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**PRACE First Implementation Project**

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## References and Applicable Documents

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- [2] D4.2 Establishment of PRACE Advanced Training Centres, PRACE-2IP project
- [3] <http://www.britishtscienceassociation.org/web/britishtsciencefestival/>

## List of Acronyms and Abbreviations

BSC	Barcelona Supercomputing Center (Spain)
CEA	Commissariat à l’Energie Atomique (represented in PRACE by GENCI, France)
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
EESI	European Exascale Software Initiative
EPCC	Edinburg Parallel Computing Centre (represented in PRACE by EPSRC, United Kingdom)
EPSRC	The Engineering and Physical Sciences Research Council (United Kingdom)
ETHZ	Eidgenössische Technische Hochschule Zuerich, ETH Zurich (Switzerland)
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
IBM	Formerly known as International Business Machines

ICHEC	Irish Centre for High-End Computing (Ireland)
IDRIS	Institut du Développement et des Ressources en Informatique Scientifique (represented in PRACE by GENCI, France)
JSC	Jülich Supercomputing Centre (FZJ, Germany)
LRZ	Leibniz Supercomputing Centre (Garching, Germany)
NCSA	National Centre for Supercomputing Applications (Bulgaria)
SARA	Stichting Academisch Rekencentrum Amsterdam (Netherlands)
SNIC	Swedish National Infrastructure for Computing (Sweden)
STEM	Science, Technology, Engineering and Mathematics
STFC	Science and Technology Facilities Council (represented in PRACE by EPSRC, United Kingdom)
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





## Executive Summary

This deliverable summarises the work during the PRACE First Implementation Phase project (PRACE-1IP) mainly related to the education outreach and the production of a series of PRACE video films as part of the task 3.2 in Work Package 3: ‘Dissemination and Training’ during the project months 12 to 24 (July 2011 to June 2012).

The aim of this document is to show the results of the organisation and delivery of the first PRACE education outreach pilot case, the production of six different PRACE video films as well as the initial insights of the possible directions for extending the PRACE education outreach collaborations with countries and infrastructures outside PRACE.

The outcomes of this report are to be used by the PRACE-2IP and PRACE-3IP projects, PRACE AISBL and its members to support their outreach activities over the next two years. This encompasses a continuation of the PRACE collaboration with the educational institutions<sup>1</sup> throughout Europe that are not directly related to the current computational agenda, but with a strong impact on the preparation of the next European generation of HPC users in different scientific and engineering domains.

The produced series of PRACE video films provide a unique visualization and illustrative tool for preparation of future presentation kits for schools as well as promotional and training materials. Such visualisations are prerequisite in the establishment of strong interactive communication with the general public and more particularly reaching out to the secondary and tertiary education levels in Europe. The final video outcomes intend to build direct virtual connections to every target group from enlightening the general public of the benefits that provide HPC to influencing those in the secondary and undergraduate education to embark on a career in HPC.

## 1 Introduction

The document describes the PRACE educational outreach activities and the production of the series of PRACE video films as a key media tool for attracting a wide range of audiences and raising awareness of HPC in Europe. Abstractly, it is divided in two main parts:

- PRACE Education Outreach
- PRACE video films

Section 2 develops a conceptual framework for HPC Education Outreach that can be used by PRACE to elaborate its Education Outreach Programme. The framework will unify all PRACE members around the common activities in organising and reporting PRACE educational outreach efforts. In that sense it is an important mythology that allows PRACE to aim at all the key educational groups in efficient and effective manner. Section 2 presents a report on the first PRACE education outreach pilot case carried out during PRACE-1IP project. The pilot uses the criteria and instruments presented in the conceptual framework and demonstrate the strong impact that PRACE can achieve with the secondary education community group. One of the main results of the pilot is recording very high interest and enthusiasm in the youth audience about HPC. On this basis we have drawn up some practical

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<sup>1</sup> For the purposes of PRACE-1IP project, under the term “educational institution” it should be understood the secondary and tertiary education sectors in Europe.

recommendations for the PRACE-2IP and PRACE-3IP projects and other PRACE bodies engaged in educational outreach activities.

Section 3 outlines the process of producing the first series of PRACE video films. In a concise manner all production steps are described, along with a dissemination plan. The ultimate goal is to produce several relatively short video films that illustrate the advantages of HPC for the society and industry as well as highlight several achievements by PRACE as a pan-European research infrastructure. It includes examples ranging from tackling social challenges, to strengthening the industrial competitiveness to the role of PRACE in the European HPC ecosystem. All produced PRACE video films that are presented in this report reflects the PRACE-1IP project video team efforts and need to be approved by the PRACE AISBL before being presented to the audiences as PRACE video films. In that order the video films formal presentations to the PRACE audiences will be gradually deployed in the following few months. The first place where the produced PRACE video films will be presented is the PRACE AISBL web site: <http://www.prace-project.eu>.

Initially, the video production task was included in PRACE-2IP project, WP3, Task 3.2. Due to a swap involving the PRACE-1IP and PRACE-2IP prototype activities, the video production was brought forward the PRACE-1IP project WP3, Task 3.2. The decision allowed the PRACE-2IP project WP3 to use the video results in the preparation of presentation kits for schools one of the main instruments towards inspiration of the educational audience to HPC. In addition, the video films equip the PRACE-3IP project with a tool which can break up the traditional educational atmosphere during its outreach events.

Section 4 briefly covers the possibilities and challenges of having closer interactions with other European countries outside PRACE. It concludes that in some cases the practical deployment of such collaboration activities with European countries outside PRACE can take longer than their accession in PRACE. Additionally there has been suggested an extension in the scope and boundaries of the PRACE interactions including other e-infrastructures and countries outside Europe.

In general, we expect the results described in this document to trigger greater efforts to reach out to wider representatives from educational institutions and to raise the awareness of HPC throughout general public leading to increase interest and demand for local HPC services.

The Annex part of the document contains six supporting documents which allowed the Task 3.2 team to successfully execute all tasks and give a broader perspective on what have been done during the course of PRACE-1IP project.

## **2 PRACE Education Outreach**

Today, the education outreach is well-recognised as an important part of every organisational and community strategies for development in dynamic internal and external environments. It refers to activities that support formal, as well as informal education. This needs to ensure that the strategy is sustainable, but at the same time to enhance the social responsibility of the involved parties. This can be achieved through proactive activities that can encourage more people to be interested in, informed, and even enthusiastic about the current and future development of specific areas.

Generally, it is well-perceived that outreach focuses chiefly on enhancing and improving education in schools, homes and communities. In the context of the education outreach, it has to be gathered together educational benefits with the specific benefits of given target. In that respect, the PRACE education outreach is to link HPC with educational institutions in PRACE countries. The main outcome is to extend the impact of HPC domain through a

variety of educational materials, media services, and collaborative activities as well as by engaging more scientists and researchers and foster participation in HPC projects and initiatives jointly with secondary education institutions. This is an intangible investment in the next generation of knowledgeable and skilful supporters, colleagues and partners of HPC.

For the purposes of the PRACE-1IP project, it is defined that the PRACE educational outreach activities envisage theoretical and practical experiences for youths through:

- Popular Science events including presentation during scientific festivals
- HPC class in schools by visiting scientists
- Campus School
- HPC teams

In PRACE-1IP project, Task 3.2 defines the education outreach efforts around the coordination and strong partnerships. This includes joint activities between PRACE partners, the educational institutions and respective HPC communities. PRACE can play an essential role in promoting such collaborations and in fostering the development of new educational outreach initiatives at local level. At the same time, the PRACE has to continue its efforts to create new HPC educational resources available for all as well as granting free access to participants from all over Europe.

This is a prerequisite for future success and at the next stage PRACE needs to deploy a common pan-European educational outreach programme that ensures high interoperability within PRACE as well as with its partners outside PRACE.

## 2.1 A Conceptual framework for HPC Education Outreach

Computing has become the third pillar of scientific research, together with theory and experimentation. While scientific computing, in principle, can be performed with almost any device featuring a sufficient central processing unit, it is the HPC systems that provide the most important opportunity to improve our understanding of nature and reality by developing and testing complex models and comparing them against measured data.

Not only does basic research benefit from high-performance computing, but applied industrial research and development is increasingly reliant on computer simulations: to verify, complement and replace studies with prototype systems, and to bring insight in building them. It is hard to imagine an area of industrial production where computing would not bring any added value. Therefore it is of utmost importance that themes of scientific computing are brought into science education from as early stage as possible.

From its very beginning PRACE has identified that a sustained, high-quality training and education programme is a prerequisite to ensuring that the PRACE infrastructure will remain productive. This can be seen as a building block in PRACE efforts to prepare the next generation of European scientists and researchers that efficiently and effectively utilize the current massive parallelism of petascale computing architectures containing hundreds of thousands of cores and providing them with some insights about the near future of emerging technology, programming languages and models. In that respect, during the last few years PRACE has been organised series of training events seasonal schools or workshops following well-distributed principle all over the Europe.

### 2.1.1 Focus on secondary education

While the PRACE trainings have been mainly focused on students, postdoctoral, young researchers and etc. with carried out training programmes that aim at improving “application development” and “advanced” competencies, there is a clear shortage of PRACE efforts with youths from the secondary education and other tertiary education institutions.

It is very important to be investigated the question whether PRACE has to invest time and resources to such activities or leave this to the respected education system and concentrate on final refinement of the almost trained young people. Above all, there is no doubt that “application development” and “advanced” competencies must stay as a primarily focus in the PRACE education and training activities.

However, some limited efforts on catching youths’ attentions on the HPC can prevent a lot of following up efforts to compensate knowledge and skills that has been missed at previous educational levels. If we assumed that an excellence in HPC area would require at least very high level of knowledge and skills in two of the following three areas: mathematics, IT (architectures and software) and specific science domain, usually the youths get into the higher education with only some basic knowledge and skill in one of these areas. Moreover, in many cases, they acquire such competencies due to their personal interest to the given area without relying on the formal educational systems.

Despite the fact that it is hard to be expected the majority of these youths to be at highest level from that early ages, it can be strengthen their interest and enthusiasm by focusing them on the opportunities and perspectives that provides HPC for professional development and personal success. In that respect, basically this report is looking for opening youths minds up to the other two missing elements in the basic triangle of HPC.

The working group on that topic suggests this to be organised in a way that all PRACE partners share and combine resources. This will lead to higher synergy and improved the monitoring process and control over the execution of such complimentary activities to PRACE. Systematically, this is presented in the next sections called “education outreach activities”.

#### **Starting by Secondary education:**

- Producing videos and presentations materials that present HPC world in the most popular and appropriate language;
- Underlining the mastery of HPC programming languages/models;
- Promoting the inter-disciplinary aspects of HPC and computational science.

#### **Working together**

Having ready-to-run teaching material – presentation slides, videos, problems with answers, computer demos and assignments and so forth – can lower the barrier of incorporating HPC themes into the secondary education. This should be an interactive approach engaging HPC specialists as well as experts and practitioners (teachers and other experts) working with pupils.

#### **Preparing educational material**

The material would be planned and completed together with science / IT teachers and other experts in pedagogy. The teachers involved in preparing the material could be recruited at education outreach events. These presentation kits could include, for example, simple electronic-structure calculations including visualizations and molecular dynamics simulations within biology and chemistry classes; simulations of everyday phenomena in physics classes;

gene sequencing techniques in biology one and simple climate and weather models in geography classes and many others coming from every scientific domain. As these are not part of the school curricula in most European countries, the PRACE research infrastructure needs to take a leading role here.

