Study of Different Approaches in Cloud Computing for Improving Load Balancing

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Abstract— Cloud computing involve to achieve coherence and economies of scale by using the sharing of resources. Load balancing distributes task at hand across number of computing resources, such as computers central processing units, a network link, clusters of computers or disk drives. In the previous approaches FCFS, RR, and SJF has been used for load balancing in the cloud computing which were less efficient. In this load balancing the major issue is about response time by the servers too different clients available in the network. The servers use the virtual machines on the system for different purposes. Bandwidth and number of jobs have been defined for every virtual machine available in the network. In this paper the different techniques are studied along with their draw backs and efficient hybrid technique is introduced to overcome this problem. Various parameters for previous and proposed work are discussed.

Keywords— *Cloud Computing, Job Scheduling, FCFS, RR, SJF.*

I. INTRODUCTION

Cloud Computing: Cloud computing include to accomplish intelligence and economies of scale by utilizing the sharing of resources. This is much the same as the power grid over a system. Distributed computing is an extremely more extensive idea of met framework and administrations. Cloud assets are moved on interest furthermore shared by different clients. This can work for allocating resources to clients.

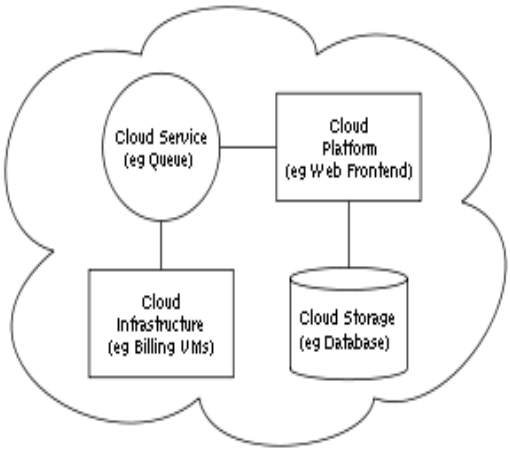

Fig 1.1: Cloud Computing

This technique enhance the utilization of figuring power subsequently decreasing environmental harm and additionally since less potency, aerating and cooling, rack attribute and so on are required to perform assortment of capacity. In distributed computing numerous clients get to a solitary server to bring and change their information without purchasing permit for various application.

II. TYPES OF CLOUD COMPUTING

- **Public Cloud: the whole enumerate groundwork is situated on the terrace of a** cloud take account of company that offers the cloud service. Public cloud use communal resources; they do excel mostly in enforcement, but are also most vulnerable to various incursion**.**
- **Private Cloud**: cloud groundwork is used by one organization. It is not shared until we doesnt find its situation. The security and control level is capital while using a private network. The cost minimization can be minimal, if the company needs to invest in an on-premise cloud infrastructure.
- **Hybrid cloud:** we use both private and public cloud building upon on their principle. For example, public cloud can be used to unite with customers, while private cloud is use to secure the data of the customers.
- **Community cloud:** implies an groundwork that is mutual between organizations with the mutual data and data management concerns. Community clouds can be placed both on and off the premises and this is very big cloud.

III. SERVICE MOCK UP CLOUD COMPUTING

- **Software-as-a-Service:** This was the primal cloud service and the first to enjoy boundless adoption. SaaS is the online shipment of software functionality and capability without the need for locally in action software. Rather, SaaS runs on a Web browser.
- **Platform-as-a-Service:** Platform-as-a-Service (PaaS) is a cloud-based functions enlargement environment. Using a PaaS, companies can produce new applications more rapidly and with a leading degree of flexibility than with older development platforms bound directly to hardware resources. Running application Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or

heads unless they are unavoidable. development on a PaaS has a number of key uses.

- **Infrastructure as a Service (IaaS)**: Infrastructure Providers gets to grips a large set of computing ways and meaning, such as processing capacity and storing. Through Virtualization, they are able to curve up, assign and dynamically re-size these resources to build ad-hoc systems as governed by customers. They deploy the software stacks that romp their services.

