International Conference on Advanced Computing (ICAC-2019)

College of Computing Sciences and Information Technology (CCSIT) ,Teerthanker Mahaveer University , Moradabad **[2019]**

WIRELESS NETWORKS AND MOBILE COMPUTING

[1]Bilal Saii
[2]Yashvant Singh
[3]Mr. Pradeep Kumar Shah
[1]Master of Computer Applications, CCSIT,TMU, Moradabad
[2]Master of Computer Applications, CCSIT,TMU, Moradabad
[3]Designation, CCSIT,TMU, Moradabad.

ABSTRACT

"MOBILE COMPUTING" and "COMMUNICATION" is a major part of wireless communication technology. Mobile computing simply means computing done by the periodic connected users who have access to use network resources. It needs a wireless mediator such as cellular radio, radio nets or low orbit (Earth-centered orbits with an altitude of 2000kms or less and with at least 11.25 periods/day) satellites. It incorporates wireless adapters which uses wireless technology to connect portable computers or PC`s with cabled network.

In this paper we are going to describe Mobility Services Architecture which supports application by an intermediator root. It enlarges the uses of computers but demand challenges also which leads to shrink of mobile computing and generating wireless networks.

The paper expresses about the strategy, and drawbacks in wireless industry, and how J2SE is used in this technology and including advantages and disadvantages of this technology and its future.

INTRODUCTION

The familiar aspect of mobile computing is the cellular phone. About two decades ago, the cell phones or cellular phones were so bulky and bigger in size not only they were bulky but also, they were having a single feature of making voice communication. It was purely an expansion of the fixed line telephony that allows a user to stay connected with his or her colleagues or guardians and friends etc. we were having some drawbacks like we can`t go somewhere we need while talking as it was cabled or wired connected and one more drawback was it was only for voice communication, we can`t send any text message or anything over that technology. But now we are having handphones or cell phones through which we not only call, now we send and receives text messages, multimedia messages, sharing multimedia files like pictures, mp3`s, documents etc. And now we`re having smartphones through which we can go live with our friends and colleagues and guardians with having feature of video calling, through which we can interact with the person like he is in front of me, it feels like we`re interacting lively. We have features like video conferencing or online interview which leads to time saving, money saving etc. and all these things are only being done through mobile computing and wireless communication.

In addition to cell phones or hand phones, different types of services are available. For example, we have personal digital assistants (PDA`S) and personal pocket computers (PC`s). Bagman use mobile devices to access up to date information from the collective database.

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For fetching or identifying the fingerprint of any criminal, a police officer can send it over the wireless network to the central database. Which leads to fast identification of suspect and gets him arrest as fast, which saves time of officer and not let the suspect to go far away from him. And now we also have one more technology which is Global Potential System whose work is of monitoring the area like wildlife preservations etc. also uses for searching some place over the internet if we want to go somewhere and we don't know exactly the root for going over there, so we can just easily put the name of the place and further reach our destination easily. It is also used for rescuing something or for rescue mission.

Expansion of Wireless Networks and Services

The 1st generation wireless technology was (1G) which was analog, and it was launched in Japan by Nippon Telegraph and Telephone (NTT

Who developed it in 1979 and within five years the whole crowd of Japan was covered up or they all get accessed to the first-generation wireless technology. Which was focused on Frequency Division Multiple Access (FDMA). It was having 1664 channels available in the 824 to 849 MHz and 894 MHz band, which were provided 832 Downlink and 832 Uplink channels. A standard system named as Advanced Mobile Phone Service (AMPS) was used in United States and other countries for analog signal cellular telephone service which was based on the initial electromagnetic radiation spectrum. It supports frequency reuse and its

data speed was very low it was likely to be 60 to 64 kbps, like if we want to download a 1 mb file it takes around 30 to 45 minutes to download that 1 mb file.

The 2-Generation wireless technology was (2G) which was launched for the Global System for Mobile Communications, developed by Radiolinja in Finland in 1991. There were three primary benefits of 2G network over 1G. It was having high data packet speed than 1G or we can say it was having fast transmission speed or double transmission speed, we can say the internet was fully discovered at the time of this 2G wireless technology development. It was having transmission speed up to 128 kbps, which means it takes half time in comparison to 1G wireless service to get data packet transmitted from 1 device to another device. It was also having a feature like roaming which means if we are going from our state to some other country or state then we will access all these services even over in that state or country with cutting some additional charges like if our call is of Re.1 cost then it might be charged as Rs1.5 or Rs2.00, Rs0.5 for ensuring services. And the second main feature of this service was Short Message Service (SMS) which is used to send a short message up to 160 characters as a text to another device or person.

Third wireless technology was 2.5G which supports features more than 2G services. It has facilities like internet access and packet switching, it also provides seamless transition technology between 2G and 3G. 2.5G systems are classified below:

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First one is High Speed Circuit-Switched Data (HSCSD) which also supports the data packet switching and it enhances the 2.5G performance and it also enhanced its transmission speed. It is used for enhancing the performance of GSM and provides the support for web browsing and file transfers. The technology which was used in it was Time Division Multiple Access (TDMA).

