WORKSHOP

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

January 26 - 28, 2026

Kraków, Poland

This project has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 101033975. The JU receives support from the European Union's Horizon 2020 research and innovation programme and France, Germany, Italy, Greece, United Kingdom, Czech Republic, Croatia.

Agenda

- 14:00 Jean-Robert Bacou, Etienne Walter:
- **EUPEX introduction**
- 14:10 Matteo Turisini, Thomas Moschny:
- **EUPEX Use cases and software ecosystem**
- 14:30 Eric Boyer:
- **Energy efficiency towards Exascale class systems**
- 14:45 Antoine Morvan:
- **Preparing flagship European codes for the sovereign Rhea CPU - Feedback from CoEs to foster co-design with EUPEX**
- 15:05 Ondrej Vysocky, Ondrej Meca:
- **Energy efficiency optimization in using dynamic tuning of Grace Hopper frequencies**
- **COFFEE BREAK** 
- 16:00 Andrew Beggs, Olivier Marsden, Philippe Couvee Mathieu Stoffel:
- **Focus on the energy-efficiency of components of the IFS on Grace Hopper GH200 superchips**
- 16:25 Piero Lanucara, Iacopo Colonnelli
- **Embracing modular supercomputers with hybrid workflows: the SPECFEM3D success story**
- 16:50 George Katevenis, George Saloustros:
- **Challenges and techniques of the XHC framework to improve the performance of collective primitives on multi-core nodes with complex internal topologies**
- **Exploring Flash for Intermediate Data Management for HPC workloads**
- 17:15 Jean-Robert Bacou
- **Conclusion of the workshop - recap on EUPEX, JUPITER and the future**

EUPEX

EUPEX in a nutshell

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

HiPEAC - Krakow – Jan 2026

Jean-Robert Bacou & Etienne WALTER — Eviden

EUPEX

EuroHPC Joint Undertaking

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A key project in the EU network of know-how

User communities
(CoEs …)
Early Access Programme

Gathering key EU technologies

- **EPI**
  - **Rhea GPP**
  - Accelerator (Test Chips)
- *SEA projects
- Other projects (Regale, Accross …)

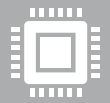
EUPEX Pilot

EUPEX

Enabling future EU Exascale systems

THE EUPILOT

EUPEX objectives

Co-design 	Co-design a modular pilot system
Deploy 	Build and deploy a pilot hardware and software platform integrating European technology
Demonstrate 	Demonstrate the readiness of the pilot technology
Applications 	**Prepare applications and European users to efficiently exploit the future Exascale machines**

Key application domains

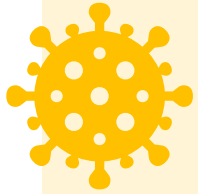
Explored by EUPEX for co-design and benchmarking

Climatology, meteorology

- ECMWF, CybeleTech, Atos

Engineering

- IT4I, CINECA



Biology and health

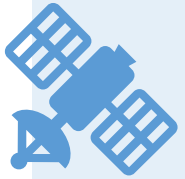
- CINECA, CINI, CEA

Astrophysics

- FORTH, INAF, CEA

Seismology

- INAF, CINECA, CINI, GENCI



Remote sensing analysis

- FZJ

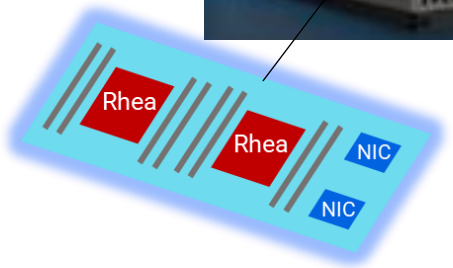
The EUPEX way

- **Leveraging the best of the assets developed in previous H2020 projects**

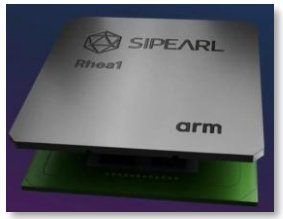
- **The first HPC platform integrating the full spectrum of European HPC technologies**
  - architecture (e.g. OpenSequana, Modular Supercomputer Architecture developed by the DEEP projects)
  - processors (e.g. SiPearl's Rhea processor)
  - interconnect (e.g. Eviden's BXI enhanced in RED-SEA)
  - system software (e.g. OCEAN & ParTec's ParaStation Modulo, IO-SEA storage software)
  - development tools incl. energy efficiency (e.g. Bull energy + dynamic power optimizers, ScoreP/Scalasca, PMIx, MERIC, COUNTDOWN, …)
  - applications (e.g. CINECA's LiGen, ECMWF's Integrated Forecasting System (IFS))

EUPEX

GPP Module
Bull Sequana XH3000



Handful of EVT blades
- Rhea1 nodes
- BXI V3 switches



The EUPEX system
Level of ambition achievable

The GPP module: Bull Sequana XH3000 rack

- equipped with fluidic cooling system
- hosting some blades embedding the targeted Rhea GPP technology:
  - Rhea1 nodes
  - BXI V3 hosted

Modularity

- OpenSequana-compliant hardware platform
- matching HPC software ecosystem implementing the Modular Supercomputing Architecture
- integrate & manage a variety of hardware modules
- handle heterogeneous workflows

Scalable enough to be a proof of concept

- modular architecture relying on European technologies
- demonstrate the Exascale readiness of the applications selected for co-design

EUPEX

Food for thoughts

Key achievements (to come)

- High TRL pilot system – to be derived rapidly in a Jupiter module

Next challenges / lessons learnt

- Reiteration with next technological blocs
- Take care of the whole value chain
- Consider economical sustainability (some support needed therefore)

EUPEX

EUPEX factsheet

- **European Pilot for EXascale**
- A 5-year project starting 1st January 2022
- A balanced consortium of 18 European academic and commercial stakeholders
- Funded by EuroHPC JU
  - And France, Germany, Italy, Greece, United Kingdom, Czech Republic, Croatia
  - Total budget: 40.76 M€

Covering the full spectrum of required supercomputing technologies with European solutions

VSB TECHNICAL UNIVERSITY OF OSTRAVA | IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

EUPEX

Thank you !

EUPEX

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