EUROPEAN TECHNOLOGY PLATFORM FOR HIGH PERFORMANCE COMPUTING

ETP 4 HPC

ETP4HPC standard presentation

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

What you should know by the end of this talk:

- Motivation and Context – HPC Ecosystem & Horizon 2020 (H2020)
- ETP4HPC
- Strategic Research Agenda (SRA)
- Other Activities

ETP 4 HPC

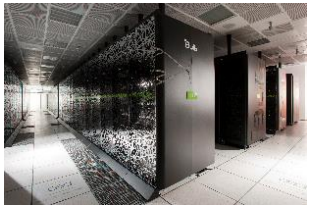
EUROPEAN TECHNOLOGY PLATFORM FOR HIGH PERFORMANCE COMPUTING

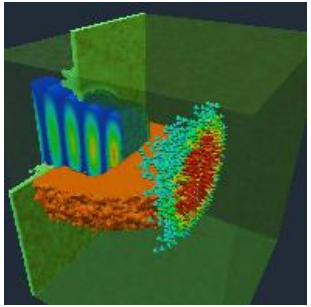
Motivation and context
HPC ecosystem & H2020

What we do

High-Performance Computing (HPC)

An essential tool for Science, Society and Industry





High-Performance Computing (HPC)

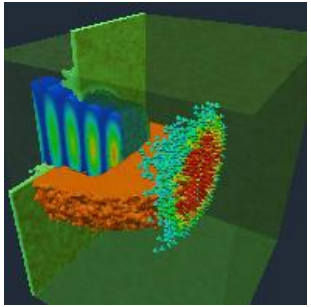
An essential tool for Science, Society and Industry

Supercomputers: essential tools for powering numerical simulation, data analytics and big data processing, machine learning and AI

HPC

From leading edge to pervasive computing

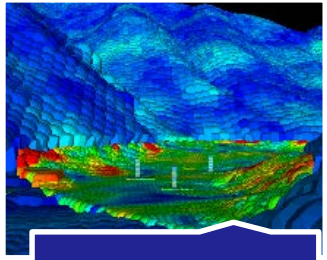
A **strategic driver** to push advanced computing **beyond its limits** from core technologies to usage



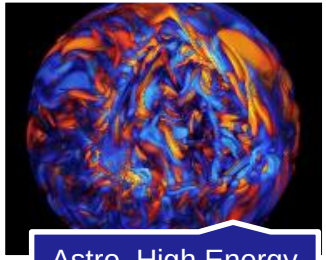
HPC : An enabler for all scientific fields

An essential tool for Science, Society and Industry

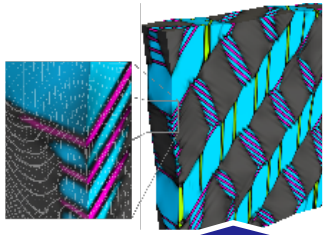
Life Sciences & Medicine



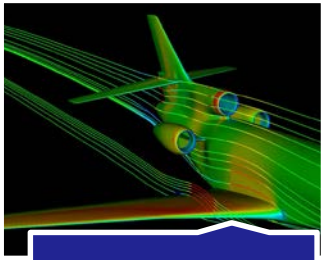
Earth Sciences



Astro, High Energy & Plasma Physics



Materials, Chemistry & Nanoscience

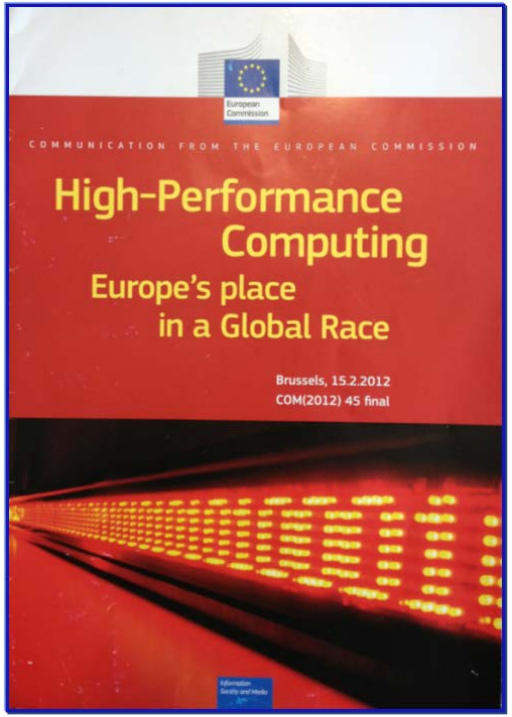


Engineering

Advances leading to:

- Improved Healthcare
- Better Climate Forecasting
- Superior Materials
- Sustainable Energy
- More Competitive Industry
- …

