

Promoting AA_AM Framework For Amplification And Auditing The Service Level Agreement From The End User Over Cloud Computing Paradigm

Abel Adane., Azath M.

Abstract: Cloud computing systems use virtualization technology over distributed data centers to allocate resources to customers via the Internet. Service Level Agreement (SLA) is an excellent managing technique, and it is vital to control and manage the expectations of keeping the responsibility of both cloud service providers and cloud service consumers. The objective of Service Level Agreement is to define the reference parameters for the provision of Cloud service provider and for monitoring the level of quality provided. Service level agreement is designed to create a common understanding about services, priorities, and responsibilities. In this research, we reduced the problems that happened to the cloud service consumers. Providers are just focused on how to increase their interest rather than accomplishing what is expected according to the negotiation Service Level Agreement signed between the two parties, which include understanding about the services, priorities, and responsibilities during service provisions. This research was designed to monitor service level agreement from the cloud consumer side. To do so, we used secondary data resources like investigating different research papers and dissertation for problem identification purposes. To design this research we have used various tools like UML (E_Draw max) for devising the framework, Cloud Analyst for simulation purpose, Virtual machine, memory, host and other needed parameters in the tool and MySQL server to create service level agreement signed between the cloud consumer and cloud service providers during the prototype. We developed the framework named as AA_AH, to monitor Service Level Agreement from the client/ cloud service consumer side. It was developed from three basics components/agents. These components are Reader of Service Level Agreement, which is used to read service level agreement during service requested by cloud service consumers, monitoring agent and cloud resources. The Researchers evaluated this research based on variant scenarios and achieved the result in well mannerism.

Keywords: Cloud Computing, Cloud Analyst, Cloud Service Consumer, Cloud Service Provider, Service Level Agreement, AA_AH Framework etc.

1. INTRODUCTION

Information and Communication Technology (ICT) is the core technology for healthcare, education, science, entertainment, and defense. In the current era of information technology, every sector demands a high level of IT interaction like e-commerce, online tutorial in academic areas, online maintenance, online training and so on [2]. Cloud computing is the new trend of computing where readily available computing resources is exposed as a service. These computing resources are generally provided by cloud services providers based on the agreement agreed or signed between cloud service provider and cloud service consumer which is called as SLA. These services that are delivered by cloud service provider are must to be paid for cloud service provider as per cloud service consumer used the services. The quality of services we received from the cloud service provider is measured by the parameters fixed between the two parties (cloud service provider and cloud service consumer) [7]. Today is the era of Cloud Computing Technology in IT Industries. Cloud computing, which is based on the Internet has the most powerful architecture of computation. It

reckons in a compilation of integrated and networked hardware, software, and internet infrastructure [8]. In cloud computing paradigm there are several ways to access resources i.e access is on demand, resources like server, network, storage and others are shared through internet. In Cloud computing environment there service delivery model like SaaS, PaaS and IaaS and three deployment model like private cloud, public cloud, community cloud and hybrid cloud [6].

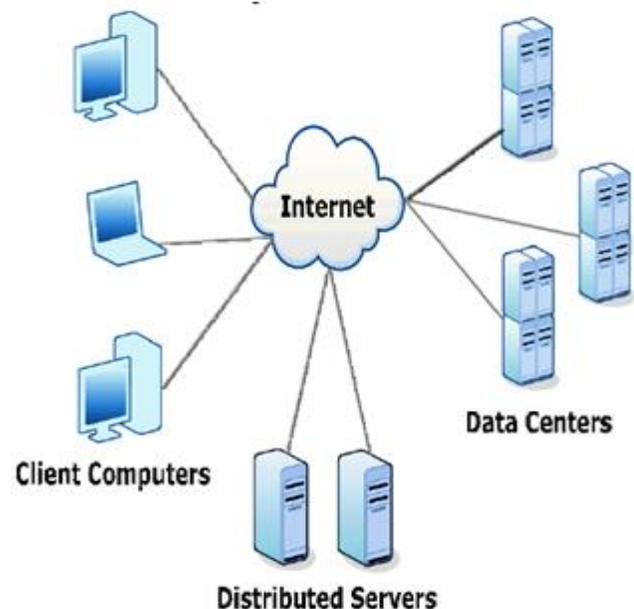


Figure 1. Cloud Computing Components

According to [5], services are delivered based on the services level agreement which is used as a negotiation between the two parties. The National Institute of Standards and Technology states that sharing of the resources

