

A Review on Scheduling Issues in Cloud Computing

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ABSTRACT

Cloud computing has become very popular in recent years. Cloud computing deals with different kinds of virtualized resources, hence scheduling play significant part in cloud computing. Though the large amount of resources is available, but is must to schedule the resources in such a manner that each job can receive the resources for completing it. So the scheduling algorithms are needed by a cloud to arrange resources for executing jobs. There are various algorithms available that can used to schedule the resources for job execution. Thus the comprehensive way of dissimilar case of scheduling algorithms in cloud computing have been thoroughly covered in this review paper and related issues and challenges have been highlighted.

Keywords

Cloud Computing, Compromised-Time-Cost Scheduling Algorithm, Hybrid Energy Efficient Scheduling Algorithm, Optimized Resource Scheduling Algorithm, ANT Colony Algorithm, Energy Efficient Algorithm uses Migration, Improved Differential Evolution Algorithm, SHEFT Workflow Scheduling Algorithm, Cloud-DLS: Dynamic Level Scheduling Algorithm, Improved Cost Based Scheduling algorithm.

1. INTRODUCTION

The Cloud computing offers a distributed system concluded a network in which a course of study or any diligence work on many related computers at the same time .Cloud computing is a hosted service in which an end user can access the cloud based applications through the browser or any mobile application. [1]. National Institute of Standard Technology (NIST) detrmnes cloud computing is exact network approach. The major advantage of cloud computing in which we can pay-for-use for any software.

Cloud computing in other words is the allegory of the internet [2]. Cloud system consists of three service models based on the resource focus [3] i.e. PaaS, IaaS and SaaS. Platform as a Service (PaaS) provider offer several environments to users for development of applications. The user can develop applications according to their requirements. Infrastructure as a Service (IaaS) that provides virtualized computing resources over the Internet, and Software as a Service (SaaS) provides software or application on the internet and customer used these, with no knowledge of development or maintenance

In Cloud Computing user may face hundreds of thousands of virtualized resources to utilize, it is impossible for anyone to allocate the jobs manually. To allocate the resources to each job efficiently, scheduling plays more important role in cloud computing [4]. For a large number of simple tasks when they execute one by one in cloud system increments the price and the price is reduced if we have a modest number of composite tasks.

When the number of users in the cloud gets increased then the scheduling becomes difficult. Therefore, there is a need to go for a better scheduling algorithm than existing one. Since cloud computing the different kinds of researches is going on, The scheduling strategies proposed to overcome the problems between users and resources[5].

Moreover, the rest of the paper is organized as: Section II describes the various comparison parameters used. Section III presents various scheduling algorithms. Based on the literature survey, various open issues have been discussed in IV and the paper is finally concluded in Section V.

2. COMPARISON PARAMETERS

Various parameters have been used in this section to compare various scheduling algorithms:

2.1 Execution time

In which program is running and single instruction, such as addition or multiplication is carried out in the computer instruction.

2.2 Response time

The response time is the sum of the service time and wait time. Technically response time is the time of system takes to react to a given input.

2.3 Make span

Difference between the depart and close of a sequence of jobs.

2.4 Energy Consumption

It is the consumption of energy or power. It is also defined in some quarters as the use of energy as a raw material in the process of manufacturing utilities.

2.5 Throughput

It refers to how much data can be transferred from one location to another in a given amount of time.

2.6 Scalability

The increasing demands and growing amount of the work is known as scalability.

2.7 Resource utilization

Resource utilization is the use of a resource in such a way that increases through output. The sources used to perform a particular task.

2.8 Load Balancing

Load balancing is the most above-board method of surmounting away an application host base. As application need growths, new hosts can be easily summed to the imagination pond and the load balancer will instantly start posting traffic to the new host.

2.9 Fault tolerance

Fault tolerance is fixed every bit how to supply, by redundancy, avail following with the stipulation in hurt of faults causing happened or happening.

3. EXISTING SCHEDULING ALGORITHMS

3.1 Compromised-Time-Cost Scheduling Algorithm

Novel Compromised-time-cost execution along with the user input is proposed [6]. For user defined deadlines this work is focused on minimizing the price below user specified deadlines. It provides the just in time graph of the time cost relationship. The multiple concurrent instances of the dynamic cloud computing platform are used to change the schedule if the user wants.

3.2 Hybrid Energy Efficient Scheduling Algorithm

This algorithm based on pre-power techniques and least load first algorithm developed. The author proposed [7] Pre-power technique that is used to reduce the response time and it uses the idle threshold value. When the data centres are running in low power mode, then the least load first algorithm is used to balance workloads.

