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Task Offloading Framework to Enhance Energy Efficiency of Smartphones

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Abstract – *we all are using the upgraded smart phones and with technology, we need new services in clouds, Offloading can be the new feature in increasing the capacity of phones, this service can also boost the battery life of our Phone. In our available system, cost of our communication and hardware cost is high. On base of Energy cost or communication cost our system can be feasible or not for the phone can be decided. This also shows that on the performance criteria our system will work or not. To design an energy-aware offloading strategy. Our system will work on the LAN connections, 3G and 4G. Battery energy, processing capability, and memory capacity are the some of the exclusive constraints of smartphones. In the most recent couple of years, quick advances in semiconductor innovations have lightened some of those requirements. The restricted battery liveliness requirement has not been acceptably tended to. As indicated by Moore's law, the rate of transistors on an integrated circuit is rapidly increased every two years. It is not acceptable the limitation of battery energy. As compared to transistor growth in every year only 5 percent of growth expected in battery capacity. To reduce the battery consumption we need to focus on the task implementation of the smartphones. Battery problem becomes one of the critical issues among the smartphone users. Today's smartphone is able to do run all application that has been work on the desktop computer. Some of the examples of the operating system are Blackberry, Apple iOS, Android and much more. The only way to reduce battery consumption is to offload the series of tasks over the cloud platform. Final result Estimation model will compare the energy cost of both locally and Cloud energy Cost And For the future reference Paper will allow the Observation and Identities the New Issues.*

Key Words: Mobile Cloud Computing, Mobile Computing, Smartphones, Computational Offloading, LAN, 3G, 4G.

1. INTRODUCTION

Battery energy, processing capability, and memory capacity are the some of the exclusive Constraints of smartphones. In the most recent couple of years, quick advances in semiconductor innovations have lightened some of those requirements. The restricted battery liveliness requirement has not been acceptably tended to. As indicated by Moore's law, the rate of transistors on an integrated circuit is rapidly increased every two years. It is not acceptable the limitation of battery energy. As compared to transistor growth in every year only 5 percent of growth expected in battery capacity. To reduce the battery consumption we need to focus on the task implementation of the smartphones. Battery problem becomes one of the critical issues among the smartphone users. Today's smartphone is able to do run all application that has been work on the desktop computer. Some of the examples of the operating system are Blackberry, Apple iOS, Android and much more. The only way to reduce battery consumption is to offload the series of tasks over the cloud platform. As a most convenient and effective communication tool, Mobile devices (smartphones, tablets, pcs etc.) are becoming an essential ingredient of human life. Simply we know that Efforts for save our Energy Consumption requires Increment of More Efficient Energy and Less Consumption. Environmental protection, energy conservation, cost reduction are the dominant Benefits. In the mobile cloud, we need the basic infrastructure for the computing, Main Network and the Mobile devices that can perform and most importantly, we need the people who can concentrate on the Energy conservation and can reduce the body size of the mobile device. In existing system, there has been lot of issues in the energy consumption. Energy Saving Issues

Into the following aspects:

1) In network infrastructures and communications.

2) In Cloud computing infrastructures and servers.

3) In mobile cloud services

As a most convenient and effective communication tool, Mobile devices (smartphones, tablets, pcs etc.) are becoming an essential ingredient of human life. In general, efforts made to save and minimize energy consumption is achieved by increased energy efficiency and reducing consumption of Energy. Environmental protection, energy conservation, cost reduction are the dominant benefits. There are major issues that how to minimize energy consumption mobile devices. in the most recent couple of years, quick advances in semiconductor innovations have lightened some of those requirements. The restricted battery liveliness requirement has not been acceptably tended to. The main Base of any mobile device is Energy of Battery, Capability of processing and The Capacity of Memory. In the Moore's Law Rate of

transistors in the integrated circuit will increase in two years. It is not acceptable the limitation of battery energy.

As compared to transistor growth in every year only 5 percent of growth expected in battery capacity. To reduce the battery consumption we need to focus on the task implementation of the smartphones. Battery problem becomes one of the critical issues among the smartphone

Users. Today's smartphone is able to do run all application that has been work on the desktop computer. Some of the examples of the operating system are Blackberry, Apple iOS, Android and much more. The only way to reduce battery consumption is to offload the series of tasks over the cloud platform. The battery drainage will be measured to compare it with the other scenario. The initial segment occurs once the consumer initiate to transfer the large amount knowledge as possible, that causes variations in the power consumption. In the second segment starts once a consumer

Of the database fires a query on a database which is in the cloud then all the complex computation will perform in the cloud. Finally, both the scenarios offload the heavy task to the cloud then it will save 30 percent to 70 percent of the energy of smartphone. The battery drainage will be measured to compare it with the other scenario. The initial segment occurs once the consumer initiate to transfer the large amount knowledge as possible, that causes variations in the power consumption. In the second segment starts once, a consumer of the database _res a query on a database, which is in the cloud then all the complex computation, will perform in the cloud. Finally, both the scenarios o_oad the heavy task to the cloud then it will save 30 percent to 70 percent of the energy of smartphone.

