



ISC Breakfast

June 20th, 2013

Leipzig

Agenda

- 7h45
Presentation of the ETP4HPC activities
 - HPC leadership and PPP
 - On-going actions
 - Working Groups
 - General Assembly
- 8h00
Presentation of the SRA
 - Technical and ecosystem context
 - The strategic vision: the 4 dimensions
 - The research priorities: 6 areas to develop
- 8h30 Discussion
- 8h45 End



Contact with the EC

- Letter to VP Neelie Kroes June 14th
 - Announcement of the creation of ETP4HPC and Vision Paper
- Meeting with VP Neelie Kroes September 27th
 - Economical impact of HPC
 - ETP4HPC objective
 - Potential impact of EC policy
- Document from the ETP4HPC November 1st
 - Europe achieving HPC leadership
- Letter from VP Neelie Kroes
 - Positive feedback

Europe achieving leadership in HPC

- Importance and impact of HPC
- 3 axes :
 - Development of HPC technology
 - Existence of world-class HPC e-infrastructure
 - Development of HPC application and use
- 3 key success factors
 - Coordination
 - Education and training
 - Focus on SMEs
- PPP could leverage all the stakeholder actions
- Budget for HPC technology R&D of 150 M€/year



NEELIE KROES

VICE-PRESIDENT OF THE EUROPEAN COMMISSION

Brussels,
Ares(2012)

11 DEC 2012

Thank you for your plan for the development of HPC in Europe. As I already said during our meeting on 27 September, your efforts are fully aligned with the implementation of the Commission strategy for HPC. I am therefore positive about your suggestion to prepare the grounds for a Public-Private Partnership in this area in Horizon 2020. Such an initiative should include the three elements of the strategy: development of exascale technologies, access to world-class HPC facilities and services for both industry and academia; and excellence in HPC applications. I encourage you to continue working with all stakeholders, to encompass these three components.

These plans are, of course, subject to availability of resources in Horizon 2020. The ambitious goals of the HPC strategy will need substantial means, and in this sense I also count on a strong mobilisation of your constituency to support the Commission's ambitious budget proposal for research and innovation 2014-2020, and to actively champion HPC in Council and Parliament.

