Gaia-X Digital Clearing House (GXDCH)

—

Gaia-X Perspektiven #2|2024

24-08-01

Agenda

Public

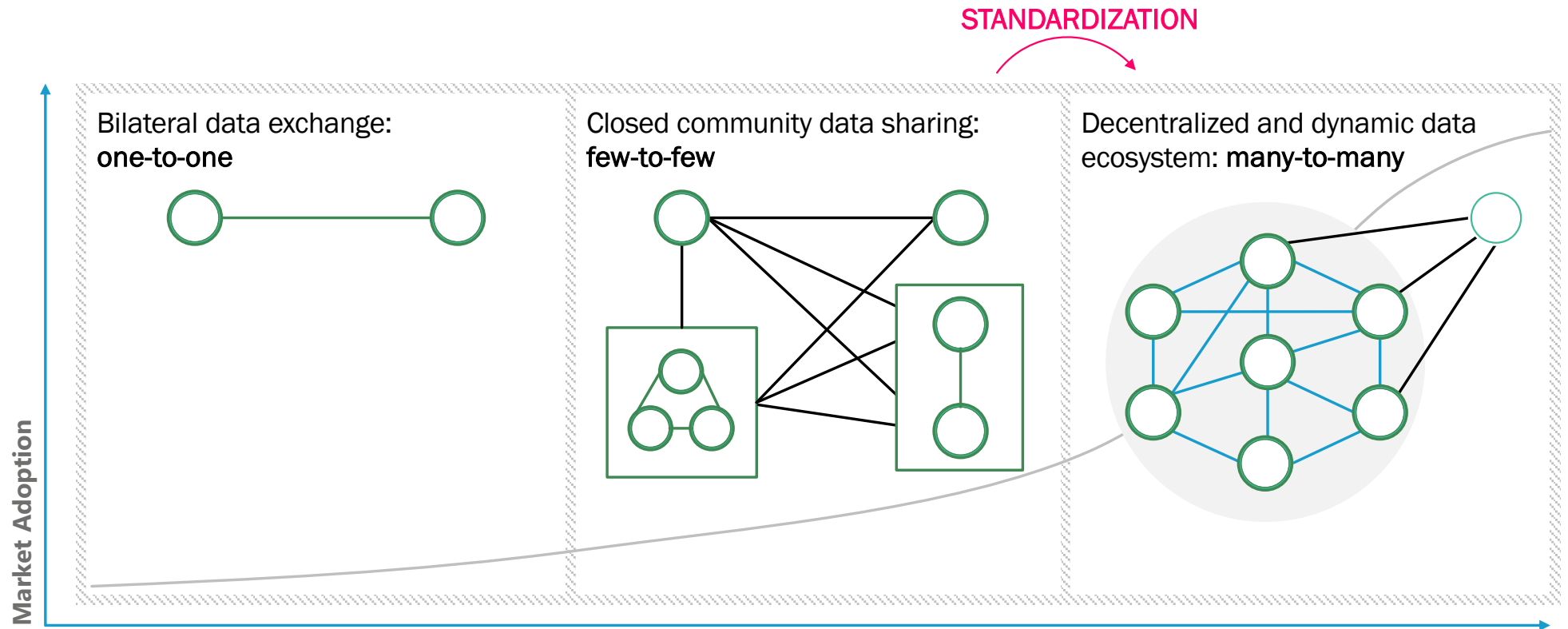# 02 Gaia-X Digital Clearing Houses – Die Idee

Gaia-X Digital Clearing House
Gaia-X Perspektiven #2-24

—

Roland Fadrany | COO Gaia-X European Association for Data and Cloud

gaia-x

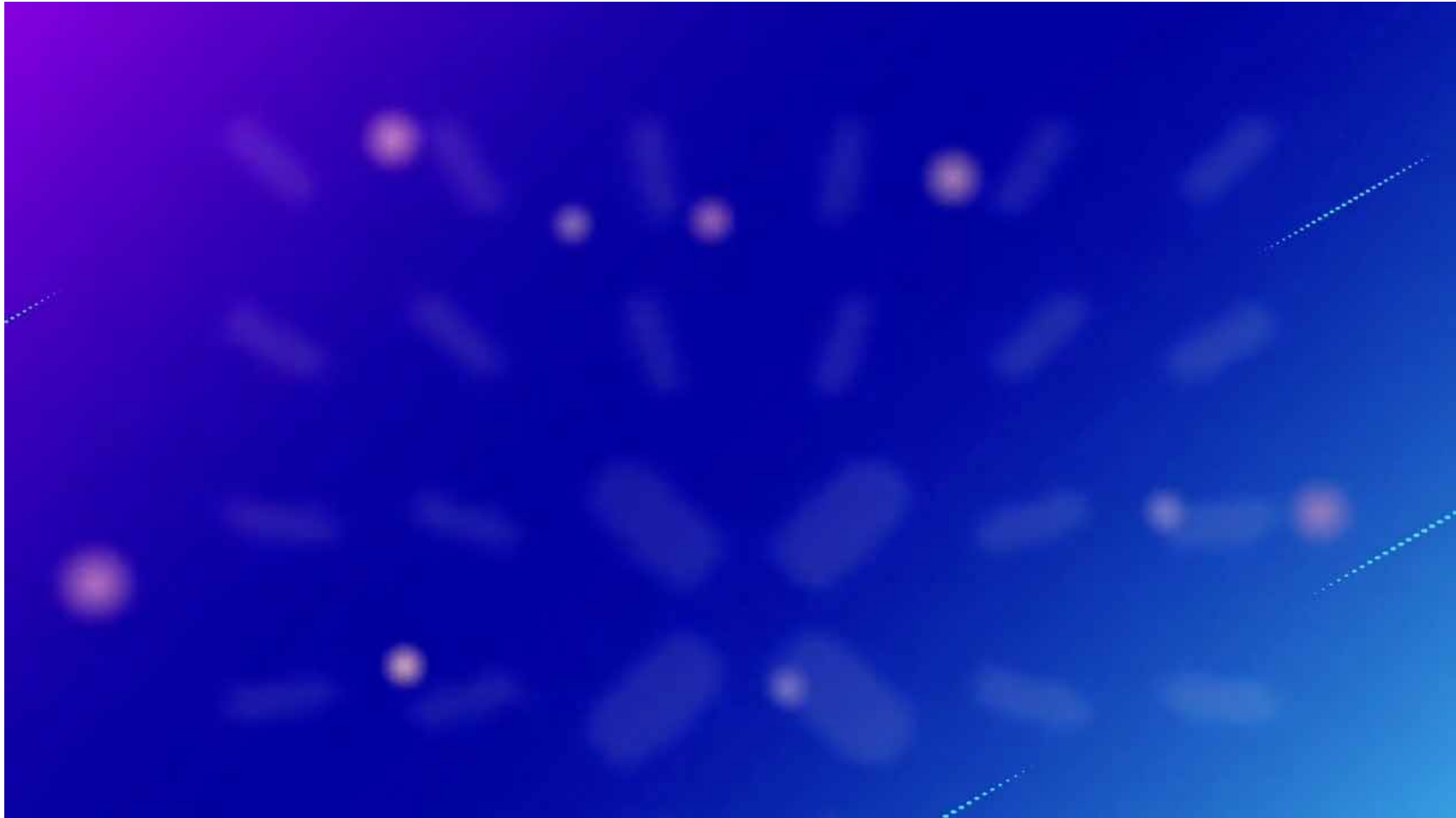# The demand for Data Spaces

STANDARDIZATION

Bilateral data exchange:
one-to-one

Closed community data sharing:
few-to-few

Decentralized and dynamic data
ecosystem: **many-to-many**

Market Adoption

Source: Data Spaces Business Alliance

Selective data usage enablement between Dataspaces

Users
New Business Layer & Governance

Automotive

Aerospace

»virtual« stack

Business Benefits
Secure investment, safe cost, accelerate Go2Market, reduce transaction cost, easy integration
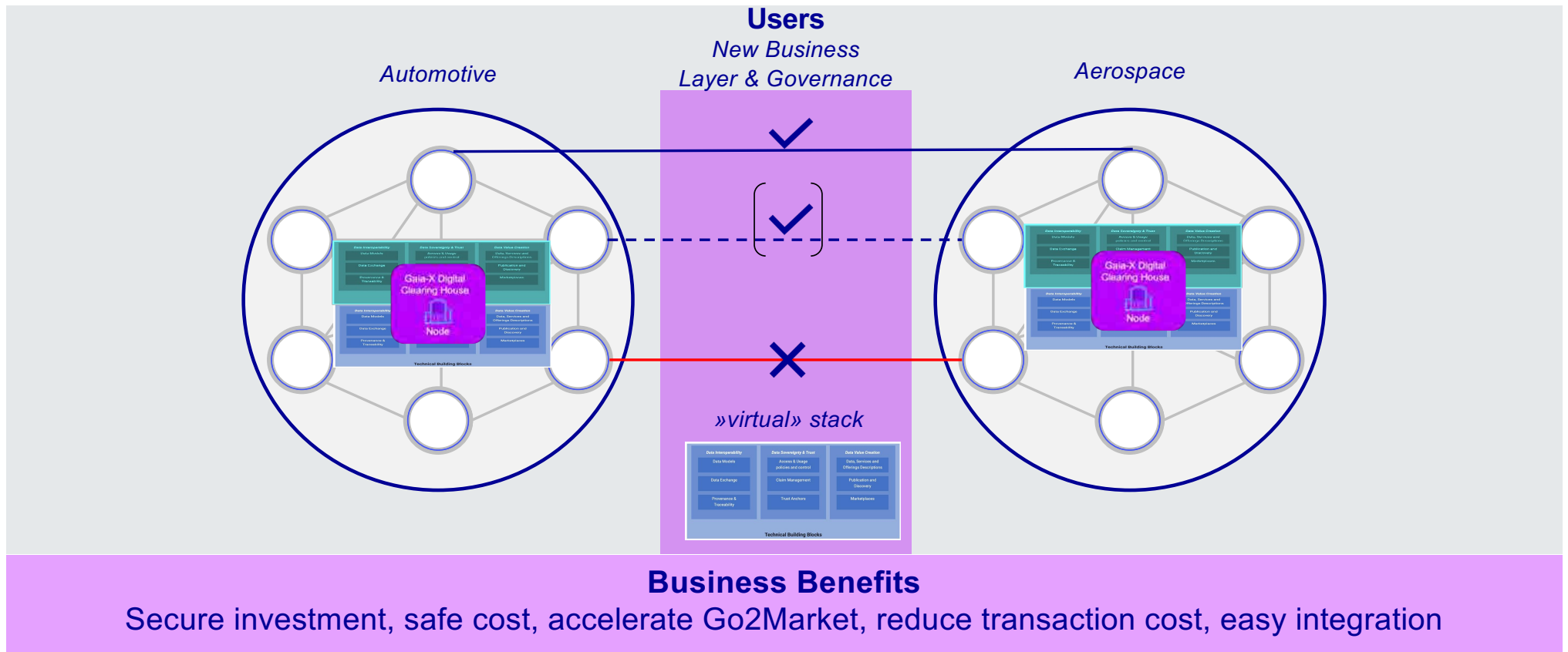
Gaia-X Digital Clearing House

