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A Review on Improving Cloud Performance Based Load Balancing Approach in Different Cloud Environment

Er. Ajit Kumar Singh
M.Tech (Computer Science)
Kurukshetra University, Geeta Engineering College,
Panipat, Haryana, India

Dr. Archana
Associate Professor
Computer Science &Engineering,
Geeta University

Mr. Kapil Saini
Assistant Professor
Computer Science &Engineering,
Geeta University

***Abstract*— In the midst of the major problem of cloud computing, load balancing is the critical problem. It can be done through resource management, task scheduling, efficient virtualization, and task resource mapping [3].**
In this head, the authors have proved to better the cloud performance over load balancing with fault trend. Wrong handler, repetition and check displaying have been used to instrument fault tolerance (reactive and proactive). This removes the faulty node and does not make them available for task assignment till its recovery. Also while allocation load among knob, achievement ratio and past load information is also studied. This has improved the quality of service as task is getting mapped with that node whose success rate is more andpresent load is less [1].

I. INTRODUCTION

Cloud computing has newly arrive as a new type of the utility-based computing model for hosting and carrying hardware and software "as services". It provides its users with the confusion of absolute computing and storage resources which are possibly available on-demand from everyplace and anytime. Cloud computing is beautiful since it drop the requirement for its customer to plan ahead for material, by acceptance IT enterprises to start from the small and to development resources only when there is a rise in service application. After all, in sprit of this, the development of approach to make cloud computing powerful is currently at its inception, with many issues still to be forwarded [1].

"The Cloud is a quality of parallel and seized system repose of a collection of hooked and idolized computers that are dynamics conduct and presented as one or more unified computing resource(s) based on service-level agreements established through agreement among the service worker and consumers" [2].

2. MOTIVATION

Today everything is on cloud either it is your business, education, hospitals, financials, government offices or others, this is only because of flexibility and availability of resources anywhere or any time with one click. Now the performance is the vital part of this services because day by day the clients are increasing and work load of servers are increasing and the performance is going down. Therefore, a load balancing module proposed for increasing performance of cloud servers.

Essential aspect of cloud computing are as follows:

- **On-demand self-serve:** a client can uninhibitedly provision computing potentiality (e.g., computing power, storage space, network bandwidth), that is without requiring human connection with the particular provider(s);

Rapid elasticity: the above abilities might be powerfully resized all together to quickly scale up (to potentially unlimited size) or down in according to the specific needs of the consumer [3].

3. ARCHITECTURE OF CLOUD SYSTEM

A cloud system, that is a system which adopts the cloud computing paradigm, can be characterized by its architecture and the services it offers. The engineering of a cloud computing framework is usually structured as a set of layers. A typical architecture of a cloud system is exposed in Figure 1 (from [4]). At the bottom level of the scale there is the hardware layer, which is held for managing the physical assets of the cloud system, such as servers, storage, network devices, power and cooling systems. On the top of the hardware layer, resides the infrastructure layer, which provides a pool of computing and storage resources by partitioning the physical assets of the hardware layer by means of virtualization technologies. Based on top of the framework layer, the platform layer consists of working frameworks and application structures. The reason for this layer is to limit the weight of conveying applications straightforwardly onto framework assets by offering help for executing capacity, data set and business rationale of cloud applications. At long last, at the most elevated level of the pecking order there is the application layer, which comprises of cloud applications [4].

For what respects services carried out on top of a cloud computing framework system, they can be given in three methodology, as per the deliberation level of the capacity provided and the service model of providers [2]:

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Infrastructure as a Service (IaaS), which includes administrations to permit its consumer's to demand computational, storage and communication resources on-demand, thus enabling the so called "pay-per-use" paradigm whereby consumers can pay for exactly the amount of resource they use (like for electricity or water). The shoppers can utilize the gave assets to convey and run erratic programming; be that as it may, the administration and control of the basic cloud framework is conceivable exclusively by the supplier. An example is Amazon EC2 [5].

Platform as a Service (PaaS), which comprises high-level services providing an independent platform to manage software infrastructures, where consumers (i.e., developers) can build and deploy particular classes of applications using programming languages, libraries, and tools supported by the provider. Generally, purchasers don't oversee or control the hidden framework (like servers, organization, stockpiling, or working frameworks), which must be gotten to through the significant level administrations given by the supplier. An example is Google App Engine [6].

Software as a Service (SaaS), which comprises specific end-user applications running on a cloud infrastructure. Such applications are delivered to consumer as a network service (accessible from various client devices, ranging from desktop computers to smart phones), thus eliminating the need to install and run the application on the consumer's own computers and simplifying maintenance and support. Customers don't oversee or control the hidden framework and application stage; only limited user-specific application configurations are possible. An example is Salesforce.com [7].

