Parallel Computing on Pax

``This is not HPC"

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Zeuthen, 16.03.2021

HELMHOLTZ RESEARCH FOR GRAND CHALLENGES

DESY.

HPC on Enterprise Linux

- Enterprise Linux for long-term OS and hardware support
- Both **Red Hat®** or **SuSE®** popular
- We run Scientific Linux everywhere
- Comes with basic Infiniband / MPI support
- Users need different MPI/compiler combinations
- Combinatorics Problem

OpenHPC

- Collaboration Project by the Linux Foundation
- Several Hardware and Software vendors
- Big HPC labs
- Modular HPC cluster distribution
- based on either **Red Hat®** or **SuSE®** Enterprise Linux
- complete setup, from provisioning to MPI compilers and batch

OpenHPC Problems

- Lifecycle differs from upstream distribution:
  - OpenHPC 1.3.x supports EL7
  - OpenHPC 2.x moved to EL8
- Slurm doesn’t get AFS token
- Slurm is missing latest security fixes

OpenHPC Components

Components used from OpenHPC:

- (Slurm batch system)
- LMOD Environment modules
- Compiler/MPI stacks

Components built locally:

- Slurm batch system with AFS support
- Wrapper for **Intel**® compilers in AFS
- Additional Compiler/MPI combinations

Slurm Setup

Keep it Simple

- Always schedule whole nodes
- Four partitions, that are not connected:
  - rome
  - broadwell a.k.a. pax, the default
  - haswell
  - sandybridge
- backfill partition for COVID-19 computing

Simultaneous Multithreading

- SMT a.k.a. Hyper-Threading, enabled on all nodes
- Slurm is aware of hardware threads
- By default, one process for each SMT core
- Useful for multi-threaded code
- **Not useful for MPI jobs**:
  - `#SBATCH -c 2`

Outlook

Enterprise Linux 8

- There is no Scientific Linux 8
- CentOS8 has EOL 2021, replaced by CentOS Stream
- Future of EL8 clones unclear
- Several groups are working on it

- PAX will stay on EL7

Future of PAX Software

- Only minor updates for OpenHPC 1.3.x
- Version freeze on installed software
- Backports from OpenHPC 2.x
- Self-built stacks possible if needed:
  - gnu9, gnu10,...
  - Intel OneAPI
  - Nvidia nvhpc

  - What do you need?

Slurm

- Zeuthen is now part of DESY's support contract
- Option to report bugs/issues
- Development of 100% free software

Links

- Official Documentation: https://dv-zeuthen.desy.de/services/parallel_computing/
- Mailing list: zn-cluster@desy.de
- OpenHPC: http://openhpc.community/
- OpenHPC on github: https://github.com/openhpc/
- Available Components: https://github.com/openhpc/ohpc/wiki/Component-List-v1.3.9

Thank you!

Contact

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