

# ETSI MEC Updates

*focus on MEC Federation and results from 2021 Hackathon*

Presented by: **Dario Sabella**  
(Intel, ETSI MEC Chairman)

For: **OEC Fall Workshop 2021**  
*Online, December 10th 2021*



# ETSI MEC: Enabling *Edge* through *Standardization*



Watch the new video on MEC

<https://www.youtube.com/watch?v=crnPWql-0oo>

## ETSI ISG MEC

### ETSI: The Standards People

We produce globally applicable standards for ICT-enabled systems, applications and services deployed across all sectors of industry and society

### MEC: Multi-access Edge Computing

Cloud Computing at the Edge of the network.

### ISG: Industry Specification Group

open to all of industry, regardless of ETSI membership and focused on all industry needs

**Standards**



**Industry Enablement**

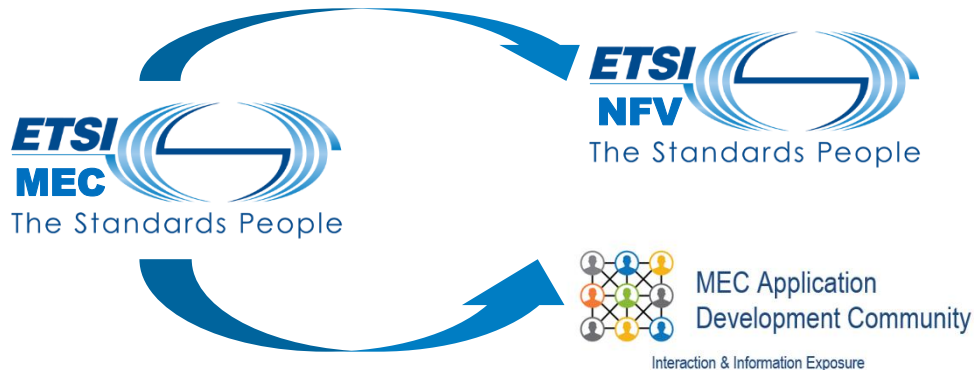


**Telco Edge Focus**



# ETSI MEC – What we do

Foundation for Edge Computing created – Fully standardized solution to enable applications in distributed cloud created by ETSI MEC + 3GPP



Application Life Cycle Management

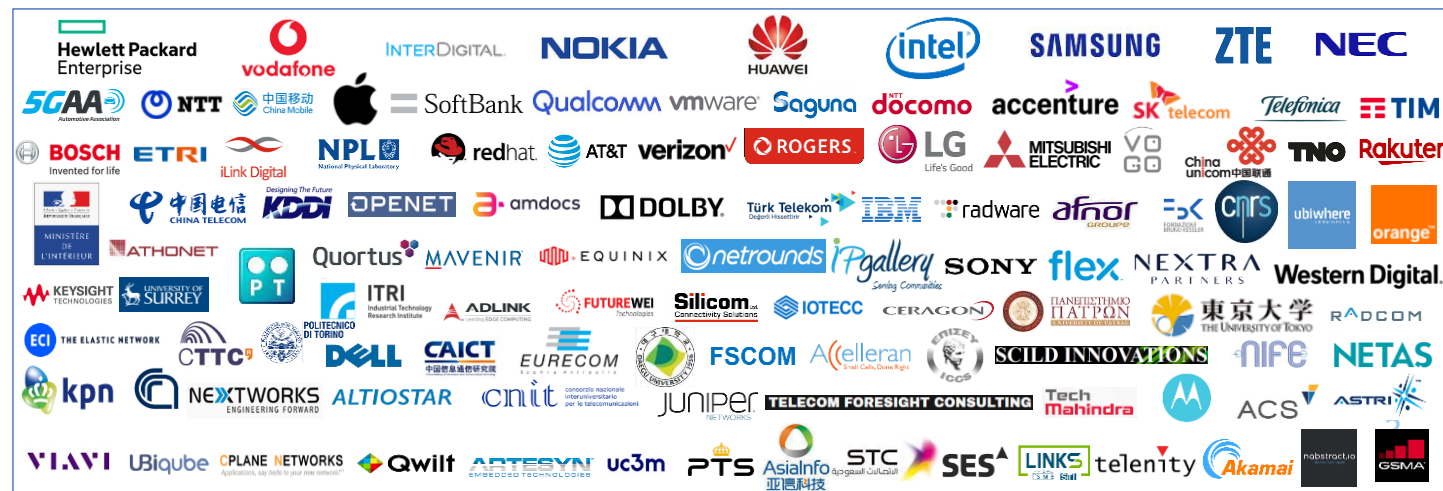
RESTful based APIs for Runtime Application Services



Look at the new webpage with the **ISG MEC Leaders** and **Support Team**

<https://portal.etsi.org/TB-SiteMap/MEC/MEC-Leaders-and-Support-Team>

**120 members** - Operators – Technology Vendors – IT players – Application developers





# The essence of MEC

MEC offers to application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the network

How do I reach my cloud service?

What is my QoS?

Where am I?

What is around me?

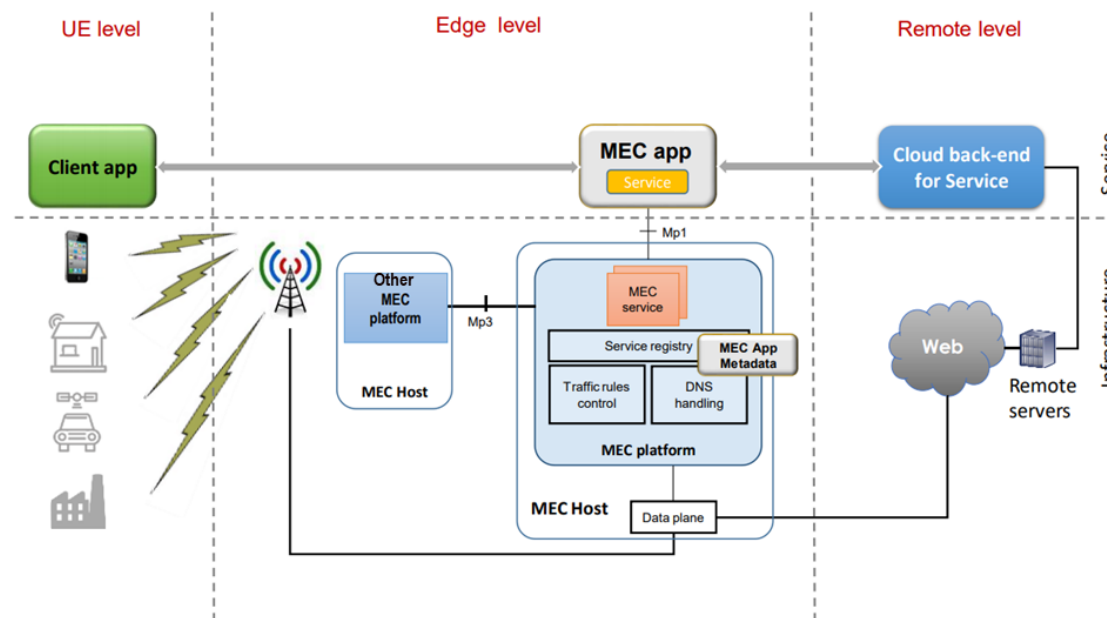


Figure 2: New application development paradigm introduced by MEC.

How do I get discovered by my users?

How am I connected to the users?

How many users am I serving? And where

How to be sure I am running when and where needed?

