Resource Cost Prediction and Comparison System for Cloud Consumers to achieve Cost Effective Uses

Aditi Irkal, Prof. Monika Mishra

Information Technology, Smt. Kashibai Navale College of Engineering & Technology
Information Technology, Smt. Kashibai Navale College of Engineering & Technology

Abstract- Cloud Computing or in shorthand just the "cloud", is a pool of resources, software and information that are accessed over a network (Internet). Cloud provides services based on "Pay for what you use" principle i.e., pay for only those resources used for a particular time. The information and services are provided to various computers and devices as utility (like electricity grid).

Cloud users require a usage accounting infrastructure not only capable of supporting billing as an accounting application, but is also supporting all kinds of applications.

There are scenarios where the service providers fail to anticipate the requirements of the customers and hence they may add additional capacity from a trusted third party (TTP) service provider. The consumer is unaware of that they are dealing with an additional cloud service provider. Thus, the cost to be paid will increase for the consumer.Billing risks associated with ensuring that you are billed correctly and only for the resources consumed. The meters rate can change depending on the billing options chosen and the time of the day.

In the proposed system, the consumer will not only keep an account of the billing, but also can predict the different schemes matching with the current requirement of the customer with their different list of charges. Consumers will be able to know different schemes provided by various providers and have option to select the best cost effective scheme matching to their requirements.

Index Terms- *Cloud Computing, Price Prediction, Price Comparison, Pricing Models, Resource Metering.*

I. INTRODUCTION

Cloud Computing is a new style of computing in which dynamically scalable and often virtualized resources are provided as a service over internet. Consumers pay for the services and capacity as they need them. Pricing for cloud platforms and services is based on three key dimensions: Storage, Bandwidth and Compute. Depending on the application characteristics, cost of deploying an application could vary based on the selected platforms. Besides the unit pricing, it is also important to calculate monthly development of application, deployment and its maintenance costs.

Needless to say that for each pay-per-use service, users must be provided with an unambiguous resource accounting model that precisely describes all the constituent chargeable resources of the service and how billing charges are calculated from the resource usage (resource consumption) data collected on behalf of the consumer over a given period. The consumers can use such resource usage data in many interesting ways, like - making their applications billing aware, IT budget planning, creating brokering services that automate the selection of services in line.

An issue that is raised[1] is the *accountability* of the resource usage data: who performs the measurement to collect the resource usage data - the provider, the consumer, a trusted third party (TTP), or some combination of thema? Provider-side accountability is the norm for the traditional utility services such as for water, gas and electricity, where providers make use of metering devices (trusted by consumers) that are deployed in the consumers' premises.

For this above issue, we have proposed a system that keeps the accounts of resource billing. The proposed system also predicts the upcoming bill for a given time- hourly or monthly.

Such system will help the consumers to maintain and control their IT budgets. Users may also search for other providers with the same resources with their costs charged.

II. BACKGROUND

Different providers provided different models to show the accountability of chargeable resources. The charges are applied for the traffic consumption, operation consumption and network consumption. Many Authors brought up many solutions for calculating the resource consumption at client side and also schemes for comparing the costs of different providers in the market.

An approach to help non-expert users with limited or no knowledge on legal and virtual appliance image format compatibility issues to deploy their services flawlessly. If these solutions are brought together in a single platform, then the consumers those are non-expert users can also perform accounting and selecting the proper schemes in a single platform. Thus, reducing the burden of searching individual provider's site for checking of the costs.

The user's satisfaction can be evaluated through a utility measure which depends not only on the resource properties but also on the user's preference to choose certain providers, i.e., two providers with the same resource capacities and usage price may be considered different for a user due to the user's choice behavior and loyalty. Furthermore, the task of optimally pricing cloud resources to attract users and improve revenue is very challenging.

In this paper, we show different schemes for cloud resource metering and prediction of bills for a particular time and how a non-expert consumer can access the pricing details of the cloud resources from various providers and select the best suited scheme as per their requirements.

III. LITERATURE SURVEY

In a cloud environment, the resources are charged for their use, i.e. "pay-as-you-use" strategy. It is necessary for a cloud consumer to know whether the bill charged by the provider is relevant to the use or not. Thus, there must be some metering service that extracts relevant data required for calculating resource usage.
In this section we will see different strategies used for billing the cloud resources and also the schemes used to compare the costs of different cloud providers.

In [1], Author speaks about the weak and strong resource accounting models. Consumer of cloud gets clear idea of the discrepancies in their resource billing. Hence consumers will become aware of the billing and IT budgeting. Dynamic adjustment of resource capacity throughout the life cycle of the cloud based application to stay within bounds of predetermined cost.

In [2], Author speaks about Cloud service composition, which includes several tasks such as discovering, compatibility checking, selection and deployment. Most of the find it difficult to select the best one among the hundreds of possible compositions available. Author includes several algorithms for the selection of the required resources, helps to non-expert users with limited or no knowledge to deploy their services faultlessly. Can only perform well when the number of given alternatives is given small and the number of objectives is limited.

Cloud pricing has attracted many researcher attentions. Existing papers discuss how the optimal pricing can be obtained with revenue gain to the providers. Yaug Feng [3], proposed a Nash equilibrium, which was used in monopoly, duopoly and oligopoly markets, showed that how providers change their prices according to the market competition.

