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Emerging Trends in Wireless Communication over Few Decays

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Abstract

Wireless communication technology has recently attracted a significant amount of attention. It makes unprecedented growth and revolution for a society. With the recent growth in wireless communication, the importance of wireless communications in emergency response has expanded it to offer standardized technologies for wide area network, metropolitan area network, and local area network. Moreover wireless technologies not only offer significant benefits over wired, but also more suitable for remote end applications. This paper throws light on the evolution and development of various generations of mobile wireless technology in past decay along with their significance advantages of one over other .Some of the emerging trends in wireless communication have been discussed in brief. This paper gives an overview of some of the Emerging Trends in Wireless Communication over Few Decays.

Keywords: Wireless communication, Mobile Communication, Emerging Trends GSM, 1G, 2G, 3G, 4G, 5G.

Introduction

Unguided media transport electromagnetic waves without using a physical conductor; this type of communication is often referred as wireless communication. India is the fastest and second largest growing market for wireless communication. A wireless mobile communication network enables users equipped with mobile terminals to initiate and receive phone calls. This capability is referred as cellular telephony .it includes many services based on transmission of data and multimedia. GSM mobile and CDMA networks for wireless local loop as well as for complete mobility have come in a big way in urban areas. Mobile wireless industry has started its technology creation, revolution and evolution since early 1970s. In the past few decades, mobile wireless technologies have

Experience 4 or 5 generations of technology revolution and evolution, namely from 0G to 4G. The cellular concept was introduced in 5G Technology stands for 5th Generation Mobile technology. 5G technology has changed the means to use cell phones within very high bandwidth. User never experienced ever before such a high value technology. Nowadays mobile users have much awareness of the cell phone (mobile) technology. The 5G technologies include all type of advanced features which makes 5G technology most powerful and in huge demand in near future.

Communications in India

It is the second largest network in the world based on the total number of telephone users which has lowest call tariff. Some major telecom operators in India include Airtel, Vodafone, Idea, Aircel, BSNL, MTNL, Reliance Communications, TATA Teleservices, In MTS, Uninor, TATA DoCoMo and Videocon. Telecommunication includes telephony, internet and Television. Telecommunication in India has greatly been supported by the INSAT system of the country, one of the largest domestic satellite systems in the world. India possesses a diversified communications system, which links the all parts of the country with radio, telephone , television and satellite.

Global System for Mobile Communication (GSM)

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz The GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS). **BSC**—The BSC provides all the control functions and physical links between the MSC and BTS. It is a high-capacity switch that provides

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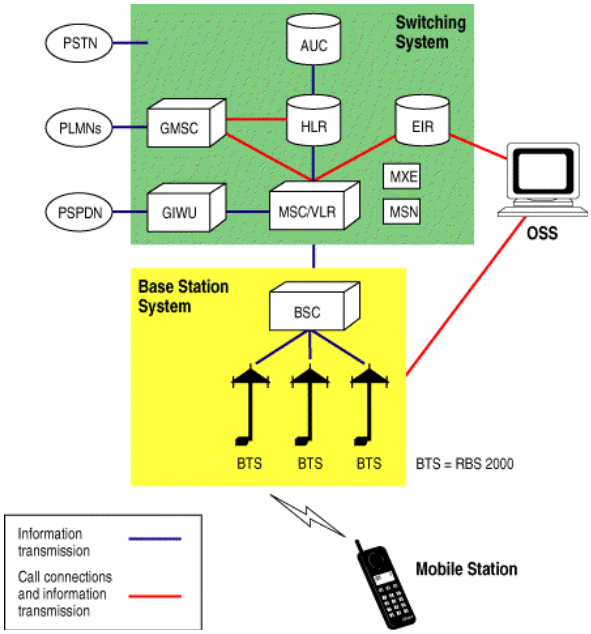
functions such as handover, cell configuration data, and control of radio frequency (RF) power levels in base transceiver stations. A
Number of BSCs is served by an MSC.

