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Hybrid Task Scheduling Algorithm in Cloud Computing: Review

Anamika Yadav[1], HrideshVarshney[2], Sarvesh Kumar[3]

[1,2,3] **Department of Computer Science and Engineering of BBD University, Lucknow, India**

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Corresponding author: Anamika Yadav

Abstract

The usage of centralized technologies, matching as garage, a imperative processing unit, and a network, shadow computing is sketched as dealing with data and offerings for individualities and agencies. Due to the fact inked- up visitors concerned in dealing with IT pocket, pall computing offers flexible/ adaptable budget, introduction, and scrimping of scale. For mixedmulti-core processors, the HTSTC method, a pass mission scheduling way predicated on venture clustering, is recommended. Assignment grouping, layering, calculating job rights-of-manner, and processor choice are the three critical factors of this technique. International magazine of innovative Computing, facts and manipulate, vol. The adulthood of evolutionary algorithms are adaptive heuristic hunt algorithms called heritable algorithms (fuel). Natural choice and genetics are the foundations of inherited algorithms.

Keywords: Cloud Computing, Hybrid, Task Scheduling, Genetic Algorithm

Introduction

Cloud computing has been enormous lately in numerous companies whilst cloud computing first emerged, it provided the desires of users to get right of entry to assets for computing want clients to be able to buy cloud services as wanted in the concept of sharing sources on call for through highly net-primarily based software. Depending at the issuer, cloud computing also can technique a wide variety of offerings. The customers' working structures are required [1]. Cloud Combining expended and resemblant computing with the sharing of pocket like software program and stuff is what is applied to as calculating .System with the intention to be used on a pay-as-you-move foundation [2]. Cloud computing has been tremendous lately in severa companies whilst cloud computing first emerged, it presented the wishes of customers to get right of entry to resources for computing want clients to have the ability to buy cloud services as needed within There are different cloud architectures. Software as a Service (SaaS) and platform as a carrier (PaaC) both represent consumer offerings through system interfaces (PaaS), and other services, into three layers [3]. (PaaS), which stands for the cloud's operating machine, and (three) infrastructure as a carrier (IaaS), which incorporates the hardware infrastructure, consisting of storage centers and network. Between SaaS and IaaS, the PaaS manages the records collection the community infrastructure [4]. The cloud deploys using one in all 3 foremost methods; the first method Is private cloud generation used [5].Certainly one of the most important problems with this task scheduling is a strategy [6]. Task transfers might be difficult to schedule due to differences in cloud centre specifications and storage capacity. switch pace of the processors, rate, and throughput [7]. Those variations ought to result in transfer. Workload, turnaround time, and useful resource usability effectiveness [8]. The dealer may want to based on to be had sources, offer offerings of unique sorts or mixtures of these

offerings. Rather than annoying complicated tenders, complicate the difficulty [9]. Pertinent resources may be reachable from several sources and customers can contend for the equal sources providers soliciting for providers, consumer submissions, and customer submissions [10] Cloud Development model represent aspecific type of cloud environment, primarily distinguished by ownership, size, size and access.

There are four common cloud deployment model in cloud computing :

- Public Cloud
- Community Cloud
- Private Cloud

Hybrid cloud

The following each section describe,

- Firstly I describe public cloud , Public cloud is a publically accessible cloud environment owned by a third -party cloud provider. The public cloud and its resources are created and continuously maintained by the cloud provider.
- Community Cloud : The only difference between a community cloud and a public cloud is that access to a community of cloud users is restricted. Unless the community allows it, parties outside the community rarely have access.
- Private cloud: A single company owns the private cloud. An organization can use private cloud technology to centralize access to its resources among various departments, locations, or parts of the organization.
- Hybrid clouds: A hybrid cloud is one that is made up of two or more distinct cloud development models. For instance, a cloud customer might decide to move sensitive data-processing cloud services to a private cloud and less sensitive cloud services to a public cloud [13].

- Private Cloud For communication-extensive DAGs with high communication-to-computation ratios, this method shows potential (CCR). Qi Tang et al. employed the duplicating approach to achieve this. Scheduled activities on a uniform platform[11].Specialised Pareto power Pareto evolutionary set of rules (SPEA) and the genetic algorithm (NPGA) are examples [15]. An method to trouble-solving known as a metaheuristic is the ABC set of artificial bee colonies rules. For an optimization response this is almost appropriate Karaboga evolved fee [12]. The ABC system resembles how bee colonies forage, which requires habitat and meals environments are tailored to numerous studies have proven that the ABC set of rules is beneficial in addressing troubles like the issue of the visiting salesman [13], and scheduling troubles within the process keep [14].

TRADITIONAL SCHEDULING ALGORITHM

Traditional scheduling algorithm, such as Round Robin, First- Come- First- Serve, and priority Scheduling, are widely used in cloud computing. However, these algorithms suffer from poor resource utilization and limited scalability. They also do not consider the heterogeneity of cloud resources and application requirements. [15]

Hybrid scheduling algorithm

Hybrid scheduling algorithm combine the strength of multiple scheduling algorithms to achieve better performance and resource utilization. They typically consider various factors such as workload, resource availability, and application requirements to make intelligent scheduling decisions.[16]

Genetic Algorithm-based hybrid scheduling

Genetic algorithm-based hybrid scheduling is another approach that combines genetic algorithm (GA) and traditional scheduling algorithms. GA is a search- based optimization algorithm that mimics the natural selection process to find the best solution. This algorithm evaluates the fitness of candidate solutions and selects the best one for further processing.[17]

Ant Colony Optimization-based hybrid scheduling

Ant colony Optimization- based hybrid scheduling is another approach that combines ant Colony Optimization (ACO) and traditional scheduling algorithm. ACO is a metaheuristic optimization

algorithm that is inspired by the behavior of real ant colonies. It uses pheromone trails to find the shortest path between two points.[18]

Particle Swarm Optimization-based Hybrid Scheduling

Particle Swarm Optimization-based hybrid scheduling is a third approach that combines particle Swarm Optimization (PSO) and traditional scheduling algorithm. PSO is a metaheuristic Optimization algorithm that is inspired by the social behavior of bird flocks and fish schools. It uses swarm intelligence to find the best solution. [19]

IV PERFORMANCE EVALUATION

The performance of hybrid scheduling algorithm is evaluated using various metrics such as make span, throughput, and energy consumption. Simulation-based experiments and real-world experiments are used to evaluate the effectiveness of hybrid scheduling algorithms.

