



# Cenaero



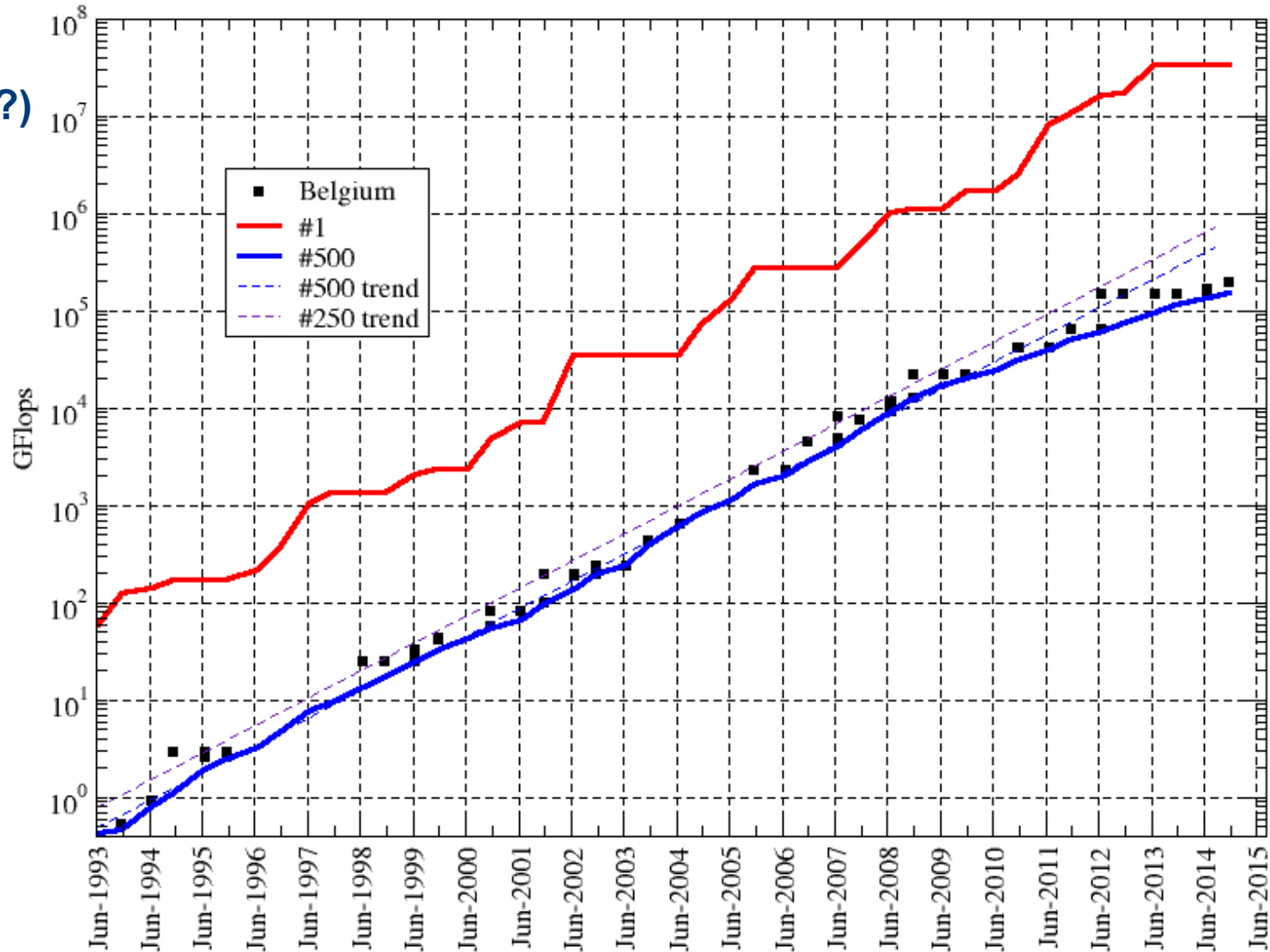
## European landscape – its initiatives towards supporting innovation and its regional perspectives

VSC Industry Day 2015

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Belgian Delegate to PRACE Council  
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# European and Industry Positioning in HPC (Top 500)

