

# Secured and Controlled Billing System by Agent for Cloud Computing Environment

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## ABSTRACT

Cloud computing is an important Transition that makes change in service oriented computing technology, With the widespread adoption of cloud computing, the ability to record and account for the usage of cloud resources in a credible and verifiable way has become critical for cloud service providers and users. The Success of Such A Billing System Depends On Several Factors: The Billing Transactions Must Have Integrity and No Repudiation Capabilities; the Billing Transactions Must Be No Obstructive and Have A Minimal Computation Cost; And the Service Level Agreement (SLA). Existing Billing Systems Are Limited In Terms Of Security Capabilities or Computational Overhead. This Project Proposes A Secure And Non- Obstructive Billing System Called Secured and Controlled Billing System by Agent for Cloud Computing Environment. A New concept of Cloud Transaction Administration For the supervision of billing the Cloud Transaction Administration Generates the mutually verifiable binding information that can be used to resolve future conflict between User and Cloud Service Provider in a computationally efficient way.

**Keywords**— Cloud Computing, Service Manager, Billing System, Verification and Authentication, Transaction processing, Pricing And Resource allocation.

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## I. INTRODUCTION

Cloud computing is an important transition that makes change in service oriented computing technology. Cloud service provider follows pay-as-you-go pricing approach which means consumer uses as many resources as he need and billed by the provider based on the resource consumed. CSP give a quality of service in the form of a service level agreement. For transparent billing, each billing transaction should be protected against forgery and false modifications. Although CSPs provide service billing records, they cannot provide trustworthiness. It is due to user or CSP can modify the billing records. In this case even a third party cannot confirm that the user's record is correct or CSPs record is correct. To overcome these limitations we introduced a secure billing system. For secure billing system we introduce a concept of cloud transaction administration (CTA). CTA generates mutually verifiable binding information that can be used to resolve future disputes between user and CSP. This project will produce the secure billing through monitoring the service level agreement (SLA) by using the S-Mon module. CTA store information that will solve problem between client and CSP efficient way the mediator will be responsible to check if the

services are provided according to the contract. The mediator will help client and CSP to verify everything .It will act like a third party hence it will be unbiased towards CSP or client.

## II. RELATED WORK

Cloud computing is now becoming a business standard. It simplifies the user's accessibility. It provides a virtual storage space to the user which could be used without bothering about the details of the entire mechanism. Billing system is mainly used to keep track of the services used by Client. There are different billing system for grid computing and cloud computing environment. In this section we are trying to define

the problems arise in exciting system. Here are some other reasons why every enterprise might need cloud computing for their business:

- **Cost savings** - Cloud computing removes the requirement of a company to invest in storage hardware and servers.

- **Focusing on the business** -Since all the services will execute over the internet, a company does not have to bother about technical issues and other problems associated with physical storage and backup. A company can thus focus more on their core business.
- **Performance** - It delivers reliable performance irrespective to the geographical location of the user. Another key feature could be the automatic updating of services and applications.
- **Security** - Cloud Computing offers optimum security which protects you against any unauthorized access, modification and loss of data.
- **Flexibility** - Even if part of the cloud environment fails or stops working, the other resources continue to work until the problem is fixed.

Billing system highly included above all the features to being system more useful and efficient. Billing system provide more security as it is non-editable.

### III. PROPOSED METHOD

In this paper, we propose a secure and non obstructive billing system as a remedy for these limitations. The system uses a novel concept of a cloud Transaction administration for the supervision of billing. The cloud Transaction administration generates mutually verifiable binding information that can be used to resolve future disputes between a user and a cloud service provider in a computationally efficient way. This project will produce the secure billing through monitoring the service level agreement (SLA) by using the S-Mon module. CTA can get a service logs from S-Mon and stored it in a local repository for further reference. Even administrator of a cloud system cannot modify or falsify the data. Followings are security issues of cloud system:

#### Reliable and scalable capabilities of Billing transaction:

The cloud services is distributed over a various cloud so to access that cloud services security must be provide to the cloud resource. To generate (compute) the billing system the transaction should be protected from unauthorized client. The services must be provided to the authorized client as per connection establish between client & CSP but, some time there may be chances of incorrect billing system due to laying between the client & CSP. The CSP will generate the bill for client which access the services of cloud but, sometime CSP can change the billing system (billing charges)so to avoid such changes in bill we used the another functional block which is Trusted Third Party(TTP).TTP work as mediator between client & CSP so it can kept the record of data, services which provided by CSP to client. The TTP will avoid the laying between the CSP & client but, cloud is distributed system (data of the cloud is scattered)so to access this data there must be connection between CSP & client. To establish a connection between

them we use authentication must be required.

#### Computing efficiency of a billing transaction:

The client can access a various data from cloud or it can access no. Services from cloud at same time so there may be chances of data lost, connection lost to avoid such network problem in bill system we use the additional overhead to the data etch access buy the client.

#### Trusted Third Party monitoring:

When the connection gets established between the CSP & client the consistent data must flow as per the requirement of client. To maintain a flow of data there are monitor so provided at CSP side but, CSP can change the bill due to this there is chances of laying between them so, to avoid that kind of problem the monitor is provided at TTP side .by using of this monitoring mechanism correct bill will be generate client can access a various data as per requirement there are some drawback & limitations.

### IV. MOTIVATION

Cloud computing is an important transition that makes change in service oriented computing technology. CSP give a quality of service in the form of a service level agreement. Although CSPs provide service billing records, they cannot provide trustworthiness. To overcome these limitations we introduced a secure billing system called THEMIS. For secure billing system introduces a concept of cloud Transaction administration(CTA). CTA generates mutually verifiable binding information. The CSP can provide the services as per availability and performance of the respective cloud services. To generate the Bill Cloud computing have different models as follow:

#### 1. Iaas (Infrastructure as a Service): –

Iaas is the one of the most important category of cloud computing models It Also referred to as Resource Clouds, provide (managed and scalable) resources as services to the user Which include virtual machines and other resources such as Xen, Oracle VirtualBox, KVM,VMware within the cloud operational supports system can support large number of virtual machines and ability to scale services up and down according to customer requirments

Examples: Amazon S3, SQL Azure.

For IaaS model bill will be compute on the basis of service time. i.e. access time.

#### 2. Platform as a Service (PaaS):-

Include operating system programming language execution environment, database and web servers. With the help of PaaS developer can develop and run their software solutions on cloud platform without any cost and complexity of buying and managing the hardware and software layers. PaaS typically makes use of dedicated APIs to control the behavior of a server hosting engine which executes and replicates the execution according to user requests (e.g. access rate).

Examples: Force.com, Google App Engine, Windows Azure

(Platform). For PaaS model bill will be compute on the basis of service usage log and total number of platform used by client.

### 3. Software as a Service(SaaS):-

This service model is also sometimes referred to as Service or Application Clouds are offering implementation of specific requirement of user. SaaS helps to user to access the application software's and database, cloud service provider manage the infrastructure and platforms which help to run requested software. For SaaS Bill will be charge for total services usages log as Pay-per-use. The cloud model has no need of indirect distribution since it is not distributed physically and it deploy almost instantaneously.

