Cloud Based Network Management Services

Srutha Keerthi Varala [1], Abdul Irfan Mohammad [2], and Jinan Fiaidhi [2]

[1]Lakehead University
[2]Affiliation not available

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Abstract

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Abdul Irfan Mohammad (1101151), amoham29@lakeheadu.ca[1]

Srutha Keerthi Varala (1101134), svarala@lakeheadu.ca[2]

Instructor: Dr. Fiaidhi

Department of Computer Science Lakehead University

Abstract—**Computational services are readily and elastically accessible to clients with the booming cloud computing industry. To draw consumers with varied demands, most cloud service providers with Infrastructure-asa-service (IaaS) offer a variety of pricing strategies, such as pay as you go, charging less per unit when you use more (so-called volume discount), and paying even less when you register. The numerous pricing schemes among multiple IaaS service providers, or even within the same provider, shape a complex economic landscape that nurtures the cloud broker industry. By carefully scheduling resource requests from multiple clients, a cloud broker may take full advantage of the discounts offered. In this paper, we concentrate on how a broker can help a community of customers make best use of cloud service providers volume discount pricing strategy by cost-effective online resource scheduling. We present a randomised online stack-centric scheduling algorithm (ROSA) and theoretically prove its competitive ratio to be the lower bound.**

Index Terms—**Cloud computing, fixed activation cost, concave pricing, scheduled jobs, volume discount**

Introduction

We've seen the enormous growth of cloud computing in recent years, with more and more cloud service providers hopping onto the cloud bandwagon. Small- cloud providers such as ReadySpace and GoGrid have actively emerged along with the steady development of large- public cloud providers such as Amazon EC2, Windows Azure, and Rackspace. From the perspective of a single cloud service provider, retaining its competitiveness among peer cloud service providers is critical. As evaluated, the only way to succeed in cloud computing is through the development or offering of effective pricing techniques. The cloud provider dynamically segments physical machines in an infrastructure-as-a-service (IaaS) environment, using virtualization technologies, to satisfy different demands from its customers on virtual machines (VM). The consumers in principle just have to pay for the item they actually used. Nonetheless, the pay-as-you-use pricing model is actually primarily ideological due to the high complexity of resource use control and auditing, such as network capacity, virtual CPU time, memory space, etc. A cloud broker can help cut customer costs through temporary multiplexing and spatial resource multiplexing. By temporary multiplexing, the broker leverages the hourly billing cycles of providers to use the unused resource of a customer to execute the tasks of other customers.

Importance of Pricing

Among different IaaS service providers or even within the same provider, the numerous pricing schemes and numerous discounts offers form a dynamic economic landscape well beyond the reach of individual end users. It offers cloud brokers the ability to act as mediators between the clients and the providers. Dedicated cloud brokers are emerging amid the foregoing trend to help customers make better buying decisions. Recent research shows that cloud brokers that mediate the process of trading between customers and cloud providers can dramatically reduce customer costs while helping cloud providers to reshape or smooth the burst of incoming VM requests.

Area of problem in cloud computingleading to Cloud Mediators

Cloud providers typically follow a system for hourly billing, even though consumers do not necessarily use the allocated services across the entire billing horizon. Furthermore, cloud providers typically give customers with large quantity demands a volume discount, e.g., Amazon EC2 cloud offers 10 percent discount for customers paying 25,000 Dollars or more on reserved instances and 20 percent discount for customers spending 200,000 Dollars or above. From an individual cloud service provider's perspective, it is important to keep its competitiveness among peer cloud service providers. As analysed the only way to cloud computing success is to develop adequate pricing techniques.

Cloud mediator's responsibility andadvantage to cloud-based environment

The aim is to optimise the usage of resources, so that more customers can be accommodated and each can pay less in return. By spatial multiplexing, the broker takes advantage of volume discount by packaging resource requests from multiple customers to meet the high threshold of the providers for bulk resource order, thereby reducing the overall cost and each will pay less accordingly. When provided with volume discount from a cloud service provider, end customers may be willing to change the execution pace of their jobs, especially those time-flexible and interruption-tolerant tasks, so that a higher volume discount can be enjoyed due to a group of customers higher total needed resource of the jobs.*A. How cloud brokers can achieve the solution to efficient cloud resource utilization*A cloud broker can help reduce the cost of customers through temporal multiplexing and spatial multiplexing of resources. The goal is to maximize resource utilization so that more customers can be accommodated and in return each can pay less.

V. Conventional Method Overview

We use an example to illustrate that conventional scheduling may not lead to the optimal cost under volume discount. As shown in Fig. 1a, we have three incoming jobs. Job 1 arrives at time 0 with a deadline of 5, a workload (which is measured by the amount of requested resource) of 6 and a maximum processing speed1 of 3. Job 2 arrives at time 3 with a deadline of 7, a workload of 3 and a maximum processing speed of 1. Job 3 arrives at time 6 with a deadline of 9, a workload of 6 and a maximum processing speed of 2. Suppose that the threshold for volume discount is 2, a conventional scheduler may schedule a job with its maximum processing speed starting from the instant when the job is submitted, as shown in Fig. 1b. Under this schedule, two units of workload from job 1 can enjoy the volume discount. We can observe that postponing the starting time for processing job 1 to time 3 and dividing the execution of job 2 into two segments give better opportunity in enjoying volume discount, as shown in Fig. 1c.

