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Multimedia Cloud Computing To Save Smartphone Energy

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Abstract: **The dramatic growth of smartphones in recent years, the challenge of limited energy capacity of these devices has not been solved satisfactorily. However, in the era of cloud computing, the limitation on energy capacity can be eased off in an efficient way by offloading heavy tasks to the cloud. It is important for smartphone and cloud computing developers to have insights into the energy cost of smartphone applications before implementing the offloading techniques. In this paper, we evaluate the energy cost of multimedia applications on smartphones that are connected to Multimedia Cloud Computing (MCC). In other words, we investigate the feasibility of MCC. Specifically, we compared the energy costs for uploading and downloading a audio file to and from MCC with the energy costs of encoding the same audio file on a smartphone. The aforementioned comparison was performed by using HTTP and FTP Internet protocols with 3G and Wi-Fi network interfaces.**

Keywords: **Smartphone, offloading, Power conservation, Multimedia Application, Cloud Computing.**

I. INTRODUCTION

Cloud computing is the delivery of computing as a service rather than a product over a network. We have created interface with sound cloud web application in that we resisters our app on sound cloud web site and after successful resister then provide us user name, password, client id and secret key. After that we further use this login credential with secret key and client id for authentication purpose to fetch sound tracks from web application to our native app. After successful authentication we redirect our app to dashboard section then user will see all the tracks which he has uploaded on web application. If he wants to play that song then he will click on sound track and after clicking on track then he will redirect to the media player to play that track.

In media player section user can play song, pause song and stop song, record tracks and share that tracks with other apps. Smartphone's are becoming increasingly popular because of their capabilities and functionalities. Their small size and light weight make them very easy to carry, and they provide useful services as they run PC-like applications. In contrast to that, Smartphone's have some unique constraints, such as limited battery energy, processing, and memory capacity. In recent years, some of these constraints, such as memory and storage capacity, have been addressed to some extent. However, the advances in the semiconductor and excommunication technologies are faster than that of the battery capacity. Therefore, energy constraint, which is result of limited capacity of the Smartphone battery, has not been solved satisfactorily. Smartphone's are rich in communication interfaces, applications, and other resources such as sensors and Global Positioning System (GPS). Multimedia applications such as audio playing and gaming are very much resource intensive in terms of processing and data transfer rates. Consequently, they consume much energy and drain Smartphone battery very quickly. In fact, those classes of applications are attracting much attention of Smartphone's users. As they require more resources, Smartphone's quite often do not meet the expectations of users in performance and battery lifetime. For example, Smartphone's can play a narrow multimedia file format because of their limited processing and energy capacity. As a result, users require and demand more advances in Smartphone have to enhance their capability for multimedia applications. Cloud Computing (CC) is a new computing paradigm that is promising in various aspects, such

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as virtually unlimited computing resources and availability. It provides data center resources such as processing, networking, and storage capabilities to the end user with required functionality. If CC provides a multimedia functionality, which includes storage, encoding, and play on-demand, then it is called multimedia Cloud Computing (MCC). MCC can access any multimedia content on the Internet and supply it to a user in a desired file format when a user provides the targeted Multimedia Universal Resource Locator (URL).

A user can take advantage of the encoding capability of MCC by uploading a multimedia content in any file format, and then request the uploaded file in another file format. In addition, MCC is responsible to adapt the suitable multimedia encoding for an end-user by known the playing client. In the era of CC, An example of heavy task is the audio encoding where there is no existing of efficient encoding application on Smartphone's. In particular, a heavy energy consuming application is offloaded to the CC for Smartphone energy saving. Thus, MCC appears to be promising to fill the gap between Smartphone performance limitations and expectation of the users by the MCC service. The aim of this project is to address the problem of running multimedia application on Smartphone's, and investigate the benefit of using MCC framework in this regard. This study will confirm that MCC provides an effective solution to extend Smartphone's battery life and enhance their multimedia capabilities. We present an extensive evaluation of the energy costs of Smartphone's and setup a large number of experiments on Smartphone's to measure their energy for running multimedia applications. Furthermore, we experimentally evaluate the energy cost on Smartphone's when the offloading technique is used. This evaluation has been conducted on a real MCC. The original file is available on the Smartphone itself. On the other hand, the original file is available in the cloud for uploading and downloading files to and from the cloud, we consider the energy implications of:

(i) Using the HTTP (Hypertext Transfer Protocol) and FTP (File Transfer Protocol) protocols at the application level; and (ii) using the 3G (Third generation mobile telecommunication) and WLAN (Wireless Local Area Networks) communications at the wireless access interface level. We compare the energy cost of locally performing file encoding on a Smartphone with the total energy cost of performing the same operation in the cloud, including the uploading and downloading communication costs. Similarly, we compare the energy cost of downloading an encoded file with the total energy cost of downloading the original file and performing encoding on a Smartphone.

