



DEP Cloud-to-Edge Infrastructure and services

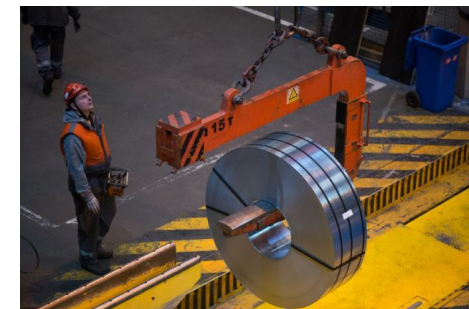
Brokering event for European Data Spaces

Manuel Mateo Goyet - 16 December 2021

Directorate-General for Communications Networks, Content and Technology

European Commission

A new paradigm for EU action on cloud and edge: high ambition & coordinated approach



Feb. 2020
European Strategy for Data
aims to build a single market for data

May 2020
Recovery and Resilience Facility
20% Digital EU Flagship
“Scale-up”

Oct. 2020
Member States Declaration for European cloud

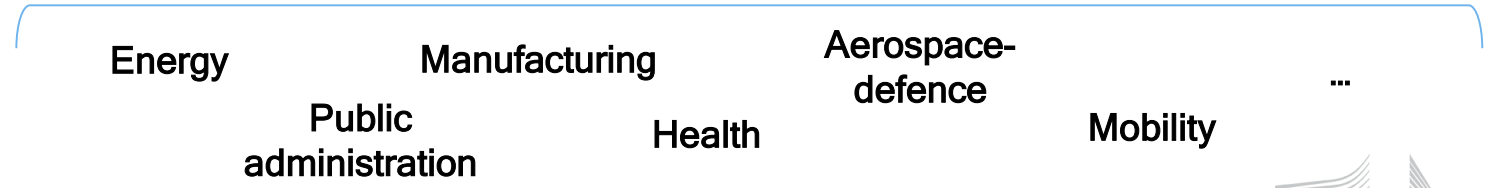
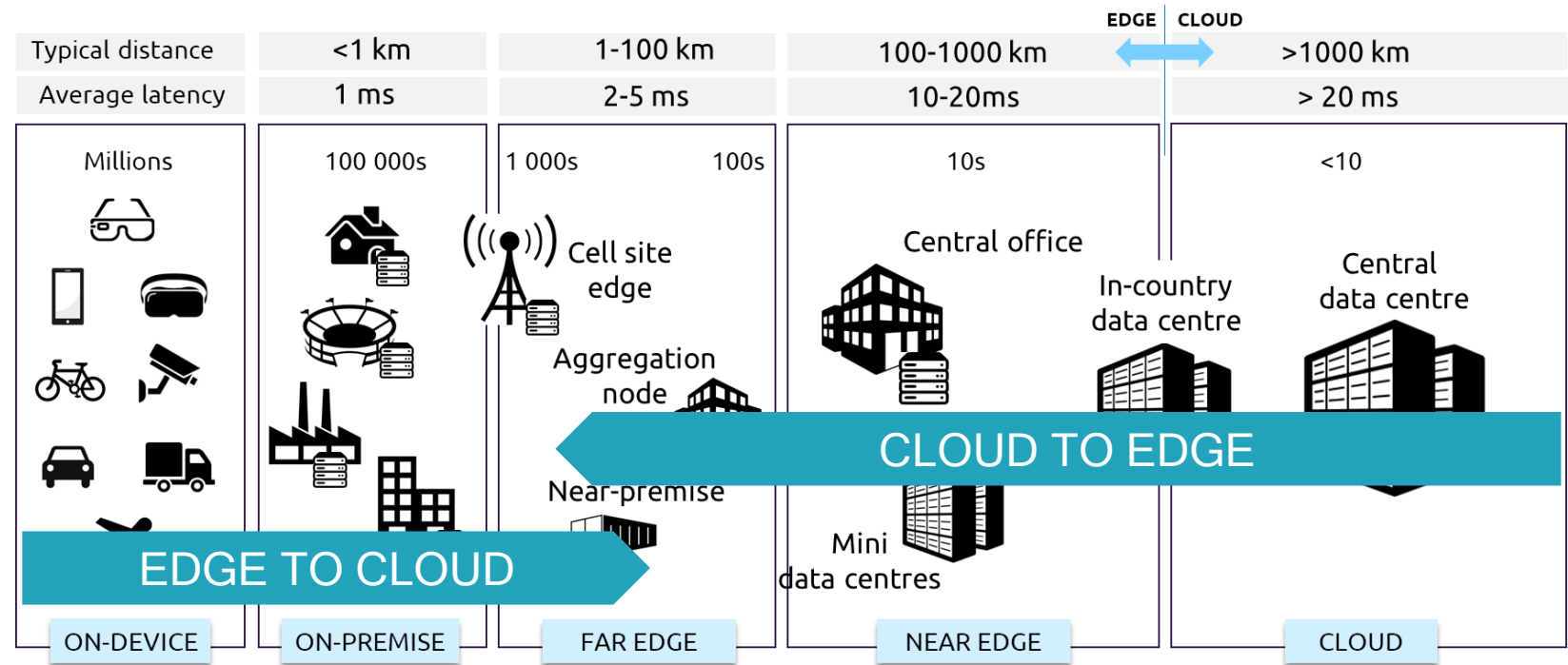
March 2021
Digital Decade Strategy sets targets on edge and cloud for 2030

May 2021
Updated EU Industrial strategy
evidences strategic dependencies

Our vision: Digital Decade objectives by 2030



- ✓ >10.000 edge nodes by 2030
- ✓ 75% of cloud uptake by EU enterprises in 2030



European industrial technology roadmap for the next generation cloud-edge offering (May 2021)

Prepared by:

AIRBUS

Atos



IRIDEXOS

NabiaX

OUTSCALE



T-Systems

amadeus

Capgemini



ERICSSON

indra

leaseweb

NOKIA

OVHcloud™

Schneider
Electric

Telefonica

aruba.it



gigas

IONOS

Magic
Cloud

orange™

RETELIT

SIEMENS

TIM

Industry Roadmap

Become the global leader in transversal domains

1
CLIMATE
NEUTRALITY AND
RESOURCE
EFFICIENCY

2
CYBERSECURITY

3
INTEROPERABILITY
AND
MULTI-PROVIDER
SERVICES

By 2025, the European cloud-edge industry should be globally renowned for its technological leadership, competitiveness and adoption in these three fields, shaping worldwide standards.

Renew and expand infrastructure foundations across Europe

4
DATA CENTRE
INFRASTRUCTURE

5
NETWORK
INTEGRATION
AND INTER-
CONNECTIVITY

6
CLOUD
FOUNDATION
INFRASTRUCTURE

To meet targets for adoption, accessibility and Single Market integration, investments must increase the **density, efficiency of cloud and edge facilities** across Europe, improve **connectivity**, and optimize operations with best-in-class **operating and management software**.

