Elysium Journal of Engineering Research & Management

P-ISSN: 2347-4408
E-ISSN: 2347-4734

A SURVEY ON TIME BASED CLOUD SCHEDULING

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Abstract - The current internet application and online task completion relies more on cloud environments. Cloud provides dynamic services are large scalable and virtualized resources over the Internet. In cloud computing environment job scheduling is important because user have to pay for time base resources. Due to the fast development of internet, task completion time increases over data centers every second. A good scheduling algorithm must minimize the execution time. To reduce the failure rate Score based algorithm is used. This paper explains the various scheduling algorithm and related issues to task completion time in cloud computing.

Index Terms- Cloud Computing, Scheduling, Algorithm.

1. INTRODUCTION

Cloud is widely considered as potentially the next dominant technology in IT industry in recent years, as it can deliver subscription-based services to users in the pay-as-you-go model. Cloud computing is one of the familiar latest technology which is developing drastically. Elastic execution environment of resources is cloud involving multiple stakeholders and providing a metered service at multiple granularities for a specified level of quality of service. Scheduling algorithms for cloud systems focus on two major parameters cost and time. cloud computing systems nowadays provide a easiest way to carry out the submitted tasks in terms of responsiveness, scalability, and flexibility problems on cloud computing. The actor is defined as the user responsible for creating and configuring the volume of tasks to be computed. Most methods balance loads in cloud by moving virtual machines, but this can involve high overhead time to complete the task. Time management is very important now a day. Using various methods of algorithm and services time taken to complete the task can be reduced.

A Cloud is a type of comparable and dispersed collection of system consisting of inter-related and virtualized computers that are enthusiastically presented as one or more shared computing resources based on service level provisions established through co-operation between the service provider and consumers[18].

A promising research direction, which applies modern heuristics [11] to scheduling on cloud computing.

2. SCHEDULING

Scheduling is the method by which assigning the work to resources that complete the work. The work may be virtual computation elements such as threads, processes or data flows, which are in turn scheduled onto hardware resources such as processors, network links or expansion cards.

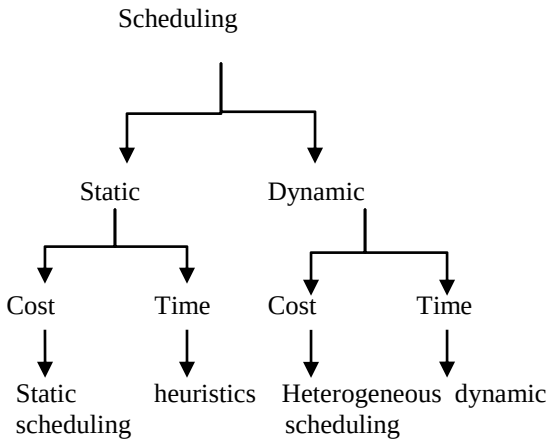

Figure no: 1 Types of Scheduling

2.1 Static Scheduling

Static Scheduling techniques provides flexible pricing model to the user, such as a tradeoff between different degrees of execution price, at the same time. The benefit of task scheduling algorithm is to attain a high performance calculating and the best system throughput. Scheduling achieves availability of CPU memory and good arrangement policy [5],and gives maximum utilization of resource.

2.2 Dynamic Scheduling

Dynamic scheduling is defined as a method in which the hardware determines which instructions to execute, as opposed to a statically scheduled machine, in which the compiler determines the execution order. In essence, the processor is executing instructions out of order. Dynamic scheduling is used in data flow machine, in which instructions don't execute based on the order in which they appear, but rather on availability of the source operands.

P-ISSN: 2347-4408
E-ISSN: 2347-4734

Dynamic scheduling machines can take advantage of parallelism which would not be visible at compile time. Dynamic scheduling is more versatile as code does not necessarily have to run efficiently be recompiled since the hardware takes care of much of the scheduling. Dynamic scheduling is also possible to rearranges CPU instructions to reduce stalls. Dynamic scheduling execute instructions in non-sequential order.
Dynamic scheduled tasks are processed on executing elements allocated at runtime.

3. TECHNIQUES IN SCHEDULING

Various techniques in scheduling related to cost and time are available.

3.1 Heuristic Task Scheduling

Heuristics scheduling provides an optimal solution in which it uses the knowledge based on time scheduling. Heuristic approaches can be either static or dynamic. First we will look at the static scheduling algorithms. Heuristic algorithm is to leverage the strengths of all low level algorithm which run low level algorithm [11] compared with the other scheduling algorithm used in both Hadoop and CloudSim.