II. LITERATURE SURVEY

During the literature survey, it was found that cloud Computing plays an important role in reducing battery conservation of smart-phones and to backup user's data. Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Many people have focused to build frameworks to offload large computation on the cloud. Mobile computation offloading involves communication in between the real mobile device and the cloud. For mobile computation offloading to work we have to run same application on smart-phone as well as on the cloud. But the application is not present on the cloud, so we have to offload or copy the application on the cloud.

That's why in previous papers that we referred they used this technology but they only created interface with cloud server but they can't utilize properly, and some papers we referred as below.

1] "Energy Economization using Multimedia Cloud Computing" : Swati Tiwari and Praveen Sen [March 2014] : In this project they created interface cloud server with their app and If we take a look around we see that there are many types of smart-phone users. Basically we are classifying the users on the basis of the types of software which they mostly use.

i] Video users

ii] Game users

iii] Audio Users

iv] Internet users

v] Regular users. (SMS audio call)

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Most of the literature papers deals with a user which is all of the above i.e. it is assumed that the user uses all the applications (such as listening to music, surfing net, chatting, watching videos, etc) regularly and in equal proportions. But usually that is not the case. A person can listen to music for 1 hour and send SMS in 5 minutes only. What we are trying to do is to focus on a particular type of user and see whether performing computation on the cloud saves smart-phone energy for that particular user but in this project there are no limitations.

2] "Energy-Efficient Platform-as-a-Service Security Provisioning in the Cloud" :W. Itani, A. Chehab and A. Kayssi : In this project they designed the security in their system, in that they have designed the security system and they provides the client key, secret key, user ID and one password for authentication. At that time when they implement connection with cloud server and their Smartphone's that time consumes their Smartphone energy but in this project there has no limitation.

From the above referred paper's we clearly understand the concept of power consumption in smart phone using multimedia sound cloud technology. So we decided to integrate some more features in it .The new implemented modules are playing sound files in media player with basic functionality. And in our future implementation process we are going to implement Sound recorder so to record sound and upload it in mp3 format to sound cloud web application and simultaneously fetch those file in our dashboard section for testing it in our created media player.

III. PROPOSED WORK

In propose work we designed the app for our System Architecture there has four important fields are Smartphone, Laptop/Computer, 3G cellular base station/Wi-Fi access point for access Internet and Cloud server. In that we first created interconnection with cloud server from our computer by helping with the Internet connection, after that we performed registration process, in that we get client ID and secret key and after that we login with user name and password. After successfully login process we changes that user name and password and create our one secret user name and password for better understanding and then we upload or add number of sound tracks in that track list so this is our web application process and after that we designed mobile application in that we make connection mobile application to web application by using "Network Connectivity".

