

5G Connected Edge Cloud for Industry 4.0 Transformation



Adaptation of Standardized MEC platform

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Introduction

- **Telecom edge is moving to deployments, along with related applications**
- **Started of low latency Edge applications and deployments**
- **Agenda**
 - 1. MEC**
 - 2. 4G/5G.**
 - 3. Deployment options**
 - 4. Technology challenges**

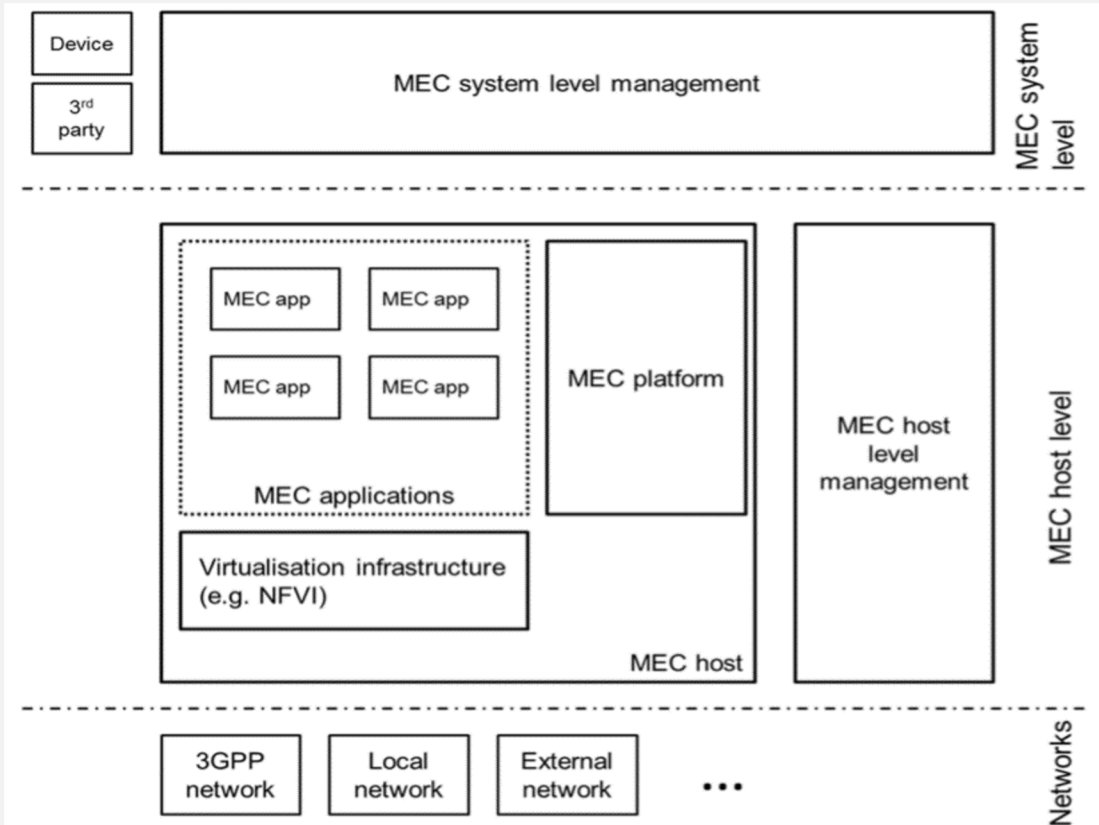
MEC Framework and Reference Architecture



