PSO And RC5 Based Advance Load Balancing Scheme for Cloud Computing

Yesha prajapati1, Nirav shah2
[1]*M.E. Department of Computer Engineering, Silver Oak College of Engineering and Technology*
[2] *Assistant Professor, Department of Information Technology, Silver Oak College of Engineering and Technology*

Abstract **- Cloud computing has emerged as a technology that greases tasks by the dynamic allocation of virtual machines. Users pay for resources based on their demand. A cloud provider has to face many challenges in existing system found certain limitation related to data, load balancing, premature convergence, reduced convergence speed, at first chosen random solutions. In this paperwork on proposed approach for load balancing using RC5 for providing security for data also and work on resulted parameters like accuracy, robustness etc.**

Index Terms **- RC5, security, load balancing, PSO.**

I.INTRODUCTION

1.1 what is cloud computing

Cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases, networking, and software. Rather than keeping files on a proprietary hard drive or local storage device, cloud-based storage makes it possible to save them to a remote database. As long as an electronic device has access to the web, it has access to the data and the software programs to run it.

Cloud computing is a popular option for people and businesses for a number of reasons including cost savings, increased productivity, speed and efficiency, performance, and security.

II. LOAD BALANCING IN CLOUD COMPUTING

Load balancing is a vital component of any cloud environment. It plays very important role in maintaining the availability of your cloud-based applications to customers, business partners, and end users.

Load balancing is the process of distributing workloads across multiple servers, collectively known as a server cluster. The main purpose of load balancing is to prevent any single server from getting overloaded and possibly breaking down. In other words, load balancing improves service availability and helps prevent downtimes.

LB's primary objective is to efficiently manage the load across various cloud nodes, so that no node is under / overloaded. LB may be characterized as a process of spreading a burden across network links on multiple devices or system clusters to maximize its use of assets to optimize overall response time. It reduces the device's total waiting period and also avoids excessive replication of assets. Requests spread inside servers in this process so that data can be distributed & processed without waiting. LB is the method of maximizing system performance by moving the device burden. The LB at CC is shown in Figure 1.

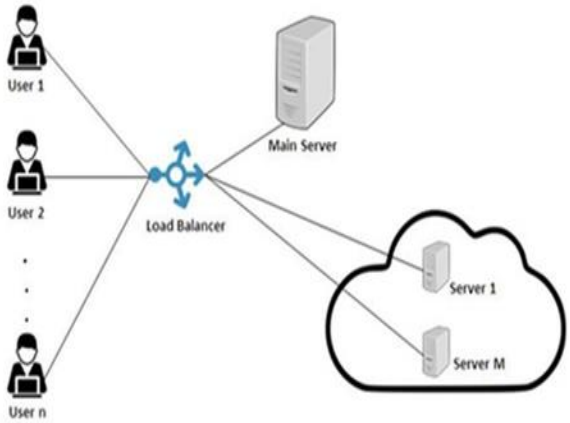


FIGURE 1. Load balancing in Cloud Computing [8]

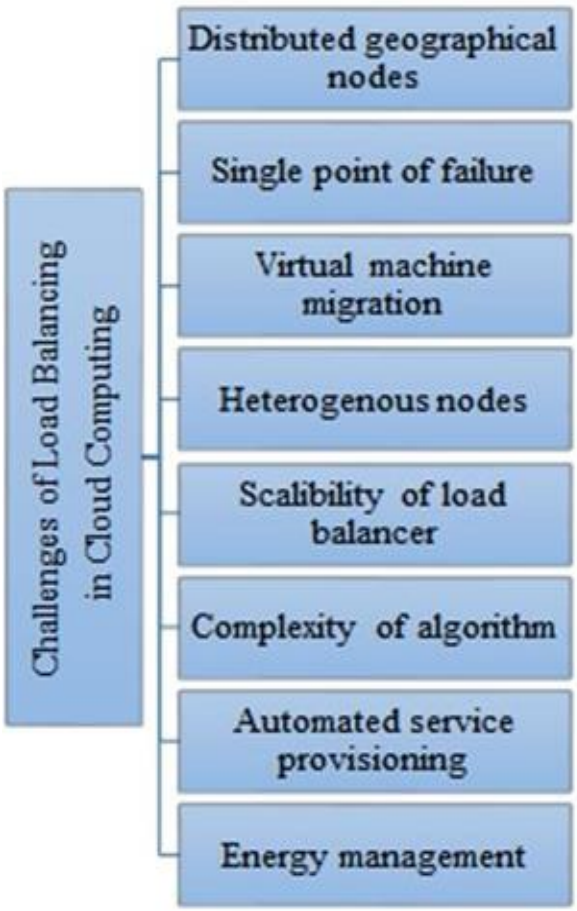
2.1 Types of load balancing

Load balancer are of two type hardware or software-based load balancer. Hardware-based load balancers use specialized processors, and the appropriate

software is loaded into the machine that the vendors provide. However, the disadvantages of such are that in order to meet the increasing traffic on the website, there is need to purchase bigger and multiple machines.

