

Using the gpu batch queuing system on the Alabama Supercomputer Center's DMC Cluster (dmc.asc.edu) for NVIDIA HPC (PGI) GPU-offloaded C++ and C programs using the *run_gpu* utility.

Step 1: Change to your appropriate working directory

Step 2: Create the source file and compile for the in the usual manner. Issue the *module load pgi* from the command line then compile the code using *pgc++* or *pgcc*

For example for the 2D Heat Transfer program type

pgc++ -acc -ta=tesla:cc3+ -Minfo=accel -o heat_2d_acc heat_2d_acc.cpp -fast.

Step 3: Using your favorite text editor (vi, nano, emacs, pico, textcomandoplus, etc.) create a bash script file that contains the module source command followed by the runtime command along with any run time arguments. Give this file a descriptive name (such as *heat_2d_test.sh* for the 2D Heat Transfer program).

#!/bin/bash

./heat_2d_acc 30000 75 C >heat_2d_acc_out.txt

./heat_2d_acc 30000 75 S >heat_2d_acc_out.txt

Step 4: Give your script file execute privileges. For the 2D heat transfer example type

chmod 744 heat_2d_test.sh

Step 5: Then type start the *run_gpu* utility by typing on the command line *run_gpu* followed by the name of the script file you have created (for example type *run_gpu heat_2d_test.sh.* for the 2D Heat Transfer example). This is an interactive script and the following dialog information will appear.

This runs a script in the current directory via the queue system
Report problems and post questions to the HPC staff (hpc@asc.edu)

Choose a batch job queue:

gpu	360:00:00	120gb	1-24
class	12:00:00	20gb	1-60

Enter Queue Name (default <cr>: gpu) class ◀ — — — — -Enter "class" Here

Enter number of processor cores (default <cr>: 1) ◀ — — — — -Accept Default

Enter Time Limit (default <cr>: 12:00:00 HH:MM:SS) 00:10:00 ◀ — — — -Enter 00:10:00 Here for 10 minutes

Enter memory limit (default <cr>: 1gb)16gb ◀ — — — — -Enter 16gb Here for 16 Gigabytes

Enter the number of GPUs (default <cr>: 1) ◀ — — — — -Accept Default

Enter GPU architecture [kepler/pascal/volta] (default <cr>: any) ◀ — — -Enter kepler,pascal, or volta

Enter a name for your job (default: heat2dtestshGPU) ◀ — — — — -Accept Default name

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===== Summary of your script job =====
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The script file is: heat_2d_test.sh
The time limit is 12:00:00 HH:MM:SS.
The memory limit is: 1gb
The job will start running after: 2020-01-15T10:15:30
Job Name: heat2dtestshGPU
Virtual queue: class
QOS: --qos=class
Constraints:
Queue submit command:
sbatch --qos=class -J heat2dtestshGPU --begin=2020-01-15T10:15:30 --requeue --
mail-user=wellsbe@uah.edu -o heat2dtestshGPU.o%A -t 12:00:00 --gres=gpu:1 -N
1-1 -n 1 --mem-per-cpu=1000mb
```

Submitted batch job 95553

Enter **class** for *Queue Name* at the first prompt and either accept or override the defaults for the remaining prompts. To accept a default just press the <enter> key. The standard screen output will be sent to a file that is given a default name of the general form

<filename>GPU.o<job number>,

where *filename* is the name of your script file where certain characters such as '.' and '_' are suppressed. For example, in the 2D Heat Transfer case that was generated by the *heat_2d_test.sh* script file this default output file was named heat2dtestshGPU.o95553, where 95553 was the queue job number assigned by the queuing system.

Viewing the Status of your Job.

After a job submission to the class gpu queue one can view the status of your job(s) using the *squeue* command. To do this type

squeue

An output similar to that shown below will appear that describes the status of your queued job(s).

JOBID	NAME	USER	TIME ST	QOS
95553	heat2dtestshGPU	uahcls25	0:05 R	class

Unlike jobs run without this queue management in place, jobs run using this batch queue will be the only ones executed on the specified CPU and its corresponding GPU during the period your program is running.

Removing Jobs from the Queue

You can also remove a job from the queue before it completes execution by using the *scancel* command with your job number as the command line argument. For example if you realize you made a mistake in your code and do not want job number 95553 run after it has been submitted to the queue, simply type

scancel 95553

to delete it. If the job is in the process or running it will be killed. If it has not yet begun to execute it will be removed from the batch queue before it is executed. This command will not erase the source or object files it will only stop the specified instance of the program from executing.