http://www.everest-h2020.eu

dEsign enVironmEnt foR Extreme-Scale big data analyTics on heterogeneous platforms

D7.4 — Final dissemination report

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1 (Coord.)	IBM RESEARCH GMBH	IBM	CH
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3	UNIVERSITÀ DELLA SVIZZERA ITALIANA	USI	CH
4	TECHNISCHE UNIVERSITAET DRESDEN	TUD	DE
5	Centro Internazionale in Monitoraggio Ambientale - Fondazione CIMA	CIMA	IT
6	IT4Innovations, VSB – Technical University of Ostrava	IT4I	CZ
7	VIRTUAL OPEN SYSTEMS SAS	VOS	FR
8	DUFERCO ENERGIA SPA	DUF	IT
9	NUMTECH	NUM	FR
10	SYGIC AS	SYG	SK

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Table of Contents

1 Executive Summary

This deliverable provides an overview of all the communication and dissemination activities carried out in the context of the EVEREST project.

A detailed dissemination plan for the consortium as a whole, as well as individual partners, was presented in Deliverable D7.2 and updated in Deliverable D7.3. In this deliverable, we reported and evaluated the EVEREST communication and dissemination activities made during the 42 months of the project. The report is intended to be a comprehensive summary, including activities for the entire duration of the project. However, the ones referring to the second reporting period (RP2) are clearly marked and highlighted. The consortium published 32 peer-reviewed contributions (8 journal and 22 conference papers plus two book chapters – 6 journal papers, 15 conference papers, and two book chapters were published in the second reporting period) and participated in several workshops and conferences also with invited presentations. Several workshops and tutorials focusing on the EVEREST technologies were organized during the project, including one summer school. It is worth noting that, in the first reporting period, the opportunities for external dissemination have been severely limited by the ongoing COVID-19 pandemic and the relative measures adopted by several conferences and events. In the second reporting period, most activities were organized as physical events. However, the EVEREST consortium continued to provide online material (e.g., webinars).

1.1 Structure of the document

The document continues as follows. Section 2 and Section 3 present the communication and dissemination activities, respectively. Section 4 evaluates such activities based on the Key Performance Indicators (KPIs) defined by the consortium. Section 5 concludes the report, discussing also some communication and dissemination activities that have been already planned beyond the project's end.

1.2 Related documents

This deliverable refers to the following documents:

- Deliverable D1.2 describes the initial data management plan.
- Deliverable D1.3 describes the interim data management plan.
- Deliverable D1.4 describes the final data management plan.
- Deliverable D7.1 describes the project website.
- Deliverable D7.2 describes the initial dissemination plan (along with activities reported in M1-M6) and associated KPIs.
- Deliverable D7.3 describes the intermediate dissemination report (with activities reported in M1-M18), the updated plan, and associated KPIs.
- Deliverable D7.7 describes the final exploitation plan.

2 Communication Activities

This section describes all communication activities carried out by the EVEREST partners, highlighting those completed in the second reporting period (M19-M42).

2.1 Visual Identity

The EVEREST consortium created a visual identity of the project with several components. First, it has a logo (see Figure 1) used in all communications and presentations. The logo has several variants to adapt it better to the media where used.

(a) Horizontal Logo (b) Vertical Logo

(c) Complete Logo (with full project's name)

Figure 1 – EVEREST logos.

Due to the many virtual events and meetings (especially during the COVID-19 pandemic), the consortium prepared several variants of a "virtual background" following the project's identity. Examples are shown in Figure 2.

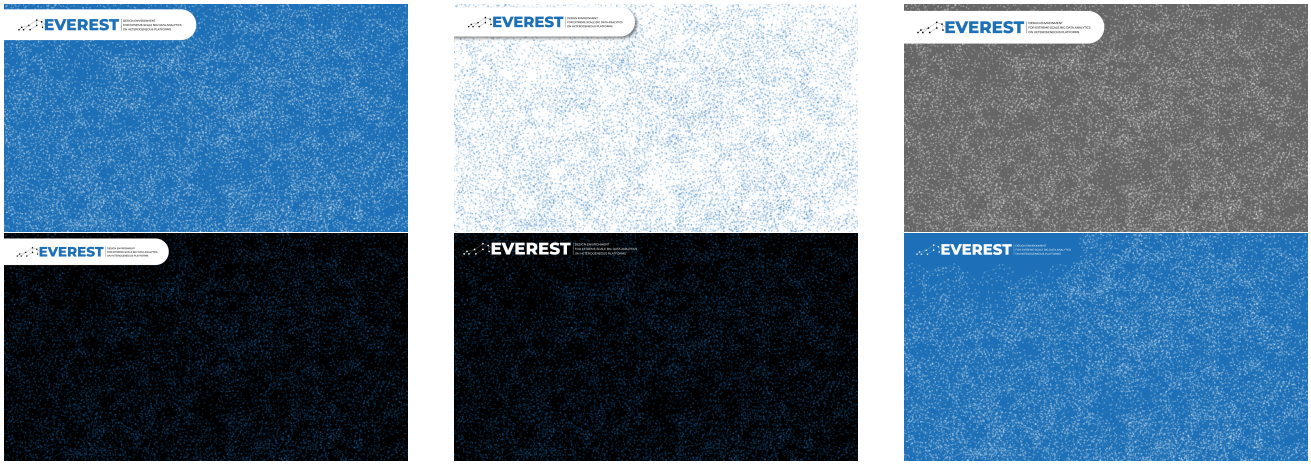


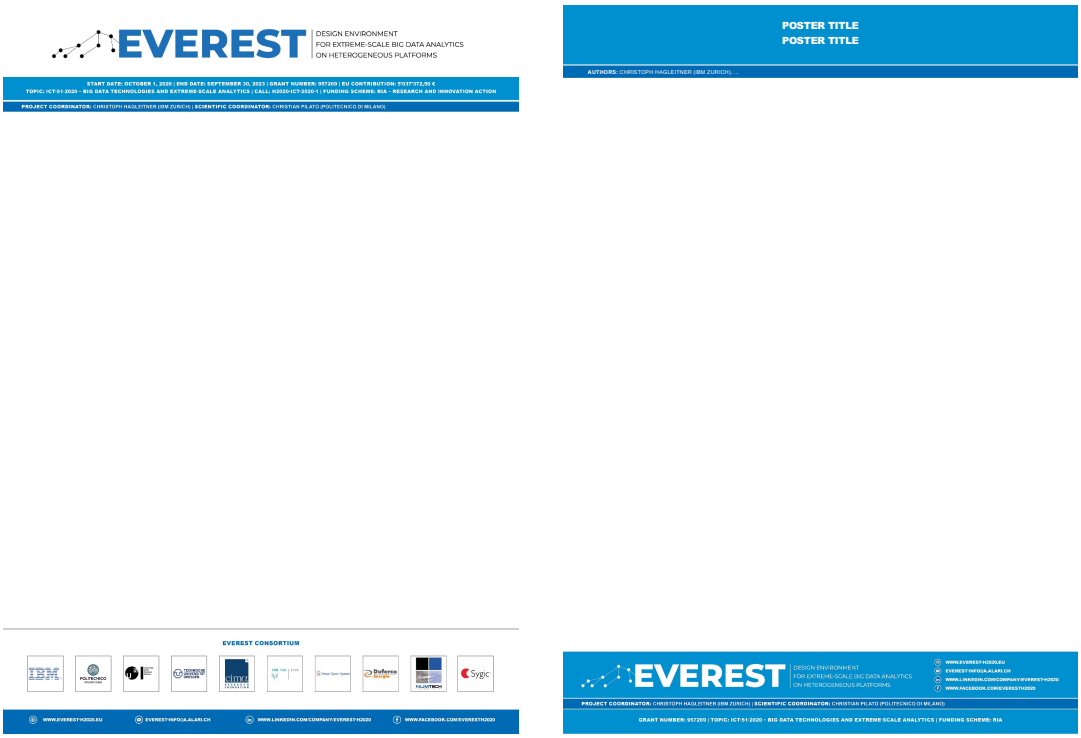
Figure 2 – Examples of EVEREST virtual backgrounds.

EVEREST also has a template for presentations (in PowerPoint) and documents (in both Word and Latex). In particular, the Latex template has been widely used for writing the technical deliverables. The EVEREST consortium created two poster templates, one for the project-level posters and one for individual contributions, both with the EVEREST identity. The two templates are shown in Figure 3.

2.2 Website

The EVEREST website (`http://www.everest-h2020.eu`) was launched in December 2020 and is currently hosted by **PDM** and jointly maintained by **USI**. It will be maintained actively also beyond the project.

It is the central point where all EVEREST activities are advertised. The organization of the EVEREST website is described in Deliverable D7.1. It contains the description of the project's goals and the consor-



(a) Consortium poster

(b) Individual posters

Figure 3 – EVEREST poster templates

tium, along with information about events and public material (e.g., publications, public deliverables, etc.) The website is regularly updated, especially with information about events, meetings, and new public material (including presentations, EVEREST webinars, and links to publications). Indeed, all EVEREST publications are in (green/gold) open access (see Section 3.1).

