Webinar Factory-X
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PART OF MANUFACTURING-X

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Agenda

Overview of Factory-X

Use cases and requirements for standardized cross-company data sharing

MX-Port concept and prototypical implementation of MX-Port configurations

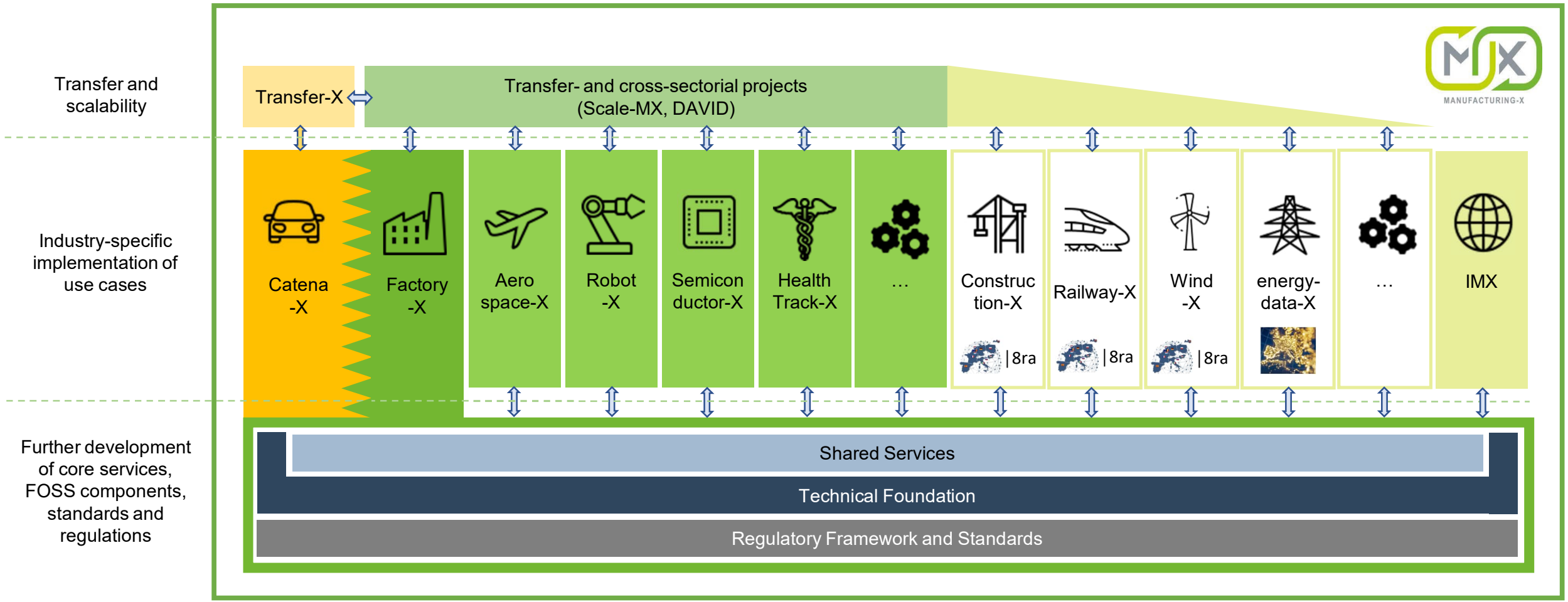
Operating model for cross-company data sharing

The way into the market

Overview of Factory-X

14 July 2026

Manufacturing-X Initiative
Cooperation between publicly funded projects



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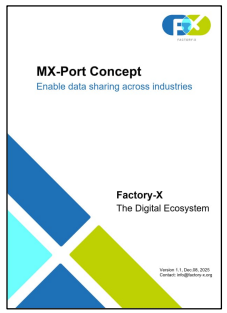
Overall Approach of Factory-X Project

requirements derived from value-creating use cases
- Supply chain optimization
- Engineering of production resources
- Production optimization

technical concept for cross-company data exchange

requirements of use cases



MX-Port concept

use case specific demonstrators

MX-Port configuration “Hercules”

MX-Port configuration “Leo”

MX-Port configuration “Orion”

use cases and requirements for standardized cross-company data sharing

MX-Port Concept and prototypical implementation of MX-Port Configurations

Use cases and requirements for standardized cross-company data sharing

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Factory-X use cases generate business benefits for participating companies through cross-company data sharing

11 Use Cases for data transfer along product and production system supply chain

Int. Toolchains & Collab. Engineer.

engineering of a product

Inform. Update and Change Service

optimization of operations

Collaborative Information Logistics

optimization of operations

Condition Monitoring led Services

optimization of operations

Modular Production

optimization of operations

Manufacturing as a Service

optimization of operations

Autonomous Operation aaS

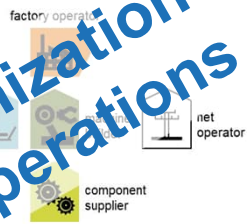
optimization of operations

Traceability

optimization of supply chain

Energy-Consump. & Load Mgmt.

