



tech-x

TECH-X Conference & **HACKATHON** #7

23 & 24 May 2024
Luxembourg



in partnership with gaia-x

 Hub Luxembourg

#GaiaX #TechX24



Welcome and Introduction

09:00 – 09:15

Ralf Hustadt, Luxinnovation GIE

Ulrich Ahle, Gaia-X

#GaiaX #TechX24

Welcome Address

09:15 – 09:30

Gauthier Crommelinck,
Ministry of the Economy– Luxembourg

#GaiaX #TechX24

Keynote Address

09:30 – 10:00

Pierre Gronlier, Gaia-X

#GaiaX #TechX24

- Gaia-X AISBL

GAIA-X European Association for Data and Cloud

NONPROFIT

Company Number 0762747721

Status Situation Normale

Incorporation Date 1 February 2021 (over 3 years ago)

Company Type Association internationale sans but lucratif

Jurisdiction [Belgium](#)

Registered Address Avenue des Arts 6-9
Saint-Josse-ten-Noode
1210
Belgium

Dataspace Business Committee

- Represent the voice of the market / Lighthouse projects / Hubs
 - Collect business requirements from different verticals / domains

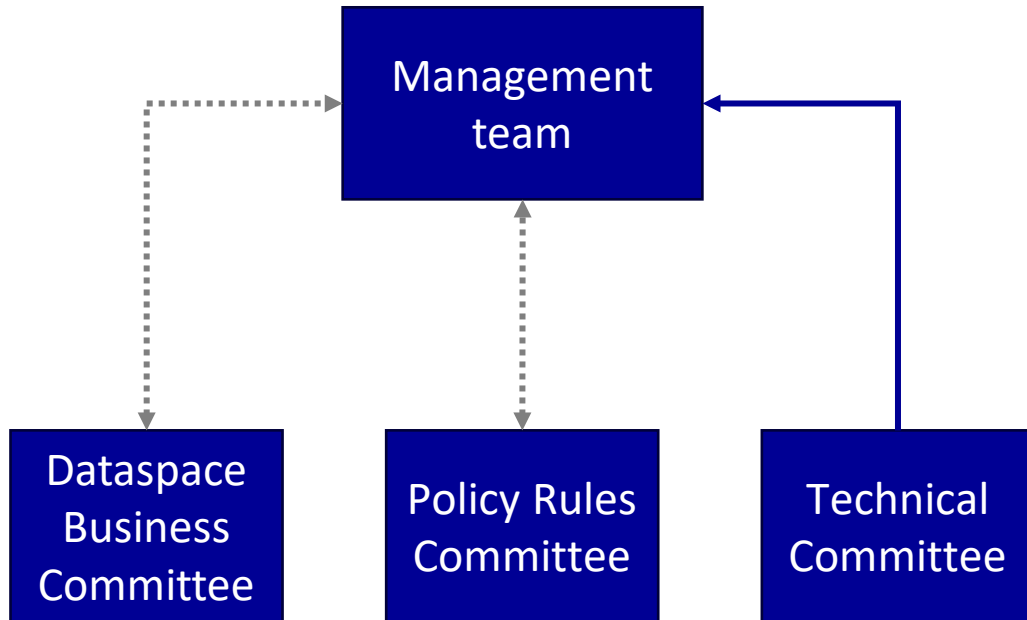
Policy Rules Committee

- Elaborate policy rules in accordance with the business needs
 - Ensure Gaia-X Compliance relevance and adoption at a global scale

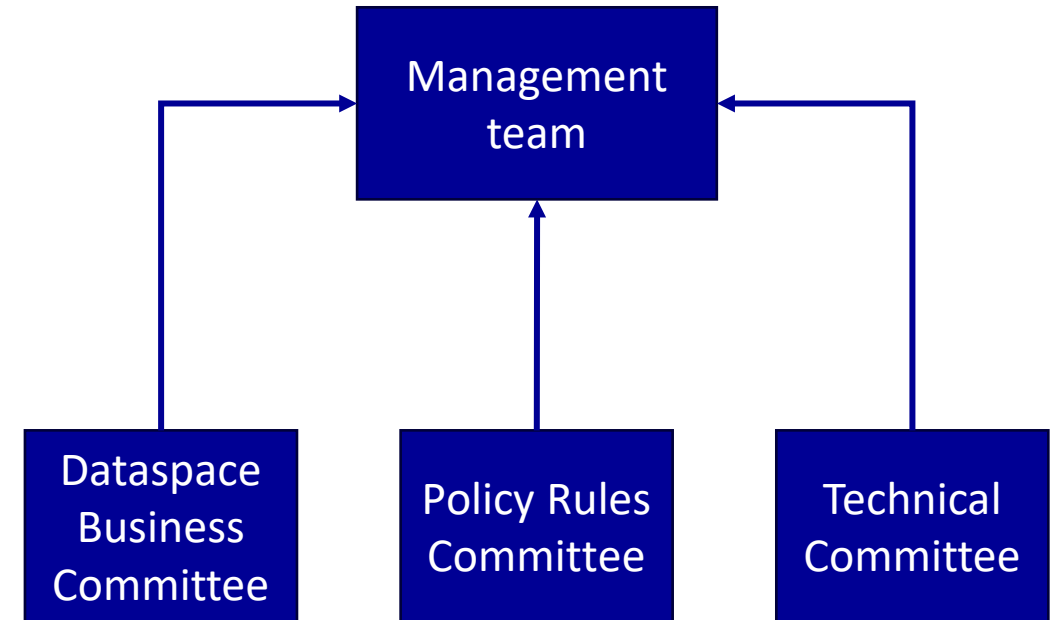
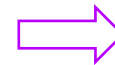
Technical Committee

- Responsible for the Gaia-X functional and technical overall architecture
 - Ensure standardisation and adoption by the open-source community

Since March 2021 until Dec. 2023



Since Jan. 2024
(approved by the Gaia-X BoD in Nov 2023)



Gaia-X mission



Data & Services
(incl. infrastructure)



privacy, self-determination, openness,
transparency, modularity &
interoperability, data protection

Enable **trusted decentralised digital ecosystems** creating the de facto standard aligned with **EU values** by developing a **set of policies, rules, specifications** and a **verification framework**

Merge of Trust Framework
document and PRCD

**Gaia-X Compliance
document.**



This document is
technology agnostic.

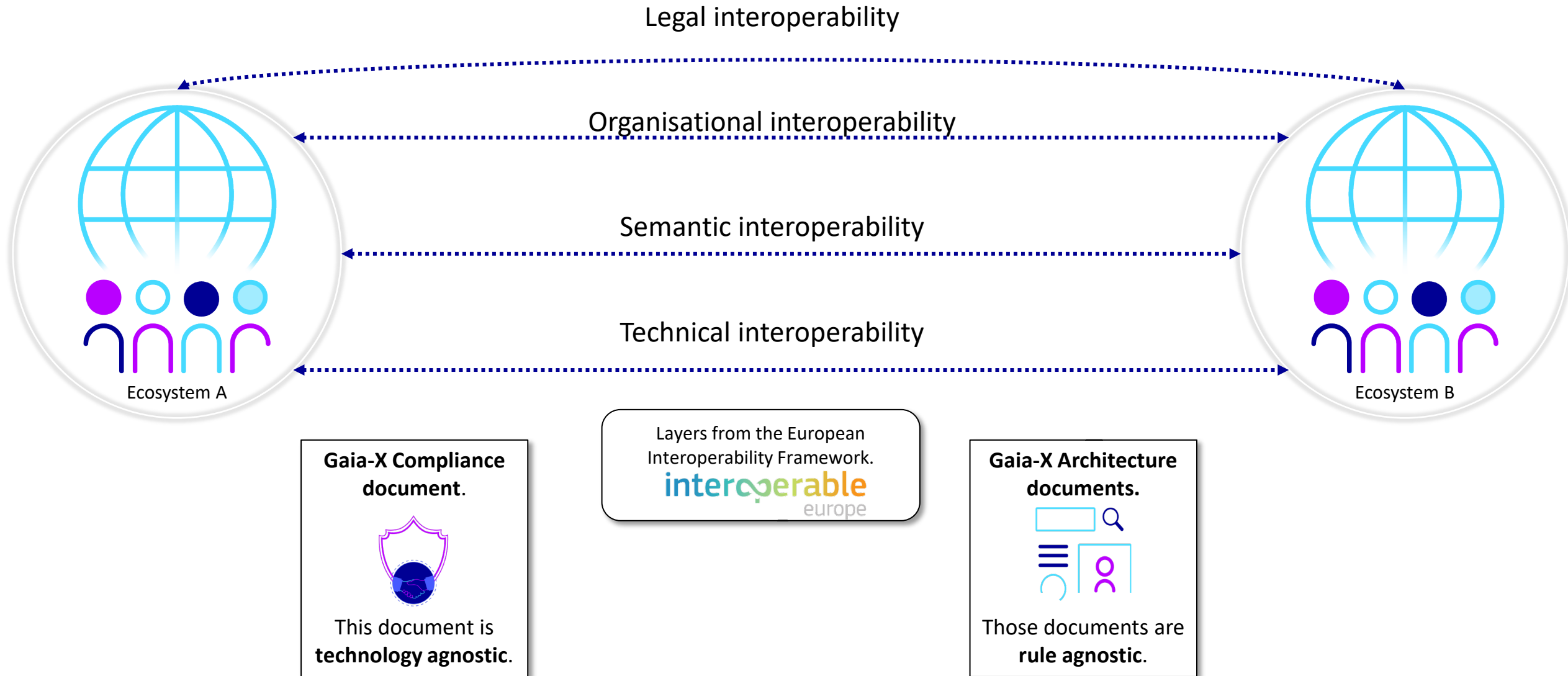
**Gaia-X Architecture
documents.**



Those documents
are
rule agnostic.

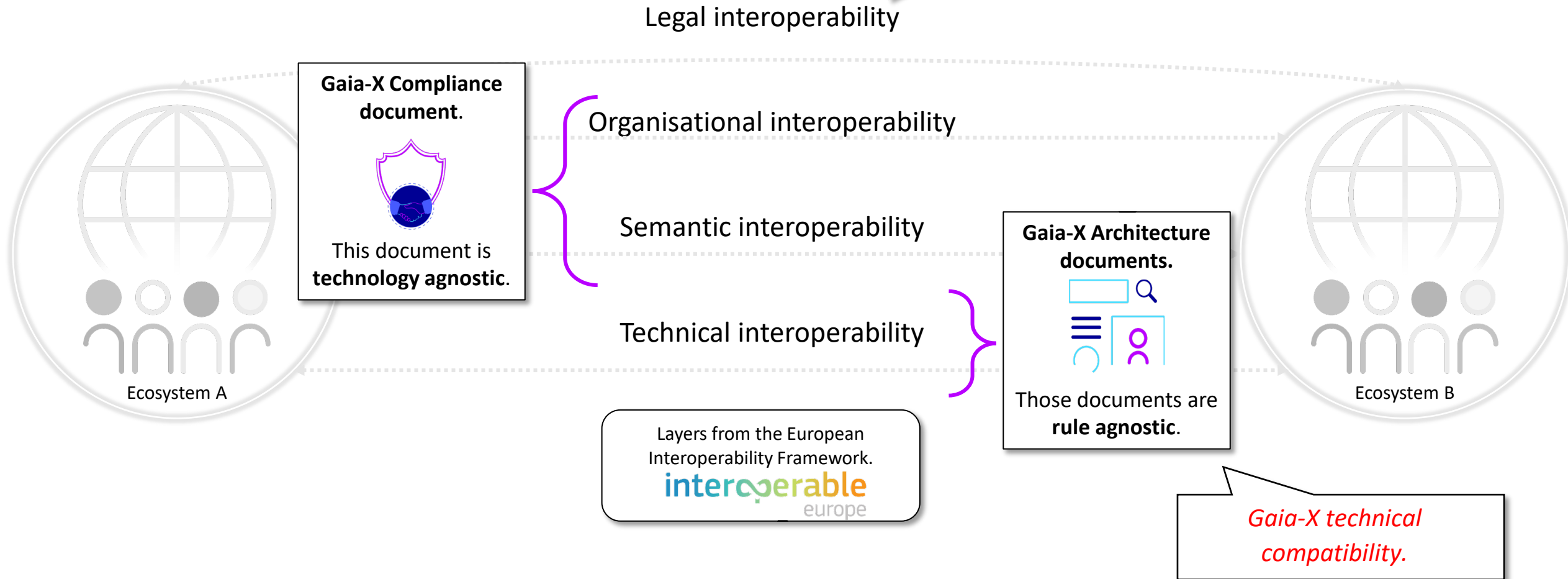
Includes DataExchange,
ICAM, ontology references

Interoperability layers



Interoperability layers

*Gaia-X is not about
legal enforcement*



Technical vs Semantic/Organisation

What is the difference between those X.509 certificates ?

-----BEGIN CERTIFICATE-----

```
MIIGrjCCBZagAwIBAgIRAPWLkE+xcgKlCul2agm3E0QwDQYJKoZIhvcNAQELBQAw
RjELMAkGA1UEBhMCVVMxIjAgBgNVBAoTGUdwb2dsZSBUcnVzdCBTZXJ2aWNlcyBM
TEMxEzARBgNVBAMTCkdUUyBDQSAxRDQwHhcNMjQwMTA2MTYxNzU5WhcNMjQwNDA1
MTcwOTUwWjAXMRUwEwYDQwDEwxdmVyYbGVhZi5jb20wggeiMA0GCSqGSIb3DQEB
AQUAA4IBDwAwggEKAoIBAQCXqJ1fo7PeH3Z6nlyPmkfYxrRBv3YXqGvZqZg/WSL5
g4vng8g2Ectfgid8oMJXFLW8+t90Mnz4KSkfHIZGdntdO/L/hRwloh+rAY9st6Fl
wyNnv2TPc8WJILsOkDkXNYwn4KariCviZSU9A/lp0s7PzRmGVybWHWxzAA2tTAA0
lCebaDdtHugxFMB2KW9aKT3dAhEkJx2sH4m3OaYx3iz00sPcQMZ7bp8kmm9xkHuk
rRgDKi86csFkr2gwYTABy8/JcoT7MF2bX3cBHbReQ8WxRwdFbQFL0XqU8D+pqnnU
+ST8WS8lndYR4VlqYp94f0UnN3Vp+4EBzTM5OcSKTU7lAgMBAAGjggPEMIIDwDAO
BgNVHQ8BAf8EBAMCBaAwEwYDVR0lBAwwCgYIKwYBBQUHAWEwDAYDVR0TAQH/BAIw
[...]
```

```
/y1RolJImifeRjJKYK991obRcrbYxvvYPgFo4QQxeSEPAAtLrsKlsad5GbiJ6tf
TvvUmlWBpRt4FuDpNiBfs/s2stkwEDhqkU794XlhcvZLZTLX5h6WFPYp0VgEiokD
58fksdrlWYA8/IEEgwg8qkb8SE2rEnkooGUHU+PYfA73ToO2QRJYK4tUusEd/EvU
Jir4s9+BQbgII5zn159IVjqhqE/jzRrsj9Now7KwF4ZpfQ==
```

-----END CERTIFICATE-----

eIDAS



-----BEGIN CERTIFICATE-----


```
MIIFjDCCA3SgAwIBAgINAgCOsgIzNmWLZM3bmzANBgkqhkiG9w0BAQsFADBHMQsw
CQYDVQQGEwJVUzEiMCAgA1UEChMZR29vZ2x1IFRydXN0IFNlcnZpY2VzIExMQzEU
MBIGA1UEAxMLR1RTIFJvb3QgUjEwHhcNMjQwMTA2MTYxNzU5WhcNMjQwNDA1
MDQyWjBGMQswCQYDVQQGEwJVUzEiMCAgA1UEChMZR29vZ2x1IFRydXN0IFNlcnZp
Y2VzIExMQzETMBEGA1UEAxMKR1RTIENBIDFENDCCASIwDQYJKoZIhvcNAQEBBQAD
ggEPADCCAQoCggEBBAKvAqqPCE2710w9zC8dTPiE89bA+xTmDaG7y7VfQ4c+mOWhl
UebUQpK0yv2r678RJEK0HWDjeq+nLIHN1Em5j6rARZixmyRSjhIR0KOQPGBMUld
saztIIJ7O0g/82qj/vGD1//3t4tTqxiRhLQnTLXJdeB+2DhkdU6IIgx6wN7E5NcU
H3Rcsejccqj8p5Sj19vBm6ilFhqLGymhMFroWVUGO3xtIH91dsy4eFKcfKVLWK3o
2190Q0Lm/SiKmLbRJ5Au4yleuFJm2JM9eB84Fkqa3ivrXWUeVtye0CQdKvsY2Fka
zvxtxvusLJzLWYHk55zcRAacDA2SeEtBbQfD1qsCAwEAAaOCAXYwggFyMA4GA1Ud
[...]
```

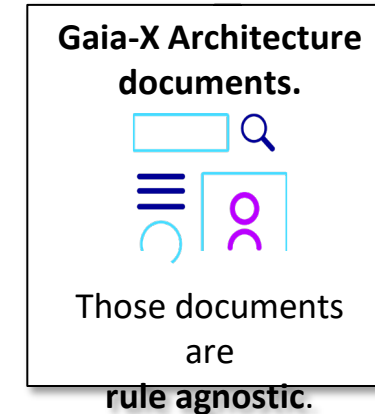
```
lVlWPzXe81vdoEnFbr5M272HdgJWo+WhT9BYM0Ji+wdVmnRffXgloEoluTnCWzc4
ldFpgJu8ff3LG0gl2ibSyCi9a6hvU0TppjJyIWxhkJTcMJlPrWx1VytEUGrX210
JDwRjW/656r0KVB02xHRKvm2ZKI03TglLIpmVCK3kBBkKNpBNkFt8rhafcCKOb9J
x/9tpNF1QTl7B39rJlJWkR17QnZqVptFePFORoZmFzM=
```



-----END CERTIFICATE-----

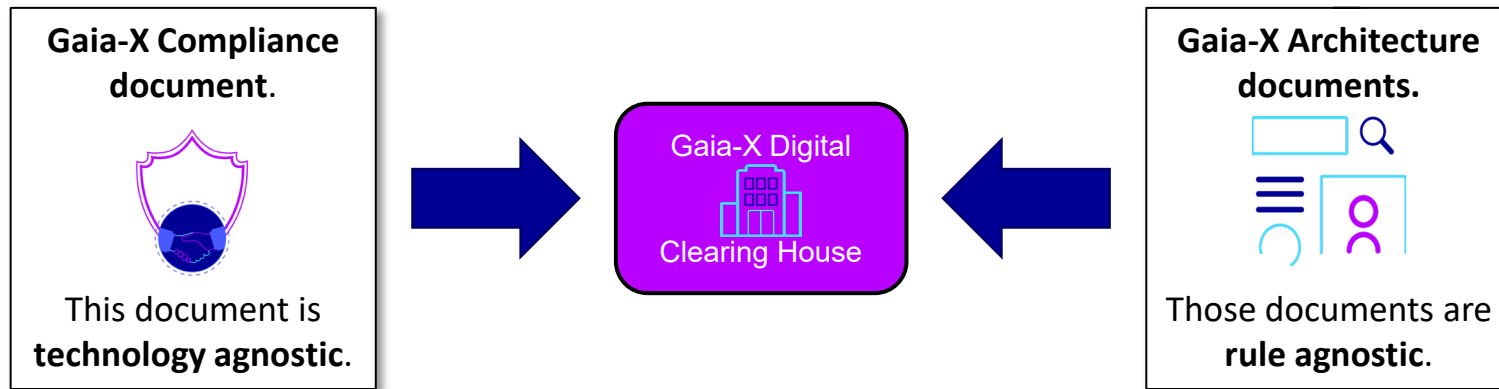
```
openssl req -x509 -newkey rsa:4096 -keyout key.pem -out cert.pem -days 365
```



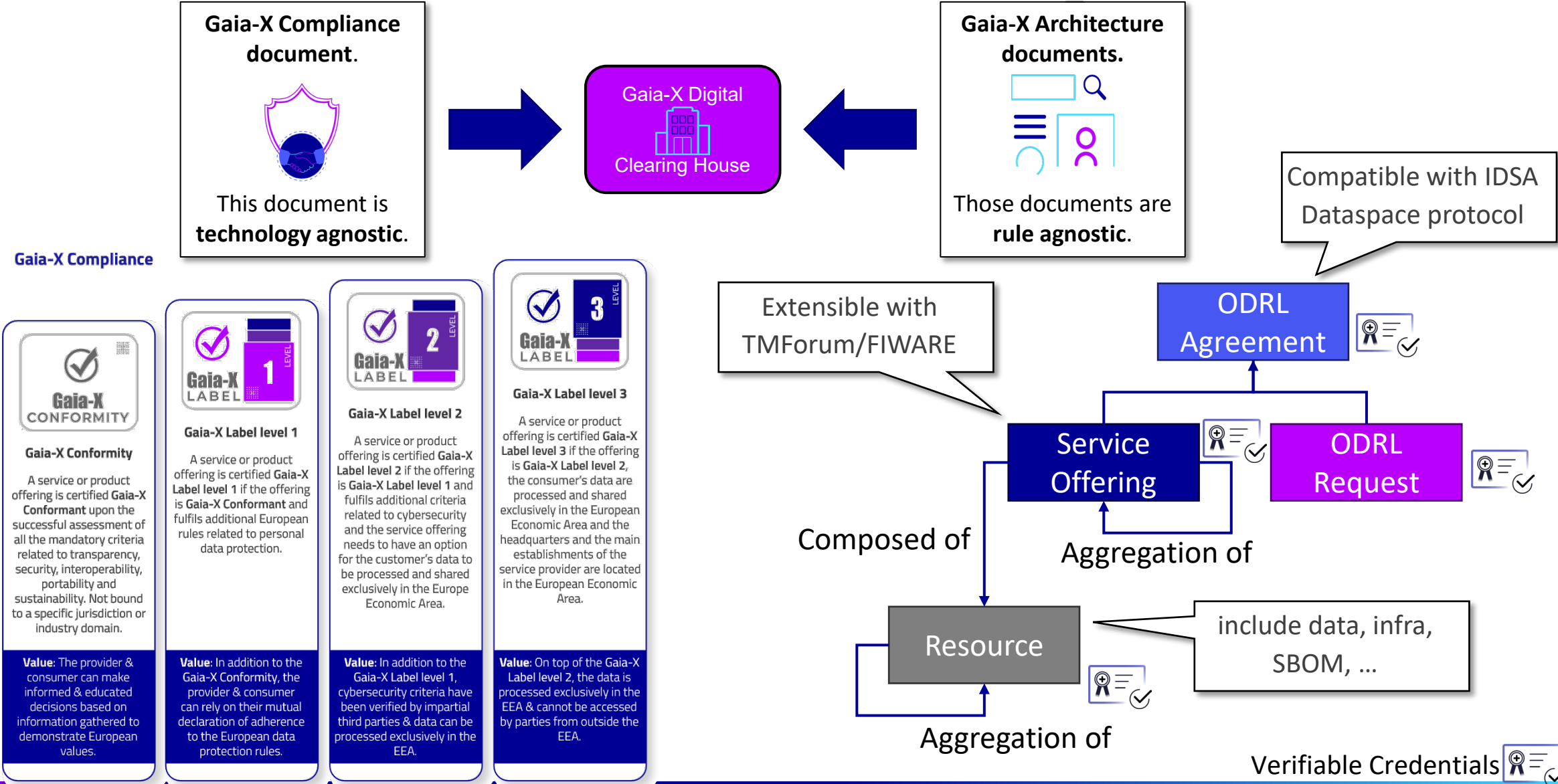

- Assessment scheme (conformity & label)
 - Based on  ISO/IEC 17000:2020
- For each scheme, a list of criteria.
- For each criteria:
 - the claim: what need to be said/claimed
 - the evidence(s): which proofs are accepted
 - the signee(s): who/what can sign the claims and evidences



- Linked-Data 
 - Serialisation format
 - Context + Shape format
 - Grammar + Vocab (ontology + information models)
- Verifiable Credential 
 - Signature type, cryptographic scheme
 - Issuance & exchange protocol
 - Publication & Search



- **Fully Open-Source Software** with an Open-Source License (EPL-2.0)
 - Code can be audited, and contributions are welcome !
- **Micro-services** architecture & **libraries** integration
- Standard APIs: OpenID Connect – Presentation Exchange – DNSSEC - ...
- Worldwide adoption ready
 - Decentralised data layer for the Gaia-X Registry scalability and information consistency (ex: EU-JP)
 - Support for European and non-European national Trust Service Providers

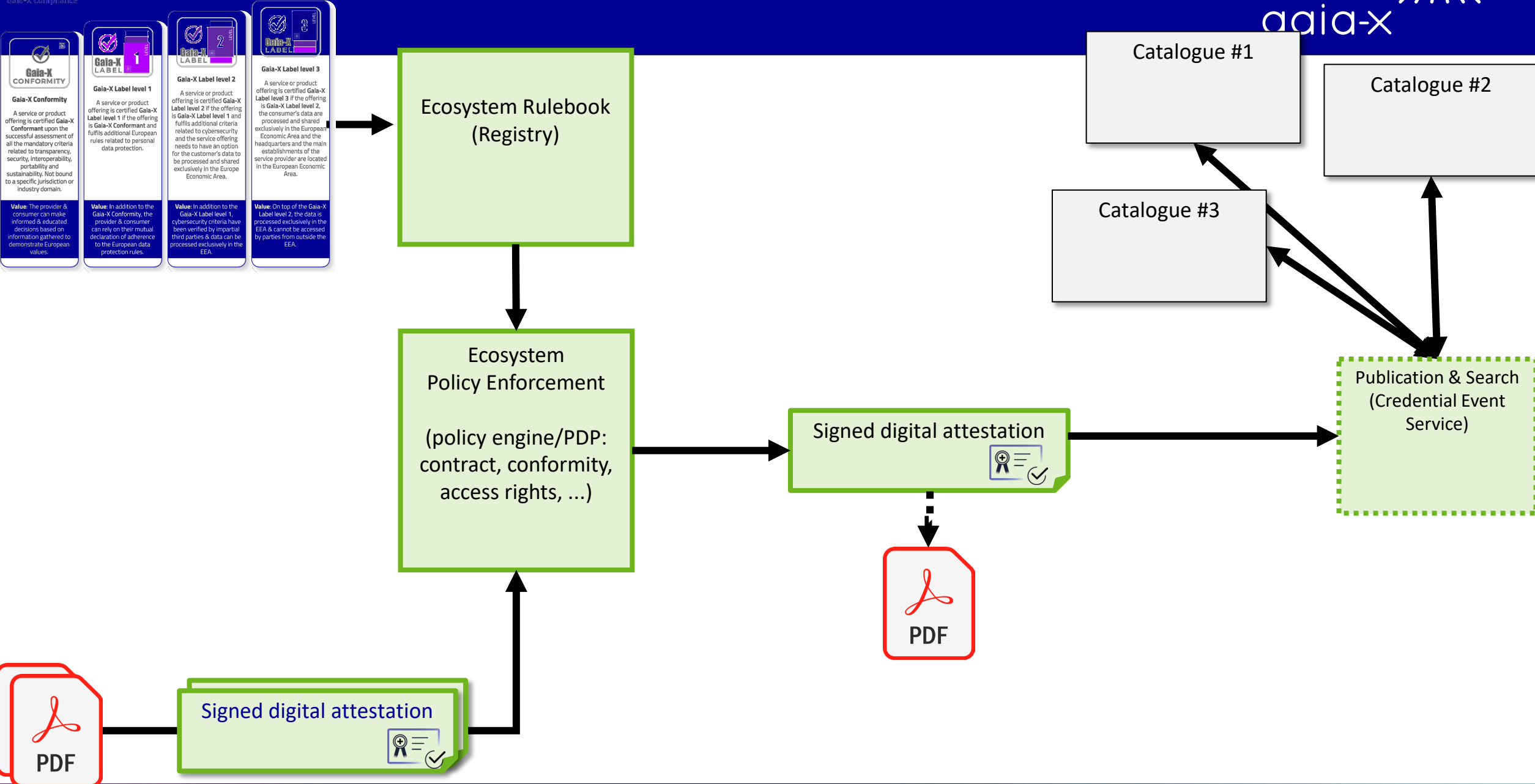
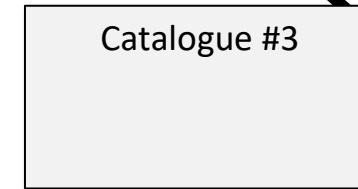
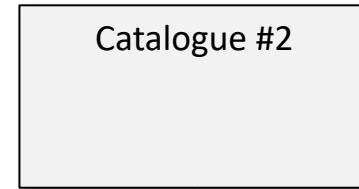
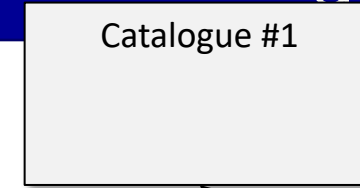
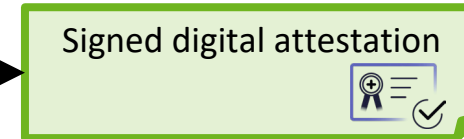
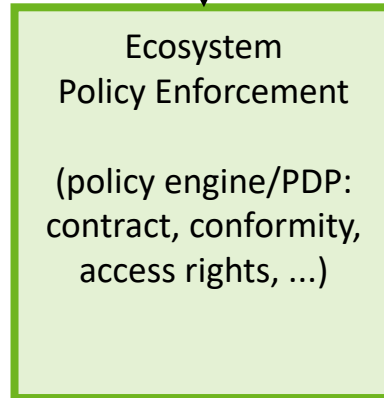
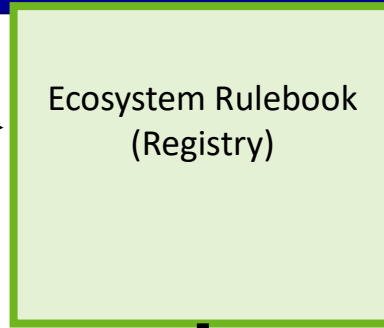


GXDCH General workflow



gala-x

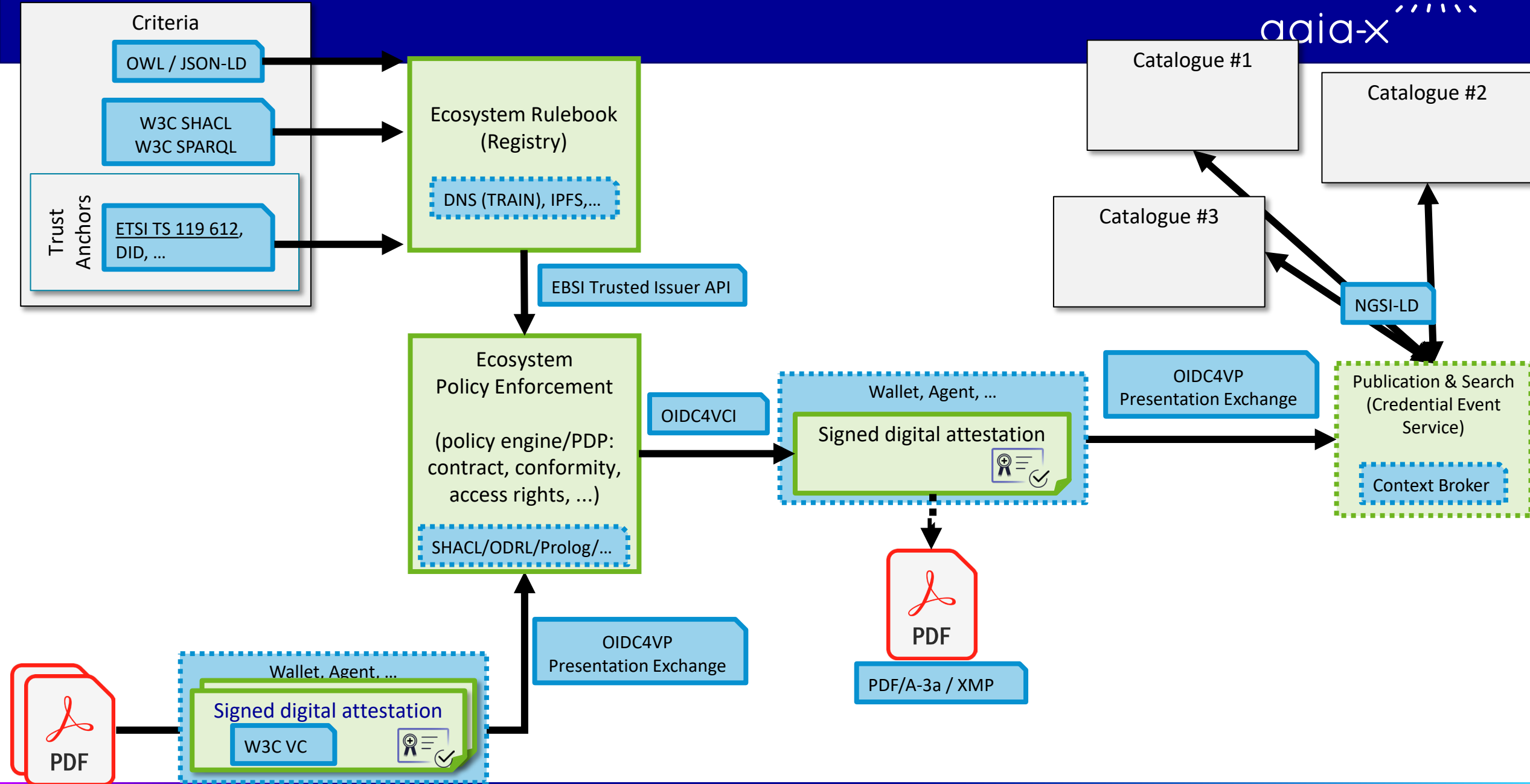
Gala-X Compliance



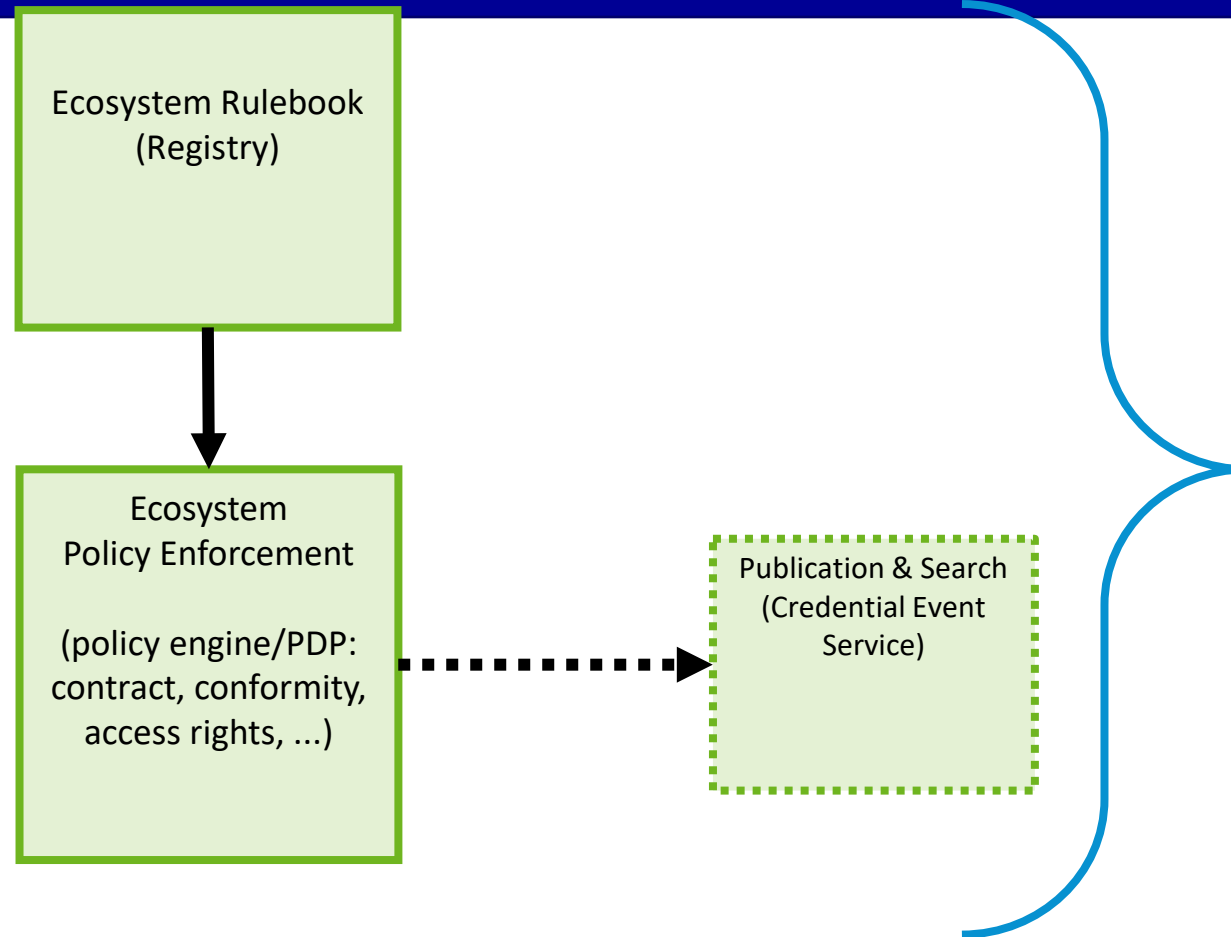
GXDCH General workflow



aaia-x



GXDCH packaging & deployment



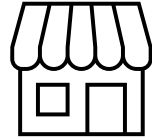
GXDCH core services

Open source softwares packaged by Gaia-X AISBL
(Elbe, Tagus, Loire, Danube, ... releases)

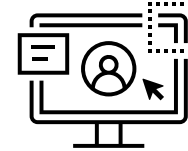
GXDCH packaging & deployment

↑
extra services
↓

marketplaces



wallets

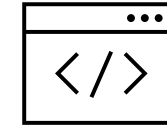


APIs

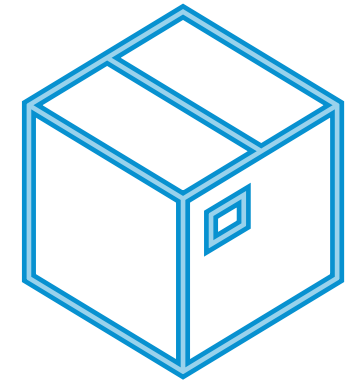
catalogues



claims and evidence
management



↑
Core services
↓




GXDCH core services
deployed by T-Systems

GXDCH core services
deployed by Aruba


GXDCH core services
deployed by Aire Networks

GXDCH core services
deployed by Gaia-X AISBL

- OpenID Connect Verifiable Credential Issuance – draft 13



**Get your Gaia-X
Membership credential!**



Use this link to get your Gaia-X
Membership Credential through the
wizard and save it in your wallet

Thank you!

