



SEcure Decentralised Intelligent Data MARKetplace

D6.4 Dissemination and Impact creation activities. Final version

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List of Acronyms

Abbreviation / acronym	Description
ADS	Advanced Digital Skills
BDVA	Big Data Value Association
CSA	Coordination and Support Action
DSSC	Data Spaces Support Centre
Dx.y	Deliverable number y belonging to WP x
EBDVF	European Big Data Value Forum
EC	European Commission
ECCC	European Cybersecurity Competence Centre
ECCO	European Cybersecurity Community
EU	European Union
FAIR	Findable, Accessible, Interoperable, Reusable
GDPR	General Data Protection Regulation
HE	Horizon Europe
IDSA	International Data Spaces Association
KER	Key Exploitable Result
KPI	Key Performance Indicator
LeADS	Leading Europe's Advanced Digital Skills
MTRL	Market and Technology Readiness Level
RECI	Spanish Network of Smart Cities.
WDME	Water Data Management Ecosystem
WP	Work Package

Executive Summary

This document is a deliverable of the SEDIMARK project, funded by the European Commission under its Horizon Europe Framework Programme. This document presents the “D6.4 Dissemination and Impact creation activities. Final version” deliverable, including all the carried out activities, communications and dissemination material, along with the final status of the Key Performance Indicators (KPIs) for such activities. Besides, it also includes the efforts that have been made for the cooperation with other projects and associations. Special emphasis will be put into the dissemination and communication activities carried out during the last eighteen months of the project, as previous actions were already reported on SEDIMARK_D6.3 [1]. The target audience for this document is manifold, including the scientific community that will find a compendium of dissemination activities from where they can get into the project’s main outcomes or the EC to assess the impact raising activities that the project has executed.

During the project lifetime, a number of dissemination and communication activities have been carried out, reaching a large audience of variable types, including users, citizens, other research projects and the scientific community. These events span across online webinars to large exhibition venues, such as the Smart City Expo or IEEE CSCN 2025 conference. Besides, project members have participated to several cooperation activities, including workshops and panel discussion, so as to explore future means of collaboration. This includes the participation in Working Groups and different association events, such as the Data Spaces Support Centre (DSSC) Technical Working Group, the International Data Spaces Association (IDSA) or the Big Data Value Association (BDVA), as well as becoming members of important clusters, such as the ICT4WATER initiative. Finally, during the project, and mainly on the second half of it, which is the main focus for this deliverable, the scientific communication and dissemination has benefitted from the outcomes and results obtained within the technical activities, submitting and publishing several papers in conferences and journals.

It is worth highlighting that the online presence of SEDIMARK has been pushed forward, following a collaborative dissemination plan among all the partners, leading to the creation of multiple articles, multimedia content and social media posts to engage with the general public and disseminate project results. Furthermore, different dissemination materials have been produced, including brochures, videos and leaflets, facilitating the dissemination of the project at online and offline events.

Last but not least, hackathon activity has been organised in order to open the tools and services developed in the project to external participants so that it is possible to get valuable insights and feedback about the usability and evaluation of the SEDIMARK Marketplace, as well as better understanding the demands from those that might make use of the integrated project results.

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1 Introduction

1.1 Purpose of the document

SEDIMARK is an Innovation Action with a duration of 36 months, involving 12 partners from different sectors. The project aims to design and prototype a secure decentralised and intelligent data and services marketplace that bridges remote data platforms and allows the efficient and privacy-preserving sharing of vast amounts of heterogeneous, high quality, certified data and services supporting the common European Union (EU) data spaces.

The content of this document is framed in WP6 "Dissemination, exploitation, standardisation", which aims to disseminate, communicate, and exploit the project results such as scientific publications, participation at conferences, seminars, industry meetings, to the general public, prospective end-users, industry stakeholders, and innovation partners.

This deliverable aims at reporting the dissemination activities carried out during the project (with special emphasis on the second half of it), including also the cooperation activities with other research projects and initiatives.

1.2 Relation to another project work

This document represents the final report on activities and communication actions in alignment with the dissemination, communication, and exploitation plan outlined in deliverable SEDIMARK_D6.2 [2]. Thus, it serves as a publicly available deliverable, continuing the series of dissemination-related deliverables initiated with that deliverable.

This deliverable serves as the final report, complementing the initial release of SEDIMARK_D6.3, titled "Dissemination and Impact creation activities. First version" in month 18. This deliverable concludes the report on dissemination and impact creation activities. The relation of this deliverable with the rest of WP6 dissemination-related deliverables is illustrated in Figure 1.

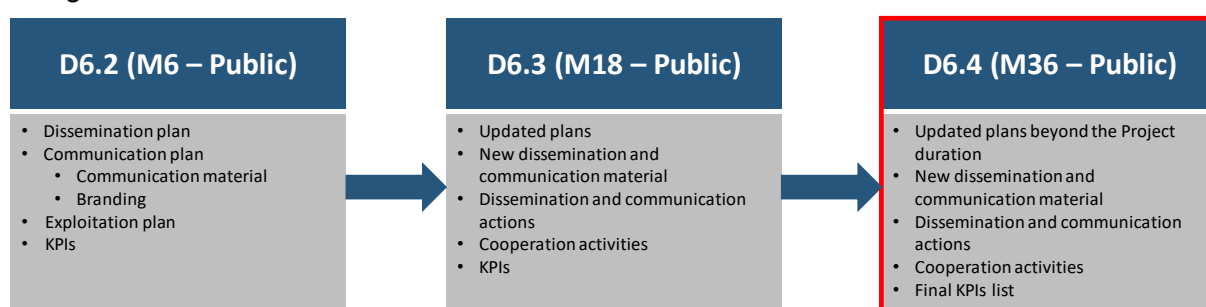


Figure 1. Overview of SEDIMARK's WP6 deliverables.

1.3 Structure of the document

This document is structured in 5 major sections, as described below:

Section 1 introduces this document, including its purpose and structure.

Section 2 presents a summary of the activities and communication actions carried out in SEDIMARK up until the publication of this document.

Section 3 depicts the cooperation activities and plans performed in collaboration with other project and initiatives.

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Section 4 presents the KPIs and the current completion status.

Section 5 concludes the document presenting an overall summary of the results presented.

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2 Dissemination, Communication and Outreach Actions

The SEDIMARK Dissemination strategy outlined in deliverable SEDIMARK_D6.2 [2], aims at maximizing the global impact of the project main objectives, achievements and key messages through different dissemination and communication actions divided in three main phases: “Awareness”, “Understanding” and “Action”. Figure 2 shows the Gantt Chart that includes the planning timeline for all the activities and Table 1 details the goals and main channels used to promote SEDIMARK are listed. There are no deviations or updates regarding the previous plan presented in deliverable SEDIMARK_D6.2 [2].

In general, the key elements of the plan include: (i) contributing to project objectives through relevant dissemination activities, (ii) identifying potential stakeholders and target audiences, (iii) providing mechanisms and tools for partners to execute dissemination tasks, (iv) setting up infrastructures to organize and monitor dissemination activities, (v) identifying dissemination opportunities, and (vi) planning scientific publications. Communication objectives focus on achieving maximum visibility and awareness among different stakeholders and audiences through a solid digital strategy, creating valuable content in various formats, promoting research and technological knowledge diffusion, and attracting potential users through participation in industry conferences and exhibitions. Additionally, dissemination and communication actions are supported by the creation of new dissemination material, such as brochures, videos and posters, among others, for distribution both online and in in-person events.

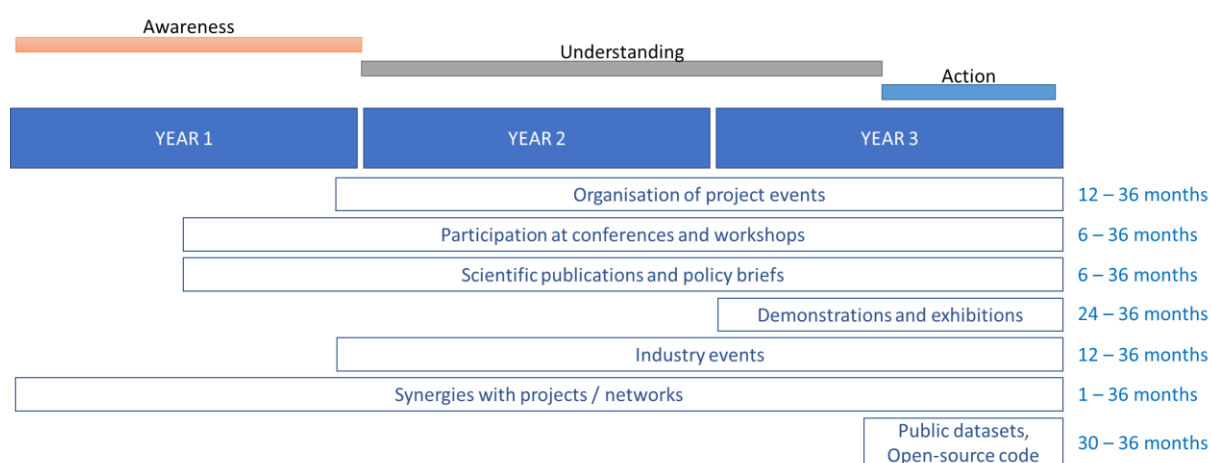


Figure 2. SEDIMARK dissemination and communication timeline.

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Table 1. Dissemination and Communication strategy.

Phase	Description	Main channels
Awareness Stage 1 – Preliminary Project Promotion Phase (M01 – M12) (October 2022 - September 2023)	Aims at: Agreeing upon the communication strategy and future activities. Creating initial awareness in the markets related to the Project's objectives and scope. Creating a first contact with the stakeholders and establishing collaboration with other projects.	Project Website. Social Media. Press Releases. Video Presentations. Leaflets. Posters. Partners social media channels and websites. Presentations about project scope and objectives at industrial exhibitions, conferences & workshops. Presentations at scientific, technical & policy conferences and workshops. Organization of joint workshops with related projects.
Understanding Stage 2 – Stakeholders engagement Phase (M13 – M30) (October 2023 - March 2025)	Aims at: Creating more “targeted awareness” regarding SEDIMARK's technologies with key players and potential users; Informing the target audiences about the technological benefits of SEDIMARK; Adjusting the requirements collected in collaboration with other projects and collect additional needs and requirements coming from a number of stakeholders much higher than the stakeholders involved in the first stage.	Project website. Press releases. Presentations at industrial exhibitions, conferences & workshops. Presentations at scientific, technical & policy conferences and workshops. Journal & conference papers. Organization of joint workshops with related projects.

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Phase	Description	Main channels
Action Stage 3 – Business Strategy Phase (M31 – M36) (April 2025 - September 2025)	Aims at: Maximizing target market awareness regarding the SEDIMARK solution. Thus, contributing to ensure the project sustainability and full exploitation.	Project website Press releases Presentations at industrial exhibitions, conferences & workshops One-to-one meetings Presentations at scientific, technical & policy conferences and workshops Scientific publications in journals and international conferences Final project Brochure

All the dissemination, communication and outreach actions are being monitored continuously through specific tools and call-to-actions throughout the project lifetime. In particular, using an excel sheet to gather all the inputs from the different partners and track the foreseen KPIs. An overview of the KPIs can be found in Section 4.

The following subsections outline the dissemination and communication actions taken during the project, with special emphasis on the ones carried out during the second half of the project as those implemented in the first half of the project were already described in detail on SEDIMARK_D6.3 [1], including the online dissemination through the project social networks and webpage; the scientific publications related to SEDIMARK; the events, trade fairs and exhibitions in which SEDIMARK has been present; and the dissemination materials created so far.

2.1 SEDIMARK Online Dissemination

One of the main aspects of the SEDIMARK dissemination plan have been the utilization of online channels to disseminate the project's goals and results, taking advantage of existing social networks and project-related webpages, including the project main website [3] and the ones from the rest of the partners.

As a collaborative effort of all the partners involved in the project, an online dissemination plan was established at the beginning of the project, involving all the partners contributing periodically with news, technical articles, and social network posts. The online dissemination plan includes the creation of the following content, by each partner, in biweekly dissemination periods:

Technical / dissemination article for the SEDIMARK webpage

Minimum of 200 words and 1 picture.

3 X / Twitter posts

Maximum 280 characters and including links / media files.

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1 LinkedIn post

At least with one image and different hashtags mentions.

2.1.1 SEDIMARK Social Networks and Newsletter

Thanks to the contributions provided by all the partners, we have already created a large set of news and social posts, leading to a growing audience, with more than 600 users taking into account all the platforms where SEDIMARK is present (i.e. LinkedIn, X / Twitter and Newsletter subscribers). In this sense, we also include the newsletter subscribers as part of our audience, as they also receive notifications aggregating content from SEDIMARK (e.g. videos, news and events).

Table 2. Social Media Contributions.

Social Network Platform	Followers	Published Posts
LinkedIn	165	90
X / Twitter	351	350
Newsletter Subscribers	86	8
Webpage	-	80

Table 2 summarizes the current number of followers and posts created for the social media. It is worth mentioning that this table comprises the followers and posts in the project social networks, not considering other posts carried out by each partner on their own accounts.

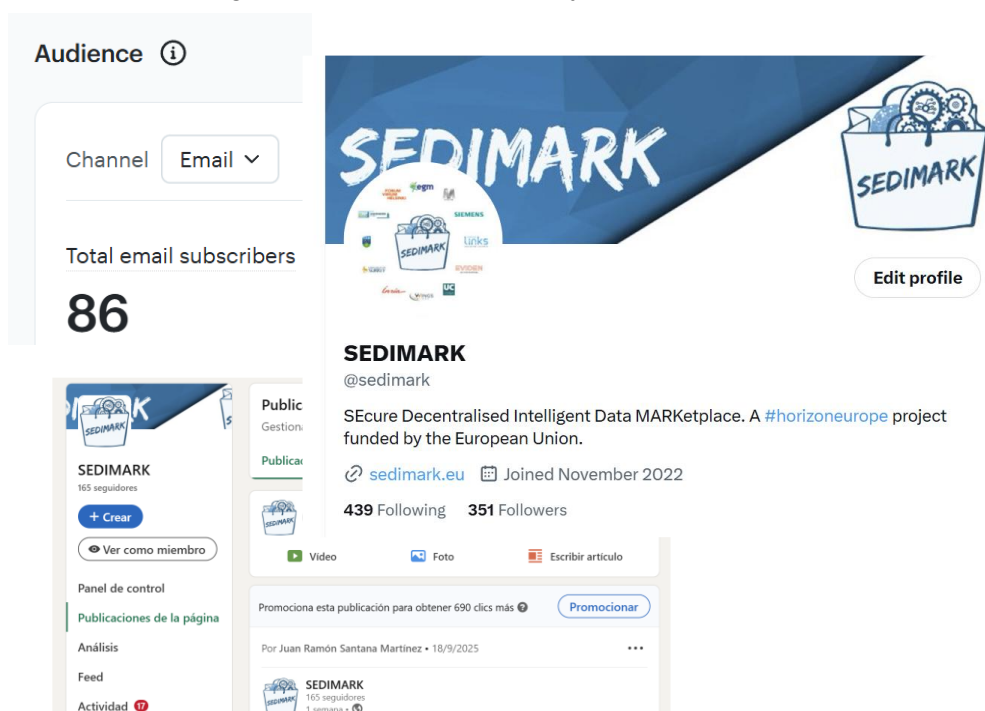


Figure 3. X / Twitter, LinkedIn and Newsletter followers.

As aforementioned, different styles are chosen depending on the audience and the platform. Figure 4 shows a screenshot from X / Twitter and LinkedIn. While X / Twitter posts are kept shorter, normally following a “call to action” style, LinkedIn posts are larger and more technical, similar to those that can be found in the webpage.

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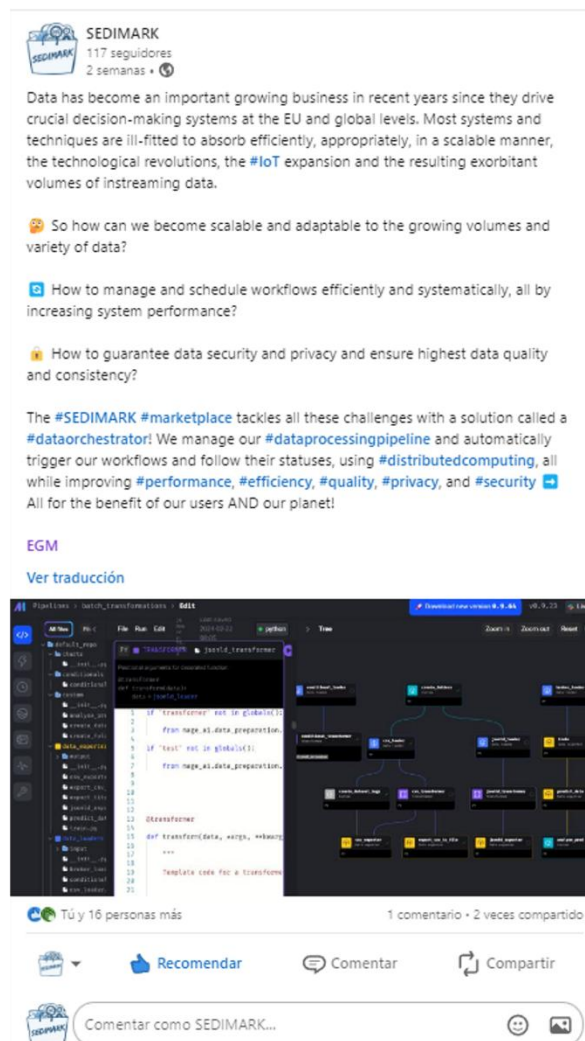
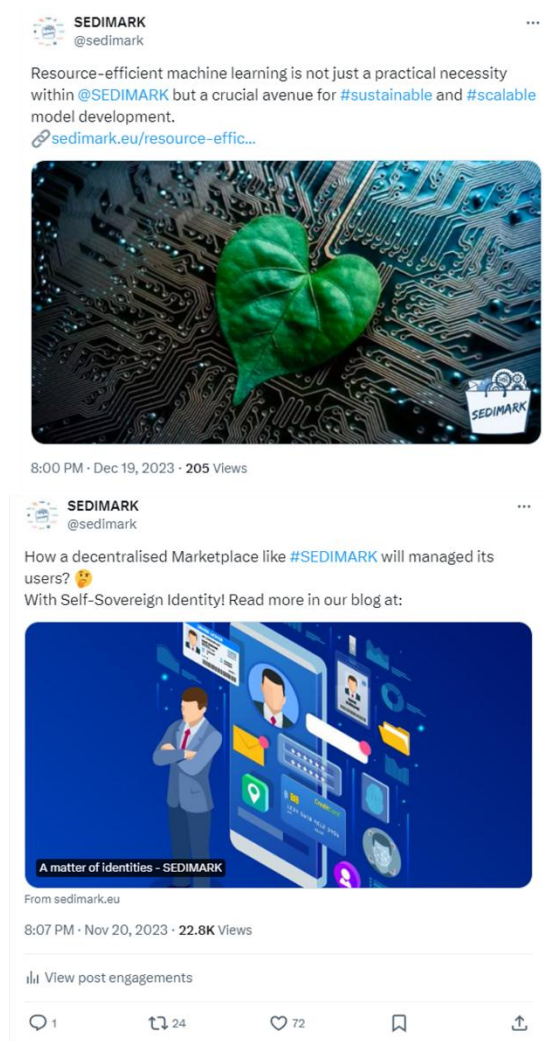


Figure 4. Twitter / X (left) and LinkedIn (right) posts.

