

Energy-Efficient for Distributed Wireless Data Transmission in Mobile-Cloud Computing

C.T.K. Amarnath, S.K. Mahendran

Abstract: In Mobile cloud computing, Energy Efficiency is the Key factors to perform every task with less Energy. The Smart phone users are increasing day by day the data transfer speed is also increase and the energy consumption is also increase. In this paper to maintain the energy efficient for distributed wireless data transmission in Mobile cloud computing is called Distributed Wireless Data Transmission (DWDT). By this method, energy efficient is to be handled by using best intermediate path of data transmission in Mobile Cloud Computing with Energy Efficient. With this methodology the mobile cloud services can be reliability and energy efficiency in wireless data transmission in mobile cloud environment.

Index terms: Energy-Efficient, Distributed, Data Transmission, and Mobile Cloud Computing, Distributed Wireless Data Transmission

I. INTRODUCTION

1.1 Mobile Cloud Computing

Mobile Cloud Computing (MCC) is a type of communication service in which processing input data and storage of processed data occur in a place apart from mobile device. The ultimate aim of MCC is to enhance the business infrastructure and capabilities of mobile network operators and cloud service providers. The Mobile Cloud Computing is to facilitate functioning of all mobile applications on mobile devices itself. Mobile cloud computing provide many business opportunities at lower cost with a lot of benefits. There are various cloud service available such as Amazon Web Services. Infrastructure as a service and Platform as a service are the services provided by cloud service providers such as amazon web services. Subjects such as mobile cloud computing, Distributed Computing were also included in computer and Information sciences. In addition to the above, research groups also work on possible innovations on protocols, operating environment, design of program and set of rules for Mobile Cloud Computing and distributed computing. The research group has established algorithms, tools, and technologies which approach productive energy, resilient, upgradable, sturdy and high throughput on mobile devices. In present scenario, the mobile cloud computing in addition with communication networks paves a path way for various experiments such as Mobile Computation Offloading, Connectivity, WAN Unconsciousness, Mobility Administration, Context-Processing, Restriction of Energy, Vendor/data Lock-in, Privacy and Security, Elasticity that delay MCC achievement and implementation.

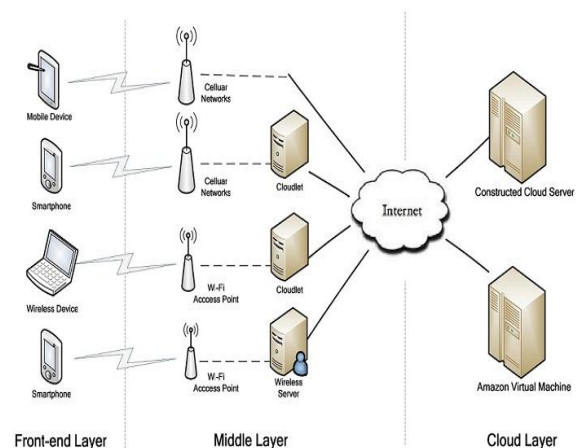
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1.2 ARCHITECTURE

MCC is the combination of resource-constraint mobile devices cloud computing, this will provides full access to all resources through the cloud “Anytime, Anywhere, Anyhow” (Fig.1). Mobile Cloud Computing, which is basically the use of Cloud Computing technology on a mobile device.



The innovations in Mobile cloud computing builds a platform for mobile devices and cloud computing to form a infrastructure, whereby cloud computing performs the lifting of computing-demanding tasks and storing huge amounts of data. In this MCC new architecture, data processing and data storage happen outside of mobile devices.

The Advantages of this IT architecture to generate Mobile applications:

- Enhanced battery life
- Increase in processing and data storage capacity
- Enhanced management of data due to storage and processing speed.
- Enhanced consistency and expandable
- Simplicity of integration

Advantages of MCC to the Users:

• Rapid Development:

Cloud companies developing mobile applications in favour of mobile phones.to meet the latency and speed by various optimizing algorithms. Researches and application program developers are also taking care of the scalable option for future extension of innovations in this regard. These applications come up the potential of both designers and apps..

