A Novel Technique for Fault Recovery in Mobile Cloud Computing

Vipanjot Kaur Sidhu, Vijay Kumar Joshi

Abstract: ***Cloud computing is a technology or distributed network where user can move their data and any application software on it. But there is some issues in cloud computing, the main one is security because every user store their useful data on the network so they want their data should be protected from any unauthorized access, any changes that is not done on user's behalf. Task allocation is one of the issue of the cloud computing. Load imbalance occurs due to limited resources available and leads to the fault occurrence situation. In this paper, a novel technique has been proposed based on weights to overcome faults occurrence problem. In this work improvement will be proposed in agent base load balancing algorithm for task reallocation and reduced fault detection time in cloud architecture.***

Keywords: Cloud computing, deployment models, load balancing, fault tolerance

I. INTRODUCTION

Cloud computing is environment which provide convenient and on demand network access to a shared pool of computing resources like servers, networks, applications, storage and services that can be rapidly released in an efficient way. Cloud is a model where services are provided by CSP (cloud server provider) on pay per use base to user, means here client has to pay only for what he is using or being served [7]. Cloud computing is a technique which provide a huge range of applications under different kind of topologies and every topology drives some new specialization. Even cloud service provider like Drop box could accidently allows accessing any user's account without user knowledge. This would potentially lead to massive data breaches which are beyond user's control [4].
To fortify the security for cloud computing most organizations adopt standard enterprise security solutions like firewall, IPS, and antivirus. Since users can now access cloud services from anywhere around the world. Some organizations may implement strong user authentication and access control solutions as a defense against identity frauds. Unfortunately, these solutions do not actually protect the user's data in the cloud.

The cloud computing model has three service job models and three sets up models. The three service job models are:

- *Cloud software as a service*
- *Cloud platform as a service*
- *Cloud infrastructure as a service*

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The three set up models are:

- *Private cloud*
- *Public cloud*
- *Hybrid cloud*

Cloud computing has particular characteristics that distinguish it from classical resource and service provisioning environments [12]:

- *Infinitely (more or less) scalable*
- *Cost saving/less capital expenditure*
- *Higher resource utilization*
- *Business agility*
- *Disaster recovery and backup*
- *Device and location independence*

While reducing up-front IT cost or capital expenditure is the one of the crucial reason for the adopting the cloud computing, there are also some other factors that encourage the various organizations for the adoption of cloud computing.Cloud computing migrate the location of resources to the cloud to cut down the costs associated with having too many resources, not using resources adequately and under-provisioning. It also reduces the time required to provision resources in minutes, allowing applications to quickly scale under-utilization both up and down, as the workload changes. Therefore, cloud computing is mainly well suited for applications with ainconsistent workload that practice hourly, daily, weekly or monthly changeability in exploitation of resources. One example of such applications is online shops, which have to handle their peak loads at Deepawali time. Another example is university websites, which have to handle their peak loads during exam result time.

In traditional (i.e. non-cloud) environments, over provisioning and under-utilization can hardly be avoided [10].

II. LITERATURE REVIEW

In this paper [1] author explained that cloud computing is a vast growing concept in today's and upcoming time. There are various technique discussed in this paper to overcome load balancing problem from the network. Author also discussed emerging technology in the field of the cloud computing for load balancing and their affects over the network. Further work can be done to balance the load by distributed policy so as to reduce the workload of the executer.

In this paper [2] they explained that with latest advent of technology load balancing in cloud becomes the major challenge in cloud computing field. There are some existing algorithms which provides better job scheduling for resource allocation. It is necessary to utilize resources efficiently to gain maximum profits with optimized load balancing algorithms. In this paper various load balancing algorithms

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has been discussed. The objective of this paper is to identify qualitative components for simulation in cloud environment and then based on these components, execution analysis of load balancing algorithms are also presented.

In this paper [3], cloud computing is the distributed architecture that centralizes the resources of server on a scalable platform which provides services on demand. Various cloud deployment models are discussed i.e. public, private and hybrid. The main security issues and risks are discussed; sharing of resources is one of them. Customers are not satisfied with the data security on cloud. Cloud service providers must tell the customers about the deployment models. They need to use the third party auditor so that they can gain the trust of customers. For this, new techniques need to be developed and older should be removed for easy work in cloud architecture.

In this paper [4] author clarified the proficient assignment planning component can meet clients' prerequisites, and enhance the asset use, in this manner improving the general execution of the cloud computing environment. However, the errand planning in matrix figuring is regularly about the static undertaking necessities, and the assets use rate is likewise low. An indicated by the new elements of cloud computing, for example, adaptability, virtualization and so on, this paper talks about a two levels assignment planning instrument in light of burden adjusting in distributed computing. This assignment booking instrument can meet client's prerequisites, as well as get high asset usage, which was demonstrated by the recreation results in the Cloud Sim toolbox.