Enable sovereign and sector-specific services to end-users

7
INFRASTRUCTURE
SERVICES

8
PLATFORM
SERVICES

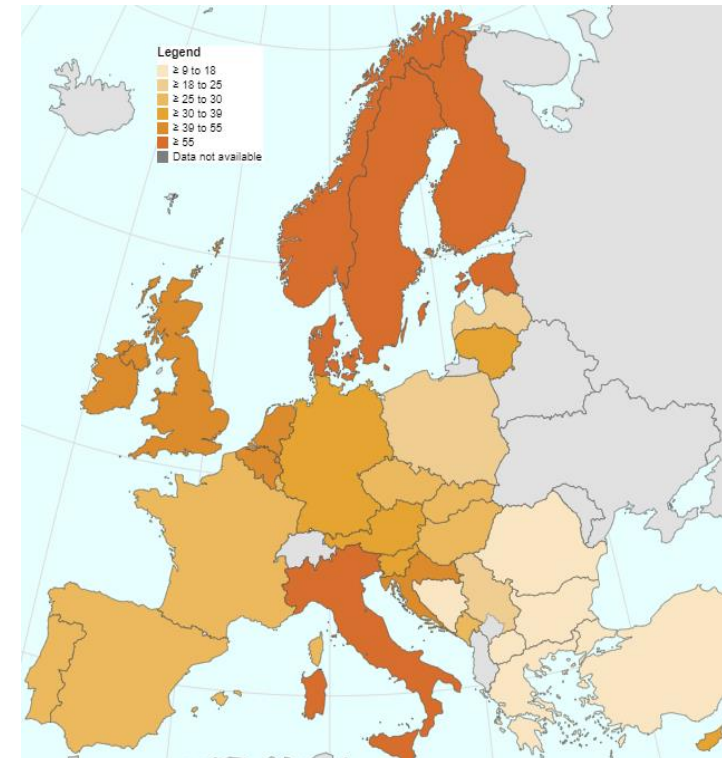
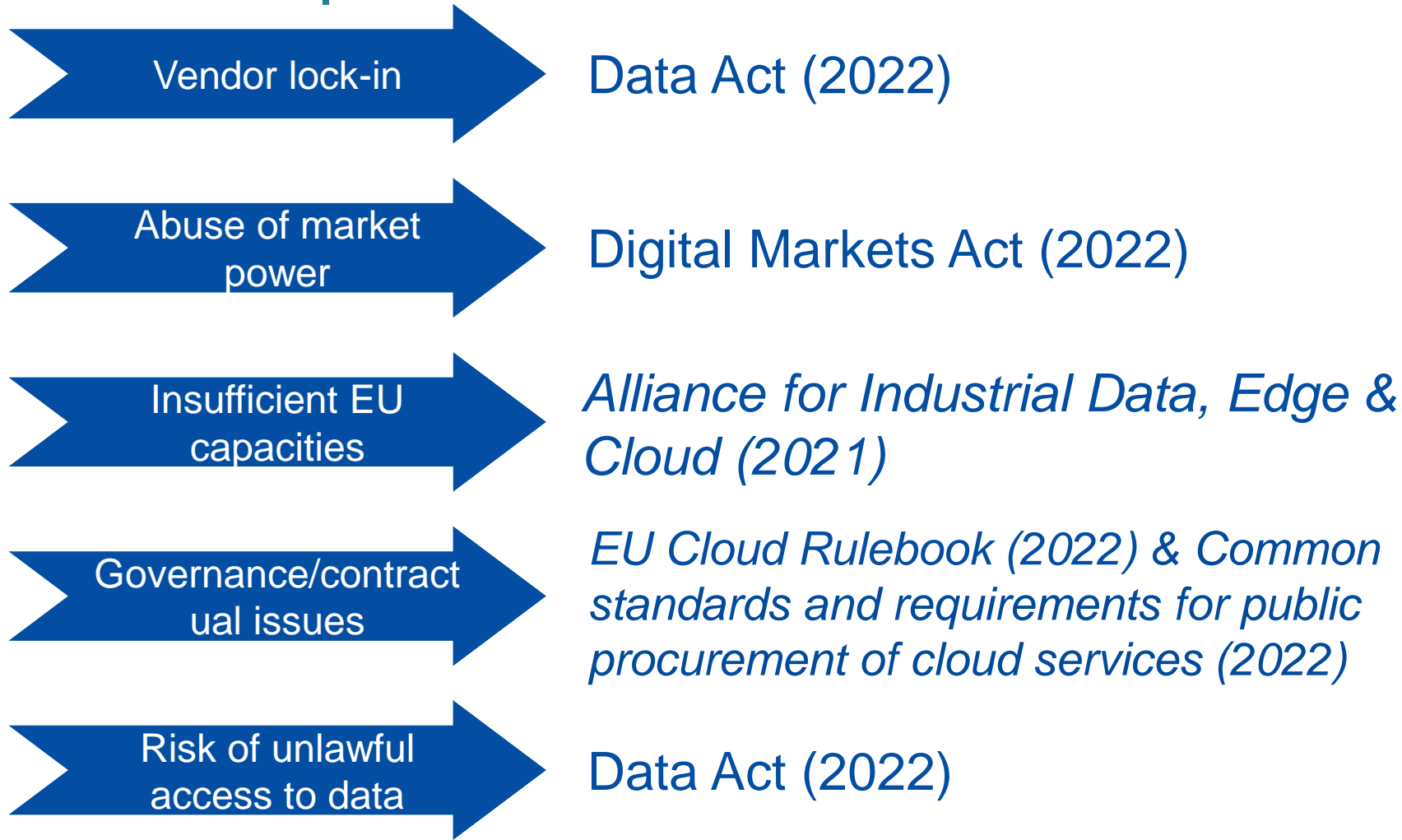
9
APPLICATION &
DATA SERVICES

European users should be in a position to choose cloud-edge services - from IaaS to SaaS - that meet their requirements for **openness, security, interoperability and data sovereignty**, and that **accelerate industry-specific use cases**.

The EU Data Policy Framework

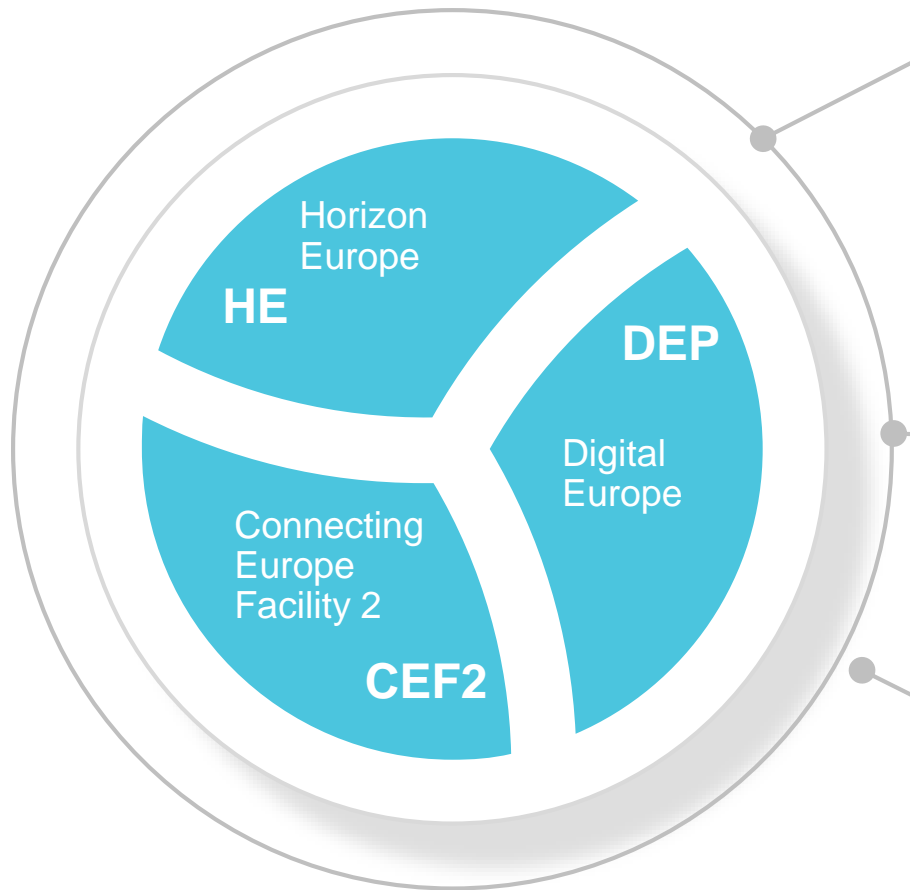
EU legislative framework: GDPR (2016) + Free Flow of Non-Personal Data Regulation (2018)

