



**SEVENTH FRAMEWORK PROGRAMME**  
**Research Infrastructures**

**INFRA-2010-2.3.1 – First Implementation Phase of the European High  
Performance Computing (HPC) service PRACE**



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**PRACE First Implementation Project**

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***Final***

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## References and Applicable Documents

- [1] <http://www.prace-ri.eu/Fourth-PRACE-Executive-Industrial-Seminar>

## List of Acronyms and Abbreviations

AISBL	Association internationale sans but lucrative, International Non for Profit Association under Belgian law, PRACE’s legal form
BSC	Barcelona Supercomputing Center (Spain)
CFD	Computational Fluids Dynamics
CINECA	Consorzio Interuniversitario, the largest Italian computing centre (Italy)
CINES	Centre Informatique National de l’Enseignement Supérieur (represented in PRACE by GENCI, France)
CPU	Central Processing Unit
CSC	Finnish IT Centre for Science (Finland)
CSCS	The Swiss National Supercomputing Centre (represented in PRACE by ETHZ, Switzerland)
DEISA	Distributed European Infrastructure for Supercomputing Applications. EU project by leading national HPC centres.
EC	European Community
EGI	European Grid Infrastructure
EPCC	Edinburg Parallel Computing Centre (represented in PRACE by EPSRC, United Kingdom)
EPSRC	The Engineering and Physical Sciences Research Council (United Kingdom)
ESFRI	European Strategy Forum on Research Infrastructures; created roadmap for pan-European Research Infrastructure.
EU	European Union
FZJ	Forschungszentrum Jülich (Germany)
GCS	Gauss Centre for Supercomputing (Germany)

GENCI	Grand Equipement National de Calcul Intensif (France)
GRNET	The organisation running the Greek Research & Technology Network
HLRS	High Performance Computing Center Stuttgart (HLRS) of the University of Stuttgart, Germany
HPC	High Performance Computing; Computing at a high performance level at any given time; often used synonym with Supercomputing
ICHEC	Irish Centre for High-End Computing
ISV	Independent Software Vendors
KTH	Kungliga Tekniska Högskolan (represented in PRACE by SNIC, Sweden)
MB	Management Board
NCF	Netherlands Computing Facilities (Netherlands)
NCSA-BG -	The National Center for Supercomputing Applications, Bulgaria
NOW	The Netherlands Organisation for Scientific Research
PC	Program Committee
PRACE	Partnership for Advanced Computing in Europe; Project Acronym
SC'11	Supercomputing 2011 conference, held in Seattle in November 2011
SME	Small and Medium Sized Enterprises, also called SMB (Small and Medium Business companies in US)
Tier-0	Denotes the apex of a conceptual pyramid of HPC systems. In this context the Supercomputing Research Infrastructure would host the Tier-0 systems; national or topical HPC centres would constitute Tier-1
UNINETT	A state-owned company responsible for Norway's National Research and Education Network (NREN)
WP3	PRACE First Implementation Phase Work Package 3: "Dissemination, Outreach and Training"
WP5	PRACE First Implementation Phase Work Package 5: "Relations with industrial users"
WP9	PRACE Second Implementation Phase Work Package 9: "Industrial Application Support"





## Executive Summary

The 4th PRACE Industrial Seminar was a milestone event that opened a new chapter in PRACE's industrial relations. The highlight of the event was an announcement of an Open R&D Industrial Access Programme in which companies will be able to access PRACE's resources on par with academic users provided they disclose the results of their projects on completion.

The event also saw the first round of the Open Competition for the Most Innovative HPC Solution in Europe, an award that this time was presented to Xcelerit, a Dublin based company, for its cross-platform parallel software kit that addresses one of the main obstacles to using HPC by smaller companies: the lack of knowledge and resources needed to adopt HPC solutions.

The seminar's programme reflected its objectives and, apart from the announcement of PRACE's industrial offer, it included a number of topics such as successful examples of achieving Return On Investment through HPC, a review of HPC Programmes for SMEs, Technology Transfer and a number of technical topics.

The feedback collected from the event's attendees shows that the seminar was a success. Compared to the previous seminars, the event saw an increase in overall satisfaction levels.

As a next step following the event, PRACE 1st Implementation Phase Work Package 5 will now focus on working closely with SMEs, Engineering companies and Independent Software Providers in order to define a dedicated programme that PRACE could adopt to facilitate the adoption of HPC by SMEs.

The event took place in Bologna over two half-days on 16th and 17th of April 2012. The event attracted a total of 96 attendees, including 67 non-PRACE attendees, and 30 speakers who provided 20 talks and 4 workshops. 30 of the companies attending were SMEs and 21 of them attended such an event for the first time. In total, the four industrial seminars to date have attracted as many as 120 different companies of various business and industrial profiles.

## 1 Objectives of the 4<sup>th</sup> PRACE Industry Seminar

This was the fourth seminar in a series of events targeting HPC industrial users in Europe. The event, held in Bologna on 16th and 17th of April 2012 over two half-days, had two major objectives:

1. To present an Open R&D Industry Access Model – a programme, approved by PRACE AISBL in January 2012, enabling European HPC users to access PRACE's resources and expertise in order to carry out research projects with a disclosure of their final results. The details of this model are included in Chapter 2 below.
2. To provide an overview of the current HPC industrial usage environment and collect information on how PRACE could further facilitate its growth by e.g. establishing a programme supporting the adoption of HPC by SMEs.

Among the other objectives of the seminar were:

- To present the current industrial HPC application environment in Europe and identify the issues such users might expect PRACE to resolve
- To demonstrate how low-level organic approach can lead to successful HPC industrial applications providing European companies with a clearly defined Return On Investment from using HPC
- To enhance the network of PRACE's industrial contacts with a view to continue developing user and support models that will help European HPC industrial users achieve competitive advantage, in particular addressing the needs of smaller companies (SMEs)

## 2 PRACE Open R&D Industry Access Programme

This programme had been prepared based on input gathered during the three previous seminars and through PRACE IIP Work Package 5's relationship with industry. The text below was distributed during the event in order to introduce the Programme as one of the main pillars of PRACE's industrial relations.



PRACE (Partnership for Advanced Computing in Europe, [www.prace-ri.eu](http://www.prace-ri.eu)) the European High-Performance Computing research infrastructure, now allows industrial users to access its resources in order to conduct open research. Industrial organisations can now apply to use PRACE's supercomputers and expertise according to the same rules as academic users within the *PRACE Peer Review Process*. The results of projects that involve industrial organisations must remain open – i.e. they must be made available publicly on project completion.

There are two types of accesses to the PRACE computing systems:

- Preparatory access:

- Managed through rolling calls, opened all year round. There are no closing dates. Technical evaluations organised every three months at defined cut-off dates.
- Meant to allow researchers to optimise and test application codes before applying to the regular Project access type of calls.
- Grant duration from two to six months.
- Project access:
  - Regular calls for Project access every six months, e.g. the next one will open in May and will stay open until the end of June.
  - Resources usually granted for a one-year period; however, multi-year access will be provided on a trial basis.

Every company with its head office or substantial R&D activity in Europe is eligible. Access is awarded solely for research purposes, and companies must commit to publishing the results before being awarded access.

Commercial companies may apply on their own or in collaboration with academia (as principal investigators or collaborators). In the former case, access is limited to a maximum of 5% of the total computing resources of a single PRACE system, subject to the approval of the boundaries imposed by state-aid regulations. In the latter case, there is no limitation. In both cases, access is free of charge.

Preparatory Access is awarded upon technical evaluation by the computing centre that hosts the targeted machine.

Project Access is awarded through an independent peer-review process, with scientific excellence being the only criteria.

Companies can apply through the PRACE Website at: <https://prace-peer-review.cines.fr/>. For information about the **PRACE Peer Review Process** and any current calls please follow this link: <http://www.prace-ri.eu/ or directly contact peer-review@prace-ri.eu>.

If you have any query about this process please contact the PRACE Industrial Seminar team at: [is2012-info@prace-ri.eu](mailto:is2012-info@prace-ri.eu)

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### 3 Open Competition for the Most Innovative HPC Application in Europe

The objective of this contest, held together with the seminar, was to award the boldest industrial HPC application in Europe, changing the present paradigms of European industry. This competition was open to all fields of HPC. The conditions were as follows:

- It is not necessary to take part in the seminar in order to participate in the Competition
- The solution must pertain to industry, i.e. it must be possible to apply it in an industrial context with clear benefits – there must be a market potential for that kind of solution
- The solutions must represent some level of implementation maturity – we are not looking just for ideas but rather for working solutions, although we will also accept those in early implementation stages

The applicants were required to provide up to three pages description of the solution submitted together with current results and some further interesting applications. There was an application form available at registration to facilitate this process with the following paragraphs:

- Who applies? – Brief introduction of the company together with a contact person
- What is it? – Functional description, application field and market potential; how does it work? – The technological process involved, the uniqueness of the selected solution
- Why has HPC been chosen as the technological vehicle and how has it been implemented?

- What are the benefits to the industrial user in terms of competitive advantage?

Award criteria:

- Novelty and originality
- Clear benefit for industry
- Maturity and market perspectives

Prize: Free entry to the next International Supercomputing Conference 2012 (Hamburg, June 17-21, 2012) and a free featured article in the next PRACE Digest.

The award was approved by a Jury with the following members:

The team of Work Package 5/Work Package 9 of PRACE- 1IP and a representative of PRACE Scientific Steering Committee.

The selection of a winner followed the process below:

1. Collect applications and all data necessary prior to the seminar (during registration) – application deadline = 16th March 2012
2. Have the jury make a decision prior to the seminar
3. Invite the winner to the seminar (if they are not coming anyway)
4. Announce the result at seminar end and award the prize

### 3.1 The winning solution

The competition had been entered by five companies:

- Danielson Engineering (France)
- OPTIMAD engineering srl (Italy)
- Vratiss (Poland)
- LAPCOS srl (Italy)
- Xcelerit (Ireland)

Four of these companies were ISV (Independent Service Vendors) : OPTIMAD, Vratiss, LAPCOS and Xcelerit and one (Danielson Engineering) was an end user company.

Following a vote by the members of the Seminar Programme Committee and two members of PRACE's Scientific Steering Committee, the award was presented to Xcelerit for a project called Xcelerit SDK.

