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GROUP REPORT

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Contents

Intellectual Property Rights 5
Modal verbs terminology 5
Foreword 5
1 Scope 6
2 References 6
2.1 Normative references 6
2.2 Informative references 6
3 Definition of terms, symbols and abbreviations 6
3.1 Terms 6
3.2 Symbols 6
3.3 Abbreviations 7
4 Overview 7
5 Use cases 7
5.1 Use case #1: Scenario-customized network 7
5.1.1 Description 7
5.1.2 Recommendations 8
5.1.3 Evaluation 8
5.2 Use case #2: Critical medical applications need multi-nodes collaboration 8
5.2.1 Description 8
5.2.2 Recommendations 9
5.2.3 Evaluation 10
5.3 Use case #3：Live streaming requires multi-scene connection 10
5.3.1 Description 10
5.3.2 Recommendations 11
5.3.3 Evaluation 11
5.4 Use case #4: Unified Management and Orchestration System 11
5.4.1 Description 11
5.4.2 Recommendations 13
5.4.3 Evaluation 13
5.5 Use case #5: MEC enables satellite communication 13
5.5.1 Description 13
5.5.2 Recommendations 14
5.5.3 Evaluation 14
6 Solutions for closing the gaps 14
6.1 Gap/Key issue #1- Introducing Integrated OSS 14
6.1.1 Description 14
6.1.2 Solution proposal #1-1: Integrated OSS 14
6.2 Gap/Key issue #2- Introducing Mp3 for collaboration between edge network nodes 15
6.2.1 Description 15
6.2.2 Solution proposal #2-1: Enable Mp3 for inter-communication among the same provider ... 15
6.3 Gap/Key issue #3 - combined deployment for core network functions and MEC applications ... 15
6.3.1 Description 15
6.3.2 Solution proposal #3-1: Unified MANO system 16
6.3.2.1 Analysis of existing approach 16
6.3.2.2 Unified Northbound interface 16
6.3.2.3 Descriptor diversity 16
6.3.2.4 High level U-MANO architecture 17
6.4 Gap/Key issue #4 - exposure computing Load 17
6.4.1 Description 17
6.4.2 Solution proposal #4-1: Load Reporting 17
6.4.3 Solution proposal #4-1: Load API 18
7 Conclusions 18

Annex A: Change history 20
History 21

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"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Foreword

This Group Report (GR) has been produced by ETSI Industry Specification Group (ISG) Multi-access Edge Computing (MEC).

1 Scope

The present document studies the potential requirements and enhancements to the MEC system needed to support distributed edge network. The content includes the concept of distributed edge network, relationship and alignment with MEC system support for distributed edge network, as well as the potential requirements and enhancements for MEC system architecture and functions.

2 References

2.1 Normative references

Normative references are not applicable in the present document.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long-term validity.

The following referenced documents may be useful in implementing an ETSI deliverable or add to the reader's understanding, but are not required for conformance to the present document.

[i.1] ETSI GR MEC 001: "Multi-access Edge Computing (MEC); Terminology".

[i.2] ETSI GS MEC 002: "Multi-access Edge Computing (MEC); Use Cases and Requirements".

[i.3] ETSI GS MEC 040: "Multi-access Edge Computing (MEC); Federation enablement APIs".

[i.4] ETSI GS MEC 003: "Multi-access Edge Computing (MEC); Framework and Reference Architecture".

[i.5] ETSI TS 128 500: "LTE; Telecommunication management; Management concept, architecture and requirements for mobile networks that include virtualized network functions (3GPP TS 28.500 Release 18)".

[i.6] ETSI GS MEC 010-2: "Multi-access Edge Computing (MEC); MEC Management; Part 2: Application lifecycle, rules and requirements management".

[i.7] ETSI GR NFV-IFA 054:"Network Functions Virtualisation (NFV) Release 6; Architecture; Report on architectural support for NFV evolution".

[i.8] ETSI GR MEC 031: "Multi-access Edge Computing (MEC); MEC 5G Integration".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI GR MEC 001 [i.1] apply.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI GR MEC 001 [i.1] apply.

4 Overview

The present document studies the potential requirements and enhancements to the MEC system needed to support Distributed Edge Network.

Clause 5 documents use cases that illustrate Distributed Edge Network in MEC systems to make the concept of "Distributed Edge Network" clearer.

Clause 6 proposes all identified key issues and their related solution proposals and evaluation.

Based on identified gaps, clause 7 contains recommendations for further work.

5 Use cases

5.1 Use case #1: Scenario-customized network

5.1.1 Description

This use case is mainly derived to meet the different requirements of vertical industries. It can integrate mobile network and MEC to a certain extent for saving investment with functions tailoring, resource sharing and signalling optimal path according to application requirements.

Different application scenarios have very different requirements in terms of data rate, mobility, policy control and functions. If the same network/function was used to serve all scenarios, the network may inevitably become very complex, but this complexity is unnecessary. It may also fail to meet the performance requirements because this scenario requires higher performance guarantees.

In terms of 5G mobile network, there are the following scenarios involved with functions tailoring:

a) Smart agriculture: monitoring soil health in agricultural with low data rate, which may just share the mobile network elements but with special MEC system for data management.

b) Intelligent mining: mining machines and sensors do not move, which makes the mobility management service of the control plane unnecessary.

c) Non-terrestrial network: considering the limited capacity and storage resources of satellites, it is necessary to simplify policy control and cooperate with terrestrial core networks.

