



The European HPC strategy and implementation

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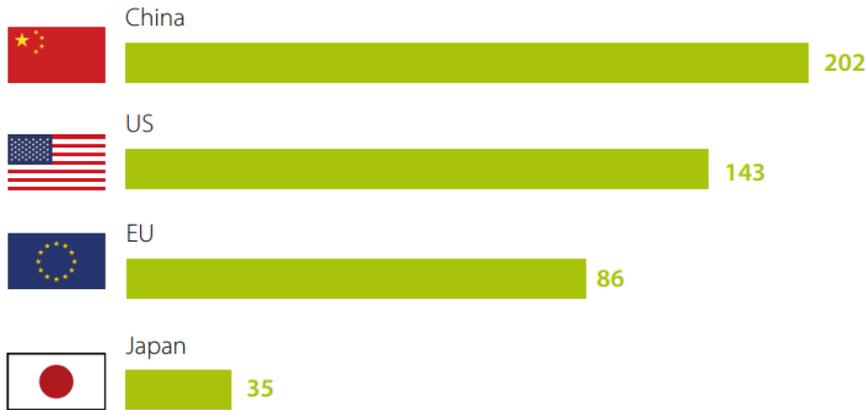
High-Performance Computing and Quantum Technology Unit

DG CONNECT, European Commission



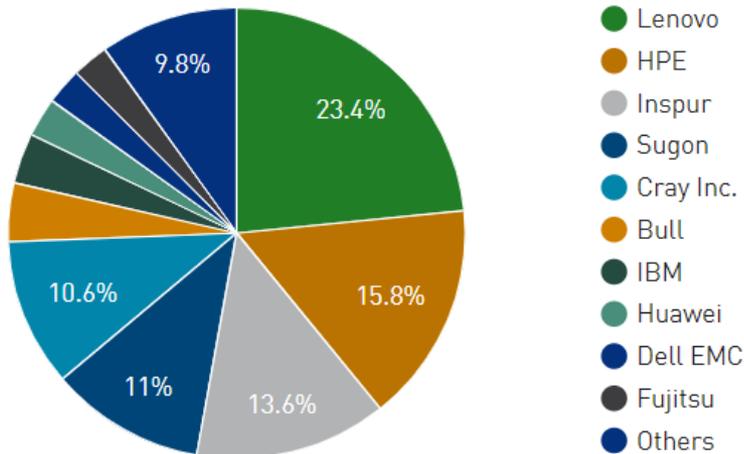
The strategy

Some figures



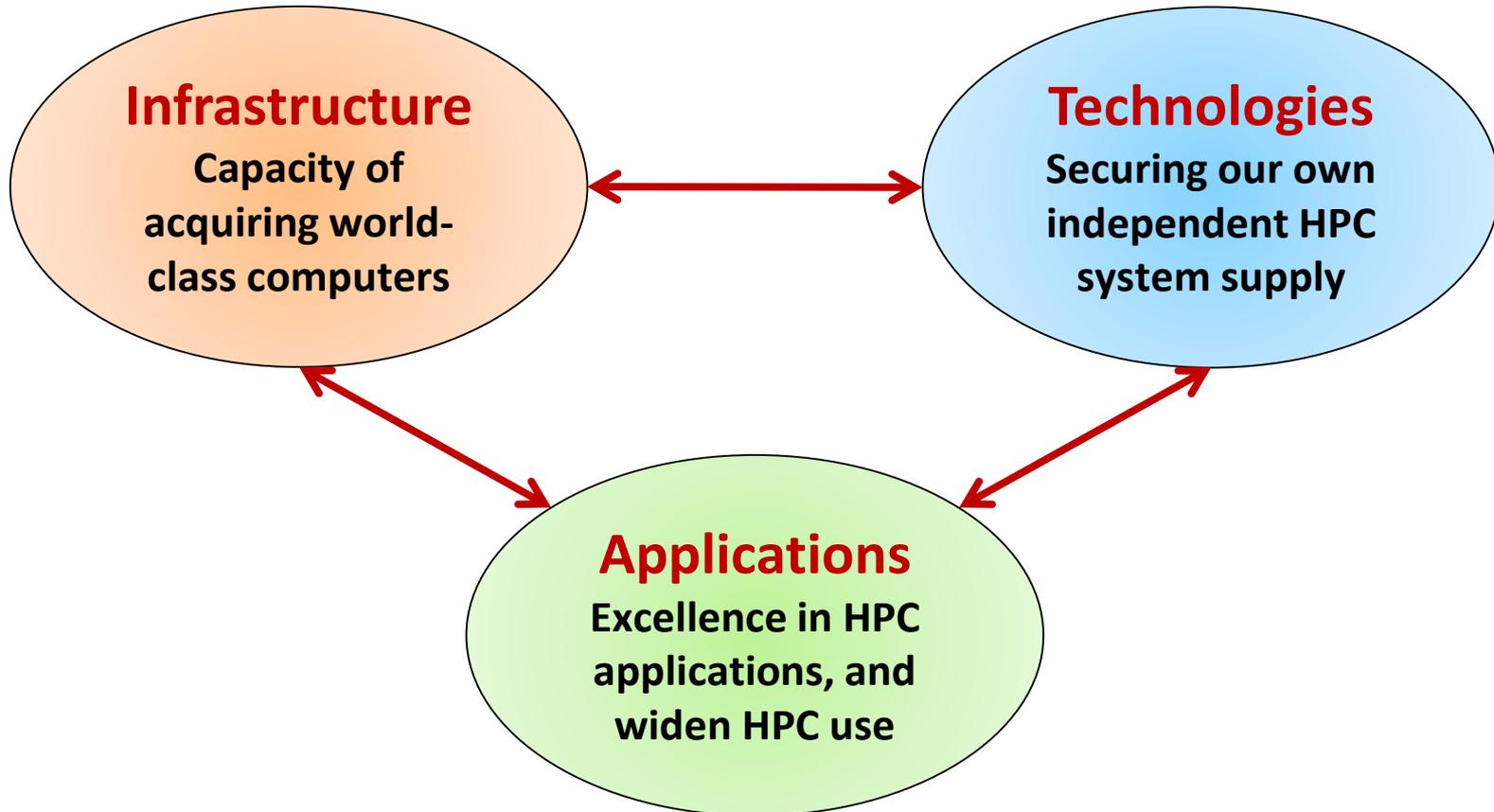
Rank	System	Cores	Rmax (TFlop/s)	Rpeak (TFlop/s)	Power (kW)
1	Summit - IBM Power System AC922, IBM POWER9 22C 3.07GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband , IBM DOE/SC/Oak Ridge National Laboratory United States	2,282,544	122,300.0	187,659.3	8,806
2	Sunway TaihuLight - Sunway MPP, Sunway SW26010 260C 1.45GHz, Sunway , NRCPC National Supercomputing Center in Wuxi China	10,649,600	93,014.6	125,435.9	15,371
3	Sierra - IBM Power System S922LC, IBM POWER9 22C 3.1GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband , IBM DOE/NNSA/LLNL United States	1,572,480	71,610.0	119,193.6	
4	Tianhe-2A - TH-IVB-FEP Cluster, Intel Xeon E5-2692v2 12C 2.2GHz, TH Express-2, Matrix-2000 , NUDT National Super Computer Center in Guangzhou China	4,981,760	61,444.5	100,678.7	18,482
5	AI Bridging Cloud Infrastructure (ABCI) - PRIMERGY CX2550 M4, Xeon Gold 6148 20C 2.4GHz, NVIDIA Tesla V100 SXM2, Infiniband EDR , Fujitsu National Institute of Advanced Industrial Science and Technology (AIST) Japan	391,680	19,880.0	32,576.6	1,649
