# EESSI

EUROPEAN ENVIRONMENT FOR SCIENTIFIC SOFTWARE INSTALLATIONS

8 May 2025

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

# Agenda

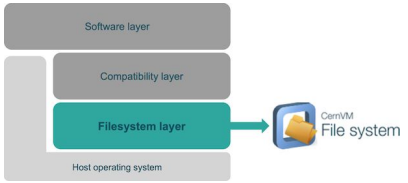

- Quick introduction by new people
- Progress update per EESSI layer
- Update on EESSI production repository `software.eessi.io`
- Update on EESSI test suite, build-and-deploy bot, documentation
- AWS/Azure sponsorship update
- EESSI governance
- Upcoming/recent events
- Q&A

# 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?

# Progress update: filesystem layer

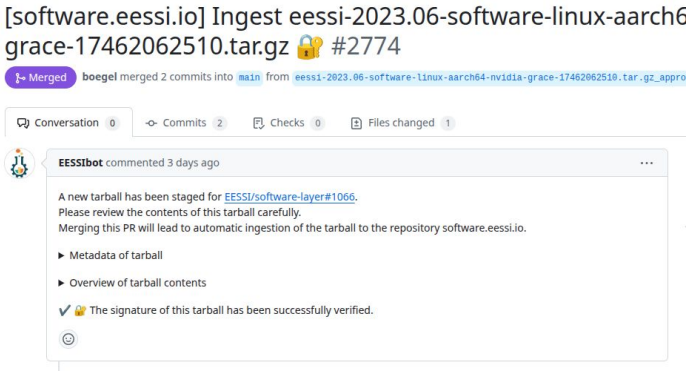



- All CernVM-FS servers have been updated to CernVM-FS 2.12.7
- **Stratum 0 now verifies the signatures of signed tarballs**
  - Still optional, but will be required in the near future
  - See also next slide
- Add functionality for ingesting tarballs for dev.eessi.io
  - Those include an additional subdirectory (named after the corresponding project)

[Bob, Pedro, Kenneth]

# Signing and verifying tarballs before ingestion

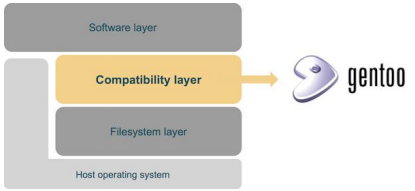

- Improve security by **signing tarballs** (and corresponding metadata files) produced by the bot before uploading them to S3 bucket for ingestion on Stratum 0
- Can use GPG or SSH keys
  - For now, use SSH keys, as they're easier to use
  - Every bot uses a different private key
  - Stratum 0 collects the public keys into an authorized signers file




- Ingestion procedure on Stratum 0 **verifies the signatures before ingesting**
- This is currently used for NVIDIA Grace tarballs
  - Will be required for all tarballs for the new EESSI version

[Bob, Thomas]

# Progress update: compatibility layer

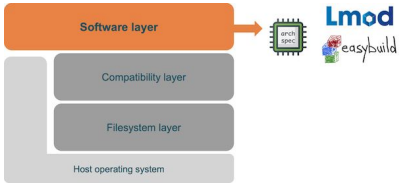



Progress on compatibility layer of next EESSI version (2025.05?)

- WIP PR #209 for playbooks & co for compat layer
- WIP PR #108 for package set
- Full discussion on new version in support issue #56
- In short: new toolchains (foss/2024a), latest glibc version, OpenSSL 3.x, `ld.bfd`-only, using EasyBuild 5.0+, version bumps for all components, signed tarballs
- Also switching to separate repository for easystack files vs scripts for software layer
- glibc version 2.41 with significant performance improvements for Arm released (Jan'25)
- Latest test builds for `x86_64`, `aarch64`, `riscv64` were successful 🎉
- Still a few small changes need to be made before we can actually build and ingest this
  - E.g. for `host_injections`

[Bob, Kenneth, Thomas, …]

# Progress update: software layer (1/3)




Highlights of recently merged software PRs:

- astropy 7.0.0 (PR #916), Pandoc (PR #964), Siesta 5.2.2 (PR #966), FALL3D 9.0.1 (PR #970), EasyBuild 5.0.0 (PR #974), lit 18.1.2 (PR #976), lit 18.1.7 (PR #984), bcgTree 1.2.1 (PR #1032), NextFlow 24.10.02 (PR #1066)

