

Data Space Governance 101

Overarching principles and technology
for a sovereign data space

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Why Data Space Governance?



Providing a reliable, trustworthy, and transparent ecosystem is at the very heart of the Catena-X value proposition, because trust is the foundation of any successful supply chain collaboration. Secondly, stipulating scalability within Catena-X and outside of its own data space boundaries is our goal. Scalability attracts further participants and drives adoption of Catena-X way beyond its original scope. The Catena-X data space governance manifests these declared goals via strategic partnerships with neutral, independent partners.

To ensure that these fundamental principles are adhered to, the Catena-X initiative works with independent governance units:

- **Identity:** Gaia-X partnership for establishment of an overarching Trust Framework.
- **Data Exchange:** International Data Space Association (IDSA) partnership for industry-agnostic foundation of sovereign data exchange.
- **Development:** Eclipse Foundation partnership for proven software development processes, best practices, and management of repositories in open source.
- **Industry-specific logic:** Catena-X Association partnership for driving standards on common business needs of the automotive industry.



Benefits

Trust, Interoperability, Transparency & Unity

Catena-X is an industry-wide initiative founded to solve the main business challenges in the automotive sector's supply and value chain. Rather than starting from scratch, we have adopted trusted and proven principles to accomplish our

task. There are **several objectives** that Catena-X pursues by using complementary governance elements in the development of its data space:

Create trust within Catena-X: Gaia-X provides a framework for the verification and description of participants, their resources, and services. This framework enables the creation of verifiable information about participants, resources, and services that can be tracked to the validator. This is important, as Catena-X participants exchange business-critical data from peer to peer, and participants want to be sure about who they are exchanging data with. Moreover, Catena-X is one of many industry data spaces and its participants will not only operate within Catena-X. To enable participants to connect with participants in other data spaces, Catena-X employs the Gaia-X Trust Framework for identity and trust.



Form the base for sovereign data exchange and interoperable solutions: To ensure sovereign data exchange between participants in the Catena-X data space, the International Data Space Association (IDSA) reference architecture model and data-space protocol are used. The IDSA reference architecture model describes how a data space can be set up so that participants can lawfully and securely exchange data without disclosing any relevant information to third parties. The data-space protocol is the technical implementation of that model. A core component of the protocol is the "connector" through which all data transfers are facilitated. At Catena-X a derivative of the Eclipse Data Space Connector (EDC) from the Eclipse Data Space Components project is used. This specific connector implements the data space protocol with Self Sovereign Identity and related catalog services such as the decentral digital twin registry. The EDC is compatible with other connectors that also implement the data space protocol, forming the basis for interoperability.



Promote an open, transparent, and fair development environment and community: The Eclipse Tractus-X project is the official open-source project in the Catena-X ecosystem under the umbrella of the Eclipse Foundation. It follows the well-established development process of the Eclipse Foundation that encourages collaboration on open-source software. Adopting a well-established, accepted, and performant process to release our software allows us to focus on content. The implied trust and acceptance are extremely beneficial to building an open-source community, which is an asset to any open-source project. The Eclipse Foundation is a not-for-profit corporation that is supported by over 300 members, is internationally balanced in terms of governance structure, and has a proven interest in fostering collaboration in the automotive industry.



Represent the entire automotive industry and focus on clear needs: The Catena-X Association orchestrates the governance model of the Catena-X data ecosystem and unites the above-mentioned principles to serve clear automotive industry needs. Its purpose is the creation, elaboration, promotion, and maintenance of common principles and standards for an equivalent, digital exchange and sharing of data concerning processes of the automotive value chain.¹ By guaranteeing an equal representation of original equipment manufacturers (OEMs), suppliers, small and medium-sized enterprises (SMEs), and outfitters in its executive board as well as ensuring international representation, the Catena-X Association ensures that this purpose is being fulfilled on an equal footing and considering the common interests of the industry.





