European Commission

High Performance Computing

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

European Commission - Exscalate4Cov project : supercomputing to identify new therapies for COVID-19
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In the digital decade, high performance computing (HPC) is at the core of major advances and innovation, and a strategic resource for Europe's future.

In today’s world, more and more data is constantly being generated, from 33 zettabytes globally in 2018 to an expected 175 zettabytes in 2025 (1 zettabyte is equal to 1 trillion gigabytes). As a result, the nature of computing is changing, with an increasing number of data-intensive critical applications.

HPC is key to processing and analysing this growing volume of data, and to making the most of it for the benefit of citizens, businesses, researchers and public administrations.

HPC can be used in a large number of application areas: from monitoring and mitigating the effects of climate change and producing safer and greener vehicles to increasing cybersecurity and advancing the frontiers of knowledge in nearly every scientific field.

It is also starting to play a key role in medicine: HPC can be used in drug design, from testing drug candidate molecules to repositioning existing drugs for new diseases. And, it can help us understand the origins and evolution of epidemics and diseases. Supercomputers are actively involved in the quest for treatments for COVID-19.

Moreover, HPC has proved to be of great importance in developing new applications and products. It has a direct impact on the digital supply chain, such as designing new materials, cars and aeroplanes, and bioengineering and manufacturing.

Today, world-class supercomputers are able to perform more than 10^{15} — at least one million billion, operations per second (petascale performance). A few top-of-the-range systems exceed 10^{17}— at least one hundred million billion, operations per second (pre-exascale performance). The next generation (exascale) will perform more than one billion billion (10^{18}) operations per second, a computing power level comparable to aggregating the computing capabilities of the mobile phones of the EU’s entire population. The world’s first exascale supercomputer is expected to be operational in 2021.

HPC is one of the key digital domains where the EU's investment is due to significantly increase in the next Multiannual Financial Framework (2021-2027). Moreover, supercomputing will play a key role in Europe’s path towards recovery, as it has been identified a strategic investment priority.

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DIGIBYTE | 13 July 2021
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).

PRESS RELEASE | 16 June 2021
Commission to invest €14.7 billion from Horizon Europe for a healthier, greener and more digital Europe

The Commission has adopted the main work programme of Horizon Europe for the period 2021-2022, which outlines the objectives and specific topic areas that will receive a total of €14.7 billion in funding. These investments will help accelerate the green and digital transitions and will contribute to sustainable recovery from the coronavirus pandemic and to EU resilience against future crises. They will support European researchers through fellowships, training and exchanges, build more connected and efficient European innovation ecosystems and create world-class research infrastructures

DIGIBYTE | 11 May 2021
EU and India to work together for a stronger digital cooperation and to tackle the pandemic

India and EU leaders have agreed to build a sustainable and comprehensive Connectivity Partnership, as well as cooperate on supercomputers to bring solutions to challenges brought by the COVID-19 pandemic, during the 16th EU-India Summit held on the 8th of May.

PRESS RELEASE | 20 April 2021
Vega: launch of the first world-class supercomputer in the EU

The European Commission together with the European High-Performance Computing Joint Undertaking and the Government of Slovenia have inaugurated the operation of the Vega Supercomputer at a high-level ceremony in Maribor, Slovenia on Monday. This marks the launch of a first EU supercomputer procured jointly with EU and Member State funds, with a joint investment of 17.2 million.

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Big Picture

Advanced computing

EU investment in high performance computing and computing technologies will enable Europe to lead the way in supercomputing in the Digital Decade.

Dig deeper

The European High Performance Computing Joint Undertaking

The European High Performance Computing Joint Undertaking helps countries coordinate efforts and pool resources to make Europe a world leader in HPC.

See Also

Destination Earth

Destination Earth aims to develop a high precision digital model of the Earth to model, monitor and simulate natural phenomena and related human activities.

Electronics

Micro and nano-electronics take us to the world in miniature, where big things are facilitated by the smallest and smartest electronic components and systems.

Photonics

We are on the verge of a new photonics era, and the European Commission is working to ensure citizens and businesses enjoy the full benefits of this technology.

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