

# A Survey on Fault Detection Enabled Optimal Load Balancing Technique by Efficient Utilization of VM in Cloud Computing

C.Priya, M.Kannan

**Abstract**—Nowadays, Cloud Computing is one of the growing up technology. In this C2 can process the large amount of data, so the scheduling mechanism works at a prominent of cloud computing and also give much needed emanate to the client, can easily share the file one to another client over the network. In this survey, we emphasize how computer associated algorithms are working under the cloud technology. Specimen, in this survey contains load balancing and ant colony concept. Like, the load balancing algorithm is one of the important feature of the computer associated algorithm in the cloud computing.

In this paper, LB concept is used to balance the load at every junction. In this paper, we take a survey about ACO also, generally ACO (Ant Colony) which track the higher population in an equidistant. Over the Cloud Computing, load balancing is one of the important roles to process the client's request which includes the entire hardware and software component. Load Balancing algorithm and its techniques are used to allocate the request and also verifies the resource of the request. The main focus on load balancing is to balance the request. For instance, Data Center (DC). The main wish of the DC, is to merge the incoming request coming from the client, and provide higher bandwidth to the user without disruption. And also cloud has progressive vantage over DNS, which shift the load or stock to the servers to deliver it across the local servers. Further, in the present work, the load balancing is introduced to allocating all incoming requests using a Novel-VM.

Cloud Computing (C2) environment has elevated to challenge the fault pinpointing in web applications. It takes many times to change the conventional application model. Eventually an extensive application is unsuitable or not-sensible operators. Moreover, in this paper, it takes the survey on fault detection enabled optimal load balancing technique by efficient utilization of VM in cloud computing.

**Index Terms**—Fault Detection, Load Balancing, ACO, VM, and Cloud Computing

## 1. INTRODUCTION

Cloud Computing is the stage to supply an Internet-based services. So many web application systems like Pinterest, Netflix are used to increase a bandwidth to download or visiting a file/folder in a quick Manner. Using cloud computing, can slice or share the information and/or vital files in a protected manner. Because the dominance of the cloud computing is, inviolable. Which is also satisfactory and

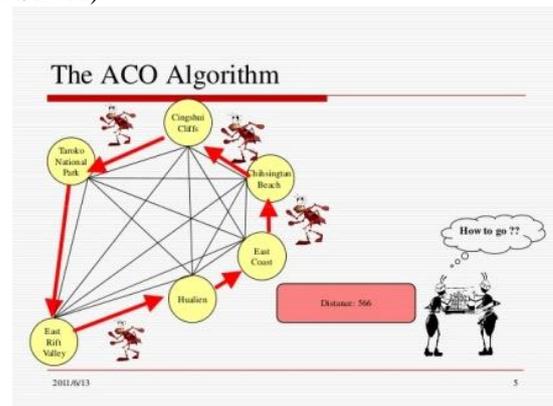
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high sufficient entity technology. The main capacitate technology for cloud computing is virtualization, which is used to detached the software. That means it willdecrete the progressive virtual devices. While we using this technology (cloud computing) it will reduce the cost with response time and it will boost up the process. So the client can't wait to get their program report and throughput.

Cloud Computing is a surface technology, which provides a new impulsion for computed simulated resources. With a generation of new applications on the Cloud ahead to increase the load on the server. The main target of the load balancing (LB) is to balance the load among the junction. So in this paper, we introduced to use a load balancing algorithm to balance the load evenly. On the other hand, we can also use ACO algorithm, which is used to track the shortest path (quick way) between two requests. The dissimilarity of these two algorithms is, load balancing is to balance the load and in a sequential order. For example, if many users sent request to one server or one controller using Ant Colony (ACO) algorithm, ACO will take first user request and provide the key to the user, and then next user's request, and vice versa. So, ACO follows the priority concept like FCFS (First Come, First Served).



On the other example, we assign ACO algorithm into TSP. The main key of the TSP is, to find the tour that minimizes the interval travelled to visiting all towns.

Below containing some cities (A, B, C, D, E, F) to visit all towns with a low cost and to reach the starting place or a junction. So the ant will make a lay and to yield an optimizing results with a low time period. Through this LBA concept we can also find and detect failure also.



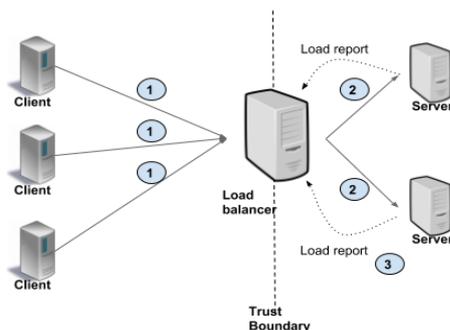
If the server or computer or other computer environment had some fault, we can also detect the fault using the fault detection method. A Virtual Machine (VM) contains a number of files that can store on your memory. The file may contain some fault. So the fault detection method will also use in this paper.