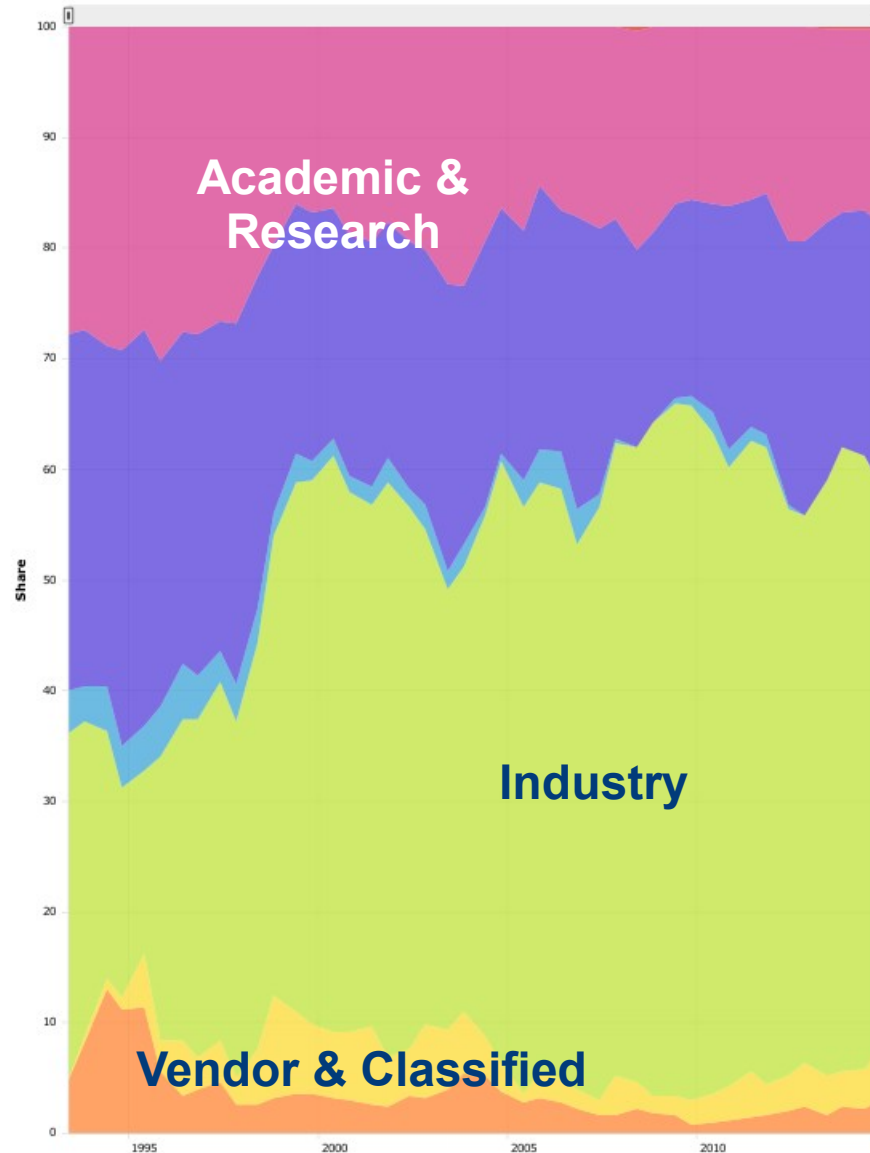
Top 500 as a reference (?)



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# European and Industry Positioning in HPC

