



**EUROPEAN TECHNOLOGY  
PLATFORM FOR HIGH  
PERFORMANCE COMPUTING**

# **DEVELOPING EUROPEAN TECHNOLOGY TO SERVE THE HPC ECOSYSTEM**

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# DEVELOPING EUROPEAN TECHNOLOGY TO SERVE THE HPC ECOSYSTEM

The European HPC ecosystem is one of the best in the world with a large HPC user base, an outstanding HPC applications development community and a set of tier0 HPC datacentres.

The purpose of the ETP4HPC (European Technology Platform for High Performance Computing) is to develop a complete European HPC technology ecosystem.

This talk will present the current efforts undertaken under the Horizon 2020 programme to foster the development of European technologies for HPC and Big Data.

# EUROHPC – SIGNED MARCH 23, 2017

On 19 April 2016 the European Commission adopted the Communication *'European Cloud Initiative – Building a competitive data and knowledge economy in Europe'*. The Communication calls on the European Commission and Member States to create a leading European High Performance Computing and Big Data ecosystem, underpinned by a world-class high performance computing, data and network infrastructure. Such infrastructure will also *support the EU to rank among the world's top supercomputing powers by realising exascale supercomputers around 2022, based on EU technology. Europe should aim to have at least two sources of this technology.*



... March 23, 2017

## Declaration of European cooperation on HPC

Germany, Portugal, France, Spain, Italy, Luxembourg, Netherlands

[http://ec.europa.eu/newsroom/dae/document.cfm?doc\\_id=43815](http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=43815)

# EUROHPC (PAGE 3)

2x pre-exascale systems 2019-20  
2x world-class full exascale 2022-23

Development of high-quality competitive  
European Technology

Co-design

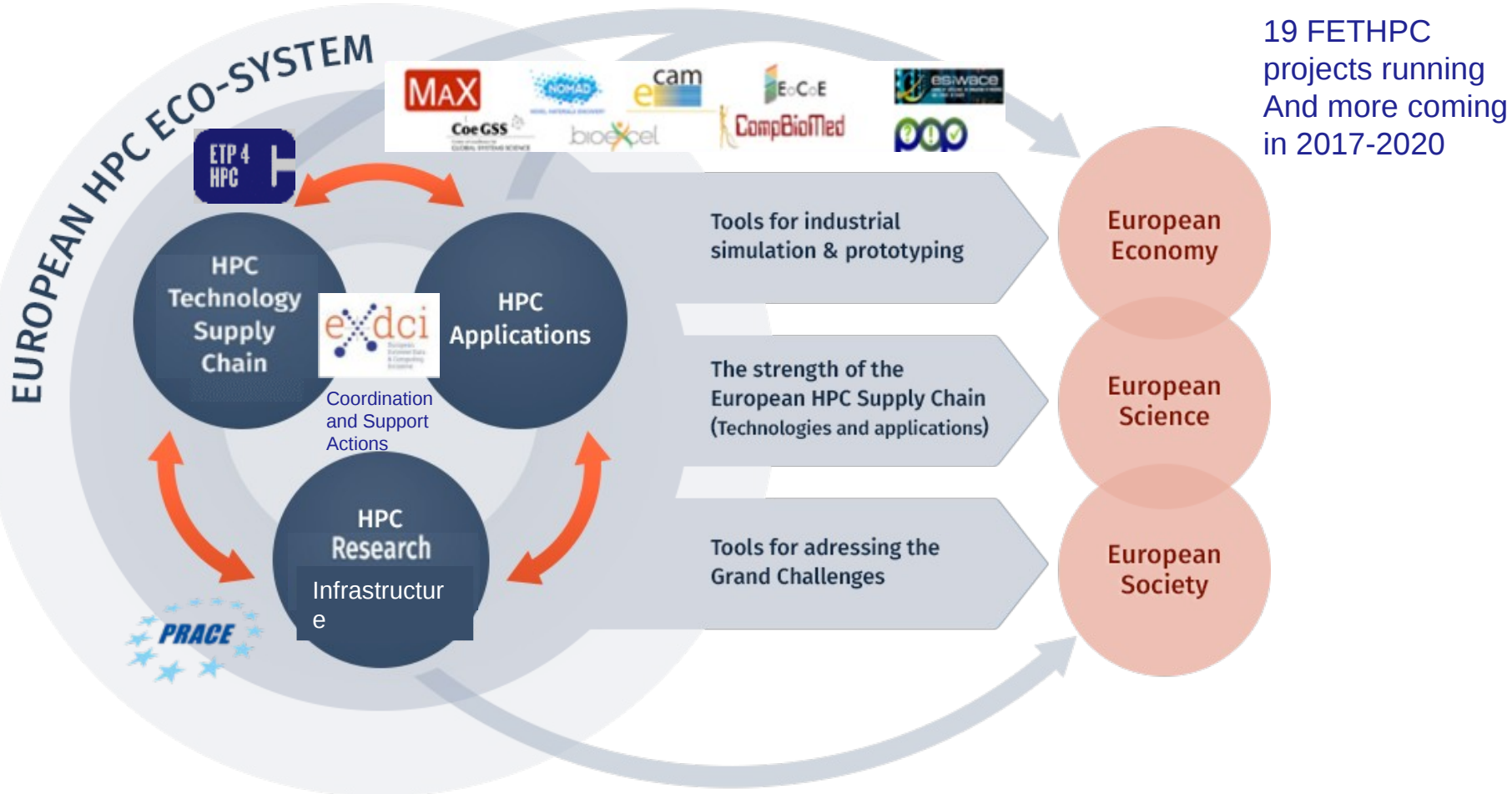
in at least one of the 2 exascale  
supercomputers

