
# EESSI meeting

6 Oct 2022

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

# Agenda


1. Quick introduction by new people
2. EESSI-related meetings in last month (incl. EESSI Community Meeting)
3. Progress update per EESSI layer (incl. bot for software layer)
4. `archdetect` alternative to archspec
5. 2021.12 version of pilot repository + outlook to next pilot version
6. AWS/Azure sponsorship update + OCRE funding opportunity
7. Update on MultiXscale EU project
8. Past & upcoming events
9. 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?

# EESSI-related meetings


- Mon-Tue 12-13 Sept: CernVM-FS workshop in Amsterdam
  - See https://indico.cern.ch/event/1079490
  - Attended by Kenneth Hoste & Hugo Meiland
  - Presentation on EESSI by Kenneth Hoste => lots of interesting questions
  - Slides + recording available via https://indico.cern.ch/event/1079490/timetable
  - News about funding (via MultiXscale project) was well received
  - Bug for corruption issue (CVM-2001) should be fixed
    - Fix is fully client-side (no relevant changes to CernVM-FS server)
    - In theory problems may still occur when doing in-place updates of files
    - We should try and verify that the problem is indeed fixed (via glibc in-place update)

[Kenneth]

# EESSI Community Meeting in Amsterdam


- First physical EESSI community meeting since March 2022
- Physical attendees: ~16 (6 outside of NL), remote attendees: ~10
- More info via https://eessi.github.io/docs/meetings/2022-09-amsterdam

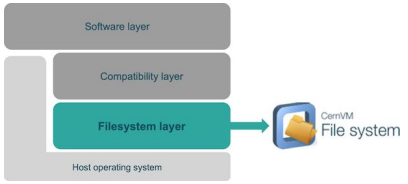
[Kenneth]

# EESSI Community Meeting in Amsterdam


- Introductory sessions on various aspects, incl. hands-on sessions
- More in-depth sessions on different layers, infrastructure, bot, GPU support, testing, …
- Presentation on the MultiXscale project and the relation to EESSI
- Site reports from NESSI, NLPL, HPCNow, Microsoft Azure
- Discussions on various topics, incl. governance, what could make or break EESSI, etc.
- Hacking sessions on using EESSI, installing EESSI, archdetect, …
- **Slides & recorded talks available: https://eessi.github.io/docs/meetings/2022-09-amsterdam**
- Ideas for (location of) next edition are welcome! Maybe in conjunction with EasyBuild User Meeting?

[Kenneth]

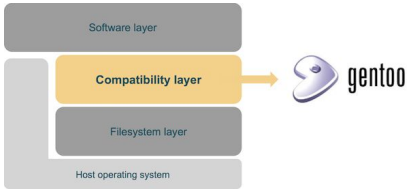
# Progress update: filesystem layer




- Fix for CernVM-FS bug (CVM-2001) merged in `devel` branch in CernVM-FS GitHub repo
  - See PR #3043 , changes will be part of next CernVM-FS release
  - Fix is fully client-side, no changes in CernVM-FS server
  - **We should try and validate this fix!**
- EESSI build/client containers updated to hide extended attributes used by CernVM-FS (PR #125)
  - + update to CernVM-FS v2.9.4
  - Needed to avoid trouble when files are being copied from EESSI (see issue #110)
- Ingest script was updated to support deploying compat layer updates (PR #127 + PR #130)
- `archspec` was added to build container to facilitate CPU detection (PR #129)
- CI workflows for testing Ansible playbooks updated to Ubuntu 22.04 (PR #128)
- Attempt at updating client/build containers to also support RISC-V 64-bit (open PR #132)

[Kenneth, Bob]