In terms of MEC, functions tailoring examples are shown below:

1) When MEC is deployed as a public resource, most of MEC functions can be deployed, such as the Location API, RNI API, Federation Enablement API, etc.

2) When MEC is deployed for a particular park, the functionality is tailored to the requirement of that park. Such as the Federation Enablement API does not need to be deployed if it does not need the functionality of MEC Federation.

Therefore, operators that deploy 5G networks and MEC at the same time are eager to integrate these two based on resource efficiency, that is, customized edge networks to meet the requirements of a variety of scenarios.

5.1.2 Recommendations

[Recommendation 5.1.2-1]

MEC system should be able to integrate with the 5G network via the 3GPP-defined interfaces to provide end-to-end services with the necessary network resources and app resources according to the third party requirements.

5.1.3 Evaluation

Recommendation 5.1.2-1 is technically feasible with the following condition:

- A support for integration of MEC and the 5G network is not specified in the current ETSI MEC specifications.

NOTE: The detail of the integration needs further investigation, which is highly dependent on the required 3GPP work in 5G-Advanced to 6G timeline.

5.2 Use case #2: Critical medical applications need multi-nodes collaboration

5.2.1 Description

At present, the phenomenon of multi-disciplinary consultation is widespread in hospitals. For example, when a patient is suspected of having a difficult disease. He will go through a large number of clinical examinations and expert consultations. This is commonly referred to as multidisciplinary consultation, which can greatly reduce the misdiagnosis and mistreatment of patients, develop the best treatment plan, improve patient prognosis, and avoid the burden of repeated referrals and examinations for patients' families.

In the current multidisciplinary consultation, that patients need to go to the different departments for doctors to make on-site diagnosis In the future, current multidisciplinary consultation might be transformed into digital medical treatment to keep the patient on one site with all the correspondingly different diagnosis with different doctors.

Holographic display technology can be used to capture images of patients or doctors in remote locations. Holographic data is to be transmitted through the network, and the terminal adopts laser beam projection to project real-time dynamic stereoscopic images in the form of hologram, supporting multi-nodes collaboration.

MEC is able to meet this requirement with holographic service of multidisciplinary consultation deployed showed in Figure 5.2.1-1 to achieve ultra-high data rata and ultra-low latency. Refer to clause A.41 of ETSI GS MEC 002 [i.2], when instantiating the HTC application. It is also necessary to consider the delay caused by the underlying transmission, so as to provide a better support for the application. Every location is equipped with special MEC system and mobile network for this multidisciplinary consultation service. The patient in one location, such as Location E, can get timely consultations with doctors in other locations, such as Location A, B, C and D shown in Figure 5.2.1-1,without having to move from place to place physically.

Each location can be regarded as an edge network node, which is composed of the 5G private network and MEC system. During consultation, they need to communicate. For example, the edge node of Location E shares the information of this node (status of the patient and the diagnosis and suggested treatment) to doctors of other nodes, and doctors of other nodes can also share their own views and treatment suggestions. Even in the process of surgery, doctors of other nodes can provide remote guidance to doctors of edge network node E.

