Integrating and Enhancing the Quality-of-service in cloud computing with software testing

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Abstract: Cloud computing involves to delivering the hosted services throughout the internet. Testing tools are used to test the desktop applications, web applications and the cloud based software systems that are used to address the quality of the cloud infrastructure such as tremendous extensibility and aggressive composition. In the existing paper it is not providing the quality of services in the effective manner. In this paper we focused on integrating the software metrics for getting the quality of services, in terms of speed, memory size, RAM, ROM size and we are also using the D-cloud and prefail testing tools to perform the fault tolerance and recovery testing. By using OVMP algorithm we are minimizing the cost spending for services and load prediction algorithm and it is also used to reduce the load. The aim is to extend the above framework with cross cloud testing scenario involving communications between heterogeneous cloud hosts. The result shows that the cloud environment ensures more flexible and quality of services.

Index terms - Cloud computing, OVMP algorithm, software metrics, D-cloud and prefail, Virtual machine Placement algorithm, Multiplexing devices.

I. INTRODUCTION

Cloud computing is ready to use for today’s world. Cloud computing is natural term for any of the services that involves delivering the hosted services through the web. Cloud providers mainly concentrated to providing the services and all resources to the customers on demand. Testing tools are used to test the applications it also applied for cloud computing application. That are need to address the unique quality concerns of the cloud infrastructure. Cloud computing has emerged as a possible choice to the procurement and management of physical resources. In existing system it is allowing the virtual machines technology which means it is used for deploying the hosted services and connecting the various operating systems. It providing more services but wasting the lot of resources like time and memory. In this paper ovmp (optimal virtual machine placement algorithm) is using it is time scheduling algorithm it will reduce the execution time and also minimizing the users budget. Load prediction algorithm is also using for reducing the load of users. D-cloud testing scheme is introduced to test the cloud computing infrastructure. D-cloud is used to perform fault tolerance and recovery testing. In large scale distributed systems creating the test environment is difficult and it may extend the time and elevate the cost. To overcome that problem virtual machines are using on each node. Virtualization can possible to run multiple operating systems and multiple applications on the same server at the same time.

It reducing the costs and increasing the flexibility of hardware. Tpc-W is an e-commerce benchmark it contains three aspects they are workload characterization, performance metrics and sensitivity of the metrics. Workload characterization cannot represent the workload. Performance metrics used to sustain the throughput and the sensitivity of the metrics it determines it is validity for wider scenarios and supporting for scaling decisions. Tpc-W measures two main metrics i.e., WIPS and $/WIPS. WIPS is web interaction per second is the ratio between the SUTs total price and WIPS value.$/WIPS determines the ratio between cost and web interaction per second. These two metrics are used for cloud computing. Load prediction algorithm using to reduce the load of the computing services. Skewness technique is used to measure the uneven utilization of servers. By using these techniques it will provide unique quality of services and it will improve the CPU performance like RAM size, ROM size and it will provides more space and increasing the servicing speed. Below figure represents how services are hosting on the multiple cloud hosts various companies are deploying the services on the cloud which are Amazon EC2,
Google, Zoho, Microsoft, Yahoo etc., These companies are providing the cloud services throughout the world.

II. RELATED WORK

Double resource renting scheme this scheme is very efficient and guarantee the quality of service and it also reduce as the usage of resources. Here for double renting scheme profit maximization problem is formulated [1]. But this profit maximization problem is considered only in a homogeneous cloud environment which doesn’t support in heterogeneous environment.

Novel approximate analytical model which is used to estimate the probability distribution of performance indicator and other request response time. This technique is mainly based on Markov chain model. This model is very flexible in terms of diversity of service time and scalability [2] But this model failed to extend for burst arrivals of requests.

Pricing model which takes a lot of factors such as work load of an application environment and requirement of a service. Service level agreement, etc... into consideration [3]. M/M/m queueing model technique can derive the problem of optimal multi-server configuration, but it is very complex to find. Pricing model it means service providers want to provide the services within the time of the customer’s deadline. If service providers failed to provide the services within time they are not charging for that service. Queuing model handling the heterogeneous requests at a time. One request is handling remaining another requests are kept in queue.

Service level agreement (SLA) which means it managing the work load service requests are raised by the customers [4] with in a deadline. Service providers exceeds the deadline then provider provides free of low quality services. In that agreement it is maintaining the records of services deadline and details about requirements of customers. To develop the power and performance of load distribution method for cloud computing in present and future large-scale data centre. It finds the problem of optimal power allocation and load distribution [5] for multiple heterogeneous multi-core server processors. It describes queue model for handling different multi-cores servers request at time. Dynamic pricing is used which means pricing is not fixed it depends upon the needs of the customers. Here revenue management frame work is used for formulate the revenue maximization problem [6] with dynamic pricing. Dynamic pricing is better than static pricing because static pricing is fixed.

