

FROM BIG DATA TO ARTIFICIAL INTELLIGENCE: THE COURSE AHEAD

XI Italian Business Forum
VII Italian Research Day

Ljubljana
9-10 April 2024

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meets



LEONARDO

Dr. Claudio Arlandini, PhD



EuroHPC
Joint Undertaking

CINECA



REPUBLIKA SLOVENIJA
REPUBLIC OF SLOVENIA
Ministrstvo za izobraževanje, znanost in šport
Ministry of education, science and sport



AN EVER-EXPANDING CONSORTIUM

CINECA

CINECA HAS BEEN SUPPORTING THE EU ACADEMIC SYSTEM SINCE 1969



118 CONSORTIUM MEMBERS

Ministero Università-Ricerca and Ministero Istruzione,
Università - Public research organisations and
institutions - University polyclinics/IRCCS



5 SITES

Bologna, Milano, Roma, Napoli, Chieti



≈ 110 MLN €

Turnover 2021



≈ 1100

Employees



THE PRESENT

CINECA

10 billions

computing hours
over last 3 years

2000

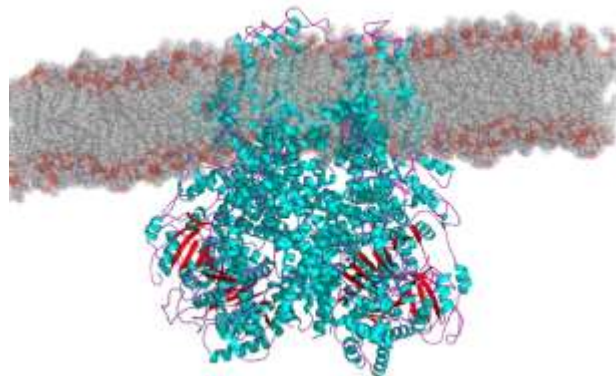
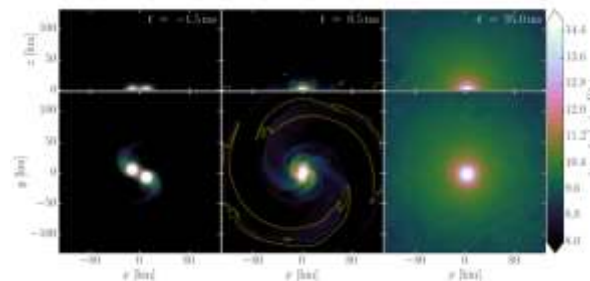
active HPC users

4000

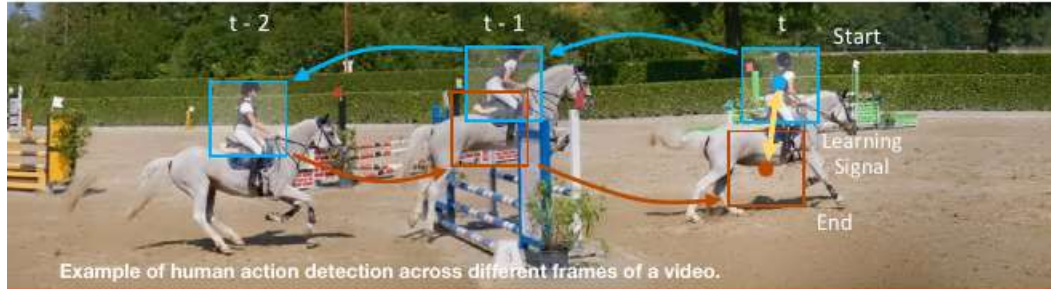
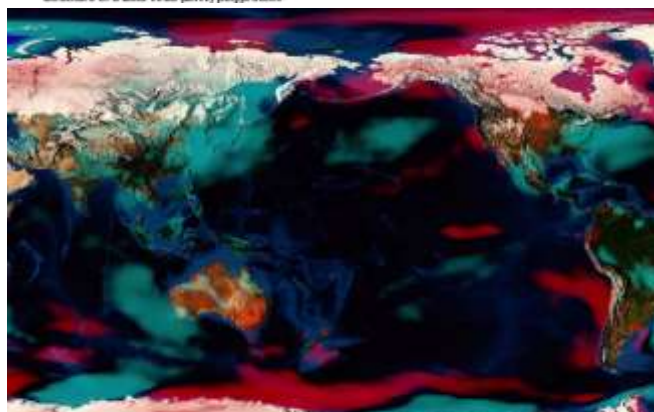
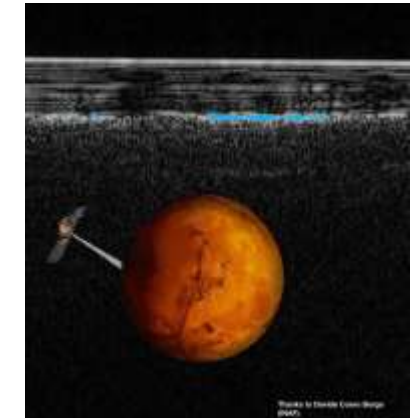
current HPC projects

