EUPEX objectives

- **Co-design** a modular Exascale pilot system

- Build & **deploy** a pilot hardware and software platform integrating European technology

- **Demonstrate** the readiness and scalability of the pilot technology and of the Modular Supercomputing Architecture towards Exascale

- Prepare **applications** and European users to efficiently exploit the future Exascale machines
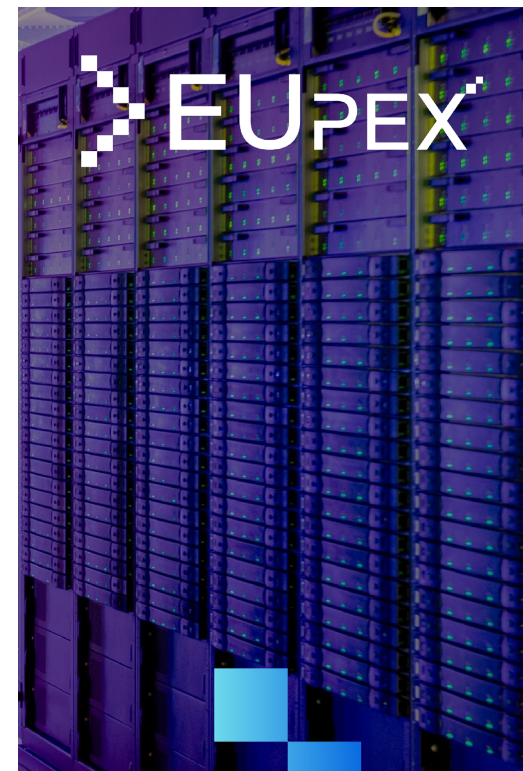
The EUPEX consortium

EUPEX brings together 17 European organisations in a balanced alliance between established European technology suppliers, recognized research centres and universities, European-scale computing centres, and application owners. The project is coordinated by Atos.

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European Pilot for Exascale

Covering the full spectrum of required supercomputing technologies with European solutions

The EUPEX pilot system
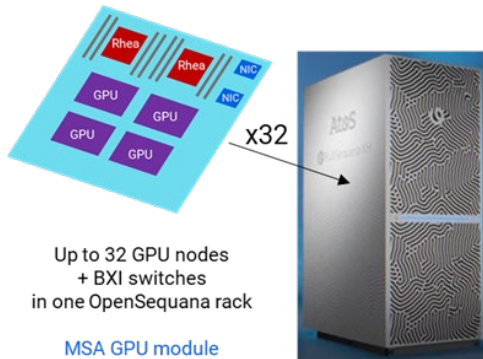
Hosted at CEA-TGCC

Modular

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

Large enough to be a proof of concept

- for a modular architecture relying on European technologies, and in particular on EPI technology
- to demonstrate the Exascale readiness of a planned EuroHPC exascale HPC cluster
- to explore the Exascale readiness of the applications selected for co-design

Production-grade

- technical choices guided by the maturity of the European solutions available

Up to 96 Rhea nodes
+ BXI switches
in one OpenSequana rack

MSA GPP module

Up to 32 GPU nodes
+ BXI switches
in one OpenSequana rack

MSA GPU module

A set of **applications** selected from a large variety of domains (**climate and weather forecast, biology and health, remote sensing analysis, material science, astrophysics, engineering, seismology**) will be optimized for the target architecture, used for benchmarking on the EUPEX Pilot, and analysed to issue recommendations for exploitation on future European Exascale systems.

European building blocks and hardware integration

- **Modular Supercomputing Architecture (MSA)** efficiently connects and orchestrates heterogeneous resources.
- **Rhea processor** is the implementation of EPI HPC processor from SiPearl
- **BullSequana X compute cabinet** from Atos provides maximum flexibility in terms of interconnect, power, and cooling, and achieves a Power Usage Effectiveness close to 1.
- The **OpenSequana initiative** opens the interface specification of the compute blades so that any manufacturer can benefit from the highly efficient BullSequana infrastructure and focus its development on the HPC compute nodes needed by its customer.
- **BXI (Bull eXascale Interconnect)** from Atos provides state-of-the-art features (low latency, high message rates…).
- **ParaStation Modulo** from Partec is an MSA-enabled supercomputing software suite, which facilitates the efficient and smooth operation of large HPC systems (ParaStation MPI, complete software stack …)
- **OCEAN** from CEA is an open-source cluster administration stack, which has proven its efficiency in operating large HPC systems.
- Plus a multitude of **open-source tools and libraries for performance and energy optimization** of applications developed in various EU research projects of the EUPEX partners.