PIACERE

Deliverable D8.4

Dissemination, communication and networking report – v2

Editor(s):	Juncal Alonso (TECNALIA), Maitena Ilardia (TECNALIA), Galia Novakova Nedeltcheva (POLIMI)
Responsible Partner:	TECNALIA
Status-Version:	Draft / Final – v1.0
Date:	30.11.2023
Distribution level (CO, PU):	PU

Project Number:	101000162
Project Title:	PIACERE

Title of Deliverable:	D8.4 Dissemination, communication and networking report - v2
Due Date of Delivery to the EC	30.11.2023

Workpackage responsible for the Deliverable:	WP8 Sustainability and Awareness
Editor(s):	TECNALIA, POLIMI
Contributor(s):	Maitena Ilardia (TECNALIA), Galia Novakova Nedeltcheva (POLIMI), Juncal Alonso (TECNALIA)
Reviewer(s):	Joao Costa (XLAB)
Approved by:	All Partners
Recommended/mandatory readers:	All WPs

Abstract:	This deliverable will explain the dissemination and communication activities followed during the reporting periods as well as the results from these activities and will update project's dissemination and communication plan respectively. This report will also contain the relevant activities executed to foster a close collaboration with projects related to PIACERE, as well as future networking plans.
Keyword List:	Communication, Dissemination, Networking, KPIs
Licensing information:	This work is licensed under Creative Commons Attribution-ShareAlike 3.0 Unported (CC BY-SA 3.0) http://creativecommons.org/licenses/by-sa/3.0/
Disclaimer	This document reflects only the author's views and neither Agency nor the Commission are responsible for any use that may be made of the information contained therein

Document Description

Version	Date	Modifications Introduced	
		Modification Reason	Modified by
v0.1	30.05.2023	First draft version	TECNALIA, POLIMI
v0.2	30.08.2023	Comments and suggestions received by consortium partners	ALL
v0.3	05.10.2023	Second draft version	TECNALIA, POLIMI
v0.4	10.10.2023	Section on Open Science Community Engagement added	XLAB
v0.5	10.11.2023	Content added and internal review done with comments to improve	TECNALIA, POLIMI, XLAB
v0.6	28.11.2023	Version after the review	TECNALIA, POLIMI
v0.7	30.11.2023	Final version ready for submission	TECNALIA

Table of contents

List of tables

List of figures

Terms and abbreviations

CSP	Cloud Service Provider
DevOps	Development and Operations
DoA	Description of Action
EC	European Commission
GA	Grant Agreement
IaC	Infrastructure as Code
IEP	IaC Execution Platform
IOP	IaC Optimizer Platform
KPI	Key Performance Indicator
KRs	Key Results
KER	Key Exploitable Result
RIA	Research and Innovation Action
SW	Software
SE	Software Engineering

Executive Summary

This deliverable D8.4 is a public report, presenting the results of the activities on communication and dissemination in the context of Work Package 8 "Sustainability and Awareness", and is the second of the two deliverables (D8.3 [1] and D8.4) providing the results of the dissemination and communication achievements obtained during the reporting periods. This report also contains the relevant activities executed to foster a close collaboration with projects related to PIACERE, as well as networking plans implementation follow up.

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

- D8.1 PIACERE brochure and public website [2]
- D8.2 Communication, Networking Plan and Dissemination Strategy [3]
- D8.3 Dissemination, Communication and Networking - v1 (RP 1) [1]
- D8.4 Dissemination, Communication and Networking - v2 (RP 2)

The deliverable D8.2 [3] has proposed the detailed plan and list of dissemination activities, including mainly the classical dissemination channels such as scientific and professional publications, participation in workshops and third-party events. The deliverable D8.3 [1] has described the results of such actions during the first reporting period.

The present deliverable D8.4 describes the achievements of Dissemination, Communication and Networking actions during the second reporting period. The Key Performance Indicators (KPIs) established at the start of the project have been fully achieved, even in some cases, surpassing the target values. The present deliverable considers the reviewers' recommendations implemented in the second half of the project's lifecycle, resulting from the first project review held virtually in June 2022.

1 Introduction

The focus of Work package 8: Sustainability and Awareness is to maximize the impact of the project. The tasks 8.1 and 8.2 reporting in this document contribute to this aim 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 dissemination, communication and networking activities [4].

Within task 8.1, we have performed the appropriate dissemination actions to reach the objectives proposed in the DoA. These actions took part right after we have obtained R&D results, and they will last beyond the end of the project's lifetime. Dissemination achievements are reported in detail in section 2, describing the results in publications, conferences, workshops, seminars, press releases, promotion materials, and web presence. Results of PIACERE have been promoted to end-users and other relevant stakeholders in meetings and customized presentations. The extensive contact networks of consortium members facilitated contacting the targeted audience. Further details of dissemination activities and specifics (e.g., acknowledged conferences, journals and workshops, poster presentations, cloud-community events participation and more general IT events) are addressed in section 2, dissemination of the project's results, as well as in the Appendices A, B, C. The tables include updated information on type of event, partners, country, link or reference to the activity and so on.

Task 8.2 includes updating the website throughout the project by TECNALIA. The website has been linked to the partners' website press releases and relevant scientific communities. This task also covers the liaison and co-operation activities with other projects under the same or similar objectives. The cooperation aims at exploiting synergies between the projects and increasing the impact of the initiative. When feasible, collaboration with projects from other Units or National strategies have been promoted.

Communication achievements are reported in section 0 and 4 describing the results of the different marketing materials that have been prepared during the project duration to use in the different dissemination activities (brochure, posters, newsletters, showcases and merchandising items). Also, as part of the Communication activities, have been analysed the values achieved for the dissemination and communication KPIs. Description of the website sections and blogposts, website analytics to monitor the behaviour of the website has been used as a communication tool. Furthermore, PIACERE's social channels (LinkedIn, Twitter, YouTube and SlideShare) have been managed to ensure that the messages that are launched in these communication networks serve to attract traffic to the project's website, which is the project's primary means of dissemination.

PIACERE communication activities follow the principle of communication as clear and easy as possible. The communication strategy is focused on stimulating people to be informed about PIACERE 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, to be active and look for interaction in websites and social networks are part of the steps in a communication strategy.

Furthermore, the deliverable reports on collaboration and networking activities (section 0) 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 [5] and in the deliverable 8.2 [3] and 8.3 [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 some deviations from what was initially planned.

Lastly, this report describes in section 6 the pillars of open research at PIACERE that promote the collaboration between researchers, the dissemination and reuse of innovation, and the sustainability of the technology developed in this project.

1.2 Document structure

This document is structured as follows:

- Section 1 gives a general introduction, scope, and structure of this deliverable.
- Section 2 presents the main results of the dissemination activities, details the scientific publications of the PIACERE partners, as well as the seminars, and various dissemination events in which the consortium has participated to promote the project.
- Section 0 describes the dissemination and communication tools that were intensively used during the reporting period (project website and blog).
- Section 4 focuses on the PIACERE digital strategy and summarizes the main results of the social networks. Moreover, the section provides dissemination and communication KPIs results.
- Section 0 describes the networking activities carried out with other European projects.
- Section 6 details the pillars of the project's Open Science community engagement, and how it contributes to Open-Source Software and Open Research.
- Section 7 draws conclusions from the work presented in this deliverable.
- Section 8 provides references to the existing literature and online resources.
- The Appendices A-J support the discussions in the previous sections.

2 Dissemination activities and results

In this section we present the PIACERE detailed dissemination strategy, including activities, stakeholders, targeted groups and audience, channels, messages, dates, as well as relevant events where the project has been presented.

2.1 Objectives of Community engagement

In the RIA context (funding research activities relatively upstream of a commercial product) where PIACERE is, the dissemination activities take an essential role, and the objectives in the second half of the project include:

- Targeting the scientific community and general public by disseminating in top-notch scientific venues as the basis for reputation-building within the Software Engineering community. The publications help to demonstrate the advances beyond the state-of-the-art and to validate the research findings.
- Refining the strategy and optimal means of dissemination, stakeholders, project milestones and results to disseminate.
- Communicating the results of the project among the technical and scientific community to improve the access to relevant research communities.
- Promote timely the project's results to end-users and other relevant stakeholders in meetings, seminars, and customized presentations.
- Seeking cooperation with Software Development initiatives in order to create synergies and accelerate innovation, such as the Software Engineering and the inter-cloud clusters.
- Monitoring results in publications, conferences, exhibitions, workshops, seminars, press releases, promotional materials, and blog posts.

2.2 Target groups for dissemination and communication

The PIACERE consortium has identified four major stakeholder groups:

- The **technical community** that is focusing on the development of IaC frameworks, toolsets and security workflows in DevOps.
- **DevSecOps teams** that aim at exploiting IaC frameworks to implement the infrastructural code for the management of their applications.
- **Researchers in the Software Engineering area** aiming at studying the DevOps processes and at developing new research methods to facilitate the activities related to the software lifecycle.
- **Experts** of the application domains relevant to the PIACERE case studies.

2.3 Dissemination activities per target group

The dissemination activities are tailored to each specific target group as highlighted below. For each target group, the aim is defined based on what is expressed in the DoA [5], and in D8.3 [1] extended with the following means and measures:

- **For the Technical Community**:
  - Show the value of the PIACERE approach for the lifecycle management of IaC [KR1 – KR13].
  - Demonstrate the benefits of abstract modelling of resources and existing networks [KR1], and the automatic code generation to existing common languages and protocols [KR4].

- Argue the necessity of having tools to verify the quality [KR5] and trustworthiness [KR6] of the IaC created and of the components that it uses [KR7].
- Demonstrate the advantages of simulating the behaviour [KR8] of the IaC before it is actually deployed to detect potential bottlenecks for misconfigurations.
- Show the benefits of optimizing [KR9] the deployment for the runtime execution platform constraints [KR10] and of collecting metrics [KR11, KR12] that will allow to always self-heal and adapt to the optimized conditions and study from the anomalies detected, learning to prevent failures [KR11].
- Demonstrate the ease of extending to other languages with the provision of extension mechanisms [KR4].

For this group the main means of dissemination are scientific papers, blog posts, webinars, and workshops.

- **For DevSecOps Teams**:
  - Demonstrate the convenience of using an IDE [KR2]/ DevSecOps framework [KR13] for the management of the lifecycle of IaC. Also, show the benefit of not having to learn multiple languages, protocols, technicalities of commonly used IaC tools through the abstractions [KR1] of resources, and so on.
  - Demonstrate that by using PIACERE tools, productivity, quality, effectiveness, and efficiency of the IaC created by DevSecOps teams will increase [KR1 – KR11]. Also, errors will be found in an easier way thanks to the verification [KR5, KR6] and sandboxing [KR8] tools.
  - Show DevSecOps teams that the operation of IaC code is easier [KR12], the performance can be monitored and the code continuously improved [KR11].

For this group the main means of dissemination are the open-source repository, demos, international conferences, blog posts, webinars, and workshops. More specifically, we have organised 3 expert round tables (see Sect. 0 and D8.6 [6] for more details).

- **For Researchers in the Software Engineering domain**:
  - Show the value of the PIACERE approach for the lifecycle management of IaC [KR1 – KR13]. In particular, show the characteristics and strength of the proposed abstractions [KR1], the verification approach and techniques [KR5, KR6], and the sandbox tools [KR8].
  - Another point to be demonstrated is the monitoring approach and the improvement of the IaC code [KR11].

For this group the main means of dissemination are international conferences, top-notch journals, workshops, industry and B2B events, including virtual events. While in the first phase of the project the main driver were position papers, followed by submissions to more important and prestigious venues.

- **For Experts in the Application domains relevant to the PIACERE case studies**:
  - Show the benefits achieved by the case studies with the adoption of the PIACERE approach [KR14]. The benefits will be quantified with reference to the impact KPIs defined in the project DoA (KPI EI1.1-KPI EI1.4, KPI EI2.1-KPI EI2.3, KPI EI3.1, KPI EI4.1-KPI EI4.2).

For this group the main means of dissemination are blog posts, webinars, participation to conferences and workshops relevant for the target application domains. Additionally, we have also organised expert round tables (see section 0 and D8.6 [6] for more details).

2.4 Dissemination results

This section provides some details on the activities carried out in the last 18 months of the project's lifecycle and presents the dissemination results obtained by the PIACERE consortium in terms of scientific achievements in the period M25-M36.

The dissemination Key Performance Indicators (KPIs) defined in the grant agreement (GA) (see Table 1) are used to monitor the progress in dissemination. Particularly, we put a special emphasis on the quality of the results obtained rather than the produced quantity.

Planned dissemination activities:

- Publication of high-quality papers in top-edge journals (Elsevier, IEEEXplore, etc.) with open access and CORE-A rank conferences. 10+ Project showcases/ demonstrations videos.
- Attending webinars and specialized CORE-A/A* international conferences (IEEE, ACM, Springer LNCS).
- Collaboration with other projects, initiatives and the Software Engineering and inter-cloud clusters identifying synergies and commonalities, organizing common workshops and events.
- Participation in events, workshops, conferences, cluster activities, round expert tables and informal meetings, where the results and achievements of PIACERE will be presented.

Partners have published papers in peer-reviewed and indexed journals, such as IEEE Software and International Journal of Cloud Computing, and they have chosen the most relevant events, among others Eclipse SAAM, Red Hat, Gaia-X, Tosca, etc.

PIACERE partners collaboratively and actively have promoted visibility through specific dissemination activities. The following paragraphs summarizes the focus of the individual partner's dissemination:

TECNALIA has focused on the presentation of both project objectives and results at conferences, seminars, and workshops, to exchange knowledge with other DevOps experts and DevOps team members that has been also dealing with Infrastructure ad Code (IaC). Additionally, TECNALIA has disseminated the results in Spain and the Basque Country through their marketing services, but also in a highly ranked scientific journals and conferences.

Prodevelop, XLAB, 7Bulls as SMEs have focused their dissemination and communication activities on workshops, tutorials and events paying special attention to industrial conferences, invited talks and social media.

PoliMi has focused on publishing PIACERE achievements in highly ranked journals and core-A conferences, workshops as FastContinuum[1] 2023 and events such as Computer Networks, IEEE Transactions on Cloud Computing, Data in Brief, ACM Transactions on Programming Languages and Systems, Software and Systems Modelling Journal, Information Systems journal. Besides, the results were also communicated through the university's website and social channels as press releases in different languages.

SI-MPA has mainly participated in public sector related events and workshops, as well as in internal meetings with other departments of the Slovenian government, so that the results are transferred to other bodies.

[1] https://sites.google.com/view/fastcontinuum-2023/

2.4.1 Dissemination monitoring KPIs

The continuous evaluation and analysis of the KPIs let PIACERE partners steer dissemination to the most valuable activities towards obtaining the maximum impact.

It can be seen in Table 1 below that for each dissemination tool a respective target value has been identified, corresponding to the specific KPI, as well as the reached results up to M36. The obtained results for many of the KPIs even overpass the target values.

Table 1 PIACERE Dissemination KPIs at M36

Dissemination Tool		Target	M36	Check
Scientific publications	Journal publications	2	9	✓
	Conference publications	15	17	✓
Project posters	Number of posters	At least 3	3	✓
Press releases	Number of specialized press releases	2 per country and language	2	✓
Project showcases	Number of demonstration videos produced	10	13	✓
Project newsletters	Number of newsletter	1 per year	3	✓
Attendance of events	Number of events attended (including workshops, keynotes, etc)	5 per year	23	✓
Cloud community, SW and services publication	Number of references on external magazines (collaboration and support actions, EC)	20	31	✓
Brochures	Number	>3	2	✓

Dissemination highlights:

- 26 Dissemination achievements in terms of **scientific publications** in highly ranked journals and international (A-ranked) conferences.
- 23 **Cloud Community** publications/ events, (see Appendix C).
- 31 attended **3rd party events - domain-specific workshops and seminars** (Cloud Community events included), (see Appendix C).
- 3 Posters, 13 demo videos, 2 brochures, 3 newsletters, and other marketing materials for the events we participated in, (see Appendix D-G).
- 61 **Zenodo community** records, including research papers and PIACERE public deliverables, (see Figure 1).

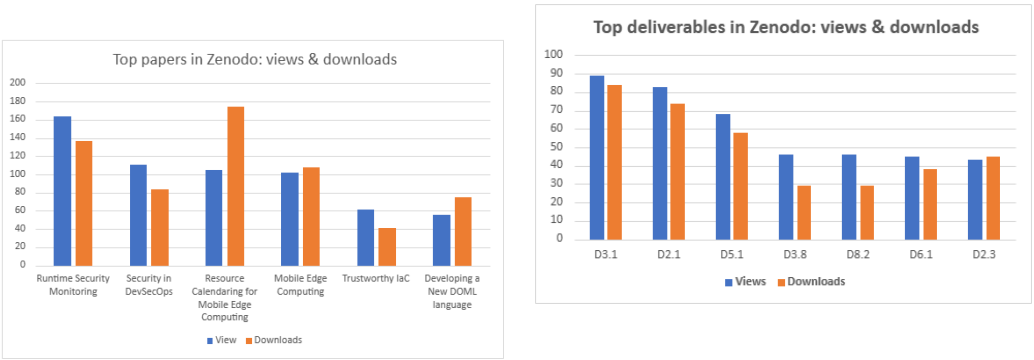


Figure 1. The most searched PIACERE publications and deliverables in the Zenodo community

The elaborated dissemination strategy outlined in deliverable D8.3 [1] has led to the respective dissemination results in terms of published scientific journal and conference papers in the second reporting period M25-M36 described in detail in Appendix A. The list of scientific journals where the PIACERE partners have contributed with the project's results includes: International Journal of Computational Science and Engineering, MDPI Information Journal, Computer Networks, IEEE Transactions on Cloud Computing, Data in Brief, MDPI Applied Sciences, ACM Transactions on Programming Languages and Systems, Software and Systems Modelling, Information Systems, IEEE Software – Special issue on Infrastructure as Code Unleashed, Journal of Cloud Computing. The details of the publications are presented in Annex A of this deliverable.

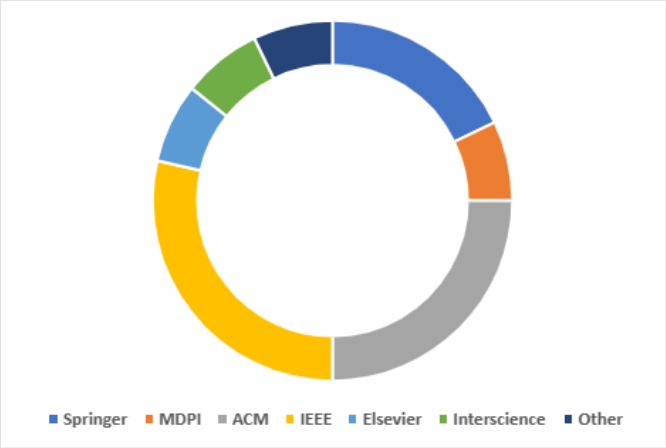


Figure 2. PIACERE publications in high-quality journals and conferences (A-core)

Open access to peer-reviewed scientific publications

We have explored the Open Access (a suitable budget has been allocated for green and gold open access) to all peer-reviewed scientific publications relating to its results. The authors of all peer-reviewed scientific publications chose the most appropriate way of publishing their results, and these publications have been stored in an Open data repository as arXiv, Zenodo (a joint repository that is part of the OpenAIRE service operated by the EC), etc.

In total, we obtained 9 highly ranked journal publications (see Figure 2), from which 7 have gold open access, and one is under a green open access, with embargo period of 12 months (see Figure 3). Besides, we have reached 17 core-A conference publications (see Appendix A) with a good citation rate.

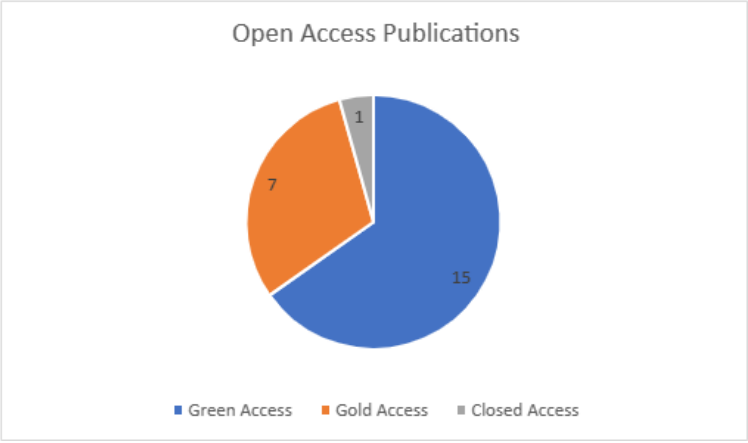


Figure 3. PIACERE publications with green and gold open access

The scientific journals (with high Scimago journal rate) where the consortium has published its research papers are listed below:

- International Journal of Computational Science and Engineering, **[H-21, Q3]**
- MDPI Information Journal, **[Q2]** open access
- Computer Networks (ELSEVIER), **[H-135, Q1]** open access
- IEEE Transactions on Cloud Computing, **[H-49, Q1]** open access
- Data in Brief, **[H-45, Q4]**, open access
- MDPI Applied Sciences, **[Q2]** open access
- ACM Transactions on Programming Languages and Systems, **[H-72, Q2]**, open access
- Software and Systems Modelling Journal, Springer Verlag, **[IF 2,2; H-52]**, open access
- ELSEVIER Information Systems journal, **[IF 3,7 H-92]**, Special issue, open access
- IEEE Software – Special issue on Infrastructure as Code Unleashed, **[H-121]** open access
- Journal of Cloud Computing, **[IF 4, H-38, SJR 0.976]** open access

Among more industrial-focused and practitioner-oriented venues the PIACERE consortium has participated in, are the following dissemination events:

- CloudFest: https://www.cloudfest.com
- Machine Learning Week Europe: https://predictiveanalyticsworld.de
- CdCon: https://events.linuxfoundation.org/cdcon/
- Conf42: Cloud Native https://www.papercall.io/conf42-cloud-native-2021
- OW2'con: https://www.ow2con.org
- H-cloud Summit: www.h-cloud.eu
- The H@ck Summit: http://thehacksummit.com/eu
- DevOpsCon: http://devopscon.io
- Ya!va Conf: http://yavaconf.com
- OWASP Day: http://owasp.org
- DevSecOps Days: Welcome to DevSecOps Days Pittsburgh 2022 (cmu.edu)
- Agile Days: www.agileday.it
- Red Hat: Red Hat Summit Connect Madrid, Spain
- EclipseCon: www.eclipsecon.org/2023

In summary, the dissemination results in terms of publication activities, attendance of third-party events, project's dissemination materials obtained by month M36 (for more details see Appendices) are as follows:

- Journal papers: 9
- Conference papers: 17
- Cloud community events[2]: 31
- Industrial and general events: 23
- Project videos: 13
- Project posters: 3

Figure 4 below presents the coverage of the PIACERE Key Results (KRs) by the published scientific publications (Journal Papers-JP and Conference Papers-CF), attended industrial events (IE), public deliverables (PD), and project's research topics (RT).

