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Review Article

OPTIMIZATION OF SERVICE LEVEL AGREEMENTS (SLAS) WITHIN SAAS CLOUD IT INFRASTRUCTURE

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ABSTRACT

Cloud computing is a dynamic and reliable IT trend that provides on-demand computing resources to a user via an INTERNET network infrastructure. CSPs generally provide 3 types of commercial services such as SaaS, PaaS and IaaS. However, we are focusing on the SaaS cloud model in which the cloud service provider (CSP) offers applications that users can access online. CSPs provide end users with a complete infrastructure that meets the expectations of users. But users generally have no control over how data is stored on the cloud or where the underlying resources are located. With this limited control, the customer requirements and service provider quality of service expectations are defined using a service level agreement. It is therefore very important to have adequate quality of service guarantees from a CSP. This document discusses cloud quality of service strategies and is a guide for future research. The conclusion is that the ultimate expectation of any quality indicator or service model is related to the cost concerns for the CSP provider and the user.

Keywords: Cloud Computing, Quality of Service (QOS), Service Level Agreement (SLA), Software as a Service (SaaS).

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INTRODUCTION

Cloud computing requires a service level contract that is clearly defined and signed by the service consumer and hired by the cloud service provider. The conclusion of an agreement is one of the most important parts of cloud computing. However, the process of this agreement is not mature enough and does not meet customer expectations. Many researchers are trying to define a perfect service level agreement for cloud computing, but things are not so easy because billions of dollars are needed in this area. To define the service level plan, the simplest definition is that it is a contract negotiated and agreed between the provider providing the service and the user using it [1]. Cloud computing has truly identified all business needs. The business and consumer sector is probably the one that benefits the most from cloud computing technologies. Converting capital into operational costs has always been a credible trend for all IT companies. On the other hand, the privacy offered by the cloud to access data and services also makes it interesting for end-users. In addition, the elasticity of cloud technologies does not entail large investments, which makes it possible to optimize more easily and compatibly with the services. Cloud computing thus makes available to businesses one of the types of commercial software delivery services, software as a service (SaaS) [2]. Indeed, in this type of cloud service, consumers publish their applications on a hosting environment, to which users can access via networks of different clients. Cloud users do not control the cloud infrastructure that often uses a multi-tenant system architecture, which means that different consumer applications are organized in a single logical environment in the SaaS cloud to save money scale and optimize speed, security and availability. , disaster recovery and maintenance. Examples of SaaS include SalesForce.com, Google Mail, Google Docs, etc. The combination of all these elements has made cloud computing the preferred technology for a wide range of applications, from CRM and ERP systems to productivity and social-networking applications. SaaS is a method of delivering services or applications over the Internet as a service and is known to be one of the most critical IT services in the field of cloud computing. Cloud computing has become an essential way for SaaS providers to deliver their applications because it enables the scalability required and the challenges of the SaaS process depend on various factors, such as cloud network size, resource requirements and communication between its components [3]. A SaaS provider leases resources to IaaS providers and leases software as a service to users. The SaaS provider aims to reduce costs by technically using IaaS vendor resources and optimizing CSL (Customer Satisfaction Level) by meeting service level agreements used to meet users QoS expectations. This means that there are two levels of SLA with users and resource providers. It is important to establish two levels of SLAs, as this can help the SaaS provider to improve the level of customer satisfaction by gaining customer confidence in QoS. Service level agreements between resource providers and application providers ensure the efficient deployment of application services to cloud clients. If one of the parties to the contract violates its terms, the defaulting party must pay the penalty in accordance with the clauses defined in the SLA [4]. This document is made available to service providers and cloud resources highlight a set of appropriate solutions through a cost-effective optimization and admission control algorithm to increase SaaS benefits by satisfying their customers. These solutions increase the number of accepted users by having requests on leased virtual machines from multiple IaaS providers. We consider quality of service requirements of each customer.

- Providing mathematical models for SaaS providers to satisfy customers.
- Proposal of admission control optimization algorithms to increase profits by decreasing costs and incrementing customer satisfaction.

