



ETP 4 HPC

**THE EUROPEAN TECHNOLOGY PLATFORM
FOR HIGH PERFORMANCE COMPUTING**

www.etp4hpc.eu

cPPP info-day

Achieving HPC leadership in Europe

JF Lavignon ETP4HPC Chair
Wednesday, April 9th, 2014



Agenda

- HPC a strategic technology
- The challenges
- ETP4HPC proposed approach
- ETP4HPC actions in the cPPP

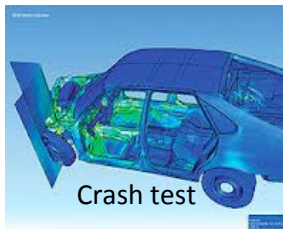
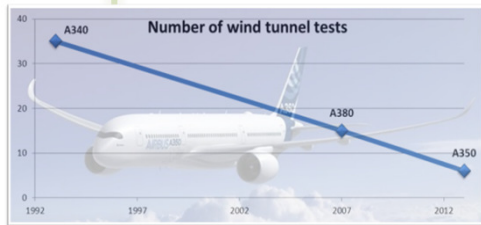


HPC a strategic technology

What is HPC true measurement?

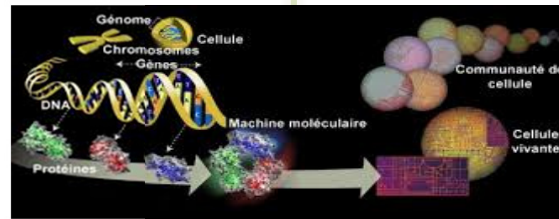
1 000 000 000 000 000 000 operations per second ?

Competitiveness



- Innovation
- Time to Market
- Cost Reduction

Societal improvement



- Life Science progress
- Predictive analysis
- Complex problems resolution
- Entertainment

Sovereignty



- Defense systems
- Intelligence activities
- Cyber security

HPC a dynamic market

- Important market with significant growth rate

Worldwide HPC Compute, Storage, Middleware, Application and Service Revenues (\$M)				
	2011	2012	2017	CAGR (12-17)
Server	10,300	11,098	15,441	6.8%
Storage	3,664	4,059	6,008	8.2%
Middleware	1,147	1,254	1,568	4.6%
Applications	3,370	3,621	4,837	6.0%
Service	1,801	1,877	2,368	4.8%
Total	20,282	21,909	30,223	6.6%

