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Cloud Computing For Mobile Users

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Abstract: **The cloud computing provides services to the application through the Internet. It can enhance the computing capability of mobile devices. It is the ultimate solution for extending such mobile devices battery lifetimes. Cloud computing provides services such as processing, memory, and storage which are not physically present at the user's location. When it comes to looking at energy efficiency and the concept of sustainability in computing, the focus has invariably been on data centers and mobile infrastructures like cell towers, as these have been considered the power intensive within the computing sector. However, some recent studies show that energy consumed globally by mobile devices is increased. But a large fraction of energy consumption must be reduced. With increased emphasis on utilizing cloud computing through mobile devices, the study and analysis of the complete end-to-end scenario from mobile devices to end-servers is needed that includes a life cycle assessment of networked data centers that provide cloud services. This paper conducts a preliminary investigation into the energy benefits of offloading tasks from mobile end devices to powerful remote servers.**

Keywords: **Cloud computing, energy consumption, networks, mobile devices, offloading [1].**

1. INTRODUCTION

The primary constraints for Smart phone computing are limited energy and wireless bandwidth. Cloud computing can provide energy savings as a service to Smart phone users, though it also poses some unique challenges. Many applications are too computation intensive to perform on a Smartphone system. If a Smart phone user put those applications on cloud, the cloud must perform computation. Other applications such as Social site, image retrieval, voice recognition, gaming, and navigation can run on a Smart phone system. However, these applications consume significant amounts of energy. By offloading these applications to the cloud save energy and extend battery lifetimes for Smartphone's. Cloud computing has the potential to save Smart phones energy but the savings from offloading the computation need to exceed the energy cost of the additional communication. Though cloud computing can reduce the energy consumption at client device in some cases, it is necessary to have analysis of end to end energy consumption from Smart phones to the backend servers encompassing all the intermediate components involved in communication Mobile Cloud Computing (MCC) is the combination of cloud computing, mobile (Smartphone) computing and wireless networks to bring rich computational resources to Smart phone users, network operators, as well as cloud computing providers. The ultimate goal of MCC is to enable execution of rich Smart phone applications on a plethora of Smart phone, with a rich user experience.

2. EXISTING SYSTEM

Smart phones opened a new horizon of portability and information assessment. Even though the new generations of mobile device provide higher computation power and more storage space compared to their previous generation, they still they are tying for the growing demand of computation power and storage space. Additionally, the mobile's battery industry is not as progressive as the telecommunication and semiconductor industries. There is always trade –off between the computation capacity and battery life of mobile devices. Portability, storage space and battery are the main characteristics of a Mobile. Processing speed and storage capacity is inversely proportional to battery life which limits mobiles as a replacement for laptops and tablets.

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3. PROPOSED SYSTEM

By Providing Cloud Storage for mobile users, we try to save users storage space. Through offloading, user can upload the files which are no longer in use (in our case it is 7 days or more) and download the files when user required. While uploading the files on cloud, user will be allowed to give some hint (or tag) for the file which to be uploaded. User can access the files stored on cloud from more than one device such as by web login or by mobile app login. User can share his/her own files with other users also if user wants it. Files which are to be uploaded are get into encrypted form (that is, hide behind the something).When user needs to download the file he/she has to search it or he/she can open's the Uploaded directory in which file's link is stored. To download the file or upload the file from mobile device user have to press on file. User can watch the videos which are uploaded by user just by clicking on it. User also able to create the document files, edit the file or update the files. User is allow to upload or download the files on the laptops or tablets by using the web login/sign in.

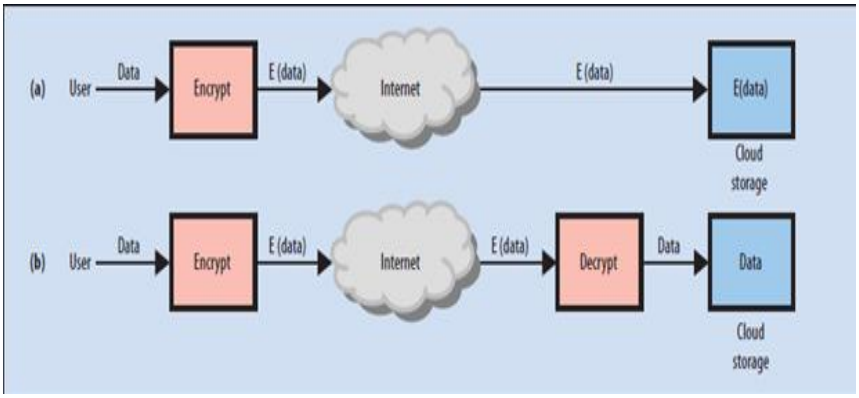

Fig. 1 (a) Data on cloud is in encrypted form. (b) Data get decrypt to perform necessary operation.

I. Saving energy For Mobile System Module:

Mobile systems

1. Various studies have identified longer **battery lifetime** as the most desired feature of Smart phone systems.
2. Many applications are too computation intensive to perform on a mobile system. If a mobile user wants to use such applications, the computation must be performed in the cloud.
3. Other applications can run on a mobile system. However, they consume significant amounts of energy, such as Image retrieval, voice recognition, gaming, and navigation.
4. Eliminate computation all together.

