Towards quantitative measures of interoperability

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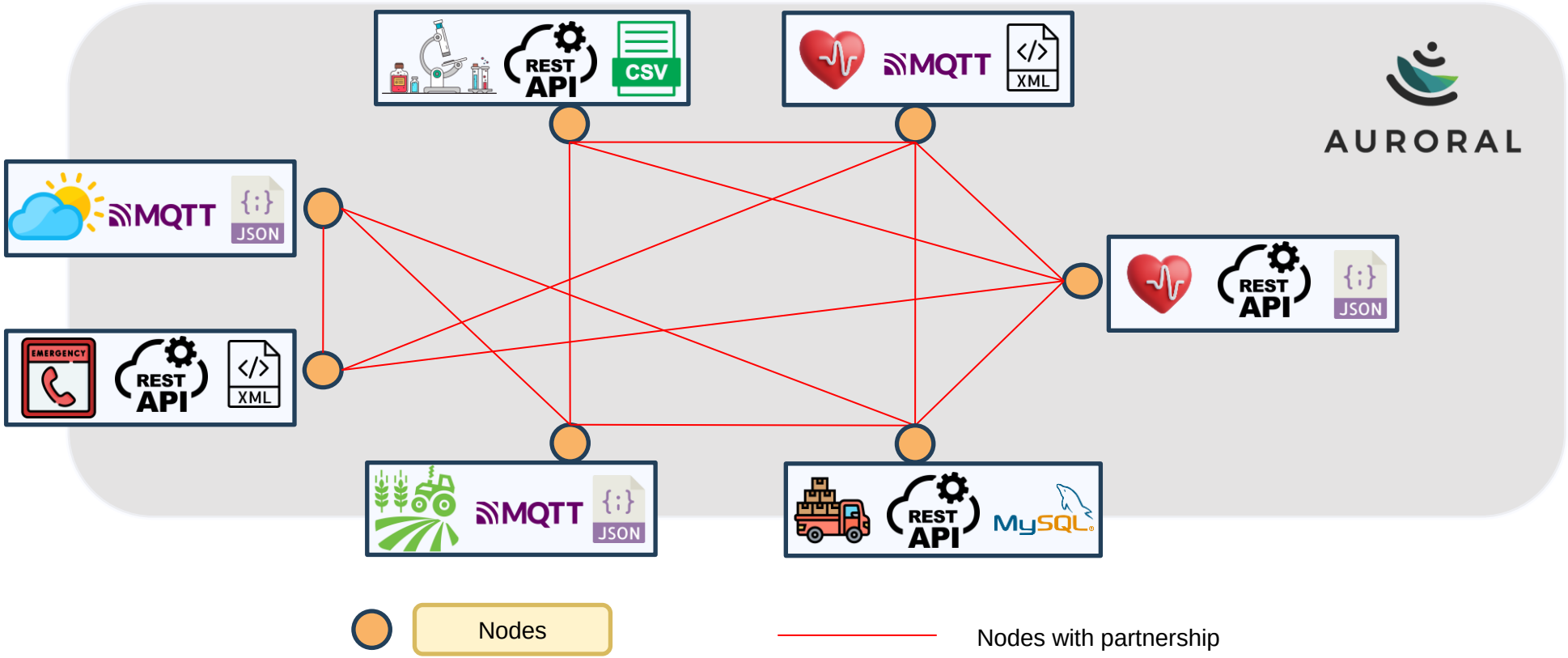
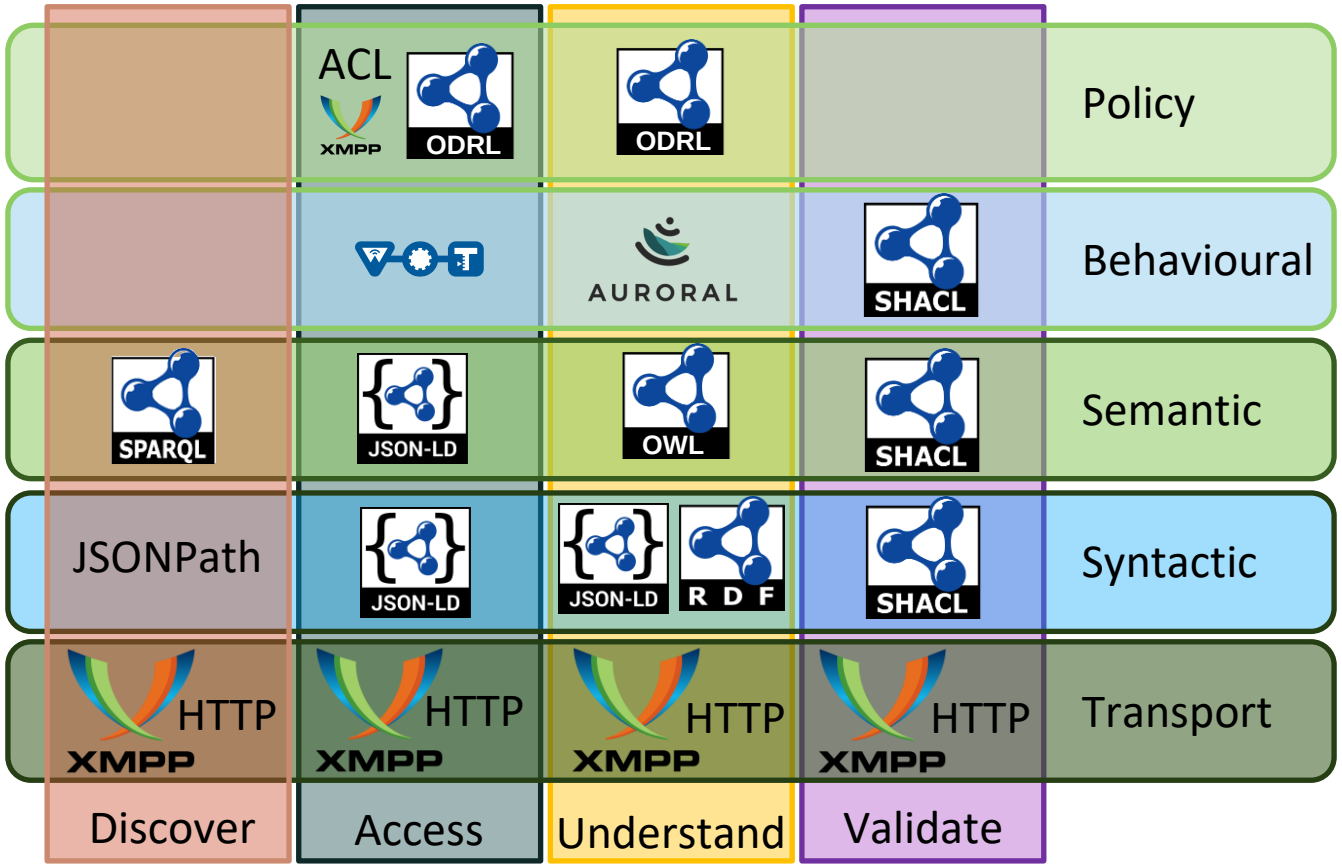
Introduction

