Paving the Way
from Privacy to Trust

Beatriz Esteves

Beatriz is Portuguese

Beatriz is Portuguese

Beatriz is Brazilian

Beatriz is Portuguese

Beatriz is Brazilian

Beatriz is Belgian

Without context

Data has no Trust

Digital Twin Personalisation

Personal data is used to tailor the behaviour of buildings or spaces based on user-specific patterns and preferences

Paving the Way from Privacy to Trust

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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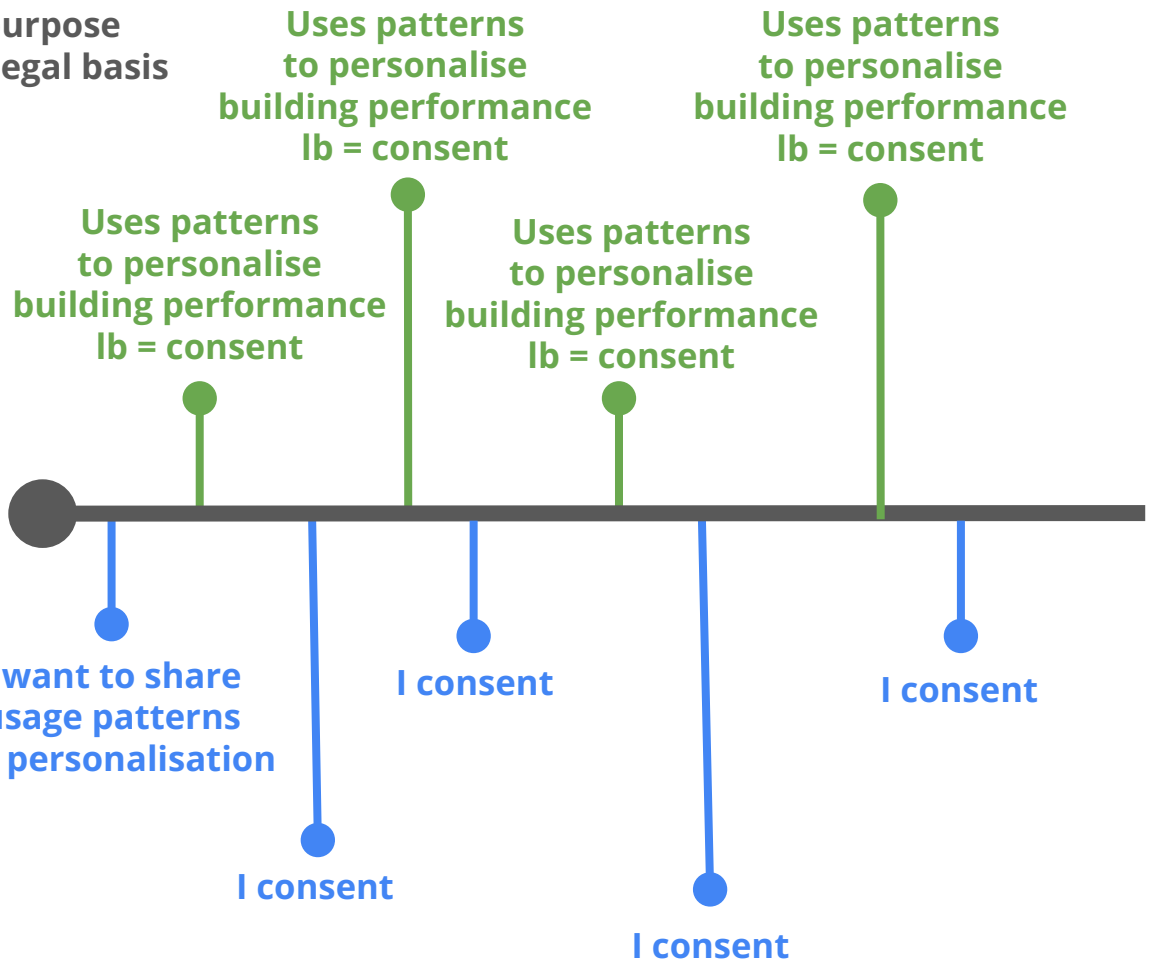
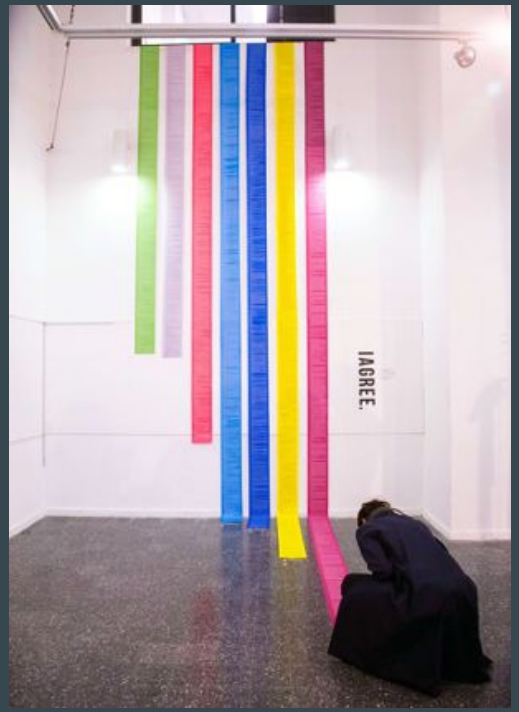
p→purpose
lb→legal basis



