MEDINA

Deliverable D7.5

Dissemination and Communication Report-v2

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Abstract:	This deliverable presents the dissemination and communication activities followed during the second half of the project (M19-M36) as well as the results from these activities. This report also contains the relevant activities executed to foster a close collaboration with projects related to MEDINA.
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Terms and Abbreviations

AISBL	Association Internationale Sans But Lucratif
AMOE	Assessment and management of organizational evidence
API	Application Programming Interface
AWS	Amazon Web Services
BSI	British Standards Institution
CAB	Conformity Assessment Bodies
CAM	Continuous Automated Monitoring
CEI	Cloud-to-Edge-IoT
CEN CENELEC	European Committee for Electrotechnical Standardization
CERN	Conseil Européen pour la Recherche Nucléaire
CISO	Chief Information Security Officer
CSA	Coordination and Support Actions
CSP	Cloud Service Provider
CSPM	Cloud Security Posture Management tools
DoA	Description of Action
EC	European Commission
ECSO	European Cyber Security Organisation
ENISA	European Union Agency for Cybersecurity
ESG	Expert Stakeholder Group
EUCS	European Cybersecurity Certification Scheme for Cloud Services
GA	Grant Agreement to the project
GCP	Google Cloud
GRC	Governance, Risk and Compliance
IEC	International Electrotechnical Commission
IaaS	Infrastructure as a Service
ICT	Information and Communication Technology
ISO	International Organization for Standardization
KPI	Key Performance Indicator
MTRL	Market & Technology Readiness Level
NCCA	National Certificate Authorities
NeCS	European Network for Cyber Security
NIST	National Institute of Standards and Technology
NLP	Natural Language Processing
ORE	Open Research Europe
OSCAL	Open Security Controls Assessment Language
PaaS	Platform as a Service
RIA	Research and Innovation actions
SaaS	Software as a Service
SC	Standardization Committee
SCCG	Stakeholder Cybersecurity Certification Group
SDO	Standardization Development Organization
SEO	Search Engine Optimization
SSI	Self-Sovereign Identity
SW	Software
SWForum.eu	European forum of the software research community
WG	Working Group
WP	WorkPackage

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Executive Summary

This deliverable (D7.5) is a public report, resulting from the communication and dissemination activities of Work Package 7 - Awareness, Training and Sustainability- and is the second of two deliverables explaining the dissemination and communication activities followed during the reporting periods, as well as the results from these activities. This report also contains the relevant activities executed to foster a close collaboration with projects related to MEDINA, as well as networking plans.

This deliverable is the last of a series of four reports:

- D7.1 MEDINA brochure and public website
- D7.2 Dissemination and Communication Strategy
- D7.4 Dissemination and Communication Report-v1
- D7.5 Dissemination and Communication Report-v2.

The deliverable D7.2 [1] proposed the detailed plan and list of dissemination activities, including mainly the organization of classical dissemination channels such as scientific and professional publications, organization and participation to workshops and events. The deliverable D7.4 [2] described the results of such actions during the first reporting period. This deliverable D7.5 describes the results of those actions during the second reporting period. Almost all the key performance indicators established have been achieved, and in some cases, we have surpassed the target values. The deliverable at hand includes the recommendations implemented in the second reporting period as result of the first project review held in June 2022.

As highlights, the project partners have been accepted 12 conference publications and 1 journal publication. At time of writing, 2 conference publications and 1 journal publication are under submission. Also, the consortium published two press releases in 6 languages (English, Spanish, German, Finnish, Italian ad Slovenian) which have been disseminated in multiple media across Europe, published 84 blog posts, which have been used to bring traffic to the website, and participated in 39 events and clustering activities. The social media profiles have been used following the inbound marketing approach defined in D7.2, using the blog posts, written by all partners, as the core around which the other tools revolve.

Dissemination activities have been performed targeting both scientific and industrial, communities. They have involved the publication of scientific results in journals and conferences, the elaboration of posters, the collaboration with similar projects and initiatives, the participation to -and the MEDINA presentation at- panels, seminars, lectures, and other public events like workshops and webinars, and the collaboration with the Expert Stakeholder Group (ESG), a group of external experts that have accepted to advise the MEDINA consortium for the project lifetime.

Communication activities have been fulfilled with the different project materials used to achieve dissemination, that is, videos, brochures, newsletters, project presentations, posters, and press releases. Other communication actions that have been performed are the publication of blog posts related to the project activities. Furthermore, the impact of social media platforms (Twitter, LinkedIn, YouTube and SlideShare) have also been evaluated with Google analytics tools to monitor their behaviour.

Networking activities have involved cooperation actions with several entities, including other European projects running in the topic of certification, cloud computing and cybersecurity, the Gaia-X initiative, other non-structured and temporal associations such as the future Cloud cluster, and other initiatives like SDOs and ENISA.

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1 Introduction

The focus of Work package 7 - Awareness, Training and Sustainability- is to maximize the impact of the project by ensuring proper communication and dissemination of the project results and subsequently to raise awareness to the scientific, industrial, and general public communities.

1.1 About this deliverable

This document distinguishes between communication, dissemination and networking activities.

First, MEDINA communication activities follow the principle of communication as clear and easy as possible. The communication strategy has been focused on stimulating people to be informed about MEDINA events and promote active participation from them. To this end, the project has gone one step forward with the launch of a series of blogposts published by the partners, which have been used as an inbound marketing tool. Finally, being active and seeking interaction on websites and social networks have also been part of the steps for a good communication activity.

Second, dissemination activities have consisted of scientific articles, general publications, whitepapers, posters, conferences and other events. For the latter, in this document we include the type of the event, partners, country, link or reference to the activity, and so on.

Third, this document reports collaboration and networking activities that open new opportunities up to the potential of exploitation and scientific value of project results.

The initial goals for these activities have been outlined in the DoA and in Deliverable D7.2 [1]. Here, we list and describe the results achieved during the last eighteen months of the project, taking into consideration the KPIs defined and highlighting also possible deviations from what was initially planned.

1.2 Relevant updates since Deliverable 7.4 (M18)

This deliverable is a self-contained document which incrementally updates the content of previous D7.4 [2]. For the sake of readability, the following table summarizes the main changes and updates performed to each one the sections in the present report.

Table 1. Change log for D7.5 with respect to D7.4

Section	Change
Section 2	Overview of the dissemination, communication and networking results for the whole lifetime of the project.
Section 3	Regarding “Brand identity and Dissemination Materials”, we present two new brochures for 2022 and 2023, update the newsletter list, show three new posters, introduce two new press releases (2022 and 2023), and show a new promotional video, new specialized videos, and videos for training activities. We also present the MEDINA merchandising items.
Section 4	In the “Communication Activities” section, we present the updates on the website. The YouTube channel has been updated with training videos and specialized videos. New content has been uploaded to the Slideshare channel. The MEDINA Zenodo community has been created and updated, and the website of a new initiative, EUROSCAL, has been launched. The content of the blog has increased and the dissemination through the LinkedIn and Twitter have been improved. Finally, new Analytics has been defined for the website and the social networks.
Section 5	In the “Dissemination Activities” section, we update the list of scientific,

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Section	Change
	business and general publications (including whitepapers). The same regarding the events in which the partners participated. For completeness, we have also kept the publications and events from the first reporting period. We have also highlighted the nature of the events, specifically, industrial events and training events. We have included collaborations with other projects established in the second half of the project. Finally, we have illustrated the meetings between the consortium and the Expert Stakeholder Group.
Section 6	Regarding networking activities with projects and initiatives similar to MEDINA, Section 6 has been updated by introducing new collaborations initiated in the second period, particularly with the PIACERE, FISHY, and DOME projects and with the initiatives StandICT.eu 2023 and HSBooster.eu in the field of standardization.
Section 7	This Section lists the Dissemination and Communication KPIs, updated to month 36.
Section 8	N.A.

1.3 Document Structure

This document is structured as follows:

- Section 1 provides a general introduction, scope, and structure of this deliverable.
- Section 2 summarises the main results in terms of dissemination, communication, and networking activities.
- Section 3 describes in detail the dissemination material that was created for the project during the second reporting period.
- Section 4 focuses on the MEDINA digital strategy and describes the tools that were intensively used during the second reporting period (project website, blog and social networks).
- Section 5 lists the relevant scientific publications of the MEDINA partners, as well as the seminars, teaching activities, and business dissemination events in which the consortium participated to promote the project. Moreover, the section describes the meetings that took place with the ESG (Expert Stakeholder Group).
- Section 6 describes the networking activities carried out with other European initiatives and projects.
- Section 7 recalls the MEDINA dissemination and communication strategy and outlines alignments and discrepancies between planned strategy and results to date.
- Section 8 concludes this deliverable.

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2 Overall MEDINA Results

This section summarizes the results achieved in terms of communication, dissemination and networking activities in the MEDINA project.

2.1 Communication Results

The outputs created during the three years of the MEDINA project need to be communicated using effective channels according to the specific target audience to be achieved as well as the features of each of these channels.

Different communication channels have been used to facilitate the partners the execution of the project activities, namely web page, blog and social networks. Several dissemination materials have been provided (see Section 3), including press releases, brochures, posters, videos, presentation slides and newsletters, so that the interested parties can achieve the dissemination and networking tasks. In addition, a promotional video has been created that presents the value proposition of the project, who is aimed at, and what its benefits are. The different materials give an overview of the project, its objectives, results and expected impacts to keep the supporters and specialized media informed about the activities executed in the MEDINA project.

One of the challenges faced by MEDINA has been the publication of blog posts with the aim of discussing those topics related to the partners' skills that are being developed in the project activities. Also, within the 'Resources' pages of the website, different dissemination results have been included, such as published scientific papers, posters, whitepapers, or the updated list of submitted public deliverables. Moreover, in the 'Communication' page, is it possible to find press releases, newsletters, presentations and brochures used for the communication work (see Section 4.1).

Social media platforms have been used to reach a wider objective audience. Their use has increased the communication and interaction with our target communities, other research projects, and people in the general public who are enthusiastic about cybersecurity, cloud computing and certification security topics. The selected media have been mainly Twitter and LinkedIn, and to a lesser extent YouTube and SlideShare (see Section 4.2).

MEDINA project has also used Google Analytics to monitor the behaviour of the website, that is, geographical information, audience, acquisition of the traffic channels of the different social networks, etc. This information is relevant to understand the operation and wellness of the different social networks and to evaluate the progress of the MEDINA website (see Section 4.1.3).

2.1 Dissemination Results

In the first eighteen months of the project, we produced and published 3 conference papers. In the second eighteen months of the MEDINA project, we produced and published 9 scientific conference papers and 1 scientific journal paper. Two papers have been submitted for publication in ORE (Open Research Europe), and another has been submitted to scientific journals.

Concerning whitepapers, MEDINA published 6 joint whitepapers that are available on the project website. The list of publications, as well as all the other dissemination results, are reported in Section 5.

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The consortium also participated in several events when the goals and results of the MEDINA project were promoted, such as a Ph.D. Schools, panels, seminars/webinars, workshops and technical discussions workshops.

We had a total of four virtual meetings with the Expert Stakeholder Group. These meetings resulted on rich feedback from the experts.

The consortium started and consolidated liaison activities with related EU projects and initiatives, like the ENISA AdHoc WG on Cloud Security Certification, NIST OSCAL, Cisco CISO Group, HSBooster, StandICT, Google, Gaia-X Community and Federated Services, and the ENISA EUCS Experimentation.

2.2 Networking Results

Networking and collaborating with other projects and initiatives is a crucial activity for a collaborative research project such as MEDINA (see Section 6). During the whole lifetime of the project, networking activities have been carried with other European projects, namely Coordination and Support Actions (CSAs) in the field of Cloud computing and cybersecurity, as well as other Research and Innovation actions (RIAs).

Another target of collaboration has been Gaia-X, which is one of the largest initiatives in the field of cloud services. Several partners of MEDINA are members of the Gaia-X AISBL association and participate actively in Gaia-X working groups since the beginning of 2020.

MEDINA partners have also collaborated in the Future Cloud Cluster, which was created under the umbrella of unit E2 of DG CONNECT of the European Commission, namely in the definition of research roadmaps for the upcoming Horizon Europe work programmes, and the development of a reference architecture for a Cloud Federation.

Finally, it is worth noting the collaboration of MEDINA with Standardization Development Organizations (SDOs) and ENISA, being MEDINA one of the proof-of-concepts that validated the version of December 2020 of the EUCS. Collaboration has also been established with other initiatives such as CEN-CENELEC WG, several ISO Standardization Committees, the NIST OSCAL group, and the SCCG (Stakeholder Cybersecurity Certification Group).

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3 Brand Identity and Dissemination Materials

Branding is essential to augment visibility and attention of a project. This section describes the communication materials that have been created to establish the MEDINA brand identity, with the aim of ensuring that all documents produced in the project, including reports, brochures, posters, presentation slides, and newsletters, have a professional and homogeneous view. These materials have been updated during the project progress.

During this second reporting period, the project has prepared several kinds of dissemination material in line with the plan defined in Deliverable D7.2 [1]. The main materials that have been prepared are presented along this section.

3.1 Brochures

Brochures aim to raise awareness of the project and provide brief and thematic information. They have been distributed at events and fairs with the purpose of giving an overview of the project, its objectives, results and expected impacts.

The first MEDINA brochure was designed in 2021 and documented in Deliverable D7.4 [2]. It summarized the main milestones, key results, approach, benefits and use cases of MEDINA.

The evolution and advances in the project made it necessary to update the information and generate a second version of the brochure with the progress made. The second MEDINA brochure was released in 2022, contains four pages (see Figure 1) and provides information on the project's goal, building blocks, benefits, use cases and consortium.

The third MEDINA brochure was finally released in October 2023 and shows the final results of the project. This brochure contains four pages (see Figure 2) and provides information on MEDINA workflows, benefits and first success stories.

All MEDINA brochures are available on the MEDINA web site[1] and have been disseminated through the project's different social media channels, as well as in the conference booths and at training and dissemination events in which the consortium has participated.

[1] Please refer to https://medina-project.eu/communication-materials/

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Figure 1. MEDINA Brochure 2022

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Figure 2. MEDINA Brochure 2023

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3.2 Newsletters

The project newsletter is a communication channel used to keep project supporters informed about key activities and achievements related to the project. MEDINA planned the release of one newsletter per year, but finally five newsletters have been released, four of them during the second half of the project.

- January 2022 Newsletter
- September 2022 Newsletter (see Figure 3)
- February 2023 Newsletter (see Figure 4)
- June 2023 Newsletter (see Figure 5)
- October 2023 Newsletter (see Figure 6)

The newsletters are structured as follows:

- General introduction to the project: project goal and results and where these will be validated.
- Information about activities related to Certification and Standardization.
- Information about the different meetings held.
- Information about publications.
- Information about relevant events attended where MEDINA outcomes were presented.

All the newsletters have been published on the project website[2] and sent to the project email list.

[2] Please refer to https://medina-project.eu/communication-materials/

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MEDINA

HOME ABOUT US USE CASES PARTNERS OPEN RESEARCH RESOURCES BLOG

HOME > COMMUNICATION MATERIALS > 2022 NEWSLETTER

September 2022 Newsletter

Security framework to achieve a continuous audit-based certification in compliance with the EU-wide cloud security certification scheme

WELCOME TO THE SECOND EDITION OF MEDINA NEWSLETTER!!!

September 2022

This newsletter is a publication of the MEDINA Project. Its goal is to provide information about the project activities and to showcase the project achievements. The objective of the Horizon 2020 MEDINA project is to provide access to secure, real-time certified cloud computing. In the future, the MEDINA platform that has been developed by the European project partners strife for enabling continuous certification through a series of efficient tools. This is based on the European Cybersecurity Certification Scheme for Cloud Services (EUCS), which has been addressed in the project by means of uniform "assessment rules" – measures, metrics, and measurement procedures. With continuous audits, we can ensure better overall security than with point-in-time audits. +info

Two use cases are being implemented: European Certification of Multi-cloud backends for IoT Solutions by Bosch and Continuous Audit of SaaS Solutions for the Public Sector by Fabasoft. +info

Exploitation & Standardization

As part of the Standardization activities, MEDINA has provided feedback to the ISO/IEC 27017 standard on continuous (automated) monitoring.

+info

MEDINA has also started to collaborate with the StandICT.eu 2023 project to reinforce European standardisation efforts in the cloud security certification field.

+info

Regarding exploitation, MEDINA has participated in a Horizon Results Booster event organized by the European Commission

Meetings

MEDINA celebrated its sixth General Assemble in May, which was attended online by all partners.

+info

Also in May, MEDINA organized a meeting with its Expert Stakeholder Group to share the research and innovation actions on continuous and automated cloud certification carried out in the project

+info

Publications

The whitepaper "An architecture proposal for the MEDINA framework" and several papers have been published in 2022.

- Kunz, I., & Binder, A. (2022, May). **Application-Oriented Selection of Privacy Enhancing Technologies.**
- Kunz, I., Schneider, A., & Banse, C. (2022). **A Continuous Risk Assessment Methodology for Cloud Infrastructures.**

+info

A new MEDINA brochure has been designed and is also available on the web site.

+info

Dissemination

MEDINA has been present at several events where the project has been disseminated.

ISACA GRC Kongress 2022

+info

ENISA Cybersecurity Certification Week

+info

Roundtable at the InfoSecurity Europe 2022

+info

ENISA Cybersecurity Certification Week

+info

Figure 3. MEDINA Newsletter September 2022

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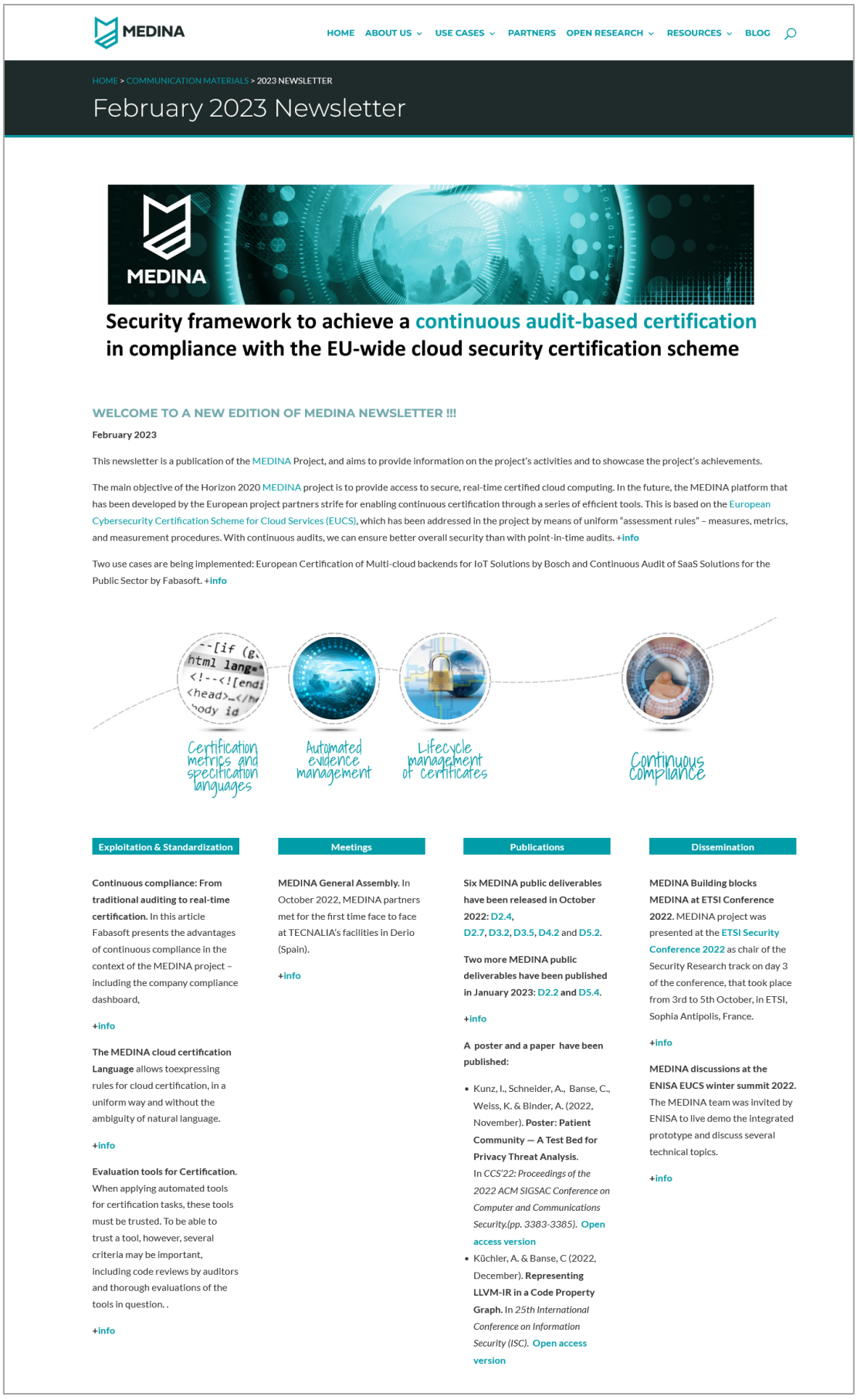

MEDINA

HOME ABOUT US USE CASES PARTNERS OPEN RESEARCH RESOURCES BLOG

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February 2023 Newsletter

Security framework to achieve a continuous audit-based certification in compliance with the EU-wide cloud security certification scheme

WELCOME TO A NEW EDITION OF MEDINA NEWSLETTER !!!

February 2023

This newsletter is a publication of the MEDINA Project, and aims to provide information on the project's activities and to showcase the project's achievements.

The main objective of the Horizon 2020 MEDINA project is to provide access to secure, real-time certified cloud computing. In the future, the MEDINA platform that has been developed by the European project partners strife for enabling continuous certification through a series of efficient tools. This is based on the European Cybersecurity Certification Scheme for Cloud Services (EUCS), which has been addressed in the project by means of uniform "assessment rules" – measures, metrics, and measurement procedures. With continuous audits, we can ensure better overall security than with point-in-time audits. +info

Two use cases are being implemented: European Certification of Multi-cloud backends for IoT Solutions by Bosch and Continuous Audit of SaaS Solutions for the Public Sector by Fabasoft. +info

Exploitation & Standardization

Continuous compliance: From traditional auditing to real-time certification. In this article Fabasoft presents the advantages of continuous compliance in the context of the MEDINA project – including the company compliance dashboard,

+info

The MEDINA cloud certification Language allows toexpressing rules for cloud certification, in a uniform way and without the ambiguity of natural language.

+info

Evaluation tools for Certification. When applying automated tools for certification tasks, these tools must be trusted. To be able to trust a tool, however, several criteria may be important, including code reviews by auditors and thorough evaluations of the tools in question. .

+info

Meetings

MEDINA General Assembly. In October 2022, MEDINA partners met for the first time face to face at TECNALIA's facilities in Derio (Spain).

+info

Publications

Six MEDINA public deliverables have been released in October 2022: D2.4, D2.7, D3.2, D3.5, D4.2 and D5.2.

Two more MEDINA public deliverables have been published in January 2023: D2.2 **and** D5.4.

+info

A poster and a paper have been published:

- Kunz, I., Schneider, A., Banse, C., Weiss, K. & Binder, A. (2022, November). **Poster: Patient Community — A Test Bed for Privacy Threat Analysis.** In *CCS'22: Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security.(pp. 3383-3385).* Open access version
- Küchler, A. & Banse, C (2022, December). **Representing LLVM-IR in a Code Property Graph.** In *25th International Conference on Information Security (ISC).* Open access version

Dissemination

MEDINA Building blocks MEDINA at ETSI Conference 2022. MEDINA project was presented at the ETSI Security Conference 2022 as chair of the Security Research track on day 3 of the conference, that took place from 3rd to 5th October, in ETSI, Sophia Antipolis, France.

+info

MEDINA discussions at the ENISA EUCS winter summit 2022. The MEDINA team was invited by ENISA to live demo the integrated prototype and discuss several technical topics.

+info

Figure 4. MEDINA Newsletter February 2023

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June 2023 Newsletter

MEDINA

Security framework to achieve a continuous audit-based certification in compliance with the EU-wide cloud security certification scheme

WELCOME TO A NEW EDITION OF MEDINA NEWSLETTER !!!

June 2023

This newsletter is a publication of the MEDINA Project, and aims to provide information on the project's activities and to showcase the project's achievements.

The main objective of the Horizon 2020 MEDINA project is to provide access to secure, real-time certified cloud computing. In the future, the MEDINA framework that has been developed by the European project partners strife for enabling continuous certification through a series of efficient tools. Certification is based on the European Cybersecurity Certification Scheme for Cloud Services (EUCS), which has been addressed in the project by means of uniform "assessment rules" – measures, metrics, and measurement procedures. With continuous audits, we can ensure better overall security than with point-in-time audits. +info

Two use cases are being implemented in MEDINA : European Certification of Multi-cloud backends for IoT Solutions by Bosch, and Continuous Audit of SaaS Solutions for the Public Sector by Fabasoft. +info

With only four months left in the project, MEDINA is finalizing the work on integration and validation actions, and is defining sustainability activities for the project outcomes.

Certification & Standardization

Second release of the MEDINA framework. A second version of the MEDINA integrated solution with increased functionalities, compared to the initial prototype at M15, has been released. +info

- Catalogue of Controls and Metrics +info
- Continuous Certification Evaluation +info
- Cloud Security Certification Language +info
- Risk Assessment +info

MEDINA Standardization presented at the SWForum webinar. During the SWForum webinar on "Software Technologies and Standards" on 21 February 2023, Jesus Luna (Bosch) discussed the project's approach to an effective and efficient standardization engagement.+info

MEDINA standardization activities presented at the CYRENE workshop. MEDINA participated (as invited project) in the CYRENE standardization workshop on cybersecurity and supply chain security, focusing on our standardization activities. +info

EUROSCAL previewed at flagship ENISA and NIST events on cloud cybersecurity and certification. EUROSCAL is one of the concrete exploitation results from MEDINA, where an EU-based community of enthusiastic participants will voluntarily exchange know-how and guidelines for supporting the use of NIST OSCAL in topics like EUCS. +info

Meetings

MEDINA consortium met for the 8th GA face to face meeting in Linz. MEDINA partners joined in the 8th General Assembly on 1 and 2 March 2023. The two days duration meeting was organized by Fabasoft and took place in Linz, inside one of the buildings of the Tabakfabrik Linz site. +info

Third Expert Stakeholder Group Meeting. A new edition of MEDINA's Expert Stakeholder Group online meeting took place on 25 April 2023, with the goal of presenting our approach to a couple of interesting aspects of the project, namely the Catalogue of Metrics and Controls, and MEDINA's Standardization Roadmap. +info

9th GA in Ljubliana (Slovenia). MEDINA consortium joined during the 9th General Assembly on 13 and 14 June 2023. We met together to work on finalising the project activities and starting to prepare everything for the project`s successful conclusion. +info

Publications

Six MEDINA public deliverables have been released in April 2023: D2.5, D2.8, D3.3, D3.6, D4.3 and D4.5. +info

Publications produced in the context of the MEDINA project. Two papers have been published:

- Security in DevSecOps: Applying Tools and Machine Learning to Verification and Monitoring Steps. Open access version
- Runtime security monitoring by an interplay between rule matching and deep learning-based anomaly detection on logs. Open access version

BSc theses produced in the context of the MEDINA project. Two BSc theses produced by Bosch's students in the context of our MEDINA project. +info

Dissemination

MEDINA Lecture at the NECS-PhD Winter school 2023. Our project had the chance to participate on the NECS – PhD Winter School (https://necs-winterschool.disi.unitn.it/) on 6 February 2023, with an invited lecture entitled "MEDINA – Paving the road towards continuous audit-based certification for cloud services in Europe", given by Jesus Luna Garcia (Bosch). +info

Bitkom meeting on Continuous Monitoring. MEDINA partners Fraunhofer AISEC (Christian Banse) and Bosch (Jesus Luna) participated on 15 March 2023 in the virtual meeting organized by Bitkom (https://www.bitkom.org/) on the topic of continuous monitoring. +info

Automated Certification at the ENISA AI Cybersecurity Conference 2023. During the ENISA AI Cybersecurity Conference, our MEDINA partner Bosch (represented by Jesus Luna) advocated about the need to introduce automated processes for the cybersecurity assessment of AI systems as a way to make more efficient any upcoming certification scheme. +info

Figure 5. MEDINA Newsletter June 2023 Newsletter

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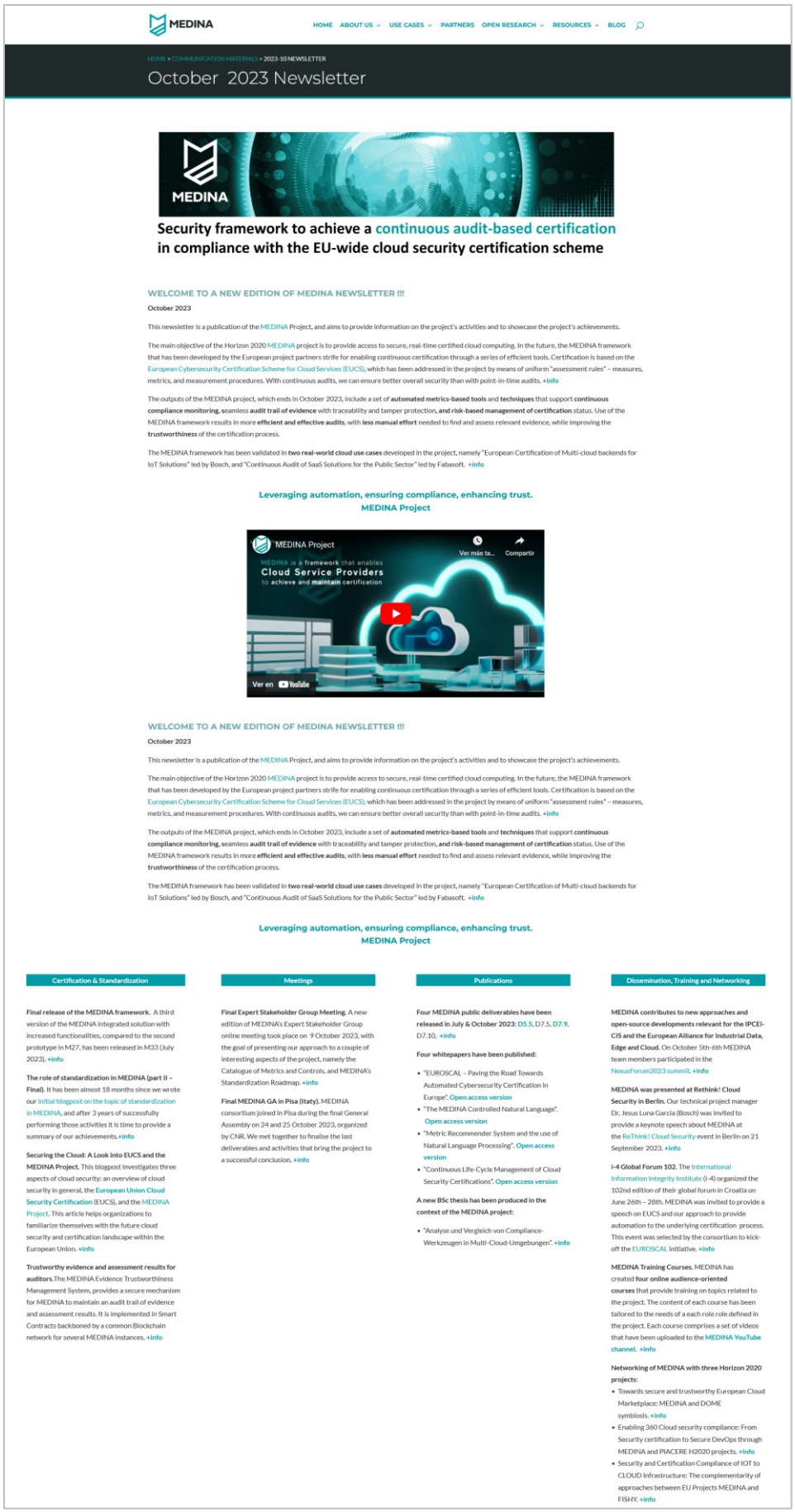

Figure 6. MEDINA October 2023 Newsletter

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3.3 General Presentation

The MEDINA presentation slides are part of the project's dissemination tools and have been designed to be used by all partners when presenting the project results at events and meetings. This presentation has been continuously updated during the project and has been complemented with more dedicated and specialized ones.

The general presentation (see Figure 7), includes an overview of the project, background, objectives, focus, goal, partners and contact information. The full content of the presentation can be found in *APPENDIX A: Project Presentation Slides*.

The general presentation, as well as any other presentation generated for events, have been uploaded to SlideShare[3].

Figure 7. MEDINA General Presentation

3.4 Posters

The aim of the MEDINA's posters is to create recognition at the different events, conferences and workshops used for the dissemination of the project results.

During the first half of the project a poster titled "Assessment and Management of Organisational Evidence – AMOE" was created describing the main features of the AMOE tool. During the second half of the project three more posters were created.

- The poster "Patient Community – A Test Bed for Privacy Threat Analysis" (see Figure 8) describes a test bed that encourages researchers and practitioners to develop and test privacy analysis tools. It can be used for educational purposes, as well as a basis for discussion about the code and deployment-level analysis of privacy weaknesses.
- The poster "Towards Generalized Security & Compliance Assessment of Programs" (see Figure 9) describes Graph-based approaches for finding patterns in source code of cloud applications. It can be used to model different levels of compliance in code, from best-practices, use-case specific standards up to high level security catalogues.
- The poster "Trustworthy Blockchain based-tools for auditors in a certification process" (see Figure 10) describes two Blockchain-based tools that provide enhanced trustworthy information to auditors. The "Evidence and Assessment Results Trustworthiness system" maintains an audit trail of the information, also providing integrity proofs; and the "Self-Sovereign Identity Framework" proves certificate status through verifiable credentials.

[3] Please refer to https://es.slideshare.net/MEDINAContinuousclou

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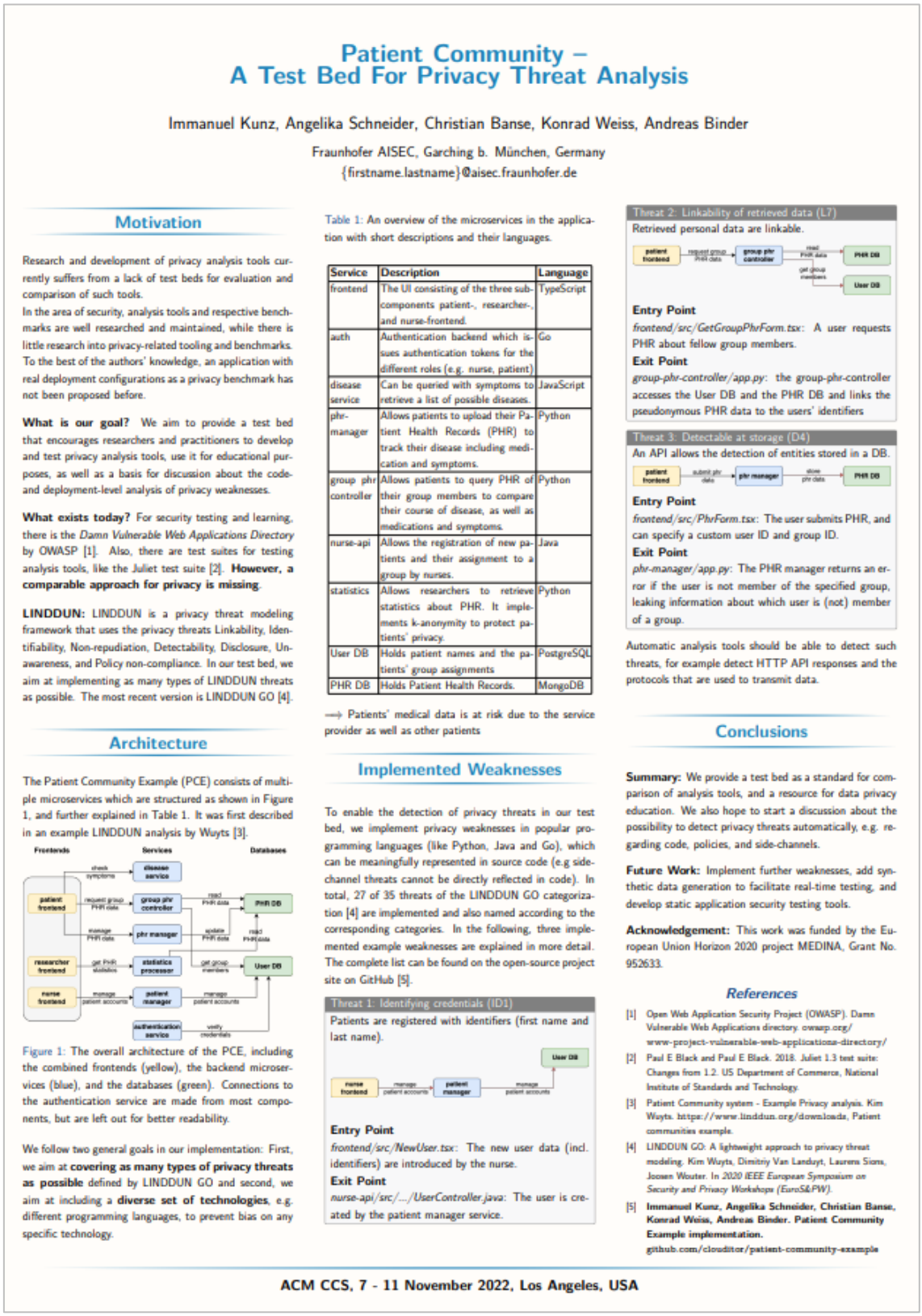
All the posters are available on the "Publications" section of the MEDINA web site[4].



