Optimum Energy Utilization In Mobile Cloud Computing Via Clone Cloud

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Abstract-*Mobile cloud computing is visualized as a capable method to expand the computational capabilities of mobile devices for rising resource-intensive mobile applications. This extension is generally achieved through the abilities of fixed resources in cloud data centers. However, these resources are typically not free and sometimes not accessible. Mobile devices are becoming influential day by day and can form a self-organizing mobile ad-hoc network of nearby devices and suggest their resources as on-demand services to accessible nodes in the network. In the ad-hoc mobile cloud, devices can move after consuming or providing services to one another. During the process, the nodes perform the operation for other nodes which is responsible for the energy consumption. To overcome this process, we perform cloning of the mobile device in the cloud to perform the task in the cloud for conserving the mobile energy. Our proposed work improved the energy of the mobile device and enhances the performance of network.*

Keywords-Mobile Ad-hoc network, Mobile Cloud Computing, Clone Cloud, Applications, infrastructure, Energy and Security.

I. INTRODUCTION

As the importance of computer increases it also build up the connectivity demand. Wired solutions are used from a very long term, however the needs for wireless solution are increasing for connecting to the Internet, exchanging records, send and receive E-mail messages and many others. Mobile Ad-hoc network (MANET) becomes one of the most capable fields for studies. MANET is a wireless ad hoc network. A MANET may be linked to internet or external network and may be a standalone network. MANET is a Latin phrase which means “for this”or“for this purpose most effective”.

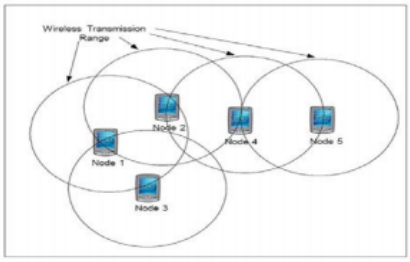


Fig.1 Structure of MANET

A MANET is a hard and quick of self-governing wireless mobile nodes that would trade data in dynamic way. Because of the mobile behavior of nodes the network structure is dynamic. The network is self- deploying and decentralized. The nodes in MANET act as each router and as a host and network topology adjustments hastily and choice taken in a dispensed manner. Due to dynamic behavior of network, routing for MANET is a daring task and wireless link end up especially error susceptible in MANET.

Security, reliability, availability, scalability, quality of carrier is a number of the requirements of MANET. Wireless network is divided into 2 parts:

Infrastructure network: An infrastructure network act as a bridge, which connect wired network and wireless network. The base stations are fixed and the mobile network move during communication. If any node is going out of range from any base station, it goes into the variety of other base station. Figure 2 suggests infrastructure network.

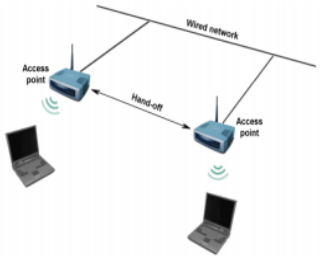


Fig.2 Infrastructure wireless networks

Infrastructure less network: No settled base station and mobile nodes can move while imparting.All the nodes present act as routers. Infrastructure much less network

additionally referred to as Ad-hoc network which forms transient networks. In this kind of network nodes are portable devices such as mobile phones and laptops. Figure 3 indicates an ad-hoc network [1].

Fig.3 An ad-hoc network

II. MOBILE CLOUD COMPUTING (MCC)

MCC integrates the cloud computing era into the mobile computing surroundings and overcomes issues related to the surroundings, usual execution and protection. Mobile Cloud Computing may be divided into two instructions: first one is carrying out data storages and second is processing outdoor mobile device. Mobile cloud applications moves away the processing force and data storage a long way from cell phones and into the cloud, bringing applications and mobile figuring to not just Smartphone customers right into a terrific deal broader variety of mobile phone subscribers [2].

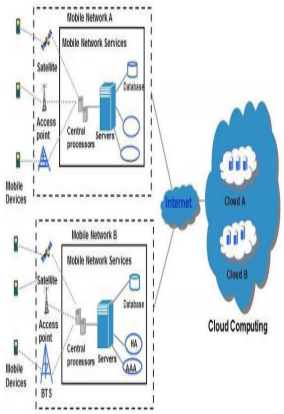


Fig 4: Mobile Cloud Computing Architecture

III. ARCHITECTURE

In mobile cloud computing mobile network and cloud computing are mixed, thereby supplying a top of the optimal offerings for mobile clients. In cloud computing applications run on a far off server after execution dispatched to the client. Here the mobile devices are related to the mobile networks through the base stations; they may establish and manage the connections (air interface) and functional interfaces between the mobile networks and mobile devices. Mobile users send service requests to the cloud through a web browser or desktop application. The information's are transmitted to the significant processors which can be connected to the servers imparting mobile network services. Here, offerings like AAA (Authentication, Authorization and Accounting) may be supplied to the customers based on Home Agent (HA) and subscriber's data saved in databases [3].

