PRACE Industrial Program

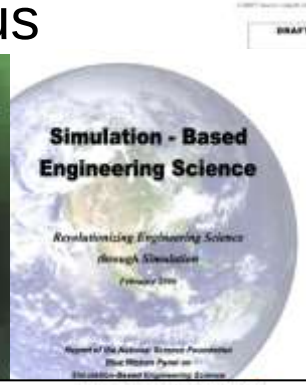
Stéphane REQUENA, CTO GENCI

47th IDC HPC User Forum, Stuttgart - July 9-10, 2012

e-infrastructure

HPC is a «key technology»

- Supercomputers are the tool for solving most challenging problems through simulations
- Access to world class computer capacity is essential for international competiveness in science and engineering
- Providing competitive HPC services is a continuous endeavor
- This has been acknowledged by leading industrial nations



→ **Europe : PRACE**

→ **France : GENCI**

PRACE, The European HPC Infrastructure & ESFRI-list item

- In Operation since April 2010
  - PRACE (AISBL) a legal entity created with 24 European countries with head office in Brussels

  - Tier0 services started in July 1st 2010, now 3 Tier0 systems available

- Funding secured for 2010-2015
  - **530 Million €** from the 4 hosting members as Tier0 services including 70 Million € from EC FP7 preparatory and implementation projects and 60 Millions € from all PRACE members

