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PRACE Third Phase Implementation Phase Project

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Report on Training Portal Development

Final

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References and Applicable Documents

[1]   PRACE web site: http://www.prace-project.eu

[2]   PRACE Training Portal web site: http://www.training.prace-ri.eu/

[3]   PRACE Events web site: http://events.prace-ri.eu/

[4]   PRACE Training Portal material: http://www.training.prace-ri.eu/material/index.html

[5]   PRACE Best Practise Guides: http://prace-ri.eu/Best-Practice-Guides

[6]   PRACE Training Portal YouTube Channel: www.youtube.com/user/PRACECourses

List of Acronyms and Abbreviations

AISBL	Association International Sans But Lucratif (legal form of the PRACE-RI)
BSC	Barcelona Supercomputing Center (Spain)
CaSToRC	Cyprus Institute is developing a Computation-based Science and Technology Research Center (Cyprus)
CINECA	Consorzio Interuniversitario, the largest Italian computing centre (Italy)
CINES	Centre Informatique National de l'Enseignement Supérieur (represented in PRACE by GENCI, France)
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
EPCC	Edinburg Parallel Computing Centre (represented in PRACE by EPSRC, United Kingdom)
EPSRC	The Engineering and Physical Sciences Research Council (United Kingdom)
FZJ	Forschungszentrum Jülich (Germany)
GENCI	Grand Equipement National de Calcul Intensif (France)
GNU	GNU's not Unix, a free OS
HPC	High Performance Computing; Computing at a high performance level at any given time; often used synonym with Supercomputing
IDRIS	Institut du Développement et des Ressources en Informatique Scientifique (represented in PRACE by GENCI, France)
JSC	Jülich Supercomputing Centre (FZJ, Germany)
KTH	Kungliga Tekniska Högskolan (represented in PRACE by SNIC, Sweden)
LRZ	Leibniz Supercomputing Centre (Garching, Germany)
MPI	Message Passing Interface
NCF	Netherlands Computing Facilities (Netherlands)
NCSA	National Center for Supercomputing Applications (Bulgaria)
NIIFI	National Information Infrastructure Development (Hungary)
OpenMP	Open Multi-Processing
PRACE	Partnership for Advanced Computing in Europe; Project Acronym
PSNC	Poznan Supercomputing and Networking Centre (Poland)
SARA	Stichting Academisch Rekencentrum Amsterdam (Netherlands)
SNIC	Swedish National Infrastructure for Computing (Sweden)
SURFsara	Dutch national High Performance Computing & e-Science Support Center
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
ULFME	University of Ljubljana, Faculty of Mechanical Engineering (Slovenia)

Executive Summary

This deliverable summarises the activities of "Task 4.3: Training Portal" of the Training Work Package (WP4) of the PRACE Third Implementation Phase (PRACE-3IP) project, from July 2012 to December 2013.

We describe how the PRACE Training Portal has been further developed from the PRACE First and Second Implementation Phase (PRACE-1IP and PRACE-2IP) projects, where it now acts as a central online hub and repository for high quality PRACE training material that are useful for self-learning and teaching purposes. The widespread global use of the portal is a good indicator of the quality of the PRACE Training Portal.

During PRACE-3IP this task has continued the maintenance and development of the PRACE Training Portal through the addition of training material from PRACE training events and through the creation of video tutorials in relevant areas of HPC that are of interest to both academic and industrial research scientists.

The integration of Google Analytics to the portal in PRACE-3IP has helped to identify potential collaboration partners within Europe and beyond. These collaborations have been initiated and will continue in the remainder of PRACE-3IP.

With data from Google Analytics there is evidence that the goal to provide access to high quality training material in HPC for European scientists is being realised by the PRACE Training Portal. The number of visits to the portal has been significantly high, with the majority of visits emanating (but not exclusively) from European countries. Specifically, between May and December 2013 there were close to 5,500 visits to the PRACE Training Portal with close to 3,500 unique visitors.

The web traffic data collected also shows the global outreach of the PRACE Training Portal, as traffic to the portal originates from many countries outside of Europe, including those that may have not had close interaction with PRACE in the past. A good example of this global appeal is the high volume of traffic originating from South Korea.

