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Enhance Dynamic Heterogeneous Shortest Job □ rst (DHSJF): A Task Scheduling Approach for Heterogeneous Cloud Computing Systems

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Abstract: *Cloud computing offers utility-oriented IT services to millions of users concurrently. Cloud computing is acting at leading role in world's technical industry .Cloud Computing demand growing drastically, which has imposed cloud service provider to make certain proper resource utilization with less cost and less energy consumption. In paper present ,Tasks are scheduled in such a way to reduce the actual CPU time and mostly system execution time or unlike consolidation problems initiate in cloud computing related to the, task ,VM and server consolidation. Thes problems develop to be challenging for resource utilization in cloud computing. Scheduling of independent, uneven length tasks in the concern of low energy consumption, CPU utilization and makespan using shortest job first algorithm is discussed. Energy reserves are achieved by continuous consolidation of VMs according to present utilization of resources. The objectives of this research are to create Simplified Energy Efficient models for physical systems and virtual machines by monitoring their resource utilization.*

Keywords: *Cloud computing; Shortest Job First Scheduling; Load Balancing; Resource utilization; Makespan; Energy-efficient;*

I. Introduction

Cloud computing conventionally uses to provide infrastructure, platforms, software and data as a service. It offers three service model Saas, Paas and Iass. computing technology is a new way in Cloud Computing .for that uses the central remote servers and Internet to maintain data and application. a lot of virtual machines(VM) will persist to run concurrently in the cloud, when a testing machine is overloaded, cloud computing dynamically transfers its load into a number of virtual machines[1]. Migration is defined as the process of transferring the virtual machine from a physical machine to the load. Cloud provides two services over the public and private network.

The cloud environment has a number of heterogeneous resources hosted in data centers in different locations. data centers have a large number of physical machines, which enclose Virtual Machines (VM). Each VM has a definite configuration of processing power, communication bandwidth ,RAM and storage related with it. So customers do not involve purchasing some hardware and software[2].

Cloud computing (CC) has two different components firstly Provider and second User. The Provider receives the users' tasks and user submits the task to provider for execution, the task execution at a definite data center and user receive the result from data center. Load Balancing is an important issue in cloud computing. The cloud platform has the ability to scale up and down any time . resembles of task scheduling is the key issue in cloud computing ,task scheduling is the key issue. Set of policies that manage the arrangement of processing tasks that is represented in cloud computing system called scheduling. because of huge number of users, large scale tasks are involved. In every task of there is a execution time based on the capability of the vm to which it is located without violating the precedence constraints. The scheduling algorithm assigns the tasks to the suitable and available resources in the cloud environment[3].In other word it might be said that tasks scheduling considered as one of the important components of cloud environment, as it maps the users' tasks to app performance of the cloud computing environment The nature of this dynamic environment required an efficient load balancing and task scheduling to reduce the time of response, completion time (makespan), energy consumption and the services interruption. It provides also high availability when the components are in non-responsive mode . The balance scheduling algorithms were proposed to schedule the load between the resources in cloud computing system for the achievement and enhancement of the optimized results as a whole[4].

Following four layers of cloud computing system architecture contains four layers:

1) User Interface: user Interface is define cloudlets, where the application services uses cloudlets that require to be executed on virtual machines.

2) VM Services: This layer is dependable for running the virtual machines services, creating the virtual machine and cloudlets execution.
3) Cloud Services: Various Cloud services on internet like resource utilization, task consolidation, load balancing and virtual machine management.
4) Cloud Resources: Cloud Resources is a physical computing servers termed like host, cloud services provides processing ability in terms of memory ,MIPS, network and bandwidth.