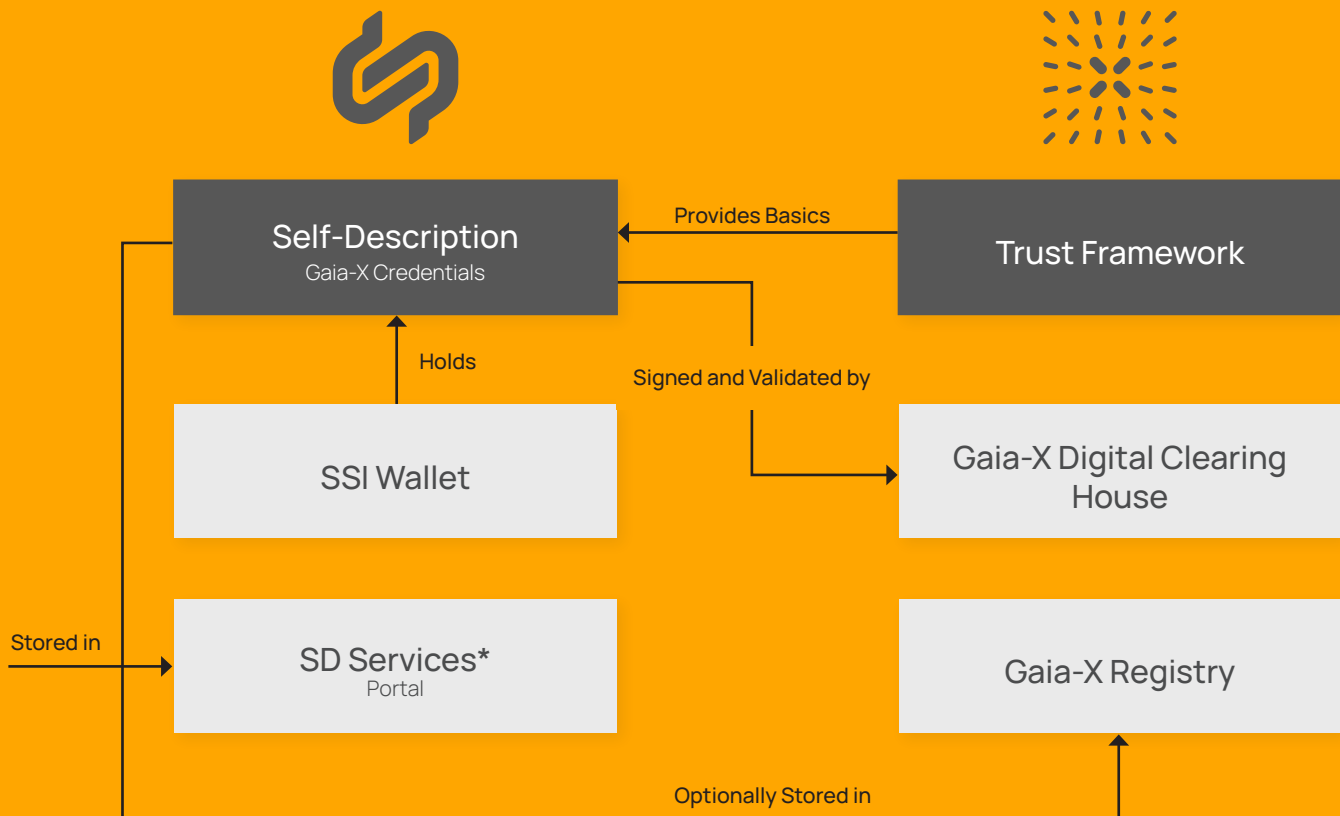
Context

Implementation in the Catena-X Data Space

What sounds like philosophical alignment can be experienced at all operational levels of the Catena-X ecosystem.

One example of creating trust is the adoption of the **Gaia-X Digital Clearing House** (GXDCH) and its inclusion in the Catena-X onboarding process. The GXDCH verifies adherence to the Gaia-X rules²: New participants receive an invitation to the network. First, they enter and validate their company information, which is then sent to the GXDCH for a veracity check. The GXDCH checks if the information provided is consistent with the publicly available information about the company. If the veracity check is positive, the

GXDCH issues a signed Participant Self-Description (Gaia-X Credential \nearrow)³ that is stored in the participant's SSI wallet and made available to the network via the company registration service as depicted in **Figure 1**. The credential can be used to identify a participant in the Catena-X network or in other networks. Moreover, when a participant registers a new connector in the network, a Self-Description (Gaia-X Credential \nearrow) is issued according to the "service offering" format of the trust framework.⁴ This credential can be used in data exchange to validate that a connector belongs to a certain participant or has certain attributes.