Figure 4 shows statistics about the website visitors collected using Google Analytics in the **first reporting period**. At that time, the website had a total of 2,569 views, corresponding to an average of 5 new visitors per day since its release. Figure 5 reports the statistics for the **second reporting period**, starting from September 2022, when the statistics started to be collected using Matomo Analytics (after Google Analytics was declared illegal in Italy – the country where the website is hosted). We can see that the website has always had more than 100 visitors per month, with a pick of more than 300 around October 2023 (when we had both a plenary meeting in Zurich and the presentations at the European Big Data Value Forum in Valencia). This trend shows the effectiveness of our connections with social media (see Section 2.3). Indeed, the website accesses have important peaks close to events involving EVEREST. In these cases, thanks to the social media activity, we were able to engage several people through different channels who ended up visiting the website.

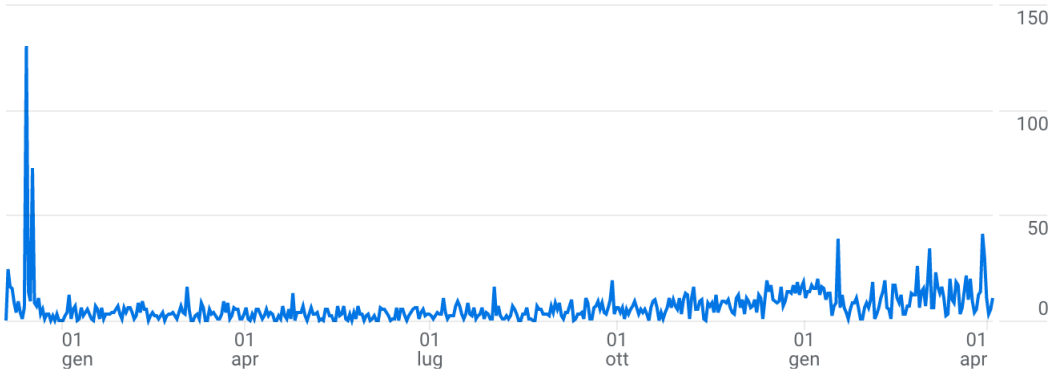


Figure 4 – Statistics on accesses to the EVEREST website in the first reporting period

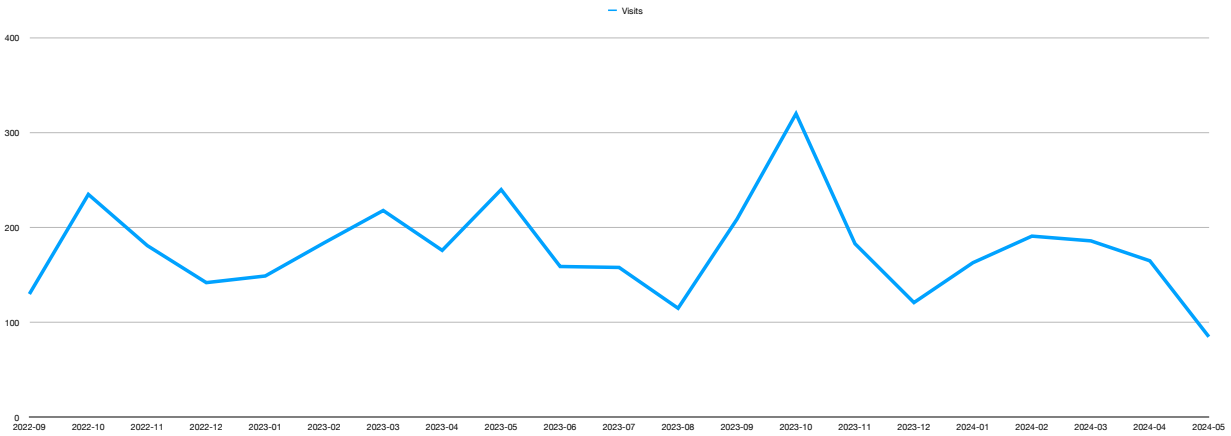


Figure 5 – Statistics on accesses to the EVEREST in the second reporting period

Since the launch of the website, several efforts have been made to increase website attendance. Among changes to the website, mainly the public material section has been revised and extended to include partner presentations from several conferences and events. The home page has been extended with additional links to the pages with presentations and publications, as shown in Figure 6. This allows us to maximize the visibility of this public material when visitors arrive at the website's home page. Search Engine Optimization (SEO) techniques have been used to increase website visibility on search engines. These techniques consist of small revisions to the website, such as changing button text, adding a meta description, and installing a SEO plugin. The consortium also created a QR-code (Figure 7) to be placed in posters, presentations, and flyers to reach the website directly.

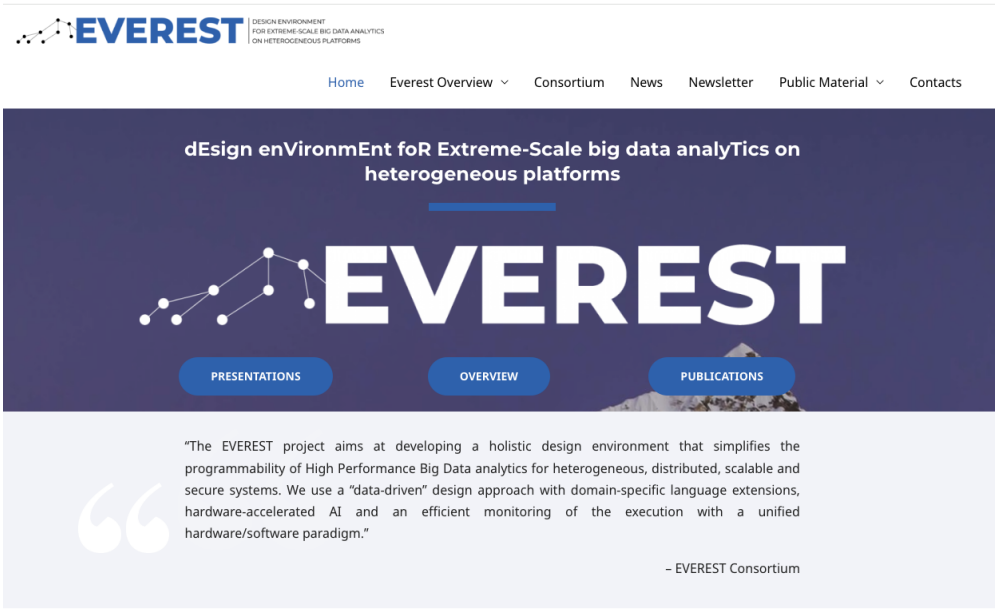


Figure 6 – Links to the public material (presentations and publications) from the home page of the EVEREST website

Figure 7 – EVEREST QR code linked to the project's website url

2.3 Social Media

The EVEREST consortium has had a large presence on social media since, especially during the COVID-19 pandemic, when they were one of the only ways to highlight the EVEREST achievements. The large variety of social media (LinkedIn, X, Facebook, and YouTube) allows the consortium to reach a wide audience and build a community around the project. To boost the project's visibility, all social media accounts are interconnected with the project website in both directions.

The EVEREST social media presence has been continuously monitored within the respective platforms, which allows us to obtain quantitative metrics about the level of engagement.

In the next sections, we detail the specific solutions for all social media.

2.3.1 LinkedIn

A company has been created on LinkedIn and can be reached at the following URL:

https://www.linkedin.com/company/everest-h2020

This page is a key tool for communicating EVEREST activities and events. Since LinkedIn's target audience is more professional, the content is more technical. The LinkedIn page currently has **364** followers and has been demonstrated to be the most efficient way to communicate outside the consortium. So, it was regularly updated for any activity related to the project. Furthermore, with the number of project results increasing due to the advanced stages of the project implementation, there was an increase in the number of uploads on the LinkedIn channel.

2.3.2 X (ex Twitter)

The project is using X (ex Twitter) to communicate with external people. The X channel can be accessed via:

https://twitter.com/project_everest

In this case, the target is a mix between professionals and the general public. The account has been active since June 2021 and has **75** followers who regularly retweet the posts. Twitter is mostly used for announcements, news, and short advertisements related to the project. The EVEREST project aimed to increase the number of followers by uploading relevant content on a regular basis. We tried various efforts to enlarge the community on the X channel. We shared the posts of the EVEREST partners and asked them to recommend interesting publications connected to the EVEREST project, which were further promoted via X. Unfortunately, these efforts did not help raise the number of the followers, also considering that many professionals left Twitter due to its recent policies and changes. On the contrary, the same efforts performed via LinkedIn were very successful, and therefore, we decided to focus more on the LinkedIn channel and enlarge its community.

2.3.3 Facebook

The EVEREST Facebook page can be accessed at the following link:

https://www.facebook.com/everestH2020

The page has been used to share information with the general public. It currently has **100 followers**. Facebook was used mainly at the initial stages of the project to gather awareness about the project. Since this media has developed over the years and is used predominantly for entertainment, we decided to shift our communication to the LinkedIn channel.

