# SEVENTH FRAMEWORK PROGRAMME
# Research Infrastructures

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

# PRACE-1IP

# PRACE First Implementation Project

**Grant Agreement Number: RI-261557**

# D5.1.1
# Third PRACE Industrial Seminar

## *Final*

Version: 1.02
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Date: 21.04.2011

## Project and Deliverable Information Sheet

| | | |
|---|---|---|
| **PRACE Project** | **Project Ref. №: RI-261557** | |
| | **Project Title: PRACE First Implementation Project** | |
| | **Project Web Site:** http://www.prace-project.eu | |
| | **Deliverable ID: D5.1.1** | |
| | **Deliverable Nature:** Report | |
| | **Deliverable Level:** PU | **Contractual Date of Delivery:** 30 / April / 2011 |
| | | **Actual Date of Delivery:** 30 / April / 2011 |
| | **EC Project Officer: Bernhard Fabianek** | |

* - The dissemination level is indicated as follows: **PU** – Public, **PP** – Restricted to other participants (including the Commission Services), **RE** – Restricted to a group specified by the consortium (including the Commission Services). **CO** – Confidential, only for members of the consortium (including the Commission Services).

## Document Control Sheet

| | | |
|---|---|---|
| **Document** | **Title: First Industrial Seminar** | |
| | **ID: D5.1.1** | |
| | **Version:** 1.02 | **Status:** Final |
| | **Available at:** http://www.prace-project.eu | |
| | **Software Tool:** Microsoft Word 2007 | |
| | **File(s):** D5.1.1.docx | |
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| | **Approved by:** | MB/TB |

## Document Status Sheet

| Version | Date | Status | Comments |
|---|---|---|---|
| 0.1 | 03/April/2011 | Draft | First scaffold for comments |
| 0.2 | 10/April/2011 | Draft | Half-Complete version |

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|---|---|---|---|
| | | | with information on few sections missing |
| 0.3 | 11/April/2011 | Draft | Semi-Complete version to be reviewed by the task team and with information missing on sections of the statistics of participation |
| 0.4 | 11/April/2011 | Draft | Semi-Complete version with comments addressed from Lilit and Dominik |
| 0.5 | 12/April/2011 | Draft | Semi-Complete version with corrections from Lennart and Georgi |
| 0.6 | 12/April/2011 | Draft | Complete version with inputs and corrections from Stéphane |
| 1.0 | 12/April/2011 | Draft | Reviewed and formatted version. –Minor changes pending |
| 1.1 | 18/April/2011 | Draft | Review and minor changes |
| 1.2 | 21/April/2011 | Final | |

## Document Keywords

| | |
|---|---|
| **Keywords:** | PRACE, HPC, Research Infrastructure, Industry, Business Cases, SME |

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[2] http://www.prace-project.eu/news/3rd-prace-industrial-seminar-is-bridging-the-gap-between-industry-and-academia

# List of Acronyms and Abbreviations

| | |
|---|---|
| BSC | Barcelona Supercomputing Center (Spain) |
| CINECA | Consorzio Interuniversitario, the largest Italian computing centre (Italy) |
| CINES | Centre Informatique National de l'Enseignement Supérieur (represented in PRACE by GENCI, France) |
| CFD | Computational Fluids Dynamics |
| 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 |
| EU | European Union |
| 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. |

| | |
|---|---|
| FZJ | Forschungszentrum Jülich (Germany) |
| GCS | Gauss Centre for Supercomputing (Germany) |
| GENCI | Grand Equipement National de Calcul Intensif (France) |
| HPC | High Performance Computing; Computing at a high performance level at any given time; often used synonym with Supercomputing |
| KTH | Kungliga Tekniska Högskolan (represented in PRACE by SNIC, Sweden) |
| ISV | Independent Software Vendors |
| MB | PRACE First Implementation Phase project Management Board |
| NCF | Netherlands Computing Facilities (Netherlands) |
| PC | Program Committee |
| PRACE | Partnership for Advanced Computing in Europe; Project Acronym |
| 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 |
| SC'10 | Supercomputing 2010 conference, held in New Orleans on November 2010 |
| WP3 | PRACE First Implementation Phase Work Package 3: "Dissemination, Outreach and Training" |
| WP5 | PRACE First Implementation Phase Work Package 5: "Relations with industrial users" |

# Executive Summary

The 3rd PRACE Industry Seminar was held in Stockholm on March 28th-29th 2011 with 81 attendees from 22 countries and 39 companies represented. Twenty of the companies were first time attendees and 19 were returning companies. Thirteen companies were from the Nordic region and four from Eastern Europe. The objective of exposing PRACE to companies in the Nordic region was thus successful. The 19 returning companies is a good indicator of the success of previous PRACE industrial seminars and the appeal of the program for this year's seminar. The objective of seeking information from participating companies for the formulation of PRACE industrial offerings was also successfully met through very interactive plenary sessions and smaller parallel sessions with foci of significant industrial interest and active participation. Thirty-two of 36 company attendees expressed interest in receiving PRACE news and information in the future and 19 companies expressed interest in a follow-up contact from PRACE. The 3rd PRACE Industry Seminar did successfully address HPC issues facing large companies as well as SMEs as evidenced by the responses and the fact that 33 of 36 companies that provided written feedback expressed an interest in participating in the 4th PRACE Industry Seminar planned for 2012.

The conference program developed by the program committee with representatives from 14 PRACE partners was intended to appeal to both large European companies and SMEs and address a range of HPC issues, not only Tier-0 issues. The format was designed to stimulate discussion and interaction between PRACE and company representatives as well as between company representatives. To achieve this objective the conference format had plenary talks from both SMEs and large companies, and parallel sessions addressing HPC topics known to be of concern to many companies. For the plenary talks great effort was expended by the program committee to seek company speakers that would address novel usage of HPC and focus on the science, engineering, computational and commercial challenges in their presentations.

The conference venue was the new Stockholm Waterfront Congress Center that opened in January 2011 and is located next to Stockholm's major transportation hub and Lake Mälaren in the centre of Stockholm. The venue was chosen for its ease of access and for being one of the worlds most environmentally friendly congress centres fully in line with Stockholm's award by the EU Commission as the 2010 Green Capital (the first such award made), and for offering state-of-the-art technology. A conference dinner was held at the Vasa Museum, a museum erected around the 1628 Swedish worship that was salvaged 50 years ago. PDC – the High-Performance Computing Centre at KTH served as the local organizer.

The seminar was conducted on a two half days format. Monday March 28th the seminar was opened by Prof. Lennart Johnsson (PDC Director, KTH) followed by a welcome speech by Prof. Gunnar Landgren (Advisor to the KTH President and the Director of the Swedish node of the European Institute of Innovation and Technology's (EIT's) ICT lab). Prof. Dr. Achim Bachem (Chair of the PRACE AISBL Council) gave an overview of PRACE's vision and PRACE approach to collaboration with industry to strengthen European competitiveness. This was followed by a presentation by Dr. Bernhard Fabianek (Program Officer, EC HPC Unit) on the critical role the EC sees HPC playing for European competitiveness in research as well as commerce and the important role PRACE.is playing in this regard.

Four representatives from European innovative SMEs gave presentations on the usage of HPC in their respective sectors. The companies were: Euro-CFD (computational fluids dynamics

(CFD) in the automotive domain), HMI (business intelligence), Rila Solutions (software services) and Vratis (GPU-based software libraries for HPC).

Cenaero, the first company to be granted access to PRACE resources as part of the newly formed PRACE Industry Pilot program for open research carried out by companies with need for access to high-end HPC resources, presented their current developments in CFD and their medium term objectives and the significant role PRACE has in aiding their success.

The first day was concluded with a presentation of the PRACE Research Infrastructure by Dr. Sergi Girona (Chair of the PRACE Board of Directors) and detailed presentations from two leaders of the PRACE 1IP work packages addressing software petascaling and future HPC technology prototypes and assessment.

On Tuesday March 29th the seminar continued with presentations from two Nordic companies with unique products: Vestas, a world leading wind turbine and energy park planning company and Efield, a small company with unique software for electromagnetic field calculations.

These presentations were followed by three parallel sessions for in-depth discussions of companies needs and expectations on key HPC related issues. The topics were:

- HPC access for SMEs
- Porting applications to new architectures
- Relationships with ISVs and open source communities

After this session, two global large enterprises, Schlumberger and ABB, presented their experiences and challenges in the usage of HPC.

This session was followed by “PRACE: What’s Next?” a session in which the Prospect and PRACE joint initiative towards the creation of a European Technology Platform on HPC was presented.

Before closing the seminar, a wrap-up session was organised with the moderators of the parallel sessions highlighting the main conclusions of their sessions.

In all, 94 companies have participated in at least one PRACE Industry Seminar. The 3rd PRACE Industry Seminar had a significant presence of Nordic Companies and also companies from Eastern European Countries an objective with locating the seminar in the Nordic region. Representatives from two potential new member countries of PRACE also participated.

# 1 Introduction

The PRACE Research Infrastructure has been created to provide access to Tier-0 resources for the European Research Area, to foster cooperation between scientist in academia and industry for grand challenge applications, to stimulate the use of HPC in the industrial and commercial sectors, and engage them in HPC. The relationship with the industrial and commercial sectors is considered critical for maintaining and improving the competitiveness of Europe, For this reason PRACE is working towards offerings for those sectors of the economy and the PRACE Industry Seminar series is an important activity in establishing a dialogue with companies for the development of successful offers for companies.

The development of offerings for companies by PRACE requires dialogue with corporate users in order to identify their HPC needs and expectations. To assist the PRACE RI (Research Infrastructure) to achieve this objective, one tasks of Work Package 5 (WP5) of the

PRACE 1st Implementation Phase (PRACE-1IP) project explores the HPC needs and expectations of European companies (from big companies to small and medium enterprises) through industry seminars. This task furthers the effort started within the PRACE Preparatory Phase that successfully coordinated the two first PRACE Industry Seminars in Amsterdam in September 2008 and Toulouse in September 2009 respectively.

