Leading the way in European supercomputing with LUMI, the EuroHPC supercomputer located in Finland

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EuroHPC Joint Undertaking

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WHO ARE WE?

- A legal and funding entity (Art 187 of the Treaty on the Functioning of the European Union -TFEU)

- Created in 2018 & autonomous since September 2020

- Headquarters: Luxembourg

- A small team of 14 employees and in the process of recruiting around 30 additional employees throughout 2022

EuroHPC
Joint Undertaking

OUR MISSIONS

# THE EUROHPC JU POOLS THE RESOURCES OF ITS MEMBERS TO:

Develop, deploy, extend & maintain in Europe a **world-leading supercomputing, quantum computing, service** & **data infrastructure** ecosystem;

Support the development of **innovative supercomputing components, technologies, knowledge** & **applications** to underpin a **competitive European supply chain**;

Widen the use of **HPC** & **quantum infrastructures** to a large number of public & private users wherever they are located in Europe and support the development of **key HPC skills** for European science and industry.

INFRASTRUCTURE

- In 2022, the EuroHPC JU will increase the **available computing power** in Europe, with the acquisition of:

  - the first European **exascale** supercomputers,

  - the first **quantum** computers,

  - additional **mid-range** systems.

- In parallel, ongoing process to upgrade the existing EuroHPC systems.
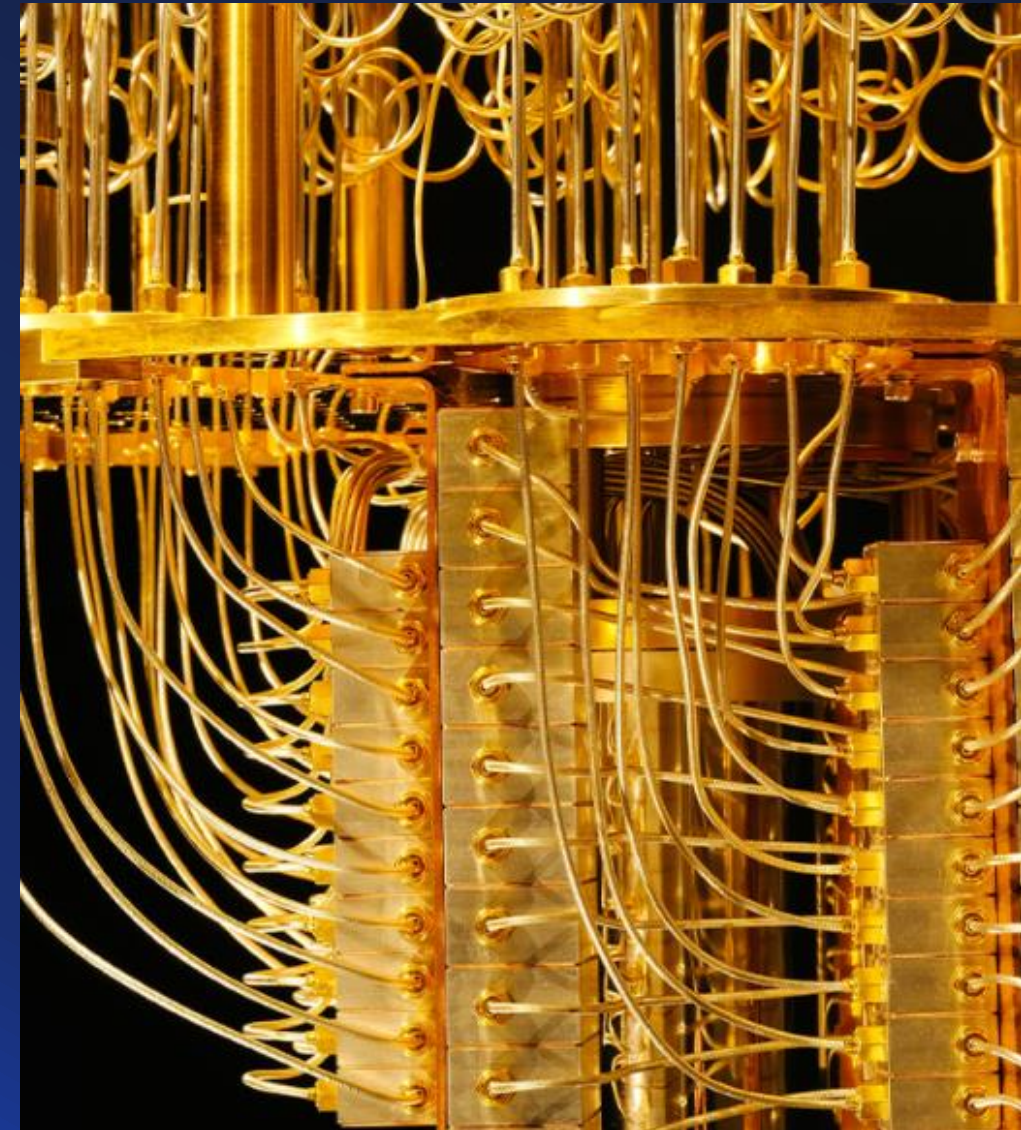
TECHNOLOGY, APPLICATIONS & INTERNATIONAL COOPERATION