2.3.4 YouTube

The EVEREST project has a presence also on YouTube. The YouTube channel of the project can be reached on the following page:

www.youtube.com/@everestproject6949

The channel is mainly used to share the webinars prepared by the partners (see Section 2.7) along with the recording of a virtual event (DATE 22 online workshop) organized by the EVEREST partners. Currently, it has **25 subscribers**. Once a content is published, the corresponding link is added to the website and posted on social media. This facilitates the distribution to a broader audience. Each webinar (see Section 2.7) has between 40 and 300 views. In the next weeks, after the EVEREST SDK release, the EVEREST partners will use the EVEREST YouTube channel to share further webinars, along with tutorials and demos about the EVEREST SDK and its final results.

2.4 Press Releases

The **first consortium press release** was released by **IBM** in August 2021. It is shown in Figure 8a and is publicly available at the following link: https://www.zurich.ibm.com/pdf/fpga/EVEREST_pr.pdf. It highlights the goals of the project, together with the first results.

EVEREST PRESS RELEASE

Project EVEREST is developing a design environment for FPGA-based platforms

There is a new consortium in Europe, which cooperates on the development of a design environment to simplify the implementation of Big Data applications on FPGA-based platforms. The international project EVEREST coordinated by IBM Research Europe - Switzerland and the Politecnico Di Milano is funded by the Horizon 2020 Programme for research and innovation action.

The European data market is showing a significant boost in recent years. Data processing has a profound impact on the industry, society and the environment. The EVEREST project gathers scientists and IT experts, and their common goal is to develop a holistic approach for co-designing computation and communication in a heterogeneous, distributed, scalable, and secure system for High-Performance Big Data Analytics (HPDA) applications on heterogeneous, FPGA-based platforms. While these systems can improve energy efficiency and performance, fixed-function accelerators introduce programmability and scalability issues. The resulting big data computing systems must not only efficiently manage, elaborate, and move the data under security and privacy constraints, but also demand powerful and easy-to-use design environments to express functional and non-functional requirements.

EVEREST will simplify architectures' programmability through a "data-driven" design approach, the use of hardware-accelerated AI, and efficient monitoring of the execution. *"Novel applications like Artificial Intelligence are promoting a resurgence of research in computer architecture, especially with the combination of general-purpose processors and specialized hardware. The programmability of such heterogeneous architectures is an unsolved problem. With this framework, application developers and architecture designers can sit at the same table and efficiently co-optimize systems and applications,"* explain Christoph Hagleitner from IBM Research Europe - Switzerland and Christian Pilato from Politecnico di Milano.

To validate the approach, a project team will cooperate with industrial partners who prepare three scenarios for business applications. The market for energy trading could benefit from a weather analysis-based prediction model. Thanks to this model, the production, utilization and commercialization of energy become foreseeable. Air-quality monitoring of industrial sites will help to forecast the environmental impacts of chemical pollutants and it will enable sites to delay their production or activate emission reduction treatments. Real-time traffic modelling framework for intelligent transportation in smart cities will reduce congestions in the traffic infrastructure thanks to traffic simulator, traffic prediction models and smart routing methods.

The three-year long project was launched on October 1, 2020. The initial focus of the project was to define and elaborate the requirements for the design environment posed by the three use cases, a process supported by two online technical meetings of the project partners. The project and the initial results have also been presented to the research community at conferences and workshops including DATE 2021, LATTE 2021, and MECO 2021. The project brings together a total of 10 partners from six European countries (Switzerland, Italy, Germany, France, Czech Republic and Slovakia), including research institutions and private companies, with IBM Research Europe - Switzerland acting as the project coordinator. The overall budget of the EVEREST project is EUR 5 037 372.50. For more information, see https://everest-h2020.eu

This project has received funding from the EU Horizon 2020 Programme under grant agreement No 957269.

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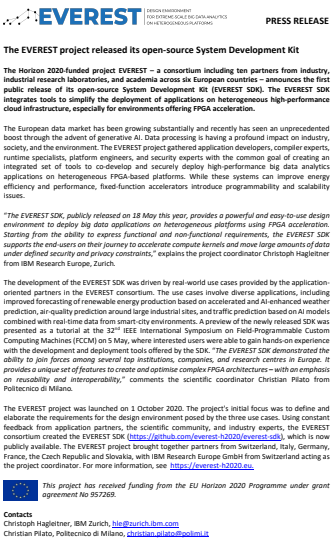
(a) Initial



EVEREST PRESS RELEASE

The EVEREST project released its open-source System Development Kit

The Horizon 2020-funded project EVEREST – a consortium including ten partners from industry, industrial research laboratories, and academia across six European countries – announces the first public release of its open-source System Development Kit (EVEREST SDK). The EVEREST SDK integrates tools to simplify the deployment of applications on heterogeneous high-performance cloud infrastructure, especially for environments offering FPGA acceleration.

The European data market has been growing substantially and recently has seen an unprecedented boost through the advent of generative AI. Data processing is having a profound impact on industry, society, and the environment. The EVEREST project gathered application developers, compiler experts, runtime specialists, platform engineers, and security experts with the common goal of creating an integrated set of tools to co-develop and securely deploy high-performance big data analytics applications on heterogeneous FPGA-based platforms. While these systems can improve energy efficiency and performance, fixed-function accelerators introduce programmability and scalability issues.

"The EVEREST SDK, publicly released on 18 May this year, provides a powerful and easy-to-use design environment to deploy big data applications on heterogeneous platforms using FPGA acceleration. Starting from the ability to express functional and non-functional requirements, the EVEREST SDK supports the end-users on their journey to accelerate compute kernels and move large amounts of data under defined security and privacy constraints," explains the project coordinator Christoph Hagleitner from IBM Research Europe, Zurich.

The development of the EVEREST SDK was driven by real-world use cases provided by the application-oriented partners in the EVEREST consortium. The use cases involve diverse applications, including improved forecasting of renewable energy production based on accelerated and AI-enhanced weather prediction, air-quality prediction around large industrial sites, and traffic prediction based on AI models combined with real-time data from smart-city environments. A preview of the newly released SDK was presented as a tutorial at the 32nd IEEE International Symposium on Field-Programmable Custom Computing Machines (FCCM) on 5 May, where interested users were able to gain hands-on experience with the development and deployment tools offered by the SDK. *"The EVEREST SDK demonstrated the ability to join forces among several top institutions, companies, and research centres in Europe. It provides a unique set of features to create and optimise complex FPGA architectures – with an emphasis on reusability and interoperability,"* comments the scientific coordinator Christian Pilato from Politecnico di Milano.

The EVEREST project was launched on 1 October 2020. The project's initial focus was to define and elaborate the requirements for the design environment posed by the three use cases. Using constant feedback from application partners, the scientific community, and industry experts, the EVEREST consortium created the EVEREST SDK (https://github.com/everest-h2020/everest-sdk), which is now publicly available. The EVEREST project brought together partners from Switzerland, Italy, Germany, France, the Czech Republic and Slovakia, with IBM Research Europe GmbH from Switzerland acting as the project coordinator. For more information, see https://everest-h2020.eu.

This project has received funding from the EU Horizon 2020 Programme under grant agreement No 957269.

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(b) Final

Figure 8 – EVEREST press releases

Individual press releases have been prepared by all other industrial partners: **SYG**, **DUF**, **NUM**, and **VOS**. In addition, also the research centers (**CIMA** and **IT4I**) released communication about their participation in the EVEREST project. **DUF** released also a video (https://www.youtube.com/watch?v=kf1ArVf9-YM) on their YouTube channel describing their involvement in the EVEREST project. Academic partners, instead, announced their participation in the project with news on their public websites and social media activities.

A communication about the end of the project, along with information about the SDK release, is expected to be released on May 28, 2024 (see Figure 8b). This activity can be considered as the starting point for creating a *community* around the EVEREST SDK, as discussed in Deliverable D7.7.

2.5 Project Posters and Flyers

The EVEREST consortium prepared posters that were presented by the partners. In particular, the EVEREST consortium presented the following posters in the **first reporting period**:

- ISC High Performance 2021 [virtual event, June 24-July 1, 2021]: the poster was presented by **IT4I** in a virtual booth together with the activities of the LEXIS project.
- Supercomputing 2021 (SC) [hybrid event, St. Louis (MO, USA), November 14-19, 2021]: the poster was presented by **IT4I** in a booth together with the activities of the LEXIS project.
- European Big Data Value Forum (EBDVF) [virtual event, Nov 29 - Dec 3, 2021], the consortium presented the general EVEREST poster, along with three posters focused on EVEREST use cases.

