# Journée d'information PPP et appels à projet 2016/2017

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# Plan

*Contexte: Priorités Juncker et Marché unique numérique*

*HPC PPP*

*Introduction des appels 2016-2017*

- **HPC**
  FET
  E-infrastructures
- **Big Data**
  LEIT
- **Cloud computing**
  LEIT

# Juncker's priorities and the cPPPs

1. **A New Boost for Jobs, Growth and Investment**
2. **A Connected Digital Single Market**
3. **A Resilient Energy Union with a Forward-Looking Climate Change Policy**
4. **A Deeper and Fairer Internal Market with a Strengthened Industrial Base**
5. A Deeper and Fairer Economic and Monetary Union
6. A Reasonable and Balanced Free Trade Agreement with the U.S.
7. An Area of Justice and Fundamental Rights Based on Mutual Trust
8. Towards a New Policy on Migration
9. **A Stronger Global Actor**
10. A Union of Democratic Change

## Five priority areas are addressed by the cPPPs

# Marché unique numérique

***Objectif: Supprimer les obstacles pour exploiter pleinement les possibilités offertes par internet***

*Trois domaines d'action ou «piliers»:*

***1. Améliorer l'accès aux biens et services numériques***

*Contribuer à transformer le monde numérique de l'UE en un marché homogène et équitable.*

***2. Créer un environnement propice au développement des réseaux et services numériques***

*Concevoir des règles en phase avec l'évolution technologique et favorisant le développement des infrastructures.*

***3. Le numérique: un moteur de la croissance***

*Faire en sorte que l'économie, l'industrie et l'emploi en Europe tirent pleinement parti des possibilités offertes par le numérique.*

# 1. Améliorer l’accès aux biens et services numériques

*1.1. Faciliter le commerce électronique*

*1.2. Améliorer la livraison de colis*

*1.3. Lutter contre le blocage géographique*

*1.4. Moderniser le droit d’auteur*

*1.5. Simplifier les règles en matière de TVA*

# 2. Créer un environnement propice au développement des réseaux et services numériques

*2.1. Adapter la réglementation sur les télécommunications à sa finalité*

*2.2. Un cadre pour les médias au XXIe siècle*

*2.3. Le rôle des plateformes en ligne*

*2.4. Renforcer la confiance dans les services en ligne*

# 3. Le numérique: un moteur de la croissance

*3.1. La numérisation de l'industrie*

*3.2. Développer les normes et l'interopérabilité*

*3.3. Tirer le meilleur parti de l'économie des données et de l'informatique en nuage*

*3.4. Exploiter les avantages des services électroniques et faire progresser les compétences numériques*

# 3.1. La numérisation de l’industrie

*Tous les secteurs industriels devraient avoir la possibilité d'intégrer les nouvelles technologies et réussir la transition vers un système industriel intelligent.*

# HPC and digitisation of industry

***Context:*** *The EU manufacturing sector accounts for 2 million companies and 33 million jobs;15 % of our GDP, 80% of our exports and 2/3 of R&D investment*

***Increased use of digital technologies brings innovation into more productive and more efficient production processes, and in new business models***

***Objective:*** *maximise the benefits from the uptake of digital technologies across European industry, while ensuring that our industrial fabric and our workforce adapt to the digital era*

***The necessary infrastructure for innovation will combine Cloud with HPC and Big Data resources and capabilities (e.g. Science Cloud)***

# 3.3. Tirer le meilleur parti de l’économie des données et de l’informatique en nuage

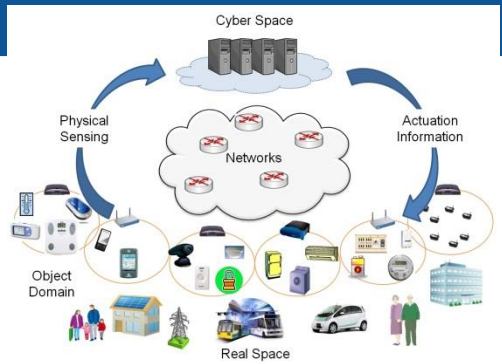
*D'énormes quantités de données sont créées par des personnes ou générées mécaniquement, y compris dans le domaine des mégadonnées ("big data"). Ces mégadonnées sont un moteur pour la croissance, la innovation et la numérisation, mail il faut investir d'avantage dans les infrastructures informatiques et les activités de recherche et d'innovation afin de stimuler la competitivité de l'industrie.*