Build for NVIDIA Grace CPU target + most modules using CUDA with CC90 (H100):

- PRs: #990, #991, #992, #993, #995, #996, #998, #1002, #1003, #1004, #1005, #1006, #1007, #1008, #1009, #1013, #1015, #1016, #1017, #1018, #1020, #1021, #1022, #1026, #1029, #1031, #1032, #1042, #1045, #1068

Resume building of A64FX CPU target (via service account on Deucalion)

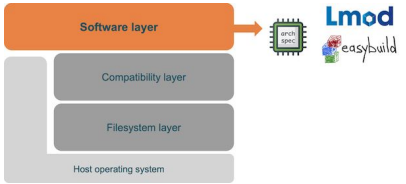
- PRs: #1025, #1028, #1033, #1034, #1038, #1040, #1049, #1050, #1051

Rebuilds:

- Siesta 5.2.2 "fixes an issue for `generic` where the compiler options were being overridden" (PR #1019)
- R 4.2.2 and 4.3.2 to include patch for a CVE (PR #1062)

[Kenneth, Thomas, Richard, Pedro, Bob, Lara, Caspar, Satish, Alan, …]

# Progress update: software layer (2/3)




Builds for Intel Ice Lake + Intel Cascade Lake CPU targets:

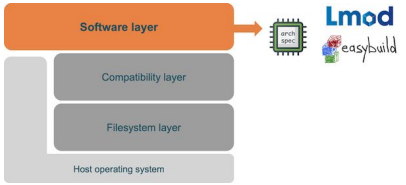
- Preliminary work (EasyBuild, EESSI-extend) (PR #1039, PR #1041)
- Easystack batches: PR #1047, PR #1048, PR #1052, PR #1053, PR #1054, PR #1055, PR #1056, PR #1057, PR #1059, PR #1063, PR #1064, PR #1065, PR #1069, PR #1070, PR #1078, PR #1079
  - About ~75% of existing software already built for Ice Lake and Cascade Lake 🎉
- New scripts to facilitate building new stacks (WIP PR #1035)

Recent active open PRs + for general improvements:

- [WIP] update licenses (PR #675)
- Add easystacks arg and bootstrap improvements (PR #801)
- Test building on Snellius @ SURF: Zen4/H100 (PR #903)
- Fix ReFrame issues on NVIDIA Grace (PR #988)
- Also check the EasyBuild hooks when checking missing installations (PR #1075)

[Kenneth, Thomas, Richard, Pedro, Bob, Lara, Caspar, Satish, Alan, Helena …]

# Progress update: software layer (3/3)




Recently merged general improvement PRs:

- Add `dev.eessi.io` support including project subdirectories (PR #885)
- Updated `link_nvidia_host_libraries.sh` for better edge case handling (PR #922)
- Improve error message w.r.t. disk space requirement in CUDA host injection script (PR #965)
- Add handling of the same-name libraries on different locations for `link_nvidia_host_libraries.sh` (PR #972)
- Add `zstd` support for faster tarball creation or extraction in `eessi_container.sh` (PR #994)
- Circumvent `fusemount` issue, improve module use, and add some packages (PR #1025)
- Add support in `archdetect` for detecting NVIDIA/Grace (PR #1042)
- Remove eessi startup hook that errors on CUDA being moved from CPU prefixes (PR #1044)

[Kenneth, Lara, Caspar, Bob, Alan, Thomas, Pedro, Pavel, Sebastian …]