RELATED WORK

For SaaS Cloud providers to market their software commercially and enable seamless execution, customers' QoS requirements must be dynamically backed up and dynamically optimized in real time, based on business requirements. For the most important cloud SaaS to meet SLA-based SaaS management standards is:

- On the customer's QoS requirements, will be taken into account, customer-oriented service management;
- Inclusion of self-managed resource management strategies that manage service entailments updates to meet the two service demands and current service entailments;
- Complete virtual machines (VMs) deployments, configurations, and dynamically assign resources based on service requirements;

Perform resource management strategies developed in an operational data center.

MATERIALS AND METHODS

Definitions

Cloud Computing

Cloud computing has revolutionized organizations and the computer industry [13], [12]. According to the National Institute of Standards and Technology (NIST) [15, 16], Cloud is a model for performing ubiquitous, convenient, network-on-demand access to a shared pool of configurable resource systems (networks, servers, storages, applications and services etc.) that can be quickly supplied. Cloud computing is a general term for anything that involves delivering hosted services over the Internet. This below figure 1 shows us the set of cloud services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flowcharts and diagrams [9].

Fig. 1: Cloud Service Models

Regarding the fig 2, a cloud can be private or public or both of them working together into single cloud called hybrid cloud.

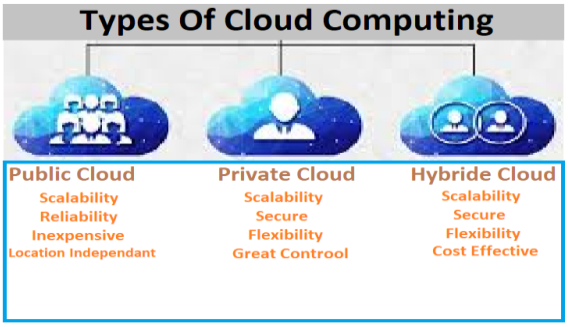

Fig. 2: Types of Cloud Computing

A public cloud sells services to anyone on the Internet. (Currently, Amazon Web Services is the largest public cloud provider.) A private cloud is a proprietary network or a data center that supplies hosted services to a limited number of people. Private or public, the goal of cloud computing is to provide easy, scalable access to computing resources and IT services. Cloud computing is an on-demand service model for IT provision, based on virtualization and distributed computing technologies:

- Abstraction hardware resources
- almost instantaneous scalability and flexibility
- virtually instantaneous provisioning
- Shared resources (hardware, database, memory, etc.)
- Programmatic management.

NIST's labor meaning comprises plenty of the equivalent mutual features or characteristics of cloud computing system [9]:

On-demand Delivery: excluding human intervention, cloud infrastructure assembly stacks namely: storage system, network access system, web server, web applications, web services etc. have a possibility to be allocated assigned and assigned systematically to the instance of the customers.

- **Total Benefit:** Customers no longer need to afford the infrastructure and restrict the amount of support and auditing. All the services delivered by the cloud providers are very lucrative and very advantageous because the reference of the invoice editing system with regard to the customers is completely oriented towards all the services that the customers use.
- **Permanent network and accessible at any time and everywhere:** the users have the capacity to have the control of access to the cloud infrastructure only on Internet in permanence and, via divergent sorts of means of communication terminals.
- **Quickly Elasticity:** Abstracting resources might be quickly and flexibly stocked and unrestricted founded on the request of the customer. Clients sight these resources as if they are countless and can be purchased in any quantity at any time.
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- **Limited service offers**: cloud capabilities and service offers are supervised, measured and enhanced by the cloud suppliers over a pay-per-use typical trade. Clients use these services in a similar manner to using power saving.
- **Multiple-rentals**: a cloud supplies services to several clients simultaneously. Clients distribute cloud resources at the network level, host level and software level, but, every client is insulated inside his custom-built instance of virtual software.
- **Developing and constant evolution:** the cloud set-up is absolutely progressive. Cloud vendors is able to add nodes and virtual servers to cloud with minor alterations to cloud infrastructure and software.
- **Coherency**: is accomplished by interacting several redundant locations in cloud. Great dependability does cloud a best resolution for disaster recovery and trade serious works.
- **Cost-effectively and low-cost scaling:** so that to gain benefit of saving of Scalability of scale, clouds system are realized to be as huge as conceivable. Other concerns are also taken to decrease charge such as localizing the cloud near to inexpensive power positions and in less cost actual condition.
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- **Customization:** a cloud is a setting which should be custom-made and accustomed as infrastructure and software built regarding client requests.
- **Taking advantage over resource capabilities:** providing resources for as long as they are needed affords for effective operation of these resources.
- **Simulation:** Cloud offers client possesses to services everywhere and anytime, over any sort of device. The necessary means occur from cloud in its place of observable object. You might able to achieve all you need by Internet service utilizing any terminal. End user might be able to reach or distribute it securely and carefully by an informal manner, any moment, any place.