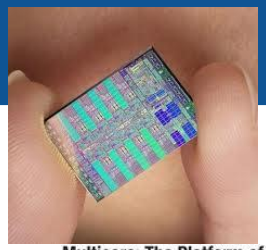
# HPC and the data economy


The European HPC strategy is an essential part to meet the ambitions of the DSM for Europe to ***building a data economy***

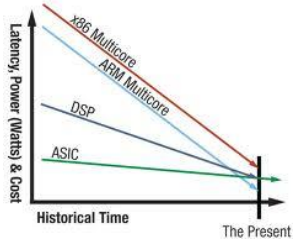
- HPC transforms big scientific, industrial and societal challenges into innovation and business opportunities
- HPC and Big Data will drive major advances and innovation in the upcoming global digital economy, giving a competitive edge and faster access of innovation results to markets
  - European HPC returns-on-investment (ROI) for projects with financial returns: €1 HPC returned on average €867 in increased revenue/income and €69 in profits *(IDC study)*
- World-class computing capability in Europe is needed as part of the Science Cloud, ensuring Europe's place as a world-leading innovation hub
- HPC is critical for European sovereignty, supporting the decision-making process (modelling the impact of political decisions for energy, home security, or climate change)

# Other trends in ICT … affecting the DSM



Multicore: The Platform of the Future




- **More computing cores in the chip at less energy**- is profoundly changing the semiconductor industry and all end-user markets

Software and parallel programming are key!


- **Convergence of HPC, Clouds and Big Data**: is essential to the *digitalisation of industry, e.g.* on-demand HPC-empowered Cloud services or high-performing trusted infrastructures /services as part of the *Science Cloud*

Cloud computing, Big Data Analytics, Mobile devices and Apps, Social Technologies, today represent about 20% of global IT spending


- **HPC is spearheading the computing frontier** (exascale) needed for new applications (e.g. Human Brain Project, Square Kilometre Array)
- Ambitious exascale plans in US and Japan and China.. out-compute is out-compete

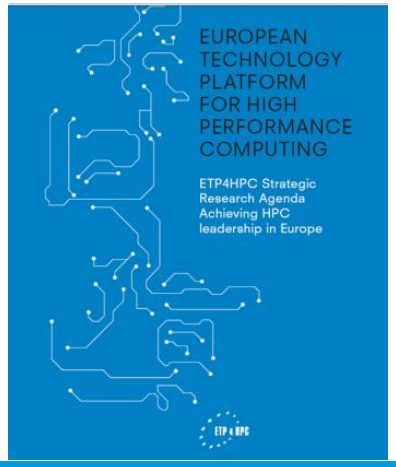
# Key EU HPC developments

European Commission

Communication from the EC "High-Performance Computing: Europe's place in a global race" (2012)


Council Conclusions on High-Performance Computing (Competitiveness Council – 2013)


Establishment of the European Technology Platform on High-Performance Computing (ETP4HPC - 2012) and Strategic Research Agenda on HPC (2013)





Public-Private Partnership with ETP4HPC (1st January 2014)


Horizon 2020 workprogramme 2014/15 fully implemented

# Commissioner Oettinger's speech 18/6/2015

*To underpin the digitalisation of industry, innovation and excellence in science, we do need a strong ICT sector based on essential e-infrastructures such as pan-European research networks, data infrastructures and distributed computing. In coordination with the Member states, the Commission aims at supporting such e-Infrastructures.*

*Investing in state-of-the-art, open and interoperable platforms and innovation e-infrastructures is essential so that business can rely and use them to make products, processes or services ready for the digital age.*

*Available and easy-to-use High Performance Computing resources is a priority for the industry's competitiveness – in particular for SMEs – and for better adaptation to market demands, especially in terms of innovation and fast renewal of their product and service offerings. This is one of the main objectives of Industry 4.0.*

