# Trust Envelopes as Instruments of Transparency and Accountability

**Beatriz Esteves**

**Solid Community day (June 20th, 2025):**
**Solid Foundations, Smart Spaces: Transforming Health Through Data**

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# Trust Envelopes as Instruments of Transparency and Accountability

Why does our data need trust?

What is needed in a trust envelope?

How are we building trust envelopes?

Where we are and where we want to go

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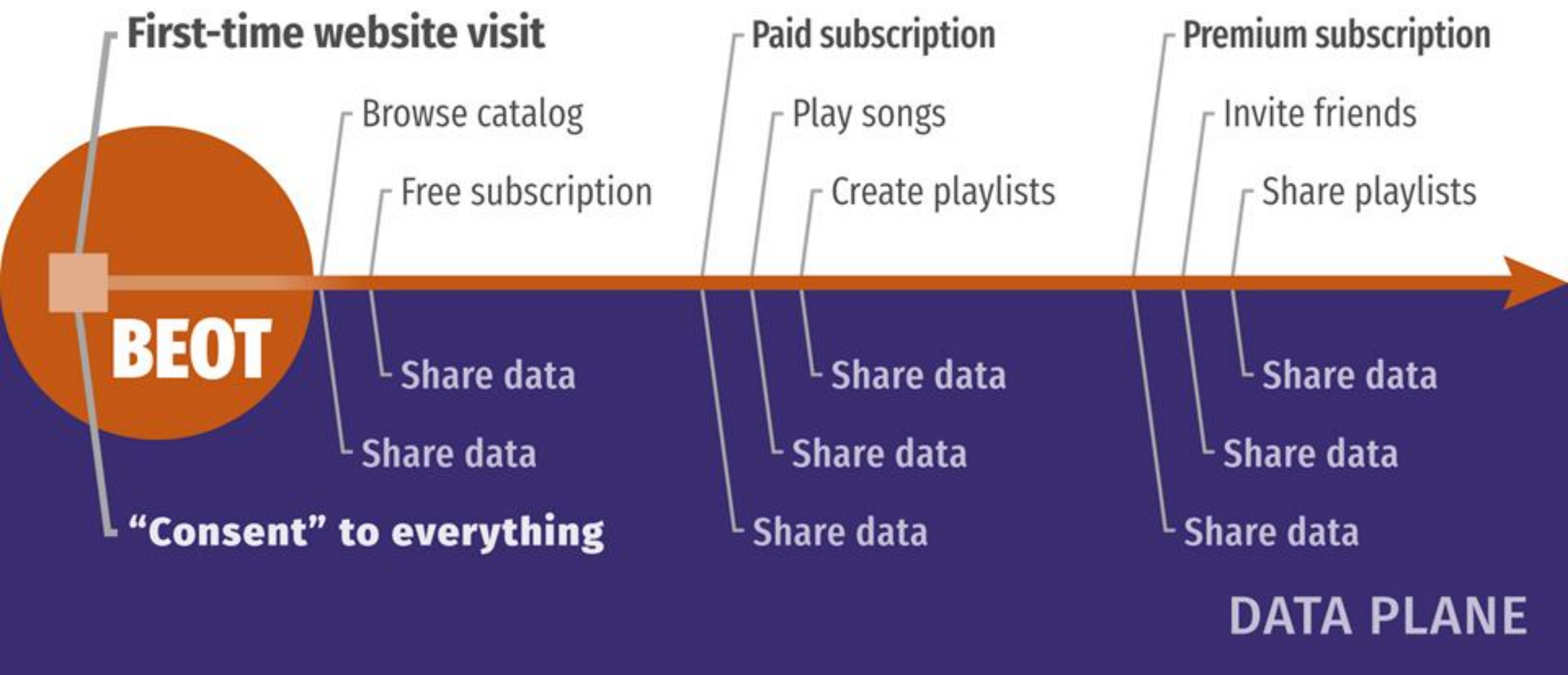
# Trustless consent model

