



High Performance Computing (HPC)

European HPC Strategy

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PO
C2 - HPC and Quantum technologies
DG CONNECT

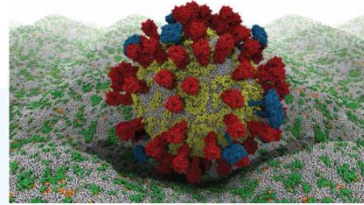
Why invest in HPC?

HPC is at the core of major advances and innovations in the digital age

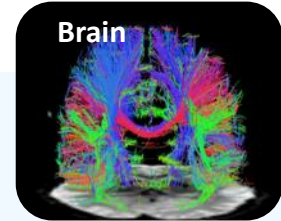
Strategic value for science

HPC enables breakthrough science

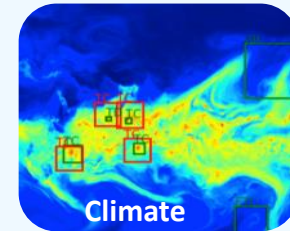
disease treatment; new therapies; brain; climate; chemistry; new materials; cosmology, astrophysics; high-energy physics; environment; transportation, earthquakes, etc.,



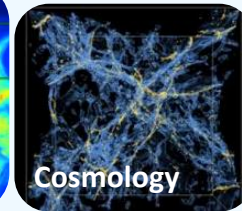
Drug discovery



Brain



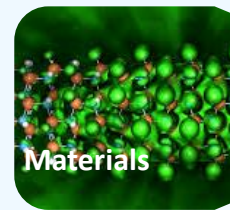
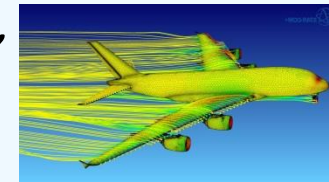
Climate



Cosmology

Strategic value for Industry

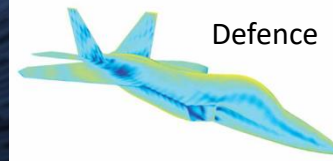
Market potential: new products, design and production cycles, decision processes, costs, resource efficiency, etc.



Materials

National security and defence

Complex encryption technologies, terrorism, forensics cyberattacks, nuclear simulations



Defence

HPC status in Europe today

**EU has no top ranked
supercomputers and
depends on non-EU
technology**

**Funding Gap
wrt USA, JP, CN**

**Weak EU supply chain
Weak integration of EU
technology in HPC machines**

**HPC strategy implementation
by EC is inefficient**

**Insufficient coordination
of national investments**

Demand is not met

The EuroHPC Declaration

Declaration signed in Rome, March 23rd, 2017 by:

France

Germany

Italy

Luxembourg

Netherlands

Portugal

Spain

Six more countries signed the Declaration later:

Belgium

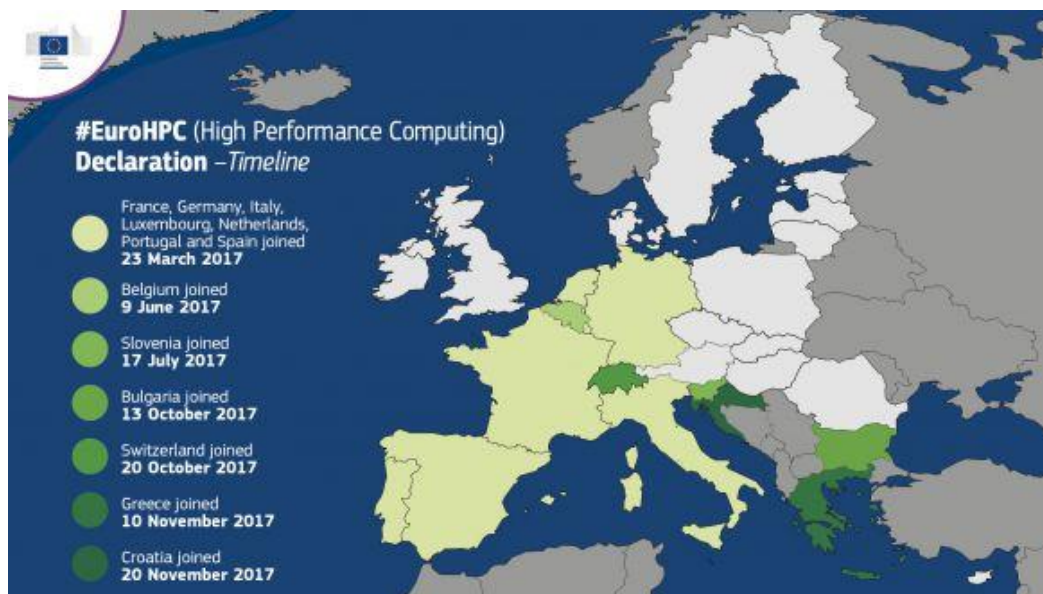
Slovenia

Bulgaria

Switzerland

Greece

Croatia



Work towards the establishment of a **cooperation framework** - EuroHPC - for **acquiring and deploying an integrated exascale supercomputing infrastructure** that will be **available across the EU** for scientific communities as well as public and private partners