*The European Commission is starting a process of involvement of stakeholders to explore the opportunities offered by the European Fund for Strategic Investment, where High Performance Computing is a key infrastructural component.*

# An integrated HPC approach in H2020

- HPC strategy combining three elements:

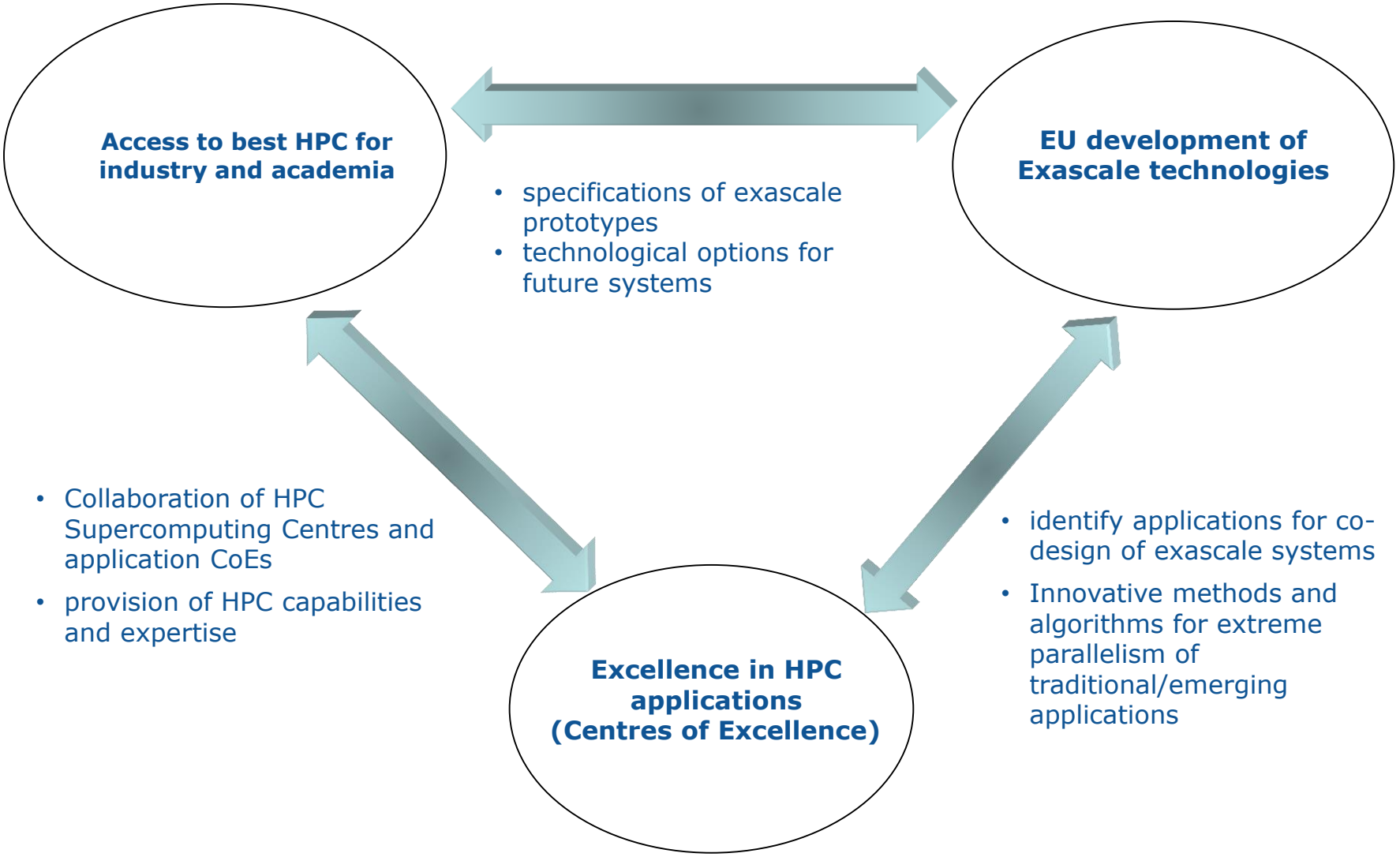
(a) Computer Science: towards **exascale** HPC; *A special FET initiative focussing on the next generations of exascale computing as a key horizontal enabler for advanced modelling, simulation and big-data applications*