Software load balancing generally run on the commodity hardware. In comparison to hardware load balancer, software load balancer is more flexible and cheaper. The installation of the software is very easy and can be installed on any hardware's or in cloud environments.

2.2 Challenges of lb in cloud computing



1. Distributed Geographical Nodes: Cloud data centers are typically distributed for computing at disparate locations. Dynamically distributed nodes in these centers are used as a centralized network for efficient processing of customer requests. Several LB approaches are available in the literature with a limited reach and where conditions such as network delay, communication delay, the range within the distributed computing nodes, space within customer & resources are not taken into consideration. Nodes in very remote areas are challenging because certain algorithms do not suit this environment.
2. Single Point of Failure: Specific LB algorithms are proposed in literature where decision-making is not distributed across multiple nodes, and LB decisions are made by the centralized node. If the key devices malfunction this will impact the overall computing system [9].
3. VM Migration: Virtualization allows for the building of multiple virtual machines on one physical unit. Those virtual machines have different settings & are autonomous in architecture. If a physical device is overloaded, it is appropriate to shift all VMs to a remote location using an LB method to relocate the VM [3].
4. Nodes Heterogeneity: The authors have proposed homogeneous nodes in the cloud load balancing in the initial inquiry. CC consumers need a dynamic switch, which needs execution on heterogeneous nodes for an efficient network and reduces response time [3].
5. Handling Data: CC addressed the issue of old conventional storage devices which demanded huge resource & equipment costs for hardware. The cloud allows consumers to heterogeneously retain the data, without any control issues. Storage is increasing day by day and requires duplication of stored data for effective accessibility & data continuity [3].
6. LB Scalability: Accessibility & on-demand scalability cloud services allow people to access resources for rapid downscaling or scale-up at any time. A strong load balance should consider rapidly changing requirements in computational conditions, memory, device topology, etc.
7. Complexity of Algorithm: CC algorithms should be quick & simple to achieve. The aim of a robust algorithm is to reduce cloud system efficiency & quality.
8. Automated Service Provisioning: The key aspect associated with cloud computing is flexibility; resources can be automatically delegated or distributed. How then do we use or discharge the cloud's services, only maintaining the same productivity as conventional systems and using the best resource [3].

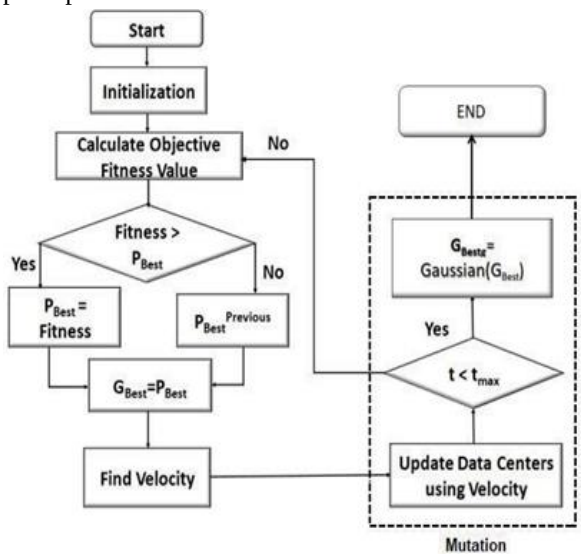
9. Energy Management: The benefits of energy management, which advocates cloud use, are the economies of scale. Power saving is the most important thing that allows for a global economy where limited companies are going to help the pool of worldwide capital, rather than each providing its private services [3].

III. CLOUD SECURITY

Cloud security involves the various procedures and technology that secure cloud computing environments against both external and insider cybersecurity threats. Cloud computing, which is the delivery of information technology services over the internet, has become a must for businesses and governments seeking to accelerate innovation and collaboration. Cloud security and security management best practices designed to prevent unauthorized access are required to keep data and applications in the cloud secure from current and emerging cybersecurity threats.

IV. PARTICLE SWARM OPTIMIZATION (PSO)

This method is inspired by social behavior of bird flocking and fish schooling. Suppose a group of birds is searching for food in an area, only one piece of food is available. Birds do not have any knowledge about the location of food, but they know how far the food is from their present location. The best strategy is to follow the bird nearest to the food. PSO works on same principle.