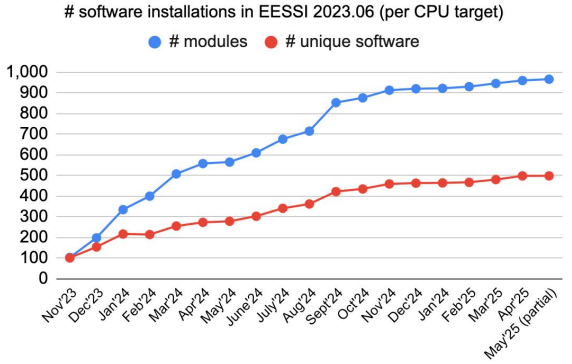
# EESSI production repository

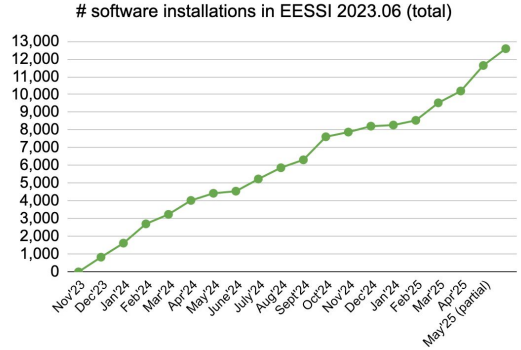
eessi.io/docs

`software.eessi.io` is the **production-ready EESSI repository**

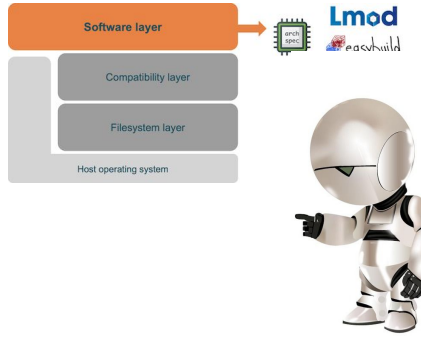
Version 2023.06 is being populated with software via PRs to software-layer repo + build-and-deploy bot

- 11 fully supported CPU targets: see eessi.io/docs/software_layer/cpu_targets
- Software installations for NVIDIA Grace now fully on par with other CPU targets
- **Work-in-progress:**
  - **Arm A64FX (for EuroHPC system Deucalion): ~50% done**
  - **Intel Cascade Lake + Ice Lake: ~75% done**
- Initial support for NVIDIA GPUs is in place, see eessi.io/docs/gpu
- **Currently: 966 software installations per CPU target**
  (+30 in March+April'25, +6 in May'25 so far)
  - **501 different software projects** (+31 since Feb'25, 498 on aarch64),
    12,590 software installations (across 11+3 CPU targets, +3,057 since Feb'25)
- Current focus:
  - Adding more (CUDA) software, processing incoming contributions, …
  - Complete set of installations for A64FX, Ice Lake and Cascade Lake



# Bot for building + deploying software layer




https://github.com/EESSI/eessi-bot-software-layer

- March-April'25
  - PR #303 & PR #304 signing tarballs to be uploaded to S3 bucket
  - PR #305 & PR #306 release v0.7.0
  - PR #307 launch build container with `--contain`
  - PR #308 use bot's name in signature's `namespaces` option
  - PR #309 some fixes for creating signatures
  - PR #311 determine pytest coverage
- Ongoing work
  - reduce/define bot chattiness, more flexible deployment actions, reversing bot command matching logic, arch_target_map, ... bundling tarballs in staging PR
- Side note: more than 60k Slurm jobs have been submitted on AWS Slurm cluster (bot + test suite)

[Thomas, Bob, Kenneth, Lara, Pedro]

# EESSI documentation

eessi.io/docs - GitHub repo github.com/EESSI/docs

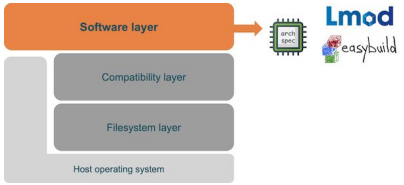
Improvements to the EESSI documentation: ~23 merged PRs (+ 10 updates to software overview)

Highlights:

- Added new systems to page on where EESSI is available (PR #408, #418, #420, #432)
  - Finisterrae (ES), ULHPC (LU), MareNostrum5 (ES), Sunrise (CZ)
- Added new blog posts (PR #411, #427)
  - GPU support in EESSI: https://eessi.io/docs/blog/2025/03/24/gpu-support-in-eessi
  - EESSI talk at GOOD: https://eessi.io/docs/blog/2025/04/03/eessi-at-good-conf
- EESSI webinar training sessions (PRs #428, #431, #434, #446, #449, #450, #451, #454)
  - https://eessi.io/docs/training/2025/webinar-series-2025Q2

[Lara, Pedro, Helena, Bob, Xin, Kenneth, Caspar…]