3.2 Energy Efficient Task Scheduling Approaches

The time management of a data center depends upon various factors and task scheduling is a significant one among them. The various task scheduling algorithms are focused on the power consumption reduction, increasing energy efficiency, performance improvement and cost reduction. In three algorithms are given which mainly focuses [8] on how to handle a request from the users in heterogeneous systems. The first one is a benefit driven algorithm in which the tasks are assigned on the best server machines. Homogeneous systems here they are proposing two methods: power best fit algorithm in which they consider the machine with least power consumption increment as its choice for scheduling the task. They mainly focus on energy efficient job scheduling considering the traffic load balancing in cloud datacenters. They look on the traffic requirements of the cloud applications. In turn it minimizes congestion and communication delays in the network. In scheduling of tasks are done by combining network awareness and energy efficiency. It satisfies QoS requirements and improves job Performance. It reduces the number of computing servers and avoids hotspots. Network awareness is obtained by using feedback channels from the main network switches. This method has less computational and memory overhead. In an optimized scheduling strategy is implemented to reduce power consumption along with satisfying task response time constraints during scheduling. It is a greedy approach which selects minimum number of most efficient servers for scheduling.

The tasks are heterogeneous in nature so that they constitute different energy consumption levels and have various task response times. Optimal assignment is based on minimum energy consumption and minimum completion time of a task on a particular machine.

3.3. Hybrid Scheduling Algorithms:

Many of these algorithms are novel or are developed on the top of some existing methods incorporating more scheduling parameters to improve the performance. They schedule tasks based on their cost to different resources. The cost of services varies for different tasks based on their complexity. The algorithm considers resource time and processing capability of resources. They group tasks based on the processing capacity and selects some best resources to schedule them in such a way to reduce cost. This algorithm reduces the make span and the processing cost when compared to other scheduling method. In task's priority is calculated for scheduling them. Based on the different attributes of the tasks, priorities are calculated for the tasks and they are sorted. Then they assigned on the machine which produces the best completion time. hyper algorithm[11] improves performance to maintain the better completion time. The tasks are partitioned into various groups and they are replicated to local middleware of the system. It makes the system fault tolerant and load balancing improves response time and resource utilization. Lexis search method is employed here to schedule the tasks to various resources along with reducing the cost. The task is assigned based on a probabilistic measurement which is calculated based on the availability of the resource and execution time of the task. Load balancing reduces the overhead created at the scheduler in each resource. They develop an algorithm based on traditional min min algorithm which includes scheduling based on load of the servers as well as considering the user priority. The users are classified into two categories as VIP and ordinary users. Load is balanced based on the maximum loaded resource and the make span of the system. The method shows a good gain in user satisfaction, make span and resource utilization ratio. They give a modified algorithm for weighted least.

3.4 Hu-level scheduling algorithm:

Hu-level scheduling algorithm simply schedules available nodes with the highest level first. When there are more than available nodes with the same highest level than there are processors, a reasonable heuristic is to schedule the ones with the longest runtime first.

3.5 Resource Attribute Selection (RAS)

RAS considered the FCFS for parallel processing and are aiming at the reserve with the smallest waiting queue time and are selected for the incoming task are shown in Fig:2. The disadvantages of FCFS are that it is non-pre-emptive. The shortest tasks which are at the back of the

P-ISSN: 2347-4408
E-ISSN: 2347-4734

queue [9] have to delay for the long task at the front to finish .Its improvement and response is quite low.

Process	Arrival Time	Execute Time	Service Time
P0	0	5	0
P1	1	3	5
P2	2	8	8
P3	3	6	16

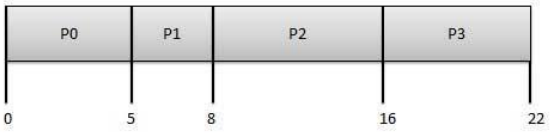

Figure no:2 FCFS Algorithm

3.6 Round Robin Algorithm

Round Robin algorithm focuses on the fairness. RR uses the ring as its queue to store jobs. Each job in a queue has the same performance time and it will be executed in turn. If a job can't be completed during its turn, it will be deposited back to the queue waiting for the next turn shown in fig:3. The advantage of RR algorithm is that each job will be executed in chance and they don't have to be waited for the previous one to get finished. But if the load is found to be weighty, RR will take a long time to complete all the jobs.