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MEC Framework

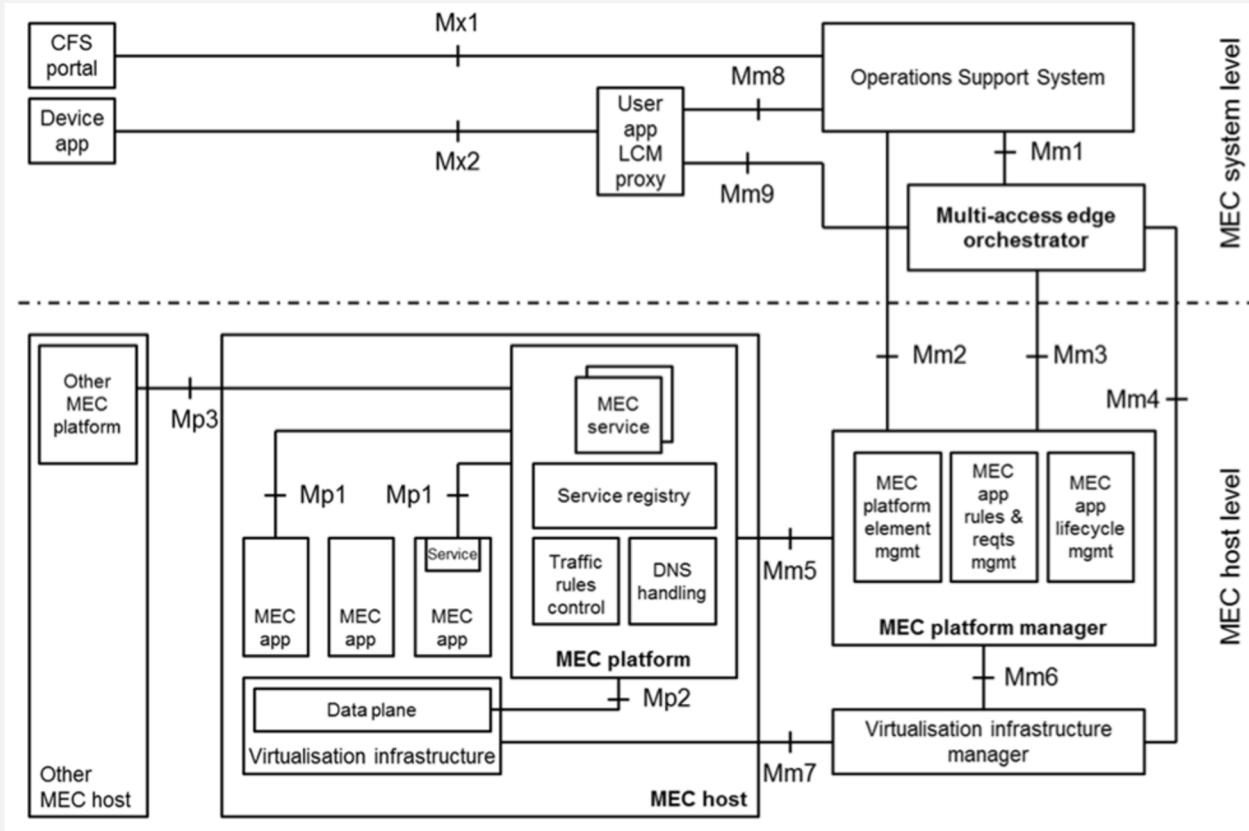


Source : ETSI GS MEC 003 V2.1.1 MEC framework and reference architecture

MEC Framework entities

- System level
- Host level
- Network level

MEC Reference Architecture



MEC reference points

- MEC platform functionality (**Mp**)
- management reference points (**Mm**);
- connecting to external entities (**Mx**).