Yours sincerely,



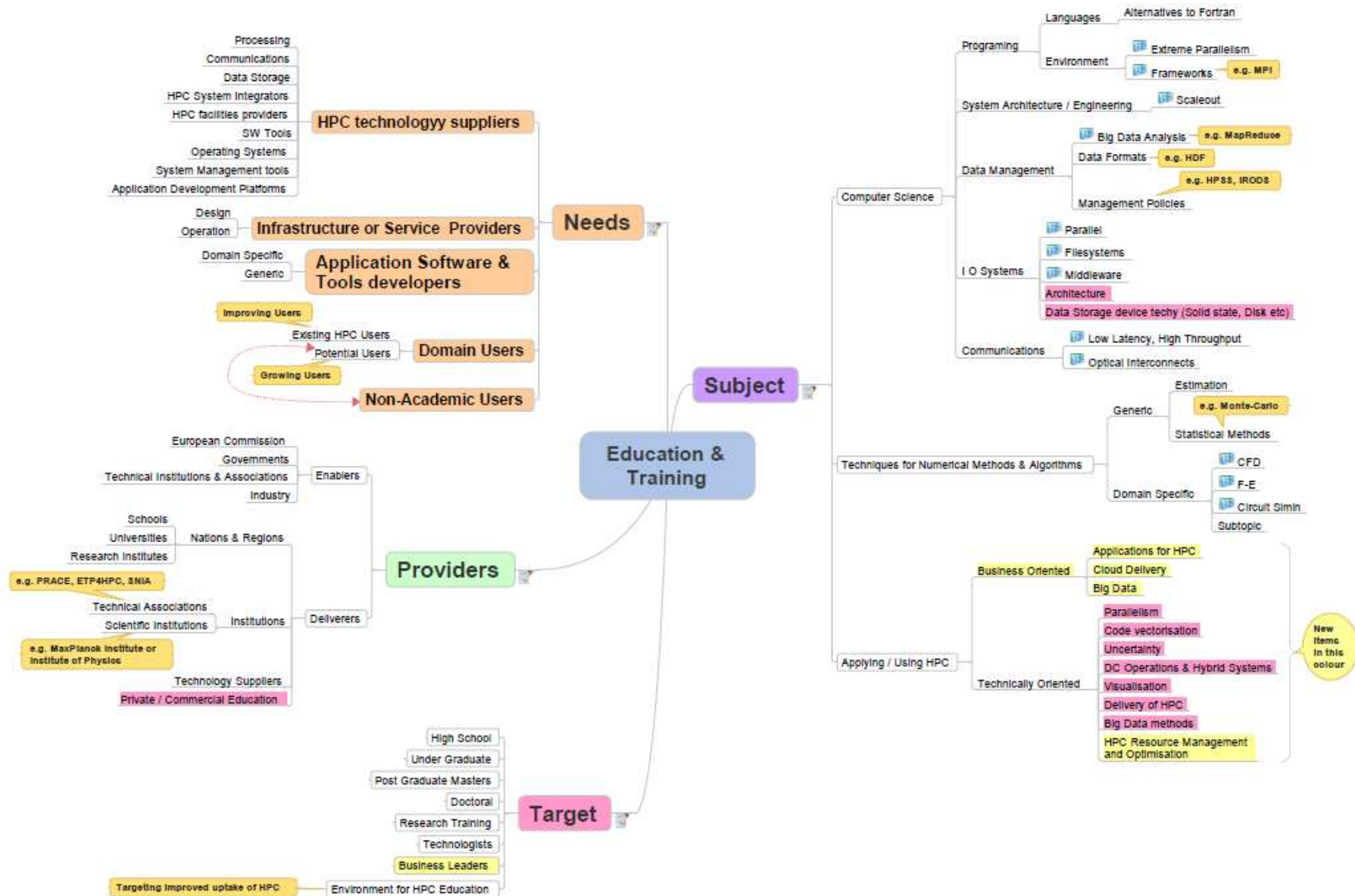
Public Private Partnership proposal

- On June 10th 2013, ETP4HPC sent a proposal for a PPP to VC Kroes
- Support of and action plan with 3 pillars:
 - The provision of HPC system technologies (i.e. the HPC Technology Supply Chain)
 - The European HPC Research Infrastructure
 - European scientific and industrial applications
- Commitment for R&D programs:
 - HPC technologies based on SRA
 - HPC application development with the establishment of Centre of Excellence

Work group Education and training

- Consolidating Education and Training Needs
 - **Across All HPC groups,**
 - Infrastructure and Service Providers, Application developers, End Users
 - Focus on HPC industrial needs,
 - Technology Suppliers , **Current and Potential** HPC Users
- Reviewing : Providers, Subject fields and Recipients
- Develop education and Propose training directions
- Encourage the establishment of E&T programs.....
- Group is now Active – **PLEASE COME AND JOIN US**

First Steps: Map out the HPC E&T Landscape



Work group SMEs

- Creation of economic value in the HPC ecosystem by the creation of SMEs
- To leverage the EU support initiatives for SMEs in HPC
- Showcase successful HPC SMEs
- Facilitate HPC development and testing infrastructure for SMEs

General Assembly

- Paris, September 20th (hosted by ST)
- Renewal of the Board
 - Call for candidatures open until June 30 (members having joined until June 6 are eligible)
 - 10 industrials
 - 5 European Corporate Active Members
 - 3 SME Active Members
 - 2 Global Active Members
 - 5 research organisations
 - Full members approved until August 31 will be able to vote
- Direction for the discussion with EC



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SRA

Strategic Research Agenda (SRA)

- **Purpose:** R&D roadmap to develop HPC technology in Europe
- Position of HPC within **Horizon 2020** will be decided in the coming weeks

5.3.6 Milestones

Deadline	Milestones
2014	M-PROG-API-1: Develop benchmarks and mini-apps for new programming models/languages
2015	M-PROG-API-2: APIs and annotations for legacy codes ²
	M-PROG-API-3: Advancements of MPI+X approaches (beyond current realisations)
	M-PROG-DC-1: Data race detection tools with user support for problem resolution
	M-PROG-LIB-1: Self-/auto-tuning libraries and components
	M-PROG-PT-1: Scalable trace collection and storage: sampling and folding
	M-PROG-RT-1: Runtime and compiler support for auto-tuning and self-adapting systems
	M-PROG-RT-2: Management and monitoring of runtime systems in dynamic environments
	M-PROG-RT-3: Runtime support for communication optimization: data-locality management, caching, and pre-fetching
2016	M-PROG-API-4: APIs for auto-tuning performance or energy
	M-PROG-LIB-2: Components/library interoperability APIs



www.etp4hpc.eu



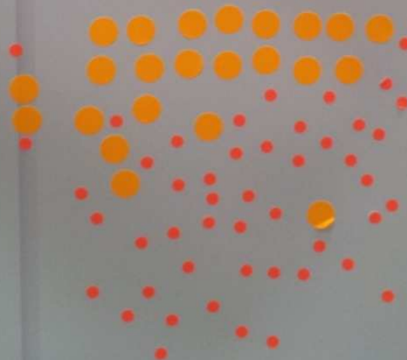
Where should we go?

What do you see as the major role of Europe in the field of Supercomputing in the years to come ?

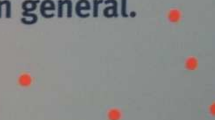
(a) Developing and building the fastest supercomputers, i.e., taking part in the race for Exascale systems.



(b) Supercomputer applications on systems not necessarily manufactured in Europe.



