

Telco Edge Cloud in Europe

DT, Orange, TIM, Telefónica 8th July 2021



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Edge and Cloud in Europe

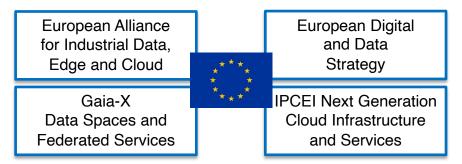
Since 2020, the activity at the EU on Data, Edge and Cloud has increased significantly with relevant regional initiatives at Technology, Business and Public Policy levels, combining public and private efforts

Gaia-X Proposal of association EU Data founded (181 Governance members) Act		EC issues Digital Services Act and Digital Market Act	IP(k-off F shop Pr CEI I	Project oposals D IPCEI D	sultation on vigital ecade vision	Start IPCEI NGCIS Projects
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of the 27 E Member Sta on Building Next Genera Cloud in Eur EAIDC	ates Allia the Indus ation and	ropean ance for strial Data d Cloud	announce- ment of IPCEI NGCIS	industrial technology roadmap for next gen cloud-edge offering	Technical	European Alliance for Industrial	Commission

Supported by European and National Recovery and Resiliency plans and other European programs (Digital Europe, Horizon Europe, CEF2...)

Joint declaration of the 27 EU member states, October 2020. Building the next generation cloud for business and the public sector in the EU.

"The EU has a unique opportunity to address the need for more data sharing and decentralised data processing, closer to the user (at the edge). The volume of generated data is greatly increasing and a growing proportion of data is being processed at the edge. The next big wave of digital transformation will be powered by industrial data. To be ahead of the curve, we need to ensure favourable conditions for EU businesses to develop cloud capacities with global reach meeting the emerging needs of industrial data, especially in terms of processing close to the user and guaranteeing users' data sovereignty. To make the most out of the data we produce, we also need to enable the deployment of EU data spaces in key public and private sectors. Only by integrating data and network technologies at European scale can we attain the next generation of resilient and competitive cloud offering. But we must act rapidly and together"



Focus points for next decade:

- a digitally skilled population and highly skilled digital professionals
- secure and substantial digital infrastructures
- digital transformation of businesses
- digitisation of public sectors

 20 M ICT specialists and 80% pop w/ basic digital skills

Some targets for next decade:

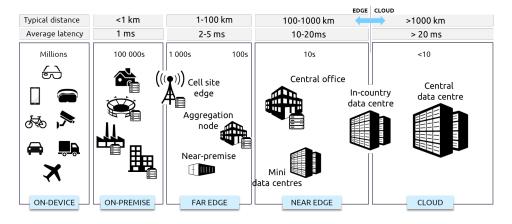
- 5G/Gigabit for everyone
- 10.000 edge nodes.
- 75% EU companies using Cloud/AI/Big Data, > 90% SMEs w/ basic digital level

European Digital Compass 2030

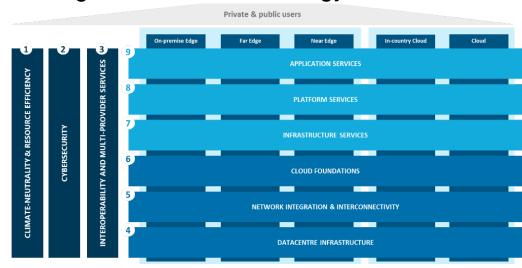


Edge and Cloud in Europe

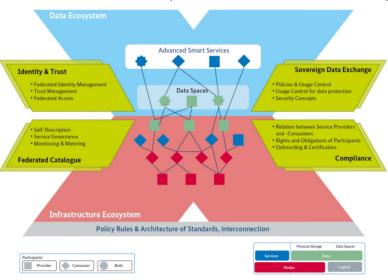
Cloud and Edge Continuum



Edge and Cloud Technology Priorities



Gaia-X – Architecture (Data and Infra Ecosystems)





Holoverse, the videoconference evolution

- Background: Video calling exploded during Covid, forcing many to work, be educated and stay in touch with friends & family from home. AR / VR takes conferencing to the next level, to be "virtually there" in the same environment, to socialise, work, collaborate, interact, share, in a way beyond what video allows.
- Scope: Multi-operator trial to demo the benefit of TEC with a service that can be understood as public utility in current socio-economic context: holographic communications & virtual shared world.