IV. LOAD BALANCING

Load balancing is the technique which makes sure that every processor within the system or every node in the network consume equal figure of power and finish approximately equal figure of work at any wink of time. The load can be known as data uploading capacity, CPU load or network hold up. To improve both resource utilization and job response time, Balancer is responsible to distribute the load among various nodes of a distributed system. It also help in come over from the situation where few nodes are heavily loaded while rest other nodes are idle or lightly loaded.

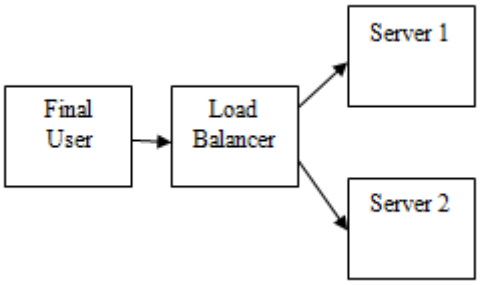

Fig 1.2: Load balancing

To optimize the performance of cloud architecture different load balancing carrying into civilty should be came after in a well manner. Overloaded links across the server and storage side frequently lead to performance degradation and are more dangerous to various misplays. Therefore, in cloud computing load balancing is needful to equally and evenly dynamic distribution of load over all available nodes**.**

V. LITERATURE REVIEW

Wang En Dong et al [1] "Oriented Monitoring Model of Cloud Computing Resources Availability" In this paper author recommended this paper researches on QoS-arranged cloud computing assets accessibility. Initial, a checking model of cloud computing resources accessibility is made. At that point, as indicated by the dynamic procedure of the electing a Template (Heading 2) cloud computing benefit, the accessibility of cloud computing resources is examined from QoS of a solitary cloud resource node which is portrayed by basic attribution and extraordinary attribution to QoS of some cloud assets which are associated by arrangement model, parallel model and blend model to give administration. By three models and the investigation of the single cloud administration asset, the accessibility of distributed computing administration is observed.

Qiang Guan et al [2] "A Cloud Dependability Analysis Framework for Characterizing System Dependability in Cloud Computing Infrastructures" In this paper author needs to say that we show a cloud constancy examination (CDA) structure with instruments to describe disappointment conduct in distributed computing foundations. We plan the disappointment metric DAGs (coordinated a cyclic diagram) to break down the connection of different execution measurements with disappointment occasions in virtualized and non-virtualized frameworks. We think about numerous sorts of disappointments. By looking at the created DAGs in the two situations, we pick up understanding into the effect of virtualization on the cloud dependability. This paper is the principal endeavor to study this critical issue. Likewise, we exploit the recognized measurements for disappointment location. Trial results from an on-grounds distributed computing test bed demonstrate that our methodology can accomplish high recognition precision while utilizing a little number of execution measurements.

Priyanka Gautam et al [3] "Extended Round Robin Load Balancing in Cloud Computing" In this paper creator recommended to balance the load on different data centers according to the task/cloudlets received and to allocate the appropriate data center or virtual machine to handle new cloudlets. The proposed work is basically an extension of round robin scheduling and randomized scheduling algorithm. The concept is further extended to support the cloudlets with different mips and mbs with the added functionality of random cloudlets/task selection. The proposed technique consider both cloudlets and processing time and file transfer time while selecting appropriate hosts for cloudlet(job) submission on distributed resource with an objective to minimize execution time and cost. The extended normal round robin scheduling method which have a primary condition for cloudlets to be of same processing time (MI) and processing size (MB). Some results of the starting and finishing times of cloudlets:

Task Id	Starting and finishing time of cloudlets		
	Start Time	Time	Finish Time
7	517.44	0.1	517.54
2	535.64	0.1	535.74
12	757.6	0.1	757.7
11	787.77	0.1	787.87
1	833.73	0.1	833.83
6	883.44	0.1	883.83
3	1057.69	0.1	1057.79
9	1067.97	0.1	1068.07
5	1096.63	0.1	1096.73
13	1127.4	0.1	1127.5

