WORKSHOP

"Preparing Applications and European Users to Efficiently Exploit Future ARM-based Exascale Machines"

January 26 - 28, 2026

Kraków, Poland

Use cases

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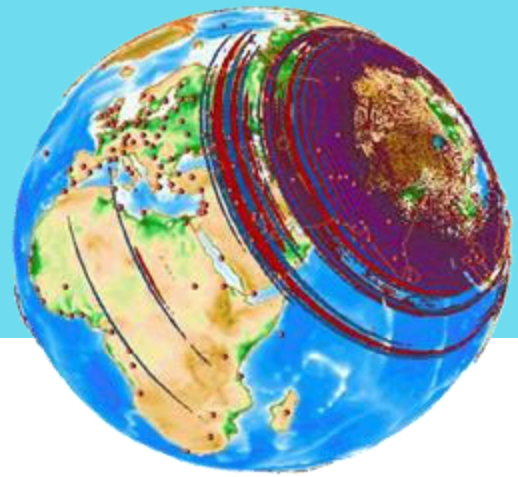
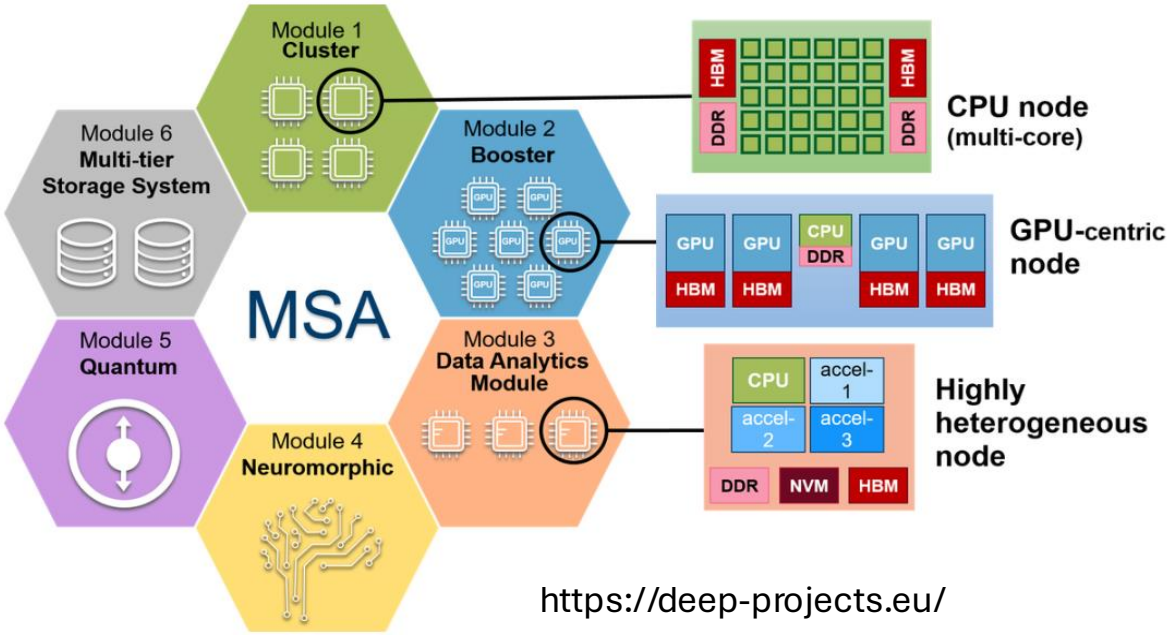
Evolve and adapt



- Modern applications are workflows
- EU recipe for Exascale

  Modular Supercomputing Architecture

  RISC-based machine
- EUPEX: complete ARM-based solution



https://deep-projects.eu/

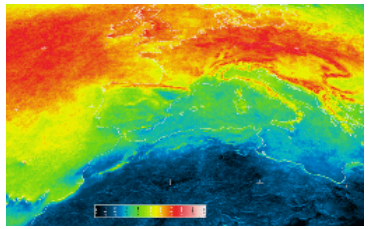
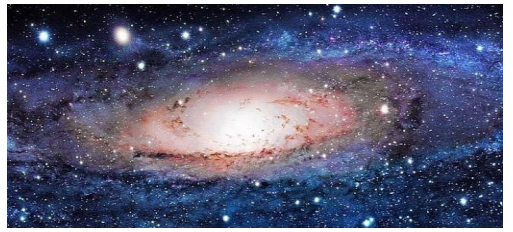
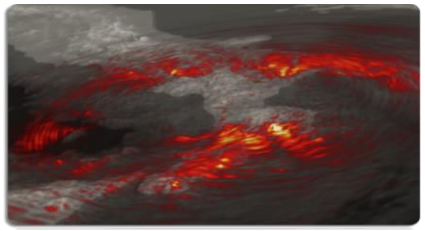
Benchmark suite

