EU Cloud Alliance Background

Defining the **enabling technologies** for the **next generation edge-to-cloud continuum**

WHEN

- Builds on the **European Data Strategy** (February 2020), endorsed by **Declaration on European Cloud** (October 2020), announced in the updated **European Industrial Strategy** (May 2021), and finally started in January 2022.

WHO

- To bring together **Businesses**, **Member States** representatives, and relevant **Experts**.
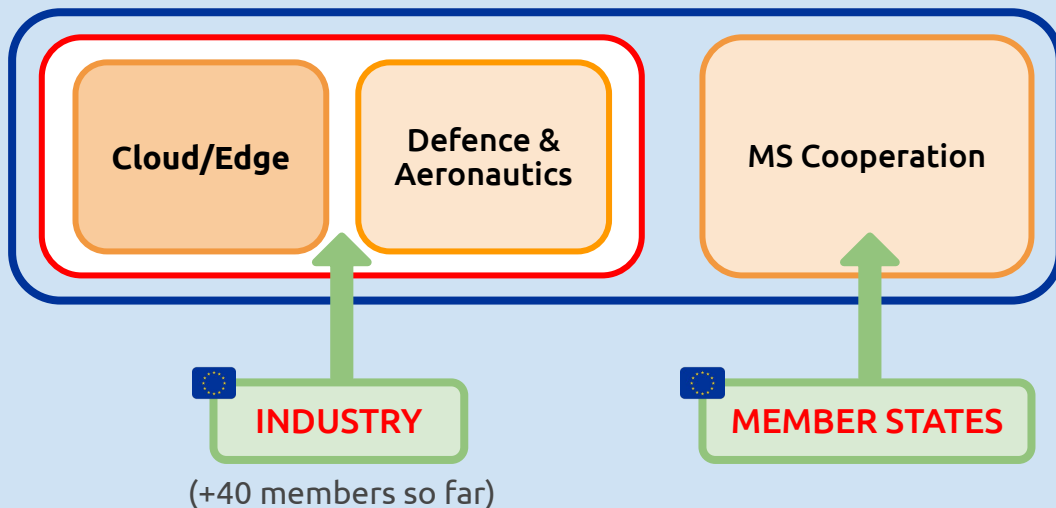
WHAT

- To **advice the European Commission** on **strategic investment roadmaps** to enable next generation cloud, edge and data processing as defined in the **European Data Strategy** and to achieve the **2030 European Digital Compass** targets.

- To provide a platform for exchange on issues of **cloud governance**, for example relating to the **public procurement** of cloud services.

EU Cloud Alliance Structure

Working Groups and **Task Forces** working on specific topics

- The work is facilitated by the European Commission's Directorate-General for Communications Networks, Content and Technology (**DG CONNECT**).

- The operational work is driven by an appointed **Steering Committee** and relevant **Working Groups** and **Task Forces**.

| Cloud/Edge | Defence & Aeronautics | MS Cooperation |

INDUSTRY

MEMBER STATES

(+40 members so far)

Cloud to Edge WG Tasks

Defining the **enabling technologies** for the **next generation edge-to-cloud continuum**

WHO

- To bring together the **main EU Industry players in cloud computing**

WHAT

- To **prepare and regularly update horizontal and technology-specific roadmaps** for next generation cloud and edge

- To **identify opportunities for joint research, development and deployment** of the next generation of European cloud and edge technologies and services

- To gather the technical requirements for cloud and edge technologies and services to meet the **processing and interoperability needs of Common European Data Spaces**.

