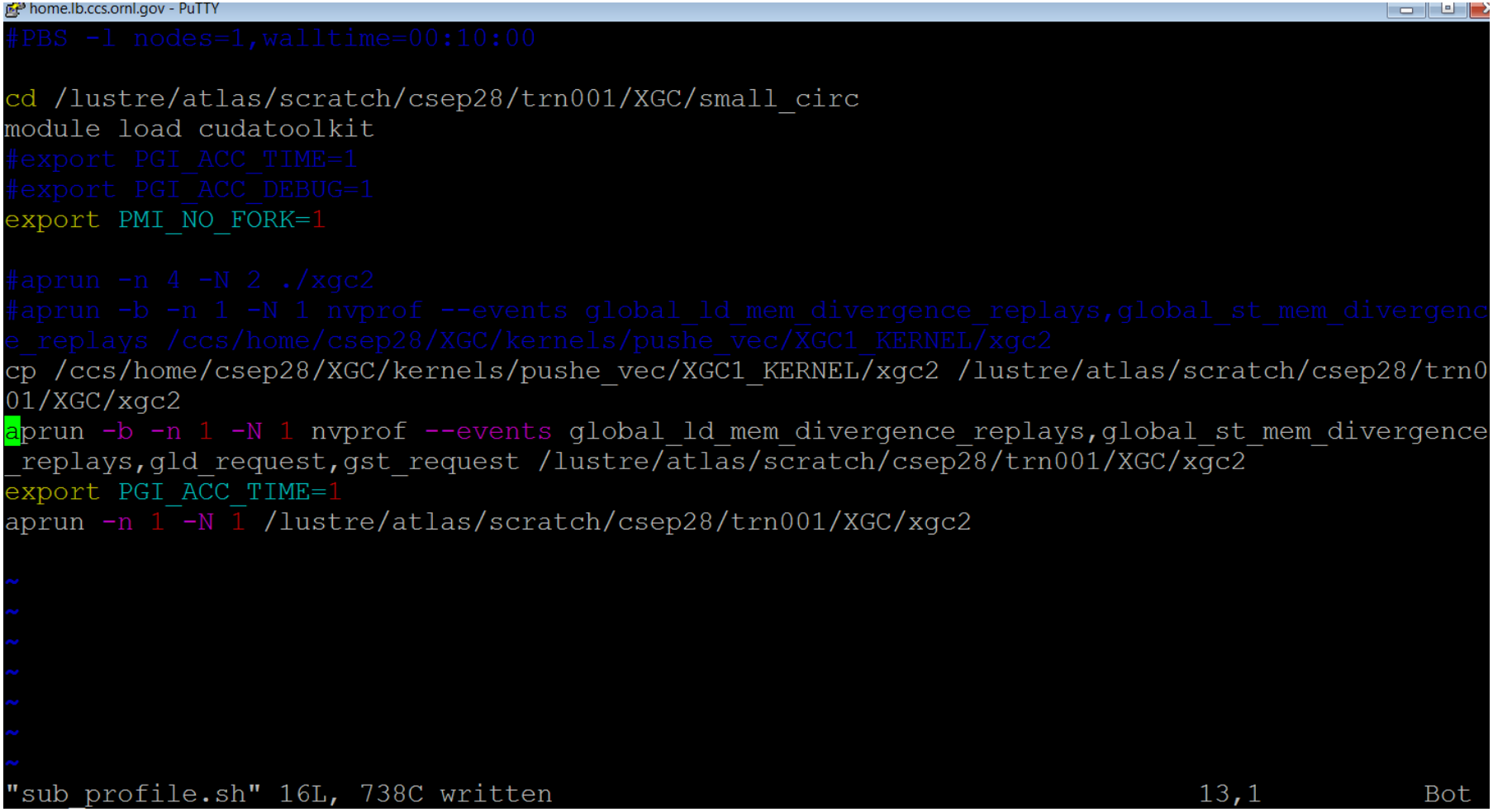
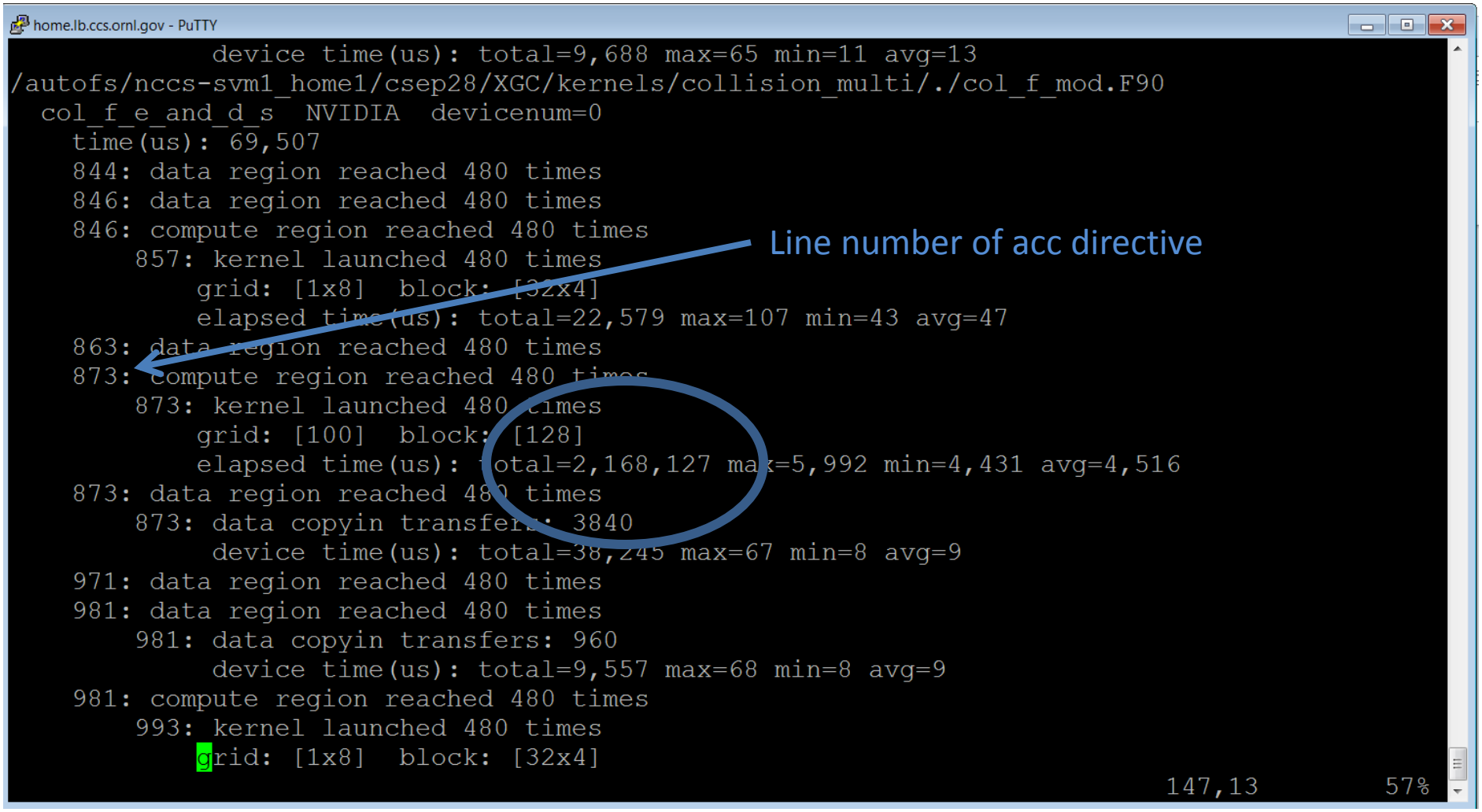
To run nvprof on chester

