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Scheduling of Load Balancing in Cloud Computing: Review

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ABSTRACT
Cloud computing provide various services to its user within less amount of time as well as minimum cost. Therefore large number of user sends their request but there is no sufficient servers are available in cloud datacenter. This issue shows load balancing problem in cloud datacenter. To solve this issue an effective scheduling techniques are used. Among various scheduling technique task scheduling is an important mechanism to solve load balancing problem and in this paper we focused various task scheduling techniques that are used to solve the load balancing problem.
Keywords: Cloud computing, load balancing, server

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I. INTRODUCTION

Cloud computing is a web based technology that provide various services that user wants. These services are offered by cloud datacenter where it contains various server and by applying virtualization technique these servers are divided into number of virtual machines (VMs) [1]. Due to dynamic nature of cloud computing the number of incoming requests are greater than available server or VMs. So, load balancing problem is arises. To solve this problem an effective scheduling technique is used. Most of all there are two type of scheduling technique are available in cloud computing. Such as, resource scheduling and task scheduling. Resource scheduling is applying in between server and VM but task scheduling is applying in between VMs and task. Resource scheduling is known as host scheduling and task scheduling is known as VM scheduling. But this paper is focusing only task scheduling approach to solve load balancing problem. Figure 1 is shows scheduling technique in cloud computing model.

The remainder of the paper is organized as follows. Various scheduling approach is described in Section 2. Comparison between varioustechniques is described in Section 3. The Results and Discussions are explained in Section 4. The paper is summarized in Section 5.

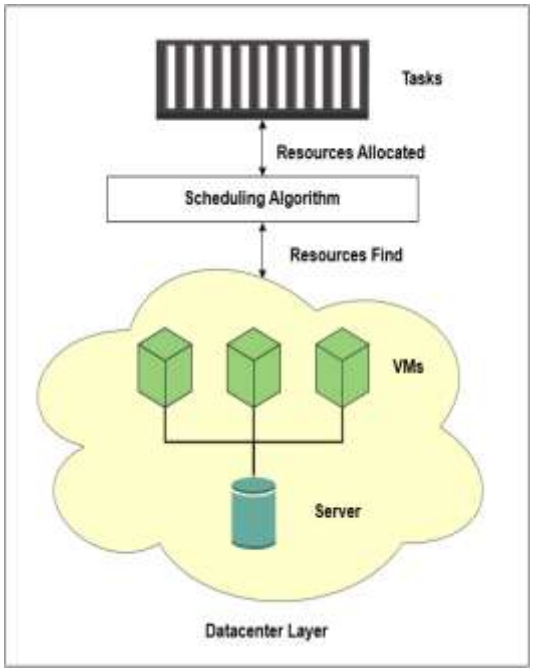

Fig.1. Scheduling technique in cloud computing model

II. TASK SCHEDULING

As we know that it is an effective method to solve the load balancing problem for this concept it is basically divided into three part, such as heuristic, meta-heuristic, and hybrid approach [2]. After the task allocation into datacentre then

task scheduling is responsible to equally distributed among the available VMs that no VM is overloaded or underloaded condition. Also, it is responsible to optimize various load balancing parameters such as makespan time, execution time, response time, resource utilization, energy consumption etc.

2.1Heuristic Scheduling Algorithm

A heuristic algorithm is used to solve a problem in quickly and efficiently manner. But the biggest drawback is that it cannot solve difficult optimization problems. However, it is still noteworthy because identifying it does not require a prohibitively long period of time. Various heuristic algorithms appeared in Table 1.

2.2Meta-heuristic Scheduling Algorithm

Metaheuristic is a higher-level technique for discovering, creating, or selecting a good solution to an improvement problem. It is capable of solving huge and complicated computational problems [10]. Table 2 shows how different meta-heuristics are applied in the cloud context to tackle NP-hard problems.

2.3 Reward Function

Hybrid scheduling algorithm is the combination of different scheduling approach also combination of various machine learning approach. Various hybrid scheduling is employed in the cloud environment to tackle NP-hard problems, as shown in Table 3.