Cloud to Edge WG Task Forces

Working Group lead by 3 companies, with **Task Forces** of 5-10 members coordinated by 2-3 co-leaders

Chair: Open Nebula

Co-chairs: Capgemini   SAP

1 EU CLOUD / EDGE COMPUTING LANDSCAPE

2 DEFINITION OF TECHNICAL SOVEREIGNTY FOR EDGE/CLOUD

Transversal domains

3 CLIMATE NEUTRALITY AND RESOURCE EFFICIENCY

4 CYBERSECURITY

5 INTEROPERABILITY AND MULTI-PROVIDER SERVICES

Technology foundations

6 EDGE AND DATA CENTRE INFRASTRUCTURE

7 NETWORK INTEGRATION AND CONNECTIVITY

8 CLOUD / EDGE FOUNDATION INFRASTRUCTURE

Sector-specific services

9 INFRASTRUCTURE SERVICES

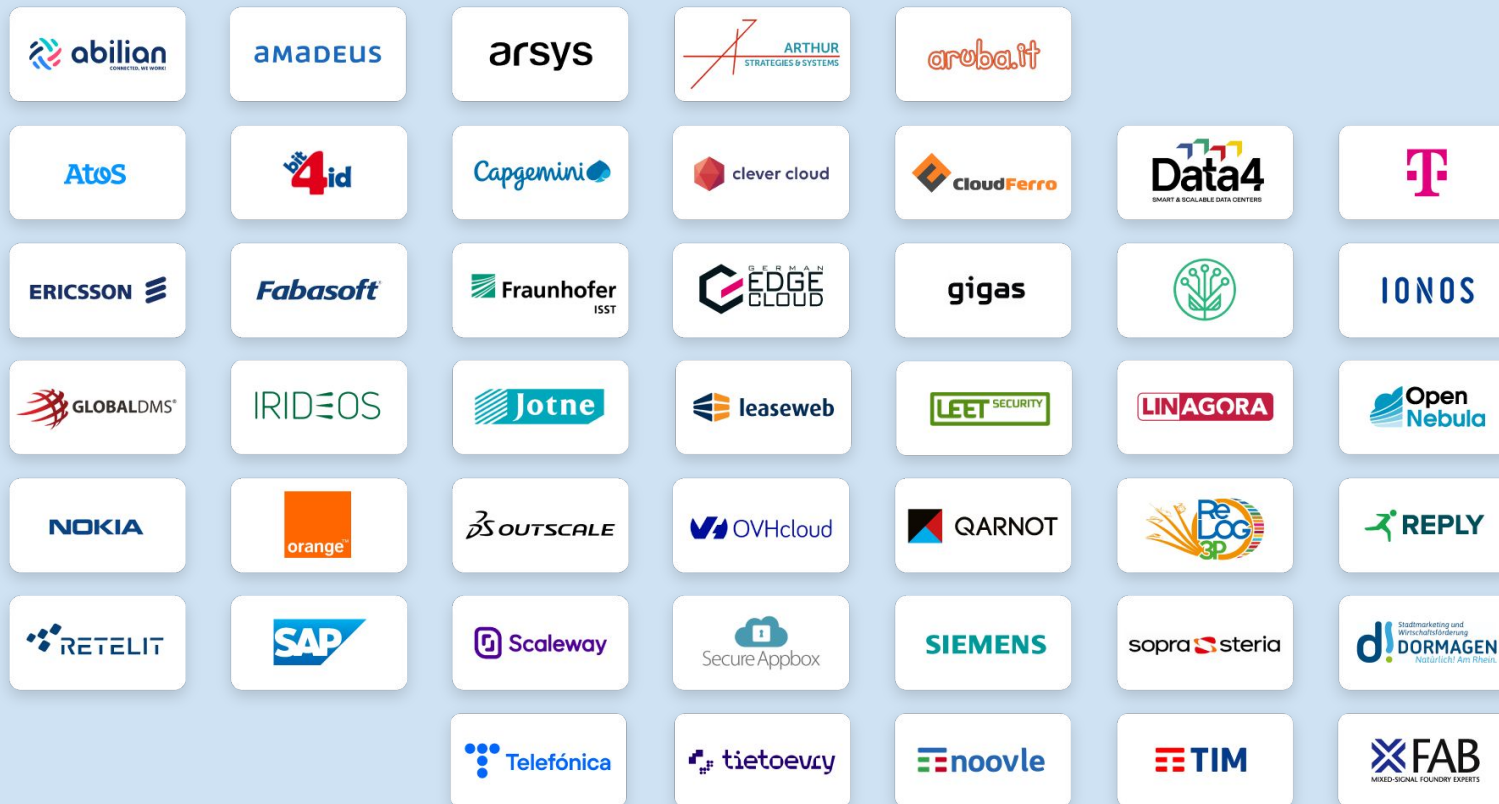**9** PLATFORM SERVICES

10 APPLICATION & DATA SERVICES

Cloud to Edge WG Members

45 industrial members representing **cloud providers**, **telco operators**, **technology providers** and **services providers**

Cloud to Edge WG Aim

Fostering the development and deployment of the **key enabling technologies** for the **next generation cloud-to-edge continuum**

EUROPEAN ALLIANCE FOR INDUSTRIAL DATA, EDGE AND CLOUD

Which **technology componentes** and **digital services** are needed to enable EU companies to take advantage of **edge computing opportunity** to reverse the **cloud market** and increase Europe's leadership position on **industrial data**?

Cloud to Edge WG New Roadmap