optimization of operations



Carbon Footprint Management

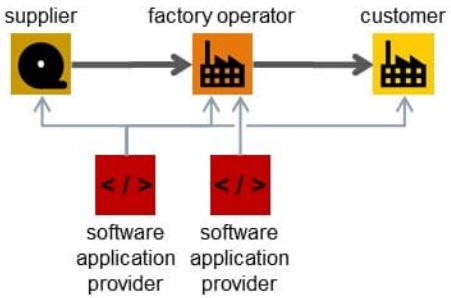
optimization of supply chain

Circular Economy

assessment of remaining life

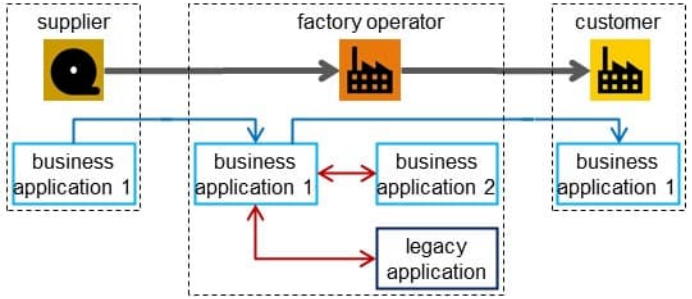
Factory-X use cases overall design according to ISO/IEC/IEEE 42010

Business View



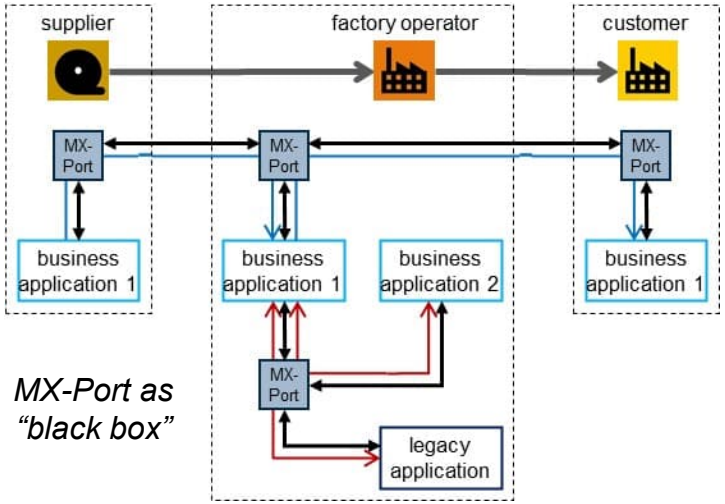
design decision of use case x

Usage View



design decision of use case x

Technical View



MX-Port as "black box"

cross-use case consolidation

requirements associated to the MX-Port layer

MX-Port Concept and prototypical implementation of MX-Port Configurations

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Fundamental challenges of cross-company data sharing

Data providers must provide their data in a standardized format

- Data is only relevant to a data consumer if it is clear what the data is about
- **Challenge 1:** Standardized **semantics** versus bilaterally and individually defined data semantics
- **Challenge 2:** Standardized **access** to the data

Data consumers must find a data provider interested in

- Approaches: data consumer knows its data provider or uses a “broker” mediating a data provider
- **Challenge 3:** Agreement on a standard for data provider **discovery**

There is not only publicly available data, but also (strictly) confidential data

- **Challenge 4:** A data provider wants to be sure that a requesting data consumer is indeed who it claims to be
- Standardization is necessary here, at least in the long term
- Use cases in Factory-X require authentication of **human users** and/or **technical systems** (authentication for companies is not sufficient)

Factory-X does not require technical enforcement of usage control

- Based on reliable receipt confirmations, violations of usage control can be easily prosecuted

MX-Port: a common technical concept that can be implemented in different ways

MX-Port as common technical concept for cross-company data sharing

Layer	Purpose	
MX Discovery	... is used to find business partners, data assets or business applications	challenge 3
MX Access & Usage Control	... is used to ensure that data providers can define and restrict the data access and usage of the provided data	challenge 4
MX Gate	... is used to exchange data in a uniform way	challenge 2
MX Converter	... provides the semantic model for the data to be exchanged	challenge 1
MX Adapter	... enables any business application to use the MX-Port	