[2] The KPI on *Cloud community, software and service publications* includes project's presentations, talks, demos, technical papers presented at industrial and more general software service events (including hybrid ones).

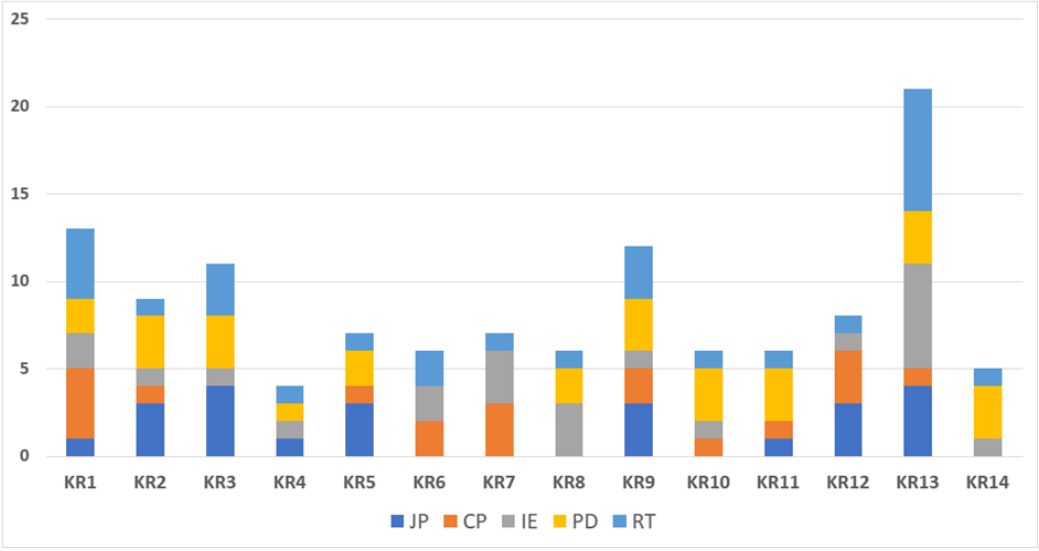


Figure 4. KR Coverage by scientific publications, industrial events, published deliverables and research topics

Table 2. KRs coverage by research topics below, in particular, shows the coverage of each KR by the research topics that PIACERE elaborated around.

From the rate of downloaded papers and most viewed ones in the PIACERE Zenodo community, it appears that the most interesting research topics that our scientific papers have covered are, as follows:

- Runtime security monitoring
- Resource calendaring for mobile edge computing
- Joint planning of network slicing and mobile edge computing
- Security in DevSecOps
- Programming trustworthy IaC in a secure framework

Moreover, the project does not only advance the existing knowledge but also opens new doors for new research topics.

Table 2. KRs coverage by research topics

RT	Research Topic	KR coverage
RT1	Trustworthy Infrastructure As Code in a Secure Framework	KR13
RT2	Challenges of Cloud services federation and monitoring towards the Cloud Continuum	KR13
RT3	Challenges Towards Modelling and Generating Infrastructure-as-Code	KR1, KR2, KR3, KR10
RT4	Security in DevSecOps: Applying tools and machine learning to verifications and monitoring steps	KR6, KR7, KR8, KR14
RT5	Multi-objective Optimization Analysis for Finding Infrastructure-as-Code Deployment Configuration	KR9
RT6	Optimization and Prediction Techniques for Self-Healing and Self-Learning Applications in a Trustworthy Cloud Continuum	KR9, KR11, KR13
RT7	CloudOps: Towards the Operationalization of the Cloud Continuum	KR13
RT8	Challenges and opportunities of Multi-Cloud native applications	KR13
RT9	IaC through the DevSecOps philosophy	KR13
RT10	Static Analysis of Infrastructure as Code	KR5
RT11	A New DevOps Modelling Language to Support the Creation of Infrastructure as Code	KR1, KR3, KR4
RT12	Optimizing Infrastructure as Code Deployment Configurations	KR13, KR9
RT13	IaC Code Inspection Using Python-Based DevSecOps Tool	KR6, KR12
RT14	Open-Source Infrastructure-as-Code	KR1
RT15	An Infrastructure as Code Modelling Approach	KR1, KR3

2.4.2 Dissemination channel and materials

The consortium has used a series of communication materials and social channels as described in D8.3 [1] (brochures, newsletters, blogs and twitter posts, press releases, posters, etc.). Besides, the consortium has already disseminated the high-quality research papers in high-notch scientific journals and international conferences as presented in detail in Appendix A of this deliverable. All PIACERE publications are available online, and they are mostly with an open access (gold or green).

Open access repository Zenodo

This is considered as an important channel to share all Open Access materials of the project. All open access publications and public deliverables are shared with the PIACERE Zenodo community (https://zenodo.org/communities/101000162/?page=1&size=20). At M36 we have a total of 61 records broadcasted in the Zenodo public repository. (See also Figure 1).

Other communication materials

Besides, the consortium has prepared reports on the interviews with experts in the PIACERE consortium or with other stakeholders (for more details see D8.6 [6]) to be promoted as user stories, user opinions. From dissemination point of view, we took advantage of this

opportunity to expose to experts in academia and industry what we have done in PIACERE project.

Additionally, videos are used as an excellent tool to disseminate the PIACERE work performed. In D8.2 Communication, Networking Plan and Dissemination Strategy [3], the PIACERE dissemination materials are detailed in terms of means, purpose and rationale.

2.4.3 Dissemination events organized by the Project

PIACERE dissemination strategy also includes (co-)organization of events where to present the PIACERE results. Those events were co-located with relevant venues or organized in collaboration with other projects, as in the case of **FastContinuum[3] workshop** held in Coimbra, Portugal on 16 April 2023, co-organised with AI-SPRINT project. It has been held as an in-presence workshop of the 14th ACM/SPEC International Conference on Performance Engineering (ICPE 2023) and co-chaired by Elisabetta Di Nitto (Politecnico di Milano). For more details see Appendix B.

In addition, there have been presentations of the project in on-line and hybrids events such as CAiSe 2022, ESOCC 2022, First and Second SwForum workshops, GAIA-X, H-Cloud summits (see Appendix B-C, Table 1-2). For the last months of the project's lifecycle the focus has been on the organization of face-to-face events when possible (such as FASTContinuum 2023, etc.)

Additionally, it has been organized **a special session** by Eneko Osaba (TECNALIA) at the 6th International Conference on Computational Intelligence and Intelligent Systems, titled **Evolutionary Computation for Industry and Real-World Applications**. The organization of this special session has been contextualized as part of PIACERE dissemination achievements, a brief description is presented in Appendix B.

Participation in third-party events

Initially, the dissemination team has sent a questionnaire to the project's partners to collect information on the kind of events the partners regularly use to communicate and disseminate results and activities (conference, congress, workshop, trade fair, etc.). This has kept track of the events where the project has been presented. The members of the consortium have participated in a series of conferences, workshops, webinars, other projects initiatives, etc. where they have disseminated the project activities and results. Moreover, the dissemination team has participated in numerous industrial and general events (31 participations) in the period M1-M36, as listed in Appendix C, Table 2.

PIACERE Expert Round Tables

Other than that, the PIACERE consortium has organised 3 expert round tables (for more details see D8.6 [6]).

- Italian Round Table held on 28 November 2023, GA10 in **Salerno** (Pagani), Italy, organised by PoliMi and Ericsson partners as a hybrid event (both in-person and online), with Italian experts.
- Round Expert Table held on 8 June 2023, GA9 in **Ljubljana**, Slovenia (in-person event), with Slovenian experts.
- Round Expert Table held on 9 May 2023, GA8 in **Valencia**, Spain (in-person event), with Spanish experts.

[3] https://sites.google.com/view/fastcontinuum-2023/

3 Marketing materials

This section presents the communication channels that have been used to establish the PIACERE brand identity and ensures that all project activities, such as reports, brochures, posters, presentation slides and newsletter have a competent and similar vision. PIACERE brand identity refers to the visual aspects in organizational communication and that all project partners have considered when developing the dissemination and communication materials.

3.1 Project presentation slides

The PIACERE project presentation slides have been designed to be used by all partners when presenting the project results at events, workshops and meetings. The project presentation slides have been continuously updated during the project period duration.

The presentation template includes an overview of the project, objectives, focus, goal, partners and contact information.

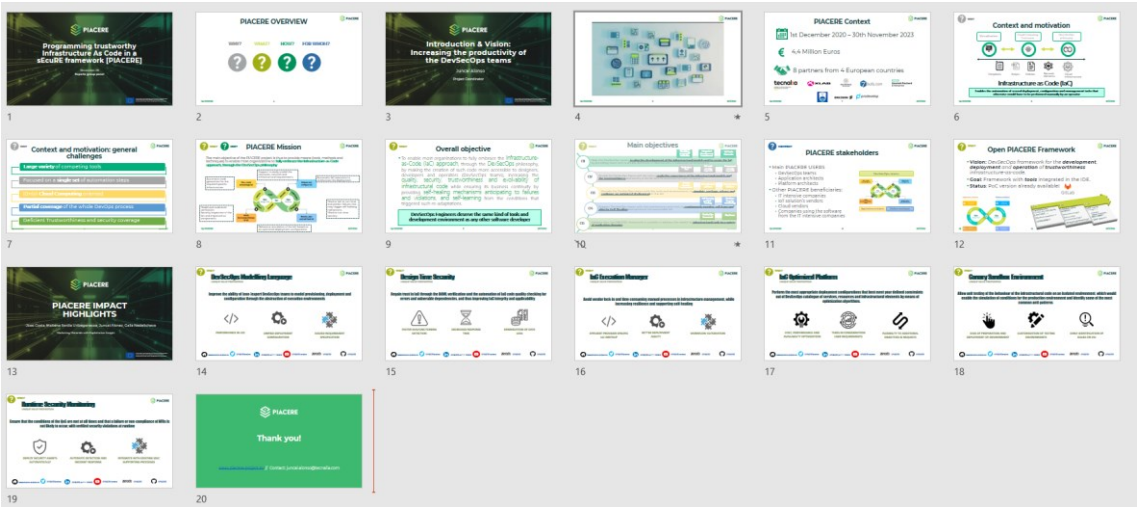


Figure 5. PIACERE updated generic presentation slides

3.2 Project brochure

The new project brochure[4] updates the 2021 version in a format that is more suitable to be shared online, given the disruption caused by COVID restrictions in the dissemination events. The objective of the brochure is to conceive knowledge of the objectives of PIACERE project, giving an overview of the PIACERE vision, approach, benefits, success stories and project consortium. The brochure contains four pages, and it was designed to be viewed both in digital and printed formats with the aim to raise visibility of the project and could be distributed in the different workshops, conferences and events that the partners attended.

During the last 18 months of the project, a brochure [7] has been created (see Appendix E). It contains four pages and provides information about the project vision, approach, benefits, success stories and a representation of the map for the different companies that accomplish the consortium.

3.3 Project poster

The main goal of the poster is to use in the different events, conferences and workshops for the dissemination of the project results.

[4] https://piacere-project.eu/wp-content/uploads/2023/08/PIACERE.pdf

In the last 18 months of the project, two posters have been created. The first of them around the topic 'Towards a holistic approach to the secure infrastructure automation'. This poster introduces the DevSecOps concept and definitions. PIACERE provides an integrated DevSecOps framework to develop, verify, release, configure, provision, and monitor infrastructure as code. Results describe success stories. Finally, it also includes PIACERE partners logo and contact. This poster [8] is available through the project website.

The second poster [9] is based on the topic 'Programming Trustworthy Infrastructure as Code in a Secure Framework', defines de PIACERE design time problem, solution, and value.

The two posters can be found in Appendix F.

3.4 Press Releases

The aim of the press release in PIACERE, intends to promote the dissemination of the results of the project. Thus, the specialized, communication media and events can discover about the work fulfilled in the project.

Next Figure shows the final of the project press release.

This press release is available through the project website: https://piacere-project.eu/wp-content/uploads/2023/10/PIACERE-press-release.pdf

The press releases of the PIACERE partners are being disseminated through the PIACERE's partners social networks.

3.5 Project newsletter

The aim of the newsletter is to inform the project's followers about the activities executed in PIACERE. The Newsletter is a communication channel that includes the most important activities of the project and the achievements obtained.

The newsletter has been published on the PIACERE project website and has been sent to the project's email list and has also been published on the social networks used by the PIACERE's partners. During the last 18 months of the project, 2 newsletters have been created and uploaded to the PIACERE project website, Newsletter 2 [10] and Newsletter 3 [11] as included in appendix G.

3.6 Showcases

During this second reporting period, PIACERE team has produced a promotional video which presents the value proposition of the project, who it is for and what are the benefits. The video is available on the PIACERE YouTube channel:
https://www.youtube.com/watch?v=fvpna_dbPMo

And is also available in the PIACERE 'HOME' page of the website: https://piacere-project.eu/

To design the video, a story board of the project video was created. Video helps attract the general public. For this reason, an attempt has been made to use a simplified storyboard to help the less technical audience understand the project.

Figure 6. PIACERE General video

3.7 Merchandising

PIACERE merchandising has been created in the second reporting period and has been used in the different events and booths in which we have participated. They are an excellent element used to promote the communication of PIACERE as a brand. It was used in several relevant events such as the 3 expert panels and on the RedHat Connect Madrid 2023 booth, also at the Italian Agile Days, 17-18 Nov. 2023.

The PIACERE merchandising products consist of notebooks, bags, and thermos bottles.

Figure 7. PIACERE merchandising materials

4 Communication activities

4.1 Communication KPIs

Key Performance Indicators (KPIs) are used to monitor the progress in communication and dissemination, covering all forms of dissemination with a special emphasis on the results obtained rather than the produced quantity. The continuous evaluation and analysis of these KPIs let PIACERE partners steer communication to the most valuable activities towards obtaining the maximum impact.

This section presents the values achieved for the communication KPIs.

Table 3. PIACERE Communication KPIs at M36

Communication tool	KPI	Objective	Period 2 (M36)	Check
PIACERE Website	Yearly visits	>1700	7142	✔
	Duration of visits	More than 2 min. for 40% of users	00:01:18	✔
	Monthly downloads: Poster, flyers, public reports	35 (Poster, flyers), 50 (reports)	213 (Poster, brochure, newsletter, press release)	✔
	References from external pages	20 (excluding partner webs)	38	✔
Twitter Feed	Regular tweets or when a relevant milestone is taking place (e.g. event, releases, etc.)	>200 followers	144	✔
Slideshare	Number of views	>300	317	✔
Youtube	Number of views	>200	429	✔
Mass media	Number of press releases	2 per country in the project	2	✔
PIACERE Blogposts	Number of entries	at least 6 every year	54	✔

Table 3. PIACERE Communication KPIs at M36 summarises the communication strategy defined in D8.2, as well as the level of achievement of the communication KPIs at M36. Almost all the communication KPIs have been achieved, even overpass the targeted values. In terms of the Twitter feed, the KPI for the number of followers has not been achieved. Although initially Twitter was thought as an adequate network to disseminate, the low value of Twitter followers reached (144 followers) could be due to the fact many people left "Twitter" in the last months, in particular people working in research and stakeholders that are not so interested in Twitter and prefer other social networks like LinkedIn. All other communication KPIs were met and in some cases exceeded, the number of Blogposts increased from 22 posts in M18 to 54 posts in M36.

4.2 Project website

The project website of PIACERE is available in: https://www.piacere-project.eu/. It is used to execute the dissemination and communication activities where the visitor can find the detailed

project information (project developments, results, events, etc.). The website was created at the beginning of the project and serves to inform about the activities of the PIACERE project, as well as to communicate with people outside the project.

The PIACERE website is distributed into different sections and is planned to let stakeholders access to the most complete information of the project organisation. These sections are:

- 'HOME' shows the carousel of images that appears on the main page. Clicking on the video opens the full version in YouTube.
- 'ABOUT US' with different subsections named vision, solution approach, objectives.
- 'USE CASES' section
- 'RESULTS' with different subsections named innovation assets, key exploitable results, value survey, success stories
- 'OPEN RESEARCH' with different subsections Gitlab and Zenodo
- 'CONSORTIUM' shows information of the team partners
- 'BLOG' section constantly updated with the contents written by the partners.
- 'DOCUMENTS' with the information about the marketing materials, public deliverables and research papers.

The initial structure of the website presented in D8.1 [2] 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 has been updated (see Figure 7). The current carousel consists of 1 short video (PIACERE promotional video) and 5 images. Clicking on a video opens the full version in YouTube.

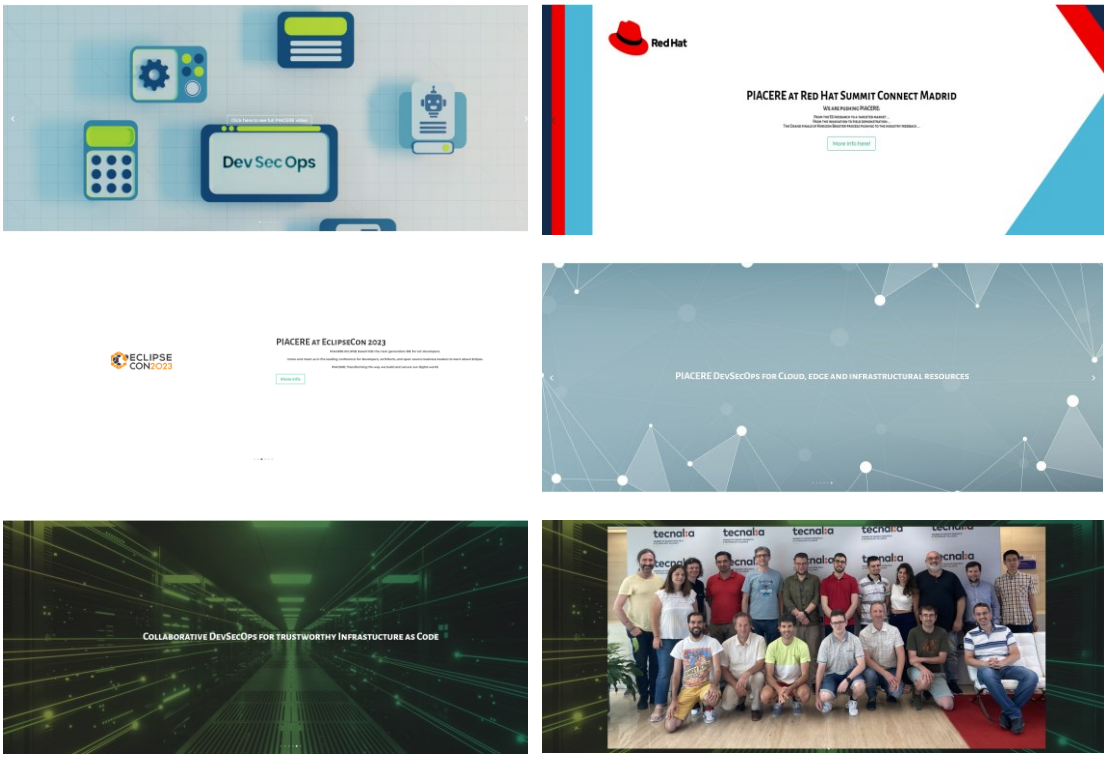


Figure 8. Videos and images displayed on the PIACERE website carousel

Furthermore, the visitor can find the details of the three use cases (The Slovenian Ministry of Public Administration (SI-MPA)[5], Critical Maritime infrastructures[6], Public Safety on IoT in 5G[7], the results currently available, and the partners working on the project. In addition, it provides the blog posts (see section 4.1.2), detailed by the PIACERE partners to allow the general public to follow the project activities. The Communication section of the website gives access to three sections, public deliverables, marketing materials and research papers, where are available the different communication materials used for the dissemination and communication activities (newsletter, brochure, poster and press releases).

Each single project progress step has been inserted in a timeline on the blog page. The "Public deliverables" and "blog" sections have been constantly updated with the contents written by the partners with the project's progress.

The current version of the website includes a new "Open Research" section that provides access to the following links:

- **GitLab** [12]: Link to the Git repositories to manage the source code and the DevOps tasks in the project. (https://git.code.tecnalia.com/piacere/public/gitlab-profile)
- **Zenodo** [13]**:** Link to the PIACERE community in Zenodo, which is an open access repository where PIACERE project deliverables, whitepapers have been uploaded.

Finally, it should be noted that during the second reporting period, a migration process of the PIACERE 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.

4.3 Blog

In the publication of the blogposts in PIACERE we had in mind that all the partners can publish their knowledge acquired through the blogposts related to the different activities that have been completed in the development of the PIACERE project, whose proposal is to discuss the topics of the project that are related to the partner's skills. Among them, topics such as the PIACERE framework architecture, results of the Key Exploitable Results, use case specifications, collaboration with other projects, session with expert panels, etc. have been published.
A calendar has been defined to schedule the publications, so that all partners are involved in the blog publication activity for the project duration.

