The European Cloud Computing Hub
to grow a sustainable and comprehensive ecosystem

D2.3: HORIZON CLOUD Forum Demographics and Evolution

Version: 1.0

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Abstract

This deliverable is the first report describing the HORIZON CLOUD Forum demographics and evolution since the inception of the HORIZON CLOUD initiative. This analysis aims at highlighting the results (both qualitative and quantitative) achieved so far in extending the HORIZON CLOUD Forum audience, broadening its share of voice within the ICT debate in Europe and beyond and engaging fresh players in the active ecosystem (e.g., participation in HORIZON CLOUD events).

Keywords: Community, Forum, Engagement

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Disclaimer

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Nature of the deliverable:	R	
Dissemination Level		
PU	Public, fully open, e.g. web	√
CI	Classified, information as referred to in Commission Decision 2001/844/EC	
CO	Confidential to HUB4CLOUD project and Commission Services	

* R: Document, report (excluding the periodic and final reports)

 DEM: Demonstrator, pilot, prototype, plan designs

 DEC: Websites, patents filing, press & media actions, videos, etc.

 OTHER: Software, technical diagram, etc

LIST OF ABBREVIATIONS

CC …………………………………………… Cloud Computing

CSA …………………………………………… Coordination and Support Action

ECC …………………………………………… European Cloud Community

EC …………………………………………… European Commission

EU …………………………………………… European Union

ICT ………………………………………….. Information & Communications Technology

RIA ………………………………………….. Research and Innovation Action

SME …………………………………………… Small and Medium Enterprise

EXECUTIVE SUMMARY

This deliverable is the 2nd and final report describing the HORIZON CLOUD Forum demographics and evolution since the inception of the HORIZON CLOUD initiative. This analysis aims at highlighting the results achieved so far in extending the HORIZON CLOUD Forum audience, broadening its share of voice within the ICT debate in Europe and beyond and engaging fresh players in the active ecosystem (e.g., participation in HORIZON CLOUD events).

The analysis is structured as follows:

- A brief description of the HORIZON CLOUD Forum and its stakeholders along with the objectives linked to the growth of the HORIZON CLOUD audience (section 1)

- A description of the HORIZON CLOUD Forum audience (section 2)

- An outline of the overall planning and next steps (section 3).

This deliverable focuses on the audience data analysis, and it is clearly complementary to the deliverables describing the communication and community building activities run in year one, such as the Deliverable *D2.1: Strengthening Outreach of European Cloud Computing Efforts* and Deliverables *D2.4 & D2.5 (Outreach and Engagement Report).*

The HORIZON CLOUD Initiative

The HORIZON CLOUD Initiative comprised 2 CSAs: H-CLOUD and HUB4CLOUD. H-CLOUD started in January 2020 and was supporting the ECC focusing on the topics of green cloud, edge computing, fog computing, cloud federation. In 2021, the sister CSA, HUB4CLOUD was funded which complemented on the activities and topics of the ongoing CSA (H-CLOUD) in order to have a complete rounded coordination of European cloud strategy in the current digital decade. The core topics of HUB4CLOUD are: open source and standardisation activities in the cloud technologies, business modelling and acceleration, cloud success stories and best practices and cloud computing skills gap analysis and opportunities.

Since the HUB4CLOUD project complemented the activities of H-CLOUD, the communication channels remained the same for both. The activities and events which were jointly organised have been branded under a joint HORIZON CLOUD initiative branding. Others, depending on the topic and the main organiser, have kept a separate branding (e.g., jointly organised Technical Community Events and HORIZON CLOUD Summit 2021 and independently organised events like CC Skills webinar series, EU Day, HUB4CLOUD session at EBDVF2021, EGI 2021 and WEGreen Workshop at GECON2022 conference).

The H-CLOUD project ended in March 2022 and since then the entire activities of the HORIZON CLOUD initiative have been led by HUB4CLOUD.

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1 THE HORIZON CLOUD FORUM

1.1 Aim of the Forum

The HORIZON CLOUD Forum as a whole combines all communication channels and activities of the HORIZON CLOUD initiative, including the project website, social media channels, community platform, and events with their outcomes and recorded material. It aims to connect cloud stakeholders, increase awareness and collaboration across different stakeholder groups, provide cross-fertilisation opportunities, and stimulate the adoption of research and innovation outputs to ensure the technological sovereignty and global competitiveness of Europe. The HORIZON CLOUD Forum community includes all the actors in the stakeholders' ecosystem, as described in the Deliverable *D2.1: Strengthening Outreach of European Cloud Computing Efforts*. A community highly diversified, which we have detailed in Table 1 below and which also represents the target of the HUB4CLOUD communication activities:

Table 1: HUB4CLOUD target stakeholders overview

Group	Description
CC funded projects, including ICT 40 RIAs	Initiatives and organisations involved in these past and ongoing initiatives
CC industrial and academic researchers	Researchers from industry and academia
CC users	Developers in the CC landscape; technology providers
CC SMEs & Start-ups	Public and private organisations and Start-ups/SMEs, innovators
Policy makers and public authorities	Actors committed to support the development of the full economic potential of Europe
CC end users industries	Non-ICT professionals who could benefit of CC applications and tools at use
Standardisation bodies / open source communities	Standardisation organisations, working groups, research groups

- In order to effectively reach these various stakeholders, HUB4CLOUD has analysed them across different axes, as shown by Table 2 below, to map them in terms of Influence (high-low) and Interest (high-low). This mapping guided the HUB4CLOUD communication activities for each target group:

- For stakeholders with high influence and low interest (see Media, Market Analysts and Big Companies), HUB4CLOUD has engaged them in high profile events, such as the Horizon Cloud Summit, providing articulated information and arguments to raise their interest around the HORIZON CLOUD initiative.

- For stakeholders with high influence and high interest (see Academics, Legislators) HUB4CLOUD has maintained a high level of interaction, making sure they have been included in the HORIZON CLOUD activities, discussions and future plans.

- Stakeholders such as start-ups, SMEs, which have a high interest (e.g., in new Cloud technologies) but still low influence on the HORIZON CLOUD developments have been increasingly important for the HORIZON CLOUD marketing activities, as they have been not only targeted in the communication, but also brought up as Key Innovators presenting their own success stories.

Table 2 : HUB4CLOUD stakeholders needs and influence

HUB4CLOUD STAKEHOLDERS NEEDS' AND INFLUENCE ANALYSIS					
INFLUENCE	HIGH	KEEP SATISFIED	Media	MANAGE CLOSELY	CC Researchers
			Big Companies		Research Bodies
			Market Analysts		CC RIAs
					Open Source Communities
					Standardisation Groups
					Legislators
	LOW	MONITOR	Citizens	KEEP INFORMED	Start-ups
					SMEs
					CC end-users
			LOW		HIGH
			INTEREST		

2 FORUM STRUCTURE AND EVOLUTION

The HORIZON CLOUD Forum combines a variety of communication channels that all aim to:

1. Encourage the participation of ECC stakeholders in the HORIZON CLOUD initiative, extending it further to include new players, liaising with existing networks and online communities.

2. Facilitate accessibility to ECC projects' outputs to foster increased adoption of CC concepts and technologies in Europe, giving major impulses to the Digital Single Market objectives.

The communication channels directly managed by HUB4CLOUD are listed here below, while the sections 2.2 and 2.3 provide the details regarding their growth trend and the demographics details (where available for each of them).

