Volume 5, Issue 6, June 2015 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Cloud Computing: Enabling Online Application Using Offloading Framework Onmobile

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Abstract - In Future of Internet Services Cloud computing and Mobile Cloud computing plays an important role and it focuses on maximizing the effectiveness of the shared resources and to process local data globally. As the cloud provides many services there are more technical challenges while accessing the cloud services such as data availability, security, reliability, and integrity and energy efficiency. The main aim of our system is to achieve security, reliability and minimize the computation overhead. In this system we are using the Cryptography algorithms for security and to minimize the computation overhead we are using task distribution scheme which help the cloud to increase security, performance and to minimize the memory and computation overhead.

Keywords—Mobile Cloud Computing ; Security; Cloud Storage: Energy consumption,Computation;

I. INTRODUCTION

As predicted by International Data Corporation Market ResearchCompany, nearly 1.1 billion mobile phones were sold in 2014,and its number is expected to increase over 1.5billion in 2017 [1].In order to fulfill the needs of huge number of users,smartmobile phones feature flexible portable applications. Cloud computing is the advance generation in computation. Possibly we can get entire things on cloud which we need .Cloud computing is Service on-demand information approach. The Cloud is a metaphor for the Internet, based on how it is illustrated in computer network diagrams, and is an abstraction for the complex infrastructure it covers. It is a style of computing in which IT-related proficiencies are provided "as a service", allowing users to access technology-permitted services from the Internet (i.e., the Cloud) without awareness of, expertise with, or resistor over the technology infrastructure that supports them. Email was the primary service on the "cloud". As the computing industry shifts toward providing Platform as a Service (PaaS) and Software as a Service (SaaS) for consumers and enterprises to access on demand regardless of time and location, there will be angrowth in the number of Cloud platforms accessible.

The majority of these mobile applications are user intuitive and data-processing concentrated, both of which oblige fast response and long battery life. Notwithstanding, most business off-the-rack smart mobile phones, compared with computers, are usually furnished with low-speed processors and limited capacity batteries. Running modern software on smart mobile phones can bring about poor execution and reduced battery life. Accordingly, it turns into a critical issue in planning smart mobile phones to convey satisfactory performance and extended battery life. A considerable measure of enhanced hardware, for example, dynamic voltage scaling, leakage power control and instruction level parallelism have been given to enhance processor speed and decrease energy utilization. Albeit enhanced technology can convey better performance, embracing high-end processors is not generally suitable for budget constrained tasks. As of late, cloud computing has gotten to be an alternate conceivable solution for improving the processing capacity of smart mobile phones. The cloud computing sellers give computing cycles to the enlisted provide to decrease computation and energy utilization of smart mobile phones, for example, Amazon Elastic Compute Cloud (EC2), Amazon Virtual Private Cloud (VPC), and Pac Hosting. Nonetheless, it takes both time and energy to transfer information to the cloud and recover the results from the cloud. The computation capability of the cloud can likewise influence the execution time.

The exploitation of cloud resources for expanding mobile devices has reared another examination area called Mobile Cloud Computing (MCC). Mobility created on focalized networks [15] is the key quality that recognizes MCC from cloud computing. MCC means to enlarge computing capacities of mobile devices, moderate local resources - particularly battery, develop storage limit, and upgrade data security to advance the computing knowledge of mobile clients. The fundamental difference between surrogate-based and cloud-based enlarging methodologies is that surrogates offer free administrations without duty to finish assigned jobs (they can leave a task whenever at any phase of registering), though clouds provides paid administrations with guaranteed accessibility, quality, also commitment as per the arranged Service-Level Agreement (SLA) between cloud seller and mobile client [16]. All things considered, MCC is a beginning innovation controlled by heterogeneity that still requires a plenty of exploration and advancement for sending in real enlargement situations.

Mobile Cloud Computing is the large and efficient technology which provides service on demand solution .Cloud is the always available data storage where we can put and retrieve or process the data also we can use the services provided by the cloud. The key challenges in Cloud Computing are to provide security, reliability, availability and the most important part is security to achieve integrity for the cloud data. Along with integrity the energy efficient cloud computing so that to maintain the performance and speed of service providing.

In this Methodology we are achieving some constraints for providing more efficiently cloud services. The important constraint is to maintain integrity and security. The user is authenticated first to access data and user can access the services. There are many cryptographic algorithms available for security, in this method used RSA algorithm for security and user authentication and for integrity.

In thispapersection II contains informationabout related work. Section III contains implementation details which includes system architecture, systems overview, mathematical model, and experimental setup. The section IV contains results and discussion of the project work done. The last section V contains the conclusion of research work done.

II. RELATED WORK

The paper [1] presents protected cloud data storage innovation which encrypts the data utilizing hybrid security algorithm with cryptography utilizing symmetric key. This security strategy gives an exceedingly secure cloud system.