In this paper [5], a new type of Identity-Based Encryption (IBE) scheme is introduced which is called as Fuzzy Identity-Based Encryption. In Fuzzy IBE, an identity is viewed as set of descriptive attributes. A Fuzzy IBE scheme allows for a private key for an identity, Ω, to decrypt a ciphertext encrypted with an identity, Ω', if and only if the identities Ω and Ω' are close to each other as measured by the "set overlap" distance metric.A Fuzzy IBE scheme can be applied to enable encryption using biometric inputs as identities and can be used as a type of application that is termed as "attribute-based encryption", These IBE schemes are both error-tolerant and secure against collusion attacks.

III. LOAD BALANCING IN CLOUD COMPUTING

Load balancing is a procedure in which the total load of the network is reassigning to the individual nodes to make resource utilization successful and to enhance the response time of the job. In the meantime, remove a state in which a some of the hubs are under stacked while a few others are over stacked. A load balancing algorithm, it depends on the present nature of the system and it does not consider the previous nature of the system which is change in nature. This load measures in the terms of CPU load, amount of memory used, delay or network load.

3.1 Type of load balancing:

The load balancing techniques are broadly classified into three types: [7]:

- **Sender initiated**: In this type, the sender is send the process of load balancing.
- **Receiver initiated:** In this type, the receiver is initialed the process of load balancing.
- **Symmetric**: In this type, both sender and receiver are initialed the process of load balancing.

Moreover, depending upon the present state of the process, it classified into 2 categories:

a) Static: The current knowledge of the system is not required in it .Previous knowledge of the system is required. In this cloud provider is installed homogenous resources. Also the resources are not flexible in static environment. It requires processing power, performance, memory and capacity of the statics user requirement. In static environment, changes are not accepted at the run-time. It is well suited and easy to implement in the static environment but not suited for heterogeneous environment. In this environment resources are serves as first come first serve [5].

b) Dynamic: The present state of the system is required in it. It does not depend upon the previous knowledge. In this environment cloud suppliers installs separate resources. Resources are dynamic in nature in this environment. It does not rely on the prior knowledge it use execution time statistics. The main requirement of the client is sure flexible.

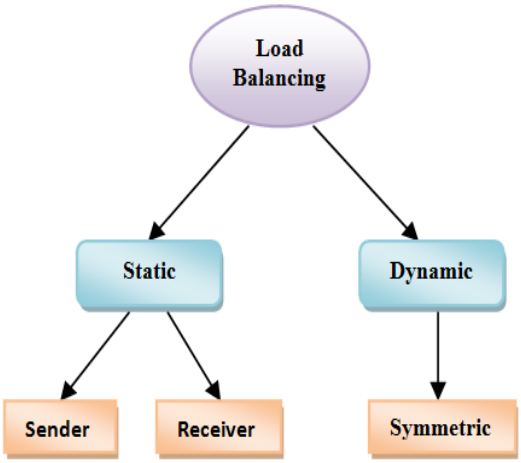

Fig. 1.2 Load Balancing

IV. PROBLEM FORMULATION

Cloud technology has become a new paradigm for distributed real-time systems because of their inherent advantages. The cloud distributed systems can reduce the load on the central authority. The central authority can distribute the task to various other mobile systems. This approach leads to enhancement in the network throughput, reduce execution time and reduce battery consumption. The network is the cloud mobile network and network's topology changed suddenly. As the cloud mobile network is defined as a relatively dense of collection of mobile entities connected by a wireless link, without any administration or fixed support. In the cloud mobile network no central authority is present due to which the network disconnection is very frequent between the mobile nodes. Due to above reasons chances of errors in the cloud mobile network is very high. The load is equally divided among the cloud mobile node to enhance the network efficiency and to reduce the task execution time. When the

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load is not equally divided among the mobile nodes, chance of error occurrences will be increased. The approach of fault tolerance is required to reduce the number of error rates in mobile distributed network. The task allocation among the mobile nodes is done with the use of task allocation modal. In task allocation modal On the basis of capacities of processors and communication links, we allocate the tasks among processors. Failure problem can be solved by task redundancy. Task redundancy is provided by backup system that is attached with each node of the cloud distributed systems. Here, it is noted that backup system does not provide service to any tasks. In case of node failure backup system will perform the following operations: 1) multicast a failure notice (FN) to alert the candidate nodes about the change in the number of functioning nodes; 2) reallocate all the unfinished tasks among those candidate nodes perceived to be functioning; When any node fails or when load on any node will increase, back up node will come into existence. The backup node will execute the task allocation algorithms to balance load between the available mobile nodes. In the existing modal, we need efficient task allocation algorithms and we need to define the certain parameters on the basis of which backup node will identify that on which node load is increased.

