Telco Edge Cloud introduction
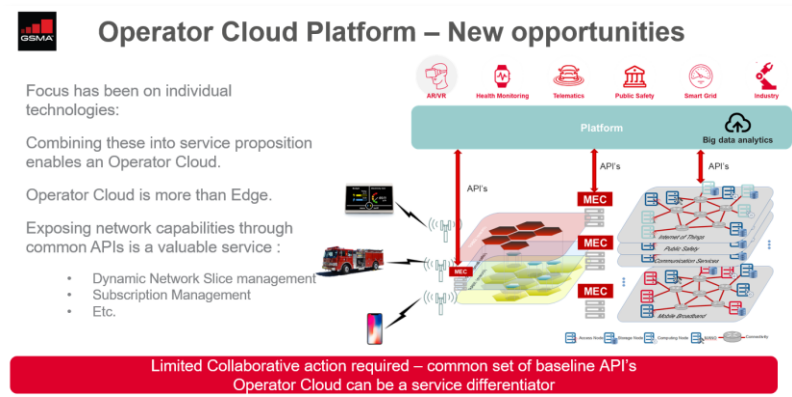
Actions at GSMA to shape the Edge

16 July 2020

The activity on Operator Cloud starts by Eo18
with a number of discussions at Strategy and Technology Groups

Operator Cloud Platform – New opportunities

Focus has been on individual technologies:

Combining these into service proposition enables an Operator Cloud.

Operator Cloud is more than Edge.

Exposing network capabilities through common APIs is a valuable service :

- Dynamic Network Slice management
- Subscription Management
- Etc.

Limited Collaborative action required – common set of baseline API's
Operator Cloud can be a service differentiator

At the beginning of 2019, GSMA starts considering the Operator Platform, that includes Edge, as a key element of the **Future Networks programme**

At that time, the **Technology Group** also includes **Edge Computing** in the list of priorities for 2019 as part of a set of disruptive technologies like AI/ML, AR/VR, quantum computing, blockchain, etc. that together with the **introduction of 5G** is going to change the landscape in the Telco Industry

Operator E-Cloud: the business case for a distributed edge/cloud solution
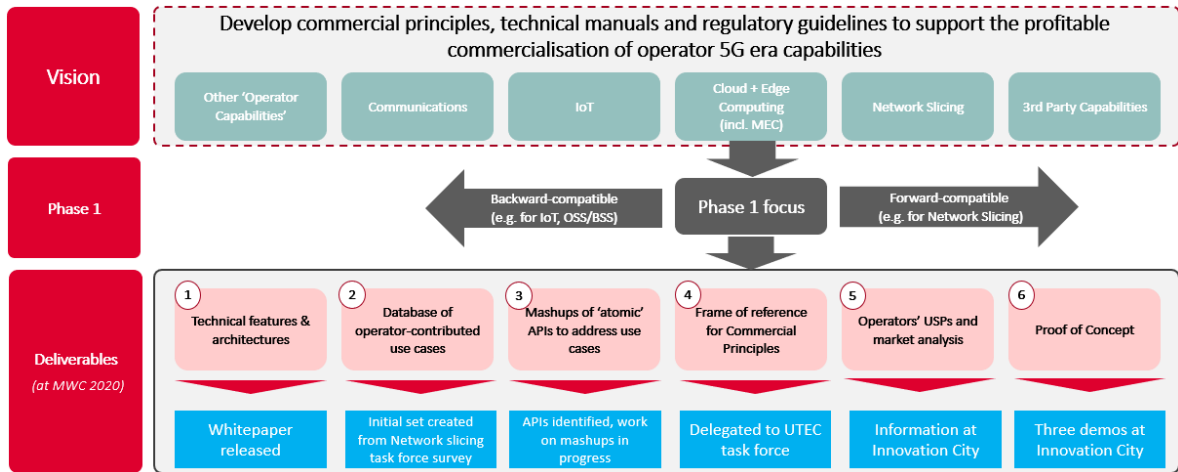
GSMA 5G Taskforce

October 2018

Operator Platform, initial focus on Edge Computing
First delivery in 2019: the Concept whitepaper

Operator Platform
Decides to focus on Edge Computing in a First Phase

Vision	Develop commercial principles, technical manuals and regulatory guidelines to support the profitable commercialisation of operator 5G era capabilities

| | Other 'Operator Capabilities' | Communications | IoT | Cloud + Edge Computing (incl. MEC) | Network Slicing | 3rd Party Capabilities |

