AutoTuning and Adaptivity approach for Energy efficient eXascale HPC systems

Deliverable D6.2: Dissemination of the Foreground Knowledge: Activities and Plans (Dissemination Plan 1)

http://www.antarex-project.eu/
Executive Summary: This report (issued at M09) details the dissemination activities realized by the project partners from M01 to M09 in Task 6.1 “Dissemination” under the leadership of UPORTO. The deliverable consists of the description of the activities done during the first nine months of the project and the dissemination plans for the rest of the project with emphasis on the period from M10 to M18 (date to release deliverable D6.3).

This document is organized as follows:
- Section 1 introduces the report
- Section 2 illustrates the ANTAREX logos and brochures.
- Section 3 describes the web presence of the project in terms of social networks and webpages.
- Section 4 lists the dissemination activities with respect to the deliverable period of this report [M01-09] and Section 5 lists the confirmed dissemination activities for the upcoming months.
- Section 6 describes our plans in terms of the dissemination activities to be done during the project.
- Section 7 concludes the report.

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1 Introduction

Recognizing the importance of the dissemination activities, the ANTAREX consortium undertook and intends to undertake various measures to increase the visibility of the project and of the main results achieved by widely promoting their dissemination through different communication channels. This report enumerates the dissemination activities during the first nine months (from September 2015 to May 2016) of the project and describes the dissemination plan for the remaining time of the project, highlighting the following nine months (the second dissemination period from June 2016 to February 2017).

The dissemination activities of the first nine months of the project have been less focused, as expected, on publication of results and more focused on disseminating the motivation, goals, key innovation aspects, and approach of the ANTAREX project. It is expected that the second nine-month period will be more focused on the dissemination of the results achieved (both in terms of their dissemination in scientific events and publications and in terms of general public dissemination). The dissemination activities presented, we believe, also highlight the efforts being addressed by the ANTAREX consortium.

The dissemination plan presented is both an ambitious and feasible plan, focused on the various dissemination channels and on the Today’s multitude of communication platforms (e.g., YouTube channels, presence in Social Networks). The dissemination plan addresses the importance of making both the society, general public and scientific communities aware of the ANTAREX findings and main innovations.
2 Dissemination Material

The ANTAREX project dissemination materials consist of the ANTAREX logos, infographics, diagrams, flyer, and the presentation templates. We adopted an unified image for all the materials produced, from webpage (details at [68]) to powerpoint presentations.

2.1 ANTAREX Logos

The following pictures present the logos specially designed for the ANTAREX project.

2.2 Brochures and Flyers

Figure 1 presents the high-level diagram designed for ANTAREX with the main goal to disseminate ANTAREX to technical and non-technical people. Figure 2 shows the ANTAREX flyer.
Figure 1. ANTAREX Diagram.

Figure 2. ANTAREX Flyer/Brochure.
3 Web Presence

3.1 Internal Project Website and Repository
This consists of a wiki (https://antarex.fe.up.pt/dokuwiki/doku.php) and a repository (https://antarex.fe.up.pt/owncloud), used as database and knowledge management tool, gathering knowledge based on ANTAREX-related scientific topics, reports, state-of-the-art and outputs of the project, and information on specific resources that will be available to all the partners. The access is restricted to partners of the Consortium and protected by user authentication. Details are provided in D6.1 [68].

3.2 Public Project Website
Main ANTAREX website (http://www.antarex-project.eu/) with general project description, publications, news, events organized, and public deliverables. Online website versions of the tools will be also provided at this website. Details are provided in D6.1 [68].

3.3 Presence in Social Networks
The ANTAREX project has presence in social networks through:

- Facebook (https://www.facebook.com/antarex.project/),
- Linkedin (https://www.linkedin.com/groups/8409003), and
- Twitter (https://twitter.com/antarex_project).
4 Dissemination Activities [M01-09]

Herein we present the external dissemination activities already conducted. Whenever applicable for each presentation we also list the project partner heading the activity and thus typically responsible for the presentation.

4.1 Publications in Scientific Journals


4.2 Publications in International Scientific Conferences


[Speaker: Cristina Silvano, POLIMI]


[Speaker: Marco Gribaudo, POLIMI]


[Speaker: Cristina Silvano, POLIMI]

[Speaker: Cristina Silvano, POLIMI]

The open archive HAL: ANTAREX - AutoTuning and Adaptivity appRoach for Energy efficient eXascale HPC systems. In 18th IEEE International Conference on Computational Science and Engineering, Oct 2015, Porto, Portugal. https://hal.ird.fr/IRISA_SET/hal-01235713


[Speaker: Amir Hossein Ashouri, POLIMI]


[Speaker: Stefano Cherubin, POLIMI]

4.3 Panels in International Conferences/Workshops

[10] [Panel] "Moore’s law is still alive! So why resource awareness?“ Cathal McCabe1, Axel Auweter2, João M. P. Cardoso3, Axel Jantsch4, X. Sharon Hu5 and Michael Hübner6, 1Xilinx, IE; 2Leibniz Supercomputing Centre, DE; 3Faculty of Engineering (FEUP), University of Porto, PT; 4Technical University of Vienna, AT; 5University of Notre Dame, US; 6Ruhr-University Bochum, DE, Chair: Michael Hübner, W08 First Workshop on Resource Awareness and Application Autotuning in Adaptive and Heterogeneous Computing, March 18, 2016, Friday Workshop of DATE 2016, Dresden, Germany, March 14 - 18, 2016.

