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Survey on Task Scheduling Based Load Balancing in Cloud Computing

Satyaranjan Mishra[1], Arabinda Pradhan[2], Prasanta Kumar Bal[3], Sukant Kishoro Bisoy[4], Chinmay Parida[5]

[1]*Associate Professor, Dept. of MCA, Raajdhani Engineering College, Bhubaneswar, Odisha,*
[2]*Associate Professor, Dept. of MCA, Raajdhani Engineering College, Bhubaneswar, Odisha,*
[3]*Professor, Dept. of CSE, GITA, Bhubaneswar, Odisha, prasantakbal@gmail.com*
[4]*Professor, Dept. of CSE, C. V. Raman Global University, Bhubaneswar, Odisha,*
[5]*Assistant Professor, Dept. of MCA, Raajdhani Engineering College, Bhubaneswar, Odisha,*

ABSTRACT
Cloud computing offers its users a variety of services for a minimal cost and in a shorter period of time. As a result, a lot of people submit requests, but the cloud datacenter does not have enough servers. This problem demonstrates a cloud datacenter load balancing difficulty. An efficient scheduling method is employed to address this problem. Of the several scheduling techniques In order to solve load balancing problems, task scheduling is essential. In this study, we focused on a number of task scheduling techniques that do this.
Keywords: Cloud computing, load balancing, server

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I. INTRODUCTION

Users can request a range of services via cloud computing, a web-based technology. Several computers in the cloud datacenter that offers these services are divided into several virtual machines (VMs) using virtualization techniques (Pradhan et al., 2019). Because cloud computing is dynamic, there are more incoming demands than servers or virtual machines can accommodate. Thus, a load balancing issue occurs. An efficient scheduling method is applied to address this issue. Generally speaking, cloud computing offers two different scheduling methods. For instance, scheduling tasks and resources.

While task scheduling applies between VMs and tasks, resource scheduling applies between servers and virtual machines. Task scheduling is called virtual machine scheduling, and resource scheduling is called host scheduling. However, this paper solely discusses task scheduling as a solution to the load balancing issue. The cloud computing model's scheduling technique is depicted in Figure 1.

The remainder of the paper is organized as follows. Section 2: Scheduling tasks. The comparison of different scheduling approaches

is covered in Section 3. The Results and Discussions are explained in Section 4. The paper is summarized in Section 5.

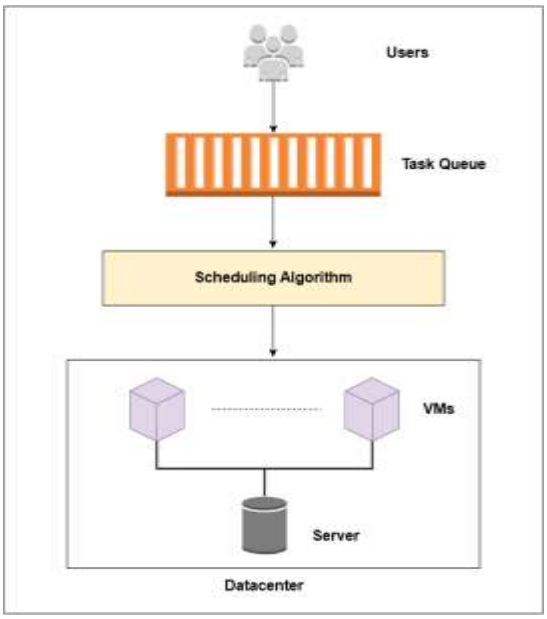

Fig.1. Scheduling technique in cloud computing model

II. TASK SCHEDULING

Task scheduling methodology, which can be divided into three main components—heuristic, meta-heuristic, and hybrid approaches—is an effective way to tackle the load balancing problem (Pradhan et al., 2022a). Following the assignment of tasks to the datacenter, task scheduling is in

charge of distributing them evenly across the available virtual machines (VMs) so that none of them are overcrowded or underloaded. Optimizing other load balancing metrics, including makespan time, execution time, reaction time, resource utilization, energy consumption, etc., is another of its responsibilities.