Phase 1

Backward-compatible (e.g. for IoT, OSS/BSS) ← | Phase 1 focus | → Forward-compatible (e.g. for Network Slicing)

Deliverables (at MWC 2020)

1 Technical features & architectures	2 Database of operator-contributed use cases	3 Mashups of 'atomic' APIs to address use cases	4 Frame of reference for Commercial Principles	5 Operators' USPs and market analysis	6 Proof of Concept
Whitepaper released	Initial set created from Network slicing task force survey	APIs identified, work on mashups in progress	Delegated to UTEC task force	Information at Innovation City	Three demos at Innovation City

Operator Platform Concept
Phase 1: Edge Cloud Computing
January 2020

January 2020

https://www.gsma.com/futurenetworks/resources/operator-platform-concept-whitepaper/

3

Operator Platform evolves in 2020…
to elaborate a Permanent Reference Document

Operator Platform
(Concept Whitepaper – Edge Cloud)

Feb 2020

30 Operators

Operator Platform Group
(Permanent Reference Document)

- **Reference architecture**
- **Technical requirements**
- Liaison with **SDOs** for technical specs and **OSCs** for open source code

11 Technology Providers

…and Telco Edge Cloud taskforce is created
aiming at launching a global Telco Edge Computing service

Operator Platform Group

30 MNOs

- **Architecture, technical requirements**
- Liaison with **SDOs** for technical specs and **OSCs** for open source code

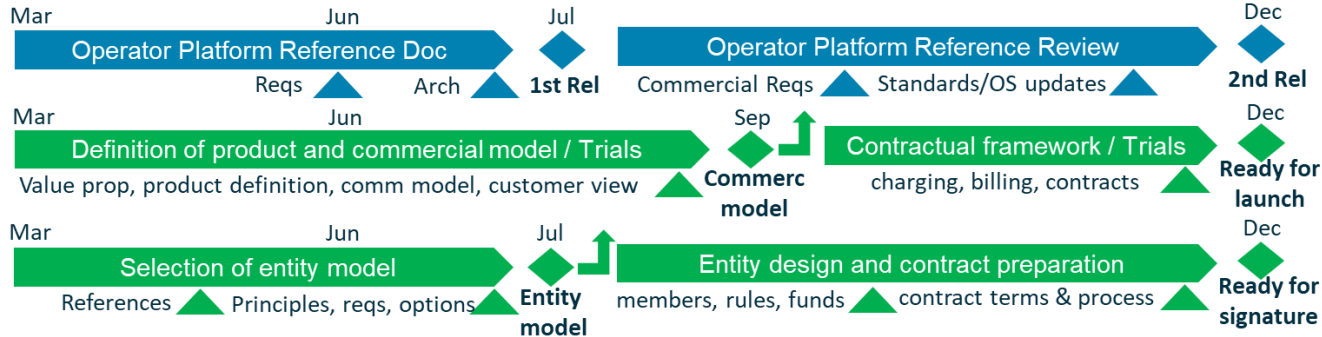https://www.gsma.com/futurenetworks/resources/operator-platform-concept-whitepaper/

Telco Edge Cloud taskforce

22 MNOs

- Commercial and contractual models
- PoC and trials
- **Launch of the global Edge Computing service**

March 2020

https://www.gsma.com/newsroom/press-release/telecom-operators-collaborate-to-build-the-telco-edge-cloud-platform-with-gsma-support/

Mar	Jun	Jul		Dec
Operator Platform Reference Doc			Operator Platform Reference Review	
Reqs ▲	Arch	**1st Rel**	Commercial Reqs ▲ Standards/OS updates ▲	**2nd Rel**

Mar	Jun	Sep		Dec
Definition of product and commercial model / Trials			Contractual framework / Trials	
Value prop, product definition, comm model, customer view		**Commerc model**	charging, billing, contracts	**Ready for launch**

