Introduction to MEC standards in China

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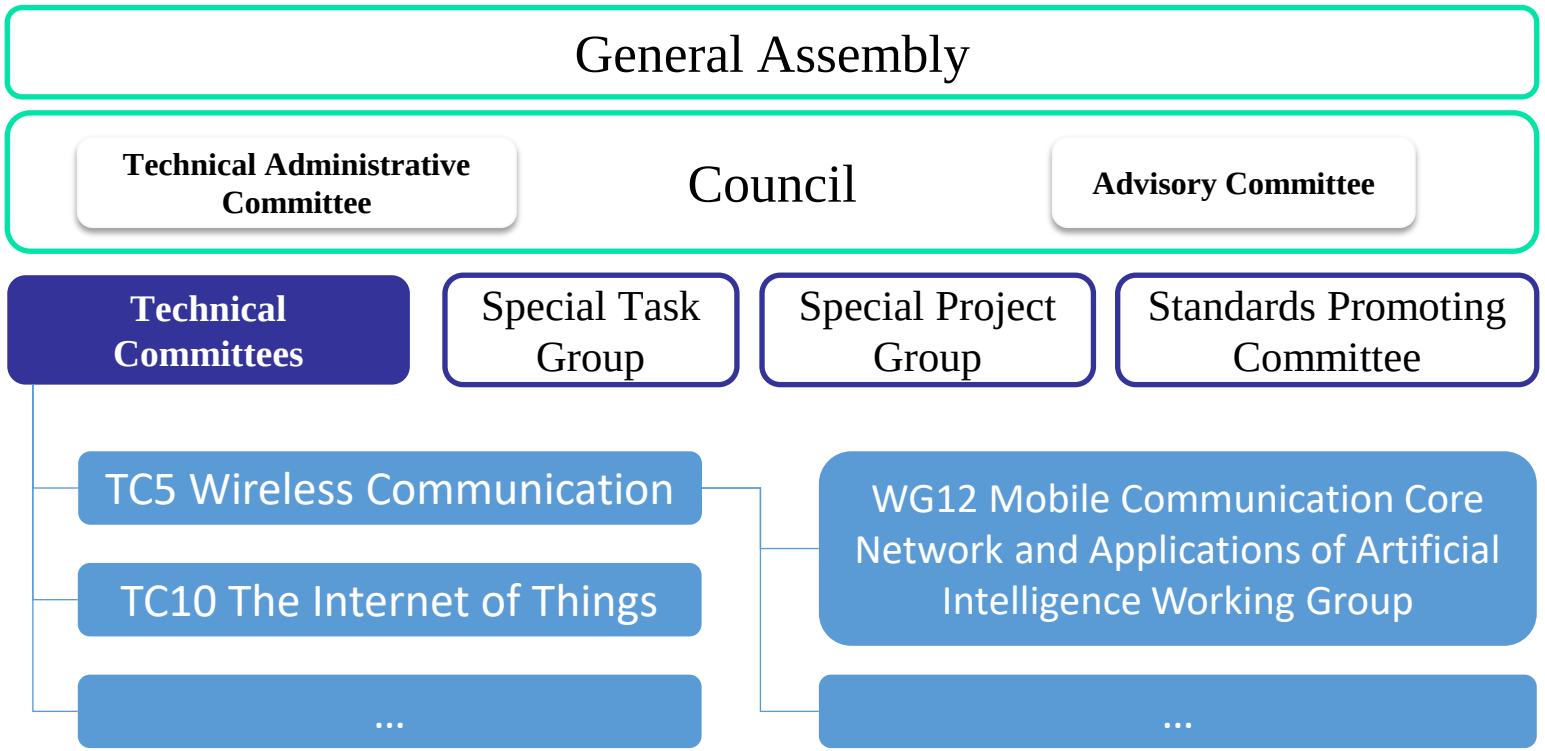
--For ETSI ISG MEC/CCSA workshop on V2X