## 2. RELATED WORKS

In this survey, we multitude figures about computer associated algorithms for better performance result using these algorithms, and the user no need to wait to get an original report of the program performance without delaying time. If we are supposed to use another algorithm like, Load Balancing Scheduling Algorithm (LBSA), and/or Earliest-Deadline First (EDF) algorithm, it does not provide offers a user's expected result in a high load condition. According to these reasons many technology companies are used in this cloud computing system. Because cloud technology is more powerful and also the multitasking component.

## 3. LOAD BALANCING IN CLOUD COMPUTING

The main intent of the load balancing is to balance the elect or incoming load (request) among the all the junction. So, the best benefit of using in this LB, no junction will be overloaded. Web application or website contents can obtain by sundry of clients at any gunpoint of a slot. It is so tough for a web application govern some user's similar request at the equal slot. So, during this relation, the system malfunction may occur. Here the load balancing is the paramount character to avoid such kind of quandary. For ex, if n-clients want to download some files at an identical time, VM load balancer helps us to assign the jobs or a request to each client. Below figure containing some clients, VM tries to assign the jobs equally.



The load balancing is used to cut or sort the problem into two separate parts and finally gives the possible solution (result) before merging the result. Here load in a sense network load, CPU load, etc. not only the website traffic. Load Balancing is also used to determine the certain parameters of the Load Balancing Algorithm (LBA) in a Cloud Computing environment. Some of the parameters/restrictions are given below:

### 3.1 Load Balancing Characteristics:

#### 1. Fairness:

A Load Balancing algorithm is said to frank and fair, i.e., which tells the whole truth between the heaviest and lightest

loaded add up resources in the network minimized.

#### 2. Optimize Resource Utilization:

A Load Balancing algorithm is also used to detect the failures and reduce the time, cost and to give the best solution using optimum resource utilization.

#### 3. Throughput:

The algorithm makes sure that raise in effectiveness by the top number of jobs with the least consumed schedule.

#### 4. Adaptability:

The algorithm must be competent of handling the energetic appeal of the user and yield allocation of task in low level time.

### 3.2 Importance of load balancing:

The Main Advantage of load balancing using cloud computing is,

- Low cost
- Flexibility
- High performance
- Scalability
- Availability

#### Disadvantage:

- Load balancing allows a cloud computing build-up to increasing demands.

### 3.3 Load Balancing Challenges:

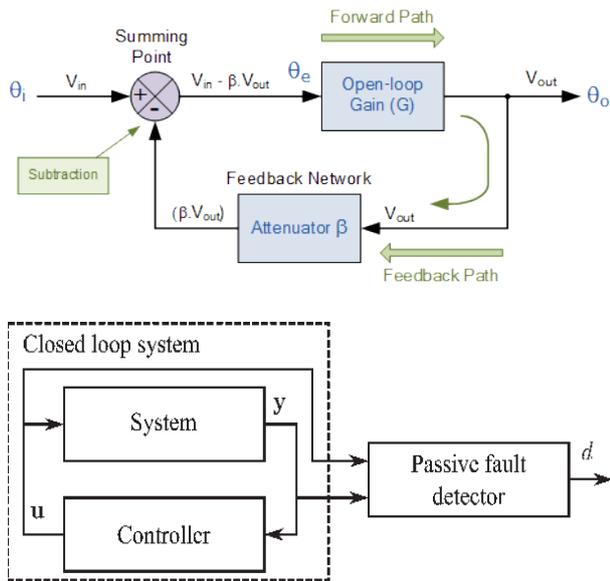
The major challenges are,

- Automated service provisioning
- Management of energy
- Stored data management
- Migration of virtual machine

## 4. FAULT DETECTION MODEL

In the Cloud Computing failure or fault, the log data gathered by the system and the quantity of data is too big, but the failure data is too little, so we can many log data with unsupervised algorithm characteristic. In this paper, we also include the fault detection method to detect the fault data and file. Classically, faults are detected when the output surpasses the anticipate values by a present tolerance, which has some weakness in open – loop and closed – loop controls.

Over the preceding decennary two groups of observer design have egress. One is a mathematical plant model to produceceremonial (state) valuation and other one is available plant knowledge, is to valuate the piece of the physical process, not only the ceremonial. Error detection or fault detection is a technique that equips dependable delivery of digital data across erratic communication channels. Error detection is the discriminate of errors or mistake spawn by noise. Error detection is an important role to reconstruct the original data, for the use of this method an error may reduced.



Fault Detection has acquired to consider in academic and industrial or business areas. An existing method call for a signature based methods and anomaly detection methods (contains behavior-based methods and metric correlation analysis). At present, equivalent studies are coordinated on Cloud Computing (C2) system. Besides, few research scientists deeply emphasis only on performance metrics and anomaly detection methods. In this paper, we methodically research fault detection model using some basic algorithms.