Next steps:



EU funded programmes

- HE
- CEF2
- DEP
- RRF
- Invest EU
- IPCEI*



Long Term Research



Horizon Europe

THE NEXT EU RESEARCH & INNOVATION PROGRAMME (2021-2027)



Deployment of Digital Services



Digital Europe Programme



Deployment of Digital Infrastructures

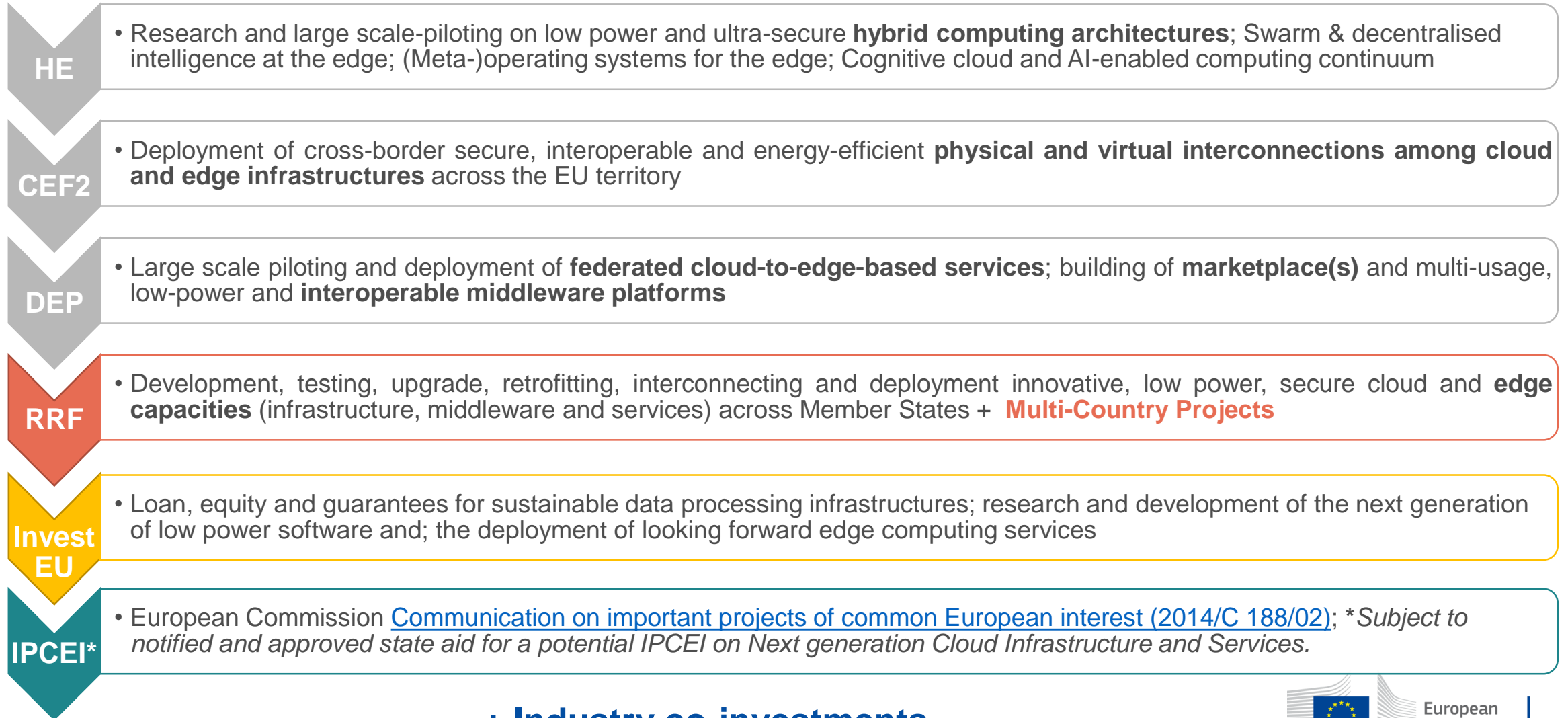


Connecting Europe Facility Digital Programme

2021-2027

#CEF2digital

European Investment Schemes on Cloud & Edge



+ Industry co-investments

A coordinated investment effort



DEP

Horizon

CEF2

RRF

National budget

Possibly: IPCEI*

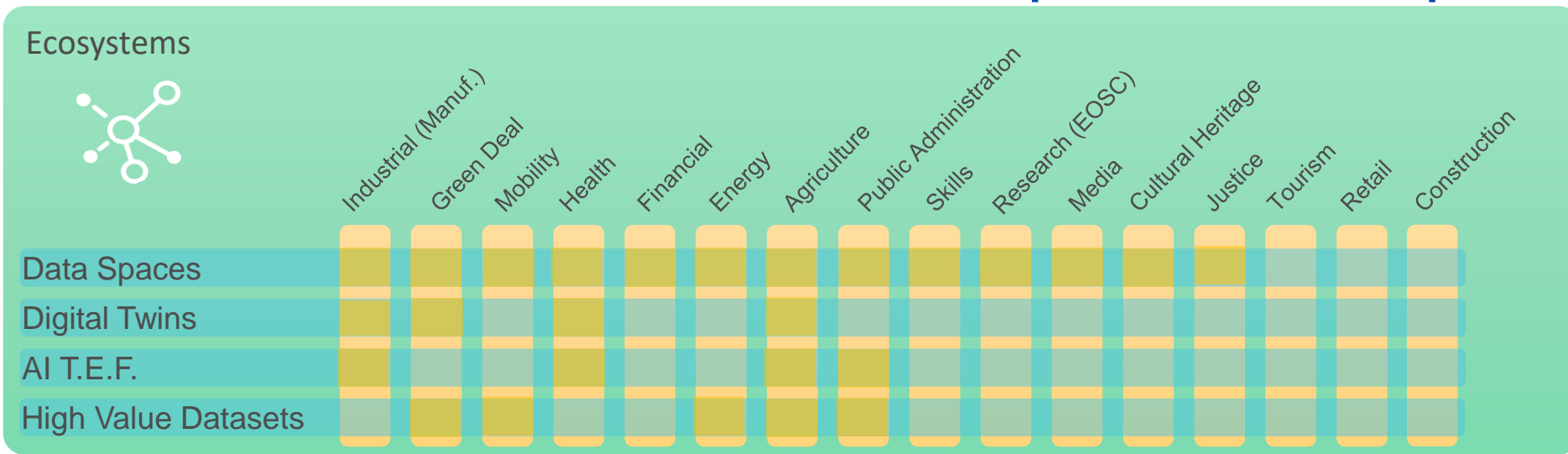
