

The Standards People

# MEC: Multi-access Edge Computing State of play from ETSI MEC

Presented by: Dario Sabella (Intel) ETSI ISG MEC Chairman For: IEEE WoWMoM 2021

Online meeting, June 9th 2021

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



# **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

ISG: Industry Specification Group open to all of industry, regardless of ETSI membership and focused on all industry needs

MEC: Multi-access Edge Computing Cloud Computing at the Edge of the network.

## **Standards +**

# Industry Enablement +

# **Telco Edge Focus**



## ETSI MEC – What we do

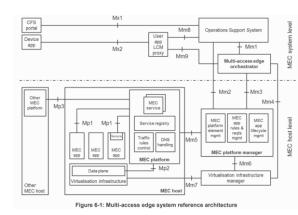
Foundation for Edge Computing created – Fully standardized solution to enable applications in distributed cloud created by ETSI MEC + 3GPP

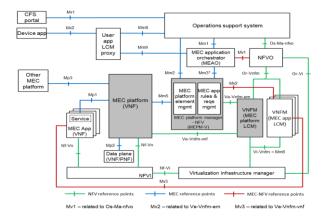


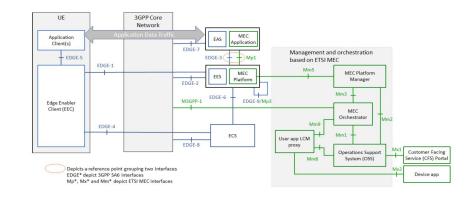


Basic principles:

- Open standard  $\rightarrow$  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  $\rightarrow$  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  $\rightarrow$  enable multiple verticals (e.g. automotive), federations



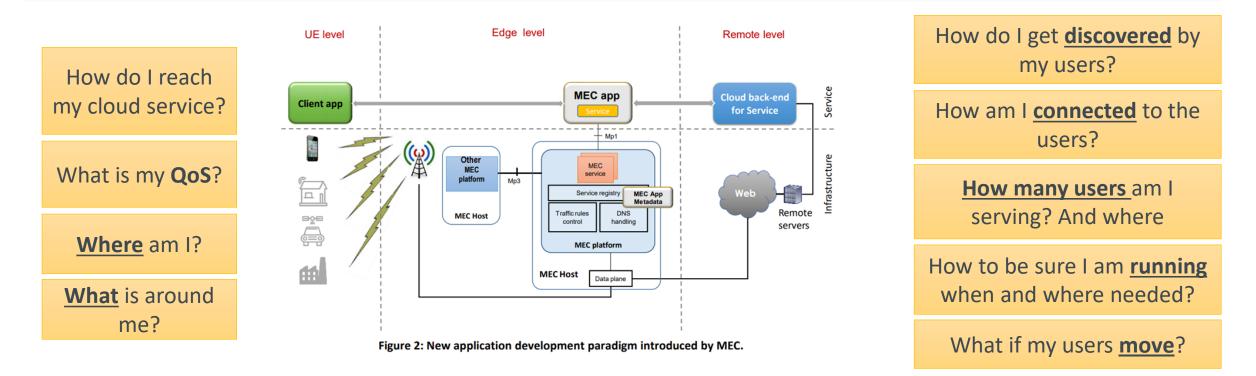




# The essence of MEC



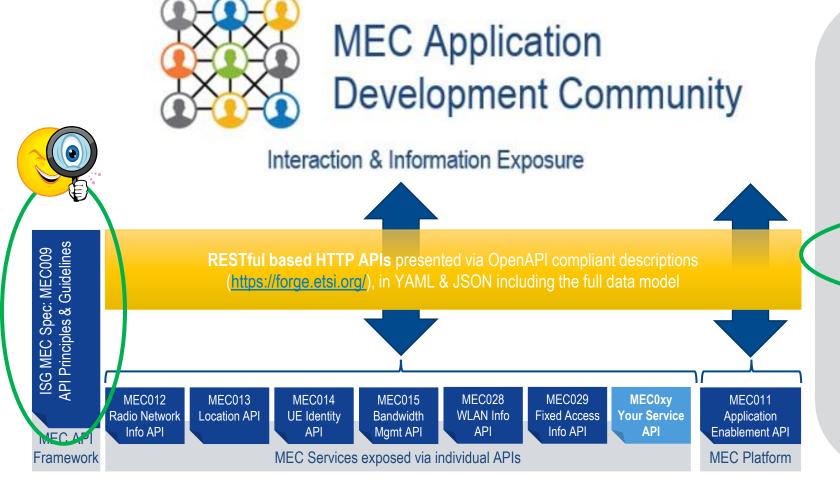
MEC offers to application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the network



### MEC is focused on *existential* questions of **applications "on the edge"**



# **MEC: Enabling Global Application Portability**



- 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)

## • ETSI MEC is covering many verticals like automotive,

as well as other industrial use cases.