Evolution of the PRACE capacity

➔ 2012: approx. 14,6 PF Peak Performance

GCS@Juelich
JUGENE : IBM BG/P 1 PF
JUQUEEN : IBM BG/Q

GENCI@TGCC
CURIE : BULL Bullx, 2 PF

CINECA
IBM BG/Q Fermi, 2 PF

GCS@HLRS
Hermit : Cray XE6, 1 PF

GCS@LRZ
SuperMUC : IBM iDataplex, 3 PF

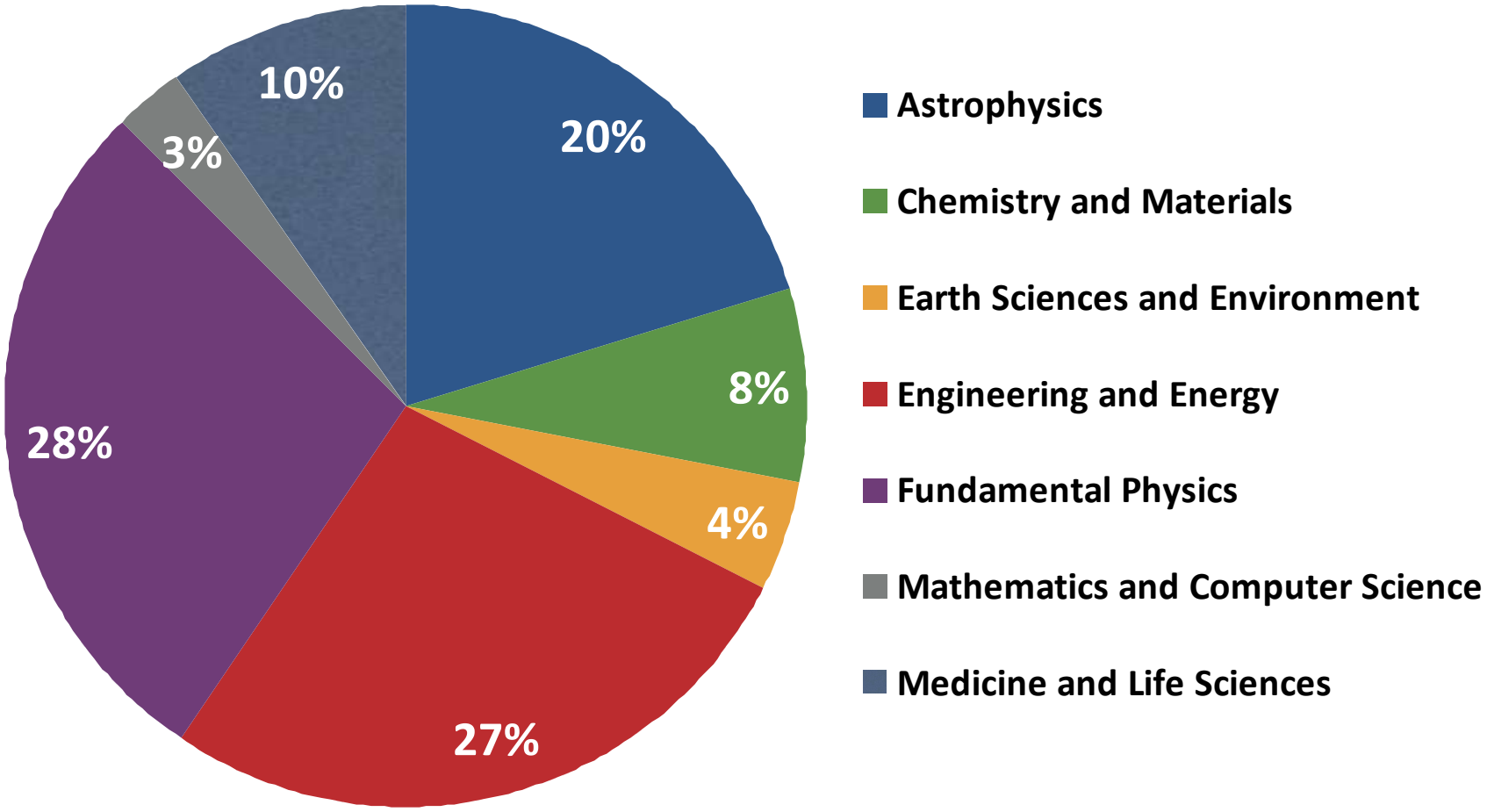
BSC
Marenostrum

Past project access calls for proposals (2 calls/year)

Call	Requested hours (million core hours)	Requested projects	Awarded hours (million core hours)	Awarded projects
Early Access	1870	68	324	10
1st	2900	59	362	9
2nd	1250	47	398	17
3rd	1700	53	721	24
4rd	1927	78	1134	43
TOTAL	**9647**	**305**	**2939**	**103**

Average = around 30 million core hours per proposal !

Distribution of resources



PRACE INDUSTRIAL PROGRAM

PRACE Industrial Program
Organisation of Industrial Seminars

- 4 industrial seminars organised by PRACE
  - Since 2008 : Amsterdam, Toulouse, Stockholm and Bologna (April 2012)
  - A cumulated attendance of more than 400p representing 114 companies
  - Good mix of large companies and SMEs, from various industrial domains

- A known yearly rendez-vous between PRACE and industry
  - Gathering industrial needs and expectations
  - Exchange about PRACE facilities and services for industry
  - In depth discussions during parallel sessions on theme like relations with ISVs and OpenSource, Cloud for HPC, how to engage SMEs, Data Management, …
  - Presentations of success stories of large and small companies
  - Networking between attendees


niceweb
numascale
faurecia
clustervision
dataidentity
Mentor Graphics
PGS
RECOM SERVICES
ST ERICSSON
Tetra Pak
NUMERICAE
Renater
SCIENCES COMPUTERS CONSULTANTS
Dompé
dallara
MOX-OFF
MATHEMATICS FOR INNOVATION
datalynx
IT Services
F1-PLATFORMS
EURODECISION
OPERATIONAL RESEARCH
TOTAL
RIA SOLUTIONS
ArcelorMittal
Ferrari
AIR LIQUIDE
ABB
GM
efield
Sun microsystems
INRIA
AkzoNobel
Tomorrow's Answers Today
AMD
SUPERMICRO
SAAB
EDF
EDS
Turbomeca
SAFRAN Group
BAE SYSTEMS
PORSCHE
EADS
T-Systems
ONERA
MEDIT
ENGIN SOFT
aerospace valley
Rhodia
Chemistry is our world, Responsibility is our way
Cenaero
CAPS
Synective Labs
Vestas
HydrOcean
allinea
SCALE TO NEW HEIGHTS
ROGUE WAVE SOFTWARE
Valeo
MERCK
hp invent
kuava
WIKKI
RENAULT
Samtech
CD-adapc
RENAULT F1 Team
BNP PARIBAS
ANSYS
SKYSOFT
HUTCHINSON WORLDWIDE
Vratis
SOCIETE GENERALE
sanofi aventis
IBERDROLA
L'essentiel c'est la santé.
DLR
BMW
intel
PSA PEUGEOT CITROËN
FFT
FREE FIELD TECHNOLOGIES
Fraunhofer
CHALMERS
DASSAULT AVIATION
SCANIA
PHILIPS
NXP
founded by Philips
PROSPECT
NUMTECH
L'ATMODÉLISATION
EURO/CFD
DASSAULT SYSTEMES
AIRBUS
F1-PLATFORMS
Schlumberger
Zürcher Kantonalbank
PARTEC
CLUSTER COMPETENCE CENTER
CRAY
THE SUPERCOMPUTER COMPANY
NEC
ACUMEN
DISTENE
sgi
HMI
Human Machine Intelligence
nag
Eni
SERVIWARE
Snecma
Groupe SAFRAN
Alcatel-Lucent
concurrent thinking
esi
IBM
BULL