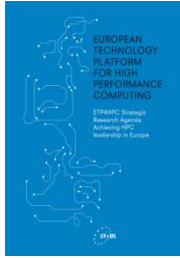
(c) Withdrawal in the field of supercomputing, in general.



SRA - Technological Context

Rationale:

- **A window of opportunity** for a European HPC Technology Value Chain - European strengths meet global opportunities: e.g.: energy efficiency & power, data, concurrency & scale, resiliency
- Europe's HPC consuming power is not matched by its share in HPC systems



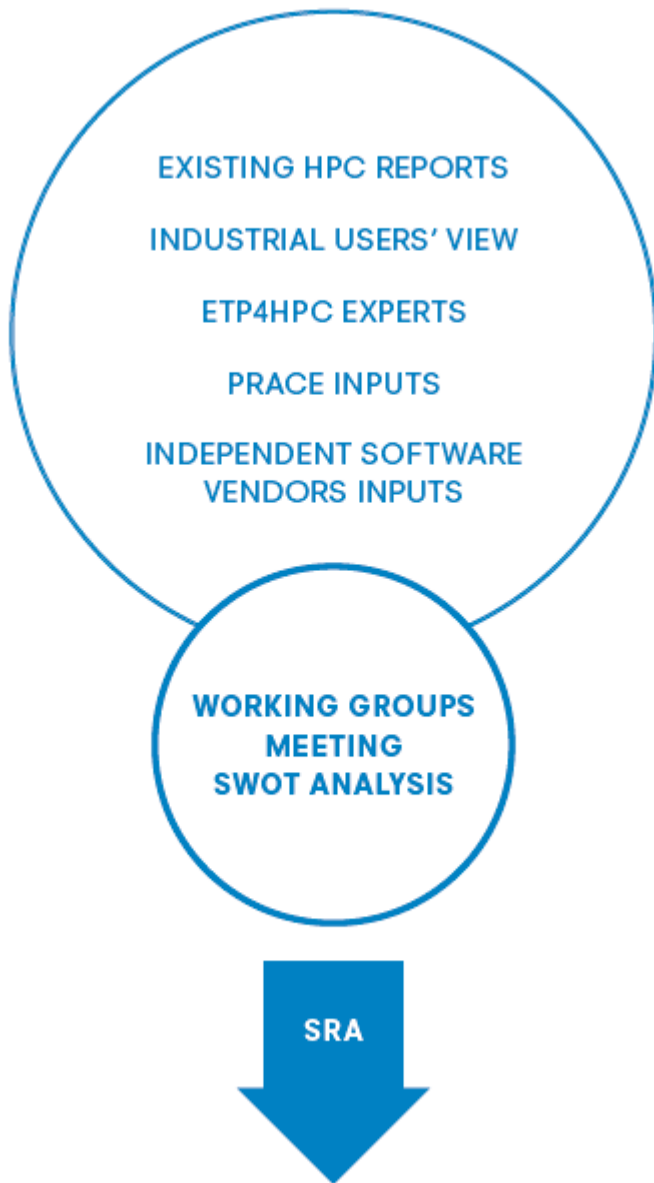
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SRA - Impact

The implementation of the recommendations of the SRA will have the following impact:

- Strengthen the European HPC technology provision eco-system and increase its global market share
- Allow Europe to achieve global leadership in HPC-related technological areas, with the possibility of transferring such technologies to other industries
- Address some of the globally recognised grand challenges, such as energy efficiency and the handling of large data volumes
- Design HPC solutions required by European science and industry

SRA - Ecosystem Context and Methodology





2017-2018

Architecture

2017-18
45kW/PFOP

2017-18
NVRAM competitive
DRAFT

2017-18
Inside-chip
Photonics

System
Software

System - 2017
HOS/Run-time
Resilient

CLL Inflight
Graphical Supervision
2018

Reacting & Balancing
Adaptive scheduling
& Resilient Parameters
2020

Flexible system
Image configuration
2020

Is microconnectivity
Edge/Intracore
superseded and
2020

Balanced
I/O

EMERGENCY
H/W Simulation
verified
2018 (cont)

MD + G3
METHODS ARE
EMERGENCY
FOR CEMTS
2018

THREATS
CONCEPT
VARIABLES +
NON-VARIABLE
MEMORY

INTERPRETERS
I/O MISCONFIG
RPLs
+ REACTION

HA/Redundant
the system
at EMERGENCY
2018

Is there
anyone in
there
the way to the
Continuum & ?