6	Piz Daint - Cray XC50, Xeon E5-2690v3 12C 2.6GHz, Aries interconnect , NVIDIA Tesla P100 , Cray Inc. Swiss National Supercomputing Centre (CSCS) Switzerland	361,760	19,590.0	25,326.3	2,272
7	Titan - Cray XK7, Opteron 6274 16C 2.200GHz, Cray Gemini interconnect, NVIDIA K20x , Cray Inc. DOE/SC/Oak Ridge National Laboratory United States	560,640	17,590.0	27,112.5	8,209
8	Sequoia - BlueGene/Q, Power BQC 16C 1.60 GHz, Custom , IBM DOE/NNSA/LLNL United States	1,572,864	17,173.2	20,132.7	7,890
9	Trinity - Cray XC40, Intel Xeon Phi 7250 68C 1.4GHz, Aries interconnect , Cray Inc. DOE/NNSA/LANL/SNL United States	979,968	14,137.3	43,902.6	3,844
10	Cori - Cray XC40, Intel Xeon Phi 7250 68C 1.4GHz, Aries interconnect , Cray Inc. DOE/SC/LBNL/NERSC United States	622,336	14,014.7	27,880.7	3,939

Vendors System Share



Source: top500

Three pillars of the strategy



Build a thriving European HPC Ecosystem (*infrastructure, hardware, software, applications, skills, services...*)

Our ambition is for Europe to become one of the top 3 world leaders in HPC by 2020

French-German Conference on Digital;
Paris, 27 October 2015

04/2016: European Cloud Initiative COM(2016) 178

a world-class HPC, data & network infrastructure and a leading HPC and Big Data ecosystem