INTERACTION PLANE



First-time website visit

BEOT

"Consent" to everything

Browse catalog

Share data

Free subscription

Share data

Paid subscription

Share data

Play songs

Share data

Create playlists

Share data

Premium subscription

Share data

Invite friends

Share data

Share playlists

Share data

DATA PLANE

# Regulations

# Regulations

# Regulations

GDPR

DG
A

DMA

DSA

Data
Act

EUDI

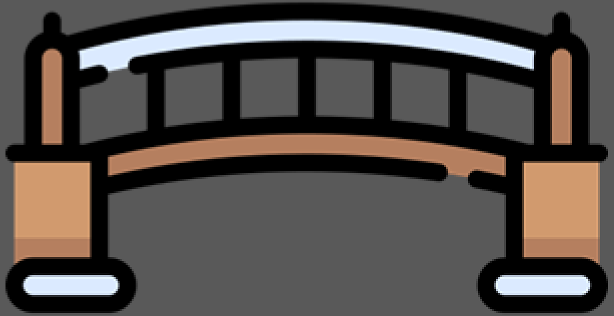
AI
Act

EHDS

Regulations

Case law

Guidelines



Compliance

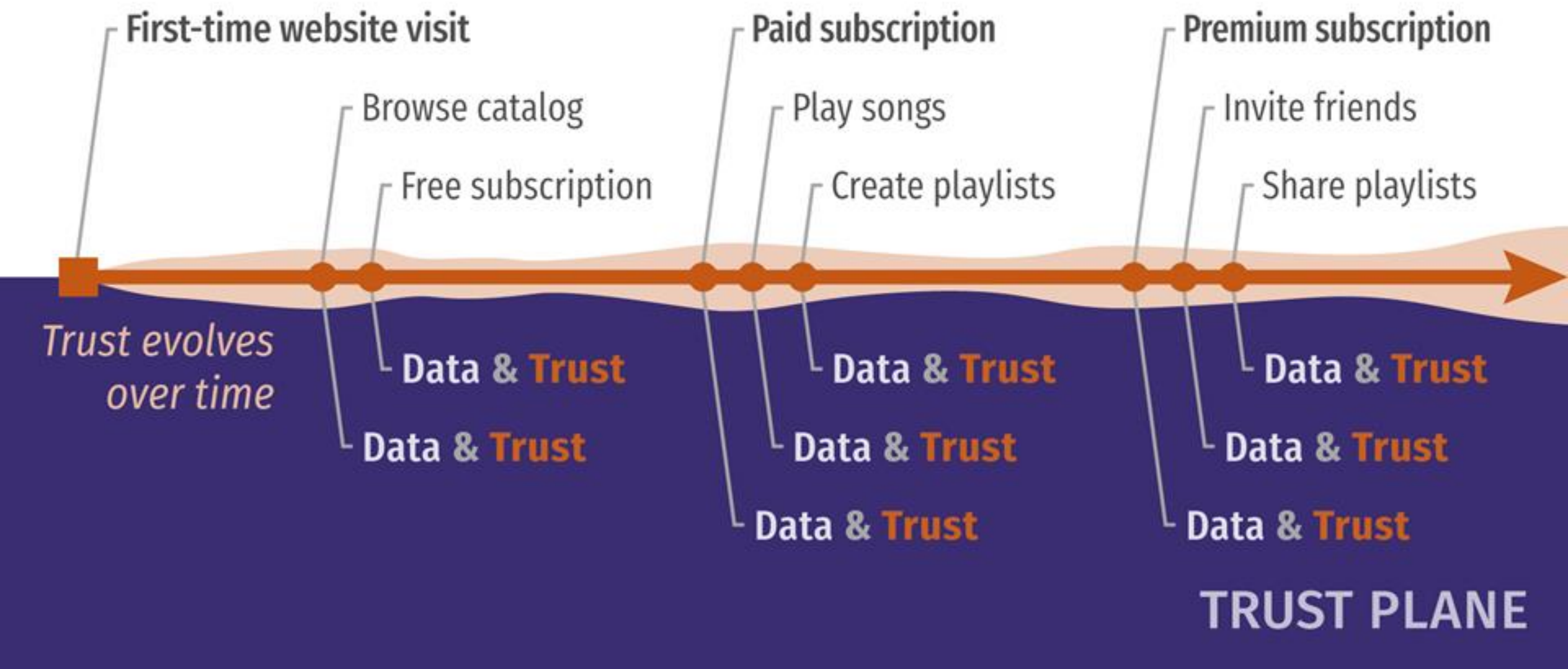
Automation

Insights

Personalisation

# Evolving trust relationships

INTERACTION PLANE



First-time website visit

Browse catalog

Free subscription

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Play songs

Create playlists

Premium subscription

Invite friends

Share playlists

*Trust evolves over time*

Data & Trust

Data & Trust

Data & Trust

Data & Trust

Data & Trust

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Data & Trust

TRUST PLANE

# Trust Envelopes as Instruments of Transparency and Accountability

Why does our data need trust?

**<u>What is needed in a trust envelope?</u>**

How are we building trust envelopes?