[Panel Participant: João MP Cardoso, UPORTO][Member of the Organization: Cristina Silvano, POLIMI]


[Participants: CINECA, Martin Palković, IT4I]
4.4 **Keynotes and Invited Talks**


[Speaker: Luca Benini, ETHZ]


[Speaker: Cristina Silvano, POLIMI]


[Speaker: Martin Palkovic, IT4I]


[Speaker: João MP Cardoso, UPORTO]


[Speaker: Luca Benini, ETHZ]


[Speaker: Andrea Bartolini, ETHZ]


[Speaker: Andrea Bartolini, ETHZ]


[Speaker: Andrea Bartolini, ETHZ]

[Speaker: Cristina Silvano, POLIMI]


[Speaker: Martin Palkovic, IT4I]

4.5 Oral and Poster Presentations


[Speaker: Amir Hossein Ashouri, POLIMI]


[Poster presentation by: Kateřina Slaninová, IT4I]


[Poster presentation by: Stefano Cherubin, POLIMI]

[25] ANTAREX: AutoTuning and Adaptivity appRoach for Energy efficient eXascale HPC systems, Cristina Silvano, Giovanni Agosta, Andrea Bartolini, Andrea Beccari, Luca Benini, João M. P. Cardoso, Carlo Cavazzoni, Jan Martinovic, Gianluca Palermo, Martin Palkovic, Erven Rohou, Nico Sanna, and Katerina Slaninova, 10th International
Conference on High-Performance and Embedded Architectures and Compilers (HiPEAC’2016), EU Projects Poster Session and Exhibition, January 20, 2016, Prague, Czech Republic.

[Poster presentation by Cristina Silvano, POLIMI]


[Speaker: Cristina Silvano, POLIMI]


[Speaker: Erven Rohou, INRIA]


[Oral and Poster presentations by Cristina Silvano, POLIMI]


[Speaker: Nico Sanna, CINECA]

[30] ANTAREX -- AutoTuning and Adaptivity approach for Energy efficient eXascale HPC systems Cristina Silvano Thematic Session on: Challenges and Opportunities in...
Next-Generation HPC Systems for Real-Time Applications, HiPEAC Computing System Week September 21, 2015, Milan, Italy

[Speaker: Cristina Silvano, POLIMI]

[31] ANTAREX -- AutoTuning and Adaptivity approach for Energy efficient eXascale HPC systems Cristina Silvano ETIP4HPC (European Technology Platform for High Performance Computing) - EXDCI (European eXtreme Data and Computing Initiative) Workshop September 29-30, 2015, Rome, Italy

[Speaker: Cristina Silvano, POLIMI]

4.6 Software Demonstrators

In cooperation with WP2, we have extended MANET, a source-to-source compiler based on Cetus and aided with LARA, in order to be used for some experiments and specially for access via a public webpage. The online version of the tool has now a new public web interface:


The compiler was one of the tools used in the LARA Tutorial given at HiPEAC Spring CSW’2016 [33] (page 14).

4.7 Tutorials

We organized a tutorial about the LARA language and current LARA aided tools on April 20, 2016 as a thematic session of the HiPEAC Spring Computing System Week (CSW’2016)\(^1\), April 20-22, 2016, Porto, Portugal. The tutorial consisted of two slots of 1h30 each and was structured in six parts.

The tutorial went smoothly and it was very well received. The total number of attendees was about 40 from 16 institutions in 11 countries, and there were several questions and fruitful discussions.


(Thematic Session)

[Speakers: João M. P. Cardoso, João Bispo, Tiago Carvalho, Pedro Pinto, Luís Reis, Ricardo Nobre, UPORTO]

4.7.1 Program of the Tutorial

The program of the thematic session was based on short presentations about the LARA language, examples, and demos. During the presentations we used some of our tools to show the use of LARA for different purposes. Specifically we used the MANET, MATISSE, and KADABRA compilers and the LARA approach to explore phase ordering (using as example the LLVM compiler) to present some of the concepts and to show the application of LARA to real examples.

\(^1\) https://www.hipeac.net/csw/2016/porto/
The materials used in the Tutorial are available at: https://web.fe.up.pt/~specs/projects/lara/doku.php?id=lara:tutorial

Session A [9:00-10:30]:
- João M.P. Cardoso, Introduction to the LARA Language and its use in the context of Toolchains and Design Flows [20 min]
- Pedro Pinto, Tiago Carvalho, LARA for Programming Code Characteristics and Metrics [20 min]
- Pedro Pinto, Tiago Carvalho, LARA for Programming Code Instrumentation Strategies [25 min]
- Ricardo Nobre, Pedro Pinto, LARA for Programming Strategies for Code Transformations and Optimizations [25 min]

Session B [11:00-12:30]:
- João Bispo, Luís Reis, LARA in the context of a MATLAB/Octave to C/OpenCL Compiler [45 min]
- Tiago Carvalho, Ricardo Nobre, LARA in the context of a Java to Java Compiler [15 min]
- Tiago Carvalho, Pedro Pinto, LARA for Programming Strategies for Runtime Adaptivity [15 min]
- João Bispo, João M.P. Cardoso, Plans for LARA in the context of the ANTAREX Project [15 min]

4.8 Organization of Events

In this section, we list the events organized during the period covered by this report and associated to the ANTAREX project and involving members of the project.


[ANTAREX Members involved: João Cardoso and Jorge Barbosa, UPORTO].