IV. CLONE CLOUD

It is designed to serve as a platform for typical mobile-device processing as a carrier. Conceptually, our system robotically transforms a single device execution Clone Cloud boosts unmodified mobile programs through seamlessly off-loading some bit of their execution from the cell phone onto device clones working in a computational cloud1. It is designed to function a platform for normal cellular-device processing as a service. Conceptually, our gadget automatically transforms a single device execution (e.g., calculation on a Smartphone) into a conveyed execution that is ideal given the network association with the cloud, if necessary, the relative handling capacities of the cell phone and cloud and the application's computing patterns [4].

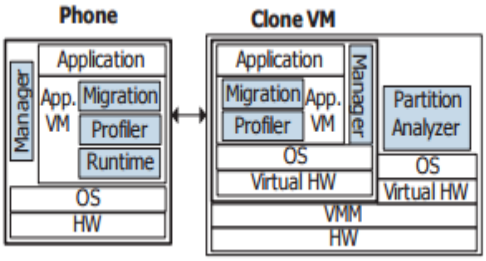


Fig 5: The Clone Cloud prototype architecture.

V. LITERATURE SURVEY

Bilel Zaghdoudi et al. [2016] the goal of this paper is to present a deep study and a comparison of the new distributed computing paradigms. We also present a proof of concept study of a proposed protocol for the deployment and the management of a resource sharing architecture composed of interconnected mobile nodes. We implemented our solution and tested it over small sized spontaneous networks. From the experiments, we obtained detailed measurements of the time required for the architecture's setup and the customers or providers nodes joining. This permits to prove the protocol feasibility in real distributed environment with acceptable times [5].

Mateusz Krzyszton et al. [2016] the paper studies the problem of estimation of boundary of located heavy gas cloud and tracking those clouds. The MANET created from mobile sensing gadgets is used to resolve this venture. We describe a

three-segment method for creation a sensing gadget, in which cellular sensors explore the location of interest to stumble on the gasoline cloud, create preliminarily network topology and sooner or later, adapt this topology to hit upon the cloud boundary and track the moving cloud retaining the everlasting verbal exchange with the relevant operator of the system. We evaluate the performance of the proposed strategy based on the results of simulations [6].

Dominic Afuro Egbe et al. [2016] this paper propose a setting based service discovery algorithm. The algorithm uses a Search All Pick One Algorithm (SAPOA) to discover the closest service based on the provider's context. A test is conducted using 10 nodes with 4 services. Our result provides the best service based on the trade-off between context battery level and distance [7]. A test is led utilizing 10 nodes with 4 administrations. Our outcome gives the best administration in light of the exchange off between setting battery level and separation.

Rasika R. Mali et al. [2016] this paper propose and implement, new IDS named as Secure Acknowledgement (ACK) System. The Secure ACK system is purely an acknowledgement based technique. The type of misbehaviour detected by proposed system is about delay in packet transmission. In this gadget, for each three consecutive nodes inside the route, the 1/3 node is needed to send returned an acknowledgement packet to the number one node within the institution. Based on the non-receipt of ACK packet within predefine time to the first node in the group, it reports about misbehaviour activity in the network. As soon as the proposed system detects misbehaving node present in the network, it stops the further data transmission. So, the misbehaving node will not be able to damage network thereafter [8].

Siddhant Dodke et al. [2016] in this paper, evaluation among usual overall performance of Ad hoc On Demand Distance Vector (AODV) and Dynamic Source Routing (DSR) is executed. We have also analyzed the routing protocol AODV as well as DSR using NS-2 simulator, the obtained results show that DSR consume 40% less energy as compared to AODV [9].

Shabina Parbin et al. [2016] this paper,propose a trust and reputation management scheme for find out the trusted location in MANET environment. MANETs operates without fixed framework and all nodes in network perform like a router in sequence to forward information next receiver. Since the pivotal point rein lack, MANETs are additionally pregnable routing attacks as against various grids. Routing is one of the most serious attacks of wormhole attacks that are easier to be implemented nevertheless harder detection. Generally, it operates in two phases; in the first phase, wormhole channel nodes tend to draw more and more traffic route, and by other phase, they loss the grid by altering or dropping the grid traffic. In MANETs, numerous writers have implemented diverse results to prevent attacks [10].