- Opportunities for European providers



Yesterday's challenges are today's standards

Democratization of access

Technology breakthroughs

1970s
(1976) Cray-1



0.1 Gigaflap / 100 kW

Mainframe



Personal

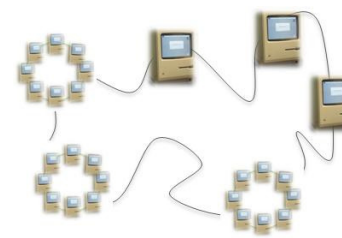


Network



1996

Internet 1.0



2010

Internet 2.0



1 Gigaflap / 1 W

2010

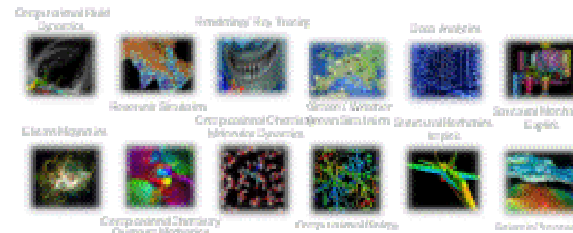


1 Petaflap / 1 MW

Apps store
Software as a Service



Usages – new capabilities, new users



2020

Mobile @ Lab
@ Enterprise
@ Home

2020

exaflop

1 Exaflop / 20 MW

Internet 3.0

200 billion objects
connected in 2020



Sustainable Performance



2035



1 Petaflap ?

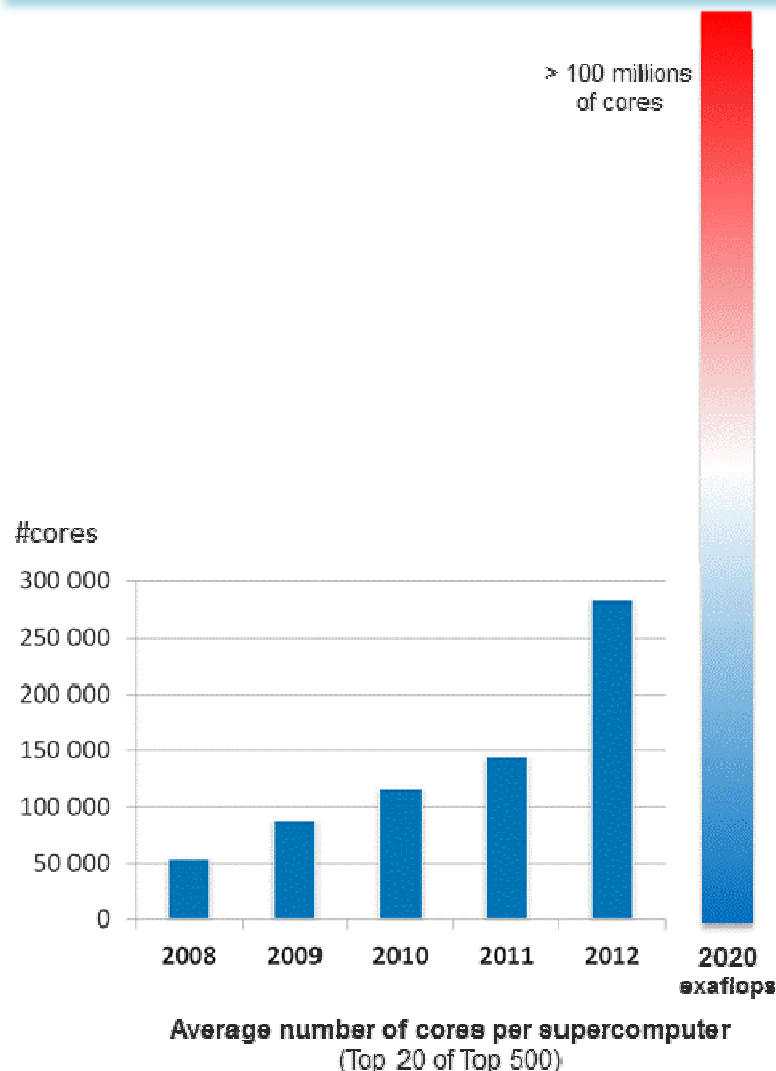




The challenges

Meeting the Application challenges with parallelism

EXAFLOP: Number of cores increases exponentially



The Current Situation:

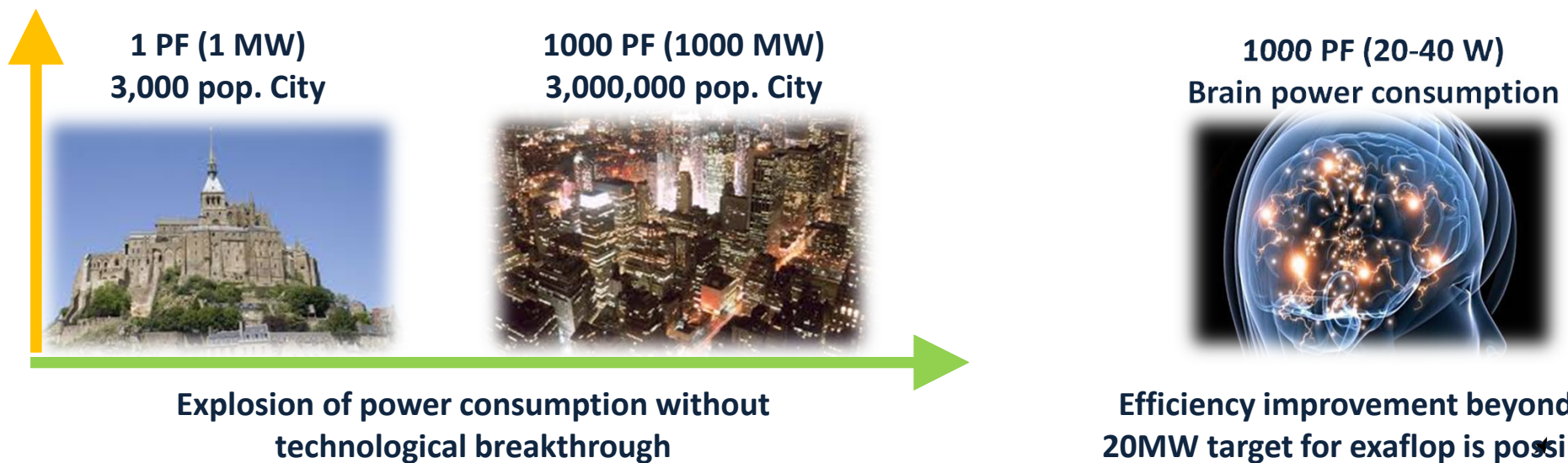
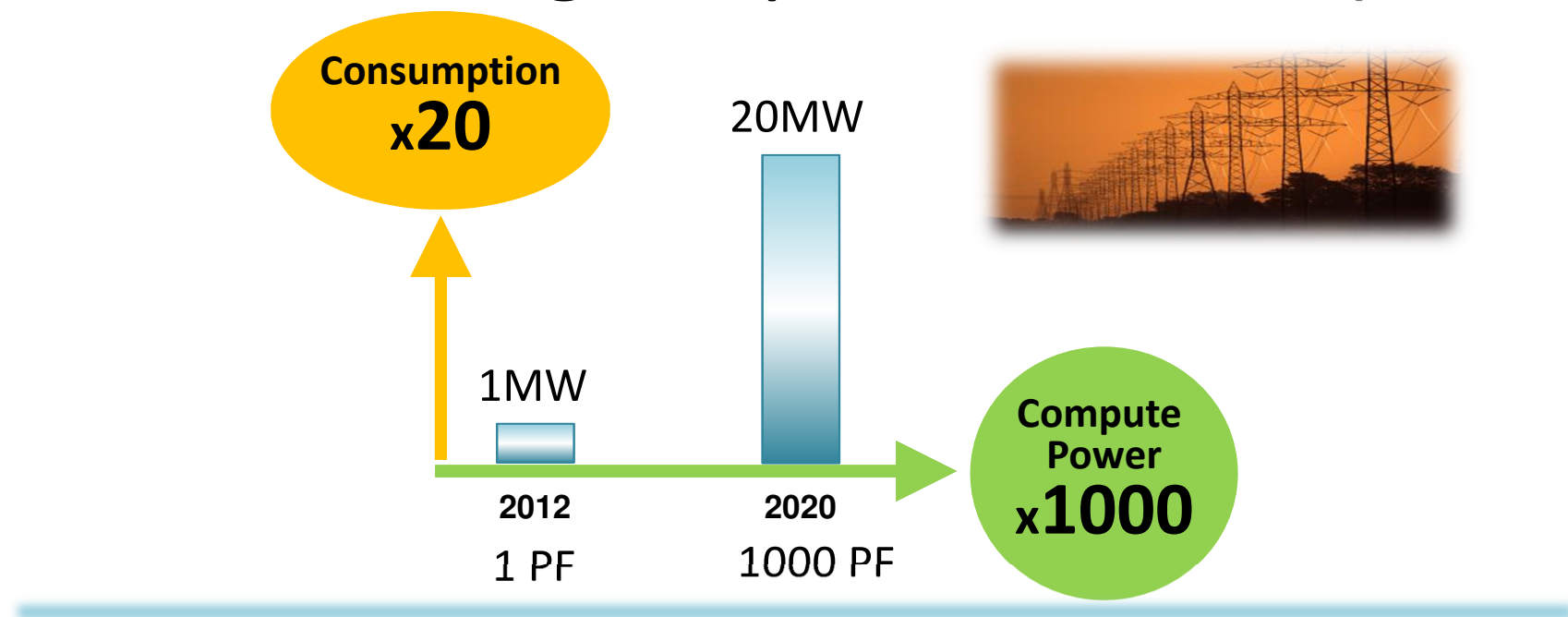
- Only 1% of SW are capable to exploit 10 000 processors
- It takes 5 to 10 years in average to rewrite an application
- 50% of IT managers said that their applications scaled at a maximum of 120 cores (2011 survey, Addison Snell)

The two-fold Challenge:

1. Keep the early adopters on path
(capture the full benefits of the performance from thousands of processors to millions of cores)
2. Bring all the others in the game



The challenge of power consumption





ETP4HPC proposed approach

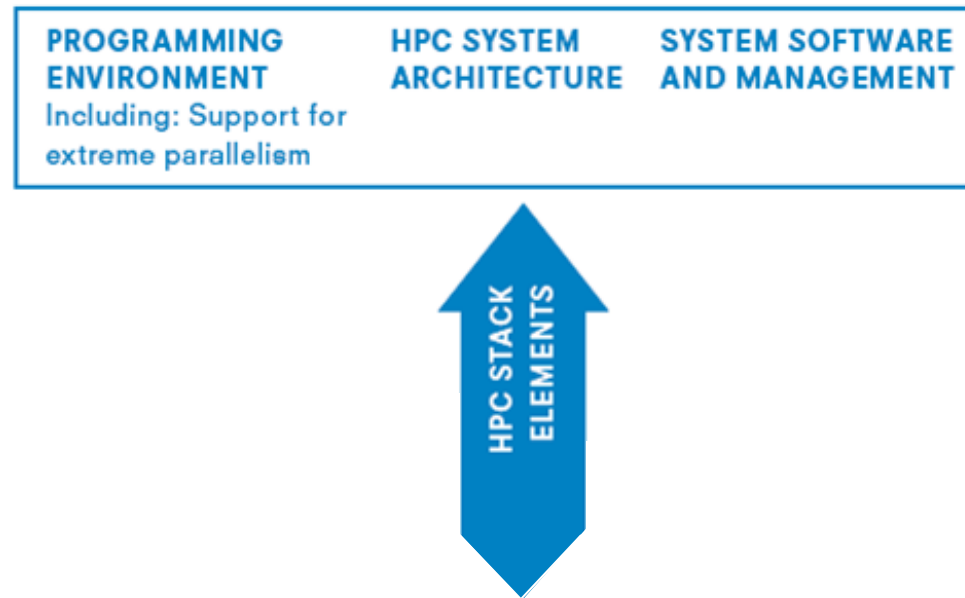


Europe achieving leadership in HPC

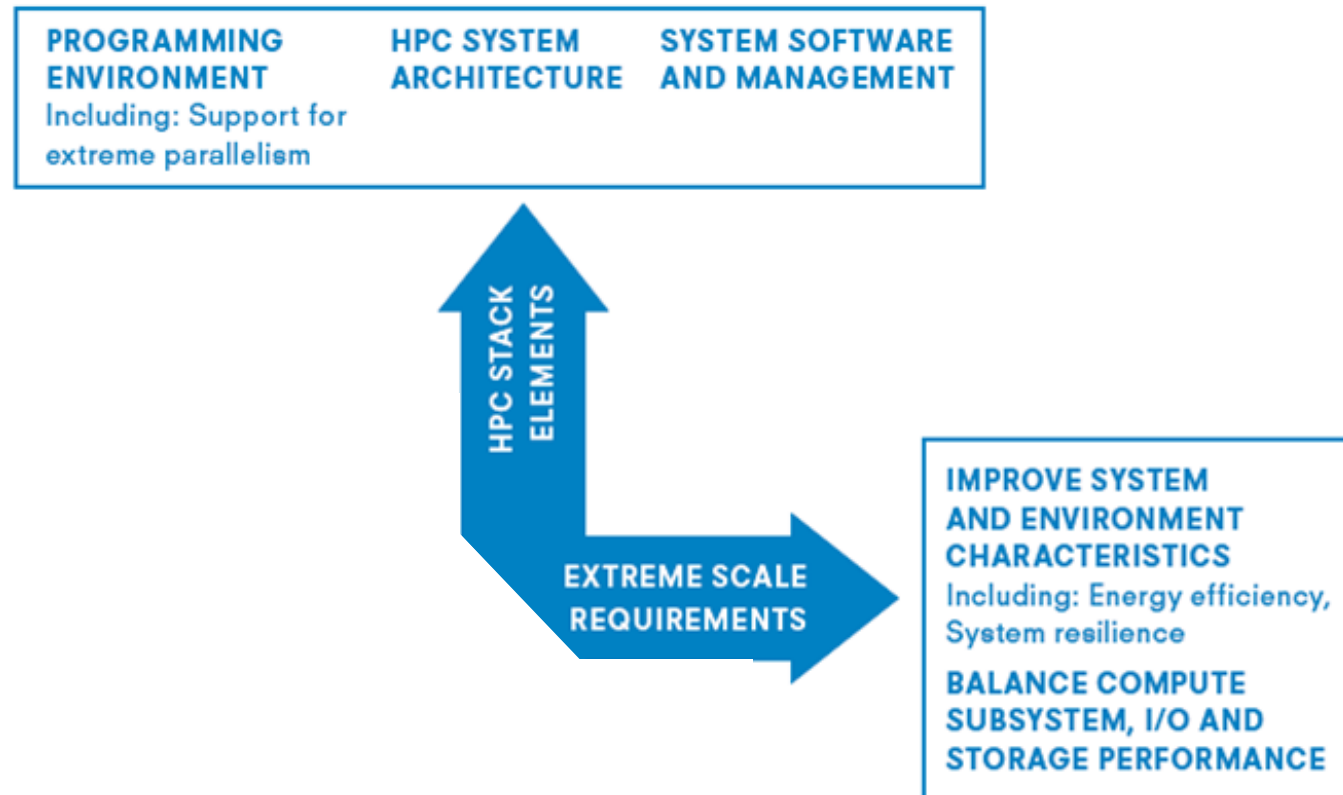
- Importance and impact of HPC
- 3 axes :
 - Development of HPC technology
 - Existence of world-class HPC e-infrastructure
 - Development of HPC application and use
- 3 key success factors
 - Coordination
 - Education and training
 - Focus on SMEs
- PPP could leverage all the stakeholder actions
- Budget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