Key document: 2012 EC Communication

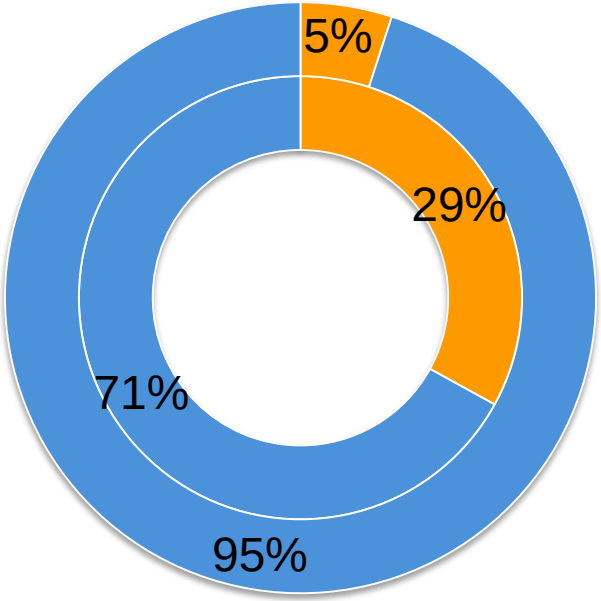


EU needs independent access to HPC technologies, systems and services

=> ETP4HPC created end of 2012 to contribute to this objective

Why do we need to act now?

Europe comsumes 29% of global HPC resources

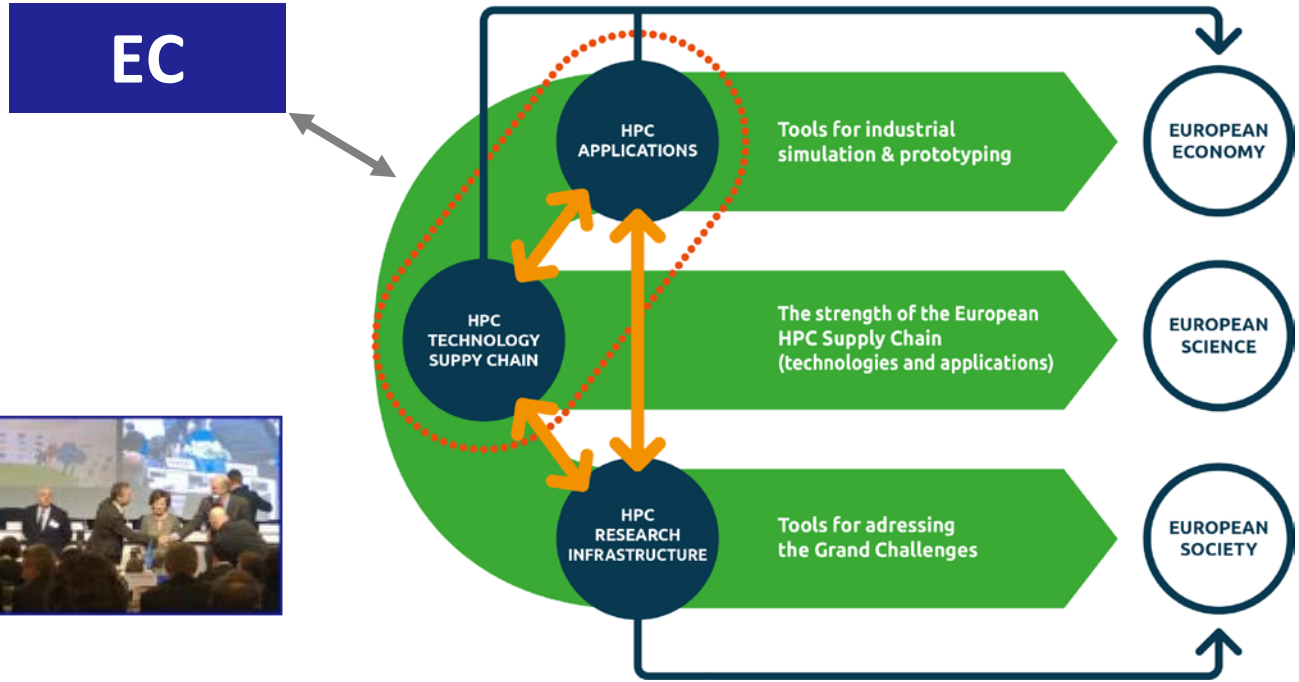


However, supplies less than 5% of them

Source : impact assessment accompanying the proposal and the 2016 Commission document on the implementation of the European HPC strategy

European HPC Eco-system

The contractual Public-Private Partnership covers two pillars of the European HPC eco-system: technology provision and application expertise



The Objectives and Principles of cPPP

Development of the next generation of HPC technologies, applications and systems towards Exascale and pervasive use

Excellence in HPC applications delivery and use

Training, education and skills development

- Structured dialogue
- Commitment from private partners to match EC funding
- Joint progress and impact monitoring

How does cPPP work?

