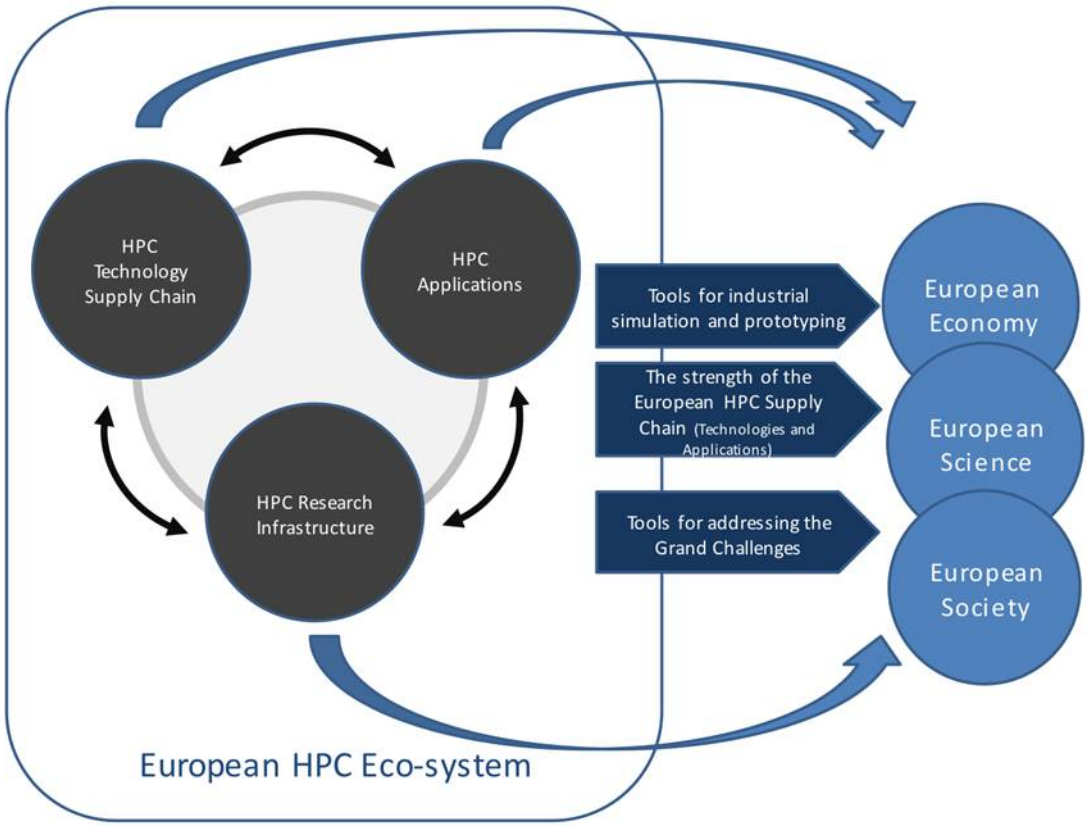
The European HPC Ecosystem

Traditionally, the European HPC ecosystem comprises of three pillars – technology, applications and infrastructure as depicted below:

In this



ecosystem:

- ETP4HPC, the European HPC Technology platform represents the European HPC technology value chain. ETP4HPC's objective is to build a globally competitive HPC technology provision industry in European. Its main deliverable is the European HPC Strategic Research Agenda (SRA), which defines the priorities for research and development in HPC technology (and applications). The European funding organisations (such as the European Commission or the EuroHPC Joint Undertaking) use the SRA to define research project contents.
- PRACE is the European shared HPC research infrastructure funded by the European Commission and selected Member States. It is a network of supercomputers at various tiers of computing power, which is available for scientific research projects based on a peer review process (industry is able to use PRACE machine for research on the same conditions).
- European Application Expertise is consolidated into the Centres of Excellence (CoE) in Computing Applications, long-term projects whose task is to develop, maintain an enhance HPC applications in various domains such as material sciences, weather and climate, biomedicine as well as tackle other related issues such performance and training.

The concept of an ecosystem based on three pillars was founded in 2011 and since then the evolution of European HPC has included a multitude of projects, programme and initiatives, for example:

HPC Technology projects tackling basic research in the area of HPC technology

Co-design projects (DEEP-EST and EuroExa), whose objective is to deliver a novel HPC system architecture in a co-design effort together with selected application domains
CoE projects (application expertise)

/all of the above are described in our annual European HPC Handbook/

EuroHPC
In contrast with other regions, Europe is a collection of independent states. The coordination of large initiatives is thus more complex and requires the consensus and contribution of multiple governments.

EuroHPC is a Joint Undertaking of the EC and 29 European countries with an aim to fund world-class integrated European HPC and data infrastructure and support a highly competitive and innovative HPC and Big Data ecosystem. Its budget for 2019-20 is 1B Euro /the total European investment in HPC over the years 2021-2027 will be 2.7B Euro and EuroHPC will remain the main mechanism for this investment/.

The goals of EuroHPC are

- Acquisition and deployment of new supercomputing capabilities (one exascale EuroHPC supercomputer and several pre-exascale EuroHPC supercomputers).
- Common platform providing horizontal HPC-based services for industry, academia and public sector for widest access to HPC infrastructure.
- Developing, preparing and optimising HPC codes and applications for future exascale and post-exascale systems, using co-design processes.
- Creation of the network of HPC Competence Centres within the participating states.
- Training and education-related activities to provide the scientific and industrial community with the skills they require to use HPC systems.

ETP4HPC chairs one of the two main advisory bodies of EuroHPC – its Research and Innovation Advisory Board. This body processes the ETP4HPC SRA and establishes the objectives of the EuroHPC funded research.

The activities of EuroHPC to date include:

- Procurement of 3 pre-exascale machines and 5 mid-range machines (**details below**)
- Funding Research and Innovation projects: exascale technologies and systems (including the European low-power processor); applications – the first EuroHPC call for proposals for a combined sum of 95M Euro was issued in Jul 2019.

High-range Pre-Exascale Supercomputers:

- 3 sites: Finland, Spain and Italy
- Selected performance: 150-200 Pflops
- Investment: ~€650 million (CAPEX+OPEX)
- Open procurement starts in Q4 2019
- Expected installation Q4 2020)

Medium-to-high range Supercomputers:
5 sites selected performance: at least 4 Pflops
Investment: 180 million Euros (CAPEX), 34 Million from EU

References:

EC Presentation on EuroHPC – Sept 2019

EXDCI – the European HPC Strategy and Ecosystem Coordination project
https://eurohpc-ju.europa.eu/documents/EuroHPC_WorkPlan_2019 _info_pack.pdf