A Survey: on 5G Technology

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Abstract: The advance affection of 5G mobile Wi-Fi network system accept latest reliability needs and objections. This paper gives a complete research on the security of 5G Wi-Fi network systems differentiate along the customary cellular network. The current information is establishing interminably the compatible with security facilities, incorporate with authentication, availability, Data confidentiality. This paper introduces among analysis on 5G wireless networks uniqueness also on latest necessity and inspiration of 5G Wi-Fi security.

Keywords: 5g, Wi-Fi.

1. Introduction

5G is the most recent evolution of cellular mobile conference. It has huge rapid data rate, energy saving, more device connection. The first stage generalization is release-15 will be finishes in April 2019 to collect the previous business arrangement. Each new generation wireless network come with all new set of new usages . The next coming wireless network make no exception and will be focused on IOT (Internet of Things) and critical communication applications. Radio technologies have evidenced a rapid and multidirectional evolution. Then to fulfill growing need for human beings i.e. 1G ,2G, 3G ,4G, and now 5G. If we look back, we will conclude that every upcoming year one generations is advancing the features of the earlier one. Starting from the initial generation (1G) in 1980's, Second generation (2G) in 1990's, Third generation (3G)in 2000's,Fourth generation in 2010,and now Fifth generation(5G)is advancing the new features towards sophisticated and smarter technology to fulfill the user requirements.5G network achieves much higher data rate than previous cellular network,5G is 100 times better than the previous network,5G network achieves these huge data rates by using greater frequency radio waves. IEEE covers a few sectors of 5G along with the central target in wire line sections into the Remote Radio Head (RRH) including Base Band Unit(BBU). Evolution of 5G is conducted by the organizations like Qualcomm, Huawei and Intel as modern profession including Nokia, Cisco as well as Samsung for foundation.5G will go ahead for making appearances in cities around the U.S.in 2019[1].

1.1.Timeline:

3G: IMT-2000 started in 1985first release in 2000
4G: IMT-Advanced, vision in 2003, First release in 2012
5G: IMT-2020, vision in 2015, first release in 2020

2. What is 5G Technology?

5G is the fifth-creation of cellular wireless network .5G technology is a new profession it has been developed to improve the performance of the mobile network. It gives outstanding performance than the earlier mobile networks.5G have 3 new aspects that are huge speed (to move additional data at a time) less latency(to be more responsive),and the capacity to connect further devices at once(for smart devices).5G profession have change the method to operate wireless phones among very tremendous frequency. Somebody not ever involved in the wireless phone technology. It can connect with numerous users. It contains each variety of leading characteristics whichever makes 5G mobile profession is more powerful and have vast interest within upcoming years[2].

3. Silent features of 5G

- Faster response time
- More secure
- Very high capacity for storing data
- More software option to upgrade
- More speed up-to 10Gbits/s
- Low latency
- High throughput (improve overall system capacity to handle growth in users)
- High-motion mobility (ability to support users on rapidly moving modes of transportation)

- 25 mbps connectivity speed.
- Better and fast solution
- Hold virtual private network
- More attractive and efficient
- Transferring and downloading rate of 5G touching the peak (max achievable data rate) (up-to 1 Gbps)
- It has incredible transmission speed
- Support very high range applications
- Long battery lifetime [3]

3.1.Which 5g phone are coming out?

- Samsung Galaxy S10 5G
- Huawei Mate X
- OnePlus
- LG V50 ThinQ
- Honor
- iphone12[4]

3.2.Benefits:

- Speedy data communication that of the earlier generation.
- 5G is extra powerful and Attractive.
- Vast cell phone memory, Ring speed rate, transparency in between audios and videos.
- Hold several different media, communication, running visual communication, Internet and further.
- Quick data transmission that of the earlier generations.
- Give HD(High Definition) Quality[5].

4. What Makes 5G So Dissimilar Against 4G?

Simply,5G is smarter, faster and efficient than 4G. It gives guarantee of mobile data rate for the external speedy home wideband network presently applicable to customer. And also occupy the speed as much as 100 gigabits per second,5G is supposed to be approximately 100 times speedy apart from 4G. Less delay is the main features to differentiate in between 4G as well as in 5g delay is the time that certain proceed through the short time is forward from the short time information is forward aside from a device up to it can be operate by recipient. By using the present peripherals and coming technologies like driverless cars but in 4G there is no such type of technologies.[6]

4.1 Potential Use of 5G:

1.Cloud based system will be allowed to flow of software upgrade, music, navigation data and traffic constraints to driverless cars.

2. Its reducing the downloading time of the movie those are high definition and full in length, that time will be in seconds instead of minutes [4].