- cPPP signed Dec. 2013 with ETP4HPC (Public-Private Partnership) Entry in force Jan. 2014
- Centres of Excellence joined in 2015 (‘private’ side = ETP4HPC + CoEs)
- Partnership Boards twice a year
- Private side provides input to define H2020 HPC programmes which are funded and operated by the EC
- Collaboration with PRACE, BDVA/Big Data PPP HiPEAC, Eurolab4HPC…

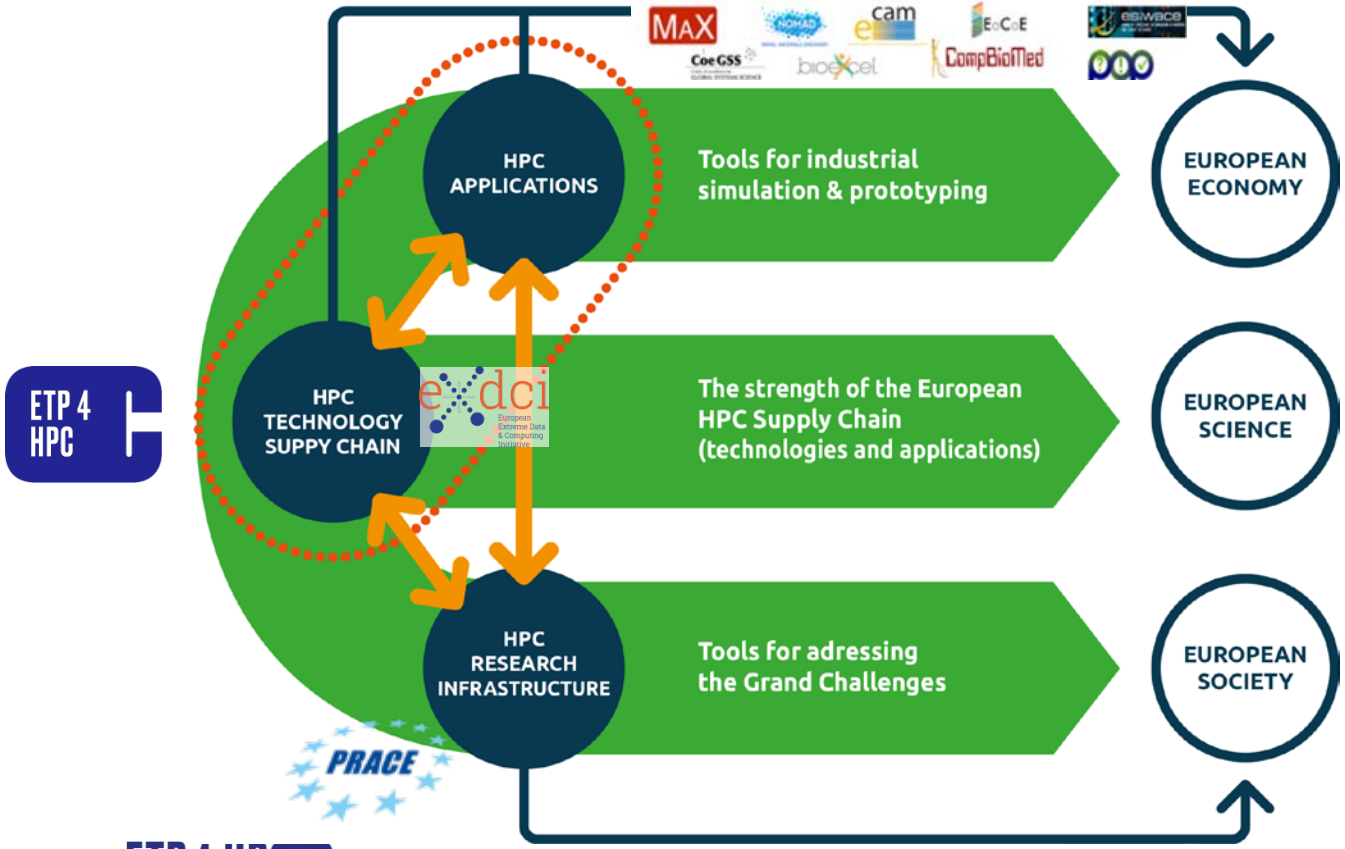
cPPP Implementation

- Calls 2015+2016: 172 M€ allocated
  - 21 FETHPC Projects (94,6 M€ + 35 M€) + 2 CSAs (4 M€)
  - 9 CoEs (42,4 M€)