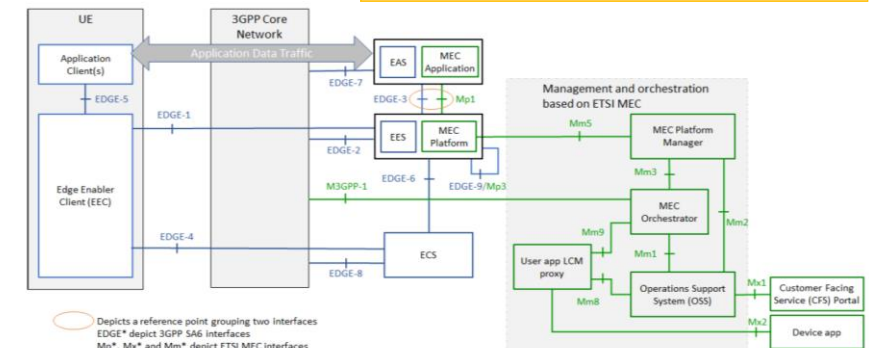
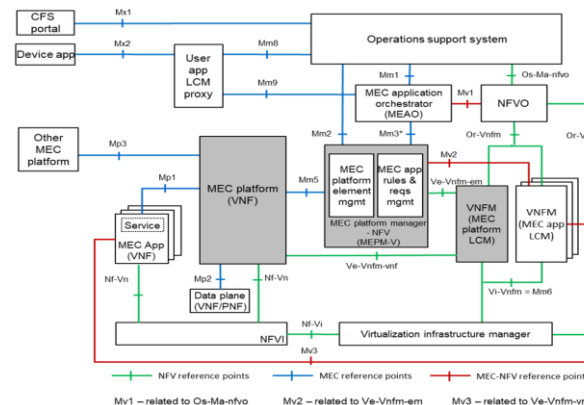
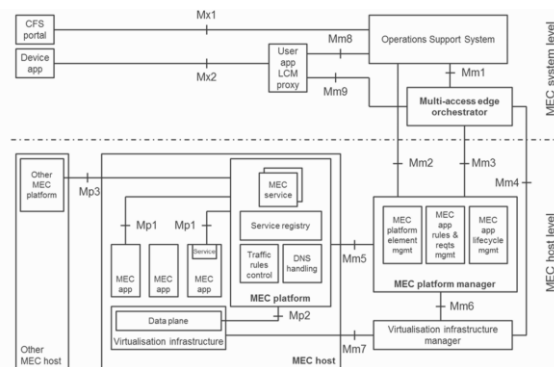
What if my users move?

MEC is focused on *existential* questions of applications “on the edge”



- *Open standard* → allowing multiple implementations and ensuring interoperability
- MEC exploiting ETSI *NFV framework* and definitions → enabling MEC in NFV deployments
- Alignment with *3GPP* based on fruitful collaboration of common member companies → enabling MEC in 5G
- *Access-agnostic* nature (as per MEC acronym - Multi-access Edge Computing) → enabling other accesses
- Addressing the needs of a *wide ecosystem* → enable multiple verticals (e.g. automotive), federations

News: 5GAA joined the MEC membership



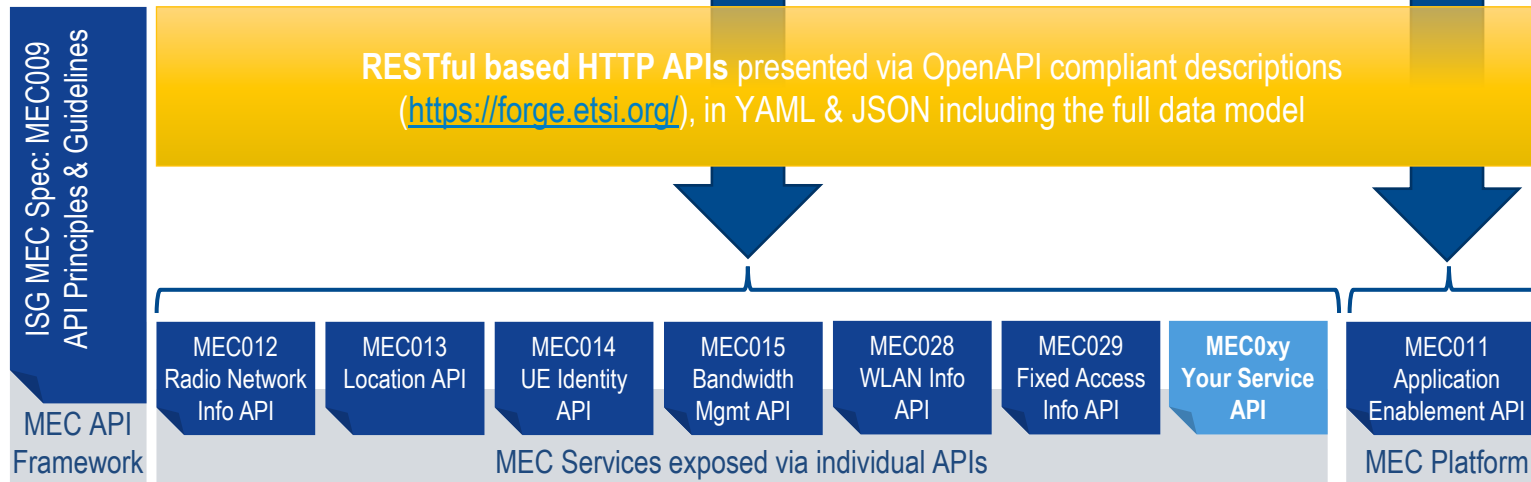


# Enabling Global Application Portability



## MEC Application Development Community

Interaction & Information Exposure



- ✓ Simple to use, well documented APIs, published with OpenAPI Framework
- ✓ Create innovative applications quickly and easily, reducing time-to-revenue
- ✓ New APIs (compliant with the MEC API principles) can be added
- ✓ Increase the Total Addressable Market (TAM)

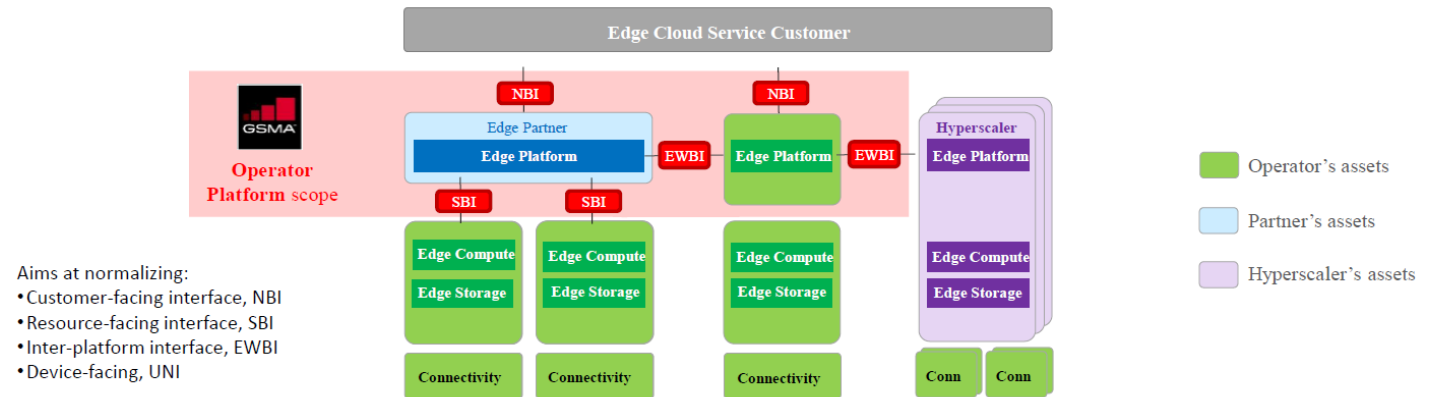




# Focus on MEC Federation



# Starting from Industry requirements ...



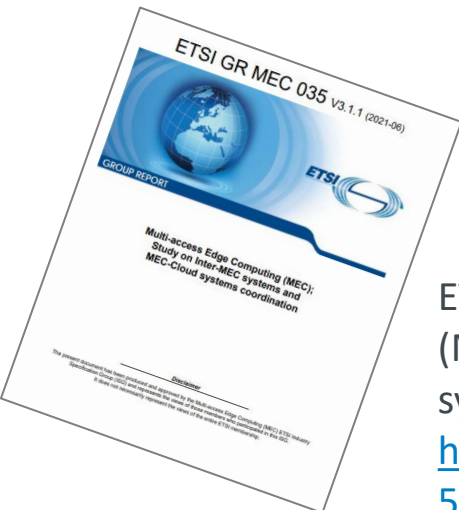
Ref: GSMA White paper: "Telco Edge Cloud: Edge Service Description and Commercial Principles", Oct 2020

