

A Review on Comparative Analysis of Task Scheduling Algorithm for Cloud Computing Environment

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ABSTRACT

Cloud computing is an emerging technology, that based upon internet computing and share resources (software and hardware) depends upon their demand. Cloud computing works on its important feature known as virtualization in order to access remote and geographically distributed resources. Depending upon cloud service provider and user requirements, a number of virtual machines are used. So it is necessary to schedule VM request. Most of the businesses are migrating from on-premise to the cloud and millions of users access these services daily via the internet. So it is very important to apply appropriate scheduling technique to process a large amount of data and to do resource utilization more efficiently with better performance. Nowadays scheduling task becomes a challenge for researchers. So a number of algorithms are used to provide proficiency of task and resource scheduling. . In this paper, we have discussed different scheduling algorithms like FCFS (First Come First Serve), Max-Min, Min-Min.

Keywords : Cloud Computing, scheduling, FCFS, Max-Min.

I. INTRODUCTION

Cloud Computing

Cloud computing can be determine as a model that allows as for the rapid deployment and distribution of shared, configurable pools of computing resources by enabling ubiquitous, on-demand network access with minimal client management and minimal service provider inter communication. Cloud computing is seen as the evolvment of technologies that make it together to change the way an organizing IT infrastructure is built.

In fact, there is nothing modern in any technical knowledge used in cloud computing, most of which has been recognized from ages. All this is the name of the cloud is for all people to visit. Clouds are the necessary foundation for cloud computing on the Internet, but cloud computing is not just the Internet; the Internet is just the latest term. If you need it, in the cloud you will need to use the technology.

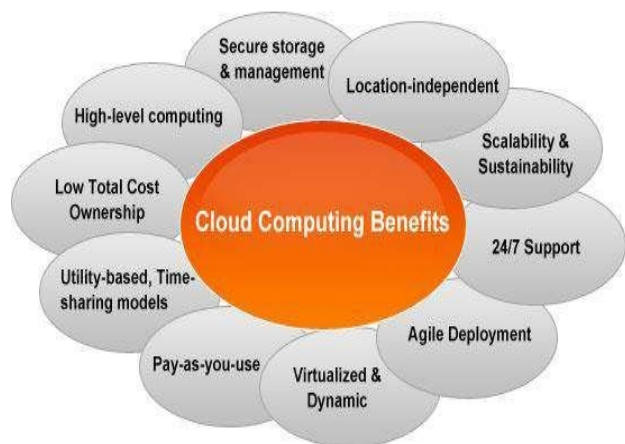
You do not have to install anything on the desktop, and you do not have to pay for it without using the technology. The cloud can be software and framework. It can be an operation accessed over the web or from a server as such Gmail, which can be an IT framework that can be used at the user's desire. In case it is software or hardware,

Here's an elementary test if the service is a cloud service.

Whether you can go anywhere, sit on any computer without preferring the operating system or browser and accessing the servicing, the service is cloud-framework. Typically, there are three parts to determine whether an appropriate service is a cloud service:

- The service can be achieved through a web browser or Web service API.
- Zero capital expenditure is mandatory to get started.
- You pay only as what you use.

II. METHODS AND MATERIAL



WHY CLOUD IS SO POWERFUL?

Figure 1. Benefits of cloud computing

There are many benefits to international companies using cloud computing. One of the main things is its extensibility. Cloud computing is a medium that employees have access to the files and data they needed, even when working remotely and outside of business hours.

As long as they have access to the Internet, employees can contact information from home, on the road, from the customer's office, and direct from smart phones such as Blackberry's or iPhones. Employees can also collaborate on documents, even if they are not to get Documents can be considered and edited from multiple sites simultaneously. Cloud computing can be very fast, easy to arise and

running. For example, consider how rapidly you can set up your Gmail or Hotmail account and start mailing e-mail - it can take a few minutes, and you only need one computer and the Internet.

Some of the main benefits are:-

LARGE RESOURCE POOL

Public clouds surprise users, its flexibility and huge pool of thousands of machine resources. With some lines of commands, users can utilize these machines to do whatever they want.

