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A New Construction for Para Virtualization in the Cloud Data Storage and Access the Data Using Web Services

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Abstract: Hybrid cloud computing has be a promising solution for Software-as-a-Service (SaaS) providers to effectively handle the dynamic user requests. The SaaS providers can extend their services into the public clouds seamlessly so that the dynamic user request workload to a SaaS can be elegantly processed with both the local servers and the rented computing capacity in the public cloud. However, although it is suggested that a hybrid cloud may save cost compared with building a powerful private cloud, considerable renting cost and communication cost. We design a service provisioning model to manage the on-spot and on-demand requirements of users. PaaS satisfy on-spot by providing space from public cloud to SaaS. This proposed method is done with online dynamic provision algorithm which calculates the number of users request for service. Depending upon this calculation the SaaS will purchase the virtual machine from PaaS and the transactions are done to pay for what is actually used.

Keywords: Platform-as-a-service (PaaS), Software-as-a-service (SaaS), Virtual machine.

I. INTRODUCTION

Recently with the rapid development of the cloud usage especially services, such as online gaming, social network, videoconference, etc., are growing exponentially. These services usually associate with problem of consumption of large amounts of computing and storage resources. Meanwhile, the tasks can be highly dynamic and exhibit huge peak resource requirement. In order to handle the dynamic services cost-effectively, more and more service providers adopt the cloud infrastructure, as it can respond to demands timely and allocate computing, communication and storage resources adaptively according to the requirements. The cost effectiveness of such a paradigm highly depends on how well the SaaS provider can optimize the cost caused by renting virtual machines from the public Paas cloud. Acquiring public Paas computing capacity may actually cause a considerable cost. Unfortunately, we still lack a good understanding of such a cost optimization problem, not to mention that there are no tools available for the cost-down task. Minimizing the cost of hybrid cloud operation is actually a very challenging task. First of all, the end users will be driven away if a SaaS cannot meet the service level agreement (SLA). In other words, a SaaS provider has to maintain its computing capacity while limiting the number of the VMs to reduce the renting cost at the same time.

However, the user requests are highly dynamic in nature. Their patterns cannot be known and even accurately predicted in advance. Moreover, communication cost between the local servers and the public IaaS cloud cannot be ignored, which unfortunately inherits the dynamics if the number of the renting VMs are dynamically tuned. Finally, the prices of VMs in the public IaaS cloud are typically varying and unpredictable.

All these dynamic factors can have a great impact on the cost, and hence bring great difficulty to the cost minimization task. However, existing approaches deciding the cost-efficient computing capacity of the cloud generally requires a priori knowledge of the user demand and the VM prices, or an accurate prediction. They also do not consider the dynamics of user requests.
As a result, they are not specifically tailored for optimizing the cost of hybrid cloud operation. IaaS is capable of dynamically providing virtual infrastructure according to the demand of users and offering flexible provisioning plans In IaaS cloud environment, a variety of computing resources can be combined to form different types of VM, each with a different combination of capacities of different resources.

There are two different rental costs, including an upfront fee for long term reservation, a usage charge of reserved resources, and an on-demand cost and on-spot demand. Our objective is to minimize the operational cost by virtue of optimal resource reservation and predictive adjustment of resource usage. The following techniques were used to achieve the objective:

1) On-demand: For Long term resource reservation, aimed to find the amount of resources to be leased such that the operational cost could be minimized, assuming that insufficient resources at any time instance could be dynamically and instantaneously allocated on demand. The resource reservation plan included the lease period, types of VM and their quantity to be reserved.

2) On-spot: For short term resource allocation, adopted based on the online dynamic provisioning algorithm to predict workload demand.

II. RELATED WORK

As more and more hybrid cloud services have been acquired, the service scheduling and resource management for hybrid cloud have attracted a lot of research interests. Previous studies have considered how to manage workload and cloud services in single private cloud environment and to purchase the virtual machine from the Iaas. The service scheduling and resource allocation in such clouds, and used the queuing theory to evaluate the queuing networks to analyze the capacity of on-demand clouds and the proposed system is used to designed an algorithm for dynamic resource allocation. These studies conducted optimization based on the pre-knowledge of the requests' arrival pattern, either through prediction or detection. The proposed algorithm optimizes the multi-service task scheduling for hybrid services in a hierarchical cloud system and minimize the resource cost. However, since the algorithms proposed in are not exact ones, they cannot provide the optimum solution, especially the long-term optimum. With the idea of hybrid cloud, one can promote the advantages of utilization of virtual machine based on the dynamic requirements proposed to categorize the service requests as workloads and then serve them in private and public.