Working on an **updated roadmap** that will provide recommendations to EC Programmes
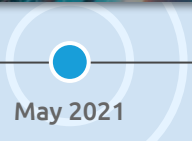
May 2021
Initial set of recommendations
(https://digital-strategy.ec.europa.eu/en/policies/cloud-alliance)

November 2022
Executive summary

July 2023 (TBC)
Updated set recommendations

Source: European Commission

Cloud to Edge WG New Roadmap

Updated roadmap that will provide recommendations to EC Programmes

NEXT-GENERATION CLOUD-EDGE

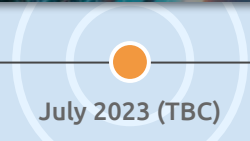**EUROPEAN INDUSTRIAL TECHNOLOGY ROADMAP**

22 FOCUS AREAS ACROSS

10 TECHNOLOGY DOMAINS

- Edge and datacenter
- Infrastructure
- New connectivity for Edge-Cloud
- Cloud-Edge foundation Infrastructure
- Infrastructure & platform services
- Cybersecurity
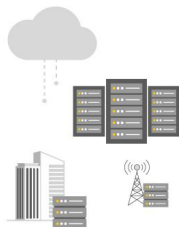
- Open source, open specifications & standards
- Digital sovereignty
- Climate positivity & resource efficiency
- Application & data services
- Interoperability & multi-provider services

50 TECHNOLOGY PRIORITIES

15 DEPLOYMENT CHALLENGES

AMPLIFYING VALUE IN SEVERAL USE CASES

INDUSTRY

- Healthcare
- Mobility
- Logistics
- Smart Cities
- Sustainability
- Supply Chain
- Public Safety & Disaster Relief

TECHNOLOGY

- Cloud Edge Continuum
- Mobile networks driving Cloud Edge
- AI Federated Machine Learning
- Digital Twins