TEC LAUNCH

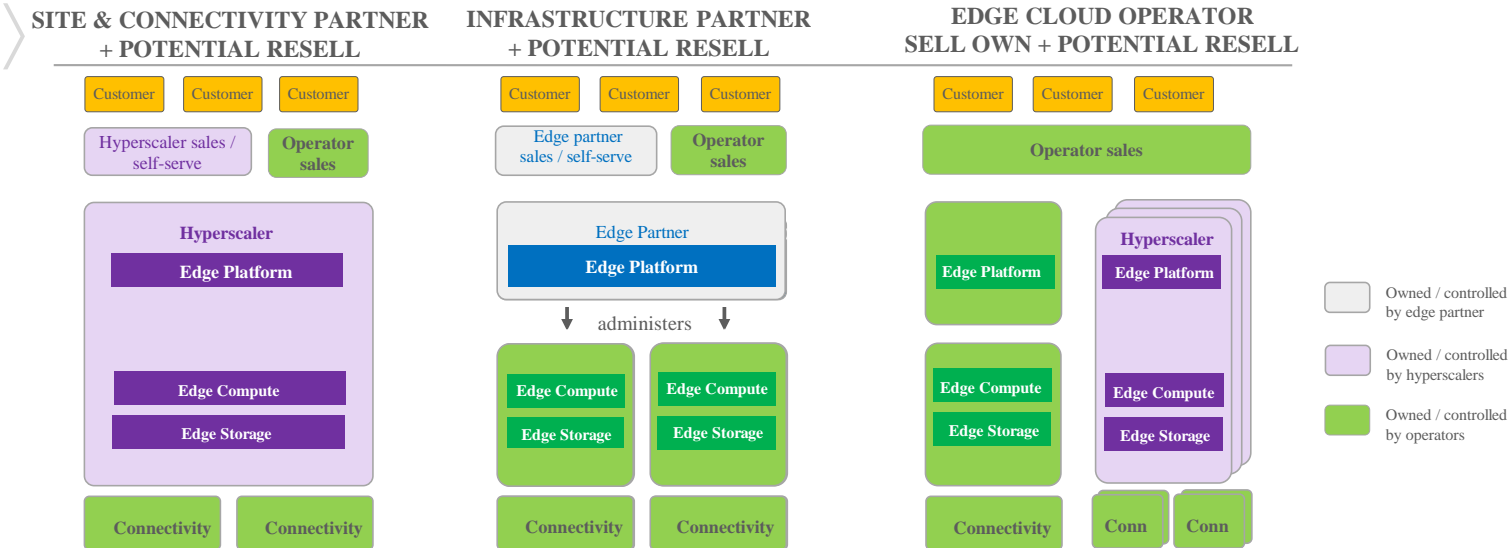| Mar	Jun	Jul		Dec
Selection of entity model			Entity design and contract preparation	
References ▲ Principles, reqs, options ▲		**Entity model**	members, rules, funds ▲ contract terms & process	**Ready for signature**

2021

Operator Platform Group
OPG

The Edge Cloud may follow several models
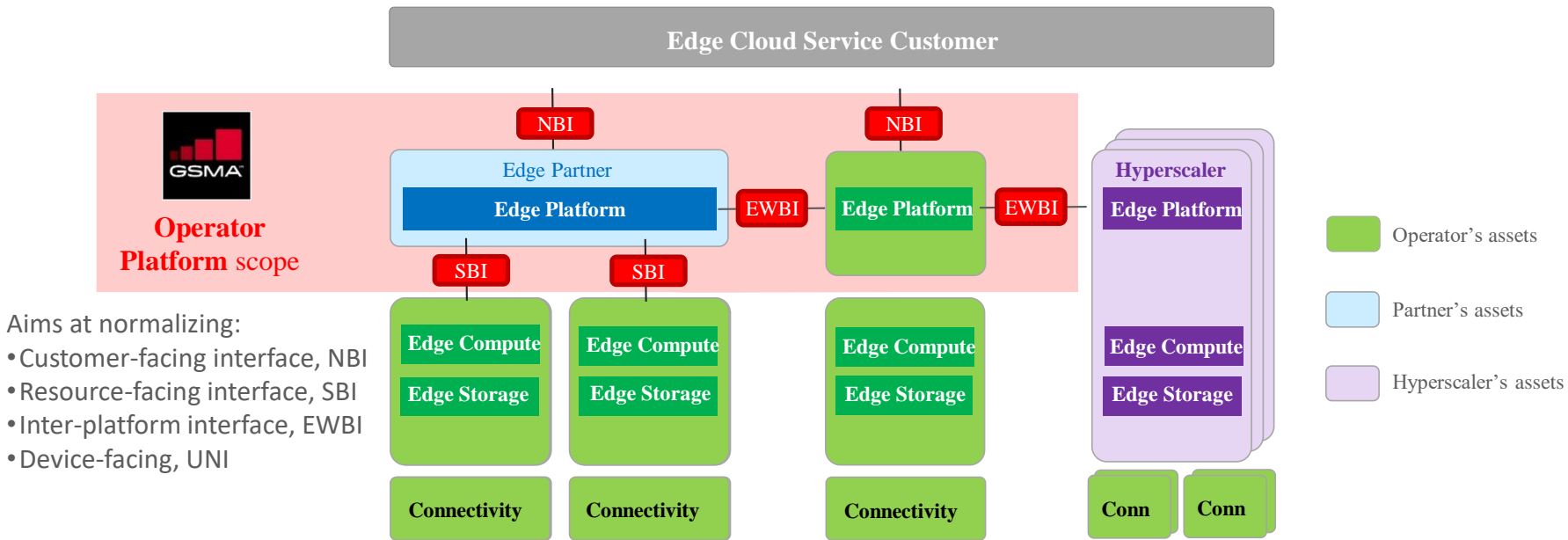## depending on the ROLE the Operator wants to play