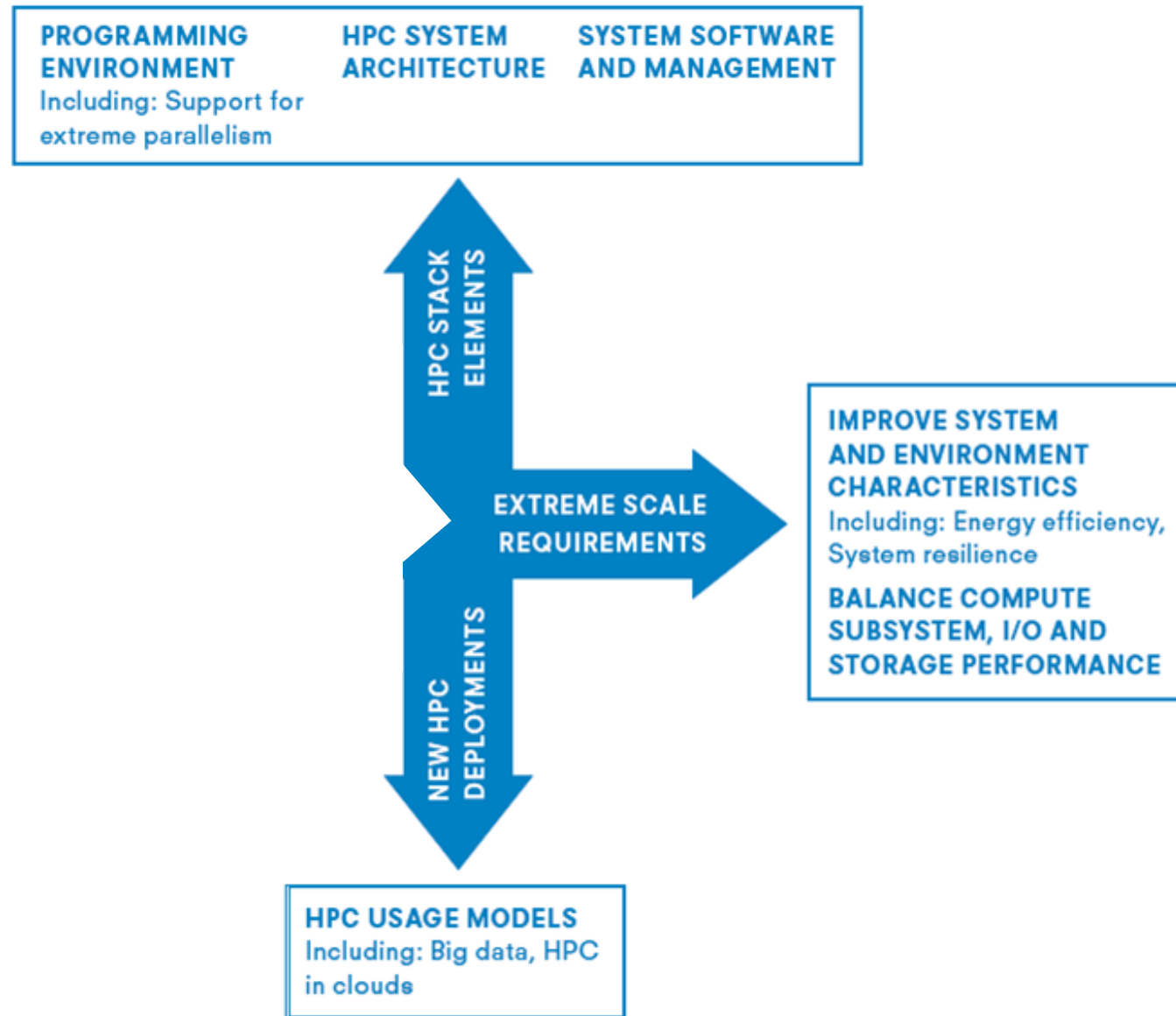
Strategic multi-dimensional vision



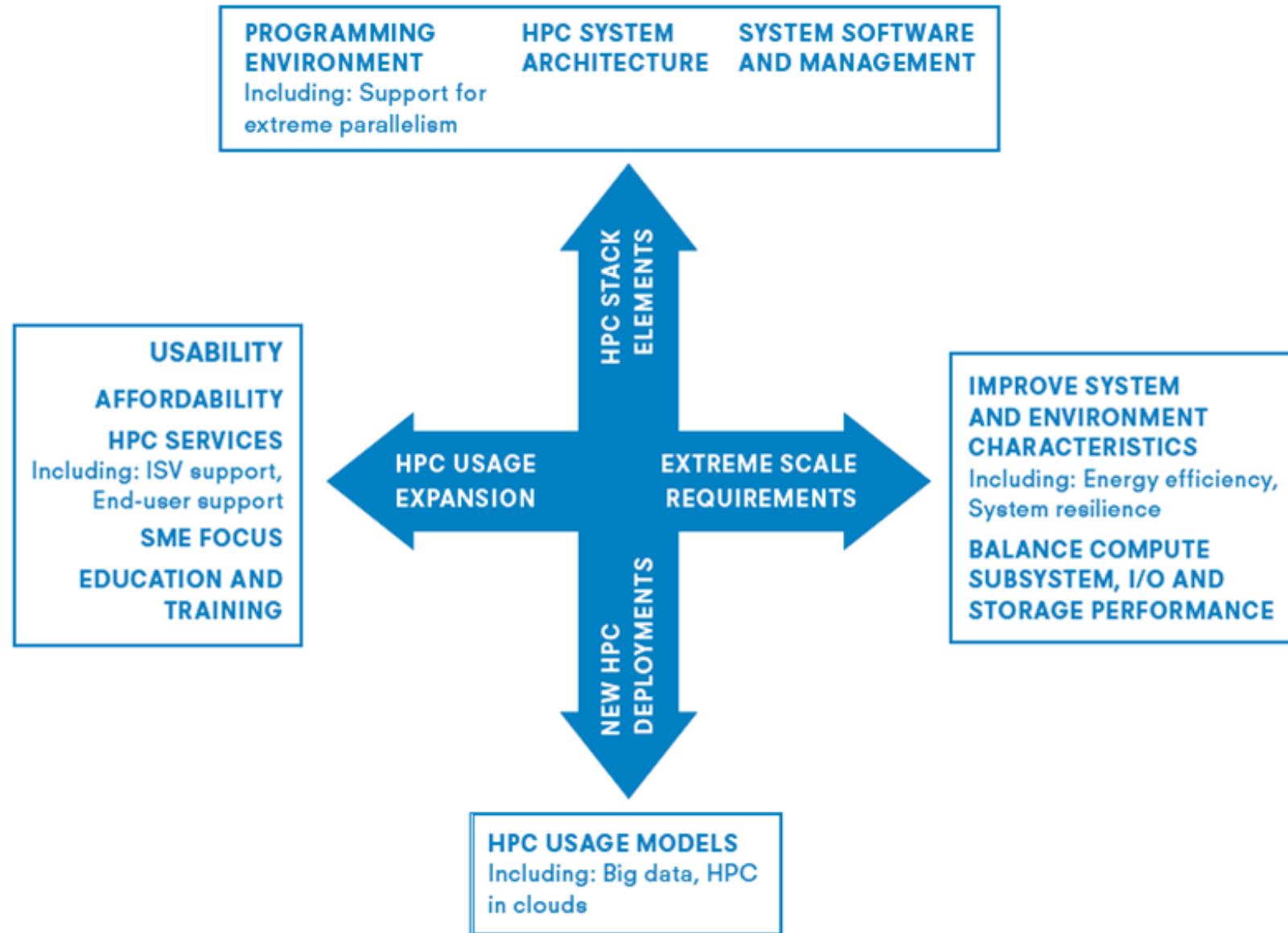
Strategic multi-dimensional vision



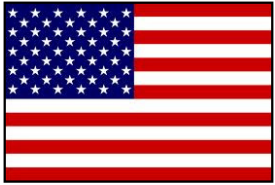
Strategic multi-dimensional vision



Strategic multi-dimensional vision



Europe is not alone



USA

■ Fast forward and Design Forward programs ; plan in preparation to be approved in 2014



Japan

■ Fast forward systems and applications



China

■ Fast forward systems and applications ; plan in 2015 ; plan for



