

SITE PRESENTATION VUB

11th **EASYBUILD**. User Meeting

Vrije Universiteit Brussel (VUB)

Cintia Willemyns and Jarne Renders



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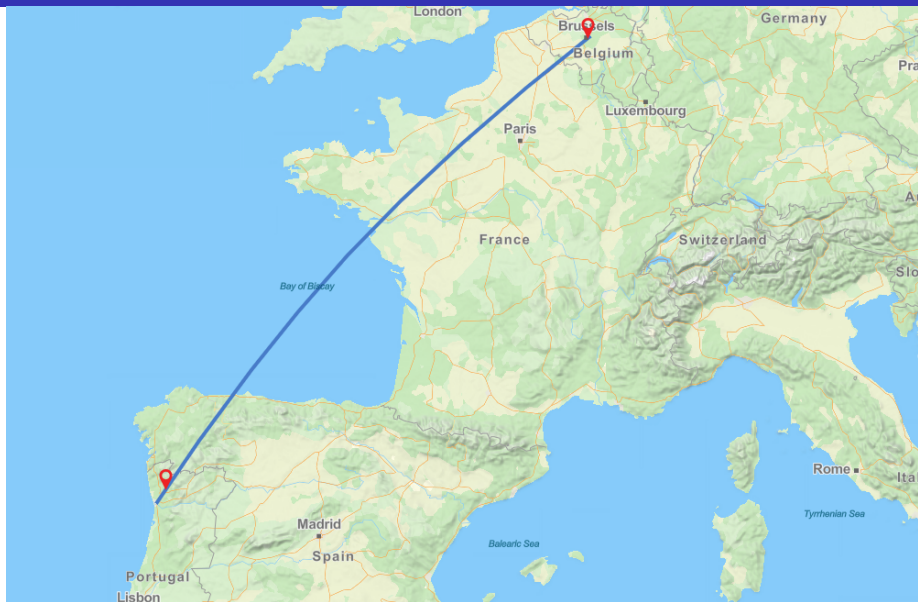
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OUTLINE

- 1 THE VUB TIER-2 CLUSTER
- 2 TIER-1 CLUSTER SOFIA
- 3 SOFTWARE INSTALLATION WORKFLOW
- 4 CLOSING

VRIJE UNIVERSITEIT BRUSSEL IS IN BELGIUM



THE VUB TIER-2



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- HPC team at the VUB Tier-2 cluster
- Two clusters: Hydra and Anansi
 - Slurm scheduler
 - ~ 5,150 CPU cores (AMD)
 - 50 NVIDIA GPUs
 - High-memory nodes with 1.5 TB of RAM
- ~ 600 unique users in 2025
- We use EasyBuild 5 for our installations
- VUB is part of the Vlaams Supercomputer Centrum (VSC)



WilleBell



JarneRenders

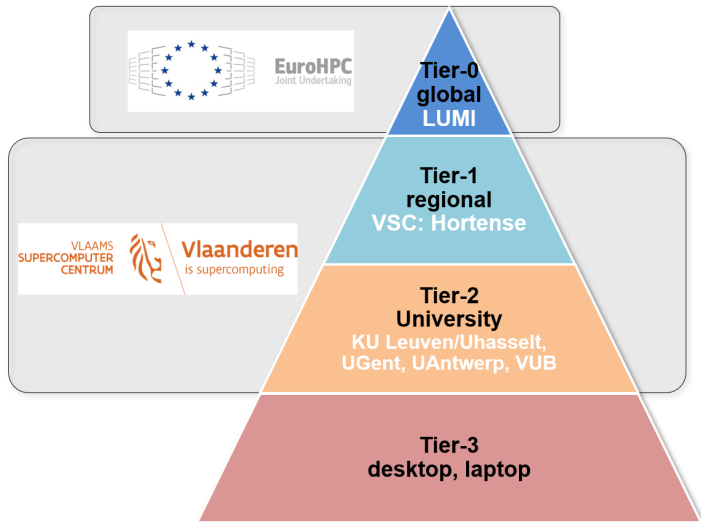


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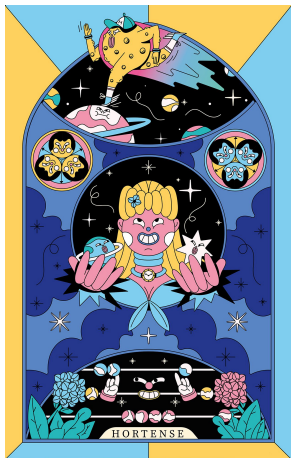


