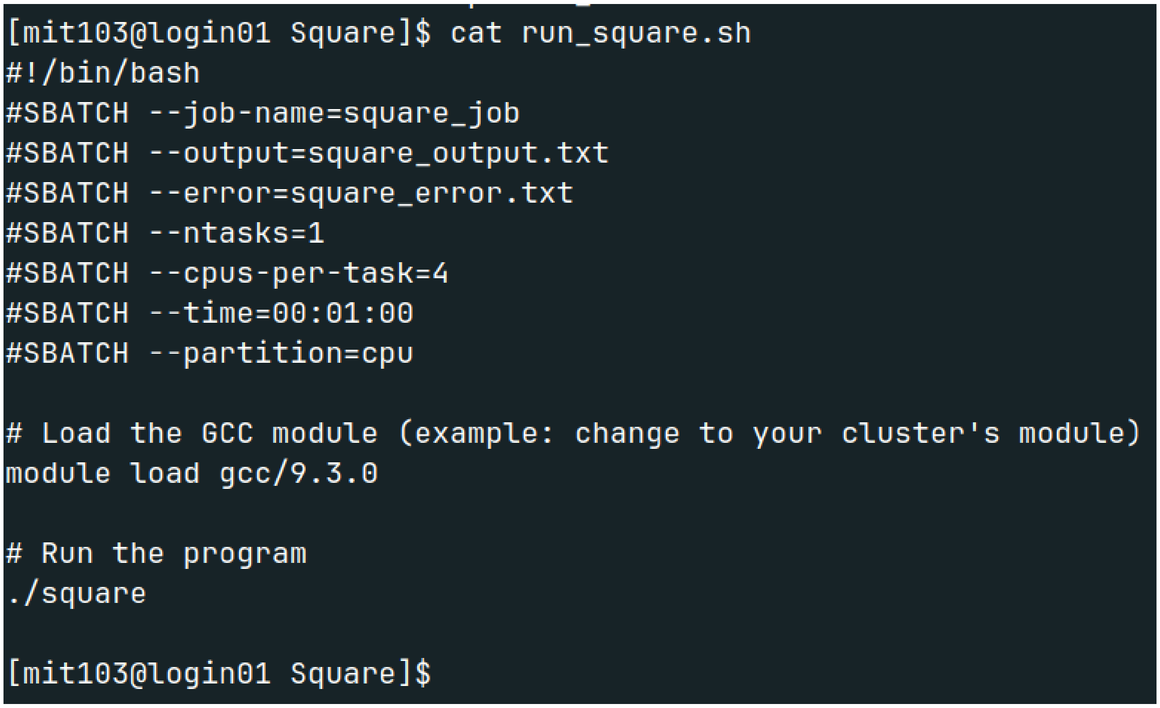
3. Example Job Script

A simple SLURM batch script 'my_job.sh':

```
#!/bin/bash
#SBATCH --job-name=TestJob
#SBATCH --output=result.out
#SBATCH --error=result.err
#SBATCH --time=00:10:00
#SBATCH --ntasks=4
#SBATCH --partition=short

# Load required modules
module load python/3.10

# Run the program
python my_script.py
```



```
[mit103@login01 Square]$ cat run_square.sh
#!/bin/bash
#SBATCH --job-name=square_job
#SBATCH --output=square_output.txt
#SBATCH --error=square_error.txt
#SBATCH --ntasks=1
#SBATCH --cpus-per-task=4
#SBATCH --time=00:01:00
#SBATCH --partition=cpu

# Load the GCC module (example: change to your cluster's module)
module load gcc/9.3.0

# Run the program
./square

[mit103@login01 Square]$
```

4. Notes

- Use 'man <command>' for detailed information about each SLURM command.
  Example: man sbatch

- Job scripts must start with #!/bin/bash and include SLURM directives beginning with #SBATCH.
- Check the cluster documentation for partition names, maximum resources, and time limits.