



D2.2 Training Plan Version 1.0

Document Information

Contract Number	801051
Project Website	www.epeec-project.eu
Contractual Deadline	M6, March 2019
Dissemination Level	PU
Type	R
Author	Renata Giménez (BSC)
Contributor(s)	Antonio J. Peña (BSC), Valeria Bartsch (Fraunhofer)
Reviewer	Manuel Arenaz (APPENTRA)
Keywords	Training, hackathon, summer school

The research leading to these results has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No "801051".



© 2018 EPEEC Consortium Partners. All rights reserved.

Change Log

Version	Author	Description of Change
V0.1	Renata Giménez Binder	Initial Draft
V0.2	Antonio J. Peña (BSC)	Second draft
V0.3	Antonio J. Peña	Added outcome of MNHACK
V0.4	Manuel Arenaz	Internal review
1.0	Renata Giménez Binder	Changes implemented – final version

Table of Contents

Executive Summary	4
Introduction	4
1 Target audience and training needs.....	4
2 Training agenda.....	5
3 EPEEC hackathon.....	6
4 Other training Initiatives.....	7
4.1 PRACE.....	7
5 PUMPS+AI summer school.....	8
6 Other training initiatives.....	8
Acronyms and Abbreviations	9

Executive Summary

A sustained, high-quality training and education programme is important to guarantee that the EPEEC project will obtain the expected results as part of the dissemination and communication strategy. This document describes the training plan.

Introduction

This document presents an initial training plan for EPEEC project that will be updated during the project's lifetime. The main goal of training is to consolidate the relationships between the project partners and specific target audiences (including scientists, scientific bodies, industry, industrial advisors and general public), and ensure their understanding of its progress and achievements.

This plan will also include exploiting the existing training channels and platform of other related projects such as PRACE training centers (or partners/BSC summer schools such as PUMPs+AI, for example) to participate actively with the suggested trainings, and trying to accommodate the courses with their requirements, if any.

1 Target audience and training needs

As part of the Dissemination Plan D2.1, training is one of the tasks within dissemination and communication. As young researchers and scientists from other European Projects as well as industry are potential audiences for the EPEEC project, the training courses described in this plan will be a way to attract these audiences and disseminate the EPEEC project progress and outcome.

Initially, we plan to organize two courses each year about the hot topics defined by the various work package leaders, as well as to include sessions in summer schools. One special attention is to emphasize that EPEEC will co-organize a yearly hackathon with a total number of 20 – 25 attendees.

The target group is formed by members of universities and enterprises participating in the project and, in particular, the researchers and developers of the different partners, as well as the potential end-users are targeted. We will also disseminate them among the PRACE Advanced Training Center (PATC) experts and invite them individually if required.

In order to define the contents of the courses, we identified the training needs for several researchers and developers participants in the project. To define the training needs, we have contacted all partners and we have required information about what kind of topics they are interested in and what kind of courses they can teach. According to their answers, the following different topics should be included in the training courses:

- Use of Parallelware tools, covering topics related to high-productivity parallel programming based on parallel patterns
- Use of OmpSs, including targeting heterogeneous hardware (GPUs, FPGAs)
- Use of the BSC performance tools

- Use of GASPI

2 Training agenda

The proposal is to offer two courses every year, ideally close to the EPEEC face-to-face meetings, and avoiding conflicts of dates in the sector (February, June and November are, typically, months in which all partners are very busy with other events). Organizers should decide on the exact dates. The expected length for each course is between 2 and 4 days. We expect that all main partners could offer some course at their own site.

The training material will be uploaded onto the EPEEC project intranet as soon it is ready, but always before the start of each course.

The courses will be structured in two parts: theory and practice. The hands-on part will cover at least 30% of the course. Each course will limit the maximum number of attendants depending on the contents and structure of the course. In general, the ratio between teachers and attendants will be lower than 1/10 and the maximum number of attendants will be 30 people. Therefore, courses are really organized as workshops, where participants learn but also share their experiences. We aim also to engage as many female experts as we can.

The classroom will provide a projector, a screen, power supply sockets for all the attendants, free Wi-Fi and access to a cluster platform to perform the hands on exercises. The trainees are expected to come with their own laptops.

Each workshop will be organized by a partner with wide expertise in the topic. However, other partners can participate in order to give a complete coverage of the subject. The expertise for each partner is described in next paragraphs:

- **Appentra** will provide training around its Parallelware technology, which is used in EPEEC to provide initial automatic code annotation and taskification. Parallelware tools use parallel patterns as a high-productivity approach to parallel programming using OpenMP and OpenACC. Special focus will be put on new features related to tasking, OpenMP and OmpSs that will be developed during the project, and which will be included in the trainings as soon as they are available for internal use.
- **BSC** will provide training on its OmpSs-2 programming model and implementation. Special focus will be put on targeting heterogeneous hardware, which is the goal of the project. OmpSs-2 with OpenACC and OpenMP offloading targeting GPUs and FPGAs, new features brought by the project, will be included as soon as they are available for internal use.
- **BSC** will also provide training on the performance tools used in the project: Extrae, Paraver, and Dimemas.
- **Fraunhofer** will provide training on its GASPI programming model and GPI implementation.

According to the previous considerations, the initial training proposal is shown on Table I.