Source : ETSI GS MEC 003 V2.1.1 MEC framework and reference architecture

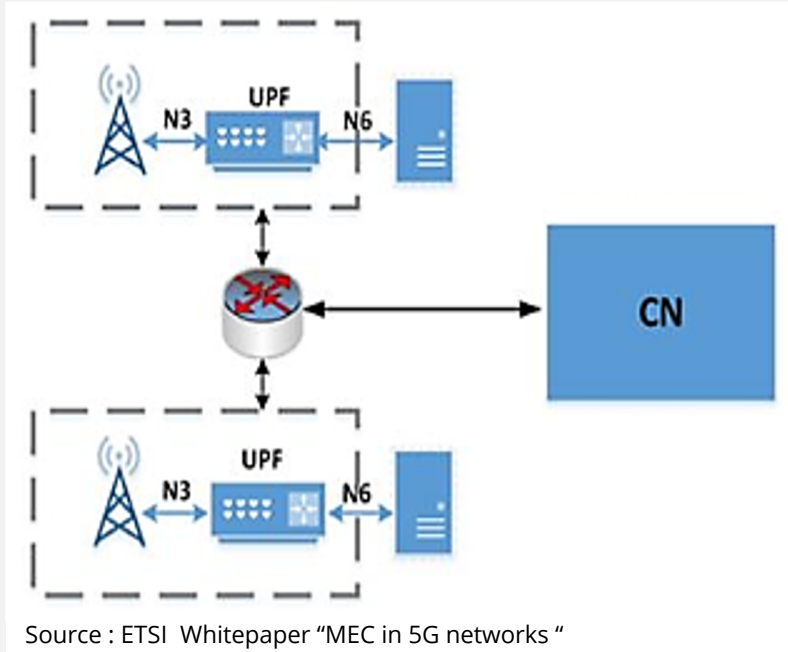
MEC Deployment Models



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MEC deployment scenarios



Source : ETSI Whitepaper "MEC in 5G networks "

MEC and the local UPF collocated with the Base Station.

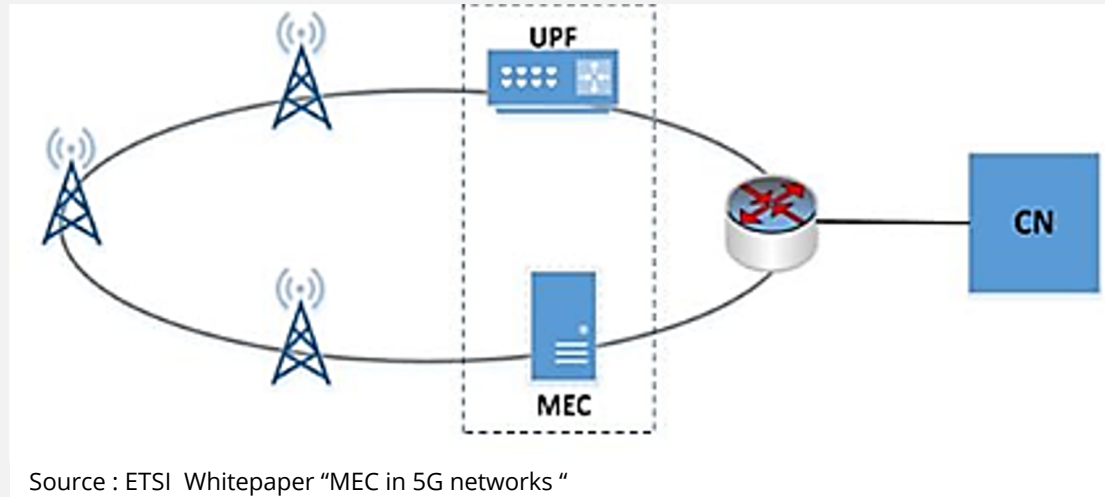


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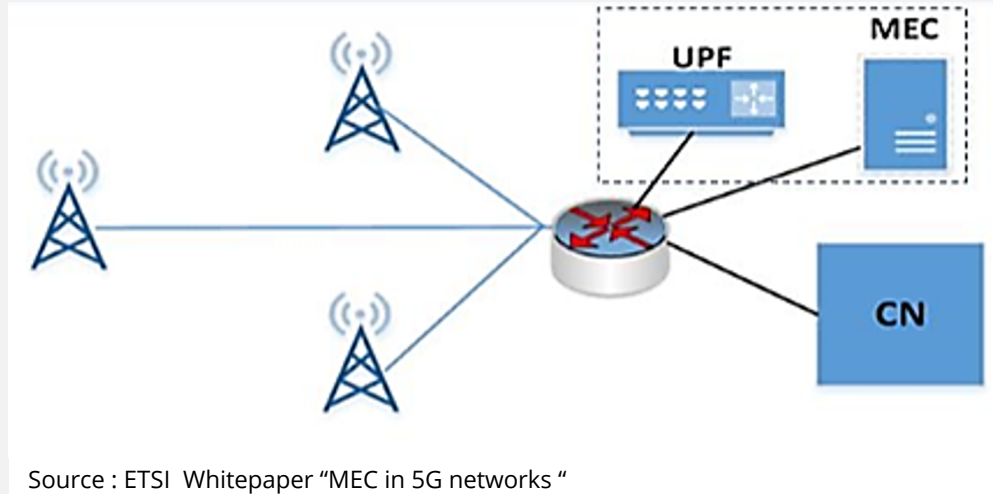
MEC deployment scenarios

