The European High Performance Computing Joint Undertaking

The European High Performance Computing Joint Undertaking a joint initiative between the EU, European countries and private partners to develop a World Class Supercomputing Ecosystem in Europe.

European Commission 2021

The EuroHPC JU will pool European resources to develop top-of-the-range exascale supercomputers for processing big data, based on competitive European technology.

The European High Performance Computing Joint Undertaking (EuroHPC JU) aims to improve quality of life of European citizens, advance science, boost industrial competitiveness, and ensure Europe’s technological autonomy. It is a legal and funding entity, created in 2018 and located in Luxembourg. It pools together the resources of the European Union, 32 European countries and three private partners with the ambition of making Europe a world leader in supercomputing.

**EuroHPC JU mission**

The JU’s main activities aims to:

- **Develop a pan-European supercomputing infrastructure**: acquiring and deploying in the EU three pre-exascale supercomputers, capable of at least $10^{17}$ — one hundred million billion, calculations per second. These computers should be among the top 5 in the world. It has acquired five petascale supercomputers, capable of at least $10^{15}$ — one million billion calculations per second, which will be fully operational by the end of 2022. These computers should rank in the global top 50. These new machines will benefit European private and public users working in academia and industry across Europe.

- **Support research and innovation activities**: developing a European supercomputing ecosystem, stimulating a technology supply industry from low-power processors to software and middleware, and their integration into supercomputing systems. Additionally, the Euro HPC JU is supporting HPC Centres of Excellence, which will promote the use of exascale computing capabilities for scientific applications. HPC Competence Centres in each of EuroHPC JU Participating States have been established to specifically enhance the provisions of HPC services to industry (including to SMEs), academia and public administrations, delivering tailored solutions to a wide variety of users that will foster wider uptake of HPC in Europe. These are all key elements of the EU’s broader digital strategy.
The EuroHPC JU in action

In July 2021, the Council adopted a new regulation on establishing the new European High Performance Computing JU and repealing Regulation (EU) 2018/1488. It sets out an ambitious mission and is accompanied by a substantially larger budget of €7 billion for the 2021-2027 period, in order to:

- further develop, deploy, extend and maintain in the EU a world-class supercomputing and data infrastructure, driven by key scientific, industrial and social applications;
  - develop and deploy a quantum computing and quantum simulation infrastructure
- reach the next frontier of high-performance computing by acquiring the first exascale supercomputers. These supercomputers are capable of more than a billion billion operations per second (when compared to ten billion operations per second of an ordinary laptop device);
- federate European supercomputing and quantum computing resources and make them accessible to a wide range of public and private users everywhere in Europe, including for the European public data spaces, as presented in the 2020 European Data Strategy;
- provide secure cloud-based supercomputing services for a wide range of public and private users everywhere in Europe;
- support the development of innovative supercomputing technologies and applications to underpin a world-class European HPC ecosystem;
- develop greener computing, and exploit the synergies of HPC with artificial intelligence, big data and cloud technologies;
- extend and widen the use of supercomputing to a wide range of scientific and industrial users, for instance by helping SMEs develop innovative business cases using supercomputers and providing them with training opportunities and the critical HPC skills they need via National HPC Competence Centres;
- deploy Centres of Excellence in HPC applications and the industrialisation of HPC software, with novel algorithms, codes and tools optimised for future generations of supercomputers;
- put in place large-scale industrial pilot test-beds and platforms for HPC and data applications and services in key industrial sectors;

Benefits of the EuroHPC Joint Undertaking

The EuroHPC JU enables European countries to coordinate their supercomputing strategies and investments together with the EU. Since its creation, the EuroHPC JU has substantially increased investments in HPC at European level, and has started to restore Europe’s position as a leading HPC power globally.

The development in Europe of a competitive HPC ecosystem and of an integrated world-class exascale supercomputing and quantum computing capability will be crucial. This will ensure that the EU maintains a leading position in the digital economy and contribute to strengthening Europe's technological and data autonomy.

As part of its research and innovation agenda, the EuroHPC JU is also strengthening the European knowledge base in HPC technologies and bridging the digital skills gap, notably through the enhancement of the network of national HPC Competence Centres. The Competence Centres will act locally to ease access to European HPC opportunities in different industrial sectors, delivering tailored solutions for a wide variety of users.
Members

The EuroHPC Joint Undertaking is composed of public and private members:

- Public members:
  - the European Union (represented by the Commission),
  - Member States and Associated Countries that have chosen to become members of the Joint Undertaking: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, and Türkiye.

