



Exploring FACIS: A Background Paper

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Introduction

Enabling innovative solutions for federated cloud-edge ecosystems while strengthening the scope of multi-provider collaboration and European digital value proposition: Precisely, this is the mission of the [European infrastructure initiative 8ra](#). FACIS (Federation Architecture for Composed Infrastructure Services) – funded by the German Ministry of Economics and Climate Action – makes a decisive contribution to building this future digital landscape – the so-called Multi-Provider Cloud-Edge Continuum. Behind this vision, there lies a shared mindset that puts the concept of interoperability across Europe first, complemented by the combined strength of other European initiatives.

The mindset behind FACIS

FACIS stands for the composition of decentralized digital services ensuring interoperability at both governance and technical levels.

1 Decentralization and Control over Data:

The demand for robust, interoperable and decentralized digital infrastructure has never been more urgent. Holding on to the centralized cloud infrastructures – nowadays still too widespread – hinders data driven innovation, such as Smart Services and AI applications. FACIS aims to support a decentralized approach that makes it possible for organizations to operate in federated environments while retaining self-determination in the digital age.

2 Federated Ecosystems:

Flexible and freely chosen collaboration between various stakeholders thus requires a seamless service orchestration across multiple providers. Federation Architecture Patterns (FAPs) will be designed as blueprint for creating a collaborative, scalable, multi-provider digital landscape. FAPs extend traditional Enterprise Architecture Patterns (EAPs) by introducing specific solutions for federated environments such as participant onboarding. These software patterns ensure interoperability across services like computing, data, identity, and trust.

By publishing FAPs as open-source components, FACIS encourages community-driven development and widespread adoption, further strengthening Europe's digital ecosystem.

3 Trust, Compliance, and Governance:

FACIS develops an SLA Governance Framework, enabling seamless collaboration and a joint service quality among service providers through machine-readable SLAs. This ensures consistent performance, security, and accountability, supporting uninterrupted service handovers — critical for applications like autonomous driving, which require low latency and high uptime.



Additionally, FACIS develops an Open-Source Digital Contracting Service aligned – where applicable - with the European Digital Identity (EUDI) to enhance trust and address legal uncertainties. By combining multi-provider SLAs with joint governance, FACIS supports cross-provider service reliability. For instance, as autonomous vehicles cross borders, the framework enforces performance standards like sub-10ms latency and 99.99% uptime, while digital contracting ensures secure, legally binding agreements. This fosters innovation without compromising trust or reliability.

How FACIS links to other Initiatives

8ra

- FACIS is part of the Important Projects of Common European Interest – Cloud Infrastructure and Services (8ra/IPCEI-CIS) initiative that aims to establish a multi-provider cloud-edge continuum across Europe. Meaning a cloud ecosystem, designed to revolutionize data processing in the next generation of cloud/edge infrastructure and services. The Initiative represents a united European effort and stands under a common governance mandated by the community of industrial partners and twelve Member States.
- As part of 8ra FACIS provides the technical as well as SLA governance support for federated cloud-edge infrastructures. FACIS concentrates on standardized FAPs for interoperability, while 8ra supports their deployment at large scale across Europe.

XFSC

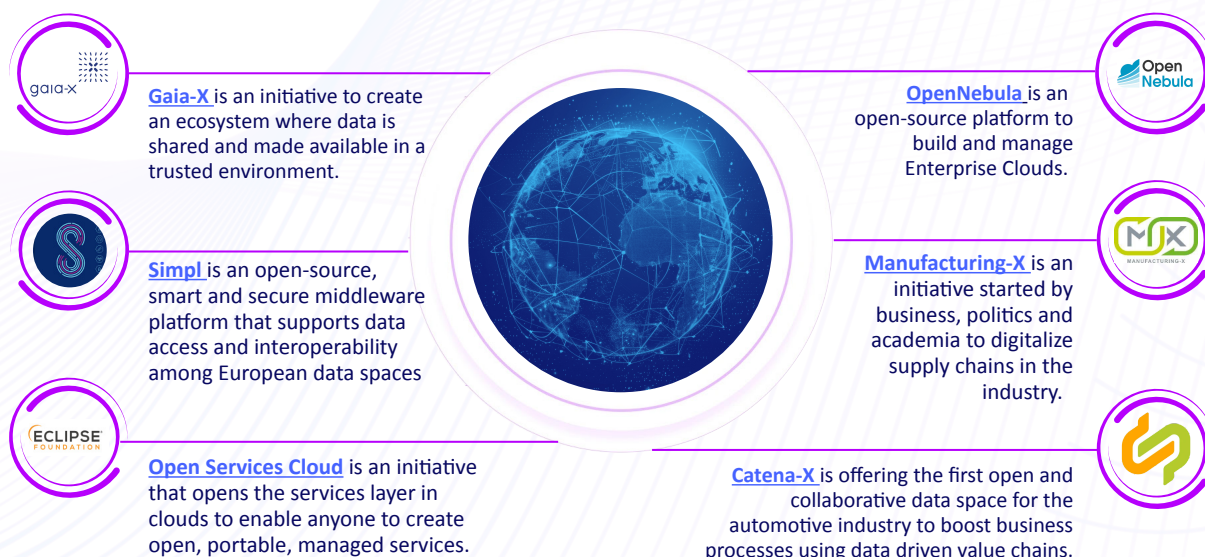
- The XFSC (Cross Federation Service Components) and the XFSC Toolbox are developed under Eclipse XFSC and focuses on standardizing and simplifying federated service management. Its goal aligns with the mission of FACIS and 8ra by enabling trustworthy and scalable federated cloud and edge services. XFSC supports sovereign data exchange, federated identity management, compliance, and federated service orchestration— key elements also found in FACIS's work on federation patterns and governance mechanisms.

- Both, FACIS and XFSC, agree with the need for interoperability through standardized approaches to federated ecosystems. Thus, FACIS integrates XFSC components for secure and interoperable service orchestration such as identity and trust management as well as catalogue services.
- FACIS and XFSC's open-source collaboration align with 8ra's goal of open provider ecosystems.

Eclipse Dataspace Connector (EDC)

- The project Eclipse Dataspace Components (EDC) is a comprehensive framework including concept, architecture, code and samples. It provides a basic set of functional and non-functional features that dataspace implementations can re-use and customize by leveraging the framework's defined APIs and ensure interoperability by design. It is powered by the specifications of the Gaia-X AISBL Trust Framework and the IDSA Dataspace protocol.
- EDC's focus on data sovereignty and secure data exchange supports FACIS's federated ecosystem, ensuring interoperability and trust across multiple service providers.

In alignment with:



and many more...

Where Europe is heading with FACIS

FACIS cannot be seen separately from other European projects and initiatives. Together they form the backbone of Europe's digital transformation – collectively fostering open collaboration and interoperability by addressing fragmentation, governance, and federated infrastructure challenges. Their combined efforts will drive innovations in cross-border cloud-edge computing, federated data spaces, and autonomous systems.

Just imagine a trip where your autonomous car smoothly travels from Budapest to Madrid, seamlessly adjusting to different environments and infrastructures across borders. However, FACIS's impact extends beyond autonomous driving. In industries such as healthcare, manufacturing, and smart cities, its frameworks and components lay the groundwork for secure, efficient, and interoperable systems. By merging technical innovation with a dedication to open-source collaboration, FACIS helps to shape a digital future for Europe that is not only inclusive, transparent, and resilient but also more competitive than ever.



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