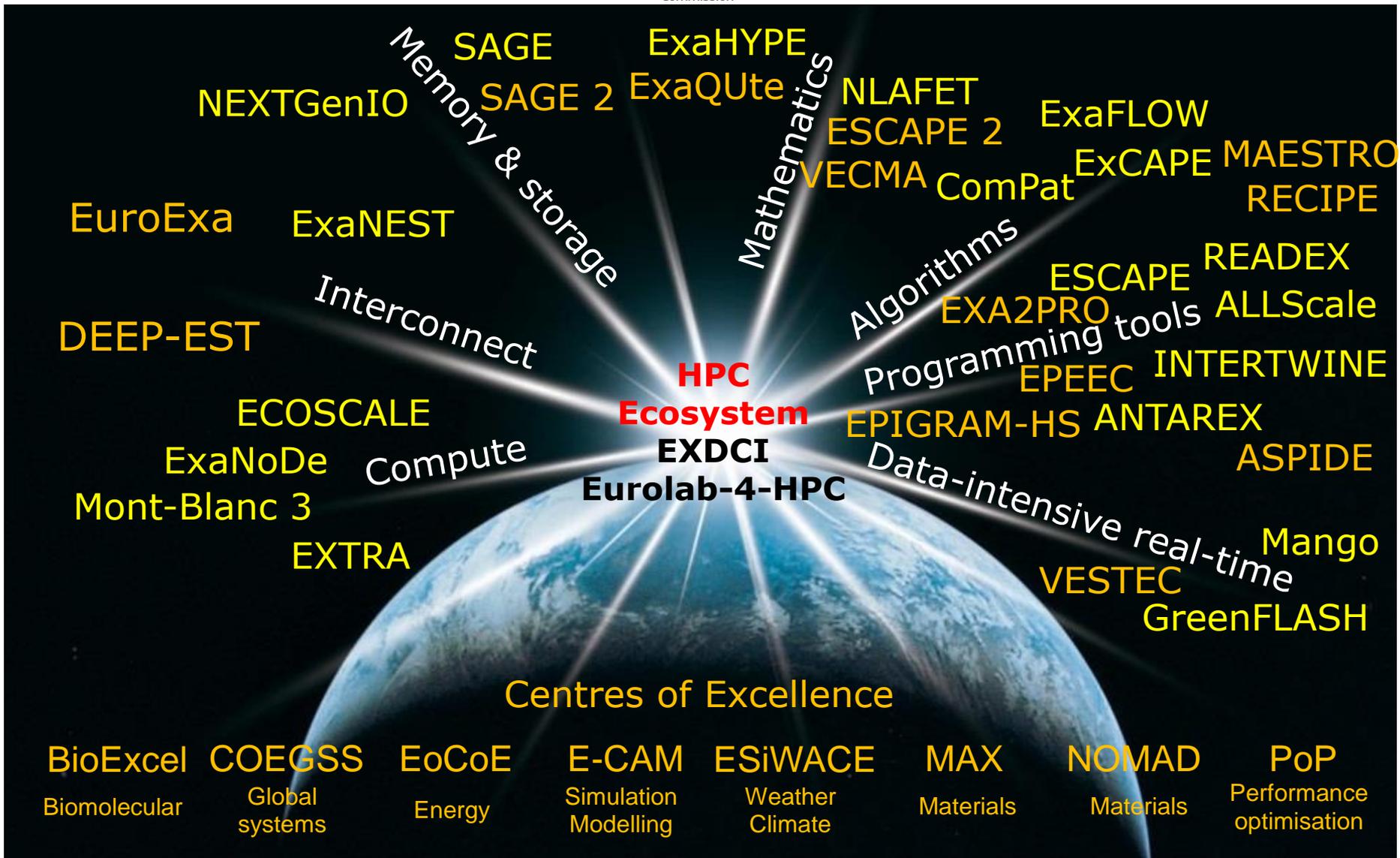
05/2017: Mid-Term Review of the Digital Single Market Strategy COM(2017) 228

*by end-2017, propose a **legal instrument** providing a procurement framework for an exascale supercomputing & data infrastructure*

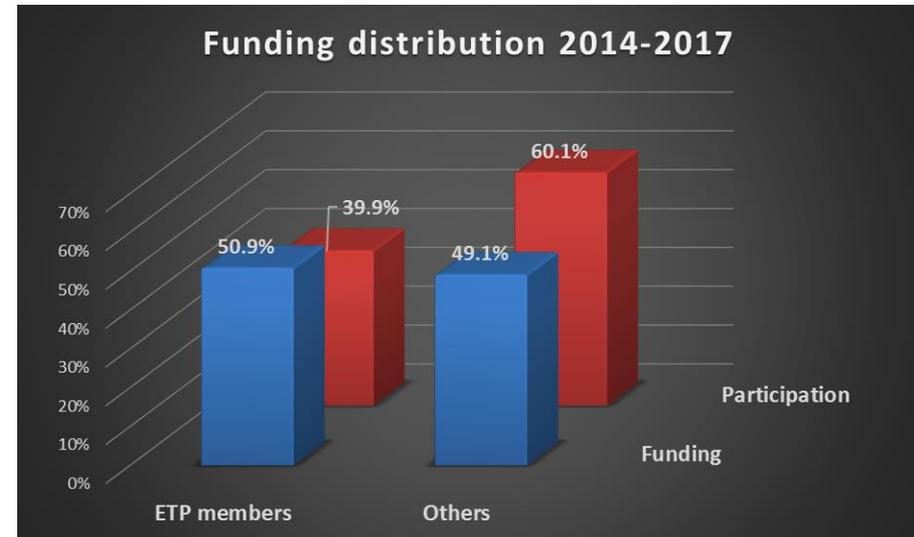
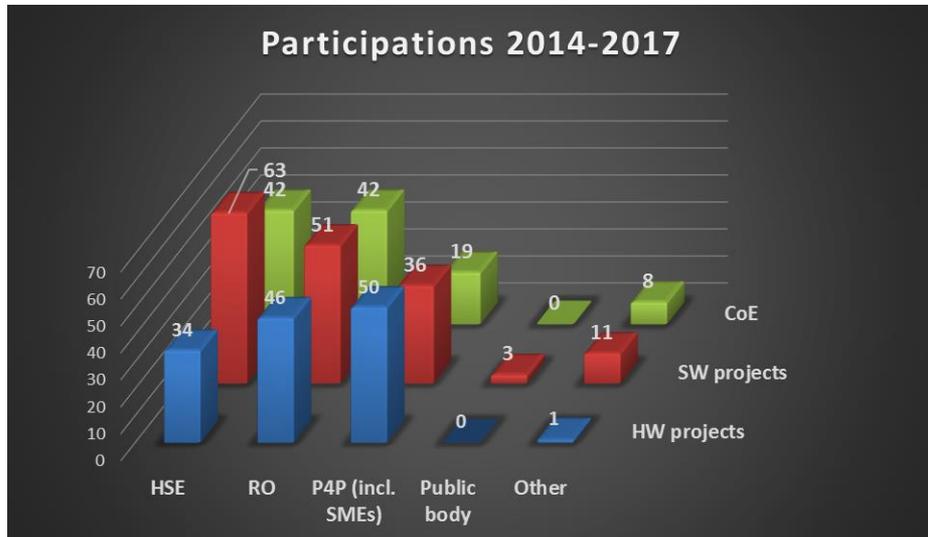
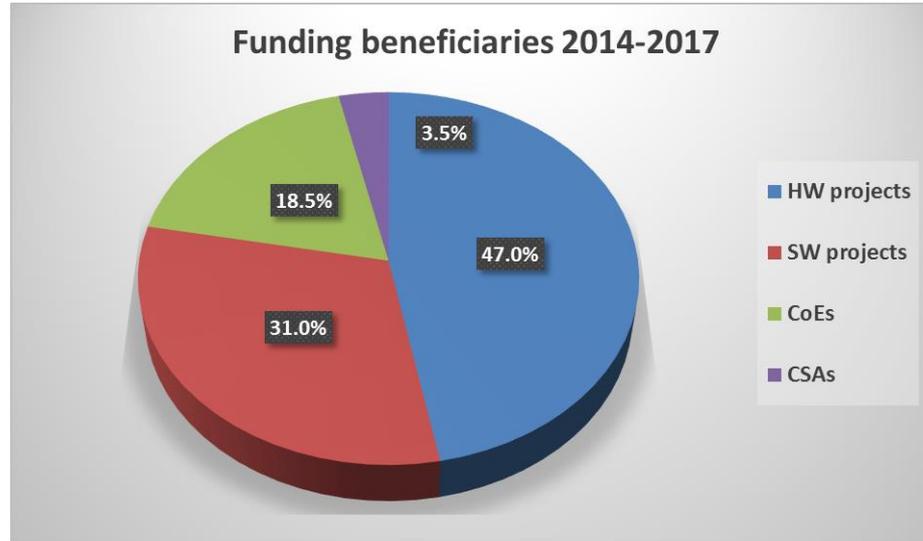