- The digital world has over 20 billion IoT devices.
- Making them work together is a big challenge.
  - Numerous semantic interoperability (profile) technological solutions have been presented.
    - Minimal Operability Mechanisms, ISO/IEC 21823-1:2019, European Interoperability Framework…
- There is no quantitative way to measure interoperability.
- We propose a method to quantitatively measure semantic interoperability.
  - A use case of this method in the AURORAL project is presented.

- The AURORAL project is a digital service platform tailored to the needs of rural communities.
- This platform emphasises openness, interoperability, and decentralisation, ensuring that it meets the diverse demands of rural environments
- AURORAL use the ISO/IEC 21823-1:2019.

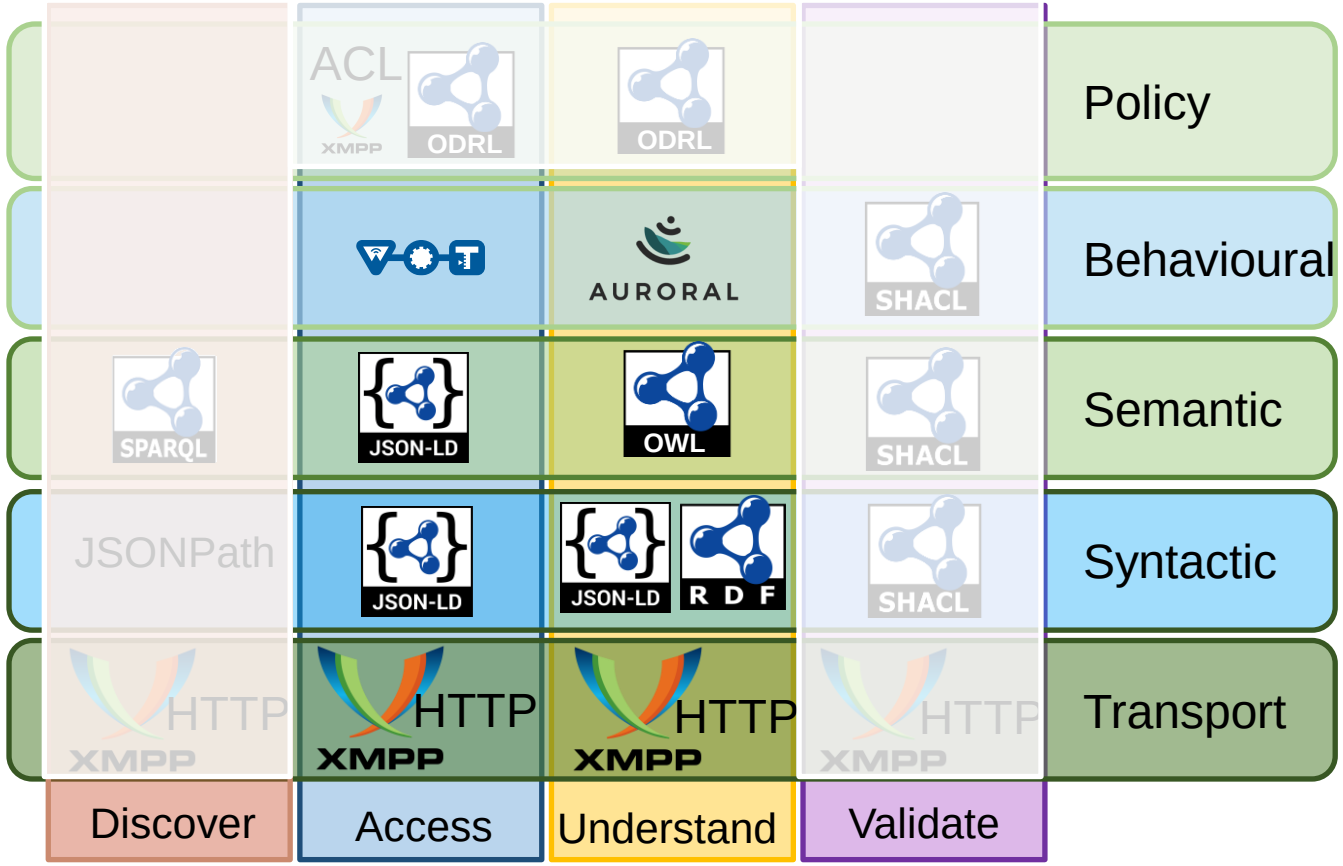


AURORAL interoperability profile

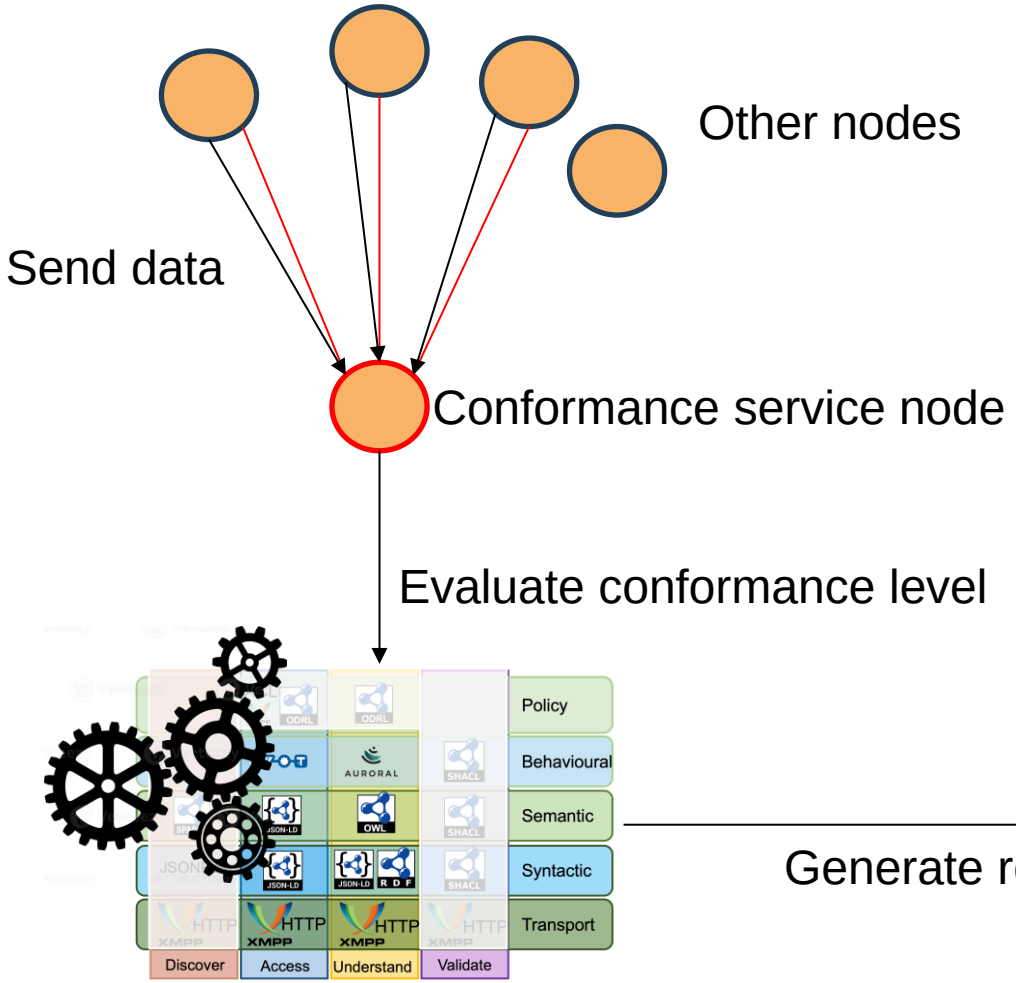


https://www.iso.org/standard/71885.html

Conformance in the AURORAL ecosystem



Ensuring conformance in the AURORAL ecosystem



Generate report

Node status:

Status	Number of Nodes
Total	116
Conformant	91
Not Conformant	25

Node details:

Status	Number of Nodes
Not Checked	0
No access	11
Access level conformant (Technical interoperability)	0
JSON conformant (Syntactic interoperability)	4
JSON-LD 1.1 conformant (Syntactic interoperability)	10
Ontology conformant (Semantic interoperability)	0
AURORAL conformant (Semantic interoperability)	91

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Conclusions and future work

- Identification of different levels to measure semantic interoperability conformance
  - Technical, syntactic, semantic, behavioral, and policy-based.
- Demonstration of how to verify node compliance with the interoperability framework defined for the AURORAL platform.
- Future work:
  - Develop non-project-specific automated tools to evaluate conformance.
  - Allow adjusting and configuring the tool for any project.
  - Issue interoperability certificates based on transparent and secure technologies (e.g. blockchain, DLT).

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