500

Students in
courses and schools

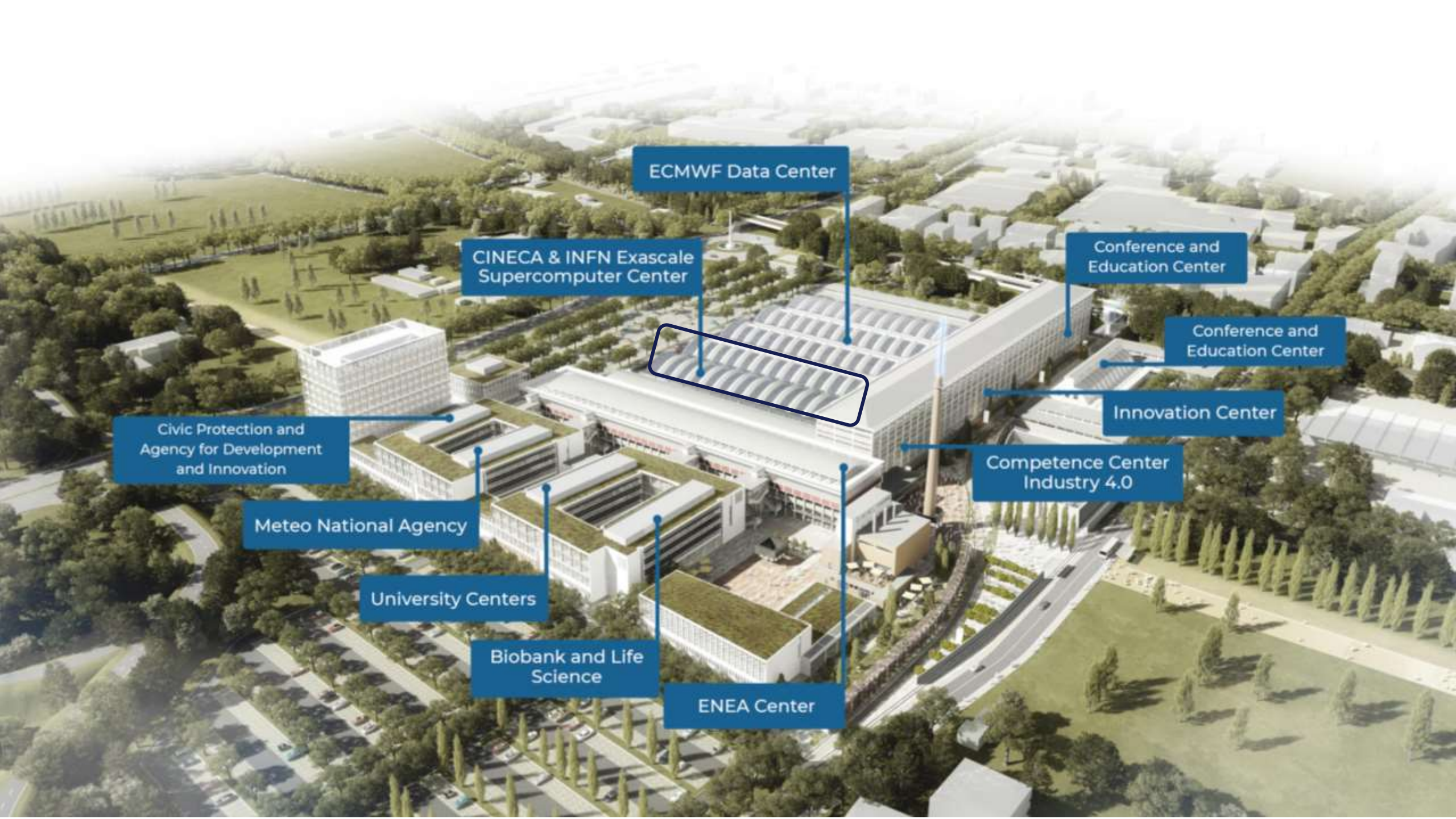


Structure of a Zika Virus (ZIKV) polyprotein.



