PRACE in a Nutshell

CERN/PRACE Workshop 22 October 2018

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PRACE Managing Director

PRACE | what we do

- Open access to world-class HPC systems to EU scientists and researchers
- Variety of architectures to support the different scientific communities
- High standards in computational science and engineering
- Peer Review at European level to foster scientific excellence
- Robust and persistent funding scheme for HPC supported by national governments and European Commission (EC)
- Support the development of intellectual property rights (IPR) in Europe by working with industry and public services
- Collaborate with European HPC industrial users and suppliers

PRACE | achievements

- 652 scientific projects enabled
- >19 000 000 000 (billion) core hours awarded since 2010
- Of which 63% led by another PI nationality than the HM
- R&D access to industrial users with >50 companies supported
- >11 500 people trained through PRACE Training
- ~110 Petaflops of peak performance on 7 world-class systems
- 26 PRACE members, including 5 Hosting Members (France, Germany, Italy, Spain and Switzerland)
- PRACE is the only e-infrastructure Landmark on the ESFRI Roadmap 2016

PRACE 2

- Ratified on 3 March 2017
- From 2017 to 2020 with overlap with PRACE 1
- 21 of 25 Members contribute

PRACE | membership

- Hosting Members (HMs) provide access to Tier-0 systems as in-kind participation to the PRACE Research Infrastructure (RI)
- General Partners (GPs) fund High-Level Support Teams (HLST) providing tailored user support on HMs' Tier-0 systems
- All 26 PRACE members contribute to high-value services including DECI, Implementation Projects, Peer Review, and dissemination & Communication

PRACE | members

Hosting Members

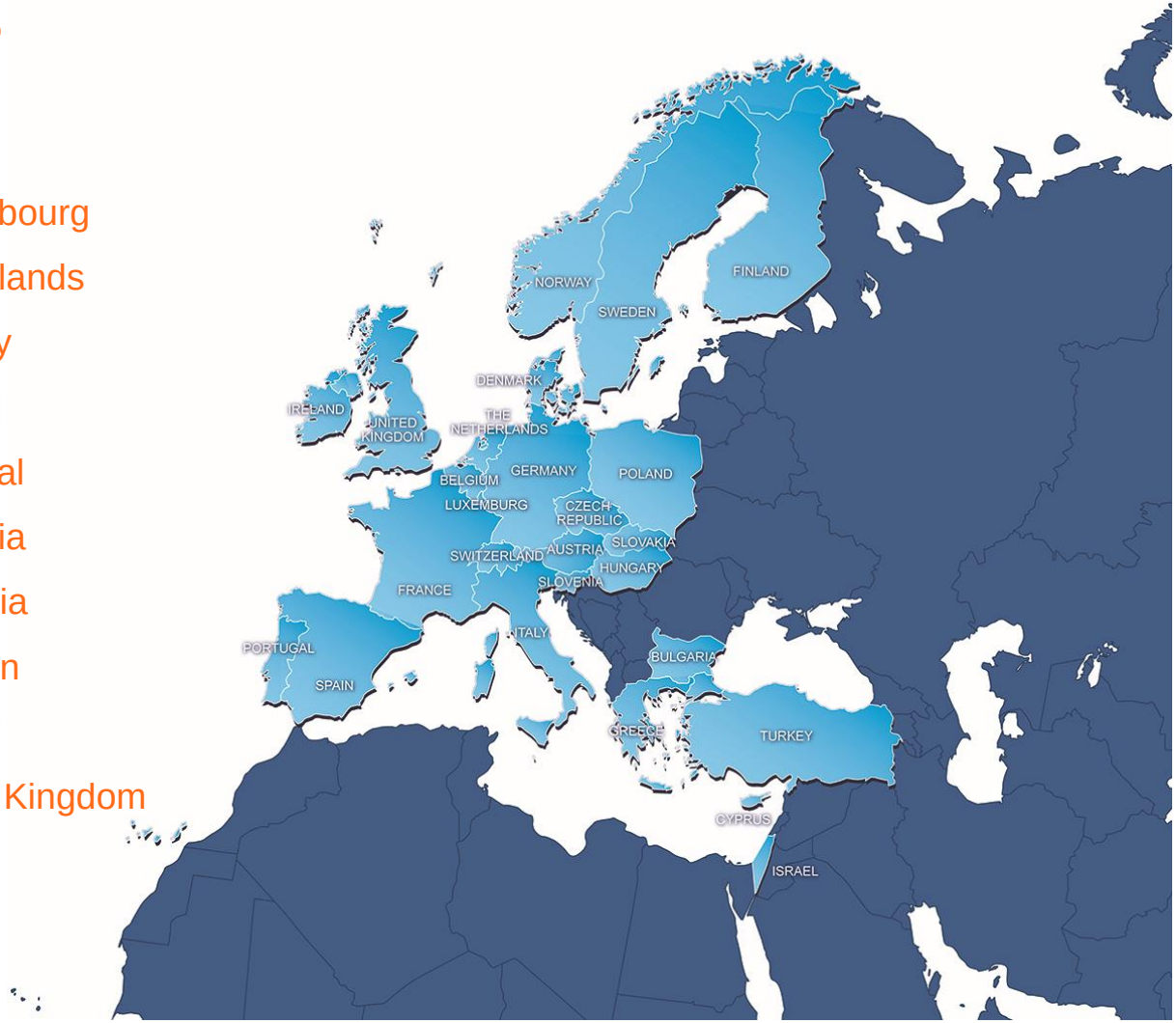
- France
- Germany
- Italy
- Spain
- Switzerland