Pierre Gronlier

Chief technology Officer

pierre.gronlier@gaia-x.eu

#GaiaX #TechX24

Gaia-X 101 – workshop

10:00 – 10:30

Ewann Gavard, Gaia-X

#GaiaX #TechX24



TECHNOLOGIES AND
STANDARD USED IN
GAIA-X



GAIA-X
SPECIFICATIONS &
DOCUMENTS



CURRENT STATE OF
THE
IMPLEMENTATION

Let's start outside of Gaia-X



Verifiable Credentials

JSON-LD

JsonWebSignature

DID/DID Web

SHACL

Represents any form of credential, permits, license

Used in Gaia-X to represent everything, companies, people, services

VCs are cryptographically signed by the issuer, allowing to check data tampering and issuer's legitimacy

VCs are written using JSON-LD, allowing to intricate and bind credentials and claims

Ver

Repr

Used

VCs

VCs

```
{
  "@context": [
    "https://www.w3.org/2018/credentials/v1",
    "https://w3id.org/security/suites/jws-2020/v1",
    "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#"
  ],
  "type": [
    "VerifiableCredential"
  ],
  "id": "https://mycompany.com/vc?vcid=brown-horse",
  "issuer": "did:web:mycompany.com",
  "issuanceDate": "2023-07-12T08:58:07.859Z",
  "credentialSubject": {
    "type": "gx:LegalParticipant",
    "gx:legalName": "Gaia-X European Association for Data and Cloud AISBL",
    "gx:legalRegistrationNumber": {
      "id": "https://gaia-x.eu/legalRegistrationNumberVC.json"
    },
    "gx:headquarterAddress": {
      "gx:countrySubdivisionCode": "BE-BRU"
    },
    "gx:legalAddress": {
      "gx:countrySubdivisionCode": "BE-BRU"
    },
    "id": "https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d"
  },
  "proof": {
    "type": "JsonWebSignature2020",
    "created": "2023-07-12T08:58:08.438Z",
    "proofPurpose": "assertionMethod",
    "verificationMethod": "did:web:mycompany.com#JWK2020",
    "jws": "eyJhbGciOiJIUzI1NiIsImI2NCI6ZmFsc2UsImNyaXQiOlsiYjY0Il19..hu3kvfqGFeQGMJ1GvdaS1Nmkb2hIk79my6SCW0uiS-Og43UiWr9i"
  }
}
```

Contexts

Same as XML contexts, allow to target attributes without name collisions

Links

Each JSON-LD file is a graph, allowing to target other nodes

Representation

JSON-LD is just one representation of RDF

JSO

Cont

Sam

Links

Each

Repr

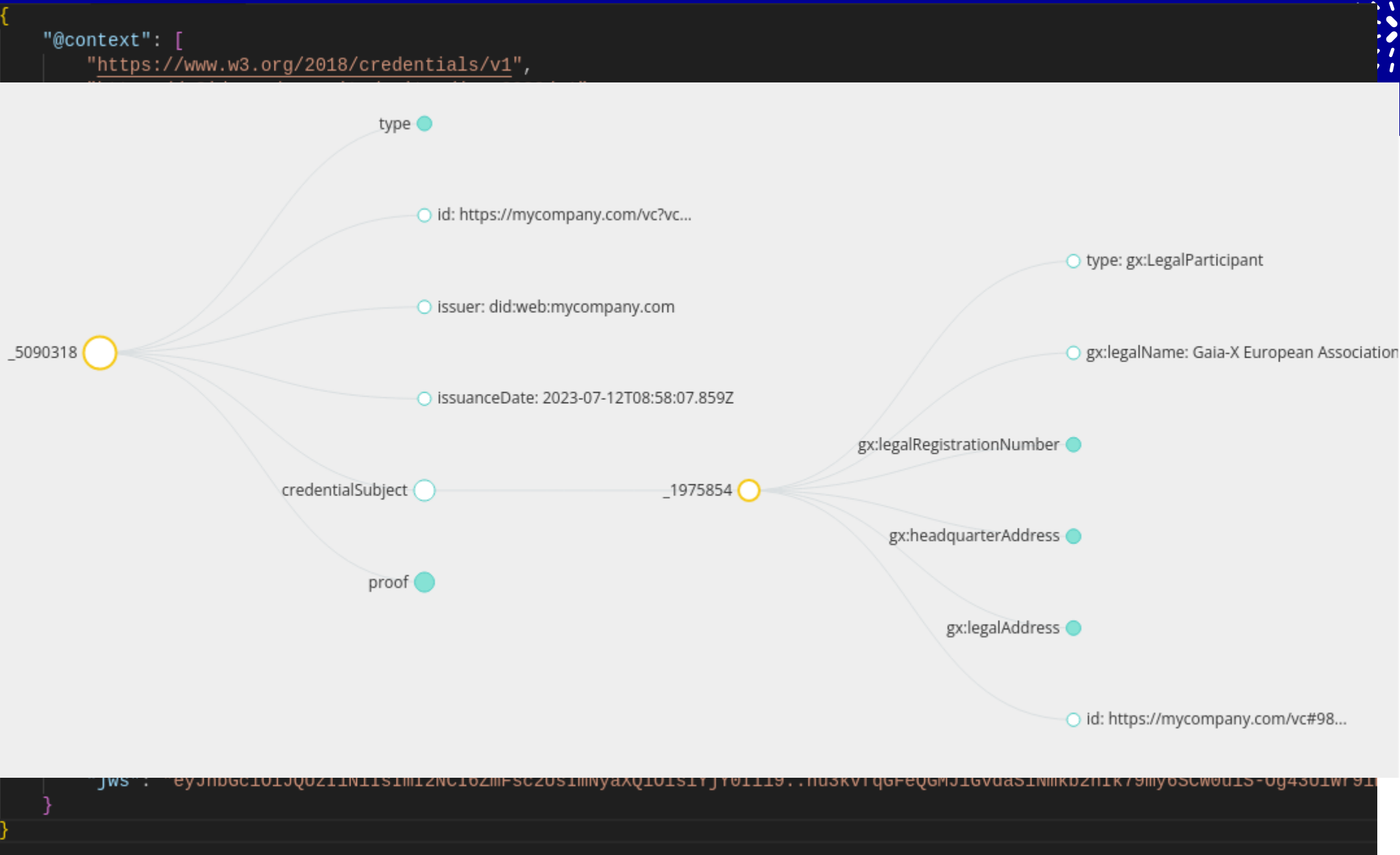
JSO

```
{
  "@context": [
    "https://www.w3.org/2018/credentials/v1",
    "https://w3id.org/security/suites/jws-2020/v1",
    "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#"
  ],
  "type": [
    "VerifiableCredential"
  ],
  "id": "https://mycompany.com/vc?vcid=brown-horse",
  "issuer": "did:web:mycompany.com",
  "issuanceDate": "2023-07-12T08:58:07.859Z",
  "credentialSubject": {
    "type": "gx:LegalParticipant",
    "gx:legalName": "Gaia-X European Association for Data and Cloud AISBL",
    "gx:legalRegistrationNumber": {
      "id": "https://gaia-x.eu/legalRegistrationNumberVC.json"
    },
    "gx:headquarterAddress": {
      "gx:countrySubdivisionCode": "BE-BRU"
    },
    "gx:legalAddress": {
      "gx:countrySubdivisionCode": "BE-BRU"
    },
    "id": "https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d"
  },
  "proof": {
    "type": "JsonWebSignature2020",
    "created": "2023-07-12T08:58:08.438Z",
    "proofPurpose": "assertionMethod",
    "verificationMethod": "did:web:mycompany.com#JWK2020",
    "jws": "eyJhbGciOiJIQUZlbnIiImI2NCI6ZmFsc2UsImNyaXQiOlsiYjY0Il19..hu3kvfqGFQGMJ1GvdaS1Nmkb2hIk79my6SCW0uiS-Og43UiWr9i"
  }
}
```


JSO

Co
Sa

Lin
Ea

Re
JS

JS

Co

Sa

Lin

Ea

Re

JS

```
{
  "@context": [
    "https://www.w3.org/2018/credentials/v1",
    "https://www.w3.org/2018/credentials#credentialSubject": [
      {
        "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#headquarterAddress": [
          {
            "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#countrySubdivisionCode": [
              {
                "@value": "BE-BRU"
              }
            ]
          }
        ],
        "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#legalAddress": [
          {
            "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#countrySubdivisionCode": [
              {
                "@value": "BE-BRU"
              }
            ]
          }
        ],
        "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#legalName": [
          {
            "@value": "Gaia-X European Association for Data and Cloud AISBL"
          }
        ],
        "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#legalRegistrationNumber": [
          {
            "@id": "https://gaia-x.eu/legalRegistrationNumberVC.json"
          }
        ],
        "@id": "https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d",
        "@type": [
          "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#LegalParticipant"
        ]
      }
    ]
  }
}
```

JS

```
{
  "@context": [
    "https://www.w3.org/2018/credentials/v1",
```

CC
Sa

Lir
Ea

Re
JS

```
<https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#LegalParticipant> .
<https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d> <https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#headquarterAddress> :b2 .
<https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d> <https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#legalAddress> :b3 .
<https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d> <https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#legalName> "Gaia-X European Association for Data and Cloud AISBL" .
<https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d> <https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#legalRegistrationNumber> <https://gaia-x.eu/legalRegistrationNumberVC.json> .
<https://mycompany.com/vc?vcid=brown-horse> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <https://www.w3.org/2018/credentials#VerifiableCredential> .
<https://mycompany.com/vc?vcid=brown-horse> <https://w3id.org/security#proof> :b0 .
<https://mycompany.com/vc?vcid=brown-horse> <https://www.w3.org/2018/credentials#credentialSubject> <https://mycompany.com/vc#9894e9b0a38aa105b50bb9f4e7d0975641273416e70f166f4bd9fd1b00dfe81d> .
<https://mycompany.com/vc?vcid=brown-horse> <https://www.w3.org/2018/credentials#issuanceDate> "2023-07-12T08:58:07.859Z"^^<http://www.w3.org/2001/XMLSchema#dateTime> .
<https://mycompany.com/vc?vcid=brown-horse> <https://www.w3.org/2018/credentials#issuer> <did:web:mycompany.com> .
:b1 <http://purl.org/dc/terms/created> "2023-07-12T08:58:08.438Z"^^<http://www.w3.org/2001/XMLSchema#dateTime> :b0 .
:b1 <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <https://w3id.org/security#JsonWebSignature2020> :b0 .
:b1 <https://w3id.org/security#jws> "eyJhbGciOiJIUzI1NiIsImI2NCI6ZmFsc2UsImNyYXQiOiJsiYjY0Iiwu3kvfQGFQGMj1GvdaS1NmkB2hIk79my6SCW0uiOg43UiW9iHh96e7acYChLVopEF_AL2a0KAjT9BnkbGfLXCgGAAKYS5X22bV1EUX5B-NHJhmGRC5ScgCjfiVU4yEzEdpoSrFiE4M0v-NbMB7Q4qvWPPT4og0IRVyU4N5pBXWxn4pfc_Rl_1k6us8Dhkl0yLgVFTQ562P1E7EorSHLZh73C2chV50YwYpH7DTmiLAaDlj5SC5X7ayWHa8LuPz3dRhl7Arj-sdFyIjEockGeg9Mmzcc2N6QjTi2hYaA493l0SdogLhp3Aqz3A1fHbKkdRH662NALERFFHdeg" :b0 .
:b1 <https://w3id.org/security#proofPurpose> <https://w3id.org/security#assertionMethod> :b0 .
:b1 <https://w3id.org/security#verificationMethod> <did:web:mycompany.com#JWK2020> :b0 .
:b2 <https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#countrySubdivisionCode> "BE-BRU" .
:b3 <https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#countrySubdivisionCode> "BE-BRU" .
```

```
jws : eyJhbGciOiJIUzI1NiIsImI2NCI6ZmFsc2UsImNyYXQiOiJsiYjY0Iiwu3kvfQGFQGMj1GvdaS1NmkB2hIk79my6SCW0uiOg43UiW9iHh96e7acYChLVopEF_AL2a0KAjT9BnkbGfLXCgGAAKYS5X22bV1EUX5B-NHJhmGRC5ScgCjfiVU4yEzEdpoSrFiE4M0v-NbMB7Q4qvWPPT4og0IRVyU4N5pBXWxn4pfc_Rl_1k6us8Dhkl0yLgVFTQ562P1E7EorSHLZh73C2chV50YwYpH7DTmiLAaDlj5SC5X7ayWHa8LuPz3dRhl7Arj-sdFyIjEockGeg9Mmzcc2N6QjTi2hYaA493l0SdogLhp3Aqz3A1fHbKkdRH662NALERFFHdeg
```

Allow to ensure data consistency

References issuer's DID (publicly available), allowing to check issuer's trustworthiness

Gaia-X uses "compact sign" to limit payloads size

Two marshalling co-existing in Tagus. Specification unclear & misinterpreted

JWS: JsonWebSignature

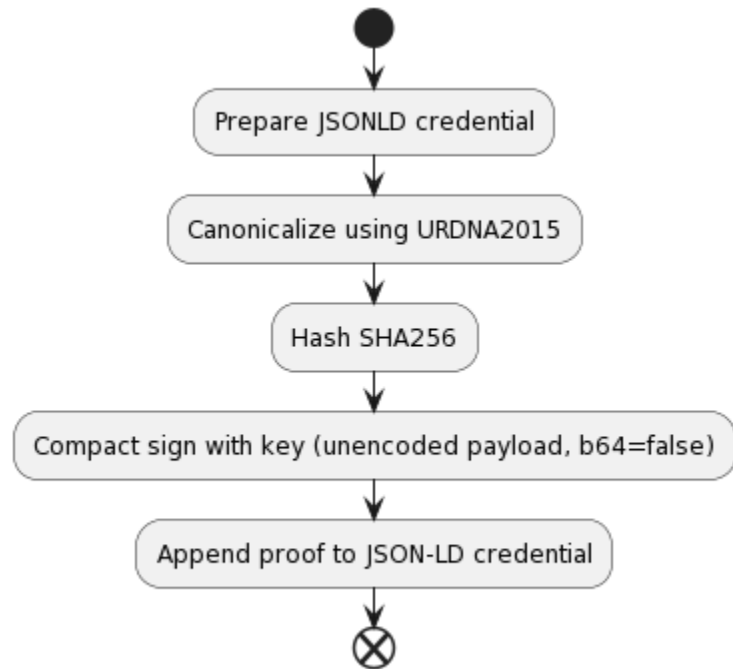


Allow to ensure data consistency

References issuer's DID (publicly available), allowing to check issuer's trustworthiness

Gaia-X

Two main



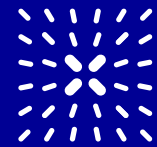
size

information unclear & misinterpreted

JWS: JsonWebSignature



gaia-x

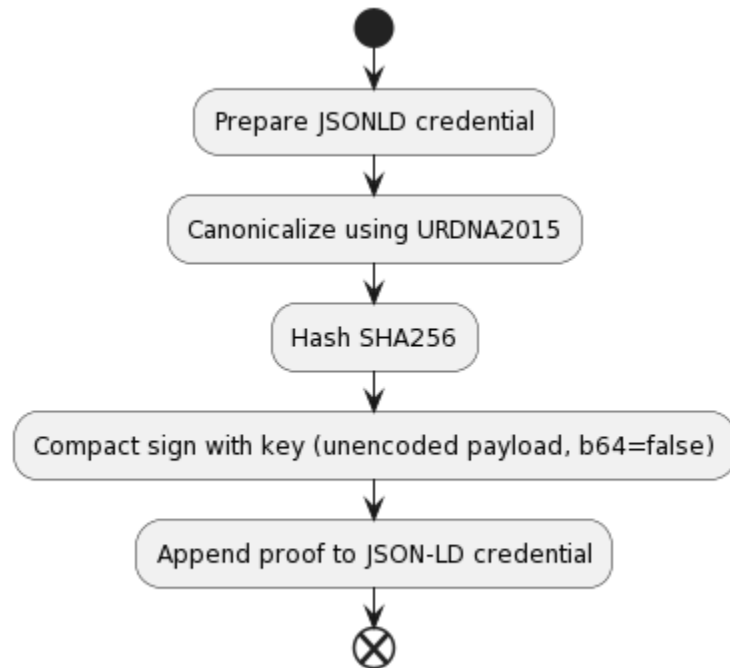


Allow to ensure data consistency

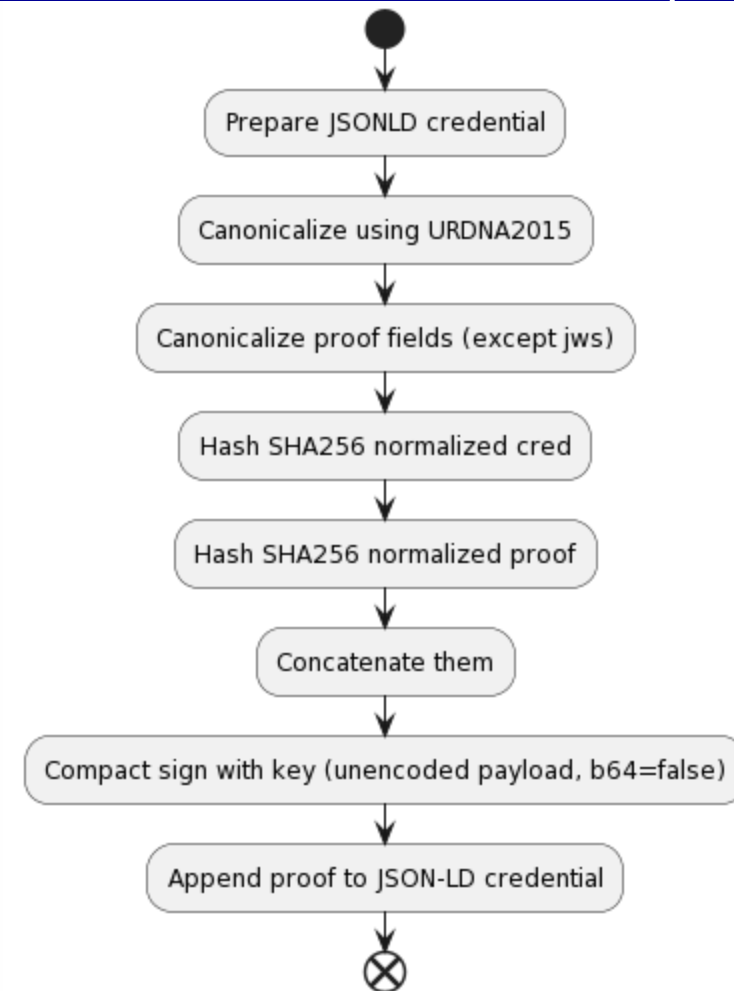
References issuer's DID (publicly available), allowing to check trustworthiness

Gaia-X

Two methods



size
calculation unclear &



JWS: JsonWebSignature



gaia-x

Allow to ensure d

References issue
trustw

Gaia-)

Two n

@gaia-x/json-web-signature-2020 TS

2.0.1 • Public • Published 5 days ago



Readme



Code

Beta



4 Dependencies



0 Dependents

Gaia-X JSON Web Signature 2020



coverage 100.00% npm v2.0.1 downloads 1.4k minified size 301 kB license Eclipse Public License 2.0

Compact sign v

App



A lightweight JsonWebSignature2020 signing and verification Typescript library by Gaia-X AISBL

b64=false)

al



DID: Decentralized Identifiers



Self-declared and self-hosted identity

Contains cryptographic material allowing to ensure trust

One specification used in Gaia-X at the moment : did:web

Examples:

did:web:compliance.lab.gaia-x.eu:v1 resolves to <https://compliance.lab.gaia-x.eu/v1/did.json>

did:web:bakeup.io resolves to <https://bakeup.io/.well-known/did.json>

DID: Decentralized Identity



Self-declared and self-hosted identity

Contains cryptographic material

One specification used in Gaia-X

Examples:

did:web:compliance.lab.gaia-x.eu/v1/did.json

did:web:bakeup.io resolves to

```
{
  "@context": [
    "https://www.w3.org/ns/did/v1",
    "https://w3id.org/security/suites/jws-2020/v1"
  ],
  "id": "did:web:bakeup.io",
  "verificationMethod": [
    {
      "id": "did:web:bakeup.io#JWK2020-RSA",
      "type": "JsonWebKey2020",
      "controller": "did:web:bakeup.io",
      "publicKeyJwk": {
        "kty": "RSA",
        "n": "...publicKey...",
        "e": "AQAB",
        "alg": "PS256",
        "x5u": "https://bakeup.io/.well-known/cert.crt"
      }
    }
  ],
  "assertionMethod": [
    "did:web:bakeup.io#JWK2020-RSA"
  ],
  "service": [
    {
      "id": "did:web:bakeup.io#participant",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/participant.json"
    },
    {
      "id": "did:web:bakeup.io#lrn",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/lrn.json"
    },
    {
      "id": "did:web:bakeup.io#tsandcs",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/tsandcs.json"
    },
    {
      "id": "did:web:bakeup.io#gx",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/gx.json"
    },
    {
      "id": "did:web:bakeup.io#service",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/service.json"
    }
  ]
}
```

DID: Decentralized Identity



Self-declared and self-hosted identity

Contains cryptographic material

One specification used in Gaia-X

Examples:

did:web:compliance.lab.gaia-x.eu/v1/did.json

did:web:bakeup.io resolves to

```
{
  "@context": [
    "https://www.w3.org/ns/did/v1",
    "https://w3id.org/security/suites/jws-2020/v1"
  ],
  "id": "did:web:bakeup.io",
  "verificationMethod": [
    {
      "id": "did:web:bakeup.io#JWK2020-RSA",
      "type": "JsonWebKey2020",
      "controller": "did:web:bakeup.io",
      "publicKeyJwk": {
        "kty": "RSA",
        "n": "...publicKey...",
        "e": "AQAB",
        "alg": "PS256",
        "x5u": "https://bakeup.io/.well-known/cert.crt"
      }
    }
  ],
  "assertionMethod": [
    "did:web:bakeup.io#JWK2020-RSA"
  ],
  "service": [
    {
      "id": "did:web:bakeup.io#participant",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/participant.json"
    },
    {
      "id": "did:web:bakeup.io#lrn",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/lrn.json"
    },
    {
      "id": "did:web:bakeup.io#tsandcs",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/tsandcs.json"
    },
    {
      "id": "did:web:bakeup.io#gx",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/gx.json"
    },
    {
      "id": "did:web:bakeup.io#service",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/service.json"
    }
  ]
}
```

Issuer

DID: Decentralized Identity



Self-declared and self-hosted identifier
Contains cryptographic material
One specification used in Gaia-X

Examples:

did:web:compliance.lab.gaia-x.eu/v1/did.json

did:web:bakeup.io resolves to

```
{
  "@context": [
    "https://www.w3.org/ns/did/v1",
    "https://w3id.org/security/suites/jws-2020/v1"
  ],
  "id": "did:web:bakeup.io",
  "verificationMethod": [
    {
      "id": "did:web:bakeup.io#JWK2020-RSA",
      "type": "JsonWebKey2020",
      "controller": "did:web:bakeup.io",
      "publicKeyJwk": {
        "kty": "RSA",
        "n": "...publicKey...",
        "e": "AQAB",
        "alg": "PS256",
        "x5u": "https://bakeup.io/.well-known/cert.crt"
      }
    }
  ],
  "assertionMethod": [
    "did:web:bakeup.io#JWK2020-RSA"
  ],
  "service": [
    {
      "id": "did:web:bakeup.io#participant",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/participant.json"
    },
    {
      "id": "did:web:bakeup.io#lrn",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/lrn.json"
    },
    {
      "id": "did:web:bakeup.io#tsandcs",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/tsandcs.json"
    },
    {
      "id": "did:web:bakeup.io#gx",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/gx.json"
    },
    {
      "id": "did:web:bakeup.io#service",
      "type": "LinkedDomains",
      "serviceEndpoint": "https://bakeup.io/service.json"
    }
  ]
}
```

Issuer

VerificationMethod

DID: Decentralized Identity



```
{
  "@context": [
    "https://www.w3.org/ns/did/v1",
    "https://w3id.org/security/suites/jws-2020/v1"
  ]
}
```

@gaia-x/did-web-generator TS

1.0.1 • Public • Published a month ago



Readme



Code

Beta



2 Dependencies



0 Dependents

Gaia-X AISBL DID Generator Library

This library allows you to generate a ready to use **DID**.

It uses your certificate to generate it, and thus relies on several x509/crypto libraries to work.

Usage

```
import {createDidDocument} from '@gaia-x/did-web-generator'
//...
function getDid(){
  return createDidDocument("https://mycompanydomain.com", "x509Certificate")
}
```

```
{
  "type": "LinkedDomains",
  "serviceEndpoint": "https://bakeup.io/service.json"
}]
}
```

Self-declared and

Contains cryptographic

One specification

Examples:

did:web:compliance

x.eu/v1/did.json

did:web:bakeup.io

Known as shapes in our ecosystem, and written in Turtle

Validates RDF structure of documents

Similar to XSD for XML

Not all constraints can be expressed in SHACL, hence some "business rules" implemented in code

Know as shapes in

Validates RDF stru

Similar to XSD for

Not all constraints
implemented in co

```

gx:LegalParticipantShape
  a sh:NodeShape ;
  sh:targetClass gx:LegalParticipant ;
  sh:property
    [
      sh:path gx:legalRegistrationNumber ;
      sh:node gx:legalRegistrationNumberShape ;
      sh:minCount 1 ;
    ],
    [
      sh:path gx:parentOrganization ;
      sh:node gx:LegalParticipantShape ;
    ],
    [
      sh:path gx:subOrganization ;
      sh:node gx:LegalParticipantShape ;
    ],
  ] ;

gx:LegalParticipantShape
  sh:path gx:headquarterAddress ;
  sh:minCount 1 ;
  sh:node gx:PostalAddressShape ;
],
[
  sh:path gx:legalAddress ;
  sh:minCount 1 ;
  sh:node gx:PostalAddressShape ;
] .

gx:legalRegistrationNumberShape
  a sh:NodeShape ;
  sh:targetClass gx:legalRegistrationNumber ;
  sh:message "At least one of taxID, vatID, EUID, EORI or leiCode must be defined." ;
  sh:property
    [
      sh:path gx:taxID ;
      sh:datatype xsd:string ;
      sh:minLength 3 ;
    ] ;
  sh:property
    [
      sh:path gx:EUID ;
      sh:datatype xsd:string ;
      sh:minLength 3 ;
    ] ;
  sh:property
    [

```

Gaia-X specifications



Identity & Credentials Access Management Document

Policy Rules & Labelling Document

Architecture Document

Data Exchange Document

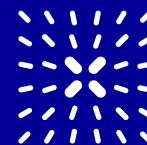
For Tagus: Trust Framework (merged in PRLD & Architecture Document since)

All available on docs.gaia-x.eu

5.2 Legal person

For legal person the attributes are

Attribute	Cardinality	Trust Anchor	Comment
registrationNumber	1	registrationNumberIssuer	Country's registration number, which identifies one specific entity.
headquartersAddress.countryCode	1	State	Physical location of the headquarters in ISO 3166-2 alpha2, alpha-3 or numeric format.
legalAddress.countryCode	1	State	Physical location of legal registration in ISO 3166-2 alpha2, alpha-3 or numeric format.
parentOrganization[]	0..*	State	A list of direct participant that this entity is a subOrganization of, if any.
subOrganization[]	0..*	State	A list of direct participant with a legal mandate on this entity, e.g., as a subsidiary.



Gaia-X TAGUS specifications in a slide



Everything is described using VerifiableCredentials in JSON-LD

Each issuer has to provide signed terms and conditions (TL;DR be nice)

Participant has to provide a Legal Registration Number issued by an accredited notary

On production, participant must use an EV-SSL or eIDAS certificate to sign their credentials

Few providers are accredited Gaia-X compliance issuers, more to come.

Having your credentials validated by the engine will result in a Gaia-X compliance VerifiableCredential

TAGUS state of the implementation



1st production-ready release: Tagus (v1)

- Trust framework 22.10 fully implemented (Participants, ServiceOfferings, Resources)
- PRLD 22.11 partially implemented: Service Offering Labels level 1

A bit of tooling provided:

- Wizard
- DID Library
- Signature Library
- DID Validator Library

Running endpoints:

- <https://docs.gaia-x.eu/framework/?tab=clearing-house>

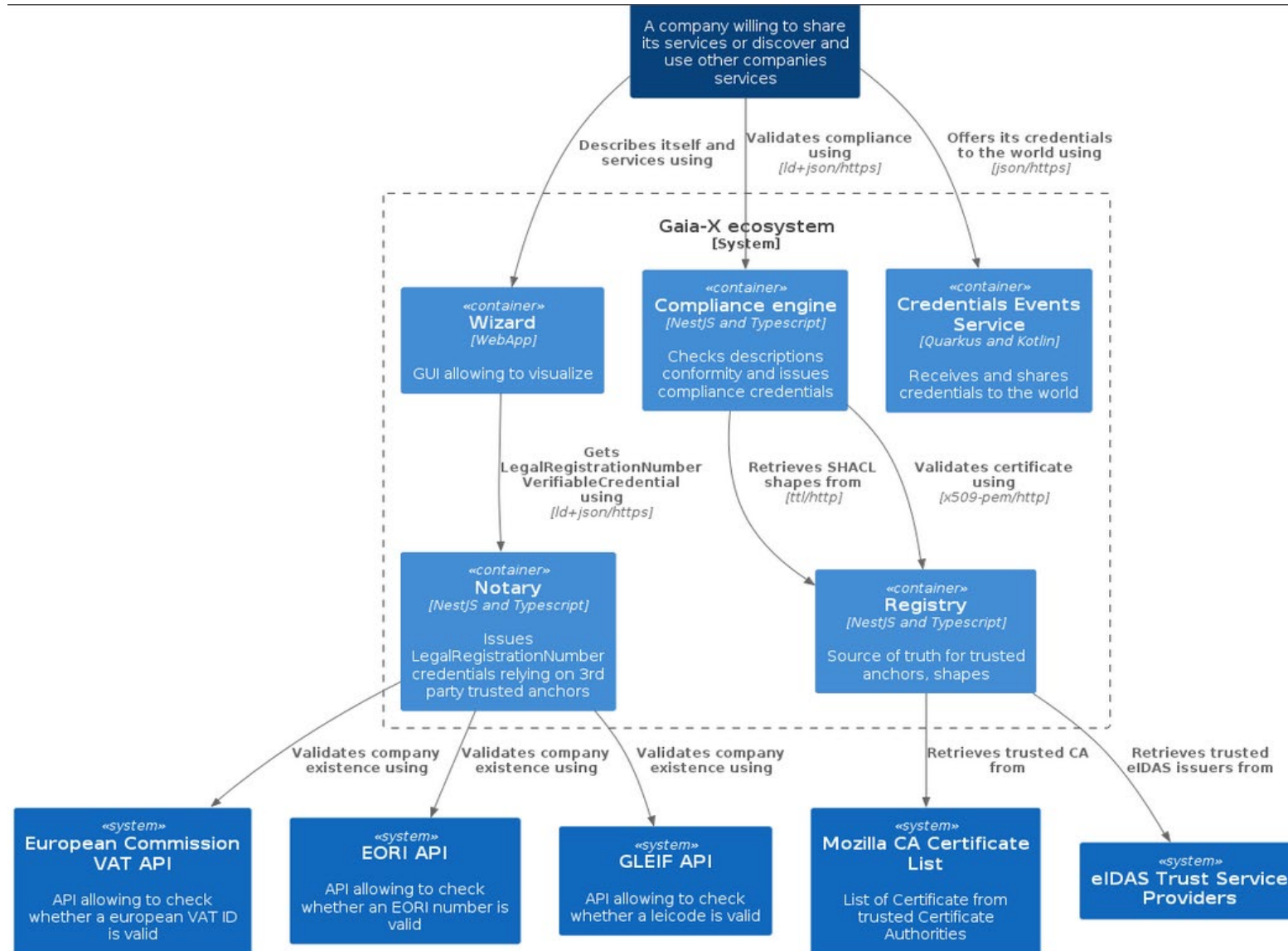
TAGUS state of the implementation



Some mistakes exist:

- JSON-LD namespace complicated and referring to development in the URL
- Shapes are not perfectly aligned with specs (LegalParticipant != LegalPerson)
- Types need to be in credentialSubject to be valid (!55)

TAGUS GXDCH Software architecture



Useful links & info



- Workshop Gaia-X 101 : <https://gitlab.com/gaia-x/lab/workshops/gaia-x-101/-/blob/master/gaia-x-101.ipynb>
- The community welcomes you : <https://gitlab.com/gaia-x/gaia-x-community/open-source-community/>
- Ask the Gaia-X Lab team for demonstrations and explanations in the hackathon room

Thank you!

Ewann Gavard

Technical leader Gaia-X AISBL

#GaiaX #TechX24

Coffee Break

10:30 – 11:00

Hemicycle Foyer



#GaiaX #TechX24

Navigating Gaia-X compliance and app prototyping: Your path to app development within trusted dataspace 11:00 – 11:15

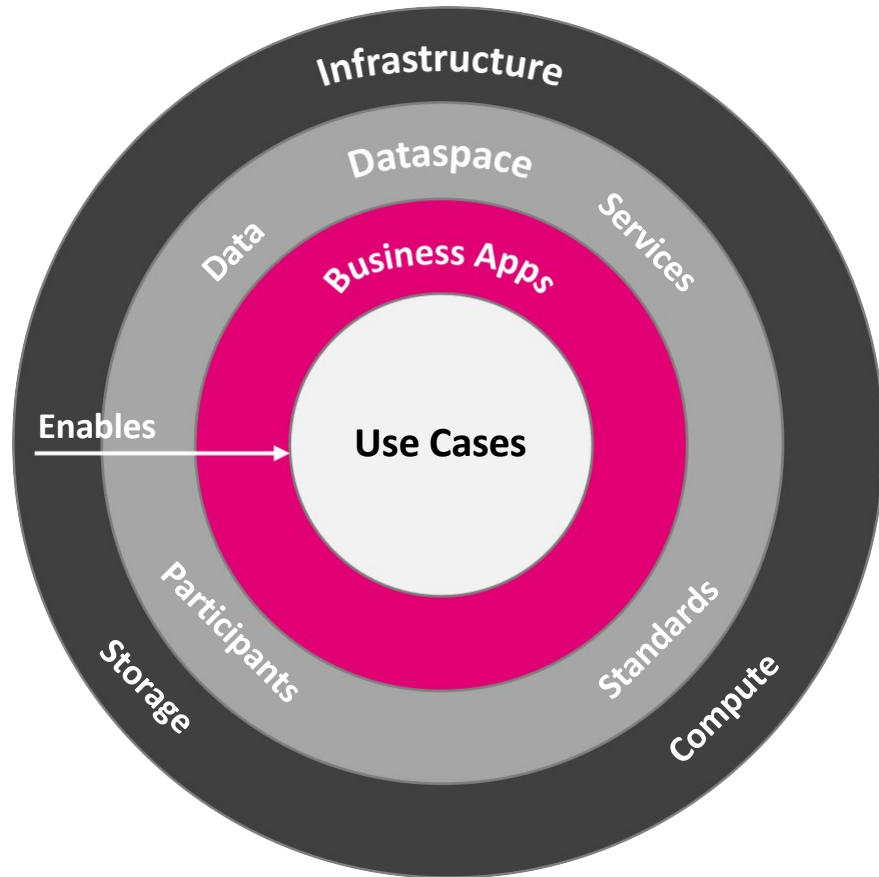
Aleksandar Kelecevic, T-Systems International

#GaiaX #TechX24

01

Application prototyping in a
dataspace environment

Domain Dataspace Driven Design



Phase 1: Understand

Dataspaces are only a part of the puzzle

Phase 2: Enable

Dataspace technology, protocols and infrastructure are there to support, not the end goal

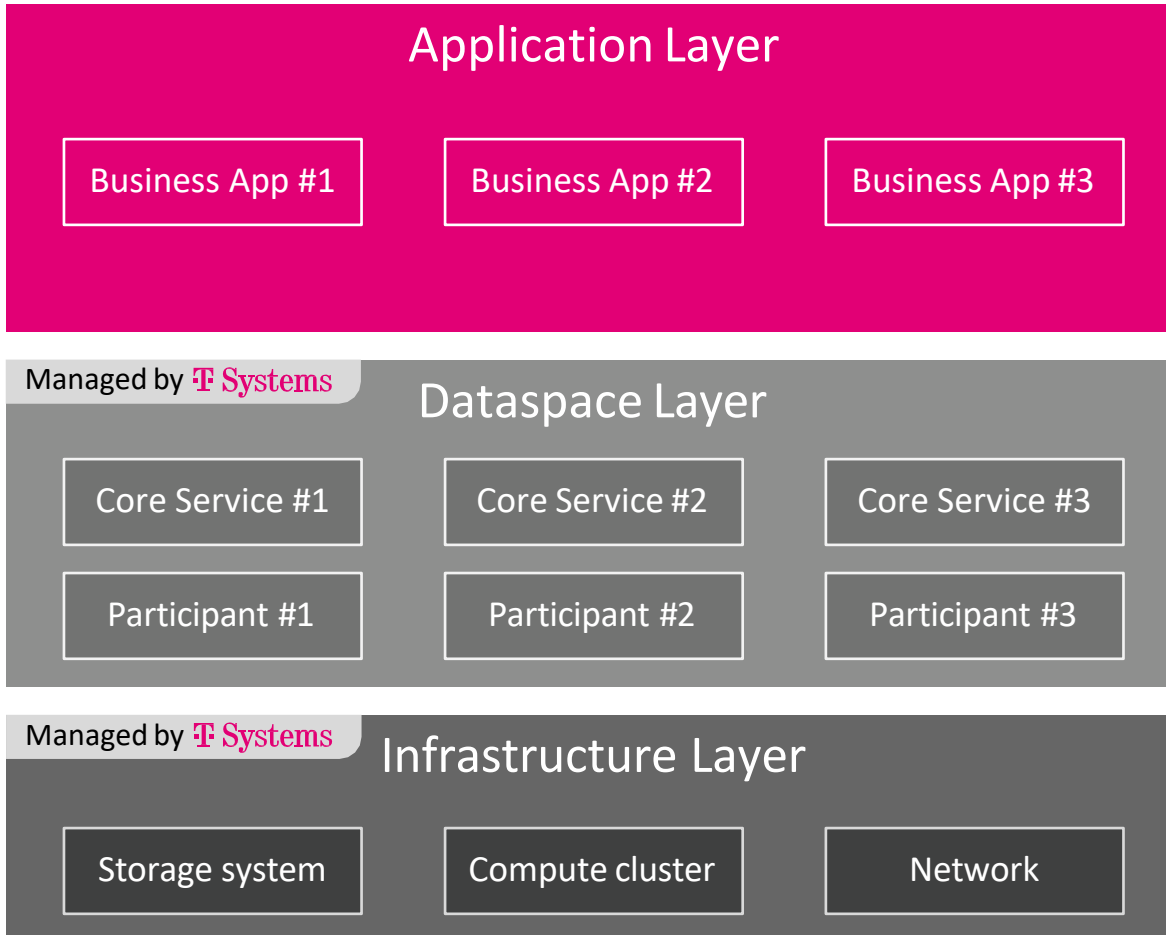
Phase 3: Create Value

Bring Business Applications and Use Cases into the spotlight

Application Prototyping Environment - Living Lab



T-Systems Living Lab



Dev Toolkit



Managed by T Systems

Dataspace as a Service

Fully functional, hassle-free dataspace, for your company and partner network

Prototyping-ready

Everything you need for Application development at your fingertips

Application Prototyping Environment - Living Lab

T-Systems Living Lab

Application Layer

Business App #1

Business App #2

Business App #3

Managed by T Systems

Dataspace Layer

Core Service #1

Core Service #2

Core Service #3

Participant #1

Participant #2

Participant #3

Managed by T Systems

Infrastructure Layer

Storage system

Compute cluster

Network

Dev Toolkit

Dev Tool #1

Dev Tool #2

Dev Tool #3

...

Managed by T Systems

Dataspace as a Service

Fully functional, hassle-free dataspace, for your company and partner network

Prototyping-ready

Everything you need for Application development at your fingertips

As simple as you want it

Peek under the hood and see how it works, or just build on top of it

Focus on what matters

Feel enabled to create value

02

Interoperability through Gaia-X Compliance

Dataspace := Participants + Services/Apps + Data + Standards



Compliant[Dataspace] := **Compliant**[Participants] +
Compliant[Services/Apps] +
Compliant[Data] +
Compliant[Standards]



Participant
Credential

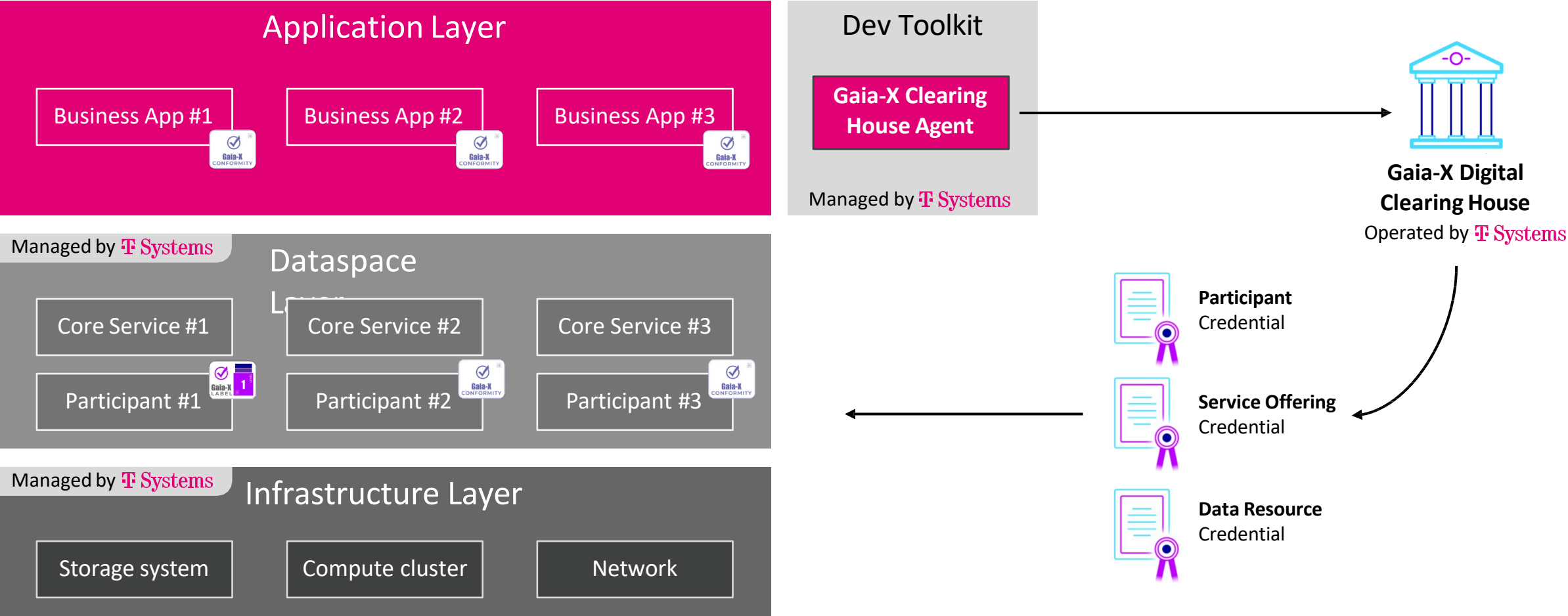
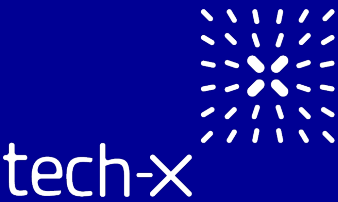


Service Offering
Credential

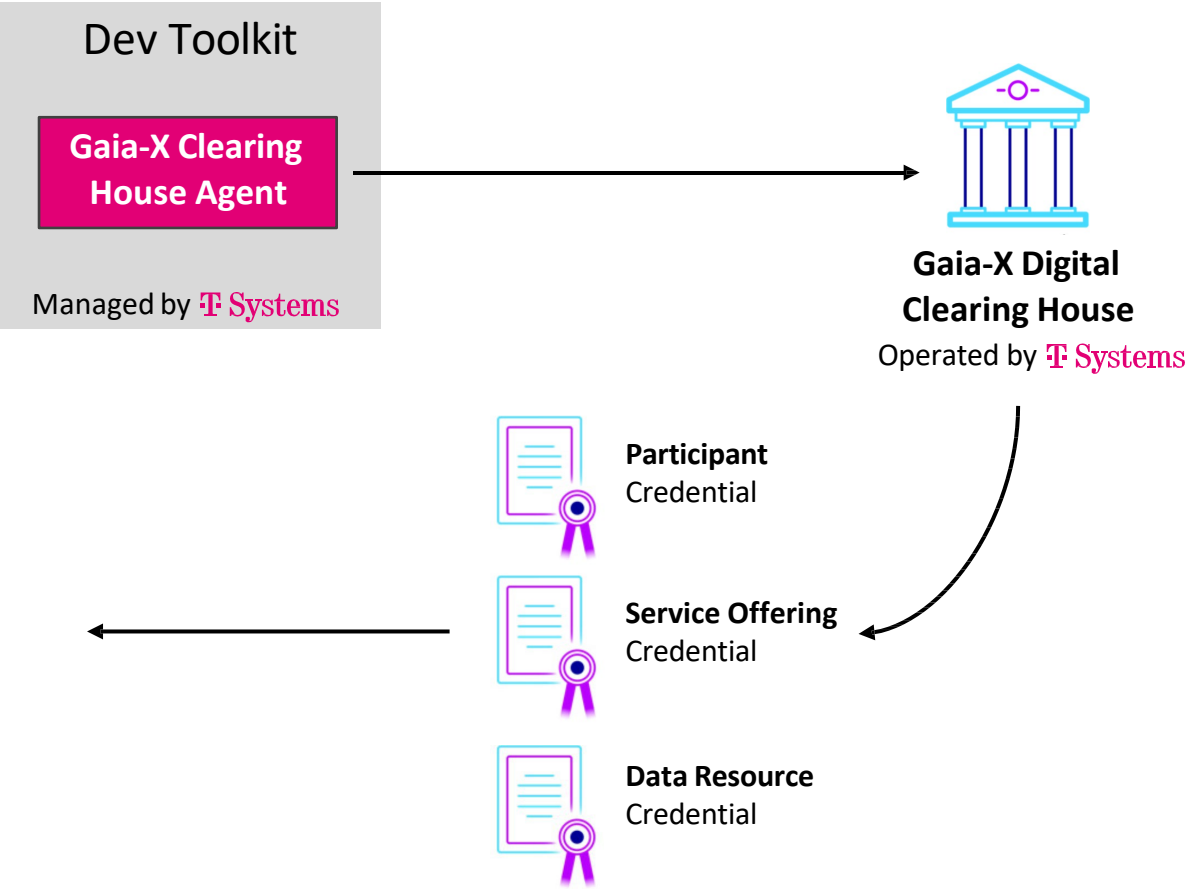
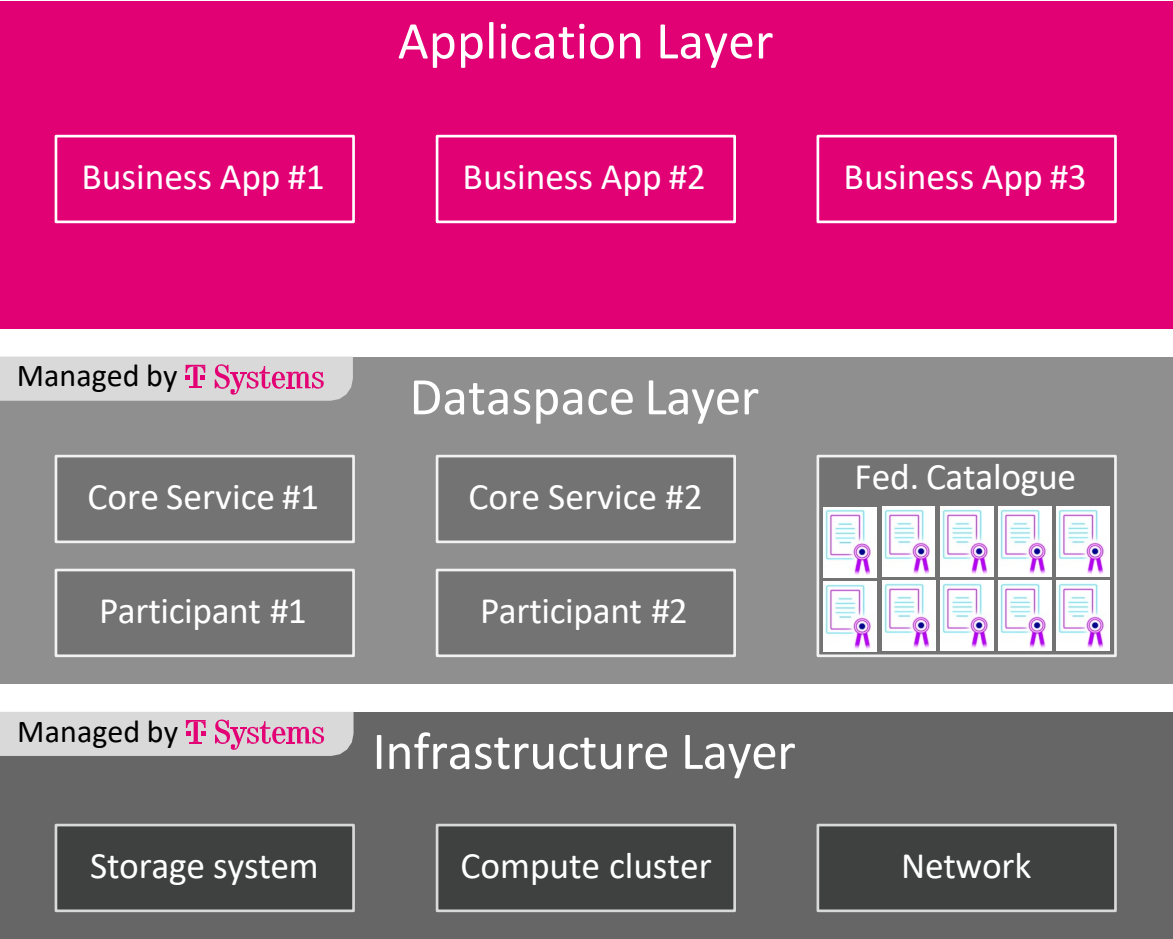


Data Resource
Credential

Gaia-X Compliant Application Prototyping Environment



Why stop there?