In cooperation with the H2020 FET-HPC ALLScale project and also involving Dr. Pedro Diniz (ISI/USC, USA), we organized the Thematic Session [35] at the HiPEAC Spring CSW’2016, held in Porto, Portugal. The main aims were bringing together researchers and practitioners in the area of HPC and in particular Exascale Computing with the goal to exchange ideas and discuss approaches that will enable tackling the various challenges Exascale computing systems raise. The session was focused on programming models and tools towards high performance and energy efficiency on these systems, migration of existing applications, resilience, and runtime adaptivity. The session included six presentations, about 50 attendees, and there were interactions and fruitful discussions. The presentations involved the following projects: EPiGRAM: EPiGRAM - Exascale ProGRAMming Models (http://www.epigram-project.eu), ALLScale: An Exascale Programming, Multi-objective Optimisation and Resilience Management Environment Based on Nested Recursive Parallelism, (www.allscale.eu/), ANTAREX: AutoTuning and Adaptivity appRoach for Energy efficient eXascale HPC systems (http://www.antarex-project.eu/), EXTRA: Exploiting eXascale Technology with Reconfigurable Architectures, (www.extrahpc.eu), RoMoL: Riding on Moore's Law,


[Organized in cooperation with the ALLScale FET-HPC project and with Prof. Pedro Diniz from USC/ISI, USA]

**ANTAREX Member involved: João MP Cardoso, UPORTO**

[36] **[Co-Chair] EU Projects Special Session:** Towards better EUprojects - Success Stories
Organiser: Roberto Giorgi, University of Siena, IT Chair: Cristina Silvano, Politecnico of Milan, IT Co-Chair: Roberto Giorgi, University of Siena, IT. DATE’2016.

**ANTAREX Member involved: Cristina Silvano, POLIMI**

[37] **[General Chair] 10th International Conference on High-Performance and Embedded Architectures and Compilers (HiPEAC’2016),** January 19, 2016, Prague, Czech Republic [https://www.hipeac.net/2016/prague/](https://www.hipeac.net/2016/prague/)

**ANTAREX Member involved: Martin Palkovic, General Chair, IT4I**


**ANTAREX Members involved in the organization: Cristina Silvano, João MP Cardoso, Giovanni Agosta, General Co-Chairs and Program Co-Chair, UPORTO and POLIMI**


**ANTAREX Members involved in the organization: Cristina Silvano, Co-Chair, POLIMI**
4.9 FEAT Artist

We have applied to host an artist in the context of the FEAT Project. ANTAREX was presented at the FEAT workshop on March 17, 2016 in Amsterdam. The workshop was a non-technical venue with the goal of having an artist (visual art, most likely), embedded in the project and supported by the EU FEAT project. This was very competitive, as the FEAT project only sponsors 6 artists, and there were about 250 FET projects represented at the workshop. ANTAREX matched with Kuai Shen (webpage: http://kuaishen.tv/), a Cologne-based Ecuadorian artist who works primarily with ants. As Kuai is not one of the FEAT residency awardees, the collaboration will be mostly remote and less formal, although the FEAT partners and the artists will be looking for other funding opportunities.

We plan to have a visit of Kuai to POLIMI and a meeting with the partners (possibly during the rehearsal day in Bologne).

4.10 Press Releases and Newsletters

The following is the list of press releases and the communication of ANTAREX through newsletters and magazines.

4.10.1 Nationally –Wide Efforts

[43] CINECA HPC report (Annual) http://www.hpc.cineca.it/content/cineca-hpc-report-0
[44] CINECA magazine http://www.cineca.it/it/content/cineca-magazine

2 http://featart.eu/
3 We had a secondary goal of dissemination and networking towards other H2020 FET projects.
The ANTAREX project in High Performance Computing wins H2020 grant, Politecnico di Milano's news, April 14, 2015. (English version)  
http://www.deib.polimi.it/eng/news/details/413

Il progetto ANTAREX vince un finanziamento H2020 in High Performance Computing, Politecnico di Milano’s news, April 14, 2015. (Italian version)  
http://www.deib.polimi.it/ita/notizie/dettagli/413

ANTAREX - AutoTuning and Adaptivity appRoach for Energy efficient eXascale HPC systems, POLIMI Research Projects.  
http://www.deib.polimi.it/eng/research-projects/dettagli/242


http://www.cineca.it/en/news/antarex-project-hpc-wins-h2020-grant-0

AutoTuning and Adaptivity appRoach for Energy efficient eXascale HPC systems, Cineca Projects.  
http://www.cineca.it/en/progetti/antarex

Exame Informática Online, “Na FEUP, há quem queira acelerar supercomputadores (e medicamentos também),” (in Portuguese), by Hugo Séneca 29/01/2016,  
http://exameinformatica.sapo.pt/keyeord/entity/unk/ANTAREX
National dissemination through “Exame Informática”, a Portuguese magazine about informatics (a circulation of 23,600 copies, March 2016, no. 249, Monthly, Year 20), (online and paper version).

[54] http://exameinformatica.sapo.pt/noticias/ciencia/2016-01-29-Na-FEUP-ha quem quere acelerar supercomputadores e medicamentos tambem-

Figure 3. ANTAREX in the “Exame Informática” Magazine (paper version).


[56] Revista Engenharia (in portuguese), No. 56, Primavera 2016, Faculty of Engineering of the University of Porto (FEUP), paper version (a circulation of 3,000 copies) https://issuu.com/feup/docs/engenharia_56
4.10.2 Internationally-Wide Efforts

[57] Blog about Navigation Use Case within ANTAREX on the Sygic website: https://www.sygic.com/blog


4.11 Educational Dissemination

In terms of the educational dissemination, we plan to enrich the curricula of appropriate graduate courses by appropriate results from the developed design methodologies and tools by the academic partners. We have already started to engage students into project activities through specific topics for MSc and PhD Thesis. The following subsections describe the ongoing and efforts done in the first 9 months of the project.

Several course projects (for the course in Advanced Computer Architectures, instructor Prof. C. Silvano) have been proposed to 4th year students in Computer Engineering at Politecnico di Milano by members of the POLIMI team based on the use of the preliminary ANTAREX framework and targeting publicly available benchmarks.

The MANET source-to-source compiler and the LARA language has been used in the High-Performance Embedded Computing (HPEC) course of the UPORTO/FEUP Doctoral Programme in Informatics Engineering (ProDEI).

