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D7.4: CERBERO Final Workshop

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Abstract:

This document is meant to report on the project final event. It includes all the distributed material and a summary of achieved results.

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1. Executive Summary

This short report is meant to provide an overview of the CERBERO final dissemination and exploitation events.

Originally, at proposal time, as part of WP7 activities we programmed workshop to be held in Sassari. Nevertheless, after careful analysis and discussions, with the goal of maximizing the project impacts, we decided to transform the originally planned workshop into a tandem of two different events: one more oriented towards the scientific community, while the other more oriented towards the industrial community.

An extension of the project activities to February 2020, has been requested and agreed with the Commission in order to attend HiPEAC 2020 Conference and Embedded World 2020, which have been carefully chosen by the consortium to meet the abovementioned visibility/impact goals.

1.1. Structure of Document

The rest of this document is organized as follow:

- Section 2 presents the scientific community-oriented event: a full day tutorial at HiPEAC 2020 Conference, which has been accompanied by booth.
- Section 3 presents the industrial community-oriented event: a stand at Embedded World in the area dedicated to Start-ups.

1.2. Related Documents

This document is not specifically related to any other CERBERO deliverable, apart from D7.3 (*Dissemination and Communication report and plan - Final version*) and D8.2 (*Innovation, Standardization and Exploitation report and plan - Final version*), where the activities described in the present deliverable are also reported.

1.3. Related Requirements

The activity reported in this document clearly goes in the direction of maximizing the project impact, through efficient and effective communication, dissemination and exploitation activities. The requirement specifically connected to this deliverable is the following and is perfectly met.

CERBERO-0011. CERBERO SHALL have Dissemination and Exploitation Plans		
• in relevant industry communities		
• for technical education		
• for standardization effort		

2. Tutorial and Booth at the HiPEAC Conference 2020

After the successful participation of the consortium to HiPEAC 2019 in Valencia, the CERBERO team has decided to organize its final, dissemination oriented, project event at HiPEAC 2020. The goal of holding this event at HiPEAC 2020 was mainly related to the possibility of reaching a large highly relevant and active community to maximize the visibility and correlated impact of the project outcomes.

2.1. HiPEAC Event and targeted community

The HiPEAC conference is a highly ranked and a very well-known European forum for experts in computer architecture, programming models, compilers and operating systems for embedded and general-purpose systems.

The HiPEAC 2020 conference took place in Bologna (Italy) from the 20th to the 22nd of January. The program was very rich, <u>https://www.hipeac.net/2020/bologna/#/schedule/</u>, and it included three impressive keynotes given by:

- Todd Austin who is Full Professor at the University of Michigan,
- Calista Redmond who is the CEO of the RISC-V Foundation, and
- Alessandro Cremonesi who is the Group Vice President, General Manager of ST System Research and Applications.

Overall, 66 sessions have been organized and run, including also workshops, tutorials and posters sessions.







This year 608 attendees were present at HiPEAC 2020 Conference, coming from 261 institutions all over 36 different countries.

2.2. CERBERO Tutorial: content and agenda

A proposal for the organization of a full day event, entitled "Adaptive CPS architectures, methods and tools: the CERBERO project", has been submitted in June 2019 and accepted in August 2019.



Figure 1 – CERBERO Final Event @ HiPEAC20 – abstract and general details

The event, whose detailed content and program can be found here: <u>https://www.hipeac.net/2020/bologna/#/schedule/sessions/7740/</u> and whose abstract is shown in Figure 1, has been structured in four different sessions as reported hereafter. Please note that for each session, we are also reporting the partners that have attended HiPEAC as speakers to the tutorial activities.

SESSION #1 – CERBERO overview

- Welcome and Introduction on CERBERO project and technologies *Francesca Palumbo* (UNISS)
- Key Scientific Highlights of the CERBERO project technologies
 - o Advancement on (dataflow) MoCs Eduardo Juarez (UPM)
 - Key Performance Indicators Francesco Regazzoni (USI)
 - CERBERO Interoperability Framework (CIF) *Evgeny Shindin (IBM)*
 - CERBERO Adaptation Loop Eduardo de la Torre (UPM)
 - Formal methods in the CERBERO Toolchain Luca Pulina (UNISS)

SESSION #2 - HANDS on "Tools Interoperability - Intra-tool interoperability using the CERBERO Interoperability Framework"

The development of a direct connection between tools can be a lengthy process, especially when inner tool data models change and therefore the interface between tools should change as well. The CERBRERO Interoperability Framework (CIF) offers a way to easily cope with model adaptations. This workshop will offer a hands-on tutorial on how to use CIF. As an example, we will discuss a use-case from the integration between DynAA and PREESM (both CERBERO tools).