They used a different service model from ours, and we do not need to detect the arrival pattern of the requests. The work in leveraged Lyapunov optimization technique to manage the content delivery services in hybrid cloud. As it was for content delivery, the work only addressed content placement and migration in the private and public DCs, but did not consider how to allocate resources to provision servers or VMs. While in our work, we study the resource management in hybrid cloud for resource computing and conduct optimization with the consideration of different time granularities for resource reservations in private and public cloud. More importantly, the proposed algorithm in has to be implemented in the centralized way for arranging the content placement, while our proposal can operate distributed.

III. PROPOSED SYSTEM

In the recent trends of hybrid cloud implementation this propose system introduce the efficient way to request an hybrid cloud service based on the load or demand and pay for the actual use of cloud space only. This proposed system mainly focuses on the cost minimization. In existing the SAAS server will acquire the private cloud space from the IAAS server and the will upload all their application. These applications are available to their users on cloud. When the number of dynamic request from user increases application services would be automatically coming from the VM server (provided by IaaS). And SaaS server's would buy the server space and keep for yearly bases so there would be unwanted cost for unused data's so we proposed two schemes On demand VM services and On-spot virtual machine services, by using these schemes we can reduce the cost for un used data's. And also we can avoid the unwanted queue as well. Initially they have to pay for selected services. In on demand VM services user can select the services for full day, monthly or weekly, and In on spot services user can select the services for hourly, minutely. Till the available validity user's can use their services after the validation the process would happen repeatedly.

Our contribution of our work can be summarized as

1. We propose an online algorithm for hybrid cloud management, which calculate the number of user requests.
2. We ensure that the proposed algorithm operated based upon the user request which changed dynamically and this enable the SaaS to determine whether their can meet the user with our private or they may need the support of hybrid cloud.
3. This paper proposes two methods to obtain the service. On-spot and On-demand. Two methods are used by calculating the number of request from user
4. Since the user request varies timely we ensure to check the status of number of user to know the actual load on their cloud. Depending on it the SaaS request for the public space from the Paas and it PaaS provide the SaaS with requested virtual machine support.
5. On-demand purchase of cloud space is done by SaaS from Iaas who provide them with bulk space as private space to SaaS.
6. When the SaaS cannot satisfy the service to user request within their private cloud, they opt for On-spot service. PaaS service to buy virtual machine to get the benefits of hybrid cloud.
7. As the number of user changes the algorithm keep checking the number the load in the cloud by implementing a timer to facilitate the timely checking of user.
8. This proposed system can seamlessly move the service from private to public space with help of PaaS and can again move to their own private cloud when the load on the cloud is limited to their own private space limit.
9. This proposed methodology reduces the cost minimization and reduced the need for bulk purchase on space from the cloud. This also enables the SaaS the option of On-demand (bulk and long time usage) and On-spot (to meet the required service, short time).

IV. SYSTEM ARCHITECTURE

In this section, we focus on the system model of the problem we are facing. We consider a SaaS provider operating with a small local data centre (or local servers) and the provider can also extend its service capacity via renting the VMs from a public IaaS cloud. This is a typical hybrid cloud model. Since renting the public cloud resources incurs monetary cost, the SaaS provider should reduce such cost. The key problem to the SaaS provider is how to decide the number of VMs it need to rent so that the performance requirement is satisfied and the cost is minimized. In the real-world scenario, the SaaS provide has to make decisions on the number of the VMs in some degrees of granularity. The allowed minimum renting period of reserved VMs is we consider by SaaS provider will divide its operation period into a sequence of time

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intervals with length T and determine the number of the reserved VMs at the beginning of each interval. We name such a decision interval with length T a coarse grained decision interval. The numbers of the other two types of VMs (the on-demand ones and the on-spot ones) can be decided in a relatively short-term manner.

A) SaaS request and PaaS Service Model:
Saas Purchase their private space from Iaas on a long term renting manner. SaaS provide the environment to the user to use their products and run them in cloud to meet their economical standard to ensure quality of service. Saas have a pre-defined level of server space to support their service to their user. But due to dynamic variation of user request the SaaS can only predict or determine e the customer number on random base. No mathematical or systematic ways are available for SaaS to calculate accurate number with only knowledge of previous history of user request. Saas cannot opt for bulk space since they may lead to wastage of cost in buying huge space and resource. So SaaS can go for selection of service name on-demand or on-spot to manage the cost optimization. The Saas will do the prior Transaction with Paas to pay the amount for purchasing the hybrid cloud space and the Saas maintain the transaction details in their local server database.