#### 2.1.2 Education outreach activities

The organisation of the educational systems in PRACE members is quite diversified and unique so that it is impossible directly to be defined the common education outreach activities suitable for all PRACE members. In order to resolve this issue within the PRACE-1IP project, WP3, Task 3.2 it has been outlined the education outreach activities for PRACE that to be integrated in the following PRACE Education Outreach Programme. The task 3.2 working group identified a necessity these activities to be piloted in a couple of partner countries before being validated as the common tool for all PRACE members.

The suggested activities are based on discussions carried out in the period of September-December 2011 within WP3, Task 3.2. As result, there were defined four educational outreach activities that to be suggested as future operational instruments to the PRACE Education Outreach Programme.

As a result of the PRACE-1IP project one of the suggested activities was tested by a Pilot case organised by NCSA-Bulgaria in March 2012 (the report is enclosed in the Annex, subsection 6.3 Report on the Pilot case “Happening: Supercomputer Challenger” - Pravets, Bulgaria). Additionally, this report suggests further education outreach pilots in order to be tested and validated the viability the suggested activities in different European countries. An example of such following step, a pilot case in UK is presented in subsection 2.2. In future, there are planned to be organised further such activities (several HPC classes and Campus schools) as part of the PRACE-3IP project so that we can envisaged that by the end of PRACE projects it will be collected enough information and good practices in order to be deployed PRACE Education Outreach Programme.

The elaborated activities are grouped around three broad subtopics: education and dissemination events aimed at science teachers and pupils; classroom visits; and contribution to educational material. The visits to science classes are carried out by both experts working in the field of scientific computing, as well as undergraduate university students trained to carry out these visits.

##### 2.1.2.1 Popular science event for teachers and pupils

###### *Description*

In these regular science events organised around Europe the science, mathematics and informatics teachers and pupils from the secondary education will meet people working in computational sciences as well as with other e-infrastructures. For instance, there can be organised meetings at HPC centres giving an opportunity to teachers and pupils to see the most advanced HPC sites in their respective country or a special meeting on HPC can be organised as part of general scientific events such as the British Science Festival in UK. They consist of a few popular science presentations, in which scientists and researchers in computational sciences present the current activities in their field together with HPC centre staffs and vendor representatives who present the state of the art of the HPC systems.

*Goal:* The goal is to get the teachers and pupils informed and enthusiastic about computational science and to present to them the importance of computing and data analysis

in modern science in the hope this would then get channelled to the STEM (science, technology, engineering and mathematics) classes.

*Subject:* Basic understanding about HPC applications in science and industry - main scientific and applied achievements of high-performance systems, presentation of the strong visible applications in our lives.

*Continuance:* From one school hour to combination of several hours.

*Target group:* Teachers and pupils from all kinds of schools, but with an emphasis on schools with strong focus on science, technology, engineering and mathematics (STEM).

#### 2.1.2.2 HPC class in schools by visiting scientists

##### *Description*

HPC class in schools by visiting scientists is organised around the preparation of a ready-to-run presentation kits for lessons on computational science in science classes combined with shared practices by local HPC staff and scientific representatives. PRACE members may support in recruiting volunteers such as scientists, HPC experts and undergraduate students of some other related fields of science that would carry out these visits. Organising this around PRACE, it can be easily created a date repository of presentations that every single partner can replicate locally. In such activities is quite appropriate to be engaged undergraduate students strongly involved in the organisation and moderation of these visits.

*Goal:* All pupils to get informed and inspired by HPC as technology and its application in science, industry and other fields of our lives.

*Subject:* Basic knowledge about HPC - main scientific and applied achievements of high-performance systems in Europe, presentation of applications in industry and other fields of our lives (health care, environment, public transportation and etc.).

*Continuance:* From one school hour to combination of several hours in the format of workshop event as well as a combination of visits in the school within a longer time period for instance a visit per week for a month.

*Target group:* Pupils from schools with strong focus on STEM disciplines.

#### 2.1.2.3 Campus School

##### *Description*

Campus School is for pupils from the secondary schools with strong focus on youths with recorded profiles (achievements) in STEM, but also having strong interest in natural sciences. Eligible for the Campus School are pupils who are able to work independently and as members of teams and should have written permission by their parents. The school will be located in resorts/camp (mountains or seaside) and the duration will be no more than a week. Pupils will have access to online educational materials and will have direct contact with their teachers and special invited lecturers during the entire training process.

*Goal:* To work closely with youths that demonstrates strong potential in STEM disciplines, higher interest and knowledge in natural sciences.

*Subject:* Introduction to HPC – from computer architectures to programming paradigms as well as by presenting them the place and role of HPC in STEM disciplines.

*Continuance:* a week in a mountain / seaside camp

*Target group:* Pupils that demonstrate strong potential as well as are interested in subjects derived from STEM disciplines as well as their teachers.

#### 2.1.2.4 HPC teams

##### *Description*

HPC teams are volunteering groups that should be established within the PRACE member under the supervision of a prominent scientist/researcher who will be the leader of the team. Every team should have members possessing different level of knowledge in HPC as it is strongly recommended the involvement of undergraduate students. The team will have clear task to work on preparation and dissemination of the presentation materials for secondary education institutions taking into account the main educational programmes implemented in each respected country.

*Goal:* To create and broadly disseminate information and practices as well as supporting human resource development in the area of secondary education institutions at local level.

*Subject:* Supporting teams will provide information on different scientific areas of interest for the national and international thematic experiments and projects in the field of HPC. The idea is every team to be proactive at local level and establish communication channels with teachers from secondary educational institutions. They will have the responsibility to support the organisation of local and other PRACE education outreach events.

*Continuance:* Permanent

*Target group:* Generally to teachers from schools with strong focus on STEM disciplines but also pupils may benefits from this activity.

The suggested activities are the main operational component of the PRACE education outreach framework. What needs to be done in future is to be defining a mechanism for regular applications and selection of such projects proposals. This has to be included in the responsibilities of the PRACE AISBL Office working together with the outreach teams in the PRACE-2IP project and PRACE-3IP project. Generally, this can be seen as gradual approach in transforming the PRACE educational outreach efforts into sustainable Europe-wide programme scouting for the next generation of European scientists and researchers.

## 2.2 Education outreach pilot cases

The main education outreach outcome as part of the PRACE-1IP project is the organisation of the first education outreach pilot that to pave the way towards more dedicated PRACE efforts in that area. The entire process from the announcement of such possibilities to the organisation lasted for almost nine months and it was conducted within PRACE-1IP project, WP3, Task 3.2.

The Task 3.2 working group plan was to be piloted a couple of events in partners' countries that are part of the PRACE-1P project and have contributed efforts to the Task 3.2, WP3. A small amount of money for covering some costs was dedicated as there was an agreement that every pilot would rely on around 2000 Euros.

The procedure includes the preparation of pilot proposals in accordance with the template form (Annex, subsection 6.1) and following the initially elaborated education outreach activities. The initial announcement within WP3, task 3.2 for such pilots lasted for several months and preliminary interest was expressed by Bulgaria, Finland and UK.

The proposals for pilots were collected and the approval for organising pilots was given by the 3.2 task leader. Later on Finland decided to withdraw from its pilot and UK postponed it for the British Science Festival in September 2012 so that PRACE can experience different

educational outreach activities. As result the only PRACE-1IP project education outreach pilot was organised in Bulgaria on 29 March 2012.

#### 2.2.1 Pilot case “Happening: Supercomputer Challenger” - Pravets, Bulgaria

The pilot case “Happening: Supercomputer Challenger” is a task from WP3, Task 3.2, PRACE-1IP project. The pilot is a “HPC class in schools by visiting scientists” type of educational outreach activity (Annex, subsection 6.2 Project Proposal for Education Outreach Pilot). The event was organised by the NCSA in cooperation with the Department “Computer Systems” of the Technical University of Sofia on 29 March 2012 in Pravets, Bulgaria.

##### 2.2.1.1 Selection

The selection of the schools was based on their high specialisation in IT architectures and IT in general and following up correlations of the graduated youths with the engineering.

On those two broad criteria two schools were selected as part of Bulgarian secondary education system - Professional High Schools under the Technical University of Sofia:

- Professional High School of Computer Technologies and Systems, located at Pravets and
- Technological School “Electronic Systems” in Sofia.

The total number of the participants from these schools was above 85% at age from 18 to 19-year old so that the pilot was oriented to youths that from this 2012 may become students in the engineering or other science domains. In addition, because of the high interest at the local level, some pupils from the English Language School in Pravets also were invited to the event.

##### 2.2.1.2 Mission

The mission of the Happening is to promote "Supercomputing Architectures and Applications" in the secondary schools in Bulgaria as well as to inspire young people with a strong interest in the area of computer systems and technologies to consider HPC in their future plans.

##### 2.2.1.3 Programme

The Programme is organised around 3 modules of 45 minutes each one on high-performance computer systems and applications divided by two breaks and following wrapped up informal sessions (the Programme is enclosed in the Annex, subsection 6.3 Report on the Pilot case “Happening: Supercomputer Challenger” - Pravets, Bulgaria). The first part is as introduction to supercomputing and history of Bulgarian supercomputing and IT development. The next two modules include lessons subdivided into two parts:

- Covering the supercomputers development over the last 60 years presenting main architectures that have prevailed at certain stage and the Blue Gene/P architecture and how it works;
- Presenting lesson deals with HPC Applications (Life science, Bioinformatics, Environmental Changes) with strong role in our lives and HPC Infrastructure in Europe - HPC European community, supercomputer centres in Europe, European resources for HPC research.





Figure 1: Poster of the event

#### 2.2.1.4 Pilot results and recommendations

The pilot case “Happening: Supercomputer Challenger” gathers together at one place 120 pupils and teachers. This is three times the average number of participants that PRACE has succeeded to attract in its other training events for the last few years.

At the event it has been presented the NCSA presentation kit for schools that includes slides part combined with specific visualisations and a local video film. On that basis in the PRACE-2IP project the NCSA will work on an update of the presentation so that it to turn into a PRACE presentation kit that to include PRACE videos produced as part of this project.

In addition some practical recommendations have been drawn that to support forthcoming PRACE education outreach event. Most of them are quite logical, but well- taken in advance may increase the overall performance and outcomes of the event:

- The upper boundaries of “HPC class in schools by visiting scientists” should not exceed the three modules by 45 minutes. During the last presentation, it was observed weariness and absent-mindedness in the participating public;

- Mixing text presentations with visualisations make it easily to the public and keep their attentions and relatively good level;
- Having more than 120 pupils at one place can make the entire process difficult for control so that it is highly recommendable to divide the audience on small groups of around 60-80 participants which to lead to higher quality with stronger impact on the audience;
- Organising a final Quiz has been a very fascinating experience for the youths, but it is necessary to be controlled the entire process by teachers. The idea is to balance the distributions of the prizes between all participants when the criterion is a fast reaction. It was observed that a few people responded with very fast and there was a real threat to discourage other pupils and to compromise the idea;
- In a case, when the event is organised in small residential area it is recommended initially to be prepared a press release and someone to be take the responsibility of spokesperson and to communicate with the local media representatives. In NCSA example, there were provided several interviews for local TV and newspapers;
- The scientific examples that are covered should be limited maximum to two as it has been observed impatience after the first two examples presented during the event. Here the role of the moderator is even bigger than in other workshops and seminars;
- Contacting as early as possible the local schools as partners and engaging them in the organisation of the events definitely can facilitate the entire process. That provides further boost and commitment to the overall process;
- Following the fact that the education outreach event is different in its specifications, scope and audience, there should be prepared special give-aways for such event.

#### 2.2.2 Following PRACE Education outreach pilots

The positive results achieved by the 1<sup>st</sup> PRACE Education Outreach event should be strengthen and extended by PRACE in the following years. It is highly recommended the next events to be organised in a way so that all identified educational outreach activities are practically tested in smaller and bigger countries around Europe. Unlike the formal training planned in WP4 such as advanced parallel, hybrid, and GPGPU programming courses these events are to enlighten and encourage those in secondary and undergraduate education to embark on HPC by illustrating the advantages that HPC can bring to society and industry.

