EESSI meeting

December 3rd 2020

https://github.com/EESSI/meetings/wiki

Agenda

1. Quick introduction by new people
2. HPC.NRW competence network [Robert]
3. Testing of 2020.10 version of pilot repository [Alan, Kenneth]
4. Progress update [Bob, Kenneth, Peter, Terje]
5. Plans for 2020.12 version of pilot repository [Kenneth, Bob, Terje]
6. Fenix project proposals [Alan, Henk-Jan]
7. Updates on sponsorship by Azure/AWS [Alan, Bob, Kenneth]
8. Starting an EESSI consortium (+ rename without ‘European’?) [Jaco, Kenneth]
9. Next steps
10. Past & upcoming events
11. Q&A

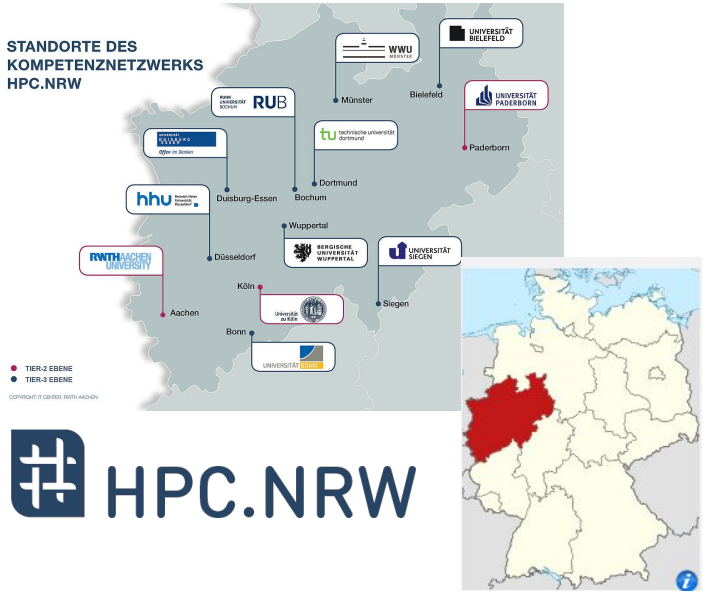
Quick introduction by new people

New people on the call: feel free to introduce yourself!

- Who are you, where do you work, on what?
- Why are you interested in the EESSI project?
- Are you planning to actively contribute,
  and if so, to which aspect(s) of the project?