VI. Paper Contributions

To discover cost efficient online scheduling algorithm under a concave cost function, this paper makes the following contributions:**Fig. 1: Conventional Model** * We investigate the basic features that a cost-optimal scheduling should possess under a generic concave cost function.

Three special cases of the concave cost scheduling problem are added, namely scheduling with a fixed activation cost under a linear function, laminar structured job requests, and requests for unit jobs with acceptable deadlines. We show that a polynomial algorithm can be used to solve each special case offline.

We propose an online request reshaping algorithm, called randomized online stack-centric scheduling algorithm (ROSA), under a generic concave cost function.

OFFLINE RESOURCE SCHEDULING

The ideal assignment booking issue is a limiting curved capacity, which goes under the NP-difficult issues, for instance, the inward system flow problem. In dislike of the way that we have not authoritatively exhibited its NP hardness issue, we have discovered the properties of ideal planning with a general sunken cost work. There are three special properties of the concave cost scheduling problem, namely, scheduling under a linear function with a fixed activation cost, laminar structured job requests, and unit job requests with agreeable deadlines. The ideal scheduling issue is to find a plausible calendar that limits the all out expense:

Fig. 2:

SCHEDULING UNDER A LINEAR

FUNCTION WITH A FIXED ACTIVATION COST Right now, will talk about the curved cost work planning issue under an uncommon piece insightful sunken cost work which is a direct capacity with a fixed initiation cost. The prompt asset cost at time t becomes,

Fig. 3:

the cost can be written as,

Fig. 4:

From the above straight cost work we can say that if a vocation must be dispensed to a given time interim, allotting different occupations however much as could be expected to this time interim won't cause extra cost which prompts an ideal calendar under the cost work.

IX. LAMINAR-STRUCTURED JOB REQUESTS

Right now, manage a remarkable occupation demands design. Let us consider for any two employments, to be specific, J1 and J2, where J1 = <t1a,t1d,w1,u1> and J2 = <t2a,t2d,w2,u2> such that t1a<=t2a and hold one of these conditions (1) deadline of t1 is less than or equal to activation time of t2 or (2) deadline of t1 is greater than or equal to deadline time of t2. The given example demonstrates this procedure as shown in the Fig 6 and Fig 7.**Fig. 5: laminar-structured job requests.pngFig. 6: laminar-model for job requests.png**X. UNIT JOB REQUESTS WITH AGREEABLE DEADLINES Right now, cost work booking issue comprises of two primary conditions namely

the entirety of the employments can be handled in a unit availability, i.e., wi=ui

Jobs must be arbitrary ,i.e ,

Randomized Online Stack-CentricScheduling Algorithm (ROSA)

ROSA is used for online job scheduling algorithm. The basic idea of our online algorithm is to stack the processing times of multiple jobs whenever possible and run the jobs with the maximum possible resource in order to reduce the total cost.

ROSA Analysis

When the scheduler allocates the processing time for a job, Ji =<t a i ;t d i ; wi;u i > , it always allocates the job with its maximum possible resource, u.

When scheduling the workload of Ji, we consider the time intervals within

the range of [ta i ;td i] in the order that the interval with the highest scheduled workload comes first.*A. We call an online algorithm reasonable if it has the following properties:* * The algorithm makes schedules upon arrival of job requests and only with information available so far, and when the schedule of a job is determined, the algorithm should not change the schedule at a later time. The job requests are processed in consecutive time intervals unless it is more cost efficient to split the processing intervals.

Whenever resource is allocated to a job Ji, the algorithm should allocate its maximum resource ui.

When there is not enough information to make a better schedule for a

task, the algorithm should not split the workload of the task.

If multiple time intervals have the same density, Algorithm selects a random interval from them to proceed.

Such randomization offers an opportunity for the current task in consideration to be processed along with future unknown incoming tasks. We refer to this algorithm as a randomized online stack-centric algorithm(ROSA).

XIII. CONCLUSIONS

Cloud is an evolving environment for computing in which service vendors, brokers, and customers exchange, mediate, and access cloud services. With the advancement of cloud computing, the Pay-as-you-go business system was diversified with volume discounts to promote cloud storage adoption by the consumers. This paper explores how a broker should schedule users 'work to maximize the pricing model of volume reductions so that its clients should reach the highest cost savings. Simulation tests on a Google data trace shows that the new algorithm for online scheduling outperforms other conventional scheduling algorithms. The research is the first step in researching the practises and approaches of cloud service providers, distributors and end users while implementing or addressing a volume-discounted pricing model. It opens a door to lots of interesting problems down the way.

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