H2020, COEs and PRACE

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CoEs

- CoEs are focussed on a particular applications domain.
  - E.g. Engineering, Genomics, Climate etc

- Must have (potential) societal impact

- Idea is to bring together community efforts on code portfolio

- Runs counter to PRACE – and to generalist focus of many HPC centres and to FP7 strategy

- Initial funding of €4-5 million for 24 months

- Those that demonstrate results and meet European Commission objectives will get further funding

HPC Centres of Excellence (HPC CoE)

- **Establish a limited number of user-centred Centres of Excellence (CoE) in the application of HPC for addressing scientific, industrial or societal challenges**

  - **CoEs may be**
    - **'thematic', addressing specific application domains such as medicine, life science or energy**
    - **'transversal' on computational science (e.g. algorithms, analytics, numerical methods etc.)**
    - **'challenge-driven', addressing societal or industrial challenges (e.g. ageing, climate change, clean transport etc.); or a combination of these types.**

CoEs – where do they fit? (1)

- eInfrastructures 2014/15 Call has nine sub-calls covering different aspects of data and HPC infrastructure provision for academia and industry plus networking, single sign-on etc.
  - CoEs are one of the nine sub-calls
  - CoEs will be funded as research and innovation actions

- Projects must demonstrate:
  - improved access to applications and expertise
  - improved European productivity and competitiveness
  - European leadership in applications through better code performance, maintenance and availability
  - more scientists trained in use of computational methods and optimisation

CoEs – where do they fit? (2)

- eInfrastructures 2014/15 Call which aims at:
  - *Integration of eInfrastructure services and resources* (networking, computing, data, software, user interfaces….),… *avoiding rigid boundaries between computing and data* (Big Research Data and COEs highlighted here)
  - *Implementing* the eInfrastructure part of *the EU strategy on HPC*, in particular the provision of services (PRACE), the infrastructure for computing applications (CoEs) and a network of competence centres for SMEs

- A Public Private Partnership in HPC (ETP4HPC) provides the framework for the implementation of the HPC strategy, addressing in particular the CoEs and the development of HPC technologies towards Exascale (via FET calls)

CoEs need to be…

- **User-driven** with applications users and owners playing a decisive role in governance

- **Integrated**, encompassing not only HPC software, but also relevant aspects of hardware, data management/storage, security etc.

- **Multi-disciplinary**, with domain expertise co-located along with HPC system, software and algorithm expertise

- **Distributed**, exploiting available competencies and ensuring synergies with national/local programmes

Centres of Excellence (1)

- Developing HPC application codes towards peta and exascale computing

- Testing, validating and maintaining codes and associated data

- Co-design of h'ware, s'ware and codes

- Consultancy to industry and SMEs, research in HPC applications and addressing the skills gap

- Working in synergy with the **pan-European HPC infrastructure** (typically PRACE and FET Exascale activities)

Centres of Excellence (2)

- Sustainability – clear business plans expected

- Creating communities around specific codes that impact the target sectors, involving ISVs where appropriate

- Governance structure driven by the needs of users. Commercial management expertise in addition to technical expertise, to manage industry clients and supply chains

- Provision of pan-European support

- EINFRA-4-2014 "Pan-European High Performance Computing Infrastructure and Services"
  - Provide a Tier-0 service promoting research excellence and innovation (aim for systems of 50 P/flops by 2020)
  - Carry out activities necessary to support Tier-0 services or a functioning HPC ecosystem (e.g. training, prototyping, software development)
  - Implement…a flexible business model to ensure long term sustainability (allowing financial or in-kind contributions)
  - Develop and maintain the strategy for the deployment of a rich HPC environment of world-class systems with different architectures
  - **Work in synergy with CoEs and ETP4HPC**
  - Develop an international co-operation policy

- Budget €15M Euros, closing date September 2014

HPC Technology and PRACE

- ## Prototyping
  - Assessment of technologies for future multi-Petaflop/s systems
  - 22 Prototypes: CPUs, Accelerators, I/O, Cooling, Programming models – focus on energy efficiency

- ## Pre-Commercial Procurement
  - 1st pilot on large scale: €9M

- ## Benefits
  - Centres: gain insight for future procurements
  - Technology providers: get feedback on usability and user requirements
  - Users: get early access to future architectures

HPC Technology – PRACE in H2020

- Assessment of prototypes produced under the Strategic Research Agendas

- Participate in Co-design actions
  - Support the selection of applications suitable for co-design
  - Make new technologies available to users – when sufficiently mature
  - Provide requirements and feedback to technology providers

- Train users on new technologies

Applications – PRACE Contributions

- Provide HPC Expertise for
    - Code enabling, optimisation, scaling, tools, …
    - SHAPE – prepare SMEs for HPC usage
    - Self-help documentation (Best Practice Guides, Whitepapers)

- Offer a platform to meet and organise
    - Annual Scientific Conference, Industry Seminar
    - Creation of Scientific Case – a community effort organised by PRACE
    - Scientific Steering Committee and Industrial Advisory Committee – HPC user community representatives