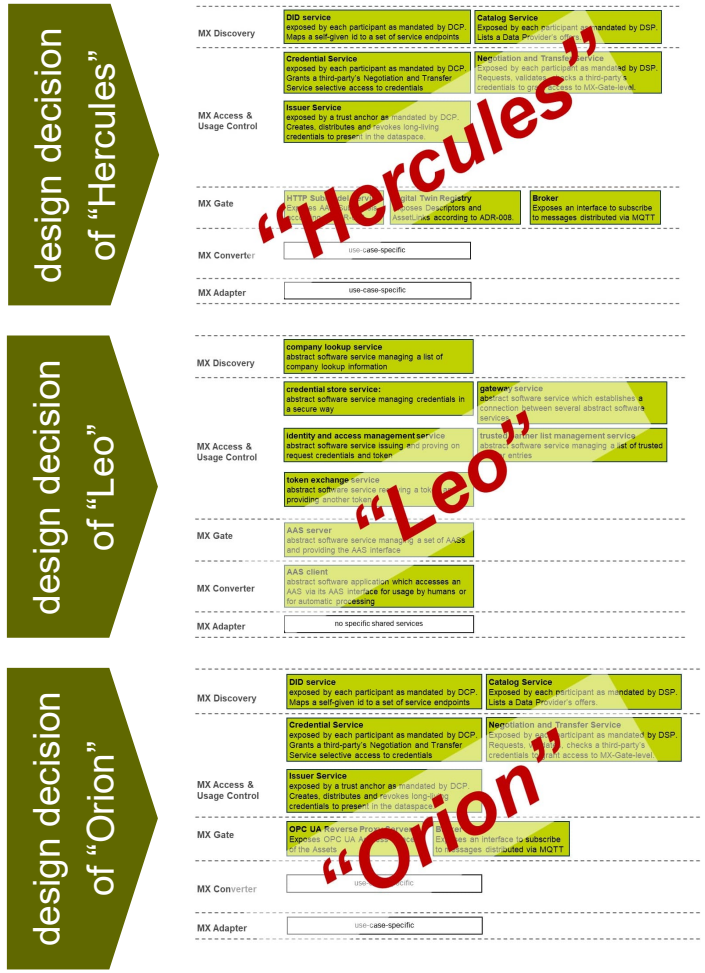
Different MX-Port configurations implementing the MX-Port concept

Implementation requires design decisions and is mainly driven by requirements of the use cases

Design and prototypical implementation of MX-Port configurations

MX-Port concept

MX-Port configurations Conceptual View



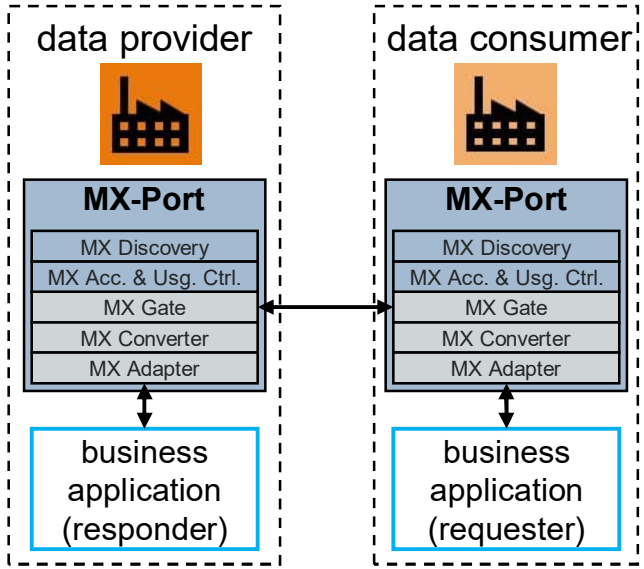
MX-Port configurations Implementation View

MX-Port configuration “Leo” paves the way for companies to be able to share data with many partners in the future

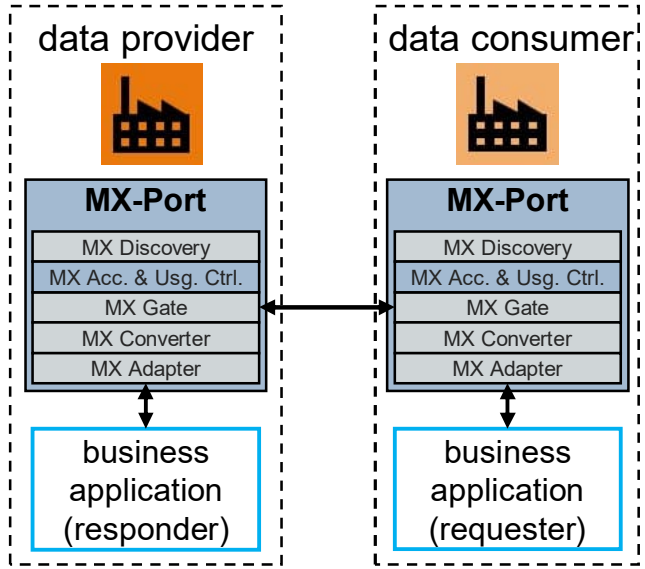
building on each other

building on each other

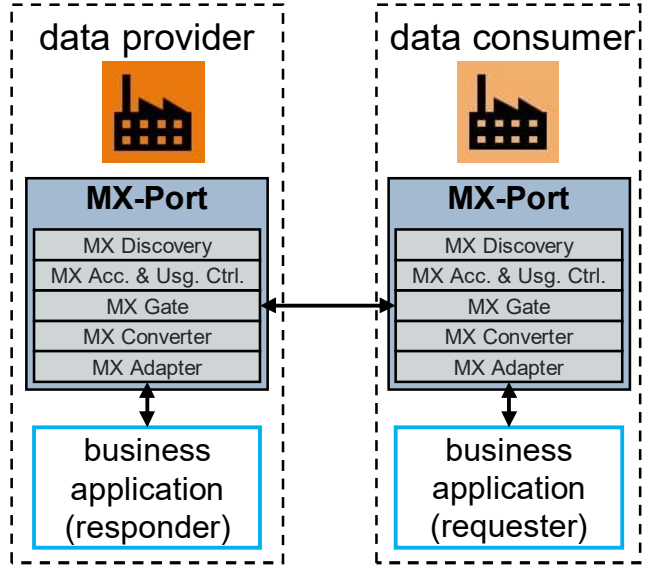
Step 1: standardized common data models and data access



