Assignment 9. [43212]

* Title:- Case study of cellular Network.

* Problem Statement:- Case study: Evolution of cellular networks all the way upto 7G.

* Theory:

Wireless Communication:

It is the transfer of information over a distance without the use of physical conductors or wires. The distance may be short (a few meters: TV remote control) or long (thousand of million kilometers for ~~rem~~ radio communication).

There are several generations namely from 0G to 4G. 5G is currently under development.

→ key benifits of developing cellular system are:-

i) Require minimal bandwith and enhance customer satisfaction.

ii) Wireless networks are cheaper to intall & setup as compared to world networks.

iii) Duplexing allows users to send and receive information at the same time through a single radio link.

i) Zero Generation Technology (0G - 0.5G)

In the pre-cell days, a mobile operator setup calls and there were only a handful channels available. Mobile radio telephone systems preceded by modern cellular mobile technology

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These systems are known as the 0G systems.
- Technologies included here are PPT (Push to talk) MTS (Mobile Telephone System) IMTS (Improvement Mobile Telephone System) AMTS (Advanced Mobile Telephone System)

ii) 1st Generation Technology or 1G:-
- It is the first generation wireless telephone tech, and all tech is analogy.
- A voice call gets modulated to a higher frequency of about 150 MHz and it transmitted between radio towards with the help of 1G.
- Technology used in 1G systems are NMT (Nardisk Mobile Technology). AMPS (Advanced mobile phone service) and CDPD.

• Features of 1st generation.

Generation : 1G (1970-84).
Frequency : 800-900 MHz.
Data Capacity : 2 kBPS.
Technology : Analog, Wireless.

iii) 2nd Generation technology:
- 2G was first introduced by the end of 1980s. This generation was completely digital multiple access of technology.
- TDMA (Time division Multiple Access) and CDMA (Code Division Multiple Access)

* Features of 2G, 2.5G and 2.75G.

Generation	2G	2.5G and	2.75G.
i) Inception	1990	2000	2003
ii) Frequency	850-1900	850-1900	850-1900
iii) Data Capacity	10kBPS	200kBPS	473 kBPS
iv) Technology	Digital wireless	GPRS	EDE.
v) Standard	CDMA, IDMA supported GSM	IDMA, GSM	GSM, CDMA

iv) 3rd Generation technology (3G-3.75G).

It is the third generation of Mobile phone standards and technology, superseding 2G and 4G. It is based an ITU family of standard under the IMT-2000.

* Features of 3G, 3.5G and 3.75G.

Generation	3G	3.5	3.75.
i) Inception	2001	2003	2003
ii) Frequency	1.6-2.5GHz	1.6-2.5GHz	1.6-2.5 GHz.
iii) Data Capacity	384 kBPS	2MBPS	30MBPS
iv) Technology	Broadband IP Technology	GSM/3GPP	
v) Standard	CDMA/WCDMA	HSDPA/HSOPA	1XEVPD

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v) Forth Generation Technology (4G)
- It is the successor to 3G. It is a network that combines internal technology with Wifi and Wimax.

Features of 4G :-

Generation	4G
Inception	2010
Frequency	2.8 GHz
Data Capacity	200 Mbps - 1 Gbps
Technology	LTE, Wi-max.
Standard	IP-broadband LAN/WAN/PAN
Multiplexing	MC-CDMA, OFAM.
Switching	Packet
Main n/w	Internet
Hands off	Horizontal & Vertical.

vi) Fifth Generation (5G):-
- It is an upcoming generation which attempts to achieve the following:
  i) Lower Battery Consumption.
  ii) Better data coverage.
  iii) High security.

5G will support all the above mentioned features by using only one internet device and interconnecting most of the existing infrastructure.

Generation	5G
Inception	2015.
Data capacity	Higher than 1 Gbps.
Technology	IPV6
Standard	IP broadband Connec
Multiplicity	CDMA.
Switching	All packet.
Service	Dynamic information acces
Main N/W	Internet.
Hand off	Horizontal & vertical

vii) Sixth Generation Technology (6G):-

- 6G will integrate 5G and satellite N/W communications, satellite will be used for voice, data, internet, the Earth imaging satellite N/W help in environment data collection. the navigational satellite is used for GPS.
- In 6G Technology, hand off and remaining will be big issue.

viii) 7th Generation Technology (7G):-

- It will be the most advanced generation in mobile communication network. It will be like 6G for global coverage. but it will also define satellite function for mobile communications.

* Conclusion:-

Hence, this case study has helped me understand the evolution of cellular network. from 0G to 7G.