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Optimizing Resource Utilization for QoS metrics for Service Vendors in Cloud Computing

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Abstract:
Cloud computing has been considered as a solution for solving enterprise application distribution and configuration challenges in the traditional software sales model. Migrating from traditional software to Cloud enables ongoing revenue for software providers. Especially, employing suitable metrics is vital in assessing practices. Nevertheless, to the most popular of our knowledge, there's no methodical explanation relating to metrics for estimating Cloud products and services. QoS metrics playing an important role in electing Cloud providers and also optimizing resource utilization efficiency. While many reports have got to devote to exploitation QoS metrics, relatively not much equipment supports the remark and investigation of QoS metrics of Cloud programs. To guarantee a specialized product is published, describing metrics for assessing the QoS might be an essential necessity. So, this text suggests various QoS metrics for service vendors, especially thinking about the consumer's worry. This article provides the metrics list may stand to help the future study and also assessment within the field of Cloud service's evaluation.

Index Terms: Cloud computing; Quality of Service; Resource Allocation; Software as a Service

1. INTRODUCTION

Conventionally the shrink-wrapped software sales model dominated the market. This model requires customers are required to purchase per petual or subscription-based license and manage the deployment themselves, including transitioning between different versions. Hence, customers need technical expertise and high initial investment for buying software. They also need to pay for upgrades as annual maintenance fee. With the emergence of Software as a Service (SaaS), applications are moving away from PCbased or ownership-based programs to web delivered hosted services. The software services are provisioned on a pay-as-you-go basis to overcome the limitation of the traditional software sales model. Using the SaaS model, providers gain steady, on-going revenue from their customers. In exchange for the on-going charges, the customers get the benefit of continuously maintained software. Hence, there is no additional license fee for new versions and the complexity of transitioning to new releases is managed by SaaS providers. Due to the SaaS model's flexibility, scalability and cost-effectiveness, it has been increasingly adopted for distributing many enterprise software systems, such as banking, e-commerce business software. SaaS providers such as Computer Associates (CA) derive their profits from the margin between the operational cost of infrastructure and the revenue generated from customers. Therefore, SaaS providers are looking into solutions that minimize the overall infrastructure cost without adversely affecting the customers. Hence, the focus of this paper is on exploring policies to minimize the required infrastructure to meet customer demand in the context of SaaS providers offering hosted software services.

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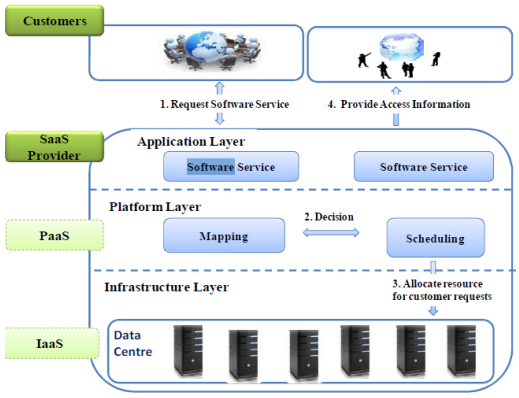

Figure 1. A system model of a SaaS layer structure

A SaaS model for serving customers in Cloud is shown in Fig. 1. A customer sends requests for utilizing enterprise software services offered by a SaaS provider, who uses three layers, namely application layer, platform layer and infrastructure layer, to satisfy the customer's request. The application layer manages all application services that are offered to customers by the SaaS provider.

Every Cloud provider offers very similar products at distinct (completely different) costs and capability degrees with various groups of choices. Whereas one seller may be inexpensive for memorial solutions, they will be costly for calculation. Moreover, the services on the server side are perceived as a black box to system customers. Therefore, quality evaluation of services before distributing is vital in a Cloud environment. The services ought to be examined by QoS metrics to form specified; the services are satisfying the consumer's expectancy. Once assessing Cloud services, a collection of appropriate measurement metrics or criteria should be chosen. In fact, based on the produced research within the analysis of ancient computing devices, the choice of metrics plays a vital role in analyzing implementation. However, compared to the massive quantity of the study attempts into the conditions for the Cloud, to the easiest of our information, there's not one methodical article concerning metrics for evaluating Cloud services even so.