Where we are and where we want to go

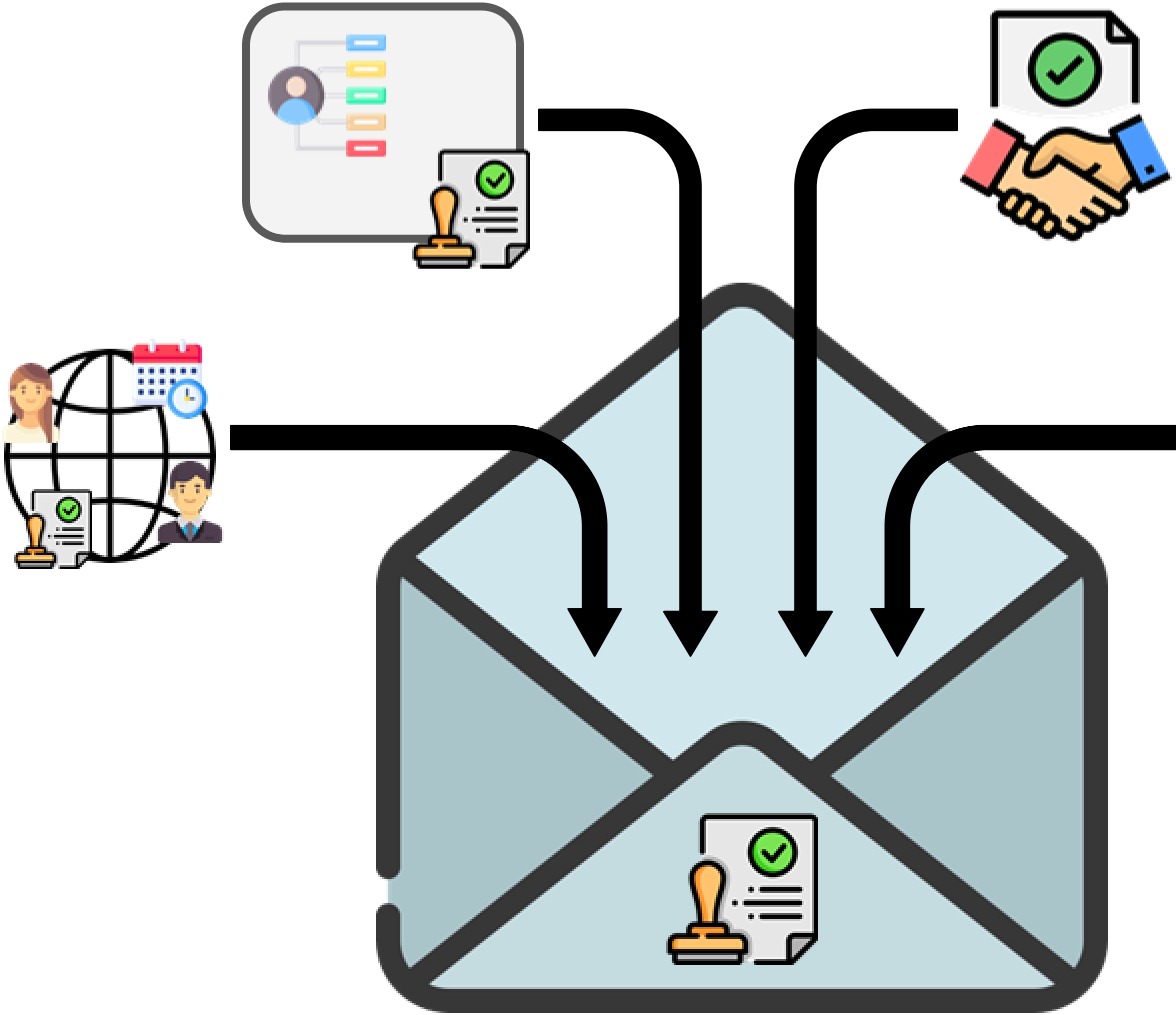
Verifiable data

Instantiated policy

Data Provenance

Policy Provenance

Icons from Uniconlabs, adrianadam, Parzival' 1997, Good Ware, Flaticon, nangicon, and Freepik.



Icons from Uniconlabs, adrianadam, Parzival' 1997, Good Ware, Flaticon, nangicon, and Freepik.

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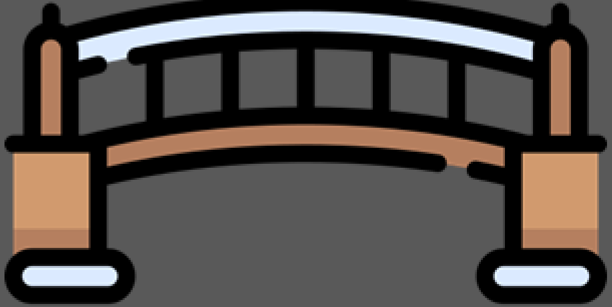
Regulations

