

A Novel Design on Wireless Communication & Emergence of Generation Techniques

¹A Srujani, ²Dr P Chandrasekhar Reddy

¹Asst Prof at Teegala Krishna Reddy Engineering College

²professor at JNTU university

Abstract

The term wireless communication was 19th century has developed over the subsequent years, most important mediums of transmission of information from one device to other devices. The information can be transmitted through the air without requiring any cable or wires electronic conductors by using electromagnetic waves like IR, RF, satellite. Evolution of wireless access technology reach its fourth generation past wireless access technology have followed different paths aimed at unified target performance and efficiency in high mobile environment. The third generation quest for data higher speeds to open the gates for truly mobile broadband experience which will be further realized by the fourth generation. 4G Provide access to wide range of telecommunication services which supports by mobile and fixed networks. Our research work extracts how to resolve a risk for using a 4G mobile phone of receiving viruses and tracking cookies through this IP-address system. Fifth generation technologies are also being planned upon. This technology will be intelligent and will interconnect the entire world without limits. This technology could be further researched to help understand qualities of 4G technology that may need to be changed.

Keywords:-Wireless Communication, 4G/3G Technology, Data transmission, WiMAX, Global Geo-Processing.

1.Introduction

The wireless communication is tremendous growth in the past decade with four billion wireless subscribers worldwide, in terms of mobile technology, first generation 1G analog cellular systems supported voice communication with limited roaming, second generation digital systems promised higher capacity and better voice quality than analog. The widely deployed second-generation cellular systems are GSM and CDMA for 1G analog systems, 2G systems were primarily designed to support data transmission. However, the data rates were generally lower than that supported by dial-up connections. The ITU-R initiative on IMT-2000 (international mobile Telecommunications 2000) paved the way for evolution to 3G. A set of requirements such as a peak data rate of 2 Mb/s and support for vehicular mobility were published under IMT-2000 initiative. Both the GSM and CDMA camps formed their own separate 3G partnership projects

(3GPP and 3GPP2, respectively) to develop IMT-2000 compliant standards based on the CDMA technology. The 3G standard in 3GPP is referred to as wideband CDMA(WCDMA) because it uses a larger 5MHz bandwidth relative to 1.25MHz bandwidth used in 3GPP2's cdma2000 system. The 3GPP2 also developed a 5MHz version supporting three 1.25MHz subcarriers referred to as cdma2000-3x. In order to differentiate from the 5MHz cdma2000-3x standard, the 1.25MHz system is referred to as cdma2000-1x or simply 3G-1x, first release of the 3G standards did not fulfill its promise of high-speed data transmissions as the data rates supported in practice were much lower than that claimed in the standards. A serious effort was then made to enhance the 3G systems for efficient data support. The 3GPP2 first introduced the HRPD (high rate packet data) system that used various advanced techniques optimized for data traffic such as channel sensitive scheduling, fast link adaptation and hybrid ARQ, etc. The HRPD system required a separate 1.25MHz carrier and supported no voice service. This was the reason that HRPD was initially referred to as cdma2000-1xEVDO (evolution data only) system. The 3GPP followed a similar path and introduced HSPA (high speed packet access) enhancement to the WCDMA system. The HSPA standard reused many of the same data-optimized techniques as the HRPD system.

A difference relative to HRPD, however, is that both voice and data can be carried on the same 5MHz carrier in HSPA. The voice and data traffic are code multiplexed in the downlink. In parallel to HRPD, 3GPP2 also developed a joint voice data standard that was referred to as cdma2000-1xEVDV (evolution data voice). Like HSPA, the cdma2000-1xEVDV system supported both voice and data on the same carrier but it was never commercialized. In the later release of HRPD, VoIP (Voice over Internet Protocol) capabilities were introduced to provide both voice and data service on the same carrier. The two 3G standards namely HSPA and HRPD were finally able to fulfill the 3G promise and have been widely deployed in major cellular markets to provide wireless data access.

The use of 2G phones are widespread and people began to use mobile phones in the daily lives that demand services was growing, if the experience from fixed

broadband services was anything to would also be demand for ever greater data speeds.