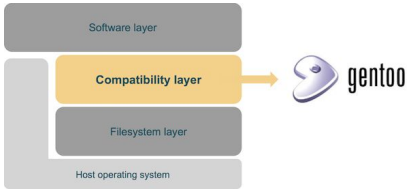
# Progress update: compatibility layer




- Several security updates required for 2021.06 and 2021.12 compat layers (these were reported by Gentoo's `glsa-check` tool)
  - Updated for 2021.12 (aarch64/ppc64le/x86_64): libarchive, lxml, vim (+ indirect Python update)
  - Updates performed using script added in PR #155, should be done via Ansible playbook instead?
  - TODO:
    - 2021.06: expat, glibc, gzip, libarchive, lxml, vim
    - 2021.12: update expat, glibc (?), gzip
- Initial scan with trivy vulnerability scanner showed that it only reports some outdated packages
  - Only reports lxml package being vulnerable in 2021.06 version (doesn't flag glibc, …)
  - Needs more work…

[Kenneth, Bob]

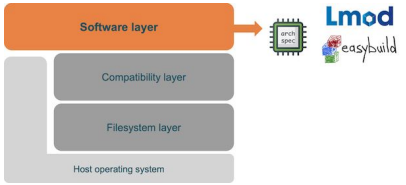
# Progress update: compatibility layer




- Attempt to let software bot build for a new architecture failed (when installing EasyBuild)
  - Lots of testing revealed that update to compatibility layer (5 Sep) likely causes this
- Started trying to build new compatibility layer (working "title" 2022.10)
  - Updated `bootstrap-prefix.sh` script to latest Gentoo Prefix version (+ EESSI changes)
  - Several issues: can't build `gcc-config-2.6` (recent version bump), see bugzilla#875377
  - Needs GCC >= 10 (which we have masked currently)
- We may want to add new tools like `direnv` (see issue #159)
- Observations/Ideas:
  - Would be nice if building compatibility layer runs completely in container
  - If we had a bot also for the compatibility layer, we could build it "daily" to detect regressions

[Thomas, Kenneth]

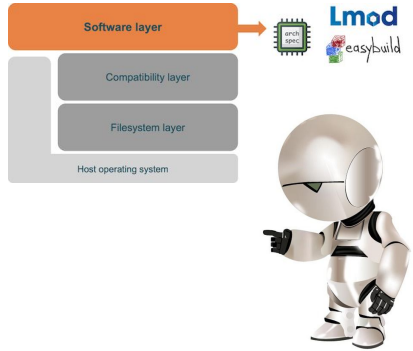
# Progress update: software layer




- Alternative to archspec by Hugo (see PR #187)
  - See separate slides coming up
- Some tweaks may be necessary to script to facilitate implementation of build/deploy bot
  - See overview of changes made by Thomas in PR #184
- Software build script doesn't correctly control EasyBuild version being installed (?)
- GCC provided by EESSI does not (by default) use compat linker (see issue #185)
- Kenneth & Caspar have been trying to find time to make progress on easystack support in EasyBuild… (see PRs #4021 + #4057)

[Kenneth, Thomas, Alan]

# Bot for building + deploying software layer




- **Goal: get procedure good enough to build next pilot release; expecting lots of needed improvements**
- Status:
  - PR #24: monitor build jobs and report result back to PR in `software-layer` repo
  - More testing and debugging for `pilot.eessi-hpc.org` (both completed)
    - Starting a new software subdirectory (cascadelake) failed already at building EasyBuild
    - Developed script to resubmit job locally with optional changes; updates PR comment
    - Problem with EESSI pilot is likely due to an update of the compat layer on 5 Sept.
- Next steps:
  - 1) Get PR#24 merged!
  - 2) Add collected issues for future improvements
  - 3) Implement `eessi-bot-deploy.sh` script that ingests built software into repo: ETA: ~ end of Oct'22
  - In parallel: use bot to build more packages; analyse failures -> collect needed improvements

[Thomas, Kenneth]