Patient Community – A Test Bed For Privacy Threat Analysis

Immanuel Kunz, Angelika Schneider, Christian Banse, Konrad Weiss, Andreas Binder

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{firstname.lastname}@aisec.fraunhofer.de

Motivation

Research and development of privacy analysis tools currently suffers from a lack of test beds for evaluation and comparison of such tools.
In the area of security, analysis tools and respective benchmarks are well researched and maintained, while there is little research into privacy-related tooling and benchmarks. To the best of the authors' knowledge, an application with real deployment configurations as a privacy benchmark has not been proposed before.

What is our goal? We aim to provide a test bed that encourages researchers and practitioners to develop and test privacy analysis tools, use it for educational purposes, as well as a basis for discussion about the code- and deployment-level analysis of privacy weaknesses.

What exists today? For security testing and learning, there is the *Damn Vulnerable Web Applications Directory* by OWASP [1]. Also, there are test suites for testing analysis tools, like the Juliet test suite [2]. **However, a comparable approach for privacy is missing.**

LINDDUN: LINDDUN is a privacy threat modeling framework that uses the privacy threats Linkability, Identifiability, Non-repudiation, Detectability, Disclosure, Unawareness, and Policy non-compliance. In our test bed, we aim at implementing as many types of LINDDUN threats as possible. The most recent version is LINDDUN GO [4].

Architecture

The Patient Community Example (PCE) consists of multiple microservices which are structured as shown in Figure 1, and further explained in Table 1. It was first described in an example LINDDUN analysis by Wuyts [3].

Figure 1: The overall architecture of the PCE, including the combined frontends (yellow), the backend microservices (blue), and the databases (green). Connections to the authentication service are made from most components, but are left out for better readability.

We follow two general goals in our implementation: First, we aim at **covering as many types of privacy threats as possible** defined by LINDDUN GO and second, we aim at including a **diverse set of technologies**, e.g. different programming languages, to prevent bias on any specific technology.

Table 1: An overview of the microservices in the application with short descriptions and their languages.

Service	Description	Language
frontend	The UI consisting of the three subcomponents patient-, researcher-, and nurse-frontend.	TypeScript
auth	Authentication backend which issues authentication tokens for the different roles (e.g. nurse, patient)	Go
disease service	Can be queried with symptoms to retrieve a list of possible diseases.	JavaScript
phr-manager	Allows patients to upload their Patient Health Records (PHR) to track their disease including medication and symptoms.	Python
group phr controller	Allows patients to query PHR of their group members to compare their course of disease, as well as medications and symptoms.	Python
nurse-api	Allows the registration of new patients and their assignment to a group by nurses.	Java
statistics	Allows researchers to retrieve statistics about PHR. It implements k-anonymity to protect patients' privacy.	Python
User DB	Holds patient names and the patients' group assignments	PostgreSQL
PHR DB	Holds Patient Health Records.	MongoDB

⟶ Patients' medical data is at risk due to the service provider as well as other patients

Implemented Weaknesses

To enable the detection of privacy threats in our test bed, we implement privacy weaknesses in popular programming languages (like Python, Java and Go), which can be meaningfully represented in source code (e.g side-channel threats cannot be directly reflected in code). In total, 27 of 35 threats of the LINDDUN GO categorization [4] are implemented and also named according to the corresponding categories. In the following, three implemented example weaknesses are explained in more detail. The complete list can be found on the open-source project site on GitHub [5].

Threat 1: Identifying credentials (ID1)

Patients are registered with identifiers (first name and last name).

Entry Point
frontend/src/NewUser.tsx: The new user data (incl. identifiers) are introduced by the nurse.
Exit Point
nurse-api/src/.../UserController.java: The user is created by the patient manager service.

Threat 2: Linkability of retrieved data (L7)

Retrieved personal data are linkable.

Entry Point
frontend/src/GetGroupPhrForm.tsx: A user requests PHR about fellow group members.
Exit Point
group-phr-controller/app.py: the group-phr-controller accesses the User DB and the PHR DB and links the pseudonymous PHR data to the users' identifiers

Threat 3: Detectable at storage (D4)

An API allows the detection of entities stored in a DB.

Entry Point
frontend/src/PhrForm.tsx: The user submits PHR, and can specify a custom user ID and group ID.
Exit Point
phr-manager/app.py: The PHR manager returns an error if the user is not member of the specified group, leaking information about which user is (not) member of a group.

Automatic analysis tools should be able to detect such threats, for example detect HTTP API responses and the protocols that are used to transmit data.

Conclusions

Summary: We provide a test bed as a standard for comparison of analysis tools, and a resource for data privacy education. We also hope to start a discussion about the possibility to detect privacy threats automatically, e.g. regarding code, policies, and side-channels.

Future Work: Implement further weaknesses, add synthetic data generation to facilitate real-time testing, and develop static application security testing tools.

Acknowledgement: This work was funded by the European Union Horizon 2020 project MEDINA, Grant No. 952633.

References

[1] Open Web Application Security Project (OWASP). Damn Vulnerable Web Applications directory. owasp.org/www-project-vulnerable-web-applications-directory/
[2] Paul E Black and Paul E Black. 2018. Juliet 1.3 test suite: Changes from 1.2. US Department of Commerce, National Institute of Standards and Technology.
[3] Patient Community system - Example Privacy analysis. Kim Wuyts. https://www.linddun.org/downloads, Patient communities example.
[4] LINDDUN GO: A lightweight approach to privacy threat modeling. Kim Wuyts, Dimitriy Van Landuyt, Laurens Sion, Jeroen Wouter. In *2020 IEEE European Symposium on Security and Privacy Workshops (EuroS&PW)*.
[5] **Immanuel Kunz, Angelika Schneider, Christian Banse, Konrad Weiss, Andreas Binder. Patient Community Example implementation.** github.com/clouditor/patient-community-example

ACM CCS, 7 - 11 November 2022, Los Angeles, USA

Figure 8. Poster "Patient Community – A Test Bed for Privacy Threat Analysis"

[4] Please refer to https://medina-project.eu/publications/

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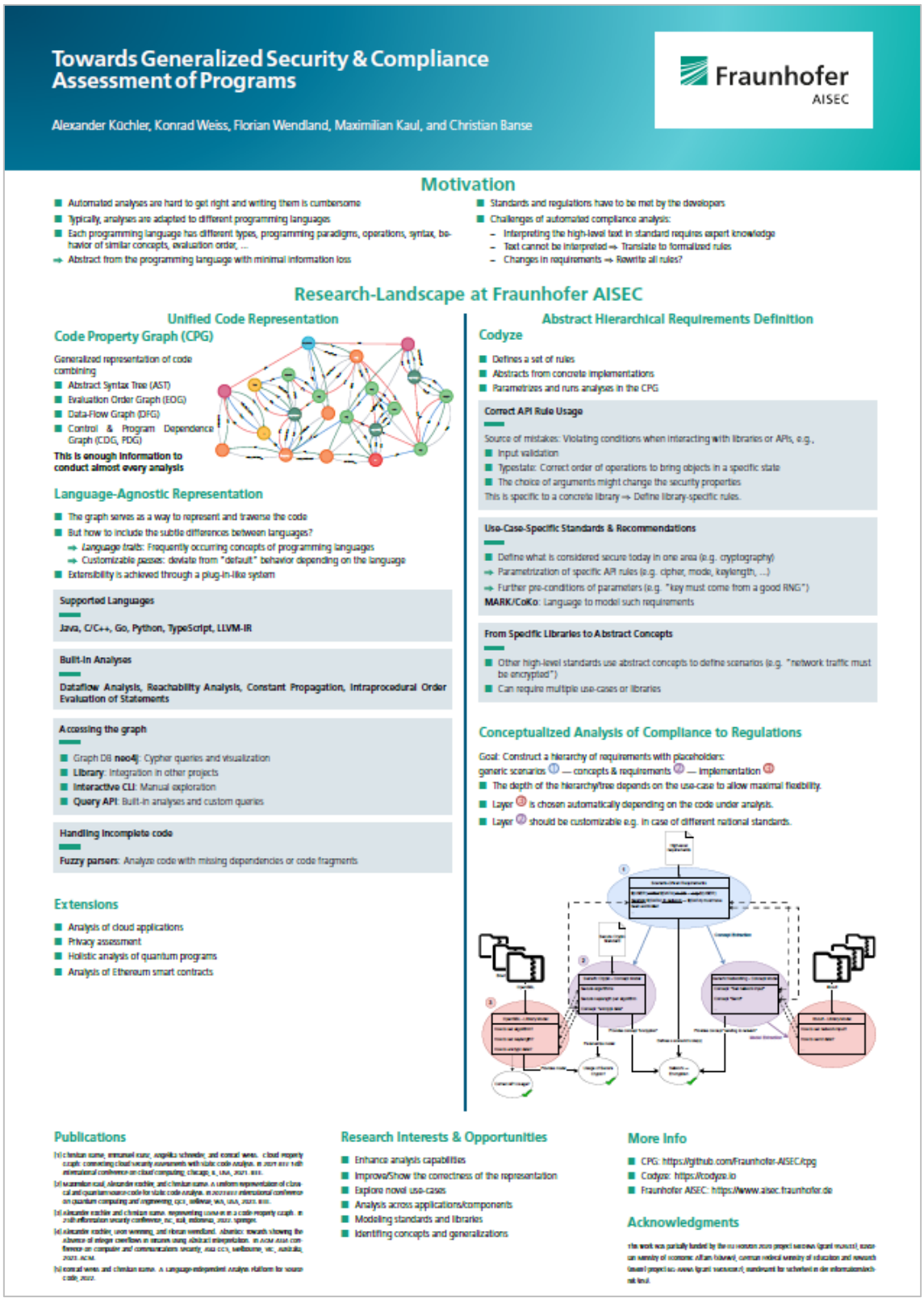

Figure 9. Poster "Towards Generalized Security & Compliance Assessment of Programs"

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MEDINA

Security framework to achieve a continuous audit-based certification in compliance with the EU-wide cloud security certification scheme

Authors
Cristina Regueiro, Aitor Gómez, Santiago de Diego, Borja Urquizu (TECNALIA)

Trustworthy Blockchain based-tools for auditors in a certification process

Introduction

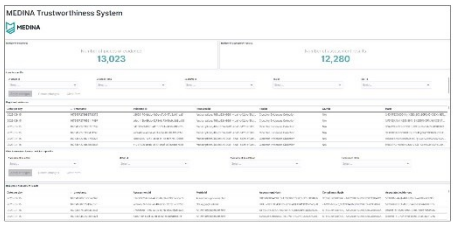
MEDINA project aims to develop an automatic **framework for continuous evidence-based auditing to achieve EUCS certification compliance in an easy way.** However, automatic tools also need to be trustworthy to **enhance objectivity, accuracy, efficiency, and consistency while reducing risks**. They help auditors and organizations maintain the credibility of the certification process and support ongoing improvement efforts.

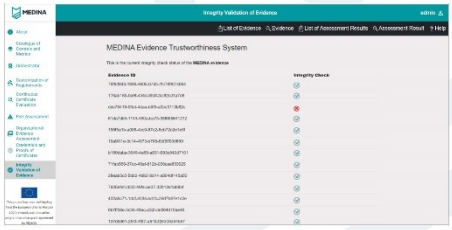
MEDINA considers the use of the **Blockchain** technology as a secure backbone as it is valuable in trusted systems because of its ability to provide data **immutability, transparency, security, decentralisation and resistance to tampering**, which contributes to the reliability and integrity of the MEDINA framework. There are two components in MEDINA which provide enhance trustworthy information for auditors.

MEDINA Evidence and Assessment Results Trustworthiness System

The **MEDINA Evidence Trustworthiness Management System**, provides a secure mechanism to maintain an audit trail of evidence and assessment results. It is implemented in **Smart Contracts** backboned by a **Blockchain network**, providing the following functionalities:

- It includes the logic to **provide the required information to be audited** (about evidence and assessment results).
- It provides **long-term information recording**, creating a secure record of information on a verifiable (**verification**), permanent (**traceability**) and resistant to modification (**integrity**) way.
- It includes the logic for external users to **access audited information** (about evidence and assessment results) **in a graphical and user-friendly way**.
- It provides a **trustworthy records for auditors** to be able to perform **manual or automated inspections** when needed while guaranteeing the integrity of information.

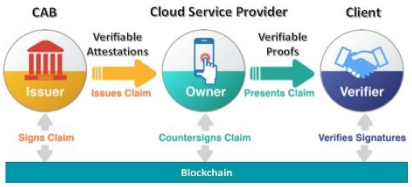


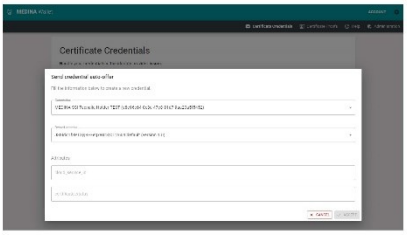


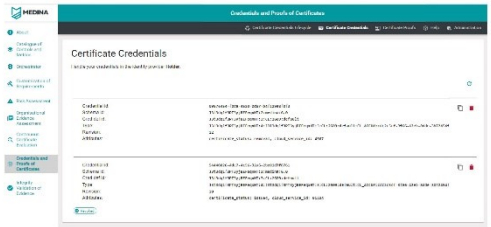
MEDINA Self Sovereign Identity Framework

The **MEDINA Self Sovereign Identity (SSI) Framework** provides a secure mechanism for Cloud Service Providers (CSPs) to **prove the certification status** of their cloud services according to the Certification Authority Board (CAB) issuance. It is composed of four main components:

- **Issuer:** It creates, signs and issues verifiable credentials with the cloud service certification status. The CAB will be the trusted authority acting as issuer of the conformity assessment result reports.
- **Owner:** It refers to the CSP; it locally owns, stores and controls the credentials about his cloud services. It also generates verifiable proofs of the certification status based on the own verifiable credentials.
- **Verifier**: It refers to an external user or auditor who needs to identify cloud service certification status based on verifiable credentials issued by trusted issuers.
- **Blockchain:** It is the secure global repository for public key identifiers in SSI, needed for the signatures' validation. It provides trust, integrity and availability.







tecnalia

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952633

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https://www.linkedin.com/groups/12486585/
https://www.slideshare.net/MEDINAContinuousclou

Figure 10. Poster " Trustworthy Blockchain based-tools for auditors in a certification process"

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3.5 Press Releases

The aim of the MEDINA press releases is to promote the downloading of project results. It is also a means of dissemination, so that specialized media can learn about the work being developed in the MEDINA project.

The first MEDINA press release was published in April 2022, i.e. during the first reporting period. This press release was translated into the partners' official languages, as reported in Deliverable D7.4 [2].

During the second reporting period, a new MEDINA press release informing about the signature of a MoU (Memorandum of Understanding) between MEDINA and StandICT.eu 2023[5] projects was published in September 2022 (see Figure 11).

The final MEDINA press release was published in October 2023 (see Figure 12). This press release has been translated into the partners' official languages, namely Finish, German, Italian, Slovenian, and Spanish, in order to be disseminated by the partners in their countries. See *APPENDIX B: Final Press Release in different languages*.

All press releases and their versions have been uploaded and are available on the project website [6].

[5] Please refer to https://www.standict.eu/
[6] Please refer to https://medina-project.eu/communication-materials

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PISA – Italy, 29.08. 2022 - StandICT.eu 2023 & MEDINA kick-off their collaboration with an MoU to reinforce European standardisation efforts in the cloud security certification field

StandICT.Eu 2023 is a European initiative supporting the EU engagement in international ICT standardisation. It has two key axes; firstly, it funds European fellowships in ICT standardisation through a series of Open calls providing a total of almost 3M€ of funding. Secondly, it operates the European Observatory for ICT Standardisation (EUOS) that is an interactive online ecosystem including an up-to-date standards repository as well as working groups sharing insights about ongoing standardisation efforts across different initiatives and domains. StandICT.eu 2023 focuses on horizontal and vertical ICT fields as defined in the Rolling Plan for ICT Standardisation.

MEDINA is an EU funded-research project that aims to provide a holistic framework that enhances cloud customers' control and trust in consumed cloud services, by supporting Cloud Service Providers (IaaS, PaaS and SaaS providers) towards the successful achievement of a continuous certification aligned to the EU Cybersecurity Act (EU CSA). The proposed framework will comprise tools, techniques, and processes supporting the continuous auditing and certification of cloud services where security and accountability are measurable by design. As the MEDINA framework is leveraged into a cloud supply chain, it continuously supports the assessment of the efficiency and effectiveness of security measures to ultimately achieve and maintain a certification.

"The collaboration with the StandICT.eu project will represent a great opportunity to enhance the impact of both projects on the standardization field, and to benefit from each other's achievements. The ICT Standards repository and the HSbooster project that shares synergies with StandICT.eu 2023 will further complement the standardisation activities in MEDINA, and will allow us to explore possible cooperation with other cybersecurity projects with which StandICT.eu has relationships"

Cristina Martínez, Project Manager of MEDINA

"We are looking forward to cooperating together to enrich our projects' results and provide benefits to our respective extensive networks of stakeholder communities. The framework MEDINA is developing matches perfectly StandICT.eu ultimate goal which is to facilitate and support standardisation activities and the digital transformation of European companies"

Francesco Osimanti, Vice- Coordinator of StandICT.eu 2023

The two projects will collaborate hand in hand to provide mutual visibility to all the outreach activities that will be organised around efforts on the Cloud Cybersecurity and Cloud Certification as well as contributions to ICT Standards, including use cases and success stories.

The projects will also cooperate on activities connected to the StandICT.eu 2023's "EUOS – European Observatory for ICT Standardisation", including the population of the StandICT.eu ICT Standards Repository and providing mutual support in creating synergies with other projects and initiatives active in the ICT standardisation domain.

Figure 11. Press release informing about the signature of a MoU between MEDINA and StandICT.eu

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Press Release

MEDINA

MEDINA: Security framework to achieve a continuous audit-based certification in compliance with the EU-wide cloud security certification scheme

Bilbao, Spain, October 2023

MEDINA is an EU-funded initiative that enables Cloud Service Providers (CSP) to achieve a **continuous audit-based certification** in compliance with the EU Cloud Security Certification Scheme (EUCS). In a nutshell, the MEDINA framework consists of tools, techniques, and processes supporting the continuous auditing-based certification of cloud services, where security is measurable by design.

The **main objective** of MEDINA is to provide an automated framework that facilitates Cloud Service Providers (IaaS, PaaS and SaaS providers) in the process to achieve an EUCS certification, with the aim of enhancing stakeholders' control and trustworthiness in consumed cloud services.

Achieving and maintaining EUCS certification can be a complex, expensive and time-consuming process, mainly due to the amount of manual work involved in the assessment process. The outputs of the MEDINA project, which ends in October 2023, include a set of **automated metrics-based** tools and techniques that support **continuous compliance monitoring,** seamless **audit trail of evidence** with traceability and tamper protection, and risk-based management of **certification** status. Use of the MEDINA framework results in more **efficient and effective audits**, with less manual effort needed to find and assess relevant evidence, while improving the **trustworthiness** of the certification process.

The MEDINA framework has been validated in **two real-world cloud use cases** developed in the project, namely "European Certification of Multi-cloud backends for IoT Solutions" led by Bosch, and "Continuous Audit of SaaS Solutions for the Public Sector" led by Fabasoft. On one hand, the Bosch use case leverages the MEDINA framework in a multi-cloud architecture (IaaS, PaaS and SaaS) using the MEDINA Integrated User Interface in a testbed comprising a set of resources deployed on two cloud hyperscalers. On the other hand, the Fabasoft use case leverages the MEDINA framework's APIs (Application Programming Interfaces), to integrate the components into an in-house solution for the purpose of achieving continuous cloud certification.

Standardization in MEDINA has also played a key role in both supporting adoption of the overall framework (interoperability) and enabling the sustainability of the project's key results. MEDINA has influenced the development of the forthcoming EUCS certification scheme, in particular the requirements related to automated cyber security compliance monitoring. Contributions around EUCS, metrics, and automation have also been made to relevant standardization bodies such as ENISA, ISO/IEC, US NIST, ETSI, and CEN CENELEC.

The MEDINA outcomes, published as open source, will serve as baseline for **future research** (such as the follow up Horizon Europe projects EMERALD and COBALT), and the community-driven initiative EUROSCAL, launched by MEDINA as a mean to leverage NIST's OSCAL (Open Security Controls Assessment Language) in Europe.

The MEDINA **consortium** (TECNALIA, Bosch, CNR, Fabasoft, FhG, HPE, Nixu and XLAB), led by TECNALIA, has been supported by a group of experts that constitute the project's **External Advisory Board.** The entire team has contributed to making MEDINA achieve the expected results, contributing to the European Cloud Security Certification policy, enhancing the trustworthiness of cloud services through compliance with security certification schemes, cooperating with relevant stakeholders, and helping Europe prepare for the cloud security challenges of tomorrow.

Leveraging automation, ensuring compliance, enhancing trust.

MEDINA project

Project Website
https://www.medina-project.eu/

Twitter
https://twitter.com/MedinaprojectEU

LinkedIn
https://www.linkedin.com/groups/12486585/

Zenodo
https://zenodo.org/communities/medina

Youtube
https://www.youtube.com/@MedinaprojectEU

Breaking news and info available at https://medina-project.eu

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Figure 12. MEDINA Press release October 2023 (English version)

3.6 Showcases

During the second reporting period, MEDINA has produced a **promotional video** that presents the value proposition of the project, who is aimed at, and what its benefits are. The MEDINA project video has been uploaded to the MEDINA YouTube channel[7], and is also accessible through the carousel on the MEDINA website homepage[8] (see Figure 15) and the "Communication" page[9] (see Figure 19).

The aim of the promotional video is to approach the most complicated target in this kind of technical projects, the general public. To work on the design of the video, a small team was created in MEDINA to develop the story board. The result has been very satisfactory.

Figure 13 shows some snapshots of the MEDINA promotional video, which has been promoted in the MEDINA web page and social networks.

[7] Please refer to https://www.youtube.com/@MedinaprojectEU
[8] Please refer to https://medina-project.eu
[9] Please refer to https://medina-project.eu/communication-materials/

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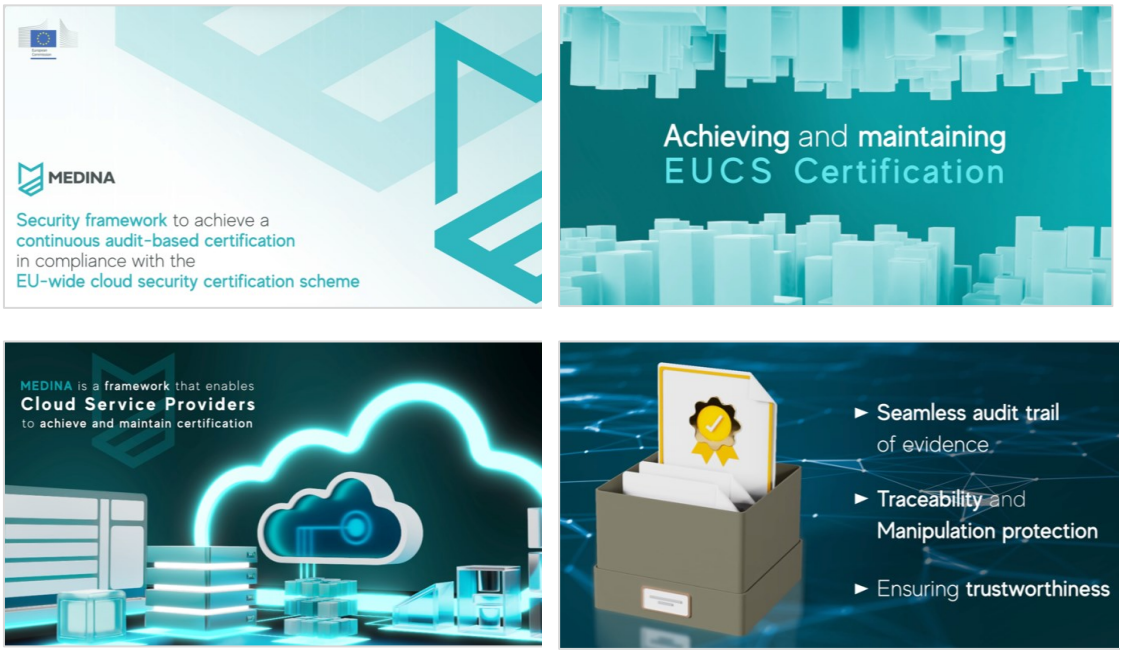

Figure 13. Screenshots of the MEDINA promotional video

In addition, **specialised videos** showing the features of the MEDINA tools have been recorded. These videos can be used as support, tutorial and demonstration for anyone wishing to use the MEDINA tools. To this end, nine demonstration videos were created during the second reporting period, in addition to the two videos that were recorded during the first reporting period (see D7.4 [2]). All these videos have been uploaded to the MEDINA YouTube channel[10] (see Section 4.2.3):

- MEDINA Trustworthiness system: Demonstration of the Trustworthiness System tool in the scope of the MEDINA framework based on blockchain technology.
- MEDINA Catalogue of Controls & Metrics: Demonstration of the Catalogue tool, that provides the information of the certification scheme with the controls, requirements, metrics, and instructions on how to assess the target cloud services.
- MEDINA CNL Editor: Demonstration of the CNL (Control Natural Language) Editor, which allows to translate the natural language of the EUCS requirements into a machine-readable format.
- MEDINA AMOE Part 1: Presentation of AMOE (Assessment and Management of Organisational Evidence), which is a tool developed for gathering organisational evidence.
- MEDINA AMOE Part 2: Demonstration of the AMOE tool, which works on organisational metrics.
- MEDINA SSI Framework: Demonstration of the MEDINA Self-Sovereign Identity Framework demo for issuance of security certificates.
- MEDINA Framework: Demonstration of the MEDINA framework as a whole, which provides a holistic framework that enhances cloud customers' control and trust in consumed cloud services, by supporting CSPs (IaaS, PaaS and SaaS providers) towards the successful achievement of a continuous EUCS certification aligned to the EU Cybersecurity Act (EUCSA).

[10] Please refer to https://www.youtube.com/@MedinaprojectEU

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- Company Compliance Dashboard: Demonstration of the Company Compliance Dashboard (CCD), which allows companies to manage all cloud-related certification and management processes.
- MEDINA Questionnaire: Demonstration of MEDINA Catalogue Questionnaire facility, which provides an assessment model for EUCS requirements that can be understood by less experienced compliance managers and CSPs in general.

Finally, MEDINA partners have worked on creating **training videos**, i.e., videos used to support the online training activities, as reported in Deliverable D7.10 [3]. All these videos have been uploaded to the MEDINA YouTube channel (see Section 4.2.3):

- Overview of the MEDINA Framework: Basic background of the European Cybersecurity Certification Scheme for cloud services (or EUCS for short), followed by a short overview of the European funded MEDINA project, along with the contributed framework.
- MEDINA Integrated UI: Demonstration of the functionality of the MEDINA Integrated User Interface.
- EUCS Automation with MEDINA-An IoT Cloud Use Case: Description of the Bosch Use Case that has been implemented in the MEDINA project.
- Company Compliance Dashboard. A continuous audit of SaaS solutions Use Case: Functionalities of the "Company Compliance Dashboard", application developed by Fabasoft which makes use of the APIs provided by the MEDINA components.
- Are you ready for European Cloud Service Security Certification?: NIXU's auditor view on MEDINA and Cloud Service Certification.
- MEDINA Training: MEDINA Architecture: Overview of the MEDINA framework architecture.
- MEDINA Training: Installation of the MEDINA framework: Training about the installation of the MEDINA framework.
- MEDINA Training: Catalogue of Controls and Metrics: Training about the functionalities of the "Catalogue of Controls and Metrics" component of the MEDINA framework.
- MEDINA Training: Customization of requirements: Training about the functionalities of the "Customization of requirements" module of the MEDINA framework.
- MEDINA Training: Risk assessment: Training video about the functionalities of the "Risk Assessment" component of the MEDINA framework.
- MEDINA Training: Clouditor components: Training about three Clouditor-based components: “Cloud Evidence Collector”, “Security Assessment” and “Orchestrator”.
- MEDINA Training: Assessment and Management of Organizational Evidence (AMOE): Training about the functionalities of the "Assessment and Management of Organizational Evidence" component of the MEDINA framework.
- MEDINA Training: Codyze: Training about the “Codyze” evidence collection component.
- MEDINA Training: Wazuh and VAT Evidence Collection: Training video about Wazuh and Vulnerability Assessment Tools (VAT) evidence collection components.
- MEDINA Training: Integrity Validation of Evidence: Training about the MEDINA Evidence Trustworthiness System component.
- MEDINA Training: Continuous Life-Cycle Management of Cloud Security Certifications: Training about three components of the MEDINA framework related to the Continuous Life-Cycle Management of Cloud Security Certifications, namely Continuous Certification Evaluation, Risk Assessment Optimization Framework and Automated Life-Cycle Manager.
- MEDINA Training: Credentials and Proofs of certificates: Training video about the Self Sovereign Identity (SSI) component.

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3.7 Merchandising

MEDINA's merchandising items, which have been ordered during the second reporting period, consist of notebooks, racks, and thermos bottles (see Figure 14). These personalized products have been used in the different events and stands in which MEDINA's partners have participated, resulting in excellent elements used to promote MEDINA's brand communication.

Figure 14. MEDINA Merchandising items

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4 Communication Activities

In MEDINA, communication activities are aimed at making available to the identified target audiences the on-going project developments as well as the results achieved. During this period the Communication Strategy was focused on the diffusion of MEDINA tools, use cases and papers. The main message was to demonstrate the benefits that MEDINA provides to the key target audiences that were identified in D7.2 [1], namely CSPs, including CISOs and compliance managers; CABs, auditors and NCCAs; ENISA; and General public and cloud service users.

The monitoring of the communication activities and the KPIs achievement has been a continuous activity in MEDINA. This continuous monitoring allowed the dissemination manager, project coordinator, technical coordinator and all project partners correct and steer the communication activities to achieve maximum awareness of the project outcomes. The tools used for monitoring were Google analytics, Twitter analytics (in its free version) and the monthly dissemination report sheet created in the project. The review of the communication KPIs can be found in Section 7.

4.1 MEDINA Digital Strategy

It can be stated that the MEDINA Digital Strategy worked satisfactorily throughout the project, revolving around the project website, especially the Blog, and the social media profiles, with special focus on Twitter and LinkedIn. The motivation behind the Blog was twofold, to use it as an online dissemination channel, and to create interest and attack visitors. The social media profiles were also used for the dual purpose of engaging stakeholders and generating traffic to the website and its contents. Every time a post was published on the Blog, or content was uploaded to SlideShare or YouTube, it was announced on Twitter and LinkedIn, with the link associated with the content.

Important information such as MEDINA framework updates and releases, tool demonstration videos, public deliverables, press releases, general assemblies and all MEDINA activities have been made available to MEDINA target communities through efficient communication channels such as the MEDINA website, MEDINA blog and MEDINA social media profiles. This has made it easier for the target communities to understand and follow the MEDINA project.

4.1.1 Project Website

The MEDINA website[11], which was set up at the beginning of the project, has been an efficient tool for disseminating and communicating MEDINA project information (project developments, activities, results, events, etc.) to people outside the project.

The MEDINA website and its sections (see Figure 16) were designed to allow the user to access the most comprehensive information on project organisation, project objectives, solution and vision, general features, key results, use cases, results currently available, and partners working on the project. In addition, it provides blog posts elaborated by the MEDINA partners that allow the general public to follow the project activities (see Section 4.1.2).

The initial structure of the website presented in Deliverable D7.1 [4] remains valid. However, as the project progressed, the content of some sections was updated with the new communication materials (brochures, newsletters, videos, papers, etc.), and new sections were modified or added.

The carousel of images that appears on the main page was also updated (see Figure 15). The current carousel consists of two short videos (MEDINA promotional video and testimony of a

[11] Please refer to https://medina-project.eu/

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Nixu Auditor), the final brochure and three relevant images. Clicking on each video opens the full version in YouTube.

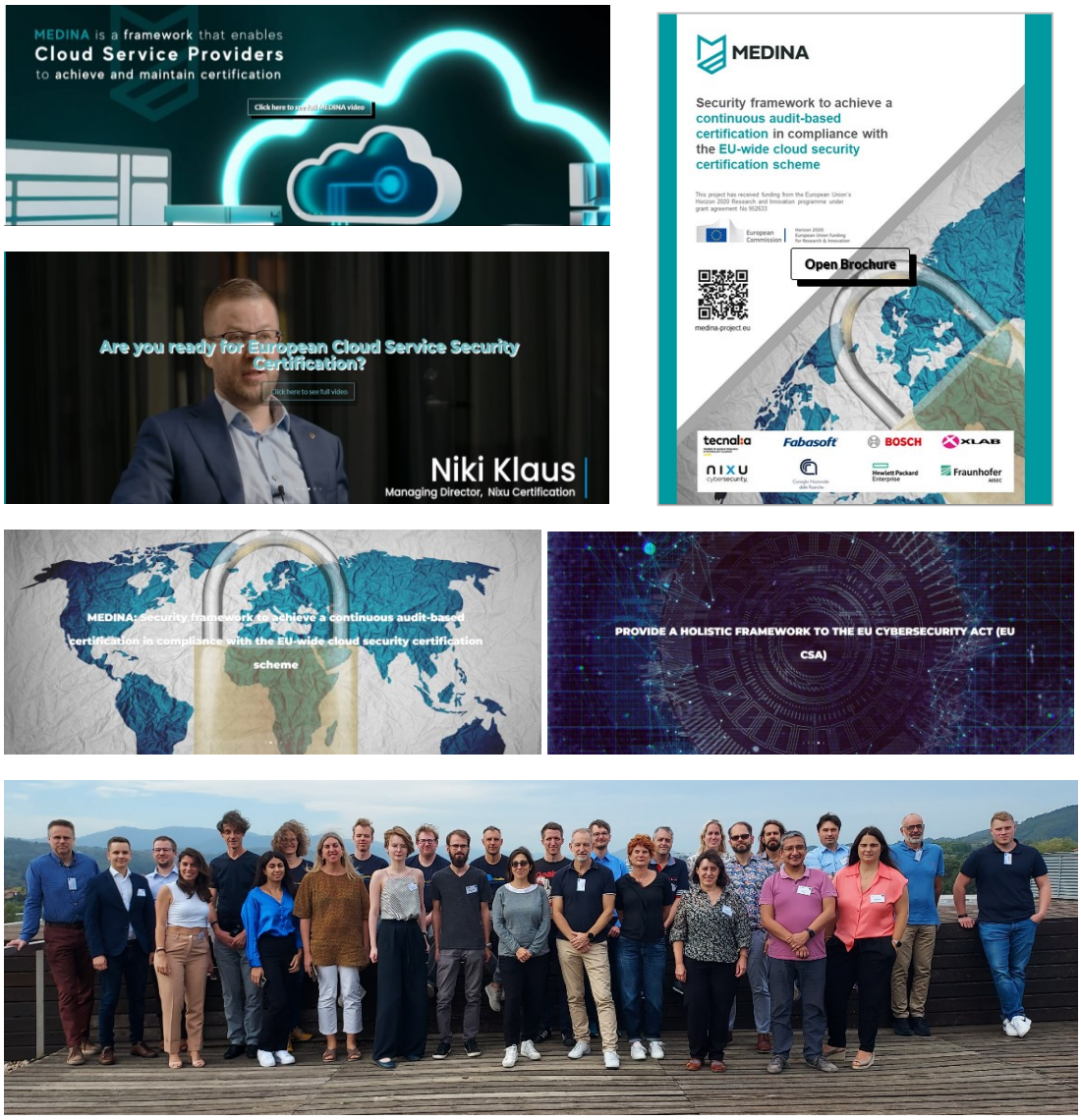

Figure 15. Videos and images displayed on the MEDINA website carousel

The "Library" section of the website has been renamed as "**Resources**" and provides access to the following pages:

- **Public Deliverables** page[12], where all public deliverables released in the project are available (see Figure 17).
- **Publications** page[13], which includes scientific publications, whitepapers, and bachelor-thesis produced in the project (see Figure 18).
- **Communication** page[14], which includes the project promotional video, general presentation, brochures, newsletters, posters, and press releases (see Figure 19)

[12] Please refer to https://medina-project.eu/public-deliverables/
[13] Please refer to https://medina-project.eu/publications/
[14] Please refer to https://medina-project.eu/communication-materials/

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- **Training** page[15] (new), which provides access to the online MEDINA training, i.e., four online courses that provide customized training for every aspect of the MEDINA framework depending on the user's role (see Figure 20). The MEDINA training material is described in detail in Deliverable D7.10 [3].