4.12 Development of Research Talent

In the ANTAREX project we are aware of the importance to improve the human capital in Europe. Thus, we are motivating the participation of our current MSc and PhD students to the ANTAREX topics, main goals, problems, trends, technology, and approaches, and we are making our best efforts to attract new MSc and PhD students for topics related to ANTAREX. Some of the planned activities such as the contests are in line to this goal.

The sections below briefly describe the current MSc, PhD and Post-Docs with some involvement to the ANTAREX work.
4.12.1 Training and Engagement of Graduate MSc Students (ongoing MSc Dissertations)

We have proposed topics for MSc Dissertations and at the moment the following two MSc students are working on their MSc Dissertations on topics relevant to ANTAREX.

Eduardo Fernandes is developing his MSc thesis (UPORTO/FEUP) on energy-aware resource management on heterogeneous systems, under the supervision of Prof. Jorge Barbosa. His research work is closely related to the WP3 of the ANTAREX project.

João Trindade is developing his MSc thesis (UPORTO/FEUP) on Graph-based representation of C/C++ applications on heterogeneous computing nodes, under the supervision of Prof. Jorge Barbosa. His research work is closely related to the WP2 of the ANTAREX project.

4.12.2 Training and Engagement of Graduate PhD Students (ongoing PhD Dissertations)

At the moment, we have the following thirteen PhD students associated to ANTAREX.

Davide Gadioli (POLIMI) started his doctoral studies (2015-2017) under the supervision of Prof. Gianluca Palermo and Prof. Cristina Silvano on autotuning methodology for HPC. Currently, his research activities are closely related to the WP3 of ANTAREX project.

Amir H. Ashouri (POLIMI) started his doctoral studies in 2013 under the supervision of Prof. Gianluca Palermo and Prof. Cristina Silvano on machine learning techniques to support compiler autotuning for HPC. Currently, his research activities are closely related to the WP2 of ANTAREX project.

Stefano Cherubin (POLIMI) started his doctoral studies (2016-2018) under the supervision of Dr. Giovanni Agosta on parallel programming models for HPC in close connection with the ANTAREX project. In particular, his work is closely related with the activities of WP2.

Ioannis Stamelakos (POLIMI) started his doctoral studies in 2013 under the supervision of Prof. Gianluca Palermo and Prof. Cristina Silvano on Near Threshold techniques for energy efficient manycore architectures. Currently, his research activities are closely related to WP3 of ANTAREX project.

André Rodrigues (UPORTO) started his doctoral studies (2015-2017) under the supervision of Prof. Ines Dutra and Prof. Jorge Barbosa on scalable energy aware resource management on ultrascale systems. His research work is closely related to the WP3 of ANTAREX project.

Luís Alexandre Cubal dos Reis (UPORTO) is a PhD student of the MAP-I (Doctoral Programme in Computer Science), FEUP/UPORTO, since September 2014. His PhD topic “Multitarget Compilation Techniques for Generating Efficient OpenCL Code from Matrix-oriented Computations” is clearly suitable to some of the ANTAREX research lines and we plan to use of some of the techniques proposed during his thesis work to generate OpenCL implementations. The requirements and application code in the context of ANTAREX will contribute to his knowledge and to the experimental evaluation in his PhD. His work is closely related to the activities of WP2.
Pedro Pinto (UPORTO) is a PhD student in the Doctoral Programme on Informatics Engineering (ProDEI), FEUP/UPORTO, since September 2013. His PhD topic “Runtime-aware Compiler Optimizations for High-Performance Embedded Computing” is focusing on techniques that can be applied and evaluated in some of the ANTAREX benchmarks. The requirements and application code in the context of ANTAREX are contributing to his knowledge and to the experimental evaluation in his PhD. His work is closely related to the activities of WP2.

Tiago Diogo Ribeiro de Carvalho (UPORTO) is a PhD student in the Doctoral Programme on Informatics Engineering (ProDEI), FEUP/UPORTO, since January 2013. His PhD topic, “Programming and Mapping Strategies for Embedded Computing Runtime Adaptability” is mostly focused on the use of LARA for runtime adaptability in the context of Java applications. Most of the LARA features proposed by his work are also suitable in the context of ANTAREX. Being aware of the requirements and adaptivity strategies proposed in ANTAREX is important for his knowledge about the topic and for reshaping some of the LARA features. His work is closely related to the activities of WP2 and WP3.

Ricardo Jorge Ferreira Nobre (UPORTO) is a PhD student in the Doctoral Programme on Informatics Engineering (ProDEI), FEUP/UPORTO, since January 2012. His PhD topic, “Techniques for Identifying Sequences of Compiler Transformations and Optimizations”, is focused on phase selection and phase ordering and can be applied to the ANTAREX use cases. The use of some of the code from the ANTAREX use cases enriches his experimental evaluation and the impact of his work. His work is closely related to the activities of WP2 and WP3.

Antonio Libri (ETHZ) started his doctoral studies (2016-2018) under the supervision of Prof. Luca Benini on fine-grain and accurate power/energy/performance monitoring support for HPC systems in close connection with the ANTAREX project. In particular, his work is closely related with the activities of WP3.

Daniele Cesarini (ETHZ) started his doctoral studies (2016-2018) under the supervision of Prof. Luca Benini on scalable energy/thermal management of HPC systems in close connection with the ANTAREX project. In particular, his work is closely related with the activities of WP3.

Martin Golasowski (IT4I) is a PhD student in the Doctoral Programme Computational Sciences, IT4I, since 2015. In his dissertation thesis, he is focused on implementation and optimization of clustering algorithms for large data collections. He is interested in algorithms suitable for HPC environment such as spectral clustering. He will investigate possible usage of the Intel Xeon Phi accelerators as a target platform for highly scalable and effective implementations of selected algorithms. His research work is closely related to the activities of WP5 and the outputs will be used within the UC2 – Self-adaptive Navigation System.