Finally, newsletters are created through the aggregation of other sources (i.e. social media content, articles, etc.). Figure 5 shows some excerpts of the second to sixth released newsletter for SEDIMARK. The main structure consists of an initial section with some recent SEDIMARK-related information (e.g., an interview video recorded specifically for the newsletter) and an additional section including some of the news generated for the webpage, with their corresponding links, as well as information about a featured partner with specific outcome to disseminate through the newsletter.

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Figure 5. Excerpts of SEDIMARK newsletters

2.1.2 SEDIMARK Webpage

During the project, a large set of new articles has been published in the webpage, following the online dissemination plan introduced at the beginning of the project. Thanks to this common effort, 80 articles have been published on the webpage, accumulating almost 9800 views. It is important to mention that this number of views are only from the SEDIMARK webpage, and does not count most of the visitors, as due to privacy policies and the European General Data Protection Regulation (GDPR) regulation, only those visitors that accept the cookie banner are counted as visitors. Besides, it does not include either the views of SEDIMARK-related articles from partners' webpages or the ones from published posts in social networks (which includes posts with a large number of views, up to more than 20000 in some cases).

Published SEDIMARK articles are basically divided into three types:

Technical magazine style articles, introducing some of the main concepts and developments carried out within the project.

Events-related articles, announcing or presenting the participation of SEDIMARK in diverse events.

Published documents and deliverables, describing recently published documents in SEDIMARK.

Figure 6 depicts an example of each of the three types of articles mentioned above.

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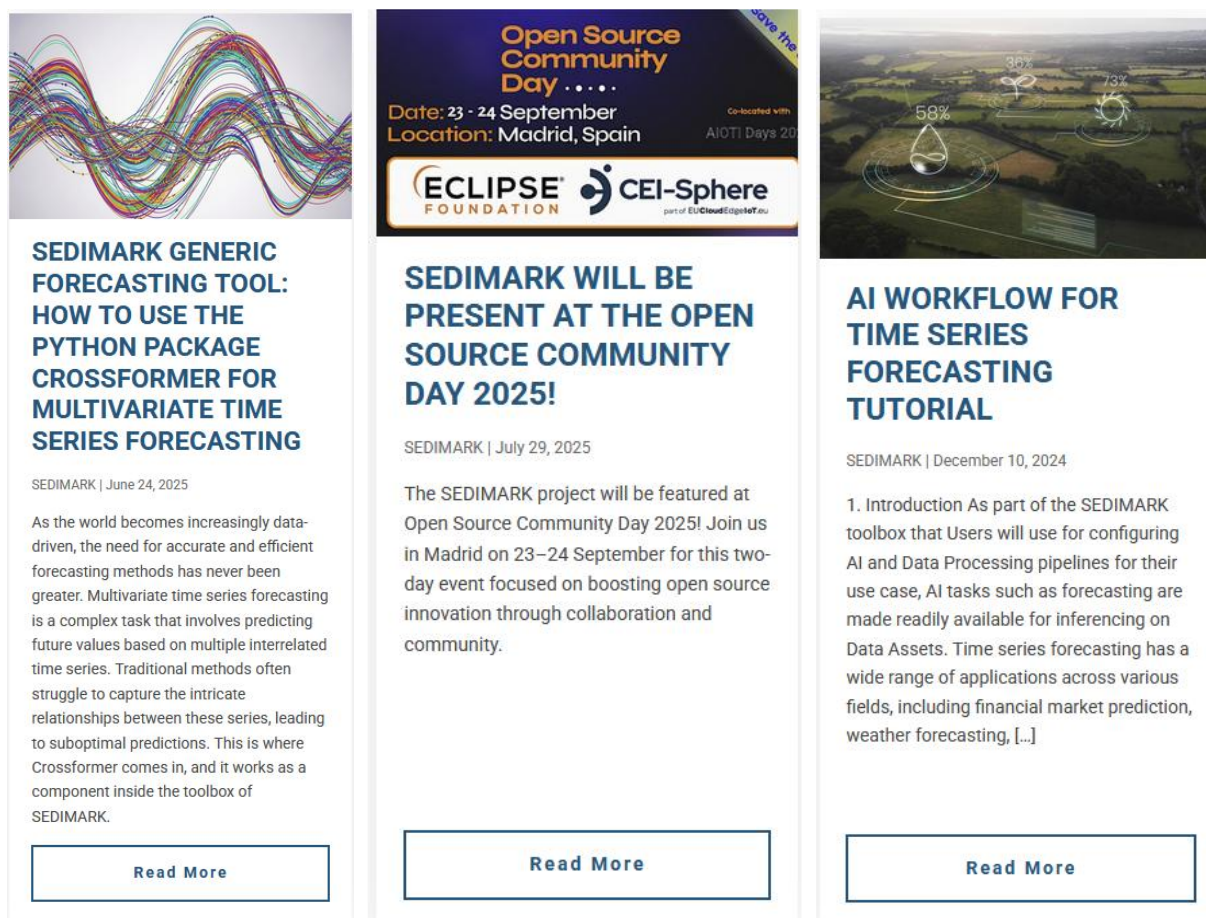


Figure 6. Type of articles in SEDIMARK webpage.

SEDIMARK webpage also hosts all the public deliverables, scientific papers and dissemination resources created within SEDIMARK, in a dedicated section as depicted in Figure 7.

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[USE CASES](#)[NEWS & EVENTS](#)[PUBLICATIONS & RESOURCES](#)[NEWSLETTER](#)[PARTNERS](#)[CONTACT](#)

Publications & Resources

Public Documents

- D1.2 Data Management and Action Plan - First Version
- D1.3 Data Management and Action Plan - Second Version
- D2.1 Use Cases Definition and Initial Requirement Analysis
- D2.2 SEDIMARK Architecture and Interfaces - First version
- D2.3 SEDIMARK Architecture and Interfaces - Final version
- D3.1 Energy Efficient AI-based Toolset for Improving Data Quality
- D3.3 Enabling tools for data interoperability, distributed data storage and training distributed AI models. First version
- D4.1 Decentralized Infrastructure and access management
- D4.3 Edge data processing and service certification - First version
- D4.4 Edge data processing and service certification - Final version
- D4.5 Data sharing platform and incentive - First version
- D5.1 Evaluation methodology, metrics and integration plan
- D5.2 Integrated releases of the SEDIMARK platform. First version
- D6.1 Project Website and Dissemination Material
- D6.2 Dissemination and Exploitation Plan
- D6.3 Dissemination and Impact creation activities. First version

Publications

- GDPR-inspired IoT Ontology enabling Semantic Interoperability, Federation of Deployments and Privacy-Preserving Applications
- A Novel DID Method Leveraging the IOTA Tangle and Its Integration into OpenSSL
- On the integration of Self-Sovereign Identity with TLS 1.3 handshake to build trust in IoT systems
- Entity Matching using Large Language Models
- AutoClass: AutoML for Data Stream Classification
- Elevating Data Quality A Paradigm Shift for Data Spaces and AI Needs
- Exploring Coresets for Efficient Training and Consistent Evaluation of Recommender Systems
- RecPrompt: A Self-tuning Prompting Framework for News Recommendation Using Large Language Models
- Elevating Data Quality A Paradigm Shift for Data Spaces and AI Needs
- DiffGR: A Discrete Diffusion-Based Model for Personalised Recommendation by Reconstructing User-Item Bipartite Graphs
- Data Marketplaces for Enhanced Water Management
- On the need of International Cross-Data Space Interworking: an EU-Japan Case Study
- ASML: A Scalable and Efficient AutoML Solution for Data Streams
- A Decentralised Architecture for Secure Exchange of Assets in Data Spaces: The Case of SEDIMARK
- NodeRec+: A Lightweight Framework for Federated Recommender Systems
- Multi-Label Transfer Learning in Non-Stationary Data Streams

Figure 7. Publication section of SEDIMARK webpage.

As aforementioned, additional articles disseminating SEDIMARK have been produced, either through direct publication on different online media platforms or through press releases. Figure 8 depicts some of these articles and press releases.

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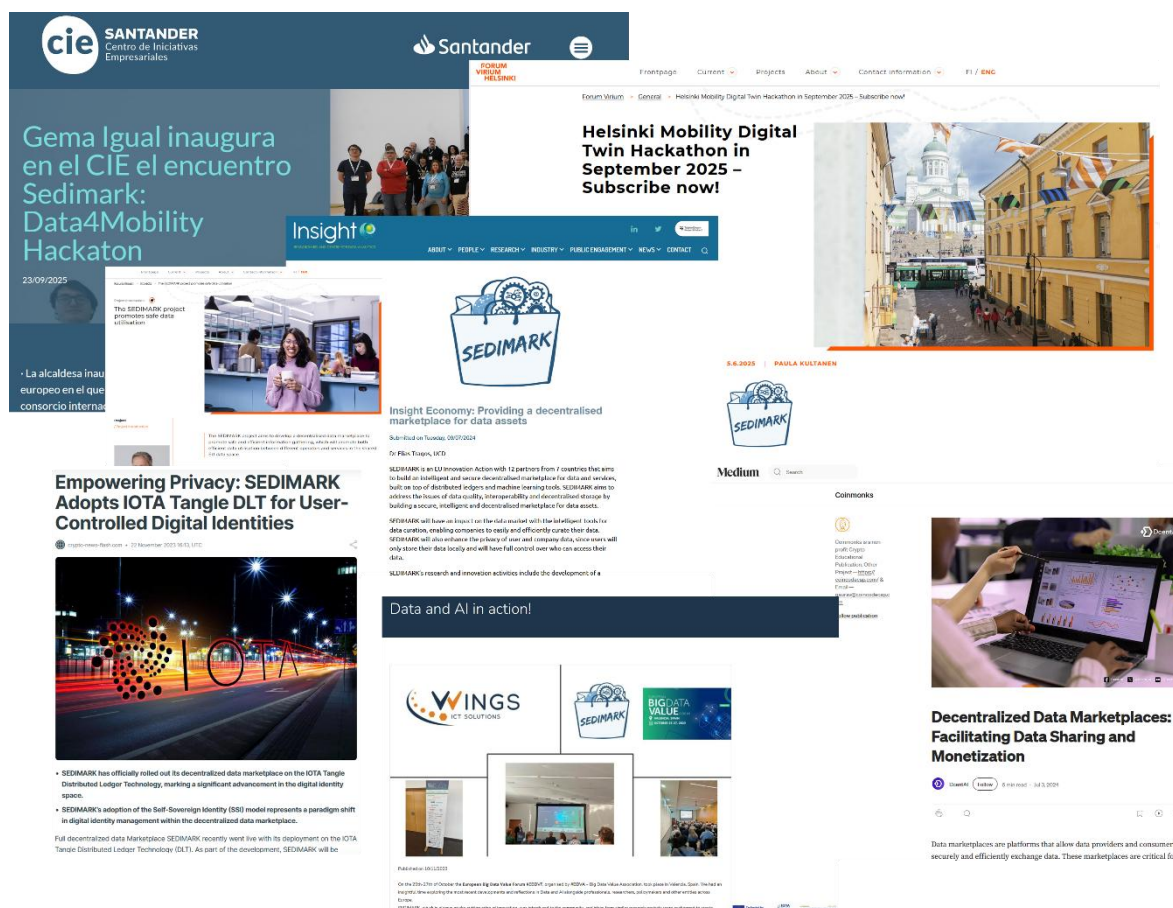


Figure 8. A selection of press releases and external articles featuring SEDIMARK.

2.2 Scientific Publications

Besides the scientific publications that were submitted during the first half of the project, which were already presented in detail on SEDIMARK_D6.3 [1], the following sections compiles the main features from the articles published during the second half-period of SEDIMARK. A number of scientific publications (a total of 24) have been submitted and accepted for both, international conferences and journals. Furthermore, additional papers gathering the latest results generated within the project might be submitted.

The publications that were not reported on SEDIMARK_D6.3 [1] are listed in the following subsections, along with their open-access link.

2.2.1 Entity Matching with Large Language Models as Weak and Strong Labellers

DOI / URL:

10.1007/978-3-031-70421-5_6

Open Access URL:

N/A.

Abstract:

A number of recent studies have shown that pre-trained large language models (LLMs) display highly competitive performance on entity matching tasks while acting in a zero shot manner, thus reducing the need for labelled training data. However, the use of the most capable LLMs

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		Version:	1
		Status:	Final

(e.g. GPT-4) comes at a strongly prohibitive cost, whilst weaker LLMs (e.g. GPT-3) are significantly cheaper yet still provide reasonable performance without training data. In this study, we consider a scenario in which a budget constrained data practitioner with limited access to training data attempts to perform LLM based inference for an entity matching task. Within budget, they can afford to have only some portion of the data labelled by a stronger LLM. We cast this problem as that of deciding when to defer to a stronger LLM. In this scenario, we assume that a weak LLM provides cheap but noisy labels, while a strong LLM provides labels with better precision, but greatly increased cost. To address this, we develop a technique capable of intelligently allocating labels between strong and weak LLM labellers to maximise performance within the given budget. We show that, given a small amount of already labelled data, it is possible to reliably learn when the weak LLM is likely to be inaccurate, and thus defer to the stronger more expensive LLM. Employing GPT-3 and GPT-4 on four popular entity matching benchmarks we find that, given a specific budget to spend on the strong LLM, our approach generally performs better than a random labelling allocation, and outperforms an in-context-learning strategy. As such, this work outlines a simple yet effective methodology whereby real-world practitioners can employ LLMs in entity matching tasks.

Published in:

New Trends in Database and Information Systems. ADBIS 2024. Communications in Computer and Information Science, vol 2186. Springer, Cham

Cite:

D. O'Reilly-Morgan, E. Tragos, E. Duriakova, H. Du, N. Hurley, and A. Lawlor, 'Entity Matching with Large Language Models as Weak and Strong Labellers', Communications in Computer and Information Science. Springer Nature Switzerland, pp. 58–67, Nov. 14, 2024. doi: 10.1007/978-3-031-70421-5_6.

2.2.2 Exploring Coresets for Efficient Training and Consistent Evaluation of Recommender Systems

DOI / URL:

10.1145/3640457.3691716

Open Access URL:

N/A.

Abstract:

Recommender systems have achieved remarkable success in various web applications, such as e-commerce, online advertising, and social media, harnessing the power of big data. To attain optimal model performance, recommender systems are typically trained on very large datasets, with substantial numbers of users and items. However, large datasets often present challenges in terms of processing time and computational resources. Coreset selection offers a method for obtaining a reduced yet representative subset from vast datasets, thereby enhancing the efficiency of training machine learning algorithms. Nevertheless, little research has been conducted to explore the practical implications of different coreset selection approaches on the performance of recommender systems algorithms. In this paper, we systematically investigate the impact of various coreset selection techniques. We evaluate the performance of the resulting coresets using inductive recommendation models which allow for consistent evaluations to be performed. The experimental results demonstrate that coreset methods are a powerful and useful approach for obtaining reduced datasets which preserve

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the properties of the large original dataset and have competitive performance compared to the time required to train with the full dataset.

Published in:

Proceedings of the 18th ACM Conference on Recommender Systems

Cite:

Z. Ju, H. Du, E. Tragos, N. Hurley, and A. Lawlor, 'Exploring Coresets for Efficient Training and Consistent Evaluation of Recommender Systems', 18th ACM Conference on Recommender Systems. ACM, pp. 1152–1157, Oct. 08, 2024. doi: 10.1145/3640457.3691716.

2.2.3 RecPrompt: A Self-tuning Prompting Framework for News Recommendation Using Large Language Models

DOI / URL:

10.1145/3627673.3679987

Open Access URL:

<https://doi.org/10.48550/arXiv.2312.10463>

Abstract:

News recommendations heavily rely on Natural Language Processing (NLP) methods to analyse, understand, and categorize content, enabling personalized suggestions based on user interests and reading behaviours. Large Language Models (LLMs) like GPT-4 have shown promising performance in understanding natural language. However, the extent of their applicability to news recommendation systems remains to be validated. This paper introduces RecPrompt, the first self-tuning prompting framework for news recommendation, leveraging the capabilities of LLMs to perform complex news recommendation tasks. This framework incorporates a news recommender and a prompt optimizer that applies an iterative bootstrapping process to enhance recommendations through automatic prompt engineering. Extensive experimental results with 400 users show that RecPrompt can achieve an improvement of 3.36% in AUC, 10.49% in MRR, 9.64% in nDCG@5, and 6.20% in nDCG@10 compared to deep neural models. Additionally, we introduce TopicScore, a novel metric to assess explainability by evaluating LLM's ability to summarize topics of interest for users. The results show LLM's effectiveness in accurately identifying topics of interest and delivering comprehensive topic-based explanations.

Published in:

Proceedings of the 33rd ACM International Conference on Information and Knowledge Management.

Cite:

D. Liu et al., 'RecPrompt: A Self-tuning Prompting Framework for News Recommendation Using Large Language Models', Proceedings of the 33rd ACM International Conference on Information and Knowledge Management. ACM, pp. 3902–3906, Oct. 21, 2024. doi: 10.1145/3627673.3679987.

2.2.4 Elevating Data Quality A Paradigm Shift for Data Spaces and AI Needs

DOI / URL:

N/A.

Document name:	D6.4 Dissemination and Impact creation activities. Final version				Page:	22 of 74
Reference:	SEDIMARK_D6.4	Dissemination:	PU	Version:	1	Status: Final

Open Access URL:

https://bdva.eu/download/92/publications/5291/elevating-data-quality-a-paradigm-shift-for-data-spaces-and-ai-needs_may-2024.pdf

Abstract:

The objectives of this document are: Present data quality from its different perspectives and gather the information and material needed to pave the way for the subsequent discussions; Explore the symbiotic relationship between data quality and data spaces, highlighting the importance to incorporate data quality in all aspects of data spaces (quality-by-design), but also presenting data spaces as a unique environment to ensure data quality when sharing data in a scalable way; Drive the fit-for-purpose paradigm to focus on the data quality for AI, which introduces AI requirements that should be addressed by specific metrics and processes, also according to the AI Act; Provide some recommendations and paths to follow in order to fully achieve those goals and shift data quality to a new dimension. This document is intended for all actors involved in the lifecycle of data, including data providers and data users and with special emphasis on value generation from data through use cases and from different industry sectors and domains. It also addresses data spaces designers and builders to incorporate data quality by design and reinforce the role of data spaces in keeping and even increasing data quality. Finally, the document is also relevant for AI practitioners, who bring the AI dimension into the picture and for whom the quality of data used to train, validate and test models is of paramount importance.