The website also includes a new "**Open Research**" section that provides access to the following links:

- **GitLab**[16]: Link to a comprehensive AI-powered DevSecOps platform where the Public code repositories of the MEDINA project are available.
- **CORDIS**[17]: Link to the project page in CORDIS, which is the European Commission's main source for the results of projects funded by the EU's research and innovation framework programmes.
- **Zenodo**[18]: Link to the MEDINA community in Zenodo, which is an open access repository where MEDINA project deliverables, whitepapers, user manuals and source code have been uploaded.
- **EUROSCAL Initiative**[19]**:** Link to the EUROSCAL website, The EU Friends of OSCAL, which has been designed by TECNALIA and Bosch and is supported by TECNALIA (see Figure 21). This is a community-driven initiative has been launched by MEDINA to promote the adoption of OSCAL in Europe (see Deliverable D7.9 [5]). The goal of EUROSCAL is to bring together an enthusiastic and open community of OSCAL stakeholders in Europe in order to further motivate its adoption. By sharing experiences, guidelines, and even source code, our hope is that EUROSCAL will further pave the road towards automated certification in the way envisioned by MEDINA.

Finally, it should be noted that during the second reporting period, a migration process of the MEDINA website from Drupal to WordPress was carried out. The main reason for this migration was because TECNALIA (as the website provider) decided to implement improvements and updates in different infrastructures, software solutions, services and different procedures. This migration affected not only the hardware and servers used by TECNALIA but also the software, i.e., the CMS (content management system) associated with the websites. TECNALIA decided to opt for a single solution and WordPress was chosen, as it is a more robust, up-to-date, secure and quicker to implement framework. Other factors were also taken into account, such as the fact that trying to update older Drupal websites has historically consumed more resources compared to WordPress, and the Google Analytics update (July 2023), which presented an unavoidable deadline.

[15] Please refer to https://medina-project.eu/training-videos/
[16] Please refer to https://git.code.tecnalia.com/medina/public
[17] Please refer to https://cordis.europa.eu/project/id/952633/results
[18] Please refer to https://zenodo.org/communities/medina
[19] Please refer to https://euroscal.eu

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Figure 16. MEDINA Website

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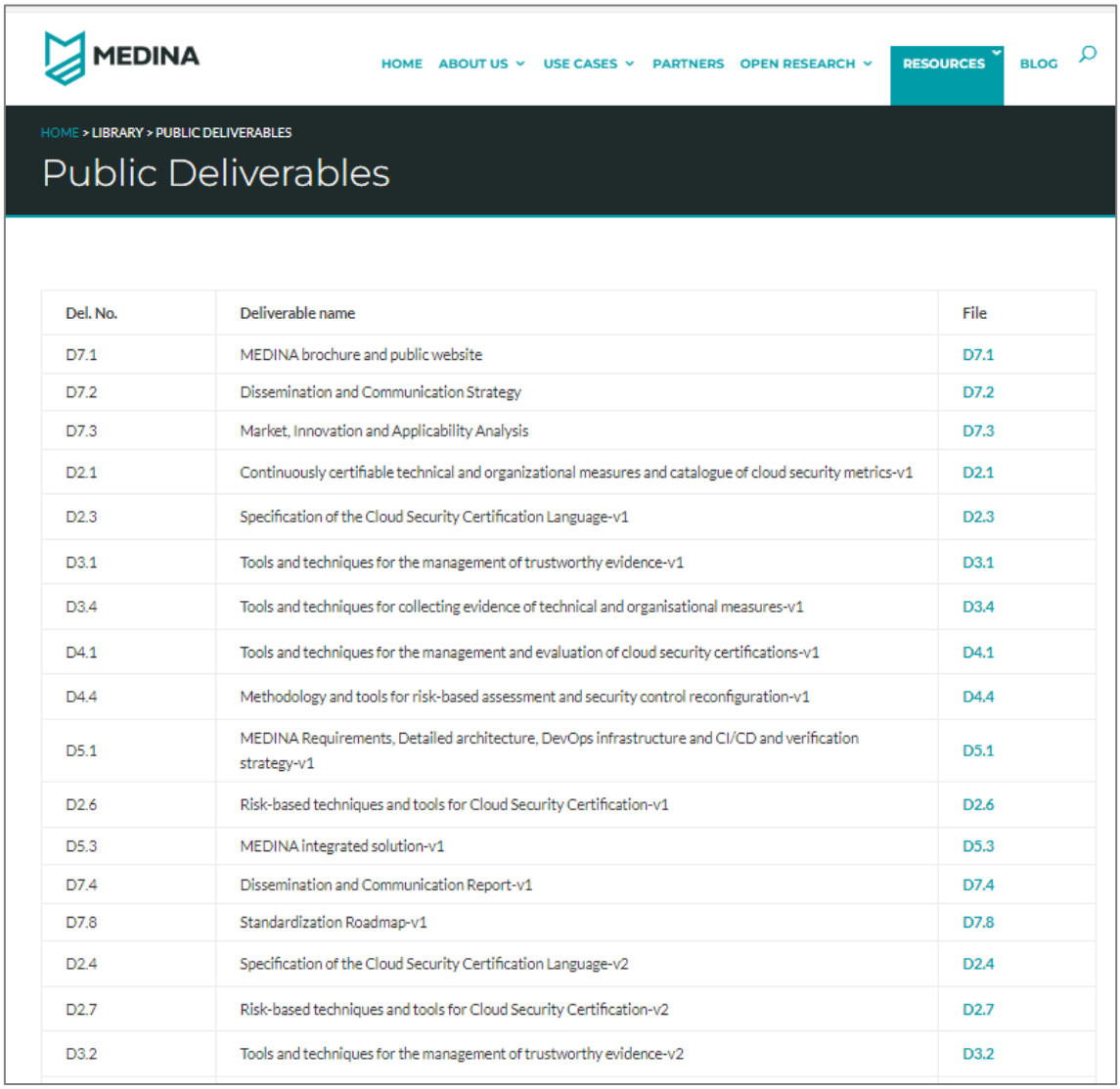

Del. No.	Deliverable name	File
D7.1	MEDINA brochure and public website	D7.1
D7.2	Dissemination and Communication Strategy	D7.2
D7.3	Market, Innovation and Applicability Analysis	D7.3
D2.1	Continuously certifiable technical and organizational measures and catalogue of cloud security metrics-v1	D2.1
D2.3	Specification of the Cloud Security Certification Language-v1	D2.3
D3.1	Tools and techniques for the management of trustworthy evidence-v1	D3.1
D3.4	Tools and techniques for collecting evidence of technical and organisational measures-v1	D3.4
D4.1	Tools and techniques for the management and evaluation of cloud security certifications-v1	D4.1
D4.4	Methodology and tools for risk-based assessment and security control reconfiguration-v1	D4.4
D5.1	MEDINA Requirements, Detailed architecture, DevOps infrastructure and CI/CD and verification strategy-v1	D5.1
D2.6	Risk-based techniques and tools for Cloud Security Certification-v1	D2.6
D5.3	MEDINA integrated solution-v1	D5.3
D7.4	Dissemination and Communication Report-v1	D7.4
D7.8	Standardization Roadmap-v1	D7.8
D2.4	Specification of the Cloud Security Certification Language-v2	D2.4
D2.7	Risk-based techniques and tools for Cloud Security Certification-v2	D2.7
D3.2	Tools and techniques for the management of trustworthy evidence-v2	D3.2

Figure 17. "Public deliverables" page on the MEDINA website

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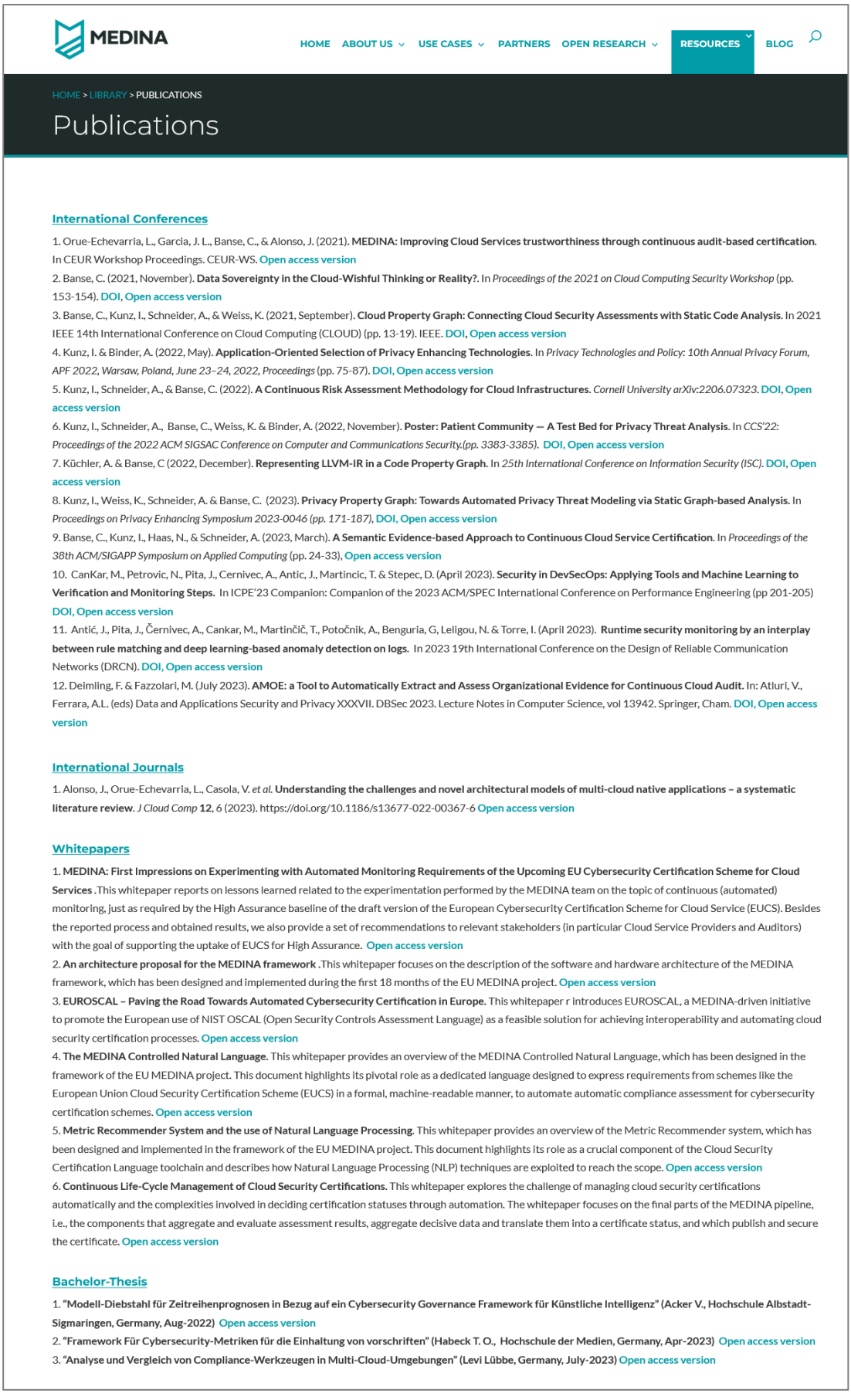

MEDINA

HOME ABOUT US USE CASES PARTNERS OPEN RESEARCH RESOURCES BLOG

HOME > LIBRARY > PUBLICATIONS

Publications

International Conferences

1. Orue-Echevarria, L., Garcia, J. L., Banse, C., & Alonso, J. (2021). **MEDINA: Improving Cloud Services trustworthiness through continuous audit-based certification.** In CEUR Workshop Proceedings. CEUR-WS. Open access version
2. Banse, C. (2021, November). **Data Sovereignty in the Cloud-Wishful Thinking or Reality?.** In *Proceedings of the 2021 on Cloud Computing Security Workshop* (pp. 153-154). DOI, Open access version
3. Banse, C., Kunz, I., Schneider, A., & Weiss, K. (2021, September). **Cloud Property Graph: Connecting Cloud Security Assessments with Static Code Analysis.** In 2021 IEEE 14th International Conference on Cloud Computing (CLOUD) (pp. 13-19). IEEE. DOI, Open access version
4. Kunz, I. & Binder, A. (2022, May). **Application-Oriented Selection of Privacy Enhancing Technologies.** In *Privacy Technologies and Policy: 10th Annual Privacy Forum, APF 2022, Warsaw, Poland, June 23–24, 2022, Proceedings* (pp. 75-87). DOI, Open access version
5. Kunz, I., Schneider, A., & Banse, C. (2022). **A Continuous Risk Assessment Methodology for Cloud Infrastructures.** *Cornell University arXiv:2206.07323.* DOI, Open access version
6. Kunz, I., Schneider, A., Banse, C., Weiss, K. & Binder, A. (2022, November). **Poster: Patient Community — A Test Bed for Privacy Threat Analysis.** In *CCS'22: Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security.(pp. 3383-3385).* DOI, Open access version
7. Küchler, A. & Banse, C (2022, December). **Representing LLVM-IR in a Code Property Graph.** In *25th International Conference on Information Security (ISC).* DOI, Open access version
8. Kunz, I., Weiss, K., Schneider, A. & Banse, C. (2023). **Privacy Property Graph: Towards Automated Privacy Threat Modeling via Static Graph-based Analysis.** In *Proceedings on Privacy Enhancing Symposium 2023-0046 (pp. 171-187),* DOI, Open access version
9. Banse, C., Kunz, I., Haas, N., & Schneider, A. (2023, March). **A Semantic Evidence-based Approach to Continuous Cloud Service Certification.** In *Proceedings of the 38th ACM/SIGAPP Symposium on Applied Computing* (pp. 24-33), Open access version
10. CanKar, M., Petrovic, N., Pita, J., Cernivec, A., Antic, J., Martincic, T. & Stepec, D. (April 2023). **Security in DevSecOps: Applying Tools and Machine Learning to Verification and Monitoring Steps.** In ICPE'23 Companion: Companion of the 2023 ACM/SPEC International Conference on Performance Engineering (pp 201-205) DOI, Open access version
11. Antić, J., Pita, J., Černivec, A., Cankar, M., Martinčič, T., Potočnik, A., Benguria, G, Leligou, N. & Torre, I. (April 2023). **Runtime security monitoring by an interplay between rule matching and deep learning-based anomaly detection on logs.** In 2023 19th International Conference on the Design of Reliable Communication Networks (DRCN). DOI, Open access version
12. Deimling, F. & Fazzolari, M. (July 2023). **AMOE: a Tool to Automatically Extract and Assess Organizational Evidence for Continuous Cloud Audit.** In: Atluri, V., Ferrara, A.L. (eds) Data and Applications Security and Privacy XXXVII. DBSec 2023. Lecture Notes in Computer Science, vol 13942. Springer, Cham. DOI, Open access version

International Journals

1. Alonso, J., Orue-Echevarria, L., Casola, V. *et al.* **Understanding the challenges and novel architectural models of multi-cloud native applications – a systematic literature review.** *J Cloud Comp* **12**, 6 (2023). https://doi.org/10.1186/s13677-022-00367-6 Open access version

Whitepapers

1. **MEDINA: First Impressions on Experimenting with Automated Monitoring Requirements of the Upcoming EU Cybersecurity Certification Scheme for Cloud Services** .This whitepaper reports on lessons learned related to the experimentation performed by the MEDINA team on the topic of continuous (automated) monitoring, just as required by the High Assurance baseline of the draft version of the European Cybersecurity Certification Scheme for Cloud Service (EUCS). Besides the reported process and obtained results, we also provide a set of recommendations to relevant stakeholders (in particular Cloud Service Providers and Auditors) with the goal of supporting the uptake of EUCS for High Assurance. Open access version
2. **An architecture proposal for the MEDINA framework** .This whitepaper focuses on the description of the software and hardware architecture of the MEDINA framework, which has been designed and implemented during the first 18 months of the EU MEDINA project. Open access version
3. **EUROSCAL – Paving the Road Towards Automated Cybersecurity Certification in Europe.** This whitepaper r introduces EUROSCAL, a MEDINA-driven initiative to promote the European use of NIST OSCAL (Open Security Controls Assessment Language) as a feasible solution for achieving interoperability and automating cloud security certification processes. Open access version
4. **The MEDINA Controlled Natural Language.** This whitepaper provides an overview of the MEDINA Controlled Natural Language, which has been designed in the framework of the EU MEDINA project. This document highlights its pivotal role as a dedicated language designed to express requirements from schemes like the European Union Cloud Security Certification Scheme (EUCS) in a formal, machine-readable manner, to automate automatic compliance assessment for cybersecurity certification schemes. Open access version
5. **Metric Recommender System and the use of Natural Language Processing.** This whitepaper provides an overview of the Metric Recommender system, which has been designed and implemented in the framework of the EU MEDINA project. This document highlights its role as a crucial component of the Cloud Security Certification Language toolchain and describes how Natural Language Processing (NLP) techniques are exploited to reach the scope. Open access version
6. **Continuous Life-Cycle Management of Cloud Security Certifications.** This whitepaper explores the challenge of managing cloud security certifications automatically and the complexities involved in deciding certification statuses through automation. The whitepaper focuses on the final parts of the MEDINA pipeline, i.e., the components that aggregate and evaluate assessment results, aggregate decisive data and translate them into a certificate status, and which publish and secure the certificate. Open access version

Bachelor-Thesis

1. **"Modell-Diebstahl für Zeitreihenprognosen in Bezug auf ein Cybersecurity Governance Framework für Künstliche Intelligenz" (Acker V., Hochschule Albstadt-Sigmaringen, Germany, Aug-2022)** Open access version
2. **"Framework Für Cybersecurity-Metriken für die Einhaltung von vorschriften" (Habeck T. O., Hochschule der Medien, Germany, Apr-2023)** Open access version
3. **"Analyse und Vergleich von Compliance-Werkzeugen in Multi-Cloud-Umgebungen" (Levi Lübbe, Germany, July-2023)** Open access version

Figure 18. "Publications" page on the MEDINA website

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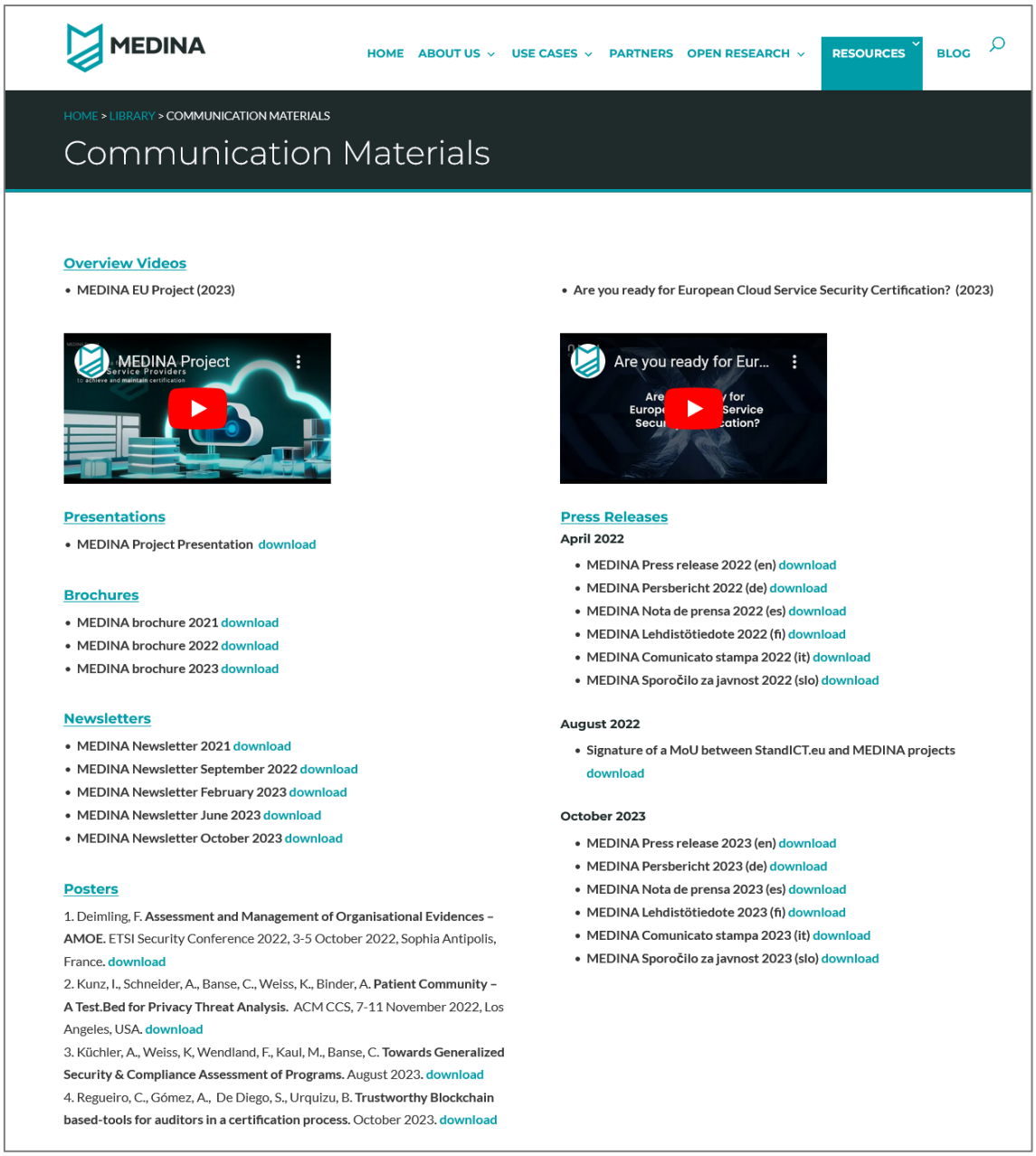

Figure 19. "Communication" page on the MEDINA website

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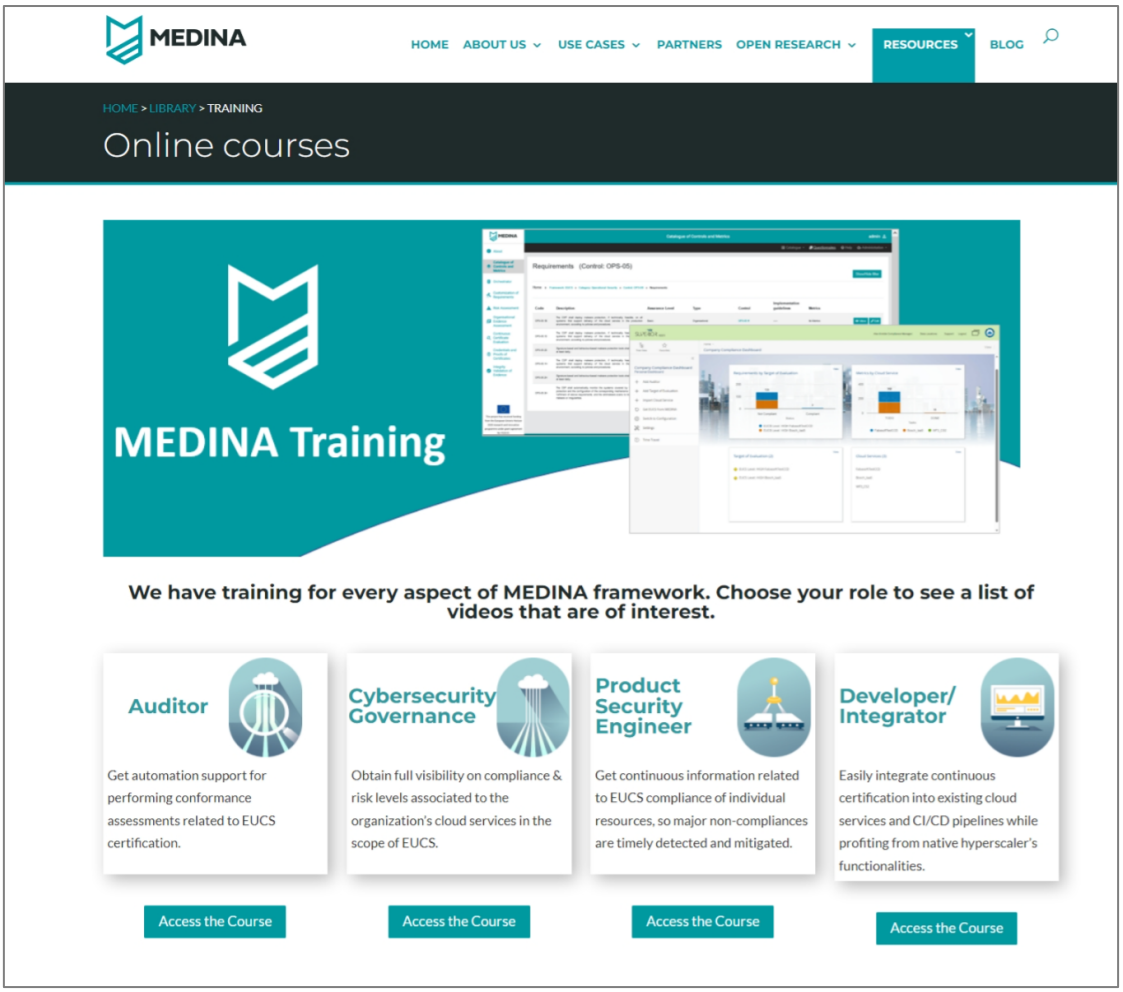

Figure 20. "Training" page on the MEDINA website

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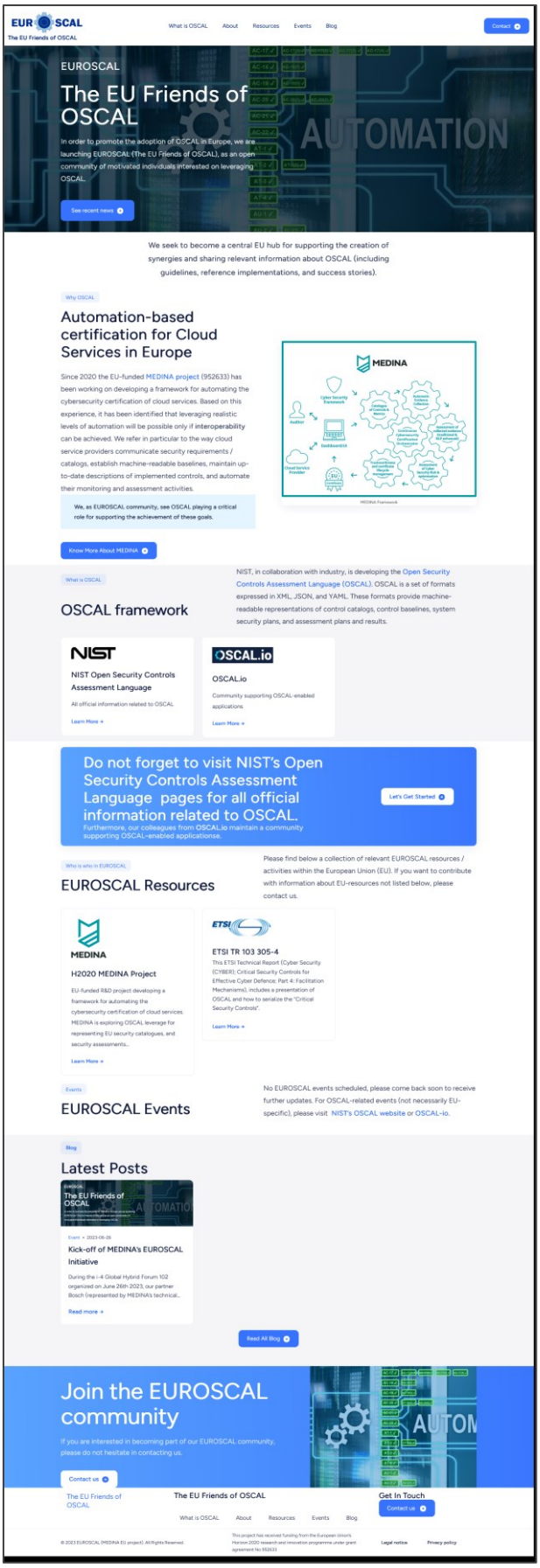

Figure 21. EUROSCAL Website (https://euroscal.eu)

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4.1.2 Blog

As explained above, the MEDINA Blog has been used as a lead generator for the project. A calendar was defined to schedule the publications of the blog posts (see Figure 22) and all partners contributed to this task. The topic was freely selected by the person responsive for the post, the aim was to discuss the topics proposed in the project that were related to the partner's skills. To name a few, blog posts were published on use cases, architecture, framework, tools, deliverables, networking, events, training, etc. In the MEDINA project, we have far exceeded the KPI related to the number of blog posts published (see Table 21).

The Blog was also used in coordination with the social media profiles to disseminate the project's activities (see Section 4.2). The blog posts and their specialized contents were also helping to position the project and its SEO, increasing the visits that come from search queries (Organic Search) as shown in Figure 30 and Figure 31.

The design of the Blog page was changed with the migration of the website from Drupal to WordPress, making it more attractive and functional. Categories were added on the right side of the page to make it easier to navigate through the blog entries (see Figure 23), and all blog entries were reviewed and assigned to the appropriate categories. In addition, now it is possible to read all the posts of a given user.

Year	2022											
Month	Jan		Feb		Mar		Apr		May		Jun	
Post	1	2	1	2	1	2	1	2	1	2	1	2
Responsible	NIXU	XLAB	TECNALIA	BOSCH	CNR	Fabasoft	FgH	HPE	NIXU	XLAB	TECNALIA	BOSCH

Year	2022											
Month	Jul		Aug		Sep		Oct		Nov		Dec	
Post	1	2	1	2	1	2	1	2	1	2	1	2
Responsible	CNR	Fabasoft	FgH	HPE	NIXU	XLAB	TECNALIA	BOSCH	CNR	Fabasoft	FgH	

Year	2023											
Month	Jan		Feb		Mar		Apr		May		Jun	
Post	1	2	1	2	1	2	1	2	1	2	1	2
Responsible	HPE	NIXU	XLAB	TECNALIA	BOSCH	CNR	Fabasoft	FgH	HPE	NIXU	XLAB	TECNALIA

Year	2023											
Month	Jul		Aug		Sep		Oct		Nov		Dec	
Post	1	2	1	2	1	2	1	2	1	2	1	2
Responsible	BOSCH	CNR	Fabasoft	FgH	HPE	NIXU	XLAB	TECNALIA	BOSCH	CNR		

Figure 22. Blogpost publication calendar

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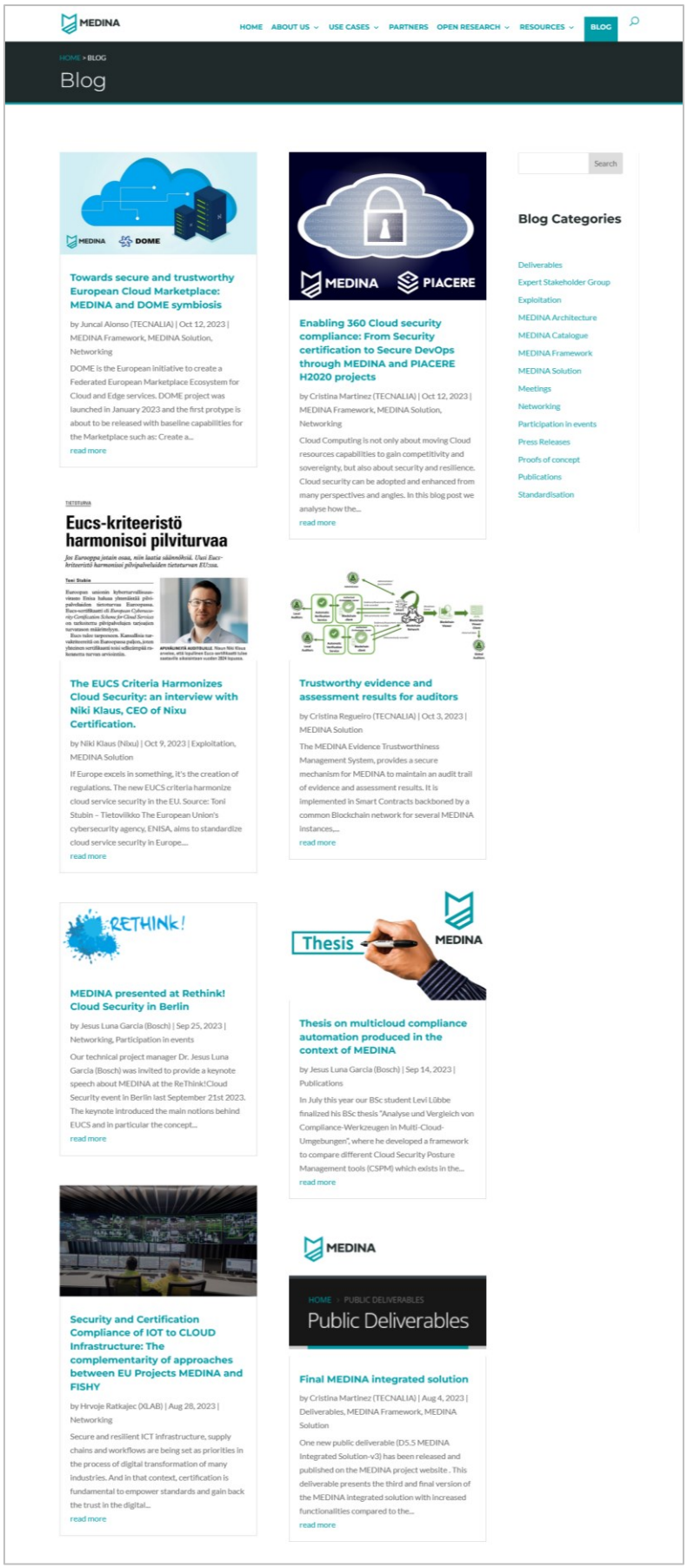

Figure 23. "Blog" page on the MEDINA website

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During the first reporting period, fifteen (**15**) entries were published on the MEDINA Blog, as reported in Deliverable D7.4 [2]. During the second reporting period, the number of posts significantly increased: sixty-nine (**69**) entries were published on the MEDINA Blog. Table 2 shows the title, main author, and release date for each entry.

