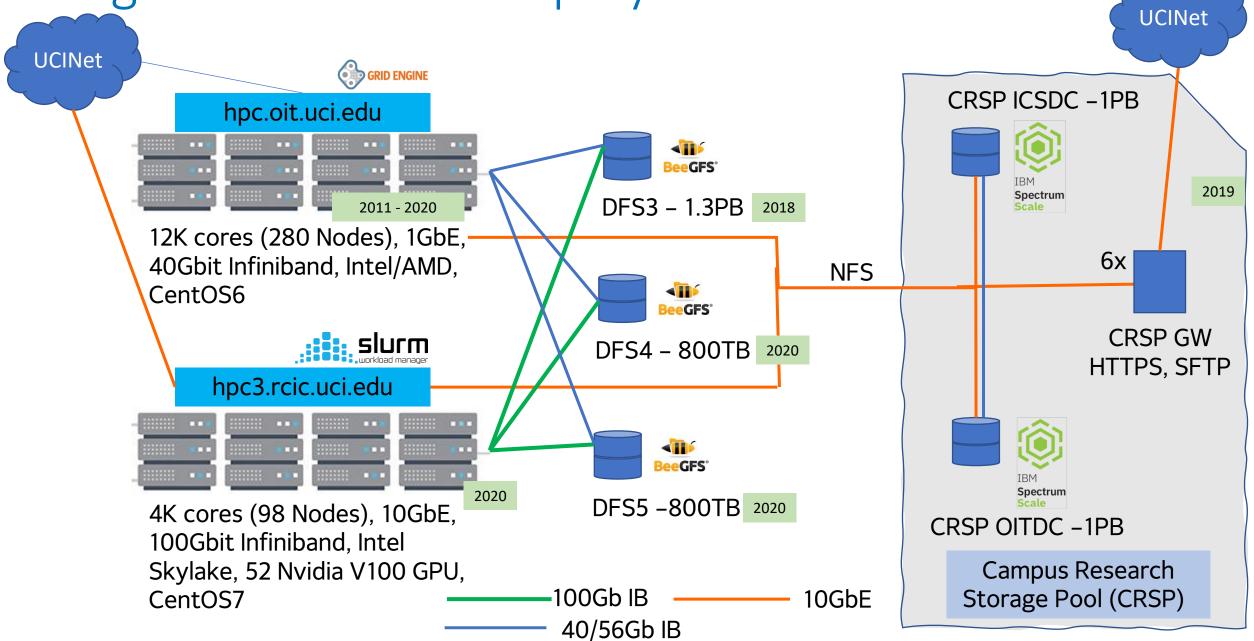# HPC3 – Production Ramp-Up A Phased Approach

July 20, 2020

Please join the google group:
https://groups.google.com/a/uci.edu/g/rcic-users

High-level view of deployed infrastructure

UCINet

UCINet

GRID ENGINE

hpc.oit.uci.edu

2011 - 2020

12K cores (280 Nodes), 1GbE, 40Gbit Infiniband, Intel/AMD, CentOS6

slurm
workload manager

hpc3.rcic.uci.edu

2020

4K cores (98 Nodes), 10GbE, 100Gbit Infiniband, Intel Skylake, 52 Nvidia V100 GPU, CentOS7

BeeGFS
DFS3 – 1.3PB   2018

BeeGFS
DFS4 – 800TB   2020

BeeGFS
DFS5 –800TB   2020

NFS

CRSP ICSDC –1PB

IBM Spectrum Scale

2019

6x

CRSP GW
HTTPS, SFTP

IBM Spectrum Scale

CRSP OITDC –1PB

Campus Research Storage Pool (CRSP)

——— 100Gb IB   ——— 10GbE

——— 40/56Gb IB

HPC3 – July 2020 - 98 Nodes, 3920 cores, 52 Nvidia V100 GPUs

- HPE Apollo 2600 CPU Nodes (4 nodes/2U)
  - 2 x 20 Core Intel Skylake
  - 192GB RAM (384GB + 768GB variants)
  - 10GbE
  - 100Gb EDR Infiniband
  - 2 X SSDs/node
- HPE DL380 GPU Nodes (1 node/2U)
  - As above +
  - 4 Nvidia V100 GPUs

Production Ramp-Up

- A set of alpha/beta users have been on HPC3 for several months
    - 1M + Jobs submitted
    - 1.1M CPU-Hours Consumed
- Next step – Production Ramp-Up
    - Expect this to last about 2 months
    - What does this mean?
        - The entire UCI community can request access, but we need to practically stage users over time
            - We Need to verify that expected software is already on HPC3. Add it if it's not there already
            - We prefer to do this on a per-lab basis
    - We will enable accounts as quickly as possible
- What happens after that?
    - Production. All existing HPC accounts will have access turned on.