PARTNERSHIP
FOR ADVANCED COMPUTING
IN EUROPE

Kind Invitation to the 5th PRACE Executive Industrial Seminar

- **Stuttgart, Germany**
- **April 15th and 16th, 2013**

PRACE Industrial program

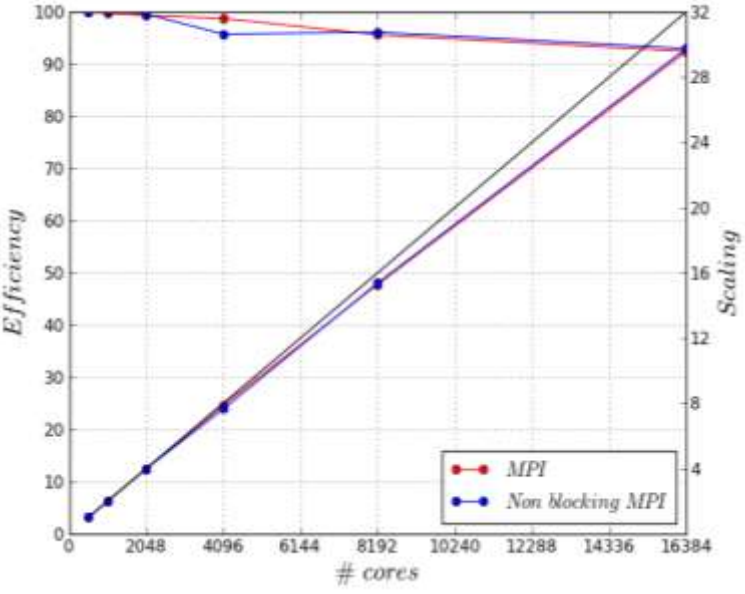
Enrolment of industrial pilots (1/3)

Cenaero

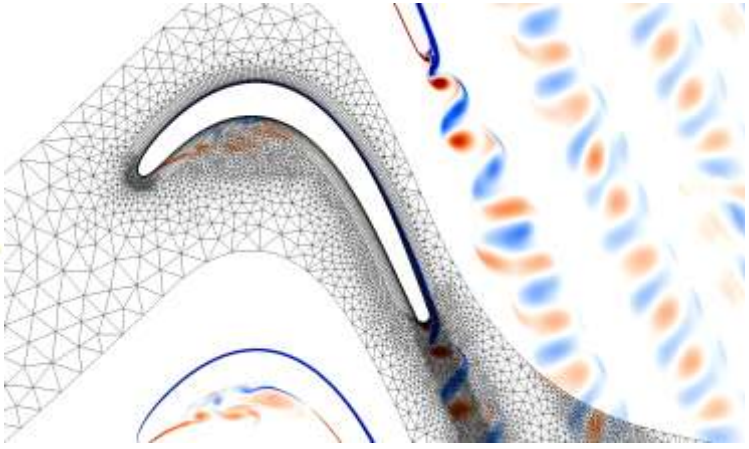
- **CENAERO** : a Belgium public/private R&D centre for CFD studies
  - Argo : in-house code, DNS simulations, used through DECI on BG/P
- noFUDGE : an Open R&D project submitted as pilot to PRACE (end of 2011)
  - Development of high-resolution methods for turbomachinery DNS and LES
  - Transitional flow around SD0073 airfoil & DNS of transition and shedding on a low pressure turbine blade
  - 2 million CPU hours on JUGENE, optimisation and improvement of scalability on up to 16k cores

PRACE Industrial program

Enrolment of industrial pilots (2/3)



Cenaero



PRACE Industrial program

Enrolment of industrial pilots (3/3)

- Audionamix : a French SME dedicated to audio sound processing
  - Participation to the PRACE Autumn School on Advanced Hybrid Computing

- On going pilots
  - ANSYS/Tetrapak : CFD simulations using Fluent on Hermit (GCS@HLRS)
  - Dompé/Univ of Parma : life sciences simulations (molecular docking) on CURIE (GENCI@CEA)
  - Vratis : porting and profiling of their SpeedIT solver on a multiGPU system on CURIE (GENCI@CEA)
  - Thermofluids : CFD and heat transfer simulations on CURIE (GENCI@CEA)

PRACE Tier-0 Calls

Eligibility for PRACE resources

- **Academia**

  Project leader = senior researcher employed in a research organization homed in the EU or a PRACE Association member country. His employment contract with the research organization must be valid to at least 3 months after the end of the allocation period.

