Interoperability in Data Spaces III

01 October 2024, Budapest, HU
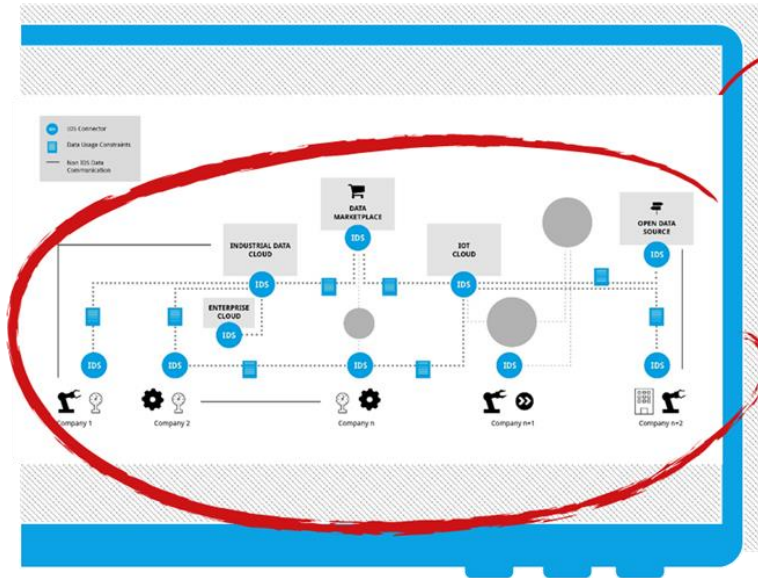
Martin Kaltenböck, Co-Founder & CFO of Semantic Web Company

What is a Data Space?

This is a data space

A concept for connecting all kinds of data endpoints

A **data space** is the sum of all end points that are able to share data with each other.

- Federated data architecture: no physical data integration, leave data where it is
- Interoperability: no silos, no vendor-dependency
- Data Sovereignty and traceability
- Trusted participants

What is a Data Space?

Data Space Radar

Mapping and monitoring IDS use cases

Domains
Inspiring Success Stories from different domains supported by our experts

Maturity Levels
Covering use cases from **business case generation to real-life data spaces**

Progress Monitoring
Forward looking radar. We make room for new items and highlight moving data spaces

https://internationaldataspaces.org/adopt/data-space-radar/

https://www.dataspaces-radar.org/radar/

The importance of Interoperability

Interoperability is a characteristic of a product or system, whose interfaces are completely understood, to work with other products or systems, at present or in the future, in either implementation or access, without any restrictions.
(Source: Wikipedia, accessed: 10/2024, https://en.wikipedia.org/wiki/Interoperability)

Data interoperability addresses the ability of systems and services that create, exchange and consume data to have clear, shared expectations for the **contents, context and meaning** of that data.
(Source: https://datainteroperability.org/, accessed: 10/2024)

The importance of Interoperability

FAIR Principles
Findability, Accessibility, **Interoperability**, and Reuse of digital assets.

The data usually need to be integrated with other data. In addition, the data need to interoperate with applications or workflows for analysis, storage, and processing.

- (Meta)data use a formal, accessible, shared, and broadly applicable **language for knowledge representation**.
- (Meta)data **use vocabularies** that follow FAIR principles
- (Meta)data include **qualified references to other (meta)data**

Source: https://www.go-fair.org/fair-principles/, accessed: 10/2024

Interoperability Governance Model

Interoperability Governance Model
(Source: European Commission, EIF 2017, p.18)

Interoperability in Data Spaces: PC

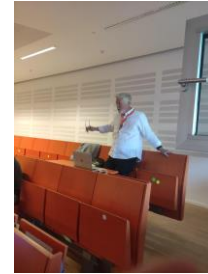**Programme Chair:** Sebastian Steinbuß, CTO of IDSA