2. RELATED WORK

Today, most people, each IT organization are discussing about the Clouds. Though' there is no precise definition of Cloud systems, you'll be able to know about it in several ways. Cloud computing could be a model for sanction present, simple, on demand access to a joint pool of computing services (e.g., servers, networks, programs, storage, and so on) that may be immediately provisioned and also discharged with lowest administration effort. The Government might be a main customer of electronic services and, thus, one in every of the principal consumers of Cloud systems. The United States National Institute of Standards and Technology (NIST) have a collection of operating definitions that distinguish Cloud computing into service models and deployment models. Cloud is TCP/IP primarily based development of computer technologies like large memory, fast microprocessor, reliable system design and high-speed network. We'll try to deliver a representative (as opposition complete) set of definitions as a referral towards future usage within the Cloud computing connected research area.

As Clouds‖ don't focus on a specific technology, nevertheless, to an all-purpose provisioning paradigm with increased abilities, it's essential to complicate on these attributes.

There are several distinct options provided by Cloud vendors dealing with the IT needs of multiple companies. Each decision has got very different efficiency regarding performance, service latency and precision. Institutions ought to recognize however their programs can do on the numerous Clouds and also whether or not those deployments satisfy their goals. Performance means diverse things in many contexts. Generally, it's relevant to response time (the time could it require to process a demand), throughput (how much a number of requires over-all might be done per unit of the time) , or even timeliness (capability to meet deadlines, i.e. , To process requesting in

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a settled and appropriate time period) . Strength of SaaS provider's security processes and standards: Because you access SaaS provider software via the Internet and your data is stored at the provider's site, security is of utmost importance. Security issues can be complex if the SaaS provider forces you to follow a fixed security model that is at direct odds with your corporate security model.

Work with the SaaS provider on a service level agreement (SLA) for security that satisfies your needs. Provider's ability to provide the flexibility needed to meet your needs: Flexibility involves a number of things. Can you easily add and drop features to your subscription, such as add seats, and can you do it online? Can you drop your subscription with cause, such as SaaS provider fails to deliver the agreed upon solution, without penalty? Can you integrate the SaaS solution with other corporate solutions? History of provider's regard for its SLAs: SLAs are important for availability, performance, scalability and security. Ask the SaaS provider for permission to look at SLA performance records to see if the provider is reliable with respect to adhering to SLAs for customers. A mature SaaS provider will negotiate SLA agreements to satisfy your needs. Provider's business viability and future outlook: Select a SaaS provider that is going to be in business for a long time. In selecting a SaaS provider, you are looking for a business partner that will not go out of business in a year. Additionally, does the provider have a good set of partners? Does the provider have a long list of satisfied customers, including reference customers for you to interview? Using different clustering techniques in SaaS, we find the answer of above written questions. With the help of clustering we make different clusters according to customer requirement for example scalability, availability, pay per use, updating of software required, time duration, etc. Providers have a long list of satisfied customer according to the satisfaction of their work with the help of clustering. Providers can create a group of clusters by applying different types of clustering algorithm on their data.

3. IMPLEMENTATION

We consider the customers' requests for the enterprise software services from a SaaS provider by agreeing to the pre-defined SLA clauses and submitting their QoS parameters. Customers can dynamically change their requirements and usage of the hosted software services. The SaaS provider can use their own infrastructure or outsourced resources from public IaaS providers. For instance, "Saleforce.com" provides CRM software as a service using its own infrastructure, and "Force.com" offers this software using third party infrastructure [15]. The SaaS provider's objective is to schedule a request such that its profit is maximized while the customers' (QoS) requirements are assured. The platform layer of a SaaS provider uses mapping and scheduling mechanisms to interpret and analyze the customers' QoS parameters, and allocates respectively. In this section, we explain the detailed system model from both the customers' and the SaaS providers' perspective and also describe the related mathematical models.

A. Actors

The actors involved in our system model are described below along with their objectives, activities and constraints.