1 Introduction

Because of the geographical spread of PRACE partners and the target audience of PRACE training, it may be challenging and sometimes impossible for European computational scientists to attend all PRACE training events that are of interest to them. The PRACE Advanced Training Centres (PATCs) established in six European countries and the series of PRACE Seasonal Schools rotated around other European countries offer a wide array of HPC training to a large portion of PRACE users. But in order to better serve all European computational scientists, facilities for remote learning or self-study are required. To address this, the PRACE training portal [2] was developed in the PRACE First Implementation Phase (PRACE-1IP) project to act as a central online hub for hosting high-quality training material delivered by PRACE for self-learning and teaching purposes. With this resource available to them, computational scientists from across Europe and beyond could follow training events of their interest at their own time without the cost associated with travelling to training events.

The PRACE Training Portal became ready for production towards the end of PRACE-1IP and since then it has been acting as an online repository for PRACE training resources. The hosting of the web site has been carried out by CSCS (Switzerland) and maintained by CaSToRC (Cyprus). During PRACE-3IP the portal has received additional contribution from NCSA (Bulgaria), CSC (Finland), NIIFI (Hungary), PSNC (Poland), and ULFME (Slovenia). In this deliverable we report on the activities of "Task 4.3: Training Portal" of the Training Work Package (WP4) of the PRACE-3IP project. These in general have continued the activities of the corresponding task in PRACE-2IP (e.g. make available material from PRACE-3IP training events). Additional tasks aimed to attract a larger industry audience to the portal (and not only from academia) but also beyond the geographic perimeter of Europe have also been carried out. These tasks will continue till the end of the PRACE-3IP project.

In Section 2 we describe the activities related to making PRACE training material available online on the portal. Section 3 describes the PRACE-3IP effort to create and publish video tutorials on the portal and other video hosting sites. In Section 4 we describe steps taken to allow for cooperation of the PRACE Training Portal with other e-Infrastructures in an effort to collaborate in the process of sharing training material to scientific communities outside of Europe. In Section 5 we present statistics from the Google Analytics integration which occurred in PRACE-3IP.

2 Training Material

In this section we describe work carried out to make training material available on the PRACE Training Portal.

2.1   Availability of PRACE Training Material online

The main purpose of the PRACE Training Portal is to host and make publicly available training material from PRACE training events. To this effect, the organiser of each training event collects all material delivered during the event and sends it to the Training Portal administrator, who then labels the material and publishes it. The majority of the material currently available on the training portal has been collected, uploaded and made available during PRACE-2IP and PRACE-3IP.

The training material from 59 PRACE training events (Seasonal Schools or PATC courses) can be found under the "Material" tab [4] of the portal. In total, over 300 different training material are hosted, with each training material grouped together with other material related to

similar topics. Close to 90 of these training materials include a video of the lecture where both the presenter and the slides can be viewed simultaneously.

Training material includes the slides of the presented lectures in pdf format and whenever a hands-on session was held, the exercises and solutions (software code etc.) are also included where possible. Hands-on exercises and solutions are crucial for efficient self-study, so that training portal users can also build up practical skills by going through the exercises by themselves and comparing their results to the solutions provided.

In total, the number of documents hosted by the training portal exceeds six hundred documents.

Training material uploaded to the portal is also appropriately categorised (using categories as presented in Deliverable 4.3 of PRACE-2IP) and tagged relative to their content to allow for an easier way for users of the portal to find material of their interest. Besides training material, the training portal also includes links to the PRACE Best Practise Guides which are hosted on the PRACE RI website [5].

2.2   Training Portal & PRACE events web site integration

The PRACE Events web-site [3] that was implemented in PRACE-2IP, serves as a centralised service for hosting event pages and for handling the registration and feed-back processes. Together with the Training Portal it allows for efficient advertisement of PRACE training events and for a unified user experience for the participants.

The PRACE Events web-site is integrated with the Training Portal through the advertisement of future PRACE training events on the portal that link to the PRACE Events web-site entries of the same events. Additionally, when viewing the training material from a PRACE training event on the Training Portal one can find out more information about the event on the PRACE Events web-site through a link that appears in the short description of the training event.