Thank you!

Aleksandar Kelečević

Product and Technology Lead – Data

Economy T-Systems International

GmbH Aleksandar.Kelecevic@t-systems.com

#GaiaX #TechX24



New data economy approaches for the GIS market – leveraging Boot-X and the Gaia-X Trust Framework

11:15 – 11:30

Alberto Berreteaga, TECNALIA

Jose A. Chica, TECNALIA

Markus Spiekermann, HUAWEI

#GaiaX #TechX24



Alberto Berreteaga

IDSA Ambassador
Senior Researcher at DIGITAL/CORES

alberto.berreteaga@tecnalia.com

tecnal:a

MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE



Jose A. Chica

Head of Digital Transformation at the
Energy, Climatic and Urban Transition Unit

joseantonio.chica@tecnalia.com

tecnal:a

MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE



Markus Spiekermann

Lead Architect
Data Ecosystems

markus.spiekermann@huawei.com

 **HUAWEI**

Boot-X Overview



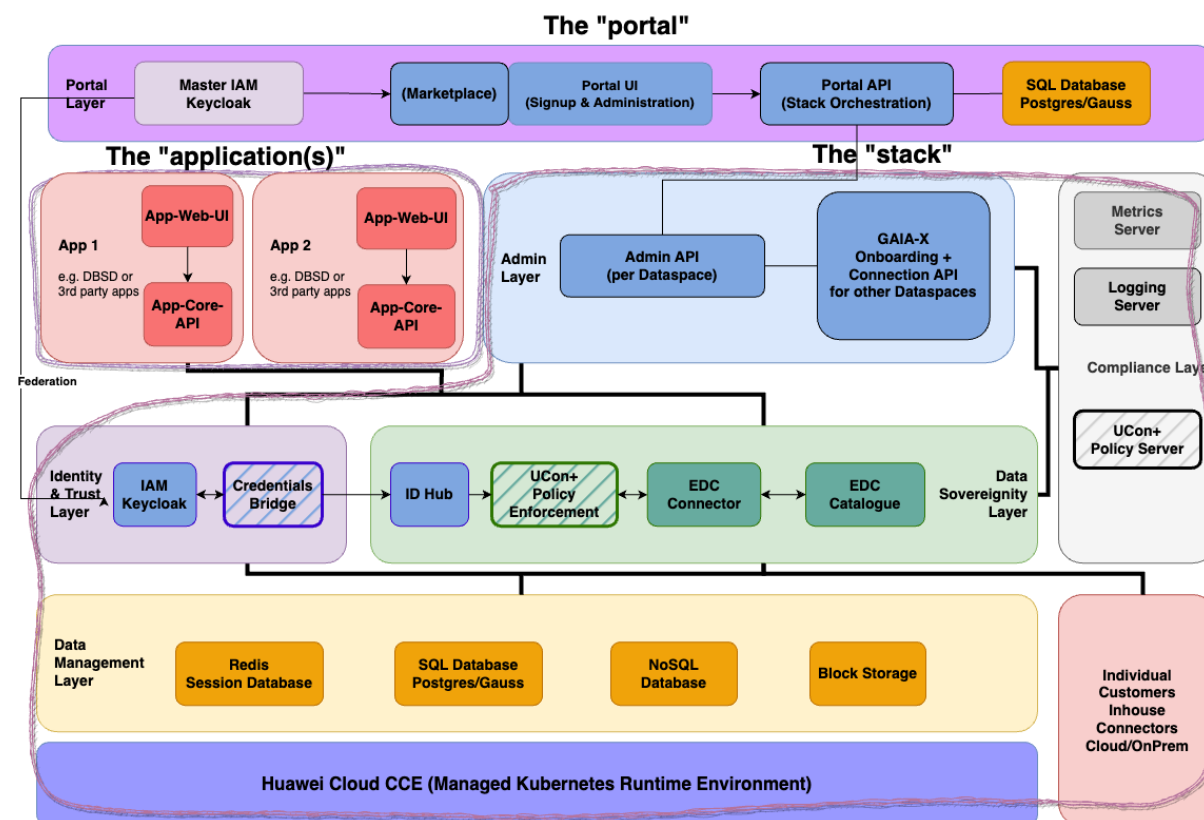
- Huawei's Exchange Data Space (EDS) main focus is to **build global dataspace environments** enabling **cross-border data exchange**, e.g. following international standards for data exchange between Chinese and European industries.
- The **Boot-X** project is a part of EDS and **the underlying infrastructure and technology stack** for setting up either a complete dataspace environment or all necessary components to participate in an existing dataspace.
- Boot-X's identity management fosters the Gaia-X Trust Framework and **provides interfaces for the GXDCH** while onboarding new participants or services
- The Boot-X stack **follows the EDC framework** and implements its capabilities for data transfer, cataloging, identity management, etc. It enhances those with an extended identity management, policy management, and monitoring in a production-ready environment.
- Boot-X thereby is the technical enabler to **implement real world use cases and applications** on top of dataspace technologies. One of these cases presents the pilot with TecNALIA and Inkolan at hand.

www.boot-x.eu



Boot-X Architecture

- Boot-X provides a portal for users as a landing page
- Users can create a new dataspace environment
- Users can join an existing dataspace
- While joining a dataspace, Boot-X provisions a preconfigured set of components for the participant
- Highly scalable through leveraging cloud-native technologies (Kubernetes, Traefik, Helm)
- Leveraging the EDC framework for our derivatives enable compliance with DSP out-of-the-box
- Adding (open source) extensions for Huawei Cloud on top of existing set (e.g. Azure, AWS, GCP)
- Adding as much applications on top of the stack
 - one example...



Connected Urban Futures: Data Space + AI + Business



Data for the City of Tomorrow



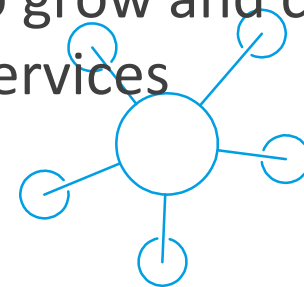
- Let's create a Data Space to share data ensuring secure and trusted data sharing mechanisms, maintaining control and data ownership (data sovereignty), enabling seamless data sharing across geographical and organizational boundaries, fostering innovation and new smart services across companies and industries.
- Let's apply AI there, let's do magic!
- Let's do business!

AI for utility networks, construction works prediction. Let's do magic!

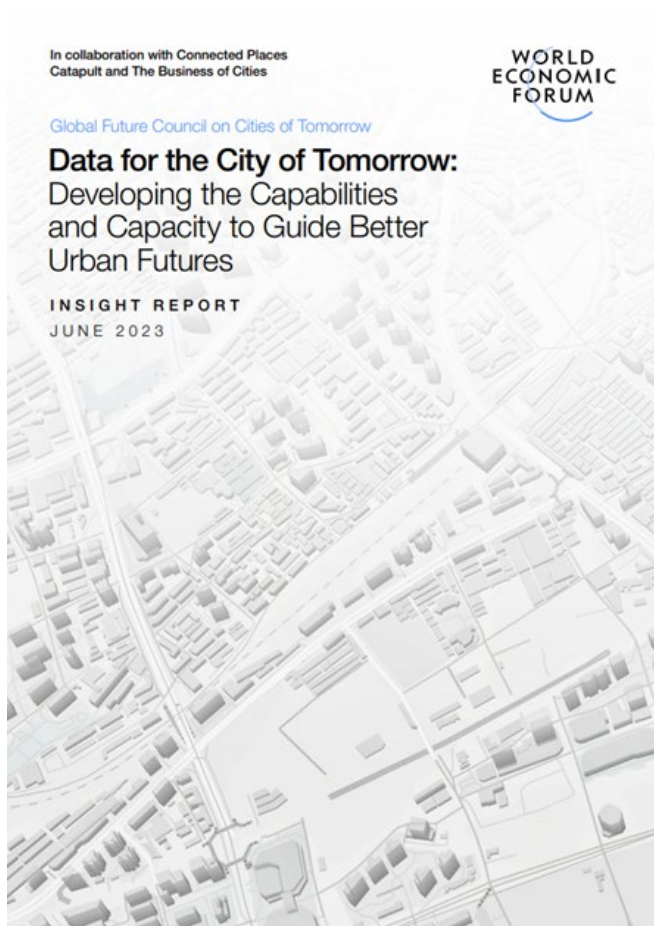


Data Space will share data and create new roles:

- Data Space Authority – To rule them all
- Data Space Operator – To run them all
- Data Provider – To feed and enrich the ecosystem
- Data Consumer – To grow and create new products and services



Data for the City of Tomorrow by WEF.

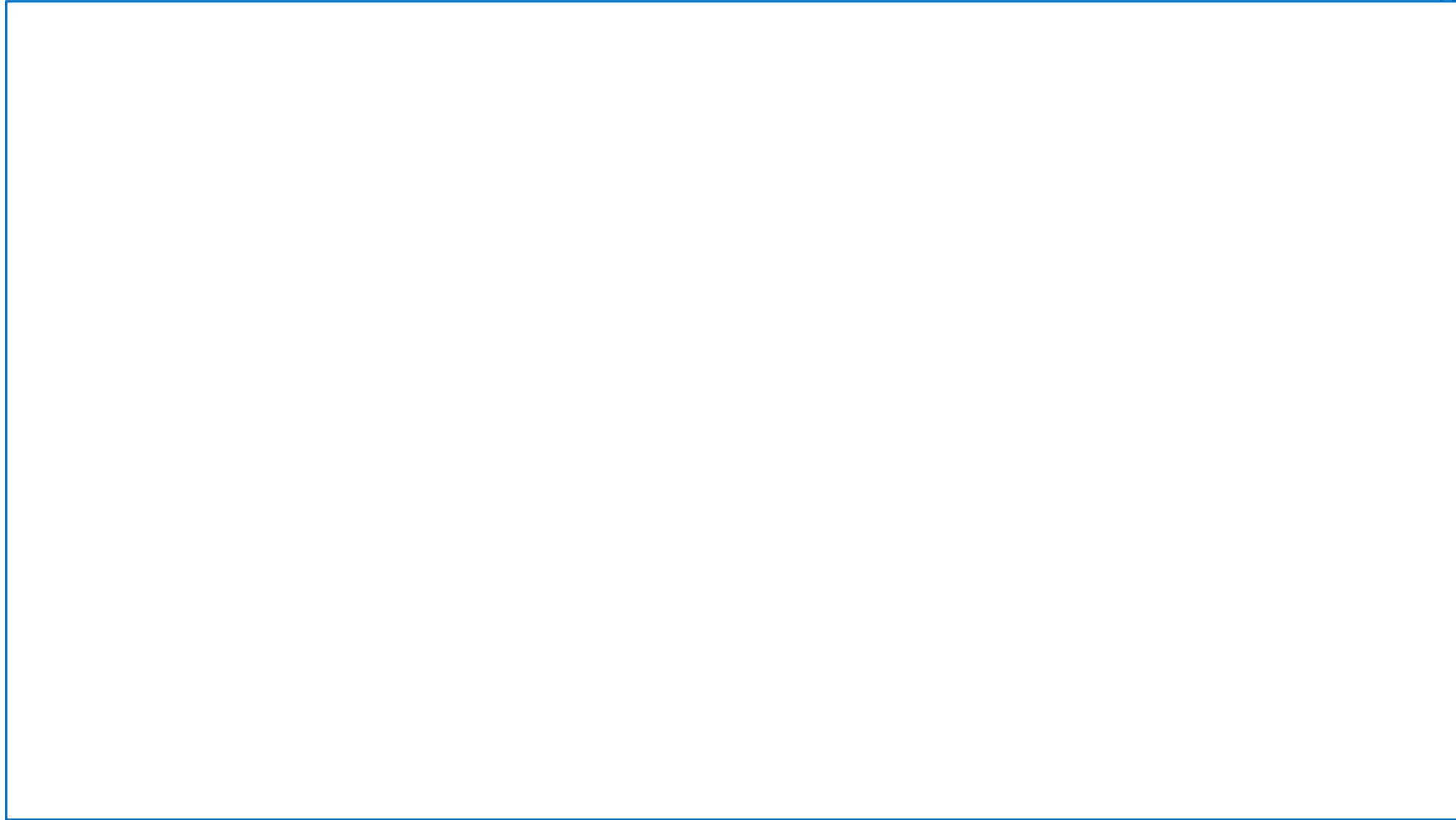


New data economy approaches for the GIS market – leveraging Boot-X and the Gaia-X Trust Framework - TECNALIA

TABLE 1 | The challenges holding back the application of data to city-making and management¹⁰

Problem and need	Limited data availability	Definitions and coherence issues	Few agreed standards
The problem	In many parts of the world, especially in lower-income cities and regions, the reservoir of public, private and civic data from which to draw is still modest.	No accepted universal definition yet exists for what constitutes a city, where cities stop, or what defines liveability, smartness or prosperity.	Efforts to standardize city indicators and data-collection processes ¹¹ are still at an early stage and are not uncontested. Data is also hard to interpret in a vacuum and translate into policy decisions.
What cities need	<ul style="list-style-type: none"> – Better data planning – Stronger digital infrastructure – More reliable or pooled resources – Incentives for data to spread to new places 	<ul style="list-style-type: none"> – More clarity on “what success looks like” – More “like-for-like” data across diverse cities or contexts 	<ul style="list-style-type: none"> – An agreed consensus on what data matters, for what and for whom – Advice to navigate the many data choices available
	Lack of skills and capacity	Governance and processes issues	Lack of trust
The problem	The collection of data, the development of accurate models and the preparation of information for decision-makers and residents rely on strong local capability and a culture of valuing this activity.	Only some cities have data strategies, chief data or technology officers, or enjoy strategic partnerships with data service providers.	Citizens do not always trust their local government or city with their data. They may also not fully understand how data is being used, especially with enhanced data sets (like digital twins).
What cities need	<ul style="list-style-type: none"> – Funds and structures to recruit the skills required – Strong technical and communication systems to maximize the value of data 	<ul style="list-style-type: none"> – Credible governance and systems to organize data around problems – Tools to combine public- and private-sector information – Tried-and-tested arrangements for durable partnerships and responsible co-ownership 	<ul style="list-style-type: none"> – Improved dialogue with citizens about the security and use of their data – Clear data policies and communication on the benefits data use will deliver to people and businesses and will contribute to sustainability – Local and international media to popularize good data for cities

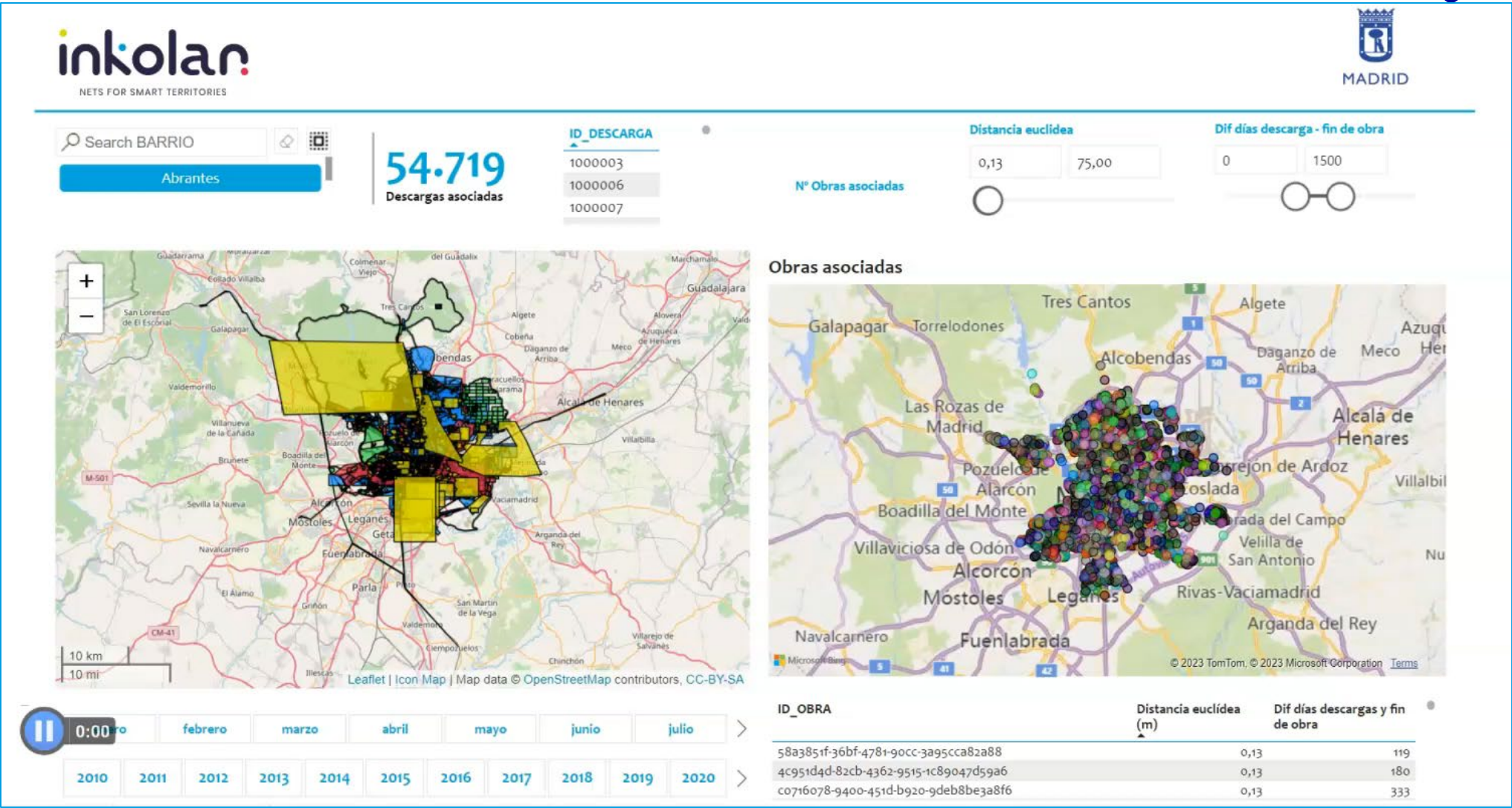
Smart Cities Utilities Networks: INKOLAN case study.



Smart Cities Utilities: data-sharing between public and private sectors.



gaia-x



Applied AI use cases for utility networks construction works prediction:



1. Identification of the urban context and relevant infrastructures in the INKOLAN reported location area. The data about the urban context of the reported information will depend on information from the City Council and third-party sources: land registry, cadastre, mobility infrastructure, singular elements (transformation centres, pumping stations, manholes or access points for maintenance...).
- **USE CASE I (Operators):** IDENTIFICATION OF POTENTIAL AFFECTIONS BY ACTIONS OF THIRD PARTIES (e.g. power cut would disable pumping, communication nodes...).
 - **USE CASES II (City Council):** EVALUATION OF EFFECTS ON CITIZENS AND COMMERCE DUE TO OCCUPATION OF PUBLIC ROADS.

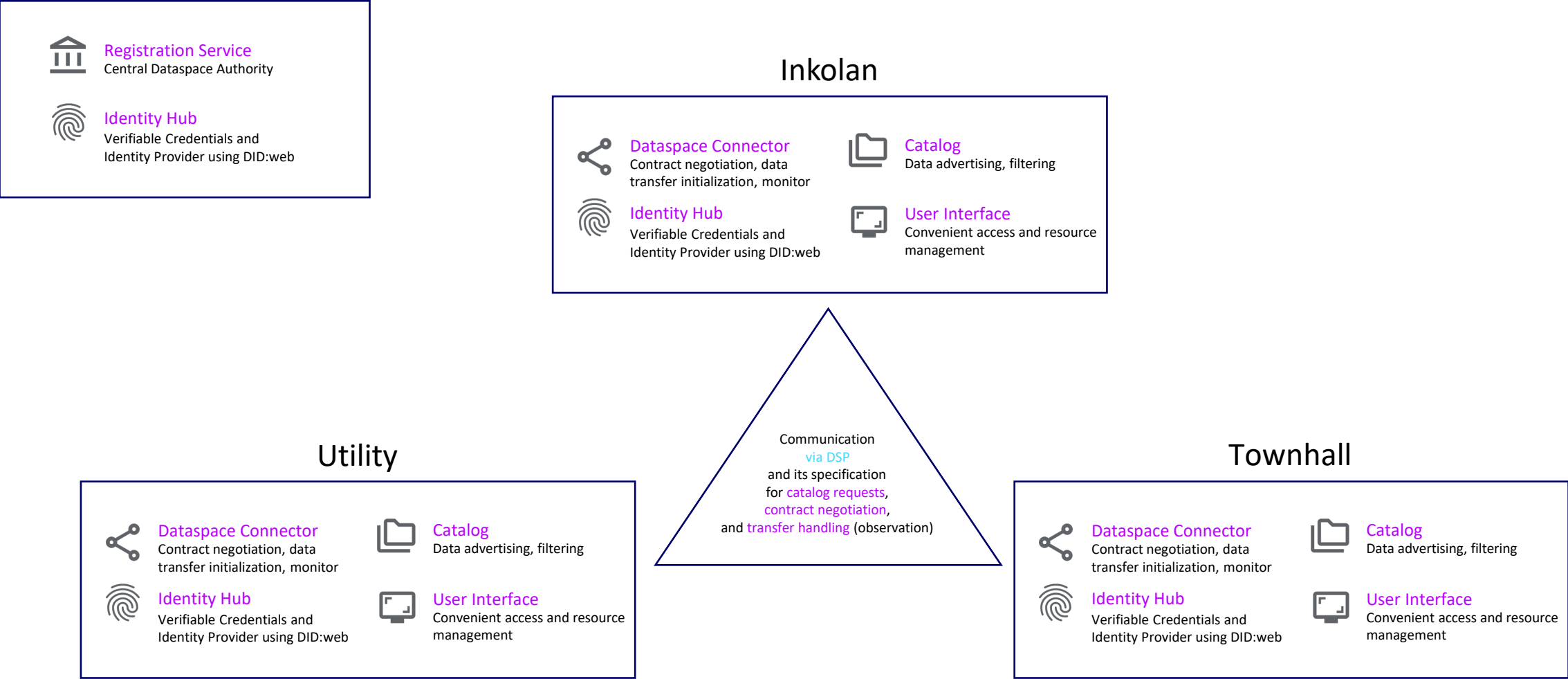


2. Algorithm for predicting the probability of conversion of INKOLAN reported data into finished works with an indication of the probability or time window in which it will materialise.
- **USE CASE I (Operators):** IDENTIFICATION OF WINDOWS OF OPPORTUNITY (licences in progress) AND TIMELINES FOR THE EXECUTION OF WORKS TO REDUCE THE RISK OF ESTIMATING INVESTMENTS.
 - **USE CASE II (City Councils):** OPTIMISATION OF CONSTRUCTION LICENSING PROCESSES AND ANTICIPATION OF ECONOMIC IMPACTS, MOBILITY, SMALL COMMERCE, ACCESS TO SERVICES (schools, health centres...) ASSOCIATED WITH INTERVENTIONS IN PUBLIC SPACE.

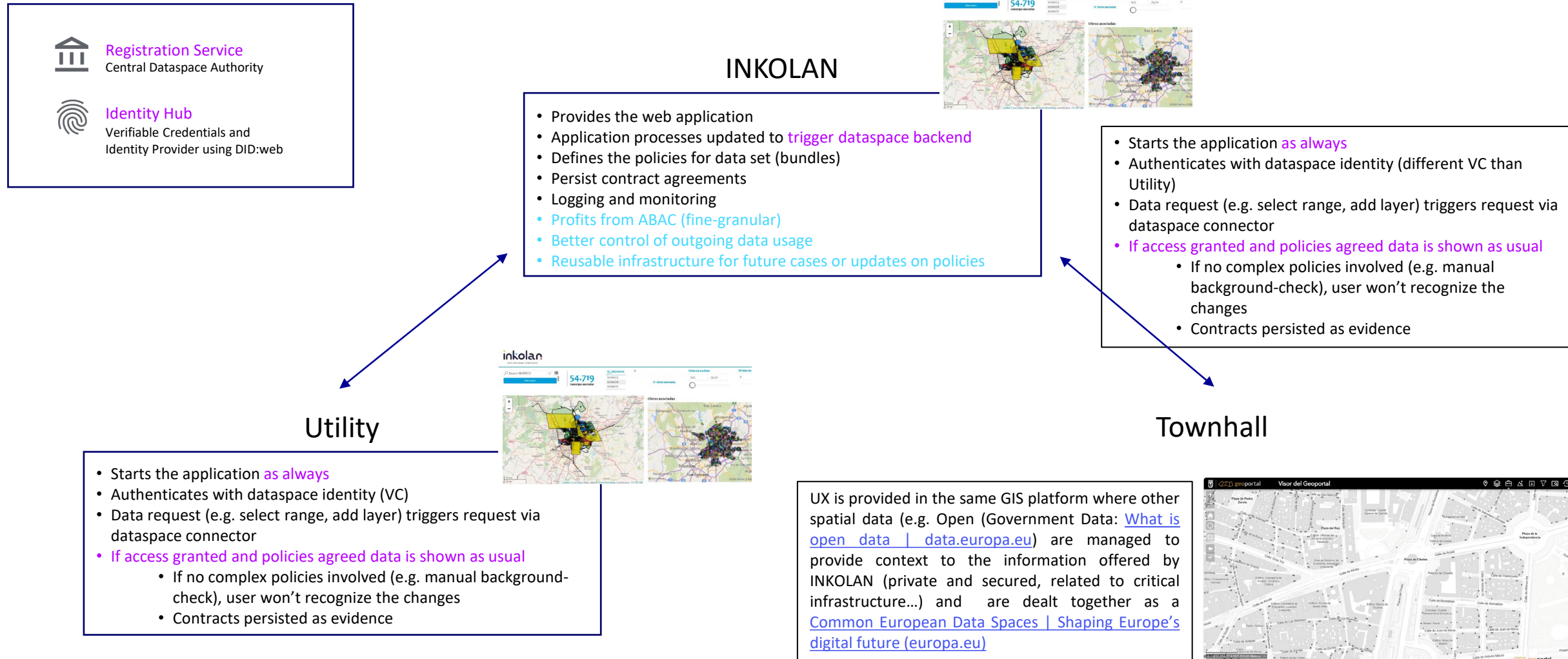
Have you ever seen a Data Space?



Business case scenario with Boot-X



Business case scenario with Boot-X



Connected Urban Futures: Data Space + AI + Business

Data for the City of Tomorrow

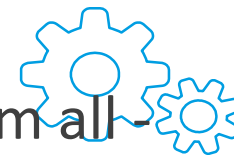
- Let's create a Data Space to share data!
- Let's apply AI there, let's do magic!
- Let's do business!

AI for utility networks, construction works prediction. Let's do magic!



Data Space will share data and create new roles:

- Data Space Authority – To rule them all – **INKOLAN, TECNALIA**
- Data Space Operator – To run them all – **HUAWEI**
- Data Provider – To feed and enrich the ecosystem - **INKOLAN, INKOLAN data provider partner**
- Data Consumer – To grow and create new products and services - **Ayuntamiento de Madrid, INKOLAN**



Thank you!

Alberto Berreteaga (TECNALIA)

Jose A. Chica (TECNALIA)

Markus Spiekermann (HUAWEI)

alberto.berreteaga@tecnalia.com

joseantonio.chica@tecnalia.com

markus.spiekermann@huawei.com

#GaiaX #TechX24

Observability and Trusted Data Transactions

11:30 – 12:00

Frédéric Bellaiche, Dawex

#GaiaX #TechX24

Dawex at a glance: a European scale-up recognized worldwide for its expertise and achievements in data exchange



Company profile

Founded in 2015

Offices: Paris, Lyon,
Montreal, Tokyo

Global reach

 France & Europe



 Japan
(2nd largest market)

 North America



 Middle East



Recognized as a pioneer and innovator



11 awards & recognitions
US, EU, ME



Tech Pioneer at the
World Economic Forum

Speaker in **Davos**



Speaker at G7 Summit
and other global events



Data Expert Group
member at the **UN**



Leads Gaia-X Data
Exchange Working Group

Customer references

in more than
15 strategic sectors



Retail



Airports



Infrastructure



Geospatial



Automotive



Mobility



Real Estate



Trading



Culture



Energy



Agriculture



Food



Tourism



Manufacturing

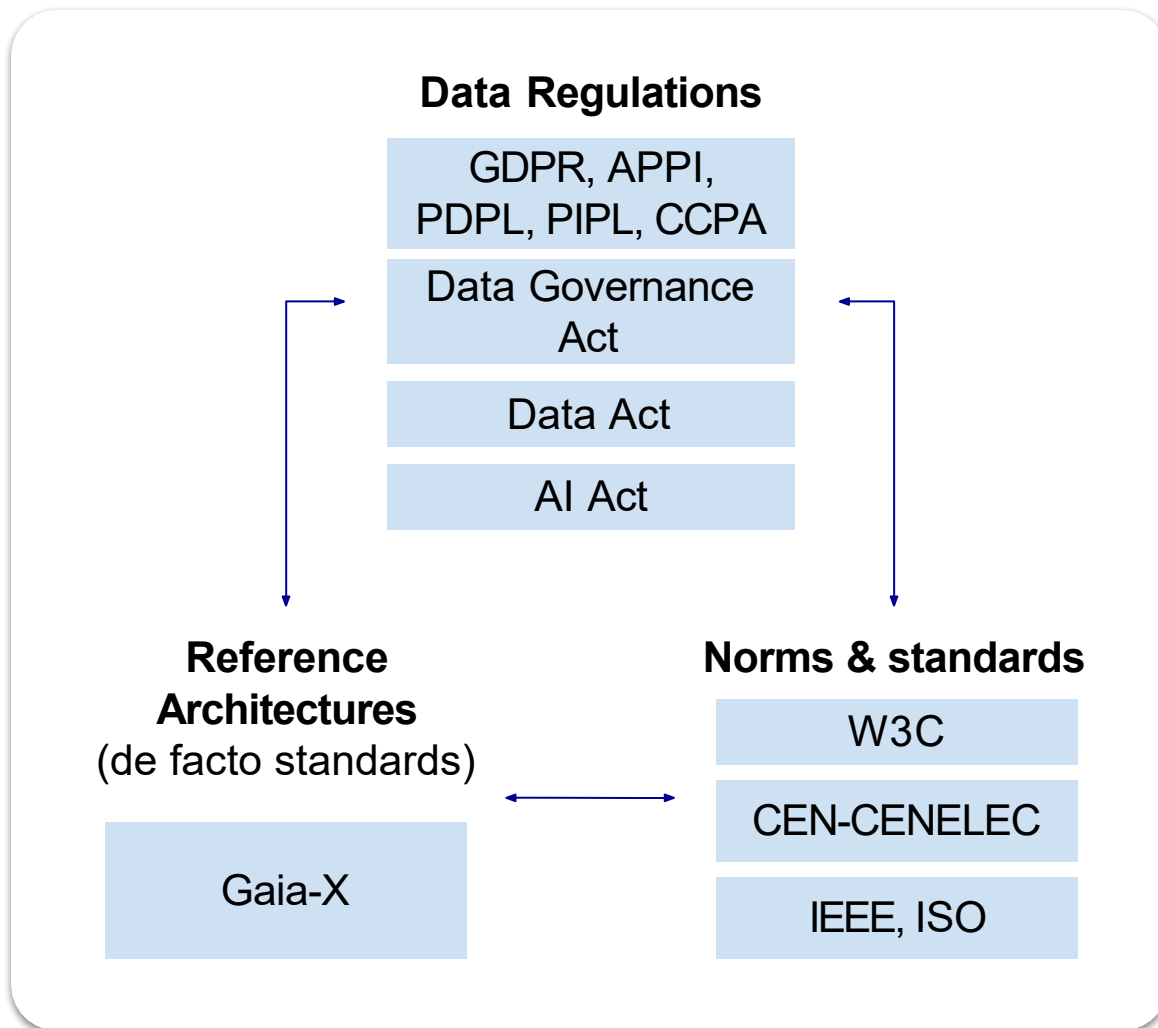


Smart
cities



Banking

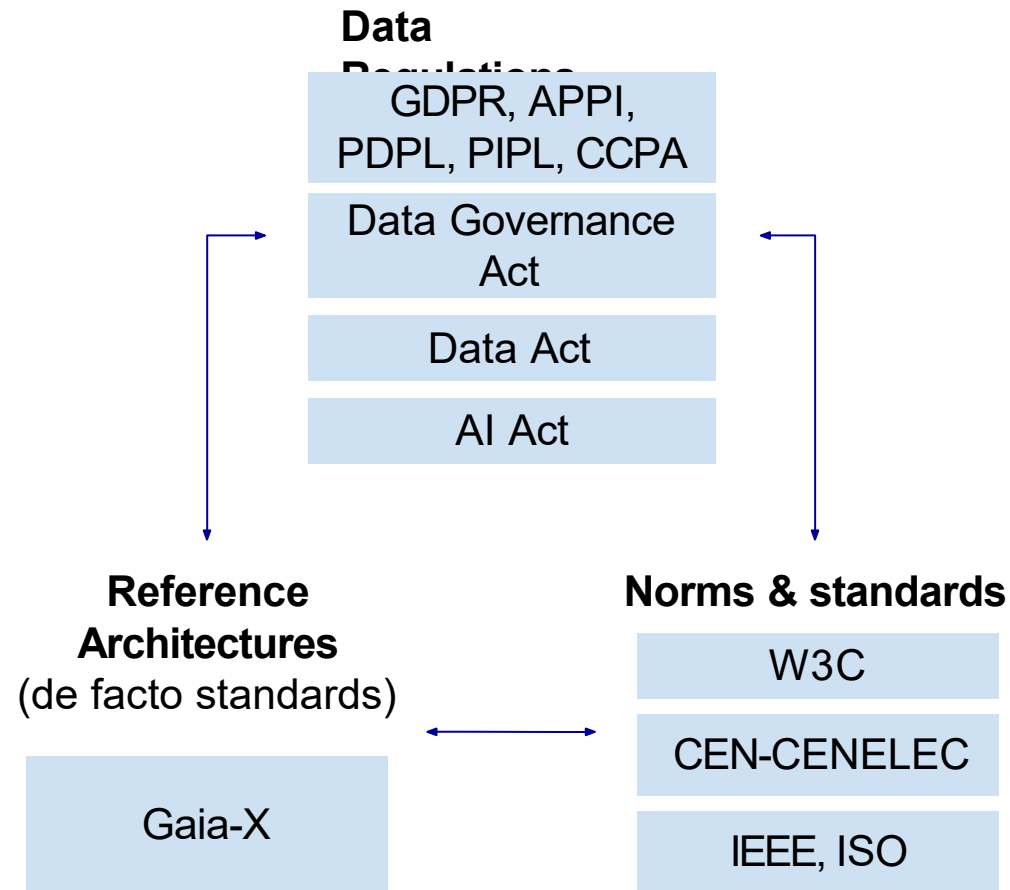
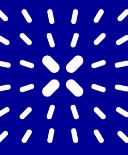
Regulations, reference architectures and standards have emerged quickly in the 2020's, paving the way for generalized data



Three powerful levers to:

- Create **trust** in **data ecosystems**
- Facilitate **interoperability**
- Ensure the highest level of **security** and **privacy** as well as **sovereignty** to all stakeholders

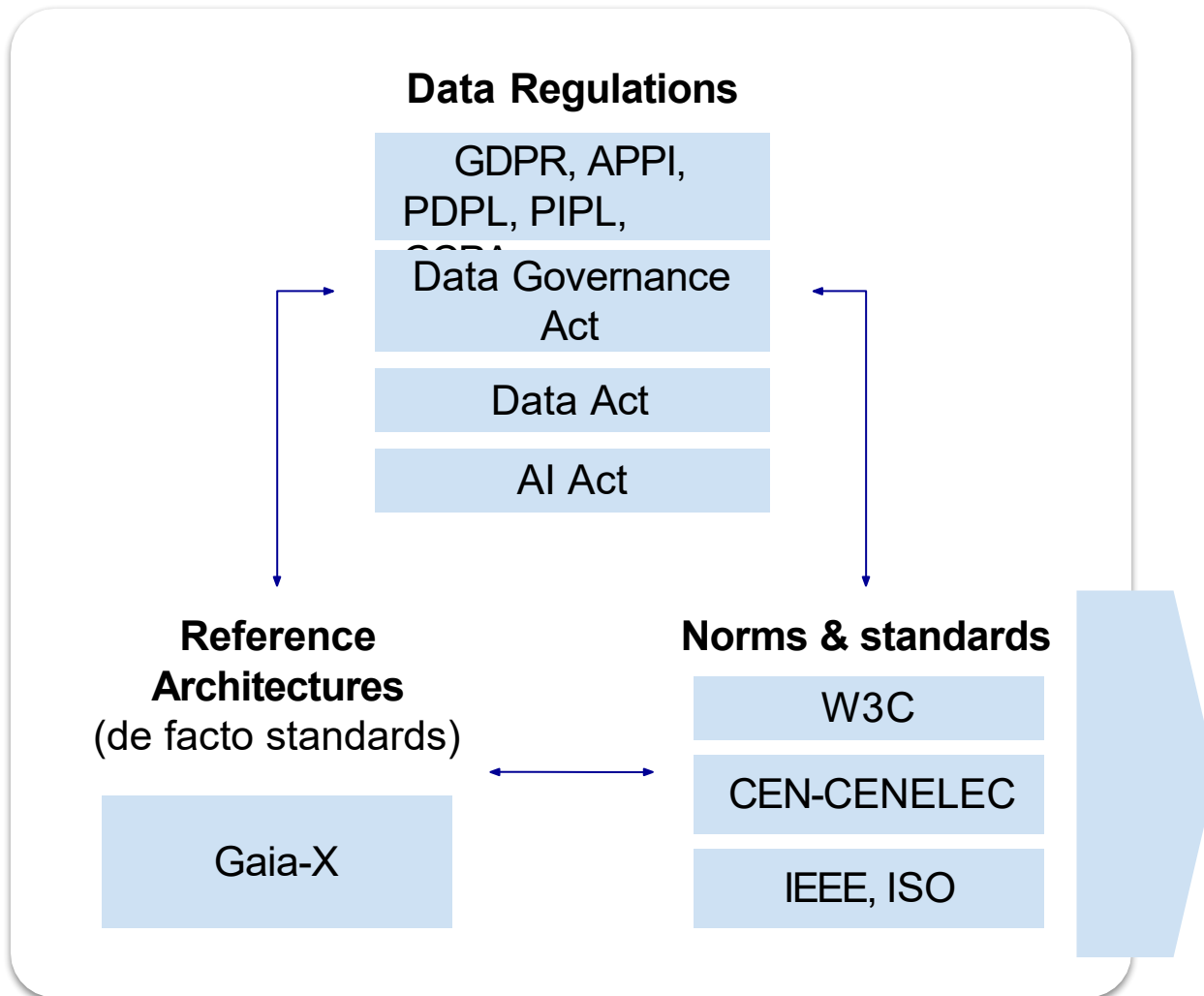
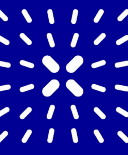
Regulations, reference architectures and standards have emerged quickly in the 2020's, paving the way for generalized data exchanges



Three powerful levers to:

- Create **trust** in **data ecosystems**
 - Facilitate **interoperability**
 - Ensure the highest level of **security** and **privacy** as well as **sovereignty** to all stakeholders
- ✓ **Dawex** is strongly **involved** in the **three pillars** that structure data exchanges

Regulations, reference architectures and standards have emerged quickly in the 2020's, paving the way for generalized data exchanges tech-X



Three powerful levers to:

- Create **trust** in **data ecosystems**
- Facilitate **interoperability**
- Ensure the highest level of **security** and **privacy** as well as **sovereignty** to all stakeholders

✓ **Dawex** at the initiative of the standardization process of **Trusted Data Transaction**

CEN pre-standardisation of Trusted Data Transaction due end of 2024, will align market players beyond regulations

Pre-Standardization workshop



Deliverable: CEN Workshop Agreement (CWA)

- **Part 1:** Standard terminology and concepts
- **Part 2:** Identification of the key characteristics of Trust and criteria to measure it

CEN pre-standardisation of Trusted Data Transaction due end of 2024, will align market players beyond regulations

Pre-Standardization workshop



Deliverable: CEN Workshop Agreement (CWA)

- **Part 1:** Standard terminology and concepts
- **Part 2:** Identification of the key characteristics of Trust and criteria to measure it

Objectives

- Prepare for and accelerate the **creation of a Harmonized standard on Trusted Data Transaction**
- **Harmonized standard:**
 - **European standard** developed by a recognised European Standards Organisation: **CEN**, CENELEC, or ETSI
 - Created following a **request from the European Commission**
 - **Can be used to derive a presumption of conformity** to a European legislation, e.g. Data Act
- **Global reach (worldwide)**

CEN pre-standardisation of Trusted Data Transaction due end of 2024, will align market players beyond regulations

CEN Workshop Agreement (CWA) - Part 1

- Description of metadata, which are important for discoverability purposes. It is also important to ensure that the description includes enough and exhaustive information about the data product, if possible regarding the specific purposes the data product is intended to.,
- data licenses, which describe the legal terms of the license for the data product,
- terms of usage, including, but not limited to, the duration, terms and conditions, territory and sub-licensing rights,
- offering details, including commercial terms and price, if any.

5.3.2 Data transaction

The concept of a data transaction has a number of key characteristics:

- A data transaction, in order to materialize, requires a data provider, a data user, a clear definition of the data product being transacted, data licensing mechanisms, the secure technical transfer of - or access to - the data, and traceability of the data transaction.
- In some cases, the data is transferred from the data provider to the data user. In other cases, the data does not move while access to the data is given to one or several stakeholders.
- Data transactions do not necessarily imply a commercial relationship between the data provider and the data user, and does not necessarily imply the payment of a fee by the data user to the data provider in order to access and use the data.
- Each data transaction is "unique" indicating that it must be treated independently of other data transactions. It is also "immutable" indicating that a data transaction is unmodifiable when it has occurred

The concept of Data Transaction can be described with the conceptual model hereafter:

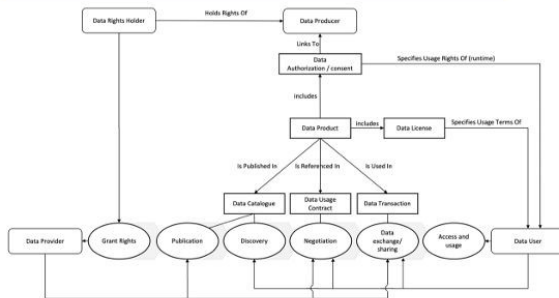


Figure 1: Conceptual model of the scope of data transaction¹

¹ Source: Gaia-X European Association for Data and Cloud AISBL - Data Exchange documents 23.11 (with simplification) and based on DSSC inputs.

- **Scope, terminology, concepts & mechanisms**
- **Started mid 2023**
- Collaborative and consensus-based process (monthly work sessions)
- Draft CWA produced & accepted
- **150+ comments received** during “public review process”
- **Strong support from European Commission**
- **Comments resolution proposals** produced by Editor (Dawex)

CWA - Part 2

- **Characteristics of trust**
- **Criteria to measure trust**
- **Increased interest of organizations to participate -> several large corporations currently onboarding for Part 2**
- **Part 2 to start in June 2024**
- **Final deliverable expected end of 2024**

Part 1 focused on the key definitions relevant to describe a Data Transaction and needed to address Trust in Part 2

105 4. Terms and definitions

106 For the purposes of this document, the following terms
107 ISO and IEC maintain terminological databases for

- 108 • IEC Electropedia
- 109 • ISO Online browsing platform

110 4.1

111 data

112 re-interpretable representation of information, or
113 interpretation, or processing of information

114 [SOURCE : ISO/IEC 24765:2017]

115 4.2

116 data consumer

117 data user

118 person or organization that uses data

119 Note 1 to entry: data user is a subset of data consumer

120 [SOURCE: ISO 5127-1:2001, 3.2.1, definition 1,
121 to "data user"]

122 4.3

123 data exchange

124 data sharing

125 process by which a data provider grants a data user access to a data product
126 technical, financial, legal, or organisational use requirements.

