

Optimized Job Scheduling With On-Demand Dynamic Fine-Grained Pricing Scheme for IaaS Cloud Platform

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Abstract— With the increasingly omnipresent nature of the Cloud computing, users are looking for new ways to interact with these paradigms. The cost effectiveness of cloud computing is one of the reasons for its reputation. Although many pricing schemes existing in the cloud but the customer always prefer for the best pricing scheme, so it will become a dispute for service providers. However, the most familiar model employed in cloud computing is the “pay-as-you-go” model. Existing schemes like fine-grained pricing scheme is still sustainable suffer from the improvident charge. In this paper, we look into an optimized job scheduling with on-demand dynamic fine-grained pricing scheme. By using the proposed technique reduces the partial usage waste; it can be facilitated by scheduling user’s jobs effectively.

Index Terms—Cloud computing, pricing scheme, Data Center, fine-grained, job scheduling.

I. INTRODUCTION

“Cloud Computing” has the majority evidential advancement in information technology because of the upward thrust of the worldwide net community [5]. The price effectiveness of the cloud computing is one of the reasons for its popularity. Infrastructure-as-a-service is one of the service layers among three fundamental provider layers of cloud computing, whereas on-demand virtualized computing resources are provided throughout the Internet to the customer. IaaS (infrastructure as a service) pricing refers to the billing models used by providers who supply IT infrastructure services through the cloud [9]. As with any business, a cloud IaaS vendor has to encounter many requirements in order to achieve successful price to its services. Initially, a cloud service provider must know what its functional costs are for its physical IT assets, to determine the cost of products bought. Secondly, a cloud services vendor must also ascertain the required profit margin for its services, taking into account all functional price rates for the commercial enterprise, with the objective of achieving the points of profitability. Researchers have determined that the profitable success of cloud computing services can only be gained if the pricing is apparent and obvious to both providers [7] and customers.

II. RELATED WORK

In this area, we first look back at the present pricing schemes of classic IaaS cloud [6] and then examine the wasteful payment because of partial usage waste. And afterward, we analyzed the classic fine-grained pricing schema which is designed to reach the uttermost public assistance that means both clients and providers should get satisfied.

A. Standard cloud pricing schemes

Recently, the appraising plans in an IaaS cloud market [2], [3] can be sorted into three types: pay-as-you-go scheme, membership choice, and spot market. Under the pay-as-you-go scheme, a customer has to pay off a frozen rate for the usage of cloud resource as per billing oscillation (e.g., an hr) with no allegiance. On-Demand cases are oft used to run short-chores or manage recurring traffic spikes.

In the membership choice scheme [4], a customer has to pay in advance to preserve assets for a definite period (e.g., monthly) plus customer incurs a significant price reduction. The billing oscillations in the membership choice were quite large than the previous scheme (paying costs as they arise) when both are being comparable. It can be membership option of one day, and may be monthly yearly membership, or customer can get some years of membership [2], [3] based on their need for resource utilization. Hence it fits for lengthy functional jobs.

On behalf of the spot market [4], customers merely tender on spare instances plus execute those at whatever time their bid rate surpass the present price in a spot market. Spot market instances are fit for time-pliability, disruption tolerant chores (similar to the web crawling) [3], on account of that they can let down the calculating costs in a significant manner, because of the low price in the spot market.

Our paper is mainly concentrating on pay-as-you-go scheme, which is peculiarly a suit for running small jobs in the cloud due to finer pricing granularity.

B. Partial usage waste analysis:

VMs under the classic scheme are regularly charged hourly, thus far short-employment users have to give money for total one-hour cost even though their tasks merely run through the resources with a little portion of one hour time. This marvel named as the waste of usage partially.

This wasteful payment is quantified with time utilization instance, which entails the depleted time percentage in consumers instance hours.

C. Coarse-grained pricing scheme:

This Hourly based scheme [2] is a traditional scheme which may become a problem for short-employment users. In this scheme maintenance of VMs become an onerous, for example, initiating cost of the VMs. It is the burden for short-running job users. As depicted in Fig. 1 if the user running job time is lesser than productive time then at that time also user has to bare overhead cost.

D. Fine-grained pricing scheme:

Fine-grained pricing scheme [1], majorly concentrate on short employment users. This is scheme mainly consists of three terms: time granularity, unit price, and resource bundle. Time granularity states that when pricing the resources consider the minimum length. The unit price is the price paid by the customer based on the time granularity for the consumption of resources. The resource package serves a customer with demanded task workloads.

