



ENHANCING VALUE CREATION THROUGH INTEROPERABLE DATA SPACES

*Unlock the Power of Data Sharing at EBDVF 2024
- A Post Event Report*



November 2024

ABOUT US

Data spaces enable secure, transparent, and efficient data sharing across various sectors. By creating data ecosystems, data spaces allow organizations to access and exchange data seamlessly, fostering innovation and collaboration. This interconnected approach helps in making data-driven decisions, improving operational efficiency, and developing new products and services.

To support the data space transformation, DS2, CEDAR, CyclOps, NOUS, and PLIADES have joined forces and created the **Data Space Cluster** to unlock the full potential of data. In this document, amongst the results of a joint event, the aforementioned projects offer some valuable recommendations.



DataSpace, DataShare 2.0



Common European Data Spaces and Robust AI for Transparent Public Governance



Automated end-to-end data life cycle management for FAIR data integration, processing, and re-use



A catalyst for European Cloud Services in the era of data spaces, high-performance and edge computing



AI-Enabled Data Lifecycles Optimization and Data Spaces Integration for Increased Efficiency and Interoperability

INTRODUCTION

The European Big Data Value Forum (EBDVF) a leading annual event uniting Europe's data-driven research and innovation community hosted in October 2024, in Budapest, Hungary, held a session on the future of data sharing and value creation through interoperable data spaces.

At the forefront of this transformative conversation was the DS2-led session, featuring projects funded under the HORIZON-CL4-2023-DATA-01-02 call, including **DS2**, **NOUS**, **CyclOps**, **CEDAR**, and **PLIADES**. Together, these projects explored how cross-sectoral, cross-data space collaboration enhanced value-creation networks and unlocked new opportunities for businesses and society alike.

The session dived into key issues surrounding data life-cycle management, AI-driven services, and human integration within the data spaces framework. Through a series of short presentations and a dynamic panel discussion, the session addressed the most pressing questions facing data-driven industries:

1. How can interoperable data spaces enhance the efficiency and impact value-creation networks across sectors?
2. What are the critical challenges and solutions in achieving seamless interoperability for cross-sectoral data sharing and integration?
3. Who are the key users of data spaces and how can they benefit from enhanced data sharing?
4. What are the needs, aspirations and barriers faced by these users in accessing and utilising shared data?
5. What valuable insights have been obtained so far from current data life cycle projects?

As industries worldwide continue to evolve through digital transformation, the importance of data sharing across sectors has never been more crucial. The DS2 session aimed to identify common challenges and solutions for achieving data interoperability, driving the next generation of data pipelines, and fostering innovative, cross-sectoral collaborations. By addressing the critical questions above, this session provided valuable insights for stakeholders from all industries, offering practical recommendations to overcome barriers to data space interoperability.

The poster features a blue and green background with a grid of speaker portraits. At the top left, it reads 'EUROPEAN BIG DATA VALUE FORUM 2-4 OCT | BUDAPEST - HUNGARY'. The main title is 'Interoperability of Data Spaces for Seamless Value Creation Networks' with the date 'October 02, 10:00 - 11:00'. The speakers are: Juha-Pekka SOININEN (VTT), Monica CABALLERO (NTT Data), Alex PAPACHARALAMPOUS (AETHON Engineering), Riina LUOMA (VTT), Thodoris SEMERTZIDIS (CERTH), Panagiotis MORAITIS (Netcompany Intrasoft), and Bernhard PEISCHL (AVL). The bottom section lists organizers and collaborators: BDV (Big Data Value Association), AI & AUT EXPO, ELTE (Eötvös Loránd University), IDEAL-IST, NTP (Neumann Technological Platform), HUN REN, and SZTAKI.

DS2



Speaker

Dr. Juha-Pekka Soininen, DS2 coordinator, VTT

Ms. Riina Luoma, DS2 project, VTT



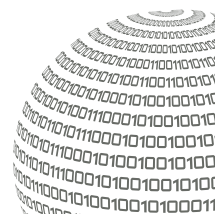
Project Summary

DS2, is on a mission to break down industry silos and unlock collaborative innovation by revolutionising cross-sector data sharing by developing solutions for data spaces interoperability. This will empower industries to facilitate better collaboration across sectors, enabling actors to work together effortlessly to share, access, and utilize data for new applications, tailored services, and seamless experiences to companies' needs

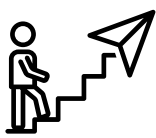


Main Takeaways

- Interoperability is a key factor in the success of both common European data spaces and industrial collaboration data spaces.



- The evolution of data spaces depends on end-users needs and it cannot be controlled, but legal frameworks and standardisation are essential creating a level playing field for all kinds of users.
- The trustworthiness of data spaces is a result of the integration level of data spaces in different interoperability scenarios. It is a trade-off between data space integrity and interoperability.
- Use case-centric industry collaboration data spaces are needed, but even for them, the adoption of interoperability solutions will expand their potential to be part of the European data economy business ecosystem.