Radek Tomis (IT4I) is a PhD student in the Doctoral Programme Computational Sciences, IT4I, since 2015. His PhD topic, “Parallel Routing Algorithms”, is focused on the research of new parallel algorithms for the probabilistic route computation, O-D cost matrix construction and other route planning related algorithms, which utilize dynamic data on roads for the most accurate results possible. His research work is closely related to the activities of WP5 and the outputs will be used within the UC2 – Self-adaptive Navigation System.
4.12.3 Training and Engagement of Postdoctoral Fellows (ongoing Post-Docs)

At the moment we have the following three Post-Docs associated to the ANTAREX project.

João Bispo (UPORTO) is a Post-Doc at FEUP/UPORTO and he is working on source-to-source code transformations. The requirements and application code provided in the context of ANTAREX, and the feedback and discussions with ANTAREX members are being very important for his work. The current source-to-source tool based on Clang and aided with LARA control he is being working on as part of his duties is intended to be one of the source-to-source compilers used in the ANTAREX toolflow. His work is closely related to the activities of WP2 and WP3.

Davide Cerotti (PhD) is a Post-Doc at POLIMI working on performance evaluation and performance modeling for high-performance computing up to the Exascale era. His work is closely related to the activities of WP2 and WP3 of ANTAREX.

Andrea Bartolini (ETHZ) is a Post-Doc at ETHZ/UNIBO and he is working on energy-efficient HPC systems and software support. He follows the WP3 activities and ETHZ technical activities. His work is closely related to the activities of WP3.
5 Confirmed Activities

In this section we list the dissemination activities already confirmed and to be finished soon.

5.1 Press Releases and Newsletters

[60] IEEE-CS TCPP Newsletter (next edition)

5.2 Keynotes and Invited Talks


[Speaker: Cristina Silvano, POLIMI]

[62] [Seminar] “Design Space and Application Autotuning for Runtime Adaptivity in Multicore Architectures,” The University of Texas at Austin, Electrical and Computer Engineering, Computer Architecture Seminar: June 3rd, 2016, Austin, USA.

http://www.ece.utexas.edu/events/design-space-and-application-autotuning-runtime-adaptivity-multicore-architectures

[Speaker: Cristina Silvano, POLIMI]

5.3 Oral and Poster Presentations


[oral presentation, UPORTO]


[10 min oral presentation and poster presentation, UPORTO]

5.4 Organization of Events


http://hpcs2016.cisedu.info/2-conference/workshops---hpcs2016/workshop03-weha

[Workshop co-organizer: Andrea Bartolini, ETHZ]

Workshop focus: “The workshop aims to strongly encourage the exchange of experiences and knowledge in novel solutions for improving the power and energy efficiency of HPC systems, and their application in HPC data centers. It focuses on analyzing and assessing new trends for high
performance architecture, accelerators, and related changes in application algorithm design able to minimize the power and energy requirements for current and future HPC systems. Additionally, the workshop will look at challenges and tools for integrating the new generation HPC systems with the data centers for improved power and energy efficiency.”

[66] **Organization Committee, 12th International Meeting on High Performance Computing for Computational Science (VECPAR’2016),** June 28th to 30th, 2016 — Porto, Portugal

**[ANTAREX Member involved in the organization: Jorge Barbosa, UPORTO]**


**[ANTAREX Member involved in the organization: João MP Cardoso, UPORTO]**

### 5.5 Benchmarks

In order to publish in top-level conferences and journals we need to evaluate the ANTAREX approach and novel techniques with public and well-recognized benchmarks. We have already started to use and analyze the most used benchmark repositories\(^4\) and we plan to have a report on them by the end of September. This report will be part of deliverable D6.3. We plan to have the opinion of the members of the ANTAREX advisory board with respect to some of the benchmarks to be used. For instance, we anticipate the possible inclusion of climate modelling and weather prediction kernels to be suggested by Dr. Haroldo Velho from INPE in the ANTAREX experiments.

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\(^4\) Some HPC Benchmarks:

- High-Performance Linpack Benchmark (HPL), [http://icl.eecs.utk.edu/hpl/](http://icl.eecs.utk.edu/hpl/)
- HPCG (High Performance Conjugate Gradients) Benchmark: [www.hpcg-benchmark.org](http://www.hpcg-benchmark.org)
- Green Graph 500, [http://green.graph500.org/](http://green.graph500.org/)
- BSC Application Repository, [https://pm.bsc.es/projects/bar](https://pm.bsc.es/projects/bar)
We note however that we may need to adapt some of the benchmarks and to contribute to a benchmark repository considering runtime adaptivity topics.
6 Planned Dissemination Activities

This section presents the planned dissemination activities with special emphasis in the activities to be done until the next deliverable related to dissemination activities (deliverable D6.3).

The ANTAREX partners are committed to disseminate the ANTAREX research results at top-level international conferences, through invited talks, special sessions, paper presentations, demos, and tutorials. We will use these forums and disseminate the research developed in ANTAREX, in order to attract the attention of national and international partners. The ANTAREX partners will also disseminate the project results through the industrial contacts, e.g., in Intel, IBM, ARM, and Xilinx.

6.1 Press Releases

We plan to intensify the efforts regarding press releases, especially for each ANTAREX significant achievement (“success story”). Our efforts will consider national and international dissemination efforts through newspapers, magazines, websites specialized in science/computers/informatics5, and other media.

For instance, CINECA and the Project coordinator (Cristina Silvano) plan to release a news to media and newspapers in the third quarter of 2016.

