

# Applying Data Spaces

Use Cases in Health, Industry and Energy

**Campus Course 3, Lesson 2**

Oktober 2025

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24.10.25

Gefördert durch:



aufgrund eines Beschlusses  
des Deutschen Bundestages

## About the series

This paper contains the content of the free online course "Applying Data Spaces: Use Cases in Health, Industry and Energy" offered by Gaia-X Hub Germany. It provides interested parties with a basic understanding of the data economy and promotes discourse and the exchange of ideas.

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## Publisher

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Karolinenplatz 4

80333 Munich

## Recommended citation

Reiberg, A. et al. (2025) Applying Data Spaces: Use Cases in Health, Industry and Energy.

# Table of Contents

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About the series .....	2
Autoren.....	2
Publisher.....	2
Recommended citation .....	2
<b>2. Use case: "CO<sub>2</sub> footprint in production engineering and manufacturing" .....</b>	<b>3</b>
2.1 EuProGigant.....	3
How can this be applied in practice? .....	3
2.2 Use Case "CO <sub>2</sub> footprint in production engineering and manufacturing" .....	4
Solution approach and components.....	5
Consortium partners and their roles in the use case .....	5
Benefits for SMEs .....	5
2.3 Outlook.....	6
Further information and opportunities to participate .....	6
<b>Sources.....</b>	<b>7</b>

## 2. Use case: "CO<sub>2</sub> footprint in production engineering and manufacturing"

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### 2.1 EuProGigant

The [EuProGigant](#) lighthouse project represents a new generation of digital cooperation in the European industry. It aims to simplify data exchange across national and industry boundaries while consistently implementing the principles of Gaia-X – decentralization, data sovereignty, and trust. The manufacturing industry is becoming increasingly connected, automated, and data-driven – the use of artificial intelligence in particular will play an increasingly important role. Although an enormous amount of data is already being collected in production processes today, the exchange and effective use of this data is still insufficient. However, challenges such as increasing complexity, product customization, and global supply chains require comprehensive data exchange. EuProGigant shows how targeted and secure data exchange along the entire value chain can be used to develop innovative solutions that increase both efficiency and sustainability and enable new business models. The project, funded by Austria and Germany, has created a dynamic ecosystem in which companies, research institutions, and technology providers work together on solutions that have an impact on everyday production and development.

#### How can this be applied in practice?

The project shows how a data space functions as a secure bridge between the parties involved. Each participant determines for themselves what data they share. EuProGigant is thus setting a standard that works beyond manufacturing, for example in logistics, energy, or aviation. Data is exchanged directly, without a third party, which minimizes administrative effort and significantly strengthens control over one's own data. The philosophy is clear: decentralization and simplicity are the basis for sustainable cooperation and value creation in digital networks.

EuProGigant has two goals in the manufacturing industry: First, EuProGigant is further developing the Gaia-X architecture to adapt it to the specific requirements of the manufacturing industry. Second, the project uses concrete use cases to demonstrate how added value is created in real-world operations through the use and exchange of data. This not only creates technical added value, such as data security or interoperability between different IT systems. The economic dimension is also central: as data providers, companies can tap into new revenue potential by, for example, monetizing data that previously remained unused. Conversely, data consumers benefit from efficiency gains – for example, through optimized material selection or improved processes based on real-time data from the network.

The development of the technical infrastructure is based on practical requirements and goes beyond the Gaia-X framework. EuProGigant focuses on four use cases that address key challenges in everyday production:

- The use case "**CO<sub>2</sub> footprint in production engineering and manufacturing**" enables companies to transparently evaluate and optimize the climate-relevant footprint of their products as early as the design phase.
- The "**Mobile processing machines**" use case shows how machines and robot systems can be used flexibly and independently of location for maintenance, repair, or production, and how large amounts of data can be transmitted securely and wirelessly to different locations in real time, enabling new digital services and autonomous processes.
- The "**Component matching**" use case automates the precise matching of components by securely exchanging and intelligently evaluating measurement data from different companies, significantly reducing assembly costs, rework, scrap, and resource waste in production.
- The "**Validation Platform**" use case enables the secure and sovereign exchange of real-time production and test bench data via digital twins within the EuProGigant project, allowing deviations in production and products to be detected at an early stage and efficiently validated together with partners along the value chain.

## 2.2 Use Case "CO<sub>2</sub> footprint in production engineering and manufacturing"

Let's take a closer look at the use case "CO<sub>2</sub> footprint in production engineering and manufacturing". Here, the focus is on climate protection and the transition to sustainable supply chains. Pressure is growing on companies to make their CO<sub>2</sub> emissions transparent and to reduce them. This is not only due to new legal requirements, but also to the increasing demands and expectations of customers and partners. Many traditional approaches to reducing emissions focus on energy supply or machine optimization. However, the greatest leverage often lies unrecognized directly in product development: up to 80 percent of a product's total emissions are determined as early as the design phase. The challenge is to capture this data at an early stage and integrate it meaningfully into the development process.