Future Steps

- The status of data spaces is that basic technical concepts exist, but the maturity of implementations needs to be improved. DSSC and SIMPL projects are creating models for development and standardisation efforts will produce more solid ground for commercial implementations. Interoperability studies need to be integrated into these workflows.
- More practical examples of using data spaces need to be developed. The expected benefits of data spaces will become clearer only with large-scale experiments and demonstrations.
- Data spaces will create an extension to companies' data management solutions. Data space opens a new interface for a company to acquire and share data. Understanding how companies should use this new interface and how integration of data management and data spaces should be done is needed.



Challenges to Overcome

- The technical maturity of data space solutions with respect to scalability, reliability, trustworthiness, and data sovereignty needs to be validated and verified.
- End-user perspective is too weak in the data space community. More attention needs to be given to how data spaces are made more usable.



Recommendations

In the following research funding rounds, the focus should be in using data space instead of developing them. More business-oriented views are needed to demonstrate what kind of benefits are coming. In the technical side, the focus should be in steps that integrate data space into a trustworthy Internet infrastructure.

**Download the
EBDVF 2024
presentation slides**



CEDAR



Speaker

Dr. Theodoros Semertzidis, Vice Coordinator of the CEDAR project, CERTH



Project Summary

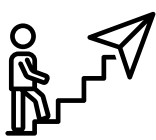
CEDAR will develop methods, tools, and guidelines to digitise, protect, and integrate data to address significant issues like corruption, aligning with the European Strategy for Data and the development of Common European Data Spaces (CEDs), and the European Data Act. This will lead to improved transparency and accountability in public governance, promoting European values and rights in the digital world, and enriching the European data ecosystem and economy.



Main Takeaways

- Data interoperability is a prerequisite for data-value creation in certain domains.

- There is an increasing need for support both from the technology and the legal/policy-making sides to ensure data trust and interoperability.
- Data sharing should first be approached as a culture-change exercise for large organisations.
- A roadmap and a definition of procedures for exchanging data with non-EU countries is needed.
- Data sharing and interoperability will drastically improve transparent governance and support the fight against corruption.



Future Steps

- Defining the procedure for exchanging data with Ukrainian colleagues will be a blueprint for future needs.
- Work needs to be done in both directions; Technology maturity and compliance with European policies and national legal frameworks
- Incorporating AI in the process as an interweaved building block is crucial for data quality and trust in different layers.



Challenges to Overcome

Public governments still struggle with bureaucracy and non-digital services. The digital transformation of public governments will improve the availability of data and the feed data spaces for accountability and transparency.



Recommendations

Let's work on the technology maturity, as this is the easiest first step in the "data sharing" endeavour.

**Download the
EBDVF 2024
presentation slides**



CYCLOPS



Speaker

Dr. Monica Caballero, CyclOps project coordinator, NTT DATA



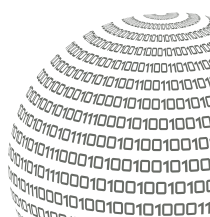
Project Summary

CyclOps aims to facilitate the adoption and production of data, models, and services from and for data spaces to enable AI-based data-driven applications for all players, businesses, and research alike. Its main objective is to develop a platform to provide interoperable, trustworthy, and secure automatic management, governance, and maintenance of the entire data life cycle for large-scale volumes of data generated in heterogeneous distributed sources.

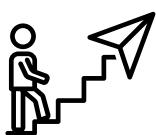


Main Takeaways

- Interoperability is key for leveraging the potential of cross-sector data sharing for creating added-value services.



- AI life cycle management should be considered as an inner part of the data life cycle management as a key enabler for exploiting new-to-come shared data in data space environments and beyond.
- Proposed solutions by the different projects regarding data interoperability, support of the data life cycle, and the deployment of data spaces are aligned and may constitute a novel set of tools to complement the current data space framework.
- Projects have several use cases with shared and/or similar domains connecting to different data spaces which led to an open space for collaboration and synergies.



Future Steps

- The CyclOps platform will facilitate all players to make effective use of data spaces, promoting its use, as well as to prepare data, models, and services at the necessary readiness level for data spaces to be published in data spaces, through specific modules.
- CyclOps will also follow the data regulations and strategy set by DSSC and EU regulation bodies. It expects to propose technical and business design aspects to initiatives under the DSBA and intends to provide and re-use technical implementations from Eclipse, FIWARE data space connector, SIMPL, DATA-EX, and will monitor and identify gaps of relevant standards and building blocks.
- CyclOps will deploy 4 Use Cases linked to European Data Spaces in the areas of Tourism and Mobility, Green Deal, Public Procurement, and Manufacturing, some of them at a low level of maturity. These use cases will contribute to the evolution of the data spaces involved.



