ICRI e-infrastructures Panel: Sustainability & Business model

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CAPACITIES

e-infrastructure

PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

Since 2010 PRACE = *the* European HPC Research Infrastructure (ESFRI)

Access to leading edge resources

- Providing **15 Pflop/s** to the European Scientific Community through a **pan-European peer review process**
- Various and complementary architectures hosted by 6 centers

Access to top-level services

- Training: PATC, « PRACE Advanced Training Centers »
- Code-enabling

Relations with industry

- Prototype development (to prepare the next supercomputer generation: exascale)
- Free access, only based on scientific excellence (Open R&D model)

Relations with users

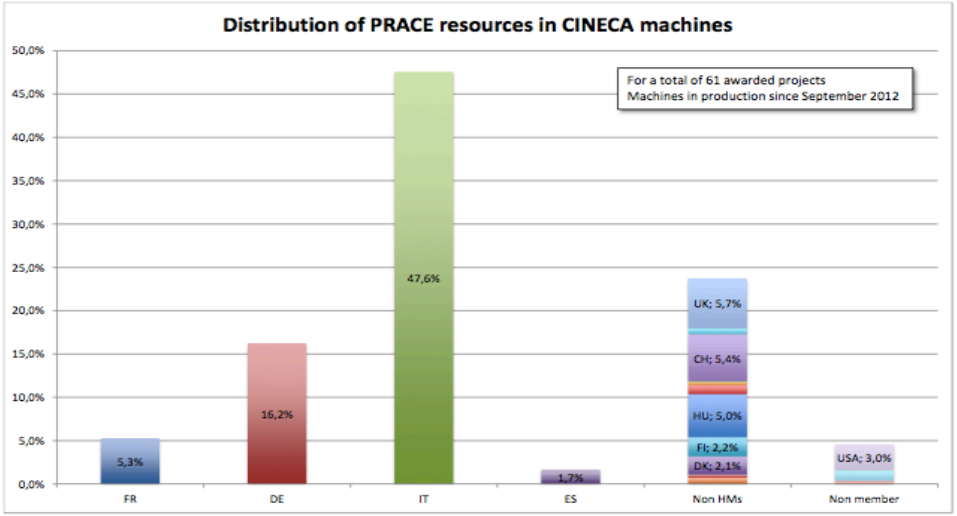
- Scientific Steering Committee (SSC)
- Industrial Advisory Committee (IAC)

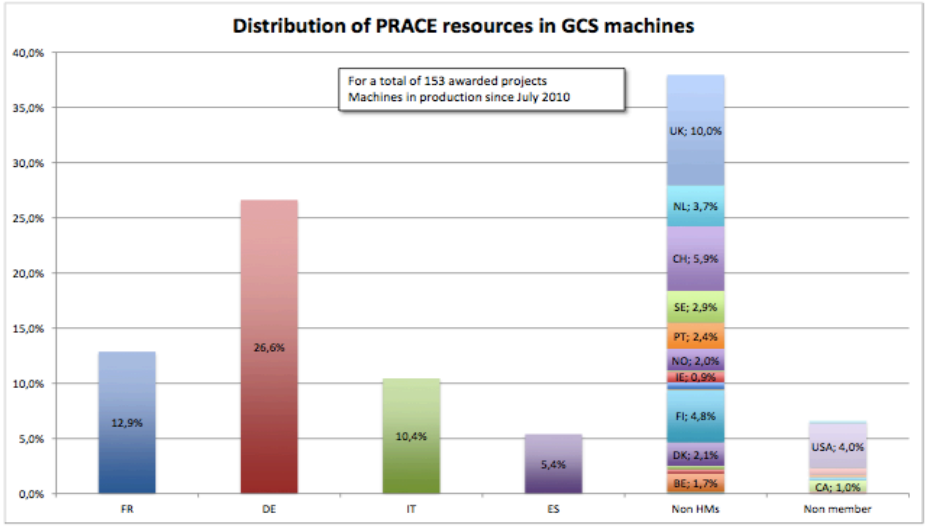
over 5 years (2010 – 2015)