The Xcelerit SDK is a software toolkit to boost the performance of compute-intensive applications while preserving programmers productivity. From a simple sequential source code – free from any parallel constructs, low-level compiler directives, etc. – the Xcelerit SDK can generate highly optimised code for a variety of target processors. These include multi-core CPUs, GPUs, and combinations of these in a grid. The programming interface is intuitive and suitable for many classes of algorithms, e.g. Monte-Carlo, N-body, signal processing, linear algebra, or spectral analysis. The Xcelerit SDK is targeted at domain specialists using heavy computations in their day-to-day work, such as mathematicians, researchers, engineers, or scientists. Users can focus on the core of their algorithm, rather than addressing parallelism and low-level hardware details, and yet they can generate high performance programs. More details available here: <http://www.xcelerit.com/xcelerit-sdk/>.

At the Seminar, the award was presented by PRACE AISBL Director Dr Maria Ramalho and PRACE Scientific Steering Committee's Chairman Prof. Richard Kenway.



**Figure 1 Mr Hicham Lahlou, Xcelerit CEO and co-Founder receives the Award from Richard Kenway, PRACE Scientific Steering Committee**

According to PRACE, Xcelerit's solution addresses the key obstacles to adopting HPC by businesses as identified in a number of studies, including PRACE's own report 'The Requirements of Industrial Users'. Among these obstacles are: a lack of knowledge about HPC, the cost of adopting and maintaining new technologies and lack of easy-to-use application tools.

The learning curve for developing HPC applications is steep and companies that recognise the potential of using HPC usually face the challenge of having to pay expensive software licences, the fees of engineering or consultancy companies, or having to hire specialised, hard-to-find staff in order to develop on-site products. The Xcelerit software development kit addresses this problem by providing a framework that enables engineers with no knowledge of parallel computing to produce results, taking advantage of HPC machines. The solution presented by Xcelerit will thus help to broaden the use of HPC within European industry.

## **4 The Seminar Organisation Process**

The seminar was organised by a Programme Committee consisting of members of Work Package 5 within PRACE Project 1st Implementation Phase.

### **4.1 Programme Committee**

The team were:

Carlos Merida – BSC/Spain

Cinzia Zannoni – CINECA/Italy

Dominik Ulmer – CSCS/Switzerland

Eoin Brazil – ICHEC/Ireland  
Georgi Prangov - NCSA-BG MTITC/Bulgaria  
Jacko Koster –UNINETT/Norway  
Lennart Johnsson –KTH/Sweden  
Lilit Axner - KTH/Sweden  
Marc Parsons - EPCC/UK  
Marcin Ostasz – BSC/Spain  
Nicolas Mignerey – GENCI/France  
Paul Graham - EPCC/UK  
Pedro Alberto– The University of Coimbra TEOR/Portugal  
Sjoerd Meihuizen – NOW/Holland  
Stefan Wesner - HLRS/Germany  
Stephane Requena - GENCI/France  
Thomas Boenisch – HLRS/Germany

Through the preparation phase (September 2011 – April 2012), the team held regular conference calls. There was also a site visit to the location of the seminar that took place in October 2011 and involved Cinzia Zannoni and Marcin Ostasz. During that visit the final location of the event was selected (Hotel I Portici in Bologna).

#### 4.1 The Seminar Preparation Process

The following steps were completed:

- The date of the seminar had been agreed by the team by the end of September 2011
- ‘Save The Date’ document was issued in early October 2011. It was distributed at the Supercomputing Conference in Seattle (Oct 2012) and subsequently it was sent to all contacts from the previous seminars
- A list of potential attendees was agreed on (using the attendance lists from the previous seminars)
- A dedicated website was prepared including an on-line registration form
- A discussion on the seminar programme was initiated – this was in process until the end of the seminar preparations
- An invitation letter signed by PRACE Director was prepared and it was sent by each country’s representative to their selected contacts
- Companies and organisations interested in the seminar responded to a designated email address: IS2012 - PRACE WP5 (Industrial Seminar) ([is2012-info@prace-ri.eu](mailto:is2012-info@prace-ri.eu))
- The team (each country’s representative) provided a registration password that allowed interested parties to sign up using a the PRACE website

##### 4.1.1 Seminar date

Due to a clash with another event (a joint event of EGI and PRACE) the original date in March 2012 was changed and the seminar was held on 16<sup>th</sup> and 17<sup>th</sup> April (two half-days).



## 4.1.2 'Save The Date' flyer



## Fourth PRACE Executive Industrial Seminar

Bologna, Italy, 16-17 April 2012

This seminar is designed for strategic decision makers (CIOs, CTOs and R&D Directors) responsible for the design, deployment and operation of computing and data management infrastructures or using them to drive innovation in their enterprises.

The main objective of the seminar is to show how High-Performance Computing (HPC) and its continuous evolution can enhance European industrial competitiveness, the innovation capabilities it brings to industry and how PRACE can facilitate effective use and development of HPC in Europe.

The programme will focus on successful applications of HPC technologies across a wide spectrum of industries, the pilot usage of PRACE resources in industrial projects and the trends in the evolution of HPC technology. Speakers will include specialists from leading innovative European companies, HPC experts from academia, as well as representatives of PRACE and the European Commission.

A special emphasis will be placed on how PRACE can facilitate the acquisition of HPC expertise by European industry. In particular, the seminar will endeavour to identify and eliminate barriers to accessing PRACE's expertise by SMEs.



## Bringing HPC closer to industry

is2012-info@prace-ri.eu





### PRACE

PRACE (Partnership for Advanced Computing in Europe) Research Infrastructure ([www.prace-ri.eu](http://www.prace-ri.eu)) is a pan-European non-profit association with a mission to increase European competitiveness in research and industry by means of High-Performance Computing. It provides world-class computing and data management resources to public and private research and development. The organisation operates an extensive education and training programme in the form of seasonal schools, workshops and scientific and industrial seminars throughout Europe.

PRACE is funded by European governments and it also receives funding from the European Community's Seventh Framework Programme. PRACE current members are Austria, Bulgaria, Cyprus, Czech Republic, Finland, France, Germany, Greece, Hungary, Ireland, Italy, The Netherlands, Norway, Poland, Portugal, Serbia, Spain, Sweden, Switzerland, Turkey and the UK.

**PRACE is committed to enabling European industry to access a world class research computing environment.**

### PRACE Seminars

PRACE Industry Seminars target organisations engaged or intending to engage in European HPC. They provide an opportunity not only to learn about how PRACE resources, expertise, education and training can contribute to business success, but also to share knowledge with other European HPC players.

The 2012 PRACE Industry Seminar will take place in Bologna following the success of the previous Industry Seminars held in Amsterdam in 2008, in Toulouse in 2009 and in Stockholm 2011. To date, the seminars have attracted nearly 300 attendees from 22 different countries and representing 94 companies.

### Fourth PRACE Executive Industrial Seminar - Bologna, Italy, 16-17 April 2012

The seminar programme will focus on the following concepts:

#### Competitive Advantage

- How successful companies achieve 'return on investment' on HPC as a part of their competitive innovation strategy
- A virtual tour of a HPC solution implementation process
- Parallel Sessions focusing on HPC application in different sectors

#### The provision of HPC resources to industry

- HPC as a Service
- Cloud as HPC infrastructure
- Examples of HPC Programmes for industry

#### Small and Medium-sized Enterprises

- Access to expertise on smaller-scale HPC services
- Research infrastructure programmes targeting SME

#### Innovation

- New ideas for HPC usage in industry
- An award for Europe's most innovative HPC application

#### Cooperation with PRACE

- How Industry can access PRACE's knowledge and infrastructural resources
- PRACE Industrial Pilot Projects and what critical issues have been resolved through them
- Open discussion on barriers to the provision of industrial access to PRACE and ways to improve it
- Technological trends assessed by PRACE through its Technology Watch activity

#### Why should you participate?

The engagement of enterprises is essential to PRACE in designing programmes aimed at leveraging European industrial competitiveness. During the seminar, you will be able to:

*Obtain expertise - Learn how Europeans use HPC in order to provide world-class products and services*

*Influence PRACE plans - Voice your requirements and address potential barriers in relation to using PRACE resources and services*

*Exchange contacts, ideas, and experiences on HPC usage with companies from different sectors and of various sizes*

**For more details on this event or on how to engage with PRACE to improve your company's competitiveness, contact us at: [is2012-info@prace-ri.eu](mailto:is2012-info@prace-ri.eu)**




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Design optimization of a motorbike fork

© 2010, DOMIFE s.p.a. All rights reserved  
Molecular docking simulation showing the active site of the human enzyme HDAC7 with the TSA inhibitor.

[www.prace-ri.eu](http://www.prace-ri.eu)





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Figure 2 'Save The Date' document



## 4.1.3 Initial invitation letter

Figure 3 – 1<sup>st</sup> Invitation letter sent to attendees

## 5 Seminar location

Hotel 'I Portici' (<http://www.iporticihotel.com>) situated in the heart of Bologna City Centre had been selected to host the event. Bologna is a major industrial and academic centre on a European scale. It has good connections with all major European traffic hubs by rail, road or air. The hotel was chosen due to its convenient location in city centre, on one of the main streets, near the bus and railway station. It is a modern facility with a number of conference rooms, offering accommodation at a reasonable price. It is located within a 5 minutes' walk from the railway station which has a bus connection with Bologna Airport (journey time is 20 minutes). The social event that concluded the first day of the event took place within a 15 minutes' walk to the old town of Bologna. It included a guided tour through the old town and a dinner that provided an opportunity for networking among the participants.



Figure 4 – Hotel I Portici – the event location in the heart of Bologna



Figure 5 The main conference room during the event



## 6 Seminar website

The main PRACE website [1] provided a facility for communicating and collecting information related to the event and the competition. Prior to the event, it contained all information needed to facilitate participation such as information on the location, a programme draft, a registration form, information on the competition (Chapter 3) and other updates. The PRACE website was also used to advertise the event and the competition e.g. through a dedicated banner. After the event, all presentations and abstracts available were posted onto the same website.

**4TH PRACE EXECUTIVE INDUSTRIAL SEMINAR**  
**HPC driving innovation in Europe**  
 Tuesday 22 November 2011

**SAVE THE DATE!**  
 April 16-17 2012, I Portici Hotel, Bologna, Italy  
*A seminar designed for strategic decision makers (CIOs, CTOs and R&D Directors) responsible for computing and data management infrastructures*

Taking place close to the oldest European university, University of Bologna (founded in 1088), the 4th PRACE Industrial Seminar will demonstrate how High-Performance Computing (HPC) can enhance European industrial competitiveness by enhancing its innovation capabilities.

