5G MOBILE TECHNOLOGY

Seminar

Guided By
EEE Dept

By
VIPINLAL.T

INTRODUCTION

- stands for 5th Generation Mobile technology.
- Next major phase of mobile telecommunication standard
- It would ideally answer the challenges that a 4G model would present.
- 5G Technology will change the way by which users access their mobile phones.

Contents

- Evolution from 1G To 5G Networks.
  - > 1G Wireless Technology
  - > 2G Wireless System
  - >3G Wireless System
  - > 4G Wireless system
- 5G Mobile Technology

Contents

- Advantages of 5G technology
- Architecture of 5G Technology

  >Aggregator

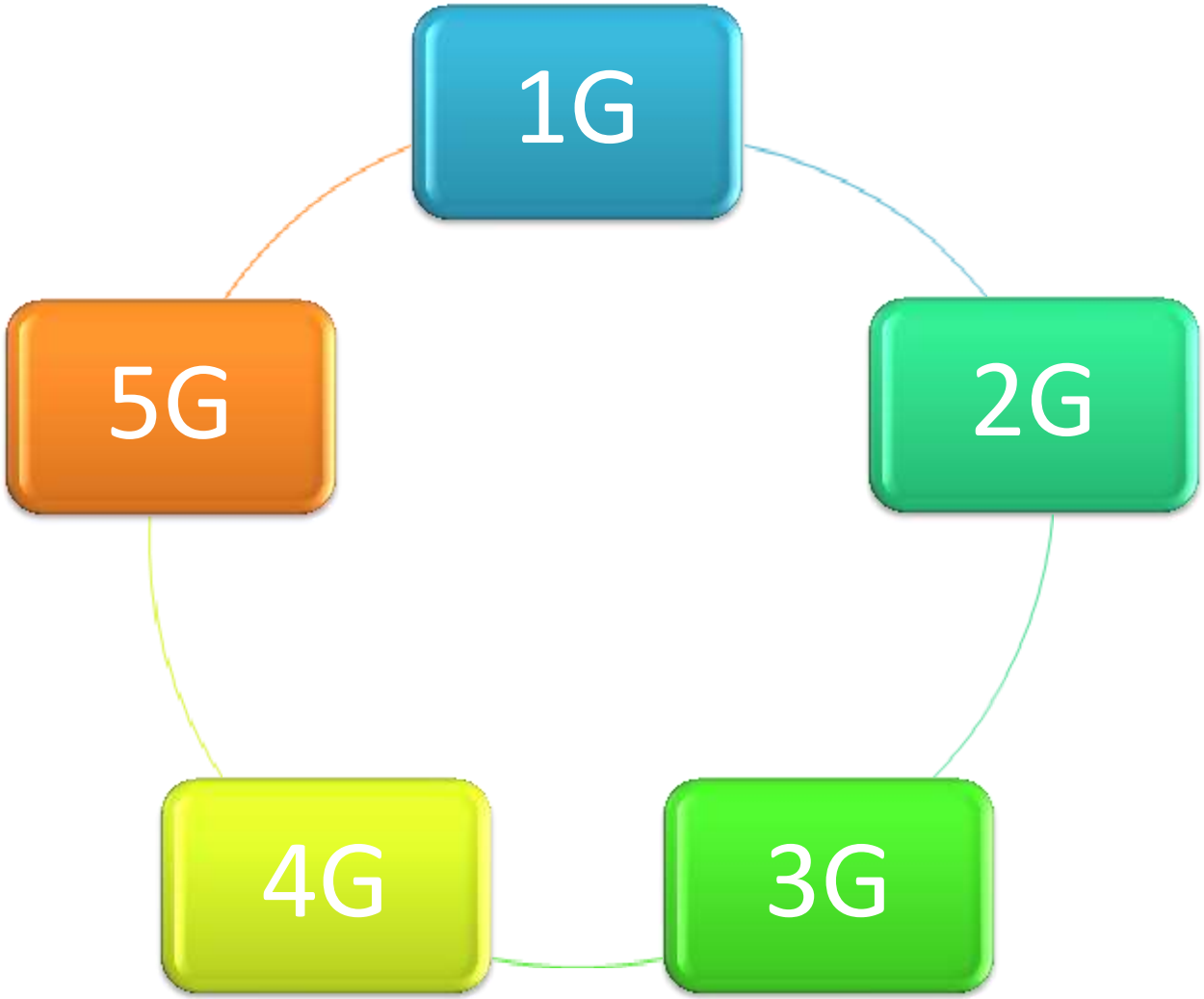
  >Flatter IP concept

  >5G: Nano Core

Contents

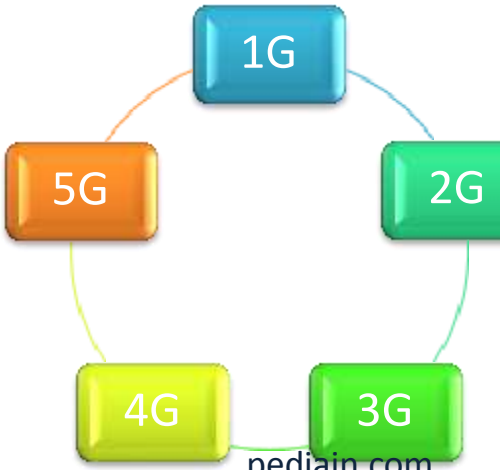
- DESIGN OF 5G MOBILE NETWORK ARCHITECTURE
- Comparision from 1G to 5G Technology.

Evolution from 1G to 5G networks



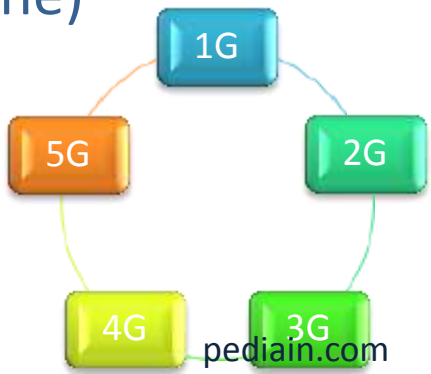
..

- 1G, 2G, 3G & 4G are the generations of wireless telecom connectivity.
- 1G : initial wireless telecom network system.
- “Brick phones” and “Bag phones” are under 1G technology.
- Analog signals are used in 1G.
- 2G is launched in 1991



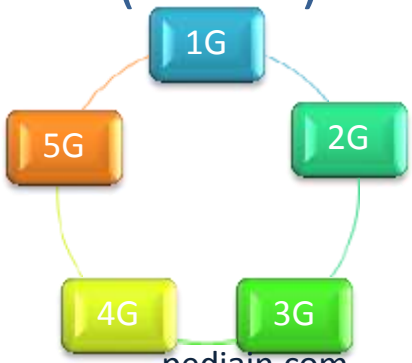
1G Mobile Technology

- Analog voice-only cellular telephone standard.
- 1G networks use analog signals.
- Voice itself during a call is only modulated to higher frequency(≈150 MHz)
- Speed of 1st generation of analog cell phones is up to 2.4kbps.
- Allows users to make voice calls in 1 country.
- 1G standards
- » NMT (Nordic Mobile Telephone)
- » AMPS (Advanced Mobile Phone System)



2G Mobile Technology

- Commercially launched on the GSM standard in Finland (1991).
- 2G network allows for much greater penetration intensity.
- Provide the services such as text messages, picture messages and MMS.
- Text messages are digitally encrypted.
- 2G uses either time division multiple access (TDMA) or code division multiple access (CDMA).
- GSM technology help to establish international roaming.
- Speeds up to 64kbps



3G Mobile Technology

- Make use of TDMA and CDMA
- The spectral efficiency of 3G technology is better than 2G technologies
- Transmission speeds from 125kbps to 2Mbps.
- Data are sent through technology called packet switching .
- High clarity in Voice calls.
- Applications: Mobile T.V, Video Conferencing, Video Calls, MMS, 3D gaming, Multi-Gaming

4G Mobile Technology

- 4G should be able to provided very smooth global roaming with 4G Mobile Phone.
- It offer both cellular and broadband multimedia services everywhere.