Example of human action detection across different frames of a video.





ECMWF Data Center

CINECA & INFN Exascale Supercomputer Center

Conference and Education Center

Conference and Education Center

Innovation Center

Competence Center Industry 4.0

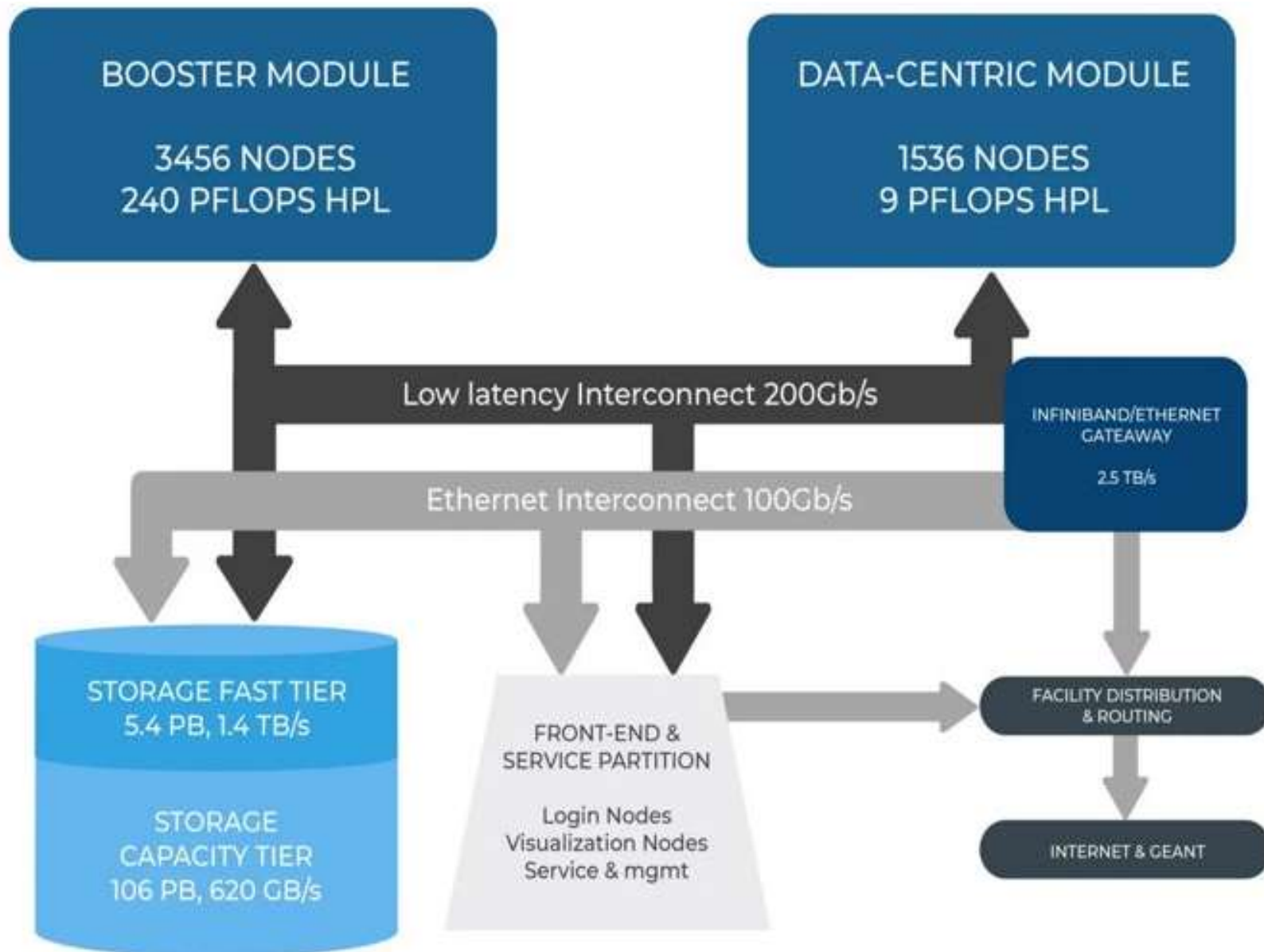
ENEA Center

Biobank and Life Science

University Centers

Meteo National Agency

Civic Protection and Agency for Development and Innovation



- 4th Top500: 240 PF + 9 PF
- TCO Investment: 240M€
- 95% Direct Liquid Cooled
- >100PB (NVMe+HDD)
- Warm water: 37-47 degrees
- HDR 200 interconnect
- Dragonfly+ topology