Task Id	Starting and finishing time of cloudlets		
8	1161.14	0.1	1161.24
10	1254.87	0.1	1254.97
0	1275.15	0.1	1275.25
14	1297.18	0.1	1297.28
4	1362.09	0.1	1362.19

Bhavan Bidarkar et al [4] "Round Robin Approach for Better VM Load Balancing in cloud computing" There are three types of VM Load Balancer that is Round Robin, Throttled and active monitoring load balancing algorithms. 1. Round Robin Load Balancer, 2. Active Monitoring Load Balancer, 3. Throtted Load Balancer. The Round Robin algorithm does not save the start of perivious allocation of a VM to a request from a given user base while the same state is saved in RR VM load balancer. Some results of overall response time and data center processing time are given below:

No. of VM's	Overall Response Time of RR Load Balancing		
	Avg(ms)	Min(ms)	Max(ms)
5	300.06	237.06	369.12
10	300.4	237.06	369.12
15	300.5	237.06	369.12
20	300.7	237.4	370.02
25	300.9	237.4	370.02

No. of VM's	Data Center processing time for RR Load Balancing		
	Avg(ms)	Min(ms)	Max(ms)
5	0.34	0.02	0.61
10	0.51	0.02	1.51
15	0.85	0.02	1.51
20	1.04	0.06	1.51
25	1.21	0.11	1.51

Brotoi Mondal1 et al [5] "Load Balancing in Cloud Computing using Stochastic Hill Climbing-A Soft Computing Approach", Cloud computing offers information and give numerous resources to users. There are two main families of procedures for solving a optimization problem. Complete method which guarantees either to find a valid assignment exists. The other Incomplete methods may not guarantee correct answer for all inputs. A variant of hill climbling[9] (SHC) is one of the incomplete approach for solving such optimization problems. The soft Computing based approach has been compared with two approaches with two approaches Round Robin and First Come First Serve.

Cloud Confi-guration	Overall Average Response Time Using Five Data Centers			
	DC Specification	RT in (ms) using SHC	RT in (ms) using RR	RT in (ms) using FCFS
CC1	Each with 25 VMs	235.86	243.57	251.03
CC2	Each with 50 VMs	230.84	238.06	244.04
CC3	Each with 75 VMs	229.46	233.88	239.87
CC4	Each with 25,50,75 VMs	225.64	231.16	238.97

Cloud Confi-guration	Overall Average Response Time Using Six Data Centers			
	DC Specification	RT in (ms) using SHC	RT in (ms) using RR	RT in (ms) using FCFS
CC1	Each with 25 VMs	235.86	243.97	251.26
CC2	Each with 50 VMs	230.84	238.34	244.04
CC3	Each with 75 VMs	229.46	233.67	239.87
CC4	Each with 25,50,75 VMs	225.64	231.496	238.97

Yiqiu Fang et al [6] "A Task Scheduling Algorithm Based on Load Balancing in Cloud Computing" Efficient assignment planning instrument can meet clients' requirements, and enhance the resource use, along these lines improving the general execution of the cloud computing environment. Be that as it may, the errand booking in matrix registering is frequently about the static assignment necessities, and the resources usage rate is additionally low. By new elements of cloud computing, for example, adaptability, virtualization and so on, this paper talks about a two levels errand booking component in light of burden adjusting in cloud computing. This assignment booking instrument can meet client's necessities, as well as get high resource use, which was demonstrated by the reproduction results in the CloudSim toolbox.