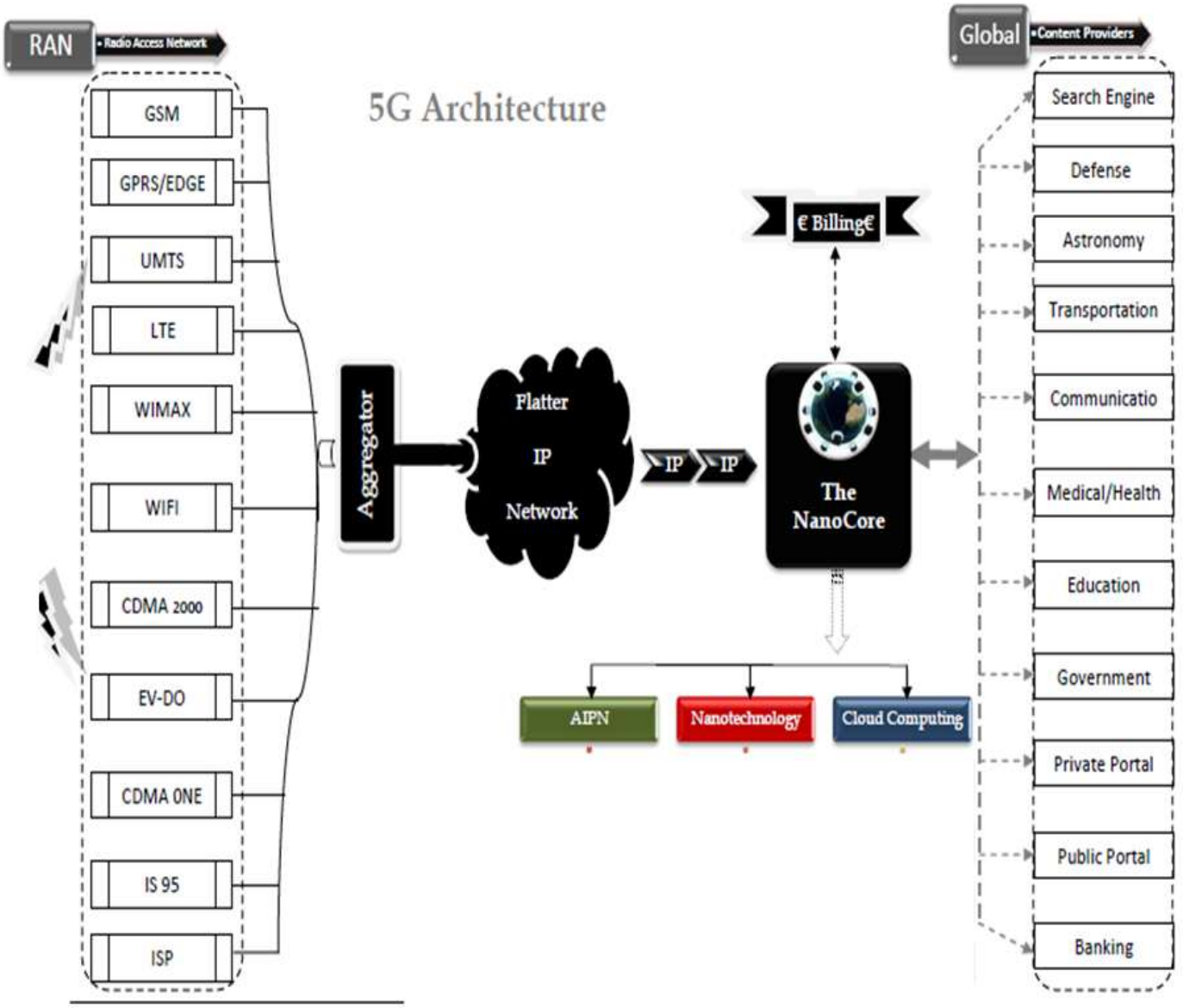
5G Mobile Technology

- stands for 5th Generation Mobile technology.
- Wearable devices with AI capabilities.
- One unified global standard.
- ubiquitous computing: user can simultaneously be connected to several wireless access technologies
- The advanced billing interfaces of 5G technology makes it more attractive and effective.
- 5G technology is providing large broadcasting of data in Gigabit which supporting almost 65,000 connections.

5G Mobile Technology

- 5G technology offer transporter class gateway with unparalleled consistency.
- Through remote management offered by 5G technology a user can get better and fast solution.
- The 5G technology is providing up to 25 Mbps connectivity speed.
- The 5G technology also support virtual private network.
- 5G Wireless uses OFDM and frequency band of 2-8 GHz.
- capable of supporting wireless World Wide Web (wwww).