Julio Oliveira (TN0) and Michiel van den Baar (TNO)

SESSION #3 HANDS on "Adaptation over Heterogeneous Embedded Computing Infrastructures"

Often deployed in hard-to-reach environments, CPS are meant to be dynamic, providing efficient ways to adapt to mutable and evolvable requirements. Self-adaptation aims at changing structure, functionality or parameters of the systems according to internal and external triggers and, in general, it needs both architectural and tooling support. This workshop will offer a hands-on tutorial on how to use PREESM, SPIDER, PAPIFY-ARTICo3, and MDC tools to implement and manage self-adaptation over an embedded heterogeneous processing platform.

Tiziana Fanni (UNISS), Daniel Madroñal (UPM), Maxime Pelcat (INSA), Alfonso Rodriguez (UPM), Carlo Sau (UNICA) and Leonardo Suriano (UPM)

#SESSION 4 – Impact, Demo and Clustering

- Clustering
 - The CPSwarm H2020 CPS Project
- Market Trends and Exploitation Potentials for CPS CERBERO path to market *Maria Katiuscia Zedda (AI)*
- Overview of CERBERO demonstrators
 - Self-healing system for Planetary Exploration *Pablo Sánchez de Rojas (TASE)*
 - Smart Travelling for Electric Vehicles Joost Adriaanse (TNO) and Antonella Toffetti (CRF)
 - Ocean Monitoring Hans Myrhaug (AS)

The two practical sessions were meant to actively transfer knowledge and to gather feedback from users. Participants have been invited to fill in a feedback form:

https://docs.google.com/forms/d/e/1FAIpQLSdhAIC9iFV5nerufXZAeF3nAWnyWRCUnPaLsUWoiNZWDNgZw/viewform

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All the presentations and the material, prepared for the overall tutorial and the hands on (i.e. the Virtual Machine with the examples), are downloadable at: <u>https://www.cerbero-h2020.eu/news-and-events/hipeac-2020/</u>



The tutorial recorded 47 registered participants (including 16 consortium members), from 33 institutions in 11 countries. The complete list of participants, for privacy protection reasons has not been included in this deliverable, which is public, but can be found in D8.2.

In parallel to the full day tutorial, a showcasing booth has been set-up and run for the entire duration of the HiPEAC conference. This booth gave us the possibility of

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discussing the different project technologies one-to-one and of organizing small demonstration sessions, beyond showing the video on the final Smart Travelling Demonstrator:

https://www.cerbero-h2020.eu/wpcontent/uploads/2020/01/CRF_Cerbero_sub_hq_v04.mp4.



2.3. Outcome & Participation

Follow up and cross-fertilization of our technologies with other conference participants has been discussed. Many people visited the booth. As a reminder and reference to the project material, small gifts (pen and small water bottle containing a link to the CERBERO website) were given to the booth visitors and tutorial attendees .Presentation of the CERBERO toolchains and use case have been done also to researchers already collaborating with CERBERO partners. The list below summarizes the main ones:

- CERBERO booth was visited by groups of students from the Bologna area, HiPEAC arranged guided tours of the stands. CERBERO members explained them the developed methodologies, the tool chain and the implemented use cases.
- Preliminary contact with researchers from the United Technologies Research Center on the usage of CIF and comparative analysis with similar work.
- During the HiPEAC conference, the CERBERO team participated on the MegaMart2 Hackathon contest. By using the CERBERO CIF tool, we were able to provide direct solutions to some of the interoperability problems mentioned by the MegaMart2 Consortium. CERBERO agreed to build a simple, yet demonstrative example on how to use CIF in one of their use cases. A teleconference will follow to exchange the results. Additionally, TNO started a

preliminary discussion for writing together a research proposal around the interoperability issues, common to both projects.

- Preliminary discussion and contact with Airbus on the CERBERO computing level technologies for self-adaptivity management on heterogeneous MPSoC. A follow up by email already started and material exchanged.
- Related with security aspects, Preliminary discussion has been done with Ilia Polian (University of Stuttgart), and Paolo Palmieri (University College of Cork) with the goal of broadening the common research interest on security to cover also security aspect of CPSs. These initial discussions have been followed by a dedicated phone call and will be other phone calls in the next weeks.

In general, it was a highly participated consortium event. To run the booth in an efficient manner, covering all the complementary skills and technologies of the CERBERO project, and to give presentations at the tutorial 19 members of the consortium took part to the event.

