Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 7, Issue, 07, pp.17794-17797, July, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

COMPUTATION OFFLOADING FRAMEWORK FOR MOBILE CLOUD COMPUTING

***Yogesh Dumbare and Kahate, S. A.**

Department of Computer Engineering, Sharadchandra Pawar College of Engineering (Pune), India

ARTICLE INFO

Article History:
Received 19th April, 2015
Received in revised form
25th May, 2015
Accepted 20th June, 2015
Published online 28th July, 2015

Key words:

Mobile Cloud Computing,
Computation framework,
Cloud Storage.

ABSTRACT

Mobile phone technology, mobile phones are turning into an inescapable part of human lives. To run enormous applications on mobile phones, users cannot utilize the capability of mobile phones in an effective way since mobile phones are compelled by processing power, memory requirements and battery limit. Running complex software on smart mobile phones could bring about poor performance and reduced battery life due to their limited resources. 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. This is accomplished by dividing an application into tasks such that the computational intensive tasks are offloaded to cloud and in the wake of executing task on cloud, results are sent once again to mobile phone, alluded to as computation offloading. An advanced a versatile, framework can be implemented for powerfully and ideally divide the application. The main aim of our proposed 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.

***Citation*:** Yogesh Dumbare and Kahate, 2015. "Computation offloading framework for Mobile cloud computing", *International Journal of Current Research*, 7, (7), 17794-17797.

INTRODUCTION

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 an growth in the number of Cloud platforms accessible. The Cross-European Technology Platforms (X-ETPs) group envisions the Internet of Services (IoS) as a key support of the future Internet. The IoSsimportant goal is to present the whole thing on the Internet as a service including software applications platforms for developing and sending these applications and underlying infrastructures (CPUs, storage, networks and so on).

****Corresponding author: Yogesh Dumbare***
Department of Computer Engineering, SharadchandraPawar College of Engineering (Pune), India

In this state cloud technology can play an important role in permitting IoS deployment because it comprises different provisioning models for on-demand access to applications (software as a service or SaaS)platforms on which developers can construct services and applications (platform as a serviceor PaaS)and elastic computing infrastructures (infrastructure as a service or IaaS).

Cloud Computing bring up to both the applications delivered as services over the Internet as well as the hardware and systems software in the datacenters that offer thoseservices. There are four basic Cloud delivery models as outlined by NIST (Kim-Kwang Raymond Choo, ?), which communicates to who provides the cloud services. Agencies may employ one model or a grouping of different models in delivery of applications and business services. These four delivery models are (i) Private Cloud, (ii) Public Cloud,(iii)Community Cloud, (iv) Hybrid Cloud. From the perspective of service delivery, NIST has identified three basic types of cloud service offerings. These models are:

- Software as a Service (SaaS) which offers renting application functionality from aservice provider rather than buying, installing and running software by the user.
- Platform as Service (PaaS) which provides a platform in the cloud upon which applications can be developed and executed.

- Infrastructure as a Service (IaaS) in which vendors offer computing power and storage space on demand.

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 the proposed 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 the proposed method used RSA algorithm for security and user authentication and for integrity.

Related Work

The paper (Priyajaiswal *et al*., 2014) presents protected cloud data storage innovation which encrypts the data utilizing hybrid security algorithm with cryptography utilizing symmetric key. The proposed security strategy gives an exceedingly secure cloud system. In this paper (ZohrehSanaei, ?), 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 (Kim-Kwang Raymond Choo, ?) gives a preview of risky regions particular to cloud services and those that apply all the more for the most part in an online environment which clients of cloud service suppliers ought to be mindful of. In this paper (Zhen Chen *et al*., 2013), 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.

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 (Key Research Challenges for Semantics and the Internet of Services).

In this paper (Ying-Dar Lin, ?), 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 the exploratory results, TDM has less false offloading decision rate than existing strategies. In addition, by offloading modules, the strategy can attain to, at most, 75% funds in execution time and 56% in battery use.

This paper (RajkumarBuyya *et al*., ?) 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 (RajkumarBuyya *et al*., ?) proposed,

- Building standards for energy-efficient administration of Clouds;
- Energy-efficient resource allocation arrangements and booking algorithms considering nature of-service expectations, and devices power utilization qualities; and
- 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. In this work, author (Jing SiYuan, 2013) proposed another system to minimize the energy utilization and VM movement at the same time; also author additionally plan a network-flow-theory based rough algorithm to understand it. The reenactment results demonstrate that, analyzed to existing work, the proposed system can somewhat diminish the energy utilization yet significantly diminish the quantity of VM position change (about 75%).

Implementation Details

System Overview

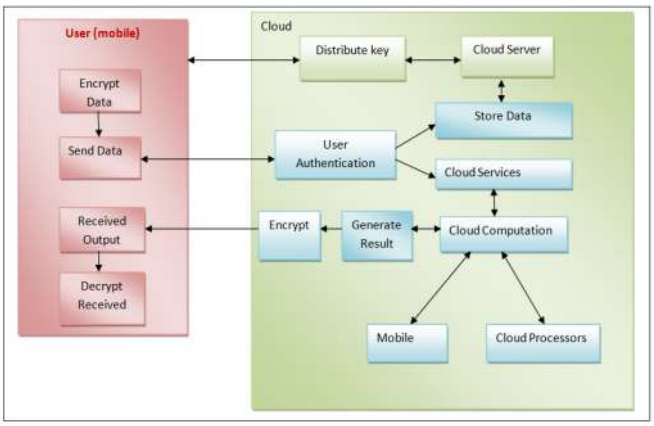

Fig. 1. System Architecture

In the System architecture the user and cloud communication and computation and the way which we are achieving security is presented. If the user want to upload data or to use cloud services first user is authenticated by the cloud server and the further data is computed by cloud services. First the user uses the key for data sending the key used by the user is distributed to the user by cloud server. While sending the data user sends the encrypted data and forwarded to the cloud server. Cloud server authenticates user and data. Cloud computing is the task for reducing the computation overhead on single system here we are distributing the load remotely on different systems it may be personal computer or mobile device. The request for the cloud service by the user is processed by cloud computing where some part of computing is done on sub cloud systems and mobile devices and the result is returned in the encrypted format by the cloud server and it is decrypted by the user. Here there are some Modules described as:

Encryption and decryption module

In this module user encrypt the data to upload on server and decrypt the result received from cloud server. For encryption and decryption we are using RSA algorithm for to achieve security.

Key distribution

In this module the key generate for each user and it is distributed to the each user.

Authentication

This model is present at cloud server to authenticate the each user. by authentication we are achieving the security.

Cloud Computing

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

Mathematical Model

In the System Master Node, manager and slaves node uses the public key for authentication. We used RSA algorithm for public and private key generation.

M – Manager
MN- is the Master Node
C- is the Customer requesting for cloud services.
P_{puk}= set of public keys at Manager
P_{puk}={MN_p,Sn1,sn2,…….Sn_n, C_{puk})
SN = set of slaves nodes.
SN = { SN1,SN2,Sn3,…….SN_n)
T = set of tokens for user to authenticate.
T = { T_{c1}, T_{c2} , $T_{c3,}$.....T_{cn})
T_c= Token for customer.

Energy(E)= $\sum \frac{S}{T}$
Where,
S is the number of services.
T is the Time

Performance (P)=$\frac{Data\ Size}{Computational\ Time}$

Experimental Setup

The system is built using Java framework (version jdk 6) on Windows platform. The Net beans (version 6.9) is used as a

development tool. The system doesn't require any specific hard ware to run, any standard machine is capable of running the application.

The following Figure 3.is the energy comparison graph for our proposed 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 proposed system has minimum energy required for services than existing system.

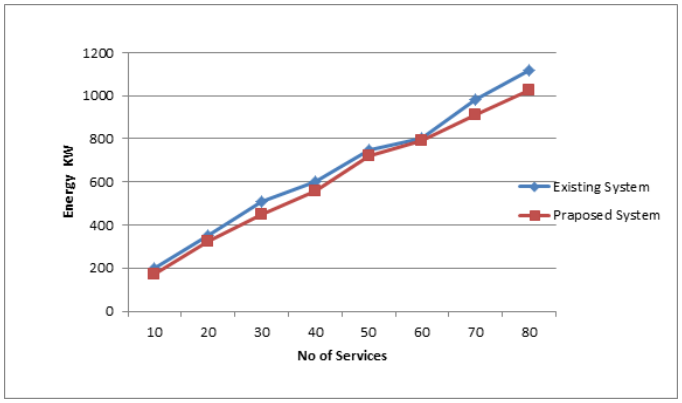

Fig. 2. The energy comparison graph for our proposed system and Existing system

Conclusion

Cloud computing playsan important role in the deployment of the future IoS. The ultimate goal of MCC is to provide rich mobile computing through seamless communication between front-users (cloud-mobile users) and end-users (cloud providers) regardless of heterogeneous, wireless environments and underlying platforms in global roaming along with security, integrity, availability and best performance. The main purpose of our proposed system is to provide security and increase the performance for mobile cloud computing by using 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.

REFERENCES

"Key Research Challenges for Semantics and the Internet of Services"

Jing Si Yuan," 2013. A Novel Energy Efficient Algorithm for Cloud Resource Management"International Journal of Knowledge www.ijklp.organd Language Processing KLP International c2013 ISSN 2191-2734Volume 4, Number 2, pp.12–-22

Kim-Kwang Raymond Choo,"Cloud computing: Challenges and future directions"

Priyajaiswal, Randeepkaur, Ashok Verma, 2014. "Privacy and Security on Cloud Data Storage Using Hybrid Encryption Technique"International Journal of Emerging Technology and Advanced Engineering Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 4, Issue 1, January)

Rajkumar Buyya, Anton Beloglazov, and JemalAbawajy, " Energy-Efficient Management of Data Center Resources for Cloud Computing: A Vision, Architectural Elements, and Open Challenges "

Ying-Dar Lin, *Fellow, IEEE*, Edward T.-H. Chu, *Member, IEEE*, Yuan-Cheng Lai, and Ting-Jun Huang, "Time-and-Energy-Aware Computation Offloading inHandheld Devices to Coprocessors and Clouds"IEEE SYSTEMS JOURNAL

Zhen Chen*, Fuye Han, Junwei Cao, Xin Jiang, and Shuo Chen"Cloud Computing-Based Forensic Analysis for Collaborative Network Security Management System" TSINGHUA SCIENCE AND TECHNOLOGYISSNl l1007-0214l l05/12l lpp40-50Volume 18, Number 1, February 2013.

ZohrehSanaei, *Member, IEEE,* SaeidAbolfazli, *Member, IEEE*, Abdullah Gani, *Senior Member, IEEE* and RajkumarBuyya, *Senior Member, IEEE,"*Heterogeneity in Mobile Cloud Computing:Taxonomy and Open Challenges"

****