- Calls 2017 and 2018
  - 10 new FETHPC projects (Sage2, MAESTRO, EPEEC, EXA2PRO, RECIPE, ASPIDE, VECMA, VESTEC, ExaQUte, ESCAPE-2)
  - Renewal of the 2 CSAs (EXDCI and Eurolab4HPC)
  - New call for CoEs (72 M€) + 1 FocusCoE (2 M€)

- cPPP-related calls on Low-power microprocessor technologies in ICT : (80 M€)

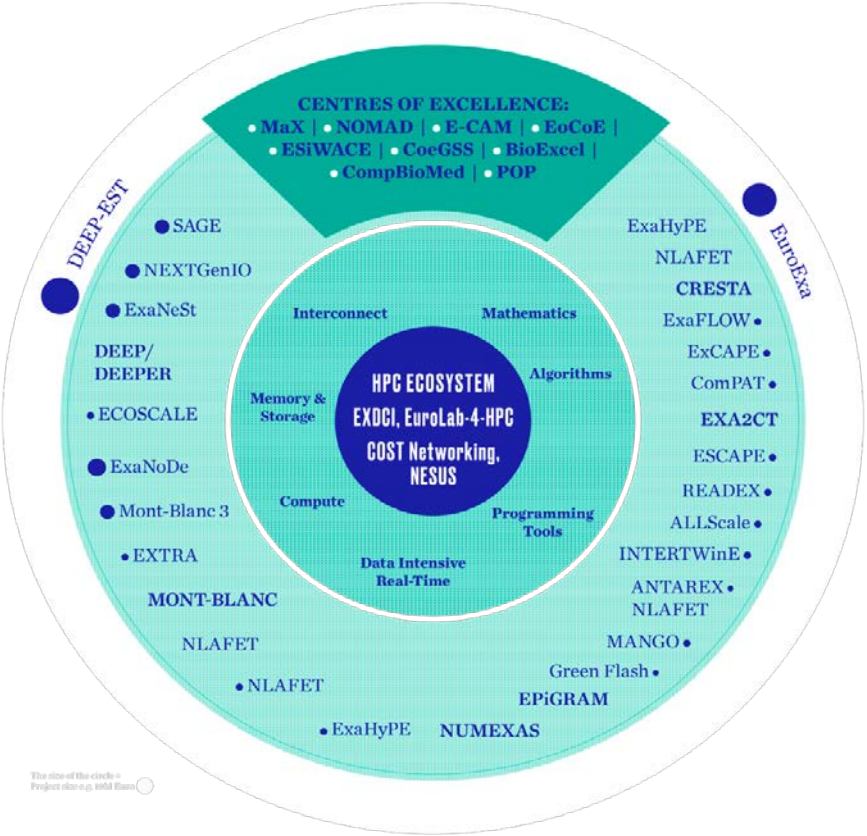
European HPC Ecosystem



Approx. 21 FETHPC projects and 9 CoEs running

And more coming in 2018 - 2020

The current European HPC technology landscape



Excellence in HPC applications (Centres of Excellence)

MAX	**Material sciences:** Materials design at the eXascale
NOMAD	**Material sciences:** The Novel Materials Discovery Laboratory
e-cam	**Material sciences:** An e-infrastructure for software, training and consultancy in simulation and modelling
E-CoE	**Energy:** Energy oriented Centre of Excellence for computer applications
esiwace	**Climate:** Excellence in Simulation of Weather and Climate in Europe
CoeGSS	**Global Systems Science:** Center of Excellence for Global Systems Science
bioexcel	**Bioscience:** Centre of Excellence for Biomolecular Research
CompBioMed	**Biomedicine:** A Centre of Excellence in Computational Biomedicine
POP	**Performance:** Performance Optimisation and Productivity

PRACE and Infrastructures

- Mission: enabling high impact scientific discovery and engineering research and development across all disciplines to enhance European competitiveness for the benefit of society.
- Realisation: Through offering world class computing and data management resources and services through a peer review process.
- Manage: Access to 7 world-class HPC systems with a total capability of more than 50 pflop/s.

PRACE
PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

April 2016: New EC communication(s)

« European Cloud Initiative – Building a competitive data and knowledge economy in Europe »

Directions :

- European Open Science Cloud
- European Data Infrastructure
- Widening access and building trust

Looking forward …

EC European Open Science Cloud and European Data Infrastructure announcements of April 2016 acknowledge and confirm the importance of HPC

