"A New Improved Storage Model of Wireless Devices using the Cloud"

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Abstract

This paper focuses on the development of new storage model by using cloud computing for mobile devises. The concept of cloud computing has been applied to mobile devices for improving the existing model (battery time and data saving) of mobile devices. In the recent eras, different types of cloud computing techniques have been used for improving the efficiency of mobile devices. The paper has combined the calibration and current launch amount characteristics with the trial results for drop in battery voltage. A mathematical equation has been derived for mote operation scenario. Through this equation, the power provide by the power supply as well as the average time of battery can be measured.

Key word

"Cloud computation, mobile application, topology management (save battery energy lifetime), mobile data archiving "

1. INTRODUCTION

With the explosion accessibility of internet entry via mobile phone, here with the growing number of cloud computing service. Smart phones, PDAs and IPods are set to become a leading access point and interface, and it will be helpful and more efficiently to carry out anywhere at any time when they want to make shopping via the internet (E-shopping) such as booking ticket purchase, ever more perceived as the most convenient access point. As a result, optimizing these devices to improved access to cloud services becomes critical. [1]

However, the cell phone services applications are different from the frequently manner in the capacity to provide execute rich user applications involving widely use. Foremost, in the mobile devices you can say these devices involve that they are battery-powered, limiting their power capabilities. As smart phones are most famous portable technology, the most intensive of computation capacity point and the main key of restricted access will be energy consumption in these days. In fact the majorly of memory in usual computer versus the mobility in this time, with this comparison will find the memory limitation in mobile. [2]

Actually, that will happen within execute the heavy application such as voice recognition, mobile phone tracker, navigations system via mobile and face recognitions. Mean while, H/W of mobile device and mobile networks are going on to evolve and to improve, the weakly points in the mobile devices, the unreachable connection with network, limitation outsourcing within access the networks, energy power of life time battery, for thus points we purpose to use the

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cloud computing outsource with access via mobile phone. In the cloud computing have unlimited outsourcing same as IEEE library, in that provides a public cloud as storage resources that will discuss later on. According to increase lifetime battery there have algorithm that will enhance and reduce of consuming energy power of lifetime battery, it's called topology algorithm. [3]

2. Problem Background

Cloud computing is a new concept which combines many fields of computing. The foundation of cloud computing is built on the software and processing capacity, delivery of efficient services, reducing consumption of battery lifetime, increasing storage, decoupling of services from technology, computerizing systems and flexibility and mobility of information. The problem in this model is that achievement of proposed benefits is far behind the achieved benefits for mobile devices. The above mentioned application models of the mobile computing are used in different scales. It is very important to propose a model where proposed benefits of mobile computing can be achieved in reality.

3. Problem Statement

Mobile phones have spread all over the world. The basic aim behind these devices is to achieve worldwide interface for accessing services and cloud computing applications. Use of cloud computing techniques allows two types of configurations. First is how to reduce the consumption of energy power for getting improved battery life time. Second is to establish special archiving data for saving power and improving battery lifetime. This can happen when archiving is established and user goes to sleep mode for saving battery time.

4. Cloud Computing

Clouted-intensive applications to the cloud is very important in energy efficient the response time and battery consumption. Without an accurate Clouded-intensive, the minimum energy battery lifetime could not find the optimal dynamic mobile outsourcing. In addition, we will first present some topology algorithm assumptions, which used to saving power of lifetime battery. To optimization of decreasing the access time of the source code on out- sourcing framework [17]

4.1 public clouds

When we need to turn on public cloud, a service provider will first need to classify the services that will be accessible to enterprise that want to place their over load in the cloud. Works with service providers through some

Programs, most not are ably the Cloud Data Center Services program, to make sure a lowest level of cloud service capability. [18]

4.2 private clouds

Is an environment which is able of running and implementing characteristics of cloud computing like virtualization and layered services more than the network.[18]

5. Topology algorithm

The topology management can be considered a primary module in managing network of wireless sensor network. The major objective of topology management is to minimize the node's energy consumption and increase the network period. [19]

Topology discovery request used to define the location and certifying the connectivity of each node in sensor network. Power control is used to maintain the range of the connection between the nodes by conducting the power of the transceivers. The key goal for using sleep cycle in topology management is turning off some nodes for periods of time in order to avoid the redundancy in the network. The last area is clustering, which is involves into dividing the nodes into groups to improve the scalability and power efficiencies. [19]