Published in:

Big Data Value Association White Paper

Cite:

D. Alonso, et. al., 'Elevating Data Quality A Paradigm Shift for Data Spaces and AI Needs', Big Data Value Association.

2.2.5 Elevating Water Flow Level Predictions through Strategic Feature Elimination

DOI / URL:

10.1109/EPEi63510.2024.10758054

Open Access URL:

N/A.

Abstract:

Knowing the level of water at a dam represents a measure of safety and environmental health. In this research, the monitoring of the water flow level is considered the point of interest. Efficient water level monitoring is important to ensure proper decision making and long-term sustainability. Making use of the existing monitoring devices to forecast future data can help decision making in case of some unforeseen circumstances. There are a multitude of factors that can influence the level of water. In this paper, an analytic approach is reached by the implementation of gradient boosting machine learning algorithms, to forecast water levels. We propose an approach for forecasting water levels by integrating recursive feature elimination. This method aims to enhance the accuracy of the results, by ensuring that the relevant features are considered.

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Published in:

Proceedings of the 2024 IEEE International Conference And Exposition On Electric And Power Engineering

Cite:

I.-A. Stroia-Vlad, D. G. Mihail, and N. C. Septimiu, 'Elevating Water Flow Level Predictions through Strategic Feature Elimination', 2024 IEEE International Conference And Exposition On Electric And Power Engineering (EPEI). IEEE, pp. 132–138, Oct. 17, 2024. doi: 10.1109/epei63510.2024.10758054.

2.2.6 Pneumonia Image Classification Using DenseNet Architecture

DOI / URL:

10.3390/info15100611

Open Access URL:

<https://www.mdpi.com/2078-2489/15/10/611>

Abstract:

Pulmonary diseases, including pneumonia, represent a significant health challenge and are often diagnosed using X-rays. This study investigates the effectiveness of artificial intelligence (AI) in enhancing the diagnostic capabilities of X-ray imaging. Using Python and the PyTorch framework, we developed and trained several deep learning models based on DenseNet architectures (DenseNet121, DenseNet169, and DenseNet201) on a dataset comprising 5856 annotated X-ray images classified into two categories: Normal (Healthy) and Pneumonia. Each model was evaluated on its ability to classify images with metrics including binary accuracy, sensitivity, and specificity. The results demonstrated accuracy rates of 92% for Normal and 97% for Pneumonia. The models also showed significant improvements in diagnostic accuracy and reduced time for disease detection compared to traditional methods. This study underscores the potential of integrating convolutional neural networks (CNNs) with medical imaging to enhance diagnostic precision and support clinical decision-making in the management of pulmonary diseases. Further research is encouraged to refine these models and explore their application in other medical imaging domains.

Published in:

Information

Cite:

M. Bunea and G. M. Danciu, 'Pneumonia Image Classification Using DenseNet Architecture', Information, vol. 15, no. 10, p. 611, Oct. 2024, doi: 10.3390/info15100611.

2.2.7 DiffGR: A Discrete Diffusion-Based Model for Personalised Recommendation by Reconstructing User-Item Bipartite Graphs

DOI / URL:

10.1007/978-3-031-88714-7_23

Open Access URL:

N/A.

Document name:	D6.4 Dissemination and Impact creation activities. Final version				Page:	24 of 74
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Abstract:

Generative models have recently been used to produce personalized recommendations by simulating user preferences in continuous space. However, existing work often overlooks crucial discrete structural relationships, such as graph sparsity and user-item topology, reducing recommendation accuracy. Current graph diffusion models that manipulate the full adjacency matrix in continuous space face scalability issues and poorly structured intermediates adjacency matrix. To address these problems, we develop DiffGR, a novel discrete diffusion model for personalised recommendation. DiffGR operates in discrete space, manipulating individual user-item bipartite sub-graphs by randomly removing edges in forward diffusion and restoring them based on a Bernoulli distribution in reverse, preserving graph structure and avoiding full adjacency matrix loading. Empirical studies show that DiffGR achieves competitive personalised recommendation results and generates synthetic graphs with high fidelity to the original dataset, suggesting a promising direction for discrete diffusion modelling in recommender systems.

Published in:

Lecture Notes in Computer Science ((LNCS,volume 15574))

Cite:

Z. Ju, H. Du, E. Tragos, N. Hurley, and A. Lawlor, 'DiffGR: A Discrete Diffusion-Based Model for Personalised Recommendation by Reconstructing User-Item Bipartite Graphs', Lecture Notes in Computer Science. Springer Nature Switzerland, pp. 246–254, 2025. doi: 10.1007/978-3-031-88714-7_23.

2.2.8 On the need of International Cross-Data Space Interworking: an EU-Japan Case Study

DOI / URL:

10.1109/MITP.2025.3545214

Open Access URL:

N/A.

Abstract:

Data spaces have emerged as pivotal elements promoting data-driven applications and driving the growth of the data economy. Opposite to traditional data exchange, where trustworthiness relies on a central entity acting as a data transactions' moderator, the decentralization introduced by data spaces overcomes the barriers for a worldwide market of data economy, ensuring the self-sovereignty for data owners. However, existing solutions for the deployment of data spaces jeopardize their adoption, isolating the data economy in different regions. This article delves into cross-data space interworking between International Data Spaces (IDS) and Connector Architecture for Decentralized Data Exchange (CADDE) architectures as they are the references, in Europe and Japan respectively, for the creation of this kind of data sharing ecosystems. The article describes a CO2 footprint assessment case study –the first of its kind as far as we know– enabling cross-domain data exchange between different data spaces and discusses the pilot results.

Published in:

IT Professional (In press)

Document name:	D6.4 Dissemination and Impact creation activities. Final version				Page:	25 of 74
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Cite:

J. R. Santana, L. Sánchez, M. Bauer, B. Hebgen, E. Kovacs, S. Hamaguchi and Y. Nomura, "On the Need of International Cross-Data Space Interworking: An EU–Japan Case Study", IT Professional, doi: 10.1109/MITP.2025.3545214

2.2.9 ASML: A Scalable and Efficient AutoML Solution for Data Streams

DOI / URL:

N/A.

Open Access URL:

<https://inria.hal.science/hal-04581479v2>

Abstract:

Online learning poses a significant challenge to AutoML, as the best model and configuration may change depending on the data distribution. To address this challenge, we propose Automated Streaming Machine Learning (ASML), an online learning framework that automatically finds the best machine learning models and their configurations for changing data streams. It adapts to the online learning scenario by continuously exploring a large and diverse pipeline configuration space. It uses an adaptive optimisation technique that utilizes the current best design, adaptive random directed nearby search, and an ensemble of best performing pipelines. We experimented with real and synthetic drifting data streams and showed that ASML can build accurate and adaptive pipelines by constantly exploring and responding to changes. In several datasets, it outperforms existing online AutoML and state-of-the-art online learning algorithms.

Published in:

Proceedings of the AutoML 2024 International Conference on Automated Machine Learning

Cite:

Verma, N., Bifet, A., Pfahringer, B., & Bahri, M. (2024, September). Asml: A scalable and efficient AutoML solution for data streams. In AutoML 2024-International Conference on Automated Machine Learning.

2.2.10 Transforming Mage AI Workflows into Standardized CWL and Python Pipelines

DOI / URL:

N/A.

Open Access URL:

<https://www.eucnc.eu/programme/poster-session-ii/>

Abstract:

Mage AI provides a powerful platform for designing and executing data pipelines. Still, its integration with workflow standards such as the Common Workflow Language (CWL) and Python-based workflows is essential to ensure reproducibility, portability, and compatibility. This paper introduces a methodology for converting Mage workflows into CWL and Python standard flows using custom scripts and transformation logic. We detail the implementation, the challenges addressed, and the broader implications of this approach while situating it within the wider context of workflow management and execution. The experimental results demonstrate significant performance improvements that validate the benefits of adopting this approach in real-world scenarios.

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Published in:

Proceedings of the EuCNC & 6G Summit 2025

Cite:

Stefan-Cristian Jarcau, Gabriel-Mihail Danciu, Septimiu Nechifor, Erika Duriakova, Grigorios Koutantos, Tarek Elsaleh, Panagiotis Vlacheas, Mihnea Ionut Lopataru, 'Transforming Mage AI Workflows into Standardized CWL and Python Pipelines', In Proceedings of the European Conference on Networks and Communications (EuCNC 2025) & 6G Summit, Poznan, 3-6 June 2025.

2.2.11 A Decentralised Architecture for Secure Exchange of Assets in Data Spaces: The Case of SEDIMARK

DOI / URL:

10.1016/j.dib.2025.111757

Open Access URL:

<https://www.sciencedirect.com/science/article/pii/S2352340925004846>

Abstract:

The European Union's (EU) data strategy aims to create a single market for seamless data flow while ensuring proper governance, privacy, and data protection. In this paper, we present SEDIMARK, an EU project, that builds on this strategy by developing a fully decentralised, secure data marketplace.

The goal of SEDIMARK is to build a complete toolbox that enables users to purchase and process data assets. The toolbox includes tools for data cleaning, decentralised machine learning models and secure data exchange. SEDIMARK offers users full control over data assets by enabling them to keep their data locally and thus removing the need for central servers. With customisable pipelines and tools, SEDIMARK supports a wide range of users, from novices to experts, promoting seamless collaboration and fair access to high-quality datasets across Europe.

The decentralised connectivity in SEDIMARK is achieved with the use of Distributed Ledger Technology (DLT). Furthermore, SEDIMARK's architecture features a unique Connector component using Self Sovereign Identities (SSI), fostering trust and secure interactions. Transactions in SEDIMARK are stored in a Registry, a decentralised, immutable, non-repudiable and permissionless database. Together the technologies used in SEDIMARK ensure privacy, trust and data quality for secure management, sharing, and monetisation of assets in data spaces.

Published in:

Data in Brief

Cite:

E. Duriakova et al., 'A decentralised architecture for secure exchange of assets in data spaces: The case of SEDIMARK', Data in Brief, vol. 61, p. 111757, Aug. 2025, doi: 10.1016/j.dib.2025.111757.

2.2.12 Contemporary development directions for urban digital twins

DOI / URL:

10.5194/isprs-archives-XLVIII-4-W10-2024-177-2024

Document name:	D6.4 Dissemination and Impact creation activities. Final version				Page:	27 of 74
Reference:	SEDIMARK_D6.4	Dissemination:	PU	Version:	1	Status: Final

Open Access URL:

<http://hdl.handle.net/10138/589578>

Abstract:

Urban digital twins have become an interest in cities worldwide. The current urban digital twins frequently build on earlier 3D city modelling efforts, and thus also share many of the applications. At the same time, the ongoing digitalization offers potential routes for further development of urban digital twins. We present some of the ongoing development projects from the Helsinki region. Based on these, we then try to identify the contemporary development directions for urban digital twins, with the three emerging main themes being: 1) the inclusion of new data sources such as satellite remote sensing, crowdsourcing and various sensor systems, 2) a stronger presence of social aspects and qualitative data and 3) modular technical architecture.

Published in:

The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences

Cite:

J.-P. Virtanen et al., 'Contemporary development directions for urban digital twins', Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., vol. XLVIII-4/W10-2024, pp. 177–182, May 2024, doi: 10.5194/isprs-archives-xxviii-4-w10-2024-177-2024.

2.2.13 Leveraging Technologies for Data Management and Sharing to Foster Collaboration and Implement Data Spaces

DOI / URL:

In press.

Open Access URL:

In press

Abstract:

The 2020 European Strategy for Data aims at developing Common Data Spaces in as a means to build a pan-European single market for data, thereby supporting economic growth and maximizing citizens' use of data. It demands data spaces in strategic sectors, with capabilities for effective data management and sharing. Although several initiatives support their adoption, data spaces are still in the early stages of development and face several data management and sharing challenges. To identify these challenges, we review the literature in developing a conceptual framework for applying data management and sharing in the context of data spaces. We then evaluate the practical implementation of the proposed solutions by analysing six representative European-funded projects. Focusing on challenges from trust and business models to interoperability, workflow orchestration, energy efficiency, and data quality, the work highlights prominent issues and explains how each project addresses them through technical means. Our evaluation outlines each project's aim and contribution along with a representative use case from different domains, e.g., water, agriculture, and energy. We recognize widely accepted strategies such as the use of semantic standards, data catalogues, distributed ledger technologies to enhance trust, and federated identity management. This work highlights recurring patterns, common practices, and key differences in implementation and identifies open research gaps. Thus, it aims to inform future initiatives and provide concrete recommendations to researchers and practitioners on achieving data spaces with best

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practices. As the field matures, the work hopes to help achieve scalable, stable, and cross-domain data spaces that support sustainable innovation and long-term collaboration throughout Europe.

Published in:

Data in Brief

Cite:

I. Chrysakis et al., 'Leveraging Technologies for Data Management and Sharing to Foster Collaboration and Implement Data Spaces', Data in Brief, vol. 61, p. 111757, Aug. 2025, doi: 10.1016/j.dib.2025.xxxxxxx.

2.2.14 Exploring Digital Twins for Urban Mobility: Applications and the Case Study of Helsinki

DOI / URL:

10.1109/IWIS66215.2025.11142394

Open Access URL:

N/A.

Abstract:

Digital twin technology is increasingly explored as a dynamic, data-driven tool for simulation, monitoring, and optimizing urban transport systems. This paper reviews the current landscape of digital twin applications in urban context, with a focus on their capabilities for predictive analytics, scenario evaluation as a support for decision making for urban mobility interventions. Based on a review of the latest literature, it examines the conceptual frameworks and applied digital twins' models across different cities. Additionally, this study presents a real-world case study from Helsinki, offering insights into the development and integration of digital twins within a complex urban mobility system. The study contributes to the state of the art by identifying key implementation challenges and proposing future research directions to advance the practical application of digital twin technologies in urban mobility.

Published in:

Proceedings of the 2025 International Workshop on Intelligent Systems (IWIS), Ulsan, Korea, Republic of, 2025, pp. 1-7

Cite:

G. Torrao, J.-P. Virtanen, and E. Volanen, "Exploring Digital Twins for Urban Mobility: Applications and the Case Study of Helsinki," 2025 International Workshop on Intelligent Systems (IWIS). IEEE, pp. 1–7, July 21, 2025. doi: 10.1109/iwis66215.2025.11142394.

2.2.15 NodeRec+: A Lightweight Framework for Federated Recommender Systems

DOI / URL:

10.1145/3726302.3730138

Open Access URL:

<https://dl.acm.org/doi/pdf/10.1145/3726302.3730138>

Abstract:

"Data privacy is a critical concern in today's data-driven world. To this end, Federated Learning (FL) has been researched extensively, as it allows sensitive data to be kept secure on local

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devices while training global Machine Learning (ML) models across multiple devices. Several FL topologies have been introduced to address different users' needs. FL fits well within the Recommender Systems (RS) domain, with decentralised large-scale datasets and user privacy issues, as it improves personalised recommendations and accuracy while keeping users' sensitive data secure.

In this paper, we introduce NodeRec+, the prototype of an FL framework, geared towards enabling the design and evaluation of decentralised RS. NodeRec+ allows quick and easy composition of various FL topologies in simple Python code and comes ready integrated with a number of RS models and evaluation protocols, enabling rapid benchmarking of models in various FL topologies. In contrast to most similar frameworks that are either used for simulations or focused solely on a single FL topology, NodeRec+ provides a framework to build real decentralised networks of nodes that can work jointly using several FL topologies in RS settings. A demonstration video showcasing the NodeRec+ framework can be found at <https://www.youtube.com/watch?v=Ilo3Cr56Yyl>. Code is provided at <https://github.com/SEDIMARK-UCD/noderec>."

Published in:

Proceedings of the 48th International ACM SIGIR Conference on Research and Development in Information Retrieval.

Cite:

D. O'Reilly-Morgan, E. Duriakova, E. Tragos, N. Hurley, and A. Lawlor, "NodeRec+: A Lightweight Framework for Federated Recommender Systems," Proceedings of the 48th International ACM SIGIR Conference on Research and Development in Information Retrieval. ACM, pp. 4076–4080, July 13, 2025. doi: 10.1145/3726302.3730138.

2.2.16 Leveraging Edge Analytics for Enhanced Data Quality in IoT Systems

DOI / URL:

In press.

Open Access URL:

In press.

Abstract:

This chapter provides an overview of leveraging edge analytics to enhance Internet of Things (IoT) data quality, discussing key concepts, challenges, and solutions. As data processing increasingly occurs at the sensor level, various edge computing paradigms have emerged to address data volumes, heterogeneity, quality, processes efficiency, privacy and storage optimization concerns. The chapter examines the need for cleansing and harmonizing heterogeneous datasets to enable trustworthy Artificial Intelligence (AI) and decision-making, emphasizing the importance of data-centric approaches and distributed processing. Key challenges of IoT data quality are discussed and the benefits and limitations of edge computing are compared to cloud computing. The chapter covers data cleaning techniques and data quality metrics that can be applied at the edge, such as missing data imputation and outlier detection. It also explores data augmentation and synthetic data generation to enhance machine learning model robustness. Security and privacy considerations for IoT systems are examined, highlighting vulnerabilities and best practices. Best practices that employ a mix of both edge and cloud solutions are explored and several case studies are illustrated to put these practical edge processing applications into context.

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Published in:

Springer Handbook for Data Engineering

Cite:

M. Marot, G. Orazi, L. Sánchez, L. Martín, D. O'Reilly-Morgan, E. Duriakonva, E. Tragos, F. Le Gall, 'Leveraging Edge Analytics for Enhanced Data Quality in IoT Systems', Springer Handbook for Data Engineering. In press.

2.2.17 Optimizing Deep Learning for Edge Deployment via Weight Statistics Aware Network Pruning

DOI / URL:

In press.

Open Access URL:

In press.

Abstract:

Deep learning models have achieved state-of-the-art performance across numerous domains, but their increasing size and computational complexity pose significant challenges for deployment in resource-constrained environments. Model pruning is a key technique to address this issue by reducing the number of model parameters. However, existing methods often present a trade-off between compression rate, computational speed-up, and performance preservation. This paper introduces a novel hybrid pruning methodology that strategically combines Weight Statistics Aware Pruning (WSAP)-based unstructured pruning with hardware-friendly structured channel pruning. Our approach first determines WSAP-driven pruning ratios using a heuristic based on the weights' Coefficient of Variation (CoV), allowing for more aggressive pruning of less critical layers. It then applies both fine-grained and channel-based pruning to maximize model compression while preserving accuracy. We demonstrate the effectiveness and generality of our method on two diverse tasks: Video Quality Assessment (VQA) with the DOVER-Mobile model and Time-Series Forecasting with the CrossFormer model. Our results show that the proposed hybrid method achieves a superior balance of efficiency and performance, reducing model parameters by up to 80% and FLOPs by over 50% while maintaining the accuracy of the original models. These improvements make our method well suited for trustworthy and efficient deployment of deep learning models in shared and constrained environments.