General Partners (PRACE 2)

- Austria
- Belgium
- Bulgaria
- Cyprus
- Czech Republic
- Denmark
- Finland
- Greece
- Hungary
- Ireland
- Israel
- Luxembourg
- Netherlands
- Norway
- Poland
- Portugal
- Slovakia
- Slovenia
- Sweden
- Turkey
- United Kingdom

Observers

- Croatia
- Romania



PRACE | Tier-0 Systems in 2018

NEW ENTRY 2018
JUWELS (Module 1) Bull Sequana
GAUSS @ FZJ, Jülich, Germany
#23 Top 500

MareNostrum IBM
BSC, Barcelona, Spain
#22 Top 500

Piz Daint Cray XC50
CSCS, Lugano, Switzerland
#6 Top 500

SuperMUC Lenovo cluster
GAUSS @ LRZ, Garching, Germany #57 Top 500
NEW ENTRY soon SuperMUC NG

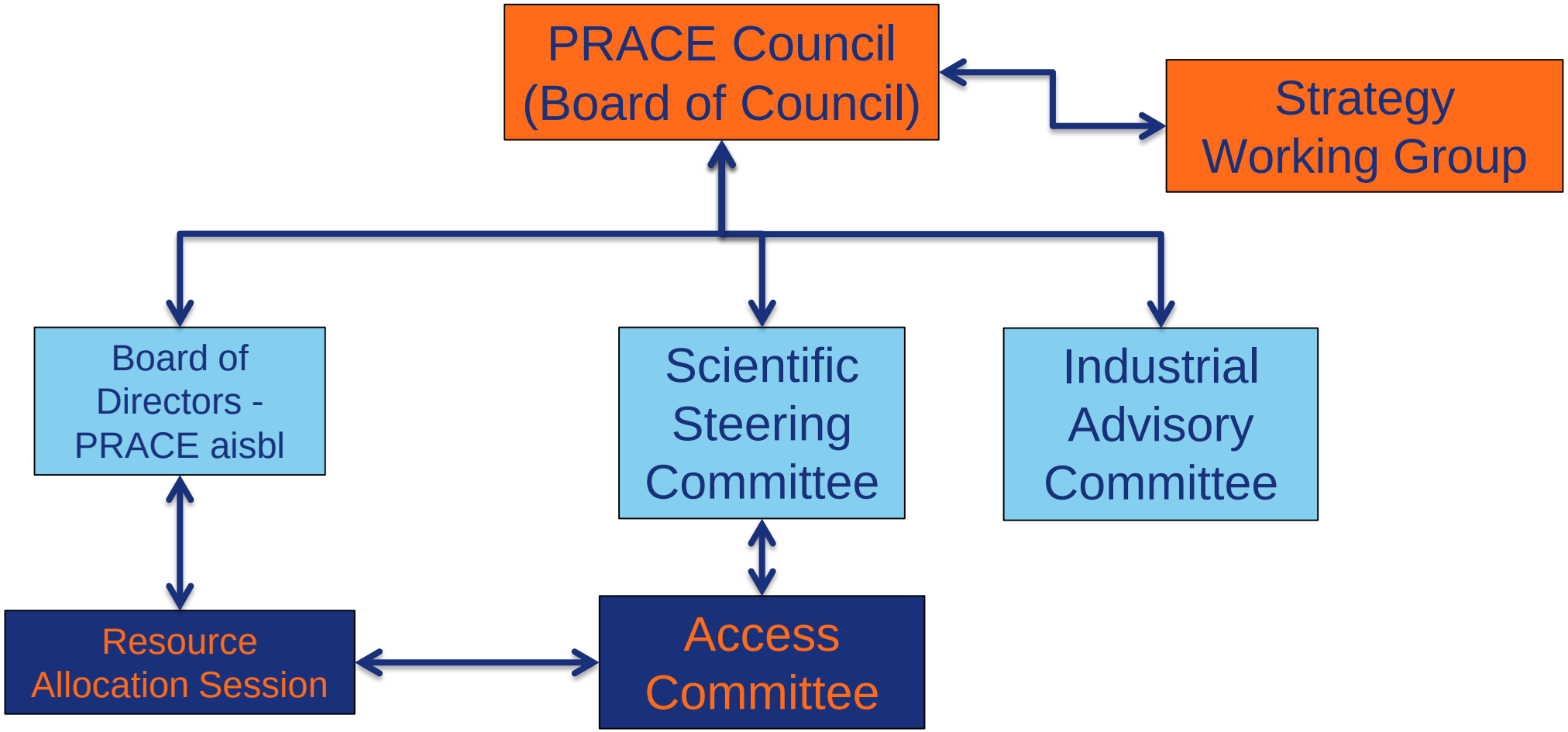
NEW ENTRY 2018
JOLIOT CURIE Bull Sequana
GENCI/CEA, Bruyères-le-Châtel, France
#34 Top 500