(b) achieving excellence in HPC **applications**; *Centres of Excellence for scientific/industrial HPC applications in (new) domains that are most important for Europe*

(c) providing **access** to the best supercomputing facilities and services for both industry and academia; *PRACE - world-class HPC infrastructure for the best research*

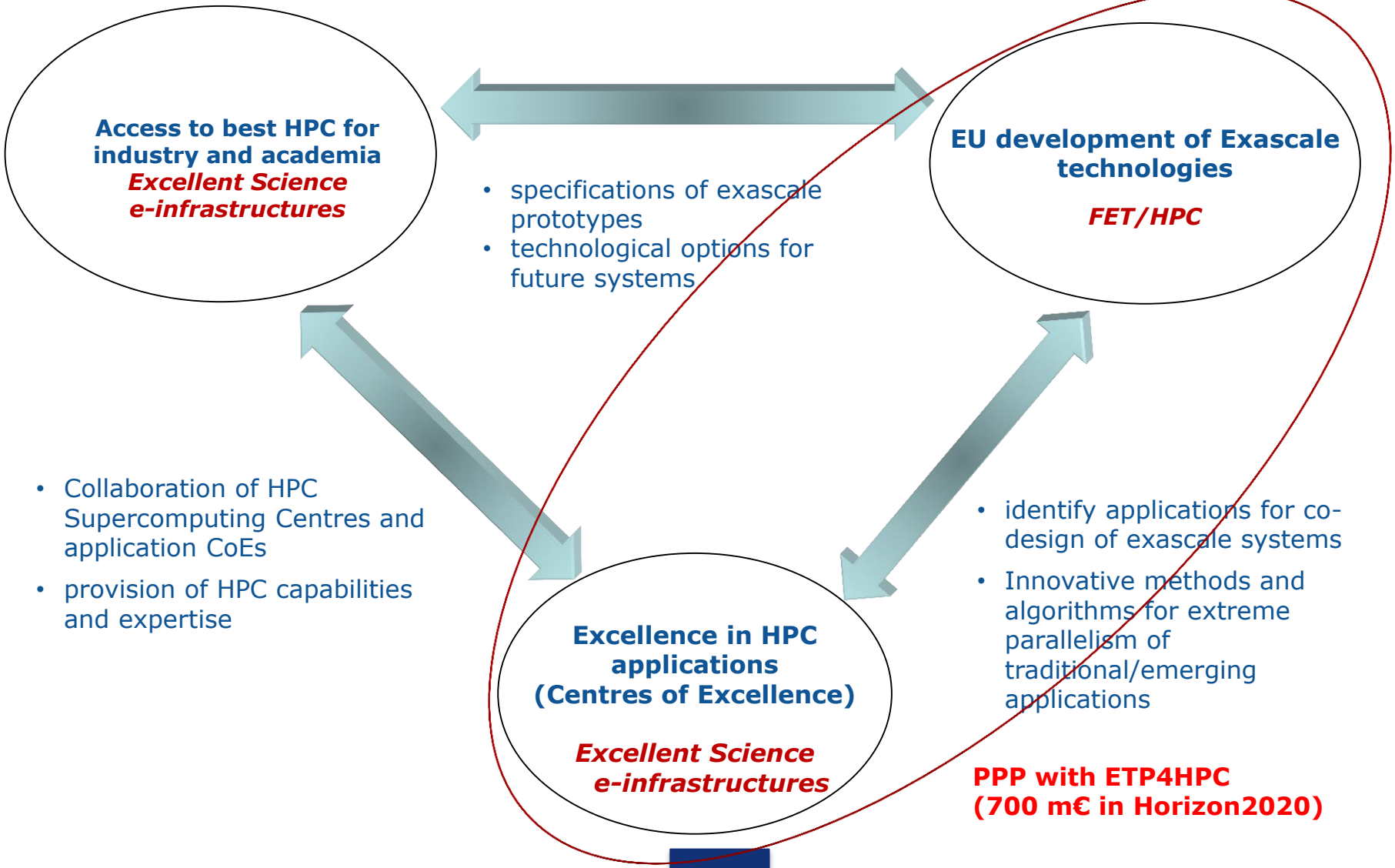
- complemented with training, education and skills development in HPC

