

OpenHPC: Beyond the Install Guide for PEARC24

Sharon Colson Jim Moroney Mike Renfro

Tennessee Tech University

2024-07-22

Acknowledgments and shameless plugs

- OpenHPC** especially Tim Middelkoop (Internet2) and Chris Simmons (Massachusetts Green High Performance Computing Center). They have a BOF at 1:30 Wednesday. You should go to it.
- Jetstream2** especially Jeremy Fischer, Mike Lowe, and Julian Pistorius. Jetstream2 has a tutorial at the same time as this one. Please stay here.
- NSF CC*** for the equipment that led to some of the lessons we're sharing today (award #2127188).
- ACCESS** current maintainers of the project formerly known as the XSEDE Compatible Basic Cluster.

Where we're starting from

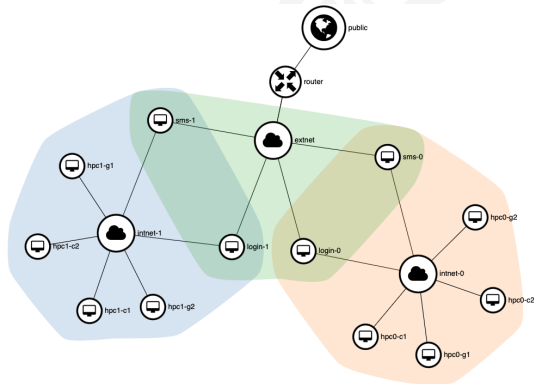


Figure 1: Two example HPC networks

31 HPC clusters (2 shown) with:

1. Rocky Linux 9
2. OpenHPC 3
3. Warewulf 3
4. Slurm
5. 2 non-GPU nodes
6. 2 GPU nodes (currently without GPU drivers, so: expensive non-GPU nodes)
7. 1 management node (SMS)
8. 1 unprovisioned login node

Where we're starting from

We used the OpenHPC automatic installation script from Appendix A with a few variations:

1. Installed s-nail to have a valid MailProg for `slurm.conf`.
2. Created `user1` and `user2` accounts with password-less `sudo` privileges.
3. Changed `CHROOT` from `/opt/ohpc/admin/images/rocky9.3` to `/opt/ohpc/admin/images/rocky9.4`.
4. Enabled `slurmd` and `munge` in `CHROOT`.
5. Added `nano` and `yum` to `CHROOT`.
6. Removed a redundant `ReturnToService` line from `/etc/slurm/slurm.conf`.
7. Stored all nodes' SSH host keys in `/etc/ssh/ssh_known_hosts`.

Where we're going

1. A slightly more secured SMS
2. A login node that's practically identical to a compute node (except for where it needs to be different)
3. GPU drivers on the GPU nodes
4. Using node-local storage for the OS and/or scratch
5. De-coupling the SMS and the compute nodes (e.g., independent kernel versions)
6. Easier management of node differences (GPU or not, diskless/single-disk/multi-disk, Infiniband or not, etc.)
7. Slurm configuration to match some common policy goals (fair share, resource limits, etc.)

Sample slide

Left column

This slide has two columns. They don't always have to have columns. It also has a titled block of content in the left column. Make sure you've always got a `::: notes` block after the slide content, even if it has no content.

Use `#` and `##` headers in the Markdown file to make level-1 and level-2 headings, `###` headers to make slide titles, and `####` to make block titles.