- **HORIZON CLOUD Online media**
    - o www.h-cloud.eu Web portal
    - o Newsletter
    - o Social media (Twitter, LinkedIn & YouTube)
    - o HORIZON CLOUD Community Platform

- **Events**
    - o HORIZON CLOUD Events (e.g., Horizon Cloud Summit, Technical Community Events, events organised on behalf of EC)
    - o Events attended by HUB4CLOUD (e.g., EBDVF, EGI Conference, CCGrid Conference, Cloud Computing Skills development webinars)
- **Press**
    - o Media online and offline

These media are included in the Circle 1 in the Figure 1 below, which represents the radius of the HORIZON CLOUD Communication publishers as "connected circles" which irradiate from the central one represented by the HUB4CLOUD direct outreach activities. The outer Circles (CC projects, third parties, EC channels, media) are not directly controlled by HUB4CLOUD but they are influenced and, where possible, guided. It is worth noticing that it is difficult to track and quantify the audience reached by the outer circles. It is possible to estimate that there is some amplification effect where the press or EC channels might be playing a major quantitative role, but where some CC projects can be more effective geographically and financially supported third-party projects may reach specific niches (e.g., CC researchers).
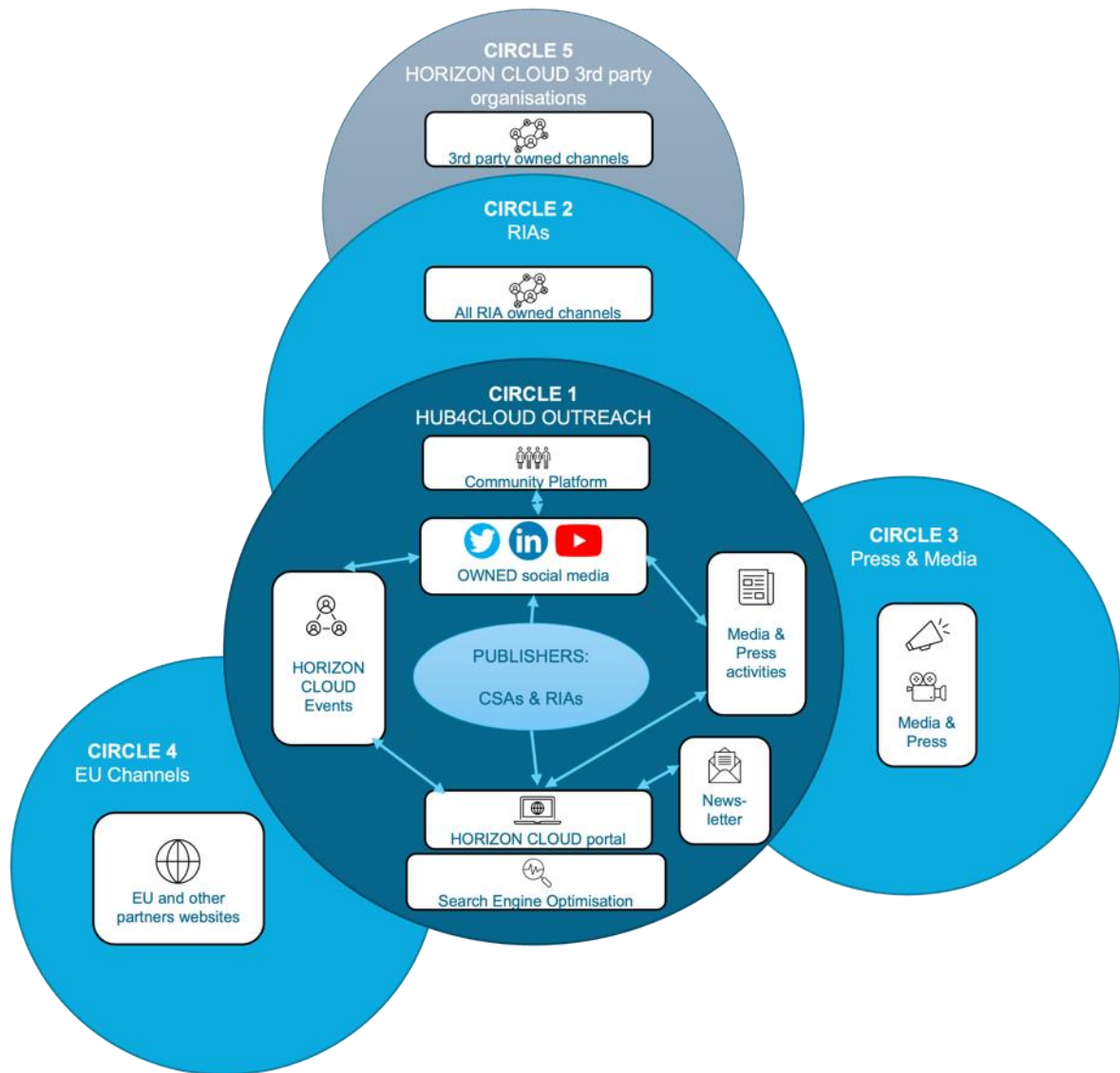
Figure 1: The HORIZON CLOUD communication ecosystem

2.1 Project website visitors

HORIZON CLOUD's official web portal (www.h-cloud.eu) is a fully functional web portal that contains comprehensive information on HUB4CLOUD's aims, objectives and results. It provides easy access to its users about the project's publicly available materials and information on the project activities gathered from the various work packages. The website was set up at the beginning of the project (M1). By the end of the project, the website has reached 4'748 unique users, and 21'147 page's views, as indicated in Figure 2:
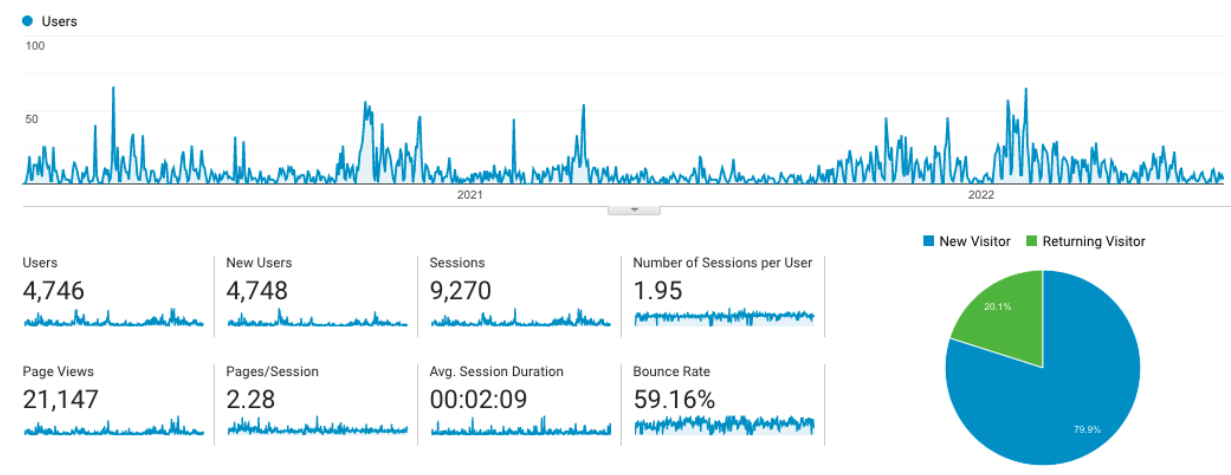
Figure 2: Overview of the h-cloud.eu audience

The peaks on the visits are related to the HORIZON CLOUD events and communications relating to events, project's outputs as well as news from the community.

2.2 Audience social media channels

2.2.1 Twitter

HUB4CLOUD maintains the twitter channel of the HORIZON CLOUD initiative. This was the common channel for the predecessor H-CLOUD project as well and was started in November 2019. Since HUB4CLOUD started, in January 2021, the twitter channel has constantly shown a growing trend of followers. Currently presenting **1475 followers** (October 2022).

2.2.2 LinkedIn

The HORIZON CLOUD community on LinkedIn is a Group. The LinkedIn Group currently has 220 members. Out of the 227 members, 186 have been found to be from the industry, 35 from the academia and 6 are policy makers. The LinkedIn group is an active community with regular sharing of posts that include project's results, outputs, events information, videos from the events, information from the HORIZON CLOUD Community of the RIA projects, and any relevant news on the European cloud/edge industry.