Operator role / business models

SITE & CONNECTIVITY PARTNER + POTENTIAL RESELL

| Customer | Customer | Customer |

| Hyperscaler sales / self-serve | Operator sales |

Hyperscaler
- Edge Platform
- Edge Compute
- Edge Storage

| Connectivity | Connectivity |

INFRASTRUCTURE PARTNER + POTENTIAL RESELL

| Customer | Customer | Customer |

| Edge partner sales / self-serve | Operator sales |

Edge Partner
- Edge Platform

administers

Edge Compute / **Edge Storage**
Edge Compute / **Edge Storage**

| Connectivity | Connectivity |

EDGE CLOUD OPERATOR SELL OWN + POTENTIAL RESELL

| Customer | Customer | Customer |

Operator sales

- Edge Platform
- Edge Compute
- Edge Storage
- Connectivity

Hyperscaler
- Edge Platform
- Edge Compute
- Edge Storage
- Conn
- Conn

Legend:
- Owned / controlled by edge partner
- Owned / controlled by hyperscalers
- Owned / controlled by operators

OPG promotes Edge standardization and federation
in order to enable global Edge Cloud Services based on Telco Infra

Edge Cloud Service Customer

Operator Platform scope

NBI

Edge Partner
Edge Platform

EWBI

NBI

Edge Platform

EWBI

Hyperscaler
Edge Platform

SBI

SBI

Edge Compute
Edge Storage

Edge Compute
Edge Storage

Edge Compute
Edge Storage

Edge Compute
Edge Storage

Connectivity

Connectivity

Connectivity

Conn

Conn

Operator's assets

Partner's assets

Hyperscaler's assets

Aims at normalizing:
- Customer-facing interface, NBI
- Resource-facing interface, SBI
- Inter-platform interface, EWBI
- Device-facing, UNI

Operators are developing the missing Edge capabilities
required for global reach, mobility and roaming support

The Edge Cloud is a Cloud but needs in addition:

- ◔ Smart Edge Resource allocation
- ◔ Smart Edge Connectivity
- ◔ **Federation** of Edge Computing platforms

…and when Mobility is required:

- ◔ Smart **Edge Discovery**
- ◔ **Mobility** support
- ◔ Service Availability in visited networks (**roaming** support)

At the **MultiOperator MEC Experience** project key operators and technology partners are working to design, develop and test this basic MEC functionality and support for **federation**, **mobility** and **roaming** to enable a global Telco Edge Cloud service

Operators:

Partners:

Contributing to:

March 2020

https://www.telefonica.com/en/web/press-office/-/telefonica-signs-an-agreement-with-kt-corp-china-unicom-and-telstra-to-collaborate-on-the-multi-operator-edge-computing-experience
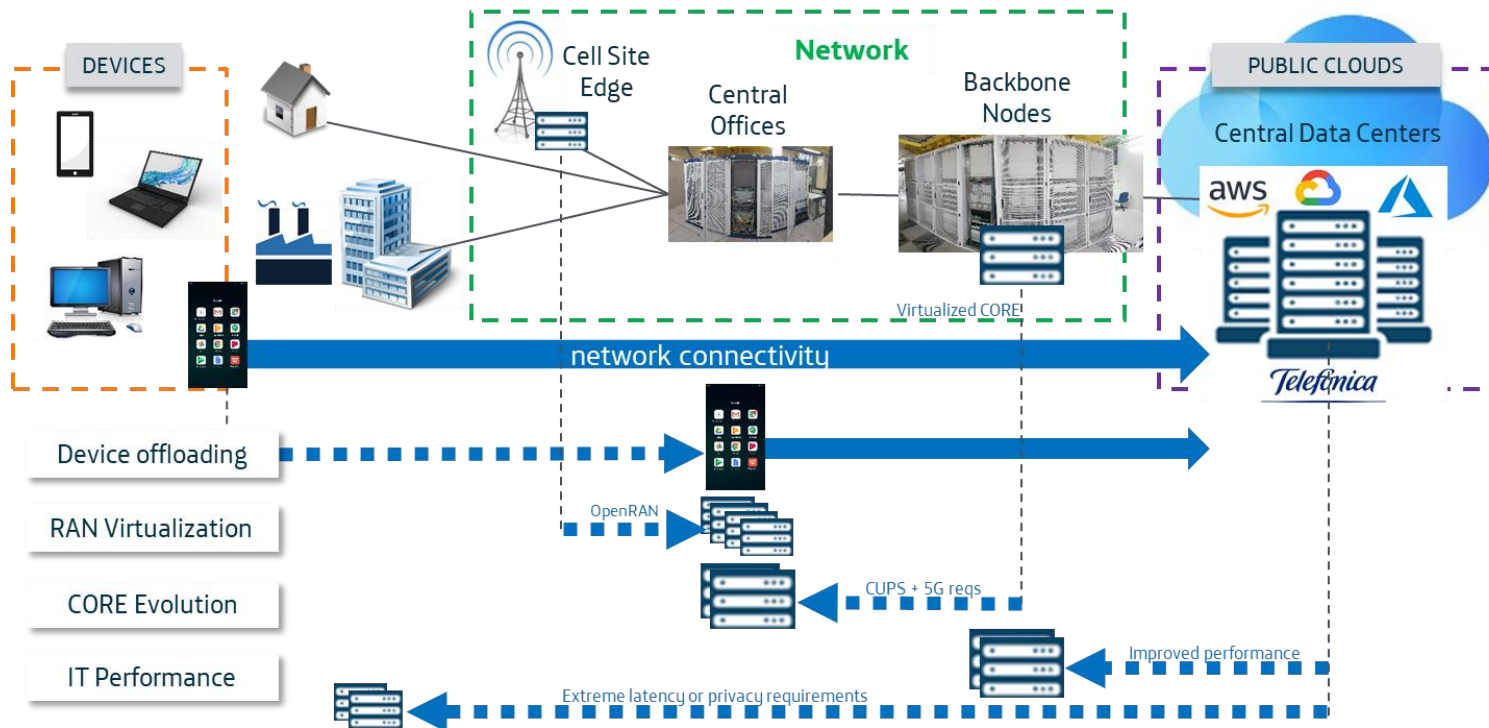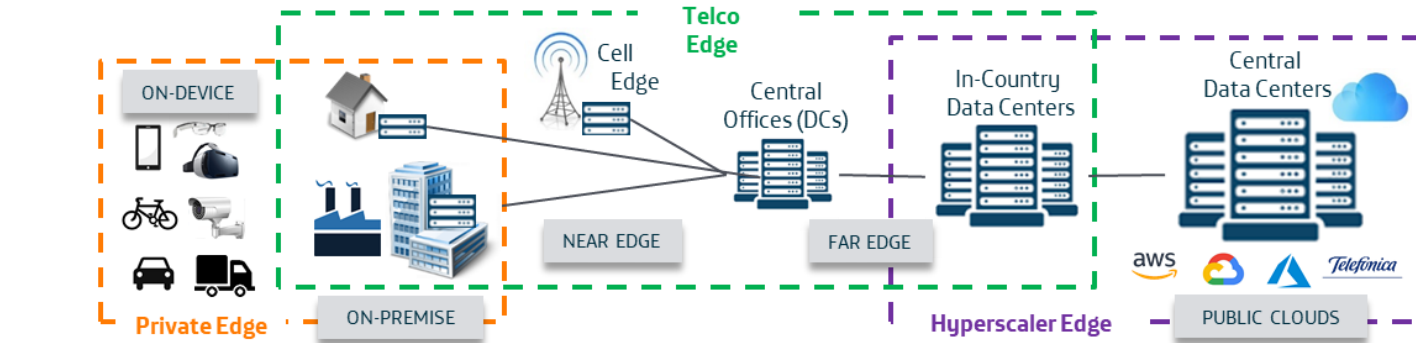
TELCO EDGE CLOUD
TEC Commercial workstream

