5GMEC4EU

European 5G Network Edge Ecosystem Approach

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Content

5GMEC4EU is part of the EU-sponsored strategic investment projects and is aimed at enabling a scalable 5G/Edge infrastructure across the EU.

5GMEC4EU is a strategic investment project of the EU

We are an EU/CEF-funded Coordination and Support Action (CSA) to enhance Smart Community & Corridor services across Europe by integrating Multi-Access Edge Computing (MEC) with 5G in the "Connected Collaborative Computing" (3C) network.

- **Origin**: Part of the EU funding program of the European Commission (specifically CEF Digital).
- **Objective**: Develop pan-European digital infrastructure
- **Focus Areas:** Funding cross-border digital infrastructure to boost Europe's connectivity and digital sovereignty.

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"Also, the telco sector suffers from a fragmented marketplace. […] This fragmentation is a missed economic opportunity. Only if we remove such differences, we will see the emergence of a single market for telco.

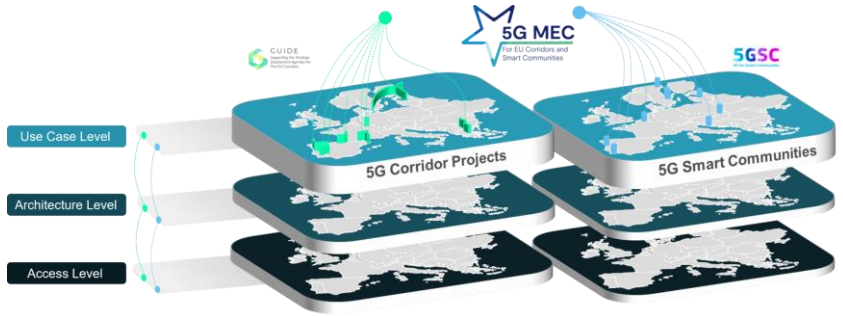
Margrethe Vestager, Executive Vice President of the European Commission for A Europe Fit for the Digital Age

Early Draft

The main task of 5GMEC4EU is to facilitate the proliferation of Network Edge Infrastructure in EC-sponsored 5G Projects (Smart Communities & Corridors).

Interplay with Smart Communities & Corridor Projects

Facilitate the proliferation of Network Edge Infrastructure in EC-sponsored 5G Projects.



Overview and interplay of work packages

WP 1
Program Management

White Paper: European 5G Network Edge Ecosystem Approach

WP 2	WP 3	WP 4
Stakeholder Engagement	**Use Cases & Demo**	**Architecture**
Community engagement and knowledge dissemination	Use case analysis of CEF projects and EVA demo implementation	Guidance on technical concept for CEF project use cases

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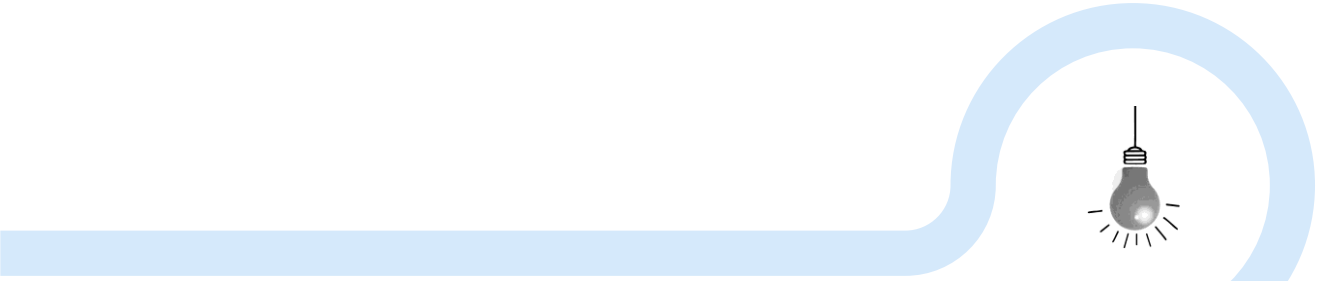
Content

Early Draft

We aim to engage key stakeholders in the edge ecosystem through a structured questionnaire, with the resulting insights forming the basis of a white paper.



01 **Concept Development [06/25]**
Define key topics and goals for the questionnaire based on ecosystem priorities.

02 **Questionnaire Design [07/25]**
Create a focused survey to gather insights from targeted stakeholders.