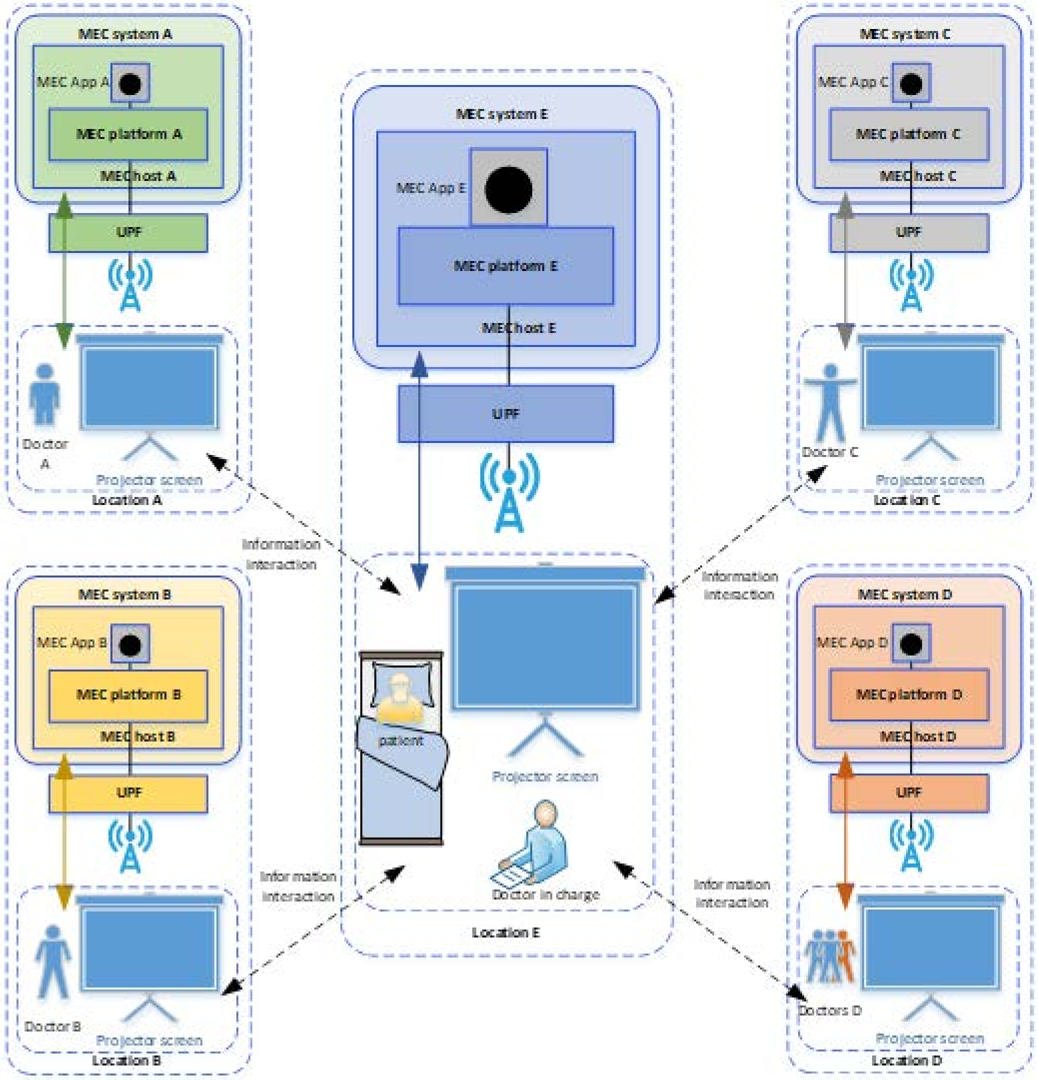


Figure 5.2.1-1: Remote multi-node collaborative consultation for critical medical applications

5.2.2 Recommendations

[Recommendation 5.2.2-1]

MEC system should be able to support the collaboration between MEC hosts deployed in the edge network nodes through Mp3 according to operator's policy.

NOTE 1: This recommendation corresponds to the edge network nodes belonging to the same provider.

[Recommendation 5.2.2-2]

MEC system should be able to support the collaboration between MEC systems deployed in the edge network nodes through Federation Enablement APIs according to operator's policy.

NOTE 2: This recommendation corresponds to the edge network nodes belong to different providers.

5.2.3 Evaluation

The list of evaluations that corresponds with the recommendations is as follows:

[Evaluation for Recommendation 5.2.2-1]

For the scenario where the edge network nodes belonging to the same provider, better collaboration between MEC hosts may be needed.

[Evaluation for Recommendation 5.2.2-2]

A support for collaboration between MEC hosts deployed in the edge network nodes belonging to different providers through Federation Enablement APIs is specified in the ETSI MEC GS 040 [i.3].

5.3 Use case #3：Live streaming requires multi-scene connection

5.3.1 Description

The application scenarios of 6G will evolve in depth in multiple dimensions such as interactive immersion, multi-dimensional intelligence and wide-area. Compared with the business scenarios in the 5G era, the business scenarios of 6G will move to a more diverse and higher-order stage, which will bring a deeper impact and change to the way people live and work. For example, the metaverse scene integrates the leapfrog change of the current entertainment and lifestyle from the concept proposal, which is one of the development directions of the new business scene in the future.

The new and diversified 6G application scenarios not only put forward higher requirements for various performance indicators of the network, such as delay, jitter, rate and reliability, but also bring certain challenges to the flexible adaptability, flexible and fast application and network interaction ability of the network.

Connection service has always been the most basic service provided by mobile network. From the initial voice communication service to the 5G Internet of everything service, mobile networks provide special QoS guarantee and network access functions for different services.

Multi-view live streaming, through multi-camera HD video acquisition and processing in the scene, provides users with different camera independent viewing, screen far and near telescopes viewing, 360-degree viewing enjoyment at will. Cloud gaming, where the game screen is completely rendered on the server and transmitted to the client through the network, reduces the threshold of data processing ability of the user terminal. The real-time interactive service of XR provides users with immersive sensory experience in games and social networks through high-definition pictures and very low-latency interactive feedback provided by AR/VR devices.

All the above multi-scenario network applications can transmit signals to the edge network containing MEC and UPF through the base station or other access, and multiple edge network can transfer data to each other for information exchange, and finally complete applications such as multi-scene live streaming, cloud gaming and XR.