Table 2. MEDINA Blog entries published during the period M19-M36

Title of blog entry	Main author	Release date
Final MEDINA deliverables	Cristina Martinez (TECNALIA)	31 Oct, 2023
2023 October Newsletter	Maitena Ilardia (TECNALIA)	31 Oct, 2023
Last MEDINA General Assembly in Pisa	Cristina Martinez (TECNALIA)	29 Oct, 2023
MEDINA contributes to new approaches and open-source developments relevant for the IPCEI-CIS and the European Alliance for Industrial Data, Edge and Cloud	Juncal Alonso (TECNALIA)	29 Oct, 2023
The role of standardization in MEDINA (part II – Final)	Jesus Luna Garcia (Bosch)	24 Oct, 2023
Whitepaper on "Continuous Life-Cycle Management of Cloud Security Certifications"	Immanuel Kunz (FhG)	22 Oct, 2023
Whitepaper on "Metric Recommender System and the use of Natural Language Processing"	Michela Fazzolari (CNR)	22 Oct, 2023
Whitepaper on "The MEDINA Controlled Natural Language"	Marinella Petrocchi (CNR)	22 Oct, 2023
Whitepaper on "EUROSCAL – Paving the Road Towards Automated Cybersecurity Certification in Europe"	Jesus Luna Garcia (Bosch)	22 Oct, 2023
MEDINA Training Courses	Cristina Martinez (TECNALIA)	18 Oct, 2023
MEDINA Press Release (October 2023)	Cristina Martinez (TECNALIA)	17 Oct, 2023
Securing the Cloud: A Look into EUCS and the MEDINA Project	Leila Arstila (NIXU)	16 Oct, 2023
Final MEDINA meeting with nominated experts	Jesus Luna Garcia (Bosch)	13 Oct, 2023
Towards secure and trustworthy European Cloud Marketplace: MEDINA and DOME symbiosis	Juncal Alonso (TECNALIA)	12 Oct, 2023
Enabling 360 Cloud security compliance: From Security certification to Secure DevOps through MEDINA and PIACERE H2020 projects	Cristina Martinez (TECNALIA)	12 Oct, 2023
The EUCS Criteria Harmonizes Cloud Security: an interview with Niki Klaus, CEO of Nixu Certification.	Niki Klaus (Nixu)	9 Oct, 2023
Trustworthy evidence and assessment results for auditors	Cristina Regueiro (TECNALIA)	3 Oct, 2023
MEDINA presented at Rethink! Cloud Security in Berlin	Jesus Luna Garcia (Bosch)	25 Sep, 2023

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Title of blog entry	Main author	Release date
Thesis on multicloud compliance automation produced in the context of MEDINA	Jesus Luna Garcia (Bosch)	14 Sep, 2023
Security and Certification Compliance of IOT to CLOUD Infrastructure: The complementarity of approaches between EU Projects MEDINA and FISHY	Hrvoje Ratkajec (XLAB)	28 Aug, 2023
Final MEDINA integrated solution	Cristina Martinez (TECNALIA)	4 Aug, 2023
i-4 Global Forum 102	Jesus Luna Garcia (Bosch)	13 Jul, 2023
MEDINA June Newsletter	Maitena Ilardia (TECNALIA)	5 Jul, 2023
Kick-off of MEDINA's EUROSCAL Initiative	Jesus Luna Garcia (Bosch)	26 Jun, 2023
9th General Assembly in Ljubljana (Slovenia)	Cristina Martinez (TECNALIA)	22 Jun, 2023
MEDINA standardization activities presented at the CYRENE workshop	Jesus Luna Garcia (Bosch)	22 Jun, 2023
Automated Certification at the ENISA AI Cybersecurity Conference 2023	Jesus Luna Garcia (Bosch)	20 Jun, 2023
EUROSCAL previewed at flagship ENISA and NIST events on cloud cybersecurity and certification	Jesus Luna Garcia (Bosch)	6 Jun, 2023
BSc theses produced in the context of the MEDINA project	Maitena Ilardia (TECNALIA)	1 Jun, 2023
Risk Assessment in the scope of MEDINA Project"	Artsiom Yautsiukhin (CNR)	1 Jun, 2023
Specification of the Cloud Security Certification Language	Marinella Petrocchi (CNR)	23 May, 2023
MEDINA deliverables released in April 2023	Cristina Martinez (TECNALIA)	3 May, 2023
Third Expert Stakeholder Group meeting	Jesus Luna Garcia (Bosch)	2 May, 2023
MEDINA invited lecture at Barcelona Tech	Jesus Luna Garcia (Bosch)	28 Apr, 2023
Continuous Certification Evaluation (CCE) component	Hrvoje Ratkajec (XLAB)	18 Apr, 2023
Bitkom meeting on "Continuous Monitoring"	Jesus Luna Garcia (Bosch)	30 Mar, 2023
MEDINA Consortium met for the 8th GA face to face meeting in Linz	Cristina Martinez (TECNALIA)	14 Mar, 2023
MEDINA Standardization presented at the SWForum webinar	Jesus Luna Garcia (Bosch)	3 Mar, 2023
Continuously certifiable Technical and Organizational Measures and Catalogue of Cloud Security Metrics	Iñaki Etxaniz (TECNALIA)	21 Feb, 2023
Second release of the MEDINA Framework	Claudia Zago (HPE)	16 Feb, 2023

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Title of blog entry	Main author	Release date
MEDINA Lecture at the NECS – PhD Winter School 2023	Jesus Luna Garcia (Bosch)	9 Feb, 2023
MEDINA deliverables released in January 2023	Cristina Martinez (TECNALIA)	24 Jan, 2023
MEDINA Integrated User Interface	Claudia Zago (HPE)	23 Jan, 2023
Evaluating Tools for Certification	Immanuel Kunz (Fraunhofer)	10 Jan, 2023
Connecting Cloud Security Assessments with Static Code Analysis	Immanuel Kunz (Fraunhofer)	10 Dec, 2022
MEDINA discussions at the ENISA EUCS Winter Summit 2022	Jesus Luna Garcia (Bosch)	7 Dec, 2022
Tools and techniques for collecting evidence of technical and organisational measures	Anže Žitnik (XLAB)	22 Nov, 2022
Tools and techniques for the management of trustworthy evidence	Cristina Regueiro (TECNALIA)	10 Nov, 2022
MEDINA deliverables released in October 2022	Cristina Martinez (TECNALIA)	7 Nov, 2022
MEDINA consortium met for the first time face to face in Bilbao	Maitena Ilardia (TECNALIA)	21 Oct, 2022
Building blocks (MEDINA at ETSI Security Conference 2022)	Fanta, Björn (Fabasoft)	17 Oct, 2022
Feedback provided to ISO/IEC 27017 on continuous (automated) monitoring	Jesus Luna Garcia (Bosch)	3 Oct, 2022
ISACA GRC Kongress 2022	Jesus Luna Garcia (Bosch)	30 Sep, 2022
The MEDINA Cloud Certification Language	Marinella Petrocchi (CNR)	27 Sep, 2022
Continuous compliance: From traditional auditing to real-time certification	Fanta, Björn (Fabasoft)	20 Sep, 2022
StandICT.eu 2023 & MEDINA kick-off their collaboration with an MoU to reinforce European standardisation efforts in the cloud security certification field	Cristina Regueiro (TECNALIA)	13 Sep, 2022
MEDINA participated in the IWCSEC 2022 workshop at the ARES Conference	Jesus Luna Garcia (Bosch)	24 Aug, 2022
Automating Certification Decisions	Immanuel Kunz (Fraunhofer)	23 Aug, 2022
MEDINA SSI-based cloud security certification management	Cristina Regueiro (TECNALIA)	28 Jul, 2022
Using NLP to extract compliance-related evidencehttps://medina-project.eu/blog/using-nlp-to-extract-compliance-related-evidence/	Fanta, Björn (Fabasoft)	29 Jun, 2022
The utopia of cybersecurity certification / certification-by-design	Jesus Luna Garcia (Bosch)	28 Jun, 2022
MEDINA roundtable at the InfoSecurity Europe 2022	Jesus Luna Garcia (Bosch)	23 Jun, 2022

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Title of blog entry	Main author	Release date
MEDINA at the ENISA Cybersecurity Certification Week	Jesus Luna Garcia (Bosch)	9 Jun, 2022
MEDINA celebrates its sixth General Assembly	Cristina Martinez (TECNALIA)	30 May, 2022
MEDINA participates in an HRB event organized by the European Commission	Antti Kantero (NIXU)	27 May, 2022
An architecture proposal for the MEDINA framework (Whitepaper)	Iñaki Etxaniz (TECNALIA)	12 May 2022
Making it automated: the MEDINA Framework on dev	HPE team	10 May, 2022
Integrating an Existing Security Analysis Tool in the MEDINA Framework	Immanuel Kunz (Fraunhofer)	06 May, 2022
Second Meeting with MEDINA's Expert Stakeholder Group (ESG)	Jesus Luna Garcia (Bosch)	05 May, 2022

4.1.3 Website Analytics

MEDINA has used Google Analytics to monitor the behaviour of the website. From the analytics collected (see Figure 24 and Figure 25), it can be seen that the total number of visits to the MEDINA website is about 11,757, with an average session duration during the last months of 00:00:57. Throughout the whole period of operation of the website, MEDINA had a stable number of daily users, with increases appearing every time there was some relevant activity in the project, such as the publication of a blog post. The number of users increased during October 2023 (see Figure 25), coinciding with the publication of specific blogposts related to training, press releases, whitepapers, networking with other projects, and the communication of MEDINA's participation in different conferences.

Due to the migration process of the MEDINA website from Drupal to WordPress explained in section 4.1.1, we have divided the information provided by Google analytics into two data sources: the first one from the launch of the website in early 2021 until 30 June 2023, and the second one from 1 July until 31 October 2023. The corresponding graphs for these two datasets are shown in Figure 24 and Figure 25 respectively.

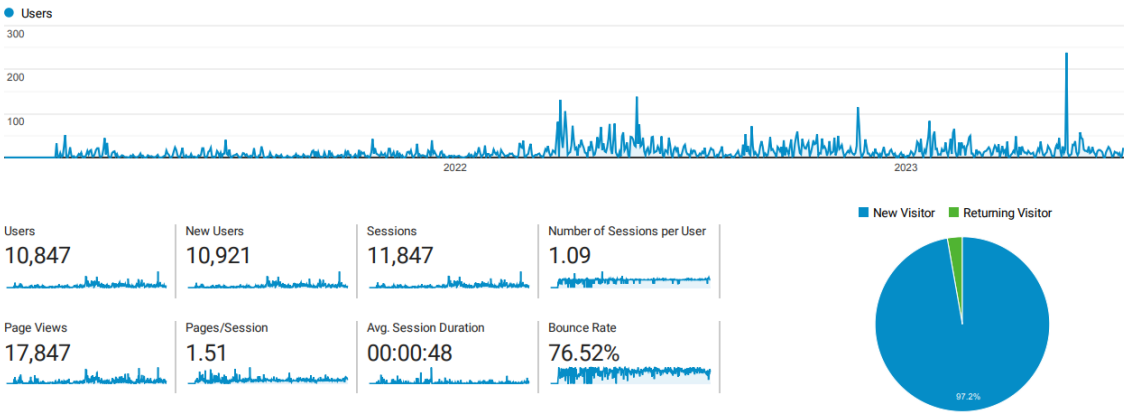

Figure 24. MEDINA website analytics from March 2021 to June 2023

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Figure 25. MEDINA website analytics from July 2023 to October 2023

As mentioned above, blog posts often mark the highest number of visits to the MEDINA website. This trend is confirmed by the fact that the blog (row `timeline` in Figure 26 and Figure 27) is the first most visited page, with 7.73% (from March 2021 to June 2023) and 6,3% (from July 2023 to October 2023) of visitors going directly to it.

	Page	Page Views	% Page Views
1.	/	5,256	29.45%
2.	/timeline	1,380	7.73%
3.	/mission-and-vision	761	4.26%
4.	/partners	712	3.99%
5.	/public-deliverables	704	3.94%
6.	/communication-materials	691	3.87%
7.	/blog/using-nlp-extract-compliance-related-evidence	562	3.15%
8.	/european-certification-multi-cloud-backends-iot-solutions	325	1.82%
9.	/publications	308	1.73%
10.	/key-results	283	1.59%

Figure 26. Most visited pages of the MEDINA website from March 2021 to June 2023

	Page path and screen class	Views	Users	Views per user	Average engagement time
		2,917 100% of total	910 100% of total	3.21 Avg 0%	57s Avg 0%
1	/	1,121	574	1.95	23s
2	/timeline/	184	39	4.72	1m 29s
3	/communication-materials/	129	28	4.61	2m 05s
4	/partners/	122	79	1.54	54s
5	/mission-and-vision/	100	77	1.30	35s
6	/public-deliverables/	97	58	1.67	19s
7	/training-videos/	84	42	2.00	28s
8	/publications/	73	37	1.97	32s
9	/european-certification-multi-cloud-backends-iot-solutions/	54	47	1.15	21s
10	/blog/medina-risk-assessment-tool/	43	26	1.65	3m 45s

Figure 27. Most visited pages of the MEDINA website from July 2023 to October 2023

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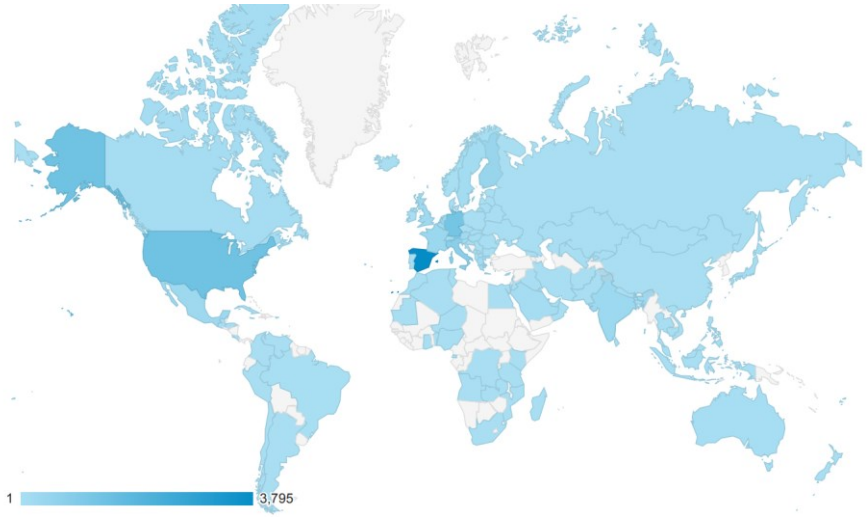
Regarding the geographical location of MEDINA's audience, the countries with the highest number of visitors are Spain, the United States, Germany, and Finland as shown in Figure 28 and Figure 29. The publication of the press release in several languages, namely English, Finish, German, Italian, Slovenian, and Spanish, has helped to increase the traffic from different countries. In addition, the interview and video "The EUCS Criteria Harmonizes Cloud Security: an interview with Niki Klaus, CEO of Nixu Certification" has increased the traffic in Finland[20].



Country	Acquisition			Behaviour		
	Users ↓	New Users	Sessions	Bounce Rate	Pages/Session	Avg. Session Duration
	10,847 % of Total: 100.00% (10,847)	10,921 % of Total: 100.00% (10,921)	11,847 % of Total: 100.00% (11,847)	76.52% Avg for View: 76.52% (0.00%)	1.51 Avg for View: 1.51 (0.00%)	00:00:48 Avg for View: 00:00:48 (0.00%)
1. Spain	3,795 (34.71%)	3,794 (34.74%)	4,303 (36.32%)	66.23%	1.99	00:01:32
2. United States	1,319 (12.06%)	1,315 (12.04%)	1,339 (11.30%)	88.95%	1.13	00:00:08
3. Germany	1,222 (11.18%)	1,224 (11.21%)	1,323 (11.17%)	78.76%	1.26	00:00:26
4. Italy	721 (6.59%)	721 (6.60%)	832 (7.02%)	74.64%	1.34	00:00:39
5. Finland	397 (3.63%)	397 (3.64%)	435 (3.67%)	87.36%	1.22	00:00:22
6. Netherlands	354 (3.24%)	354 (3.24%)	359 (3.03%)	90.81%	1.09	00:00:04
7. France	314 (2.87%)	314 (2.88%)	326 (2.75%)	85.89%	1.38	00:00:23
8. India	296 (2.71%)	296 (2.71%)	306 (2.58%)	79.08%	1.30	00:00:51
9. Mexico	256 (2.34%)	255 (2.33%)	258 (2.18%)	72.48%	1.27	00:00:24
10. United Kingdom	219 (2.00%)	218 (2.00%)	223 (1.88%)	85.65%	1.09	00:00:09

Figure 28. Visits to the MEDINA website by geographical location (from March 2021 to June 2023)

[20] Please refer to: https://medina-project.eu/blog/the-eucs-criteria-harmonizes-cloud-security/

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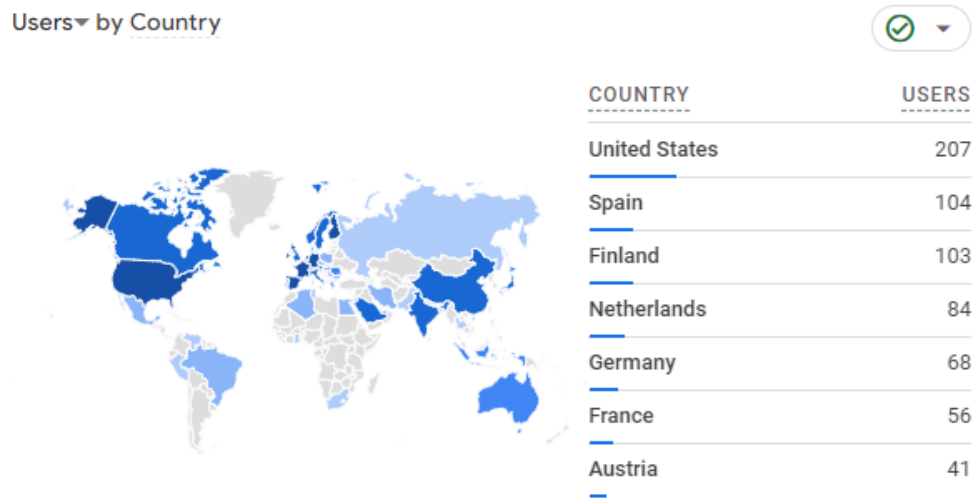

	Country	Users	New users	Engaged sessions	Engagement rate	Engaged sessions per user	Average engagement time
		910 100% of total	882 100% of total	757 100% of total	47.67% Avg 0%	0.83 Avg 0%	57s Avg 0%
1	United States	207	209	65	28.76%	0.31	12s
2	Spain	104	96	298	65.49%	2.87	2m 48s
3	Finland	103	99	66	36.87%	0.64	39s
4	Netherlands	84	84	43	43.43%	0.51	17s
5	Germany	67	63	50	47.17%	0.75	57s
6	France	56	54	15	26.32%	0.27	12s
7	Austria	41	40	8	18.6%	0.20	5s
8	Italy	41	36	45	62.5%	1.10	2m 02s
9	Belgium	24	22	16	53.33%	0.67	42s
10	India	17	18	31	53.45%	1.82	9m 10s

Figure 29. Visits to the MEDINA website by geographical location (from July to October 2023)

The SEO, as explained before, is improving on a continuous basis thanks to the provisioning of dedicated and targeted content through the Blog. As shown in Figure 30 and Figure 31, visits coming from direct search queries have increased along the timeframe of the project, representing about 73,86% of the traffic (8,012 users) from March 2021 to June 2023, and 60% (534 users) of the traffic from July to October 2023. While 23,18% of the visitors to the MEDINA website (2,515 users) from March 2021 to June 2023 and 32,73% of the visitors (290 users) from July to October 2023 come through organic searches. This is the primary channel that inbound marketing strives to increase.

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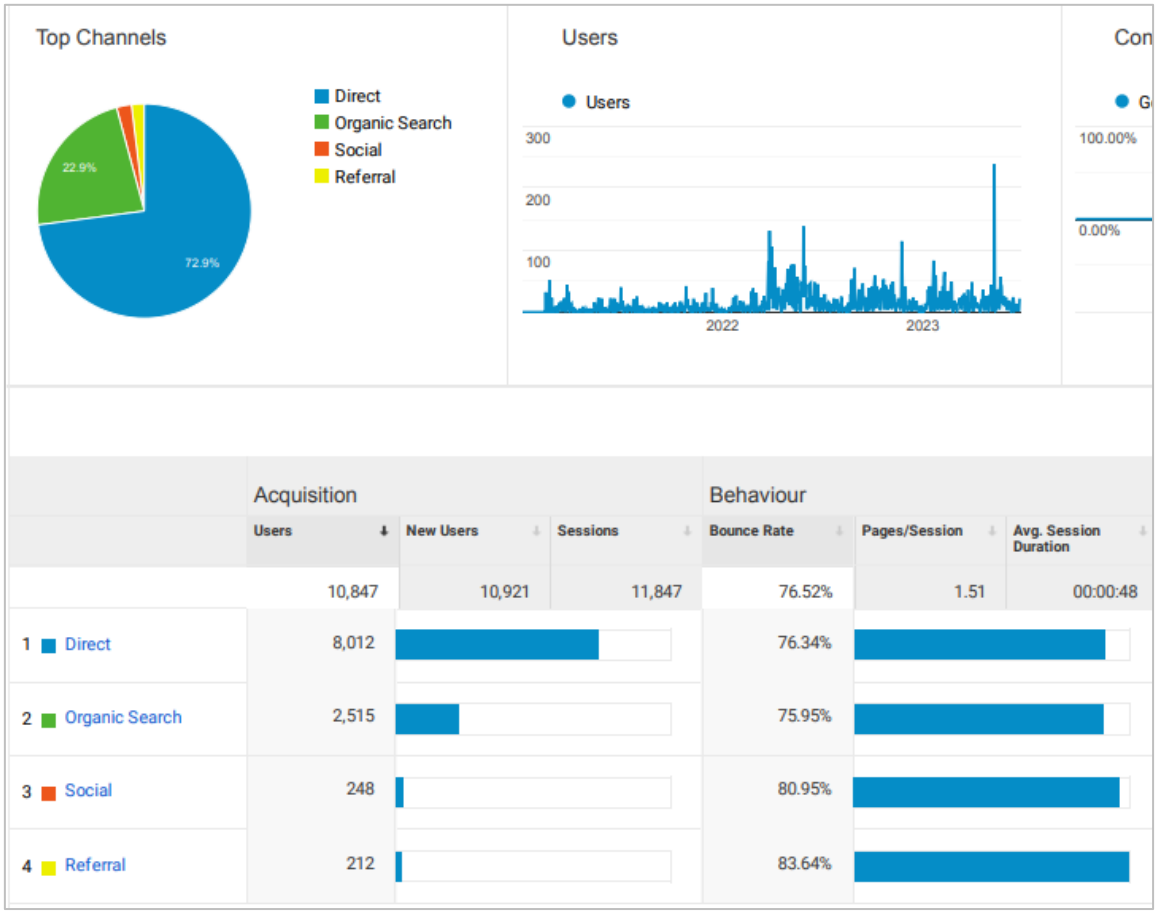
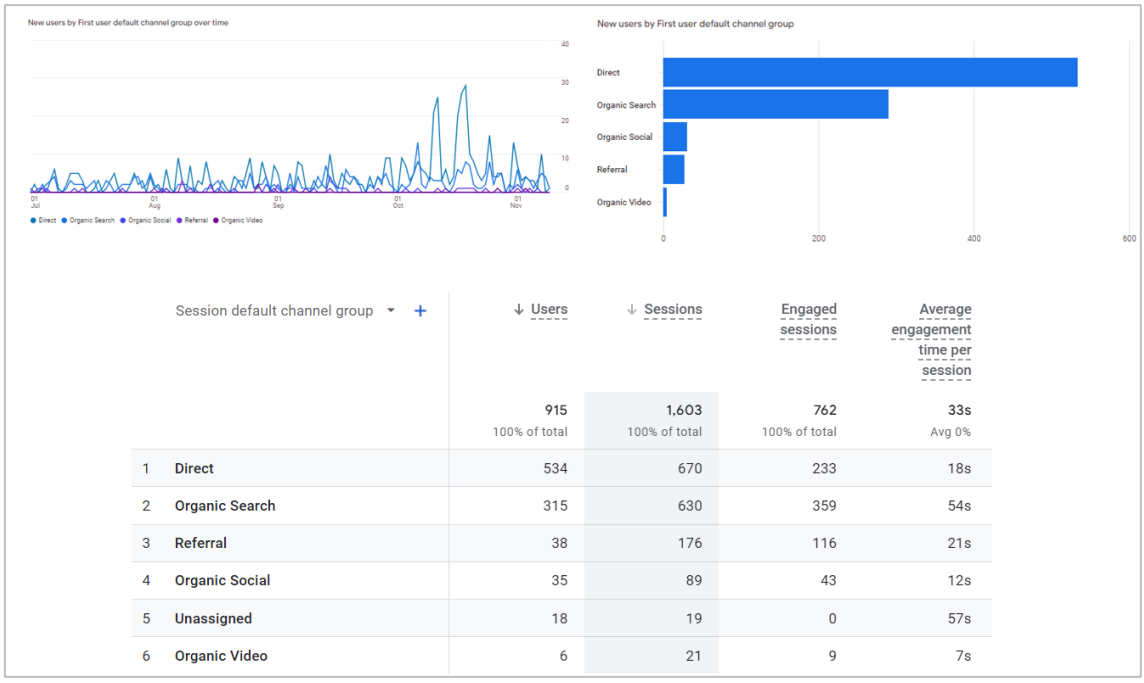


	Acquisition			Behaviour		
	Users	New Users	Sessions	Bounce Rate	Pages/Session	Avg. Session Duration
	10,847	10,921	11,847	76.52%	1.51	00:00:48
1 Direct	8,012			76.34%		
2 Organic Search	2,515			75.95%		
3 Social	248			80.95%		
4 Referral	212			83.64%		

Figure 30. Traffic in the MEDINA website from March 2021 to June 2023



	Session default channel group	Users	Sessions	Engaged sessions	Average engagement time per session
		915 100% of total	1,603 100% of total	762 100% of total	33s Avg 0%
1	Direct	534	670	233	18s
2	Organic Search	315	630	359	54s
3	Referral	38	176	116	21s
4	Organic Social	35	89	43	12s
5	Unassigned	18	19	0	57s
6	Organic Video	6	21	9	7s

Figure 31. Traffic in the MEDINA website from July 2023 to October 2023

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In terms of the visits provided by the social networks (see Figure 32), we can see that Twitter has been the main channel used to access the MEDINA website, accounting for more than 56% of the sessions, followed by LinkedIn with a percentage of sessions around 38%[21].

Social Network	Sessions ↓	Page Views	Avg. Session Duration	Pages/Session
1. Twitter	153 (56.04%)	218 (63.01%)	00:01:06	1.42
2. LinkedIn	103 (37.73%)	110 (31.79%)	00:00:20	1.07
3. Facebook	14 (5.13%)	15 (4.34%)	00:00:24	1.07
4. reddit	2 (0.73%)	2 (0.58%)	00:00:00	1.00
5. YouTube	1 (0.37%)	1 (0.29%)	00:00:00	1.00

Figure 32. Traffic in the MEDINA website provided by the social networks from March 2021 to June 2023

4.2 Activity in Social Networks

MEDINA has used social media as a channel to reach a wider and more accessible target audience in different parts of the world. This strategy enabled communication and interaction with our target communities, other research projects, and people in the public interested in certification, cybersecurity and cloud.

Following a recommendation from the experts during the RP1 project review, we focused more on the Twitter and LinkedIn platforms, and less on other media such as SlideShare and YouTube. The messages that were launched in the social networks served to attract traffic to the project's website, which has been the project's primary means of dissemination.

In the following sections, we explain how each social network was used to outreach MEDINA project activities.

4.2.1 Twitter/X

MEDINA Twitter/X account, @MedinaprojectEU[22], was created in November 2020, shortly after the start of the project (see Figure 33).

Twitter/X is the most prominent of the MEDINA project's social networks. During the first reporting period, the account had a total of **64** followers and **72** tweets were published. During the second reporting period the account reached a total of **128** followers and more than **275** tweets were published. These tweets are mainly original contents (e.g., event, blog posts, publication of deliverables), but some retweets of external stakeholders' content that MEDINA considers interesting and relevant have also been published.

Every time a certain event took place in MEDINA, such as a blog post, the publication of a report, a video, a poster or a press release, a tweet was published including detailed information, the URL to the information and relevant hashtags. The aim of including the URL was to generate interest in additional content, and thus increase awareness of the MEDINA project.

In addition, MEDINA partners used their respective Twitter/X feeds to directly promote MEDINA-related events and news. MEDINA Twitter/X's profile then functioned as a central hub

[21] We do not have statistics on visits provided by social networks for the period July to October 2023.
[22] Please refer to https://twitter.com/MedinaprojectEU

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that retweeted partners' mentions and ensured a centralized distribution of all project-related news.

Figure 33. MEDINA Twitter/X account

The number of interactions in Twitter/X has increased during the second reporting period, with a peak of 2,200 impressions in July 2023 and a peak of 2,142 impressions in October 2023, as shown in Figure 34. The total number of impressions during the last eighteen months of the project is 13,236 and the number of profile visits is 8,777.

As for the tweets, the MEDINA account also achieved a peak of 31 tweets in October 2023, as shown in Figure 35.

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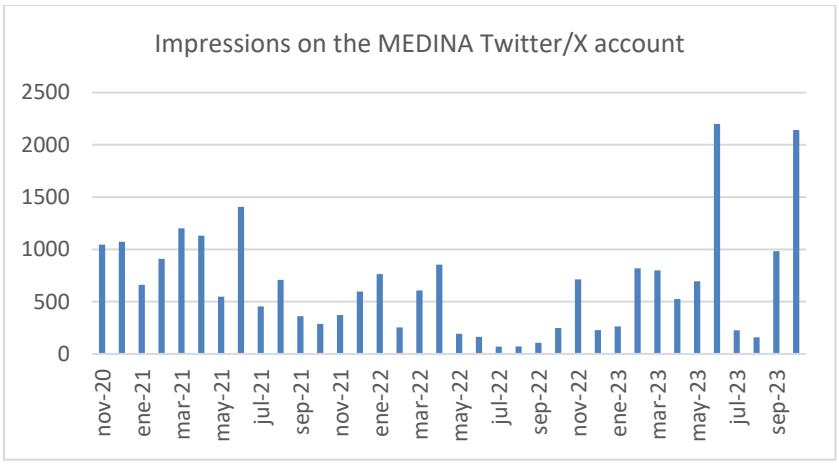

Figure 34. Number of impressions on the MEDINA Twitter/X account during the project lifetime

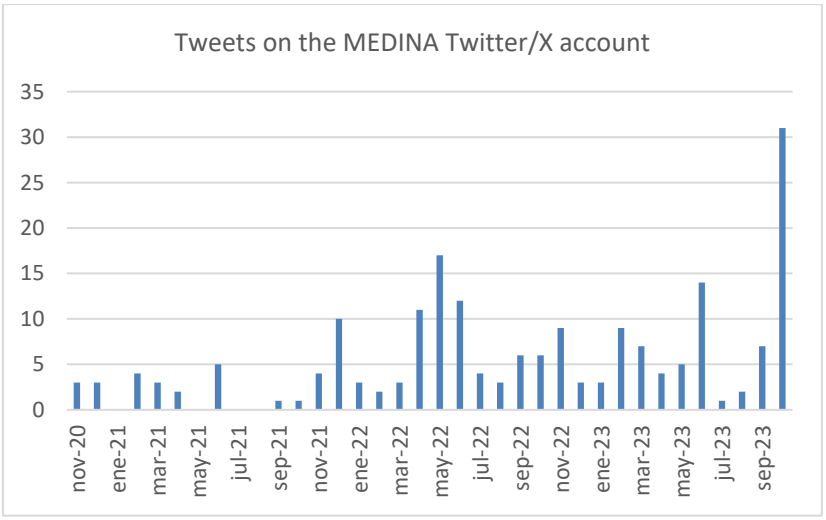

Figure 35. Number of tweets published on the MEDINA Twitter/X account during the project lifetime

4.2.2 LinkedIn

MEDINA LinkedIn group[23] has been an excellent tool to showcase the achievements of the project, allowing to increase contacts and foster interpersonal relationships between MEDINA partners and other professionals involved in cybersecurity, cloud computing and certification topics.

Blog posts published on the MEDINA website were replicated as posts or articles (depending on the content) on the MEDINA LinkedIn group to attract more visitors to the website.

During the first reporting period, the MEDINA LinkedIn group had **39** members and **65** posts were published. During the second reporting period, the MEDINA LinkedIn group reached a total of **74** members and a total of **100** posts were published.

[23] Please refer to https://www.linkedin.com/groups/12486585/

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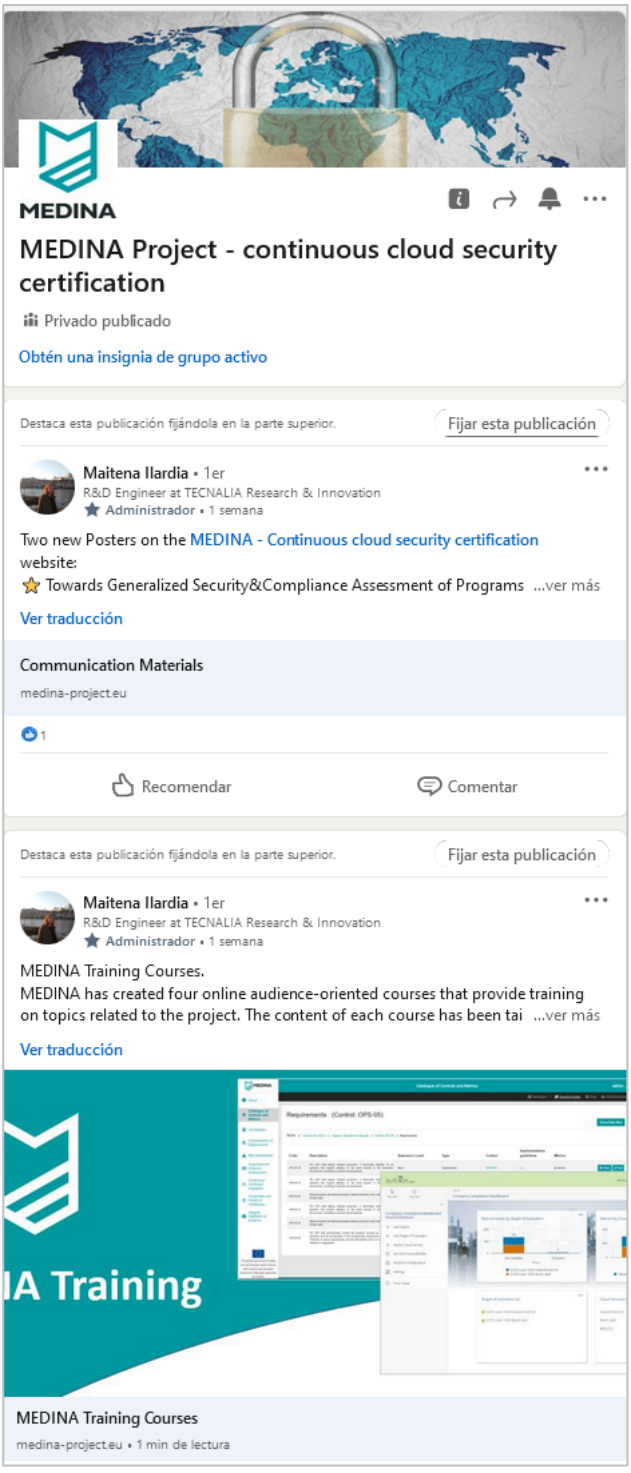

Figure 36. MEDINA LinkedIn group

4.2.3 YouTube

MEDINA YouTube channel[24] has been a valuable means of communication and positioning to communicate MEDINA's key results with greater impact. In principle, the aim of the YouTube profile was not to generate direct traffic to the MEDINA website, as with other social media, but rather to use it as a channel in which to place all videos generated during the project.

[24] Please refer to https://www.youtube.com/@MedinaprojectEU

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MEDINA YouTube channel hosts a total of 30 videos (see Figure 38), which have been classified according to the following categories (see Section 3.6):

- Specialized videos (11)
- Training videos (17)
- Promotional video (1)
- General presentation video (1)

The channel design includes six playlists (see Figure 37):

- "MEDINA Demonstrators" (12 videos)
- "MEDINA Training: Auditor Role" (11 videos)
- "MEDINA Training: Security Governance Role" (10 videos)
- "MEDINA Training: Product Security Role" (13 videos)
- "MEDINA Training: Developer/Integrator Role" (4 videos)
- "MEDINA Overview" (3 videos)

The "*MEDINA Training*" playlists are used to support the MEDINA online courses reported in Deliverable D7.10 [3]. Figure 39 shows the contents of the "MEDINA Training: Auditor Role" playlist.