Second one is General packet radio services (GPRS) which is the enhanced version of 2.5G. Now speed of transmission of data packet has increased to 192 kbps and by this GSM performance also increased. GPRS provides always on connectivity which means for each transmission the data user do not have need to reconnect to the network. As it have more than eight slots to transmit calls on one device, it allows user to have more than one transmission request at just one single time. For example, a voice call or a text message can be controlled or handled at one time simultaneously.

The third one is Enhanced Data Rates for GSM (EDGE) which is the combination of both GPRS and TDMA over GSM network. It was faster than 2.5G and we can say it was 2.7G with having higher packet speed up to 384 kbps. The transmission speed of EDGE was too faster than 2.5G. It supports data communication over technology existing networks.

The fourth one technology was 3G which was created for high bit rate with over 384 kbps packet transmission speed. It was created to meet the provision or requirement of multimedia applications and internet services. By the time of 3G the new feature discovered which was video calling over mobile cellular data through which we can interact with our friends, our colleagues and guardians etc. face to face instantly from our sitting place to around the world and even video conferencing and online interview has started at that time which saved time and money of the business enterprises and companies and individual people. And the other capability of this 3G system was that it has ability to find the user`s location within 125 m with 67% of time. Below is the figure which shows the evolution of all these services.
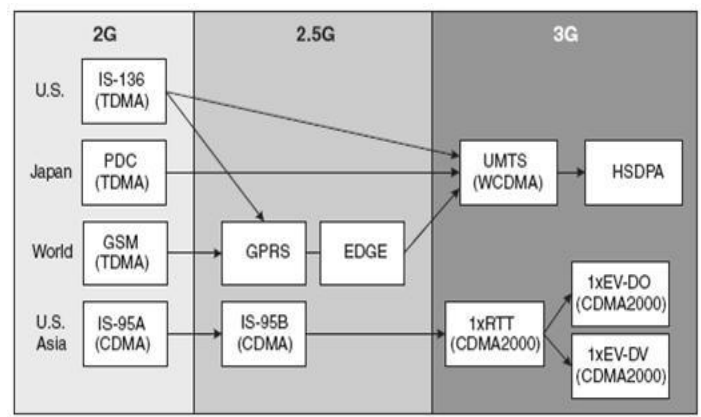

Figure 1.1   Evolution of wireless standards.

Types of Mobile Computing

There are some types of mobile computing have been introduced since 1990`s which includes:

1. Wearable Computer

2. Personal Digital Assistant

3. Smartphone

4. Carputer

5. Ultra-Mobile PC

Wearable Computers: -

Wearable computers are those computers which are also knows as body worn computers or the computers which we can wears, nowadays we are seeing wearable computers in the form of watches, which we wear on our hand. The advantage of this is we can go anywhere and we can instantly receive and send calls without being using our phone. Basically, these used specially for fitness purpose like tracking speed while running or jogging and tracking the distance how much he or she ran in kms. Or it helps in maintaining the schedule of time of someone`s like when he or she had to done what thing all these things can be managed by these wearable computers.

Personal Digital Assistant (PDA): -

A personal digital assistant is a mobile gadget which works as a personal formation collector or manager which was introduced as an Organizer (The first PDA) in 1984 by Psion. It was used for navigation as it had a touchscreen and a memory card slot for storing information. For inputting data in PDA, the thumb key and a numeric keyboard was used. And it was having features like a calendar for ensuring dates and a to do list and an address book for storing contacts. PDA`s becomes rarely used devices by the 2010 as the technology improved the use of PDA`s become obsolete.

Smartphone: -

A smartphone is a device which typically perform all the tasks with having an interface and a touch screen and internet access. It really, helped the people in a good way as well as in a bad way also. Good ways are that we can capture our pictures, selfies, video calling, voice calling, and n number of features are over there through which all things are gets managed by smartphones like we can put an alarm clock by setting time in it. We can share our memories our sweet times with our friends and families with different social media applications like Facebook, Instagram, WhatsApp etc. as smartphones have ability to store those multimedia applications. It has a slot of memory for storing the data and a primary memory called as RAM which is used for installing an application in a smartphone for running an application RAM is used.

An Ultra-Mobile Personal Computer is a type of Pen Computer which is the mini version of Pen computer and it is a class or type of a laptop whose specification was launched in 2006 by Microsoft and Intel. It was having a TFT (Thin Film Transistor) display in which each pixel was controlled by transistors. We find this display in desktops, laptops, television, mobiles etc.

Carputer: -

The word Carputer came from the two words car and computers which is fixed in a car for playing music and videos and for navigation purpose. It also includes upgraded technologies like GPS through which we can go to our exact location we just typed our destination and it show the fastest root for reaching out our destination as fast as it shows. Other feature is of Bluetooth through which we connect our smartphone with carputer for performing tasks like playing music of our phone with carputer, but these carputers are only and specially made for automobiles.