Date	Subject	Partner	Place
22 October 2018	MNHack: The first MareNostrum hackathon	BSC	Barcelona, Spain
6-7 Feb 2019	GASPI Training	Fraunhofer (CERFACS hosting the event)	Toulouse, France
12-13 February 2019	Xilinx/BSC HLS and OmpSs tutorial	BSC, co-organized with EuroEXA and LEGATO projects	Barcelona, Spain
4-5 April 2019	PATC Introduction to OpenACC	BSC	Barcelona, Spain
8-11 April 2019	PATC Introduction to CUDA Programming	BSC	Barcelona, Spain
24-29 April 2019	PUMPS+AI Summer School	BSC	Barcelona, Spain
To be determined	Parallelware tools: Parallel patterns for parallel programming:	Appentra	To be determined

Table 1: Training agenda

3 EPEEC hackathon

As mentioned before and further to the EPEEC training, one of the main trainings is to organize a yearly hackathon. The idea is to organize a three days hackathon in order to offer the possibility to optimize applications using the variety of programming models supported by EPEEC (OpenMP, OmpSs, GASPI, MPI, CUDA, OpenCL, OpenACC, GASPI).

The first hackathon was already organized at the BSC premises under the title "MNHack: [The first MareNostrum hackathon](#)" that took place 22 – 24th October 2018. EPEEC paid for the training room, lunch and coffee breaks, and mentors. Participants were responsible for their travels to the meeting venue and accommodation.

The first edition was a great success with a participation of a total of 19 attendees in 8 teams, for which we appointed 12 mentors. The outcome of the MN Hackathon was that these teams were trained on the use of current EPEEC technology directly on their application of interest, while they were also instructed about the upcoming features. After the event, we received several compliments. Quoting an e-mail from Huixia Lu: *"Thanks to that, I am now able to deal with my job in a more productive way. Discussion with Pablo is such a fruitful way for us physicists to improve the code and understand much better how to make more advantage of the computing time of supercomputers and finally publish more results of our work with your help!"*

We hope that the future editions will continue contributing towards the dissemination of the EPEEC technology.



Image 2: Photo of the First MN hackathon, October 2018

4 Other training Initiatives

Workshops are frequently the basis for collaborative application development, e.g. the PRACE training courses done by the PRACE training centers and other seasonal schools where students were able to use programming models such as OmpSs and other programming tools.

4.1 PRACE

PRACE, the Partnership for Advanced Computing in Europe, has selected six of its members sites: Barcelona Supercomputing Center (Spain), CINECA - Consorzio Interuniversitario (Italy), CSC - IT Center for Science Ltd (Finland), EPCC at the University of Edinburgh (UK), Gauss Centre for Supercomputing (Germany) and Maison de la Simulation (France) as the first PRACE Advanced Training Centers.

The mission of the PRACE Advanced Training Centers (PATCs) is to carry out and coordinate training and education activities that enable the European research community to utilize the computational infrastructure available through PRACE. The long-term vision is that such centers will become the hubs and key drivers of European high-performance computing education.

The training centers will provide top-class education and training opportunities for computational scientists in Europe. The training centers are also the main bodies responsible for producing materials for the PRACE training portal: www.prace-ri.eu/training

There will be at least one PRACE PATC in operation at any one time, but the geographical locations of centers, assessed every two years, may and will vary

over time. Training events may also be organized at locations external to PATC hosting sites.

5 PUMPS+AI summer school

PUMPS+AI is the acronym for Programming and Tuning Massively Parallel Systems + Artificial Intelligence.

The PUMPS summer school (PUMPS) is aimed at enriching the skills of researchers, graduate students, professors, and other professionals with cutting-edge technique and hands-on experience in developing applications for many-core processors with massively parallel computing resources like GPU accelerators, with special emphasis on artificial intelligence.

PUMPS is Organized by Barcelona Supercomputing Center (BSC), University of Illinois at Urbana-Champaign (University of Illinois), Universitat Politècnica de Catalunya –BarcelonaTech (UPC) and HiPEAC Network of Excellence (HiPEAC).

6 Other training initiatives

Whenever possible, EPEEC will try to contribute with existing training initiatives that might be of interest for the EPEEC partners such as, for example, EPEEC co-organized the "[Xilinx/BSC HLS and OmpSs tutorial](#)" that took place in 12-13 February 2019 at BSC, in collaboration with other EU projects such as LEGATO and EuroEXA. This gives visibility to EPEEC and also promotes the scientific careers to HPC specialization.

Acronyms and Abbreviations

Each term should be bulleted with a definition.

Below is an initial list that should be adapted to the given deliverable

- BSC – Barcelona Supercomputing Center
- CA – Consortium Agreement
- D – Deliverable
- DoA – Description of Action (Annex 1 of the Grant Agreement)
- EC – European Commission
- EPEEC - European joint Effort toward a Highly Productive Programming Environment for Heterogeneous Exascale Computing
- EUG- End User Group
- GA – General Assembly / Grant Agreement
- IM- Innovation Manager
- M – Month, Milestone
- PM – Person month / Project manager
- PO – Project Officer
- PMQG – Project Management plan and Quality Guidelines
- R – Risk
- RP – Reporting Period
- RV – Review
- SIAB- Scientific Industrial Advisory Board
- TM- Technical Manager
- WP – Work Package
- WPL – Work Package Leader