Regulations

Regulations



Regulations

Regulations

Case law

Guidelines

Regulations

Case law

Guidelines

Compliance

Regulations

Case law

Guidelines

Compliance

Automation

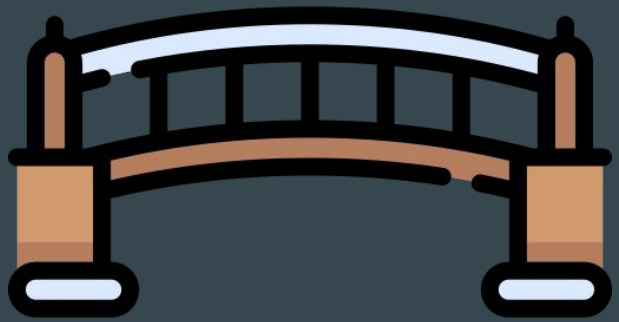
Insights

Personalisation

Regulations

Case law

Guidelines



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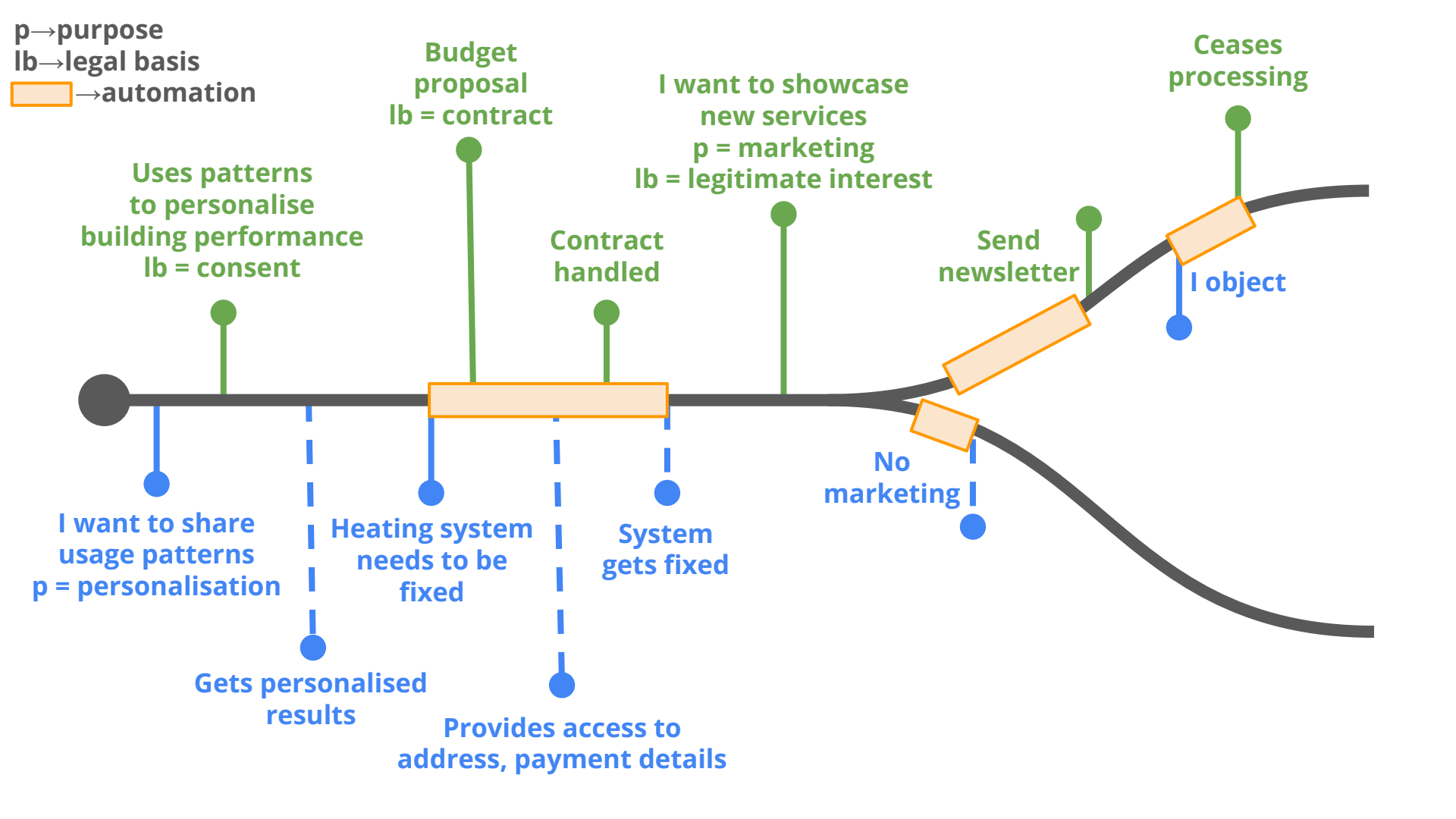
p→purpose
lb→legal basis
→automation
Budget proposal lb = contract
I want to showcase new services p = marketing lb = legitimate interest
Ceases processing
Uses patterns to personalise building performance lb = consent
Contract handled
Send newsletter
I object
I want to share usage patterns p = personalisation
Heating system needs to be fixed
System gets fixed
No marketing
Gets personalised results
Provides access to address, payment details

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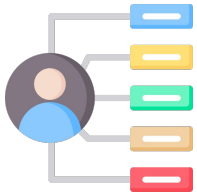
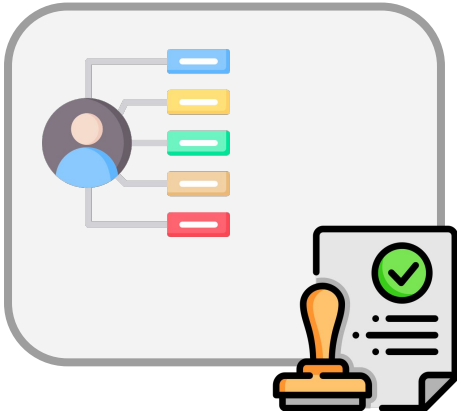
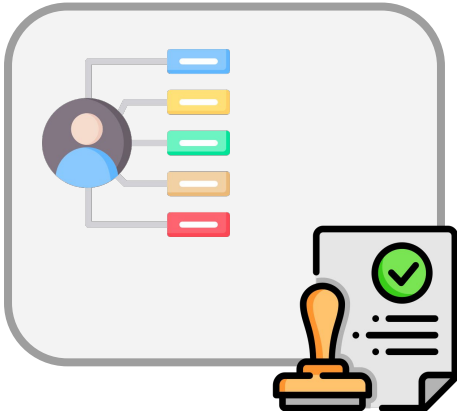