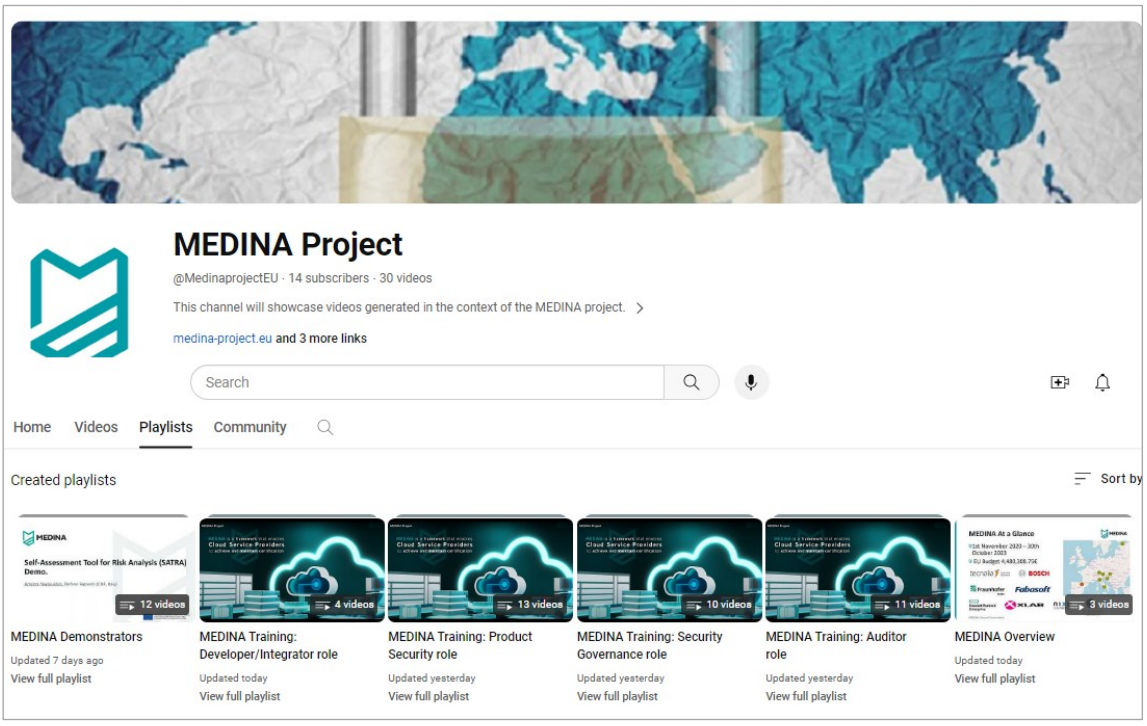

Figure 37. Playlists in the MEDINA YouTube channel

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Figure 38. MEDINA YouTube channel

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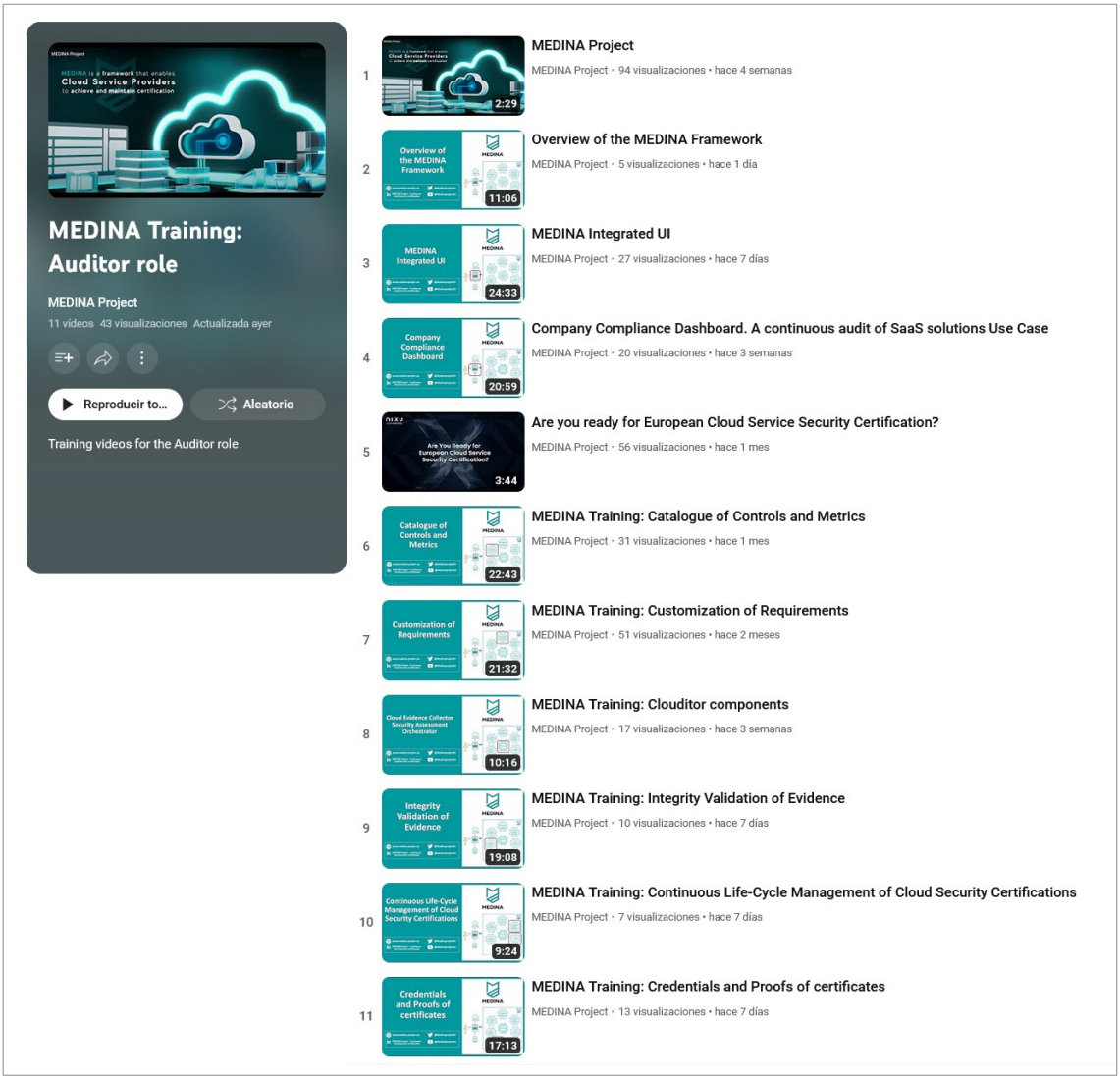

Figure 39. Contents of the "MEDINA Training: Auditor Role" playlist

In terms of YouTube analytics, Figure 40 represents the views per content over the entire duration of the project. As can be seen in the figure, over the last few months, video views have become more relevant as more videos have become available on the channel.

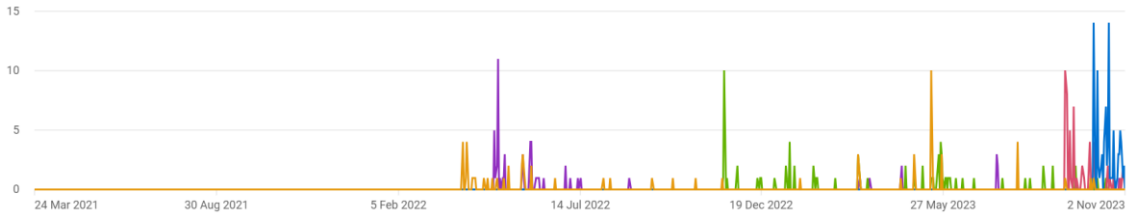

Figure 40. YouTube analytics over the entire duration of the MEDINA project

Figure 41 shows the videos with the highest number of views and impressions at the time of writting. The MEDINA Project video has received the highest number of views (more than 100) and impressions (more than 1,000).

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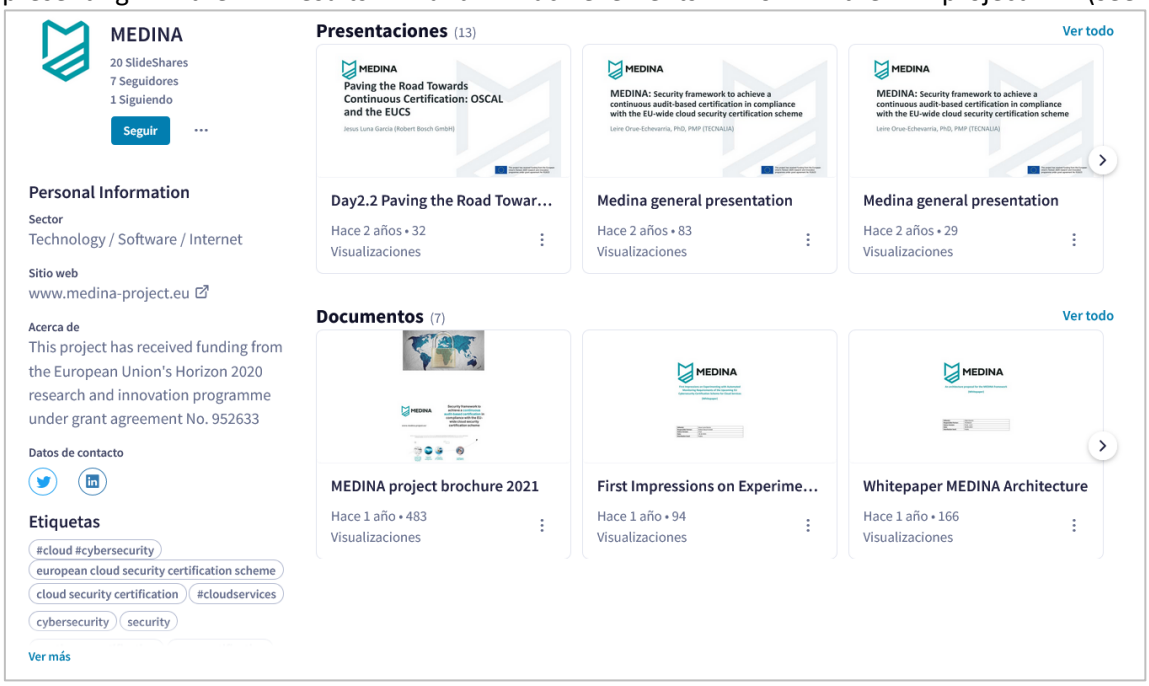
	Content	Average view duration	Views
1	MEDINA Project 6 Oct 2023	1:04 (43.4%)	106
2	MEDINA Framework demo 16 Nov 2022	3:08 (17.9%)	75
3	MEDINA H2020 Project overview 2 Apr 2022	1:05 (32.9%)	64
4	SATRA Demo 29 Apr 2022	3:11 (19.0%)	63
5	Are you ready for European Cloud Service Security Certification? 11 Sept 2023	0:42 (18.9%)	57
6	MEDINA Training: Customization of Requirements 11 Aug 2023	2:42 (12.6%)	53

Figure 41. Overview of views and impressions on the MEDINA videos

4.2.4 SlideShare

MEDINA SlideShare profile[25] has been used to spread the achievements of the MEDINA project to all target groups, by offering project partners the possibility to upload and share publicly documents in different formats (Adobe PDF, Microsoft Word, and OpenOffice).

The SlideShare profile has been defined to contain relevant presentations, generic or specific, presenting the results and achievements of the project (see



[25] Please refer to https://es.slideshare.net/MEDINAContinuousclou

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Figure 42). During the first reporting period, 4 project presentations and 2 documents (Whitepaper and Brochure) were uploaded to the SlideShare platform. During the second reporting period, 12 project presentations were uploaded to the MEDINA SlideShare and 9 documents (4 Whitepapers, 3 Posters and 2 Brochures) were uploaded to the SlideShare platform.

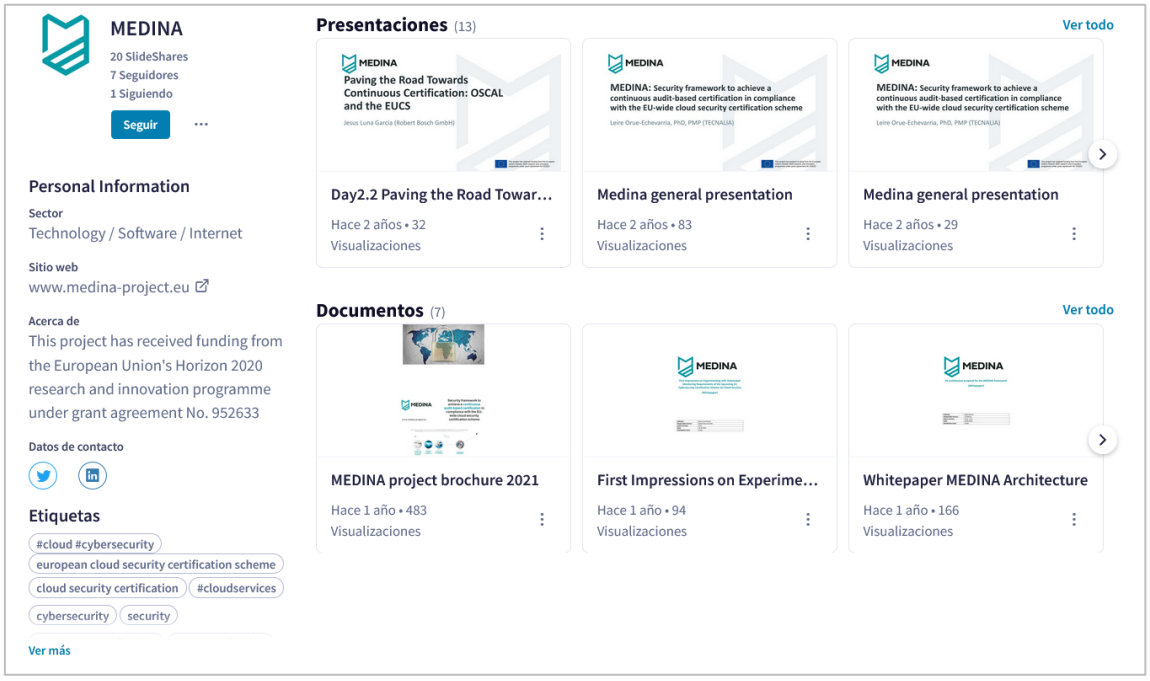

Figure 42. MEDINA SlideShare profile

In terms of the SlideShare analytics, the total number of views on MEDINA's SlideShare channel during all the project duration has been 1,172. The document with the most views is the MEDINA brochure 2021 with 483 views.

Figure 43 shows the traffic sources to the MEDINA Slideshare channel, with Slideshare being the most relevant source (39.80%), then Referral (19.39%), Direct (19.39%), Search (19.39%) and Social (2.04%).

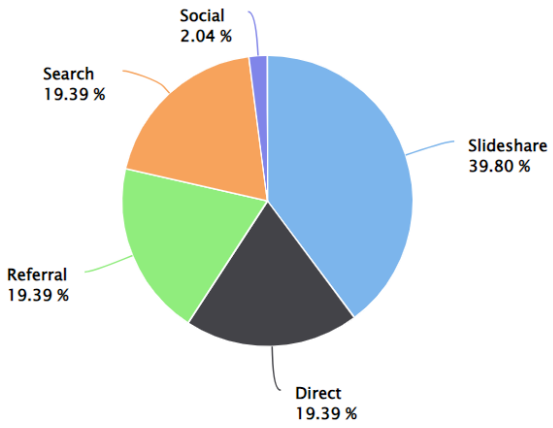

Figure 43. MEDINA SlideShare Traffic analytics for the full project

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4.2.5 Zenodo

The MEDINA Community has been created in Zenodo[26], representing an open access repository where all public deliverables, whitepapers, publications and open-source SW components of MEDINA have been published, following a recommendation of the experts during the RP1 project review.

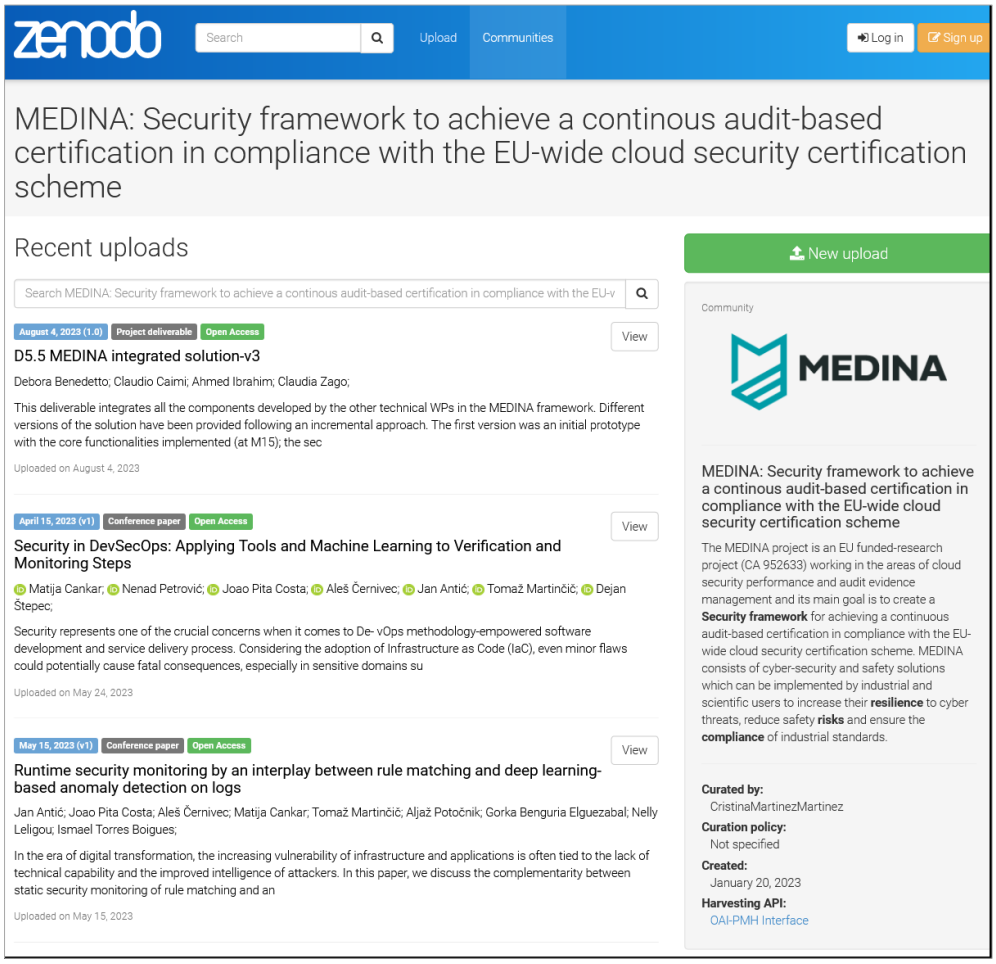

Figure 44. MEDINA Community page in Zenodo

[26] Please refer to https://zenodo.org/communities/medina

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5 Dissemination Activities

This section lists the results of the dissemination activities carried out during the second half of the project (month 19-36). The revision of the dissemination KPIs can be found in Section 7.

Dissemination activities mainly concern scientific publications, participation to industrial events related to MEDINA, as well as the participation of partners to panels, seminars, lectures in which the MEDINA project was presented and enhanced. The consortium updated monthly devoted dissemination reports, in order to be always updated on this kind of activities as well as to monitor their outcome.

5.1 Scientific Publications

5.1.1 Journal publications

Table 5 shows the list of MEDINA journal publications that have been accepted. Table 6 lists those publications submitted but not yet accepted at the time of writing.

Table 3. List of MEDINA Journal publications published and accepted

Title of the article	Event and publication	Name of author and Organisation
Understanding the challenges and novel architectural models of multi-cloud native applications – a systematic literature review	Journal of Cloud Computing: Advances, Systems and Applications, Volume 12, Issue 1, Aug 2023 https://doi.org/10.1186/s13677-022-00367-6	Alonso, J., Orue-Echevarria, L., Casola, V. *et al.* (TECNALIA)

Table 4. List of MEDINA Journal Publications submitted but not yet accepted at the time of writing

Title of the article	Event and publication	Name of author and Organisation
Evolution of secure development lifecycles and maturity models in the context of hosted solutions	Journal of Software: Evolution and Process	Felix Lange, Immanuel Kunz (FhG)

5.1.2 Conference publications

Table 5 shows the list of MEDINA scientific publications from M19 to M36. Table 6 lists those publications submitted in this period but not yet published at the time of writing.

Table 5. List of Conference Publications published and accepted from M19 to M36

Title of the article	Event and publication	Name of author and Organisation
Poster: Patient Community - A Test Bed for Privacy Threat Analysis	CCS '22: Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security November 2022 Pages 3383–3385 https://doi.org/10.1145/3548606.3564253	Immanuel Kunz, Angelika Schneider, Christian Banse, Konrad Weiss, Andreas Binder (FhG)

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Title of the article	Event and publication	Name of author and Organisation
Representing LLVM-IR in a Code Property Graph	International Conference on Information Security ISC 2022: Information Security pp 360–380 https://doi.org/10.1007/978-3-031-22390-7_21	Alexander Küchler, Christian Banse (FhG)
A Continuous Risk Assessment Methodology for Cloud Infrastructures	IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGRID) 2022 https://doi.org/10.48550/arXiv.2206.07323	Immanuel Kunz, Angelika Schneider, Christian Banse (FhG)
Application-Oriented Selection of Privacy-Enhancing Technologies	Annual Privacy Forum, June 23-24, 2022, Warsaw. APF 2022: Privacy Technologies and Policy pp 75–87 https://doi.org/10.1007/978-3-031-07315-1_5	Immanuel Kunz, Andreas Binder (FhG)
Privacy Property Graph: Towards Automated Privacy Threat Modelling via Static Graph-based Analysis	Privacy Enhancing Technologies Symposium (PETS) 2022, July 11-15, 2022 https://doi.org/10.56553/popets-2023-0046	Immanuel Kunz, Konrad Weiß, Christian Banse, Angelika Schneider (FhG)
A Semantic Evidence-based Approach to Continuous Cloud Service Certification	SAC '23: Proceedings of the 38th ACM/SIGAPP Symposium on Applied Computing, March 2023, Pages 24–33 https://doi.org/10.1145/3555776.3577600	Christian Banse, Immanuel Kunz, Nico Haas, Angelika Schneider (FhG)
Runtime security monitoring by an interplay between rule matching and deep learning-based anomaly detection on logs	2023 19th International Conference on the Design of Reliable Communication Networks (DRCN) https://ieeexplore.ieee.org/document/10108105	Jan Antic et al. (XLAB)
Security in DevSecOps: Applying Tools and Machine Learning to Verification and Monitoring Steps	ICPE '23 Companion, Companion of the 2023 ACM/SPEC International Conference on Performance Engineering, April 15–19, 2023, Coimbra, Portugal https://dl.acm.org/doi/10.1145/3578245.3584943	Matija Cankar et al. (XLAB)
AMOE: a Tool to Automatically Extract and Assess Organizational Evidence for Continuous Cloud Audit	37th Annual IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSec'23) Sophia Antipolis, France - July 19-21, 2023 https://doi.org/10.1007/978-3-031-37586-6_22	Franz Deimling (Fabasoft) Michela Fazzolari (CNR)
Understanding the challenges and opportunities of Multi-Cloud native applications -a systematic literature review	Journal of Cloud Computing: Advances, Systems and Applications, Volume 12, Issue 1, Aug 2023 https://doi.org/10.1186/s13677-022-00367-6	Juncal Alonso (TECNALIA) et al.

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Table 6. List of Conference Publications conditionally accepted for publication at time of writing

Title of the article	Event and publication	Name of authors and Organisations
MEDINA Catalogue of Cloud Security controls and metrics: Towards Continuous Cloud Security compliance	Open Research Europe	Cristina Martinez, Iñaki Etxaniz, Alberto Molinuevo, Juncal Alonso (TECNALIA)
Continuous Auditing and Continuous Certification in MEDINA: Security Auditor's View	Open Research Europe	Tatu Sahonen (NIXU), Cristina Martinez (TECNALIA)

5.2 Detailed Information of Scientific Publications (once published)

Table 7 shows more detailed information about those scientific publications that have already been published at the time of writing. For the sake of completeness, we report all the published publications since the beginning of the project.

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Table 7. List of Scientific Publications (detailed info)

Title	Authors	Title of the periodical or the series	Number, date or frequency	Publisher	Year of publication	Relevant pages	Permanent identifiers (if available)	Is/Will open access be provided to this publication?
MEDINA: Improving Cloud Services trustworthiness through continuous audit-based certification	Leire Orue-Echevarría, Juncal Alonso (TECNALIA) Jesus Luna (Bosch) Christian Banse (FhG)	First SwForum workshop on trustworthy software and open source	CEUR-WS.org, ISSN 1613-0073 Vol 2878	CEUR-WS (Online)	2021	8-15		Yes http://ceur-ws.org/Vol-2878/paper3.pdf
Data Sovereignty in the Cloud-Wishful Thinking or Reality?	Christian Banse (FhG)	Proceedings of the 2021 on Cloud Computing Security Workshop		ACM	2021	153-154	DOI: 10.1145/3474123.3486792	https://dl.acm.org/doi/pdf/10.1145/3474123.3486792
Cloud Property Graph: Connecting Cloud Security Assessments with Static Code Analysis	Christian Banse, Immanuel Kunz, Angelika Schneider, Konrad Weiß (FhG)	IEEE International Conference on Cloud Computing 2021		IEEE	2021	13-19	DOI: 10.1109/CLOUD53861.2021.00014	https://arxiv.org/abs/2206.06938
Poster: Patient Community -- A Test Bed for Privacy Threat Analysis	Immanuel Kunz, Angelika Schneider, Christian Banse, Konrad Weiss, Andreas Binder (FhG)	Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications		ACM	2022	3383–3385	10.1145/3548606.3564253	https://arxiv.org/abs/2308.02272

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Title	Authors	Title of the periodical or the series	Number, date or frequency	Publisher	Year of publication	Relevant pages	Permanent identifiers (if available)	Is/Will open access be provided to this publication?
		Security November 2022						
Representing LLVM-IR in a Code Property Graph	Alexander Küchler, Christian Banse (FhG)	International Conference on Information Security ISC 202		Springer	2022	360–380	10.1007/978-3-031-22390-7_21	https://arxiv.org/abs/2211.05627
A Continuous Risk Assessment Methodology for Cloud Infrastructures	Immanuel Kunz, Angelika Schneider, Christian Banse (FhG)	22nd IEEE International Symposium on Cluster, Cloud and Internet Computing (CCGrid), Taormina, Italy, 2022		IEEE	2022	1042-1051	10.1109/CCGrid54584.2022.00127	https://arxiv.org/abs/2206.07323
Application-Oriented Selection of Privacy-Enhancing Technologies	Immanuel Kunz, Andreas Binder (FhG)	Annual Privacy Forum, June 23-24, 2022, Warsaw APF 2022: Privacy Technologies and Policy		Springer	2022	75-87	10.1007/978-3-031-07315-1_5	https://arxiv.org/abs/2206.07329
Privacy Property Graph: Towards Automated Privacy Threat Modeling via	Immanuel Kunz, Konrad Weiß, Christian Banse,	Privacy Enhancing Technologies Symposium			2023	171-187	10.56553/popets-2023-0046	https://www.researchgate.net/publication/369700862_Privacy_Property_Graph_Towards_Automat

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Title	Authors	Title of the periodical or the series	Number, date or frequency	Publisher	Year of publication	Relevant pages	Permanent identifiers (if available)	Is/Will open access be provided to this publication?
Static Graph-based Analysis	Angelika Schneider (FhG)	(PETS) 2022, July 11-15, 2022						ed_Privacy_Threat_Modeling_via_Static_Graph-based_Analysis https://petsymposium.org/popets/2023/popets-2023-0046.php
A Semantic Evidence-based Approach to Continuous Cloud Service Certification	Christian Banse, Immanuel Kunz, Nico Haas, Angelika Schneider (FhG)	SAC '23: Proceedings of the 38th ACM/SIGAPP Symposium on Applied Computing, March 2023		ACM	2023	24-33	10.1145/3555776.3577600	Open access: https://dl.acm.org/doi/10.1145/3555776.3577600
Runtime security monitoring by an interplay between rule matching and deep learning-based anomaly detection on logs	Jan Antic et al. (XLAB)	19th International Conference on the Design of Reliable Communication Networks (DRCN)		IEEE	2023	1-5	10.1109/DRCN57075.2023.10108105	https://zenodo.org/record/7937448/files/Paper%20IOSEC%202023.pdf
Security in DevSecOps: Applying Tools and Machine Learning to Verification and Monitoring Steps	Matija Cankar, et al. (XLAB)	ICPE '23 Companion, Companion of the 2023 ACM/SPEC International Conference on Performance Engineering, April 15–19,		ACM	2023		10.1145/3578245.3584943	Open access: https://dl.acm.org/doi/abs/10.1145/3578245.3584943

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Title	Authors	Title of the periodical or the series	Number, date or frequency	Publisher	Year of publication	Relevant pages	Permanent identifiers (if available)	Is/Will open access be provided to this publication?
		2023, Coimbra, Portugal						
AMOE: a Tool to Automatically Extract and Assess Organizational Evidence for Continuous Cloud Audit	Franz Deimling (Fabasoft) Michela Fazzolari (CNR)	37th Annual IFIP WG 11.3 Conference on Data and Applications Security and Privacy (DBSec'23) Sophia Antipolis, France - July 19-21, 2023	LNCS 13942	Springer	2023	369-385	10.1007/978-3-031-37586-6_22	https://arxiv.org/abs/2307.16541
Understanding the challenges and opportunities of Multi-Cloud native applications – A systematic literature review	Juncal alonso et al. (TECNALIA)	Journal of Cloud Computing: Advances, Systems and Applications, Volume 12, Issue 1, Aug 2023	Volume 12, Issue 26, 2023	Springer	2023		10.1186/s13677-022-00367-6	Open access: https://journalofcloudcomputing.springeropen.com/articles/10.1186/s13677-022-00367-6

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5.3 General and Business Publications and Whitepapers

Table 8 and Table 9 list the main general and business publications during the second reporting period.

Table 8. List of general and business publications from M19 to M36

Title	Link or reference	Date	Partner
The EUCS Criteria Harmonizes Cloud Security: an interview with Niki Klaus, CEO of Nixu Certification	https://www.tivi.fi/uutiset/pilven-tietoturva-sai-uuden-sertifikaatin-yritykset-voivat-pohtia-minka-tason-palveluja-ne-alkavat-tarjota/c9c54873-ff94-4bcc-a6cc-8d9a1d88e9ed • LinkedIn • Twitter/X	10/10/2023	NIXU
Dissemination of Nixu's testimonial video	https://youtu.be/d0lJjk3-Eio • LinkedIn • Twitter/X	06/10/2023	NIXU
Trabajamos en soluciones de ciberseguridad y certificación (ENG: Working on cybersecurity solutions and certification)	https://www.tecnalia.com/noticias/soluciones-ciberseguridad-certificacion • LinkedIn	01/08/2023	TECNALIA
BSc Thesis: Analyse und Vergleich von Compliance-Werkzeugen in Multi-Cloud-Umgebungen (ENG: Analysing and comparing compliance tools in multi-cloud environments)	https://medina-project.eu/wp-content/uploads/2023/09/Bachelorarbeit_Levi_Lu%CC%88bbe_Final.pdf	16/07/2023	Bosch
BSc Thesis: Framework für Cybersecurity-Metriken für die Einhaltung von Vorschriften (ENG: Framework for cybersecurity metrics for regulatory compliance)	https://medina-project.eu/wp-content/uploads/2023/05/Bachelorarbeit_mit_EU_Nachweis.pdf	14/04/2023	Bosch
Reforzamos la certificación de seguridad en la nube (ENG: Strengthening cloud security certification)	https://www.tecnalia.com/noticias/certificacion-seguridad-nube • Twitter, LinkedIn, Facebook	31/08/2022	TECNALIA
BSc Thesis: Modell-Diebstahl für Zeitreihenprognosen in Bezug auf ein Cybersecurity Governance Framework für Künstliche Intelligenz (ENG: Model theft for time series forecasting in relation to a cybersecurity governance framework for artificial intelligence)	https://medina-project.eu/wp-content/uploads/2023/05/Thesis_Valentin_Acker_MEDINA.pdf	23/08/2022	Bosch

In August 2022, Bosch BSc student Acker finalized "Modell-Diebstahl für Zeitreihenprognosen in Bezug auf ein Cybersecurity Governance Framework für Künstliche Intelligenz". In his thesis, Mr. Acker explores the idea of assessing the cybersecurity of Artificial Intelligence models in order to

detect vulnerabilities which are specific to this technology. The resulting assessment methodology (applicable to so-called time-series AI models) can become an AI-specific Evidence Collector in the MEDINA framework, which is the basis for the upcoming Horizon Europe COBALT project (project number 101119602).

In April 2023, Bosch BSc student Habeck finalized his BSc thesis "*Framework für Cybersecurity-Metriken für die Einhaltung von Vorschriften".* Mr. Habeck's thesis is a direct extrapolation of MEDINA framework in an industrial context, where real-world experiences are leveraged. The resulting framework (consisting of processes and proposed tools) is currently being analyzed by our operational teams at Bosch to assess its feasibility of implementation.

In July 2023, Bosch BSc student Levi Lübbe finalized his BSc thesis "Analyse und Vergleich von Compliance-Werkzeugen in Multi-Cloud-Umgebungen**",** where he developed a framework to compare different Cloud Security Posture Management tools (CSPM) that exist in the market. The proposed framework aims to guide cloud service providers in selecting the CSPM which closer fulfills its requirements, and this is relevant given the growing market demand for such services. This topic is relevant to MEDINA because on the one hand the notion of CSPM is fundamental to leverage the proposed continuous audit framework. On the other hand, Mr. Lübbe's thesis also supports MEDINA's EUROSCAL initiative[27] with some initial thoughts on extending OSCAL for native CSPM usage.

For the sake of completeness, Table 9 shows the list of general and business publications during the *first* eighteen months of the project.

Table 9. List of general and business publications from M1 to M18

Title	Link or reference	Date	Partner
Certificación continua de seguridad para servicios en la nube	https://www.tecnalia.com/noticias/certificacion-continua-alta-seguridad-servicios-nube	12/04/2022	TECNALIA
How to enable better security posture in the cloud environment?	https://www.nixu.com/blog/how-enable-better-security-posture-cloud-environment	25/02/2022	NIXU
Automated cybersecurity monitoring: the path to continuous compliance	https://www.fabasoft.com/en/news/blog/automated-cybersecurity-monitoring-path-continuous-compliance	27/10/2021	Fabasoft
Continuous compliance: From traditional auditing to real-time certification	https://www.fabasoft.com/en/news/blog/continuous-compliance-traditional-auditing-real-time-certification	04/10/2021	Fabasoft
Using NLP to extract compliance-related evidence	https://www.fabasoft.com/en/news/blog/using-nlp-extract-compliance-related-evidence	29/06/2021	Fabasoft
MEDINA and EU cybersecurity – a new European approach to security?	https://www.fabasoft.com/en/news/blog/medina-and-eu-cybersecurity-new-european-approach-security	21/05/2021	Fabasoft

[27] Please refer to https://euroscal.eu/

Title	Link or reference	Date	Partner
MEDINA entwickelt Methoden und Werkzeuge für automatisierte Sicherheitsüberprüfung	https://www.aisec.fraunhofer.de/de/presse-und-veranstaltungen/presse/pressemitteilungen/2021/Medina_Project.html	28/01/2021	FhG
Fabasoft "goes MEDINA": On track to real-time certification for cloud services	https://www.fabasoft.com/en/news/latest-news/fabasoft-goes-medina-track-real-time-certification-cloud-services	20/01/2021	Fabasoft
Cybersecurity: Certifying cloud services with real-time data	https://www.fabasoft.com/en/news/blog/cybersecurity-certifying-cloud-services-real-time-data	30/10/2020	Fabasoft

Table 10 lists all the whitepapers produced during the project lifetime.

Table 10. List of whitepapers during the project lifetime

Title	Link or reference	Date	Partner
Continuous Life-Cycle Management of Cloud Security Certifications	https://medina-project.eu/wp-content/uploads/2023/10/202309_Whitepaper_MEDINA_Continuous-Life-Cycle-Management-of-Cloud-Security-Certifications.pdf	30/09/2023	FhG, XLAB, CNR, NIXU, TECNALIA
The MEDINA Controlled Natural Language	https://medina-project.eu/wp-content/uploads/2023/10/202309_Whitepaper_MEDINA_CNL.pdf	30/09/2023	CNR
Metric Recommender System and the use of Natural Language Processing	https://medina-project.eu/wp-content/uploads/2023/10/202309_Whitepaper_MEDINA_Metric_Recommender_NLP.pdf	30/09/2023	CNR
EUROSCAL – Paving the Road Towards Interoperable and Automated Compliance Monitoring in Europe	https://medina-project.eu/wp-content/uploads/2023/10/202308_Whitepaper_EUROSCAL_MEDINA.pdf	06/09/2023	Bosch
An architecture proposal for the MEDINA framework	https://medina-project.eu/wp-content/uploads/2023/05/202204_Whitepaper_MEDINA_Architecture_v1.0.pdf	30/04/2022	TECNALIA, Bosch, CNR, FhG, HPE, NIXU
MEDINA: First Impressions on Experimenting with Automated Monitoring Requirements of the Upcoming EU Cybersecurity Certification Scheme for Cloud Services	https://medina-project.eu/wp-content/uploads/2023/05/202109_Whitepaper_ENISA-PoC_MEDINA.pdf	01/11/2021	Bosch, NIXU, Fabasoft

5.4 Participation in Events

Table 11 shows the main dissemination events in which MEDINA partners participated during the second reporting period.