One example of a hybrid task scheduling algorithm in cloud computing is the Genetic Algorithm-based Hybrid Scheduling (GAHs) algorithm. The GAHS algorithm combines the strengths of traditional scheduling algorithms with the search-based optimization capabilities of genetic algorithms to achieve better performance and resource utilization.

The GAHS algorithm works as follows:

Initialization: The GAHS algorithm starts initializing a population of potential scheduling solution, each representing a possible scheduling of tasks on available resources in the cloud .*Fitness Evaluation*: The fitness of each potential solution is evaluated based on various factor such as task completion time, resource utilization, and energy consumption.

Selection: The solution with the best fitness scores are selected for further processing. These solutions are considered as the "parents" for the next generation of potential solution.

Crossover: The selected solutions are combined through crossover, a process where parts of each parents scheduling solution swapped to create a new scheduling solutions.

Mutation: Some of the new solutions undergo a mutation process, where small random changes are made to the scheduling solution.

Fitness Evaluation: The fitness of the new solutions is evaluated, and the process repeats from step 3 until a satisfactory scheduling solution is found.

LIETRATURE REVIEW

Citation	**Table Column Head**		
	Propose solution	***Author***	***Tools***
[21]	The green optimization strategy for project scheduling proposed in this research is entirely based on MVO-GA, a hybrid multi-verse optimizer and genetic algorithm.	Muhammad Alkhrabsheh and Laith Abualigah	MATLAB distrusted system.
[22]	To address these issues, a hybrid approach to resource allocation security and efficient project scheduling in the cloud system learning (RATS-HM) approach is suggested in this study. The effectiveness is demonstrated by comparing the results to cutting-edge work methods.	Yuh-Chung Hu, KathiRavan, Sudhir Kumar Mohaptra, Tapan Kumar Das, and Prasanta Kumar Bal.	Cloudlet
[23]	This paper presents the problem of scheduling scientific workflows using a hybrid cloud architecture as a bi-objective optimization	Reza Noorian Talouki and	CloudSim

	problem. from the viewpoints of time and cost minimization. In order to enhance canonical SA.	Mirsaeid Hosseini Shirvani.	
[24]	It becomes critical to respond to these significant obligations. We propose a task scheduling strategy based on project precedence in this essay, focusing on the multi-goal task scheduling issue with clever production lines.	Yuanguo, Guanggjie Han, Feiqing Zhang, Yue Li, Chao Fan, OZhenyu Yin, and Fulong Xu.	Clou-Fog
[25]	As an independent cloud computing project scheduling method, this paper proposes the Multi-objective Challenge Scheduling Optimization based on the Artificial Bee Colony set of Rules (ABC) with a Q-getting to know Algorithm,	BOONHATAI KRUEKAEW, AND WARANGKHANA KIMPAN.	CloudSim
[26]	Given the current issues and constraints, this artwork enables the reader to select the appropriate scheduling algorithm that optimises strength well.	N. Mansouri, R. Ghafari, and F. Hassani Kabutarkhani	CloudSim
[27]	In the meanwhile, granular computing uses a granulation method to solve complicated problems. All of the numerical experiments performed on the CloudSim platform demonstrate that our technique has significant influence on the optimization of energy intake and is a useful set of scheduling guidelines for assignments.	Shuaishuai Liu, Xinyu Ma, Yuanfei Jia, and Yue Liu.	CloudSim
[28]	In order to reduce makespan, this research uses a new partial hostile-based population initialization approach that combines the tabu seek technique with a genetic set of criteria.	Suryono Suryono, Mustafid Mustafid, and Moch Saiful Umam.	CloudSim

Conclusion

In cloud computing, in order to address the scheduling issue, some of heuristic and meta-heuristic solutions were positioned forth. The scheduling difficulty receives more tough when there are extra responsibilities, virtual machines, and actual gadget. A well-known Genetic algorithm was stated to be trapped within the nearby surest consequences even though the meta-heuristics techniques failed to produce answers which might be close to perfect. The hybrid scheduling algorithms, which integrate the fine functions of two or greater algorithms to provide the best answer, have received popularity in latest years. In this take a look at, we review cloud computing's hybrid scheduling strategies. Most of the people of the hybrid algorithms that were advised were merged with the modern-day or altered Cat swaram Optimization, GA, and ACO variations. So, the usage of the mixed algorithms, we categorized the hybrid techniques. Findings screen that most people of hybrid.The maximum extensively used simulator for producing the simulation effects is CloudSim. Scheduling techniques used makespan and cost as an objective characteristic. Destiny proposals should include a hybrid set of rules this is greater multi-objective. Even though just a few works used the based duties,

this will nonetheless be researched in the future. The actual cloud surroundings may be used to check the hybrid algorithms. In the destiny, diverse meta-heuristic algorithm combinations can be capable of mimic more hybridization.

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