2.2.3 YouTube

HUB4CLOUD maintains a YouTube channel to disseminate the HORIZON CLOUD vision, concepts, and objectives by sharing project videos, such as recorded project events with the project's YouTube subscribers, engaged stakeholders and the public. In the past two years, the HORIZON CLOUD YouTube channel had **4.7k views**, **472 subscribers,** and featured **84 videos**. As shown in Figure 3, the channel attracted a heterogeneous audience from all of Europe, with France, Spain, Italy, Poland, and Portugal among the top five geographical origins.

	Total		4 700	
☐	Join us at Horizon Cloud Summit 2020 / 25-26 Nov 2020!		1 338	28,5 %
☐	Join us at Horizon Cloud Summit 2020 / 25-26 Nov 2020!		1 247	26,5 %
☐	Join us at Horizon Cloud Summit 2020!		176	3,7 %
☐	Cognitive Cloud: AI-enabled Computing Continuum - "Digital Auton…		115	2,5 %
☐	Cloud Computing Research Challenges Session		90	1,9 %
☐	The Role of European Cloud Computing in the EU Data and Industri…		85	1,8 %
☐	MORPHEMIC/MELODIC workshop: Proactive and polymorphic ada…		83	1,8 %
☐	Digital Autonomy in the Computing Continuum		76	1,6 %
☐	Opening Session DAY 1: Welcome & Keynote Session Pierre Chasta…		57	1,2 %
☐	Horizon Cloud Summit 2020 - Live Stage		51	1,1 %
☐	Horizon Europe Information and Brokerage Session		48	1,0 %

Figure 3: YouTube Audience Overview

2.3   Newsletter subscribers

HORIZON CLOUD produces e-newsletters on a quarterly basis, which provide regular updates on trends of CC research and innovation practices, project findings and results, future events, as well as news from project partners and stakeholders upon subscription and news availability. All e-newsletters are uploaded to the project website. So far, 512 people have subscribed to the newsletter. Figure 4 below gives an overview of the evolution of the newsletter's outreach.
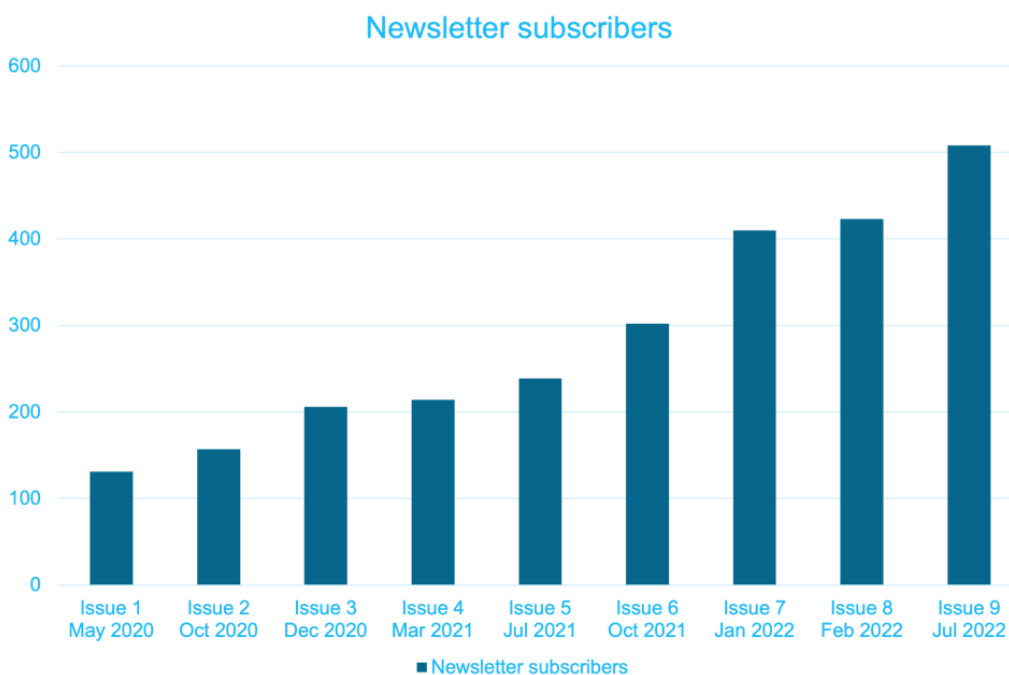
Figure 4: HORIZON CLOUD Newsletter Outreach by Editions

2.4   Community platform

The HORIZON CLOUD Forum as a whole combines all communication channels and activities, including the project website, social media channels, community platform, and events, to connect cloud stakeholders, increase awareness and collaboration across different stakeholder groups, provide cross-fertilisation opportunities, and stimulate the adoption of research and innovation outputs to ensure technological sovereignty and global competitiveness of Europe. The HORIZON CLOUD Forum community platform intended to support this aim by providing a software solution, which serves as go-to-point for the ECC community to exchange information.

After the first year of the project, the Forum community platform counted just 60 registered users and we suspected the Forum registration process to be a barrier for Forum participation. Therefore, we decided to open the Forum in January 2021 by removing the registration barrier and giving interested stakeholders the possibility to access Forum content and participate in discussions there without constraints. Also, this step made it much easier for us to cross-disseminate Forum content via already established social media channels, which we hoped would increase platform uptake, too. After having launched several Forum campaigns and linked directly to the Forum from our social media channels for a while, we noticed that our efforts did not help in increasing Forum participation. Hence, there must have been other reasons why the community did not take up our offer.

One reason might be that it is in general very difficult to move audiences to new platforms. This difficulty might have been even more pronounced during the pandemic because people had to adopt several new platforms during a short period of time, as most meetings and events swiftly moved online. This has caused some kind of "platform fatigue" and we suspect this is one of the reasons why the Forum community platform was not adopted widely. In addition to that, it has been shown that existing community networks, such as LinkedIn, are much easier to extend and engage, as many people already have a professional profile there. It is of much more interest to users to be active on already existing networks, because there they can reach some kind of visibility among peers and position themselves within their own group of followers when being active in the community. Setting up and being active on a new platform takes much more time and effort, and during the busy times we are living in, it is hard to convince people to make that effort. The latter argument is supported by the fact that it was much easier to grow an HORIZON CLOUD LinkedIn group, which currently consists of 227 active members. Finally, another reason for the low engagement on the HORIZON CLOUD community platform might be that Nextcloud, the technical solution that has been chosen to implement the Forum, caused some regular technical trouble during project runtime. While the technical staff of HORIZON CLOUD continuously monitored and updated the platform, the server of Nextcloud experienced some downtime, which made it difficult to use the platform.

Despite the shortcomings of the Forum community platform itself, the overall Forum aims have been reached through other means, including the following extra activities HORIZON CLOUD organised: During our main flagship events (i.e., the HORIZON CLOUD Summits and the 2 events organised on behalf of the EC which gave the HORIZON CLOUD initiative good visibility) we used the professional event platform Swapcard, which gave event attendees several opportunities to connect. When registering for the event, attendees automatically created a short profile for themselves, which was depicted on the "Attendee" page of the platform. Other attendees could browse these profiles and get in touch with others via an integrated chat function, via an "Event Lounge", or via (video) meetings they could schedule themselves (see example Figure 5). These functions were available before and during the event and they will remain at our stakeholders' disposal until at least two years after the event. As Figure 6 shows, this Swapcard community features were used widely.

Figure 5: Example Swapcard Networking Features

Figure 6: Networking results of the Information and Virtual Brokerage Session on 2 February 2022 hosted on Swapcard.

2.5   Community events outreach

HORIZON CLOUD organised and attended several internal and external events aiming to promote and communicate all relevant information of the project. Figure 7 gives an overview of relevant stakeholders that participated in these events and helped cross-promoting them.

