

LUMI AI Factory

Case Finland

InPEX Workshop
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lumi-ai-factory.eu

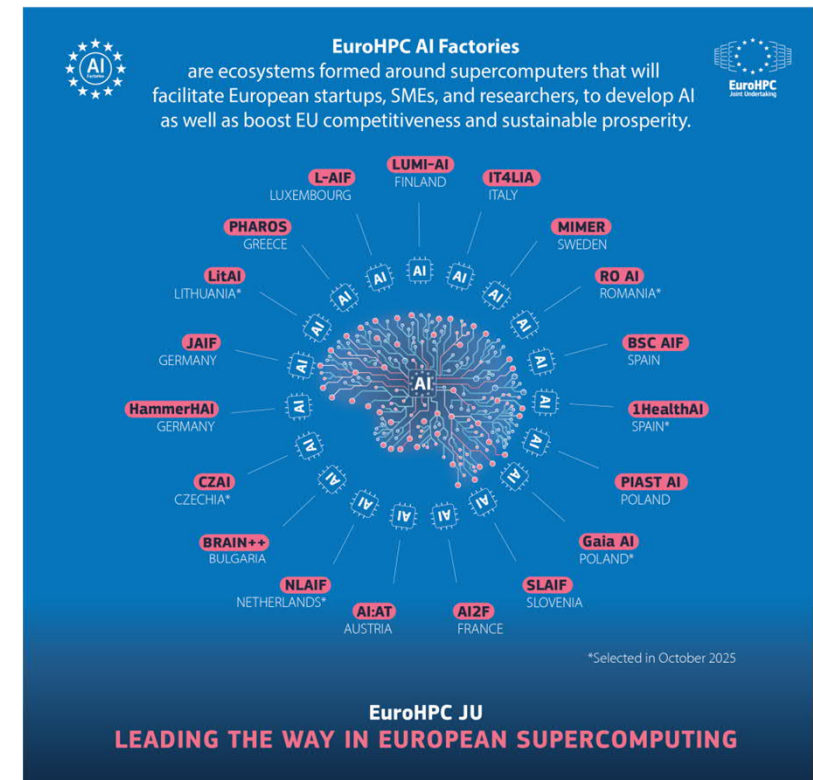
EU promotes AI innovation

The EuroHPC AI Factories

- Boost European competitiveness in AI
- Ecosystems formed around supercomputers to foster innovation
- Compute + Data + Talent
- 19 AI Factories + 13 AI Factory Antennas

LUMI AI Factory (LUMI AIF)

- CSC (Finland) coordinates consortium with participation from Czechia, Denmark, Estonia, Norway and Poland
- Plus 4 associated antennas: Belgium, Iceland, Latvia and Switzerland
- Largest EuroHPC AI Factory investment with total budget of over 600 million euros



AI supercomputing

Can we build a supercomputing infrastructure that could serve both worlds?

Need to harness the full system for a single job
Need for 64-bit precision
Big collection of (legacy) apps
Write-dominant I/O
Fair sharing of resources (jobs & scheduler)
Shared environment
Advanced support by humans

HPC

Partitioning of the system, small instances
Low fp precision
AI frameworks, MLOps
Read-dominant I/O
Interactivity and immediate access (Kubernetes)
Private enclaves
Compute (GPU) cycles