Brief Introduction of CCSA TC5WG12



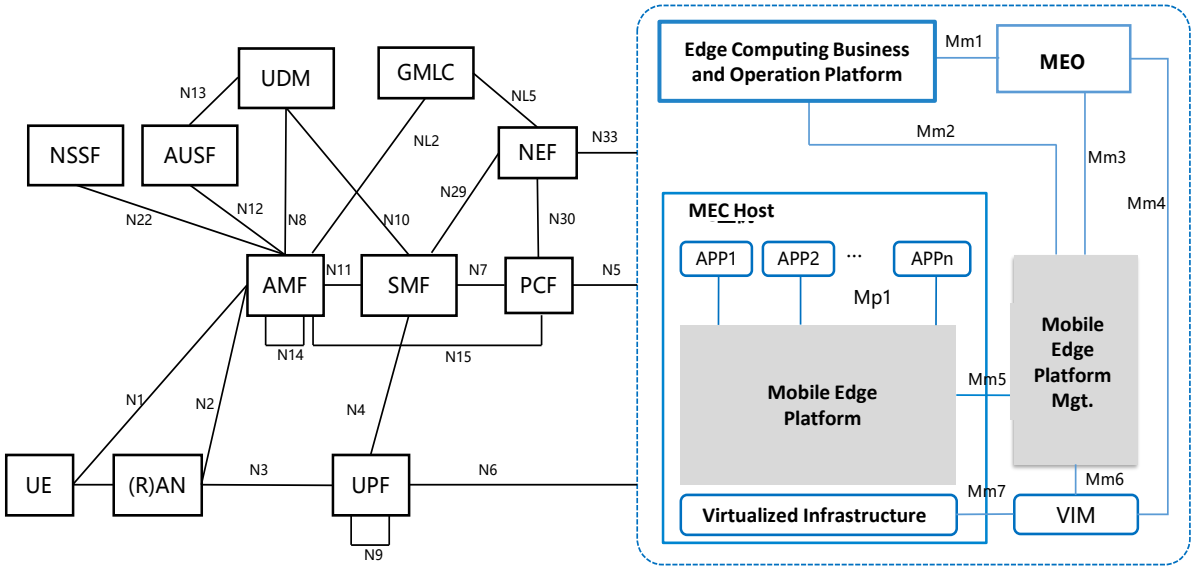
- Responsible for mobile core network related standardization and research
- For example:
  - 4G/5G core network architecture and function specifications
  - network slicing
  - 5G mobile edge computing
  - network capability exposure
  - ...

Overview of MEC Standard Work in TC5WG12

Arch & Reqs	General Technical Requirements for 5G Edge Computing
Components	Technical Requirement for Edge Computing Platform of 5G Network Test Method of Edge Computing based on 5G Network Technical Requirement for Capability Exposure Function in Edge Computing of 5G Network Technical Requirements of Mobile Edge Applications Enabling Architecture
Interface	Technical Requirement for Interface between MEP and App in Edge Computing of 5G Network Test Specification of Mp1 interface between MEC application and MEC platform

General Technical Requirements for 5G Edge Computing

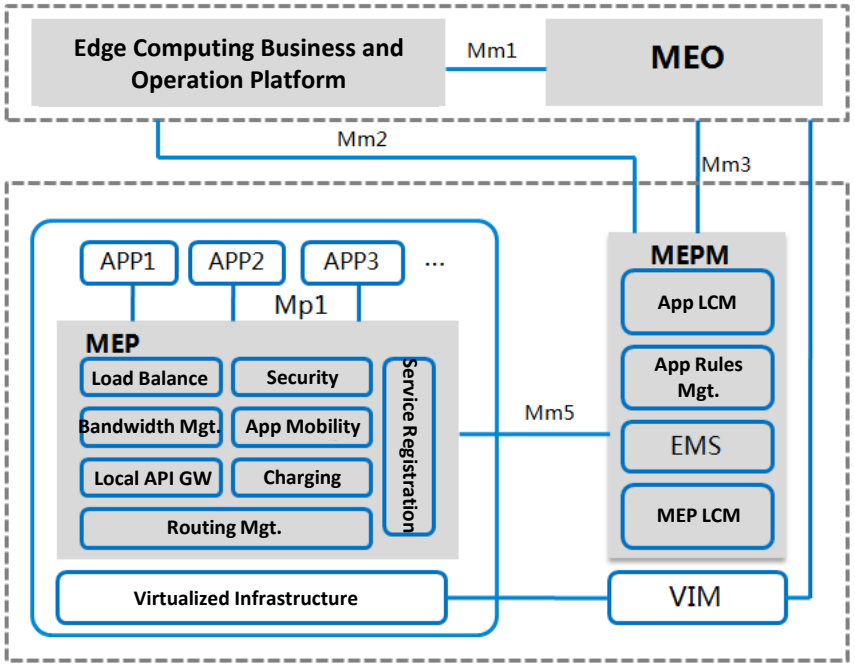
Overall Architecture of 5G Edge Computing Defined in CCSA



5G network and edge computing system defined by ETSI MEC are combined, utilizing functions and features defined by both 3GPP and ETSI MEC.

