

Preface for The Second International Workshop on Semantics in Dataspaces (SDS 2024)

Johannes Theissen-Lipp^{1,2}, Pieter Colpaert³, Sulayman K. Sowe¹, Edward Curry⁴ and Stefan Decker^{1,2}

¹RWTH Aachen University, Germany

²Fraunhofer Institute for Applied Information Technology FIT, Germany

³Ghent University, Belgium

⁴University of Galway, Ireland



Dataspaces, which are critical to seamless and trusted data sharing, have gained prominence in Europe with the European Data Governance Act (DGA). This legislation defines terms and aims to increase trust, expand data availability, and promote common dataspace. The impact spans sectors such as data providers, researchers, businesses, and citizens. Initiatives like the European Open Science Cloud and the adoption of the FAIR Data Principles further contribute to the relevance of dataspace. Efficient data sharing within dataspace requires semantic interoperability, for which the Semantic Web community has a long history of developing RDF-based solutions.

The Semantic Web Dataspaces (SDS) 2024 workshop seeks to advance semantic methods and solutions for dataspace by encouraging collaboration between researchers and practitioners. It aims to advance the expressiveness, standardization, and integration of semantic technologies in dataspace architectures. The workshop promises interactive sessions, presentations, and discussions to drive advances in semantics for dataspace.

The Second International Workshop on Semantics in Dataspaces, co-located with the Extended Semantic Web Conference, May 26 – 27, 2024, Hersonissos, Greece

✉ theissen-lipp@dbis.rwth-aachen.de (J. Theissen-Lipp)

🆔 0000-0002-1234-0000 (J. Theissen-Lipp); 0000-0001-6917-2167 (P. Colpaert); 0000-0002-8605-2009 (S. K. Sowe); 0000-0001-8236-6433 (E. Curry); 0000-0001-6324-7164 (S. Decker)



© 2024 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

CEUR Workshop Proceedings (CEUR-WS.org)

SDS 2024 Edition

The Second International Workshop on Semantics in Dataspaces continues the success of its previous edition [1, 2]. The workshop brings together people interested in dataspace or the role of semantics in them, from different communities such as dataspace drivers, legal and policy makers, as well as the researchers from the Semantic Web community. Since members of these different communities rarely have the opportunity to interact with each other, we design the workshop to be highly interactive and communicative. This full-day workshop consists of formal paper presentations with fruitful Q&A sessions, and an open discussion that allowed participants to identify promising topics for collaboration and follow-up activities.

The topics of interest in this workshop are threefold: First, a conceptual perspective highlights definitions of dataspace, their core elements, and lifecycles. Participants examine formal models, the impact and potential of unique identifiers, and conceptual reusable assets in general. Second, state-of-the-art implementations in both academia and adoption are reviewed. This includes comparisons of current dataspace efforts and analyses of their requirements, key drivers, and common sustainable elements and standards. Last but not least, this workshop advances the application of semantics for dataspace. Participants evaluate the potential of semantic-based methods and solutions for dataspace, and discuss the tailored benefits of ontologies, unique identifiers, algorithms, and concepts for a widespread dataspace adoption in the future.

With more than a dozen contributions, *The Second International Workshop on Semantics in Dataspaces* presents many challenges, but also opportunities that will enhance the potential of dataspace and lead to future global solutions. The workshop organizers are excited to strengthen the role of semantics for dataspace and are confident that this workshop provides a stimulating and engaging forum for researchers and practitioners working in this area.