MEC collocated with a transmission node, possibly with a local UPF

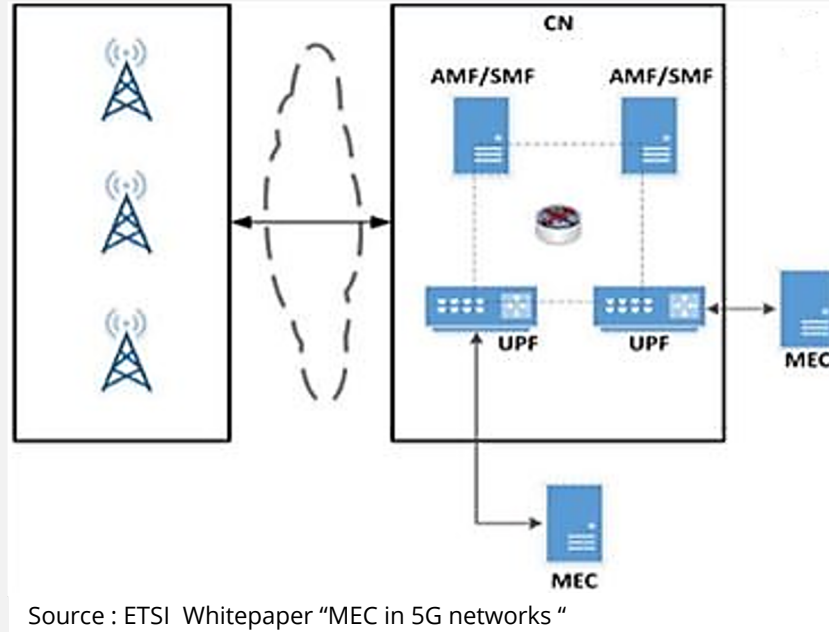


MEC deployment scenarios

MEC and the local UPF collocated with a network aggregation point



MEC deployment scenarios



MEC collocated with the Core Network functions (i.e. in the same data center)

