



SWForum.eu

European forum of the software research community



CHARITY

Cloud for Holography and Augmented Reality



MEDINA



EUCloudEdgeIoT.eu



HSbooster.eu

Horizon Standardisation Booster



European
Commission



Software Technologies and Standards: Enabling Interoperability and Innovation

MARCH 2023

RECOMMENDATION REPORT

Introduction

On 2 February 2022, the European Commission presented a new Standardisation Strategy, with the aim to “strengthen the EU’s global competitiveness, to enable a resilient, green and digital economy and to enshrine democratic values in technology applications. They help manufacturers ensure the interoperability of products and services, reduce costs, improve safety and foster innovation.” Software technology, digital infrastructure, and cybersecurity are all deeply affected by standards, but awareness of both the utility and the necessity of standards is often lacking in the software community

SWForum.eu organised its second webinar focussing on “**Software Technologies and Standards: Enabling Interoperability and Innovation**” which took place on 21 February 2023. In this webinar, we invited four EU-funded projects namely: **CHARITY, MEDINA, EUCloudEdgelot and HSbooster.eu**, represented by experts who provided an overview and key insights on how software technologies and standards are enabling interoperability and innovation in Europe.

All speakers’ presentations are publicly available for download at SWForum.eu Zenodo community. Also, a video recording of the full session is available at the [SWForum.eu page](#).

The first objective of this webinar is to present practical examples of standards at work in applications ranging from virtual and augmented reality to autonomous mission-critical components. Different types of standards ranging from international norms to telecom technical specifications to open data exchange will be presented and discussed.

A second objective is to raise awareness of programmes and assistance made available to the software community by the European Commission for effective use of standards and participation in the standardisation process.



Results of the interactive live poll session

This webinar managed to gather 35 live participants from 16 countries across the globe: 12 EU Member States and 4 Non-EU/global. The majority of them were from EC-funded H2020 and Horizon Europe projects with interest in standardisation (40%), followed by Software technology and digital infrastructure communities (37%), Policy makers and decision makers (11%), Standardisation experts in ICT technologies (9%), and representatives from ESOs, NSBs and SDOs (3%).

Key recommendations emerging from the session are also provided in the next pages.