# European HPC Strategy



# Interrelation between the strategy pillars

"Excellent Science" part of H2020

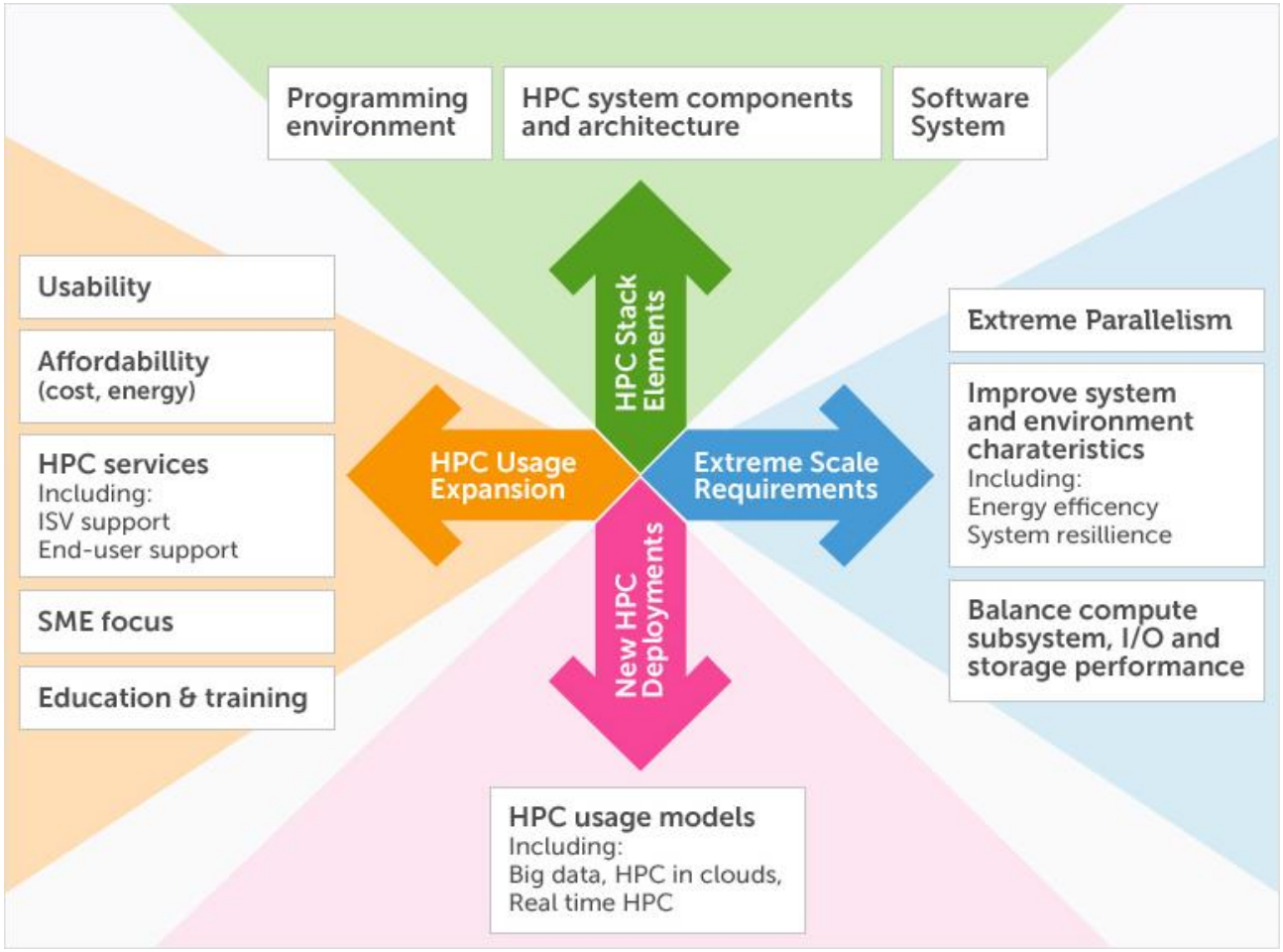


European Commission

# ETP4HPC

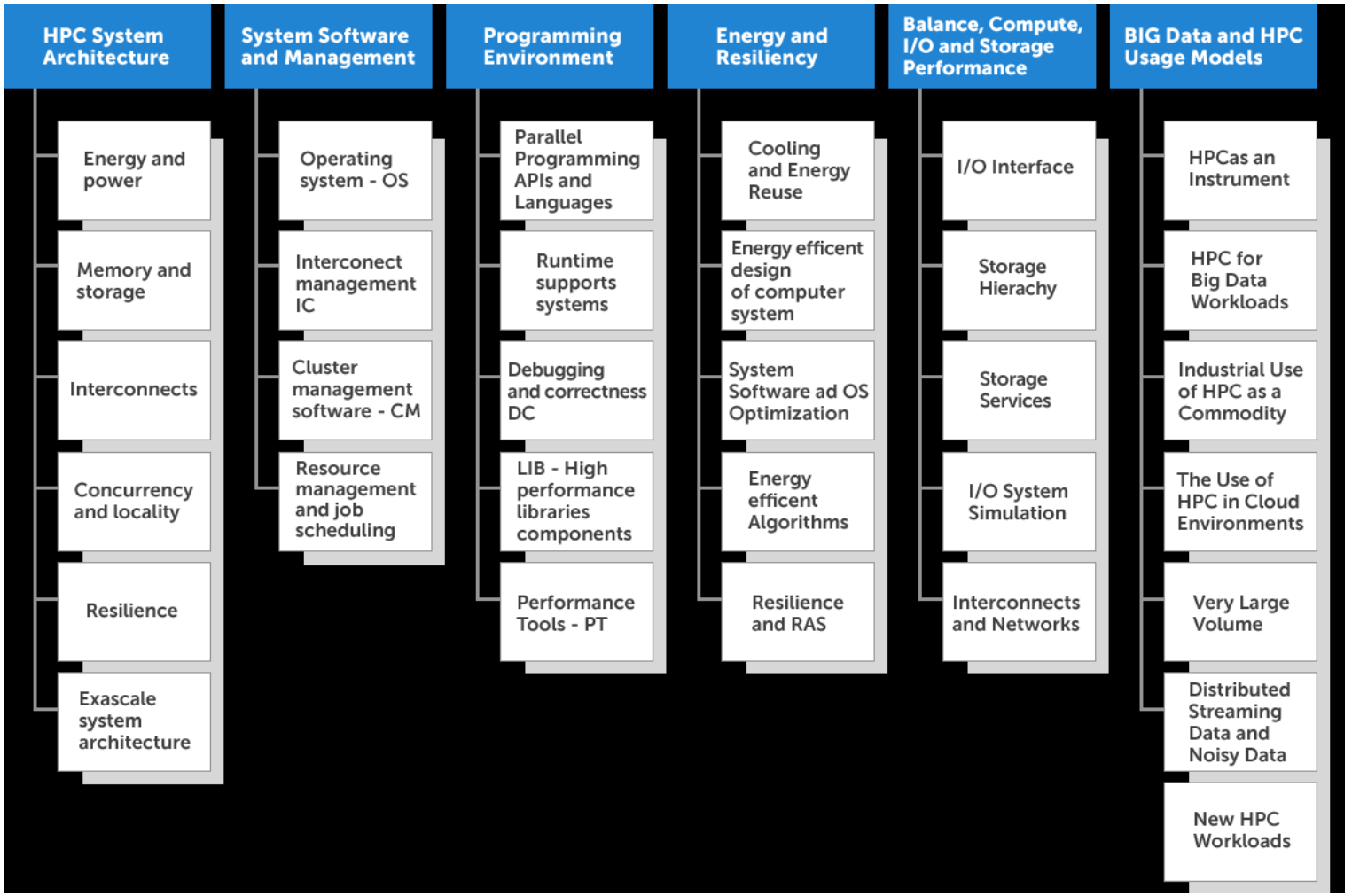
European Commission