# archdetect script (alternative to archspec)

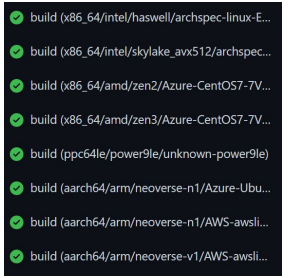
- archspec (github.com/archspec) is not sufficient for our purpose
  - Too focused on **strict** CPU architecture definition instead of ‘enough’ for binary compatibility
  - Mis-identifying Ampere Altra (in Azure) as AWS Graviton2 (`graviton2` instead of `neoverse-n1`)
  - Relies on Python in compatibility layer
  - No capabilities in e.g. GPU identification (for e.g. PR #172) or interconnect identification
- Proposing alternative “archdetect” with pure shell script (PR #187)

```
27      # determine subdirectory in software layer
28      if [ -z $EESSI_USE_ARCHDETECT ]; then
29        # if archdetect is enabled, use internal code
30        export EESSI_SOFTWARE_SUBDIR=$(${EESSI_INIT_DIR_PATH}/eessi_archdetect.sh cpupath)
31        echo "archdetect says ${EESSI_SOFTWARE_SUBDIR}" >> $output
32      else
```

[Hugo, Kenneth]

# archdetect script (alternative to archspec)

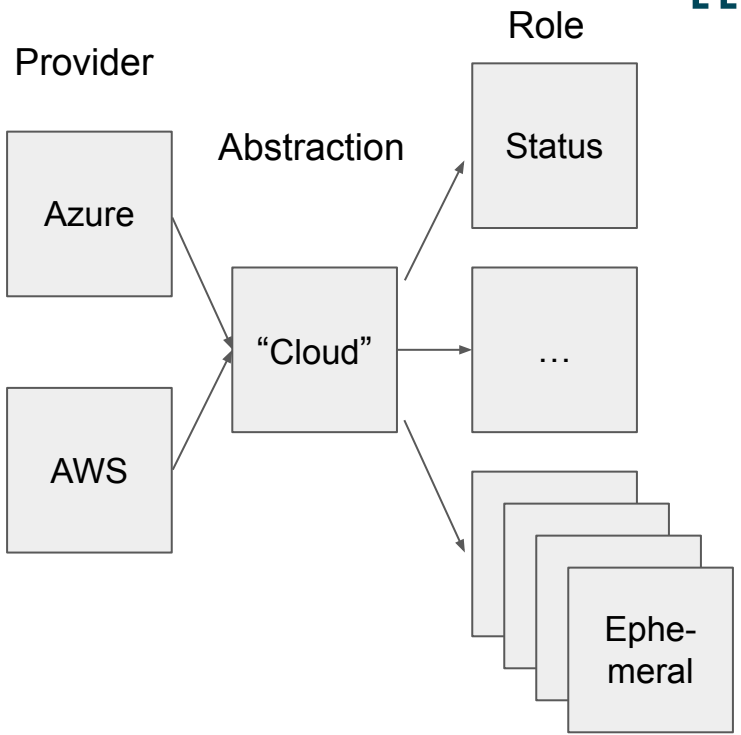
- Proposing alternative “archdetect” with pure shell script (PR #187)
  - Identify CPU architecture based on minimal required features and align with EESSI tuned binaries
  - Currently tested against 8 cpuinfo examples:
    - **-action- Please provide more cpuinfo examples!**
  - Extensible to supported CPU architectures (RISC-V?)
  - Extensible to understand more CPU/memory capabilities,
    like L3 cache in Milan and Milan-X, NUMA domains, hierarchical system memory, …
  - Extensible to identify e.g. GPU architecture / GPU driver / interconnect
  - Next steps discussed in #archdetect channel
  - Activating step 1 (merge PR): add as optional to init scripts
  - Activating step 2: become default script used by init




[Hugo, Kenneth]