Operators are going to deploy workloads at the Edge
that is the natural evolution of its own network and their customer demand

Need to understand motivations and barriers for Telco Edge usage
to show customers the value of TEC and meet expectations

Telco Edge

ON-DEVICE

Cell Edge

Central Offices (DCs)

In-Country Data Centers

Central Data Centers

NEAR EDGE

FAR EDGE

ON-PREMISE

Private Edge

Hyperscaler Edge

PUBLIC CLOUDS

aws · Telefónica

Scale (PoPs)	10s of millions	millions	thousands	hundreds		tenths
Typical latency	>1ms	<5ms		<10-20ms		>20ms

From device

- Optimize device form factor
- Reduce device complexity

- Increase battery lifetime
- Enrich services at device
- Postpone device swap

...to Edge

- Reduce latency
- Increase bandwidth
- Enlarge device density

- Data Privacy, Security, Trust
- Save Transport costs

From Cloud...

From on-premise

- Save IT costs/complexity
- Agility, flexibility
- Focus on own business

Drivers for Edge

Latency reduction, data privacy/residency, transport efficiency

Multitenancy, **operational scale**, energy efficiency

Drivers for Cloud

CONFIDENTIAL

The Telco Edge Cloud offers a wide footprint
enabling a global Edge Computing service based on telco assets

- The Telco Edge Cloud is a global distribution system that offers Edge Computing services for customers to **develop, deploy and manage edge-based solutions over a global footprint**, benefiting from the unique capabilities that Telecom operators offer.

- It offers a **digital one-stop shop** for edge computing services, on a trusted and secure environment.

- It presents a **fair and transparent commercial model** across the value chain.

- TEC is built on edge technology based on a combination of **Open Source, Cloud and Telco standards**.

- It provides a single and simple interface (GUI, CLI, API), that facilitates the relationship with multiple Service Providers and multiple Mobile Operators, interconnected by open and standard federation mechanisms.

- TEC is supported by a group of 22 operators from Europe, Middle East, Asia-Pacific and the Americas.
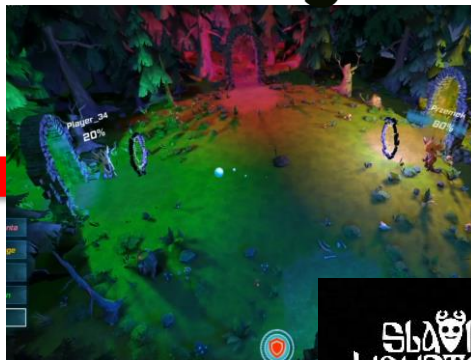
TELCO EDGE CLOUD

TEC Trials workstream

Multi-operator VR gaming trial Telefonica-DT
using MobiledgeX as an aggregation platform solution
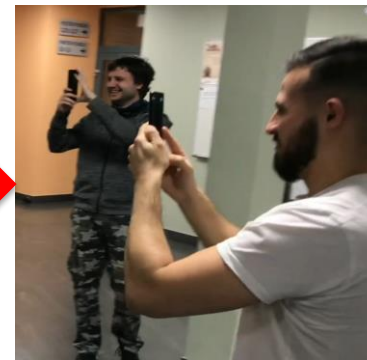

Players in Spain
with Telefonica Spain NW

Joint virtual world of
„Mythical Wars"

