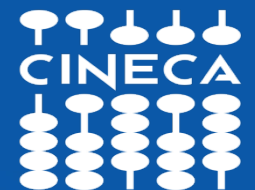
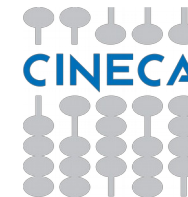


SCAI
SuperComputing Application & Innovation
CINECA

Daniela Galetti - December 2019



CINECA at a glance



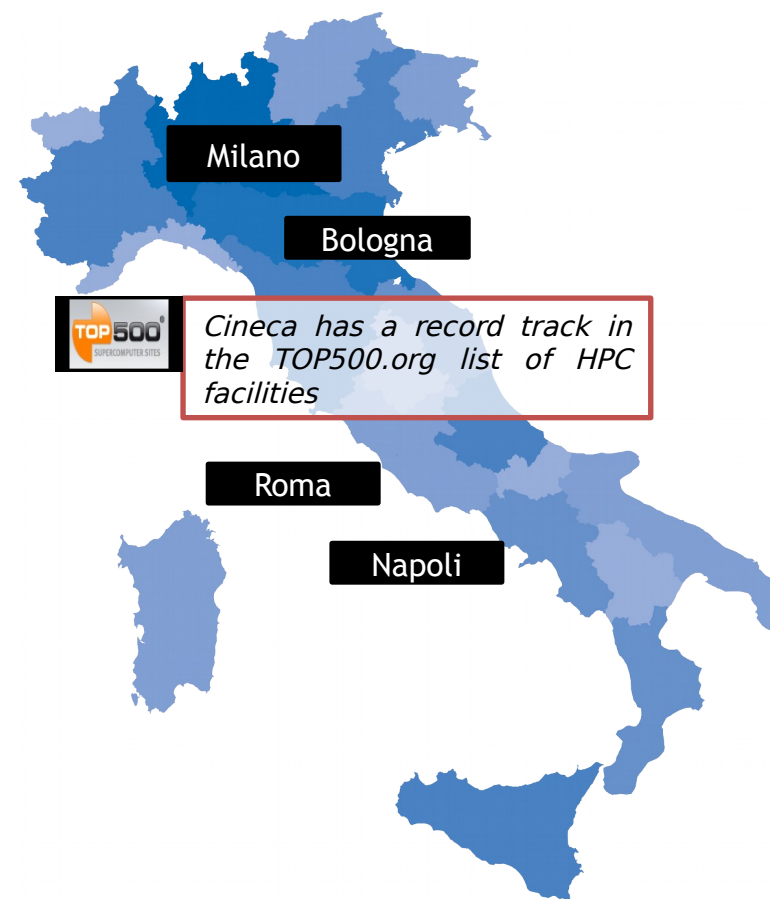
CINECA is a **Consortium of Universities**,
founded in 1969 by (MIUR) to support scientific research
CINECA is a not-for-profit organization

Members:

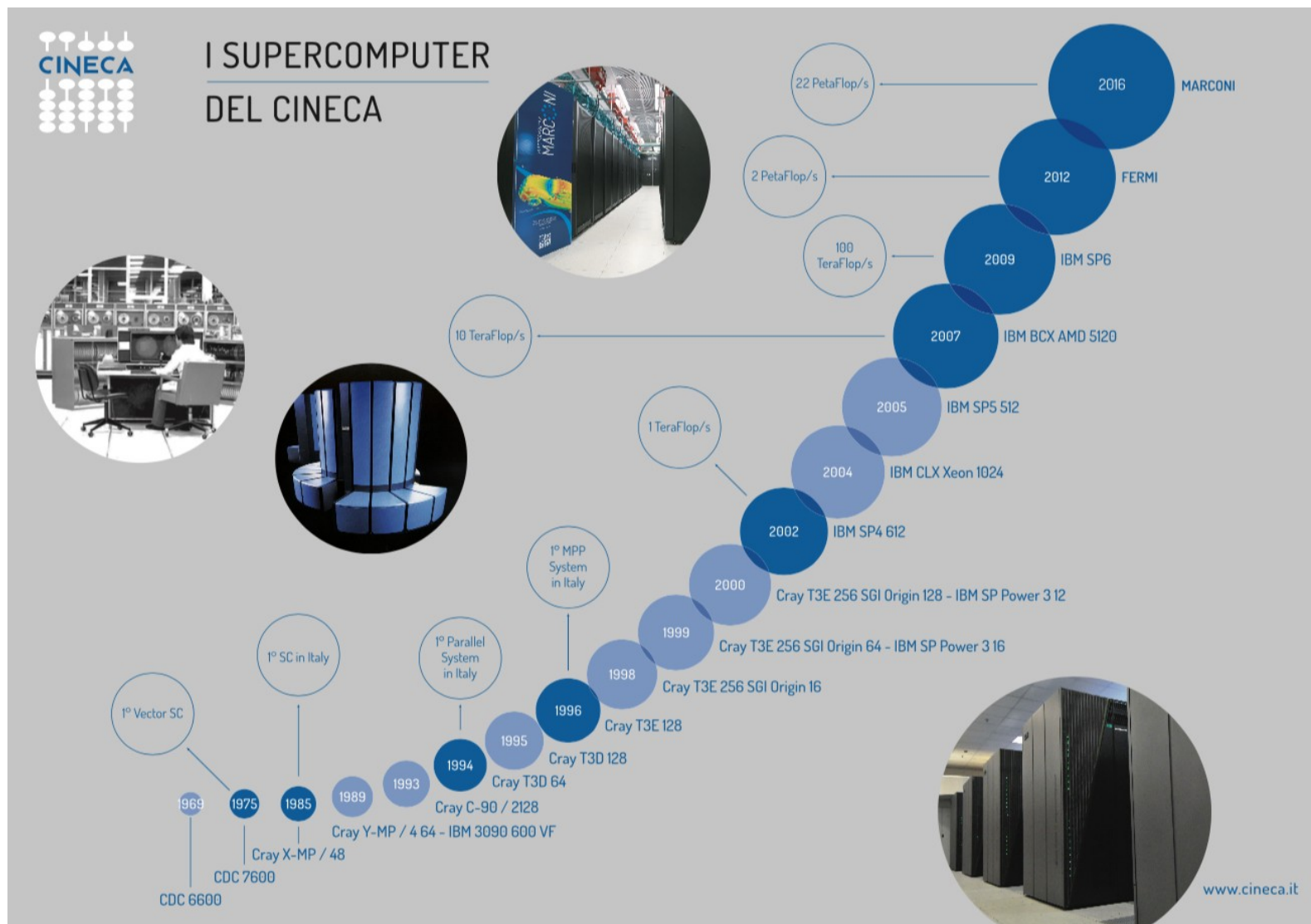
- ➔ MIUR
- ➔ 67 Italian Public Universities
- ➔ 9 Institutions (Anton Dohrn, CNR, CREA, INAF, INDIRE, INFN, INRIM, INVALSI, OGS)
- ➔ 1 Hospital (Policlinico Umberto I)

In-house provider:

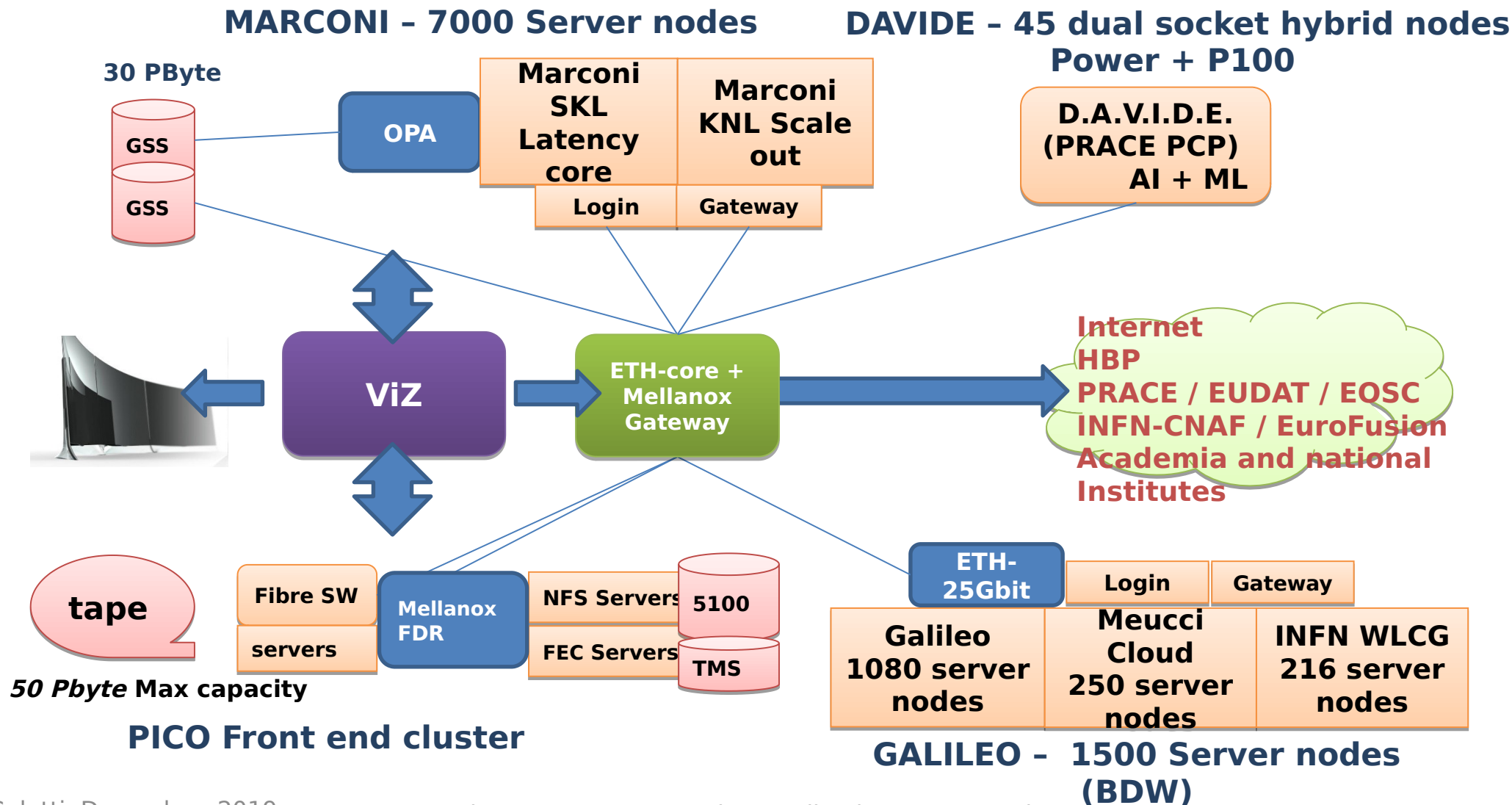
- ✓ Supervised by MIUR
- ✓ No private capital
- ✓ 80% of activities towards Consortium members
- ✓ 20% Technology Transfer
- 🔴 Annual Budget: 100M€
- 🔴 Employees: 700