127 Note 1 to entry: the term refers to a full spectrum of practices related to sharing
128 of data, including open data and the many forms of non-open data.

129 Note 2 to entry: data sharing may or may not require transfer of data.

130 4.4

131 data license

132 agreement which defines the conditions of use of data

133 Note 1 to entry: conditions of use include, but are not limited to, rights and territory

134 rights and territory

135 4.5

136 data product

137 standardised data product

138 Note 1 to entry: data product is typically published

139 data licenses and terms of use

140 Note 2 to entry: data product is typically published

141 Note 3 to entry: data product is typically published

142 users

143 4.6

144 data producer

145 natural person, legal person,, device or any system

146 4.7

147 data provider

148 data product provider

149 natural or legal person that provides data

150 Note 1 to entry: data provider is a subset of data provider

151 Act

152 Note 2 to entry: data provider is a subset of data provider

153 - non-technical, on behalf of the data provider

154 data licenses and terms of use

155 conclusion of contract

156 - technical

157 Note 3 to entry: data product provider is a subset of data provider

158 pursuant to the data product provider

159 General Data Protection Regulation

175 4.10

176 data transaction

177 immutable outcome of an agreement for data access or exchange

178 Note 1 to entry: data transaction requires a data provider, a data user, a clear definition of the data
179 product being transacted, data licensing mechanisms, the secure technical transfer of - or access to- the
180 data, and traceability of the data transaction.

181 Note 2 to entry: "data exchange" and "data access" terms are used in order to describe different
182 mechanisms, like actual transfer of data or situations where data does not move but where access is
183 provided to different stakeholders

184 Note 3 to entry: Data transactions do not necessarily imply a commercial relationship

161 data rights holder

162 party that has legal rights and/or obligations to use, grant access to or share certain personal or non-
163 personal data, and to transfer such rights to others

164 Note 1 to entry: data rights holder and data provider represent different roles, that can be carried out by
165 the same entity or by different entities

166 Note 2 to entry: data rights holder's role is focused on managing authorizations and consents to use
167 certain data, required before the provision of the data

168 4.9

169 data space

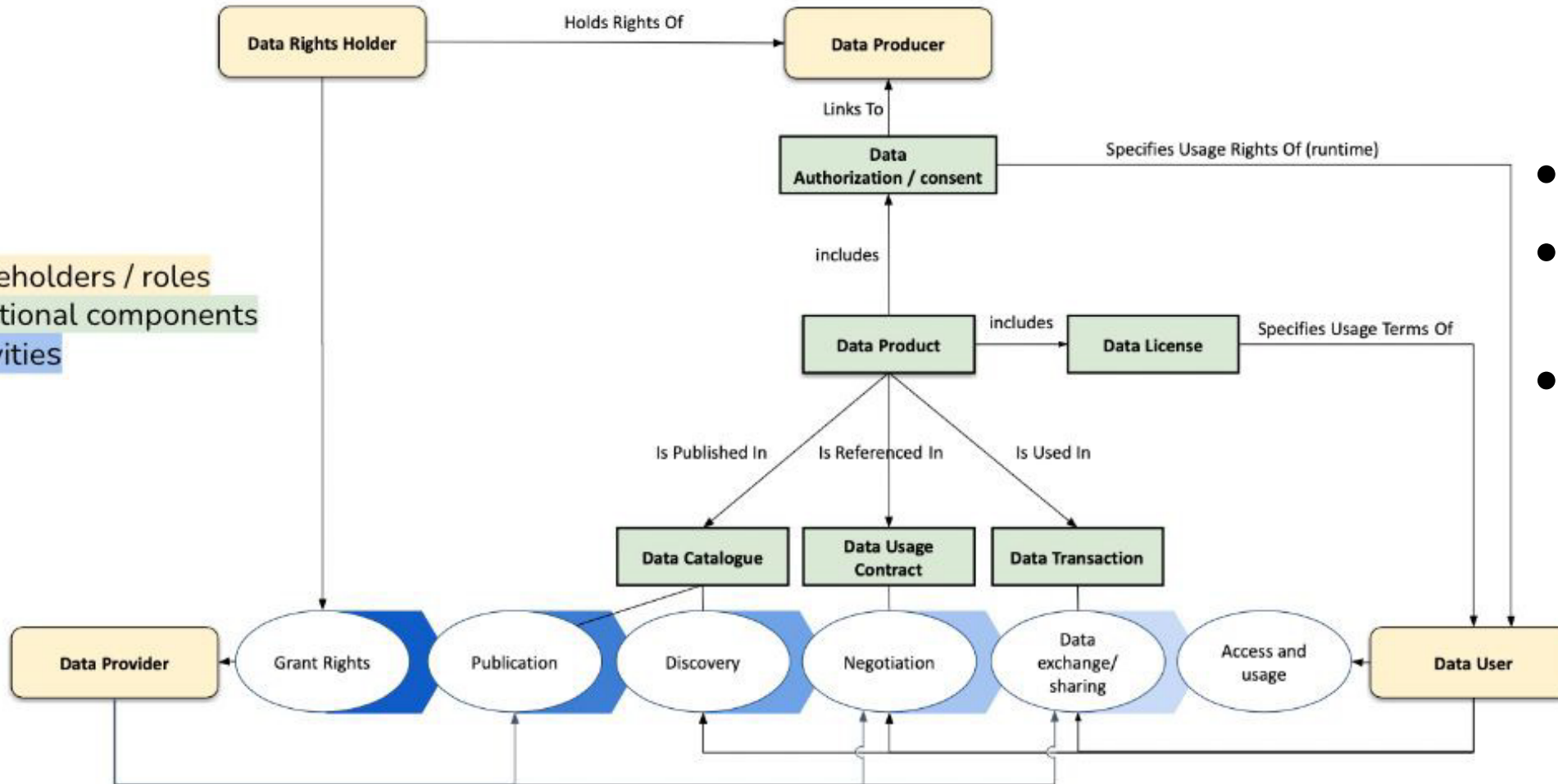
170 distributed system defined by a governance framework that enables secure and trustworthy data
171 transactions between participants while supporting trust and data sovereignty

172 Note 1 to entry: data space is implemented by one or more infrastructures and enables one or more use
173 cases

174 [SOURCE: DSSC Glossary | Version 2.0 | September 2023]

Part 1 focused on the key definitions relevant to describe a Data Transaction and needed to address Trust in Part 2

Stakeholders / roles
Functional components
Activities



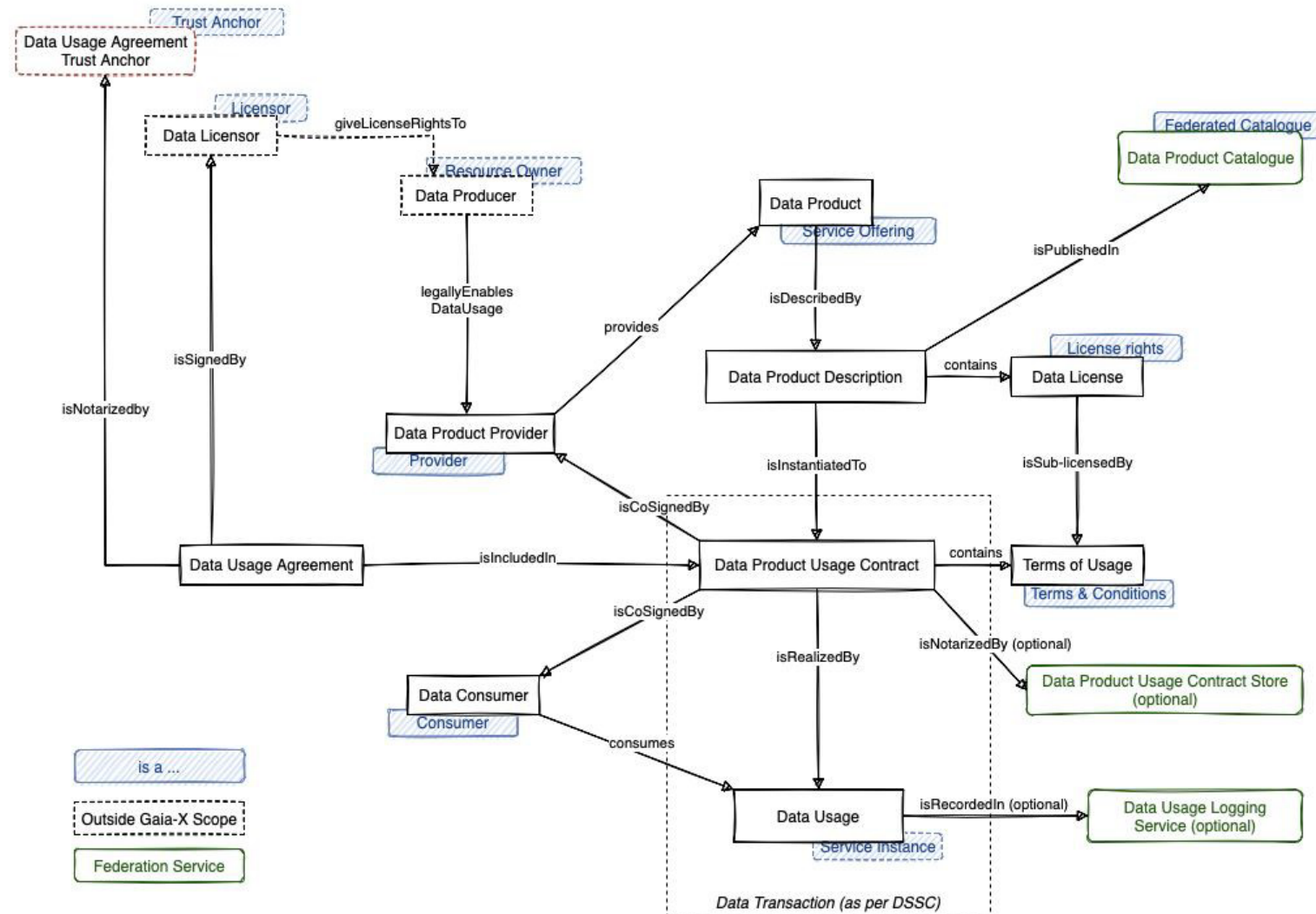
- Key terms defined
- Key stakeholders and roles defined
- Key activities defined

- **Trusted Data Transactions** imply the necessity to make the data exchange process **observable**.
- This can be done for **legal** reasons to prove that data has been **acquired** only by **authorized** entities and, if necessary, with proper **consent**
- This can be done for **business** reasons, for example to provide a marketplace with **billing** function through a trusted third party
- In this context, an **auditor** would request **logs** of **data transaction** with an **access policy** which restricts access to the auditor.
- To verify the validity of those log entries, **digital signing** mechanism can be used. This would limit access to sensitive observation data to auditors that are participants of the data space, have special credentials which qualify them as trusted auditors and are bound to the policies of those contracts due to the contracts on the collected log data.

- **Observer** actions are automatically **logged** by the system and can be **tracked** and **monitored**. This would enable a **trust relationship** in which auditors can be audited by participants.
- To simplify the auditability of a data space, the data space can **mandate** that participants make their audit data available. Then auditors would not need to request publication but could simply **negotiate** the relevant contracts, which are only accessible to participants with valid auditing and monitoring credentials.
- Following the same pattern, additional optional functional roles can be implemented: a payment clearance service, notary services, regulatory reporting, and the like.

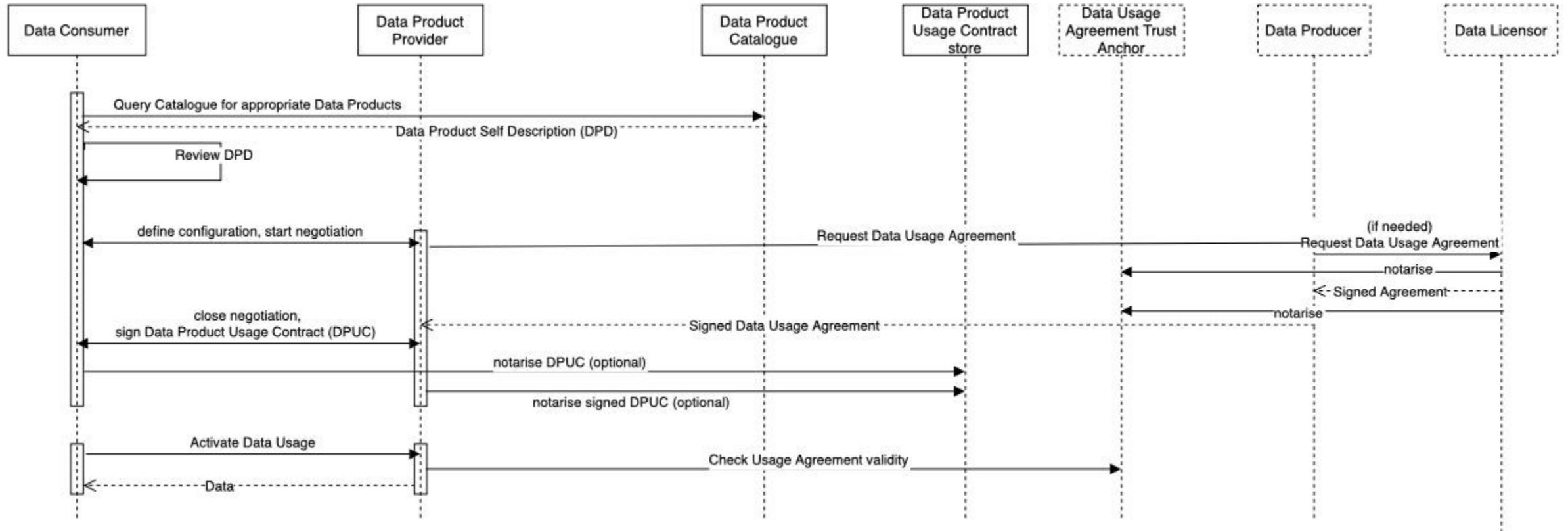
Gaia-X and observability

Data Products and Data Exchange Services



Gaia-X and observability

Operational model



- Attributes available to logging purposes in the Gaia-X Data Transaction model (23.11.1)

Signature Check Type

Attribute	Type.Value/Voc	Mandatory	Comment
gx:participantRole	String	Yes	Establish a unique way to identify the participant that has to Sign (e.g. gx:providedBy is identified by Provider). Possible values are Provider, Consumer, Licensor, Producer.
gx:mandatory	String	Yes	Establish if a Signature is mandatory or Optional. Possible values are Yes/No.
gx:legalValidity	String	Yes	Establish if the legal validity check needs to be enforced to the Signature. Possible values are Yes/No.

Data Product Usage Contract

Attribute	Type.Value/Voc	Mandatory	Comment
gx:providedBy	URI	Yes	A resolvable link to the Data Product Provider .
gx:consumedBy	URI	Yes	A resolvable link to the Data Consumer .
gx:dataProduct	URI	Yes	A resolvable link to the Data Product Description (after negotiation).
gx:signers	SignatureCheckType[]	Yes	The array identifying all required Participant signatures.
gx:termOfUsage	URI	Yes	A resolvable link to the Term of Usage.
gx:notarizedIn	URI	No	A resolvable link to the Notarization service.
gx:dataUsage	URI	Yes	A resolvable link to Data Usage.

Data Usage

Attribute	Type.Value/Voc	Mandatory	Comment
gx:loggingService	URI	No	Link to the Logging Service.

Data Usage Agreement

Attribute	Type.Value/Voc	Mandatory	Comment
gx:producedBy	URI	Yes	A resolvable link to the Data Producer .
gx:providedBy	URI	Yes	A resolvable link to the Data Product Provider .
gx:licensedBy	URI[]	No	A list of resolvable links to Data Licensors .
gx:dataUsageAgreementTrustAnchor	URI	Yes	A resolvable link to the Data Usage Agreement Trust Anchor .
gx:dataProduct	URI	Yes	A resolvable link to the Data Product Description .
gx:signers	SignatureCheckType[]	Yes	The array identifying all required Participant signatures.

Gaia-X and observability

GXFS-FR observability component



Observed (Cloud)Events

- Participant OnBoarding events
 - Data Producer
 - Data Consumer
- Contractualisation Events
- Data Access Events

POST	/onboard	Stores the participant onboarding	▼
POST	/contract	Stores a contract between a data producer and an acquirer	▼
POST	/access	Stores an access to a data product by an acquirer	▼

Audit Trail

Data Transaction Audit

Store and search data transaction events

POST /audit Search for events

Parameters

Cancel Reset

Curl

```
curl -X 'POST' \
  'https://observability-api.abc-federation.dev.gaiax.ovh/audit' \
  -H 'accept: application/json' \
  -H 'Content-Type: application/json' \
  -d '{
    "acquirerId": "https://wizard.lab.gaia-x.eu/api/credentials/2d37wbGvQzbA084yRouh2m2vBKkN8s5AFH9Q75HZRCUQmJW7yAVSNKzjJj6gcjE2mDNDUHCichXWdMH3S2c8AaDLm3kXmf5R8AriEc6j9GBN3CgYV2qLgybAgL5hqRYuYV2qLgybAgL5hqRYuZzk384Zq7fziQdcaRsd7qrA9DXdf9TbQMhdCeljBam6LmknDbwF6T95PjcsLdZHR55riQaL6LxS1q6SWDoR7YheX1Cq7vwxTeA1ZRT3BT1ZrjGUkyji53K3BTBypTrDTCrEbkDrFmoFkpVqkELUSzXGmt2HpLQdEAJXsvDUUSdydzBzHBM1az3ewTuJDHCK3gsVuTdzLXAvWBVzB3QlnEySs1tqaHaIAFRdghiZKkxRZJ59ZLtd9Lw4hLabLz7zsAumMFTwa1u61v43ztFJmeALkbbDNIjigMSrkazuJwC8MumLHdnSNGFDE7RYZntJcAmxRFyAK4FQKzd4jwHlueiilnXKPam44PfbryC8tv4UWREKtUfsgKfMRPRQxeanEUB58BmRQMX1PKpG4J9tvKwJ4NQVUJWpWQARXGch3YpEzuetTR8dRKz3sa6aZAKTxdyn5sKBkd24ERh4zc6t9TAvsblcNejUp8b846ace72c1d7233fdd66f3e4a85fdbaa44792f10786b589bb3a8f6e05c54af",
    "dataProducerId": null,
    "dataProductId": null,
    "dataContractId": null
  }'
```

Request URL

https://observability-api.abc-federation.dev.gaiax.ovh/audit

Server response

Code	Details
200	<p>Response body</p> <pre>{ "content": [{ "id": "529fd8d3-7f5f-4ed1-9f3f-3ca5377340cb", "timestamp": "2023-12-15T13:02:06.675157Z", "type": "ONBOARDING", "acquirerId": "https://wizard.lab.gaia-x.eu/api/credentials/2d37wbGvQzbA084yRouh2m2vBKkN8s5AFH9Q75HZRCUQmJW7yAVSNKzjJj6gcjE2mDNDUHCichXWdMH3S2c8AaDLm3kXmf5R8AriEc6j9GBN3CgYV2qLgybAgL5hqRYuZzk384Zq7fziQdcaRsd7qrA9DXdf9TbQMhdCeljBam6LmknDbwF6T95PjcsLdZHR55riQaL6LxS1q6SWDoR7YheX1Cq7vwxTeA1ZRT3BT1ZrjGUkyji53K3BTBypTrDTCrEbkDrFmoFkpVqkELUSzXGmt2HpLQdEAJXsvDUUSdydzBzHBM1az3ewTuJDHCK3gsVuTdzLXAvWBVzB3QlnEySs1tqaHaIAFRdghiZKkxRZJ59ZLtd9Lw4hLabLz7zsAumMFTwa1u61v43ztFJmeALkbbDNIjigMSrkazuJwC8MumLHdnSNGFDE7RYZntJcAmxRFyAK4FQKzd4jwHlueiilnXKPam44PfbryC8tv4UWREKtUfsgKfMRPRQxeanEUB58BmRQMX1PKpG4J9tvKwJ4NQVUJWpWQARXGch3YpEzuetTR8dRKz3sa6aZAKTxdyn5sKBkd24ERh4zc6t9TAvsblcNejUp8b846ace72c1d7233fdd66f3e4a85fdbaa44792f10786b589bb3a8f6e05c54af", "dataProducerId": null, "dataProductId": null, "dataContractId": null }, { "id": "419885ec-dbf6-47bc-88a5-cf8667117d11", "timestamp": "2023-12-15T13:02:17.819936Z", "type": "ONBOARDING", "acquirerId": null, "dataProducerId": "https://wizard.lab.gaia-x.eu/api/credentials/2d37wbGvQzbA084yRouh2m2vBKkN8s5AFH9Q75HZRCUQmJW7yAVSNKzjJj6gcjE2mDNDUHCichXWdMH3S2c8AaDLm3kXmf5R8AriEc6j9GBN3CgYV2qLgybAgL5hqRYuZzk384Zq7fziQdcaRsd7qrA9DXdf9TbQMhdCeljBam6LmknDbwF6T95PjcsLdZHR55riQaL6LxS1q6SWDoR7YheX1Cq7vwxTeA1ZRT3BT1ZrjGUkyji53K3BTBypTrDTCrEbkDrFmoFkpVqkELUSzXGmt2HpLQdEAJXsvDUUSdydzBzHBM1az3ewTuJDHCK3gsVuTdzLXAvWBVzB3QlnEySs1tqaHaIAFRdghiZKkxRZJ59ZLtd9Lw4hLabLz7zsAumMFTwa1u61v43ztFJmeALkbbDNIjigMSrkazuJwC8MumLHdnSNGFDE7RYZntJcAmxRFyAK4FQKzd4jwHlueiilnXKPam44PfbryC8tv4UWREKtUfsgKfMRPRQxeanEUB58BmRQMX1PKpG4J9tvKwJ4NQVUJWpWQARXGch3YpEzuetTR8dRKz3sa6aZAKTxdyn5sKBkd24ERh4zc6t9TAvsblcNejUp8b846ace72c1d7233fdd66f3e4a85fdbaa44792f10786b589bb3a8f6e05c54af", "dataProductId": null, "dataContractId": null }] }</pre> <p>Download</p>

Thank you!

Frédéric BELLAICHE

VP Technology & Research

frederic.bellaiche@dawex.com

#GaiaX #TechX24

SOLID protocol: A solid foundation for Data spaces

12:00 – 12:30

Guillaume Rouyer

Co-founder of Virtual Assembly and PhD student

Sylvain le Bon

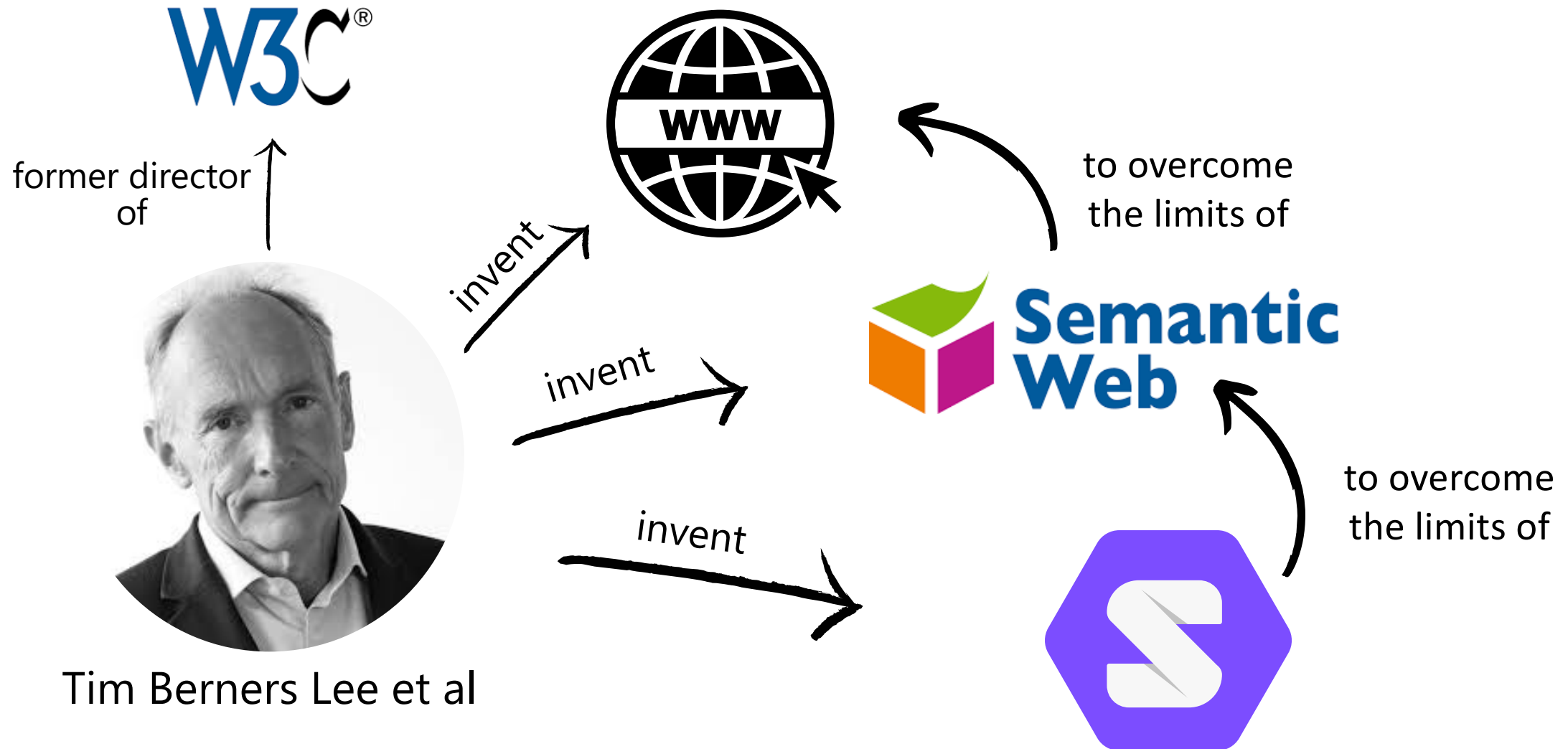
Co-founder of Startin'blox

Frédéric Lé

Président Youragileway, expert AFNeT

#GaiaX #TechX24

A brief history of SOLID



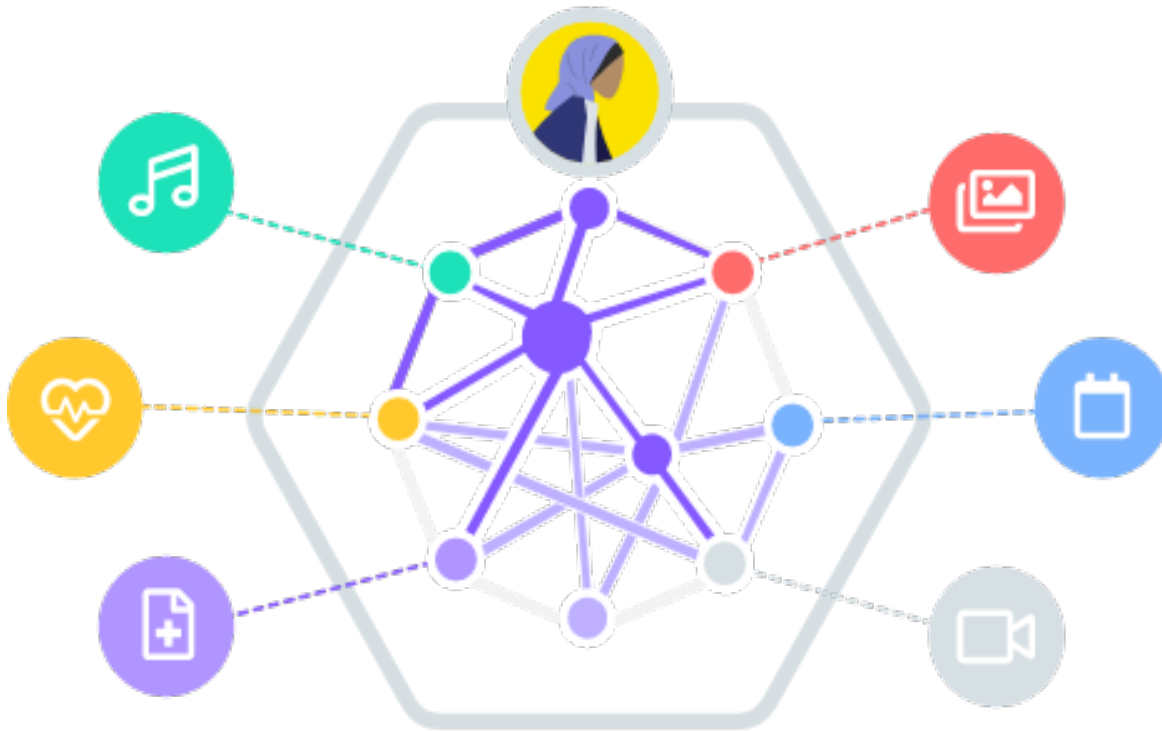
What is SOLID?



Standardisation
work at **W3C**[®]

- Solid is a **specification** that lets individuals and groups store their data securely in decentralized data stores called Pods
- **Pods** are like secure web servers for data. When data is stored in a Pod, its **owners control** which people and applications can access it.

Your Pod: All your data, under your control

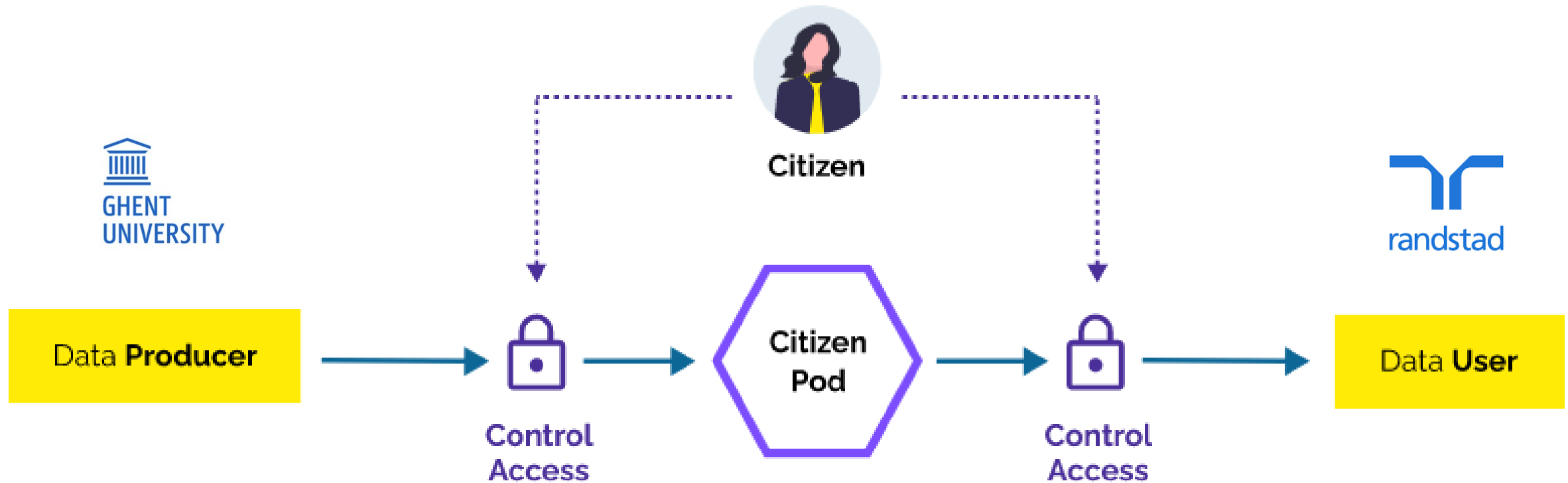


Any kind of data can be stored in a Solid Pod, from structured data to regular files that you might store in a Google Drive or Dropbox folder.

Individuals and groups can grant or revoke access to any slice of their data as needed.

Deployment of Solid by Athumi and the Flemish government

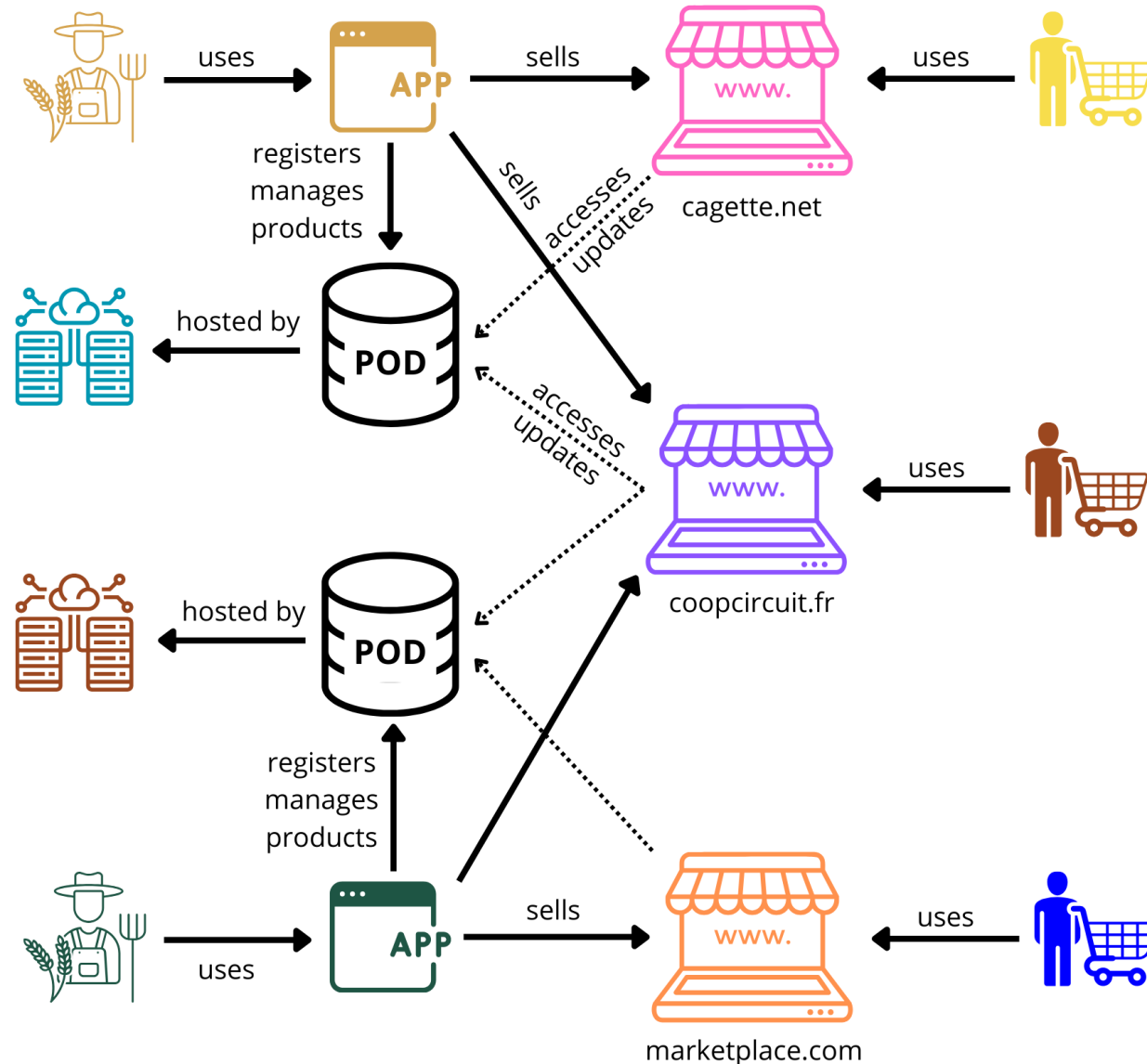
MyDiploma & MyCitizenProfile



Other use cases : Health, Energy, Banking

Enabling the interoperability of local producers' catalogs

Open Food Network use-case



Open Food Network Use case

Producers can sell via multiple platforms. They have full control over the management of their stocks

Standards to enable interoperability

All data in a Solid Pod is stored and accessed using standard, open, and interoperable data formats and protocols.

Solid uses a common way of describing things and their relationships that different applications can understand.



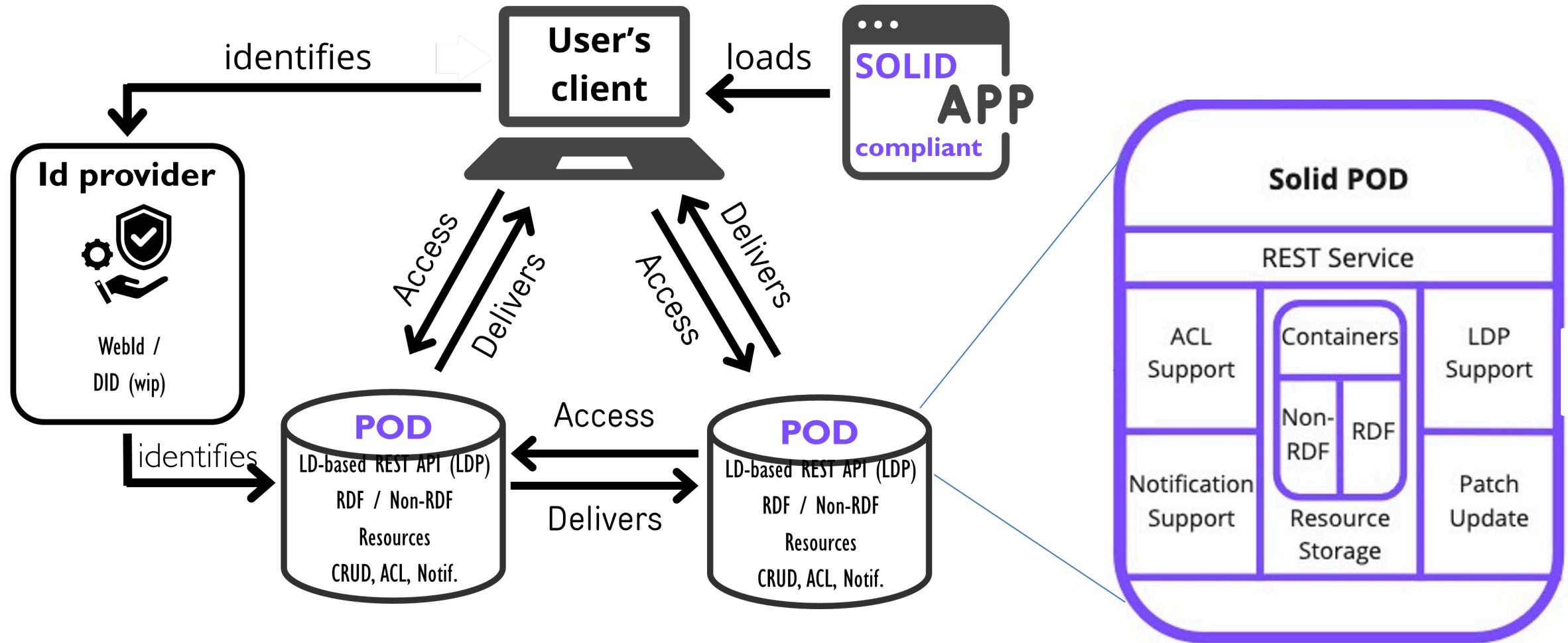
SOLID standards' stack

Layer	Interoperability	Agreements on standards and technologies
Dataspace	Application	• Additional agreements between participants of a specific dataspace
		• Services for easier data sharing, e.g. data catalog
		• Trusted third-parties that supervise the data sharing processes
Solid	Access	• Decentralized identity (WebID, Solid-OIDC)
		• Access control (WAC)
		• Read-write Linked Data API (LDP)
Linked Data	Data	• Uniform data format (RDF in different serializations, e.g. Turtle, JSON-LD, N-Triples)
		• Human- and machine-understandable data with semantics
		• Knowledge representation via ontologies and shared vocabularies (RDFS, OWL)
		• Linked Data concepts (LD principles and 5-star LD)
Web	Communication	• Uniform communication protocol (HTTP, HTTPS)
		• Communication security and certificate authorities (TLS)
		• Common data formats (XML, JSON, HTML)

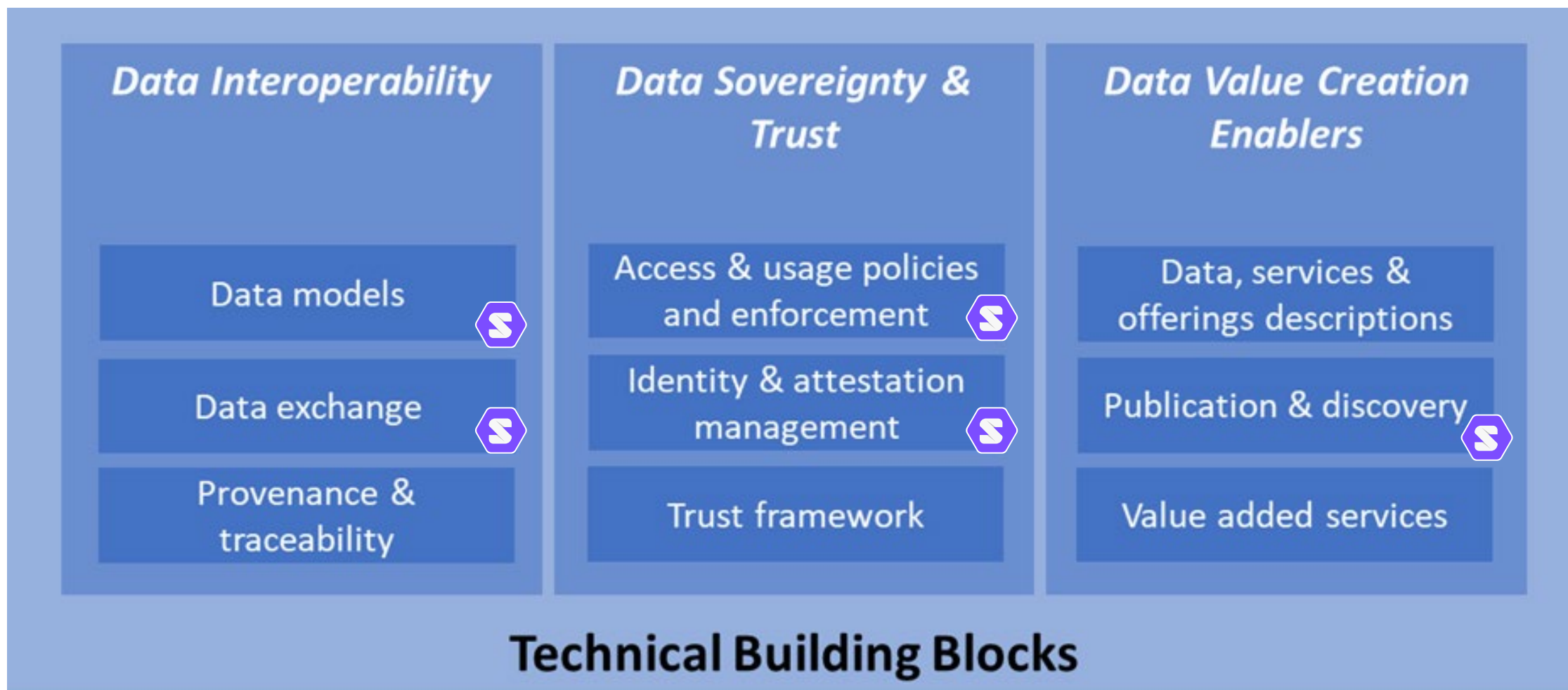
Solid Data Space on top of Solid and Web layers, [Sascha Meckler](#), Fraunhofer IIS, 2023

<https://dl.acm.org/doi/fullHtml/10.1145/3543873.3587616#fn5>

SOLID Architecture



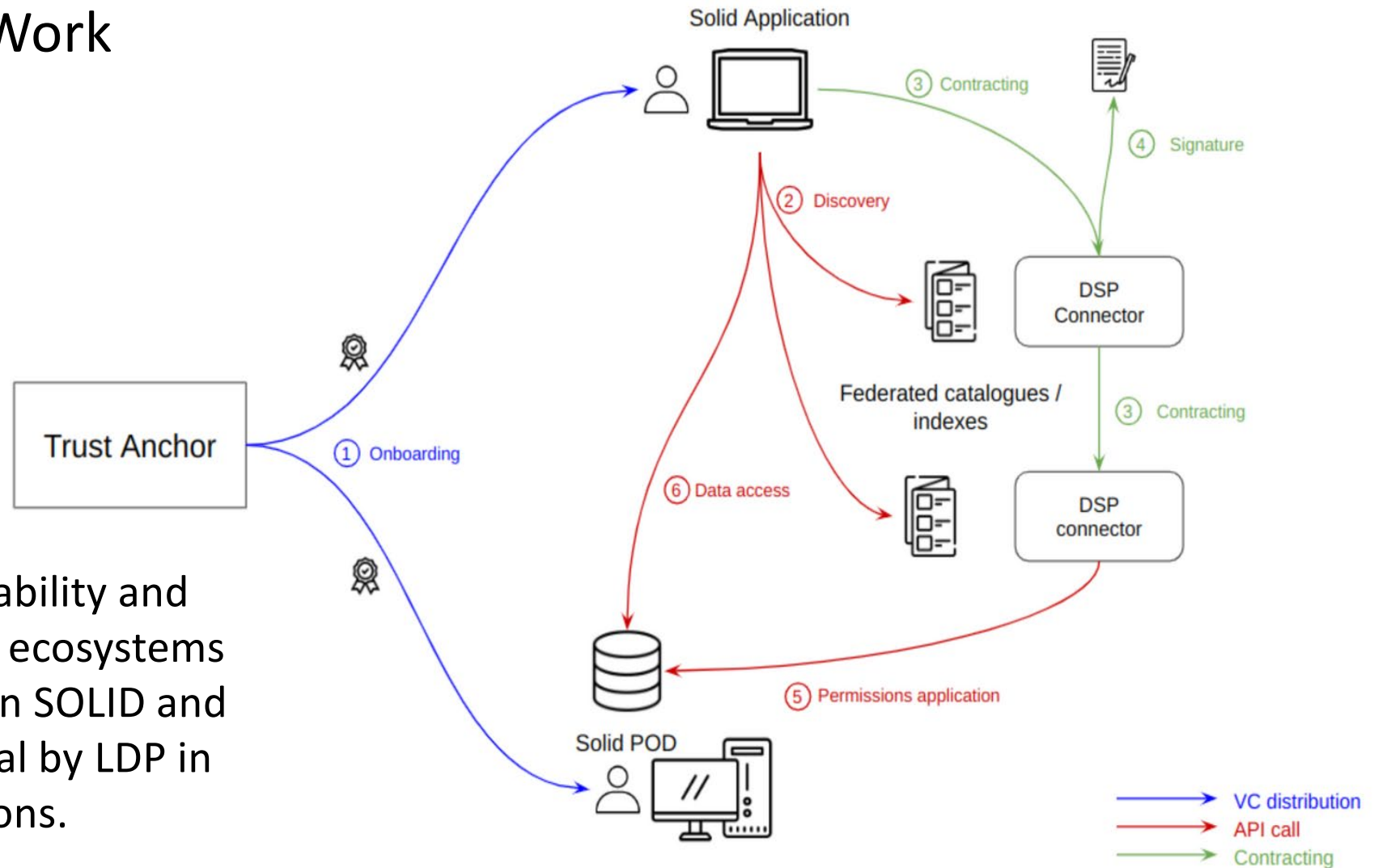
Positioning of Solid vis-à-vis the DSSC's Technology Building Blocks



Integrating SOLID with IDS and Gaia-X ecosystems 1/4

Integration scenario (Work In Progress)

Using Solid for data discoverability and integration in the IDS & Gaia-X ecosystems via an indexing engine based on SOLID and Communica, with data retrieval by LDP in SOLID-based applications.