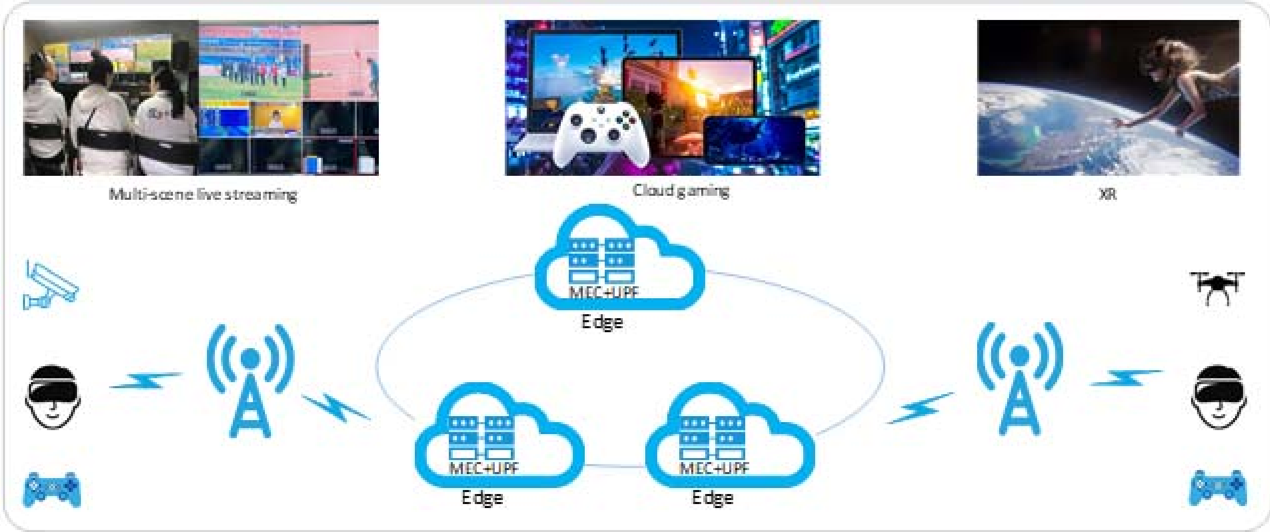


Figure 5.3.1-1: A new Perspective on Live Streaming

5.3.2 Recommendations

[Recommendation 5.3.2-1]

The MEC system needs to be integrated with the mobile network to support live streaming service scenarios with ultra-low latency and high data rata requirements.

[Recommendation 5.3.2-2]

The MEC system should be deployable in an edge network at the hour level, and eventually Plug-and-Play to support the temporary requirements of high data rate and ultra-low latency such as live streaming services.

5.3.3 Evaluation

The list of evaluations that corresponds with the recommendations is as follows.

[Evaluation for Recommendation 5.3.2-1]

A support for integration of MEC and the mobile network is not specified in the current ETSI MEC specifications.

[Evaluation for Recommendation 5.3.2-2]

Support for deployment of the MEC system at the hour level or Plug-and-Play is not specified in the current ETSI MEC specifications.

5.4 Use case #4: Unified Management and Orchestration System

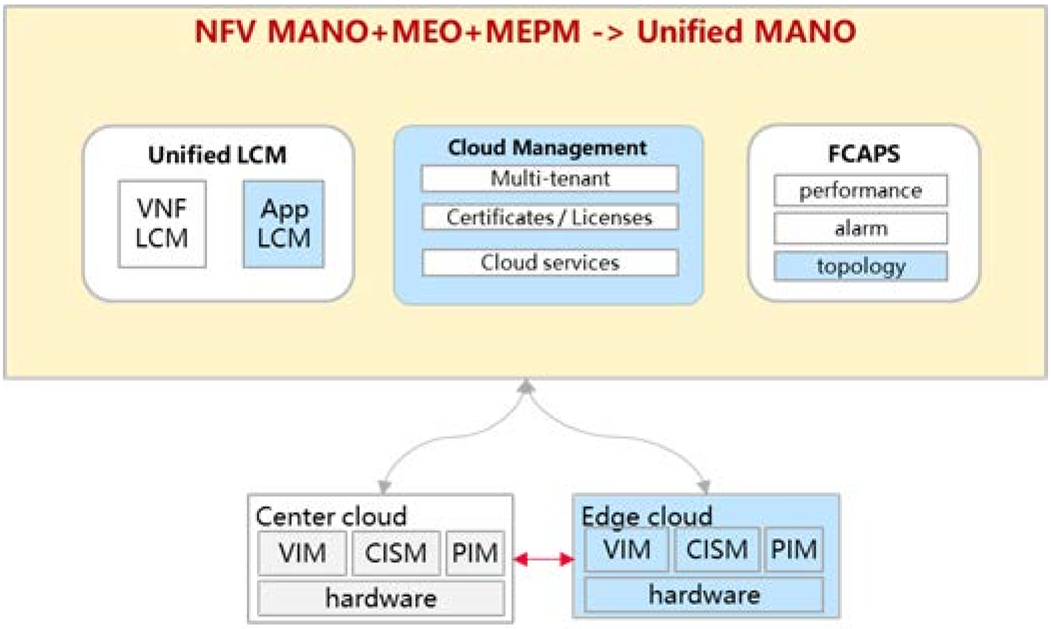
5.4.1 Description

With the development of 5G networks, 5G technologies are closely combined with edge computing technologies and are increasingly used in various vertical industries, such as smart factories, smart agriculture, and smart campuses. In some scenarios, a 5GC network function, for example, a UPF, is deployed at a network edge, and may even be co-deployed with MEC. In this scenario, the UPF may be directly used as a data plane of the MEP. In some other scenarios, the entire 5GC can even be deployed in the campus to provide dedicated network services. 5GC NFs are closely related to MEC.

In different scenarios, users have increasingly personalized requirements for networks and APP services. For example, some services require extremely low response latency, some services require high bandwidth, some services require huge computing power, and some services need to access APP services at the edge. Operators need to provide customized networks to meet differentiated requirements of users.

