

MOBILE CLOUD COMPUTING AS A FUTURE OF MOBILE MULTIMEDIA DATABASE

Amreen Khan and Kamalkant Ahirwar

Department of Computer Science and Engineering, Amity University, Noida, INDIA. E-mail: amreenkhan29@gmail.com, kamalkant28@gmail.com

ABSTRACT

In the past decade, due to technological advancement in wireless communications, mobile computing, and multimedia streaming mobile multimedia has experienced an explosive development. This paper shows the key issues of Mobile Multimedia Database Systems and the issues that need to take into consideration in the future.

Keywords: Mobile Multimedia databases, Mobile cloud computing.

1. INTRODUCTION

More of us use our mobile phones as mini-computers that travel with us and keep us connected 24 hours a day, and that number will surely continue to grow. Mobiles are now integral part of business world and importance of mobile database is inevitable.

According to a new study from ABI Research has revealed that 'cloud computing' will completely transform future of mobile applications development, and their use. 'Cloud computing' will dramatically reduce the requirement of advanced handsets for running mobile applications, according to the study. According to the latest study from Juniper Research, the market for cloud-based mobile applications will grow 88% from 2009 to 2014. The market was just over \$400 million this past year, says Juniper, but by 2014 it will reach \$9.5 billion [8].

A mobile database system (MDS) provides full database and mobile communication functionality. It allows a mobile user to initiate transactions from anywhere and anytime and guarantees their consistency preserving execution. Multimedia libraries have enormous amount of information for communication in audio, video, text, graphics, animation form.

With tremendous advancement in technology people expecting more and they want services anytime and anywhere. Although current technology and advancement allows connecting on move, still there are certain issues that hinders the communication process.

1.1 Mobile Multimedia Challenges

As multimedia data is consists of images, audio, video and text it requires large amount of storage and fast speed for transferring data. For storing and managing data in heterogeneous mobile environment certain issues are there that need to be concern and can be considered as issues of mobile multimedia database (MMMDB) issues are:

- How to represent database object efficiently
- Database architecture and model
- Efficient multimedia data retrieval

The other issues related to providing multimedia content to mobile devices are frequent device disconnection as in mobile environment connection breaks frequently that leads to the issue of synchronization and consistency. Mobility issues are need to be considered. There are basically two types of mobility (a) Terminal Mobility, (b) network Mobility. Although speed of Internet improved a lot in recent year with advancement of technology, but still there is need of improvement. Other issues are poor performance, limitation of communication bandwidth, limitation of the database model, data consistency, synchronization, limited device storage and other resource constraints. An issue of security and privacy is also important as data in mobile environment is broadcast; this may leads to issues of security and privacy of data.

2. FUTURE OF MMMDB: MOBILE CLOUD COMPUTING (MCC)

Cloud computing is the next big thing in the current market scenario. Cloud computing is not only related to personal computers, it also affects and heavily impact the mobile technology. In Mobile Cloud Computing both the data storage and the data processing happen outside of the mobile device i.e. when we combined concept of cloud computing in mobile environment. In MCC scenario all the computing power and data storage move into the mobile cloud. MCC will not provide benefits only to the smart phone users but for will help a broader range of mobile subscriber.

With MCC mobile phone user will get benefit in number of ways and help them to ran there business application without large amount of capital investment in infrastructure and services.

2.1 MCC: Services and Modes of Cloud Computing Considerations

In cloud computing there are different categories of cloud services. These services delivered to the users in real time via internet.

2.1.1 Software as a Service (SaaS)

In this model an application is hosted as a service to customer who accesses it via the Internet [7]. For example web user can use Google doc and they do not need to install any application for that. Other providers like Amazon provides cloud services and subscriber need to pay only for the amount of services they want to use.

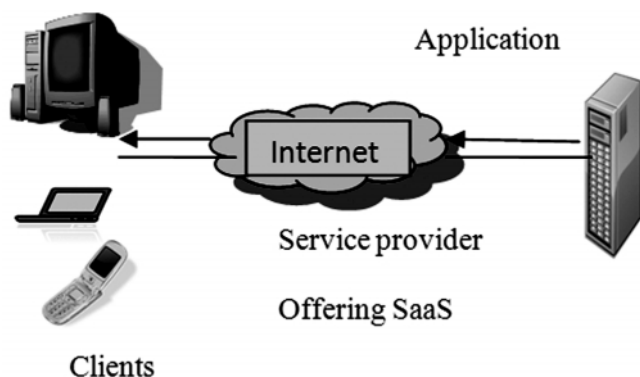


Fig. 1: Software as a Service (SaaS)

2.1.2 Platform as a Service (PaaS)

PaaS services include application design, development, testing, deployment and hosting [7]. In this not only services (application software etc) but server, memory and other platforms can be used and subscriber needs to pay as per terms and conditions.

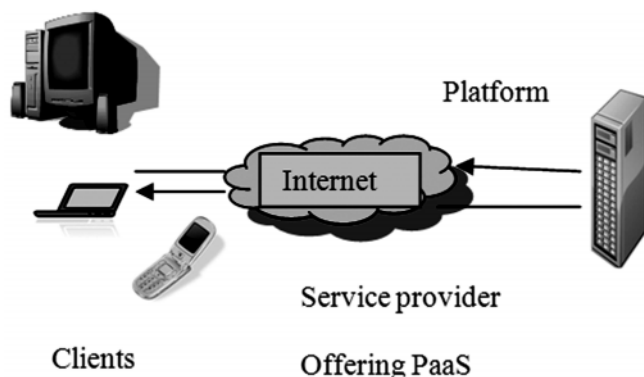


Fig. 2: Platform as a Service (PaaS)

3. MMMDB CONTENTS TYPE CONSIDERATION MCC ENVIRONMENT

Generally MMMDB contents are either Interactive or Non-interactive. The Interactive multimedia also known as non linear multimedia and non interactive multimedia known as linear multimedia. In interactive multimedia end user interact with the content with some appropriate

user interface. All e-learning materials are example of interactive multimedia. Thus in interactive multimedia processing consumption of power is much high as compare to non interactive multimedia. In non interactive multimedia user has no control on information flow i.e. it runs without any human intervention.

The following Fig. 3 illustrates the MMMDB interactive and non interactive contents retrieval and delivery with the mobile cloud computing. Non-interactive contents can be treated as a non interactive mobile TV contents. Of course a mobile device needs a receiver like a mobile TV to receive broadcasted Non-interactive multimedia contents [3].

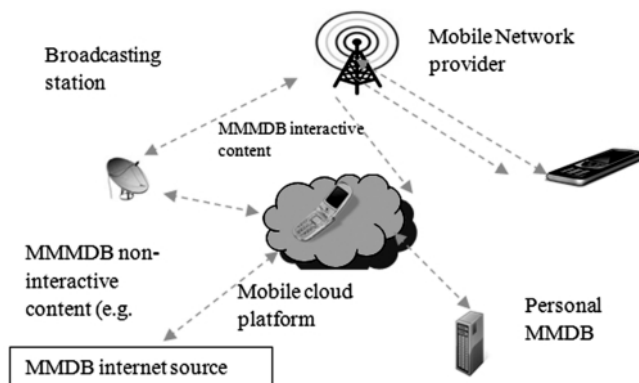


Fig. 3: Mobile Cloud

4. MOBILE CLOUD COMPUTING: FUTURE SCOPE AND CHALLENGES

In near future because of MCC there will be no need of downloading and installing applications on the mobile handsets (smart phones, tablets, etc.) users can access them directly in the cloud and display through the mobile browser, it is analogous to Software-as-a-Service provisioning. Other predictions includes according to Gartner's 2010 key IT predictions for organizations, in near future mobile phones expected to overtake PCs as the most common Web access device worldwide by 2013.

ABI Research predicts that there will be nearly one billion end users accessing the "mobile cloud" by 2014. Smart phone applications will move from the handset itself to the cloud-creating an ecosystem for new kind of smart phones-sometime termed "Mobile Cloud Phones" [8].

Although future of MCC is full of opportunities, but it has certain challenges as:

4.1 A Key Challenge for Cloud Computing is Network Availability and Intermittency. Because all Services will Provided Via Internet

4.2 Environment Challenges

The spaces in which mobile client and server that want to communicate are also an issue to be considered. This affects many other factors like delays and connectivity issues.

4.2.1 One Dimensional Metric Space

Mobile Target Server or Mobile Target Client on the road network can be considered as One Dimensional metric space. Here transit-time delay is to be considered as the major obstacle in delivering MMMDB contents. For example, on festive seasons, the mobile network will have relatively heavy traffic which will affect the transit-time. Similarly, another issue which can be considered in relation to transit-time delay is frequent access of current hot talks for certain periods of time. (Michael Jackson's ring tone, wall paper, MP3 and streaming videos). These sudden unexpected frequent accesses will affect the MMMDB's performance, scalability, integrity and availability [5].

4.2.2 Two Dimensional Metric Space

Mobile Target Server or Mobile Target Client on the plane like manner representation used in GIS can be considered as Two Dimensional metric space [5].

4.2.3 Three Dimensional Metric Space

"System involving control of aircraft or submarine can be considered as Three Dimensional metric space" [5].

4.2.4 Four Dimensional Metric Space

"System which concern themselves in the possibility of intersecting vehicles trajectories (usually trying to avoid collisions) may need to operate in four dimensions (3 spatial dimension and 1 temporal) can be considered as four dimensional metric space" [5].

Systems involving tracing device movements in incessant areas (at sea, in the air, fast moving wild fires, forest fires, strong wind, etc) in which, both devices and environment are mobile [5]. To represent this settings temporal dimension can be used.

4.2.5 Green Cloud

The core principle of the green Cloud is to bring new business opportunities to Telco and in the same time be as economically/energy efficient as possible [2].

Concept of green cloud is to perform all cloud computing function in an energy efficient environment. Although many architecture are proposed for this but still it requires improvement.

5. CONCLUSION

In this day to day changing technology environment, demands of the users also changes. Users demands quality service at anytime and anywhere with speed and accuracy. In this paper author discussed various issues including current problems and the problems that may arise in future. Author has discussed challenges that may encounter in implementation of MMMDB.

REFERENCES

- [1] Ismail Khalil Ibrahim, Handbook of Research on Mobile Multimedia.
- [2] Martin Gilje Jaatun, "Cloud Computing: First International Conference", *CloudCom 2009, Beijing, China*, December 1-4, 2009, Proceedings, Springer Publications.
- [3] Selvakumar Samuel, Kesava Pillai Rajadorai, "Mobile Multimedia Database Common Issues and Future Considerations", in Proceeding of MoMM 2009 IEEE.
- [4] J. Arreympi, and M. Dastbaz, "Issues in Delivering Multimedia Content to Mobile Devices", in *Proceedings of the Sixth International Conference on Information Visualisation, (IV'02)* 1093-9547/02 \$17.00 © 2002 IEEE.
- [5] Le Gruenwald, Frank Olken, "Mobile Database Research: What Is To Be Done?" DOI=web.mst.edu/~cswebdb/Workshop-AFRL/Paper3209559.pdf
- [6] Özsu, M.T. 1999. "Issues in Multimedia Database Management". In *Proceedings of the 1999 International Symposium on Database Engineering and Applications (August 02-04, 1999)*. IDEAS IEEE Computer Society, Washington, DC, 452.
- [7] Toby Velte, Anthony Velte, Robert C. Elsenpeter, "Cloud Computing: A Practical Approach", *Tata McGraw Hill Professional*, 2009.
- [8] Research Report by ABI Research in 2009. [www.abiresearch.com/1003385Mobile+Cloud + Computing](http://www.abiresearch.com/1003385Mobile+Cloud+Computing).