Gaia-X Digital Clearing House

GXDCH Components*

Gaia-X Registry (compulsory)

Gaia-X Compliance (compulsory)

Notary (compulsory)

Wizard (optional)

Catalogue (optional)

Credential Event Service (Optional**)

Gaia-X Digital
Clearing House

Node

Gaia-X Digital Clearing Houses

Signed
- T-systems
- Aruba
- Aire Networks
- OVH
- Exaion
- Arsys

Pipeline
- Orange
- Proximus
- A1.digital
- KPN
- Pfalzkom

* Current list, may expand in future releases
** CES will become mandatory in Loire (next release)
*** not all criteria can be automated, "+" means automated verification if the evidence issuer (Standard & CAB)

Gaia-X 24.04 (Loire)

- In Tagus, Level 1 is based on a single self-declaration to "obey" the rules.

- In Loire, Level 1 is based on individual validation and where possible verification of the 62 criteria, significantly increasing veracity.

	CONFORMITY	LEVEL 1	LEVEL 2	LEVEL 3
Declaration of Service or Product	✔	✔	✔	✔
Signed with verified method (e.g. eIDAS)	✔	✔	✔	✔
Automated validation by GXDCH	✔	✔	✔	✔
Automated verification by GXDCH*	✔	✔	+	+
Data Exchange Policies	✔	✔	✔	✔
Certified Label Logo		✔	✔	✔
Data protection by EU legislation		✔	✔	✔
Manual verification by CAB			✔	✔
Provider Headquarter within EU				✔

*not all criteria can be automated, "+" means automated verification if the evidence issuer (Standard & CAB)
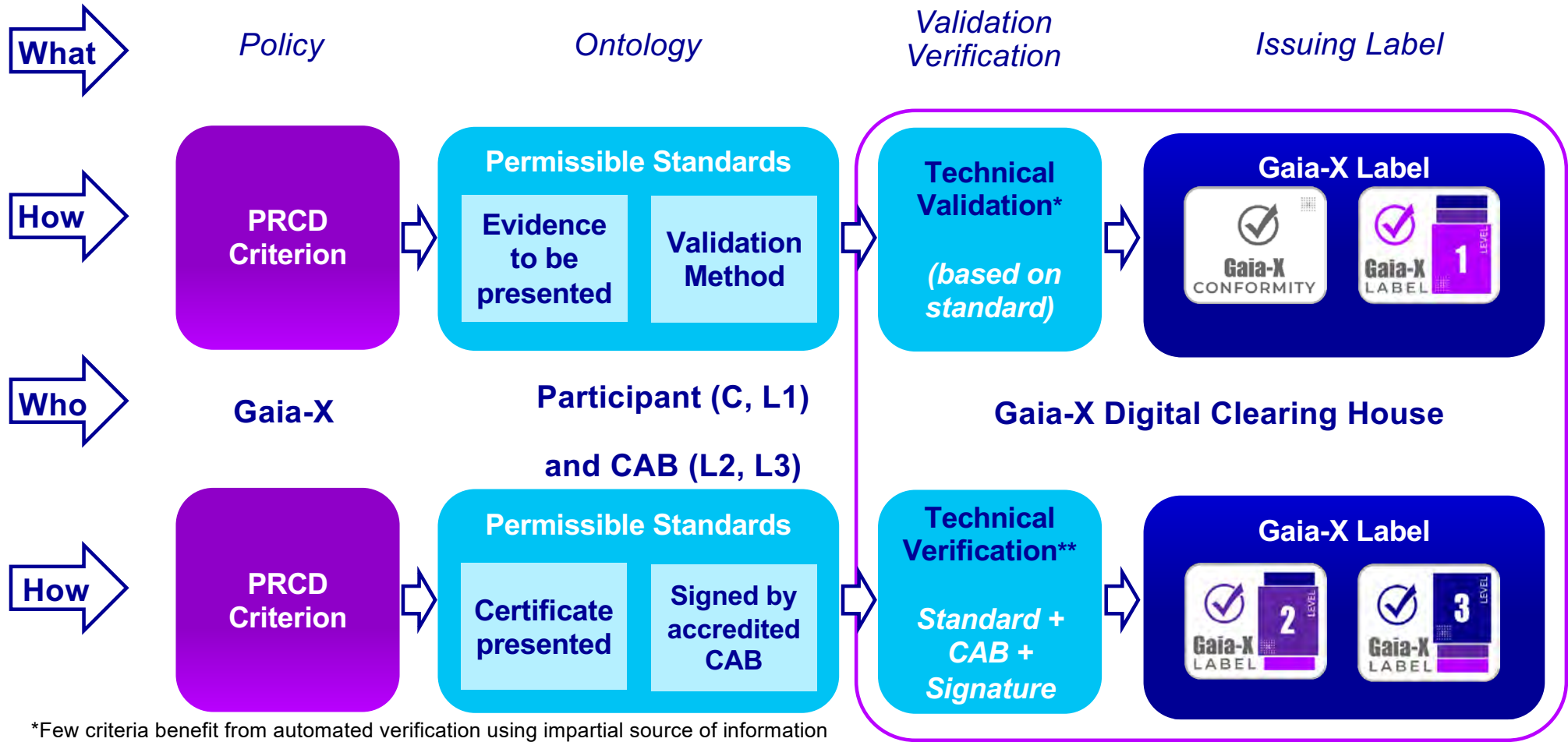
- Loire will, in later minor releases, also enable Level 2 & Level 3 through external CABs and verification of the certificates (permissible standard + accredited CAB+valid signature)

Implementation of technical validation & verification
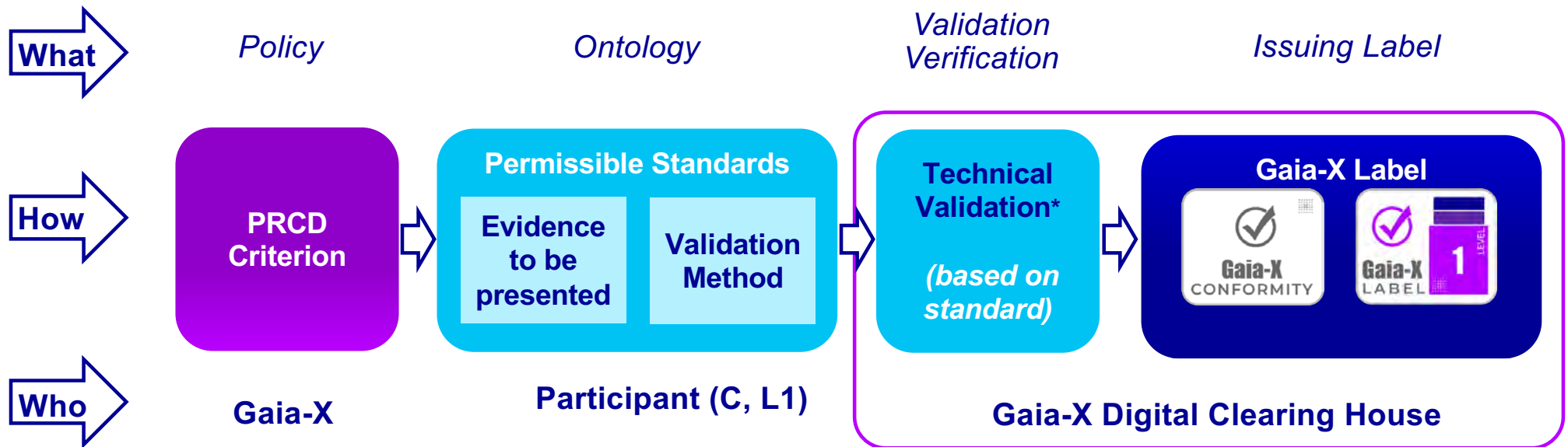
*Few criteria benefit from automated verification using impartial source of information
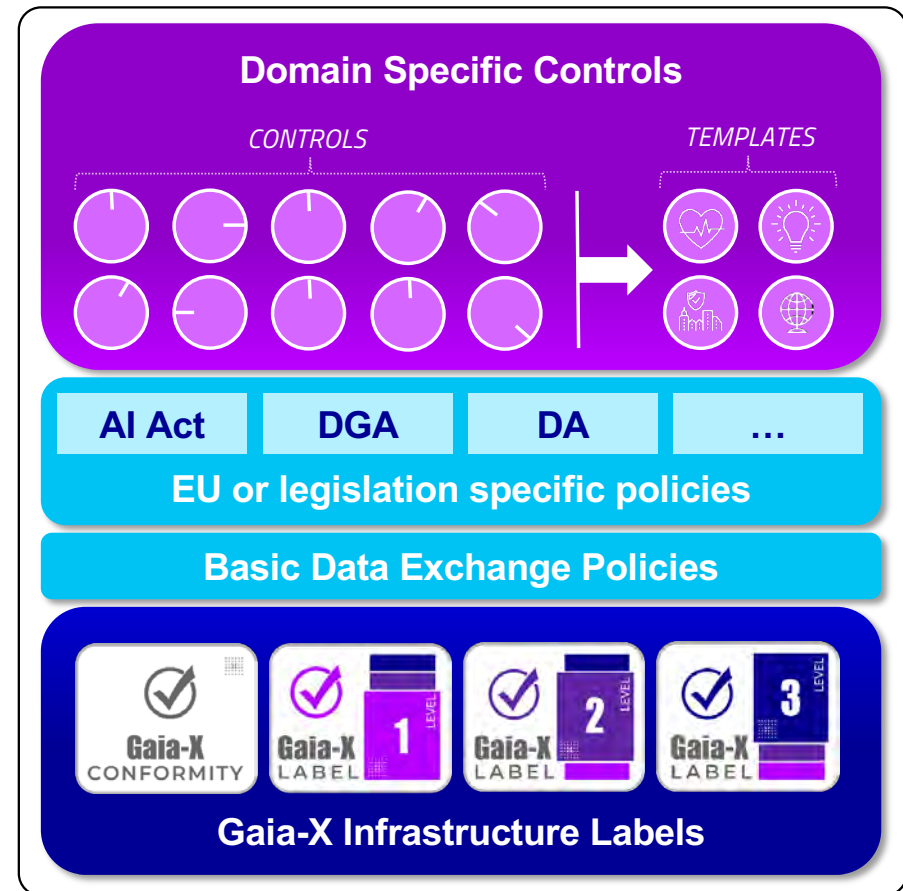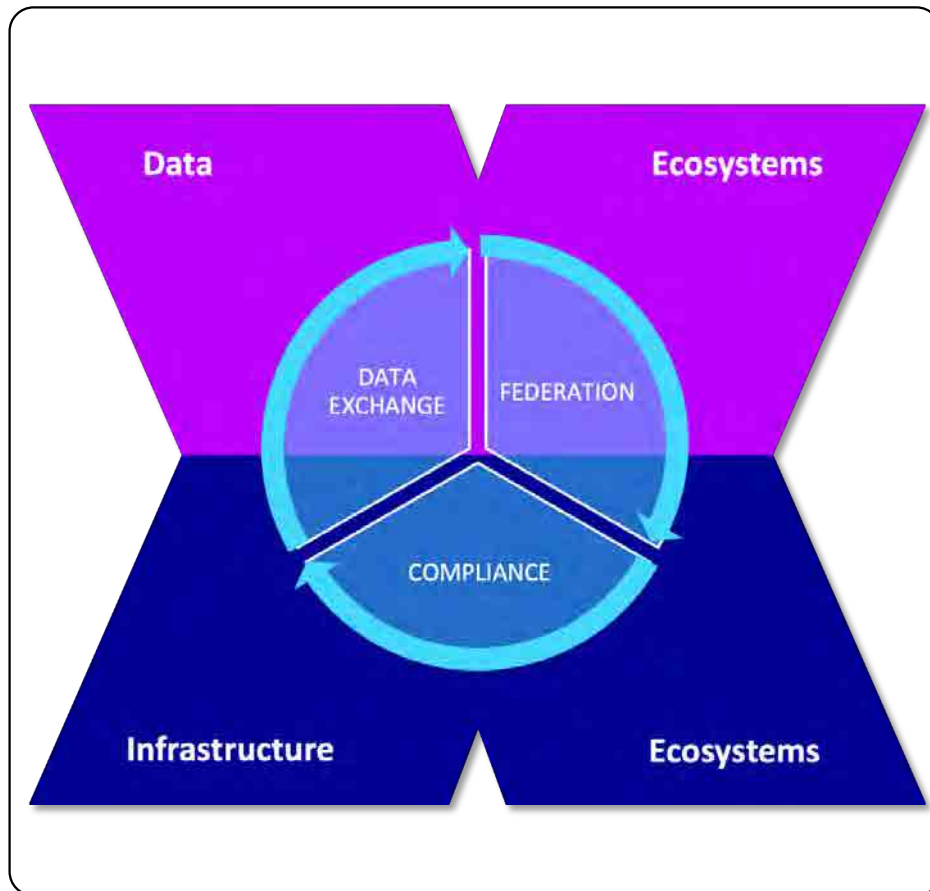
Implementation of technical validation & verification

