



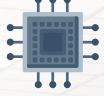
# EuroHPC Summit Week 2022



Leonardo precursor-of-exascale system  
G. Scipione, D. Cesarini (CINECA)

From 22 to 24 March 2022 | Paris, France

#EHPCSW #PRACEdays

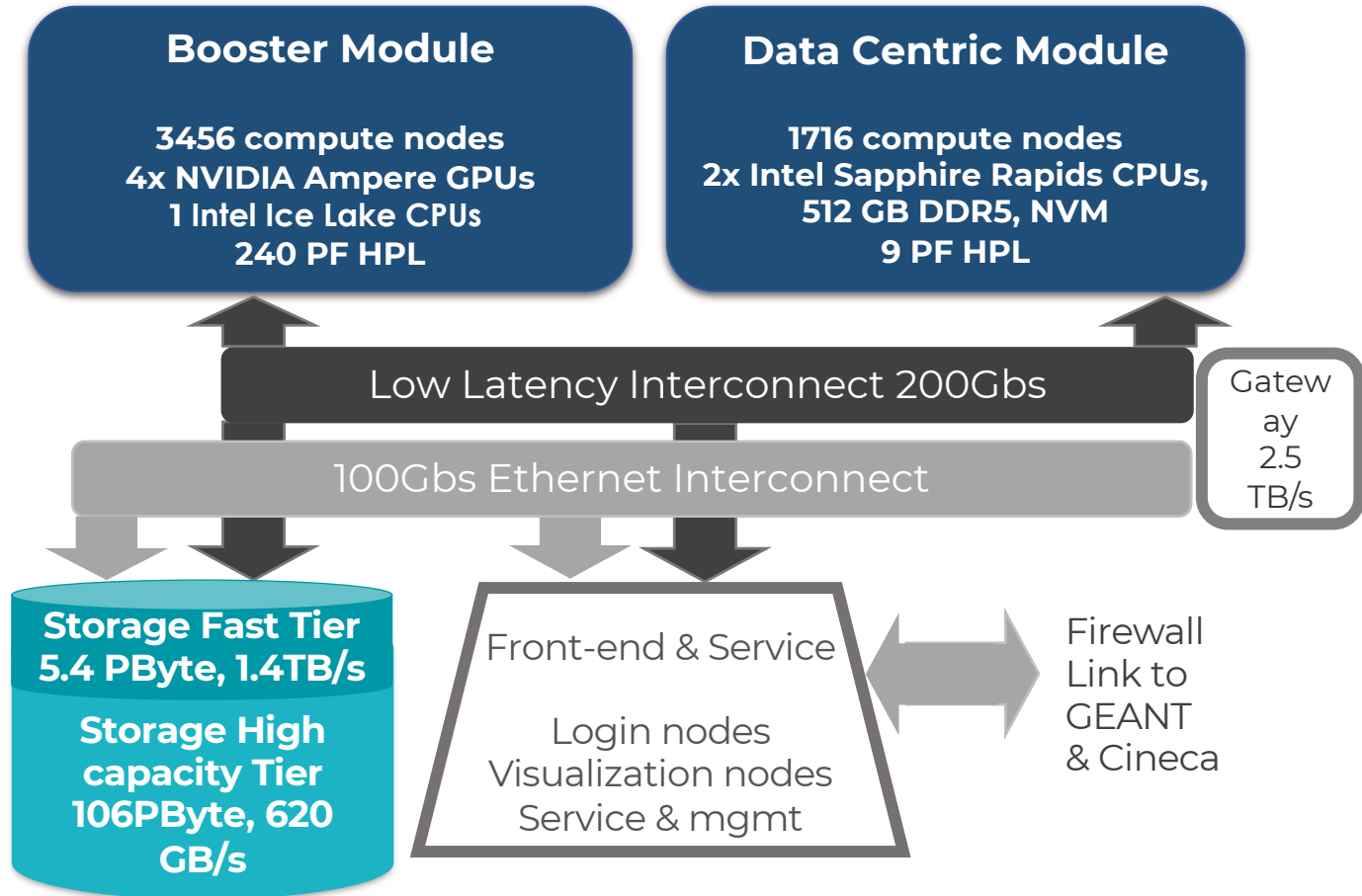


# Leonardo – Pre-exascale HPC system

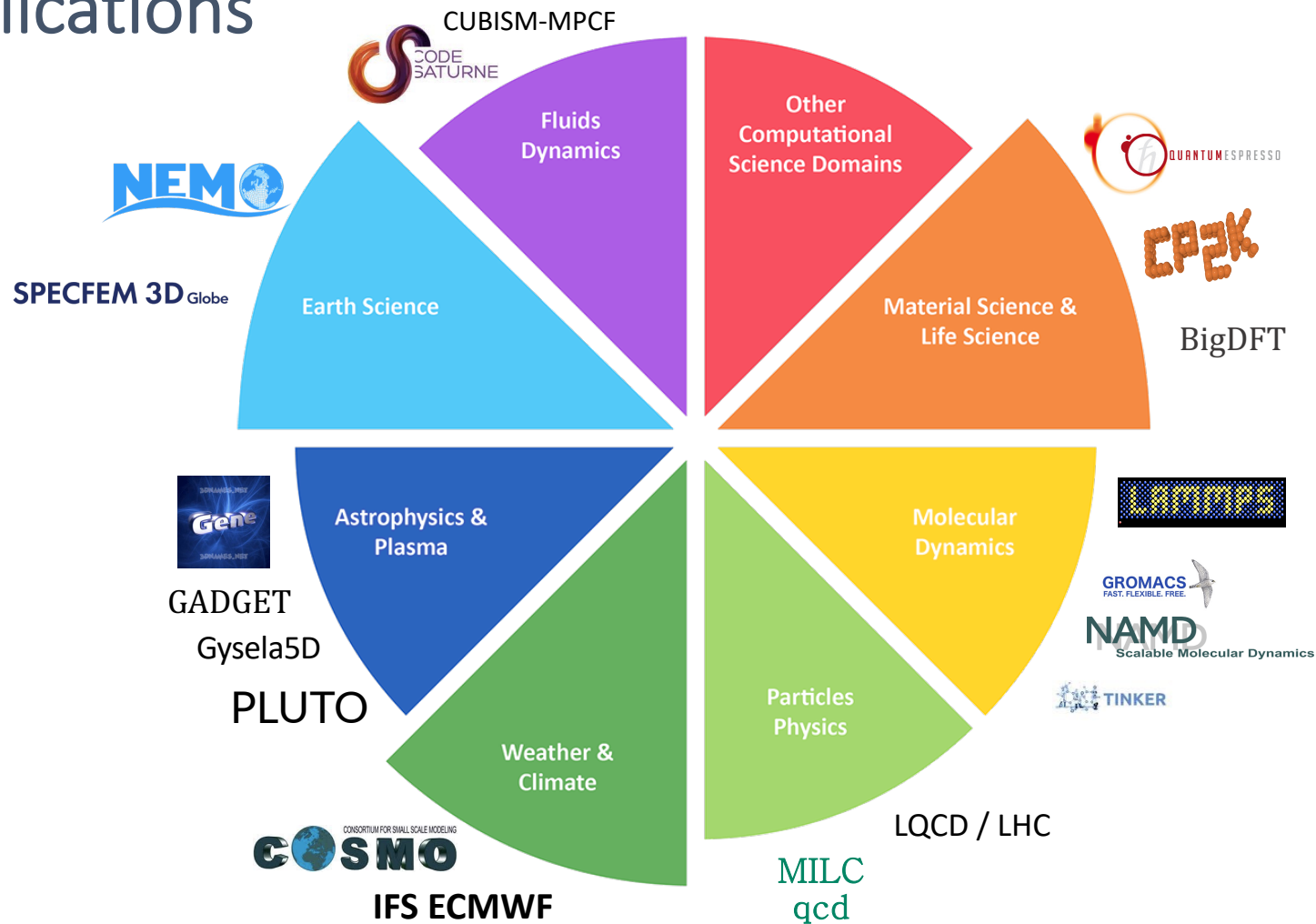


- Based on Atos BullSequana XH2000 technology
- 13,000 GPUs based on NVIDIA Ampere architecture
- 3456 GPU nodes (Intel Ice Lake + Nvidia GPUs)
- 1536 GPP nodes (Intel Sapphire Rapids)
- 250 Petaflops – 120 PByte
- Computing racks 95% Direct Liquid Cooled
- Warm water: Inlet temperature of 37 degrees, outlet 47 degrees
- NVIDIA Mellanox HDR 200 interconnect
- Dragonfly+ topology
- 1.11:1 (intra-cell)
- 0.8:1 globally

# Leonardo Modular Computing



# Applications





AtaS