Then, the EVEREST consortium presented the following project-level posters in the **second reporting period**:

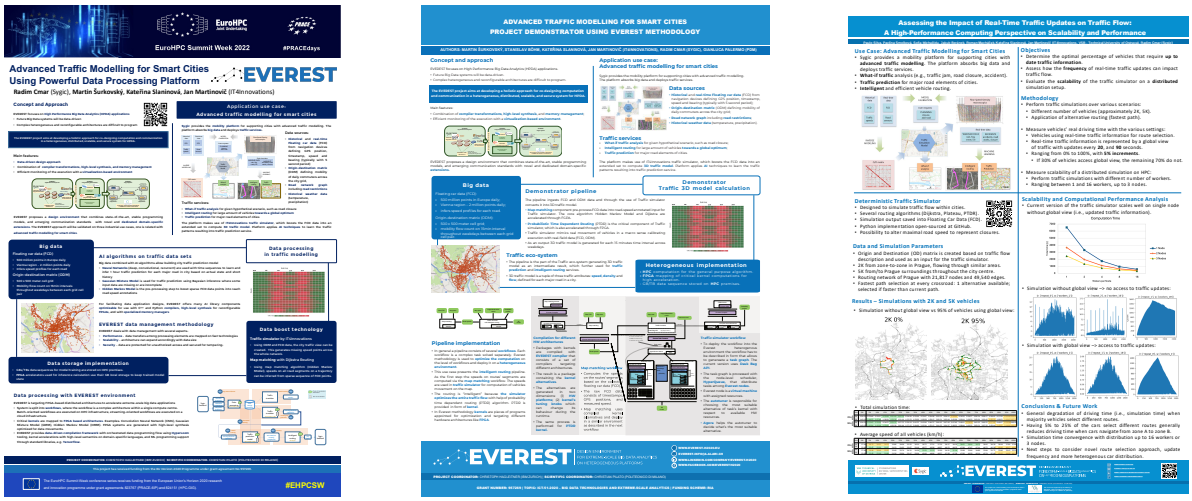
- EuroHPC Summit Week 2022 (EHPCSW) [Paris (France), March 22-24, 2022]: This poster was presented by **SYG** and **IT4I** on the use case about traffic modeling. An image of this poster is shown in Figure 9a.
- 19th ACM International Conference on Computing Frontiers (CF'22) [Turin, Piedmont (Italy), May 17-19, 2022]: **USI**, **NUM**, **CIMA**, and **SYG** prepared a poster Anomaly detection to improve the security of big data analytics.
- ISC High Performance 2022 (ISC) [Hamburg (Germany), May 29-June 2, 2022]: This poster was presented by **SYG**, **PDM**, and **IT4I** on the use of the EVEREST technologies in the traffic modeling use case. An image of this poster is shown in Figure 9b.
- The 31st International Conference on Parallel Architectures and Compilation Techniques 2022 (PACT) [Chicago (Canada), October 10–12, 2022]: **PDM** presented a poster MLIR Loop Optimizations for High-Level Synthesis: A Case Study.
- ISC High Performance 2024 (ISC) [Hamburg (Germany), May 12-16, 2024]: Submitted by **SYG**, **PDM**, and **IT4I** on the use of the EVEREST technologies in the traffic modeling use case. This poster was unfortunately rejected, but the plan is to submit the extended poster with more experiments to Supercomputing 2024 (SC). An image of this poster is shown in Figure 9c.

The number of (scanned) visitors at each booth was around 250 attendees. In all events, the partners had many interesting interactions with those interested in the activities of EVEREST. We also collected the contacts of interested people to build a list for the newsletters (see Section 2.6).

After the COVID-19 pandemic, many conferences and events returned in presence. So, the EVEREST consortium also prepared a flyer to be distributed. The **flyer** briefly describes the project's goal and approach and is shown in Figure 10. To engage even more people, the EVEREST consortium prepared a set of **beer coasters** with the EVEREST logo and QR code and **stickers**. These beer coasters and stickers were distributed during all events of the second reporting period in which the EVEREST partners participated.

2.6 Newsletters

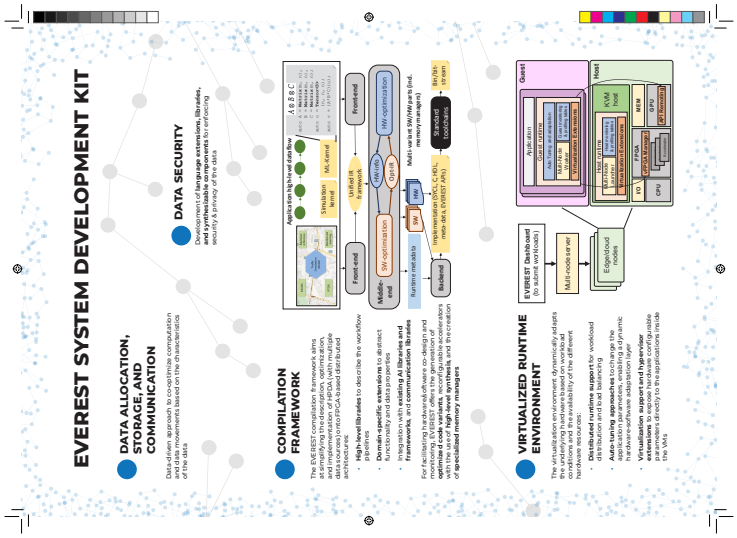
In the **second reporting period**, the EVEREST consortium prepared and distributed a series of newsletters to engage potential stakeholders and keep them informed about EVEREST activities. These newsletters were prepared by the **IT4I** communication office and managed with Mailchimp. So far, the consortium has distributed four newsletters, on August 8, 2022 (link), March 1, 2023 (link), September 8, 2023 (link), and March 28, 2024 (link). The consortium is preparing a final newsletter summarizing the last months of the projects and advertising the EVEREST SDK release. The current mailing list has around **450 subscribers**.



(a) EHPCSW'22 (b) ISC'22 (c) ISC'24

Figure 9 – Recent EVEREST posters.

(a) External side



(b) Internal side

Figure 10 – EVEREST flyer

2.7 Webinars

The EVEREST consortium organized a series of webinars to present the technologies developed in the project. The consortium is releasing these videos through the project's YouTube channel: https://www.youtube.com/@everestproject6949. An updated screenshot of the current status of the EVEREST webinar playlist on the YouTube channel is shown in Figure 11. The idea was to prepare one-hour seminars where the partners

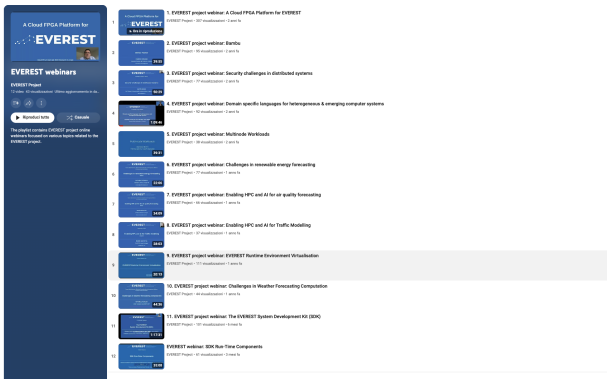


Figure 11 – Screenshot of the EVEREST YouTube channel with the webinars already published (updated at the end of the **second reporting period**).

describe and demonstrate their technologies.

Webinars in Table 1 were prepared and published on YouTube channel in the **first reporting period**.

Table 1 – EVEREST webinars in the **first reporting period**

No.	Title	Partners	Views
1	A Cloud FPGA Platform for EVEREST	IBM	312
2	Bambu	PDM	95
3	Security challenges in distributed systems	USI	80
4	Domain specific languages for heterogeneous & emerging computer systems	TUD	93

while the webinars in Table 2 were prepared and released during the **second reporting period**.

Table 2 – EVEREST webinars in the **second reporting period**

No.	Title	Partners	Views
5	Multinode Workloads	IT4I	39
6	Challenges in renewable energy forecasting	DUF	85
7	Enabling HPC and AI for air quality forecasting	NUM	68
8	Enabling HPC and AI for Traffic Modelling	SYG	39
9	EVEREST Runtime Environment Virtualisation	VOS	112
10	Challenges in Weather Forecasting Computation	CIMA	45
11	The EVEREST System Development Kit (SDK)	TUD, VOS, IT4I	105
12	SDK Run-Time Components	PDM, VOS, IT4I	68
13	EVEREST Optimisation with Traffic Modelling Use Case	SYG	26
14	Wind Power Forecasting Application	DUF	21
15	The EVEREST Platform	IBM, IT4I	14

As shown from this list, the first round of webinars was intended to show the individual technologies of the partners, while the last showed how the components interact to form the two main parts of the SDK, i.e., the compilation and runtime frameworks, respectively. Also, a recording of online EVEREST workshop at DATE 2022 was published on our YouTube channel with more than 400 views now.

The webinars received almost 200 views at the end of the **first reporting period**, while this number exceeded 1,550 in total at the end of the **second reporting period**. The series were extended by three webinars focused on demos and tutorials with the EVEREST SDK after its release.

3 Dissemination Activities

This section describes activities for disseminating the technical results to the community.

3.1 Publications

The EVEREST consortium published the following papers (J indicates journal papers, BC indicates book chapters, and C indicates conference or workshop papers). Table 3 shows the publications for the first reporting period, and the list of publications for the second reporting period can be seen in Table 4.