During two half-days in the heart of the medieval city of Bologna, the event will provide answers to two questions:

- How successful applications of HPC technologies in various industries can help achieve industrial leadership in either innovation or large-scale data modeling
- How PRACE, as the pan-European HPC research infrastructure, can help European industry apply novel HPC-based solutions by providing access to PRACE resources and knowledge

Speakers will include specialists from leading innovative European companies, HPC experts from academia, as well as representatives of PRACE and the European Commission.

A special emphasis will be placed on how PRACE can facilitate effective use and development of HPC in Europe with strong focus on the acquisition of HPC expertise by European industry. The seminar will endeavour to identify and eliminate barriers to accessing PRACE's expertise by SMEs.

In particular, this event will provide an opportunity to present the new industrial offer of PRACE. The offer is designed for large companies as well as SMEs to foster the acquisition of HPC expertise and allow such European companies with substantial R&D activity in Europe to access PRACE HPC resources within the existing PRACE peer-review process based on scientific excellence.

The Bologna seminar builds on the success of the previous Industry Seminars held in Amsterdam in 2008, in Toulouse in 2009 and in Stockholm 2011. To date, the seminars have attracted nearly 300 attendees from 22 various countries and representing 94 companies.

For the first time ever, during this seminar, PRACE will award Europe's most innovative HPC application. This competition is open to all organisations (not only seminar participants). [Click here for more details.](#)

**Program:** [Download here](#)

**Flyer:** [Download here](#)

**Registration:** Participation in the seminar is by invitation only. If you have not been invited and are interested in taking part in the event, please send an email to our Seminar Organisation Team at [is2012-info@prace-ri.eu](mailto:is2012-info@prace-ri.eu). If you have already been sent a password required for registration, please proceed to fill in [this form](#).

**June 17, 2012**  
**PRACE Day**

- Call announcements
- PRACE Press releases
- PRACE Newsletters
- Job vacancies

**PRACE Open Competition**  
 Most Innovative European Industrial HPC Application  
 4th PRACE Industrial Seminar April 16-17, 2012, Bologna, Italy

**PRACE Spring School**  
 School for Developers of Petascale Applications

**FOURTH PRACE EXECUTIVE INDUSTRIAL SEMINAR**  
 HPC driving innovation in Europe  
 April 16-17, 2012 Bologna, Italy

**PRACE News**

- FERMI ready for launch in PRACE 6 March 2012
- CURIE Grand Opening on March 1st, 2012 15 February 2012
- EU-U.S. Summer School 3 February 2012
- The Most Innovative Industrial HPC Application in Europe 2 February 2012
- PRACE to establish six advanced HPC training centres 2 February 2012

Figure 6 - PRACE website announcing the seminar

## **7 Seminar Programme**

This final version of the seminar programme was available to all attendees two weeks prior to the seminar (2<sup>nd</sup> April 2012). All drafts of the programme were posted onto the seminar's website from as early as December 2011. A well-advanced skeleton of the programme was available in early January 2012.

# HPC driving innovation in Europe

4<sup>th</sup> PRACE Industrial Seminar – Bologna, 16-17 April 2012 - **PROGRAMME**

DAY 1		
TIME	TOPIC	SPEAKER
12:00 – 13:30	Registration & Welcome Buffet	
13:30	Seminar Opening	
14:00	Official Opening	<b>Sanzio Bassini</b> HPC Director, CINECA, Bologna, Italy
14:15	Welcome Message	<b>Paolo Bonaretti</b> General Director, Aster
14:30	The European Commission	<b>Thomas Reibe</b> The European Commission
14:45	PRACE and Industry	<b>Prof. Thomas Lippert</b> PRACE
PRACE driving industrial innovation in European industry		
15:00	PRACE Open R&D Model <i>What is it? How to use it?</i>	<b>Dr Maria Ramalho</b> PRACE Director
15:15	ETP4HPC – European Technology Platform	<b>Jean-François Lavignon, Hugo Falter, Giampietro Tecchiolli</b> ETP4HPC
15:40	PRACE Industrial Pilot Projects: CENAERO	<b>Dr Koen Hillewaert</b> Scientific Expert, CENAERO
16:00	Coffee Break	
Success Stories: Return on Investment from innovation using HPC – Part 1		
16:30	Success Story - The impact of HPC on business	<b>Sergio Zazzera</b> ENI, Italy
16:50	Success Story - Pharmaceutical	<b>Andrea Beccari</b> Dompe, Italy
17:05	Success Story - Automotive	<b>Erik Lönroth</b> Scania, Sweden
Parallel Sessions – Part 1		
17:20	<b>HPC for SMEs</b> <b>Moderator: Dr Eoin Brasil, PRACE</b> <u>Plenary Room</u> 1 - Mark Parsons, EPCC, Scotland – <i>Supercomputing Scotland</i> 2 - Stéphane Requena, GENCI – <i>French HPC Programmes for SMEs</i> 3 – Rui Da Silva, Danielson Engineering, France	<b>From Academia to Industry</b> <b>Moderator: Dr Thomas Boenisch, PRACE</b> <u>Garden Room</u> 1 - Prof. Claudio Tebaldi, Bocconi University, Italy <i>High Performance computing in Financial Risk management</i> 2 - Mark Westwood, Petroleum Geo-Services 3 - Dr.-Ing. Risio Benedetto, President, RECOM Services GmbH,
18:30	End of DAY 1	
19:00	Social Event – Guided Tour from <i>I Portici</i> to <i>Corte Isolani</i>	
20:30	Social Event – Aperitive in <i>Corte isolani</i>	
21:00	Seminar Dinner – <i>La Capriata (Corte Isolani)</i>	

DAY 2		
TIME	TOPIC	SPEAKER
08:00	Welcome Coffee	
Success Stories: Return on Investment from innovation using HPC – Part 2		
08:30	Success Story	<b>Bert Jagers</b> Deltares, Holland
08:50	Success Story	<b>Michael Olsson</b> Tetra Pak, Sweden
09:10	Success Story	<b>Erwan Jacquin</b> Hydrocean, France
09:30	Success Stories from Another Region: <i>Korean Grand Plan for Industrial Supercomputing</i>	<b>Sang Min Lee</b> KISTI Supercomputing Center, Korea
HPC in a business environment		
10:00	Barriers to the introduction of simulation methods and HPC Technologies in SMEs	<b>Prof. Stefano Odorizzi</b> EnginSoft, Italy
10:15	<i>Virtual Tour</i> – The process of implementing HPC in a business environment	<b>Erik Lönroth</b> Scania, Sweden
10:30	Coffee Break	
Parallel Sessions – Part 2		
11:00	<b><i>HPC Service as a Cloud</i></b> <b>Moderator: Dominik Ulmer</b> , PRACE <u>Garden Room</u> 1 - Christian Mezzanotte, Datalynx AG, Switzerland - <i>Hands-on: cluster automation with AWS</i> 2 – Dr Axel Berg, SARA, Holland - <i>Dutch HPC Cloud: flexible HPC for high productivity in science and business</i>	<b><i>PRACE Technology Watch Prototypes &amp; Software enabling</i></b> <b>Moderator: Mark Parsons</b> , PRACE <u>Plenary Room</u> 1 - Jonathan Follows – <i>Technology Watch</i> 2 - Torsten Wilde- <i>Prototypes</i> 3 - Paul Graham – <i>Progress in software enabling</i>
CLOSING		
12:00	WRAP UP OF PARELLEL SESSIONS AND SEMINAR <b>Stéphane Requena, Mark Parsons, Dominik Ulmer, Georgi Prangov</b> (all PRACE)	
12:30	What is coming next? Chaired by Dr Maria Ramalho, PRACE Director	
12:40	Industrial Advisory Committee PRACE 3 <sup>rd</sup> Implementation Phase	<b>Dr Cinzia Zannoni</b> PRACE
12:55	Presentation of Award for the Most Innovative European HPC Application	<b>Prof. Richard Kenway</b> PRACE - Scientific Steering Committee
13:05	Announcement of Next Seminar	<b>Dr Thomas Boenisch</b> HLRS, Stuttgart
13:15	Closing Message	<b>Dr Maria Ramalho</b> PRACE Director
13:30	Lunch and End of Seminar	

Please help us improve our work. Please fill in a seminar feedback form at:

<https://www.surveymonkey.com/s/H9SY28W>

The Annex includes abstracts of the talks given during the event (some speakers refused to allow their presentations or abstracts to be published). The event's success was maximised by providing an attractive mix of topics targeting industrial HPC users interested in collaboration with PRACE. The programme items fall into the following categories:

- Success Stories from larger companies, SMEs and ISVs – showing the most interesting examples of how HPC changes the current paradigms of industrial innovation
- Presentation of PRACE's collaboration models, resources and expertise
- Projects whose success is owed to industrial collaboration with PRACE
- Parallel Sessions targeting specific questions such as HPC for SMEs, Technology Transfer between Academia and Industry, HPC as a Cloud, and PRACE Technology Watch

The seminar was also an opportunity for networking between PRACE members and industrial organisations (there was a dinner organised after the end of Day 1).

## **8 Material distributed to attendees**

The attendees received a conference folder with a PRACE brochure, the programme, presentation abstracts, information on Bologna and an USB key with selected presentations, abstracts, the biographies of the seminar programme committee and a description of the Open R&D Industrial Access Programme.

Following the seminar all presentations, their abstracts and other related information available to the attendees was posted onto the PRACE Website (c.f. Chapter 6).

## **9 Seminar proceedings**

Due to the convenient lay-out of the venue, the event provided an opportunity for networking during the breaks and parallel sessions, apart from delivering key messages during the plenary sessions. The event did not experience any major delays or other issues which would decrease its quality.



**Figure 7 Dr Cinzia Zannoni of CINECA opening the seminar – with the logos of the companies attending in the background.**



**Figure 8 Dr Maria Ramalho, PRACE Director, presenting the principles of the PRACE Open R&D Industrial Access Programme**



## 10 Attendance

The seminar attracted 96 attendees from 15 countries. The event took place over two half-days and it included 20 talks, 4 workshops and a networking event, with the involvement of 30 speakers.

67 of the attendees (70%) represented industrial or research/academic organisations not affiliated with PRACE. The graph below illustrates the countries of the attendees.

