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Linked List Implementation of Discount Pricing in Cloud

Malar.J[1], S.Jesintha Starvin[2]

Master of Engineering in computer Science, Assistant professor –IT department Ponjesly College of Engineering

Abstract: **In the cloud computing environment computational resources are readily and elastically available to the customers. In order to attract customers with various demands, most Infrastructure-as-a-service (IaaS) cloud service providers offer several pricing strategies such as pay as you go, pay less per unit when you use more (so called volume discount), and pay even less when you reserve. In order to enjoy these discounts, the customers must be ready to adjust the time limits. By strategically scheduling multiple customers' resource request, a cloud broker takes the responsibility of distributing the discounts offered by cloud service providers. Here the focus is on how a broker can help a group of customers to fully utilize the volume discount pricing strategy offered by cloud service providers through cost-efficient online resource scheduling. A randomized online stack-centric scheduling algorithm (ROSA) is implemented with linked list in order to maintain the status of the resource and to allocate resources without time constrains.**

Keywords: **Broker-Mediator, Computing –Operation of computers, Discount- Deduction, Instance-Single occurrences, Random – Informal, Scheduling – Arrange.**

I. INTRODUCTION

The linked list is introduced here to maintain the current status of the resource. Doubly linked list is used to maintain the previous and next state of the resource. Pricing is done by cloud brokers through cost efficient online resource Scheduling called ROSA. The main objective of this project is to maximize resource utilization, with less payment amount but without adjusting the time limits. The drawback in this domain is the user has to adjust the time limits in order to enjoy the volume discounts. To overcome this problem here we are implementing the linked list in the Randomized Online Stack - centric Algorithm. ROSA with linked list comparatively achieves better performance with flexibility.

II. SYSTEM ANALYSIS

A. EXISTING SYSTEM:

In an Infrastructure-as-a-Service (IaaS) cloud, the real-world charging scheme has become absurdly complicated. For a instance, cloud providers usually adopt an hourly billing scheme, even if the customers do not actually utilize the allocated resources in the whole billing horizon. In the current cloud market, many cloud providers offer big discount for reserved and long term request.

The cloud provider provides the resources to the users only after the requested time duration. Thus it causes the time wastage. In order to enjoy the discount the users has to adjust to the time limits. Randomized Online Stack Centric algorithm is used for resource scheduling. Multiple instance of resource utilization is prohibited and single instance resource utilization is allowed. Individual user comfort is not considered by the cloud brokers. The resources are not allocated by the end users even if it is not in use. The goal is to maximize resource utilization so that more customers can be accommodated and in return each can pay less.

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Drawbacks:

- ✓ Customer need to wait for the resource even if it is not in use.
- ✓ Individuals cannot enjoy the volume discounts without adjusting the time limits.
- ✓ Time flexibility faces the major problem.
- ✓ Multiple instance of resource utilization is not allowed.

B. PROPOSED SYSTEM:

In order to attract customers with various demands, most Infrastructure-as-a-service (IaaS) cloud service providers offer several pricing strategies such as pay as you go, pay less per unit when you use more (so called volume discount), and pay even less when you reserve. The diverse pricing schemes among different IaaS service providers or even in the same provider nurtures the market of cloud brokers. By strategically scheduling multiple customers' resource requests, a cloud broker can fully take responsibility of the discounts offered by cloud service providers.

It focus on how a broker can help a group of customers to fully utilize the volume discount pricing strategy offered by cloud service providers through cost-efficient online resource scheduling. Here, the linked list implementation of ROSA is used. Thus it maintains the current status of the resource. So the resources can be enjoyed by the end users before the requested time if it is free. The current state of the previous link and the next state is maintained to eliminate the waiting time of the users.

Advantages:

- ✓ Multiple of instance of resources can be shared among individuals.
- ✓ Time flexibility can be enhanced.
- ✓ End users can enjoy the resources without strict time durations.
- ✓ Customers can utilize the resources if it is free.

C. ALGORITHM:

Randomized Online Stack-centric Scheduling Algorithm (ROSA):

The online resource scheduling problem assumes that, at any time instant t, the scheduler only knows the tasks which arrive upon or before t. The scheduler does not rely on any knowledge of future information. The doubly linked list is used for online task scheduling to make decision with information available so far. Thus it uses the randomized online stack centric algorithm implemented with linked list.