Mayur S. Pilavare1 et al [7] "A Novel Approach Towards Improving Performance of Load Balancing Using Genetic Algorithm in Cloud Computing". In the proposed work comparison of different techniques are done and observed. By observing the system we can conclude that the GA selected processors on the random basis and performs the GA over that here the processor higher fitness value are taken for use and the VM there having lowest fitness value are left as so. Simulation done using cloud simulator and results are displayed according

to the DCs and variation of virtual machines. Different algorithm compared are SHC, RR, FCFS algorithm for overall response time and processing time.

Task Id	Overall Response Time and Processing time		
	Start Time	Time	Finish Time
7	517.44	0.1	517.54
2	535.64	0.1	535.74
12	757.6	0.1	757.7
11	787.77	0.1	787.87
1	833.73	0.1	833.83
6	883.44	0.1	883.83
3	1057.69	0.1	1057.79
9	1067.97	0.1	1068.07
5	1096.63	0.1	1096.73
13	1127.4	0.1	1127.5
8	1161.14	0.1	1161.24
10	1254.87	0.1	1254.97
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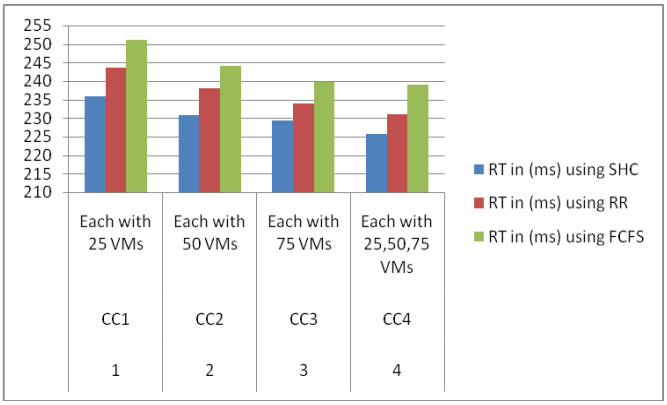
15	0.85	0.02	1.51
20	1.04	0.06	1.51
25	1.21	0.11	1.51

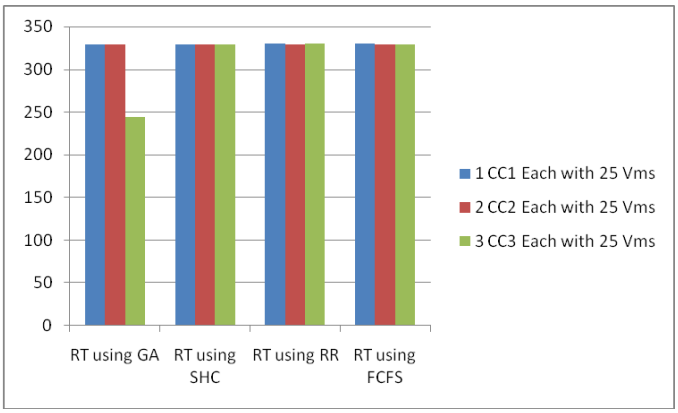
Cloud Confi-guration	Overall Average Response Time Using Five Data Centers				
	DC Specifi-cation	RT using	RT using	RT using	RT using

Cloud Confi-	Overall Average Response Time Using Five Data Centers				
		GA	SHC	RR	FCFS
CC1	Each with 25 Vms	329.01	329.02	330	330.11
CC2	Each with 25 Vms	328.97	329.01	329.42	329.42
CC3	Each with 25 Vms	244.00	329.34	329.67	329.44

