



**Alliance for AI, IoT and Edge
Continuum Innovation**

AIOTI Workshop on Semantic Interoperability for Digital Twins – 24/25 March 2026

Overview of AIOTI Semantic Interoperability Group and its activities

Martin Bauer

Chair AIOTI Focus Group on Semantic Interoperability

Cornelis Bouter

Co-chair AIOTI Focus Group on Semantic Interoperability

Mission and Vision of AIOTI

Origin of Alliance for AI, IoT and Edge Continuum Innovation

“The **Alliance for Internet of Things Innovation (AIOTI)** was initiated in **2015**, with the aim to strengthen the dialogue and interaction among **Internet of Things (IoT)** players in Europe ...”

Mission

To drive, on behalf of our members, **business, policy, research, and innovation development** in **AI, IoT, Edge Continuum**, and other converging technologies across the Digital Value Chain to **support Europe's digitisation and competitiveness**.

Vision

We aim to lead, promote, bridge and collaborate in AI, IoT, Edge Continuum and other converging technologies research and innovation, standardisation and ecosystem building, providing IoT deployment for European businesses and creating benefits for European society. We cooperate with other global regions to ensure the removal of barriers in developing the AI, IoT, and Edge Continuum market while preserving European values, including privacy and consumer protection.

What AIOTI is about

Main Themes

- AI/IoT/cloud/edge applications in vertical domains
- Driving the convergence in the computing continuum (telco/cloud/IoT/Edge/AI)

Thought Leadership

- We support the development of EU policies, regulations and standardisation by providing examples, best practices, use cases and testbeds



Collaboration

- We develop R&I agenda for EU funded projects and partnerships
- We help our community to build consortia to participate in EU funded projects

AIOTI community

150 Members

Corporates

SMEs

Research/Academia

Associations

Individual Experts

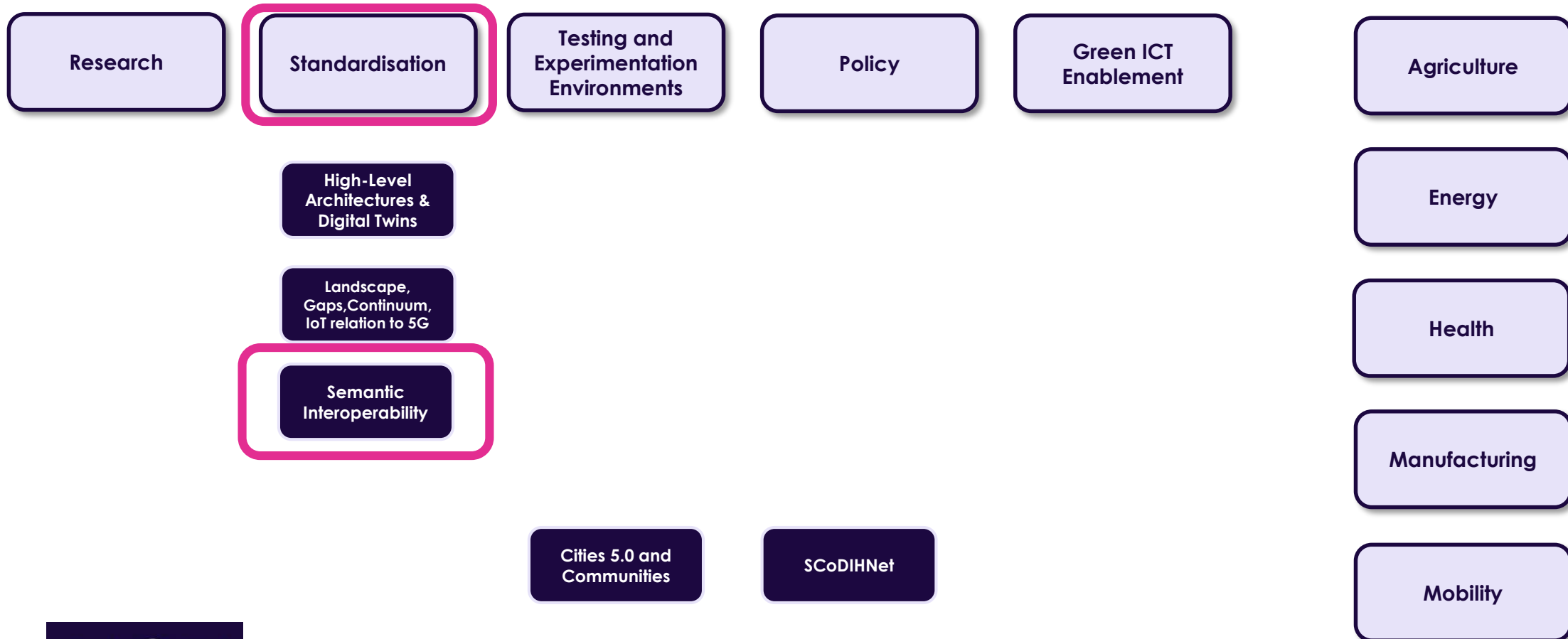
Public Authorities

AIOTI Members : <https://aioti.eu/members/>

How AIOTI works

Horizontal WG

Vertical WG



Semantic Interoperability Focus Group: What do we do?