HOW TO ACCESS LEONARDO

EU-WIDE and INDUSTRIAL ACCESS

- Goes through competitive calls managed by **EuroHPC JU**
 - Different tiers with increasing computing quotas and bureaucracy/competition
 - Benchmark / Regular / Extreme
- Including the new **Access Calls for AI and Data-Intensive Applications**

NATIONAL PARTNERS ACCESS

Selection criteria is left to individual partners



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Reserved: about 2 MLN core_hours on Booster Module
about 3 MLN core_hours on Data Centric Module

AND THE FUTURE

Leonardo Improvement Supercomputing Architecture (LISA)

Upgrade Leonardo supercomputer thanks to a dedicated EuroHPC call launched in Q1 2022

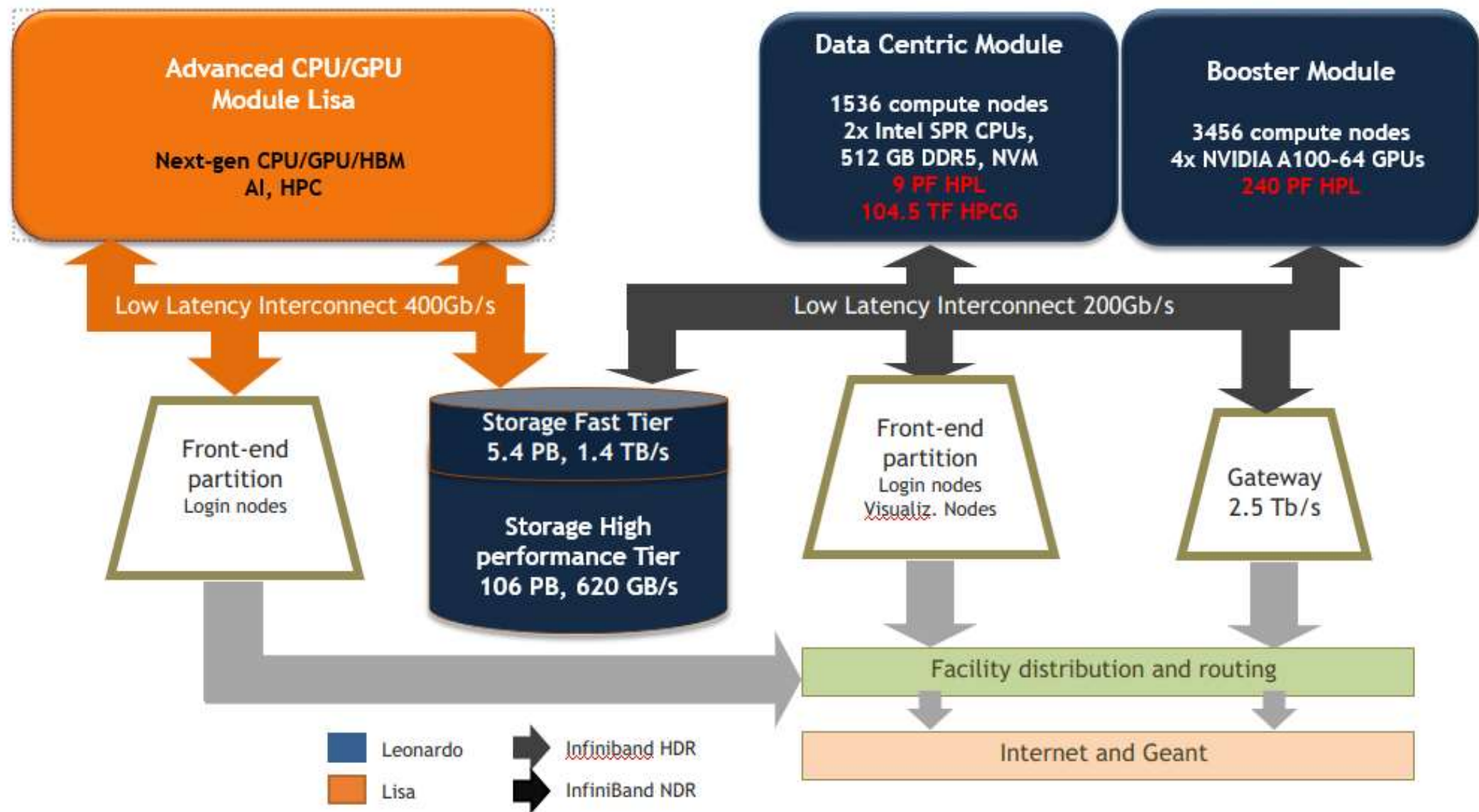
EuroHPC responsible for the tender procedure as was for Leonardo procurement. CINECA provides the technical specifications for the bids