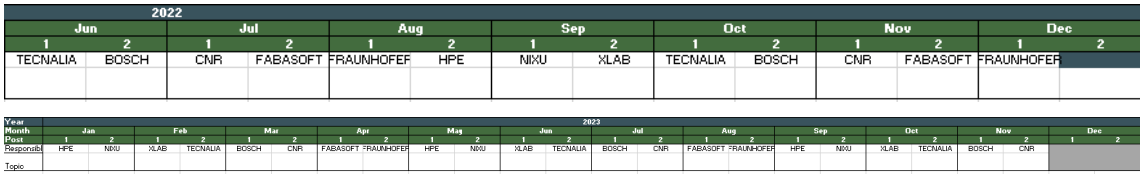


Figure 9. Blogpost calendar prepared for the participation of the different partners (during the last 18 months of the project)

[5] https://piacere-project.eu/slovenian-ministry-public-administration-si-mpa/
[6] https://piacere-project.eu/critical-maritime-infrastructures/
[7] https://piacere-project.eu/critical-maritime-infrastructures/

In addition, the PIACERE blog is used in coordination with social networks to disseminate the project's activities. Also have been mapped most of the blog posts to KRs to identify what needs to be written.
During the last 18 months of the project, we had 33 entries on the PIACERE Blog entry poster. Appendix I shows a table with the different blogposts prepared in the last 18 months of the project, the title for each blog entry, author and release date.

4.4 PIACERE Website analytics

PIACERE project uses Google analytics in order to monitor the behaviour of the website. The total number of users acceding to the PIACERE website (during all the project duration) is 7142 with an average session duration of 00:01:18. During the whole period of operation of the website, PIACERE has had a stable number of daily users, with increases appearing every time there is some relevant activity in the project, such as the publication of a blog post, press release, brochure and poster.

Due to the migration process of the PIACERE website from Drupal to WordPress that has been explained in 4.2, we have divided the Google analytics information provided into 2 sources of data (from March 2021 to 30 June 2023, from 1st July to 31 November 2023) and is represented in the 2 figures below.

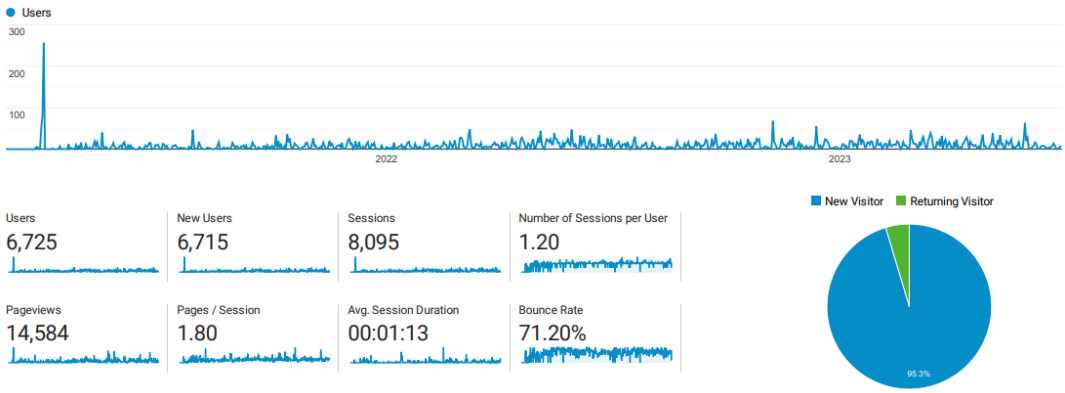


Figure 10. PIACERE website analytics until June 2023

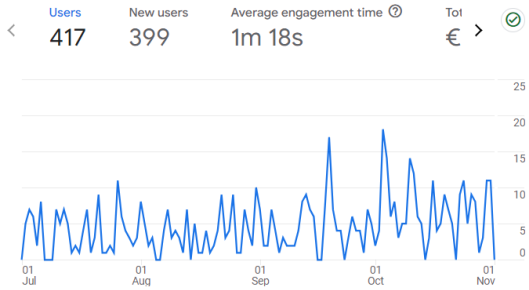


Figure 11. PIACERE website analytics from 1st July to November 2023

Blogposts often point to the highest number of visits to the PIACERE website. The tendency confirms that the blog (rows blog-and timeline) is the second most visited page after the homepage, with an average of 12% of visitors going directly to it, as can be seen in the two figures below.

	Page	Pageviews	% Pageviews
1.	/	4,351	29.83%
2.	/timeline	998	6.84%
3.	/public-deliverables	917	6.29%
4.	/blog-timeline	543	3.72%
5.	/vision	517	3.54%
6.	/materials	461	3.16%
7.	/solution	428	2.93%
8.	/partners	315	2.16%
9.	/innovation-assets	314	2.15%
10.	/consortium	254	1.74%

Figure 12. Most visited pages on the PIACERE website until June 2023

TITLE		% TOTAL	AVG. TIME	
Piacere | Piacere Project	26.9%	↑260.7%	18s	↓0.9%
BLOG | Piacere	14.3%	↑99.6%	27s	↓4.2%
Home | Piacere	0.0%	↓100.0%	0s	↓100.0%
timeline | Piacere	0.0%	↓100.0%	0s	↓100.0%
Solution | Piacere	2.7%	↓66.3%	33s	↓28.0%
Materials | Piacere	7.7%	↑992.2%	15s	↑82.6%
Innovation Assets | Piace...	4.1%	↓22.3%	23s	↑2.3%
A potential liaison betwe...	7.4%	-	36s	-
Research Papers | Piacere	3.8%	↑24.7%	24s	↓0.9%

Figure 13. Most visited pages on the PIACERE website from 1st July to November 2023

Regarding the geographical location of PIACERE public, the countries with the highest number of visitors are Spain, Italy and the United States, as shown in Figure 14, Figure 14 and Figure 15. Thanks to the publication of different public deliverables and blogs has helped to increase the traffic from different countries. We have improved our presence in Europe thanks to the efforts of our partners in their local diffusion.

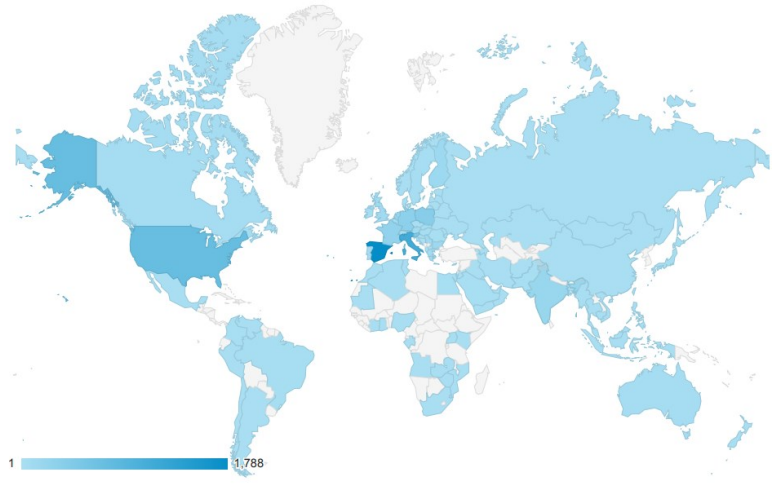


Figure 14. Visits to the PIACERE website by geographical location until June 2023

Country	Acquisition			Behavior		
	Users ↓	New Users	Sessions	Bounce Rate	Pages / Session	Avg. Session Duration
	6,725 % of Total: 100.00% (6,725)	6,715 % of Total: 100.00% (6,715)	8,095 % of Total: 100.00% (8,095)	71.20% Avg for View: 71.20% (0.00%)	1.80 Avg for View: 1.80 (0.00%)	00:01:13 Avg for View: 00:01:13 (0.00%)
1. Spain	1,788 (26.54%)	1,789 (26.64%)	2,493 (30.80%)	57.68%	2.52	00:02:34
2. Italy	1,103 (16.37%)	1,096 (16.32%)	1,403 (17.33%)	67.71%	1.81	00:00:52
3. United States	717 (10.64%)	714 (10.63%)	727 (8.98%)	90.78%	1.18	00:00:15
4. Slovenia	454 (6.74%)	455 (6.78%)	607 (7.50%)	60.30%	1.66	00:00:58
5. Poland	368 (5.46%)	368 (5.48%)	385 (4.76%)	79.22%	1.28	00:00:14
6. Germany	300 (4.45%)	297 (4.42%)	314 (3.88%)	77.39%	1.36	00:00:25
7. France	254 (3.77%)	253 (3.77%)	257 (3.17%)	86.77%	1.16	00:00:08
8. India	184 (2.73%)	184 (2.74%)	189 (2.33%)	92.59%	1.10	00:00:13
9. Netherlands	181 (2.69%)	179 (2.67%)	185 (2.29%)	88.65%	1.11	00:00:20
10. Finland	138 (2.05%)	138 (2.06%)	139 (1.72%)	95.68%	1.09	00:00:09

Figure 15. Countries that visit PIACERE website until June 2023

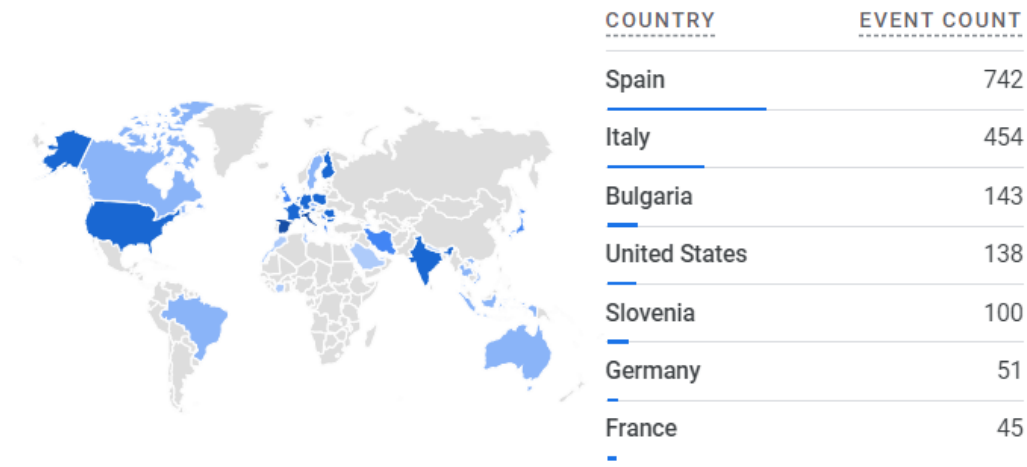
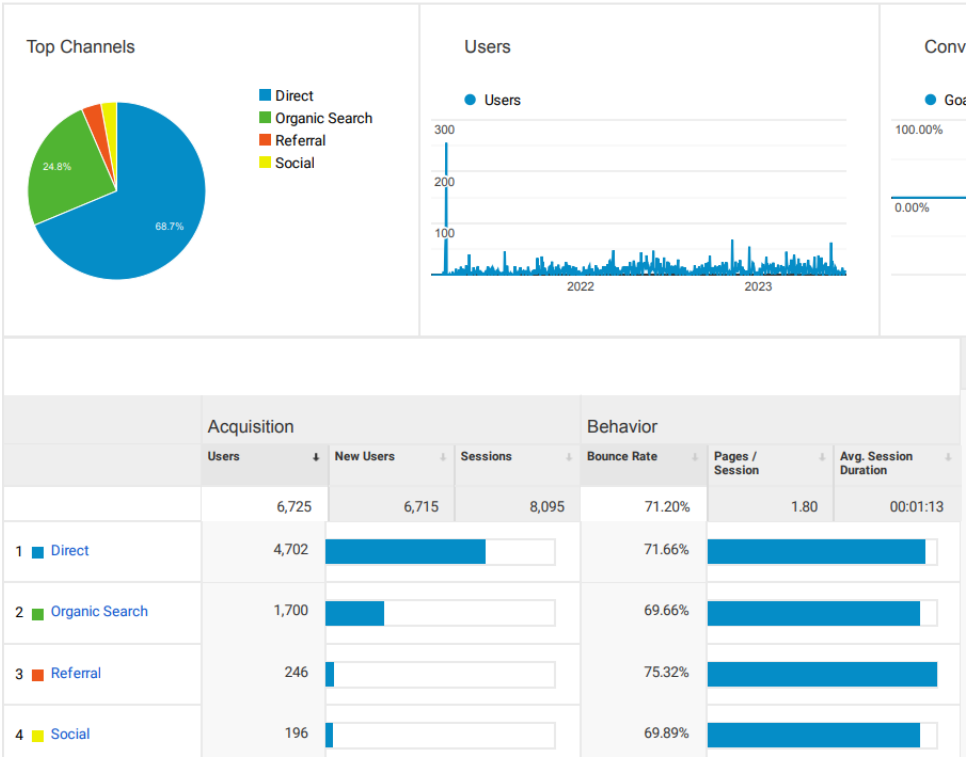


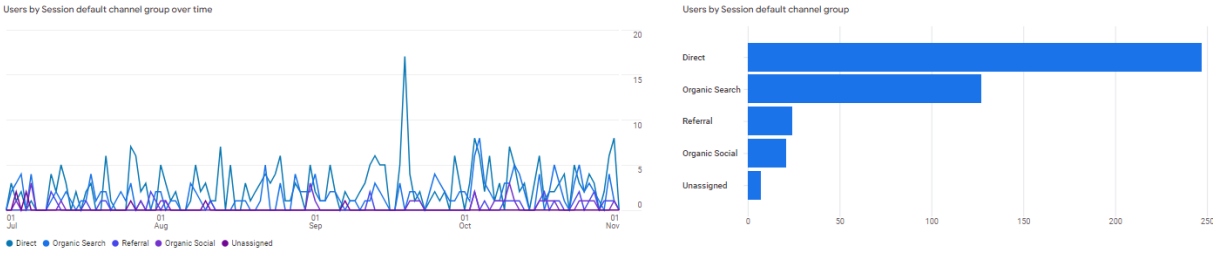
Figure 16. Countries that visit PIACERE website from 1st July to November 2023

As shown in Figure 17 and Figure 17 most website traffic (72%) is direct. Direct traffic is defined as visits with no referring website and that they come directly to the website, typing the URL directly into the browser or through bookmarks. When a visitor follows a link from one website to another, the site of origin is considered the referrer. While 70% of the visitors to the PIACERE website come through organic searches (the traffic that's come to the site through unpaid search results on search engines such as Google), about 200 users came from social networks.



	Acquisition			Behavior		
	Users ↓	New Users	Sessions	Bounce Rate	Pages / Session	Avg. Session Duration
	6,725	6,715	8,095	71.20%	1.80	00:01:13
1 Direct	4,702			71.66%		
2 Organic Search	1,700			69.66%		
3 Referral	246			75.32%		
4 Social	196			69.89%		

Figure 17. Traffic in the PIACERE website until June 2023



Search...

Rows per page: 10 1-5 of 5

	Session default channel group	Users	Sessions	Engaged sessions	Average engagement time per session	Engaged sessions per user	Events per session	Engagement rate	Event count All events	Conversions All events	Total revenue
		417 100% of total	825 100% of total	419 100% of total	0m 39s Avg 0%	1.00 Avg 0%	5.50 Avg 0%	50.79% Avg 0%	4,535 100% of total	0.00	€0.00
1	Direct	247	415	163	0m 32s	0.66	4.97	39.28%	2,061	0.00	€0.00
2	Organic Search	127	299	185	0m 45s	1.46	5.71	61.87%	1,706	0.00	€0.00
3	Referral	24	49	37	1m 05s	1.54	8.12	75.51%	398	0.00	€0.00
4	Organic Social	21	52	33	0m 45s	1.57	6.75	63.46%	351	0.00	€0.00
5	Unassigned	7	8	0	0m 25s	0.00	2.38	0%	19	0.00	€0.00

Figure 18. Traffic in the PIACERE website from 1st July to November 2023

In terms of the visits provided by the social networks, LinkedIn has been the main channel used to access the PIACERE website, accounting for more than 130 sessions, followed by Twitter with the number of sessions is around 92.

Social Network	Sessions ↓	Pageviews
1. LinkedIn	130 (46.59%)	214 (28.53%)
2. Twitter	92 (32.97%)	276 (36.80%)
3. YouTube	39 (13.98%)	242 (32.27%)
4. Facebook	18 (6.45%)	18 (2.40%)

Figure 19. Traffic from social networks until June 2023

4.5 Social media channels

Social media pages are mostly used to drive traffic to the website, where more content is provided in blogposts.
PIACERE's social channels are Linkedin, Twitter, Youtube and Slideshare. The messages that are launched in these communication networks serve to attract traffic to the project's website, which is the project's primary means of dissemination.
In the following sections, it is explained how each social network is used to outreach PIACERE project activities.

4.5.1 Twitter

The twitter account of the project is **@PIACEREproject**. The PIACERE twitter account has more than 2500 twitter impressions. The twitter feed can be found at: https://twitter.com/PIACEREproject
Twitter has 112 followers and more than 150 tweets have been published.
When an event takes place in PIACERE, such as a blog post, the publication of a report, attendance to events, press releases, etc, a tweet is published including detailed information, the URL to the information and relevant hashtags. Also, content from external stakeholders that the PIACERE project finds interesting and relevant is retweeted.

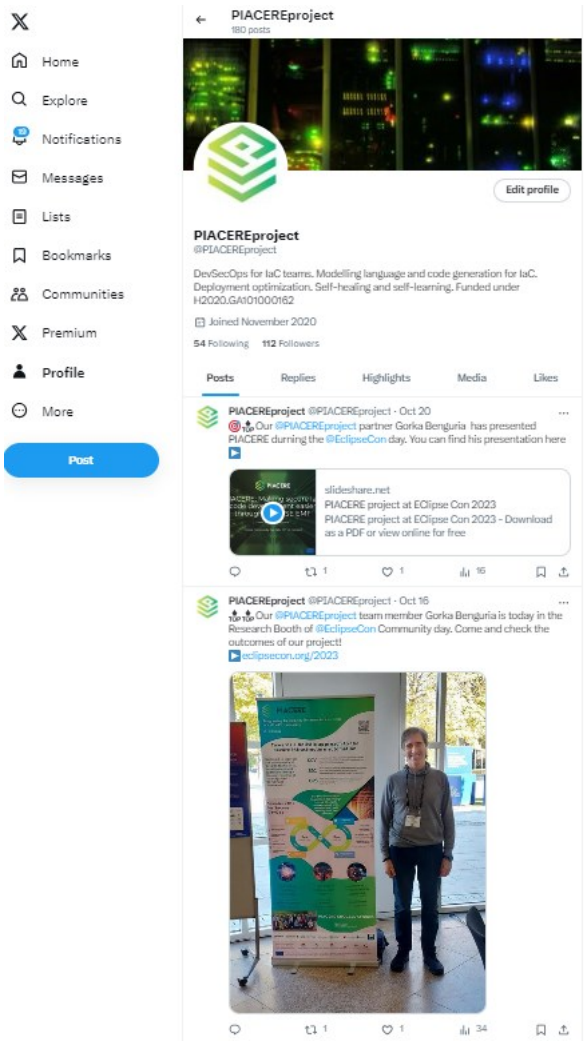


Figure 20. PIACERE Twitter

The number of interactions in Twitter has increased over the last months, with a peak of 755 impressions in May 2023, as shown on next figure. The total number of impressions is more than 12.000 and the number of profile visits of the project is 8.334.

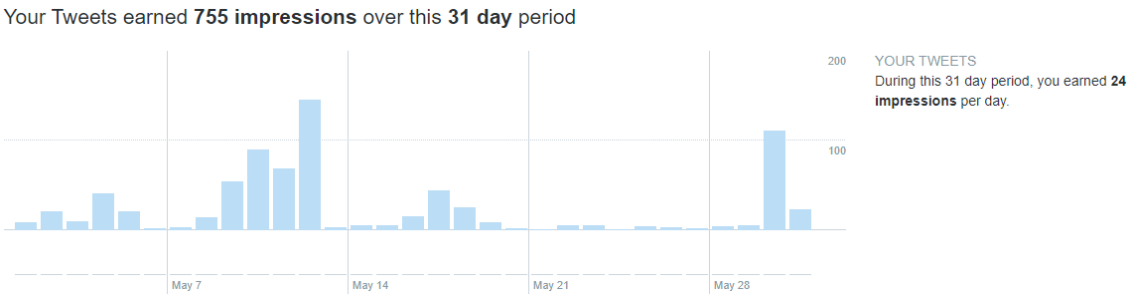


Figure 21. Twitter account analytics during May 2023

Figure 22 shows the tweets with the highest number of impressions during the reporting period.