Figure 7: Liaisons with other initiatives

2.5.1 Technical community events

In March 2021, the project kicked-off a webinar series of Technical Community Events for the European Cloud Community. Aim of the event series was to create awareness for and foster synergies and collaboration between European Cloud projects. European Cloud projects had the chance to propose the topic for the Community Events via the HORIZON CLOUD Forum or during the monthly Communication Task Force meetings. Until the end of the project, HUB4CLOUD hosted five Technical Community Events in collaboration with its sister CSA H-CLOUD. Table 3 gives an overview of all webinars organised in the second half of the project.

Table 3: Technical community events

Title	Thematic focus	Date	Attendees
HORIZON CLOUD Technical Community Event Series - Kick-off	This webinar kicked-off the HORIZON CLOUD Technical Community Event series. Five H2020 Cloud projects (i.e., RADON, UNICORE, ACCORDION, PLEDGER, MORPHEMIC) as well as two other stakeholders (i.e., ONEedge, Digital4Planet) from the Cloud ecosystem presented their Cloud initiatives. Topics discussed ranged from Cloud modelling and optimisation to edge computing, Unikernels, DevOps practices, and green Cloud.	23 Mar 2021	72
HORIZON CLOUD Community Event "Open Source Initiatives for Cloud Computing"	During this event, the three Open Source Cloud Initiatives Eclipse Foundation, OpenNebula, and Sovereign Cloud Stack presented their work.	15 June 2021	43
HORIZON CLOUD Community Event "Unleashing the Potential of Cloud, Fog, and Edge Computing in Europe"	The webinar showcased results of the H2020 Cloud projects RAINBOW and PLEDGER. PLEDGER presented the first steps for an intelligent resource management, benchmarking infrastructure providers and taking deployment decisions based not only on availability. RAINBOW demonstrated the advanced features included in the first release of its fog computing platform.	29 Sept 2021	41
HORIZON CLOUD Community Event "Proactive and polymorphic adaptation of multi-cloud deployments"	The webinar showcased results of the H2020 Cloud projects MORPHEMIC and MELODIC. It introduced multi-cloud application modelling, configuration, deployment, and adaptation, including the survey of the existing Cloud Management Platforms (CMP), modelling methods, and languages.	26 Oct 2021	18

Title	Thematic focus	Date	Attendees
HORIZON CLOUD Technical Community Event "Insights of the H2020 projects SmartCLIDE and PHYSICS"	The webinar showcased results of the H2020 Cloud projects SmartCLIDE and PHYSICS. SmartCLIDE presented its vision for a Cloud based integrated development environment, while PHYSICS introduced its architecture, stacks, and design environment.	3 Mar 2022	18
HORIZON CLOUD Technical Community Event "Transparent Application Deployment in a Secure, Accelerated and Cognitive Cloud Continuum"	This webinar showcased the mid-project results of the SERRANO project. SERRANO EU project introduces an abstraction layer that transforms the distributed edge, cloud and HPC resources into a single borderless infrastructure.	29 Sept 2022	47

2.5.2 Communication task force meetings

One of HUB4CLOUD's main goals is to create visibility for and connect all CC stakeholders active in Europe. To this end, we are in touch with all active European funded CC projects on a regular basis via different communication channels. We regularly met the communication managers of our RIAs during our monthly Communication Task Force meetings. These meetings usually take place on the first Wednesday of a month from 11:00 – 12:00 CET (except during summer breaks). During the whole project runtime (including HUB4CLOUD & H-CLOUD), we hosted 20 Task Force Meetings, which usually counted between 10 – 20 attendees on average. The meetings always started with a general HORIZON CLOUD update (e.g., upcoming meetings and activities) and continued with a "tour de table" during which all Cloud projects got the chance to share their project updates. Minutes were always taken and HORIZON CLOUD followed-up on any action items (e.g., sharing RIA content via HORIZON CLOUD channels) after the meetings. The Communication Task Force currently counts 57 members consisting of the representatives from the different RIAs.

In the last Horizon Cloud Communication Task Force Meeting, we presented and explained the sustainability of the Horizon Cloud community, explained in Section 3 in detail.

2.5.3 HORIZON CLOUD Summit 2021 & 2022

In 2021, HUB4CLOUD organised the HORIZON CLOUD Summit 2021 on 8 – 9 December 2021, in collaboration with H-CLOUD. The aim of the Summit was to gather innovators and researchers, Cloud adopters, policy makers, as well as Cloud initiatives, and open-source projects to shape the EU digital transition. Originally planned as a physical event co-located with Cloud Expo Europe, the Summit and the Expo moved online at the very last minute, due to increasing COVID-19 cases in Europe, especially in Germany where the event was supposed to take place. Despite

the sudden change of location, the Summit was a big success. A total of 225 participants attended the event and discussed the future of Cloud Computing in Europe with 46 speakers during 8 inspiring sessions. Table A1 in the appendix indicates the affiliations of the event attendees.

The final version of HORIZON CLOUD Summit was organised by HUB4CLOUD and took place on 11 – 12 May 2022. For the first time since the pandemic, the event took place physically at Cloud Expo Europe, Frankfurt, Germany. The Summit aimed at gathering a diverse community of researchers, policymakers, Cloud innovators, and broadly understood technological initiatives, to continue building the EU's competitive position in the market. A total of 177 participants attended the event and discussed the future of Cloud Computing in Europe with 23 speakers during 8 sessions. Table A2 in the appendix indicates the affiliations of the event attendees.

This in-person event, co-located with the [Cloud Expo Europe Frankfurt](), took place along with other big events, e.g. the GAIA-X and the Digital Transformation event. We invited several high-profile keynote speakers and panellists who availed the opportunity to create synergies, partnerships and take the European cloud innovation further. Amongst the high-profile speakers and the keynote speakers at the Horizon Cloud Summit 2022 have been Alberto Palomo, then Chief Data Officer of the Spanish Government and now also Chairman of the Gaia-X Government Advisory Board, Ignacio Llorente, CEO of OpenNebula and Chair of the Cloud/Edge Working Group at the European Alliance for Industrial Data, Edge and Cloud, and Carla Arend, Senior Program Director at IDC. A list of all panellists and speakers are to be found [here]().

2.5.4 Events organised in collaboration with EC Cloud and Software Unit

Until now, the HORIZON CLOUD initiative organised two additional high-level events in collaboration with the European Commission's Cloud and Software Unit:

EC Workshop "Digital Autonomy in the Computing Continuum"

On 11 November 2021, HUB4CLOUD, in collaboration with the EC, H-CLOUD, EU-IoT, and SWForum, organised the virtual workshop "Digital Autonomy in the Computing Continuum" ([more information, including recordings and presentations, here]()). The event gathered 373 researchers, innovators, industrial stakeholders both from the supply and the demand side, SMEs/Start-ups, policy makers, standardisation experts, regulators, as well as relevant initiatives and projects, to exchange views on specific R&I topics, challenges, and opportunities and converge on priorities to guide future investments under Horizon Europe, Destination 3, area "From Cloud to Edge to IoT for European Data". Table A3 in the appendix gives an overview of the affiliations of the event attendees.

EC Workshop "Information and Virtual Brokerage Session on the Horizon Europe Cloud, Edge, IoT 2022 Calls"

On 2 February 2022, HUB4CLOUD, in collaboration with the EC, H-CLOUD and EU-IoT, organised an [Information and Virtual Brokerage Session on the Horizon Europe Cloud, Edge, IoT 2022 Calls](). The 275 attendees had the opportunity to learn about the three Horizon Europe calls "Cognitive Cloud: AI-enabled computing continuum from Cloud to Edge (RIA)", "[Open source for cloud-based services (RIA)]()", and "[Programming tools for decentralised intelligence and swarms (RIA)]()". Moreover, the event provided participants with a unique opportunity to brainstorm on emerging concepts, pitch concrete ideas, and exchange expertise with leading research organisations and cutting-edge innovators from across the industry. Table A4 in the appendix gives an overview of the affiliations of the event attendees.

