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Cost Based Ranking Service Models in Cloud Computing

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Abstract: Cloud Computing is an emerging technology where user can store and access services logically over the internet rather than a local server or a computer's hardware. Internet world is growing rapidly, service providers also increasing their features according to the user requirements. Since users feels discomfort to choose cloud service provider to meet their expectations. The proposed system involves creation of a framework for selecting the service provider based upon user's requirements primarily by cost. Ranking the service providers based on cost and various parameters of cloud services like response time, security etc... Package levels like Premium, Classic and Standard are derived for better clarity of users to select service providers among the available list. Priority selection model also applied when one or more service providers got the same rank in the pool. Finally, user will be benefited from this framework.

Keywords: Cloud Broker Architecture, Package Selection Process, Ranking Of Services, Priority Selection Model.

INTRODUCTION

Cloud computing is a kind of Internet-based computing that provides shared processing resources and data to computers and other devices on demand.Cloud computing has become a highly demanded service due to the advantages of high computing power, cheap cost of services, high performance, accessibility as well as availability.Cloud computing offers service models are:

Platform as a service (PaaS)
PaaS vendors offer a development environment to application developers. The provider typically develops toolkit and standards for development and channels for distribution and payment. In the PaaS models, cloud providers deliver a computing platform, typically including operating system, programming-language execution environment, database, and web server. Application developers can develop and run their software solutions on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layers.

Infrastructure as a service (IaaS)
IaaS offer computer physical or (more often) virtual machine and other resources. IaaS refers to online services that abstract the user from the details of infrastructure like physical computing resources, location, data partitioning, scaling, security, backup etc... IaaS cloud providers supply these resources on-demand from their large pools of equipment installed in data centres. For wide-area connectivity, customers can use either the Internet or carrier clouds.To deploy their applications, cloud users install operating system images and their application software on the cloud infrastructure.

Software as a service (SaaS)
In the software as a service (SaaS) model, users gain access to application software and databases. Cloud providers manage the infrastructure and platforms that run the applications. cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. Cloud users do not manage the cloud infrastructure and platform where the application runs. This eliminates the need to install and run the application on the cloud user's own computers, which simplifies maintenance and support [3].

Users of public cloud services can generally select from three basic categories:

User self-provisioning: Customers buy cloud services directly from the provider, typically through internet.The customer pays on a per-transaction basis.

Advance provisioning: Customers contract in advance a predetermined amount of resources, which are prepared in advance of service. The customer pays a usage fee or a monthly fee.

Dynamic provisioning: The provider assigns resources when the customers wants them, and then disconnect them when they are no longer needed. The customer is charged on a pay-per-use basis [2].

WEB SERVICES

Web services, a new type of component that can be invoked over the internet, have a widely known and widely studied concept. In the early stages, the process-based approach to web service composition gained considerable momentum and standardization. However, with the ever increasing number of functionally similar web services being made available on the Internet, there is a need to be able to distinguish them using a set of well-defined Quality of Service (QoS) criteria .Like software products, the quality offered by web services is becoming the utmost priority for not only users but also service

providers. However, the early Universal Description, Discovery, and Integration (UDDI) registries only support web services discovery based on the functional aspects of services. However, now users are interested in not only the functionalities of web services but also their Quality of Service (QoS), which is a set of non-functional attributes (for example, response time and availability) that may impact the quality of the service provided by web services. In this paper, web services are ranked based on the QOS factors and by their preferred cost thereby making the users to choose services according to their interest.

LITERATURE REVIEW

(i) M. Aramudhan, M. Saravanan, [1]" Trust Based Ranking Service Models in Cloud Computing Environment".
Proposed frame work will address few key concepts to select the appropriate service provider for their requirements. We proposed grade table for categorize the resources, grade values to distinguish components, grade total computation for rank the service providers and priority based decision tree applied to separate best service provider among similar highest rank list. Our frame work also provides trustworthy environment to the user by evaluating output with help of trust evaluation unit. We used grades are Gold, Silver and Bronze to categorize the resources, grade values 1.0, 0.5, 0.25, for represents key components.