test-beds for HPC and big data

are located.

- Agree, in the context of EuroHPC, to work together and with the European Commission to prepare, preferably by the end of 2017, an implementation roadmap for putting in place the above-mentioned exascale supercomputing infrastructure that would address the following:
  1. The technical and operational requirements and the financial resources needed for acquiring such infrastructure.
  2. The definition of appropriate legal and financial instruments for such acquisition.
  3. The procurement processes for the acquisition of two world-class pre-exascale supercomputers preferably starting on 2019-2020, and two world-class full exascale supercomputers preferably starting on 2022-2023.
  4. The development of high-quality competitive European technology, its optimisation through a co-design approach and its integration in at least one of the two exascale supercomputers.
  5. The development of test-beds for HPC and big data applications for scientific, public administration and industrial purposes.
- Invite the European Commission to participate in this endeavour and work together on how it can be best supported at EU level.
- Agree that the target exascale supercomputing infrastructure will address the growing needs of the scientific community, and to look also for ways and conditions to open the availability of

# EUROPEAN HPC ECOSYSTEM

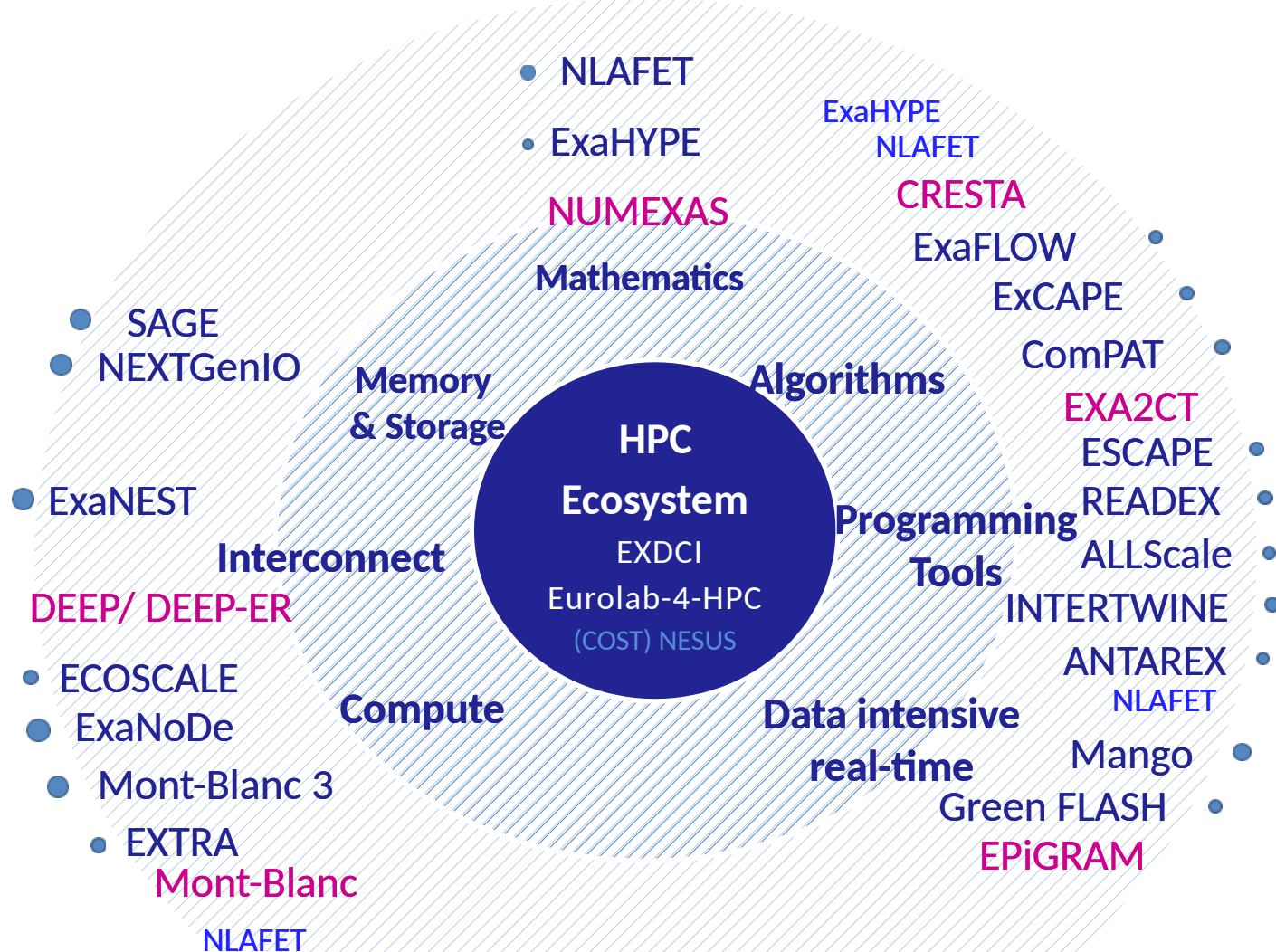


19 FETHPC projects running  
And more coming in 2017-2020