5G Mobile Technology



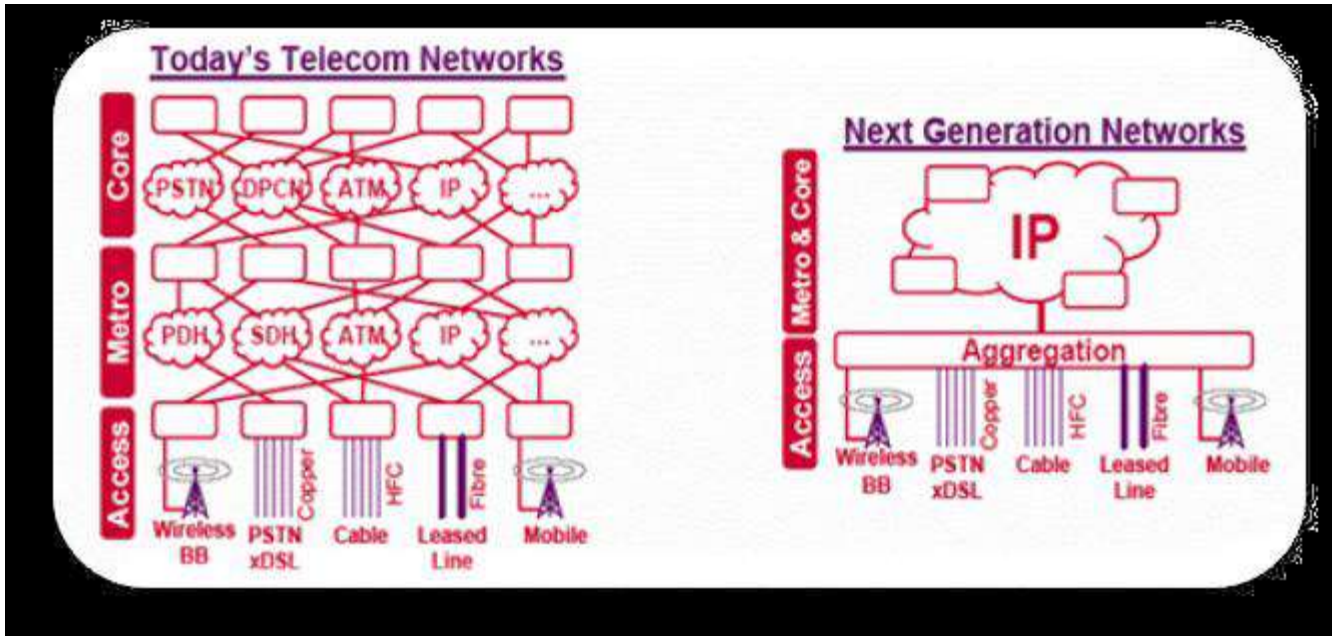
5G Mobile Technology

- 5G Network uses Flat IP Concept to make it easier for different RAN to Single NanoCore
- Flat IP Network is the key concept to make 5G acceptable for all kind of technologies
- Flat IP Architecture provides a way to identify devices using symbolic names Unlike the hierarchical architecture such as that used in normal IP addresses.

Flat IP Architecture

- Reduce the number of Network elements in the data path to lower operation cost and capital expendicture.
- Minimise the system latency and enable applications with a tolerance for delay.
- Create a platform that will enable mobile broadband operators to be competitive.

5G Aggregator



Existing telecom networks traffic is aggregated at aggregation point (BSC/RNC) and then routed to gateways.

Design of 5G Mobile Technology

- Fig shows Network

Architecture for 5G

- Which is all IP based

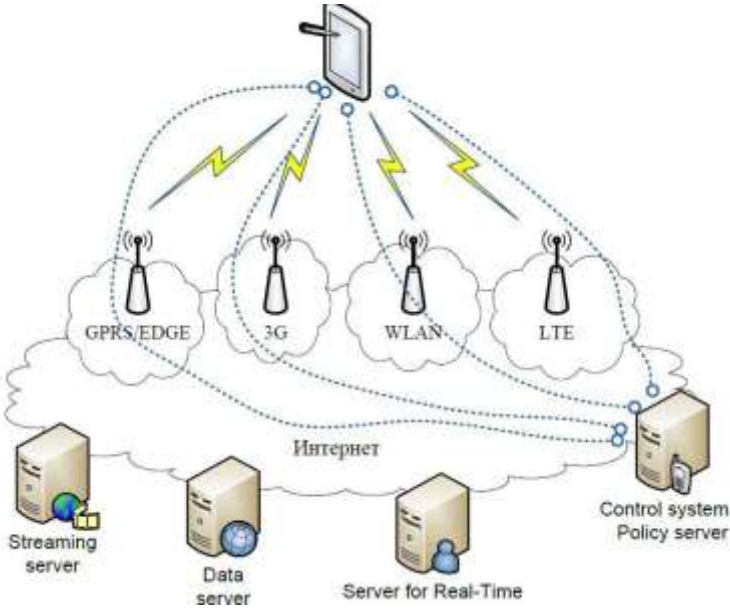
Model for wireless and mobi

Network interoperatability.

- System uses a terminal

And number of independent

Access technologies.