In this workshop edition, 18 papers were submitted for peer review. Of these, 13 papers were accepted for this volume, 8 as regular papers and 5 as short papers:

- FAIRness in Dataspace: The Role of Semantics for Data Management [3]
- The Rights Delegation Proxy: An Approach for Delegations in the Solid Dataspace [4]
- Towards LLM-augmented Creation of Semantic Models for Dataspace [5]
- Inter-Pod Credential Exchange Protocol via Linked Data Notifications [6]
- Selective disclosure of Digital Calibration Certificate in a quality infrastructure data space [7]
- Adapting Ontology-based Data Access for Data Spaces [8]
- Linking of open and private data in dataspace: A case study of air quality monitoring and forecasting [9]
- On the Governance of Semantic Artefacts in Dataspace [10]
- Towards Enabling FAIR Dataspace Using Large Language Models [11]
- Interoperable and Continuous Usage Control Enforcement in Dataspace [12]
- DFDP: A Declarative Form Description Pipeline for Decentralizing Web Forms [13]
- Challenges and Opportunities for Enabling the Next Generation of Cross-Domain Dataspace [14]
- Semantic Data Link: Bridging Domain-Specific Needs with Universal and Interoperable Semantic Models [15]

The SDS organizers would like to thank all authors for submitting their papers, the members of the program committee for their thorough and detailed reviews, the presenters for their exciting talks, and the numerous participants for the great discussions during the workshop. In the open discussion session, the participants agreed to use the term *dataspace* in one word instead of *data space* in the future. This emphasizes the role of dataspaces as a concept and research area, rather than just a space with data, similar to how *database* was coined earlier. During this discussion session, participants also agreed to form the *W3C Dataspaces Community Group*¹ to strengthen the dataspaces community. We look forward to seeing everyone again at a future SDS workshop.

Program Committee (Random Order)

- Sandra Geisler, RWTH Aachen University, Aachen, Germany
- Nguyen Do-Van, National Institute of Information and Communications Technology, Japan
- Adamantios Koumpis, University of Cologne, Cologne, Germany
- Manfred Hauswirth, Technical University of Berlin, Berlin, Germany
- Minhson Dao, Nguyen Do-Van, National Institute of Information and Communications Technology, Tokyo, Japan
- Alexandros Vassiliades, Aristotle University, Thessaloniki, Greece
- Aiara Lobo Gomes, Maastricht University, Maastricht, The Netherlands
- Christoph Quix, Hochschule Niederrhein, Krefeld, Germany.
- Sisay Adugna Chala, Fraunhofer Institute for Applied Information Technology, Germany
- André Pomp, University of Wuppertal, Wuppertal, Germany
- Oscar Corcho, Universidad Politécnica de Madrid, Madrid, Spain
- Wout Slabbinck, Ghent University, Ghent, Belgium
- Andreas Harth, University of Erlangen, Nuremberg, Germany
- Boukhers Zeyd, Fraunhofer Institute for Applied Information Technology, Germany
- Alexander Paulus, University of Wuppertal, Wuppertal, Germany
- Vassilios Peristeras, Aristotle University, Thessaloniki, Greece
- Inès Akaichi, Vienna University of Economics and Business, Vienna, Austria
- Gertjan De Mulder, Ghent University & IMEC, Ghent, Belgium
- Christoph Lange, Fraunhofer Institute for Applied Information Technology, Germany
- Asif Razzaq, Kyung Hee University, Suwon, South Korea
- Fatemeh Fathi, RWTH Aachen University, Aachen, Germany
- Mohan Timilsina, Insight SFI Research Centre for Data Analytics, Galway, Ireland

¹<https://www.w3.org/community/dataspaces/>

Acknowledgments

This research was funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) under Germany's Excellence Strategy – EXC-2023 Internet of Production (390621612), by a grant from Science Foundation Ireland under Grant number SFI/12/RC/2289_P2, and by the FAIR Data Spaces project of the German Federal Ministry of Education and Research (BMBF) under the grant number FAIRDS05.