What	Policy	Ontology	Validation Verification	Issuing Label

How → **PRCD Criterion** → **Permissible Standards** [Evidence to be presented | Validation Method] → **Technical Validation*** *(based on standard)* → **Gaia-X Label** [Gaia-X CONFORMITY | Gaia-X LABEL 1]

Who → **Gaia-X** — **Participant (C, L1)**

and CAB (L2, L3)

Gaia-X Digital Clearing House

How → **PRCD Criterion** → **Permissible Standards** [Certificate presented | Signed by accredited CAB] → **Technical Verification**** *Standard + CAB + Signature* → **Gaia-X Label** [Gaia-X LABEL 2 | Gaia-X LABEL 3]

*Few criteria benefit from automated verification using impartial source of information
**Few criteria in the 2nd flow are not yet covered by CAB and are following the 1st flow

Implementation of Sovereignty Controls (Labels)

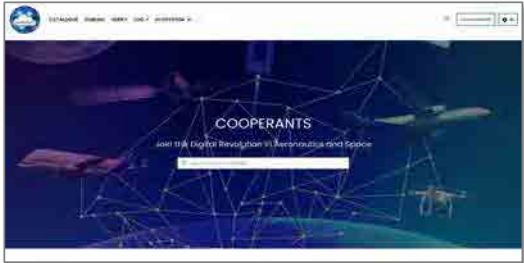# Are Gaia-X Lighthouse Projects interoperable?

Lighthouse Data Spaces

Agriculture
Agdatahub

Automotive Supply Chain
Catena-X

Lighthouse Projects

Project	Sector
ACCURATE	Manufacturing — Accurate
Boot-X	Infrastructure & Technology — Boot-X
COOPERANTS	Aeronautics, Space — Cooperants
Data4Industry-X	Manufacturing, Industry 4.0 — Data4Industry-X
ELINOR X	Urban Data Cooperative — ELINOR-X
EONA-X	Mobility, Transport & Tourism — EONA-X
energy data-X	Energy — Energy data-X
EuPro Gigant	Manufacturing, Industry — EuProGigant
EuroDaT	Finance — EuroDaT
gaia-x future mobility	Mobility & Transport — Gaia-X4 Future Mo...
HEALTH-X dataLOFT	Health — HEALTH-X dataLOFT
Mobility Data Space	Mobility — Mobility Data Space (MDS)
omega-x	Energy — Omega-X
PROMETHEUS-X	Education — PROMETHEUS-X
SCSN smart connected supplier network	Electronics Supply Chain — SCSN
Structura-X	Cloud Services — Structura-X
TEAM-X	Health — TEAM-X

gaia-x

8 Federated Catalogues enabled by CES

Ecosystem between projects and Gaia-X

Project		Gaia-X
Use cases		**Gaia-X Architecture & Trust Framework**
Industry Regulations		**Labels & Data Exchange policies enforcement**
Short term ROI		**Protect long term ROI**
Operations		**Digital Clearing Houses**
Interoperability among business partners		**Gaia-X Ecosystem and interoperability**

03 Gaia-X Digital Clearing Houses – Die Umsetzung

Agenda

Introduction | Development towards Dataspaces

Development towards standardized products and new dataspace avenues

2018 - 2022 | **2023 - 2024**

Launch DIH 1.0

2019 Founding member of IDSA

2019 Benchmark for HALO

2019 ECB

2020 Mobilithek: First live mobility Dataspace

2020 Founding member of GAIA-X

2021 Setup Catena-X

2022 Launch Catena-X

Launch DIH 2.0

2023 Cofinity-X launch

2023 Connect Products Go-Live

2023 Catena-X go-Live April'23

2023 Digital.ID go-Live April'23

2023 DIH Space Products go-live

2023 EONA-X

2023 Data Product - Motion Data

2023 M-X launch Q4

2024 SIMPL

2024 IPCEI-CIS

... new dataspaces & products

across industries

Accelerator for Dataspaces

● Data Governance Act

● Digital Services Act

● Digital Markets Act

● Supply Chain Act

Pioneer dataspace ➡ Usecase applications realization ➡ Products for dataspace connections ➡ Dataspace ecosystem orchestration

Next 18 months will see a growth of standarized products for dataspace connections and orchestration

T · **Systems**

Dataspace Ecosystems initiatives | Around the world
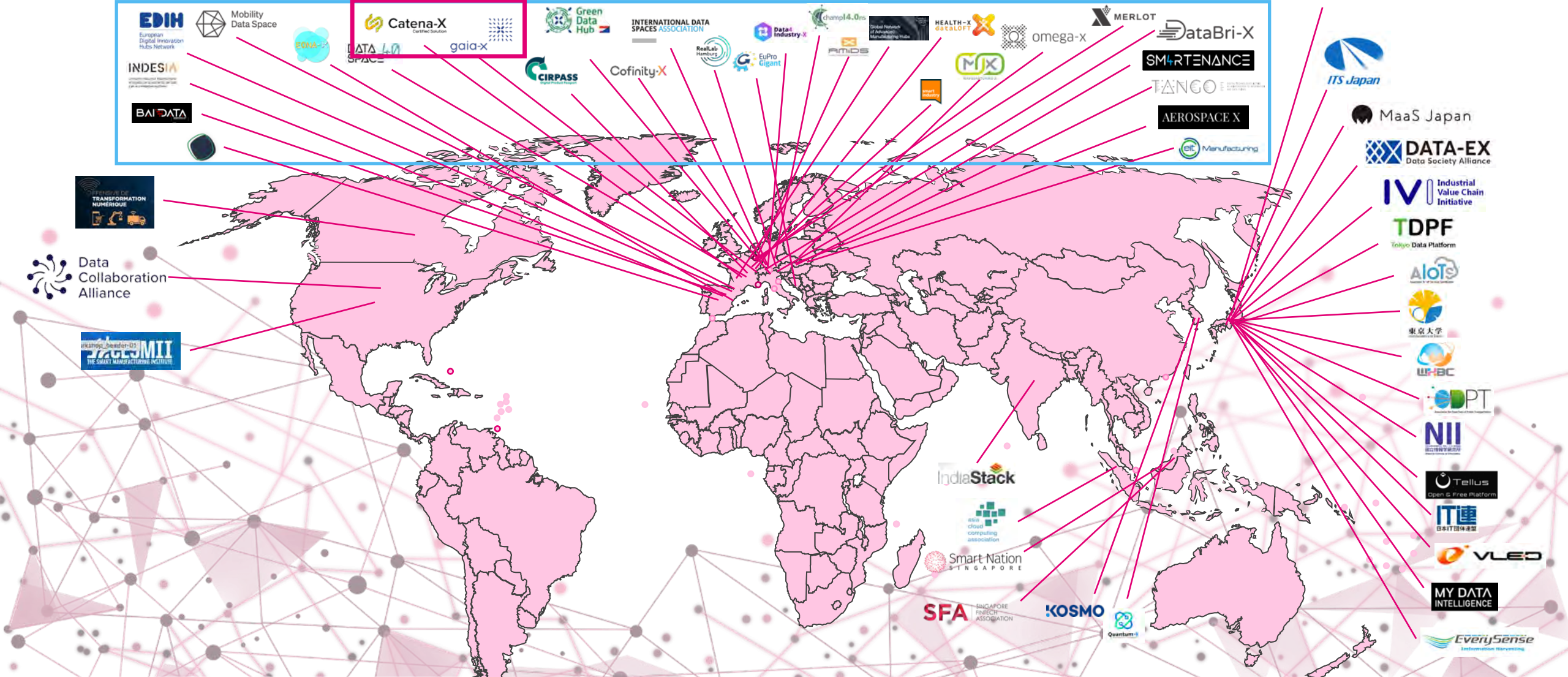
Press Release: Product Digital.ID | 18.11.2022

Digital verified credentials for Catena-X

Gaia-X Digital Clearing House for the Catena-X Automotive Industry Network

Homepage > Insights > Newsroom > News > Digital Verified Credentials for Catena-X

November 18 2022

Share article

T-Systems checks self-descriptions of Catena-X data ecosystem participants

· Link

Why Digital.ID? | Digital verification matters

Digital identity verification ensures trust in dataspaces

Trust, but verify!