Within WP5 of the PRACE-1IP, two seminars are planned. This deliverable reports on the first 1IP industry seminar (the 3rd PRACE Industry Seminar) held in Stockholm March 28 – 29, 2011, its organization and outcome. The information from industry obtained in this seminar will be used in developing a business model for corporate access to the PRACE RI. This business model is developed within the second task within WP5.

This deliverable provides a complete overview of the 3rd PRACE Industry Seminar organization, and its results in terms of participation, participant evaluation of the event, and main conclusions. The document is structured as a set of short chapters, each presenting a particular aspect of the seminar. The chapters are: the goals, the program committee, the target audience, details of the location, website, flyer, booklet and the final agenda, a description of the material distributed to the attendees, and analysis of the results in terms of participation: distribution of attendees per country, per industry domain, feedback of attendees, next steps, follow up meetings and an online survey. The document ends with a set of conclusions, acknowledgements, and two annexes: the list of attendees and the evaluation form.

## 2 Goals of the 3rd PRACE Industry Seminar

As the previous seminars, the 3rd PRACE Industry Seminar was designed to attract leaders in the industrial and commercial sectors responsible for research, development and commercial activities that are likely to benefit from the use of future HPC and the infrastructure deployed by PRACE.

As in previous editions, the seminar had two objectives: first, to disseminate information about the PRACE Research Infrastructure and its resources and expertise, in particular, the details of the already operating Research Infrastructure; and second, to collect, in particular during parallel sessions, information about the needs and expectations of companies that use HPC, plan to use it or is developing computational methods, tools, software or hardware for it.

From PRACE the operation of the Research Infrastructure and the usage of PRACE by a company as a pilot of open research by an industry user were highlighted. In regards to engaging industry to provide information to guide the development of offers by PRACE for companies, the programme committee made strong efforts to attract SMEs and present novel diverse and interesting cases of HPC usage. A wide perspective is not only extremely useful for PRACE, but was also expected to serve as stimulation for insightful and stimulating discussions among industrial participants in their use of Tier-1 and Tier-2 resources and evolution towards Tier-0 use.

The seminar was held in Stockholm in order to attract Nordic and Eastern European companies. The Nordic region is well known for its well developed and competitive industrial and commercial sectors with Stockholm being rated in 2006 as the "*Most Innovative City"* by the Maastricht Economic Research Institute on Innovation and technology (MERIT) and the Joint Research Centre's Institute for the Protection and the Security of the Citizen of the European Commission, and the Stockholm region rated in 2008 as "*most competitive region outside the US* "and 6th in the world by the Center for International Competitiveness (UK)

The subtitle of the 3rd PRACE Industry Seminar was retained from the previous two seminars: **Europe goes HPC: Industrial Competitiveness** in order to emphasize the gain in competitiveness offered by the use of HPC for the European companies.

# 3 Organising Committee

The 3rd PRACE Industry Seminar was organized by WP5 with PDC at KTH (Sweden) being the local organizer, and BSC (Spain) and GENCI (France) as general coordinators. The programme was developed by a Program Committee (PC) with the following members:

- Pedro Alberto (University of Coimbra, Portugal)
- Lilit Axner (SNIC-KTH, Sweden)
- Sverker Holmstrom (SNIC, Sweden)
- Lennart Johnson (SNIC-KTH, Sweden)
- Jack Koster (Uninett-Sigma, Norway)
- Miroslaw Kupczyk (PSNC, Poland)
- Thomas Lippert, (FZJ, Germany)
- Carlos Merida (BSC, Spain)
- Naomi Messing–Klopstra (NCF, The Netherlands)
- Marcin Ostasz (BSC, Spain)
- Mark Parsons (EPSRC, UK)
- Georgi Prangov (NCSA, Bulgaria)
- Peter Raback (CSC, Finland)
- Stéphane Requena (GENCI, France)
- Jim Slevin (ICHEC, Ireland)
- Dominik Ulmer (CSCS, Switzerland)
- Stefan Wesner (HLRS, Germany)
- Cinzia Zanoni (CINECA, Italy)

A mailing list called "*IS2011-PC@prace-ri.eu"* was used for communication among the PC members. In addition, the address "*is2011-info@prace-ri.eu*" was used for the invitation process and communication with the potential and final attendees.

To manage invitations of companies (avoiding potential overlap and ensuring that all companies had an assigned contact person), a centralised excel file was used in a restricted area of the BSCW content management system. The access restrictions were implemented to assure that contact details of individuals were only available to PC members. All partners were requested to contact the PC with information on their communication with companies. The centralised file served to log the progress.

Companies were contacted individually, including an invitation letter from the PRACE Council Chair:

Jülich, January 11, 2011

**3rd PRACE Seminar for industrial Users: Europe goes HPC**

Dear Sir or Madam,

High Performance Computing (HPC) is becoming more and more important for companies who need to stay ahead of their competition – both in developing innovative products and offering high value services.

The research infrastructure **Partnership for Advanced Computing in Europe** (**PRACE AISBL**), an International Association in Belgium with members in 20 European countries, has started to deploy a world-class HPC Infrastructure, through a sustained program of investment in new systems. Two Tier-0 systems are already available in Germany and France and further deployments in Spain and Italy are scheduled offering high level HPC services to European scientists, as part of an initial investment plan of over 450M€ from 2010-2015.

PRACE is committed to supporting projects from European industry from an early stage. Building on the great success of the previous seminars in Amsterdam and Toulouse, in which companies such as Airbus, Repsol, and SMEs like Free Field Technology or Numtech participated, PRACE is organising a third seminar dedicated to industrial users of HPC, who will have the opportunity to learn more about PRACE, and to influence PRACE plans. The seminar will act as a forum to develop or strengthen links with CTOs, CIOs and R&D managers coming from both large Corporations and SMEs, as well as Independent Software Vendors.

PRACE cordially invites you to discuss your HPC requirements and the best way for you to access the planned services, at the seminar

***Europe Goes HPC***
**March 28 & 29, 2011**
**Stockholm, SWEDEN**

We would be very pleased if you could reserve this date in your agenda and confirm your attendance to is2011-info@prace-ri.eu

Yours sincerely

Prof. Dr. Achim Bachem

**Contact**
Chairman of the Council of PRACE AISBL
Prof. Dr. Achim Bachem:
is2011-info@prace-ri.eu

PRACE

**Figure 1 - Invitation letter sent to the attendees**

# 4 Addressing the target audience

Raising the interest of the top-level representatives of companies for a two half days event on a topic that might not be in the focus of their attention, in particular in times of economic crisis, is a challenge of its own. The PC decided on a set of measures to achieve the maximum attractiveness of the event:

- A program with a mix of highly ranked speakers from both big industries and SMEs with presentation titles that "speak the language" of industry
- Exploitation of the personal contacts of the PRACE Management Board members
- Create an opportunity to learn of new business models related to the usage of HPC
- Create opportunities to discuss common issues on HPC resource access (hardware and software but also associated services like training, optimisation/petascaling, user support or technological watch/prototyping)
- Provide an opportunity to engage in PRACE endeavours in coordinating the HPC ecosystem in Europe and to learn about the channels and the stakeholders
- A prestigious social event with a guided tour at the Vasa museum
- Exploitation of institutional contacts of PRACE Partners' industrial cooperation
- Offer an opportunity to showcase the company's R&D HPC advances in video format during coffee and lunch breaks.
- Free attendance

Since a major goal was to foster communication between PRACE and companies, the programme was also designed to encourage dialogue. This was achieved through smaller parallel sessions for topics deemed of high interest to companies and a joint dinner where the participants were seated at small round tables, mixing attendees from different industrial and commercial sectors and from PRACE.

# 5 Location of the seminar

After an assessment of expected number of attendees, venues suitable for the expected audience size were evaluated in terms of ease of access, general appeal and appeal to a technologically savvy audience, and cost. Feasible options proposed by PDC-KTH, the local organizer, were discussed within the PC. The new Stockholm Waterfront Congress Center at Nils Ericsons Plan 4, 111 64 Stockholm, Sweden, next to Stockholm's major transportation hub, and one of the worlds most environmentally friendly congress facilities was chosen as venue.

The Center is a part of the Rezidor Hotel Group, one of the fastest growing hospitality companies in the world and situated at the heart of Stockholm on the waters' edge. It offers vast possibilities for experiences out of the ordinary. The Waterfront Congress Center is one of the most energy efficient buildings in the world. Its world-class energy solution has been designed to cut $CO_2$ emissions and minimize impact on the environment and climate change. The glass façades are 1,040 $m^2$ solar collectors that on average gather 1 MW of heat energy daily; heating and cooling is distributed in a concordant system. Heat is moved and distributed between the different buildings - from surplus to shortfalls. The building is cooled by water drawn from lake Malaren, with the water stored in 250 tones ice tanks in the basement.

Furthermore, a large part of the center construction material was reused from the building previously occupying the site.

Three PRACE roll-ups presenting the Research Infrastructure, Tier-0 systems and ongoing activities were at the entrance of the conference room and stage. Also many posters were on the walls of the premises. Special PRACE Industrial Seminar signs were posted all around the centre as well as announcing the event at the entrance of the building.

During the coffee and lunch breaks three large screens in the hallway and foyer were displaying short videos a-priory collected from participant companies by the PC. The videos were subject to a selection process by the PC to assure a focus on science, engineering and innovation. In addition to videos from industrial participants, many short-videos from academic HPC users were displayed as well, especially results obtained from using PRACE RI services and systems. These videos were collected previously by WP3 and displayed in the PRACE booth at SC10.

After their presentation speakers received a gift symbolizing Sweden (a moose in glass created by Mats Jonasson, Målerås, a renowned artist at a successful glassworks in Sweden's well known Glass District, located in a province also known for its entrepreneurship with the founder of IKEA, Ingvar Kamprad, being its most successful entrepreneur).