##### *2.2.2.1 Interactions with other PRACE projects*

PRACE has confirmed its engagements with outreach topic in the following up projects PRACE-2IP and PRACE-3IP. They will definitely boost the overall number of educational outreach pilot projects and reached out youths within the next two years so that some critical mass of general understanding and future directions are aggregated at Europe level.

The required budget for the organisation and content (presentation) support of such activities is planned in PRACE-2IP project and PRACE-3IP project. The following up work on PRACE Education Outreach should be divided between both projects as the involvement of the PRACE ASIBL is highly recommended. An indicative demarcation line between both projects has to be drawn on their main responsibilities according to the both project's Description of Work (DoW).

A rough example of such division envisages that the PRACE-2IP project is covering the preparation of PRACE presentation kit for schools that to support the programme part of the

next PRACE Education Outreach events. Additionally to this as part of the PRACE-3IP project it will be funded several education outreach activities (organisational) following the educational outreach activities defined in PRACE-1IP project.

In general, the budget is varied based on the type of educational activity. For example the costs for a “Campus School” activity may reach to 5 000 Euros whereas the cost for “HPC class in schools by visiting scientists” of around 2 000 Euros is considered as quite reasonable. On the available budget in both PRACE projects, it may be considered that up to four events in the next two years can provide the necessary foundation for elaboration of the PRACE Education Outreach Programme.

#### *2.2.2.2 Next Pilot*

An interest to host the next Education outreach pilot has been expressed by EPCC at the University of Edinburgh as it defines the main objective: Promote HPC and computational science to the general public, hopefully convincing them that the EU should continue to invest in HPC by showing its relevance to their own lives. For example, although computers are ubiquitous in modern life, their crucial role in modern science is not generally understood. For example, the evidence that human activity plays a major role in climate change comes mainly from computer simulations that can only be performed on supercomputers. This important point is not generally understood, with the public perception being that the evidence is simply that temperatures have risen over the past century.

School children are a particular target audience – we want them to consider a career in computational science and take appropriate science options at school.

The pilot case will be part of the British Science Festival which is an annual event which is heavily promoted around the UK, particularly to children of secondary school age – see <http://www.britishscienceassociation.org/web/britishsciencefestival/>

Under the title "Supercomputers in Science: From the Big Bang to Climate Change" the event will explain what supercomputers are, and how they play a key role in nanotechnology, particle physics, cosmology, engineering and climate research.

It is aimed to have a presentation that will be equally accessible to interested adults and school children.

The public abstract for the event is:

“Today's supercomputers are the most powerful calculating machines ever invented, and they get faster every year. EPCC, the supercomputing centre at the University of Edinburgh, has been at the forefront of supercomputing for over 20 years. This talk will explain what supercomputers are, and how they play a key role in nanotechnology, particle physics, cosmology, engineering and climate research. They can even help us understand whether dinosaurs walked on two or four legs!”

The talk will be made available after the event to all PRACE partners, along with a video of its delivery to guide someone wishing to make their own presentation based on this material.

### **2.3. Recommendations**

Encouraging the next generation of software engineers, system administrators, and general users of HPC systems is an important challenge to keep Europe at the forefront of supercomputing.

This should start as earlier as possible starting now from the secondary and tertiary education sectors in closed collaboration with the HPC centres that provide educational and training services.

In order to be fostered the synergy between all involved parties the following general recommendations have been drawn up:

- Use PRACE HPC Training Portal to increase the visibility and accessibility of existing training materials to secondary and tertiary educational organisations;
- Utilise the entire range of training and dissemination materials (brochures, flyers, and toolkits for schools and etc.) which can be used offline in case there is no internet access
- Build a distribution system to support and extend a good communication network with other representative organisations involved in the educational field
- Ensure that the information is highly visualised in an interactive manner – it can be encouraged event topics organised like games by taking into strong consideration to not present things that are off-topic
- Facilitate and encourage mentoring and volunteering across all levels of the PRACE in special joint activities with the secondary and tertiary education sectors
- Organise the events somewhere away of the traditional educational settings and include techniques such as feedback in real time, confidence building, presentation and interview skills and creative thinking
- Consider some special events such as for instance a PRACE Education Outreach day once per year
- After completing event programme, set up regular action learning sets for participants to embed their new knowledge

All these recommendations can only boost in complementary way the implementation of a long-term outreach programme such as “Summer of HPC” programme. It will be tailored for youths who can spend up to a week during the summer months at a distance place organised by HPC centre in a PRACE partner country.

### 3 The PRACE video

Nowadays, video is the most powerful multimedia instrument used to reach out to every person or community group as well as the society as a whole. It is the medium to show dynamic processes that are filmed or created in other ways so that video has become a very accessible and powerful tool for promotion and even decision-making. There is no doubt that PRACE would only benefit greatly from a series of carefully tailored and well-produced video packages to get across why Europe needs to invest more than 500 million € into an HPC infrastructure during an economic crisis like this.

This powerful media tool adds to the PRACE efforts to reach out to the vast diversity of target audiences ranging from youths in the secondary education level through young students and researchers to people strongly involved in the development of HPC in Europe and other countries. The video packages highlight the benefits of such an e-infrastructure to the general public and the economy in general and show what has already been achieved in the field so far.

Based on the PRACE-1IP project Management Board decision and followed approval by the Commission the PRACE video production was put forward from the PRACE-2IP project to PRACE-1IP project. The project decision to assign the responsibility for the video production to this task and link it to the education outreach is based on the fact that initially in the PRACE-2IP project WP3, Task 3.2, it was integrated in the outreach activities including next PRACE steps towards educational outreach.

#### 3.1 Working Plan for PRACE video films production

From its very beginning it was proposed three different packages as part of the PRACE video films: A three-minute piece, which serves as a general introduction of the project to the general public, a eight-minute piece, which also caters to the general public and educational audience both secondary and higher education through highlights on scientific achievements as well as some industrial perspectives, and up to 25 minute piece, which is geared to EU officials, specific industrial association, universities, scientific organizations and members of the industry.

In reality, based on the well-organisation and strong support by the PMO, BoD, the Chairmen of the SSC and User Forum, the PRACE video films turn to be double productive efforts leading to six different PRACE video films ranging from 2 to 25 minutes the longest one.

##### 3.1.1. Organisational and conceptual framework of the PRACE video films

At the beginning of this task, a collaborative platform was created where PRACE bodies and members produced a wish list of desirable video features from which the PRACE videos would be produced later on by the production companies.

##### 3.1.1.1 Editorial (creative) group

The main role of the Editorial group is to support the Board of Directors (Managing Director) on all matters regarding the preparation of series of PRACE video films during the timeframe of PRACE-1IP project. The Editorial group is an informal group providing direct contribution to PRACE Managing Director.

- Georgi Prangov (NCSA) – [gprangov@mtitc.government.bg](mailto:gprangov@mtitc.government.bg);
- Nelly Stoyanova (NCSA) – [nstoyanova@mtitc.government.bg](mailto:nstoyanova@mtitc.government.bg);

- Ari Turunen (CSC) – [ari.turunen@csc.fi](mailto:ari.turunen@csc.fi);
- Tanja Weber (FZJ) – [tan.weber@fz-juelich.de](mailto:tan.weber@fz-juelich.de);
- Martin Peters (ICHEC) – [martin.peters@icheck.ie](mailto:martin.peters@icheck.ie);
- Laetitia Baudin (GENCI) – [laetitia.baudin@genci.fr](mailto:laetitia.baudin@genci.fr);
- Renata Gimenez (BSC) - [renata.gimenez@bsc.es](mailto:renata.gimenez@bsc.es);
- Tanja Bergrath (PRACE AISBL) – [T.Bergrath@staff.prace-ri.eu](mailto:T.Bergrath@staff.prace-ri.eu);

Advisors and facilitators to the group:

- Lennart Johnsson (SNIC - telcons and comments on write-ups) – [johnsson@tlc2.uh.edu](mailto:johnsson@tlc2.uh.edu);
- Hermann Leder (LRZ) - [leder@rzg.mpg.de](mailto:leder@rzg.mpg.de);
- Francesca Garofalo (CINECA) – [f.garofalo@cineca.it](mailto:f.garofalo@cineca.it)
- Nicole Mc Donnell (ICHEC) - [nicola.mcdonnell@icheck.ie](mailto:nicola.mcdonnell@icheck.ie)

### Main responsibilities:

- Pre-production: preparing a synopsis for a PRACE video films including:
  - Target Audience to determine style, mood, use of language, choice of featured applications and use of voice-over and on-screen talent, an in-depth knowledge of the audience targeted is necessary. Considerations of age, nationality, pre-existing knowledge, educational background and economic status seem in place (Annex as part of subsection 6.6 PRACE target audiences).
  - Distribution methods: via internet, PRACE at international events (examples: International Supercomputing Conference (ISC) and Supercomputing Conference (SC)); PRACE events (Industrial Seminars, Scientific Conferences, Training events); TV channels and local PRACE members' events especially targeting research and innovation and via internet;
  - Locations: It has to be determined how many shooting locations will be necessary and what logistical preparations are necessary for each location.
  - Talent and Experts: a suitable voice has to be found. This most likely will be a professional voice-over talent.
  - Existing Footage: it has to be reviewed the existing footage as possible, desirable or necessary input source.
- Granting the editorial control during video production stage - the selected production company to be handled in this part according to the terms that can grant the high quality and do not jeopardize the overall production process and deadlines.

#### *3.1.1.2 Interaction with other PRACE bodies*

In order to be granted that this final outcome of the Editorial group would be a success, it has been identified the key PRACE bodies that have to be approached before moving up at the next level of the whole video production process:

- Interrelation with PMO – the Editorial group as part the PRACE-1IP project strictly follows the rules and procedures defined in the Consortium Agreement for approval of project’s results.
- Interrelation with the Managing Director – the Editorial group organises an open platform for gathering ideas and HPC video materials, preparing the first draft version of synopsis including target groups and communication messages, taking a first look at the produced video films and providing feedbacks. The Editorial group provides the Managing Director with the following outcomes of its work for approval:
  - Draft version of a synopsis for the PRACE video films
  - Advice on the following steps and necessary improvements that have to be taken by the Producer;
  - Recommendations to the Producer before being validated the final version of the PRACE video films.

The Editorial group regularly discusses with the Managing Director the working status and forthcoming steps. The Managing Director defines the following three milestones as essential checkpoints that need the explicit approval:

1. Start the implementation of the Working Plan;
  2. Validation of the synopsis for PRACE video films;
  3. Validation and launching the initial PRACE video films at the ISC’12 in Hamburg, Germany.
- Interrelation with the SSC - this interaction will mainly concern recommendations regarding selection criteria and validation support by SSC to be ranked 5 most suitable scientific projects that used PRACE resources and have to be shown to the European public as well as providing key communication messages understandable for general audience. The Chairperson of SCC is invited to give short interview explaining the main European HPC Scientific Cases.