Generally, users require both network and application services, and the service quality needs to be guaranteed by the two parts. Currently, the NFV system is responsible for providing an NS service and VNF lifecycle management, and the MEC system is responsible for providing an edge service and application lifecycle management. The integration of the two systems became a potential research direction.

Clause 6.2 of ETSI GS MEC 003 [i.4] proposes a method for instantiating an APP based on an NFV system. In this method, an APP is essentially deployed by using a resource deployment capability of NFV, and the APP is considered as a VNF. However, unified management of APPs and VNFs is not implemented. (In the NFV system, there is only VNF, and there is no APP object).



NOTE: The blue parts in figure 5.4.1-1 are the functions that ETSI MEC may more focus on.

Figure 5.4.1-1 Unified MANO

As shown in Figure 5.4.1-1, in the future MNOs may use a unified MANO to perform lifecycle management and O&M (operation and maintenance) on NFs and applications as a whole. The unified MANO can also provide cloud management capabilities such as multi-tenant management, certificates/licenses management and other cloud services management. In addition, the unified MANO can manage the infrastructure resources for both centre cloud and edge cloud. Where CISM is short for Container Infrastructure service management, and PIM is short for Physical infrastructure management. They are both related to NFV.

The present document emphasizes that APP management and NE management could be unified in the future. The reasons for this trend are as follows:

- The package format and template format are similar for NE and APP management. The lifecycle management operations are also similar.
- VNFs and APPs use the same virtualization technologies. The technology stacks of VNFs and APPs are the same, regardless of whether VMs or containers are used.
- User requirements are becoming more and more diversified. Users want to use 5G private network services to implement wireless communication in campuses, and may also use edge computing services to support ultra-low latency services. In addition, a combination of the two may be required, such as unmanned vehicles and manufacturing.

The benefits of using a unified MANO system are as follows:

- MNOs can use a unified MANO system to provide diversified services for users and facilitate service collaboration. For example, 5GC and edge computing can use slice to provide end-to-end SLA.
- The unified MANO system can simplify the system and reduce Operation and Maintenance (O&M) costs. Users can deploy a customized network and provision edge services using one system, which can save time.

5.4.2 Recommendations

[Recommendation 5.4.2-1]

The MEC system should support the combination with the NFV management and orchestration system to manage both NFs and APPs.

5.4.3 Evaluation

Recommendation 5.4.2-1 is technically feasible with the following conditions:

- The package format and template format are similar for NE and App management.
- VNFs and APPs use the same virtualization technologies-NFV.

5.5 Use case #5: MEC enables satellite communication

5.5.1 Description

With the development of Non-Terrestrial Network (NTN), it is possible for users in remote areas, sea and air to communicate using satellite access. On the other hand, due to limited resources and/or capabilities, some terminals are unable to handle compute-intensive and time-sensitive services. For this reason, MEC technology has become an indispensable key part of satellite networks for some applications.

Using the MEC system to provide local service to the users on board can not only ensure the service delay, but also effectively alleviate the bandwidth demand of the satellite-ground link and reduce the computing load of satellite operators' data centre.

Below are two example scenarios:

- The first is the airborne/shipborne MEC converged communication. In this scenario, the MEC platform is deployed on the airplane/ship server at the edge of the network. According to the user's service requirements and the MEC platform capability, the airborne /shipborne MEC or the ground mobile network remote server is selected to provide services for the user.
- The second is about the satellite Internet of Things (IoT). The IoT devices are deployed in the remote areas for environmental protection monitoring. Some monitoring data from these areas require satellites to return images to data centres on the ground for processing, which will lead to high energy consumption and large transmission delay for these services. With the MEC system deployed onboard the satellite, image recognition and processing can be completed directly at the MEC platform, and the satellite only needs to return the key part of the image or alarm information, rather than return all the observation results.

Corresponding to the above two scenarios, the deployment location of the MEC system is different, it may be deployed on the satellite, it may be deployed on the ground gateway station, and it can also be deployed on the satellite terminal. Due to the load constraints of the deployment location, only a limited number of required functions of MEC can be selected. It is therefore necessary to customize MEC functions to achieve optimal performance with the corresponding gateway station or satellite terminal.

5.5.2 Recommendations

[Recommendation 5.5.2-1]

The MEC system should support the customization of its functionalities according to the needs of satellite applications based on satellite access so that it can be integrated with satellite networks to provide corresponding services.

5.5.3 Evaluation

Recommendation 5.5.2-1 is technically feasible with the following condition:

- MEC system can be tailored to support the applications based on satellite access.

6 Solutions for closing the gaps

6.1 Gap/Key issue #1- Introducing Integrated OSS

6.1.1 Description

Typical Distributed Edge Network scenarios are considered, as described in use cases #1, #2, #3 and #4. It can be inferred that the distributed edge network consists of two parts, one is the application, and the other is the mobile network that carries the communication between the application and the outside.

Under the current MEC architecture, there are no mobile network roles and entities that carry the communication, nor can they be instantiated accordingly.