Case law

Guidelines



Compliance

Automation

Insights

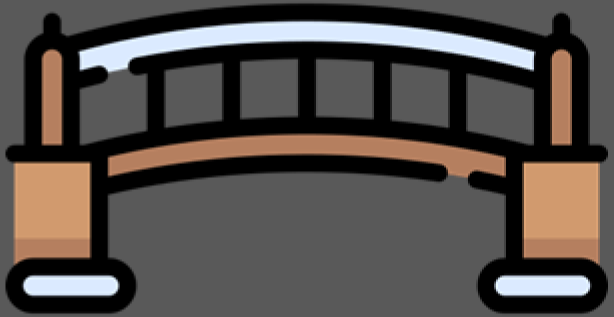
Personalisation

# Standards

Regulations

Case law

Guidelines



Compliance

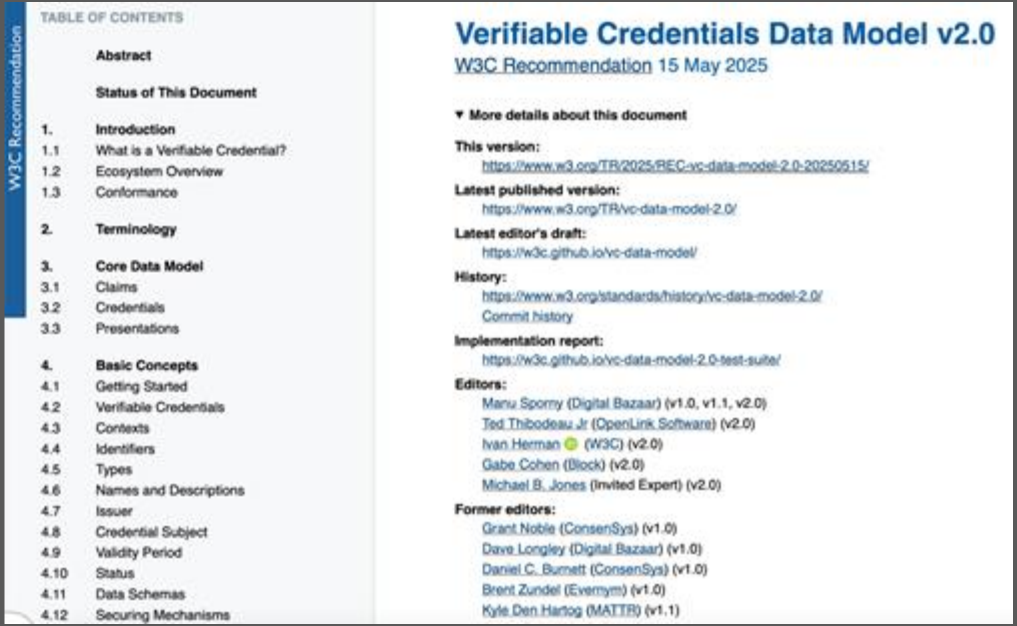
Automation

Insights

Personalisation

Verifiable data

https://www.w3.org/TR/vc-data-model-2.0/



W3C Recommendation

# Verifiable Credentials Data Model v2.0

W3C Recommendation 15 May 2025

▼ More details about this document

**This version:**
https://www.w3.org/TR/2025/REC-vc-data-model-2.0-20250515/

**Latest published version:**
https://www.w3.org/TR/vc-data-model-2.0/

**Latest editor's draft:**
https://w3c.github.io/vc-data-model/

**History:**
https://www.w3.org/standards/history/vc-data-model-2.0/
Commit history

**Implementation report:**
https://w3c.github.io/vc-data-model-2.0-test-suite/

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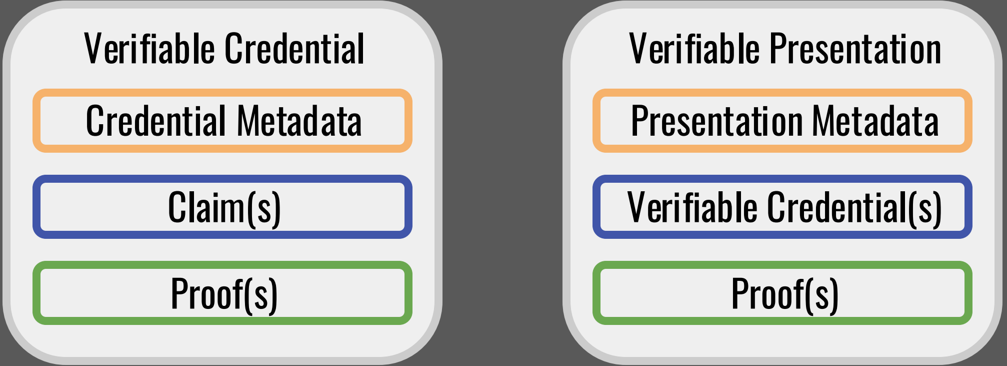


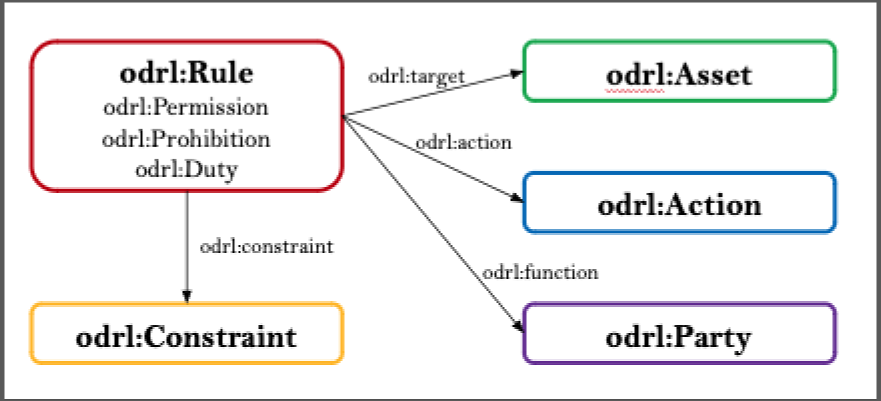
Verifiable Credential

- Credential Metadata
- Claim(s)
- Proof(s)