PREPARED BY

45 LEADING EUROPEAN INDUSTRY PLAYERS

EDGE & CLOUD CONTINUUM WORKING GROUP

Cloud to Edge WG New Roadmap

Updated roadmap that will provide recommendations to EC Programmes

Digital Sovereignty
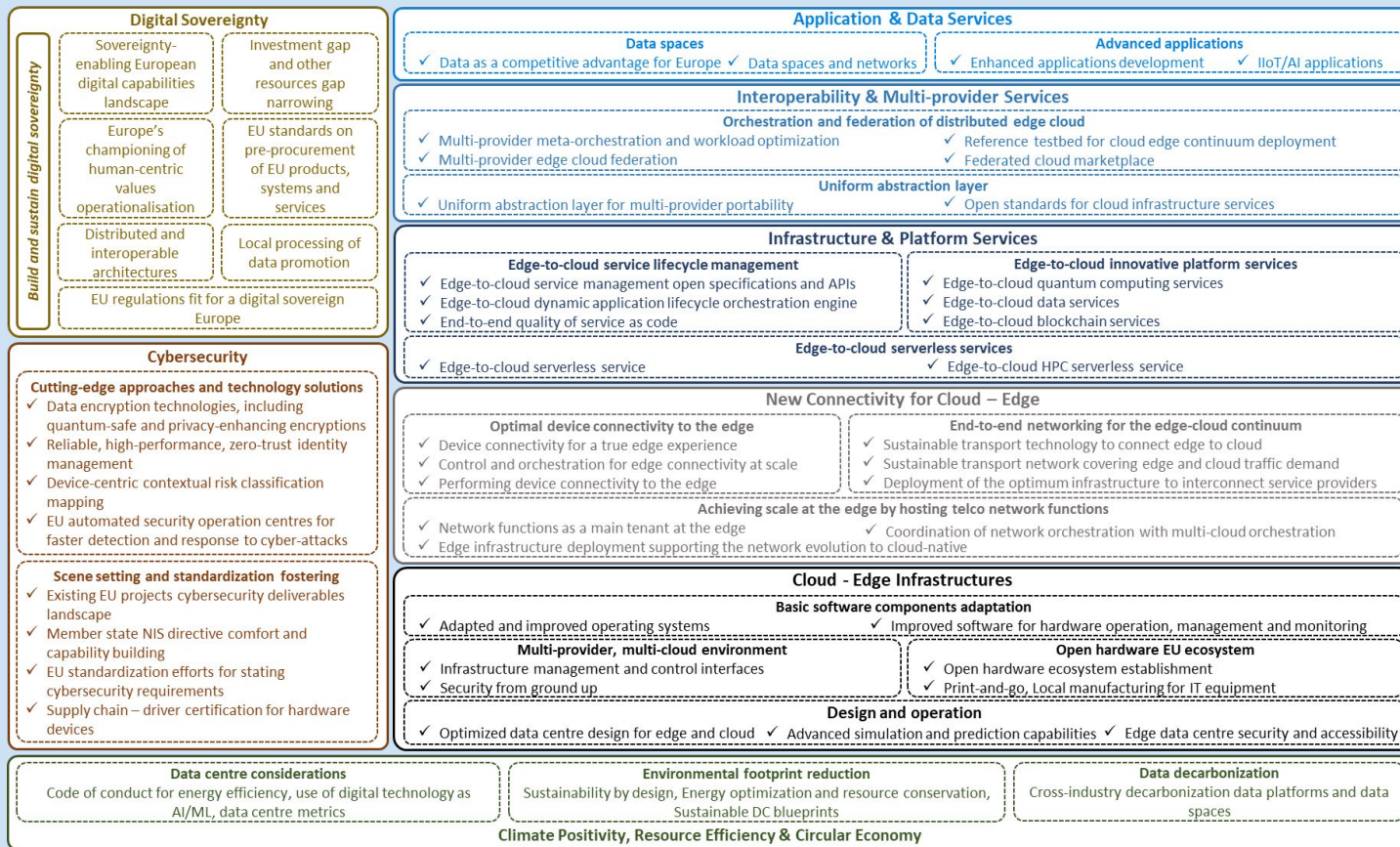
Build and sustain digital sovereignty

- Sovereignty-enabling European digital capabilities landscape
- Investment gap and other resources gap narrowing
- Europe's championing of human-centric values operationalisation
- EU standards on pre-procurement of EU products, systems and services
- Distributed and interoperable architectures
- Local processing of data promotion
- EU regulations fit for a digital sovereign Europe

Cybersecurity

Cutting-edge approaches and technology solutions
- ✓ Data encryption technologies, including quantum-safe and privacy-enhancing encryptions
- ✓ Reliable, high-performance, zero-trust identity management
- ✓ Device-centric contextual risk classification mapping
- ✓ EU automated security operation centres for faster detection and response to cyber-attacks