- An ambitious research & innovation programme to develop a full European supercomputing supply chain, boost **European technological autonomy** & focus on **energy-efficient** HPC technologies,

- To further strengthen **Europe's leading position in HPC applications**, through supporting innovation via co-design & exploiting the synergies with **Artificial Intelligence**, **big data** and **cloud technologies,**

- To develop strategic research & innovation **partnerships in HPC with third countries**, including facilitating access for researchers to EuroHPC JU resources and co-development of HPC applications.

SKILLS & FEDERATION

- Further widen the use of HPC to a large number of public & private users **wherever they are located in Europe,**

- Support the development of **key HPC skills**, **education** & **training** for European science & industry,

- Establish a **one-stop shop** access point for any supercomputing or data service managed by the EuroHPC JU, providing any user with a **single point of entry.**

LEVEL AND SOURCES OF EU FUNDING 2021-2027

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Digital Europe Program

1.98B Eur

Infrastructure

Federation of supercomputing services

Widening usage and skills

Horizon Europe Program

900M Eur

Technology

Application

International Cooperation

Connecting Europe Facility

200M Eur

Hyperconnectivity

Data connectivity

*Member states to match this with national contributions

INFRASTRUCTURE

PRE-EXASCALE

PETASCALE

MareNostrum 5
Barcelona
SPAIN

LEONARDO
Bologna
ITALY

MeluXina
Bissen
LUXEMBOURG

Vega
Maribor
SLOVENIA

Discoverer
Sofia
BULGARIA

Karolina
Ostrava
CZECHIA

Deucalion
Guimarães
PORTUGAL

LUMI
Kajaani
FINLAND

The EuroHPC JU has already procured seven supercomputers:

- 2 Pre-exascale
- 5 Petascale
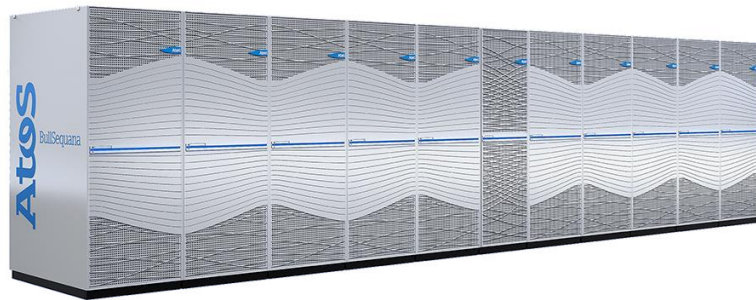
Total contracts cost: EUR ~360M

5 supercomputers are already operational:

- **Vega** in Slovenia,

- **MeluXina** in Luxembourg,

- **Karolina** in the Czech Republic,

- **Discoverer** in Bulgaria,

- **LUMI** in Finland (LUMI-C – CPU partition).
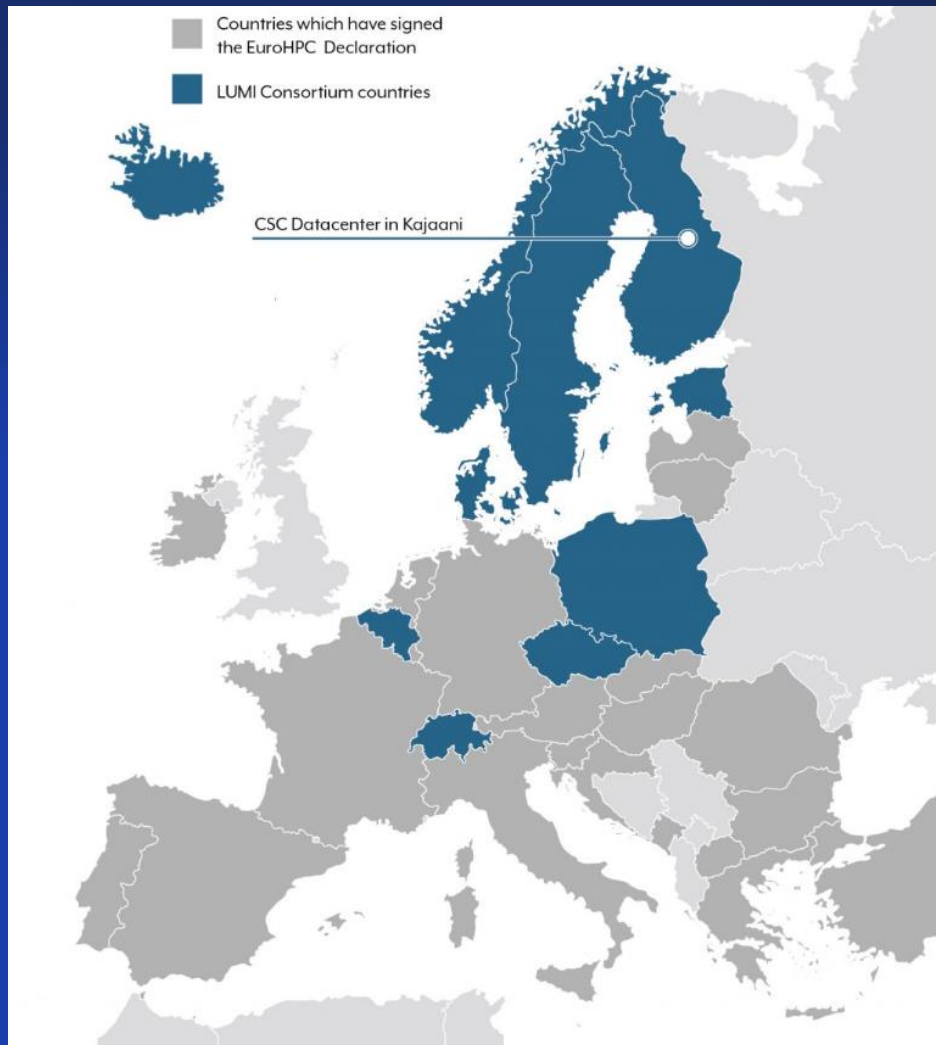
NOT JUST ABOUT POWER...

The EuroHPC JU is committed to building supercomputers which are both **powerful** and **eco-efficient** by:

- Procuring **energy efficient systems**, with low requirements for cooling. All our systems are **water cooled**, removing the requirement of high operational costs of air-cooled systems and in parallel reducing the energy footprint.

- Investing in the development of **next generation "green" microprocessors** that rely on energy efficient architectures.
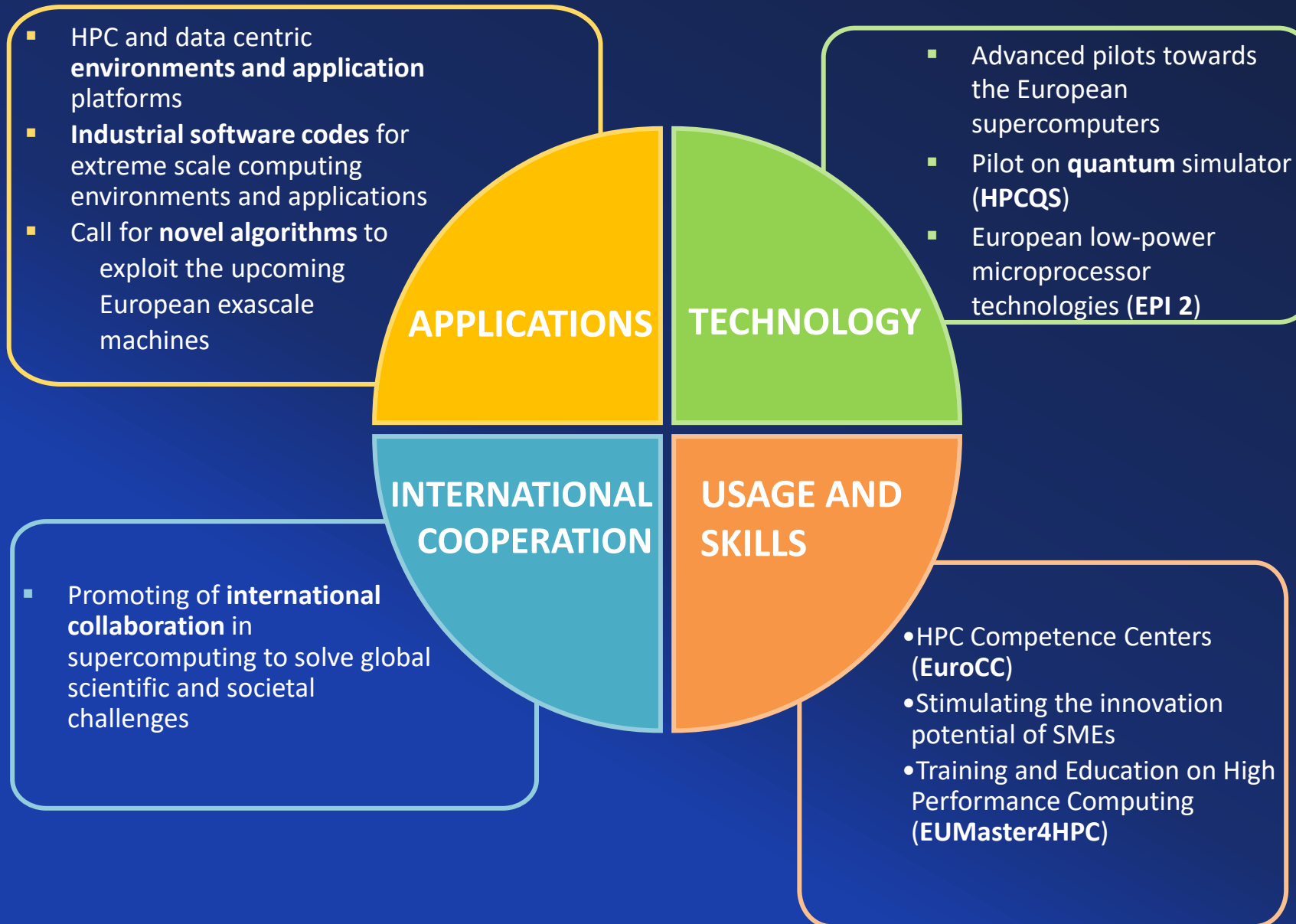
Green and sustainable technologies are a priority for the JU, as part of the European Green Deal's aim to make Europe climate neutral by 2050

