# Revolutionary Technology of 2020 The 5g - Survey

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***Abstract - The provisioning of higher end-user data and assorted market demands are making a tremendous pressure on the present wireless network system. The requirement of higher speed, minimized bit-error rate, high signal quality and various multi-media function have become a new challenge for researchers , engineers etc. This paper is about the scope of 5G wireless communication, propound transmission techniques combination of Network Function Virtualization, Software Defined Radios and Software Defined Networks.***

***Keywords – OFDM, OFDMA, NFV, SDN, SDR.***

## 1. INTRODUCTION

The wireless communication is going through an phase of treemndous changes from the past two decades, diversified functions other than calling and receiving a call has become a new demand.The basic need for the fulfilment of these diversified functions are high speeds, high SNR, minimum bit-error rate etc.,the heterogenity of wireless5G networks will be a cahllenge for network operators which can be solved only when cost-efficient and energy saving solution will be developed.

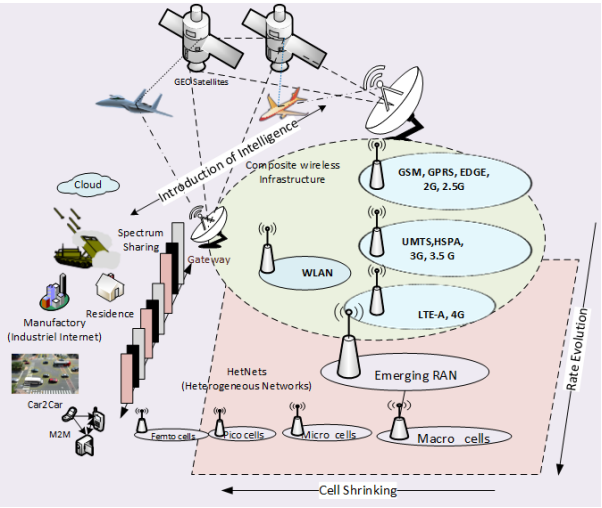


Fig.1 wireless architecture

## 2. THE ERA OF 5G

This is a new technology which will need a very high carrier frequency with unwieldy bandwidth, high densities of transmitting and receiving antennas. Also the 5G should be more interactive.

In recent years, preliminary interest and discussion has been developed about a possible and reliable 5G standard such that they can be evolved into a full-fledged communication that has captured the attention and imagination of researchers, engineers all around the world. [1]

The long-term evolution (LTE) system are epitomizing 4G has now been set out and is achieving a matured state where is a little margin of improvement in spectrum can be expected. We introduce some new paradigms to solve the above issues which includes three factors basically i.e. network function virtualization (NFV), software defined radios (SDRs) and software defined network (SDN) [2], therefore it will be necessary to fulfill these demands by using above three factors that will make 5G more efficient, intelligent and smart technology. Academia is also showing interest in projects which combine MERIS [3] and other very demanding technology the 5GNOW [4].

## 3. COMBINATION OF NFV, SDN, SDR

The combination of NFV, SDR and SDN is a first step for the implementation and setting a stage for protocols, but it does not mean that it will cover all the aspect due to some practical limitations, but still very useful for the researchers and scientists.

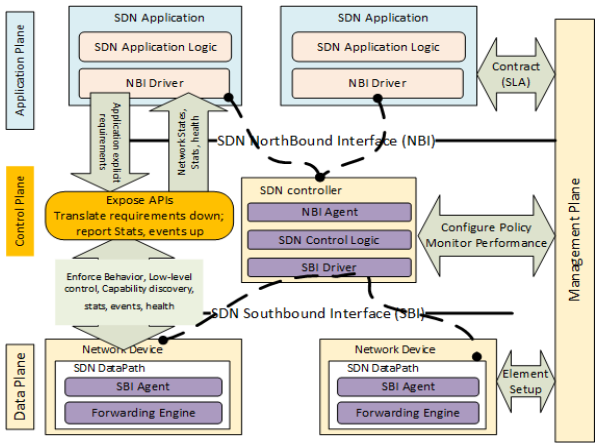


Fig.2 SDN Architecture

SDN provide such an environment for telecom software developers to control network resources in the simplified manner way as ordinary computing resources[5].The Control plane is separated from data plane, also open air interfaces between central controller and forwarding of packet through devices is done by SDN. The extension of SDN to satellites would provide an attractive perspective for the SatCom community. NFV employs IT virtualization technology to maps multiple network equipment types on to the standards of industry such as high volume servers with large data handling capacity , switches and storage devices.[6]