1.2 Motivation

Processing power, a battery power and memory of smartphones is limited and main utility of any smartphones. Processing power can be utilized properly by offloading some of the tasks to the cloud. The decision to offload the task is crucial and independent on many factors. To benefits from task offloading, the energy consumed in offloading activities need to be estimated and a decision can be taken as to whether to offload the task to the cloud or to perform it

Locally. The mobile device can save processing capabilities by offloading heavy tasks to the cloud.

2.REVIEW OF LITERATURE

Literature survey shows that some outstanding research work has been done on mobile cloud computing and task offloading of mobile devices.

1]M. Altamimi and K. Naik, The Concept of a Mobile Cloud Computing to Reduce Energy Cost of Smartphones and ICT Systems Todays era of cloud computing(cc,) some energy limitations on smartphones can be resolved by offloading big heavy task fro smartphones to the cloud[1].

2]G. P. Perrucci, F. H. P. Fitzek, and J. Widmer, Survey on Energy Consumption Entities on the Smartphone Platform The researcher has been attracted towards the need to reduce the energy consumption of smartphones. many methodologies and schemes have been proposed in the literature(Paper). [2].

3]Qian, Z. Wang, A. Gerber, Z. Mao, S. Sen, and O. Spatscheck, Pro_ling Resource Usage for Mobile Applications: A Cross-layer Approach

In This Paper, These two researchers tracing the radio resources and power consumption of the smartphones for 4G and 3 G networks, to show the di_erence between levels of power consumption. We use this literature to develop our models.[3].

4]L. Sarga Cloud Computing: An Overview It is practical to offload the task to the cloud because cloud services are widely available, nowadays many researchers attracted to o_oading to the cloud[4].

5] M. Altamimi, R. Palit, K. Naik, and A. Nayak, Energy as- a-Service (EaaS): On the Efficiency of Multimedia Cloud Computing to Save Smartphone Energy Study in this paper shows the feasibility of task offloading to whether or not a smartphone can save energy by o_oading tasks to the cloud [5].

6] S. Hao, D. Li, W. Halfond, and R. Govindan, Estimating Android Applications CPU Energy Usage via Bytecode Profiling,Literature shows an estimation of energy consumption due to local task execution is way more than the energy consumption in cloud task execution. Specifically, model the energy cost at the application level considering all the details of the networks stack (i.e. Transmission Control Protocol (TCP), Media Access Control (MAC), and Physical layer (PHY))[6].

7] M. Lauridsen, P. Mogensen, and L. Noel, Empirical LTE Smartphone Power Model with DRX Operation for System Level Simulations, We use this concept to develop our models. Instead of considering the power consumption of individual components inside the interface, we consider the overall power consumption of the network interface, because we develop our models to be used at the upper system level. This simplifies the overall system need of our models and minimizes the parameters that are used for the offloading decision [7].

8] A. Abogharaf and K. Naik, Client-Centric Data Streaming on Smartphones: An Energy Perspective, This paper proposed a client-centric and energy-efficient algorithms based on experimental observations of data streaming. Their research shows the impact of communication parameters

like a low water mark, buffer size and socket-reading size on the energy consumed during data streaming. Sleep behavior of the Wireless network interface controller (WNIC) affected by above-mentioned behavior. The algorithms tune those parameters in a profitable way by promoting the WNIC during continuous active mode (CAM) and maximizing the use of power saving mode [8].

9]A. Albasir, K. Naik, and T. Abdunabi, Smart Mobile Web Browsing This paper calculates the energy cost of web browsing for different contents, and they observed that for web pages containing advertisements (ads) a smartphone consumes more energy than the same web pages without ads. Based on this observation, a client-server algorithm is proposed that saves energy by managing the web browsing contents. The server alters the contents of the web pages based on smartphone requests, where the requests include battery-level and type of network connection [9].