#### *3.1.1.3 Action Plan*

An Action Plan, which contains some horizontal activities, was elaborated and followed through the entire videos production process consisting of the following steps:

- Collecting all video materials from the PRACE Database server – BSCW (NCSA);
- Investigating all received videos, grouping and appointing some suitable ones based on predefined criteria (NCSA);
- Defining scientific and industrial areas to be covered by the videos. For example we can focus on the scientific areas defined in the report for European Supercomputing Infrastructure (WP4, Task 4.5) – involvement of SCC and BoD;
- Defining the “content provider” for the videos – computer centres and other sources and contact them by e-mails and letters (NCSA);
- Making a direct contact with every source of information in order to get detailed information about the content of the visualized model and simulations (NCSA);
- Getting permission by copyright holders (CSC, NCSA, BoD and PRACE legal advisor) - prepared a template to be signed by the copyright holders if there are such rights;

- Preparing a table with information about the reviewed HPC video materials as well as a list of general expectations and vision about PRACE as a truly pan-European HPC infrastructure – collected information from Commission, policy makers and funding agencies, scientific communities, individual scientists and industrial representatives (NCSA).

#### 3.1.1.4 Target audience analysis

To determine style, mood, use of language, choice of featured applications and use of voice-over and on-screen talent, an in-depth knowledge of the audience targeted was done. In order to cover as many as possible groups and to mitigate the issue related with the fact that a one fit all production might not be as powerful as more targeted pieces, it was made a choice taking into consideration the age, nationality, pre-existing knowledge, educational background and economic status seem in place. A research on how other HPC organizations reach the selected target groups was conducted. More detail analysis is provided in Annex, subsection 6.6 PRACE target audiences.

At the first stage, the target audiences were identified and the delivery platform was specified.

Target Audience	Continuance	Content	Delivery Platform
Scientists and researchers and organised scientific community groups	23-25 minutes	PRACE activities and goals for scientific excellence, the results and expected impact in various fields of human activity and the benefits for individuals and society as a whole	<ul style="list-style-type: none"> <li>- international HPC events as well as PRACE organised scientific ones</li> <li>- disk/memory sticks distribution</li> <li>- network distribution (PRACE website)</li> </ul>
Engineers and industrial representatives targeted specific industrial associations and industry EU and some policy authorities international targeted bodies and national officials	14-16 minutes	The main societal and industrial and applied achievements of high-performance systems in Europe. PRACE AISBL will not be in a focus, but will be included as an information	<ul style="list-style-type: none"> <li>- international HPC events as well as PRACE organised industrial ones</li> <li>- disk distribution/memory sticks</li> <li>- network distribution (PRACE website and its partners websites)</li> </ul>
General public, National and European Public Authorities, secondary and higher educational institutions	5-7 minutes	PRACE mission and objectives achieved so far, the role of HPC for ageing society and higher industrial competitiveness - the benefits for individuals and society as a whole	<ul style="list-style-type: none"> <li>- education and outreach events</li> <li>- network distribution (PRACE website and its partners websites)</li> <li>- online video platforms and video streaming platforms</li> </ul>



General public in particular young adults interested in science and engineering.	2-3 minutes	Demonstrations of attractive applications in everyday life	online video platforms and video streaming platforms (YouTube, etc.)

**Table 1:** Initial pre-selection of the target audience

### 3.1.1.5 Definition of goals

At that stage, the editorial group worked on the definition of goals that to be included in the PRACE video films as strong messages to the target audiences. The goals are to be given some clear, convincing and memorable answers of the following group of questions:

- Why Europe needs to invest more than 500 million Euros in HPC infrastructure during the crisis?
- Why it is a strategic infrastructure?
- What will bring to citizens and economy of Europe unification of its HPC scientific and engineering potential in PRACE AISBL?
- What are expectations (at EU level, national and individual perceptions) from PRACE projects and what has been already achieved?

### 3.1.1.6 Format considerations

There are a lot of video file types in the world at this time. Also each format have a big number of the "codecs" - compression algorithms and each of these have its original characteristics, like compression quality, complexity etc.

Creating video, the following factors should be considered:

- frame's size
- file's size
- quality
- compress ratio.

If the video frames are small, then video loses quality during enlarge process, but the files are smaller and users faster can get it through the Internet. If the compression ratio is small, we will get high quality, but the file will be large. Increase of compress ratio decreases the file size, although the quality too. At that stage it must be decided what we want, for what user (Intranet/Internet) and what we need in order to make video information smaller and accessible.

By the initial enquiry with organisation coming from the media sector, it has been defined that the PRACE video films should be in the sizes and formats: 16:9 and tested the films played at least with VLC media player, Windows media player and AVS DVD Player.

For presentation-use:

- Windows Media Video (auditorium, projectors, events, laptop-use), 1280x720 (720p = progressive), bitrate for video: 6000-8000kbps, bitrate for audio: 128kbps, mp3, stereo;
- iPad (native);

- iPhone (native);
- Flash video: .FLV (For PRACE-website) 640x360, bitrate for video: 2000-3000kbps, bitrate for audio 96-128kbps, stereo.

### 3.1.2 Preparation of the PRACE video films synopsis and screenplay

The most important part of the preparation work is to define the purposes of the video and the boundary conditions of the forthcoming PRACE video films:

The purpose of the series of video films is to acquaint the European citizens, scientists, industrial representatives, policy makers, research performing and research funding organizations, education institutions as well as overseas partners with HPC in general as research infrastructure and the PRACE mission, objectives and main tasks, the results having been achieved so far and expected impact on scientific excellence, various fields of human activity and the benefits for individuals and society in general.

**Production time:** By the end of PRACE-1IP project – presentation during ISC'12 in Hamburg, Germany.

**Lifespan:** around 2 years;

**Main events for presentations in the period 2012-2013:** ISC'12 in Hamburg, Germany (Beta version); SC'12; PRACE-3IP Kick-off meeting 2012; ICT 2012; PRACE Seasonal Schools 2012-2013; PRACE Industrial Seminar 2013 and 2014; PRACE Scientific Conference'13; other PRACE members events in this period.

**Target audience:** the PRACE video films are perceived as directed to all tax-payers in Europe who are interested in and support the establishment of PRACE as pan-European HPC infrastructure. The video is strong instrument in the raising awareness of HPC so that it is hardly to be specified only a few groups of our society.

However, in order to facilitate the following up indicative dissemination plan, several groups of target audiences are identified and enclosed in the Annex as part of the subsection 6.6 PRACE target audiences.

#### 3.1.2.1 Synopsis of the PRACE video films

During the PRACE-1IP project discussions on the synopsis of the PRACE video films, the following mandatory elements of the video content were identified and approved:

- Introduction to high performance computing;
- Retrospective introduction of the common European HPC endeavour: PRACE beginning from 2006 to the incorporation of PRACE AISBL in 2010;
- Presentation of PRACE AISBL;
- Presentation of the main scientific cases of PRACE AISBL;
- PRACE Training opportunities;
- PRACE approach to the Industry – pilot cases;
- Wrapped up session presenting future perspectives and challenges;
- The end sequences: Acknowledgement, Production, and Copyright – a document overview of the main copyrights practices is enclosed in the Annex as part of subsection 6.5 Copyrights and right-of-publicity issues.

Once the first document (synopsis) had been drawn up, it was started open consultations with all involved parties to refine the document into a functional screenplay providing the main requirements of the video that the subcontractors to use as a basis for video production.

#### 3.1.2.2 Consultations within PRACE

In October 2011 the consultation started within PRACE on the scope, content and timeframe of the video films. It has proved as a very beneficial way to define and even to refine the different components of the video films as well as looking for the most appropriate solutions to some unexpected problems that rose during the entire time period.

The open dialogue within PRACE passed through 3 stages:

- At the beginning, it was established within the Editorial group engaging representatives from 9 members in PRACE-1IP project and a representative by PRACE BoD. Mainly, at that stage, it was collected different visualisation materials as well as it was started shaping the goals and coverage of the PRACE video that led the group to the preparation of the first synopsis of the PRACE video films;
- At the next stage, the first synopsis of PRACE video films was broadly discussed with the PRACE Managing director and first amendments to the coverage were introduced to all involved parties. During this stage, it was validated the PRACE video film synopsis by the Managing Director and it was stepped up in the next round of the consultations with the PRACE-1IP, WP3 partners involved in this activity. At this stage, it was suggested the following decision: “The PRACE video film would be divided by modules that cover different aspects of the HPC development and PRACE in principle”;
- At the next final stage of the consultation process the suggestion of the modules and overall distributions of the roles between the involved PRACE representatives, scientists and engineers was presented to the PMO and Managing Director. Based on all suggestions and comments during this phase, it was crated the first version of the PRACE video film screenplay.

#### 3.1.2.3 Screenplay

With the respect to the overall consultations results and recommendations within PRACE, the identified target audiences and the distribution methods, the detail content of the PRACE video films - screenplay was structured accordingly. The screenplay consists of list of all participants, key words and phrases in a certain order, the voiceover and the corresponding video footage and simulations as well as the running time.

The video is based on six modules that can be shown independently. The module approach was chosen since the main platform will be the PRACE web site and present gadgets (Tablets and smart phones) also support the web-based media. Also updating the material is more flexible compared to DVD.

During the production stage there were applied several revisions of the screenplay as there was necessary special extra attention to details that had to be played in this process.

This takes place in close collaboration with production companies as below it would be presented very briefly the structure and main actors in the video modules:

### **MODULE 1: Introduction in supercomputers - global perspectives and opportunities**

**People involved in the module:**

- It is organised around a professional voiceover.

**Additionally, it is involved in the module:**

- **Prof. Richard Kenway** - Chairman of the PRACE Scientific Steering Committee, University of Edinburgh, UK;

**MODULE 2: Presentation of PRACE AISBL****People that provide interviews:**

- **Prof. Dr. Achim Bachem**, Chairman of the PRACE Council, 2010-2012, Forschungszentrum Jülich GmbH, Germany
- **Catherine Rivière**, Chair of the PRACE Council, GENCI, France
- **Dr. Maria Ramalho**, Managing Director, PRACE AISBL

**Additionally, it is involved in the module:**

- Embedded a professional voiceover.

**MODULE 3: PRACE for users****People that provide interviews:**

- **Prof. Richard Kenway** - Chairman of the PRACE Scientific Steering Committee, University of Edinburgh, UK;
- **Prof. Dr. Gustavo Yepes**, [Universidad Autónoma de Madrid](#), Spain
- **Dr. Turlough Downes**, Chairman of the PRACE User Forum, Dublin City University and Dublin Institute for Advanced Studies, Ireland
- **Dr. Derek Groen**, University College London, UK
- **Prof. Pier Luigi Vidale**, Willis Chair in Climate System Science and Climate Hazards NCAS-Climate, Department of Meteorology, University of Reading, UK;
- **Prof. Ricardo Fonseca**, Institute for Plasmas and Nuclear Fusion (IPFN) in Lisbon, Portugal

**MODULE 4: Supercomputers' Place in Our Lives and in the Development of Europe****People that provide interviews:**

- **Prof. Dr. Dr. Thomas Lippert**, Coordinator of the PRACE-1IP, 2IP & 3IP projects, Forschungszentrum Jülich GmbH, Germany
- **Ir. Koen Hillewaert**, Argo Team Leader, CENAERO, Belgium
- **Mr. Hicham Lahlou**, Xcelerit CEO & Co-Founder, Ireland

**MODULE 5: PRACE training opportunities****People involved in the module:**

- It is organised around professional voiceover.

**MODULE 6: European HPC perspectives and challenges****Person that provides interviews:**

- **Dr. Maria Ramalho**, Managing Director, PRACE AISBL

**Additionally, it is involved in the module:**

- Embedded a professional voiceover.

Without getting into professional details of the real production process, it should be explained that the final screenplay per module is a co-production between the production companies and the editorial groups. Moreover, the latter was iteratively engaged in the finding and the realisation of corresponding illustrative materials and video, and responsible for accuracy and accessibility of necessary locations and footage.

**3.2 The Production Process – collaboration and support**

The selection of a production company depends heavily on the budget in place and on careful research by the committee. It should be pointed out that these video films are produced in quite constraint financial framework. To avoid later allegations a clear catalogue of criteria for this selection process are put in place.