Software metrics is used for measuring the quality of software various types of software metrics which are size metrics, control flow metrics and dataflow metrics. Software metrics are applied for all phases of the software life cycle [7]. Software metrics mainly used for analysing the complexity of regression testing.

Optimization-based profit maximization strategy is used for reducing the data centres expenditure[8]. It mainly address the trade-off between minimize the data centres energy expenditure and maximize the revenue for internet and cloud computing services.

Model based integration and system test automation (MISTA) generates test cases automatically. It converts the test code into executable code. [9] Petri level net is used to capturing the control and information related condition. But Petri level nets are time taken process.

Software metrics is used for deriving the quality of software and watched efficiently. [10] Mainly software metrics is used to measuring the complexity of software. But the complexity of software will directly affect the eligibility and trustworthy of the software. Software metrics are using to measuring the software.

Testing the parallel and distributed systems for highly availability of servers.[11] D-cloud testing is used for finding the fault injection and managing the hardware and software composition. But here performance is not maintaining. D-cloud is also finding the failures in infrastructure.

Int test provides a novel integrated attestation graph analysis scheme substituting the bad results generated by malevolent attacker with better results produced by benign service providers. [12] It imposes the low performance for the data processing services in the cloud computing infrastructure.

Eucalyptus is an open source software for cloud computing that implements as infrastructure as a service (IAAS). It gives ability to run and control the virtual machine [13] instances and deployed across a different physical resources.

Cloud providers offers two plans for computing resources, namely reservation plan and on-demand plan. Reservation plan is cheaper than the on-demand plan. In Reservation plan it is difficult to the cloud providers to estimate the consumer’s future demands. In on-demand this difficulty is not raising. To overcome the problem in reservation plan it uses the optimal control resource provisioning (OCRP) algorithm [14].

Testing the cloud based applications it performs the verification and validation of the resources it is termed as Testing-as-a service (TAAS). Testing inside a cloud it is testing the quality of
infrastructure [15]. This is mainly performed by cloud vendors. Testing the cloud application is difficult for multiple cloud services.

III. BACKGROUND APPROACH

In conventional approach, it uses the usage based pricing strategy and also double quality guaranteed resource renting scheme. It is providing more services but using more resources. Very costly it is very burden to the users. It is not handling the load at the time of peak traffic. It is mainly based on Amazon EC2 (elastic cloud) which means it is providing more services to the users and it requires more resources in this Amazon they are using the

Fig.2: Hosting multiple OS in virtual machine

virtual machine concept. A multi-server system is used which is modelled as M/M/M+D queuing model for handling the multiple requests and providing the services. Profit maximization is also formulated but it is in homogeneous environment. Fig.2 represents about virtualization concept which means multiple operating system and applications are running at a time.

Joint-VM provisioning methodology originates from a perception on the VM asset request in genuine server farms. It is well realized that the applications encased by Vms - and accordingly the Vms themselves - display time varying asset interest examples with blasts of appeal periods, intermixed with low-use districts. Besides, our estimation on an expansive set of Vms demonstrates that numerous Vms, even in the same server farm, display interest examples with diverse, unaligned appropriations of these crests and valleys. In this manner, while a limit organizer that works over singleton Vms is bound by the crests of every individual VM, a joint-VM methodology can conceivably misuse the multiplexing among the interest examples of numerous Vms to achieve an amassed limit measure that is just bound by the total crest conduct. To evaluate the potential limit reserve funds with multiplexing in VM limit arranging at the undertaking scale, we develop the above examination to a monstrous dataset gathered from a set of business server farms.

IV. SYSTEM IMPLEMENTATION

In this section implement OVMP(optimal virtual machine placement) algorithm is using for uncertainty of future demands and prices of resources is taken in to account and adjust the trade-off between on demand and oversubscribed costs .Enhancing the software metrics for this cloud the main essential metric utilized by the TPC-W is WIPS(web interaction per second) it supports to estimate the performance constraints .Here prefail and D-cloud testing tools are using for identifying the abstract information of an I/O call and also finding the injected failure, to identify every failure. D-cloud provides actual faults in application. Fig 3 mainly represents about the multiple clusters are deploying. Interconnection links between the service components and nodes. Open Nebula is cloud software it is used to connect the services to remote work nodes and also connected to local worker nodes.

Fig.3: Deployment of multi cloud cluster.