Innovations

- LDP-based APIs as data plane allowing for direct access to data in a unified way
- Automatic management of permissions on the POD by the connector for efficiency but user still have the upper hand on it
- Proposed standardization of index format to unify data discovery and querying, and introduce a distributed search engine operating at the data level

Limits

- WebACL are limited to simple identity-based access management schemes when the DSP handles delegation and more complex role-based schemes.
- Convergence between the WebID and did:web/did:jwt standards are explored
- Support for EIDAS-based identities should be investigated for broader adoption based on governmental use-cases

Next step

- StartinBlox, Imec and PTX are joining forces to integrate SOLID open-source components with other open-source data space components
- PTX has established a consent driven data exchange protocol on top of the IDSA dataspace protocol, the GAIA-X trust model, as well as a connector to verify consent before starting data exchange
- Startin'Blox and Imec are now working with PTX to connect solid pods to this protocol and connector
- This will approach will be deployed in other data space opportunities, for example the skills and media ones

Thank you!

Guillaume Rouyer

Founder of Virtual Assembly & PhD student, guillaume-rouyer@protonmail.com

Sylvain le Bon

Co-founder of Startin'blox, sylvain@startinblox.com

Frédéric Lé

Président Youragileway, expert AFNeT, fle@youragileway.com

#GaiaX #TechX24



tech-x

Trust Indexes beyond conformity

12:30 – 13:00

Pierre Gronlier, Gaia-X

#GaiaX #TechX24

Lunch Break
13:00 – 14:00

Hemicycle Bar



#GaiaX #TechX24

Policy reasoning

14:00 – 14:30

Yassir Sellami, Gaia-X

#GaiaX #TechX24

Safeguarding Financial Well-being: Leveraging Data Analytics to Combat SMS-based Fraud for Vulnerable Populations

14:30 – 15:00

Fawad Qureshi, Snowflake

Damion Rose, BICS

#GaiaX #TechX24



tech-x

Safeguarding Financial Well-being

Leveraging AI-for-Good in Telcos to Combat Fraud for Vulnerable Populations

Fawad Qureshi

Global Field CTO

Snowflake

Damion Rose

Strategic Partnerships Lead

BICS

#GaiaX #TechX24



snowflake®

bics

Billions of Dollars Robbed from the Vulnerable Last Year

\$8.8 bn

in US consumer losses to fraud in 2022

70%

increase in fraud from 2020 to 2021

700%

increase in smishing attacks in the UK in the first half of 2021

A Crime Against Humanity's Most Defenseless

How does SMISHING work?

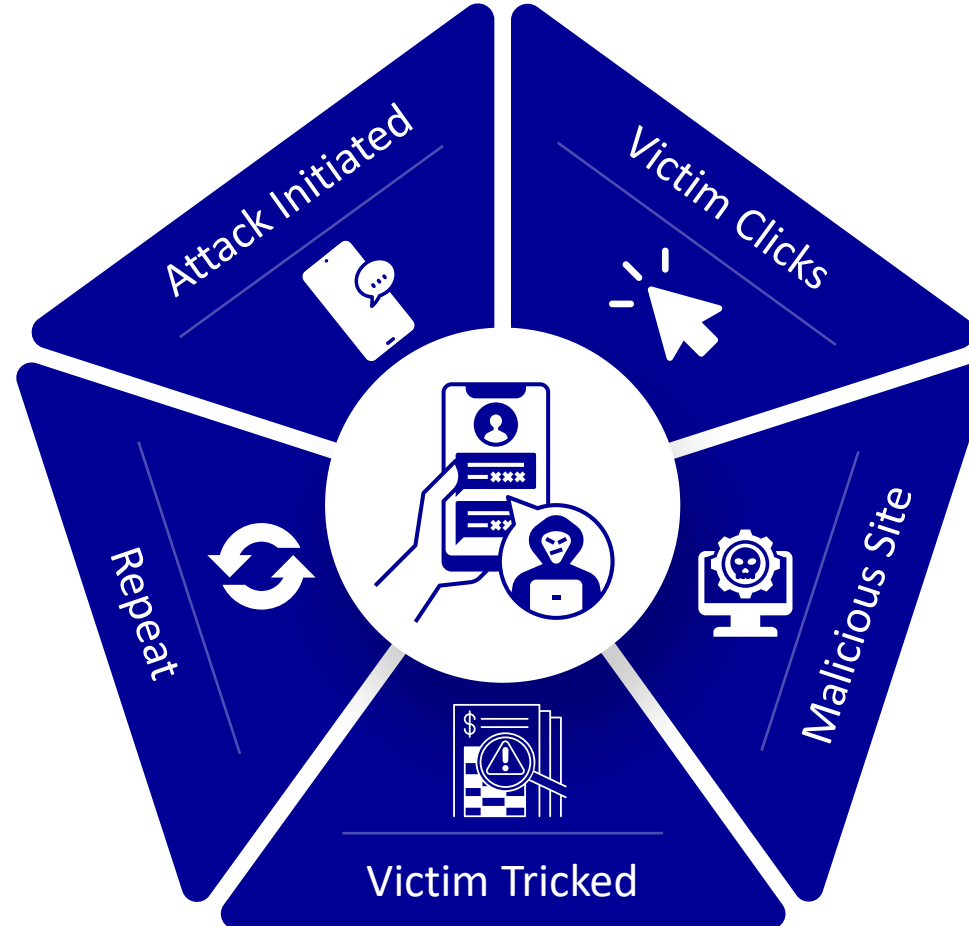
1. An attacker, pretending to be a legitimate sender, sends an SMS

2. Victim clicks the URL without scrutinizing

3. URL takes the victim to a malicious site.

4. The victim is tricked into sharing sensitive information

5. The victim is usually also added to a "suckers list"



Why do the banks care?

- Direct monetary losses
- Mistrust of SMS by consumers
- Cost of additional security measures



Americans lost over \$330 million to text message scams in 2022 – with fake bank text messages being the most common scheme.

Who is BICS?

bics

#GaiaX #TechX24

BICS – Connecting Everything

Connecting communities and creating opportunities



BICS' mission is to **connect communities** and **create opportunities**.



BICS puts the 'internet' in the Internet of Things, **enabling devices to be easily connected**, whether it's private network, mobile, or even satellite networks - BICS makes it happen.



People, machines and businesses are all being connected to bridge the digital divide and drive **digital transformation worldwide**.



It's also helping bridge the digital divide through **roaming enablement** and **VoLTE** - ensuring no one is left behind even as we develop newer 5G networks.



BICS at a glance

Connecting everyone, everything, everywhere



6.8 billion **SMS**
20 billion **voice minutes**



2.3 billion text
messages between
people



4.5 billion text messages
between applications and
people



Carrying half of
the world's
data roaming traffic



Connecting
150 million+
IoT devices



BICS **blocks**
617 million **fraudulent call** attempts
473 million **smishing** attacks
507 million **robocalls**



€1 billion+ **revenues**



900+ **employees**
around the world



Headquarters in **Brussels**,
offices globally serving
customers all over the **world**

Figures based on 2023 reporting

What is Snowflake?



#GaiaX #TechX24

The Snowflake Data Cloud

Snowflake Data Cloud

A global network connecting you to the most relevant content, powered by a single platform

>9.4K

Customers

>2.4K

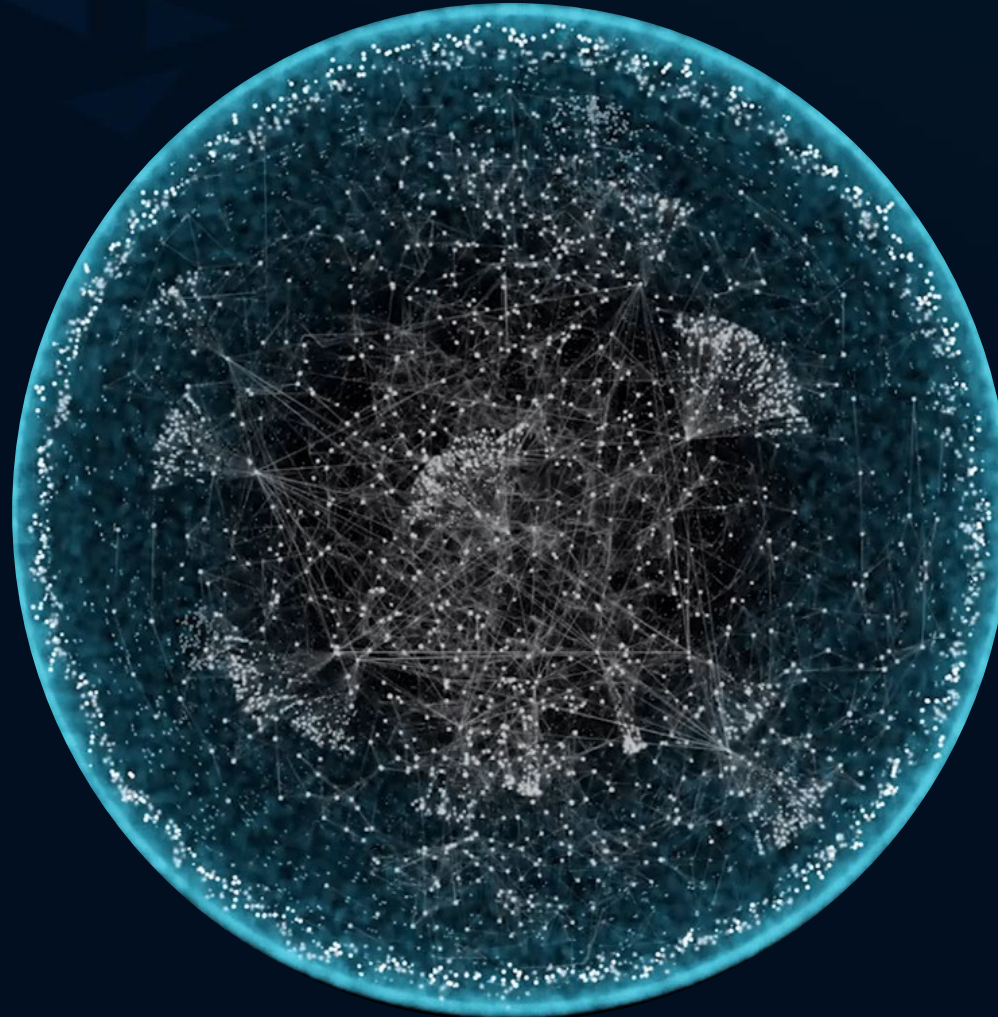
Marketplace Listings

Figures as of Jan. 31 2024



THE DATA CLOUD

**THOUSANDS OF
ORGANIZATIONS
COLLABORATING
WITH THEIR
ECOSYSTEM**



**The Network Effect
of the
Data Cloud**

Above visual illustrates collaboration between Snowflake accounts and is not based on actual customer adoption

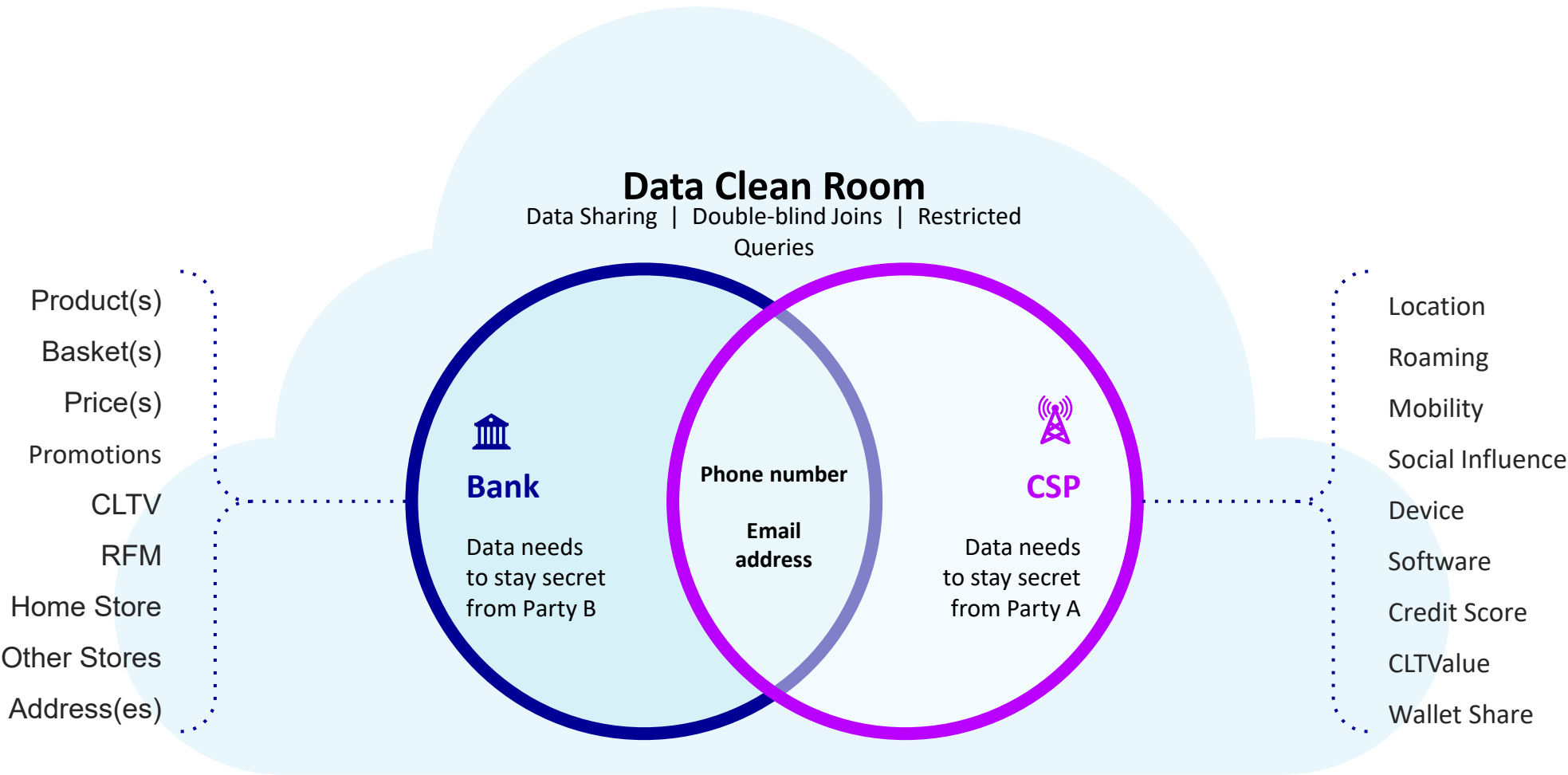


tech-x

The Solution

#GaiaX #TechX24

What are Data Clean Rooms?

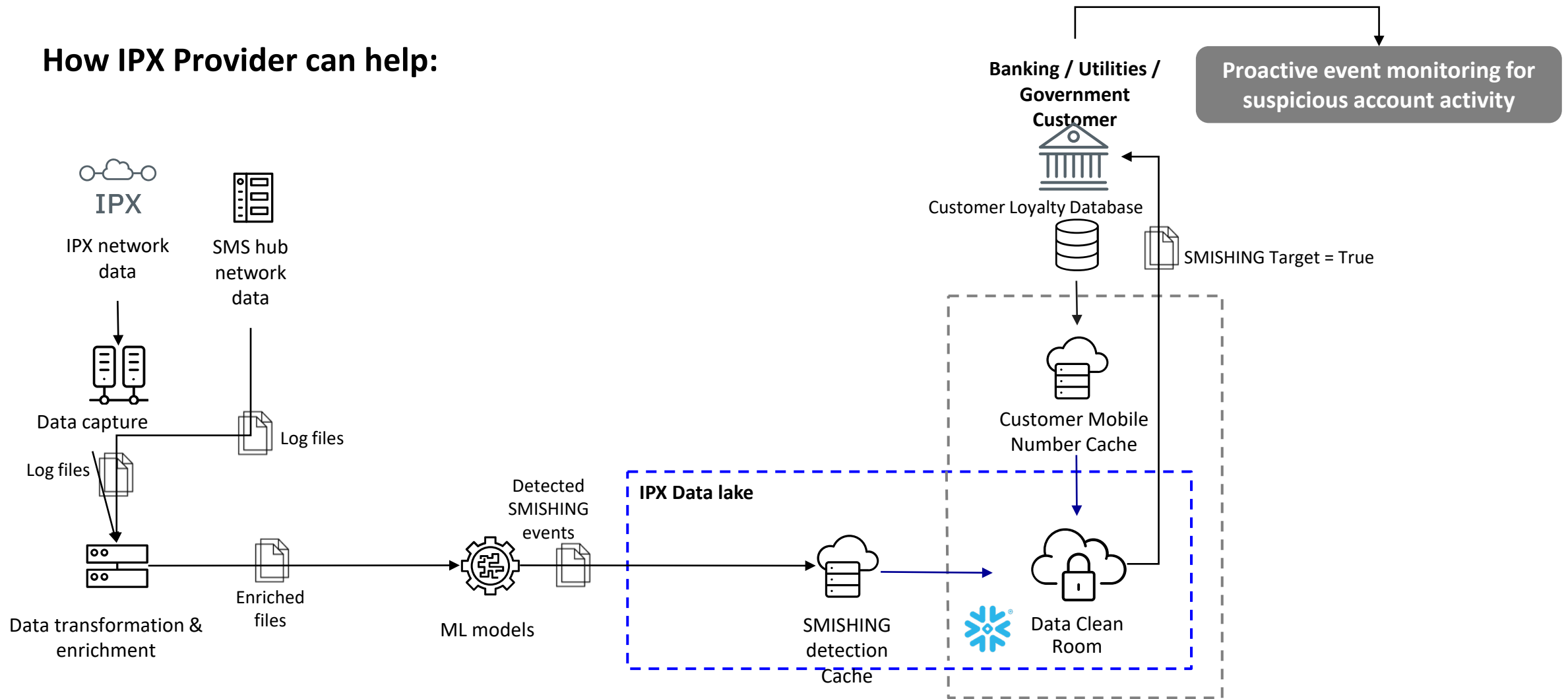


Phone Number Is a Global Identifier

SMISHING Prevention using Data Clean Rooms



How IPX Provider can help:





Thank you!



Fawad Qureshi
Global Field CTO
Snowflake

Damion Rose
Strategic Partnerships Lead
BICS



#GaiaX #TechX24

Cybersecurity - Banking Fraud

SMISHING with Social Engineering Risk Signals

Background:

- SMS is a key channel to interact with brands and service providers.
- Bad actors know this and use SMS to defraud money and personal information.
- Americans lost over \$330 million to text message scams in 2022 – with fake bank text messages being the most common scheme
- IPX Provider could play a role in helping banks prevent these kinds of fraud with early warnings social engineering

Idea:

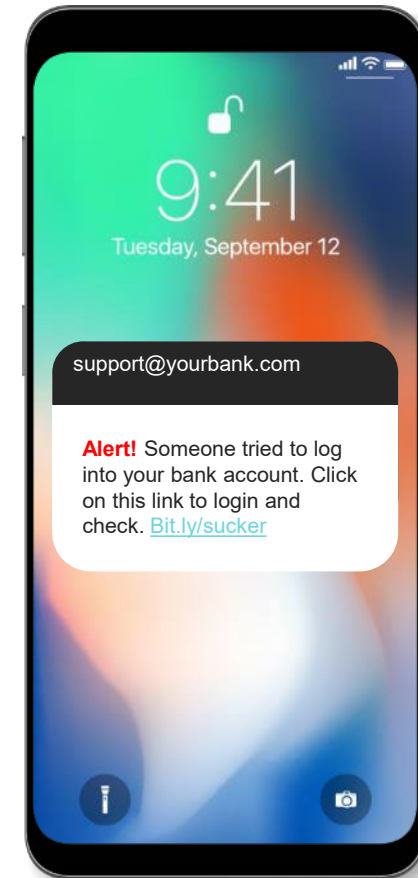
Provide risk signals to private banks when a mobile subscriber receives a SMS related to unsolicited payments / transactions / banking information. This includes the CLI seen by the user.

- payments fraud via international come is increasing
- vulnerable groups and increasingly targeted (senior citizens)
- these group tend to not talk about their attacks to avoid criticism or losing agency (children taking over their money management)
- the vulnerable groups tend to not be digitalized (don't read SMS properly, are likely to engage, if on they get into a voice conversation are likely to keep talking on a call, prefer printed information, etc.)
- SMISHING is often a first step for targets, then once engaged it escalates.
- targets are normally on a traded "suckers" list, so they will be targeted again
- banks can monitor for unusual activities on the user's bank account following an early threat signal
- bank can check if customer is in "vulnerable" category (senior citizens, surviving spouses of deceased, etc.).
- banks are facing legislation to better protect customers against fraud

There is also the possibility to augment this with a line-busy check ad-on if there is suspicious activity on the customers account (e.g., large payment or transfer of funds) to detect if customer is being socially engineered.

Note:

This is not just limited to the Banking Sector (any critical infrastructure could be targeted).



Cybersecurity - Banking Fraud

SMISHING with Social Engineering Risk Signals

Why banks need a solution:

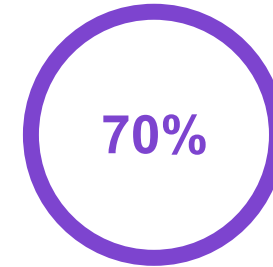
- **Direct monetary losses** linked to writing off fraudulent payments / transactions for customers
- **Mistrust of SMS** by consumers will lead them to abandon SMS as a channel and require banks to pump additional investment into other channels
- **Cost of additional security measures** and the impact on the experience of customers, for example through additional authentication steps

Americans lost over \$330 million to text message scams in 2022 – with fake bank text messages being the most common scheme.

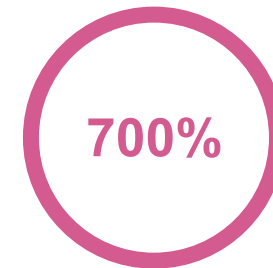
[Consumers lost \\$330 million to SMS scams in US in 2022, says report | World News - Business Standard \(business-standard.com\)](#)



in US consumer losses to fraud in 2022



increase in fraud from 2020 to 2021



increase in smishing attacks in the UK in the first half of 2021

Interoperable Trust models

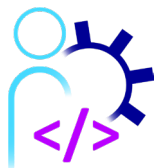
15:00 – 15:45

Pierre Gronlier, Gaia-X

#GaiaX #TechX24



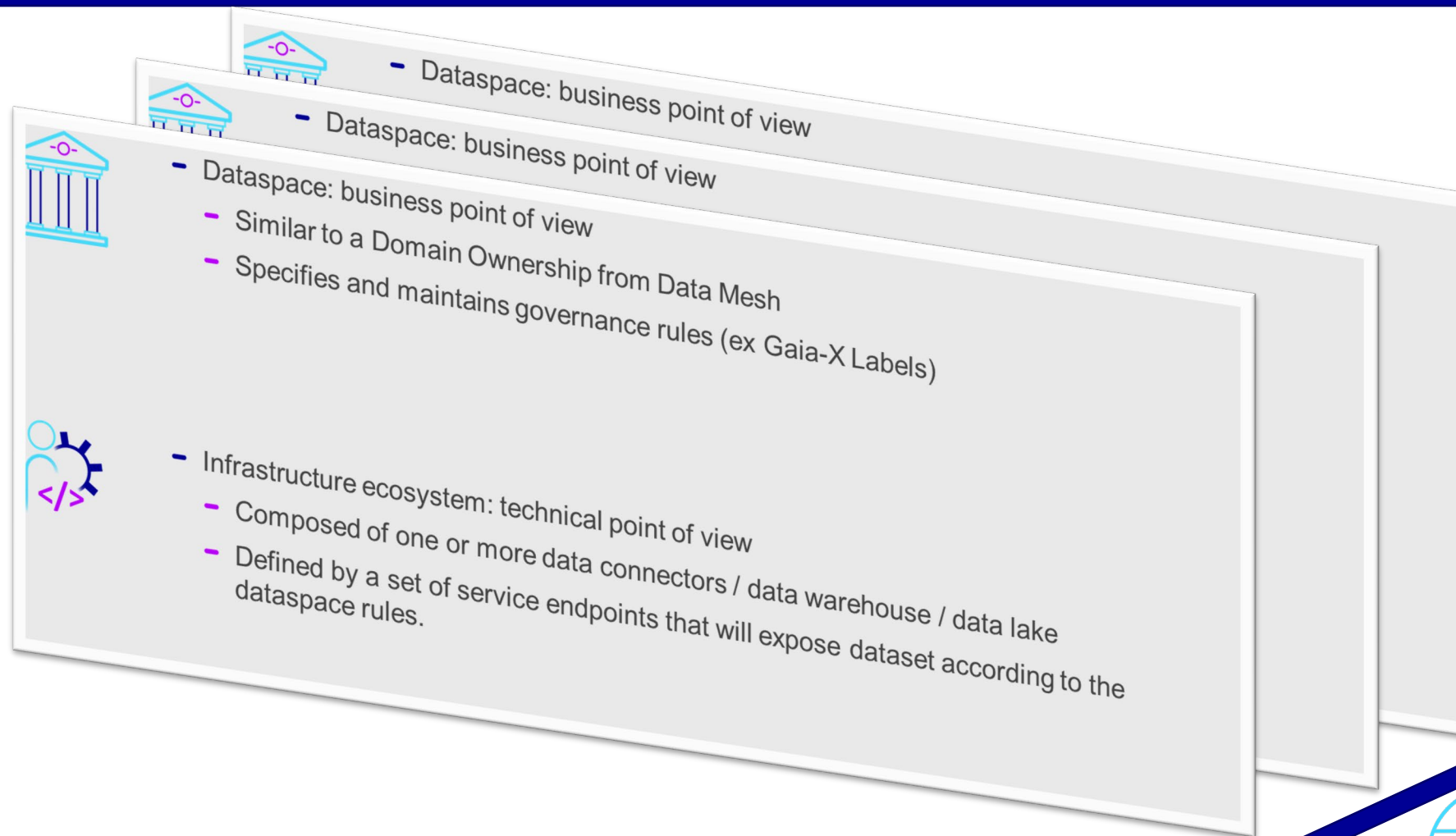
- Dataspace: business point of view
 - Similar to a Domain Ownership from Data Mesh
 - The Dataspace Authority specifies and maintains governance rules



- Federations: technical point of view
 - Composed of one or more data connectors / data warehouse / data lake
 - Defined by a set of service endpoints that will expose dataset according to the dataspace rules.

=> A dataspace can span across several federations.

=> A federation can be used by several dataspaces.



Shared governance
adopted across dataspaces,
operationalised by the
Gaia-X Digital Clearing
Houses



The scenario 2023



DUFOUR STORAGE

Dufour Storage is offering data storage services. Currently it is trying to build a competitive advantage based on Gaia-X standards.



MONT BLANC IoT








Mont Blanc IoT provides IoT Device Management services. They are currently looking for safe and trusted data storage.



RIVER TRAIL

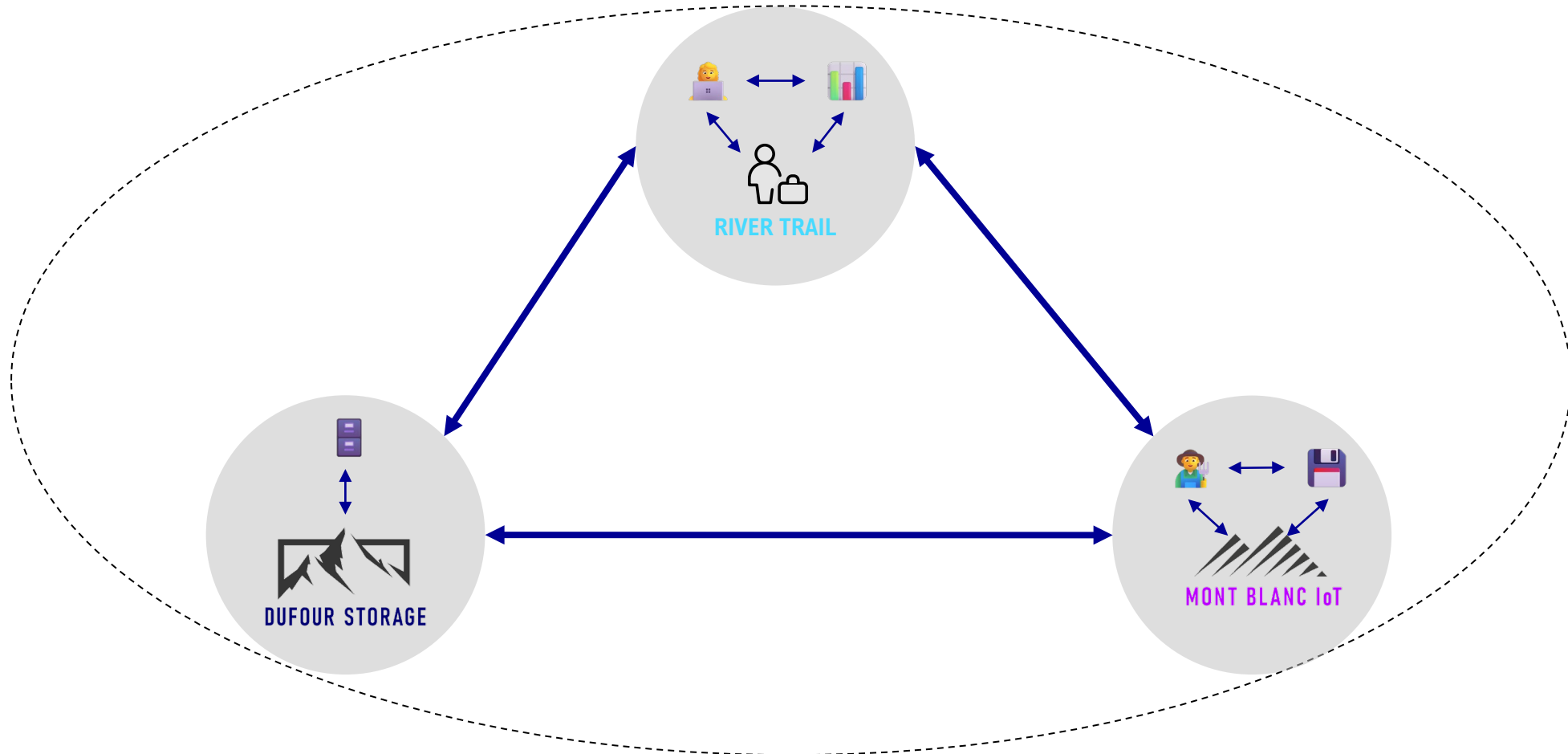
River Trail is a company specialised in IoT market analysis.

They are buying data for studies and researches.

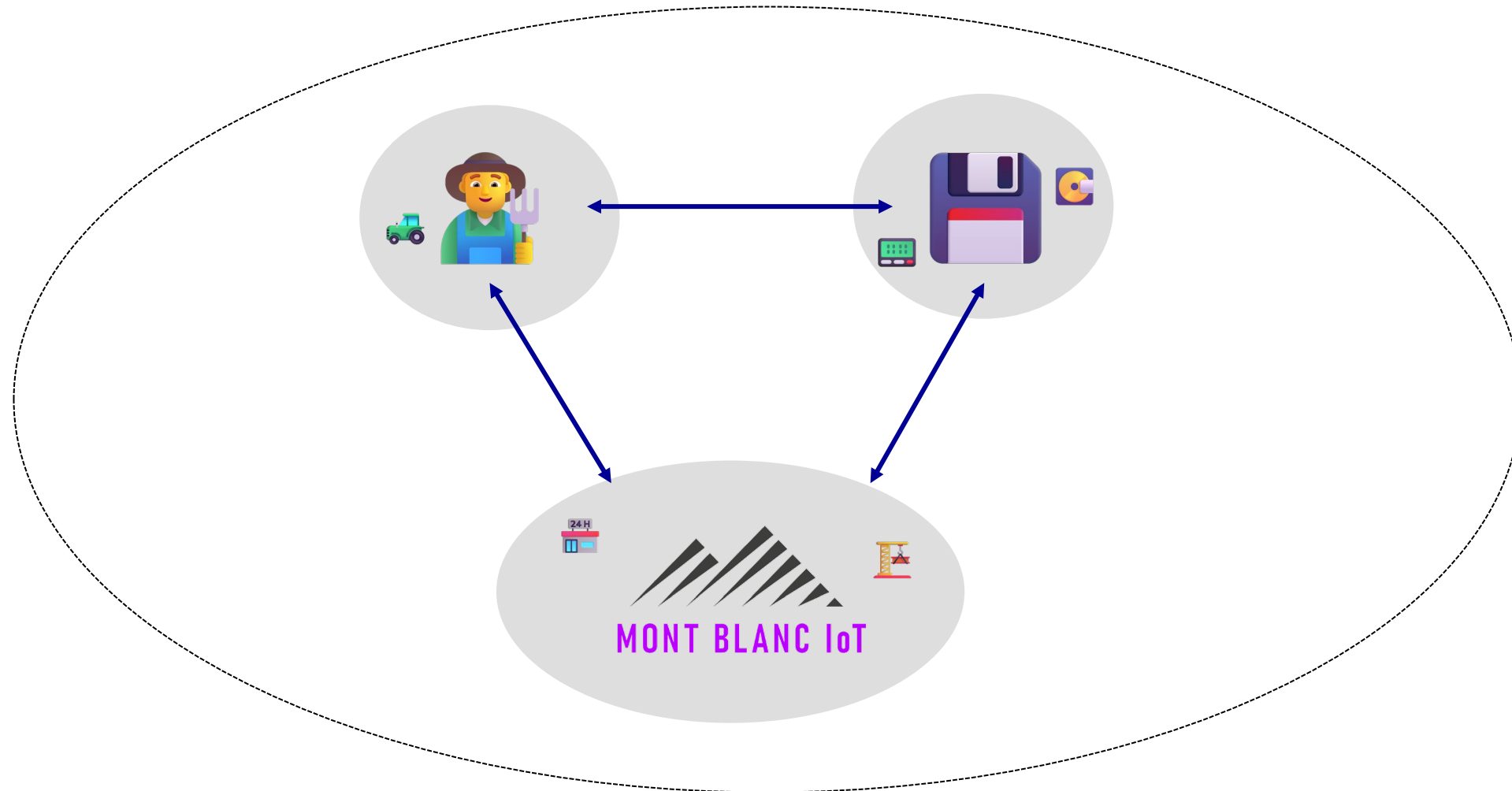
1. Bob the farmer  has installed IoT sensors from Mont Blanc IoT and the sensors are generating Data .
2. Mont Blanc IoT is looking for storage offering and found cloud storage  from Dufour Storage.
3. Alice , a marketing research  employee from RiverTrail is looking for IoT sensors data and found Bob's  Data .

The scenario

Alice 🧑💻, a marketing research 📊 employee from RiverTrail wants to process Bob the farmer 🧑🌾 Data 💾 from Mont Blanc IoT stored on a cloud storage 🗄️ from Dufour Storage.

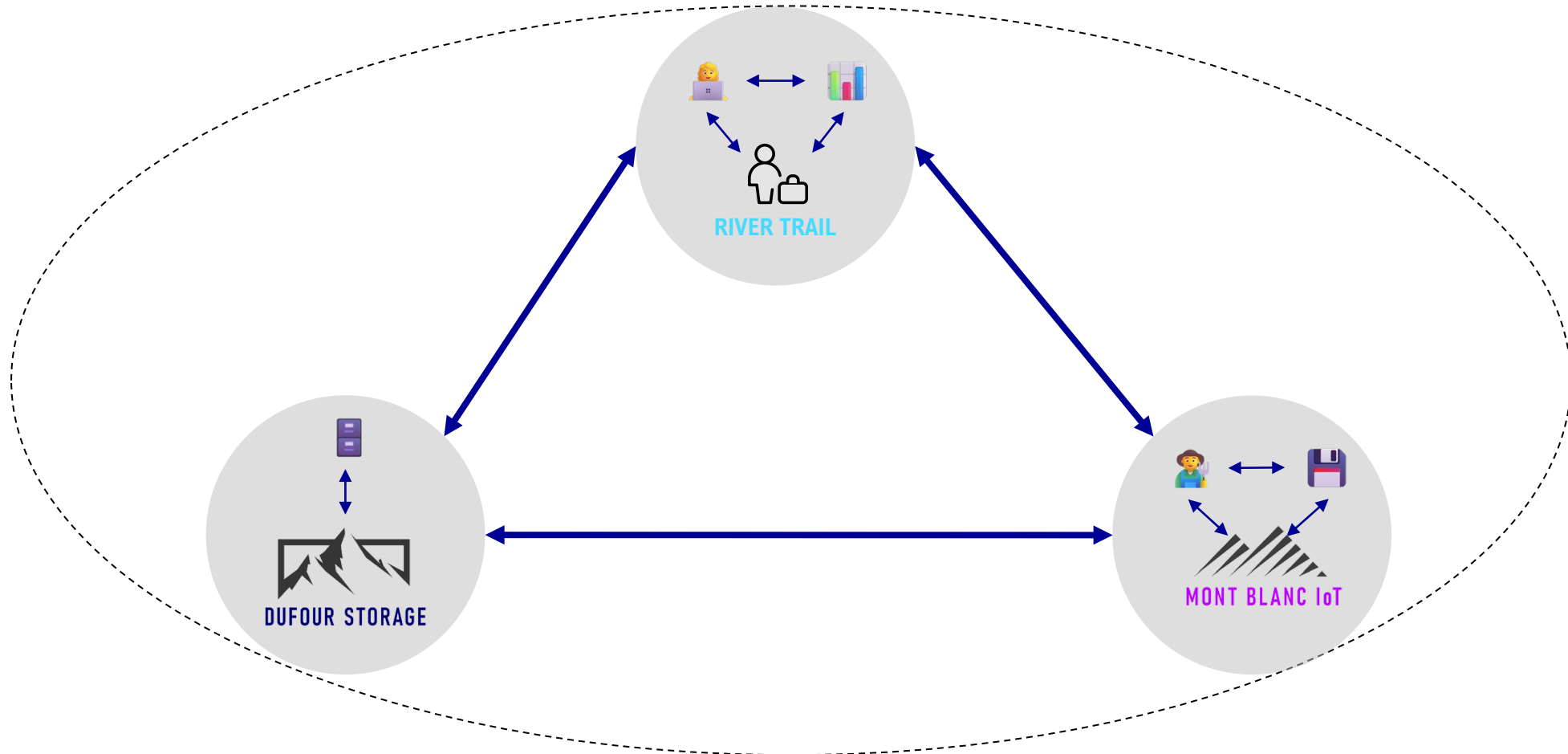


The scenario: a simple chainable and nested schema



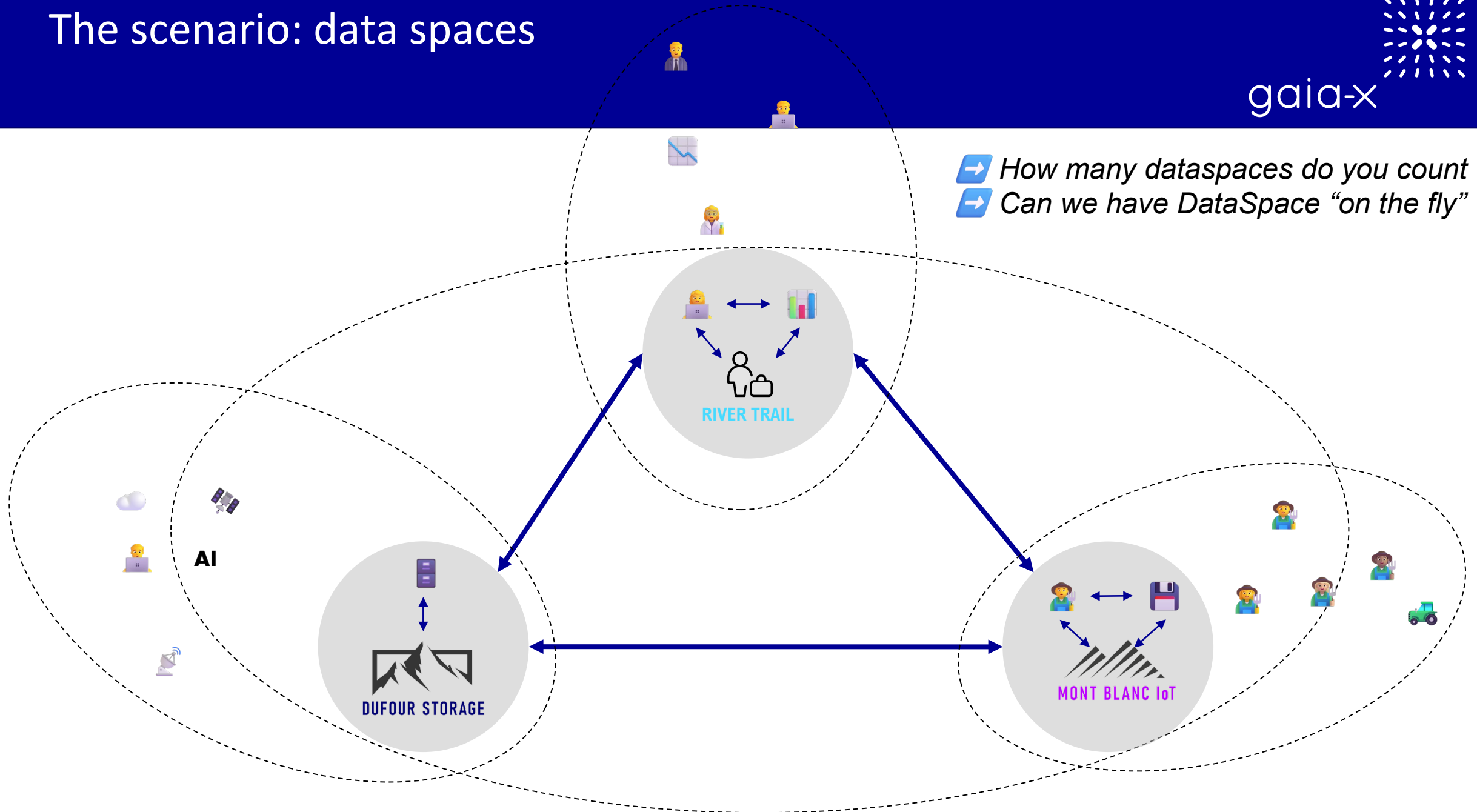
The scenario

Alice 🧑💻, a marketing research 📊 employee from RiverTrail wants to process Bob the farmer 🧑🌾 Data 💾 from Mont Blanc IoT stored on a cloud storage 🗄️ from Dufour Storage.