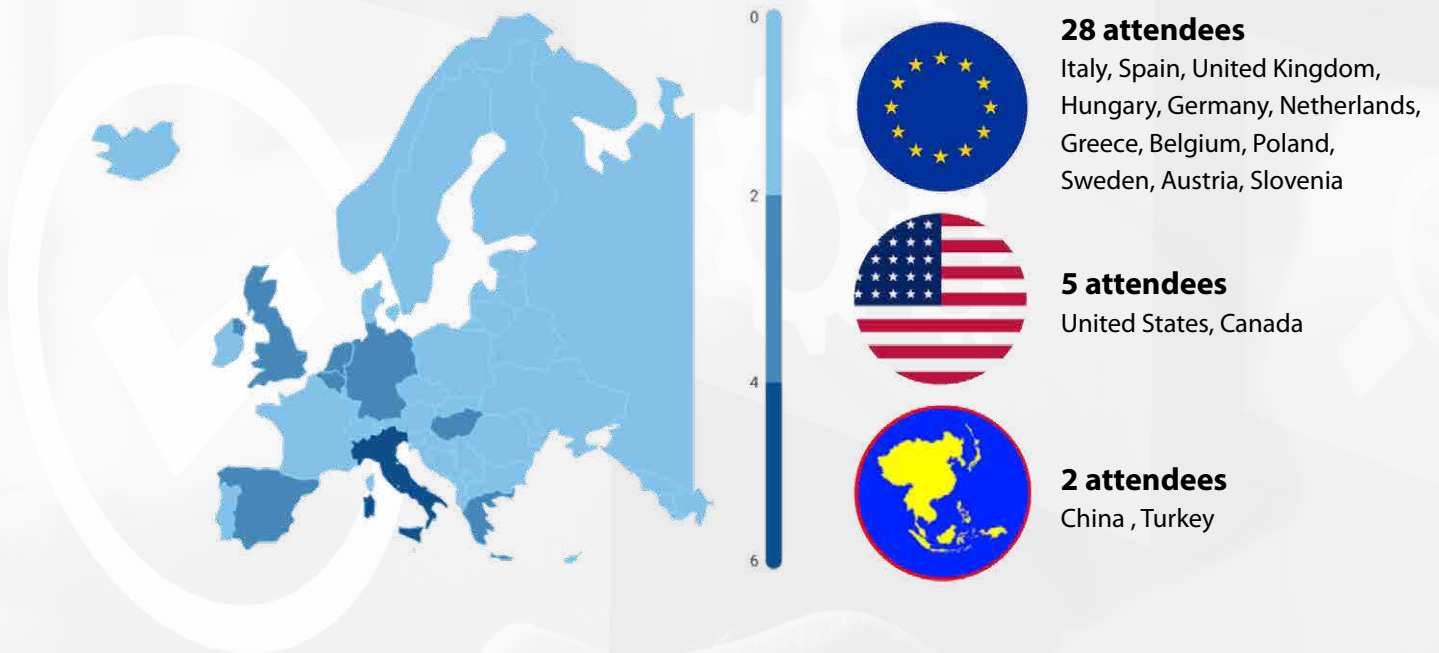


Figure 1: Attendees by regions



Figure 2: Attendees by groups

Chairs and Speakers

SWForum.eu

WEBINAR

21 February 2023 15:00-16:30 CET

Software Technologies & Standards: Enabling Interoperability & Innovation

SPEAKERS

- Juncal Alonso**
TECNALIA, SWForum.eu
Project Coordinator
- Luis Carlos Busquets Perez**
EU Programme Officer in DG Connect E2
- Ferran Diego**
Telefonica, CHARITY
- Jesus Luna Garcia**
Bosch, MEDINA
- Maria Giuffrida**
Trust-IT Services, EUCLoudEdgelot
- Ray Walshe**
Dublin City University, HSbooster.eu

MODERATOR

- John Favaro**
Senior Research Analyst at Trust-IT Services

Funded by the European Union

Juncal Alonso, PhD - R&D Engineer at Tecnalía, SWForum.eu Project Coordinator

Juncal is a senior researcher working in the Cloud Technologies projects area of TECNALIA (since 2007). She received her diploma of Master Telecommunication Engineering (BSc) from the University of the Basque Country (Escuela Técnica Superior de Ingeniería - UPV) in 2006. She also obtained a Master's diploma in Local ICT administration (UNED) and the ITIL certification in IT services management and also holds a PhD in Telecommunications, in the Cloud Computing domain. Currently, Juncal belongs to the High-Performance Architecture group in TECNALIA as a specialised researcher on Cloud-based architecture, DevOps and multi-cloud. Her research interests include software engineering for the cloud continuum, secure cloud federation and multi-cloud-enabled software applications. She is currently the coordinator of the PIACERE H2020 RIA action and SWForum H2020 CSA.



Luis Carlos Busquets Pérez - Programme Officer at DG CONNECT, European Commission

Luis C. Busquets Pérez holds a degree in telecommunications engineering (UPC, Barcelona) and a Master's in Business Administration (ESADE, Barcelona). For more than 20 years, his professional career has been developed in the ICT sector covering all OSI layers (from fibre optics and semiconductors to IT applications). Previous to his career in European institutions, he held several positions in marketing and sales for ICT Fortune 500 companies. In 2006, he joined the European Commission services and is currently Programme Officer in DG CONNECT E2, which is the Cloud and Software unit.



John Favaro - Senior Research Analyst at Trust-IT Services, SWForum.eu Communications and Dissemination Officer

John Favaro is a Senior Research Analyst at Trust-IT, where he is responsible for tracking cutting-edge technologies and trends. He has experience in numerous technologies ranging from 5G to automotive engineering, and is currently also an Assistant Editor of IEEE Software Magazine and a member of its Advisory Board. John has degrees in computer science from Yale University and the University of California at Berkeley.