Table 3 – EVEREST publications in the **first reporting period**

Type	Title	Partners	Venue
J	A Survey on Domain-Specific Memory Architectures	**PDM**	Journal of Integrated Circuits and Systems (JICS)
J	Dynamically-Tunable Dataflow Architectures based on Markov Queuing Models	**PDM**	MDPI Electronics
C	EVEREST: A design environment for extreme-scale big data analytics on heterogeneous platforms	All	DATE 2021
C	High-Level Synthesis of Security Properties via Software-Level Abstractions	**PDM**, **USI**	LATTE 2021
C	Compiler Infrastructure for Specializing Domain-Specific Memory Templates	**PDM**	LATTE 2021
C	VOSySmonitoRV: a mixed-criticality solution on Linux-capable RISC-V platforms	**VOS**	MECO 2021
C	Dynamic Network selection for the Object Detection task: why it matters and what we (didn't) achieve	**PDM**	SAMOS 2021
C	Acceleration-as-a-μService: A Cloud-native Monte-Carlo Option Pricing Engine on CPUs, CPUs and Disaggregated FPGAs	**IBM**	CLOUD 2021
C	From Domain-Specific Languages to Memory-Optimized Accelerators for Fluid Dynamics	**PDM**, **TUD**	HPCFPGA 2021

LATTE'21 is a workshop organized in conjunction with ASPLOS 2021

HPCFPGA'21 is a workshop organized in conjunction with CLUSTER 2021

The DATE'21 paper is a positional paper that introduces the EVEREST project and consortium to the DATE community. Despite the virtual format of the conference, it was an excellent opportunity to introduce the project in the special session organized for multi-partner projects. The DATE'24 paper is, instead, a project-level paper that describes the achievements of the EVEREST project and consortium to the DATE community. It was an excellent opportunity to showcase the results and anticipate the release of the EVEREST SDK.

All these papers are peer-reviewed publications and are mostly oriented to disseminate the results in the individual aspects of the EVEREST SDK and technologies. All publications are available in open access, and the links are also on the project's website (`https://everest-h2020.eu/public-material/#publications`).

The EVEREST consortium also published an article in the HiPEAC Info magazine (no. 63 - June 2021).

3.2 Technical Presentations

In addition to the paper presentations and the talks at the organized events, the EVEREST partners have been invited to give several talks, in which they presented the EVEREST project or mentioned their activities in the project. The presentations of the first reporting period are listed in Table 5, while the presentations of the second reporting period are listed in Table 6. The partners gave **43** keynote, invited, and regular talks at conferences, workshops and other events in total.

In addition, two PhD students (Serena Curzel and Stephanie Soldavini, both from **PDM**) presented their contributions to the EVEREST project at the DATE'23 PhD Forum.

Table 4 – EVEREST publications in the **second reporting period**

Type	Title	Partners	Venue
J	Automatic Creation of High-Bandwidth Memory Architectures from Domain-Specific Languages: The Case of Computational Fluid Dynamics	**PDM**, **TUD**	ACM Transactions on Reconfigurable Technology and Systems (TRETS)
J	The Side-Channel Metric Cheat Sheet	**USI**	ACM Computing Surveys
J	Advancing compilation of DNNs on FPGAs using Operation Set Architectures	**IBM**	IEEE Computer Architecture Letters
J	A Survey of FPGA Optimization Methods for Data Center Energy Efficiency	**PDM**	IEEE Transactions on Sustainable Computing
J	Generating Posit-based Accelerators with High-Level Synthesis	**PDM**	IEEE Transactions on Circuits and Systems I: Regular Papers
J	Compact Circuits for Efficient Möbius Transform	**USI**	IACR Transactions on Cryptographic Hardware and Embedded Systems
BC	Practical Implementations of Remote Power Side-Channel and Fault-Injection Attacks on Multitenant FPGAs	**USI**	Cloud FPGA Security 2024
BC	Efficient and Secure Encryption for FPGAs in the Cloud	**USI**	Cloud FPGA Security 2024
C	Poster: Anomaly detection to improve security of big data analytics	**USI**	Computing Frontiers 2022
C	High-Level Synthesis: Experimenting with MLIR polyhedral representation for accelerator design	**PDM**	IMPACT 2022
C	Poster: MLIR Loop Optimizations for High-Level Synthesis: A Case Study	**PDM**	PACT 2022
C	Shisha: Online scheduling of CNN pipelines on heterogeneous architectures	**TUD**	PPAM 2022
C	STAMP-Rust: Language and Performance Comparison to C on Transactional Benchmarks	**TUD**	Bench 2022
C	DOSA: Organic Compilation For Neural Network Inference on Distributed FPGAs	**IBM**	EDGE 2023
C	On the Limitations of Logic Locking the Approximate Circuits	**USI**	AsiaHOST 2023
C	Automatic Generation of Efficient Data Layouts for High Bandwidth Utilization	**PDM**	ASPDAC 2023
C	Modelling linear algebra kernels as polyhedral volume operations	**TUD**	IMPACT 2023
C	Virtio-FPGA: a virtualization solution for SoC-attached FPGAs	**VOS**	ESARS 2023
C	Composability of Cloud Accelerators in Virtual World Simulations	**IBM**	CLOUD 2023
C	SVFF: An Automated Framework for SR-IOV Virtual Function Management in FPGA Accelerated Virtualized Environments	**VOS**	CITS 2023
C	Data Under Siege: The Quest for the Optimal Convolutional Autoencoder in Side-Channel Attacks	**USI**	IJCNN 2023
C	ConDRust: Scalable Deterministic Concurrency from Verifiable Rust Programs	**TUD**	ECOOP 2023
C	base2: An IR for Binary Numeral Types	**TUD**	HEART 2023
C	A System Development Kit for Big Data Applications on FPGA-based Clusters: The EVEREST Approach	**All**	DATE 2024
C	Poster: Etna: MLIR-Based System-Level Design and Optimization for Transparent Application Execution on CPU-FPGA Nodes	**PDM**, **TUD**, **SYG**	FCCM 2024

Table 5 – EVEREST presentations in the **first reporting period**

Title	Presenter	Venue
EVEREST: dEsign enVironmEnt foR Extreme-Scale big data analyTics on heterogeneous platforms	C. Pilato (**PDM**)	NECST Monday Talk, October 5, 2020
From DSL to Bitstream: Automatic generation of massively parallel architectures	C. Pilato (**PDM**)	Open ESP Meeting, July 1, 2021
Climbing EVEREST: A design environment for extreme-scale big data analytics on heterogeneous platforms	C. Pilato (**PDM**), M. Paolino (**VOS**)	Workshop on DevOps Support for Cloud FPGA platforms (cFDevOps) @ FPL 2021, August 30, 2021
From DSL to Bitstream: Automatic generation of massively parallel memory-optimized architectures	S. Soldavini (**PDM**)	M.Sc. Seminar Series at Rochester Institute of Technology, Sept. 3, 2021
Domain-specific languages to tame heterogeneous and emerging computing systems	J. Castrillon (**TUD**)	Keynote at PASC'21, Dec. 3, 2021
On tool flows for high-performance reconfigurable computing	J. Castrillon (**TUD**)	PARMA-DITAM 2022 (invited talk)
Domain-specific programming methodologies for domain-specific computing platforms	J. Castrillon (**TUD**)	Seminar series at the Center for Advanced Systems Understanding (CASUS) (invited talk), 2022

Table 6 – EVEREST presentations in the **second reporting period**

Title	Presenter	Venue
Automatic generation of hardware memory architectures for HPC	C. Pilato (**PDM**)	Seminar at the Complutense University of Madrid, Madrid, Spain, April 21, 2022
High-level synthesis of HPC memory architectures	C. Pilato (**PDM**)	Seminar at Politecnico di Torino, April 27, 2022
Generating HPC memory architectures with HLS: The two sides of the medal	C. Pilato (**PDM**)	Seminar at New York University, May 18, 2022
Domain-specific programming methodologies for domain-specific and emerging computing systems	J. Castrillon (**TUD**)	LCTES 2022 (keynote)
Language and compiler research for heterogeneous emerging computing systems	J. Castrillon (**TUD**)	SPCL_Bcast(COMM_WORLD) seminar series, SPCL ETH Zurich (invited talk), 2022
Domain specific languages to tame heterogeneous and emerging computing systems	J. Castrillon (**TUD**)	4th e4rTM Symposium 2022. Beyond Moore's Law: The next golden age of computer architecture (invited talk), 2022
Designing memory architectures with high-level synthesis: What could possibly go wrong?	C. Pilato (**PDM**)	FLASHLIGHT workshop @ FCCM'22
FPGA-specific Physical Attacks and Efficient Countermeasures	F. Regazzoni (**USI**)	FPL 2022
Modern trends in accelerator design with high-level synthesis	C. Pilato (**PDM**)	Safari Seminar Series, ETH Zurich, November 28, 2022
Programming models and abstractions for computational efficiency	J. Castrillon (**TUD**)	Future of Wireless, Technology Workshop 2023 (invited talk) 2023
An Architecture for Heterogeneous High-Performance Computing Systems: Motivation and Requirements	C. Hagleitner (**IBM**)	2023 IEEE JVA Symposium on Modern Computing