Published in:

Proceedings of the IEEE Conference on Standards for Communications and Networking 2025, Bologna, 15-17 September 2025.

Cite:

S. Hanumanthaiah, P. Wu, A. Mackin, A. Collins, T. Elsaleh, X. Zhu, 'Optimizing Deep Learning for Edge Deployment via Weight Statistics Aware Network Pruning', IEEE Conference on Standards for Communications and Networking 2025, Bologna, 15-17 September 2025. In press.

Document name:	D6.4 Dissemination and Impact creation activities. Final version				Page:	31 of 74
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2.2.18 Towards Efficient Structured Description Generation for Data Marketplace Offerings

[DOI / URL:](#)

In press.

[Open Access URL:](#)

In press.

[Abstract:](#)

As data marketplaces are expected to become a prominent theme in the digital economy, whereby data assets are being generated today more than ever, and their potential to transform how value can be unlocked, the automation of metadata description generation will become a necessity for data asset discoverability, especially as data volumes explode and manual documentation becomes unsustainable. Therefore, semi-autonomous means are required to bring down the barrier to entry for data providers. As an extension of the Data Space concept, marketplaces advertise their assets or products through " offerings " , that enable the discoverability of an asset or bundle of assets, published by data providers to a catalogue, which data consumers in turn can use for querying. Recent advances in large language models (LLMs) and constrained decoding techniques enable schema-compliant, semi-automated metadata generation, reducing manual overhead and improving discoverability. We propose a schema-aware, edge-optimized LLM pipeline for generating structured descriptions for data asset offerings in the SEDIMARK marketplace, with evaluation on realistic information models.

[Published in:](#)

Proceedings of the IEEE Conference on Standards for Communications and Networking 2025, Bologna, 15-17 September 2025.

[Cite:](#)

M. Awan, A. Nadeem, J. R. Santana, P. Sotres, T. Bousselin, M. Costalonga, T. Elsaleh, 'Towards Efficient Structured Description Generation for Data Marketplace Offerings', IEEE Conference on Standards for Communications and Networking 2025, Bologna, 15-17 September 2025. In press.

2.2.19 A Decentralised DLT-based Offering Management and Asset Sharing Framework for Data Marketplaces

[DOI / URL:](#)

In press.

[Open Access URL:](#)

In press.

[Abstract:](#)

The secure and trustworthy exchange of interoperable data assets is a key enabler for the development of IoT-based data spaces. This paper presents a decentralised framework for offering management and asset sharing within trusted and interoperable data spaces, leveraging Distributed Ledger Technologies (DLTs) and the Self-Sovereign Identity (SSI) paradigm to ensure transparency, integrity, and participant self-sovereignty. The proposed architecture integrates identity management and tamper-resistant smart contracts leveraging the IOTA Tangle to support decentralised offering discovery, access control and verifiable

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transactions. By addressing critical challenges related to trust, interoperability, and decentralisation, the framework contributes to the technological foundations required for scalable, secure, and resilient data ecosystems.

Published in:

Proceedings of the IEEE Conference on Standards for Communications and Networking 2025, Bologna, 15-17 September 2025.

Cite:

P. Sotres, A. Carelli, M. Festa, M. Costalonga, A. Fernandez Bejarano, T. Elsaleh, S. Hanumanthaiah, V. González, J. R. Santana, 'A Decentralised DLT-based Offering Management and Asset Sharing Framework for Data Marketplaces', IEEE Conference on Standards for Communications and Networking 2025, Bologna, 15-17 September 2025. In press.

2.2.20 Quantifying Energy-Accuracy-Latency Trade-offs in Cloud-Offloaded and On-Device TinyML Inference on IoT Devices

DOI / URL:

In press.

Open Access URL:

In press.

Abstract:

This paper presents a comprehensive evaluation of energy-accuracy-latency trade-offs for human-activity recognition on the Arduino Nano RP2040 Connect, using only its on-board LSM6DSOX IMU and Wi-Fi and 5G radios. A quantized 1D CNN (~ 10 k parameters) and a larger variant (~ 20 k parameters) are implemented both on-device via TensorFlow-Lite Micro and off-loaded via HTTPS to an Azure Function. Experiments systematically vary model size, Wi-Fi RSSI (-30 dBm to -80 dBm), and server region (Europe vs. US), logging microsecond-resolution timestamps for feature extraction, inference, and communication. On-device inference yields latencies of 6.5-7.2 ms and energy use of 0.18-0.21 J with accuracies of 97.5 % (tiny) and 99.0 % (small). Cloud-offload over Wi-Fi in Europe reduces energy to 0.05 J at ~ 95 ms latency with 97.8 % and 99.2 % accuracy, degrading to 0.28 J/275 ms under weak signal to US. Pareto-front analyses identify optimal operating points, offering clear guidelines for mode and model selection in energy-constrained IoT deployments.

Published in:

Proceedings of the IEEE Conference on Standards for Communications and Networking 2025, Bologna, 15-17 September 2025.

Cite:

H. Alexandru-Modran, G. Mihail-Danciu, 'Quantifying Energy-Accuracy-Latency Trade-offs in Cloud-Offloaded and On-Device TinyML Inference on IoT Devices', IEEE Conference on Standards for Communications and Networking 2025, Bologna, 15-17 September 2025. In press.

2.2.21 Data Marketplaces for Enhanced Water Management

DOI / URL:

Waiting for final publication.

Document name:	D6.4 Dissemination and Impact creation activities. Final version				Page:	33 of 74
Reference:	SEDIMARK_D6.4	Dissemination:	PU	Version:	1	Status: Final

Open Access URL:

Waiting for final publication

Abstract:

Addressing the challenges of data fragmentation and interoperability in water resource management, this paper details a decentralized data marketplace architecture developed within the SEDIMARK project. We present its operational deployment for the Communauté de la Riviera Française, demonstrating an end-to-end data valorisation pipeline. The system acquires real-time data from a private LoRaWAN network of IoT sensors and integrates it with external sources, including weather forecasts and hydrogeological models. At its core, a FIWARE context broker standardizes all information using the ETSI NGSI-LD specification, creating a unified and context-rich data asset. An integrated AI and data engineering toolbox enables the creation of pipelines for data curation—such as quality assessment and outlier detection—and for training predictive models. We illustrate this capability through a use case on water flow forecasting, showing the platform's ability to transform raw, heterogeneous data into actionable intelligence. The main outcome is a scalable and interoperable system that provides a robust foundation for enhanced, data-driven decision-making in critical water management applications.

Published in:

Advances in Hydroinformatics - SimHydro 2025 Volume 1: Data for Water and Models

Cite:

Franck Le Gall, Jérôme Grégoire, Jérémy Deremarque, Thomas Bousselin, Iheb Khelifi, Gabriel Danciu, "Data marketplace for enhanced water management", Advances in Hydroinformatics - SimHydro 2025 Volume 1: Data for Water and Models, Springer.

2.2.22 Multi-Label Transfer Learning in Non-Stationary Data Streams

DOI / URL:

Waiting for final publication.

Open Access URL:

<https://arxiv.org/abs/2509.08181>

Abstract:

Label concepts in multi-label data streams often experience drift in non-stationary environments, either independently or in relation to other labels. Transferring knowledge between related labels can accelerate adaptation, yet research on multi-label transfer learning for data streams remains limited. To address this, we propose two novel transfer learning methods: BR-MARLENE leverages knowledge from different labels in both source and target streams for multi-label classification; BRPW-MARLENE builds on this by explicitly modelling and transferring pairwise label dependencies to enhance learning performance. Comprehensive experiments show that both methods outperform state-of-the-art multi-label stream approaches in non-stationary environments, demonstrating the effectiveness of inter-label knowledge transfer for improved predictive performance. The implementation is available at <https://github.com/nino2222/MARLENE>

Published in:

IEEE International Conference on Data Mining, 2025

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Cite:

Du, Honghui, Leandro Minku, Aonghus Lawlor, and Huiyu Zhou. "Multi-Label Transfer Learning in Non-Stationary Data Streams." In IEEE International Conference on Data Mining (ICDM). 2025.

2.2.23 SplitFedEE: Balancing Communication and Accuracy

DOI / URL:

Waiting for final publication

Open Access URL:

Waiting for final publication

Abstract:

"SplitFed algorithm is a novel collaborative learning framework that enables decentralised learning of large deep architectures without the need to share sensitive raw data. However, this approach comes with a drawback of large communication overhead, as both the intermediate weights for forward propagation and gradients for backpropagation need to be regularly communicated with the server.

This paper presents an empirical evaluation of methods that have the potential to address the communication inefficiency of the SplitFed algorithm. In particular, we study Early Exit (EE) algorithms and their application in the context of SplitFed. In our empirical evaluation, we insert the EE at the last layer of the local client model and train this smaller model locally in tandem with the large model. We show that the communication overhead can be reduced even further by randomly sampling smaller subsets from the training set. We evaluate this approach on several deep model architectures across various datasets and demonstrate that this approach can significantly save on communication while maintaining the accuracy of the base model."

Published in:

International Conference on Visual Communications and Image Processing (VCIP)

Cite:

E. Duriakova, D. O'Reilly-Morgan, E. Tragos, N. Hurley, A. Lawlor, 'SplitFedEE: Balancing Communication and Accuracy', International Conference on Visual Communications and Image Processing (VCIP), December 2025, Klagenfurt, Austria.

2.2.24 OSMAC: a dynamic SMAC for data streams

DOI / URL:

Waiting for final publication

Open Access URL:

Waiting for final publication

Abstract:

"Automated machine learning (autoML) methods often require multiple passes over data and are computationally intensive, rendering them unsuitable for streaming scenarios where data is continuously generated and distributions evolve over time. The few existing autoML solutions for stream learning mainly rely on random search or genetic algorithms, which struggle to maintain high performance in dynamic environments. By contrast, leading methods in batch learning such as the Sequential Model-based Algorithm Configuration (SMAC) leverage model-based approaches, suggesting opportunities for improvement in stream

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settings. To address these challenges and meet the requirements of stream scenarios, we introduce OnlineSMAC, a model-based optimizer for data streams. OnlineSMAC combines Bayesian optimization with an extension of the SMAC optimizer to dynamically select optimal processing pipelines and hyperparameters. Our results show that this approach is highly competitive, achieving performance on par with state-of-the-art stream autoML methods. This highlights the promising potential of using Bayesian optimization for data streams."

Published in:

37th International Conference on Tools with Artificial Intelligence

Cite:

É. Royer, M. Bahri, and N. Georgantas, 'OSMAC: a dynamic SMAC for data streams', presented at the 37th International Conference on Tools with Artificial Intelligence, Athens, Greece: IEEE, Nov. 2025.

2.2.25 Ongoing publication activities

Apart from the scientific papers discussed above, a number of scientific articles are being prepared currently and will be submitted after the delivery of this deliverable:

"Exploring anomaly detection techniques in quality-diverse IoT datasets: unsupervised approaches in the absence of ground truth", Pablo Sotres, Viraj Rohit Gala, Laura Martín, Martin A. Schneider and Luis Sánchez.

2.3 Organization of workshops and sessions

Besides the publication of scientific papers, dedicated sessions have been organized in order to engage the research community with the main results and outcomes generated throughout the project.

2.3.1 IEEE CSCN 2025

SEDIMARK organized a special session during the IEEE Conference on Standards for Communications and Networking (held in Bologna, Italy, from 15th to 17th September) titled "Technologies for trustworthy sharing of enriched and interoperable data in IoT-based data spaces".

As the EU has set out a strategy towards creating trusted common data spaces aiming to become a society empowered by data and create a single market for data. The data spaces are promoting the sharing and reuse of data across companies, researchers and individuals. Data spaces are considered to bring together infrastructures and frameworks to enable easy and trusted sharing of data. To facilitate this, a number of technologies have to be developed and integrated, covering a wide range of domains, from data generation, data management and data sharing to security, interoperability and trust. Data quality, interoperability, trustworthiness and knowledge extraction are key requirements for enabling the efficient sharing of data in data spaces. Poor quality data won't be useful to be shared since the recipient will need to devote significant resources to understand and clean the data and might negatively impact their activities. Additionally, data in proprietary formats will also require significant manual conversion in order to be reused by third parties. Furthermore, providers and consumers should be provided with tools to guarantee their self-sovereignty over the transacted data. Finally, added value services to enrich the offer of data including not only raw data but also processed knowledge, are fundamental to leverage the potential of data spaces.

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The Special Session aimed to bring together experts in the areas of data management, data sharing, IoT, trust and machine learning and provide a floor for discussions on how various technologies (e.g. machine learning, artificial intelligence, semantics, DLTs, etc.) can help towards automating and improving the management, curation, enrichment, interoperability and sharing of data in IoT-based data spaces.

Four papers were accepted after thorough review from a panel of more than twenty experts who provided their reviews over the nine manuscripts that were submitted.

The session was set on Monday, September 15th and run for one and a half hours chaired by Luis Sánchez, SEDIMARK's Technical Manager.

This session has been an excellent opportunity to present some of the key results from the project as the papers presented were all describing some of the latest results and outcomes from the project. More than 20 people attended the session where a lively discussion (e.g. on integration with other frameworks like TM Forum APIs, or on availability of the datasets used for AI-enabled data processing techniques presented) was established both at the questions and answers time after each paper presentation and at the end of the session when an open discussion was organized by the session chair.



Figure 9. Special Session at IEEE CSCN 2025

2.3.2 SEDIMARK Online Webinar: Introduction to SEDIMARK toolbox

On August 11th, 2025, an online webinar was held to introduce how Data Marketplaces can be built securely around the Data Space concept.

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During the webinar, the SEDIMARK team walked the attendees through:

Technologies that are powering data marketplaces

Real-world use cases and success story

Practices applied for building trust and compliance in data sharing

The session, held virtually, as it is shown in Figure 10, which was running for 1.5 hours, was followed by 26 assistants. The feedback that was gathered helped the project to better understand potential needs from the users and interesting aspects to be included in the SEDIMARK system.

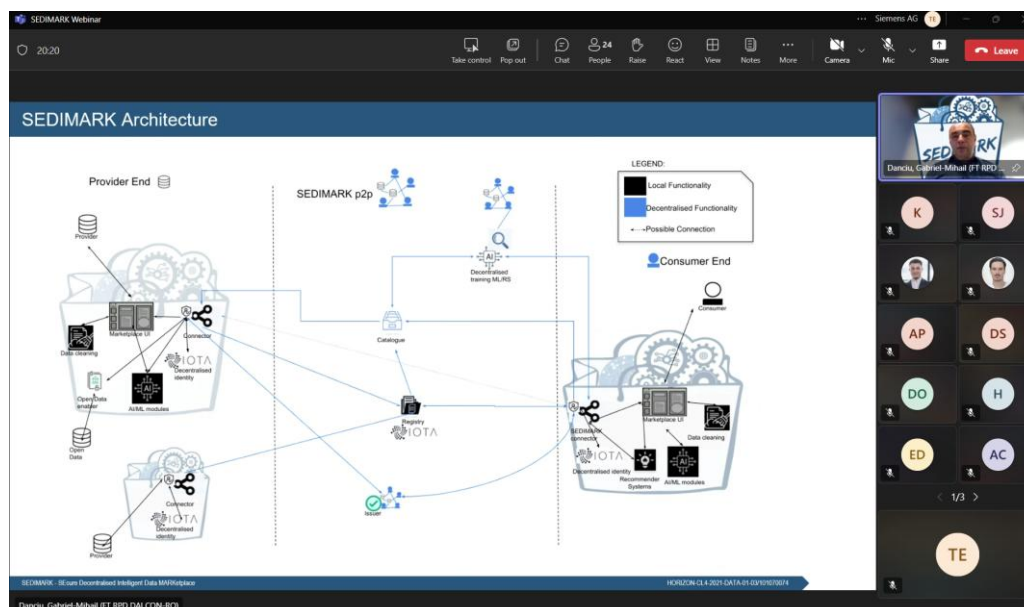


Figure 10. Screenshot from a moment during SEDIMARK Online Webinar

During the introductory part, we asked the participants to fill in a questionnaire asking about their technical background, type of organization, role in organization. The results are presented in Figure 11.

During the seminar and live demonstration of the toolbox, several key questions were raised by participants. Below is a structured response addressing each point, along with recommendations for improving the toolbox and future demonstrations.

Participants asked how to verify if nodes can be connected.

Each node should declare input/output schemas, data formats, and resource requirements.

A compatibility checker can automatically validate connections and suggest adapters (e.g., unit or format converters).

Visual cues (green ticks, warnings) would make compatibility transparent during flow design.

The audience questioned whether decentralization adds value.

Advantages are: a stronger privacy and sovereignty (data remains local); reduced latency and bandwidth usage; resilience in case of connectivity issues; and potential cost and energy savings.

The trade-offs are higher coordination complexity and the need for consistent policy enforcement.

Concerns were raised about whether edge performance can bottleneck system throughput.

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The slowest stage (edge CPU, network bandwidth, broker/storage I/O) determines end-to-end performance.

Mitigations include buffering, batch size tuning, autoscaling, offloading to fog/cloud resources, or enabling hardware acceleration.

Tooling should highlight bottlenecks with predictive profiling and live dashboards.

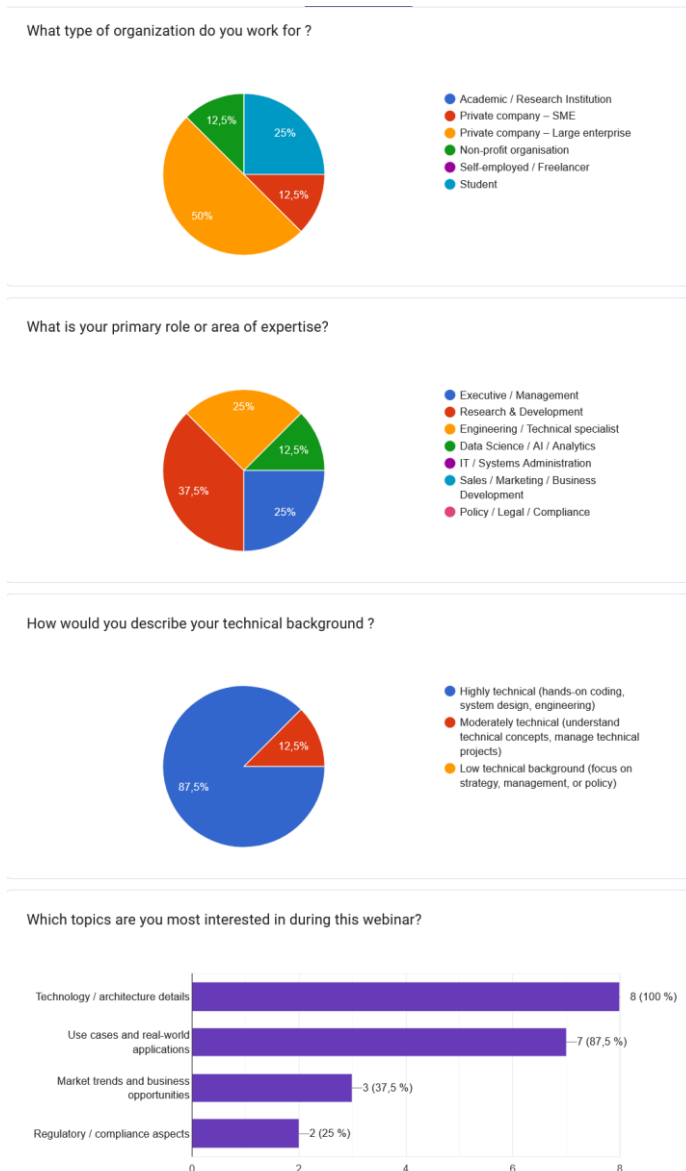


Figure 11. Participants answers to the questionnaire

Participants asked where training and processing actually take place.