03 **Insights & Discussion [10/25]**
Analyze responses and validate findings through stakeholder dialogue.

04 **White Paper [12/25]**
Summarize results and recommendations in a White Paper.

White Paper

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We aspire to have a holistic communication approach involving both industry-related players and EU-funded projects initiatives.

EU-funded Projects / Initiatives

EU-funded projects / initiatives as well as , standards organizations & academic institutions – for example:

gaia-x, 5GAA Automotive Association, 6GSNS, 3GPP, O-RAN ALLIANCE, GSMA, IPCEI-CIS, 5GSC, ETSI, 8ra CLOUD·EDGE CONTINUUM

...

Industry (Demand side)

Industry players from various verticals representing a potential demand for 5G Edge infrastructure.

BOSCH, SIEMENS, ABB, MAERSK, DHL, DB, ZEISS, Nestlé, Lufthansa, AIRBUS, RHEINMETALL

...

Industry (Supply side)

Industry players representing a potential supply-side (MNOs, CSPs, DC & Cloud players, CDNs, TowerCos, etc.)

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Akamai, fastly, Open Nebula, EQUINIX, NVIDIA, T Systems, OVHcloud, ERICSSON, NOKIA, STL PARTNERS, cellnex, CETIN, INWIT, TIM, vodafone, Telefónica, orange, swisscom

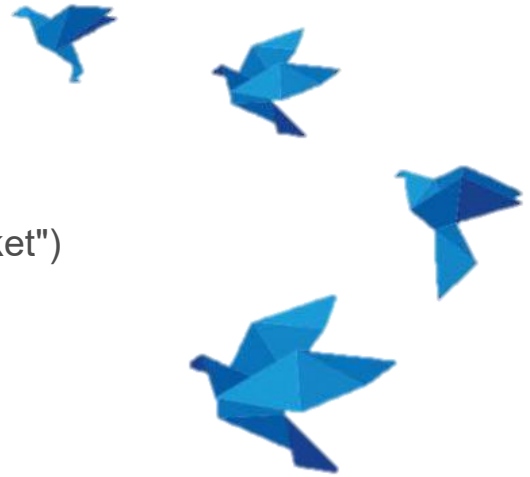
...

The goal of our White Paper is to identify the socio-economic context to establish a modern and viable 5G and Edge Infrastructure ecosystem.

Central research question:

What are the key socio-economic conditions that enable the sustainable development of 5G and Edge infrastructure ecosystems within the EU?

- Identifying viable ownership, business, and operating models tailored to the European context…
- … to enable the emergence of a harmonized, cross-border 5G/Edge infrastructure ecosystem ("Single Market")
- … while maximizing socio-economic and environmental value for European citizens.



Participation in the Questionnaire & Interview process is connected with significant benefits.

Your general benefits by participating

Exclusive Access to Concept & White Paper

- Potentially shape EU policy and funding priorities
- Get early access to survey results and the concept paper on a European 5G Edge Ecosystem

Recognition and Acknowledgment

- Potential public visibility in the published report
- Invitations for speaker slots on follow-up events such as publication.

Networking Opportunities

- Contact and alignment with other 5G / MEC stakeholders on both demand & supply-side
- Invitations to community meetings (Roundtable in Brussels)

Selected overview and snippets of our concept paper:

A Visionary Network Edge Ecosystem:

Use Case Evaluation:

Innovative Architecture Approaches & Business Models:

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Content

Early Draft

A Sovereign European Cloud Ecosystem is essential amid increasing mistrust among Continental Technospheres.

American Technosphere

Dominated by Hyperscalers (AWS, Microsoft, Google) with a focus on global scale.

aws Azure Google ...

Trump signs CLOUD act in 2018, permitting U.S. law enforcement to access data stored overseas.

European Technosphere

Seeking autonomy through regulations like GDPR and fostering cloud sovereignty initiatives (e.g. GAIA-X).

EU Sovereign Play (TBD)

aws Azure Google

SAP ... orange Atos T aws new STACKIT GAIA-X OVHcloud

"I will push to create a new European Sovereignty Fund. Let's make sure that the future of industry is made in Europe."

Chinese Technosphere

Focused on state-controlled technology giants (Alibaba, Tencent) and strict data localization laws.

HUAWEI Tencent Cloud Alibaba Cloud ...

Chinese data sovereignty regulation & licensing regime essentially prevents market access to external players.