- Edge computing system are considered as AF/DN of the 5G network, and are connected through NEF/PCF in control plane, and UPF in data plane.
- Optionally, a 5GC proxy can be deployed to help the interoperation between 5GC and edge computing system, e.g., aggregating messages from different edge sites, drop repeated requests, API adaptations, etc.
- Edge Computing Business and Operation Platform FB is introduced to act as a portal to the authorized users, as well as provide business and order management, FM and PM of edge services functionalities to the CSPs.
- The spec also defines requirements and procedure for the following functions and features:
  - Local breakout
  - Service continuity
  - Capability exposure
  - Security
  - Charging

Requirements and Testing Methods for Edge Computing Platform



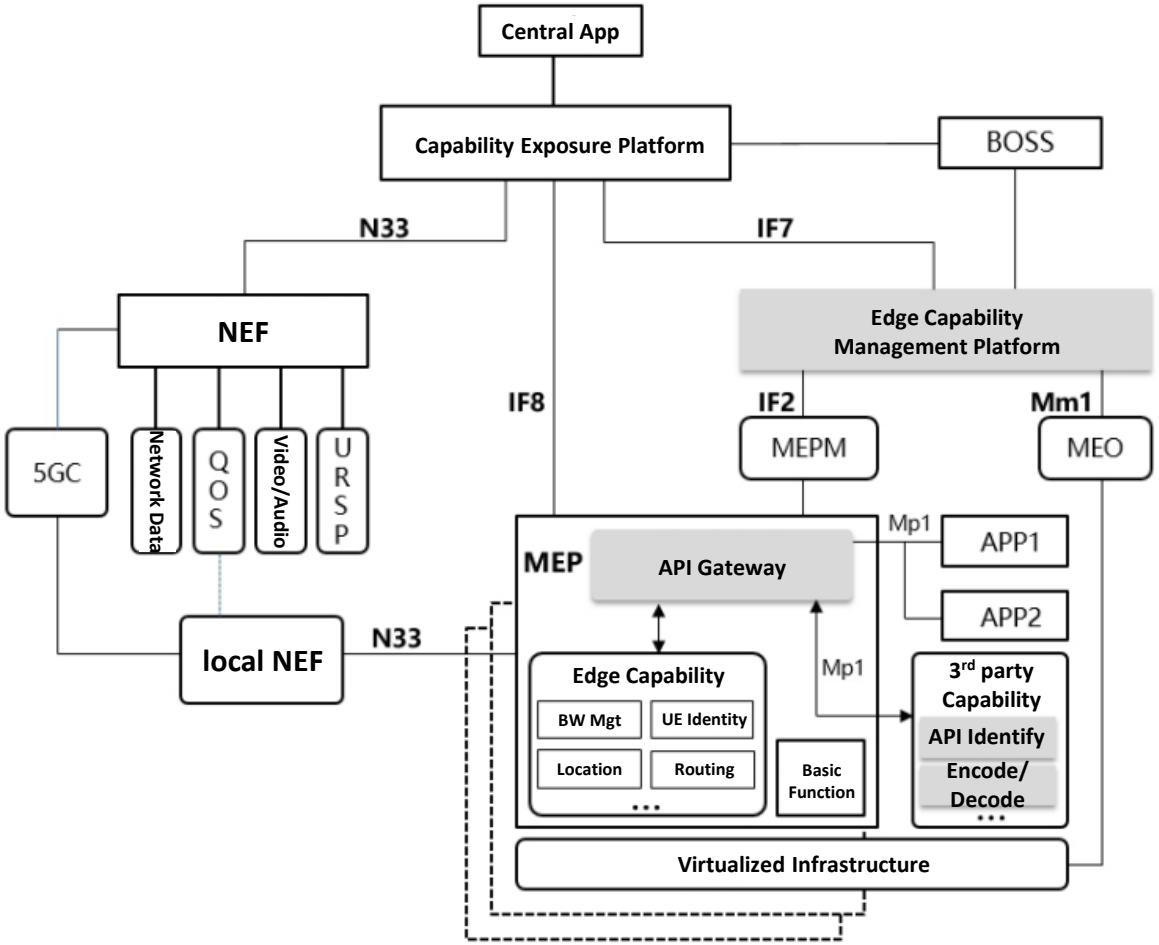
The edge computing platform specs mainly defines the functionalities of the MEP, MEO and MEPM, referencing from ETSI MEC specs MEC010-2, 011, 013, 014, 015, 021, etc.
Some additional requirements are added, including container support, tenant management, log management, VIM upgrade, hardware, power, cooling, reliability, etc.