In this paper [2], author characterize MCC, clarify its significant difficulties, examine heterogeneity in convergent registering (i.e. mobile figuring and cloud registering) and systems administration (wired and remote networks), and separation it into two dimensions, in particular vertical and horizontal. Heterogeneity roots are separated and taxonomized as fittings, platform, feature, API, and system. Multidimensional heterogeneity in MCC brings about application and code fragmentation issues that block improvement of cross-platform mobile applications which is scientifically depicted. The effects of heterogeneity in MCC are researched, related open doors and difficulties are distinguished, and overwhelming heterogeneity taking care of methodologies like virtualization, middleware, and service oriented architecture (SOA) are examined. The author proposed a diagram of open issues that support in distinguishing new research directions in MCC.

This paper [3] gives a preview of risky regions particular to cloud services and those that apply all the for the most part in an online environment which clients of cloud service suppliers ought to be mindful of.

In this paper [4], author proposed a configuration and implementation of a cloud-based security center for system security forensic examination. The author proposed utilizing cloud storage to keep gathered traffic data and afterward handling it with cloud figuring platforms to discover the malicious attacks. As per, phishing attack forensic analysis is displayed and the appreciative processing and storage resources are evaluated based on real trace data. The cloud-based security center can train every community UTM and prober to gather occasions and simple traffic, send them over for profound investigation, and produce new security standards. These new security principles are authorized by shared UTM and the feedback occasions of such manages are come back to the security center. By this sort of close-loop control, the shared system security administration framework can recognize and address new distributed attacks all the more rapidly also effectively.

This paper [6] presents vision, challenges, and engineering components for energy-efficient administration of Cloud registering environments. The author focus on the improvement of dynamic resource provisioning and allocation algorithms that consider the collaboration between different data center bases (i.e., the fittings, power units, cooling and programming), and comprehensively work to help data center energy proficiency and execution. Specifically, this paper [6] proposed,

(a) Building standards for energy-efficient administration of Clouds;

(b) Energy-efficient resource allocation arrangements and booking algorithms considering nature of-service expectations, and devices power utilization qualities; and

(c) A novel programming engineering for energy-efficient administration of Clouds.

The author has been permitted the methodology by conducting a set of thorough execution evaluation study utilizing the CloudSim toolkit. The results demonstrate that Cloud processing model has monstrous potential as it provide large execution picks up as respects to response time and expense cautious under dynamic workload scenarios.The Serviceweb 3.0 undertaking has delivered two roadmaps concentrating on future improvements in semantic and service improvement and distinguishing key regions for examination. To supplement these roadmaps, author give an additional document which concentrates on the open examination challenges around some key ranges which (i) will assume a feasibly critical part in business and personal life in the following 5-10 years and (ii) present energizing new difficulties for the semantic and service innovations. In the event that these complications can be determined by imaginative new research, expanding upon the current advancements in semantic and service innovation, in the following years author are confident that the semantic and service groups will assume an essential part in engaging future (1) endeavor service platforms, (2) Linked (services over Linked Data), and (3) client produced services in the mobile context [5].

In this paper [7], the author create an offloading framework, named Ternary Decision Maker (TDM), which plans to abbreviate response time and diminish energy consumption in the meantime. Dissimilar to past lives up to expectations, the main focuses of execution incorporate an on-board CPU, an on-board GPU, and a cloud, all of which consolidated give a more adaptable execution environment for mobile applications. The author conducted a true application, i.e., network multiplication, in request to assess the execution of TDM. As per theexploratory results, TDM has less false offloading decision rate than existing strategies. In addition, by offloading modules, thestrategy can attain to, at most, 75% funds in execution time and 56% in battery use.

III. IMPLEMENTATION DETAILS

A. System Overview

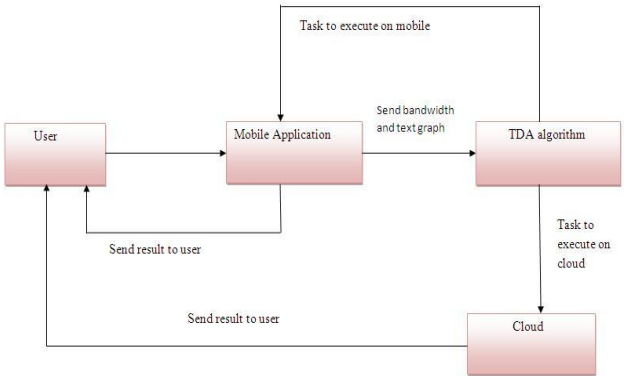

Figure 1. System Architecture

In the System architecture the user and cloud communication and computation and the way which we are achieving security is presented user.Here there are some Modules described as:

TDAAlgorithm
In this module TDA algorithm that is task distribute algorithm is implemented. This algorithm distribute the task among mobile application and cloud server.
MobileApplication: This Model issued to send the bandwidth towards the TDA and also execute the task which is given by the TDA.

CloudComputing:
In cloud computing we are distributing the cloud processing to the cloud processors and mobile devices which helps to minimize the computation overhead and to improve the performance of this system.