# THE CURRENT EUROPEAN HPC TECHNOLOGY LANDSCAPE

## Centres of Excellence

- MaX
- NoMaD
- E-CAM
- EoCoE
- ESIWACE
- COEGSS
- BioExcel
- ComBioMed
- POP



FP7 projects

FETHPC (start: Autumn 2015)

CoEs (start: Autumn 2015)

The size of the circles = project size, e.g. 10M Euro = ●

# EXCELLENCE IN HPC APPLICATIONS (CENTRES OF EXCELLENCE)



**Material sciences:**  
Materials design at the eXascale



**Material sciences:**  
The Novel Materials Discovery Laboratory



**Material sciences:** An e-infrastructure for software, training and consultancy in simulation and modelling



**Energy:** Energy oriented Centre of Excellence for computer applications



**Climate:** Excellence in Simulation of Weather and Climate in Europe



**Global Systems Science:**  
Center of Excellence for Global Systems Science



**Bioscience:** Centre of Excellence for Biomolecular Research



**Biomedicine:** A Centre of Excellence in Computational Biomedicine



**Performance:** Performance Optimisation and Productivity

5/30/17

ETP4HPC Event

# How does this work?

- cPPP signed Dec. 2013 with ETP4HPC (Public-Private Partnership) - Entry into force Jan. 2014
- Centres of Excellence joined in 2015 ('private' side = ETP4HPC + CoEs)
- 'Structured dialogue', Partnership Boards twice a year
- Private side provides input to define H2020 HPC programmes – which are funded and operated by the EC
- Commitment from private partners to match EC funding
- Joint progress and impact monitoring
- Collaboration with PRACE, BDVA/Big Data PPP, HiPEAC, Eurolab4HPC...



