NUG Monthly Meeting

November 17, 2022

Today's Plan

- Interactive – Please participate!
  - Raise hand or just speak up
  - NERSC Users Slack – discussions in the **#webinars** channel
- Agenda:
  - Win-of-the-month
  - Today-I-learned
  - Announcements/CFPs
  - Topic of the day: **Transitioning from Cori to Perlmutter**
  - Coming meetings: topic suggestions/requests?
  - Last month's numbers

Win of the Month

Show off an achievement, or shout out someone else's achievement, e.g.:

- Had a paper accepted
- Solved a bug
- A scientific achievement (maybe candidate for Science highlight, or High Impact Scientific Achievement award)
- An Innovative Use of High Performance Computing (also a candidate for an award) (https://www.nersc.gov/science/nersc-hpc-achievement-awards/)

Please let us know of award-worthy work from you or your colleagues – tell us what you did, and what was the key insight?

Today I Learned

What surprised you that might benefit other users to hear about?

(and might help NERSC identify documentation improvements!)

E.g.:

- Something you got stuck on, hit a dead end, or turned out to be wrong about
  - Give others the benefit of your experience!
  - Opportunity to improve NERSC documentation
- A tip for using NERSC
- Something you learned that might benefit other NERSC users

"If we knew what it was we were doing, it would not be called research, would it?" – Einstein

Announcements & CFPs

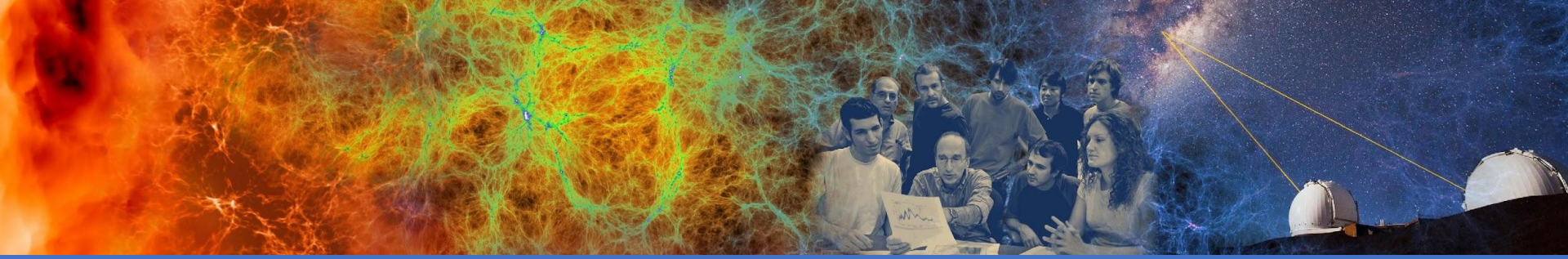
See weekly email for these and more:

- Calls for Papers
  - **Platform for Advanced Scientific Computing (PASC)**, https://pasc23.pasc-conference.org, due December 11
- Upcoming Training Events
  - **Debugging GPU-Accelerated Applications with NVIDIA Developer Tools**, November 30
  - **Migrating from Cori to Perlmutter Training**, December 1
  - **OLCF Crusher User Experiences**, December 1 & 9
  - **Using HIP & GPU Libraries with OpenMP**, December 14

Announcements & CFPs

See weekly email for these and more:

- **Cori to Perlmutter Transition Office Hours**
  - We've held 3 office hours this month, met with 50+ users
  - Additional Office Hours scheduled for
    - Friday, December 2
    - Thursday, December 8
    - Friday, December 16
    - Friday, January 6
    - Thursday, January 12



Transitioning from Cori to Perlmutter

Cori Will Be Retired in March, 2023

- Cori was installed in 2015, and at 6+ years may be NERSC's longest lasting system
- AY2023 allocations are based on Perlmutter's capability
- We will give users more time to transition from Cori to Perlmutter
- Cori will be retired in **March, 2023**

Cori Retirement Plan

- **October, 2022:** Software freeze (no new user-facing software installed by NERSC)
- **AY 2023:** All allocations based on Perlmutter's capacity only
- **November-January:** Cori to Perlmutter transition training focus & office hours
- **Late January or early February:** Announce final date (**T**) for decommissioning
- **T - 1 week:** Implement reservation, preventing new jobs from running effective **T**
- **T:** Delete all jobs from queue, no new jobs can be submitted; continue to allow login to retrieve files from Cori scratch
- **T + 1 week:** Close login nodes permanently
- **T + 1 month:** Disassembly begins