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according to the service level agreement and both parties are governed by service level agreement. Where virtualization creates the appearance that each user or workload has dedicated computing resources while the actual physical resources are being shared, cloud computing is concerned with the dynamic allocation of these virtual computing resources and the delivery of IT services over the network in response to rapidly changing business needs. According to [2], Service Level Agreement (SLA) is defined as a legal agreement between the cloud service provider and cloud service customers. The design of such agreement aims to maximize the profit to the provider as well as assuring the availability of services to the customer. The services on cloud computing is measured [3], as conducting the service level agreements between cloud service providers and service customers. There are other problems like resource management and accessibility of services. Without the monitored service level agreement, cloud computing may not have advantages for customers.

2. LITERATURE REVIEW

The SLA mainly consists of three main components. The first component is Parties, which contains cloud service providers, cloud service consumers, and third parties. The second component is, Metrics specify SLA parameters. The objective of SLA is to define the reference parameters for the provision of the Cloud service provider and for monitoring the level of quality provided. The objective of SLA is also to define the rules of interaction between the two parties. With the considerable increase in the speed of the network over the last decades, there is a significant rise in its usage involved millions of Web queries a day. This increasing demand is handled through massive data centers. These massive data centers are operated by many IT global companies such as IBM, Google, Amazon, and eBay. The mechanism in which the above business institutions used as cloud computing, where computing is delivered as a utility on a pay-as-you-go model [4]. Now, let's look at these elements closer.

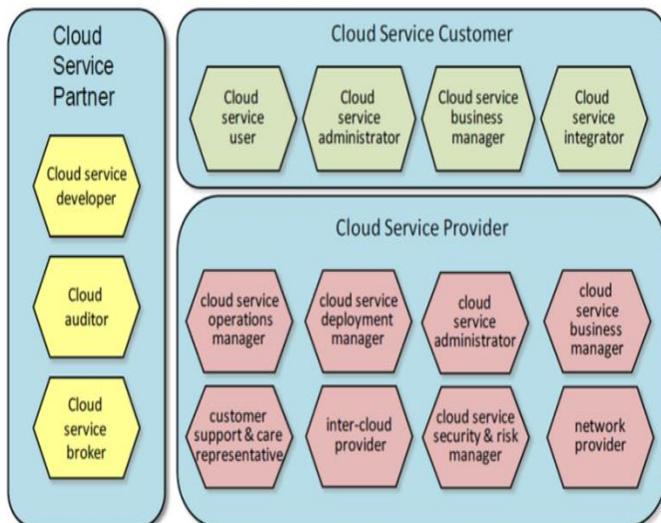


Figure 2. Elements of cloud computing

According to [10], it gives a platform to convert low-level metrics to high-level parameters for measurement. The platform contained the repository of mapped metrics and

agreed on SLA. When any new customer request comes to the system, it mapped with a metrics repository. This framework saves customers from costly SLAs and futures failures. LoM2HiS is automatic SLA management and enforcement framework.