28 Members (in alphabetic order)

- Vladimir Alexiev, Chief Data Architect at Ontotext AD
- Phil Archer, GS1, Director Web Solutions
- Sören Auer, Director TIB; Professor for Data Science & Digital Libraries at Leibniz University of Hannover
- Victor de Boer, Vrije Universiteit Amsterdam (VU), Assistant Professor at the User-Centric Data Science group at the Computer Science department
- David Bowden, Principal Research Scientist at EMC
- Silvia Castellvi, IDSA, Stakeholders Engagement Senior Consultant
- Pierre-Antoine Champin, W3C, Research Project Manager
- Oscar Corcho, Universidad Politécnica de Madrid, Professor at Ontology Engineering Group
- Edward Curry, Professor Data Science, NUI Galway | Director, Insight SFI Research Centre for Data Analytics | Director, Data Science Institute | VP, Big Data Value Association (BDVA)
- Stefan Decker, Director Fraunhofer FIT, Professor RWTH Aachen University
- Mark Dietrich, CTO GaiaX - EGI
- Anna Fensel, Associate Professor at Wageningen University & Research; Associate Professor at University of Innsbruck
- Erwin Folmers, Kadaster Netherlands, Lead Data Science Team; Docent, PLD | Universiteit Twente

- Ahmad Hemid, Fraunhofer FIT, Data Engineer and Assistant Researcher
- Olga Galanets, International Data Space Association
- Fabien Gandon, Head Wimmics Lab (Inria, UCA, CNRS, I3S); Vice Head of Science Inria Sophia, W3C rep. Inria; DSTI professor; Director Qwant-Inria Lab
- Stefan Gindl, Research Studios Austria (RSA), Senior Data Scientist/Senior Researcher
- Sylvia Ilieva, Director of GATE Institute
- Martin Kaltenboeck, Semantic Web Company, Co-Founder & CFO
- Petr Knoth, Open University, Senior Research Fellow in Text and Data Mining; Founder & Head of CORE
- Christoph Lange-Bever, Fraunhofer FIT, Head of Data Science and Artificial Intelligence department
- Andreas Müller, Schaeffler AG, Expert Knowledge Engineering / Expert Data Engineering & Architecture
- Axel Polleres, University of Economics Vienna, Head of Institute at WU (Vienna University of Economics and Business)
- Felix Sasaki, Chief Expert for Knowledge Graph and Semantic Technology to the AI Unit at SAP
- Ruben Verborgh, Professor of Decentralized Web technology, Ghent University
- Ray Walshe, Data Science Foundation International, Executive Director
- Rigo Wenning, ERCIM, Legal Counsel
- Josiane Xavier Parreira, Siemens AG, Senior Research Scientist

Interoperability in Data Spaces I (Vienna, 2022)

Identified Gaps in Interoperability in Data Spaces

- Interoperability often on **metadata level ONLY** (what about the data?)
- No industry specific **controlled vocabularies & Knowledge Graphs**
- Resources **not available in other languages** than English
- **Insufficient data usage control** mechanisms (right-, value-, purpose modeling)
- Connection of the **physical and digital world** still missing

https://www.trusts-data.eu/data-spaces-semantic-interoperability/ | WS on Interoperability in Data Spaces | Vienna, 03rd of June 2022 |

Interoperability in Data Spaces II (Leipzig 2023)

Experts Panel on Interoperability and Standardisation

Panelists (alphabetic order)
- **Phil Archer**, Director Web Solutions at GS1, formerly W3C, LinkedIN
- **Silvia Castellvi** Head of Research & Standardisation, IDSA, LinkedIN
- **Edward Curry,** Professor Data Science, University of Galway, LinkedIN
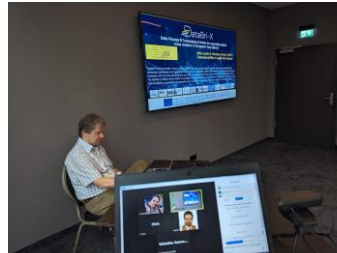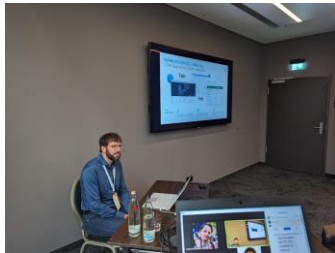- **Felix Sasaki**, Chief Expert Knowledge Graph, Semantic Technology to the AI Unit at SAP, LinkedIN

Moderation: **Vassilios Peristeras,** IT Strategic Analyst , Council of the European Union, Brussels / Associate Professor, International Hellenic University, Thessaloniki, Greece, LinkedIN

Interoperability in Data Spaces II - Results

Two crucial factors for Interoperability & Standardisation:

- **Interdisciplinary collaboration** across industries involving all relevant stakeholders
- **Centralised coordination** of Interoperability developments, standardisation & implementation

Workshop WEBSITE | WS on Interoperability in Data Spaces II | Leipzig, 20th of September 20223| Official SEMANTiCS 2023 workshop |

Interoperability in Data Spaces III

01 October 2024 | Full Day Workshop
back2back to EBDVF2024, Budapest, Hungary
Approaches & Methods of Semantic Interoperability in Specific Domains

- 4 organising partners
- 5 supporting projects
- 1 keynote & 3 invited talks
- 12 accepted position papers from Call for Participation & invited lighting talks
- 60+25 participants on-site and online
- Programme Chair: Sebastian Steinbuß, CTO of IDSA
- Programme Committee: 28 Members
- ALL information: https://semantic.internationaldataspaces.org/workshop-2024/

Interoperability in Data Spaces III

Supporting Projects & Organising Partners

- **DataBri-X project**, https://databri-x.eu/
- **UNDERPIN project,** https://underpinproject.eu/
- **Glaciation project**, https://glaciation-project.eu/
- **champi4.0ns project,** https://www.champi40ns.eu/
- **VELES project**, https://veleshub.eu/

- **European Research Consortium for Informatics and Mathematics**, https://www.ercim.eu/
- **International Data Space Association**, https://internationaldataspaces.org/
- **Semantic Web Company**, https://www.semantic-web.com
- **Big Data Value Association,** https://bdva.eu/

Interoperability in Data Spaces III - Agenda

Time	Session
09.00 - 09.15	Welcome & Introduction - Martin Kaltenboeck (CFO SWC)
09.15 - 09.35	Keynote - Coen Janssen (Policy Officer "Data Policy & Innovation" at DG CONECT, EC) - remote talk
09.35 - 09.45	BDVA Paper on Interoperability - Rigo Wenning (W3C)
09.45 - 09.55	IDSA Position Paper on Semantic Interoperability - Sebastian Steinbuß (CTO of IDSA)
09.55 - 10.15	*Coffee Break*
10.15 - 12.15	Invited Lightning Talks from the Call for Participation ● Milenko Tosic, VizLore Labs Foundation and co-founder at INVT DOO Novi Sad; ● Federico Gutt, Fraunhofer EMI, "HERAKLION" project; ● Haridimos Kondylakis, Hellenic Digital Health Cluster; ● Lipp, Johannes, Fraunhofer Institute for Applied Information Technology FIT ● Juan Cano de Benito, Universidad Politécnica de Madrid; ● Iván Alfonso, Luxembourg Institute of Science and Technology (LIST); ● Pedro Guimarães, CCG/ZGDV and University of Minho; ● Robert David, Semantic Web Company; ● Raul Palma, Poznan Supercomputing and Networking Center (PSNC); ● Wouter van den Berg, MSc, TNO; ● Roberto García, Universitat de Lleida, Spain; Rosa Gil, Universitat de Lleida, Spain; ● Tharindu Ranathuna, Munster Technological University; Sourabh Bharti, Munster Technological University;

Interoperability in Data Spaces III - Agenda

Time	Session
12.15 - 13.15	*Lunch-Break*
13.15 - 13.30	Solutions for establishing semantic interoperability across data spaces: SEMIC approach and offering Pavlina Fragkou (DG IT), https://www.linkedin.com/in/pavlina-fragkou-9b86855/
13.30 - 15.30	**Fish Bowl** (moderated fishbowl discussion along the following topics) 1. Approaches for semantic Interoperability 2. Domain / industry specific activities (where do we have to align, or do we need different approaches (per domain)) 3. Related standards: gaps & actions Moderation: Rigo; Queue: Martin
15.30 - 16.00	*Coffee Break*
16.00 - 16.30	Presentation of results in plenary (by the Organisers)
16.30 - 17.00	Summary and take home message & what happens next (by the Organisers)

Interoperability in Data Spaces III

Thank you for attention & for participation!!

Planned follow-ups of this workshop…

- Results will be presented on 02 October at EBDVF
- Workshop report to be accomplished & published
- Please get in touch via the website to contribute
- And apply if you are interested to join the PC

https://semantic.internationaldataspaces.org/workshop-2024/