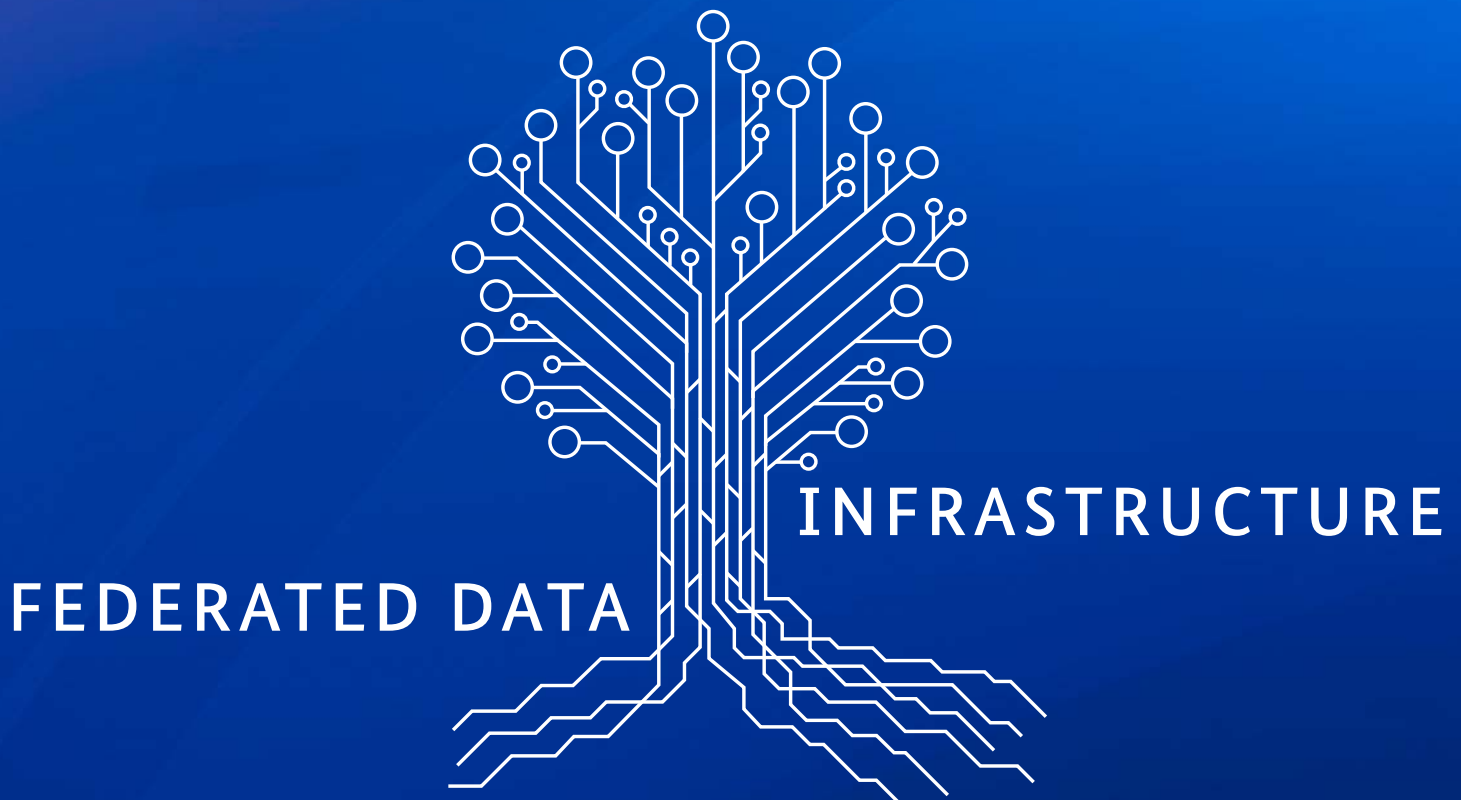# Project GAIA-X

A Federated Data Infrastructure as the Cradle of a Vibrant European Ecosystem

Executive Summary

FEDERATED DATA INFRASTRUCTURE

We, representatives of the German Federal Government, business and science communities, are striving to set up a high-performance, competitive, secure and trustworthy data infrastructure for Europe. To this end, we have drawn up the foundations for a federated, open data infrastructure based on European values, giving it the provisional project name 'GAIA-X'. The project serves the following objectives:

1. Stating the specific technical and economic conceptual work involved in building such an infrastructure; and

2. On this basis, creating a common ecosystem of users and providers from public administration, the health sector, enterprises and scientific institutions; and

3. Establishing supporting framework conditions and structures.

We see 'Project GAIA-X' as the cradle of an open, digital ecosystem where data can be made available, securely collated and shared while enjoying the trust of its users. Our goal is to join forces with other European countries to create the next generation of a federated data infrastructure for Europe, its states, companies and citizens; a data infrastructure which satisfies our highest aspirations in terms of digital sovereignty while promoting innovations.

