ISSN:0975-9646

Sukeshini S.Gawai / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (6) , 2014, 7706-7709

Cloud Service Reservation System with Price & Time Slot Negotiation.

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Abstract— Consumers and providers need to establish service-level agreements through negotiation, for making cloud service reservation. Whereas it is necessary for both a consumer and a provider to reach an agreement on the various issues like price of a service and when to use the service, to date, there is no negotiation support for both price and time-slot negotiations (PTNs) for Cloud service reservations. This paper presents a multi-issue negotiation mechanism using a negotiation agent to facilitate the following: 1) PTNs between Cloud agents and 2) tradeoff between price and time-slot utilities. In existing negotiation mechanisms in which a negotiation agent can only make one proposal at a time but brokers in this work are designed to concurrently make multiple proposals in a negotiation round that generate the same aggregated utility, differing only in terms of individual price and time-slot utilities. Another uniqueness of this work is formulating a novel time-slot utility function that characterizes preferences for different time slots..

Keywords: Resource Management, cloud service reservation system, Multi-issue Negotiation, Consumer and provider's broker.

I. INTRODUCTION

A CLOUD is a parallel and distributed system consisting of a collection of interconnected and Virtualized computers that are dynamically provisioned and presented as one or more unified computing resource(s) based on service-level agreements (SLAs) established through negotiation between service providers and consumers. Hence, a Cloud service provision is commonly governed by an SLA. An SLA is a service guarantee that defines a set of quality of service (QoS) constraints such as price or time constraints and specifies how the service is offered. To establish an agreement between a consumer and a provider for utilizing a Cloud service, offered. To establish an agreement between a consumer and provide for utilizing a Cloud service, some of the important issues include the following: 1) determining when to use a service (i.e., time slot) and2) determining the price of the service. Even though these issues are essential, mechanisms to automate the negotiation of price and time slot for Cloud services have not been devised. Whereas previous works have dealt with advance reservations considering bandwidth or time constraints and considered SLA Negotiation, to date, there is no service reservation system that considers both price and time-slot negotiations (PTNs).Since there is an inverse relationship between price and time-slot utilities [e.g., a consumer needs to pay a higher price (obtaining a lower price utility) to use a service at a more desirable time slot (obtaining a higher time-slot utility), price and time slot have to be negotiated simultaneously. This work considers a multi-issue negotiation mechanism for PTNs for Cloud service reservations.

II. RELATED WORKS

Cloud computing is upcoming platform for providing resources. This platform also reserves the services in cloud environment. Cloud service reservations a negotiation is based on Service level Agreement.

Seoko son and Kwang Mong Sim explains price and time slot negotiation, previously, there is no service reservation system that considers both price and time-slot negotiations (PTNs). Whereas in previous works concentrate to dealt with advance reservations considering bandwidth or time constraints and so there is an inverse relationship between price and time-slot utilities, price and time slot negotiation should done simultaneously. The Pricing model the most important concern in Cloud service reservations system. There are two types of pricing models. One is fixed pricing and another is flexible pricing which includes spot instances for leasing virtual machine (VM) instances. The Spot Instances in Price and Time slot Negotiations, Spot instances is used in this work permit consumers to bid for unused cloud resource i.e. computing power. Instances are charged at the spot price set.

The spot price depends on the supply and demand for spot instances. Cloud resource consumers' requests can be fulfilled if their maximum bid prices are above the spot price and they can run their applications on the spot instances for as long as their maximum bid prices exceed the current spot price. All consumers will pay the same spot price for that period even if their maximum bid prices are above the spot price. This provides the motivation for designing a mechanism that will allow a consumer to reserve a preferred time slot by negotiating with the provider the price for reserving the time slot. Using such negotiation mechanism for flexible pricing of Cloud resources, providers can benefit from more efficient utilization of their resources, and consumers can benefit from cost saving in some situations and having more flexibility in planning the start and termination times for running their applications. Such a negotiation mechanism provides a means for consumers to establish contracts with providers to guarantee that consumers can run their applications at the reserved time slots without interruption. In this work, a PTN mechanism that enables both providers and customers to do specify their preferences for price and time slot and search for mutually acceptable prices and time slots. It consist aggregated utility function, negotiation strategies and a negotiation protocol. A price utility function, a time-slot utility function, and an aggregated utility function are used for various preferences of cloud participants.