In another example of integration, the PRACE Events web-site offers links to the training material hosted on the Training Portal. For all training events where training material is available, the material can be accessed through the entry in the PRACE Events web-site using a "Slides link", which re-directs the user to the portal where the training material can be found.

This integration work between the two sites has continued in PRACE-3IP and will continue at least until the end of the project.

3 Video Tutorials

Continuing the success of video tutorials created in PRACE-2IP, coordinated and structured training videos providing users with specific and concise information on various computational topics are also being created during PRACE-3IP.

Unlike videos created by partners in PRACE-2IP that focused on various parallel programming paradigms, the training videos in PRACE-3IP will be of a different nature. Emphasis will be given to more industry focused content to better take into account the training needs of users coming from industrial research and development.

Such videos will be of potential benefit to training portal users as they will provide them with good knowledge on how to approach and use various software related to different fields of computational science.

3.1   PRACE-3IP Video Tutorials

Based on the expertise of the partners involved, it was agreed to create the following video tutorials as presented in Table 1, which also describes the current production status of each tutorial.

Partner	Video Tutorial Title	Status of Production
NCSA (Bulgaria)	1. Introduction to Molecular Dynamics 2. DL_POLY Introduction	Completed and published October 2013
CSC (Finland)	1. Elmer GUI and parallel computing 2. Introduction to electron-structure calculations with GPAW	Under production with an expected completion date of end of April 2014
NIIFI (Hungary)	1. Accessing the visualization infrastructure with TurboVNC and VirtualGL 2. CUDA 5 in user perspective	Under production with an expected completion date of end of April 2014
PSNC (Poland)	1. Classification of Sparse Matrices for most efficient SpMV computation	Under production with an expected completion date of end of April 2014
ULFME (Slovenia)	1. Block Meshing with ICEM-CFD 2. External flow bluff body CFD simulation with ANSYS Fluent	Completed and published December 2013

Table 1 PRACE-3IP Video Tutorials and their status of production

The two video tutorials created by NCSA (Bulgaria) were completed in October 2013 and were without delay made available to the public on the Training Portal. Similarly, the two video tutorials created by ULFME (Slovenia) were completed towards the end of November 2013 and made available to the public on the Training Portal in early December.

Other video tutorials are in different stages of production with some being at the initial stage of production whilst others being in a more advanced and close to completion. Assistance and guides on video production have been offered to all partners on multiple occasions to ensure the production of good quality training videos and the completion of this task remains on schedule. Indeed, all videos are expected to be finished and become available on the PRACE Training Portal towards the end of April 2014.

3.2   Availability of Video Material on Public Video Hosting Sites

In May 2013 a YouTube video channel was created for the purpose of uploading video material hosted on the PRACE Training Portal to YouTube. The name of the channel is PRACECourses and can be found in [6].

The aim of this initiative is to reach a much wider audience than would be possible through the Training Portal alone. Indeed, this seems to be the case with the uploaded PRACE-2IP video tutorials attracting viewers from non-European countries such as India, Mexico and the USA. From the PRACE-2IP video tutorials the introductory PETSc and OpenMP videos seem to be most popular with 120 and 295 views respectively.

Following the success of the PRACE-2IP video tutorials on YouTube, PRACE-3IP video tutorials will also be uploaded on this video hosting site.

The video tutorials completed by NCSA were uploaded on the PRACECourses YouTube channel in October 2013 and the video tutorials completed by ULFME were similarly uploaded in December 2013. Video lectures recorded during PRACE training events, and for which consent has been received from the speakers, will also be uploaded to the PRACE Training Portal YouTube channel in 2014.

4 Synergies and co-operation with related initiatives

Following on from Task 4.4: *Training collaboration* in this section we describe similar efforts to allow for cooperation with related initiatives concerning the sharing and cooperation of training portal related initiatives.

The aim of this collaboration is to allow for a greater diversity, number and range of quality training material to become available to computational scientists through the PRACE Training Portal.

Two different initiatives have so far been approached for collaboration.

4.1 LinkSCEEM and Cy-Tera

The Linking Scientific Computing in Europe and the Eastern Mediterranean (LinkSCEEM) and Cy-Tera projects pursue the development of a high performance-computing ecosystem in the Eastern Mediterranean region by interlinking and coordinating regional computational, data and visualisation resources.