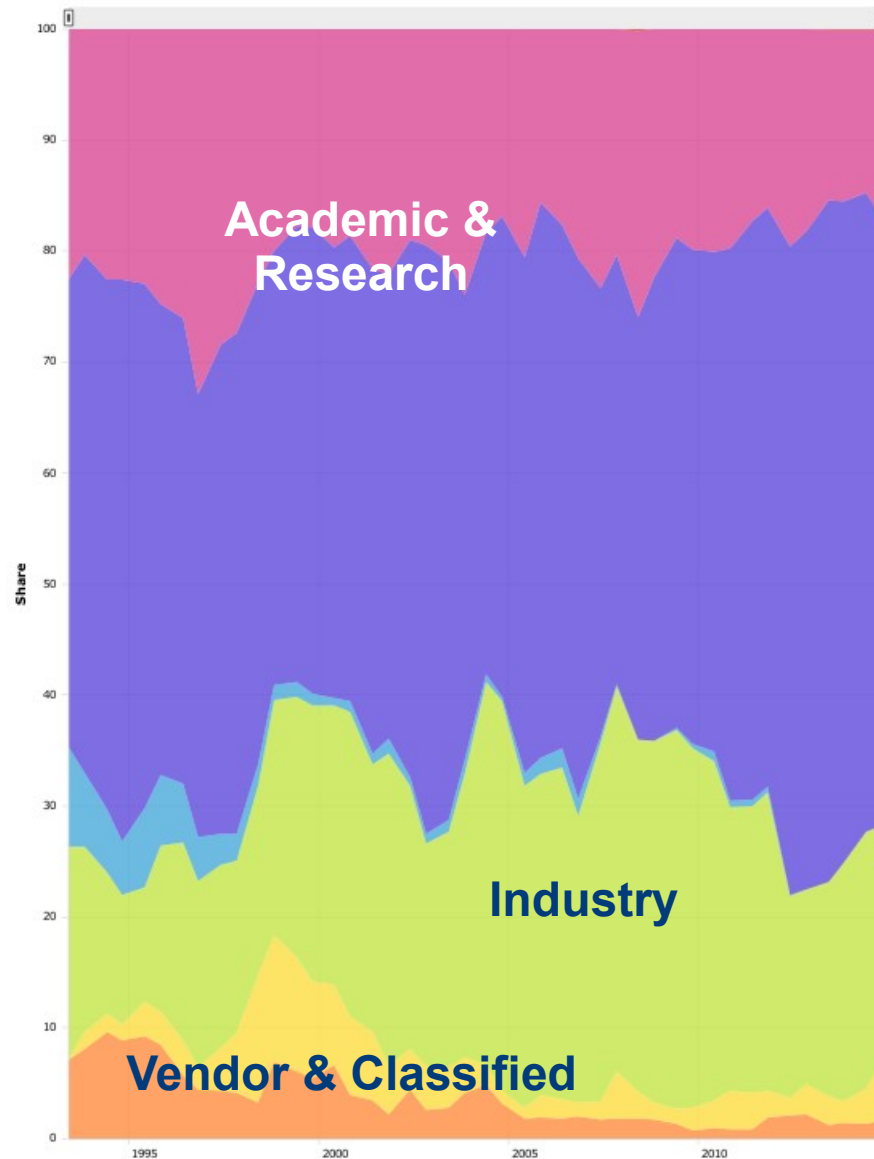
Top 500 segments  
#systems share



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# European and Industry Positioning in HPC