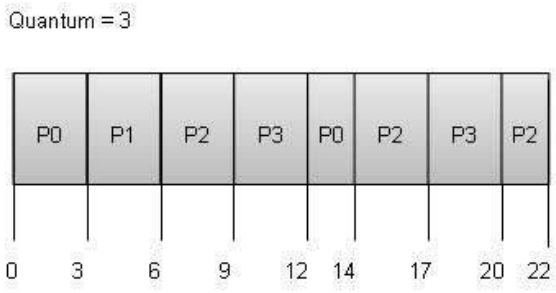

Figure no: 3 Round Robin Algorithm

3.7 Agent Based Task Scheduling:

Derived Min-Min and Max-Min Algorithms are two other heuristic methods used for task scheduling. Min-min heuristic selects the lowest task first from all the available tasks and gives it to a machine which gives the minimum completion time for that task. It growths the total completion time of all the tasks and hence increases the make span. But it does not consider load of the machines before scheduling as simply conveying smaller tasks on faster machines. Here the predictable completion job and completing time for a task are considered to be almost same values or close values. The long tasks have to wait for finalizing the execution of smaller ones. But the method improves the system's overall quantity.

3.8 Cloud Task Scheduling based techniques:

ACO algorithm is an accidental exploration algorithm, like other evolutionary algorithms. It replacements the performance of real ant colonies in nature to search for food and to attach to each other by pheromone laid on paths covered. Many investigators used Load Balancing An Colony Optimization algorithm to find the optimum standby allocation for each task in the dynamic cloud system. Not only does it minimize the kinds pan of a given tasks set but it also adapts to the active cloud computing system and balance the complete system.

4. EFFECTIVE TIME MANAGEMENT TECHNIQUES

4.1 Delegation

Delegation is the work of any responsibility or authority to the task to carry out specific activities. Delegation of work is used to save time and very important time management technique that can really help. Break the job into small steps that are easy to manage time. If one server do the work alone, it take more time to complete the job. Assign the job to another server, the job will be complete soon within the given time.

4.2 Procrastination

Procrastination is usually as a result of fear of fault or even success or believing that you cannot do things perfectly. For effective time management, they should thrive to tackle every problem head on no matter how tough the task may be. This will greatly save time.

5. SCHEDULING ISSUES IN CLOUD

5.1 Review in scheduling issues in cloud

Cloud computing has captured the attention of today's CIOs, offering huge potential for more flexible, readily-scalable and cost-effective IT operations. It represents a different way to architect and remotely manage computing resources. Cloud computing deals with different kinds of virtualized resources, an important role in cloud computing is scheduling. User may use hundreds of thousands virtualized resources for each user task. Hence manual scheduling is not a feasible solution. The workflow scheduling as well as grid scheduling is the comprehensive way of different scheduling algorithms in cloud computing environment.

5.2 Load balancing

P-ISSN: 2347-4408
E-ISSN: 2347-4734

Cloud computing is an internet based network system in which a large number of Scalable computing resources are made available as a service over the internet to users. The resources connected over larger geographical areas physical must be efficiently utilized. Scheduling the available resources under cloud computing environment is an important issue because of high scalability and heterogeneity of computing resources.

Scheduling Policies

Scheduling policies may be preemptive or non-preemptive.

i. Preemitive Policies

Preemitive policies, force the currently active process to release the CPU on certain events, such as a clock interrupt, some I/O interrupts, or a system call.

ii. Non Preemitive Policies

In a non-preemptive pure multi programming system, the short-term scheduler lets the current process run until it blocks, waiting for an event or a resource, or it terminates.

5.3 A survey on resource scheduling in cloud computing

Challenging job and the scheduling of appropriate resources to cloud workloads depends on the QoS requirements of cloud applications is Resource scheduling. In cloud environment, heterogeneity, uncertainty and dispersion of resources encounters problems of allocation of resources, which cannot be addressed with existing resource allocation policies.

Efficient and appropriate resource scheduling algorithm for a specific workload from the existing literature of resource scheduling algorithms faces troubles.

The current status of resource scheduling in cloud computing is distributed into various categories.

6. CONCLUSION

Cloud computing is used for scheduling support and time management support. A study of existing task scheduling algorithms is done. The usage and the application can be extended when cloud support is given with the discussed properties. A brief analysis of each method is done and most algorithms perform scheduling based on one or more parameters. Improving scheduling to reduce the time and cost. several methods are studied which can be combined to create a hybrid method for scheduling in cloud computing. Combining different parameters such that to obtain an efficient scheduling algorithm and improve the overall performance of the cloud computing. Task completion time also maintained. Traditional approaches of scheduling lead to high time response and low throughput.

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