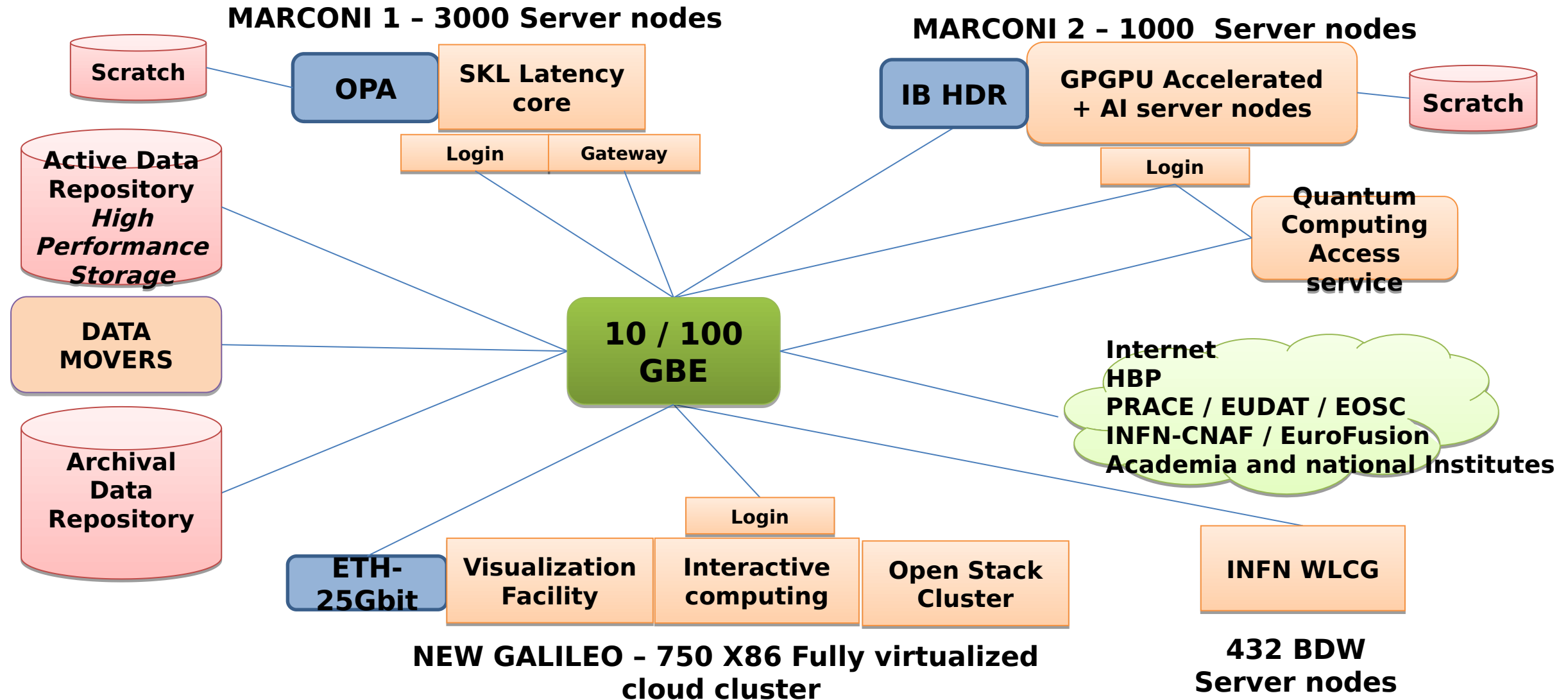
CINECA HPC Systems' History



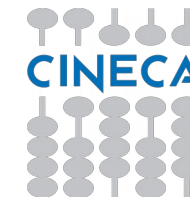
HPC architecture infrastructure



Next development HPC architecture infrastructure



Partecipazione in Horizon 2020



HPC infrastructure



Digital infrastructure



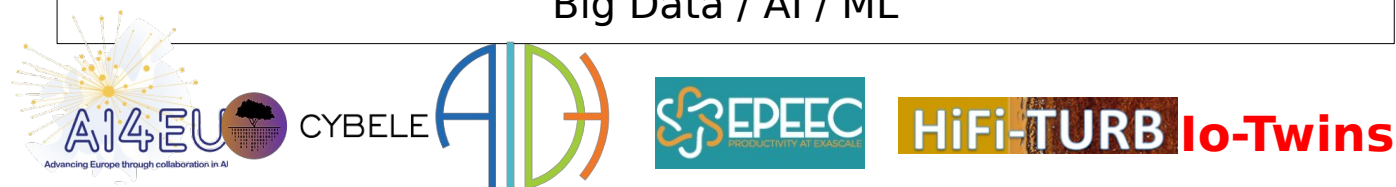
HPC Center of Excellence



Environment



Big Data / AI / ML



Highlander

Life Science



Multimedia / Cultural Heritage



Energy efficiency



Low Power Microprocessor



Supporting Innovation

Industrial Area

Chemistry
Life Science
Engineering
Geophysics
AI & ML
Cultural Heritage

Main Activities

Molecular Dynamics
Material Science Simulations
Geophysics Simulations
Fluid dynamics Simulations
Applications Developments
Engineering Applications
Code Parallelization
Code Optimizations
Graphics interfaces & VR