Based on the mobile network management architecture, referring to figure 6.1.1-1 of ETSI TS 128 500 [i.5] and Multi--access edge system reference architecture variant for MEC in NFV, referring to figure 6-2 of ETSI GS MEC 003 [i.4]. If applications and mobile networks need to be integrated to form an edge network, an integrated OSS needs to be introduced to deliver application and network instantiation information and instructions to subsequent entities.

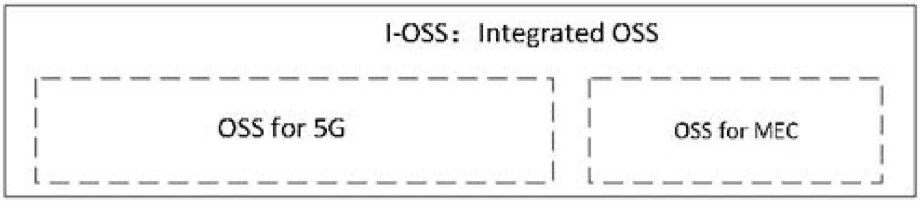
6.1.2 Solution proposal #1-1: Integrated OSS

The integrated OSS can replace the OSS function of MEC systems defined by ETSI GS MEC 003 [i.4] and the NM function of 5G systems defined by 3GPP.

As a result, the integrated OSS would support the family of interfaces and functions defined by ETSI GS MEC 010-2 [i.6], such as Mm1 reference point between the MEC Orchestrator/MEC application orchestrator and the OSS which is used for on-boarding application packages, triggering the instantiation and the termination of MEC applications in the MEC system and the application LCM coordination function including four items: instantiate application in NFV, terminate application in NFV, operate application in NFV and configure application in NFV.

In addition to the interfaces and functions defined by the MEC system above, the integrated OSS also requires to support the interfaces and functions defined in clause 6.1 of ETSI TS 128 500 [i.5]. There are two parts：One is the Itf-N, the interface between NM and DM/EM, the other is Os-Ma-nfvo, the reference point between OSS and NFVO.

The integrated OSS diagram with two parts of functionality is as figure 6.1.2-1.



NOTE: This is a loose integration from the operational maintenance level.

Figure 6.1.2-1:Integrated OSS for MEC and 5G Network

6.2 Gap/Key issue #2- Introducing Mp3 for collaboration between edge network nodes

6.2.1 Description

ETSI MEC has defined a standard on Federation API based on GSMA OPG requirements, see ETSI GS MEC 040 [i.3].

Federation API focuses on the interoperability and communication among different platforms and service providers.

However, when the platform/service provider is the same company, the communication based on Mp3 is much more appropriate. There are two main reasons: Federation API seems to be overqualified with complicated security check, and its position is much higher than communication in Mp3 level.

6.2.2 Solution proposal #2-1: Enable Mp3 for inter-communication among the same provider

ETSI GS MEC 003 [i.4] has defined Mp3 as reference points regarding the MEC platform functionality, see its Figure 6-1. The interconnection through MEP can bring better experience for cooperation in different region MEC nodes, mainly because MEP itself offers the environment for App to discover, advertise and subscribe. The more important is that MEP offers MEC services for all the Apps. All the elaboration through Mp3 is host level. However, Federation API is a system level communication with Mfm connecting different MEOs. For delay sensitive, and the same provider elaboration, the first choice is Mp3.

6.3 Gap/Key issue #3 - combined deployment for core network functions and MEC applications

6.3.1 Description

As described in use cases #1 and #4, to meet various vertical industries requirements, a unified management and orchestration system may be beneficial for deploying a scenario-customized network including core network functions and MEC applications. The unified MANO can improve the efficiency by reducing the number of operations and can facilitate the unified QoS management, e.g. enabling the network slices and MEC application slices. The solutions should support deploying a scenario-customized network simply and efficiently.

6.3.2 Solution proposal #3-1: Unified MANO system

6.3.2.1 Analysis of existing approach

The clause 6 of ETSI GS MEC 003 [i.4] depicts an architecture variant for MEC in NFV, which supports managing MEC applications through integration with NFV system sharing the same virtualisation infrastructure. According to ETSI GS MEC 003 [i.4], there are two parallel orchestration entities in the architecture, and they have different responsibilities. The MEAO is the entry point for the MEC application deployment. The NFVO is responsible for the NS deployment. It means that the current method does not support deployment of an NS containing both MEC applications and VNFs.

ETSI GR NFV-IFA 054 [i.7] is studying the development trend of the next-generation NFV system architecture. Simplification and evolution are considered as two important design principles. The unified MANO will enable carriers to manage the central cloud and edge cloud in a unified manner. This will reduce the integration test complexity caused by the deployment of two systems, simplify the O&M, and implement unified management of end-to-end network services, complying with the NFV architecture design principles.

6.3.2.2 Unified Northbound interface

Different from the MEC system in NFV solution in ETSI GS MEC 003 [i.4], the unified MANO uses a unified northbound interface to interconnect with the carrier's OSS/BSS. Administrators can use this interface to deploy and manage multiple types of objects, such as an NS, VNFs, MEC applications, and functions. These objects can be considered as deployable objects. The unified MANO needs to support the LCM of deployable object instances.