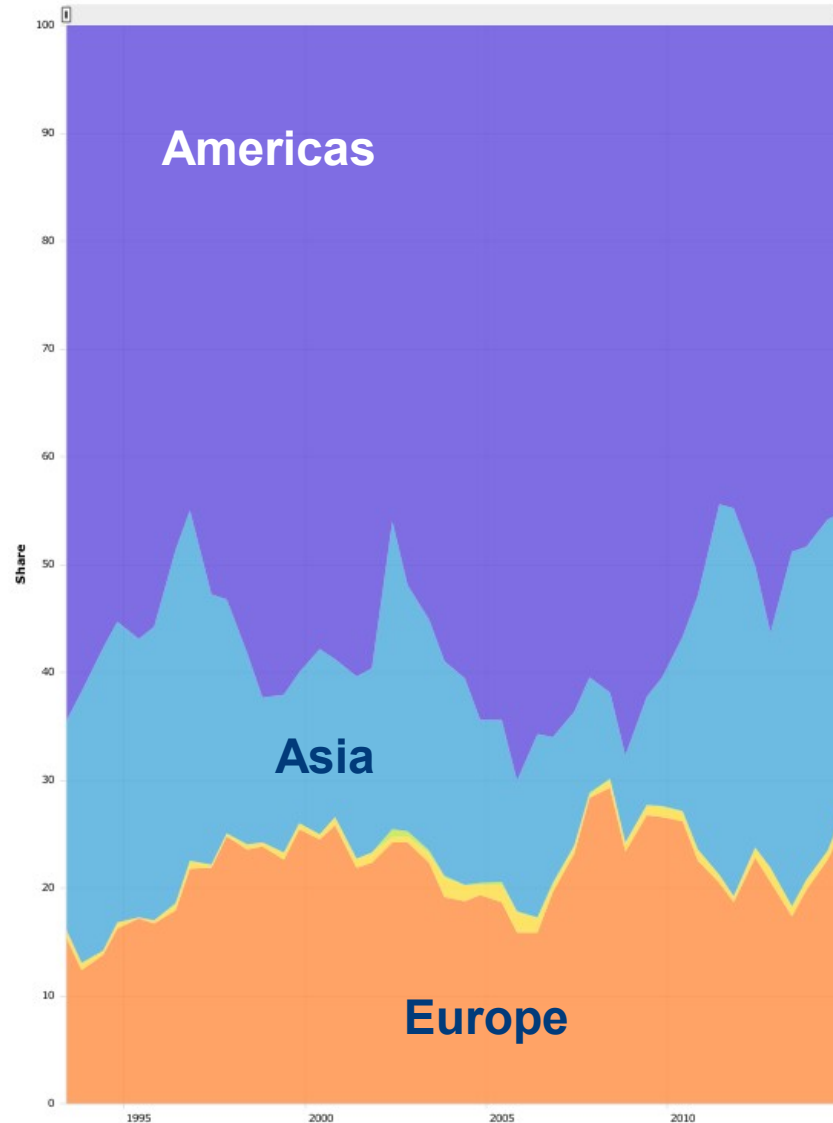
Top 500 segments performance share



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# European and Industry Positioning in HPC

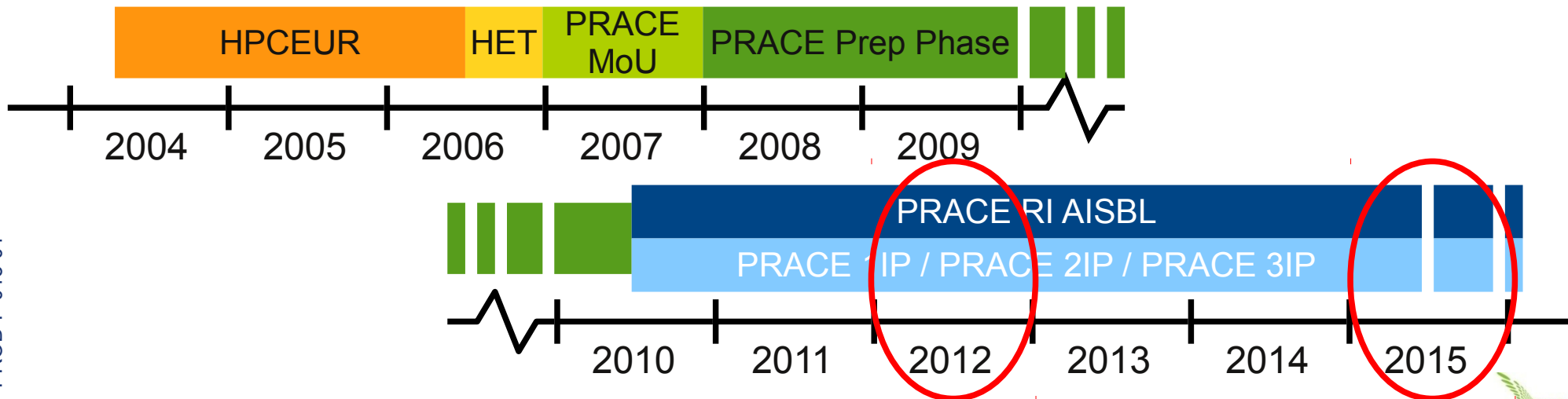
Top 500 continents performance share



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# Partnership for Advanced Computing in Europe (PRACE)