Challenges to Overcome

To develop a platform that can be used with a great diversity of data Spaces: current data spaces in diverse maturity levels, potential differences in data space implementation of the blueprint and building blocks.



Recommendations

Follow the standardization recommendations given by the EU organizations (CEN/CENELEC) and related initiatives (DSSC, EDIB) and contribute to their adoption and enhancement in the scope of the project.

**Download the
EBDVF 2024
presentation slides**





NOUS



NOUS Empowering Europe's Data Future



Speaker

Dr. Panagiotis Moraitis, NOUS project, Netcompany

Mr. Alex Papacharalampous, NOUS project, AETHON Engineering



Project Summary

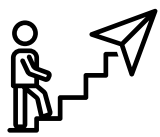
The NOUS project aims to develop a European cloud architecture supporting Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS) capabilities, integrating edge devices, high-performance computing (HPC), and quantum computing resources. The project pipeline includes three primary component types: computational components for executing tasks, edge components for interacting with IoT and edge devices, and data storage components for managing data storage. These components are researched both individually and jointly to foster breakthroughs and develop cloud-level services, including platform integration and virtual labs.



Main Takeaways

- What gives value to Data Spaces related project is their direct link with real-world Use Cases to ensure that the technology meets real-world industry needs, showcasing the practicality and scalability

- Building a strong European Consortium exemplifies collaborative innovation in European technology, bringing together expertise from a wide range of disciplines.
- Integrated Cloud and Edge ecosystem creates a versatile cloud framework that supports diverse devices, from edge IoT sensors to supercomputers, in a unified data processing ecosystem.



Future Steps

- Use Case validation and industry feedback to ensure the architecture meets industry requirements, gaining feedback to refine the platform based on actual operational demands.
- Launch Open-Source Architecture to encourage widespread adoption and adaptation across industries, promoting continuous innovation and development.
- Integrate core components to create a cohesive cloud architecture that operates seamlessly across devices and platforms.



Challenges to Overcome

Ensuring Interoperability across diverse systems.



Recommendations

Demonstrating real-world viability through Use Cases validates and showcases the architecture's effectiveness for real-world applications.

**Download the
EBDVF 2024
presentation slides**



PLIADES



Speaker

Dr. Bernhard Peischl, PLIADES project, AVL



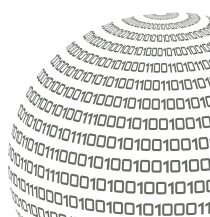
Project Summary

PLIADES aims to revolutionize the use of data for significant advances in AI and robotics. The overarching goal of the project is to advance dataspaces through the development of innovative tools that leverage AI capabilities to optimise the entire lifecycle of data – from creation to application. This includes developing novel approaches to reduce data volume, improve storage efficiency, and ensure robust security and privacy measures. In addition to improving data processing, PLIADES also aims to facilitate the seamless exchange of data between different organisation, promoting promote connectivity and interoperability between different dataspaces, ensuring the quality and integrity of the data.

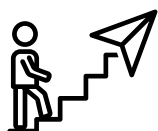


Main Takeaways

- PLIADES will try to extend cross-domain interoperability of data spaces by further building upon the IDS-RAM layers.



- PLIADES can exploit flexibility and adaptability of DSSC's blueprint to specific needs and characteristics of different sectors and domains to adapt to PLIADES Use Cases.



Future Steps

- Novel AI-enabled tools for sustainable and human-factors-aware data creation in diverse dataspace.
- Advanced data spaces connectors for extended interoperability across different data spaces.
- Novel AI-boosted data brokers matching data consumers with data providers across different sectors utilizing IDS-RAM.
- Novel data processing and analytics services, ensuring data privacy, trustworthiness, security, re-use, and disposal.



Challenges to Overcome

Data integration is the process of combining data from different sources to create a unified view. However, data integration can be complex due to differences in data structures, formats, and protocols. Effective interoperability requires developing common data standards, formats, and protocols that enable seamless data exchange.



Recommendations

Essential integration of data spaces is already a possibility, however, a richer integration of data life cycles across data spaces and across domains could bring significant benefits for European competitiveness, including improved data quality and data integration, enhanced collaboration, increased efficiency and better data governance, along with paving the way for step changes towards further advanced AI and Robotics technologies, both in terms of effectiveness and efficiency as well as of human-machine and more holistic human-technology interaction.