Corporate investments

Invest EU

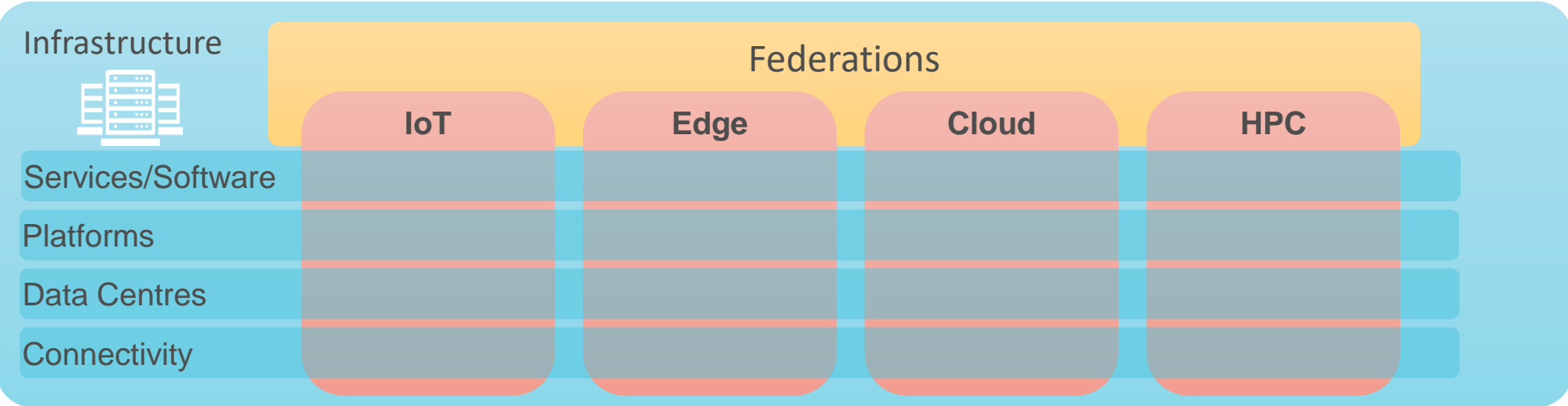
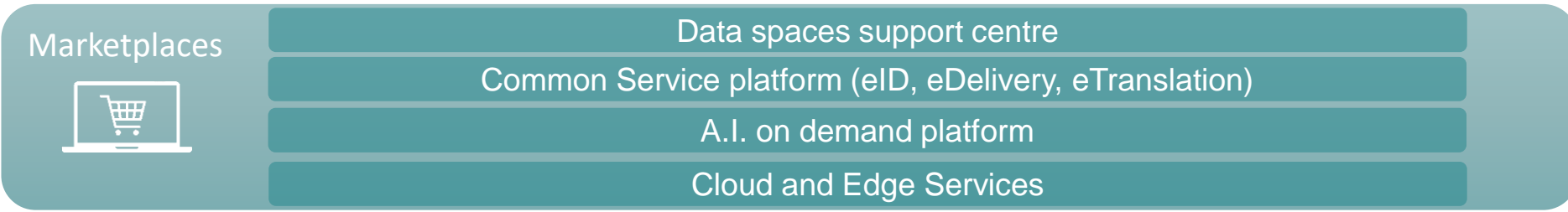
* subject to notified state aid by Member States and approval by the EC, cf. [Communication \(2014/C 188/02\)](#)

Our vision: Cloud, Common European Data Spaces and AI

Skills & Digital Innovation Hubs
Standards, Interoperability & Portability
End-to-end cybersecurity, Trust, authentication, identification

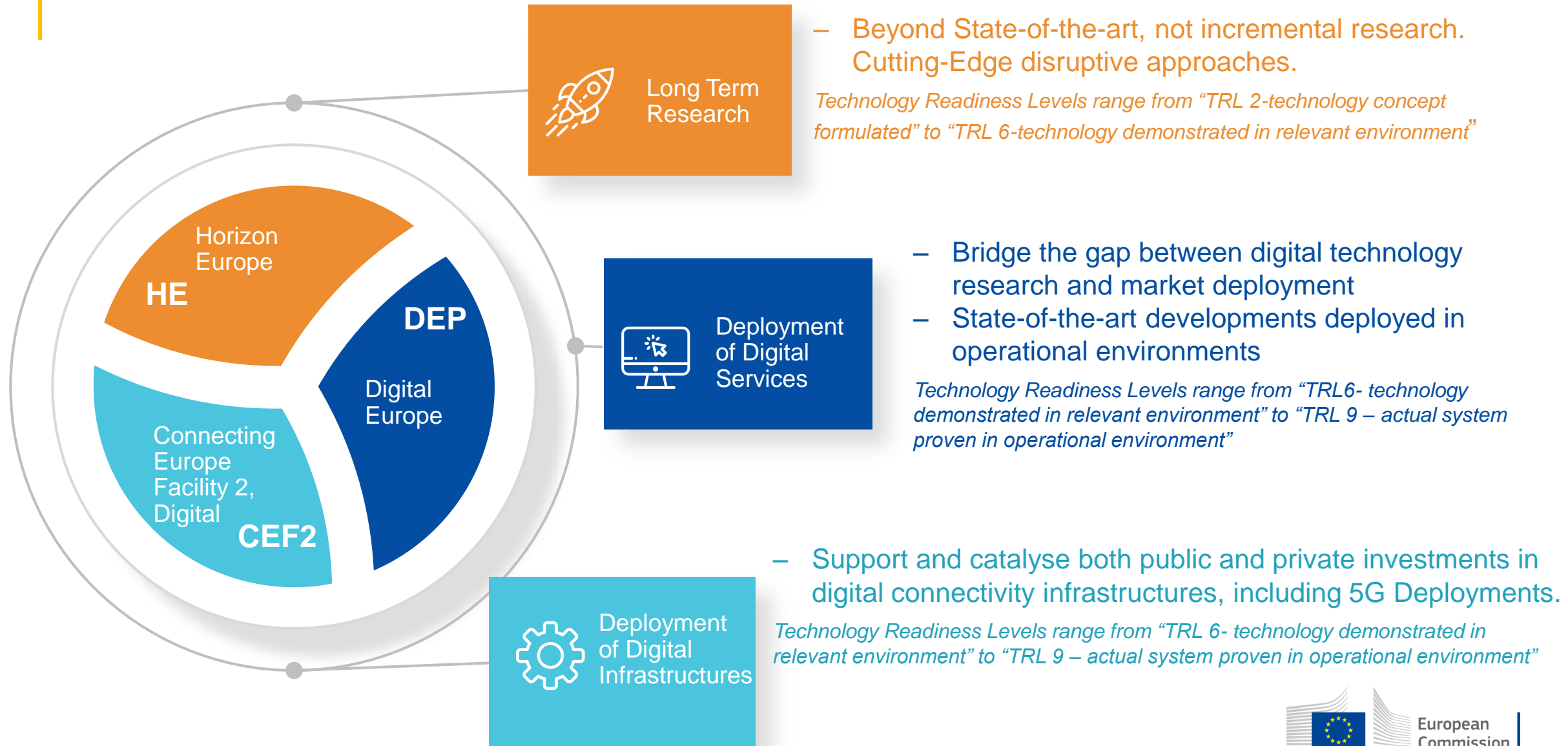


Data Spaces will be built over federated data infrastructure with common technical requirements (where possible)

