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Mobile Computing Using Cloud Computing

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ABSTRACT

Now day's mobile phones have become an essential part of our daily life.The development of the mobile phone has been rapid. From being a device mainly used for phone calls and writing text messages the mobile phone of today, or commonly referred to as the smartphone, has become a multi-purpose device. Because of its size and constraints there are certain limitations in areas like temporary loss of network connectivity when they move; they are likely to have scarce resources, such as low battery power, slow CPU speed and little memory; whereas more demanding applications typically require specific hardware resources that are very unlikely to be available on mobile devices.

"Remote display solution for mobile cloud computing is an attempt to separate the input/output interface from the application logic for the mobile devices.

Essentially, the principle of mobile cloud computing physically separates the user interface from the application logic. Only a viewer component is executed on the mobile device, operating as a remote display for the applications running on distant servers in the cloud. In this Paper we are trying to cover the intersection of cloud computing and mobile computing both, to increase the speed of mobile phones by offloadingcomputational heavy mobile phone application functions by using cloud computing.A mobile phone application was developed that conducts two computational heavy tests.The tests were run twice, by not using cloud computing offloading and by using it. Thetime taken to carry out the tests were saved and later compared to see if it is faster to usecloud computing in comparison to not use it.

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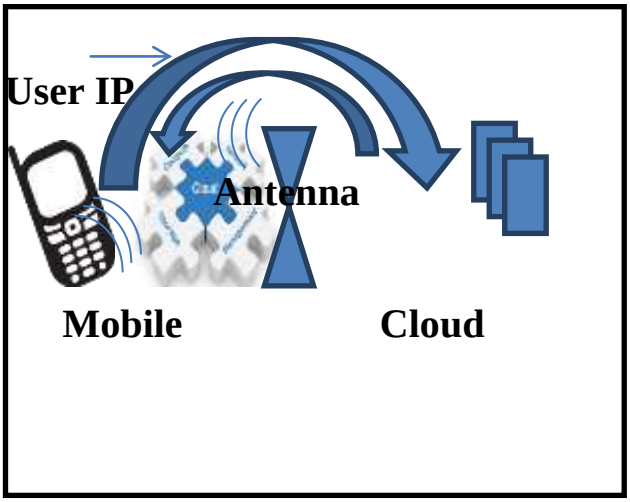
I. INTRODUCTION

Mobile devices have become an essential part of our daily life as mobile device popularity grows, end-user demands to run heavier applications are equally increasing. Although advances in miniaturization continue, the desire to preserve the advantages of weight, size and device autonomy will always impose intrinsic limits on processing power, storage capacity,battery lifetime and display size. From being a device mainly used for phone calls and writing text messages the mobile phone of today, or commonly referred to as the smartphone, has become a multi-purpose device. On the other hand cloud computing has reach to another level, where n services are available for utilization with little maintenance. In this paper I am trying to intersect these two things to increase the efficiency of mobile phone devices by physically separating the processing task from mobile devices, by offloading it to the cloud. Where processing will be done, so that mobile phone device will simply act like a input output device. It will provide the required input to the device and will display the processed output.

Conventional desktop applications need to be redesigned to operate on mobile hardware platforms, thereby often losing functionality; whereas moredemanding applications typically require specific hardwareresources that are very unlikely to be available on mobiledevices. At the same time, the web hosts increasingly powerfulcomputing resources and has evolved to a ubiquitouscomputer, offering applications ranging from simple word processors, over all-encompassing enterprise resource planning suites to 3D games. Both Microsoft and Google have developed complete online office suites, called Office Live and Google Apps respectively that may evolve to all round alternatives for the mobile office suites. Cloud computing broadens the range of applications offered to mobile end-users with

demanding applications in terms of graphical hardware, such as 3D virtual environments, or storage capacity, such as 3Dmedical imaging applications. As the cloud infrastructure is shared among multiple users, these hardware resources can be provided in a cost-effective way.Essentially, the principle of mobile cloud computing physically separates the user interface from the application logic.Only a viewer component is executed on the mobile device,operating as a remote display for the applications running on distant servers in the cloud.



Mobile cloud computing provides a solution to meet the increasing functionality demands of end-users, as all application logic is executed on distant servers and only user interface functionalities reside on the mobile device. The mobile device acts as a remote display, capturing user input and rendering the display updates received from the distant server.

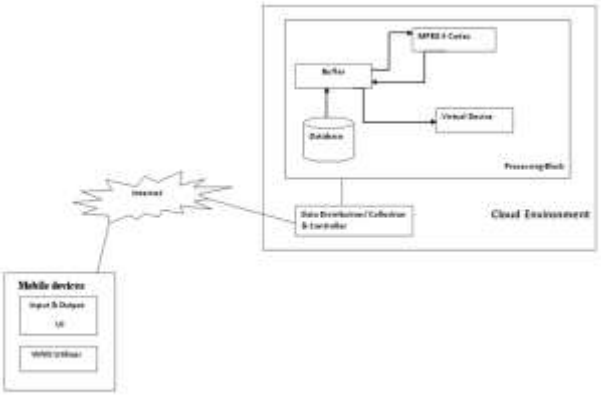
II. LIMITED MOBILE DEVICE BATTERY LIFETIME

Offloading applications to the cloud is astraightforward way to save on energy consumption because the amount of local processing is reduced.Offloadingapplications from mobile devices is mainly interestingwhen large amounts of computation are needed in combinationwith relatively small amounts of network communication.Demanding applications exchange a significant amount ofdata between client and server because theyexhibit a highdegree of interactivity and detailed graphics.