AI

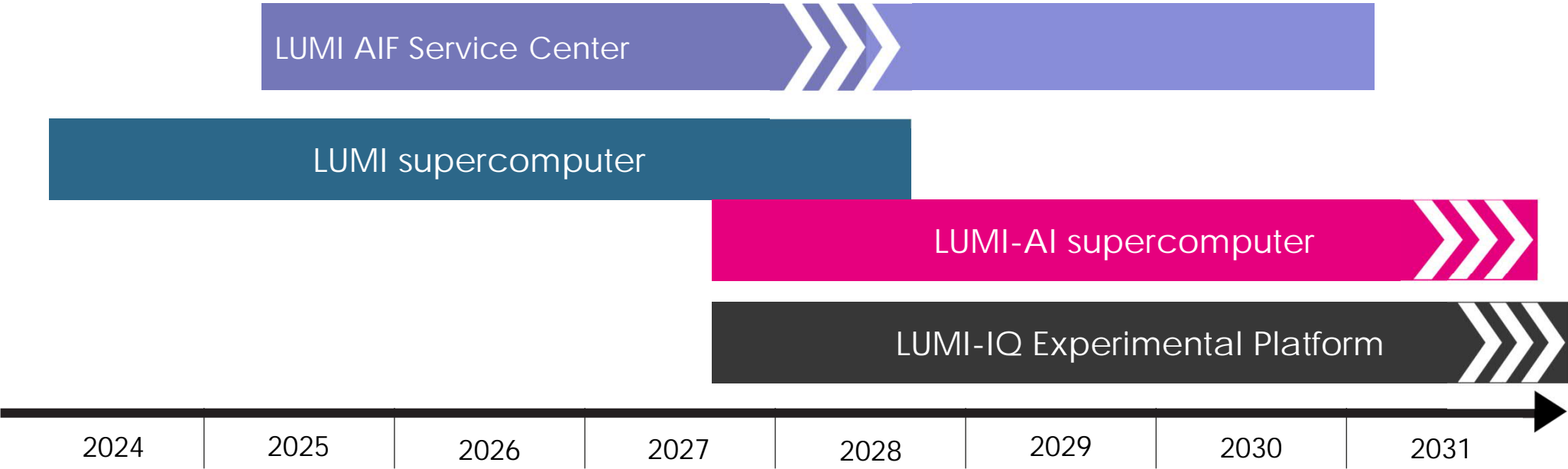
The three pillars

1.
AI-optimised
supercomputer
LUMI-AI

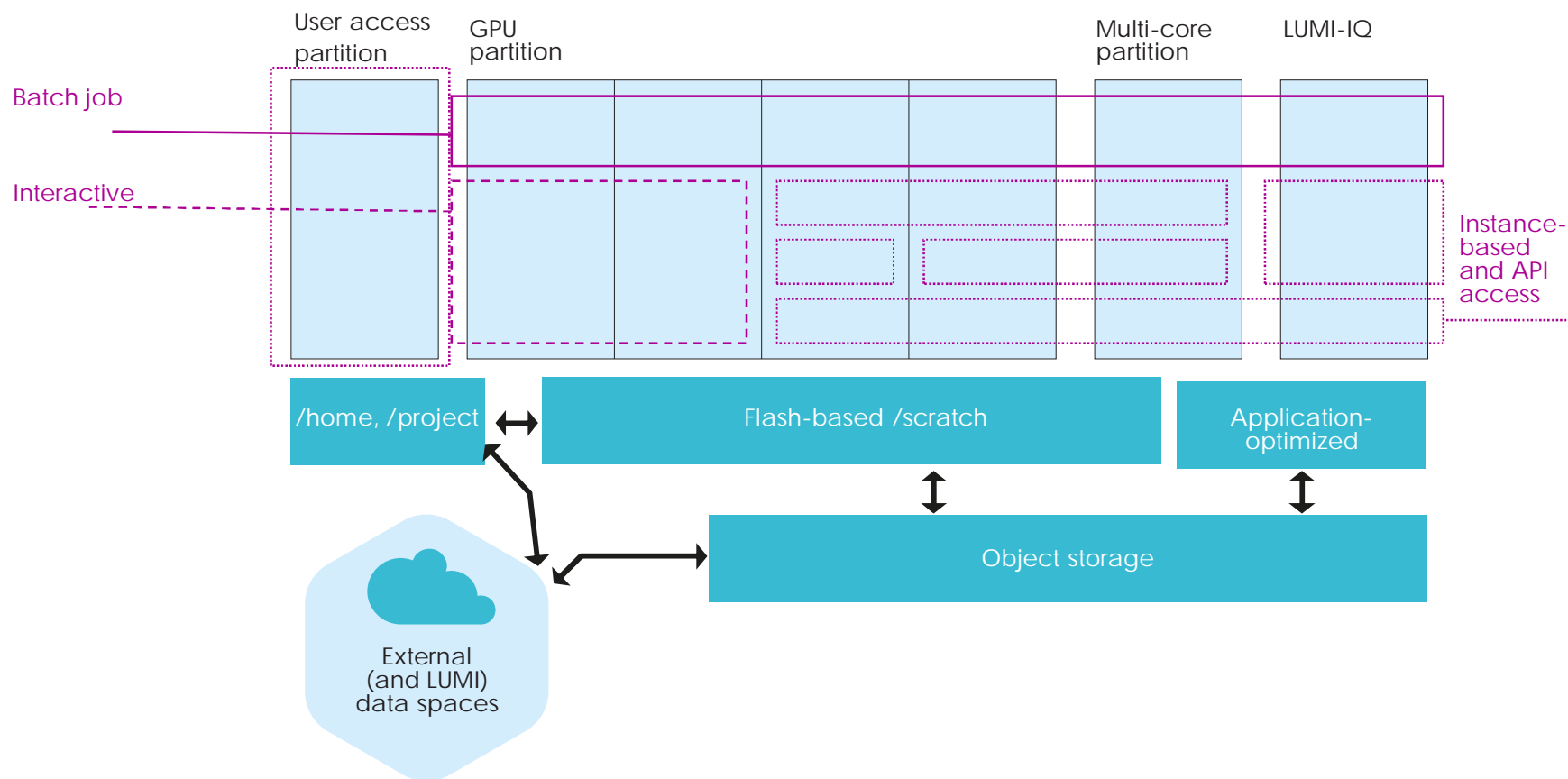
2.
Expert support by
LUMI AI Factory
Services