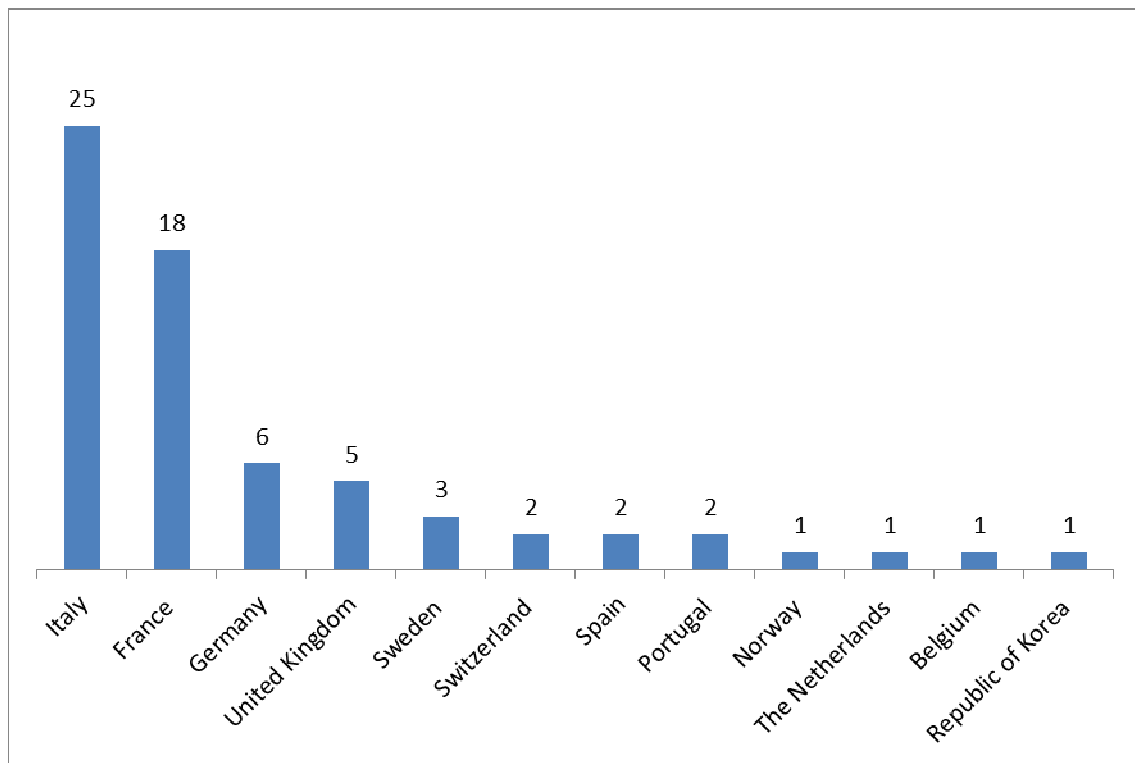


Figure 9 The country of origin distribution of the non-PRACE attendees

Most of the industrial HPC users who attended the seminar were Engineering companies, followed by Research/Academic organisations (e.g. spin-offs), and IT companies (excluding vendors):

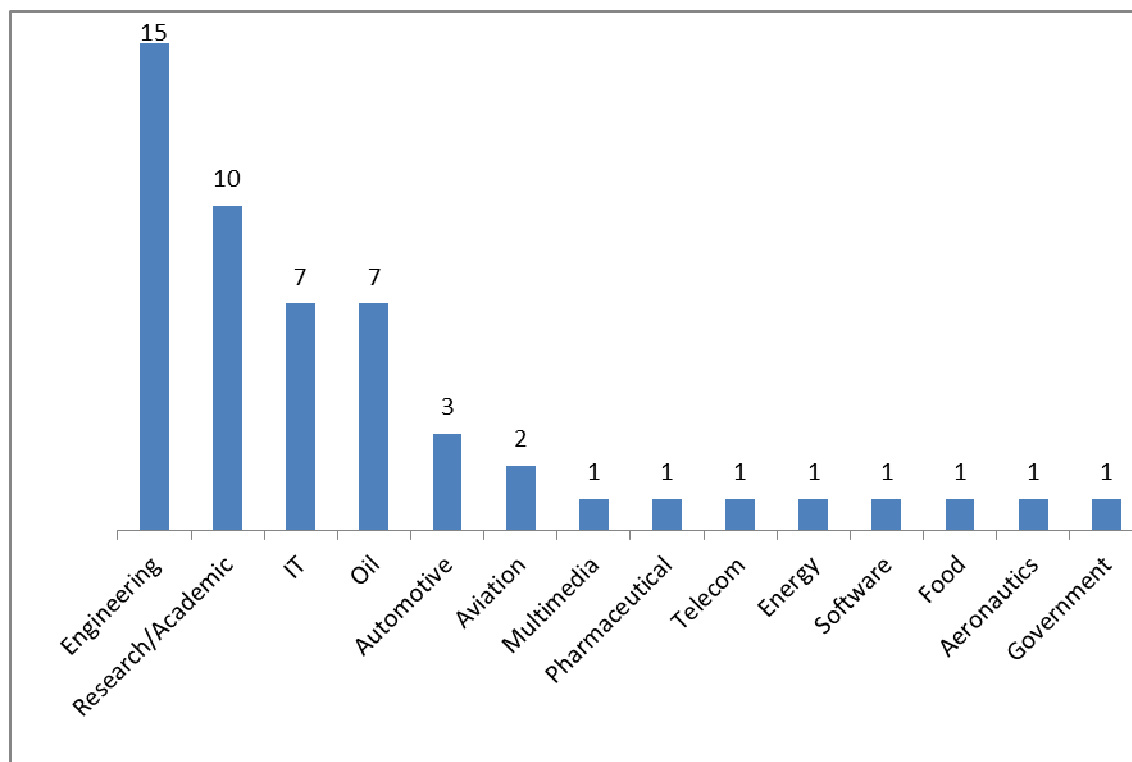


Figure 10 The industrial profiles of the attendees

The event attracted 46 companies, out of which 30 were SMEs and 16 were corporate organisations. The graph below the evolution of attendee profiles over the four industrial seminars.

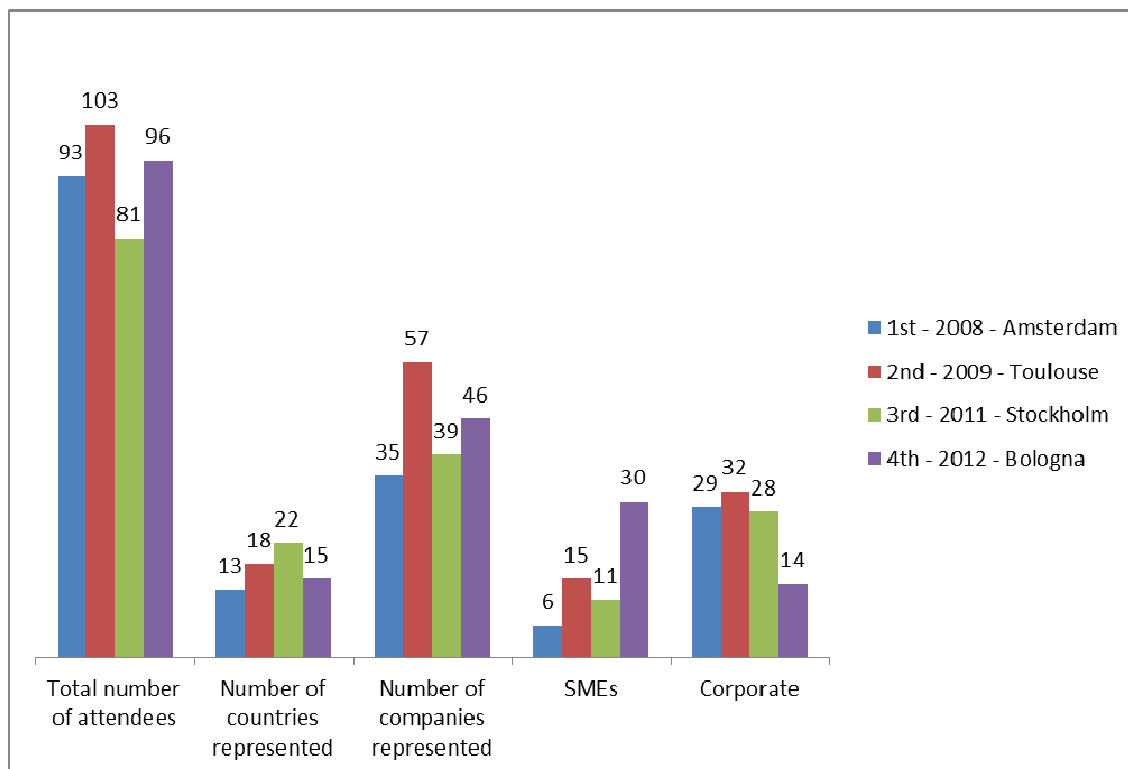


Figure 11 The evolution of attendee profiles at the four industrial seminars

Most of the attendees (73%) attended such an event for the first time, including 21 SMEs.

Compared with the previous seminars (in particular with the last one held in Sweden), the fourth seminar has been able to attract a larger number of new companies, with an increased presence of SMEs. In total, the four industrial seminars organised by PRACE to date have attracted almost 120 different companies representing a wide range industrial sectors and company profiles.

## 11 Feedback from attendees

The seminar team had prepared an evaluation form available on the internet at the following address:

<https://www.surveymonkey.com/s/H9SY28W>

A request to complete this form was sent to the 67 non-PRACE attendees and 29 (43.3% of the total) responses were received.

In overall, the attendees' feedback is **overwhelmingly positive** with 69.2% of them stating that the event was 'Productive' and 30.8% stating that it was 'Very productive'. There are no negative responses. In this way, 100% of the attendees rated the event as either 'Productive' or 'Very productive', which is an improvement on the previous event (a corresponding value at the previous seminar was 90%).