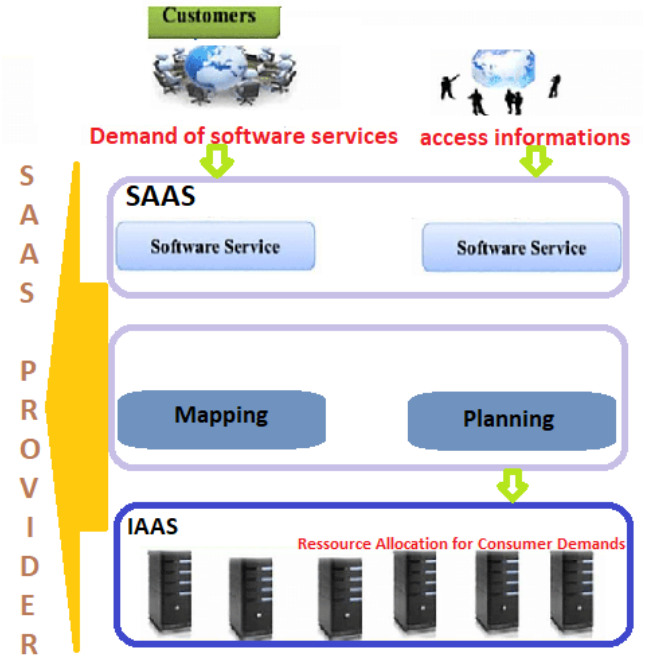

Fig. 3: SaaS Structure

This Figure 3 summarize SaaS mechanism in cloud environment. Customers have no management control over the resource supplied by the vendor, including server, storage stack, network stack, operating, or even individual application capabilities, with the ability to override settings client-specific application configuration [6]. SaaS describes the possibility of creating a lower-cost path for organizations that want to use software. Instead of buying the licenses for each computer, use the on-demand software, especially if you understand that most computers are besieged for 70% of the time. Recently, the SaaS exploitation has burts and alluded to the lack of blur. According to Gartner, the global market would grow from $ 18.2 billion to $ 45.6 billion between 2012 and 2018. IBM said that among more than 900 companies, the ultimate goal of adopting SaaS was reducing total cost of ownership of their applications by multiplying their profit. 41% achieved. This goal to a higher degree.

Quality Of Service (QOS)

Massively migrating enterprise applications to the cloud raises some very important challenges in the cloud environment. One of the most important challenge entities is consolidation of QoS settings and properties that consists of resources allocation and provision to the software product to ensure a level of service corresponding to measurements such as performance, accessibility and dependability and flexibility [7]. QoS states to any technology that accomplishes data traffic to decrease leakage of data, latency, and network jitter. QoS verifies and administers network resources pool by set of priorities for explicit categories of information on the network. Enterprises must provide expectable and computable services as Software that is to say:

- Voice Parameters
- Video Settings
- Delicate data

These QOS entities annoyed the network functionalities. Organizations use QoS to response to the exigencies of data flexibility of complex softwares, that is to say: fit with sound system, video quality image quality, flexibility of storage management in real time, and to avoid quality defacement affected by data leakage, and incidents. Businesses might accomplish quality of service by utilizing implements and strategies. About certain companies, the quality of service is involved in the SLAs with their network service vendor to ensure a higher level performance [8].

1. Service Level Agreement (SLA)

In fact, SaaS clients only have access to their online application environments, but they are not in charge of controlling the underlying IT resources. Providers must at least guarantee their quality, availability, reliability, and performance as they migrate their core functions to the cloud they own. This speaks to the importance for customers to obtain service provider guarantees on the provision of services and generally provided in the context of SLAs negotiated between suppliers and cloud customers, whose requirements focus on the definition of SLA specifications. to ensure a satisfactory level of service quality. Trade-offs between expressiveness and complexity to meet most consumer expectations and relatively easy to evaluate, verify, and enforce through the cloud resource allocation mechanism. SLAs can be determined from different viewpoints, such as WEBSERVIC, NETWORKS, the INTERNET, and DATACENTER. Although they vary from one domain to another, this is also true for cloud computing [10].

