



European strategy on HPC

Forum ORAP : spécial 20 ans

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Why does the EU need a HPC strategy?



HPC is a strategic resource for the EU's future



- **Computational Science is already the "third pillar" of science:** Scientific endeavours increasingly rely on data, simulation and models. The most powerful supercomputers are needed to address scientific and societal grand challenges needing huge computing and data resources
- **Industry relies more and more in HPC to innovate in products and services.** Several of the most profitable and vibrant industrial sectors in Europe are big HPC users (Manufacturing, Oil and gas, Pharmaceutical industry, etc.)



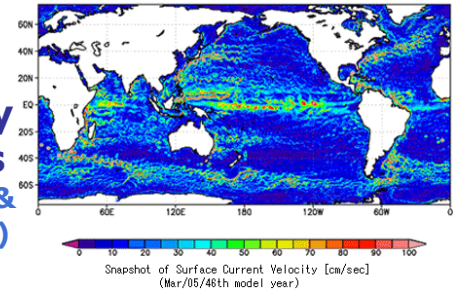
HPC is a key tool to address Societal Challenges



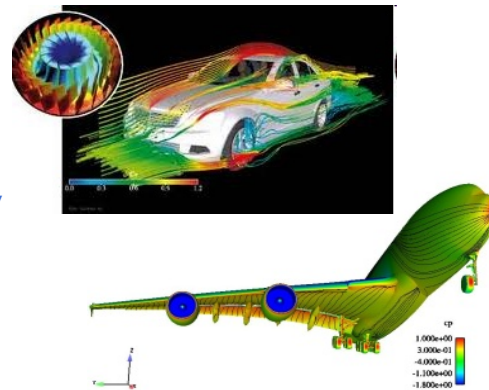
Health, demographic change and well-being
(Personalised medicine, pharma/bio-medical simulations, Virtual Physiological Human, Human Brain Project)



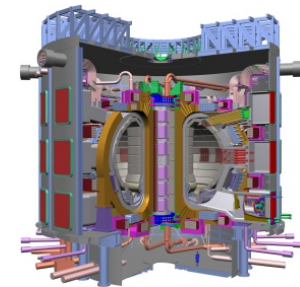
Climate action, resource efficiency and raw materials
(Simulators for Climate & Earth Sciences, Gas&Oil)



Smart, green and integrated transport Engineering
(performance, sustainability, energy efficiency)



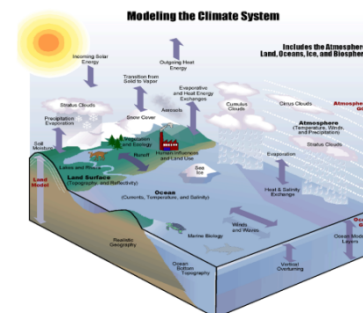
Secure, clean and efficient energy
(Fusion, nuclear plant simulations)



Inclusive, innovative and secure societies
(Smart Cities, multivariable decision/analytcs support)



Food security, sustainable agriculture, marine research and the bio-economy
(simulation of sustainability factors (e.g. weather forecast, stock plagues and diseases control, etc))