# ETP4HPC multi-dimensional vision

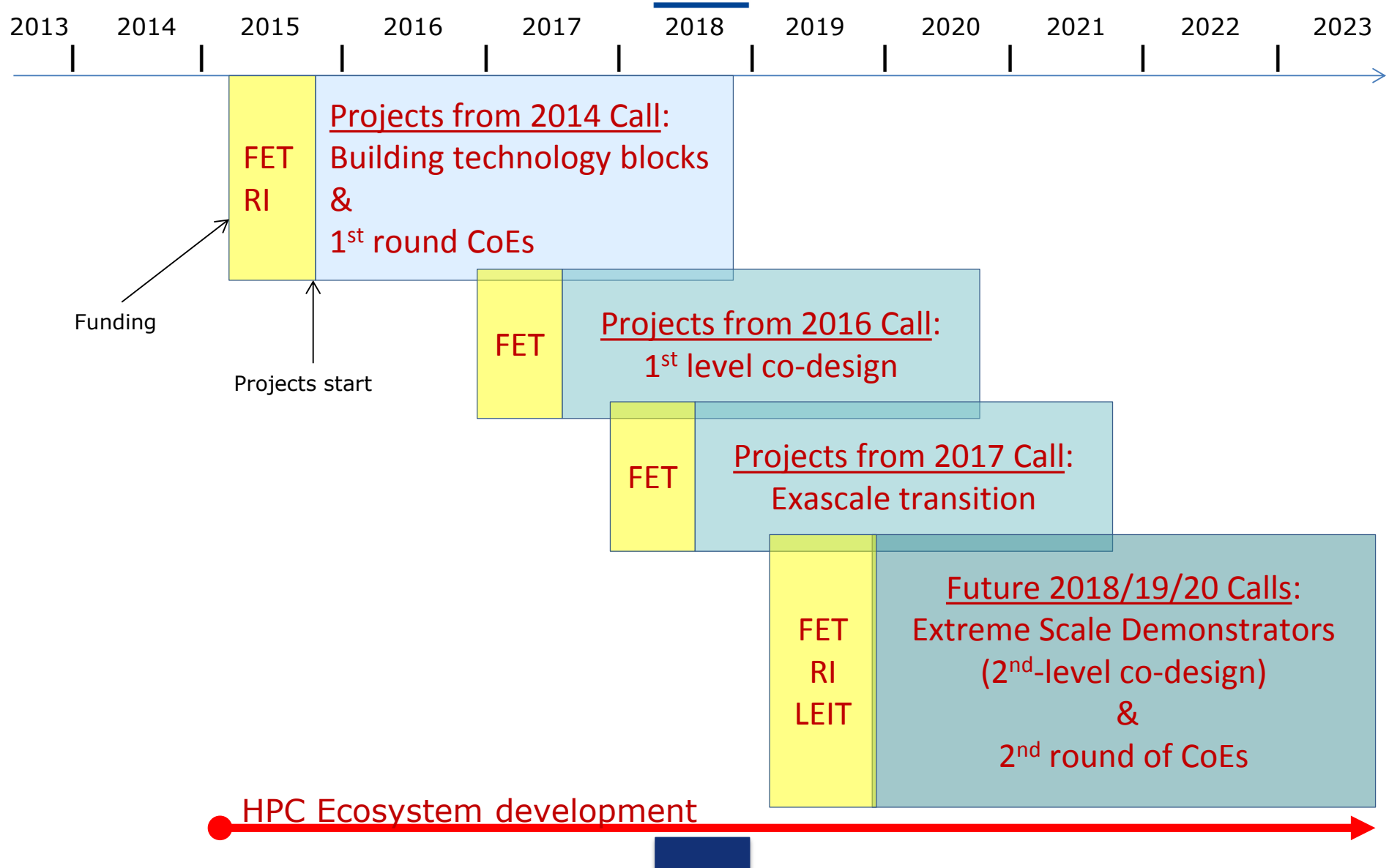


European Commission

# ETP4HPC's research topics



# Timeline


2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
FET
RI
Projects from 2014 Call:
Building technology blocks
&
1st round CoEs
Funding
Projects start
FET
Projects from 2016 Call:
1st level co-design
FET
Projects from 2017 Call:
Exascale transition
FET
RI
LEIT
Future 2018/19/20 Calls:
Extreme Scale Demonstrators
(2nd-level co-design)
&
2nd round of CoEs
HPC Ecosystem development