Table 11. List of attended events from M19 to M36

Event	Date	Name and type of audience	Countries addressed	Size of audience	Partner
HSBooster.eu webinar Standardization in Cybersecurity"	17/10/2023	Industry, Research	10	50	Jesus Luna Garcia (Bosch)
World Summit AI	11/10/2023	Industry	International	150	Jesus Luna Garcia (Bosch)
Risk Management @ CyberSecurity Day 2023, Pisa, Italy	06/10/2023	Research/Secondary Schools/Industry	Italy	100	Artsiom Yautsiukhin (CNR)
NexusForum2023	5-6/10/2023	Industry	EU	90	Juncal Alonso (TECNALIA)
reThink! Cloud Security 2023	19/09/2023	Industry	International	150	Jesus Luna Garcia (Bosch)
Nixucon 23	18-19/08/2023	Nixu Employees	Finland, Sweden, Denmark, Norway, Netherlands	400	Niki Klaus, Tatu Suhonen (NIXU)
ENISA AI Cybersecurity Conference	07/07/2023	Policy Makers, Academia, Industry	EU	500	Jesus Luna Garcia (Bosch)
i-4 Global Hybrid Forum 102	26/06/2023	Industry	EU/US	100	Jesus Luna Garcia (Bosch)
CYRENE Workshop on Standardization	26/06/2023	Academia, Industry	EU	20	Jesus Luna Garcia (Bosch)
4th Open Security Controls Assessment Language (OSCAL) Conference and Workshop	23/05/2023	Policy Makers, Industry	US	50	Jesus Luna Garcia (Bosch)
ENISA Cybersecurity Week	23/05/2023	Industry, Policy Makers	EU	30	Jesus Luna Garcia (Bosch)
Third MEDINA Expert Stakeholder Group meeting	25/04/2023	Academia, Industry	EU, US, UK	8	Cristina Martínez (TECNALIA), Iñaki Etxaniz (TECNALIA), Mika Leskinen (NIXU), Jesus Luna Garcia (Bosch)
Lecture "MEDINA: Automation-based certification for	12/04/2023	Academia, Industry	Spain	30	Jesus Luna Garcia (Bosch)

Event	Date	Name and type of audience	Countries addressed	Size of audience	Partner
cloud services in Europe"					
Bitkom webmeeting "Continous Monitoring"	15/03/2023	Cloud Providers and Customers, Industry	Germany	50	Christian Banse (FhG), Jesus Luna (Bosch)
SWForum Webinar	16/02/2023	Research, Industry	EU	15	Jesus Luna Garcia
NECS PhD Winter School	06/02/2023	Academia, Researchers	EU	50	Jesus Luna Garcia (Bosch)
20 years of IIT-CNR: MEDINA overview	14/12/2022	Academia	Italy	80	Michela Fazzolari (CNR)
ENISA EUCS Plenary	23/11/2022	CABs, CSP, CSC, Industry	EU	50	Jesus Luna Garcia (Bosch), Cristina Martinez (TECNALIA), Christian Banse (FhG)
ENISA EUCS Meeting (vulnerability handling)	22/11/2022	CABs, CSPs, Industry	EU	70	Jetzabel Serna Olvera, Jesus Luna Garcia (Bosch)
Cybersecurity Market Analysis Conference	21/11/2022	Policy makers, CABs, CSPs, CSC, Industry	EU	50	Jesus Luna Garcia (Bosch)
Dagstuhl Seminar on Intelligent AI Security	14/10/2022	Academia, Industry	US, Singapore, EU	30	Jesus Luna Garcia (Bosch)
ISACA GRC Kongress 2022	28/09/2022	Industry	Germany	30	Jesus Luna Garcia (Bosch)
InfoSecurity Europe 2022	21/06/2022	Industry	International	30	Jesus Luna Garcia, Thomas Ruebsamen (Bosch)
ENISA Cybersecurity Certification Conference 2022	30/05/22-01/06/22	Industry and policy makers	EU	>100	Jesus Luna Garcia (Bosch)
Info session on Horizon Results Booster – steering research towards a strong societal impact	25/05/2022	Horizon H2020 projects	EU	500	Antti Kantero (NIXU)
3rd International Workshop on Secure Mobile Cloud Computing (IWoSeMC) @CCGrid 2022	16/05/2022	Cloud Researchers and Practitioners	International	5	Immanuel Kunz, Angelika Schneider and Christian Banse (FhG)
Cloud Expo Europe 2022	11/05/2022	Industry	International	~60	Jesus Luna Garcia (Bosch)

Event	Date	Name and type of audience	Countries addressed	Size of audience	Partner
Cyber Security Nordic	07-08/05/2022	CyberSecurity Professionals	Finland	10	NIXU
Second MEDINA Expert Stakeholder Group meeting	03/05/2022	Academia, Industry	EU, US, UK	8	Cristina Martínez (TECNALIA), Mika Leskinen (NIXU), Jesus Luna Garcia (Bosch)

The following figures show some evidence of the participation of MEDINA in dissemination events during the second reporting period.

Figure 45. Poster for the HSBooster.eu event, held online on October 17, 2023, attended by partner Bosch

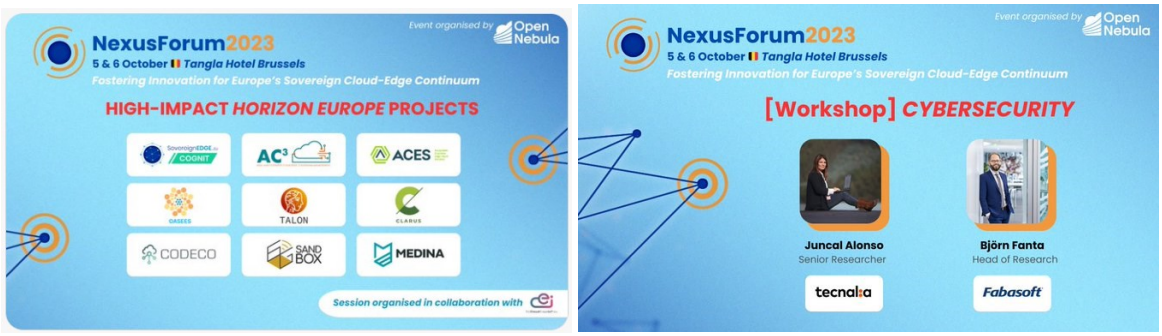


Figure 46. Poster for the NexusForum 2023 event, held in Brussels on October 5 and 6, 2023, attended by partners TECNALIA and Fabasoft

Figure 47. Participation in the World Submit AI, held in Amsterdam on October 11-12, 2023, attended by partner Bosch

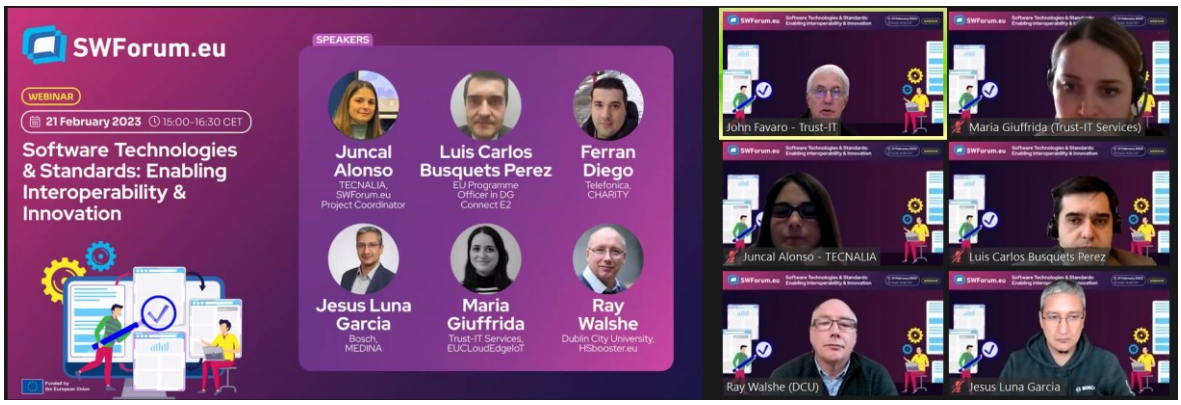


Figure 48. Participation in the SWForum webinar "Sofware Technologies & Standards: Enabling Interoperability & Innovation", held online on February 21, 2023, attended by partner Bosch

For the sake of completeness, Table 12 shows the main dissemination events in which MEDINA partners have participated during the *first* eighteen months of the project.

Table 12. List of attended events from M1 to M18

Event	Date	Name and type of audience	Countries addressed	Size of audience	Partner
Beyond AI Algorithms: How can AI systems be protected and trusted https://www.ai-circle.de/16-ai-circle	26/04/2022	Industry, Academia, Public Sector	Online/International	~100	Jesus Luna Garcia (Bosch)
TAS-S Seminar "From Continuous Monitoring to Continuous Cloud Cybersecurity Certification" https://tas-security.lancs.ac.uk/seminars/	04/02/2022	University seminar	UK, EU	30	Jesus Luna Garcia (Bosch)

Event	Date	Name and type of audience	Countries addressed	Size of audience	Partner
Lecture: Cyber insurance	18/01/2022	NeCS winter school	Online	25	Artsiom Yautsiukhin (CNR)
"Future Proofing and Certifying Supply Chains" Clustering Workshop https://www.project-assured.eu/event/future-proofing-and-certifying-supply-chains/	13/12/2021	EU projects	EU, Online	100	Leire Orue-Echeverria (TECNALIA)
H-cloud summit 2021 – Participation in the panel "Cloud Standardisation and Open-Source for a Robust Digital Cloud Landscape"	08/12/2021	Research	Worldwide	50	Jesus Luna Garcia (Bosch), Leire Orue-Echeverria (TECNALIA)
Talk: A tool for risk analysis and reduction)@ CyberSecurity Day 2021, Pisa, Italy	08/10/2021	Research/Secondary Schools/Industry	Italy	100	Artsiom Yautsiukhin (CNR)
Webinar: Cybersecurity in automotive industry	21/09/2021	Slovenian Chamber of Commerce members, ICT sector	Slovenia	50	Aleš Černivec (XLAB)
Workshop: MEDINA: Security framework for cloud service providers to achieve a continuous audit-based certification	03/09/2021	CyberCert 2021	International	20	Artsiom Yautsiukhin (CNR)
BSI Sicherheitskongress	03/02/2021	Automatisierte Compliance Prüfung in Software-Artefakten	Germany	100	Christian Banse (FhG)
US NIST "OSCAL Workshop 2021" https://www.nist.gov/news-events/events/2021/02/2nd-open-security-controls-assessment-language-oscal-workshop	03/02/2021	Industry, Academia, Public Sector	US/International	500	Jesus Luna Garcia (Bosch)

In addition to the offer of the packaged videos for MEDINA online courses, MEDINA partners delivered lectures and seminars to doctoral schools and specific workshops on Cloud Security topics. Table 13 shows the training events where these teachings were conducted, throughout the lifetime of MEDINA. The material related to these training activities is included in Deliverable D7.10 [3].

Table 13. List of Training Events during the project lifetime

Event	Date	Name and type of audience	Countries addressed	Size of audience	Partner
Talk "More than just a Risk Management" CyberSecurity Day 2023, Pisa, Italy	06/10/2023	Academia/Industry /Secondary Schools	Italy	100	Artsiom Yautsiukhin (CNR)
Lecture "Valutazione e mitigazione del rischio di sicurezza cyber" (ENG: "Cyber Security Risk Assessment and Mitigation")". Cyber Security master in the University of Pisa.	31/03/2023	Academia	Italy	60-70	Artsiom Yautsiukhin (CNR)
Lecture "MEDINA: Automation-based certification for cloud services in Europe". Barcelona Tech's MSc Programme in Cybersecurity.	12/04/2023	Academia, Industry	Spain	30	Jesus Luna Garcia (Bosch)
Lecture "MEDINA – Paving the road towards continuous audit-based certification for cloud services in Europe", NECS PhD Winter School.	06/02/2023	Academia, Researchers	EU	50	Jesus Luna Garcia (Bosch)
Seminar "Intelligent AI Security". TU Darmstadt (Germany).	14/12/2022	Academia, Industry	US, Singapore, EU	30	Jesus Luna Garcia (Bosch)
TAS-S Seminar "From Continuous Monitoring to Continuous Cloud Cybersecurity Certification". Lancaster University (UK).	04/02/2022	University seminar	UK, EU	30	Jesus Luna Garcia (Bosch)
Lecture "Cyber insurance". NeCS winter school	18/01/2022	Academia, Researchers	EU Online	25	Artsiom Yautsiukhin (CNR)
Talk "Lo strumento di analisi e riduzione dei rischi" (ENG: The tool for risk analysis and reduction). CyberSecurity Day 2021	08/10/2021	Academia, Researchers	IT	100	Artsiom Yautsiukhin (CNR)
Webinar "Cybersecurity in automotive industry". Slovenian Chamber of Commerce members.	21/09/2021	ICT Sector	SLO	50	Aleš Černivec (XLAB)

5.5 References to MEDINA in external sources

Table 13 shows a list of projects and initiatives which have referred to MEDINA on their own whitepapers, blogs, or social accounts.

Table 14 References to MEDINA in external sources

Source	Reference
hsbooster.eu	https://hsbooster.eu/project-hub/medina
swforum.eu	https://swforum.eu/project-hub/security-framework-achieve-continuous-audit-based-certificationn-compliance-eu-wide-0
standict.eu	https://standict.eu/news/standicteu-2023-medina-kick-their-collaboration-mou-reinforce-european-standardisation-efforts
all-about-security.de	https://www.all-about-security.de/medina-entwickelt-methoden-und-werkzeuge-fuer-automatisierte-sicherheitsueberpruefung/
StandICT.eu 2023	https://www.standict.eu/news/standicteu-2023-medina-kick-their-collaboration-mou-reinforce-european-standardisation-efforts
StandICT.eu 2023 Twitter/X	https://twitter.com/Stand_ICT/status/1569281584292831232?s=20
First SWForum.eu Workshop on Trustworthy Software and Open Source	https://swforum.eu/events/first-swforumeu-workshop-trustworthy-software-and-open-source https://swforum.eu/workshop-programme
Software Technologies and Standards: Enabling Interoperability and Innovation	https://swforum.eu/events/software-technologies-and-standards-enabling-interoperability-and-innovation
CYRENE Clustering workshop	https://www.cyrene.eu/future-proofing-and-certifying-supply-chains-clustering-workshop/
CYRENE Workshop on Cybersecurity Standardization and Supply Chain Security	https://www.cyrene.eu/cyrene-standardisation-event/
CYRENE Twitter/X	https://twitter.com/CYRENE_H2020/status/1687342101099388928?s=20
Open Class "MEDINA: Audit-Based Certification for Cloud Services in Europe" (UPC)	https://www.talent.upc.edu/ing/agenda/event/4381/32330600/open-class-medina-audit-based-certification-cloud-services-europe/
NIST – Presentation “Paving the Road Towards Continuous Certification: OSCAL and the EUCS”	https://www.nist.gov/system/files/documents/2021/02/22/Day2.2-Jesus%20Garcia%20Luna%20-%20OSCAL_Workshop_Medina.pdf
HSBooster project hub	https://www.hsbooster.eu/project-hub/medina
HSBooster webminar “Standardisation in Cybersecurity”	https://twitter.com/HSboosterEU/status/1714287134969126943?s=20
FISHY project	https://twitter.com/H2020Fishy/status/1696454261498863901?s=20

Source	Reference
FISHY project	https://fishy-project.eu/blog/fishy-liaisons-and-collaborations
NexusForum2023	https://x.com/NexusForumEU/status/1707325649835130894?s=20
EUCloudEdgeIoT	https://www.linkedin.com/posts/eucloudedgeiot_nexusforum2023-activity-7115989937333616640-KfEk?utm_source=share&utm_medium=member_desktop
SWForum	https://swforum.eu/project-hub/project-spotlight/project-spotlight-medina
PIACERE	https://piacere-project.eu/blog/enabling-360-cloud-security-compliance-from-security-certification-to-secure-devops-through-medina-and-piacere-h2020-projects/

5.6 Liaison Activities with other Related EU Funded Projects

Table 15 lists the projects on which MEDINA partners collaborated, under which areas and topics, and the status. The networking activities of MEDINA are presented in detail in Section 6.

Explanation symbols

✔	Collaboration has already started – concrete collaboration activities are reported
✔	Collaboration is envisioned but have not started yet
✖	Collaboration is not feasible Collaboration have started but could not be continued – concrete collaboration activities are not reported

Table 15. Collaboration with other projects

Project	Areas for collaboration	Remark	Status
ENISA AHWG EUCS	Participation in periodic meetings related to the development of EUCS, including the CEN CENELEC Technical Specification	Activities related to the Standardization Roadmap created by WP7.	✔
NIST OSCAL Applied	Exploration on applying OSCAL in the context of commercial CSPMs	Activity led by Bosch, collaboration exploration with GCP and AWS.	✔
ETSI CYBER OSCAL	Standardization in security metrics and OSCAL / Activity moved to ETSI CYBER OSCAL	Activities related to the Standardization Roadmap created by WP7.	✔
Price Waterhouse Coopers (PWC)	Continuous compliance assessments	Activities related to the Standardization Roadmap created by WP7. Accepted participation in ESG.	✔

Cisco CISO Group	Cloud Compliance Framework (CCF)	Activities related to the Standardization Roadmap created by WP7. Accepted participation in ESG.	✔
HSBooster	Standardization support	Several meetings with expert took place, and concrete actions were discussed for implementation.	✔
StandICT	Standardization support	Participation in survey to identify future areas of collaboration.	✔
Google Cloud CISO Group	NLP and continuous compliance monitoring	Discussion started on sustainable collaboration (data sharing, internships). Initial meetings took place together with CNR and Fabasoft.	✔
CYRENE	Standardization	Workshop participation by MEDINA.	✔
EUROSCAL	Collaboration with US NIST for up taking OSCAL in Europe	Kick-off done in June 2023.	✔
AssureMoss	Exploration of collaborative work on metrics and final dissemination event	Activity led by TECNALIA and Bosch.	✔
RegScale	OSCAL, MEDINA Catalogue	Activity led by TECNALIA and Bosch	✘
BBVA Susto Project	Exploration of synergies with privately funded SUSTO project (BBVA, Spain)	Led by TECANLIA and Bosch.	✘
Steinbeis	Risk management for compliance monitoring	Activity led by Bosch.	✘
Center for Internet Security (CIS)	Standardization in security metrics and OSCAL	Activities related to the Standardization Roadmap created by WP7.	✔

5.7 Expert Stakeholder Group (ESG)

As mentioned on the Description of Action (DoA) document [6], the MEDINA project has assembled an Expert Stakeholder Group (ESG) to provide feedback on planned research and innovation on cloud certification. The ESG presented in the DoA was proposed with recognized experts from academia, industry, and the standardization community. The prospective group of experts was confirmed in June 2021 with the members shown in Table 16.

Table 16. Members of MEDINA's Expert Stakeholder Group

Name	Affiliation	Country	Value for MEDINA
Andreas Weiss / Thomas Niessen	Gaia-X	Germany	Gaia-X is in the core of MEDINA's exploitation plan (WP7).
Patrick Grete	BSI	Germany	The German Ministry of Information Security (BSI) maintains a security controls framework[28] which was the first to introduce the notion of continuous (automated) monitoring (WP2-WP6).

[28] Please refer to https://www.bsi.bund.de/EN/Topics/CloudComputing/Compliance_Criteria_Catalogue/Compliance_Criteria_Catalogue_node.html;jsessionid=BC93835E06756BF8DF81CD531A513DD4.internet462

Name	Affiliation	Country	Value for MEDINA
Eric Vetillard	ENISA	Greece	ENISA is the lead developer of EUCS, which is one of the main focus for MEDINA's activities (WP2-WP7).
Jim de Haas[29]	ABN Amro	Netherlands	Provides the cloud customer perspective and expertise to the outcomes from MEDINA, which support the project's exploitation activities (WP7).
Meghan Herster[30]	Oracle / ISO	US	Represents global Cloud Service Providers with strong interest on compliance and certification automation. Mrs. Herster is also ISO/IEC representative for cloud security (WP7).
Michaela Iorga	NIST	US	NIST develops one of the most prominent standards[31] for machine-readable exchange of cybersecurity assessments (WP2-WP7).
Roberto Cascella	ECSO	Italy	Brings to the consortium the perspective of the cloud customers along with their interest in developing a single market for certification (WP7).
Ronit Reger	Microsoft	US	One of the major global Cloud Service Providers, and pioneer in continuous compliance mechanisms for the cloud (WP2-WP7).
Volkmar Lotz	SAP Research	France	Provides the EU research perspective to the outcomes and activities from MEDINA (WP2-WP4).
Vikram Khare	Google CISO	US	Leads continuous compliance monitoring at Google CISO group. Started on ESG in August-2023.
Prashant Vadlamudi	CISCO	US	Leads Cisco Cloud Controls Framework. Started on ESG in April-2023.
Tom Nash	PwC	UK	Leads OSCAL adoption in Europe. Started on ESG in April-2023.

As seen on Table 16, the ESG composition shows diversity from different perspectives (e.g., expertise, geography, industrial sector, gender) which results on a high value for MEDINA. Despite the DoA proposes to have a strong engagement with the ESG during the second half of the project's duration, it was decided to engage the experts earlier in order for them to realize how the project matures in its different stages. For this reason, on May 2021 the prospective ESG members were contacted based on an email communication with the following text:

> *Dear Expert Stakeholder Group members,*
>
> *I would like to inform you that starting in November 2020, we are working on MEDINA Project "MEDINA-Security framework to achieve a continuous audit-based certification in compliance with the EU-wide cloud security certification scheme"- SU-ICT-02-2020 No. 952633.*
>
> *Some months ago, you showed interest on participating in this project as a Member of the MEDINA Expert Stakeholder Group (ESG).*
>
> *The objective of the MEDINA Expert Stakeholders Group is to extend the MEDINA capability to involve experts outside the project's consortium, to improve project's assessment on its approaches, technologies*

[29] Requested leaving the ESG on July-2023 due to workload reasons.
[30] Substituted by Machiel Boulis (Oracle) on April-2023 due to change of employer.
[31] Please refer to https://pages.nist.gov/OSCAL/

and strategies, as well as to support the project in improving its capability to analyse opportunities for dissemination or standardization and to validate the exploitation strategy.

We have recently faced Month 6 of the project and we would like to have our first (on-line) meeting with the objective of presenting the initial outcomes and gathering feedback from all of you.

We want to acknowledge you that MEDINA project is for the purpose of research and not for profit and that your participation in this group is voluntary. You are free to withdraw from the project at any time. With your participation you will make a substantial contribution to achieve MEDINA project main goal, i.e. to enhance cloud customers control and trust in consumed cloud services, by supporting CSPs towards the successful achievement of a continuous certification aligned to the EUCS.

If you finally agree to be part of the ESG please complete the following doodle with your availability so that we can start the preparation of the kick-off meeting:

We would like to share with you the project brochure with an overview of the project (attached). You can also follow our latest news through our social networks:

Website and blog: https://medina-project.eu/

Twitter: https://twitter.com/medinaprojecteu

LinkedIn: https://www.linkedin.com/groups/12486585/

Slideshare : https://www.slideshare.net/MEDINAContinuousclou

Regards, the MEDINA consortium

Based on the positive responses and interest from the ESG members, we decided to organize virtual kick-off meetings on July-16th 2021 and July-23rd 2021 (two different meetings took place in order to accommodate the different time zones of the ESG members). The agenda of both meetings covered not only the background and objectives of MEDINA, but also provided a deep dive into two technical topics selected from preliminary discussions with the ESG and our WP leads. The selected topics were risk management (WP2) and evidence collection (WP3), which were presented by the respective MEDINA experts.

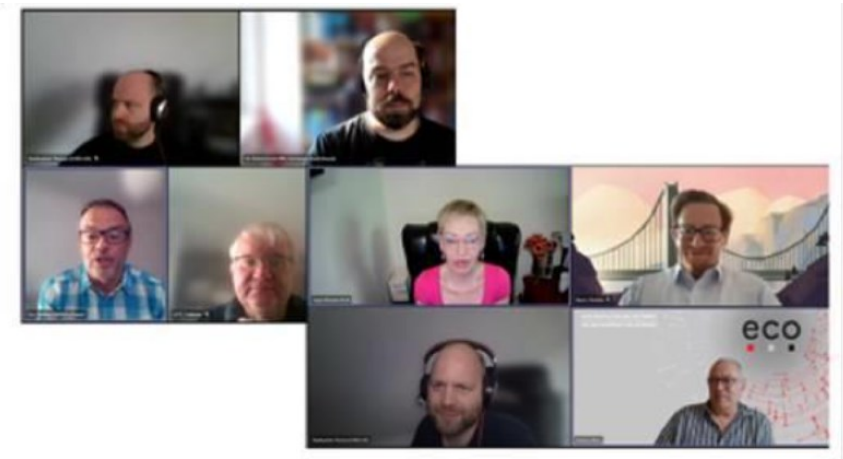


Figure 49. ESG Kick-off Meetings in July 2021

The kick-off ESG meeting resulted on rich feedback from the experts, in particular related to the validation of the different EUCS-Assurance levels in MEDINA, and technical details related to the presented risk assessment methodology. Provided feedback was followed up by the corresponding WP leads, and integrated into the corresponding activities of the project (e.g., the static risk assessment tool discussed in the D2.3 [7]).

The second ESG meeting took place on May 3rd, 2022. This meeting presented the progress of MEDINA after 18 months, including the demonstration of some of the project's tools for risk management and automated assessment of organizational evidence. Furthermore, and given the strong presence of ESG members affiliated with standardization bodies, the MEDINA standardization roadmap described in the D7.8 [8] was also presented.

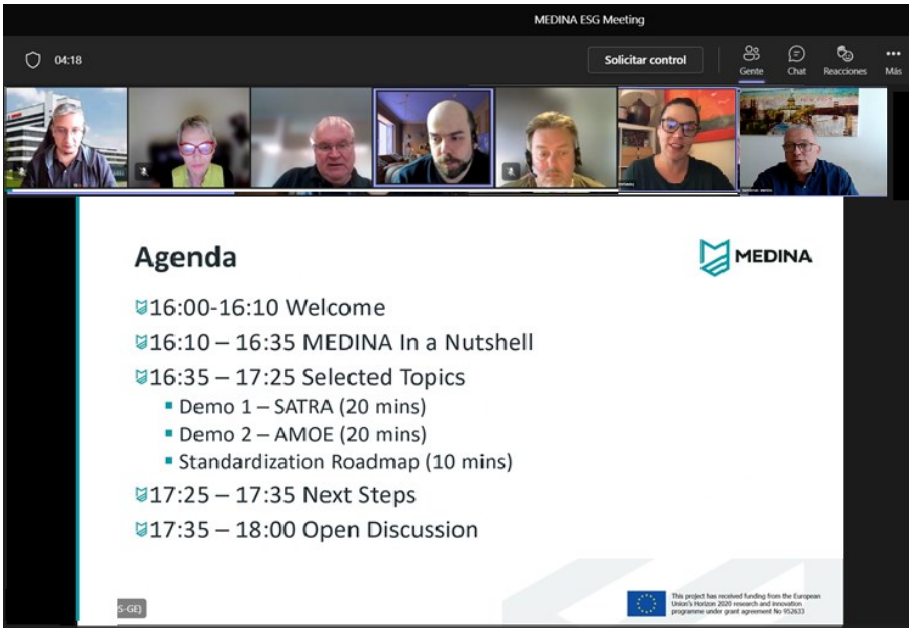


Figure 50. Second MEDINA ESG meeting on 3 May 2023

The third ESG meeting took place in May-2nd 2023 and welcomed new members joining from Cisco (US) and PwC (UK). On this occasion, topics related to the MEDINA Catalogue and the progress in standardization were discussed. The meeting adopted an interactive approach to gather feedback from the ESG members, which could then be used for discussion with the technical work packages in the project.

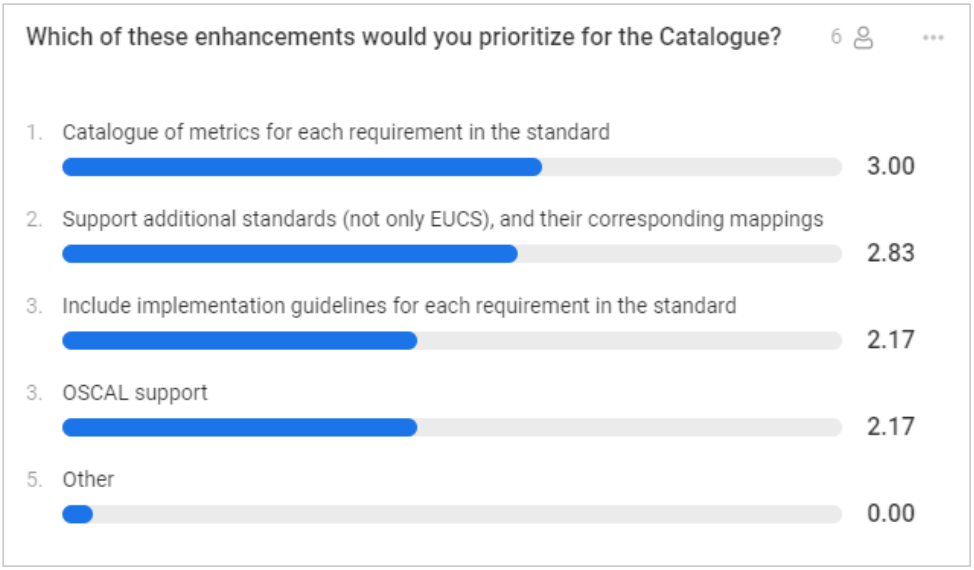


Figure 51. Feedback provided during the third MEDINA ESG meeting on 2 May 2023

The fourth and final MEDINA ESG meeting took place last October 9th, 2023, via teleconference. After reviewing the basics of MEDINA's approach and contributed framework, this meeting focused

on presenting the developed validation use cases, and the project's exploitation and sustainability actions. Both Bosch and Fabasoft presented their corresponding validation scenarios and the proposed approach which was used to guarantee that all framework components' requirements were successfully achieved. The presentation was complemented with live demonstrations of both the MEDINA Integrated UI (Bosch) and the Continuous Compliance Dashboard (Fabasoft), where most available features were shown to the ESG members. Also, partner Nixu (lead of MEDINA's exploitation activities) discussed the different "tracks" in which the project organized its sustainability actions, namely research, standardization, sales, and cost savings. Finally, the consortium received feedback from the nominated experts including questions about the proposed trustworthiness framework, leverage of SSI technology, and development of compliance metrics. It is our hope that these discussions will continue even after the finalization of the project, and as an effort to guarantee uptake of EUCS in the road to automation of compliance monitoring.

Figure 52. Fourth MEDINA ESG meeting on 9 October 2023

5.1 Other Dissemination Activities

Table 17 and Table 18 list other dissemination activities performed during the project lifetime, such as participation in panels and discussion tables.

Table 17. Other dissemination activities from M19 to M36

Type	Name & Comment	Partner	Date
Workshop	Industrial discussions with Orange (DE), and RegScale (US) on Topics related to security monitoring and compliance respectively	Bosch	01/09/2022 (RegScale) 26/09/2022 (Orange)
Workshop	Nixu Laurea event	NIXU	03/06/2022
Presentation	Presentation for Finnish authority Traficom	NIXU	21/04/2023

Table 18. Other dissemination activities from M1 to M18

Type	Name & Comment	Partner	Date
Technical Discussion	MEDINA presentation to internal Power Tool business unit	Bosch	29/11/2021
Technical discussion	Cloud Security and Assurance discussion with CERN	Bosch	24/11/2021
Technical Discussion	Bosch's Product Security Board presentation of MEDINA	Bosch	11/11/2021
Technical discussion	OSCAL, EUCS and Continuous Certification with Microsoft – discussion with MS lead on cybersecurity standardization (Andreas Fuchsberger)	Bosch	09/11/2021
Technical Discussion	MEDINA presentation to Bosch's Central IoT Digitalization and Security business unit.	Bosch	08/11/2021
Technical discussion	MEDINA and standardization of automated monitoring with Oracle Compliance (Meghan Hester)	Bosch	07/09/2021
Technical Discussion	EUCS and MEDINA – discussion with Google Engineering Compliance (Nathaly Rey)	Bosch	16/06/2021
Workshop	Internal workshop with company cFocus on OSCAL adoption for continuous auditing and FedRAMP compliance.	Bosch	22/04/2021
Workshop	Internal workshop with Oracle's GRC team (US) on continuous certification with MEDINA and NIST OSCAL.	Bosch, Fabasoft, FhG	21/04/2021

6 Networking Activities

Networking and collaborating with other projects and initiatives is a crucial activity for a collaborative research project such as MEDINA, especially collaboration with other similar European projects running in the topic of certification and cybersecurity, which face similar technical challenges to those faced by MEDINA.

In this section we report networking and collaboration activities carried out with:

- Other European projects: namely Coordination and Support Actions (CSAs) in the field of Cloud computing and cybersecurity, and other Research and Innovation actions (RIAs).
- Gaia-X, which is one of the largest initiatives in the field of cloud services.
- Non-structured and temporal associations such as the Future Cloud cluster, promoted by the Commission.
- SDOs and ENISA.

6.1 Networking with other European projects

During the first reporting period, MEDINA carried out networking activities with the **H-Cloud**[32] , **HUB4CLOUD**[33] and **SWForum.eu**[34] Coordination and Support actions (CSAs), as well as with the **CYRENE**[35] project (see D7.4 [2]).

During the second reporting period, MEDINA has kept its collaboration with **SWForum.eu**, which is a CSA focused on Software Technologies, Cybersecurity and Digital infrastructures. The goal of the project is to "*raise awareness and strengthen the competitiveness of the European Software Industry by facilitating a sustainable European forum for stakeholders representing scientific researchers, providers, developers, operators and policy-makers relevant to software technologies, digital infrastructures and cybersecurity*". This will be achieved through the organization of cross-fertilization workshops, the development of research and innovation roadmaps that will serve as input to the EC and the creation of a forum of practitioners. To this respect, MEDINA participated in the SWForum Webinar "*Software Technologies and Standards: Enabling Interoperability and Innovation*"[36] (see Figure 53), which was held in February 2023[37]. The presentation, as well as the whole workshop, was recorded and the video is available at the SWForum.eu web page. Also, MEDINA team participated in the implementation of the final recommendations report[38] delivered in March 2023 as a result of the Webinar.

MEDINA was also part of the SWForum.eu project radar until the end of SWForum.eu and completed the MTRL assessment twice, in 2021 and 2023 (see Figure 54). Moreover, MEDINA appears in the SWForum project hub (see Figure 55, Figure 56 and Figure 57).