Step 2: standardized discovery of the data provider



Step 3: standardized concepts for data sovereignty and trust



MX-Port configuration “Leo”

FACTORY-X

Operating model for cross-company data sharing

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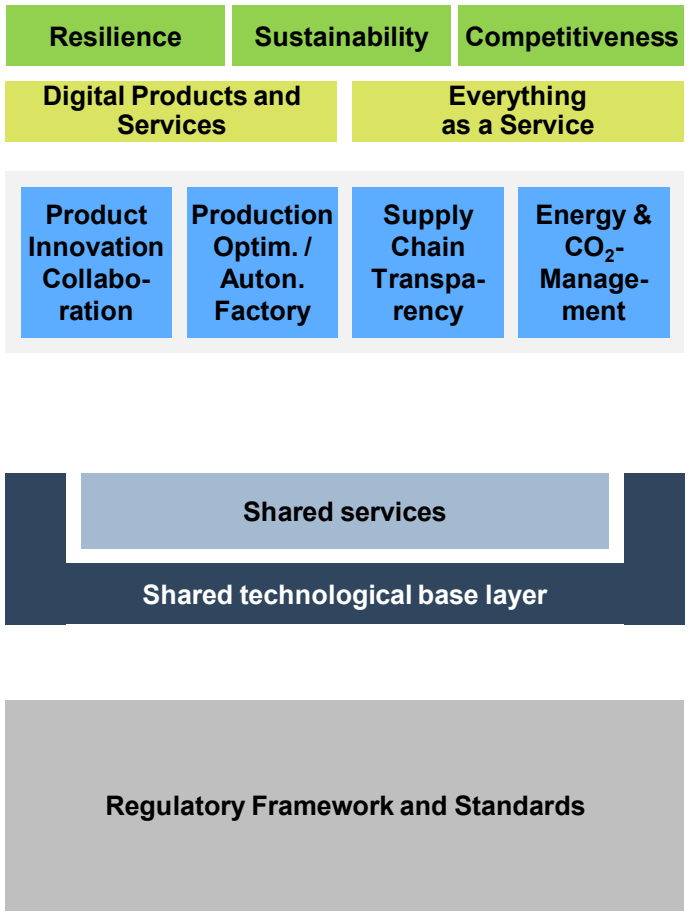
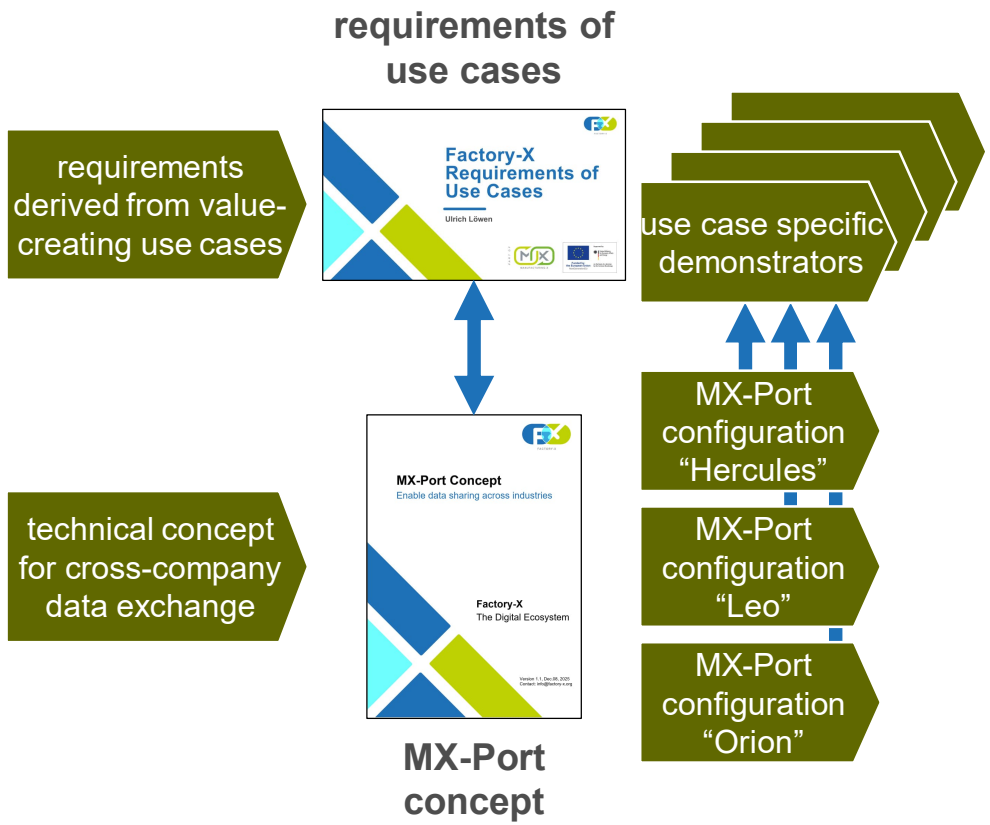
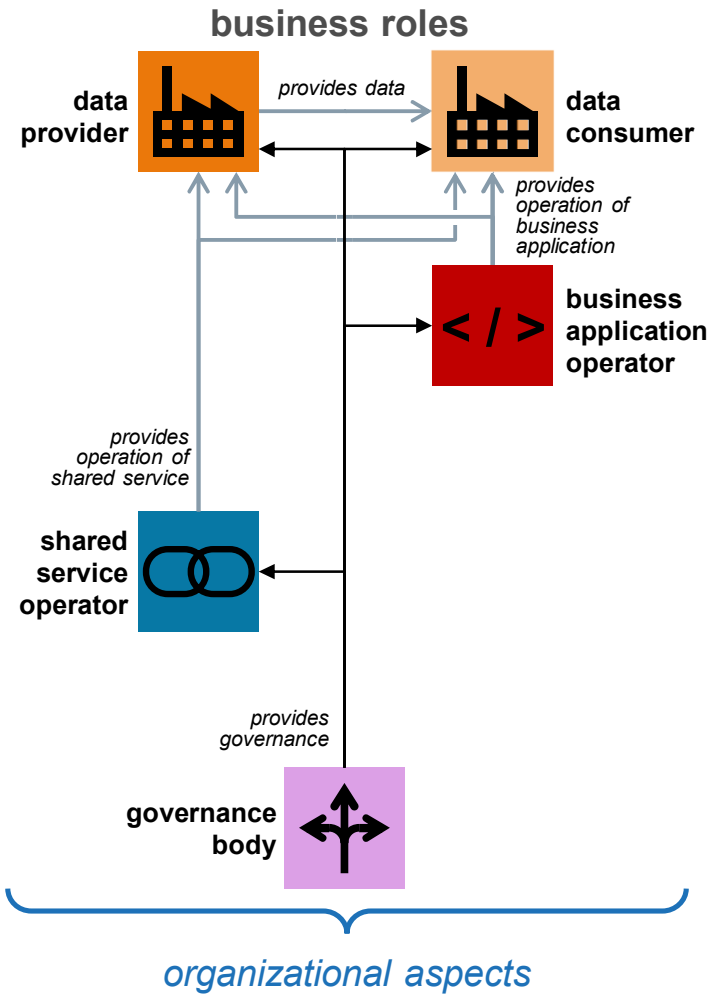
Context of technically driven activities of Factory-X