# EESSI test suite




eessi.io/docs/test-suite - github.com/EESSI/test-suite

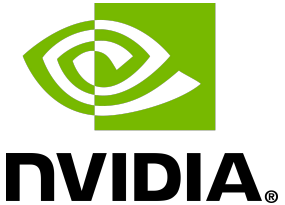
ReFrame

Highlights

- Ported last test to `eessi_mixin`: ESPResSo
- Use namedTuples for constants (#258) => Requires adaptation of existing ReFrame configs!
- Various smaller fixes/changes
- New release 0.5.2 and 0.6.0, see github.com/EESSI/test-suite/releases
- Hand-on session during EUM'25 for users to create configs on their system(s). Session was a bit short, but a handful of people did get some hands-on experience.
- Autogenerated API documentation: WIP, docs PR #319 (reviewed, putting in final changes)

[Caspar, Sam, Satish, Kenneth, Lara]

# Improving NVIDIA GPU support

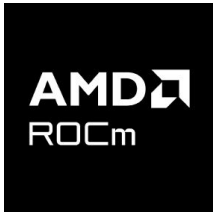




- Previously: very limited set of GPU software in CPU prefixes
  - Unclear what CUDA Compute Capabilities were supported
  - These installations were removed
- Decision on CPU/GPU architecture combinations we will support
  - Major CUDA Compute Capabilities (cc70 - V100, cc80 - A100, cc90 - H100) for all CPU architectures
  - Selected combinations of minor CUDA Compute Capabilities + CPU architectures
- Builds will only be done natively (and thus including e.g. running software test suite) on a *subset* of GPU + CPU combinations. The rest will be cross-compiled.
  - 2 bots with GPU support for zen3+A100 (UGent) and zen4+H100 (SURF)
  - Personal bots in Grace-Hopper systems (Juelich, SURF)
- EasyBuild framework PR to implement a CUDA Sanity Check (easybuild-framework PR #4692) to check if the installed binaries indeed have code for the configured CUDA Compute Capability
- Currently installing low level CUDA stack for all supported architectures in PR #1030, #1076, #1077
  - CUDA, UCX-CUDA, UCC-CUDA, OSU-Micro-Benchmarks

[Caspar]