*Company Registration Service and Connector Administration Service

Figure 1 Catena-X and Gaia-X Components and Their Interplay



The goal is that a participant can also decide to publish their services Gaia-X Credential in the Gaia-X registry and make it available to a wider audience.

To create the base for sovereign data exchange and interoperable solutions, the **IDSA data-space protocol** provides the foundation of the EDC, which is a reference implementation of the protocol. With the EDC, any data provider can structurally describe the data assets that they offer to data consumers. They can also define who can see and consume a data asset via access policies, and usage policies define under which conditions the data assets may be consumed. Although the usage policies are not technically enforceable, the data-space protocol and the EDC are a strong basis for data sovereignty. This construct is legally binding, which means that all data consumers are obligated to follow the usage policies as if they were hand signed contract.

The **Tractus-X project** adopts the Eclipse Foundation's development process to use or contribute to the Catena-X operating system, including source code, semantic models, technical documentation, and deployment instructions. Following this development process, the following principles are at the core of our Tractus-X development process to enable a flourishing development community for the long term:

- **Transparency** is crucial for effective software development and problem-solving. Access to information and resources enables developers to excel, e.g., by building on ideas and results from others, fostering collaboration and informed decision-making.
- **Open collaboration** drives innovation by encouraging active participation and allowing modifications to shared content such as the Catena-X operating system. It enables us to tackle complex challenges collectively.
- **Communities** form when diverse organizations and individuals unite around a common purpose. Guided by shared values, they prioritize community objectives over individual interests, promoting cohesive decision-making.

Adopting this well-established process focuses on quality and timely releases rather than questions of ownership and methodology.

The Catena-X Association is present in all aspects of the Catena-X ecosystem. Its presence can be felt most clearly in the standards released by the Association, the certificates it provides as part of its conformity assessment, and the activities it undertakes to transfer its knowledge and tools to the automotive industry, particularly SMEs. It also ensures the ecosystem's compliance with antitrust laws. **Figure 2** outlines the Catena-X Association's role in the ecosystem governance.