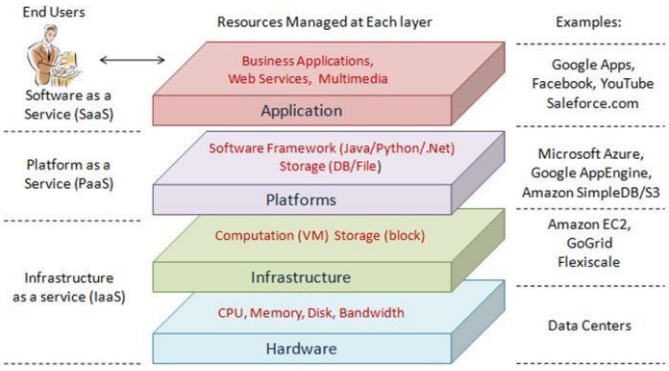

Fig -1: The architecture of a cloud system (from [4])

The traditional approach to deploy a cloud system is a public computing system. However, other deployment models are possible which differentiate each other's by variations in physical location and distribution. For instance, the following models are taken from NIST [12]:

Public cloud: the cloud framework is support for open use by the general public and is build possible in a "pay-per-use" manner;

Private cloud: the cloud framework is support for absolute use by a single organization comprising multiple users;

Community cloud: the cloud framework is supported for absolute use by a clear-cut community of users from associations that have shared concerns (e.g., mission, security prerequisites, strategy, and consistence considerations);

Hybrid cloud: the cloud framework is a design of two or more distinct cloud infrastructures (private, community, or public) that remain rare entities, yet, are bound together by innovation that empowers information and application convey ability. A typical example is when a private cloud is for a time fill up with computing quality from public clouds, in order to manage peaks in load (also known as "cloud-bursting") [13].

4. LOAD BALANCING

Load balancing can be characterized as the course of assignment dissemination among numerous PCs, cycles, plate, or different assets to get ideal asset usage and to decrease the calculation time, processes, disk, or other resources in order to get optimal resource utilization and to reduce the computation time. Load balancing is a quality means to accomplish viable asset sharing and utilization. As a rule, load balancing calculations can be divided into following three types [8]:

Centralized approach: In this way, a single node is answerable for dealing with the distribution within the whole system. [13]

Distributed approach: In this approach, every hub autonomously fabricates its own heap vector by gathering the heap data of different hubs. Choices are made locally utilizing nearby burden vectors. This approach is more reasonable for generally disseminated frameworks such as cloud computing. [14]

Mixed approach: A mix between the two ways to deal with take benefit of each methodology advantage of each approach [9].

5. RESEARCH GAP

- Authors had focused only on how to decrease the response time of job scheduling and they ignored talk about processing cost. [15]
- Creators apportions the VM which have higher RAM particular, yet they disregards others particular, for example, processor power. On different hands they don't present any outcomes and correlation with different algorithms. [17]
- In Throttled Load Balancing algorithm, only predefined number of the tasks is allocated. The problem occurs if the request arrives more than the pre-defined number of the tasks.
- Round Robin also handles the problem in the similar fashion. In that situation, the requests have to be queued till the VM becomes available [10].

6. RELATED WORK

This section consists of previous works that had been already proposed by several researchers. Some common approaches are also discussed here that work efficiently with response time, data center processing time and cost.

International Journal of Engineering Research & Technology (IJERT)
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(Adhikari and Amgoth [1]) Heuristic-based Load Balancing Algorithm (HBLBA): A proposed heuristic algorithm for the IaaS model known as HBLBA is presented. It plans to address ill-advised designation of undertakings to VMs by designing servers in view of the number of undertakings, size, and VM amity to increase ability and find an applicable VM. The methodology turns out perfect for few errands, accordingly might be wasteful when there's an enormous number of undertakings in the framework. Also using additional configuration information may slow down the process.

(A. Jain and R. Kumar) [2]) Dynamic Cost-Load Aware Service Broker (DCLASB) to guarantee high QoS, the creators in this exploration proposed a powerful calculation that thinks about network inactivity for balancing the load. VMs are organized in light of their speed, the VM is picked based on the solicitation length. Server farm with the most un-handling time is chosen, inertness is contrasted and Data Center and the smallest expense is thought of. The calculation can accomplish powerful execution in the cloud in any case, it doesn't consider the needs of client demands.

(Eman M.Mohamed, Hatem S. Abdelkader, Sherif EI-Etriby et al. [3]) Starvation Threshold–Based Load Balancing (STLB) this proposed algorithm makes sure that load balancing happens when there is at least one free VM (starvation state) and this helps in reducing the quantity of undertaking migrations from one VM to another and avoid additional overhead cost as it only deals with direct nodes for workload balancing. However, the algorithm is suitable only for independent tasks.