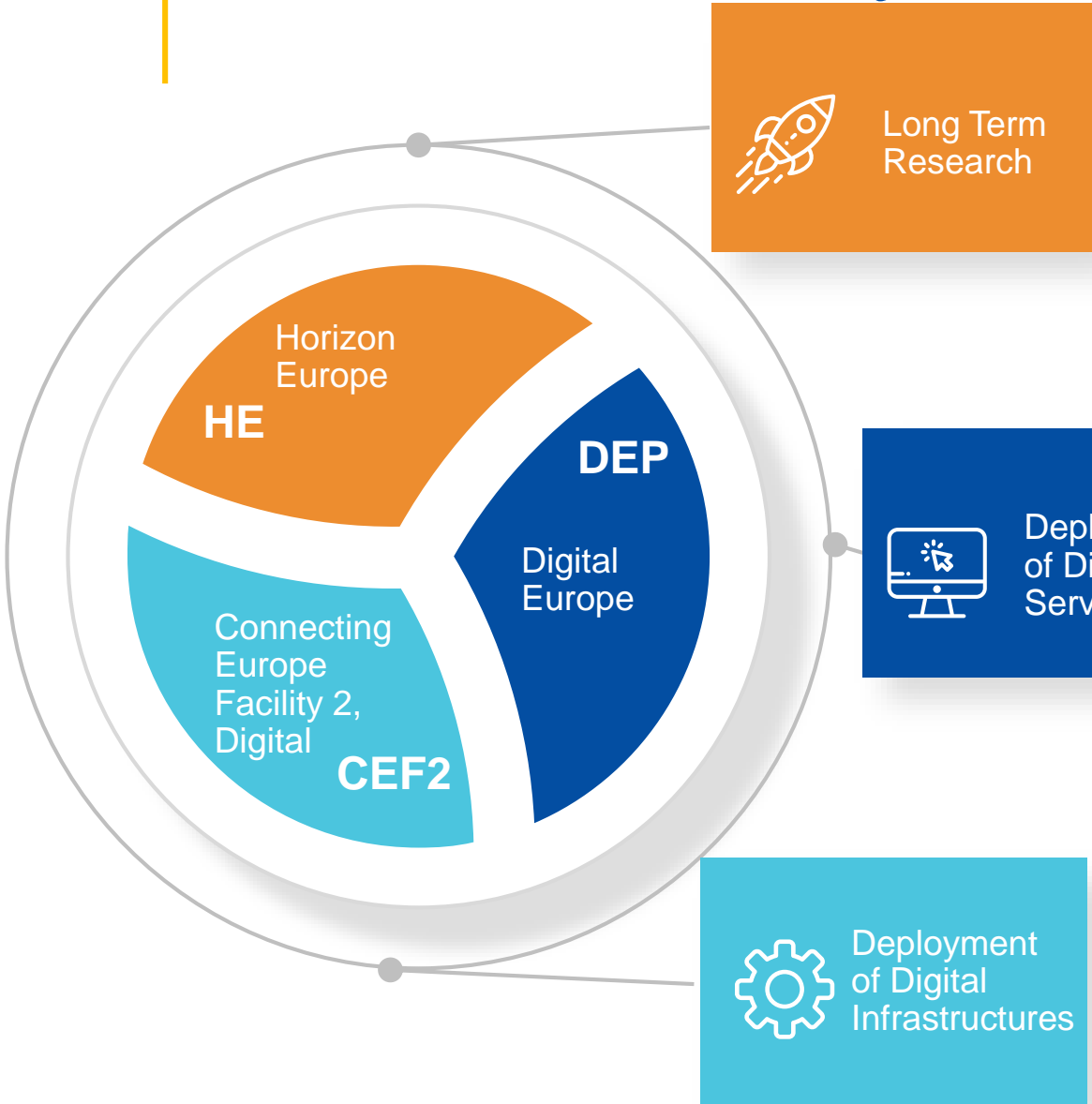


Services and middleware developed to enable a federation of cloud-to-edge capacities will be at the disposal of all data spaces

EU actions & programmes – Edge-Cloud continuum



Overview of key EU programmes, Roadmap



→ **Cloud and Edge New hardware design, Energy efficiency**



→ **Advanced E2E Intelligent Orchestration across compute continuum.**



→ **Middleware for large cloud continuum ecosystems, e2e data pipelines**



→ **Pilots for Smart IoT**



→ **Federated European Marketplace (Edge 2 Cloud)**



→ **Reference Implementation for federated cloud (& edge)**
→ **Open source software stack**