- Based on the validated 1<sup>st</sup> synopsis of the PRACE video film a procedure for selection of subcontractors was started with the following responsibilities and obligations:
  - Preparing the basic technical specifications of the PRACE video films;
  - Preparing a indicative textual description of the PRACE video film modules together with the Editorial group;
- Contract: A legally binding contracts has been drawn up between the client (PRACE-IIP project) and the production company. This contract defines very clearly and in detail what is expected from the production company. They also have to specify how the company will be held accountable if the expectations are not met.

**3.2.1. Collection of cost estimations and negotiations**

From January 2012, we launched a procedure for selection of the production company (subcontractor) within Finland and Bulgaria which to transform the PRACE screenplay into a vivid, interesting and educational useful an electronic media tool for vast range of target audiences.

The overall selection process was concentrated in two countries Finland and Bulgaria. The main reasons behind this were that beside, the pure budgetary issues of the production costs there had to be calculated the total cost of ownership and at the same time to be granted efficient control by PRACE-IIP project. Based on the fact that there would be a daily communications that engaged representatives from these countries as the main involved PRACE-IIP partners, there had been strong concerns that company coming by other country might lead to communication delays and overall failure of the initially defined production deadlines.

The potential companies should have a working knowledge of technology and science in possible in HPC and show related capabilities to organised video production in the international environment. Within the period of three weeks, it was collected 2 offerings from Finnish companies and no one proposal from Bulgaria.

By the end of January 2012, based on the collected initial offerings, it was preceded to the next step of getting in active negotiations with both companies. Due to the fact, that the companies come from Finland, the CSC asked the NCSA to take care of the following negotiation process and provide them with the final selection and evaluation.

During the negotiation process twice both companies had been requested to provide detailed and modified offerings that to meet pre-defined elements in the synopsis of the PRACE video film with new budgetary considerations based on different total numbers of the interview sessions.

**Companies (ordered by the way we got the offers)**

1. Venimis Oy, Inc., Helsinki, Finland - <http://www.venimis.com/>
2. Smile Audiovisual Oy, Helsinki, Finland - <http://www.smileaudiovisual.fi/>

3.2.2 Final offerings evaluation and selection

In order to be selected the most appropriate production company it was divided the evaluation and selection process on two. In first, the offerings were gathered by the NCSA-Bulgaria as an assessment was prepared and provided to CSC in order to be taken the final decision. This was done in respect to mitigate some preliminary procedural constraints such as fairness and independent insights. It has to be mentioned that the NCSA representatives had no information about the two candidates before they started the negotiation process in mid-February 2012.

Within the period from 14 February 2012 to 27 February 2012, the NCSA had the opportunity to review the initial offers and exchanged several clarifying e-mails with both companies.

The main criteria followed:

- Meeting as close as possible the initial elements that are described in the synopsis including clear understanding of the purposes and the target audiences of the task;
- Number of interview sessions that can be organised within the initially defined budgetary framework;
- Reference materials that the companies have sufficient experience to execute this task, and;
- Additional support in the preparation of the final screenplay of the PRACE video films.

At the end of this process, it was established a basic impression that both companies had good references and they could execute successfully such challenging work in the timeframe. On the information collected within this period, in the NCSA could not prevailed which was better one as we had found many opportunities and diversity approaches that both companies could provide to the final PRACE video films.

In order to resolve the raising issue with the increasing number of the necessary interview sessions supported by the majority of all parties that participated in the consultation process, it was expressed the hypothesis both companies could be invited to produce the PRACE video films. This stance was supported by the argument that this would lead to higher flexibility in a net cost efficient manner and the production could be ensured in given schedule as the total efforts is dividing equally between both companies. The module format might also increase the overall attractiveness especially all over the young people by producing six modules on specific topics giving the audience opportunity to choose which one or combinations of them they prefer to watch.

In order to visualize such approach in mid-March 2012, it was prepared a very tentative distribution of the responsibilities between both companies which were presented to CSC:

Assignment	Organization(s)	Readiness to start work
I. Preparation and presentation of the Producer screenplay	Smile Audiovisual Oy	Immediately
II. Module I: Introduction in supercomputers - global perspectives and opportunities	Venimis Oy, Inc	Immediately
III. Module II: Presentation of PRACE (AISBL)	Smile Audiovisual Oy	Arranging an interview session in Brussels – end of April and early May, 2012 1. Prof. Achim Bachem 2. Catherine Riviera
IV. Module III: PRACE for users	Venimis should take the interview of Richard Kenway and work on the presentation of the scientific themes	Interviews with Prof. Richard Kenway on April 16-17, 2012 and Arranging an interview session in Brussels – end of April and early May, 2012 with a small group of scientists coming from different scientific domains.
V. Module IV: Supercomputers' Place in Our Lives and in Development of Europe	Venimis Oy, Inc	April 16-17, 2012 in Bologna, Italy Interviews with Prof. Thomas Lippert and some of the industrial participants
VI. Module V: PRACE trainings opportunities	Smile Audiovisual Oy	Almost immediately depending on their availability
VII. Module VI: PRACE Future perspectives and challenges	Smile Audiovisual Oy	Arranging an interview session in Brussels – end of April and early May, 2012 An interview with Dr Maria Ramalho
VIII. Preparation of the PRACE video modules in different formats including but not limited to the following mobile platforms: Android and Windows phones, Apply products and etc.	Smile Audiovisual Oy	Starting from May 14, 2012 to June 15, 2012

**Table 2:** Indicative distribution of responsibilities between the subcontractors

Nevertheless the final decision, it was strongly recommended to request from the producer to take part into some regular teleconferences (once monthly) as well as providing regular update (every 2 weeks) so that PRACE could monitor how the film were progressing on according to the suggested roadmap.

### Selection completion

On March 16, 2012 taking into consideration the position expressed by NCSA, announcement was made by CSC informing that the PRACE video films were divided on 6 different modules and between two companies as following:

- Venimis Oy, Inc., Helsinki, Finland was awarded to produce Module 1, 3 and 4, and
- Smile Audiovisual Oy, Helsinki, Finland was awarded to produce Module 2, 5 and 6.

At the beginning of April 2012 the production of PRACE video films started and continued by the end of June 2012. Within this two-month period, it has been carried out the video montage of demo versions of the PRACE video film modules - video animations, films rendering, simulations, interviews, sound-track, etc.

Both companies have worked together with the editorial group in order to be determined to what extent the use of the existing visualisation materials volunteered by the PRACE partners and other HPC parties are possible, desirable or necessary in the production phase as well as the format compatibility and the possibilities to re-shoot.

### 3.2.3 Roadmap for the production of the PRACE video films

As the main concerns to the PRACE video films was the deadline and the operational capacity to be executed the task on time, it was drawn up a Roadmap for the production of the PRACE video films (Annex, subsection 6.4). The plan is organised around necessary activities, assignment of each task as well as timeframe and deadline. There is an extra horizontal group of actions related with the monitoring of the progress.

Generally, the roadmap includes the following eight main activities:

- Selection of Production companies/subcontractors
- Preparation of a list of potential scientists and researchers that to support identification of scientific themes
- Carry out video montage of the different PRACE video modules
- Review and feedback on the demo versions of the video film modules
- Production of the 1<sup>st</sup> version of the PRACE video modules
- Review of the 1<sup>st</sup> version of the PRACE video modules
- Presentation of the PRACE video films
- Production of final versions of the PRACE video films

Some of the activities are drilled down on subtasks and other are aggregated as one. Despite the fact that some of the initially identified subtasks had been flexibly executed the final deadline was fulfilled according to the plan with slight deviations. One of the PRACE video films was presented during the ISC'2012 in Hamburg, Germany. All other video films are technically prepared waiting for final validations by the PRACE AISBL. In that respect, the Roadmap has achieved its goal granting the necessary discipline and visibility on future steps.



### 3.2.4 Production and validation of the 1<sup>st</sup> series of PRACE video films

As a final result of the joint work between both subcontractors and the PRACE Video Team, it has been produced 6 modules of the PRACE video films<sup>2</sup> each of them presenting unique aspects of the HPC ecosystem in Europe with strong emphasis on the role of the PRACE as a pan-European HPC Infrastructure. They are presented below:

#### **MODULE 1: Introduction in supercomputers - global perspectives and opportunities**

**Production Company:** Venimis Oy, Finland

**Messages to the public:** By defining the HPC it is introduced HPC as a natural extension of scientists and researchers efforts to find the answers to questions what, how and why the phenomena, processes and natural laws into the Universe and our Nature happen with the potential emphasis on further important scientific breakthroughs.

**Total time:** around 6 minutes and 30 seconds

#### **MODULE 2: Presentation of PRACE AISBL**

**Production Company:** Smile Audiovisual Oy, Finland

**Messages to the public:** By fostering excellence and cooperation PRACE is assigned to combines efforts and resources at one place reserved for the most exigent/urgent computational tasks of high potential value for Europe. In the meantime, PRACE constant efforts are to turns into a unique European RI where every scientist and researcher in Europe should have access to it.

**Total time:** around 6 minutes

#### **MODULE 3: PRACE for users**

**Production Company:** Venimis Oy, Finland

**Messages to the public:** By inviting to give interviews, the Chairman of the PRACE Scientific Steering Committee and five PRACE users cover different scientific aspects of the HPC development and briefly provide overview of the main scientific case of PRACE and some examples of HPC applications in Europe.

**Total time:** around 25 minutes

#### **MODULE 4: Supercomputers' Place in Our Lives and in the Development of Europe**

**Production Company:** Venimis Oy, Finland

**Messages to the public:** By inviting to give interviews, the Coordinator of the PRACE-1IP, 2IP & 3IP project and the 1<sup>st</sup> PRACE Industrial User and 1<sup>st</sup> PRACE Winner for the Most Innovative Industrial HPC Solution in Europe provide their insights on how HPC can enable scientific excellence and industrial competitiveness and tackle growing societal challenges in

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<sup>2</sup> All video films are PRACE-1IP project results and they will pass through approval by the PRACE AISBL before being publically disseminated to the PRACE audiences.

Europe. In addition, two different industrial cases are presented with strong and visible influence on creating added value to Europe.

**Total time:** around 17 minutes

#### **MODULE 5: PRACE training opportunities**

**Production Company:** Smile Audiovisual Oy, Finland

**Messages to the public:** By briefly introducing the PRACE training activities - organized PRACE training events, presentation of PRACE Training portal and the PRACE Advanced Training Centres (PATCs), it is provided general understanding about the current PRACE trainings and future perspective in order to be established sustainable PRACE training model.

**Total time:** around 2 minutes and 30 seconds

#### **MODULE 6: European HPC perspectives and challenges**

**Production Company:** Smile Audiovisual Oy, Finland

**Messages to the public:** By interviewing the Managing Director of PRACE AISBL, this final module of the entire series of different PRACE video films identifies the main challenges that Europe has to overcome in order to deliver world-class HPC infrastructure and services and some PRACE perspectives in terms of strategic directions in the global race for HPC development.

**Total time:** around 4 minutes

All the PRACE video films produced by PRACE-1IP project above need to be approved by the PRACE AISBL so that their formal presentation to the PRACE audiences will be gradually deployed in the following few months. The first place where the produced PRACE video films will be presented is the PRACE AISBL web site: <http://www.prace-project.eu>.

### **3.3 Dissemination Plan**

In this section, it is presented a Dissemination Plan of the series of the PRACE video films gathered around six different modules that covers different aspects from the HPC domains. This plan is based on the assumption that it is important to have a concrete target for distribution of the PRACE video films in place as early as possible, since these choices also have a direct influence on the production itself.