II. User Interface

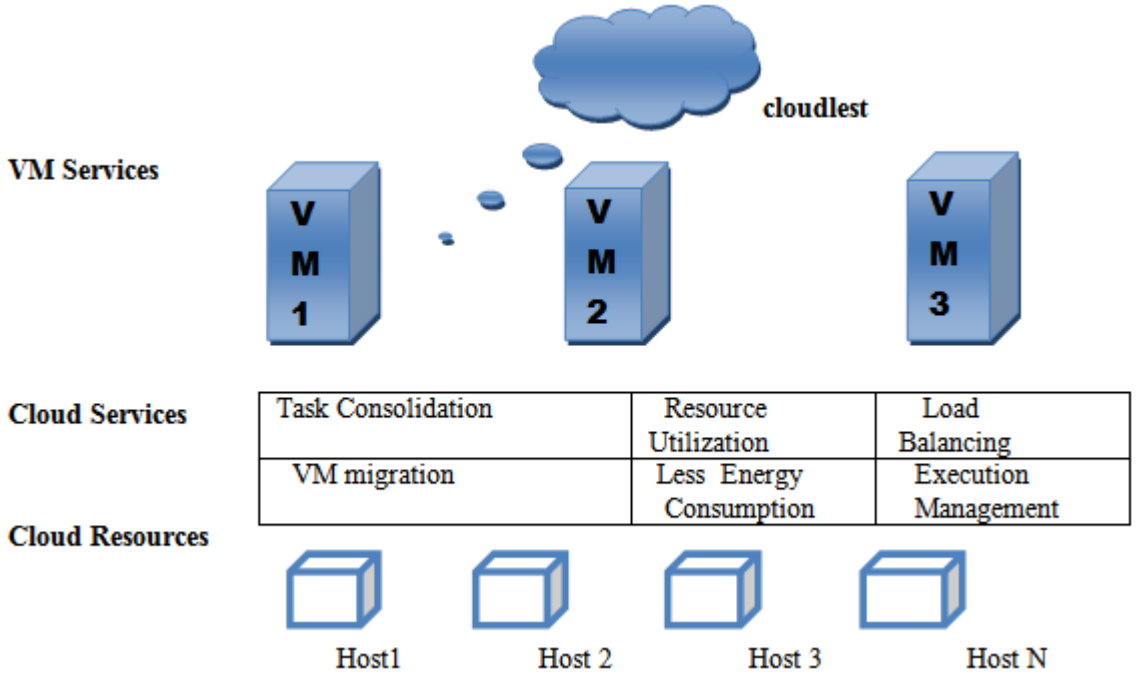

Fig 1: System Architecture

III. Algorithm In Scheduling

A] Round Robin

Round-robin (RR) is a algorithms working by procedure and network schedulers in computing. As the term is generally used, time quantum are assigned to each job in identical portions and in circular organize, managing all processes not including priority . Round robin scheduling is easy to implement ,simple and starvation-free. Round-robin scheduling can also be useful to data packet scheduling in computer networks. It is an Operating System concept. A round-robin scheduler generally employs time-sharing, giving each job a quantum (its grant of CPU time), and interrupting the job if it is not completed by then. The job is resumed next time a time slot is assigned to that process. If the process terminates or changes its state to waiting during its attributed time quantum, the scheduler selects the first process in the ready queue to execute

B]Shortest-Job-First Scheduling

A different approach to CPU scheduling is the shortest-job first (SJF) scheduling algorithm. This algorithm associates with each process the length of the process's next CPU burst. When the CPU is available, it is assigned to the process that has the smallest next CPU burst. If the next CPU bursts of two processes are the same, FCFS scheduling is used. As an example of SJF scheduling, consider the following set of processes, with the length of the CPU burst given in milliseconds:

SJF scheduling algorithm to minimize the energy in a cloud computing which is totally based on enhancing the green scheduler which performs the work load consolidation on a minimum server in green cloud computing by the help of executing task which have minimum arrival time. In paper presents a data center scheduling approach that helps in reducing the power consuming and achieves balance between the two factors energy efficient and performance. The author has used green cloud simulator for the experimental results for simulation work they use domain name system scheme for minimizing energy consumption. The applied algorithm reduces the energy in server up to 33.99%, in switch energy 49.65% and data center 38.04%. Its reduce energy consumption in all the components of cloud computing.