*Example below*: 5GAA (5G Automotive Association)

5GAA



**3GPP** 

5G standardization

A GLOBAL INITIATIV

MEC

#### **ETSI MEC** (\*) and Industry Groups

Jan 2019:

ETSI and 5GAA signed a MoU, especially for

collaboration on V2X

VRARA (VR/AR association) OFC (Open Fog Consortium) AREA (Augmented Reality for Enterprise Alliance) 5GAA SCF (Small Cell Forum) **GSMA BBF** (BroadBand Forum) ...

(\*) ETSI MEC is establishing collaborations with different industry organizations



**Industry Group** 

on automotive

(not an SDO)

Collecting inputs from 5GAA

automotive sector)

(and other potential Fora in the

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# MEC: Edge Computing, 5G and verticals.





# 3rd 3-year Phase of work under way

- Key overall specification
  - Technical Requirements (MEC 002)
  - Framework and Ref. Arch. (MEC 003)
  - MEC PoC Process (MEC-IEG 005)
  - API Framework (MEC 009)
- IaaS Management APIs
  - Platform mgmt. (MEC 010-1)
  - Application mgmt. (MEC 010-2)
  - Device-triggered LCM operations (MEC 016)

### PaaS Service Exposure

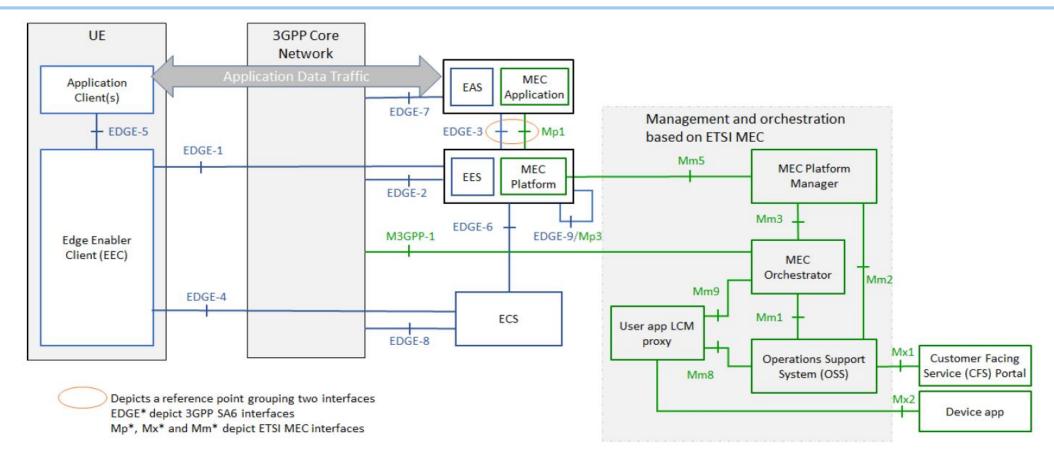
- Required Platform Svcs / App. Enablement (MEC 011)
- Service APIs (MEC 012, 013, 014, 015)
- Key Studies for Future Work
  - Study on MEC in NFV (MEC 017)
  - Study on Mobility Support (MEC 018)

- Evolution of Phase 1 and closing open items
  - Application Mobility (MEC 021 published)
  - Lawful Intercept (MEC 026 published)
- Addressing key Industry Segments
  - V2X (MEC 022 published; MEC 030 published)
  - IoT (MEC 033), Industrial Automation, VR/AR
- Key use-cases and new requirement
  - Network Slicing (MEC 024 published)
  - Container Support (MEC 027 published)
- Normative work for integration with NFV
  - Incorporate in v2 of existing specs as needed
- From "Mobile" to "Multi-Access"
  - Wi-Fi (MEC 028 published)
  - Fixed Access (MEC 029 published)
- MEC integration in 5G networks (MEC 031)
- Developer community engagement
  - API publication through ETSI Forge (more overleaf)
  - Hackathons, MEC Delpoyment Trials
- Testing and Compliance (MEC-DEC 025 published; multipart specification MEC-DEC 032-x)

