International Journal of Computing Science and Information Technology, **2013, Vol.1 (02) 13 - 16**
ISSN: 2278-9669,April 2013 (http://ijcsit.org)

CLOUD-SLA: Service Level Agreement for Cloud Computing

[1] J.UDAYAKUMAR [2] M.MANIKKAM [3]A.ARUN

[1] DEPT. OF CSE, P.K.I.E.T, KARAIKAL.
Uday.ja@gmail.com

[2] DEPT. OF CSE, P.K.I.E.T, KARAIKAL.
manikkam11@gmail.com

[3] DEPT. OF CSE, P.K.I.E.T, KARAIKAL.
activearun1006@gmail.com

Abstract

In the last few years, the cloud computing becomes the most important developing platform for both scientific and commercial application. Clouds are rapidly becoming an important platform for scientific applications. In the Cloud environment with uncountable numeric nodes, resource is inevitably unreliable, which has a great effect on task execution and scheduling. In cloud computing, cloud providers can offer cloud consumers two provisioning plans for computing resources, namely reservation and on-demand plans. In general, cost of utilizing computing resources provisioned by reservation plan is cheaper than that provisioned by on-demand plan, since cloud consumer has to pay to provider in advance. With the reservation plan, the consumer can reduce the total resource provisioning cost. However, the best advance reservation of resources is difficult to be achieved due to uncertainty of consumer's future demand and providers' resource prices. To address this problem, The SLA can provision computing resources for being used in multiple provisioning stages as well as a long-term plan, The Service Level Agreement (SLA) based super scheduling approach promotes cooperative resource sharing. Super scheduling is facilitated between administratively and topologically distributed sites via resource schedulers such as Resource brokers and workflow engines.

Keywords: Service level agreement; Cloud Computing; Software as a service; Quality of Service; Resource allocation.

1. Introduction

Cloud computing is basically an Internet-based network made up of large numbers of servers - mostly based on open standards, modular and inexpensive. Clouds contain vast amounts of information and provide a variety of services to large numbers of people. The benefits of cloud computing are Reduced Data Leakage, Decrease evidence acquisition time, they eliminate or reduce service downtime, they Forensic readiness, they Decrease evidence transfer time. The main factor to be discussed is security of cloud computing, which is a risk factor involved in major computing fields.

Cloud Computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth.

A service level agreement is a formal negotiated agreement which helps to identify expectations, clarify responsibilities, and facilitate communication between a service provider and its customers. The purpose of this Agreement is to ensure that the proper elements and commitments are in place to provide consistent IT service support and delivery to the Customer(s) by the Service Provider(s).

A service-level agreement (SLA) is a contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish. Many Internet service providers (ISP)s provide their customers with an SLA. More recently, IS departments in major enterprises have adopted the idea of writing a service level agreement so that services for their customers (users in other departments within the enterprise) can be measured, justified, and perhaps compared with those of outsourcing network providers.

2. Related Work

Though Cloud computing is a highly studied topic today and a large body of research has gone into studying specific standards of interoperability amongst clouds and how they are to be achieved, the aspects of brokering services to the end client from amongst those available is finding refereed status only recently [2]. A cloud broker has been described as an entity that manages the use, performance and delivery of cloud services and negotiates relationships between cloud providers and cloud consumers. Existing work in literature primarily stress on using SLAs to guarantee consumer of cloud services a level of performance, that is defined by abstract metrics, directly from the cloud service providers to the end client or cloud consumers [3], [4], [5]. There is an apparent void in research on SLA formulation strategies between the cloud service broker and the cloud consumer and between the cloud service broker and the cloud service provider. This research is an attempt to highlight the research void and recommend a framework which can be developed for creation of enforceable and implementable SLAs in the cloud paradigm.