The Switching System

The switching system (SS) is responsible for performing call processing and subscriber related functions. The switching system includes the following functional units:



Home location Register (HLR)

The HLR is a database used for storage and management of subscriptions. The HLR is considered the most important database, as it stores permanent data about subscribers, including a subscriber's service profile, location information, and activity status. When an individual buys a subscription from one of the PCS operators, he or she is registered in the HLR of that operator.

Mobile services Switching Center (MSC)

The MSC performs the telephony switching functions of the system. It controls calls to and from other telephone and data systems. It also performs such functions as toll ticketing, network interfacing, common channel signaling, and others.

Visitor Location Register (VLR)

The VLR is a database that contains temporary information about subscribers that is needed by the MSC in order to service visiting subscribers. The VLR is always integrated with the MSC. When a mobile station roams into a new MSC area, the VLR connected to that MSC will request data about the mobile station from the HLR. Later, if the mobile station makes a call, the VLR will have the information needed for call setup without having to interrogate the HLR each time.

Authentication Center (AUC)

A unit called the AUC provides authentication and encryption parameters that verify the user's identity and ensure the confidentiality of each call. The AUC protects network operators from different types of fraud found in today's cellular world.

Equipment Identity Register (EIR)

The EIR is a database that contains information about the identity of mobile equipment that prevents calls from stolen, unauthorized, or defective mobile stations.

The AUC and EIR are implemented as stand-alone nodes or as a combined AUC/EIR node.

First Generation (1G) to Fifth Generation (5G)

- **The First Generation(1G)**

1G mobile phones were based on the analogue system. The introduction of cellular systems in the late 1970s was a quantum leap in mobile communication, especially in terms of capacity and mobility. Semiconductor technology and micro processors made smaller, lighter, and more sophisticated mobile systems a reality.

However, these 1G cellular systems still transmitted only analogue voice information The prominent ones among 1G system were advanced mobile phone system (A M P S), Nordic mobile telephone(N M T), and total access communication system (T A C S). With the introduction of 1Gphones,mobile market showed annual growth rate of 30 to 50%, rising to nearly 20 million subscribers by 1990.

- **The Second Generation (2G)**

The existing mobile network consists of the radio access network (comprising cells and backhaul communications) and the core network(comprising trunks ,switches, and servers) .Mobile switching centers (MSCs) are intelligent servers and the whole network is data-driven, using subscription and authentication information held in the home location register(HLR) and authentication centre (AuC) .The standard services include circuit-switched voice, fax, and data, as well as voicemail and voicemail notification. Additional services include wireless application protocol(WAP), high-speed circuit-switched data (HSCSD),mobile location services(MLS), and cell broadcast You can change to a new operator keeping your old phone number.

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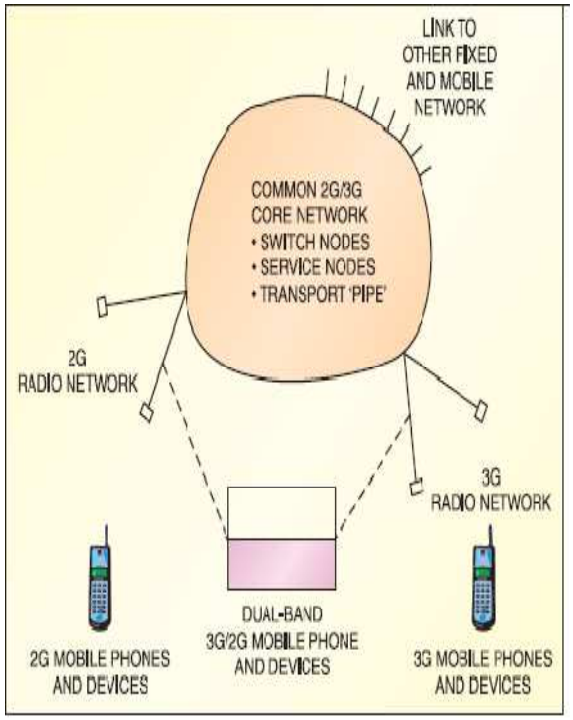
- **The third generation(3G)**

The 3G technology adds multimedia facilities to 2G phones by allowing video, audio, and graphics applications. Over 3G
phones, you can watch streaming video or have video telephony. The idea behind 3G
is to have single network standard instead of the different types adopted in the U.S, Europe, and Asia. These phones will have



the highest speed of up to 2Mbps, but only indoors and in stationary. 3G cellular services, known as Universal Mobile Telecommunications System (UMTS) or IMT-2000, will sustain higher data rates and open the door to many Internet style applications.