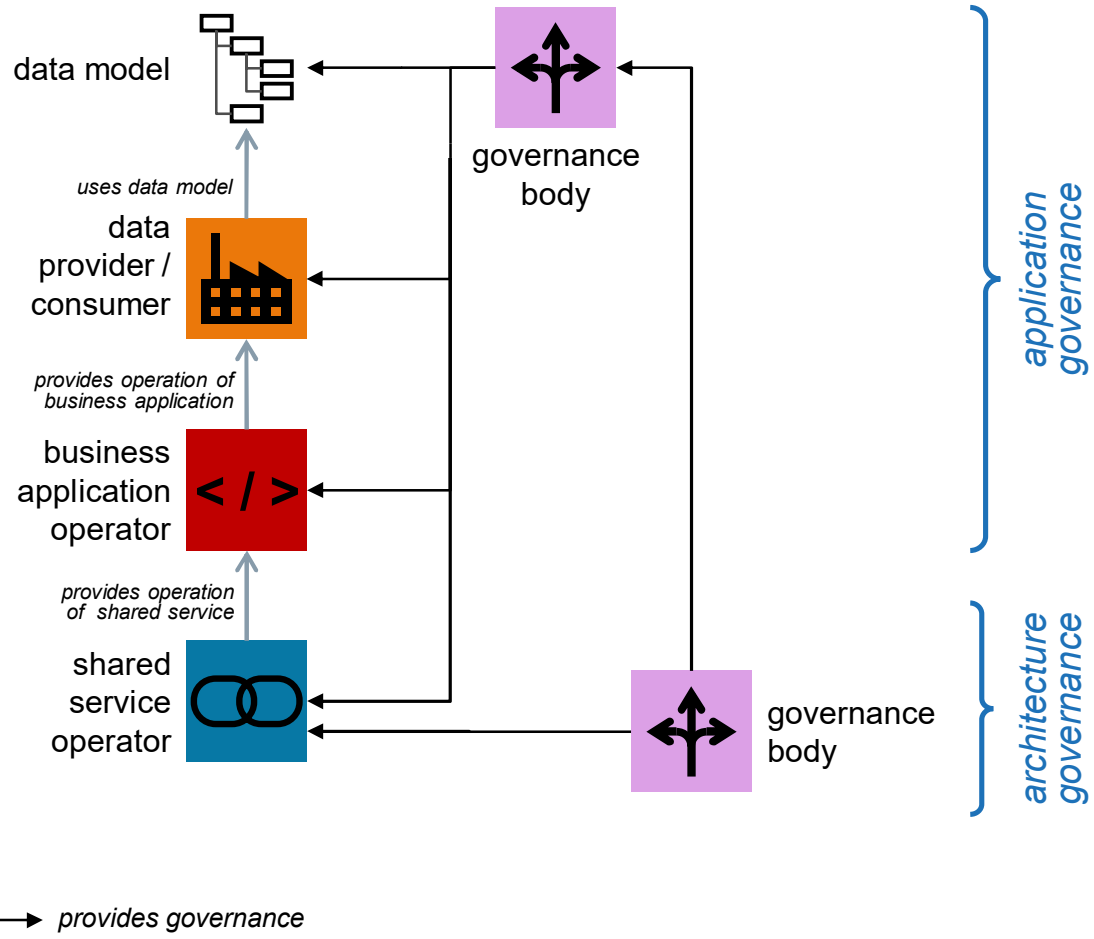






Overall governance principles for cross-company data sharing

Overall illustration

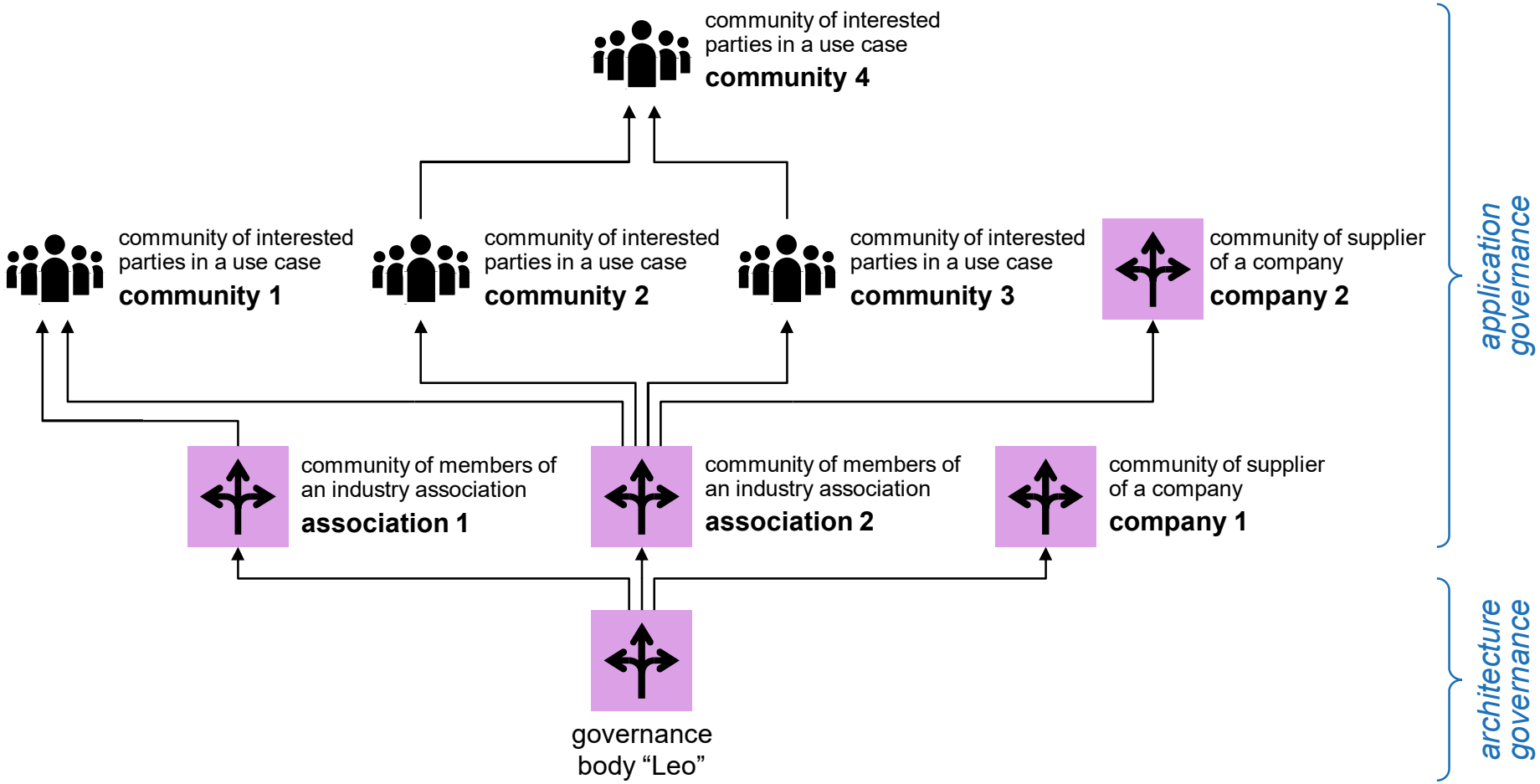


Separation of governance into

- **Application governance** driven by use cases
  - Data models
  - Interfaces and functions of business applications
  - Interaction of business applications
- **Architectural governance** driven by MX-Port configuration
  - **Technical** aspects: shared services of MX-Port configuration
  - **Organizational** aspects: business roles and their interactions (for example, define additional business roles regarding conformity)
  - **Legal** aspects