Improved
System Ch
(Energy + Res)

HPC usage

2018-2019
- Abs. threshold
of programming
- Domain: only
changes

2018-2019
- Runtime of
software tools
- Runtime of
tools: only
by us

2018-2019
- Runtime of
tools: only
by us

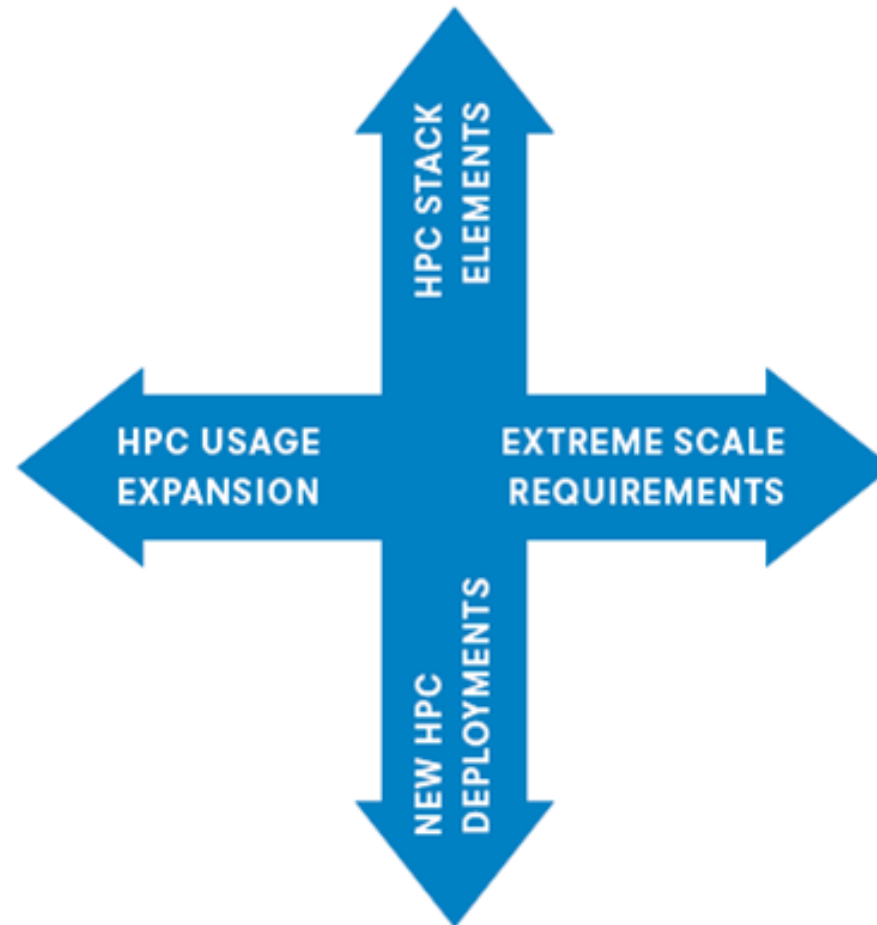
2018-2019
- Runtime of
tools: only
by us

2018-2019
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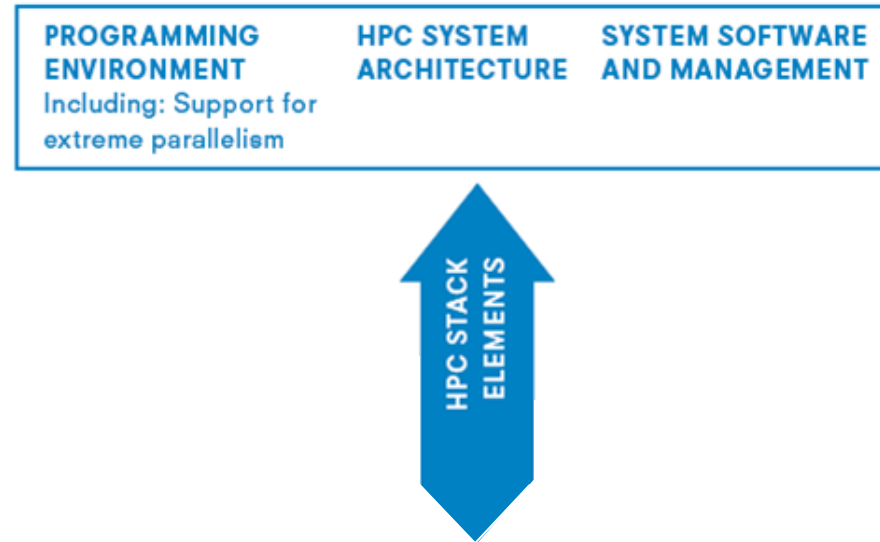
2018-2019
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Strategic, multi-dimensional vision