A strategic and integrated approach to HPC in Horizon 2020





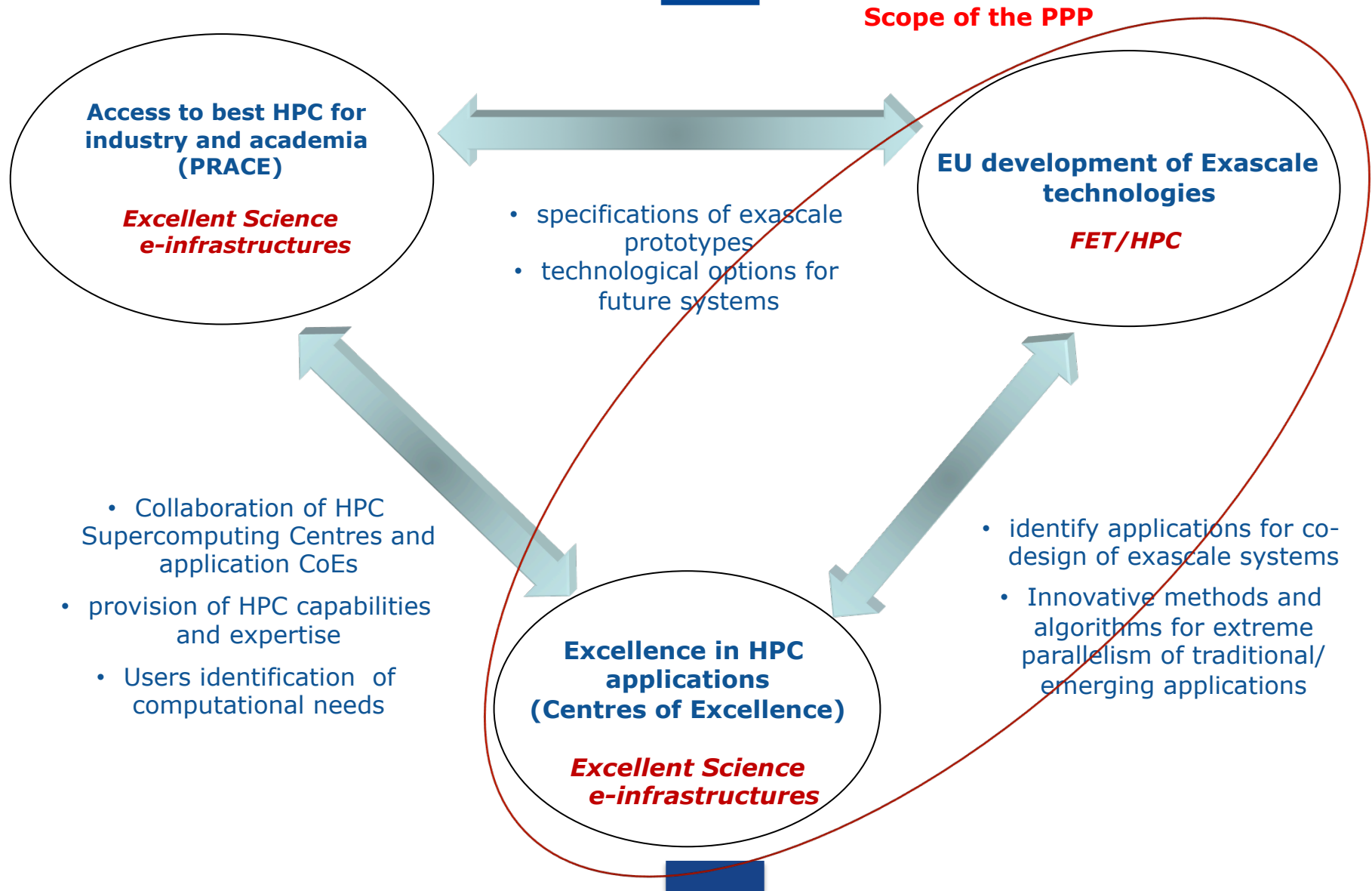
- HPC strategy combining three elements:
 - (a) Computer Science: towards **exascale** HPC; *A special FET initiative focussing on the next generations of exascale computing as a key horizontal enabler for advanced modelling, simulation and big-data applications [HPC in Future and Emerging Technologies (FET)]*
 - (b) providing **access** to the best supercomputing facilities and services for both industry and academia; *PRACE - world-class HPC infrastructure for the best research [HPC in e-infrastructures]*
 - (c) achieving excellence in HPC **applications**; *Centres of Excellence for scientific/industrial HPC applications in (new) domains that are most important for Europe [HPC in e-infrastructures]*
- Complemented with training, education and skills development in HPC
- (a) and (c) will be implemented in the context of the HPC Public-Private Partnership**



Interrelation between the three elements



"Excellent Science"
part of H2020





Public Private Partnership (PPP) in HPC





- To build a **European world-class HPC technology value chain that is globally competitive** - synergy between technology development, applications and computing infrastructure
- To achieve a **critical mass** of convergent resources in order to increase the competitiveness of European HPC vendors and solutions
- To leverage the transformative power of HPC to **boost European competitiveness in science and business**
- To **expand the HPC base**, especially SMEs (both as users and suppliers of competitive HPC technology solutions)
- To develop a **EU leadership and world-wide excellence in key application domains for industry, science and society**



Private Side in the PPP: European Technology Platform for HPC



An industry-led forum founded by stakeholders of HPC technology

Open to any actor of the HPC ecosystem in Europe

Through the **Strategic Research Agenda**, the ETP4HPC has identified research areas and topics to reach a stronger European HPC environment that can benefit Europe and the rest of the world.

Public-Private Partnership (PPP) with ETP4HPC (starting 1st January 2014) - **700 m€ (2014-2020)** (**143,4 m€** committed in H2020 WP2014-2015)

www.etp4hpc.eu



Some reflections



Some reflections on the HPC strategy



HPC is a strategic resource for Europe's future

- HPC world-class systems and services in Europe are essential for its competitiveness and its social, economic and scientific development
- Many countries (US, Japan, Russia, China, Brazil, India) have announced ambitious plans for building and deploying state-of-the-art supercomputers.
- ...however, building "THE EXASCALE MACHINE" is not the issue, it's the path to arrive there and the know-how for the next generation of computing and applications! Mastering advanced computing technologies from hardware to software has become essential



Some reflections on the HPC strategy



HPC needs a European-wide strategy

- No single EU country has the resources to sustain the whole HPC value chain – particularly in view of the critical mass needed for new technological developments and evolving/re-designing applications for exascale
- Some countries can afford top-range machines, but users need a rich ecosystem of systems – there is a need for coordination and pooling of national efforts

The HPC strategy is also about users and applications

- Users must become major players in the strategy, in close cooperation with supercomputing centres and technology developers



Some reflections on the HPC strategy



Europe can become global leader in HPC

- Increasing dependency on other regions' technology can lock in or deprive European users of leading-edge technology
- HW is not the main issue: it's SW and applications, areas in which Europe is strong
- We must leverage recent European achievements, such as PRACE, EESI, ETP4HPC, and the PPP in HPC, in order to take advantage of the current political support to HPC
- This means that we have to work together, respecting individual differences but with a common goal
- Europe has all the talent, technical and human-skills to achieve world-leadership in the three areas: in the supply of critical HPC technology (HW and SW), in the use of HPC applications, and in the provision of HPC capabilities and services.