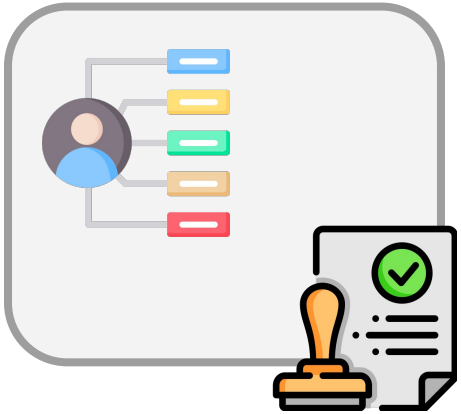


Verifiable data



Verifiable data

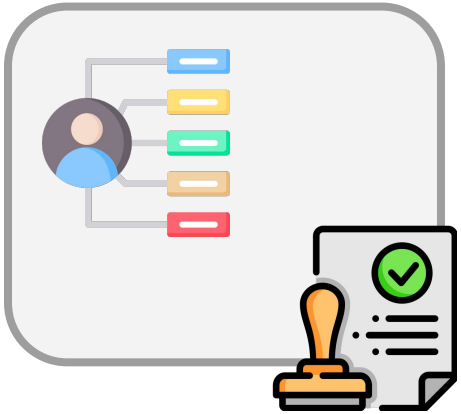
Data Provenance



Verifiable data

Instantiated policy

Data Provenance



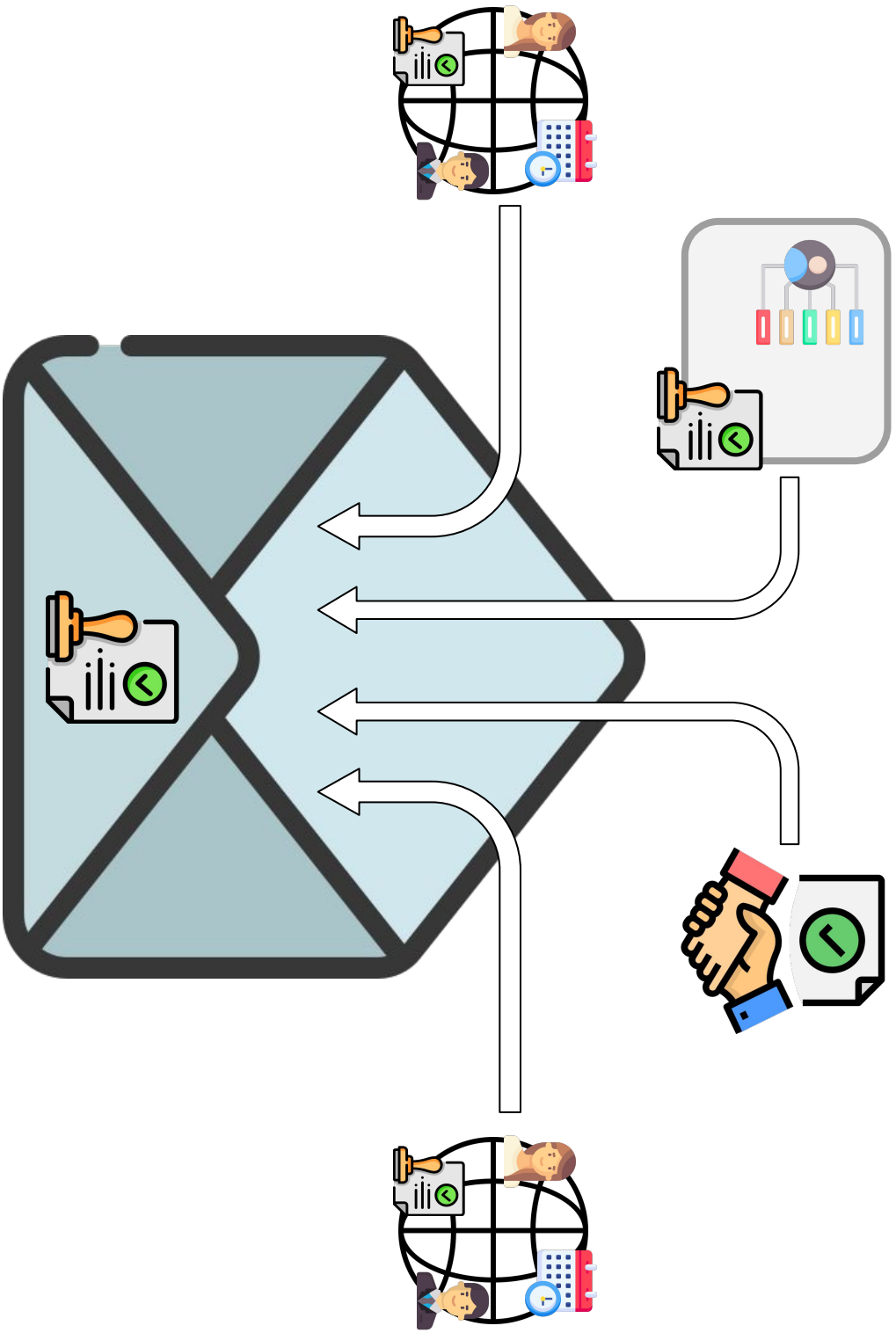
Verifiable data

Instantiated policy

Data Provenance

Policy Provenance

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



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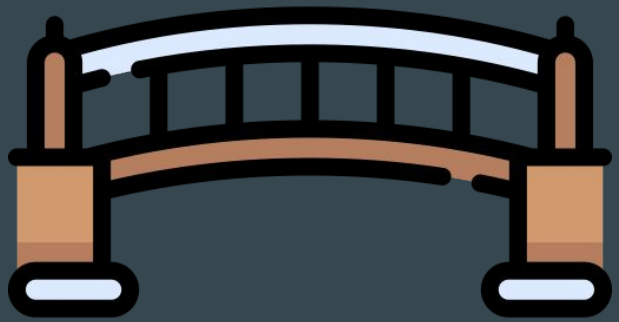
Case law

Guidelines



Compliance

Automation

Insights

Personalisation

Standards

Regulations

Case law

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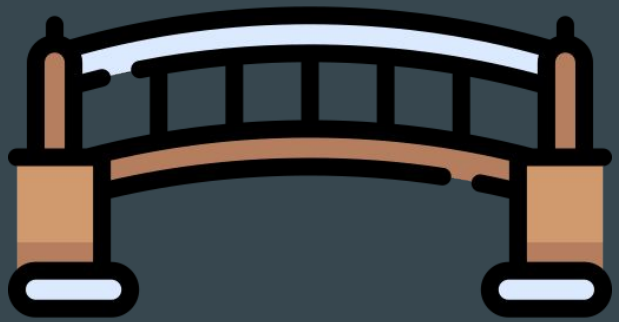

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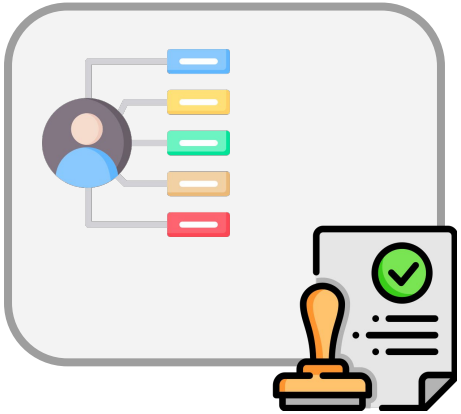

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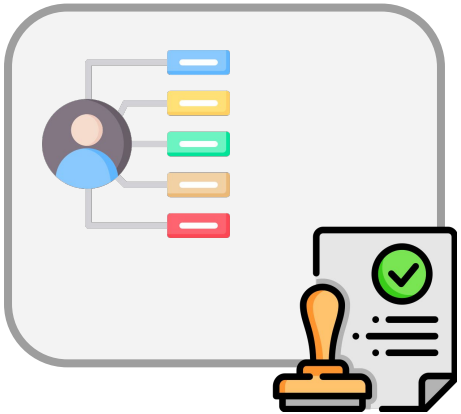

Verifiable data

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

W3C Recommendation

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Verifiable Credentials Data Model v2.0

W3C Recommendation 15 May 2025

▼ More details about this document

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Ted Thibodeau Jr (OpenLink Software) (v2.0)
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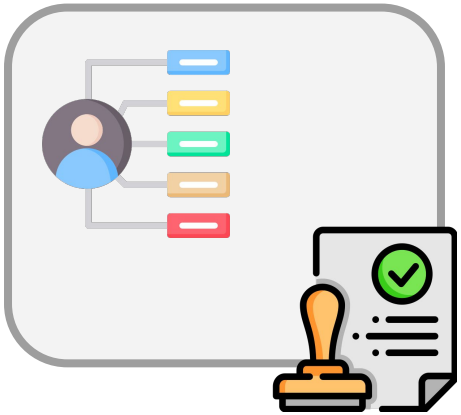