Russia



India

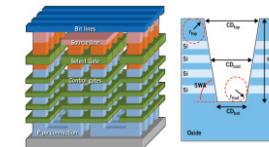
■ 1G\$ program ; plan in preparation to be approved in March 2012

Let be smart
European people

Europe strengths

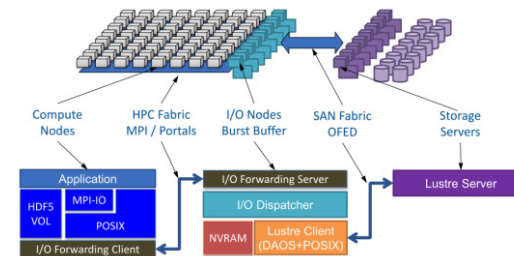
Technology strengths

- Architecture : low power processor, complex systems
- System SW : middleware, highly scalable management center, IO
- Applications : mathematical method, algorithms, integration



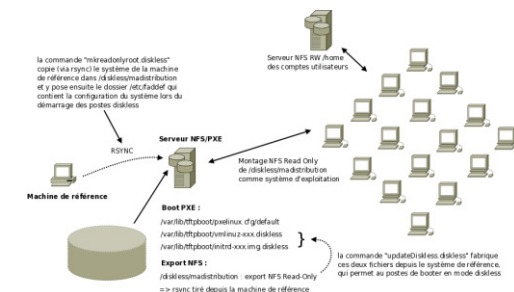
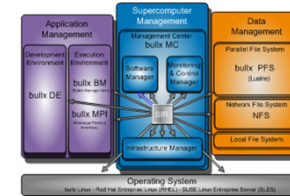
Industrial strengths