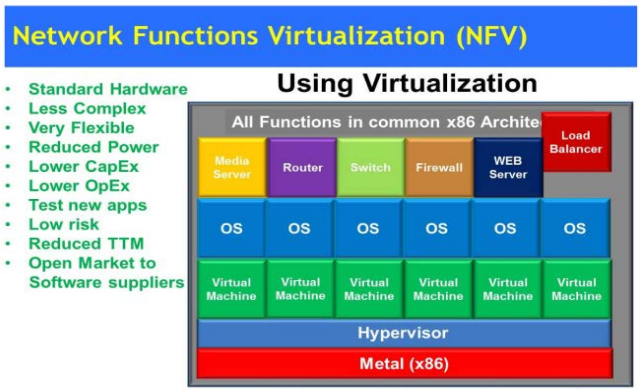


Fig.3 Network Function Virtualization

This will help the network operators for creating architecture of network that will help network services to make compatible with standard devices. The main element of NFV is that it enables new network function without the installation of hardware equipment for every new service, that will result in the reduction of cost.

The SDR focuses on the implementation of many modes by simply reconfiguring the radio with different software, these software helps in the reconfiguration of network, the key point is that the software may be pre-loaded in the device or can be downloaded through fixed data links or over-the-air (OTA).[7]

This was first used in military communication system propitiously and now will be made available for general customers.

## 4. CARDINALS OF 5G

The requirements of 5G are very clear-cut . The important thing is that each application will have different requirements in the context of data-rate, performance. If we discuss about requirements of 5G then only three consideration comes in mind at first instant they are:-

- *Consideration of Data Rate:* - In general, it is supposed that aggregate data rate for 5G will be increased up to 1000 times from 4G network. Also the consumer can expect to receive lowest rate up to 5% this rate is also called as Edge Rate.

- *B. Consideration for Latency:* In current scenario 4G round trip latencies are of the order of approximately 15 ms and are based on the 1ms sub frame time with necessary overheads for resource allocation and access.[8]

  This latency can fulfil the requirement of most of the current services anticipated 5G applications include two- way gaming, and merging it with advanced technology like cloud-computing can enhance their performance.

- *C. Energy and Cost Consideration:* In 5G the main consideration is reduction of energy and cost. These both parameters should not be increased beyond certain, otherwise it will result in the increment of the cost, therefore effort should be made so that there should be no extra load on the customers.

## 5. 5G DEVELOPMENT SCENARIOS

In 3G network we used W-CDMA technology which is successfully succeeded by the OFDM and OFDMA. The noticeable point about OFDMA is its ability to handle multipath distortion, also the orthogonality of subcarriers help in the elimination of intercell interference. [9]

This will generate the possibility for adaptation of transmitted power and modulation cardinality and with the ease of integrating it with multi antenna hardware both at transmitter and receiver.

The main drawback of OFDM is the spectral efficiency which is limited by the need of Cyclic Prefix and because of its larger side lobes which require some null guard create disturbances at the spectrum edges i.e. at the transition side, OFDM signals can exhibit large peak-to -average power ratio values [10].

These both technologies i.e. OFDM and OFDMA are the modulation techniques and multiple access strategy that are adopted by the LTE 4g cellular network standards and are much efficient then W-CDMA which is used in 3G wireless communication systems . [11]

The main strategy behind developing such a system is the synchronization which plays a vital role in the uplink of a cellular network because in such a efficient network different mobile terminals transmit separately [12] , the same efficiency is also required in the downlink where base station co-ordination is used [13].

## 6. CONCLUSION

This paper clearly indicates that the combination of NFV, SDR and SDN is very important so that the defining of protocols can be done which will result in making system less complex and user friendly. Secondly we have to develop the new techniques, algorithm, for transmission of data in such a way that it will overcome the shortcomings of OFDM and OFDMA. This can be done only when LTE (Long Term Evolution) system are made more efficient .Thirdly we have to make the 5G technology compatible with the existing devices so that there should be the reduction of energy and cost.

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