**Download the
EBDVF 2024
presentation slides**

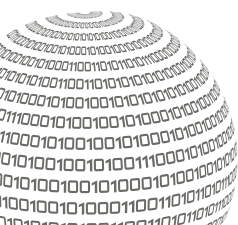
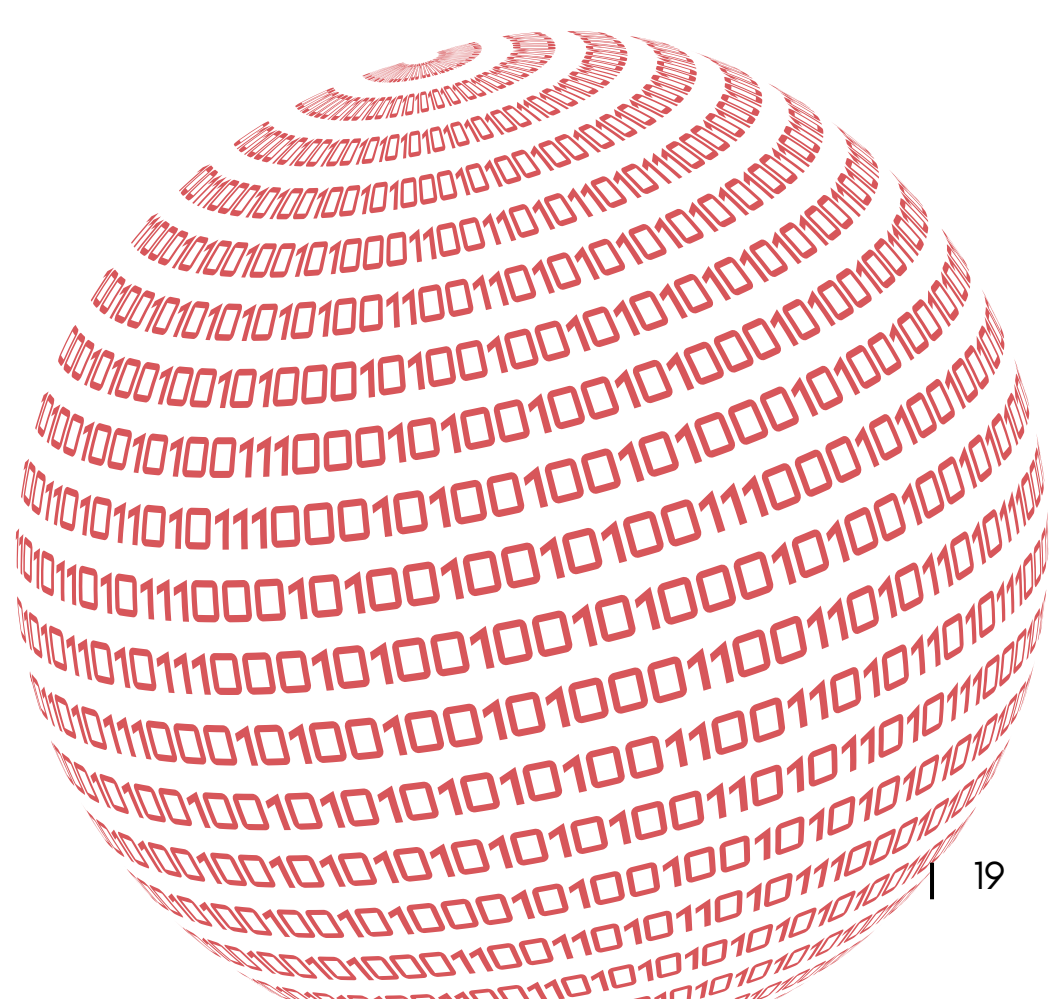




NEXT STEPS

The Data Space Cluster will continue its journey and mission toward enhanced data sharing and interoperability. Stakeholders from across industries will be invited to join **DS2**, **CEDAR**, **CycLOps**, **NOUS**, and **PLIADES** in driving innovation and value creation.

Together, we can pave the way for a future of seamless data sharing, unlocking unprecedented opportunities for efficiency, collaboration, and growth.



● Data Space Cluster

CONTACT US



dataspace2.eu



cedar-heu-project.eu



cyclopsproject.eu



nous-project.eu



pliades-project.eu

Lead Editors

Laura Gavrilit (21c Consultancy) - *DS2 Project*

Susie McAleer (21c Consultancy) - *DS2 Project*

Authors

Juha-Pekka Soininen (VTT) - *DS2 Project*

Theodoros Semertzidis (CERTH) - *CEDAR Project*

Monica Caballero (NTT DATA) - *CyclOps Project*

Panagiotis Moraitis (Netcompany) - *NOUS Project*

Bernhard Peischl (AVL List GmbH) - *PLIADES Project*



These projects have received funding from the European Union's Horizon Europe research and innovation program under grant agreement numbers: DS2 101135967, Cedar 101135577, CyclOps 101135513, NOUS 101135927, Pliades 101135988.