ETSI Multi-Access Edge Computing
Enabling the 5G Cloud
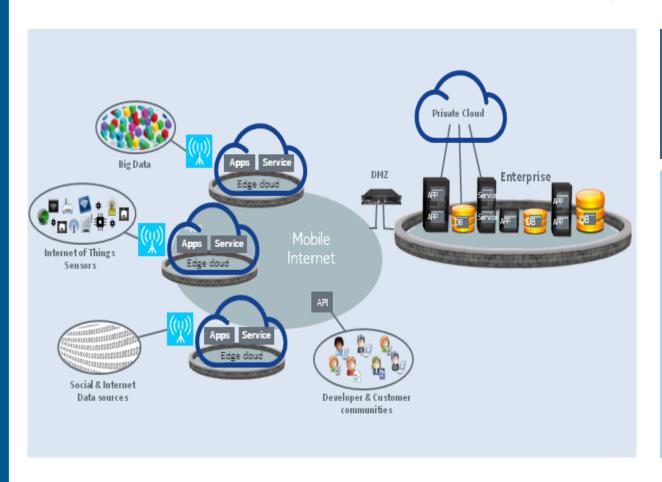
Pierre Lynch

SCF Cooperation Workshop, July 2017

Why Edge Computing?

… as in Real Estate, it's about just 3 things: **Location, Location, Location**

Cloud-computing at the network edge.

- **Proximity**
- **Ultra-low latency**
- **High bandwidth**
- **Real-time access to access network and context information**
- **Location awareness**

What Can We Do at the Edge?

- Quality of Experience

- Contextualized services

- Efficient utilization of the Radio and the Network resources

- Innovative applications and services towards mobile subscribers, enterprises and vertical segments

Real time	Interactive	Analytical	Security and privacy	Distributed

MEC (Multi-Access Edge Computing)
Business Benefits

| New Ecosystem / Value Chain | → | Wider collaboration can help to drive favorable market conditions for sustainable business for all players in the value chain. |

| Business transformation | → | New market segments (enterprises, verticals and subscribers); short innovation cycle; revenue generation and differentiation |

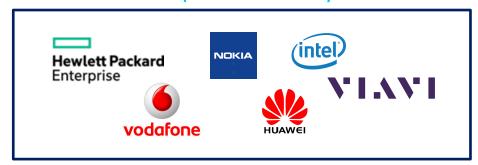| A myriad of new use cases | → | Video acceleration, augmented reality, connected vehicles, IoT analytics, enterprise services, network performance and utilization optimization, retail, eHealth, etc. |

ETSI **Multi-Access** Edge Computing

Pioneering open standards for Edge Computing

- Since 2014
- First and still only international SDO focused on this space

Leadership across Ecosystem

Broad Participation

CRAN

IOT

CONN. CARS
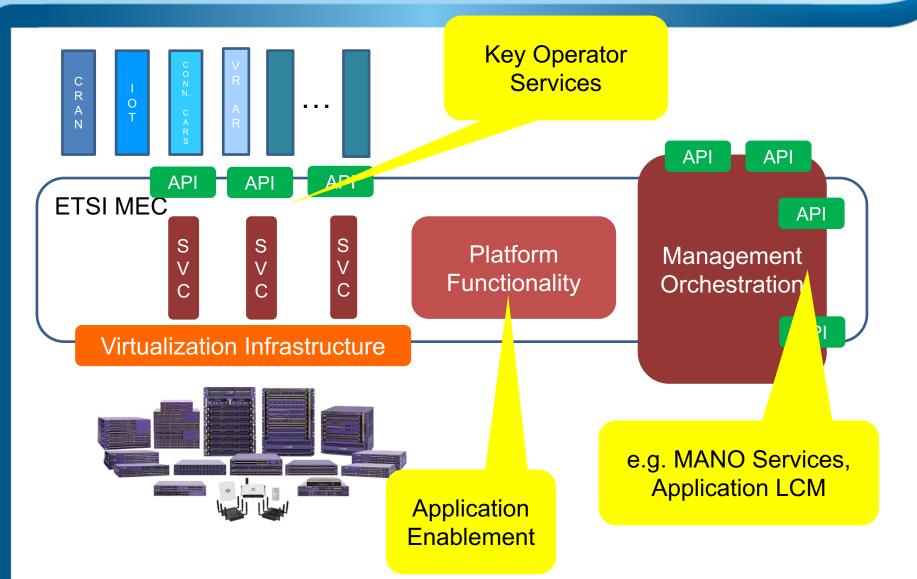
VR AR

...