# Adding support for AMD GPUs (ROCm)



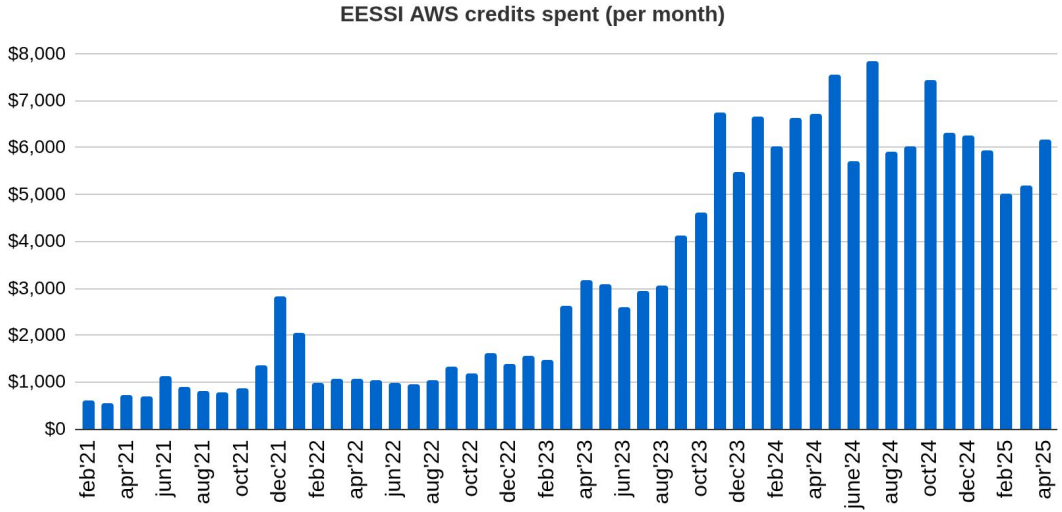


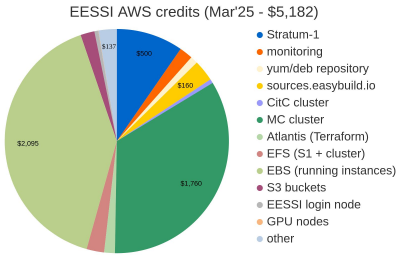
- Work on adding support for AMD GPUs has started
- Support ticket in GitLab with a lot of information, discussion, and feedback
  - https://gitlab.com/eessi/support/-/issues/71
- Still working towards getting the ROCm stack installed with EasyBuild
  - Lots of changes have been made in the EasyBuild LLVM easyblock
  - Try to reuse this easyblock for ROCm LLVM compilers
- Recent sync meeting about the current status and short-term plans
  - https://github.com/EESSI/meetings/wiki/Sync-meeting-on-EESSI-ROCm-support-(2025-04-04)
- Meeting with AMD
  - They reached out, because they are interested in having ROCm support in EasyBuild
  - Are available for answering our (technical) questions
- Funded effort by Microsoft Azure via INUITS to help out with this effort (just got started)

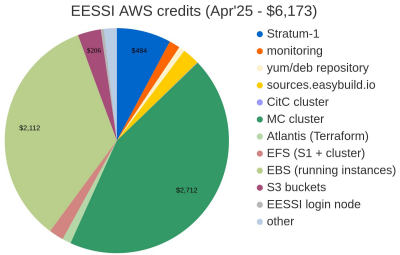
[Bob]

# Sponsored AWS credits

- Ask in #aws-resources Slack channel to get access!
- ~$5,182 + $6,173 “spent” in Mar'25 + Apr'25 on Stratum-1 servers, monitoring, demos, sources.easybuild.io,Slurm clusters (build bot), building for Cascadelake and Icelake, …
- **Bulk of consumed credits due to EESSI build-and-deploy bot**
- Regular sync meetings with AWS - more sponsored credits have been provided for coming months



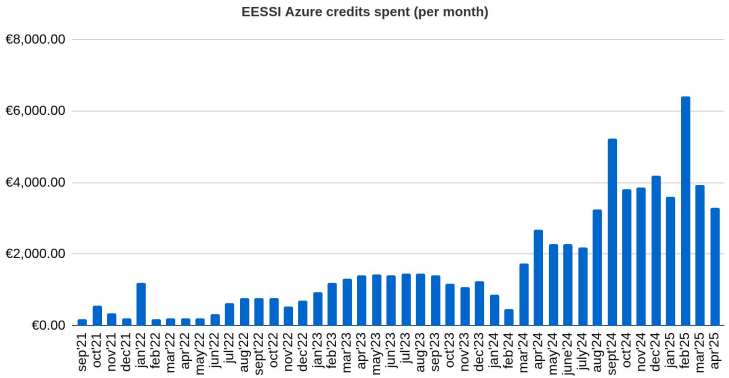



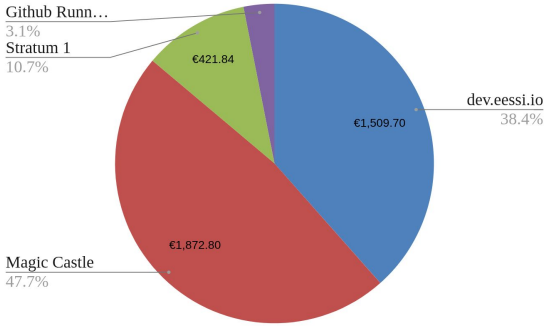




[Kenneth, Bob]

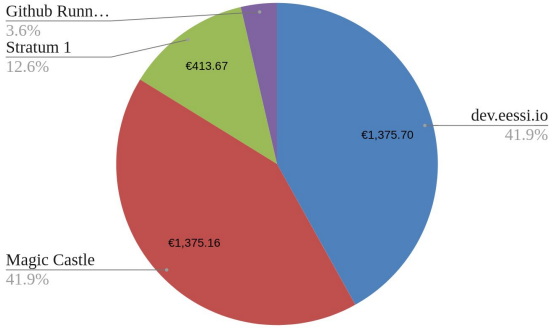
# Sponsored Azure credits

- Ask in #azure-resources Slack channel to get access!
- In Mar+Apr'25: €3,928+€3,284 worth of credits spent
- Used for: **Slurm cluster for bot (Zen4)**, Stratum-1 mirror servers, GitHub Runners, GPU nodes, …
- Ongoing discussions to extend sponsored credits into 2025