Focus in extending the compute partition with an **AI computing modules**; some **AI computing technologies** are under investigation

Time frame: **installation H2-2024**

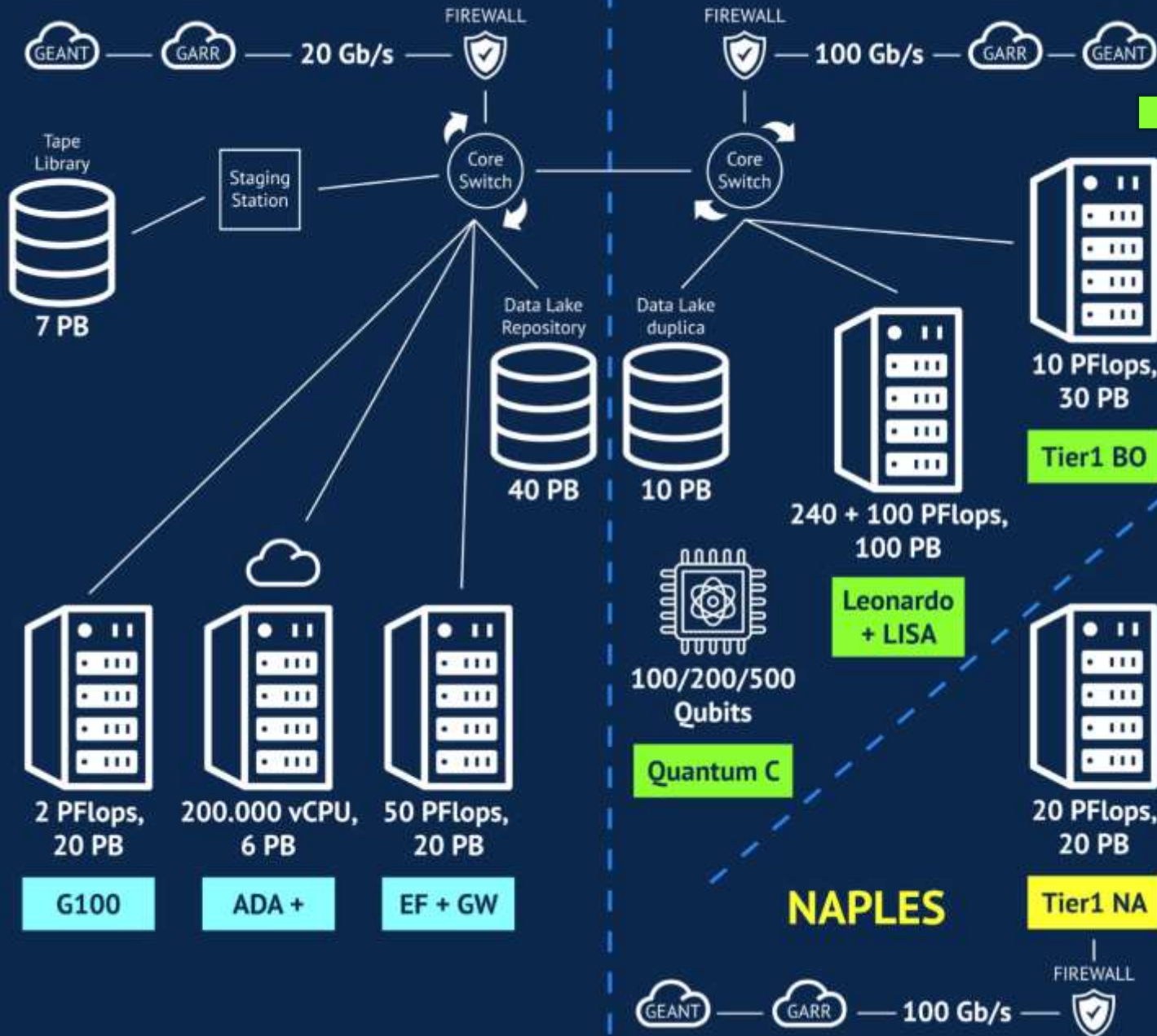


LISA



BOLOGNA

BOLOGNA TECHNOPOLE



AN INDUSTRY-GRADE PLATFORM

CALL FOR EXPRESSION OF INTEREST for the selection of consortia of private partners and the Hosting Entities for the procurement of Industrial High Performance Computers

https://eurohpc-ju.europa.eu/call-expression-interest-selection-consortia-private-partners-and-hosting-entities-procurement_en