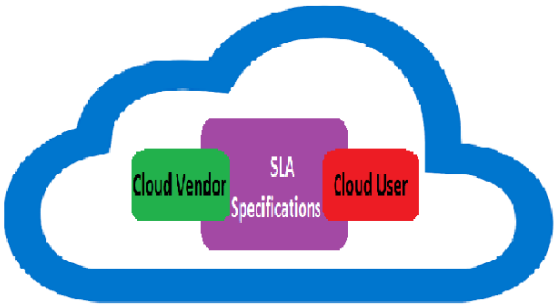

Fig. 4: Service Level Agreement between its Actors

Figure 4 shows a schematic diagram of the **SLA** position. It is a deal amongst the vendor's side and the consumer's side. Consumers and vendors shall adhere to the exigencies mentioned in the deal. In this contract, trade relations amongst those cloud actors parties are distinctly and audibly targeted.

SaaS Cloud Architecture

The SaaS cloud service is intended to serve customers who need to integrate the cloud computing trend. However, a delivery procedure has been elaborated and illustrated in the following figure:

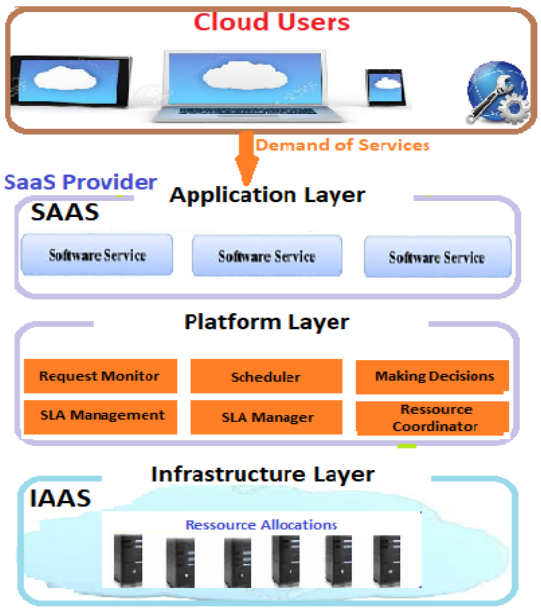

Figure 5: SaaS Cloud Architecture Schema

In fact, to fulfill the client's expectations, the client forwards a demand for application on-demand offered by the service vendor, which takes on different stack services, that is to say the software stack, runtime environment and the hardware resource layer. The software stack exploits, works and administers with each software stacks delivered on-demand to clients by the supplier. About the runtime environment, the demand inspector is used to inspect demands, inclosing further demands and promote demands. Whenever a custom quality of service setting is altered, the scheduler and the making of ruling is asked for help. scheduler is in charge of transposing the quality of service expectations of clients into infrastructure settings and the making of ruling are empowered to decide whether demands might be taken into account or not. The cloud vendor has responsibilities of running or allocation of VMs in order to meet customer expectations. And then, service level contract management is practiced to detect service level contract violations based on actual resource information. The farm resource layer includes data centers on which the virtual machines, the layer application, the platform layers, and the infrastructure layers, are deployed to meet customer expectations. The application layer provides services to clients by the SaaS provider.

Exigencies of SaaS cloud Service

Many quality of service properties that the Software As a Service administration setup shall be taken over for providers to deploy their environments in a professional manner and seamlessly empower achievement of enterprise performances. Cloud computing environment is perceived as a dynamic and resilient. The quality of service requirements imposed by the customers must be updated in real time and in a dynamic way, in particular according to the needs of the company. Imagine that if the ALIBABA GROUP service has been in the cloud, with number of end users, the resource requirements of ALIBABA GROUP will also change. When implementing a SaaS Cloud Service management package based on the customer or SLA, the following conditions should be mentioned as follows:

- Support for service management based on the customer's QoS requirements;
- The implementation of self-resource management strategy that administers the alternatives in the existing service requirements, service expectations and new service requests and service obligations;
- Dynamically implement virtual machines (VMs) to deploy, configure, and assign resources based on service requirements;
- Reinforce the resource management strategy developed in a physical computer server in an operational DATACENTER.