- Leading companies
- Dynamic SMEs
- Services

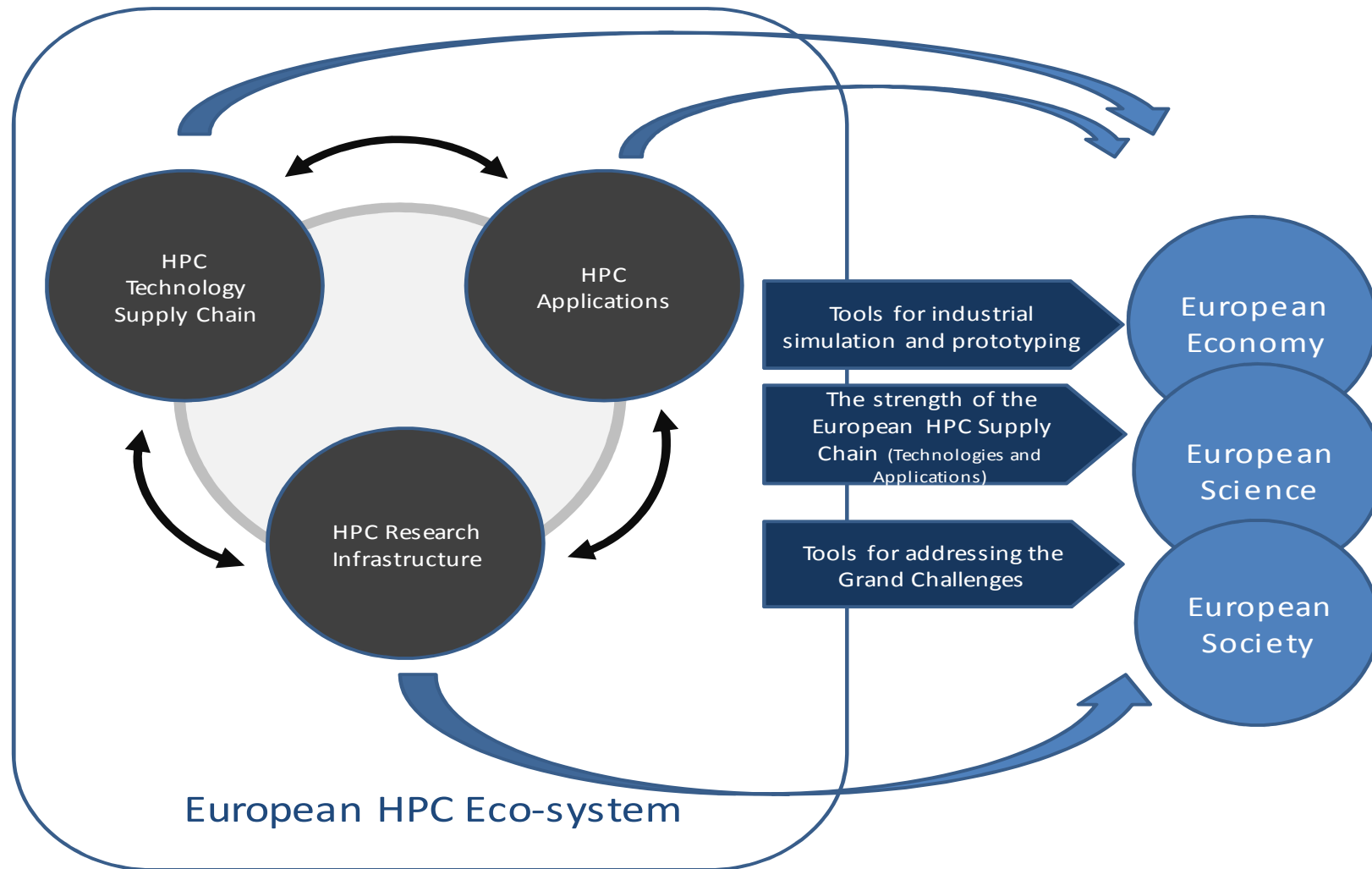


Ability to create an ecosystem

- Relationship education/research/industry
- Cooperation mind through European programs



HPC cPPP – Building a European HPC Ecosystem





ETP4HPC actions in cPPP

cPPP governance

- Participation in the Partnership Board
 - Representative of the whole ecosystem
 - Open and accountable to the stakeholders
- Committed to advise the European Commission
 - Open working groups for preparation
 - Preparation of roadmaps to propose a vision

Animation of the ecosystem (1/2)

- Events
 - Today infoday
 - Prace days
 - ISC, Teratec,
 - September event
- Communication gateway
 - Look at our web site <http://www.etp4hpc.eu>
 - We can also relay your information



Animation of the ecosystem (2/2)

- Monitoring of the progress of HPC in Europe
 - KPIs
 - Exchange of information
- Participation in a support action FET HPC 2 a)
- Neutral in the preparation of FET HPC 1

Last message

- The scene has been set up
- It is up to us to make European HPC a success !!!



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