DIGITAL.ID

- Secure digital identities for organizations & machines

- Reduces overall business risks & increases consumer confidence through reliability of trust chains

- Boosts operational efficiency through automation

- Proof of authenticity and origin of digital assets

- Ensures regulatory compliance, e.g., GDPR, eIDAS

- Creates long-term business relationships built on trust

T··Systems DATA INTELLIGENCE HUB

Digital.ID | Gaia-X verification node

Digital.ID as GXDCH Node

Verification node of the Gaia-X rules and the go-to place for Gaia-X compliance

Node operated by T-Systems, acting as Gaia-X Trust Anchor

Operate and run **services of the Gaia-X Framework** (compulsory and optional), to achieve compliance and support the onboarding of any Gaia-X adopter

Integrate to external Conformance Assessment Bodies for external asseverations, Identity Verification, and other Trusted Data Sources as defined by the Gaia-X AISBL

Notarization API

- Authenticates master data and converts it into **verifiable W3C format**
- Establishes **trust through tamper-proof digital assertions** for accurate self-descriptions

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Digital.ID | Service Overview

Trusted Data Sources

- **VAT ID:** for the European member states or North Ireland, the VAT Information Exchange System (VIES)

- **EORI:** registration and identification of economic operators in the European Union

- **LEI Code:** the Global Legal Entity Identifier (GLEIF) with worldwide coverage

- **Local Commercial Registration Number**
  opencorporates

Validation: validation of companies' legal commercial registration numbers & European tax and customs identifiers

Gaia-X Compliance: validation of shape and content of Gaia-X Credentials, attesting the compliance with the latest Gaia-X Trust Framework

Credential Management: creation, secure storage and usage of Verifiable Credentials in user-friendly manner

Certificate & Signing: qualified certificates issued by Trust Service providers to increase trust in ecosystem

Business Reporting: reporting of successful and rejected validations and compliance requests for Dataspace operators

DIGITAL.ID

VC
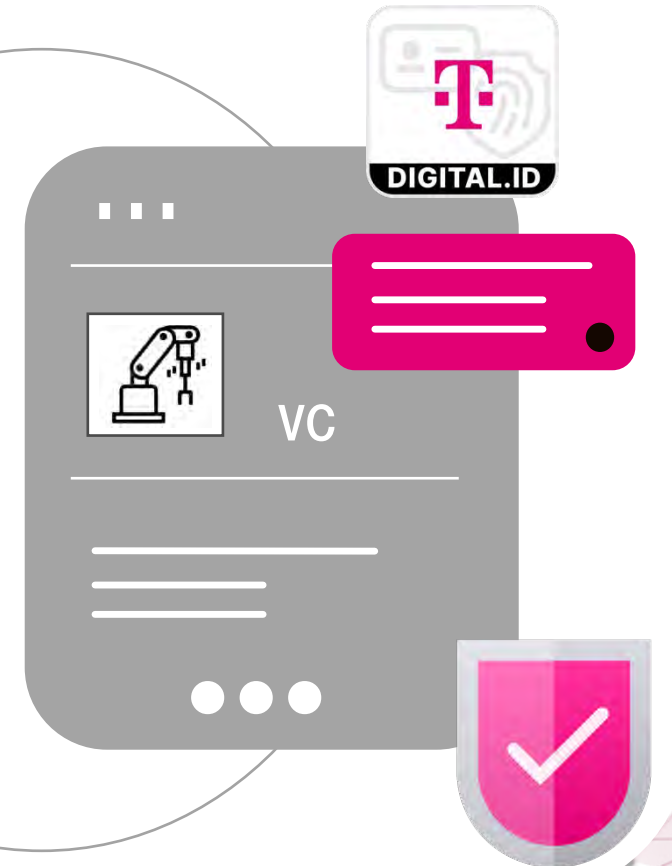
Digital.ID | Certificate & Signing Services

eIDAS conform certificate & signing services with PKI from a **Trust Service provider**

Usage of **eSignatures** and **eSeals** guarantee proof or origin , integrity and **higher trust level** in your ecosystem

High availability and **reliability** through Service Level Agreements (SLAs) and managed service

Integration into Digital.ID allows **user-friendly issuing** of Verifiable Credentials and **signing** process

Use your Digital.ID in Data Intelligence Hub

Benefit from Digital.ID:

- User-friendly **self-service user interface**

- Easy **Credential** management

  - Managed Credential Wallet

  - Request new Credentials

  - Overview of existing Credentials

  - Revoke Credentials

- Built-in **participant validation** to secure a trusted Dataspace with **Digital.ID**

- **Seamless integration** with other product offerings
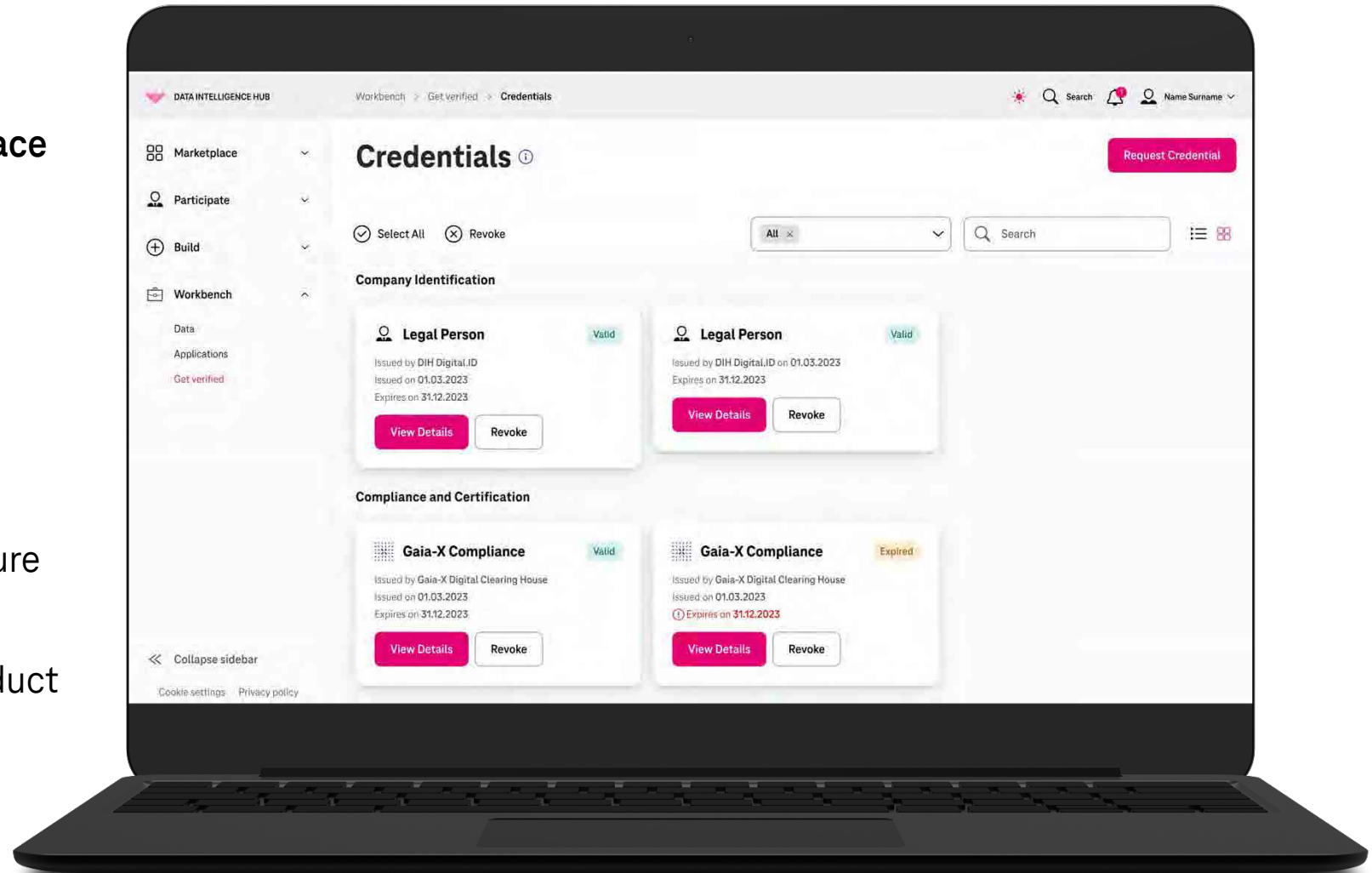
Demo | Digital.ID in action
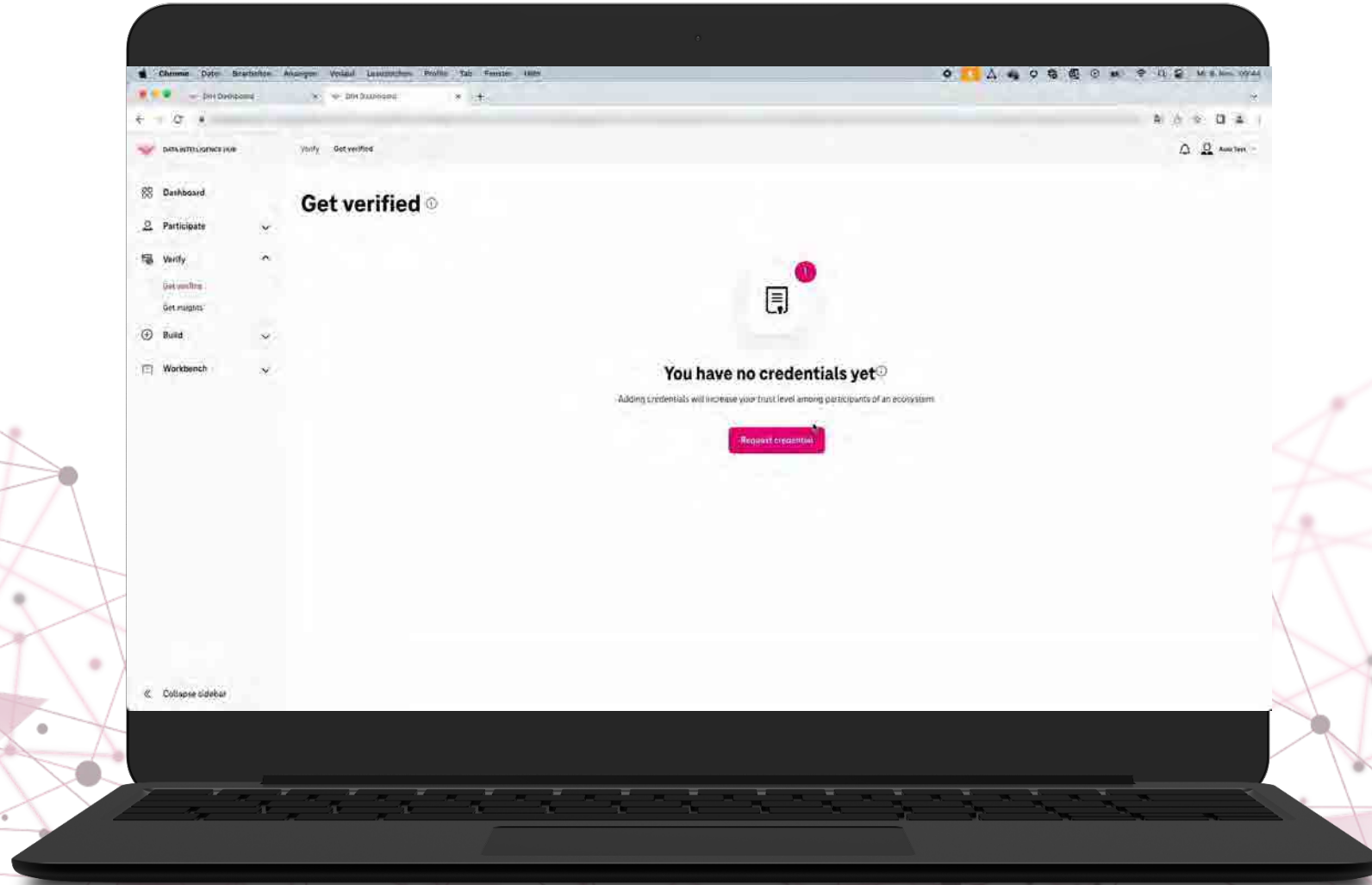
Reference: Digital.ID for Catena-X