6.2 Articles for Promotion of Science

We plan to publish articles regarding the ANTAREX approach, tools, and achievements in websites and magazines related to computers and supercomputing (an example is the supercomputing.pt) as a

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5 Examples of channels:
HPCToday http://www.hpctoday.com/
HPCToday, France http://www.hpctoday.fr/
HPCToday, EU http://www.hpctoday.eu/
Inside HPC http://insidehpc.com/newsletter/
Computer World http://www.computerworld.com
PRACE Newsletter http://www.prace-ri.eu/newsletters/
HPC Wire http://www.hpcwire.com/
Info World http://www.infoworld.com/category/high-performance-computing
ACM SIGHPC http://www.sighpc.org/
SIGDA Newsletter http://www.sigda.org/newsletter
Science News https://www.sciencenews.org/
Science Daily http://www.sciencedaily.com/
way to increase the visibility of the project more widely considering academic and scientific communities, practitioners, and industry.

### 6.3 Dissemination using Videos and Web-based Demonstrators

A 3-minute promotional “high-level” video is being prepared and it is expected for June 2016. The main objective is to increase the visibility of the project to general public by describing the motivation, main goals, approach and key innovations of the project. We plan to prepare at least one global short video per year and to have other videos for specific significant achievements. Besides these non-technical videos, we also plan to have short videos showing the use of the technology (e.g., LARA and the toolflow).

In addition to the online version of some of the ANTAREX tools, we will provide “high-level” web-based demonstrators (e.g., LARA and the toolflow) in the ANTAREX website. These web-based demonstrators will consist of interactive webpages that will show graphically the results achieved by specific tools and/or techniques of the ANTAREX approach and the main achievements as easily understandable messages.

We strongly believe that the short videos and the web-based demonstrators are effective ways to make the project and its main achievements more visible, and provide the tools to also make dissemination over social networks (e.g., Twitter, Facebook, and LinkedIn) more effective.

### 6.4 Tutorials and Demos

We plan to organize additional tutorials related to specific ANTAREX technology and tools. The LARA tutorial organized at HiPEAC Spring CSW’2016 was the first one in a series of planned activities. Those activities will consist of local/national and international tutorials. For example, the UPORTO’s team plans to organize one LARA tutorial on September 2016 in cooperation with the FEUP’s IEEE Students Branch and with the Portuguese section of the IEEE.

### 6.5 Educational Activities and Development of Research Talent

In addition to the tutorials and contests to be organized, we intend to use the technology in future editions of MSc and PhD courses. For instance, UPORTO’s team intends to extend the use LARA and the source-to-source tools in the Compilers course (3rd year of the MSc program in Informatics Engineering). This action will expose more than 150 students per year to the ANTAREX technology that will be used for student projects, in addition to the lecture material that will be available online. Similar plans are focused on PhD level courses.

We will also promote the connection of other PhD students working on topics related to ANTAREX to the project. We believe that their interaction with the project, partners, use cases, and technology is very important and contribute to their expertise and skills.

Table I below presents the number of MSc, PhD and Post-Docs currently associated to ANTAREX and the number planned for the upcoming years.
Table I Number of ongoing students and students planned for the next years.

<table>
<thead>
<tr>
<th>Type of Student</th>
<th>Ongoing</th>
<th>Planned for the next years</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSc</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>PhD</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Post-Doc</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

6.6 Cross Project Dissemination

In addition to the thematic session with EU-funded projects organized in the HiPEAC Spring CSW’2016 ([35], page 16), we have already started discussions about cross-project dissemination with other EU-funded projects such as READEX (http://www.readex.eu), and with other projects such as the MULTITHERMAN project and a DARPA Project.

The ERC Advance MULTITHERMAN Project lead by Prof. Luca Benini target the development design practice, tools and theory for multiscale energy-thermal management in electronics devices, embedded and large scale systems. The interaction of ANTAREX and the MULTITHERMAN project is ensured by the participation in ANTAREX of personal trained in the MULTITHERMAN project. On the long term there is a plan of integrating the tools developed in MULTITHERMAN with the ANTAREX methodology.

With respect to the interaction with the READEX project, ANTAREX members have been interacting in different venues with the FET4HPC READEX project. ANTAREX members have participated to the DCAT workshop co-organized by READEX at GCO’16 and presented the ANTAREX vision. Same thing happened at the Dagstuhl Seminar 2016, at the HiPEAC Spring CSW’2016 and at EXDCI events. There is an ongoing discussion in between READEX and ANTAREX about the sharing co-integration of the energy/performance monitoring tools developed in the two consortium.

We also have started collaborations with the project Nano2017 PSAIC, a collaboration between Inria and STMicroelectronics, funded by the French Ministry of Industry. Specifically, the work being done by Arif Ali Ana Pparakkal (Inria), who started his doctoral studies (2015-2018) under the supervision of Dr. Erven Rohou on split-compilation and dynamic binary analysis and optimization and is a member of project Nano2017 PSAIC, may benefit WP2 of ANTAREX.

We also plan to disseminate the project at COST actions. For instance, we plan to present the ANTAREX project and major research findings at specific meetings of the Network for Sustainable Ultrascale Computing (NESUS) COST action (http://www.nesus.eu) as Prof. Jorge Barbosa is a member.
6.7 External Cross-Dissemination Initiatives

We plan to take advantage of cross-dissemination opportunities promoted by initiatives such as EXDCI6 (European eXtreme Data and Computing Initiative), regarding, for instance the organization of booths at international events accommodating various projects (e.g., a shared booth will be in ISC’2016: https://www.isc-events.com/ir/grafik/floorplan16.png). The participation of the ANTAREX members in events organized by PRACE7 and by ETP4HPC8 will be enforced due to the presence of two ANTAREX partners, CINECA and IT4I, in these programs. IT4Innovations (IT4I) represents the Czech Republic in the European research infrastructure PRACE which is the unique institution joining national supercomputing centres in Europe. IT4Innovations also applied for ETP5HPC membership and is waiting for the decision.

The ANTAREX project outputs will be disseminated also within European Cloud Initiative9.