Increasing Demand of Sovereign Cloud Solutions especially by regulated Industries like TelCo, Defense, Public & Healthcare

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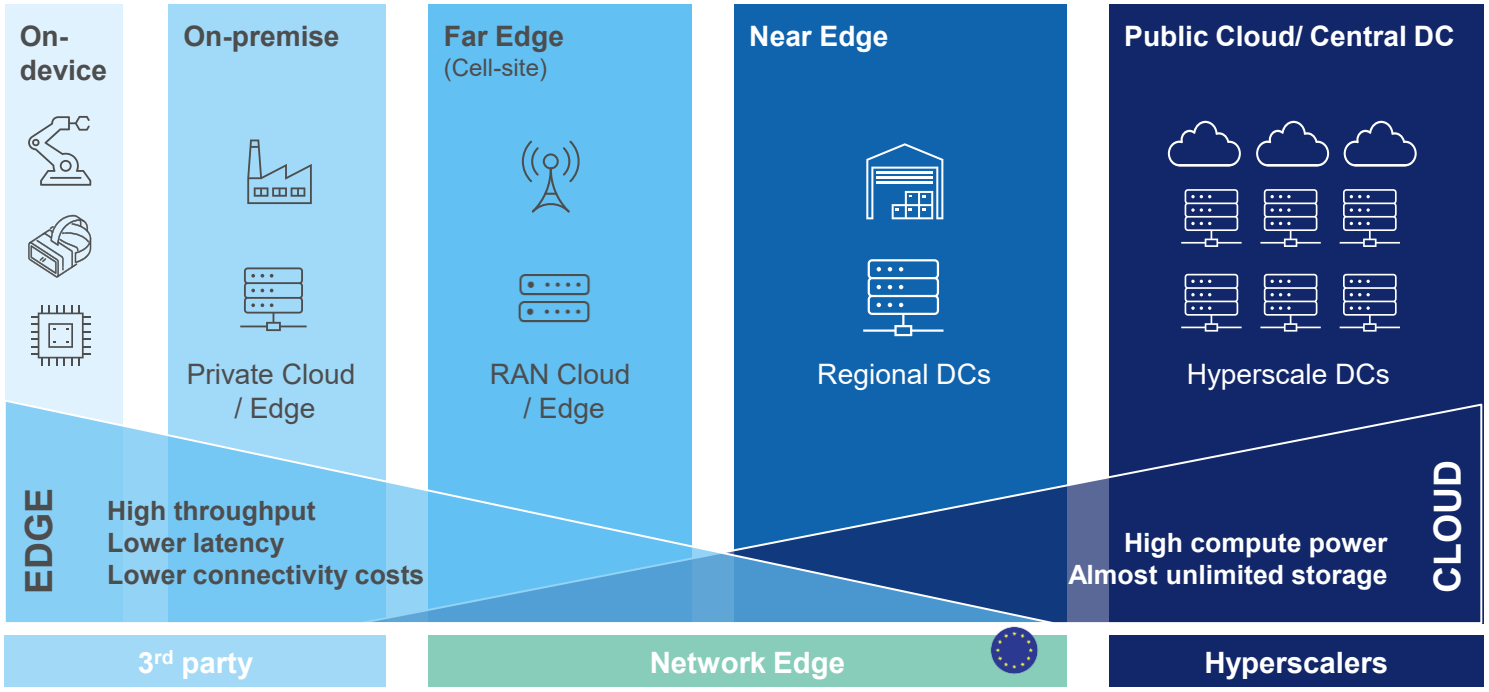
Within the Cloud / Edge Continuum, the Network Edge represents a window of opportunity to enable (partial) digital Autonomy via European ownership!