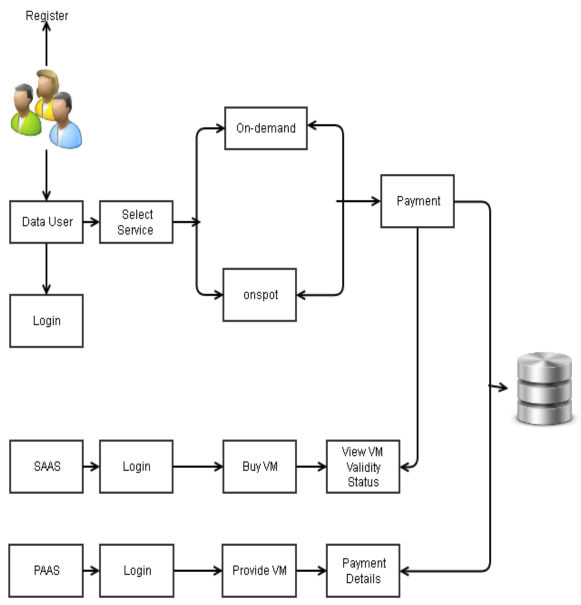

Fig 1: Architecture of proposed system.

B) User Request And SaaS Service Model:
SaaS are the service providers and the user requests them for the service. Prior to the load on the cloud the SaaS must satisfy the user request to ensure the quality of service. The service is done through web service and the request is passed through a proper authentication and verification by the SaaS local server. The user may select the service offered by the SaaS and they pay to Saas service provider for enabling the service. When the number of load on the SaaS server exceeds their maximum load limits then the SaaS will opt for the support of virtual machine. The SaaS will get the requested virtual machine space depending on the SaaS user load. Saas implements the online dynamic provision algorithm to determine the load status of the user. The SaaS will allocate the number of users in the queuing pattern manner and provide their space in the private cloud space. As the number of request increase dynamically the algorithm determine when to seamless from private cloud to public cloud space.

V. ONLINE DYNAMIC PROVISIONING ALGORITHM

To achieve the minimum time-averaged cost is a huge challenge, since the SaaS provider cannot have the knowledge of the future user requests and VM prices in advance in the real practice. In this section, we first discuss how we tackle the resource requirement heterogeneity of user requests, which is typical in real-world scenarios. Then we discuss our virtual queue notion to bound the request delay so as to meet the SLA contract. Based on these considerations, we then build the online dynamic provisioning optimization model and convert the cost minimization problem into a solvable one. We design an online dynamic provision algorithm to solve this problem. ODPA is able to approach the minimum time average cost without any a priori knowledge of the future user request workload and the future IaaS VM prices.

Step1: The algorithm determines the number of active user requested for the service to SaaS. The values are determined by maintaining the user account status in the local database maintained by the SaaS.
Step 2: The algorithm operates in the queuing pattern. It rearranges the number of users request into a queue pattern depending upon the duration and first in first server manner.
Step 3: Algorithm sets the minimum space limit of SaaS private space limit of SaaS private server and when the load exceed the limit only then the SaaS will get the hybrid cloud from the Paas, till this the user will be served only from the private cloud space of SaaS.
Step 4: When the user loads exceed the SaaS will purchase the public cloud from the PaaS and this is done by on-spot payment method.
Step5: The Algorithm will maintain a timer function will periodically checks foe the number of user .As the user becomes inactive the algorithm will set the limits to the actual load in the cloud. As the load decrease the service from virtual machine can be retrieved back to their own private space area.

The algorithm provides the flexibility to change the service mode based on the demand of the user request. This will provide a solution for the unnecessary purchase of cloud space and coat optimization is done by this flexible service option.

VI. SYSTEM MODEL AND FUNCTIONS

A. SaaS Authentication :
The Proposed system has a authentication modules for SaaS and User to enable to get the requested service and for transaction purpose. Saas publish they product in cloud

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and they maintain their own local server database to maintain the records of the transaction details. These transactions will take place for the service which was provided by the SaaS to the user and the user can avail the options of on-spot and on-demand. The second level of interaction will happen between the SaaS and the PaaS for only for the availing the on-demand service of public cloud. SaaS will maintain their records in their local server database. SaaS purchase virtual machine with validity and for short time usage purpose. It holds the entire details of validity status, time, consumed space and payment amount details.