2.1 Our Contributions

In this paper The proposed framework is evaluating by measuring the prototype application for Android devices in the real cloud computing framework environment for mobile. The server is designed and configured for the services to the mobile device in the online mode. Various power tutor tools used for the measuring the performance of battery power consumption in distributed application processing. SaaS model of computational cloud is utilized for the arrangement of services which are provided to smartphones. For example, First of all select task t from set of tasks application task T=t1, t2, t3...tn. then user have to calculate the Energy Cost by using device current configuration. If processing is possible on computing device itself. If it is possible to do computation on device, it then do not push application task on server. if Processing is not possible then Calculate Uploading time, Compute application task on cloud server and get results and while downloading also calculate the downloading time. The proposed framework is evaluating by measuring the prototype application for Android devices in the real cloud Computing framework environment for mobile. The server is designed and configured for the services to the mobile device in the online mode an application consists of four scenario. While offloading task to the remote server aims to save mobile energy consumption and shorten the total delay transmission induces extra cost in both energy and delay metrics, and cost for cloud computing.

3. Proposed System

STEP 1(S1):

Smartphone and it will also available as Local copy too. We used this as a reference for compare the power consumption in both cloud and locally in smartphones.

STEP 2(S2)

Second, Data exists locally but the main Task Execution will be done in the Cloud. In that, Smartphone will Upload the task in the cloud and will download the Results.

STEP 3(S3)

Third, The task data exists locally and Task execution is performing locally too. In this, both task data and Execution will be performed Locally. In addition, Both will be available Locally so we don't have to Download it again.

STEP 4(S4)

Fourth, The Input data and task execution both will be done in the cloud. So that Smart phones all do the one task is that download the results.

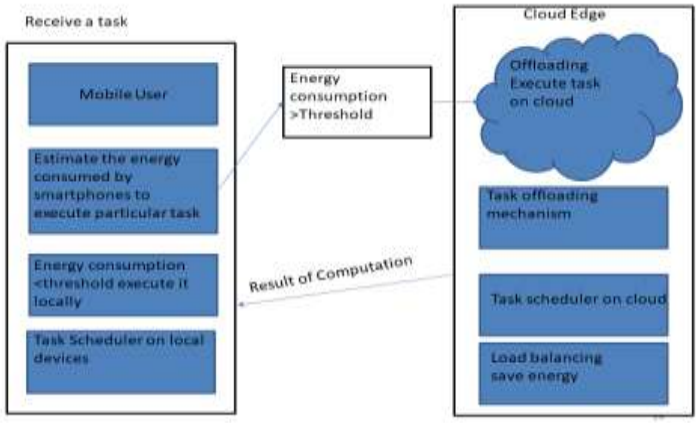

Fig-1: Proposed System

4. ALGORITHM

Task offloading is a basic method in light of the fact that at times it increments the energy consumption of smartphone device. To understand this, if a smart phone needs perform a task calculation where undertaking information subsists on the smartphone, there are two situations: either execute the task locally (loc), or offload the task to the cloud (cld). Postulate that the

Smartphone consumes energy identically tantamount to Eloc when the task is executed locally. To execute task locally we require RAM.

7. PERFORMANCE ANALYSIS

Presenting the Results of the System done on various Modules.