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Verifiable Credential

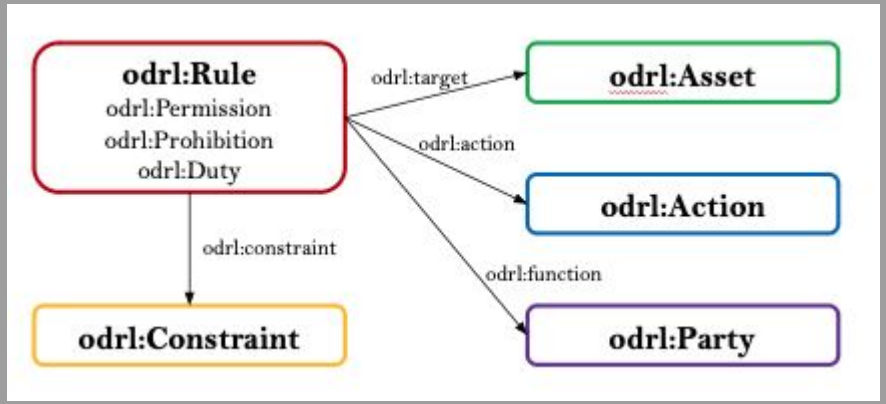
- Credential Metadata
- Claim(s)
- Proof(s)

Verifiable Presentation

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

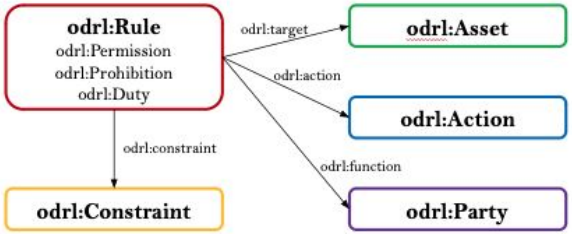
Instantiated policy

Instantiated policy



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

Instantiated policy



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

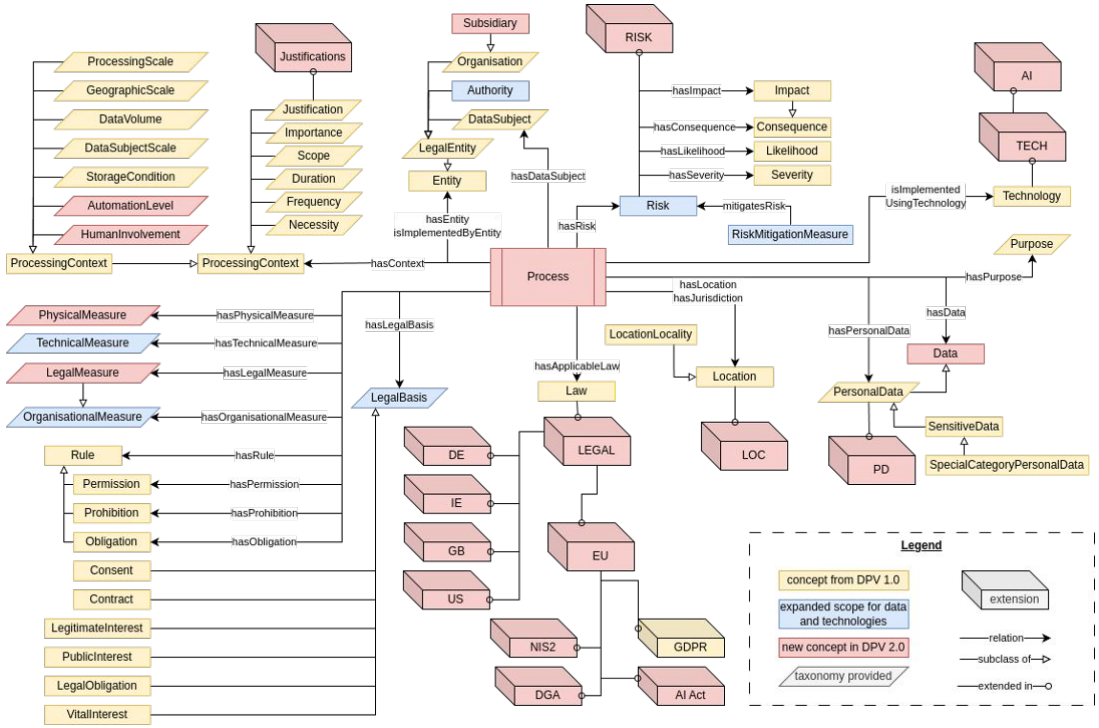
- W3C Recommendation
- Maintained by the W3C ODRL Community Group
- Composed by several specifications
  - ODRL Information Model – W3C Recommendation
  - ODRL Core Vocabulary – W3C Recommendation
  - ODRL Implementation Best Practices
  - ODRL Profile Best Practices
  - ODRL Formal Semantics [Under 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**