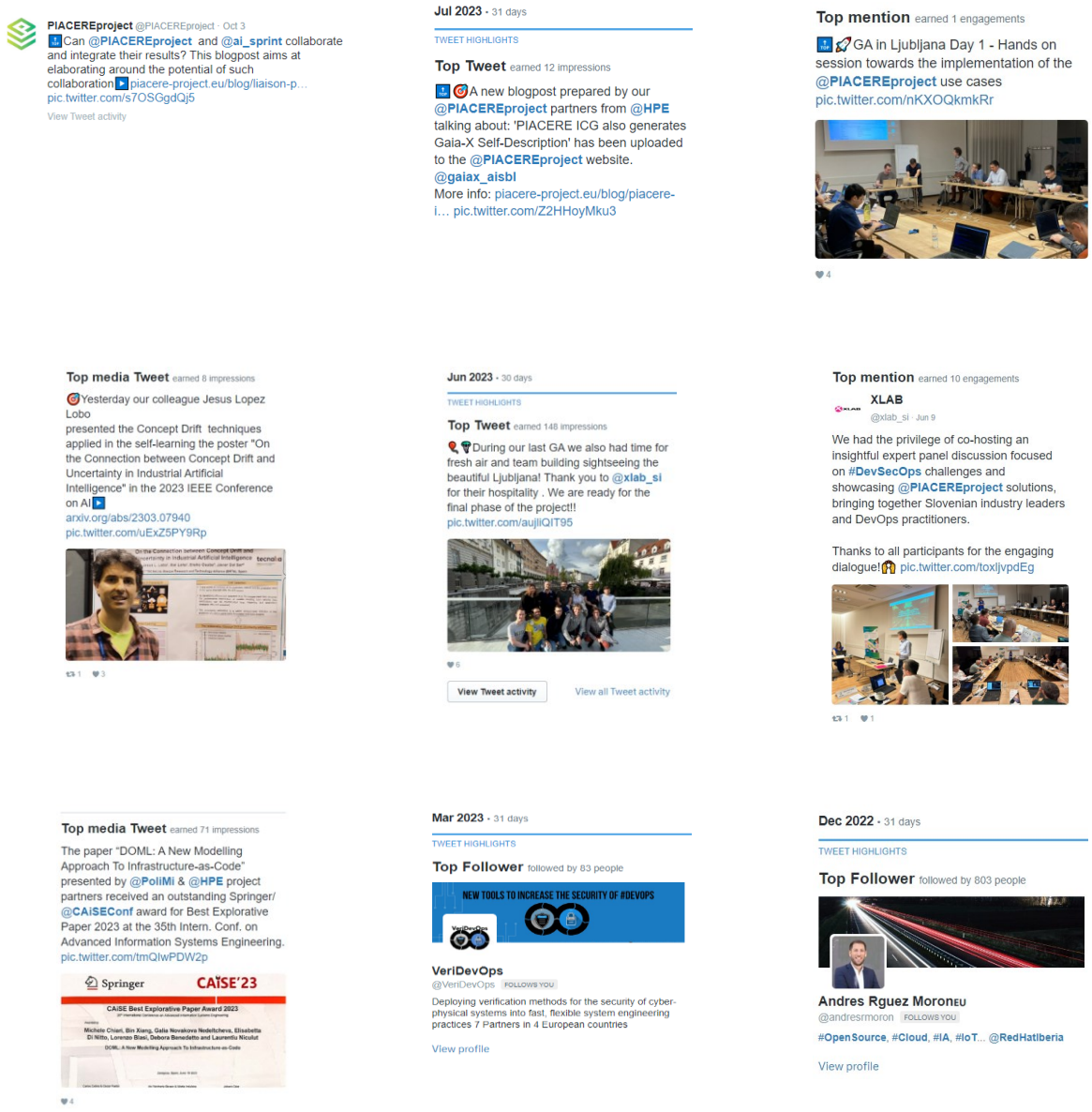


Figure 22. PIACERE Top tweets

4.5.2 LinkedIn

LinkedIn is a social network that allows to increase contacts and support interpersonal relationships between PIACERE partners and other professionals involved in trustworthy infrastructure, cloud computing and DevSecOps framework.
The PIACERE LinkedIn group [14] has 100 members and more than 71 posts have been published. LinkedIn has proved to be an excellent tool to show the achievements of the project.

4.5.3 YouTube

The different videos uploaded to the YouTube channel can be used to positioning and communicate the PIACERE results in order to achieve a high impact. The YouTube profile [15] is intended to post the different videos created by the partners during the project. Its objective is not to generate direct traffic to the web, as is the case with other social networks.

Different types of videos are prepared (specialized and promotional ones), depending on the target audience. These videos are very useful as training materials.

- Specialized videos, showing the features of the tools. These videos are used as support, tutorial and demos for anyone wishing to use the PIACERE tools. The consortium has prepared videos for the M36 PIACERE components which are uploaded to the Youtube channel.
- Promotional video, to present the value proposition of the project, who is it for and what are the benefits. The PIACERE project also created a task force to work on the storyboard for the project video, the script, and the storyline.

During the whole duration of the project, 13 videos (12 videos linked to the different KER+1 PIACERE promotional video) have been uploaded to the PIACERE YouTube profile.

Each of the demo videos has been created by the partners and are related with the key results and KERs of the project The KRs have been grouped into exploitable Results (KER).
There are some KR videos that have been grouped because belongs to the same KER and are accessed to the corresponding link in the Youtube Channel :

- KR1 - DevSecOps Modelling Language (DOML) and KR4- DOML Extension mechanism (DOML-E) have been grouped and belongs to KER1.
- KR2 (KER2)- PIACERE Integrated Development Environment (IDE).
- KR3 (KER1)- Infrastructural Code Generator (ICG).
- KR5– Verification Tool (VT), KR6– IaC Code Security Inspector and KR7– Component Security Inspector have been grouped and belongs to KER2.
- KR 8(KER5)– Canary Sandbox Environment (CSE)
- KR9 (KER4)- IaC Optimized Platform (IOP).
- KR10 (KER3) - IaC Execution Manager (IEM).
- KR11 (KER6)- PIACERE Self-learning and self-healing mechanisms.
- KR12 (KER6)- Runtime security monitoring
- KR13 - PIACERE DevSecOps framework
- KR14 - PIACERE Use cases

The YouTube profile has gained more relevance as more demonstrations of PIACERE has been available on the channel.

4.5.4 Slideshare

SlideShare is used to disseminate the achievements of the PIACERE project to all target groups. Project partners have the possibility to upload and share publicly or privately documents. The PIACERE SlideShare profile [16] contains eight relevant presentations:

- The presentation about the 'PIACERE Integrated Development Environment' at the eSAAM2023 on Cloud-to-Edge Continuum,
- PIACERE project presentation at EClipse Con 2023,
- PIACERE presentation during the ICG Gaia-X Event in Bilbao 2023,
- PIACERE presentation at the CCM Brussels 2023,
- Presentation of PIACERE at Databeers event 2023
- Presentation of PIACERE during the WORLD CIST 2023
- Presentation of PIACERE during the Conf42 DevSecOps 2021
- PIACERE general presentation

In terms of the SlideShare analytics, the total number of views on PIACERE's SlideShare channel during the duration of the project has been 306.

Slideshare visits represents 52.33%. of the total traffic. The traffic visits coming from direct search queries represents 12.79% of the total traffic. Other traffic sources represent social network search queries, referral and search traffic.

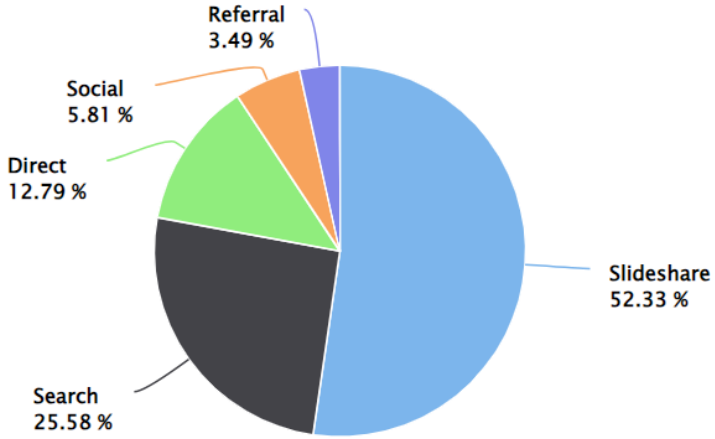


Figure 23. PIACERE SlideShare traffic sources

4.5.1 Specific professional social media profiles and target groups

One of the actions to find specific professional social media profiles and target groups has been to search into the different influential profiles that follow PIACERE through the social channels and identify between those, the most influential LinkedIn profiles.

The selection has chosen between different stakeholders/profiles as a reference for the PIACERE project (ex. IaC developers, Software developers, DevOps teams, Infrastructural managers, scientific technical community and general public) with the intention of identifying the drivers of a community interested in the research and industrial topics that characterise PIACERE. Moreover, we consider that those who are enthusiastic about cloud computing and DevOps topics can be influential in the overall subnetwork tied to PIACERE priority topics. The profiles that have been collected are those that appear in Table 4, whom we have observed and interacted with, whenever possible.

Table 4. Most influential people that follow PIACERE LinkedIn profile

Person/Entity	Company	Position
Eva Caletta	Institut za korporativne varnostne	Project research
Robert Caroll	F6S	EU funded projects development manager
Amelia del Rey	GIS Consultant	Business developer
Jolanda Modic	ICS	Senior project manager
Cristina Silva	INFARMED, IP	Public procurement manager
Jože Rožanec	Qlector	Machine Learning engineer at Qlector
Daniel Vladusic	XLAB	Senior consultant

5 Networking activities

In the RIA context, PIACERE partners understand the value of collaborating with other projects and initiatives beyond European projects. Besides the co-organised workshops and co-authored papers, there were different levels of collaboration between PIACERE and other European initiatives in this last reporting period.

The networking and collaboration with other European projects are a natural process as synergies can be easily found, besides they are quite important for the sustainable research and development. Unfortunately, due to COVID-19 travelling restrictions, the concertation events have been virtual. Finding common areas of work with other actions in these circumstances has proven to be more challenging than expected. In spite of that, PIACERE has collaborated with several seven EU projects (described in Table 5), four of which research projects and three Coordinated Support Actions.

Table 5. Networking initiatives with other European projects

No	Project Name	Description of activity
RIA projects		
1.	MEDINA	Co-organisation of workshops, webinars, writing mutual papers.
2.	AIDOaRT	Prodevelop is a UC Provider in AIDOaRT, they are using the design time tools of PIACERE to model their use case in AIDOaRT. One of the use case scenarios of the UC of AIDOaRT is to provide a IaC for deploying the UC. Instead of creating the Terraform manually, they are using the PIACERE KRs (DOML + IDE + VT+ ICG) for obtaining the corresponding Terraform.
3.	AI-SPRINT	Co-organisation of the workshop FASTContinuum 2023, writing a mutual blog post on the liaison potential between both projects.
4.	FISHY	Co-organisation of workshops, webinars, mutual papers.
CSA projects		
5.	SWForum	CSA. Participation in the three workshops, questionnaires, and so on.
6.	H-Cloud	CSA. Participation in the H-Cloud Communication task force: attendance to the monthly meetings.
7.	EUCloudeEdgeIoT	CSA. Participation in monthly meetings, communication channels, Continuum architecture definition working groups, and in the final event happening in early January.

MEDINA[8] is a RIA addressing the continuous security compliance of cloud services. MEDINA and PIACERE addresses the cloud security perspective form two different but complementary perspectives. Both teams shared the approach and techniques developed in the context of the projects setting up the collaboration and continuous update on the main milestones of the project mainly related to software components deliveries. This collaboration was also reflected through the co-writing of the mentioned blog post *"Enabling 360 Cloud security compliance: From Security certification to Secure DevOps through MEDINA and PIACERE H2020 projects"* [9].

[8] https://medina-project.eu/
[9] https://medina-project.eu/?s=piacere

Moreover, **AI-SPRINT**[10] and PIACERE focus on different but complementary facets, with AI-SPRINT addressing the development and optimal execution of AI applications and PIACERE proposing a DevSecOps toolset for IaC.
The complementary features of AI-SPRINT and PIACERE could be possibly integrated, as well as some others that are similar could be compared with each other to assess their effectiveness and flexibility. Thus, possible actions for cooperation are as following:

1. AI-SPRINT could assess security breaches in the optimal deployments through the analysis of the Infrastructure Manager TOSCA recipes with the PIACERE IaC Security Scan Runner.
2. PIACERE could exploit OSCAR-P to profile applications and optimize their usage of resources thus enabling the possibility to deploy them not only on the cloud but also at the edge.
3. PIACERE and AI-SPRINT together could experiment with the usage of the PIACERE DOML to model application deployments and with the translation of DOML models into TOSCA to take then advantage of the AI-SPRINT runtime tools.

Additionally, in the **AIDOaRT**[11] **project,** PRODEVELOP plays the role of provider of one of the use cases whose main goal is to take advantage of AI and Machine Learning capabilities for the monitoring of the PRODEVELOP platform.

PIACERE project having developed a framework that supports the different DevSecOps activities and provides a single IDE to develop infrastructure code, PRODEVELOP decided to start from it for a faster generation and deployment of its IaC to be used in the AIDOaRt project. Therefore, the knowledge acquired throughout the development of the PIACERE project, and all the experience learned about infrastructure as code has been applied to develop the use case of the maritime port monitoring infrastructure, by deploying it through infrastructure as code and by improving the maintenance and management of the resulting system.
AIDOaRt project benefited from the PIACERE project in the development of its activities and contributed to the dissemination of the work carried out in the PIACERE project, by enabling more development teams to be aware of the capabilities of the framework developed, popularising it more quickly.

On the other hand, the networking and collaboration activities with the **FISHY**[12] **project** has resulted in two scientific papers presented in our list of published papers as:

- **C12.** M. Cankar, N. Petrovic, J. Pita Costa, A. Cernivec, J. Antic, T. Martincic, D. Stepec. *Security in DevSecOps: Applying tools and machine learning to verifications and monitoring steps.* FASTContinuum 2023 workshop, co-located with the International Conference on Performance Engineering (ICPE 2023), 16 April 2023, Coimbra, Portugal. ACM Digital Library.
- **C14.** Jan Antić, Joao Pita Costa, Ales Cernivec, Matija Cankar, Tomaz Martincic (2023). Runtime security monitoring by an interplay between rule matching and deep learning-based anomaly detection on logs. 4th International Workshop on Information and Operational Technology Security (IOSEC 2023), IEEEXplore Digital Library. 19 April 2023, Barcelona, Spain.

SWForum.eu[13] is another Coordination and Support Action (CSA), but this one is in the field of Software technologies, cybersecurity and digital infrastructures. PIACERE continued collaborating with SWForum.eu during the second half of the project, more concrete in the participation of Webinar entitled "*DevOps Innovation in Practice: New lifecycle processes, new*

[10] AI-Sprint (ai-sprint-project.eu)
[11] AIDOaRt (www.aidoart.eu)
[12] fishy-project.eu
[13] SWForum.eu

applications"[14] in April 2023 where PIACERE DevSecOps framework was presented by the project technical coordinator. Furthermore, PIACERE contributed to the writing of the recommendation report because of the webinar. PIACERE was also included in the list of spotlight projects of the SWForum program[15], contributing to enlarge the exposition of the PIACERE outcomes to a larger audience. Also, HADEA European Health and Digital Executive Agency (HaDEA), amplified the dissemination of this participation through an article in its news[16].

Figure 24. SWForum recommendation report on DevOps practices.

EUCloudeEdgeIoT[17] initiative aims to realise a pathway for the understanding and development of the Cloud, Edge and IoT (CEI) Continuum by promoting cooperation between a wide range of research projects, developers and suppliers, business users and potential adopters of this new technological paradigm. It is supported by 2 CSAs Open Continuum and UNLOCK-CEI covering the supply and demand side of the continuum. PIACERE has collaborated with the initiative since it was created through diverse channels, mainly:

- Attendance to relevant meetings online and physical events such as the "*Concertation and Consultation on Computing Continuum: From Cloud to Edge to IoT*" event in Brussels in May 2023 where PIACERE was present in the "*Success Stories and Lessons Learned*" session with a presentation, participated in the panel for software engineering and in the general track of projects with PIACERE roll up.

[14] https://www.swforum.eu/events/devops-innovation-practice-new-lifecycle-processes-new-applications
[15] https://www.swforum.eu/project-hub/project-spotlight/project-spotlight-piacere-project
[16] https://hadea.ec.europa.eu/news/join-webinar-devops-innovation-practice-new-lifecycle-processes-new-applications-20-april-2023-and-2023-04-14_en
[17] https://eucloudedgeiot.eu/

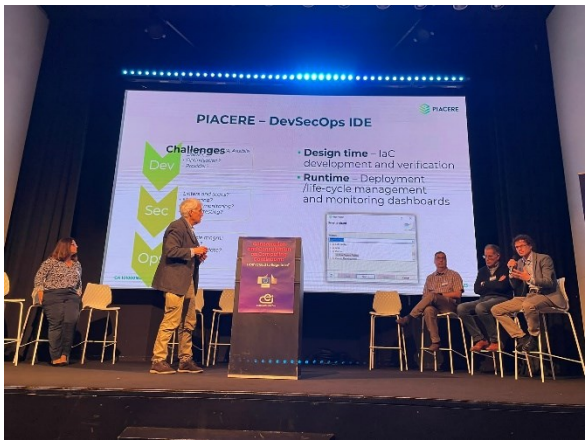


Figure 25.PIACERE in the event organized by EUCEI.

- Participation in the EUCEI webinar that aims to present the final results of all ICT-50 projects. This is planned for the first weeks of January.
- Participation in the different Working groups for the definition of the Continuum architecture, more precise in WG5 orchestration, WG7 monitoring and observability, WG1 security and privacy.

Networking with Gaia-X

Gaia-X[1] is an initiative initially launched by Germany and France but now European that aims at creating a European federated data infrastructure. PIACERE started the collaboration with GAIA-X in the first half of the project and continued during this second half of the project. At development level PIACERE has created the self-description as part of the ICG (read more in D8.6 [6]). These enabled us to present the PIACERE results during the Tech-X Conference & Hackathon #6 in May 2023. This was one of the technical main events of Gaia-X, and we were able to show there the PIACERE framework. In this session PIACERE introduced the experiments done in the project to create IaC code compatible and *"orchestrable"* by GXFS. The presentation introduced the PIACERE DevSecOps framework for the automatic creation of IaC from a technology agnostic perspective and presented the results of the experiments made towards the execution of the PIACERE IaC using the GXFS orchestrator. It also showed supporting features offered by PIACERE DevSecOps framework to automatically generate Gaia-X compliant Self-descriptions of the developed IaC It was a great opportunity to connect with the community and offer our tools for the creation of trustable IaC that can be on-boarded to the Gaia-X ecosystem.

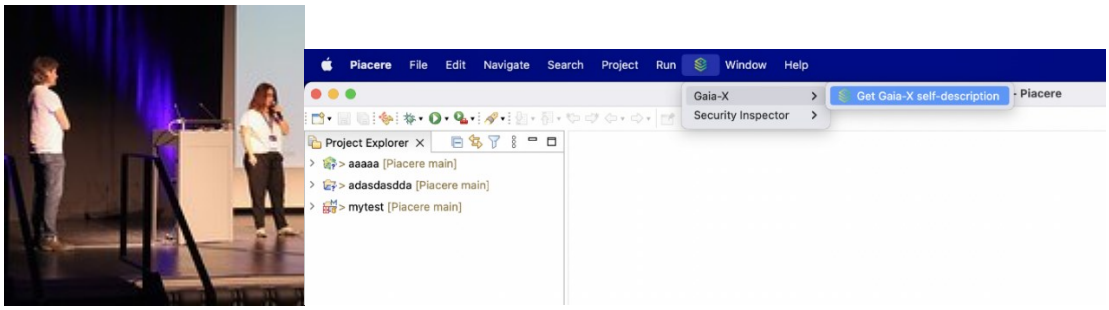


Figure 26. PIACERE in the Gaia-X Tech event.

Networking with the Eclipse Foundation

EclipseCon[18] was our biggest event of the year and connects the Eclipse ecosystem and the industry's leading minds to explore common challenges and innovate together on open-source runtimes, tools, and frameworks for cloud and edge applications, IoT, artificial intelligence, connected vehicles and transportation, digital ledger technologies, and much more. This followed the several discussions held with the PIACERE coordination and with the Impact Generation team to identify useful collaboration (read more in D8.6 [6]).
PIACERE took place at this event through Prodevelop, Polimi and Tecnalia. During the community day PIACERE provided a talk in the Eclipse CloudDev Tools and Open VSX track about the PIACERE IDE and its usage to design and deploy secure IaC code using the different PIACERE components. During the Tuesday PIACERE participated in the collocated conference eSAAM 2023 in Cloud-to-Edge Continuum. On that talk PIACERE presented the design phase and the multicloud support. Finally, we participated by holding a booth to present the PIACERE approach and potential applications to the conference participants.

Networking with the Ansible Community

Red Hat organizes a set of Red Hat Summit Connect events, bringing interactive labs, demos, and networking opportunities to more than 16 selected cities. These events offer a valuable opportunity to explore the future of hybrid cloud, open source, and IT. Red Hat Summit Connect Madrid[19] took place on October 17, at the prestigious and unique venue – the Atletico de Madrid stadium. The event attracted over 700 participants, including major Spanish banks, insurance companies and telecommunication giants. XLAB proudly sponsored the event, showcasing our expertise in automation.

PIACERE took place at this event through XLAB, holding a booth to discuss the potential and challenges of DevSecOps with the visitors. Due to the nature of this event, the pitch was focused on PIACERE's capabilities in the context of Ansible and special attention was given to DOML, design time security and to IaC execution. During the event, our team delivered two micro presentations on Ansible upgrades and custom policies, and introduced Steampunk Spotter[20], the enterprise version of the open-source IaC Scan Runner, that XLAb is developing together with the PIACERE partners. Our booth received a great response, attracting numerous visitors and expanding our network. It was truly fulfilling to witness our research turn into practical solutions that assist businesses in overcoming real challenges. The more engaging visitors were also very happy to be awarded with the PIACERE giveaways.

[18] https://www.eclipsecon.org/2023
[19] https://www.redhat.com/en/summit/connect/emea/madrid-2023
[20] https://steampunk.si/spotter/

6 Open Science Community Engagement

The importance of Open-Source Software and of the Communities associated with it highly contributes to the excellence of European research and development, and for the health and prosperity of the European industrial landscape. In line with the European Commission's Open-Source Software Strategy [17], PIACERE contributes to the innovation and autonomy of Europe's digital infrastructure, particularly in the context of design time and runtime security.

To guide these contributions, we defined the five pillars of open research at PIACERE that promote the collaboration between researchers, the dissemination and reuse of innovation, and the sustainability of the technology developed in this project. To follow the progress of this community engagement, we are considering several metrics: GitHub contributors to KER; social media followers of lead partner; and research papers and conferences exposing the KER. Some of these are already described in this document in the context of the project's dissemination efforts.

P1. PUBLIC REPOSITORY & DOCUMENTATION

This is a common approach to practical exposure in EC-funded projects complying with the open research directions of EC, as addressed in the DoA. A substantial part of PIACERE's technology is made of open-source code, shared on the Project's repository: https://git.code.tecnalia.com/piacere

In this way, we provide the basic functionality of the project's technology on a unique open-source repository, with code well documented and licensed mostly through Apache 2.0 or compatible licensing.