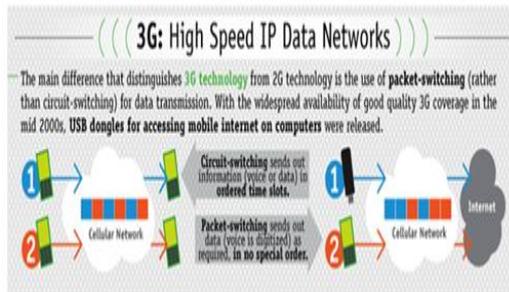


Figure 1 Wireless Technology 3G Network

The mid 2000w an evolution of 3G to be implemented High speed downlink packet access enhanced 3G mobile telephony communication protocol in the high speed packet access also coined 3.5G, 3G+ or turbo 3G which allows networks based on universal mobile telecommunications to have higher data transfers speeds and capacity. Consequently data optimized 4th generation technology with the promise of speed improvements upto 10 fold over existing 3G technologies with more bandwidth services offers in the 3G, the 4G generation is basically the high quality audio/video streaming over end internet protocol billed as 4G were the WiMAX standard and the LTE standard. 4G different techologies from 3G was in its elimination of circuit switching instead of employing an all IP networks 4G is ushered in a treatment of voice calls just like other type of streaming audio media utilizing packet switching LAN WAN networks data transfer speed can reach peak download 100Mbits WiMAX offers peak data rates of 128Mbits.

2.Related Work

The existence of the 4G network designed to the development of superior alternative to the existing 3G strategy in terms of quality and data transmission speed for 4G networks is a great dependence advanced technologies and increased speed in order for the network to be a success. The term 4G network is substantial improvements to multimedia messaging services including video services mean while user is manually moving at high speeds and a one gigabit per second data rate in a fixed position. It is important for the new data network to meet the expected demand of the consumer and of different organization have come to depend upon high-speed data networks with minimal interruptions for a variety of needs. Issues with 4G network that reflect some degree of risk opportunity that networks are successful once rolled to general public and 4G networks are designed in order to create an environment that supports high-speed data transmission and increased profit margins for organizations that utilize the capabilities. The 4G network platform is not brand many telecommunication providers have not yet developed their own alternatives that will support the network products

are still in the development phase with additional products to be developed and rolled out on a periodic basis. This 4G is intended to replace the current 3G systems within few years.

The ambitious goal of 4G is to allow everyone to access the Internet anytime and everywhere. The provided connection to Internet will allow users to access all type of services including text, databases, and multimedia. 4G, unlike 3G, is IP based, that is every user connected to the Internet will have an IP address. This feature makes it easier to integrate the infrastructure of all current networks and consequently will it easier for users to access services and applications regardless of the environment. 4G will also provide higher bandwidth, data rate, lower authentication overhead, and will ensure the service is constantly provided to the user without any disruption.

Another key feature of 4G networks is high level of user-level customization. That is, each user can choose the preferred level of quality of service, radio environment, etc. Accessing 4G networks will be possible virtually by using any wireless device such as PDAs, cell phones, and laptops. Figure 1 illustrates elements and techniques to support the adaptability of the 4G domain.



Figure 2 4G Network allows everyone to access Internet

In the development of 4G Networks, security measures must be established that enable data transmission to be as safe as possible. Specifically, "The 4G core addresses mobility, security, and QoS through reuse of existing mechanisms while still trying to work on some mobility and handover issues" [3]. Therefore, it is necessary for the organization to develop an effective series of tools that support maximum 4G security measures as a means of protecting data that is transmitted across the network from hackers and other security violations. Because of the nature of the 4G network, there is an increased likelihood of security attacks, and therefore, multiple levels of security, including increased requirements for

authentication, will be necessary to protect data and information that is transmitted across the network [3].

One of the main goals of 4G networks is to blanket very wide geographic area with seamless service. Obviously, smaller local area networks will run different operating systems. The heterogeneity of these wireless networks exchanging different types of data complicates the security and privacy issues. Furthermore, the encryption and decryption methods being used for 3G networks are not appropriate for 4G networks as new devices and services are introduced for the first time in 4G networks. To overcome these security and privacy issues, two approaches can be followed. The first is to modify the existing security and privacy methods so that they will be applicable to heterogeneous 4G networks. Another approach is to develop new dynamic reconfigurable, adaptive, and lightweight mechanisms whenever the currently utilized methods cannot be adapted to 4G networks [4].