EuProGigant is specifically addressing this challenge. An intelligent, digitally networked production ecosystem will enable engineers and developers to select and compare suitable materials and processes based on their carbon footprint as early as the concept stage of product development. A web-based application allows users to simulate various alternatives even before production begins. Complex algorithms check each component variant and automatically calculate the predicted greenhouse gas emissions. This means that design decisions are directly linked to ecological criteria without losing sight of everyday practicality.

## Solution approach and components

At the heart of the approach is a decentralized, sovereign data ecosystem that can be used to provide material and process data as well as calculation data for industry and research. This enables both SMEs and large corporations to exchange sensitive data in a controlled and secure manner. Material and laboratory suppliers make their characteristic values available for licensed use, thereby opening up new, data-based business models. The knowledge database also shows how knowledge can be traded along the value chain: standardized interfaces allow suppliers to provide their material data for a fee, while manufacturers and users of machines gain direct access to relevant information for green production processes.

## Consortium partners and their roles in the use case

The leading role in the coordination and implementation of the EuProGigant project is assigned to the European Institute of Innovation and Technology (EIT) Manufacturing, which, as the consortium leader, ensures the connection between research and industry as well as strategic management. EIT Manufacturing brings together the large European network in the field of production and contributes expertise to the development of sustainable, data-driven business models.

Key partners include the *Vienna University of Technology (TU Wien)* and the *Technical University of Darmstadt*, which are leading the scientific and technical development of emission prediction models. As a software company, *concircle Österreich GmbH* provides important digital platforms and interfaces that enable the secure integration of different data sources and ensure interoperability in the data space in accordance with Gaia-X standards. This also includes the technical implementation of data connectors and ensuring compliance with the Gaia-X Trust Framework. In addition, *Haidlmair GmbH*, as an industrial partner, provides process-related data from manufacturing, thereby supporting the practical relevance and applicability of the solutions developed. *Voestalpine High Performance Metals GmbH* contributes material data that is essential for the precise assessment of the carbon footprint of various materials and manufacturing processes. Other partners such as *Arburg GmbH + Co KG* and *SIMCON kunststofftechnische Software GmbH* complement the project's value chain with their expertise in plastics processing and simulation.

Together, these consortium partners form an interdisciplinary network that combines industrial practice with technological and scientific development. Through this strong collaboration, they ensure that the use case is not only implemented on a sound technical basis but also creates real added value for SMEs and large companies by giving them access to valid CO<sub>2</sub> data and efficient tools for sustainable product development.

## Benefits for SMEs

SMEs in particular benefit from this solution. They gain access to validated CO<sub>2</sub> and energy data without having to invest in their own expensive IT development. The solution increases transparency and trust along the entire supply chain. It helps companies to effectively meet

regulatory requirements such as the Supply Chain Act. Standardized interfaces ensure that control remains with the data owners, while new services, such as automated CO<sub>2</sub> accounting, are standardized for the first time in accordance with Gaia-X. For many companies, this opens up the option of not only making their own production more efficient and sustainable, but also of credibly documenting this progress to clients, customers, and partners.

### 2.3 Outlook

The EuProGigant project was successfully completed in February 2025 after four years and is now being gradually expanded to other areas of industrial research and new materials. The current state of research includes the development of industry standards for high-frequency and cost-effective data collection, the rollout of so-called smart integrated devices for tapping into new data sources, and the further transfer of the Gaia-X architecture to real production environments.

#### Further information and opportunities to participate

Companies can get involved in EuProGigant in a variety of ways, for example as active participants in the industry committee, as technology providers, or by helping to shape business models. There is also the opportunity to showcase products and deepen cooperation with existing projects. Interested parties are invited to contact the project team to find the right form of participation and contribute to the development of the production of the future.

All important information, studies, and guidelines can be found on the [EuProGigant website](#) and in the [consortium's publications](#).

#### Conclusion

EuProGigant impressively demonstrates how digital cooperation in European industry can succeed through secure and sovereign data spaces. The project demonstrates the practical advantages of Gaia-X principles such as decentralization and data sovereignty for networked, sustainable, and efficient production. Real-world use cases, such as CO<sub>2</sub> accounting and component matching, create technical and economic added value that enables new business models. The integration of research, industry, and technology providers is creating a dynamic ecosystem for the industry of the future.

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