The main characteristics of IMT-2000 3G systems are:

1. A single family of compatible standards that can be used worldwide for all mobile applications.

2. Support for both packet-switched and circuit-switched data transmission.

3. Data rates up to 2 Mbps (depending on mobility).

4. High spectrum efficiency. IMT-2000 is a set of requirements defined by the International Telecommunications Union (ITU). 'IMT' stands for International Mobile Telecommunications, and '2000' represents both the scheduled year for initial trial systems and the frequency range of 2000 MHz . The most important IMT-2000 proposals are the UMTS (W-CDMA) as the successor to GSM, CDMA2000 as the successor), and time-division synchronous CDMA (TDSCDMA)and UWC-136/EDGE as TDMA based enhancements to D-AMPS/GSM—all of which are leading previous standards towards the ultimate goal of IMT-2000. UMTS increases transmission speed to 2 Mbps per mobile user and establishes a global roaming standard. Network perspective .UMTS is a so-called3G,

The fourth generation (4G)

4G mobile communications will have transmission rates up to 20 Mbps higher than of 3G. The technology is expected to be available by the year 2010. Presently, NTT DoCoMo and Hewlett-Packard are on their agenda to make it available by the year 2006. 4G is being developed with the following objectives:

1. Speeds up to 50 times higher than of 3G. However, the actual available bandwidth of 4G is expected to be about 10 Mbps.

2. Three-dimensional virtual reality imagine personal video avatars and realistic holograms, and the ability to feel as if you are present at an event even if you are not. People, places, and products will be able to interact as the cyber and real worlds merge.

3 .Increased interaction between corroborating technologies; the smart card in

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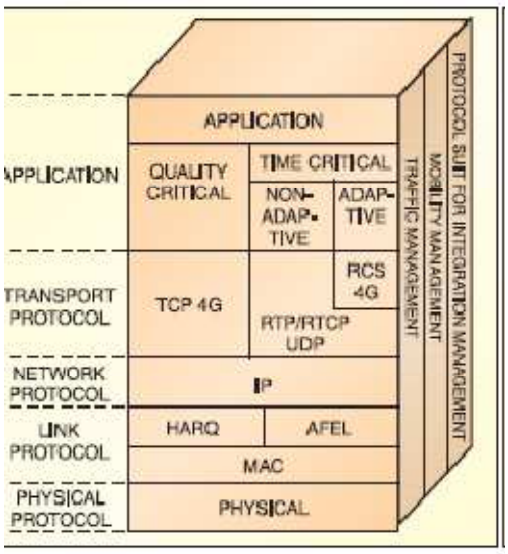
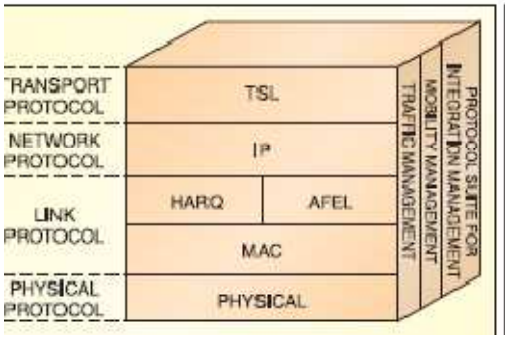
Your phone will automatically pay for goods as you pass a linked payment kiosk, or will tell your car to warm up in the morning as your phone has noted you leaving the house. Ericsson and the University of California are jointly researching CDMA wireless access technology, advanced antenna systems, next-generation mobile Internet, quality of service, power amplifier technology, and wireless access networks. Other 4G applications include high-performance streaming of multimedia content based on agent technology and scalable media coding methods.