Verifiable Presentation

- Presentation Metadata
- Verifiable Credential(s)
- Proof(s)

Instantiated policy



odrl:Rule
odrl:Permission
odrl:Prohibition
odrl:Duty

odrl:target

odrl:Asset

odrl:action

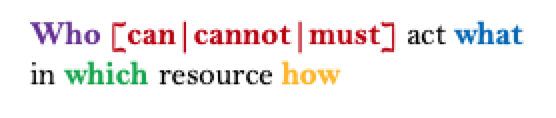
odrl:Action

odrl:function

odrl:Party

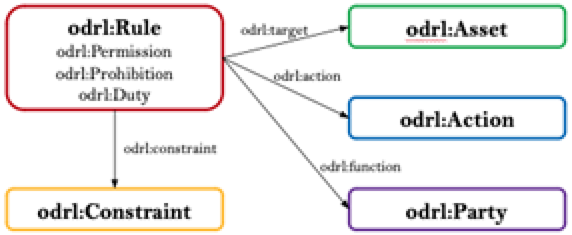
odrl:constraint

odrl:Constraint



Who [can|cannot|must] act what
in which resource how

Instantiated policy



Who [can|cannot|must] act what in which resource how

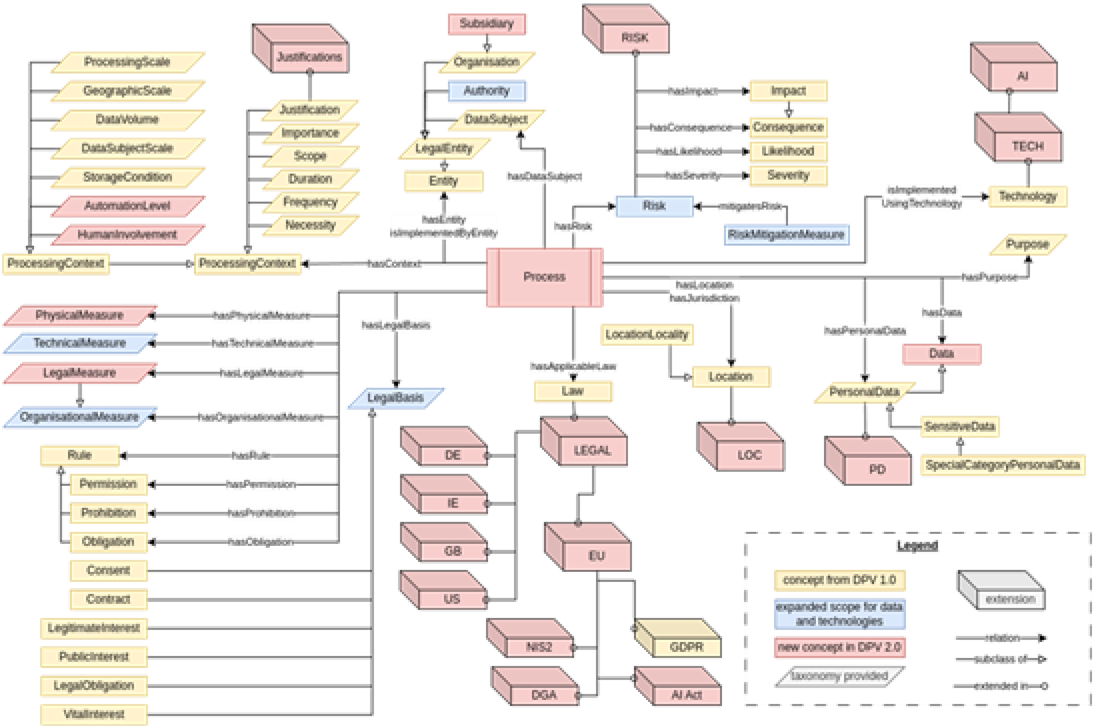
- W3C Recommendation
- Maintained by the W3C ODRL Community Group
- Composed by several specifications
  - ODRL Information Model – W3C Recommendation
  - ODRL Core Vocabulary – W3C Recommendation
  - ODRL Implementation Best Practices
  - ODRL Profile Best Practices
  - ODRL Formal Semantics [Under development]
- Easily extendable through the use of ODRL profiles

