

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

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Project Guide

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Abstract -Day by day the use of cloud computing is increasing, so it is challenging task for cloud service provider to provide services and maintain data of provided service of cloud storage in very secure way for generation of bill .the transaction should be reliable effective trustworthy. There should be no interrupt in transaction. In previous system cloud faces many security issues and is considered unreliable by the client because of inflexible communication between CSP and client. In this paper, we propose billing system which provide effective and trust worthy solution for such problems .The system uses concept of CTA for confirmation of billing. 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.

Index Terms-cloud computing, service manager, billing system, verification and authentication

1. INTRODUCTION

The service oriented technology such as Amazon EC2, S3, and Microsoft Azure are becoming more popular technologies which provide the cloud computing services. The base of cloud computing is distributed system and Utility computing which together form a service model. Client can access the resources of the computing with the help of different services provided by cloud service provider. Data access on cloud must be in

the consistent and secure form. Cloud-based services having different benefits such as scalability, reliability, cost saving, maintenance and mobile accessible. Bill will be compute by Cloud service Provider on the basis of pay-per-use of user. The CSP can provide the services as per availability and performance of the respective cloud services. To generate the Bill for different cloud service model CSP will consider following paradigm.

1. Iaas (Infrastructure as a Service): –

Also referred to as Resource Clouds, provide (managed and scalable) resources as services to the user – in other

words, they basically provide enhanced visualization capabilities.

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):-

Provide computational resources via a platform upon which applications and services can be developed and hosted. 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):- is also sometimes referred to as Service or Application Clouds are offering implementation of specific requirement of user.

2. Related work

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. Followings are security issues of cloud system:

1. Billing transaction with reliable and scalable capabilities:

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.

2.2 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.

2.3 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.

3. System Architecture:

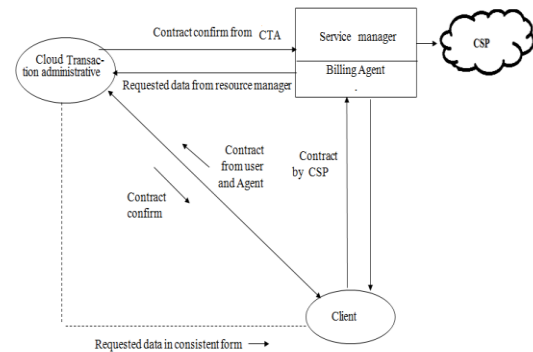


Fig.3.1 Architecture of billing system

3.1 Design of Secured and controlled billing system by agent for cloud computing environment

We present an overview of the Secured and controlled billing system by agent for cloud computing environment system in this section. We first introduce the important factor of Secured and controlled billing system by agent for cloud computing environment and then description of the overall system.

3.2 The five major factors of billing system are as follows:

1. Client
2. Cloud transaction authority
3. Cloud service provider
4. Service manager
5. Billing agent

1) USER: User will firstly register on system by sending a request to billing agent. Agent will receive half password from user and then combine with half password from his database. Whole password will be encrypted and send to CTA. CTA will confirm the password and allow to user to access the cloud. Now, the User is a nothing but client of the CSP who is eligible to be provided access to the resources provided by the CSP according to the Contract. The User can request resource related services from the CSP and is dependent on the CTA to control the various transactions taking place between him and the CSP.

2) Cloud Transaction Administrator (CTA): The CTA or the Cloud Transaction Administrator looks after authentication, List of services as per contract proper

resource delivery and finally analysis of the bill generated by the CSP. Its sub-modules include Authentication, Service Manager, and Billing Agent. Cloud Transaction Administrator Takes data from service manager and then provides data consistently to user.

3) Cloud Service Provider (CSP): The CSP or the Cloud Service Provider provides the data related services after confirming with the CTA. Cloud Service Provide takes the request from Cloud Transaction Administrator then check for service availability if available then provide it to service manager through CTA. Its main purpose of Cloud Service Provider is to search the data in database and provide it. There are many types of services which are stored in sorted format. Following are the types of resources:

- a. Computing Resources
- b. Storage Resources
- c. Networking Resources etc.

4) Service Manager: The service manager just take request from CTA and then provide that request to CSP. After that provide requested data to user through CTA. It manages the resources only to increase the speed of system. It just takes the data from CSP and provides it to CTA. So we can say that the service manager is the mediator between CSP and CTA.

5) Billing Agent: The Billing Agent take the password from user and attach that with Agents password and this complete password he send to CTA after getting confirmation from CTA allow access to services as per contract. After log-out request the Billing Agent generate the bill according to services used and time duration between log-in and log-out. Finally at the end of the complete transaction, it sends the generated bill to CTA for verification. After Verification Billing Agent send the bill to user. We can provide Bill monthly or at every time of access. The Bill can be generated according to time duration or according to data accessed by user.