4G will solve problems like limited bandwidth in 3G when people are moving and uncertainty about the availability of bandwidth for streaming to all users at all times. One of the key requirements is to realize a wireless 4G IP-based access system.

The ultimate objective is to create a protocol suite and radio communication schemes to achieve broadband mobile communication in 4G wireless systems. A new protocol suite for 4G wireless systems
Supported by Department of Defense(DoD) contains:
1. Transport-layer protocols
2. Error-control protocols
3. Medium-access protocol
4. Mobility management
5. Simulation test bed
6. Physical test bed
7. Protocol suite in the mobile terminal.



) Mobile terminal



5G Technology:

5G Technology stands for 5th Generation Mobile technology. 5G mobile technology has changed the means to use cell phones within very high bandwidth. User never experienced ever before such a high value technology.

Nowadays mobile users have much awareness of the cell phone (mobile) technology. The 5G technologies include all type of advanced features which makes 5G mobile technology most powerful and in huge demand in near future. A user can also hook their 5G technology cell phone with their Laptop to get broadband internet access. 5G technology including camera, MP3 recording, video player, large phone memory, dialing speed, audio player and much more you never imagine. For children rocking fun Bluetooth technology and Piconet has become in market.

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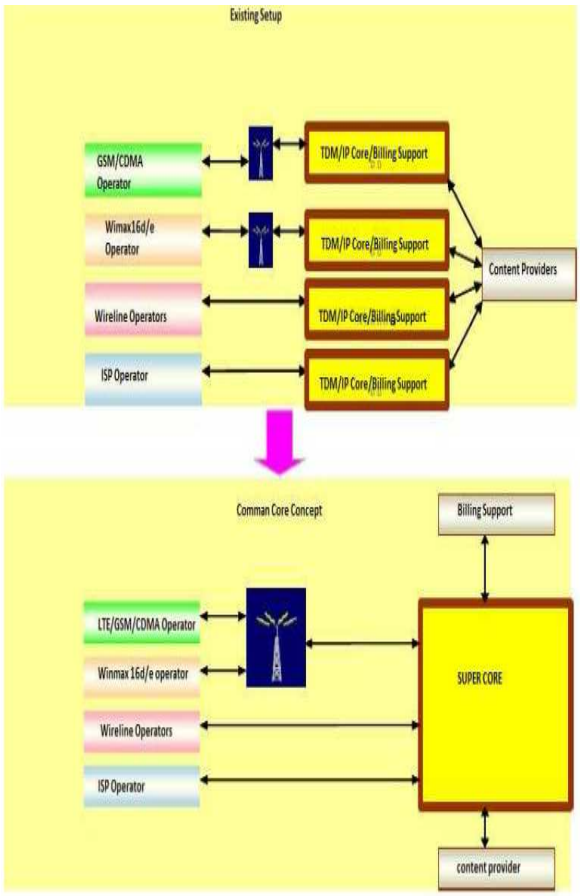

Researches going on to be implemented in 5G:

1. Researchers are working so that the user can simultaneously be connected to several wireless access technologies and can switch between them.

2. Instead of Internet Protocol version 4(IPv4) it will use IPv6.

3. It would have user centric network concept

Conclusion

Wireless communication technology has existed for less than 200 years. In these few recent years, technology has changed at an incredible rate. In the early 1900's, as the wireless telegraph was being perfected, The first cellular standards began to emerge in the late 1970's in the United States. AMPS was and still is the basic standard for analog cellular telephone systems utilized in the US. The Nordic Mobile Telephone System, launched in 1981, was the first cellular system to become a multi-national cellular system.

Third generation cellular systems were soon to follow. CDMA technologies, the basis of third generation systems, were first to appear in the United States as early as 1993. These new 3g systems were defined by IS-95. The 3g systems were also the first cellular systems to employ a soft handoff feature .Currently four wireless LAN standards dominate the market in the world.

5G technology going to be a new mobile revolution in mobile market. Through 5G technology now you can use
Worldwide cellular phones and this technology also strike the china mobile market and a user being proficient to get
Access to Germany phone as a local phone

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