(ii) C. S. Rajarajeswari, M. Aramudhan,[4] "Ranking Model for SLA Resource Provisioning Management" (2014).
Presented work provides a new federated cloud mechanism, in which Cloud Broker Manager (CBM) takes up the responsibility of resource provisioning and ranking. In this technique they used pCBM and sCBM to handle SLA and non SLA user. Dynamic Loose Priority Scheduling used to manage queue, Markov process used to map the available services from service provider and finally they usedPoincare plot mechanism for ranking the service providers.

PROPOSED WORK

The proposed system involves creation of a framework for selecting the service provider based upon user's requirements primarily by cost. Ranking the service providers based on cost and various parameters of cloud services like response time, security etc... Various package levels like Premium, Classic and Standard are derived for better clarity of users to select service providers among the available list. Priority selection model also applied when one or more service providers got the same rank in the pool. Finally, user will be benefited from this framework.Based on the table 1 cost computed by evaluating the Quality attributes, the services are ranked.Some criteria on which QOS parameters is evaluated are as follows:

(i) Usage cost: The cost involved in requesting and using the service.

(ii) Fault rate: The rate invocation failure for the service's method.

(iii) Response time: The time required to complete a web service request. It is calculated to be the mean value over a certain time span.

- Response time = (Response completion time)-(User request time).

(iv) Operability: The ability of the web service to enable the user (system developer) to operate and control it.

(v) Privacy: The quality of a user's control over the availability of information about and exposure of him- or herself. It is related to being able to function in society anonymously (including pseudonymous or blind credential identification). On both sides of web services, consumers and providers, it measures the ability of the service to protect the disclosure of private information.

(vi) Availability: The fraction of the time the web service exits or is ready to use. If the time that a system is not available is referred to as the ''Down Time'' and the time that the system is available is denoted as the ''Up Time,'' then the Availability is the average Up Time. To obtain the Availability, instead of monitoring Up Time continuously, we suggest monitoring the Down Time. The Down Time could be obtained by monitoring the number of system down events that occur in an operation. The following formula calculates the Availability, where ''Unit Time'' is a standard measure of time.

- Availability=1- Down Time/ Unit Time.

CLOUD BROKER ARCHITECTURE

Enhanced cloud architecture categorizing user as SLA user and non SLA user, Register with particular service provider or specifying particular service provider come under the category of SLA user and non-register with any of service provider named as non SLA user. User requirement classified as functional SLA parameters includes memory related information like memory size, CPU cores, CPU size etc. and non-functional SLA parameters consists of response time, cost, execution time, security etc (Jrad, Tao, &Streit, 2012; Aljawarneh, 2011).Brokers obtain the request from users and perform services based on functional and non-functional parameters, such as Key Performance Indicators [7].

In the proposed model, Cloud Broker Manager (CBM) communicates with service provider broker. CBM, There are two types of CBM namely slaCBM and nonslaCBM.The roles of slaCBM in the proposed cloud architecture are (i) Obtaining request from the SLA user.(ii) Match the requirements of user with registered service provider (iii) Executing the task with that service providernonslaCBM has proposed to provide services to non sla user or not specifying particular service provider. Broker will be given better path to choose suitable service provider to user.