... ETSI MEC published a very first work on **MEC federation**



## MEC Federation:

*“federated model of MEC systems enabling shared usage of MEC services and applications”*

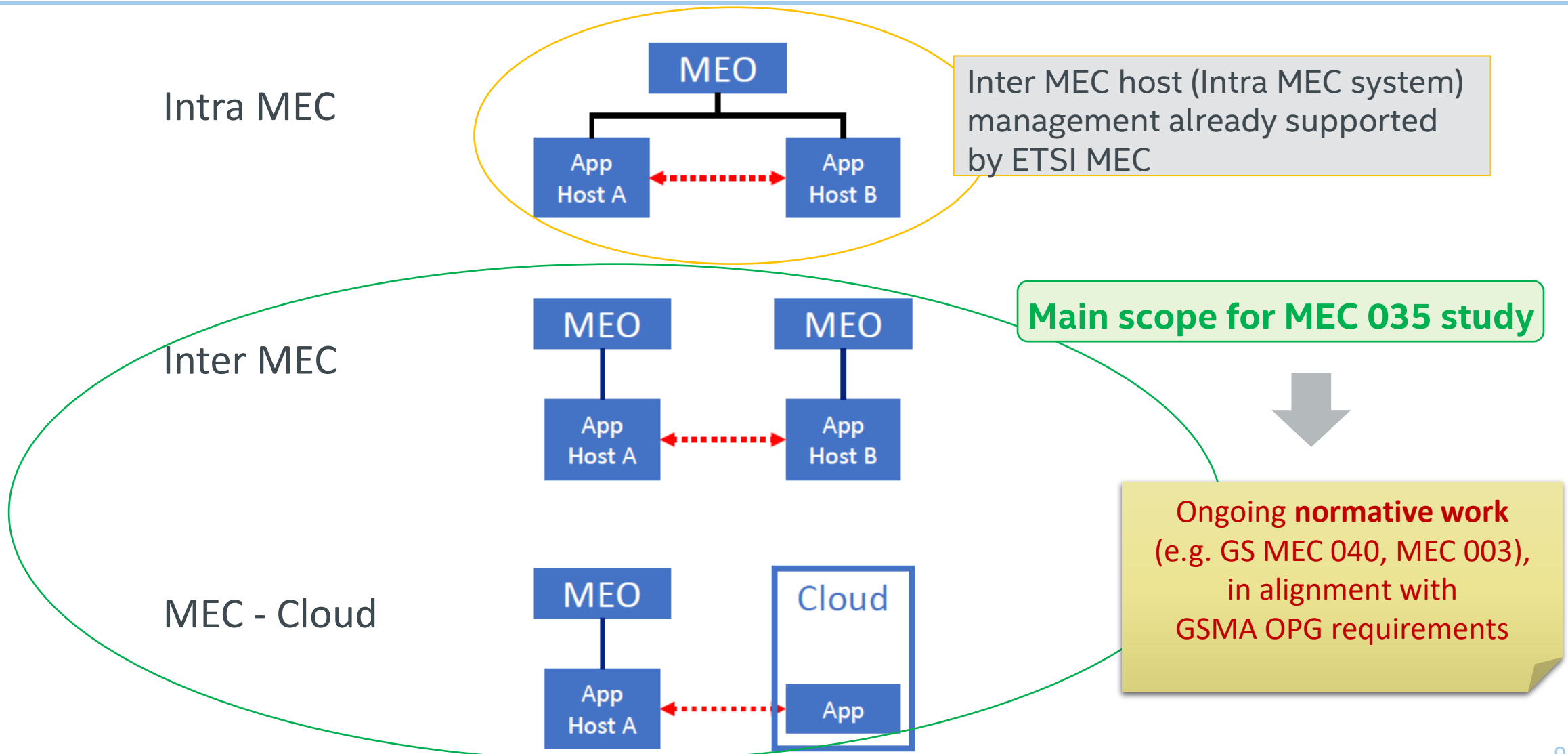


ETSI GR **MEC 035** v3.1.1: “Multi-access Edge Computing (MEC); Study on Inter-MEC systems and MEC-Cloud systems coordination”, June 2021,

[https://www.etsi.org/deliver/etsi\\_gr/MEC/001\\_099/035/03.01.01\\_60/gr\\_mec035v030101p.pdf](https://www.etsi.org/deliver/etsi_gr/MEC/001_099/035/03.01.01_60/gr_mec035v030101p.pdf)



