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Qualitative Analysis on SDN and NFV in 5G VMesh Milieu

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Abstract: In VMesh evolution, the two key technologies that set the way to 5G networks with the low latency and high capacity are Network Functions Virtualization (NFV) and Software Defined Networking (SDN). This paper initiates an architecture that integrates 5G technologies and IEEE 802.11 based VMesh network with SDN and NFV. In addition, this paper also intends at analyzing the key concept and network architecture and amenity of SDN and NFV in the 5G VMesh milieu. This paper will give an idea to the researcher for innovation in the 5G VMesh milieu.

Key words: VMesh Network · 5G · SDN · NFV

INTRODUCTION

VMesh network coalesce the wireless mesh network and vehicular ad hoc network features. 5G is an intellectual technology and it is relies on IPV6 and virtual private network [1] [2]. 5G VMesh milieu capable of supporting wwww which includes intelligent antenna and flexible modulation to optimize the VMesh networks. The present network architecture is more convoluted terms of interconnections and functionalities. In order to minimize the network expenditures and to facilitate supple network, the eulogistic technologies such as, SDN and NFV have been endorsed by IT and telecom industries and it is standardized by Internet Engineering Task Force (IETF) and European Telecommunications Standards Institute (ETSI) [3] [4]. The eulogistic technologies concentrate on hardware normalization and virtualization in the core network and the data and control plane separation in the radio access network [5]. Fig. 1 illustrates the existing and prospect VMesh milieu scenario.

The six challenges must address by the 5G VMesh milieu are offering enhanced quality of experience, capacity and data rate and minimizing cost and end to end latency. These challenges and a few imminent facilitators are addressed in Fig. 2.

SDN: SDN is the emerging technology in networking. SDN lays on the new-fangled paradigm which consists of centralized network controller, control and data plane separation, enhanced network management and so on [8].

Fig. 3 illustrates the jagged model of SDN in 5G VMesh milieu network architecture. SDN based 5G VMesh milieu network architecture encompass of vehicles, Aggregator Node B (ANB), SDN controller and SG/GGSN. ANB is rigged with various medium access control protocols to transmit various types of data's. As illustrates in Fig.3, the packet with huge payload necessitates extra check bits and reliable header and the small size packets rid of those overheads. SDN controller manages the network services by abstraction of lower-level functionality.

Amenity: SDN 5G VMesh milieus is fully controllable and end-to-end flow optimization. It is logically centralized which provide low OPEX and COPEX. SDN in a 5G VMesh milieu affords globally optimized load balancing and high performance in terms of network usage and transmission rate. SDN in 5G VMesh milieu affords the applications at software speed and advancing network services.

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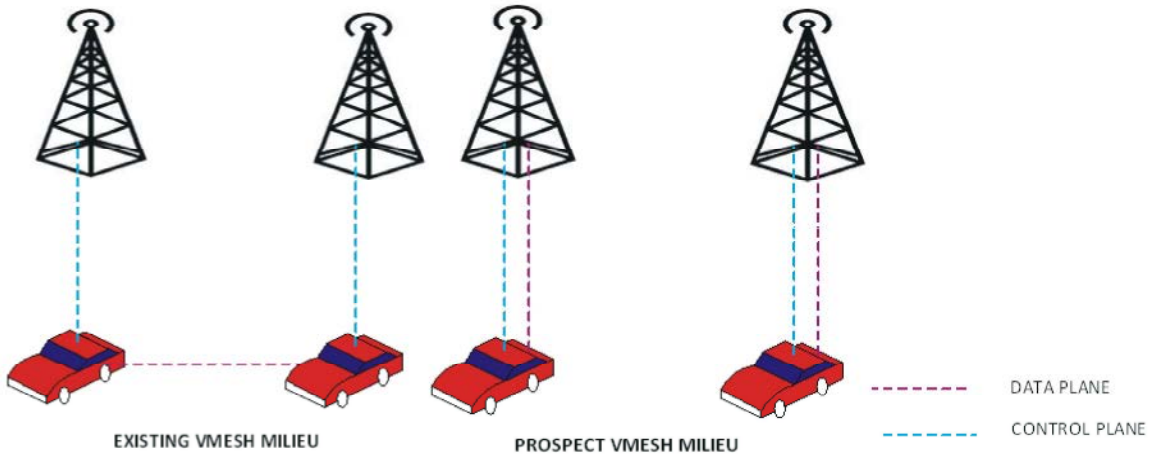

Fig. 1:

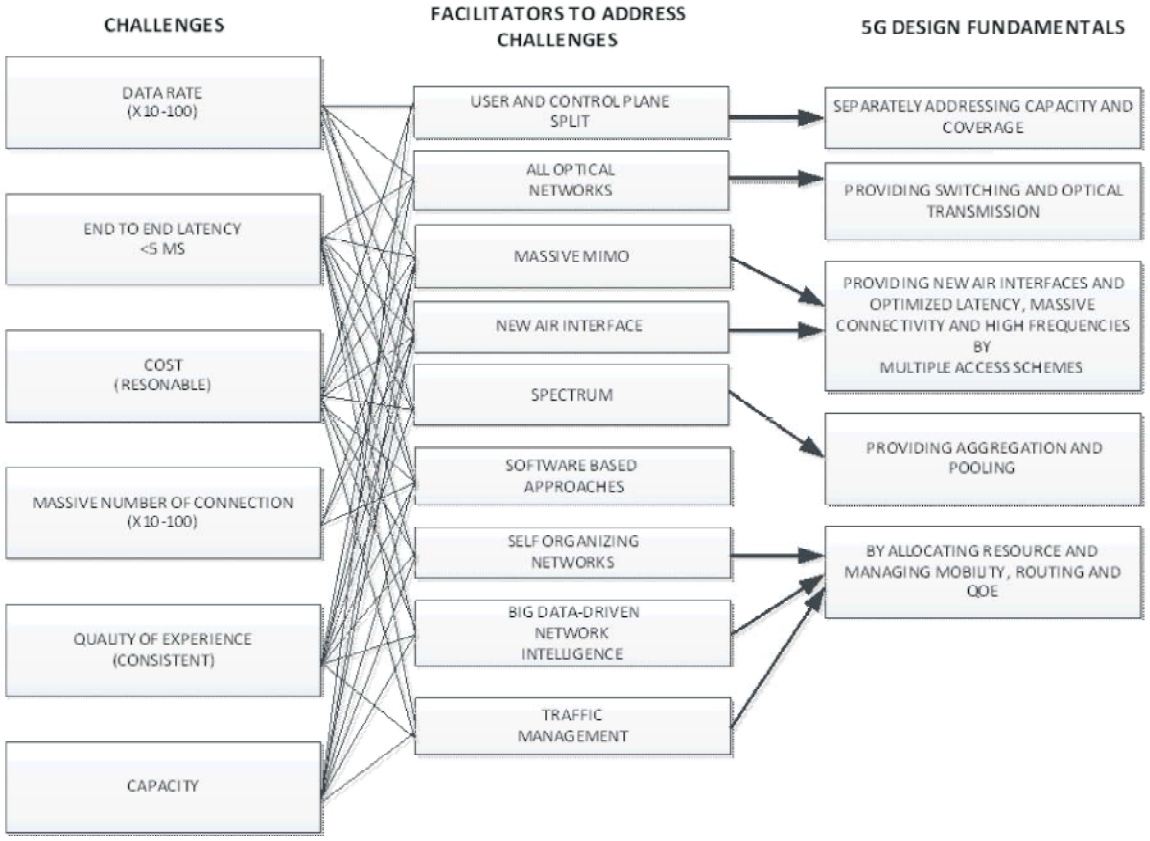

Fig. 2: 5G VMesh Milieu Challenge, Facilitators and Design Fundamental

NFV: Fig. 4 illustrates the jagged model of NFV 5G VMesh milieu network architecture. NFV 5G VMesh milieu's network architecture comprises of vehicles, Aggregator Node B (ANB) and NFV enabled cloud. ANB affords the air interface between the user and control plane terminations. NFV consists of Network Intelligence (NI), U- Plane Entity (UPE) and C-Plane Entity (CPE). NI affords context-aware quality of experience provisions, traffic optimization and caching. CPE provides mobility management, authentication and radio resource control. UPE affords the over the air provisions and it function as the U-plane mobility anchor and a gateway.