**Figure 2 - Photo of the Waterfront Congress Center**

**Figure 3 - Photo of the Auditorium during the seminar**

**Figure 4 - Photo of the stage**

**Figure 5 - Collection of all the logos from attending industries**

**Figure 6 - Panel members at the end of the seminar**

**Figure 7 - PRACE folders and USB keys distributed to attendees**

# 6 Conference Website

With the support of CSC and the PRACE-1IP web team the PC created a conference website under the PRACE-1IP project domain *prace-project.eu*. It contained general information about the scope and target audience of the conference, the flyer, the final version of the programme, registration form as well as logistics information about the event. After the seminar this website was replaced by a different site providing the presentations at the event [1] and the event press release [2].

The website was launched on time and during the whole active period of its existence no functional problems were detected.

In addition, a dedicated registration page was created, asking for basic attendee information (name, date of birth, nationality, affiliation), and individual preferences, such as meal preferences, choices of parallel session on Tuesday March 29th and desire to be included in the dissemination network of PRACE. During the registration process a small survey providing the PC with valuable information about the industry HPC utilization - vendors systems used and application scalability was carried out. The information has been summarised and will be used in the planning of future industrial events as well as for comparing seminar audience development between events. It should be emphasized though that the collected information cannot be used for any conclusive market analysis due to the very small sample size, limited scope and few questions.

Furthermore, as part of the registration process participants were offered to express their wish to present their companies R&D efforts with short video materials.

**Figure 8 - Capture of the PRACE website announcing the PRACE seminar**

# 7 Conference Flyer

To spread information about the 3rd PRACE Industrial Seminar the PC prepared a conference flyer that was distributed during multiple events (including SC'10). It was also available from the events section on the PRACE website, and mailed out with the invitation letter.

## What is PRACE?

PRACE (Partnership for Advanced Computing in Europe) Research Infrastructure (PRACE-RI) is an international non-profit association with a mission to advance European competitiveness in research and industry by means of high-performance computing. It provides leadership class computing and data management resources to public and private research and development. PRACE resources are available to European researchers and their collaborators through a peer review process governed by a Scientific Steering Committee of European leading scientists. The peer review process assures high scientific and economic impact of the PRACE-RI for the benefit of European societies and citizens. PRACE has an extensive education and training effort for effective use of the RI through seasonal schools, workshops and scientific and industrial seminars throughout Europe.

PRACE partners operate the PRACE-RI as well as national and regional high-performance computing centres with considerable expertise in user support, applications, and supercomputer systems and software. PRACE deploys, operates and maintains a broad range of high-performance computer systems, and is an early adopter of cutting edge hardware and software. PRACE has one Petascale (1 Petaflop/s = $10^{15}$ floating-point operations/sec) system in operation and a second Petascale system is being deployed. Energy efficiency and environmental impact of computing systems are at the forefront in systems procurement, installation and operation.

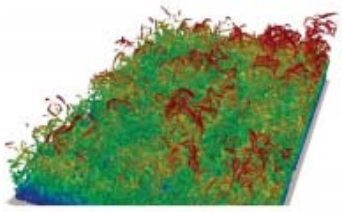
PRACE is funded by European government organisations responsible for High-Performance Computing resources and services for public research. PRACE also receives funding from the European Community Seventh Framework Programme (FP7/2007-2013) under grant agreement n° RI-261557. PRACE-RI is governed by a council of representatives of the member governments and is seated in Brussels, Belgium. PRACE current members are Austria, Bulgaria, Cyprus, Czech Republic, Finland, France, Germany, Greece, Ireland, Italy, The Netherlands, Norway, Poland, Portugal, Serbia, Spain, Sweden, Switzerland, Turkey and the UK.

## PRACE Seminars

PRACE industry seminars are ideal events for parties engaged in European HPC, not only to learn about how PRACE resources, expertise, education and training can contribute to business success, but also to meet others engaged in European HPC and share experiences. The seminar is designed for small as well as large enterprises. The PRACE expertise includes extensive knowledge in a broad range of computer systems, software, infrastructure and emerging technologies, and training in the effective use thereof.

**The PRACE 2011 Industry Seminar** will take place in Stockholm following the success of the previous Industry Seminars in 2008 in Amsterdam which included 93 attendees from 13 European countries representing 35 European companies and in 2009 in Toulouse with 103 attendees from 19 European countries representing 57 European companies.

The 2011 Seminar will present success stories from HPC use in Nordic enterprises and address Independent Software Vendor (ISV) issues in HPC in addition to presenting PRACE resources, service offerings and plans. Sessions will address issues of high relevance to Small and Medium Enterprises (SMEs) and inform how PRACE can assist in terms of resources and expertise. The Seminar will also present opportunities to provide suggestions and inputs to PRACE to enhance its value to enterprises and to affect a pilot program being established for use of PRACE resources and services by industrial, commercial and public sector entities.



© Linné FLOW Centre, KTH Mechanics, Stockholm, Sweden: Vortical structures in a turbulent boundary layer.

## PRACE for Enhanced Competitiveness

Simulation and data analysis are integral parts of engineering research, development, product design and manufacturing as well as the third pillar of scientific discovery together with theory and experimentation. Simulation and data analysis are also integral and critical parts of business decision making in many enterprises. Success stories cover the range from multi-million Euro capital equipment, such as aircraft, to consumer products costing a few Euros or less, and also decision making in many sectors, such as energy, finance and transportation affecting billion Euro activities.

PRACE can contribute to the competitiveness of European enterprises and effectiveness of public sector entities through its computation and data management resources and expertise. This leads to shortened time-to-solution, improved products from a user's perspective, decreased cost, more informed or faster decision making and more effective and efficient services.

### Why should you participate?

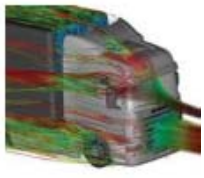
**The seminar presents a unique opportunity for enterprises to voice requirements and potential obstacles in using PRACE services and to influence PRACE plans.**

**Your participation provides a prime opportunity to influence the PRACE pilot program being established to lower the barriers for industrial use of PRACE resources and associated services.**

**Engagement of enterprises is essential for PRACE to successfully contribute to the competitiveness of European enterprises.**

**To be able to exchange contacts, ideas, and experiences on HPC usage with companies of different sectors and sizes.**

© Scania CV AB: Underhood thermal management simulations showing streamlines colored by velocity magnitude.



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e-infrastructure

PRACE receives funding from the EU's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° RI-261557.

**Figure 9 - Conference flyer**

# 8 Conference Booklet

A booklet containing the abstract of the presentations, was distributed to the attendees on the first day of the seminar. The text of the abstract can be found at Appendix 3. The booklet is also available at the seminar website together with the presentation slides [1].

# 9 Final programme

The final programme (see Figure 10) with its final design as distributed to the attendees on the first day of the seminar (also available on the website):

# Industrial Competitiveness: Europe goes HPC

## March 28-29, 2011
## Stockholm, Sweden

## Preliminary Agenda

**Monday 28th March**

| | | |
|---|---|---|
| 12:00 - 14:00 | **Welcome Buffet** | |
| 14:00 | **Seminar Opening** | Prof. Dr. Lennart Johnsson: PDC director, KTH and University of Houston |
| 14:15 | **Official Institutional Welcome Message** | Prof. Gunnar Landgren: KTH president advisor |
| 14:30 | **PRACE: Europe Goes HPC** | Prof. Dr. Achim Bachem: PRACE coordinator, FZJ |
| 14:45 | **PRACE and European Commission** | Dr. Bernhard Fabianek: High-Performance Computing, European Commission |
| 15:00 | **Success HPC Stories for Small to Medium-sized Enterprises** | |
| | HPC usage case from companies | 1. Mr Vincent Soumoy: Sales manager, Euro/CFD<br>2. Dr. Björn Sander: Technical director, HMI GmbH<br>3. Dr. Valentin Pavlov: CTO & VP R&D, Rila<br>4. Dr. Lukasz Miroslaw: CEO, Vratis Ltd. |
| 16:20 | **Coffee Break/ Video Demo Session** | |
| 16:40 | **Success Story of Pilot Usage** | |
| | Pilot results of using PRACE for open research | Dr. Koen Hillewaert: Scientific expert, Cenaero |
| 17:10 | **PRACE Information** | |
| | 5. Introduction of PRACE Research Infrastructure: deployment of RI, offered services, key results and future plans | Dr. Sergi Girona: Chair of the PRACE AISBL Board of Directors, Operations director, BSC |
| | 6. New technologies, prototypes and technology watch. Introduction to optimisation and petascaling services of PRACE | 1. Dr. Alan Simpson: PRACE 1IP WP7 Leader and Technical director, EPCC<br>2. Dr. Herbert Huber: PRACE 1IP WP9 Leader, LRZ |
| 18:10 | End of the First Day | |
| 20:00 | **Seminar Dinner** | **Vasa Museum** |

**Contact**

PRACE Coordinator:
Prof. Dr. Achim Bachem:
is2011-info@prace-ri.eu

**Tuesday 29th March**

| | | | |
|---|---|---|---|
| 8:00 | | **Coffee- croissants** | |
| | | | |
| 08:30 | | **Nordic Companies in HPC** | 1. Mr. Harald Hermansson: Managing Director, Efield AB<br>2. Mr Anders Rhod Gregersen: Senior specialist, Vestas Wind System |
| | | | |
| 09:15 | | **Parallel Sessions** | |
| | | **HPC access for SMEs**<br><br>Dr. Christian Tognacca: Director, Beffa Tognacca Ltd.<br><br>Moderator – Mr. Dominik Ulmer: General manager, CSCS Swiss National Supercomputing Centre | **How to port applications to new architectures**<br><br>Prof. Erik Hagersten: CTO, Rogue Wave Software AB<br><br>Moderator - Dr. Stefan Wesner: Managing director, HLRS | **Relations with ISV (independent software vendors) and open source communities**<br><br>Prof. Hrvoje Jasak: Director, Wikki Ltd.<br><br>Moderator – Mr. Stephane Requena: CTO, GENCI |
| | | | |
| 10:15 | | **Coffee Break/Video Demo Session** | |
| | | | |
| 10:35 | | **Success HPC Stories for Large Enterprises** | |
| | | HPC usage cases from industries | 1. Mr. Anthony Lichnewsky: Software architect, Schlumberger WesternGeco<br>2. Mr. Ola Widlund: Principal Scientist, ABB Corporate Research |
| | | | |
| 11:35-12:00 | | **PRACE: What's Next?** | |
| | | Public-private partnerships in HPC of European relevance | Dr. Maria Ramalho: project co-ordinator, FZJ |
| | | | |
| 12:00 – 13:00 | | **Wrap-up Sessions** | |
| | | Driving economic growth with HPC | Chair - Dr. Mark Parsons: Executive director of EPCC |
| | | | |
| 13:00 | | **Closing of Seminar** | |
| | | | |
| 13:05 | | **Lunch** | |

**Contact**
PRACE Coordinator:
Prof. Dr. Achim Bachem:
is2011-info@prace-ri.eu

**Figure 10 - Final programme of the seminar**

## 10 Material distributed to the attendees

At the registration desk the attendees received a conference folder with a PRACE brochure, the final programme, the booklet of presentation abstracts, a brochure for visiting Stockholm with a map and an USB Key with PRACE materials (brochure, newsletters, etc.) and the abstracts booklet from presentations of the seminar speakers.