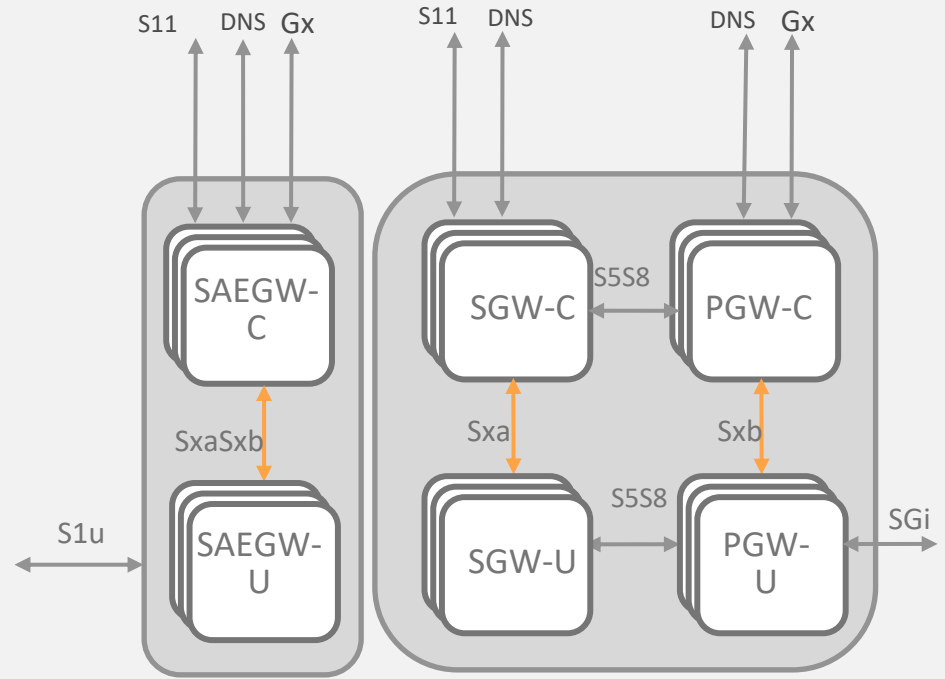


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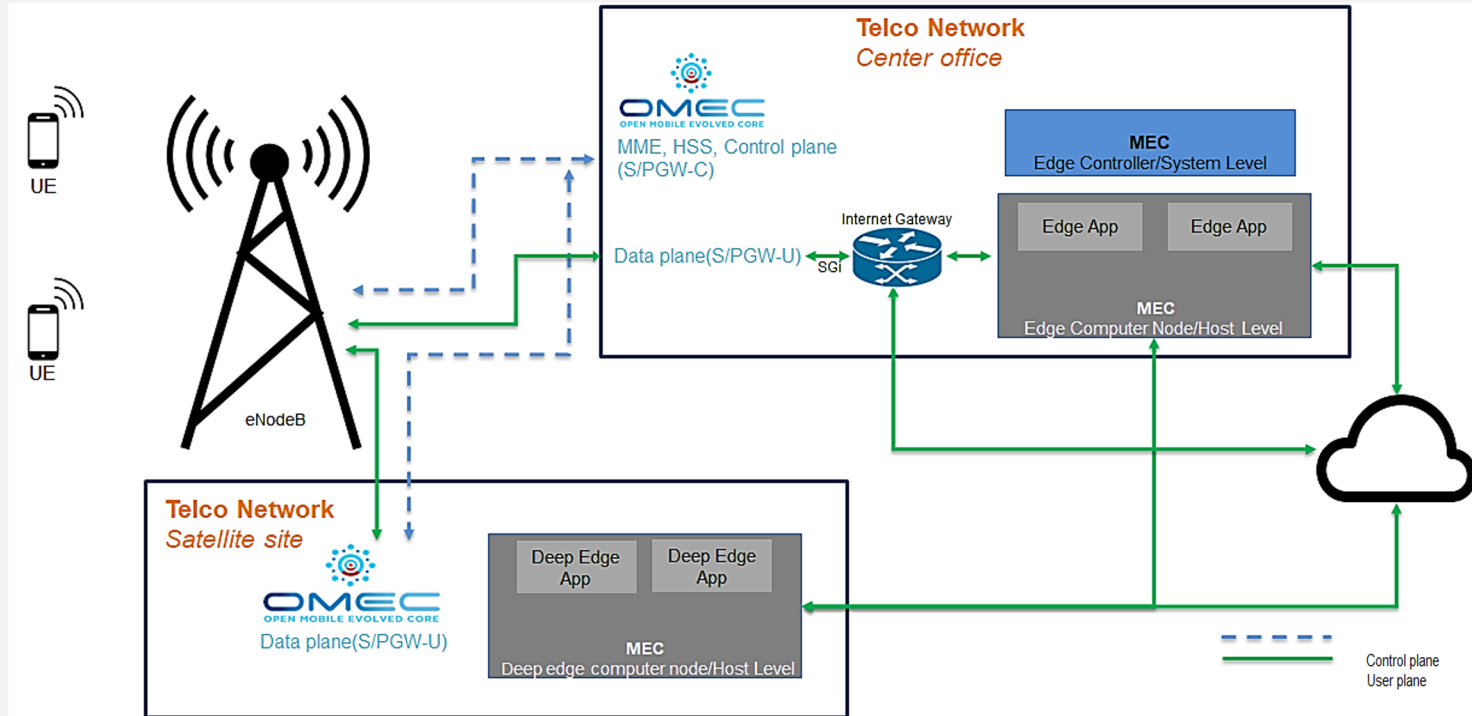