#### **3.3.1 Main elements**

At first, the group has identified the main elements of the dissemination plan that includes:

- Strategies for Distribution: possible distribution choices are delivery over the web, TV Networks, DVDs and Blue Rays as well as public and educational presentations.
- Definition of main communication channels for dissemination – PRACE website; PRACE events; International events (ISC and SC); PRACE members – site and local media;
- Strategies for success measurement: Strategies on how to measure the success of the campaign and concrete goals have been developed by PRACE-1IP project, WP2, Task 2.4 related with initial PRACE Impact Assessment;

- Collection of information: viewers' opinions (science and technology message; visual effects; influence); number of broadcast on all communication channels;
- Implementation of Distribution & Feedback Analysis - in order to achieve the goals set forward and measure the success of the videos, it is eminent to carefully monitor how the distribution is carried out and to make sure feedback is recorded properly. Future PRACE video projects will depend on this data;
- Evaluation and initialization of new PRACE video materials - approximately every 2 years.

In order to not collide with initially taken budgetary decisions for dissemination, the plan is mainly based on the available PRACE projects information up to now. Following a thorough PRACE dissemination analysis, it is decided which dissemination channel play what role in the distribution process of the video films. A detailed dissemination plan early in the distribution process will ensure the greatest possible impact.

### 3.3.2 PRACE Training and Outreach events

Taking into consideration that within last 4 years, PRACE has organized 18 different training events mixed of PRACE Seasonal Schools and Workshops that has reached 837 people (students, postdoctoral, young researchers and etc.) by a number of European countries on average of 47 participants per event plus the initial plan of 72 PATCs events organized by all PATCs<sup>3</sup> per year it can be extrapolate that only in the next 2 years PRACE video films can be presented at around 160 different PRACE Training and Outreach events reaching out more than 7 426 participants from all over the Europe.

Year/Event	Seasonal School	PATCs	Outreach	Local Trainings
2012	1	36	1	3
2013	4	72	3	6
2014	3	36	3	6

Table 3: PRACE Video film distribution at PRACE Training and Outreach events

### Main target audience groups:

- Pupils coming from secondary and tertiary educational institutions:
  - ✓ Age: in the range from 14s to 20s;
  - ✓ Nationality: throughout the Europe plus youths outside Europe that situated themselves in European educational institutions;
  - ✓ Pre-existing knowledge: from beginners to intermediate;
  - ✓ Educational background: special focus on mathematics, technology and science.
- Students including PhD students, Postdoctoral, Principal Investigator and Staff scientists:
  - ✓ Age: in the range from 20s to 40s;

<sup>3</sup> D4.2 Establishment of PRACE Advanced Training Centres, PRACE-2IP project.

- ✓ Nationality: all round the Europe plus young people outside Europe that situated themselves in European educational and research centres;
- ✓ Pre-existing knowledge: ranging from beginners to proficiency;
- ✓ Educational background: computer engineering, software development and specific scientific domains;
- ✓ Research background – from fundamental to technology transfer in the following fields: IT (hardware and software) and/or specific scientific domains.

In order to turn this into reality the PRACE Dissemination team should contact in advance the local program and organizing committees and discuss with them how different modules of the PRACE video films can be embedded in the Programmes of the respected event. Generally, it is envisaged two approaches for dissemination:

- Saving a time slot as part of the programmes when the specific modules of the PRACE video film are presented and/or
- Using parts of the video in the preparation of the presentation (kit) as a supporting illustrative/visualization tool.

For instance, as an integral part of PRACE-2IP project, WP3, task 3.2, it will be developed a presentation kit for schools, undergraduate students, and the general public to demonstrate the value of HPC. The presentation kit may include different parts of the PRACE video films providing a basic introduction for the achievements of HPC with animations and visualisations.

### 3.3.3. HPC International exhibitions and other PRACE industrial and scientific events

During the last several years PRACE has invested significant efforts to position and brand itself at the international stage as the leading European HPC infrastructure. PRACE has regularly taken part in the well-know international exhibitions in the field of HPC such as the annual organized exhibitions - International Supercomputing Conferences (usually held in Hamburg, Germany) and Supercomputing Conferences in US. In addition, PRACE takes part in the EU organized biannual ICT event in Europe as well as PRACE take the leading role in organizing specialized industrial and scientific HPC events so that PRACE to have direct contact with as much as possible of its main stakeholders.

In the table below, an approximate and conservative estimation of the number of the international exhibitions where PRACE can attend within the next 2-year timeframe based on the PRACE project description of work. Taking into consideration the gradually increasing role of the PRACE AISBL in the organization of the coming next PRACE events, we can expect a handful number of PRACE events being missed from our projection plan so that the total number of the reached out audience to be significantly higher.

<b>PRACE @ International Exhibition and other PRACE industrial and scientific events</b>	<b>Location</b>	<b>Year</b>	<b>Reached out audience<sup>4</sup></b>
PRACE @ International Supercomputing Conference	Hamburg, Germany	2012	400
PRACE @ Supercomputing Conference	Salt Lake City, US	2012	750
PRACE @ European ICT'2012	Europe	2012	350
PRACE Industrial Seminar	Stuttgart, Germany	2013	80
PRACE @ International Supercomputing Conference	Leipzig, Germany	2013	400
PRACE Scientific Conference	Europe	2013	70
PRACE @ Supercomputing Conference	US	2013	800
PRACE Industrial Seminar	Europe	2014	80
PRACE @ International Supercomputing Conference	Germany	2014	450
Other industrial and scientific events organized by PRACE members with the support of the PRACE – at least 6 events	All over Europe	2012-2014	400
<b>Total</b>			<b>~ 3 700</b>

**Table 4:** PRACE Video film distribution at International Exhibitions and PRACE Industrial and scientific events

In total, it is approximated that 3700 representatives ranging from the target audience described below will view the video material:

- Worldwide HPC communities' representatives working in the field of enabling high performance computing applications, deploying and operating of computing and data management infrastructures and advancing scientific discovery:
  - ✓ Age: in the range from mid-20s to early 70s;
  - ✓ Nationality: USA; Japan; China; Republic of Korea; Brazil; India; Canada; Australia and New Zealand;
  - ✓ Pre-existing knowledge: ranging from very good knowledge to proficiency;

<sup>4</sup> The projected number is based on the information collected from previous exhibitions and PRACE industrial and scientific events multiply by coefficient formed by the number of the new contacts gathered and the assumption on the total number of people that will pass through the PRACE booths or take part in the PRACE event.

- ✓ Educational background: computer engineering, software development and specific educational disciplines mainly in natural sciences;
  - ✓ Research background – IT (hardware and software) and/or specific scientific domains;
  - ✓ Professional experience: HPC centres management staffs; Research and educational seniors; Public authorities; other e-Infrastructure communities representatives (cloud, networking, scientific data and other)
- European HPC communities’ representatives working in the field of enabling high performance computing applications, deploying and operating of computing and data management infrastructures and advancing scientific discovery:
- ✓ Age: in the range from mid-20s to early 70s;
  - ✓ Nationality: all round the Europe;
  - ✓ Pre-existing knowledge: ranging from very good knowledge to proficiency;
  - ✓ Educational background: computer engineering, software development and specific educational disciplines mainly in natural sciences;
  - ✓ Research background – IT (hardware and software) and/or specific scientific domains;
  - ✓ Professional experience: HPC centres management staffs; Research and educational seniors; other e-Infrastructure communities representatives (cloud, networking, scientific data and other).
- Industrial and Vendor representatives working on the design and production of high performance computing systems and/or applications enabling and development as well as fostering the technology transfer – turning the advanced scientific discovery into new products and services:
- ✓ Age: in the range from early 30s to mid-60s;
  - ✓ Headquarters’ location: USA; Japan; China; Republic of Korea; Brazil; India; Canada; Australia and New Zealand;
  - ✓ Pre-existing knowledge: ranging from good knowledge to proficiency;
  - ✓ Educational background: computer engineering, software development and scientific domains; economy, finance and legal;
  - ✓ Research background – technology transfer in IT (hardware and software) and/or specific scientific domains;
  - ✓ Professional experience: CIOs, CTOs and R&D Directors and other HPC engaged managers by IT vendors and/or heavy computationally engaged industrial sectors – automotive; energy; pharmacy and medicine and etc.
- European authorities at EU or national level including policy makers, decision bodies and/or funding agencies responsible for HPC policy development and operational implementation:
- ✓ Age: in the range from mid-20s to mid-60s;
  - ✓ Nationality: all round the Europe;
  - ✓ Pre-existing knowledge: ranging from some knowledge to good knowledge;

- ✓ Educational background: computer engineering, software development and specific scientific domains; business administration, economy, finance and legal.
- ✓ Professional experience: European Commission representatives – managers and senior experts; National policy and funding representatives; Professional organizations and associations.

Once again, in order to turn this into reality the PRACE Dissemination team should contact in advance the organizing committees of the PRACE participation at the international exhibitions or PRACE organized events and discuss with them how the PRACE video films can be embedded in the Programmes of the respected event.

Generally, it is envisaged two approaches including renting screens on which it is presented different illustrative materials including the PRACE video film during the exhibitions and the other one having a time slot as part of the program and/or using parts of the video in the preparation of the presentation as a supporting illustrative/visualization tool.

### 3.3.4 Internet-based communication channels

There is no doubt that the best way to reach out global audience in today information age is through the Internet as a global media. In that sense, utilizing all 24 PRACE members web site plus PRACE AISBL one, the PRACE video films will have the most suitable platform to reach out to the vast majority of its audience. The target audience is unlimited with slightly higher expectations that younger people will be the most active target group.

Only through PRACE AISBL web site<sup>5</sup>, it may be speculated that around 40 unique visitors per day will take a look at the PRACE video film or around 15 000 people within one year. Including the opportunities provided by all PRACE partners web sites and other popular social media, the target should be fixed on 245 000 viewers<sup>6</sup> over the period of 2 years. In order to achieve the targets, it is crucially important to be positioned on such places easily accessible by website visitors.

In addition, having in mind that social networking services are increasingly transforming from a simple tool for expression and for communication between individuals to professional groups by interest, it can be part of PRACE future efforts for defining its place on the most popular ones Facebook, Twitter, Google+ and LinkedIn.

## 4 PRACE Education Outreach interactions with European countries outside PRACE

Generally, in PRACE-1IP project the outreach activities with countries outside PRACE was defined as primarily responsibility of the Deliverable 4.2 of WP 4 of the PRACE-1IP project entitled "Tier-0 and Tier-1 Providers Relationship". This deliverable in broad terms examines the interrelationship between so-called Tiers<sup>7</sup> in the PRACE HPC ecosystem. It does this

<sup>5</sup> The assumption based on the unique visits on PRACE web site around February 2012 provided by PRACE Web team, and the recorded distribution of different sections – aggregating an average percentage of around 7% of the total visits.

<sup>6</sup> The assumption is based on 24 web sites of PRACE members with an average of 200 unique visits per day and around 7% of the total visits.

<sup>7</sup> From Desktop To Teraflop: Exploiting the U.S. Lead in High Performance Computing, 1993

principally from the perspective of the differing blends of resources and community development that can be found across Europe. It is intended that this analysis would serve as useful background to others hoping to further outreach development in countries currently outside PRACE by providing a concise description of differing circumstances, thus relevant points can be identified and explored on a bilateral basis if desired.

In respect with the results and all efforts completed by WP4 team, it is the goal of this section to outline a potential niche for PRACE interactions with European countries outside PRACE in the area of the education outreach activities. The main idea is to design the PRACE education outreach activities in a way so that they should be easily extended in future offering access for youths coming from countries outside PRACE.