The Cloud / Edge Continuum is a fluid ecosystem of many participants

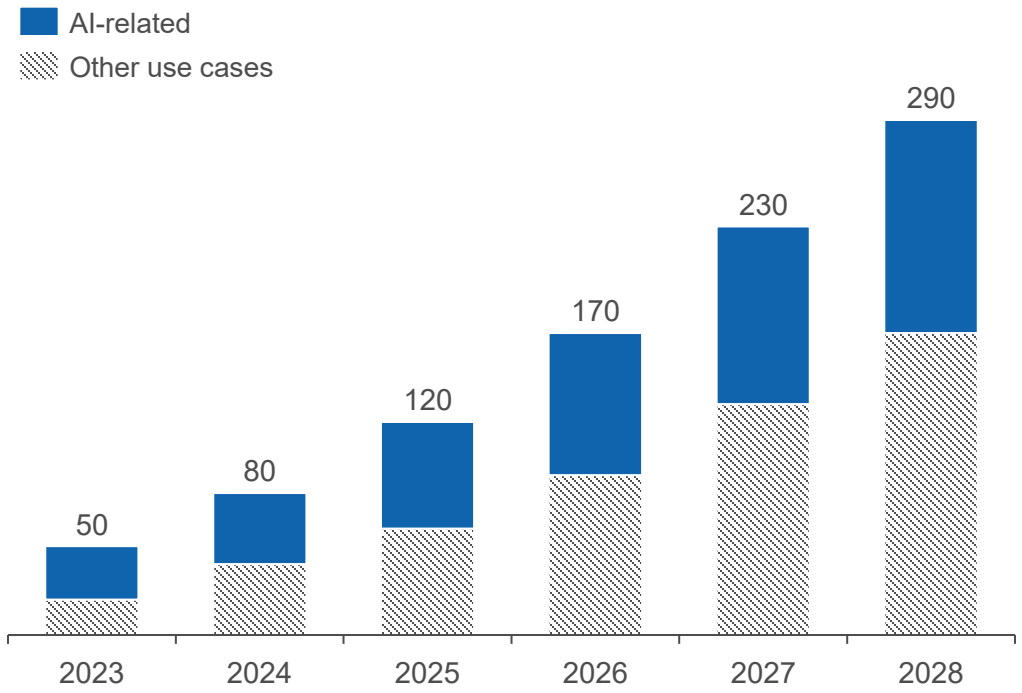


Comments:

- The Cloud/Edge Continuum spans from on-device computing to hyperscaler-dominated cloud, involving diverse ownership models.
- Unlike the hyperscales , TelCo Edge is not yet dominated by a few large foreign players, offering a window of opportunity for European companies.
- European participation in this domain could allow digital autonomy as especially critical workloads will be deployed on the edge-part of the continuum.
- However currently scalable and viable models of infrastructure provisioning have not yet developed.
- **A thorough evaluation of ownership-, operating & underlying business Models is essential to enable a future autonomous European Edge Cloud ecosystem.**

Especially (Sovereign) AI-related workloads will fuel the need for Edge computing infrastructure around the globe.

Total Revenue from Edge-related use cases (Global, B$)



Source: STL Partners, 2024. McKinsey, 2025.

Specifically, AI-RAN is a valuable opportunity for TelCos

- **AI-RAN concept:** Share GPU-based hardware for both RAN and AI workloads, transforming RAN deployments and enabling new revenues.
- **AI-RAN Alliance:** Formed in early 2024 by telco and AI players to explore embedding AI in RAN.
- **Technical shift:** Replace traditional baseband units (BBUs) with GPU-based hardware for dual RAN and AI processing.
- **Efficiency gains:** AI optimizes RAN workloads, improving spectral efficiency, network performance, and resource management.
- **New business model:** Telcos offer distributed GPU-as-a-Service (GPUaaS) for AI workloads via mobile network sites.
- **Edge advantage:** Leverages existing site locations to solve latency, congestion & grid energy load