- Value of IoT grows with **available information**
- “IoT” Today characterized by
 - Heterogeneity
 - Silos
 - Tight coupling
 - Multiple representations of the information
- True IoT characterized by
 - Sharing of information
 - Federation across silos
 - Dynamic use of sources

- Explicit **agreement** on **semantics** (= meaning) is vital to the success of IoT
→ **Semantic Interoperability**

→ **Support adoption of semantic technologies**

Semantic Interoperability Focus Group: What do we do?

- Semantics often perceived as “difficult”, “academic”, “for experts only”
- We are a group of experts from standardization & research
 - **Bring together and help the semantic community**
 - **Provide information and tools supporting semantic interoperability**
 - **Lower barrier for implementing semantic systems**

Bi-Weekly Calls: Wednesday, 14:00 - 15:00 CE(S)T

Whitepapers on Semantic IoT Solutions and Semantic Interoperability (1)

Written by a group of experts affiliated with different standardization organizations – published August 2016

Semantic Interoperability for the Web of Things

Target Group: Semantic Experts, Standardization Engineers & SDOs

“How to enable semantic interoperability for IoT”

<http://dx.doi.org/10.13140/RG.2.2.25758.13122>

Paul Murdock:

This paper is co-authored by an informal group of experts from a broad range of backgrounds all of whom are active in standards groups, consortia and/or alliances in the Internet of Things (IoT) space. The ambition is to create mindshare on approaches to semantic interoperability and to actively encourage consensus building on what the co-authors regard as a key technical issue.

Whitepapers on Semantic IoT Solutions and Semantic Interoperability (2)

Written by a group of experts affiliated with different standardization organizations – published October 22nd, 2019

Towards Semantic Interoperability Standards based on Ontologies

Target Group: Semantic Experts, Standardization Engineers & SDOs

“How to create standards for semantic interoperability”

<http://dx.doi.org/10.13140/RG.2.2.16339.53286>

Semantic IoT Solutions: A Developer Perspective

Target Group: Developers and Software Architects

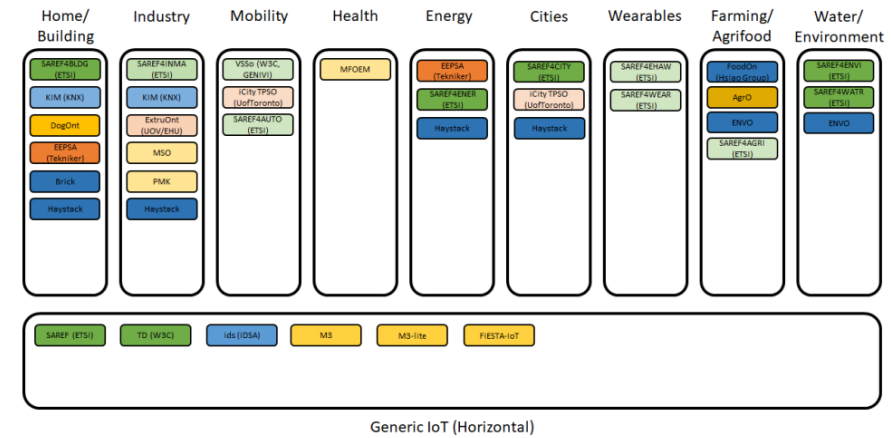
“How to develop semantic systems and achieve semantic interoperability”

<http://dx.doi.org/10.13140/RG.2.2.26825.29282>

Semantic Tutorial – IoT Week 2021

- IoT Week 2021 – **2nd September 2021**
- This tutorial was prepared by the Semantic Interoperability Focus Group of the AIOTI Standardization Working Group of AIOTI: <http://tinyurl.com/kjrv2uu3>
- It was presented by Martin Bauer, Raúl García-Castro, Amélie Gyrard, María Poveda-Villalón and Dave Raggett at the Online IoT Week 2021
- The recording of the session is available here:
<https://iotweek.blob.core.windows.net/iotweek2021thursday/8-%20SEMANTIC%20TUTORIALS.mp4>
- The tutorial introduces the idea of semantic interoperability and the use of ontologies. Participants learn what an ontology is and how it can be used. A focus is on reusing and extending existing ontologies, e.g. SAREF, and getting experience on finding the right ontologies for a given purpose in an ontology catalogue. The semantic modelling of two use cases is shown, starting from the smart home domain, which is extended to smart health. The tutorial concludes with some semantic web best practices for better ontology reuse.