Luqun Li explains dynamic scheduling system of Cloud Computing service to meet QoS requirement of cloud consumer. And describe the approach of QoS performance analysis with dynamic scheduling system of Cloud Computing service.

III. Cloud Service Models.

Cloud computing is used to deliver the hosted services over the Internet. Cloud services are categorized in to three categories i.e. Infrastructure as a Service (IaaS) Platform as a Service (PaaS) c) Software as a Service (SaaS). IaaS is cloud service model in which an organization outsources the physical equipment used to support operations, including storage, hardware, servers and networking components. The Cloud service provider owns the equipment and they are responsible for housing, running and maintaining that equipments. The client can pays according their usage.

Using PaaS model, cloud service provider rent hardware, operating systems, and storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones. SaaS cloud model can provides the Consumers to purchase the ability to access and use an application or service that is hosted in the cloud. Desktop as a service (DaaS), also called virtual desktop or hosted desktop services, is the outsourcing of a virtual desktop infrastructure (VDI) to a third party service provider.

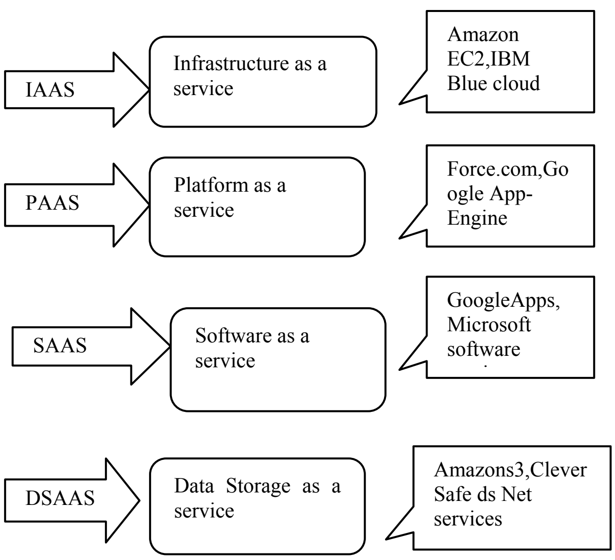

fig. 1Z Cloud service provider models and examples.

IV. Proposed System

Most challenging issue in Cloud service reservations is devising an appropriate pricing model. Amazon elastic Cloud computing (EC2) having both models i.e. Amazon EC2's fixed pricing model and Amazon EC2's spot pricing model. Amazon EC2's spot pricing model showed that our mechanism allows consumers to both save cost and utilize the cloud service without interruption. Using Spot pricing model it allows to consumer pay hourly basis & EC2's Fixed Pricing model allows to consumer for paying long term.

The spot price depend on the demand and supply of resource if supply is more and demand is less then spot price is less vice versa. Bidding is used to reserve instances

If the customer's maximum bid prices are above the spot price then only customer's request for the instance can fulfill, due to this it require the designing a mechanism that will allow a consumer to reserve a preferred time slot by negotiating with the provider the price for reserving the time slot. Using such negotiation mechanism for flexible pricing of Cloud resources, the provider get the advantage of efficient utilization of their resources and consumer get the advantage of cost saving in some situations and having more flexibility in planning the start and termination times for running their applications. Generally the demand for the resources is fluctuating with time. The cloud resources are unused at non peak time & providers are unable to fulfill the request of consumer at peak time, so providers required scheduling resources according to consumer's request in peak time & non peak time to increase more return from resources.

V. Price And Time Slot Negotation

A. Aggregated Utility Function

Consumer offer the lowest price for leasing the resources & provider want the highest price for their resource consumer's & Provider's preferences can be mapped to values of utility, greater preferences means higher utility. Utility can be measured by subjective units. We cannot compare consumer's and providers utility values. A utility function is simply a mapping from a space of outcomes onto utility values. A Price utility function, a time slot utility function, and an aggregated utility function are used to map the preference ordering of each proposal and each negotiation outcome.

