

4G TECHNOLOGIES

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Introduction

The first commercial mobile networks were launched in the mid-1980s. Since then the mobile communication world had been witnessing rapid changes.

First generation US universal coverage used Classic Wire line MaBel Public switched telephone network (PSTN) along with a diversified cellular architecture and use of analog signals pertaining features like speech and TAC (type allocation codes).

Second generation wireless supported more users within a cell with digital technology which allowed many users to use a multiplexed channel. This was however more focused on making global roaming realistic. But this was still meant for speech and not data.

2.5G allowed the carriers to increase the data rates with a minimum software upgrade at base transceiver stations (BTS). Still the data transmission speed was low. It supported techniques like GPRS, EDGE, etc.

The inadequacy in case of existing bandwidth and multimedia services pumped 3G networks in market infrastructure. This technique was based on radio interface. It offered significant user benefits including high quality wireless multimedia to a convergent network of fixed, cellular and satellite components.

It involved techniques like evolution to all IP networking including VOIP, CDMA 2000/WCDMA, WiMAX, Hyper LAN, etc.

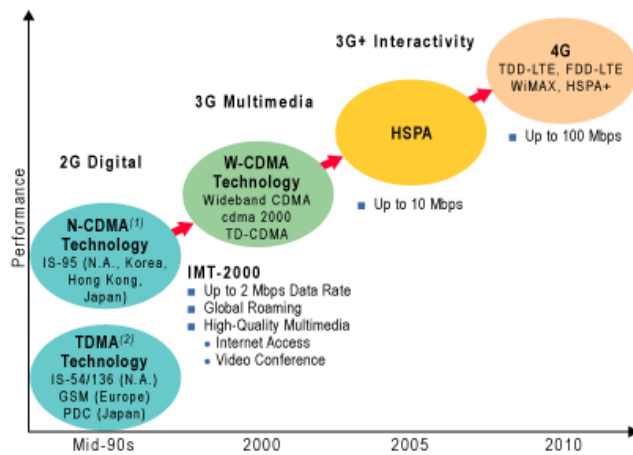
4G v/s Pre-4G-TABLE

Attributes	1G	2G	3G	4G
Major Character- istics	Only voice data	Voice & small text data like sms	Voice & multi Media data	Converged Data & VoIP
Data Rate	-	9.6kbps	385kbps-2Mbps	20-100Mbps
Switching	packet	Packet	Circuit/ Packet	Packet
Speed Ratio	-	1	20	200
Network Archite- cture	Cellular	Cellular (access by BTS)	Wide area cell based	Hybrid-integration of LAN (Bluetooth, wide area)
Access	AMPS, TAC'S	FDMA, TDMA, GSM, PDC	WiMAX, WIFI, Hyper LAN, CDMA, WCDMA	MC-CDMA, OFDM
Operat- ional Duration	1980's	1990 onwards	~2004	~2011

Why we need 4G

4G is a wireless ad hoc peer to peer networking basically meant to accommodate QoS (quality of service). The brilliant comprehensive solutions provided over sluggish pace of 3G has set 4G's developments to use its achievements in areas of wireless technology. Some more fields of its excellence are:

- ✓ 4G overcome the shortcomings of 3G like issue of available bandwidth along with the followed past issues like global roaming and network scalability.
- ✓ Through this upcoming technology we may access mobile intelligent internet options.
- ✓ It is a fully IP based integrated system.
- ✓ Provides premium quality of data and high security.
- ✓ It is capable of providing 100Mbps and 1Gbps for both outdoors and indoors.



4G Components

A. Access schemes

It uses access schemes like OFDMA, SC-FDMA, MC-CDMA, Interleaved FDMA with 3GPP-LTE.

B. IPv6 Support

Used to connect a number of wireless enabled devices without NAT.

C. Advanced antennae systems

Multiple antenna technologies are used to achieve high rate, high reliability and long communication range.

D. Software Defined radio (SDR)

Standards constituted by a 4G device can be realized using SDR.

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