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VSC: PARTNERSHIP AMONG FLANDERS' UNIVERSITIES



HORTENSE'S SUCCESSOR WILL BE sofia



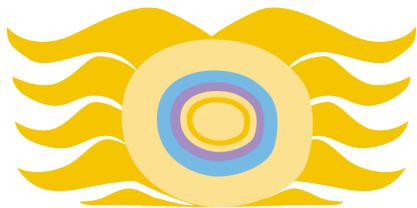
Hortense managed by HPC-UGent
2021–2026



sofia managed by VUB-HPC
2026–

TIER-1 CLUSTER sofia

- **sofia's specs**
 - Slurm scheduler
 - ~ 29,500 CPU cores (AMD)
 - 184 NVIDIA GPUs
 - High-memory nodes with 1.5 TB of RAM
- Access to Tier-1:
 - Researchers from Flemish universities (via project proposals)
 - Industry users (via paid access)



sofia

Powered by



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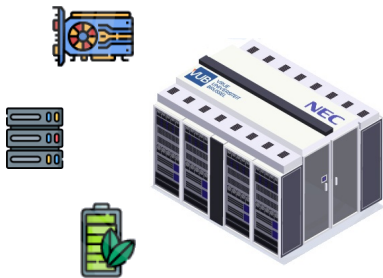
Enlightened by



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WHY IS sofia SPECIAL?

- Successor of Hortense, but with a much stronger GPU focus
- Designed for both traditional HPC and modern AI workloads
- Energy efficiency is one of the key design goals
- New Tier-1 system operated by VUB within the VSC partnership





ACCESS TO TIER-1

- Similar access model as on Hortense
- Researchers from Flemish universities can apply for compute time through the VSC
- Industry users can also access Tier-1 resources
- Pricing and some operational details for **sofia** are still being finalized

CURRENT WORKFLOW FOR INSTALL REQUESTS ON TIER-2

- New easyconfig or easystack prepared by the support team based on user requests
- Added to site's branch in `vsc-software-stack`
- In parallel, a PR is opened in the EasyBuilders repositories
- Installation executed on the cluster with custom submit/build script
- Repository cleanup and long-term maintenance afterwards

 **vsc-software-stack** Public  **easybuild-easyconfigs** Public  **build_tools** Public

 site-vub ▾  12 Branches  0 Tags

SOFTWARE INSTALLATIONS ON **sofia**

- Installations on **sofia** will be managed by the VUB team
- Other VSC sites will still need software on **sofia**
- Challenge: keep installations collaborative without opening direct install access
- The plan is to use the same PR-based **bot** workflow already used for Hortense/UGent

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O---O Welcome to the VSC Tier-1 cluster sofia! O---O

zen4_h200  |-----|
           | Avail. CPUs: 4224/4224 (100%)  GPUs: 176/176 (100%) |
zen5_dense  |-----|
           | Avail. CPUs: 21120/21504 (98%)  |
zen5_himem  |-----|
           | Avail. CPUs: 2880/3072 (94%)   |
zen5_vis    |-----|
           | Avail. CPUs: 768/768 (100%)   GPUs: 8/8 (100%) |