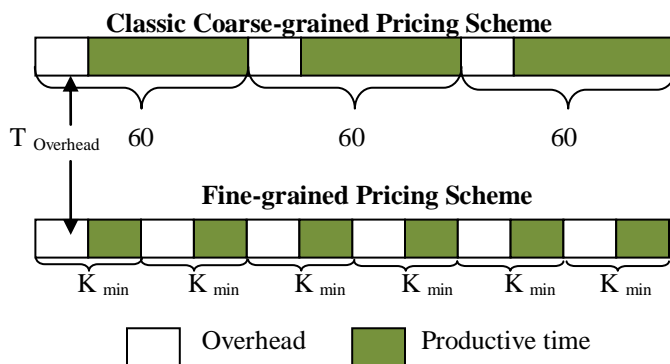


Fig. 1: Service time analysis between existing pricing schemes

III. PROPOSED WORK

In this paper, we declare a job scheduling plan for the fine-grained pricing scheme to reduce the wasteful payment. Scheduling refers to the group of plans to manage the order of jobs executed by a computer system. The best scheduler

adapts its scheduling scheme according to the environment and kind of task variation.

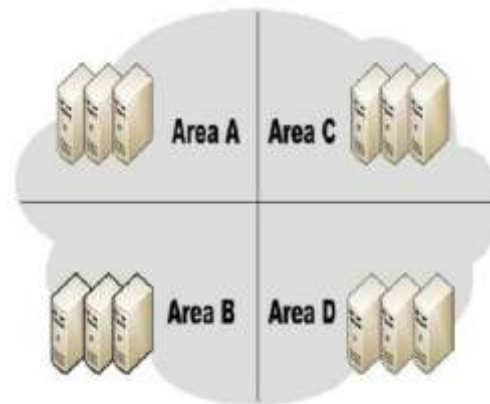


Fig. 2: partitioning data center

In this work partitioning of a data center in fig.2 takes place. Each partition allotted [8] with some no of VMs, based the capacity of VMs and partition of the data center the jobs will execute. Controller will be there internally for giving the current status of the VMs and partitions [10].

Wasteful payment can be mitigated by ordering the customer's jobs effectively. It can be alleviated by combining user's scheduling knowledge.

Algorithm: Optimized User Job Scheduling

Inputs : Requests with user jobs

Outputs: Response time/state of servers, fine-grained cost

STEP1: Read requests from the queue.

STEP2:

1. **BEGIN**
2. **While** request **do**
3. SearchBestServer (request);
4. **IF** Server State==IDLE || server State==NORMAL
 - a. **THEN** send request to Server;
 - b. Processing request.
5. **ELSE**
 - a. Update/Compute refresh period based on load.
 - b. If all servers are OVERLOADED, wait for the server to NORMAL.
6. **END IF**
7. **END WHILE**
8. **END**

Setting an order of jobs is a specific piece of work which requires being allotting the system resources to the different tasks that are held back for the CPU time and issued in a

queue. The scheme has to determine that for giving CPU time which job should take first for processing, in order to execute all the jobs in efficient and fair manner. Besides fairness in scheduling is the significant standard that furnishes the resource allotment in an optimal manner and improves efficiency.

IV. PERFORMANCE ANALYSIS

In Fig. 3 contents the performance of the reduced time during the execution of user jobs. It analyzed that the partitioning data center and scheduling user jobs technique out performance the existing method by alleviating the wasteful payment. It explicitly shows the time reduction during jobs execution. In this way, jobs can execute in less time, and payment can reduce.

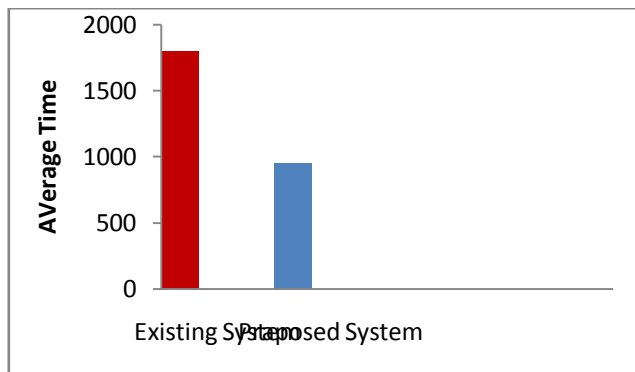


Fig. 3: Time comparison between two schemes

V. CONCLUSION

In this paper, firstly we concentrated on analyzing the wasteful payment issue in cloud computing and also analyzed the different pricing schemes and work done in the perspective of short-running jobs; it includes some favor to the providers also. We evaluated an optimized fine-grained pricing scheme with scheduling jobs effectively. This work reduces the wasteful payment in the cloud.

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