



PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

PRACE | The Research Infrastructure Supporting Science and Industry through Provision of High Performance Computing Resources

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HPC Team
GRNET SA





PRACE | Mission

- The mission of PRACE is to enable **high-impact scientific discovery** and **engineering research** and development across all disciplines to enhance **European competitiveness** for the benefit of society.
- PRACE seeks to realise this mission by offering world-class computing and data management resources and services through a peer review process.
- PRACE also seeks to strengthen the European users of HPC in **industry through various initiatives**.
- PRACE has a strong interest in improving energy efficiency of computing systems and reducing their environmental impact.



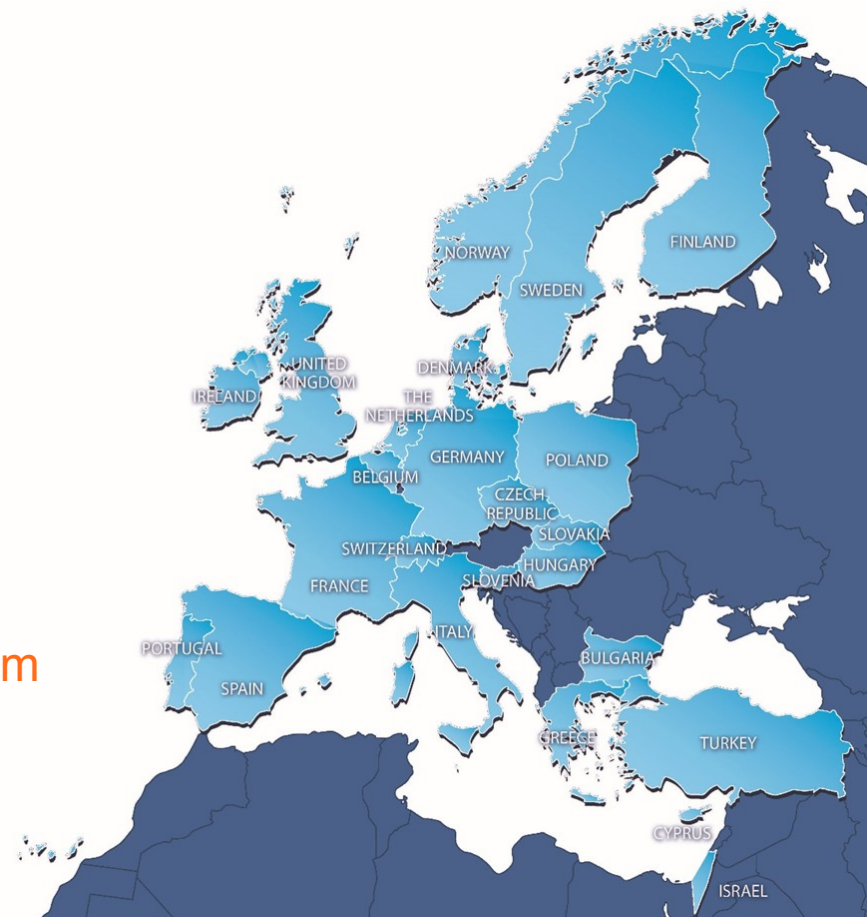
PRACE | 26 members

Hosting Members

- ▶ France
- ▶ Germany
- ▶ Italy
- ▶ Spain
- ▶ Switzerland

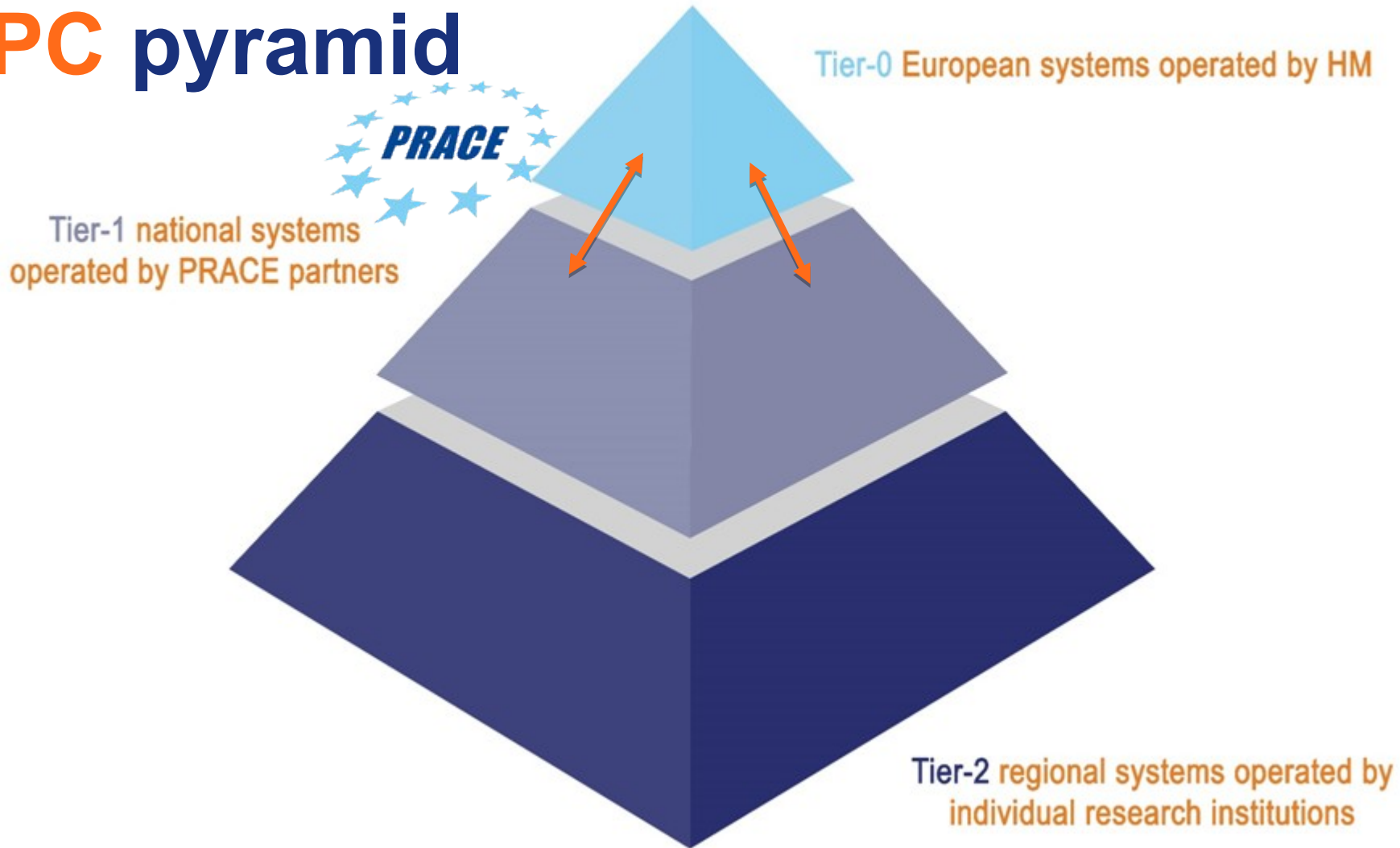
General Partners (PRACE 2)