- Scientific but also industrial and societal stakes
- Wider scope of Digital Single Market and Digitising European Industry

http://europa.eu/rapid/press-release_IP-16-1408_en.htm

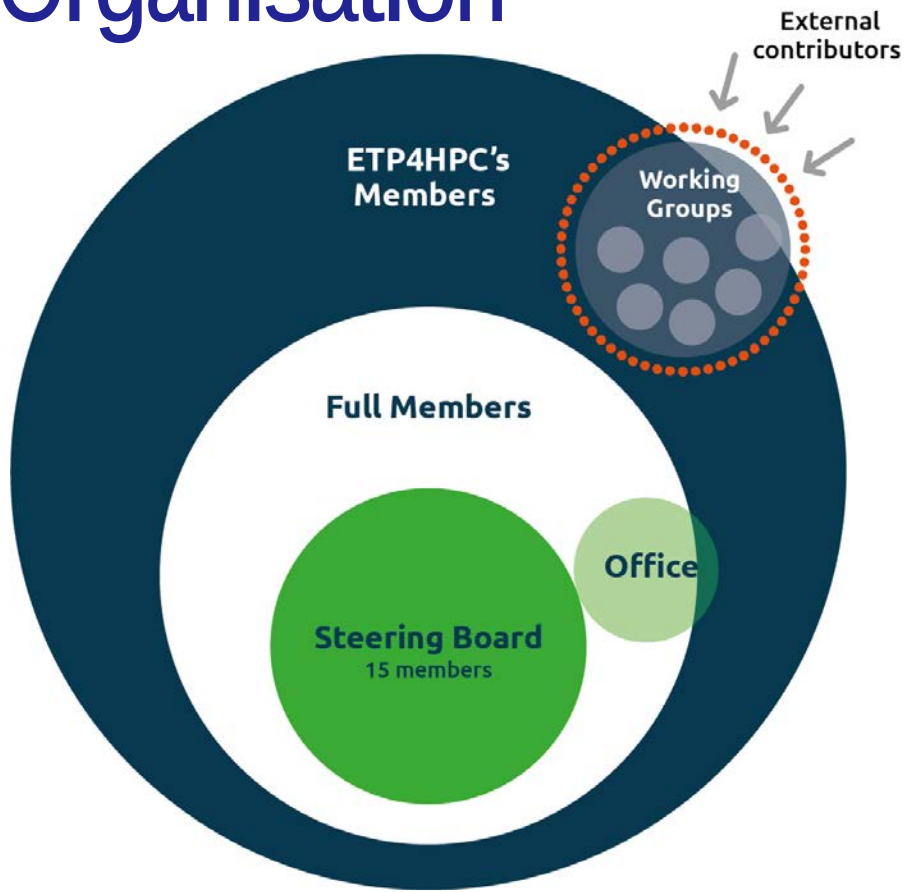
ETP4HPC

What we do

Key Activities

- Foster growth of HPC technology Research and Development in Europe
- Advise EC through cPPP
- Define Strategic Research Agenda (SRA)
- Propose H2020 Work Program contents
- Monitor ecosystem development

ETP4HPC Organisation



ETP4HPC

Established in 2011
Officially a Dutch Association since December 2012

91 members
(as of July 2018)

- 56 full
- 35 associated

- 51 private
- 34 SMEs
- 17 larger companies
- 37 research organisations

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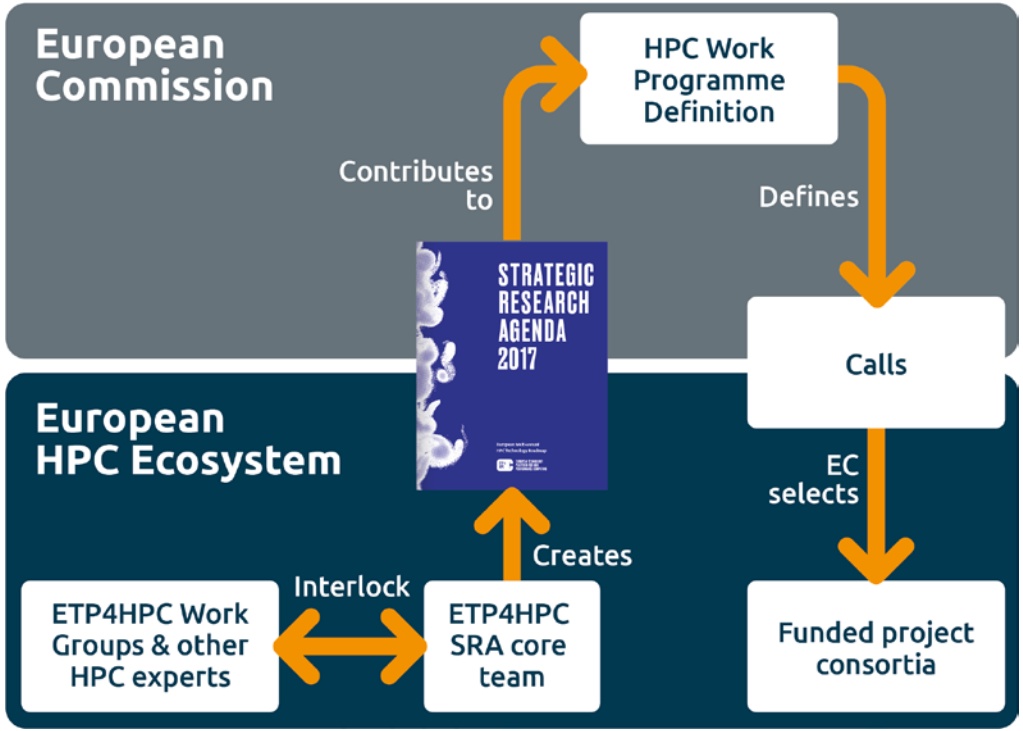
Strategic Research Agenda (SRA)