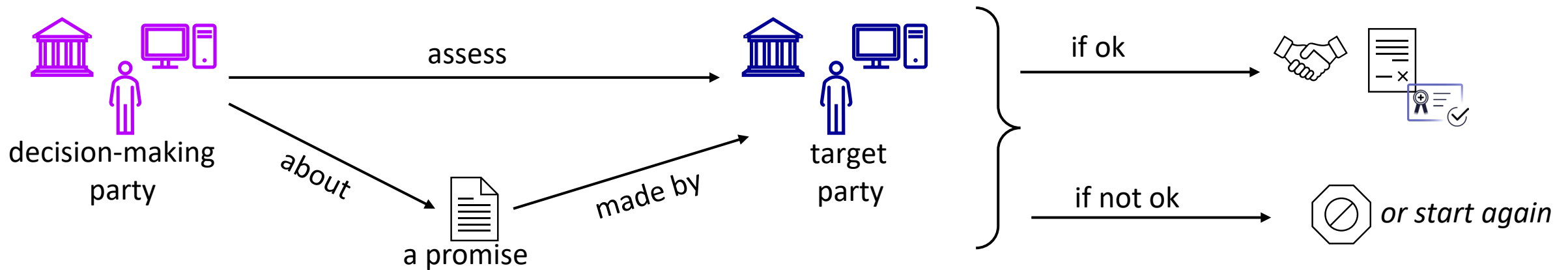


The scenario: data spaces

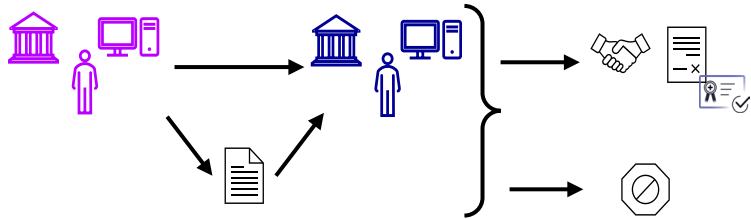
- How many dataspaces do you count ?
- Can we have DataSpace “on the fly” ?



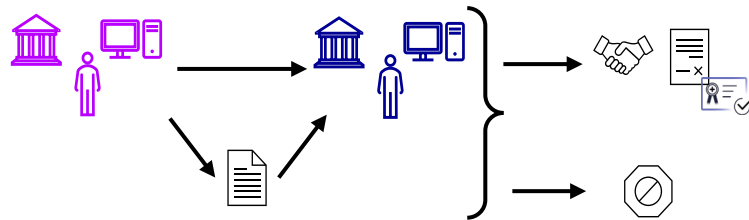
- Trust: the “**favourable response of a decision-making party who assesses the risk concerning the target party’s ability to fulfil a promise**”



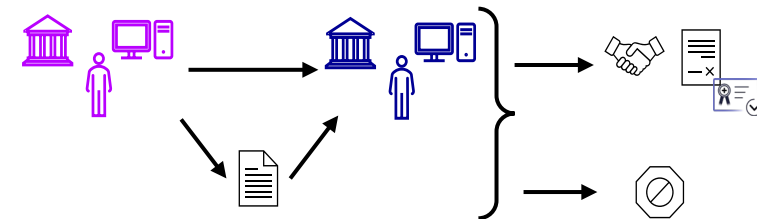
To onboard an ecosystem



To order a service for my domain



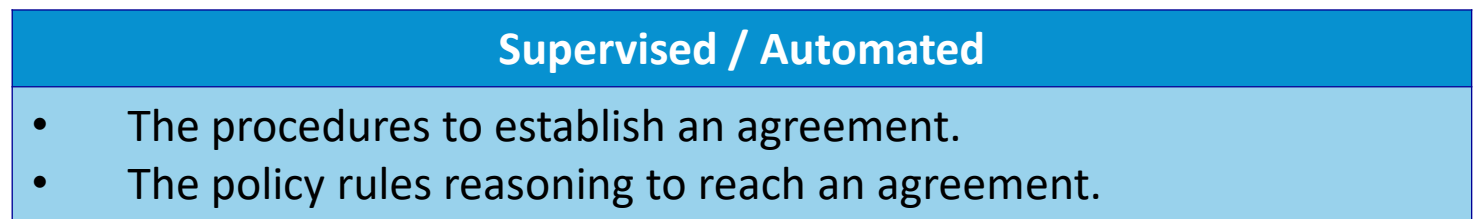
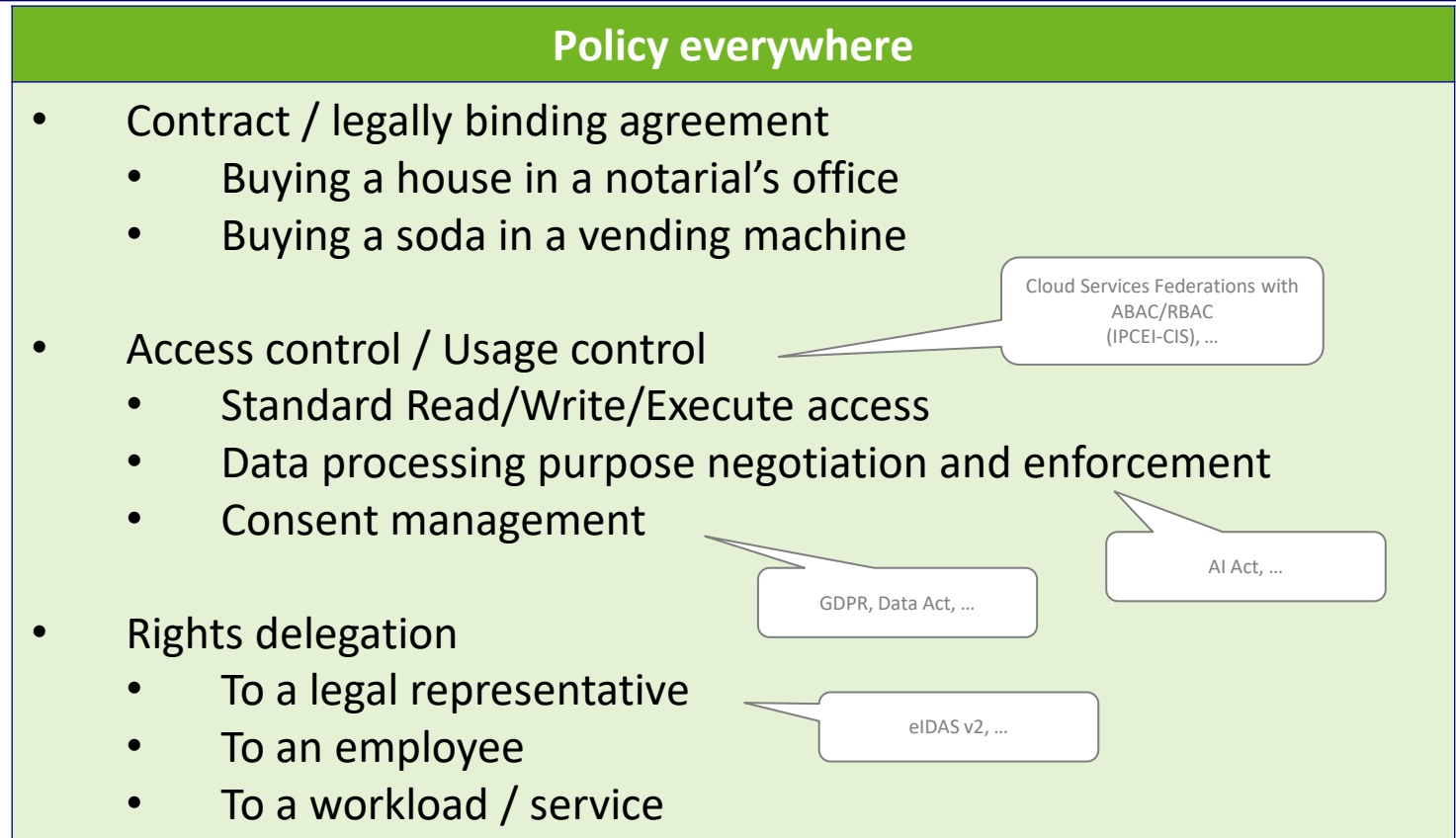
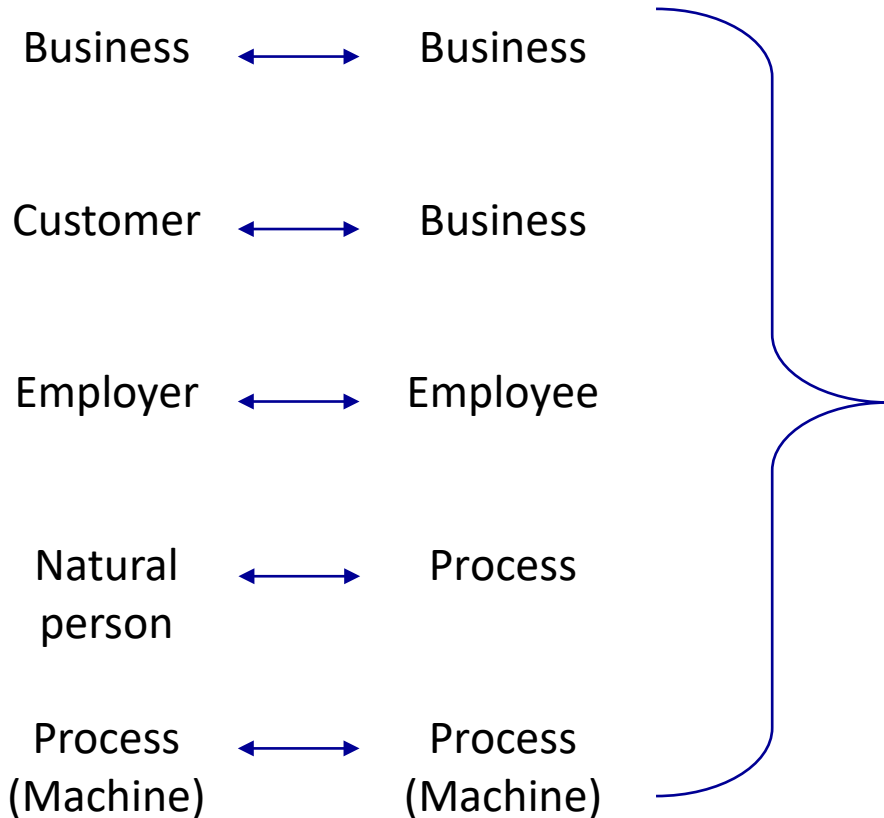
To access data for a specific purpose



...

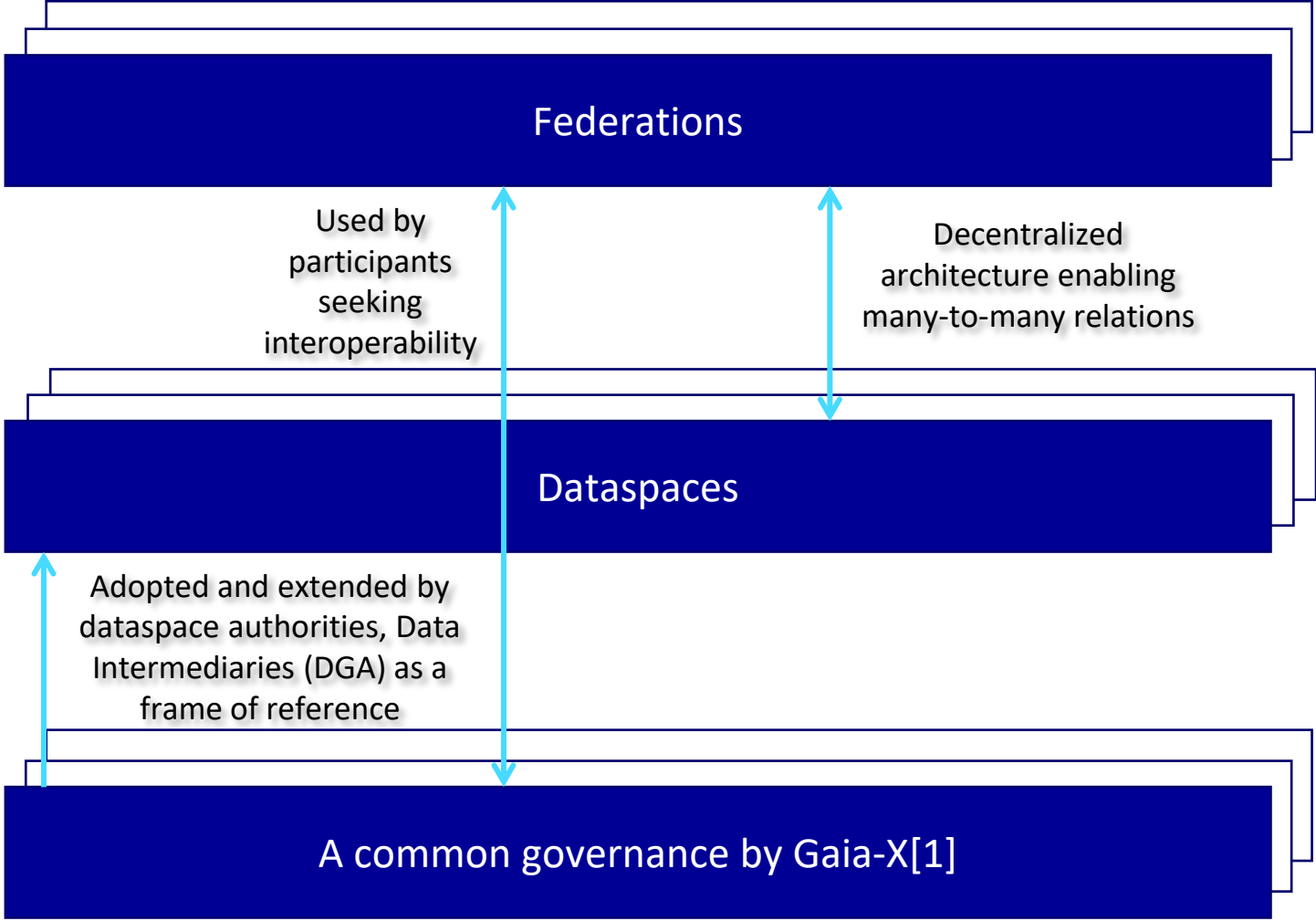
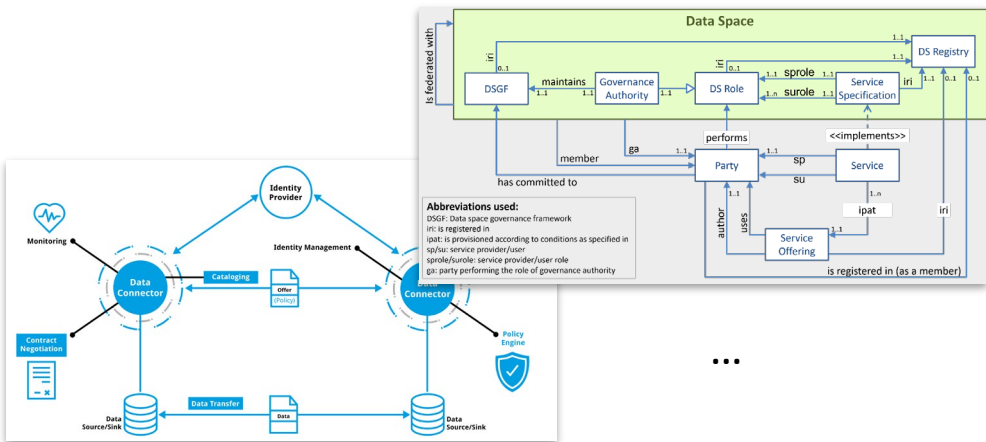


Trust with consistent policies everywhere



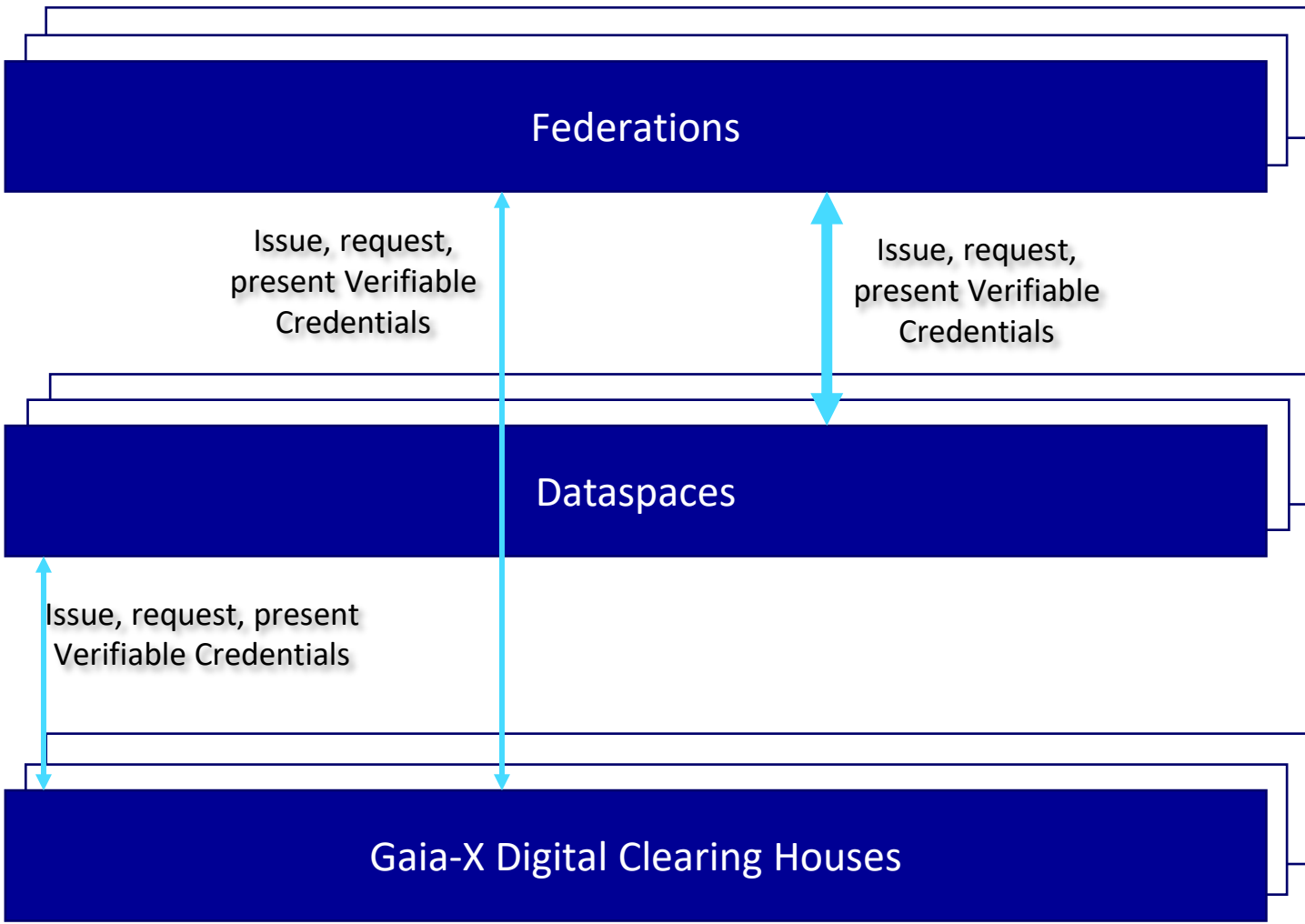
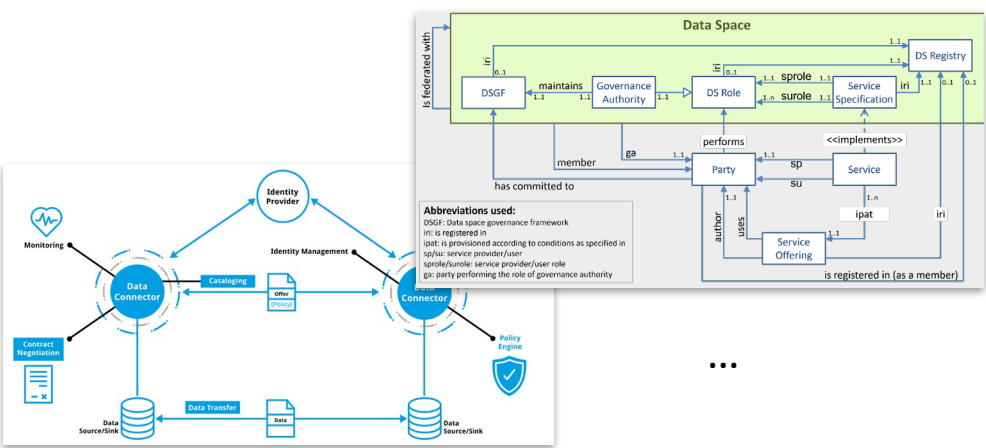
Example of integration

gaia-x



Example of integration

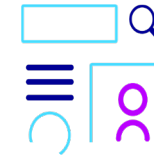
gaia-x



There are 2 interoperability scheme

- Technical + partial semantic interoperability because **adopting *de facto* standards** and information models.
 - No stickiness to Gaia-X rules.
 - No obligation to use GXDCH services.
 - Can use the GXDCH source code with non-Gaia-X rules.
- Organisational + partial semantic interoperability because based and optionally **extending Gaia-X Compliance**.
 - Must use GXDCH services.

Gaia-X Architecture documents.










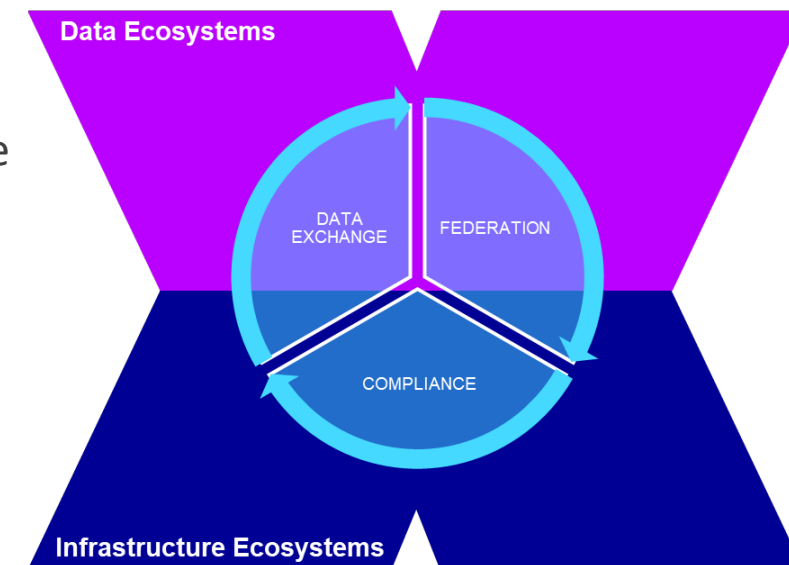
Those documents are
rule agnostic.

Gaia-X Compliance document.

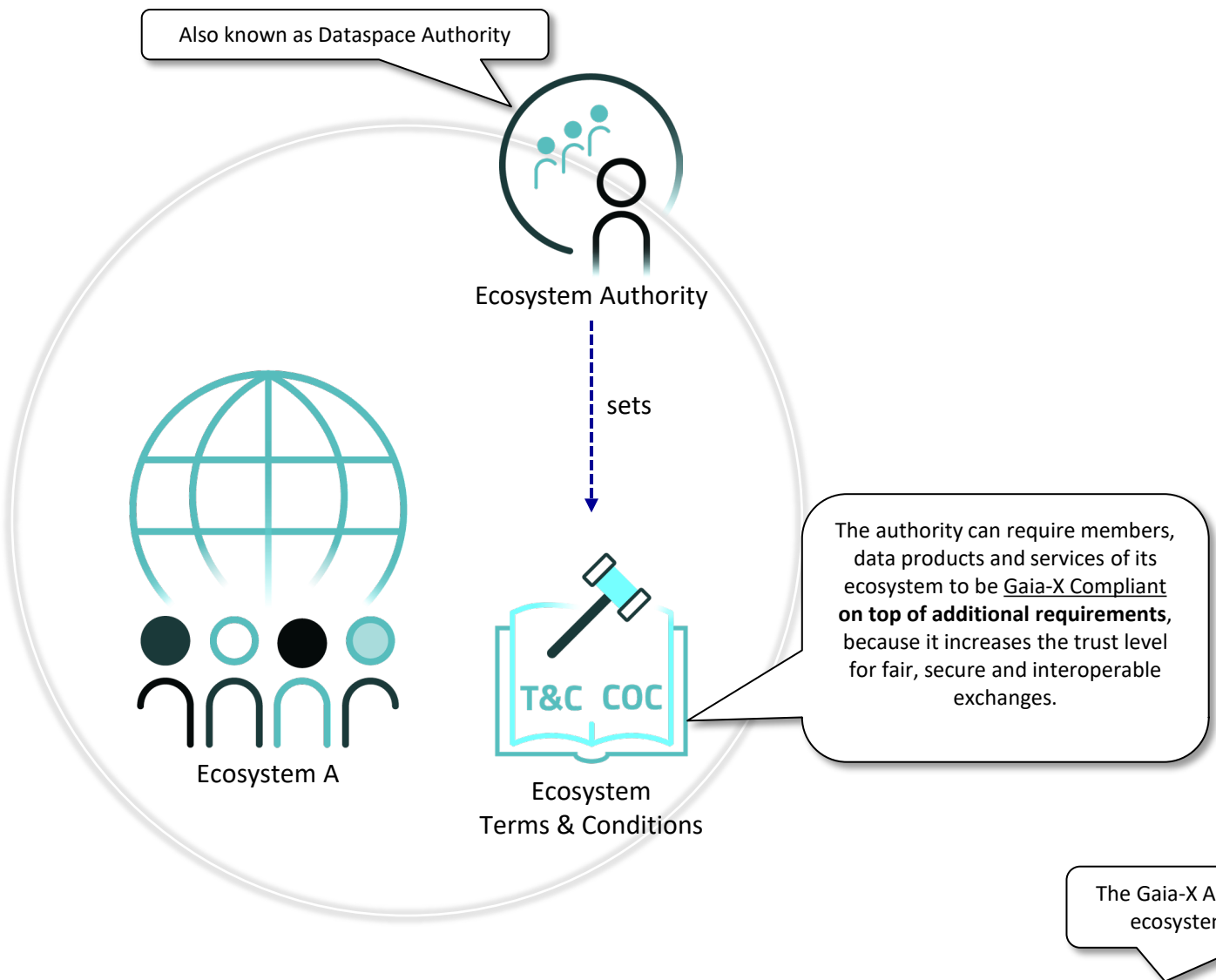


This document is
technology agnostic.

- Unexpensive and **scalable**  technology.
- **Privacy-preserving** with no lock-in nor lock-out for services and products
discovery  with the Federated Catalogues  .
- Support **multiple dataspaces governances**, derived and elaborated  from the common Gaia-X policy rules.
- Support **multiple federations architectures**  , with a minimal technical footprint based on open-standards and open-source code.
- Cloud service  switchability.
- Smart legal contract (Ricardian contracts)  .
- Enable users to **self-determine** their level of technical, operational and legal **autonomies**



Gaia-X Compliance adoption

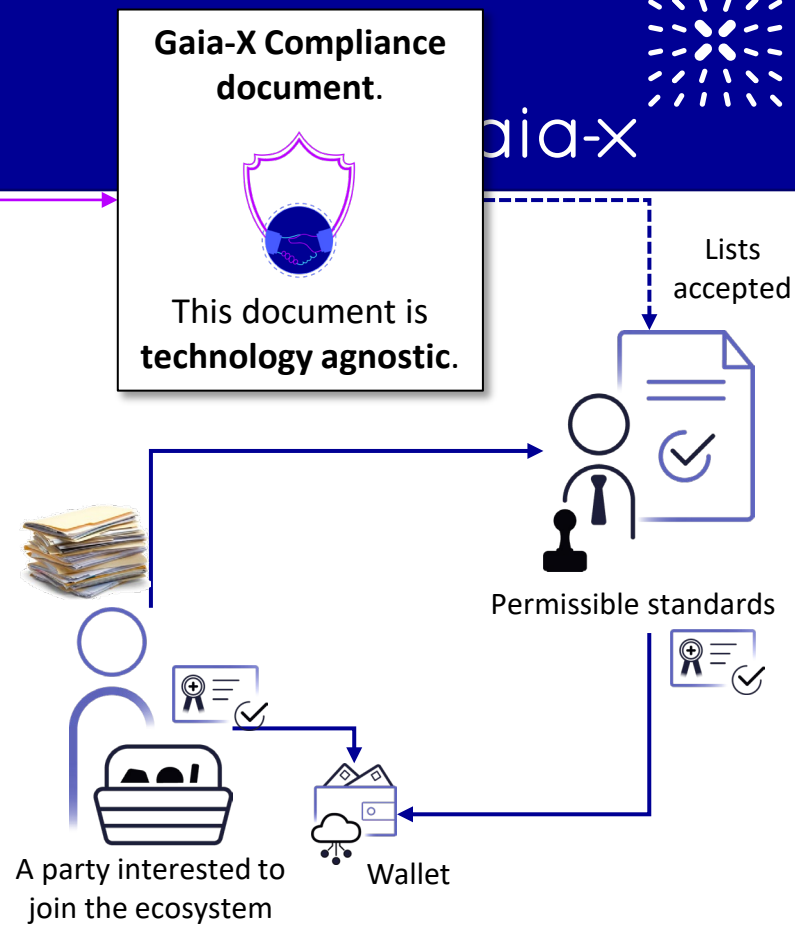
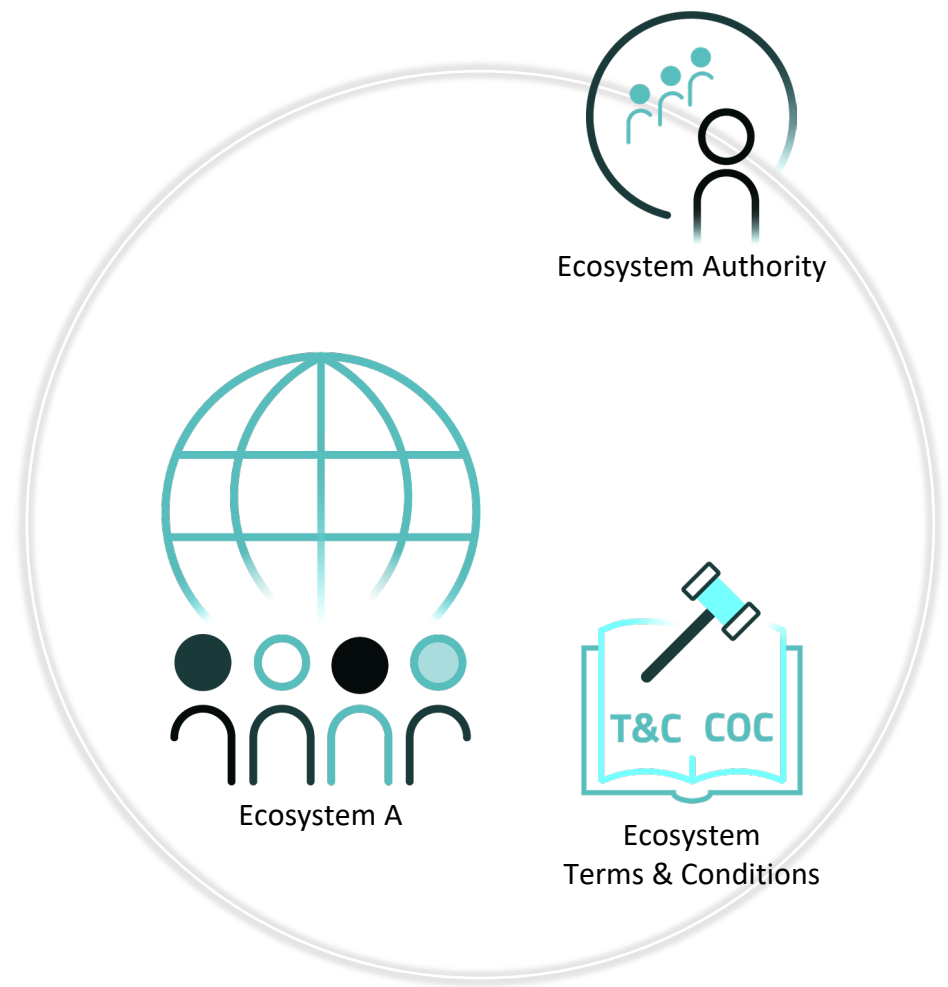


Gaia-X Compliance document.

This document is technology agnostic.

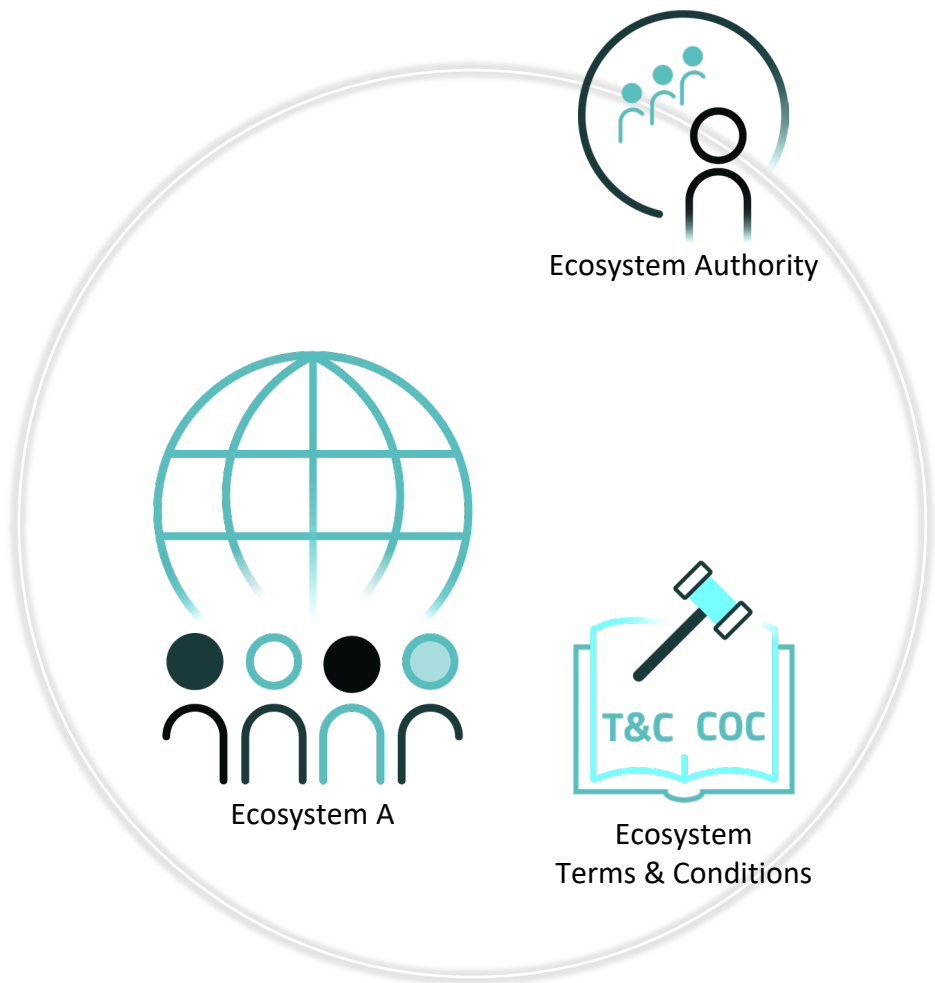
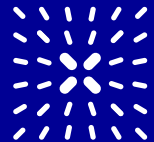
The Gaia-X AISBL is not involved in the ecosystem setup / onboarding.

Ecosystem onboarding 1/3



Ecosystem onboarding 2/3

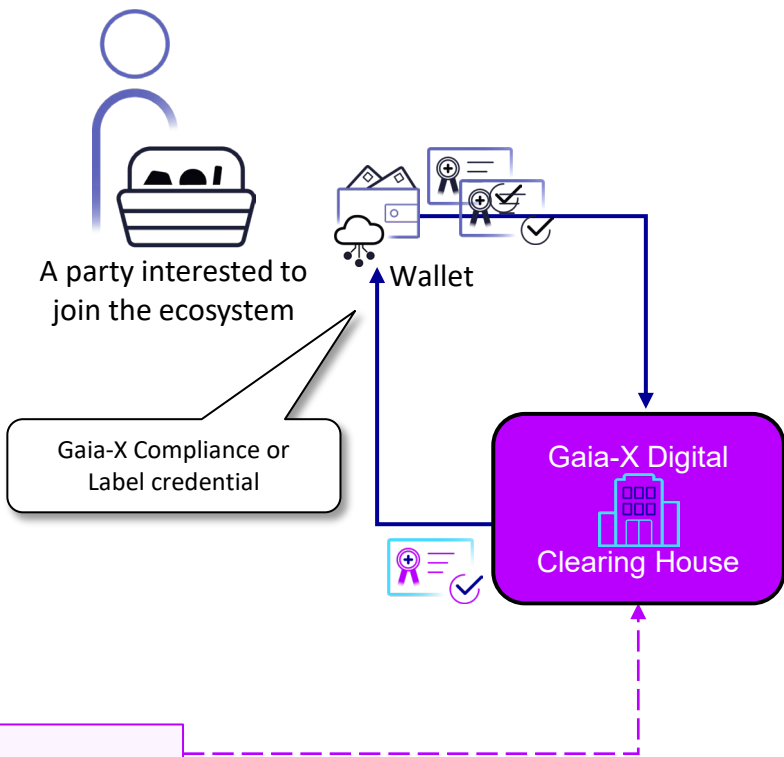
gaia-x



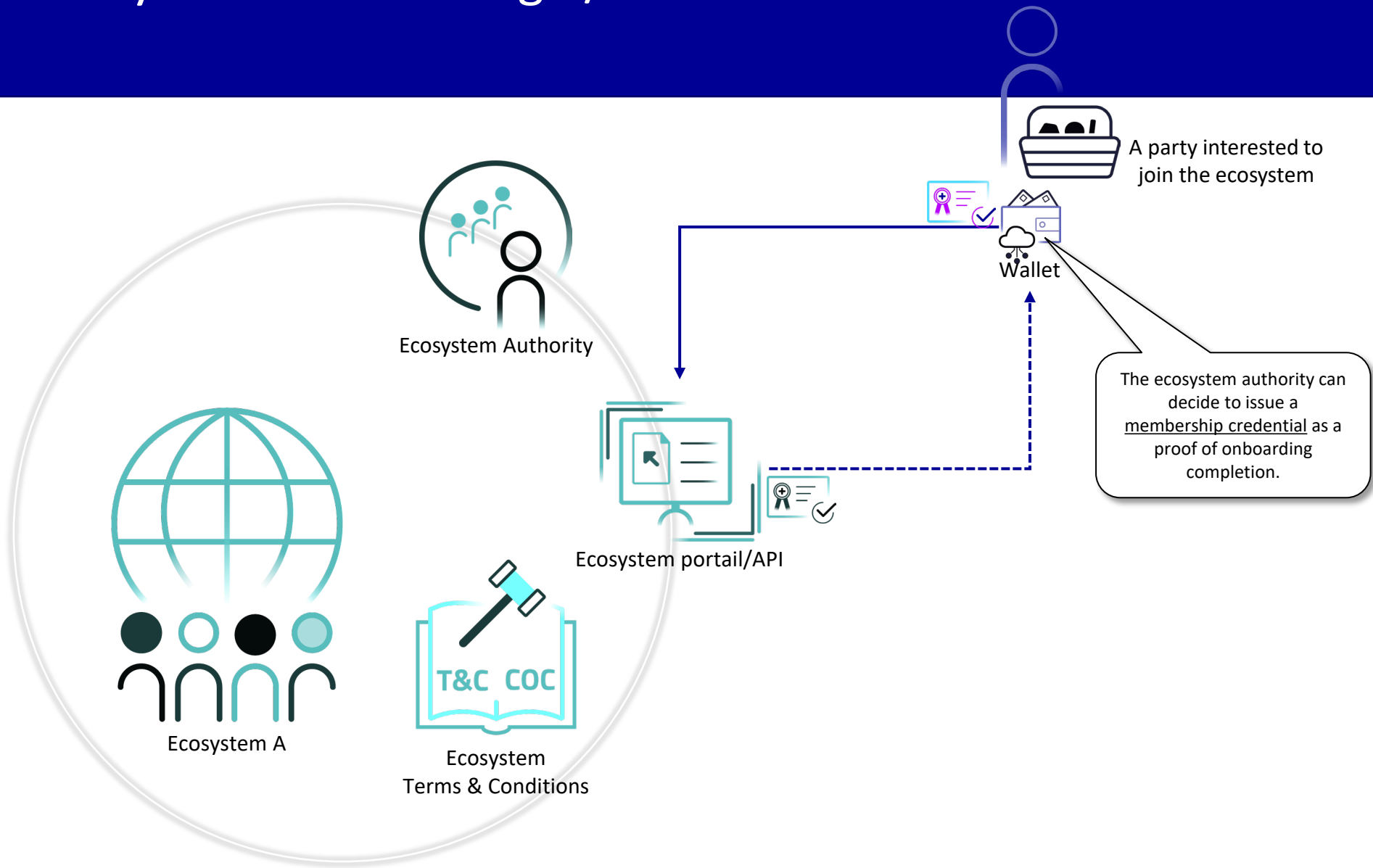
Gaia-X Compliance document.



This document is **technology agnostic**.