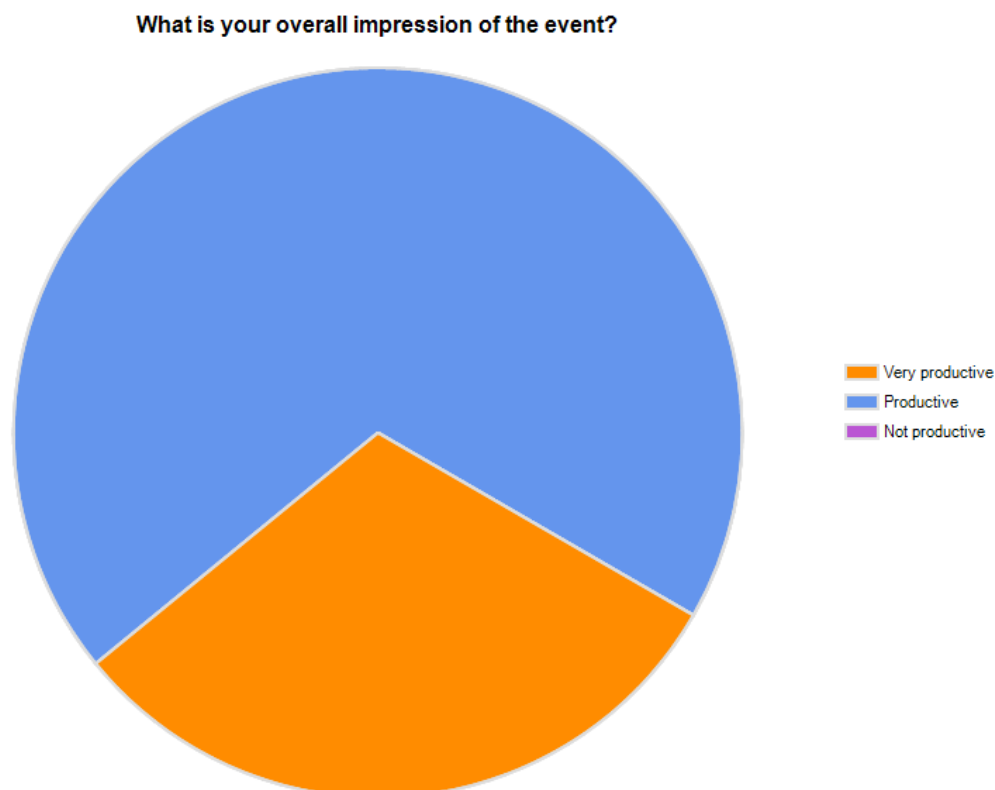
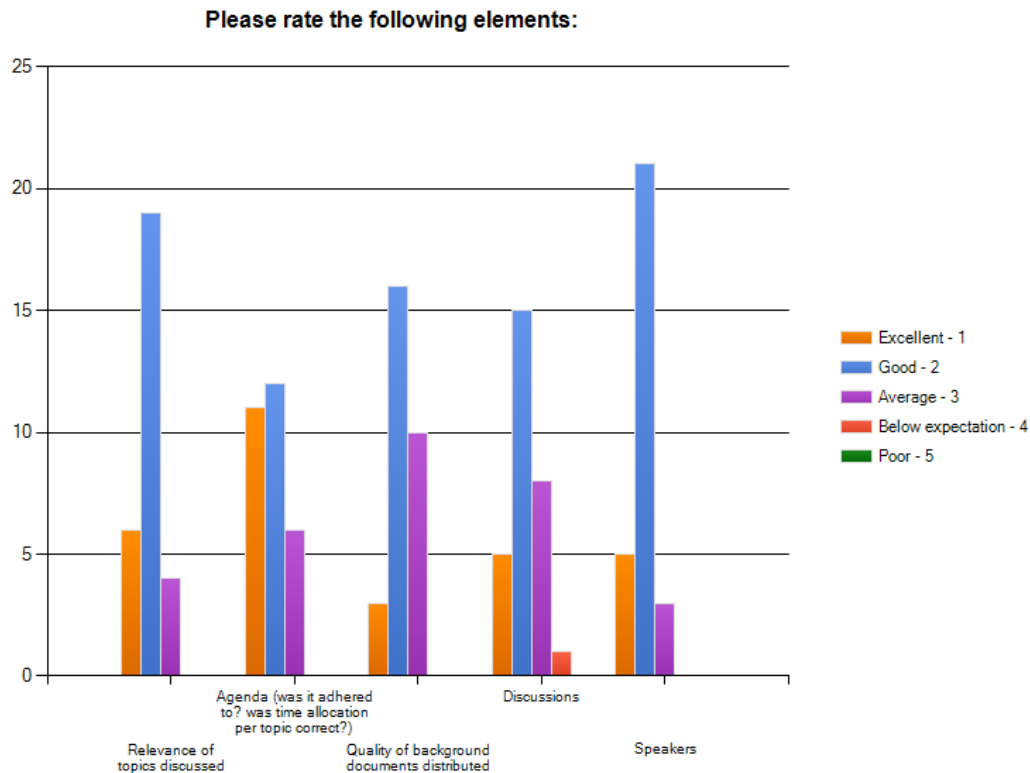


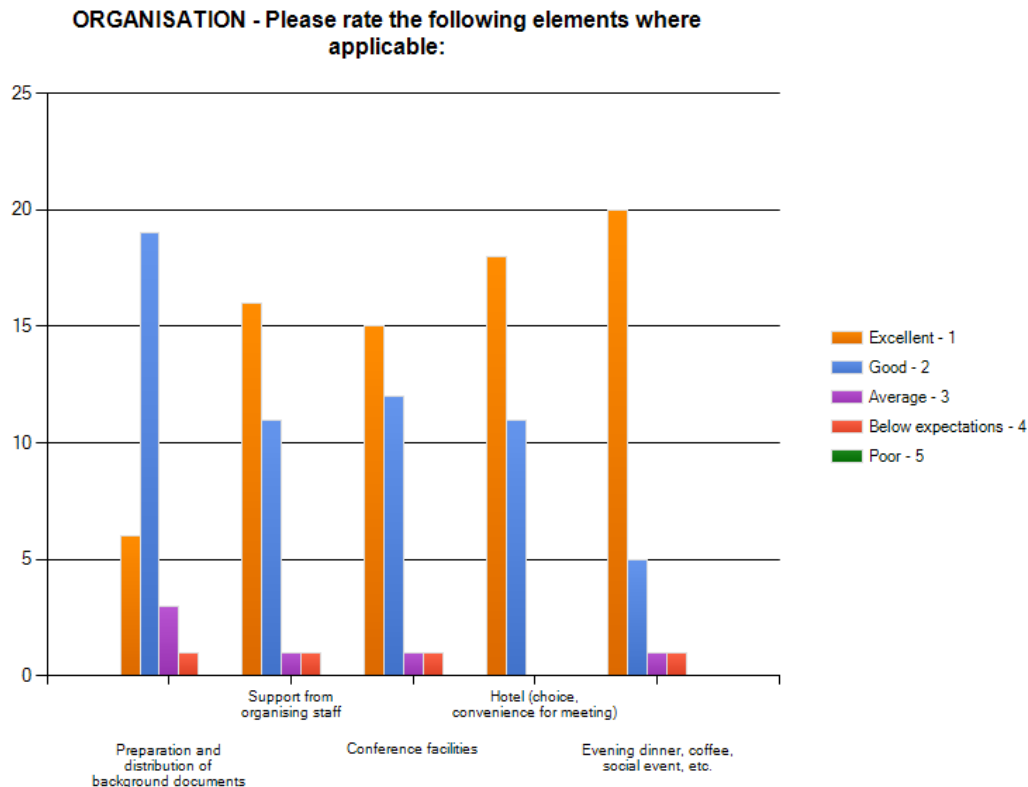
Figure 12 'What is your overall impression of the event?' - answers

Most respondents rate the various components of the event as 'Good'. The seminar programme and agenda has received the highest proportion of 'Excellent' answers (37.9%). According to one participant, the contents of the Discussions were below expectation.



**Figure 13 Evaluation of the various elements of the event**

In overall, the organisation of the event has received a higher number of 'Excellent' ratings. The respondents highly rate Support from organising staff as well as the selection of the venue and the social event. According to one respondent, the seminar facilities were not of adequate standard. The background documents prepared prior to the event received the lowest mark. The choice of venue showed a significant improvement compared to the previous event.



**Figure 14 Evaluation of the event's organisation**

Two remarks indicate that the quality of the sound was not adequate. According to another participant, too much time at the beginning of the seminar was given to non-technical speakers. There is also a suggestion to increase the number of breaks during the technical presentations. On the other hand, all other comments are positive, for example:

- *It has been an excellent opportunity to have more information about this initiative and about the on-going activities on HPC.*
- *Case History about real projects are for sure the most interesting part. Thanks for the organization. Good Job.*
- *This seminar is a great opportunity to pull together the HPC community and facilitate exchanges and networking. The examples provided by Scania, GENCI, EPCC, Dompe where very interesting and educational. PRACE proposal to open machine to industry is great, 5% is certainly the minimum required to make a impact. On the SMB programs, recruitment and scaling are the 2 main issues. May be one way to solve this is to include in the overall schedule partners such as Chamber of Commerce (for recruitment) and fellow end users (SMBs) as consultant (for the solution). A big thank you to Sangio for sharing his passion for Bologna after the event during the visit and the diner. One idea: speed dating between participants and PRACE members to reinforce the community momentum: I would like to meet with Mr X and Mr Y. 30 mn pause devoted to this. Thank you for a very well organized and fruitful seminar.*

## 12 Communication after the event

PRACE 1IP Work Package 3 have issued an article on the Competition (available at <http://prace-ri.eu/PRACE-s-Award-for-the-Most>). The winning company have also published a number of press releases in relation to the event, e.g.:

<http://insidehpc.com/2012/04/19/xcelerit-wins-award-for-the-most-innovative-industrial-hpc-application-in-europe/>

[http://www.hpcwire.com/hpcwire/2012-04-17/xcelerit\\_receives\\_award\\_from\\_prace.html](http://www.hpcwire.com/hpcwire/2012-04-17/xcelerit_receives_award_from_prace.html)

<http://www.siliconrepublic.com/careers/advice/category/s/item/26762-irish-software-start-up/>

Furthermore, an article about the seminar will appear in PRACE Newsletter (not available yet at the time of writing this document).

## 13 Next Steps

The PRACE 1IP WP5/2P WP9 team will be in contact with seminar attendees in relation to the following tasks:

- The work of WP9 on enabling open source codes and liaising with ISVs
- Further facilitating access to PRACE resources through the Open Calls (as defined in the Open R&D Industrial Access Programme)
- Defining a PRACE programme supporting the adoption of HPC by SMEs – to be finalised within WP9 of PRACE 3<sup>rd</sup> Implementation Phase.