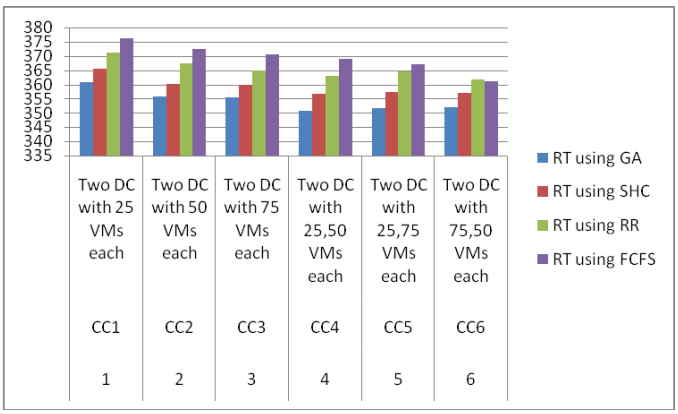
Cloud Confi-guration	Result comparison of GA with SHC, RR, FCFS using one data center				
	DC Specification	RT using GA	RT using SHC	RT using RR	RT using FCFS
CC1	Two DC with 25 VMs each	360.77	365.44	371.27	376.34
CC2	Two DC with 50 VMs each	355.72	360.15	367.49	372.52
CC3	Two DC with 75 VMs each	355.32	359.73	364.78	370.56
CC4	Two DC with 25,50 VMs each	350.58	356.72	362.91	368.87
CC5	Two DC with 25,75 VMs each	351.56	357.23	364.45	367.23
CC6	Two DC with 75,50 VMs each	352.01	357.04	361.61	361.01



Comparison of Data Centers Processing Time for Round Robin Load Balancing



Overall average Response Time (RT) using five data center



Result comparison of GA with SHC, RR, FCFS using one data center

VI. APPROCHES USED

Round robin Algorithm: Round Robin (RR) algorithm concentrates on the decency. RR utilizes the ring as its line to store employments. Every occupation in a line has the same execution time and it will be executed thus. On the off chance that work can't be finished amid its turn, it will be put away back to the line sitting tight for the following turn. The upside of RR algorithm is that every occupation will be executed thusly and they don't need to be sat tight for the past one to get finished. Be that as it may, if the heap is observed to be overwhelming, RR will take quite a while to finish every one of the employments. The disadvantage of RR is that the biggest employment sets aside enough time for completion.

$$RST[T_I] = BT[T_I] - \sum_{K=1}^{Q-1} TQ[k]$$

First Come First Scheduled: FCFS for parallel preparing and is going for the asset with the smallest holding up line time and is chosen for the approaching task. Assignment of utilization particular VMs to Hosts in a Cloud-based server farm is the obligation of the virtual machine provisioned segment. The default arrangement executed by the VM provisioned is a direct approach that designates a VM to the Host in First-Come-First-Serve (FCFS) premise. The disadvantages of FCFS is that it is non preemptive. The most brief assignments which are at the back of the line need to sit tight for the long errand at the front to complete .Its turnaround and reaction is very low.

$$c_{opt} = c_s = \frac{1}{2}\left(\max_{i \in T}\{t_i^2\} + \sum_{i \in T} h_i^2\right)$$

Generalized Priority Algorithm: Customer characterizes the need as per the client request you need to characterize the parameter of cloudlet such as size, memory, transmission capacity planning strategy and so on. In this procedure, the errands are at first organized by size such that one having most highest size has most highest rank. The Virtual Machines are additionally positioned (organized) by MIPS esteem such that the one having most elevated MIPS has the most noteworthy rank. Hence, the key variable for organizing assignments is their size and for VM are their MIPS. This arrangement is performing superior to anything FCFS and Round Robin scheduling.

$$F_i^k = \frac{1}{p_i} + \max\{F_i^{k-1}, F(a_i^k)\}$$

VII. CONCLUSION

In cloud computing environment, the random accomplishment of tasks with random utilization of CPU service time requirements can burden a specialized resources to a huge level, while the other resources are unemployed or are less loaded. Load balancing is a methodology to distribute caseload across number of computers, or other resources terminated the network. In this load balancing the major issue is about response time by the servers too different clients available in the network. The servers use the virtual machines on the system for different purposes. Bandwidth and number of jobs have been defined for every virtual machine available in the network. I am studied various techniques cloud computing .in this paper review of work how to use for secure network.

VIII. REFERENCES

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