4G Technology

4G Definition

- 4G is not one defined technology or standard, but rather a collection of technologies at creating fully packet-switched networks optimized for data.

- 4G Networks are projected to provide speed of 100Mbps while moving and 1Gbps while stationary.

0G (Zero Generation Mobile System)

- At the end of the 1940's, the first radio telephone service was introduced, and was designed to users in cars to the public land-line based telephone network.

- In the 1960's, a system launched by Bell Systems, called, Improved Mobile Telephone Service (IMTS), brought quite a few improvements such as direct dialing and more bandwidth. The very first analog systems were based upon IMTS and were created in the late 60s and early 70s.

1G Technology

- 1G refers to the first-generation of wireless telephone technology was developed in 1970's.

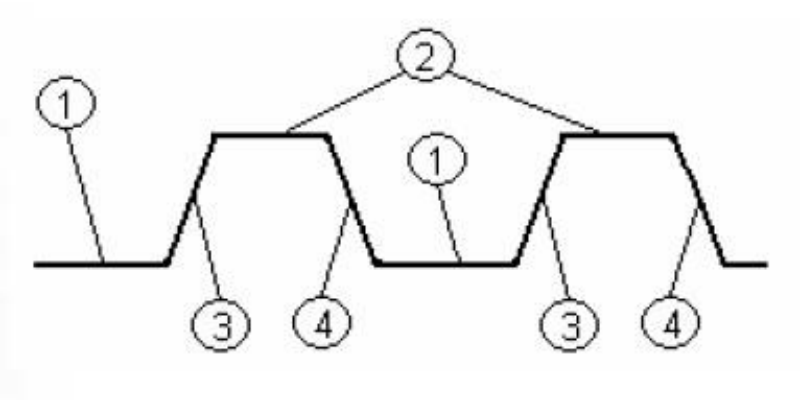
- 1G had two major improvements:
  - the invention of the microprocessor
  - the digital transform of the control link between the phone and the cell site.
- Analog signal

2G Technology

- Around 1980’s
- Better quality & capacity - More people could use there phones at the same time
- Digital Signals – consist of 0’s & 1’s

Previous Technology - 2G

- Digital – consist of 0’s and 1’s
- Digital signal:
  - 1.Low level, 2.High level, 3.Rising edge and 4.Falling edge



Previous Technology - 2G

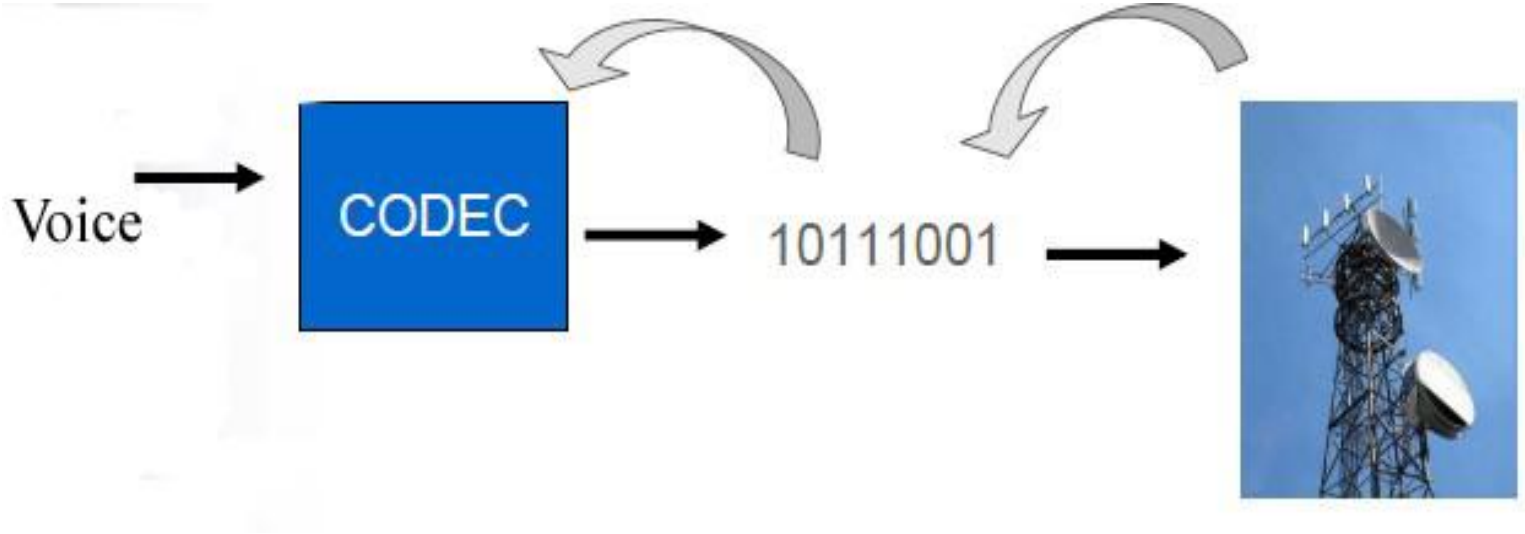
- Digital data can be compressed and multiplexed much more effectively than analog voice encodings
- Multiplexing -multiple analog message signals or digital data streams are combined into one signal
- For 1 and 2G standards, bandwidth maximum is 9.6 Kbit/sec, (I.E) approximately 6 times slower than an ISDN

Previous Technology - 2G

- Allows for lower powered radio signals that require less battery

- Power–CODEC introduction -program that encodes and decodes digital data stream or signal
  - Translates data from digital to analog and vice versa

Previous Technology - 2G



Advantages in Previous Technology - 2G

- The digital voice encoding allows digital error checking
  - increase sound quality
  - lowers the noise level
- Going all-digital allowed for the introduction of digital data transfer
  - SMS –“short message service”
  - E-mail

Disadvantages in Previous Technology - 2G

- Cell towers had a limited coverage area
  - Jagged Decay curve
    - Abrupt dropped calls
    - Analog –gradual sound reduction
- “Spotty” coverage

3G Technology

- Large capacity and broadband capabilities
- Allows the transmission of 384kbps for mobile systems and up to 2Mbps
- Increased spectrum efficiency –5Mhz
  - A greater number of users that can be simultaneously supported by a radio frequency bandwidth
  - High data rates at lower incremental cost than 2G–Global roaming

Previous Technology - 3G

- CDMA –Code Division Multiple Access
  - Form of multiplexing
  - Does not divide up the channel by time or frequency
  - Encodes data with a special code associated with each channel

Code Division Multiple Access