Digital IDs for Catena-X create the largest sovereign ecosystem in the automotive industry

The challenge

The automotive industry, including all its suppliers, is striving to create a **data-driven value chain**. This requires **sovereign data exchange** within a vast ecosystem, all while **enhancing trust** among participants.

Catena-X operates under the guidelines of the European **Gaia-X** initiative to build a trusted data infrastructure including the management of secure identities and validation of participating companies.

The solution

T-Systems, as a **Trust Anchor**, has been chosen as one of the first Gaia-X Digital Clearing House providers for Catena-X.

In addition to offering **eIDAS-compliant** certificates, T-Systems provides comprehensive **validation and reporting services**, elevating the trust level within the ecosystem. This ensures that each participating company receives a **verifiable credential** for the Catena-X ecosystem, akin to an ID card.
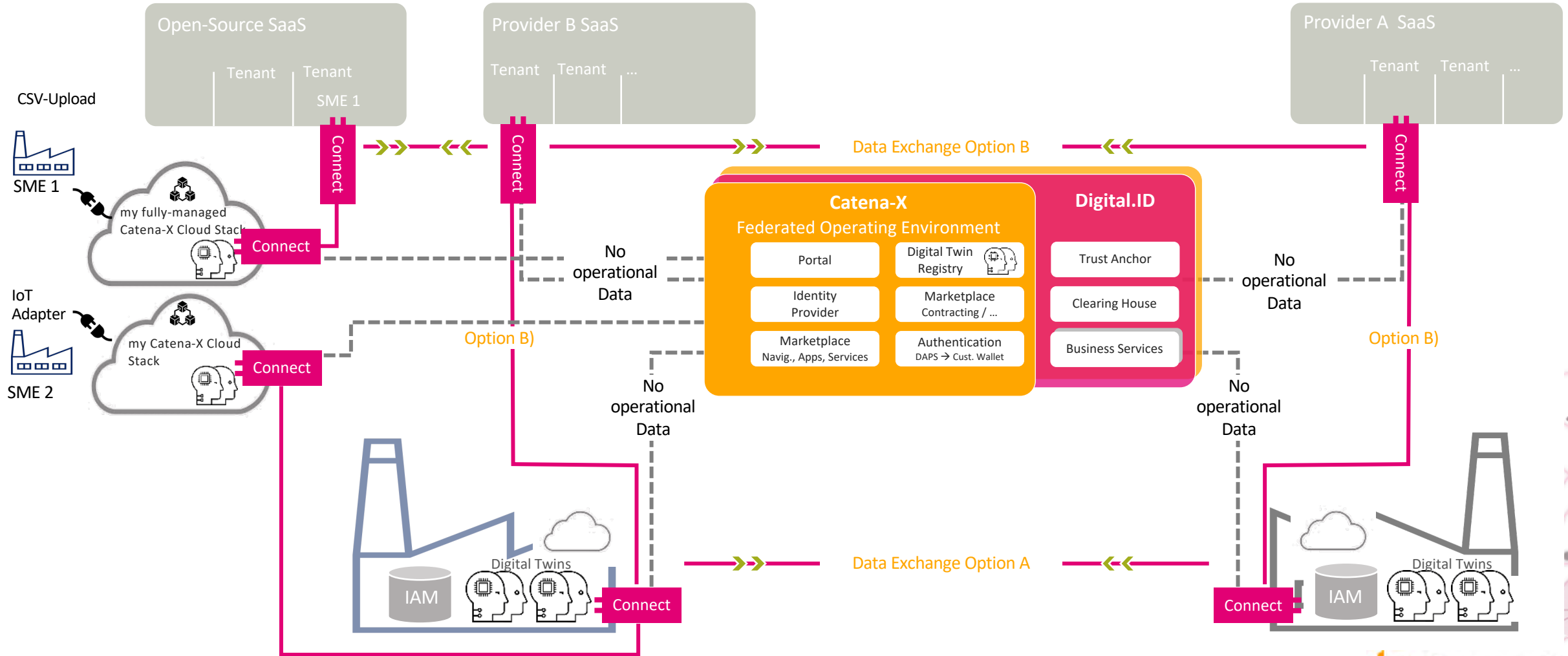
Customer benefits

- **Trusted Proof of Authenticity**: Digital.ID serves as reliable proof in Catena-X
- **Compliance with Gaia-X Regulations**: A trustworthy framework that aligns with Gaia-X specifications.
- **Secure Data Exchange**: Facilitate trusted and secure data exchange within the largest sovereign ecosystem of automotive manufacturers and suppliers.

Reference project: **Catena-X** Automotive Network

T **Systems** **DATA INTELLIGENCE HUB**

Digital.ID in Catena-X

Digital.ID | Steps to become a trusted participant

Open Source

Gaia-X mandatory services:

- Compliance
- Registry
- Notary

Product | Digital.ID

incl. Gaia-X mandatory services

Starter Kit

Support for up to 50 participants per month
for non-commercial usage

Features:
- Managed service
- FAQ & **knowledge base** access
- Additional trust source: **OpenCorporates**

From **49€/month**

Enterprise

Unlimited participants per month
incl. Starter Kit + initial onboarding & setup

Additional Features:
- **Extended validation** services
- Credential management in **wallet**
- **eIDAS** conform certificate & signing services
- Business reporting
- API customization
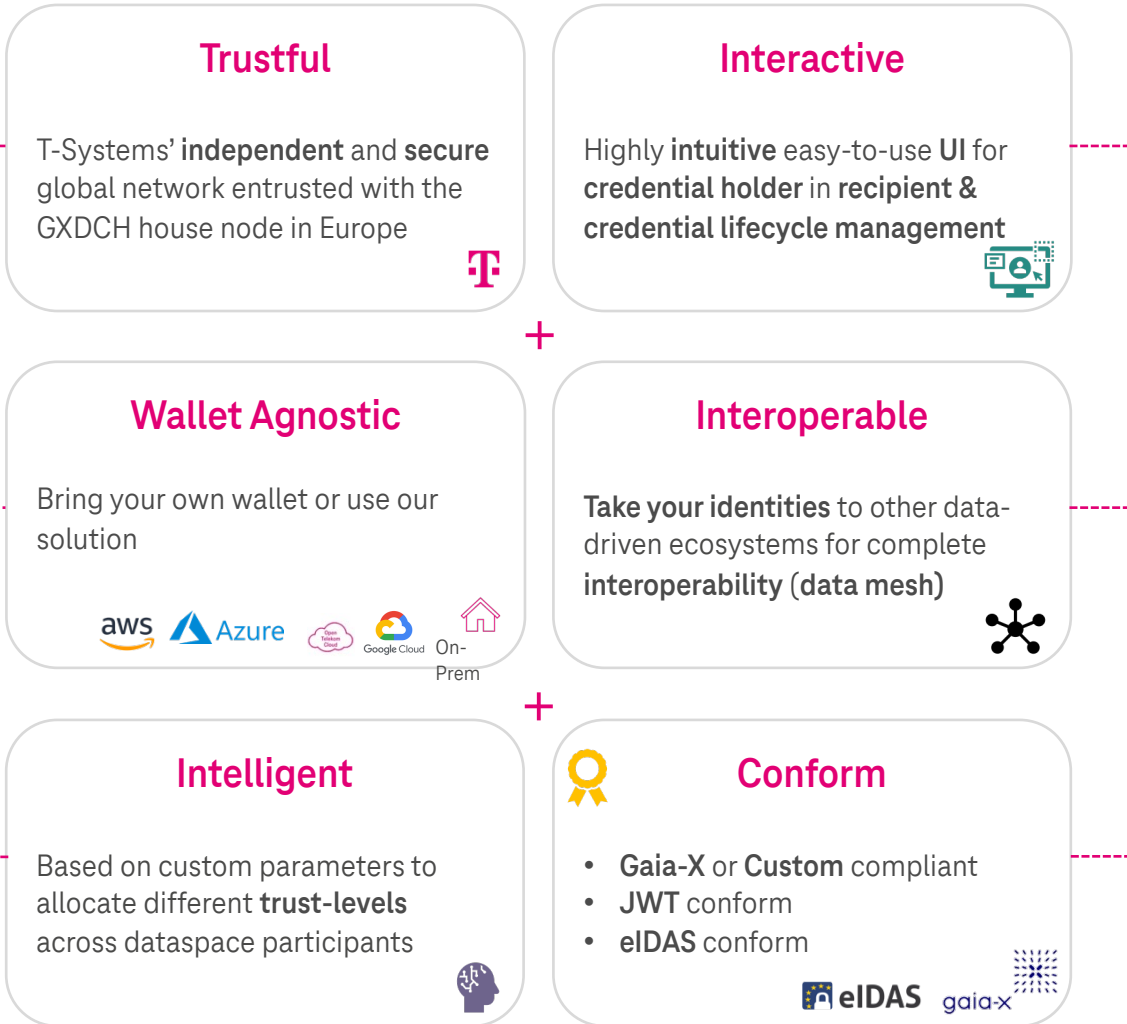- **24/7** support