P2. KR-SPECIFIC UPSTREAMING

Most PIACERE consortium partners that are IP owners and technology providers contribute to several OSS communities. This is directly connected with their internal priorities and reflects in the further development of the code produced in PIACERE. Based on that we can consider the contribution to specific communities through the specific KRs that these partners develop. More details can be found in the following paragraphs, that discusses these KRs, namely:

- HPE: ICG (KR3) and IaC code generation
- XLAB: IaC run scanner (KR6, KR7) and runtime security (KR12)
- 7BULLS: Canary Sandbox (KR8)
- POLIMI: DOML (KR1, KR4, KR5) and DevOps modelling
- TECNALIA: IaC execution and optimization (KR9 and KR10), and self-learning self-healing (KR11)
- PRODEVELOP: IDE (KR2) and user dashboards

This is reflected in the project open-source contribution page (see the Open Research/Open PIACERE tab at https://piacere-project.eu/ and https://git.code.tecnalia.com/piacere) and the IP Results assigned with an Open-Source license in the list found in the annex of this document.

P3. LOOKING FOR FURTHER OSS OPPORTUNITIES

We are identifying IaC-focused and other PIACERE-related communities to engage with from M18 onwards. Highlights are:

GAIA-X: XLAB, TECNALIA and HPE have been contributing to the cloud orchestration of GAIA-X and presented the PIACERE solutions in several technical meetings.

SWForum.eu: PIACERE was highlighted in the SWForum Spotlight initiative exposing the main vision and technology in the project, as well as some basic information. It was further discussed

in the SWForum Discussion "Unbreakable Chains: How AI is Fortifying Cyber Resilience in Supply Chains" in the context of the collaboration with FISHY.

Cyberwatching.eu: The project is also exposed through its seven KERs at the marketplace of the Cyberwatching.eu initiative, where each of the outcomes of the project are exposed and labelled according to the National Institute of Standards and Technology (NIST), highlighting benefits and referencing success stories from the use cases.

P4. STANDARDS

Project results have been contributed to different standardization efforts (e.g. the engagement with OASIS TOSCA) to maximize their industrial impact, and more specifically their application to the scenarios identified in the use cases. Standards activities have been tracked, analysing the most relevant opportunities, and bringing PIACERE results as direct contributions to existing activities (through their presentation in dedicated working group events). The project team has sought the collaboration with other related research projects.

P5. OPEN RESEARCH

As discussed in section P2, the open nature of the research developed in this project is very important for the appropriate dissemination of the project's outcomes, contributing to their sustainability in the hands of other researchers and projects. For these reasons, all open access publications and public deliverables are shared on our Zenodo community page (see Search PIACERE - Programming trustworthy Infrastructure As Code in a sEcuRE framework (zenodo.org)). The public deliverables and green/gold access research papers are available through Zenodo.

7 Conclusions

In the second half (M19-M36) of its lifecycle, the project has produced tangible results, including visibility at domain events, relevant EU project initiatives, preparation of press releases, newsletters, posters, scientific and technical papers, as well as liaison with ongoing RIA and CSA projects. Besides, the co-organised workshops and papers are showing promising collaboration.

The dissemination and communication roadmaps have been developed and followed as part of work package WP8, and they have ensured a proper monitoring of the defined KPIs and engagement of technical and more general stakeholders.

Even after the project's lifetime ends, there will be further contributions to the scientific community because some results still need to be published, this will result in further impact, increased usage of the information provided, reuse of innovation and sustainability of the technology developed in PIACERE.

8 References

[1] PIACERE Consortium, «D8.3 Dissemination, communication and networking report - Report - v1,» May 2022.

[2] «D8.1 PIACERE brochure and public website».

[3] PIACERE Consortium, D8.2 Communication, Networking Plan and Dissemination Strategy, 2021.

[4] European Commission, «What is the difference between dissemination, exploitation and communication?,» [En línea]. Available: ec.europa.eu/research/participants/portal/desktop/en/support/faqs/faq-933.html.

[5] PIACERE H2020 project, «Description of Action – Annex 1 – GA 10110000162,» 2020. [En línea]. Available: file:///D:/A%20PIACERE%20&%20SWForum%20projects/A%20PIACERE%20WPs/ALFRESCO%20documents_PIACERE%20&%20SWForum/A%20PIACERE%20WPs/Contractual%20information/GA/GA/Grant%20Agreement-101000162-PIACERE.pdf.

[6] PIACERE Consortium, «D8.6 PIACERE IPR Management, Business Models, and Business Plan - v2,» November 2023.

[7] «PIACERE Brochure,» [En línea]. Available: https://piacere-project.eu/wp-content/uploads/2023/08/PIACERE.pdf.

[8] «Poster 2023,» [En línea]. Available: https://piacere-project.eu/wp-content/uploads/2023/10/PIACERE-roll-up.pdf.

[9] «Poster 'Programming Trustworthy Infrastructure as Code in a Secure Framework',» [En línea]. Available: https://piacere-project.eu/wp-content/uploads/2023/11/PIACERE_Second-Roll-up.pdf.

[10] «Newsletter 2,» [En línea]. Available: https://piacere-project.eu/newsletter-2022/.

[11] «Newsletter 3,» [En línea]. Available: https://piacere-project.eu/newsletter-2023/.

[12] «GitLab,» [En línea]. Available: https://git.code.tecnalia.com/piacere?sort=name_desc. [Último acceso: 2023].

[13] «Zenodo,» [En línea]. Available: https://zenodo.org/communities/101000162/?q=&l=list&p=1&s=10&sort=newest. [Último acceso: 2023].

[14] «Linkedin,» [En línea]. Available: https://www.linkedin.com/company/75574737/admin/ . [Último acceso: 2023].

[15] «Youtube,» [En línea]. Available: https://www.youtube.com/channel/UCLzVC4ZR9DJ3BKeTMc4Mk9Q . [Último acceso: 2023].

[16] «SlideShare,» [En línea]. Available: https://www.slideshare.net/PIACERECOMMUNITY . [Último acceso: 2023].

[17] European Commission, Open Source Software Strategy 2020-2023, 2020.

[18] SWForum consortium, “Title 1,” *Computer Magazine,* vol. 3, no. 1, p. 2, 2013.

[19] SWForum consortium, “Title 2,” in *CloudCom*, Madrid, 2012.

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

APPENDIX A: PIACERE List of scientific papers

International Journals

J1. Juncal Alonso, Leire Orue-Echevarria, Maider Huarte. *ACSmI: A solution to address the challenges of Cloud services federation and monitoring towards the Cloud Continuum*. Special issue on "Smart Cloud Applications, Services and Technologies", **International Journal of Computational Science and Engineering. Inderscience**. **2021**. **[H-21, Q3], relates to WP5, KR13.**

Zenodo: https://zenodo.org/records/8157352
Available online: https://www.inderscience.com/info/ingeneral/forthcoming.php?jcode=ijcse

This paper presents a solution for Cloud Brokerage and monitoring. ACSmI serves as baseline for the implementation of the IEC (Infrastructural Elements Catalogue) and the performance monitoring Key results in PIACERE.

J2. Alonso, J., Orue-Echevarria, L., Osaba, E., López Lobo, J., Martinez, I., Diaz de Arcaya, J., & Etxaniz, I. (**2021**). *Optimization and Prediction Techniques for Self-Healing and Self-Learning Applications in a Trustworthy Cloud Continuum*. **MDPI Information**, 12(8), 308. Publisher **MDPI**. **[Q2], Gold open access. Relates to WP5, WP6, KR9, KR11, KR13.**

Zenodo: https://zenodo.org/records/10053859
Open access: https://www.mdpi.com/2078-2489/12/8/308

In this work, authors describe some of the most important aspects that compose the PIACERE project, in which it is proposed the use of AI-based techniques to assist DevOps teams in the whole lifecycle of infrastructure management.

J3. Bin Xiang, Jocelyne Elias, Fabio Martignon, Elisabetta Di Nitto. *Resource calendaring for mobile edge computing: Centralized and decentralized optimization approaches*. **Computer Networks (ELSEVIER)**, **2021**. open access, https://doi.org/10.1016/j.comnet.2021.108426 **[H-135, Q1], Gold open access. Relates to WP5, KR9.**

Zenodo link: https://zenodo.org/record/5495557#.Yqh-dBNByko

Resource calendaring permits to exploit the intrinsic flexibility in the services demanded by different users, whose starting time can be shifted without penalizing the utility perceived by the user while, at the same time, permitting a better resource utilization in the network. Both the centralized and decentralized optimization approaches for resource calendaring studied in this paper can be used in PIACERE IOP in the edge computing scenarios.

J4. Bin Xiang, Jocelyne Elias, Fabio Martignon, Elisabetta Di Nitto. *Joint planning of network slicing and mobile edge computing: models and algorithms.* **IEEE Transactions on Cloud Computing**, **2021**. **Gold open access. [H-49, Q1], Relates to WP5, KR9.**

Zenodo:https://zenodo.org/record/5495727#.Yqh_ERNByko
Available online: https://www.computer.org/csdl/journal/cc/5555/01/09521805/1wkrmdXmjdK

Jointly planning the availability of computational resources at the edge, the slicing of mobile network and edge computation resources allows the network operator to fine tune the network operation cost and the total latency experienced by users. The optimization approach for resource planning studied in this paper can be used in PIACERE IOP in the edge computing scenarios.

J5. Bin Xiang, Jocelyne Elias, Fabio Martignon, Elisabetta Di Nitto. *A dataset for mobile edge computing network topologies*, **Data in Brief**, **Volume 39, 2021**, 107557, **ELSEVIER BV,** ISSN 2352-3409, **[H-45, Q4]**, **Gold open access. Relates to WP5, KR9.**

Zenodo: https://zenodo.org/record/6471276#.Yqh_NhNByko
Open access: https://doi.org/10.1016/j.dib.2021.107557

In the present paper we provide data related to 3 randomly generated topologies, with increasing network size (from 25 to 100 nodes). Moreover, we propose a MEC topology generated from OpenCellID real data and concerning the Base Stations' location of 234 LTE cells owned by a mobile operator (Vodafone) in the center of Milan. We also provide realistic reference parameters (link bandwidth computation and storage capacity, offered traffic), derived from real services provided by MEC in the deployment of 5G networks.

J6. Juncal Alonso, Leire Orue-Echevarria, Maider Huarte. CloudOps: Towards the Operationalization of the Cloud Continuum: Concepts, Challenges and a Reference Framework. **MDPI Applied Sciences [Q2].** MDPI, Basel 2022, 12(9), **Gold open access**. Relates to WP2, KR13.

Zenodo: https://zenodo.org/records/6874682
Available online: https://www.mdpi.com/2076-3417/12/9/4347/pdf

This paper presents a solution for Cloud Brokerage and monitoring. ACSmI serves as baseline for the implementation of the IEC (Infrastructural Elements Catalogue) and the performance monitoring Key results in PIACERE.

J7. Juncal Alonso, Leire Orue-Echevarria, Ana Isabel Torre, Maider Huarte, Ana Juan, Valentina Casola. *Understanding the challenges and opportunities of Multi-Cloud native applications – A systematic literature review.* **Journal of Cloud Computing, 2021, Springer Science, [IF 4, H-38, SJR 0.976, Q2]. Gold open access. Relates to WP2, KR13.**

Zenodo: https://zenodo.org/records/10054637
Available online: Understanding the challenges and novel architectural models of multi-cloud native applications – a systematic literature review.pdf

The goal of this study is manifold. Firstly, it aims to characterize the multi-cloud concept from the application development perspective by reviewing existing definitions of multi-cloud native applications in the literature. Secondly, we set up the basis for the architectural characterization of these kind of applications. Finally, we highlight several open research issues drawn up from the analysis carried out.

J8. Juncal Alonso, Radoslaw Piliszek, Matija Cankar. *Embracing IaC through the DevSecOps philosophy: Concepts, challenges, and a reference framework.* **IEEE Software [H-121, Q2] Special issue** on Infrastructure-as-Code Unleashed, 40.1 (2022): 56-62. **Gold open access. Relates to WP2, KR13.**

Zenodo: https://zenodo.org/records/10054445
Available online: Embracing IaC Through the DevSecOps Philosophy: Concepts, Challenges, and a Reference Framework | IEEE Journals & Magazine | IEEE Xplore

The paper introduces the challenges of DevSecOps philosophy and its applicability to the development and operation of trustworthy Infrastructure-as-Code. Here all solutions are combined into a single framework covering all crucial steps. Finally, it is discussed how the proposed framework addresses the challenges as well as an initial design for it is outlined.

J9. Michele Chiari, Dino Mandrioli, Francesco Pontiggia, Matteo Pradella. A Model Checker for Operator Precedence Languages. ***ACM*** *Transactions on Programming Languages and Systems,* **ACM Digital Library, [H-72, Q2].** Accepted June 2023. **Relates to WP4, KR5.**

Zenodo: https://zenodo.org/records/8223876
Available online: https://dl.acm.org/doi/10.1145/3608443

This paper presents a model checker, named POMC, for Operator Precedence Language (OPL) programs to prove properties expressed in Precedence Oriented Temporal Logic (POTL). To the best of the authors' knowledge, POMC is the first implemented and openly available model checker for proving tree-structured properties of recursive procedural programs. They also report on the experimental evaluation they performed on POMC on a nontrivial benchmark.

J10. Michele Chiari, Bin Xiang, Galia Nedeltcheva, Elisabetta Di Nitto, Lorenzo Blasi, Debora Benedetto, Laurentiu Niculut, Igor Skof. *DOML - A New Modelling Approach To Infrastructure-as-Code.* **Special issue of the Information Systems**. **[IF 3,7 H-92, Q2], ELSEVIER ScienceDirect.** S*ubmitted on November 11, 2023.* **Relates to WP3, KR1, KR3, KR4.**

Preprint online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4634067

The paper introduces the DevOps Modelling Language (DOML), a new Cloud modelling language for infrastructure deployments. Also, it presents the DOML's principles and discusses the related work on IaC languages. The advantages of DOML for the end-user are demonstrated in comparison with state-of-the-art IaC languages such as Ansible, Terraform, and Cloudify, besides it is shown its effectiveness through several examples and case studies.

International Conferences

C1. Juncal Alonso, Christophe Joubert, Leire Orue-Echevarria, Matteo Pradella, Daniel Vladusic. *Programming trustworthy Infrastructure As Code in a Secure Framework.* **First SWForum workshop on trustworthy software and open source (SWForum.eu).** CEUR-WS.org proceedings, ISSN 1613-0073 Vol 2878. 23 March 2021, pp. 16-23. **Relates to WP2, KR13.**

Green open access. Embargo period of 12 months to upload the papers to Zenodo.

Zenodo: https://zenodo.org/record/6881894#.YvS6tHZBxPY
Available online: http://ceur-ws.org/Vol-2878/paper2.pdf
https://www.semanticscholar.org/paper/PIACERE%3A-Programming-trustworthy-Infrastructure-As-Alonso-Joubert/b0d86113c5c96b932382c2f1fb57a3f64ea46850

This paper presents PIACERE as a whole at conceptual level. The presentation in the workshop has been used to gather feedback on the PIACERE solution and approach.

C2. Galia Novakova Nedeltcheva, Alfonso De La Fuente Ruiz, Leire Orue-Echevarria Arrieta, Nejc Bat, Lorenzo Blasi. *Towards Supporting the Generation of Infrastructure as Code Through Modelling Approaches – Systematic Literature Review.* 2022 **IEEE** 19th International Conference on Software Architecture Companion **(ICSA-C 2022)**. First International Workshop on the Foundations of Infrastructure Specification and Testing (FIST 2022). **IEEE**, Hawaii. 12-14 March 2022. DOI: 10.1109/ICSA-C54293.2022.00048. **Relates to WP3, KR1, KR3.**

Zenodo: https://zenodo.org/records/10054711
Available online: https://ieeexplore.ieee.org/document/9779836

The paper presents a structured literature review (SLR) concerning the aspects of Infrastructure as a Code (IaC) languages, modelling approaches supporting the generation of IaC, categories of languages, and their characteristics, and security analysis techniques. An extensive study has been performed on the generation of the Infrastructure as Code modelling approaches that are relevant to PIACERE DOML (DevSecOps modelling language) specifically, in order to study which DOML requirements could be satisfied by each of those approaches.

C3. Michele Chiari, Michele De Pascalis, Matteo Pradella. *Static Analysis of Infrastructure as Code: a Survey.* 2022 **IEEE** 19th International Conference on Software Architecture Companion (**ICSA-C 2022**). **First International Workshop on the Foundations of Infrastructure Specification and Testing** (**FIST 2022**). **IEEE**, Hawaii, virtual. 12-14 March 2022. **Relates to WP4, KR5.**

Zenodo: https://zenodo.org/records/10055508
ArXiv: https://arxiv.org/abs/2206.10344
Available online: https://ieeexplore.ieee.org/abstract/document/9779848

This is a literature review on static analysis approaches for IaC, which covers methods based on code smell detection, data mining, and model checking. Its purpose within the project was to analyse the state of the art on static verification tools upon which to build the DOML Model Checker (WP4).

C4. Michele Chiari, Elisabetta Di Nitto, Adrián Noguero Mucientes, Bin Xiang. *Developing a New DevOps Modelling Language to Support the Creation of Infrastructure as Code*. **European Conference on Service-Oriented and Cloud Computing** (**ESOCC 2022**). 22-24 March 2022, virtual. DOI: 10.1007/978-3-031-23298-5. **SpringerLink, Relates to WP3, KR1.**

Zenodo: https://doi.org/10.5281/zenodo.6697369
Repository: https://www.piacere-doml.deib.polimi.it/publications/ESOCCProjectTrack.pdf
Available online: Developing a New DevOps Modelling Language to Support the Creation of Infrastructure as Code | SpringerLink

This is a short paper giving an overview of the motivations for building the DOML, the principles behind it, and its current structure. In this paper we have not introduced new developments, but its purpose is pure dissemination, to receive feedback on the DOML ideas from an expert external audience.

C5. Osaba, E., Diaz-de-Arcaya, J., Orue-Echavarria, L., Alonso, J., López Lobo, J., Benguría G., & Etxaniz, I. *PIACERE Project: Description and Prototype for Optimizing Infrastructure as Code Deployment Configurations*. **The Genetic and Evolutionary Computation Conference** (**GECCO 2022**). 9-13 July 2022, hybrid. **ACM Digital Library, Relates to WP5, KR9, KR13.**

Zenodo: https://zenodo.org/records/10054826
Available online: https://dl.acm.org/doi/10.1145/3520304.3533938

The goal of this technical paper is to describe the preliminary approach followed in PIACERE for carrying out this optimization, and how the IOP fits into the whole PIACERE ecosystem. Additionally, results obtained in a preliminary experimentation are detailed in this study.

C6. N. Petrović, M. Cankar and A. Luzar. *Automated Approach to IaC Code Inspection Using Python-Based DevSecOps Tool.* **30th Telecommunications Forum (TELFOR 2022)**, 16-17 Nov. 2022, Belgrad, Serbia. Publisher **IEEEXplore**, pp. 1-4. doi: 10.1109/TELFOR56187.2022.9983681. **Relates to WP5, KR6, KR12.**

Zenodo: https://zenodo.org/records/7315430
Available online: https://ieeexplore.ieee.org/document/9983681

In this paper, we present an open-source Python-based tool with web-based graphical interface which enables automation of static code analysis and checks when it comes to Infrastructure as Code (IaC) scripts. The proposed tool is evaluated in several scenarios when it comes to terraform scripts.

C7. Eneko Osaba, Josu Diaz-de-Arcaya, Juncal Alonso, Jesus L. Lobo, Gorka Benguria, Iñaki Etxaniz. *An Evolutionary Computation based Platform for Optimizing Infrastructure-As-Code*

Deployment Configurations. **Eighth International Congress on Information and Communication Technology (ICICT 2023)**, 20-23 February 2023, London, UK. **Springer Link, Relates to WP5, KR9.**

Zenodo: https://zenodo.org/records/10055124
Available online: An Evolutionary Computation-Based Platform for Optimizing Infrastructure-as-Code Deployment Configurations | SpringerLink

The main motivation of this technical paper is to describe and demonstrate the applicability of the IOP, which is based on EC metaheuristics for dealing with the task of providing the user with optimized Infrastructure-as-Code configurations deployed on the most appropriate infrastructural elements that best meet the predefined requirements. In the paper, we also describe the main optimization problem to solve, deepening its particularities and demonstrating its adaptability to user needs.

C8. Michele Chiari, Bin Xiang, Galia Nedeltcheva, Elisabetta Di Nitto, Lorenzo Blasi, Debora Benedetto, Laurentiu Niculut. *DOML - A New Modelling Approach To Infrastructure-as-Code.* **35th International Conference on Advanced Information Systems Engineering (CAiSE 2023)**. 12-16 June 2023, Zaragoza, Spain. **Springer, Relates to WP3, KR1, KR3, KR4.**

Zenodo: https://zenodo.org/records/7884450
Available online: DOML: A New Modelling Approach to Infrastructure-as-Code | SpringerLink

In this paper, we introduce the DevOps Modelling Language (DOML), a new Cloud modeling language for infrastructure deployments. We present the DOML's principles and discuss the related work on IaC languages. We demonstrate the DOML advantages for the end-user in comparison with state-of-the-art IaC languages such as Ansible, Terraform, and Cloudify, and show its effectiveness through an example.

C9. Alfonso de la Fuente Ruiz, Galia Novakova Nedeltcheva. *Game theory strategies for Open-Source Infrastructure-as-Code.* **IEEE** 20th International Conference on Software Architecture Companion (**ICSA-C 2023**). Second International Workshop on the Foundations of Infrastructure Specification and Testing (**FIST 2023**). **IEEE Xplore Digital Library**, L'Aquila, Italy, 14 March 2023. DOI: 10.1109/ICSA-C57050.2023.00075 **Relates to WP3, KR1.**

Zenodo: https://zenodo.org/records/10055136
Available online: Game-theory strategies for open-source Infrastructure-as-Code | IEEE Conference Publication | IEEE Xplore

In this paper, we study the adoption of OSS philosophy by industrial partners from the perspective of game theory, to then draw conclusions on what information to share, when, why, how, and with whom, so that risks are minimized, and benefits are maximized for each, and every partner engaged in IaC-focused collaborative projects that make use of an OSS approach.