Manshu Goyal, et al. [2016] the proposed offloading framework divides the application into tasks, thus, offloading them on remote cloud server for execution. The offloading process in cloud computing extends battery duration and conserves energy. However, it is critical to evaluate the cases where offloading ensure advantages in terms of data transfer, computing power needed, costs of using the clouds, a decided QOS. The paper presents a fault-tolerant energy efficient framework for application offloading with minimal energy consumption and response time [11].

Manpreet kour et al. [2016] this paper propose a model named as intermediate cooperator. As the name justifies it is placed at intermediate position between local or remote resource cooperators. This leads to best decisions on allocation of resources, small distance, and low bandwidth for communication, minimum communication delays, and satisfactory quality service. Further, we introduce a high alert resource point that provides indication when 25% resources are left. Utility operations have been observed to include the cost, time, latency and efficiency. The simulation results suggest that our proposed scheme enhances the utilization of data center with improvement in parameters like efficiency, time, cost and latency etc [12].

VI. PROPOSED WORK

In previous work, they used directory based method in which all the record is stored. When AM performs a task for other and then the node moves then they didn't get any award or incentives of their resources. So every AM should be registered at directory which enables it to keep the track of all the process in the directory. But this kind of process is responsible for energy consuming by doing tasks for others.

In our work, we are using Clone Cloud method which is used for energy conservation. When AMs create a proximate cloud to perform the tasks for others then they also create their clone to the cloud. This makes them fast to perform their time consuming tasks at the cloud. When AM request for computation resource and they don't have their clone then they can request to other AM which has their clone in the cloud. Then at cloning, their tasks are performed and return back to the mobile. We integrate these two technologies which create very energy efficient method and perform all the processes in less time.

Proposed Algorithm

Step:1 Start
Step:2 Create proximate clouds of Android Mobiles (AMs)
Step:3 If AM has no Resources
then it request for resources to their neighbour mobile (NM)
else
perform task itself
Step:4 If NM has Resources
then they calculate their own energy
$E_{mobile} = I+T$
Else
Send data to cloud
//Where input data size (I), energy consumed (E_{mobile}) and total time required for completing task (T)

Step 5: If $E_{mobile} \leq$ threshold
then all the data sent to cloud
else
they complete all the tasks itself
Step 6: Performs the computation at mobile clone
Step 7: Send back to the mobile
Step 8: updated to the directory
Step 9: End

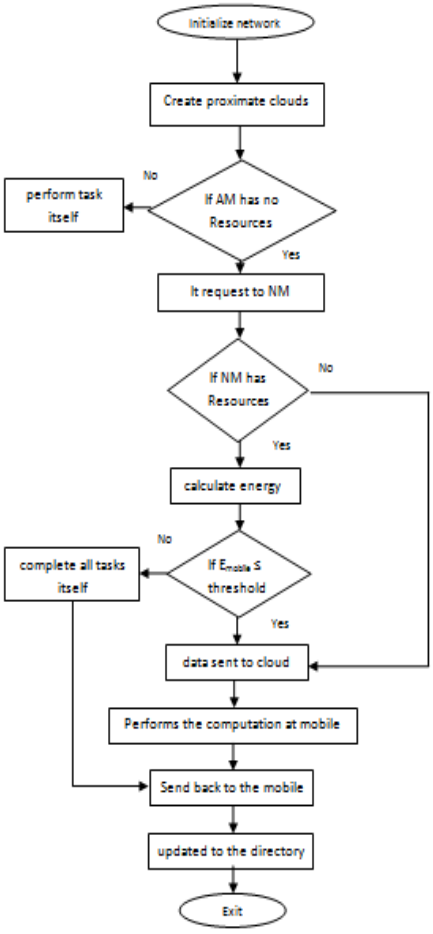


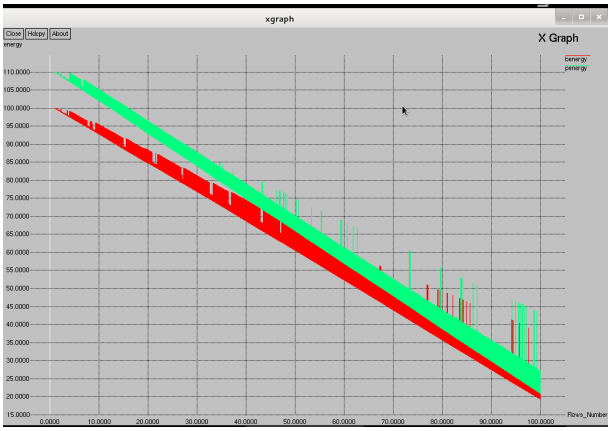
Fig.6 Flowchart of proposed work

VII. RESULT SIMULATION

Energy of nodes:

Determine the ability of a system to change Initial energy (Transmitting) and Energy loss (Receiving) remaining Residual. From the graph below, we show that our proposed method consumed less energy than the existing work.