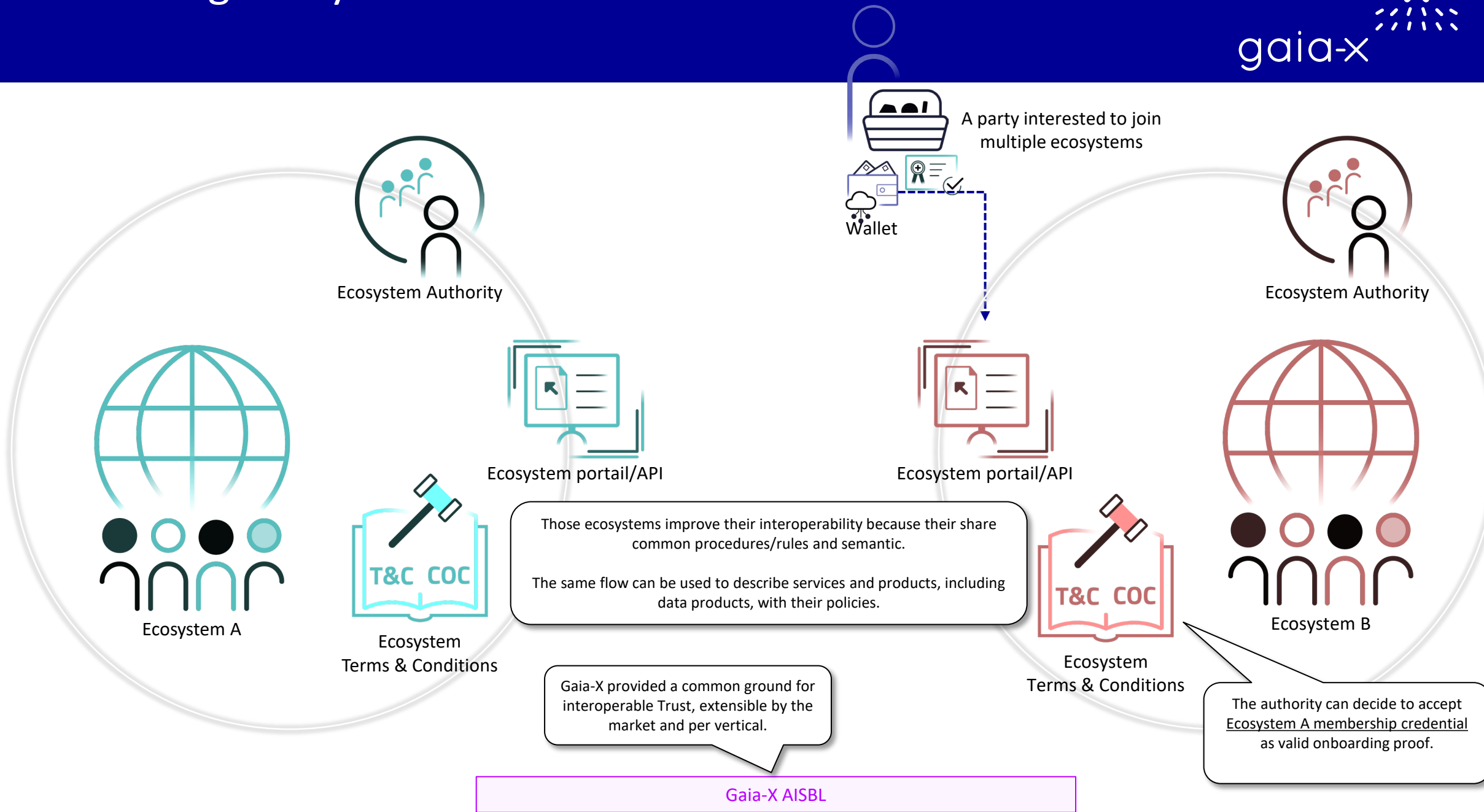
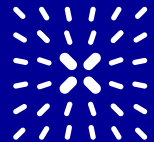


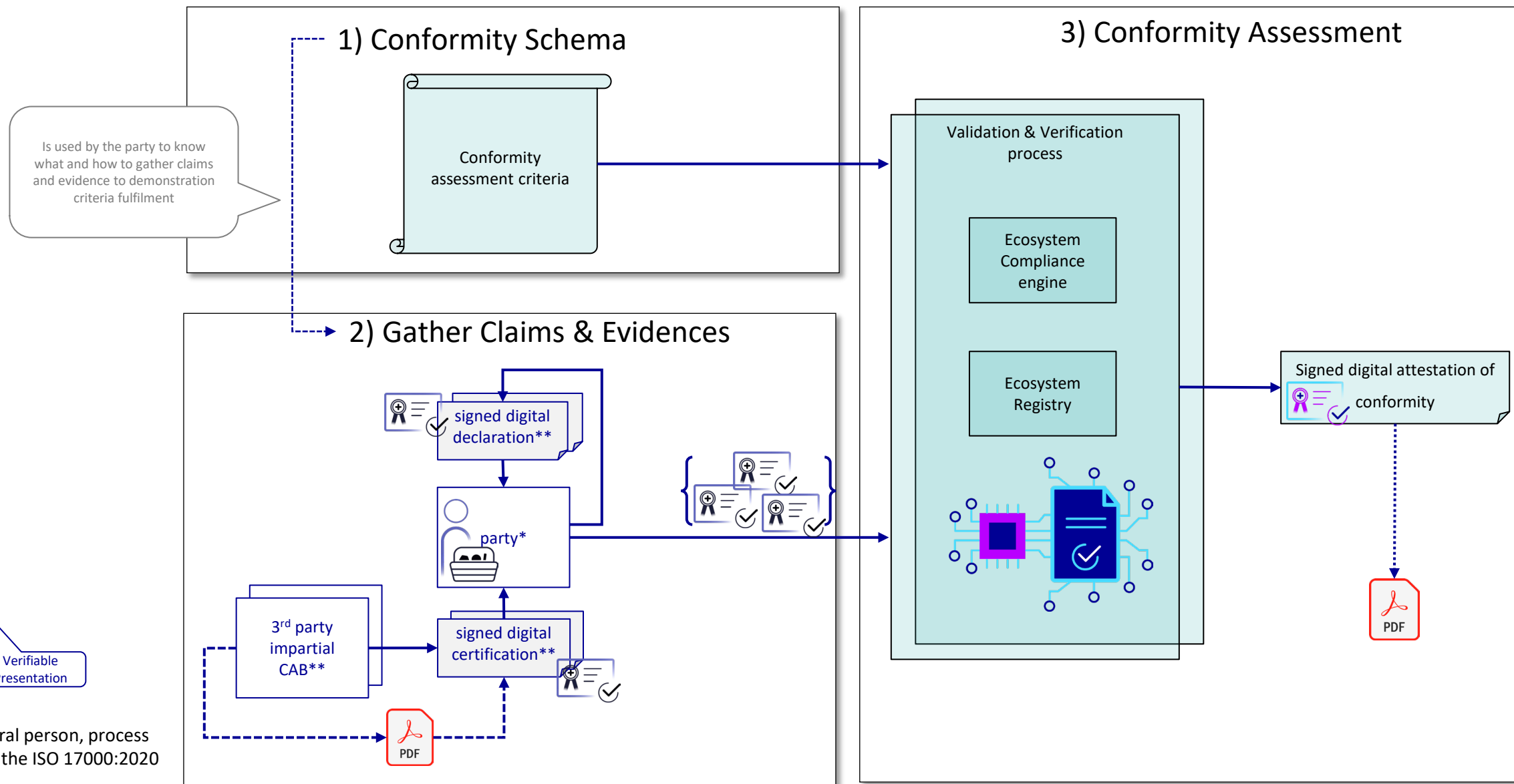
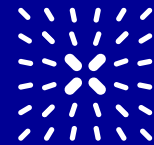
Gaia-X AISBL



Federating ecosystems

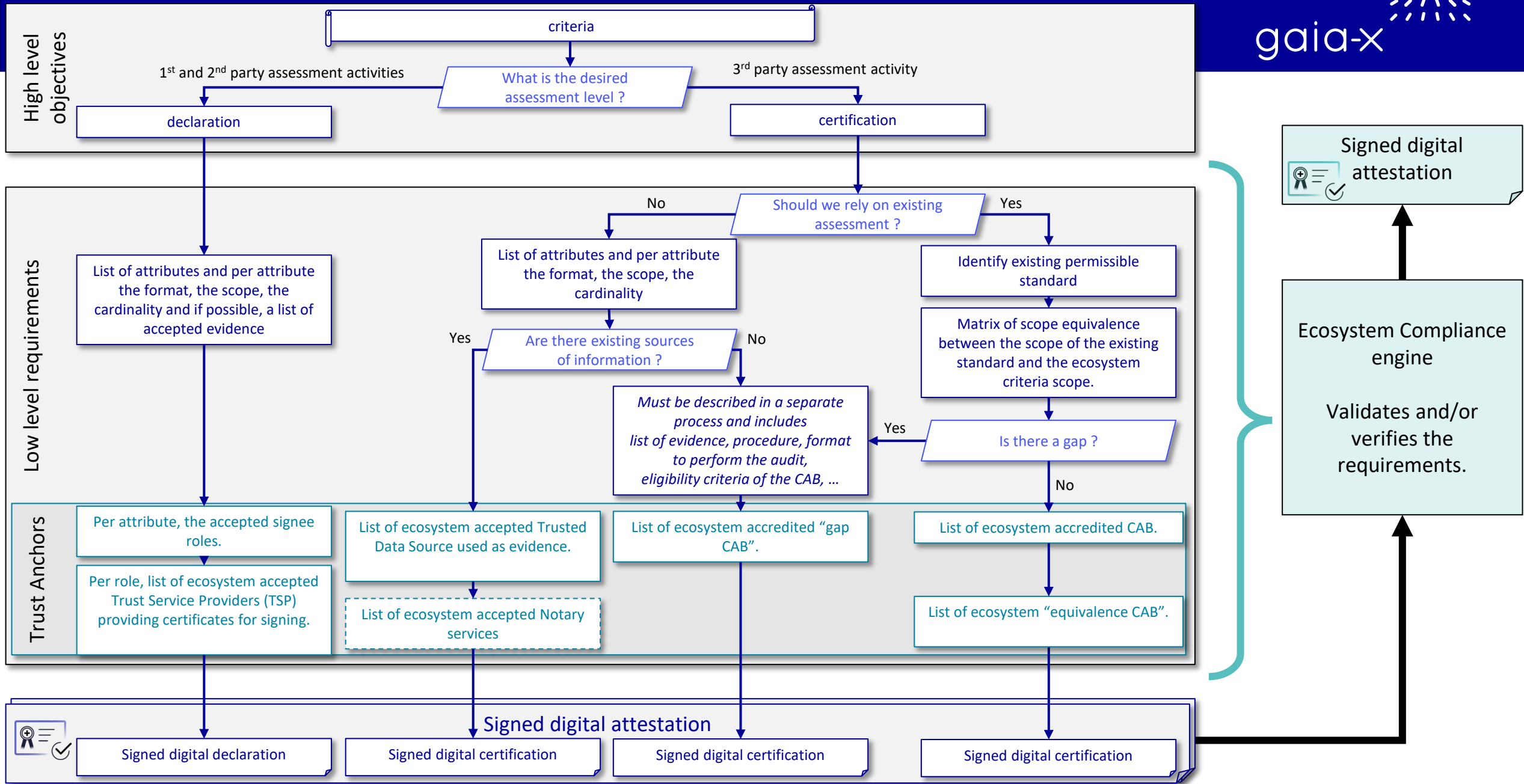
gaia-x



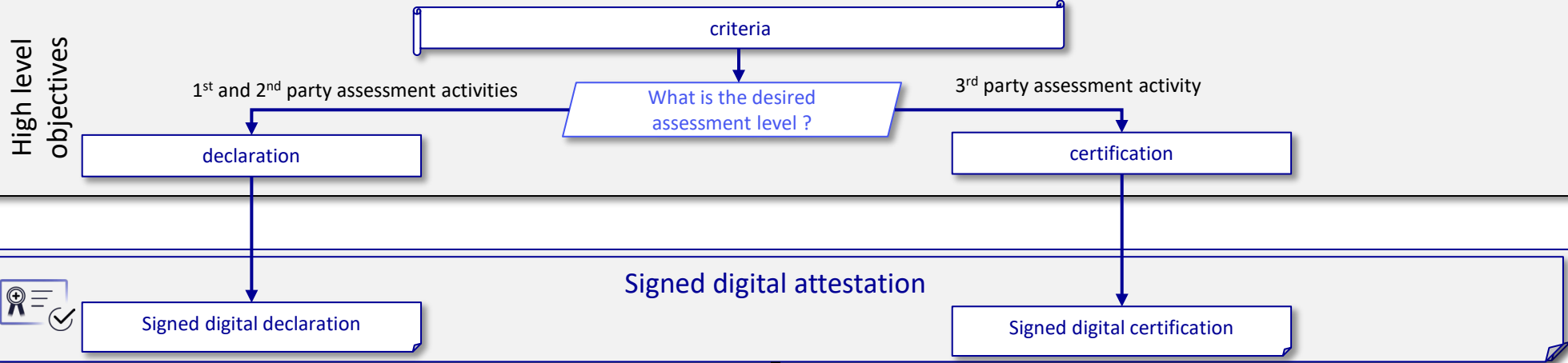


*: legal person, natural person, process
**: terms defined in the ISO 17000:2020

Ecosystem Conformity scheme

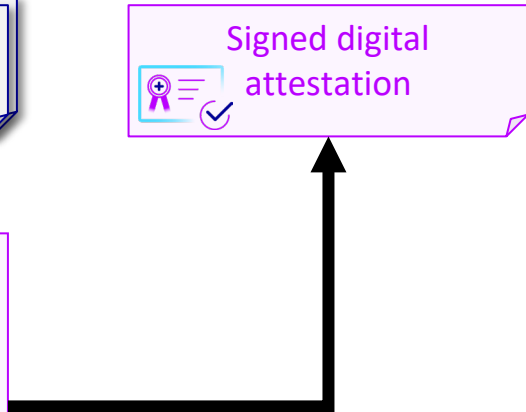


Conformity scheme



Gaia-X Compliance engine

Action	Declaration	Certification
Verify the cryptographic chain used to sign the claim	✓	✓
Verify the issuer of the claim	✓ (role + TSP)	✓ (accredited/equivalence/gap CAB + Notary)
Verify the claim itself	✗	✗ (done by the CABs)
Validate the claim	✓ (when a format has been specified)	✓ (when a format has been specified)

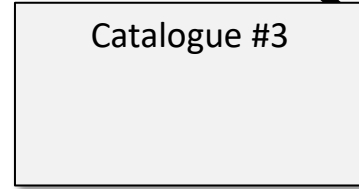
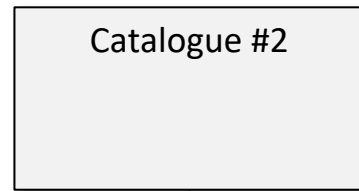
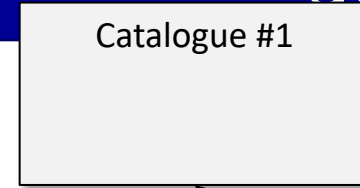
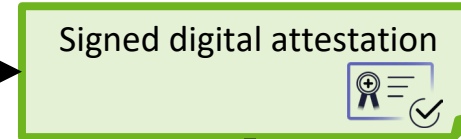
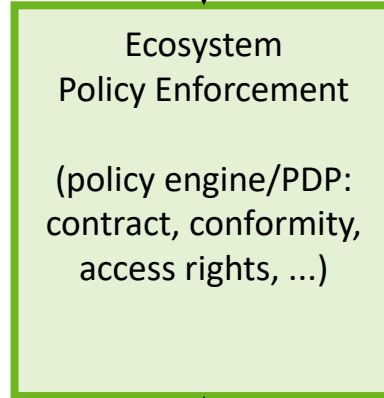
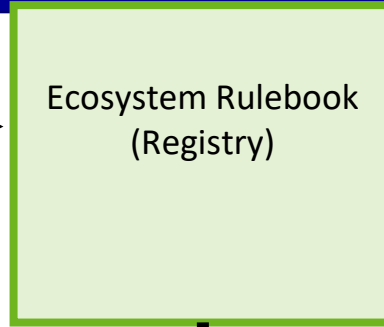


GXDCH General workflow



gaia-x

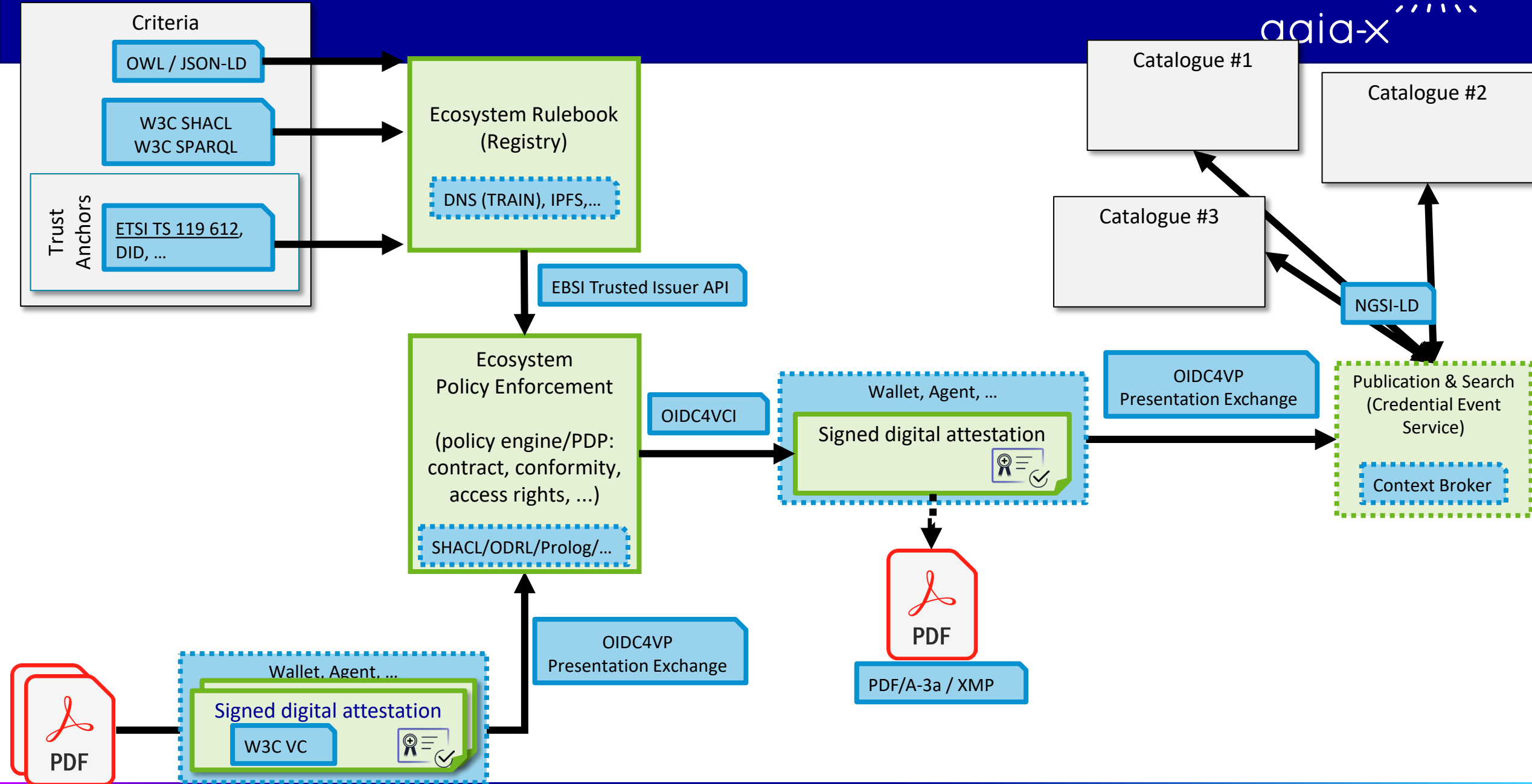
Gaia-X Compliance



GXDCH General workflow



aia-x



GXDCH General workflow

Criteria

Criterion P1.1.5: The Provider shall clearly identify in each legally binding act the applicable governing law.

Conformity	Label L1	Label L2	Label L3
declaration	declaration	declaration	declaration

Declaration: Using the Gaia-X Ontology, the declaration shall detail the applicable governing laws for the legally binding act, by indicating the ISO 3166-2 code of the respective country.


Criteria's translation

```
gx:PostalAddressShape a sh:NodeShape ;
  sh:targetClass gx:headquarterAddress, gx:legalAddress ;
  sh:property [
    sh:path gx:countrySubdivisionCode ;
    sh:datatype xsd:string ;
    sh:minCount 1 ;
    sh:pattern "^[a-zA-Z]{2}-(?:[a-zA-Z]{1,3}|[0-9]{1,3})$" ;
    sh:flags "i" ;
    sh:message "an ISO 3166-2 format value is expected." ;
  ] .
```


gaia-x

Digital signed
attestation

```
@context: [...]
type: "VerifiableCredential"
id: "https://www.riphixel.fr/...0-82ae-f0c89cc10768.json"
issuer: "did:web:www.riphixel.fr"
credentialSubject:
  id: "https://www.riphixel.fr/workshop/demo2023/25ab6315-81b8-4f90-affb-94af099a025c.json"
  gx:legalName: "Riphixel"
  gx:headquarterAddress:
    gx:countrySubdivisionCode: "FR-59"
    gx:legalRegistrationNumber: {...}
    gx:legalAddress: {...}
  type: "gx:LegalParticipant"
validFrom: "2024-05-06T21:56:55+00:00"
validUntil: "2024-08-04T21:56:55+00:00"
proof: {...}
```


 Gaia-X Compliance Document - main version (72e95908)

Search

 GitLab
☆ 4 🗨 1

About

Introduction

Compliance Rules

Gaia-X Trust Anchors

Annexes

Compliance Rules

Compliance for Cloud Services

Proposed Compliance for Data Exchange Services

4. Gaia-X Compliance Criteria for Cloud Services

Note

We use the term **'Provider'** throughout this section as the short denominator for a cloud Service Provider or CSP, i.e., the participant who provides cloud Service Offerings in the Gaia-X ecosystem. We use the term **'Customer'** in this section to denominate the cloud service Customer, i.e., the participant who consumes a Service Offering from a cloud Service Provider.

Table of contents

Nomenclature and Versioning of Referenced Standards

Assessment procedures

Contractual framework

Contractual governance

General material requirements and transparency

Technical compliance

Acronyms

We use the following abbreviations in this section: C (Conformity), L1 (Gaia-X Label level 1), L2 (Gaia-X Label level 2) and L3 (Gaia-X Label level 3).

Criteria extract in JSON

A machine readable version of the criteria in JSON is available here. Download JSON

Thank you!

Pierre Gronlier

Chief technology Officer

pierre.gronlier@gaia-x.eu

#GaiaX #TechX24

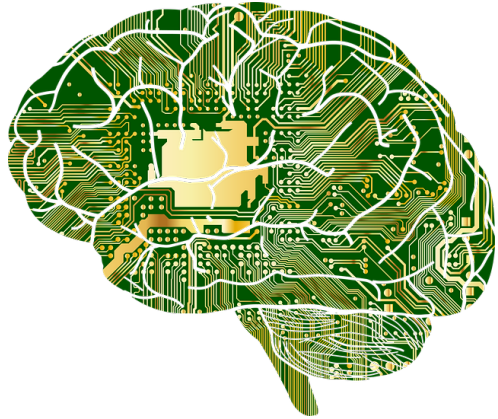
How to make a data product for Gaia-X

15:45 – 16:15

Jesus Maria Santamaria, Tecnalia Research & Innovation

#GaiaX #TechX24

Context: OASEES Horizon Europe project



OASEES

Open Autonomous programmable cloud appS & Smart EdgE Sensors

The OASEES project aims to create a new programmability framework that will allow edge devices to work together in a decentralized and secure way, using advanced technologies such as AI/ML accelerators (FPGAs, SNNs, Quantum) and a privacy-preserving Object ID federation process. This will be fully European open-source framework.

ἔτος ἔργου

ἔτος ἔργου: 3 years (2023-2025)

ἔτος ἔργου: 8 M€

ἔτος ἔργου: 21 partners from 9 EU countries

ἔτος ἔργου: 6 (health, energy, industry, construction)

 oasees-project.eu



USE CASES



E-Health: Smart Nodes for Analysis of Voice, Articulation and Fluency Disorders in Parkinson Disease



Energy: EVs fleet coordinated recharging to support optimal operation of electricity grid.



Drone Swarm for area and infrastructure inspection: Drone Swarm over 5G for High Mast Inspection.



Structural Safety for Building and Critical Infrastructure: Swarm powered intelligent Structural safety assessment for Buildings



Collaborative robotic automation: : Robotic Swarm powered Smart Factory for I4.0



Wind Energy: Smart Swarm Energy harvesting and Predictive Maintenance Wind turbines

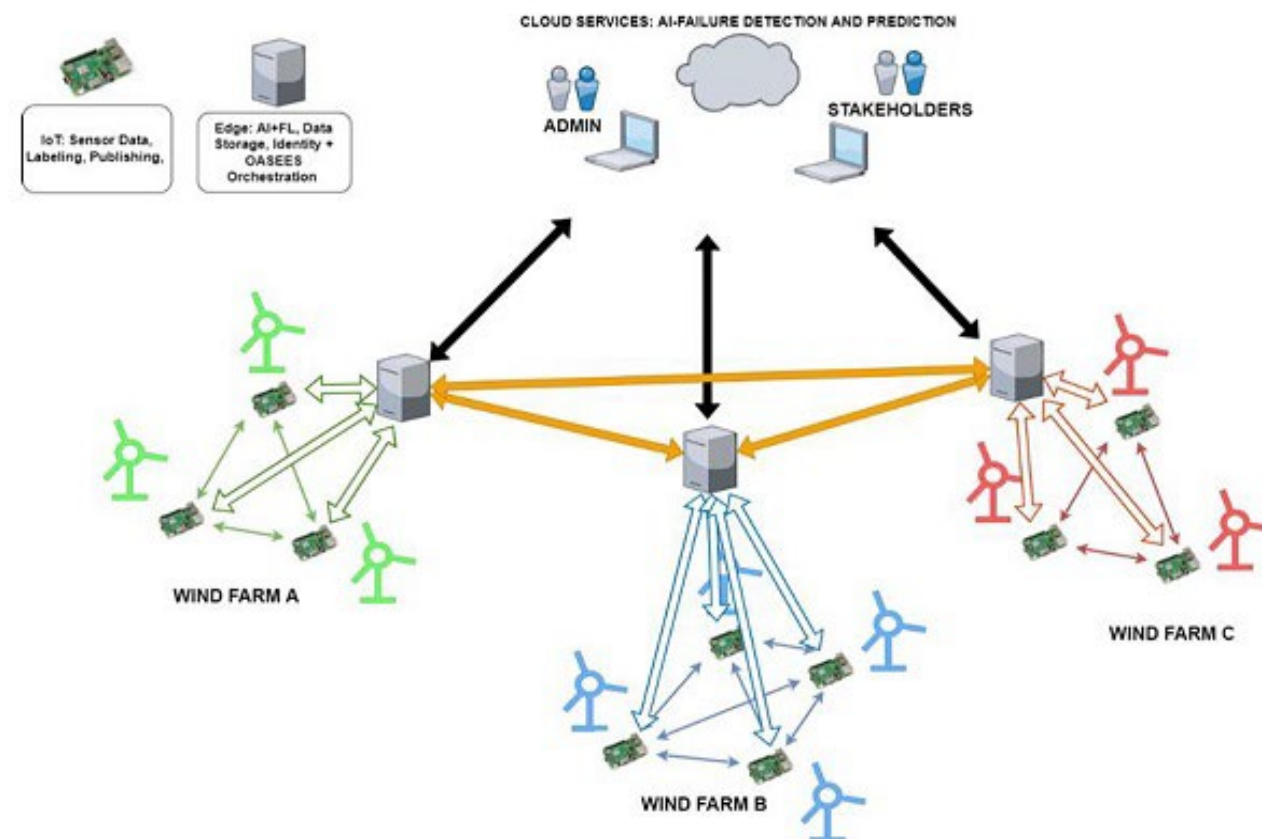
A real-world Business Case



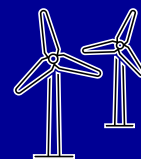
- The **Wind Farm owners** share **acoustic data** with the **Wind Turbine maintenance company**
- The WT maintenance companies provide a WT blade **anomaly detection service**: Using signal processing methods and AI, they are able of detecting blade damage and to launch preventive maintenance actions.

Data product:

Blade Acoustic Monitoring Swarm System



Wind energy Data Product definition








The Data Product Canvas

Name of Data Product: **Blade Acoustic Monitoring Swarm System**

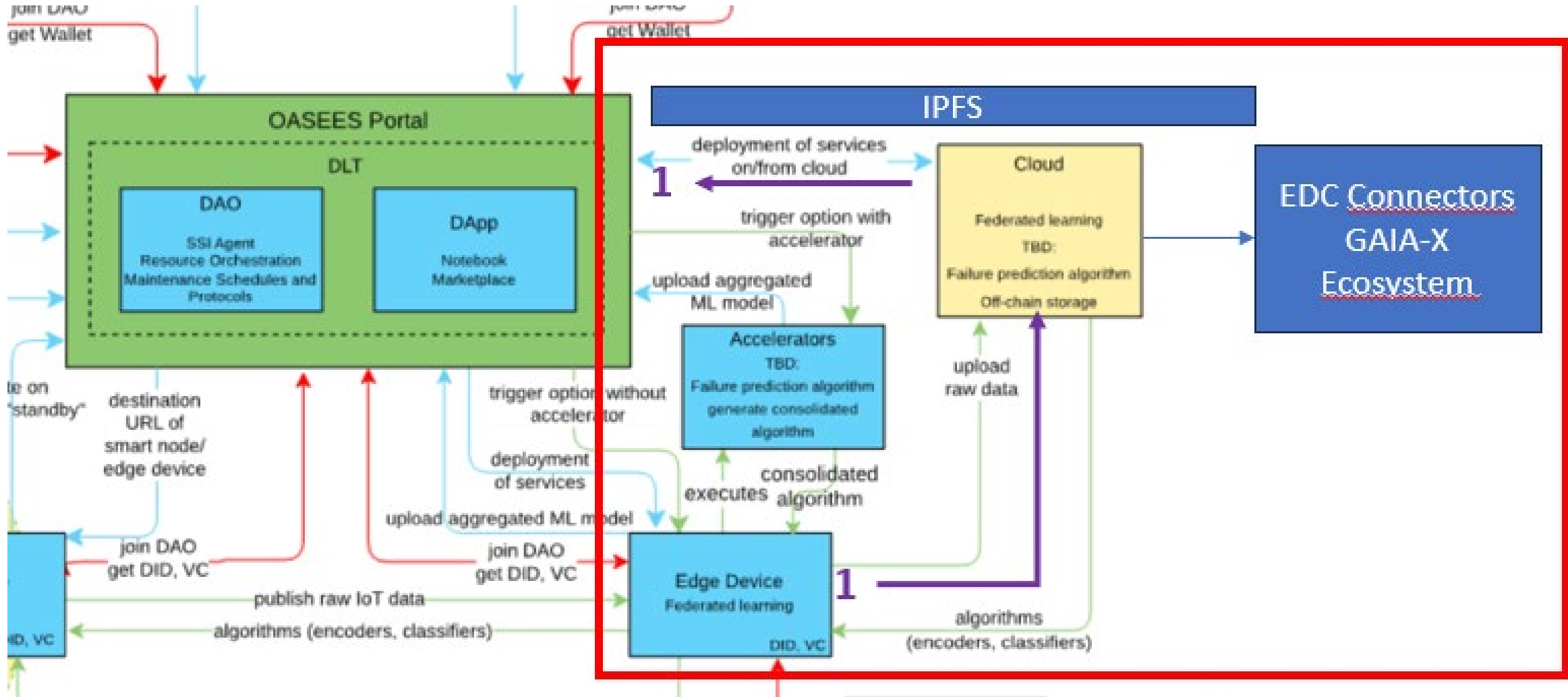
Who is the customer? **Wind Farms owners – Wind turbine Maintenance companies**

We create the data analytics solution

... for the following customers and users

Data Sources	Analytics	Data Product	Customer benefits	Pains and Gains
 <p>What data sources do we need to create customer value?</p> <p>Wind turbines (WT) acoustics monitoring systems: This refers to systems that monitor the acoustic characteristics of wind turbine blades. These systems collect raw acoustic data, providing insights into the sound produced by the blades during their operation.</p> <p>WT blade failure and stop historic. This involves gathering information about the historical occurrences of blade failures and instances where the wind turbine had to be stopped.</p> <p>WT blade maintenance plan. It outlines the schedule and procedures for maintaining and servicing the blades, ensuring optimal functionality and preventing potential failures.</p>	 <p>With which data analytics methods do we generate insights from the data?</p> <p>Signal Processing Methods: identifying relevant features in the sound patterns failures associated with turbine performance and potential.</p> <p>Neural Networks Trained by Distributed Learning Algorithms: Neural networks, a type of artificial intelligence, will be employed to recognize complex patterns in the acoustic data.</p>	 <p>In which form do we provide the data service to our users and customers?</p> <p>Technical Reports Based on Processed Acoustic Dataset: information included in the reports consists of datetime, wind turbine id, wind turbine height and diameter, and labelled anomalies.</p> <p>Wind Turbine Blades anomaly detection: Unusual patterns or anomalies in the acoustic data that can indicate issues with the blades.</p> <p>Maintenance Prediction and Impact on LCOE (Levelized Cost of Energy): potential impact of maintenance activities on the Levelized Cost of Energy</p> <p>Dynamic Maintenance Plan According to Blade Health Status: The data product includes a dynamic maintenance plan that adapts based on the real-time health status of the turbine blades.</p> <p>Anonymized Blade Acoustic Data: To address privacy concerns, the product includes anonymized versions of the raw acoustic data.</p>	 <p>What added value and what advantages does the data service generate to our users and services?</p> <p>This data service adds value by improving turbine performance, offering non-intrusive monitoring, enabling proactive analysis and detection, ensuring algorithm reliability, evaluating maintenance cost impact, and providing anonymized data for further analysis and development.</p> <p>These advantages collectively contribute to a more efficient and cost-effective management of wind turbine operations.</p>	 <p>What wishes, problems and challenges do our customers and users have?</p> <p>Wishes:</p> <ul style="list-style-type: none"> - Privacy and data protection between stakeholders (Wind Farms owners – Maintenance companies) <p>Problems:</p> <ul style="list-style-type: none"> - Lack of availability, quality and veracity of the raw acoustic blade data. - Expensive blade failure detection methods. - Wind turbine shutdown for blade inspection. <p>Challenges:</p> <ul style="list-style-type: none"> -Improve Operational and Maintenance Expenditure elaborating dynamic maintenance plans. -New and innovative alternatives to diagnose blade status.

Close view on Use case data gathering



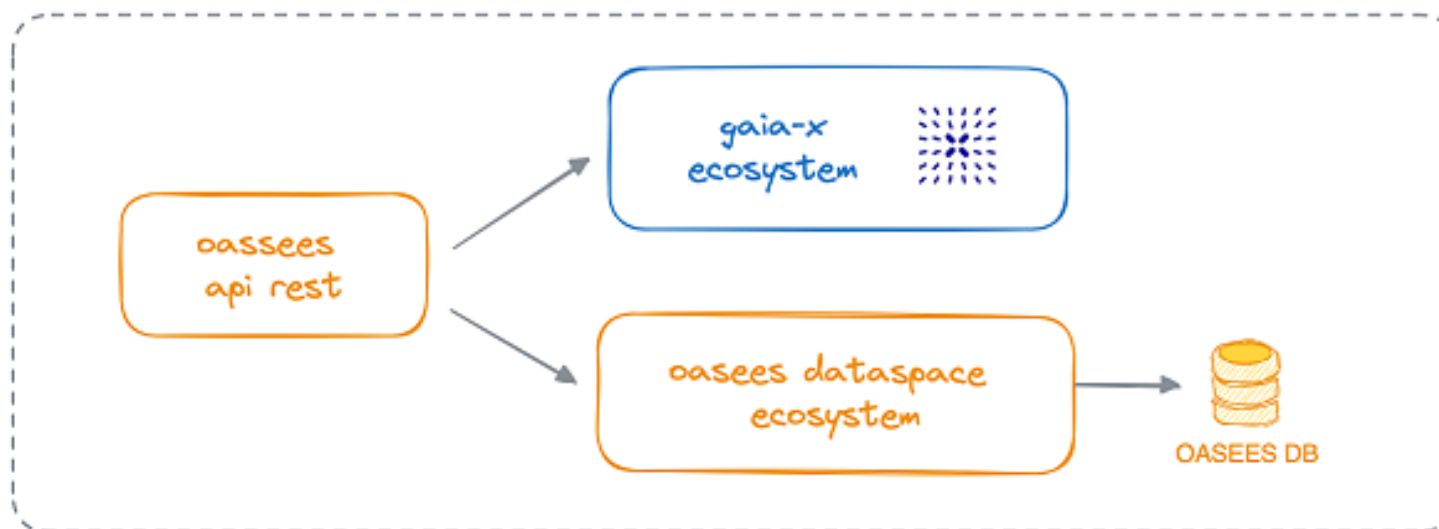
The process to make a Data Product for Gaia-X



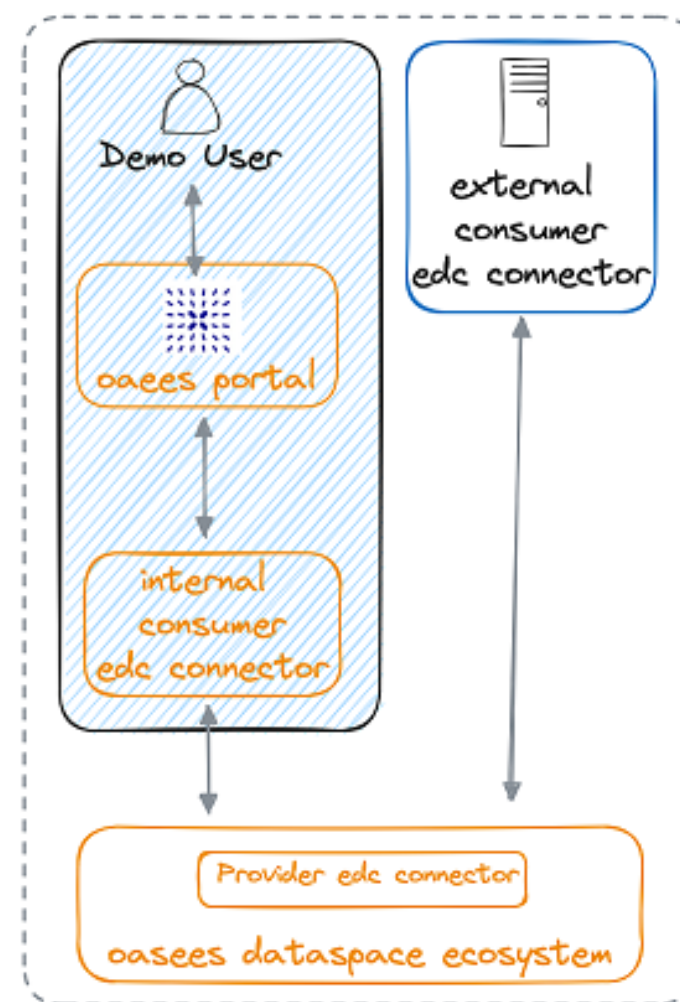
1 Store the data



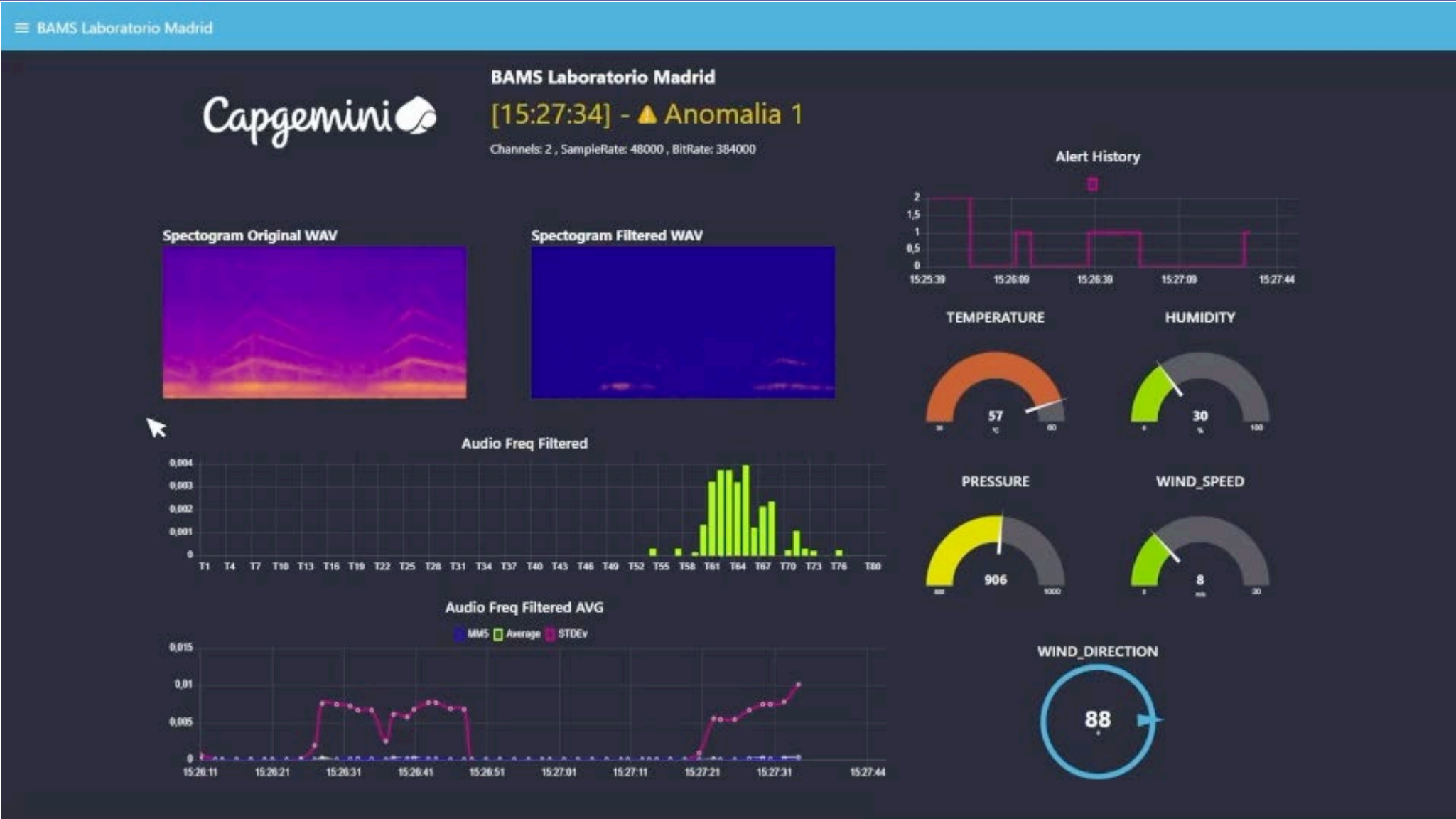
2 Register the data-products



3 Consume the data



DATA PRODUCT generation (Technical Report)



Checking that the DATA PRODUCT is stored in IPFS



IPFS API for Data Products - OASEES0.1.0OAS 3.1

/dataproducs/openapi.json

Servers

/dataproducs

default

POST/{dataproducs_id}/path/ Create Folder Structure In Ipfs

POST/{dataproducs_id}/files/add Upload Files To Ipfs

GET/{dataproducs_id}/files Get Files In Zip

GET/{dataproducs_id}/file Get File

GET/{dataproducs_id}/items Get Item List By Path

DELETE/{dataproducs_id}/items Delete Item

Schemas

Body_upload_files_to_ipfs_dataproducs_id_files_add_post > Expand all object

HTTPValidationError > Expand all object

ValidationError > Expand all object

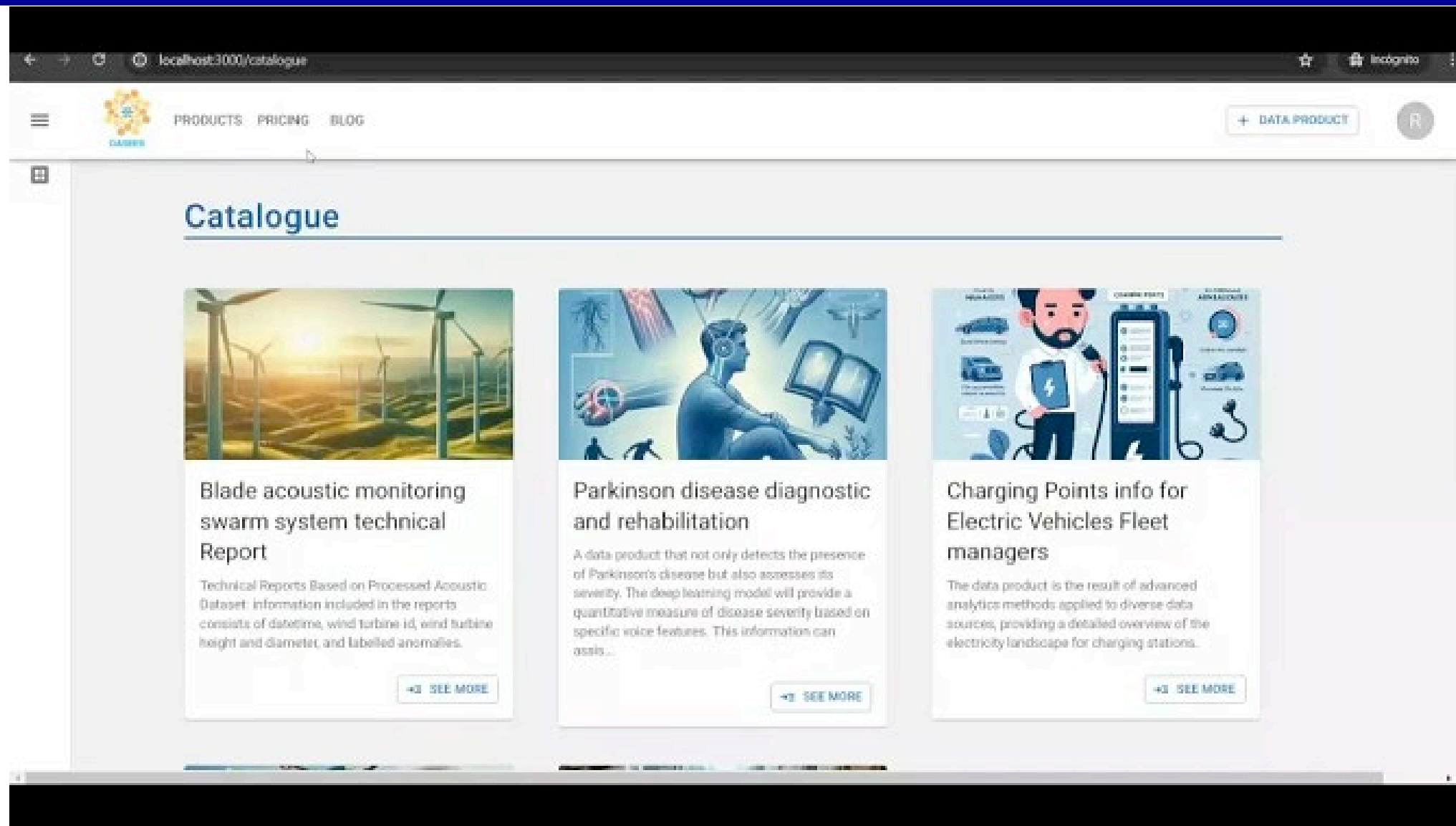
tecnal:a
MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

Generating the Verified Credentials for the Data Product offer



A screenshot of a web browser displaying the Swagger UI for the Oasees API. The browser's address bar shows "oasees:9102/docs/#/". The page title is "Oasees 0.1.0 OAS 3.1". Below the title, it says "Oasees API documentation". The main content area is titled "Oasees API" and lists several endpoints. The first endpoint is a POST method to "/diddocument" with the description "Create Did". The second endpoint is a POST method to "/legalparticipant" with the description "Create legal participant". The third endpoint is a POST method to "/dataproducer" with the description "Create data product with resources". The fourth endpoint is a GET method to "/dataproducer" with the description "Get data product by name". The fifth endpoint is a POST method to "/publish-dataproduct" with the description "Create and publish data product". The sixth endpoint is a GET method to "/dataproducers" with the description "Get data products list". The seventh endpoint is a GET method to "/cesrecords" with the description "Get ces records". Below this section, there is a section titled "Oasees testing API" which lists four more endpoints: a POST method to "/signVC" with the description "Sign VC", a POST method to "/sign-vp" with the description "Sign VP", a POST method to "/compliance" with the description "Call to compliance", and a POST method to "/credential-quest-creator" with the description "Call to credential quest creator".