I) Price Utility Function

For Provider Price Utility function is U_p^p**(p)** it can be specified as follows

$$U_p^p(p)=\{u_{min}^p+(1-u_{min}^p).\left| \frac{p-RPp}{IPp-RPp} \right|$$

where $RP_p \leq P \leq IP_p$ **otherwise** $RP_p = 0$

$IP_p =$ Initial Price of Customer

$RP_p =$ **Least** Preferred Price of Provider

P =price that both agents reach an agreement
u_{min}^p = Minimum utility (eg.0.01)

For Consumer Price Utility function is U_p^c(p) it can be specified as follows

$U_p^c(p)=\{u_{min}^p+(1-u_{min}^p).| \frac{RPc-P}{RPc-IPc}|$ where $IP_c \leq P \leq RP_c$

IP_c = Initial Price of Customer
RP_c =Least Preferred Price of Customer
P =price that both agents reach an agreement
u_{min}^p = Minimum utility (eg.0.01)

II) Time Slot Utility Function

Time-slot utility function is designed to map consumers' and providers' choices for different time slots. In general, a consumer can have multiple sets of acceptable time-slot preferences.
A provider's time slot preferences consider following things 1) Service demand in both situation peak time service demands is high & non- peak time service demand is low.
2) Sequential ordering (some Resources devaluate with time so schedule the job at the earliest possible time 3) fitting job size (appropriate job size to maximize resource utilization.
A function consisting of a weighted combination of these three formulas is used to prioritize all the available time slots.

B. Negotiation strategies

Negotiation strategies are implemented for both time and Price. Both consumer and provider will negotiate between the price and time slots and which generate counter proposals which leads of two type of algorithm i.e. Tradeoff algorithm
Or concession algorithm.

*I)Tradeoff algorithm:*Tradeoff algorithm is used to improve negotiation speed & utility aggregated functions. In the existing system the agent can generate only one multi issue proposal in one negotiation round but The tradeoff algorithms used here are used to make multiple proposals with each proposal consisting of different price and time slot that generated the same aggregated utility.Each proposal having the different combination of price and time The consumer can select from the available proposals. If the consumer is satisfied with the given proposal the instance will be allocated to the consumer. If the consumer is not satisfied with the available proposals, then the consumer will be making some proposals with their preferred price and time. The negotiation protocol of the PTN mechanism follows Rubinstein's alternating offers protocol in which agents make counteroffers to their opponents in alternate rounds. Both agents generate counteroffers and evaluate their opponent's offers until either an agreement is made or one of the agents' deadline is reached. Counter proposals are generated according to the negotiation strategy. If a counterproposal is accepted, both agents found a mutually acceptable price and time slot with the Quality of Service (QoS) given by the user. If one of the agents' deadline expires before they reach an agreement, the negotiation fails.

Algorithm for Trade-off or Burst Mode:
Input: Request list from consumers, resource list from providers
Output: Allocated Resources list
1. Get the price and time of all Providers registered in the PTN
2. For each consumer get the multiple proposal which consist of price, time and QoS
3. Consumer & Provider's broker checks for a flexible resource for a given

4. If match found based on service initiation time and
penalty rate ratio then
5. Allocate VM
6. Else
7. Call negotiation protocol

II) Concession making algorithm: The concession making algorithm will generate concessions when the new proposals can be made. The consumers who are not satisfied with the given proposals can give their preferred proposals. The given proposals will be compared with the condescend proposals; if it is acceptable then the service will be given the consumer. Else the negotiation takes place. If the consumer is not satisfied with the available proposals, then the concession making algorithm is used by the provider to make the compromise on the price. And the consumer will provide with the preferred time and price.

The negotiation between the consumer and the provider will continue till they reach a agreement. Each negotiation round will have some amount of Concession in the price the amount of concession for each negotiation round. Shows the expected utility in next round.

Algorithm for concession making:

Input: Request list from consumers, resource list from providers
Output: Allocated resources list
1. Consumer Broker contacts the provider's Broker
2. If specification matches then
3. Consumer's Broker asks how much concession Provider can
make
4. If the concession made is accepted by the consumer
then
5. Agreement made and protocol stops
6. Else
7. Next round of negotiation is called

C. Performance Measure

To measure the performance of the burst mode using the PTN mechanism, we consider following as the performance measures: 1) negotiation speed and 2) average total utility of the negotiating pair. The number of negotiation rounds spent on negotiation is a negotiation speed. Average total utility is the level of satisfaction in terms of price and time slot with the service to be provided