3. RESEARCH METHODOLOGY

Providers are just focused on how to increase their interest rather than accomplishing what is expected according to the negotiation of SLA signed between the two parties, which include understanding about the services, priorities, and responsibilities during service provisions. This research was designed to monitor SLA from the cloud consumer side. To do so, we used secondary data resources like investigating different research paper as base paper and dissertation for problem identification purposes in detail. To design this research we have used various tools like UML (E_Draw max) for designing the framework, cloud Analyst for simulation purpose, Virtual machine, memory, host and other needed parameters in the tool and MySQL server to create service level agreement signed between the cloud consumer and cloud service providers during the prototype. During this research, we have compared different cloud simulation tools like ican_cloud, cloudsim, cloud Analyst, and so on. But as a result, we have taken a cloud Analyst for its suitability and efficiency. Since it was developed using java programming language, it was suitable to write java programming during the implementation of the prototype in the implementation part of our research. Different software and designing tools and techniques were used to accomplish the research tasks. Open-source Cloud Computing tool, i.e., Cloud Analyst, was selected for simulation of monitoring service level agreement from the cloud data center. Java software platform Net beans have been selected. MySQL database was selected, and we used the E-DrawMax modeling tool. Detailed of tools and techniques have been covered result Analysis and discussion.



Figure 3 Research Methodology

We have designed the prototype using the above strategies, as mentioned in the flow of the activities as shown in the Figure 3. Accordingly, we have selected the cloud Analyst tool as a simulation, E_Draw max (UML) for designing the framework, MySQL server, and java net beans. The framework was developed using the tools mentioned in this paragraph. Implementation was done as well, and finally, we had evaluated our framework using four different scenarios.

4. RESEARCH FINDINGS

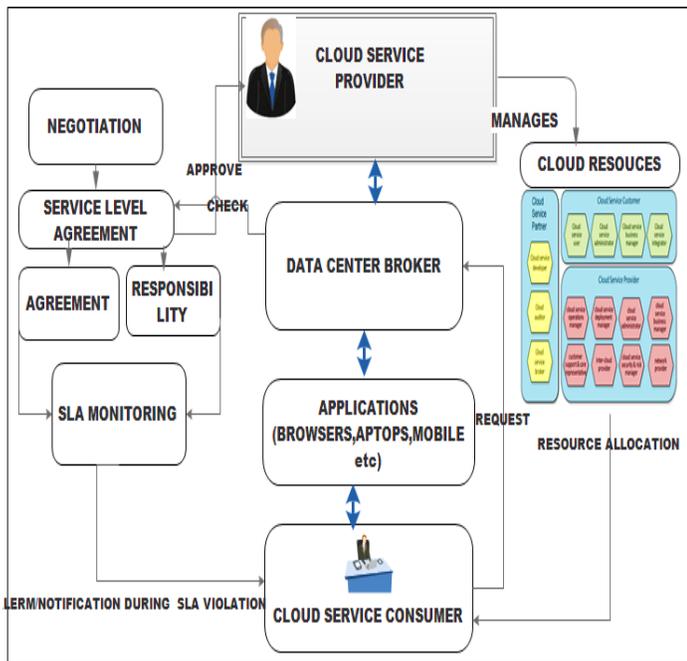


Figure 4: AA_AH Framework to measure and monitor Service Level Agreement over cloud computing paradigm

As we mentioned above, almost all research is done on the area of cloud computing SLA; there are large gaps in this area. So we proposed to develop the framework that is used to monitor service level agreement from client/ cloud service consumer side in the cloud computing environment. SLA is the negotiation between these cloud service providers and cloud service consumers as well. A problem mentioned earlier has been solved by the framework we proposed in this research. In this framework, two parties, cloud service provider and cloud service consumers, are negotiated based on the service level agreement. The service level agreement contains two components, which are the agreement and responsibilities by the two parties. This means according to the agreement, the cloud service providers must provide the services based according to the agreement designed in the service level agreement, and the cloud service consumers also must fulfill the responsibilities like billing activates on time and for the services they used. The cloud service consumer requests to the cloud broker to get services from the cloud provider. In cloud computing, consumers directly cannot receive the services because there must be a cloud broker between them. After the request reached the broker, the broker sends it to the cloud providers, and the cloud provider approves the request, and the resource will be allocated to