Data Product consumption



Thank you!

Jesus Maria Santamaria

CTO Digital Unit, Tecnalia Research & Innovation

jesusm.santamaria@tecnalia.com

#GaiaX #TechX24

Controlling Data in Gaia-X: Utilising Policy as Code for Product Carbon Footprint Sharing and Estimation

16:15 – 17:00

Paul Weißenbach, Posedio GmbH

#GaiaX #TechX24

Controlling Data in Gaia-X: Utilizing Policy as Code for Product Carbon Footprint Sharing and Estimation

- Paul Weißenbach
 - Lead Cloud Engineer @ Posedio
 - Reliably, secure, performant, and sustainable software and cloud deployments (with a focus on authorization).
 - Working on EuProGigant a Gaia-X Lighthouse Project


Agenda



- Product Carbon Footprint *Sharing* (Use Case Part 1)
- Policy and Policy as Code
- A Company Service, Data Space Service, and Service for Multiple Data Spaces
- Implementing
 - Access Policies, Admission Policies, Content Policies, “Sharing” Policies
- Product Carbon Footprint *Estimation* (Use Case Part 2)
- Implementing
 - Usage Policies
- Policy Management

Use Case Part 1: Product Carbon Footprint (PCF) *Sharing*

- Reliably store PCF information for Engineers and keep it available.
- Allow fine-grained access control to protect the PCF provider's business interests.
- Access through an API

 <http://co2.eupg.example.com>

EuPG PCF Service

Consumer Corp ▾ Engineer ▾

Search

Estimate

Search:

M30X HIGH HARD TOOL

XX CO₂e / KG

Steel One . Tool Steels

✓ audited

M30X HHT is a corrosion-resistant, martensitic chrome steel with very good toughness, corrosion resistance, wear resistance as well as improved cutting and polishability properties.

M30 Screw

XX CO₂e / Stk

Quality Screws . galvanized

DIN 933 / ISO 4017 - Steel 8.8 galvanized - M30x320 - hex bolt; fully threaded

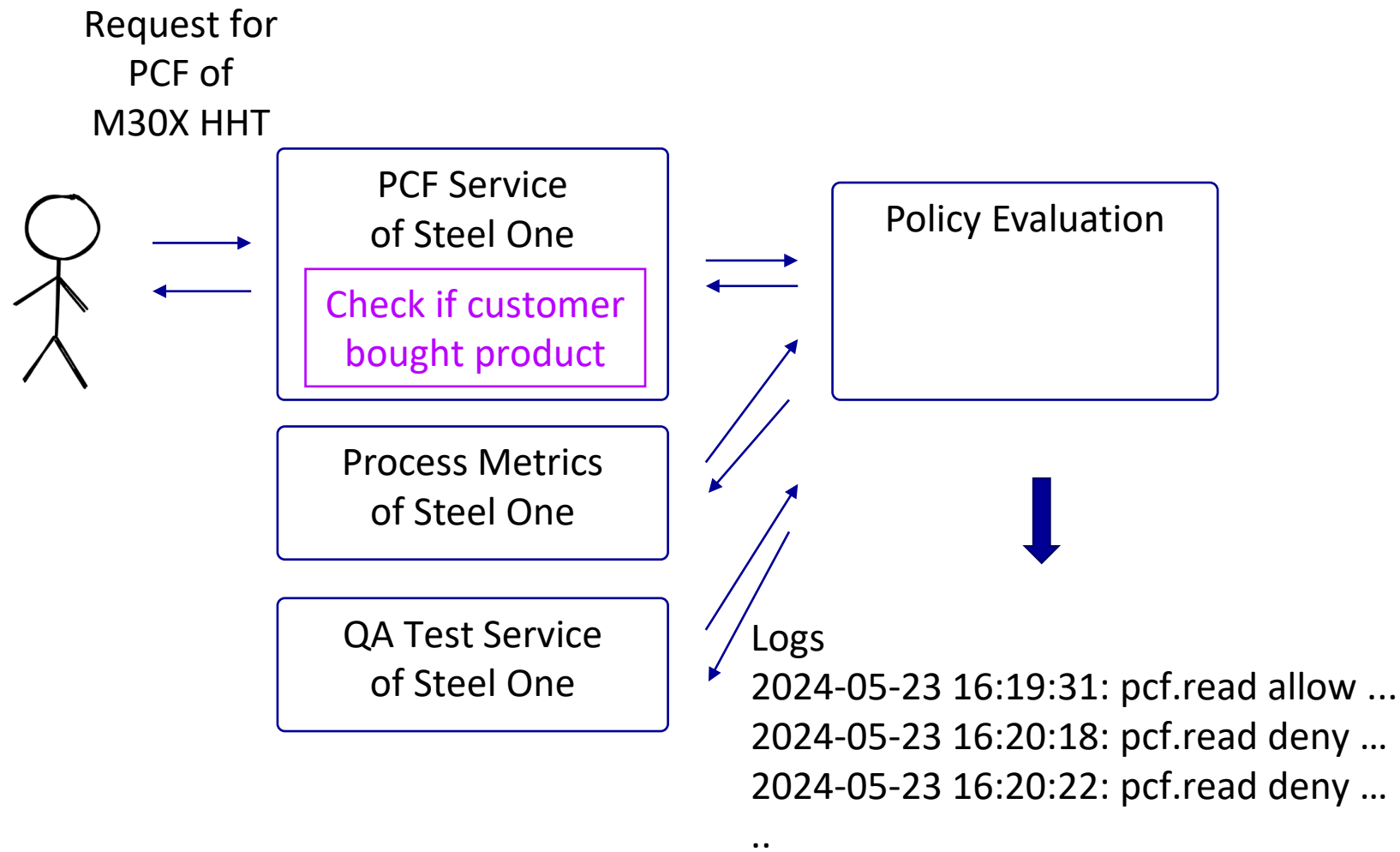
“A set of ideas or a plan of what to do in particular situations that has been agreed to officially by a group of people, a business organization, a government, or a political party.”

- Cambridge Dictionary

- Policies are not an end in themselves!
 - Goals → Instruments → Implementation
- Examples:
 - Protect process IP → Coercion → Role-based access control
 - Provide historical data reliable → Coercion → Retention of data (forbid deletion)
 - Increase data quality → Suasion → Offer discounts on audits

Policy as Code

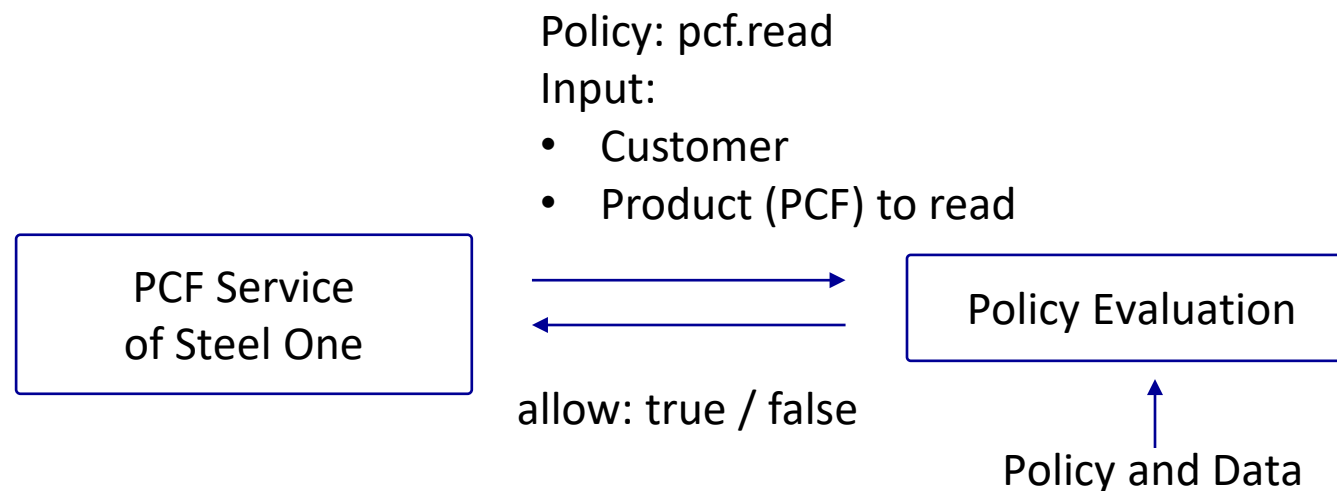
- Example:
 - Only customers who bought a product can access its PCF
- Decouple from Application Code
 - Policy Enforcement Point
 - Policy Decision Point
- Reusable over multiple services
- Central decision logs



Policy as Code Language



- In Gaia-X, two Domain Specific Languages are especially interesting
 1. ODRL (Open Digital Rights Language) with OVC profile
 2. Rego (for Open Policy Agent)



```
package pcf.read

import data.pcf.crm.is_customer

default allow := false

allow if {
  is_customer

  input.product in
  data.customers[input.customer].products_bought
}
```


Rego Example

Access Policies (1)

PCF Data and User

Data Provider

- How can we restrict who can access PCF data?
- Examples
 - Based on product (meta) data.
 - Based on user information
 - Or both: PCF data and user information

 <http://co2.eupg.example.com>

EuPG PCF Service

Provider Org ▾ Manager ▾

Search

Estimate

Manage

Organization

Products

Policies

Access PCFs

Policies > Access PCFs

Allow everyone access to public PCFs

allow if {
 data.pcf[input.pcfId].public
}

☒

Allow admins of PCF Service access

allow if {
 "admin" in input.user.pcf_roles
}

☐

Only employees with role "pcf-manager" or "pcf-reviewer" can see PCF drafts

allow if {
 data.pcf[input.pcfId].status = "Draft"
 some role in input.user.roles
 role in {"pcf-manager", "pcf-reviewer"}
}

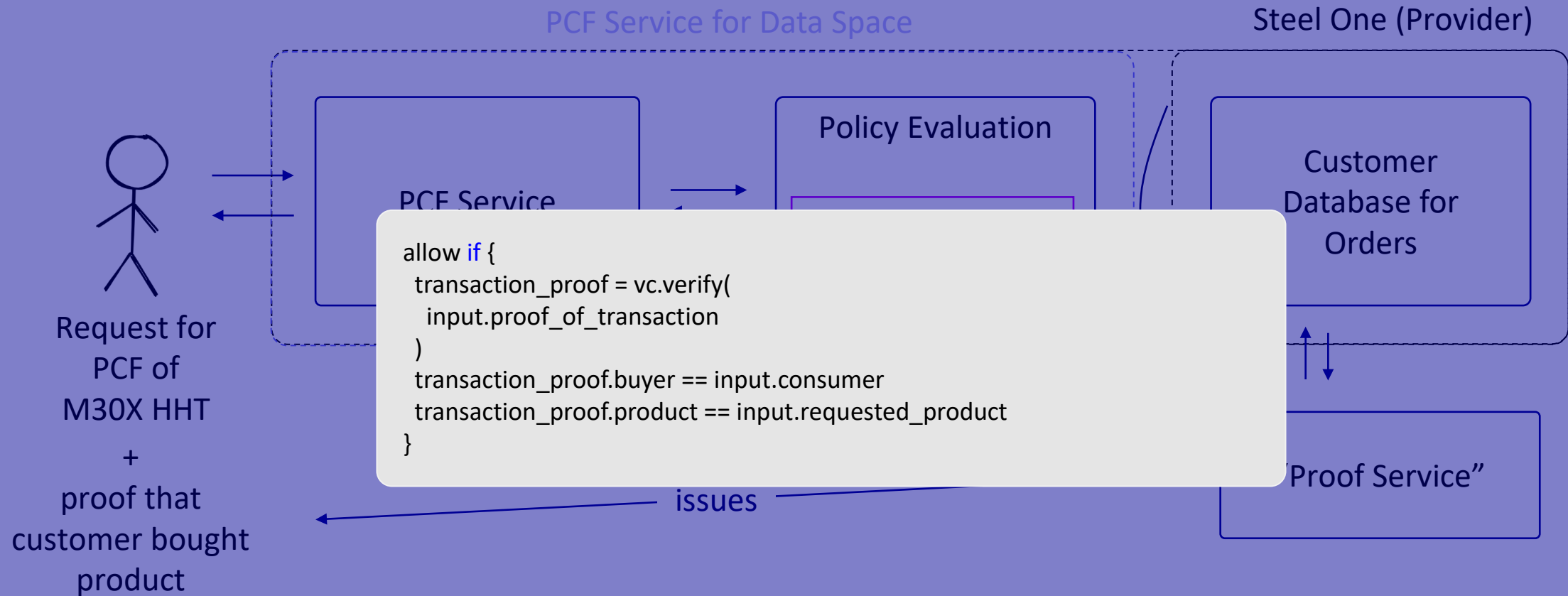
☒

Whitelist specific users

allow if input.user.id = "12345"
allow if input.user.id = "23456"

☐

Service for a Data Space




Access Policies (2)

External Information Sources

Data Provider

- Examples
 - Rules use data made available to the policy evaluation system
 - Rule uses verifiable credentials as input. Custom extension to verify.
 - Rule uses API-call to another service

 <http://co2.eupg.example.com>

EuPG, PCF Service

Provider Org ▾ Manager ▾

Search

Estimate

Manage

Organization

Products

Policies

Access PCFs

Policies > Access PCFs

Allow users in customer-list access (list needs to be set ahead of time) ☐

```
allow if {
  is_customer
  has_bought_product
}
```

Allow users with proof of transaction access ☒

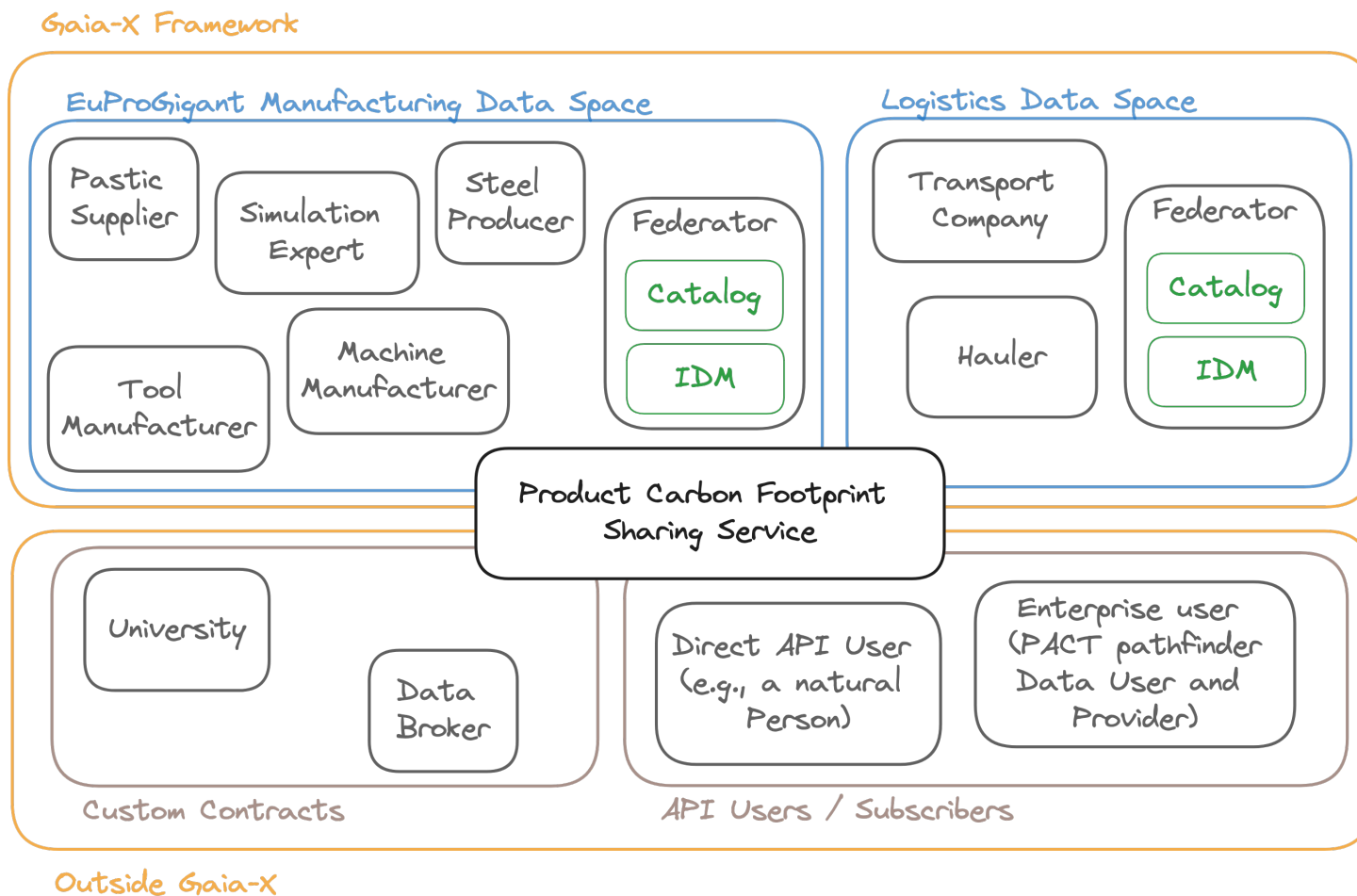
```
allow if {
  transaction_proof = vc.verify(
    input.proof_of_transaction
  )
  transaction_proof.buyer = input.consumer
  transaction_proof.product = input.requested_product
}
```

Delegate decision to service of PCF provider ☐

```
allow if {
  provider = data.pcfs[input.pcfId].provider
  res = http.send({
    "url": provider.customer_service_url,
    "method": "GET",
    "body": { "product": input.product,
              "customer": input.customer }
  })
  res.is_customer_and_has_bought_product
}
```


Multiple Data Spaces

- PCF is of universal interest
- Use infrastructure of data spaces
 - Catalog
 - Identity Management (e.g., authentication)
 - Contracting Service



Admission Policies

Service Administration

- Who do we allow to use the PCF-Service and eventually store and publish their PCFs?
- Example:
 - Everyone from a data space.
 - Allow everyone who accepts the TOS and pays a monthly fee.
 - Anyone with a Gaia-X-compliant self-description

 <http://co2.eupg.example.com>

EuPG PCF Service

Administration ▾ Manager ▾

Search

Estimate

Admin

Policies

Admission

Policies > Admission

Allow participants of EuProGigant data space ☒

allow if {
 vc.verify(input.legalParticipant)
 is_participant_of_eupg_ds
}

Allow participants of Logistic data space ☒

allow if {
 vc.verify(input.legalParticipant)
 is_participant_of_logistics_ds
}

Allow paying subscribers ☐

allow if {
 accepted_terms_of_service
 data.payments[input.customer].current_period
}

Definitions


is_participant_of_eupg_ds if {
 cat_participant := http.send({
 "url": data.eupg.cat.url,
 "method": "GET",
 "body": { "lpId": input.legalParticipant.id }
 })
 input.participant.id = cat_participant.id
}

Content Policies

Service Administration

Data Provider

- How does a PCF must look like to be published?
- Example:
 - Fields need to be set
 - Only (recently) audited PCF's can be published

 <http://co2.eupg.example.com>

EuPG PCF Service

Provider Org ▾ Manager ▾

Search

Estimate

Manage

Organization

Products

Policies

Access PCFs

PCF Content

Policies > PCF Content

No negative PCF excluding biogenic. ☒

errors contains error if {
input.pcf.pcf_excluding_biogenic ≤ 0
error := sprintf(
"Value must be greater than or equal to 0 (≠ %v).",
[input.pcf.pcf_excluding_biogenic]
)
}
}

Allow only audited PCFs ☒

errors contains error if {
not input.pcf.audit
error := "PCF needs to be audited."
}
}

Audit needs to be current (in last 6 months) ☐

errors contains error if {
[years, months, _, _, _, _] := time.diff(
time.parse_rfc3339_ns(input.pcf.audit.completed_at),
time.now_ns()
)
years ≠ 0
months ≥ 6
error := sprintf(
"PCF must be audited in the last 6 month. Is %v.",
[input.pcf.audit.timestamp]
)
}
}

Retention Policies

Service Administration

Data Provider

- Deleting and Yanking
 - Deleting removes PCF completely
 - Yanking removes PCF from indexes and catalogs but preserves data and history
- Examples
 - Prevent early deletion
 - Allow deletion only with specific roles
 - Prevent deletion completely

 <http://co2.eupg.example.com>

EuPG PCF Service

Provider Org ▾ Manager ▾

Search

Estimate

Manage

Organization

Products

Policies

Access PCFs

PCF Content

Retention

Policies > Retention

Only can be deleted after 20 years (set by PCF Service can't be deactivated) ☒

```
errors contains error if {
  20 ≥ years_since(data.pcf[id].published)
  error = "Can only delete PCF after 20 years"
}
```

Allow deletion only after product End of Life + 10 years ☒

```
errors contains error if {
  10 ≥ years_since(data.pcf[id].eol)
  error = "Can only delete PCF after it is 10 years EoL"
}
```

Only users with the role "pcf-manager" can delete a PCF. ☐

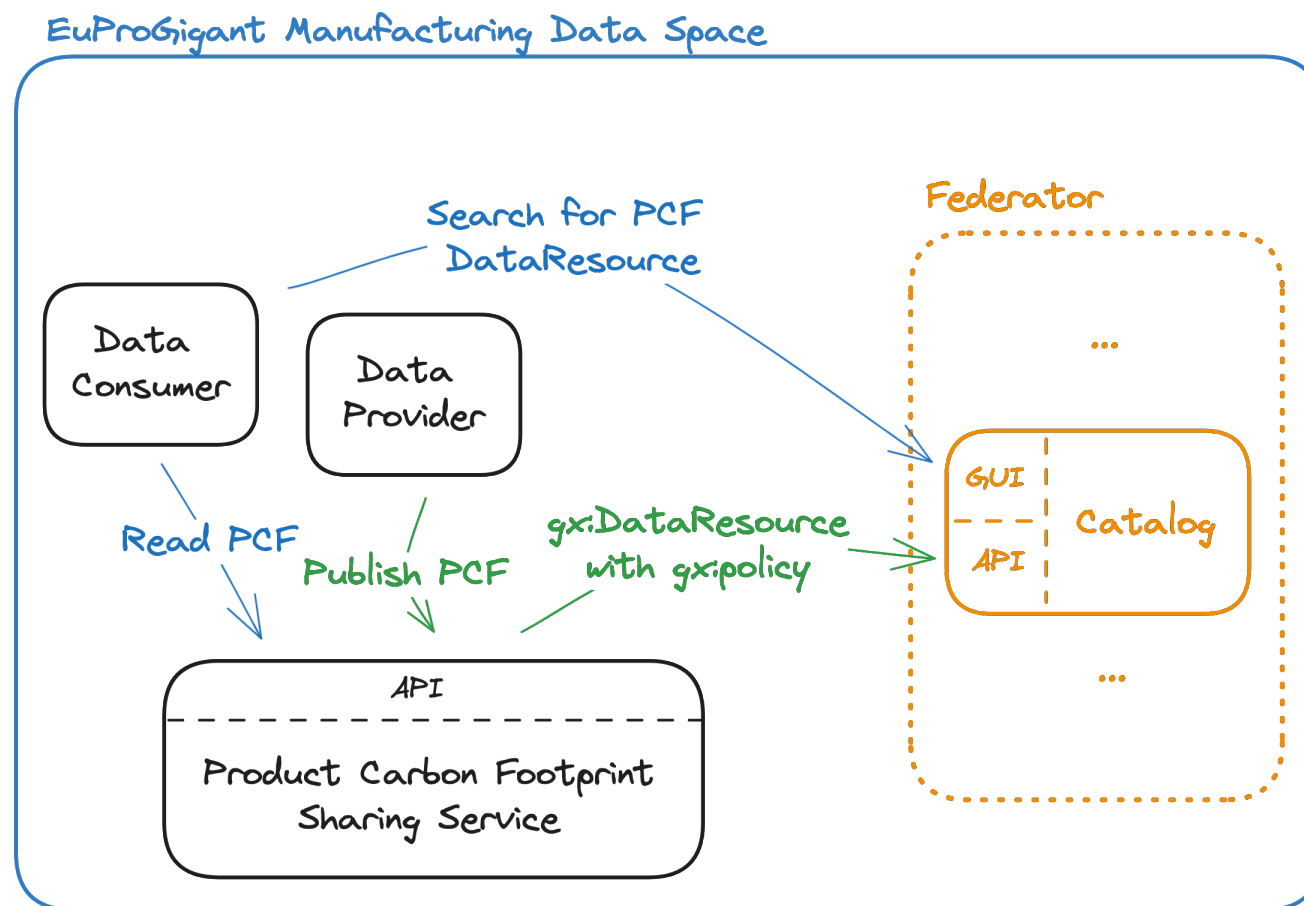
```
errors contains error if {
  not "pcf-manager" in input.user.roles
  error = "Only 'pcf-manager's can delete PCFs"
}
```

Definitions

```
years_since(timestamp) := time.diff(
  time.parse_rfc3339_ns(timestamp),
  time.now_ns(),
)[0]
```


Listing PCFs in Gaia-X Catalogs

- Use the catalog of the data space.
- `gx:DataResource` has a `gx:policy` field
 - Rego
 - ODRL
- In this context, “policy” is more a statement of intent. Used for
 - Filtering (in Catalog)
 - Automated contracting



Open Digital Rights Language (ODRL)

- OVC Profile
 - credentialSubjectType
 - JSON-Path Selectors
- ODRL Types
 - Offer, Agreement, (Set)

```
{
  "@context": [
    "http://www.w3.org/ns/odrl.jsonld",
    "https://registry.lab.gaia-x.eu/.../trustframework#",
    "https://w3id.org/gaia-x/ovc/1/"
  ],
  "@type": "Offer",
  "uid": "http://example.com/policy/123",
  "profile": "https://w3id.org/ovc/1/",
  "permission": [
    {
      "target": "http://pcf.eupg.example.com/pcf/ab12345",
      "action": "http://www.w3.org/ns/odrl/2/read",
      "assigner": "http://steel-one.example.com",
      "assignee": {
        "ovc:constraint": [
          {
            "ovc:leftOperand":
              "$.credentialSubject.gx:legalAddress.gx:countrySubdivisionCode",
            "operator": "http://www.w3.org/ns/odrl/2/isAnyOf",
            "rightOperand": [
              "FR-HDF",
              "BE-BRU",
              "LU-LU"
            ],
          },
          "ovc:credentialSubjectType": "gx:LegalParticipant"
        ]
      }
    }
  ]
}
```

Sharing Policies (1)

Data Provider

- The result of a policy evaluation does not need to be “allow: true/false” it can be a complex (JSON) object.

 <http://co2.eupg.example.com>

EuPG PCF Service

Provider Org ▾ Manager ▾

Search

Estimate

Manage

Organization

Products

Policies

Access PCFs

PCF Content

Retention

Sharing PCFs

Policies > Sharing PCFs

Allow sharing PCFs with third parties if sharing is set to true and license is CC-BY 

permissions contains {
 "action": "share",
 "assigner": data.default_assigner,
 if {
 data.pcf[input.pcfId].allowSharing
 data.pcf[input.pcfId].license = "CC-BY"
 }
}

Definitions

policy = {
 "@context": [
 "http://www.w3.org/ns/odrl.jsonld",
 "https://registry.lab.gaia-x.eu/ ... /trustframework#",
 "https://w3id.org/gaia-x/ovc/1/",
],
 "@type": "Offer",
 "uid": sprintf(
 "http://example.com/policy/%s",
 [urlquery.encode(input.pcf)]
),
 "profile": "https://w3id.org/ovc/1/",
 "permission": permissions,
}

Sharing Policies (2)

Data Provider

- Provide helpers to simplify ODRL creation

 http://co2.eupg.example.com

EuPG PCF Service

Provider Org ▾ Manager ▾

Search

Estimate

Manage

Organization

Products

Policies

Access PCFs

PCF Content

Retention

Sharing PCFs

Policies > Sharing PCFs

Allow reading if legal participant is from Brussels or Luxembourg city & PCF is special. ☒

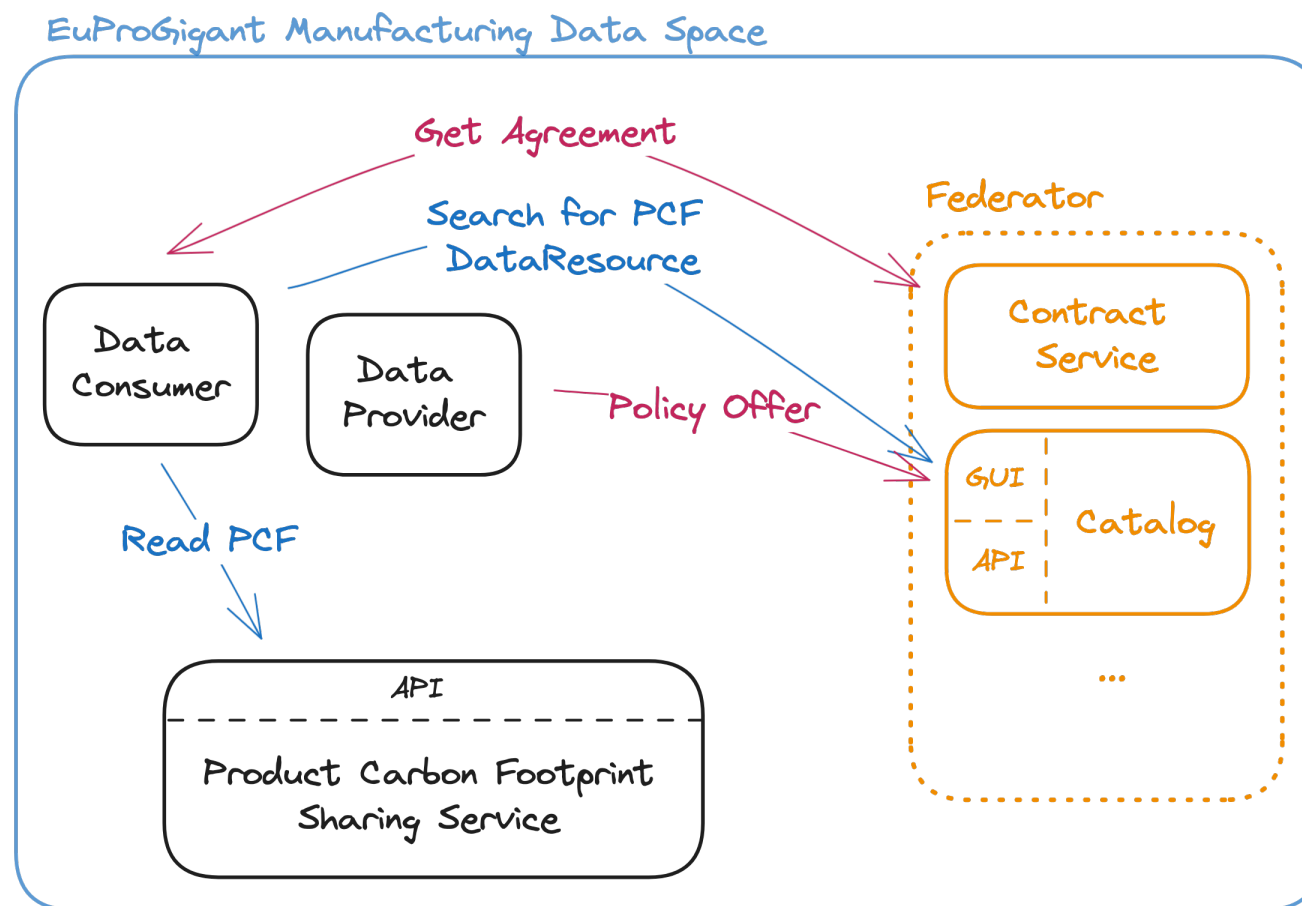
```
permissions contains {  
  "action": "read",  
  "assignee": constraint(  
    country_sub_in({ "LU-LU" })  
  },  
} if {  
  data.pcf[input.pcfId].isSpecialForTechX2024  
}
```

Definitions

```
country_in_list(country_subdivisions) := {  
  "ovc:leftOperand":  
    "$.credentialSubject.gx:legalAddress.gx:country ...  
  "operator": "http://www.w3.org/ns/odrl/2/isAnyOf",  
  "rightOperand": country_subdivisions,  
  "ovc:credentialSubjectType": "gx:LegalParticipant",  
}  
  
constraint(contstraints) := {  
  "ovc:constraint": [constraints]  
}
```


Independent Contracts


- Contracts can be created completely independent of the PCF Service



Access Policies (3) Honor Agreements

Data Provider

- Access policies need to respect agreements made by the data provider.
- Examples
 - Allow access if a consumer provides a verified contract (ODRL Agreement) and the contract is not blacklisted.
 - Allow users who fulfill the criteria in the `gx:policy` field of the `gx:DataResource` even without an Agreement.

 <http://co2.eupg.example.com>

EuPG PCF Service

Provider Org ▾ Manager ▾

Search

Estimate

Manage

Organization

Products

Policies

Access PCFs

PCF Content

Retention

Sharing PCFs

Policies > Access PCFs

Allow users with a valid contract if not blacklisted 

```
allow if {
  not input.contract.id in data.blacklisted_contracts

  vc.verify(input.agreement)


  gxi.odrl_evaluate(
    "read",
    input.product.url,
    input.agreement,
    input.consumer.legalParticipant
  )
}
```

Allow users that fulfil policy even without an agreement. 

```
allow if {
  gxi.odrl_evaluate(
    "read",
    input.product.url,
    input.product.odrl_policy_offer,
    input.consumer.legalParticipant
  )
}
```

Use Case Part 2: Product Carbon Footprint (PCF) *Estimation*

- Enable product engineers to more accurately lower the environmental impact of their designs.
- Hide complexity behind simple interfaces.

 <http://co2.eupg.example.com>

EuPG PCF Service

Consumer Corp ▾ Engineer ▾

Search

Estimate

Estimate

Material

CAD-Model

Quantity

Request Estimation

PC

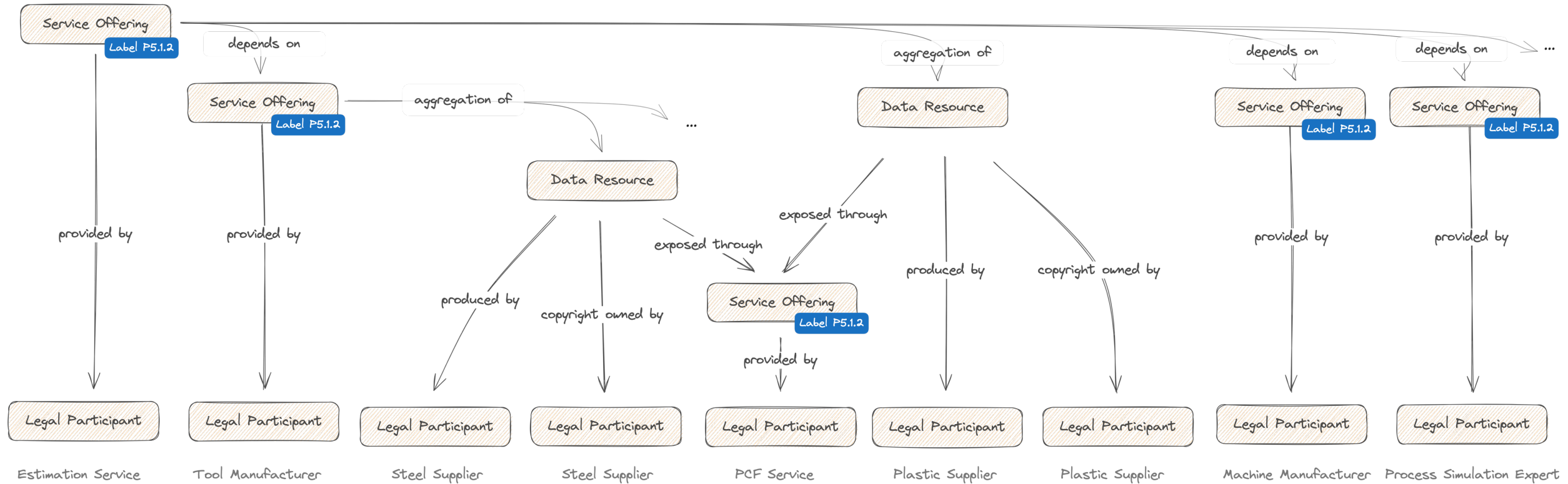
Drop here
or
Select File



15.000.000

Many Participants involved to get accurate Estimations

Label P5.1.2: For Label Level 3, the Provider shall process and store all Customer Data exclusively in the EU/EEA.



Usage Policies

Service Administration

Data Consumer

- Which estimation services can be used through the PCF-Service by employees (engineers) of the consumer organization?
- Examples
 - Check all service offerings for Gaia-X Labels.
 - Allow specific services (Whitelisting)
 - Disallow some services (Blacklisting)

 <http://co2.eupg.example.com>

EuPG, PCF Service

Consumer Corp ▾ Manager ▾

Search

Estimate

Manage

Organisation

Products

Estimation

Policies

Access PCFs

PCF Content

Retention

Sharing PCFs

Service Usage

Policies > Service Usage

All services need to store data only in EU/EEA (Gaia-X Criteria 5.1.2) 


```
errors contains error if {
  service_offering.type = "serviceOffering"
  walk(input.serviceOffering, [_ , service_offering])

  not has_label(service_offering, "P5.1.2", "L3")

  error := sprintf(
    "ServiceOffering (id: '%v') needs label 5.1.2 at L3",
    [service_offering.id],
  )
}
```

Whitelist specific services 

```
allow if {
  data.whitelist[input.serviceOffering.id]
}
```

Blacklist specific services 

```
errors contains error if {
  data.blacklist[input.serviceOffering.id]
  error := "Service not allowed"
}
```

Definitions

```
has_label(service_offering, criteria, level) if {
  # ... snip ...
}
```

Manage Policies

- Policies are code, and we use Source Code Management (SCM) system to manage them.
 - Code reviews, automated testing, signed commits, etc.
- Planned UI for Non-Developer
 - Activation and deactivation
 - Adding new rules
 - Basic editing
 - See rules history of changes
 - See decisions logs for rules
 - Replay decisions with edited rules



```
paul@work ~/I/e/e/p/policies (main)> git log --pretty=oneline --abbrev-commit
33ed92c (HEAD -> main, origin/main) Initial usage policies
02cc357 Initial retention policies
9c5ac11 Adds validation and checks when publishing
e184422 Add helpers for ODRL policy creation
0e97c20 Permit sharing of `CC-BY` licensed PCFs, when sharing is active
96ff0ea Allow admittance with logistics token
79e3a08 Allow EuProGigant LegalPersons to use service
ab55189 Disable whitelisted users
26b2723 Adds basic access policies
2fe842e Delegate read decision to provider
7395b41 Allow customers with proof of transaction to read PCF
862db0d Allow customer who bought a product to read it's PCF

paul@work ~/I/e/e/p/policies (main)> git show 7395b41
commit 7395b41c19bd0ca3829bbf3fba42c270d6b68d50
Author: Paul Weissenbach <paul.weissenbach@posedio.com>
Date: Tue May 14 13:38:37 2024 +0200

    Allow customers with proof of transaction to read PCF

diff --git a/policies/policies/pcf.read.rego b/policies/policies/pcf.read.rego
index deda5e2..b00fa0c 100644
--- a/policies/policies/pcf.read.rego
+++ b/policies/policies/pcf.read.rego
@@ -10,4 +10,12 @@ allow if {
     has_bought_product
 }

-
+## Allow users with proof of transaction access (a valid proof issuers
+## need to be configured)
+allow if {
+  transaction_proof = vc.verify(
+    input.proof_of_transaction
+  )
+  transaction_proof.buyer == input.consumer
+  transaction_proof.product == input.requested_product
+}

paul@work ~/I/e/e/p/policies (main)> _
```

Conclusions

- Policies as Code
 - Automate and develop a rule system aligned with participants' goals
- Gaia-X and Verifiable Credentials
 - Benefit from common vocabulary and labels
 - Benefit from data spaces rules (e.g., participant and service offering vetting)
 - Use existing services from federations (e.g., catalog, contract, IDM)
 - Using verifiable credentials to externalize information

Thank you!

Paul Weißenbach

Lead Cloud Engineer

paul.weissenbach@posedio.com



#GaiaX #TechX24



Networking Reception

17:00 – 20:00

Hemicycle Bar



#GaiaX #TechX24