IV. Literature Survey

Sr, no	Tital	Author/year	Simulator	Parameter	Algorithm	Observation
1	Algorithm for task consolidation in cloud computing a Comparative Survey [4]	Rajat Pugaliya*1, Prof. Madhu B R (2018)	cloudesim	resource utilization	FCFS, priority queue, round robin, first fit, genetic algorithm,	In these papers got many techniques,algorithms and different methods to maximize the resource utilization like DCOA, Max Util and ECTC algo
2.	Load Balancing in Cloud Computing Environment Using Improved Weighted Round Robin Algorithm for Nonpreemptive Dependent Tasks[5]	D.ChitraDeviand V.RhymendUtharaiaraj(2015)	cloudesim	Load balancing completion time	weighted round robin	In these paper The load balancer of these algorithm runs at the end of each task's completion and the load distributed across all the VMs at the end of each task's completion.
3.	A Dynamic and Energy Efficient Greedy Scheduling Algorithm for Cloud Data Centers.[6]	Mrudula Sarvabhatla Swapnasudha Konda Chandra Sekhar Vorugunti (2017)	cloudsim	Energy Efficient	Greedy algorithm	In these paper to achieves optimal avg task response time and total energy cost metrics.
4.	Reducing Energy Consumption With Cost Budget Using Available Budget Pre assignment in Heterogeneous Cloud Computing Systems[7]	Yukun Chen,Guoqi Xie,and Renfa li(Senior Member, IEEE)march 2018	cloudsim	Minimize Energy consumption	MSLBL algorithm	In these paper to introduce the available budget preassignment method to reduce the energy consumption
5	A Comparative Study on Job Scheduling Algorithm Augmenting Load Balancing in Cloud Computing[8]	Aswathy B Namboothir,Dr. R. Joshua Samuel Raj 2016	cloudsim	Response time Throughput Resource Utilization	Throttled Load Balancing, Minmin Algorithm, SHC, GA, Ant Colony Optimization, Honey Bee Behavior Algorithm	Genetic Algorithm gives better Performance than others. Throttled Load Balancing reduces the response time when each VM works quickly
6	A Genetic Algorithm inspired task scheduling in Cloud Computing[9]	Mohit Agarwal, Dr. Gur Mauj Saran Srivastava 2016	CloudSim	Execution Time	Genetic Algorithm	In genetic algorithm Execution Time with different task s configuration is less by Genetic Algorithm based-Search approach from First come First Serve and Greedy based.
7.	Effective resource utilization in cloud environment through a dynamic well-organized load balancing algorithm for virtual machines[10]	M. Vanitha, P. Marikkannu 2017	cloudsim	Power Utilization of servers	Dynamic well organized load balancing (DWOLB)	dynamic well-organized load balancing is capable of reducing power consumption by approximately 25% in comparison with other load balancing technique
8.	Ant colony	Guo Xin 2016	cloudsim	Makespan	Genetic	In these paper the

	optimization algorithm for computing resource allocation based on cloud computing environment[11]				Algorithm	simulation results, in the cloud computing provides less Time Cost per ms than others.

V. Observation

- E.Iniya Nehru et al. proposed a priority-based algorithm, they checked each task according to different algorithms and calculated their waiting time. The waiting time average compared to First Come First Serve scheduling algorithm is lower. It means that Shortest Job First Scheduling algorithm is more efficient than the First Come First Serve algorithm [14].
- Ranjan Kumar Mondal et al. proposed an efficient scheduling algorithm for load balancing, providing an improved techniques among efficient task scheduling to reduce the RT and increase the availability of virtual machines to assign new tasks from requesting users [15].
- Rashmi et al. proposed an efficient technique for load balancing for reducing the Response Time (RT) to execute the task that comes from different customers of cloud environment. This technique of SJFST provides an effective balancing technique for minimizing the RT to process the job requests received from different customers of the cloud[16]