From **3.599€/month**

+ additional consulting services

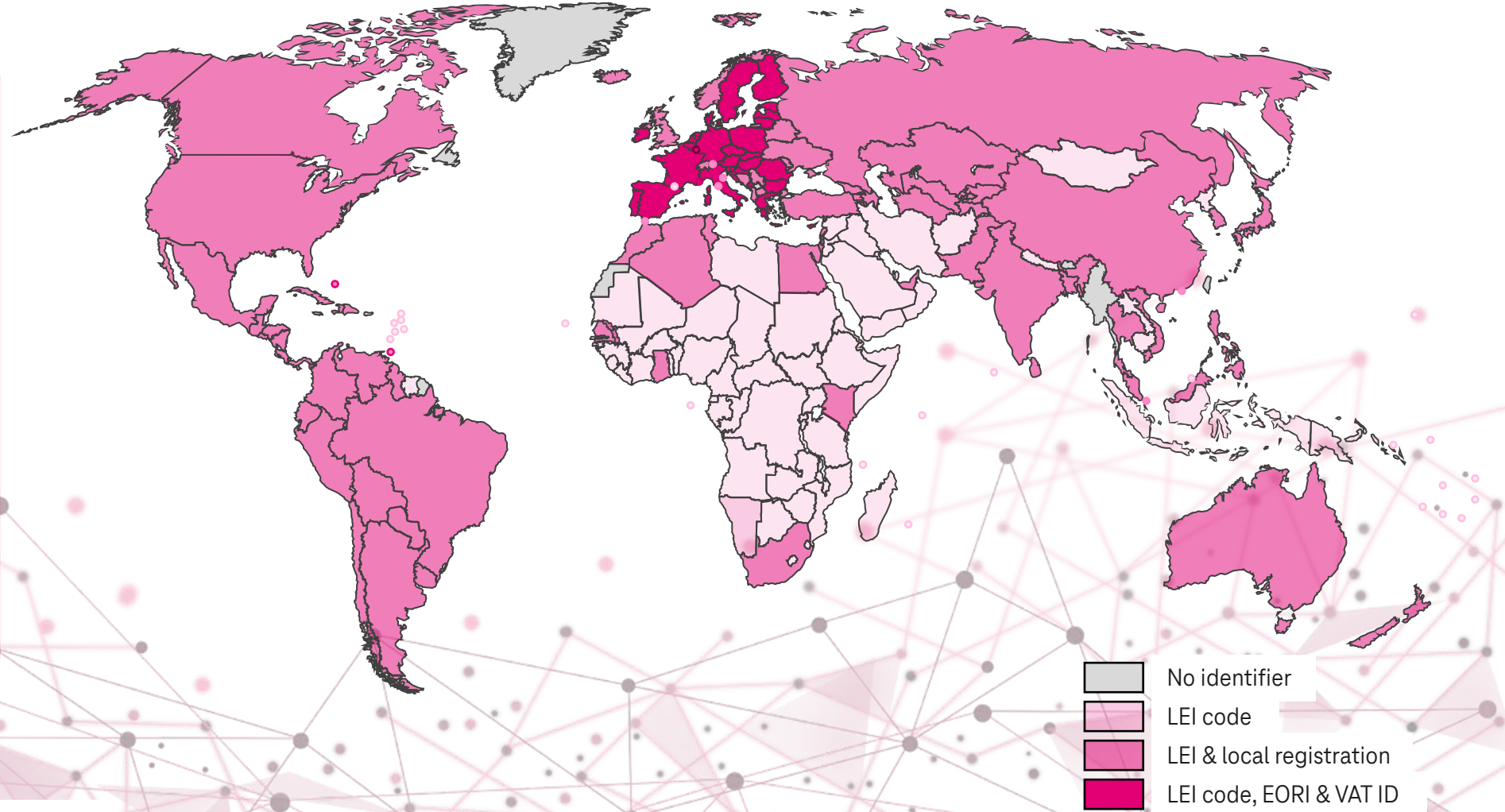# Why Digital.ID? | First Trust Service on the market

DIGITAL.ID

1st commercial product of GXDCH

Trustful

T-Systems' **independent** and **secure** global network entrusted with the GXDCH house node in Europe

+

Interactive

Highly **intuitive** easy-to-use **UI** for **credential holder** in **recipient & credential lifecycle management**

Wallet Agnostic

Bring your own wallet or use our solution

aws • Azure • Open Telekom Cloud • Google Cloud • On-Prem

Interoperable

Take your identities to other data-driven ecosystems for complete **interoperability (data mesh)**

+

Intelligent

Based on custom parameters to allocate different **trust-levels** across dataspace participants

Conform

- **Gaia-X** or **Custom** compliant
- **JWT** conform
- **eIDAS** conform

eIDAS • gaia-x

SME — Medium -Enterprise — Large -Enterprise

Digital.ID services

- ■ T-Systems added value
- ■ Gaia-X mandatory services

Validation service

Ecosystem specific adaptations

Compliance

Registry

Additional trust sources

Notary

EIDAS signature

VCs as a Service

T Systems — DATA INTELLIGENCE HUB

Trust and Compliance | Digital.ID Validation Coverage

Validation of companies from **195** countries

First Commercial Gaia-X service in the market

Legend:
- No identifier
- LEI code
- LEI & local registration
- LEI code, EORI & VAT ID

T Systems

DATA INTELLIGENCE HUB

Ecosystems | Trust Service – Digital.ID

Get Verified

Your benefits

- ✓ Secure **Digital.IDs** for organizations and machines
- ✓ Proof of **authenticity** and **origin** of digital assets
- ✓ Management of multiple credentials in **user-friendly UI**
- ✓ Regulatory **compliance**, e.g., Gaia-X, eIDAS
- ✓ Operational efficiency through **automation**
- ✓ Reduced business risks and increased customer confidence through **reliability of trust chains**
- ✓ Long-term business **relationships built on trust**

Use Cases for your business

Carbon Footprint

Machines trust Machines

DIH as Trust Anchor in Dataspaces

Reliability in Production

Proof of Origin

Digital Trust Chains

Supply Chain Due Diligence

Legal Entities with Digital ID
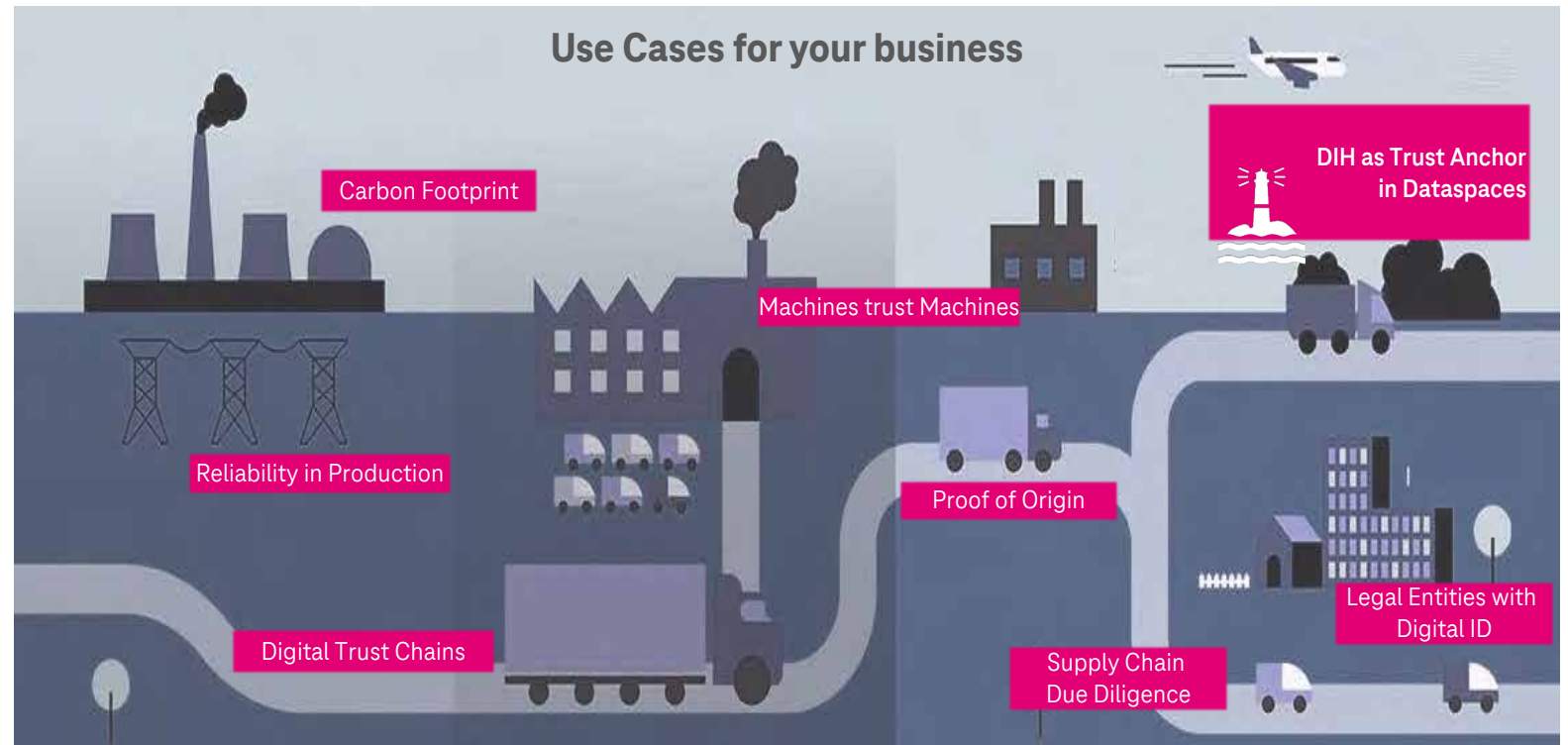
The Magenta Advantage:

Managed services with standardized packages and prices pioneered, orchestrated and integrated by T-Systems, and operated on Deutsche Telekom network

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Open Round and FAQ

T Systems

Let's power
higher performance

Next step **|** Contact us!