• Flexible

Mobile applications are built of adaptable and expansive means. While developing the application, the requirement of customer should also be taken into account in line with the platform of mobile cloud computing.

• Secure

To keep the data secure in cloud the mobile cloud computing system is designed with reliable and redundant hardware and software. The confidentiality, availability and Integrity of data is required to be strictly adhered to protect the data as vital data were backed up and get back as per utility in a secured manner.

II. RELATED WORK

The Data Transmission network having A nodes is pictured by a graph $G=(A,B)$ where A express the distance of node $A = (a_1, a_2, \dots, a_n)$ were the set of nodes. Consider r as the transmission range of data a_i and the node a_i is within the transmission limits of data a_i and node a_i is confined within transmission limits if the extent between $(a_i, a_j) = r$ and edge $d_{ij} = (a_i, a_j) \in A_s$. $C_{i,j}$ is the cost of direct edge d_{ij} and E represents the minimum data transfer from a_i to the destination. The undermentioned speculations are contemplated: (i) Energy will be saved while there will be no data traffic and mobile node gets into sleep or power down mode. (ii) All nodes are free in the of time data transmission in mobile cloud computing. (iii) All links between nodes are direct and easily transfer the data is given.

III. SYSTEM MODEL AND PROBLEM FORMULATION

3.1 EXISTING SYSTEM

The mobile computing Technology and cloud computing prospects are combined together to form mobile cloud computing and the same is being implied on mobile devices to run various applications. There are various applications and area of mobile computing. In mobile devices, energy scarcity is a major problem and hence energy efficient data transmission is an acute problem. The issues of consideration are data transmission set up for delay tolerance, energy saving link selection and data concerted application in mobile cloud computing. First of all the problem is taken as a separate time stochastic dynamic application program that schedules to enhance the energy utilisation and system productiveness. To conclude the solution for the framed SDP, we have chosen a Distributed Wireless Data Transmission algorithm that does not depend on statistics of estranged speculative information. The present studies revealed that the proposed algorithm could minimise the mean energy utilisation for transporting a packet by a highest of over sixty percent in comparison to other possible minimum-delay and SALSA policies.

Disadvantages

- High delay
- Inefficient result

3.2 PROPOSED ALGORITHM

In the proposed system, the energy efficiency and finding the best intermediate path to transfer the data in the destination is called Distributed Wireless Data Transmission

(DWDT). In processing, a replica of computing device could be made by virtual machines. Virtual machines behave like original computers with same architecture and render the same functionality of a computer. It includes specialized hardware, software, or a combination of all. Virtual machines are collaborated for cloud servers. The assigned memory, limit, bandwidth and the time limit for downloading the files from the cloud are predefined for virtual machines. For downloading files and to access any information from cloud, a secret key is created from the cloud in a very secure manner. The user is required to registers their particulars and details for accessing and downloading files from the cloud.

IV. METHODOLOGY

To increase the energy efficiency and finding the best intermediate path to transfer the data to destination.

DWDT runs in $O(|X| \cdot |Y|)$ time, where $|X|$ and $|Y|$ are the number of vertices and edges respectively.

Function DWDT(list vertices, list edges, vertex source) distance [],predecessor[]

/* In implementation part, The graph represented as lists of vertices and edges, and fills two arrays (distance and predecessor) about the shortest path from the source to each vertex */

// 1. Initializing Graph

p is the predecessor

d is the distance

for each vertex x in vertices

$d[x] = \text{inf}$ // to Initialize the distance to all vertices to infinity

$p[x] = \text{null}$ // A null predecessor

$d[\text{source}] = 0$

// 2. Finding Edges repeatedly

for n from 1 to size(vertices)-1

for each edge (e, z) with weight z in edges

if $d[e] + z < d[x]$

$d[x] = d[e] + z$

$p[x] = e$

// 3. Checking negative-weight cycle graph

for each edge (e, z) with weight z in edges

if $d[e] + z < d[x]$

error "A negative-weight cycle graph "

return d[], p[]

In second part, let a shortest path D from the source to e with at most n edges. Consider z be the intermediate vertex before e on this path. Then, the part of the path from source to x is a strictly shortest path from source to x with at most $n-1$ edges, since if it were not, then there must be some shorter path from source to x with at most $n-1$ edges, and we could append the edge ex to this path to obtain a path with at most n edges that is strictly shorter than D —a contradiction.