- Private members: representatives from the three participating private partners, the European Technology Platform for High Performance Computing (ETP4HPC), the Big Data Value association (BDVA) and the European Quantum Industry Consortium (QuIC). The JU also relies on collaboration with key European actors such as PRACE (Partnership for Advanced Computing in Europe) and GEANT (the pan-European high-speed network for research and education).

Other Member States and Associated States to Horizon 2020 Europe or Digital Europe Programme can also join the Joint Undertaking at any moment.

Governance

The governance structure of the EuroHPC Joint Undertaking is composed of:

1. The Governing Board (representatives of the public members), responsible for the Joint Undertaking’s decision-making, including funding decisions related to all procurement and research and innovation activities.
2. The Industrial and Scientific Advisory Board (representatives appointed by the private members
and the Governing Board), consisting of the Research and Innovation Advisory Group (RIAG) and the Infrastructure Advisory Group (INFRAG), which provides independent advice to the Governing Board on the Joint Undertaking’s strategic research and innovation agenda and on the acquisition and operation of the supercomputers it owns.

3. The Executive Director, the chief executive responsible for the Joint Undertaking’s day-to-day management.

Budget

The EuroHPC Joint Undertaking is jointly funded by its participating countries and private members. The budget of the JU is of around EUR 7 billion for the period 2021-2027. Its funding is allocated as follows:

- € 1.9 billion from the Digital European Programme to support the acquisition, deployment of exascale supercomputers and post exascale facilities, the federation of supercomputing services, and the widening of HPC usage and skills;
- € 900 million from Horizon Europe to support research and innovation activities for developing a world-class supercomputing ecosystem across Europe;
- € 200 million from Connecting Europe Facility- to improve the interconnection of HPC, and data resources, as well as the interconnection with the Union’s common European data spaces and secure cloud infrastructures.

An equal investment will be from the participating states, while the private members contribution amounts to € 900 million (as in-kind and cash contributions).

As no European country has the capacity to develop world-class supercomputing resources individually, the Joint Undertaking provides financial support in the form of procurement or research and innovation grants to participants following open and competitive calls.

EuroHPC JU supercomputers

The EuroHPC JU is already equipping the EU with a world-class infrastructure of pre-exascale and petascale supercomputers, and developing the necessary technologies, applications and skills for reaching full exascale capabilities (performance level capable of executing ten to the power of eighteen operations per second) by 2023.

To date, five supercomputers are now fully operational: LUMI in Finland (which ranks number 3 in the world), Vega in Slovenia, MeluXina in Luxembourg, Discoverer in Bulgaria and Karolina in the Czech Republic. Three supercomputers are underway: Deucalion in Portugal, MareNostrum5 in Spain, and LEONARDO in Italy.

The EuroHPC JU has also announced five new hosting sites for a new generation of European supercomputers in Germany, Greece, Hungary, Ireland and Poland. Just as the existing EuroHPC supercomputers, the new sites will be connected and available to serve a wide range of European users in the scientific community, as well as industry in particular small and medium businesses, and the public sector across the EU and participating countries.

EuroHPC JU's website
Brochure on the EuroHPC JU
Factsheet on the EuroHPC JU
Follow the latest progress and learn more about getting involved.
Follow the Commission's work on tech and digital @DigitalEU

Latest News

PRESS RELEASE | 04 October 2022
EU deploys first quantum technology in six sites across Europe

The European High-Performance Computing Joint Undertaking (EuroHPC JU) has announced the selection of six sites that will host the first European quantum computers: in Czechia, Germany, Spain, France, Italy, and Poland.

PRESS RELEASE | 16 June 2022
EU awards tender for world-class supercomputing in Barcelona

The European High Performance Computing Joint Undertaking has announced that Bull SAS (Atos) won the procurement of the MareNostrum 5, a new European world-class supercomputer.

PRESS RELEASE | 15 June 2022
New exascale era for European supercomputing: five new hosting sites announced

Five new sites for the next generation of European supercomputers were announced, following the related selection procedure.

PRESS RELEASE | 13 June 2022
New European supercomputer is inaugurated in Finland

Today, at a dedicated event, the European High Performance Computing Joint Undertaking inaugurated its latest supercomputer: LUMI, located in Kajaani, Finland.

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High performance computing refers to computing systems with extremely high computational power that are able to solve hugely complex and demanding problems.

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