# MEC Phase 3: expanding the scope to MEC Federation

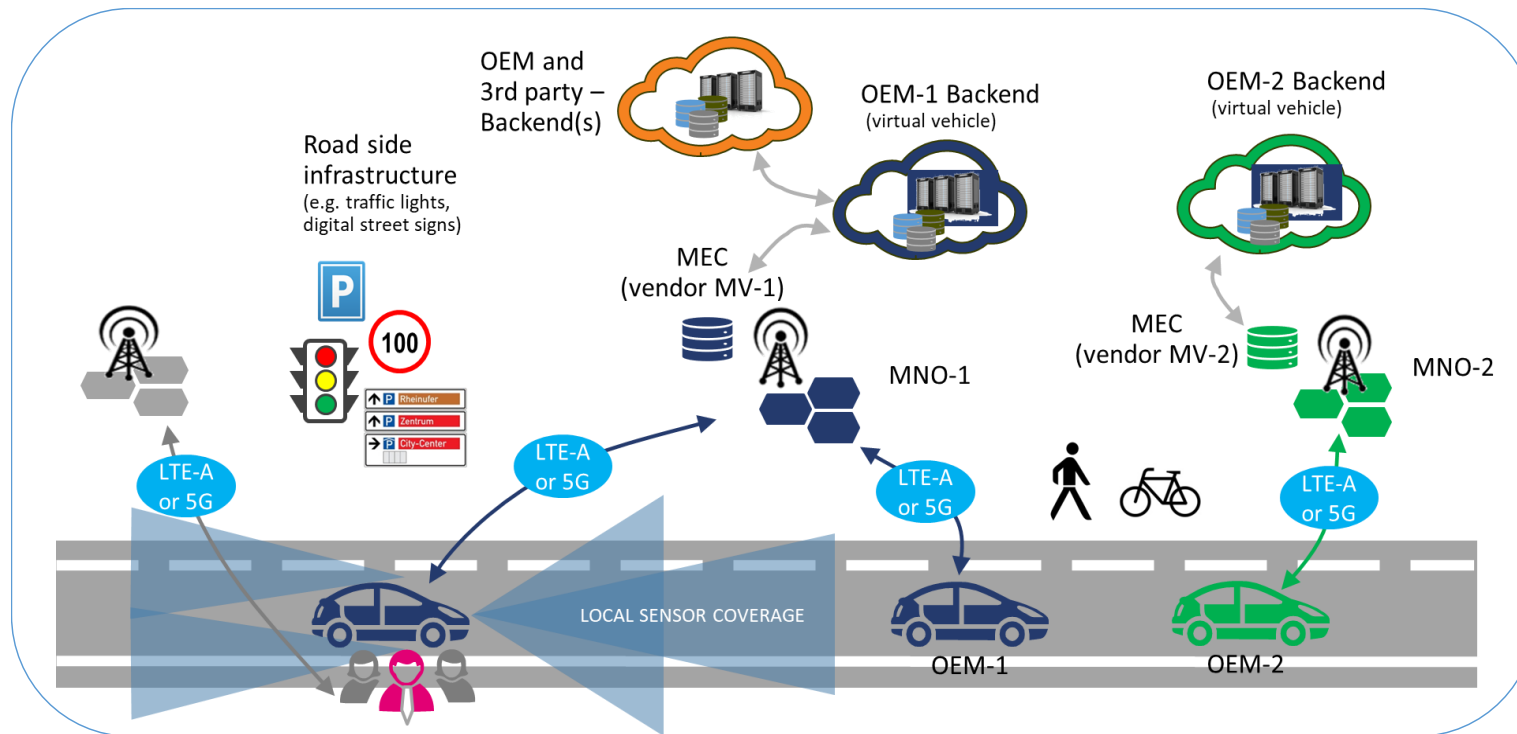




# MEC Study on Inter-MEC systems and MEC-Cloud systems coordination (MEC 035)

## Many Use cases

### #1: MEC federation scenario of V2X services



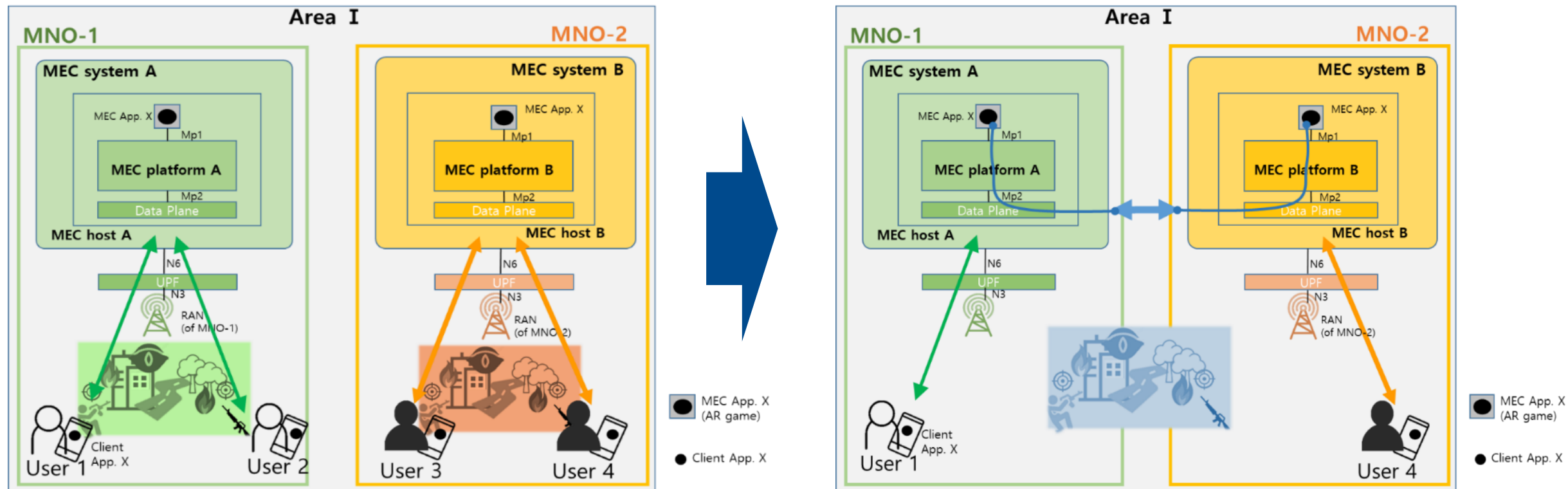
1. Interop. between MNOs
2. Interop. between MEC vendors/suppliers
3. Interop. between OEMs (applications)



