

# A vision for Europe

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The Atos logo, consisting of the word 'Atos' in a blue, sans-serif font.

# In the beginning there was a “situation” ... and a dream, and a call for action

## ETP4HPC Vision Paper – 2012:

*To sustain its competitiveness, Europe needs to enhance its innovation capabilities using HPC. However:*

- *Today, HPC is mostly used in large HPC research centres and some large enterprises. It needs to become much more pervasive across the entire industry, including Small and Medium Enterprises (SMEs).*
- *While Europe represents a significant portion of the world's available HPC resources, only a fraction of that technology and infrastructure is developed in Europe.*
- *Other regions invest considerably more in new technologies, architectures and software for HPC systems, gaining a substantial competitive edge over Europe.*



# A European HPC Research & Innovation program

## 2014-18: Horizon 2020, Contractual Public Private Partnership (cPPP)

originally 700M€ over the HPC Horizon2020 (FP8, 2014-21)

- Research Projects: Mont-Blanc -2-3-2020, Deep(-er-est), Sage (-2), ...
- Centres of Excellence
- EPI SGA1

The cPPP had some limitations:

- Horizon2020 was Research and Innovation program → aiming at low TRL
- H2020 rules call for collaborative efforts, often many partners in a call
- Funding Limited to EC, other national efforts fragmented
- Disconnected from Infrastructure programs (nationally funded, PRACE coordination)

Alternatives:

- Important Projects of Common European Interest (IPCEI) ? [Joint Undertaking \(JU\)?](#)



**23 March 2017:** “EU ministers commit to digitising Europe with high-performance computing power”  
7 countries sign the “declaration to support the next generation of computing and data infrastructures, a European project of the size of Airbus in the 1990s and of Galileo in the 2000s.”

**28 Octobre 2018:** EuroHPC officially starts

Total Budget: **962M€** (486M€ EC + 476M€ PS)  
Private members (ETP4HPC, BDVA) 422M€ (in-kind)

**The Infrastructure and Research&Innovation programs start in 2019 !**

**13 July 2021:** **EuroHPC-2** officially established (Horizon Europe, FP9 2021-2027)

Total Budget: **6000M€** ( EC + PS) + 900M€ in-kind  
Infrastructure: **4200M€**  
Research & Innovation: **1800M€** + 900M€ in-kind  
Private Partners: ETP4HPC, BDVA/DAIRO, **QuIC**

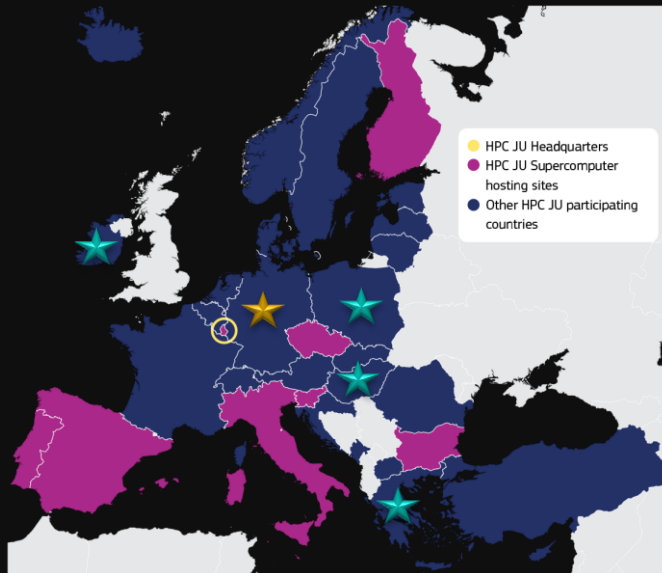
# EuroHPC Infrastructure program

## 3 pre-Exascales:

- ▶ Leonardo, CINECA, Italy
- ▶ Lumi, CSC, Finland
- ▶ MareNostrum 5, BSC, Spain

## 5 Petascales:

- ▶ Discoverer, NCSA, Bulgaria
- ▶ Karolina, IT4I, Czech rep.
- ▶ Meluxina, LuxConnect, Luxembourg
- ▶ Deucalion, Univ Minho, Portugal
- ▶ Vega, Izum, Slovenia



## And soon, Exascale: ★

- ▶ Germany
- ▶ ?

## And more Midrange ★

- ▶ Greece
- ▶ Hungary
- ▶ Ireland
- ▶ Poland

## 34/39 current HPC projects run under EuroHPC :

ACROSS, ADMIRE, CoEC, CompBioMed2, DCoMEX, DEEP-SEA, eFlows4HPC, eProcessor, ESiWACE2, exaFOAM, FF4EUROHPC, HEROES, IO-SEA, LIGATE, MAELSTROM, MEEP, MICROCARD, NextSim, NOMAD, OPTIMA, PerMedCoE, RAISE, RED-SEA, REGALE, SCALABLE, SPARCITY, TEXTAROSSA, TIME-X, TREX, EUPEX, HPCQS, The European PILOT, EUMaster4HPC, EPI

cf <https://etp4hpc-handbook.online/>

Total EU Budget **196M€**, to be matched with **196M€** by PS and same in-kind

- Industry < 33% [13% SMEs, 18% LEs]
- RTOs > 66%

# HPC program goal not reached yet

European Application developers are at the top !!!

Centres of Excellence a great asset to user's community

But:

- **European Infrastructure / Investments** still behind other regions (USA, JPN, China, ... )
- **EU parts of technology in EU systems** limited
  - Asymmetric rules of engagement
  - Few EU players
- **European HPC Industry Ecosystem** not striving
  - Insufficient investment capacity (self or VC)
  - High mortality for SMEs
- **Research&Innovation impact** still limited
  - Hardware components, SW ...

# EuroHPC Infrastructure, Research&Innovation programs

## Implementing Improvements

- Users/Applications driven Infrastructure calls (more than just Flops)
- Coordination between R&I projects  
e.g. EuroHPC-01-2019, (“develop world-class extreme scale, and energy-efficient High Performance Computing (HPC) and data driven technologies”) mandatory coordination work package
- Coordination of R&I and Infra  
EuroHPC advisory boards InfraG and RIAG in common **Industrial and Scientific Advisory Board**
  - Wants best technology for users
  - Wants to develop the best technology
- Easing the complexity of dual-financing (EU + PS) ... and in-kind contribution
- Looking for a strategic (long-term), sufficiently funded plan for Integration of R&I and Infra  
Model programs: DoE Exascale (USA), Riken Fugaku (JPN), China, India ?



- Sovereignty requirement long ignored  
Free Access to technology vs Control of technology
- Sovereignty ensures a commercially viable ecosystem
- Ambitious programs are needed  
European Chips Act (ECA), foundries, CPUs, GPUs, EPI, RISC-V

## To Exascale and beyond

# Questions ?

# Thank you!

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