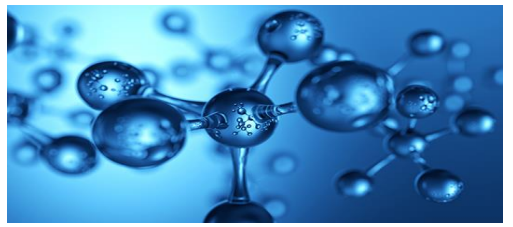
EUPEX
European Pilot for Exascale

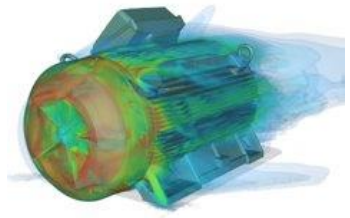
Scientific and industrial, Central for European development

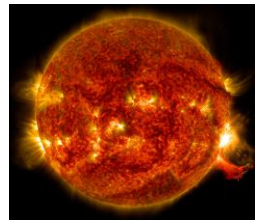
- Weather (IFS)
- Agriculture (CybeleTech)
- Earth Observation (AI4EO)
- Astrophysics (OpenGadget)
- Seismology (SPECFEM3D)
- Structure of the matter (BigDFT)
- Biochemistry (LiGen)
- Engineering (ESPRESO FEM)

+ miniapps and standard benchmarks



Recent work

D3.3

EUPEX European Pilot for Exascale

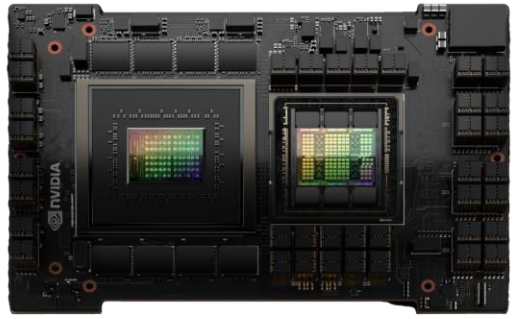
After ARM CPU features exploration (SVE and HBM)

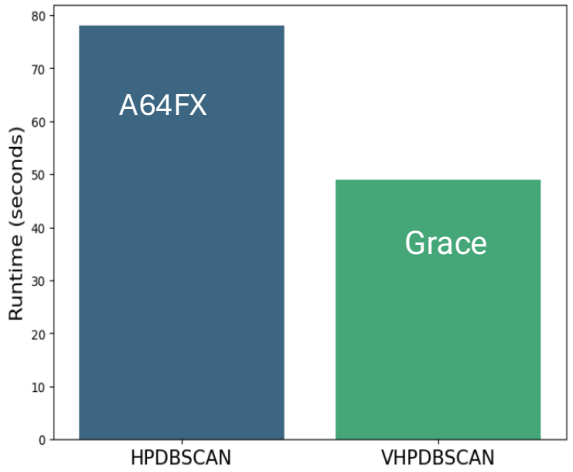
Porting and optimizing for heterogeneous systems

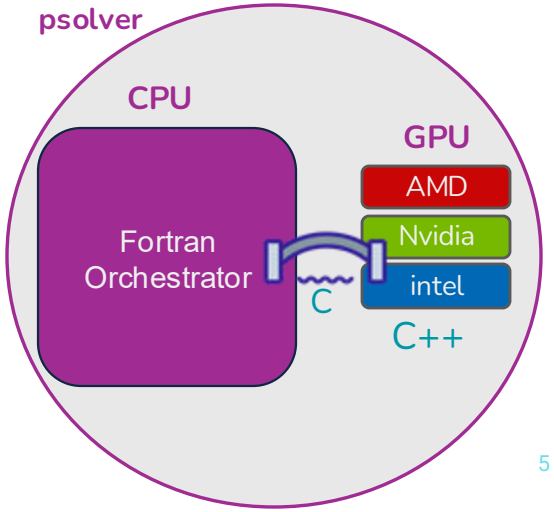
Three directions

- Further Optimization for ARM CPU
  - Vectorization toolchain (Source to source compiler),multi-core, etc
- GPU acceleration (tremendous speed up)
  - Different programming models (OpenMP, OpenACC, SYCL, CUDA)
  - Relatively new (vendor neutrality, efficiency)
- System level heterogeneity (dedicated talk in the second half!)

Nvidia GH200







Plans for 2026

EUPEX
European Pilot for Exascale

Second half of this workshop!

- Adopt the EUPEX software stack to demonstrate achievements
- Final report on application experience (Public)
- New innovative workflows (Confidential)
  - Precision Agriculture
  - Natural Disaster Recovery

- Webinars, Reports and papers availble on https://eupex.eu/

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Next presentation is on Energy Efficiency by Eric Boyer