- The testing method spec covers test case descriptions for MEP, MEPM, MEO, VIM.
- Including function tests like load balancing, DNS, API gateway, app LCM, etc., and also API tests like location API, app mobility service API, etc.

Test Case #	5.1.1	Mandatory	True
Title	Load Balancing		
Sub-title	Load balancing based on DNS		
Goal	Verify that MEP can provide load balancing functionality for multiple edge applications		
Pre-condition	a) MEP runs normally b) Edge DNS service runs normally c) Multiple instances of an application have been deployed d) UE can access test applications deployed on MEP e) Edge DNS server has configured the mapping between a URL with the applications' IP addresses f) Packet analysis tool ready		
Steps	1) Start packet analyzing using the tool 2) Using multiple UEs to send edge service requests sequentially 3) Check the IP address each UE access to		
Record	a) Packet info b) IP address of the application instances that each UE access		
Expected Result	a) After step 1, packet info can be retrieved b) Every UE can access the edge service successfully c) MEP can apply load balancing among the multiple application instances through the DNS service		

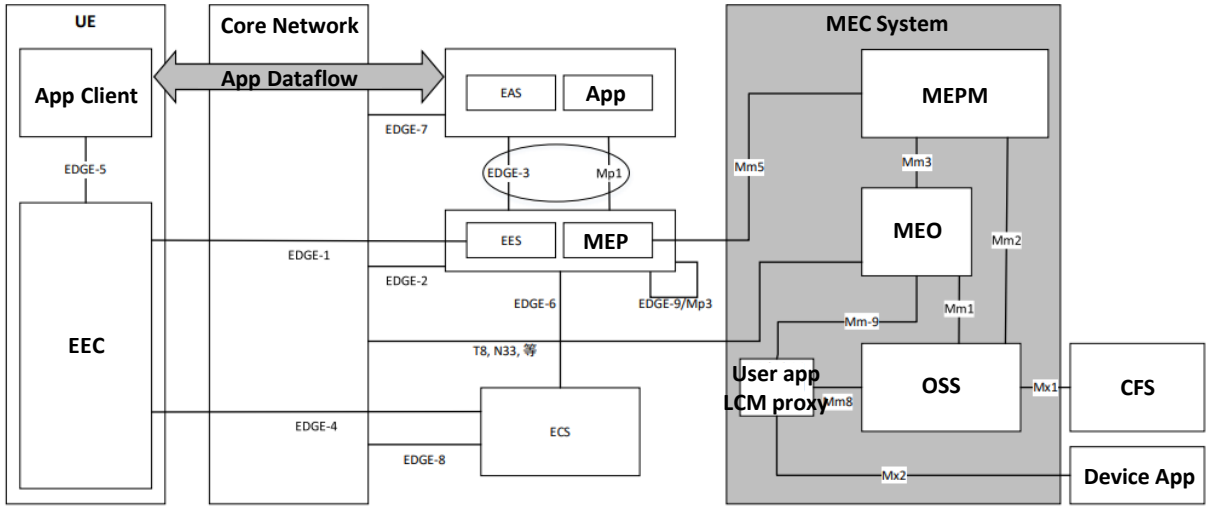
Requirements for Capability Exposure

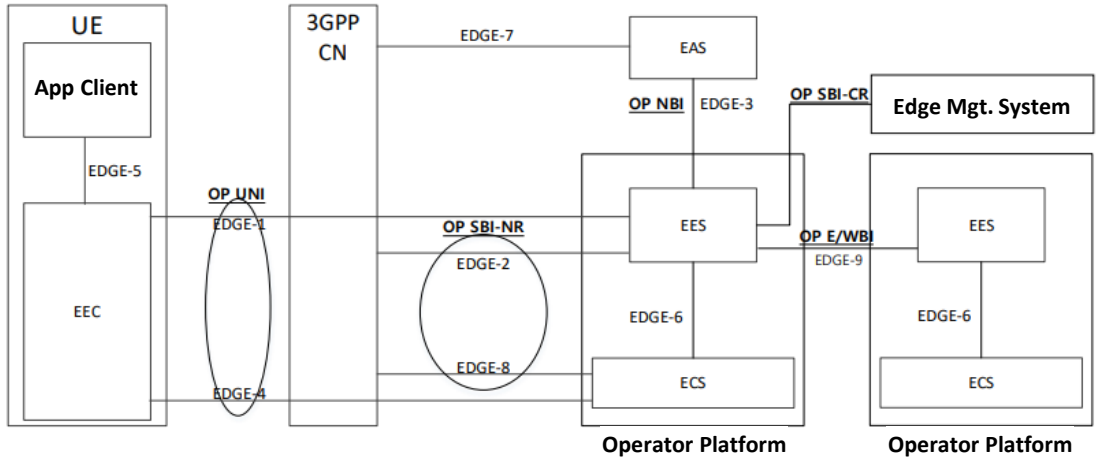
- There are several scenarios for edge capability exposure:
  - Application expose its services through the local MEP
  - MEP exposes its services to other MEPs
  - Edge services are exposed to applications deployed in central DC, or to the end users
  - Core network capabilities exposed to edge computing system
- To fulfill the demands of all these use cases, a capability exposure architecture is defined
- Functional requirements are defined for:
  - Edge capability management platform: LCM of API services, RBAC, policy, user management, etc.
  - MEP: API publication, statistics
  - Capability exposure platform: traffic control, capability orchestration, network and edge capability publication
  - MEO/MEPM
  - NEF



Requirements for Mobile Edge Applications Enabling Architecture

- Defines the architecture and functional requirements based 3GPP SA6 EdgeApp specs
- Also shows the relationship with ETSI MEC and GSMA OPG