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





HPC pyramid





TOP500.org – updated November, 2019

Rank	Site	System	Cores	Rmax (TFlop/s)	Rpeak (TFlop/s)	Power (kW)
1	DOE/SC/Oak Ridge National Laboratory United States	Summit - IBM Power System AC922, IBM POWER9 22C 3.07GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband IBM	2,414,592	148,600.0	200,794.9	10,096
2	DOE/NNSA/LLNL United States	Sierra - IBM Power System S922LC, IBM POWER9 22C 3.1GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband IBM / NVIDIA / Mellanox	1,572,480	94,640.0	125,712.0	7,438
3	National Supercomputing Center in Wuxi China	Sunway TaihuLight - Sunway MPP, Sunway SW26010 260C 1.45GHz, Sunway NRPC	10,649,600	93,014.6	125,435.9	15,371
4	National Super Computer Center in Guangzhou China	Tianhe-2A - TH-IVB-FEP Cluster, Intel Xeon E5-2692v2 12C 2.2GHz, TH Express-2, Matrix-2000 NUDT	4,981,760	61,444.5	100,678.7	18,482
5	Texas Advanced Computing Center/Univ. of Texas United States	Frontera - Dell C6420, Xeon Platinum 8280 28C 2.7GHz, Mellanox InfiniBand HDR Dell EMC	448,448	23,516.4	38,745.9	