III. COMPARISON

This section generally shows the basic comparison between three different types of task scheduling approach. Table 4 shows the comparison between task scheduling approaches. Various heuristic algorithms with their favorable circumstances and constraints.

Table 1

Various heuristic algorithms with their favorable circumstances and constraints.

Citation	Algorithm	Advantage	Disadvantage
[3]	DHSJF	Reduction the normal reaction time.	Difficult to foresee the burst time.
[4]	Modified RR	Reduces the average waiting time	Switching problem arises.
[5]	TMA	Reduce Response time & Processing Time	Starvation arises
[6]	LBHM	Reduce Response Time, Processing Time & Algorithm Cost	Required more space
[7]	Improved SJF	Minimize both the completion time and response time.	Required more focused on deadline constraint.
[8]	WRR	Reduce makespan time	Dynamic constraint arises.
[9]	Improved Load Balancing	Decrease the makespan and increment the resource usage.	Not practically implemented.

Table 2
VariousMeta-heuristic algorithm with their favorable circumstances and constraints.

Citation	Algorithm	Advantage	Disadvantage
[11]	MPPSO	Find an optimal solution in dynamic environment	Energy constraint is not considered
[12]	LBMPSO	Minimizes makespan time and improve utilization of resources	Bi-objective constraint
[13]	GLMPSO	Minimizes makespan time	Single objective constraint
[14]	PSO-COGENT	Reduce execution time and cost but maximize the throughput.	Less fault tolerance.
[15]	ACO	Minimizes the execution time and improve utilization of resources.	Less reliability.
[16]	ACO	Reduce the makespan time	Algorithm work only for independent tasks
[17]	ACO	QoS parameters are satisfied.	Less secure.
[18]	ABC	Improve cost, time and resource utilization	Conflict in calculation.
[19]	BPSO	Reduce makespan time and cost.	Less reliability and take high execution time.
[20]	GA	Minimize the completion time and cost of tasks.	Less parameter is taken to achieve QoS.
[21]	SAMPGA	Improve completion time, convergence speed and degree of load imbalance.	VM migration approach is time consuming.
[22]	SA	Quickly find the optimal approximate solution.	Less efficiency and success rate

Table 3
Hybrid algorithms with their favorable circumstances and constraints.

Citation	Algorithm	Advantage	Disadvantage
[23]	ABPS	Limited makespan, cost, and expanded asset use.	Less security.
[24]	PEFT and HEFT with ACO	Minimizing the total makespan and cost	Fitness function is not discussed.
[25]	DRLPPSO	Decrease energy consumption and makespan time	Bi-objective constraint
[26]	HPSOAC	Decrease energy consumption and makespan time but increase resource utilization	Idle server energy constraint
[27]	TA & ESCE	Response Time, Processing Time, Cost	

Table 4
Comparison between various scheduling algorithms.

Objective	Heuristic	Meta-heuristic	Hybrid
Nature oriented	Static environment	Dynamic environment	Dynamic environment
Time complexity	Less in static environment	Less in dynamic environment	More as compare to other
Space complexity	Less	Less in dynamic environment	More as compare to other
Accuracy	Better in static environment	Better in both static and dynamic environment	Better in both static and dynamic environment

IV. RESULT AND DISCUSSION

This section presents the findings of a comparative examination of various task scheduling algorithms with different parameters in cloud computing. Figure 2 depicts various tasks scheduling approach. From this figure it is clearly shows that metaheuristic approach is more useful scheduling approach than other two approaches but in recent time various hybrid scheduling approach as well as different machine learning approaches is used to solve the load balancing problem. Figure 3 shows different load balancing parameters where makespan time is an important parameters in task scheduling approach to balance the load in datacentre.