...start your Dataspace journey with us!

Visit our website!

Sven Löffler

Head of Dataspace &
Data Products
Data Intelligence Hub

sven.loeffler@t-systems.com

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What does EuProGigant stand for?

The European Production Giganet

- Secure and sovereign Data Exchange
- Transfer of gained Knowledge
- Multi-locational
- New, data-driven Business Models
- Gaia-X Lighthouse Project since 2022

A **value creation and learning ecosystem** for a **resilient, data-driven, and sustainable production** in Europe.

Project Ecosystem for European Manufacturing Data & Services

EuProGigant is …

… a binational research project carried out by an Austrian-German project consortium to build a multi-location, digital data and learning ecosystem in manufacturing.

4

€ 10.6 Mio.

22
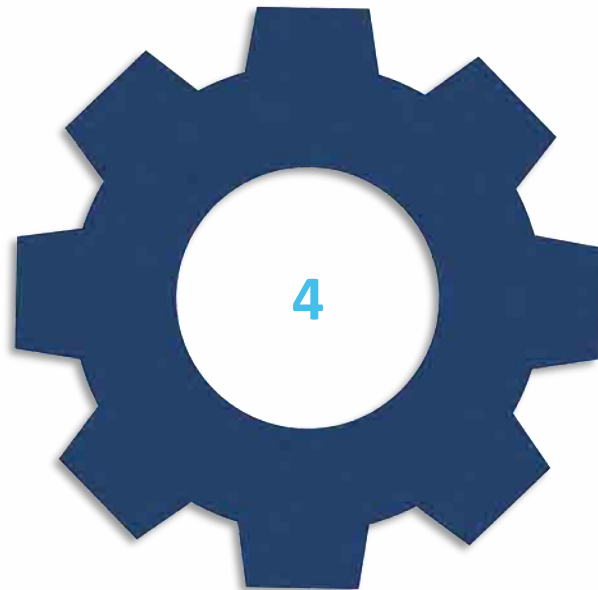
years project duration
(1 March 2021 to 28 February 2025)

total budget
(10.6 MM €, of which 6.8 MM € is funded)

project partners
(from 12 locations in Austria and Germany)

Project Ecosystem for European Manufacturing Data & Services

Vision

- A new way of interacting in **value creation and learning ecosystems**…

- …**for a resilient, data-driven and sustainable production** to strengthen Europe's role in the manufacturing industry

Project Ecosystem for European Manufacturing Data & Services

4 Thematical Working Groups (Use Cases)

CO$_2$ footprint in production engineering & manufacturing

How can estimations on energy use and CO$_2$ footprint be created and used in the design phase by using portable data and interoperable software tools?
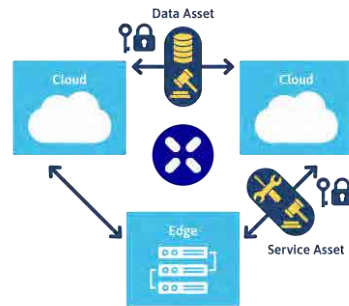
Mobile processing machines

How does the concept work when the machine comes to the part instead of the other way around?

Component matching

How can Gaia-X principles be instrumentalized to manufacture and assemble with optimal resource use and minimal waste?
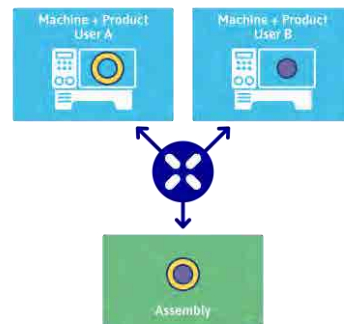
Validation platform

How can small companies monitor machines and assemblies without having to compile a large database?

Project Ecosystem for European Manufacturing Data & Services
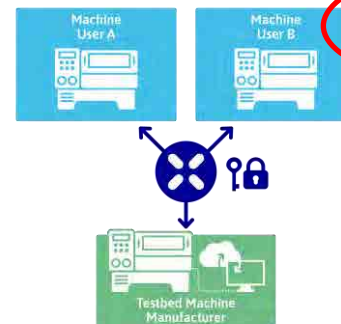
Video EuProGigant Demonstrator

Source: https://www.youtube.com/watch?v=44eXhsN1Y2k

Project Ecosystem for European Manufacturing Data & Services

Fully functional Gaia-X compliant Demonstrator

Project Ecosystem for European Manufacturing Data & Services

Details of a Data Asset

Overview

Multi-Cloud & -Plattform-Ökosystem für Produktions- und Lerndaten

Project Ecosystem for European Manufacturing Data & Services
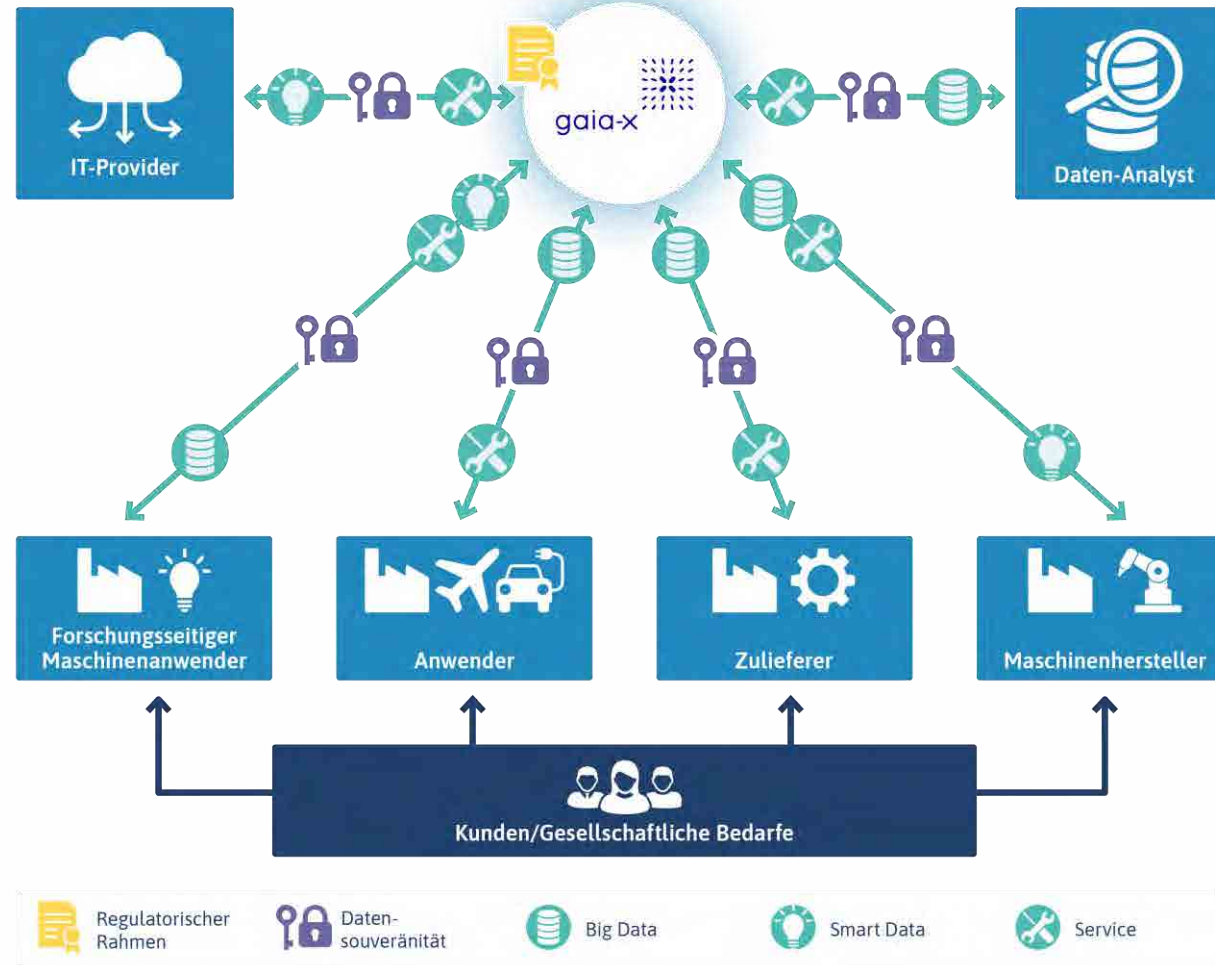
How we use the GXDCH (v22.10)

Mandatory components

- **Gaia-X Registry**: This service implements the Gaia-X Registry as described in the Architecture Document. It is the backbone of the ecosystem governance as it stores the Trust Anchors accepted by the Gaia-X Trust Framework, the shapes and schemas used to validate the Gaia-X compliance as well as other relevant information, like the Terms and Conditions for users of the compliance service.

- **Gaia-X Compliance**: This service implements the Gaia-X Compliance as specified in the Architecture Document. It validates Gaia-X Credentials, asserting compliance to the rules described in the compliance document or Trust Framework and signs ones that are valid.

- **Gaia-X notarisation service for the registration number**: This service implements the Gaia-X Notary. This is a tool used to check the validity of all registration numbers given by the participants in their Participant Credentials.