4.2 Network Layers of 5G

Table 4.2: Network layers of 5g mobile technology for security

OSI Network Model	Model Of 5g Technology
Application Layer	Application (Services)
Presentation Layer	
Session Layer	Open Transport Protocol (OTP)
Transport Layer	
Network Layer	Upper Network Layer
	Lower Network Layer
Data Link Layer	Open Wireless Architecture
Physical Layer	

Physical Layer: The first two layers of the OSI model for the 5G technology are based on Open Wireless Architecture for wireless Architecture.

Network Layer: The network layer protocol is an TCP/IP protocol. IPV4 continue spread worldwide with some limitations like limited address space which are resolved in IPV6.

Open Transport Protocol (OTP) Layer: TCP (Transmission Control Protocol) modifications are proposed for both wireless and mobile networks. The TCP again transmit the missing or flawed TCP section above wireless links.

Application Layer: An intelligent behavior facility of selecting best wireless connection out of different networks is provided in 5G. Terminals have the facility to check and inform the storage of these layer[2].

4.3 Difference Between 1G 2G,3G,4GAnd 5G Wireless Network:

Table 4.3: Difference Between 1G, 2G, 3G, 4G and 5G [4]

PARAMETERS	1G	2G	3G	4G	5G
Introduced In Year	1980's	1993's	2001's	2009's	2014's
Bandwidth	2kbps	14-64kbps	2mbps	200mbps	>1gbps
Technology	Analog Cellular	Digital Cellular	Broadband Width/ Cdma/Ip Technology	Combo Of LAN/WAN/MAN/PAN	4G+Wwww
Internet Services	NO	Narrowband	Broadband	Broadband	Ultra-Broad Band
Services	Mobile Telephony	Digital Voice, Short Messaging	Integrated High Quality Audio, Video And Data	Dynamic Information Access, Variable Devices	Dynamic Information Access, Variable Devices With AI Capabilities
Switching	Circuit	Circuit Access For Network & Air Interface	Packet Except For Air Interface	All Packet	All Packets
Core Network	PSTN	PSTN	Packet Network	Internet	Internet
Handoff	Horizontal	Horizontal	Horizontal	Horizontal And Vertical	Horizontal And Vertical
Carrier Frequency	30khz	200khz	5mhz	15mhz	1ghz And More

Today Which Technology Is Used	No	Less Frequently	Frequently	More Frequently	Very High Use

4.3 Will 5G Technology Secure?

Yes, 5G is secure network because it consists the OSI reference model and in these models, there are several layers to protect the network. so that we can conclude that 5G is more secure than the previous generations.

4.4 Costing?

It is expensive than previous generations.

5. Security Services in 5G:

There are 3 types of security services as follows:

It is also called as CIA

Confidentiality: Confidentiality is referring to privacy. And most important in wireless network. Data confidentiality protect data transmission from passive attacks (hacker change the data and there is data security will loss) by restrict the data access to known users only. Data encodes keep frequently apply to protect the data confidentiality by avoiding the unapproved access. For example, imagine your bank transaction; you should able to access it. And the employee at the bank who are helping you with a transaction should be able to access it. But other than you and bank employee no one able to access it. It causes failure in confidentiality means no one able to be managed it. If your bank details are attaching on public website. Then everyone can be aware about your bank account numbers, and each factor respect to bank.

Integrity: 5G aims to provide confirmation cause of the message, there is no protection provided in opposition to the replication and updating of message. Integrity avoid information apart from improve by active attack (hacker trying to do some alteration in data or the specified targeted data or do changes in the route the target).

Authentication: Authentication has huge important network.5G network does not require only among User Equipment(UE) and Mobility Management Entity (MME) but also management is required inside 5G and the mixed as well as changeable authentication of UE can be categories into three methods. first one is verification through network. second is Authentication through service provider only. and authentication through pair of networks as well as facility [7].

5.1 Security Issues In 5G:

Dr.Sasa Radomirovic, Superior lecturer belong to enumeration in the school of science and engineering at the University of Dundee, is one of research them, Mr.Sasa Radomirovic speaks that users being charge for the mobile usage space, whatever could be outcome in number of cyber-attacks and user existence charge for use of a mobile by third party. For that issue they said that we must suggest several improvements to close these gaps. so, then the 5G become a secured wireless mobile network. They said that their employee is presently employed among the 3GPP to device refinement in the weakness they found [6].

5.2 Does 4G Phone Supports 5G Network?

5G phone will also work on 4G LTE networks when they are not on 5G. Your current phone won't be able to work on 5G[8].

5.3 In Which Country 5G Is Available?

1. South Korea
2. China
3. Japan
4. The United States
5. Turkey [7].

Conclusion

5G is the coming wireless technology and it has very huge data transmission rate from the earlier wireless technologies. Numerous huge countries being infuse large quantity of fund interminably this project just as it was possessing huge interest within the upcoming years. It captures the user requirements better organized. It generates most effective change in people's life. So that 5G was having a more response than earlier technologies. It is excepted to be made commercially available over devices that will arrive in the upcoming years.

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