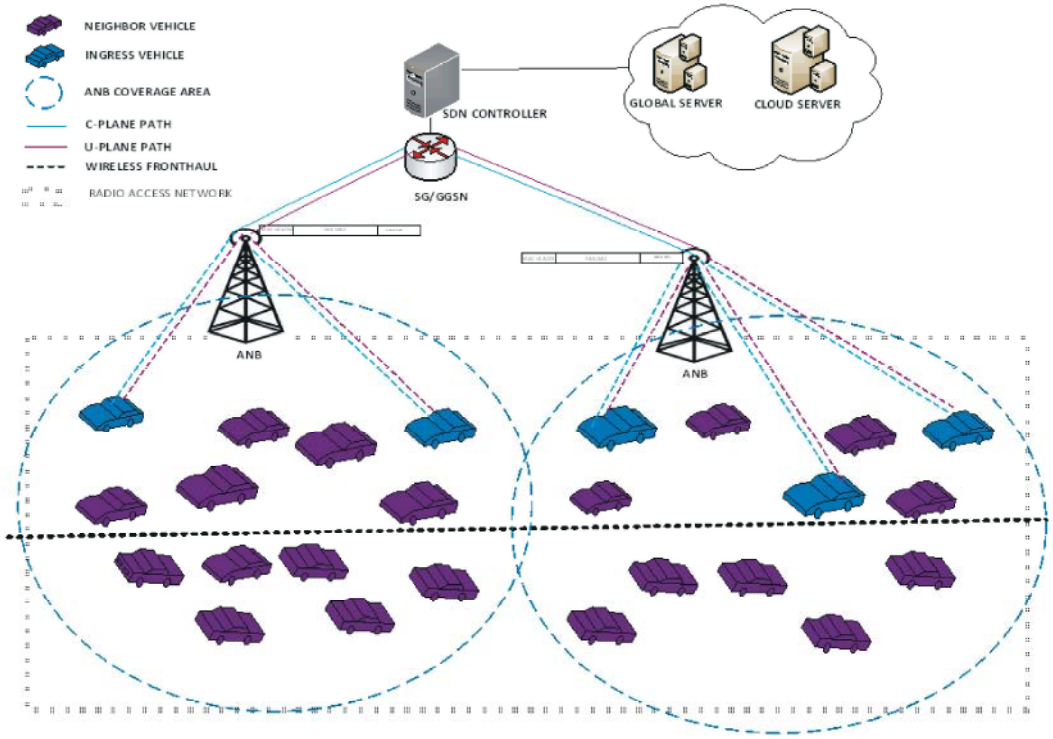

Fig. 3: SDN 5G VMesh Milieu Network Architecture

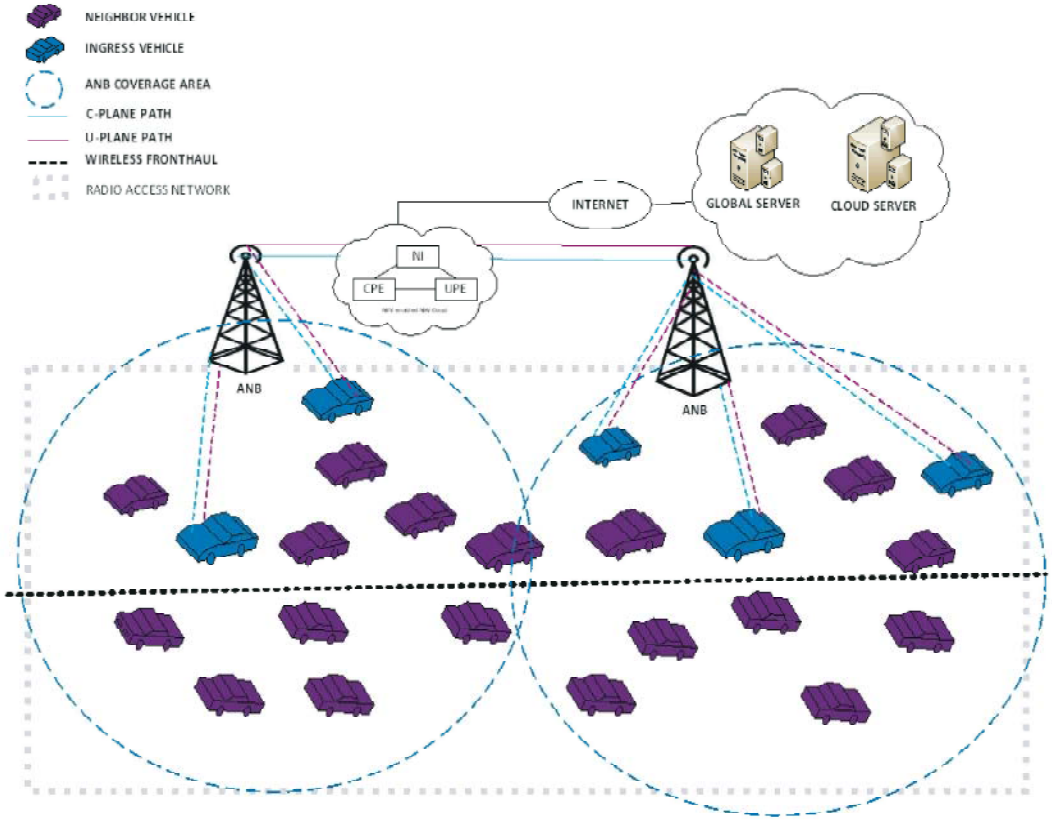

Fig. 4: NFV 5G VMesh Milieu Network Architecture

Table 1: Difference between SDN and NFV in 5G VMesh Milieu

Characteristic	SDN in 5G VMesh Milieu	NFV in 5G VMesh Milieu
Network Functions	Software based over well-known hardware.	Specific hardware and software.
Basic Idea	SDN in the 5G VMesh Milieu separates the data and control plane. It affords programmability of the network and centralized control.	From dedicated appliances the NFV transfers the network functions to generic servers.
Roles	Multiple roles over same hardware.	One physical node per role.
Protocol	OpenFlow	Protocol : None
Control	Centralized control.	No centralized control.

Amenity: NFV concept in VMesh milieu offers reduced equipment, space and management costs. NFV provide resource sharing, agility, enhance the reuse of existing infrastructure, simplify compatibility, facilitate operations and faster time-to-market of any service. 5G VMesh milieu network architecture is more flexible and simple by minimising dependence on hardware constraints. Table 1 illustrates the difference between SDN and NFV in the 5G VMesh Milieu.

NV^2: NV^2 is the combination of SDN and NFV. NV^2 = SDN+NFV. SDN augments the NFV performance, facilitate operations and compatibility. NFV augments IT orchestration, virtualization and management techniques. SDN and NFV afford a new intend and deploy which manages the VMesh networks and its services. Networks based NV^2 are more programmable, flexible, efficient and scalable.

Amenity: In 5G VMesh milieu, the dedicated and expensive appliances are replaced by generic hardware and advanced software. The software based control plane moves the dedicated platform (expensive network) to POP or server in a data center (optimized location). The data plane has been standardized and abstracted which allows the application evolution and network without necessitate of upgrades of network devices in the 5G VMesh milieu.

CONCLUSION