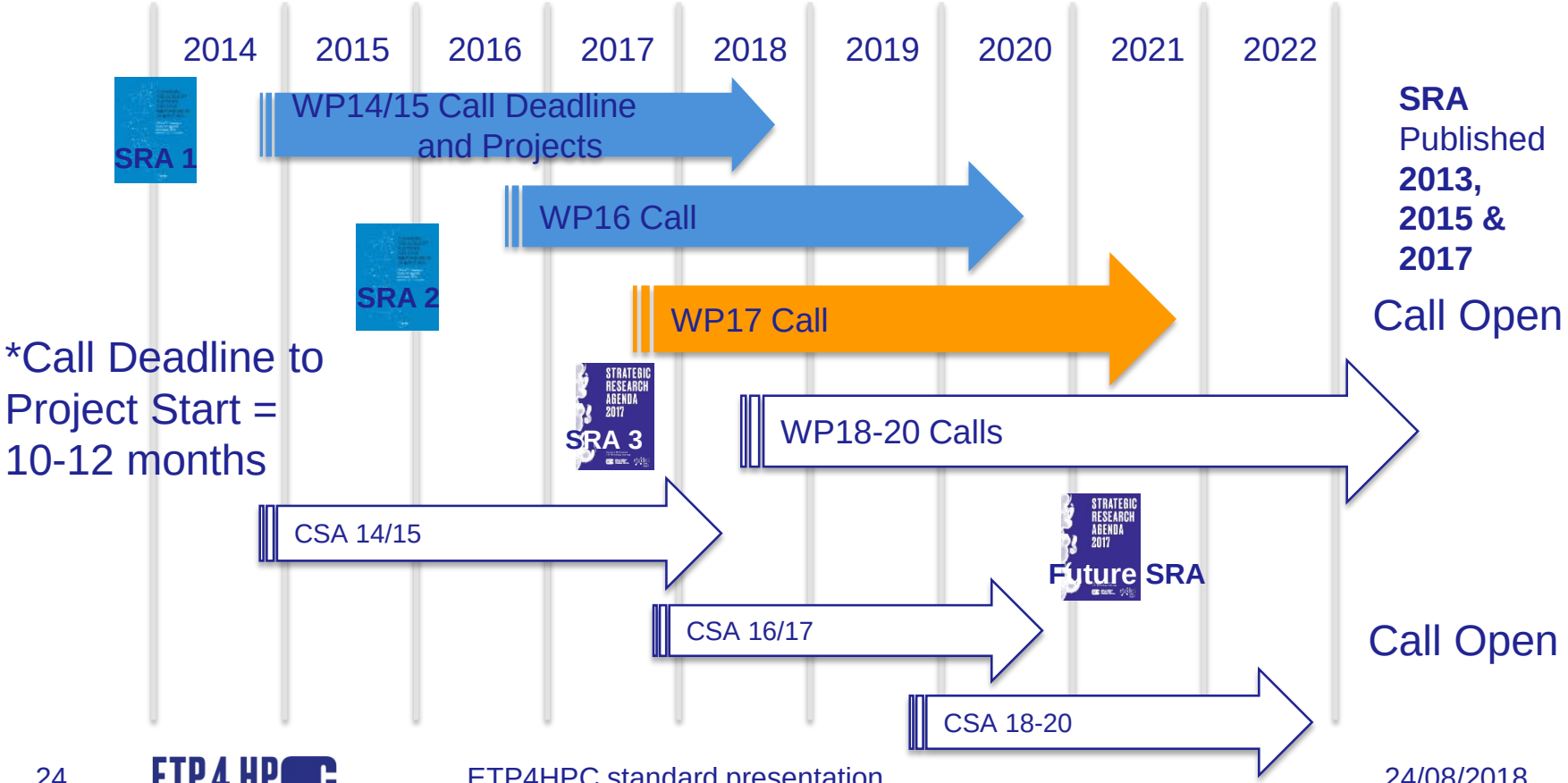
Our Multi-Annual HPC Technology Roadmap

www.etp4hpc.eu/sra

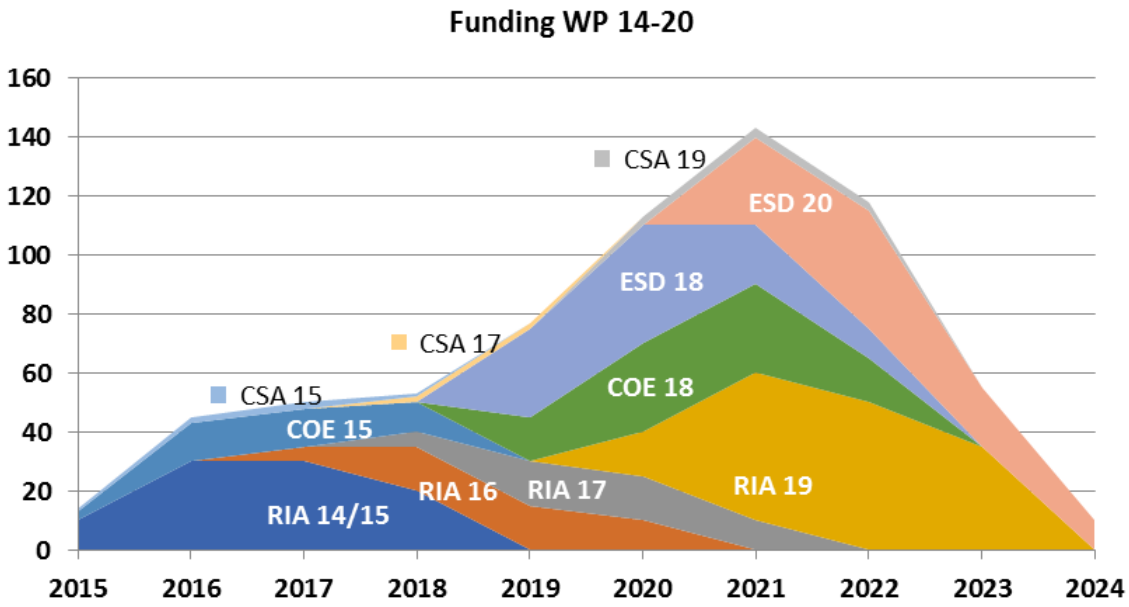
The role of the SRA: research priorities



SRA in Horizon 2020 Timeline



H2020 HPC Work Programme
Duration/Values (Euro Ms)