2.5.5 Day colocated at CCGrid 2022 conference

The CCGrid symposium series serves as a major international forum for presenting and sharing recent research accomplishments and technological developments in the field of Cluster, Cloud and Internet computing.

The first CCGrid Conference started in Brisbane, Australia, in 2001. Since then, the conference has successfully been hosted around the world. The 22nd International conference was held in Taormina (Messina), Italy.

EU Day, a 1 day event organised by HUB4CLOUD within the CCGrid 2022, explored the major developments in the European cloud computing ecosystem, in particular open-source approaches. The idea of this event was to bring together various European communities that are working across multiple fields but are linked together with the common topic of the Cloud! There were 11 European Horizon2020 projects that participated and presented their project use-cases and experience.

This event turned out to be a great platform for the different communities to share information about their project and network. The audience of this academic conference was in general academic, as expected given the established CCGrid target and positioning.

Table 4: EU Day Participants

List of H2020 projects that participated in the EU Day	
Keynote - Luis Busquets, *Programme Officer Cloud and Software unit, DG CONNECT, European Commission*	**MORPHEMIC (H2020-ICT-2018-20)** - Marta Rozanska, *University of Oslo, Institute of Communications and Computer Systems*
DataCloud (H2020-ICT-2020-2) - Radu Prodan, *University of Klagenfurt, Austria*	**DECIDO (H2020-SC6-GOVERNANCE-2018-2019-2020)** - Antonio Filograna, *Engineering Ingegneria Informatica S.p.A.*
URBANITE (H2020-SC6-TRANSFORMATIONS-2019) - Maria Fazio, *University of Messina*	**DigiPLACE (H2020-DT-2018-2020)** - Giusi Di Pino, *Expert – EU Projects, Municipality of Messina – European Affairs Dept.*
DataVaults (H2020-ICT-2018-20) - Ana Isabel Torre Bastida, *Tecnalia research & Innovation*	**PHYSICS (H2020-ICT-2020-2)** - George Kousiouris, *Harokopio University*
ARTICONF (H2020-ICT-2018-20) - Radu Prodan, *University of Klagenfurt, Austria*	**PolicyCloud (H2020-SC6-GOVERNANCE-2018-2019-2020)** - Panayiotis Michael, *National Technical University of Athens*
AssureMOSS (H2020-SU-ICT-2018-2020) - Francesco Minna, *Vrije Universiteit Amsterdam*	**AI4PublicPolicy (H2020-SC6-GOVERNANCE-2018-2019-2020)** - Andrea Cristofori, *Data Solution Architect at EGI Foundation*

2.5.6 Cloud Computing Skills Development Webinar Series

One of the core topics of HUB4CLOUD is assessing cloud computing skill gaps and opportunities in Europe, and to prepare recommendations for the European Commission to address these

gaps. For this purpose, HUB4CLOUD launched the "Cloud Computing Skills Development in Europe" webinar series. Through this series of webinars, we discuss and learn from the different players in the market (industries, SMEs and startups, academia, online courses platforms and individuals) about the European cloud computing skill gaps and ways to bridge them. This activity focused on exploring the needs for CC skills, training needs and opportunities in the next 5 to 10 years and retrofeed them into roadmapping and policy recommendations.

The following sessions have been organised in the Cloud Computing skills development webinar series:

Table 5: Audience Skills Development Webinars

Title	Focus and Presentations	Date	Attendees
Cloud Computing Skills Development in Europe - Webinar 1	This webinar kicked-off the CC Skills topic. There were presentations from the CC course providers Cloud Academy and the Data on Kubernetes Community.	08 Mar 2022	20
Panel – "Cloud computing skill training needs and opportunities in Europe"	This panel session was part of the Horizon Cloud Summit 2022 program. Here panelists from IDC, Bluspecs and NextCloud (a SME) participated and shared insights.	12 May 2022	6
Cloud Computing Skill Development in Europe Webinar	In this webinar, data were shared from the different projects and initiatives which are working towards digital skills in Europe. The initiatives that participated were Mobile World Capital presenting the Barcelona Digital Talent, I4MS and cloudSME.	20 July 2022	14

2.5.7 HUB4CLOUD attended events

HUB4CLOUD participated in external events which held prestige in the European digital ecosystem, such as the EGI conference, the European Big Data Value Forum and the Jomada PLANETIC event. These sessions have been mentioned in detail in D2.4 Outreach and Engagement Report and D2.5 Outreach and Engagement Report (Final Version).

Panel discussion at the EGI Conference 2021, 19.10.2021: "Joining forces for a robust digital landscape: European Cloud Open Source and Standardisation efforts"

HUB4CLOUD organised this panel session at the EGI conference 2021. EGI conference 2021 was an external event where **HUB4CLOUD was a participant**. There was a formal call for submissions where we made a submission to discuss the ongoing open-source and standardisation efforts in the European cloud computing ecosystem. This session took place via

online conference and this session was attended by 35 people. The data on attendees could not be attained because of GDPR regulations as the registration process was handled by the EGI Foundation and was not transferable to HUB4CLOUD.

Jomada PLANETIC de espacios de datos federados, 24.09.2021

HUB4CLOUD presented the CSA objectives as well as invited stakeholders to participate by sharing their vision on the European Cloud Computing scene at the online workshop "Data Spaces in Federated Environments" organised by PLANETIC on September 24th, 2021. HUB4CLOUD **participated in this external event.**

Panel discussion at EBDVF 2021, 02.12.2021: "Next Generation Computing Infrastructure to support Data Spaces"

HUB4CLOUD organised a panel session at the EBDVF2021 (BDVA Forum). There was a formal call for submissions where we made a submission to discuss the next generation computing infrastructure to support data spaces. The BDVA Forum is a very prestigious event in the European data, cloud and AI community. The event took place from 29th of Nov to 3rd of Dec 2021 and the HUB4CLOUD session was attended by 166 attendees. As the registration process was handled by BDVA, it was not possible to attain the attendee information.

WEGreen Workshop at GECON Conference 2022, 15.09.2022: Workshop on Engineering Green and Sustainable Software in the Computing Continuum

HUB4CLOUD and SWForum (the sister CSA in Software technologies) organised a workshop at the GECON Conference 2022. There were 2 keynote presentations and 2 problem statement presentations that took place during the event, followed by a panel discussion between the 4 speakers. This workshop gathered together 40 (live and online) attendees in the software and cloud community across the globe. Unfortunately, data on the participants could not be received because of GDPR reasons as the registration was handled by the GECON conference.

3 SUSTAINABILITY AND CONCLUSION

The HORIZON CLOUD community is an active and vibrant community with many subscribers via the different channels. A sustainability plan is in place in order to ensure that the support to the community is not interrupted and/or lost.

Martel Innovate, as the coordinators of HUB4CLOUD and leading the HORIZON CLOUD initiative, is also coordinating one of the two successor CSAs, the supply-side "OpenContinuum", which is a Horizon Europe CSA in the topic of European Cloud-Edge-IoT, and is already in action since September 2022 in the name of the initiative **EUCloud-Edge-IoT**. There is an ongoing transition of engagement, activities and support towards the European Cloud Community as well as the merging of the Cloud-Edge-IoT communities.

Due to the merger of the cloud-edge and the IoT communities and the active projects, there will be a massive expansion of the community in terms of persons, organisations as well as a proliferation of topics of the future.

A detailed explanation of the EU-Cloud-Edge-IoT social media channels status quo is described in HUB4CLOUD D2.5 Outreach and Engagement Report.

The figures below depicts what communities and projects will be supported by the EUCloud-Edge-IoT fora.