6.3.2.3 Descriptor diversity

The unified MANO system needs to support the diversity of descriptors. A conventional NFV system is oriented to a main scenario of deploying an NS that contains one or more VNFs. A VNF could be a 5GC network element or a router device. Each of these VNFs is described by a VNFD. An NS is described by an NSD that references the VNFDs of all VNFs that are part of the network service. After the container technology has been introduced, the NSD and VNFD have been enhanced to support containerized VNF deployment. In addition, administrators can directly use open-source solutions to deploy VNFs, for example, using Helm Chart to deploy Kubernetes clusters and containerized VNFs. If the unified MANO supports the deployment of NSDs with MEC applications, the diversity of virtualization technologies used for MEC applications and future compatibility have to be considered. The deployment mode of a MEC application can be more flexible than that of a VNF, and the virtualization technology applied to MEC applications can be updated more frequently. Therefore, when designing the unified MANO, it is necessary to support the diversity of descriptors.

6.3.2.4 High level U-MANO architecture

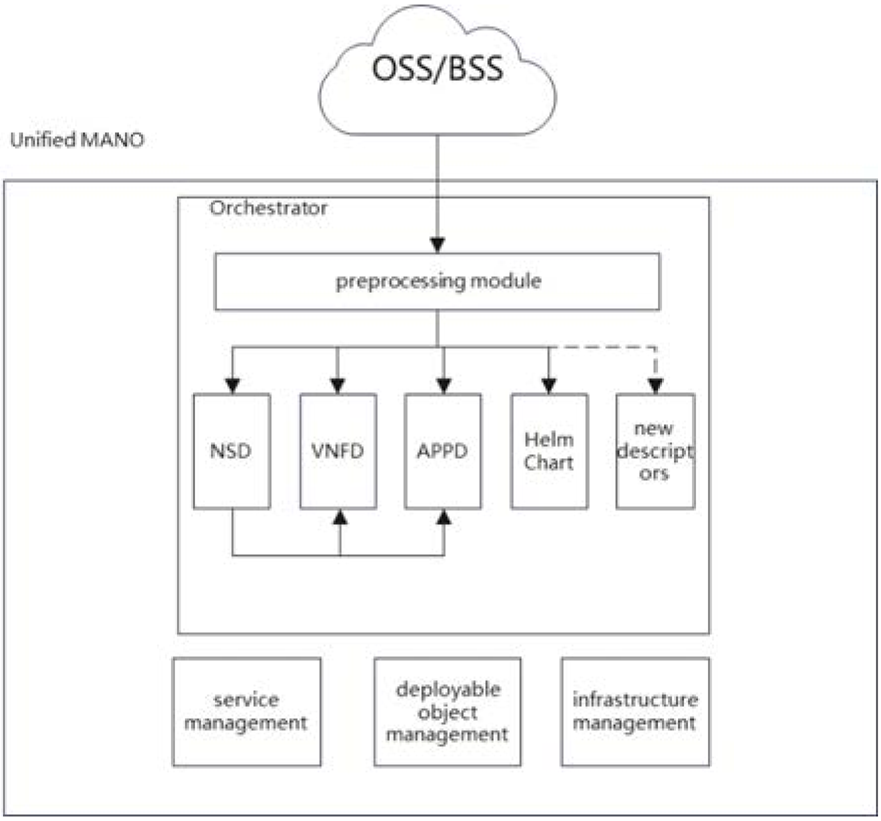


Figure 6.3.2.4-1: High level U-MANO architecture

The unified MANO should support unified northbound interfaces, support the processing of deployable objects, and support the descriptors of deployable objects in multiple formats. The unified MANO should also support open-source solutions, such as Kubernetes (K8S) management container clusters.

6.4 Gap/Key issue #4 - exposure computing Load

6.4.1 Description

Currently, edge computing offers a traffic offloading environment for 5G networks, thereby reducing network latency and providing robust support for real-time applications. This positions it as one of the cornerstone technologies for 5G. However, with the development of services, MEC has transitioned from a single traffic offloading function to a more sophisticated computing node. In this scenario, the service consumers' choice of MEC should be based not only on geographical location, but also take into account the load status of MEC itself. If edge computing would share its load information with service consumers, the integration of which and edge computing could achieve even more significant performance improvements in the new era, such as optimizing resource allocation, enhancing network performance, and fostering business innovation.

6.4.2 Solution proposal #4-1: Load Reporting

Load reporting for Multi-access Edge Computing (MEC) as an Application Function (AF) within service consumers can be highly tailored/customized to meet specific requirements for load management scenarios, thereby enabling corresponding reporting. This mechanism is structured around two key information dimensions:

1) Adaption to Load Management Mechanisms:

   - The MEC system is designed to actively respond to various management and control directions, ensuring that the reporting of load information strictly adheres to established communication protocols, thus guaranteeing the accuracy and timeliness of data processing.

NOTE 1: Load Management Mechanisms is out of scope of MEC. Such feature has not been specified in 3GPP.

2) Diverse Reporting Capabilities:

- Fine-grained Data Collection: Includes comprehensive data on resource utilization such as CPU usage, memory consumption, and storage capacity.
- Flexible Reporting Modes: Supports both periodic and event-triggered reporting mechanisms:
    - Periodic reporting is executed according to a preset time interval.
    - Event-triggered reporting, on the other hand, is initiated based on pre-set thresholds. When the CPU utilization rate exceeds 80 %, the reporting process is immediately triggered to ensure that abnormal network conditions can be responded to in a timely manner.

