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A SURVEY ON MOBILE CLOUDS IN CURRENT SCENARIO

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***Abstract*— Mobile devices such as smart phones, tablets, laptops, embedded boards, robots can serve as 'dumb' terminals for cloud computing services over intelligent network. Mobile cloud has emerged as a new cloud computing platform that 'puts cloud into a pocket'. Mobile Computing has fast become an important new paradigm in today's world of networked computing systems. Important issues include optimizing the scheduling and transport schemes, access management, and application optimization, for mobile devices to achieve energy saving. This talk will first introduce the development of mobile cloud computing and describe some applications involving multimedia, vision/recognition, graphics, gaming, text processing. In the process, we will seek to gain an improved understanding about where the field is headed, and what is the importance in the mobile computing. We explored how client devices can use standards to interact with cloud services. This provides flexible communication between people and continuous access to networked services. Mobile computing is revolutionizing the way computers are used and in the coming years this will become even more perceptible although many of the devices themselves will become smaller or even invisible to users.**

***Index Terms*—mobile Cloud, mobile computing, survey, mobile devices**

I. INTRODUCTION

Mobile computing Is the combination of Cloud computing and mobile networks to bring benefits for mobile users, network operators, as well as cloud providers . Cloud computing exists when tasks and data are kept on the Internet rather than on individual devices, providing on-demand access.

Figure1

Mobile clouds= cloud computing + mobile networks.
A technology that allows transmission of data, via a computer, without having to be connected to a fixed physical link. Technology as it allows users to transmit data from remote locations to other remote or fixed locations. This proves to be the solution to the biggest problem of business people on the move - mobility. One of the main benefits of cloud computing is reducing downtime and wasted expenditure for servers and other computer equipment. A given company is required to purchase the minimum amount of hardware necessary to handle the maximum points of stress on their system. Given situations where the strain and traffic are highly variable this leads to wasted money. The mobile platform is going to be heavily influenced by this technology as well. Basically, the term 'mobile cloud computing' refers to a way of communications where both operations, data storage and data processing, happens outside of the mobile device

A. Mobile computing involves

Mobile Computing is a technology that allows transmission of data, voice and video via a computer or any other wireless enabled device without having to be connected to a fixed physical link. The main concept involves:
Mobile communication
Mobile hardware
Mobile software

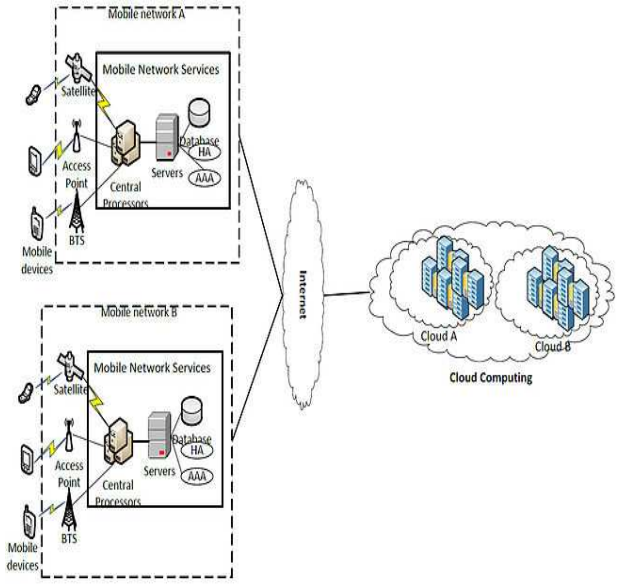


Figure 2

1) Mobile communication

The mobile communication in this case, refers to the

infrastructure put in place to ensure that seamless and reliable communication goes on. These would include devices such as Protocols, Services, Bandwidth, and Portals necessary to facilitate and support of the stated services. The data format is also defined at this stage. This ensures that there is no collision with other existing systems which offer the same service.

Since the media is unguided/unbounded, the overlaying infrastructure is more of radio wave oriented. That is, the signals are carried over the air to intended devices that are capable of receiving and sending similar kinds of signals.

2) Mobile hardware

Mobile hardware includes mobile devices or device components that receive or access the service of mobility. They would range from Portable laptops, Smartphones, Tablet Pc's, Personal Digital Assistants. These devices will have receptor medium that are capable of sensing and receiving signals. These devices are configured to operate in full- duplex, whereby they are capable of sending and receiving signals at the same time. They don't have to wait until one device has finished communicating for the other device to initiate communications. Above mentioned devices use an existing and established network to operate on. In most cases, it would be a wireless network.

3) Mobile software

Mobile software is the actual program that run on the mobile hardware. It deals with the characteristics and requirements of mobile applications. This is the engine of that mobile device. In other terms, it is the operating system of that appliance. It's the essential component that makes the mobile device operate. Since portability is the main factor, this type of computing ensures that users are not tied or pinned to a single physical location, but are able to operate from anywhere. It will incorporate all aspects of wireless communications. This tutorial will look into the concept of mobile computing, current and future trends, advantages, applications, and major security concerns.

II. WHY MOBILE CLOUD COMPUTING

It's a fact that very soon the smart phones will be so common to use because of its benefits and advantages. And so on the demand of such phones will increase because of the mobile cloud computing trend. There are some more web developers who are eligible for making and building the mobile web applications, however there are certain other types of the developers of mobile devices. Although, this is a fact that such types of smarter phones are becoming more reliable and useful for the people who are enterprisers. As it will be easy to access for web browsing that will definitely have a good impact on the growth of mobile cloud computing.

A. Mobile computing major advantages

Mobile computing has changed the complete landscape of human being life. Following are the clear advantages of Mobile Computing:

1) Location flexibility

This has enabled user to work from anywhere as long as there is a connection established. A user can work withoutbeing in a fixed position. Their mobility ensures that they are able to carry out numerous tasks at the same time perform their stated jobs.

2) Saves Time

The time consumed or wasted by travelling from different locations or to the office and back, have been slashed. One can now access all the important documents and files over a secure channel or portal and work as if they were on their computer. It has enhanced telecommuting in many companies. This also reduces unnecessary expenses that might be incurred.

3) Enhanced Productivity

Productive nature has been boosted by the fact that a worker can simply work efficiently and effectively from which ever location they see comfortable and suitable. Users are able to work with comfortable environments.

4) Ease of research

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

5) Entertainment

Video and audio recordings can now be streamed on the go using mobile computing. It's easy to access a wide variety of movies, educational and informative material. With the improvement and availability of high speed data connections atconsiderable costs, one is able to get all the entertainment they want as they browser the internet for streamed data. Onecan be able to watch news, movies, and documentaries among other entertainment offers over the internet. This was not such before mobile computing dawned on the computing

world.

6) Streamlining of Business Processes

Business processes are now easily available through secured connections. Basing on the factor of security, adequate measures have been put in place to ensure authentication and authorization of the user accessing those services. Some business functions can be run over secure links and also the sharing of information between business partners. Also it's worth noting that lengthy travelling has been reduced, since there is the use of voice and video conferencing.

7) Advantages to the users of mobile apps

With cloud-based apps, mobile users do not need high-end hardware and infrastructure to run or maintain mobile apps. Businesses are able to pass along the reduced cost of development to their users, while improving the functionality of data sharing, and offering features like collaboration that were not previously feasible. All told, users with any Internet-enabled device can run many more apps and more powerful apps than ever before, at little or no cost.

8) Advantages to the developers of mobile apps

The advantages of cloud computing for mobile app developers are most pronounced. One, cost savings. Developers need not invest heavily in building infrastructure and resources. Cloud computing provides instant access to scalable mobile application tools for building mobile and tablet apps. Two, cross-platform app development. Developers can now build an app once and deploy across multiple platforms. And of course, building once and deploying to many devices dramatically reduces the cost of developing apps. Three, deploying apps to app stores and web sites is much easier. For example, developers can avoid device manufacturers or carrier app stores to distribute their apps, and publish them on their own private channels.

9) Mobile computing security issues

Mobile computing has its fair share of security concerns as any other technology. Due to their nomadic nature, it's not easy to monitor the proper usage. User might have different intentions on how to utilize this privilege. Improper and unethical practices such as hacking, industrial espionage, pirating, online fraud and malicious destruction are some but few of the problems experienced by mobile computing.

Another big problem plaguing mobile computing is credential verification. It's not possible to that the person using that person is the true barrier. Other users share username and passwords. This is also a major threat to security. This being a very sensitive issue, most companies are very reluctant to implement mobile computing to the dangers of misrepresentation.

The problem of identity theft is very difficult to contain or eradicate. Issues with unauthorized access to data and information by hackers, is also a plaguing problem. They gain access to steal vital data from companies. This problem has been a major headache and hindrance in rolling out mobile computing services. No company wants to lay open their secrets to hacker and other intruders, who will in terms sell them to their competitors. It's also important to take the necessary precautions to minimize these threats from taking place. Some of those measures include:

- Hiring qualified personnel.
- Installing Security Hardware and Software.
- Educating the Users on proper Mobile computing ethics.
- Auditing and developing sound, effective policies to govern mobile computing.
- Enforcing proper access rights and permissions.

These are just but a few ways to help deter possible threats to any company planning to offer mobile computing. Since information is vital, all possible measures should be evaluated and implemented for safeguar purposes.

In the absence of such measures, it's possible for exploits and other unknown threats to infiltrate and cause irrefutable harm that would cost a huge of damage. These maybe in terms of reputation or financial penalties. In such cases, it's very easy to be misused in different unethical practices. The other issue would be online security. If this factor isn't properly worked on, it might be an avenue for constant threat. Theft and Espionage can be also another fact limiting its full utilization. Various threats to security still exist in implementing this kind of technology.

III. MOBILE COMPUTING CURRENT TRENDS

In today's computing world, different technologies have come up. These have grown to support existing computer networks all over the world. With mobile computing, we find that the need to be confined within one physical location has been eradicated. We hear of terms such as tele commuting. This is being able to work from home or the field but atthe same time accessing resources as if one is in the office.

The emergence of portable computers and laptops, personal digital Assistants (PDA), PC Tablets and Smartphones, has in turn made mobile computing very convenient. The portability of the devices ensures and enables user to access all services as if they were in the internal network of their company. For example, the use of Tablet Pc and Ipads. This new

technology enables users to update documents, surf the internet, send and receive e-mail, stream live video files, take photographs and also support video and voice conferencing.

The constant and ever increasing demand for superior and robust smart devices has been as a catalyst for market share. Each manufacturer is trying to curve a niche of themselves in the market. These devices are invented and innovated to provide top of the class applications and services. With cellular phones, different manufacturers have come up with unique Smartphones that are capable of performing the same tasks as computers and at the same processing speed. The market share for different competitors is constantly being fought for. For example the manufacturers of Apple's Iphone OS, Google's Android' Microsoft Windows Mobile, Research In Motion's Blackberry OS, are constantly competing to offer better products with each release.

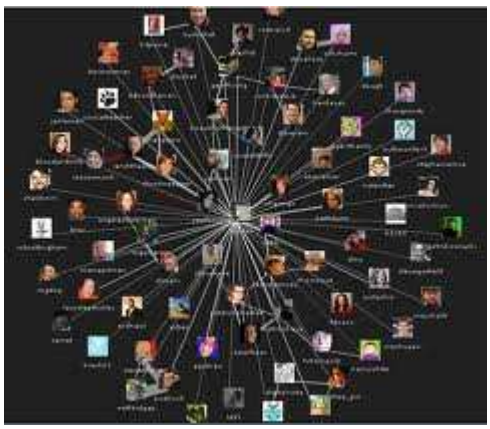
The essence of mobile computing is to work from any location. The use of Ipads, Tablets, Smartphones, and notes books, have in turn pushed the demand for these devices. Modern day workers have such devices that enable them carry out their work from the confines or comfort of their present location. These devices are configured to access and store large amounts of vital data. Executive and top management

can act of decisions based of ready information without going to the office. For example, sales reports and market forecasts can be accessed through this devices or meeting carried out via video or audio conferencing through the device. With such features being high in demand, manufacturers are always and constantly coming up with applications geared to supporting different service delivery in terms of mobile computing.

A. Evolution of mobile clouds

1) Evolution of 4G

3G or 3rd generation mobile telecommunications is a generation of standards for mobile phones and mobile telecommunication services fulfilling the International Mobile Telecommunications-2000 (IMT-2000) specifications by the International Telecommunication Union. Application services include wide-area wireless voice telephone, mobileInternet access, video calls and mobile TV, all in a mobile environment.



2) GPS (Global Positioning System)

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. The GPS program provides critical capabilities to military, civil and commercial users around the world. In addition, GPS is the backbone for modernizing the global air traffic system, weather, location services.

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. Its related with the implementation of forth 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 1 Gbit/s for fixed stations. It is a part of a fourth generation, or 4G, of wireless-communication technology. WiMax far surpasses the 30-metre wireless range of a conventional Wi-Fi local area network (LAN), offering a metropolitan area network with a signal radius of about 50 km.WiMax offers data-transfer rates that can be superior to conventional cable-modem and DSL connections, however, the bandwidth must be shared among multiple users and thus yields lower speeds in practice.

5) Near Field Communication

Near field communication (NFC) is a set of standards for Smartphones 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. Present and anticipated applications include contactless transactions, data exchange, and simplified setup of more complex communications such as Wi-Fi. Communication is also possible between an NFC device and an unpowered NFC chip, called a "tag".

IV. CONCLUSION

With the high increasing of data computation in commerce and science, the capacity of data processing has been considered as a strategic resource in many countries. Mobile cloud computing (MCC), as a development and extension of mobile computing (MC) and cloud computing (CC), has inherited the high mobility and scalability, and become a hot research topic in recent years. We conclude that there are three main optimization approaches in MCC, which are focusing on the limitations of mobile devices, quality of communication, and division of applications services. Firstly,

using virtualization and image technology can address it effectively, and immigrate task from terminal to cloud is also a good way to achieve better results. Secondly, as we know the quality of communication in wired network is better than in wireless network, so reducing the proportion of data delivery in wireless environment is an effective way to improve the quality. In addition, upgrading bandwidth is envisaged to be a simple way to increase performance but it incurs additional cost to users. Deploying an effective elastic application division mechanism is deemed to be the best solution to guarantee the application service in MCC; its complicated, but promising high impact results

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