AI-RAN ALLIANCE

SoftBank

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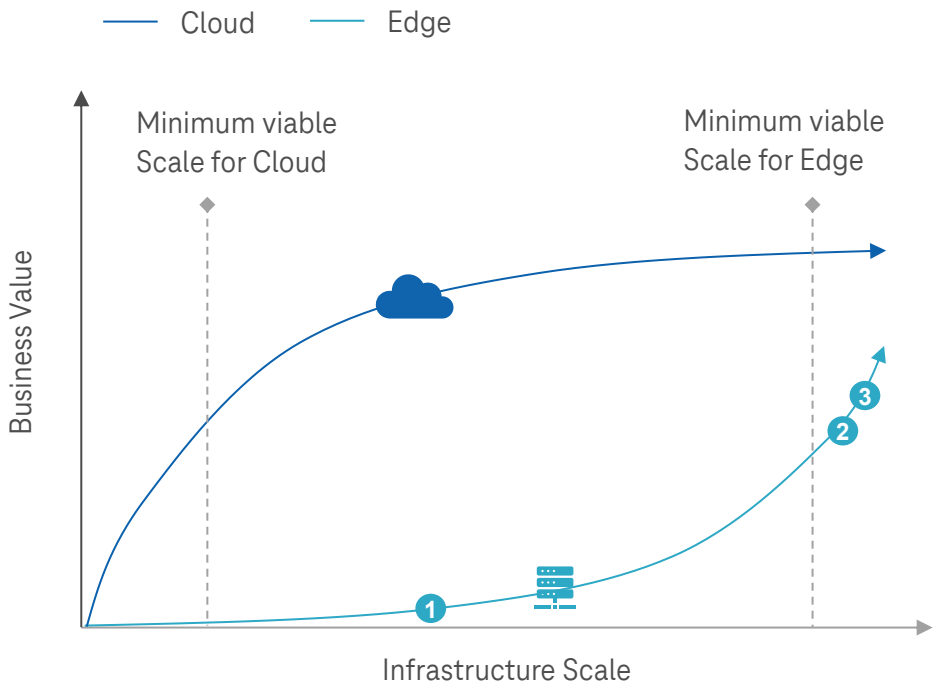
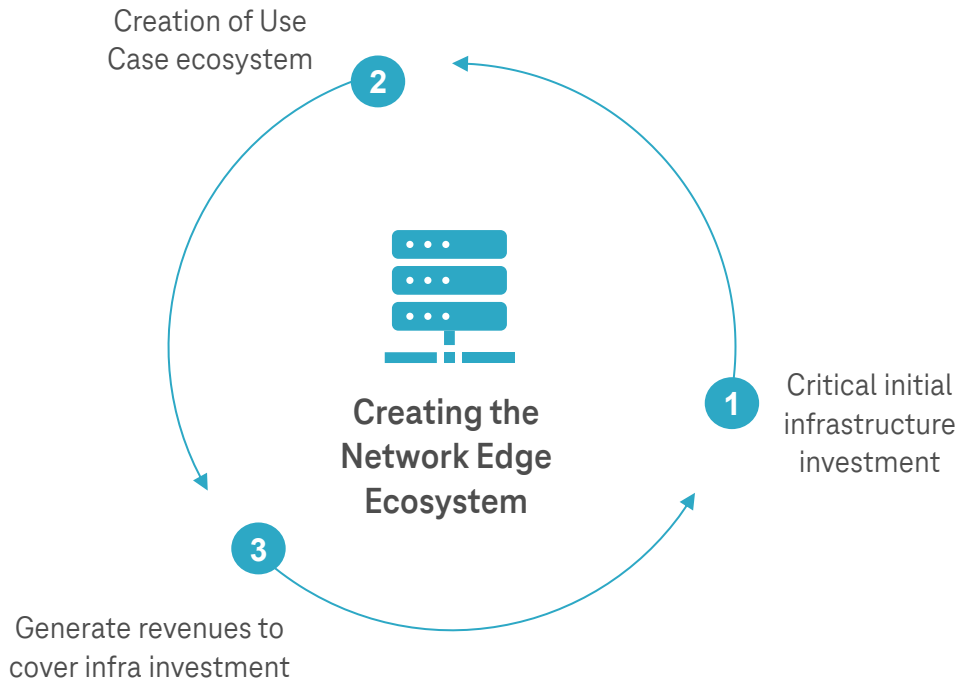
But the needed investments for the Network Edge pose a challenge as reaching a minimum viable scale (MVS) and hence positive ROI is essential yet difficult.