Optional components

- **Wizard**: UI to sign Verifiable Credentials in a Verifiable Presentation on the client side. Calling the Gaia-X Compliance service is integrated with the wizard, making it possible to obtain Gaia-X Compliant Credentials by directly using this tool.

- **Wallet**: Application that allows the user to store their Credentials and present them to third parties when needed.

- **Catalogue**: Not available yet

Usage of the GXDCH

For Participants

1. Use Notary Service to obtain Legal Registration Number

Project Ecosystem for European Manufacturing Data & Services

Usage

For Partic...

1. Use Nota...

Your Legal Registration Number Verifiable Credential (billowy-dog)

```
{
  "@context": [
    "https://www.w3.org/2018/credentials/v1",
    "https://w3id.org/security/suites/jws-2020/v1"
  ],
  "type": [
    "VerifiableCredential"
  ],
  "id": "https://wizard.lab.gaia-x.eu/api/credentials/2d37wbGvQzbAQ84yRouh2m2vBKkN8s5AfH9Q75HZRCUQmJW7yAVSNKzjJj6gcjE2mDNDUHCi
  "issuer": "did:web:registration.lab.gaia-x.eu:v1-staging",
  "issuanceDate": "2024-07-30T11:20:49.620Z",
  "credentialSubject": {
    "@context": "https://registry.lab.gaia-x.eu/development/api/trusted-shape-registry/v1/shapes/jsonld/trustframework#",
    "type": "gx:legalRegistrationNumber",
    "id": "https://wizard.lab.gaia-x.eu/api/credentials/2d37wbGvQzbAQ84yRouh2m2vBKkN8s5AfH9Q75HZRCUQmJW7yAVSNKzjJj6gcjE2mDNDUH
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    "gx:leiCode-subdivisionCountryCode": "DE-HE"
  },
  "evidence": [
    {
      "gx:evidenceURL": "https://api.gleif.org/api/v1/lei-records/",
      "gx:executionDate": "2024-07-30T11:20:49.620Z",
      "gx:evidenceOf": "gx:leiCode"
    }
  ],
  "proof": {
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    "created": "2024-07-30T11:20:49.634Z",
    "proofPurpose": "assertionMethod",
    "verificationMethod": "did:web:registration.lab.gaia-x.eu:v1-staging#X509-JWK2020",
    "jws": "eyJhbGciOiJQUzI1NiIsImI2NCI6ZmFsc2UsImNyaXQiOlsiYjY0Il19..oxb9Hng5H7prG76ZOSpy-nHFp-fCnGZ1Ut5-NRRvJZG56b8m-QLp6fke2
  }
}
```

Usage of the GXDCH

For Participants

1. Use Notary Service to obtain Legal Registration Number

2. Use Registry for Participant and Terms & Conditions Schema

3. Generate Gaia-X compliant LegalPartipant and let it be validated and verified

4. Put it in the (Federated) Catalogue

Project Ecosystem for European Manufacturing Data & Services

Usage of the GXDCH

Participants Operation

Add

Show 10 entries   Search: _____

	Id	Name	Public-Key
⊕	did:web:sagresearch.de	did:web:sagresearch.de	{"alg":"PS256","kty":"RSA","x5u":"https://sagresearch.de/.well-known/x509CertificateChain.2024-01-12.pem","n":"pH8VhRgeU gMlnm8RpwLHotalCIbf5Hp4MtaiuAM8QT8P28TV02b6-eEyhHfPQYn6hlKy23nM3HdrwTUJYKHZLm7uA3sqM4zjqZr8EMU_JWY9EhZwV78x2VtNfQx16GRHjSxpzFCH5MwYI2Clh8VgL0xx dG-P3Kor05NSTckEYUb1QSfyHQ7JImHtZ3JaUTvcVIuBfcaL0DT3DQw7b_9OGbSTGj3CrafbiJ11tbx-cBpoL-6w","e":"AQAB"}
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⊕	did:web:tuwien.at	did:web:tuwien.at	{"alg":"PS256","kty":"RSA","x5u":"https://sagresearch.de/.well-known/x509CertificateChain.2024-01-12.pem","n":"pH8VhRgeU gMlnm8RpwLHotalCIbf5Hp4MtaiuAM8QT8P28TV02b6-eEyhHfPQYn6hlKy23nM3HdrwTUJYKHZLm7uA3sqM4zjqZr8EMU_JWY9EhZwV78x2VtNfQx16GRHjSxpzFCH5MwYI2Clh8VgL0xx dG-P3Kor05NSTckEYUb1QSfyHQ7JImHtZ3JaUTvcVIuBfcaL0DT3DQw7b_9OGbSTGj3CrafbiJ11tbx-cBpoL-6w","e":"AQAB"}

Usage of the GXDCH

For Service Offerings

1. Use Registry for Service, ServiceOffering and DataResource Schema

2. Generate Gaia-X compliant Services and let it be validated and verified

3. Put it in the (Federated) Catalogue

Project Ecosystem for European Manufacturing Data & Services

Usage of the GXDCH

Project Ecosystem for European Manufacturing Data & Services

Our Goal

Gaia-X Compliance

Gaia-X Conformity

A service or product offering is certified **Gaia-X Conformant** upon the successful assessment of all the mandatory criteria related to transparency, security, interoperability, portability and sustainability. Not bound to a specific jurisdiction or industry domain.

Value: The provider & consumer can make informed & educated decisions based on information gathered to demonstrate European values.

Gaia-X Label level 1

A service or product offering is certified **Gaia-X Label level 1** if the offering is **Gaia-X Conformant** and fulfils additional European rules related to personal data protection.

Value: In addition to the Gaia-X Conformity, the provider & consumer can rely on their mutual declaration of adherence to the European data protection rules.

Gaia-X Label level 2

A service or product offering is certified **Gaia-X Label level 2** if the offering is **Gaia-X Label level 1** and fulfils additional criteria related to cybersecurity and the service offering needs to have an option for the customer's data to be processed and shared exclusively in the Europe Economic Area.

Value: In addition to the Gaia-X Label level 1, cybersecurity criteria have been verified by impartial third parties & data can be processed exclusively in the EEA.

Gaia-X Label level 3

A service or product offering is certified **Gaia-X Label level 3** if the offering is **Gaia-X Label level 2**, the consumer's data are processed and shared exclusively in the European Economic Area and the headquarters and the main establishments of the service provider are located in the European Economic Area.

Value: On top of the Gaia-X Label level 2, the data is processed exclusively in the EEA & cannot be accessed by parties from outside the EEA.

	CONFORMITY	LEVEL 1	LEVEL 2	LEVEL 3
Declaration of Service or Product	✔	✔	✔	✔
Signed with verified method (e.g. eIDAS)	✔	✔	✔	✔
Automated validation by GXDCH	✔	✔	✔	✔
Automated verification by GXDCH*	✔	✔	+	+
Data Exchange Policies	✔	✔	✔	✔
Certified Label Logo		✔	✔	✔
Data protection by EU legislation		✔	✔	✔
Manual verification by CAB			✔	✔
Provider Headquarter within EU				✔

*not all criteria can be automated, "+" means automated verification of the evidence issuer (Standard & CAB)

Building an Eco-System – five partners, one goal

Supported by industry and research partners, the projects focus on specific goals that feed into the project ecosystem

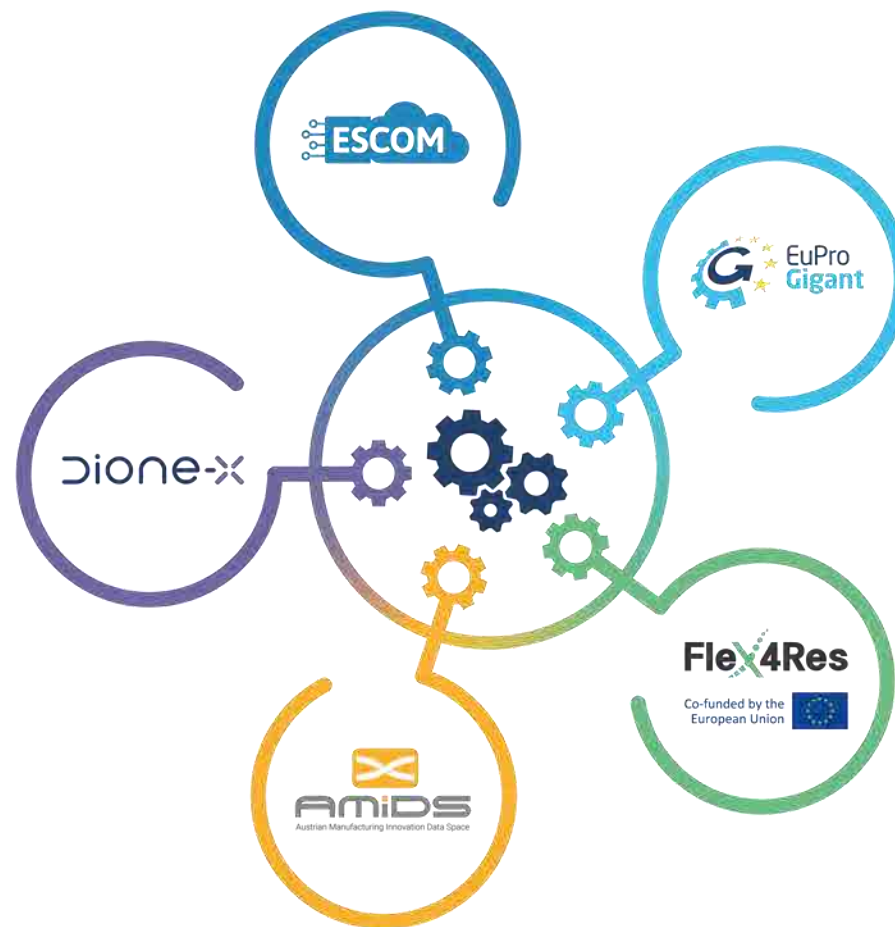| AMIDS	DIONE-X	ESCOM	EuPro-Gigant	Flex4Res
innovation processes & learning factories	secure data exchange for the machining value network	edge-cloud computing	production & learning ecosystem	supply chain resilience

Outlook

- Development of a sustainable **business model** for the Gaia-X federator

- Extend the **Compute-to-Data** Approach

- Let the **ecosystem** grow further

- Present a approach for **federated learning**

- Build up a Gaia-X complaint ecosystem using the Eclipse **XFSC components**

Project Ecosystem for European Manufacturing Data & Services

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Q & A

Vielen Dank!