→ **Large scale deployments in application sectors**



→ **Density Edge deployments**



→ **Density Edge and Cloud deployments**

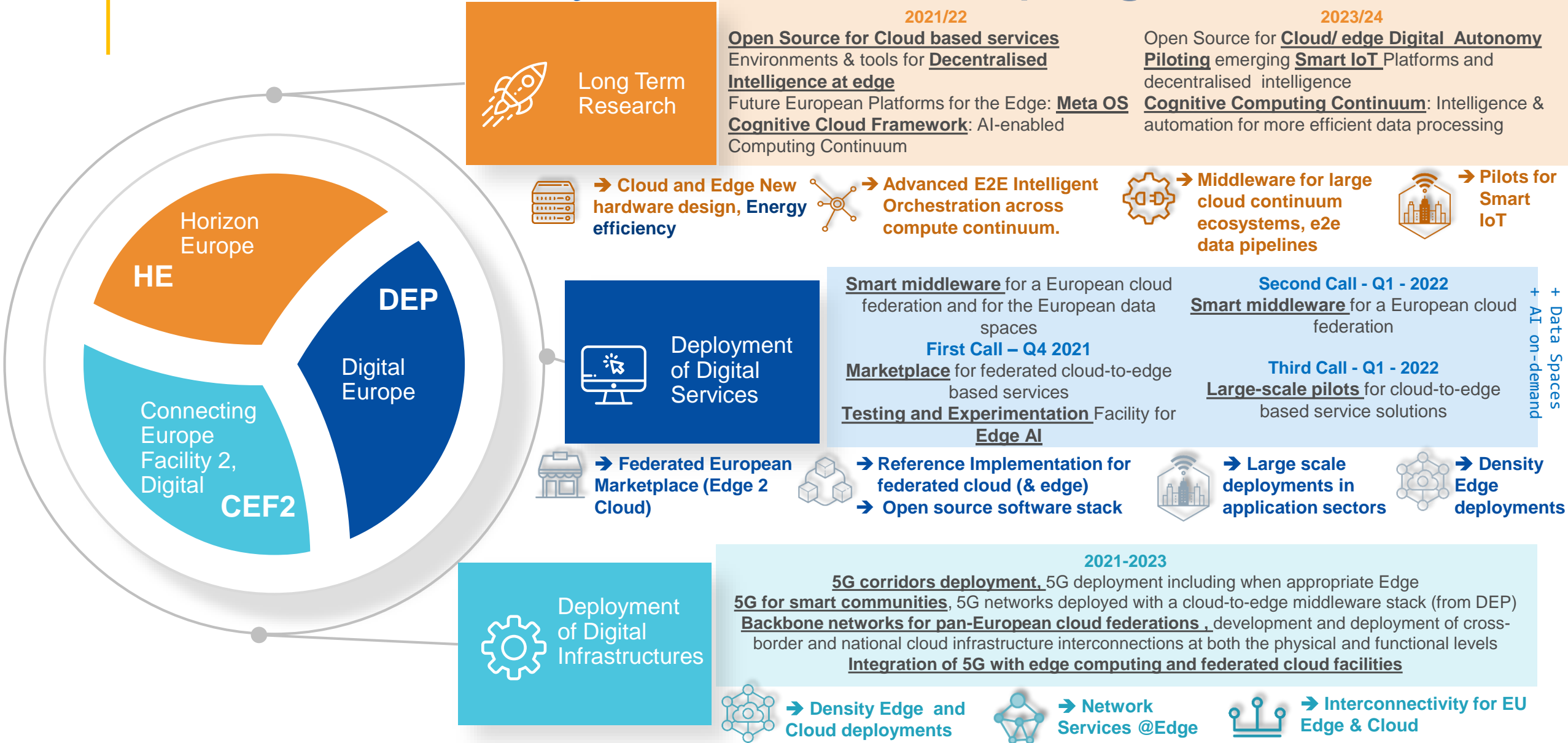


→ **Network Services @Edge**

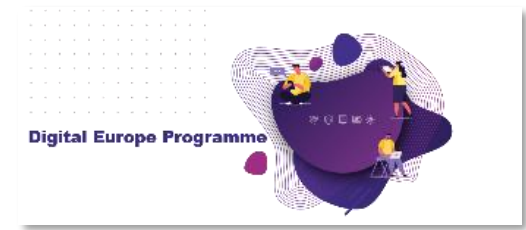


→ **Interconnectivity for EU Edge & Cloud**

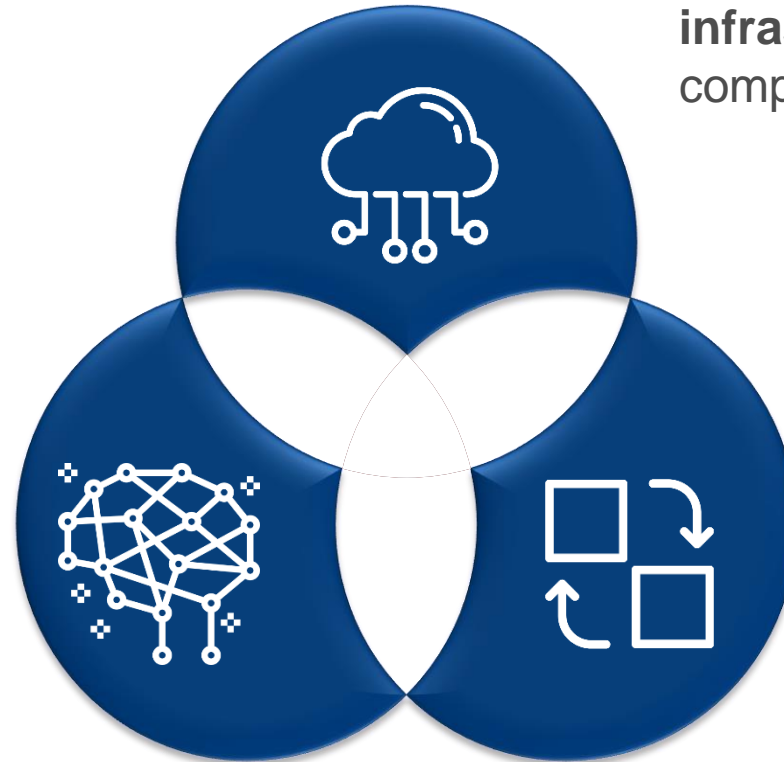
Overview of key EU actions & programmes



Digital Europe: Cloud, data and Artificial Intelligence



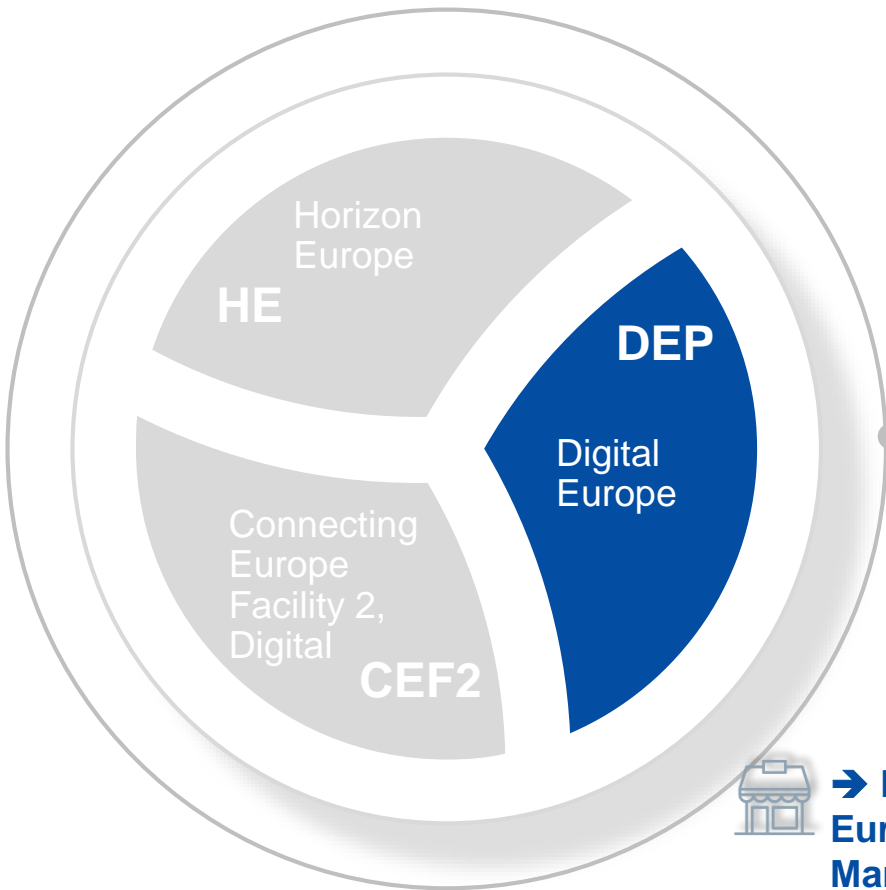
Deployment of **cloud-to-edge infrastructure and services** compliant with EU rules



AI reference testing and experimentation facilities
AI on demand platform

Deployment of a Data for EU strand with a focus on building **common data spaces**

Digital Europe – Edge-Cloud continuum, Roadmap



Deployment of Digital Services

Procurement 2021/22

- **Smart middleware** for a European cloud federation and for the European data spaces

First Call – Q4 2021

- **Marketplace** for federated cloud-to-edge based services
- **Testing and Experimentation** Facility for **Edge AI**

Third Call - Q1 - 2022

- **Large-scale pilots** for cloud-to-edge based service solutions

+ **Data Spaces**
+ **AI on-demand**



→ Federated European Marketplace (Edge 2 Cloud)



→ Reference Implementation for federated cloud (& edge)
→ Open source software stack

