EuroHPC Joint Undertaking Information Day for SMEs

Introduction to EuroHPC Joint Undertaking

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EuroHPC
Joint Undertaking

WHO ARE WE?

- A legal and funding entity (Art 187 of the Treaty on the Functioning of the European Union -TFEU)
- Created in 2018 and autonomous since September 2020
- Based in Luxembourg (Cloche d'Or district)
- A small team of 30 employees and still in the process of recruiting additional employees throughout 2023

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.

OUR MEMBERS

- 32 participating countries
- The European Union (represented by the European Commission)
- Private partners

BDV BIG DATA VALUE ASSOCIATION

QIC European Quantum Industry Consortium

ETP 4 HPC EUROPEAN TECHNOLOGY PLATFORM FOR HIGH PERFORMANCE COMPUTING

LEVEL AND SOURCES OF EU FUNDING 2021-2027

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

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INFRASTRUCTURE

The EuroHPC supercomputers:

- **5 fully operational systems** in
  - Luxembourg,
  - Slovenia,
  - Czechia,
  - Bulgaria
  - Finland;

- **3 systems underway** in
  - Italy
  - Portugal
  - Spain

WORLD-CLASS GREEN PETASCALE SUPERCOMPUTERS

NOVEMBER 2022	TOP 500	GREEN 500
LUMI	#3	#7
Leonardo	#4	#14
MELUXINA	#52	#22
KAROLINA	#85	#20
DISCOVERER	#123	#247
VEGA	#140	#288

