Fact sheet: data spaces

Basic concepts and design principles 101.



Data spaces facilitate the trustworthy implementation of data-based applications and business models and allow all participants a high degree of flexibility and sovereignty.

rightarrow Objectives



Data spaces are flexible and open IT structures that guarantee the absolute sovereignty of the participants involved. As such, they facilitate the trustworthy and transparent use of decentralised data according to pre-defined scopes of use.

Data spaces are set up as federal entities and are based on various basic concepts/elements:

- a. Data space operation and management services (core services)
- b. Technical standards
- c. Operational processes
- d. Regulatory frameworks (governance model)

A key feature of data spaces is that they create a level playing field for sovereign data sharing. This means that all participants can benefit from the use of data in the same way.

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Key concepts

Federation

A data space follows federal principles, which, for instance, allows a local data space view to be evolved into a global one. This is possible thanks to the syntactic and semantic harmonisation of different approaches and the use of standards. In a data space, the data provider decides how data offerings are displayed, e.g. in terms of volume. Harmonising the descriptions of the data offerings and the use of standards paves the way for individual offerings to be findable and usable by a large number of actors.

Trust and transparency

An important prerequisite of trust in data spaces are digital identities for participants. Moreover, the application of and adherence to the above basic elements a) to c) (core services, technical standards, operational processes) also builds trust in data spaces. This allows for transparency and traceability of data use and provides a technical proof of compliance with data sharing agreements.

🍫 Sovereignty

In the context of data spaces, sovereignty has several levels:

- Data sovereignty and adequate control mechanisms for providers, who need to be able to determine whether and to what extent their data is used.
- Technological sovereignty that enables data providers to manage data within their own systems. Only for the purpose of exchanging data, they need to use components dictated by a data space (e.g. a connector).

Interoperability within the data space

The adherence to the above basic concepts and elements a) to c) (core services, technical standards, operational processes) supports the compatibility of individual data offerings in the data space.



This creates a marketplace for a specific data offering, e.g. focusing on one single domain of application.

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Key concepts

[°] Decentralised set-up

A data space is not a centralised repository or centralised platform. The actual management of the data sources linked to a data space always takes place within the participants IT systems. This implies that peer-to-peer structures are set up for actual data use.

Meshed data spaces/Data space mesh

Meshed data spaces facilitate the integrated use of data from data sources that come from different data spaces. In this context, operation and management services of these different data spaces help clarifying syntactic and semantic conflicts, which can arise, for instance, in connection with the cross-sectoral use of data. Data providers themselves retain control over the use of their data.

As a result, the data offerings of different marketplaces can flow more easily across sector boundaries. For example, the integration of data offerings from the mobility and energy domains is important for realising use cases for improved e-vehicle charging.

Example of a Data Space Mesh



Data space from the culture domain



Data space from the energy domain



Data space from the mobility domain





Interoperability beyond the boundaries of a data space

The adherence to the basic elements a) to c) (core services, technical standards, operational processes) supports the compatibility of individual data offerings beyond data spaces.

This means that it does not matter to a user or application developer by what technical means they obtain the data – from an individual data space or from different data spaces.

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