There are two models:

1. Federated Learning: local model training occurs at the edge, with aggregation handled by a coordinator (central or hierarchical).
2. General computation: placement (edge, fog, or cloud) depends on policies combining data sensitivity, available resources, and cost/carbon metrics.

Finally, questions addressed how pipelines are deployed end-to-end.

Pipelines are declared in a portable specification (e.g., YAML/CWL).

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Preflight checks validate schema compatibility, resource fit, and policies.

Deployment includes monitoring, lineage tracking, and bottleneck detection.

Together, these enhancements will make the toolbox more transparent, reliable, and scalable, while simplifying pipeline design and execution across edge, fog, and cloud environments.

2.4 SEDIMARK Hackathon

In order to open the tools and systems that have been integrated throughout the project, mainly the SEDIMARK Platform and Marketplace, integrated within WP5, one hackathon was organized so that we could have direct feedback from external users that interacted with the main SEDIMARK outcomes. Besides being a way of communicating and disseminating the work that has been carried out in the project, this activity has been instrumental for demonstrating the actual integration of the SEDIMARK Platform and Marketplace, as well as for pushing us into maximizing the system usability and subsequent impact generation, and to allow us deriving significant insights on whether we have achieved high usability standards.

The SEDIMARK: Data4Mobility Hackathon was organized on 23rd to 25th September 2025. As part of the SEDIMARK project, in which Santander City Council and the University of Cantabria are participating, a hackathon was held inviting developers, designers, urban planners and data experts to explore the future of sustainable mobility in cities through the power of data. Participants had access to the tools developed by the project to share real-world urban data and datasets, and were able to discover how the exchange of reliable data through the SEDIMARK Data Marketplace can drive innovation in mobility, the environment and urban planning.

The initiative was organized to be ideal for developers, data scientists, researchers, and anyone interested in smart cities, sustainability, mobility, advanced data ecosystems, or SEDIMARK Data Market technologies. However, it was open to anyone who were curious about exploring data applications and wants to develop innovative ideas using data as a foundation.

The main objective for the SEDIMARK Data4Mobility Hackathon is to revolve around the data catalogues available in the Data Marketplace developed in the SEDIMARK project. These include real urban datasets related to sustainable mobility, places of interest in cities, traffic flows and air quality, not only in the city of Santander but also in other Spanish and European cities. Participants have had the opportunity to experiment with static and real-time data to jointly create services and ideas for smarter and more sustainable urban mobility. The Data4Mobility Hackathon invited both experts and students to participate in real-world challenges, using real data from Santander and other European cities to create prototypes of solutions that support urban development.

2.4.1 Data4Mobility Hackathon objectives

The aim of the hackathon was to demonstrate how decentralised data exchange can drive smarter and more efficient urban services. During the hackathon, participants were required to:

Use the SEDIMARK Data Marketplace together with the tools developed within it.

Propose and develop solutions for the integration and visualisation of geospatial data sets.

Propose and develop applications and services that contribute to more sustainable urban mobility.

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The results that participants presented ranged from conceptual solutions or use case ideas to the materialisation of these in prototypes of their projects/ideas.

Hackathon's participants were mainly using the tools developed in the SEDIMARK project to search for and obtain the datasets available in the Data Marketplace that has been built as part of the project.

Technical training, documentation and details about the available datasets were provided to participants at the start of the hackathon, examples from these datasets are:

The journeys made with TUEBICI service bicycles between October 2024 and February 2025.

The evolution of the availability of TUEBICI service bicycles at their stations (both historical and real-time data).

The availability of public bicycles in more than 20 Spanish cities.

The position of TUS buses.

Information and location of tourist points of interest in Santander and three other Spanish cities.

In addition, during the hackathon, a team of developers from the SEDIMARK project were available to answer questions and provide support to participants in all matters relating to the use of the tools and datasets of the SEDIMARK Data Marketplace, both on site and through telematic channels that were made available for this purpose.

The jury that was formed to select the winners were made up of an interdisciplinary panel composed of municipal technicians, urban mobility researchers, data analysis specialists and representatives from the technology sector. The members of the panel of reviewers were as follows:

Miguel Ángel Esbri, Project Manager at ATOS, SEDIMARK Project Coordinator

Amaya Landín, Director of "Centro de Iniciativas Empresariales" Santander

Sonia Sotero, New Technologies Department at Santander Municipality

Luis Sánchez, Professor at Universidad de Cantabria, SEDIMARK Technical Coordinator

The evaluation criteria that were used were as follows:

Impact on sustainable mobility: The extent to which the proposed solution contributes to improving sustainable urban mobility; Potential to reduce emissions, improve accessibility or promote alternative modes of transport.

Innovative use of data: Effective and creative use of available data sets (provided by the project or publicly available); Ability to extract relevant knowledge and convert it into value for citizens.

Originality and innovation: Level of novelty of the proposed solution; Creative approaches to solving current or emerging challenges in urban mobility.

Technical feasibility: Robustness (functional prototype, architecture, scalability) and state of technical development (idea/functional sketch, alpha version); Appropriate use of technologies and tools.

Presentation and communication: Clarity and effectiveness of the final presentation to the jury; The team's ability to explain the problem, the proposed solution and its impact.

2.4.2 Data4Mobility Hackathon execution details

One of the key preparatory steps prior to the hackathon launch was the drafting and approval of the official competition rules. This process followed the administrative procedures established at the municipal level.

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First, the document was reviewed by the Legal Department, which issued the corresponding report. It was then examined by the Municipal Oversight Department. After receiving both favourable reports, the document was approved by the Local Government Board.

Once the bureaucratic process was completed, the competition rules were officially published, and promoted through the designated communication channels, marking the launch of the hackathon's public announcement. The hackathon rules are available on the municipal website via the following link [basesparticipacionhackatondata4mobility - sedimark 0.pdf](#)

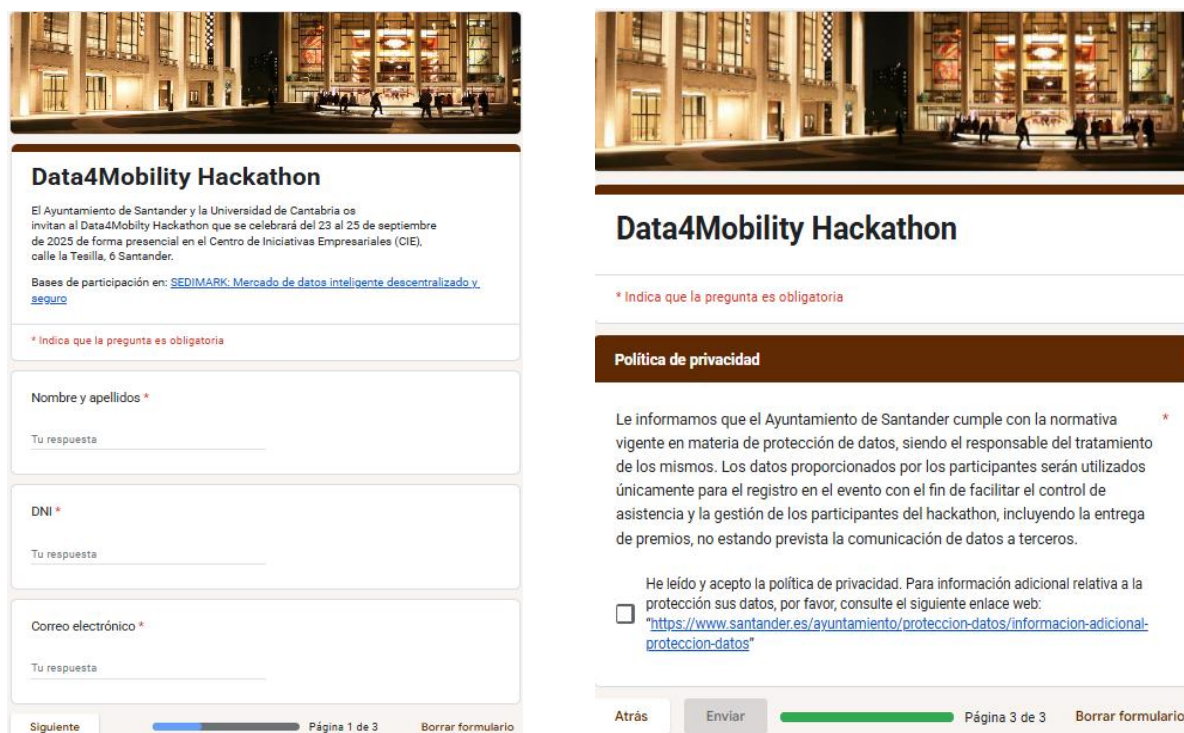
Another essential preparatory task was the creation of the registration form for prospective hackathon participants. To ensure compliance with the General Data Protection Regulation (GDPR), the process was carried out in collaboration with the Municipal Data Protection Officer. Security measures were implemented in accordance with Annex II (Security Measures) of Royal Decree 3/2010, of January 8, which regulates the National Security Framework in the field of Electronic Administration. These measures are documented within the Information Security Policy of the Santander City Council.

The registration form collected only the minimum personal data required to identify participants: full name, ID number (DNI), and email address (used for communication purposes related to the event).

The form was accessible via a web link (<http://rebrand.ly/sedimark>) and was structured into two sections:

1. Personal data of the participant or team (teams could consist of up to two member) can be seen in Figure 12, on the left-hand side.
2. Privacy policy, presented in a two-layer format as can be seen in Figure 12, on the right-hand side:
 - The first layer, visible directly on the form, included basic data protection information such as:
 - Data Controller: Santander City Council.
 - Purpose: management of participant data, including attendance control and prize distribution.
 - Data Sharing: no data transfers to third parties are foreseen.
 - The second layer, with more detailed information, was available via a dedicated URL at the municipal website (https://www.santander.es/sites/default/files/informacion_adicional_sedimark_data4mobility_hackathon_2a_capa.pdf).

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Data4Mobility Hackathon

El Ayuntamiento de Santander y la Universidad de Cantabria os invitan al Data4Mobility Hackathon que se celebrará del 23 al 25 de septiembre de 2025 de forma presencial en el Centro de Iniciativas Empresariales (CIE), calle la Tesilla, 6 Santander.

Base de participación en: [SEDIMARK: Mercado de datos inteligente descentralizado y seguro](#)

* Indica que la pregunta es obligatoria

Nombre y apellidos *

Tu respuesta

DNI *

Tu respuesta

Correo electrónico *

Tu respuesta

Siguiente

Página 1 de 3

Borrar formulario

Data4Mobility Hackathon

* Indica que la pregunta es obligatoria

Política de privacidad

Le informamos que el Ayuntamiento de Santander cumple con la normativa vigente en materia de protección de datos, siendo el responsable del tratamiento de los mismos. Los datos proporcionados por los participantes serán utilizados únicamente para el registro en el evento con el fin de facilitar el control de asistencia y la gestión de los participantes del hackathon, incluyendo la entrega de premios, no estando prevista la comunicación de datos a terceros.

He leído y acepto la política de privacidad. Para información adicional relativa a la protección sus datos, por favor, consulte el siguiente enlace web: ["https://www.santander.es/ayuntamiento/proteccion-datos/informacion-adicional-proteccion-datos"](https://www.santander.es/ayuntamiento/proteccion-datos/informacion-adicional-proteccion-datos)

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Atrás

Enviar

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Borrar formulario

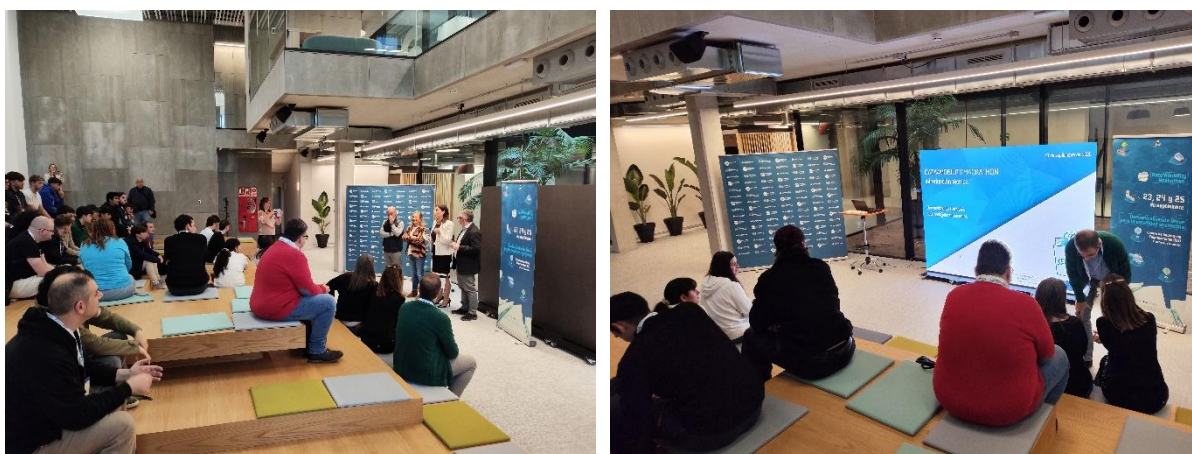
Figure 12. Screenshots of the DATA4MOBILITY HACKATHON registration form.

Registration could only be completed if the participant selected the checkbox *I have read and accept the privacy policy*, thereby providing informed consent. Finally, in compliance with GDPR regulations, all collected personal data was deleted once the hackathon concluded.

A total of 34 participants registered to the Hackathon. They were allowed to team in pairs.

The Mayoress of Santander and the Vice-Chancellor for Research and Innovation from the University of Cantabria were at the opening ceremony. Afterwards, all the registered participants were involved in a three hour introductory session in which they were presented with the SEDIMARK Marketplace tools that they could use during the hackathon. Once the technical introduction finished, they were ready to start working in their ideas/projects.

Throughout the two days that they had to develop their projects; members of the project were providing their support in the utilization of the SEDIMARK Platform. Figure 13 shows several moments during the hackathon.



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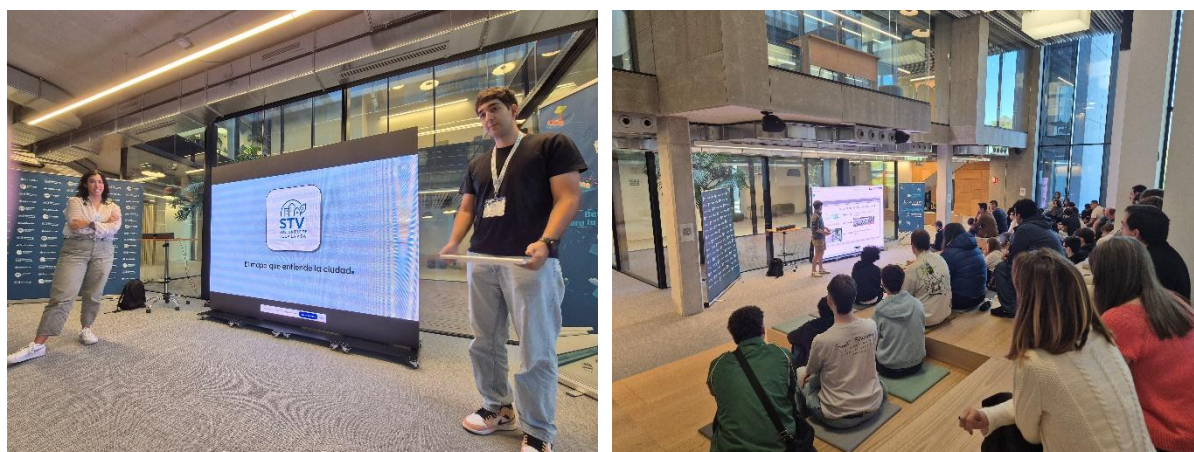
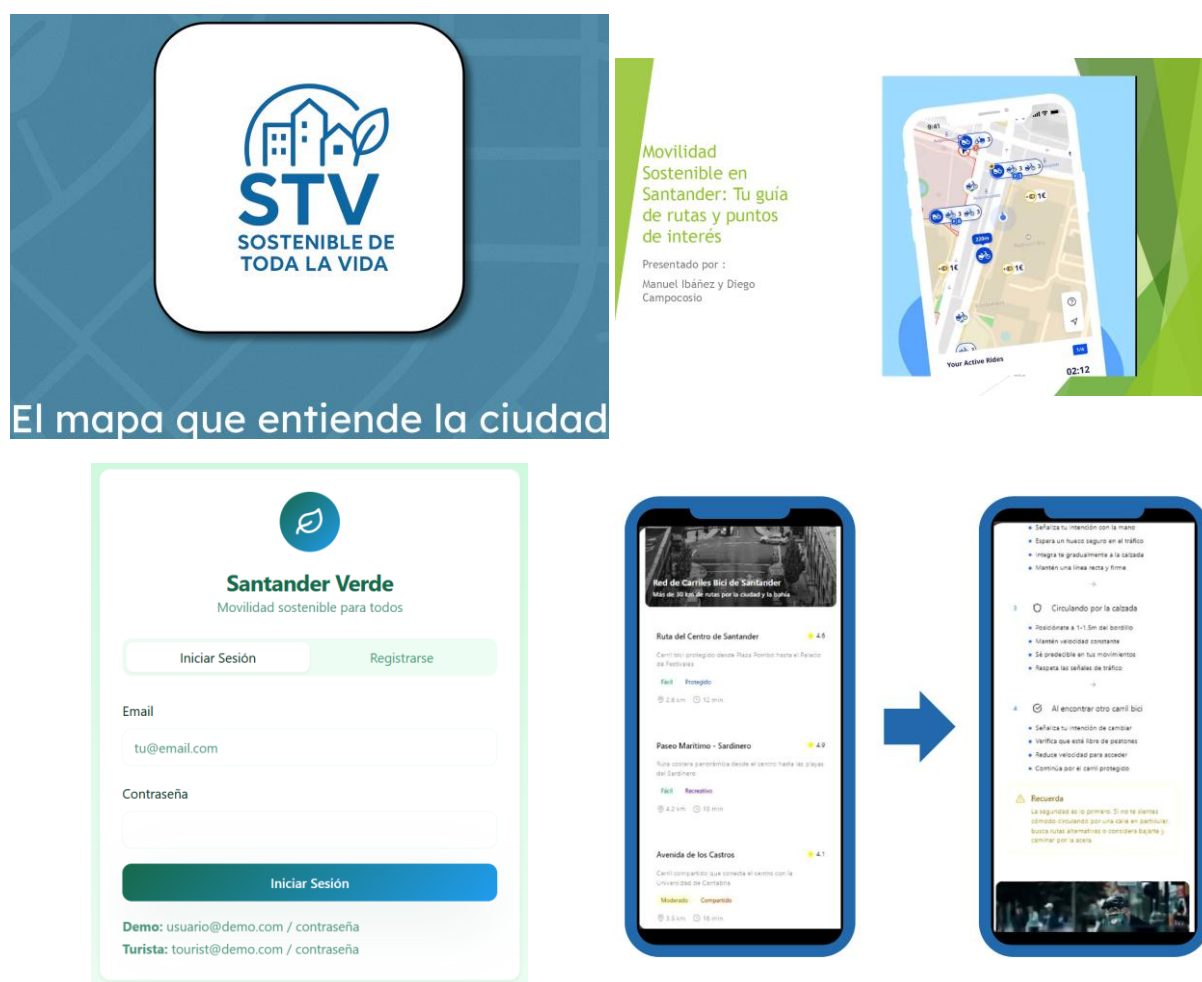


Figure 13. DATA4MOBILITY HACKATHON venue and participants

Out of the 34 participants, a total of 8 teams (accounting 13 people) reached the step of formally presenting their projects. Figure 14 shows some excerpts of the projects presented.