By inductive assumption, $x.d$ after $n-1$ iterations is at most the length of this path from *source* to x . Therefore, $ex.weight + x.d$ are at most the length of D . In the n^{th} iteration, $e.d$ gets compared with $ex.weight + x.distance$, and is set equal to it if $ex.weight + x.d$ is smaller. Therefore, after $n-1$ iterations, $e.d$ is the most length of D , i.e., the length of the shortest path from *source* to e that uses at most n edges.

$$x[n].distance \leq x[n-1(mod j)].distance + x[n-1(mod j)]x[n].weight$$

Around the Sum of cycle, the $x[n].distance$ and $x[n-1(mod j)].distance$ terms cancel, leaving

$$0 \leq \text{sum from 1 to j of } x[n-1(mod j)]x[n].weight.$$

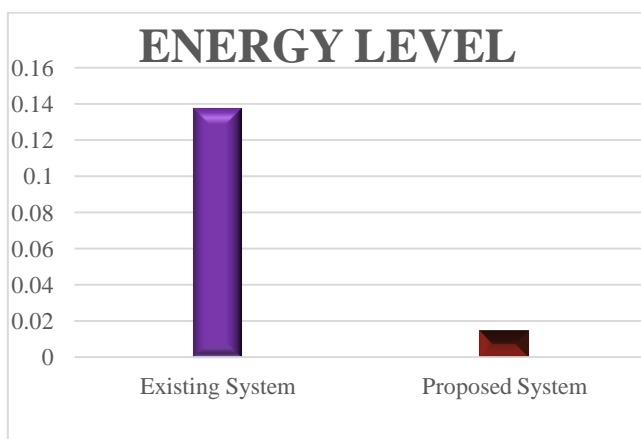
V. RESULTS WITH CONVERSATION

The performance of Distributed Wireless Data Transmission (DWDT) is finding out by the simulation results, it is observed by the transmission data rate.

ACCURACY OF DATA TRANSMISSION

Sending File Size KB	Data Rate @ Millisecond	Accuracy
2467	879	99.91
3556	983	99.84
5789	1144	99.93
7903	1352	99.78
9223	1492	99.72

VI. PERFORMANCES ANALYSIS



In the existing system, the energy level is calculated based on the ramp energy, transfer energy (uploading and downloading data) and the maintenance energy.

$$E_i = E_{\text{ramp}} + \sum_i E_i + E_{\text{Tail}} + E_{\text{main}}$$

In the existing system, the total energy required for transmitting the data is 0.137J/bit.

In the proposed system, energy expenditure for transferring and receiving information/data of the mobile client are both 0.0142 J/bit. The ingress and egress information/data sizes of each assignment are considered to be homogeneous. The transmission energy of each assignment is identical to the size of each problem / transfer rate.

VI. CONCLUSIONS

It is concluded that the mobile cloud computing plays an important role in transferring of data between the users. The user can upload the files in the cloud server using the VM. We have proposed a Distributed Wireless Data Transmission algorithm called DWDT to arrive at a solution for this optimization problem, which works with dynamic programming and randomization. It also fetch the concepts of hamming distance as a Transmission criterion. Simulation results envisaged that the proposed DWDT algorithm can have the ability to find good optimal solutions and it could handle complex issues and problems without discharging its computational efficiency. The DWDT algorithm can be used dynamically, to comply with the changes in the network transmission rate. The simulation results will tend to offload as many assignments as possible when the network efficiency is good, resulting in existing scheme in these segments to a near optimal solution with a very fast execution time.

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