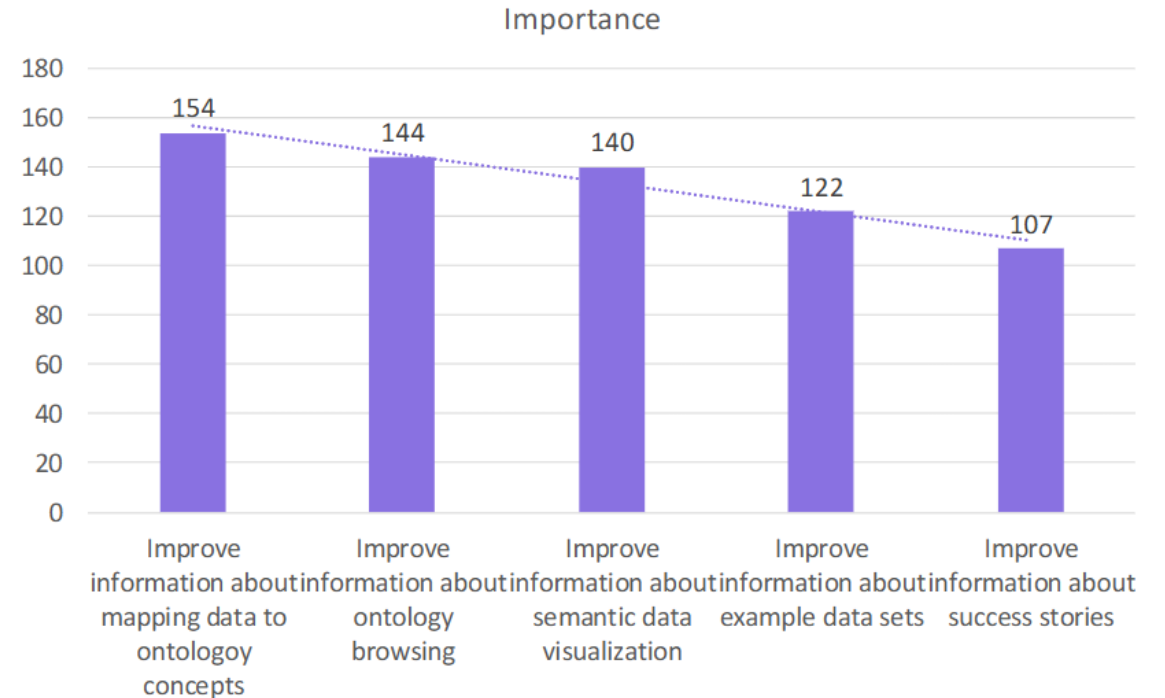
Ontology Landscape – 2022



- Released February 2022
- T Week 2021 This tutorial was prepared by the Semantic Interoperability Focus Group of the AIOTI Standardization Working Group of AIOTI: <http://tinyurl.com/kjrv2uu3>
- It was edited by Martin Bauer, Davide Conzon, Aitor Corchero, Laura Daniele, Iker Esnaola, Amelie Gyrard, Claudio Pastron
- The report is available here: [AIOTI-Ontology-Landscape-Report-R1-Published-1.0.1.pdf](#)
- The report identifies the relevant ontologies per vertical and horizontal sector. The landscape has since received various updates.

Ontology Gap Analysis – 2023

- Released in two different versions 2023
- Presented at the ETSI IoT Conference 2023 [Gap Analysis | Powered by Box](#)
- The results are available here: [AIOTI Survey on Usage of Ontologies-v2.pptx | Powered by Box](#)
- The report sets the stage for future AIOTI FG Semlop deliverables since it identifies the gaps users perceive.



Data to Ontology Mapping Whitepaper – 2025

- Released as first version in 2025
- Presented at a.o. first AIOTI Workshop on Semantic Interoperability for Digital Twins
- The results are available here: [Data to Ontology Mapping R1 – AIOTI](#)
- Overview of which mapping tools is a proper fit to the right use case in terms of complexity, user-friendliness, scalability, and expressivity.



Current Activities

... presented in the following

- **Artificial Intelligence for Ontologies survey**
- In another session of today
- Goal: white paper on what respondents perceive to be most and least impactful applications
- **Future directions:**
 - Annual workshop on semantic interoperability for digital twins
 - Additional white papers?



Thank you for listening

Any questions?

You can email me at martin.bauer@neclab.eu

For information about AIOTI in general, contact Damir Filipovic at sg@aioti.eu