The Cy-Tera and LinkSCEEM projects are similar to PRACE, and also deliver training events to their respective communities.

PRACE has strong ties with both projects that use the PRACE Training Portal as an educational tool for their users and potential users. Indeed, the PRACE-2IP video tutorials on MPI and OpenMP were referred to the attendees of a LinkSCEEM training event so they could be better prepared for the event.

In Cy-Tera/LinkSCEEM user meeting roadshows, the PRACE Training Portal is also promoted to potential users as a source of quality training material where one can learn about various aspects of parallel programming paradigms and software. Such roadshow events occur in countries outside of Europe, such as Egypt, Saudi Arabia and Jordan. Thus through LinkSCEEM, the PRACE training portal is also disseminated to an audience outside of Europe.

The Cy-Tera/LinkSCEEM training portal will soon enter the process of development and it is expected that it will in some way link to the PRACE Training Portal. Sharing of training material and fostering links between the training portals will benefit both PRACE as well as Cy-Tera/LinkSCEEM.

4.2 XSEDE

The Extreme Science and Engineering Discovery Environment (XSEDE) project is a virtual organisation in the United States that provides a distributed infrastructure, support services, and technical expertise that enable computational scientists in their research. As a successor to the TeraGrid project XSEDE has great maturity and experience in many aspects of training scientists to use HPC in their research.

Further to the training collaboration PRACE has established with XSEDE, initial contact with staff working on XSEDE's training portal has taken place.

The idea is to first link the two portals together through links that direct users from one portal to another, and at a later stage the sharing of training material among the two portals are under ongoing discussions in PRACE-3IP.

This effort is still in its initial stage, though, and it is yet unclear as to how successful this attempt will be or to what extent this collaboration can be developed to within the time-frame of PRACE-3IP.

5 Google Analytics Integration and Statistics

To gain further insight into the usage profile and to collect statistics of web-site visits, Google Analytics was integrated into the PRACE Training Portal in May 2013. The visitor statistics for the Training Portal during the period of 15th May – 1st December 2013 are summarised in Figure 1.
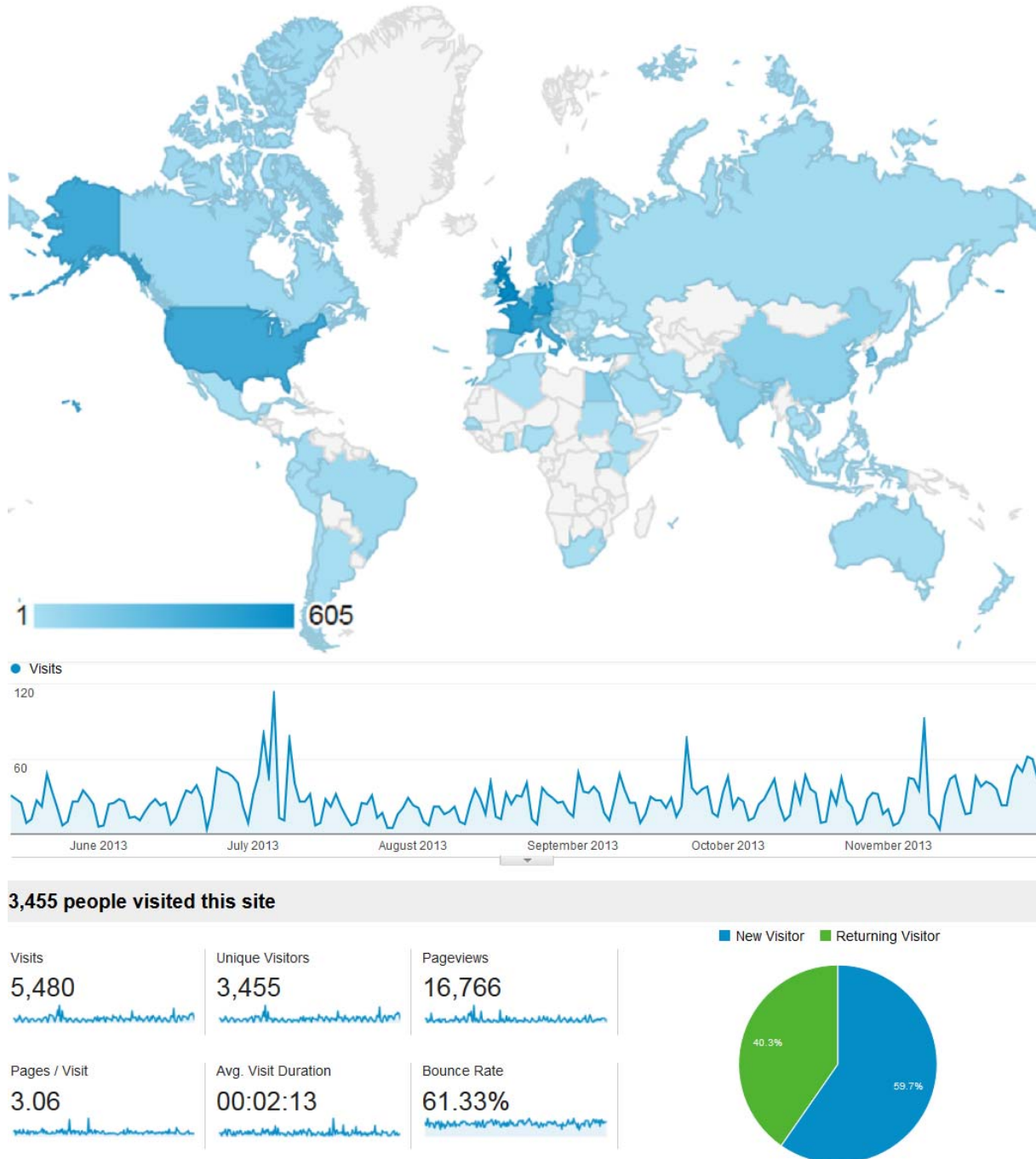