The implementation - 1



Funding statistics





European Processor Initiative



- *23 partners*
- *10 countries*
- *Multidisciplinary*
- *Cross-market*
- *Industry + academia*

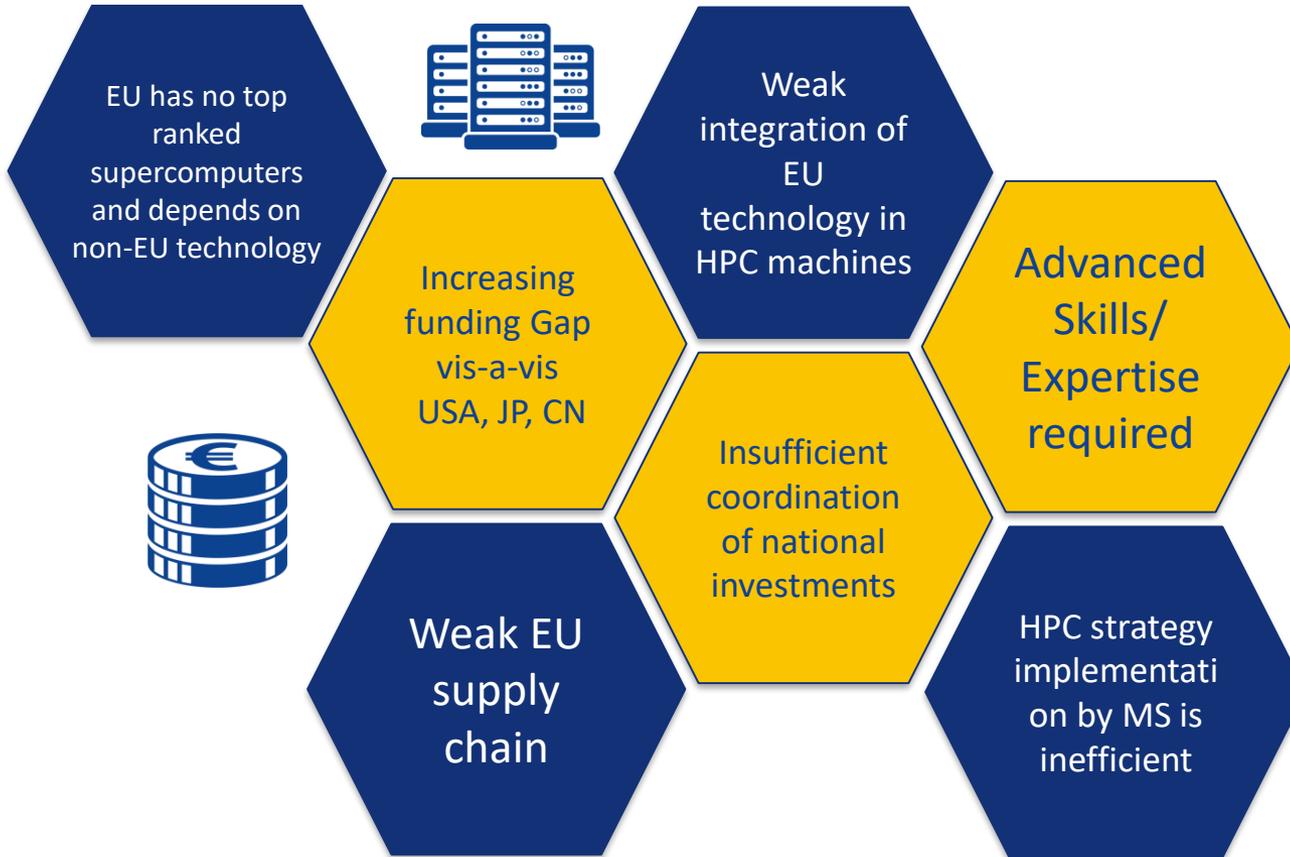


- *Develop low-power processor technology to be included in HPC systems and this contribute to building a technology supply Europe by 2023 and beyond*
- *Ensure that the application areas of the technology are not limited only to HPC, but cover other areas, thus ensuring the economic viability of the initiative.*



