

PERCEPTIONS OF PRESENT AND FUTURE WIRELESS NETWORKS

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ABSTRACT

In 1983 the first field trial of a cellular wireless system was conducted in Chicago. This system was purely analog and carried one voice channel in 15 KHz of carrier bandwidth. It was a landmark achievement since it allowed people to communicate while on the move. Since then a lot of progress has been made. Currently 4th Generation LTE (Long Term Evolution) and Advanced LTE systems are being deployed around the world. These systems can handle up to 20MHz of bandwidth and can deliver up to 300Mb/sec peak rate to the user. The Advanced LTE systems deploy carrier aggregation on the down link to increase the peak bit rate up to a factor of 3 and thus increasing the peak bit rate of LTE system from 100Mb/sec to 300Mb/sec.

The initial objective of broadband system was to achieve a peak bit rate in the downlink in excess of 1Gb/sec. 4th generation systems could not achieve that objective. Next generation systems, called 5G are under development in various laboratories and should be available In 2018 to 2020.

In terms of core network architecture, 3GPP Standard body defined a packet architecture which (1) simplified network architecture from 3G,(2)all IP network supports higher throughput and low latency radio access networks. It also allows supports for and mobility between multiple heterogeneous networks. It consists of Mobility Management Entity, Serving Gateway and PDN gateway components.

The core network architecture of 5G networks is expected to follow the same architecture.

The future applications of wireless systems are expected to grow beyond mobile services where people exchange high speed data and video while moving at very high speeds as well as providing interconnectivity to Internet. The new emerging services will be dominated by self- driving cars where you need connectivity to data centers

This talk will present major aspects of access design for both 4G and 5G, discuss salient features of core network . Towards the end we will explore new emerging applications beyond current mobile communications.