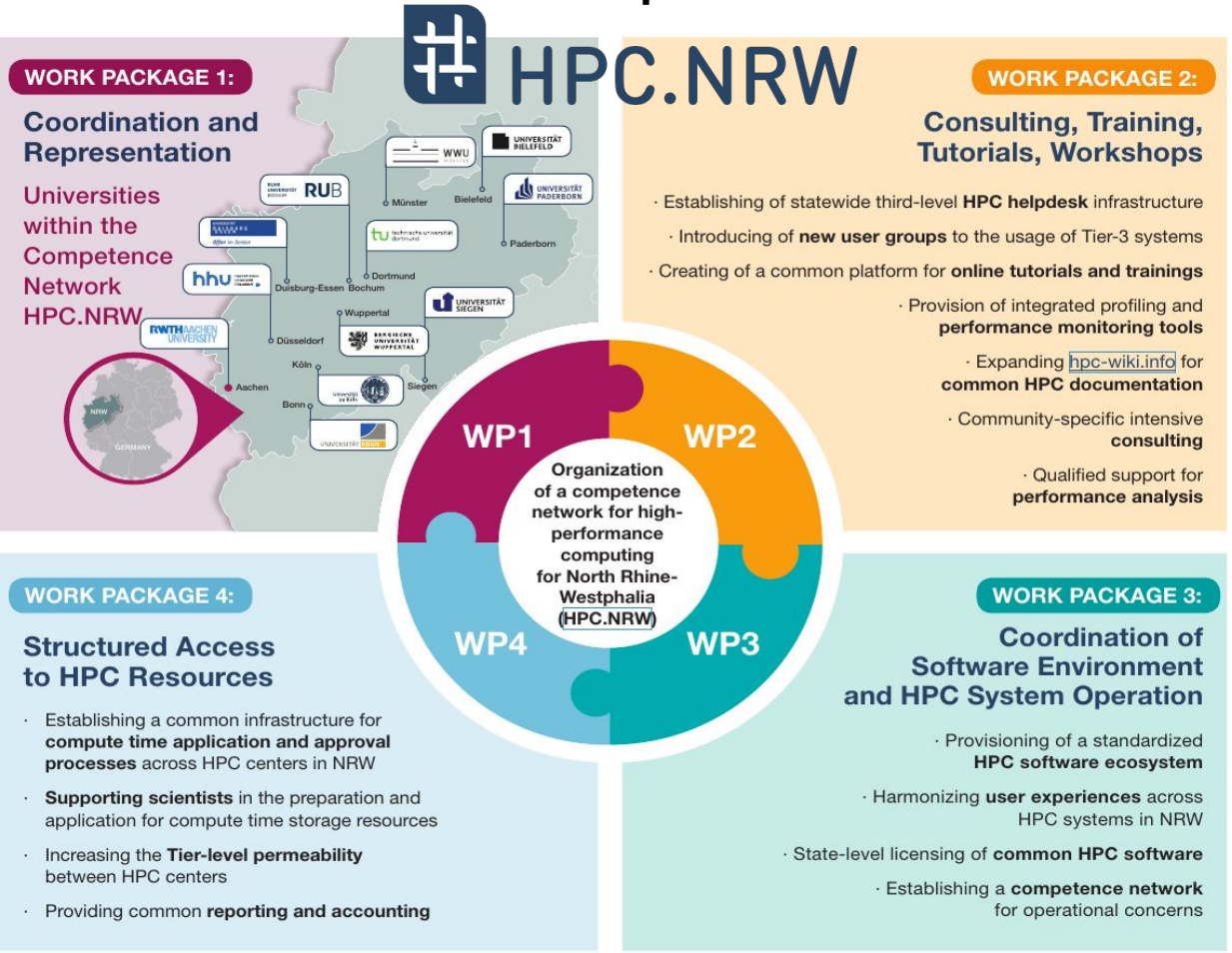
HPC.NRW competence network

- Competence network of all universities with data centers in North-Rhine-Westphalia (NRW)
  - 12 universities
- Established mid 2019
- First funding phase till end of 2022
- Main goals:
  - Support for transitions between HPC-tiers
  - Competent HPC-Support for all researchers in NRW
  - Efficient planning, setup and use of HPC resources
- Funding for personnel (18 FTE) and for state-level software licensing, ...



[Robert]

HPC.NRW competence network



WP3: Coordination of Software Environment and HPC System Operation:

- Provisioning of a standardized HPC software ecosystem
- Harmonizing user experiences across HPC systems in NRW
- …..

[Robert]

HPC.NRW competence network

WP3: Coordination of Software Environment and HPC System Operation:

Efforts so far for a standardized HPC software ecosystem:

- Investigation and analysis of available software and software usage in NRW
- Internal Easybuild Workshop and Best-Practice guides
- Concept for an “HPC.NRW-module-tree”
    - In addition to the existing module-trees, deployment with Easybuild
    - → instead of setting up a similar initiative

We think we can contribute to EESSI because:

- we have developers and system administrators in the project (6 FTE for WP3)
- we have sites that have experience with/use Easybuild and/or CVMFS
- we have many different clusters (for testing purposes)

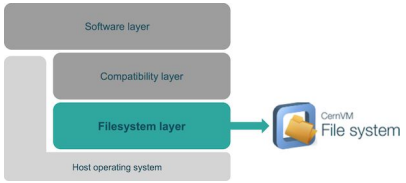
[Robert]

Testing of 2020.10 version of pilot repository

- EESSI demos used during imakefoss/SORSE/Nordic RSE talks
  - (Kenneth) on 4-node Raspberry Pi cluster (native CernVM-FS, built from source)
  - (Kenneth) Cloud (single node): Azure (Intel, native CernVM-FS), AWS (Graviton2, Singularity)
  - (Kenneth) On HPC-UGent AMD Rome pilot cluster (via Singularity, only single node)
  - (Thomas) On Saga cluster @ Sigma2 + VM on OpenStack platform at (NREC)
- Alan: MPI benchmarks on JUWELS @ JSC (via Singularity):
  - OSU benchmarks comparable to system for latency and bandwidth (need set of ReFrame tests)
  - GROMACS: 54.16 ns/day for 1 node, 98.46 ns/day for two (compared to 56.5/107 for system)
- Alan @ JSC + Magic Castle
  - Couple of PRs to Magic Castle to get things working
  - Requires some PRs in EESSI too (related to JupyterHub and shell initialisation)
  - Successfully tested on AWS and Azure (including infiniband)
- Jaco: further testing in WSL with ParaView + ImageMagick (GUI)

[Kenneth, Alan, Thomas, Jaco]