## 11 Attendees

The participation in the seminar was by invitation only. Each member of the PRACE-1IP Management Board (MB) was asked (with the help of 1IP-WP5 representatives and the PC) to contact potential attendees and to invite them personally to attend the seminar. In the first step, the potential attendees received an invitation letter, which was sent by each national PRACE partner. After the letter was sent out, PRACE MB members and the PC members made follow-up contacts by phone calls and personal visits.

This process lead to a final participation of **81 attendees** during the two days of the seminar including:

- 20 European countries represented (14 PRACE AISBL partners: Netherlands, Portugal, France, Germany, United Kingdom, Italy, Spain, Finland, Norway, Sweden, Switzerland, Ireland, Bulgaria and Poland)

  Five participants from four non-PRACE European countries: Belgium (from CENEARO), Denmark (from Vestas), Estonia and Lithuania (from academic HPC centres)
- Two participants from USA (from University of Houston and ANSYS)
- Two participants from Russia (from T-Platforms)
- One representative from the EC (Mr B. Fabianek)
- 39 European companies with 11 SMEs (Small and Medium Enterprises)
- 34 representatives of PRACE and other HPC European Centres
- A wide range of industrial domains highlighted in the HET's Scientific Case

A complete list of attendees with their names, countries and affiliations can be found in Annex 1 of this document.

## 11.1 Distribution of attendees per country

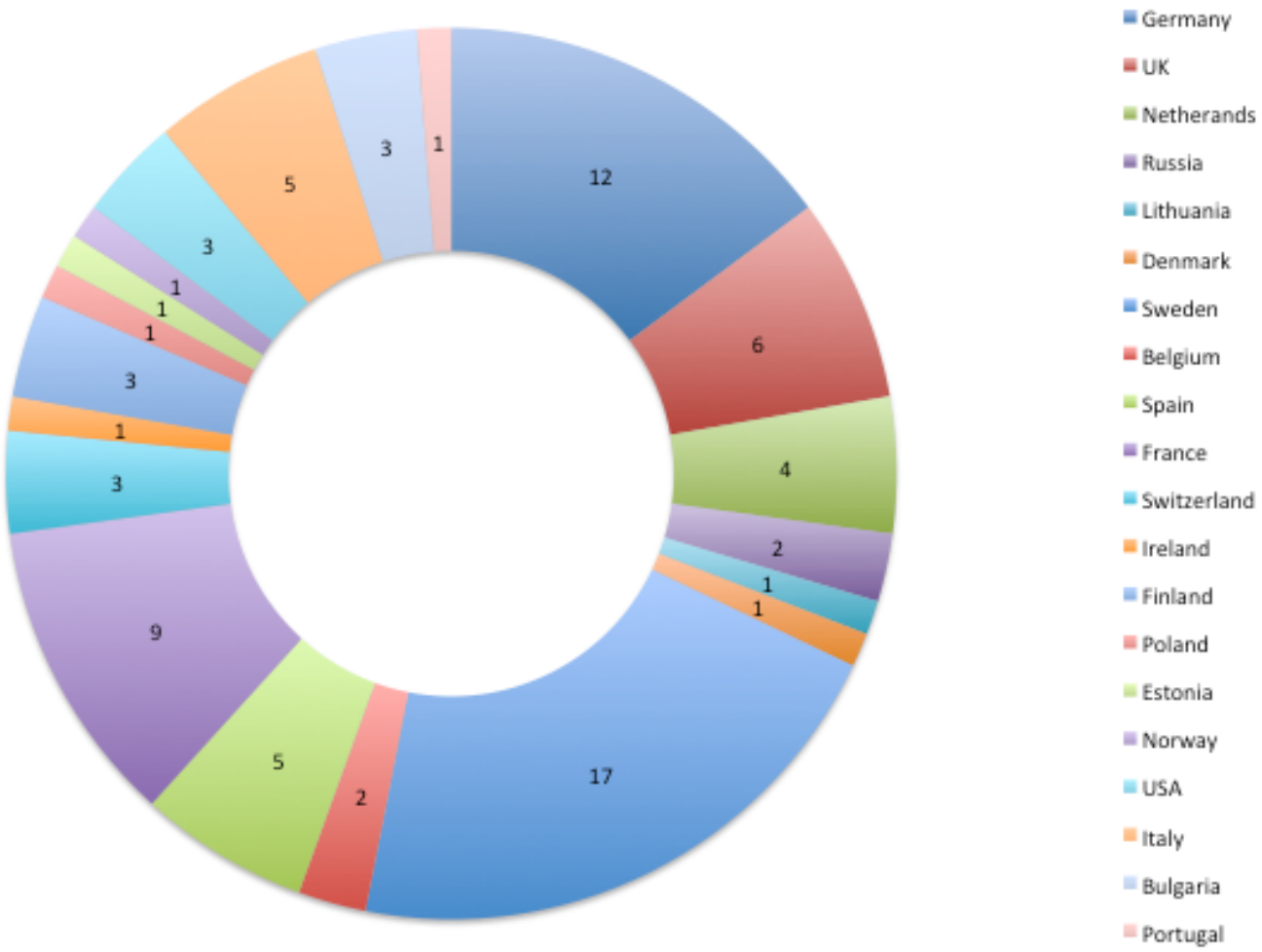



**Figure 11 - Distribution of attendees per country**

The 3rd PRACE Industry Seminar gathered attendees from 22 countries, three of which were present at a PRACE Industry Seminar for the first time: Denmark, Lithuania and Estonia. All three are potential future members of PRACE with Belgium and Estonia already having contacted PRACE for membership information.

The attendance of European Northern and Eastern countries was 30 people, which represent close to 40% of the total attendance.

## 11.2 Distribution of attendees per Industry domain

The 3rd PRACE Industry Seminar was successful in enlarging the previous attendance on new industrial domains, like Digital Media (with HMI TECH) and Risk Management (simulation of damages, modelling the impact of emissions from industrial activities, ... with FLUVIAL, RILA SOLUTIONS and NUMTECH).

It was also successful in attracting 12 SMEs accounting for close to 30% oft he total number of companies attending the event.

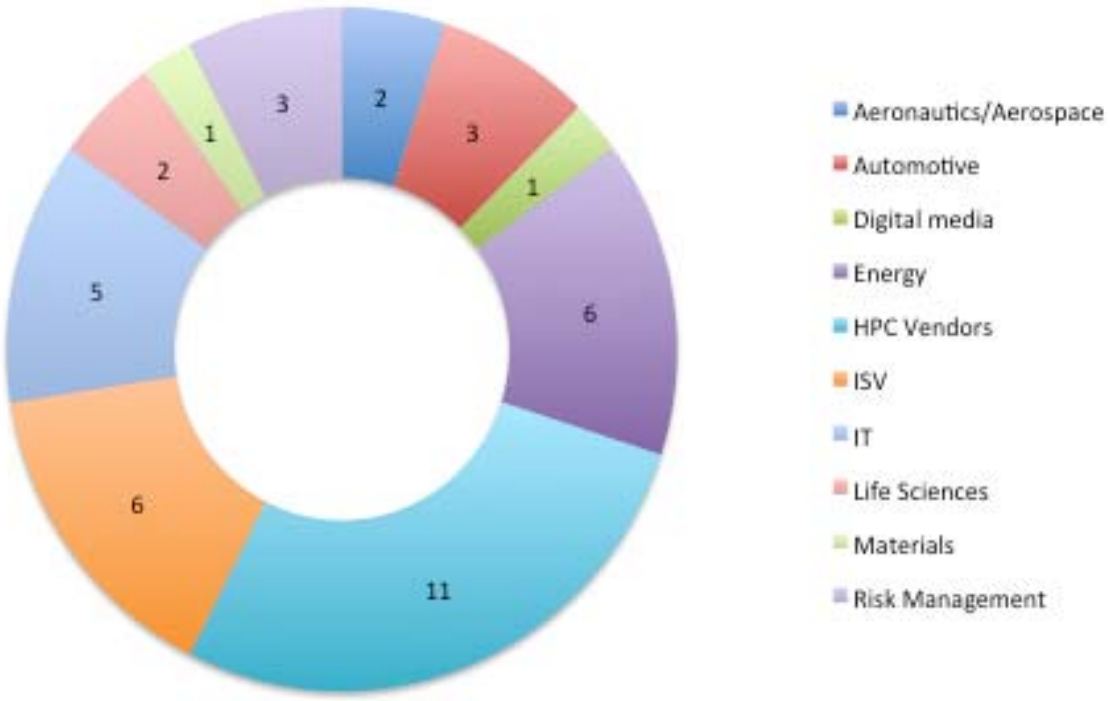



**Figure 122 - Distribution of attendees per industrial domain**

The Energy domain was represented by the following companies:

- ABB (Sweden), EDF (France), ENI (Italy), REPSOL (Spain), SCHLUMBERGER (UK) and VESTAS (Denmark)

The Automotive domain was represented by the following companies:

- EURO-CFD (France), RENAULT (France) and SAAB (Sweden)

The Aerospace domain was represented by the following companies:

- AIRBUS (France) and CENEARO (Belgium)

The Materials domain was represented by the following company:

- ARCELOR-MITTAL (France)

The Life Sciences domain was represented by the following companies:

- Merck Sharp & Dohme-Chibret (The Netherlands) and VRATIS (Poland)

The Risk Management domain was represented by the following companies:

- FLUVIAL (Switzerland), NUMTECH (France) and RILA SOLUTIONS (Bulgaria)

The IT domain was represented by the following companies:

- The Fraunhofer-Chalmers Research Centre for Industrial Mathematics (Sweden), T-SYSTEMS (Germany), TECHNOTRONICS BG (Bulgaria) and a Private Investor (Finland)

The HPC vendors were represented by the following companies:

- AMD, CRAY, EUROTECH (Italy), IBM, INTEL, NUMASCALE (Norway), PARTEC (Germany), T-PLATFORMS (Russia), SOUTHPOLE (Sweden), SUPERMICRO (UK) and SYNTECTIVE LABS AB (Sweden)

The ISVs domain was represented by the following companies:

- ANSYS (USA), CD-ADAPCO (UK), EFIELD (Sweden), EURO-CFD (France), ESI GROUP (France) and WIKKI (UK)

Of the 39 companies the following were SMEs (Small and Medium Enterprises):

- EFIELD, EURO-CFD, FLUVIAL, HMI TECH, NUMASCALE, NUMTECH, RILA SOLUTIONS, SOUTHPOLE, SYNTECTIVE LABS AB, TECHNOTRONICS BG, VRATIS and WIKKI

## 12 Feedback of attendees

In order to evaluate the effectiveness of the 3rd PRACE Industry Seminar an evaluation form was prepared and presented with the conference documentation to the attendees. The evaluation form can be found in Annex 2. At the beginning of the seminar it was announced that the evaluation form would be collected in a specially prepared box and a drawing would be conducted from submitted evaluation forms at the end of the seminar and two lucky winners would receive Apple iPods. (or possibly digital music players)

Of 81 attendees, 36 evaluation forms were collected, 26 from company attendees and 10 from PRACE partner participants (members of the PC were excluded from submitting evaluation forms) and EC attendees. The winners in the drawing were Mr Lukasz Miroslaw CEO of Vratis Ltd., Poland and Dr Algimantas Juozapavicius, Vilnius University, Lithuania.

The evaluation questions and responses were as follows:

***Rating Level: 1-Excellent, 2-Very Good, 3-Good, 4- Fair and 5-Poor***

| Question | Results for all attendees | Result for industry attendees |
|---|---|---|
| Overall impression | 1.7 | 1.7 |
| Relevance of topics | 1.78 | 1.89 |
| Agenda | 1.75 | 1.89 |
| Quality of background documents distributed | 1.87 | 2.15 |
| Discussions | 1.8 | 1.89 |
| Speakers | 1.78 | 1.8 |
| Preparation & distribution of background documents | 1.8 | 1.82 |
| Support from organising staff | 1.28 | 1.37 |

| | | |
|---|---|---|
| Conference facilities | 1.25 | 1.33 |
| Hotel choice | 1.65 | 1.69 |
| Social Event (Dinner and tour at Vasa) | 1.36 | 1.43 |

**Table 1 – Average rating from 36 responses**

The distribution of the answers is easily seen from Figures 14 and 15.

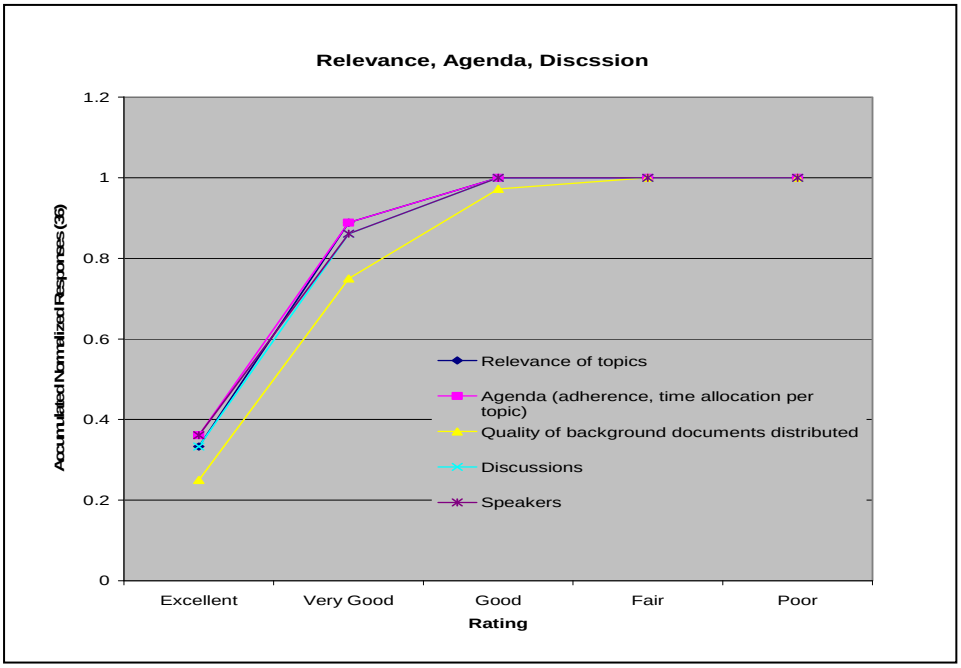



**Figure 14 - Normalized responses for relevance, agenda and discussion**

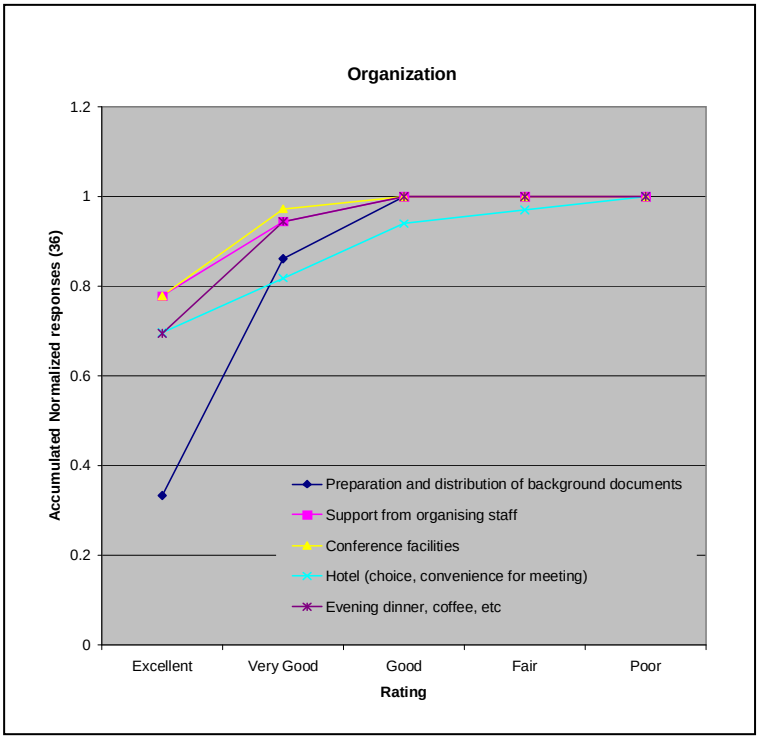



**Figure 15 - Normalized responses for organisation**

As seen from Figures 14 and 15, for most aspects of the event about 90% of the attendees rated the event as Very Good or Excellent. But the responses also shows where improvement can and should be made for the 2012 4th PRACE Industry Seminar.

Attendees were also asked to answer the following questions:

- Do you wish to receive news from the PRACE project? **Result: 32 YES out of 36 responses, which is a very promising result in terms of European interest in PRACE.**
- After this seminar would you like to be contacted for a follow up about your needs and expectations of your company on the infrastructure?

  **Of 26 answers from the industry attendees half did express an interest in a follow-up from PRACE, with the other half either declining or declaring no interest at this time but possibly later. Thus, there is very important that a dedicated follow-up activity is undertaken to develop the interest among participating companies and assure that PRACE as seen as a valuable resource.**
- Do you (or one of your colleagues) plan to attend the fourth industry seminar in 2012? **All 26 answers from industry attendees were positive which is a very strong indicator that the 3rd PRACE Industrial Seminar met its objectives and that there is a real interest within industry to explore relationships with PRACE.**

# 13 Next Steps

## 13.1 Follow up meetings

The main finding of the seminar is that companies expressed as their foremost interest access to the knowledge present within PRACE. Access to hardware resources is secondary. The event provided an opportunity for companies, academia and PRACE representatives to take the first step to establish relationships for knowledge sharing and potential use of PRACE resources.

It is recommended that the participants (from both industry and academia) that expressed interest in further contacts with PRACE be contacted within a 3-month period with the following objectives:

- To facilitate establishing collaboration between industry, academia and PRACE if not already well under way
- To gather information on preferred or established business models for such collaborations
- To determine next steps towards developing collaborations or suitable business models

The follow-up activity should preferably take the form of a comprehensive and in-depth dialogue. Shall there be a need for further assistance; the PRACE project team should provide any additional information, e.g. in regards to PRACE, or facilitate establishing desired levels of communication with PRACE partners. In such cases, further meetings might be necessary, and PRACE 1IP project team members should participate in the initial phases of establishing such collaborations.

It is also recommended that in the follow-up contacts with the industrial participants it is assessed whether or not the seminar did trigger some actions towards increased or more novel use of HPC, or lead to opportunities for access to new, more diverse or more extensive HPC resources.