Title	Presenter	Venue
Operation Set Architectures for low-latency ML inference using FPGAs - Which advantage is left for FPGAs in ML/AI?	B. Ringlein (**IBM**)	Invited keynote at ITEM Workshop 2023
Programming abstractions and optimizing compilers for energy-efficient computing	J. Castrillon (**TUD**)	NetZero Carbon Computing (NetZero'23), @ HPCA'23
Anomaly Detection to Improve Security of Big Data Analytics	T. Slooff (**USI**)	ICT.Open 2023
Operation Set Architectures for low-latency ML inference using FPGAs	B. Ringlein (**IBM**)	Invited talk at Ostschweizer Fachhochschule, 2023
Don't forget the compiler: Why FPGAs for HPC need to look beyond circuits and applications	B. Ringlein (**IBM**)	"F4HD: FPGA/xPU Accelerators for Future HPC and Datacenter" workshop @ HiPEAC 2024
Intermediate abstractions and optimizing compilers for adaptable HPC	J. Castrillon (**TUD**)	Workshop on LLVM Compiler and Tools for HPC (LLVM-CTH), @ ISC'23
The EVEREST SDK	C. Hagleitner & B. Ringlein (**IBM**)	ETH Systems Seminar, May 25, 2023
Compact Circuits for Efficient Mobius Transform	S. Banik (**USI**)	Cryptarchi Workshop (Castro-Urdiales, Cantabria, Spain, 11-14 June 2023)
Programming abstractions for in and near-memory computing	J. Castrillon (**TUD**)	In-Memory Architectures and Computing Applications Workshop (iMACAW'23), @ DAC'23) (keynote), 2023
Automatic system-level design for reconfigurable HPC applications: The EVEREST approach	C. Pilato (**PDM**)	Research Projects event @ FPL'23
Next-generation compilers for emerging systems	J. Castrillon (**TUD**)	Workshop on Compilers, Deployment, and Tooling for Edge AI (CODAI'23), @ ESWeek'23 (keynote), 2023
Domain-specific programming methodologies for domain-specific and emerging computing systems	J. Castrillon (**TUD**)	International Workshop on Extreme Scale Programming Models and Middleware (ESPM2) @ SC'23
Compact Circuits for Efficient Mobius Transform	S. Banik (**USI**)	Asian Symmetric Key Workshop in Cryptography, Guangzhou, China, 1st to 3rd December 2023
Efficient Hardware Solvers over GF(2)	S. Banik (**USI**)	Security Privacy and Applied Cryptography Engineering, Roorkee, India, 14-17 December 2023
Automatic Application of Side Channel Countermeasures: History and Perspectives	F. Regazzoni (**USI**)	Security Privacy and Applied Cryptography Engineering, Roorkee, India, 14-17 December 2023 (keynote)
Automatic optimization for heterogeneous in-memory computing	J. Castrillon (**TUD**)	Focus Session, Design, Automation and Test in Europe Conference (DATE) (invited talk), 2024

3.3 Organization of Workshops

In the **first reporting period**, the EVEREST consortium organized two events that were supposed to be in presence but ended up being virtual. In the **second reporting period**, the activity inceased and **4** more workshops were organised, all in presence.

3.3.1 HiPEAC Workshop 2022 (virtual)

The EVEREST workshop at the HiPEAC conference was supposed to be in Budapest, Hungary, on January 18, 2022. It was supposed to be an event with a keynote from Rosa Badia (BSC, Spain), along with invited talks from the EVEREST consortium and other projects funded under the Big Data Analytics calls. However, due to the COVID-19 pandemic and the risks associated with travel, the organizers decided to postpone the conference to June 2022. So, we agreed to organize a virtual seminar on February 15, 2022. The webinar was organized and supported by HiPEAC with the following program:

```
14:05 - 14:25 Presentation of the EVEREST project
14:25 - 14:45 Presentation of the SELMA project
14:45 - 15:10 Break
15:10 - 15:30 Presentation of the DAPHNE project
15:30 - 15:50 Presentation of the CLOUDBUTTON project
15:50 - 16:10 Break
16:10 - 16:30 Presentation of the MARVEL project
16:30 - 16:50 Presentation of the ELASTIC project
```

The workshop had the participation of 6 different projects (including EVEREST - presentation given by C. Pilato, **PDM**) and a total of 28 attendees. Despite the virtual format, it was able to establish interesting connections. For example, the EVEREST and DAPHNE projects agreed to continue the discussion offline to identify possibilities for collaboration and cross-contamination.

3.3.2 DATE Workshop (virtual)

EVEREST organized a “Friday Workshop” titled “Data-driven applications for industrial and societal challenges: Problems, methods, and computing platforms” at DATE’22. The workshop was meant to be an open event for discussing challenges for big data applications on heterogeneous platforms. It was held on Zoom on March 18, 2022. The program included several invited talks from renovated experts and was organized as follows:

```
13:00 - 13:15 Workshop Introduction
13:15 - 13:45 ‘‘Evolution of the Data Market: Highlights and Projections’’
              Speaker: Nuria De Lama (IDC4EU)
13:45 - 14:15 ‘‘System and Applications of FPGA Cluster "ESSPER" for Research on
              Reconfigurable PC’’
              Speaker: Kentaro Sano (Riken)
14:15 - 14:45 ‘‘Open-Source Hardware for Heterogeneous Computing’’
              Speaker: Luca Carloni (Columbia University)
14:45 - 15:15 ‘‘Near-Memory Hardware Acceleration of Sparse Workloads’’
              Speaker: Zhiru Zhang (Cornell University)
15:15 - 15:30 Break
15:30 - 16:00 ‘‘Methods and Tools for Accelerating Image Processing Applications
              on FPGA-based Systems’’
              Speaker: Diana Gohringer (TU Dresden)
16:00 - 16:30 ‘‘GridTools: High-level HPC Libraries for Weather and Climate’’
              Speaker: Hannes Vogt (ETH Zurich / CSCS)
16:30 - 17:00 ‘‘Domain-Specific Multi-Level IR Rewriting for GPU: The Open Earth Compiler
              for GPU-Accelerated Climate Simulation’’
              Speaker: Tobias Grosser (University of Edinburgh)
17:00 - 17:30 ‘‘Climbing EVEREST: Design Environment for Extreme-Scale Big Data Analytics
              on Heterogeneous Platforms’’
              Speaker: Gianluca Palermo (Politecnico di Milano)
17:30 - 17:40 Break
17:40 - 18:00 Open Discussion and Closing
```

Thanks to the support of **TUD**, the registration fee was waived for all participants. So, despite the virtual format, it had more than 36 participants connected for all the duration of the event. The organizers collected the slides from the authors and made them available on a dedicated page on the EVEREST website (https://everest-h2020.eu/data-dream22/).

3.3.3 HiPEAC Workshop 2022

This workshop, titled "EVEREST: Design and Programming High-performance, distributed, reconfigurable and heterogeneous platforms for extreme-scale analytics", was a follow-up of the previous edition that was moved to a virtual format. It took place in Budapest (Hungary) on June 22, 2022, during the HiPEAC conference. The program included several invited talks from renovated experts and was organized as follows:

```
14:00 - 14:05 Welcome and Introduction
14:05 - 15:00 Keynote
- Rosa M. Badia, Barcelona Supercomputing Center
15:00 - 15:30 Invited Collaborative Project Presentation
15:30 - 16:00 Break
16:00 - 17:25 EVEREST Presentations
17:25 - 17:30 Closing Remarks
```

In this workshop, the EVEREST consortium started a collaboration with the DAPHNE project that led to the joint organization of the two consecutive editions.

3.3.4 cFDevOps22 (FPL 2022)

This workshop, titled "3rd Workshop on DevOps support for Cloud FPGA platforms", was a follow-up of the previous two editions organized by **IBM**. This time, also other Everest partners helped organizing it. It took place in Belfast, Northern Ireland, on September 1st 2022 during the FPL conference. The workshop focused around end-to-end tool chains including compilation as well as the runtime environment for heterogeneous platforms, a topic of EVEREST core contributions. The program included several invited talks from renovated experts and was organized as follows:

```
14:00 Opening
  Session 1 Design time compilation
14:10 Creating reusable MLIR abstractions for heterogeneous systems
    Karl F. A. Friebel, Technical University Dresden
14:45 Automatic Compilation, Deployment & Debugging of DNNs on Cloud FPGAs
    Burkhard Ringlein, IBM Research Europe
15:20 Building a practical and developer friendly FPGA toolchain
    Ulrich Drepper & Ahmed Sanaullah, Redhat Research
15:55 Break
  Session 2 Run time management
16:10 The OmpSs@FPGA framework: developing heterogeneous applications fast and efficiently
on FPGA-based clusters
    Juan Miguel De Haro Ruiz, Barcelona Supercomputing Center
16:45 Runtimes for FPGAs - Why and How
    Dirk Koch, Universität Heidelberg
17:20 Closing
```

The detailed abstracts and speaker biographies can be found at the workshop website: https://cfdevops.github.io/cFDevOps22/.