In past decagon the information technology infrastructure fruitfully lined up to virtualization. In future the infrastructure will be virtualized and will intrinsically amalgamate the information technology resources. SDN and NFV are rapidly emerging virtualization concepts, which have the potential to radically modify the telecommunication scenario in the next few years. This paper develops an integrated architecture of NFV and SDN in a 5G VMesh milieu by considering the evolution of standards and emerging key technologies. Our study shows that, though the upgrade of VMesh network infrastructure has to go a long way, the integration of NFV and SDN will play an essential role in expediting this historical evolution. Researchers should now adopt the SDN and NFV 5G VMesh milieu, in their research and then contribute to closing standards gaps as well as to standards evolution.

REFERENCES

1. Venkat Narayana Rao, T., S.A. Aasha and Sravya Tirumalaraju, 2011. Journal of Global Research in Computer Science, 2(7): 164-170.
2. Pulkit Gupta, 2013. Evolvement of Mobile Generations: 1G To 5G, International Journal For Technological Research In Engineering, 1(3).
3. Jacobs, D., 2010. IETF SDN: I2RS uses traditional routing protocols in software networks, TechTarget, 2010. http://searchsdn.techtarget.com/tip/IETF-SDN-I2RSuses-traditional-routing-protocols-in-software-networks.
4. ETSI, 2014. Network Functions Virtualisation, ETSI, 2014. http://www.etsi.org/technologies-clusters/technologies/nfv.
5. Jose Costa-Requena, Jesús Llorente Santos, Vicent Ferrer Guasch, Kimmo Ahokas, Gopika Premsankar and Sakari Luukkainen, 2015. SDN and NFV Integration in Generalized Mobile Network Architecture, 2015 European Conference on Networks and Communications (EuCNC), pp: 154-158.
6. Dharanyadevi, P. and K. Venkatalakshmi, 2015. Optimized Heuristic Buffer-based Routing For VMesh Milieu, Australian Journal of Basic and Applied Sciences, 9(11): 386-390.
7. Dharanyadevi, P. and K. Venkatalakshmi, 2014. Reliable and Scalable Routing Protocol (RSRP) For Multimedia Data Transmission In Vehicular Mesh Milieu, 9(23): 19935-19946.
8. Hyunwoo Nam, Doru Calin and Henning Schulzrinne, 2015. Intelligent Content Delivery over Wireless via SDN, 2015 IEEE Wireless Communications and Networking Conference (WCNC):-Track 4 - Services, Applications and Business, pp: 2185-2190.
9. Patrick Kwadwo Agyapong, Mikio Iwamura, Dirk Staehle, Wolfgang Kiess and Anass Benjebbour, 2014. Design Considerations for a 5G Network Architecture, IEEE Communications Magazine, pp: 65-75.