

Developing Unified Mechanisms To Move Towards 5G Through Software-Defined Networking

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Abstract:-Software-Defined Networking is an approach to computer networks, which are programmable networks, allows network admins to manage network services through the perception of higher functionality. This architecture provides the cost-effective, dynamic, manageable, and adaptable, and suitable for the high bandwidth of data. This is a new idea of networking, which is commonly associated with the Open Flow protocol standards. This paper will elaborately explain the complete architecture of the SDN and the other alternative implementations of protocol standards and services of SDN. Furthermore, the future software applications of SDN and research issues will be studied. By comparing with historic perspective to recent developments, it will give the idea of programmable networks. While showing the scenario the following must be noted.

Keywords: Open Flow Protocol; Software-Defined Networking; Programmable Network; Higher Functionality;

I. INTRODUCTION

SDN architectures decouple network control and forwarding procedures. Hence, the networking control directly programmable and the underlying structure to be abstracted from network services and programming applications [2]. This will result to build highly scalable, flexible networks that adapt to dynamic nature of the applications. A major revolution in telecom industry, that will design the networks and services for the future deployments [3]. Now a day emerging applications and services, really capable of providing such services in order to satisfy the users demand, even some networking providers are moving towards cloud computing environments for outsourcing communication services and decreasing the computational costs[5]. The SDN architecture emphases on the following four key aspects:

- A centralized controller
- Decouple control plane and data plane
- Networking programming by applications.
- Open interfaces among control plane and data plane.

The following Fig.1 shows the basic architecture of the Software-Defined Network.

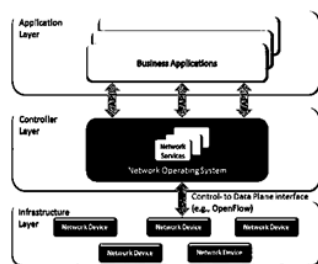


Figure-1 simple SDN architecture

Network providers already adopted such mechanism, which provides network sharing, dynamic power supply policies which will reduce the cost of energy, virtualization of core services running in data servers. Due to the dependency on proprietary protocols, it is not possible to deploy new schemes into a current network. The current approach of SDN is an alternative process of traditional distributed system in forward thinking in computer networks[1]. In this project we examined the applicability of SDN architecture to mobile wireless network. For this we proceeded wireless SDN mobile operator's architecture could bring utmost benefits, in order to overcome the classical networks[6]. This approach will also shows that the way in representation of data and control planes in traditional and the current approach. The information is collected by Network Operating Systems' Application Programming Interface (API). As shown in Fig.1 the SDN architecture consists three layers: i) the application layer; ii) the control layer; and the iii) infrastructure layer; and the communication between layers is possible by using APIs, which are southbound-API, northbound-API, westbound-API, and eastbound-API.

II. IMPLEMENTATION

Due to most popularity of mobile communications form the last decade the revolutionary technologies are emerged to meet the consumers such as 2G, 3G, 4G and now growing further towards 5th Generation communication technologies. The comparison among these generations includes speed, bandwidth, services, multiplexing, core network and technology. Due to this comparison, we need SDN for the following purpose: i)

programmable; ii) automation; iii) dynamic scaling; iv) virtualization; v) performance; vi) multi-tenancy; vii) openness; and viii) service integration. To achieve these tasks we propose a mechanism towards 5G that is software defined decentralized mobile network architecture namely SoftNet.

The designing principles as studied in the above, we propose mobile network architecture for future purpose based on the guidelines as mentioned earlier discussions. In a proposed network structure SoftNet, consists decentralized network control on the system level, instead, it provides this service at component level for efficiency in utilization of system resources. This SoftNet consists a unified Radio Access Network (RAN) and SDN core network. Using RAN we can manage radio components at base stations to provide wireless connectivity to the mobile consumers. All the radio access points in unified ran must connect access servers at the edge of SDN core network, hence the radio access points of the mobile terminals can visit either the operator's network or third party network. The network services offered in the SDN core network includes the following functionalities: i) communication control functions; ii) policy control functions; and iii) network management functions. The following Fig.2 shows the data flow in proposed SDN Soft Net system.

The unified RANs network functions are deployed on decentralized control function, access server, and gateway control. The user traffic control and monitoring wireless network conditions between the RANs, the multi-radio access technology RAT is used. The distributed gateway function is used to support the efficient data forwarding. In distributed gateway the control plane is implemented as a gateway control. This will help the mobile servers to accessing the Internet will act as an anchor point for data forwarding for mobile terminals.