MEC deployment scenarios and OMEC

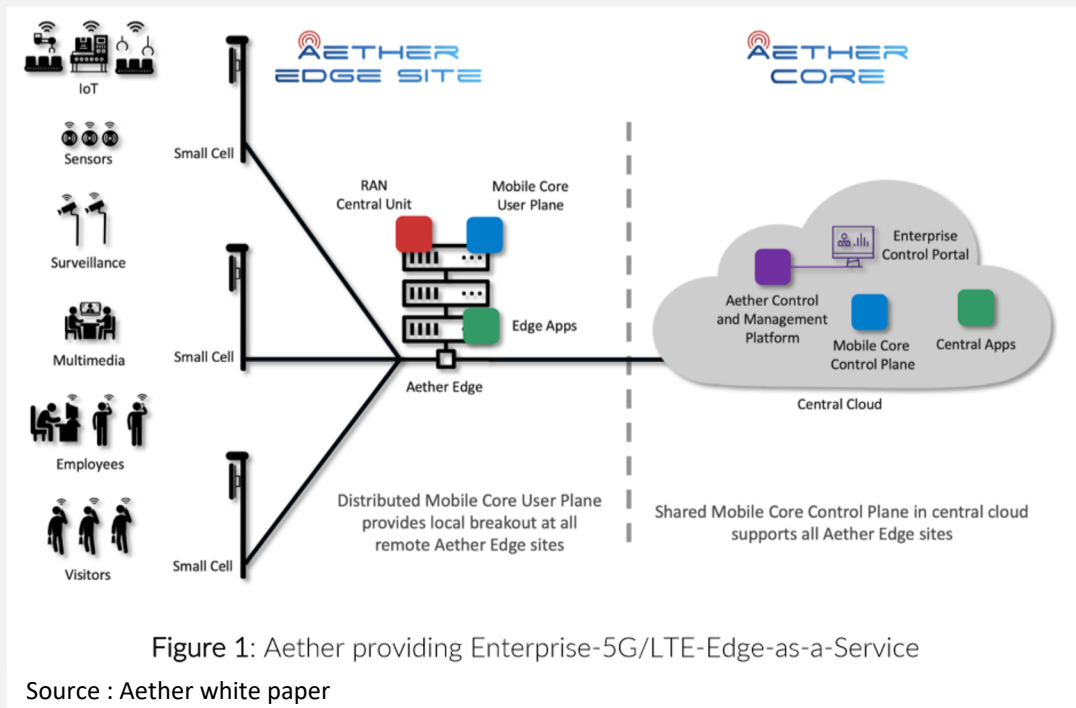
- Flexible deployment of MEC
- UPF/S-PGWU is common
- OMEC Gateway's deployment options with CUPS (Rel 15 complaint)



Example MEC deployment with OMEC

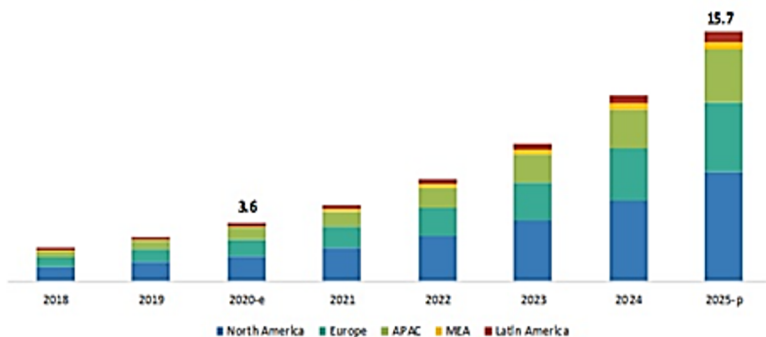


MEC Aether deployment



MEC Market Research

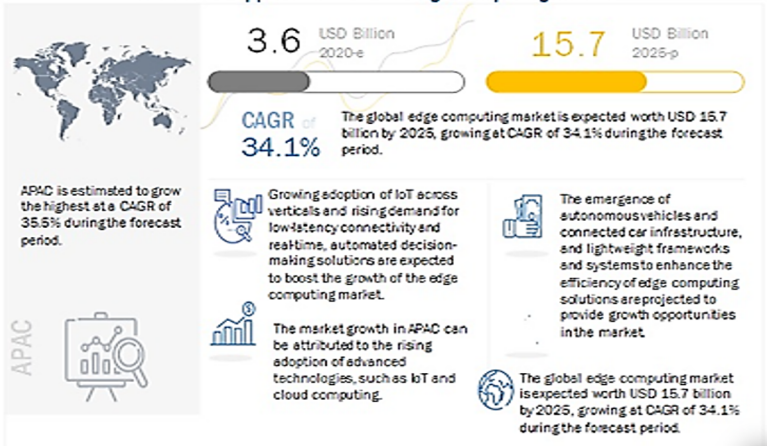
EDGE COMPUTING MARKET, BY REGION (USD BILLION)