In terms of visibility, the CERBERO twitter profile performed quite well. During the 3 days of the conference, the profile account earned 2.8K impressions per day, 33 re-tweets and 87 likes, with an increment of followers.



Your Tweets earned 8.3K impressions over this 3 day period



3. Booth at Embedded World 2020

Embedded World is a major market-oriented event in Europe for the embedded system community. Therefore, after the first review at M18, we decided to opt for this location to present the project final outcomes to a broad industrial community.

3.1. Embedded World Event and targeted community

Embedded World took place from the 25th to the 27th of February 2020 in Nuremberg (Germany) and it hosted 900 exhibitors and numerous speakers from all over the world.

[Please note that all pictures below have been downloaded from the Embedded World website. Use of the pictures is permitted exclusively for the creation of advertising and information materials as the present deliverable is.]



[SRC: NürnbergMesse]



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[SRC: NürnbergMesse]

Right from the start in 2003, Embedded World has always been an highly participated event, thanks to the exhibition range and the parallel specialist congresses that are tailored upon the requirements of the embedded community.

Topics covered span across different aspects of the embedded domain ranging from construction elements through modules and full systems, operating systems, hard and software to services, security for electronic systems, distributed intelligence, IoT and eservices and energy efficiency.

This year official number are not available yet, but regarding 2019 edition here are some numbers: 1117 exhibitors from 84 countries, 30.895 visitors and 1,990 participants to the congress.

3.2. CERBERO Booth

Since the CERBERO project main outcomes is certainly strongly related to Embedded World topics, to give visibility to the set of integrated tools and technologies for Cyber Physical System and to the developed demonstrators we applied to participate to this event in the start-up area:

https://www.embedded-world.de/en/exhibitors/participation/start-ups

The reason that moved us to present CERBERO technologies in that area were the following:

- Even if we participated as the consortium of a research project some partners are evaluating the possibility to set up a start-up with a selection of the developed tools. Therefore, ideally, being in that area was an opportunity to get a valuable feedback for their plans.
- Some companies of the consortium participated to previous edition of Embedded World and, given the huge general scale of the event, felt that the start-up area was more appropriate for CERBERO size.

[Please note that the pictures below have been downloaded from the Embedded World website. Use of the pictures is permitted exclusively for the creation of advertising and information materials as the present deliverable is.]

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[SRC: NürnbergMesse]

The booth proposal got enthusiastically accepted on December 2019. The booth gave us the possibility of discussing the different project technologies one-to-one to gather maximum feedback and visibility. Moreover, the booth gave us the possibility of

- showing the video on the final Smart Travelling Demonstrator: <u>https://www.cerbero-h2020.eu/wp-content/uploads/2020/01/CRF_Cerbero_sub_hq_v04.mp4</u>.
- preview the video of the CERBERO project to get a feedback before its consolidation. The video is currently in CERBERO homepage <u>https://www.cerbero-h2020.eu/</u>

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Furthermore, CERBERO project was selected for a 5 minutes pitch in a special session for start-ups gaining the possibility to present the results and approach to possible users and Business Angels.

3.3. Outcome & Participation

This event was originally meant to be a highly participated consortium event. Unfortunately, only 4 CERBERO members got the chance to be there¹. Nevertheless, the achievements and results of CERBERO participation to Embedded World are extremely positive, as detailed hereafter.

- During the exhibition 300+ people has been visiting the CERBERO booth and most of them were interested by tools and methodologies developed during CERBERO project. CERBERO Self adaptation-loop and CERBERO Interoperability Framework got special attention of visitors. As a reminder and reference to the project material, small gifts were given to the visitors (pen, usb hub or small water bottle containing a link to the CERBERO website).
- Results of CERBERO project have been presented to the several groups of students from German and Hungarian universities.
- The CERBERO stand was also visited by groups of the guided tours of the Embedded World, were we were able to explain the developed methodology, the tool chain and the implemented use cases.
- Preliminary contacts started with several companies including: CEO of Embedded Systems SIA (Latvia and Germany), CTO of NXM (USA and Canada), Country Manager of Karamba Security (USA, Israel and Germany), Managing Director of AEI corporation (India), CEO of CESANTA (Ireland), CEO of Elektor (the Netherlands) and R&D manager of Turkish Airlines Technic.

In terms of visibility, the CERBERO twitter profile performed quite well al so in relation to this event.



Overall, the profile account has earned 8.5K impressions in February and increased the followers by 5, with 296 impressions per day on average. The top tweet relates to Embedded World participation and got 1339 impressions.

¹ Other five consortium members for personal matters were not able to attend last minute to the event.

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