Algorithm: Randomized online stack centric algorithm with linked list

1 Initialization: an ordered list of time instants I = Φ;

2 while an task J_i arrives do

3 Insert time instants t_i^a and t_i^d into I;

If next instance > t_i^d then t_i^a ⟶ J_{i+1}

If previous instance < t_i^a then t_i^a ⟶ J_{i-1}

4 Find all subintervals [t_i^a , t_i^d] each representing a time period in betweentwo adjacent time instants in I, and mark them as unprocessed;

5 while wi > 0 do

6 Select the unprocessed subinterval [t_i^a , t_i^d] denoted by [t1, t2], that has the highest task density (randomly select one if there is a tie);

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Where,

t_i^a - arrival time of the job request

J_i - current resource state

J_{i+1} -next resource state

J_{i-1} - previous resource state

t_i^d - specified deadline of the job request

Multiple customers may submit job requests at random instants with random workload that should be fulfilled before specified deadline to a broker. By assuming that the inter-arrival times for job requests are arbitrary. The processing time for each job is deterministic and known to the broker given the resource allocated to the job. The broker is responsible for purchasing computational resource from IaaS clouds, allocating resource to and executing jobs, as well as meeting job deadlines.

The deadlines specified by the customers are flexible. Different from PaaS cloud, where the customers directly submit job requests to cloud service providers, brokers mediate the process by organizing the job requests in a manner which benefits the most from the volume discounts provided by the cloud provider. Both the cloud provider and the customers benefit from this mediation.