VI. Challenges

In cloud computing environment, load balancing is an important issue which affects the performance of cloud service provider. Some of the challenges are faced in static methods:

- Proper resource utilization.
- Reduces makespan.
- Reduces overhead from resource.
- Balance proper load over resource.
- Increase throughput and system performance.
- Better CPU utilization.
- Minimize turnaround, waiting and response time

VII. Proposed Methodology

The proposed algorithm contains three main Block: first Block represents user side (tasks), second block contains the broker (balancing scheduling) and the third Block represents the service provider. The main components are illustrated in Fig.1. Data center helps to manage several hosts in a CC system. Host is one of the important components which is a physical computing server in a Cloud. We can create any number of hosts in a data center based on datacenter capacity. Each host can has its own configuration and resources like CPU, bandwidth, RAM (in MB), and storage. The other component is Virtual Machine. It is possible to create any number of virtual machines on host with different computational capabilities according to host capacity. Each virtual machine has its own configuration and resources also. Cloud provider is responsible for delivering computing and services to the users and managing the scheduling and balancing with the cloud broker based on the resources available. Cloud Broker is another component which is working as mediator between users and providers. Task is the user request. It is an independent and computational one. Each task has its own configuration and resources like task length, id, and number of processing element (CPU) required.

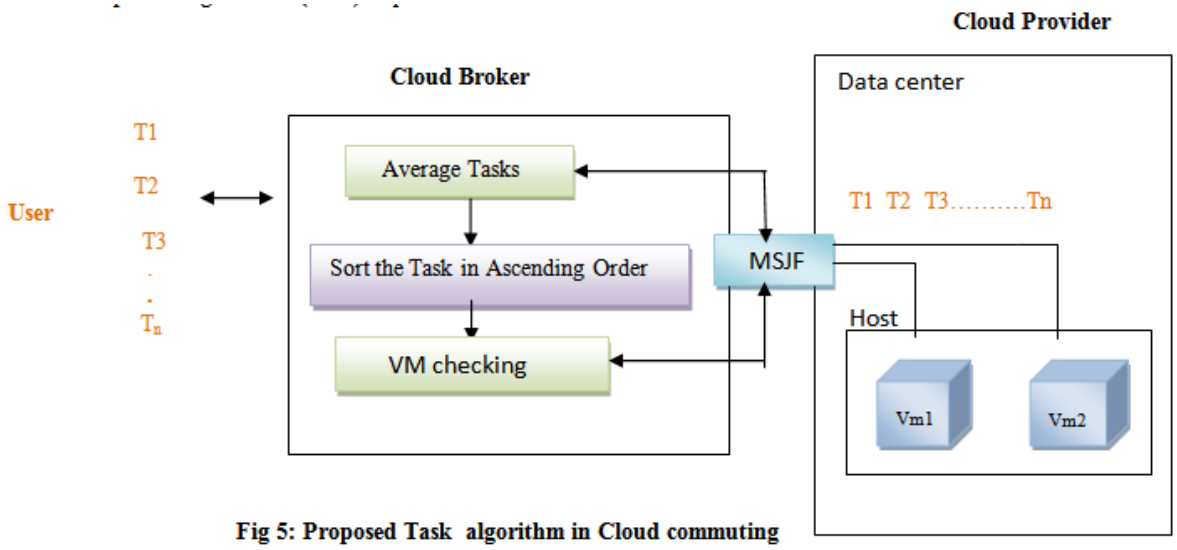

Fig 5: Proposed Task algorithm in Cloud commuting

VIII. Conclusion

In this paper different scheduling algorithms of cloud computing based on apparent scheduling parameters like resource utilization, response time, makespan, energy Efficient load balancing and results have been compared and analyzed. There are some disadvantages in some scheduling algorithm, like many of algorithms minimize response time but lacks in utilization of resources, increases cost and waiting time in case of load imbalance on Virtual Machines thus need of new algorithms which considers like utilization, consistency and accessibility. Proposed work can be implemented with many parameters. our propose a better solution to maximize the resource utilization in task consolidation with less energy consumption and less cost. SJF algorithm provides enhanced performance in terms of low energy consumption and reduced makespan.