Reaching minimum viable scale is challenging for Edge



The creation of MVS faces a circular dependency



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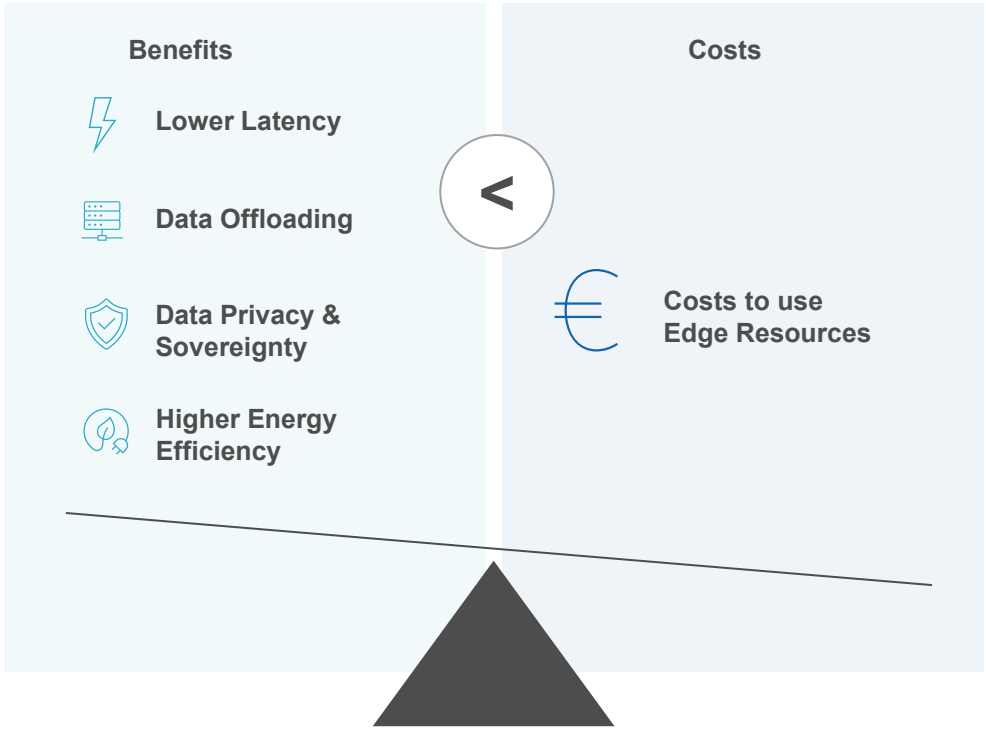
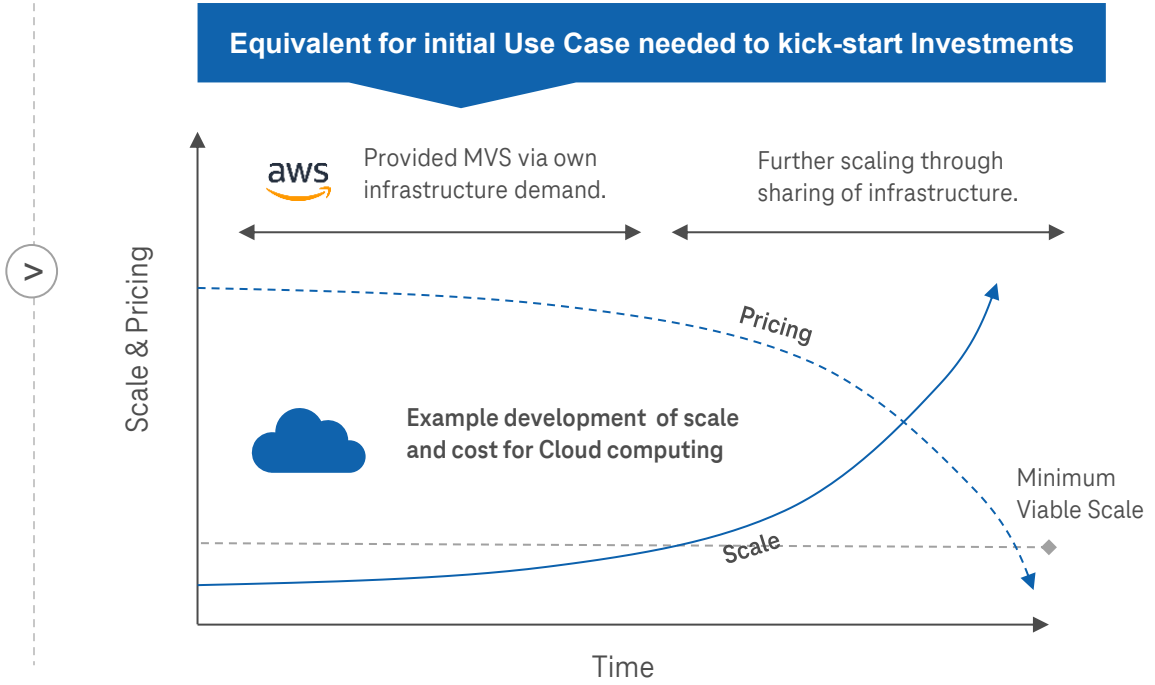
Moreover, currently the benefits of Network Edge do not outweigh the cost – there needs to be an initial demand to reduce costs to a reasonable level.