The implementation - 2

Issues at stake





DECLARATION

Cooperation framework on High Performance Computing

Bundesrepublik Deutschland

and

República Portuguesa

and

République française

and

Reino de España

and

Repubblica Italiana

and

Grand-Duché de Luxembourg

and

Koninkrijk der Nederlanden

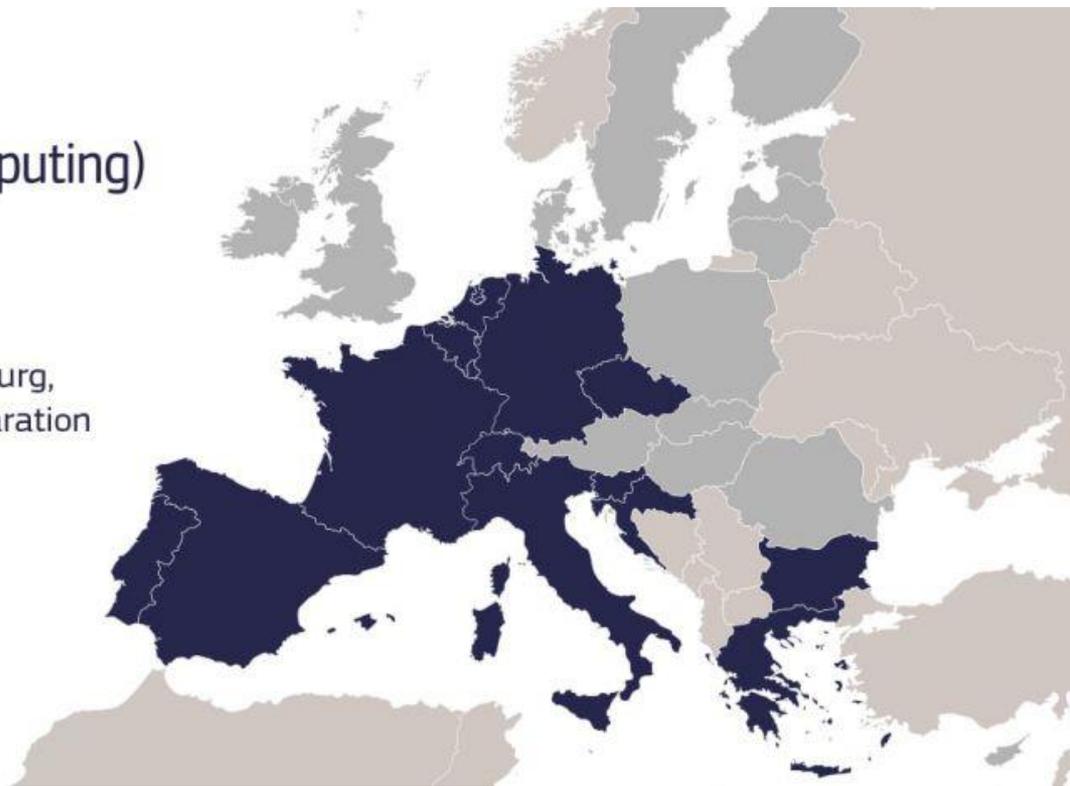
The signing Member States agree to work together towards making available across the EU an integrated world-class high performance computing (HPC) infrastructure, which in combination with European data and network infrastructures would upraise Europe's scientific capabilities and industrial competitiveness.

#EuroHPC (High Performance Computing) Declaration

Signatory European countries

Seven countries – France, Germany, Italy, Luxembourg, Netherlands, Portugal and Spain – signed the declaration in March 2017.

Since then, another seven countries – Belgium, Slovenia, Bulgaria, Switzerland, Greece, Croatia and the Czech Republic – have also signed.





European Commission - Press release



Commission proposes to invest EUR 1 billion in world-class European supercomputers

Brussels, 11 January 2018

The European Commission unveiled today its plans to invest jointly with the Member States in building a world-class European supercomputers infrastructure.