# MEC Study on Inter-MEC systems and MEC-Cloud systems coordination (MEC 035)

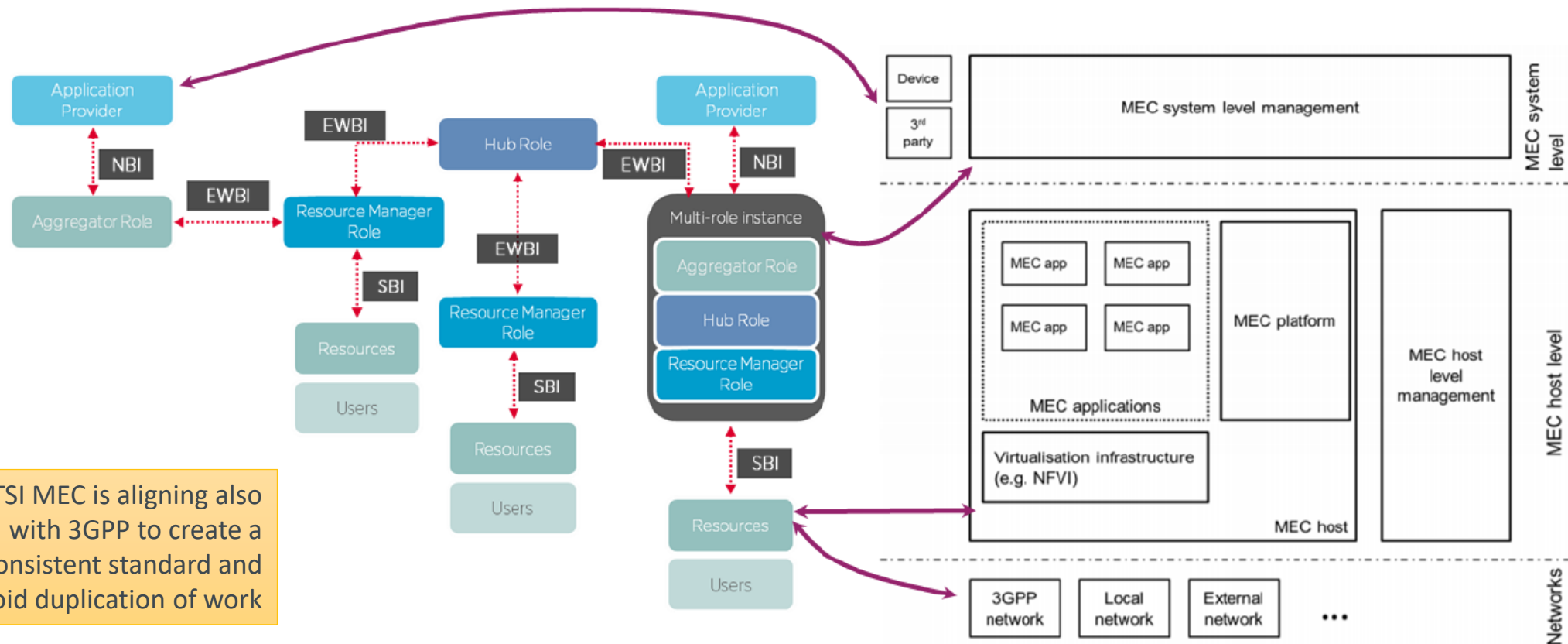
Many Use cases

#6: MEC federation scenario for immersive AR game





# GSMA OPG (Operator Platform Group) mapping with ETSI MEC

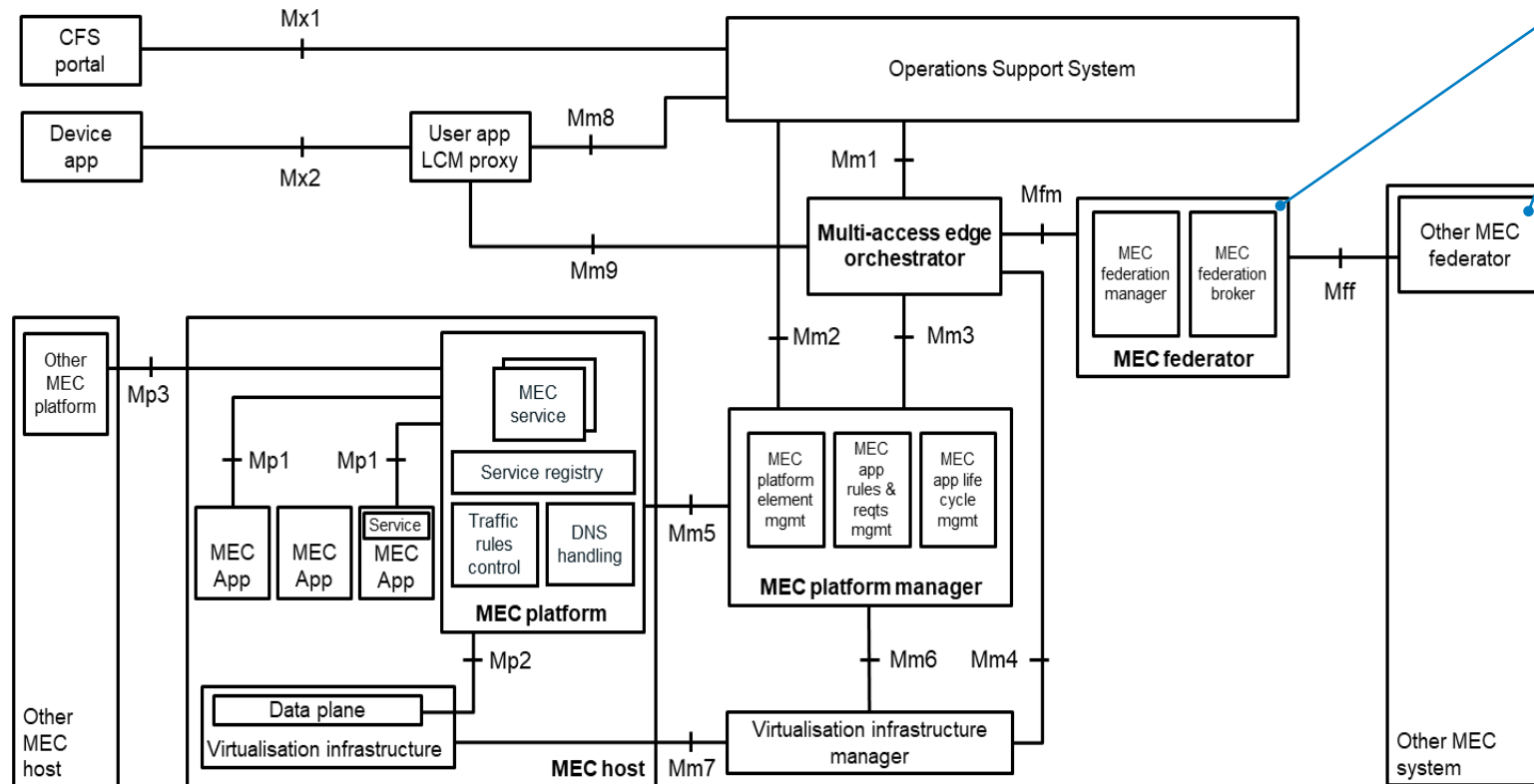


ETSI MEC is aligning also with 3GPP to create a consistent standard and avoid duplication of work

**Note:** GSMA is listed as a MEC Participant, can submit contributions to ISG MEC for Discussion or Decision, and not only for Information. Dually, ETSI MEC nominated 2 observers, to represent the ISG in GSMA OPG.



# Multi-access edge system reference architecture variant for MEC federation (*under discussion*)




**MEC federator (MEF):** enables a MEC federation between MEC systems

- A MEF interfaces to at least one MEO
- Each MEF enables information exchange with at least one other MEF
- A MEF may serve as a single point of contact for multiple MEFs in the MEC federation

Ongoing normative work  
MEC 003



A circular inset image showing a close-up of blue network cables plugged into a server rack. The cables are bundled and connected to multiple ports on the rack. The background is a blurred view of the server rack.

# **WG DECODE: Enabling MEC Deployment and Ecosystem Development**



# ETSI ISG MEC DECODE Working Group: MEC Deployment and Ecosystem engagement activities



- OpenAPI representations: ETSI Forge
- Testing and Conformance
- MEC Ecosystem wiki
- PoCs (proof-of-concepts)
- MDTs (MEC Deployment Trials)
- MEC Sandbox
- Collaborations: Akraino
- Hackathons
- Plugtests
- MEC Tech Series

**MEC**

**MEC Sandbox**  
Experience MEC APIs

<https://try-mec.etsi.org/>

**EDGE COMPUTING WORLD**

12 Oct 2021,  
<https://www.edgecomputingworld.com/hackathon/>

**1 - 15 Oct 2021  
NFV&MEC IOP  
Plugtests 2021**

**MEC Solutions**

For each MEC solution, there is a corresponding MEC solution ID. Each solution ID is a unique identifier for the MEC solution. It is used to track the solution across different MEC solutions.

Solution ID	Description	MEC Solution provider	MEC Solution category	Link	Contact
MEC-001	MEC-001 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-002	MEC-002 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-003	MEC-003 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-004	MEC-004 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-005	MEC-005 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-006	MEC-006 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-007	MEC-007 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-008	MEC-008 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-009	MEC-009 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact
MEC-010	MEC-010 is a MEC solution that provides a MEC solution. It is used to track the solution across different MEC solutions.	MEC Solution provider	MEC Solution category	Link	Contact

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<https://apiportal.akraino.org/apimap.html>

[https://mecwiki.etsi.org/index.php?title=MEC\\_Ecosystem](https://mecwiki.etsi.org/index.php?title=MEC_Ecosystem)



# MEC: DECODE Working Group

- OpenAPI representations: ETSI Forge

Discover the APIs on [forge.etsi.org/rep/mec](https://forge.etsi.org/rep/mec)

Powered by

- Testing and Conformance

- MEC Ecosystem wiki

- PoCs (proof-of-concepts)

- MDTs (MEC Deployment Trials)

- MEC Sandbox

- Collaborations: Akraino

- Hackathons

- Plugtests

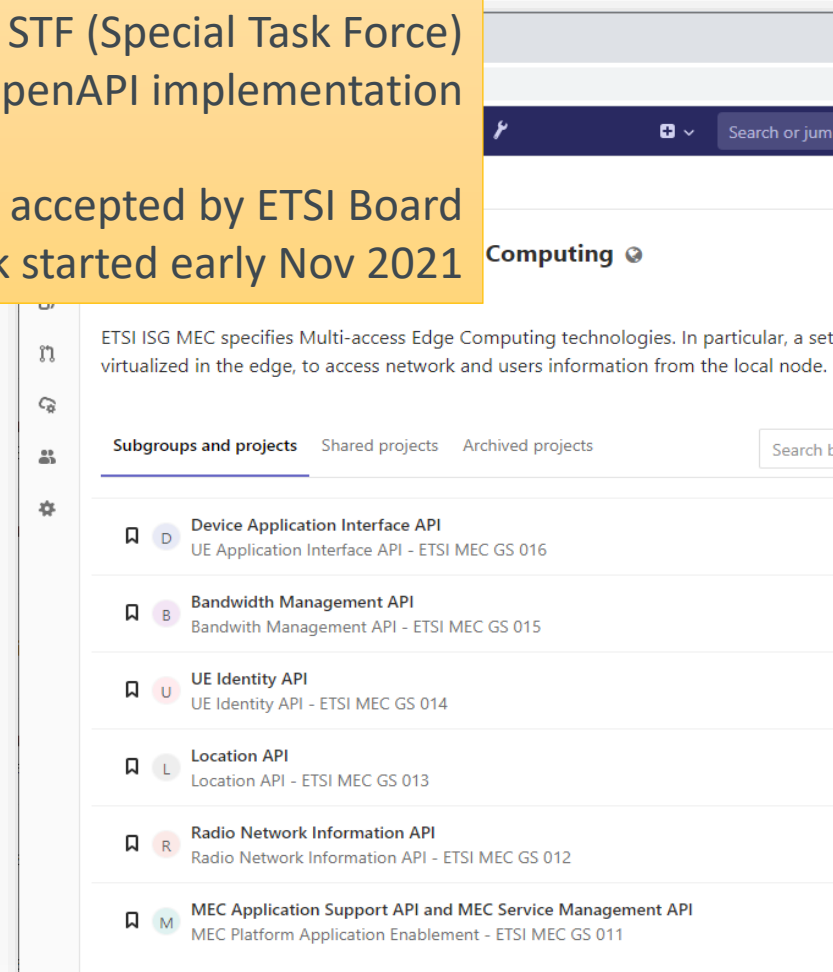
- MEC Tech Series

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News: new STF (Special Task Force)  
for OpenAPI implementation