6. Recent Techniques

6.1. Cloudlets

Most of mobile devices use the energy saving techniques, used in wireless networks, to increase the latency and jitter average; this is to make mobile device's switch on only for little time. The Cloudlet is therefore proposed to ease the amount of data sent transversely the network. Cached version of cloud are Decentralized, Available everywhere cloudlet and high speed connection. [4]

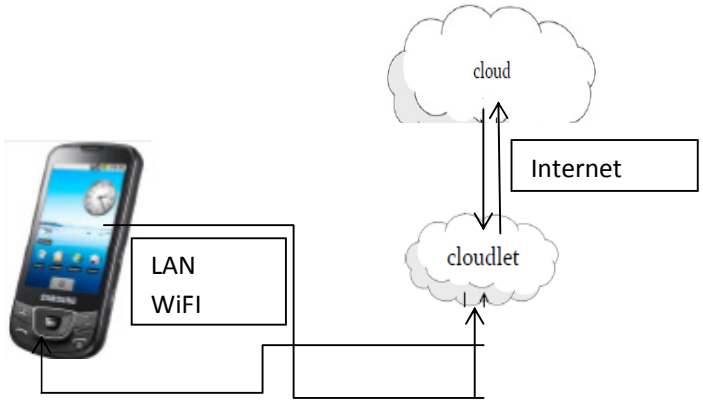

Figure 1. Cloudlets

6.2. Virtual cloud Provider

Mobile Clint access the same cloud service on the same time ,the Clint can share the reply from cloud service, the users get a part of translation reply using Internet, and in this technique using Per 2 Per (P2P) protocol to share with everyone in Local Wi-Fi, all users have the full translation and helps when bandwidth is small. The process for the creation and usage of a virtual cloud provider is easy ,for example If a user is at a stable place and wants to complete a task which need more resources than available at the device, the system listens for nodes in the area. If available or not, the system intercept the application loading and modifies and the applications in order to use the virtual cloud. This is a main idea for virtual cloud provider [16]

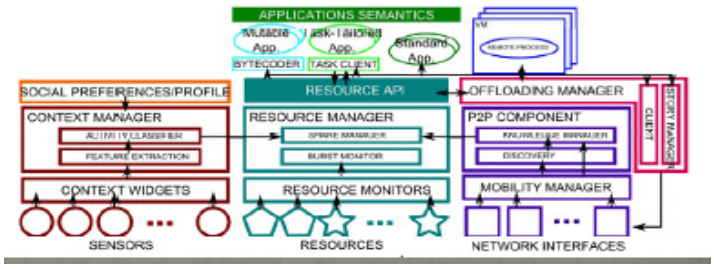

Figure 2. Virtual cloud Provider

6.3 WINC Sleep

Sometimes we may have to wait completely a long time There perhaps also be sometime between inputs from User. Wireless Network Interface Card (WNIC) is energy consuming when switch on before receiving answer from cloud multimedia streams makes wireless network interface (WNIC) energy consumption an especially acute problem for mobile clients. [14]

In my work I will to allow the clients to move in the WNIC to a lower power consuming sleep stat. In the following table, benefits of techniques used in the project are summarized:

Table 1. Comber Between Techniques

Cloudlets	Virtual Cloud Provider	WINC Sleep
Ease in data transfer	Helpful when bandwidth is small	Lower power consumption
Available everywhere	Easy process of usage	Speedy connection
Speedy connection	All users have the full translation	Connectable between cable and device

7. Google Gears Geo Location

From here, I will try to describe, based on the above info, how Google might use this information to give location information. In the case of GPS, data sent to Google contains:

1. GPS data
2. GSM towers
3. Wi-Fi towers

In the case of a mobile that supports a GPS, it is enough to determine the GSM towers to have accurate info about location. This info is sent to Google as part of the request. But as we can see, this information already contains the geo location, so Google might do the following:

1. Calculate you location [latitude and longitude].
2. Use Wi-Fi data to calculate your relative position to each Wi-Fi.
3. Calculate the absolute position of each Wi-Fi tower based on a and b:

a. Mobile absolute location is already known.

b. Wi-Fi relative location from the mobile is known.