A system designed for and dedicated exclusively to industry, with enterprise software stack, cloud access and appropriate service level agreements and security standards

Access to resources follows the logic of time-sharing: each party is entitled to a share of calculation resources proportional to the share of TCO incurred, also with the possibility of dynamic allocation of resources according to needs.

The instrument is a **public-private partnership**:

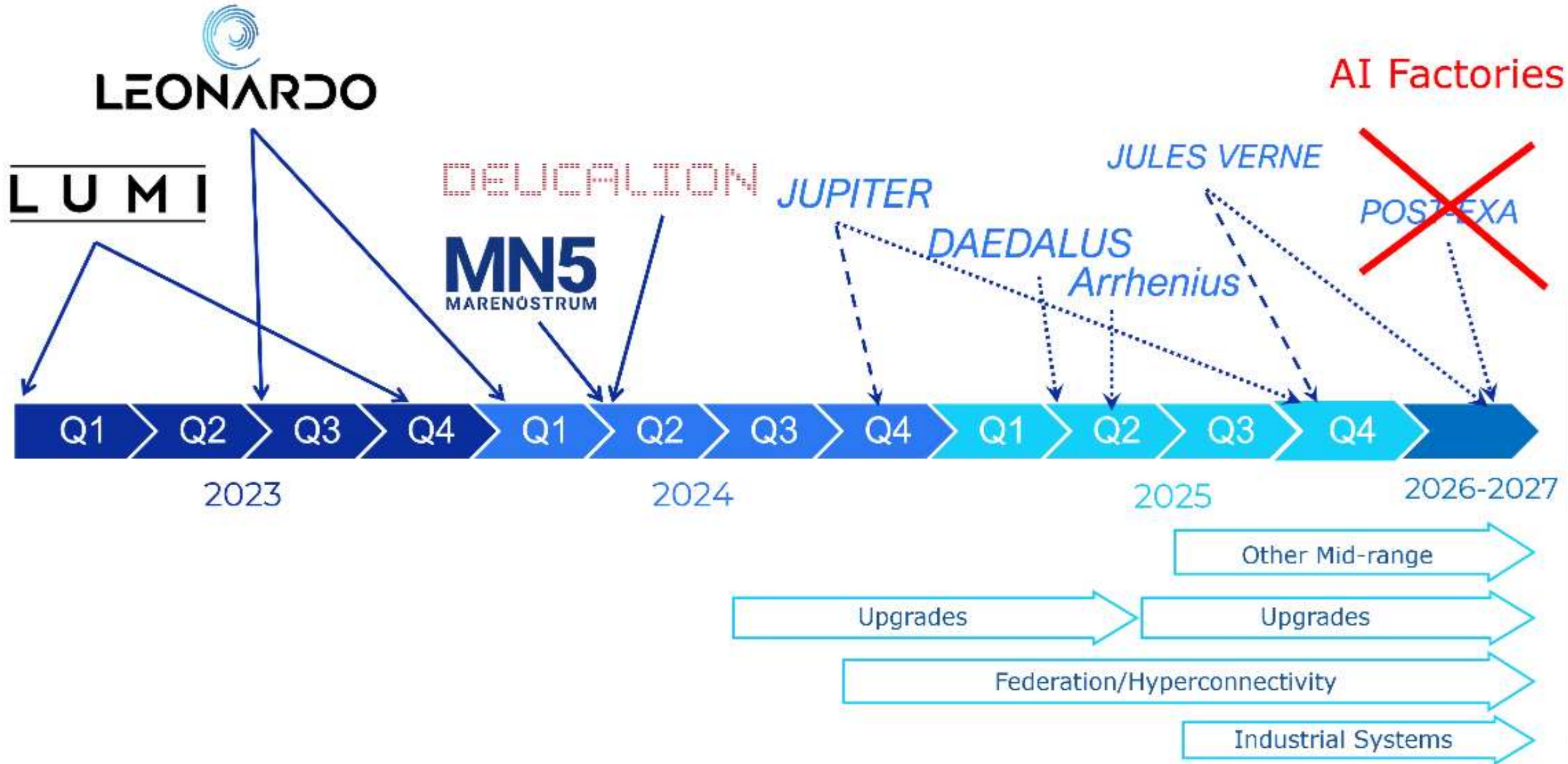
(1) management is by Cineca

(2) EuroHPC JU covers 35% of the CAPEX

(3) a consortium of private entities covers the remaining TCO

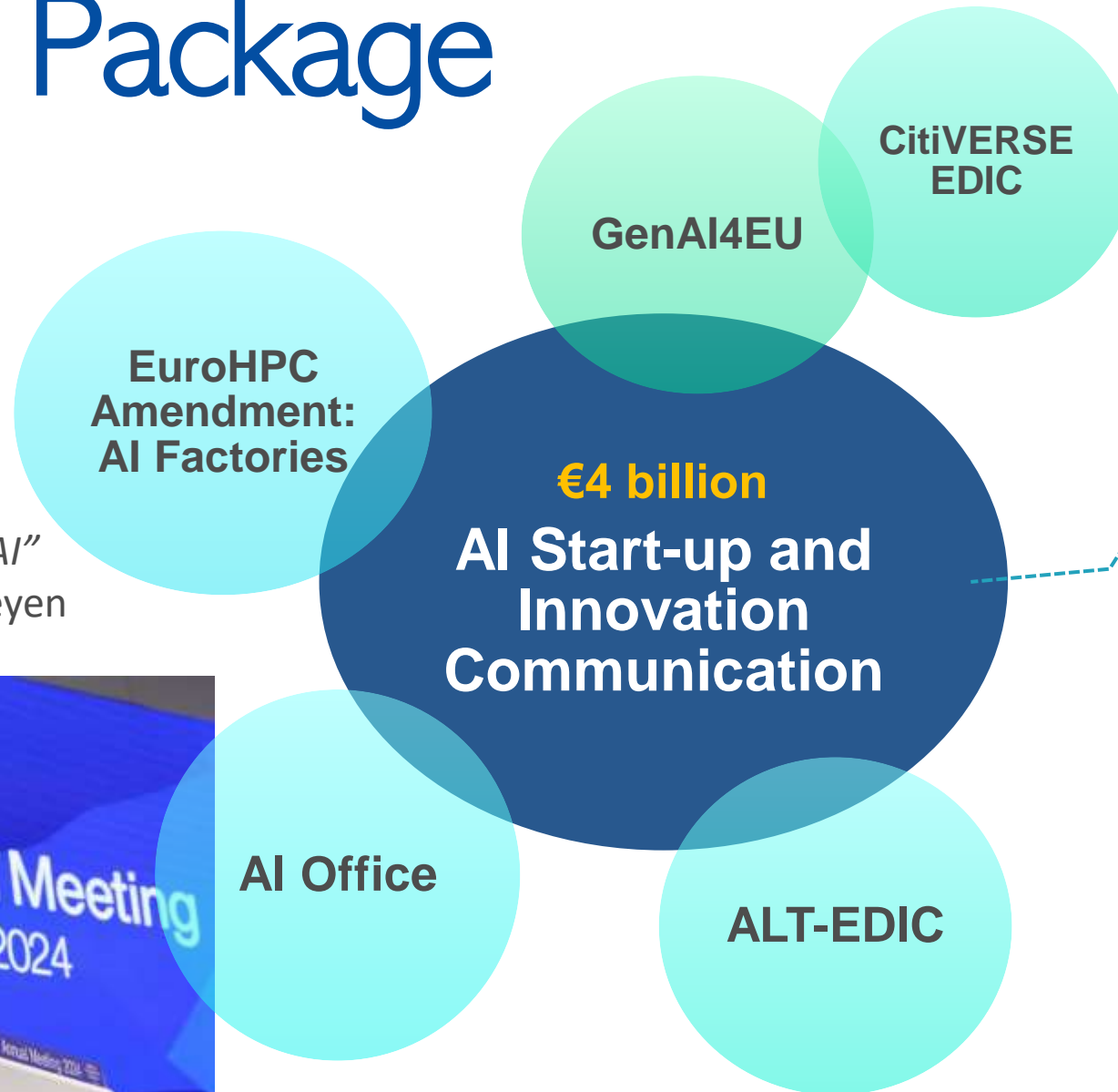
**BUT THE REAL
CHALLENGE AHEAD
REQUIRES A EU-WIDE
RESPONSE**

TIMELINE OF UPCOMING SYSTEMS



The AI Package

"Europe must up its game on AI"