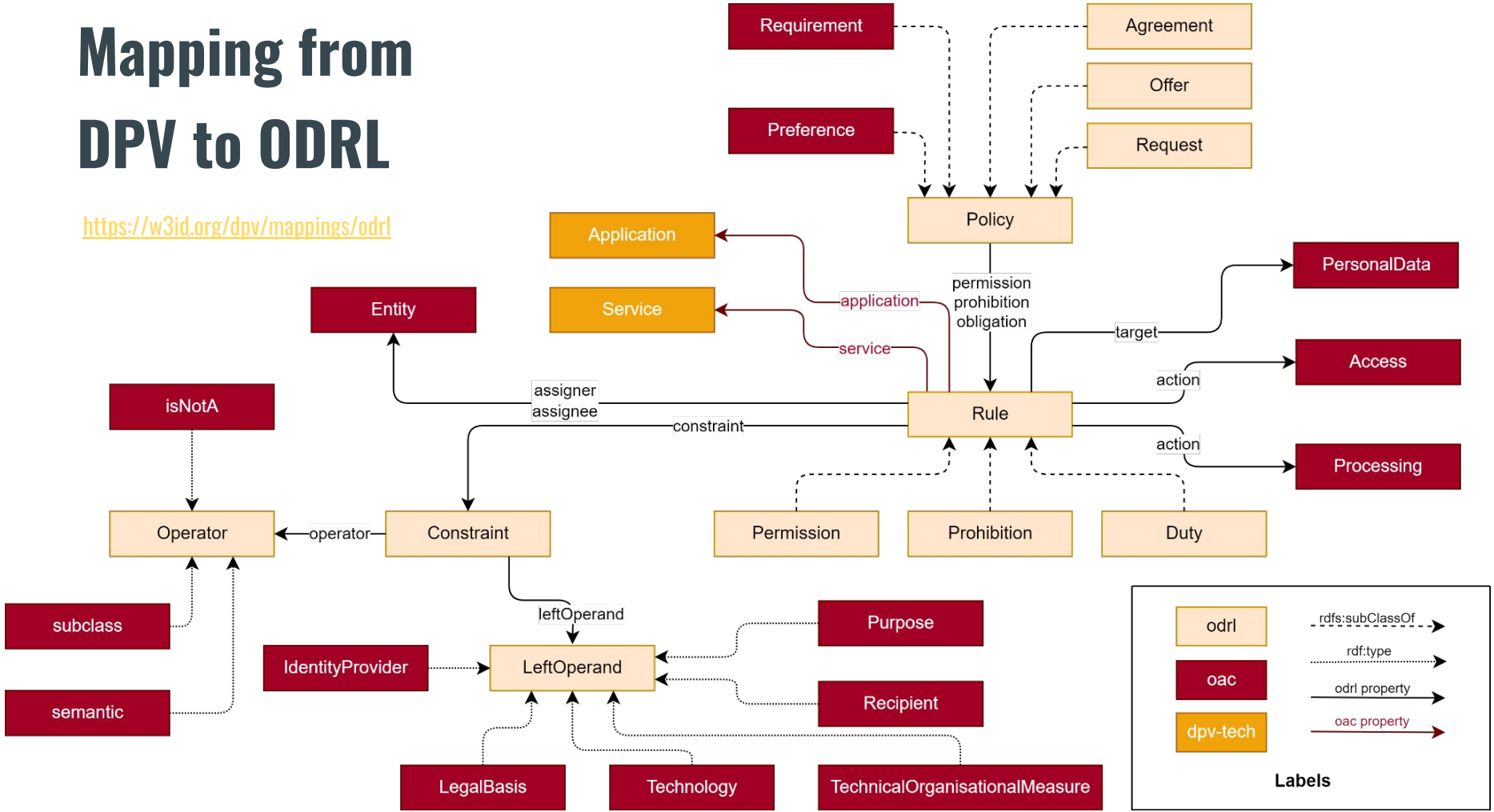
https://w3id.org/dpv

https://w3id.org/dpv/primer



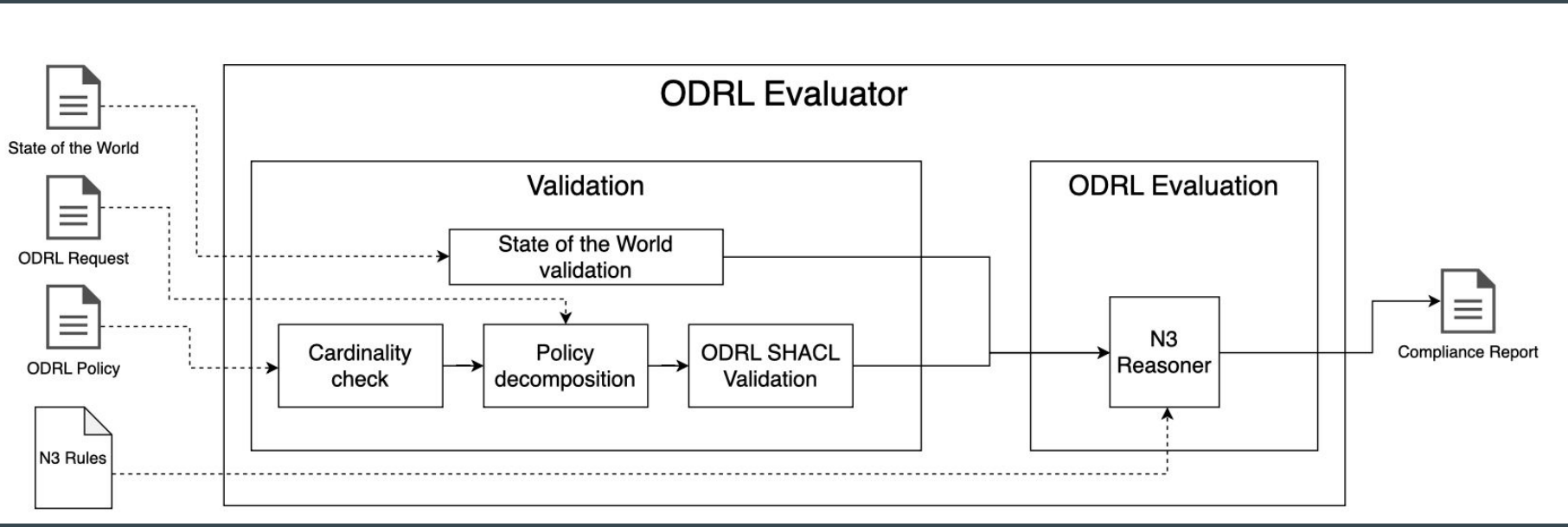
Mapping from DPV to ODRL

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



```
ex:request a odrl:Request ;
    odrl:uid ex:request ;
    dcterms:description "Request to read usage patterns for personalised building performance." ;
    odrl:permission [
        odrl:action odrl:read ;
        odrl:target ex:usage-patterns ;
        odrl:assignee ex:building-maintainer ;
        odrl:constraint [
            odrl:leftOperand dpv-odrl:Purpose ;
            odrl:operator odrl:eq ;
            odrl:rightOperand dpv:ServicePersonalisation ], [
            odrl:leftOperand dpv-odrl:LegalBasis ;
            odrl:operator odrl:eq ;
            odrl:rightOperand eu-gdpr:A6-1-a ] ] .
```