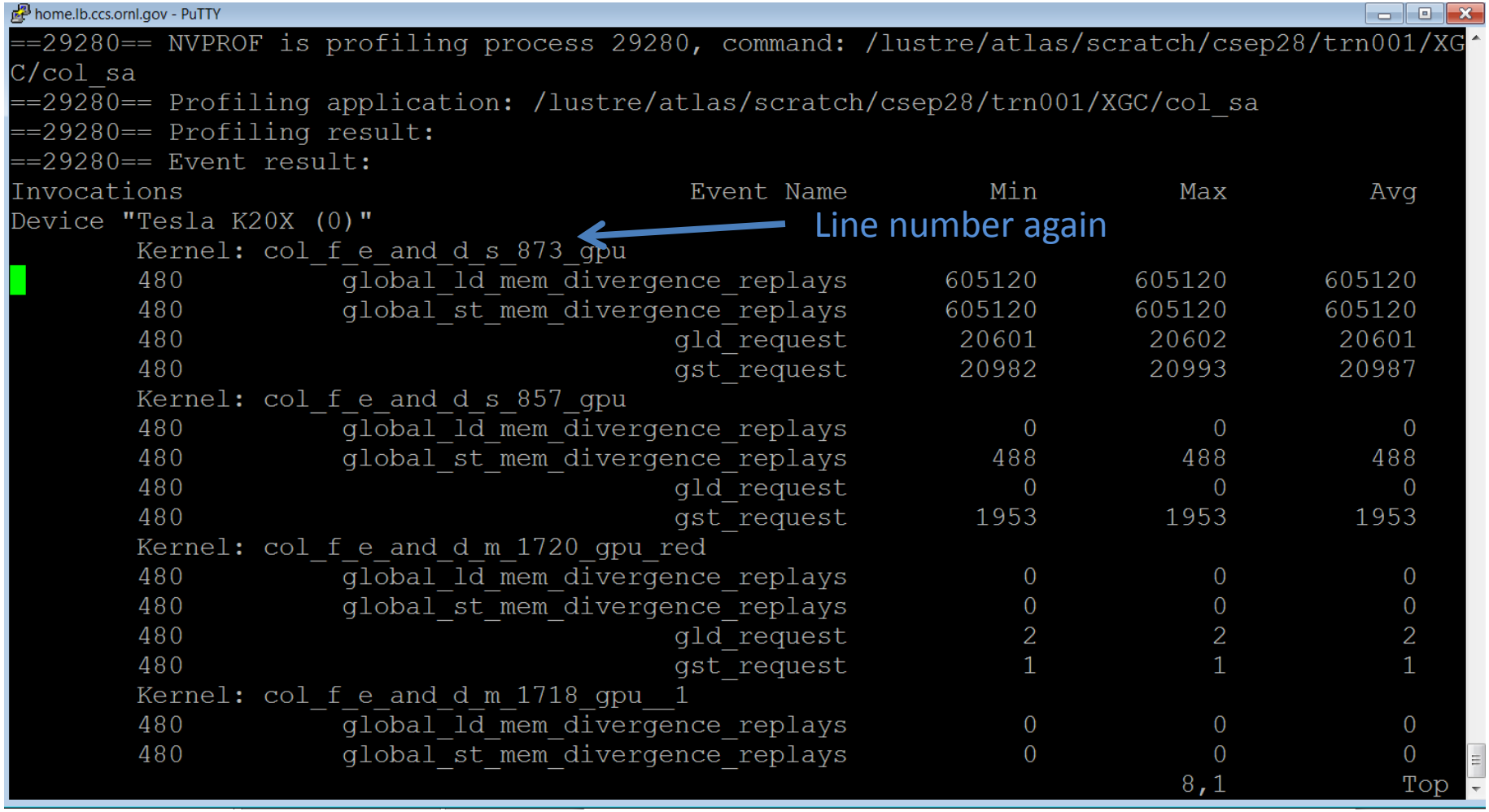
- add –b to aprun
- export PMI_NO_FORK=1
- don’t read outside lustre file system