Scene setting and standardization fostering
- ✓ Existing EU projects cybersecurity deliverables landscape
- ✓ Member state NIS directive comfort and capability building
- ✓ EU standardization efforts for stating cybersecurity requirements
- ✓ Supply chain – driver certification for hardware devices

Application & Data Services

Data spaces
- ✓ Data as a competitive advantage for Europe   ✓ Data spaces and networks

Advanced applications
- ✓ Enhanced applications development   ✓ IIoT/AI applications

Interoperability & Multi-provider Services

Orchestration and federation of distributed edge cloud
- ✓ Multi-provider meta-orchestration and workload optimization
- ✓ Multi-provider edge cloud federation
- ✓ Reference testbed for cloud edge continuum deployment
- ✓ Federated cloud marketplace

Uniform abstraction layer
- ✓ Uniform abstraction layer for multi-provider portability
- ✓ Open standards for cloud infrastructure services

Infrastructure & Platform Services

Edge-to-cloud service lifecycle management
- ✓ Edge-to-cloud service management open specifications and APIs
- ✓ Edge-to-cloud dynamic application lifecycle orchestration engine
- ✓ End-to-end quality of service as code

Edge-to-cloud innovative platform services
- ✓ Edge-to-cloud quantum computing services
- ✓ Edge-to-cloud data services
- ✓ Edge-to-cloud blockchain services

Edge-to-cloud serverless services
- ✓ Edge-to-cloud serverless service   ✓ Edge-to-cloud HPC serverless service

New Connectivity for Cloud – Edge

Optimal device connectivity to the edge
- ✓ Device connectivity for a true edge experience
- ✓ Control and orchestration for edge connectivity at scale
- ✓ Performing device connectivity to the edge

End-to-end networking for the edge-cloud continuum
- ✓ Sustainable transport technology to connect edge to cloud
- ✓ Sustainable transport network covering edge and cloud traffic demand
- ✓ Deployment of the optimum infrastructure to interconnect service providers

Achieving scale at the edge by hosting telco network functions
- ✓ Network functions as a main tenant at the edge
- ✓ Coordination of network orchestration with multi-cloud orchestration
- ✓ Edge infrastructure deployment supporting the network evolution to cloud-native

Cloud - Edge Infrastructures

Basic software components adaptation
- ✓ Adapted and improved operating systems
- ✓ Improved software for hardware operation, management and monitoring

Multi-provider, multi-cloud environment
- ✓ Infrastructure management and control interfaces
- ✓ Security from ground up

Open hardware EU ecosystem
- ✓ Open hardware ecosystem establishment
- ✓ Print-and-go, Local manufacturing for IT equipment

Design and operation
- ✓ Optimized data centre design for edge and cloud   ✓ Advanced simulation and prediction capabilities   ✓ Edge data centre security and accessibility

Climate Positivity, Resource Efficiency & Circular Economy

Data centre considerations
Code of conduct for energy efficiency, use of digital technology as AI/ML, data centre metrics

Environmental footprint reduction
Sustainability by design, Energy optimization and resource conservation, Sustainable DC blueprints