C10. Josu Diaz-de-Arcaya, Eneko Osaba, Gorka Benguria, Iñaki Etxaniz, Jesus L. Lobo, Juncal Alonso, Ana I. Torre-Bastida, Aitor Almeida. *IEM: A Unified Lifecycle Orchestrator for Multilingual IaC Deployments*. **FASTContinuum 2023** workshop co-located at ICPE 2023, International Conference on Performance Engineering (**ICPE 2023**), 16 April 2023, Coimbra, Portugal. **ACM Digital Library**. DOI: https://dl.acm.org/doi/abs/10.1145/3578245.3584938 **Relates to WP5, KR10.**

Zenodo: https://zenodo.org/records/10055200
Available online: IEM: A Unified Lifecycle Orchestrator for Multilingual IaC Deployments | Companion of the 2023 ACM/SPEC International Conference on Performance Engineering

This paper presents the IaC Execution Manager (IEM), a unified framework for the lifecycle management of software components alongside their IaC. Moreover, its benefits in an industrial use case are discussed.

C11. Nedeltcheva, Galia Novakova, Bin Xiang, Laurentiu Niculut, and Debora Benedetto. "*Challenges Towards Modeling and Generating Infrastructure-as-Code*." In Companion of the 2023 ACM/SPEC International Conference on Performance Engineering, pp. 189-193. 2023. **FASTContinuum 2023** workshop, co-located with the International Conference on Performance Engineering (**ICPE 2023**), 16 April 2023, Coimbra, Portugal. **ACM Digital Library**. DOI: https://doi.org/10.1145/3578245.3584937, Published Online: 2023-04-15, **Relates to WP3, KR1, KR3.**

Zenodo: https://zenodo.org/records/10055255
Available online: Challenges Towards Modeling and Generating Infrastructure-as-Code | Companion of the 2023 ACM/SPEC International Conference on Performance Engineering

This paper aims at describing our experience in applying IaC in cloud-native applications particularly, discussing the key challenges towards modeling and generating IaC faced in the ongoing project PIACERE (Programming Trustworthy Infrastructure-As-Code in a Secure Framework). The concluding insights could be helpful for the wider adoption of IaC by software developers.

C12. M. Cankar, N. Petrovic, J. Pita Costa, A. Cernivec, J. Antic, T. Martincic, D. Stepec. *Security in DevSecOps: Applying tools and machine learning to verifications and monitoring steps.* **FASTContinuum 2023** workshop, co-located with the International Conference on Performance Engineering (**ICPE 2023**), 16 April 2023, Coimbra, Portugal. **ACM Digital Library**. DOI: https://dl.acm.org/doi/abs/10.1145/3578245.3584943 **Relates to WP6, KR6, KR7, KR8, KR14.**

Zenodo: https://zenodo.org/records/7966321

This paper proposes a) IaC Scan Runner, an open-source solution developed in Python for inspecting a variety of state-of-the-art IaC languages in application design time and b) the run time anomaly detection tool called LOMOS. Both tools work in synergy and provide a valuable contribution to a DevSecOps tool set.

C13. Jesus L. Lobo, Ibai Laña, Eneko Osaba, Javier Del Ser. *On the Connection between Concept Drift and Uncertainty in Industrial Artificial Intelligence.* **IEEE** Conference on Artificial Intelligence (IEEE **CAI 2023**). Santa Clara, California, USA, 5-6 June 2023. **IEEE**, **Relates to WP6 (T6.2), KR11.**

Zenodo: https://zenodo.org/records/10055445
ArXiv: https://arxiv.org/abs/2303.07940
Available online: https://ieeexplore.ieee.org/document/10195049

This paper presents the relationship between the Concept Drift phenomenon and the uncertainty in streaming regression tasks.

C14. Jan Antić, Joao Pita Costa, Ales Cernivec, Matija Cankar, Tomaz Martincic (2023). *Runtime security monitoring by an interplay between rule matching and deep learning-based anomaly detection on logs*. 4th International Workshop on Information and Operational Technology Security (**IOSEC 2023**), **IEEEXplore Digital Library**. 19 April 2023, Barcelona, Spain. **Relates to WP4, KR7, KR8, KR11, KR12.**

Zenodo: https://zenodo.org/records/10055477
Available online: https://ieeexplore.ieee.org/document/10108105

This paper discusses the combination of a static rule-matching approach with dynamic self-supervised machine learning to detect anomalies in logs. One key research question in this field is whether identified anomalies can be transformed into Security Information and Event Management (SIEM) rules (e.g., Wazuh), and how the LOMOS tool can contribute to this process.

C15. Eneko Osaba, Josu Diaz-de-Arcaya, Juncal Alonso, Jesus L. Lobo, Gorka Benguria and Iñaki Echaniz. *Multiobjective Optimization Analysis for Finding Infrastructure-as-Code Deployment Configurations.* 1st International Conference on Computer and Communications Management (**ICCCM 2023**) http://www.icccm.org/. 4-6 August 2023, Nagoya, Japan. **ACM Digital Library, Relates to WP5, KR9.**

Zenodo: https://zenodo.org/records/10066862
Available online: https://dl.acm.org/doi/10.1145/3617733.3617777

This paper is focused on a multiobjective problem related to optimizing Infrastructure-as-Code deployment configurations. A deep analysis is conducted, focusing on the resolution of the problem, in order to determine which is the most appropriate multiobjective method for embedding in the IOP. Nine different evolutionary computation-based multiobjective algorithms are reported in this paper. Findings reached from the tests carried out led to the creation of a multi-algorithm system, capable of applying different techniques according to the user's needs.

C16. Villanueva, E., Torres, I., Osaba, E., Canzoneri, S., Franchini, A., & Blasi, L. (2023, October). **PIACERE Integrated Development Environment.** In 3rd Eclipse Security, AI, Architecture and Modelling Conference on Cloud to Edge Continuum (pp. 62-66). **ACM Digital Library. Relates to WP3, KR2.**

Zenodo: https://zenodo.org/records/10149210
Available online: https://dl.acm.org/doi/abs/10.1145/3624486.3624507

This article presents a model-driven engineering (MDE) integrated development environment (IDE) to assist the DevSecOps (Development Security and Operations) process. This tool has been developed within the PIACERE H2020 project, which proposes a framework composed of a set of tools developed to support all phases of the DevSecOps life cycle including modeling, test/validation, build/generate, deployment, operate and modeling.

C17. Eneko Osaba, Gorka Benguria, Jesus L. Lobo, Josu Diaz-de-Arcaya, Juncal Alonso, Iñaki Etxaniz. **Optimizing IaC Configurations: A Case Study Using Nature-inspired Computing.** The 6th International Conference on Computational Intelligence and Intelligent Systems (**CIIS 2023**), Tokyo, Japan. November 25-27, 2023. www.ciis.net **Relates to WP5, KR9.**

Zenodo: https://zenodo.org/records/10171566
ArXiv: https://arxiv.org/abs/2311.10767

The main objective of this paper is to demonstrate a tool based on nature-inspired computing for solving a specific software engineering problem. In particular, the problem that has been faced consists of optimizing Infrastructure as Code (IaC) deployment configurations. The IaC Optimizer Platform (IOP) is contextualized within the complete platform in which it is embedded, describing how a user can benefit from its use. Also, a real-world use case is presented and solved.

APPENDIX B: Dissemination events organised by the PIACERE consortium

FastContinuum[21] workshop has been co-organised by partners from the AI-Sprint, SWForum, and PIACERE projects and has been held as an in-presence workshop of the 14th ACM/SPEC International Conference on Performance Engineering (ICPE 2023). The event took place in Coimbra, Portugal on 16 April 2023. For more details see Appendix B.

- Description: The goal of the workshop has been to foster discussion and collaboration among researchers from cloud/edge/fog computing and performance analysis communities, to share the relevant topics and results of the current approaches proposed by industry and academia. FastContinuum solicited full papers as well as demo, short and vision papers including reports about research activities and new ideas.
  - The program included 4 full paper presentations and 3 short ones (they have been all included in the proceedings of the ICPE conference), one keynote given by Samuel Kounev, a prominent researcher in the area of performance engineering, and a panel discussion. The keynote and the panel have been organized in cooperation with other parallel workshops running at the same conference, Load Testing and Benchmarking of Software Systems (LTB 2023) and 6th Workshop on Hot Topics in Cloud Computing Performance (HotCloudPerf 2023), respectively. They have, therefore, given us the opportunity to join different communities.
  - In general, the workshop has offered an interesting overview on the status of research and technology development in the computing continuum and has highlighted possible opportunities for the adoption of the serverless computing and FaaS paradigm in the computing continuum as well as opportunities and challenges concerning the role of AI in the continuum and the dangers of trusting it too much.

Additionally, it has been organized **a special session** by Eneko Osaba (TECNALIA) at the *6th International Conference on Computational Intelligence and Intelligent Systems*, titled **Evolutionary Computation for Industry and Real-World Applications**. The organization of this special session has been contextualized as part of PIACERE dissemination achievements, a brief description is below.

- Description: The industry has gradually evolved towards the complete digitalization of processes and products. The great amount of information available and its embedded value has led to unprecedent opportunities to take productivity to another level. Additional technologies, such as Cloud Computing, Artificial Intelligence and Big Data have also contributed to this trend, allowing the fusion, storage and retrieval of heterogeneous data and its related knowledge. This scenario has helped to the efficient solving of valuable problems such as predictive maintenance, delivery logistics, optimization of could computing processes, optimized stock management, or the digital replication of industrial systems and processes. Within this confluence of digital technologies, Artificial Intelligence has undoubtedly emerged as one of the industry pillars, igniting a vibrant research activity in recent times. In this regard, the special session "Evolutionary Computation for Industry and Real-World Applications", to be held during CIIS 2023, aims at disseminating the latest findings and research achievements dealing with Evolutionary Computation applied to industrial and real-world problems and setups. The session congregated interested people willing to share new research topics and ideas that could stimulate fruitful collaborations.

[21] https://sites.google.com/view/fastcontinuum-2023/

The special session is focused on a topic that has been interesting for PIACERE, specifically on the work done on the IOP. Within this session, different researchers have shared their experience working on evolutionary computation in industrial and real-world environments. Also, as part of this special session, Eneko Osaba (Tecnalia) talked about the last version of the PIACERE IOP as well as he gave general overview of the project. Also, he presented the roll up of PIACERE enhancing the visibility of the project.

APPENDIX C: Participation in industrial and general domain events

Table 1. Participation in industrial and general domain events (23 records)

Title	Link and reference	Date	Partner/Authors (organisations)
Conf42: Cloud Native 2021	https://www.conf42.com/devsecops2021	02.12.2021	7Bulls/ Radoslaw Piliszek
The H@ck Summit 2021	https://thehacksummit.com/cfp/	05.11.2021	7Bulls/ Radoslaw Piliszek
OW2' conf2021: Leveraging the European Open-Source ecosystem "reliable and Predictable Open-Source Software"	Virtual event	23-24 June 2021	Leire Orue-Echevarria (TECNALIA)
Cloud & DevOps World Summit 2021		June 2021	Leire Orue-Echevarria (TECNALIA)
Horizon Cloud Summit 2021	Virtual event	8-9 Dec. 2021	Leire Orue-Echevarria (TECNALIA)
DevSecOps Days	LA, USA	21 July 2021	Leire Orue-Echevarria (TECNALIA)
BSides Newcastle 2021	https://bsidesnewcastle.org/	09-10.09.2021	7Bulls/ Radoslaw Piliszek
DevOpsCon 2021	Munich, Germany	29 Nov.-2 Dec. 2021	Leire Orue-Echevarria (TECNALIA)
Warsaw IT Days	Section: SysOps, DevOps & Cloud, presentation title: PIACERE - DevSecOps Automated https://warszawskiedniinformatyki.pl/index-en.html	2 April 2022	7Bulls/ Radoslaw Piliszek
OWASP New Zealand Day 2022	https://appsec.org.nz/conference/	5-8 July 2022	7Bulls/ Radoslaw Piliszek
Open-Source Community Conference (OSCONF) 2022	https://www.papercall.io/osconf2022	15 Oct. 2022	7Bulls/ Radoslaw Piliszek
Horizon Cloud Summit 2022	Frankfurt, Germany	11-12 May 2022	Juncal Alonso/ Tecnalia
OW2 "Reliable and Predictable Open-Source Software"	PIACERE Canary Sandbox Environment to the rescue of IaC testing https://www.ow2con.org/view/2022/	8-9 June 2022	7Bulls/ Radoslaw Piliszek
Ya!va Conf., Warsaw	https://yavaconf.com/	27-28 Sept. 2022	7Bulls/ Radoslaw Piliszek

H-Cloud Summit 2022		2022	Juncal Alonso/ Tecnalia
GAIA-X Technical Meeting	Bilbao, Spain	4 May 2023	Juncal Alonso, Gorka Benguria/ Tecnalia
Concertation and Consultation meeting	Brussels, Belgium	10-11 May 2023	Juncal Alonso/ Tecnalia Matjia Cancar/ XLAB
DevOps Vitoria Days (DataBeers)		20 April 2023	Josu/ Tecnalia
Enpresa digitala, The Basque agency SPRI https://enpresadigitala.spri.eus/es/		20 June 2023	Josu Diaz / Tecnalia
Eclipse Con 2023	Ludwigsburg, Germany	17 Oct. 2023	Tecnalia
Eclipse SAAM	Ludwigsburg, Germany	17 Oct. 2023	Prodevelop Tecnalia
Red Hat Summit Connect Madrid	Madrid, Spain	17 Oct. 2023	Juncal Alonso (Tecnalia)
Italian Agile Days, 20th Edition Italian Agile Days 2023	Milan (Politecnico di Milano), Italy	17-18 Nov 2023	Elisabetta Di Nitto, Galia Nedeltcheva, Andrea Franchini (PoliMi)

Table 2. Participation in workshops and other initiatives (total of 31 records)

Event	Date	Name & type of audience	Countries addressed	Size of audience	People attending	Activity
The Hack Summit 2021	5.11.2021	Professionals working in the field of broadly defined IT security. Management representatives dealing with technical aspects of projects. Developers and architects People interested in IT security.	All Europe	+100	7bulls team	Presentation Radosław Piliszek
Conf42: DevSecOps 2021	2.12.2021	Conf42 are quality tech conferences, which gather more than 3500 people	All Europe and +	+3000	7bulls team	Presentation Radosław Piliszek
GAIA-X WP Continuous monitoring	08.03.2021	Technical, members of the open work package on continuous monitoring	All Europe, attendees mainly from Germany and Spain	20	Leire Orue-Echevarria (TECNALIA)	Presentation
First SwForum workshop on trustworthy software and open source	23-25.03.2021	Technical: practitioners, RTOs, etc	All Europe/world	100 (in the three days)	Elisabetta Di Nitto, Leire Orue-Echevarria, Juncal Alonso	Presentation
GAIA-X-WP Self-description – presentation of TOSCA	23.4.2021	Technical, members of the open work package on self-description	EU	30-40	Matija Cankar XLAB TOSCA presentation	Presentation
Second SwForum workshop on trustworthy software and open source	29-30.06.20210 1.07.2021	Technical: practitioners, RTOs, etc	All Europe (world)		Elisabetta Di Nitto, Leire Orue-Echevarria, Juncal Alonso, Pawel, Nejc, Alfonso de la Fuente	Presentation
Second SwForum workshop on trustworthy software and open source	29-30.06.2021/ 01.07.2021	Technical: practitioners, RTOs, etc	All Europe (world)		Elisabetta Di Nitto, Leire Orue-Echevarria, Juncal Alonso, Pawel,	Presentation

					Nejc, Alfonso de la Fuente	
SWForum.eu Webinar: Market & Technology Readiness Levels	26.05.2021	Technical: practitioners, RTOs, etc	All Europe (world)	50	Elisabetta Di Nitto, Leire Orue-Echevarria, Juncal Alonso, Nejc, Galia Nedeltcheva	Attendance
BSides Newcastle 2021	10.09.2021	BSides Newcastle is the weirdest InfoSec event out there. Last year we went virtual with a 2 day event with speakers from 4 continents. This year we go hybrid offering both the coverage of the virtual events and the opportunity for live events again.	Worldwide	approx. 500	7bulls team	Presentation Radosław Piliszek Paweł Skrzypek 7bulls
TOSCA Implementation Stories	27.10.2021	This series of events are suitable for network operators, service providers, cloud brokers, application providers, tooling providers, and so on.	Worldwide	100	Matija Cankar, Anže Luzar, Nejc Bat – XLAB	Presentation and Demo
H-cloud summit 2021	8-9.12.2021	Industrial, virtual	EU		Leire Orue-Echevarria	Participation in the panel Open Source and standardization
H-cloud summit 2021	8-9.12.2021	Industrial, virtual	EU		Leire Orue-Echevarria	Participation in the final SODALITE event
Sustainability SwForum workshop	19.01.2022	Technical: practitioners, RTOs, etc.	All Europe		Elisabetta Di Nitto, Leire Orue-Echevarria	Presentation
DevSecOps 2022 https://devsecopsconf.kubedaily.com/index.html#section-about	8.01.2022	DevSecOps Conf is non-profit developer-first platform for sharing and collaborating on open source, cloud native technologies, GitOps, and security domains.	worldwide	+500	7bulls team	Presentation by Radosław Piliszek
1st International Workshop on the Foundations of Infrastructure Specification and Testing (FIST 2022).	FIST Workshop (google.com) Virtual event	14 Feb. 2022	worldwide	20	Galia Nedeltcheva (PoliMi)	presentation

Warsaw IT Days	Section: SysOps, DevOps & Cloud, presentation title: PIACERE - DevSecOps Automated https://warszawskiedniinformatyki.pl/index-en.html	2 April 2022			7Bulls/ Radoslaw Piliszek	
33rd Nordic Workshop on Programming Theory, NWPT 2022	Bergen, Norway https://nwpt.w.uib.no/	2-4 Nov. 2022		+100 Technical and practitioners, scientific audience	Michele De Pascalis (a former MA student at POLIMI)	Presentation on tools for program verification and construction
OW2' conf2021 Leveraging the European Open-Source ecosystem "reliable and Predictable Open-Source Software"	Virtual event	23-24 June 2021				
Cloud & DevOps World Summit 2021		June 2021				
DevSecOps Days	LA, USA	21 July 2021				
DevOpsCon 2021	Munich, Germany	29 Nov.-2 Dec. 2021				

OWASP New Zealand Day 2022			7Bulls/ Radoslaw Piliszek			
Open-Source Community Conference (OSCONF) 2022			7Bulls/ Radoslaw Piliszek			
Horizon Cloud Summit 2022	Frankfurt, Germany	11-12 May 2022				
OW2 "Reliable and Predictable Open-Source Software"	PIACERE Canary Sandbox Environment to the rescue of IaC testing https://www.ow2con.org/view/2022/	8-9 June 2022	7Bulls/ Radoslaw Piliszek			
Ya!va Conf., Warsaw		27-28 Sept. 2022	7Bulls/ Radoslaw Piliszek			
H-Cloud Summit		2022	Juncal Alonso/ Tecnalia			
2nd International Workshop on the Foundations of Infrastructure Specification and Testing (FIST 2022).	L'Aquila, Italy CFP (easychair.org)	14 March 2023	Galia Nedeltcheva (PoliMi)	20		Paper presentation

Red Hat Summit Connect Madrid	Red Hat Summit Connect Madrid, Spain	17 Oct. 2023	Juncal Alonso (Tecncalia)			
FASTContinuum		16 April 2023	Elisabetta Di Nitto, Galia Nedeltcheva, Laurentiu Niculut, Debora Benedetto, Josu Diaz-de-Arcaya, Eneko Osaba, Gorka Benguria, Iñaki Etxaniz, Jesus L. Lobo, Juncal Alonso	40		Paper presentation (Tecnalia) + Short paper presentation (POLIMI, HPE)
Special session Evolutionary Computation for Industry and Real-World Application at the 6th International Conference on Computational Intelligence and Intelligent Systems		23 Nov. 2023	Eneko Osaba (Tecnalia)			Eneko Osaba (Tecnalia)

APPENDIX D: Dissemination of the final Press Release

The following figures show the content of the press releases translated into the languages of the PIACERE partners, namely Bulgarian, Italian, and Spanish.

PIACERE Press Release translated into Bulgarian:

Press Release

PIACERE

PIACERE: A DevSecOps framework for secure IaC Development and Operation

Октомври 2023 г.

PIACERE (*Programming trustworthy Infrastructure As Code in a sEcuRE framework*) дава възможност за автоматизиране на няколко задачи за внедряване, конфигуриране и управление, които иначе би трябвало да се изпълняват ръчно от оператор. Накратко, решението, което PIACERE предлага се състои от интегрирана рамка на DevSecOps за разработване, проверка, пускане, конфигуриране, предоставяне и наблюдение на инфраструктурата-като-код (**IaC**).

Основната цел на PIACERE е да разработи решение, което обхваща разработването, внедряването и експлоатацията на инфраструктурата-като-код на приложенията, разположени в облачния континуум. Рамковият подход на PIACERE има за цел да подкрепи дейностите на DevSecOps и да съкрати кривата на обучение за новите екипи на DevSecOps. За да постигне това, PIACERE предлага DevSecOps Modelling Language (**DOML**), стандартен, лесен за използване език за осигуряване на инфраструктура, внедряване на приложения и управление на конфигурацията.

По време на проектирането подходът на PIACERE може да избегне неправилни конфигурации, несигурно кодиране и конфигурационни модели чрез автоматизирано решение за проверка на целостта и приложимостта на IaC кода, който трябва да бъде внедрен в инфраструктурата. В него се разглежда липсата на адаптирано решение за проверка на целостта и приложимостта на IAC кода, който да бъде внедрен в инфраструктура, предоставена от инструментите за проверка, което води до много ограничено доверие в автоматизираните системи за внедряване. Той помага за решаването на персонализирането на опциите за сигурност и преодоляване на ограниченията в автоматизацията, като същевременно оптимизира появата на IaC грешки и по този начин повишава нивото на доверие и намалява необходимото ниво на знания за нови потребители.