LUMI, THE QUEEN OF THE NORTH

Countries which have signed the EuroHPC Declaration

LUMI Consortium countries

CSC Datacenter in Kajaani

- LUMI is the **most powerful** and the **greenest** supercomputer in Europe.

- The **Swiss army knife of science**: lending itself to a multitude research problems such as climate change, natural language processing, genomics & pandemic research.

- An **exceptionally green system**: running on 100% renewable hydroelectricity, using free cooling and with its waste heat being used for local district heating.

- A **unique endeavour** between **EuroHPC JU & 10 countries**, investing together in an HPC ecosystem.

- The LUMI Consortium: Finland, Belgium, Czech Republic, Denmark, Estonia, Iceland, Norway, Poland, Sweden, & Switzerland.

RESEARCH & INNOVATION

- HPC and data centric **environments and application** platforms
- **Industrial software codes** for extreme scale computing environments and applications
- Call for **novel algorithms** to exploit the upcoming European exascale machines

- Advanced pilots towards the European supercomputers
- Pilot on **quantum** simulator (**HPCQS**)
- European low-power microprocessor technologies (**EPI 2**)

APPLICATIONS

TECHNOLOGY

INTERNATIONAL COOPERATION

USAGE AND SKILLS

- Promoting of **international collaboration** in supercomputing to solve global scientific and societal challenges

- HPC Competence Centers (**EuroCC**)
- Stimulating the innovation potential of SMEs
- Training and Education on High Performance Computing (**EUMaster4HPC**)

The EuroHPC **R&I** activities aim to foster HPC uptake and support the **research**, **development** and **use** of HPC technologies and infrastructures across the EU.

✓ **2** open calls on National Competence Centres & New algorithms for applications on European exascale supercomputers

✓ **29** ongoing projects

USERS

WHO CAN ACCESS OUR SUPERCOMPUTERS?

- **What organisations are eligible for access to EuroHPC JU machines?**

Any organisation from a participating state is eligible for access to perform Open Science research. This includes public and private academic and research institutions, public sector organisations, industrial enterprises and SMEs.

- **What are the participation conditions?**

Participation conditions depend on the specific access call that a research group has applied. In general users of EuroHPC systems commit to:

- ✓ acknowledge the use of the **resources** in their related publications,
- ✓ contribute to **dissemination** events,
- ✓ produce and submit a **report** after completion of a resource allocation.

FOR WHAT PURPOSE?

The EuroHPC world-class infrastructure, available to users wherever they are in Europe, is powering a multitude of applications for:

- improving **quality of life** of European citizens,

- boosting industrial **competitiveness**,

- advancing **science**,

- ensuring European **technological and digital autonomy**.

THANK YOU

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https://eurohpc-ju.europa.eu

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