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Mobile Cloud Computing - New Paradigm of Computing

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ABSTRACT

Mobile Cloud Computing (MCC) is the association of cloud computing, mobile computing paradigm to provide strong computing resources to mobile users, network operators, and cloud providers. The ultimate goal of MCC is to provide rich user experience using rich mobile applications. It accommodates equal business opportunities for network operators and cloud providers. Mobile computing provides with wireless, flexible communication while on the move and Cloud eases the need of service on demand through its various dimensions. The goal of this paper is to present how mobile cloud computing is emerging as a viable solution for current day urban life. We also discussed the characteristics, restrictions, applications of mobile computing in association with the cloud paradigm.

Keywords **-** Introduction, key concept, characteristics, current technologies, Advantages, limitations of mobile computing, need of mobile computing and issues of mobile computing.

I. INTRODUCTION

Mobile computing is a Mobile Computing is a technology that allows transmission of data, without having to be connected to a fixed physical link. The mobile computing devices, which usually interact in some fashion with a central information system while away from the normal, fixed workplace. it allows transmission of data, voice and video via a Laptop or any other wireless enabled device without having to be connected to a fixed physical link. We are discussing main characteristics, limitations, applications, advantages of mobile systems and their architecture.

The main concept involves:

A. Mobile Communication

B. Mobile Hardware

C. Mobile Software

A.Mobile Communication

The mobile communication in this case, refers to the infrastructure put in the place to ensure that seamless and reliable communication goes on.

B. Mobile Hardware

Mobile Hardware Includes Mobile Devices Components that receive or access the services of mobility, they would range from portable laptops, smart phones, table, Pc's Personal Digital Assistants.

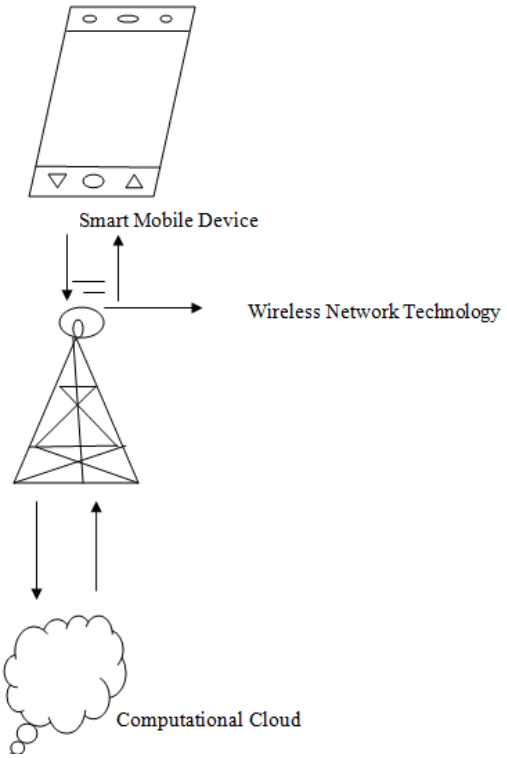
C. Mobile Software

Mobile Software is the actual program that runs on the Mobile hardware. It deals with the characteristics and requirements of mobile application.

This is the engine of the Mobile Devices.

In Mobile Computing platform information between processing unit flows through wireless channels.

The discipline of Mobile Computing has its origin in Personal Communications Services (PCS)



II. LITRATURE REVIEW

1] Deepak G, Dr.Pradeep BS[1]

Mobile Computing offers significant benefits for organization that choose to integrate the technology into their fixed organizational information system. Mobile Computing is made possible by portable computer hardware, software and

communications System that interact with a non mobile organizational information system while away from the normal, fixed workplace. Mobile Computing is a versatile and potentially strategic technology that improves information.

The name of mobile is derived from the first letter in each of the six categories that makeup the framework.

M-The need of mobility

O- The need to improve operation.

B- The need to break business barriers.

I - The need to improve information quality.

L- The need to decrease transaction log.

E - The need to improve efficiency.

2] Kusuma kumari B.M , assistant professor , department of CS university college of science , Tumkar.[2]

Kusuma kumari B.M study from constraints of mobility and limitation of mobile computing .

1. Insufficient Bandwidth
2. Security Standard
3. Power Consumption

3] Han Qi faculty of CS and IT of Malaysia KualaLampur , Malaysia or Abdullah Gani university of Malaya ,Malaysia[3]

Has studied architecture of Mobile Cloud Computing .The Mobile Cloud Computing is a development of Mobile Computing .The terminal which people used to access and acquire cloud services are suitable for Mobile Devices like smart phone , PDA , Tablet , and I-pad but not restricted to fixed devices. Which connects with a hotspot or base station by WI- FI or GPS .

4] Sakshi Gujral CSE department, Kashmiri gate Delhi , India[4].

studied Architecture of Mobile Computing that uses model view controller.

1. Presentation Layer
2. Application Layer
3. Data Layer

5] Miss Poonam S. Sharma Student of master Engg, Amravati. She study techniques of Mobile Computing and they studied some challenges or solutions for Cloud Computing.[5]

6] Dr. Pranav Patil Studied some characteristics of Mobile Cloud Computing and important limitations. [6]

III. KEY CONCEPT

3'rd Generation	4'th Generation
1. It came in 2000	1. It came in 2010-2015
2. it is known as three band 3G	2. 4G is the fourth generation mobile communication
3 .The maximum data transfer speed is up to 3.1 mbps	3. Speed for 4G are further increased to keep up with data access demand used by different services
4. It provides digital navigation and access to video	4G provides high nition streaming and e additional qualities n as multimedia.
5. 3G network frequency band is 1.8-2.5 GHZ	5. 4G network frequency is 2.8 GHz
6. 3G uses turbo codes for error correction	6. Concatenated codes are used for error correction in 4G
7. 3G connection type is circuit switching	7. 4G connection type is packet switching
8. 3G Mobile TV resolution is low	8. 4G Mobile TV resolution is high
9. 3G services is CDMA2000,UMTS,EDGE	9. 4G services is Wimax2 LTE-Advance

IV. CHARACTERISTICS OF MOBILE COMPUTING

1. Portability:

The ability to move a device within a learning environment or to different environments with ease.

2. Social Interactivity:

The ability to share data and collaboration between users.

3. Context Sensitivity:

The ability to gather and respond to real or simulated data unique to a current location, environment, or time.

4. Connectivity:

The ability to be digitally connected for purpose of communication of data in any environment.

5. Individual:

The ability to use the technology to provide scaffolding on difficult activities and lesson customization for individual learners.

6. Small Size:

Mobile device are also known as handhelds, palmtops and smart phones due to their roughly phone-like dimensions. A typical mobile device will fit in the average adult's hand or pocket. Some mobile devices may fold or slide from a compact, portable mode to a slightly larger size, revealing built-in keyboards or larger screens. Mobile devices make use of touch screens and small keypads to receive input, maintaining their small size and independence. The standard form of a mobile device allows user to operate it with one hand, holding the device in the palm or fingers while executing its functions with the thumb.

7. Wireless Communication:

Mobile devices are typically capable of communication with other similar devices, with stationary computers and systems, with networks and portable phones. Base mobile devices are capable of accessing the Internet through Bluetooth or Wi-Fi networks, and many models are equipped to access cell phones and wireless data networks as well. Email and texting are standard ways of communicating with mobile devices, although many are also capable of telephony, and also some specialized mobile devices, such as RIFD and barcode.

V. CURRENT TECHNOLOGIES OF MOBILE COMPUTING

1. 3G (Third Generation):

Third generation mobile telecommunications is a generation of standards for mobile phones and mobile telecommunications services fulfilling the international mobile telecommunications-2000 specifications by the international telecommunications union. Application services include wide area wireless voice telephone, mobile internal access, video calls and mobile TV, all in a mobile environment.

2. Global Positioning System (GPS):

The Global Positioning System (GPS) is a space based satellite navigation system that provides location and time information in all weather, anywhere on or near the earth, where there is an unobstructed line of sight to four or more GPS satellites.

3. Long Term Evolution (LTE):

LTE is a standard for wireless communication of high speed data for mobile phones and data terminals. It is based on the GSM/EDGE and UMTS/HSPA network technologies, increasing the capacity and speed using new modulation techniques. It is related with the implementation of fourth generation (4G) technology.

4. WIMAX:

WIMAX (Worldwide Interoperability For Microwave Access) is a wireless communications standard designed to provide 30 to 40 megabit per second data rates, with the latest update providing up to 1Gbits for fixed stations. It is the part of fourth generation or 4g wireless communication technology.

5. Near Field Communication:

Near Field Communication (NCF) is a set of standards for smart phones and similar devices to establish radio communication with each other by touching them together or bringing them into close proximity, usually no more than a few centimeters.

VI. ADVANTAGES OF MOBILE CLOUD COMPUTING

Mobile Cloud Computing has changed the complete land space of our day to day life. Following are the major advantages of Mobile Computing.

1] Location Flexibility:

This has enable users to work from anywhere as long as there is a connection established. A user can work without being in a fixed position. There Mobility Ensure that they are able to carry out numerous, tasks at the same time and perform their stated jobs.

2] Save Time:

Tile the time consumed or wasted while travelling from different location or to the office and back has been slashed .One can now access all the important document and files over a secure channel or portal and work as if they were in their computer.

3] Enhanced Productivity:

User can work efficiently from whichever location they find comfortable. This is enhanced their productivity level.

4] Ease of Research:

Research has been made easier, since users earlier were required to go to has field and search for facts and feed them back into the system. It has also made it easier for field officer and researchers to collect and feed data from wherever they are without making unnecessary trips to and from the office to the field.

5] Entertainment:

Video and audio recording can now be streamed on the go using Mobile Computing. It's easy to access a wide variety of movies, educational and informative material.

6] Streamlining Of Business Processes:

Business processes are now easily available through secured connections. Looking into security issues, adequate measures have been put in place to ensure authentication and authorization of the user accessing the services.

VII. NEED OF MOBILE CLOUD COMPUTING

They include cell phones and other portable devices. Mobile Computing can use cell phone connections to make phone calls, well as to connect to the internet.

Eg: Laptops, Smart phones.

Cell phones have become a necessity for many people throughout the world. The ability to keep in touch with family, business, association, and access to email are only a few of the reasons for the increasing importance of cell phones.

Today's technically advanced cell phones are capable of not only receiving and placing phone calls, but storing data, taking pictures and can even be used as walkie talkies, to name just a few of the available option.

Mobile computing requires mobile applications to be stored in the device storage thus imposing space restrictions on the other hand MCC allows Web Applications to be accessed through the cloud without concern of device storage thus eliminating the Native device Applications.

VIII. LIMITATIONS OF MOBILE CLOUD COMPUTING

1. Insufficient bandwidth:

Mobile internet access is generally slower than direct cable connections, using technologies such as GPRS and EDGE, and more recently HSDPA and HSUPA3G networks.

2. Security standard:

When working mobile, one is concern while concerning the mobile. Computing standards on the fleet. One can easily attack the VPN through a huge number of networks interconnected through the line.

3. Power consumption:

When a power outlet or portable generator is not available, mobile computers must rely entirely on battery power.

4. Transmission interferences:

Weather, terrain, and the range from the nearest signal point can all interfere with signal reception. Reception in tunnels, Some buildings, and rural areas if often poor.

5. Potential health hazards:

People who use mobile devices while driving are often distracted from driving and are thus assumed more likely to be involved in traffic accidents.

6. Human interface with device:

Screens and keyboards tend to be small, which may make them hard to use. Alternate input methods such as speech or handwriting recognition require training.

IX. ISSUES OF MOBILE CLOUD COMPUTING

1. Emergency efficient transmission:

There should be a frequent transmission of information between cloud and mobile devices.

2. Architectural issues:

Mobile Cloud Computing required making architectural neutral because of heterogeneous environment.

3. Live VM migration:

It is challenging to migrate an application, which is resource intensive to cloud and to execute it via virtual machine.

4. Mobile communication congestion:

Due to continuous increase in demand for Mobile Cloud services, the workload to enable smooth communication between cloud and mobile devices has been increases.

5. Security and Privacy:

This is one of the major issues because mobile user share their personal information over the cloud.

X.CONCLUSION

Mobile computing is an important, evolving technology. In this paper we discussed several aspects on secure data processing, Introduction, key concept, characteristics, current technologies, Advantages, limitations of mobile computing, need of mobile computing and issues of mobile computing.

REFERENCES

[1] Deepak G, Dr. Pradeep B S, "Challenging Issues and Limitations of Mobile Computing", Computer Technology And Applications, vol 3(1), 177-181 and Research Publication ISSN: 2229-6093.

[2] Kusuma Kumari B.M, "Challenging Issues and Limitations of Mobile Computing", An International Journal Of Advanced Computer Technology, Research Publication ISSN: 2320-0790.

[3] Han Qi faculty of CS and IT of Malaya Kuala, "Research on Mobile Cloud Computing ".

[4] Sakshi Gujral, "Mobile Computing and Snapdragon", International journal of computer science and mobile Computing and Research Publication ISSN: 2320-088X.

[5] Miss. Poonam S. Sharma, "Mobile Cloud Computing: Its Challenges and Solutions", An International of Computer Science and Mobile Computing and Research Publication ISSN: 2320-088X.

[6] Dr. Pranav Patil, "An International of Computer Science and Mobile Applications and Research Publication ISSN: 2321-8363."

[7] Sited on https://www.tutorialspoint.com/mobile_computing/mobile_computing_overview.htm

[8] Sited on https://en.m.wikipedia.org/wiki/mobile_computing