- Preliminary activities starting now.
- Full Phase 3 work started already, while completing outstanding Phase 2 work.
- MEC as heterogeneous clouds
  - Expanding traditional cloud and NFV LCM approaches
  - Inter-MEC systems and MEC-Cloud systems coordination (MEC 035): "MEC Federation"
  - Mobile or intermittently connected components, and resource constrained devices (MEC 036)
  - Consumer-owned cloud resources
- MEC deployments
  - MEC in Park enterprises (MEC 038)
- Continuing emphasis on enabling developers
  - Application Package Format and Descriptor Specification (MEC 037)
  - API Serialization
  - Sandbox development
  - Testing and compliance
- Continue to defined services that meet industry demand
- Maintain completed APIs



# MEC harmonized architecture with SA6 EDGEAPP



- Joint white paper <sup>(\*)</sup> from both ETSI and 3GPP officials
- 3GPP TS 23.558 "Architecture for enabling Edge Applications; (Release 17)" v1.1.0, Oct. 2021 (informative Annex C)

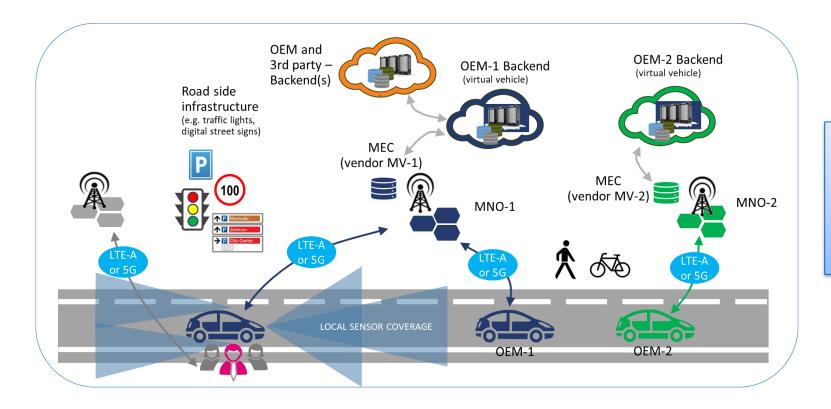
Ref. ETSI White paper: "Harmonizing standards for edge computing - A synergized architecture leveraging ETSI ISG MEC and 3GPP specifications", July 2021, link here

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



### Many Use cases

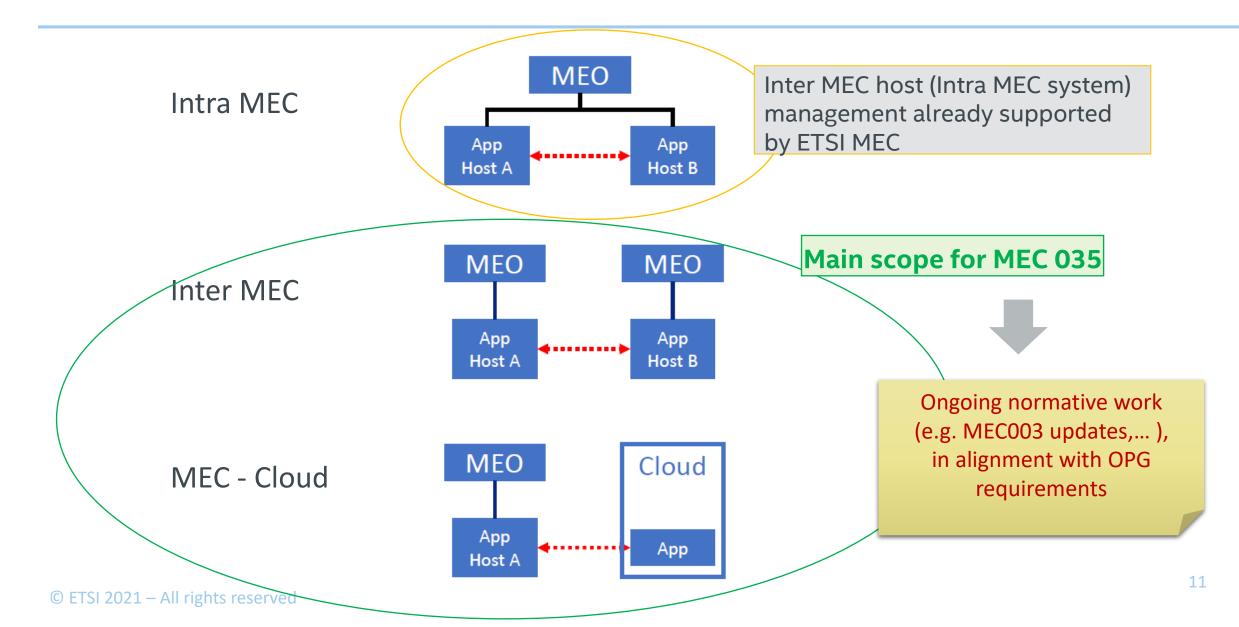
example: MEC federation scenario of V2X services