- Each of the radio access

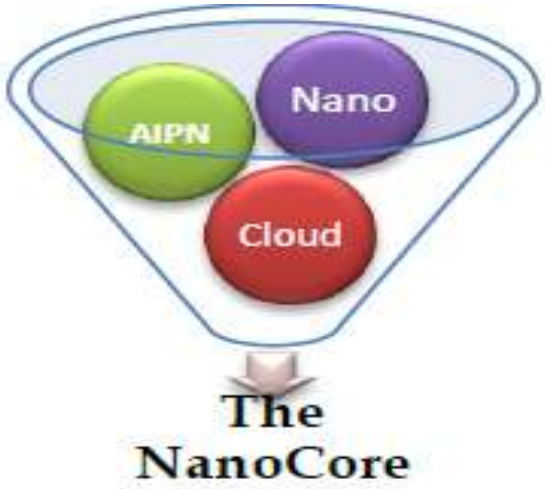
Technologies seen as the IP link to the outside internet world

- There should be different radio interface for each Radio Access Technology(RAT) in the mobile terminal.

5G Architecture The Nanocore

5G Nanocore is the convergence of beloew mention technologies.

- Nanotechnology
- Cloud Computing
- All IP architecture



Nanotechnology

- It is the appliction of Nanoscience to control process on nanometer scale. (0.1 and 100nm)
- The field is also known as MNT
- MNT deals with control of structure of matter based on atom by atom
- Nanotechnology has shown its impact on both mobile as well as core Network.

Nano Equipment

- In 5G Nanocore these mobile are referred as Nanoequipment as they are geared up with Nanotechnology.
- With the help of Nanotechnology 5G will became more intelligent.
- Computation and communication always available to the user in an Intelligent way
- Mobile devices together with the intelligence that will be embedded in human enviorments
- Eg: Home, Office, Public places
- It will create a new platform that enables sensing, computing, and communication

Nanoequipment Specification

- Self caning
- Self Powered- Derives Energy from sources
- Sense the enviorment : Weather, Air Pollution
- Flexible : Can be bend
- Transperent

Cloud Computing

- It is a technology that uses the Internet and central remote server to maintain data and applications.
- In 5G network this central remote server is our content provider.
- Cloud computing make our user to obtain much more real time application to utilize 5G network efficiently.
- It allows consumers and business to use applications without installation and access their personal files at any computer with internet access.
- Same concept used in the nanocore user access their private account from a content provider hrough nanocore in form of cloud

Cloud Computing

- Cloud computing customer avoids capital expendicture for the physical infrastructure by renting the usage from the third party provider.

All IP network

- Its a common platform to interct with all these technologies.

- Lower costs
- Universal access
- Improved user experience.

5G Mobile Technology

- Applications
- Our mobile can share the work load.
- If you can able to sense Tsunami/earthquake before it occurs.
- Mobile phone get cleaned by its own.
- you can able to fold your mobile as per your desire.
- Able identify your stolen mobile with nanoseconds
- mobile can able to suggest you possible medicine as per your healthiness.

Comparison of Mobile Technologies

Technology / Features	1G	2G/2.5G	3G	4G	5G
Start/ Deployment	1970/ 1984	1980/ 1999	1990/ 2002	2000/ 2010	2010/ 2015
Data Bandwidth	2 kbps	14.4-64 kbps	2 Mbps	200 Mbps to 1 Gbps for low mobility	1 Gbps and higher
Standards	AMPS	2G: TDMA, CDMA, GSM 2.5G: GPRS, EDGE, 1xRTT	WCDMA, CDMA-2000	Single unified standard	Single unified standard
Technology	Analog cellular technology	Digital cellular technology	Broad bandwidth CDMA, IP technology	Unified IP and seamless combination of broadband, LAN/WAN/ PAN and WLAN	Unified IP and seamless combination of broadband, LAN/WAN/PAN /WLAN and wwww
Service	Mobile telephony (voice)	2G: Digital voice, short messaging 2.5G: Higher capacity packetized data	Integrated high quality audio, video and data	Dynamic information access, wearable devices	Dynamic information access, wearable devices with AI capabilities
Multiplexing	FDMA	TDMA, CDMA	CDMA	CDMA	CDMA
Switching	Circuit	2G: Circuit 2.5G: Circuit for access network & air interface; Packet for core network and data	Packet except circuit for air interface	All packet	All packet
Core Network	PSTN	PSTN	Packet network	Internet	Internet
Handoff	Horizontal	Horizontal	Horizontal	Horizontal and Vertical	Horizontal and Vertical

Conclusion

- 5G is the best mobile technology for data transfer and calling purpose.
- 5G would introduce Artificial Intelligence to mobile telecommunication.

References:

- 1 . A review on 5G Technology, International Journal of Engineering and Innovative Technology
- 2. 5G : Future Mobile Technology, International Journal of Computer Applications.
- 3. Functional Architecture of 5G Mobile Network, International Journal of Advanced science and Technology
- 4. The 5G Nanocore, by Imthiyaz Ali
- 5. Google.com

Questions