home.lb.ccs.ornl.gov - PuTTY
#PBS -l nodes=1,walltime=00:10:00
cd /lustre/atlas/scratch/csep28/trn001/XGC/small_circ
module load cudatoolkit
#export PGI_ACC_TIME=1
#export PGI_ACC_DEBUG=1
export PMI_NO_FORK=1
#aprun -n 4 -N 2 ./xgc2
#aprun -b -n 1 -N 1 nvprof --events global_ld_mem_divergence_replays,global_st_mem_divergence_replays /ccs/home/csep28/XGC/kernels/pushe_vec/XGC1_KERNEL/xgc2
cp /ccs/home/csep28/XGC/kernels/pushe_vec/XGC1_KERNEL/xgc2 /lustre/atlas/scratch/csep28/trn001/XGC/xgc2
aprun -b -n 1 -N 1 nvprof --events global_ld_mem_divergence_replays,global_st_mem_divergence_replays,gld_request,gst_request /lustre/atlas/scratch/csep28/trn001/XGC/xgc2
export PGI_ACC_TIME=1
aprun -n 1 -N 1 /lustre/atlas/scratch/csep28/trn001/XGC/xgc2
"sub_profile.sh" 16L, 738C written
13,1
Bot

```
aprun –b –n 1 –N 1 nvprof --events
gld_request,gst_request  ./myapp
```

```
aprun –b –n 4 –N 1 -o
prof.out.%q{OMPI_COMM_WORLD_RANK} ./myapp
```