e- estimated, p-projected

Source: Expert Interviews, and MarketsandMarkets Analysis

Attractive Opportunities in the Edge Computing Market



Applications will see major growth:

- Smart Cities
- Industrial IoT (IIoT)
- Remote Monitoring
- Content Delivery
- AR & VR
- Autonomous vehicles, Drones & Gaming

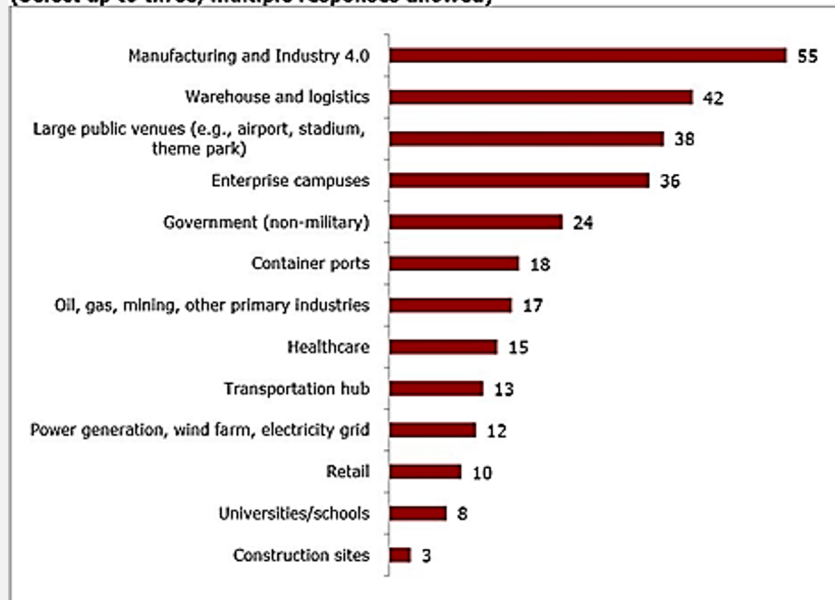


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MEC Market Research

In which sectors are private 4G and 5G networks most in demand?
(Select up to three; multiple responses allowed)



n=103

Source: Heavy Reading

AR/VR Market Overview



Valuate reports : Nov 2019

- USD 11.35 billion in 2017.
- Forecast is projected to reach USD 571.42 billion by 2025.
- Growing at a CAGR of 63.3% from 2018 to 2025.



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MEC Open Source Platforms and Toolkits

- **Aether/OpenCORD**
- **LF Akriano**
- **StarlingX**
- **EdgeX Foundry**
- **EdgeGallery (<http://www.edgegallery.org>)**
- **OpenNESS**
 1. Provides the toolkit
 2. Inbuilt services and standardized APIs
 - a) Network plugin including DPDK
 - b) GPU as service
 - c) Controller APIs
 - d) Application on boarding , Service Registration , Service Discovery etc.



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MEC standardization

- **3GPP**
 - SA6 – Defines EDGEAPP
 - SA5 – Mgmt and Charging of 3GPP Network
 - SA2 – Mobile network including 5G and Integration with MEC
- **ETSI**
 - ETSI GS MEC 003 V2.1.1 MEC framework and reference architecture
 - Open standardized environment to deploy **edge-aware** as well as **edge unaware** application deployment
 - Provides APIs for Management, Orchestration and Mobility which facilitates the application running at correct location at the right time and ensure service continuity.
- **GSMA**
 - Working with Operators for end-to-end high-level architecture for a unified Operator Platform
 - Allow Global edge access to Application Developer and Enterprise segments



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Thank You