Ursula von der Leyen

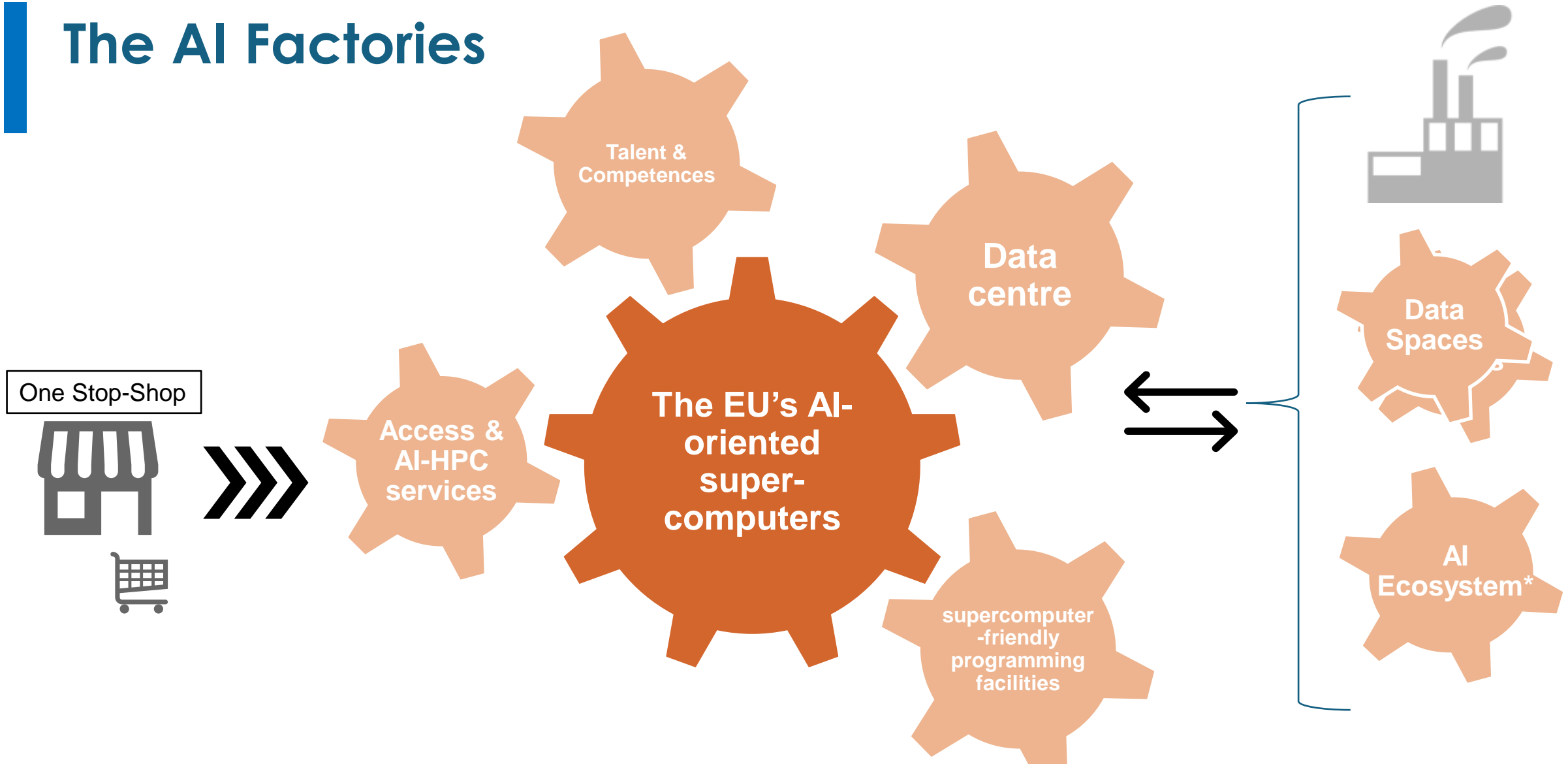


Key Ingredients for AI

- **Data Access**
- **Algorithms**
- **Investment**
- **Skills**
- **Processors**



The AI Factories



*AI Ecosystem:

Testing and Experimentation Facilities, AlonDemand Platform, AINetworks of Excellence, AI-Data-Robotics PPP

CINECA

THANK YOU

hpc.cineca.it

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