# Infrastructure update : Terraforming EESSI

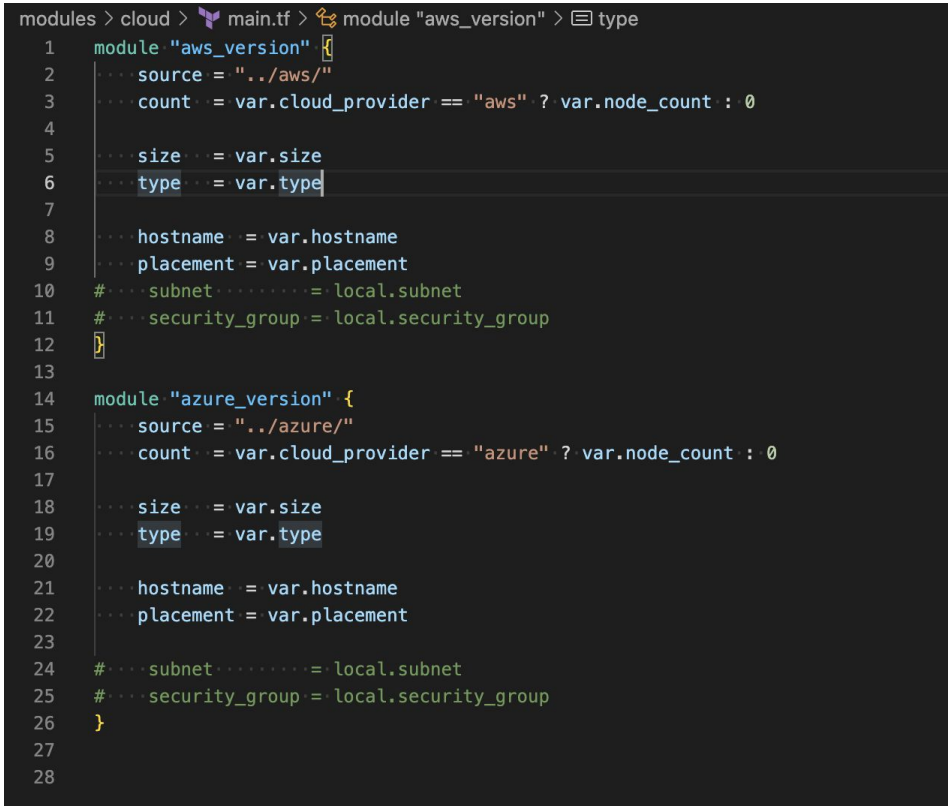
- Azure and AWS have different approaches
- Can we abstract away such differences?
- Kinda. Maybe. Sort of.
- Terraform isn’t very agreeable
- Conditional creation is fine
- Conditional module output is harder
- The end problem is consuming the roles




[Terje]

# Infrastructure update : The problem, part 1

- Defining the modules
- Calling the right one
- Ignoring the other(s?)




[Terje]

# Infrastructure update : The problem, part 2


- We need output so we can tell callers (users) what the IPs and ssh keys created are…
- How do we get the address from the created module?
- Non-created modules are empty, so we can't "dot" into them…

modules > cloud > outputs.tf > output "ssh_private_key"

```
1  output public_ip4 {
2      description = "The IPv4 address of the created node."
3      value = module.aws_version ? module.aws_version.public_ip4 : module.azure_version.public_ip4
4  }
5
6  output ssh_private_key {
7      description = "The private key for the created node."
8      value = module.aws_version ? module.aws_version.ssh_private_key : module.azure_version.ssh_private_key
9  }
```

[Terje]