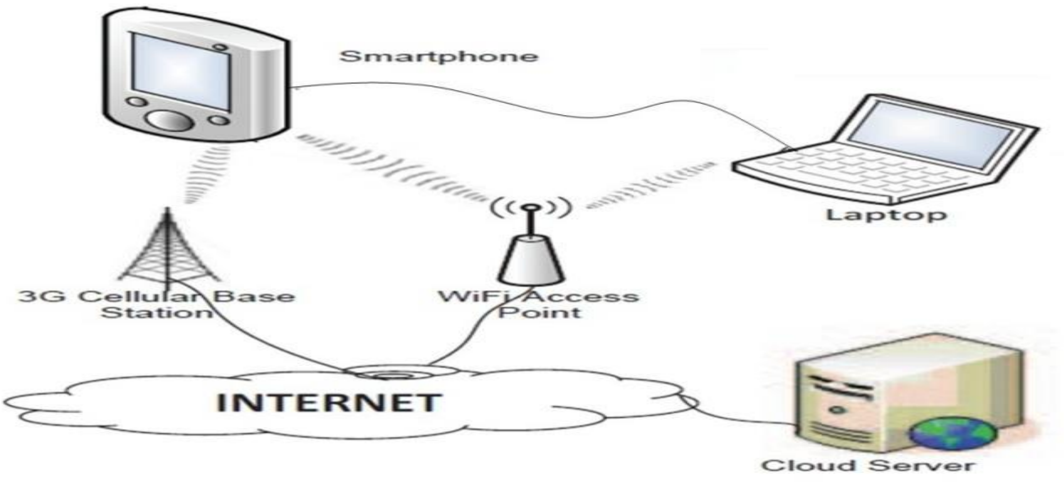

Fig 1: System Architecture

After Check Network Connection we create one login page in that we keep one Username field second Password field and third one is Login Button after clicking login button it will check is internet connection is available or not if is it not available then you wants to on your internet connection either 3G Internet connection or Wi-Fi and if is it available then it will go to our web application and check our username and password is correct or not if it is correct then it will go to our dashboard and check there has any song is available or not if is it available then it will tack all that track list and keep in to our mobile application dashboard and in that dashboard list of songs are present that we already uploaded in web application and then we wants to play any sound track then click on any track and after clicking any sound track it will

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redirect to the media player section to play that sound track in that we can play song for listening the track's, we can pause song and we can also stop song if we wants to stop the song. In recording section record the sound and upload on cloud and after that they can share with friends and other apps so, this is all over the description of our System Architecture.

We describe our project by using case diagram and the in case diagram we designed the structure that how to work our project actually,

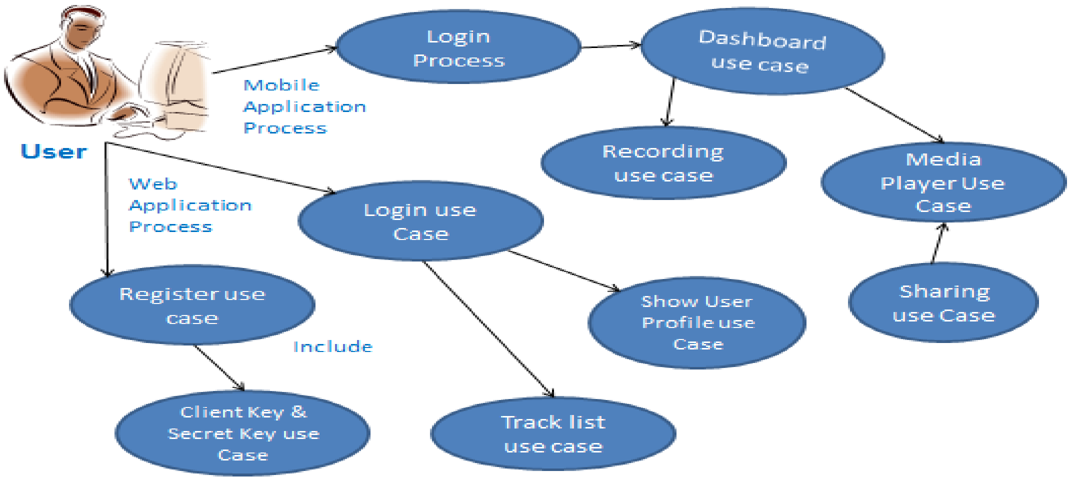

Fig 2: Case Diagram

We have created interface with sound cloud web application in that we resisters our app on sound cloud web site and after successful resister then they provide us user name, password, client id and secret key. After that we further use this login credential with secret key and client id for authentication purpose to fetch sound tracks from web application to our native app. After successful login user will redirect our app to dashboard section then he will see all the tracks which we have already uploaded on web application.If he wants to play that song then he will click on one particular sound track and after clicking on track then he will redirect to the media player section to play that track.In media player section he can play song, pause song and stop song**.** In recording section we can record and directly upload to the cloud server and we can share these songs that we played on media player, so this is all over description of system case diagram.

IV. ADVANTAGES

i] User Friendly.

ii] Memory is Save.

iii] Power is save so battery will give larger backup.

iv] Smart management of sound files.

V. DISADVANTAGES

i] It must require High speed internet connection.

ii] If we will used 2G internet connection of lower speed then the performance will lack and sometimes it will load or play slowly because of lower bandwidth so to overcome that of we will used Wi-Fi or 3G type of internet connection then we will overcome this type of drawback.

VI. CONCLUSION

Our study clearly indicates that offloading heavy applications, namely multimedia applications, from smartphones to MCC is beneficial, and memory is save because we are not install any media player to play songs. MCC significantly reduces the energy conservation on smartphones, MCC enriches smartphones capabilities for multimedia applications.

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