6.4.3 Solution proposal #4-1: Load API

This clause provides an overview of the Multi-access Edge Computing (MEC) load API, which is designed to facilitate the reporting and management of load information in edge computing environments. The API enables seamless interaction between application developers and the MEC platform, ensuring optimal resource allocation and enhancing system performance and reliability. Especially to report their resource usage to the service consumer for efficient load balancing and resource optimization.

It mainly includes the below aspects: how to collect Load information, interface definition and data format.

Generally, the Multi-access Edge Platform (MEP) is tasked with supplying computing, storage, and network resources, along with the corresponding service environment at the edge, to facilitate the operation of diverse edge applications. Its primary focus is on the management of local resources and the support of local applications. Although it is capable of retrieving load information regarding the local resources it oversees, such as the CPU and memory utilization of local servers, as well as the storage occupancy rate, it does not bear the direct responsibility of managing or acquiring load information from other MEPs or other edge nodes throughout the entire Multi-access Edge Computing (MEC) system.

On the other hand, the Multi-access Edge Orchestrator (MEO) plays a more coordinating role. It is responsible for aggregating and orchestrating resources across multiple MEPs. The MEO has to collect comprehensive load information from its subordinate MEPs. This information is then used to manage resources at a broader scale, enabling efficient load - balancing and optimized resource allocation across the edge computing ecosystem. It also serves as an interface to expose API load information to the 5G network, streamlining communication between the MEC system and the 5G infrastructure.

Based on the above analysis, ETSI GR MEC 031 [i.8], clause 4.1 can be taken as an example where MEC serves as Application Function(s) of 5G system. In this context, two scenarios exist for Load API nodes: MEP and MEO. The Load API reporting reflects a closer relationship between MEC and the service consumers.

In the scenario where the Multi-access Edge Orchestrator (MEO) functions as a node to expose the API load to the service consumer, the comprehensive load information is to be reported by the various MEPs subordinate to the MEO. Conversely, when a MEP serves as a node, it directly inputs its existing local information into the load API, thereby formulating a standardized format for external disclosure.

7 Conclusions

The mapping of the key issues, identified in clause 6, to their associated solutions is provided in table 7-1. This includes highlighting any identified gaps and external dependencies.

Table 7-1: Key issue and solution evaluation

Key issues	Clause #	Solution	Gap	External dependency
#1: Introducing Integrated OSS	6.1	#1: Integrated OSS	Yes, ETSI GS MEC 003 [i.4]	ETSI TS 128 500 [i.5] (note 1)
#2: Introducing Mp3 for collaboration between edge network nodes	6.2	#1: Enable Mp3 for inter-communication among the same provider (note 2)	Yes, ETSI GS MEC 003 [i.4]	No
#3: combined deployment for core network functions and MEC applications	6.3	#1: Unified MANO system	Yes, ETSI GS MEC 003 [i.4]	ETSI TS 128 500 [i.5] (note 1)
#4: exposure computing Load	6.4	#1: Load Reporting (note 3)		No
		#2: Load API (note 3)		No
NOTE 1: The external dependency on 3GPP needs further investigation and alignment, because 3GPP external interaction is still not available.				
NOTE 2: The Mp3 reference point between MEC platforms is used for control communication between MEC platforms.				
NOTE 3: A new service API will be provided to support the computing load exposure.				

ETSI ISG MEC may take the above recommendations into further consideration.

Annex A: Change history

Date	Version	Information about changes
September 2023		Remote Consensus MEC(23)DEC258 of WI，see contribution MEC(23)000189r4
October 2023	V3.0.1	Implements document MEC(23)000374r1
December 2023	V4.0.1	Early draft V4.0.1 is similar to V3.0.1, and is uploaded further to the decision at MEC#36 to have MEC047 published as V4.0.1
June 2024	V4.0.2	Implements document MEC(24)000197r4, MEC(24)000198r4, MEC(24)000226r2 and MEC(24)000278r2
September 2024	V4.0.3	Implements documents MEC(24)000337r2, MEC(24)000338, MEC(24)000339r1, MEC(24)000340r1, MEC(24)000341, MEC(24)000374r2, MEC(24)000375r1, MEC(24)000363r2, MEC(24)000364r3, MEC(24)000365r1 and MEC(24)000366
October 2024	V4.0.4	Implements the minutes of MEC#339-Tech to adjust the size
November 2024	V4.0.5	Implements documents MEC(24)000433r2 and MEC(24)000434
April 2025	V4.0.6	Implements documents MEC(25)000061r3
June 2025	V4.0.7	Implements documents MEC(25)000244r1, MEC(25)000245r2 and MEC(25)000247r1
June 2025	V4.0.8	Stable draft similar to V4.0.7
July 2025	V4.0.9	Final draft similar to Stable draft V4.0.7 and ready to go to MEC review via RC.
July 2025	V4.0.10	Final draft taking into account proposed updates in contribution MEC(25)000303, raised during the MEC RC for review. This draft is ready to be submitted to the MEC RC for approval before ETSI publication.

History

Document history		
V4.1.1	September 2025	Publication