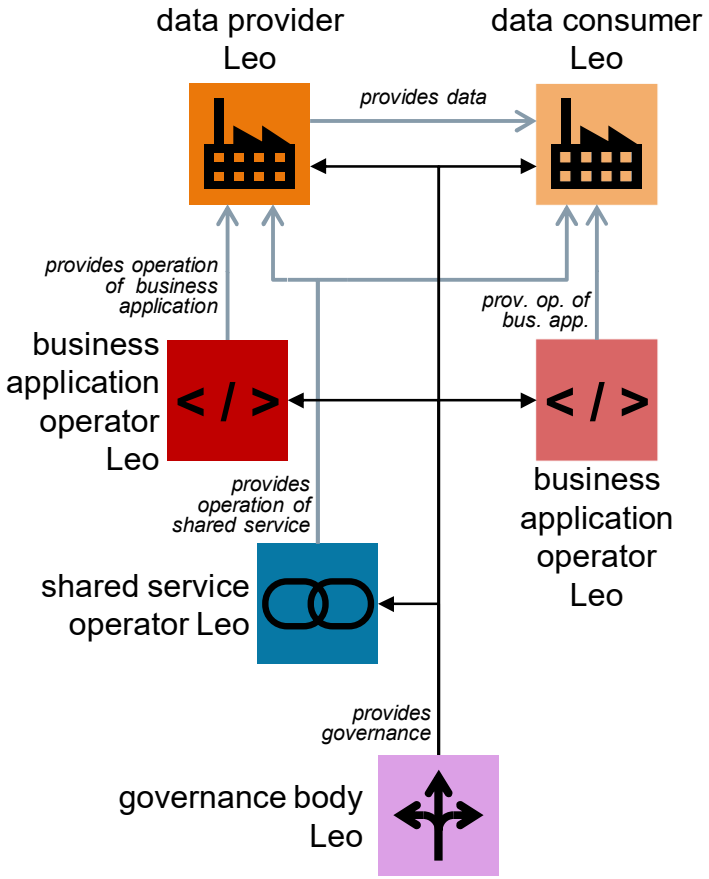
Governance can be cascaded and assumed by legal entities or interest groups

Example



Interoperability in the context of cross-company data sharing
Example Leo – Hercules

Example Leo

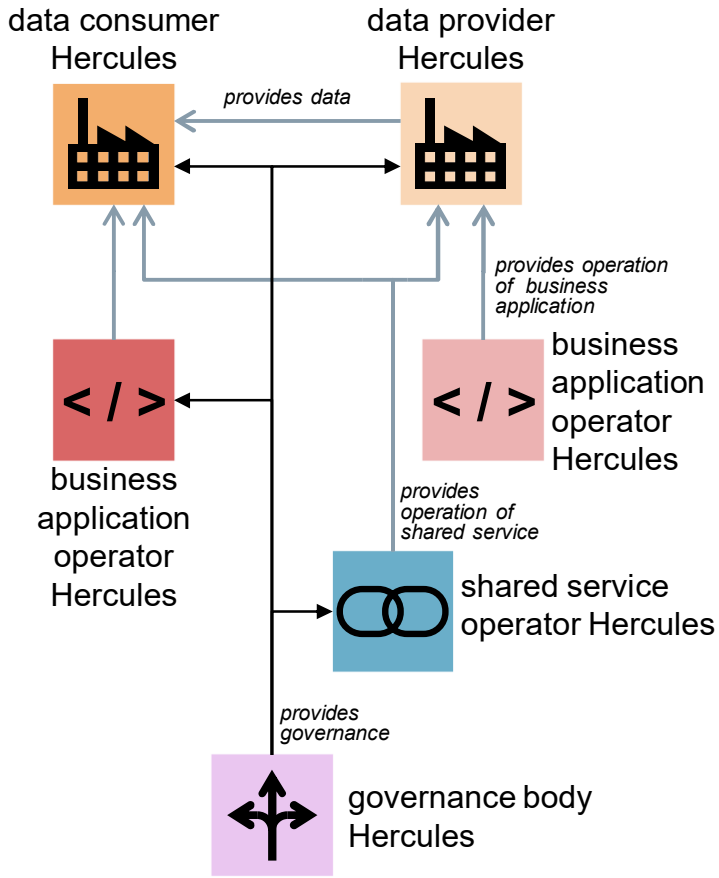


Principle

- All companies adhere to the rules set by the governance body “Leo”

Interoperability in the context of cross-company data sharing
Example Leo – Hercules