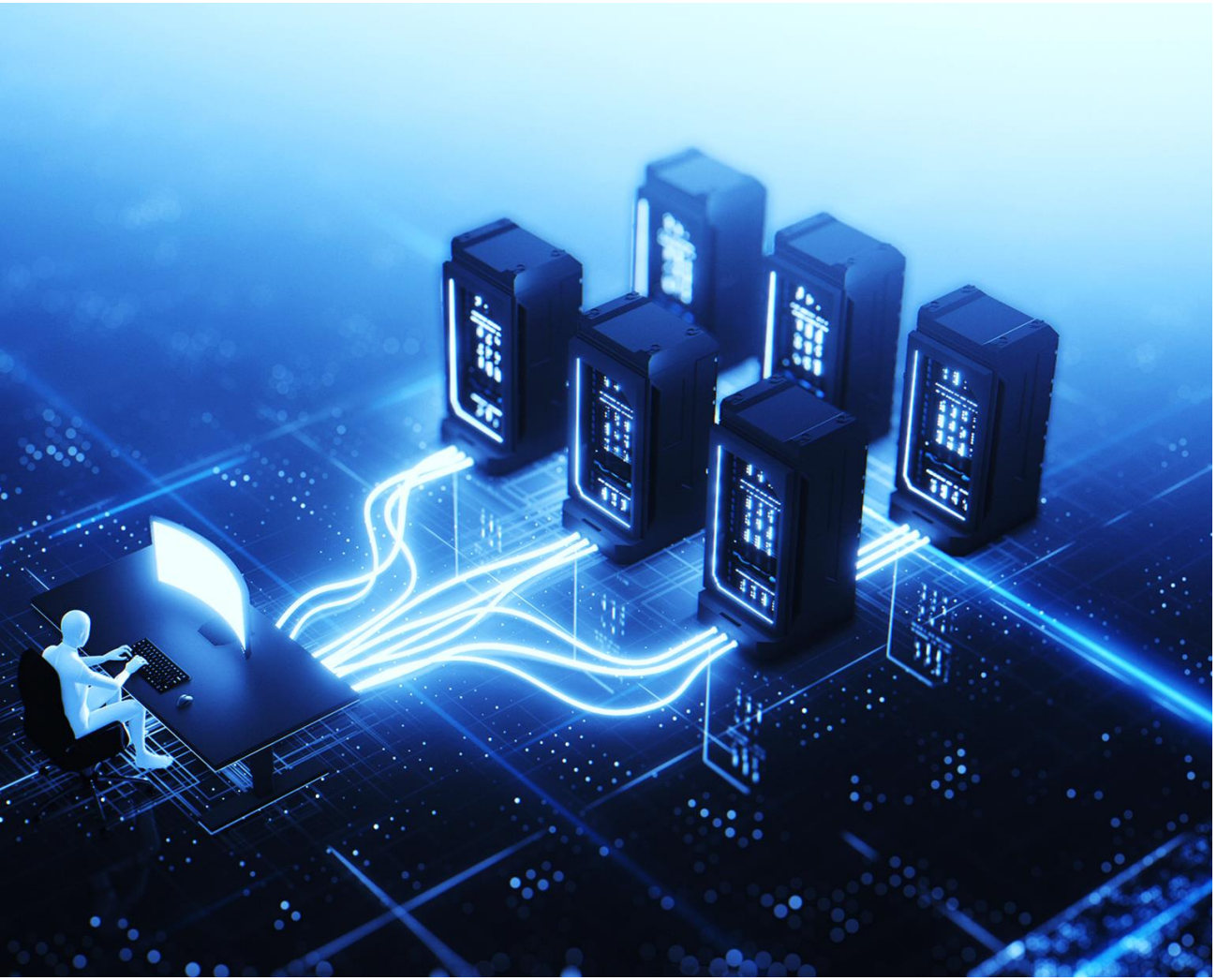
FUTURE EUROHPC SYSTEMS

- Hosting entities entities selected for EuroHPC new midrange systems in:
  - Greece
  - Ireland
  - Poland
- Selection of the hosting entity for the first EuroHPC exascale supercomputer: JUPITER which will be hosted in Germany

Quantum computers

- 6 hosting entities for new quantum computers selected

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.

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RESEARCH & INNOVATION

STRATEGIC R&I – INTERVENTION AREAS

EuroHPC Joint Undertaking

- **Leadership in Use & Skills**
  Competence Centres and training programmes in HPC commensurate with the labour market.

- **Applications and Algorithms**
  Centres of Excellence for HPC Applications and new algorithms for European exascale technology.

- **European Software Stack**
  Software and algorithms, programming models and tools for exascale and post exascale systems.

- **European Open Hardware**
  Ecosystem for the low power high-end general purpose processor and accelerator.

TECHNOLOGIES

European Processor Initiative

- A cornerstone of the European initiative towards strategic autonomy in HPC & chip technologies.
- 1st phase has already delivered cutting-edge technologies e.g. Rhea General-Purpose Processor (GPP) & a proof-of-concept implementation of European accelerator technology.
  - 1st gen of low-power processor units,
  - 2nd gen of low-power accelerator test chips,
  - Enhancing tech for incoming European exascale machines,
  - Developing industrialisation & commercialisation paths.

- Aims to integrate two quantum simulators, each controlling about 100+ qubits in :
  - the GENCI supercomputer Joliot Curie (France);
  - the JSC supercomputer JUWELS (Germany).
- Incubator for quantum-HPC hybrid computing.
- Enabling research entities & industries to exploit new quantum technologies and find solutions to complex challenges in many areas.

APPLICATIONS

- Support drug design campaigns with the highest speed and accuracy with the combination of exascale capability, machine learning, extreme scale computer simulations & big data analytics,
- Support repurposing drugs, natural products and nutraceuticals with therapeutic indications,
- Keep worldwide European leadership on Computer-Aided Drug Design (CADD) solutions.

LIGATE

- Develop exascale software to simulate the electrical behaviour of the heart,
- Will be applied to real-life use cases and will be made accessible for a wide range of users both as code and through a web interface,
- Will be adaptable to other biological systems e.g. nerves and reusable in a wide range of applications.

MICROCARD

- Increase the capabilities of current Computational Fluid Dynamics tools for aeronautical design,
- Make aircrafts lighter, quieter and more fuel efficient for less greenhouse gas emissions,
- New methods and algorithms will be freely distributed to scientific community.

NextSim

Next generation of industrial aerodynamic simulation code

USAGE & SKILLS

EURO

- European network of 33 NCCs to widen the use of HPC in Europe.
- A single point of access for users and delivering tailored solutions;
- Promoting cooperation and implementation of best practice;
- Mapping competencies and identifying knowledge gaps;
- Ensuring a coordinated and consistent high level of expertise across Europe.

- Facilates SMEs' access to HPC technologies and expertise to boost their innovation and competitiveness;
- Connects innovative businesses with cutting edge-technologies to develop unique products or innovative business opportunities;
- Experiments must address SME business problems by using HPC and complementary technologies such as HPDA and AI.

f4 EuroHPC

EUMaster4HPC

- 1st pan-European Masters Programme in HPC to train the next generation of HPC experts in Europe;
- A coordinated curriculum offered 7 European universities
- Unique links with industry and supercomputing centres
- Providing students with distinct qualifications and outstanding career prospects in the rapidly expanding field of HPC.

Keep up with EuroHPC news:

https://eurohpc-ju.europa.eu

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