- Number of ongoing RIAs in ICT-40-2020 Cloud Computing: 5

- Number of ongoing RIAs in ICT-15-2020 Cloud Computing (finishing in Dec 2022) – 6

- Number of MetaOS RIAs started in 2022 - 6

- Number of Cognitive Cloud & Swarm computing RIAs starting in 2023 - about 15. The correct number of these RIAs is not confirmed as the data is still not available on CORDIS. However, with the amount of budget available for these calls it is estimated that 15 RIAs would've been funded.
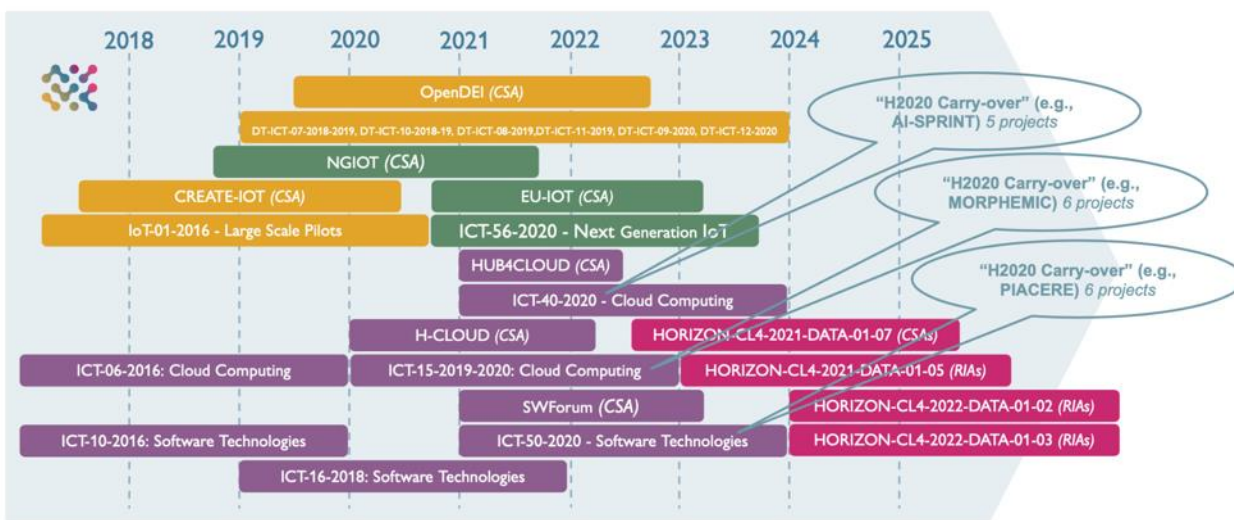

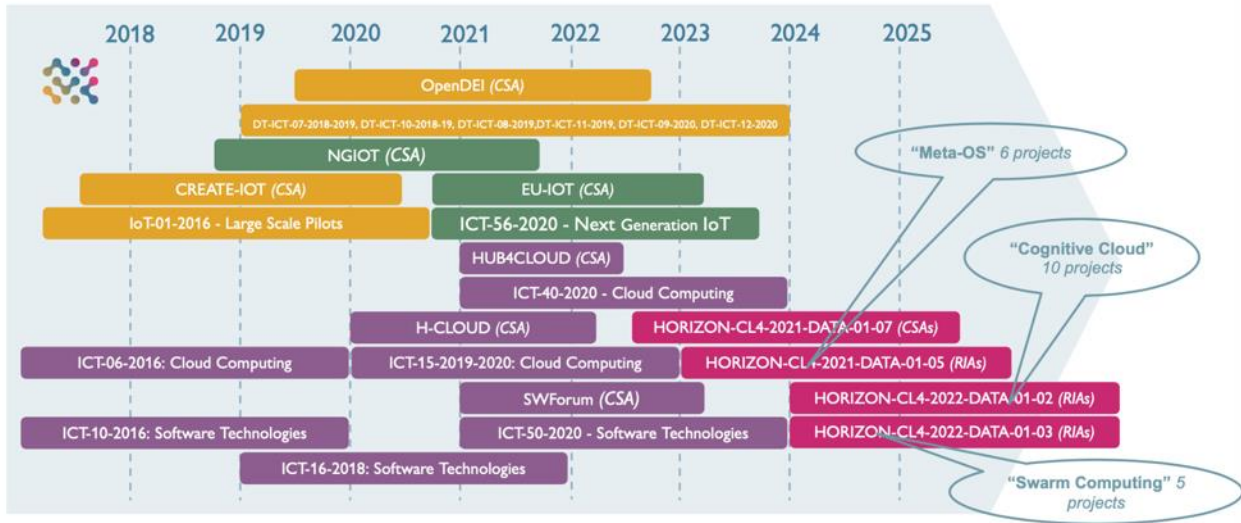*Figure: Timeline and project portfolio of the EUCloud-Edge-Iot initiative*

Figure: Timeline and project portfolio of the EUCloud-Edge-Iot initiative

4 CONCLUSION

The current analysis allowed HUB4CLOUD to unlock useful evidence regarding the HORIZON CLOUD audience distribution, the positive trends and the weakness points. Actionable insights have been highlighted and they should be further discussed not only by the HUB4CLOUD team but also shared with the HORIZON CLOUD internal stakeholders to provide a holistic analysis, encourage the collection and share of currently missing data and pave the way to a more comprehensive and meaningful analysis so that the successive projects, among which "OpenContinuum", engage a vibrant community.

APPENDIX

Table A1: Affiliations HORIZON CLOUD Summit 2021 Event Attendees

- 7bulls.com Sp. z o.o.
- A1 Group
- AcrossLimits
- ADN
- Afghanistan High Security Printing
- Ailio GmbH
- Altaplano
- AMENESIK SARL
- Anixter Deutschland GmbH
- Atos
- Avaya GmbH
- Axians Cloud & IT Automation GmbH
- B2CLOUD
- Barracuda Networks Inc
- BCA AG
- Bechtle AG
- Bechtle Clouds GmbH
- Bechtle Systemhaus Holding AG
- Beyond.pl
- Bilfinger Digital Next GmbH
- Blancco Central Europe GmbH
- Blancco Technology Group
- Blockheating
- Blue Reply GmbH
- BOLDLY GO INDUSTRIES GmbH
- Capgemini Deutschland Holding GmbH
- Cargobull Telematics GmbH
- Check Point Software Technologies GmbH
- Christophorus-Consult
- Chrono24
- Cisco Systems
- Claranet GmbH
- codecentric AG
- Commerzbank AG
- Computacenter AG & Co. oHG
- concedro
- CONINTEC
- CoPlanner Software & Consulting GmbH
- D. Swarovski KG
- Database Interactive Pvt Ltd
- Dataiku
- DDIM
- DEIB - Politecnico di Milano
- Denso Germany
- Der Touristik Deutschland Gmbh
- Detasad
- DLR
- DRESMARA
- dsip
- DXC Technology Deutschland GmbH
- DZBANK AG
- e.kundenservice Netz GmbH
- eco - Verband der Internetwirtschaft e.V.
- Egypt Japan University of Science and Technology
- eins energie in sachsen
- ELEVEN BI Gesellschaft für Consulting mbH
- Eltek Deutschland GmbH
- embl
- embl
- Ericsson
- Erste Digital
- ESB Reutlingen

- Ethos Engineering
- Eurescom
- EXAGATE
- Exasol AG
- Experian
- Exyte
- Fiducia & Gad It Ag
- Fiege Logistik Stiftung & Co.KG
- Freelancer / www.trak.de
- Fresenius Kabi Deutschland GmbH
- Frey DC Consulting
- Friends of IT GmbH
- FSZ GmbH
- Fujitsu Technology Solution GmbH
- Georg Fischer Piping Systems
- GlobalDots
- globus consult
- GRASS-MERKUR GmbH & Co. KG
- Green
- Gutenberg-RZ
- Hartz Regehr GmBH
- Helder
- Hessischer Rundfunk
- HKM
- HPE
- huawei
- Huawei Technologies
- Hugo Boss AG
- hystreet.com
- IBM
- ICBC Frankfurt Branch
- ICON
- IMS:GEAR
- Independent
- Innovapps GmbH
- Inst-it Gmbh
- Instaclustr