Energy = Initial Energy / Number of node in Route or Remaining Energy

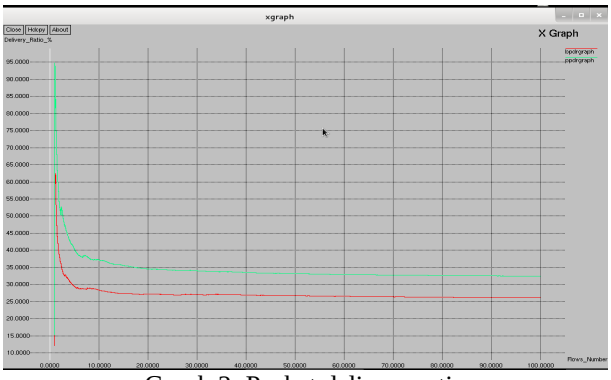


Graph 1: Energy of node

Packet delivery ratio:

The total number of data sends successfully to the destination. The graph represents a PDR graph among base approach as well as proposed approach. This PDR value is much improved in proposed than an existing approach.

Packet Delivery Ratio = Number of packet received / Number of packets sent



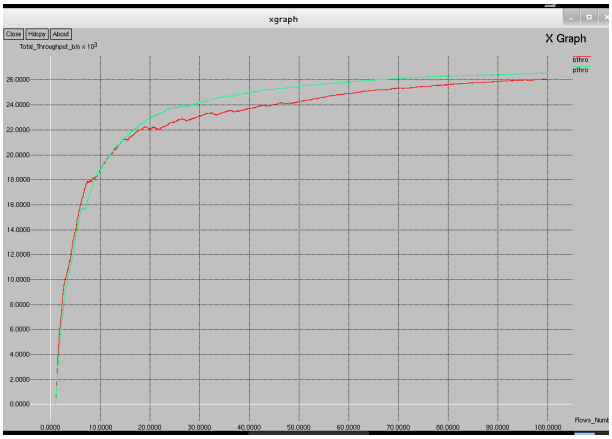
Graph 2: Packet delivery ratio

Throughput:

Throughput is the quantity of effectively received packets in a unit time and it is represented in bps. Throughput is computed utilizing awk script which forms the trace file and

delivers the outcome. The graph represents a throughput graph among base approach as well as proposed approach. The throughput of the proposed approach is little bit improved than the existing approach.

Throughput (kbps) = (Receive size/ (stop time - start time)*1/60

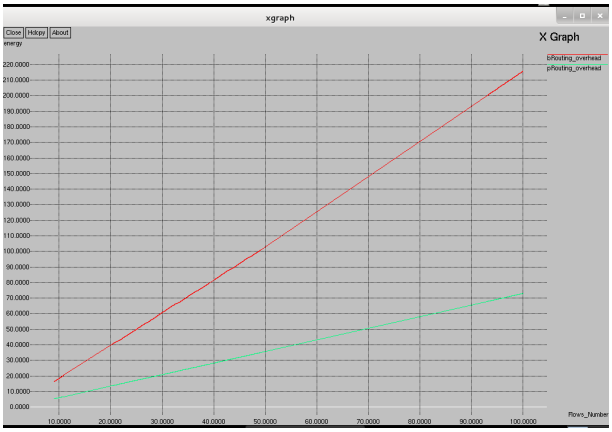


Graph 3: Throughput

Routing overhead:

It is defined as the flooding of data in the network transmitted by application, which utilize a bit of easy to get to transfer rate of communication protocols. The graph represents a routing overhead graph among base approach as well as proposed approach. The base approach has an extra overhead than the propose approach.

Routing overhead = Number of packets control in particular time.



Graph 4: Routing Overhead

VIII. CONCLUSION

Mobile cloud computing (MCC) is motivational approach to address various issues such a challenge by offloading the wide computation via wireless access (cell network, Wi-Fi, or Bluetooth) to the resource-rich cloud infrastructure to expand the gadget battery lifetime and to get better user reaction time. In MCC, the ecosystem of computational offloading contains dissimilar resources and may use any of them depending on availability and scheduling decisions. We improved the energy consumption by cloning the device in the cloud and perform.

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