TOP500.org – updated June, 2019

6	Swiss National Supercomputing Centre (CSCS) Switzerland	Piz Daint - Cray XC50, Xeon E5-2690v3 12C 2.6GHz, Aries interconnect , NVIDIA Tesla P100 Cray Inc.	387,872	21,230.0	27,154.3	2,384
7	DOE/NNSA/LANL/SNL United States	Trinity - Cray XC40, Xeon E5-2698v3 16C 2.3GHz, Intel Xeon Phi 7250 68C 1.4GHz, Aries interconnect Cray Inc.	979,072	20,158.7	41,461.2	7,578
8	National Institute of Advanced Industrial Science and Technology (AIST) Japan	AI Bridging Cloud Infrastructure (ABCI) - PRIMERGY CX2570 M4, Xeon Gold 6148 20C 2.4GHz, NVIDIA Tesla V100 SXM2, Infiniband EDR Fujitsu	391,680	19,880.0	32,576.6	1,649
9	Leibniz Rechenzentrum Germany	SuperMUC-NG - ThinkSystem SD650, Xeon Platinum 8174 24C 3.1GHz, Intel Omni-Path Lenovo	305,856	19,476.6	26,873.9	
10	DOE/NNSA/LLNL United States	Lassen - IBM Power System S922LC, IBM POWER9 22C 3.1GHz, Dual-rail Mellanox EDR Infiniband, NVIDIA Tesla V100 IBM / NVIDIA / Mellanox	288,288	18,200.0	23,047.2	



PRACE Tier-0 Systems in 2019

JUWELS Module 1: Bull

Sequana

GAUSS@FZJ, Jülich, Germany

#30 Top 500



MareNostrum: Lenovo
BSC, Barcelona, Spain
#29 Top 500



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



SuperMUC-NG: Lenovo
GAUSS@LRZ, Garching, Germany
#9 Top 500



NEW ENTRY 2018

JOLIOT CURIE : Bull Sequana
GENCI/CEA, Bruyères-le-Châtel,
France #47 Top 500



MARCONI: Lenovo
CINECA, Bologna, Italy
#21 Top 500

Hazel Hen: Cray
GAUSS@HLRS,
Stuttgart, Germany
#34 Top 500



PRACE | Achievements to-date

- ▶ **>650** scientific projects enabled
- ▶ **>17** 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
- ▶ **>11 000** people trained through PRACE Training
- ▶ Close to **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 | 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
- 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



PRACE | access

**Criterion:
Scientific
Excellence**

- ▶ Free-of-charge, obligation to publish results at the end of the award period
- ▶ Project Access (bi-annual calls)
 - ▶ For a specific project; award period 1 to 3 years
 - ▶ For individual researchers and (international) research groups (PI has to come from a PRACE 2 supporting member)
 - ▶ Requires to demonstrate technical feasibility of project
- ▶ Preparatory Access
 - ▶ Optionally with support from PRACE experts
 - ▶ Prepare proposals for Project Access
 - ▶ SHAPE projects receive Preparatory Access
- ▶ **DECI**
- ▶ **0,5% of resources for CoEs**



PRACE | training

a **sustained, high-quality** training and education service for the European HPC community

Different **levels** of training

- Basic, intermediate, advanced **HPC**
- Parallel programming
- Accelerators
- Performance optimization

Domain-specific topics

- Simulation software
- Visualisation
- Data intensive computing

10 PRACE **Training Centres**

PRACE **Training Events**: Seasonal Schools, International HPC Summer School, On-demand training events

PRACE Training and Events portal

Code Vault

Massive Open Online Courses (**MOOCs**)

Summer of HPC

(Programme for undergraduate and postgraduate students)



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THANK YOU FOR YOUR ATTENTION

www.prace-ri.eu