ETSI MEC

We don't make any of this work

We make it all work on your Generic Edge infrastructure

And we help you expose the cool new things apps can do on your networks
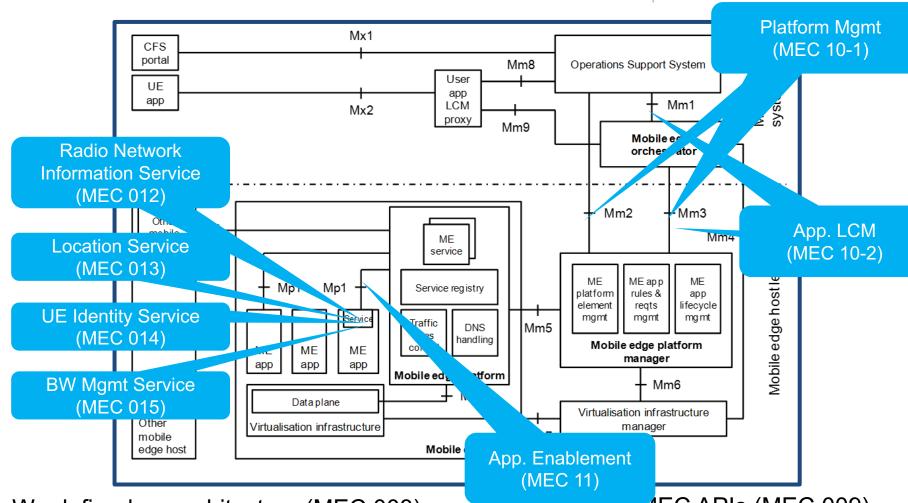
ETSI MEC ISG: What Do We Specify?

CRAN | IOT | CONN. CARS | VR AR | . . .

Key Operator Services

ETSI MEC

API | API | API

SVC | SVC | SVC

Platform Functionality

Management Orchestration

API | API | API | API

Virtualization Infrastructure

Application Enablement

e.g. MANO Services, Application LCM

Based on use case drive Requirements Spec (MEC 002)

Platform Mgmt (MEC 10-1)

App. LCM (MEC 10-2)

Radio Network Information Service (MEC 012)

Location Service (MEC 013)

UE Identity Service (MEC 014)

BW Mgmt Service (MEC 015)

App. Enablement (MEC 11)
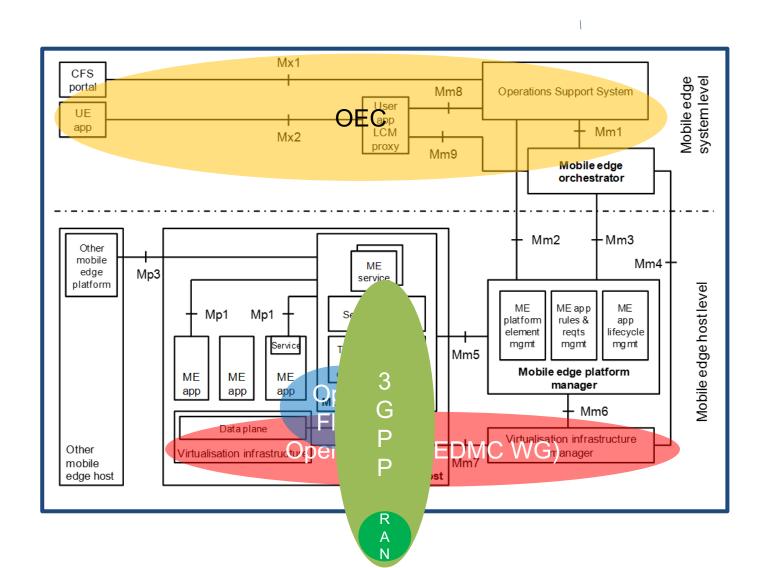
We defined an architecture (MEC 003)   API Rules for MEC APIs (MEC 009)
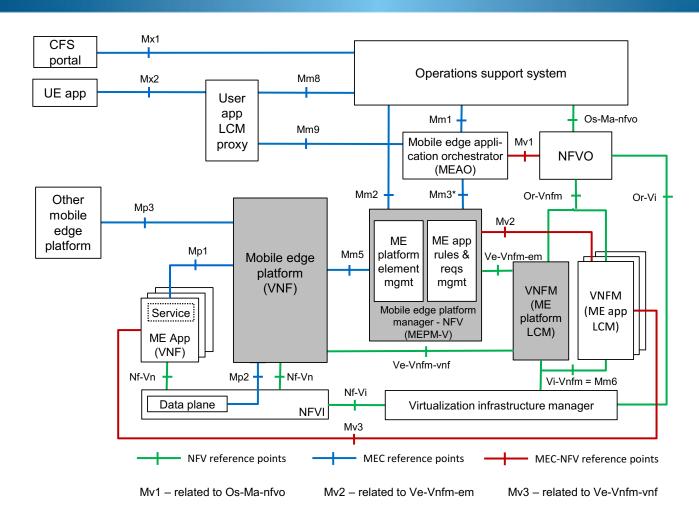
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* Based on draft of GR MEC 017

Let's reflect on the work status...