Data decarbonization
Cross-industry decarbonization data platforms and data spaces
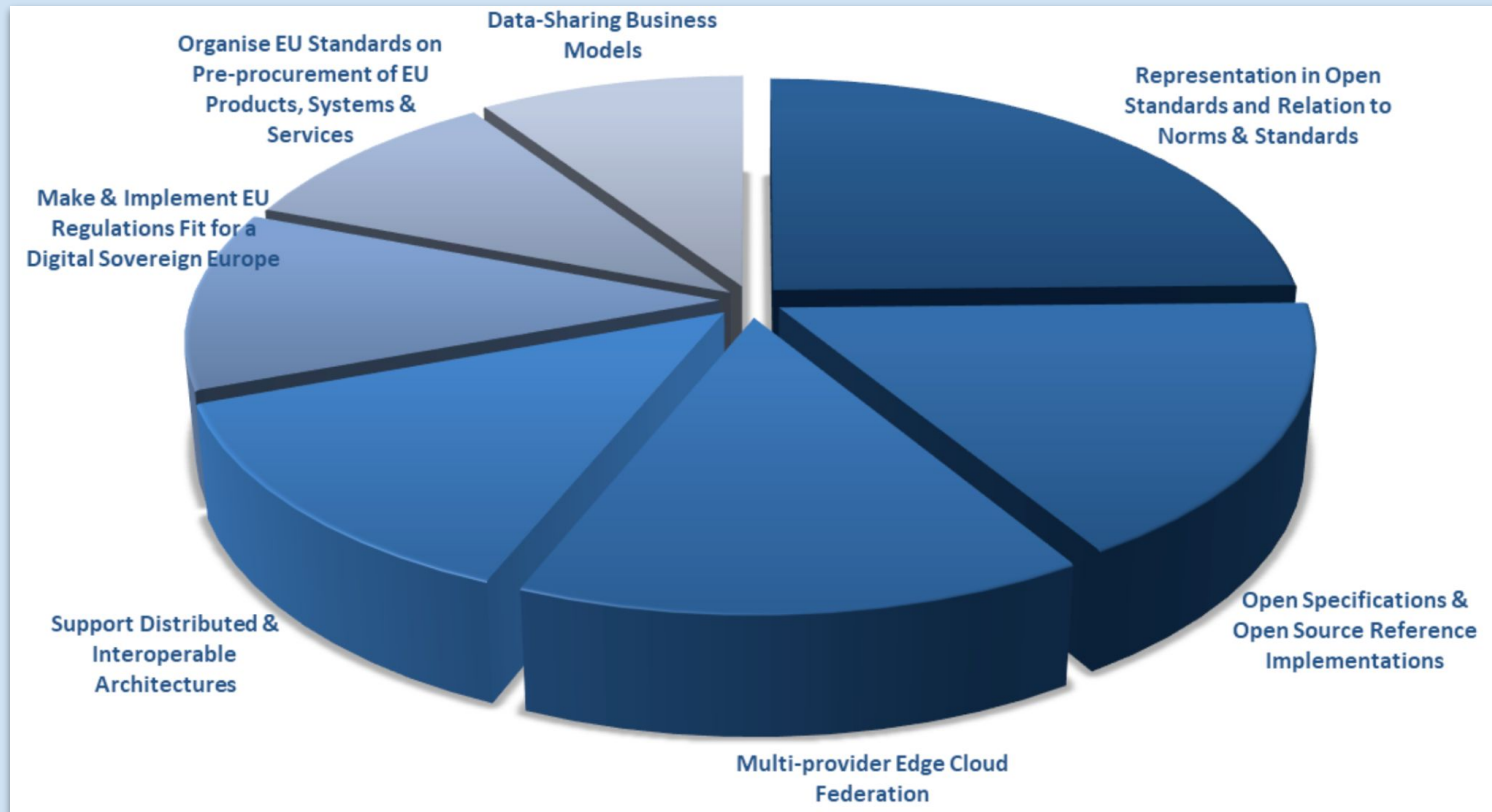
Open specifications & standards, reference implementations & open source

Open Specifications & Open Source Reference Implementations, Representation in open standards and relation to norms and standards, Closer collaboration between initiatives and associations, Data-sharing business models

Technology Roadmap Essential Priorities

Essential Priorities according to internal survey

Technology Roadmap Essential Priorities

Essential Priorities according to internal survey

1. [TP1.1] Representation in Open Standards, Relation to Norms & Standards, Industrial Data
Focus Area: Open Specifications and Standards, Reference Implementations, and Open Source

Key Driver	The international cloud and edge landscape, along the entire industry value chain, is using a **growing broad range of normative, standardisation, and de-facto standardisation rulings** where the European industry should be more actively engaged.
Recommendation	The representation in open standards committees and communities should become an **integral part of European and National funded projects**. EU and member states should consider legislation by law and in new contracts to **mandate the use of standards** in order to open up and increase the use of industrial data dramatically, and bring **cloud interoperability and vendor-neutrality** to market.