References

- [1] J. Theissen-Lipp, S. Decker, E. Curry, The first international workshop on semantics in dataspace, in: Companion Proceedings of the ACM Web Conference 2023, WWW '23 Companion, Association for Computing Machinery, New York, NY, USA, 2023, p. 1439. doi:10.1145/3543873.3589750.
- [2] J. Theissen-Lipp, M. Kocher, C. Lange, S. Decker, A. Paulus, A. Pomp, E. Curry, Semantics in dataspace: Origin and future directions, in: Companion Proceedings of the ACM Web Conference 2023, WWW '23 Companion, Association for Computing Machinery, New York, NY, USA, 2023, p. 1504–1507. doi:10.1145/3543873.3587689.
- [3] M. Hauff, L. Molinas Comet, P. Moosmann, C. Lange, I. Chrysakis, J. Theissen-Lipp, FAIRness in Dataspace: The Role of Semantics for Data Management, in: The Second International Workshop on Semantics in Dataspace, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
- [4] S. Schmid, D. Schraudner, A. Harth, The Rights Delegation Proxy: An Approach for Delegations in the Solid Dataspace, in: The Second International Workshop on Semantics in Dataspace, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
- [5] S. Hoseini, A. Burgdorf, A. Paulus, T. Meisen, C. Quix, A. Pomp, Towards LLM-augmented Creation of Semantic Models for Dataspace, in: The Second International Workshop on Semantics in Dataspace, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
- [6] J. Steinbach, G. De Mulder, B. De Meester, B. Esteves, R. Verborgh, Inter-Pod Credential Exchange Protocol via Linked Data Notifications, in: The Second International Workshop on Semantics in Dataspace, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
- [7] T. Sołtysiński, J. Niederhausen, S. Eichstädt, Selective disclosure of Digital Calibration Certificate in a quality infrastructure data space, in: The Second International Workshop on Semantics in Dataspace, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
- [8] M. Andresel, V. Siska, R. David, S. Schlarb, A. Weißenfeld, Adapting Ontology-based Data Access for Data Spaces, in: The Second International Workshop on Semantics in Dataspace, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
- [9] A. Acquier, A. Donald, E. Curry, I. Ullah, U. u. Hassan, Linking of open and private

- data in dataspace: A case study of air quality monitoring and forecasting, in: The Second International Workshop on Semantics in Dataspaces, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
- [10] L. Sánchez-González, A. Iglesias-Molina, O. Corcho, M. Poveda-Villalón, On the Governance of Semantic Artefacts in Dataspaces, in: The Second International Workshop on Semantics in Dataspaces, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
 - [11] B. T. Arnold, J. Theissen-Lipp, D. Collarana, C. Lange, S. Geisler, E. Curry, S. Decker, Towards Enabling FAIR Dataspaces Using Large Language Models, in: The Second International Workshop on Semantics in Dataspaces, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
 - [12] I. Akaichi, W. Slabbinck, J. A. Rojas, C. Van Gheluwe, G. Bozzi, P. Colpaert, R. Verborgh, S. Kirrane, Interoperable and Continuous Usage Control Enforcement in Dataspaces, in: The Second International Workshop on Semantics in Dataspaces, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
 - [13] I. Smessaert, P. Hochstenbach, B. De Meester, R. Taelman, R. Verborgh, DFDP: A Declarative Form Description Pipeline for Decentralizing Web Forms, in: The Second International Workshop on Semantics in Dataspaces, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
 - [14] R. A. Deshmukh, D. Collarana, J. Gelhaar, J. Theissen-Lipp, C. Lange, B. T. Arnold, E. Curry, S. Decker, Challenges and Opportunities for Enabling the Next Generation of Cross-Domain Dataspaces, in: The Second International Workshop on Semantics in Dataspaces, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.
 - [15] M. Stäbler, P. Moosmann, P. Dittmer, D. Wang, F. Köster, C. Lange, Semantic Data Link: Bridging Domain-Specific Needs with Universal and Interoperable Semantic Models, in: The Second International Workshop on Semantics in Dataspaces, co-located with the Extended Semantic Web Conference, May 26–27, 2024, Hersonissos, Greece, CEUR-WS, 2024.