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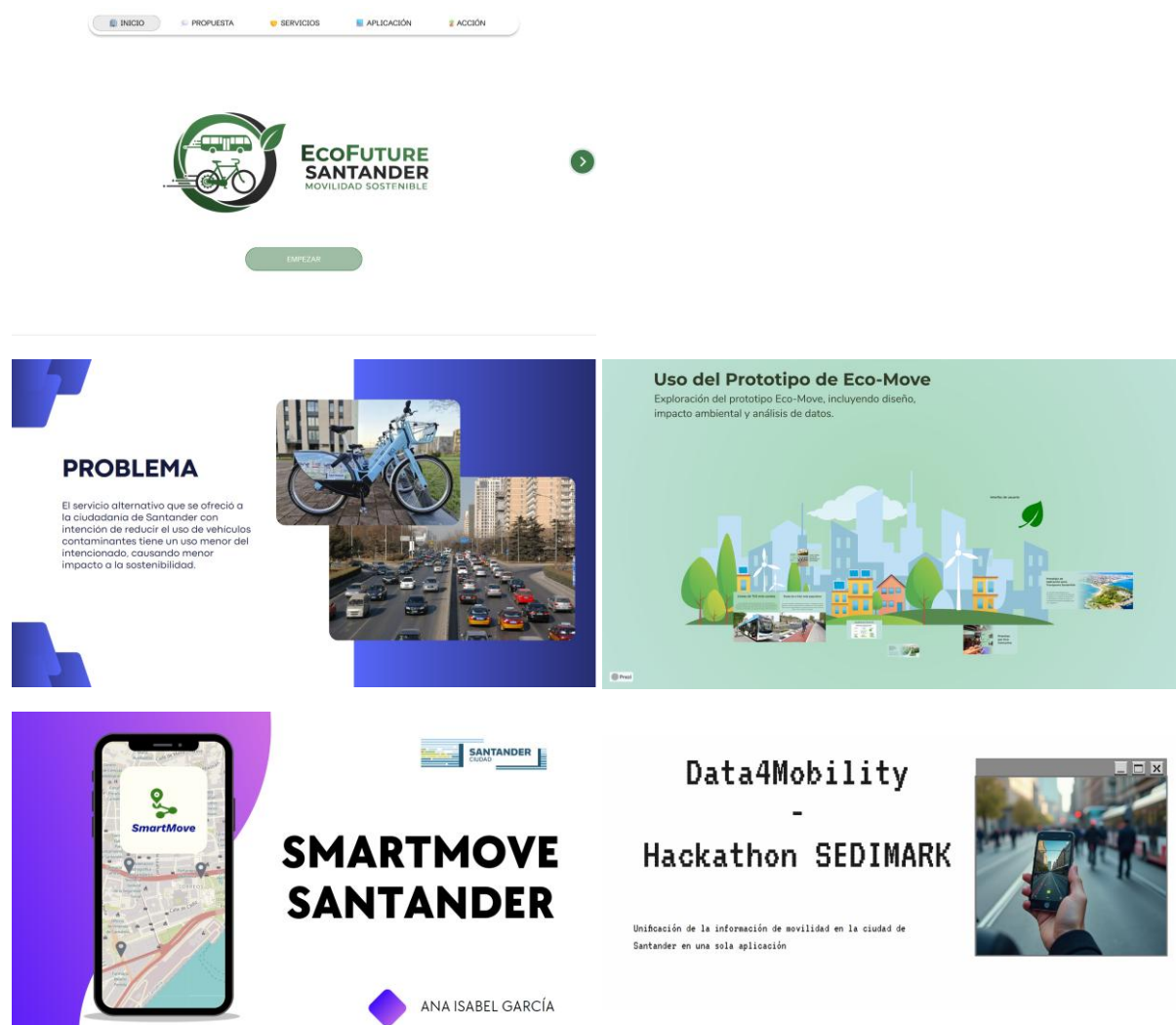
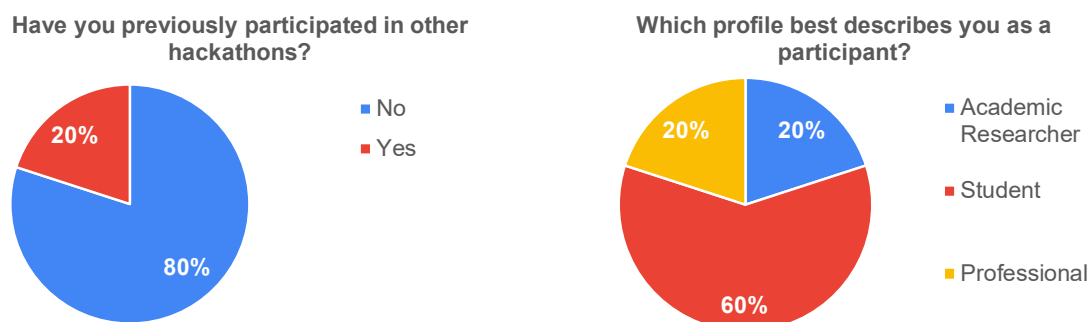


Figure 14. DATA4MOBILITY HACKATHON venue and participants

After the completion of the hackathon, participants were invited to fill out a questionnaire to get feedback from them.

As it can be seen in Figure 15, most of the participants had no experience on previous hackathons but had quite some experience on software development whether as students or professionally.



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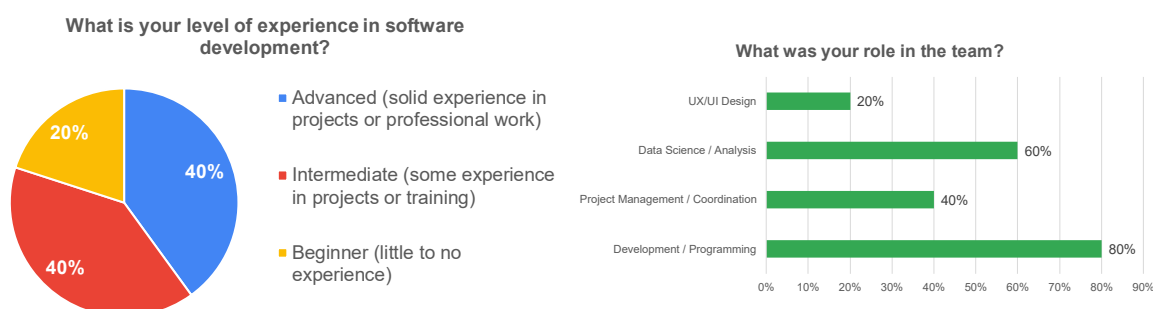


Figure 15. DATA4MOBILITY HACKATHON participants' profiles

Pertaining to the actual feedback on the SEDIMARK Platform utilization, as it can be seen in Figure 16, participants have given good marks in terms of usability and user friendliness, positively assessing the key functionalities of the SEDIMARK Platform.

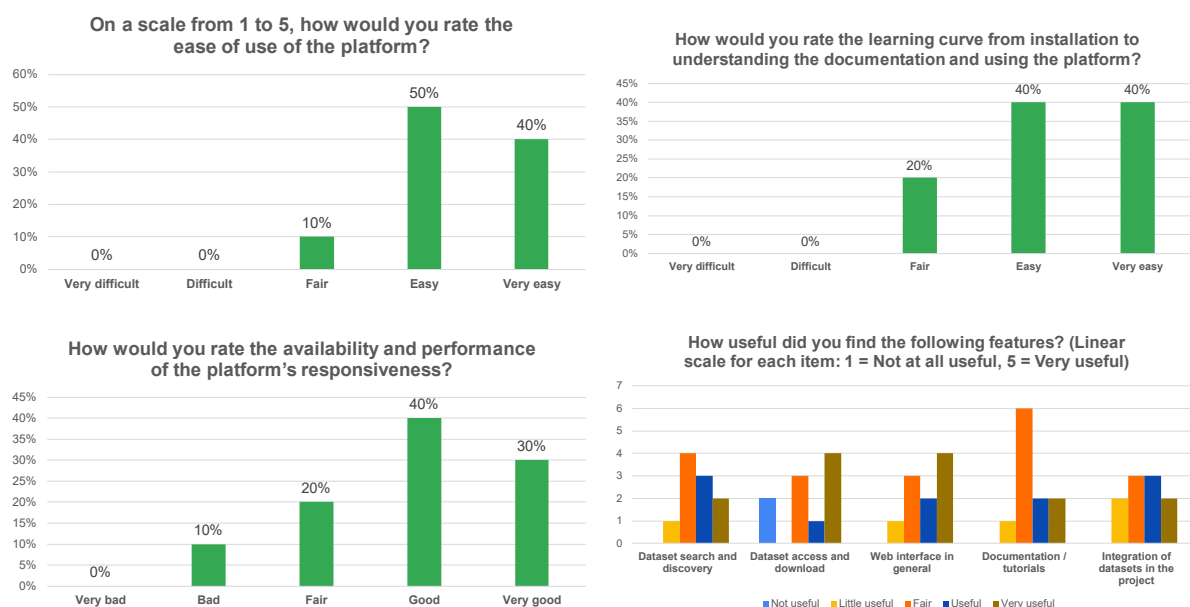


Figure 16. DATA4MOBILITY HACKATHON participants' evaluation of the SEDIMARK Platform

In terms of the available datasets, they were also positively evaluated, as it is shown in Figure 17.

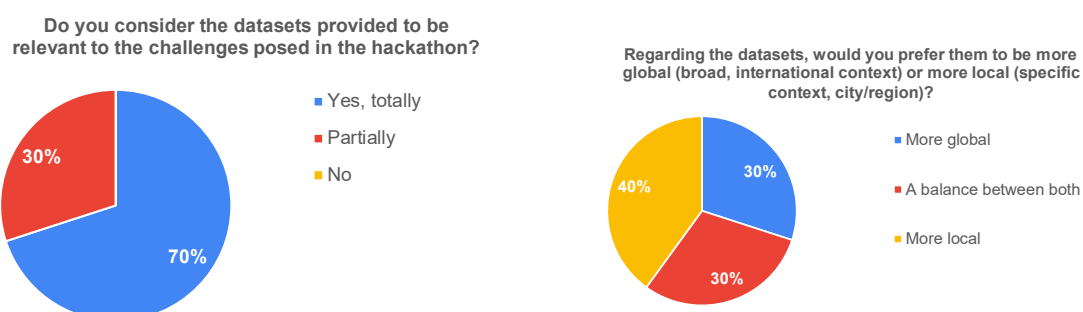


Figure 17. DATA4MOBILITY HACKATHON participants' evaluation of the available datasets

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In global terms, both the overall experience and the value of the SEDIMARK Platform and Marketplace have been positively assessed, as it is shown in Figure 18

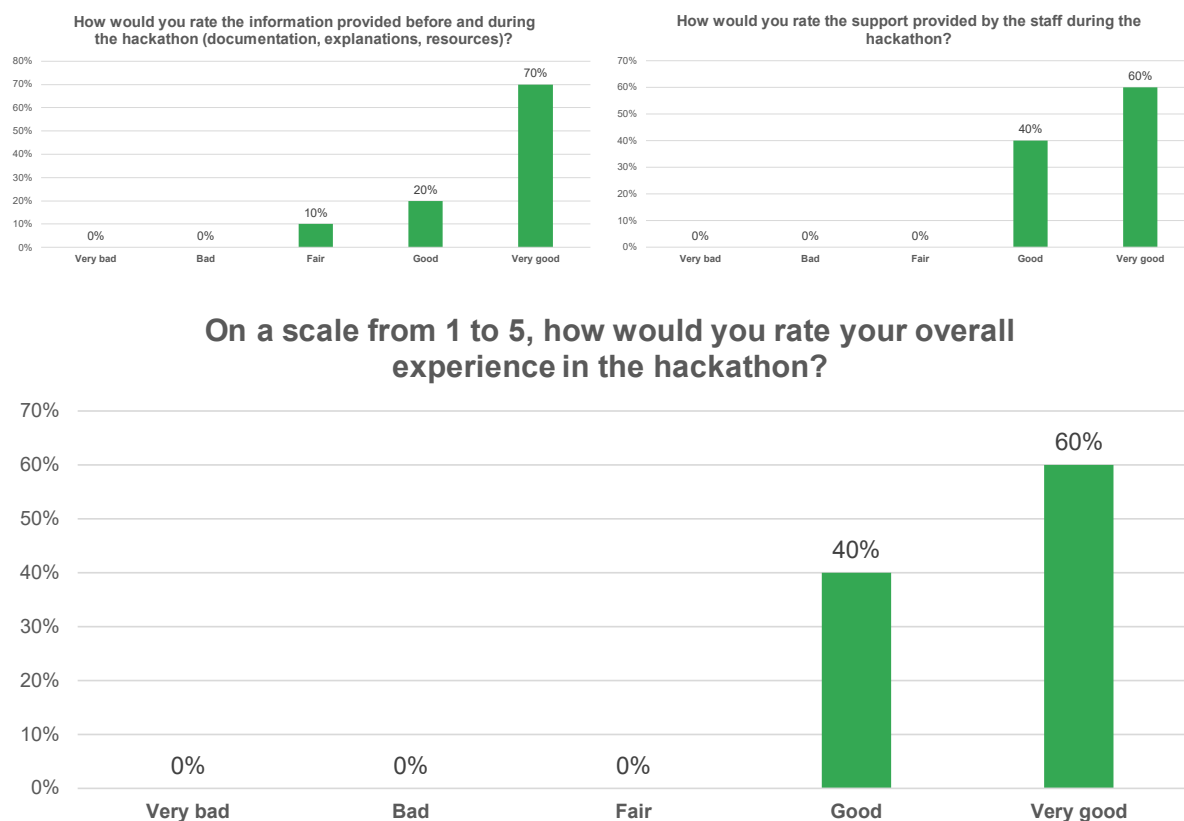


Figure 18. DATA4MOBILITY HACKATHON participants' overall evaluation

Finally, from the project standpoint, the hackathon was an excellent opportunity to get some valuable feedback from real users as well as from real usage of the tools integrated within the SEDIMARK Platform. In this sense, some performance scalability aspects were experienced during the initial moments, when most of the participants were using the most demanding functionalities. This situation was solved by adding some more computational power to the infrastructure where the providers' Platform were deployed, reaching a grade of service that was considered sufficient by the participants. Furthermore, several requests for additional datasets were received. While it was not possible to address these requests during the hackathon, it is a clear indication about the benefits from integrating as many and as heterogeneous datasets possible on a single platform.

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2.5 Participation on events, trade fairs and exhibitions

Over the last 18 months of the project, SEDIMARK has been present at numerous events, trade fairs and exhibitions, presenting both its objectives and the results achieved to date. In Table 3 a list of all the events in which it has participated in is shown, along with a brief description and other details.

2.5.1 Engagement activities with research community and industrial fabric

Table 3. Events, Trade Fairs and Exhibitions.

Event Name	Event Date	Participant	Type of event	Audience	Where	Description
Meeting with Eclipse Foundation about Data Spaces	27/06/2024	Luis Sánchez, Pablo Sotres, Jorge Lanza (UC)	Other	Researchers / Other EU Projects	Santander (Spain)	During the meeting, Eclipse Foundation representative, Javier Valiño, presented the latest advancements made by the Data Space WG. Their mission is to promote the global use of dataspace technologies, supporting the development and maintenance of secure data-sharing ecosystems. We also discussed SEDIMARK's initiatives in creating technologies for decentralized and secure data exchange.

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Event Name	Event Date	Participant	Type of event	Audience	Where	Description
General Assembly of the Network of Spanish Cities for Climate	12/06/2024	Gema Igual (Santander's mayoress), Margarita Rojo (environment and technical services city councillor) (SDR)	Congress / conference	General	Seville (Spain)	The city of Santander has been awarded for its Local Good Climate Practices related to initiatives such as the replacement of street lighting, the construction of municipal buildings and social housing with maximum energy efficiency, the deployment of the 17 vertical mechanical routes, the construction of 33 kms of bicycle lanes and the new electric bicycle rental system.