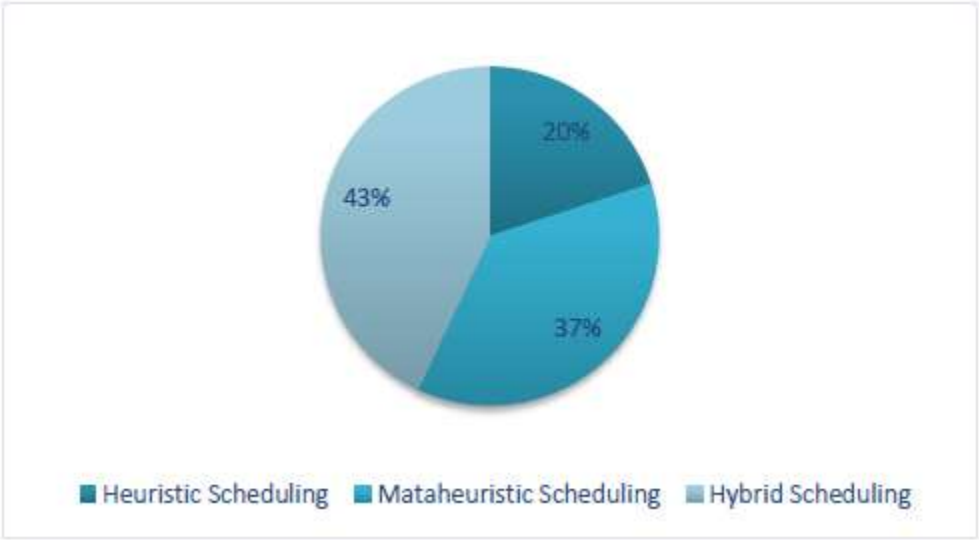

Fig.2. Percentage based on various scheduling algorithm

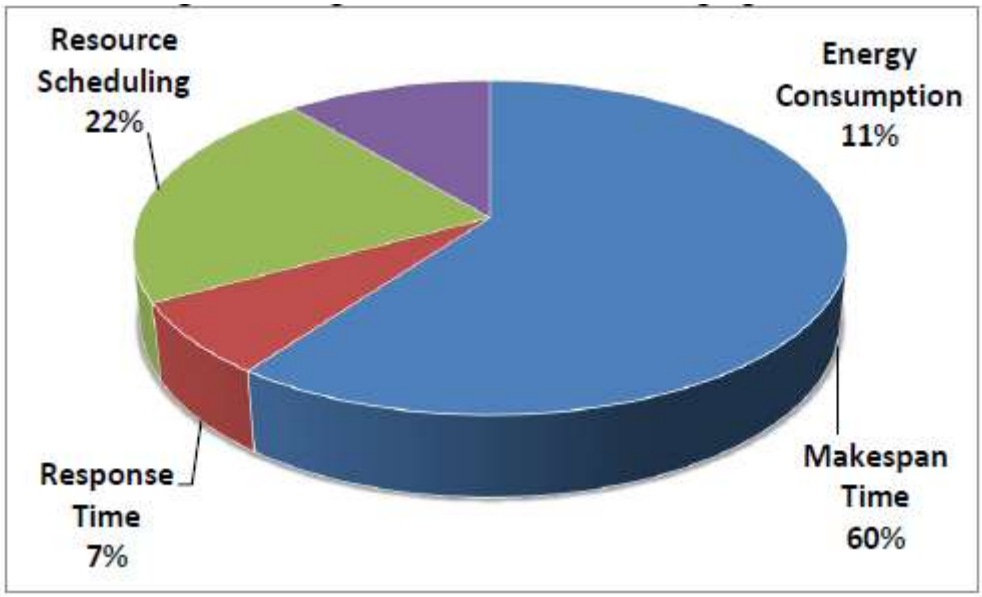

Fig. 3. Load balancing parameters

V. CONCLUSION AND FUTURE WORK

Cloud provides a good platform and infrastructure to its end user. Every one of the administrations offered by servers to clients is given by cloud service provider which is on a very basic level equivalent to filling in as the ISP in the electronic registering. Load Balancing helps appropriate use of resources and improve the presentation of the framework. It balances all workload requests by various resources among different PCs, frameworks or servers. Many research fields are available in task scheduling load balancing as mentioned in Table 1 to 3. The basic goals are to keep up framework solidness

and to improve framework execution. We have summarized the basic concepts of different scheduling algorithm in load balancing with their comparison. In future we would develop a hybrid based task scheduling load balancing algorithm to optimize different parameters.

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