EASILY MANAGED:

Private clouds surprise users by making it easier to manage resources and make finer use of resources. Private cloud users can direct requests related to public cloud users. In addition, they can obtain what they want almost immediately.

VIRTUALIZATION BASED ROLES:

Universal Cloud uses a lot of virtualization technology and runs many basic machines on a single visible machine. All virtual machine gets an environment by a different amount of resources, such as RAM size, storage space, and basic CPU cores. Allocated resources can be very slight and very vast.

Public cloud is a word used to determine a generic cloud computing frame work where service providers provide assets such as software and data storage up the Internet. During the time the public cloud is a large enterprise that invites the largest providers in the world, as such Amazon Web Services and IBM, public cloud of itself is typically cheaper and freely accessible and users tend to be smaller businesses or individuals. Private clouds typically only provide virtual machines and storage as a service. Private clouds have characteristics that are very similar to public clouds. Private cloud users have similar services to public users, but fewer resources. In addition to the user can get some benefits, the administrator from the management point of view the cloud feels powerful. It reduces management costs and makes better use of IT

resources. Hybrid clouds are a connection of two and more communities, public or private clouds.

As a result, the volume of data saved and processed in the cloud is bulky and the amount of data is arising. Correct task scheduling techniques are important for managing a large number of tasks simultaneously, so we need effective resources utilization to handle a vast amount of load. Job assigned to the sources is task schedules.

Better scheduling technology is also good for cloud providers to earn more revenue and resources. In the cloud, task organizing and resource formation play great role in effective system management (Sindhu; 2015).

There is no unified workflow organizing in cloud computing. Various workflow organizing techniques at present exist. But the research work recommends an efficient workflow scheduling algorithm that reduces the overall span of the schedule and makes correct use of the resources.

2.1 Task scheduling

Scheduling is a method of assigning jobs that are assigned to work to be done by some method of assignment. It can be a virtual computing unit, such as threads and processors or data streams, which are in turn dispatched to hardware resources such as processors.

2.1.1 Goal of Task Scheduling

To generate a plan, assign each task to the processor for a specific period of time to:

1. The task starts only when the processor's input is available.
2. The task's time interval is appropriate for the task's needs and processor score.
3. The processor runs only one task at a time.
4. If you assign two tasks to different processors and have one output to input priority, there must be enough time to transfer the related files.
5. The schedule has been shortened.

2.2 Scheduling parameters

Deadline: - Define the time period from submission of the job to completion of the job. A good organizing algorithm for keep tries to accomplish the task inner the deadline.

Execution time: - This is the specific time required to execute an inclined task. Decreasing execution time is ultimate goal of a valuable scheduling algorithm.

Completion Time: - This is the time to takes to completion of the entire job execution. It consists of the execution time or latency lead by the cloud system.

Energy Consumption: - The energy utilization of cloud data centers is a common issue and these days would be various cautious. Some organizing algorithms have been developed to recede power utilization and upgrade the performance, making cloud services green.

Performance: - Performance shows that scheduling algorithms provide overall efficiency in order to contribute good service to users as per needed. A valuable scheduling algorithm would consider the client's achievement and result of the cloud in service provider.

Quality of Service (QOS): - Quality of Service consists of many user input restriction such as execution costs, deadlines, achievement, costs, and production cycles.

Load Balancing: - This is a technique of distributing the total load across disparate nodes and links within a cloud network so that some nodes and channel do not load any nodes and channel when they are over burden.

III. LITERATURE REVIEW

Yang, L., Zhu, X., Chen, H., Wang, J., Yin, S., and Liu, X., "Real-time tasks oriented energy-aware scheduling in virtualized clouds," 2014. In this paper, investigated the problem of energy aware scheduling for independent, a periodic real time tasks in virtualized clouds. The scheduling objectives are to improve the system's schedule ability for real-time tasks and save energy.

Ekelin, C., "Clairvoyant non-pre-emptive edf scheduling," in *Real-Time Systems, 2006.18th Euro micro Conference on*, pp. 7–pp, IEEE, 2006. In this paper, presented a non pre-emptive scheduling algorithm called Clairvoyant EDF (CEDF). CEDF uses a look ahead technique to determine when a task must be postponed to a later time and inserted idle times. It is guaranteed to schedule all task sets that EDF schedules.