B. IaaS Service:
IaaS support the SaaS with providing a bulk space for a long period of time. This is done on a monthly or yearly manner. IaaS will provide the SaaS with their private space as renting of private cloud is far better than setting up a new infrastructure to run their applications. The interacting environment will support the SaaS to run their service and through this support the SaaS can serve their user demands. This service between the SaaS and PaaS is based on the Service Level Agreements (SLA). It frame the service validity, and other technically requirements which are to be meet to avail this service. When the validity our previous agreement expires the SaaS have to sign up for a new SLA to continue their business.

C. User Authentication:
User gets the service from the SaaS who provide their application to meet the needs of the user. The user will raise the request to the service provider. SaaS will maintain a individual login accounts to all their customers and maintain them in their local server. Each time when the user sends the request the SaaS will authenticate the appropriate user to use their product. As the request for the service increase dynamically use SaaS service will implement the algorithm to determine the load in their private cloud space. SaaS will determine their private space by setting the algorithm maximum limits to their maximum server capacity. As the SaaS cannot calculate any accurate number of loads for te service, they set the algorithm to perform it manually. SaaS but provide their best quality of service to their user and have the flexible and efficient way to meet the dynamic request rate.

SaaS will provide their product to their customer will certain logins and service options. As the users get their service from the SaaS they have to do the payment for the service to the SaaS. SaaS will provide these transactions with the help of web services. This will maintain their login table to hold only the active user numbers. The value of active logged in user are giving as the input to the algorithm which is implemented by the SaaS who sets the limits and virtual machine capacity The algorithm will perform in a queue manner from which the input to each instance is based on the result executed by the timer. SaaS will set the timer for their algorithm to refresh the status of the logged in used for a certain period of time. As they complete the service Saas will maintain the appropriate database to hold all these user activity and provide them will individual accounts details so view their service charges.

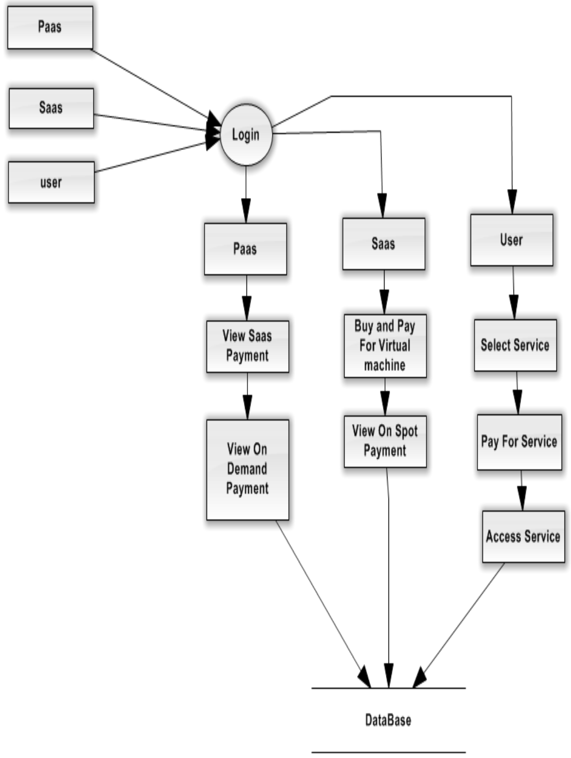

Fig 2: System and function workload.

By implementing the proposed algorithm the SaaS can provide a solution for cost optimization and other technical faults like server error or any server crush.

VII. CONCLUSION

This paper investigates how to optimize the monetary cost of purchasing cloud virtual machines for the hybrid cloud computing paradigm. Firstly this provides any option of selecting the method of service as on-demand or on-spot. Our work calculates the actual number of user request by using the online dynamic optimization algorithm and periodically updates them to know the exact value of the load in the cloud. This system overcomes the disadvantage of working with arbitrary values of request, arriving probability and no accurate a priori knowledge of VM prices in the public cloud. We then develop an method to minimize the time average cost with an online dynamic allocation algorithm. Both the theoretical analysis and the experimental study based on real world data trace demonstrate the advantages of the algorithm. The evaluation shows that the online dynamic provision algorithm can achieve much lower cost than the conventional method and approach the ideal offline optimal method closely.

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