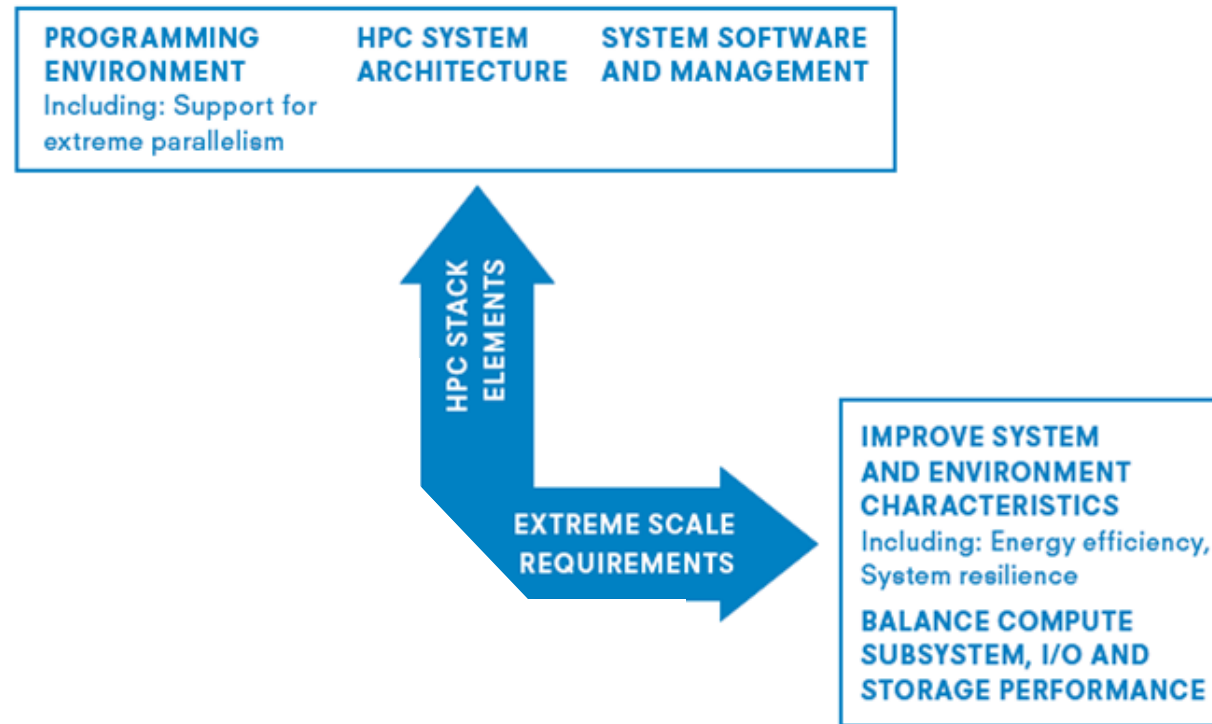


The four dimensions of the
ETP4HPC Strategic Research
Agenda

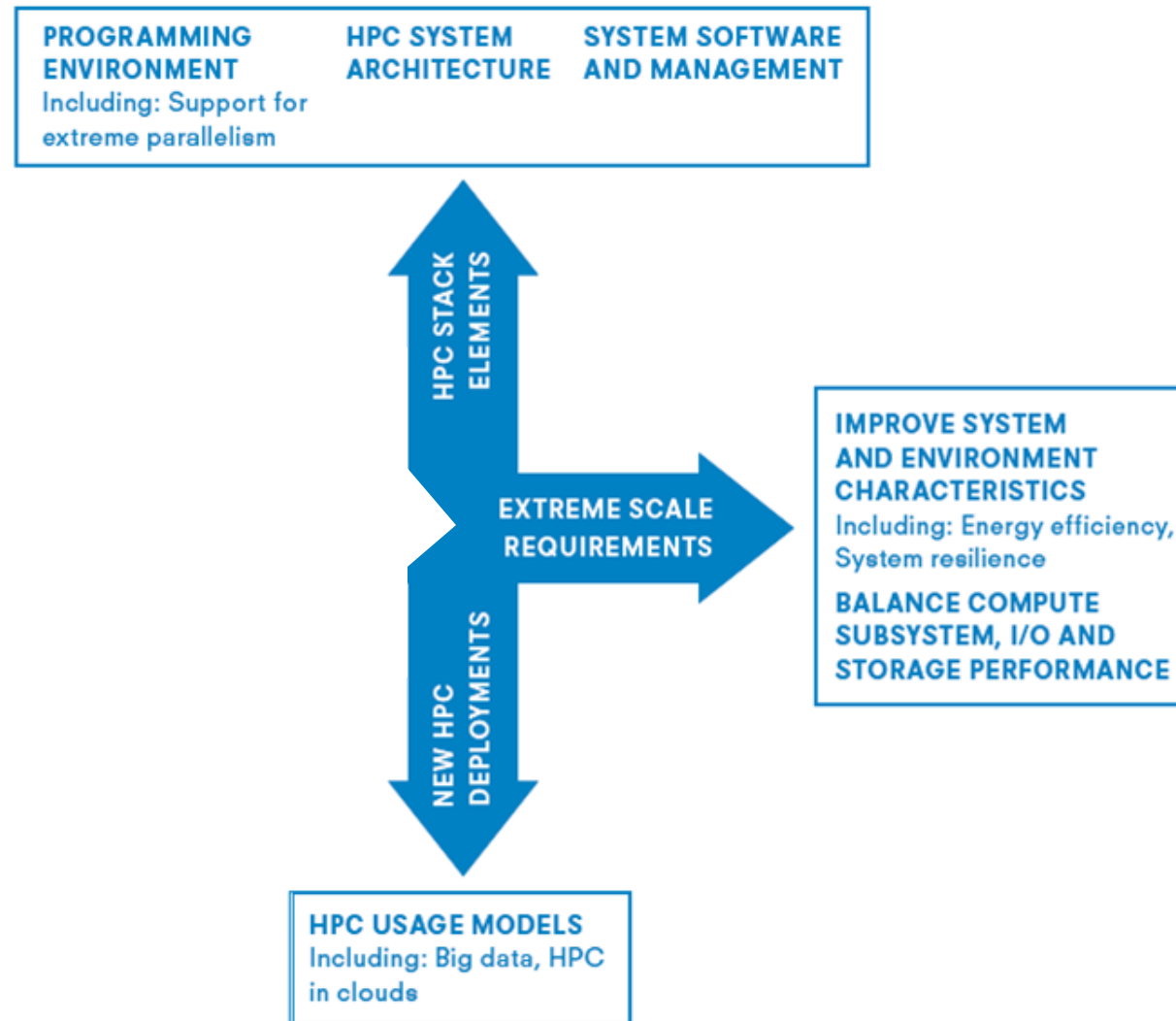
Strategic, multi-dimensional vision



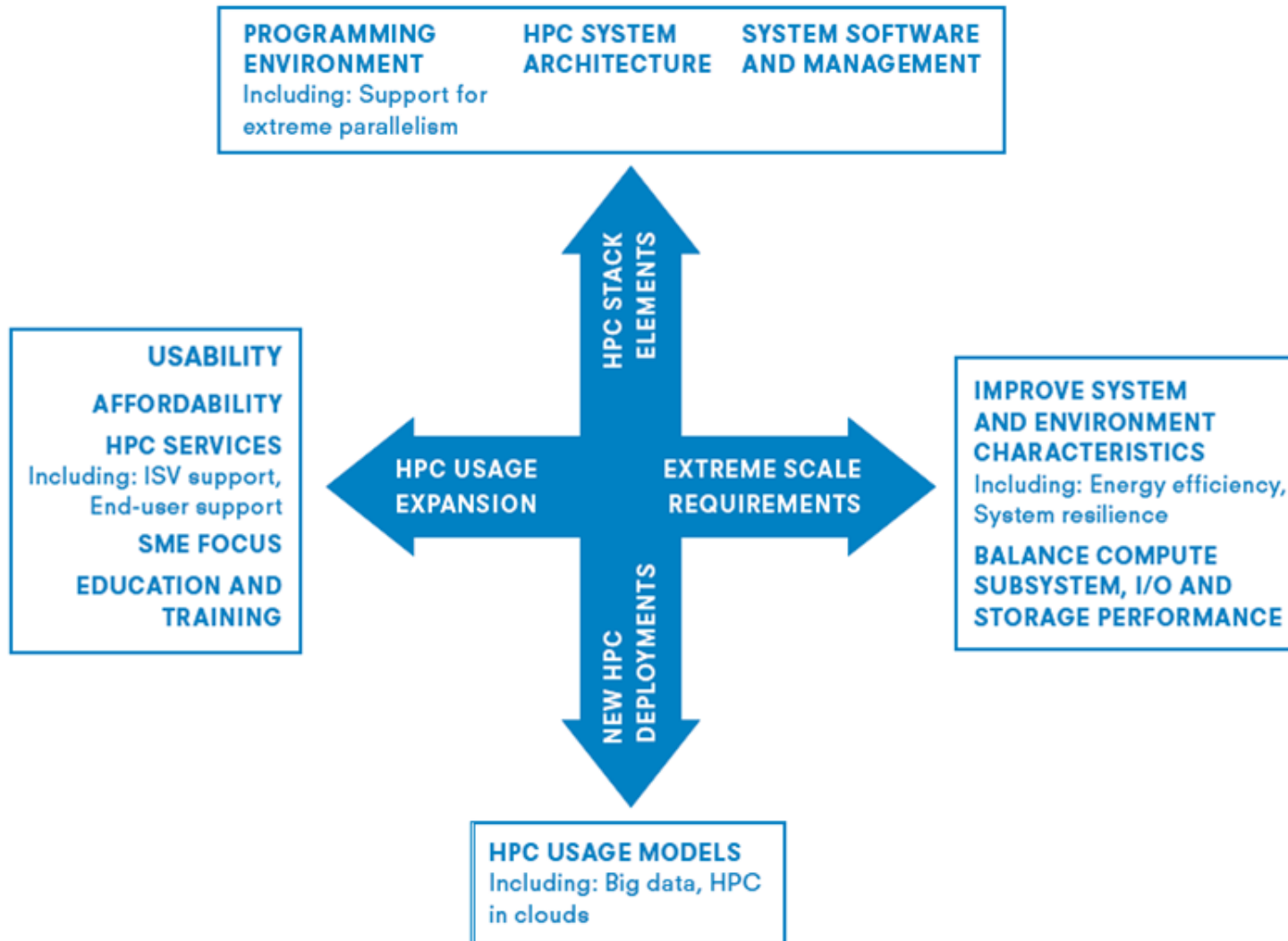
Strategic, multi-dimensional vision