Proposal of SaaS Cloud Service with SLAs Supporting

By approving SLA conditions based on quality of service parameters, take into account consumer expectations for enterprise applications from a SaaS cloud supplier. In order to increase its revenues, the SaaS provider aims to plan a request by providing an effective guarantee meeting the client QOS expectations. The platform layer of a SaaS supplier utilizes setting up process to transpose and evaluate the quality of service properties of the clients and allocate the corresponding resources. Customers have the ability to dynamically modify their expectations and their use of deployed application as a on-demand services. In order to regularize the publishing standards of the two service level agreements, the SaaS provider must use remoted resources from IaaS vendors, for example: MICROSOFT AZURE company deliver an Enterprise Resource Planning (ERP) or Customer Relationship Management (CRM) as a on-demand service [11, 12]. This is an approach to a detailed system model in the opinion of the customer and the SaaS provider, as well as associated mathematical models. QoS alludes to the capacity of a service to meet the various requirements of its users in terms of service availability, reliability, performance, response time, cost and energy [18] will be provided by metrics characterized by a type, a unit, and a calculation function, for example, with respect to the QoS reliability criterion, MTBF metric (average time between failures) expressed in hours and calculated from the same way:

$$MTBF = \frac{Operating\ time \ - \ Downtime}{Number\ of\ Breakdowns}$$

Service Level Agreement (SLA) is a set of properties that defines the quality of service (QOS). SLA is therefore a set of formalities in order to fulfill cloud consumer QOS expectations. This entity service is composed of the parties involved in the contract and their respective roles), the definition of the services (their signature), the Service Level of Service (SLO) objectives, Key Performance Indications (KPI), a period of validity of the contract and fines when this product is broken.

Mathematical Plan

1. Advantage Model

Accord to the SaaS provider's idea, there is an SLA with all their cloud service users and if any of them violates the standards, however the defaulting party pays the fine award to the standards mentioned. The contract settings include the software vendor specifications and QoS settings specified by the cloud user. The characteristics specified over the contract are:

- **Kind of Demand** (TD): is type of demand of user X
- **Type of Product** (TP): is application offered to users.
- **Type of Account** (AccT): limiting the maximum number of axccount accounts a user must create.
- **Duration of the contract** (ConDur): period of availability of the application, purpose Min is a month.
- **Set of account** (SAcc) **a user creates is ≤ the max number of accounts for an account type.**
- **Set of recordings** (SRec) is Maximum of number of recordings a user must create per account.

Let's consider U as the number of user requests and u indicate the ID of the user request. At one point, let a user submit a demand to the application vendor. The user defines while précising a kind of product, a type of account, a contract duration (ConDur), the set of accounts according to SLA support (execution time). The vendor provisions the expected application on demand that are transposed until resource sector in terms of the capacity of the virtual machine.

IVM as the set of IVMs, it indexes the identity of virtual machine. TVM highlights classes of Virtual Machines, for a specific IVM with category TVM (IVM) has CstIVM cost. iniTmSvr be the period is used for starting tasks. CstSvc as the cost of Software as a Service vendor loading by cloud consumer u every monthly that is topic over category of software, and class of account. TP is all sorts of applications. Priceilc is the price sustained to Software as a Service vendors by distribute the user u along IVM. Profilc refers the advantage for distributing user expectations (u) employing IVM. The Global advantage earned by the Software as a Service supplier for distributing global U sef of user requirements.

$$\sum_{u}^{u} = Pppilof1Pr$$

$$\sum_{u}^{u} Pppilof1Pr = \sum_{u}^{u} cst\ iVMsrv \times \sum_{u}^{u} ConDur - \sum_{u}^{u} Pr^{u}$$

Prices of VMs are based on the type of VMs (TVM), the price of virtual machine along with (Cstivmt), (iniTmSrv) and duration (conDur) of user demands

$$VMCost^{c} = CstVM \times \left(iniTimeSev^{u} \times ConDur^{u}\right)$$

(u).