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

## Phase 3: expanding the scope to MEC Federation



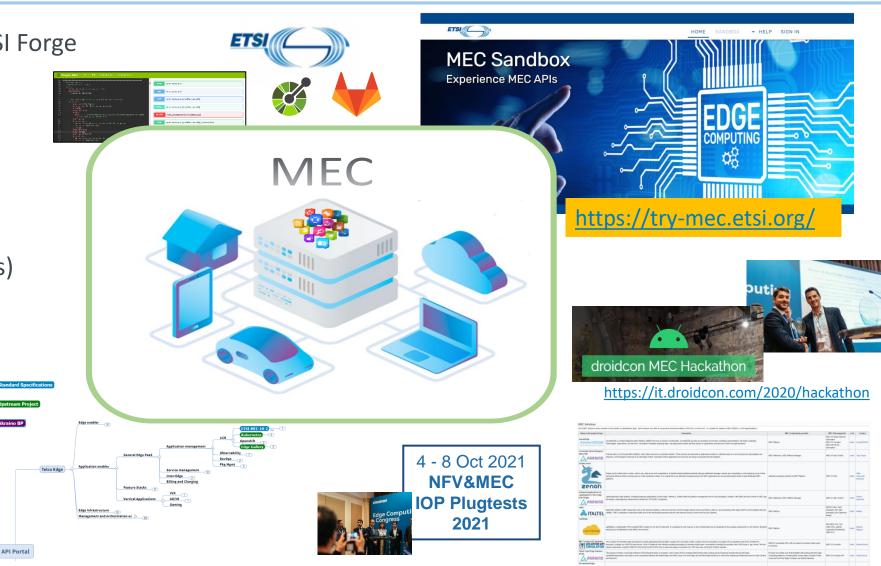




WG DECODE: Enabling MEC Deployment and Ecosystem Development



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



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

https://mecwiki.etsi.org/index.php?title=MEC Ecosystem

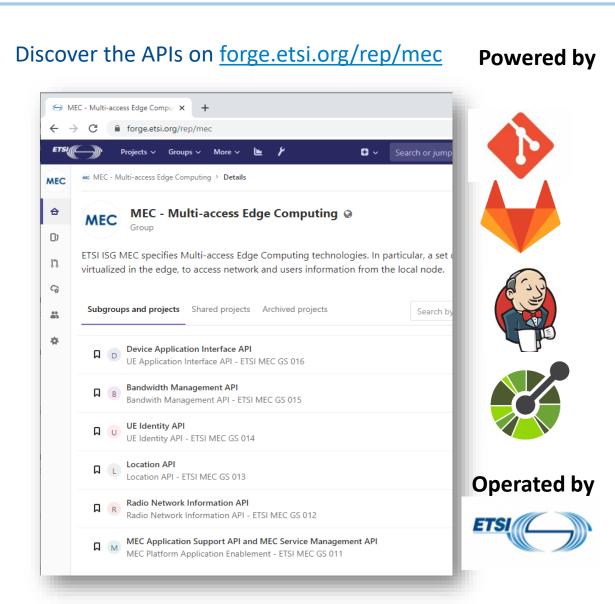


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# MEC deployment and ecosystem engagement activities

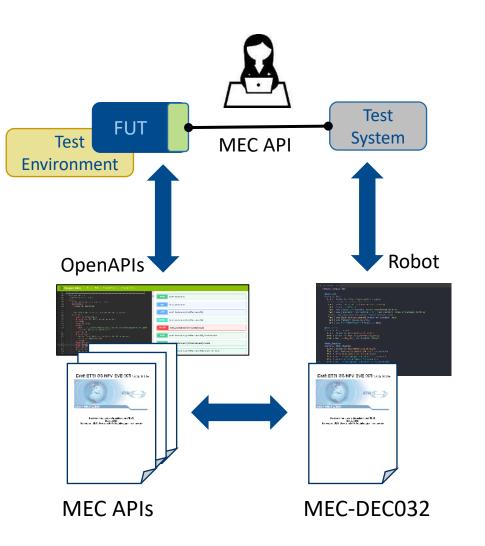
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General testing framework for MEC Technologies (<u>MEC 0025</u>)