This method is used to improve fitness function and reduce makespan time to optimize load balancing in cloud computing. In cloud environment every user utilizes cloudlets with the help of the internet. Each data center divides the user's job into various jobs and allocates them between available processing elements in their (DCs). The given load balancing technique is responsible for assigning a job into available (DCs) efficiently with an aim to decrease the Makespan time and improve fitness function.[1]

V. RC5 ALGORITHM

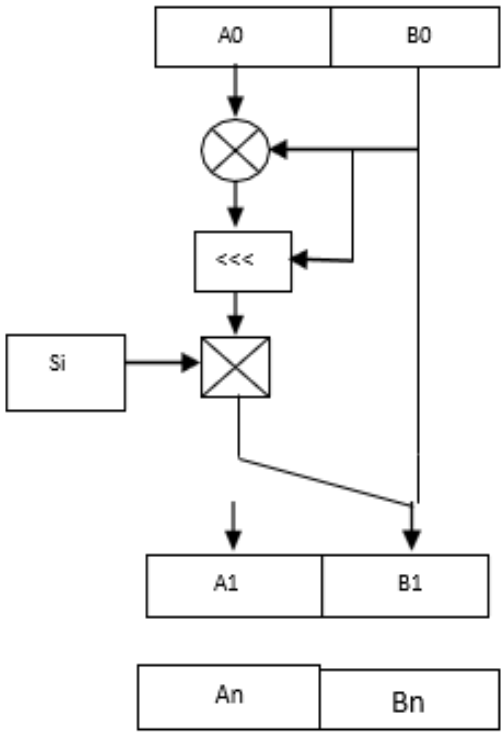
Rc5 is a block cipher notable for its simplicity. Designed by Ronald Rivest in 1994.

RC stands for "Rivest Cipher", or alternatively "Ron's code". Rivest announced also RC2 and RC4 and now there is RC6 which is the advanced Encryption Standard (AES) candidate.

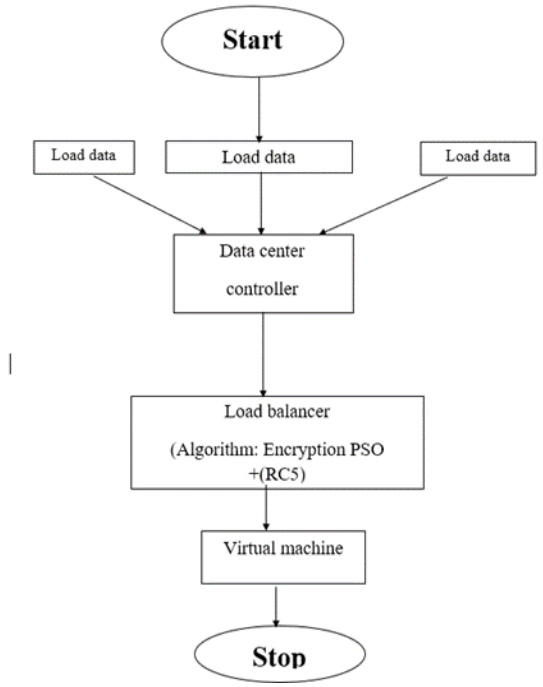
5.1 Structural features of Rc5 block cipher

The RC5 algorithm uses an input of 2 WORDS of w bits (A and B). Arithmetic and logic operations are applied on those blocks as depicted in figure1.

The RC5 algorithm uses an input of 2 WORDS of w bits (A and B). Arithmetic and logic operations are applied on those blocks as depicted in figure [4].



VI. PROPOSED MODEL



VII. CONCLUSION

In this paper I have discussed about two main problem of cloud computing, Load Balancing and security. We are working on hybrid approach of two algorithm PSO and RC5. PSO will be used for load balancing and RC5 for data security in cloud. This hybrid approach will provide accuracy and robustness.

REFERENCES

[1] Ronak Agarwal, Neeraj baghel and Mohd. Amir khan, “Load balancing in cloud computing using mutation-based particle swarm optimization,” IC3A, 2020.
[2] Asam Belhai Mohamed,Ghada Zaibi, Abdennaceur Kachouri, “Implementation of rc5 and rc6 block ciphers on digital images,” 2011.
[3] Mike jia, weifa liang senior member, meitian huang and Yu ma, “Qos- aware cloudlet load balancing in wireless metropolitan area network,” IEEE, 2017.
[4] J.Frankenfield, “Cloud computing,” Investopedia. Accessed: Jul.28, 2020. [online]. Available: https://www.investopedia.com/terms/c/cloud-computing.asp