With respect to network quality, many telecommunications providers are promising that there will be enhanced connectivity, and the quality of data that is transmitted across the network will be of the highest possible quality, as in the case of Ericsson's 4G Network for TeliaSonera [7]. The company promises that "The new 4G network will do for broadband what mobile telephony did for voice. With real-time performance, and about 10 times higher data rates compared to today's mobile broadband networks, consumers can always be connected, even on the move" [7]. As a result, it is important for providers to develop an effective approach to the 4G Network that will enhance quality, provide effective security measures, and will ensure that all users are provided with extensive alternatives for downloading video, music, and picture files without delays.

The main challenge that 4G networks are facing is integrating non-IP-based and IP-based devices. It is known that devices that are not IP address based are generally used for services such as VoIP. On the other hand, devices that are IP address based are used for data delivery. 4G networks will serve both types of devices. Consequently, integrating the mechanisms of providing services to both non-IP-based as well as IP-based devices is one of key challenges 4G networks have to address.

3. SECTION

3.1. Problem Definition

Now a days mobile and wireless networks become more novel problems that demand field of some more important than other, most probably limited bandwidth secure connections reliable which occurs only in mobile networks and other reliable connections. Bandwidth is limited resource such as regulated by different organization alone restricted the widespread use of wireless networks technique such as FDMA (Frequency Division Multiple Access) and TDMA (Time Division Multiple Access) are used together with new CDMA (Code Division Multiple Access) to get most out of the

limited bandwidth. Wired networks attenuation of signals much greater the transmission powers are lesser because of the reasons and interference to other equipment and less transmission led to cellular networks. As wireless network become common for secure connection in radio waves rather simple but with the development of modulation schemes listening even of unsecured transmission demands special equipment that does not eliminate the need for reliable encryption scheme.

In practice, however, no CSI is a priori available at terminals (transmitters and receivers), and proper channel training mechanisms. The achievable rate region is computed, and the optimum number of cells that should be active simultaneously is determined. The high speed wireless access the systems in an Open Wireless Architecture (OWA) platform which has become the hub of this emerging next generation mobile technology. Any single architecture wireless system, including 3G, HSDPA, WiMAX, etc., is a transitional solution only, and will be replaced by open wireless architecture system very soon where in various different wireless standards can be integrated and converged on open platform. Mobile communication is playing a vital role in the data and voice in the network front with the deployment of mass scale 3G, 4G just around the globe, new directions are already researched. The 4G mobile technology is the intersection and convergence of wireless mobile and wireless access around the globe.

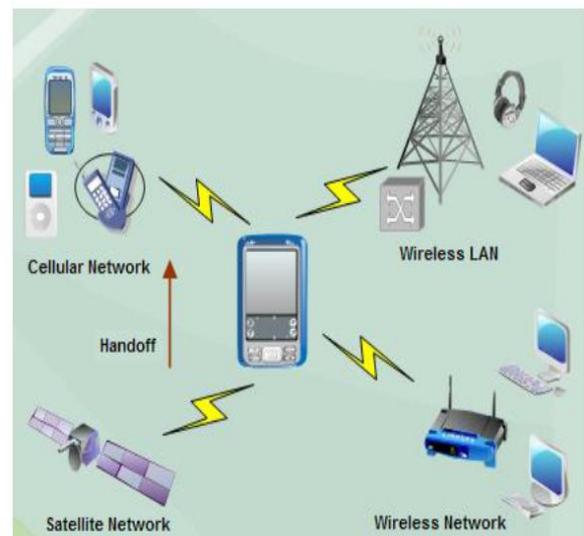


Figure 3 Multi node Access for 4G Networks

Wireless mobile networks compares to reduce the operating costs devices that operate 4G networks should have the capability to operate in different networks not only reduce the operating cost but will also simplify design problems and will reduce power consumption accessing different mobile and wireless networks meanwhile the major issue 4G networks addressing the multimode devices that allows the end-user device to adapt various wireless interfaces of the networks.

Heterogeneity of 4G networks have to process signals sent from different systems discover available services and connect to appropriate service providers own protocols which can be incompatible with each other as well as with the users device may complicate the process of selecting the most appropriate technology on the time may affect the quality of service provided to the end user.

3.2. Existing System

The fourth generation is a wireless network system or packet switched wireless system with extensive area exposure and soaring throughput is intended to be cost efficient to supply high phantom effectiveness. Data rate or velocity of 20Mbps is working mobile velocity will be upto 200Km/Hr and elevated presentation is accomplished by the utilization of extensive term channel in both instance channel occurrence preparation among users

Fast access the files on wireless network and elevated voice excellence

Instant internet messaging common networks video calling

Continues connected to the internet devoid of any disturbance

At the same time we have disadvantages as well

It has advanced data rates for customers

Customers are required to purchases a new equipment to maintain the 4G

4G only presents accessible in convinced cities within the US

4G productions frequently fetch new standard techniques extra network ability for extra data per user and the possible improved voice excellence, data throughput in 4G is 2-12 Mbps but probable expected at a range of series of 100-300 Mbps utilizes packet messages switching techniques.