Pty is the penalty of violation [18] [19], (R) the fine rate and TL the time limit:

$$Pty = N + R * TL$$

The fine of the infractions handicaps the provider by endanger his advantages and his career:

$$Pty\ Pr = N + R(RT) \times delayTime^{u}(TD)$$

RESULTS AND DISCUSSION

The cost of a fine has always been based on a specific time, the fine rate (R) and a statique number (N). The period limit and flow detect the categories of demands of consumer cloud. The duration limit is the execution period specified in the contracts and the current period that the clients are waiting for the answer to the service.

Table 1: Point of view of Fine Time Limit along with to Classes of Demands

Predefined Parameters	***First Rental (fr)***	***Enhance Service***	
		Add Account	***Enhance Product***
SLA Execution Time	***ExecTime***	***ExecTime (UpSrv, AddAcc)***	***ExecTime (UpSrv,UpPro)***
Current Time	***Service Init Time***	***Service Init Time (data Trafic)***	***Service Init Time (dataTrafic)***

Algorithms for Improvement

The primary goal is to increase the benefits of SaaS providers by lowering the cost of providing services to SaaS cloud users through the means of allocating platform layer resources. [20]. Our algorithmic syntaxes are suitable for running a virtual machine for each organization to reduce SLA violations by improving revenue. We are implementing it to increase the profits of SLAs.

1. Incrementing the advantages by reducing the set of infractions of Service Level Agreement (PrRedViol)

Software as a service's vendors must reduce SLA violations by providing every organization along with a new virtual machine implying two types of important demands:

- upgrade service (UpSrv)
- first rental (Fr)

Our plan audits the set of Request Categories (TD). If the request class is a rental service (fr), it looks for the most suitable virtual machine class and starts the mapping strategy. However, if the demand category has been optimized, then audit what sort of optimization is requested. If the upgrade type is AddAcc, the organization's authorizations are improved by authorizing access to user profits on IVM that administer this organization. If the upgrade class is upgraded, it looks for the most appropriate virtual machine class and grants the request (u), and then evaluates the gains. These technical means reduce the intensity of offenses by launching an unused virtual machine for each organization to ensure the execution time: Increase profit by reducing the cost by using reusable virtual machines with maximum available space PrRedVmIncAvlbleSpace. A SaaS cloud vendor might maximize the advantages by decreasing the price materials that count on on classes of virtual machines. This code decreases the set of virtual machines by using IVMs. The code characterizes the PrRedVmIncAvlbleSpace and that implies main categories of demands:

- *Demand of a user u includes class of demand (TD)*
- *Class of product (TP), sort of account (AccT)*
- *Set of accounts (SAcc).*

The program audits the class of demand, if the type of demand is Prime Rental. Afterwards it discovers the IVM along with category (t) IVM and which works with the service setting of demand utilizing scheduling on the Table 1. Then, it controls so there is previously launched IVM and extended along with selfsame category of product like cloud client u demanded. Therefore IVM in which product class of software (TP) has been deployed as user (u) requested, then the program will be developed:

Code A: for PrRedVmMincAvlbleSpace

```
Upgrade (u) {
1  If (upgrade type is 'AddAcc') {
2  get Id I and type t of VM, which processed the previous request
from same organization as u
3  If ( IVM has enough space to place u){
4  Schedule to process u on IVM.
5  }
6  Else {
7  Repeat step 1 to 21 of First Rental(u)
8  Transfer data from old VM to new VM
9  Release space in old VM
10  }
11 }
12 If (upgrade type is 'upgrade service') {
13 Repeat step 7 to 9 of Upgrade(u)
14    }
15 }
```

Code B: for PrRedVmMincAvlbleSpace

```
Algorithm 1. Pseudo-code for PrRedVmIncAvlbleSpace
1 Input : request (u) with QoS settings, IVM
2 Output: Booleans
3 Functions:
4 First Rental (u){
5 If (there is initiated IVM with type I matches to
   the VM type requested by u){
6 If (IVM deployed the same product type as u required){
7 For each initiated IVM with type t (TVM){
8 If (IVM has enough space to place u){
9 put IVM into ListOfVm
10     }
11 }
12 Sort(ListOfVm) according to the available space
13 Schedule to process c on VmMax, which has maximum available space
14  }
15   Else {
16  Initiate new VM with type t and deploy the product
     type as request u required
17         }
14    }
18  Else While (t+j<=T) loop {
19  If (there is initiated VM with next type t +j,where type t+j matches
    to the VM type required by request u){
20  Repeat from Step 2 to 13
21          j++
22          }
23    }
24 }
```

Assessment Performance System

Through these experiments, we compare our codes with the planning technique of current SaaS providers. First of all, we characterize the experience method, attend by execution standards and a characterization of the QOS parameters. In what follows, we analyze the outcomes illustrating the effect of the Quality of Service settings on the user side of

the cloud: the arrival rate of the requests is proportional to the request for upgrade compared to the parameters of the supplier relative to the rate of execution time of the SaaS cloud service.