Some previous work also refers to the dynamic pricing, which increases the efficiency of cloud resources. The mechanism is introduced by author [4], is based on reverse auction. The mechanism allows user to select the appropriate cloud vendors and decide price dynamically.

Another approach that can be used for dynamic pricing is using game theory [5]. Using the game theory author tries to solve the problem between the competition of providers and propose dynamic pricing. This is done by Markov Decision Process that produces Markov Perfect Equilibrium.

Agent based cloud computing is concerned with design and development of software agents for bolstering the cloud service discovery, service negotiation and service composition. The advantage of using this is Software tools and testbeds are used for managing cloud resources, Complex cloud negotiation mechanism was deviced to support cloud commerce and a multicriteria search engine that accepts as its inputs functional, technical and budgetary requirements from consumers.

In [7], Author speaks about different pricing models and new pricing policies for federated cloud. The two pricing models are – fixed and dynamic models, where fixed pricing model fixes the 0070rices for a particular time horizon and where as dynamic pricing scheme allows to charge consumer with different prices for the same product depending on the characteristics of transaction. The pricing policies that the author introduces are On-demand (OD), Spot (S), and Reserved(R).

IV. COMPARISON OF EXISTING SYSTEM

Paper name	Current Bill Status	Comparison of schemes with different providers.	Dynamic Pricing	Graphical Representation on Cost	Sync
Consumer-centric resource accounting in the cloud	Yes	No	No	Yes	No
Compatibility-Aware Cloud Service Composition under Fuzzy Preferences of Users	Yes	No	Yes	Yes	Yes
Price Competition in an Oligopoly Market with Multiple IaaS Cloud Providers	No	Yes	Yes	Yes	No
Mechanism Design Approach to Resource Procurement in Cloud Computing	No	Yes	Yes	Yes	No
A Novel Model for Competition and Cooperation among Cloud Providers	No	Yes	Yes	Yes	No

Agent-Based Cloud Computing	No	Yes	No	No	No
New Pricing Policies for Federated Cloud	No	Yes	Yes	No	No

Table 1 : Comparison chart of the existing systems.

V. PROPOSED SYSTEM

From the above survey, we can conclude that the cloud pricing has become an important topic of research and how to improve it is a challenge. We propose a system that provides the bill of the consumed resources, predicts the bill for a given time period and compares cost of resources from different providers for the purpose of increasing cost effective selection of the provider by the users.

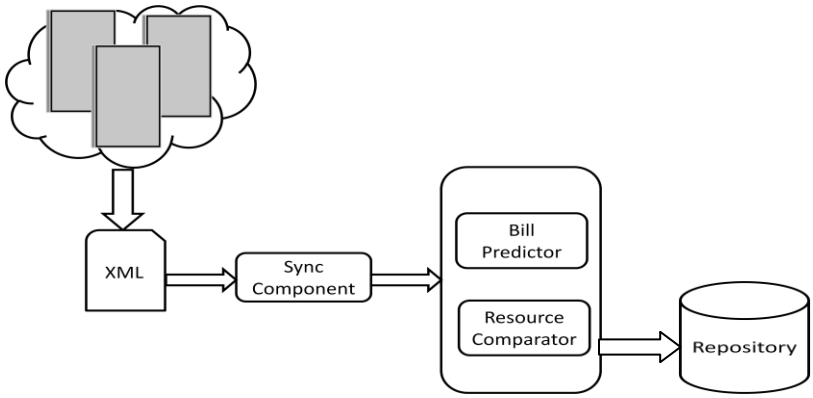

Figure 1: Module Diagram of Proposed System.

As shown in the Figure 1, there are three important modules in the proposed system. Bill Predictor (BP), Resource Comparator(RC) and Sync Component. The BP module provides the consumers the current bill of the resources consumed by the consumer and also it predicts the bill for a given time period. The dynamic bill prediction is done based on three parameters, hourly, daily and monthly bill prediction. This module will tell the consumer how much budget would be required for the upcoming bill.

The second module is Resource Comparator(RC), which is used to compare different prices of various provider in a single platform so as to help consumers to select for the best suitable price for their requirements. The selection of the providers is could be carried out on the parameters like, most recently used resource combinations.

The Sync Component is the last module which is will link the system to the cloud providers. Its responsibility is to keep the repository consistent with latest metadata provided by cloud providers.

VI. CONCLUSION

Cloud is a collection of resources called as “resource pool”. Users hire resources based on “pay-as-you-use” strategy. In this survey, we studied different ways of pricing and how to select the best resource schemes from different providers. Selection of different schemes and making it automated will help non-expert users to hire the cloud resources easily and efficiently, and within their budget.

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AUTHORS

First Author – Aditi Irkal,B.E(IT),M.E(IT), Smt. Kashibai Navale College of Engineering & Technology, Pune, India. email:aditi.chavan2009@gmail.com.

Second Author – Prof. Monika Mishra, B.E.(E n TC),M.Tech(IT)& MBA, Smt. Kashibai Navale College of Engineering & Technology, Pune, India email: monika.r.mishra@gmail.com