3.3.5 HiPEAC Workshop 2023

This workshop, titled "EVEREST + DAPHNE: Workshop on Design and Programming High-performance, distributed, reconfigurable and heterogeneous platforms for extreme-scale analytics", was organized jointly with the DAPHNE project and took place in Toulouse (France) on January 18, 2023, during the HiPEAC conference. The program included several invited talks from renovated experts (including the EU Project Officers of the two main projects and the Secretary General of the BDVA) and was organized as follows:

```
10:00 - 11:00 Opening: Welcome and Workshop Overview
- Looking at Horizon 2020 ICT-51-2020 five years later, Stefano Bertolo, EVEREST Project Officer
- ICT projects in the frame of EU policies, Beatrice Plazzotta, DAPHNE Project Officer
- From projects to sustainable Data and AI ecosystems for value creation. Ana García Robles, BDVA
11:00 - 11:30 Break
11:30 - 12:30 Project Introductions
12:30 - 13:00 EVEREST Deep Dive
13:00 - 14:00 Lunch
14:00 - 14:30 DAPHNE Deep Dive
14:30 - 15:30 Panel
15:30 - 16:00 Break
16:00 - 16:45 Hands-on and PhD students pitch presentations
```

3.3.6 HiPEAC Workshop 2024

This workshop, titled "EVEREST + DAPHNE: Workshop on Design and Programming High-performance, distributed, reconfigurable and heterogeneous platforms for extreme-scale analytics", was organized again jointly with the DAPHNE project and took place in Munich (Germany) on January 19, 2024, during the HiPEAC conference. The program included several invited talks from renovated experts (including Stephen Neuendorffer, one of the EVEREST Advisory Board members) and was organized as follows:

```
10:00 - 10:20 Project Introductions
10:20 - 11:00 Keynote talk
- Open Source MLIR Compilers for Versal Ryzen AI SOCs, Stephen Neuendorffer, AMD
11:00 - 11:20 Break
11:20 - 12:00 Project Introductions (chair: Jeronimo Castrillon, TU Dresden)
12:00 - 13:00 Panel
13:00 - 14:00 Lunch
14:00 - 14:45 EVEREST Deep Dive
14:45 - 15:45 DAPHNE Deep Dive
```

The workshop included an engaging panel with Raffaele Montella (University of Napoli Parthenope), Christian Pilato (Politecnico di Milano), Patrick Damme (TU Berlin), Stephen Neuendorffer (AMD), and Torsten Hoefler (ETH).

3.4 Organization of Tutorials

EVEREST organized several tutorials about the use of the technologies. In particular, the following tutorials have been organized to showcase the Bambu HLS tool:

- Tutorial at ISC'21 (**RP1**): "Bambu: High-level synthesis for parallel programming"
- Tutorial at DATE'22 (**RP1**): "Modern High-Level Synthesis for Complex Data Science Applications"
- Tutorial at PACT'22 (**RP2**): "Modern High-Level Synthesis for Complex Data Science Applications"

- Tutorial at DATE'23 (**RP2**): "Modern High-Level Synthesis for Complex Data Science Applications"

While the following tutorials have been organized to show the hardware generation parts and their connection with the compilation framework:

- Tutorial at CPS School'22 (**RP2**): "EVEREST project tutorial; How to use HLS for building customized memory architectures"
- Tutorial at CPS School'23 (**RP2**): "EVEREST project tutorial; How to use HLS for building customized memory architectures"
- Tutorial at FCCM'24 (**RP2**): "EVEREST SDK: Towards an interoperable system-development kit for heterogeneous computing"

3.5 Participation to Fairs and Exhibitions

EVEREST project approach, goals and results were presented at several academic and industrial events including fairs and exhibitions.

3.5.1 Project's Booths

In the **first reporting period**, the EVEREST consortium organized the following project's booths to present the project, its goals, and partial results:

- Design, Automation & Test in Europe Conference & Exhibition (DATE) 2021 (Virtual event, February 1-5, 2021): An EVEREST virtual booth with a general presentation of the project
- ISC High Performance (ISC) 2021 (Virtual event, June 24-July 1, 2021): Presentation of the EVEREST project at the booth of **IT4I** and the LEXIS project
- Supercomputing (SC) 2021 (St. Louis, November 15-19, 2021): Presentation of the EVEREST project at the booth of **IT4I** and the LEXIS project
- European Big Data Value Forum (EBDVF) 2021 (Virtual event, December 2, 2021): Sponsored session and virtual booth of the EVEREST project

In the **second reporting period**, the EVEREST consortium organized the following booths:

- ISC High Performance (ISC) 2022 (Hamburg, May 29-June 2, 2022): Presentation of the EVEREST project at **IT4I** booth, EVEREST poster at scientific posters section
- Supercomputing (SC) 2022 (Dallas, November 13-18, 2022): Presentation of the EVEREST project at **IT4I** booth, EVEREST poster at scientific posters section
- European Big Data Value Forum (EBDVF) 2022 (Prague, November 21-23, 2022): Sponsored session and participation in **IT4I** and LEXIS Platform booth where the EVEREST project was presented
- ISC High Performance (ISC) 2023 (Hamburg, May 21-25, 2023): Presentation of the EVEREST project at **IT4I** booth
- Supercomputing (SC) 2023 (Denver, November 12-17, 2023): Presentation of the EVEREST project at **IT4I** booth
- European Big Data Value Forum (EBDVF) 2023 (October 25-27, 2023): Sponsored session and participation in the IT4I booth where the EVEREST project was presented
- ISC High Performance (ISC) 2024 (Hamburg, May 12-16, 2024): Presentation of the EVEREST project at **IT4I** booth

3.5.2 Fairs and Exhibitions

In the following, we report the participation of the EVEREST partners to fairs and exhibitions in the **second reporting period**. Specifically, the industrial partners responsible for the use cases presented their achievements to potential stakeholders.

SYG participated in the event European Researcher's Night in Bratislava (Slovakia) on September 30, 2022. **SYG** discussed the latest achievements of the Smart mobility platform and the use cases that could be brought to make city transport more effective in the future. The traffic modeling framework as the outcome of the EVEREST project has been presented during the panel discussion with the traffic management authority of Bratislava, the representative of the Ministry of Environment, and others.

SYG and **IT4I** showcased the Smart City Traffic Computation Platform at the ITS European Congress (https://itseuropeancongress.com/). This exhibition, held on May 22-24, 2023, in Lisbon (Portugal), featured over 100 exhibitors in an area of 25,000 sqm. It was centered around the topics of Smart mobility and Transport solutions. Over 2,500 attendees participated in more than 100 Programme sessions. **SYG** presented the latest development of the Traffic modeling platform offered to cities with a strong promotion of EVEREST technology, see Figure 12. Around 30 relevant business contacts have been collected.

Figure 12 – ITS 2023 Lisbon exhibition booth

NUM presented the EVEREST project at **NUM** booth during the POLLUTEC fair in Lyon (France) on October 10-13, 2023. POLLUTEC is the most important European fair about the environment, with around 51,000 attendees in 2023. Exchanges have been done with around one hundred visitors above the new products developed during the project for **NUM**'s weather forecast.

3.6 Organization of Other Events

In the **first reporting period**, the EVEREST consortium organized a thematic session at the European Big Data Value Forum (EBDVF 2021, see Section 3.6.1) and participated in some project booths, especially to-

wards the end of the reporting period, when the COVID-19 measures allowed it.

In the **second reporting period**, the EVEREST consortium organized two other thematic sessions at the European Big Data Value Forum (EBDVF 2022, see Section 3.6.2 and EBDVF 2023, see Section 3.6.4) and participated in other project booths. A big event was **EVEREST PhD summer school** organised as a one week event in 2022 (see Section 3.6.3).

3.6.1 European Big Data Value Forum 2021

The EVEREST project organized a special session, titled "EVEREST: High-Performance, Distributed, Reconfigurable and Heterogeneous Platforms for Extreme-Scale Data Analytics", at the European Big Data Value Forum (EBDVF 2021). This edition was organized by C. Pilato (**PDM**) and K. Slaninova (**IT4I**) and held online on December 2, 2021. The session had the following program:

```
Opening: Opening of the special session and a short introduction to EVEREST project
Speaker: Katerina Slaninova, IT4Innovations, Czech Republic (5 min)
• Title: ''EVEREST Environment for High-Performance, Distributed, Reconfigurable
         and Heterogeneous Platforms''
         Speaker: Christian Pilato, Politecnico di Milano, Italy (10 min)
• Title: ''Traffic modelling for intelligent transportation in smart cities''
         Speaker: Radim Cmar, Sygic, Slovakia (10min)
• Title: ''Weather modelling and prediction''
         Speaker: Antonella Galizia, IMATI-CNR \& CIMA Foundation, Italy (10 min)
• Title: ''Weather-based prediction of renewable energy production''
         Speaker: Riccardo Cevasco, Duferco Energia, Italy (10 min)
• Title: ''Air quality monitoring in industrial sites''
         Fabien Brocheton, Numtech, France (10 min)
• Discussion (5 min)
```

The session had a project booth associated with the session (see Section 3.5.1).