Status: accepted by ETSI Board  
and work started early Nov 2021



Operated by



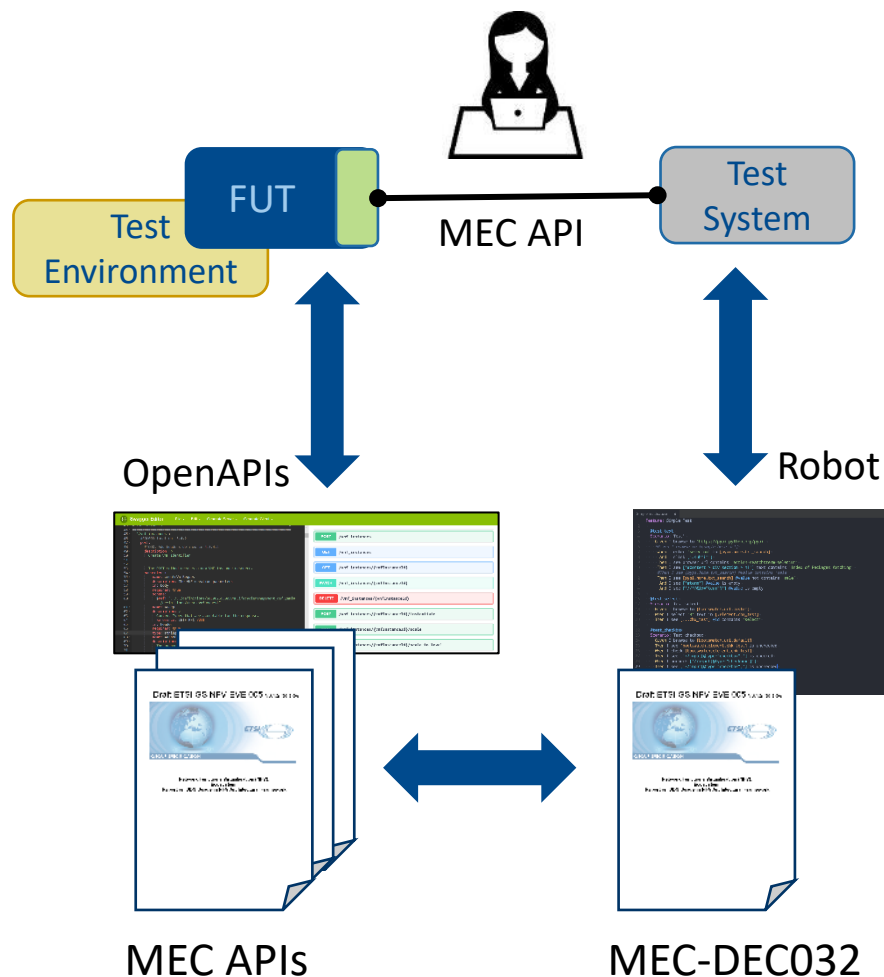


# MEC: DECODE Working Group



News: new Work Item MEC-DEC0042 for Testing an Interoperability

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General testing framework for MEC Technologies ([MEC 0025](#))

API Conformance testing developed for server implementations

- Standardized test suite ([MEC-DEC 032](#)) Test implementations in [Robot Framework](#) and [TTCN-3](#)
- Openly available and released under BSD-3 license



- ## PoCs

[https://mecwiki.etsi.org/index.php?title=Ongoing\\_PoCs](https://mecwiki.etsi.org/index.php?title=Ongoing_PoCs)



## New MDTs

## MEC Deployment Trials

[https://mecwiki.etsi.org/index.php?title=Ongoing\\_MDTs](https://mecwiki.etsi.org/index.php?title=Ongoing_MDTs)

## MEC Ecosystem

[https://mecwiki.etsi.org/index.php?title=MEC\\_Ecosystem](https://mecwiki.etsi.org/index.php?title=MEC_Ecosystem)



## New implementations


[illegible]

We encourage **new submissions** to ETSI MEC !

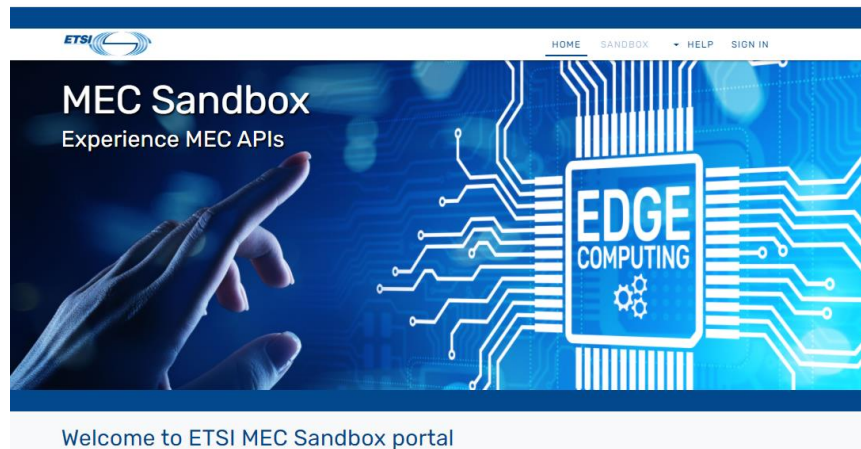
For further details,  
please see:  
<http://mecwiki.etsi.org> or  
contact [CTI\\_Support@etsi.org](mailto:CTI_Support@etsi.org)



# MEC: DECODE Working Group

- OpenAPI representations: ETSI Forge
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- PoCs (proof-of-concepts)
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- **MEC Sandbox**  New features and APIs implemented
- Collaborations: Akraino
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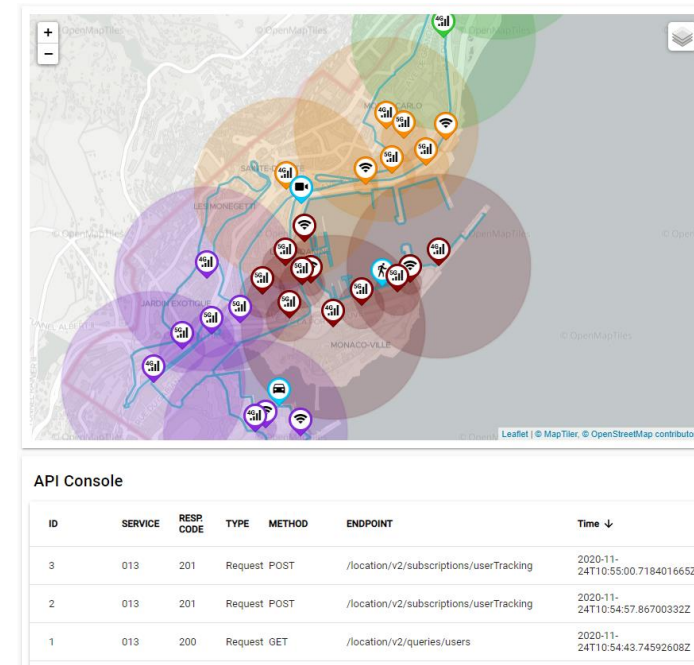
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<https://try-mec.etsi.org/>