Generated: 2026-04-20 11:00:16 Legend: █ full, █ mixed, █ empty, X unavailable
Last login: Mon Apr 20 10:48:34 2026 from 172.18.124.252
✓[11:01] vsc11353@login01 $VSC_SCRATCH $ cd /apps/sofia/RL9
✓[11:02] vsc11353@login01 /apps/sofia/RL9 $ tree -F -L2 --noreport
├── zen4-lb/
│   ├── modules/
│   └── software/
├── zen5-lb/
│   ├── modules/
│   └── software/

```

SHARED INSTALLATION WORKFLOW WITH VSC-APPS-BOT

- Other VSC sites can open a PR to request software on **sofia**
- Each PR contains one new easystack file (`.yaml`)
- VUB validates and triggers the actual installation on **sofia**
- Other sites can keep track of the installations



KU LEUVEN



SHARED INSTALLATION WORKFLOW WITH VSC-APPS-BOT

- The bot-driven workflow keeps requests structured and reproducible
- Responsibilities stay clear: request from all sites, deployment by VUB
- `bwrap` enables isolated builds, fitting well in this workflow
- Scales well for Tier-1 support across the VSC

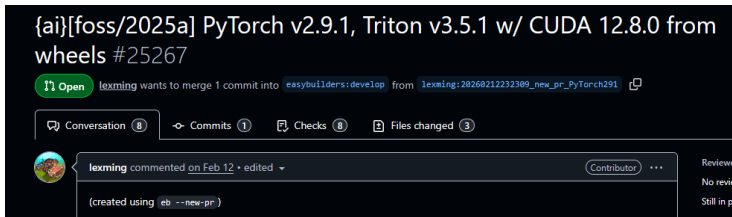


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PYTORCH: FROM SOURCE BUILDS TO OFFICIAL WHEELS

- In our Tier-2: we now install PyTorch from official wheels instead of building from source
- This was motivated in part by observations around PyTorch complexity in EasyBuild



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- Building PyTorch from source remains valuable, but it is a large and complex software stack
- Passing all tests consistently can be difficult and time-consuming

PyTorch-2.9.1_GCC14-ARM-workaround.patch
PyTorch-2.9.1_avoid-multiprocess-tests-hanging-forever.patch
PyTorch-2.9.1_avoid-using-wrong-libomp.patch
PyTorch-2.9.1_check-device-avail-test_schedule.patch
PyTorch-2.9.1_disable-slow-tests.patch
PyTorch-2.9.1_dont-print-test-items.patch
PyTorch-2.9.1_fix-TestExportOpInfoCPU-with-single-GPU.patch
PyTorch-2.9.1_fix-hypothesis-deadline.patch

PyTorch-2.9.1_fix-iteration-in-fligh-reporter.patch
PyTorch-2.9.1_fix-test_dist2-decorators.patch
PyTorch-2.9.1_ignore-warning-incompatible-pointer-types.patch
PyTorch-2.9.1_increase-tolerance-TestDecomp-matmul.patch
PyTorch-2.9.1_normalize_tree_output.patch
PyTorch-2.9.1_set-test-timeout.patch
PyTorch-2.9.1_skip-RingFlexAttentionTest.patch
PyTorch-2.9.1_skip-cpu_repro-tests-failing-on-ARM.patch

PyTorch-2.9.1_skip-cutlass-addmm-test.patch
PyTorch-2.9.1_skip-flex-attention-test_block_mask_non_divisible.patch
PyTorch-2.9.1_skip-flex-attention-tests-on-unsupported-cpus.patch
PyTorch-2.9.1_skip-svd-pca-lowrank-tests-on-cpu.patch
PyTorch-2.9.1_skip-test_dtensor_op_db_nn_functional_multi_head_attention_forward_cpu_...
PyTorch-2.9.1_skip-test_optree_graph_break_message.patch
PyTorch-2.9.1_skip-tests-requiring-MKLDNN.patch
PyTorch-2.9.1_skip-tests-requiring-SM90.patch

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- This was motivated in part by observations around PyTorch complexity in EasyBuild
- Building PyTorch from source remains valuable, but it is a large and complex software stack
- Passing all tests consistently can be difficult and time-consuming
- Using official wheels is faster and pragmatic, and helps users who need quick access to new/specific PyTorch versions, often required by other packages
- The same approach is likely to be useful on **sofia** as well

EESSI ON SOFIA

- Integration of European Environment for Scientific Software Installations (EESSI)
- Provides a shared, distributed software stack
- Reduces need for local installations
- Complements EasyBuild-based workflows



MAIN TAKEAWAYS

- VUB continues to operate its own Tier-2 cluster within the VSC ecosystem
- **sofia** will be the new Tier-1 cluster, with stronger GPU and AI focus
- Software support on **sofia** needs a shared but controlled workflow
- The `vsc-apps-bot` model is a good fit for that
- For complex software such as PyTorch, pragmatic deployment choices matter

Thank you!

Questions?