3.3. Proposed System

Although the speed and just overall quality of web-based applications would improve, it would not occur without a cost. Most industry such as Sprint are trying to reduce the cost as much as possible starting at a "ten dollars a month service fee to use the HTC Evo on a 4G network" (Hansen, 2010). This cost is not unusually high, but with a reduction in fee comes a cheap deployment of this technology which means that it is expected to disrupt broadband access alternatives such as DSL and cable modems. This is because it is cheaper to deploy and covers such a wide bandwidth in the network (Jarrett, 2006).

Also, since people are being connected to a variety of devices while using 4G, each person needs to be aware of the security threats they are opposing on themselves. As mentioned earlier, this is a problem because each person may be connected to many devices using 4G therefore increasing their risk of receiving a virus attack.

Research will have to be done in order to figure out how much more battery life a phone must be able to hold in order to participate on a 4G network as well. "The big

challenge in bringing 4G to the market will be using the right applications' processors as well as modem and power management technologies to deliver the performance, size and battery life that consumers demand" (Krenik, 2008). This may be a con since the battery life and the processors may have to be changed greatly, therefor causing 4G technology to cost more for the company that acquires their phones with this network. Some research may be required in figuring out exactly how much more at risk a person is for using a 4G mobile phone of receiving viruses and tracking cookies through this IP-address system.

5G technologies are also being planned upon. This technology will be intelligent and will interconnect the entire world without limits (Jarrett, 2006). This technology could be further researched to help understand qualities of 4G technology that may need to be changed.

SECTION IV

4. Fourth Generation Technology

The fourth generation series and services models need to be further examined for the interface design of 4G systems, below figure demonstrate the elements of the fourth generation model. The terminal for accessing mobile service has been the mobile phone with advanced technology broadening. User interfaces of terminals will vary from traditional keyboard display and tablet to new interfaces based on touch button, vision clearance, piece appearance etc. general purpose computing devices with more specific purposes to serve particular marker segments. The recognizable mobile phones will have larger screens to display internet pages and access the application compare to this smaller smartphones with limited web browsing and email capabilities mobile communication capabilities to laptop and palmtop computers will speed up the convergence of communication bring to portable all the functions and features available on the most powerful desktop machines. Networks are delayed in some countries by the enormous costs of additional spectrum licensing cost do not use same radio frequencies as second generation. Requiring mobile operators to build entirely new networks and license entirely new frequencies so that a number of spectrum allocation decisions spectrum standardization decisions.

4.2. Overview of Fourth generation

Wireless systems typically require highly heterogeneous and time varying quality of service from the underlying protocol layers adaptability will be one of the basic requirements to the development and delivery of new mobile services.

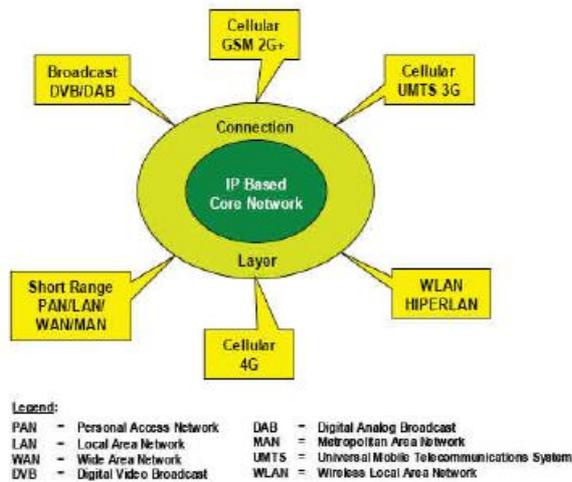


Figure 4 Fourth Generation Network Technology

Techniques adaptive multimedia unified messaging terminal characteristics into account service can be received on a terminal with the most suitable form to the host type. 4G technology will be able to support interactive services like video conferencing with more than two sites at a time wireless internet, the bandwidth would be much wider 1000MHz and data would be transferred at much higher rates. The cost of the data transfer would be comparatively very less and global mobility would be possible, networks will be all IP networks based on IPv6 antennas will be much smarter and improved access technologies like OFDM and MC-CDMA multi carrier will be used the security features much be efficient. Evolution LTE is also part of 3G technology its research item for release 8 as 3.9G WiMAX lobby and people working with the WiMAX technology are trying to push WiMAX as the 4G wireless technology among people to refer to the 4G wireless technology, WiMAX does not satisfy the criteria completely support mobility very well to overcome the mobility problem 802.16e or mobile WiMAX is standardized thing to remember research for 4G technology is based around OFDM WiMAX.

4.2. Application of Fourth Generation

Fourth generation provides user services at the time even if the user is off-site, virtual navigation 4G provides users with virtual access a database of the large cities data transmission.

Fourth generation supports remote health monitoring of patients, need not to go to the hospital instead a user can get videoconference assistance for a doctor at any time. Tele geo-processing is combination of geographical information system and global positioning system which user can get the location by querying. Natural disasters can cause breakdown in communication systems, 4G can restore such crisis issues in a few hours others might be weeks to restore the system. A user interested in lifelong education provides a good opportunity in the world can

continue the education through online in a cost effective manner.

5. CONCLUSION

The history of wireless mobile communications shows, attempts have been made to reduce a number of technologies to a single global standard. The fourth generation systems offer this promise of a standard that can be embraced worldwide through its key concept of integration. Future work extends wireless networks will need to support fifth generation diverse IP multimedia applications to allow sharing of resources among multiple users. There must be a low complexity of implementation and an efficient means of negotiation between the end users and the wireless infrastructure. The fifth generation promises to fulfill the goal of personal computing and communication vision that affordably provides high data rates everywhere over a wireless network.

Reference

- [1]. R. Jackson, T-Mobile 4G network coming with help from Comcast, 2009.
- [2]. T. H. Le and A. H. Aghvami, "Performance of an Accessing and Allocation Scheme for the Download Channel in Software Radio," Proc. IEEE Wireless Commun. And Net. Conf., vol. 2, 2000, pp. 517–21.
- [3]. J. Al-Muhtadi, D. Mickunas, and R. Campbell, "A Lightweight Reconfigurable Security Mechanism for 3G/4G Mobile Devices," IEEE Wireless Commun., vol. 9, no. 2, Apr. 2002, pp. 60–65.
- [4]. N. Montavont and T. Noel, "Handover Management for Mobile Nodes in IPv6 Networks," IEEE Commun. Mag., vol. 40, no. 8, Aug. 2002, pp. 38–43.
- [5]. A. D. Stefano and C. Santoro, "NetChaser: Agent Support for Personal Mobility," IEEE Internet Comp., vol. 4, no. 2, Mar./Apr. 2000, pp. 74–79.
- [6]. P. Taylor, AT&T to roll out 4G network, 2009.
- [7]. B. Thai and A. Seneviratne, "IPMoA: Integrated Personal Mobility Architecture," Comp. and Commun., 2001, pp. 485–90.
- [8]. K. R. Santhi, V. K. Srivastava, G. SenthilKumaran, A. Butare, "Goals of true broad band's wireless next wave (4G-5G)," Vehicular Technology Conference, 2003. VTC 2003-Fall. 2003 IEEE 58th, Volume: 4, 6-9 Oct. 2003, Pages:2317 - 2321 Vol.4
- [9]. L. Zhen, Z. Wenan, S. Junde, H. Chunping, "Consideration and research issues for the future generation of mobile communication," Electrical and Computer Engineering, 2002. IEEE CCECE 2002. Canadian Conference on, Volume:3, 12-15May,2002, pp:1276 - 1281 vol.3 7. S. Chatterjee, W. A. C Fernando.

AUTHOR



A Srujani B.Tech from PRRM Engineering College M.Tech VLSI SD from Teegala Krishna Reddy Engineering College. Currently working as Asst Prof at Teegala Krishna Reddy Engineering College guided many UG & PG students. Her research areas include

VLSI design, Wireless Communication, Embedded Systems.



Dr P Chandrasekhar Reddy B.Tech ECE from JNTU M.E Applied Electronics from Bharatiar University M.Tech DSCE from JNTU PhD ECE Wireless Routing from JNTU. He is having 25years of experience currently

working as professor at JNTU university guided many UG PG & PhD students. He Published Text books, International journals and attended Conference in the areas of VLSI Embedded System and Wireless Communication.