A simulator of a real 4G/5G network as seen via the MEC APIs

- ✓ 4G/5G/Wifi access points
- ✓ Steady and moving UE (~devices)
- ✓ API Console, integrated Swagger UI, & more
- ✓ Real MEC Apps can interact with the Sandbox and can register services





# MEC: DECODE Working Group

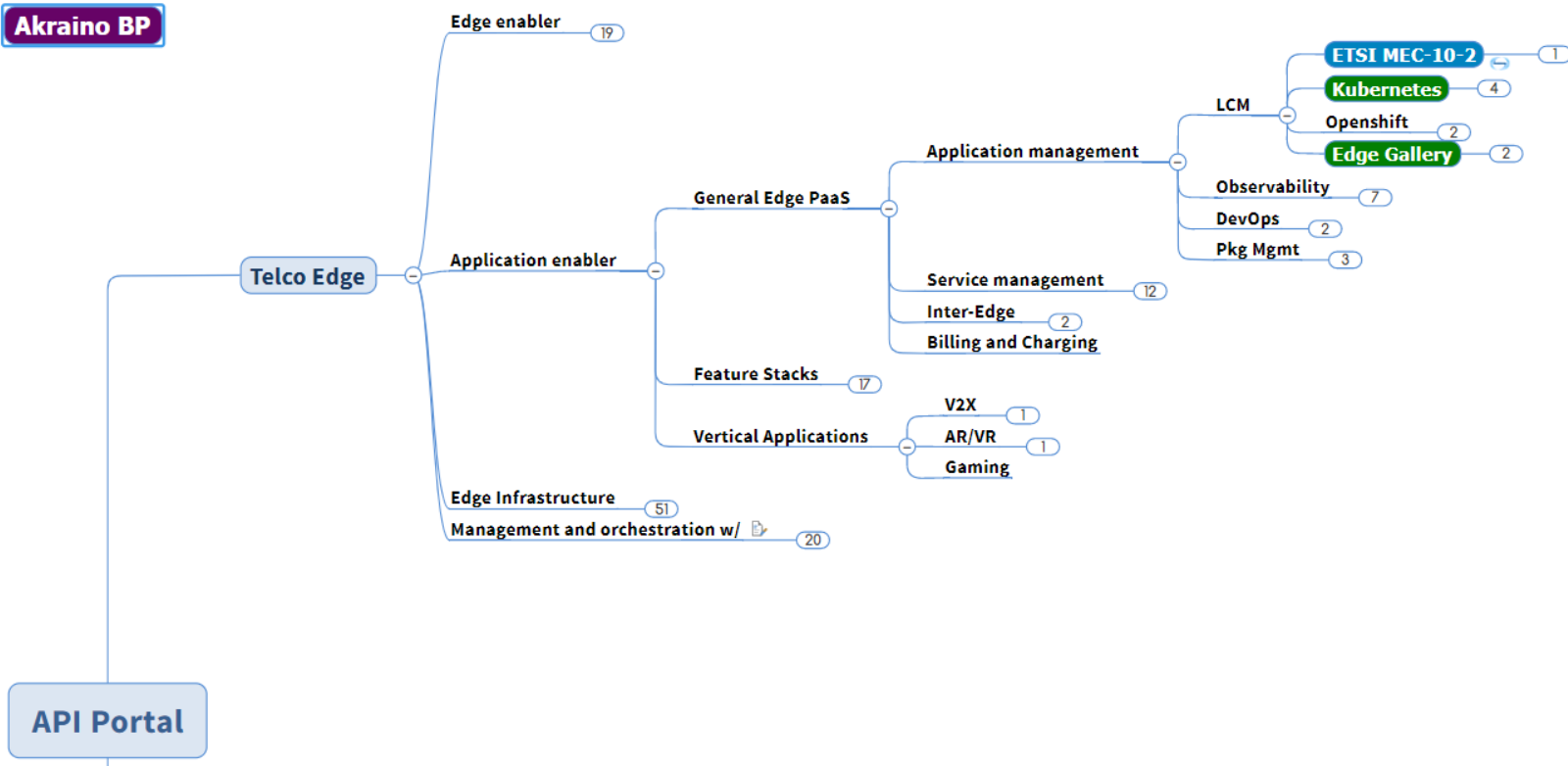
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- **Collaborations: Akraino**
- Hackathons
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- MEC Tech Series

<https://apiportal.akraino.org/apimap.html>

Standard Specifications

Upstream Project

Akraino BP





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## Past MEC Hackathons:

- [18-19 September 2018: 3 parallel events \(link\)](#)
  - Berlin (co-located with Edge Computing Congress)
  - Beijing (China)
  - Turin (Italy)
- [17-18 September 2019: 2 parallel events \(link\)](#)
  - London, UK (co-located with Edge Computing Congress)
  - Shenzhen (China)
- [18 November 2019, in collab. with LF Edge and Akraino \(link\)](#)
  - San Diego (USA) (with KubeCon + CloudNativeCon North America)
- [25-26 November 2020](#)
  - 2020 Droidcon MEC Hackathon (co-located with Droidcon Italy)