The architecture of the cloud, whether public, private, community or hybrid, would make it non trivial to propose and implement a framework for creating of such binding frameworks in the absence of accurate measuring and monitoring mechanisms for provision of services. This is especially true for a use case when the broker is aggregating and arbitraging services from multiple cloud service providers and packaging them as a service bundle for the end client. Previous work on the subject include [6], [7] and [8] that pertains to SLA formulation, but does not address the aspects of the cloud brokering actor's role in the provisioning of services. Alhamad [3] [4] discusses the aspect of SLA and performance measurement in his recent findings but does not address the issue in the perspective of how a broker would become a party to the SLA agreement between the end user or the cloud consumer and the cloud service provider. In [9], Alhamad describes a conceptual framework for SLA in the cloud computing paradigm, but the same is silent on the aspect pertaining to Brokers in the service model.

This system is in charge of brokering the collection of Cloud resources from different providers that fulfills requirements of user's applications as a best effort service. The user is able to delegate to the Agency the necessary checks of the agreement fulfillment, the monitoring of resource utilization and eventually necessary re-negotiations. In [13], Balakrishnan and Somasundaram propose a broker framework where SLA enabled broker evaluate the number of resources available in the environment and the number of policies per resource that need to be implemented. The results presented in the paper indicate that the inclusion of SLA affects the resource selection behavior of the broker. The paper is however silent on the methods to control the affect using an SLA. It does however indicate that the overall performance of the system improves in terms of job throughput with an extra overhead in request processing due to the presence of a broker. These results are shown on a grid sharing environment and major differences exist in the business model used for the grid service provisioning and cloud service provisioning model. A number of publications, post 2010 [14], [3], [11], [15], [16], [9] are either addressing the aspect of SLA management for brokering services at the level of a resource scheduler, or abstractions of the same when lifted from the grid computing era.

3. Existing System

In cloud computing, a resource provisioning mechanism is required to supply cloud consumers a set of computing resources for processing the jobs and storing the data. Cloud providers can offer cloud consumers two resource provisioning plans, namely short-term on-demand and long-term reservation plans. Cloud providers which offer IaaS services with both plans. In general, pricing in on-demand plan is charged by pay-per-use basis (e.g., 1 day). Therefore, purchasing this on-demand plan, the consumers can dynamically provision resources at the moment when the resources are needed to fit the fluctuated and unpredictable demands. For reservation plan, pricing is charged by a onetime fee (e.g., 1 year) typically before the computing resource will be utilized by cloud consumer. With the reservation plan, the price to utilize resources is cheaper than that of the on-demand plan. In this way, the consumer can reduce the cost of computing resource provisioning by using the reservation plan

Disadvantages- The reservation plan, the cloud consumers a priori reserve the resources in advance. As a result, the under provisioning problem can occur when the reserved resources are unable to fully meet the demand due to its uncertainty. Although this problem can be solved by provisioning more resources with on-demand plan to fit the extra demand, the high cost will be incurred due to more expensive price of resource provisioning with on-demand plan. On the other hand, the over provisioning problem can occur if the reserved resources are more than the actual demand in which part of a resource pool will be underutilized. It is important for the cloud consumer to minimize the total cost of resource provisioning by reducing the on-demand cost and oversubscribed cost of under provisioning and over provisioning. To achieve this goal, the optimal computing resource management is the critical issue.

4. Proposed System

In this paper, minimizing both under provisioning and over provisioning problems under the demand and price uncertainty in cloud computing environments is our motivation to explore a resource provisioning strategy for cloud consumers. In particular, an optimal cloud Service Level Agreement (SLA) algorithm is proposed to minimize the total cost for provisioning resources in a certain time period. To make an optimal decision, the demand uncertainty from cloud consumer side and price uncertainty from cloud providers are taken into account to adjust the tradeoff between on-demand and oversubscribed costs.

Using our SLA users can share our memory to any other users through pay per basic or open source and user can use unused memory's to use other applications, and the results show that SLA can minimize the total cost under uncertainty. In this paper, cloud consumer can successfully minimize total cost of resource provisioning in cloud computing environments using SLA.