*Mar'25 (€3,928)*




*Apr'25 (€3,284)*

[Kenneth, Bob]

# EESSI Governance - (interim) Steering Committee

- (interim) Steering Committee https://eessi.io/docs/governance
  - Kenneth/Lara, Alan/Davide, Bob/Henk-Jan, Caspar/Satish, Thomas/Terje
- Most recent meeting of was held 6 May 2025
- Actively discussing governance for EESSI
  - Formalize/document how we collaborate in EESSI community
  - See WIP PR: https://github.com/EESSI/docs/pull/456
- Reached out to Linux Foundation Europe
  about making EESSI a Linux Foundation project…

# EESSI webinar series


- 5 webinars in a row, Mondays in May/June 2025
- Anyone can attend, but registration is required
  - Over 100 people have registered!
- 1st webinar “Introduction to EESSI” was last Monday (5 May’25)
  - Slides + recording are available
  - Over 60 attendees in Zoom webinar session
- Next webinars:

  Introduction to CernVM-FS (12 May), Introduction to EasyBuild (19 May),

  EESSI for CI/CD (26 May), EESSI as the base for a system stack (2 June)

- More info via https://eessi.io/docs/training/2025/webinar-series-2025Q2

# EESSI as a EuroHPC JU Success Story

- See “EESSI Does It! An Award-Winning Software Story” blog post
  https://eurohpc-ju.europa.eu/eessi-does-it-award-winning-software-story-2025-04-07_en
- Triggered by EESSI receiving HPCWire Reader’s Choice Award at Supercomputing’25

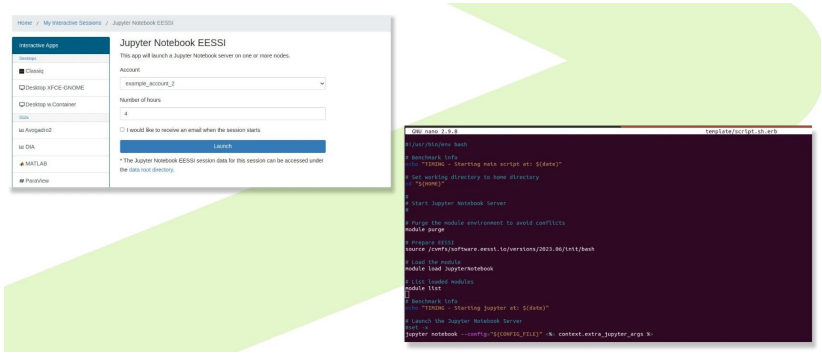
[Kenneth, Alan]

# EESSI in “Supercomputing in Europe” podcast episode


- Podcast interview by EuroHPC NCC Belgium
  with Kenneth Hoste & Lara Peeters (Ghent University)
- Covering MultiXscale EuroHPC CoE, EESSI, etc.
- Listen via https://open.spotify.com/episode/2bLu96i1ZPPYgPhDtW4IOg

[Kenneth, Lara]

# EESSI at Global Open OnDemand conference


- EESSI was presented at the Global Open OnDemand conference (GOOD) by Do IT Now at Harvard University (17-20 March 2025) https://openondemand.org/good
- Integration of EESSI into Open OnDemand (OoD) to provide software for interactive apps
- See blog post: https://www.eessi.io/docs/blog/2025/04/03/eessi-at-good-conf
- We're in close touch with OoD development team via their Slack (see #eessi channel)

# 10th EasyBuild User Meeting

- **10th EasyBuild User Meeting** 2025: 25-27 March in Jülich (Germany)
- Last day mostly focused on EESSI, with talks on various aspects of EESSI, MultiXscale, CernVM-FS, EuroHPC Federation Platform, …
- Slides & recordings for all talks available https://easybuild.io/eum25/#program


# Frequency of EESSI update meeting

- EESSI update meetings are **bi-monthly**
- First Thursday of the month at 14:00 CE(S)T, only in odd months
  - iCalendar URL for calendar integration
- Next meetings:
  - Thu 3 July 2025 14:00 CEST (12:00 UTC)
  - Thu 4 Sept 2025 14:00 CEST (12:00 UTC)
  - Thu 6 Nov 2025 14:00 CET (13:00 UTC)