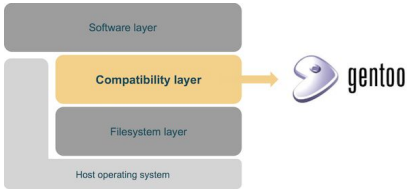
Progress update: filesystem layer



- Some updates on issue with `fuse-overlayfs` + `Singularity`, but still not solved...
- Symlink `/cvmfs/pilot.eessi-hpc.org/latest` that points to the latest version
- Manually built client package for macOS
  - Needs some effort to build it automatically with the existing Github Action (see PR #54)
- `cvmfs_server enter` now available in nightly CernVM-FS builds
  - Could be useful for quickly getting a writable overlay for testing purposes
- Monthly CernVM-FS coordination meeting (Nov 10th)
  - `aarch64` / Debian builds of CernVM-FS packages
  - Adding CernVM-FS as component to OpenHPC (ongoing effort with Jakob (CERN) + Karl (OpenHPC))
  - Github Action for mounting CernVM-FS (see cvmfs-contrib/github-action-cvmfs)

[Bob, Kenneth]

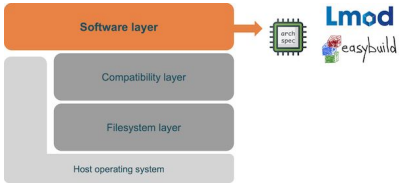
Progress update: compatibility layer



- End-to-end Ansible playbook (see EESSI/compatibility-layer/ansible/playbooks)
  - Now includes a step to first bootstrap Gentoo Prefix, then install packages (Lmod, archspec, …)
  - **Building compat layer is fully automated**: `ansible-playbook -i hosts -b install.yml`
- Playing with macOS/x86_64 and Linux/POWER
  - Gentoo Prefix devs fixed the bootstrap script for macOS (see bug #730476)
  - Very good support from Gentoo for adding a `ppc64le` profile to Prefix
- Libraries go in different places on x86_64 vs aarch64: `/usr/lib` vs `/usr/lib64`?
- Architecture-specific package sets on top of one base set (see gentoo-overlay/etc/portage/sets)
  - Some packages only work / are only needed on a specific architecture / OS (rdma-core, opa-psm, …)

[Peter, Bob, Terje]

Progress update: software layer



- Containers for build nodes
  - Debian 10 OS + CernVM-FS + `fuse-overlay`, images for both `x86_64` and `aarch64`
  - Available through Docker Hub (`eessi/fuse-overlay`), can be run via Singularity
  - Easy to create writable overlay on top of read-only `/cvmfs` mount
  - TODO: documentation on usage + use GitHub container registry?
- Quick demos (run in minutes) for applications in pilot repo
  - https://github.com/EESSI/eessi-demo
  - Good starting point for proper application tests to run in CI !
- Some CMake problems popped up when building for `aarch64/generic` ...
  - CMake fails to find libraries in compat layer; only looks in lib, not lib64 (or vice versa)?!
  - Best workaround seems to be to patch CMake; WIP in EasyBuild, see PR https://github.com/easybuilders/easybuild-easyblocks/pull/2248
  - Not entirely clear why this didn't pop up before...

[Kenneth]

Progress update: testing with ReFrame

ReFrame: single file defines a test

- What to compile
- What to run
- Sanity check
- Performance check
- Valid systems & prog environments
- #tasks
- #tasks-per-node

System specific

[Caspar]

Progress update: testing with ReFrame

How to make ReFrame test generic?

- ReFrame ‘abstract tests’: https://github.com/eth-cscs/reframe/issues/1555
  - Define all non-system specific things. Reusable.
  - Each site needs to create derived classes to set num_tasks etc.
- #tasks: `--flex-alloc-nodes`: at runtime selection of #nodes
  (SLURM backend only)
- #tasks_per_node: get from a ‘config’, instead of hardcoding, e.g.
  - `self.num_tasks_per_node = system_properties.ncorespernode`
- #tasks_per_node: define tests for all core counts (parametric test),
  and select with tag
  - `reframe -r … --tag ncpn16`
- https://github.com/casparvl/software-layer/tree/mpihello/tests/reframe [Caspar]

Progress update: other stuff

- GPLv2 licenses are now in place in all repositories @ github.com/EESSI
- Initial support for “easystack” files has been merged in EasyBuild
  - See https://github.com/easybuilders/easybuild-framework/pull/3479
  - Will eventually replace dirty shell script we use for installing stuff in software layer
  - Initial support will be included in upcoming EasyBuild v4.3.2, but insufficient for our purposes…
- Access to OSU OSL infrastructure (Linux/POWER)
  - Temporarily used Easybuild’s access for testing on POWER8
  - Requested Openstack access to POWER9 machines on behalf of EESSI
  - Approved, but waiting for IP addresses to become available
- Script for mounting the EESSI repository under Windows (WSL) [Jaco]
  - Will soon be added to the Github repository

[Kenneth, Bob]

EESSI pilot repository

https://eessi.github.io/docs/pilot

NOT FOR PRODUCTION USE!