LEONARDO



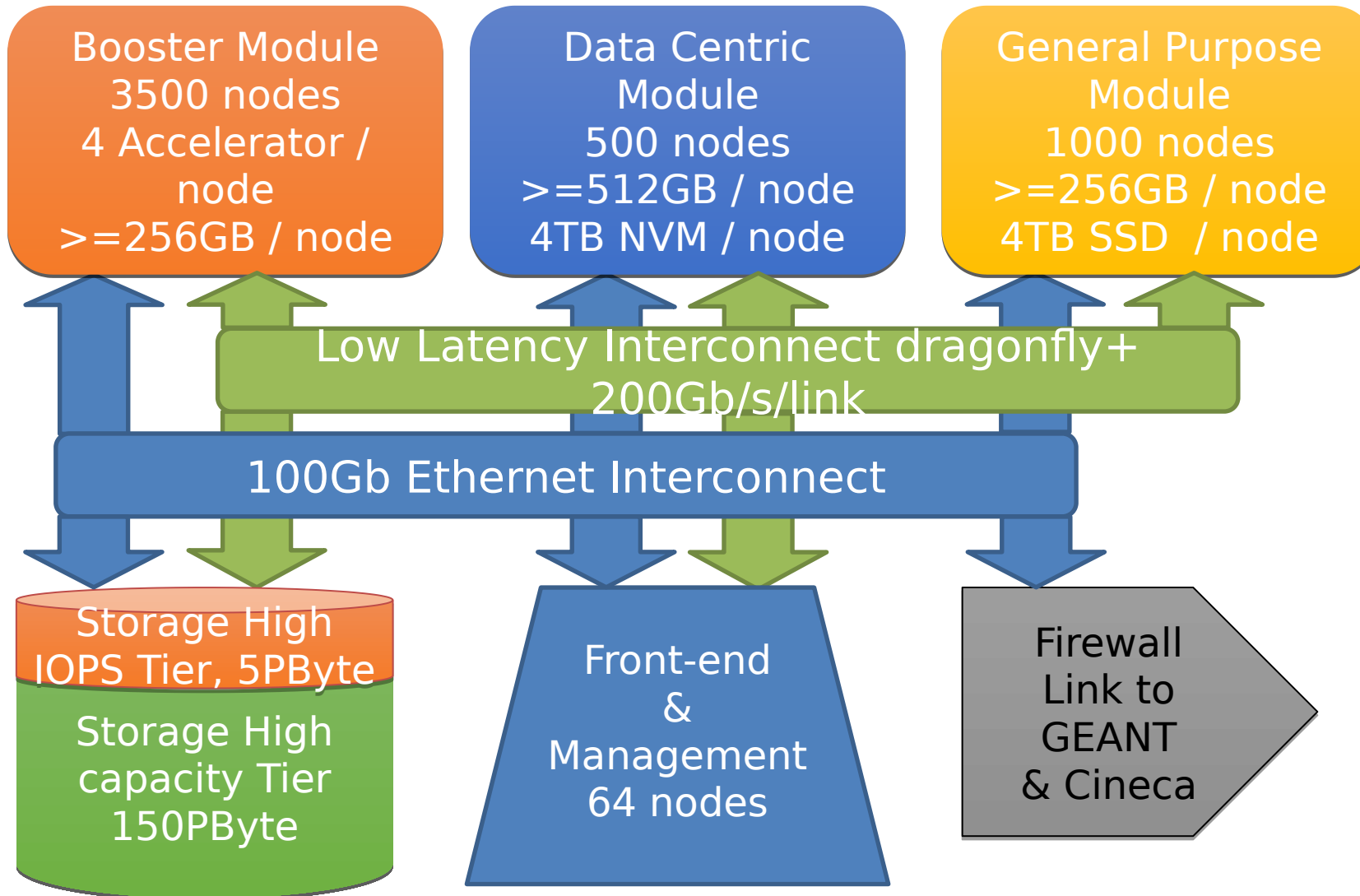
REPUBLIKA SLOVENIJA
REPUBLIC OF SLOVENIA
Ministrstvo za izobraževanje, znanost in šport
Ministry of education, science and sport
Masarykova cesta 16, SI - 1000 Ljubljana