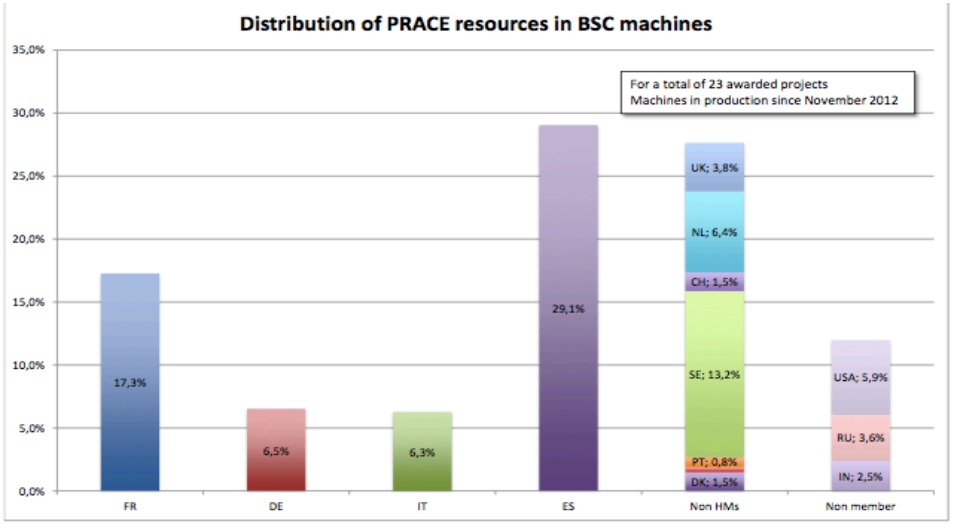
- 4 Hosting members funding 400 M€ (100M€ each)
- 130 M€ from the partners including 70 M€ from the EC

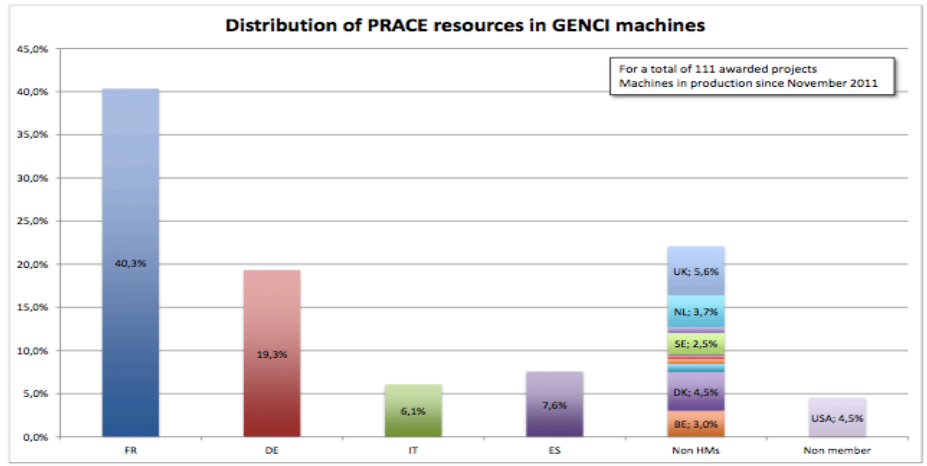
- **25** members, since 2010
- **8 billion** hours granted since 2010
- **303** scientific projects enabled from **38 countries**
- More than **20 SMEs** & industries access in the first year
- **125 trainings** more than **2700 trainees**

PRACE is a European infrastructure

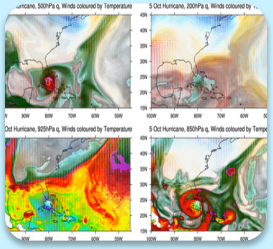
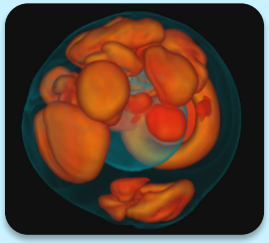
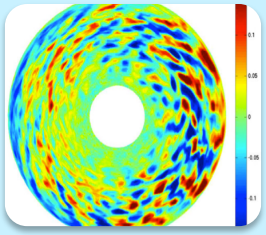
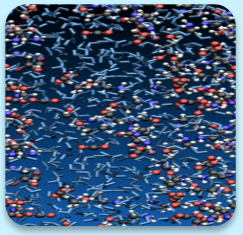
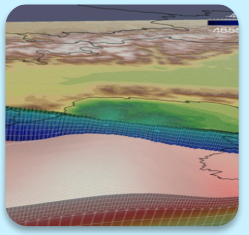
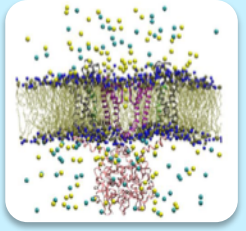








Partnership for Advanced Computing in Europe

Climate

144 million core hours on Hermit (DE) for UK - UB

PRACE will give to UK Met a 3 years advance in the development of their models (high resolution global weather & climate models).