3.3 Optimized Resource Scheduling Algorithm

The author proposed [8] optimal use of resources by using virtual machines. It used Improved Genetic Algorithm (IGA). As compared to traditional GA scheduling method speed of the IGA was almost twice and utilization of resources is also larger. IGA selects optimal VMs by introducing dividend policy.

3.4 ANT Colony Algorithm

The author proposed a poised Ant colony algorithm [9] which uses a pseudo random proportional rule to poise the integral organization load while completing all the jobs at hand as soon as possible according to the environmental status. This algorithm balances the workload as well as minimizing the make span.

3.5 Energy Efficient Algorithm uses Migration

Author proposed a hybrid energy-efficient scheduling algorithm [10] using dynamic migration. In this paper powering down a busy node is not feasible using the threshold value. It uses the power up command to wake sleep nodes as well as the idle nodes. The expected spectrum set for the left capacity is used. Hence power efficiency is improved.

3.6 Improved Differential Evolution Algorithm (IDEA)

In [11] author proposed a scheduling algorithm which Optimize task scheduling and resource allocation based on the price and clock methods. It is a multi-objective optimization approach. This price model includes the treating, obtaining and clock model includes obtaining, treating and waiting time. This algorithm trusts the Taguchi method.

3.7 SHEFT Workflow Scheduling Algorithm

This paper [13] proposed the SHEFT (Scalable HEFT) scheduling algorithm that helps increasing and decreasing the number of resources at runtime. It provides facility to resources to scale at runtime, outperforms in optimizing workflow execution time. It scheduled a workflow in a cloud environment elastically. There was optimized execution time for the workflow.

3.8 Cloud-DLS: Dynamic Level Scheduling Algorithm

The Cognitive trust model is used in dynamic level scheduling (DLS) & hence trusts dynamic level scheduling algorithm is introduced in [14]. This paper focuses on trustworthiness in cloud computing. Because of the characteristics of cloud computing obtaining trustworthiness in computing resources is difficult. In this the two kinds of trust, i.e. direct trust degree, recommendation, trust degree is obtained to obtain the trusted scheduling and extends the traditional DLS algorithm.

3.9 Improved Cost Based Scheduling algorithm

In [15] paper author proposed the approach that is improved cost-based scheduling algorithm. It measured computation performance and resource cost. It also increased execution data transfer ratio by combining the tasks.

4. OPEN ISSUES

Based on the survey a scheduling fabric can be enforced by utilizing the different parametric quantities. The efficiency of the energy usage is main issue that took a lot concern. But Scheduling is unmatched issues in the management of diligence performance in a cloud environment. It must focus on cost, time, energy efficiency and load balancing of the data centres. Paleness imagination allotment sets a critical use in scheduling.

5. CONCLUSION

In this paper, we have sight several living scheduling algorithms in cloud computing. The table 1 is shown for promote quotations. A scheduling theoretical history should be enforced to amend the user satisfaction. We have used various parameters to make a comparison. The scheduling framework should consider the user input constraints execution time, energy efficiency, performance issues and make span so on. We also acknowledged that disk quad management is vital in practical surroundings. Hence, there is a demand to carry out a scheduling algorithm in cloud computing.

Table1: Comparison Between Existing Scheduling Algorithms Issues

Scheduling Algorithms	Execution Time	Response Time	Make Span	Energy Consumption	Through-put	Scalability	Resource Utilization	Load Balancing	Fault Tolerance
Compromised-Time-Cost Scheduling Algorithm	✗	✗	✓	✗	✗	✗	✗	✗	✗
Hybrid Energy Efficient Scheduling Algorithm	✓	✗	✗	✓	✗	✗	✗	✓	✗
Optimize Resource scheduling Algorithm	✓	✓	✗	✓	✗	✗	✓	✓	✗
ANT Colony Algorithm	✗	✗	✓	✓	✗	✗	✗	✗	✗
Energy Efficient Algorithm uses Migration	✗	✓	✗	✓	✓	✗	✗	✓	✗
Improved differential evolution algorithm (IDEA)	✓	✓	✓	✗	✗	✗	✓	✗	✗
SHEFT Workflow Scheduling Algorithm	✓	✗	✗	✗	✗	✓	✗	✓	✗
Dynamic Level Scheduling Algorithm	✗	✗	✗	✗	✗	✗	✗	✗	✗
Improved Cost Based Scheduling Algorithm	✓	✓	✗	✓	✗	✗	✓	✗	✗

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