Adoption of the Council Regulation to establish the new EuroHPC JU

On 13 July the Economic and Financial Affairs Council adopted the Council Regulation on establishing the new European High Performance Computing Joint Undertaking (EuroHPC JU).

© DrAfter123 - DigitalVision Vectors via Getty.

This marks the start of the EU and EuroHPC JU's ability to draw funds from the Horizon Europe, Digital Europe and the Connecting Europe Facility programmes that will, together with the investment of the participating states and the EuroHPC Private Members, be worth around €7 billion. This will be done with a view to Europe becoming a world leader in high-performance computing and quantum computing. The promotion of these two fields is vital, as they are a strategic resource for powering innovative applications to understand and design efficient solutions to address many complex societal, scientific and industrial challenges

Supercomputers

Such a €7 billion investment will see Europe reaching the next frontier of high-performance computing: the acquisition of 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). The European Commission also expects to develop the first computers that use the properties that underlie quantum mechanics. Indeed, as part of the digital decade and our aim to have secure and sustainable digital infrastructures, we plan to build state-of-the-art pilot quantum computers by 2025. These computers would act as accelerators interconnected with the EuroHPC JU's supercomputers, forming 'hybrid' machines that blend the best of quantum and classical computing technologies.

Interconnectivity

But investment and activity won't stop there. Investing in such computers would not be of much value, if there was no connection between machines and access for users, nor if there was not any linking of these machines to the data spaces, Destination Earth, EOSC, AI and other digital infrastructures. That is why the EuroHPC JU will invest both in interconnection through terabit networks of this supercomputing infrastructure, as well as in allowing access from the cloud to a large number of public and private users from anywhere in Europe.

Applications for life

As for the practical use of this interconnected supercomputer infrastructure, the EuroHPC JU investments in the next generation supercomputers will enable the further development of novel scientific and industrial applications. Examples include precision medicine, the development of new drugs and treatments, climate change, the development of new materials, and bioengineering, digital twin of the Earth and AI, among many others.

Skills and engagement with business

Supercomputers are swiftly becoming a part of 'everyday' life. As such, the Regulation will see the increased investment in skills, education and training in the use of high-performance computing to see further advantage being taken of the opportunities that supercomputing can offer European stakeholders. In particular we aim to train a large number SMEs and public users to make use and benefit from our supercomputing investments.

The EU will also co-invest with industry in the acquisition of dedicated systems and in the development of large-scale industrial applications. The EuroHPC JU will ensure that the EU supercomputing infrastructure supports new AI applications, provides cloud-based services to a wide range of users, and effectively links with the future public data spaces.

Additionally, the Euro HPC JU will create HPC Centres of Excellence which will promote the use of exascale computing capabilities. National HPC Competence Centres will also be supported in each of EuroHPC JU Participating States to 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.

Technology activities

Currently, the European Union does not produce high-end processors that can reach the performance levels required for world-class supercomputers. The EuroHPC JU will therefore launch our own research and innovation programmes for the development of high-end European technologies, for example in the European Processor Initiative (EPI).

The EuroHPC JU will also focus on energy-efficient HPC technologies that will cover both the HPC sector and broader technology sectors and markets, such as autonomous vehicles, extreme-scale, big data and applications based on edge computing. Within a few years, Europe will be able to produce competitive technology that can be integrated in supercomputers that will be in the global market. This is also a major goal for Europe's digital autonomy and reducing its dependency on foreign technology computing.

Work done

All of this work follows from the establishment of the first EuroHPC Joint Undertaking in 2018 and the allocation of €1.5 billion already made in 2019-2020 for the acquisition of a world-class high performance computing infrastructure and development of HPC technology and applications.

This investment has already seen the acquisition of 7 world class supercomputers, including our petascale supercomputers: Vega in Slovenia, Discoverer in Bulgaria, Karolina in Czechia, , MeluXina in Luxembourg (ranked number 4 in the world for its energy efficiency), Deucalion in Portugal, and our pre-exascale supercomputers: LEONARDO in Italy and LUMI in Finland. The acquisition of an eighth pre-exascale supercomputer is currently ongoing.

Two of these, Vega in Slovenia and MeluXina in Luxembourg have entered service, with the remaining five to become operational in 2021 and 2022.

Background

The European High Performance Computing Joint Undertaking (EuroHPC JU) is a legal and funding entity, created in 2018 and located in Luxembourg. The EuroHPC JU achieved autonomy in September 2020. The EuroHPC Joint Undertaking allows the European Union and EuroHPC participating countries to coordinate their efforts and pool their resources with the objective of making Europe a world leader in high performance computing (HPC).

The EuroHPC JU is made up of the following members: the European Union, represented by the Commission, Member States, countries associated to Horizon Europe, the Digital Europe Programme or the Connecting Europe Facility, associations representing their constituent entities, and other organisations with an explicit and active engagement to produce research and innovation results in the area of high-performance computing or quantum computing.

The EuroHPC JU governance is assured by two bodies: a Governing Board, and an Industrial and Scientific Advisory Board. The Governing Board will be composed of representatives of the European Union (50% of voting rights) and Participating States and is responsible for strategic policy making and funding decisions related to the activities of the Joint Undertaking, including all the public procurement activities.

The Industrial and Scientific Advisory Board will include representatives of academia and industry as users and technology suppliers. It should provide independent advice to the Governing Board on the

Strategic Research and Innovation Agenda, on the acquisition and operation of the supercomputers owned by the Joint Undertaking, the capability building and widening activities programme and the federation, connectivity and international cooperation activities programme.

More information

- European Council press release and text of the regulation
- European High Performance Computing Joint Undertaking (EuroHPC JU)

Related topics

HPC