#### 4.1 Fault Detection:

Usually the detection process is used to find out the faults using some techniques. It can be divided into two major categories: (1) Model Based and (2) Signal Processing Based

##### Model based:

In Model Based System used to verify if the fault occurs or not. This can be Mathematics or Knowledge based system. This type includes many methods and approaches. Like an observer-based approach, parity-space approach and parameter identification based method. With Which type of model is also called as a set-membership method. This method is used to give the guarantee to the detector under the rules.

##### Signal Processing Based:

This method is used to perform the measurements like mathematical or statistical operations. For instance, if the client sent a voice message or make a video call to any other third party through the wire line, this method involves detecting if the signal is fast or down. So it checks the signal and give us the clearest sound.

#### 4.2 Faults Actuator

The fault actuator can use VM technologies to transport the impact of failure through the modification of the resource allocation in the virtualized Cloud Computing platform (or) stage.

An Actuator is a one type of fault which affects the user's or control input. It can be deviated by two ways: (1) Additive faults and/or (2) Multiplicative faults. An actuator may occur the computer system; during an abnormal operation is processed. If the user gives unmapped inputs, the fault

actuator can only find and produce the original output. In the below figure, some unfamiliar control input is given to the actuator, first it will process the data or input, next it will detect the failure using sensors, finally it produces the throughput for the user. The same process will repeat whenever the user wants to check the input.

## 5. VIRTUAL MACHINE PROCESS

Initially, Virtual Machine was outlined by Popek and Goldperk. The server virtualization technology is the major component to empower flexible computing while dispatching IaaS (Infrastructure as a Service) to the end user. There are different sort of Virtual Machine, each with dissimilar functions:

#### System virtual machine:

They offer functionality demand to achieve whole operating system.

#### Process virtual machine:

Which is designed to perform computer programs in a platform independent situation

Server virtualization has been broadly used in commodity and industrial computers. For instance, Amazon Elastic compute cloud, it is a web-service which offers a different kind of Virtual Machine (VM). According to the fault detection, system failures can be derived into two parts: (1) Hardware Failure, (2) Software Failure.

#### 5.1 Benefits of Virtualization:

Some of the initial benefits of virtualization are,

- It reduces the operating cost
- Increased IT productivity
- Availability
- Fast and Efficient

#### 5.2 Key Properties of Virtual Machine:

Key properties:

- **Partitioning:**  
By use of physical machine we can run multiple operating System.
- **Isolation:**  
Conserve performed with advanced resource control.
- **Encapsulation:**  
We can create a folder and save the whole state of a virtual machine.

## 6. ANT COLONY OPTIMIZATION (ACO)

Ant Colony Algorithm was initially inaugurated by Dorigo and Gambardella to improve the performance of the program. ACO is a meta heuristic concept and/or algorithm which was conferred in 1991, and which is primarily used for combinatorial optimization problems. And also it is a priority based working style that means it takes the client's request and offer the result over the priority manner as it is. Generally, ACO tracks the shortest path for establishing their quick, positive result, like an original ant behavior.

The real ant is to find the shortest way to reach their food place from the nest using pheromone trails.

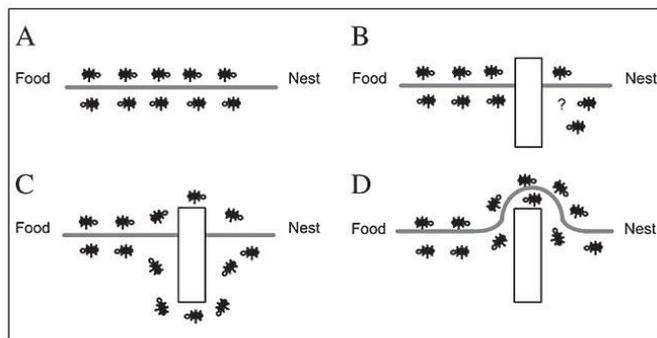


Figure 2. A. Ants in a pheromone trail between nest and food; B. an obstacle interrupts the trail; C. ants find two paths to go around the obstacle; D. a new pheromone trail is formed along the shorter path.

Above figure, Ant Colony Optimization, the ants exits from their nest and quit the pheromone when the trip. Other ants follow the chain, and they puzzle out the path. Finally, they reach the food place. The same strategy has been used in this Ant Colony optimization which offers the smart practicable tincture.

## 7. CONCLUSION

Cloud Computing is a crucial chunk which has many entities to explore in the research field. Load balancing (LB) is a salient empirical of cloud computing, in which the algorithm performs at either high load or low load condition and also neutral. In this paper, we present a fault detection framework for web application in Cloud Computing. In the present life Cloud Computing is one of the work area and which have many important concepts to analyze in the research area. Meanwhile, we took the survey on fault detection technique. In the future, we move to the next stage, to implement some algorithm to detect a an error in which they include unwanted resource and to track the optimum solution.

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