### 13.2 Online Survey

An on-line survey following the seminar could accompany or precede the follow-up meetings/interviews and it could serve a number of purposes:

- To determine how the end-users' system requirements have changed
- To find out whether the current business models offered by the HPC infrastructure centres are adequate and how such models should be changed to facilitate increased corporate use
- To find out what is needed in order to enable companies and academia to optimise their collaboration
- To find out the level of interest in the next seminar and what topics should be addressed
- To find out what expertise companies is particularly interested in receiving from PRACE

## 14 Conclusions

Following the two previous editions of the PRACE Industry Seminars in 2008 in Amsterdam and 2009 in Toulouse, the 3rd PRACE Industry Seminar in Stockholm was a very successful event. From the event evaluation by the participants PRACE successfully disseminated information about the recent inauguration and successful start of operations of the Research Infrastructure, and arose interest from industry to explore opportunities to work with PRACE. The 81 participants represented 22 countries and 39 companies, with many of the 20 new companies having their base in the Nordic or Eastern regions of Europe, as hoped for in deciding to locate the 3rd PRACE Industry Seminar in the Nordic region. The fact that close to half of the participants had attended at least one previous PRACE Industry Seminar is also a strong indicator of companies finding the seminars useful.

The format of the seminar, its size and the local venue setup did result in very active question sessions after the formal presentations, given a good indication of an effective information exchange. Extensive discussions in the parallel sessions further enhanced the dialogue and information exchange. The conclusions from the parallel sessions were highlighted during the final wrap-up panel session. With respect to advances in application porting, and development of new languages and compilers, neither significant change nor convergence has been experienced by companies in the last few years. Regarding the design of applications, the participants expressed an increasing urge to avoid isolation, and to find a path to co-designing applications together with ISVs. To increase commercial exploitation of the outcomes further analysis is needed and new licensing models found. PRACE could potentially facilitate several aspects of evolving software and licensing models through active dialogue and collaboration with corporate users. As in previous seminars, training of well-qualified HPC professionals is seen as a key factor by companies in evolving its use of new methods, software and HPC technology. Finally, in regards to SME access to Tier-0 resources, in many

cases effective use of such resources is beyond the capabilities of SMEs who typically are not in a position to send staff to training events to make them competent in adapting or developing applications suitable for Tier-0 resources. SMEs need to learn more about know-how and human resources from PRACE than access to hardware resources. Access to skills is seen as more important than to hardware capabilities. PRACE needs to become an enabler to companies, putting tools in the hands of SMEs and sharing successful business cases.

The feedback collected from evaluation forms is very positive and now the project and the infrastructure have to ensure follow-up and regular communication with the attendees in order to enable a fluent communication with companies to achieve the enabler role.

## 15 Acknowledgements

The authors of this deliverable and the PC want express their sincere appreciation to the seminar participants, in particular the company participants, but also the local organizers for a very successful event. The openness and insights shared by the corporate participants is what made this seminar a very effective information exchange event with promise for a good path towards an effective collaboration between PRACE and the corporate world.

# 16 Annex 1- List of attendees

The following table shows the list of the attendees. The list is sorted alphabetically by the last name.

| First Name | Last Name | Affiliation | Country |
|---|---|---|---|
| Achim | Bachem | Forschungszentrum Juelich GmbH | Germany |
| Alan | Simpson | EPCC, The University of Edinburgh | UK |
| Alfred | Geiger | T-Systems | Germany |
| Algimantas | Juozapavicius | Vilnius University | Lithuania |
| Ana Bela | Dias | NCF (Netherlands National Computer Facilities Foundation) | The Netherlands |
| Anders Rhod | Gregersen | Vestas Wind System | Denmark |
| Anette | Arling | KTH PDC-HPC | Sweden |
| Anthony | Lichnewsky | Schlumberger | UK |
| Anwar | Osseyran | SARA | The Netherlands |
| Arndt | Bode | Leibniz Supercomputer Centre LRZ | Germany |
| Bernhard | Fabianek | European Commission | Belgium |
| Björn | Sander | HMI GmbH | Germany |
| Carl-Daniel | Norenberg | Intel Nordic AB | Sweden |
| Carlos | Merida-Campos | BSC | Spain |
| Catherine | Riviere | GENCI | France |
| Christian | Tognacca | Fluvial | Switzerland |
| Cinzia | Zannoni | CINECA | Italy |
| Daniel | Ahlin | KTH | Sweden |
| Dominik | Ulmer | CSCS Swiss National Supercomputing Centre | Switzerland |
| Elena | Churakova | T-Platforms | Germany |
| Eoin | Brazil | ICHEC | Irland |
| Eric | Landel | Renault | France |
| Erik | Hagersten | Rogue Wave Software AB | Sweden |
| Erling | Weibust | IBM Svenska AB | Sweden |
| Erwin | Laure | PDC/KTH | Sweden |
| Etienne | de Pommery | ESI Group | France |
| Francesc | Subirada | BSC-CNS | Spain |
| Gaël | Mathis | ArcelorMittal | France |
| Gert | Svensson | KTH PDC | Sweden |
| Giampietro | Tecchiolli | Eurotech S.p.A. | Italy |
| Gilbert R. | Lauber | T-Platforms | Germany |
| Gunnar | Landgren | KTH | Sweden |
| Harald | Hermansson | Efield AB | Sweden |
| Herbert | Huber | Leibniz Supercomputing Centre | Germany |
| Hrvoje | Jasak | Wikki Ltd. and University of Zagreb | UK |
| Hugo | Falter | ParTec Cluster Competence Center GmbH | Germany |

| First Name | Last Name | Affiliation | Country |
|---|---|---|---|
| Jakob | Sandgren | Southpole AB | Sweden |
| Jean-Yves | Berthou | EDF | France |
| Jerry | Eriksson | HPC2N | Sweden |
| Jesus | Garcia | Repsol | Spain |
| John | Bancroft | Science & Technology Facilities Council | UK |
| Kari-Pekka | Estola | Private Investor | Finland |
| Karl | Solchenbach | Intel | Germany |
| Kimmo | Koski | CSC - IT Center for Scinece Ltd. | Finland |
| Koen | Hillewaert | Cenaero | Belgium |
| Lauri | Anton | University of Tartu | Estonia |
| Leif | Nordlund | AMD | Sweden |
| Lennart | Johnsson | Univ of Houston and KTH | USA |
| Lilit | Axner | PDC/KTH | Sweden |
| Lukasz | Miroslaw | Vratis Ltd. | Poland |
| Magnus | Peterson | Synective Labs AB | Sweden |
| Marcin | Ostasz | Barcelona Supercomputing Centre | Spain |
| Maria | Ramalho | Forschungszentrum Juelich | Germany |
| Marjut | Andler | CSC | Finland |
| Mark | Parsons | EPCC | UK |
| Mattias | Sillén | Saab AB | Sweden |
| Michele | De Lorenzi | CSCS Swiss National Supercomputing Centre | Switzerland |
| Mitesh | Dudhaiya | Supermicro UK | UK |
| Morere | Marc | AIRBUS | France |
| Niels | Gronlund | Eurotech S.p.A. | Italy |
| Ola | Widlund | ABB Corporate Research | Sweden |
| Patrick | Aerts | NCF (Netherlands National Computer Facilities Foundation) | The Netherlands |
| Pedro | Alberto | University of Coimbra | Portugal |
| Pierre | Beal | NUMTECH | France |
| René | van Schaik | MSD | The Netherlands |
| Sanzio | Bassini | CINECA | Italy |
| Sergi | Girona | Barcelona Supercomputing Center | Spain |
| Sergio | Zazzera | ENI Exploration and Production | Italy |
| Simon | Mountfort | CD-adapco | UK |
| Sjur | Fjellbirkeland | Numascale | Norway |
| Sonia | Markova | Technotronics BG | Bulgaria |
| Stefan | Wesner | High Performance Computing Centre Stuttgart | Germany |
| Stephane | Requena | GENCI | France |
| Stoyan | Markov | Bulgarian National Centre for Supercomputing Applications | Bulgaria |
| Thierry | Marchal | ANSYS, Inc. | Belgium |
| Thomas | Eickermann | Forschungszentrum Juelich | Germany |
| Thomas | Lippert | Forschungszentrum Juelich | Germany |
| Ulla | Thiel | Cray | Germany |
| Uno | Nävert | FCC | Sweden |

| First Name | Last Name | Affiliation | Country |
|---|---|---|---|
| Valentin | Pavlov | Rila Solutions EAD | Bulgaria |
| Vincent | Soumoy | EURO/CFD | France |

# 17 Annex 2- Evaluation form

In order to gather feedback from the attendees an evaluation form was distributed to the attendees together with other conference material in a PRACE folder at the beginning of the seminar.

**Partnership for Advanced Computing in Europe**
**Third Industry Seminar – 28-29 March 2011 - Stockholm**

Dear Participant,

Thank you for attending the PRACE 3rd Industry Seminar in Stockholm, we hope you enjoyed this event. Please take a few moments to complete this short questionnaire.