Players in Germany
with Deutsche Telekom NW

Multi-operator and **multi-locations** consumer trial conducted between **Telefonica** and **Deutsche Telekom** using the **MobiledgeX** platform running on top of edge infrastructure provided by the participating operators.
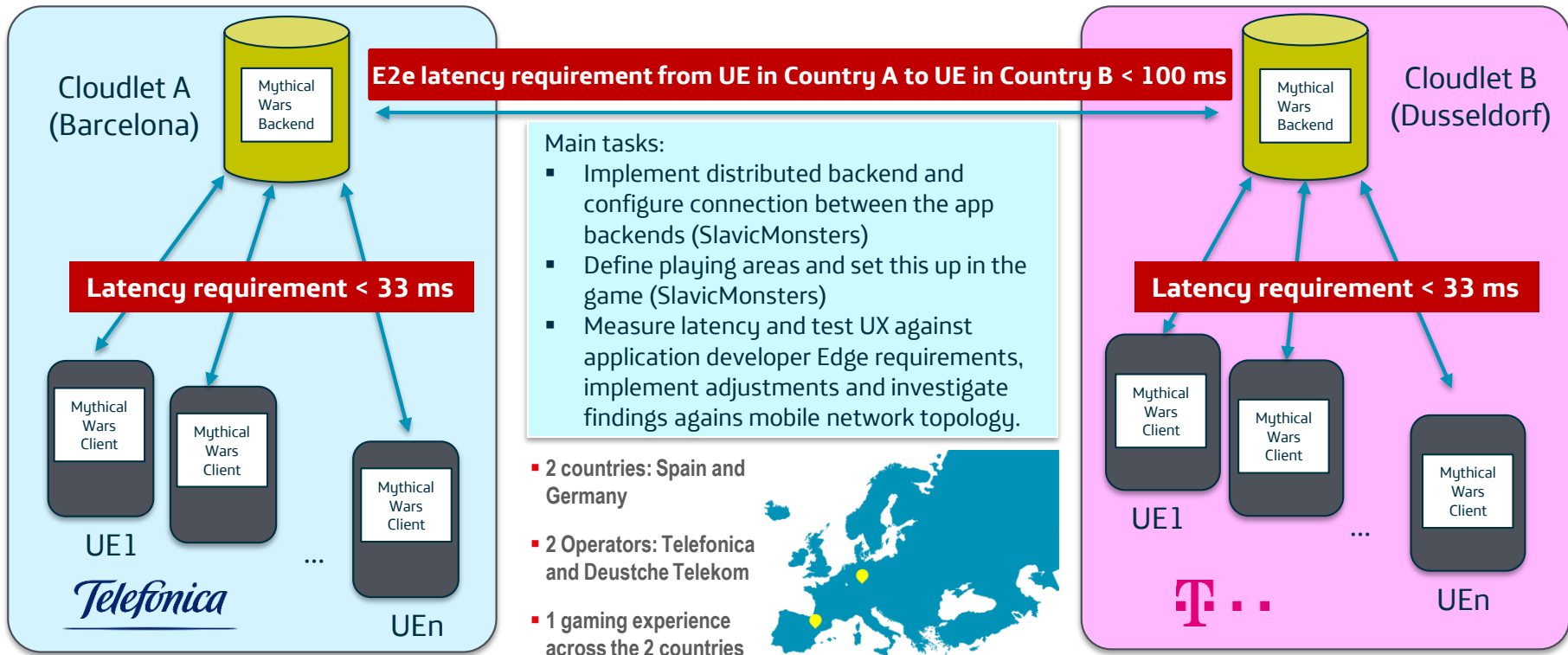The participating operators are responsible to provide the connectivity between user devices and the respective edge location as well as between the edge locations with sufficient quality.
Content of the trial was a **XR multiplayer-game, "MythicalWars",** developed with game provider **Slavic Monsters**.

https://youtu.be/05IO7-W-VHk

VR gaming trial set up and technical requirements
connecting the applications across borders

Cloudlet A
(Barcelona)

Mythical Wars Backend

E2e latency requirement from UE in Country A to UE in Country B < 100 ms

Mythical Wars Backend

Cloudlet B
(Dusseldorf)

Latency requirement < 33 ms

Latency requirement < 33 ms

Main tasks:
- Implement distributed backend and configure connection between the app backends (SlavicMonsters)
- Define playing areas and set this up in the game (SlavicMonsters)
- Measure latency and test UX against application developer Edge requirements, implement adjustments and investigate findings agains mobile network topology.

Mythical Wars Client

Mythical Wars Client

Mythical Wars Client

UE1

...

UEn

Telefonica

- **2 countries: Spain and Germany**
- **2 Operators: Telefonica and Deustche Telekom**
- **1 gaming experience across the 2 countries**

Mythical Wars Client

Mythical Wars Client

Mythical Wars Client

UE1

...