> API Conformance testing developed for server implementations

- Standardized test suite (<u>MEC-DEC 032</u>)Test implementations in <u>Robot</u> <u>Framework</u> and <u>TTCN-3</u>
- Openly available and released under BSD-3 license



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### **PoCs** <u>https://mecwiki.etsi.org/index.</u> <u>php?title=Ongoing\_PoCs</u>

### **MEC Deployment Trials**

https://mecwiki.etsi.org/index. php?title=Ongoing\_MDTs

### **MEC Ecosystem**

https://mecwiki.etsi.org/index. php?title=MEC Ecosystem

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

For further details, please see: <u>http://mecwiki.etsi.org</u> or contact <u>CTI\_Support@etsi.org</u>



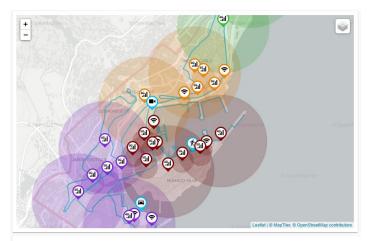
## **MEC: DECODE Working Group**

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Welcome to ETSI MEC Sandbox portal





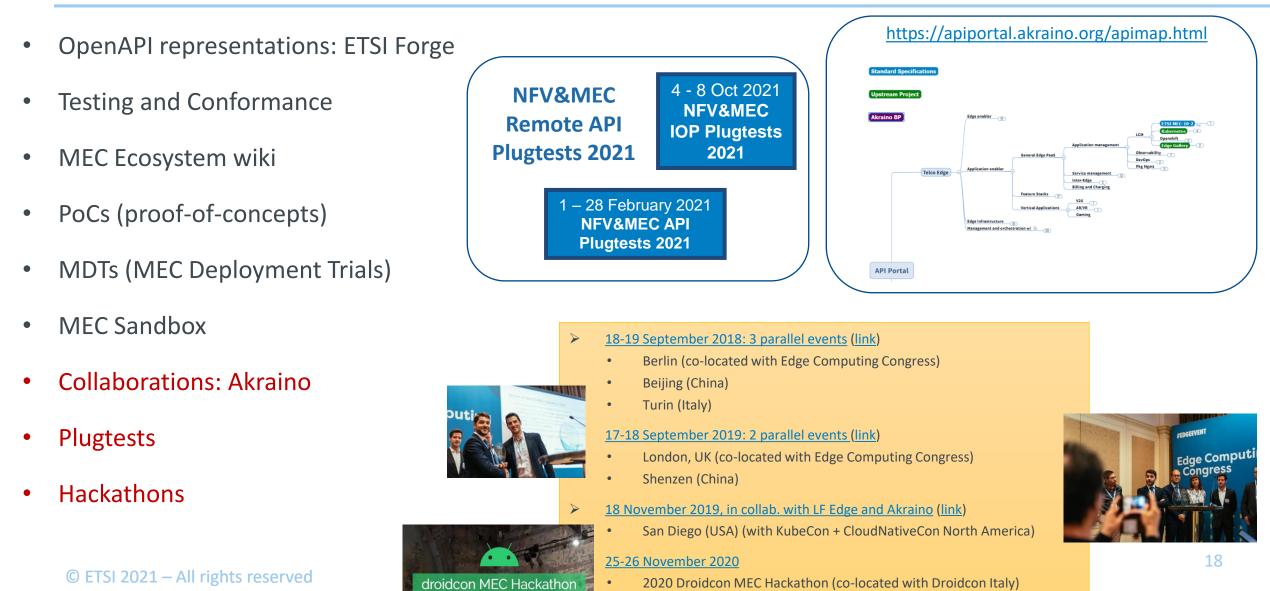
API Console

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2	013	201	Request	POST	/location/v2/subscriptions/userTracking	2020-11- 24T10:54:57.86700332Z
1	013	200	Request	GET	/location/v2/queries/users	2020-11- 24T10:54:43 745926087

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

- Steady and moving UE (~devices)
- API Console, integrated Swagger UI, & more





## Conclusions

- ETSI ISG MEC is the leading voice in standardization & industry alignment around MEC (Multi-access Edge Computing)
  - Key building block for next generation networks, complementing NFV & SDN
  - Widely recognized as one of the key architectural concepts and technologies for 5G
  - Enable a myriad of new use cases across multiple sectors and innovative business opportunities
- ETSI ISG MEC is involved in many activities for the ecosystem engagement
- As a standard body, ETSI ISG MEC is collaborating with Industrial Groups,
  Open Source communities and projects.









# Thank you!

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