[32] Please refer to https://www.h-cloud.eu/
[33] Please refer to https://www.h-cloud.eu/ict_40-projects/hub4cloud/
[34] Please refer to https://www.swforum.eu/
[35] Please refer to https://www.cyrene.eu/
[36] Please refer to: https://www.swforum.eu/events/software-technologies-and-standards-enabling-interoperability-and-innovation
[37] Please refer to https://medina-project.eu/blog/medina-standardization-presented-at-the-swforum-webinar/
[38] Please refer to https://zenodo.org/record/7804787

Figure 53. SWForum webinar and recommendations report

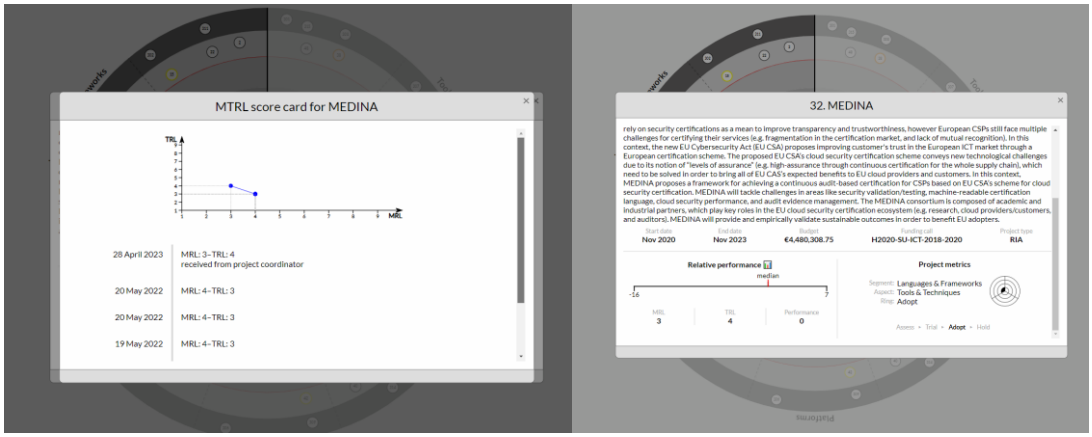


Figure 54. MEDINA in SWForum.eu project Radar

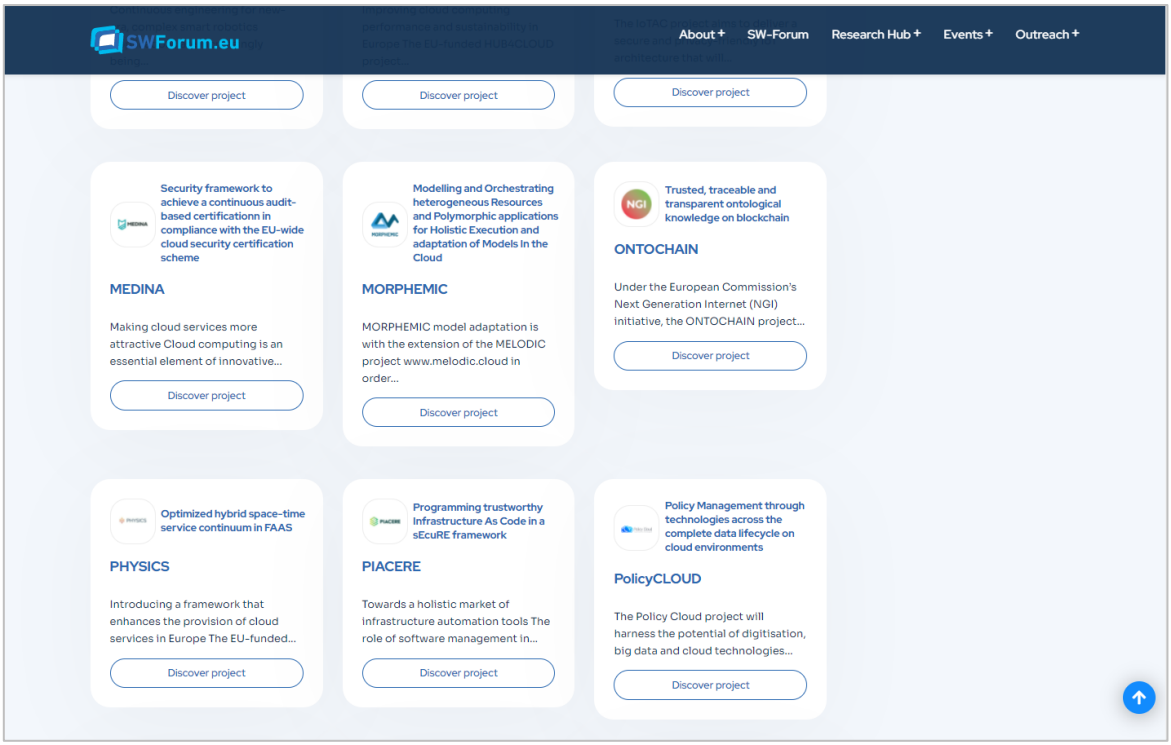


Figure 55. MEDINA in the Project Hub of SWForum

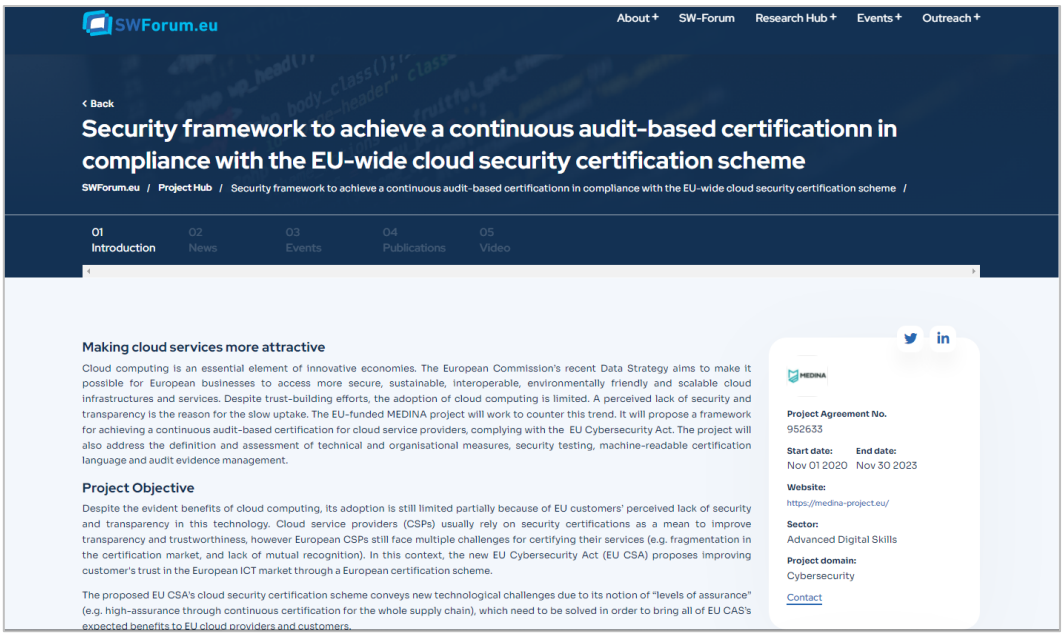


Figure 56. MEDINA details in the SWForum project Hub

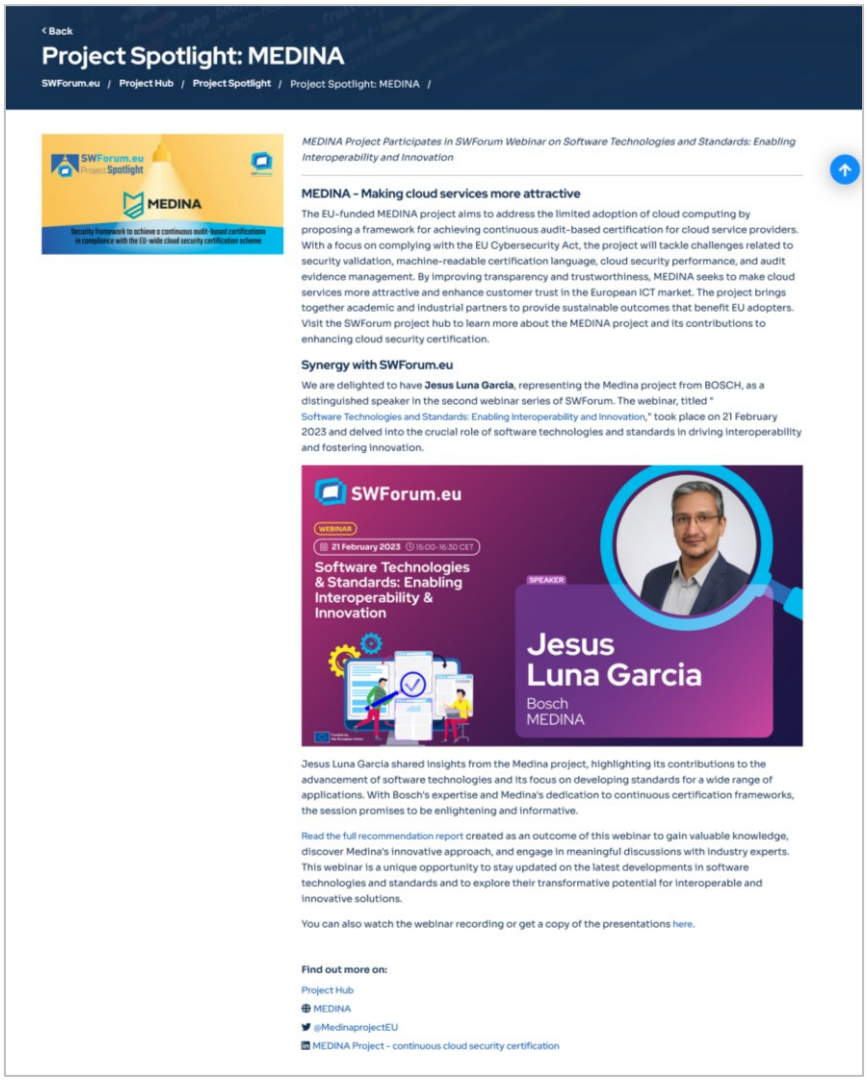


Figure 57. MEDINA Project Spotlight in the SWForum project Hub

Continuing with the collaboration with ongoing CSAs, MEDINA participated in the **EUCloudEdgeIoT** session organized in NexusForum2023 summit[39] (see Figure 58), a physical event aimed at exploring technological synergies between the European Alliance for Industrial Data, Edge and Cloud, the EU companies and Members States involved in the IPCEI on Cloud Infrastructure & Services, and the community of research and innovation projects developed under the Horizon Europe programme. The EUCloudEdgeIoT initiative is supported by the effort of two CSAs, namely Open Continuum and UNLOCK-CEI, which cooperate focussing respectively on the supply and demand sides of the CEI Continuum. In the NexusForum2023 summit[40] EUCloudEdgeIoT organized a session on high-impact EU-funded research and innovation actions which presented new approaches and open-source developments that are especially relevant for the IPCEI-CIS and the European Alliance for Industrial Data, Edge and Cloud. MEDINA was presented in this session and the presentation is available here[41].

Figure 58. MEDINA presence in the NexusForum2023 summit

Furthermore, two members of the MEDINA team, Björn Fanta (Fabasoft) and Juncal Alonso (TECNALIA) led a panel on Cybersecurity during the NexusForum2023 Summit (see Figure 59). In this panel, one of the addressed topics was *"Solutions/approaches/actions/ initiatives to ensure*

[39] Please refer to: https://medina-project.eu/blog/medina-contributes-to-new-approaches-and-open-source-developments-relevant-for-the-ipcei-cis-and-the-european-alliance-for-industrial-data-edge-and-cloud/

[40] Please refer to https://opennebula.io/innovation/nexusforum2023/

[41] Please refer to https://es.slideshare.net/MEDINAContinuousclou/towards-continuous-security-compliance-in-the-cloud-continuum-medina-project-beyond

compliance with cybersecurity schemes and legislation, EUCS, etc." where the outcomes and lessons learnt form MEDINA project were also discussed with the audience.

Figure 59. Cybersecurity workshop in NexusForum 2023 summit

CYRENE[42] is a H2020 action that devises methodologies, techniques and tools for the efficient evaluation and handling of security threats and vulnerabilities for the provision of critical Supply Chain services. MEDINA kept its collaboration with CYRENE in the second reporting period. To this respect, MEDINA participated (as invited project) in the CYRENE "Standardization workshop on cybersecurity and supply chain security"[43] on 26 June 2023, with focus on our standardization activities[44]. The CYRENE event was a good opportunity to know about the technical and standardization approach followed by projects funded in the same H2020 Call as MEDINA (e.g., BIECO, SIFIS, ASSURED, IOTAC, SANCUS and CYRENE itself).

MEDINA also joined forces with several ongoing projects to analyse and detect collaborations opportunities, namely **PIACERE, FISHY** and **DOME**. To this respect three joint blog posts have been published:

- Enabling 360 Cloud security compliance: From Security certification to Secure DevOps through MEDINA and PIACERE H2020 projects
- Security and Certification Compliance of IOT to CLOUD Infrastructure: The complementarity of approaches between EU Projects MEDINA and FISHY
- Towards secure and trustworthy European Cloud Marketplace: MEDINA and DOME symbiosis

With respect to **PIACERE**[45], MEDINA team, especially the coordinator continuously monitored the potential complementarities of both projects focused on Cloud Computing. Cloud Computing is not only about moving Cloud resources capabilities to gain competitivity and sovereignty, but also about security and resilience. Cloud security can be adopted and enhanced from many perspectives and angles. Both teams have analysed how the complementary approaches of MEDINA and PIACERE H2020 projects can enhance the security, trustworthiness and resilience of Cloud based

[42] Please refer to https://www.cyrene.eu/
[43] Please refer to https://www.cyrene.eu/cyrene-standardisation-event/
[44] Please refer to https://medina-project.eu/blog/medina-standardization-activities-presented-at-the-cyrene-workshop/
[45] Please refer to https://piacere-project.eu/

systems, from the infrastructure to the processes and policies, setting up the basis for the next generation of Trusted Execution Environments.

With respect to **FISHY**[46], there was an exploration of common potential with the tools and objectives of both projects. Although the main objectives of each of those being different, there is a complementarity identified in the context of the trustworthiness and cloud certification strengthening FISHY's engagement in the cybersecurity and resilience of supply chains. Our analysis (published in the blog post mentioned before) shows that FISHY's coordinated approach towards trusted supply chains of ICT systems through novel evidence-based security assurance methodologies and metrics can benefit from MEDINA's methodologies and technologies. Common points rely on innovative strategies for risk estimation and vulnerabilities forecasting.

DOME[47], in contrast to PIACERE and FISHY Research and Innovation projects, is the European initiative to create a European Marketplace for Cloud and Edge services, under the DIGITAL Europe Programme. As part of the roll-out activities, DOME is addressing the certification of the services inside the Market place in accordance with the European regulatory framework, and the upcoming EU Cloud Rulebook[48] which provides a single European framework relevant binding and non-binding rules for cloud service users and providers in Europe. At certification level, DOME proposes:

1. A formal process to verify the compliance against the reference standards.
2. A methodological framework supported by existing and new tools to evaluate the compliance of the cloud services when being on-boarded in DOME.
3. The necessary tools to automatically continuously monitor that the certificates attained are valid (e.g., by checking the ENISA's public registry).
4. Tools to continuously monitor that the security requirements from the EUCS, especially those of assurance level high are being always fulfilled and support the conformity assessment of the reference standards.

To this respect, the outcomes of MEDINA can leverage the implementation of the certification approach in DOME through the MEDINA framework for EUCS certification.

All the cloud services that will be included in the DOME marketplace will have to warranty some security requirements before being included. MEDINA tools are being considered from the beginning of the project to be incorporated as a mechanism to demonstrate that any cloud service included fulfils the EUCS requirements:

a) As added value services for the CSPs which want to achieve the EUCS or other certification to be able to be endorsed in DOME, or to gain competitive advantage and transparency to their customers.
b) As the methodological and technical baseline to define the certification and security compliance approach in DOME marketplace.

MEDINA and DOME collaboration already started in 2023 and will continue happening applying the outcomes and lessons learnt from MEDINA towards the implementation of the DOME marketplace with secure and certified European Cloud and Edge services.

MEDINA also developed networking activities with the EU-funded **AssureMOSS**[49] project, where discussions on topics related to cybersecurity risk management took place. Both consortia

[46] Please refer to https://fishy-project.eu/
[47] Please refer to https://dome-marketplace.eu/
[48] Please refer to https://digital-strategy.ec.europa.eu/en/policies/cloud-computing
[49] Please refer to https://assuremoss.eu/

demonstrated their developed tools and contributed approaches, however concrete action items could not be developed due to the lifetime of both projects. In any case, this opportunity to exchange ideas was useful for both projects to realize similarities between taken approaches. These might be further studied for a future collaboration in the context of upcoming EU projects.

Also, MEDINA developed collaboration with both **StandICT.eu 2023**[50] and **HSBooster.eu**[51] in the field of standardization. Related to the former, a Memorandum of Understanding was created between both projects[52], which opened the possibility for MEDINA to contribute the repository of standards being built by StandICT.eu 2023. In the case of HSBooster.eu, both projects found a green field for collaborating thanks to the assigned standardization expert who supported our project in further scoping MEDINA's standardization roadmap. The provided expert service was of great help to focus our standardization activities on high-impact topics as reported in deliverable D7.9 [5]. MEDINA was invited to participate in the webinar "*Standardization in Cybersecurity*"[53] organized by HSBooster.eu that was held on 17 October 2023 (see Figure 60) to discuss about MEDINA Standardization experiences and the HSBooster.eu support.

Figure 60. Participation of MEDINA in the HSbooster.eu webinar

[50] Please refer to https://standict.eu/
[51] Please refer to https://hsbooster.eu/
[52] Please refer to StandICT.eu 2023 & MEDINA kick-off their collaboration with an MoU to reinforce European standardisation efforts in the cloud security certification field | MEDINA (medina-project.eu)
[53] Please refer to https://www.hsbooster.eu/events/webinar-standardisation-cybersecurity?utm_source=social&utm_medium=twitter&utm_campaign=hsbooster

6.2 Networking with Gaia-X

Gaia-X[54] is an initiative initially launched by Germany and France in summer 2020. The initiative has now become European with organizations from multiple European countries participating in it and several national hubs already launched.

Several partners of MEDINA are members of the **Gaia-X AISBL** association and participate actively in the working groups of Gaia-X since the beginning in 2020. Some of the activities where MEDINA partners have been more involved are:

- Participation in the working group of **Compliance** (not active any more at the time of writing this deliverable in October 2023). This working group dealt with issues related to certification schemes, policy and rules, and continuous automated monitoring. MEDINA was presented several times in that working group. The definition of the metrics as they stand now come from the inputs provided by MEDINA partners.
- Participation in the working group of **Federated Catalogue.** This group works in the definition of the service lifecycle of a cloud resource. MEDINA partners provided input related to how certification should be considered and how the status of a certificate can affect a service and its lifecycle.

In addition to the participation in these working groups, the MEDINA partner Fraunhofer AISEC is one of the winners of the Lots of the Gaia-X Federated Services (GXFS)[55] project, namely the one on Continuous Automated Monitoring (CAM)[56]. The core functionalities of these Federation Services include integration, identity and authentication, security as well as compliance. The work performed in MEDINA and on CAM have thus benefited each other, for example in developing a common metric format and in solving engineering problems in the continuous monitoring of cloud services. Additionally, the MEDINA partner XLAB has been contracted for the implementation of the portal services of the GXFS project.

The Gaia-X Spanish Hub Working Group on Industry 4.0 was launched on 15 February 2022 in Bilbao. The event was organized by the Secretary of State of Digitalization and Artificial Intelligence (SEDIA), and the Office for Data (Oficina del dato) of the Spanish Government and the Department of Economic Development of the Basque Government. A TECNALIA representative under the affiliation of the Basque Research and Technology alliance (BRTA)[57] was among the presenters, as TECNALIA co-leads the working group. The presentation introduced the challenges of a cloud federation and the data spaces in industry. MEDINA was mentioned as one of the current initiatives that could help increase the trust in cloud services. During the questions and answers, a dedicated question to the EUCS and MEDINA was asked.

In the last months the activities towards Gaia-X continued. TECNALIA organized the first technical Gaia-X Tech event in Bilbao on 3-4 May 2023. MEDINA representatives (from TECNALIA and Fabasoft) attended the sessions and had discussions and networking with the Gaia-X community to create awareness around MEDINA outcomes and its alignment with the Gaia X framework.

[54] Please refer to https://gaia-x.eu/
[55] Please refer to https://www.gxfs.eu/
[56] Please refer to https://www.gxfs.eu/continuous-automated-monitoring/
[57] BRTA is an alliance of 17 technology centres and cooperative research centres of the Basque Country and counts with the support of the Basque Government, SPRI and the Provincial Councils of Araba, Bizkaia and Gipuzkoa.

TECNALIA is also an active partner of the OS Gaia-X Working Group where the advancements are being monitored, and the MEDINA outcomes will be considered if a potential opportunity is detected.

6.3 Networking with the Future Cloud Cluster

The Future Cloud Cluster was created under the umbrella of unit E2 of DG CONNECT of the European Commission with the aim of "*providing a forum for discussion and collaboration for research and innovation initiatives that address next generation Cloud Computing challenges and issues, including diverse forms of distributed computing (Cloud, Multi-Cloud, Edge, Fog, Ad-hoc and Mobile computing)*"[58]. Participants are members of running and past projects, and participation is on a voluntary basis.

During this period, the work of the cluster has revolved around two main topics:

- **Research roadmaps**[59]: in 2020, the Future Cloud Cluster received the request from the European Commission to update the research areas already described in 2017 (see Figure 61). The focus of said areas are Edge computing, Multi-Cloud, Computing continuum and Federated Cloud, all areas tightly related with MEDINA. The purpose of the submitted document was to provide the European Commission with input for the definition of topics in the upcoming Horizon Europe work programmes. In this context, and based on the experience of MEDINA, several topics were proposed, namely, #1, #2 and #3.

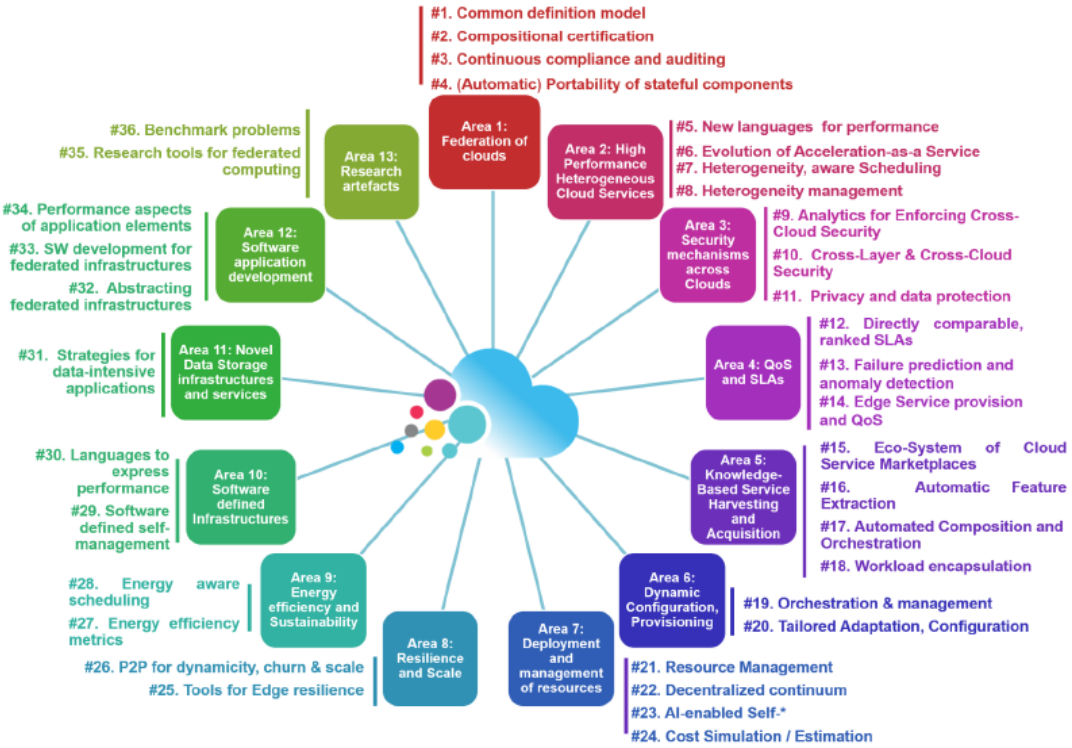


Figure 61. Future Cloud research areas (source: Future cloud cluster research roadmap)

[58] Please refer to https://eucloudclusters.wordpress.com/future-cloud/
[59] Please refer to: https://drive.google.com/file/d/1Qw-PIR5D4H-ZZ4-CZ1pXRkf8lUZjLMzE/view?usp=sharing

- **Cloud Federation Reference Architecture**[60]: several projects and members of the Future Cloud Cluster developed, under request of the European Commission, a reference architecture for a cloud federation. MEDINA participated in the different discussions held in the group and contributed to the architecture and analysis of current initiatives. Finally, MEDINA was mapped as one of the research projects that have provided research findings to contribute to the realisation of the reference architecture building blocks. The final paper can be found online[61]. The main contributions of MEDINA were focused on the incorporation of "Compliance" components as part of the Reference Architecture, "Edge Management layer", "Cloud Service Management" and "Federation Management", with the aim of giving support to the needs at each layer to support the assessment compliance with the applicable standards and schemes and regulations.

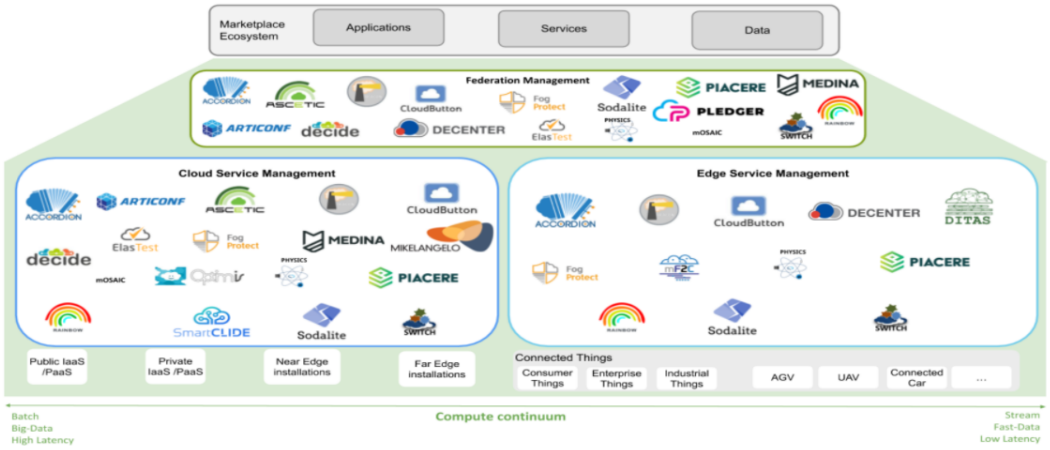


Figure 62. Mapping of Research projects to Reference Architecture layers. MEDINA is featured among the selected projects.

6.4 Networking with other initiatives such as standardization development organizations (SDOs) and ENISA

The collaboration activities with ENISA have been very important for MEDINA. The main SDO collaboration actions which took place during the first half of MEDINA were[62]:

- Participation of Leire Orue-Echevarria (TECNALIA) and Jesús Luna (Bosch) in the ad-hoc working group (AHWG) of ENISA that is defining the cloud services certification scheme (EUCS). Leire Orue-Echevarria led the technical group devoted to the definition of the technical security requirements.
- MEDINA was one of the proof-of-concepts that validated the version of December 2020 of the EUCS, more specifically, MEDINA was focused on the requirements of assurance level high.
- Participation of Leire Orue-Echevarria (TECNALIA) and Jesús Luna (Bosch) in CEN-CENELEC WG, working in the standardization of the requirements identified in EUCS.
- Participation in several SC of ISO, namely SC38 and SC7.
- Continuous contact with NIST, more specifically, the group dedicated to OSCAL. Participation in at least two workshops organized by NIST OSCAL.

[60] Please refer to https://drive.google.com/file/d/1Kw6j41bcGw8v_o8KW18TkE0xe4kxBMlR/view?usp=sharing
[61] Please refer to https://drive.google.com/file/d/1Kw6j41bcGw8v_o8KW18TkE0xe4kxBMlR/view
[62] Further details can be found in D7.8 [6]

- TECNALIA participated in the SCCG (Stakeholder Cybersecurity Certification Group), where MEDINA was briefly presented under the scope of certification research projects.

During the second half of the project's lifetime, and as reported in D7.9 [5], engagement with SDO was focus on the so-called "standardization pillars" namely:

1. EUCS
2. Metrics for cybersecurity compliance
3. Automation for continuous compliance monitoring and assessment

Specific engagements are reported in Table 19.

Table 19. SDO networking from M19 to M36

Roadmap Topic (Revised)	Contributed MEDINA Standards
EU Cybersecurity Certification Scheme for Cloud Services	• ENISA AHWG thematic groups on assurance levels, security controls, assessment methods, guidance, and self-assessment questionnaire. • CEN CENELEC JTC13 WG2 – EUCS1 • Cisco CCF
Cybersecurity Compliance Metrics	• NIST 800-55 • ISO/IEC 27004
Automation of Cybersecurity Compliance Monitoring	• ISO/IEC 27017 • NIST OSCAL • ETSI CYBER OSCAL • Gaia-X Initiative

Engagements listed in Table 19 were developed to guarantee not only uptake of the MEDINA framework and dissemination of Key Results, but also sustainability of our contributions even after the project finalizes.

7 Dissemination and Communication KPIs

Table 20 presents the values achieved for the dissemination and communication KPIs that were defined in deliverable D7.2 [1]. The level of achievement of each criterion in month 36 is indicated by the following icons.

Explanation symbols

✔	Criterion has been met
✔	Some actions have already been done
✘	Nothing to report

Table 20. MEDINA Dissemination tools and KPIs at month 36

Dissemination tool	KPI	Objective	M1-M36	
Brochures	Number of leaflets / brochures produced	>3	**3**	✔
Conference / Journal publications	Number of publications: Scientific journals	2	**1 published** **1 under submission**	✔
	Number of publications: Scientific conferences	15	**12 published** **2 under submission**	✔
Project posters	Number of posters	At least 3	**4**	✔
Press releases	Number of specialized press releases	2 per country and language	**2 per country and language** **1 MoU with StandCT.eu 2023**	✔
Project showcases	Number of different demonstration videos produced	10	**30**	✔
Project newsletters	Number of newsletters	1 per year	**5**	✔
Attendance at industry-focused events	Number of events attended	5 per year	**26**	✔
Whitepapers	Number of whitepapers published	2 per year	**6**	✔
Cloud Community, Software and Services Publications	Number of references in external magazines (Collaboration and Support Actions, EC)	20	**21**	✔
Courses / Capacity building	Number of training activities delivered	4	**9 Training events** **4 online courses**	✔

As we can see in Table 20, almost all the **dissemination KPIs** have been achieved. In terms of journal publications, at the time of writing we have one article published and one in submission. As for conference papers, we have 12 manuscripts published, and 2 in submission. As for brochures, we actually produced 3 brochures, which does not meet the KPI, but it is in line with the duration of the project. All other dissemination KPIs were met and in some cases exceeded.

Table 21 summarises the communication strategy defined in D7.2, as well as the level of achievement of the communication KPIs at month 36.

Table 21. MEDINA Communication KPIs at month 36

Diss. tool	KPI	Objectives	Tool used	M1-M36	
MEDINA website	Yearly visits	**>1,700**	Google analytics	**11,693 (total number of visits)**	✓
	Duration of visits	**More than 2 min. for 40% of users**	Google analytics	**00:00:54 (average)**	✓
	Monthly downloads: Posters, flyers	**35**	**> 1,000 (total number of downloads)**		✓
	Monthly downloads: Public reports	**50**			
	References from external web pages	**20 (excluding partner webs)**	Manual / Conversion rates by Google Analytics	**7 (external web pages)** **21 (including social networks)**	✓
Twitter/X feed	Number of followers (new)	**>200 followers**	Twitter/X analytics (free version)	**128**	✓
	Number of Tweets (new)	**>700**	Twitter/X analytics (free version)	**>275**	✓
	Number of following profiles (new)	**>200**	Twitter/X analytics (free version)	**203**	✓
	Number of likes (new)	**>600**	Twitter/X analytics (free version)	**932**	✓
	Impressions (new)	**>5000**	Twitter/X analytics (free version)	**23,829**	✓
SlideShare	Number of views	**>300**	SlideShare analytics	**674**	✓
YouTube	Number of views	**>200**	YouTube	**918**	✓

Diss. tool	KPI	Objectives	Tool used	M1-M36	
Mass Media	Number of releases	**2 per country in the project**	Monthly dissemination report	**2 per country** **1 MoU with StandCT.eu 2023**	✔
Blog posts	Number of entries	**at least 6 every year**	Monthly dissemination report	**84**	✔

As we can see in Table 21, almost all the **communication KPIs** have been achieved. In terms of the Tweeter/X feed, the KPIs for the number of followers and the number of Tweets have not been achieved. The low value of Twitter followers reached (128 followers) could be due to the fact many people left "Twitter/X" in the last months, so it was difficult to get new audience, in particular people working in research, however MEDINA achieved a significant increase in followers compared to the first reporting period (64 followers). All other communication KPIs were met and in some cases exceeded. Thus, the number of tweets quadrupled from 72 tweets in month 18 to more than 275 tweets in month 36; and the number of Blogposts increased from 15 posts in month 18 to 84 posts in month 36.

8 Conclusions

This deliverable presented the description of the dissemination, communication and networking activities carried out in the MEDINA project.

Dissemination Achievements

In the course of the MEDINA project, significant strides were made in dissemination efforts. The first eighteen months saw the publication of three conference papers, followed by a substantial increase in the second eighteen months, resulting in the publication of nine scientific conference papers and one scientific journal paper. Additionally, two papers are currently under review for publication in Open Research Europe (ORE), with one more awaiting consideration by a scientific journal. These accomplishments are detailed in Section 5, along with a comprehensive list of other dissemination outcomes.

Furthermore, the consortium actively engaged with the wider community by participating in a variety of events, including Ph.D. Schools, panels, seminars/webinars, workshops, and technical discussions. This led to invaluable feedback from expert stakeholders, enriching the project's overall development.

Our collaboration extended to several EU projects and initiatives, including the ENISA Ad Hoc Working Group on Cloud Security Certification, Gaia-X Community and Federated Services, and the ENISA EUCS Experimentation. These alliances allowed us to strengthen our presence and impact within the field.

Effective Communication and Outreach

Communication and outreach were vital components of the MEDINA project. Diverse channels, such as our project website, blog, and social networks, were leveraged to facilitate the execution of project activities. A comprehensive range of dissemination materials, encompassing press releases, brochures, posters, videos, presentation slides, and newsletters, were made available to assist interested parties in disseminating and networking. To provide a succinct overview of the project's value proposition, target audience, and anticipated benefits, promotional and training videos were created. These materials collectively serve to keep supporters and specialized media informed about the MEDINA project's activities, objectives, results, and expected impacts.

One of our noteworthy accomplishments was the regular publication of blog posts that delved into topics relevant to our partners' expertise and their development within the project. The `Resources' section of our website contains essential dissemination outcomes, including published scientific papers, whitepapers, and an updated list of submitted public deliverables. Additionally, the `Communication' page hosts press releases, newsletters, presentations, posters and brochures employed in our communication endeavours.

In our endeavour to reach a broader audience, we harnessed the power of social media platforms, primarily utilizing Twitter and LinkedIn, with supplementary engagement on YouTube and SlideShare. This approach facilitated enhanced communication and interaction with our target communities, fellow research projects, and individuals from the general public enthusiastic about cybersecurity, cloud computing, and certification security topics.

To gauge the effectiveness of our outreach, we employed Google Analytics to monitor website traffic and audience behaviour, including geographical information and traffic acquisition channels across various social networks. This data has proved indispensable in comprehending the functionality and success of our social media presence and the evolution of the MEDINA website.

Fostering Collaboration and Networking

Collaboration and networking were at the core of MEDINA's mission. Throughout the project's lifecycle, we actively engaged with other European projects, including Coordination and Support Actions (CSAs) in the domains of cloud computing and cybersecurity, along with Research and Innovation actions (RIAs). Our partnership with Gaia-X, one of the largest initiatives in the cloud services realm, was marked by the active involvement of several MEDINA partners in Gaia-X working groups.

Notably, we played a pivotal role in the Future Cloud Cluster, operating under the aegis of unit E2 of DG CONNECT within the European Commission. Our contributions extended to shaping research roadmaps for the forthcoming Horizon Europe work programs and developing a reference architecture for a Cloud Federation.

Furthermore, MEDINA's engagement extended to Standardization Development Organizations (SDOs) and ENISA. As a proof-of-concept, MEDINA validated the December 2020 version of the European Cybersecurity Certification Scheme (EUCS). Collaboration with various initiatives, such as CEN-CENELEC Working Groups, ISO Standardization Committees, the NIST OSCAL group, and the Stakeholder Cybersecurity Certification Group (SCCG), demonstrated our commitment to advancing the standards and practices within our field.

References

[1] MEDINA Consortium, “D7.2 Dissemination and Communication Strategy,” 2021.

[2] MEDINA Consortium, “D7.4 Dissemination and Communication Report-v1,” 2022.

[3] MEDINA Consortium, “D7.10 Training materials,” 2023.

[4] MEDINA Consortium, “D7.1 MEDINA brochure and public website,” 2021.

[5] MEDINA Consortium, “D7.9 - Standardization Roadmap - Final,” 2023.

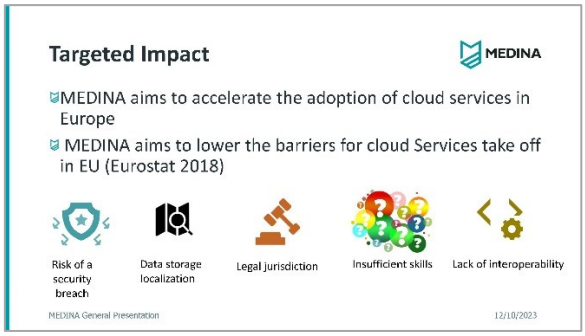
[6] MEDINA Consortium, “MEDINA Annex 1 Part B - GA Number 952633,” 2020.

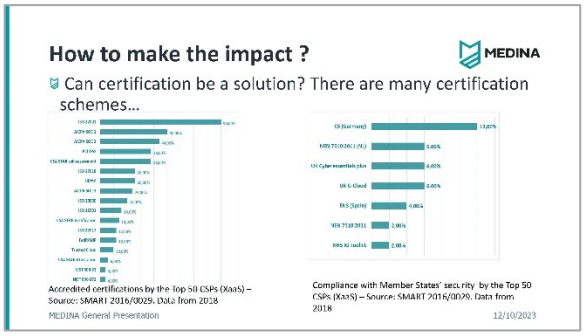
[7] MEDINA Consortium, “D2.3 Specification of the Cloud Security Certification Language-v1,” 2021.

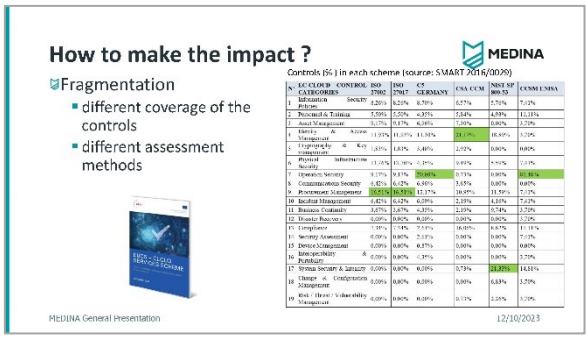
[8] MEDINA Consortium, “D7.8 Standardization Roadmap-v1,” 2022.

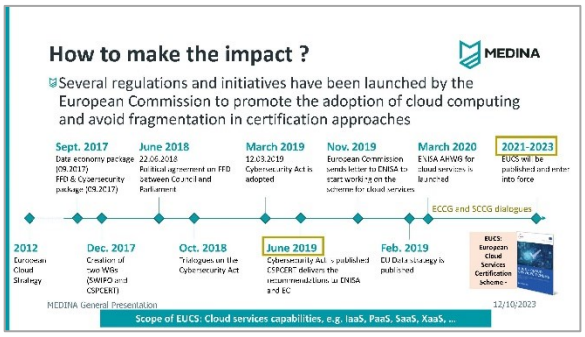
APPENDIX A: Project Presentation Slides

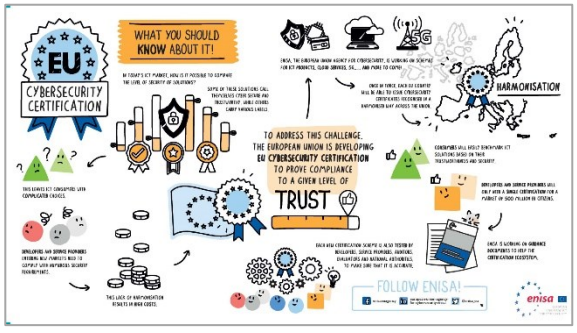
The following figures show the slides of the MEDINA general presentation[63].