## 14 Conclusions

The event was a key milestone in defining what PRACE can offer the industrial user. Apart from delivering a clear message on how HPC can lead to a well-defined Return on Investment in an industrial environment, PRACE AISBL was also able to present a first model that industry are now able to use in order to access PRACE resources on par with academic users. It was also an important step in a broader discussion on how PRACE should tackle its future programme targeting SMEs, in particular through the ‘HPC for SMEs’ Parallel Session.

## 15 Acknowledgements

The Seminar Programme Committee would like to thank CINECA for hosting the event. We would also like to acknowledge the contribution of all the speakers, both from industry and academia.

**16 Annex 1- List of attendees**

<b>First Name</b>	<b>Last Name</b>	<b>Industrial Sector</b>	<b>Organization/Company</b>
Patrick	Aerts	PRACE	Netherlands eScience Center
Pedro	Alberto	Research/Academic	University of Coimbra
Claudio	Arlandini	Engineering	CILEA
Jagadees	Bangalore	Research/Academic	BHABHA ATOMIC RESEARCH CENTRE
Pascal	Barbolosi	IT Vendor	Bull Group
Sanzio	Bassini	PRACE	Cineca
Andrea	Beccari	Pharmaceutical	Dompe SpA
Florian	Berberich	PRACE	Forschungszentrum Juelich
Axel	Berg		SARA
Marco	Bianchi	Oil	Eni S.p.A.
Nicola	Bienati	Oil	eni E&P
Patrick	Blouet	Telecom	ST-Ericsson
Thomas	Boenisch	PRACE	High Performance Computing Center Stuttgart
Paolo	Bonaretti	Government	ASTER S. Cons. p.a.
Ricard	Borrell	Research/Academic	Termo Fluids S.L.
Eoin	Brazil	PRACE	Irish Centre for High End Computing (ICHEC)
Marco	Briscolini	IT Vendor	IBM Italy
Frederic	CAMY-PEYRET	Engineering	AIR LIQUIDE
Carlo	Cavazzoni	PRACE	CINECA
Antonio	Cervone	Research/Academic	MOX - Politecnico di Milano
David	Craddock	Research/Academic	HPC Wales
Philippe	David	Engineering	Sciences Computers Consultants
Luca	Degano	IT Vendor	Eurotech
Marc	Dollfus	IT Vendor	Intel
PATRICK	DONATH	Research/Academic	GIP RENATER
John	Donners	PRACE	SARA Academic Computing Center Amsterdam
Giovanni	Erbacci	PRACE	Cineca
Hugo	Falter	IT	ParTec Cluster Competence Center GmbH

Paolo Giacomo	Ferrandi	Research/Academic	MOXOFF s.r.l. - Spinoff Politecnico di Milano
Jonathan	Follows	Research/Academic	STFC Daresbury Laboratory
Valerio	Gaioni	Engineering	NumeriCAE
Vincent	Galinier	Aviation	Airbus
Federico	Gallizio	Engineering	Optimad engineering S.r.l.
Michel	Gazaix	Aeronautics	ONERA
Alfred	Geiger	IT Vendor	T-Systems SfR
Stephan	Gillich	IT Vendor	Intel GmbH
Sergi	Girona	PRACE	Barcelona Supercomputing Center
Jean	GONNORD	Research/Academic	CEA
Paul	Graham	PRACE	EPCC, University of Edinburgh
Erik	Hagersten	Software	Rogue Wave Software
David	Hillewaert	Engineering	Cenaero
Erwan	Jacquin	Engineering	HydrOcean
Bert	Jagers	Engineering	Deltares
Andrew	Jones	Engineering	Numerical Algorithms Group Ltd (NAG)
Richard	Kenway	PRACE	University of Edinburgh
Marcus	Kotschner	IT	Datalynx AG
Eric	Landel	Automotive	Renault
GilbertR.	Lauber	IT Vendor	T-Platforms
Jean-Francois	Lavignon	IT Vendor	Bull
Francois	LEGRAND	Engineering	Valeo
Oriol	Lehmkuhl	Engineering	Termo Fluids S.L.
Christophe	Lemaitre	Automotive	faurecia automotive seating
Thomas	Lippert	PRACE	FZJ
Rosend	Llurba	PRACE	NWO/EW
Erik	Lonroth	Automotive	Scania Infomate AB
Philippe	Malzac	Oil	Total
Stoyan	Markov	PRACE	National Centre for Supercomputing Applications
Anthony	Massobrio	Engineering	CD-adapco
Mario	Mattia	IT Vendor	Cray
Giovanbattista	Mattiussi	IT Vendor	Eurotech



Douglas	McKinley	IT	NICE srl
Sjoerd	Meihuizen	PRACE	NWO- Netherlands Organization for Scientific Research
Angelo	Messina	Engineering	EnginSoft S.p.A.
Cristian	Mezzanotte	IT	Datalynx AG
Nicolas	Mignerey	PRACE	GENCI
MARC	MORERE	Aviation	AIRBUS
Keld Lund	Nielsen	Oil	Eni E&P
Stefano	Odorizzi	Engineering	EnginSoft S.p.A.
Michael	Olsson	Food	Tetra Pak
Edmondo	Orlotti	IT Vendor	NVIDIA
MARCIN	OSTASZ	PRACE	PRACE/BARCELONA SUPERCOMPUTING CENTRE
Nuno	Paiva	IT	Data Identity
Mark	Parsons	PRACE	The University of Edinburgh
Georgi	Prangov	PRACE	National Centre for Supercomputing Applications
Maria	Ramalho	PRACE	PRACE AISBL
Thomas	Reibe	PRACE	European Commission
Stephane	Requena	PRACE	GENCI
Benedetto	Risio	Engineering	RECOM Services GmbH
Catherine	Riviere	PRACE	GENCI
Paolo	Ruffo	Oil	eni
Einar	Rustad	IT Vendor	Numascale
LEE	SANG MIN	Research/Academic	Korea Institute of Science & Technology Information
Manuel	Severiano	IT	Identity
Ivan	Spisso	Research/Academic	Univerity of Leicester
Jean-Marc	TALBOT	Multimedia	Mentor Graphics
Claudio	Tebaldi	Research/Academic	Universitat Commerciale L:Bocconi
Giampietro	Tecchiolli	IT Vendor	Eurotech S.p.A.
Ulla	Thiel	IT Vendor	Cray Europe
Beppe	Ugolotti	IT	NICE srl
Dominik	Ulmer	PRACE	CSCS - Swiss National Supercomputing Centre
Claire	WAAST-RICHARD	Energy	EDF

Mark	Westwood	Oil	Petroleum Geo-Services
Torsten	Wilde	PRACE	Leibniz Supercomputing Center (LRZ)
Cinzia	Zannoni	PRACE	CINECA
Sergio	Zazzera	Oil	ENI E&P

## 17 Annex 2 - Evaluation Form

Available at: <https://www.surveymonkey.com/s/H9SY28W>

4th PRACE Industrial Seminar - Evaluation Form - Bologna 16/17th April 2012

### Participant Feedback

Dear Participant,

Thank you for attending the 4th PRACE Industrial Seminar. Please take a few moments to complete this short survey. This will help us evaluate our work and determine your future requirements.

#### 1. What is your overall impression of the event?

- ☐ ☐ What is your overall impression of the event? Very productive
- ☐ ☐ Productive
- ☐ ☐ Not productive

#### 2. Please rate the following elements:

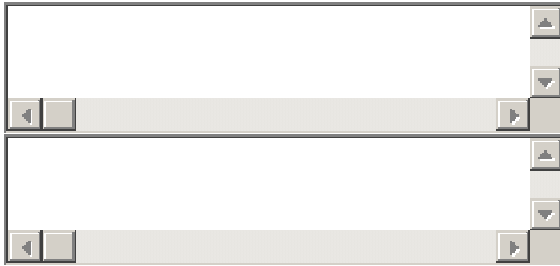
	Excellent - 1	Good - 2	Average - 3	Below expectation - 4	Poor - 5
Relevance of topics discussed	<input type="checkbox"/> <input type="checkbox"/> *Please rate the following elements: Relevance of topics discussed Excellent - 1	<input type="checkbox"/> <input type="checkbox"/> Relevance of topics discussed Good - 2	<input type="checkbox"/> <input type="checkbox"/> Relevance of topics discussed Average - 3	<input type="checkbox"/> <input type="checkbox"/> Relevance of topics discussed Below expectation - 4	<input type="checkbox"/> <input type="checkbox"/> Relevance of topics discussed Poor - 5
Agenda (was it adhered to? was time allocation per topic correct?)	<input type="checkbox"/> <input type="checkbox"/> Agenda (was it adhered to? was time allocation per topic correct?) Excellent - 1	<input type="checkbox"/> <input type="checkbox"/> Agenda (was it adhered to? was time allocation per topic correct?) Good - 2	<input type="checkbox"/> <input type="checkbox"/> Agenda (was it adhered to? was time allocation per topic correct?) Average - 3	<input type="checkbox"/> <input type="checkbox"/> Agenda (was it adhered to? was time allocation per topic correct?) Below expectation - 4	<input type="checkbox"/> <input type="checkbox"/> Agenda (was it adhered to? was time allocation per topic correct?) Poor - 5
Quality of background documents distributed	<input type="checkbox"/> <input type="checkbox"/> Quality of background documents distributed Excellent - 1	<input type="checkbox"/> <input type="checkbox"/> Quality of background documents distributed Good - 2	<input type="checkbox"/> <input type="checkbox"/> Quality of background documents distributed Average - 3	<input type="checkbox"/> <input type="checkbox"/> Quality of background documents distributed Below expectation - 4	<input type="checkbox"/> <input type="checkbox"/> Quality of background documents distributed Poor - 5
Discussions	<input type="checkbox"/> <input type="checkbox"/> Discussions Excellent - 1	<input type="checkbox"/> <input type="checkbox"/> Discussions Good - 2	<input type="checkbox"/> <input type="checkbox"/> Discussions Average - 3	<input type="checkbox"/> <input type="checkbox"/> Discussions Below	<input type="checkbox"/> <input type="checkbox"/> Discussions Poor - 5

	Excellent - 1	Good - 2	Average - 3	Below expectation - 4	Poor - 5
Speakers	Speakers Excellent - 1	Speakers Good - 2	Speakers Average - 3	Speakers Below expectation - 4	Speakers Poor - 5