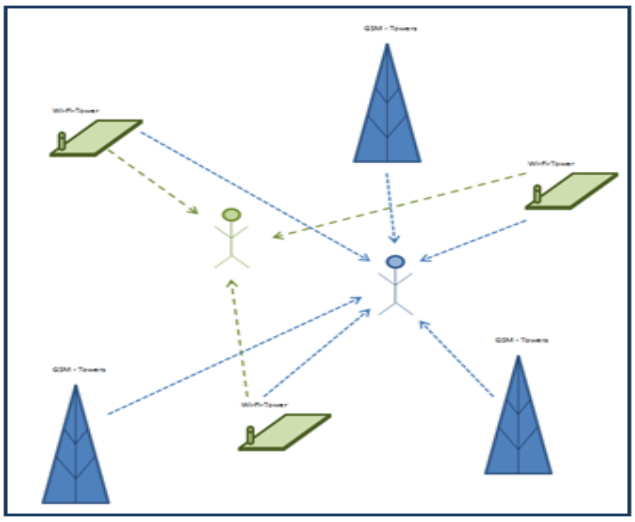

Figure 3. Google Gears Geo Location

Now, Google stores the mac_address and the SSID together with the absolute location in a geo database that is kept updated when possible. In case you open your laptop and connect to Google Latitude, Google can determine your absolute location using the Wi-Fi towers only because it already knows, from other queries from you and different persons, the absolute location of the Wi-Fi towers. As we can see in the following figure, the blue person sends GPS, GSM towers info, and Wi-Fi towers info. Google calculates the Wi-Fi towers info. Now the green person can know his location by querying Google with Wi-Fi towers only. This is not that easy. We need to think of many challenges such as similar Wi-Fi names, changing Mac-addresses, Wi-Fi turning on/off etc. [15]

7. Cloudlets

7.1. Cloudlets Can Help

Can we obtain the advantages of cloud computing without being WAN-limited fairly than counting on a handheld distant control "cloud," the source hardship of a cellular phone can be addressed by using a close by resource rich cloudlet? The need for real-time entertaining reaction can be met by low latency, one-hop, high-bandwidth Wi-Fi entry to the cloudlet.[5]

The cellular phone features as a slim customer, with all significant calculations happening in the encompassing cloudlet. Physical vicinity of the cloudlet is essential: the end-to-end reaction duration of programs performing in the cloudlet needs to be fast (few milliseconds) and foreseen. If no cloudlet is available close by, the cellular phone can beautifully lower to a fallback function that includes a handheld distant control reasoning or, in the toughest, completely its own sources. Full efficiency and efficiency can come back later, when a close by cloudlet is discovered

Cloudlets are decentralized and widely-dispersed online facilities whose estimate periods and storage space sources can be utilized by nearby cellular computer systems. A cloudlet can be considered as a "data center in a box." It is self-managing, demanding little more than power, online connection, and accessibility control for installation. This convenience of management goes along to an equipment style of processing sources, and makes it simple to set up on a business property such as a cafe or a physician's office. Inner, a cloudlet may be considered as a group of multi-core computer systems, with gigabit internal connection and a high-bandwidth Wi-Fi LAN. For safe implementation in unmonitored areas, the cloudlet may be packed in a mess proof or tamper-evident housing with third-party distant tracking of components

reliability, a cloudlet only contains smooth state such as storage space cache duplicates of data or value that is available elsewhere. Loss or destruction of a cloudlet is hence not catastrophic. [6]

7.1. Temporary Cloudlet Customization

We think about an upcoming in which cloudlet facilities is implemented much like Wi-Fi accessibility points these days. Indeed, it would be relatively uncomplicated to include cloudlet and Wi-Fi entry way components into a single easily deployable entity. A key task is to easily simplify cloudlet control. [7] Extensive implementation of cloudlet facilities will not happen unless program control of that facility is simple preferably, it should be completely self-managing. Firmly reducing program on cloudlets to easily simplify control is unappealing because it constrains program advancement and progress. Instead, a perfect cloudlet would support the greatest possible range of mobile customers, with little restrictions on their program. [2]

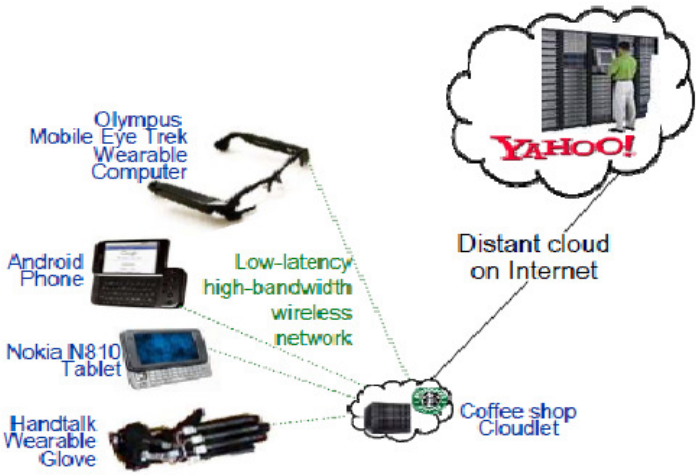

Figure 4. Cloudlet Customization

Table 2. Cloudlet& Cloud

	Cloudlet	Cloud
State	Only soft state	Hand and soft state
Management	Self management little to no professional attention	Professional administered 24x7 operator
Environment	"Datacenter in a box" at business premises	Machines room with power conditioning and cooling
Ownership	Decentralized ownership by local business	Centralized ownership by Amazon, Yahoo

