



PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

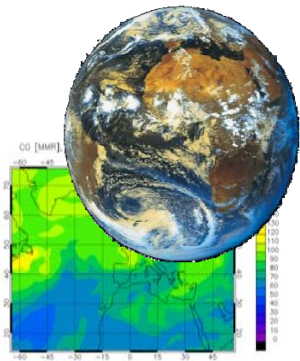
Collaboration with academia and industry

S. Requena – GENCI & G. Erbacci - CINECA

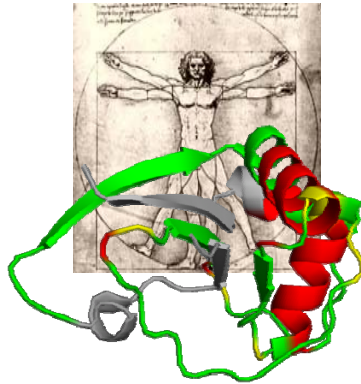
PRACE BoF – SC10



Supercomputing Drives Science and Industry through Simulation



Environment
Weather/ Climatology
Pollution / Ozone Hole



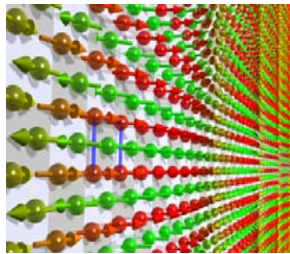
Ageing Society
Medicine
Biology



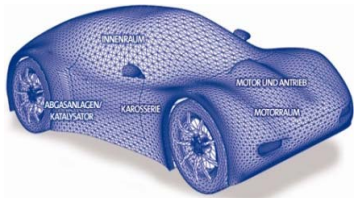
Aerospace



Energy
Plasma Physics
Fuel Cells



Materials/ Inf. Tech
Spintronics
Nano-science



Automotive



Finance



Virtual power plant
Smart Grids

PRACE Research Infrastructure Created

- Establishment of the legal framework
 - PRACE AISBL created with seat in Brussels in April (Association Internationale Sans But Lucratif)
 - 20 members representing 20 European countries
 - Inauguration in Barcelona on June 9



- Funding secured for 2010 - 2015
 - 400 Million € from France, Germany, Italy, Spain
Provided as Tier-0 services on TCO basis
 - Funding decision for 100 Million € in The Netherlands
expected soon
 - 70+ Million € from EC FP7 for preparatory and
implementation
Grants INFSO-RI-211528 and 261557
Complemented by ~ 60 Million € from PRACE members



PRACE Tier-0 Systems

- 1st Tier-0 System provides cycles since August 1
 - Jugene: BlueGene/P in GCS@Juelich
 - 72 Racks, 1 PFlop/s peak
 - 35% of capacity provided to PRACE
- 2nd Tier-0 System announced by GENCI on October 5
 - Curie: Bull Cluster with Intel CPUs operated by CEA
 - 1.6 PFlop/s peak in Oct. 2011 (1st step end of 2010)
 - Largest fraction of capacity provided to PRACE
- Next Procurements (in alphabetical order)
 - BSC, CINECA, GCS@HLRS, GCS@LRZ
 - Procurement plan based on analysis of user requirements and market



Next step : Integration and extension of DEISA

Tier1 systems & services

PRACE HPC user services

Not only a rough access to Tier0/1 systems

- Dissemination, education and training
- User support
- Optimisation and petascaling of the applications
- Procurement guidances and best practises
- Technology assessment and prototyping

Collaboration with academia & industry into PRACE Implementation Phase project

- WP1 Management
- WP2 Evolution of the Research Infrastructure
- WP3 Dissemination and training
- WP4 HPC Ecosystem Relations
- WP5 Industrial User Relations
- WP6 Technical Operation and Evolution of the Distributed Infrastructure
- WP7 Enabling Petascale Applications: Efficient Use of Tier-0 Systems
- WP8 Support for the procurement and commissioning of HPC services
- WP9 Future Technologies



Dissemination and training services

- A major and constant effort in dissemination
 - PRACE website : www.prace-ri.eu
 - Newsletters and an upcoming PRACE magazine
 - Attendance on HPC and IT conferences : SC, ISC, ICT, ...
 - Organisation of the PRACE/DEISA Symposium
 - **SAVE THE DATE : 6-7 April 2011 in Helsinki**
 - Attendance on scientific communities conferences
 - Creation of the PRACE Award in 2009, given during ISC



- A mandatory need for training users
 - Organisation of regular seasonal schools across Europe and upcoming creation of the PRACE Advanced Training Centers
 - Sessions of code porting workshops and tutorial on hpc tools
 - Online Training portal with also dedicated users communities content

Relations with HPC Eco-system

- Let us hear the voice of our users !
 - **Creation of the PRACE Users Forum**
- Promotion of PRACE leadership on HPC at the European and international level
- Identification of Research Infrastructures with globally distributed user base and need for collaboration in accessing extreme computing resources:
 - **list of potential candidates**
 - **analyse their needs**
 - **identify opportunities for concrete collaboration**
- Address synergies with similar HPC infrastructures overseas to promote global sharing of resources.