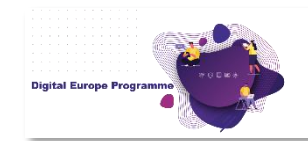


→ Large scale deployments in application sectors



→ Density Edge deployments

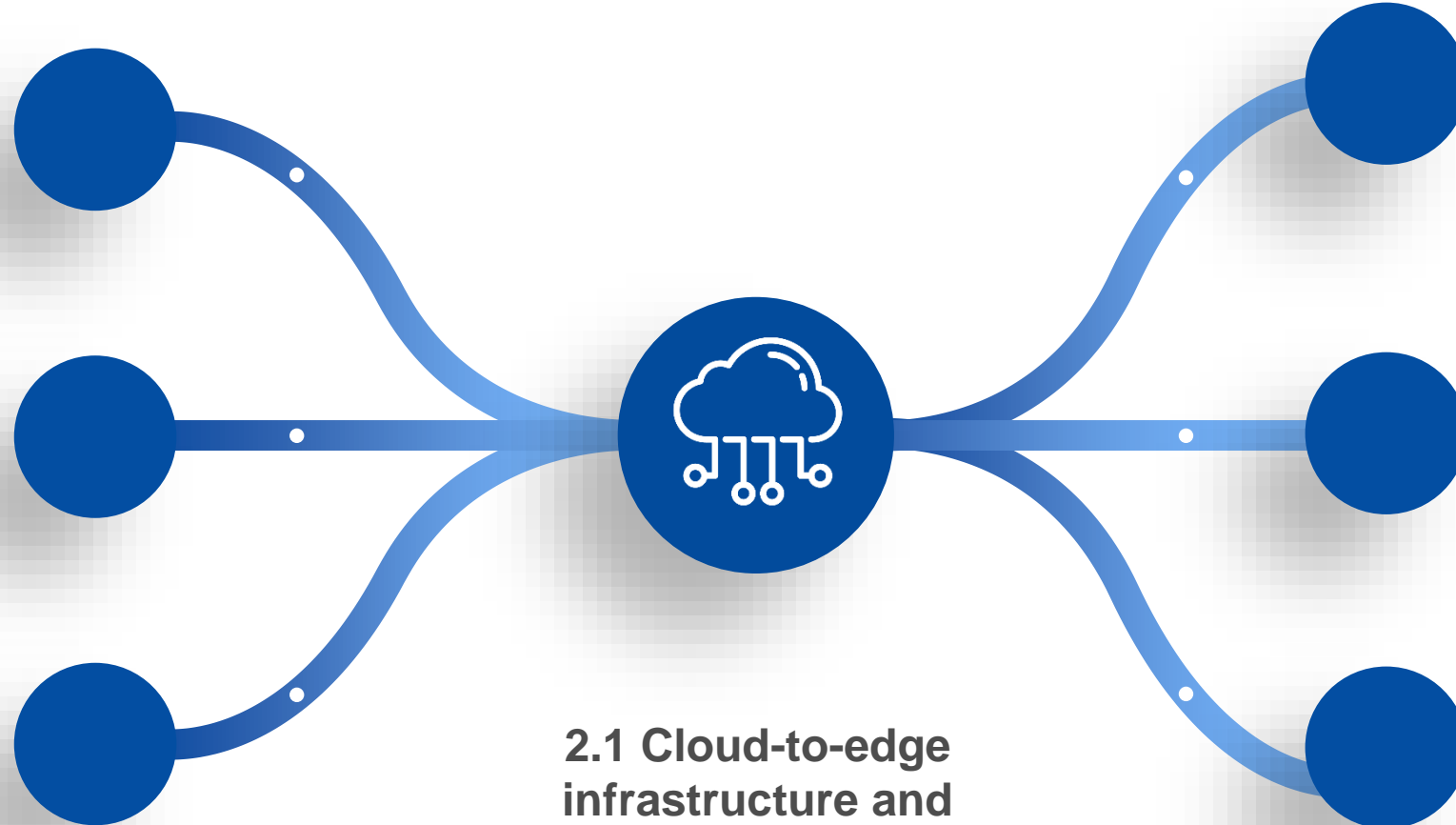
Digital Europe: Cloud-to-edge infrastructure and services



2.1.6 Secretariat for the Alliance on Processors and Semiconductor technologies

2.1.5 Testing and Experimentation Facility for Edge AI

2.1.4 Secretariat for the Alliance on industrial data, cloud and edge



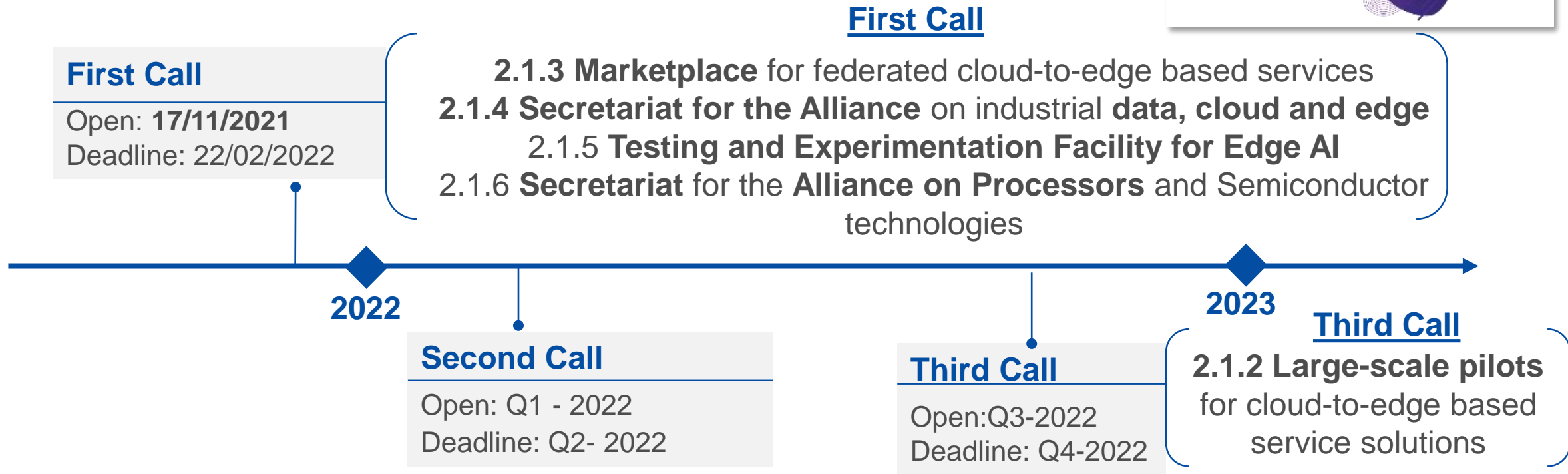
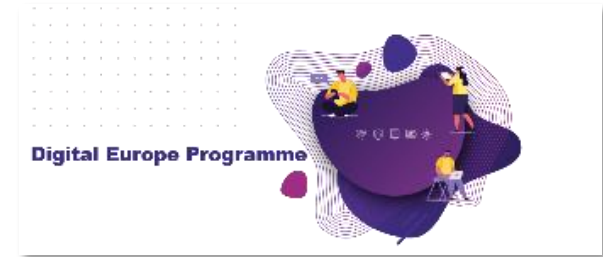
2.1 Cloud-to-edge infrastructure and services

2.1.1 Smart middleware for a European cloud federation and for the European data spaces

2.1.2 Large-scale pilots for cloud-to-edge based service solutions

2.1.3 Marketplace for federated cloud-to-edge based services

Timeline: Calls on Cloud-to-edge Infrastructure and services



Public procurement 2.1.1 Smart middleware for a European cloud federation and for the European data spaces (2021-2022)

CEF2 – Edge-Cloud continuum, Roadmap



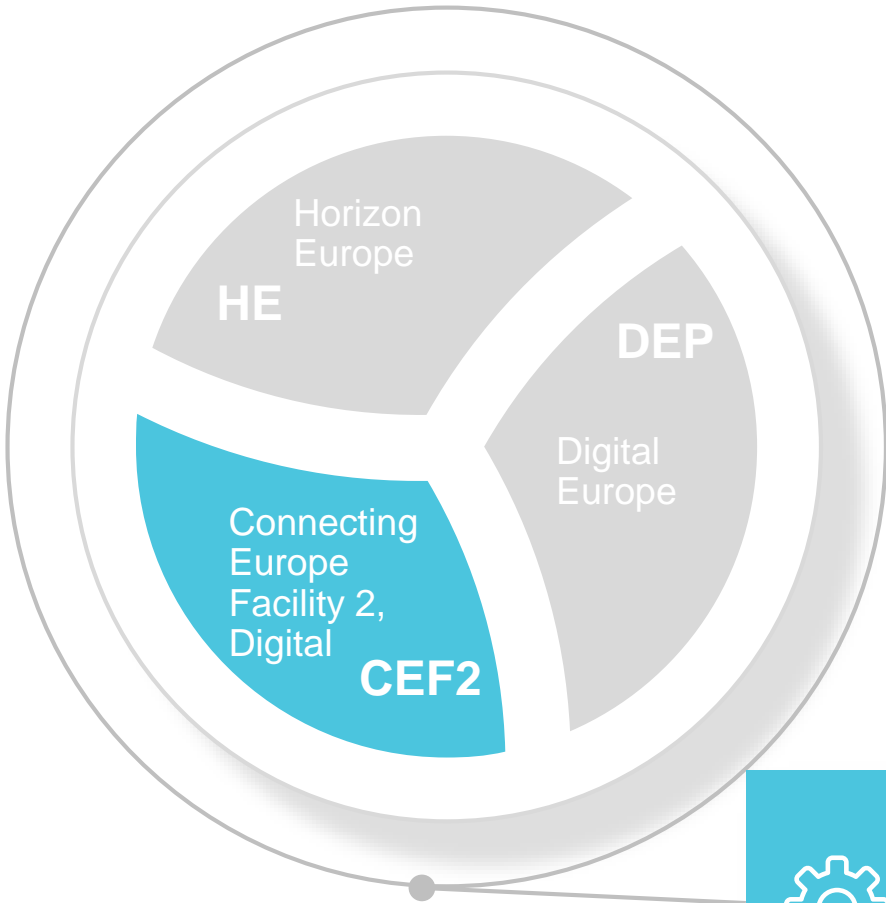
→ Density Edge and Cloud deployments



→ Network Services @Edge



→ Interconnectivity for EU Edge & Cloud



2021-2023

5G corridors deployment, 5G deployment including when appropriate Edge

5G for smart communities, 5G networks deployed with a cloud-to-edge middleware stack (from DEP)

