EUPEX
European Pilot for Exascale

Production-grade European pilot towards exascale

About us

- A balanced consortium of 17 European academic and commercial stakeholders
- A 4-year project started 1st January 2022
- Total budget: 40.76 M€

Our 4 objectives

1. **Co-design** a modular Exascale-pilot system
2. Build and **deploy** a pilot hardware and software platform integrating European technology
3. **Demonstrate** the readiness and the scalability of the pilot technology in general and the MSA in particular, towards Exascale
4. Prepare **applications** and European users to efficiently exploit the future Exascale machines

Visit our website

The EUPEX pilot target system

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 (**Rhea processor**)
- 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

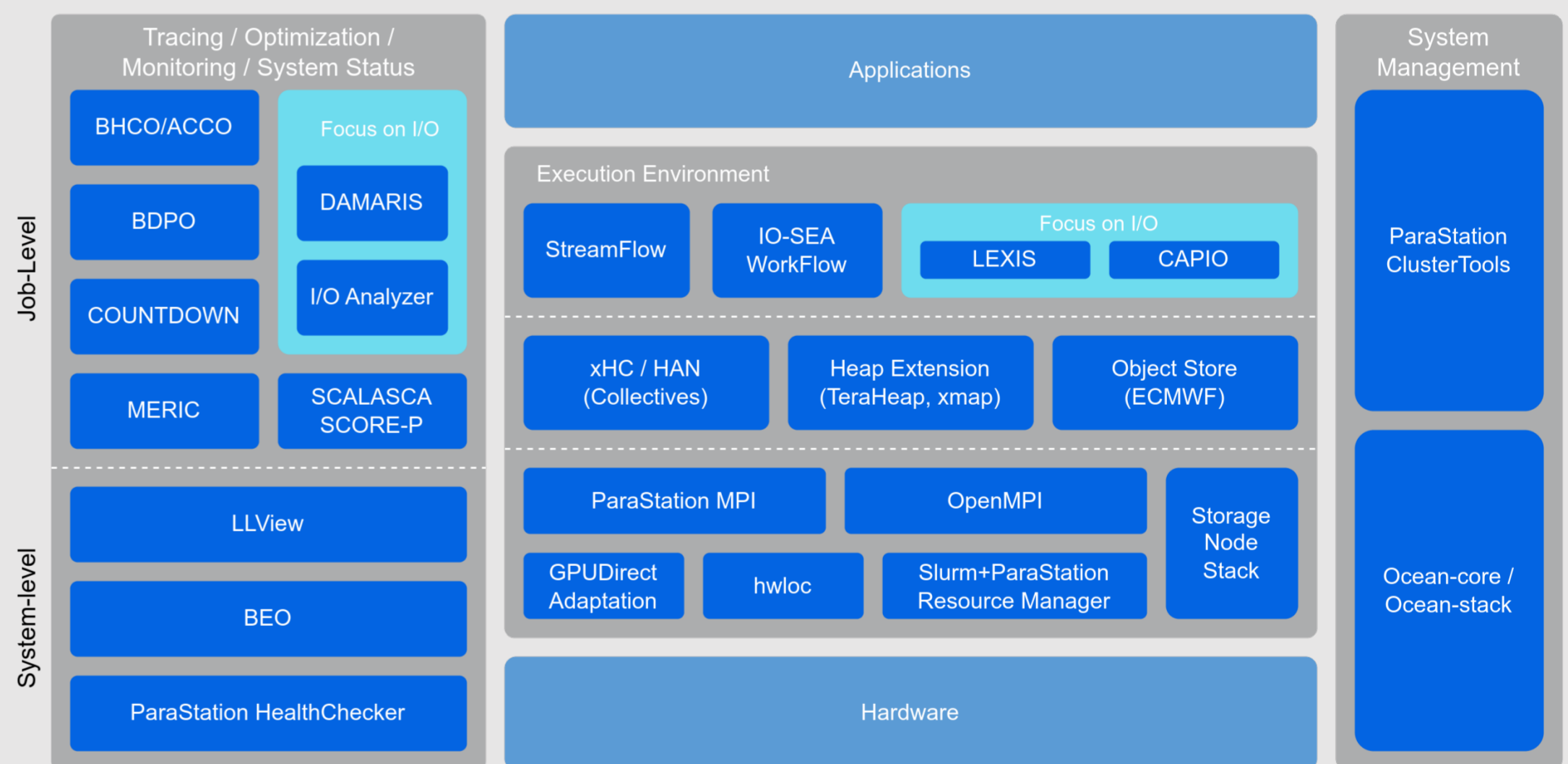- technical choices guided by the **maturity** of the European solutions available
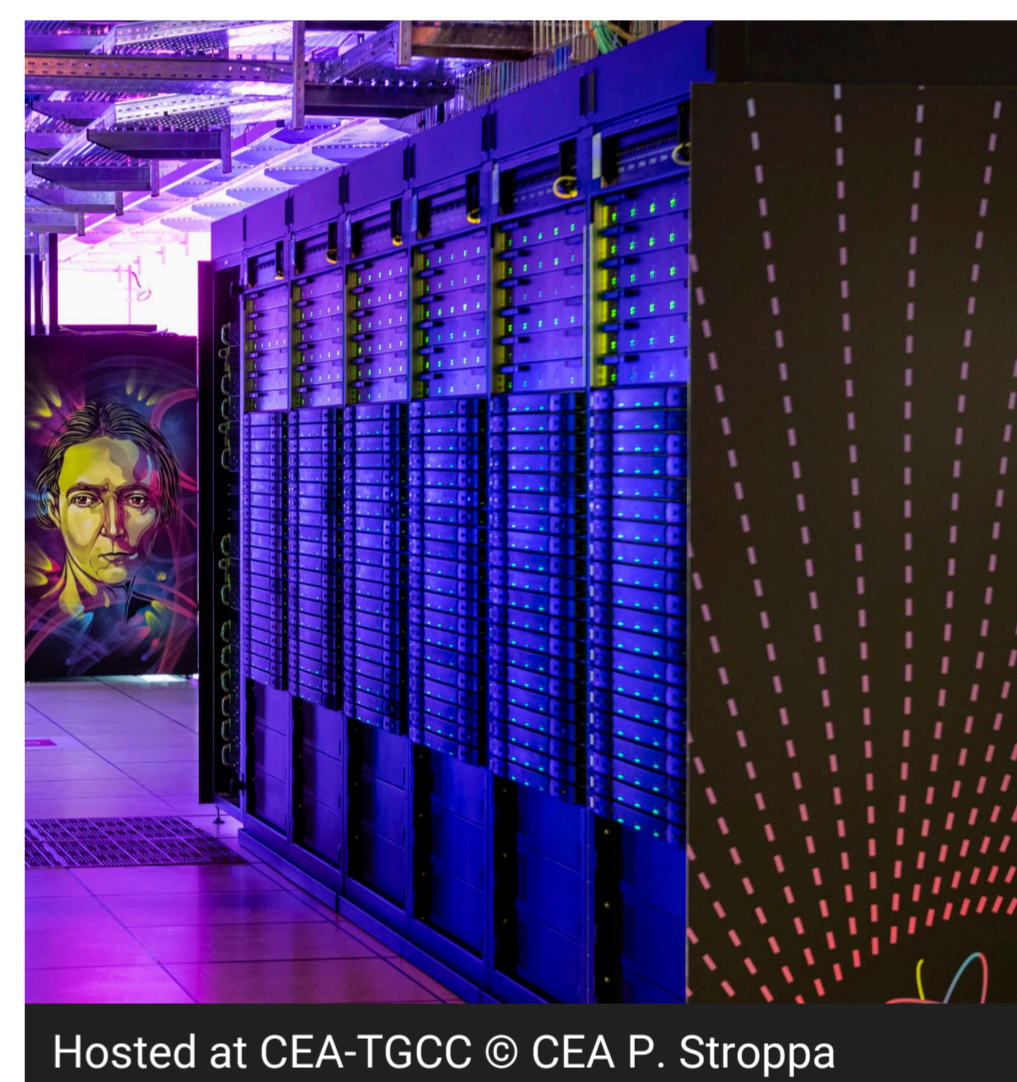
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Applications explored by EUPEX

- Climatology, meteorology
- Combustion
- Biology and health
- Astrophysics
- Seismology
- Remote sensing analysis

The EUPEX software stack

- A software ecosystem based on European technologies
- Encompassing Management, Execution environment, Tools and Storage architecture

Tracing / Optimization / Monitoring / System Status

Job-Level
- BHCO/ACCO
- Focus on I/O: DAMARIS
- BDPO
- COUNTDOWN
- I/O Analyzer
- MERIC
- SCALASCA SCORE-P

System-level
- LLView
- BEO
- ParaStation HealthChecker

Applications

Execution Environment
- StreamFlow
- IO-SEA WorkFlow
- Focus on I/O: LEXIS, CAPIO
- xHC / HAN (Collectives)
- Heap Extension (TeraHeap, xmap)
- Object Store (ECMWF)
- ParaStation MPI
- OpenMPI
- Storage Node Stack
- GPUDirect Adaptation
- hwloc
- Slurm+ParaStation Resource Manager

Hardware

System Management
- ParaStation ClusterTools
- Ocean-core / Ocean-stack

> **EUPEX will pave the way for a self-reliant European HPC industry, capable of delivering exascale-class supercomputers designed in Europe**

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EuroHPC Joint Undertaking