ETSI

We've come a long way in just 2 years!

Published

- Technical Requirements, including use cases (MEC 002)
- Framework and Reference Architecture (MEC 003)
- MEC Proof of Concept (PoC) Process (MEC-IEG 005)
- Service Scenarios (MEC-IEG 004)
- Metrics (MEC-IEG 006)
- API Framework (MEC 009)
- Management APIs (MEC 010-2)
- Application Enablement (MEC 011)
- Service APIs (MEC 012, 013)

Coming Soon

- Management APIs (MEC 010-1)
- Service APIs (MEC 014, 015)
- UE Application Interface (MEC 016)
- Study on NFV Alignment (MEC 017)
- Study on Mobility Support(MEC 018)

Phase 2

- Evolution of Phase 1 and closing open items
  - Lawful Intercept
  - Charging
  - Mobility
- Normative work for integration with NFV
- From "Mobile" to "Multi-Access"
  - Wi-Fi
  - Fixed Access
- From VMs to Containers
- Developer community engagement
- Supporting partner organizations as they move towards deployment

End 2014

End 2016

ETSI MEC phase 1

ETSI MEC phase 2

But there is so much more to do!

ETSI MEC PoCs

MEC Proof of Concept

PoC #1
Video User Experience Optimization via MEC
A Service Aware RAN MEC PoC

Intel - China Mobile - iQiYi

PoC #2
Edge Video Orchestration and Video Clip Replay

Nokia - EE - Smart Mobile Labs

PoC #3
Radio-aware video optimization
in a Fully Virtualized Network

Telecom Italia - Intel - Eurecom - Politecnico di Torino

PoC #4
Flexible IP-based services

InterDigital - Bristol is Open - Intracom - CVTC - Essex University

PoC #5
Enterprise Services

Saguna - Adva Optical Networking - Bezeq International

PoC #6
Healthcare
Dynamic Hospital User, IoT and Alert Status Management

Quortus Ltd - Argela - Turk Telecom

PoC #7
Multi-Service MEC Platform
For Advanced Service Delivery

Brocade - Gigaspaces - Advantech - Saguna - Vasona - Vodafone

PoC #8
Video Analytics

Nokia - Vodafone Hutchison Australia - SeeTec

PoC #9
Low-latency Industrial IoT

Vasona Networks - RIFT.io - Xaptum - Oberthur - Intel - Vodafone

OpenAPI Specification: API description files
(aka Swagger Specification)

- ### OpenAPI Specification
  - Open source framework for defining & creating RESTful APIs
  - OpenAPI Specification compliant API description file
    - Inherently includes MEC data structure definitions
    - Machine readable facilitating content validation
    - Allows autocreation of stubs for both service client & server
- ### Motivation with ISG
  - Specification accessibility & validation
  - Accessibility → Wider adoption: 3rd party developers
  - Adoption → Critical review & feedback
- ### Where we are now
  - ETSI Repository targeted for May 2017
  - MEC-12, MEC-13 & MEC-16 available
- ### Future Plans
  - Complete set of APIs available via ETSI Repository
  - Currently exploring other approaches towards a more extensive engagement with the developer community.

https://www.openapis.org/

I want to help, what can I do

Areas of MEC/SCF Cooperation:
- Active contribution by common membership
- As a partner, SCF can contribute directly!
- Proven track record of cooperation:
  - MEC 013 (Location): essentially adopted SCF APIs (via OMA) (but first determined SCF work fit our needs)
  - MEC 014 (UE identity): initiated as a result of LS from SCF (but needed company efforts to see it through)
- NOW!!! is the best time to influence direction of Phase 2 – we are in the middle of Use Case and Requirements development for Phase 2

I am an Application Developer and need my apps to run at the edge
- Great, help us make what we did available for other developers to use

Joint Plugfests are a mutual benefits: Small Cell vendors demonstrate their product capabilities in MEC using standardized APIs, while ETSI MEC highlights industry adoption

Usage of ETSI MEC Specification in SCF Solution White Papers, Plugfests, potential certification efforts?

Epilogue

In just over 2 years of activity ETSI MEC ISG gained significant momentum and is accelerating the industry

- Key building block in the evolution of mobile-broadband networks, complementing NFV and SDN.

- Key enabler for IoT and mission-critical, vertical solutions.

- Widely recognized as one of the key architectural concepts and technologies for 5G.

  - Can be used to enable many 5G use cases without a full 5G roll-out (i.e. with 4G networks)

- Enable a myriad of new use cases across multiple sectors as well as innovative business opportunities.

The work on Release 2 will extend the applicability of the MEC technology and render the MEC environment even more attractive to third-party application developers.

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Thank you!