## EVALUATION FORM

Name:_____ e-mail:_____

Institution / dept.:_____

Do you wish to receive news from the PRACE Research Infrastructure: YES NO

### I. OVERALL IMPRESSION

What is your overall impression of the event?

| Very productive 1 | Productive 2 | Not productive 3 |
|---|---|---|

### II. RELEVANCE, AGENDA AND DISCUSSIONS

Please rate the following elements.

| | Excellent | | Average | | Poor |
|---|---|---|---|---|---|
| *1)* Relevance of topics discussed | 1 | 2 | 3 | 4 | 5 |
| *2)* Agenda (adhered to, allocation of time per topic) | 1 | 2 | 3 | 4 | 5 |
| *3)* Quality of background documents distributed | 1 | 2 | 3 | 4 | 5 |
| *4)* Discussions | 1 | 2 | 3 | 4 | 5 |
| *5)* Speakers | 1 | 2 | 3 | 4 | 5 |

Comments:

### III. ORGANISATION

Please rate the following elements where applicable.

| | Excellent | | Average | | Poor |
|---|---|---|---|---|---|
| *6)* Preparation and distribution of background documents | 1 | 2 | 3 | 4 | 5 |
| *7)* Support from organising staff | 1 | 2 | 3 | 4 | 5 |
| *8)* Conference facilities | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| *9)* Hotel (choice, convenience for meeting) | 1 | 2 | 3 | 4 | 5 |
| *10)* Evening dinner, coffee, etc | 1 | 2 | 3 | 4 | 5 |

Comments:

## IV. FOLLOW UP WITH PRACE

After this seminar would you like to be contacted for a follow up about your needs and expectations of your company on the infrastructure?

| | |
|---|---|
| Yes | No |

Would you like to attend again the Forth Industry Seminar in 2012?

| | |
|---|---|
| Yes | No |

# 18 Annex 3- Abstracts of the presentations

**PRACE – Europe goes HPC**
**Prof. Dr. Achim Bachem**
**PRACE coordinator,**
**Chairman of the Board of Directors**
**Abstract**
Today, High Performance Computing (HPC) is a key technology and enables new possibilities to solve the most challenging scientific and engineering problems. In our global world, numerical simulations on supercomputers are becoming more and more important for companies who need to stay ahead of their competitors both in developing most innovative products and offering excellent services. A key element for a successful competition is an European independent access to HPC competence. The Partnership for Advanced Computing in Europe (PRACE) is a unique persistent pan-European Research Infrastructure for HPC. PRACE forms the top level (Tier-0) of the European HPC ecosystem and provides access to computing resources at the highest performance level and offers sophisticated services for scientific simulations in all fields of research and engineering. On all steps of the HPC value chain PRACE is collaborating with industrial partners. This ranges from the development of technologies for future generation supercomputers to large scale applications, e.g. in the aerospace industry. To enhance the applicability of HPC, the future model could be opened towards cloud computing, to adapt to the specific needs of industrial users to access the PRACE resources.

**The Business Dimension of the EU's HPC Strategy**
**Dr. Bernhard Fabianek**
**Research networking officer**
**European Commission**
**Abstract**
The European Commission is in the process of defining a European High-Performance Computing Strategy. This strategy will address the scientific and industrial HPC needs in Europe. The industrial component includes HPC services rendered for industrial use as well as an independent European access to HPC. PRACE is at the centre of the scientific European HPC efforts and makes its expertise available to industry. A European technology Platform for HPC will support the industrial access to HPC resources and services.

**HPC Tools & SME Competitivity**
**Dr. Vincent Soumoy,**
**SalesManager,**
**EURO/CFD**
**Abstract**
Most engineering organizations have an interest in leveraging the power of high-performance computing (HPC) environments to support their simulations. Everybody wants to deliver results faster, more cost effectively and with a greater degree of confidence. However, it is not easy or inexpensive to build a world-class computing cluster, and many small and mid-sized businesses simply cannot afford to make this kind of investment.
EURO/CFD founded in 2005 to create a cost-efficient, flexible HPC resource for companies across Europe who rely on computational fluid dynamics (CFD) simulations to analyze and improve their product and process designs, make this choice. Headquartered in Belfort, France

EURO/CFD is easily accessible to customers throughout Europe. The company serves a wide range of clients, including namely energy, automotive, aeronautics companies.
The mission of EURO/CFD is to enable customers to focus on their core engineering capabilities, while relying on the firm's simulations expertise and robust HPC cluster to produce high-quality results at a minimal investment of time and money. The company employs more than 15 multi-lingual engineers and scientists, experts in fluid mechanics and heat transfer.
EURO/CFD's HPC cluster, called "Little BIG," is the largest computing resource of its kind in France. The cluster consists of 720 AMD Opteron/Intel Xeon processors, operated under Windows HPC 2008 and Linux, in 64 bits. A Fast InfiniBand Network enables it to realize calculations on more than 200 millions of cells.
The challenge of EURO/CFD was to create a powerful computer cluster, which represents an investment that many companies are hesitant to make. By offering CFD consulting, EURO/CFD is hoping to introduce more engineering organizations to the speed and scale benefits of HPC enabled simulations.

**Usage of HPC in a Business environment**
**Dr. Björn Sander**
**Technical Director**
**HMI GmbH**
**Abstract**
Applications with growing computation need arrived in the industrial daily business. HMI is a software developer with language understanding background from Heidelberg, Germany. We use artificial neural networks (ANN) to qualify incoming documents in an e-mail response system. Calculating nets take a lot of our computing sources thus we are looking for external resources to fit our needs. In addition, the use of genetic algorithms multiplies this need. Our goal is, to research much bigger problems in order to optimize our workflows. We show two business cases which will lead us to HPC in the very near future.

**Usage cases from a Software Services company in South-East Europe**
**Dr. Valentin Pavlov**
**CTO & VP R&D**
**Rila Solutions EAD**
**Abstract**
We present Rila Solutions EAD -- a SME company from Bulgaria, working in the area of Software Services. We discuss the importance of HPC in the Software Services industry, why is it used and how does HPC leverage our competitive advantage. We outline our main HPC activities and their relation to distinctive European competences. We show how we currently apply HPC in our area and what are our plans for HPC-related activities in the next few years. Finally, we present some of the challenges which SMEs meet in regards with HPC.

**GPU Computing in the Cloud. A future of HPC**
**Dr. Lukasz Miroslaw,**
**CEO Vratis Ltd.**
**Abstract**
We present the use of SpeedIT library as the plugin in OpenFOAM platform which is commonly used in HPC systems. The SpeedIT Tools library provides a set of accelerated solvers for sparse linear systems of equations. Such systems can be found in various applications performed by SMEs such as computational fluid dynamics (CFD), computational chemistry, structural engineering, electromagnetics, semiconductor devices, thermodynamics, materials, acoustics, computer graphics/vision, robotics/kinematics, as well as in optimization,

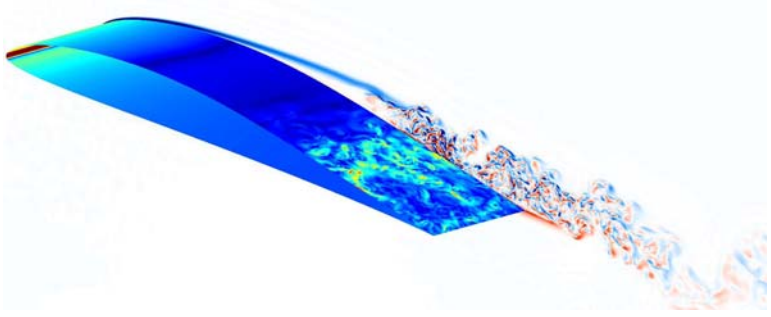
circuit simulation, economic and financial modeling, mathematics and statistics, power networks. Manyfold acceleration was achieved by implementing SpeedIT algorithms on multi-GPU systems. We will show its performance in a selection of 3D and 2D CFD simulations. The GPU-based HPC platform equipped with such software is a reasonable alternative to expensive multi-core systems.

**Evaluation of the discontinuous Galerkin method for direct simulation of industrial turbulent flows**

**Dr. Koen Hillewaert**
**Scientific expert, Cenearo, CFD and Multiphysics group**

**Abstract**

During the last few decades, Computational Fluid Dynamics (CFD) has become an indispensable tool for the aeronautic, automotive and energy-related industries. Current practice is based on Reynolds-Averaged Navier-Stokes (RANS) simulations in which the average effect of the turbulence on the flow is modeled.
A number of important design challenges, such as noise generation, unsteady loading on wind turbines and buildings, stability of rotor flows and combustion processes, efficiency of cooling ... require the direct computation of turbulent structures.
Thereto approaches, such as Large Eddy Simulation (LES) and hybrid RANS-LES methodologies, have been developed and investigated over the last decade. Here the modeling is restricted to the smallest turbulent scales, and the largest structures are directly computed. These approaches require very low numerical dissipation.
During the last decade, research has clearly been focused on the physical models, while much less effort has been spent on developing the adequate discretisation technologies. The fundamental benchmarks used are geometrically very simple, and highly accurate codes can be constructed easily on regular structured meshes. It is clear however that the use of these codes for the computation of industrial flows is not evident or even possible.
In industry more flexible standard CFD codes are currently being used to cope with the complex geometry. As these codes have often been adapted to preserve kinetic energy, they are used at the border of stability, and hybridisations of kinetic-energy preserving and more diffusive schemes need to be used. The use of these standard CFD methods is far from optimal, given the impact of the hybridisation and the low order of accuracy.
The advent of new unstructured high-order methods, combined with the availability of large-scale computational resources will hence be key enablers for the computation of turbulent industrial flows. In particular the discontinuous Galerkin method (DGM) allows an arbitrary order of accuracy on unstructured meshes, whilst retaining high computational efficiency and large-scale parallelisability. The method is inherently stable, thus avoiding the need for flux hybridisation and allows for easy detection of under resolution.
The talk will elaborate on the ongoing research at Cenaero, in particular on the results of the application of the method to direct numerical simulation (DNS) of transitional flows such as the Taylor-Green vortex and an airfoil at Re=60.000, as a step-up to LES based computations. Furthermore, the roadmap for the next year and the potential interaction with PRACE will be discussed.



**Introduction of PRACE Research Infrastructure**
**Dr. Sergi Girona**
**Operations Director Barcelona Supercomputing Center**
**Abstract**
PRACE has its origin back in 2004 with the start of the HPCEur project. Since then, the concept of a Pan-European HPC Infrastructure has been further developed, and after a successful preparatory project, the PRACE Research Infrastructure (RI) was founded in April 2010 with a clear mission: to enable and support European global leadership in public and private research and development. Besides the supporting projects to prepare and implement PRACE, the RI was created as a Belgium Non-Profit International Association (AISBL) with 20 members, and the commitment of four different countries of more than 400 million euros to be used in the next 5 years in a distributed infrastructure. The deployment of PRACE RI has required an enormous organizational effort to prepare its operation. The Infrastructure is governed by different bodies and assessed by committees. Amongst its different activities, PRACE implements a peer review process to grant Tier-0 resources to projects across Europe. PRACE AISBL has been in place for just 11 months; however, it has granted a total of 700 million computation hours to projects of different nationalities. The members of PRACE plan to work on having an increasingly centralised infrastructure with responsibilities that are nowadays distributed amongst the hosts of the different Tier-0 nodes. Plans for PRACE RI are in place for also having a better integration with Tier-1 services, as well as for promoting the usage of HPC in scientific and industrial development in Europe.