References

[1]. Ekta Rani , Harpreet Kaur "Study on Fundamental Usage of cloudsim simulator and Algorithm of Resource Allocation in cloud Computing "July 3-5, 2017, IIT Delhi, Delhi, India.
[2]. Sonam Seth1, ipur Singh2 "Dynamic heterogeneous shortest job first (DHSJF): a task scheduling approach for heterogeneous cloud computing systems" April 2018.
[3]. Mokhtar A. Alworafi , Atyaf Dhari , Asma A. Al-Hashmi An Improved SJF Scheduling Algorithm in Cloud Computing Environment 2016 International Conference
[4]. Rajat Pugaliya *1, Prof. Madhu B R "Algorithm for task Consolidation in cloud computing" Pugaliya et. al., (Iss.5): May 2018 .
[5]. D.ChitraDeviandV. "Load Balancing in Cloud Computing Environment Using Improved Weighted Round Robin Algorithm for Nonpreemptive Dependent Tasks" RhymendUthariaraj(2015).
[6]. Mrudula Sarvabhatl, Swapnasudha Kond "A Dynamic and Energy Efficient Greedy Scheduling Algorithm for Cloud Data Centers" Chandra Sekhar Vorugunti (2017) .
[7]. Yukun Chen, Guoqi Xie,"Reducing Energy Consumption With Cost Budget Using Available Budget Preassignment in Heterogeneous Cloud Computing Systems" AND RENFA LI, (Senior Member, IEEE)march 2018
[8]. B Aswasthy Namboothiri and Joshua Dr. R. Samuel Raj, "A comparative study on Job Scheduling Algorithm Augmenting Load Balancing in cloud," in 2016 second International Conference on scinence Technology Engineering and Management(ICONSTEM), 2016.
[9]. Mohit Agarwal and Dr. Gur Mauj Saran Srivastava, "A Genetic Algorithm inspired task scheduling in Cloud Computing," in International Conference on Computing, Communication and Automation (ICCCA2016), 2016.
[10]. M. Vanithaa and P. Marikkannu, "Effective resource utilization in cloud environment through a dynamic well Organised load balancing algorithm for virtual machines," Computers and Electrical Engineering, 2017.
[11]. Guo Xin, "Ant Colony Optimization Computing Resource Allocation Algorithm Based on Cloud Computing Environment," 2016.
[12]. Dhinesh Babu L.D., P. Venkata Krishnab 2013 Honey bee behavior (HBB)inspired load balancing(LB) of tasks in cloud computing environment
[13]. Kousik Dasgupta, Brototi Mandal, Paramartha Dutta, Jyotsna kumar Mondal, and Santanu Dam, "A Genetic Algorithm (GA) based Load Balancing Strategy for Cloud Computing," First International Conference on Computational Intelligence: Modeling Techniques and Applications (CIMTA) 2013, 2013
[14]. Nehru, E. Iniya, Saswati Mukherjee, and Abhishek Kumar. "Deadlinebased Priority Management in Cloud." Artificial Intelligence and Evolutionary Algorithms in Engineering Systems. Springer India, 2015.
[15]. Mondal, Ranjan Kumar, Enakshmi Nandi, and Debabrata Sarddar. "Load Balancing Scheduling with Shortest Load First." International Journal of Grid and Distributed Computing 8.4 (2015): 171-178.
[16]. Srinivasan, Rashmi KrishnaIyengar, V. Suma, and Vaidehi Nedu. "An Enhanced Load Balancing Technique for Efficient Load Distribution in Cloud-Based IT Industries." Intelligent Informatics. Springer Berlin Heidelberg, 2013. 479-485