Abstract: The proliferation of Internet of Things (IoT) and the success of rich cloud services have pushed the horizon of a new computing paradigm, edge computing, which calls for processing the data at the edge of the network. Edge computing has the potential to address the concerns of response time requirement, battery life constraint, bandwidth cost saving, as well as data safety and privacy. Multi-access edge computing (MEC) is an emerging ecosystem, which aims at converging telecommunication and IT services, providing a cloud computing platform at the edge of the radio access network. MEC offers storage and computational resources at the edge, reducing latency for mobile end users and utilizing more efficiently the mobile backhaul and core networks. This paper introduces a survey on MEC and focuses on the fundamental key enabling technologies. This paper will review Multi-access edge computing in context to 5G. In addition, this paper analyzes the MEC reference architecture along with its pros and cons.

Keywords: MEC, LTE, IoT, ETSI, 3GPP.

I. INTRODUCTION

Edge computing is a method of optimizing cloud computing systems by performing data processing at the edge of the network, near the source of the data[1]. This reduces the communications bandwidth needed between sensors and the central data center by performing analytics and knowledge generation at or near the source of the data. This approach requires leveraging resources that may not be continuously connected to a network such as laptops, smartphones, tablets and sensors.[2] Edge computing covers a wide range of technologies including wireless sensor networks, mobile data acquisition, mobile signature analysis, cooperative distributed peer-to-peer ad hoc networking and processing also classifiable as local cloud/fog computing and grid/mesh computing, dew computing,[3] mobile edge computing,[4][5] cloudlet, distributed data storage and retrieval, autonomic self-healing networks, remote cloud services, augmented reality, and more.[6]

Multi-Access Edge Computing (MEC) is an open platform which integrates the core capabilities of network, computing, storage and application at the network edge close to people, things or data sources. The platform provides edge intelligence services to meet the key requirements of industry digitization in various aspects such as agile connection, real-time service, data optimization, application intelligence, security and privacy protection. In 3GPP R15, based on the service-oriented architecture, 5G protocol module can be called according to service requirements and provide technical standards for constructing edge network. As a result, the MEC can be flexibly deployed in wireless access cloud, edge cloud or converged cloud in different scenarios based on demands. MEC can provide mobile operators with the following values:

● To reduce the utilization of the core network and backbone transmission network and effectively improve the utilization rate of the operator network through local offload of high-bandwidth services such as 4K/8K and Virtual reality and augmented reality (VR/AR);
● The operator network will effectively support future latency-sensitive services (such as the Internet of Vehicles and remote control) and services requiring high computing and processing capabilities (such as video monitoring and analysis) by descending the content and computing capability, so as to help operators transform from connection pipe to information-based service enablement platform;
● As an edge computing environment and network capability open platform, MEC will lay a foundation for operators to construct the network edge ecology.

II. MEC NETWORKING ARCHITECTURE OF LTE NETWORK

In today’s LTE network, a MEC server has two forms:
1) built-in: integrated with the base station as an enhancement function through upgrading software or an add-in board card;
2) external form, deployed behind the base station or gateway as stand-alone equipment.
IV. PROBLEM ANALYSIS OF MEC DEPLOYMENT

ETSI defines the function of MEC standards, while the definition of concrete implementation is incomplete. There was no standard interface established with the 3GPP elements in the network and the commercial deployments are faced with the following challenges:

• Billing: At present, there is no complete traffic billing scheme in the existing network application. Further research and evaluation need to be done for statistics and report of local traffic through MEC, the newly-added node at the core network side (or P-GW upgrade) is responsible for the scheme of generating the CDR and reporting to BOSS system;

• Security: The security of the MEC platform is a prerequisite for the deployment of third party applications, and further research needs to cover physical port isolation, logic port isolation, firewall security control and access control;

• Lawful intercept: Providing the listening and monitoring function at the user level should be considered when deploying MEC;

• Mobility management: There is no well-validated mobility scheme, and the continuity of service (between MEC servers) needs to be ensured in the handover scenarios

V. CONCLUSION

For more than a decade, the innovation of mobile technology has continuously boosted the development of the mobile industry. Compared to 4G, 5G has become the primary productivity of the society and is about to implement industry-wide digitization. On the basis of improving the user experience of mobile Internet services, 5G will further satisfy the massive requirements of IoT applications and deeply integrate with such industries as the Internet of Vehicles, industrial control, telemedicine and energy, so as to implement the “Internet of Everything” in a real sense.[10]

In the 5G era, the applications of MEC will extend to such fields as transportation system, intelligent driving, real-time tactile control and Augmented Reality to become the key enabler for the digital transformation of operators. This will bring about a transformation of the network from access pipeline to information-based service enablement platform. The development of the MEC industry standards and the deployment of general virtualization platforms will provide a new network ecosystem and value chain.

REFERENCES