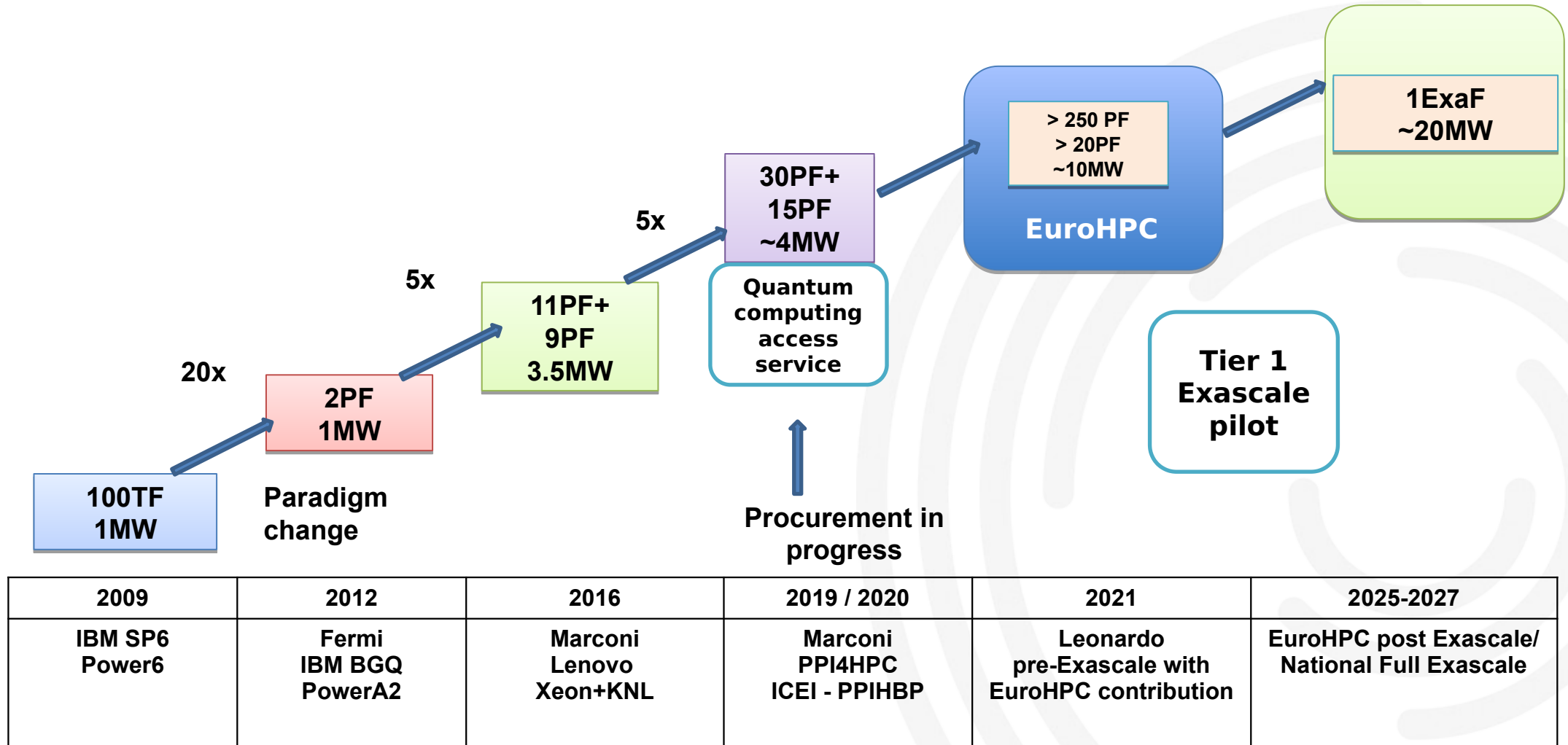
MINISTRY
OF EDUCATION, SCIENCE,
RESEARCH AND SPORT
OF THE SLOVAK REPUBLIC



Leonardo High Level description

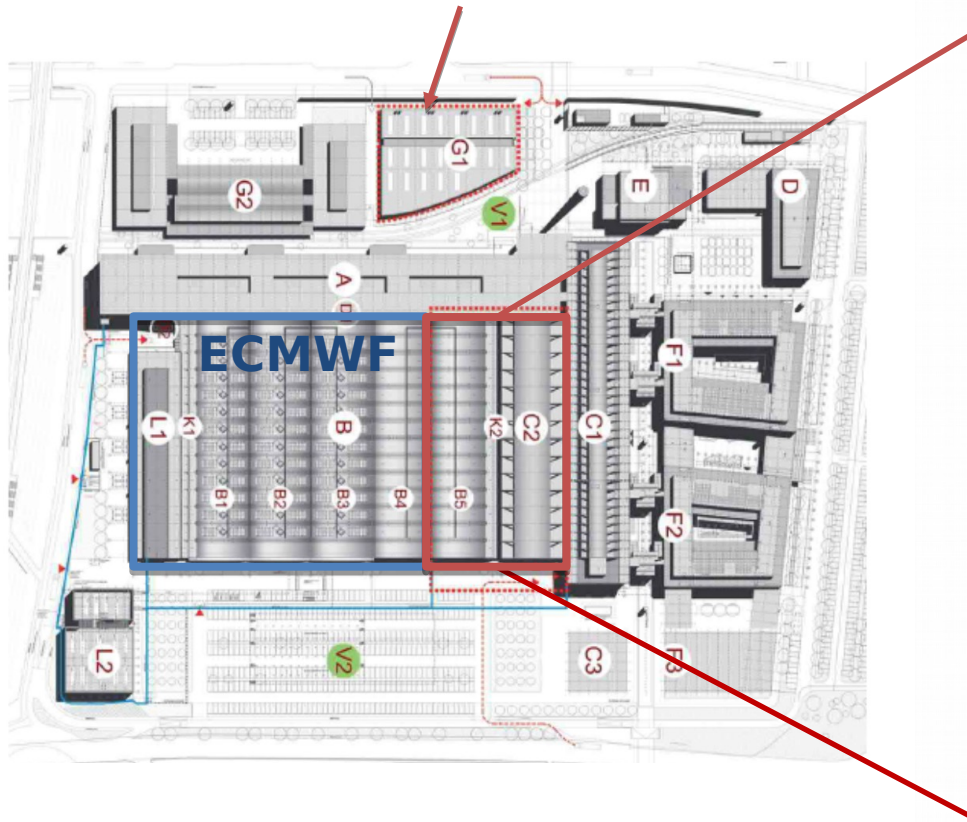


HPC RoadMap