# Data Privacy Vocabulary (DPV)

- Developed by the **W3C** Data Privacy Vocabularies and Controls Community Group (**DPVCG**)
- Defines a **jurisdiction-agnostic** ontology for expressing metadata about the processing of personal data
- Provides **hierarchical taxonomies**, from abstract to more specific concepts, to instantiate specific concepts in practical use-cases
- Has **law-specific extensions**

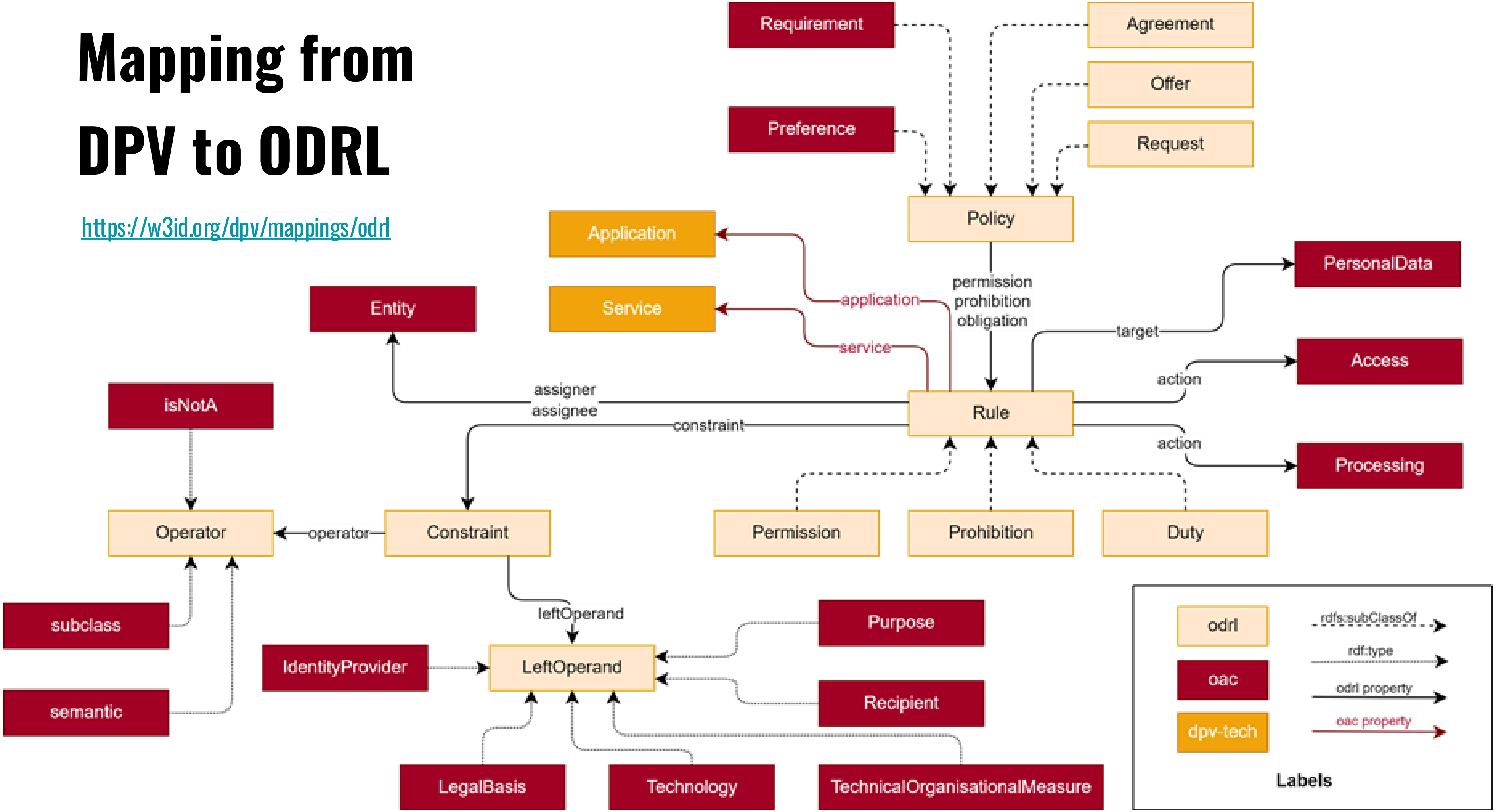
https://w3id.org/dpv

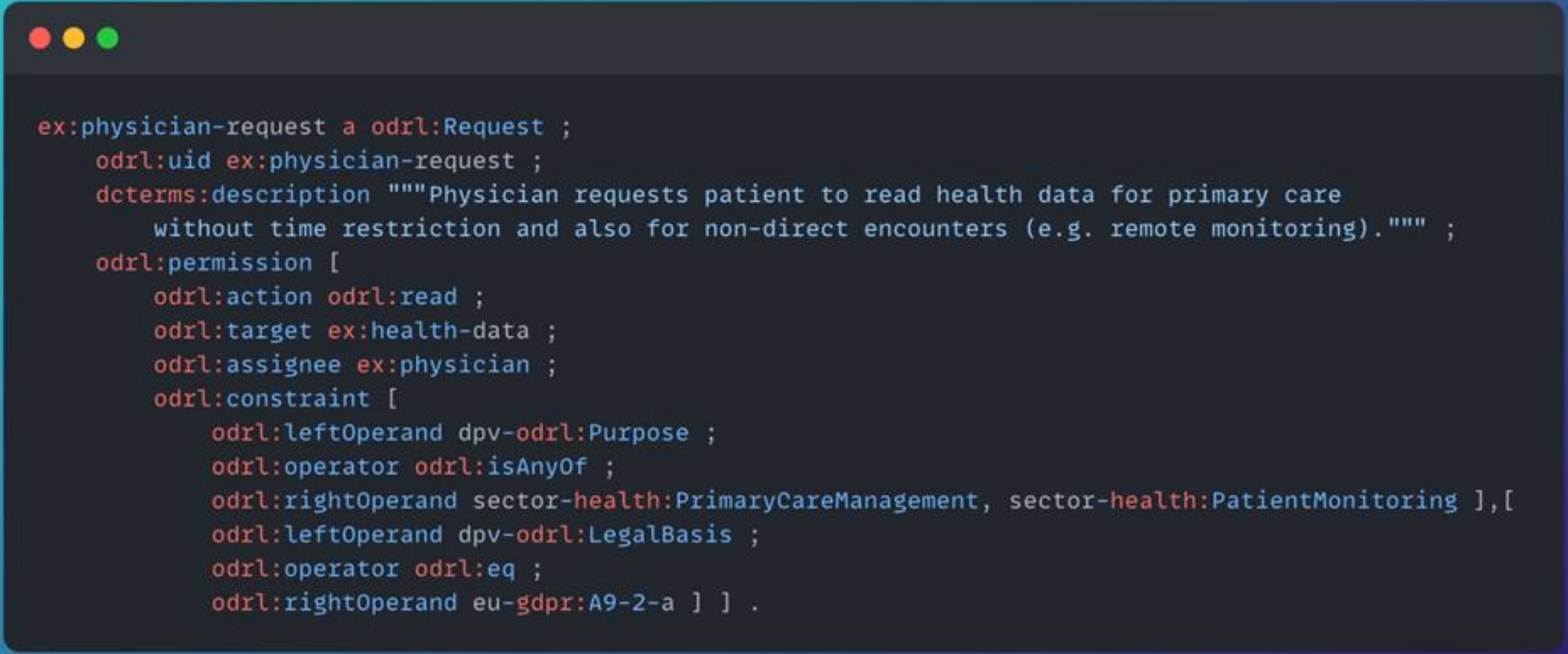
https://w3id.org/dpv/primer



# Mapping from DPV to ODRL

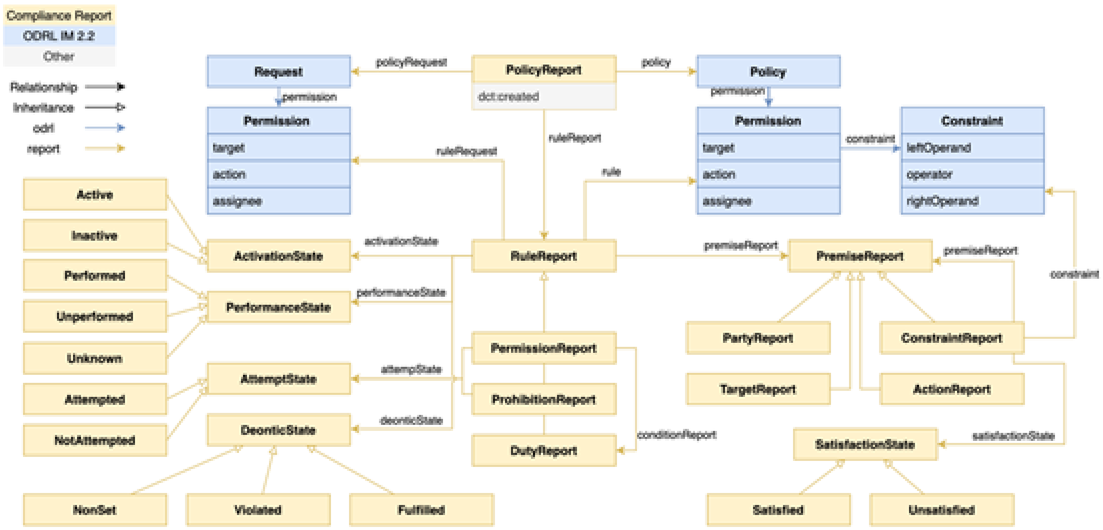
https://w3id.org/dpv/mappings/odrl





```
ex:physician-request a odrl:Request ;
    odrl:uid ex:physician-request ;
    dcterms:description """Physician requests patient to read health data for primary care
        without time restriction and also for non-direct encounters (e.g. remote monitoring).""" ;
    odrl:permission [
        odrl:action odrl:read ;
        odrl:target ex:health-data ;
        odrl:assignee ex:physician ;
        odrl:constraint [
            odrl:leftOperand dpv-odrl:Purpose ;
            odrl:operator odrl:isAnyOf ;
            odrl:rightOperand sector-health:PrimaryCareManagement, sector-health:PatientMonitoring ],[
            odrl:leftOperand dpv-odrl:LegalBasis ;
            odrl:operator odrl:eq ;
            odrl:rightOperand eu-gdpr:A9-2-a ] ] .
```

