

# Batch Matlab

This example is based on using `gplogin2`, the login node for the new side of cluster.

We use `lmod` on `gplogin2/3` as opposed to environment-modules on `gplogin1`.

All examples below are created in your home directory via copy-and-paste into your GP shell account:

Consider the following example, `matlab_example.m`

```
cat << 'EOF' > ~/matlab_example.m
[X,Y] = meshgrid(-2:.2:2);
Z = X .* exp(-X.^2 - Y.^2);
surf(X,Y,Z);
print('example-plot','-dpng');
exit;
EOF
```

Running the above matlab example **\*WITHOUT\*** Slurm: (this is how many people run on the login node which is **BAD!**)

```
cat << 'EOF' > ~/run.sh
#!/bin/bash

ml purge
ml matlab/R2017b

matlab -nodisplay -nodesktop -nosplash < matlab_example.m
EOF

chmod 755 ~/run.sh && ~/run.sh
```

running the above matlab example **\*WITH\*** Slurm:

```
cat << 'EOF' > ~/runv2.sh
#!/bin/bash
```

```
#SBATCH --job-name=my_matlab_job
#SBATCH --output=my_matlab_job.out
#SBATCH --error=my_matlab_job.err
#SBATCH --partition=brd2.4,has2.5,ilg2.3,m-c1.9,m-c2.2,nes2.8,sib2.9
#SBATCH --time=00:01:00
#SBATCH --nodes=1
#SBATCH --ntasks=16

ml purge
ml matlab/R2017b

matlab -nodisplay -nodesktop -nosplash < matlab_example.m
EOF

chmod 755 ~/runv2.sh
```

To submit the job

```
sbatch runv2.sh
```

This will create a file in your home directory

```
example-plot.png
```

The hardest part is determining how much resources your computation/simulation will need.

One has to pick an partition based on the computation. Usually people will want Intel CPUs, but we have AMD CPUs as an option.

- [Partitions](#)

The resources for your computation/simulation needs to be determined emperically.

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**Method 1: Make a Slurm submission script and guesstimate your resources required (CPU cores, number of nodes, walltime etc.).**

Submit the job via sbatch and then analyze the efficiency of the job with seff and refine your scheduling parameters on the next run.

```
$ seff 10773
Job ID: 10773
Cluster: blueplanet
User/Group: santucci/staff
```

```
State: COMPLETED (exit code 0)
Nodes: 1
Cores per node: 32
CPU Utilized: 00:00:20
CPU Efficiency: 1.56% of 00:21:20 core-walltime
Job Wall-clock time: 00:00:40
Memory Utilized: 448.57 MB
Memory Efficiency: 2.74% of 16.00 GB
```

If you want to see which node was selected for the job look at the epilog output

```
$ cat slurm.epilog-10773
----- slurm.epilog -----
Job ID: 10773
User: santucci
Group: staff
Job Name: my_matlab_job
Partition: has2.5
QOS: normal
Account: staff
Reason: None,c-19-293
Nodelist: c-19-293
Command: /data11/home/santucci/runv2.sh
WorkDir: /data11/home/santucci
BatchHost: c-19-293
```

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**Method 2: Request an interactive shell and experiment to determine how much memory is required and how long it needs to run.**

```
srun --pty --x11 -t 300 -n 1 -p <partition-list> bash -i
```

recommendations on profile are available @  
[https://www.nccs.nasa.gov/user\\_info/slurm/determine\\_memory\\_usage](https://www.nccs.nasa.gov/user_info/slurm/determine_memory_usage)

If new to Slurm please see [this page](#).

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Here are two quick reference guides that you will want to have handy:

<https://slurm.schedmd.com/pdfs/summary.pdf>

<https://www.chpc.utah.edu/presentations/SlurmCheatsheet.pdf>

*Credit: inspiration for this example comes from* <https://it.math.ncsu.edu/hpc/slurm/batch/matlab>

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