(Yashpalsinh Jadeja and Kirit Modi [4]) The work done by proposed a novel load balancing algorithm called VectorDot. This calculation handles the progressive intricacy of the datacenter and multidimensionality of asset loads across server's network switches and capacity in a spry server farm that has coordinated server and capacity virtualization innovations.

(Ram Prassd Pandhy (107CS046) [5]) The work done proposed a mechanism CARTON for cloud control that unifies the use of LB and DRL. The LB (Load Balancing) is used to equally distribute the jobs to different servers so that the associated costs can be minimized and DRL (Distributed Rate Limiting) is used to make sure that the resources are distributed in a way to keep a fair resource allocation.

(J. Sahoo, S. Mohapatra and R. lath "Virtualization [6]) Addressed the problem of intra-cloud load balancing amongst physical hosts by adaptive live migration of virtual machines. The load balancing model is designed and implemented to reduce virtual machines migration time by shared storage to balance load amongst servers according to their processor or IO usage.

(Bhaskar. R, Deepu.S. R and Dr.B. S. Shylaja [7]) Work done by introduced an occasion driven load adjusting calculation for constant Massively Multiplayer Online Games (MMOG). The calculation subsequent to getting limit occasions as information, additionally investigation its parts in setting of the assets and the worldwide condition of the game meeting, then, at that point, creating the game meeting load adjusting activities.

(R.Shimonski. [8]) Dynamic Cost-Load Aware Service Broker (DCLASB) to guarantee high QoS, the creators in this exploration proposed a powerful calculation that thinks about network inactivity for balancing the load.

(J. Kruskall and M. Liberman [9]) The proposed a Central Load Balancing Policy for Virtual Machines (CLBVM) that adjusts the heap equitably in a dispersed virtual machine/distributed cloud computing.

(Mr. Nitin S. More, Mrs. Swapnaja R. Hiray and Mrs. Smita Shukla Patel [10]) The proposed a heap adjusting virtual capacity methodology (LBVS) that gives an enormous scope net information stockpiling model and Storage as a Service model in light of Cloud Storage. The Storage virtualization is accomplished utilizing an engineering that is 3-layered and load adjusting is accomplished utilizing two burden adjusting modules. It helps in working on the effectiveness.

(R. X. T. and X. F. Z [11]) The talked about a two-level errand planning system in view of burden adjusting to meet unique necessities of clients and acquire high asset use. Calculation accomplishes load adjusting by first planning errands to virtual machines and afterward virtual machines to have assets accordingly further developing the undertaking reaction time, and asset usage additionally generally speaking execution of the distributed cloud computing.

(M Randles, D. Lamb, and A. Taleb-Bendiab [12]) Author investigated a decentralized honey bee based load balancing technique that is a nature inspired algorithm for selforganization. Algorithm accomplishes worldwide burden adjusting through neighborhood server activities. Execution of the framework is upgraded with expanded framework variety however throughput isn't expanded with an expansion in framework size. This is the most ideal for the circumstances where the different populace of administration types is required.

(Ravindra Sandaruwan Ranaweerat [13]) The reviewed methods have been assessed based on some metrics and parameters such as scalability, resource utilization, throughput, reaction time, overhead, and performance. Be that as it may, recently distributed papers have been ignored. Likewise, the proposed overview paper in has surveyed the current procedures in three fundamental classes, including meta-heuristic, heuristic, cross breed. It has indicated the primary stars, cons, and streamlining proportions of every procedure. However, these survey papers have ignored the recently published papers.

(Bih-Hwang Lee, Ervin Kusuma Dewi, Muhammad Farid Wajdi [14]) The authors of have presented a systematic study of current research in the ground of workflow arrange in cloud computing with the goal of identifying distinct trends in the problem. They have classified methods into three groups, including heuristic, meta-heuristic, and hybrid schemes, and explored different factors such as workflow types and QoS constraints, and specified practical impacts and multi-disciplinary applications.

International Journal of Engineering Research & Technology (IJERT)
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(Omar G. Abood, Shawkat K. Guirguis [15]) The authors of have presented a thorough examination of conventional resource scheduling algorithms, emphasizing the technical characteristics and challenges of cloud computing. The issues faced by The issues looked by cloud computing in terms of service provider success, customer satisfaction, resources consumption, high computation cost, what's more, high energy utilization of appropriated data centers have been recognized.

(Amro Al-Said Ahmad, Peter Andras [16]) A review of existing tools and methods for load balancing in cloud computing has been presented in [16]. The reviewed methods have been assessed based on some metrics and parameters such as scalability, resource utilization, throughput, reaction time, overhead, and performance. Notwithstanding, recently distributed papers have been dismissed. Likewise, the proposed study paper in has looked into the current strategies in three fundamental classes, including meta-heuristic, heuristic, half and half. It has indicated the principal professionals, cons, and enhancement proportions of every strategy. However, these survey papers have ignored the recently published papers.