Plans for 2020.12 version of EESSI pilot repository

- Tweak compat layer: `2020.12/compat/{linux/macos}/{x86_64,aarch64}`
- Same software? (GROMACS, OpenFOAM, Bioconductor, TensorFlow, foss/2020a)
- Same targets:
  - `x86_64/generic`, `x86_64/amd/zen2`, `x86_64/intel/{haswell,skylake_avx512}`
  - `aarch64/generic`, `aarch64/graviton2` **(maybe `aarch64/{thunderx2,a64fx}`)**
- Look into GPU installations with `fosscuda/2020a` (GROMACS, TensorFlow)
  - Fat installations, optimized for all CUDA compute capabilities
  - Evaluate pros/cons of fat vs GPU-specific installations
- Experiment with software built for Linux/POWER and macOS clients?

[Kenneth]

Fenix project proposals

- **Both project proposals accepted! \o/**
- Project 1 (submitted by Henk-Jan)
  - 36,000 node hours on scalable resources (EPYC)
  - 2vCPU + object store at CINECA, 4vCPU+vGPU at JSC (EPYC)
  - Additional info required by Dec 7th
- Project 2 (submitted by Alan)
  - Related to EESSI + Magic Castle and HPC training
  - 40vCPU and 2vGPU at JSC (EPYC), 40vCPU at CINECA
- PRACE-ICEI resources at both JSC (soon) and CINECA (~ April'21)

[Henk-Jan, Alan]

Update on sponsorship by Azure/AWS

- Credits for several people available in both Azure/AWS to play with
  - Kenneth, Alan, Terje
- Looking into more structured sponsorship
  - EESSI “project” in both Azure/AWS
  - Univ. of Groningen as receiving party
  - People involved in EESSI can get access to develop/test EESSI
- Currently working on the red tape + agreements with Azure/AWS on specifics

[Henk-Jan, Kenneth]

Starting an EESSI consortium

- Current collaboration is voluntary, no official agreement or consortium
- Time to change that, make it “official”?
- Task for Dell Technologies (Jaco) + SURF?
- Look into what setting up a consortium actually involves...
- Maybe also rename first ‘E’ in EESSI from “European” to “Easy”
  - The “European” part has been raising questions, feels restrictive
  - *“EESSI is the Easy Environment for Scientific Software Installations”*

[Jaco, Kenneth]

Next steps

- Improve support for “easystacks” in EasyBuild
- GPGPU software installations (GROMACS, TensorFlow)
- **Testing & continuous integration**
  - More & better CI checks for EESSI layers **(leverage software demos?)**
  - Tests for software layer via ReFrame (smoke tests, apps, benchmarks, …)
- Documentation: build nodes, “native” CernVM-FS access, HPC clusters, ...
- **Automatic deployment of software to EESSI repository**
  - Triggered by pull requests in GitHub
  - Bots negotiating with each other?
  - Leveraging both cloud resources in Azure/AWS + resources at HPC sites
- EESSI pilot stack for Linux/POWER + macOS clients?

Past events

https://github.com/EESSI/docs/tree/master/talks

- Terje's talk on EasyBuild on ARM (+ EESSI pitch at the end)
  - ARM HPC Users Group @ Supercomputing'20
  - Recording (YouTube)
- Kenneth's interview during IMakeFoss live stream (Nov 24th)
  - Slides - recording (YouTube)
- Kenneth's "software demo" talk at SORSE (Nov 25th)
  - Slides - recording (YouTube) (Q&A chat transcript available)
- Thomas's talk at Nordic RSE meeting (Dec 2nd)
  - Slides - Q&A (good starting point for Q&A section in docs?)

Upcoming events

- Kenneth's talk at **HPC Champions workshop** (UK HPC sites)
  - Dec 15th 2020, 1.15pm UTC, free to attend
  - https://www.archer2.ac.uk/training/courses/201215-champions
  - Maybe including demo on Isambard system (Arm64 ThunderX2 + A64FX)...
- **EasyBuild User Meeting** (virtual): week of 25-29 Jan 2021
  - https://github.com/easybuilders/easybuild/wiki/6th-EasyBuild-User-Meeting
  - Talks on CernVM-FS, Gentoo Prefix, EasyBuild, Lmod, ReFrame, ...
  - **CernVM-FS tutorial**, co-org. by Kenneth/Bob, CernVM-FS developers, Compute Canada
  - **ReFrame tutorial**, organised by ReFrame developers
- CernVM-FS Workshop: 1-3 Feb 2021: https://indico.cern.ch/event/885212
  - **Incl. talk by Bob on EESSI** (by invitation)
- HPC devroom at FOSDEM'21 (virtual): Sun Feb 7th 2021: https://hpc-bigdata-fosdem21.github.io
  - Submissions for HPC devroom are open NOW (**deadline is Tue Dec 15th!)**