January 2018

October 2018

Legislative adoption @ Council

JU operational

Setting up JU office and procedures

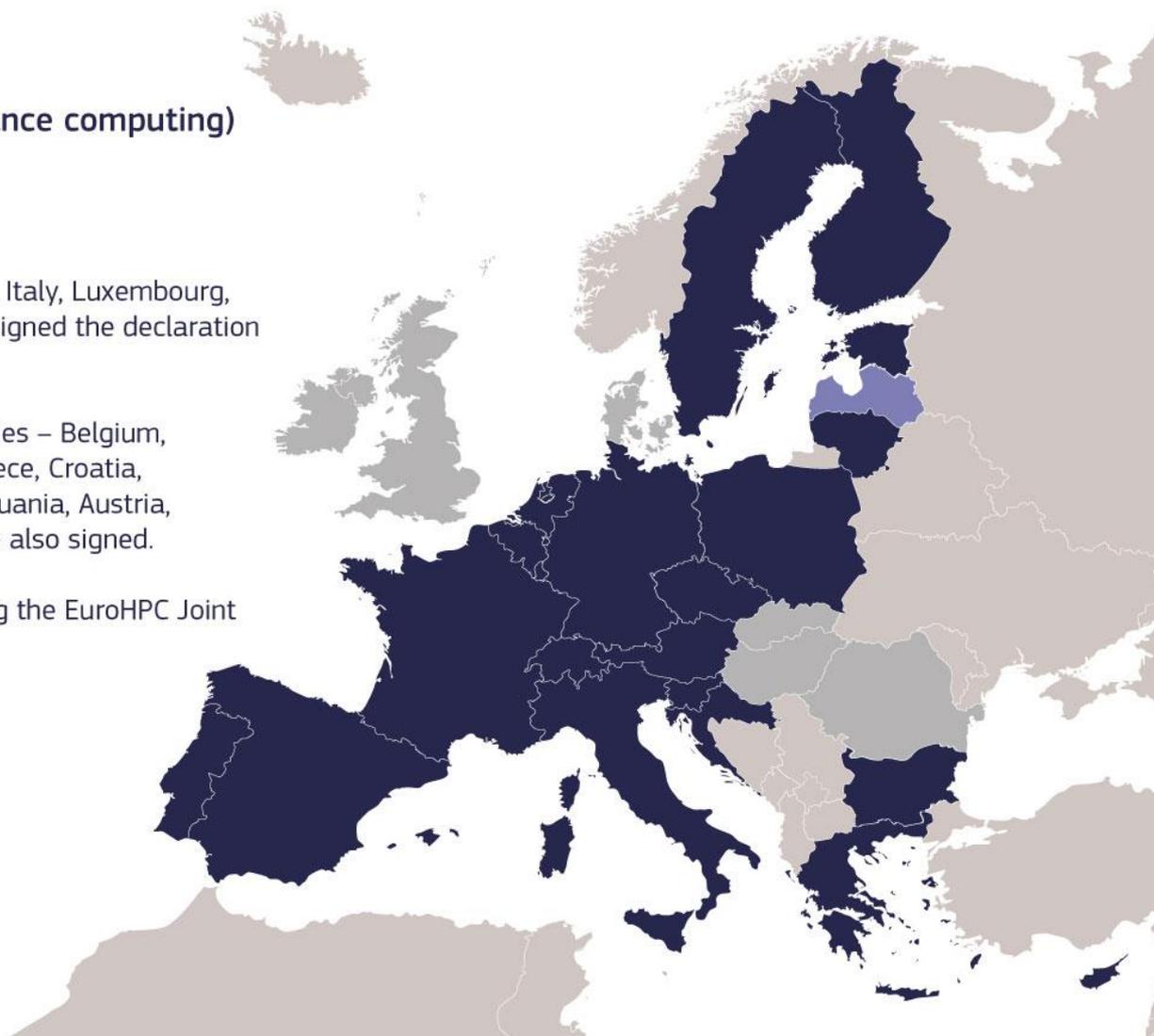
#EuroHPC (high-performance computing) Declaration

Signatory European countries

Seven countries – France, Germany, Italy, Luxembourg, Netherlands, Portugal and Spain – signed the declaration in March 2017.

Since then, another fourteen countries – Belgium, Slovenia, Bulgaria, Switzerland, Greece, Croatia, Czech Republic, Cyprus, Poland, Lithuania, Austria, Finland, Sweden and Estonia – have also signed.

Latvia has also committed to joining the EuroHPC Joint Undertaking.



EuroHPC Joint Undertaking



Governing Board



Industrial and Scientific Advisory Board

Infrastructure Advisory Group

[academia & user industry
advising on Pillar 1 activities]

Research & Innovation Advisory Group

[academia & industry advising
on Pillar 2 activities]