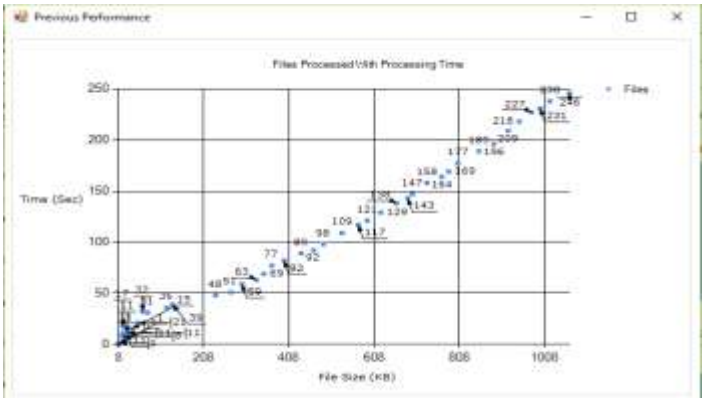

Chart -1: Previous performance local

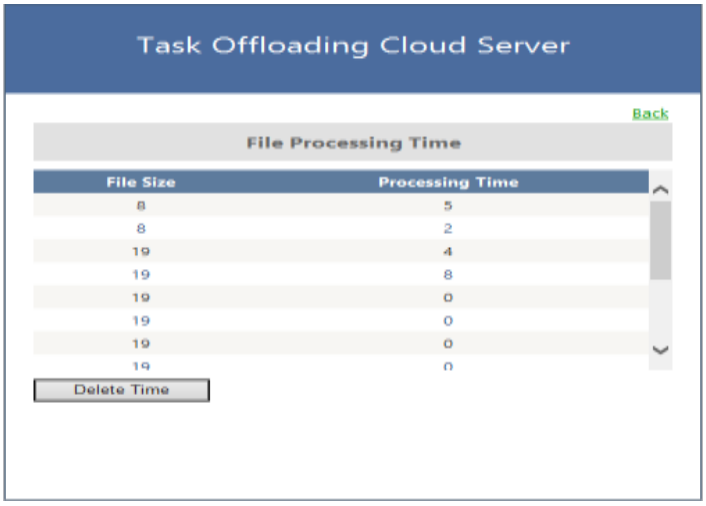

Chart - 2: Previous performance cloud

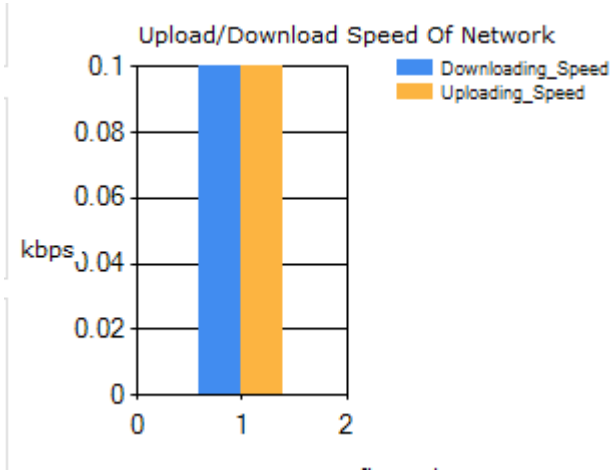

Chart -3: Upload download speed of network

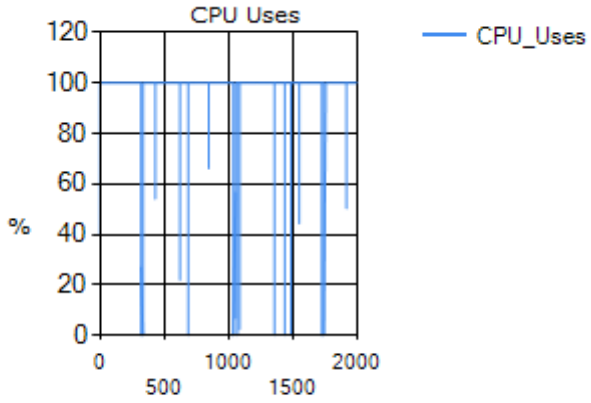

Chart -4: CPU Uses

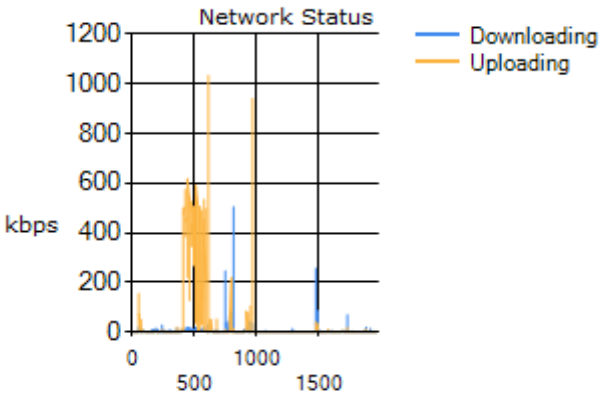

Chart-5: Network Status

This performance analysis shows that our scheme is better than all existing schemes, Also our scheme is in better in the way of Efficiency and Flexibility.

8. CONCLUSION

With The Cloud Computing, we can access our data anytime anywhere. In this Scheme, We implemented the way that is less costly and More Efficient. Expanding the potential

Of handheld devices is promising by task offloading to the cloud. However, estimation of the power utilization in task offloading is basic for making assignment offloading favorable, which occur just when the power consumed in the offloading Method is not as much as the power consumed without it. Calculating some basic parameter like Processor capability, Battery energy and memory capacity we can make decision whether to offload the task or not A few credentials Thus, the smart phone devices can be utilized to spare vitality by offloading overwhelming undertakings to the cloud, and afterward the cloud executes the task and gives the smart phone the outcomes.

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