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Event Name	Event Date	Participant	Type of event	Audience	Where	Description
Smart cities and smart tourist destinations	17/06/2024	Gema Igual (Santander's mayoress), Veronica Gutierrez (General Director for municipal innovation) , Alvaro Lavin (Councillor for innovation) , Belen Dominguez (General Director for Environment) ; Celia Gilsanz, Sonia Sotero and Juan Echevarría (Innovation Technicians) (SDR)	Congress / conference	General	Santander (Spain)	The Mayoress of Santander took part in the round table on 'Challenges and opportunities in the digitalisation of cities', explaining the work carried out in the city to become a smart city through the use of new technologies, improving municipal services, the quality of life of citizens and the experience of tourists. Through the implementation of city-scale projects and extensive participation in European innovation projects the city is becoming more sustainable, energy efficient and better managed multimodal transport. 17-19/06/2024

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Event Name	Event Date	Participant	Type of event	Audience	Where	Description
2nd Technical Committee RECI 2024	20/06/2024	Veronica Gutierrez (General Director for municipal innovation), Alvaro Lavin (Councillor for innovation) ; Celia Gilsanz, Sonia Sotero and Juan Echevarría (Innovation Technicians) (SDR)	Congress / conference	General	Santander (Spain)	Santander city council hosted the 2nd technical committee RECI. During the first day, several round tables were held on topics related to the importance of data governance, digital twins, the cities of the future, as well as speakers from service providers and technological solutions... During the second day, municipal technicians shared the good practices developed related to energy efficiency and the environment, urban mobility, cybersecurity and citizen participation. 20-21/06/2024
SEDIMARK in DSSC (Data quality in SEDIMARK)	13/06/2024	NUID UCD and UC	Workshop	Researchers / Other EU Projects	Online (Data Spaces Support Centre)	Delivered a presentation in the DSSC periodic meeting regarding how data quality is managed within SEDIMARK presenting the data curation pipeline and the data quality annotations
Introducing SEDIMARK to Aqua Valley		Franck Le Gall (EGM)	Congress / conference	Researchers / Other EU Projects		The pitch by EGM was about data exchange in the water-agriculture joint domains. About 20-30 participants

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Event Name	Event Date	Participant	Type of event	Audience	Where	Description
Energy Efficiency and Manufacturing Conference	13/06/2024	WINGS	Congress / conference	Researchers / Other EU Projects		WINGS participates in and exploits its developments in SEDIMARK in relation to the creation of a secure decentralized data marketplace for the energy sector with high quality data on edge based on blockchain and AI
Total Digital Transformation conference	19/03/2024	WINGS	Congress / conference	Industry		WINGS participates in and exploits its developments in SEDIMARK in relation to the creation of a secure decentralized data marketplace for the energy sector with high quality data on edge based on blockchain and AI
European Big Data Value Forum	04/10/2024	Luis Sánchez (UC)	Trade fair / Exhibition	General	Budapest (Hungary)	SEDIMARK main outcomes were presented alongside professionals, researchers, policymakers and other stakeholders, exploring the most recent developments and reflections in Data and AI. They were compared with DSSC reference Building Blocks.
ETSI ISG CIM Plenary Meeting (Consuming, exposing and evaluating quality of datasets)	09/10/2024	Laura Martín (UC)	Workshop	Researchers / Other EU Projects	Madrid (Spain)	SEDIMARK overall target and specifically the activity on data quality management and annotation was presented. Moreover, data and services modelling ontology for Offerings discovery (based on DCAT-AP and other well-known ontologies) was also presented.

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Event Name	Event Date	Participant	Type of event	Audience	Where	Description
COMFORTAge plenary Meeting (Open day of the general assembly)	15/11/2024	Gabriel Danciu (SIE)	Congress / conference	Researchers / Other EU Projects	Bucharest(Romania)	SEDIMARK overall target, architecture and specifically the activity was presented. SEDIMARK could provide a solution for the transfer of health related datasets from one clinical facility to another.
Gaia-X SUMMIT Helsinki	14-15/11/2024	Eero Jalo (FV)	Congress / conference	Industry	Helsinki (Finland)	Gaia-X Summit 2024: Empowering global data spaces – shaping tomorrow’s cloud infrastructure
AQUATECH 2025 - Water Projects Europe	12/03/2025	Luis Sánchez (UC)	Congress / conference	General	Amsterdam (The Netherlands)	SEDIMARK value proposition for the creation of a unified, interoperable digital twin of the hydrosphere, from inland waters to oceans, which can be facilitated by the creation of an ecosystem for efficient data management (in particular for Water Data Management).
Connected territories (https://www.rex-tcd.fr/)	18/03/25	Franck Le Gall (EGM)	Congress	Public authorities	Paris (France)	Invited to provide a Keynote speech on “What interoperability mechanisms for the systems and data of a Connected and sustainable Territory project?”
Workshop Dataliike	30/04/2025	Eero Jalo (FV)	Workshop	Data ecosystem Workshop	Helsinki (Finland)	Presentation of SEDIMARK Helsinki pilot. Workshop for enhancing collaboration, data governance, policy development, and data ecosystem value creation. 8 participants

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Event Name	Event Date	Participant	Type of event	Audience	Where	Description
Imagine 2025 The Cityverse, Tampere	27/05/2025	Eero Jalo (FV)	Congress / conference	Industry	Tampere (Finland)	
SEDIMARK in DSSC (SEDIMARK Ontology)	03/04/2025	SURREY, UC	Workshop	Researchers / Other EU Projects	Online	Delivered a presentation in the DSSC periodic meeting (22nd meeting - Technology TG) regarding SEDIMARK's ontology
Transport Data Ecosystem Working Group at Fintraffic	Continuous	FV	Workshop	Transport Data Ecosystem Working Group	Helsinki (Finland)	A continuous working group (https://www.fintraffic.fi/fi/liikenteendataekosysteemi/liikenteen-ekosysteemin-tyoryhmat)
“Cimes durables”	17- 18/06/2025	Gilles Orazi, Pierre Michem (EGM)	Exhibition / Workshop	Local ecosystem of industries industries and public authorities	Les Orres (France)	The CIMES Durables event was a strategic gathering focused on the future of mountain resorts amid ecological, energy, and digital transitions, bringing together public, industrial, and innovative stakeholders around three key challenges: tourist housing renovation, decarbonization and energy management, and intelligent water management. While public territories are not yet fully prepared for advanced data marketplace platforms, there is clear willingness for interoperability and sovereignty.

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Event Name	Event Date	Participant	Type of event	Audience	Where	Description
Women in IR poster sessions as part of the SIGIR conference	16/07/2025	Erika Duriakova (NUID UCD)	Poster session	Researchers / Other EU Projects	Padova, Italy	Presentation of women at various stages of career in the IR domain.
Open Source Community Day	23-24/09/2025	Tarek Elsaleh (SURREY)	Community session: Presentation , Exhibition	Industry Researchers / Other EU Projects	Madrid (Spain)	This event, organized by ECLIPSE Foundation and CEI-Sphere, provides a unique opportunity for EU-funded projects to engage directly with the open source community—offering a space to connect, collaborate, and exchange ideas. SEDIMARK presented the SEDIMARK Platform and the components that have been developed. Its integration with the Eclipse Data Space Connector makes it a direct interaction with the developers' community created around the Eclipse Foundation projects.

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Event Name	Event Date	Participant	Type of event	Audience	Where	Description
Université de la Transition Numérique des Territoires	16-17/09/2025	Franck Le Gall (EGM)	Exhibition	Public authorities	Dijon - France	The 10th UTNT (Université de la Transition Numérique des Territoires) event was focused on key themes that directly align with SEDIMARK's objectives, particularly through workshops on digital twins ("Jumeau numérique: du rêve à la réalité !") and territorial digital transformation that emphasize data interoperability and sovereignty. The conference's emphasis on connected and sustainable territories, along with discussions about artificial intelligence as an accelerator for solutions, provided an ideal context to explore how SEDIMARK's decentralized data marketplace could support French territorial digital initiatives.
INPACE Virtual Fair		Luis Sánchez (UC)	Workshop	Industry Researchers / Other EU Projects	On-line	Presentation of the SEDIMARK Marketplace in an event designed to connect mature European and Indo-Pacific innovations in order to showcase solutions to an international audience through a presentation and dedicated visibility in the virtual environment.

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2.5.2 Communication to users, citizens and other stakeholders

As part of the communication activities carried out by the partners, several bilateral interactions have been carried out in which the SEDIMARK objectives and activities have been shared with end users and decision makers globally. This kind of bilateral interactions have been mainly produced in the framework of the SEDIMARK pilot cases in which, for example, in the case of Santander, several delegations from around the world (e.g. Japan, Korea) have get in contact with Santander's Municipality in order to get acquainted in the Smart City model that Santander is developing, and, in particular, the application of data spaces and data marketplaces in such a model.

Moreover, a series of different meetings with Smart City associations and other stakeholders have been also carried out. For instance, in Helsinki, the project and its Smart Mobility pilot have been introduced to the city's urban environment department; and the VTT Technical Research Centre of Finland. Similarly, Santander has also introduced the project and its goals during the periodical technical meetings carried out by the Spanish Network of Smart Cities (RECI).

2.6 Other Publications and Dissemination Materials

A number of dissemination materials have been provided to project participants and interested parties to act as multipliers in disseminating the results and impact of the tools implemented in SEDIMARK. All these materials can be accessed or downloaded to be used in online or physical events, such as the SEDIMARK first roll-up shown in Figure 19.

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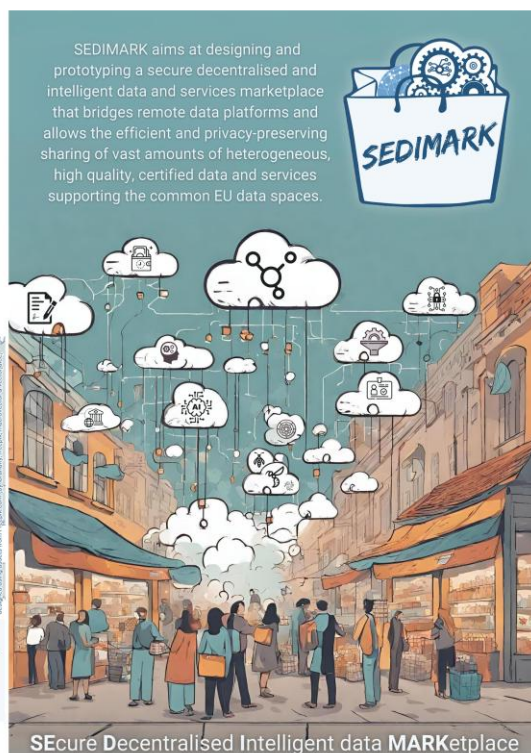


Figure 19. SEDIMARK's first roll-up.

These materials include a roll-up and leaflet, with a general overview of the project (see Figure 20), as well as a brochure explaining the first technical results of the project, including the SEDIMARK architecture and the system view. This brochure is shown in Figure 20.

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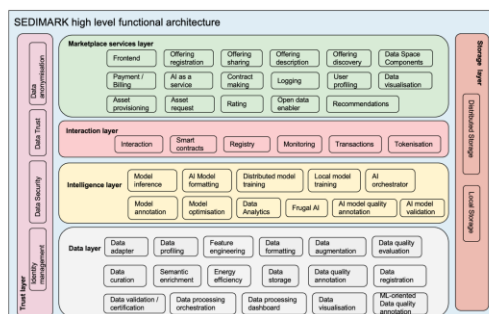
Marketplace Use Cases...



SEcure Decentralised Intelligent data MARKetplace

Features and functionalities	
Marketplace	Decentralised
Data/services publication	Distributed storage
Data/services discovery	Federated repositories
Value exchange	Edge access
Intelligent	Secure
Data interoperability	Identities (provenance, reputation)
Semantic annotation (metadata)	Data exchange
AI-based data enrichment (quality, linkage, augmentation)	Trustworthiness (access control, usage control, logging)
Energy efficiency	Data storage & data sovereignty
Added-value as a Service	

SEDIMARK merges the expertise of a large team of experts to build a secure, trusted and intelligent decentralised data and services marketplace, based on Distributed Ledger Technology and Artificial Intelligence. SEDIMARK enables distributed heterogeneous data within the EU to be easily and seamlessly linked, shared and exploited for diverse business and research scenarios.



SEcure Decentralised Intelligent data MARKetplace

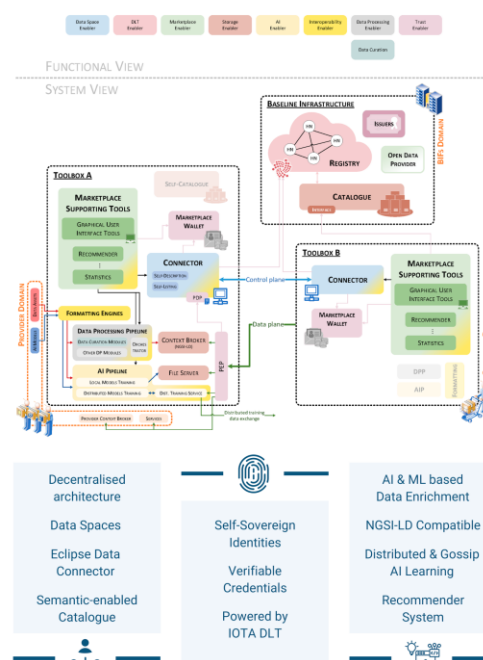


Figure 20. SEDIMARK's first technical brochure.

Furthermore, an additional technical brochure has been created gathering some of the key results from the project which have been used as handover to be distributed on the latest events that have been organised by or attend by the project partners (e.g. IEEE CSCN 2025). This brochure is shown in Figure 21.

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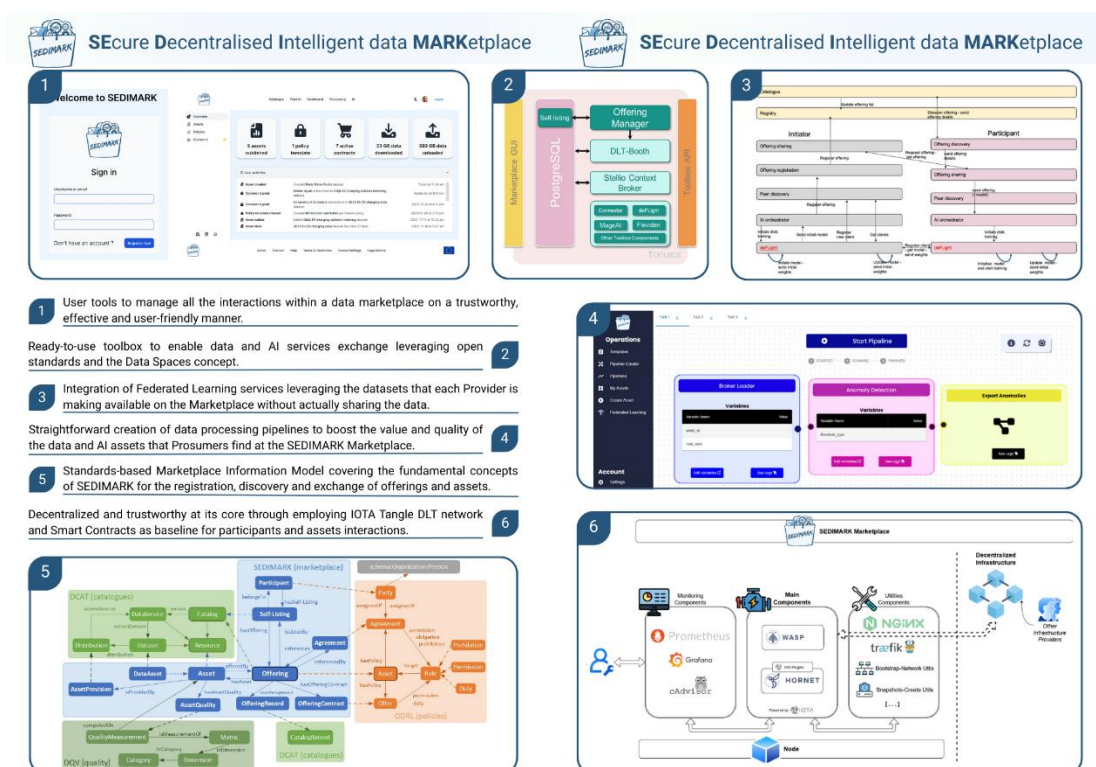


Figure 21. SEDIMARK's final technical brochure.

On the other hand, a set of three videos have been created to disseminate the project and its use cases. These videos are intended to be shared through social networks, emailing or simply

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in events where SEDIMARK can be present through any of its partners, such as the Smart City Expo.

The videos have been created to describe and disseminate the use cases of SEDIMARK, the Smart Mobility [4], the Water Valorisation [5], and the Energy Data Valorisation [6] use cases. Figure 22 shows the thumbnails of the videos, which can be found in the project webpage as well.

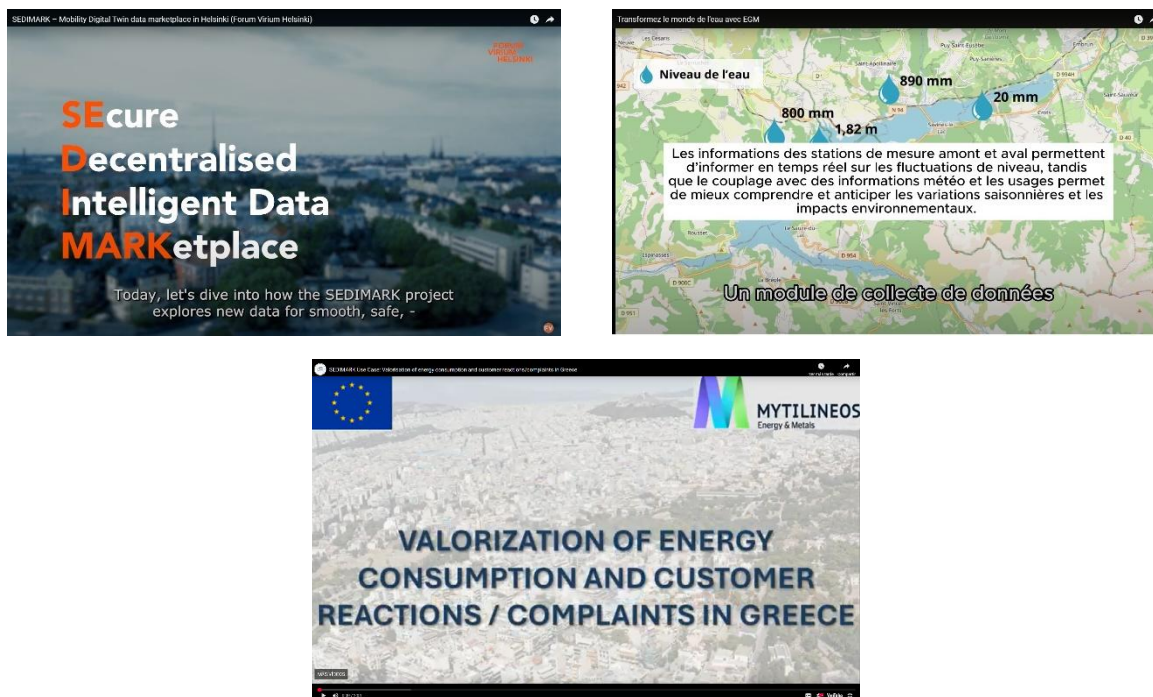


Figure 22. SEDIMARK Use Cases Videos

Furthermore, high-level multimedia materials have been also prepared in order to provide a general introduction to the project and its objectives. The first video [7] consists in an interview of SEDIMARK's project coordinator introducing the project and the consortium, the four use cases and its main goals. Likewise, a second video [8] was produced to disseminate the project at local level in Cantabria, Spain, with a short interview in Spanish to the technical coordinator of SEDIMARK. Both videos' thumbnails are shown in Figure 23.



Figure 23. SEDIMARK video interviews.

Moreover, a series of practical videos have been created showing the key procedures that can be carried out within the SEDIMARK Marketplace so that users can follow them to have a quick introduction to the SEDIMARK integrated system and its functionalities. These videos, shown

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in Figure 24, have been extensively used within the training activities that have been arranged during the hackathons that the project has organized.