[63] Please refer to https://www.slideshare.net/MEDINAContinuousclou/medina-general-presentation-7ddb

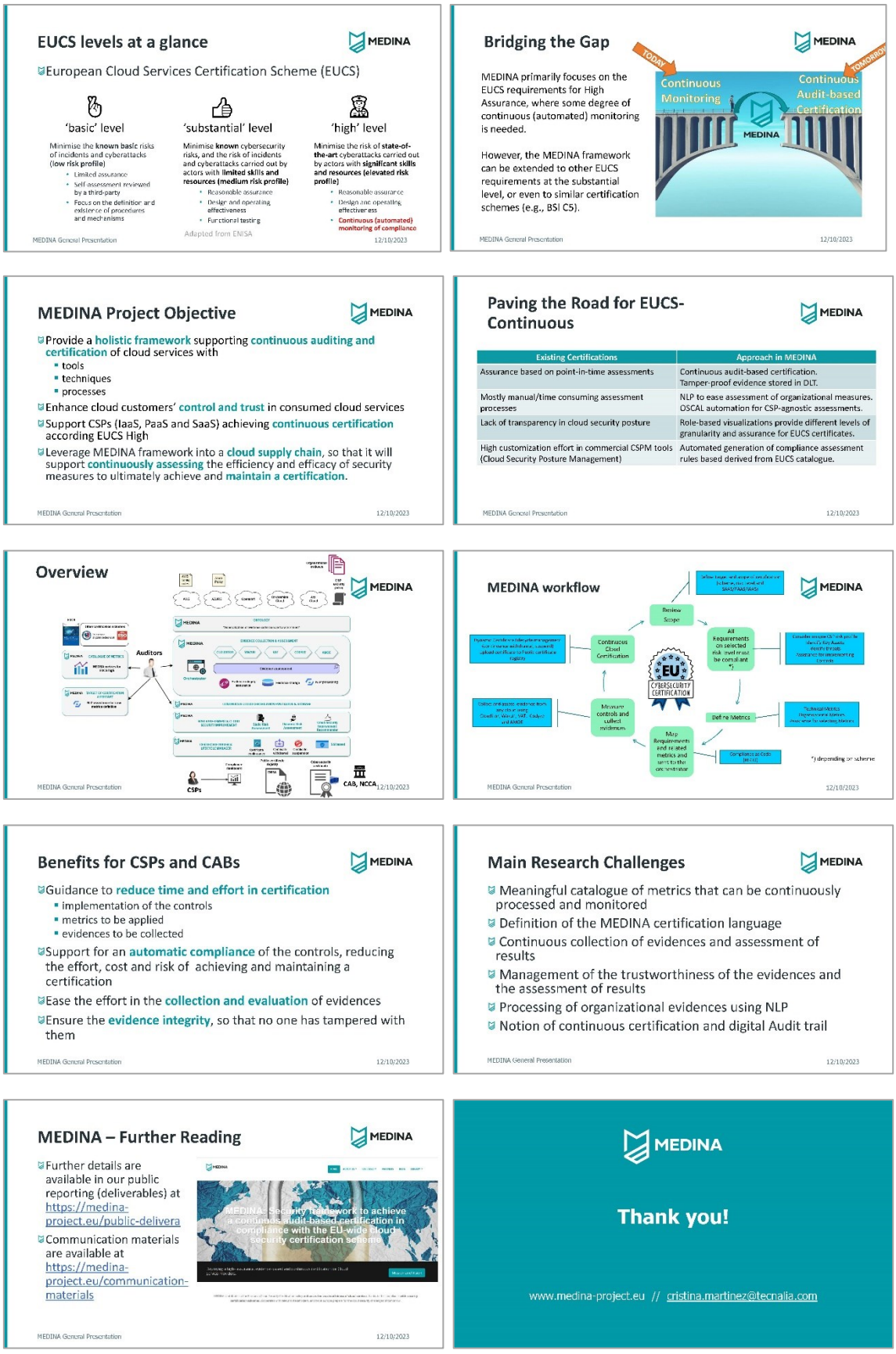
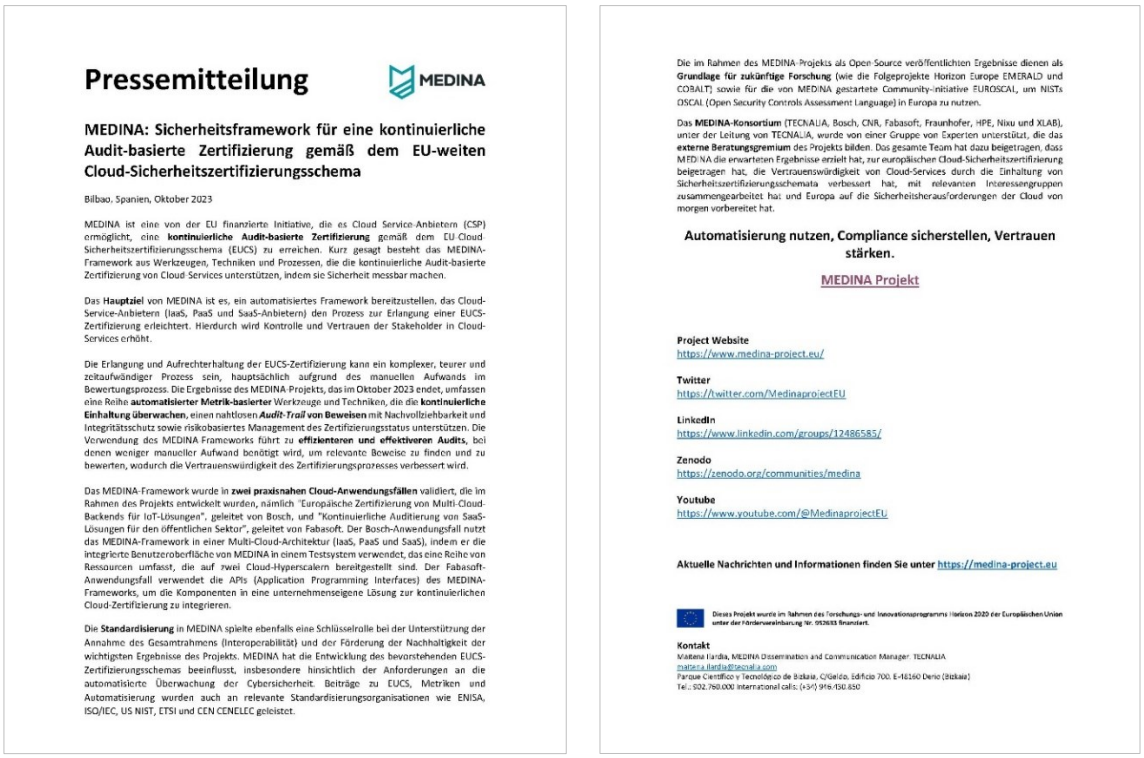


Figure 63. MEDINA Presentation slides

APPENDIX B: Final Press Release in different languages

The following figures show the content of the final project press release, dated October 2023, translated into the languages of the MEDINA partners, namely German, Spanish, Finish, Italian, and Slovenian.



Pressemitteilung

MEDINA

MEDINA: Sicherheitsframework für eine kontinuierliche Audit-basierte Zertifizierung gemäß dem EU-weiten Cloud-Sicherheitszertifizierungsschema

Bilbao, Spanien, Oktober 2023

MEDINA ist eine von der EU finanzierte Initiative, die es Cloud Service-Anbietern (CSP) ermöglicht, eine **kontinuierliche Audit-basierte Zertifizierung** gemäß dem EU Cloud Sicherheitszertifizierungsschema (EUCS) zu erreichen. Kurz gesagt besteht das MEDINA-Framework aus Werkzeugen, Techniken und Prozessen, die die kontinuierliche Audit-basierte Zertifizierung von Cloud-Services unterstützen, indem sie Sicherheit messbar machen.

Das **Hauptziel** von MEDINA ist es, ein automatisiertes Framework bereitzustellen, das Cloud-Service-Anbietern (IaaS, PaaS und SaaS-Anbietern) den Prozess zur Erlangung einer EUCS-Zertifizierung erleichtert. Hierdurch wird Kontrolle und Vertrauen der Stakeholder in Cloud-Services erhöht.

Die Erlangung und Aufrechterhaltung der EUCS-Zertifizierung kann ein komplexer, teurer und zeitaufwändiger Prozess sein, hauptsächlich aufgrund des manuellen Aufwands im Bewertungsprozess. Die Ergebnisse des MEDINA-Projekts, das im Oktober 2023 endet, umfassen eine Reihe **automatisierter Metrik-basierter** Werkzeuge und Techniken, die die **kontinuierliche Einhaltung überwachen,** einen nahtlosen ***Audit-Trail*** **von Beweisen** mit Nachvollziehbarkeit und Integritätsschutz sowie risikobasiertes Management des Zertifizierungsstatus unterstützen. Die Verwendung des MEDINA Frameworks führt zu **effizienteren und effektiveren Audits,** bei denen weniger manueller Aufwand benötigt wird, um relevante Beweise zu finden und zu bewerten, wodurch die Vertrauenswürdigkeit des Zertifizierungsprozesses verbessert wird.

Das MEDINA-Framework wurde in **zwei praxisnahen Cloud-Anwendungsfällen** validiert, die im Rahmen des Projekts entwickelt wurden, nämlich "Europäische Zertifizierung von Multi-Cloud-Backends für IoT-Lösungen", geleitet von Bosch, und "Kontinuierliche Auditierung von SaaS-Lösungen für den öffentlichen Sektor", geleitet von Fabasoft. Der Bosch-Anwendungsfall nutzt das MEDINA-Framework in einer Multi-Cloud-Architektur (IaaS, PaaS und SaaS), indem er die integrierte Benutzeroberfläche von MEDINA in einem Testsystem verwendet, das eine Reihe von Ressourcen umfasst, die auf zwei Cloud-Hyperscalern bereitgestellt sind. Der Fabasoft-Anwendungsfall verwendet die APIs (Application Programming Interfaces) des MEDINA-Frameworks, um die Komponenten in eine unternehmenseigene Lösung zur kontinuierlichen Cloud-Zertifizierung zu integrieren.

Die **Standardisierung** in MEDINA spielte ebenfalls eine Schlüsselrolle bei der Unterstützung der Annahme des Gesamtrahmens (Interoperabilität) und der Förderung der Nachhaltigkeit der wichtigsten Ergebnisse des Projekts. MEDINA hat die Entwicklung des bevorstehenden EUCS-Zertifizierungsschemas beeinflusst, insbesondere hinsichtlich der Anforderungen an die automatisierte Überwachung der Cybersicherheit. Beiträge zu EUCS, Metriken und Automatisierung wurden auch an relevante Standardisierungsorganisationen wie ENISA, ISO/IEC, US NIST, ETSI und CEN CENELEC geleistet.

Die im Rahmen des MEDINA-Projekts als Open-Source veröffentlichten Ergebnisse dienen als **Grundlage für zukünftige Forschung** (wie die Folgeprojekte Horizon Europe EMERALD und COBALT) sowie für die von MEDINA gestartete Community-Initiative EUROSCAL, um NISTs OSCAL (Open Security Controls Assessment Language) in Europa zu nutzen.

Das **MEDINA-Konsortium** (TECNALIA, Bosch, CNR, Fabasoft, Fraunhofer, HPE, Nixu und XLAB), unter der Leitung von TECNALIA, wurde von einer Gruppe von Experten unterstützt, die das **externe Beratungsgremium** des Projekts bilden. Das gesamte Team hat dazu beigetragen, dass MEDINA die erwarteten Ergebnisse erzielt hat, zur europäischen Cloud-Sicherheitszertifizierung beigetragen hat, die Vertrauenswürdigkeit von Cloud-Services durch die Einhaltung von Sicherheitszertifizierungsschemata verbessert hat, mit relevanten Interessengruppen zusammengearbeitet hat und Europa auf die Sicherheitsherausforderungen der Cloud von morgen vorbereitet hat.

Automatisierung nutzen, Compliance sicherstellen, Vertrauen stärken.

MEDINA Projekt

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Dieses Projekt wurde im Rahmen des Forschungs- und Innovationsprogramms Horizon 2020 der Europäischen Union unter der Fördervereinbarung Nr. 952633 finanziert.

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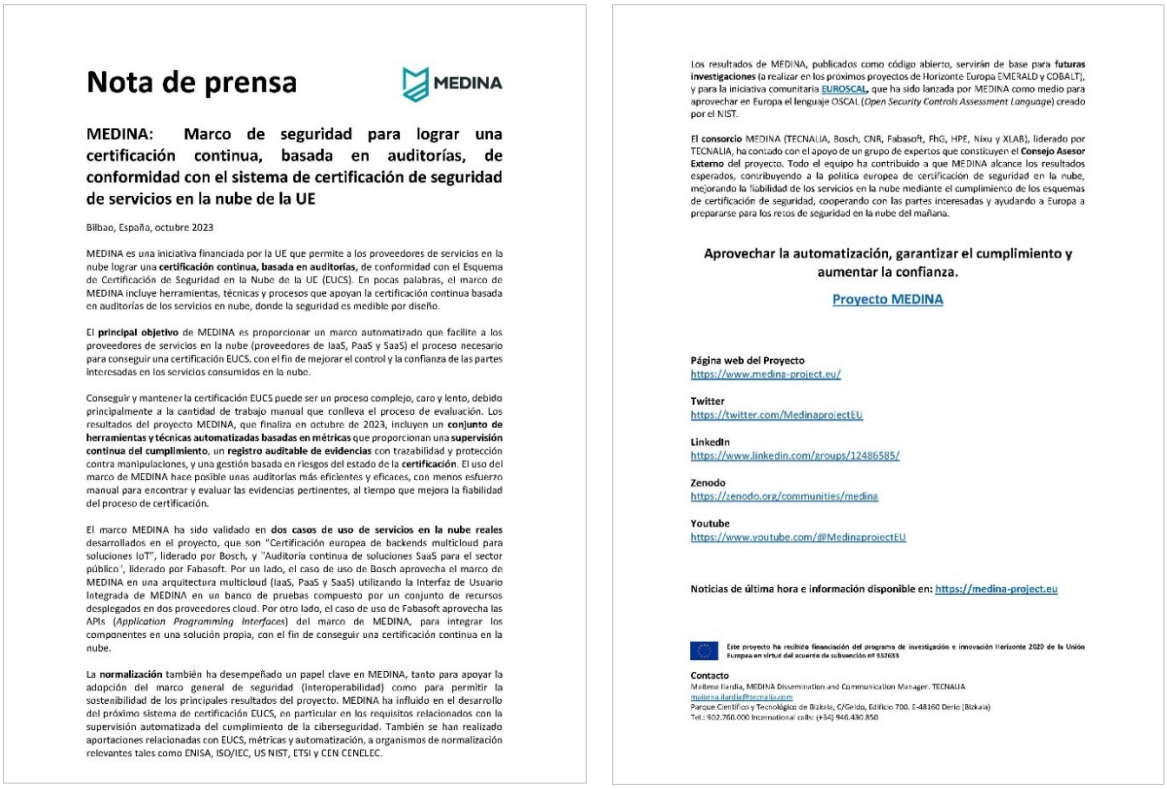
Figure 64. MEDINA Press release translated to German



Nota de prensa

MEDINA

MEDINA: Marco de seguridad para lograr una certificación continua, basada en auditorías, de conformidad con el sistema de certificación de seguridad de servicios en la nube de la UE

Bilbao, España, octubre 2023

MEDINA es una iniciativa financiada por la UE que permite a los proveedores de servicios en la nube lograr una **certificación continua, basada en auditorías,** de conformidad con el Esquema de Certificación de Seguridad en la Nube de la UE (EUCS). En pocas palabras, el marco de MEDINA incluye herramientas, técnicas y procesos que apoyan la certificación continua basada en auditorías de los servicios en nube, donde la seguridad es medible por diseño.

El **principal objetivo** de MEDINA es proporcionar un marco automatizado que facilite a los proveedores de servicios en la nube (proveedores de IaaS, PaaS y SaaS) el proceso necesario para conseguir una certificación EUCS, con el fin de mejorar el control y la confianza de las partes interesadas en los servicios consumidos en la nube.

Conseguir y mantener la certificación EUCS puede ser un proceso complejo, caro y lento, debido principalmente a la cantidad de trabajo manual que conlleva el proceso de evaluación. Los resultados del proyecto MEDINA, que finaliza en octubre de 2023, incluyen un **conjunto de herramientas y técnicas automatizadas basadas en métricas** que proporcionan una **supervisión continua del cumplimiento**, un **registro auditable de evidencias** con trazabilidad y protección contra manipulaciones, y una gestión basada en riesgos del estado de la **certificación**. El uso del marco de MEDINA hace posible unas auditorías más eficientes y eficaces, con menos esfuerzo manual para encontrar y evaluar las evidencias pertinentes, al tiempo que mejora la fiabilidad del proceso de certificación.

El marco MEDINA ha sido validado en **dos casos de uso de servicios en la nube reales** desarrollados en el proyecto, que son "Certificación europea de backends multicloud para soluciones IoT", liderado por Bosch, y "Auditoría continua de soluciones SaaS para el sector público", liderado por Fabasoft. Por un lado, el caso de uso de Bosch aprovecha el marco de MEDINA en una arquitectura multicloud (IaaS, PaaS y SaaS) utilizando la Interfaz de Usuario Integrada de MEDINA en un banco de pruebas compuesto por un conjunto de recursos desplegados en dos proveedores cloud. Por otro lado, el caso de uso de Fabasoft aprovecha las APIs (*Application Programming Interfaces*) del marco de MEDINA, para integrar los componentes en una solución propia, con el fin de conseguir una certificación continua en la nube.

La **normalización** también ha desempeñado un papel clave en MEDINA, tanto para apoyar la adopción del marco general de seguridad (interoperabilidad) como para permitir la sostenibilidad de los principales resultados del proyecto. MEDINA ha influido en el desarrollo del próximo sistema de certificación EUCS, en particular en los requisitos relacionados con la supervisión automatizada del cumplimiento de la ciberseguridad. También se han realizado aportaciones relacionadas con EUCS, métricas y automatización, a organismos de normalización relevantes tales como ENISA, ISO/IEC, US NIST, ETSI y CEN CENELEC.

Los resultados de MEDINA, publicados como código abierto, servirán de base para **futuras investigaciones** a realizar en los próximos proyectos de Horizonte Europa EMERALD y COBALT), y para la iniciativa comunitaria **EUROSCAL**, que ha sido lanzada por MEDINA como medio para aprovechar en Europa el lenguaje OSCAL (*Open Security Controls Assessment Language*) creado por el NIST.

El **consorcio** MEDINA (TECNALIA, Bosch, CNR, Fabasoft, FhG, HPE, Nixu y XLAB), liderado por TECNALIA, ha contado con el apoyo de un grupo de expertos que constituyen el **Consejo Asesor Externo** del proyecto. Todo el equipo ha contribuido a que MEDINA alcance los resultados esperados, contribuyendo a la política europea de certificación de seguridad en la nube, mejorando la fiabilidad de los servicios en la nube mediante el cumplimiento de los esquemas de certificación de seguridad, cooperando con las partes interesadas y ayudando a Europa a prepararse para los retos de seguridad en la nube del mañana.

Aprovechar la automatización, garantizar el cumplimiento y aumentar la confianza.

Proyecto MEDINA

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Este proyecto ha recibido financiación del programa de investigación e innovación Horizonte 2020 de la Unión Europea en virtud del acuerdo de subvención nº 952633

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Figure 65. MEDINA Press release translated to Spanish

Lehdistötiedote

MEDINA

MEDINA: Turvallisuusviitekehys, jolla saavutetaan jatkuva tarkastuspohjainen sertifiointi EU:n laajuisen pilviturvallisuussertifiointijärjestelmän mukaisesti

Bilbao, Espanja, Lokakuu 2023

MEDINA on EU:n rahoittama aloite, jonka avulla pilvipalveluiden tarjoajat (CSP) voivat saada jatkuvan tarkastuspohjaisen sertifioinnin EU:n pilviturvallisuussertifiointijärjestelmän (EUCS) mukaisesti. Lyhyesti sanottuna MEDINA-viitekehys koostuu työkaluista, tekniikoista ja prosesseista, jotka tukevat jatkuvaan auditointiin perustuvaa pilvipalveluiden sertifiointia, jossa tietoturva on mitattavissa suunnittelulla.

MEDINAn päätavoitteena on tarjota automatisoitu kehys, joka helpottaa pilvipalveluiden tarjoajia (IaaS-, PaaS- ja SaaS-tarjoajia) prosessissa EUCS-sertifioinnin saavuttamiseksi tavoitteena sidosryhmien hallinnan ja luotettavuuden parantaminen kulutetuissa pilvipalveluissa.

EUCS-sertifioinnin saavuttaminen ja ylläpitäminen voi olla monimutkainen, kallis ja aikaa vievä prosessi, pääasiassa arviointiprosessiin liittyvän manuaalisen työn määrän vuoksi. Lokakuussa 2023 päättyvän MEDINA-projektin tuotoksiin kuuluu sarja automatisoituja metriikkapohjaisia työkaluja ja tekniikoita, jotka tukevat jatkuvaa vaatimustenmukaisuuden valvontaa, saumaton jäljitettävyyttä ja peukalointia tukeva todistusaineiston jäljitysketju sekä sertifiointitilan riskipohjainen hallinta. MEDINA-viitekehyksen käyttö johtaa tehokkaampiin ja tehokkaampiin tarkastuksiin, joihin tarvitaan vähemmän manuaalista työtä asianmukaisten todisteiden löytämiseksi ja arvioimiseksi ja sertifiointiprosessin luotettavuuden parantamiseksi.

MEDINA-kehys on validoitu kahdessa todellisessa pilvikäyttötapauksessa, jotka on kehitetty projektissa. Boschin johtama Euroopan sertifiointi monipilvipohjaisista käyttöjärjestelmistä IoT-ratkaisuille.
Fabasoftin johtama SaaS-ratkaisujen jatkuva tarkastus julkiselle sektorille. Toisaalta Boschin käyttötapaus hyödyntää MEDINA-kehystä monipilviarkkitehtuurissa (IaaS, PaaS ja SaaS) käyttämällä integroitua MEDINA-käyttöliittymää testipenkissä, joka koostuu kahdesta pilvihyperskaalaajasta. Toisaalta Fabasoftin käyttötapauksessa hyödynnetään MEDINA-kehyksen API-rajapintoja (sovellusohjelmointirajapintoja) komponenttien integroimiseksi talon sisäiseen ratkaisuun jatkuvan pilvisertifioinnin saavuttamiseksi.

MEDINAn standardoinnilla on myös ollut keskeinen rooli sekä yleisen viitekehyksen (yhteentoimivuuden) omaksumisen tukemisessa että projektin keskeisten tulosten kestävyyden mahdollistamisessa. MEDINA on vaikuttanut tulevan EUCS-sertifiointijärjestelmän kehitykseen, erityisesti automaattisen kyberturvallisuuden valvonnan vaatimuksiin. EUCS:ään, mittareihin ja automaatioon liittyvät lähjoitukset on myös tehty asianmukaisille standardointilaitoksille, kuten ENISA, ISO/IEC, US NIST, ETSI ja CEN CENELEC.

Avoimeksi lähteeksi julkaistut MEDINA-tulokset toimivat lähtökohtana tuleville tutkimuksille (kuten Horizon Europe -projektit EMERALD ja COBALT) ja yhteisölähtöiselle EUROSCAL-aloitteelle, jonka MEDINA on julkaissut tarkoituksena hyödyntää NIST:n OSCAL (Open Security Controls Assessment Language) -kieltä Euroopassa.

MEDINA-yhdistymää (TECNALIA, Bosch, CNR, Fabasoft, FhG, HPE, Nixu ja XLAB) – TECNALIAn johdossa – on tukenut joukko asiantuntijoita, jotka muodostavat projektin ulkoisen neuvoa-antavan toimikunnan. Koko tiimi on auttanut MEDINAa saavuttamaan odotetut tulokset, myötävaikuttaen Euroopan pilviturvallisuussertifiointikäytäntöön, parantaen pilvipalveluiden luotettavuutta tietoturvasertifiointijärjestelmien noudattamisen avulla, tekemällä yhteistyötä asiaankuuluvien sidosryhmien kanssa ja auttamalla Eurooppaa valmistautumaan tulevaisuuden pilviturvallisuushaasteisiin.

Automaation hyödyntäminen, vaatimustenmukaisuuden varmistaminen, luottamuksen lisääminen.

MEDINA projekti

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Uutisia ja tietoja saatavilla osoitteessa https://medina-project.eu

Tämä hanke on saanut rahoitusta Euroopan unionin Horizon 2020 -tutkimus- ja innovaatio-ohjelmasta, jonka hankesopimus on nro 952633.

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Figure 66. MEDINA Press release translated to Finnish

Rassegna Stampa

MEDINA

MEDINA: Security framework to achieve a continuous audit-based certification in compliance with the EU-wide cloud security certification scheme

Pisa, Italia, October 2023

MEDINA è un'iniziativa progettuale finanziata dall'Unione Europea che consente ai fornitori di servizi cloud (Cloud Service Providers) di ottenere una **certificazione basata su monitoraggio continuo**, in conformità con lo schema di certificazione della sicurezza cloud dell'Unione Europea (EUCS). In breve, MEDINA consiste in strumenti, tecniche e processi che supportano la certificazione dei servizi cloud basata su monitoraggio continuo, in cui il livello di sicurezza è misurabile sin dalla progettazione dei servizi.

L'obiettivo principale di MEDINA è **fornire una architettura automatizzata** che faciliti i fornitori di servizi cloud (fornitori IaaS, PaaS e SaaS) nel processo di ottenimento della certificazione EUCS, con l'obiettivo di aumentare la fiducia degli utenti nell'adozione dei servizi cloud.

L'ottenimento e il mantenimento della certificazione EUCS consiste in un processo complesso, costoso e dispendioso in termini di tempo, soprattutto a causa della quantità di lavoro manuale necessario per il processo di valutazione. I risultati del progetto MEDINA, che si concluderà nell'ottobre 2023, comprendono una serie di **strumenti e tecniche automatizzati basati su valutazione di metriche**, che supportano il **monitoraggio continuo della conformità ai requisiti**, la **tracciabilità delle misurazioni** e la **protezione delle stesse da manomissioni**, nonché la **gestione dello stato di certificazione basata su fattori di rischio**. L'utilizzo dell'architettura MEDINA si traduce in **controlli più efficienti ed efficaci**, con un minore sforzo manuale necessario per trovare e valutare le misurazioni rilevanti, **migliorando l'affidabilità del processo di certificazione**.

I risultati di MEDINA sono stati convalidati in **due casi d'uso reali**: 'European Certification of Multi-cloud backends for IoT Solutions', caso d'uso guidato da Bosch e 'Audit continuo di soluzioni SaaS per il settore pubblico', guidato da Fabasoft. Il caso di studio di Bosch sfrutta MEDINA in un'architettura multi-cloud (IaaS, PaaS e SaaS) utilizzando la specifica interfaccia utente integrata, in un banco di prova che comprende un insieme di risorse distribuite su due hyperscaler cloud. Il caso di studio di Fabasoft sfrutta le API (Application Programming Interfaces) di MEDINA per integrare i componenti in una soluzione interna all'azienda.

In MEDINA, gli aspetti relativi alla **standardizzazione** hanno svolto un ruolo chiave, sia nel sostenere l'adozione dell'architettura (anche in termini di interoperabilità), sia nel consentire la sostenibilità dei risultati chiave del progetto. MEDINA ha influenzato lo sviluppo del prossimo schema di certificazione EUCS, in particolare i requisiti relativi al monitoraggio automatico di conformità di Cyber-sicurezza. Contributi su EUCS, metriche e automazione sono stati forniti anche a enti di standardizzazione rilevanti, come ENISA, ISO/IEC, US NIST, ETSI e CEN CENELEC.

I risultati di MEDINA, pubblicati come open source, serviranno come base per la **ricerca futura** (due esempi su tutti: i progetti follow-up di Horizon Europe, EMERALD e COBALT). Non dimentichiamo inoltre l'iniziativa comunitaria EUROSCAL, lanciata da MEDINA come mezzo per

operare in Europa, a livello di requisiti di sicurezza, col linguaggio OSCAL (Open Security Controls Assessment Language) del NIST.

Il consorzio MEDINA (TECNALIA, Bosch, CNR, Fabasoft, FhG, HPE, Nixu e XLAB), guidato da TECNALIA, è supportato da un gruppo di esperti che costituiscono l'External Advisory Board del progetto. L'intero team ha contribuito a far sì che MEDINA raggiungesse i risultati attesi, contribuendo alla politica europea di certificazione della sicurezza del cloud, migliorando l'affidabilità dei servizi cloud garantendo la conformità agli schemi di certificazione della sicurezza, aiutando l'Europa a prepararsi per le sfide di sicurezza del cloud di domani.

Leveraging automation, ensuring compliance, enhancing trust.

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Il progetto è finanziato dal programma di Ricerca e Innovazione dell'Unione Europea H2020, grant agreement n. 952633

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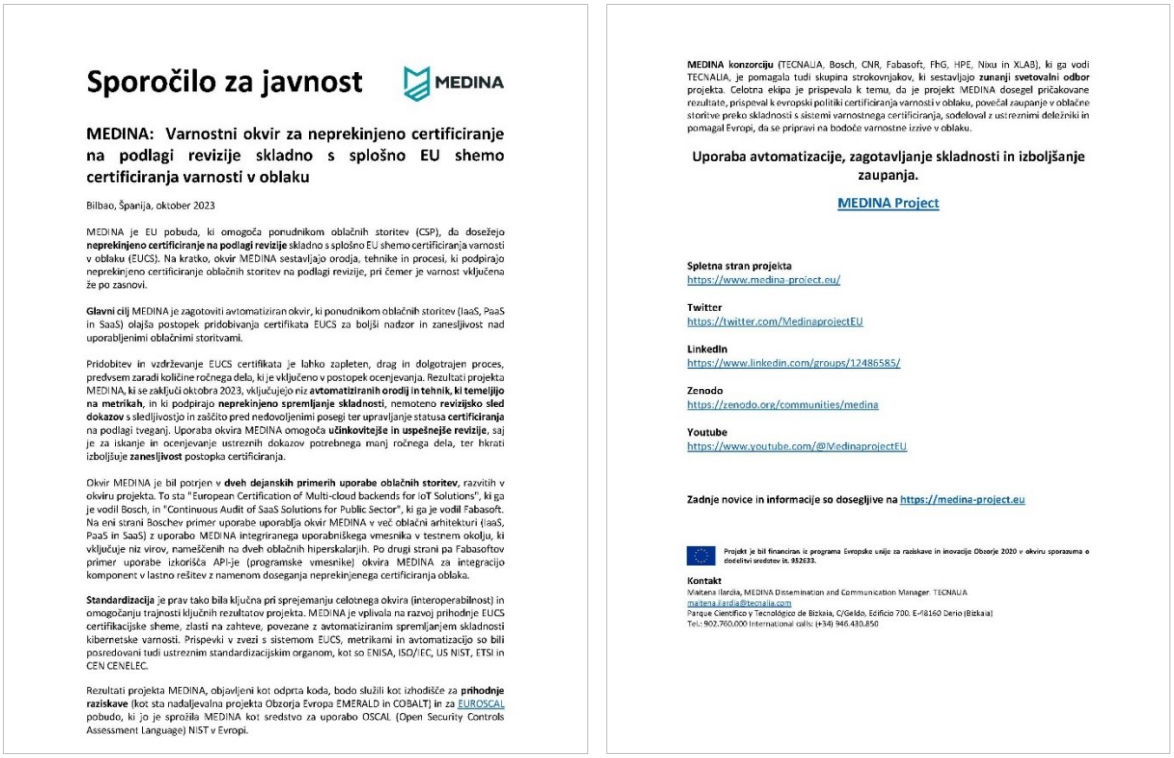
Figure 67. MEDINA Press release translated to Italian



Sporočilo za javnost

MEDINA

MEDINA: Varnostni okvir za neprekinjeno certificiranje na podlagi revizije skladno s splošno EU shemo certificiranja varnosti v oblaku

Bilbao, Španija, oktober 2023

MEDINA je EU pobuda, ki omogoča ponudnikom oblačnih storitev (CSP), da dosežejo **neprekinjeno certificiranje na podlagi revizije** skladno s splošno EU shemo certificiranja varnosti v oblaku (EUCS). Na kratko, okvir MEDINA sestavljajo orodja, tehnike in procesi, ki podpirajo neprekinjeno certificiranje oblačnih storitev na podlagi revizije, pri čemer je varnost vključena že po zasnovi.

Glavni cilj MEDINA je zagotoviti avtomatiziran okvir, ki ponudnikom oblačnih storitev (IaaS, PaaS in SaaS) olajša postopek pridobivanja certifikata EUCS za boljši nadzor in zanesljivost nad uporabljenimi oblačnimi storitvami.

Pridobitev in vzdrževanje EUCS certifikata je lahko zapleten, drag in dolgotrajen proces, predvsem zaradi količine ročnega dela, ki je vključeno v postopek ocenjevanja. Rezultati projekta MEDINA, ki se zaključi oktobra 2023, vključujejo niz **avtomatiziranih orodij in tehnik, ki temeljijo na metrikah**, in ki podpirajo **neprekinjeno spremljanje skladnosti**, nemoteno **revizijsko sled dokazov** s sledljivostjo in zaščito pred nedovoljenimi posegi ter upravljanje statusa **certificiranja** na podlagi tveganj. Uporaba okvira MEDINA omogoča **učinkovitejše in uspešnejše revizije**, saj je za iskanje in ocenjevanje ustreznih dokazov potrebnega manj ročnega dela, ter hkrati izboljšuje **zanesljivost** postopka certificiranja.

Okvir MEDINA je bil potrjen v **dveh dejanskih primerih uporabe oblačnih storitev**, razvitih v okviru projekta. To sta "European Certification of Multi-cloud backends for IoT Solutions", ki ga je vodil Bosch, in "Continuous Audit of SaaS Solutions for Public Sector", ki ga je vodil Fabasoft. Na eni strani Boschev primer uporabe uporablja okvir MEDINA v več oblačni arhitekturi (IaaS, PaaS in SaaS) z uporabo MEDINA integriranega uporabniškega vmesnika v testnem okolju, ki vključuje niz virov, nameščenih na dveh oblačnih hiperskalarjih. Po drugi strani pa Fabasoftov primer uporabe izkorišča API-je (programske vmesnike) okvira MEDINA za integracijo komponent v lastno rešitev z namenom doseganja neprekinjenega certificiranja oblaka.

Standardizacija je prav tako bila ključna pri sprejemanju celotnega okvira (interoperabilnost) in omogočanju trajnosti ključnih rezultatov projekta. MEDINA je vplivala na razvoj prihodnje EUCS certifikacijske sheme, zlasti na zahteve, povezane z avtomatiziranim spremljanjem skladnosti kibernetske varnosti. Prispevki v zvezi s sistemom EUCS, metrikami in avtomatizacijo so bili posredovani tudi ustreznim standardizacijskim organom, kot so ENISA, ISO/IEC, US NIST, ETSI in CEN CENELEC.

Rezultati projekta MEDINA, objavljeni kot odprta koda, bodo služili kot izhodišče za **prihodnje raziskave** (kot sta nadaljevalna projekta Obzorja Evropa EMERALD in COBALT) in za EUROSCAL pobudo, ki jo je sprožila MEDINA kot sredstvo za uporabo OSCAL (Open Security Controls Assessment Language) NIST v Evropi.

MEDINA konzorciju (TECNALIA, Bosch, CNR, Fabasoft, FhG, HPE, Nixu in XLAB), ki ga vodi TECNALIA, je pomagala tudi skupina strokovnjakov, ki sestavljajo **zunanji svetovalni odbor** projekta. Celotna ekipa je prispevala k temu, da je projekt MEDINA dosegel pričakovane rezultate, prispeval k evropski politiki certificiranja varnosti v oblaku, povečal zaupanje v oblačne storitve preko skladnosti s sistemi varnostnega certificiranja, sodeloval z ustreznimi deležniki in pomagal Evropi, da se pripravi na bodoče varnostne izzive v oblaku.

Uporaba avtomatizacije, zagotavljanje skladnosti in izboljšanje zaupanja.

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Projekt je bil financiran iz programa Evropske unije za raziskave in inovacije Obzorje 2020 v okviru sporazuma o dodelitvi sredstev št. 952633.

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Figure 68. MEDINA Press release translated to Slovenian