Application enabling services

- An essential activity in PRACE : **>40% of the workforce**
- Benefits from the expertise of all the PRACE members

Petascaling

- Mixed-mode parallelisation
- Load balancing
- Minimisation of communication overheads
- Parallel I/O
- Checkpointing, ...

Optimisation

- Optimising serial performance
 - CPU
 - Memory
- Optimising both for general-purpose architectures and specialised architectures
- Algorithmic optimisations, ...

- Services addressed by PRACE in a 2 ways vision :
 - By addressing needs of single users in a code by code approach
 - ➔ PRACE Preparatory access calls (6 months)
 - By working in a mid term collaboration with users communities



Enabling Petascale Applications from Communities

- Cooperation with **European scientific communities** providing petascaling expertise to ensure that their key applications codes can effectively exploit Tier-0 systems.
- Focus on the petascaling and optimisation of codes which are of value to a community of researchers.
 - **Unstructured communities**
 - wide group of users active in the same scientific discipline
 - **Structured communities**
 - i.e. IS ENES (meteo-climatology), EFDA (Fusion), ...

Identify Scientific Communities

- engagement with selected scientific communities:
 - **Material Sciences and Life Sciences**
 - **Computational Chemistry**
 - **Astrophysics, Cosmology and Plasma Physics**
 - **Meteo-Climatology and Geophysics**
 - **Engineering and CFD**
- Identify the most challenge HPC codes used by these communities
- Strategies for (peta,exa)scaling and **collaboration in a co design approach through integrated teams**



How to foster relations with industrial users ?

WP5 goals and objectives

- ✓ Establish continuous relations with industrial users of HPC
- ✓ Develop a proposal for a PRACE offer for industry

Amplify the activities of previous PRACE project

- Organisation of 2 industrial seminars in Amsterdam (2008) and Toulouse (2009)
 - Close to 100 attendees/seminar and up to 57 companies from 21 countries
 - Presentation of PRACE and needs from users



Relations with industrial users of HPC

- Establish a permanent link with industrial users
 - Organisation of 2 industrial seminars during the project
 - One in end of March 2011 organised by KTH/SNIC in Stockholm (Sweden)
 - The other around Jan 2012 organised by BSC and CINECA in Italy
 - Participation in the setup of the PRACE user forum
 - Inputs for the PRACE training portal
- Finalise the collect of industry needs and expectations
 - Industrial seminars & dedicated face to face meetings with industrial users
 - Selection of industrial pilots for using the PRACE RI facilities
 - Participate to the refresh of the Scientific Case



Definition of the PRACE industrial offer

- Analysis on existing European infrastructures or existing Tier1 and in USA, Japan and China of HPC usage by industry
 - Business models (pre-competitive and collaborative R&D, commercial activities) and integrated services proposed
 - Impact on security, administration, peer review procedures, ...
- Elaboration of a proposal for a PRACE industrial offer
 - Based on previous analysis
 - Will include industrial needs and feedback of industrial pilots
 - Will need to address legal aspects wrt PRACE RI statuses

PRACE third industrial seminar

- Organised by SNIC/KTH in 28-29 of March '11
- Location : Stockholm (Sweden)
- Expected new audience from EU Northern Countries and Eastern countries
- Focus increased on « HPC for SMEs (or SMBs) »
- Agenda still in preparation – Flyer available for SC'10
 - Presentations of PRACE RI (systems, services, vision, ...)
 - HPC success stories from industrial users
 - Feedback from PRACE industrial pilots ?
 - Parallel sessions
 - Relations with ISVs
 - Training / User Support
 - How to involve SMEs, ...



DRAFT

Conclusions

- PRACE is **the** European HPC Research Infrastructure
- PRACE offers access to leading edge HPC Tier0 (and sooner Tier1 systems) with high value integrated hpc services
- PRACE engaged a strong and essential link with users communities from academia and industry
- Wants to know more about PRACE ?
 - Please ask questions now or
 - Visit our booth (number 4021) at SC'10
 - Or visit our web site : www-prace-ri.eu