V. PROPOSED METHODOLOGY

In the cloud mobile network, it is infrastructure less in behavior because of which the system is not connected extremely incessant between the mobile nodes. Because of on top of reasons likelihood of errors in the cloud mobile system is high. The load is separated among the cloud mobile node just as to enhance the system efficiency and to decrease the assignment execution time. At the point when the load is not distributed among the mobile node, possibility of error events will be developed. With the use of assignment allotment model, the assignment allotment among the mobile nodes is finished. In task allocation modal on the premise of limits of processors and communication joins, we assign the tasks among processors. Task redundancy is given by recovery system that is appended with every node of the cloud distributed system. Here, it is noticed that recovery system does not give service to any tasks. In the event of node failure recovery system will perform the accompanying operations: 1) multicast a failure notice (FN) to caution the candidate nodes about the adjustment in the quantity of working hubs; 2) reallocate all the unfinished assignments among those candidate nodes perceived to be working. When any node fails or when load on any node will increase, back up node will come into existence. The backup node will execute the task allocation algorithms to balance load between the available mobile nodes. In the existing modal, we need efficient task allocation algorithms and we need to define the certain parameters on the basis of which backup node will identify that on which node load is increased.

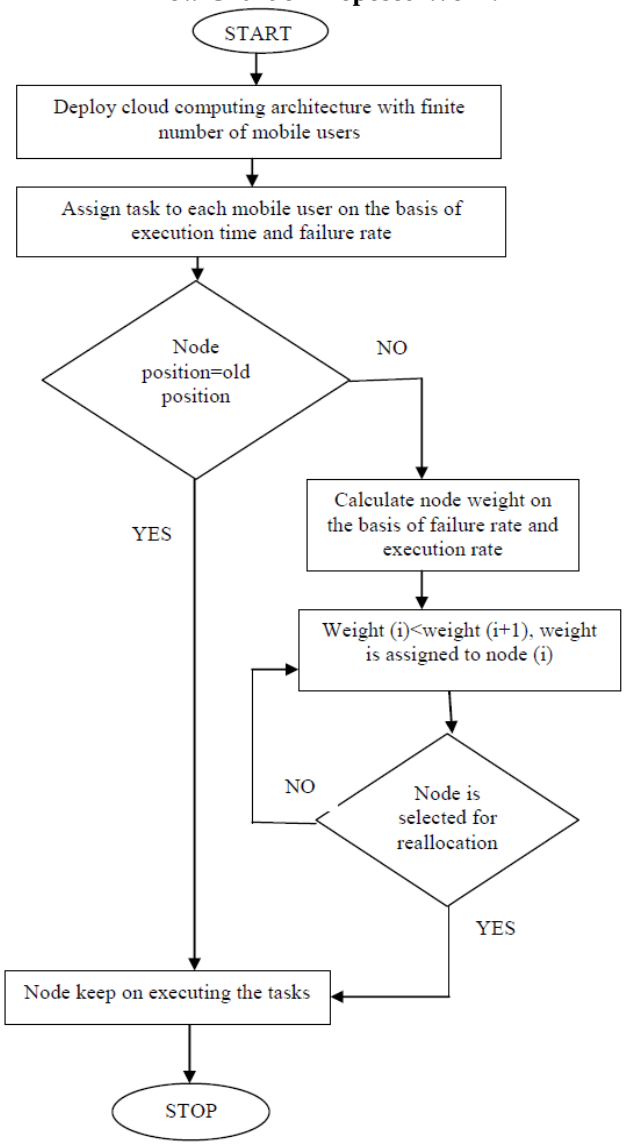
In the proposed algorithm, we have added a new parameter in the present algorithm that is master node time. Master node time is the result time to join the end users. It is for node collaboration. For this we have formulae which are as follow:

1. E-cost= maximum execution time + Time taken by the master node (master node time)

After that we will calculate profit of each node.

2. Profit of each node = E-cost+ Failure node of each node
3. Weight of each node= No. of tasks + maximum execution time/Profit

Flow Chart of Proposed Work:



VI. EXPERIMENTAL RESULTS

The whole scenario has been implemented on CLOUDSIM.

Fig.5.1 Time Graph

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As illustrated in figure 5.1, the time is used to calculate for the task execution. As shown in the figure, proposed algorithm use less time for the task allocation.

Table 1: Time Comparison

No of Tasks	Proposed Algorithm	Existing Algorithm
5	90	100
10	92	102
12	97	106
15	99	110

As illustrated in table 1, the execution time of proposed and existing algorithm is been compared on different number of tasks

VII. CONCLUSION

In this paper, it is concluded that cloud computing is the architecture in which virtual machine, cloud servers and hosts are involved in the communication. The technique is this work has been proposed for the virtual machine migration. The proposed technique is based on the weight based algorithm in which weight of each virtual machine is calculated on the basis fault detection rate and execution time. The simulation is been performed in cloudsim and it is been analyzed that proposed technique performs well in terms of execution time. As defined in the table the execution time of the proposed algorithm is reduced to 10 percent as compared to existing algorithm.

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