3.3Over all billing transaction of Secured and controlled billing system by agent for cloud computing environment system

After a completing registration, Secured and controlled billing system by agent for cloud computing environment system can use the all factor to provide a secure and reliable billing process without any type of security key process of any entities. The Authentication of client can be done by registration and Password can be generated by each client with the help of Billing Agent. The P1 and P2 of client and Billing Agent's database are combined to form complete password at every billing transaction. It helps the CTA to confirm the correctness of the complete process. Secured and controlled billing system by agent for cloud computing environment system continuously check all the transaction and as we are providing more security in Bill generation process, users will accepted it defiantly and process of CSP will be simple and secure one .There are two types of operation are involved in billing bill generation process they are: request for

services for getting data from CSP and a request for stopping the process i.e.(log-out) at the end of session. The process of these two is quite similar manner. For all transaction the message send by CTA is very useful to confirm that client is registered one. A password is stored in a data structure that contains all information of registered user of a billing process and the P1 and P2 of client and Billing Agent's database are combined to form complete password at every billing transaction. The P1 and P2 of client and Billing Agent's database are combined to form complete password at every billing transaction which will get decrypted by, the CTA that is nothing but third party to confirm the consistency of the billing process between the user and the CSP. The actual transaction is explained in following steps:

- 1) The user sends a request for services by log-in process or log-out
Request for stopping the process or we can say stop transaction which is like a message and sends it to the CSP.
- 2) The CSP can use a password from the CSP's database to send the user a complete password which is in digital format
- 3) The user have a password along with his self which is provided at the time of registration which is used to create complete password that is nothing but digital signature. The user then combines the P1 with P2 and sends the combined password to the CTA.
- 4) The CTA check and confirm the password from the user, and establish the mutual connection between the user and the CSP to provide data or services in consistent manner.
- 5) The Authentication will get completed when the user and the CSP receive confirmation message from the CTA.
- 6) Finally, in the case of a service log-in request, user's authentication request to the CTA. In the case of a service log-out, CTA sends the generated bill to user after confirmation from Billing Agent. The Billing Agent will store the Bill in his database for Future requirement or processing.

4.Proposed System

4.1 Description of "Secured and controlled billing system by agent for cloud computing environment" protocol

Step 1 :- (Mutual Authentication for Client): state 1 is for a user who accesses the cloud services for the first time. When the user first accesses the Cloud he required authentication rights. This authentication is performed by the user who is fetching data from CSP. The CSP and the CTA are main factor to give the authentication to user. Followings are three keys required for Authentication:

Definition of the entity symbols

- Billing Agent ↔ CTA: making P (P1+p2)
- User ↔ Billing Agent: P1
- User ↔ CTA: sending P (including p1 by user and P2 by Billing Agent)

P2: Billing Agent

P1: Client

P: Cloud Transaction Administrator (CTA)

Definition for Key symbols

{P}B: Password encrypted by billing agent

Mutual authentication process for client:

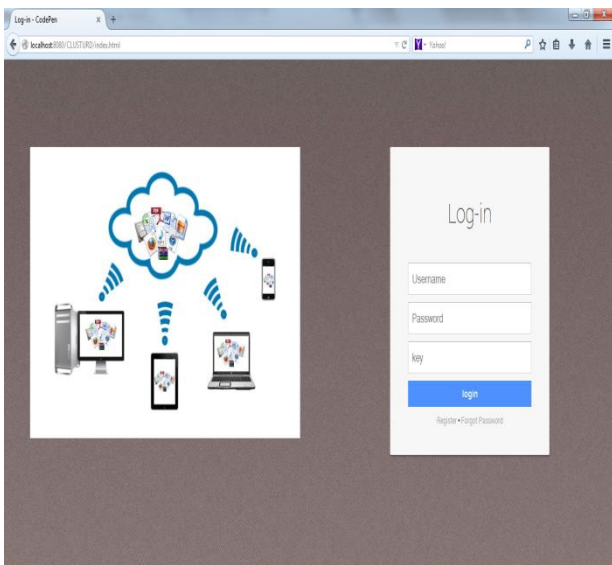


Fig.4.1 Login request by user

Registration by user:

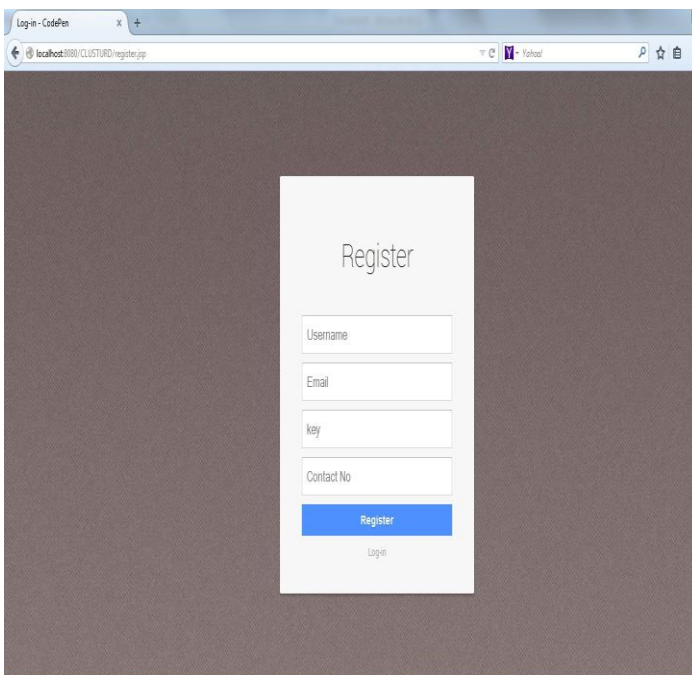


Fig.4.2 registration process of client

State 2 (Sending Password to CTA): This state is for sending password to CTA through User. Each of these two components of the system (User and CSP) generate password i.e. (P1-generated by client P2-generated by billing agent. For the first time of registration of client, client will send P1 to the billing agent with log in request. Billing agent check the P1 and make the whole P (password) by integrating P1 and P2 (P2 generated by billing agent).

Again, P will send to client in encrypted form user. With the help of cipher text algorithm billing agent will encrypt the password. Encrypted password further will send to CTA to check authorization of the user.

State 3 (Authentication provided by Cloud Transaction Administrative): This state is used to check Authentication of user. CTA checks for service contract made by user to access the cloud services. If client is registered properly how having control access for cloud then CTA allow client to access the data.

State 4 (Billing Transaction): An actual billing transaction is performed in State 4. In this state, a user can access the data stored on cloud by two ways ‘service log-in’ (to start accessing service on cloud) and ‘a service log-out’ (to end of accessing services provided by cloud). The service log-in is for requesting a cloud service, such as a virtual machine service or any software which is directly accessing form cloud. A user who wants to stop the services provided by cloud can Perform ‘a service log-out’. Both types of services requests are performed in a similar way. The difference between them is the type of request (Service log in-start service, service Log out- to stop the service).The service log-in includes initialization of services by CTA. The service log-out includes details of data usage by client to verify data for generation of bill.

State 4.1 (user service log in request for cloud transaction):

A user who wishes to receive a cloud services from a Cloud will sends a service log-in request to Cloud transaction administrator. After receiving the service request form user, the CTA checks user validation and contract between billing agent and user. The service contract include performance factors, such as availability, CPU speed, I/O throughput, a time stamp, and the cost.CTA sends the service request of user to service manager. Service manager takes the required data form resources available on cloud and send it to CTA. Then, CTA will send the data in consistent form to user. Hence, user can access the cloud data via Cloud transaction authority.

State 4.2 (Billing transaction for a service log out):

This step is used to stop the access of cloud via cloud transaction authority. A user who intends to stop the services of cloud will send log out request to CTA. The CTA consequently checks whether service manager provide service to user as per contract or not .If the service manager is not capable to give the services as mention in contract then, the CTA may impose take appropriate action on service manager such as reducing

or canceling the payment, order to service manager to increase the service level.

State 5 (Bill generation by billing agent):

This step is mainly used to generate the bill as per data usage by user. It include log in time and log out time of user. Different constraints are applied for different cloud service Model to generate the bill. After service log out request of user service manager inform to billing agent.

Billing agent checks data usage, different services used by user and then generates the bill. This bill will be further confirmed by CTA with the help of service transaction report.

5. Future scope- proposed system is mainly taking in consideration for reliability, scalability and robust performance. We are working towards the system for more fault tolerance against scalable billing system. Main remarkable feature of the billing system is security; we can increase the security by applying different type of encryption and decryption algorithm. Different type of billing system format can be used to avoid lagging between user and cloud service provider. We introduce a new concept of a CNA to ensure undeniable verification of any transaction between a cloud service user and a CSP. By increasing more security in CNA verification we can achieve better performance of the system. By doing this, we made the transactions for billing more objective and acceptable to users and Cloud Service Providers. Data security is another important part for our proposed system, our system does provide all data in confidential manner so that user get his own data in consistent form, we can apply different data encryption algorithm to keep user data Confidential.

6. Conclusion: 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 billing system have basic three advantages they are: First, we introduce a new element that is called as CTA the work of CTA is to make confidant confirmation of any transaction that is happen between a client and a CSP. Second, our transparent and reliable bill generation system replaces all the expensive operations of security accepts such as password generation without compromising with level of security; so because of this, it is able to reduce the billing process complications. Third and the last goal which we have achieved is, we implement the cipher text mechanism and

logging mechanism. So we can say that the system is more acceptable with minimum cost and time complexity also provides more security.

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