- **Open R&D for Industry**

  Commercial companies must have their HQ in Europe or substantial R&D activity located in Europe.

  Commercial companies may apply **on its own**
  (max. 5% total computing resources of a single PRACE system)
  or in collaboration with academia (as principal investigators or collaborators).
  But prior to being awarded access, companies should commit to publish the results obtained in publicly available media.

Only one single selection criteria = scientific excellence

Access is free of charge

PRACE Tier-0 Calls

3 Types of access

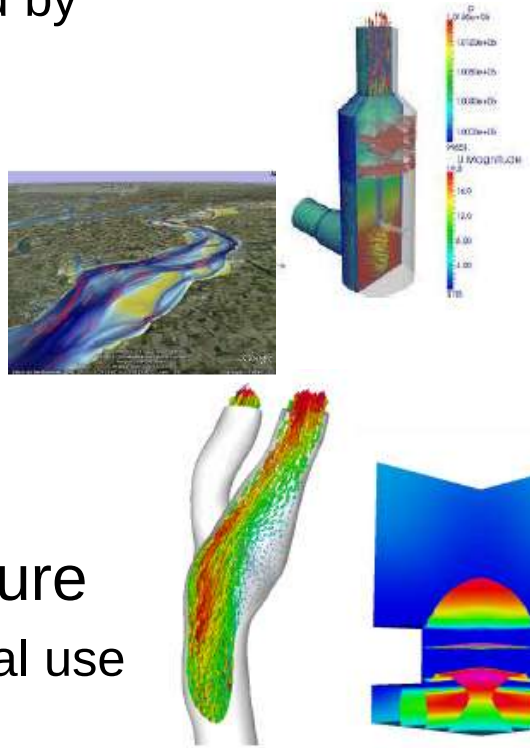
www.prace-ri.eu/Call-Announcements

- **Preparatory Access**
  - Intended for preliminary resource use required to prepare proposals for Project Access
  - From 50 to 200k cpu hours per allocation
  - Technical review only
- **Project Access**
  - Intended for individual researchers and research groups including multi-national research groups
  - One year allocation
  - Technical and Scientific review
- **Program Access (in evaluation)**
  - Available to major European projects or users communities that can benefit from PRACE resources
  - Planned for 2 years allocation

PRACE Industrial program

Petascaling industrial open source applications

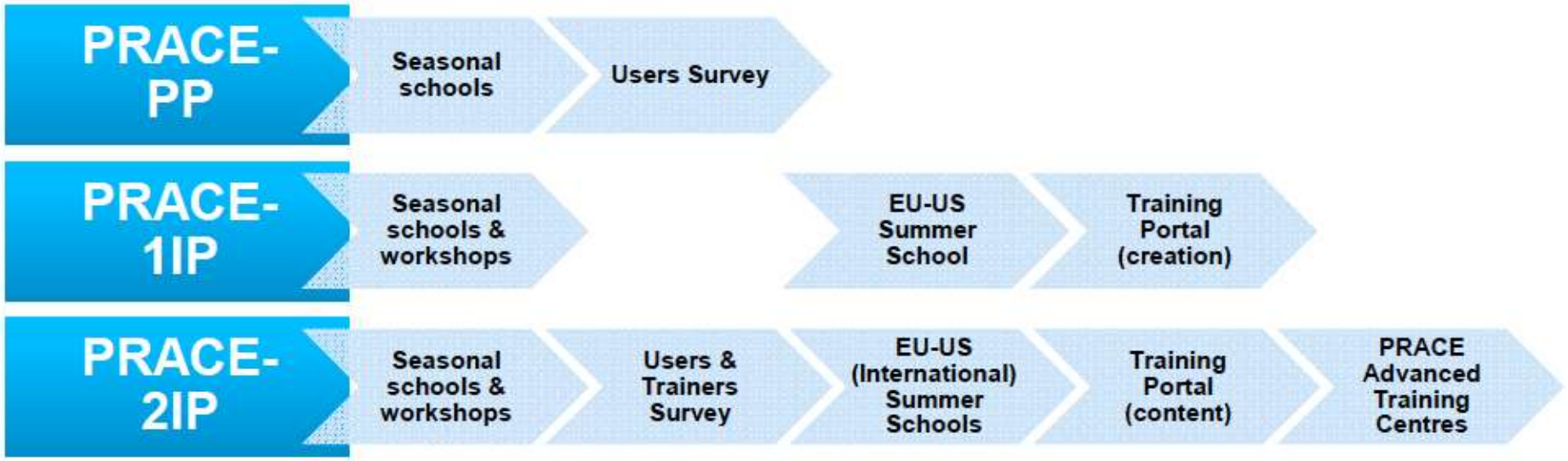
- Petascaling of the most relevant applications
  - based on the interest and commitment expressed by industrial users throught surveys and seminars
- Coverage of different industrial fields
  - Automotive, drug design, mechanics, CFD, …
  - Ongoing activities around :
    - **OpenFOAM** and **Code_Saturne** : CFD
    - **Elmer** : Multiphysics and **Delft3d** : Hydrodynamics
    - **Fembio** : computational biomechanics
- Production runs on the PRACE infrastructure
  - Within the business model developed for industrial use