2. [TP1.2] Open Specifications & Open Source Reference Implementations
Focus Area: Open Specifications and Standards, Reference Implementations, and Open Source

Key Driver	Open specifications and the corresponding open source reference implementations are needed for **solving the heterogeneous multi-vendor industry market challenges**.
Recommendation	Strengthen existing (and create new) open source communities, **led by European organisations**, able to maintain important technologies in the long term as well as to lead open source reference implementations. Active promotion of **open source implementations of open standards and specifications**, synchronizing and integrating them with the normative and standardisation roadmaps of major organisations.

Technology Roadmap **Essential Priorities**

Essential Priorities according to internal survey

3. [TP5.4] Multi-Provider Edge-Cloud Federation
Focus Area: Orchestration and Federation of Distributed Edge Cloud

Key Driver	Integrated architectures are required to **meet the federation needs in edge computing to transverse one or more administrative domains** and provide t**he edge-to-cloud continuum in multiple verticals**.
Recommendation	Leading European providers with relevant open source software developers should work together in the creation of a **community-managed platform capable of solving the key federation challenges** in the cloud-edge continuum with support from the telecommunications and public sectors. The new federation models should allow the **transitioning from the existing master-slave relationship in current aggregation solutions to a peer-to-peer relationship between edge locations** and reduce the overheads and complexity of existing meta-orchestration and cloud federation mechanisms

4. [TP2.6] Support Distributed & Interoperable Architectures
Focus Area: Build, Achieve & Sustain Digital Sovereignty

Key Driver	A more distributed and interoperable cloud and edge infrastructure is needed to **allow innovation** and enable a **more dynamic and competitive vendor-neutral market of data processing**.
Recommendation	In line with the Digital Decade target for 2030 and European initiatives to foster digital sovereignty, **decentralised architectures with distributed data processing and storage** should be promoted starting in the short term and further expanding the capillarity of edge infrastructure.

Technology Roadmap Essential Priorities

Essential Priorities according to internal survey

5. [TP2.5] Make EU Regulations Fit for a Digital Sovereign Europe
Focus Area: Orchestration and Federation of Distributed Edge Cloud

Key Driver	Adapt existing **regulation in line with evolution of the developed standards** for sovereignty.
Recommendation	Align with global regulatory bodies to **ensure an open market and interoperability**.

6. [TP2.4] EU Standards on Pre-procurement of EU Products, Systems & Services
Focus Area: Orchestration and Federation of Distributed Edge Cloud

Key Driver	Clear guidelines to **identify service offerings which are compliant with EU regulations**.
Recommendation	Mechanism to provide **identifiers for compliant products, systems & services** (e.g. Provider ID)

7. [TP1.4] Data-sharing Business Models
Focus Area: Open Specifications and Standards, Reference Implementations, and Open Source

Key Driver	**Competition between business models i**s increasingly replacing differentiation based on products or process excellence.
Recommendation	Multi-sided business and market activities based on clear rules (e.g. for data sharing) to provide a **secure legal and technical framework for cross-vendor data sharing**.

EU Cloud Alliance **Join Us!**

https://digital-strategy.ec.europa.eu/en/policies/cloud-alliance

Source: European Commission

MAIN INTERESTS ?

- **Interoperability & multi-cloud** approaches.
- **Climate-neutral & sustainable** cloud.
- **Edge** deployment.
- **Sovereign cloud stack**, encompassing the edge.
- **Defence** cloud.
- Governance **rules and standards** for data processing services.
- Cloud for **European common data spaces**, including coordination with the Support Centre for Data Sharing and the European Data Innovation Board.
- **Telco** edge cloud.

Thanks!