MARCONI Lenovo
CINECA, Bologna, Italy
#18 Top 500

Hazel Hen Cray
GAUSS/HLRS, Stuttgart, Germany
#27 Top 500

Close to 110 PFlops cumulated peak performance

PRACE | governance



PRACE | current services

Towards End-Users

Access

Tier-0 systems (open R&D)
- Project Access
  1-3 years
- Preparatory Access
  Type A, B, C, D

Tier-1 systems (open R&D)
- DECI Programme

Support

Application Enabling & Support
- Preparatory access Type C
- Preparatory access Type D
  - Tier-1 for Tier-0
- SHAPE
- HLST support

Training
- Training Portal
- PATC, PTC
- Seasonal Schools & on demand
- International HPC Summer School
- MOOC

- Code Vault
- Best Practice Guides
- White Papers

Communication, Dissemination, Outreach
- Website
- Public Relations
- Scientific Communication
- Summer of HPC

Events
- PRACEdays
- SC, ISC, ICT, ICRI, DI4R, …

Operation & Coordination of the common PRACE Operational Services
- Service Catalogue
- PRACE MD-VPN network
- Security

HPC Commissioning & Prototyping
- Technology Watch, PCP
- Infrastructure WS
- Best Practices
- UEABS

Towards PRACE Partners

Addressing HPC Exascale challenges

- Aim at scientific excellence and improve application scaling and throughput
- Focus on PRACE Scientific Case
  - Computing requirements (capability-, capacity-, real-time-, burst-, cloud-computing, …)
  - Data management (distributed (big) data processing, storage, HPDA, …)
  - Networking requirements (AAA, SDN, QoS, …)
  - Application development (portability, tools, libraries, …)
- Specific exascale challenges
  - Parallelism of software, data movement, reliability, energy consumption, …
  - System integration, software-, hardware-, services- and skills-development
  - Exascale performance only through combination of improvements
- Pan-European collaboration is needed