Astrophysics

300 million core hours:
200 on CURIE (FR) + 100 on SuperMUC (DE) for DE

The objective is to Understand the explosion of massive stars into supernovae and understand the origin of the heaviest of the chemical elements, such as gold, platinum, lead, and uranium.
This PRACE grant is one of the biggest worldwide allocation in this domain.

Energy

30 million core hours on SuperMUC (DE) for Finland

PRACE resources enable the first European direct comparison of first-principles simulations to multi-scale experimental data for fusion energy (Link ITER).

Chemistry

59,8 million core hours on JUQUEEN (DE) for Switzerland

The goal is to catch CO_2 in a solvent before it is released into the air, making the exhausts from e.g. power plants significantly cleaner – and then to reduce the cost of regenerating the solvent by optimizing the regeneration process.

Seismology

53.4 million core hours on SuperMUC (DE) for Italy

The massive allocation of computing resources awarded via PRACE can be used to explore the non-linearity involved in the dependence of local ground shaking on geological structure.

Life Science

56 million core hours on CURIE (FR) and 82 million core hours on SuperMuc for FR

The project aims at understanding how a nervous impulse is transported with neurons, and especially the function of the ion channels, to contribute to the design of drugs that will modulate their activity.
This allocation is 30 times larger than a typical allocation.

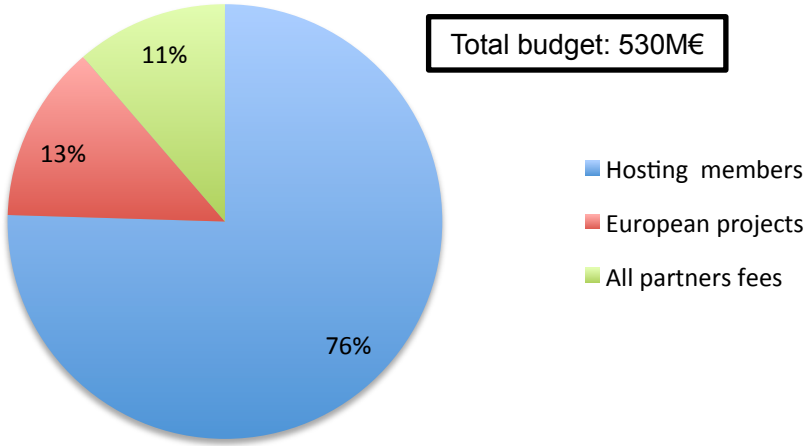
HBP The Human Brain Project

Business model & sustainability

PRACE 1.0 Business model
2010 - 2015

6 systems > 1Pflop/s each

Current funding model:
- **Hosting members** funding for **hardware + operation costs**
- **EC + PRACE partners funding** through 4 **Implementation Projects**
- Payment of an **annual fee** by all PRACE partners



Total budget: 530M€

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Still under discussion

PRACE 2.0 Business model
2015 – 2020

4 systems ≈ 50 Pflop/s each

General principles:
- Access based on **scientific excellence** only
- **Openness**
- **Inclusiveness** for all European Member States and Associated Countries
- Target **50 Pflop/s** systems

Tentative budget: 700-800M€

Tentative funding model:
- Hosting members funding **hardware costs**
- **Participation of all members to the operation costs** (indicator based on a mix of GDP / past usage)

→ Need to find alternative sources of funding!

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PRACE 2.0 a stepping stone towards PRACE 3.0, sustainable model

PRACE 1 → PRACE 2.0 → PRACE 3.0

2010 — 2015 — 2020 — 2025

Results

- ✓ Creation of a European world-class HPC infrastructure
- ✓ Providing high-quality services to all European users, from academia & industry
- ✓ Significant scientific breakthroughs
- ✓ Organizational challenges

Transition period

- ○ Necessity to spread the usage of HPC (in Science and Industry as SMEs)
- ○ Important to provide support to (emerging) communities in to the use of exascale systems
- ○ Reinforce training (PATC)
- ○ Create new services towards Big Data and large scale instruments
- ○ Integrate Tier-1 systems into the PRACE ecosystem