- Provide Access to Tier-0/1 systems – model tbd

- PRACE Advanced Training Centres
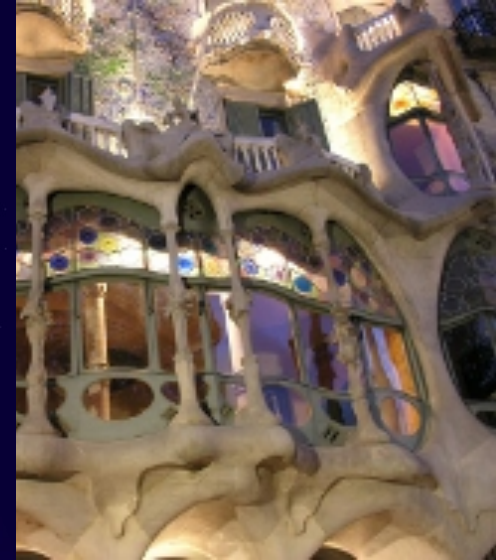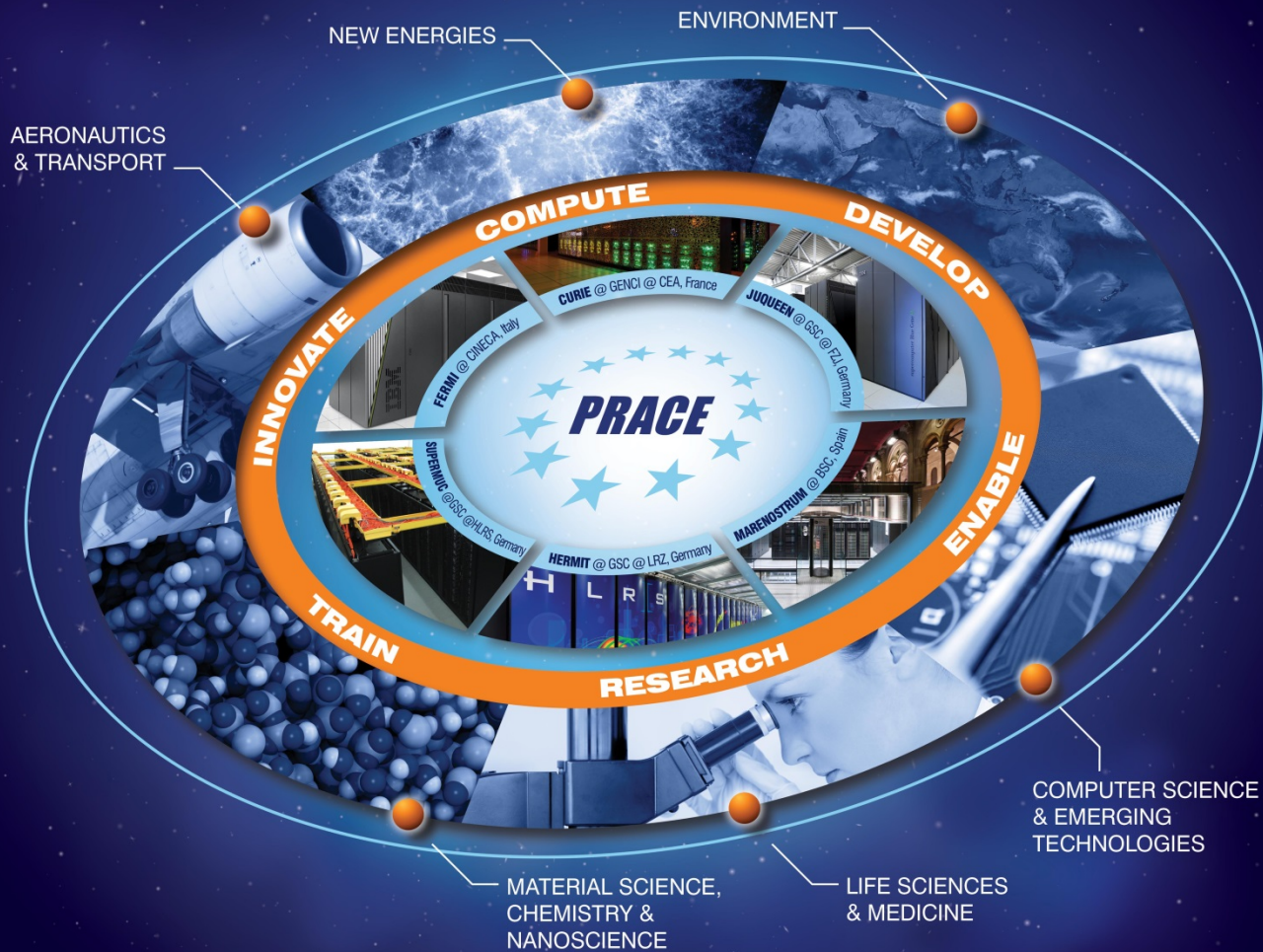
- Public session for joint analysis with proposers for centres of excellence and VRE
- Expectations for resources from PRACE
  - HPC resources
  - Storage resources
  - Expertise
  - …
- Organised on May 20, afternoon session
- Two additional days for private discussion with PRACE on specific needs

BARCELONA
20 – 22 May 2014

See you in Barcelona PRACEdays14!

Summary

- PRACE provides infrastructure and general services, based on user requirements
  - Role in supporting structured communities is weaker and less well defined in H2020

- CoEs are expected to be focused around particular communities but will use PRACE services and provide a focus for user input
  - Possibly paying on a costed basis for CPU

- Interfaces between PRACE and CoEs (and between each of them and EGI, EUDAT, Helix Nebula etc.) need to be discussed and refined over the coming months

CoE Physics at Extreme Conditions