B. Algorithm

TDA(Task distributionalgorithm)-

Input: WORG = (V;E;Wv;We);
b; bl; NL; a;
Output: the optimal partitioning solution X , and the optimal model value minValue (the minimal of W(X, b))
1.compute the optimal model valueW(Xoptbl ; bl) under the bandwidth of bl using the Stoer-Wagner algorithm;
2. minV← W(Xoptbl ; bl) X(1 + a); // minV is the upper bound;
3. for all vi ϵV do
4. if vi ϵ NL then
5. xi← 1; // node i must run on mobile devices;
6. else
7. xi←-1; // node i needs to be partitioned;
8. end if
9. end for
10. BBSearch(1;minV;WORG;X; minValue; b);
11. return X; minValue;

C. Mathematical Model

1. **Time optimization model**
   T(X,b) =P1≤i≤n Xi ×tnli + (1−Xi ×tnsi) +P1≤i≤n | Xi −Xj ×tij
   Where, b= bandwidth
   T(X,b) =Execution time of partitioning X under the bandwidth of b
   tnsi= Remote execution time of node i running on servers
   tnli =Local execution time of node i running on mobile devices
   tij =Transmission time between node i and node j
   n = Number of nodes(objects)in the application ORG Xi =Partitioning result of node i, Xi = 1 : node i runs locally on mobile devices;
   Xi = 0 : node i runs remotely on servers, i = 1....n
   X = Application partitioning solution,which is defined as{X1,.....Xn
2. **Energy optimization model**
   E(X,b) =P1≤i≤n Xi ×Ei+P1≤i≤n | Xi −Xj ×EijEi =Energy consumption of node i running locally on mobile devices
   Eij =Energy consumption of data communication between node i and j
   E(X,b) =Energy consumption of partitioning X under the bandwidth of b,

3. Timeandenergyweightedoptimizationmodel

W(X,b) = wt ×T(X,b)/TLocal + we ×E(X,b)/ELocal
TLocal =Execution time when the whole application runs locally
ELocal =Energy consumption when the whole application runs locally
wt =Weight of execution time in the partitioning model
we=Weightofenergyconsumptioninthepartitioning model, satisfying wt+we = 1
W(X,b) =Weighted model value of partitioning X under the bandwidth of b

D. Experimental Setup

The system is built using Java framework(version jdk 6)on Windows platform. The Netbeans (version 6.9) is used asa development tool. The system doesn't require any specifichardware to run, any standard machine is capable of runningthe application.

IV. RESULT AND DISCUSSION

A. Results

TABLE I. FACTOR INPROVEMENT TABLE

	Security	Energy	Performance
Existing System	high	High	Moderate
Our System	Higher Than Existing System	Low	High

The above table shows the factors which we are improving in our system. As we are using task distribution framework in the systemfor improving the performance and minimizing the Energy required for computing.
The following Figure 4.is the energy comparison graph for our system and Existing system as we are implementing mobile Cloud Computing and processing the cloud services in mobile cloud processors so it require minimum energy as compared to existing system for the services. So this graph represents the system has minimum energy required for services than existing system.

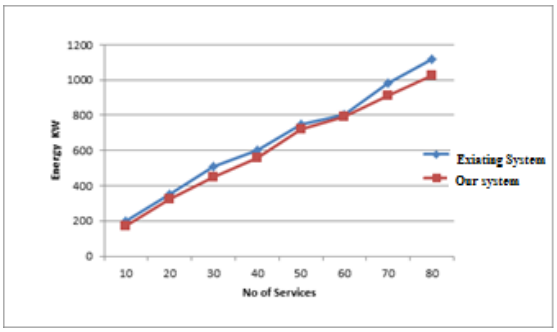

Figure 4. The energy comparison graph for our system and Existing system

V. CONCLUSION

In setting of running massive applications on mobile phones, users cannot use the capability of mobile phones in a productive way since mobile phones are constrained by processing power, memory necessities and battery limit. The augmented execution in mobile cloud computing infrastructure is an early technology to increase the capacities of weaker mobile phones by using the services of resource-rich and influential cloud serversCloud computing playsan important role in the deployment of the future IoS. The ultimategoal of MCC is to provide rich mobile computing through seamless communicationbetween front-users (cloud-mobile users) and end-users (cloud providers) regardless ofheterogeneous, wireless environments and underlying platforms in global roaming along with security, integrity, availability and best performance. The main purpose of our system is to provide security and increase the performance for mobile cloud computing by using RSA cryptographic algorithm and task distribution scheme to conserve energy also the advantage of this system is provide security and privacy for user and data stored at cloud and to use services.

ACKNOWLEDGEMENT

The authors would like to thank the researchers as well as publishers for making their resources available and teachers for their guidance. We are thankful to the reviewer for their valuable suggestions. We also thank the college authorities for providing the required infrastructure and support. Finally, we would like to extend a heartfelt gratitude to friends and family members.

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