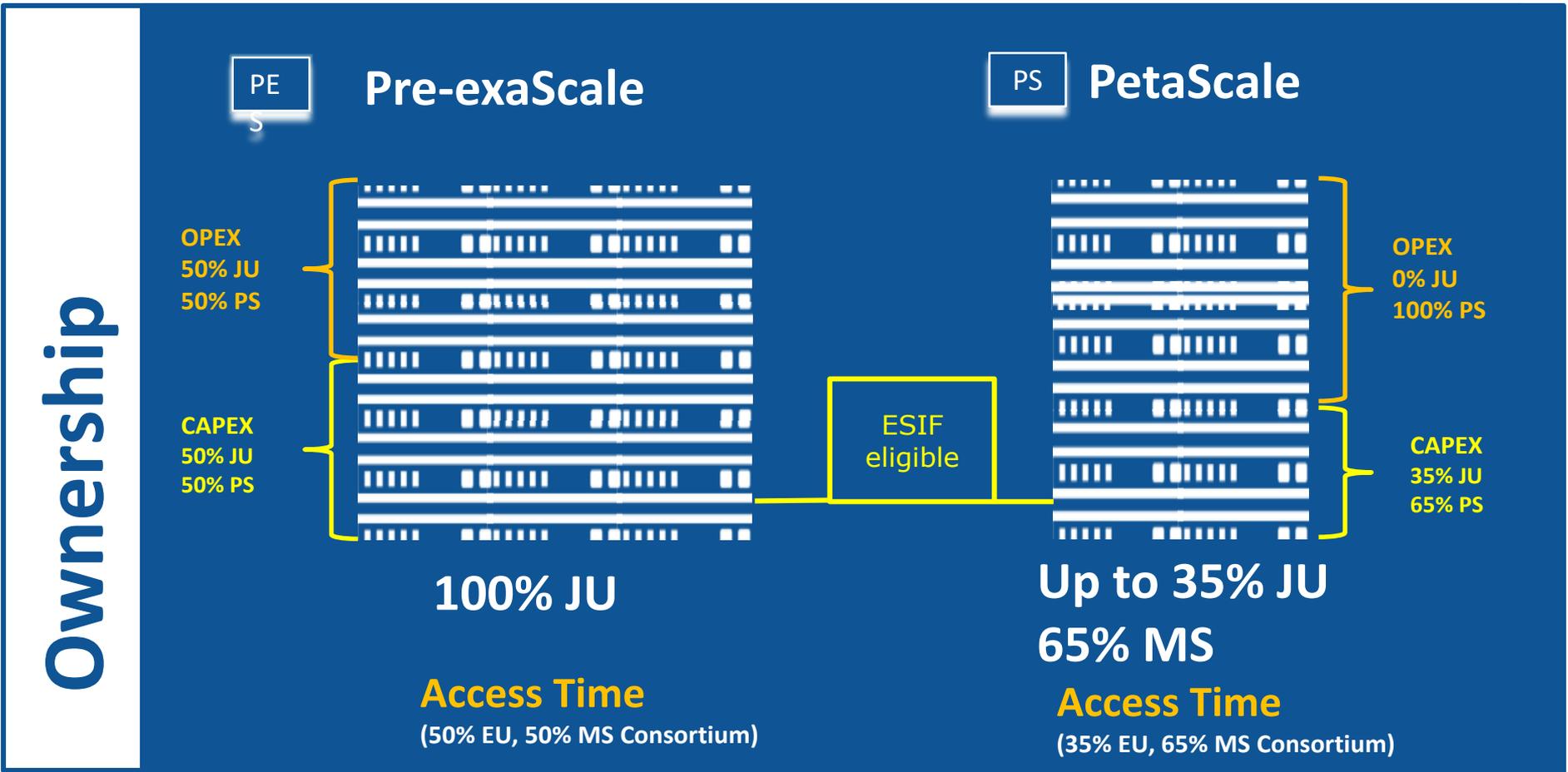
Infrastructure &
Operations

R&I, Applications
& Skills

HPC Ecosystem



The Infrastructure Pillar





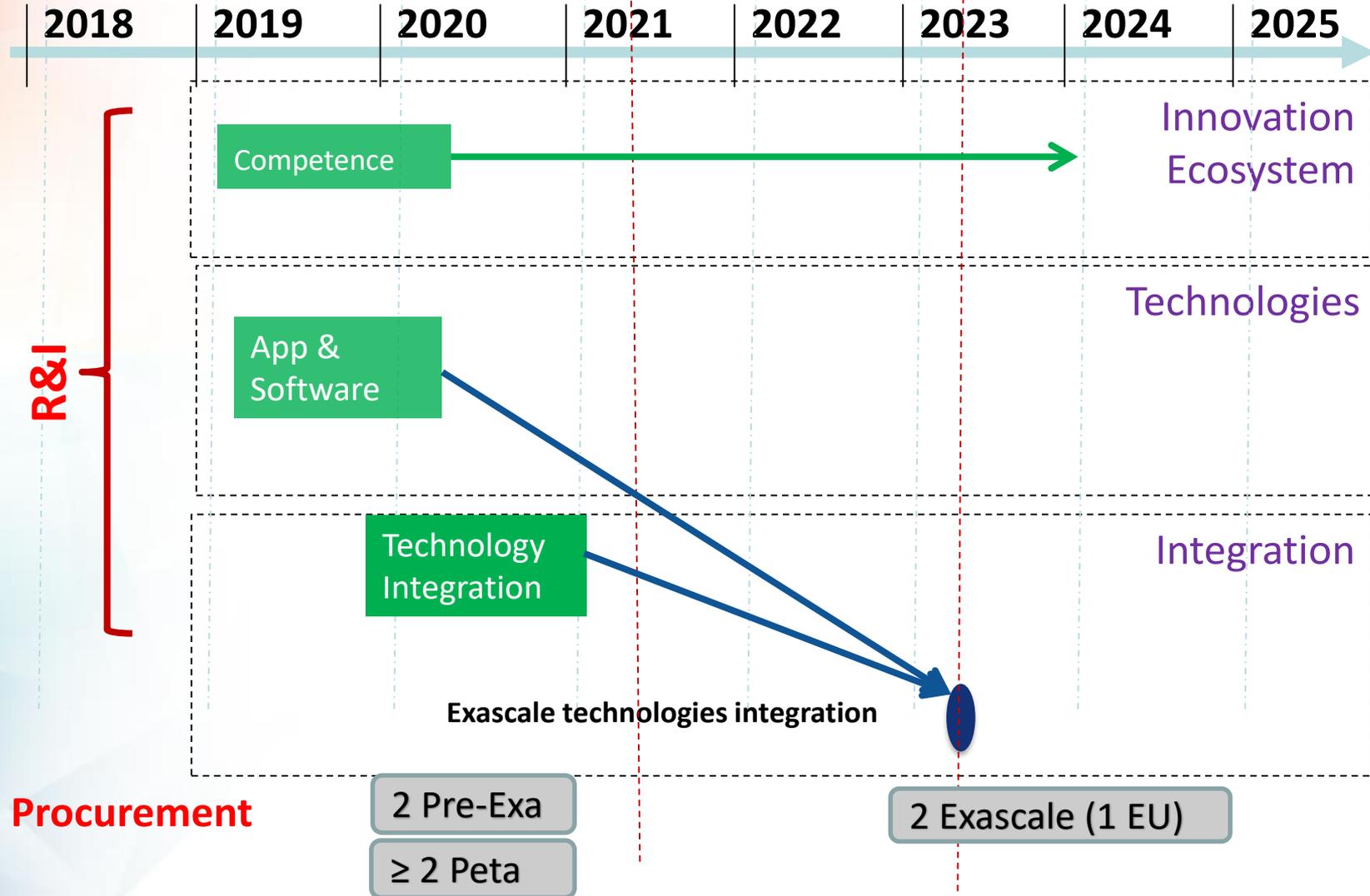
HPC Competence centres

- One per MS – associated with national supercomputing centres
- On-demand services and tools to users
- Access to the HPC innovation ecosystem, and to the supercomputers
- Access to skilled technical experts