Interoperable Interpretation and Evaluation of ODRL Policies



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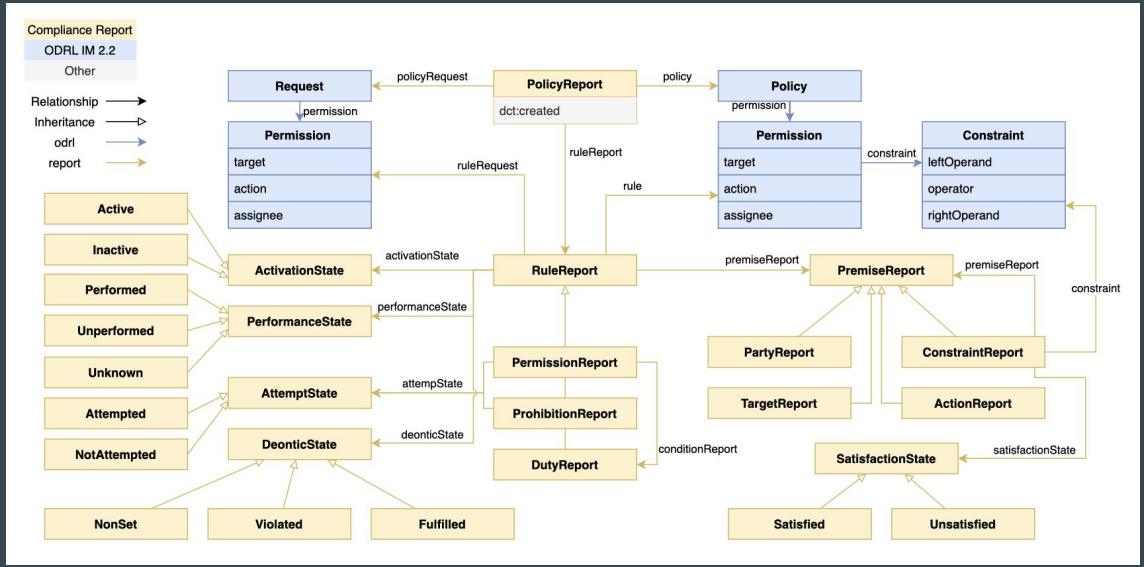
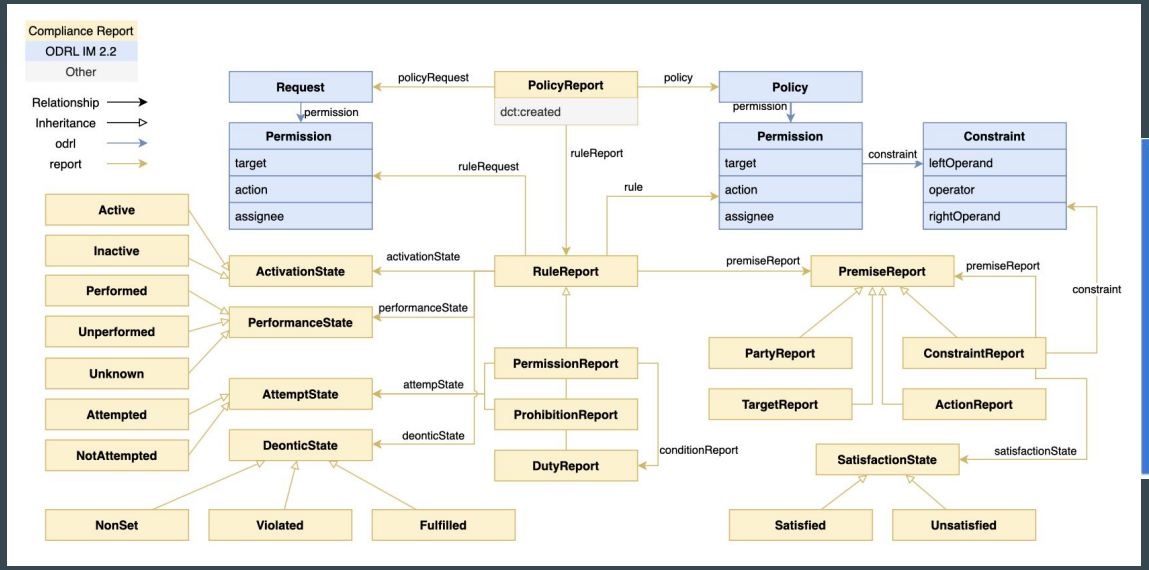


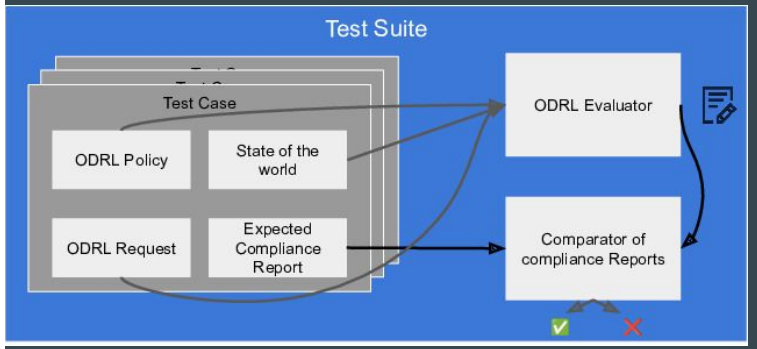
https://w3id.org/force/compliance-report