3.6.2 European Big Data Value Forum 2022

The EVEREST project organized a special session, titled "EVEREST SDK: High-Performance, Distributed, Reconfigurable and Heterogeneous Platforms for Extreme-Scale Data Analytics", at the European Big Data Value Forum (EBDVF 2022). This edition was organized by C. Pilato (**PDM**) and K. Slaninova (**IT4I**) in Prague on November 23, 2022. The session had the following program:

```
Opening: Opening of the special session and a short introduction to the EVEREST project
Speaker: Katerina Slaninova, IT4Innovations, Czech Republic (5 min)
• Title: ''EVEREST SDK: Environment for High-Performance, Distributed, Reconfigurable
         and Heterogeneous Platforms''
         Speaker: Christian Pilato, Politecnico di Milano, Italy (10 min)
• Title: ''Traffic modelling for intelligent transportation in smart cities''
         Speaker: Radim Cmar, Sygic, Slovakia (10min)
• Title: ''Weather modelling and prediction''
         Speaker: Antonella Galizia, IMATI-CNR \& CIMA Foundation, Italy (10 min)
• Title: ''Air quality monitoring in industrial sites''
         Fabien Brocheton, Numtech, France (10 min)
• Title: ''Weather-based prediction of renewable energy production''
         Speaker: Riccardo Cevasco, Duferco Energia, Italy (10 min)
• Discussion (5 min)
```

3.6.3 PhD Summer School 2022

The EVEREST partners organized a PhD Summer School where they invited renovated experts from different communities to discuss the challenges of executing complex big data applications on heterogeneous platforms and how the EVEREST SDK and its individual tools address these challenges. The event involved many partners (**PDM**, **IBM**, **USI**, **TUD**, **CIMA**, **IT4I**) as organizers or presenters. The school was held at Villa Grumello, Lake Como, Italy, from September 26-30, 2022, with the following external speakers:

- Alessio Merlo, Università di Genova
- Dieter Kranzlmueller, LMU and LRZ Munich
- Enrico Bazzi, Jakala
- Gabriele Provana, Eni
- Lana Josipovic, ETH Zurich
- Luca Caviglione, IMATI-CNR

The internal speakers presented the EVEREST technologies with presentations and hands-on sessions. This event helped disseminate the EVEREST SDK and its individual tools and support the building of a community around them. The school was attended by around 40 students, mostly from Europe.

3.6.4 European Big Data Value Forum 2023

The EVEREST project organized a special session, titled “EVEREST SDK: A System Development Kit for Extreme-Scale Data Analytics on High-Performance and Heterogeneous Platforms”, at the European Big Data Value Forum (EBDVF 2023). This edition was organized by C. Pilato (**PDM**), K. Slaninova (**IT4I**), and C. Hagleitner (**IBM**) in Valencia on October 27, 2023. To show the tight integration of the components, the session was organized as a single presentation (“EVEREST SDK: A System Development Kit for Extreme-Scale Data Analytics on High-Performance and Heterogeneous Platforms”) held by C. Pilato, the EVEREST Scientific Coordinator.

3.7 Project Outputs on ZENODO

It was created an EVEREST community on ZENODO repository to disseminate the project outputs like datasets:

https://zenodo.org/communities/everest/

The EVEREST project outputs were already reported in Data management plan (see initial version in Deliverable D1.2, interim version in Deliverable D1.3 and final version in Deliverable D1.4. The statistics of views and downloads is presented in Table 7.

As can be seen from Table 7, the number of total views (>840) and total downloads (>196) is not negligible and should be considered while assessing project website attendance KPI.

Table 7 – EVEREST outputs on ZENODO

ID	Title	Partner	Views	Down-loads
D1	Weather data (forecast and observation) at three locations in France over 2021 for Machine Learning Training (DOI: 10.5281/zenodo.6528866)	**NUM**	180	7
D2	Weather forecast and observation data for Italy at Calabria location (DOI: 10.5281/zenodo.10592939)	**DUF**	60	22
D3	Duferco forecast results using Kernel Ridge (DOI: 10.5281/zenodo.10592071)	**DUF**	178	58
D5	One day FCD data of Prague (DOI: 10.5281/zenodo.6373586)	**SYG**	147	49
D6	Road speed profiles of Prague 2022 (DOI: 10.5281/zenodo.10663409)	**SYG**	52	22
D7	Training sequences for road speed prediction on a selection of roads in Prague (DOI: 10.5281/zenodo.10818506)	**SYG**	64	34
D8	Probabilistic Time-Dependent Routing (PTDR) Profile for the City of Prague, Czech Republic (DOI: 10.5281/zenodo.10701789)	**IT4I**	24	4
D9	Benchmark for deterministic traffic simulator - parameter space exploration (Prague, Jun 6 2021) (DOI: 10.5281/zenodo.6985345)	**IT4I**	216	14

4 Dissemination and Communication KPIs

This section discusses the dissemination and communication activities in relation to the KPIs defined in Deliverable D7.2. The results of this analysis for the communication and dissemination activities of the **first reporting period** are shown in Table 8. "Press releases" includes only the consortium-level press releases.

Table 8 – Analysis of EVEREST communication and dissemination KPI for the **first reporting period**

Action	Communication KPI	Plan Y1	Plan Y2	Real M1-M18
Website	Average number of website accesses for month (project website)	500	1,000	165
Social media	Number of Twitter/LinkedIn posts per month/retweets/views	1/10/100	2/20/200	5/57/932
Social media	Number of social media followers	100	200	225
Press release	Number of press releases	1	1	1
Exhibitions	Demos at academic/industrial events	-	2	-
Exhibitions	Participation to industrial fairs and exhibitions (including open-source events)	2	3	4
Action	**Dissemination KPI**	**Plan Y1**	**Plan Y2**	**Real M1-M18**
Publications	Publications in conferences	3	6	7
Publications	Publications in peer-review journals	2	3	2
Workshops	Number of attended workshops	3	5	4
Workshops	Number of project workshops	1	1	3
Networking	Number of distribution list contacts	300	400	-
Networking	Direct contacts with stakeholders	30	40	27

Table 9 – Analysis of **final** EVEREST communication and dissemination KPIs

Action	Communication KPI	Plan Y1	Plan Y2	Plan Y3	Plan Y4	Real M1-M42
Website	Average number of website accesses per month (project website)	500	1,000	1,500		**200**
Social media	Number of Twitter/LinkedIn posts per month/retweets/views	1/10/ 100	2/20/ 200	4/30/ 300		**6/5/ 1,474**
Social media	Number of social media followers	100	200	300		**539**
Press release	Number of press releases	1	1	1		**2**
Exhibitions	Demos at academic/industrial events	-	2	4	3	**8**
Exhibitions	Participation in industrial fairs and exhibitions (including open-source events)	2	3	4	2	**6**
Action	**Dissemination KPI**	**Plan Y1**	**Plan Y2**	**Plan Y3**	**Plan Y4**	**Real M1-M42**
Publications	Publications in conferences	3	6	8	6	**24**
Publications	Publications in peer-review journals	2	3	4	4	**8**
Workshops	Number of attended workshops	3	5	5	4	**20**
Workshops	Number of project workshops	-	1	1		**6**
Networking	Number of distribution list contacts	300	400	500		**450**
Networking	Direct contacts with stakeholders	30	40	50	40	**130**

The **final** results for the communication and dissemination activities are shown in Table 9. The table shows that all KPIs have been significantly improved compared to the first reporting period, especially thanks to the coordinated activities in this workpackage. For example, as the technical work advanced, partners increased the dissemination through publications, invited talks, etc., including the visibility in public events (e.g., organizing tutorials and workshops, participation at exhibitions, etc.). All these events were timely advertised on social

media, significantly increasing the number of views and followers. Despite the efforts on the website, the number of views is still quite low. It was partially caused by the publication of data sets on ZENODO, webinars on YouTube channel, and the EVEREST SDK release on GitHub. These project outputs were accessed directly and not through the project website. Due to this reason, these numbers should be considered a significant part of this KPI (see view and download statistics in Table 1, Table 2, and Table 7). However, the positive effects of the latest actions (SEO, stronger cross-links with social media) had promising effects. We expect that the dissemination activities of the EVEREST SDK after the project can further increase the number of website visitors. This is an important action to create a *community* around the SDK, as described in Deliverable D7.7.

Additional publications and tutorials are expected during the rest of the year, presenting the final results and technical achievements of the project. Participation to industrial fairs and events is below expectations mainly due to the pandemic effects in the first reporting period. In the second reporting period, the participation was in line with the expectations. Further events have been indeed already planned by the partners (see Section 5). Number of distribution list contacts is slightly below the plan. This is partially caused by a limit of the Mailchimp used for the distribution of EVEREST newsletters due to the license owned by **IT4I**.

5 Conclusions and Future Plans

The document reported the list of communication and dissemination activities carried out by the EVEREST project. It summarizes the activities for the entire duration of the project, highlighting the ones of the second reporting period.

The EVEREST consortium was able to almost cancel the negative effects of the first reporting period due to the ongoing pandemic. They created a systematic and coordinated set of activities around the technical achievements to disseminate and, at the same time, communicate them.

The partners already have **additional planned activities** to continue disseminating the results and build a strong community around the SDK. This is a key element to proper exploit the results at different levels. For example, the academic and industrial partners (**PDM**, **TUD**, and **IBM**) are planning additional joint tutorials (e.g., FPL 2024 in Turin). Journal publications are expected in the following months with the results coming out from the demonstrators. Application partners will present their results in dedicated exhibitions. For example, NUM will present the new consolidated service developed in EVEREST (see Deliverable D7.7) at the POLLUTEC 2025 European Fairshow about Environment in Lyon (France).