# EESSI pilot repository

**NOT FOR PRODUCTION USE!**

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

- 2021.06: considered “final”: no further changes, except security updates in compat layer if needed
- Current status for 2021.12 (default version)
  - Compatibility layer: in place for `aarch64` / `ppc64le` / `x86_64`
    - **Security updates for a handful of packages were installed (ingested on 8 Sept’22)**
  - Software layer:
    - Software installations included in 2021.06 also in place for 2021.12, incl. GROMACS, OpenFOAM, TensorFlow + Horovod, R + Bioconductor, QuantumESPRESSO
    - Additional software (vs 2021.06): SciPy-bundle with foss/2021a (excl. `ppc64le`), WRF
    - Targets: `aarch64/generic`, `aarch64/graviton2`, `aarch64/graviton3`, `ppc64le/generic` (partial!), `ppc64le/power9le` (partial!), `x86_64/generic`, `x86_64/amd/zen2`, `x86_64/amd/zen3` (Milan), `x86_64/intel/haswell`, `x86_64/intel/skylake_avx512`
  - TODO:
    - Ensure that Lmod cache update is done correctly, includes *all* available modules (first step: PR #168)
    - Bot to automate workflow of adding software to EESSI (to avoid losing time doing it manually)
    - Build the stack for Azure's Ampere Altra (Arm) CPUs (generally available since 1 Sept’22)

[Kenneth]

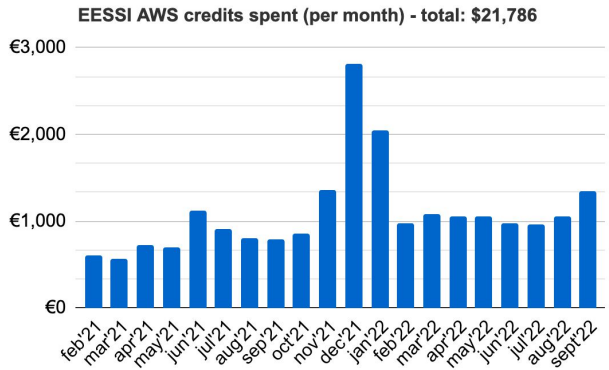
# Time for the next pilot version?

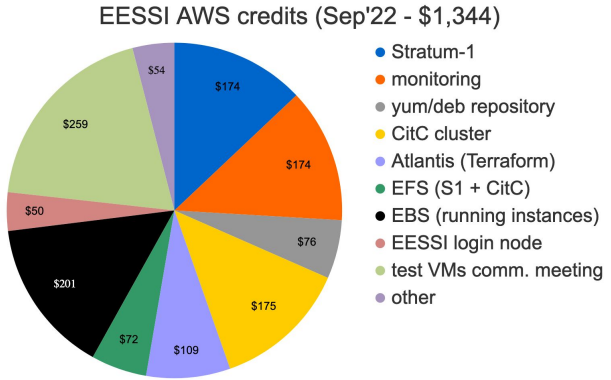

- Small changes to compatibility layer: updated Lmod, more tools, …
- Include enhancements/changes that are necessary for CUDA GPU support
- Work towards getting rid of ugly install script, aim for easystack-only
- **Only add software installations via bot, no more manual deployments!**
- Initially include same software installations in software layer, then **gradually expand**
- Also install software with more recent toolchains + more applications
- Stop wasting time with supporting POWER (`ppc64le`), not used broadly enough
- Alpha/beta for production EESSI repository
- Switch to `eessi.io` domain + new Stratum 0 (dedicated hardware, yubikey)

[Kenneth]

# Usage of sponsored AWS credits

- **Ask in #aws-resources Slack channel to get access!**
- Original batch of $25,000 worth of sponsored credits expired on Jan 31, 2022
- Request for new credits is WIP, extra $15,000 worth of credits received to bridge the gap
- ~$6,495 worth of sponsored credits left (should be sufficient until Mar'23 at current spending rate)
- Shared document with outline of how sponsored credits can be leveraged was shared with AWS
- In Sept '22: ~$1,344 worth of credits spent on Stratum-1, monitoring, CitC cluster, test VMs, …
- ~$21,786 worth of credits spent in total so far (since Feb'21), all covered by sponsored credits