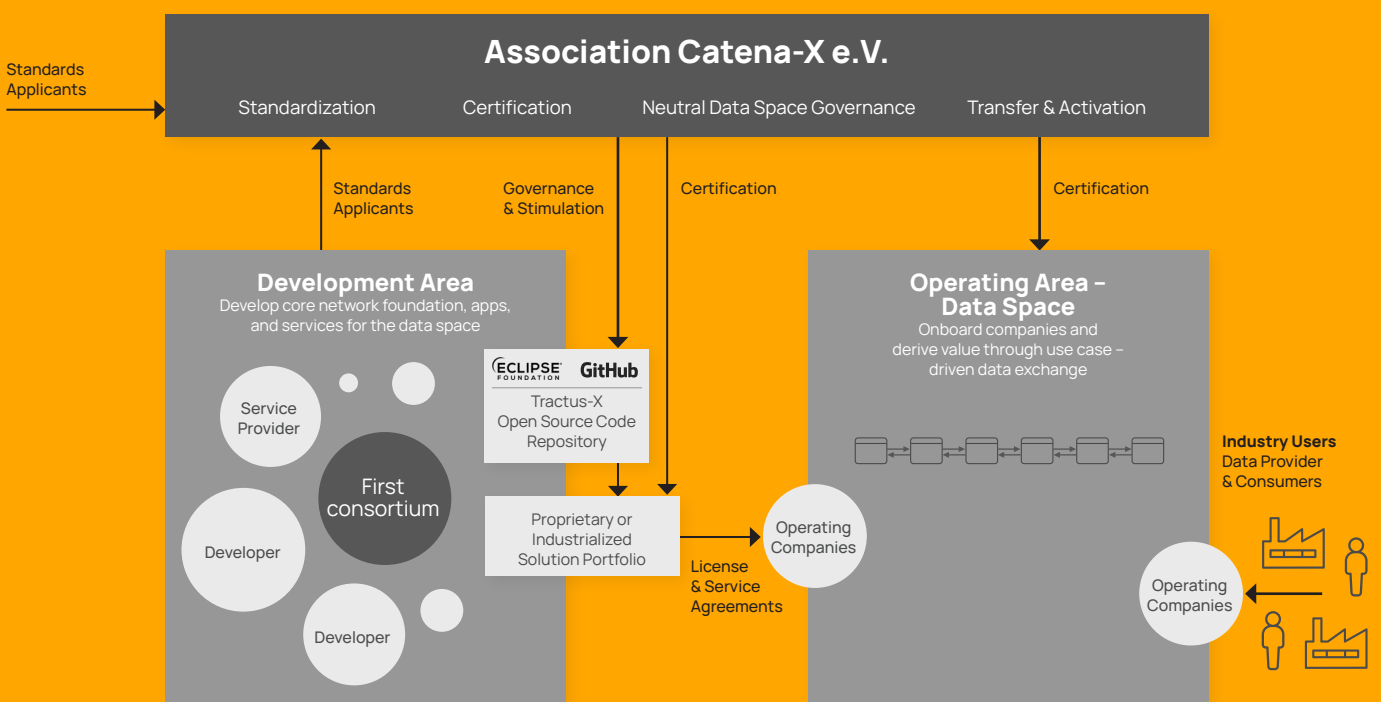


Figure 2 Catena-X Association's Role in the Catena-X Ecosystem Governance.



Roadmap

The Catena-X Association aligns its roadmap in terms of Gaia-X compliance with the latest Gaia-X Trust Framework and strives for constant compliance. Implementing compliance with the Trust Framework occurs within the operating environment, as Gaia-X compliance is guaranteed by the core services. As mentioned above, this involves both the company registration and connector administration services.

The data-space protocol provided by the IDSA is subject to continuous improvement. The goal is to establish it as an official W3C standard. To achieve that, the protocol shall be further developed in an Eclipse working group with participation from Catena-X and IDSA. In addition, IDSA and Catena-X are working on a framework to validate if a connector has

properly implemented the data-space protocol. This enables the conformity assessment and certification of connectors for the purpose of interoperability. If a connector passes the conformity assessment, it can communicate with other connectors that are also certified.

Our collaboration with the Eclipse Foundation follows a roadmap, shown below, that outlines the shift from primarily Catena-X consortium-focused work, to a fully mature open-source project, Tractus-X.

Endnotes

- 1 https://catena-x.net/fileadmin/user_upload/Vereinsdokumente/Catena_X_Satzung_Articles_of_Association.pdf
- 2 <https://gaia-x.eu/gxdch/>
- 3 <https://gaia-x.gitlab.io/policy-rules-committee/trust-framework/participant/>
- 4 https://gaia-x.gitlab.io/policy-rules-committee/trust-framework/service_and_subclasses/



Additional Resources

[Vision and Strategy](#) ↗

The Gaia-X Vision and Strategy paper provides a good overview of their goals, mission, and values.

[Trust Framework](#) ↗

The Gaia-X Trust Framework is the basis for the Catena-X Identity and Trust approach.

[Architecture Document](#) ↗

The Gaia-X Architecture document gives an overview of the technical setup of Gaia-X, which is very similar to the Catena-X setup in terms of participants and resources.

[IDSA Reference Architecture Model \(RAM 4.0\)](#) ↗

The IDSA reference architecture model (RAM 4.0) describes in detail how a data space can be created and what components are required.

[Data-Space Protocol](#) ↗

The Data-Space Protocol standardizes secure and sovereign data exchange.

[Tractus-X](#) ↗

Tractus-X is live and provides access to our KITs, including reference implementations.

[Eclipse Foundation Development Process](#) ↗

The Eclipse Foundation Development Process outlines the foundations of open-source development in Tractus-X.

[Articles of the Catena-X Association](#) ↗

The Articles of the Catena-X Association outline its purpose and governance in detail.

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