Ferran Diego - Research Scientist on Machine Learning and Deep Learning at Telefonica Research, CHARITY

Ferran Diego is an Associate Researcher on Machine Learning and Deep Learning at Telefonica Research. He received the Higher Engineering in Telecommunications in 2005 from Politechnical University of Catalonia (UPC), the M.Sc. degrees in Language and Speech from Politechnical University of Catalonia and University of Edinburgh in 2005, the M.Sc. degrees in Computer Vision and Artificial Intelligence in 2007, and obtained his Ph.D. degree at Computer Vision Center and Universitat Autònoma de Barcelona in 2011. His main research interests include video alignment, low-level image processing, sensor fusion, machine learning, image retrieval, sparse and redundant representation modelling, structured sparsity and group and probabilistic graphical models for image analysis.



Jesus Luna Garcia - Cloud and AI Cybersecurity at Bosch, MEDINA

Dr. Jesus Luna has worked since 1995 in the field of cybersecurity with both public and private sector organisations in America and Europe and has co-authored more than 50 peer-reviewed publications in that field. Currently, he works for Robert Bosch GmbH (Germany) on topics related to cybersecurity governance for Cloud and AI systems. Since 2019 he has been a member of the ENISA working group developing the upcoming EU Cybersecurity Certification Scheme for Cloud Services (EUCS), and also he technically manages the H2020 MEDINA project on continuous cloud security certification.



Maria Giuffrida - Senior Research Analyst at Trust-IT Services, EUCloudEdgeloT

Maria is a Senior Researcher at Trust-IT, where she is involved in the research, communication and dissemination activities of a multitude of research projects, mainly in the areas of ICT, new technologies, and standardisation. She is the Leader of the Work Package on Communication, Dissemination and Engagement of UNLOCK-CEI, one of the two CSAs coordinating EUCloudEdgeloT together with Open Continuum. She received her Master of Science in International Management from Bocconi University (Italy) in 2014 and a PhD in Management, Economics and Industrial Engineering from Politecnico di Milano (Italy) in 2019, where she also worked as a Postdoctoral Researcher and Assistant Professor until December 2021 focussing on digital innovation technologies (as part of the “Digital Innovation Observatories” group in the Politecnico di Milano School of Management) with special applications to logistics, transportation and supply chain management. She is the author of over 17 journal and conference papers on related topics.



Ray Walshe - Assistant Professor at Dublin City University, HSbooster.eu



Ray is an internationally recognised ICT Standardisation Expert and Senior Researcher in the ADAPT Research Centre at Dublin City University (DCU), IRELAND. He began his career in the industry as a software engineer, software consultant and project manager with LM Ericsson initially, then Software and Systems Engineering Limited and later with Siemens. Joining the School of Computing DCU in 1995 he has taught AI, IoT and Data Governance modules in Undergraduate, Masters, and PhD Programmes. He is Chair of the External Advisory Boards of the StandICT.eu and HSBooster.eu Horizon Europe Projects,

Director of the EU Observatory for ICT Standards and Project Coordinator for StandICT2026, and ELITE-S Fellowship Programme for Emerging Technologies Standardization (Elite-Fellowships.eu). Ray is an International Expert Delegate for Ireland in Artificial Intelligence, IT Governance and Internet of Things Standards.

Appointed in 2020 to the OECD Network of Experts (ONE AI), Appointed to the Board of Directors of the Big Data Value Association (2022), appointed Vice President of the European Academy for Standardisation (2022), member of the EU-U.S. Trade and Technology Council Working Group 1 on ICT Standardisation (2022), and Standards Lead for ADRA (AI, Data and Robotics Association) (2022)



Questions and Answers

Question: Perhaps more than any other area, the 'media' sector has to deal with many different SDOs, with many different approaches. For example, I counted no fewer than seventeen standards you have to monitor in the CHARITY project. How does the media sector cope with this successfully?

Answer: The media sector has to handle and monitor several standards, e.g., codecs, edge/cloud computing, 5G, etc., due to the heterogeneous domain. The main idea is to monitor the most active standards and check the proposed contributions and benefits. This monitoring helps in identifying parts of the standards that need improvement and incorporating the parts that bring an actual benefit. To recap, the media sector has to spend a lot of effort monitoring standards to improve them and also incorporating the latest achievements.