We also plan to continue taking advantage of the communication services available from the HiPEAC 4 project (we note that most of the ANTAREX members are members of HiPEAC). HiPEAC also promotes the dissemination of projects via the presence at booths in international events such as DATE.

6.8 Visits to Research Groups/Companies

We foresee a number of visits to companies and research groups in order to increase the visibility of the ANTAREX achievements. We intend to use the privileged contacts the ANTAREX members have in order to make meetings in companies such as Intel, LENOVO, ARM, IBM, Microsoft, and Xilinx.

We believe it is important to start by contacting the members of the ANTAREX advisory board in order to plan a number of visits (at least one per advisory board members’ institution).

6.9 Hosting an Artist

As we think that the possibility to have art work inspired in ANTAREX can increase the visibility of the project to the general public and possibly also to public that otherwise may not pay attention to the ANTAREX topics, we plan to organize soon at least two meetings with Kuai Shen (http://kuaishen.tv/), the FEAT artist hosted by ANTAREX, in order to help Kuai Shen on understanding the ANTAREX’s goals and approach and to facilitate deeper engagement. The collaboration is planned from May 2016 until January 2017. The exhibitions of the resulting artists are planned by the FEAT coordination action to occur from February to April 2017.

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6 https://exdci.eu/
7 http://www.prace-ri.eu/
8 www.etp4hpc.eu/
6.10 Scientific Publications

We expect to publish research results and findings in high-quality conferences and journals. We foresee an increase in the number of submissions of scientific papers with ANTAREX achievements to international conferences and journals. While we anticipate publications from each project partner, we also envision and will promote publications resulting from close cooperation between ANTAREX partners.

The following is a list of the conferences selected for submitting ANTAREX achievements:

- International Workshop on Languages and Compilers for Parallel Computing (LCPC)
- International Conference on Software Language Engineering (SLE)
- International Conference on Programming Language Design and Implementation (PLDI)
- International Conference on Modularity (Modularity)
- International Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES)
- International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)
- International Conference on Compilers, Architecture, and Synthesis for Embedded Systems (CASES)
- International Conference on Code Generation and Optimization (CGO)
- International Conference on Parallel Architectures and Compilation Technologies (PACT)
- International Conference on Principles and Practice of Parallel Programming (PPoPP)
- ACM International Conference on Computing Frontiers (CF)
- International Conference on Compiler Construction (CC)
- International Supercomputing Conference (ISC), www.ics-conference.org/
- International Symposium on High-Performance Computer Architecture (HPCA), http://www2.sbc.org.br/sbac
- International Conference on High-Performance Embedded Architectures and Compilers (HiPEAC), http://www.hipeac.net/conference
- IEEE International Parallel & Distributed Processing Symposium (IPDPS), www.ipdps.org/
- IEEE High Performance Extreme Computing Conference (HPEC)
- IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC)
- International European Conference on Parallel and Distributed Computing (EuroPar)
- Computer Information Systems and Industrial Management Applications (CISIM)

The following is a list of prestigious journals we selected for submitting research papers:

- IEEE Trans. on Computers

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10 Strictly following the DoW plans: “ANTAREX partners will ensure dissemination of peer-reviewed scientific publications which might result from the project by using the self-archiving “green” open access. The published or the final peer-reviewed manuscript will be archived by the researcher (or by their institution) in an online repository linked from the ANTAREX public project website. Submission of papers jointly written by project partners will be encouraged. For Consortium-wide publications, the “gold” open access model will be applied to ensure a prompt and wide dissemination of the project outcomes.”
In the end of the project, we plan to conclude a book to be published by the consortium with the approach and the most relevant results achieved by ANTAREX. In the end of 2017 we will propose to Springer the publication of the book.

6.11 Summer/Fall School

We plan to organize a summer school in the last quarter of the project. The intention is to cover the ANTAREX topics and possibly organize it in conjunction with other FET-HPC projects. The summer school will be open to students, the scientific community, practitioners, and industry.

6.12 Social Networks

We plan to intensify the use of social networks and to use the ANTAREX YouTube channel\(^{11}\). Our plans for the social networks include inviting the contacts of the members of the ANTAREX project in order to reach as many people as possible. We believe that the creation of short videos will contribute to the effectiveness of the dissemination of significant research results and findings. We are, however, aware of the need to be very selective in terms of the information to be posted to effectively attract attention.

6.13 Summary of Planned Activities

The following tables (Table II, Table III, and Table IV) summarize the planned dissemination activities. We would like to emphasize that some of the planned activities will be in cooperation with other HPC-FET projects with common interests. Those activities include the organization of special sessions, panels in conferences, workshops, and journal special issues. These activities will promote cross-dissemination and possibly will contribute to a wider dissemination.

\(^{11}\) https://www.youtube.com/channel/UCwRZ_P3bGmMy17xIEViq8Tg
Table II. Overview of Planned Dissemination Activities (M10-M18).