III. SYSTEM ARCHITECTURE

The system architecture contains 3 blocks

1. Mobile device
2. Communication medium
3. Cloud environment



The first block is mobile device which is nothing but any hand held device through which user wants to access the data stored in cloud environment. There are only two tasks of this block which are providing Input & displaying Output. The first task helps us to overcome the battery problem as we are processing whole data on the cloud itself. So the task of the mobile is just to give the input and take the output. Which will helps us to solve the power consumptions problem. The application is provided to communicate among the internet. Task of the application is nothing but to just provide the User Interface for the communication.
The next block which is nothing but the internet block that's task is just to provide the medium of communication.

The last block is the Cloud Environment which contains two more sub-blocks in it. The first block is Data Distribution/Collection & Controlling. Tasks of this block are controlling data, distributing data, gathering required data. In this block the data is distributed among the cloud parallel among the cloud for that certain algorithms are used which will simply divide data and distribute among the available servers. Next task of this block is to gather the required data. Whenever request comes from the mobile device for the particular resources the information is gathered by this block. Here the database is filtered and the data is gathered then that data is forwarded to the next Processing block.

Now the task of the processing block is the important the simplification of the data is important. Separate database is provided to store filtered data gathered by the Data gathering block. Then buffer uses the stored data to provide input to the processing algorithm. The task of this algorithm is to process the data collected and perform the specified task. Then the processed data is again forwarded to the buffer to store it temporarily before sending. Then that data is executed on the virtual device which is nothing but the Android simulator if the given data is executed successfully on the virtual device then it is clear to send.

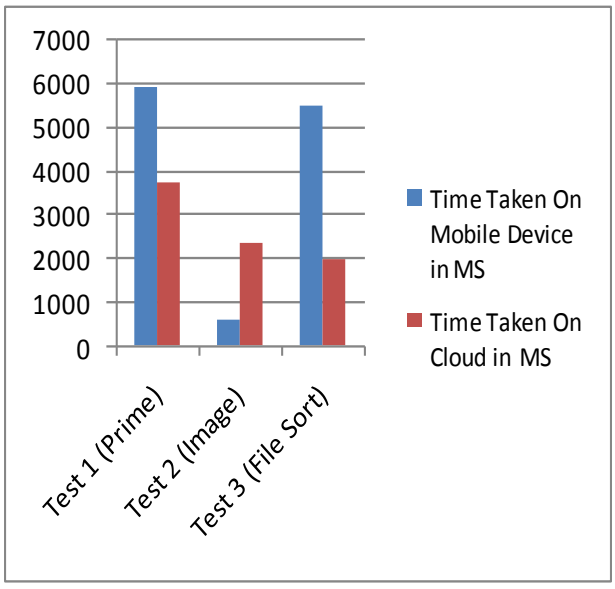
Mobile phones are set to become the universal interface to online services and cloudcomputing applications" Generally mobile phone applications runlocally on the mobile phone. This means that the application is downloaded and then executed

on the mobile phone. The application might interact with servers on the Internet to get
information that the application need, but the computation and processing of data is mainly performed on the mobile phone, which has its limitations when it comes to mobile phone hardware as previously mentioned.

A cloud computing mobile phone application can be downloaded in the same way as a local mobile phone application but would execute on a server instead of on the mobile phone.The application would function as a communicator with the cloud server which function would be to display the data received by it. Another approach is to access the application through the mobile phone's web browser. For example Google Docs that is a word processor accessed through a web browser. A third alternative is a hybrid mobile phone application that partly operates in the cloud and partly on the mobile phone. For example a mobile phone application that runs on the mobile phone but files generated are saved in the cloud.

The idea is to build a mobile phone application that executed a task locally on the mobile phone and then executing the same task using cloud computing. Both tasks would be timed and by comparing the result it would show which one that was the fastest.

A feature is that the tasks performed by the mobile phone are computational heavy, that they require a lot CPU and RAM to be executed. The idea is that computational heavy tasks might be more suitable to offload to the cloud in comparison to light tasks that would not affect the mobile phones performance anyhow. According to that two tests were designed. The first test is to calculate prime numbers within a certain range. It is possible to change the range that the prime number should be calculated within, making it possible to increase or lessen the workload.The second test is to use the java.util.Collections to shuffle a list of 1000 words, and then sort them in alphabetical order. To build the application Eclipse IDE was used because of its good support for Java development and easy integration with Android SDK and Google App Engine SDK. The build started out by developing the two tests and to execute them in a Java environment. When they were completed the timer class was developed to measure how many milliseconds each test took to execute.



Execution time and battery life extension are not the only possible advantages with cloud
computing. Backup of pictures and contact information is one advantage of the cloud. The possibility to share files with other devices are another. Cloud computing brings a lot of opportunities. All new technology has side- effects and drawbacks. A disadvantage is that third-party organizations might be able to access the files, as they are stored on their servers. Cloud server uptime is another concern. If a mobile phone application relies on cloud computing to work, and the cloud servers are down for maintenance, then the application will be useless. Cloud computing will become even more integrated with mobile phones in the future.

IV. CONCLUSION

By physically separating the user interface from the application logic, the principle of mobile cloud computing allows to access even the most demanding applications in the cloud from intrinsically resource-constrained mobile devices. The results showed that it is beneficial to use cloud computing to carry out these types of tasks; it increases the mobile phones execution speed and saves the battery life also by offloading the processing on cloud.

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