UEn

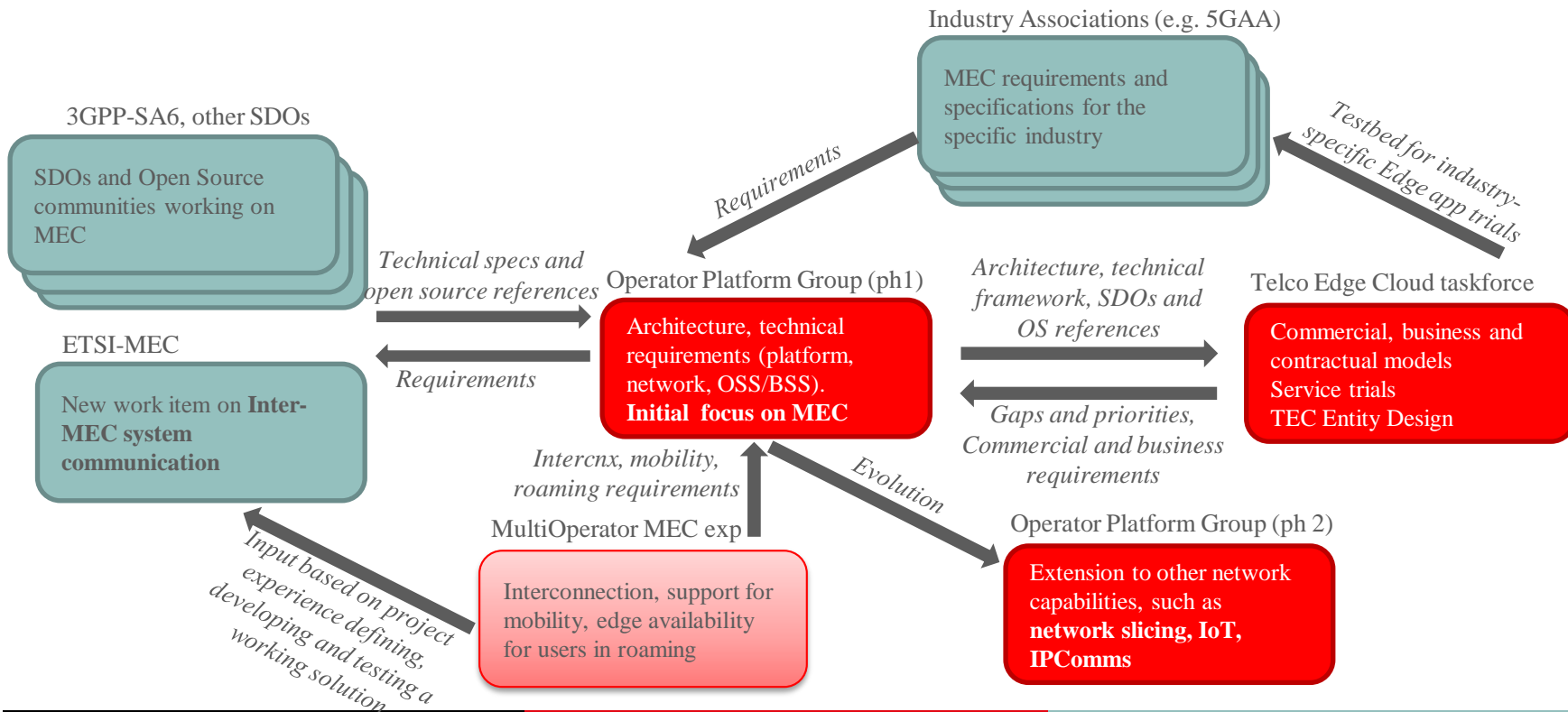# OPG/TEC
Industry Engagement

…building links to other Industry bodies
from SDOs to Associations from other Industries

Industry Associations (e.g. 5GAA)

MEC requirements and specifications for the specific industry

Testbed for industry-specific Edge app trials

3GPP-SA6, other SDOs

SDOs and Open Source communities working on MEC

Requirements

Technical specs and open source references

Operator Platform Group (ph1)

Architecture, technical requirements (platform, network, OSS/BSS). **Initial focus on MEC**

Architecture, technical framework, SDOs and OS references

Telco Edge Cloud taskforce

Commercial, business and contractual models
Service trials
TEC Entity Design

ETSI-MEC

New work item on **Inter-MEC system communication**

Requirements

Gaps and priorities, Commercial and business requirements

Intercnx, mobility, roaming requirements

Evolution

MultiOperator MEC exp

Interconnection, support for mobility, edge availability for users in roaming

Input based on project experience defining, developing and testing a working solution

Operator Platform Group (ph 2)

Extension to other network capabilities, such as **network slicing, IoT, IPComms**

Collaboration opportunities at the Edge
following our OPENNESS principles