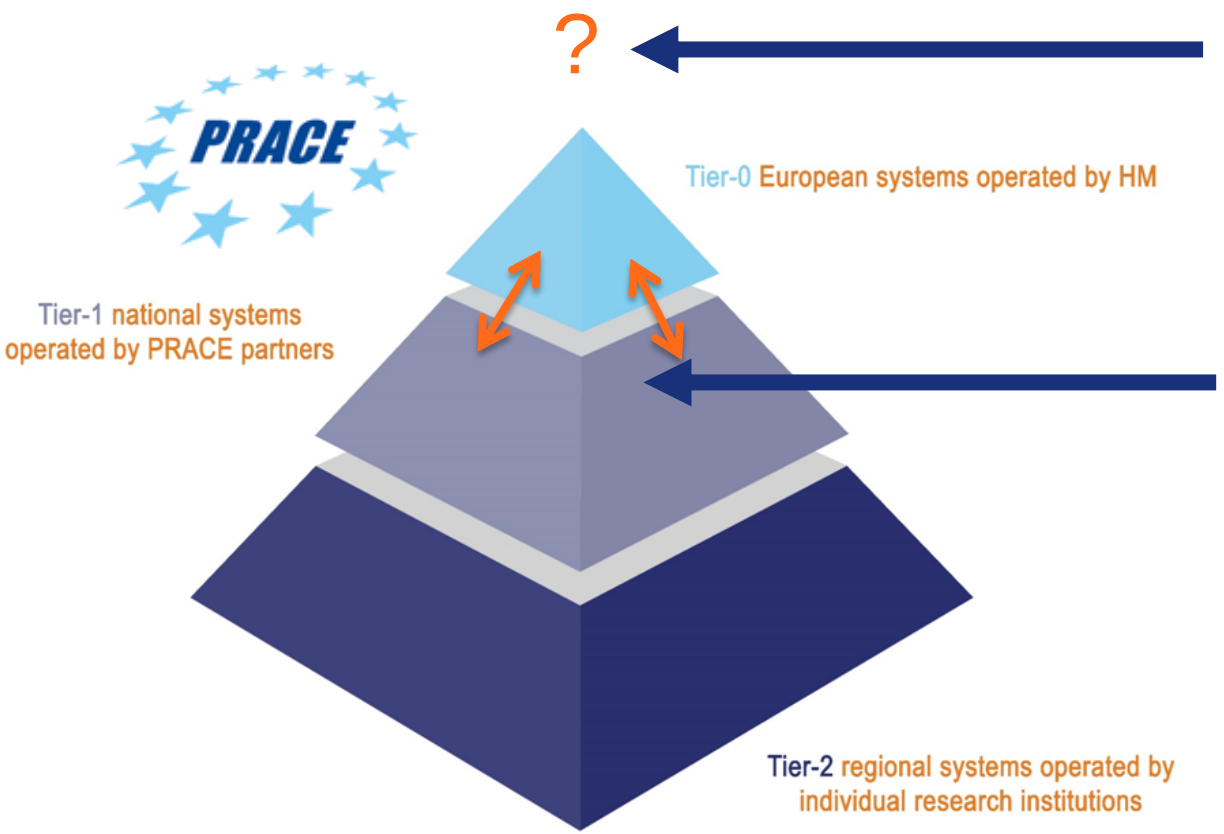
Release date 17 Oct 2018

Recipe for a data-centric approach

- Need to address the convergence of HPC, HTC, HPDA and AI
- Handle the large volume of data generated
  - Rethink data movement (edge / data center) & support end-to-end workflows
  - Offer computing capacity to large scale scientific instruments
- Enhance integration of the Tiers and connect to EOSC
- Anticipated key role of the GÉANT networking services (AAA, SDN, QoS, …) and FENIX and EUDAT for data management and processing

Piloting in Call 18

Strengthening the HPC pyramid



EuroHPC systems
(exa- and pre-exascale)