Benefits of Edge (vs Cloud) do not outweigh the costs



An initial Spark is needed to start driving down prices



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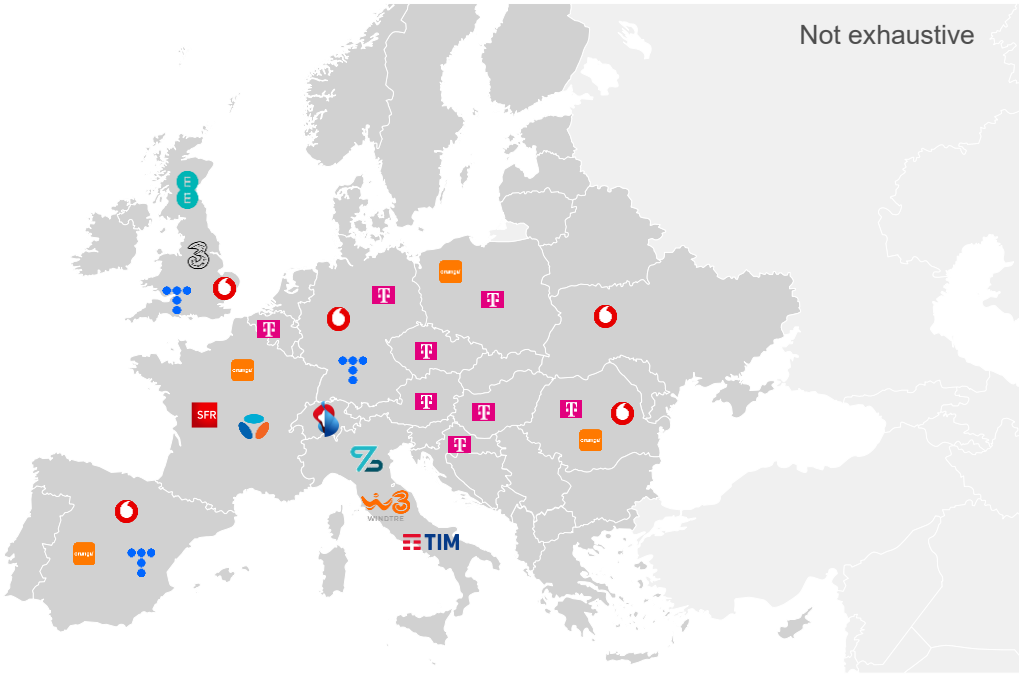
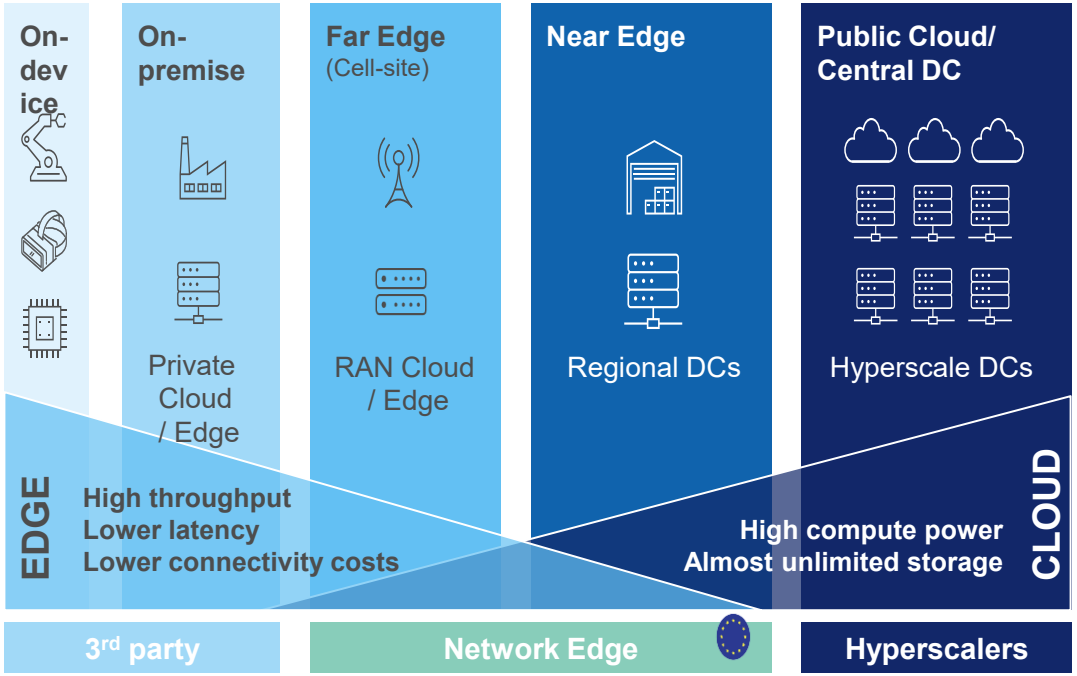
On top, the required MVS demands both a compatibility between MNOs across various countries, as well as within the larger Cloud / (Device) Edge ecosystem.