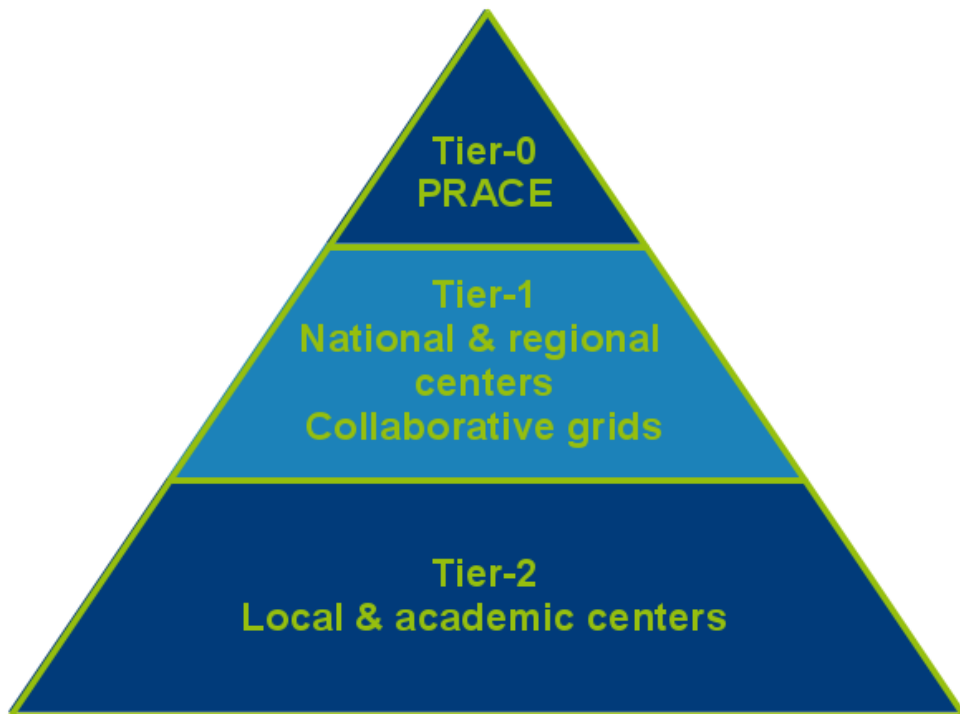
- **Persistent pan-European supercomputing infrastructure**
  - Enables world-class science through **large scale simulations**
  - Offers HPC services on **leading edge capability systems**
  - Awards its resources through a **single and fair pan-European peer review process for open research**



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# PRACE at a glance

- 25 member countries (Belgium since Oct 2012)
- 4 hosting members
- 530 M€ funding (2010-2015)
- 6 world-class systems



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# PRACE awarded resources

## 346 projects and 9.2 billion core-hours awarded over 4 years

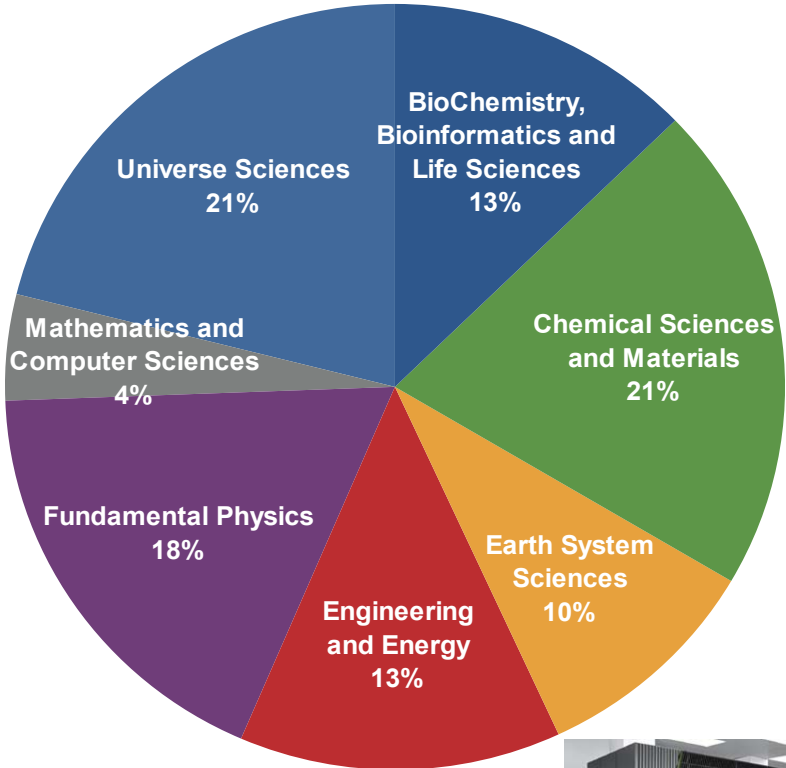
**Marenostrum**, IBM  
BSC, Barcelona, Spain



**Curie**, Bull Bullx  
GENCI/CEA, France



**Hornet**, Cray  
GAUSS/HLRS, Germany



**JUQUEEN**, IBM BlueGene/Q  
GAUSS/FZJ, Germany



**SuperMUC**, IBM  
GAUSS/LRZ, Germany



**FERMI**, IBM BlueGene/Q  
CINECA, Italy

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# PRACE Access for Industrial Users (since Jan 2012)