Towards the world top HPC powers: EuroHPC Joint Undertaking

Co-invest on a leading HPC and data infrastructure

for our scientists, industry and the public sector and support the development of technologies and applications across a wide range of fields

- **Coordinate EC/MS activities**
- **Pool public and private resources at EU level**
- **Procure world-class infrastructure**
- **Close the chain from R&D to procurement**
- **Become lead Users**
- **Create a competitive supply industry**
- **Lead in Applications**

A world-class European HPC, Big Data and Cloud Ecosystem

EuroHPC JU: the Legal Proposal



The JU Regulation:

- **Objectives**
- **Financial contribution**
- **HPC machine acquisition policy**
Selecting a hosting entity; the hosting agreement; access; machine ownership; access conditions and access time to machines; commercial services, etc.
- **Standard articles:** staff; liability of the JU; evaluation; audits; starting phase of the JU)

The statutes (Annex to the Regulation)

- **Description of the JU tasks**
- **The JU Members**
- **Governance, bodies, and voting rights**
- **Financing sources and commitments**

EuroHPC JU

Activities and Funding

Pillar 1

Infrastructure Acquisition
Operating machines

Pillar 2

Research & Innovation
Applications & Skills

JU Admin/Running costs

- **Pillar1: Infrastructure Acquisition & Machine Operation**

2 Pre-exascale machines and at least 2 mid-range (petascale) machines

- **Pillar 2: Research and Innovation – Application and Skills**

European exascale technologies and systems (incl. low-power processor); Applications & Skills;

- **JU Admin/running costs**

JU Operation: 2019 to 2026

Indicative only!

~270	~206	10	486	EC
~290	~186	10	486	Participating States
560	392	20	972	Total

In M€

EuroHPC JU in a nutshell



- Follows underlying model of JUs (legal base, reporting, establishment, staff issues, auditing, ...)
- Tripartite partnership: EC + Participating States + Private Members
- Implements H2020 + Connecting Europe Facility
- Infrastructure Acquisition AND R&I activities
- Open to in-kind contributions by MS
- Governance adapted to the EuroHPC objectives
- Participating countries entrust JU with their financial contributions
- JU running costs shared → EC, Participating States, Private Members
- Seat = Luxembourg

EuroHPC JU

Future Plans



2019-2020 (Present EU Financial Framework)

[Pillar 1] Pre-exascale machines and petascale machines

[Pillar 2] Applications; technologies for exascale

→ The JU operates until 2026

2021-2028 (Next EU Financial Framework)?

[Pillar 1] Exascale and post-exascale machines + first hybrid HPC / Quantum Computing infrastructures

[Pillar 2] applications; technologies for post-exascale

→ JU operates until 2030+

Rationale for intl. collaboration on HPC

FETHPC-01-2018

From the user/application side: countries identified for intl. collaborations bring unique expertise and competences strengthening the respective scientific communities and applications in Brasil/Europe.

From a technology perspective: it enlarges the market potential for technology and solutions and know-how on both sides.

FETHPC-01-2018 (RIA)

International Cooperation on HPC with Brazil

Specific Challenge:

the aim is to develop strategic partnership in HPC with Brazil that enables advancing the work on HPC applications in domains of common interest. Brazilian partners will not be funded by the EU and they are expected to participate in the project with their own funding.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 million for the cooperation with Brazil would allow this specific challenge to be addressed appropriately.

Matching funds expected from Brazilian funding agencies

FETHPC-01-2018 (RIA)

International Cooperation on HPC with Brazil

Scope:

developing state-of-the-art HPC applications in domains of common interest, such as in eHealth and drug design (e.g., related to diseases such as Zika and Dengue) or energy (e.g., renewables or management of natural resources). Proposals should put emphasis on application development towards exascale performance, develop codes, algorithms, other software tools, big data analytics, and hardware where appropriate. Proposals should ensure access to and using relevant big data suites as needed.

FETHPC-01-2018 (RIA)

Expected Impact:

Improved international cooperation of research and industrial communities on advanced HPC application development.

Improved sharing of information and expertise to solve common societal problems with the use of advanced computing.

THANK YOU!



<https://ec.europa.eu/digital-single-market/en/policies/high-performance-computing>