Example: Google Apps

## V. METHODOLOGY

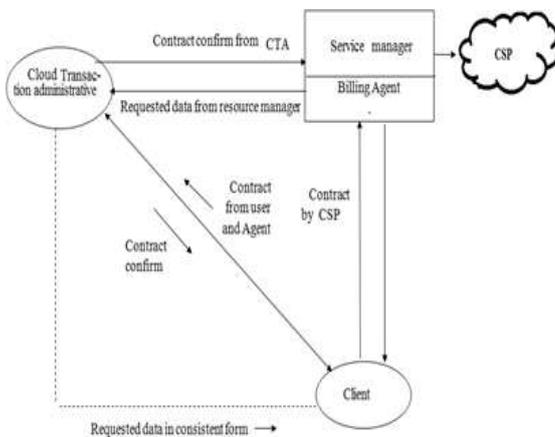


Fig.1 System Architecture

Fig. shows the overall process of the billing transaction with our billing system. The main steps are as follow:

- New user have to register on system via password which will be generated using hash chain algorithm.
- Once user get the new password he will generates a service check-in or check-out request message and sends it to the CTA.
- The CTA verifies the key from the user, and generates mutually verifiable binding information of the user and Request to the service manager.
- Service manager provide requested data to CTA using Cloud service provider. CTA takes care to send the data for user in consistent Manner from service manager.
- After completion of user request user will request for service out to the CTA for exit form services.
- The billing process is completed when the user and the CSP receive confirmation from the CTA.
- Finally, in the case of a service check-out, the CTA Inform to the billing agent and with the help of SLA records Billing agent will generate the bill.

Basically it has set of Modules. These are as follows:

- User Interface Design
- Cloud Service Provider
- User

## 1. User Interface Design Module

User Interface Design have a purpose that a user to move from login page to user page of the website. In this we want to enter our user name and password provided by Service provider. If we enter the valid password and user name then only the user can move login page to user window while entering user name and password it will check username and password is match or not. If we enter any wrong username or wrong password it generates some error message.

So we are preventing from unauthorized user entering into the service provider website. It will provide a good security for our project. So Service provider contain user name and password server also check the authentication of the user. It will improve the security and preventing from unauthorized user enters into the website. In our project we are using java swings for creating design. Here we are validating the users who are going to access the Service providers.

## 2. Cloud services provider module

Service provider has a job of providing a service like software to the cloud users. In our proposed method, CSP doesn't provide billing transaction to the user. It is due to the reason if billing transaction performed in the CSP then complexity in security to be provided for billing transaction increases the overhead. If the user logged in for service, CSP validate the user whether he/she is an authenticated user or not. Once if user is found authenticated user then it waits for service check in message else it found any unauthenticated user it will send the error message.

If it received the service check in message then it responds the user by transmitting the agreement and hash chain (one time key). After getting the service request from the user, CSP provide the requested service to the user. It is also have a contact with the Cloud notary authority. It will provide the service until it receive the service checkout message. The CSP enables users to scale their capacity upwards or downwards regarding their computing requirements and to pay only for the capacity that they actually use.

## 3. User Module

User can access a service from the Cloud Service Provider by authenticated login process Via CTA. We assume that users are thin clients who use services in the cloud computing environment. To start a service session in such an environment, each user makes a service check-in request to the CTA with a billing transaction. To end the service session, the user can make a service check-out request to the CTA with a billing transaction. Once if the users send the service check-in message it can get the contract from the CTA. Now user log details are stored in Monitor for future Conflicts. After accessing the service, user want billing transaction. If he/she wants the bill means it should send the contract of the CSP with contract of the user to the CTA. If both the details checked by the CTA are identical then user can receive the bill binding information along with confirmation message. If any

error occurred or forgery activity found from the user side then the user will receive the penalty for that.

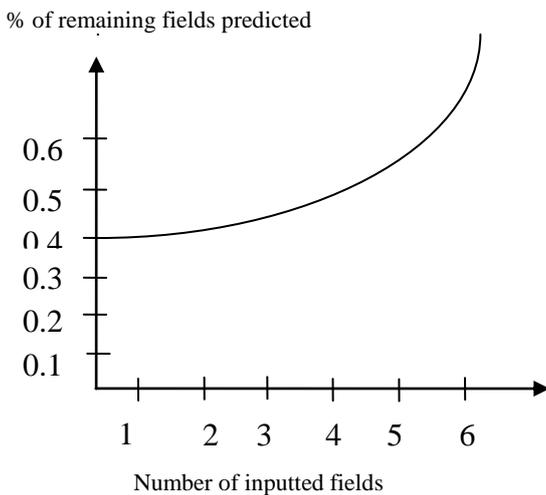
**VI. EXPERIMENTAL RESULTS AND ANALYSIS**