Taking European values as our starting point, we are guided by the following principles:

1. European data protection

2. Openness and transparency

3. Authenticity and trust

4. Digital sovereignty and self-determination

5. Free market access and European value creation

6. Modularity and interoperability

7. User-friendliness

Business, science and politics have firmly resolved to work together to set up the preconditions for an innovative data economy that is focused on the future, in both Germany and the rest of Europe. Business and society rightly expect the digital infrastructure to provide a high level of security and availability.

> We understand **data infrastructure** as a federated technical infrastructure, consisting of components and services that make it possible to access data and to store, exchange and use it according to predefined rules. We understand a **digital ecosystem** as the network of developers, providers and users of digital products and services, connected with transparency, wide-based access and a vibrant process of interchange. Such a system thus serves as a crucial foundation for European growth, digital innovations and new business models.

We are banking on Europe's enduring strengths. Among others, these include the diversity of offerings, together with strong decentralised structures suitable to small and medium-sized firms. In this way, we link up the many investments in digital technologies made throughout Europe, enabling them to have an even greater effect.

Project GAIA-X makes provision for the federalised structuring of infrastructure services, especially cloud instances and edge instances, to transform them into a homogeneous, user-friendly system. The federated form of data infrastructure that results from this strengthens both the digital sovereignty of sources of demand for cloud services and also the scalability and the competitive position of European cloud-service providers.

The GAIA-X solution concept is based on central technical requirements for the architecture of a federated, open data infrastructure:

1. Data sovereignty in the sense of complete control over stored and processed data and also the independent decision on who is permitted to have access to it.

2. The use of transparently secure, open technologies, including the use of open source principles, in an open ecosystem.

3. Decentralized or distributed data processing via multi-edge, multi-cloud or edge-to-cloud processing to achieve benefits through pooling together.

4. Interoperability in terms of technical and semantic standards as well as interconnectivity at network, data and service levels between edge or cloud instances.

5. Independent and automated certification and contracting of a participant in the GAIA-X ecosystem with regard to compliance with the GAIA-X regulations regarding IT security, data sovereignty, service levels and framework contracts.

6. Provision of central services that the ecosystem needs for secure and user-friendly operation (e.g. authentication).

7. Self-describing GAIA-X nodes to promote transparency, but also to create new business and application models across participants (e.g. data or service relaying).

The openness to national and European initiatives with a similar objective gives the project a decisive impetus, directed at a joint European solution. Building upon existing solutions and their further development, we want to launch competitive offerings from Europe out onto the world market. Involvement is also open to market participants outside Europe who share our goals of data sovereignty and data availability.

The federated data infrastructure is tailored to the needs of both the providers and users: it enhances transparency and visibility on the provider side; advances innovations in the data economy; clearly commits to interoperability of offerings and links up companies of all sizes – from major industrial corporations to small and medium-sized enterprises (SMEs), through to start-ups.

In order to implement the federated data infrastructure, we consider it necessary to establish a central organisation at the European level. This organisation would lay the economic, organisational and technical foundations of a federated data infrastructure. Its task will be to develop a reference architecture, to define standards and to determine criteria for certifications and product quality seals. It should be a neutral mediator and the hub of the European ecosystem.

Through this concept of a federated data infrastructure, we enable Europe to develop its potential in its data economy with a dynamic ecosystem. We aim to establish an ecosystem that distributes sovereignty and benefits among business, science, the state and society in equal measure.

Note: The German term "Digitale Souveränität", which is used in the German original version of this document, does not have a direct equivalent in the English language. Both "digital sovereignty" and "digital autonomy" are frequently used, with slight variations in meaning. When using the term "digital sovereignty" in this translation, we understand digital sovereignty as the possibility of independent self-determination by the state and by organisations with regard to the use and structuring of digital systems themselves, the data produced and stored in them, and the processes depicted as a result. Our project primarily addresses the aspect of data sovereignty, i.e. complete control over stored and processed data and also the independent decision on who is permitted to have access to it.