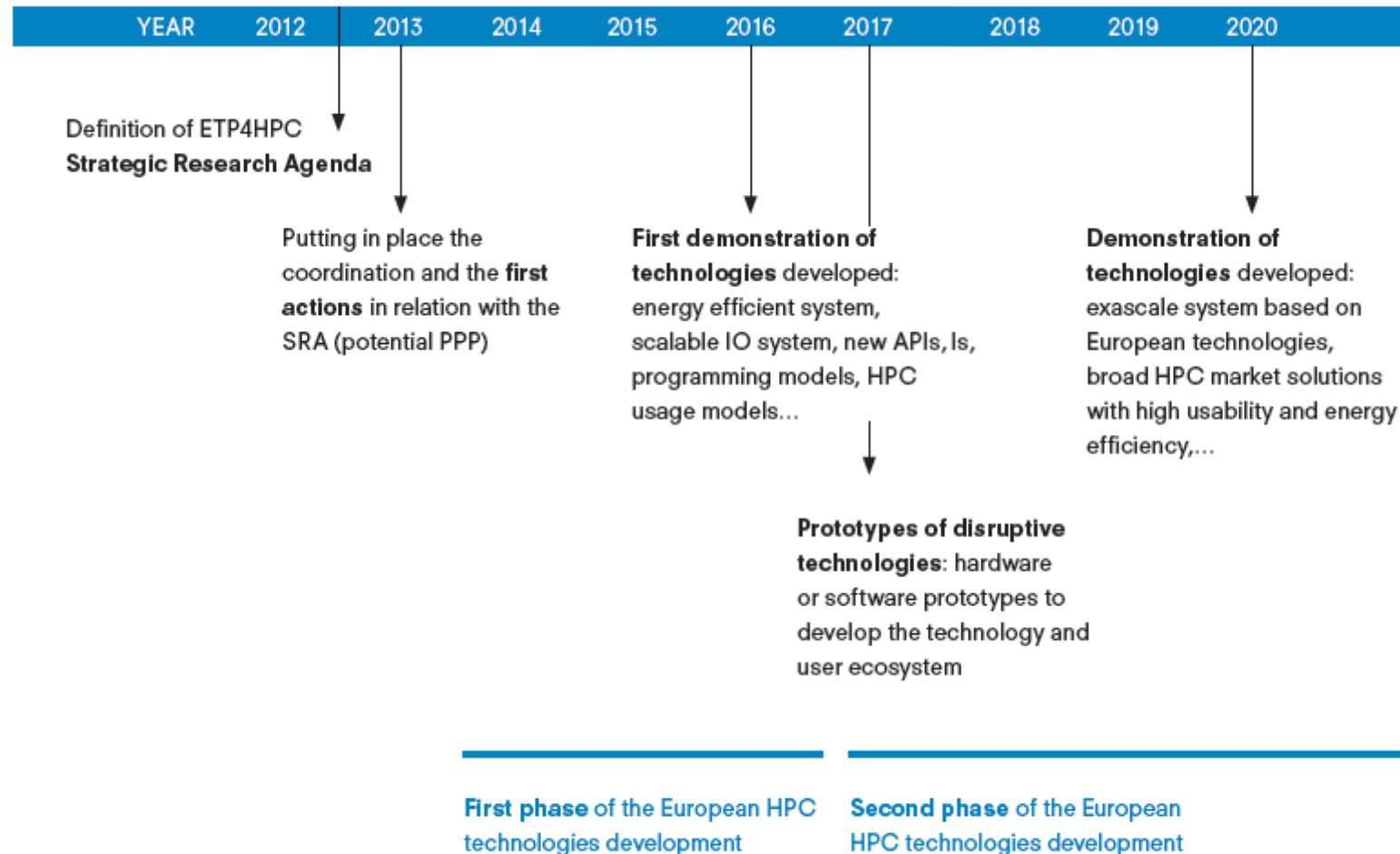
Strategic, multi-dimensional vision



Strategic, multi-dimensional vision

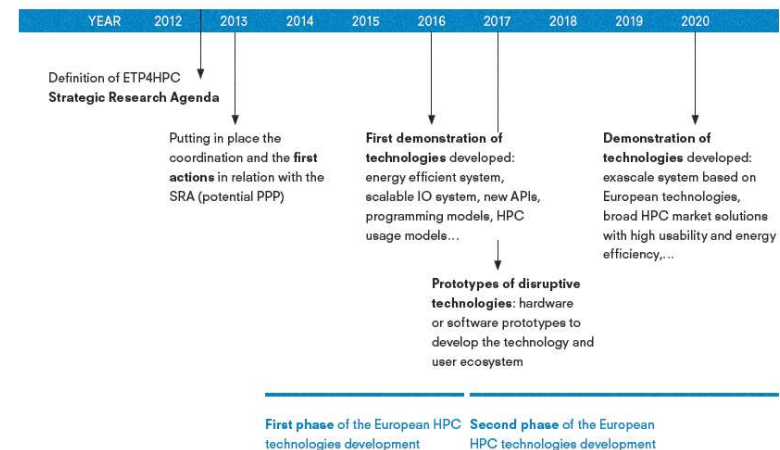


The time line of the R&D program



The budget of the R&D programme

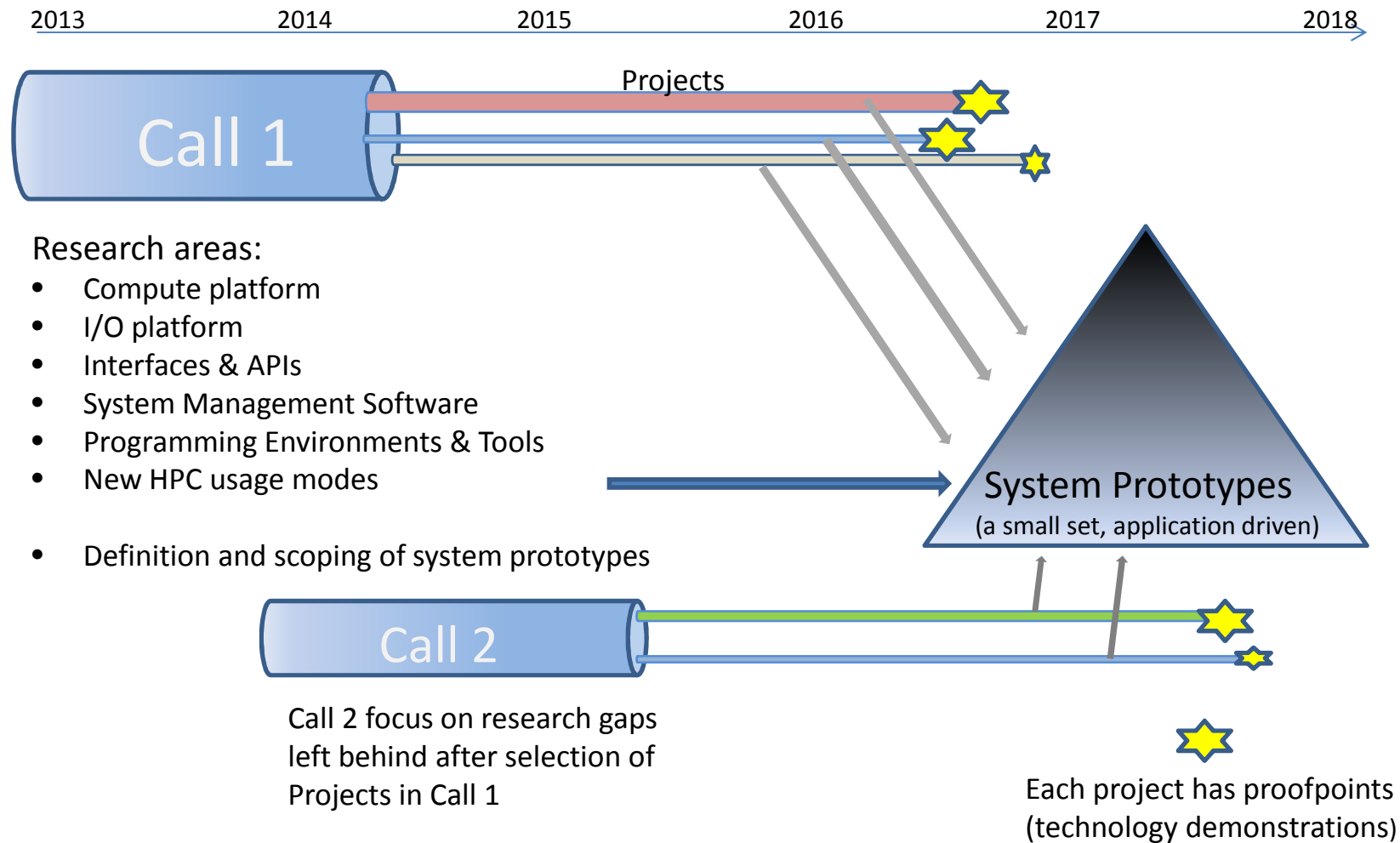
- 150 M€/year over 7 years necessary for the SRA R&D programme
Co-funded 50+ % by EC
- Focused on the domains where Europe can make a difference
- The budget will cover the range of necessary technologies and will allow the development of a comprehensive set of results Prototypes not included



Research priorities in 6 areas



Proposed rollout of EC HPC research calls





Thanks for your attention!
Time for discussion
Do you have any questions?



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