Example Hercules

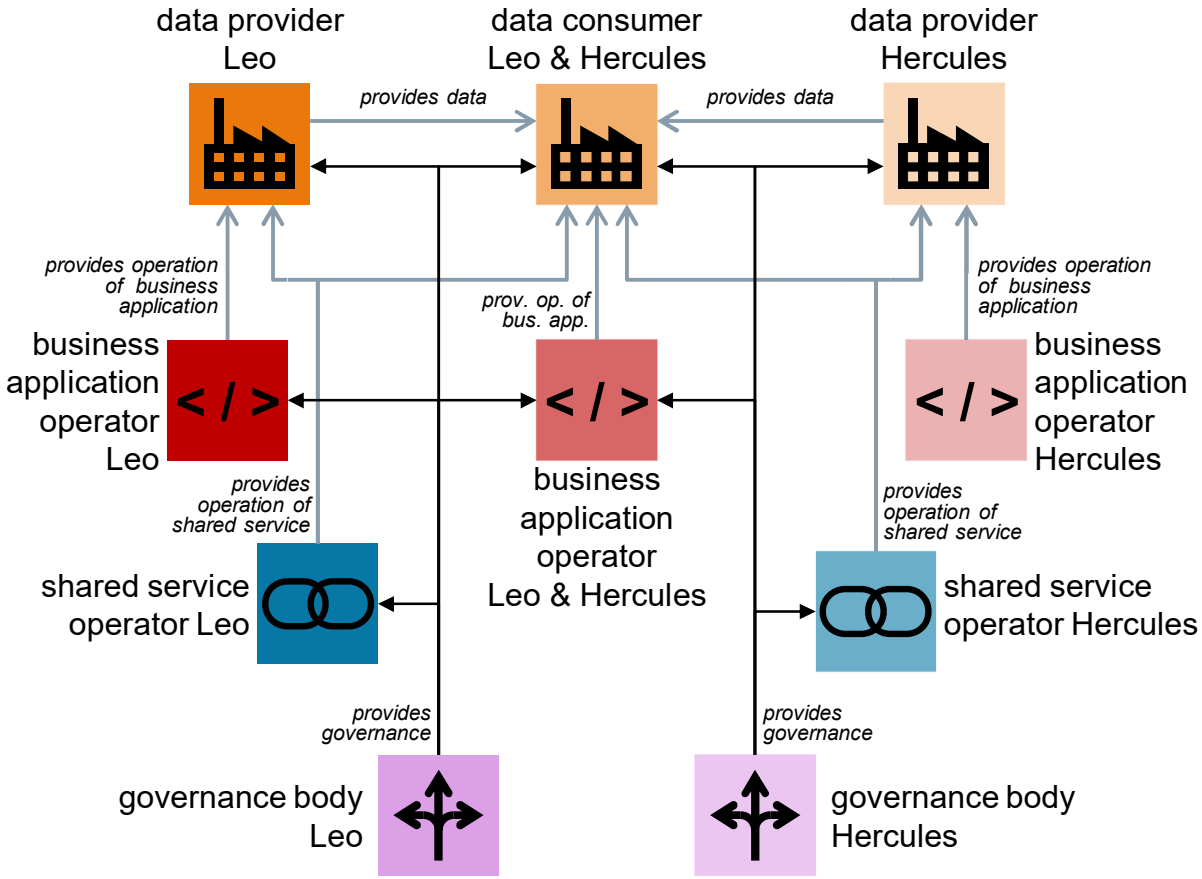


Principle

- All companies adhere to the rules set by the governance body “Hercules”

Interoperability in the context of cross-company data sharing
Example Leo – Hercules

Example



Principle

- Data consumer Leo & Hercules and business application operator Leo & Hercules adhere to the rules sets by the governance body “Leo” **and** the governance body “Hercules”

Note

- Governance bodies act **autonomously** and can pursue **incompatible** solutions

The way into the market

Commercialization in the market

Establishing data spaces (bottom-up)

enable the commercial implementation of use cases

data space …

data space “Orion”

data space “Hercules”

data space “Leo”

governance body (architecture governance)

technical architecture based on MX-Port (“Leo”, “Hercules”, “Orion”)

operating model: business roles in a data space and their collaboration

commercially available products, solutions and services

Implementation of use cases (top-down)

concrete use case

interested companies agree on governance body for application governance

governance body for application governance can build on another governance body

commercially available products, solutions and services

data space

governance body (application governance)

can build on (example)

- **Data space** in the sense of **participating companies adhering to a set of rules** defined by a governance body

Thank You!

Background information

- Factory-X Use Cases: Application guide; https://factory-x.org/wp-content/uploads/Factory-X-Application-Guide.pdf
- Consolidated Business and Usage Views; https://factory-x.org/wp-content/uploads/Business-And-Usage-View.pdf
- Prozessdiagramme der Factory-X Use Cases als ergänzende Beschreibung (distribution upon request)
- Factory-X Requirements of Use Cases; https://factory-x.org/wp-content/uploads/FX-0104-Requirements-UseCases-1-37.pptx
- MX-Port Concept: Enable data sharing across industries; https://factory-x.org/wp-content/uploads/MX-Port-Concept-V1.10.pdf
- Factory-X Use Cases: MX-Port Configuration “Leo”; https://factory-x.org/wp-content/uploads/MX-Port-Configuration-Leo.pdf
- Service Maps of MX-Port configurations; https://factory-x.org/wp-content/uploads/Factory-X_General_Slideset_HM26-public-version.pdf (page 128ff)
- Factory-X Cross Cutting Roles Team: Governance MX-Port configuration “Leo”; https://factory-x.org/wp-content/uploads/FX-0097-CCRT-Governance-MX-Port-Leo-20.pdf
- Data Spaces and their Way into the Market (distribution upon request)