Initially, such education outreach extension can be organised around the establishment of the “Summer of HPC” programme within PRACE-3IP project. Similar to Google’s “Summer of Code” programme, PRACE may offer groups of youths led by teachers the opportunity to spend up to a week during the summer months at mountain or seaside camp as part of its “Campus School” activity. During this time the PRACE member will mentor youths in HPC through project-based work. The main idea is such initiatives to be opened slightly wider allowing participants from European countries outside PRACE to apply and take a full part in the programme. Admission to this programme needs to be competitive where youths are selected using a fully transparent selection process letting participants all over Europe to participate. Each centre proposing to host such events will submit proposals of work while the youths will submit a list of preferred projects, topics and/or locations. Proposals with end points that aid in the dissemination and/or outreach effort of PRACE will be given higher priority, such as those that create graphical or video content.

After the reconciliation of pupils/locations/projects/topics the selected visitors will be offered summer fellowship. The “Summer of HPC” programme can be extended similarly to the HPC-Europa2<sup>8</sup> Transnational Access programme but on secondary level.

From the perspective of the PRACE programme it is encouraging that some events could be seen to outpace the foreseen need for outreach activity with European countries outside PRACE. Anecdotally, it is widely held that the reputation of PRACE has grown in the wider community. This is evident in terms of national membership. For example the recent accession of Denmark to PRACE alters the nature of the outreach required to the Danish scientific community though it does not obviate the need for it. Likewise a similar situation pertains in Slovenia a country initially identified in the 4.2 deliverable as a ‘target’ for outreach activity. Furthermore, other nations are at advanced stages of discussion regarding PRACE membership.

In order to strengthen the PRACE education outreach impact and efficiently utilized all dedicated efforts, special attention should be paid on interactions with entities and countries outside PRACE and even Europe. A number of such infrastructures and organisations were identified during the PRACE-1IP project whereby mutual benefit could be derived from potential outreach activities examples of which are: HPCWorld<sup>9</sup>, and EXSEDE<sup>10</sup>. Interaction with these and other bodies is an on-going and evolving process. Similarly other aspects of PRACE such as the Scientific Steering Committee are involved at the highest levels with bodies such as INCITE<sup>11</sup>.

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<sup>8</sup> <http://www.hpc-europa.eu>

<sup>9</sup> <http://www.hpcworld.eu>

<sup>10</sup> <https://www.xsede.org>

<sup>11</sup> <http://www.doeleadershipcomputing.org>



In future PRACE-2IP project and 3IP project outreach activities needs to be planned and executed in growing interactions with the PRACE AISBL/BoD.

## 5 Summary

The PRACE education outreach activities were launched during the PRACE-1IP project to reach out to the secondary and tertiary education sectors, which were identified as a target outreach community in the PRACE preparatory phase. An initial education outreach plan was laid down and broadly discussed between partners in the PRACE-1IP project. The first educational outreach pilot was organised which gathered 115 pupils from 3 different high schools to one place.

The event was a success, not only because of the high attendance, but because of the very strong spirit and high commitments that amazed both speakers and teachers. It's worth noting how quickly and easy the young people absorb the information about supercomputers.

The overall level of PRACE educational outreach activities has to be boosted in the coming years. It can be assumed that at least two to three other events need to be organised and information from them analysed before making any strong recommendations on the future directions and how to overcome potential challenges.

In the PRACE-2IP and PRACE-3IP projects the outreach activities will grow. Both projects embed some activities: the preparation of presentation kits in PRACE-2IP and the organisation of different HPC campus and other education outreach activities in PRACE-3IP. They need good practices and strong instruments to be successful. This document reports on the 1<sup>st</sup> PRACE education outreach pilot which is complemented by some general and some concrete recommendations for future such pilots.

The PRACE-1IP project it has been produced six different PRACE video films equipping PRACE and its all partners with a powerful media tool that to underpin the PRACE education outreach activities within next two years. The PRACE-1IP project cost effectively produced over 1 hour of video films as they cover broad areas of HPC topics:

- Introduction in supercomputers - global perspectives and opportunities;
- Presentation of PRACE AISBL;
- Demonstrating some examples of the PRACE for users;
- Showing the Supercomputers' Place in Our Lives and in the Development of Europe;
- Emphasising the PRACE training opportunities;
- Providing European HPC perspectives and challenges.

These will allow different audiences to raise their awareness of how supercomputers transform mathematical method and algorithms into simulations and new discoveries in science and industry. They are available to support the development of presentation kit for schools, undergraduate students, or to raise awareness among the general public by demonstrating the value of HPC.

In contrast to the formal training planned implemented by the PRACE training programmes, the educational representatives (e.g. secondary, undergraduate) require slightly softer approach. It must capture and fascinate their hearts and minds through the demonstration in an illustrative and sound way the influence and importance of the HPC developments and supercomputing outcomes for our lives or favourite industrial companies, both in Europe and overseas.

There is no faster and more sustainable way to better European HPC future then by encouraging those in secondary and undergraduate education to embark on a career in HPC, to enlighten the general public of the utility of HPC and to illustrate the advantages of HPC that can bring to industrial users.

## 6 Annex

### 6.1 A Template of Education Outreach Project

<p><b>Education outreach activity:</b> From Educational Outreach Plan</p> <p><b>Project name:</b> (The name of the concrete project)</p> <p><b>Organiser:</b> (HPC centre)</p> <p><b>Description of the project:</b> (should be very short)</p> <p><b>Parameters of the project:</b> (main activities and components; target group; partnership; management; financial parameters; ...)</p> <p><b>Main objective:</b> (project readiness and expected results; socio-economic goals; compliance with PRACE goals...)</p> <p><b>Working Program:</b> (timetable for development of the whole project)</p> <p><b>Financial Plan:</b> (decomposition of the cost; funding sources)</p> <p><b>Awareness Activities:</b> (measures for publicity)</p>
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### 6.2 Project proposal for education outreach pilot

<p><u>PILOT PROJECT: HAPPENING: SUPERCOMPUTERS CHALLENGER, PRAVETS, BULGARIA</u></p> <p>29 March 2012</p>
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**I. Education outreach activity:** HPC class in Professional High School of Computer Technologies and Systems

**Project name:** **Supercomputer Challenger**

**Organizer:** NCSA-Bulgaria in cooperation with Technical University - Sofia

#### **Description of the project**

The project is organised around 3 modules of 45 minutes each one covering a range of different topics from high-performance computer systems to supercomputing applications specially dedicated for secondary educational audience. The first part will be an introduction to supercomputing and the history of Bulgarian supercomputing and IT development. The next two modules will include lessons subdivided into two parts: the first part covers the supercomputers development over the last 60 years presenting main architectures that have prevailed at certain stage and a separate presentation on the Blue Gene/P architecture and how it works. The second part will present the lessons deals with HPC Applications (Life science, Bioinformatics, Environmental Changes) with strong emphasis on the role of HPC in our lives

followed by short presentation on HPC Infrastructure in Europe - HPC European community, supercomputer centres in Europe, European resources for HPC research.

Based on these two modules information, a Quiz with questions and answers will be played and the best pupils' answers will be awarded. The main chunk of the questions will be coming from a specially prepared presentation kit that present the high performance computing comprising both HPC architectures and applications. It is intended that by such game we can easily attract pupils' attentions as well as provide them memorable basis for further investigations and educational interest in HPC.

### Parameters of the project

#### Main activities and components:

- To identify and contact the schools and classes in order to provide good initial basis for the event;
- To prepare a ready-to-run presentation kit for making three-hours lessons on high-performance computer systems and computational science;
- To identify interested scientists, HPC experts and undergraduate students of some relevant field of science to carry out these visits;
- To translate the presentation kit in English for replication in other PRACE partners;

Target group: Pupils and teachers from Professional High Schools located at Pravets and Sofia. The pilot will cover around 90 pupils and 10 teachers from the schools.

Partnership: Professional High Schools management bodies, Universities, Academy, National electronic media.

Management: NCSA-Bulgaria, Technical University – Sofia.

Financial parameters: Funding for preparation of the presentation kit, lecturers, and organisational costs and dissemination materials.

### Main objective:

The main objective of the pilot project is to raise awareness about HPC at the secondary educational level and to attract pupils' attentions on further investigations and educational interest in HPC.

Additionally this pilot project aims at getting familiar the youth audience for the benefits that HPC plays in our society and industry. Globally, the field of HPC is at a crossroad – the speed up of computer processors has paved the path from the single-core CPUs towards multicore solutions.

### Working Program:

Main activity	Initiation date	Completion date
1. Identification of the schools and classes. Creation of a thematic network in HPC for secondary education	1 February 2012	6 February 2012

2. Identification of interested scientists, HPC experts and undergraduate students of some relevant field of science and create a thematic scientific network in HPC for pupils in Professional High School	7 February 2012	10 February 2012
3. NCSA Presentation kit preparation	13 February 2012	23 March 2012
4. Logistics (hall rent, transportation, academic, students and media arrangements, catering, preparation activities for dissemination)	15 March 2012	29 March 2012
5. Presentation kit translation	26 March 2012	28 March 2012
6. HPC class	29 March 2012	29 March 2012

**Financial Plan:**

Expense	Budgeted (EU)
Transportation cost of the speakers and the pupils from Sofia	70
Materials (folders, pens and other) and Poster of the event	250
Breaks (beverage and sweets) and light snacks	1 600
NCSA Presentation kit and video film	700
<b>Total</b>	<b>2 620</b>

**Awareness Activities:**

- Online information for the event as well as press release for the local media
- Distribution of the PRACE dissemination materials as well as preparation of special materials of the event
- Production of a local promotional video for the initiative to be presented during the event and on the local TV channel
- Preparation of promotional audio for the initiative to be broadcasted on the national radio
- Design and printing of Posters of the event

**6.3 Report on the Pilot case “Happening: Supercomputer Challenger” - Pravets, Bulgaria**

**Name:** Happening: Supercomputer Challenger

**Dates:** 29 March 2012

**Location:** Pravets, Bulgaria

**Participants:** Initially, it was targeted at two secondary schools under auspices of the Technical University of Sofia:

- Professional High School of Computer Technologies and Systems, located at Pravets and
- Technological School “Electronic Systems” in Sofia.

In addition, because of the high interest at the local level, some pupils from the English Language School in Pravets also were invited to take part in the event.

**Number of participants:** 127 participants including official guests from Pravets municipality, speakers, teachers and pupils. Only the number of the participating pupils from the schools is 115 accompanied by 6 teachers. Around 85% of the participating pupils coming from the Professional High Schools and the Professional High School of Computer Technologies and Systems were in the last year at school at ages of around 18-19 years old. The other less than 15% of the pupils are at age of around 15-16 years old.

**Organiser:** NCSA in cooperation with the Department “Computer Systems” of the Technical University of Sofia

#### **Organising Committee**

1. Assoc. Prof. Plamen Vatchkov – NCSA-Bulgaria;
2. Trifon Trifonov, Director of the Professional High School of Computer Technologies and Systems in Pravets, Bulgaria;
3. Prof. Plamenka Borovska – NCSA-Bulgaria and Technical University, Sofia;
4. Nelly Stoyanova – NCSA-Bulgaria;
5. Georgi Prangov – NCSA-Bulgaria

#### **Venue**

The pilot “Happening: Supercomputer Challenger” was held at the City University Hall, Pravets. This location was chosen because of the Professional High School of Computer Technologies and Systems in Pravets combined with the fact that there had been assembled the first Bulgarian computers and the last but not least it is proximately closed to the city of Sofia. The conference room has a capacity of around 130 participants and offers modern facilities.

#### **Budget**

The total budget of the event is provided in the subsection 6.2 as here it is presented only the available budget for the 1<sup>st</sup> PRACE Education Outreach Pilot case secured by the PRACE-IIP project.

