LAB

NUMA Control for Hybrid Applications

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What you will learn

- Using numactl in execution of serial, MPI and a 4x# (4 tasks each with # threads) hybrid code

- For on site users, untar the file numahybrid.tar
  - cd (Start in your home directory.)
  - tar xvf ~train00/numahybrid.tar (extract files)
  - cd numahybrid
- For remote users, download the lab_numahybrid_external.tar, and refer the README in it about how to experiment numactl on your local system.

numactl_serial on Ranger

The memory intensive daxpy code is run on four different sockets using local, interleave and off-socket-memory policies. The commands below make the daxpy executable and run it with numa control commands. See the job script and the table on the next page for the numa options. Run the job and report the times and relative performance.

- Execute:

  cd numactl_serial (change directory to numactl_serial)

  make

  qsub job (submits job)

numactl_serial on Ranger

- From the job output fill in the table.

Command	Time (secs)
numactl –l -C 0	
numactl –l -C 1	
numactl –l -C 2	
numactl –l -C 3	
numactl –i all –C 0	
numactl –i all –C 1	
numactl –i all –C 2	
numactl –i all –C 3	
Numactl –m 3 –C 0	

Rank the performance of local, interleave, and off-Socket-memory policies.

1.)

2.)

3.)

best to poorest performance.

Numactl_4x1, Numactl_4x4 on Ranger

The daxpy code is run as 4 tasks in a node (4x1) and 4 tasks with 4 threads in a node(4x4). Cd down to directories numactl_4x1 and numactl_4x4, respectively, and follow the instructions below.

- Execute:

  cd numactl_4x1 or numactl_4x4

  make

  qsub job (submits job)

Numactl_4x1, Numactl_4x4 on Ranger

- From the job output fill in the table.

Command (4x1)	Time (secs)
<no numactl> numactl –l	
numactl –i all	
numactl tacc_affinity	

Command (4x4)	Time (secs)
<no numactl> numactl –l	
numactl –i all	
numactl tacc_affinity	

Rank the 4x1 performance of.

1.)

2.)

3.)

From best to poorest performance.

Rank the 4x4 performance of.

1.)

2.)

3.)

From best to poorest performance