# ETP4HPC

## BUILDING A GLOBALLY COMPETITIVE EUROPEAN WORLD-CLASS HPC TECHNOLOGY VALUE CHAIN

### 78 Members

(as of May 2017)

- 51 Full
- 27 Associated
- 39 Private
- 25 SMEs
- 11 Larger companies
- 36 Research organisations
- Established in 2011
- Officially a Dutch Association since December 2012





# ACTIVITIES: SRA = core mission

## Strategic Research Agenda

(Multi-annual Roadmap)

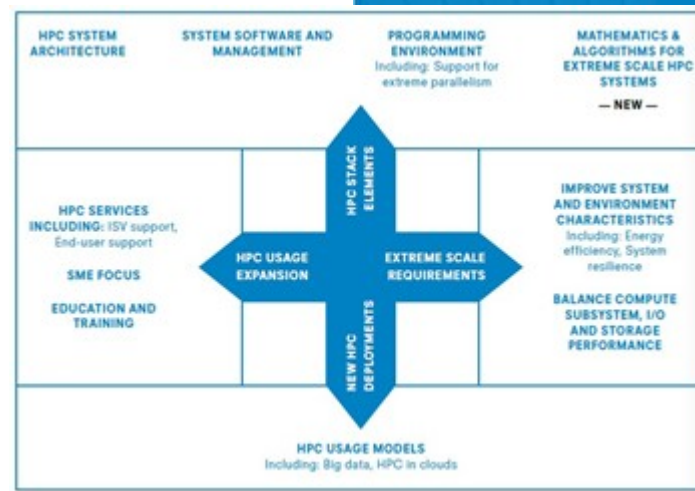
- 2013, 2015, 2017 in the making
- 8 topical working groups 150 to 200 experts
- Collaboration with BDVA, HiPEAC & Eurolab4HPC
- Input for H2020 FETHPC and CoEs calls
- Extreme-scale Demonstrators concept (WP18-20)

### ETP4HPC

European Technology Platform  
for High-Performance Computing

## Strategic Research Agenda 2015 Update

European Technology  
Multi-annual Roadmap  
Towards Exascale  
Update to 2013 Roadmap



# Hot topic... WP18-20 input

- Being elaborated actively by ETP4HPC, with CoEs, PRACE and talking to BDVA and other stakeholders
- Discussed with the EC within the framework of the cPPP (structured dialogue)
  - Technology – « FETHPC » follow-up
  - Extreme Scale Demonstrators to put together FETHPC outcomes
  - Centres of Excellence (second period)
  - Coordination and support action
- SRA Version 3 (2017 edition) will develop a more detailed technical vision and WP18-20 calls will implement the SRA

# Extreme scale Demonstrators

“The “Extreme-Scale Demonstrators” (EsDs) are vehicles to **optimise and synergise the effectiveness of the entire HPC H2020 Programme** through the integration of isolated R&D outcomes into fully integrated HPC system prototypes;