2.1 Heuristic task scheduling

A heuristic algorithm can solve a problem quickly and efficiently. The main disadvantage, however, is that it is unable to resolve complex optimization issues. It is still notable, though, because it does not take an unreasonably lengthy time to recognize. Table 1 had a variety of heuristic methods.

2.2Meta-heuristic task scheduling

The meta-heuristic is a higher-level technique for determining, creating, or selecting an efficient solution to an improvement challenge. Large and complex computational problems can be resolved by it (Pradhan et al., 2022b). Table 2 illustrates how several meta-heuristics are used to solve NP-hard problems in the cloud environment.

2.3 Hybrid task scheduling

A hybrid scheduling algorithm integrates several machine learning approaches with diverse scheduling techniques. NP-hard issues are addressed in the cloud context using various hybrid scheduling strategies, as shown in Table 3.

III. COMPARISON BETWEEN VARIOUS SCHEDULING

The basic comparison of three distinct task scheduling approaches is presented in this section. The comparison of the various work scheduling strategies is displayed in Table 4.

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 environments that are both static and dynamic

IV. RESULT AND DISCUSSION

The results of a comparative analysis of several scheduling methods are presented in this section. Different approaches to work scheduling are shown in Figure 2. This figure makes it evident that the metaheuristic approach is a more effective scheduling strategy than the other two. However, in recent years, several hybrid scheduling strategies and machine learning techniques have been employed to address the load balancing issue. Figure 3 illustrates several load balancing factors. Such as makespan time, energy consumption etc.

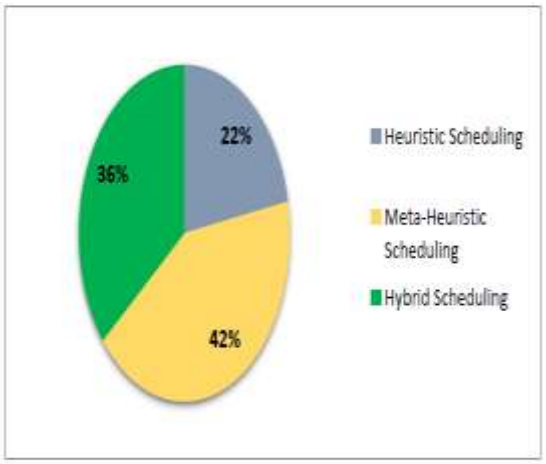

Fig.2. Percentage based on various scheduling algorithm **10%**

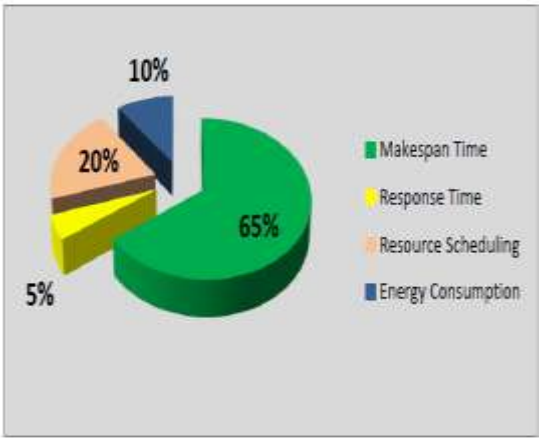

Fig.3. Load balancing parameters

V. CONCLUSION AND FUTURE WORK

The cloud provides its users with a good platform and infrastructure. All of the services that servers provide to clients are provided by cloud service providers, which is basically equivalent to filling out the ISP section on the online registration form. Load balancing makes the framework seem better

and makes it easier to use resources effectively. Based on varying resources, it divides up all workload requests among various PCs, frameworks, or servers. Task scheduling load balancing has several research fields, as Tables 1 through 3 demonstrate. The primary goals are to improve the framework's performance and preserve its stability. The basic concepts of a number of load

balancing scheduling algorithms have been assembled and compared. In the future, we would develop a hybrid-based task scheduling load balancing solution to optimize a number of characteristics.

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