(Yujiao Song, HaoWang, XiaochaoWei and LeiWu [17]) A survey on multiple algorithms for load balancing in cloud computing has been done in [20], in which the advantages and shortcomings of the reviewed algorithms have been specified, and available challenges have been discussed to improve these algorithms. This paper explicitly has explored technical details, but future research directions have not been discussed. Also, some optimization algorithms like Ant Colony Optimization (ACO), PSO, GA, and ABC for load balancing problems have been reviewed in [21]. This paper shows that the looked into calculations have great execution contrasted with conventional ones as far as make span, reaction time, and so forth. By the by, this review paper is restricted to distributed papers from 2012 to 2015 and is not written in a systematic structure.

(Sead Mašović, Muzafer Saračević, Hamza Kamberović, Mensura Kudumović [18]) A remarkable survey paper has been proposed in [18], in which the existing load balancing techniques have been reviewed in seven categories, including workflow specific, network-aware, application-oriented, general, agent-based, natural phenomena, and Hadoop map-reduce. A few strategies have been examined and broke down in every class in light of critical burden adjusting measurements, like asset usage, throughput, versatility, make span, reaction time, and energy. Besides, a few future works and exploration headings to offer effective strategies have been recommended. By and by, adaptation to non-critical failure as a fundamental calculate load adjusting has been disregarded, and existing works in this field have not been covered.

TABLE I. COMPARATIVE STUDY

Types	Publication	Description	Findings.
Efficient Algorithm for function arrange in Cloud Computing Environment [1].	Mainak Adhikari et. al.[1]	Study of Cloud Scalability, Performance, Availability, Security with pros and cons.	1. Enhancing features for Scalability. 2. Enhancing features for Performance. 3. Enhancing features for Availability. 4. Enhancing features for Safety.
Analysis of Cloud Security, Performance, Scalability and Availability (SPSA)[3]	Eman M.Mohamed, Hatem S. Abdelkader, Sherif EI-Etriby [3]	Learning of various aspects of computing of cloud like Need, Use, approaches with the theory of augmentation of act, Scalability, Availability, & safety.	1.Enchancing features for Scalability. 2. Enhancing features for Performance 3 Enhancing features for Availability 4.Enhancing features for Safety
An Effective Approach for Balancing load in Cloud Environment[7]	Bhaskar. R, Deepu.S. R and Dr.B. S. Shylaja [7]	Learning of balancing of load methods for making successful and powerful balancing of load Algorithm. Here investigator give the theory of FCFS with existing algorithm	1. Know the portion of cloud -based Load balancer. 2. Learning of cloud virtualization. 3. Balancing of load methods. 4. Learning of various parameters that are required for balancing of load. 5. Mixed study of revised Load Balancing is best for finding best one. 6. Result analysis for these algorithms.
Performance Improvement in Cloud Computing using Resource Clustering[16]	Amro Al-Said Ahmad, Peter Andras [16]	In this study, provide custom allocation for a sector of nodes with indistinguishable supply, patterns are acknowledged and preserved as a Cluster and besides notorious as supply cluster approach. The supply clustering come within reach of is modelled using Cloud Sim is, a kit for	1. Supply clusters Gives elevated accuracy for supply discovery. 2. Structural design of cloud computing. 3. Supply credentials and Clustering. 4. Supply with similarity identified. 5. Implementation of clustering in

International Journal of Engineering Research & Technology (IJERT)
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Vol. 11 Issue 05, May-2022

		model and simulate cloud computing scenario and the evaluation Enhances the execution of the framework in the procedure of the possessions.	cloud sim.
Cloud Computing Issues, Research and Implementations[4]	Yashpalsinh Jadeja and Kirit Modi [4]	A examine sloping structure, summary data Technology overhead for the end-user with completion matters.	1. Learning of service sloping Structure of cloud computing to facilitate to designing the proposed model. 2. Kepler-based accomplishment of a fraction blending simulation workflow. 3.Theory of virtualization 4. Role of cyber infrastructure developer in cloud computing. 5. Examination composition of cloud. 6. Learning of all investigator issues in field of cloud omputing Methods

7. CONCLUSION

In this paper present the review of load balancing technique for cloud computing. Load balancing technique is very important issue in cloud computing. The proper management of load balancing improves the efficiency of throughput. Swarm intelligence play a critical role in load balancing technique. Cloud Computing is a vast concept and load balancing hit a very important role in case of Clouds. There is a huge scope of improvement in this area. We have talked about just two detachable burden planning calculations that can be applied to mists, however there are then again different methodologies that can be applied to adjust the heap in mists. The presentation of the given calculations can likewise be expanded by shifting various boundaries.

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