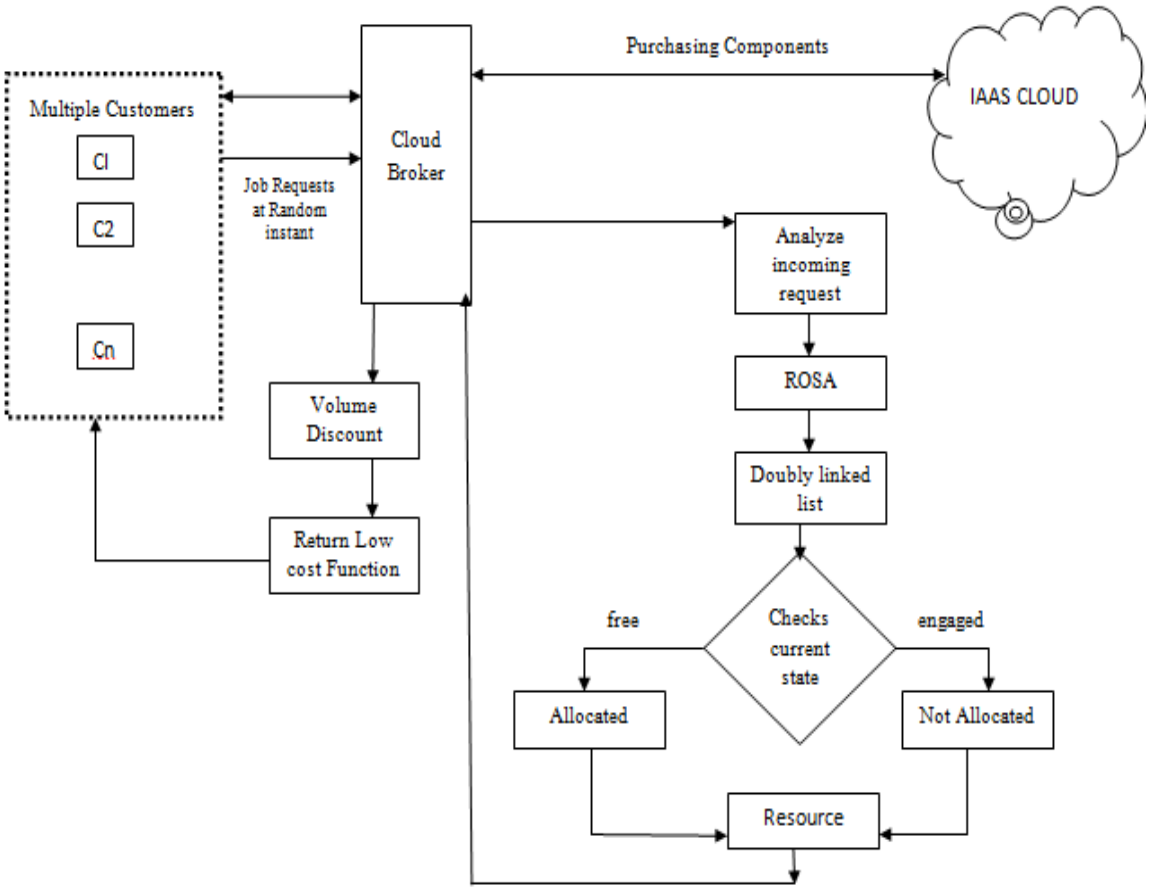

FIG.1 OPTIMAL SCHEDULING USING CLOUD BROKERS

Figure 1 illustrates the four functionalities such as 1) Job request 2) scheduling 3) volume discounts 4) status identification .Initially multiple customers sends the job request to the cloud broker thus the scheduler performs scheduling.The cloud broker finds the inter arrival time and allocate the unit time slots. Thus the job scheduling is done efficiently .Broker performs low cost function operation to return cost with volume discount.

Multiple customers: Multiple customers involve the individual users. They can send resource request to both the cloud brokers or cloud providers. Based on their request the resources are allocated to them. Cloud provider's offers various discount schemes for bulk resources but it is beyond the need of individual cloud users. Such discount schemes are beneficial to organizations.

Cloud broker: The cloud brokers emerge as the mediators between the cloud providers and the customers. Here the cloud brokers takes the responsibility of the providers in providing discounts based on the utility. Brokers purchase the bulk amount of resources and distribute the discount based on the independent purchasing of resources.

Arrival time: The arrival time is the time at which the user log on to the system. It is also recorded in the stack for the future verification.

Deadline: It is the time requested for the resources to be obtained. The deadline is provided at the time of user logon into the system. Thus the resources are available to the user only after the deadline timing.

But by using the doubly linked list implementation the strict deadline can be removed. It maintains the list of user requirements and based on that the resources will be allocated to the end users if it is free.

Job schedule: The job is scheduled to the user at the unique time slots. Thus it can assigned based on the arrival time and deadline.

Volume discount: Based on the utility discount the volume discounts can be enjoyed, The more you use the resources the large your discount will be. Thus the mathematical formulation is used for the low cost evaluation

Cloud is an emerging computing market where cloud providers, brokers, and users share, mediate, and consume computing resource. With the evolution of cloud computing, Pay-as-you-go pricing model has been diversified with volume discounts to stimulate the users' adoption of cloud computing.

MODULES:

There are four modules in the proposed system they are involved in efficient resource management in the cloud environments .So the resources can be managed efficiently with low cost.

- ✓ User registration
- ✓ Job scheduling
- ✓ Volume discount
- ✓ Status identification

With the help of these modules the resources can be retrieved efficiently by the users and each and every individual users can enjoy the volume discounts based on their utility threshold without time limits.

III. CONCLUSION

Cloud is an emerging computing market where cloud providers, brokers, and users share, mediate, and consume computing resource. With the evolution of cloud computing, Pay-as-you-go pricing model has been diversified with volume discounts to stimulate the users adoption of cloud computing. It shows how a broker can schedule the jobs to users with volume discounts so that the maximum cost saving can be achieved for its customers. For that an online scheduling algorithm is developed and its competitive ratio is derived. Simulation results have shown that the proposed online scheduling algorithm outperforms other conventional scheduling algorithms. The spatial and temporal resolution is involved in reshaping the incoming VM request. Mathematical evaluation is used for reducing the cost with volume discounts. Randomized online stack centric algorithm implemented with doubly linked list is efficiently used for the resource allocation by mapping the time instances as processed and unprocessed. As the multiple instances of resources are scheduled to the individual users without any time limits and the end users are paying only for their used resources, it increases the demand for the cloud resources. As the multiple instance of resource utilization is allowed in the cloud brokerage it is efficient for the online customers. Thus the cloud users can utilize the resources without any time delay with the volume discounts.

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