3.
Experimental
quantum-computing
platform **LUMI-IQ**

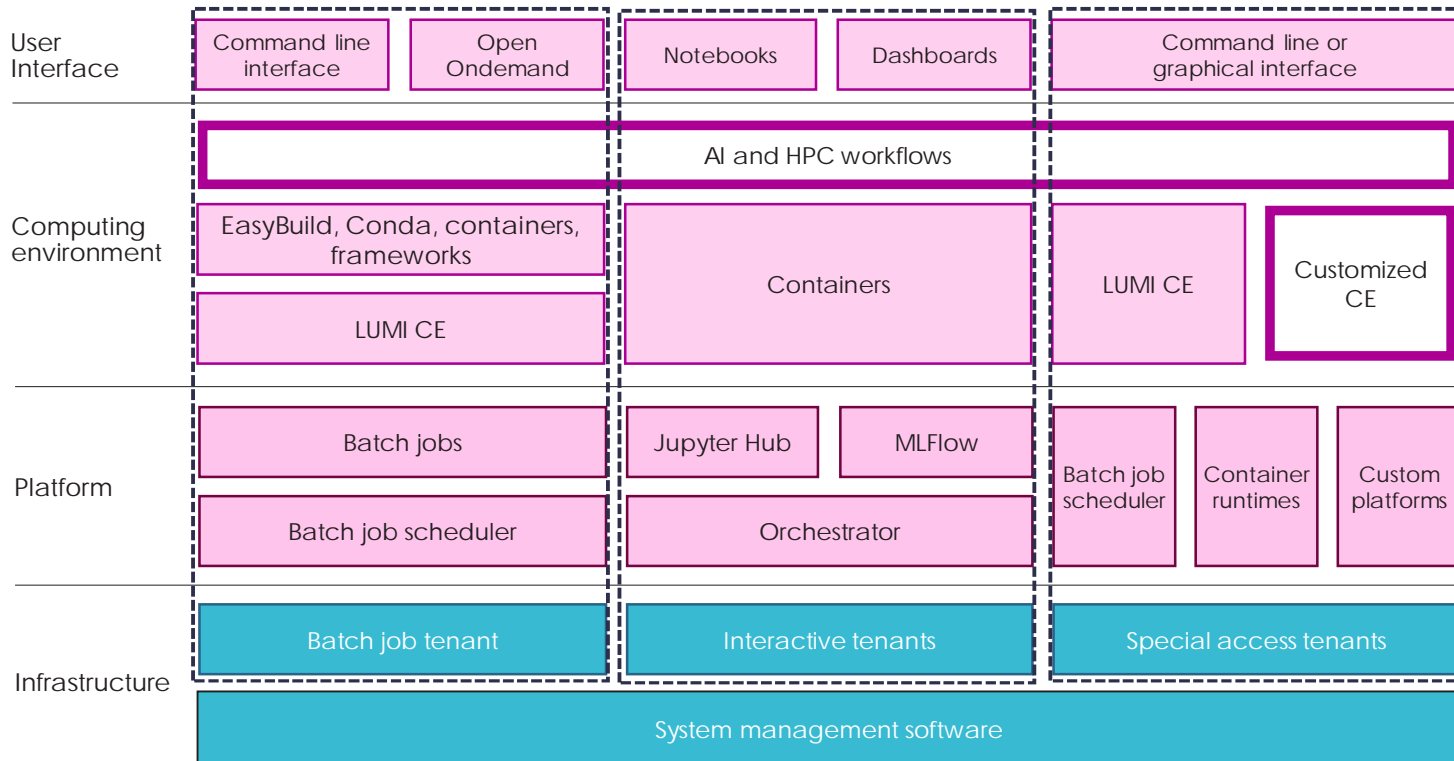
LUMI AI Factory timeline



LUMI-AI architecture: HPC + cloud computing converged



LUMI-AI system architecture: Software-defined clusters



The ability to flexibly deliver:

- SaaS-like experience (AI platform / inference & model serving),
- PaaS-like experience (HPC environment / managed runtime),
- exposure of the IaaS layer so user communities can deploy their own stack.

- Maintained by end users and user communities
- Maintained by CSC platform admin team
- Maintained by CSC infrastructure admin team together with vendor's team

Concluding remarks

- We can serve the AI community, including enterprises, with HPC systems: "AI supercomputing". The same platform can cater for the scientific simulation workflows of this and the early next decade.
- Building blocks of an AI supercomputer
 - Sufficient computing power to support large-scale GPU jobs – and CPU jobs
 - Expert support services! Here HPC centers can differentiate.
 - Data environment: Datasets-as-a-Service, dynamic data
 - Decomposable software stack (SaaS / PaaS / IaaS)
 - Model serving capabilities and interactive resources
 - Elevated support for confidentiality
 - AI interfaces and assistants
- LUMI AI Factory empowers Europe's AI, scientific computing, and AI for science ecosystem with one of the most advanced and powerful HPC+AI+QC platforms in the world