Network	LAN latency/ bandwidth	Internet latency/ bandwidth
Sharing	Few User at time	100s-1000 of user at time

7.2. Joining to Cloudlet Infrastructure

The operator of the temporary capturing between cellular phone and cloudlet is a user-level procedure known as Kimberley Control Administrator (KCM). An example of KCM operates on it and on the cloudlet, and they together summary service development and system management from the rest of Kimberley. KCM can handle the surfing around and posting of solutions using the procedure in A Linux System Unix.[8] The first thing in the capturing series is the establishment of a protected TCP tube using SSL between KCM circumstances on a system and a cloudlet. This tube is then used by the relax of the capturing series, which typically involves individual verification and optionally available charging connections. Kimberley can handle the Simple Authentication and Protection Part (SASL) structure, which provides an extensible user interface for developing different verification systems. After effective verification, the cloudlet KCM completes a management. This brings the VM overlay from the cellular phone or a Web site, decrypts and decompresses it, and is applicable the overlay to the platform VM. The revoked VM is then released, and is willing to offer solutions to the cellular phone. [9]

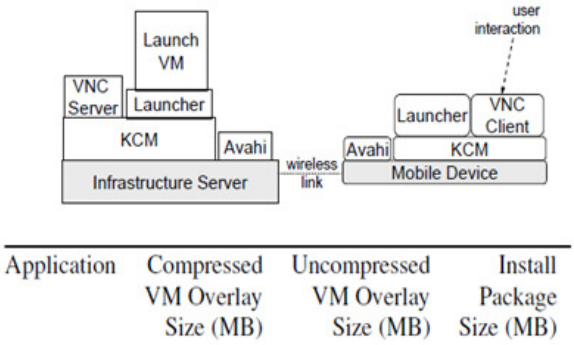

Figure 5. Cloudlet Infrastructure

8. WINC Sleep

8.1. Power Consumption Modeling

It is feasible to evaluate the power use of the Telos (B) platform primary segments based on the profiling procedure offered. I will explain how to simplify the program's level of power consumption using models that do not have a decrease in precision. "According to the measurements' results, the difference in power consumption among the analyzed segments is quite significant. This particular understanding is crucial when assessing methods that guarantee greater expected gains in power preservation".[10] Moreover, these methods are essential for determining the most critical operations with regards to power consumption corresponding to the HW segments used, which can be conducted by a WSN mote, to determine the battery's functional life-time. Therefore, this section is designed to offer combined details extracted from my research, regarding important power consumption of primary efficient segments in useful and realistic ways assisting by my suggested technique. [11]

The most sensible element to start with is the MSP430 micro-processor. By comparing the results, it is proven that although the primary handling device provides five possible low power ways, an easy conversion to the LPM1 power condition is enough to offer considerable power consumption gains in a program stage range. Such a conclusion is further highlighted when considering concurrent power consumption linked to modules that save more power, which will be proven later in this area. When the battery is asleep, the outcome to present a decrease in the cloud may provide only a minor distinction in a WSN common program. The mobile's battery is saved when considering the transitioning delays back to the mobile's complete effective condition, as well as various restrictions in the function of side-line elements included in the microcontroller processor. Furthermore, when the CPU is effective, the kind of function or control performing does not affect the calculated present sketch. More specifically, depending on the CPU dimensions, such current stages for concern of battery loss are defined in Desk I, assuming a CPU regularity of 4MHz. Therefore, the particular power consumption computation can quickly be of use by the multiplication of certain present stages during which the CPU is located in a particular efficient condition. [12]