VI. Conclusion And Future Work

This work is related to identifies a common time slot that is acceptable to both Cloud resource Consumer broker and cloud resource provider broker, it consider broker's preferences for different time slots and different price preferences. This is multi issue negotiation mechanisms for cloud resource negotiation. To improve the existing system this mechanism is proposed for both price and time-slot negotiations with Quality of Service (QoS) parameters .An improved tradeoff algorithm, known as the "burst mode" proposal, is used to improve both the negotiation speed and the aggregated utility. In existing system can only make one proposal at a time, PTN agents can concurrently make multiple proposals. Thus the effectiveness of PTN mechanism with QoS is improved. Using the PTN mechanism, not only consumers can benefit by paying a lower price but also providers can have more flexibility in allocating consumers' applications to other available time slots, hence achieving more efficient resource utilization. In future work, federated cloud computing environment that facilitates just-in-time, reliable and scalable provisioning of application services can be developed. Consistently achieving QoS targets under variable workload can be done. The proposed trade off algorithm can be enhanced by adaptively controlling the number of concurrent proposals in a burst mode proposal to reduce the computational complexity.

References

[1] B.krishnakumar,K.kousalaya, R.s.mohana, N.sasipriyaa," design of qos based price and time slot negotiation Mechanism for cloud service reservations", international journal of advances in computer science and cloud computing, issn: 2321-4058 volume- 2, issue- 1, may-2014.

[2] Saranya.K.S1, Saravanakumar.K2," Performing a Negotiation on Task Using Task Based Meta Negotiation Algorithm for Cloud Service Reservation", International Journal of Innovative Research in Computer and Communication Engineering Vol. 1, Issue 2, April 2013.

[3] Praveen.K1, Sudhakar.K2," An Effective Cloud Service Reservation Through Negotiation", International Journal of Computer Trends and Technology (IJCTT) – volume 6 number 1 – Dec 2013.

[4] Ariya T.K, Christopher Paul, Dr S.Karthik," An Aggregated Utility Function for Negotiation to Model the Preference Ordering of Services in Cloud Computing", International Journal of Scientific & Engineering Research, Volume 4, Issue 7, July-2013 2502 ISSN 2229-5518.

[5] Mario Mac´ıas and Jordi Guitart," A Non-Additive Negotiation Model for Utility Computing Markets", A Coruña, 16-18 de septiembre de 2009.

[6] Remya Gopinadh #1, K. Saravanan," Cloud Service Reservation using PTN mechanism in Ontology enhanced Agent-based System", International Journal of Engineering Trends and Technology (IJETT) - Volume4Issue4- April 2013.

[7] N Chandrakala, K Meena, M Prasanna Laxmi," Application of a novel time-slot utility mechanism for pricing cloud resource to optimize preferences for different time slots", International Journal of Enhanced Research in Management & Computer Applications, ISSN: 2319-7471 Vol. 2 Issue 9, Nov.-Dec., 2013, pp: (14-22).

[8] Abirami," Negotiation Mechanisms for Cloud Services", International Journal of Emerging Trends in Engineering and Development Issue 3, Vol.2 (March 2013)

[9] Gaurav Raj, Ankit Nischal "efficient resource allocation in resource provisioning policies over resource cloud communication paradigm" iccsa,vol.2, no.3, june 2012.

[10] Seokho Son and Kwang Mong Sim "A Price- and-Time-Slot-Negotiation Mechanism for Cloud Service Reservations", IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART B: CYBERNETICS, VOL. 42, and NO. 3, JUNE 2012.

[11] Edwin, Philipp Wieder,"A Generic Platform for Conducting SLA Negotiations ".

[12] DivyaJyothi.Madhe, D.R.Ingle, 2012, Dealer Agent based Cloud Ecommerce Framework" International Conference on Advances in Communication and Computing Technologies (ICACACT).

[13] Taekgyeong Han and Kwang Mong Sim, "An Ontology-Enhanced Cloud Service Discovery System", Proceedings of the International MultiConference of Engineers and Computer Scientists 2010 Vol 1.

[14] Gaurav Raj, Ankit Nischal ―Efficient Resource Allocation in Resource provisioning policies over Resource Cloud communication paradigm ICCSA,Vol.2, No.3, June 2012.

[15] D.Seenivasan, P.Gayathri, R.Anitha, P.Dhivya "Optimization of Resource Provisioning in Cloud", International Conference on Simulations in Computing Nexus, ICSCN-2014.

[16] B.Chitra, M.Sreekrishna, A.Naveenkumar" A Survey on Optimizing the QoS during service level agreement in cloud ",International Journal of Emerging Technology and Advanced Engineering (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 3, Issue 3, March 2013)