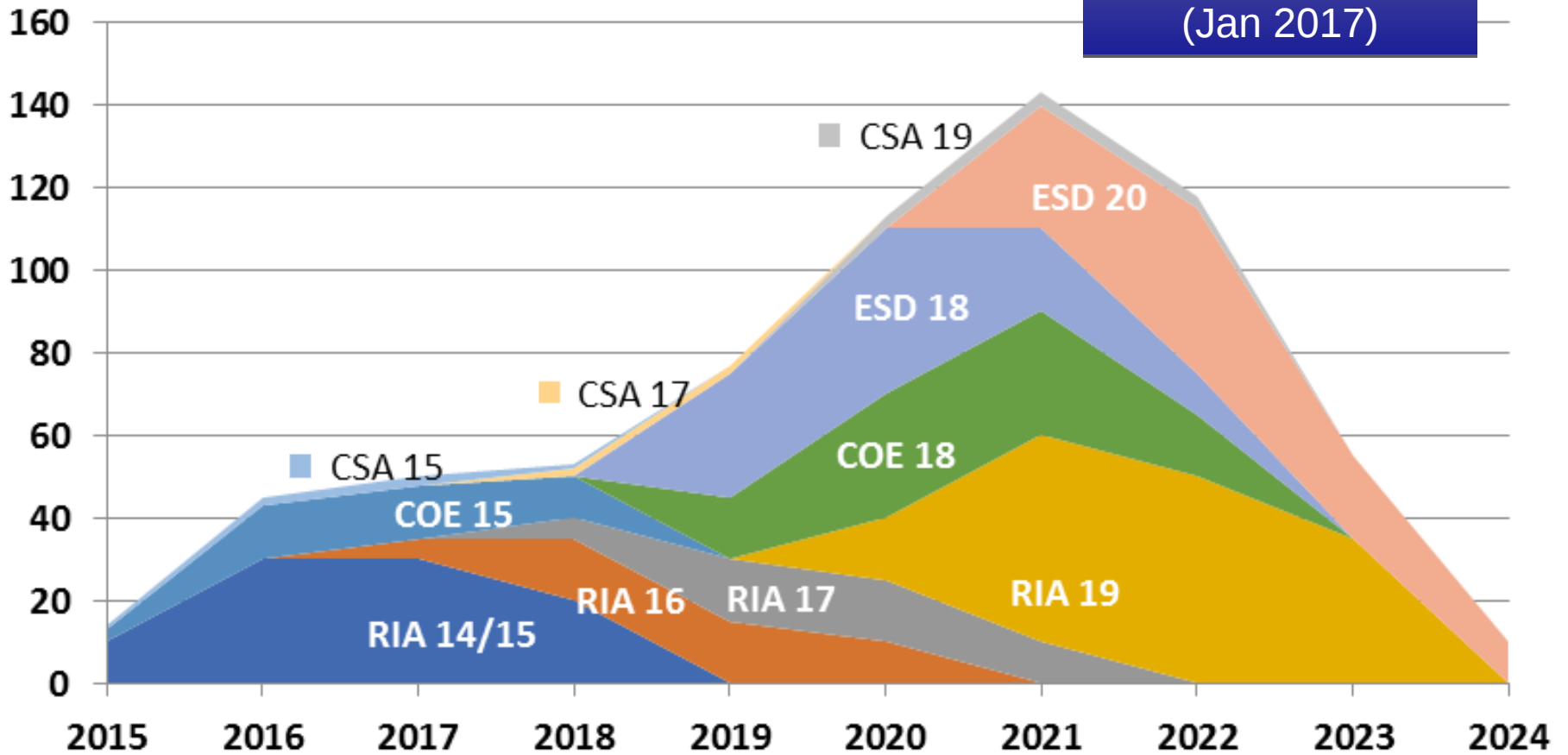
It is a key step towards establishing European exascale capabilities and solutions.” *(From the ETP4HPC SRA, chapter 8 p.67)*

EsDs will fill critical gaps in the HPC H2020 programme:

- Bring technologies from FET-HPC closer to commercialisation (TRL 7-8)
- Combine results from targeted R&D efforts into a complete system (European HPC technology ecosystem)
- Provide the missing link between the 3 HPC pillars: Technology providers, infrastructure providers, user communities (co-design)

