

[High Performance Computing](https://digital-strategy.ec.europa.eu/en/policies/high-performance-computing) **[\(https://digital-strategy.ec.europa.eu/en/policies/high-performance-computing\)](https://digital-strategy.ec.europa.eu/en/policies/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 79 zettabytes globally in 2021 to an expected 181 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](https://digital-strategy.ec.europa.eu/en/news/exscalate4cov-performs-most-complex-supercomputing-experiment-identify-new-therapies-covid-19) (<https://digital-strategy.ec.europa.eu/en/news/exscalate4cov-performs-most-complex-supercomputing-experiment-identify-new-therapies-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. Europe's [first exascale supercomputer](https://digital-strategy.ec.europa.eu/en/news/eu-enters-exascale-era-announcement-new-supercomputing-hosting-sites) (<https://digital-strategy.ec.europa.eu/en/news/eu-enters-exascale-era-announcement-new-supercomputing-hosting-sites>), JUPITER, is expected to be operational in 2023.

As part of the digital decade, HPC is key to Europe's future prosperity, digital transformation and resilience. With €7 billion in funding from [Horizon Europe](https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en) (https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en), [Digital Europe Programme](https://digital-strategy.ec.europa.eu/en/activities/digital-programme) (<https://digital-strategy.ec.europa.eu/en/activities/digital-programme>) and the [Connecting Europe](#)

[Facility \(https://ec.europa.eu/inea/en/connecting-europe-facility\)](https://ec.europa.eu/inea/en/connecting-europe-facility) the Commission will strengthen investments in supercomputing.

It aims to build up supercomputing and data processing capacities by buying world- class exascale supercomputers, post exascale facilities, and supporting an ambitious HPC research and innovation agenda.

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PRESS RELEASE | 16 November 2023

[Commission opens access to EU supercomputers to speed up artificial intelligence development](#)

<https://digital-strategy.ec.europa.eu/en/news/commission-opens-access-eu-supercomputers-speed-artificial-intelligence-development>

The Commission and the European High-Performance Computing Joint Undertaking (EuroHPC JU) have committed to open and widen access to the EU's world-class supercomputing resources for European artificial intelligence (AI) start-ups, SMEs and the broader AI community as part of the EU AI Start-Up Initiative.

PRESS RELEASE | 03 October 2023

[EU awards tender for JUPITER Exascale Supercomputer for breakthrough solutions to accelerate drug development, emergency response and climate action](https://digital-strategy.ec.europa.eu/en/news/eu-awards-tender-jupiter-exascale-supercomputer-breakthrough-solutions-accelerate-drug-development-emergency-response-and-climate-action)

<https://digital-strategy.ec.europa.eu/en/news/eu-awards-tender-jupiter-exascale-supercomputer-breakthrough-solutions-accelerate-drug-development>

The European High Performance Computing Joint Undertaking (EuroHPC JU) has announced the procurement for JUPITER. Once in place, JUPITER will be the most powerful computer in Europe.

PRESS RELEASE | 03 October 2023

[Commission recommends carrying out risk assessments on four critical technology areas: advanced semiconductors, artificial intelligence, quantum, biotechnologies](https://digital-strategy.ec.europa.eu/en/news/commission-recommends-carrying-out-risk-assessments-on-four-critical-technology-areas-advanced-semiconductors-artificial-intelligence-quantum-biotechnologies)

<https://digital-strategy.ec.europa.eu/en/news/commission-recommends-carrying-out-risk-assessments-four-critical-technology-areas-advanced>

The Commission has adopted a Recommendation on critical technology areas for the EU's economic security, for further risk assessment with Member States.

PRESS RELEASE | 27 September 2023

[First report on the State of the Digital Decade calls for collective action to shape the digital transition](https://digital-strategy.ec.europa.eu/en/news/first-report-state-digital-decade-calls-collective-action-shape-digital-transition)

<https://digital-strategy.ec.europa.eu/en/news/first-report-state-digital-decade-calls-collective-action-shape-digital-transition>

The first report on the State of the Digital Decade, published earlier this week, provides a comprehensive look at progress towards achieving the digital transformation to empower a more digitally sovereign, resilient, and competitive EU.

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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](#)

<https://digital-strategy.ec.europa.eu/en/policies/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.

See Also

[Destination Earth \(https://digital-strategy.ec.europa.eu/en/policies/destination-earth\)](https://digital-strategy.ec.europa.eu/en/policies/destination-earth)

Destination Earth (DestinE), a European Commission flagship initiative for a sustainable future

[Electronics \(https://digital-strategy.ec.europa.eu/en/policies/electronics\)](https://digital-strategy.ec.europa.eu/en/policies/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 \(https://digital-strategy.ec.europa.eu/en/policies/photonics\)](https://digital-strategy.ec.europa.eu/en/policies/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.

[Quantum \(https://digital-strategy.ec.europa.eu/en/policies/quantum\)](https://digital-strategy.ec.europa.eu/en/policies/quantum)

To unlock the transformative power of quantum, the EU should develop a solid industrial base that builds on its tradition of excellence in quantum research.

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The DIGITAL Europe programme aims to build up and strengthen the EU's supercomputing and data...

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