# FETHPC 2014 CALL Summary


***FETHPC-1-2014*: HPC Core Technologies, Programming Environments and Algorithms for Extreme Parallelism and Extreme Data Applications** *(Research and Innovation Actions)*

a) **HPC core technologies and architectures** *(e.g. processors, memory, interconnect and storage) and their optimal integration into HPC systems, platforms and prototypes*
b) **Programming methodologies, environments languages and tools***: new programming models for extreme parallelism and extreme data applications*
c) **Application Programming Interfaces and system software** *for future extreme scale systems*
d) **New mathematical and algorithmic approaches** *for existing or emerging applications*

***FETHPC-2-2014*: HPC Ecosystem Development** *(Coordination and Support Actions)*

a) **Coordination of the HPC strategy**: coordination of the activities of stakeholders, development of Strategic Research Agenda, mapping and analysis of national and international R&I programmes, attracting young talents ,…
b) **Excellence in High Performance Computing Systems**: boosting European research excellence on the key challenges towards the next generations of high-performance computing systems; cutting across all levels.

# Participation in the FETHPC call

- *Eligible proposals*: ***81***
- *Retained proposals*: ***21***

# E-infrastructures Summary

# Centres of Excellence and PRACE

## Centres of excellence

The call was aimed at establishing a **limited number of Centres of Excellence** (CoE) to ensure EU competitiveness in the **application of HPC** for addressing **scientific, industrial or societal challenges**.

CoEs should be **user-focused**, develop a **culture of excellence**, both **scientific and industrial**, placing **computational science** and the **harnessing of 'big data'** at the centre of scientific discovery and industrial competitiveness.

## PRACE

World class HPC resources for research and SMEs (SHAPE)

# Participation in the CoEs call

- *Eligible proposals*: ***20***
- *Retained proposals*: ***8***

# Thematic Areas Eligible Proposals


# Centres of Excellence

Renewable Energy
New Energy Sources

Materials Modelling
& Design

Molecular & Atomic Modelling
Spintronics
Particle Physics & Cosmology

Energy

Physics

Material Science
& Engineering

Weather & Climate Change Modelling
Environmental Computing software
Blue, Marine & Maritime
Ground Water Resource Management

Environmental

Computer
Science

Biomolecular Research
Biomedicine
Personalised Medicine

Life Sciences

System Science
& Engineering

Humanities &
Social Sciences

High Performance Computing
Numerical Algorithms, HPC, Statistics

Digital Humanities

Global System Science

# Next steps in the HPC strategy (1/2)

***Continue technological development of key building blocks and HPC applications***

- *FET programme towards exascale*
- *e-infrastructure HPC Centres of Excellence for application co-design, development, optimization and provisioning*

***Integration of technological building blocks into extreme-scale platforms/demonstrators***

- *proof-points of technological readiness, usability and scalability*
- *co-design process meeting the needs of strategic European applications, linking the industrial environment supply and use*
- *exascale performance expected by 2021-2022 in view of exascale by 2023*

# Next steps in the HPC strategy (2/2)

***Continue support to implementation of the Pan-European HPC infrastructure (PRACE)***

***Coordinated acquisition strategy complementing integration***

- *procurement/acquisition of pre- and exascale systems for transitioning the European set of leading machines to the new computing generation (collaboration with PRACE)*

***Towards a service-oriented European e-infrastructure platform encompasing HPC, Big Data, Cloud, and communication networks***


- **Conference** sessions on EC policy and initiatives on R&I in ICT
- **Networking** sessions
- **Exhibition** showcasing results of most recent EU projects

➢ **Presentation of WP2016-17**

**info & registration: ec.europa.eu/digital-agenda/ict2015**


# Merci!