5. Approach

The key advantages of our approach are that it allows:

i. Resource owners to have new degree of control over the resource allocation which is something that is not possible with traditional mechanisms; and

ii. Schedulers to bid for SLA contracts with focus on completing a job within a user specified deadline. In this work, we use simulation to show the effectiveness of our proposed approach.

iii. And SLA will provide only authorized users to access our Application.

Here, we present the algorithm that is based on a proportional allocation of bandwidth per traffic class as that provides the be sterilizations of available resources. To fully support SLAs, bandwidth constraints agreed in a service contract are used to ensure that the just amount of bandwidth is assigned to a particular class.

Let $Q^i(j)$ be the amount of the bandwidth requested for queue j by ONU I and $\beta_k{}^i(j)$ is the bandwidth allocated to this queue in step k of the algorithm. Let γ^i_{min} (j) and γ^i_{max} (j) be the minimum and maximum of the bandwidth guaranteed to the particular queue.

In phase *I*, the OLT assigns bandwidth proportionally to reported queue length Q^i (j).

$$\beta^i{}_I(j) = 1/\Sigma_{i,j} Q^i(j) . Q^i(j)$$

In the second phase the constraints given in the SLA are applied. Three distinct situation have to be considered:

1) $\beta^i{}_I(j) \geq \gamma^i{}_{max}(j)$ – Assigned bandwidth has exceeded the amount promised in the SLA. The bandwidth allocated to a particular queue is thus reduced to $\beta^i{}_{II}(j) = \gamma^i{}_{max}(j)$.

2) $\beta^i{}_I(j) \geq \gamma^i{}_{min}(j)$ and $\beta^i{}_I(j) < \gamma^i{}_{max}(j)$ – Requested bandwidth is within the limits of the SLA. No changes are made and $\beta^i{}_{II}(j) = \beta^i{}_I(j)$

3) $\beta^i{}_I(j) < \gamma^i{}_{min}(j)$ – In a situation where $Q^i(j) > \beta^i(j)$ bandwidth assigned is equal to $\beta^i{}_{II}(j) = Q^i(j)$ as it is smaller than agreed in the SLA. Otherwise no changes are made and $\beta^i{}_{II}(j) = \beta^i{}_I(j)$

Bandwidth that is not allocated during the second step is shared among all queues in phase three. The amount of bandwidth assigned to a queue could be thus expressed as:

$$\beta^i{}_{III}(j) = \beta^i{}_{II}(j) + \beta_{ex}/\beta^i{}_I(j) \qquad [18]$$

6. Conclusion

The number of users that can be served simultaneously. The proposed mathematical analysis will be useful to the cloud consumers (e.g., organization and company) for the management of virtual machines in cloud computing environment. Then proposed SLA will facilitate the adoption of cloud computing of the users as it can reduce the traffic and cost of using computing resource significantly. Then increase the trustworthiness and Quality of Service (QOS).Cloud computing is one of the important domain in today's technology world and it is accessible from anywhere so in our future work security constraints are implemented to provide highly secured resource provisioning.

REFERENCE

[1] Wei Wang, Guosun Zeng, "Cloud-DLS: Dynamic trusted scheduling for Cloud computing".

[2] C. A. Yfoulis and A. Gounaris, "Honoring SLAs on cloud computing services: a control perspective", Proc. 2nd Workshop on Bio-inspired Algorithms for Distributed Systems, Jan. 2010, pp. 29-38.

[3] M. Alhamad, T. Dillon, and E. Chang, "SLA-Based Trust Model for Cloud Computing," Proc. 13th International Conference on Network-Based Information Systems (NBIS '10).IEEE Computer Society, Dec. 2010, pp. 321-324. doi:10.1109/NBiS.2010.67

[4] M. Alhamad, T. Dillon, and E. Chang, "A survey on SLA and performance measurement in cloud computing," Proc. Confederated International Conference on On the Move to Meaningful Internet Systems - Vol II(OTM'11), Springer-Verlag, Dec. 2011, pp. 469-477.