MEC Hackathon 2021

**EDGE**  
COMPUTING WORLD





# MEC: DECODE Working Group

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- Hackathons

## • Plugtests

- MEC Tech Series

3 – 7 June 2019  
**4<sup>th</sup> NFV Plugtests  
2019**

15 – 19 June 2020  
**NFV&MEC  
Plugtests 2020**

1 – 28 Feb 2021  
**NFV&MEC API  
Plugtests 2021**

 **2021 editions**

1 - 15 Oct 2021  
**NFV&MEC IOP  
Plugtests 2021**

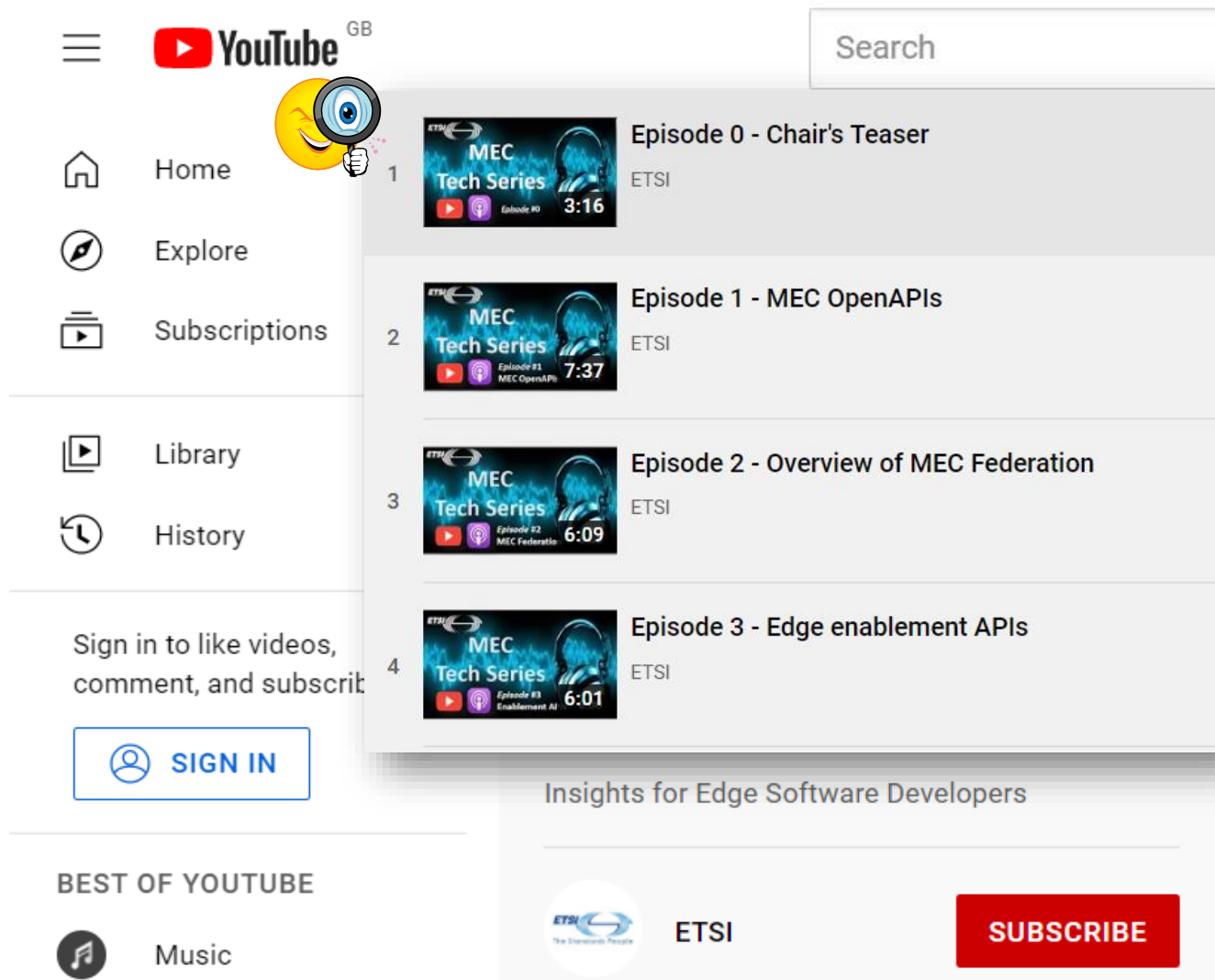


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- **MEC Tech Series**

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The screenshot shows a YouTube channel page for 'MEC Tech Series' by ETSI. The channel has 4 videos listed:

- Episode 0 - Chair's Teaser (3:16)
- Episode 1 - MEC OpenAPIs (7:37)
- Episode 2 - Overview of MEC Federation (6:09)
- Episode 3 - Edge enablement APIs (6:01)

The page includes a search bar, a sidebar with navigation links (Home, Explore, Subscriptions, Library, History), a sign-in button, and a 'SUBSCRIBE' button. The bottom of the page features a 'BEST OF YOUTUBE' section with a 'Music' icon and the ETSI logo.



A circular inset image showing a close-up of blue network cables plugged into a server rack. The cables are bundled and connected to multiple ports on the rack. The background is a blurred view of the server rack.

# Results from the MEC Hackathon 2021



## The Hackathon Challenge:

- “What innovative Edge Application or Service can you imagine using MEC Service APIs?”
- Bring that App or Service to life with the [ETSI MEC Sandbox](#).
- Teams were encouraged to be creative in selecting an application vertical to focus on for their submission.

## Global, Fully Virtual / Remote Hackathon:

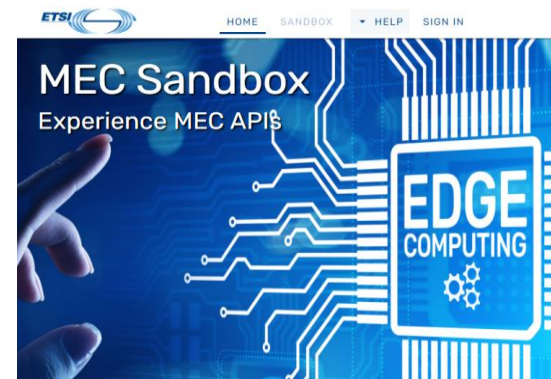
- Teams participated from across the world: North America, Europe, and Asia.
- Teams were provided with a dedicated and isolated MEC Sandbox for their work.
- Cost of participation was free.

## Edge Computing World – Edge Developer Conference:

- Website: <https://www.edgecomputingworld.com/hackathon/>

## Evaluation Criteria:

- 1) Usage of MEC Services (x2);
- 2) Use-Case/Solution Credibility;
- 3) Innovation;
- 4) Quality;
- 5) Pitch (only for the selected short list)





## HACKATHON SUPPORTERS:



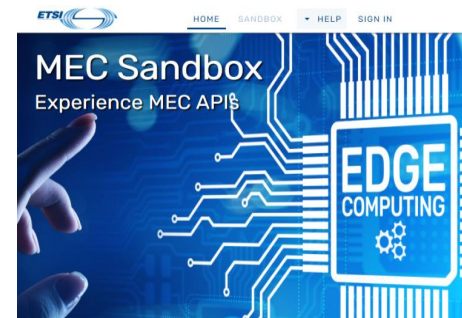


## Hackathon Timeline:

- Hackathon Start – August 9
  - Teams provided with remote access and introduction to their Sandbox
- Mid-Hackathon Check-in Submission – September 15
- Final Deliverable Submission – October 1
- First Round Judging – October 4-6
  - 3 teams short listed for Hackathon Pitches
- *Edge Developer Conference – Hackathon Pitches + Final Judging – Oct 12*



<https://www.edgecomputingworld.com/etsi-mec-hackathon-2021-the-developer-challenge/>



Sandbox instances:



Sandbox hosting:



EQUINIX

Virtualization Env.  
(optional):



### MEC Edge Hackathon Final • 30min

#### Plenary Session

- Kyle Ellicott, Topio Networks  
MC
- Serge Fdida, Empower  
Judge
- Bob Gazda, InterDigital  
Judge
- Dario Sabella, ETSI MEC  
Judge
- Mahadev Satyanarayanan (Satya), Carnegie Mellon University  
Judge

Location: • Edge Developers Conference

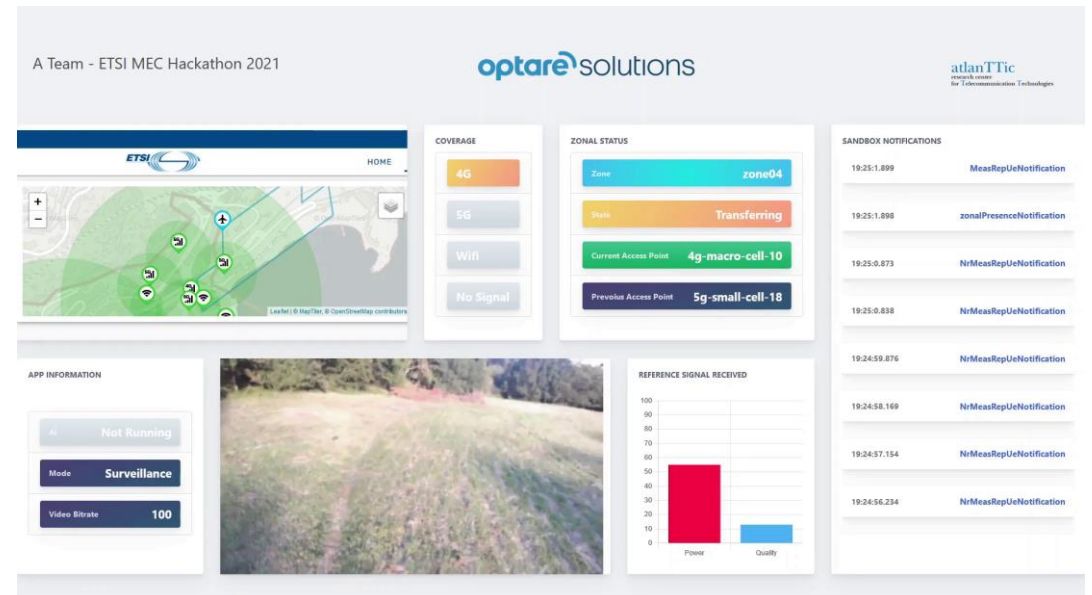


## A Team – Follow Mec



atlanTTic  
research center  
for Telecommunication Technologies  
Universida de Vigo

Rapidly and flexibly deployable aerial camera drone MEC application for surveillance activities (tracking pedestrians, wildlife control, crowd control) that uses the resources of the MEC to execute the AI algorithms, adapting its behaviour in real time to the different conditions about coverage, signal quality and power, etc.





The  
END