Survey on Wireless Technologies and Security Procedures

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Abstract - **Modern world is shrinking due to the development of science and its technology. Over the years, wireless telecommunications market has long been recognized as one of the most dynamic and fastest growing segments of the global telecommunications industry. But requirements of human being augment day by day. However further modernization will be on convergence of this existing technology in to a single platform. Mobile broadband is becoming a reality, as the internet generation grows accustomed to having broadband access wherever they go and not just at home or in the office. Of the estimated 3.4 billion people who will have broadband by 2014, about 80 percent will be mobile broadband subscribers – and the majority will be served by High Speed Packet Access (HSPA) and Long Term Evolution (LTE) networks. There is strong evidence supporting predictions of increased mobile broadband usage. This paper mainly focuses on how a 5G network can provide more approach to a common man to utilize his available possessions in an immense way to make him to feel the real progress. While considering a 5G network now it is very obvious that the access network is almost freezing and there will not be any further modification.**

Keywords – wireless, telecommunication, broadband, HSPA, LTE, network.

I. Evolution of Wireless Technologies:

In 1895, Guglielmo Marconi opened the way for modern wireless communications by transmitting the three-dot Morse code for the letter „S" over a distance of three kilometers using electromagnetic waves. From this beginning, wireless communications has developed into a key element of modern society. From satellite transmission, radio and television broadcasting to the now ubiquitous mobile telephone, wireless communications has revolutionized the way societies function. The evolution of wireless begins here.

1G: The 1st generation was pioneered in early 1980?s. First generation cellular mobile telephones developed around the world using different, incompatible analogue technologies. It support speed up to 2.4kbps. Major contributors were AMPS, NMT, and TACS. In terms of overall connection quality, 1G compares unfavorably to its successors. It has low capacity, unreliable handoff, poor voice links, and no security at all since voice calls were played back in radio towers, making these calls susceptible to unwanted eavesdropping by third parties.

2G: The 2nd generation was accomplished in later 1990?s. 2G mobile telephones used digital technology. Group Special Mobile (GSM) was first developed in the 1980s and was the first 2G system. Mainly used for Voice communication and supports speed up to 64kbps. Another advantage of 2G over 1G is that the battery life of a 2G handset lasts longer, again due to the lower-powered radio signals. Since it transmitted data through digital signals, 2G also offered additional services such as SMS and e-mail. Major prominent technologies were GSM, CDMA, and IS95.

2.5G In term "2.5G" usually describes a 2G cellular system combined with General Packet Radio Services (GPRS), or other services not generally found in 2G or 1G networks. A 2.5G system may make use of 2G system infrastructure, but it implements a packet-switched network domain in addition to a circuit-switched domain..It can support data rate up to 144kbps.GPRS, EDGE, & CDMA 2000 were the focal 2.5G technologies. This does not necessarily give 2.5G an advantage over 2G in terms

of network speed, because bundling of timeslots is also used for circuit-switched data services (HSCSD).

3G: An attempt to establish an international standard for 3G mobile is being moderated through the ITU, under the auspices of its IMT-2000 program. It was inveterate in late 2000.It provides transmission speed up to 2Mbps. Third generation (3G) services combine high speed mobile access with Internet Protocol (IP)-based services. Apart from transmission speed innovative enhancement was made in Quality of services. Add on services such as global roaming, better voice quality, always on made 3G as a significant generation. In addition to being more expensive, 3G handsets also require more power than most 2G models. The major disadvantage for 3G network plans centers around pricing. Generally, 3G network price points are much higher than 2G networks with comparable features.

4G: The approaching 4G (fourth generation) mobile communication systems are projected to solve still-remaining problems of 3G (third generation) systems and to provide a wide variety of new services, from high-quality voice to high-definition video to high-data-rate wireless channels. The term 4G is used broadly to include several types of broadband wireless access communication systems, not only cellular telephone systems. One of the terms used to describe 4G is MAGIC—Mobile multimedia, anytime anywhere, Global mobility support, integrated wireless solution, and customized personal service. As a promise for the future, 4G systems, that is, cellular broadband wireless access systems have been attracting much interest in the mobile communication arena. The 4G systems not only will support the next generation of mobile service, but also will support the fixed wireless networks. This paper presents an overall vision of the 4G features, framework, and integration of mobile communication. The features of 4G systems might be summarized with one word—integration. The 4G systems are about seamlessly integrating terminals, networks, and applications to satisfy increasing user demands. The continuous expansion of mobile communication and wireless networks shows evidence of exceptional growth in the areas of mobile subscriber, wireless network access, mobile services, and applications.

Grow rapidly as they become more users friendly. Fluid high quality video and network creativity are important user requirements. Key infrastructure design requirements include: fast response, high session rate, high capacity, low user charges, rapid return on investment for operators, investment that is in line with the growth in demand, and simple autonomous terminals. As a comparison, the expected best performance of 3G is around 10 bit/s/Hz/km2 using High Speed Downlink Packet Access (HSDPA), Multiple-Input Multiple-Output (MIMO), etc. No current technology is capable of such performance.

OFDMA:

Orthogonal Frequency Division Multiplexing (OFDM) not only provides clear advantages for physical layer performance, but also a framework for improving layer 2 performance by proposing an additional degree of free-dom. Using ODFM, it is possible to exploit the time domain, the space domain, the frequency domain and even the code domain to optimize radio channel usage. It ensures very robust transmission in multi-path environments with reduced receiver complexity.

5G: While considering a smooth migration for 5G it is apparent that it should be valid for all sorts of radio access technologies. So that it could make better revenue for current global operators as well as interoperability will become more feasible. To make 5G practical for all sorts of radio access technologies there should be a common platform unique for all the technologies. One of those unique platforms is Flat IP network. Certainly Flat IP network is the key concept to make 5G acceptable for all kind of technologies. To meet customer demand for real-time data applications delivered over mobile broadband networks, wireless operators are turning to flat IP network architectures. Flat IP architecture provides a way to identify devices using symbolic names, unlike the hierarchical architecture such as that used in "normal" IP addresses.

5G Applications:

- If you can able to feel yours kid stroke when she/he is in her mother’s wombs.
- If you can able to charge your mobile using your own heart beat.
- If you can able to perceive your grandmother sugar level with your mobile.
- If you can able to know the exact time of your child birth that too In Nano seconds.
- If your mobile rings according to your mood.
- If you can Vote from your mobile.
- If you can get an alert from your mobile when some once opens your intelligent car.
- If you can able to view your residence in your mobile when someone enters.

- If you can able to locate your child when she/he is unfortunately missed.
- If you can able to pay all your bills in a single payment with your mobile.
- If you can able to sense Tsunami/earthquake before it occurs.
- If you can able to visualize lively all planets and Universe.
- If you can able to navigate a Train for which you are waiting.
- If you can get the share value lively.
- If you can able to access your office desktop by being at your bedroom.
- If you"re mobile can able to suggest you possible medicine as per your healthiness.
- If you"re mobile can able to provide recent worth on products using its barcode.

Yes of course, "Everything is possible for him who believes."Our 5G network will make everyone's belief come true.

II To protect their networks and customers, mobile operators need to:

- Take an architecture approach to implementing security solutions in their network; point solutions are not sufficient.

- Deploy a variety of products in their networks, such as firewalls, intrusion detection and prevention (IDP) and virtual private networks (VPNs).

- Make client-side anti-virus and firewall software readily available to their subscribers who use data devices (e.g., feature phones with data capabilities, smart phones, notebook computers).

- Be vigilant and adopt appropriate security policies that reflect the threats in the 2.5/3G world. This has additional ramifications given the widespread use of WiFi and the general evolution toward networks based on the IP Multimedia System (IMS) standard.

- Be aware that their networks are only as secure as the weakest link. Mobile operators need to work with each other, the ISP community and other telecom providers to ensure that even the minimum amount of security is quite strong.

- Vigorously protect signaling as the migration of signaling traffic over IP creates new risks. Mobile operators carry much more signaling traffic than their wired counterparts and signaling is mission critical traffic.

III Types of attacks against mobile networks and defenses:

Types of Attack	**Target**	**Purpose**	**Defence**
Worm,Virus, Trojan, SMS/MMS spam	Others users, Network elements (contents servers)	Harassment, denial of service / service interruption	Device $network antivirus; content scanning
Denial of service, application layer attack	HLR, AAA, content servers, signalling nodes	Attack ability to provide service	Firewalls, signalling firewalls and IDP
Overbilling attack	Operator's management elements	Fraud	Intrusion detection & prevention (IDP)
Spoofed PDP context	User sessions	Service theft	Signalling firewalls
Signalling – level attacks	Signalling nodes	Attack ability to provide service	Firewalls, signalling firewalls and IDP

IV Conclusion

As the history of mobile communications shows, attempts have been made to reduce a number of technologies to a single global standard. Projected systems offer this promise of a standard that can be embraced worldwide through its key concept of

integration. Future wireless networks will need to support 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 fulfil the goal of PCC (personal computing and communication) a vision that affordably provides high data rates everywhere over a wireless network.

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