Transitioning from Cori to Perlmutter

- Poll time!
  - I am ready to use Perlmutter
  - I have begun to prepare for Perlmutter
  - I know what I need to do to prepare for Perlmutter
  - I don’t yet know what I need to do to prepare for Perlmutter

Cori / Perlmutter Comparison: Similarities

- Cray user environment
  - Compiler wrappers (cc, CC, ftn)
  - PrgEnv modules
- Slurm
  - Similar queues set up (regular, premium, overrun, etc.)
- CPU nodes
  - AMD instead of Intel, but standard CPU architecture with no major surprises
  - Similar to Haswell in clock speed, similar to KNL in number of cores per node

Cori / Perlmutter Comparison: Differences

- Lmod vs modules
  - Many similarities, but some major differences
  - Modules may not be initially visible due to dependencies; using **`module spider`** will find hidden modules
- GPU nodes
  - Substantially different programming models required to exploit GPU nodes
  - Codes may have different GPU-compatible and CPU-only versions
- Compiler/PrgEnv versions
  - No Intel compiler (no plans to support)

Preparing for Perlmutter: Logging In

- Your account that you have used on Cori is valid for use on Perlmutter
- To connect: **`ssh elvis@perlmutter-p1.nersc.gov`** (substituting your username for "**`elvis`**")
- Use password + one-time password in same way as Cori
  - Can use sshproxy to reduce the frequency of login authentication
  - See NERSC documentation for more information about logging in

Preparing for Perlmutter: CPU Only

- Recompile codes on Perlmutter
  - Most of the time, this should *Just Work*
  - Reports that Perlmutter default compiler (GNU) is more pedantic than Cori default compiler (Intel)
    - Look for flags that reduce strictness (e.g., **`-fpermissive`**)
    - **`-Wpendantic`** informs you which standard a line of code is breaking (sometimes)

Preparing for Perlmutter: GPUs

- Many community codes have GPU-enabled versions that can be compiled for Perlmutter
- You may be able to port your own code to use GPUs (though this could be non-trivial)
  - Upcoming training on using Codee tool for this purpose, likely Q1 2023

Preparing for Perlmutter: Jupyter

- CPU workloads: you (probably) don't need to change much
  - But please test it out well before Cori is gone!
- GPU workloads: you (probably) need to rebuild your environment to exploit GPUs
  - (unless you have used Cori GPU testbed, in which case you still may need to but please test it out!)
- Give it a try & don't hesitate to contact NERSC's consultants if you run into any issues!

Preparing for Perlmutter: Running Jobs

- Job scripts are largely similar to Cori
- Job script generator now available within Iris to help you get correct process affinity, etc.
  - https://iris.nersc.gov/jobscript

Preparing for Perlmutter: Data Migration (1)

- Files/data in your **home directory** or project's **CFS directory** **will be available** on Perlmutter
  - These *global file systems* are mounted on all NERSC resources
    - Home directory = directory where you land by default when you log in (e.g., **`/global/homes/e/elvis`**)
    - Project's CFS directory = directory shared by members of your project, on the Community File System (e.g., **`/global/cfs/cdirs/m1234`** for m1234 project)
  - Former mount point for CFS (created during transition from old project file system), **`/global/project/projectdirs`**, not created on Perlmutter; be sure to remove this from old scripts!

Preparing for Perlmutter: Data Migration (2)

- Files/data on **HPSS archive system** **will be available** on Perlmutter
  - Use **`htar`** or other commands to access it, just like on Cori
- Files/data on **Cori scratch not accessible** on Perlmutter
  - Perlmutter has its own scratch file system
  - Cori scratch will be retired with Cori
  - Currently no one-step process to migrate data from Cori scratch to Perlmutter scratch
  - *Reminder:* Scratch systems are for temporary storage only, while the data is actively being used, subject to purging

NERSC is here to help!

- Please sign up for December 1 Migrating from Cori to Perlmutter Training
  - Focus on building and running jobs
  - Hands-on session at the end where you can bring your own jobs
- Cori to Perlmutter Office Hours
  - Next one: Friday, December 2, 9 am to noon (Pacific); additional sessions in December & January
  - Drop in to our Zoom meeting to get help from NERSC experts!

Coming Up

- **December:** Preparing for Allocation Year 2023
- **January:** Plans for user community engagements
- **February:** TBD

We'd love to hear some lightning talks from NERSC users about the research you use NERSC for!

Last Month's Numbers

- Cori Utilization: 97.48% (KNL)
- Large Jobs: 36.03%
- New tickets: 666
- Closed tickets: 705
- Ticket backlog: 706