### 3. ORGANISATION - Please rate the following elements where applicable:

	Excellent - 1	Good - 2	Average - 3	Below expectations - 4	Poor - 5
Preparation and distribution of background documents	*ORGANISATION - Please rate the following elements where applicable: Preparation and distribution of background documents Excellent - 1	Preparation and distribution of background documents Good - 2	Preparation and distribution of background documents Average - 3	Preparation and distribution of background documents Below expectations - 4	Preparation and distribution of background documents Poor - 5
Support from organising staff	Support from organising staff Excellent - 1	Support from organising staff Good - 2	Support from organising staff Average - 3	Support from organising staff Below expectations - 4	Support from organising staff Poor - 5
Conference facilities	Conference facilities Excellent - 1	Conference facilities Good - 2	Conference facilities Average - 3	Conference facilities Below expectations - 4	Conference facilities Poor - 5
Hotel (choice, convenience for meeting)	Hotel (choice, convenience for meeting) Excellent - 1	Hotel (choice, convenience for meeting) Good - 2	Hotel (choice, convenience for meeting) Average - 3	Hotel (choice, convenience for meeting) Below expectations - 4	Hotel (choice, convenience for meeting) Poor - 5
Evening dinner, coffee, social event, etc.	Evening dinner, coffee, social event, etc. Excellent - 1	Evening dinner, coffee, social event, etc. Good - 2	Evening dinner, coffee, social event, etc. Average - 3	Evening dinner, coffee, social event, etc. Below expectations - 4	Evening dinner, coffee, social event, etc. Poor - 5

## 4. Comments:



Comments:

## 5. Please provide your name:



Please provide your name:

## 6. Please provide your email address:



Please provide your email address:

## 7. Please provide the name of your organisation:



Please provide the name of your organisation:

## 8. Would you like to receive news from PRACE Research Infrastructure?

- ☒ ☐ Would you like to receive news from PRACE Research Infrastructure? Yes
- ☐ No ☒ No

## 18 Annex 3 - Abstracts of the presentations

### 18.1 DAY 1

After the event, all available presentations and abstracts were posted on the PRACE website at [1].

#### **Thomas Reibe, The European Commission**

##### *HPC driving innovation*

HPC is an important factor of European competitiveness and sustainability. It plays a vital role in support European science, industrial innovation and also addressing the grand challenges of today's society and environment. Europe should re-gain and maintain its place in the global HPC race and PRACE is the main vehicle of this effort. Europe's objectives are:

- Provide a world-class HPC infrastructure & service
- Ensure independent access to HPC
- EU a global actor

Europe should address the following challenges:

- Develop further the HPC ecosystem
- PRACE governance and services to industry
- Centres of excellence for HPC applications
- Competence centres for HPC services to SMEs
- A European Technology Platform for the EU HPC industry
- Workforce well trained in HPC

European Industry is strongly encouraged to make use of the services and know-how offered by PRACE.

#### **Prof. Thomas Lippert, PRACE Coordinator**

##### *PRACE (and Industry)*

Europe must still increase its already high standards in computational science and computational engineering. It has to guarantee independent access to HPC-systems of the highest performance class for all computational scientists as well as European industry. EU and national governments are motivated through PRACE to establish robust and persistent funding schemes. User requirements as to a variety of architectures will profit from harmonized procurements of high end systems. Scientific Excellence requires peer review on European scale to motivate and foster best ideas and groups

PRACE is able to deliver Added Value to Industry, for example, by addressing the following needs:

- *Jean-Francois Hamelin, EDF - Industry needs well trained academics in HPC*
- *Jesús Garcia San Luis, Repsol - Limitation: computer resources and efficient applications*

The Mission of PRACE is – Provision of Capacity and Access. Binding commitments: France, Germany, Italy, Spain. GENCI – GCS (HLRS, JSC, LRZ) – CINECA – BSC. 100 Mio € over 5 years in terms of cycles. Access is strictly by peer review at a European level. Type of access:

- **Preparatory access**
  - only technical peer review
- **Project access**
  - both technical and scientific peer review
- **Programme access (planned)**

- both technical and scientific peer review

WP5 of 3IP aims at

- building a comprehensive novel offer in order to engage industry and SMEs in HPC
- demonstrating the potential of HPC for their business
- fostering technology transfer from academia to industry
- providing coherent integrated services from training to access to funding opportunities to SMEs and industry

### **Dr Maria Ramalho, PRACE Director**

#### *PRACE's Open R&D Model*

PRACE (Partnership for Advanced Computing in Europe) is a persistent pan-European Research Infrastructure providing Tier-0 HPC services, which are open to all scientists and researchers.

PRACE's aim is to make EU the World-Leader in High-Performance Computing. During the past 4 project access calls for proposals PRACE was able to offer about 30,51 Mio. core hours per proposal.

With our selection process (Technical Peer Review by technical experts in PRACE systems and software, Scientific Peer Review by Researchers with expertise in scientific field of the proposal and Prioritisation + Resource Allocation is by the Access Committee) we can make sure to find the best machines for applicants.

PRACE offers Preparatory Access, Project Access and Multi-year Access to enable world-class science and engineering. Just as academia, industry can apply for PRACE HPC services. There are two options: commercial companies can apply on their own (subject to the approval of the boundaries imposed by state-aid regulations) or in collaboration with academia (as principal investigators or collaborators). The access will be in both ways free of charge. But prior to being awarded access, companies should commit to publish the results obtained in publicly available media.

### **Jean-François Lavignon, Hugo Falter, Giampietro Tecchiolli, ETP4HPC**

#### *European Technology Platform for High-Performance Computing*

After introducing what a European Technology Platform (ETP) is, the talk will present the importance of the creation of an ETP dedicated to HPC technologies. Due to growing place of HPC in both science and industry a strong European HPC eco-system ranging from technology providers to users is a key asset for science excellence and industry leadership. The ETP will strengthen European HPC technology providers and will contribute to having the right skills in Europe to make a difference with HPC; The ETP4HPC plans to issue a Strategic Research Agenda by the end of this year in order to set priorities related to HPC technologies for the next Horizon 2020 program

### **Dr Koen Hillewaert, CENAERO**

#### *PRACE Industrial Pilot Projects: CENAERO*

Results of the industrial pilot project noFUDGE:

DNS of a Low Pressure Turbine blade computed with the Discontinuous Galerkin Method

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The simulation of turbulent flows by Direct Numerical Simulation (DNS) and Large-Eddy Simulation (LES) approaches requires extremely low numerical dispersion and dissipation errors. Recently finite element (FEM) like high-order methods such as the discontinuous Galerkin (DGM) [1, 2, 3], the spectral difference (SDM) [4, 5] and spectral element (SEM)

[6, 7] methods have been applied to such computations. The main motivation is that these methods bridge the gap between the high accuracy - deemed indispensable for adequate resolution of the turbulent structures - of academic solvers and the geometric flexibility of industrial solvers. Next to very interesting dispersion and dissipation properties, DGM offers a simple way of checking grid resolution. Finally excellent serial and parallel computational efficiencies are obtained.

The aforementioned advantages potentially make DGM a powerful tool for high fidelity simulation of turbulent flows in complex geometry. Cenaero develops a solver based on this new technology to provide industry with the next generation CFD tools, capable of performing accurate LES in real geometries. This will allow a far better prediction of transitional flows, off-regime conditions and instabilities, noise generation mechanisms, etc. During the PRACE industrial pilot project noFUDGE, a low pressure turbine blade row operating at a isentropic Reynolds number of about 85000 and Mach 0.6, has been computed. These conditions are representative for jet engines. The relatively low Reynolds number and the resulting transitional flow both at the pressure and the suction side make the flow nearly impossible to compute with standard solvers. This computation therefore serves as a proof of concept.

Figure 1 shows that, even if small discontinuities can be observed in the wake region, the vorticity field is globally continuous, meaning that the flow is properly resolved around the blade.

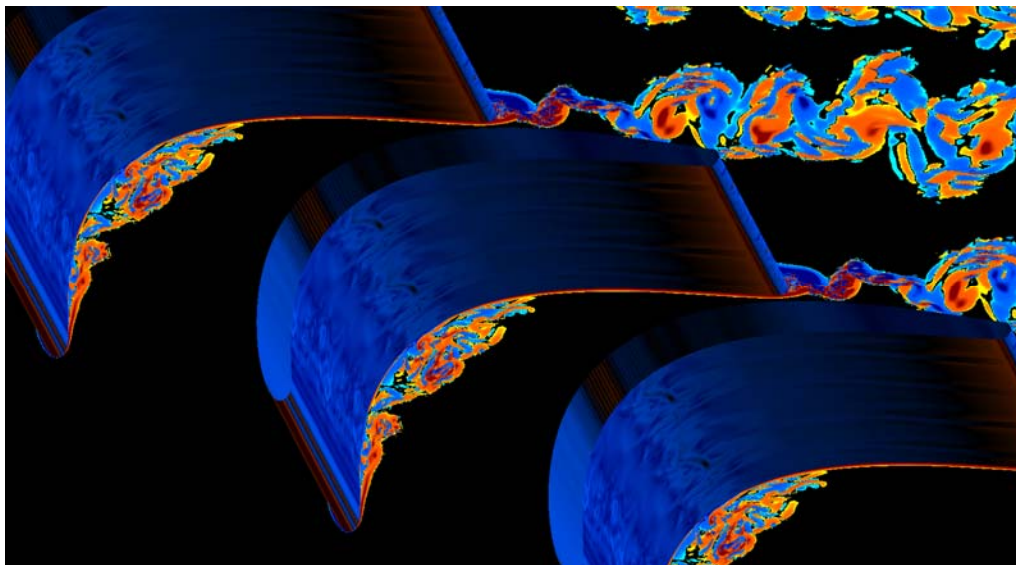


Figure 1: Spanwise component of the vorticity at the periodic boundary and skin friction on the blade surface.

The computed time-averaged values of the total pressure downstream of the blade, compared with experiments undertaken at VKI are shown in Figure 2. This figure also shows the values obtained by more classical approaches. It can be seen that the position and the shape of the wake is correctly captured in the DNS, contrary to the LES and RANS. Nevertheless, the absolute value of the loss is a bit under-predicted in the centre of the wake. This difference can be explained by a slight under-resolution at the trailing edge, a mismatch with the actual geometry and/or by the inlet turbulence condition that has not been taken up in the DNS. These hypotheses are currently under investigation.