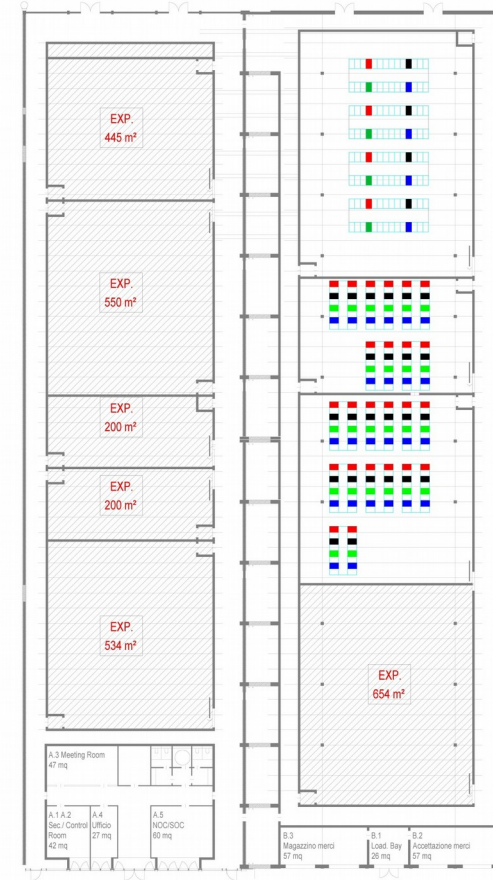
A modern energy efficient new data center capable of hosting a full exascale system

Cooling equipment
3MW (2020) -> 5MW(2023)



$PUE < 1.1$

Computer Rooms
10MW (2020) -> 20MW (2023)