Освен това PIACERE помага за разработването и поддържането на IaC за хетерогенни инфраструктури на различни етапи (конфигуриране, предоставяне, внедряване, оркестриране) с многоезична поддръжка в един инструмент, което позволява повторно внедряване на инфраструктурен код за нова конфигурация на същото приложение по автоматичен начин, без ръчна намеса. Резултатът от проекта, който приключва в края на ноември 2023 г., позволява автоматично, конфигурируемо и следователно по-бързо и по-лесно изпълнение, оркестриране и внедряване на IaC код в хетерогенни (облачни) среди, с уникалната функция да поддържа частични преразпределения и реконфигурации.

Екипът на PIACERE представя най-новите резултати на две от големите европейски събития, посветени на DevOps, които ще се проведат в средата на октомври от **Eclipse Foundation** и **RedHat**. На 16 октомври ще имаме презентация в Деня на общността **Cloud DevTools** и **Open VSX** сесия *"PIACERE: Улесняване на сигурното разработване на IaC код чрез ECLIPSE EMF"*, а на следващия ден продължаваме на събитието ESAAM с презентацията *"PIACERE Интегрирана среда за разработка"*. И в двата дни ще присъстваме на щанда на проектите, очакваме Ви там.

А на 17 октомври представяме PIACERE с щанд на **Red Hat Summit Connect Madrid**, закрито индустриално събитие с очаквани 700+ участници с профил decision-making. Това са чудесни възможности за представяне на ключовите резултати на PIACERE, с голям потенциал за увеличаване на въздействието, Grand Finale точно преди официалния край на проекта.

Project Website

https://www.piacere-project.eu/

Twitter

https://twitter.com/PIACEREproject

LinkedIn

https://www.linkedin.com/company/piacere-project-h2020/

Zenodo

https://zenodo.org/communities/101000162/?page=1&size=20

Youtube

https://www.youtube.com/channel/UCLzVC4ZR9DJ3BKeTMc4Mk9Q

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

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731533

Contact
Galia Novakova Nedeltcheva, Dissemination@PIACERE
galia.nedeltcheva@polimi.it
Piazza Leonardo da Vinci 32, Milan 20133 (Italy)
Tel.: (+39) 02.2399.3769

PIACERE Press Release translated into Italian:

Press Release

PIACERE

PIACERE: Un approccio DevSecOps per lo sviluppo e l'esecuzione di codice infrastrutturale (IaC) sicuro

Milano, Italia, Ottobre 2023

PIACERE (*Programming trustworthy Infrastructure As Code in a sEcuRE framework*) consente l'automazione di diverse attività di implementazione, configurazione e gestione di codice infrastrutturale (**IaC** – Infrastructure as Code) che altrimenti dovrebbero essere eseguite manualmente da un operatore. In breve, la soluzione PIACERE consiste in un framework DevSecOps integrato per sviluppare, verificare, rilasciare, configurare, fornire e monitorare IaC.

Il framework PIACERE mira a supportare le attività DevSecOps e ad abbreviare la curva di apprendimento per i nuovi team DevSecOps. Per raggiungere questo obiettivo, PIACERE propone DevSecOps Modelling Language (DOML), un linguaggio standard e facile da usare per modellare il provisioning dell'infrastruttura, la distribuzione delle applicazioni sull'infrastruttura e la gestione della configurazione (IaC).

In fase di progettazione, l'approccio PIACERE consente di evitare errori di configurazione e l'adozione di codice non sicuro attraverso una soluzione automatizzata per verificare l'integrità e l'applicabilità del codice IaC che deve essere distribuito su un'infrastruttura. In questo modo si affronta la carenza di soluzioni sul mercato che consentano di verificare l'integrità e l'applicabilità di codice IaC, riducendo significativamente la fiducia nei sistemi di distribuzione automatizzata del software.

Inoltre, PIACERE aiuta a sviluppare e mantenere IaC per infrastrutture eterogenee, consentendo la ridistribuzione del codice infrastrutturale per una nuova configurazione della stessa applicazione in modo automatico senza intervento manuale. I risultati del progetto, che terminerà alla fine di Novembre 2023, offrono la caratteristica unica di supportare ridistribuzioni e riconfigurazioni parziali di un sistema software complesso.

Il team di PIACERE presenta gli ultimi risultati in occasione di due dei principali eventi europei dedicati al DevOps organizzati da **Eclipse Foundation** e **RedHat**. Durante l'evento sponsorizzato dall'Eclipse Foundation, il 16 Ottobre il team terrà una presentazione nella sessione **Community Day Cloud DevTools e Open VSX** dal titolo *"PIACERE: Making secure IaC code development easier through ECLIPSE EMF"* e, il giorno seguente, parteciperà al workshop ESAAM con la presentazione *"PIACERE Integrated Development Environment"*. PIACERE sarà presente anche negli spazi espositivi dell'evento con un booth dedicato: venite a trovarci!

Infine, il 17 Ottobre, PIACERE sarà presente con uno stand al **Red Hat Summit Connect Madrid**, un evento industriale privato con più di 700 partecipanti con un profilo decisionale.

A livello Italiano, PIACERE sarà presente all'**Italian Agile Days** (17 e 18 Novembre 2023) https://www.agileday.it/ con uno spazio espositivo. I membri del team saranno disponibili per presentare e dimostrare i risultati del progetto.

Project Website

https://www.piacere-project.eu/

Twitter

https://twitter.com/PIACEREproject

LinkedIn

https://www.linkedin.com/company/piacere-project-h2020/

Zenodo

https://zenodo.org/communities/101000162/?page=1&size=20

Youtube

https://www.youtube.com/channel/UCLzVC4ZR9DJ3BKeTMc4Mk9Q

News and info available at https://www.piacere-project.eu/

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731533

Contact
Galia Novakova Nedeltcheva, Dissemination@PIACERE project
POLITECNICO DI MILANO
galia.nedeltcheva@polimi.it

PIACERE Press Release translated into Spanish:

Press Release

PIACERE

PIACERE: A DevSecOps framework for secure IaC Development and Operation

Bilbao, España, Octubre 2023

PIACERE (Programming trustworthy Infrastructure As Code in a sEcuRE framework) permite la automatización de varias tareas de despliegue, configuración y administración de la infraestructura de computación que de otro modo tendrían que ser realizadas manualmente por un operador. En pocas palabras, la solución PIACERE consiste en un marco DevSecOps integrado para desarrollar, verificar, lanzar, configurar, aprovisionar y supervisar la infraestructura siguiendo el paradigma de infraestructura como código, "Infrastructure as Code"(IaC). PIACERE quiere conseguir que los desarrolladores de este tipo de código, el código que se utiliza para gestionar la infraestructura de computación, cuenten con las mismas herramientas de desarrollo y gestión de la configuración que los desarrolladores de código de aplicación.

El **principal objetivo** de PIACERE es desarrollar una solución que cubra el desarrollo, implementación y operación del código de infraestructura para aplicaciones desplegadas en la nube. El enfoque de la solución PIACERE tiene como objetivo respaldar las actividades de DevSecOps y acortar la curva de aprendizaje para los nuevos equipos de DevSecOps. Para lograr esto, PIACERE propone un lenguaje de modelado especifico de dominio llamado DOML-DevSecOps Modeling Language, un lenguaje estándar y fácil de usar para el modelado de la capa de infraestructura, y su relación con la capa de aplicación, incorporando toda la información necesaria para para poder genera el código de infraestructura de manera automática. .

En la fase de diseño, el enfoque DevSecOps de PIACERE puede evitar configuraciones erróneas, codificación insegura y patrones maliciosos de configuración a través de una solución automatizada para verificar la integridad y aplicabilidad del código IaC para implementar ña infraestructura. De esta forma, PIACERE aborda la falta de una solución personalizada para verificar la integridad y aplicabilidad del código IaC, abordando los problemas de seguridad específicos de este tipo de código.. Además, PIACERE soporta la personalización de las opciones de seguridad y minimiza la ocurrencia de errores en el código IaC, aumentando por tanto el nivel de confianza en la infraestructura generada a partir de este código..

Además, PIACERE ayuda a desarrollar y mantener código de infraestrucutra para infraestructuras heterogéneas en sus diferentes fases del ciclo de vida de (configuración, aprovisionamiento, implementación, orquestación) con soporte multilingüe, lo que permite la reimplementación del código de infraestructura para una nueva configuración de la misma aplicación de forma automática, sin intervención manual. Los resultados del proyecto, que finalizará a finales de noviembre de 2023, permiten la ejecución, orquestación e implementación automática, configurable y, por lo tanto, más rápida y sencilla del código IaC en entornos heterogéneos, soportando la monitorización y reconfiguración de dicho código en tiempo de ejecución. .

El equipo de PIACERE presentará los últimos resultados en dos de los principales eventos europeos dedicados a DevOps que tendrán lugar a mediados de octubre organizados por la **Fundación Eclipse y RedHat**. El 16 de octubre tendremos una presentación en la sesión Community Day Cloud DevTools y Open VSX *"PIACERE: Haciendo más fácil el desarrollo seguro de código IaC a través de ECLIPSE EMF"* y, al día siguiente, continuamos en el evento **ESAAM** con la presentación *"PIACERE Entorno de desarrollo Integrado"*. También estaremos presentes ambos días en el Stand de Proyectos.. Y el 17 de octubre llevamos a PIACERE con un stand al Red Hat Summit Connect Madrid, un evento industrial cerrado en el que se esperan más de 700 participantes. Estas son grandes oportunidades para exponer los resultados clave de PIACERE con un gran potencial de generación de impacto, un Gran Broche final justo antes de la terminación oficial del proyecto.

Website del proyecto

https://www.piacere-project.eu/

Twitter

https://twitter.com/PIACEREproject

LinkedIn

https://www.linkedin.com/company/piacere-project-h2020/

Zenodo

https://zenodo.org/communities/101000162/?page=1&size=20

Youtube

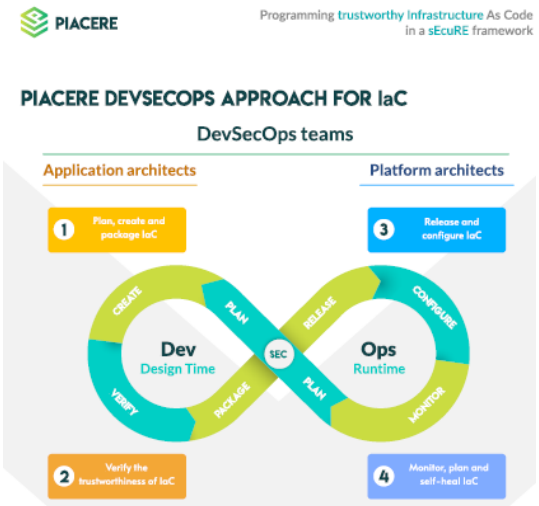
https://www.youtube.com/channel/UCLzVC4ZR9DJ3BKeTMc4Mk9Q

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

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731533

Contacto
Juncal Alonso, Project Manager in PIACERE. TECNALIA
Juncal.alonso@tecnalia.com
Parque Científico y Tecnológico de Bizkaia, C/Geldo, Edificio 700. E-48160 Derio (Bizkaia)
Tel.: 902.760.000 International calls: (+34) 946.430.850

APPENDIX E: PIACERE 2022 Brochure



APPENDIX F: PIACERE Posters

The following figures show the content of the posters. The pdfs can be accessed from the web page https://piacere-project.eu/materials/ .

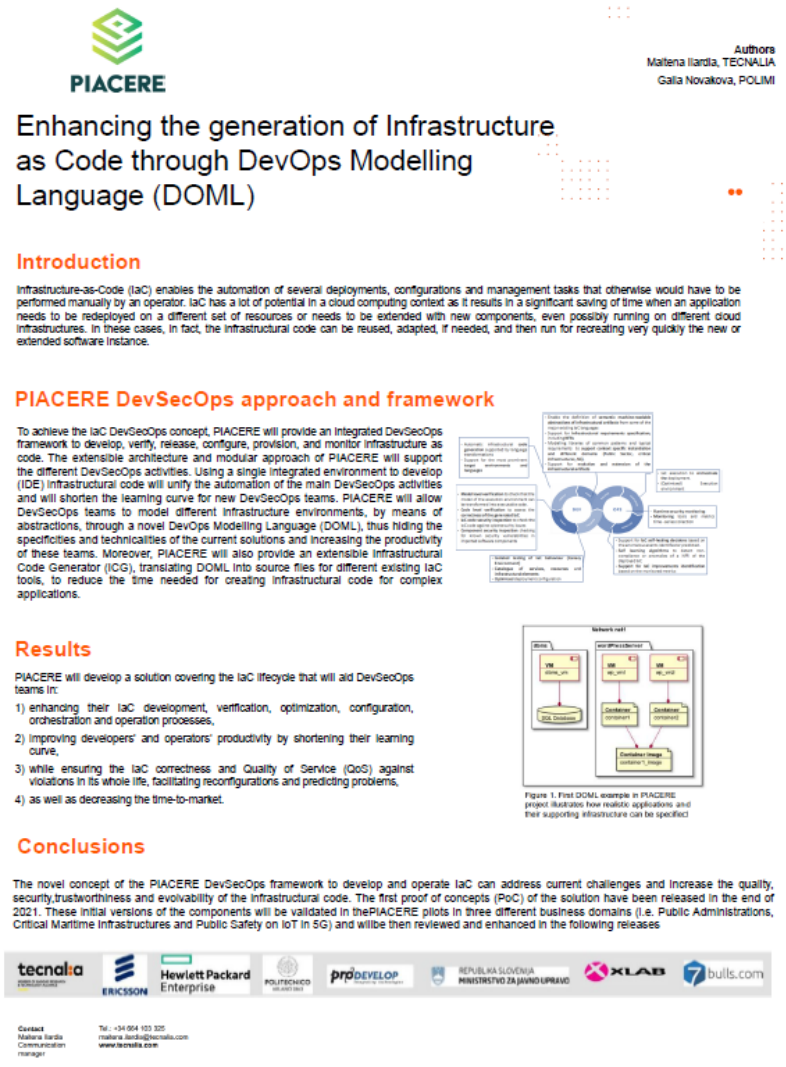


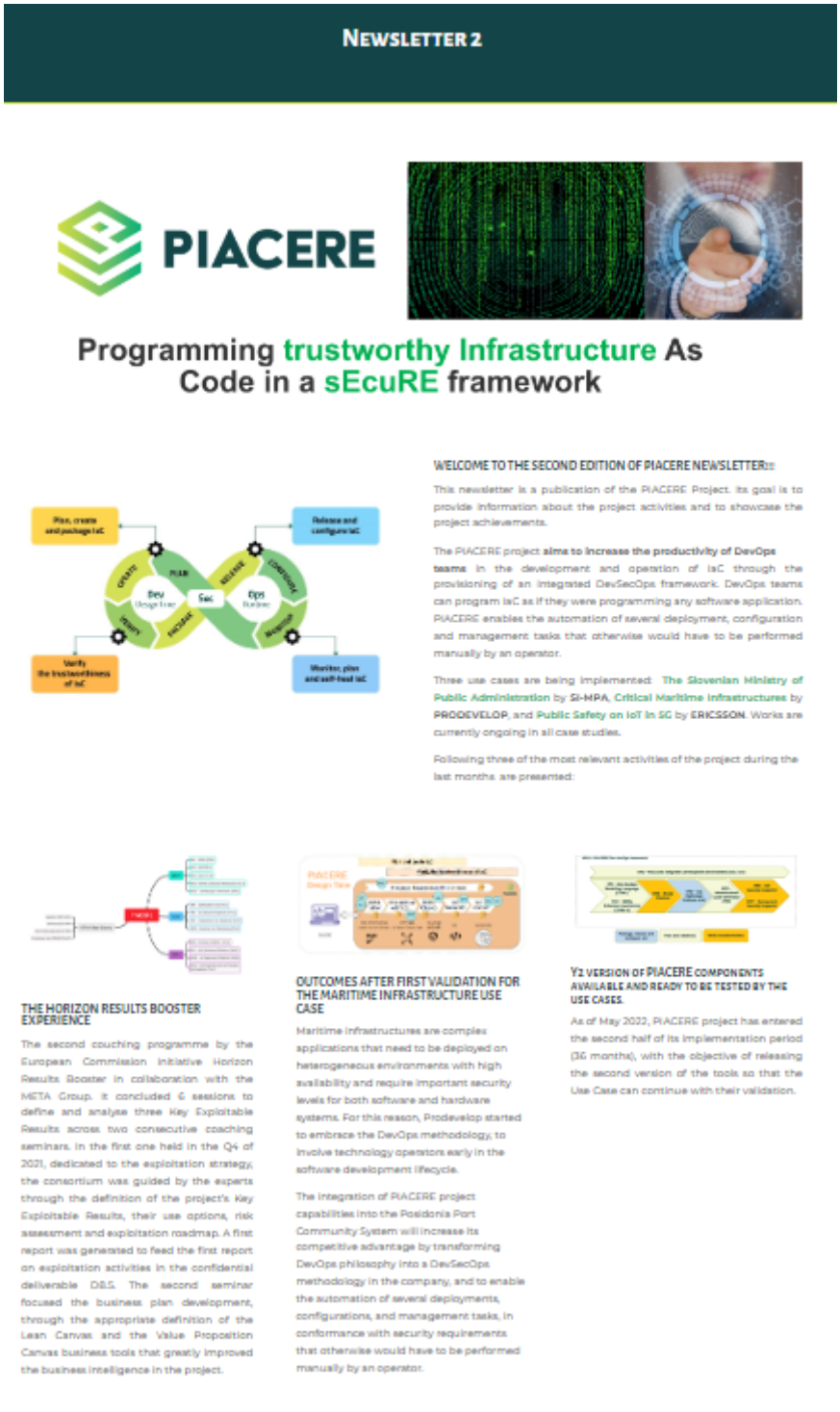
Figure 27. PIACERE poster 1

Figure 28. PIACERE poster 2

Figure 29. PIACERE poster 3

APPENDIX G: PIACERE Newsletters

Newsletter 2



NEWSLETTER 2

PIACERE

Programming trustworthy Infrastructure As Code in a sEcuRE framework

WELCOME TO THE SECOND EDITION OF PIACERE NEWSLETTER!!!

This newsletter is a publication of the PIACERE Project. Its goal is to provide information about the project activities and to showcase the project achievements.

The PIACERE project **aims to increase the productivity of DevOps teams** in the development and operation of IaC through the provisioning of an integrated DevSecOps framework. DevOps teams can program IaC as if they were programming any software application. PIACERE enables the automation of several deployment, configuration and management tasks that otherwise would have to be performed manually by an operator.

Three use cases are being implemented: **The Slovenian Ministry of Public Administration** by **SI-MPA**, **Critical Maritime Infrastructures** by **PRODEVELOP**, and **Public Safety on IoT in 5G** by **ERICSSON**. Works are currently ongoing in all case studies.

Following three of the most relevant activities of the project during the last months are presented:

THE HORIZON RESULTS BOOSTER EXPERIENCE

The second coaching programme by the European Commission initiative Horizon Results Booster in collaboration with the META Group. It concluded 6 sessions to define and analyse three Key Exploitable Results across two consecutive coaching seminars. In the first one held in the Q4 of 2021, dedicated to the exploitation strategy, the consortium was guided by the experts through the definition of the project's Key Exploitable Results, their use options, risk assessment and exploitation roadmap. A first report was generated to feed the first report on exploitation activities in the confidential deliverable D8.5. The second seminar focused the business plan development, through the appropriate definition of the Lean Canvas and the Value Proposition Canvas business tools that greatly improved the business intelligence in the project.

OUTCOMES AFTER FIRST VALIDATION FOR THE MARITIME INFRASTRUCTURE USE CASE

Maritime infrastructures are complex applications that need to be deployed on heterogeneous environments with high availability and require important security levels for both software and hardware systems. For this reason, Prodevelop started to embrace the DevOps methodology, to involve technology operators early in the software development lifecycle.

The integration of PIACERE project capabilities into the Poseidonis Port Community System will increase its competitive advantage by transforming DevOps philosophy into a DevSecOps methodology in the company, and to enable the automation of several deployments, configurations, and management tasks, in conformance with security requirements that otherwise would have to be performed manually by an operator.

Y2 VERSION OF PIACERE COMPONENTS AVAILABLE AND READY TO BE TESTED BY THE USE CASES.

As of May 2022, PIACERE project has entered the second half of its implementation period (36 months), with the objective of releasing the second version of the tools so that the Use Case can continue with their validation.

Newsletter 3

NEWSLETTER 3

PIACERE

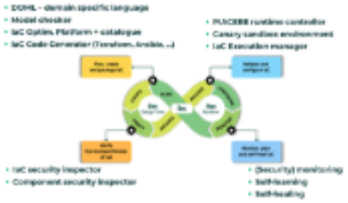
Programming trustworthy Infrastructure As Code in a sEcuRE framework

WELCOME TO THE THIRD EDITION OF PIACERE NEWSLETTER!!

This newsletter is a publication of the PIACERE Project. Its goal is to provide information about the project activities and to showcase the project achievements.

The PIACERE project **aims to increase the productivity of DevOps teams** in the development and operation of IaC through the provisioning of an integrated DevSecOps framework. DevOps teams can program IaC as if they were programming any software application. PIACERE enables the automation of several deployment, configuration and management tasks that otherwise would have to be performed manually by an operator.

The outputs of the PIACERE project, which ends in November 2023, include a the whole DevOps toolchain for IaC, from development to operation, with a holistic support to the security aspects.



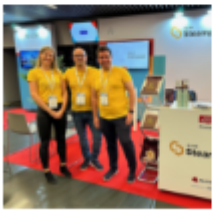
The PIACERE use cases are finalizing the validation of the tools in their industrial domains: **The Slovenian Ministry of Public Administration** by **SI-MPA**, focusing on the need of Public Administrations developments which need to externalize the software implementations but providing to their providers a solid and detailed understanding of the infrastructure to be used for the deployment as well as address the security requirements..