- International Business Consultants (IBC)
- IOMI
- ISG
- ISTI-CNR
- IT-Beratung Radlow
- IT4Innovations
- ITC
- ITQS GmbH
- iX Magazin
- K-Lab
- K2S GmbH
- Kennametal
- Koelnmesse GmbH
- Kr Consulting
- Liebeherr-Aerospace
- Maciag GmbH
- Markley Group
- Markus Ueberall Consulting GmbH
- Martel Innovate GmbH
- Matrix Structures
- Mazars GmbH & Co. KG
- MEN@NET GmbH
- Mercedes (daimler)
- Microsoft
- msg systems ag
- MT AG
- muRata
- MVM EGI Zrt.
- Narwhal Data Solutions GmbH
- National Research, Development & Innovation Office
- Netbound.de
- Netgineers GmbH
- Nordavind DC Sites
- Nordcloud Deutschland GmbH
- NORMA
- Norma Group

- NVL B.V. & Co. KG
- Objectivity GmbH
- OBO Bettermann Holding GmbH & Co. KG
- OPITZ CONSULTING Deutschland GmbH
- Oracle
- ORAYLIS GmbH
- OSISM GmbH
- PFLZKOM GmbH
- PlusServer GmbH
- ProDevelop
- Prodware Deutschland AG
- Red Hat
- Reuzado ITAD Services
- Robert Bosch GmbH
- Rolls-Royce Solution GmbH
- RPGI
- SAP Deutschland SE Gmbh & Co.KG
- SAP SE
- Scheer PAS GmbH
- Schneider Electric
- Schwarz Dienstleistungen
- Siemens AG
- Skaylink
- Sky Deutschland Fernsehen GmbH & Co. KG
- SM2 SOFTWARE & SERVICES MANAGEMENT, SA
- Soft Xpansion Gmbh & Co. KG
- Softeam
- Software AG
- Spike Reply GmbH
- Stief Consulting

- SVA System Vertrieb Alexander mbH
- synetics GmbH
- T-Systems International GmbH
- Taigr Systems GmbH
- Tata Consultancy Services
- Tech Data Deutschland
- Technical University of Darmstadt
- TECNALIA Research & Innovation
- TelemaxX Telekommunikation GmbH
- Telia Carrier
- ThreeFold Tech
- TMRW Global
- TNPIT Consulting
- Tridium
- University of Klagenfurt
- University of Tübingen
- Unzer
- Uptime Informations-Technologie GmbH
- VAIMEE
- Vetter Pharma-Fertigung GmbH & Co. KG
- Virtivity GmbH
- VMware Global Inc.
- Wagner eCommerce Group
- WAGNER Group GmbH
- Wilo SE
- WINGAS GmbH / Gazprom Germania Group
- Worldwide Services
- XLAB | SODALITE
- Yellowhouse GmbH
- Zürcher Kantonalbank

Table A2: Affiliations HORIZON CLOUD Summit 2022 Event Attendees

- Afur
- Agenda Open Systems
- Aiven
- Alex & Gross Technology GmbH
- Altair Engineering GmbH
- Arsys Internet
- ATOS
- Avanade
- BluSpecs
- BURG F.W. Lüling KG
- Canonical
- Computer-L.A.N. GmbH
- Comsysto Reply
- Container Solutions Software Ltd.
- CzechInvest
- D-Orbit
- Data Center Group GmbH
- Datef Ag
- De-Cix
- Deutsche Bank
- Digisecur
- DonLuigi IT-Service
- DPR Construction
- EC Germany GmbH
- Eclipse Foundation Europe GmbH
- eco – Association of the Internet Industry e.V.
- ethernetics
- European Champions Alliance
- Evalueserve
- EvolutionIt
- Evonik
- Frinvest
- Gaia-X Federation Services
- Google
- Government of Spain

- Heise Media
- Helio AG
- Hewlett Packard Enterprise
- Horváth
- Huawei Cyber Security Transparency Center
- IDC Central Europe GmbH
- IDC Dach
- Ims health
- Innovapps GmbH
- Interxion
- IONOS SE
- KeySolution IT GmbH
- KfW
- KIT
- Kubermatic GmbH
- L-One Systems GmbH
- Landesbank Hessen-Hessen Thüringen
- Lumen
- ManageEngine
- Martel Innovate GmbH
- Mentopolis
- Mercer Pulp Sales GmbH
- meshcloud GmbH
- Microsoft
- Ministry of economy
- Muharrem Oguz
- N+P Informationssysteme GmbH
- NEXGEN Business Consultants GmbH
- Nextcloud GmbH
- NTT Ltd.
- OFFICEFIRST Real Estate GmbH
- OpenNebula
- Own.com

- Paessler AG
- Pfeifer
- PwC WPG GmbH
- PYUR Business
- Red Hat GmbH
- Robert Bosch GmbH
- SAP SE
- Schenck Process
- Schenker AG
- Siemens AG
- Sopra Steria SE
- T-Systems International GmbH
- TECNALIA Research & Innovation

- Tencent cloud
- UkrAvto
- Union Investment
- Union IT-Services GmbH
- Unisystems
- University of Bremen
- University of Innsbruck
- University of Klagenfurt
- Vertiv
- VIAVI Solutions
- Winthrop
- WT Alliance Software

Table A3: Affiliations "Digital Autonomy in the Computing Continuum" Event Attendees

- @bc
- |pipe|
- AAU
- AcrossLimits
- Agentschap Telecom
- AIOTI
- AIT Austrian Institute of Technology
- AKGUN
- AKIM METAL
- Alibaba Cloud
- Allianz SE
- Anca Wlizlo
- APAI LTD.
- APOSTOLOU
- Architecture of Things
- Arsys Internet, S.L.U.
- Artech International
- Asociacion europea de IA
- ATC Intl
- Athens University of Economics and Business
- ATOS
- AWS
- Axelera AI
- Ayuntamiento de Espartinas
- Barcelona Supercomputing Center
- BAYKON Endüstriyel Kontrol Sistemleri San. ve Tic. A.Ş.
- BBVA
- Beltug
- Big Onion
- BigTRI
- BluSpecs
- BMW Group
- Bosch Sensortec
- BSA
- BSI
- Bundesdruckerei GmbH
- Cabinet Samman
- Capgemini Engineering
- Çapraz engineering
- CEA / Grenoble - LETI - DSYS
- Centric Netherlands - Steinbeis University Berlin
- Comunicare Digitale
- Confindustria Emilia-Romagna Ricerca
- Constelcom
- Consultancy Informatics and Education
- CORVERS
- CSEM
- Cyberdonia
- Cyfrowy Polsat SA
- Danish Business Authority
- Dankea
- Datev
- Deutsche Telekom / T-Systems
- Deutsche Telekom AG
- DEUTSCHER ANWALTVEREIN
- Developers Alliance
- Digital Catapult
- Digital for Planet
- Digital Leadership Institute
- DLR RNH
- Dutch Ministry of Economic Affairs and Climate Policy
- E4 Computer Engineering SpA
- EBU
- Eclipse Foundation
- eco Verband der Internetwirtschaft

- e.V.
- EDP NEW R&D
- EGI Foundation
- Eliar Electronic Coorp.
- Endocode AG
- Enel
- Enercoutim/ ResilientGroup/ AIOTI
- ENISA
- Enterprise Ireland
- EPoSS
- ESCAC
- EscherCloud
- ESOP
- EU-Support
- Eurecat Technology Centre
- EURESCOM
- Euresearch
- EuroCC@Austria
- European Economic And Trade Office
- European Broadcasting Union
- European Commission
- EZK
- F6S Network
- FCT - Fundação para a Ciência e a Tecnologia
- Fondazione Bruno Kessler, DECENTER
- FORSKNINGSRÅDET
- Fraunhofer IOSB
- Fraunhofer ISI
- Fraunhofer-Gesellschaft
- Fundación Big Data
- GAIA-X
- Genç Başarı Eğitim Vakfı, Junior Achievement Turkey
- Geodata IT GmbH
- GFT Italia