Technical and Non-Technical Drawbacks of Mobile Computing

As far as mobile computing has beneficial features it also has some drawbacks and we can say some issues related to mobile computing which leads to many technical and non-technical drawbacks we have discussed below.

Insufficient Bandwidth

Insufficient bandwidth simply means it have slow transmission or we can say slow sending and receiving of data packet. In general terms we can say a bandwidth is an ability or capacity of a cable to transmit the data from one point to another point. More bandwidth means high transmission speed so in concepts of mobile computing it have low bandwidth if we talk about the 2G or

Ultra-Mobile PC: -

2.5G, which leads to slow transmission data rates which measured in the terms of Mbps (Mega Bits Per Second) and Gbps (Giga Bits Per Second).

Power Consumption

When we were not having power generators or availability of energy, we use highly expensive batteries for better performance and working of mobile computing as it takes more and more power to be used for better working and the cost of energy which was used from the batteries were so costly.

Security Standards

Security standards are we can say some issues related to mobile computing like unethical or improper activities like hacking, online frauds, industrial intelligence which leads to theft in online transactions and hacking important data files of hidden agencies like we can say in India we have RAW which can lead to know the rivalry what we are planning and what plan we are plan to be executed.

Transmission Obstruction

In transmission obstruction we have the interfere of some unexceptional things like weather and signal weakness which leads to transmission obstruction or which interfere unexceptionally while we are doing transmission of data packet over a network due to which transmission get interrupted or canceled.

Probable Health Dangers

Nowadays we see many road accidents are increasing while a person has lack of concentration while driving and talking on his phone constantly and suddenly a big vehicle hits him which leads him to death.

And there are some signals and cell battery problems through which a person got diseased and fired up by the explosion of battery.

Portable Computing Device

There are numbers of portable devices which can run on the batteries but excluding to laptops, Mobiles, keyboard less PC`s, PDA`s, Smartphones etc.

Portable Computer

A portable computer is a computer which can be easily placed from one place to another. And we can say it is a general-purpose computer which is used to do general tasks we can`t use it while transmitting data in it or from it, as it needs to get setting up and power source like AC. The best example for this portable computer is "Adaptable" Pc.

Tablet PC

A tablet Pc is a is a portable computer which is light weighted and handy in nature which we can carry with us wherever we go. A tablet pc we can say combination of both PDA`s and Notebook Pc. It was having application software which is used to run a

virtual keyboard with having a touchscreen and battery inside it for power consumption. It can do maximum task as laptop do.

We`re having some more portable computers like UMPC`S, Smartphones PDA`s etc. which we discussed above.

Mobile Computing Applications Issues

The programs which are used for making connection from a device to the internet through mobile devices like cell phones, computers and palms etc. are called mobile computing applications. Below we have discussed some issues regarding to mobile computing.

Technical Design

First we have the technical design issue which consists of network design like how a network should be designed and what capacity we have to give that network which it have ability to handle the data over a network and how data should be compressed and what response time we`re getting or at what speed data transmission is being done. Technical design plays a crucial part in mobile computing project and system administration.

Network Design

Network designs issues are the issues regarding the design of Wireless Local Area Network (WLAN) and Wide Area Radio Network Design (WARND) which we have discussed below.

Wireless LAN Design Issues

• The number of mobile users who will use wireless LAN and the number of them active during the peak period.

• The types of LAN application permeate by them. (Keeping in mind that wireless LANs will not be acceptable for the planned users as they produce at much slower speed than wired LANs).

• Use of notebook with a wireless NIC as an essential and user device.

Wide Area Radio Network Design

• Most convenient radio network technology for the suite of applications.

• Pairing of user application-usage profiles to a given network ability.

• Alliance of RNA technology within radio network framework.

• Assuring better analysis & a small number of dead spots.

Data Confining and Examination

As we know the bandwidth of wireless network is modest and deficient it is mandatory to confine the packet data to have the higher bandwidth. Mostly this process is done in the modem by going through the modem hardware in deducting the

congestion over the wireless network using client network program.

System Availability Design

Rather than stay on with the normal base station hardware & network monitors, redundancy & message switches are typically made on error permissive framework. Public shared network providers must be approached for details of their redundancies. MCSS is other main component that really needs controlled redundancy.

Conclusion

The world of personal computing has become more connected. The arrival of the World Wide Web has caused an explosive growth in the population of Internet users. Every day more and more people becoming starting using network services. It has changed the path we work, the path we think. The world of computing has become much bilateral. Now we have quick or fast responses of everything we do on these computing gadgets. Even as we move to a more decentralized, remote model of computing our expectations stay the same.

The world of computing has become more technical. The gadgets or electronic devices like computers, mobiles, etc. has become much smaller than we used before.

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