Question: There is a big discussion going on around making open standards which are freely available and not behind paywalls. What is that discussion about and why is it important? Are there other approaches to interoperability possible, such as OSCAL?

Answer: In our MEDINA experience, both open and freely available standards are an enabler for research and innovation. In analogy to the OSS community, the transparent development of standards which are then offered for free to the citizens should trigger EU research's outcomes which are aligned with the industrial state of practice. In consequence, this might accelerate the uptake and sustainability of innovative EU research..



Question: The Continuum is one of the most challenging areas for standardisation because three very distinct contexts – from 'macro' to 'micro' – must interact successfully. Furthermore, it encompasses a vast range of use cases. I counted up to twenty valid sectors in just one of your reports. How can all of this be coordinated among all these many contexts?

Answer: This is indeed one of our main challenges. There are at least two ways that we have identified so far to manage this vastity of contributions. The first one is represented by the cooperation mechanisms provided by the set-up of six distinct task forces, focused on various topics, that help harmonise the discussions among projects in the community around priority themes. More information on such task forces are available here. The second method regards the selection of a defined set of industrial sectors (five at the moment) that we prioritise in order to put a boundary and be able to deep-dive into the main use cases available within or across the identified sectors: manufacturing, agriculture, healthcare, transportation and mobility, energy.



Question: Too many researchers and practitioners alike don't seem to appreciate standards. In the 'old days', standards were even considered boring and stuffy. How can we improve standards awareness and education? Do we need new approaches to standardisation?

Answer: Everyone likes a "happy-ever-after story"! Educators need to both disseminate and evangelise the impact of Standards. Standards are the result of internationally accepted best practice solutions and the key pillar of interoperability for technologies/ tools/ systems/ processes that work on a global scale. There are numerous examples of success stories where companies adopted a strategy of active standardisation development in parallel with their technological developments as part of their business strategy and experienced exponential growth in their businesses. Also, the key contribution of standardisation in the innovation life cycle is



where standardisation provides an agreed “survival of the fittest” winner where competing (and diverse) solutions exist in the market. It quells the chaos that ensues when there is a new technological/industrial revolution and a stable interoperable marketplace needs to be created.

Question: Is there a role for global standards collaboration on the sixteen issues raised in the following article, mindful of the dramatic changes in the ICT ecosystem. Ref. <https://circleid.com/posts/20230203-global-standards-collaboration-is-it-possible>



Answer: From the perspective of EU research projects like H2020 MEDINA (and the upcoming HEC COBALT), I DO hope that there will be a chance to enable such global collaboration to promote open and freely available standards for cybersecurity. As an EU citizen and researcher, I would like to see initiatives like HSBooster and active involvement from the EC in order to bring together a concrete action plan to realise the vision on the 16 issues raised in that article.



Recommendations

A major objective of linking software and standards in Europe is to **ensure that software products and services comply with relevant industry standards and regulations.**

This helps to enhance the interoperability, safety, and security of software systems across different domains, such as healthcare, automotive, aviation, and telecommunications. By linking software and standards, businesses can improve their competitiveness, reduce development costs, and increase the speed of innovation. Additionally, it helps to promote a level playing field for software vendors, prevent vendor lock-in, and facilitate market access for innovative products and services.

Overall, the goal is to **enable European businesses to deliver high-quality software products and services that meet the needs of their customers while adhering to the latest standards and regulations.**

To that end, here are some recommendations that emerged from the SWForum.eu webinar on standardisation.



CHARITY is an EC-H2020 project developing a complete framework for enabling immersive communication, i.e. Virtual Reality or Holography, to support day-to-day business operations, social events, and general lifestyle. CHARITY leverages an innovative cloud architecture that exploits edge solutions, a computing and network continuum autonomous orchestration, application-driven interfacing, mechanisms for smart, adaptive and efficient resource management, community involvement, and compatibility with infrastructure vendors.