1) SaaS Providers

SaaS providers lease enterprise software as hosted services to customers. They are interested in maximizing profit and ensuring QoS for customers to enhance their reputation in the marketplace. In our context, an example of the business process between a SaaS provider and a customer is where a service provider (SaaS X) offers CRM or ERP software packages, which are offered as three types of products (for example, Standards, Professional

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and Enterprise) and accounts (for example, Group, Team and Department). When a customer (Company X) submits its first time rent request with product type (Standards), account type (Group), and the required number of accounts (m), the provider will allocate resources to serve this customer. At anytime, Company X may require an upgrade in the service by adding more accounts or software editions. Customers can request an upgrade of services dynamically at any time in practice. Thus a SaaS provider has to handle these requests intelligently in line with the requirements as set out in the SLA.

2) Customers

When a customer agrees with pre-defined SLA properties (such as response time), a request for an enterprise application is sent to the SaaS provider's application layer with the customer's QoS requirements (including request type, product type, account type, contract length, and number of accounts) .

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Government might be a main customer of electronic services and, thus, one in every of the principal consumers of Cloud systems. The United States National Institute of Standards and Technology (NIST) has a collection of operating definitions that distinguish Cloud computing into service models and deployment models. Cloud is TCP/IP primarily based development of computer technologies like large memory, fast microprocessor, reliable system design and high-speed network. While not the standard interconnection protocols and mature of set data centre concepts, Cloud system wouldn't reality too. The varied definitions and interpretations of Clouds and or Cloud computing‖ can be found. With particular respect to the multiple usage scopes, the term is used to.

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4. CONCLUSION

In Cloud computing environments, primarily three types of on-demand services are available for customers i.e. Software as a Service, Infrastructure as a Service and Platform as a Service. This paper focused on scheduling customer requests for SaaS providers with the explicit aim of cost minimization with dynamic demands handling. To achieve this goal, we answered questions raised in the introduction section by using mapping and scheduling mechanisms to deal with the customer side dynamic demands and resource level heterogeneity. Thus, we implemented three cost driven algorithms which considered various QoS parameters (such as arrival rate, service initiation time and penalty rate) from both the customers' and the SaaS providers' perspective. In building on the research undertaken in this paper in the future, we will analyze ways to increase the efficiency of the algorithms in terms of total profit and shall also consider the SLA negotiation process in Cloud computing environments to improve customer satisfaction levels. We would also like to add different types of services and other pricing strategies such as spot pricing to increase the profit for service providers. Moreover, investigating the knowledge based scheduling for maximizing a SaaS provider's profit to improve our algorithms' time complexity. Moreover, we will look into the penalty limitation by considering system failures.

REFERENCES

[1.] Y. Amanatullah, C. Lim, H.p. Ipung, A. Juliandri, Toward Cloud Computing Reference Architecture: Cloud Service Management Perspective‖, ICT for Smart Society (ICISS), 2013 International Conference, 2013, pp. 1–4.

[2.] E. Ciurana. ―Developing with Google App Engine‖, Apress, Berkeley, CA, USA.

[3.] M. Cusumano. ―Cloud Computing and SaaS as New Computing Platforms‖, Communications of the ACM, 53 (4), 2010, pp. 27–29.

[4.] Sami Ayramy and Tommi Karkk "Introduction to partitioning-based clustering methods with a robust example".Lior Rokach "Clustering methods".

[5.] "Knowledge Discovery in Services (KDS): Aggregating Software Services to Discover Enterprise Mashups" IEEE Transations on knowledge and data engineering Vol. 23, No. 6, June 2011.

[6.] Sun Jigui, Liu Jie, Zhao Lianyu, "Clustering algorithms Research", Journal of Software, Vol 19,No 1, pp.48 61,January 2008.

[7.] Clustering Composite SaaS Components in Cloud Computing using a Grouping Genetic Algorithm, published IEEE

World Congress on Computational Intelligence June, 10-15, 2012 - Brisbane, Australia.

[8.] M. A. Vouk, "Cloud Computing-Issues, Research and Implementation". In Proceedings of 30th International Conference on Information Technology Interfaces (ITI 2008), Dubrovnik, Croatia.

[9.] J. Broberg, S. Venugopal, and R Buyya, Market-oriented Grids and Utility Computing: The state-of-the-art and future directions, Journal of Grid Computing, 3(6), (pp.255-276).

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