PRACE Industrial program

Training activities

- PRACE developped a wide offer of training activities
- Industrial users may benefit from these trainings
- Dicussions with ISVs/OpenSource comm. for being involved



PRACE Industrial program

Other activities

- Strengthen relations with ISV
- Support for emerging applications -> foster tech transfer between academia and industry
- Ongoing establishment of a PRACE Industrial Advisory Group

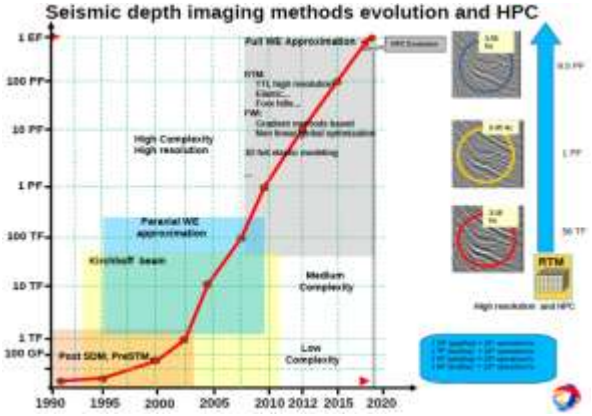
And

- Participation of industrial users to the PRACE Users Forum
- Prototyping and Technological watch
- Best practises on procurements, site installation, …

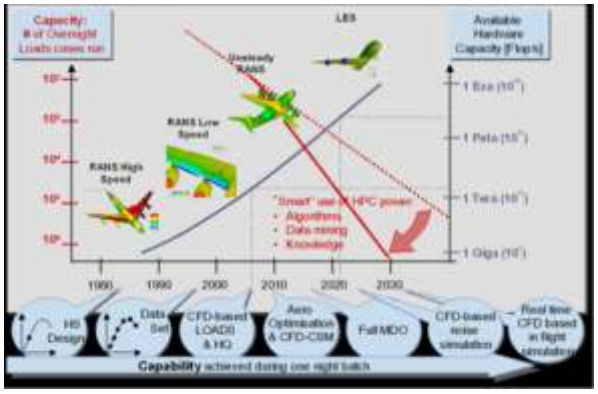
✓ All PRACE results are available on the web

PRACE Industrial program
Some perspectives (1/3)

- A French example: Some companies with a strong HPC roadmap



TOTAL



AIRBUS

- And France has a stong industrial top500 ranking
  - Airbus : #40 with around 300 TFlops
  - EDF : #66 and #131 with around 350 TFlops ➔ >1 PFlops in 2012
  - TOTAL : #112 with 122 TFlops ➔ 2.3 PFlops in 2012
  - …
- But few French SMEs are using HPC (and even numerical simulation)

PRACE Industrial program
Some perspectives (2/3)

HPC usage by SMEs : A not so simple plan

- Most of the SMEs are not aware of « what is HPC and what for »
  - Lack of trained resources/skills in HPC and simulation
  - Lack of knowledge of the ecosystem and tech transfer from academia
    - Who can help me and what tools/methodologies …
  - SME are not talking the HPC and the Cloud jargon
    - Access to rough cycles is NOT the solution
- HPC : a strategic decision for a SME
  - Need of training, new HR, new investments, …
  - ✓ SME need to have a clear view and a ROI demonstration

PRACE Industrial program
Some perspectives (3/3)

In the field of the PRACE-3IP project : proposal for a new initiative for engaging industry and SMEs to HPC

- Based on the outcome of existing national initiatives in UK, Germany, France, Italy, …
- Help industry to demonstrate the potential of HPC for its daily business
- Provide a full set of integrated services from information, training, expertise from PRACE and from science experts, access to HPC resources (Tiers-1 and Tiers-0) and funding opportunities

✓Stay tuned for more news

As a conclusion : PRACE – our mission

- We are a persistent pan-European Research Infrastructure providing leading HPC services
- PRACE services are open to all European scientists and researchers from academia AND INDUSTRY
- We enable world-class science an engineering for academia and industry