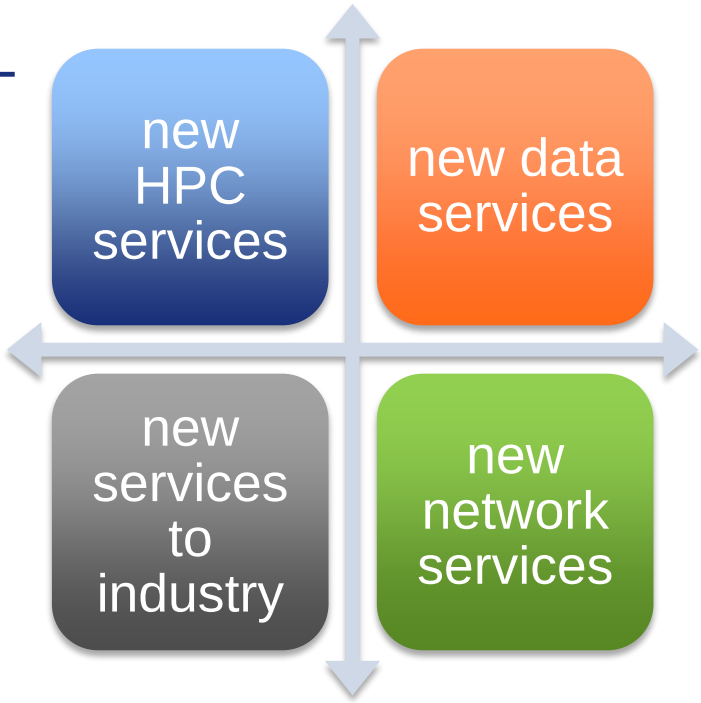
Importance of Tier-1:

- National Stepping Stone
- Data reduction at RIs
- Industry access
- Pilots

Address various needs with full pyramid

Extend PRACE activities → EDI

- PRACE as main contributor to EDI with GÉANT
- Access to JU- & Tier-0-infra provided by HMs for Open R&D for science & industry
- Offer training, code enabling, communication, Tier-1 for Tier-0 services provided by PRACE partners & AISBL office
- Extend services towards industry (SHAPE-Fortissimo), and to the public sector
- Local support across Europe



- New extended services provided by partners
- EDI as a one-stop-shop for all EU project/infra on HPC and data
- EOSC as potential vehicle to offer services to wider communities

PRACE & EuroHPC

- EuroHPC Joint Undertaking funding instrument
  - *EC- & MS-lead initiative*
  - *Procure (pre-)exascale systems and more in Europe*
  - *Support development of European technology*

- PRACE and its partners
  - Continued PRACE 2 Programme until 2020
  - Share know-how
  - Provide services, support, and training adapted to user communities

Stay tuned !

THANK YOU FOR YOUR ATTENTION

www.prace-ri.eu

Current PRACE Access Mechanisms
CERN/PRACE Workshop 22 October 2018

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PRACE Managing Director

PRACE | access mechanisms

- Distributing resources via various access mechanisms
  - All targeting excellence in science + support to industry/SMEs

- Project Access
  - Tier-0 through peer-review
- Preparatory Access
  - Several types
- SHAPE Programme
  - Targeting SMEs
- Distributed European Computing Initiative (DECI)
  - Transnational Tier-1

Scientific Excellence

PRACE | project access

- Main access mechanism distributing Tier-0 resources
- Bi-annual calls for proposals
  - For a specific project; award period 1 to 3 years
  - Small share reserved for Centres of Excellence (CoE)
  - For individual researchers and (international) research groups
  - Accessible to industry for Open R&D
  - Requires to demonstrate technical feasibility of project
- Peer-Review Process (under continuous improvement)
  - Scientists driving the ranking across disciplines (on the ERC model)
  - Accounting for technical requirements
  - Accounting for PRACE 2 Programme settings

PRACE | project access

PRACE | preparatory access

Under revision

- Support users to get access to Tier-0
- Four types of preparatory access
  - Type A – Collect performance information on given system
  - Type B – Porting application
  - Type C – Porting application with PRACE efforts
  - Type D – Porting application on Tier-1 then on Tier-0 with PRACE efforts
- Lightweight access process

PRACE | SHAPE

- SME HPC Adoption Programme in Europe
- Target SMEs willing to test how HPC supports their business case
- Calls for applications judged on :
  - Strength of business case
  - Achievability, commitment from the SME and innovation
  - Social and economic impact for society
- Increasing competitiveness & create new business opportunities
- Enable development of new products or services

PRACE | DECI

- DECI = Distributed European Computing Initiative
  - Exchange of Tier-1 cycles between PRACE members (Optional Programme)
- Based peer review process similar to the Project Access
  - DECI Access and Allocations Local Panel (DAALP)
    - *Country providing resources to the DECI undertakes its own scientific evaluation*
  - DECI Access and Allocation Committee (DAAC)
    - *Operational committee issuing recommendations on proposals*
      - *Those which should be granted allocation and*
      - *Distribution of available resources to the successful proposals*

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