Northeastern University
Information Technology Services – Research Computing

Northeastern University is commissioning a new compute queue within the Discovery research cluster. Below is a description of the new resource, as well as an access-request questionnaire. To gain access to this queue, each user must complete the attached questionnaire. The intention of the questionnaire is to ensure computational competency of users on these nodes.

Hardware and Queue Description

- 256 compute nodes
- Each compute node has Dual Intel(R) Xeon(R) CPU E5-2680 v4 processors, 2.40GHz with 35MB L2 cache, 28 physical (56 logical) compute cores per compute node, 256GB of RAM, 10 Gbps backplane.
- SLURM Partition name: ser-par-10g-5
- 24 hour time limit per job
- Resources are allocated in units of nodes, not cores. If your jobs cannot use the full capacity of a full node, then other queues are more appropriate.

Access Request Questionnaire

To gain access, please fill out the following questionnaire, and send it to researchcomputing@neu.edu. Applications will be reviewed by members of the NEU Research Computing Committee, and decisions on access will be made as applications are received (typically within 48 hours).

1) Name and department of faculty sponsor:

2) Name of user requesting access to fullnode-10g:

3) Approximate resources required:
   a. How many physical cores/logical cores are required per job?
   b. What is the maximum memory usage for a typical job?
   c. Describe the job throughput (e.g. how many jobs are submitted per day, how many hours and cores per job, etc.).

4) Parallel utilization details:
   a. Software to be used
b. Name of software module on Discovery to be used. If software module is not present on the cluster, provide details of software to be used.

c. What level of parallelization is employed? For example, does your code use MPI, openMP, hybrid parallelization, or other forms of parallelization?

d. Scalability and Performance: Please use one of the ser-par-10g nodes with the “—exclusive” option when testing the performance of your code.
   i) Describe your benchmark calculation: This benchmark should represent a fixed computational load, such as a specific number of timesteps for a certain type of simulation. Typically, when using a single core, it is useful if this calculation takes 10-20 minutes.
   
   ii) How long, in seconds, does your calculation require to complete, when using 1, 2, 4, 8, or 16 cores? Please test the performance up to the number of cores on the node you are using for testing. Please indicate the number of physical cores per node that you are using for benchmarking.
   
   iii) For each scaling test that you perform, calculate the parallel performance for each number of cores N. This is evaluated according to: performance= (time required on one core)/(N*(time required on N cores)). A value of 1 indicates perfect scaling. As a goal, this number should be over 0.8 when using all cores on a node.
   
   iv) If a single compute job will use multiple nodes, please provide additional appropriate scaling statistics.