the cloud service consumers. The service level agreement monitoring component and/or agent is used to monitor the services requested and allocated to the cloud service consumers. This monitoring component performs its task by fetching or reading the quality of services that are stored in the database. If SLA is violated, the quality of service decreases, and as a result, consumers are unsatisfied. If consumers are not satisfied, business from the provider side will be failed. To overcome the above problem, this framework is developed. In this framework, there are basic components or Agents like a cloud service provider, cloud service consumer, negotiation, service level agreement, cloud resources, and cloud broker. This framework was implemented by using cloud Analyst simulator on java Net Beans for running cloud Analyst simulator. MySQL as a database, and JADE for GUI to show an alert if any violation occurs. Based on the above best solution, the cloud service consumer can monitor the services provided by the cloud service provider according to the service level agreement they signed. Cloud providers and cloud consumers communicated through online. These services are a software as a service, platform as a service and infrastructure as a service. All services must be provided according to the service level agreement signed between the two parties, cloud provider and cloud consumer.

5. RESULT

In this research, we developed the best framework, which is designed to monitor service level agreement from the client/cloud service consumer side. Our framework was developed from three basic components/agents. These components are the readers of SLA, which is used to read SLA during their service requested by cloud service consumers. Service Parameters reader, which is used to indicate the services in progress and measuring it. The third and very important component is SLA monitoring or controller component, which is used to display the alerts to the service consumer when requested service and provisioned services are varied. This indicated that the service level agreement was violated. We had evaluated our research based on different scenarios and was completely working for the purposes it designed for.

6. CONCLUSION

Now a day's Cloud computing is an important technology for public and private organizations. The developed and developing countries are migrating towards the cloud computing paradigm for delivering the services to their consumers interests. Those services are offered based on the SLA signed between the two party's service providers and service consumers. However, sometimes SLA on cloud computing is violated. As the number of cloudlets or users increases, the resources provider side becomes challenged; in a sense, the quality of services decreases, and as a result, cloud users become unsatisfied. The service level agreement contains two components, which are the agreement and responsibilities of the two parties. This means according to the agreement, the cloud service providers must provide the services based according to the agreement designed in the service level agreement, and the cloud service consumers also must full fill the responsibilities like billing activates on time and for the services they used. This monitoring component performs its

task by fetching the quality of services that are stored in the database. We developed the new framework that is known as AA_AH (Abel Adane, Azath Mohamed), framework that are used to measure and monitor the SLAs from their clients/consumers sides. This framework was evaluated and has a great personification for the future adaptation of cloud computing all over the world.

REFERENCES

- [1]. Satinder Kaur, S. (2015). A Comprehensive Study on the Security Framework in. ISSN : 0976-8491 (Online) | ISSN : 2229-4333 (Print).
- [2]. Buyya, R. (2009). Cloud computing and emerging IT platforms. Vision, hype, and reality for.
- [3]. Editors, d. c. (2010). Review and summary of cloud service level agreements.
- [4]. Garg, s. B. (2011). Green Cloud Computing and Environmental Sustainability.
- [4]. Gorelik, E. (2013). Comparison of Cloud Computing Service and Deployment Models. Composite Information Systems Laboratory (CISL).
- [5]. Lucia De Marco, L. (2015). A Service Level Agreement Formal Model for Cloud Computing. Research Gates.
- [6]. Mell, P. (2011). NIST Definition of Cloud Computing. NIST Definition of Cloud Computing.
- [7]. Patel, P. (2019). Service Level Agreement in Cloud Computing. Kno.e.sis Publications.
- [8]. Patel, P. (2019). Service Level Agreement in Cloud Computing. Kno.e.sis Publications.
- [8]. Srivastava, P. (2018). A Review Paper on Cloud Computing. International Journals of Advanced Research.
- [9]. Teixeira, J. O. (2013). A Vision of Personalized Service Level Agreement. New York, NY, USA: DanaC 2013.
- [10]. Vincent C. Emeakaroha, I. B. (2010). Metric to High Level SLAs- LoM2HiS Framework. HPCS, 48-54.