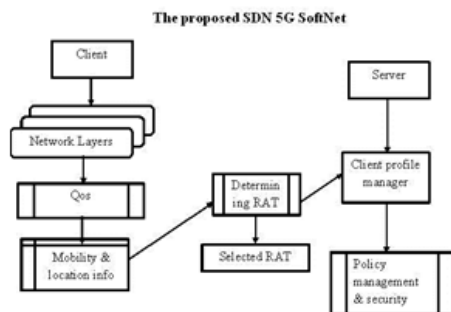


Figure-2 Data flow in 5G softnet-SDN

Furthermore, the unified RAN shows the deployment of mobility anchors, centralized or distributed. The softnet's another basic component is DCF, which will provide decentralized mobility management. The DCF and CCF services provide

the functionality for handling the location management and handover management.

III. SIMULATION PARAMETER

1. Signal to Noise interference

It is a quantity used to give theoretical upper bounds on channel capacity in wireless communication systems such as networks. Analogous to the SNR used often in wired communications systems, the SINR is defined as the power of a certain signal of interest divided by the sum of the interference power and the power of some background noise.

2. Doppler Effect

It is the change in frequency of a wave (or other periodic event) for an observer moving relative to its source.

3. Throughput:

It is the rate of successful message delivery over a communication channel. 5G SDN have low Doppler Effect where the LTE-A have high Doppler Effect.

IV. RESULTS

This paper projects the dynamic resource utilization of the network resources by providing new wireless communication network architecture scheme, which consists SDN based core network and a unified radio access network to achieve the proposed guidelines. The performance and network utilization can greatly achieved by this scheme based on the decreasing the signaling costs, which is accomplished by employing decentralizing the mobility management. So the proposed architecture is suitable for mostly 5G wireless system.

Signal to Noise interference

Table 1 Time VS SINR

LTE-A	13	18	24	31	57
SINR 5G	25	33	41	58	72
TIME	20	25	30	35	40

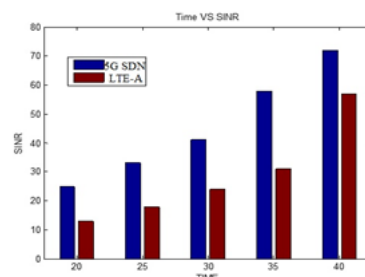


Figure-3 SINR Versus time

Show the result of signal to noise interference which is important parameter to measure the

performance of network. It is clear that the 5G has higher signal to noise interference than older technologies show the 5G cost and size are reduced and its performance is better. LTE-A has low SINR where 5G SDNR has high SINR.

Doppler Effect

Table 2 Time VS DOP

Time (s)	20	25	30	35	40
Velocity (m/s)	50	60	90	100	120
Fc (MHz)	1800	1800	1800	1800	1800
Doppler effect 5G	1.364	1.222	1.134	1.100	1.005
Doppler effect LTE-	1.999	1.970	1.962	1.958	1.955

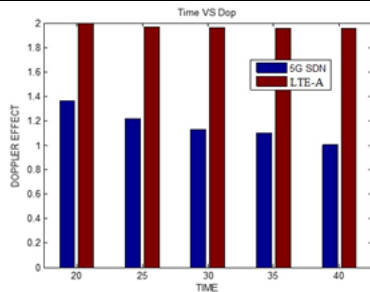


Figure-4 between Doppler Effect and time

Throughput:

Table 3 Time VS Throughput

Time (s)	20	25	30	35	40
throughput LTE-A	312	480	573	604	678
throughput 5G	680	712	839	984	1002

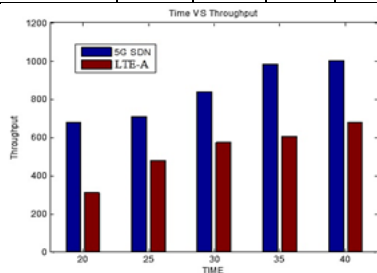


Figure-5 between throughput and time

In this figure, 5G is faster than the old technologies since the delay time is minimized and the channel capacity is increased. Throughput means throughput or Network through is the rate of successful Message delivery over a common caution channel. 5G SDN has high throughput as compared to the LTE-A.

V. CONCLUSION

This paper projects the dynamic resource utilization of the network resources by providing new wireless communication network architecture scheme, which consists SDN based core network and a unified radio access network to achieve the proposed guidelines. The performance and network utilization can greatly be improved by this scheme based on the decreasing the signaling costs, which is accomplished by employing decentralizing the mobility management. So the proposed architecture is suitable for mostly 5G wireless system.

VI. REFERENCES

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