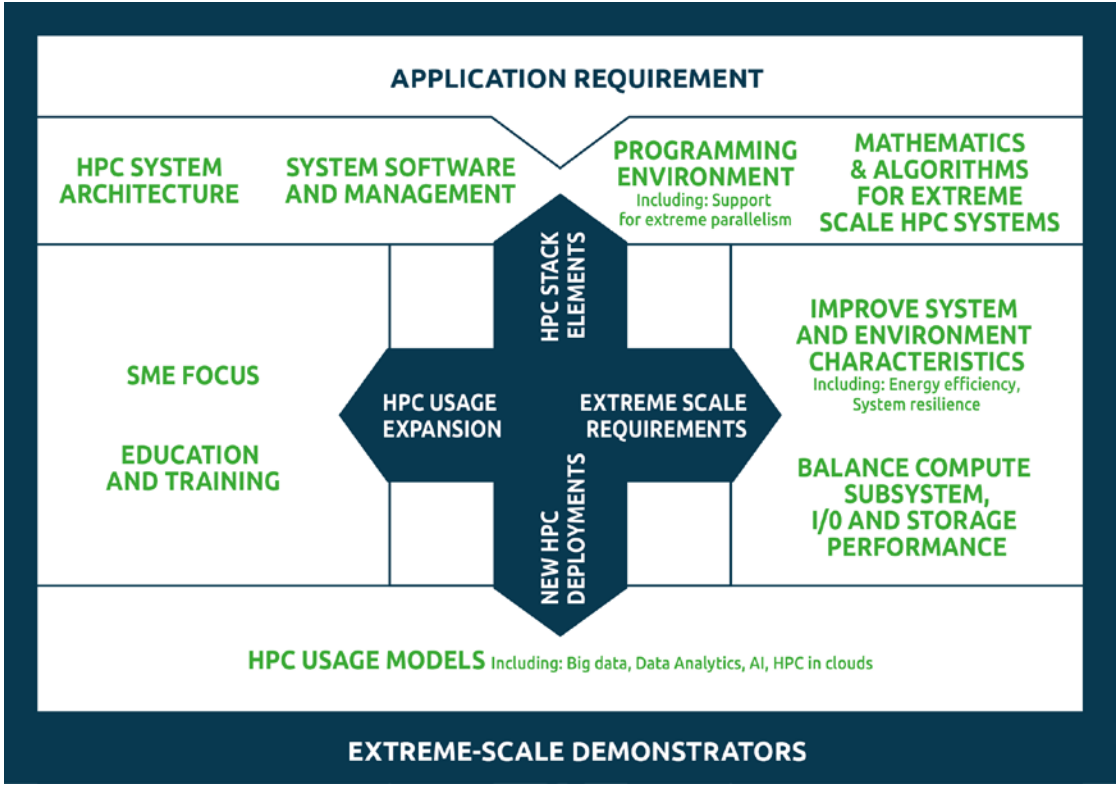


ETP4HPC Recommendation

SRA Contents – more than…

- Not only hardware…
  - Software stack, programming environments, tools, algorithms
  - Delivery modes
- Not only technology…
  - Link with applications, co-design; services; training; innovation and SME support…
- Not only compute intensive…
  - Data intensive as well
  - Balanced architectures
- Not only extreme scale…
  - Affordability, ease of use
  - Pervasiveness at all scales
  - New uses

Multi-Dimensional SRA HPC Model



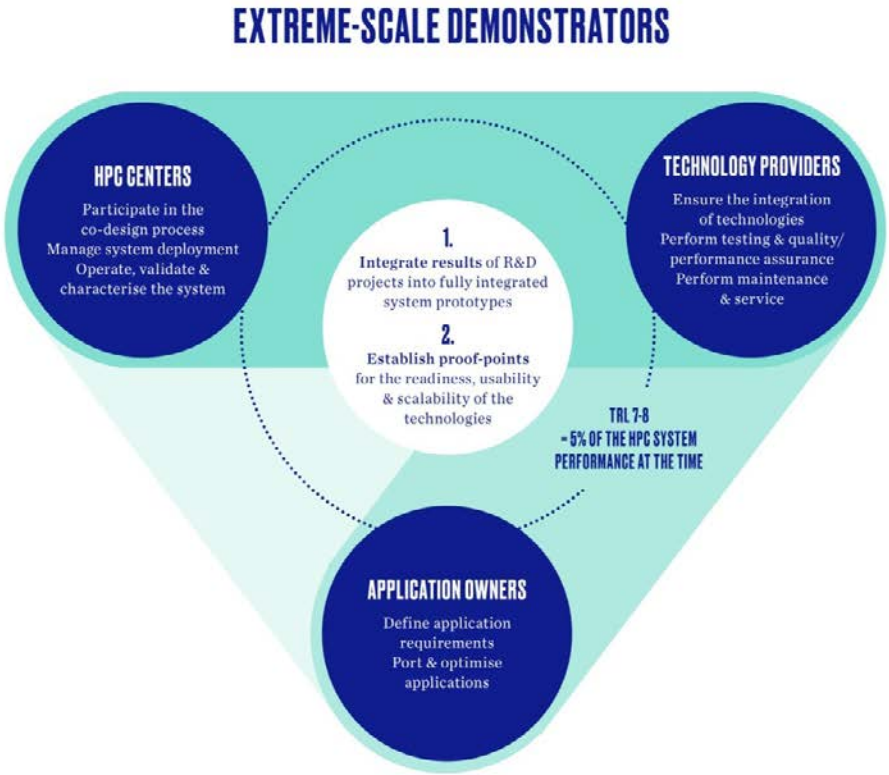
Input related to **Centres of Excellence** (CoEs) **in Computing Applications**

Extreme-scale Demonstrators (EsD) concept in WP18-20

How do we write an SRA?

- 8 topical ETP4HPC Working Groups reflecting the Dimensions: 150 to 200 experts
- Workshops and Conference Calls
- Recognised external sources
- SWOT Analysis to identify general strategy
- Collaboration with PRACE, BDVA, HiPEAC & Eurolab4HPC, Industrial End-Users, ISVs and external experts

Extreme-Scale Demonstrators



Other ETP4HPC Activities

What else do we do?

Other Working Groups & Activities

- IP&E & Education and training reports

- SME Working Group
- HPC Software WG
- Energy Efficiency WG

- EXDCI – one of the two partners

- ISC: booth, workshops and other events

Our annual BoF at SuperComputing (SC)

Promoting European HPC Technology and Application projects and supporting their international collaboration

EXDCI Coordination and Support Action

European eXtreme Computing and Data Initiative

- Managed by PRACE and ETP4HPC
  (PRACE = coordinator; started in Sept 2015)

The EU HPC Ecosystem Booster!

Supporting:

- roadmaps : technical (SRA), scientific cases
- cross cutting topics : technical topics, training, SMEs
- international cooperation
- impact assessment
- HPC Summit Week

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THANKS!

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