Critical Maritime Infrastructures by PRODEVELOP, addressing the need of avoiding vendor lock in and flexibility for their clients to be able to deploy their solutions in different providers and support optimized and flexible to demands infrastructure configurations.

Public Safety on IoT in 5G by **ERICSSON**, addressing portability between CSPs issues, and networking configuration validation.

PIACERE tools are ready to impact the needs of a wide range of industrial domains and their needs, come and see the latest insights!

+info



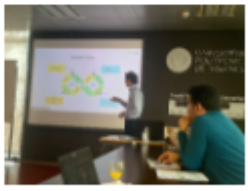
PIACERE IMPACT EXPOSURE AT ECLIPSECON & REDHAT CONNECT

The month of October was very hectic in regards to the exposure of PIACERE's results engaging highly impactful communities

PIACERE gaia-x

PIACERE ICG ALSO GENERATES GAIA-X SELF-DESCRIPTION

With the new releases PIACERE is moving further in the integration with new tools and technologies. A possible integration that PIACERE is exploring is for the ICG (Infrastructure Code Generator) to generate code that is compatible with Gaia-X. For this integration a Self-Description file was added to the ICG output.

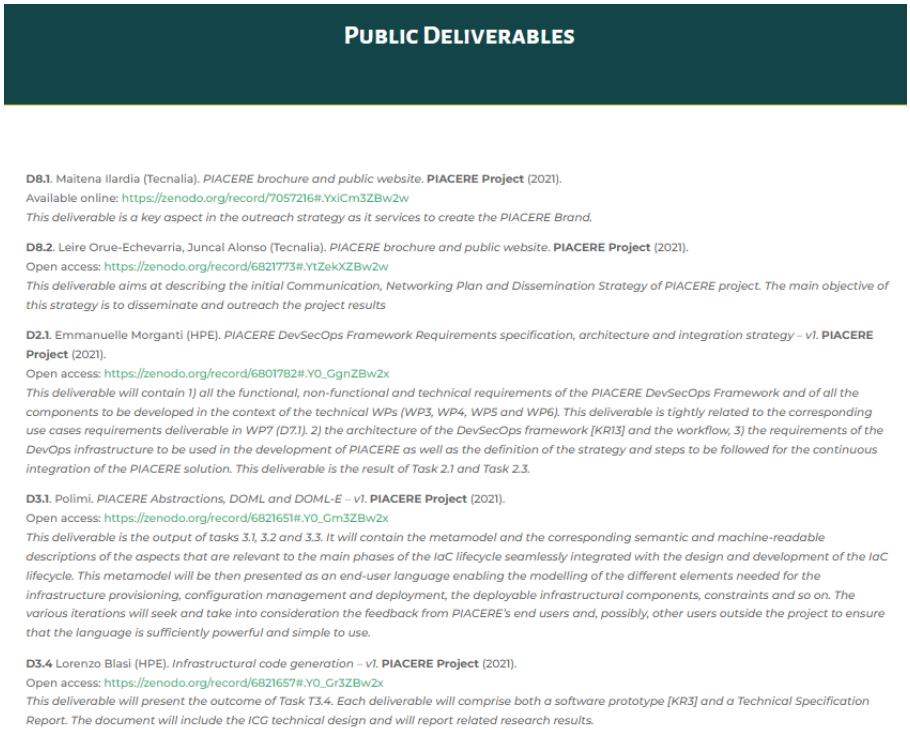


SESSION ABOUT EXPERTS PANEL

During the GA meeting in Valencia, there was a discussion group on the following topics: Panel on DevSecOps applicability, challenges and future directions.

APPENDIX H: PIACERE Website sections

Public deliverables section on the PIACERE website



PUBLIC DELIVERABLES

D8.1. Maitena Ilardia (Tecnalia). *PIACERE brochure and public website*. **PIACERE Project** (2021).
Available online: https://zenodo.org/record/7057216#.YxiCm3ZBw2w
This deliverable is a key aspect in the outreach strategy as it services to create the PIACERE Brand.

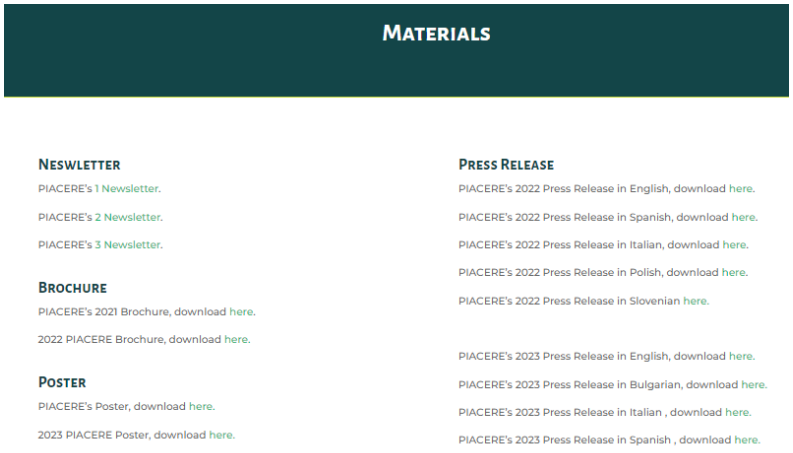
D8.2. Leire Orue-Echevarria, Juncal Alonso (Tecnalia). *PIACERE brochure and public website*. **PIACERE Project** (2021).
Open access: https://zenodo.org/record/6821773#.YtZekXZBw2w
This deliverable aims at describing the initial Communication, Networking Plan and Dissemination Strategy of PIACERE project. The main objective of this strategy is to disseminate and outreach the project results

D2.1. Emmanuelle Morganti (HPE). *PIACERE DevSecOps Framework Requirements specification, architecture and integration strategy – v1*. **PIACERE Project** (2021).
Open access: https://zenodo.org/record/6801782#.Y0_GgnZBw2x
This deliverable will contain 1) all the functional, non-functional and technical requirements of the PIACERE DevSecOps Framework and of all the components to be developed in the context of the technical WPs (WP3, WP4, WP5 and WP6). This deliverable is tightly related to the corresponding use cases requirements deliverable in WP7 (D7.1). 2) the architecture of the DevSecOps framework [KR13] and the workflow, 3) the requirements of the DevOps infrastructure to be used in the development of PIACERE as well as the definition of the strategy and steps to be followed for the continuous integration of the PIACERE solution. This deliverable is the result of Task 2.1 and Task 2.3.

D3.1. Polimi. *PIACERE Abstractions, DOML and DOML-E – v1*. **PIACERE Project** (2021).
Open access: https://zenodo.org/record/6821651#.Y0_Gm3ZBw2x
This deliverable is the output of tasks 3.1, 3.2 and 3.3. It will contain the metamodel and the corresponding semantic and machine-readable descriptions of the aspects that are relevant to the main phases of the IaC lifecycle seamlessly integrated with the design and development of the IaC lifecycle. This metamodel will be then presented as an end-user language enabling the modelling of the different elements needed for the infrastructure provisioning, configuration management and deployment, the deployable infrastructural components, constraints and so on. The various iterations will seek and take into consideration the feedback from PIACERE's end users and, possibly, other users outside the project to ensure that the language is sufficiently powerful and simple to use.

D3.4 Lorenzo Blasi (HPE). *Infrastructural code generation – v1*. **PIACERE Project** (2021).
Open access: https://zenodo.org/record/6821657#.Y0_Gr3ZBw2x
This deliverable will present the outcome of Task T3.4. Each deliverable will comprise both a software prototype [KR3] and a Technical Specification Report. The document will include the ICG technical design and will report related research results.

Materials section on the PIACERE website



MATERIALS

NESWLETTER

PIACERE's 1 Newsletter.

PIACERE's 2 Newsletter.

PIACERE's 3 Newsletter.

BROCHURE

PIACERE's 2021 Brochure, download here.

2022 PIACERE Brochure, download here.

POSTER

PIACERE's Poster, download here.

2023 PIACERE Poster, download here.

PRESS RELEASE

PIACERE's 2022 Press Release in English, download here.

PIACERE's 2022 Press Release in Spanish, download here.

PIACERE's 2022 Press Release in Italian, download here.

PIACERE's 2022 Press Release in Polish, download here.

PIACERE's 2022 Press Release in Slovenian here.

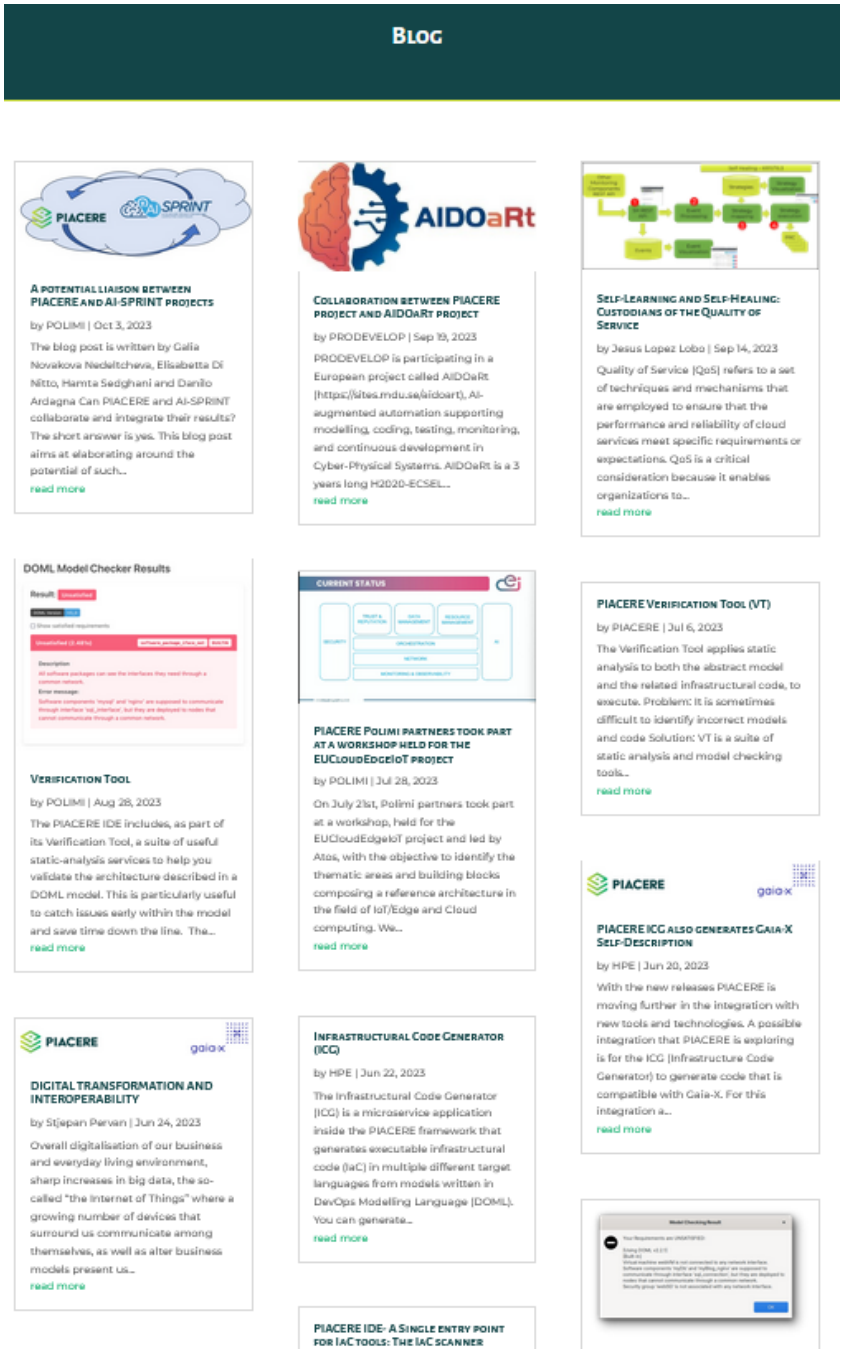
PIACERE's 2023 Press Release in English, download here.

PIACERE's 2023 Press Release in Bulgarian, download here.

PIACERE's 2023 Press Release in Italian , download here.

PIACERE's 2023 Press Release in Spanish , download here.

PIACERE Blogpost section on the PIACERE website



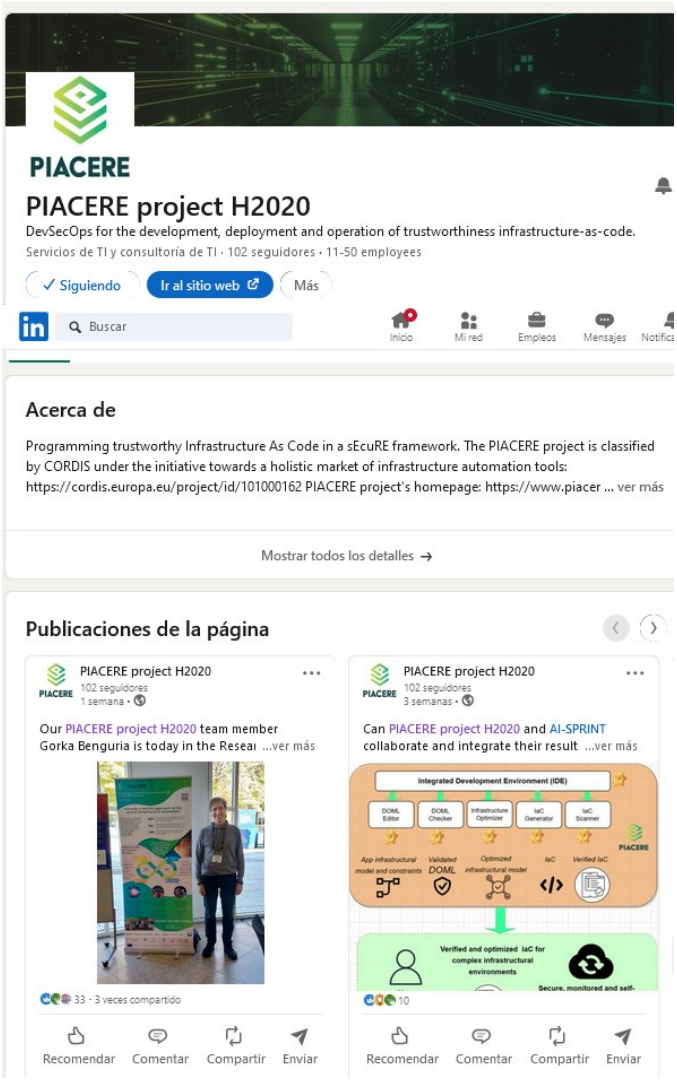
APPENDIX I: PIACERE Blogposts entries

Title of Blog post entry	Author	Release date
The Evolvability of DOML to DOML-	Sergio Canzoneri, Elisabetta Di Nitto, Galia Nedeltcheva (POLIMI)	28 November 2023
OPEN PIACERE: Technology, Methodology, Research out in the Open	Joao Costa (XLAB)	27 November 2023
Enabling 360 Cloud security compliance: From Security certification to Secure DevOps through MEDINA and PIACERE H2020 projects	Juncal Alonso (TECNALIA)	8 November, 2023
PIACERE Impact Exposure at EclipseCon & RedHat Connect	PIACERE WP8	7 November, 2023
A potential liaison between PIACERE and AI-SPRINT projects	POLIMI	3 October, 2023
Collaboration between PIACERE project and AIDOaRt project	PRODEVELOP	19 September, 2023
Self-Learning and Self-Healing: Custodians of the Quality of Service	Jesus Lopez Lobo (TECNALIA)	14 September, 2023
Verification Tool	POLIMI	28 August, 2023
PIACERE Polimi partners took part at a workshop held for the EUCloudEdgeIoT project	POLIMI	28 July, 2023
PIACERE Verification Tool (VT)	TECNALIA	6 July, 2023
Digital transformation and Interoperability	Stjepan Pervan (GOV.SI)	24 June, 2023
Infrastructural Code Generator (ICG)	HPE	22 June, 2023
PIACERE ICG also generates Gaia-X Self-Description	HPE	20 June, 2023
Public safety on IoT in 5G Use Case specification	Cosimo Zotti (ERICSSON)	11 June, 2023
PIACERE IDE- A Single entry point for IaC tools: The IaC scanner example	PRODEVELOP	18 May, 2023
DOML Model Checker	Matteo Pradela (POLIMI)	2 May, 2023
A final horizon results Booster experience	Joao Costa (XLAB)	11 April, 2023
Empowering security at runtime, from traditional rule-matching to AI based anomaly detection	Joao Costa (XLAB)	31 March, 2023
Session about experts panel	Juncal Alonso (TECNALIA)	31 March, 2023
PIACERE consortium met for the 8th face meeting in Valencia	Juncal Alonso (TECNALIA)	12 March, 2023
PIACERE 2.0 framework architecture	HPE	25 January, 2023
PIACERE as part of the first FASTCONTINUUM workshop at the ICPE2023	Galia Novakova (POLIMI)	22 December, 2022
Scanning ansible playbooks for improved security	Matija Cankar (XLAB)	13 December, 2022
Next generation digital commision	Stjepan Pervan (GOV.SI)	24 October, 2022
Outcomes after first validation for the Maritime Infrastructure Use Case	PRODEVELOP	4 October, 2022
PIACERE project presented at GECON'22	Galia Novakova (POLIMI)	27 September, 2022
"PIACERE – DevSecOps AUTOMATED" at @YavaConf 2022	Radosław Piliszek (7BULLS)	22 September, 2022

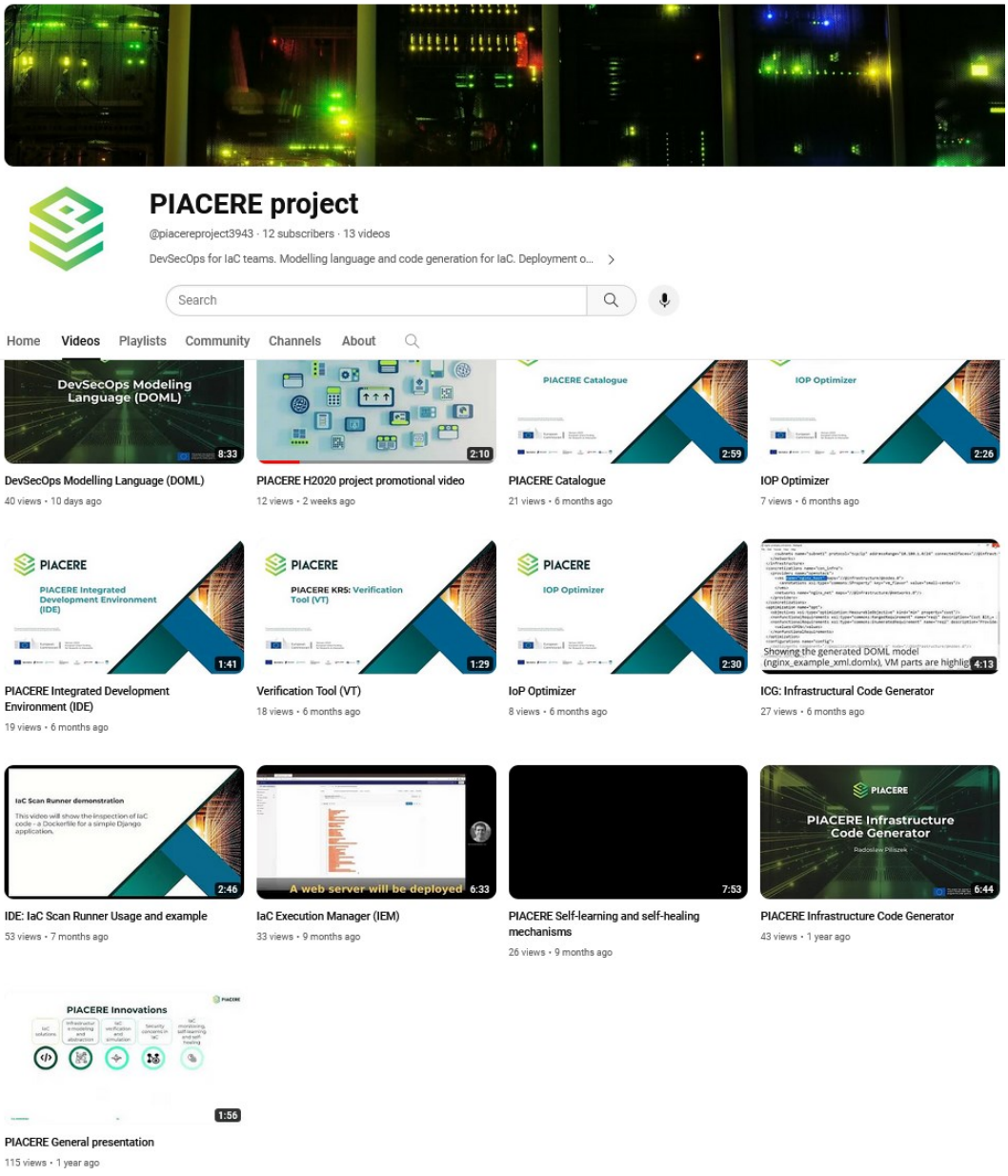
Infrastructure Code Generator extends its low-code/no-code functionalities and the integration with the other PIACERE components	HPE	20 September, 2022
Canary sandbox environment MOCKLORD – One tool to mock 'EM ALL! AWS Validation enters THE SCENE	Radosław Piliszek (7BULLS)	18 July, 2022
PIACERE consortium met for the first Face 2 Face Meeting in Bilbao	Juncal Alonso (TECNALIA)	7 July, 2022
The Horizon results Booster Experience	Joao Costa (XLAB)	21 June, 2022
Digital path to recovery and resilience in the EU	Stjepan Pervan (GOV.SI)	10 June, 2022
Rollback to ECLIPSE IDE	Jose Climent (PRODEVELOP)	31 May, 2022
Y2 version of PIACERE components available and ready to be tested by the use cases.	Juncal Alonso (TECNALIA)	20 May 2022

APPENDIX J: PIACERE Social media

PIACERE LinkedIn group



PIACERE YouTube channel:



PIACERE SlideShare page: