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Performance measurement and energy efficiency of smartphone for offloading task to cloud

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Abstract
In this paper we concerned in the use of Smartphone is the battery life due to the increase of its embedded sensors and it features. In cloud computing, we studies how the computational source extend. How the cloudlet and public cloud are used to perform offloading. Energy efficiency is the essential features of mobile system. Cloud computing has capacity to save mobile client energy. The application that are present on smart phone all the application are put into cloud so cloud is public network. That allocate spaces to variety of user and provide security by giving user ID and password so that energy consumption of mobile phone is less we execute all the application by using cloud.4G, Wi-Fi and 3G are the most commonly used technique to connect to the internet for offloading task. When we offloading task to cloud using technique 4G, Wi-Fi and 3G at that time we compare energy consumption. Today's every field uses the mobile phone and that help in various situation. We browse the internet, send emails messages, chatting with friends, download videos and audios, live movies can be watch on internet with the help of smart phone at same time many work should be handle by using mobile phone. But we are less happy because of battery lifetime.

Keywords: Cloud Computing, Smartphone, Wi-Fi, offloading

1. Introduction
Cloud computing has the potential to save the mobile client energy. But when we saving from offloading the computation there is need to extend the energy cost of additional computation [1].If the application are more computational powerful they can be offloaded or else they can be run in mobile system itself. If offloading that can be depends on various parameters such as energy consumption, bandwidth, speed when offloading done then sensitive data that can be send from Smartphone to cloud. At that time we concentrated on privacy [2]. Privacy can be protected using two techniques such as Encryption of data and Steganography in computation offloading [3].

In our day-to-day life mobile system is the platform where many computations are done for variety of user. There are large number of mobile devices such as PDA, Tablet, Smartphone etc. They capacity to support wide range of application and services. These devices are work as primary devices for many users.

Cloud computing offers delivery of services software and processing capacity with the help of internet cost scheduled can be reduced, increasing automatic system, flexibility, privacy, security of mobile information.

Extended technology of cloud computing is the mobile cloud computing. It provide all the essential resources to overcome the obstacles of the mobile devices. MCC is the such type of infrastructure where both data store and data processing are moved away from mobile device to powerful and centralized computing platform located in the cloud.

Many issues that can be solved early the main obstacles are battery lifetime, intension latency speed, quality of services, privacy, availability and billing.

In this paper we concentrate on survey of mobile cloud computing (MCC) which include architecture, definition, service and application. What are the drawback of existing system and how to improve the existing system with new upcoming technology?

2. Literature Survey / Related Work
The main objective behind offloading a mobile application is to save energy, to improve computational performance or both.

Computation offloading is a procedure that makes resource intensive computation from a mobile device to the resource rich cloud or server to get it processed there and result will be return back to devices. Computational offloading is essential for handheld devices there are some application are too resource demanding to run on handheld devices. We use those application programs is to offload all or the part of computation to powerful machine. In recent years there are various applications development model for mobile cloud computing. Some of the model that focused on energy efficiency. Some models focused on performance enhancement and some models are focused on both energy and performance [5, 6, 7].

Following are the application development model on which some of the research done on the application development model. There are three types of models

2.1 Energy based application development model
In this model increasing the battery life time these is one of the most designed thing for a Smartphone. The u cloud model [6] is one of the energy based model for mobile cloud computing. The merit and demerit of this model are as follows:

- **Merit**: Support self-contained application components that are decoupled from each other [4].
- **Demerit**: It require skilled programmer to develop the application component that are later used [4].

2.2 Performance based application development model

This model deals with offloading the task to improve the performance without caring about the energy efficiency. Clone cloud model [5] is one of the Performance based application development model it create clone of the mobile devices in cloud infrastructure. To run the heavy resource demanding applications performance enhancement is needed.

- **Merit**: When a Smartphone is destroyed the clone can be used as the backup for recovery of the data and applications.
- **Demerit**: The model is only capable of migrating at points in the execution where no native heap state is collected.

2.3 Energy and performance based application development model

These model concerned with performance and energy efficiency of mobile cloud application. These model provides offloading application with minimum possible intervention of programmer. This is a plus point as programming to offload is not preferable in the cases of smart phones.

- **Merit**: It uses dynamic method for partition in order to reduce the burden on the programmers.
- **Demerit**: For offloading decisions MAUP (multipurpose application model) uses history [7].

3. System model

Our model contain the two major part namely Smartphone (i.e. user equipment) and cloud capacity (cc) both are connect to the internet.

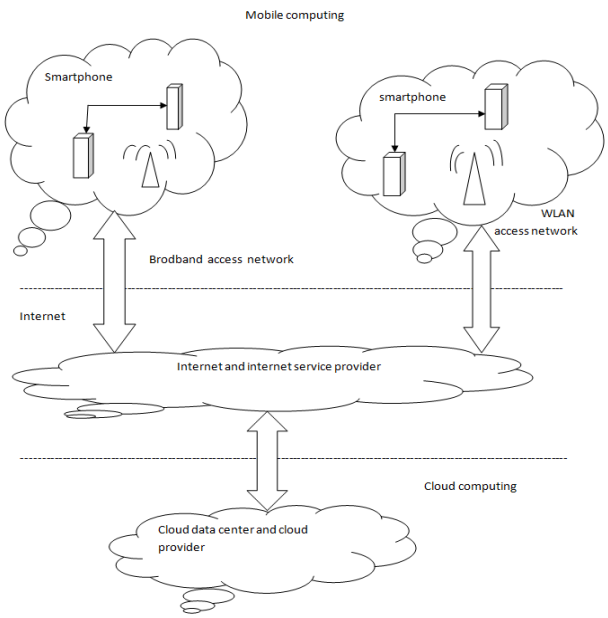

Fig 1: Offloading task to cloud using Smartphone

In the offloading technique, smart phone access the cloud via internet. The offloading technique smart phones access the cloud via internet therefore offloading is network related application. The network interfaces and protocols are the major factors. That affects the energy cost of task offloading.

Our experiment should be conducted in two broad scenario related to the location of task data

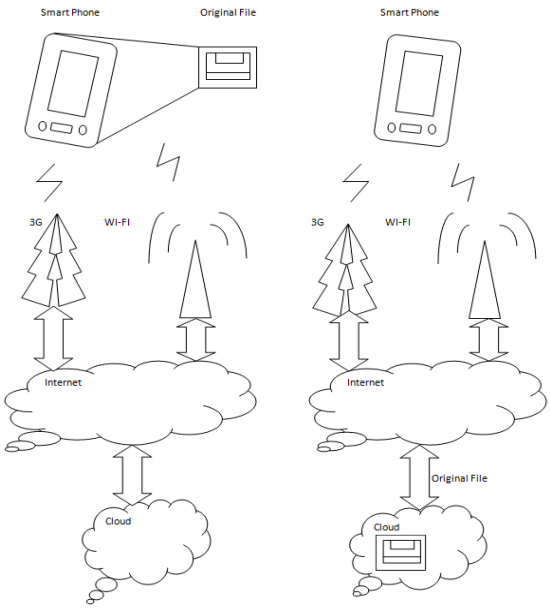

Fig 2: Task data (original file) should be available on Smartphone and we execute the data on Smartphone

Our task data (original file) available on cloud and we execute it on to the location of the task data as follows.

The first scenario corresponds to s1,where there is a local task execution and the task data exists on the Smartphone the second scenario s2 where uploading the task data doing the task computation by the cloud and downloading the task result is presented by the “upload +cc encoding +download” the third scenario corresponds to the s3,where there are local task execution and the task data is downloaded from cloud the fourth scenario corresponds to s4 where the task data exist in cloud and the task executed on the cloud.

Offloading computations to save energy, if computations are too computational intensive the mobile system does not perform the computations instead computation is performed somewhere else, there by extending the mobile systems battery life the cloud computing is distinguished from the existing model of adoption of virtualization in which instead of service providers managing programs running on servers virtualization allows cloud vendors to run arbitrary applications from different customers on virtual machines.

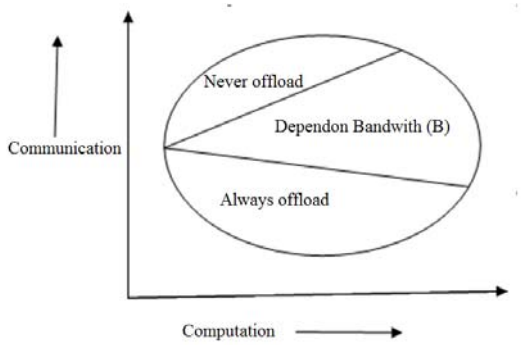

Fig 3: when computation is high bandwidth is high, offloading can be done

3.1 Energy consumption model

With steganographic protection original data D are first protected by protection scheme P. The protected data D' are sent to the server and proceed by the program C' to generate result R' is returned to the mobile system and finally the result R'' is produced using inverse protection Pi.

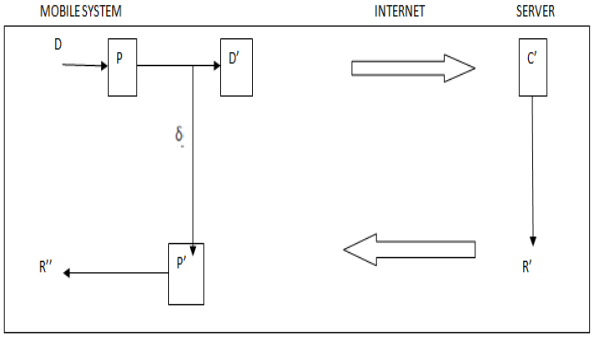

Fig 4: offloading a program with protection the data are protected by P and D' are sent to the server R' returned and produces the final result R

4. Conclusion

A Proposed system is now able to determine whether offloading a computationally expensive task into cloud that help for saving energy on the phone. This paper presents a comparative analysis of: 1. Energy consumption in Smartphone when executing a computation intensive task versus. 2. End-to-End energy consumption when the same task is offloaded to a remote server. In this paper we concerned the evaluation between two popular communication technologies i.e. Wi-Fi and 3G. Offloading using Wi-Fi is more energy consumed as compared to offloading 3G and also carried out the experiment to prove that mobile cloud computing can save energy as well as time of the Smartphone by offloading its tasks to the cloud using high speed stable internet connections. A Proposed system conclude that in mobile cloud computing energy and time framework is proportional to the speed of the internet connection and its stability.

As performing task on the device it consumes the main memory. Cloud computing have potential to save energy for mobile user. Not all the applications are energy efficient when migrated to the cloud mobile cloud computing services are slightly different from cloud services for desktop offers energy savings.

5. References

1. Kumar K, Lu YH. Cloud computing for mobile users:can offloading computation save energy ? IEEE computer, 2010; 43(4):51-56.
2. Wolski R. Using Bandwidth Data to Make Computation Offloading Decisition, Proc. IEEE Int'l symp.parall and Distributed Processing (IPDPS 08).2008, (1-8).
3. Zhang. Steganography with Least Histogram Abnormality. In Computer Network Security, 2003, 395-406.
4. Atta ur Rehman Khan, Mazliza Othman, Sajjad Ahmad Madani, IEEE Member, and Samee Ullah Khan A Survey of Mobile Cloud Computing Application Models. IEEE Communications Survey and tutorials 2013.
5. Chun BG, Ihm S, Maniatis p, Naik M. Clonecloud boosting mobile device applicitations through cloud clone execution", arXiv preprint arXiv:1009.3088, 2010.
6. March Y, Gu E, Leonardi G, Goh M. Kirchberg, and B. S. Lee, µcloud towards a new paradigm of rich mobile application "Procedia Computer Science, 2011; 5:618-624.
7. cuervo E, Balasubraamanian ADK. Cho A, Wolman S, Saroiu R, Chandra, Bahl p. Maui: making smartphone last longer with code offload, in Proc 8th international conference on moblle systems, applications, and services, ACM, 2010, 49-62.