Figure 1 Google Analytics output describing visitors to the PRACE Training Portal between May 15 and December 1, 2013.

A few key details of these statistics should be pointed out.

First, from the above statistics it is clear that the PRACE Training Portal has a global reach spanning beyond Europe with visits originating across the continents of North and South America, Asia and Africa.

Second, visits to the PRACE Training Portal from the Eastern Mediterranean region - and most notably countries such as Egypt and Saudi Arabia, are most likely due to the cooperation which exists between PRACE and LinkSCEEM which has partners and collaborations with institutions from such countries. Similarly, the visits to the training portal originating from the USA are most likely due to the cooperation which exists between PRACE and XSEDE – such as the "International Summer School on HPC Challenges in Computational Sciences", which has helped to raise the awareness of PRACE and the Training Portal across the Atlantic.

Third, interest in PRACE training from South Korea has allowed for a high number of visits from this country. Specifically, the city of Daejeon, a "high technology" city with 18 universities and important research institutes in the country, is the second city where most visits to the PRACE training portal originate from.

The user statistics provide very strong evidence to support that the PRACE Training Portal is an invaluable tool which provides high quality training material related to computational science and is of interest to research scientists in Europe and beyond. Successful PRACE outreach activities in various events and newsletters will only serve to increase even further the interest, traffic and visits to the portal in the future.

6 Conclusion

The PRACE Training Portal was originally developed to act as a central online hub and host training material delivered by PRACE for self-learning and teaching purposes.

Throughout the PRACE-2IP and PRACE-3IP projects the portal has successfully fulfilled this goal making publicly available quality training material delivered at PRACE training events to computational scientists from Europe and beyond. In PRACE-3IP the Training Portal has been, and will be, further strengthened e.g. by producing training videos on computational topics of interest especially to industrial users. This work will continue into the final six months of the project.

Initial possibilities for collaboration with other research infrastructures have also been explored in PRACE-3IP. This work has produced promising contacts with Cy-Tera, LinkSCEEM and XSEDE.

The PRACE Training Portal has proven to be a highly successful platform for sharing top-quality training material across Europe and beyond that is an integral part of PRACE training activities. In the future, this work needs to be continued and further developed to ensure that European computational scientist are given assistance in acquiring the necessary skills to fully exploit PRACE resources.