[5] A. Lawrence, K. Djemame, O. Wäldrich, W. Ziegler, C. Zsigri, "Using service level agreements for optimising cloud infrastructure services," Proc. International Conference on Towards a Service-based Internet (ServiceWave'10), Springer-Verlag Berlin, 2011, pp. 38-49.

[6] D.D. Lamanna, J. Skene, and W. Emmerich, "Slang: A language for defining service level agreements," Proc. Nnth IEEE workshop of Future Trends of Computing 2003, IEEE Press, May 2003, pp. 100-106, doi:10.1109/FTDCS.2003.1204317.

[7] H. Ludwig, A. Keller, A. Dan, R. King, and R. Franck, "Web service level agreement (WSLA) language specification," IBM System Journal, vol. 43, Jan. 2004, pp. 136-158, doi:10.1147/sj.431.0136.

[8] A. Paschke, "Rbsla - A declarative rule-based service level agreement language based on rulem," Proc. International Conference on Computational Intelligence for Modelling, Control and Automation and International Conference on Intelligent Agents, Web Technologies and Internet Commerce Vol-2 (CIMCA-IAWTIC'06), IEEE Computer Society Dec. 2005, vol. 2, pp. 308-314, 28-30, doi:10.1109/CIMCA.2005.1631486.

[9] M. Alhamad, T. Dillon, and E. Chang, "Conceptual SLA framework for cloud computing," 4th IEEE International Conference on Digital Ecosystems and Technologies (DEST, Apr. 2010, pp. 606-610, doi: 10.1109/DEST.2010.5610586.

[10] D. M. Parrilli, "The determination of jurisdiction in grid and cloud service level agreements," Proc. 6th International Workshop on Grid Economics and Business Models (GECON '09), Springer-Verlag, 2009, pp. 128-139, doi: 10.1007/978-3-642-03864-8_10.

[11] M Wang, X Wu, W. Zhang, F. Ding, J. Zhou, and G. Pei , "A Conceptual Platform of SLA in Cloud Computing," Proc. IEEE Ninth International Conference on Dependable, Autonomic and Secure Computing (DASC), 2011, Dec 2011, pp.1131-1135, 12-14, doi: 10.1109/DASC.2011.184.

[12] S. Venticinque, R. Aversa, B. Martino, M. Rak, and Dana Petcu, "A cloud agency for SLA negotiation and management," Proc. Conference on parallel processing (Euro-Par 2010), Springer-Verlag, Aug. 2010, pp.587-594.

[13] P. Balakrishnan and T. S. Somasundaram, "SLA enabled CARE resource broker," Proc. Future Gener. Comput. Syst, vol. 23, Mar 2011, pp. 265-279, doi:10.1016/j.future.2010.09.006.

[14] H. Boley, S. Tabet, and G. Wagner, "Design rationale of ruleml: A markup language for semantic web rules" 2001, pp. 380-401 [retrieved: May, 2012].

[15] R. N. Calheiros, R. Ranjan, A Beloglazov, D. Rose, A. F. César, and R. Buyya, "CloudSim: a toolkit for modeling and simulation of cloud computing environments and evaluation of resource provisioning algorithms," Journal of Software Practice and Experience, vol 41, Aug 2010, pp. 23-50, DOI: 10.1002/spe.995.

[16] M. Mac as, J. O. Fit, and J. Guitart, "Rule-based SLA management for revenue maximization in Cloud Computing Markets," International Conference on Network and Service Management (CNSM), Oct. 2010, pp. 354-357, doi:10.1109/CNSM.2010.5691226.

[17] V. C. Emeakaroha, I. Brandic, M. Maurer, I. Breskovic, "SLA-Aware Application Deployment and Resource Allocation in Clouds," Proc. Computer Software and Applications Conference Workshops (COMPSACW 2011), IEEE Press, July 2011, pp. 298-303, doi:10.1109/COMPSACW.2011.97.

[18] Dawid Nowak, Philip Perry, John Murphy "A novel Service Level Agreement based algorithm for Differentiated Services enabled Ethernet PONs".