Backbone networks for pan-European cloud federations, development and deployment of cross-border and national cloud infrastructure interconnections at both the physical and functional levels

Integration of 5G with edge computing and federated cloud facilities

Connecting Europe Facility (CEF 2) - Digital



Support and catalyse both public and private investments in digital connectivity infrastructures between 2021-2027



Developing and making available very high-capacity networks, including 5G systems, across Europe

5G infrastructures along cross-border corridors



Increased security, resilience and capacity of the digital backbone networks in the EU



Including Edge Computing



Boost digitalisation of transport and energy networks

5G connectivity for smart communities



Backbone networks for pan-European cloud federations

Horizon Europe: Cloud - Edge – IoT



CSAs: Co-ordination and roadmapping

DATA-2021-01-07 / DATA-2021-01-08

Destination 4

2022-DIGITAL-EMERGING-01-26

Open Source for Cloud based services

Destination 3

DATA-2022-01-03

Environments & tools for **Decentralised Intelligence** at edge

DATA-2021-01-05

Future European Platforms for the Edge: **Meta OS**

DATA-2022-01-02

Cognitive Cloud Framework: AI-enabled Computing Continuum

Open Source for Cloud/ edge Digital Autonomy
Research TRL 2-5

Industrial Cloud / Edge Technology Roadmap

Piloting emerging Smart IoT Platforms and decentralised intelligence
Innovation TRL 4-7

Cloud-Edge-IoT Strategy Forum

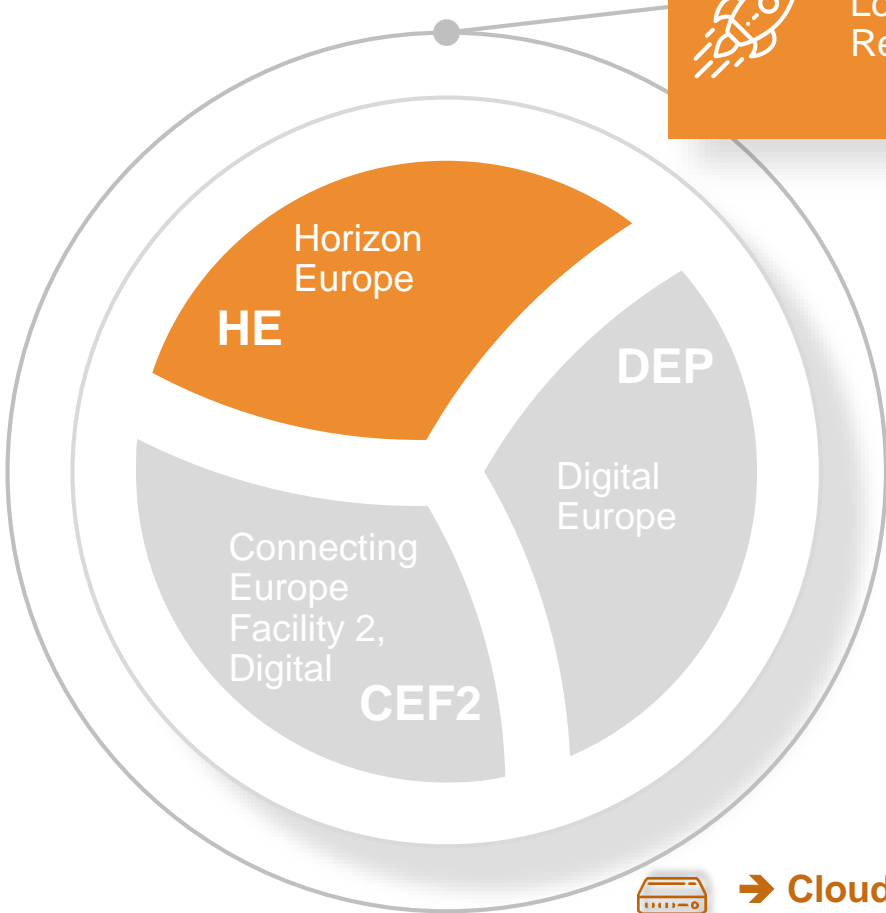
Cognitive Computing Continuum: Intelligence & automation for more efficient data processing
Research TRL 2-5

Industrial Cloud / Edge Technology Roadmap

2021/22

2023/24

Horizon Europe – Edge-Cloud continuum, Roadmap



2021/22

- Open Source for Cloud based services
- Environments & tools for Decentralised Intelligence at edge
- Future European Platforms for the Edge: Meta OS
- Cognitive Cloud Framework: AI-enabled Computing Continuum

2023/24

- Open Source for Cloud/ edge Digital Autonomy
- Piloting emerging Smart IoT Platforms and decentralised intelligence
- Cognitive Computing Continuum: Intelligence & automation for more efficient data processing



→ Cloud and Edge
New hardware design, Energy efficiency



→ Advanced E2E
Intelligent Orchestration across compute continuum.



→ Middleware for large cloud continuum ecosystems, e2e data pipelines



→ Pilots for Smart IoT

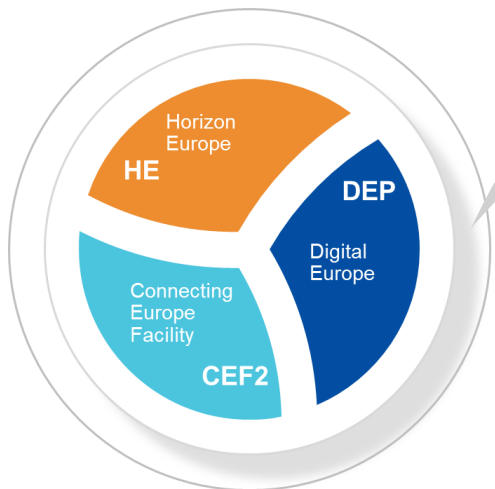


European Commission

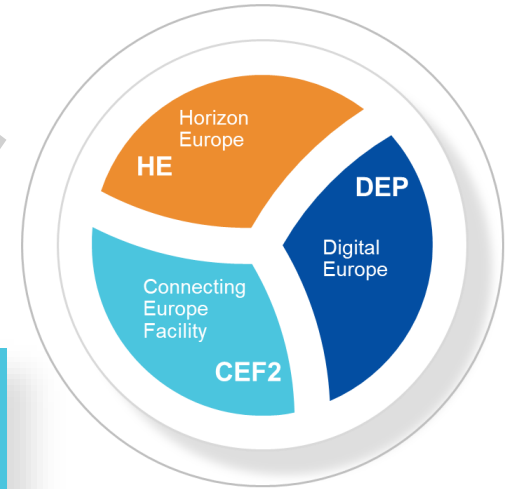
Next Steps for EU actions & programmes



Industrial view



2021-2022



2027 and beyond

Thank you !