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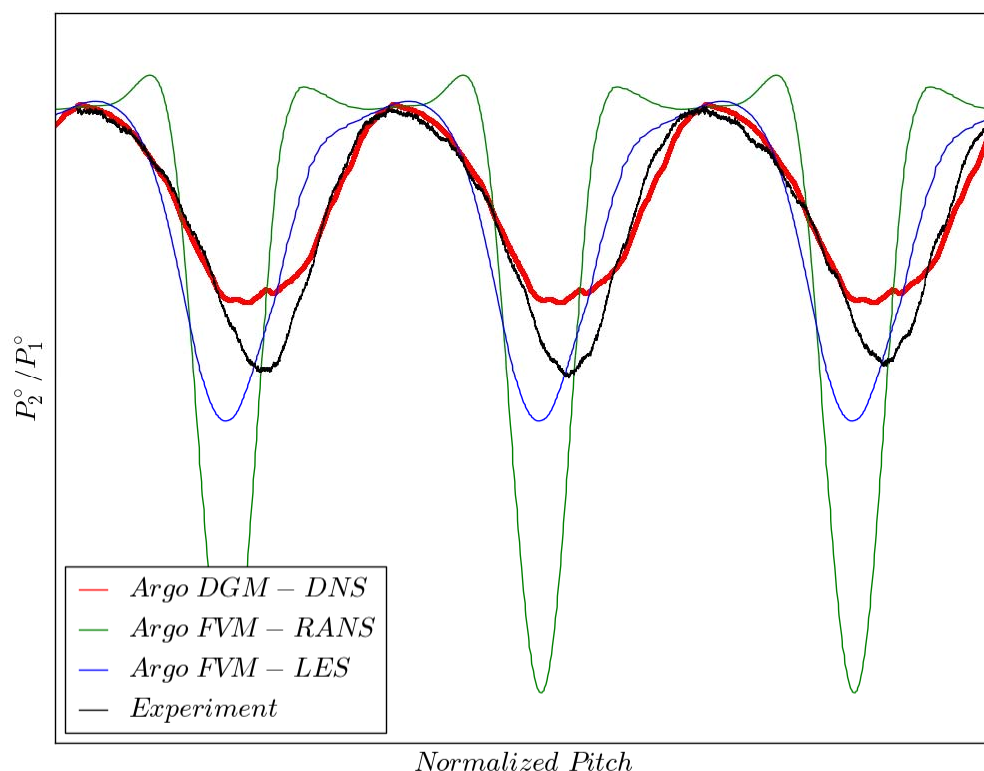


Figure 2: Total pressure in the wake of the blade. DNS results obtained with DGM (red), RANS (green) and LES (blue) results of the FVM solver and experiment (black) are plotted.

**Erik Lönroth, Scania**

*Success story - Scania InfoMate HPC*

In this talk, you will get to know the journey Scania has taken during 10 years of HPC and what internal strategies are used to strengthen the R&D area.

### **Parallel Session – HPC for SMEs**

#### **Mark Parsons, EPCC**

##### *Supercomputing Scotland*

Giving businesses a competitive edge in today's global markets relies on innovation in their products and services. Whether it's a desire to improve a product or service or design a new one, many companies around the world are turning to modelling and simulation on high performance computers to give them that edge. Supercomputing Scotland is a new initiative from EPCC at The University of Edinburgh and Scottish Enterprise to give companies the knowledge to help them decide if using high performance computing makes sense for them and if so, to support them to proceed. The three-year programme is targeting companies from the Energy, Life Sciences and Financial Services sectors, but will consider engaging with any company on a case-by-case basis. This talk will focus on how bringing together a company's knowledge of its business and market opportunities with the modelling and simulation knowledge of a local HPC centre can deliver company growth. The Supercomputing Scotland initiative will be described in detail along with a discussion of some of the successes and challenges of delivering economic growth success stories in this way.

#### **Stephane Requena, GENCI (presented by Nicolas Mignerey), French HPC Programmes for SMEs, and Rui Da Silva, Danielson Engineering**

The presentation will focus on a French initiative named HPC-PME that aims at helping SMEs to use numerical simulation and HPC to increase their competitiveness. Unlike big companies like Airbus or Total, well-informed and already well-equipped in HPC, French SMEs lack awareness of what benefit they can get from numerical simulation and HPC. In order for them to climb that first step, we need to demonstrate that benefit. Co-conducted by GENCI (in charge of the national strategy in HPC), INRIA (a French R&D center in computational science) and OSEO (the national bank for SMEs), HPC-PME is unique in that it is a joint effort providing all the needed service to SMEs: information and training, scientific and industrial expertise, and funding possibilities. The presentation will present examples of SMEs that benefited from this initiative. The most striking one is Danielson Engineering, a company designing motor prototypes for the car industry, and mastering the whole process of the design, from the theoretical concept to the physical demonstrator. Danielson Engineering submitted a project to HPC-PME in order to test new possibilities for their numerical department. After going through HPC-PME they went on to buy a cluster of 200 cores and are looking forward to hire 2 or 3 engineers.

### **Parallel Session – From Academia to Industry**

#### **Prof. Claudio Tebaldi, Bocconi University, Italy**

##### *High Performance computing in Financial Risk management*

#### **Mark Westwood, Petroleum Geo-Services**

PGS ([www.pgs.com](http://www.pgs.com)) EM Technology group (<http://www.pgs.co/en/Geophysical-Services/Towed-Streamer-EM/Technology/>) is developing a variety of geophysical modelling and inversion programs to interpret the results of surveys. The inversion programs in particular are computationally-intensive and we have now successfully completed two projects with EPCC to optimise the performance of one of our modelling and inversion programs. Generally this program runs on the company's own large clusters.

This talk covers our experiences of working on these collaborative projects, and some of the challenges in dealing with codes which have their origins in academia when trying to extend and enhance their capabilities in a commercial setting.

**Dr.-Ing. Risio Benedetto, President, RECOM Services GmbH,**

*Did not participate due to a personal issue*

## 18.1 DAY 2

**Erwan Jacquin, Hydrocean**

HydrOcean is a SME, spinoff of Ecole Centrale Nantes, which uses numerical simulation to solve all kind of marine hydrodynamics problem for industry. In this presentation, you will see what HydrOcean is able to do with HPC, with Marine CFD codes and also with SPH, a promising numerical method, and its solver SPH-flow.

**Erik Lönroth, Scania**

*Virtual Tour - Scania Infomate HPC*

In this talk, you will hear about the implementation process of an HPC appliance - going from single server computing, to massively parallel and lessons learned from 10 years of industry HPC.

### Parallel Session – HPC Service as a Cloud

**Cristian Mezzanotte**

*Hands-on: Cluster Automation with Amazon Web Services*

The presentation will give an insight on how the Amazon Web Services Cloud framework can revolutionise the approach to High Performance Computing. Traditionally, ad-hoc HPC infrastructures are often too expensive to be deployed by SMBs, who have to rely on larger super-computing facilities: the advent of Cloud Computing has opened new perspectives to scientific computing. The purpose of this work is to show how to run a real world scientific model in the AWS Cloud exploiting all the advantages of the Cloud like limited, controlled costs, availability of resources and versatility of the infrastructure. The demo will also emphasize the role of Web Services as a means for workflow automation and it is meant to be a building block of a more complex system.

**Dr. Axel Berg, SARA National HPC & E-science Support Center**

*Dutch HPC Cloud: flexible HPC for high productivity in science and business*

Beyond the hype around Cloud Computing, there is large interest and benefit for Scientific and Technical Computing workloads using High Performance Cloud Computing.

Driven by user demands, SARA has developed over the last two years an HPC Cloud production service for science and business. With the HPC Cloud environment users get access to their own Virtual Private HPC Cluster that users can configure to exactly match their needs. It is flexible, offers self service and is dynamically scalable (elastic) and fully configurable. The HPC Cloud offers full control over a HPC cluster, with fast CPUs, high memory nodes and high-bandwidth interconnect and with the possibility to attach Terabytes of local storage to a compute node. Because of this flexibility, users can fully tailor the system for a particular application or workflow. Additionally, the system facilitates collaboration. Users can share control over their virtual private HPC cluster with other users and share processing time, data and results.

HPC Cloud Computing brings HPC compute clusters within the reach of science and businesses for whom other 'traditional' HPC facilities are today a bridge too far. Within the

HPC Cloud users can use a computer environment that is virtually identical to the environment that they have developed for their own use – but one which is many times faster. In that way, there will hardly be any difference between their development environment and their production environment. There is no need for an (expensive) rewrite or adaptation of their software, and scientific challenges can be scaled up very easily to large scale.

In this way, the compute environment is tailored to the application rather than that the application needs to be adapted to the specific compute environment. This dramatically lowers the barriers for the use of High Performance Computing for many scientific and business applications. The provided flexibility enables new modes of high performance computing. Usage patterns that were hard to realize previously, because of legacy software, security concerns, complex workflows or source code unavailability, can now be accommodated with a customized HPC Cloud solution. A number of concrete examples will be presented. The HPC Cloud largely enhances user productivity and is therefore a great enabler for productive science and business.

### **Parallel Session - PRACE Technology Watch**

#### **Jonathan Follows**

##### *Technology Watch*

This presentation results from an internal PRACE deliverable in which an analysis of the likely challenges and implications for high performance computing based on technology trends with likely applicability in the

2012-2015 time period was performed. It identifies 14 technology areas in which significant changes are going to have implications for the construction and use of future multi-Petascale systems. A further analysis is being performed by PRACE on the likely impacts of technology in 2015-2018, and this will be published as a public report on the PRACE Web site later in 2012.

#### **Torsten Wilde**

##### *Prototyping in PRACE: PRACE Energy to Solution prototype at LRZ*

Torsten Wilde of the Leibniz Supercomputing Centre (LRZ) is the leader of the PRACE 2IP-WP11 "Prototyping" activity. In this talk he describes the work underway in the activity, and the challenges for supercomputer sites going forward as the power requirements of the hardware increases.

In particular the impact of water cooling and efficient heat dissipation is considered for the case of the machines at LRZ.

#### **Paul Graham**

##### *Progress in software enabling*

Within PRACE the software petascaling work is one of the largest activities engaging all the project partners. Its goal is to identify and understand the software libraries, tools, benchmarks and skills required by users to ensure that their application can use a Petaflop/s system productively and efficiently. This talk covers the work already completed and underway within the activity, the proposed work for the future, and how industry can engage with and take advantage from the petascaling activity.