1. SaaS consumer's side

With a certain number of cloud clients, the cloud client side (arrival rate and number of updates of the organization) are edited to evaluate the performance flows of the proposed code:

- Several classes of software rates are utilized by changing the average per second.
- 5 types of enterprise applications used in a variation of the average of 20% to 80% of companies using a service upgrade.

2. SaaS provider's side

The SaaS provider submits classes of software services products, with account classes. The hourly cost of using a virtual machine (CSTVM) in a self-hosted virtual machine follows the Amazon EC2 pricing scheme [21]. The price of resources used for virtual machine modeling is presented on Table 2:

- Various categories of averages and charge launching delay are utilized in the expertise and the average service launching delay was included between 5 and 15 min.
- Average duration of launching is evaluated by performing tests on 60 patterns on Amazon EC2 [21]. The beginning of services varies depending on the initial distribution.
- The cost of the fine depends on the category of the demand of the product class and the lot of the account. The average fine rate (R) varies from the value 2 (which is very low) to the value 15 (very high).

Table 2: Statement of Virtual Machine Price

Type Of Virtual Machines	*Price ($ / hr)*
LOW	***0.80***
AVERAGE	***0.34***
WIDE	***0.65***

CloudSim accustom to feign the cloud service environment that uses algorithmic syntaxes for the provision of computing resources. From the position of clients and cloud SaaS vendors, SLAs are violated. From the position of SaaS vendors, amount of cost reduction and all virtual machines have started. Three standards measure performance:

- Global cost
- Set of virtual machines started
- Rate of SLAs violations.

The effect of the fine (R) rate on the codes, PrRedVmDecAvlbleSpace and PrRedVmIncAvlbleSpace are assigned to vary the fine rate factor when scheduling customer demands with mutual IT resources. The cost of the fine increments as the fine rate progresses due to a breach of the SLA that affords for the partition of resources among several cloud clients. After all, the service level is very feeble, the uttermost proportion is lower.

CONCLUSION

Many IT infrastructure companies face the rising costs of setting up and maintaining IT systems. However, these companies are turning to outsourcing solutions such as Cloud Computing. The avenue of this trend and its vision in the IT world has brought tremendous satisfaction to companies using robust IT systems via its on-demand services. Cloud Computing is a technology that poses the Internet at the core of activity operations by empowering the utilization of distant IT material resources to establish attainable online services, as well as a demand for the provision of computing resources over the Internet with pricing (pay-as-go pricing or pay-per-use) that provides a low-cost IT infrastructure solution [23]. The migration of on premise IT infrastructures to the cloud computing trend is actually generating huge credibility and benefits for cloud consumers and cloud service providers. This is an era of capital transformation and conversion into operational costs and results in fairly adequate revenues for SaaS vendor. This document leads to the prescription of appropriate solutions for planning customer expectations in relation to SaaS vendors within the specific framework of cost reduction along with an application processing. To accomplish this objective, we have addressed the concerns raised by using appropriate mechanisms to meet customer expectations. As a result, we have implemented cost-based optimization codes for various quality of service features from a customer and SaaS provider perspective. The results indicate that, on average, PrRedVMDecAvlbleSpace optimizes cost savings at best. Based on the research undertaken in this long-term collection, we will evaluate strategies to increase efficiency and reliability as global advantage and the SLA method in cloud environments to boost client gratification. Then, we will study the limitation of the penalties by taking into account the failures within the Cloud system.

FUTURE SCOPE

Based on the research undertaken in this long-term collection, we will evaluate strategies to increase efficiency and reliability as global advantage and the SLA method in cloud environments to boost client gratification. Then, we will study the limitation of the penalties by taking into account the failures within the Cloud system.

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