- **Regular Calls**
  - Twice a year
  - Based on scientific excellence only
  - Open to industry
    - Alone or with a laboratory
    - Free of charge
  - Publish results
  - Large companies and SME's
- **Permanent Preparatory Access Call**
  - Assess the scalability and port the codes preparation for future regular calls
  - Large companies and SME's

**50 companies  
half of them SME's  
> 200 million core hours**

- **Results up to call 9**
  - Calls 10 and 11 not published yet
- **20 proposals involving BE team(s) submitted**
  - Above scientific and technical threshold
  - Out of 656 proposals in total
- **13 projects awarded**
  - 7 with BE team as Principal Investigator
  - >120 million hours awarded (~1,5%)
  - Out of 346 proposals awarded in total

# PRACE Industrial Advisory Committee (IAC)

- **Composed of European industry representative**
  - Across 11 sectors (Oil&Gas, Aeronautics, Automotive, Life Sciences, ...)
  - Multinationals (Airbus, Daimler, EDF, ...)
  - SME (Thermofluids)
- **Provides PRACE with advice on HPC usage for the benefit of European competitiveness and economic growth**
  - Focus on manufacturing
  - 99% are SME's with low research capacity
    - high potential in the lower part of the pyramid
  - Need to go vertical

# SME HPC Adoption Programme in Europe

- **Support SMEs up to a proof-of-concept**
  - **Based on an integrated set of services**
    - Networking
    - Training in PRACE Centers
    - Expertise provided by HPC and domain-specific experts
    - Access to PRACE HPC systems (Open R&D model)
  - **Co-developing a concrete industrial project with PRACE experts and demonstrate it using PRACE HPC resources**
  - **The SHAPE demonstration clarifies for the SME**
    - Potential of HPC
    - Investments to perform and skills to hire
    - Software or methodologies to develop
    - Next HPC Services to use



- **SHAPE Pilot**
  - 14 companies applied to the Call for Proposals (Summer 2013)
  - 10 companies were selected by the Jury (November 2013)
  - Good EU representation: SMEs from Bulgaria, France, Germany, Ireland, Italy, Spain and the UK
  - Various domains covered: CFD, life sciences, naval, digital media, electromagnetism, pharmaceuticals, micro electronics, etc.
  - Projects carried out → Summer 2014
  - Results showcased during PRACEdays14
  - See <http://www.prace-ri.eu/shape-prototypes/>
- **Permanent SHAPE service (2<sup>nd</sup> call closed)**

# European Commission Vision

## Excellent Science e-Infrastructure

Access to best HPC  
for industry and academia  
(PRACE)

- Specifications of exascale prototypes
- Technological options for future systems

## FET / HPC PPP with ETP4HPC

EU development of  
Exascale technologies

- Collaboration of HPC Supercomputing Centers and application CoEs
- Provision of HPC capabilities and expertise

Excellence in HPC applications  
(Centres of Excellence)

- Identify applications for co-design of exascale systems
- Innovative methods and algorithms for extreme parallelism of traditional/emerging applications

## Excellent Science e-Infrastructure

- **European Technology Platform for High Performance Computing**
  - **Industry-led framework for stakeholders of HPC technology**
  - **Defining research priorities**
    - Strategic Research Agenda
  - **Targeting EU growth, competitiveness and sustainability**
  - **PPP signed with the EC**
    - 700 M€ over 2014-2020

- **Double challenge**
  - **Span the different scales**
    - Provide researchers with access to world-class infrastructures
    - Make sure the know-how and the technology benefits to regional industry
  - **Large application range vs dilution**
    - HPC is transverse → large range of applications / industries can benefit from it
    - Lacks visibility / readability (complex eco-system)
- **Can rely on sound local assets**
  - **Scientific expertise in computational science**
  - **Reliable infrastructure management**
  - **Practice of SME-based economy**





PARTNERSHIP FOR  
ADVANCED COMPUTING IN EUROPE



**enable Science foster Industry**  
26 - 28 May 2015, DUBLIN, IRELAND



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- **Most material courtesy of**
  - **PRACE Research Infrastructure AISBL**
  - **TOP500.org**