Haritsa, J. R., Livny, M., and Carey, M. J., "Earliest deadline scheduling for real-time database systems," in *Real-Time Systems Symposium, 1991. Proceedings., Twelfth*, pp. 232–242, IEEE, 1991. In this paper, use EDF as presenting a new priority assignment algorithm called Adaptive Earliest Deadline(AED), which having character as a feedback control mechanism that detects overload conditions and modifies transaction priority assignments accordingly.

Liu, S., Quan, G., and Ren, S., "On-line scheduling of real-time services for cloud computing," in *Services (SERVICES-1), 2010 6th World Congress on*, pp. 459–464, IEEE, 2010. In this paper, present a utility accrued approach which account the gain by completing a real time task in time and the cost when aborting or discarding the task.

Santhosh, R. and Ravichandran, T., "Pre-emptive scheduling of online real time services with task migration for cloud computing," in *Pattern Recognition, Informatics and Mobile Engineering*

(PRIME), 2013 International Conference on, pp. 271–276, IEEE, 2013. This paper presents a online, pre-emptive scheduling with task migration algorithm for cloud computing environment is proposed in order to improve the efficiency and to minimize the response time of the tasks.

Oh, S.-H. and Yang, S.-M., "A modified least-laxity-first scheduling algorithm for real-time tasks," in *Real-Time Computing Systems and Applications in 1998 Proceedings. Fifth International Conference on*, pp. 31–36, IEEE, 1998. In this paper, For solving the disadvantage of the LLF Scheduling algorithm proposed the Modified Least Laxity First (MLLF) scheduling algorithm. MLLF scheduling algorithm defers the pre-emption by allowing laxity inversion as far as deadlines of tasks are not missed. Hence, MLLF scheduling algorithm performs better than LLF Scheduling algorithm.

IV. CONCLUSION

An improved task organizing algorithm based upon resource partitioning is proposed through minimize total length about scheduling or resource usage. Max-Min has a limit, and sometimes large tasks are mapped towards slow resources. That increases the overall length about the schedule. However, now the proposed algorithms, the opportunity of scheduling lengthy tasks towards slow resources are reduced. The result used now in this study to divide resources within two categories based on MIPS (Microprocessor without Interlocked Pipeline Stages) speed. Whether the fastest usable resource comes against the second category as fast resource category, the biggest task is organized whether the fastest usable resources are the resources from the first category; the medium span task will be mapped into it. The outcomes show, so that the proposed algorithms accomplish the effective resource usage, and have completion time better than the actual scheduling algorithms Max-Min or FCFS (First comes first serve).

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Table-1. Comparison of different scheduling algorithms based on various factor

METHOD USED IN ALGORITHM	FACTOR CONSIDERED	ADVANTGES	TOOL USED
DBD-CTO Algorithm[13]	Cost, Time	It lowers the cost of computations and completes task in given time boundary.	Java Environment
Improved Cost Based Task Scheduling algorithm [14]	Performance, Cost	It measures resource cost as well as computational performance also improves (computational /communication) ratio.	Cloud Sim

A PSO based heuristic for scheduling workflow applications [15]	Cost of computation, cost of data transmission	It gives three times cost saving as compares to BRS and also balances the load on resources by distributing tasks to available resources.	JSwarm Package
Multi-Objective task assignment in cloud computing by particle swarm optimization [16]	Processing and Transferring time, Processing and Transferring cost	It is not optimizes the times, but at the same time optimizes the cost also.	Matlab R2009b
Bi-criteria priority based particle swarm optimization [17]	Execution time and Execution cost	It minimizes the execution cost while meeting the budget and deadline constraint.	Java Environment
Independent task scheduling based on GA [18]	Execution Time	Consider resource and time utilization.	Cloud Sim
Genetic simulated annealing algorithm [19]	QOS parameters, cost	Considers the QOS requirements of different user tasks.	Java Environment