home.lb.ccs.ornl.gov - PuTTY
device time(us): total=9,688 max=65 min=11 avg=13
/autofs/nccs-svm1_home1/csep28/XGC/kernels/collision_multi/./col_f_mod.F90
col_f_e_and_d_s NVIDIA devicenum=0
time(us): 69,507
844: data region reached 480 times
846: data region reached 480 times
846: compute region reached 480 times
857: kernel launched 480 times
grid: [1x8] block: [32x4]
elapsed time(us): total=22,579 max=107 min=43 avg=47
863: data region reached 480 times
873: compute region reached 480 times
873: kernel launched 480 times
grid: [100] block: [128]
elapsed time(us): total=2,168,127 max=5,992 min=4,431 avg=4,516
873: data region reached 480 times
873: data copyin transfers: 3840
device time(us): total=38,245 max=67 min=8 avg=9
971: data region reached 480 times
981: data region reached 480 times
981: data copyin transfers: 960
device time(us): total=9,557 max=68 min=8 avg=9
981: compute region reached 480 times
993: kernel launched 480 times
grid: [1x8] block: [32x4]
147,13 57%
Line number of acc directive


home.lb.ccs.ornl.gov - PuTTY
==29280== NVPROF is profiling process 29280, command: /lustre/atlas/scratch/csep28/trn001/XGC/col_sa
==29280== Profiling application: /lustre/atlas/scratch/csep28/trn001/XGC/col_sa
==29280== Profiling result:
==29280== Event result:
Invocations Event Name Min Max Avg
Device "Tesla K20X (0)"
Kernel: col_f_e_and_d_s_873_gpu
480 global_ld_mem_divergence_replays 605120 605120 605120
480 global_st_mem_divergence_replays 605120 605120 605120
480 gld_request 20601 20602 20601
480 gst_request 20982 20993 20987
Kernel: col_f_e_and_d_s_857_gpu
480 global_ld_mem_divergence_replays 0 0 0
480 global_st_mem_divergence_replays 488 488 488
480 gld_request 0 0 0
480 gst_request 1953 1953 1953
Kernel: col_f_e_and_d_m_1720_gpu_red
480 global_ld_mem_divergence_replays 0 0 0
480 global_st_mem_divergence_replays 0 0 0
480 gld_request 2 2 2
480 gst_request 1 1 1
Kernel: col_f_e_and_d_m_1718_gpu__1
480 global_ld_mem_divergence_replays 0 0 0
480 global_st_mem_divergence_replays 0 0 0
8,1 Top
Line number again

Use events to:

- Detect uncoalesced memory access, bank conflicts
  - global_ld_mem_divergence_replays
  - shared_store_replay
- Track cache performance
  - e.g. l1_global_load_hit

~csep28/sub_profile.sh

~csep28/all_events.txt

nvprof --query-events