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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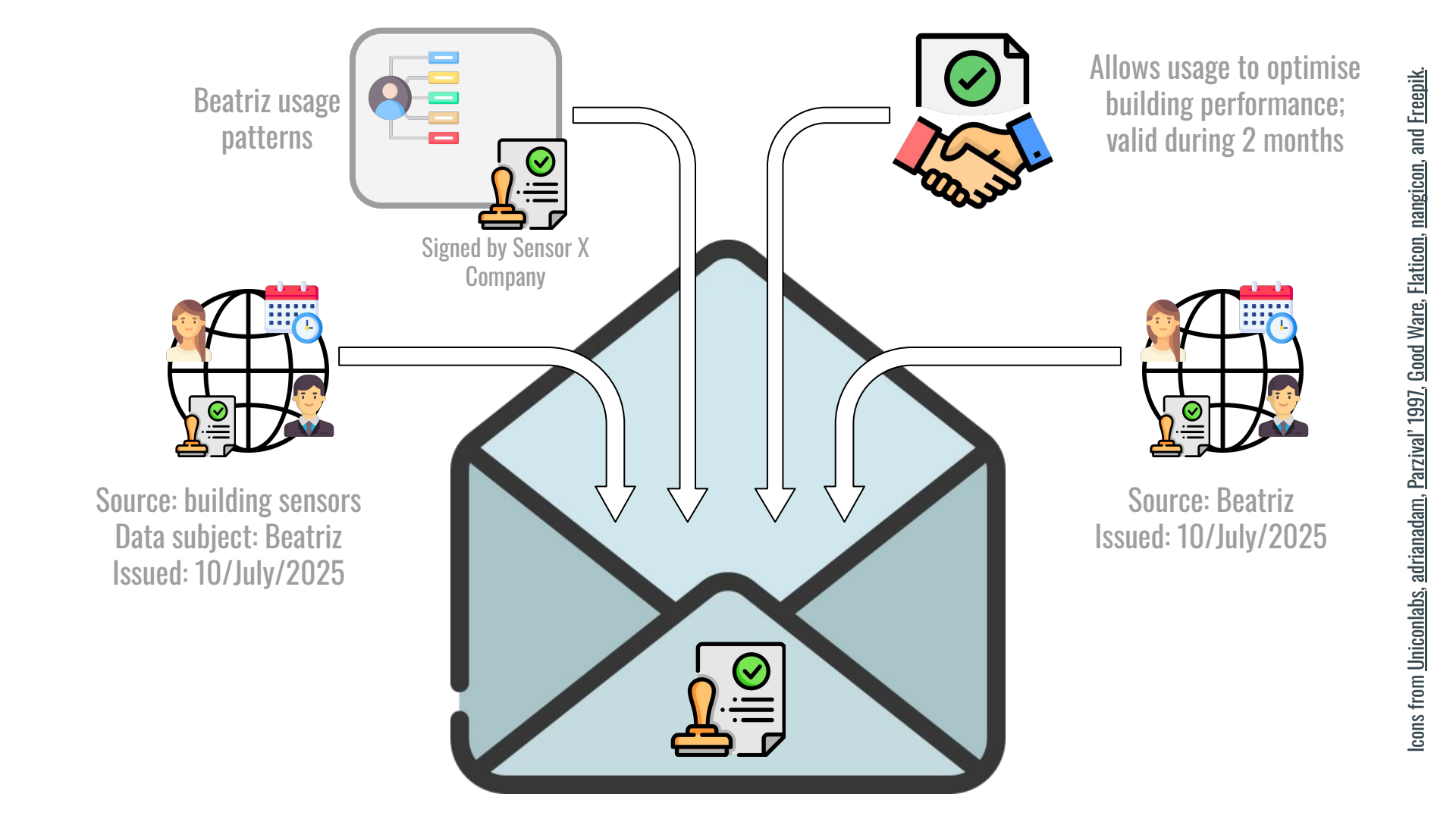
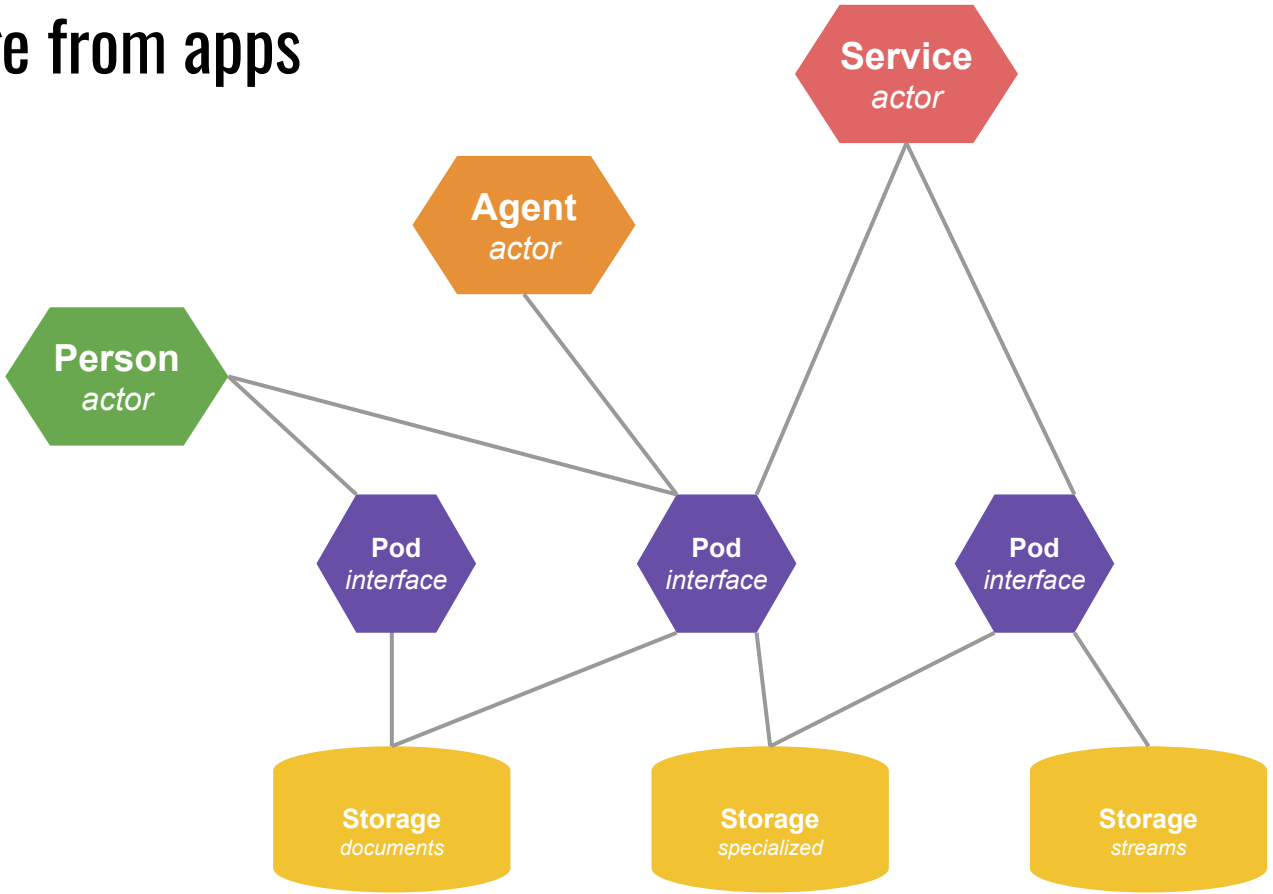
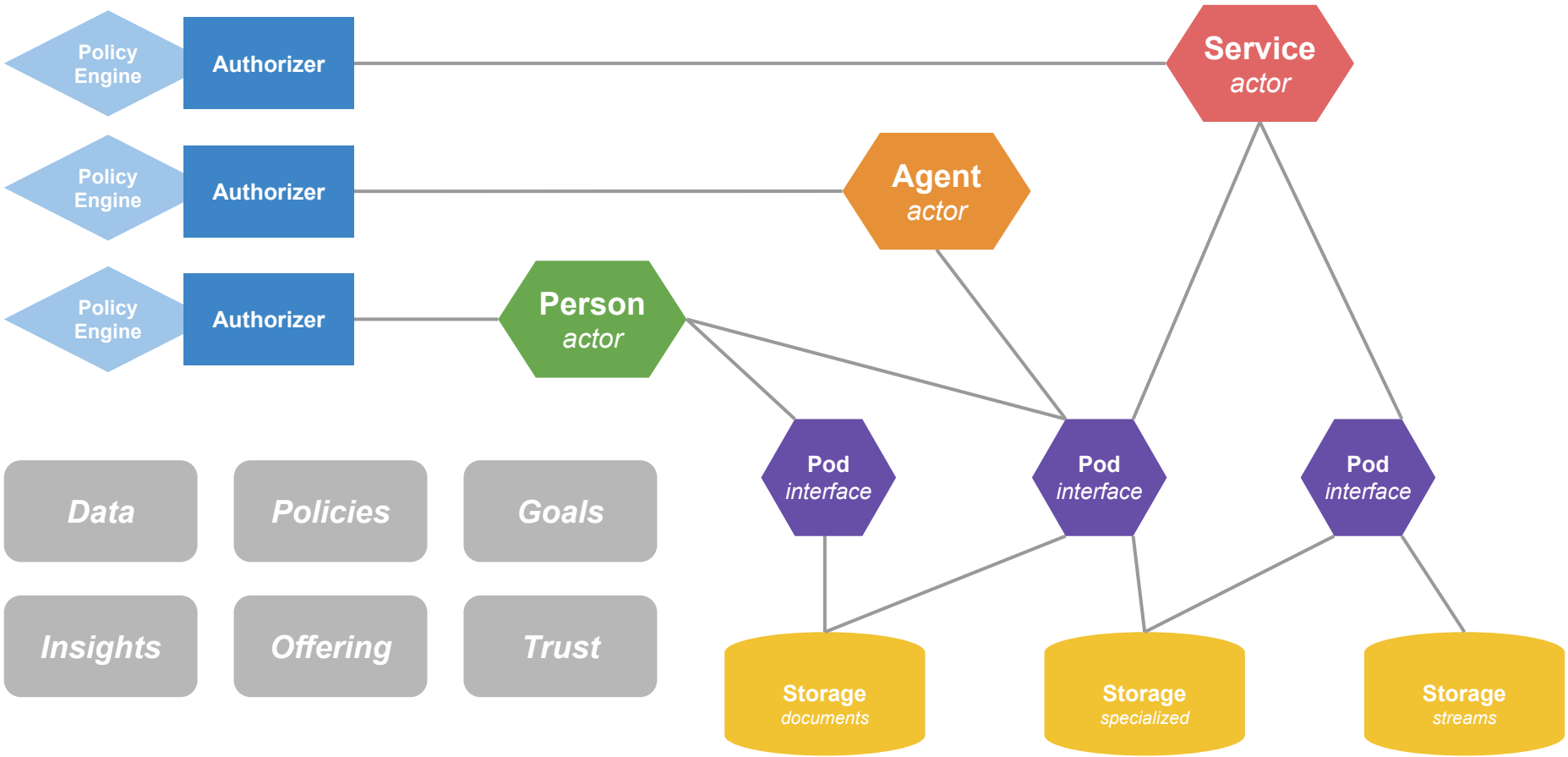