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Planned date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short promotional videos</td>
<td>Short videos describing ANTAREX motivation, goals, achievements, key innovations. Three videos are planned.</td>
<td>June 2016, January 2017, July 2018</td>
</tr>
<tr>
<td>Press Releases</td>
<td>Widely dissemination of specific achievements and “success stories”.</td>
<td>June 2016 and one every 3 months</td>
</tr>
<tr>
<td>Blogs and tweets</td>
<td>News, and achievements disseminated through partner’s webpages (e.g., Sygic blog website <a href="http://www.sygic.com/blog/">http://www.sygic.com/blog/</a>, twitter, facebook, and linkedin (e.g., linkedin reference on Sygic or Sygic Business Solutions accounts: <a href="https://www.linkedin.com/company/sygic-business-solutions">https://www.linkedin.com/company/sygic-business-solutions</a> and <a href="https://www.linkedin.com/company/sygic">https://www.linkedin.com/company/sygic</a>).</td>
<td>Regularly and based on the activities and achievements.</td>
</tr>
<tr>
<td>Intensify presence in Social Networks</td>
<td>Motivating members’ contacts to join the ANTAREX related groups, linkedin references to the ANTAREX webpage on, e.g., Sygic or Sygic Business Solutions account: <a href="https://www.linkedin.com/company/sygic-business-solutions">https://www.linkedin.com/company/sygic-business-solutions</a>, <a href="https://www.linkedin.com/company/sygic">https://www.linkedin.com/company/sygic</a>.</td>
<td>Regularly.</td>
</tr>
<tr>
<td>Contests</td>
<td>Involving students to the use of the ANTAREX approach and kernels of the use cases through a contest focused on specific requirements (e.g., best performance, low energy consumption, and considering different target architectures). The plan is to also involve ACM/IEEE Student Branches whenever possible and appropriate. 1st Contest with students from each ANTAREX academic partner and locally organized; 2nd Contest with students from the four ANTAREX academic partners and globally organized;</td>
<td>September 2016, September 2017</td>
</tr>
<tr>
<td>Online tools</td>
<td>Online versions of the ANTAREX tools publically available through websites.</td>
<td>Ongoing and regularly updated based on the new versions of the tools.</td>
</tr>
<tr>
<td>Online Demos</td>
<td>Besides the demonstrators required for the tutorials about the ANTAREX approach, we will develop high-level online demos to show in an interactive way some of the ANTAREX achievements.</td>
<td>2017 and 2018</td>
</tr>
<tr>
<td>Tutorials</td>
<td>Tutorials organized at prestigious venues, such as HiPEAC, PLDI, and SC.</td>
<td>Beginning of 2017 and 2018, and middle 2018.</td>
</tr>
</tbody>
</table>
## Activity Description Planned date

### Tutorials
Tutorials organized at each partner institution and open to the university students, faculty members, researchers, and industry delegates.
Third quarter of 2016.
Middle of 2017 and 2018.

### Booths
Demonstration of the tools and use cases by organizing booths at Conferences and exhibitions such as SC, ISC, HPCA, PACT, IPDPS, EuroPar, and HiPEAC.
DATE 2017 and 2018
HiPEAC 2017 and 2018
SuperComputing (SC) 2016, 2017 and 2018
ISC 2017 and 2018

### Presence in tradeshows, fairs, and large exhibitions
Participation of the industrial partners (DOMPE and SYGIC) to trade shows and main venues (such as Computationally Driven Drug Discovery Meeting and Connected Fleets Europe Conference & Exhibition), and industrial workshops.
2017 and 2018

### Dissemination over specific groups and initiatives
Disseminate of results related to the open source OpenCL toolchain over the Khronos Group by POLIMI.
Fostering the use and development of exascale-ready algorithms in the computer aided drug design community by Dompe as member of the organization committee of the Computationally Driven Drug Discovery Meeting (http://www.cddd.it/).
2017 and 2018
2016

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### Table III. Overview of Planned Dissemination Activities related to publications.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Planned date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benchmarks</strong></td>
<td>Code repository with the selected benchmarks to be used in ANTAREX experimental evaluations, mainly in terms of scientific publications.</td>
<td>First version on October 2016</td>
</tr>
<tr>
<td><strong>Scientific Journal Papers</strong></td>
<td>Publications in prestigious scientific journals.</td>
<td>Dates of submissions based on the results achieved.</td>
</tr>
<tr>
<td><strong>Scientific Conference Papers</strong></td>
<td>Publications in prestigious scientific conferences.</td>
<td>Dates of submissions based on the results achieved.</td>
</tr>
<tr>
<td>Activity</td>
<td>Description</td>
<td>Planned date</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Edition of Journal Special Issues</td>
<td>Special issues of international journals (e.g., The Journal of Supercomputing) dedicated to ANTAREX topics.</td>
<td>2018</td>
</tr>
<tr>
<td>MSc Dissertations and PhD Thesis</td>
<td>The conclusion of some MSc and PhD dissertations is foreseen during the project.</td>
<td>2016, 2017 and 2018</td>
</tr>
</tbody>
</table>

Table IV. Overview of Planned Dissemination Activities related to Events.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Planned date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization of Special Sessions</td>
<td>Special sessions dedicated to ANTAREX topics in conferences/workshops.</td>
<td>June 2016</td>
</tr>
<tr>
<td>Organization of Workshops</td>
<td>Workshops dedicated to ANTAREX topics (e.g., PARMA-DITAM). An ANTAREX Dissemination and Training Workshop</td>
<td>January 2017; June 2017</td>
</tr>
<tr>
<td>Organization of Panels in conferences/workshops</td>
<td>PARMA-DITAM</td>
<td>January 2017, 2018</td>
</tr>
<tr>
<td>Joint Events with other projects (cross-dissemination)</td>
<td>PRACE, EXDCI, and HiPEAC</td>
<td>January 2017, January 2018, Middle 2017.</td>
</tr>
<tr>
<td>Summer school/Fall school</td>
<td>A Summer School including keynotes, lectures and hands-on sessions on ANTAREX research topics (joint effort with other EU-funded projects).</td>
<td>July 2018</td>
</tr>
</tbody>
</table>
7 Conclusions

In the first nine months of the ANTAREX project we have been involved in several dissemination activities, focusing almost all the types of activities planned. Although this period focused more on the dissemination of goals, approach, key innovations, of the ANTAREX project, we foresee that the following period will highlight the dissemination of the research results and findings.

Upcoming efforts will try to address a wider audience at the national and international level through press releases and the use of the communication channels such as social networks and magazines.
8 References

9 ANTAREX Website Accesses

The following images show the information regarding the ANTAREX website accesses from Sept. 2015 to May 23, 2016. During this period the website had 1,953 visits.