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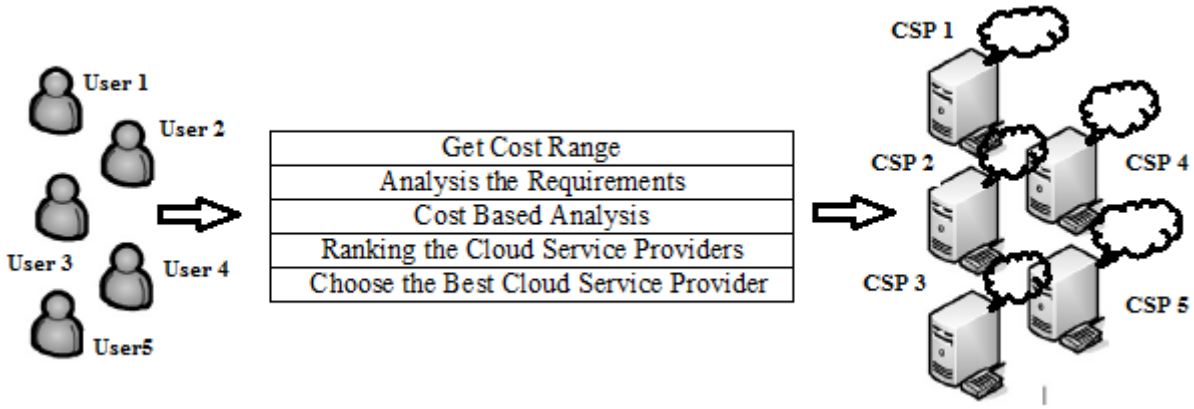

Figure 1 Cloud Architecture Diagram

ALGORITHM1

CLOUD BROKER ALGORITHM

Step 1: CBM receives a request from user.
Step 2: It verifies the user category based on cost: SLA user and Non-SLA member.
If user is SLA member.
Then
Submitted to slaCBM and process the task
Else
Submitted to nonslaCBM and process the task.
Step 3: End procedure.

PACKAGE SELECTION PROCESS

Packageselection process is based on the cost range which we are getting from the user. It is helpful to the user to select the service provider to meet their expectations mainly based on cost. It will show the service providers in three levels of package like Premium, Classic and Standard. User can select the service providers from their choice of cost range (Classic) or above, below of it (Premium, Standard) respectively.

TABLE 1 PACKAGE TABLE

Package	Cost
Premium	> User Cost
Classic	= User Cost
Standard	< User Cost

RANKING OF SERVICES

We proposed therank computation algorithm to rank the service providers. From the package selection process, User will select service providers for ranking process based on cost primarily. In the ranking of services, we will compute the parameters like response time, security, availability etc… of the service providers and will assign value points to make the ranking process easier. Sum the value points of each service provider's parameters and sort the value points of service providers. Ranking the service providers based on sorted value points. Finally, choose the service provider which holds top position from the rank list and display it as best service provider.

TABLE II Rank Computation Table

User requirement Based on cost	User requirement type	SP1		SP2		SP3	
		AR	Value Points	AR	Value Points	AR	Value Points
$100-$200	Response time (in Seconds)	60-120	1	40-120	2	60-120	1
	Security	High	1	Medium	2	High	1
	Availability	98%	2	96%	3	99%	1
	Memory (RAM in GB)	4	1	3	2	4	1
	Processor Speed(GHz)	2.5	2	2.0	3	3.0	1
Total Value Points			7		12		5
Rank			II		III		I

ALGORITHM 2

RANK COMPUTATION ALGORITHM

Begin
Step 1: Get the user requirement as cost of service providers.
Step 2: List out the available service providers based on SPi (i=1, 2, 3,4,5….n)
Step 3: Get service providersfrom package selection process for ranking process SPi (i=1, 2,3,4,5….n)
Step 4: Ranking the service providers based on the parameters like response time, security and availability.

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3.1 Calculate response time
Get response time of chosen service providers
Response time = (Response completion time)-(User request time).
Sort and assign the value points to service providers (SP1, SP2, SP3 etc...)

3.2 Compute Security Aspect
Get the URL
Get the HttpsURLConnection object
Get the security Certificate Details
If the service is SSL certified value point+=1;
else
value point+=2;

3.3 Calculate availability
Availability=1- Down Time/ Unit Time.
Sort and assign the value points to service providers (SP1, SP2, SP3 etc...)
Step 5: Total Value Points = Sum (Value Points(SP1),Sum (Value Points(SP2), Sum (Value Points(SP3)…
Step 6: Sort the Total Value Points of each service provider
Sort(∑SP1,∑SP2,∑SP3 …)
Step 7: Assign the rank based on the sorting and choose the best service provider from it.
Step 8: Priority Selection Model
If rank (SP1) == (SP2)
If Cost (SP1) < Cost (SP2)
Assign Rank = 1,
Else
Assign Rank = 2.
Else if
Cost (SP1) == Cost (SP2)
Show value points of parameters ((SP1) & (SP2))
End.