Changing the *status quo*

Solid separates storage from apps

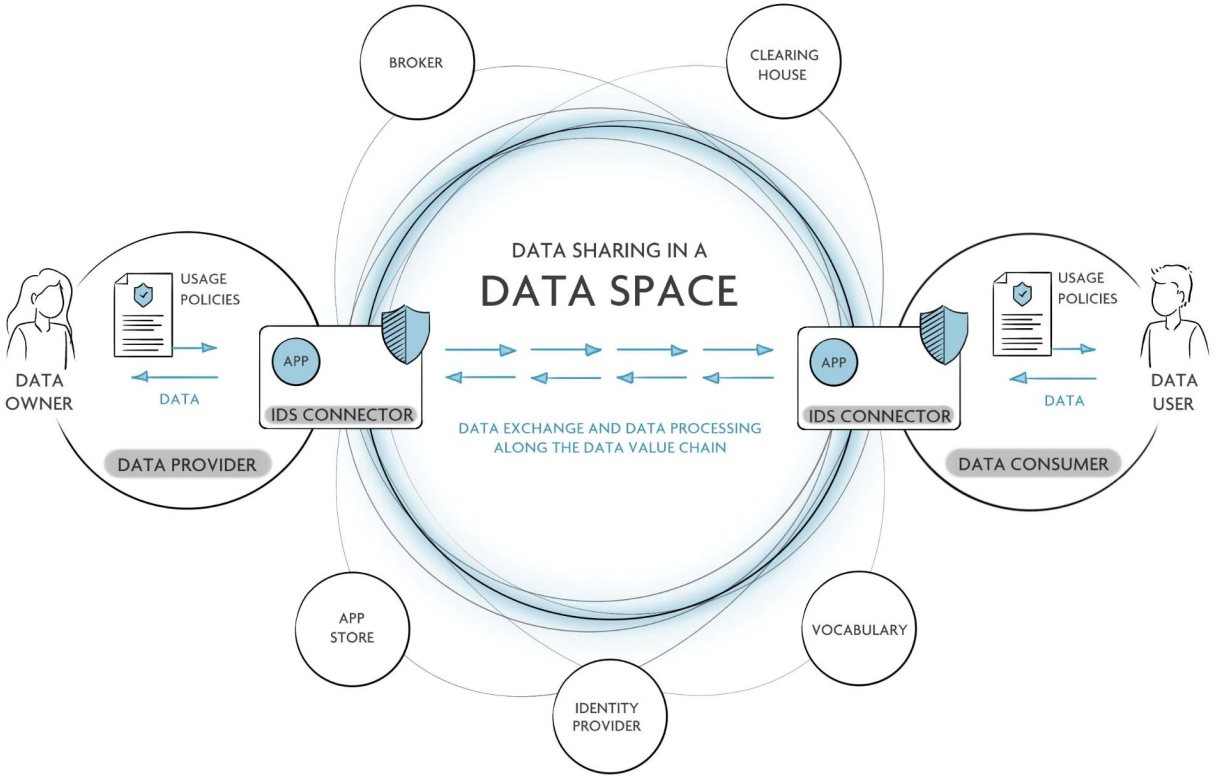


High-level ecosystem architecture – Separation of Concerns



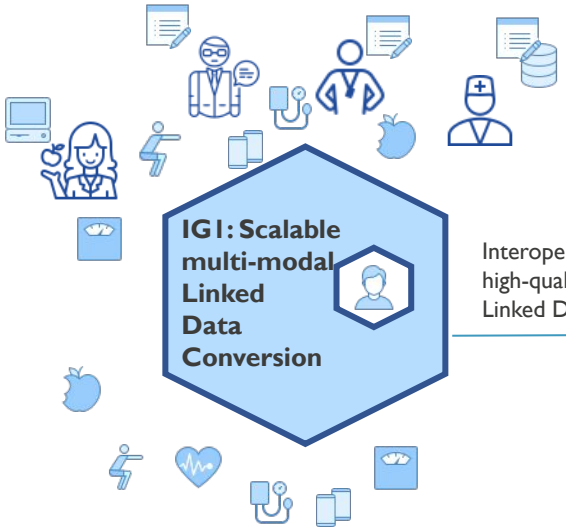
Alignment with **dataspaces**

… to automate **interoperability**, **discoverability**, and **trust**



PACSOI – Showcase

Before clinical intervention



Remote monitoring
(video, streaming data, questionnaires, etc.)

Interoperable & high-quality Linked Data

IG4: Policies enabling dynamic informed consent

IG2 & 3: Transparent, Efficient, Encrypted & Anonymized storage for multi-modal data

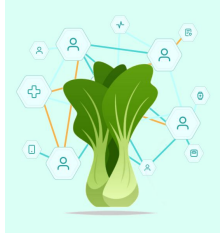
AUDIT

IG3: Qualitative audit logs of read/write operations

IG5: Aggregators to enable scalable Analytics & Querying

IG5: Federated ML

IG6: Patient journey overviews & population-based policy & research insights



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LDAC2025 - Linked Data in Architecture and Construction

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