Compatibility between MNOs across various countries



Integration with Cloud and device Edge



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Early Draft

To address these challenges, we propose 3 key guiding hypotheses which act as foundation for our concept paper and will be validated with stakeholders.

Overview of key challenges:

I **Ecosystem compatibility:** The network edge is embedded in a fragmented computing continuum across different ownership domains (device, private, public), making E2E workload integration complex.

II **Initial demand & economic viability:** Current benefits of Network Edge do not justify the high costs, and a critical mass of initial demand is needed to drive down prices and reach economic viability

III **Minimum viable scale:** A viable Network Edge-based computing ecosystem can only be established at minimum European scale.

Guiding Hypothesis:

One cloud continuum: End-to-end workload integration at the network edge requires an open architecture that spans hyperscalers, private edge, device and MNO domains.

One key customer: MNOs are currently the only actors with strict demand for the network edge; to accelerate broader adoption, they must share the capacity already required for their own workloads.

One orchestrator: A single, federated orchestration layer is required across the network edge, but MNOs are not positioned to fulfill this role, as their operations are limited to national markets. Potentially a Joint Venture of European MNOs would be suited well to do so.

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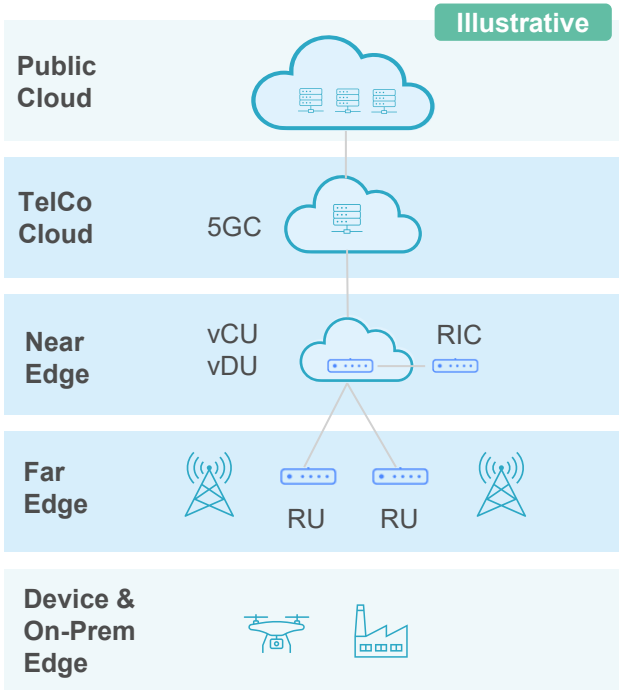
Following our Guiding Hypotheses, a socio-economically optimized NW Edge is based on shareable infrastructure while enabling holistic cloud ecosystems.

Next-Gen Mobile 5G Edge NW

Overview of future Open-RAN based self-healing and automated 5G Network architecture.



Guiding Hypothesis

Guiding hypothesis shaping network edge design implications.

- **I** One cloud continuum
- **II** One key customer
- **III** One orchestrator

Design implications for an optimized Network Edge

Key enablers driving transformation towards a socio-economically optimized Network edge ecosystem while addressing the key guiding hypothesis mentioned earlier.

- **A** **Holistic workload orchestration:** Allowing dynamic workload orchestration across network edge nodes as well as from device edge to public cloud.
- **B** **Shared Edge Capacity with Industry-Players:** Supports cross-industry innovation by providing cost-effective, sovereign computing resources at the edge – especially GPUs.
- **C** **Shared active RAN infrastructure among MNOs:** Enables more efficient use of network resources, reduces deployment costs, and improves rural connectivity.
- **D** **Centralized user interfaces and interactions:** Unified access and control for managing distributed edge infra, enabling streamlined operations, monitoring & automation.

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