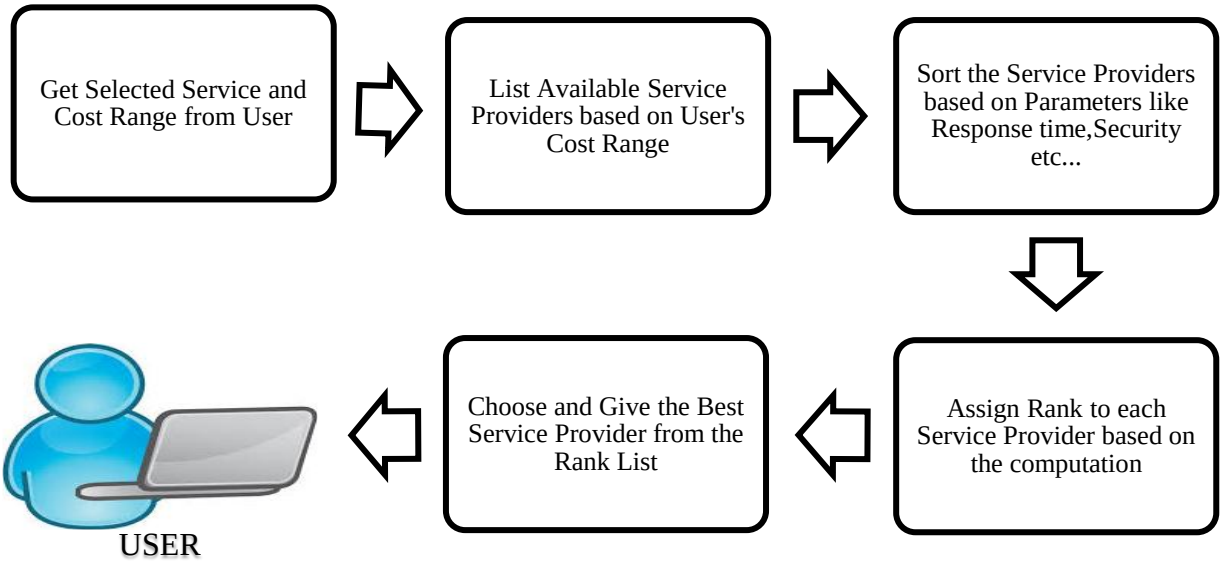

Figure 2 Functional diagrams of Ranking Services

PRIORITY SELECTION MODEL

We need help of priority selection model, if the rank of service providers is similar.

Case 1:
Suppose the rank of the service provider is similar, it will check with one more parameter as cost of service provider which user has already selected from the package selection process. It provides priority to the service provider which has minimum cost between them.

Case 2:
May the cost also same between the service providers, display the value points of the parameters of service providers accordingly. Finally, user will select the service provider based on their parameter choice.

CONCLUSION

Cloud Computing is a fast growing technology where users can access services from service providers through internet from anywhere at any time. The Quality of Services offered by web services is becoming the utmost priority for not only users but also service providers, many researches focus on the quality-based selection of web services. So service providers also increasing their features according to the user requirements.The proposed system involves creation of a framework for selecting the service provider based upon user's requirements primarily by cost. Ranking the service providers based on cost and various parameters of cloud services like response time, security etc... Various package levels like Premium, Classic and Standard are derived for better clarity of users to select service providers among the available list. Priority selection model also applied when one or more service providers got the same rank in the pool. It covers the quality of service attributes and cost based on the user's requirements.

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