Requirements and Testing Methods for Interface between MEP and App

- These specs define detailed capabilities provided by the MEP to the applications, including:
  - Application enablement
  - Bandwidth management
  - Location service
  - UE Identity
  - App mobility service
- The basic functionalities are referencing ETSI MEC specs, with the following enhancements to the application enablement API:
  - update the API of a particular service
  - get info of the API of a particular service

- Corresponding Test Case

Test Case #: 6.1.22

Title： Application Enablement API

Sub-title： Update Service API

Goal： Verify the Update Service API function

Pre-condition：

1. MEP and APP are deployed and run normally, ApplicationInstanceId of the app is appInstanceId001;
2. APP has registered to MEP, with the service name: serviceName001;
3. Operation and monitoring tools ready

Steps：

1) APP calls the “Update Service API” API;
2) MEP responses;
3) Check the request and response message

Expected Result：

1) For step 1, the request message should comply with the specification, example:

```
{
"requestConfig": [{
                "apiName": "compressAPIforAPP",
                "description": "API for compressing figures",
                "requestHttpMethod": "POST",
                "requestPath": "http://api.a.com:8080/abc/aaa/bbb"
}],
"baseUrl": "/abc"
}
```

2) For step 2, the response should return with state code 200 OK

Takeaway

- CCSA TC5WG12 mainly defines the edge computing solution with 5G network
- The architecture references 3GPP and ETSI MEC specifications and utilize features and functionalities from both sides

- CCSA make some enhancements based on own demands:
  - For architecture:
    - introducing "Edge Computing Business and Operation Platform" FB as user portal, and provides management of business and orders
    - Introducing an optional 5GC proxy to ease the interconnection between 5GC and edge system
  - For capability exposure:
    - define a capability exposure architecture that combines both capabilities from core network, edge network and 3rd party provided capabilities
  - For MEP-App API:
    - enhance the app enablement API with service API update and query functions