- Training and outreach activities
- Networking and coordination with other competence centres

The EuroHPC Roadmap



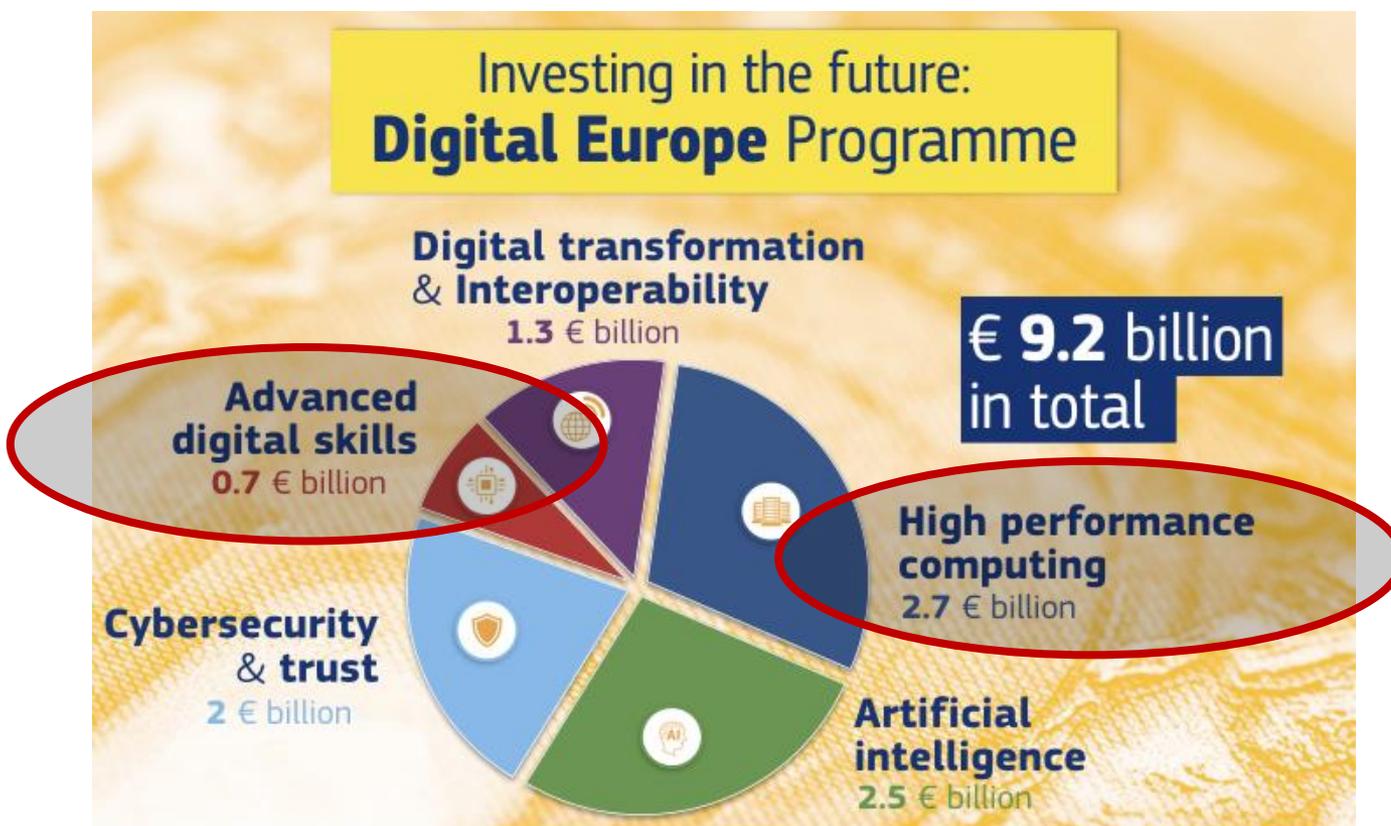
HPC and Accelerator Chips & Systems



EuroHPC beyond 2020

Digital Europe programme

Commission proposal



Commission proposal for **Horizon Europe**

THE NEXT EU RESEARCH & INNOVATION PROGRAMME (2021 – 2027)



Advanced computing
& Big Data

THANK YOU!