The initial agreed amount for such events was 2 000 Euros as the NCSA utilized only 1 587.92 Euros due to the fact that additional funding was raised by the Technical University in Sofia for the preparation of the presentation kit and video production as well as the travel cost of the participants from the Technological School “Electronic Systems” in Sofia. In addition, the event hall was secured by the host from the Professional High School of Computer Technologies and Systems at Pravets so that a well funding balanced was achieved.

	Budgeted (EUR)
Transportation cost of the speakers	22.55
Materials (folders, pens and other) and Breaks (beverage and sweets) and light snacks	1462.29
Poster of the event	103,08
<b>Total</b>	<b>1587.92</b>

Table 5: Requested reimbursement by PRACE-IIP Project

### Members of the local Program Committee

1. Prof. Stoyan Markov – Head of National Centre for Supercomputing Applications, Bulgaria;
2. Prof. Plamenka Borovska – NCSA-Bulgaria and Technical University, Sofia;
3. Assoc. Prof. Plamen Vatchkov – NCSA-Bulgaria;
4. Assoc. Prof. Krassimir Georgiev – NCSA-Bulgaria and Project “Super K++”
5. Dr. Valentin Pavlov – NCSA-Bulgaria and Rila Solutions.

### Photos from the Happening: Supercomputer Challenger:



*Pictures from the Happening: Supercomputer Challenger*

## Programme

10.00 – 10.45	Introduction: presenting officials; short greetings by the Chairman of the Municipal Council of Pravets and the President of Technical University in Sofia, Bulgaria <i>Moderator Desislava Ivanova</i>
10.45 – 11.00	Prospects and development of IT technologies in Bulgaria – from the first Bulgarian PC and supercomputer to the current perspectives and opportunities that provides modern IT in particular Supercomputers Prof. Plamen Vatchkov
11.00 – 11.20	Break
11.20 – 11.35	Centre of Excellence SCA "Supercomputer Challenger" – video film
11.35 – 11.50	Presentation NCSA Kit for schools Prof. Borovska
11.50 – 12.05	IBM Blue Gene/P - presentation of the Blue Gene/P architecture and how to run jobs on the Bulgarian Supercomputer Dr. Valentin Pavlov
12.05 – 12.30	Break
12.30 – 12.45	Center of Excellence SCA – presentation of some sound examples of supercomputers applications in our lives Prof. Krasimir Georgiev
12.45 – 13.00	Presentation of PRACE Georgi Prangov
13.00 – 13.15	Quiz, Prizes
13:30 – 14:30	Light snacks and informal discussion

## 6.4 Roadmap for the production of the PRACE video

Activity <sup>12</sup>	Assignments	Timeframe and Deadlines
<b>I. Selection of Production companies/subcontractors:</b> <ol style="list-style-type: none"> <li>1. Venimis Oy, Inc., Helsinki, Finland - <a href="http://www.venimis.com/">http://www.venimis.com/</a></li> <li>2. Smile Audiovisual Oy, Helsinki, Finland – <a href="http://www.smileaudiovisual.fi/">http://www.smileaudiovisual.fi/</a></li> </ol>	NCSA and CSC	From February 2012 to March 16, 2012
<b>II. Preparation of a list of potential scientists and researchers that to support identification of scientific themes</b>	NCSA, CSC, BoD and Editorial Board	by March 23, 2012
<b>III. Carry out video montage of the different PRACE video modules</b>	Production team with the logistics support of the Editorial Group and BoD	From May 14 to June 15, 2012
<ol style="list-style-type: none"> <li>1. Selection of 5 scientific themes that to be included in the film and respective scientists or researchers to request for supporting the preparation of short explanations</li> </ol>	BoD and Group of 4	till April 30, 2012
<ol style="list-style-type: none"> <li>2. Organization of interviews' sessions</li> </ol>	Production team, CSC, BoD, NCSA	<b>1. Interview session on 16-17 April, 2012</b> during Industrial Seminar in Bologna with: <ul style="list-style-type: none"> <li>– Prof. Richard Kenway</li> <li>– Prof. Thomas Lippert</li> <li>– Representative by CENAERO – the first PRACE industrial user as well as the winner of the PRACE Competition as part of the Industrial</li> </ul>

<sup>12</sup> Progress of the activities is monitored by NCSA-Bulgaria



Activity <sup>12</sup>	Assignments	Timeframe and Deadlines
		Seminar <b>2. Interview session in Brussels in the beginning of May 2012</b> with: – Scientists from concrete domains <b>3. Interview session in Brussels in the beginning of May 2012</b> with: – Prof. Achim Bachem – Catherine Riviera – Dr. Maria Ramalho
3. Obtaining permission by the owners of the used visualization to be included in the PRACE video films	NCSA with the active support of Editorial Group	by the end of June, 2012
<b>IV. Review and feedback on the demo versions of the video film modules</b>	All speakers, Editorial Group and BoD	June 2012
<b>V. Production of the 1<sup>st</sup> version of the PRACE video modules</b>	Production team	June 2012
<b>VI. Review of the 1<sup>st</sup> version of the PRACE video modules</b>	All speakers, Editorial Group and BoD	June 2012
<b>VII. Presentation of the PRACE video films</b>	PRACE-1IP, WP3 – Event team and web team	From 17 June 2012 at ISC in Hamburg onwards
<b>VIII. Production of final versions of the PRACE video films</b>	Production team, PRACE AISBL	June 2012 – July 2012
1. Preparation of PRACE video modules in different formats including but not limited to the following mobile platforms: Android and Windows phones, Apply products and etc.	Production team and CSC	From June 28, 2012 onwards

## 6.5 Copyrights and right-of-publicity issues

### 1) Copyrights and right-of-publicity issues involved with any video production:

- **Other people’s own copyrighted footage** (e.g., video, audio recordings, or graphics) we wish to insert in the video
- **Talent featured in the video**, either paid or non-paid.
- **Locations in the video**. If we’re shooting at an event, we may also have to get permissions from the facility holding the event, as well as the event promoters.
- **Usage**. How we feature any of these people or things in our video directly relates to the types of permissions we need. Even if we have permission to record something or someone, we may only be allowed to do so for personal use, not for public use. Or, we may be allowed to publish a video for informational purposes, but not for commercial purposes.

Copyright is created long before the emergence of the Internet. The default setting of copyright law requires having explicit permission to copy, paste, edit source, and post to the Web, granted in advance.

### 2) “Fair Use”

If we haven’t received expressed permissions (such as in writing or otherwise recorded) we need to understand “**fair use**” – when you have protection under the law to copy someone’s copyrighted material.

“**Fair Use**” is a legal defense that allows for limited use of copyrighted material without permission from rights holders. The “Fair Use Doctrine” is actually part of United States copyright law, as codified in the Copyright Act of 1976, Section 107. It states as follows:

“The fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, *for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright.* In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include - (1) the purpose and character of the use, including whether such use is of a commercial nature or is for non-profit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work. The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors.”

For example, fair use protections with a video are much stronger when that video is considered “newsworthy,” versus publishing a video primarily for commercial purposes (or even selling that video).

### 3) Creative Commons

Creative Commons licenses help you share your work while keeping your copyright. Other people can copy and distribute your work provided they give you credit and only on the conditions you specify.

“Creative Commons is a non-profit that offers an alternative to full copyright.” ([www.creativecommons.org](http://www.creativecommons.org))

Briefly:



**Attribution means: You let others copy, distribute, display, and perform your copyrighted work - and derivative works based upon it - but only if they give you credit.**



**Noncommercial means:**

You let others copy, distribute, display, and perform your work - and derivative works based upon it - but for noncommercial purposes only.



**No Derivative Works means:**

You let others copy, distribute, display, and perform only verbatim copies of your work, not derivative works based upon it.



**Share Alike means:**

You allow others to distribute derivative works only under a license identical to the license that governs your work.

#### **4) Consultation with an attorney**

Consult with an attorney who specializes in intellectual property, Internet law, and entertainment law. Budgeting for the consultation to have our plans reviewed should be considered. This way we can be advised on what permissions we may or may not need to get, and what precautions we may need to take, before we start production. At the very least, we should have a much better awareness of what the risks are and how to prepare accordingly.

#### **6.6 PRACE target audiences:**

- 1) Worldwide HPC communities' representatives working in the field of enabling high performance computing applications, deploying and operating of computing and data management infrastructures and advancing scientific discovery:
  - a. Age: in the range from mid-20s to early 70s;
  - b. Nationality: Europe; USA; Japan; China; Republic of Korea; Brazil; India; Canada; Australia and New Zealand;
  - c. Pre-existing knowledge: ranging from very good knowledge to proficiency;
  - d. Educational background: computer engineering, software development and specific educational disciplines mainly in natural sciences;
  - e. Research background – IT (hardware and software) and/or specific scientific domains;
  - f. Professional experience: HPC centres management staffs; Research and educational seniors; Public authorities; other e-Infrastructure communities representatives (cloud, networking, scientific data and other)
- 2) European HPC communities' representatives working in the field of enabling high performance computing applications, deploying and operating of computing and data management infrastructures and advancing scientific discovery:
  - a. Age: in the range from mid-20s to early 70s;
  - b. Nationality: all round the Europe;

- c. Pre-existing knowledge: ranging from very good knowledge to proficiency;
  - d. Educational background: computer engineering, software development and specific educational disciplines mainly in natural sciences;
  - e. Research background - IT (hardware and software) and/or specific scientific domains;
  - f. Professional experience: HPC centres management staffs; Research and educational seniors; other e-Infrastructure communities representatives (cloud, networking, scientific data and other).
- 3) Industrial and Vendor representatives working on the design and production of high performance computing systems and/or applications enabling and development as well as fostering the technology transfer – turning the advanced scientific discovery into new products and services:
- a. Age: in the range from mid-30s to mid-60s;
  - b. Headquarters' location: Europe; USA; Japan; China; Republic of Korea; Brazil; India; Canada; Australia and New Zealand;
  - c. Pre-existing knowledge: ranging from good knowledge to proficiency;
  - d. Educational background: computer engineering, software development and scientific domains; economy, finance and legal;
  - e. Research background – technology transfer in IT (hardware and software) and/or specific scientific domains;
  - f. Professional experience: CIOs, CTOs and R&D Directors and other HPC engaged managers by IT vendors and/or heavy computationally engaged industrial sectors – automotive; energy; pharmacy and medicine and etc.
- 4) European authorities at EU or national level including policy makers, decision bodies and/or funding agencies responsible for HPC policy development and operational implementation:
- a. Age: in the range from mid-20s to mid-60s;
  - b. Nationality: throughout the Europe;
  - c. Pre-existing knowledge: ranging from some knowledge to good knowledge;
  - d. Educational background: computer engineering, software development and specific scientific domains; business administration, economy, finance and legal.
  - e. Professional experience: European Commission representatives – managers and senior experts; National policy and funding representatives; Professional organizations and associations.
- 5) Students including PhD students, Postdoctoral, Principal Investigator and Staff scientists:
- a. Age: in the range from 20s to 40s;
  - b. Nationality throughout the Europe plus young people outside Europe that situated themselves in European educational and research centres;
  - c. Pre-existing knowledge: ranging from beginners to proficiency;

- d.** Educational background: computer engineering, software development and specific scientific domains.
  - e.** Research background – from fundamental to technology transfer in the following fields: IT (hardware and software) and/or specific scientific domains;
- 6)** Pupils coming from secondary and tertiary educational institutions:
- a.** Age: in the range from 14s to 20s;
  - b.** Nationality: throughout the Europe plus youths outside Europe that situated themselves in European educational institutions;
  - c.** Pre-existing knowledge: from beginners to intermediate;
  - d.** Educational background: special focus on mathematics, technology and science.