# Interoperable Interpretation and Evaluation of ODRL Policies

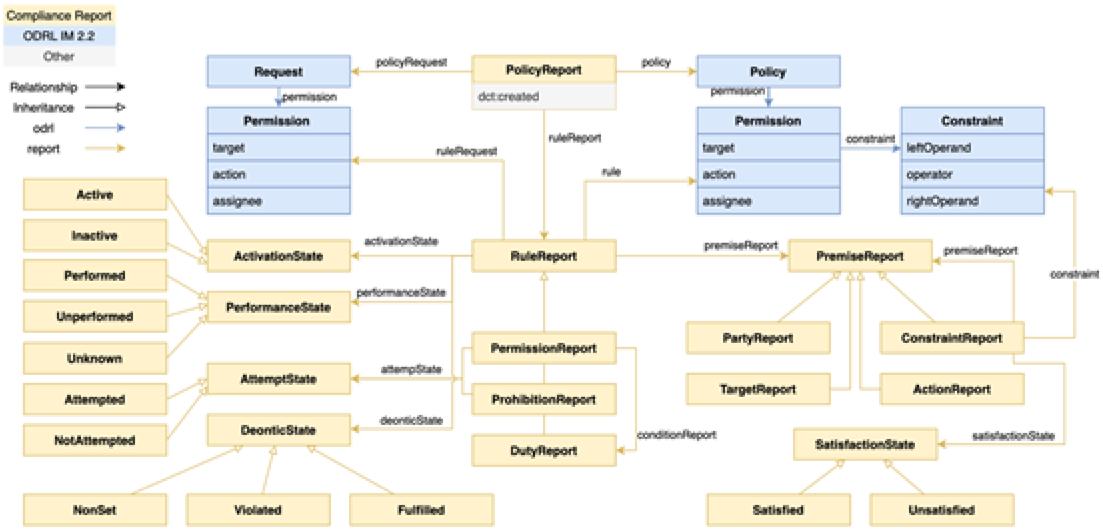


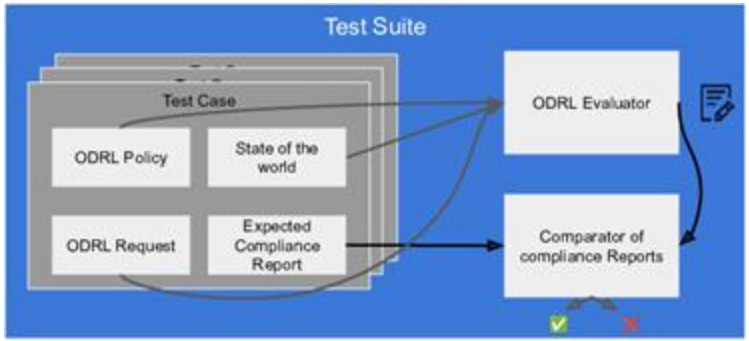
https://w3id.org/force/compliance-report

ESWC 2025

Best Resource Nominee

# Interoperable Interpretation and Evaluation of ODRL Policies





https://w3id.org/force/compliance-report

https://w3id.org/force/test-suite

# Agreement Instantiation

- Validate the proper modelling of the odrl:Policy, odrl:Request and SoTW information.
- Convert compact policies into their atomic equivalents.
- Evaluate policies to generate compliance reports.
- Reference the ODRL request that triggered the agreement instantiation and the policies from the data subject/holder.
- Instantiate the concrete assigner and assignee of the agreement.
- Include relevant rules with concrete actions, targets and constraints.

https://w3id.org/force/evaluator

https://w3id.org/force/ESWC2025-demo

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# Conclusions & future work

Enforcement of interoperable policies

Alignment with legal requirements from GDPR

Validated by legal experts in DPV and SolidLab & PACSOI projects

Finalise Trust Envelopes specification

Extend evaluator to cover all ODRL left operands & operators

Extend evaluator to cover all DPV constraints

Use different legal grounds to share data

Integrate provenance standards (DCAT, PROV, …)

IDLab
INTERNET & DATA LAB

GHENT
UNIVERSITY

imec

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