- Google Cloud
- GPP Communication
- GREEN AI CLOUD
- Green Continuum
- Grenoble Alpes Cybersecurity Institute
- GT-ARC / TU Berlin
- H3Dynamics
- Hasso Plattner Institute
- HIRO-MicroDataCenters.nl
- Hitachi Europe Ltd
- Holonix S.r.l.
- HPE
- huawei
- HUAWEI CYBERSECURITY TRANSPARENCY CENTER
- HUAWEI TECHNOLOGIES
- i2CAT
- i3D.net
- IBM
- IBM Haifa Research
- ICCS
- ICE
- IDC
- Idencity Consulting
- IDSA
- iExec Blockchain Tech
- IFRS
- IHP
- Ikerlan
- Images et Reseaux
- INCoDe.2030
- Inside Industry Assocation
- Institute of Communications and Computer Systems (ICCS)
- Interconnect
- International Data Spaces Association

- Intracom Telecom
- IONOS
- IOT WORLDS S.R.L.
- ITAINNOVA
- ITI - Instituto Tecnológico de Informática
- Johannes Kepler University Linz
- Joint Research Centre
- JOT INTERNET MEDIA
- Karlsruhe Institute of Technology (KIT)
- Keith G Jeffery Consultants (EPOS)
- KINERE
- Kompetenznetzwerk Trusted Cloud
- Koninklijke DSM N.V.
- Kreab España
- KTH Royal Institute of Technology
- Lacroix Group
- Lauth transmedia GmbH
- Linbit
- LINK Centre, University of the Witwatersrand
- Linköping University
- LINKS Foundation
- LIT
- LNU
- LSEC - Leaders in Security
- Luleå University of Technology
- Luxinnovation
- Mad20
- Malta Communications Authority
- Marmara University
- Martel Innovate
- Melita Limited
- Microsoft
- Microsoft Deutschland GmbH
- mm-it4you.de
- MOG Technologies

- Munster Technological University
- myTECHNIC
- NAVIGATING.NXT
- Nestle
- Net Reply
- NodeWeaver
- Nokia
- NOVE
- NTUA
- Nvt
- OpenForum Europe (OFE)
- OpenNebula
- Oracle
- Orange
- Oslo University
- P.J.Safarik University in Kosice
- Palo Alto Networks, das führende Unternehmen im Bereich IT-Sicherheit
- peopol GmbH
- POLE SCS
- Politecnico di Milano
- Politecnico di Milano, AI-SPRINT
- Polytechnic Institute of Porto
- PRESS SHIFT SRL
- Private
- ProDevelop
- PROMIS@Service Srl
- Red Hat
- RISE Research Institutes of Sweden
- SAP
- SCAPOS
- scapos AG
- Selbstregulierung Informationswirtschaft (SRIW)
- Self and Co-Regulation for an Optimized Policy Environment in Europe
- SES

- SICOS BW GmbH
- Sightline Innovation
- SINTEF
- SINTEF Digital, Norway
- SINTEFAS
- Sistem Global
- Sistem Teknik (Revolvind)
- Sofia University
- Softeam
- Sorbonne Université
- Spindox spa
- SUSE
- Swapcard
- Swisscom
- Tech Mahindra Ltd
- Technical University Dortmund
- Technical University of Valencia
- Technical University Vienna
- Technological University of the Shannon: Midlands Midwest
- Technology Industries of Finland
- TECNALIA
- telespazio
- THHINK Wireless Technologies
- THINGS
- Thomas Obst - Beratung zur digitalen Transformation
- ThreeFold Tech
- TIBCO Software
- TNO
- TOP-IX Consortium
- Tree Technology
- Trinity College Dublin
- Trust-IT
- TTTECH COMPUTERTECHNIK AG
- TTTech Industrial Automation AG
- TU Wien
- TÜBİTAK BİLGEM

- UBITECH
- UBITECH
- UBITECH LTD
- Ubiwhere
- Umeå University / Elastisys
- UniFG
- UNIV OF OXFORD / EUROPEAN UNIV CYPRUS
- Universidad de Murcia
- Université Libre de Bruxelles
- University Erlangen-Nuremberg
- University of A Coruña
- University of Amsterdam
- University of Athens
- University of Aveiro
- University of Bologna
- University of Catania
- University of Cyprus
- University of Edinburgh
- University of Extremadura
- University of Gent
- University of Innsbruck
- University of Lapland
- University of Limerick
- University of Ljubljana
- University of Patras
- University of Trento
- University of Ulm
- UPF
- uppsala university/finlandiabiosciences
- US Mission to the EU
- Utrecht University
- VAA
- VDI/VDE Innovation + Technik GmbH
- VDIVDE-IT
- VEDECOM

- VIRTECH OOD (LTD)
- Vision & Values
- Vodafone Group
- Vodafone Innovus
- Vrije Universiteit Brussel
- VTT
- Warpcom
- Wirtschafts- und Digitalministerium NRW
- World Bank
- WUT
- ZVEI e.V. - Electro and Digital Industry Association

Table A4: Affiliations EC Brokerage Event Attendees

- 2IA Consulting
- 7bulls.com Sp. z o.o.
- AAU
- AcrossLimits
- AIT - Austrian Institute of Technology
- AKGUN
- Akım Metal
- AnyWi Technology BV
- Arçelik A.Ş.
- Arsys Internet, S.L.U.
- Atos
- Bewell Tecghnology
- BigTRI Bilisim AS
- Bilecik Şeyh Edebali Üniversitesi
- Brisa Bridgestone Sabancı
- Cogninn
- Collins ART
- ComSensus
- CRESITT Industrie
- Digital Catapult
- Eliar Elektronik A.S.
- Elif Plastik Amb. San. ve Tic. A.Ş.
- Enable Research Programme
- Enterprise Ireland
- EURECAT
- Euresearch
- EuroCC Austria
- European Centre for Medium-Range Weather Forecasts (ECMWF)
- European Commission
- Forschung Burgenland
- FORTH-ICS
- Freelance EU Grants and Project Coordination
- Genç Başarı Eğitim Vakfı, Junior Achievement Turkey

- GFT Italia
- Green Continuum
- Hacettepe University
- i2CAT Foundation
- ICCS
- ICterra
- IDC
- IDEMIA PUBIC SECURITY AND IDENTITY
- Ikerlan
- INFO-CARE
- Intel
- IS-Wireless
- Israel Innovation Authority - ISERD
- Karlsruhe Institute of Technology
- KoçSistem
- Marmara University
- Martel Innovate
- myTECHNIC
- NTUA
- OpenNebula
- Orion Innovation Turkey
- Penguen
- Politecnico di Milano
- Polytechnic Institute of Porto
- Prato Municipality
- RISE Research Institutes of Sweden
- Robert Bosch GmbH
- Satakunta University of applied sciences
- SENSATA BV
- Silesian University of Technology
- SINTEF
- Sistem Teknik (Revolvind)
- Softeam
- Startup Colors

- Sun Tekstil San. ve Tic. A.S.
- SYNELIXIS SOLUTIONS
- Teknopalas Yüksek Teknoloji Sistemleri A.Ş.
- Telecommunications department
- Terraview
- Trust-IT
- TUBITAK - Scientific & Techological Research Council Turkey
- Türk Telekom
- TWI
- UBITECH
- Umeå University / Elastisys
- Unisystems
- Universitat Politècnica de València
- University of Amsterdam
- University of Duisburg-Essen
- University of Extremadura
- University of Messina
- University of Napoli
- University of Pisa
- University of Southern Denmark
- UPV
- ZABALA Innovation