The stations transceiver relevant power consumption is the most crucial element regarding the program's power level consumption. This is due to the fact that facilitating radio connections are probably the most elementary function of a common WSN program and, that as an element; it provides the highest current draw specifications than any other primary HW element. As experimental dimensions indicate, only two different existing draw levels are actually identified in Table I, assuming that the nodes are required to transmit/listen/receive at complete power, for which current demands are roughly the same. Based on these levels, the power consumption offered by the air programs' operation can be calculated considering the amount of energy and energy frame percentages regarding the air programs “ON” and “OFF” states. By using a program that switches the mobile off, more energy is saved and signs do not execute so large a part in mote lifetime development for common deployments, because the average existing specifications will continue to be helpful. As far as receptors and existing monitoring are concerned, the information supply by an AD ripper resources path, measurements have confirmed that the existing drawn depends greatly on the ADC path consumption, being approximately 0.5mA. Lastly, LEDs contain the most consistently used indicator concerning all effective states of a WSN mote and can be considered as a type of actuator for Telos(B) and other WSN techniques, which generate proportional current specifications to the current use. Measurements concerning the LEDs’ function show that each one of them constitutes considerable power source consumption. [13]

With respect to a WSN program, the most straightforward guideline is to avoid the use of LEDs all together. If that is not possible, then any particular future development must be satisfied by boasting the battery's consumption function, rather than by a constant “ON” state, considering the existing draw indicated in Table I. In conclusion, the system-level power consumption of a WSN node can be related to a limited and definite number of factors. In most WSN techniques, the identification and accurate figure of these factors, allows the formulation of a particular genuine and easily applicable equation which styles the mote’s power consumption pattern. [13]

Table 3. HW COPMONETS CURRENT DRAW LEVELS

CPU Mode	**Measured Current**
LPM0	2.35mA
LPM1	1.85µA
Radio Mode	
Active	23mA

(transmute/receive/listen)	
Idle	2.5mA
Type of Led	
Blue	3.4mA
Red	5.5mA
AD converter	
Sensors	0.6mA

8.2. Scientific power supply potential and life-time characteristic

The calibration and current launch amount characteristics are combined with the trial results for the battery voltage drop relatively to time duration for each particular mote function. The latter combination can produce a graph relating the normal launch amount with the power in mAh and power supply life-time, defined by the threshold of 1.5V being the cut-off current for the Telos(B) platform, where any communicational function can no longer be performed. The relation between total power offered by power supply and the average launch amount is described by power supply capacity characteristics, whilst the algorithm between power supply life-time and average launch amount is described by power supply lifetime characteristic. [14]

Considering the power potential provided, and its identified reliance on the release amount, an average discharge amount can be produced corresponding to the overall battery life-time as portrayed in the following formula.

$$I_{LEDS+CPU_{LPM0}+ADC}(V_s) = 2.98 \times V_s^2 - 7.31 \times V_s + 5.65$$

$$I_{RX+CPU\_LPM0+ADC}(V_s) = \begin{cases} 0.93 \times V_s + 18.34, V_s > 1.86 \\ 8.85 \times V_s + 3.6, V_s \leq 1.86 \end{cases}$$

$$I_{RXLEDS+CPU-LPM0+ADC}(V_s) = \begin{cases} 2.7 \times V_s^2 + 22.66, V_s > 1.86 \\ 11.14 \times V_s + 0.15, V_s \leq 1.86 \end{cases}$$

$$I_{CPU-LPM0}(V_s) = 0.89 \times V_s - 0.804$$

$$E_{offered} = \int_{t=0}^{t=t} = I(t)dt \qquad \sum_{i=0}^{i=\text{number of current steps}} I_i \Delta t_i$$

$$= I_{average} \dagger_{max}$$

$$i_{avg\_operation} \times t_{max\_opration} = E_{offered}$$

The above formula explains that the Eoffered is the power potential provided by power supply power, tmax is power supply life-time, Iaverage is the normal launch rate and Ii is the present attracted for a specific time period Δti. Experimental results concerning the current fall of the batteries for the air stations functions and the removal of the current attracted by the RX function are shown in Fig. 4. The type of power supply power used is AA alkaline provided by Energizer Company (E91, AA, 1.5V, LR6, AM3) with 1.5V nominal voltage. The area within the present bend symbolizes the energy potential provided and is calculated by summing the multiples of present per time steps as provided in. Using the produced present fall for every mote operation scenario, the power provided by power supply power as well as the average present attracted can be measured with. The lifetime tmax symbolizes enough time. [14]

9. Conclusion

The paper has attempted to present a new model for the mobile devices by using techniques of mobile computing. The literature has discussed that cloud intensive applications are very important for achieving energy efficiency in relation to battery time and energy saving. Without developing an appropriate and accurate cloud computing model, the minimum energy consumption and battery lifetime cannot be obtained. The paper has attempted to consider the power potential and its reliance on the release amount. An equation has been derived through cloud computing techniques through which battery time and average discharge time to corresponding overall battery life can be determined.

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