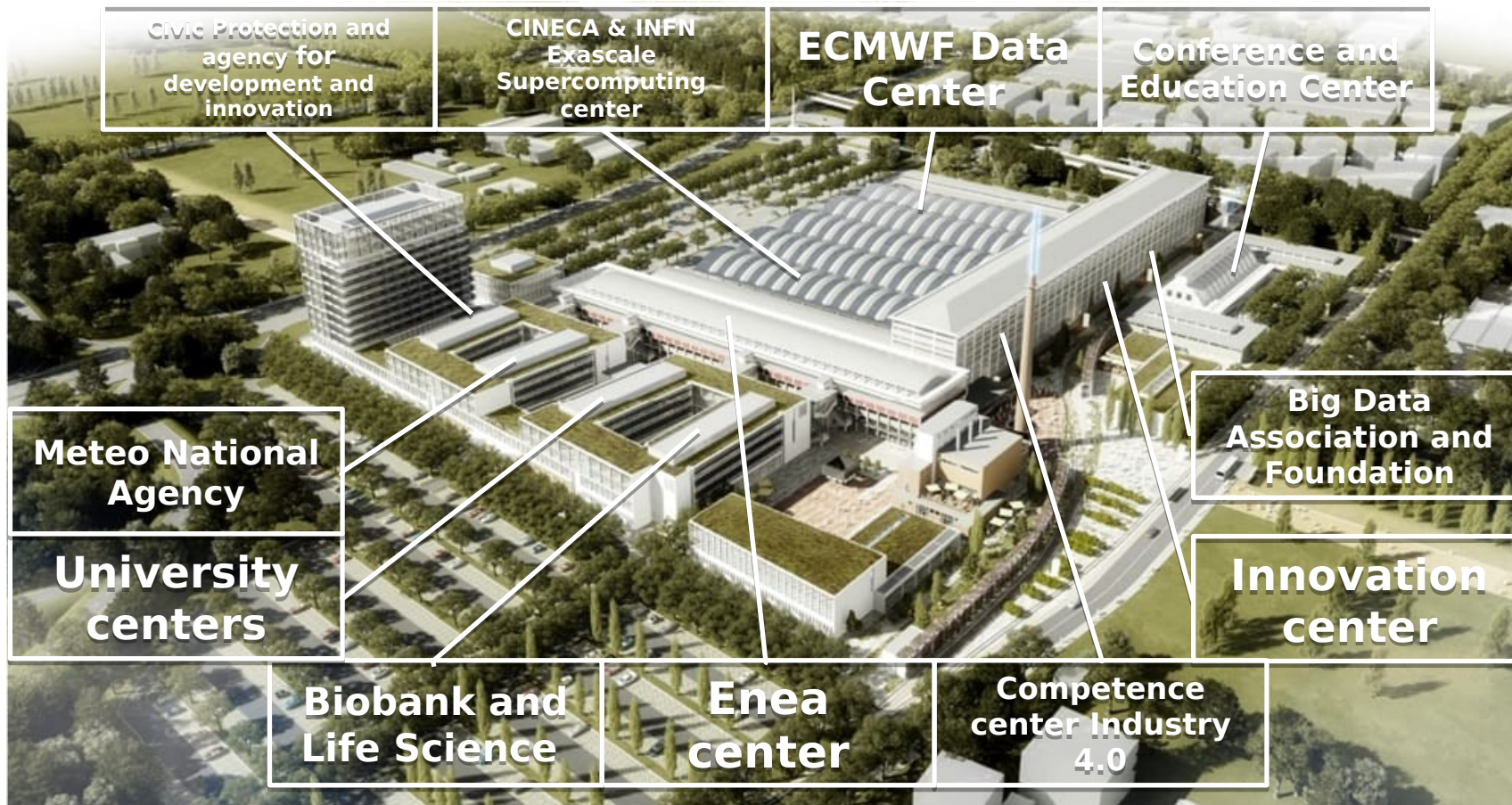
8MW hot water
DLC
Compute nodes

2MW AIR Cooled
Storage +
Ancillary

DATA ROOM STAGE 1: 1600 sqm
DATA ROOM STAGE 2: 2600 sqm
ANCILLARY SPACES: 900 sqm

World class HPC European Hub

Bologna Big Data Science Park





Big Data Association partnership - BDA

- Governance
- Inclusiveness
- National & International Networking
- Awareness
- Funds raise

Leonardo will enable...

Medical treatments tailored to the patient

internet-of-Things

New material from scratch

Simulate formation of galaxies

Source of gamma-ray bursts

Predict solar eruptions

Properties of elementary particles

Next-generation weather forecasting

Advanced quantum chromodynamics

Uncertainty quantification in predictions

Understanding of general relativity

New algorithms / non-traditional areas

New batteries

Direct numerical simulations of Navier-Stokes eqs.

Improve nuclear power, hydropower, wind turbines