1 Multi-access Edge Computing (MEC) offers application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the network. MEC is a natural development in the evolution of mobile base stations and the convergence of IT and telecommunications networking to **enable new vertical business segments and services for consumers and enterprise customers** such as Holographic use cases.



MEDINA is an EC-H2020 project developing a framework for continuous audit-based certification supporting the new EU Cybersecurity Certification Scheme for Cloud Services (EUCS). Our presentation focused on explaining our approach to actively

engage with relevant SDO initiatives, both to influence their development and also to align internal activities to recognized standards areas.

2 **Open and freely available standards are necessary enablers for the adoption and sustainability of EU-research outcomes.** Therefore we invite relevant stakeholders (including policy makers, SDO and industry) to establish the foundations to guarantee that “made in Europe” standards are transparently developed by the community, and also made freely available to citizens. As required, new business models for SDO shall be designed to maintain the high-quality production and expert community engagement in EU standardisation initiatives.



The EUCloudEdgeIoT.eu initiative aims to realise a pathway for the understanding and development of the Cloud, Edge and IoT (CEI) Continuum by promoting cooperation between a wide range of research projects, developers and suppliers, business users and potential adopters of this new technological paradigm. It is a collective effort of various RIAs involved in various

domains across the computing continuum coordinated by two CSAs, Open Continuum, focused on the supply side and UNLOCK-CEI, focused on the demand side.

3 Working on a **common taxonomy for the computing continuum and identifying key use cases** to demonstrate the viability of the continuum “in practice” represent two important priorities of this initiative to which all interested players should contribute. Standards may play a key role in both these objectives. Therefore, strategically liaising with initiatives in this field, like StandICT.eu or HSbooster.eu, as well as with SDOs and experts that can provide training on how to develop standardisation and open source strategies to companies and projects is our way forward and part of our objectives.



HSbooster.eu, a Coordination and Support Action funded by the European Commission under the Horizon Europe framework, aims at boosting the entire European Standardisation dialogue between Horizon 2020 and Horizon Europe projects with corresponding Standards Developing Organisations (SDOs) to increase the European impact on (international) standardisation and strengthen the European competitiveness

4 Increased information sharing by SDOs on the current state-of-the-art in international standardisation. Many standard documents and technical specifications exist behind pay-walls and are not openly accessible due to the business models of some major SDOs. At a minimum, there should be an open API provided by the SDOs/SSOs where summary (not detailed specs) information about their standards (published and under development) can be accessed freely so that regular and accurate Standards Landscape Reports can be generated and maintained.



About the projects



[SWForum.eu](https://swforum.eu) is the European forum of the software research community, promoting best practices and technology transfer opportunities to cross-synergise European excellence.



[CHARITY](#) project aims to develop a framework that takes advantage of novel cloud architecture, a computing and network continuum autonomous orchestration, among others, to overcome the challenges as well as meet the requirements of these applications.



[MEDINA](#) project is an EU funded-research project working in the areas of cloud security performance and audit evidence management and its main goal is to create a Security framework for achieving a continuous audit-based certification in compliance with the EU-wide cloud security certification scheme.



[EUCloudEdgeIoT](#) initiative aims to realise a pathway for the understanding and development of the Cloud, Edge and IoT (CEI) Continuum by promoting cooperation between a wide range of research projects, developers and suppliers, business users and potential adopters of this new technological paradigm.



[HSbooster.eu](#) is increasing the European standardisation impact coming from H2020 & Horizon Europe Research & Innovation projects by designing, launching, and managing a dedicated booster-type initiative.

Software Technologies and Standards: Enabling Interoperability and Innovation

Download the presentation slides and watch the webinar recording

<https://swforum.eu/events/software-technologies-and-standards-enabling-interoperability-and-innovation>

zenodo

[ZENODO Presentation Slide](#)

 @SWforumEU

 @swforumeuproject

 /company/swforumeu/

 swforum.eu



European forum of the software research community - SWForum.eu project has received funding from the European Union's Horizon 2020 - Research and Innovation program - under grant agreement no. 957044.