**Petascaling Applications in PRACE**
**Dr Alan D Simpson EPCC Technical Director PRACE WP7-1IP Leader**
**Abstract**
PRACE invests significant effort in petascaling of key applications which are important to European researchers and industry. This is the largest activity within PRACE and has already involved all of the PRACE partners. The goal of the activity is to identify and understand the software libraries, tools, benchmarks and skills required by users to ensure that their application can use Petaflop/s systems productively and efficiently.
This talk will outline what PRACE has already achieved in this area, what it is currently doing and our plans for the future. As well as describing the work done on enabling key applications for Petascale systems, the activities covered will include: surveys of European HPC usage; the PRACE Applications Benchmark Suite; Best Practice guides to disseminate petascaling experience; and collaboration with user communities. The talk will also discuss the applications interactions between PRACE and industry and will show how industrial users can benefit from PRACE.

**New technologies, prototypes and technology watch**
**Dr. Herbert Huber BADW-LRZ PRACE-1IP WP9 Leader**
**Abstract**
PRACE invests considerable effort in the evaluation and development of new emerging HPC technologies. The goal of this activity is threefold:
(1) Collection of most up-to-date information on innovative technological developments;
(2) identification and evaluation of novel technologies that might be crucial for the European HPC infrastructure;
(3) collaboration with European and Europe based vendors to develop and assemble testable novel HPC technology prototypes.
The talk will outline what PRACE has already achieved in this area as well as our plans for the future. In addition the goals and activities of the PRACE Advisory Group for Strategic

Technologies (STRATOS) will be briefly presented and it will be shown how industrial users can benefit from this consortium.

**Wind. It means the world to us.**
**M.Sc and HD(O) Anders Rhod Gregersen**
**Senior Specialist**
**Wind & Site Competence Centre**
**Vestas**
**Abstract**
Vestas Wind Systems is the world leader in the design, engineering, and manufacturing of wind power plants. The success of the company is dependent wind, so knowing exactly how the wind blows becomes paramount. Over the past years there has been an increasing effort at Vestas to model the wind, from the microscale simulation of wind near the turbine, to the mesoscale modelling of entire weather systems. This is provided by usage of high performance computing (HPC).
HPC enables Vestas to remain the market leader, by providing our customers with a number of competitive advantages. Some of these are, finding the optimal locations for new wind turbine installations with respect to energy production, forecasting the energy production to enable integration with the power grid and virtual power plant prototyping, all of which increase the customers' business case certainty.
Once a wind power plant is in operation, a network of sensors supply Vestas with an ongoing stream of data. These actual site measurements are compared to the simulated data for the given site, and used in a feedback loop to further improve the processes and models, which govern the HPC simulations. This enables an even further increase in business case certainty for our customers, and is an example of how we use state of the art in HPC, statistics, meteorology and mechanical modelling in a complex interplay to deliver novel value to our customers.

**HPC: Opportunities and constraints for a small enterprise**
**Dr. Christian Tognacca**
**Director**
**Beffa Tognacca Ltd.**
**Abstract**
Our firm is a highly specialised, small enterprise active in the fields of hydraulics, hydrology, river mechanics and morphology, natural risk analysis and protection against natural hazards. Our three collaborators have a master in engineering and two of them have a PhD at the Swiss Federal Institute of Technology Zurich (ETH). Our enterprise has a very strong link to university and research world, one of the two owners is still teaching at the ETH in Zurich.
Our activities are strongly dependent on our expertise and know-how (so that the need for continuing education is high) but also on the numerical simulation tools we continuously develop within the frame of commercial jobs. The necessity to keep on developing and improving our numerical tools is given by the increasing needs and expectations of our clients (both public and private) but also by our wish and ambition to further increase the possibility to better understand and describe natural phenomena.
The opportunity to use the computational possibilities of HPC could help our enterprise to further improve its competitiveness but also to give a contribution to scientific progress. We already got in touch with the Swiss National Supercomputing Centre (CSCS in Manno) to define the possibilities to improve the capabilities of our numerical simulation tools (e.g. parallelising the codes) and we found a very interested and opened partner. Unfortunately the collaboration didn't start up to now, especially because it is difficult for our small firm to allocate the necessary resources (especially time) to this development project (which is not

really vital for our business). The daily activities and all the constraints of the projects do not allow us to invest much more time in research and development work. In the private sector, especially for a small enterprise, it is quite difficult to find the freedom as well as the time and the resources (existing at good universities or research institutes) to participate at conferences, to publish, to research and develop beyond the daily business.
From the PRACE seminar we expect to get new inputs and ideas on the possibilities to combine the daily activities on commercial projects and the collaboration with an advanced computing centre.

**Productivity and HPC**
**Prof. Erik Hagersten,**
**CTO**
**Rogue Wave Software AB**
**Abstract**
HPC is growing in several dimensions: (1) Using multicores and GPUs as the computational vehicle from which we build larger machines have raised the requirements for parallelism, (2) the larger data sets have increased the need for on-chip state and/or better data locality in the application, and (3) the HPC users have expanded from being a few computer science majors to a large number of scientists with a mixed background. HPC is also moving outside of the traditional labs and into mainstream business, such as Wall Street and the oil industry. This creates contradictive needs and requirements. Creating efficient data-intensive applications is getting harder, while the users tend to have their expertise more and more outside of computer science.
In this talk I will argue for a user-centric view requiring productive environments for HPC users. I will identify some of the major hurdles for effective usage of the computer resources, as well as effective usage of the scientist's time. I claim that productivity is a first-class citizen in HPC.

**HPC Deployment of OpenFOAM in an Industrial Setting**
**Prof. Hrvoje Jasak**
**Director**
**Wikki Ltd, United Kingdom and**
**University of Zagreb, Croatia**
**Abstract**
Availability of large-scale commodity computing power at reasonable cost we are experiencing today bring a new perspective of the need and capability of numerical simulation software in an industrial environment. A combination of the “drive to optimise” and stringent environmental regulations drives engineering requirements on the accuracy of simulation.
Improved understanding of aspects of fluid flow, structural stresses, heat and mass transfer in engineering components pushes the fidelity requirements to the level where only High Performance Computing (HPC) can provide the answer.
Traditionally, the limiting factor in use of large-scale HPC in Computational Fluid Dynamics (CFD) was the high cost parallel licenses of commercial simulation software. Over the last few years, Open Source implementation of established CFD algorithms has proven to be a game changer in the way CFD is utilised in an industrial setting. OpenFOAM (Field Operation and Manipulation) library is a popular CFD package with a substantial user base in many areas of engineering and science, in both academic and commercial organisation. A combination of open source development paradigm and zero license cost of running the software on massively parallel machines is changing the way engineers apply their CFD tools. This is primarily true in terms of size of simulation, use of alternative physical models (eg.

LES and DES), increase in mesh size to improve solution accuracy and use of optimisation algorithms based on CFD results.
In this talk, an overview of major developments and community contributions to the OpenFOAM library will be presented in the context of HPC. A brief overview of structure and characteristics of OpenFOAM will be followed by practical examples where low running cost of CFD with OpenFOAM on large computers changes the way CFD is applied in an industrial design process in small and large companies.

**HPC in Oil and Gas Exploration**
**Mr. Anthony Lichnewsky**
**Software architect**
**Schlumberger WesternGeco**
**Abstract**
Long-term global demand for energy is growing, largely driven by China and India. Fossil fuels will be filling the major part of that demand. The oil and gas industry faces many challenges. Operations are moving to deeper waters, harsher conditions and more remote locations. New reservoirs are harder to find, generally smaller and geologically more complex. As a result, replacing reserves and adding production capacity is becoming more technology and capital intensive.
To reduce exploration risks and costs, seismic exploration, our exploration method of choice, relies heavily on high performance computing to produce high quality “maps” of the subsurface.
I will quickly describe the principles of seismic acquisition and processing, and then address its growing computational and storage requirements.
I will present the current state of Schlumberger’s seismic-related HPC activities, and, if time permits, the other uses we have for HPC.
Finally, I will comment on current and future challenges as we move towards exascale computing.

**Simulations in a global company: Possibilities and challenges**
**Mr. Ola Widlund**
**Principal Scientist**
**ABB Corporate Research**
**Abstract**
ABB started benchmarking its use of computer simulations against other global companies a few years ago, after the publication of a large international study showing that the world's most successful companies performed more simulations, and earlier in the design process, than did their less successful competitors. An internal survey was performed across all ABB divisions, asking both individual business units and corporate research centers about the importance of simulations in their business and the needs they saw for global collaboration. The general trend was for a growing use of parameterized simulation models, used by non-experts, and their tighter integration in the engineering processes. The study also pointed at a large need for company-wide coordination and sharing of software licenses, and an interest in sharing HPC hardware resources across the group. Already in 2005, simulation experts in several companies and countries formed the "ABB Simulation Network". This group of specialists is very active in shaping the future of numerical simulations within ABB. The talk discusses the possibilities and challenges we see in the use of numerical simulations, and the progress we have made so far in coordinating the activities across the company.

**Public-private partnerships in HPC of European relevance**

**Dr. Maria Ramalho**
**Project co-ordinator**
**FZJ**

**Abstract**

Europe requires investment in research and development to achieve a leading position in mastering HPC technology. Private-public partnerships will facilitate the creation of successful initiatives in this area by:

- Allowing industry to directly influence research priorities in the market areas with the most competitive relevance,
- Addressing the issue of the fragmentation of the European HPC industry and research base by proving a forum for collaborative research projects,
- Stimulating the growth of the European HPC value chain,
- Defining technological barriers to the exploitation of the technology for innovation purposes.

This talk will describe the work done by the PROSPECT Association to foster the creation of public-private partnerships in HPC in Europe and the important role of HPC users for the success of such partnerships. As a complement of the PRACE initiative, the private-public partnerships will have European industry use cases as the main focus and will leverage the know-how and skills available in academia and HPC research centres.