**RESULTS**

Cloud Transaction administration Will ensure undeniable verification of any transaction between a cloud service user and a CSP. Bill generated by System is non-editable and enclosed with security. Mutually verifiable billing system replaces prohibitively expensive PKI operations without compromising the security level of the System, it significantly reduces the billing transaction overhead. By integrating the module into each cloud resource, we made the billing transactions more objective and acceptable to users and CSPs.

**Performance measurements**

Performance evaluation also refers to performance review or systematic evaluation of the performance of system and understand the ability of the system. Following is fig. for Performance measurement which include number of inputted fields and %of remaining fields.



**Fig. 2. Graph for performance evolution of purpose system**

In the case of Billing system the micropayment, the throughput is saturated on 0.4 and 0.6 transactions per second, respectively, as the number of billing requests increases. This phenomenon is due to the fact that the quantity of billing system and micropayment operations of the user and server provider is much smaller than that of PKI-based billing.

**Absolute Performance SLA Monitoring**

Organizations have an increasing demand for business visibility. As a business executive, it is vital to know the state of your business-critical and revenue critical applications at all times. Knowing that your application is being managed to meet your business requirements is necessary to ensure 24x7 availability, transaction volume and performance of the application from the end-user perspective. Absolute Performance provides the visibility through custom SLA monitoring, enabling executives to view real-time SLA compliance and reporting, consolidated

into a cohesive, easy to use portal view.

Algorithm	P@10	P@20	N@10	N@20	MAP
Verification	0.638	0.683	0.571	0.625	0.654
Hash	0.673	0.576	0.612	0.673	0.656
Splitting password	0.649	0.593	0.678	0.627	0.589

**Table No. 1 Tabular form for performance evaluation.**

Three metrics are used for evaluating performance: Precision@n (P@n), Mean Average Precision (MAP), and Normalized Discount Cumulative Gain (NDCG). P@n is the precision at rank n, which is calculated as

$$p@n = \frac{\text{No. of Relevant forms in top n results}}{n}$$

**Performance impact of S-Mon**

The goal of our next experiment is to examine the Performance impact when Sla is applied to the cloud Computing platform. To measure the S-Mon monitoring overhead, one cloud computing resource hosts four virtual machines which are assigned to users. if S-Mon is applied to the.cloud computing platform. This can be attributed to the very low overhead imposed by S-Mon, as it can achieve trusted SLA monitoring with system overhead of less than 1.0%.

**VII. CONCLUSION AND FUTURE WORK**

Main goal of our study was to generate the trustworthy, reliable, consistently working system for a cloud computing environment. To fulfill all these requirements, we completely learn or we can say studied all advantages and the limitations of existing billing systems are already in use in this field that is cloud computing environment. We just obtained system for Secured and controlled billing system by agent for cloud computing environment, our reliable, consistent, trustworthy, integral and efficient bill generation system. For improving existing billing system , we have designed and implemented factor like CTA , which control the billing process to make them more transparent and acceptable one to all the our factors like to users and CSPs, CTA etc.

Our system significantly reduces the overheads of billing transaction. It provides a high securable and non Obstructive billing system. Cloud Transaction Administration (CTA) generates the bill with binding information. It acts as forgery-resistive SLA measuring and logging mechanism. So even administrator of a cloud system cannot modify or falsify the data. In future, the deployment of our system in the context of existing cloud computing services requires minimal modification to the CSPs, CTA and users if seeking to provide mutually verifiable billing transactions. Our next step is to consider the scalability and fault tolerance of THEMIS. This fault tolerance can be implemented by web service (Banking).

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