# Funding WP 14-20

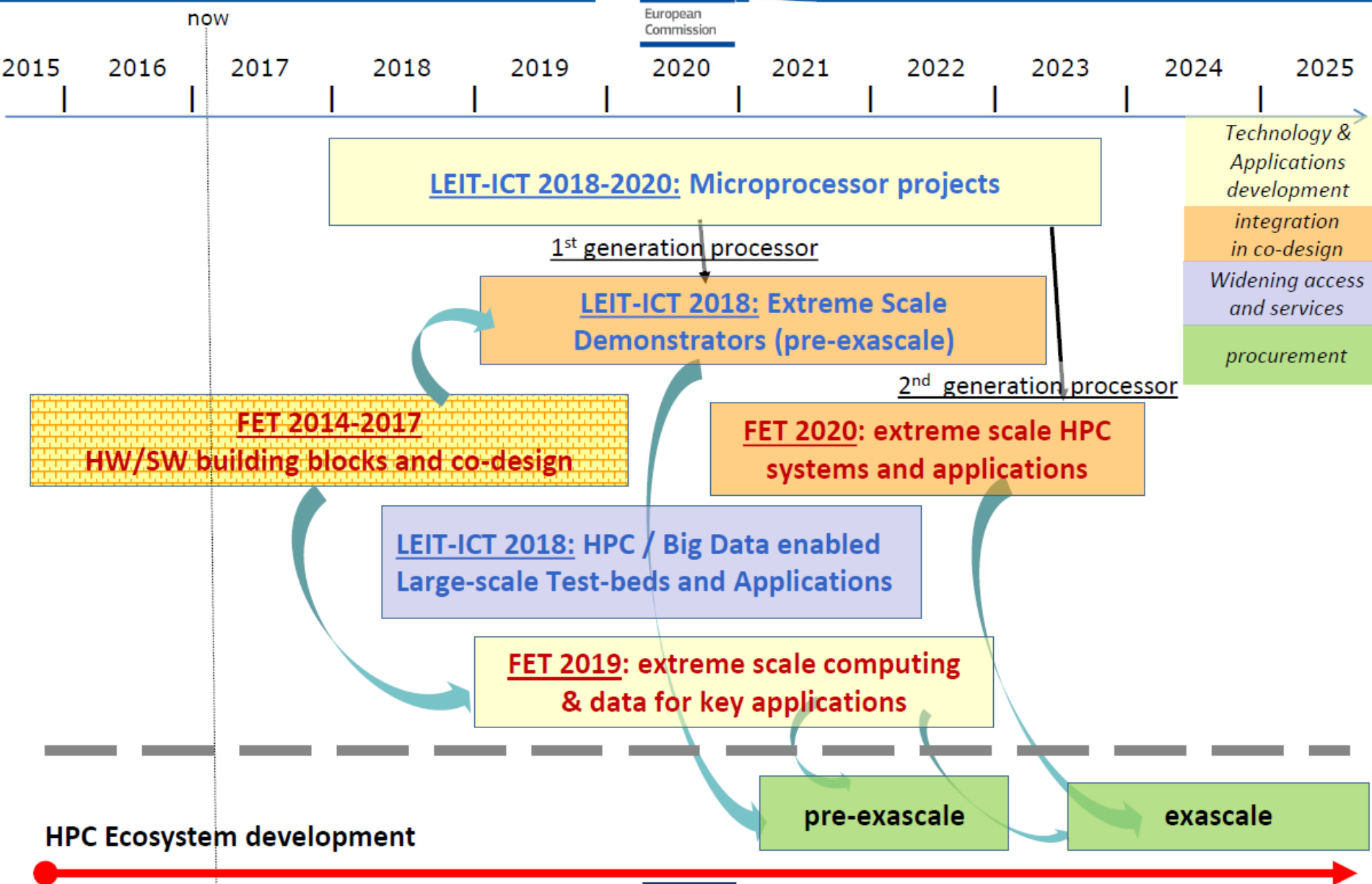
ETP4HPC proposal  
(Jan 2017)



# HPC timeline LEIT/FET (indicative)



subject to discussion with committees



- Technology & Applications development
- integration in co-design
- Widening access and services
- procurement

# UPCOMING EVENTS IN 2017

- **EHPCSW (Barcelona):**

May 17<sup>th</sup>: cPPP meeting

**May 18<sup>th</sup>: EsD - Roundtable (FETHPC projects, CoE, HPC centers, system integrators, technology providers)**

May 19<sup>th</sup>: SRA-workgroup leaders' internal meeting (Barcelona)

- **June 22<sup>nd</sup>: Workshop at ISC with industrial users: "how to benefit from EsDs?"**
- April-May-June-July: SRA3 writing & interlock with workgroups, integration, tuning, review
- **September 15<sup>th</sup>: release and distribution of SRA3** (after WP17 call closure)
- **SC17 Nov???: BOF - review of the European HPC landscape and its projects**





**HIGH  
PERFORMANCE  
COMPUTING  
FOR EUROPE**

ETP 4  
HPC

# TO EXASCALE ... AND BEYOND

“Building a globally competitive European world-class  
HPC technology value chain”

**ETP4 HPC**

**THANK YOU FOR YOUR ATTENTION!**

For more information:

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HPC strategy, work programmes and HPC related news:  
[ec.europa.eu/horizon2020-hpc](http://ec.europa.eu/horizon2020-hpc)