Requesting Access to HPC3: During Production Ramp-up

- Lab-by-lab
  - Faculty member (or their designate) should compile the following and **send ONE request** to hpc-support@uci.edu
    1. Name of lab
    2. Names of account coordinators*
    3. UCNetIDs to be activated
    4. List of software (versions, URLs) REQUIRED for day 1 of being enabled
    5. List of software (versions, URLs) DESIRED for day 1, but OK if implemented later
    6. Where your data is currently stored (data in CRSP, DFS3,DFS4,DFS5 are already cross-mounted on HPC and HPC3)

  - RCIC will respond and work with you to get things going as quickly as possible

- All existing HPC accounts are already on HPC3, but not all logins are currently enabled.

* Faculty can request a CPU allocation. These hours go into an account and jobs can be charged to this account. Coordinators can add/remove additional users to that account. Maximum hours/user can also be set by the Coordinators.
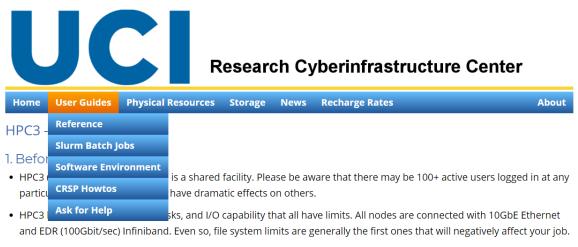
Overlapping Operations: HPC3 and HPC

- Expect to run HPC through the end of fall quarter.
  - HPC's base operating system (CentOS 6) is end-of-life in Nov. 2020
  - HPC needs to be thought of as "in maintenance".
  - New software will generally not be added to HPC (we expect that there will need to be case-by-case exceptions).
- Preference for new accounts to be added only to HPC3 (there will need to be exceptions to this during production ramp-up)
- New software to be added only to HPC3
- Once ramp-up is complete, RCIC will turn significant attention towards the turn-down of HPC (see next-to-last slide)
- Any group-specific questions?
  Please send an email to hpc-support@uci.edu

Transitions can be "difficult"

- We'll do our level best to make it smooth, but there are a number of things that will cause some bumps.
  - Home areas are different. DFS3/4/5 systems are available on both HPC and HPC3
  - User-owned NFS servers –will not transition to HPC3. If you have one, please contact us
  - The HPC Software Stack was 9+ years in the making.
    - We have already transitioned (updated, rebuilt, harmonized) a good fraction of it
    - There is still more to do. (and we never expected to have all of it on day one of HPC3)
  - ALL User-compiled software needs to be rebuilt. The OS changed.
  - New SLURM scheduler.
    - Users need to transition their batch scripts from SGE to SLURM. This is straight-forward in most cases.
  - New sharing policy
    - Accounted vs. Free Jobs (see the website)
    - No checkpoint/restart (technology on HPC is dead, BLCR was last developed in 2013)
  - New GPUs are available
    - Still a limited resource, but there is more availability (by request)
- We, RCIC, are going to have very full plates as we move through this, we ask for patience.

Updated Web Site

While documentation is the last thing to be built, we're made some really good progress.

- https://rcic.uci.edu/hpc3/hpc3-reference.html

- Reference to many of the details of HPC3
- Slurm guide, definition of basic queues
- The software environment

We don't have all the answers on day 1 ….

- What happens to HPC at the end of December
  - Practically, it is "turned off"
  - Disposition of hardware
    - Really old (7+ years) – It needs to be completely retired. Its day is done.
    - Mid-life (3-7 years) - To be determined.
      - Our commitment. You bought hardware 3 – 5 years ago with the promise that RCIC would run it. We'll make good on that commitment.
      - Optionally rebuild as a part of logically and physically separate cluster (similar to HPC3)
    - Relatively new (1-3 years) – Would like to transition it to HPC3 (there's not a cost for this).
      - Determined case-by-case.
      - Optionally rebuild as a part of logically and physically separate cluster (similar to HPC3)
  - We have over 250 pieces of equipment to look at.

- Can I add hardware to HPC? No.

- How do I add hardware to HPC3? Contact RCIC. We need to aggregate enough requests for hardware to obtain a new quote so that we can purchase a batch of "standardized" configurations.

Talking to RCIC and to Each Other

- **How do I ask for help/talk to RCIC?**
  - Same as HPC: send email to hpc-support@uci.edu

    This automatically creates a help ticket

  - Read that fine website: https://rcic.uci.edu

- **What about talking to RCIC and other Users@UCI?**
  - Join the new! Google group

    https://groups.google.com/a/uci.edu/g/rcic-users
  - Chat with us on Slack: https://rcicos.slack.com/