4.1 The mobile system does not perform the computation. Instead, computation is performed somewhere else in the virtual machines.[3]

II. Offloading Computation To Save Energy Module:

1. **Client-server computing:** service providers managing programs running on servers and mobile user/client just pass the task to the server.
2. **Cloud computing:** Allows cloud vendors to run arbitrary applications from different customers on virtual machines.
3. Cloud vendors thus provide computing cycles, and users can use these cycles to reduce the amounts of computation on mobile systems and save energy.
4. Cloud computing can save energy for mobile users through **computation offloading**
5. **Virtualization:** Lets applications from different customers run on different virtual machines, thereby providing separation and protection.
6. **Energy analysis for computation offloading:**

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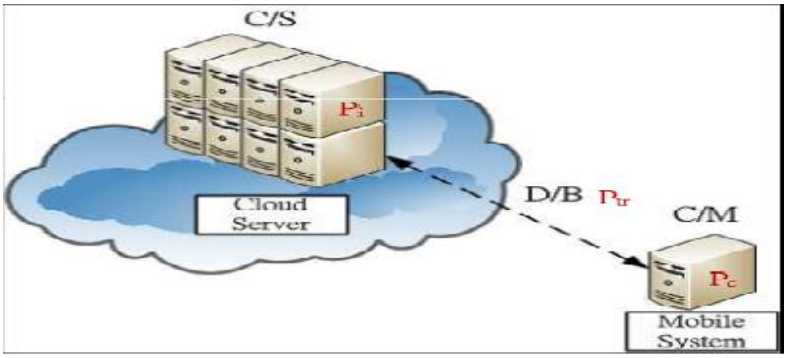

Fig. 2 Offloading Computation To Save Energy Module

III. Making Computation Offloading More Attractive Module:

1. Energy saved by computation offloading through wireless bandwidth, amount of computation to be performed, amount of data to be transmitted.
2. **Client-Server Model:** Because the server does not already contain the data, all the data must be sent to the service provider by the client.
3. **Cloud Computing:** The cloud stores data and performs computation on it like as Google's Picasa, Amazon S3, and Amazon EC2 [3].

IV. Challenges And Possible Solution Module:

1. Privacy and Security

1.1. Because the data is stored and managed in the cloud, security and privacy settings depend on the IT(information technology)management of the cloud provides.

1.2. Some types of data cannot be stored in the cloud without considering the privacy and security implications.

1.3. One possible solution is to encrypt data before storage

2. Reliability

2.1. A mobile user performing computation in the cloud depends on wireless network and cloud service.

3. Real Time data[3]

3.1. Table below shows Response Time of file while accessing an file on Android device, Amazon Cloud, etc.

3.2. As the file size goes increasing, Response time of Android device is increases and as compare to Android device, on Amazon cloud response time is less.

Table1. Response Time (Sec) [2]

File Size (KB)	Android	Amazon EC2
10	0.0481	0.0146
100	0.425	0.096
200	0.424	0.971

3.3. Table below shows Energy Consumption by file while accessing a file on android device, Amazon Cloud, etc.

3.4. As the file size goes increasing, Android device consumes more energy and as compare to Android device, on Amazon cloud energy consumption is also less.

Table2. Energy Consumption (J) [2]

File Size (KB)	Android	Amazon EC2

10	0.117	0.098
100	0.332	0.984
200	0.886	1.815

3.5. By using mobile device user can access the files on a cloud without knowing the connectivity to the cloud. Figure below show that how working of cloud computing for mobile users is going on.

4. CONCLUSION

1. Cloud computing can potentially save energy for mobile users.
2. Not all applications are energy efficient when migrated to the cloud.
3. Cloud computing services would be significantly different from cloud services for desktops because they must offer energy savings.
4. The services should consider the energy overhead for privacy, security, reliability, and data communication before offloading.
5. Using app we can access videos and mp3 file from cloud. That means no need to stored it on secondary storage.
6. Everything like file upload, download, search, login, register, managing documents, contacts, accessing file is possible by using cloud this may leads to diskless mobile in future

5. FUTURE WORK

Future work will be focused on performing the same task on other mobile devices OS like iOS, Blackberry OS, Microsoft OS etc. It would be fascinating to see how the distribution in energy consumption chart changes with different OS. The present implementation offloads the task to a single server.

It would be interesting to observe the energy consumption when the task is divided among multiple servers. One other aspect we would like to investigate is the affect of poor network condition on performance and energy consumption. Also it would be interesting to observe the user's response to the mobile app and web interface.

As we all know internet is so useful today. At this stage company like reliance giving free access to almost 30 websites including facebook. In future it may happen that entire city will have WIFI connection, so then in future why to have a storage space in mobile, as we can access, modify, create our data on cloud. We can access our data without computation that means all processing will be done at server. This may preserve battery life.

Our mobile processing speed becomes slow and its performances decreases day by day, that means more no of application more computation means more battery will be consumed. So this paper suggest that cloud computing has the potential to change this entire thing

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