 **LEONARDO**



CINECA



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# Tecnopolo di Bologna

1950s structure designed by Ing. Pier Luigi Nervi

ECMWF DC relocation

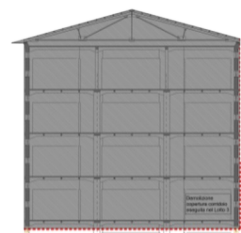
# CINECA



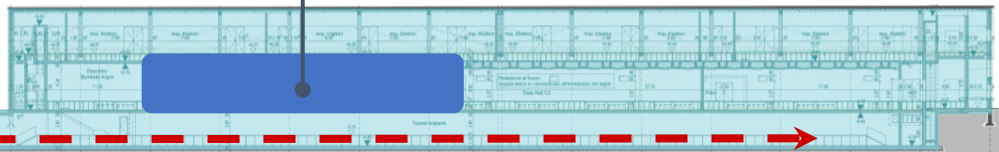
Capannone Miscela C2 - LEONARDO



Ballette building

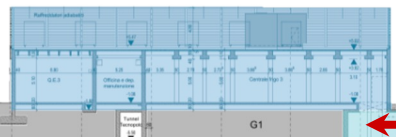


Data Hall Leonardo



Capannone Miscela C2

Technological center G1



Technological tunnels



MEP connections



## Vision of Cineca on exascale and quantum

Paragrafo

### FERMI

IBM BCQ  
POWER A2  
2 PetaFLOPS  
2 MW

2009



5x

5x/10x IN TOTAL

### MARCONI 100

PPI4HPC  
ICEI-PPHIBP  
50+ PetaFLOPS  
~4 MW

2019/2020



5x/1x LATENCY CORES

WITH  
EUROHPC  
CONTRIBUTION

QC

Quantum Computing  
Integration with  
HPC

2023/2025



### IBM SP6

Power6  
100 TeraFLOPS  
1 MW

2009



PARADIGM  
CHANGE

### MARCONI

Lenovo  
Xeon+KML  
11+9 PetaFLOPS  
3.5 MW

2016



### LEONARDO

>250 PetaFLOPS  
>20PetaFlops  
~10MW

2021/2022



QCaaS:

### EXASCALE

Exascale with EuroHPC  
3.5 | 1 ExaFLOP  
~20MW

2025/2027

D-WAVE  
The Quantum Computing Company



PASQAL

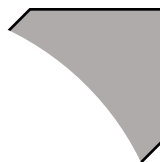
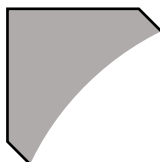


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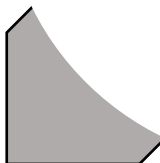
#PRACEdays #EHPCSW



**CINECA**



**LEONARDO**



**HELLENIC REPUBLIC**  
Ministry of Digital Governance



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



**MINISTRY OF**  
**INNOVATION AND TECHNOLOGY**

**Federal Ministry**  
**Republic of Austria**  
**Education, Science**  
**and Research**