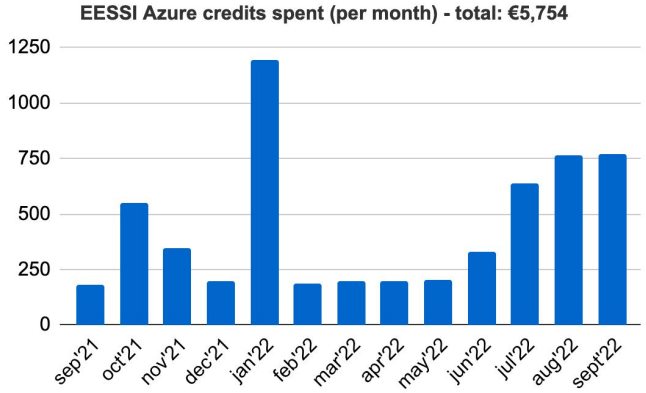


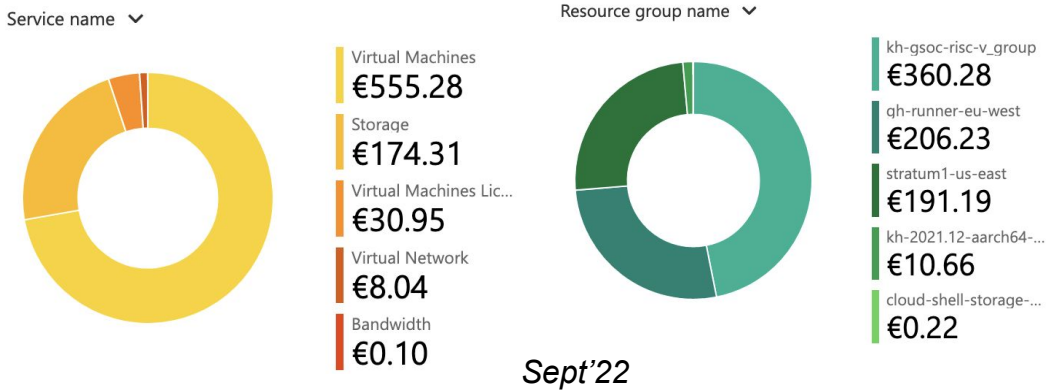

[Kenneth]

# Azure sponsorship

- Sponsored credits (€40,000) are being put to good use!
- **Ask in #azure-resources Slack channel to get access!**
- In Sept'22: ~€768 worth of credits spent: Stratum-1 + VM for GSoC RISC-V project + GH Runners
- ~€5,754 worth of credits spent in total (since Sept'21)
- We should look into setting up a CitC cluster in Azure as well… (using Hugo's PRs #118 + #68)




*Overview of spent credits per month*




*Sept'22*

[Kenneth]

# EU project: MultiXscale

EuroHPC
Joint Undertaking


- MultiXscale project: *Increasing performance, productivity and portability in the domain of multiscale simulations*
- 16 partners in 8 countries
- Total budget: ~6M EUR (of which ~50% for WPs related to EESSI)
- 4 year project (~2023-2027), ~5 FTE for WPs related to EESSI
- **Currently working through red tape towards grant agreement**
- **Expected project start: 1st January 2023**
- Presentation on MultiXscale project & relation to EESSI at EESSI Community Meeting see https://eessi.github.io/docs/meetings/2022-09-amsterdam/#fri-16-sept-2022

[Alan, Bob, Kenneth]

# Upcoming events: BioHackathon Europe 2022



- Near Paris (7-11 Nov'22)
- Our project proposal is accepted:
  ***"Make your own or favourite software available on your cluster with EasyBuild/EESSI"***
- Registration is open
  - All on-site seats taken for now (but there's a waiting list)
  - Remote participation also possible
- Biology-oriented hackathon **but potentially** a good place to:
  - Reach new users and developers
  - Meet Galaxy users and community
- More information via https://easybuild.io/biohackathon_eu_2022.html

[Sebastien, Kenneth]