• The Partners:

- DT, Orange, TIM and Telefonica providing the network and edge infra.
- MobiledgeX as telco edge platform provider
- DoubleMe provides "TwinWorld" the holographic and virtual world application to be deployed on TEC.













• The objective:

- Improve end user experience on holographic communications by bringing the relevant application components closer to the end-user (relying on the better latency and jitter, saving transport bandwidth and offloading graphic processing from the device to the network).
- Demonstrate key MNO features in the telco edge: primarily roaming and interconnection, as well as the multi-MNO aggregation (federation) & smart Edge Discovery.

What we will need develop:

- Adapt the application design to work in a distributed environment where users from different MNOs need to communicate altogether.
- Enable local break out while roaming at network layer to enable Edge Service Availability in Visited Networks.
- Expose specialized hardware resource in the TEC cloudlets (GPU – graphical processing units).



Holoverse, the videoconference evolution

DoubleMe's application

Users can create shared virtual spaces that can decorate with virtual objects and where to colaborate and communicate with other users joining from any country or MNO.

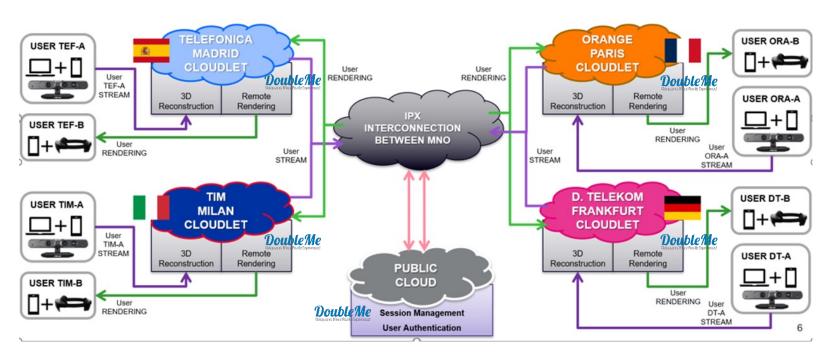


Users can be present in their virtual space as 3D avatars as well as as realistic holograms





Deployment Architecture over the TEC



- The **hologram Reconstructor component and 3D rendering** component is to be deployed in the **TEC cloudlets** of each MNO, these components requires GPUs in the cloudlet.
- The session and user manager is kept centralized deployed at the the **public cloud**.
- On the end user side the holograms and avatars are captured using one depth camera at the "caller"/
 producer side, and the visualization of the virtual world and holograms at the "called"/consumer side
 requires a mixed reality glasses like Hololens2.



Holoverse, videoconference evolution

Time Plan

- We follow an incremental approach in phases.
 - Phase 1 focuses on adapting the application load into the TEC and enabling communication among users in the home network working properly with the GPU resources.
 - Phase 2 deals with implementing Network LBO for the trial and enabling the service to work in home and roaming scenarios.
 - Phase 3 focuses on improvement in the multi-MNO interconnection and improvement in QoS with e.g. IPX, improvement in edge roaming, new features in the application, new devices on the end user side and other aspects that might be decided during the first two phases.

Challenges

- App architecture: Move from a centralized design to a multi-MNO distributed edge topology with smart edge discovery.
- Network architecture: Enable LBO, with different options under investigation.
- Edge Capabilities: Expose GPU in the TEC cloudlets.

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1. Project Scoping																																	
2. Phase 1: Holoverse - Home scenario – Internet connectivity.																																	
3. Phase 2: Holoverse – Basic Edge Roaming																																	
4. Phase 3: Improvements										П																							









REAL TIME HOLOGRAPHIC MIXED REALITY EXPERIENCES









VISUAL POSITIONING SERVICE



Federated Edge Hub













FEDERATION OF EDGE COMPUTE SERVICES