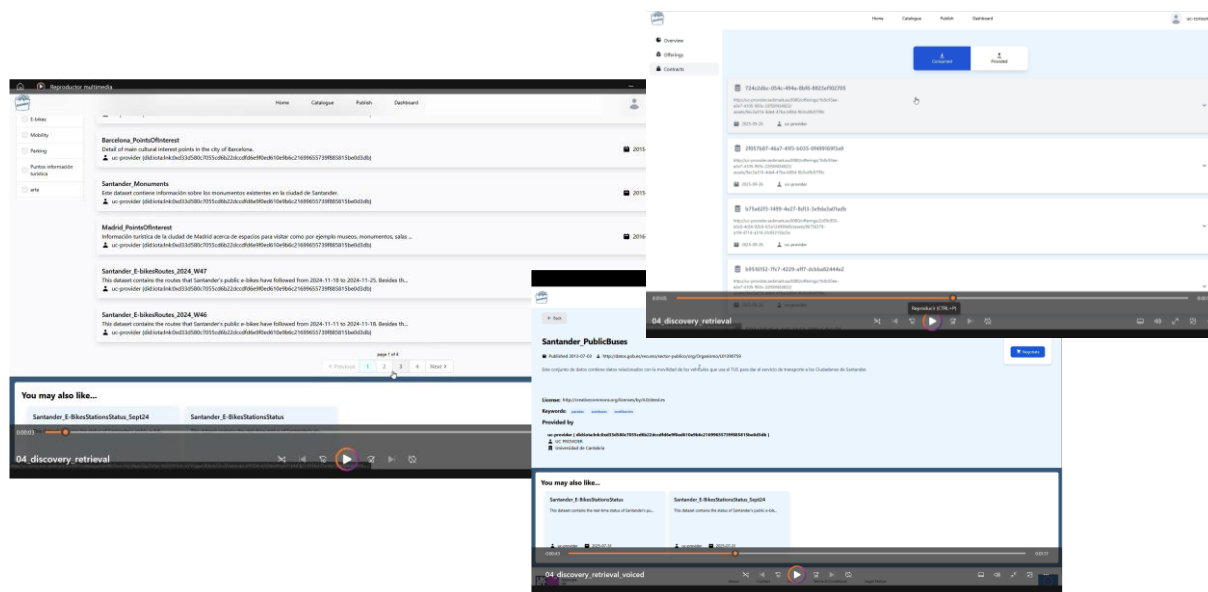


Figure 24. SEDIMARK Marketplace procedures videos.

Finally, for the hackathon that was organized in Santander, a dedicated roll-up poster, shown in Figure 25, was created together with a flyer that was used for informative and branding purposes.



Figure 25. SEDIMARK roll-up and flyer for Santander hackathon.

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3 Cooperation with Other Initiatives

As part of the dissemination and communication activities of the project, SEDIMARK targets to establish continuous links with other projects and initiatives, so that it exchanges views, and ideas and develop joint concepts and technologies. This chapter presents a summary of the related in the first half of the project.

3.1 Related Projects and Initiatives

SEDIMARK aims to have close collaborations with other projects and initiatives that work in the same areas, with the goal to align their activities and find common ground to build joint concepts that will help move forward the EU research landscape. SEDIMARK's main focus areas for collaboration are:

Data spaces.

Data quality and data curation.

Machine learning and artificial intelligence.

Interoperability and ontologies.

Use cases.

Table 4. Related Initiatives

Initiative	Relationship	Project Link	Link Established
International Data Spaces Association (IDSA) [9]	Follow the activities of IDSA and contribute with the project innovations via talks and participation to events	ATOS, SIE	Yes, participation to IDSA Data Spaces Symposium March 2024
Big Data Value Association (BDVA) [10]	Follow the activities and contribute with its AI technologies and data quality management tools,	ATOS, UC, NUID UCD	Yes, contribution to BDVA whitepaper on Data Quality
FIWARE Foundation [11]	Working group exploring the role of ledgers for new secure digital smart cities and smart building infrastructures.	ATOS, SDR, UC, EGM	Not yet
TMForum [12]	Open Data Alliance for definition of generic and interoperable telecommunication architecture for data and services.	ATOS, LINKS, SURREY, NUID UCD	Yes, but result is that it is not of interest for SEDIMARK.
Data Spaces Support Centre (DSSC) [13]	Follow the activities and contribute to all groups.	ATOS, UC, NUID UCD	Yes, continuous participation and contribution.

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Initiative	Relationship	Project Link	Link Established
ICT4WATER cluster [14]	Participate in the cluster and contribute to aspects related with smart models and data processing.	EGM, UC	Yes, SEDIMARK became a member of ICT4WATER
European Cybersecurity Community (ECCO) [15]	Contribute the SEDIMARK tools and concepts	ATOS	Yes, SEDIMARK was invited to participate and contribute.
Water Projects Europe [16]	Participate in the AQUATECH 2025 session on From Inland Waters to Digital Connectivity, Shaping the Future of Water Management	UC	Yes, SEDIMARK was invited to participate and contribute.
Fintraffic's Traffic Data Ecosystem [17]	Joining the EU Collaboration and Data Spaces working group, led by Fintraffic, to introduce the SEDIMARK project	FV	Yes, SEDIMARK was invited to participate and contribute.

Table 5. Related Projects

Project	Relation to SEDIMARK	Link
WATERVERSE [18]	WATERVERSE focuses on making data management practices and resources in the water sector, through accessible, affordable, secure, FAIR (Findable, Accessible, Interoperable, Reusable), and easy to use practices, improving usability of data and the interoperability of data-intensive processes.	Link established. Joint organisation of special sessions in DATA WEEK 2023 and EBDVF 2024, joint proposal for EUCNC 2024 workshop and publication of joint scientific paper.
MobiSpaces [19]	MobiSpaces focuses on AI-based Data Operations for Declarative querying, Decentralised Data Management, Edge-driven Federated Learning, and Visual Analytics.	Link established and joint proposal for EUCNC 2024workshop
TANGO [20]	TANGO focuses on privacy preserving and environmentally-friendly data collection, processing, analysis, sharing and storage.	Link established and joint proposal for EUCNC 2024workshop

Project	Relation to SEDIMARK	Link
DataBri-X [21]	DataBri-X works on energy-efficient and user-friendly toolbox that improves the interoperability, usability, discoverability, quality, and integrity of data and metadata.	Link established. Joint organisation of special sessions in EBDVF 2024 and publication of joint scientific paper.
enRichMyData [22]	enRichMyData works on rich, high-quality and valuable datasets to feed Big Data Analytics and AI applications.	Link established. Joint organisation of special session in DATA WEEK 2023 and EBDVF 2024 and publication of joint scientific paper.
STELAR [23]	STELAR focuses on FAIR principles and AI-ready (high-quality, reliably labelled) data.	Link established. Joint organisation of special session in DATA WEEK 2023 and EBDVF 2024 and publication of joint scientific paper.
HPLT [24]	HPLT focuses on natural language data with large-scale model training.	Link established. Joint organisation of special session in DATA WEEK 2023.
GREEN.DAT.AI [25]	GREEN.DAT.AI focuses on energy efficiency in industrial AI-based systems, reducing the environmental impact of data management processes.	Link established. Joint organisation of special session in EBDVF 2024 and publication of joint scientific paper.
COMFORTage [26]	COMFORTage focuses on the development of a Virtualized AI-Based Healthcare Platform (VHP) to centralize AI resources for risk factor analysis, early diagnosis, and personalized decision-making.	Link established. SEDIMARK architecture was presented at its November 2024 General Assembly and, specifically, how SEDIMARK could support the transfer of health related datasets from one clinical facility to another.

Project	Relation to SEDIMARK	Link
Aqua Valley [27]	Pole Aqua-Valley brings together a network of over 210 members within the water industry. Its main objective is to contribute to the rapid expansion of micro enterprises and SMEs through active networks, sharing resources, and developing collective action across the entire range of professions within the water industry.	Link established. SEDIMARK was introduced by EGM. The presentation was about data exchange in the water-agriculture joint domains leveraging the SEDIMARK Marketplace.

3.2 Cooperation Activities

This subsection provides more details regarding the activities that have been performed in the second half of the project with respect to the cooperation with other initiatives and projects. Details on the actions and liaison activities with other relevant initiatives carried out during the first half of the project were already reported on SEDIMARK_D6.3 [1]. For the sake of completeness, Table 6 presents a summary of the activities carried out during the first half of the project. Some of them have had a continuation during the second half of the SEDIMARK project so Table 6 focus only on those that were specific to the first eighteen months of the project.

Table 6. Cooperation activities during first half of the project

Activity	Description
DATA WEEK 2023	SEDIMARK participated in the DATA WEEK 2023 with an invited contribution as speaker in a special session entitled “Data management and data sharing for trusted AI applications” [24] together with other projects (WATERVERSE, HPLT, ENRICHMYDATA and STELAR) of the call DATA-01-03 and organised by Data Spaces Business Alliance (DSBA).
Workshop on ‘Tech Adoption Scenarios and Data AI 2030	Organised by the LeADS project (Leading Europe’s Advanced Digital Skills), which is a Coordination and Support Action (CSA) funded by the Digital Europe Programme, and among other objectives, it aims to provide guidance for the deployment of the DIGITAL programme Advanced Digital Skills (ADS) over the next 7 years. From SEDIMARK, SURREY contributed to the co-creation exercise by BluSpecs, which focused on the definitions of market dynamics in relation to data management and analysis.
BDVA data quality whitepaper	Data quality is a core concept in SEDIMARK, the consortium contacted BDVA, asking to participate and contribute to the whitepaper. This attempt was successful and SEDIMARK added contributions to the whitepaper related with the description of data quality, the definition of data quality metrics for ML/AI applications, the handling of data quality in streams, data description and data models for data quality and a description on how data quality is being processed in the SEDIMARK pipeline. A first version of the whitepaper has been released in May 2024 [28].

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Activity	Description
WATERVERSE	Relations have been established with the WATERVERSE project on the topic of data quality evaluation and NGSI-LD based annotations. The organisation of a joint workshop is in discussion under the umbrella of ETSI ISG CIM.
ICT4WATER	SEDIMARK has identified itself as relevant actor for contributing to two of the ICT4WATER Cluster Action Groups: Interoperability and Standardisation (I&S), and Data Sharing (DS).
MobiSpaces	Presentations on the technical aspects of MobiSpaces and SEDIMARK, discussions on data management strategies, and the exploration of FAIR principles reflect our deep commitment to innovation and standards compliance.
Data Value & Applications in Data Spaces	SEDIMARK received an invitation to be part of a session on the Data Spaces Symposium 2024, called "Data Value & Applications in Data Spaces", since the project could contribute very valuable knowledge to the discussion, taking into account what it is building.
EUCNC Workshop	This workshop aimed to explore the technological advancements necessary for the efficient sharing, management, and enrichment of data within IoT-based ecosystems. It emphasises the importance of data quality, interoperability, trustworthiness, and the creation of value-added services to leverage the full potential of data spaces. It was led by SEDIMARK and co-organized with the TANGO and WATERVERSE projects.
ECCO	After registering and managing SEDIMARK's project minisite [29], some project representative is designated as the "Radar tester", with the responsibility to conduct the Market and Technology Readiness Level (MTRL) assessment, apply Joint Research Centre (JRC) tagging, and upload Key Exploitable Results (KERs) for the project.
INPACE online Virtual Fair	INPACE Virtual Fair is designed to connect mature European and Indo-Pacific innovations (technologies and products). By participating in this event SEDIMARK was able to showcase its integrated solution (i.e. the SEDIMARK Marketplace and Platform) to an international audience, as well as connect with partners and potential interested stakeholders across the EU and the Indo-Pacific.

3.2.1 DSSC Contributions

SEDIMARK has been invited to participate in the DSSC, which contributes to the establishment of data spaces across the EU. The goal is to promote and enable interoperable and trustworthy data sharing environments and reuse data across sectors. SEDIMARK's partners Atos, UC and NUID UCD are members in three groups of DSSC, namely Business, Governance and Technology. The involvement is related with active participation in the periodic teleconferences, where the activities of each group are discussed.

SEDIMARK's interests mainly relate with the Technology group and the project has a strong participation in the group activities and the telcos (every three weeks). The contributions include involvement in discussions and promoting SEDIMARK concepts in the definition of the building blocks of the functional architecture of DSSC (first published in September 2023,

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released its version 1.0 on March 2024, and updated to its 1.5 version in February 2025). More technical details about the relation of SEDIMARK with DSSC are given in Deliverable SEDIMARK_D2.2.

The DSSC invited SEDIMARK to appear in the DSSC's list of relevant initiatives and stakeholders that they drafted in order to be included within the DSSC's website. There, they include the name of the project, linking to its website, and in the future some relevant info & descriptions (e.g., what is the motivation for fostering discussions/collaboration with DSSC and Data Space Initiatives).

Furthermore, SEDIMARK received an invitation to take part in the **"Get-to-know"** Introductory and Welcome day, organized by Data Spaces Support Centre in February 2023, trying to create synergies both among Horizon Europe (HE) projects and among projects and DSSC.

Moreover, the Data Spaces Support Centre launched on April 2023 **3 thematic groups** as a way to better organise its existing communities and the DSSC Network of Stakeholders. More specifically, the DSSC launched:

the thematic group of **Technology of Data Spaces**

the thematic group of **Governance of Data Spaces**

the thematic group of **Business of Data Spaces**

The participation within the thematic groups is open to representatives from the initiatives/projects that would like to support DSSC on a voluntary basis and contribute to knowledge sharing between various stakeholders and identify and co-create new knowledge for the Data Space community. Hence, people from ATOS, UC and NUID UCD act as SEDIMARK representatives in the periodic meetings organized by those thematic groups.

In this regard, SEDIMARK has participated in several topic-specific workshops organized by the DSSC Technology Thematic Group on the aspects of Data Quality and Information Modelling, which were held on 13th June 2024, 3rd April 2025, and 18th September 2025 respectively. During these sessions, experts from the SEDIMARK consortium presented the developments that were being carried out in the project to address some of the challenges that are connected to the DSSC Data Spaces Blueprint Building Blocks.

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4 Impact Assessment

All the effort carried out during the project has been reflected in the current status of the KPIs, which have been, in the majority of the cases, exceeded from the planned. Table 7 shows an overview of the KPIs that have been foreseen for the project, including their completion status and comments.

Table 7. KPIs Monitoring status

Metric / Activity	Measure	Target Value	Status	Completion	Comments
Creation of strong online presence, via the SEDIMARK website and partners' websites.	Views	50000	9800	<u>~20%</u>	Due to privacy legislation, views are only counted when a user clicks on accept, which represents a small subset of all the views. Besides, it only includes views from the project website, not from the rest of the partners webpages or Social Media posts views.
Published articles in technical papers, (e-)magazines, (e-)newspapers	Articles	15	28	<u>187%</u>	Even larger number if we include all the technical articles from the SEDIMARK webpage (e.g. "From Auto-ML to Auto-GPT" [30]).
Number of recipients (i.e. newsletter x subscribers)	Recipients	1000	~700	<u>~70%</u>	Reaching 100% in the coming months as more newsletters will be released with the latest results generated by the project.
Trade fairs/exhibitions (> 20 events; > 8 panels/discussions organisation; > 5 talks)	Events	20	32	<u>160%</u>	
	Panels / Discussions organisation	8	6	<u>75%</u>	It does not track panel/discussion participation (currently more than 8)
	Talks	5	17	<u>340%</u>	
Publications in open access	Papers	15	18	<u>120%</u>	Some publications which are still In press will be made

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Metric / Activity	Measure	Target Value	Status	Completion	Comments
scientific Journals and conferences					open access through institutional repositories.
Brochures, leaflets and posters	Brochures	2	2	<u>100%</u>	
	Leaflets and Posters	4	4	<u>100%</u>	
Social media posts (Facebook, Twitter, Instagram) and Number of followers	Posts	500	520	<u>104%</u>	Email subscribers are also counted as followers.
	Followers	1000	600	<u>60%</u>	
SEDIMARK Dissemination Videos	Videos	4	19	<u>475%</u>	
	Views	4000	1200	<u>30%</u>	
Public workshops to present SEDIMARK and to engage stakeholders	Workshops	3	11	<u>367%</u>	
Demonstrators of the project use cases	Demonstrators	4	2	<u>50%</u>	
Hackathons	Hackathons	1	1	<u>100%</u>	
Communication to technology developers, networks, clusters, related industries, investors.	Communications	20	25	<u>125%</u>	
Communication towards local authorities / citizens / user communities (> 6 workshops with users/citizens; > 5 smart city associations)	Workshops with users and citizens	6	8	<u>133%</u>	
	Smart City Associations	5	14	<u>280%</u>	
	Data Providers	15	15	<u>100%</u>	

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Metric / Activity	Measure	Target Value	Status	Completion	Comments
Link with external Open Data Repositories and data providers.	External Data Repositories	5	5	<u>100%</u>	
Project's Open-Source software	Downloads	100	389	<u>~400%</u>	Out of 30 public repositories
Links with other R&I initiatives projects and decision makers (8 activities, 4 projects)	Activities	8	10	<u>125%</u>	
	Projects	4	8	<u>200%</u>	

As it can be seen, most of the KPIs have been accomplished when not largely exceeded. This demonstrates the big effort that the consortium has collectively made to maximize the project's outreach and generated impact. However, there have been some of the indicators have not been achieved. In this regard, presence in social networks have not been extensively used as efforts have been put in disseminating and communicating the project results in other events and venues that were identified as better suited for the project's outcomes. Besides, in what relates to the project webpage views, a technical issue related to the cookies management and the GDPR prevents us from being able to perform the counting of actual visits (only we can count the visits from those that have accepted the webpage cookies, which use to be only a minimal part of the total number of visitors), thus, the indicator shows a quite poor completion level.

Furthermore, Table 7 just presents a fix image as on the project last day. However, SEDIMARK consortium partners will continue promoting the project's results in view of maximizing the sustainability and exploitation beyond the project lifetime.

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5 Conclusions

Throughout the project, SEDIMARK has developed the dissemination and communication strategy outlined in SEDIMARK_D6.2 [2], succeeding to achieve the ambitious project dissemination goals in due time. Special emphasis has been placed not only on online dissemination but also on preparing specific materials for use in events and other activities conducted during the project, especially those in which the SEDIMARK system has been open for external users to make use of it and provide feedback. Additionally, a significant number of the outreach actions were carried out in collaboration with other projects and initiatives.

Section 2 of this deliverable provides a detailed overview of the dissemination activities, including the scientific publications related to the SEDIMARK project, the events that SEDIMARK has organized or where SEDIMARK has been present, and specific details of the online presence and collaborative dissemination executed by all consortium partners. Additionally, the dissemination materials created for the project, such as videos, brochures, or newsletters, have been presented.

Furthermore, Section 3 outlines the cooperation activities undertaken during this period. These activities are integral to SEDIMARK's overarching goal of cooperation, which involves aligning with other projects and initiatives that share similar objectives, aiming to establish common ground for building the EU research landscape.

Finally, Section 4 provides a comprehensive review of KPIs, including their completion status, brief descriptions, and, where fitting, future plans.

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