Procedure for developing cloud environment using OVMP as follows:

| Input: Data Process on OS module description |
| Output : Formation of cloud resource process |
| 1. Derive the constraints parameters to the processing virtual machines |
| 2. For each VM i |
| 3. Decompose xi(t) \rightarrow xi(t) = ^\prime xi(t) + ^\prime xi(t) |
| ^\prime xi(t): trend and seasonal components |
| ^\prime xi(t): irregular fluctuations |
| 4. Perform forecast operations on each virtual machine placement process and construct virtual machine process. |

ALGORITHM 2: RESERVATION SCHEME

N denotes the number of cloud providers
Step1: first get the sample reservation cost from cloud provider
Step2: initialize the cost for basic variables like
\[ C_{ijk}(r)(\omega) \]
for \( i = 1,2,...,N \) do
for \( j = 1,2,...,N \) do
for \( k = 1,2,...,N \) do
\( z = \text{scenario of reservation phase decision variable of reservation phase I} \)
\( I = \min (\text{decision variable of reservation phase, on demand phase, Expending phase}) \)
end for;
end for;
end for;
end for;
end for;
end for;

This system is using to deploying the multiple clouds. Amazon EC2 web services using elastic cloud it elongates the services based upon the users requirements. Mainly these cloud services are deploying in the Kross cloud testing scenario.

V. PERFORMANCE EVALUATION

Stochastic Integer Programming for OVMP: The general type of stochastic whole number project of the OVMP calculation. The destination capacity (5) is to minimize the cloud customer’s aggregate asset provisioning with respect to administrations. Choice variable \( x_{ijkt} \) means the quantity of Vms provisioned in the first provisioning stage.

\[
\begin{align*}
\text{subjected to:} & \\
& x_{ijkt} \in IN, \forall i \in I, \forall j \in J, \forall t \in T,
\end{align*}
\]

As it were, this number alludes to as the aggregate sum of saved assets. Therefore, the time to get the arrangement of the OVMP calculation can be diminished. The arrangement of the OVMP calculation by tackling the stochastic programming detailing specifically if all situations in the issue are considered. Two careful investigations are considered in this assessment, specifically two provisioning stage issue (2-PSP) and 12 provisioning stage issue (12-PSP). The previous, 2-PSP, has just two provisioning stages.

We accept that the cloud agent is settling on a choice for provisioning assets toward the end of year. Under value and interest instability, the cloud specialist performs the development reservation of assets in the first stage for being utilized as a part of the following entire year which is the second stage. Subsequently, the 1-year reservation contract is sufficiently needed by the agent since the agreement can cover the time span. At the second stage, the value and interest are watched. At that point, the quantity of saved assets are used and some extra measure of assets can be provisioned in an on-interest design. Also, extra assets can be provisioned by obtaining on-interest arrangements if the held assets can’t take care of the genuine demand. For both careful investigations, the ideal arrangement got from the OVMP calculation is the measure of saved assets in diverse provisioning stages (or the first stage for 2-PSP). Since the measure of assets is saved for the quantity of Vms, this ideal arrangement can be considered to the quantity of held Vms at the end of the day. Consequently, the OVMP calculation would be obliged to ensure the base assets to the purchase.

VI. EXPERIMENTAL RESULTS

In this section we present to develop the associated results of increasing memory and time with developing of software testing in cloud resource provisioning process.

Figure 4: Increasing memory representation with respect to operating services with utilisations.

OUTPUT: REDUCING THE TIME

Figure 5: Utilization of all the resource from normal processing to loading modules with respect to time.
We evaluate the strength of our criteria in abundance minimization and normal handling. We start with a little scale examination made up of three PMs and five VMs so we can existing the outcomes for all web servers. Various shades are used for each Virtual Machine. All Virtual Machines are made with 128 MB out of RAM. An Apache server takes a shot at each VM. We use httpperf to make CPU exceptional PHP programs on the Apache Server.

<table>
<thead>
<tr>
<th>Virtual Machines</th>
<th>Skewness</th>
<th>Resource Framework</th>
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<tbody>
<tr>
<td>10</td>
<td>3.8</td>
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<tr>
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<td>60</td>
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Table 1: Comparison of time efficiency with respect virtual machines.

As the top goes off and down, our criteria will do it again the above method: course over or organize the VMs as required.

Next we grow the investigation’s degree to 30 web servers. We use the TPC-W routine for this examination. TPC-W is a business part standard for e-exchange programs which imitates the surfing around and purchasing exercises of clients. We set up 8 VMs on each server at the beginning, allow the hypervisor to recover from time to time used limit. Each VM works the server bit of contrasting with diverse sorts of the workloads: surfing around, purchasing, different workloads, et cetera.

**VII. CONCLUSION**

In order to providing the quality of services by using lower number of resources. This paper has proposed a optimal virtual machine placement (OVMP) algorithm for minimizing the execution time and also reducing the cost. And then, D-cloud and prefail testing techniques are using for identifying fault tolerance and recovery testing. Load prediction algorithm is using to reduce the load of services. It greatly reducing the time and providing more available free space and also enhancing the software metrics for this cloud computing application for providing the quality of services. Web interaction per second (WIPS) is one of the metric using in this paper WIPS is measured by TPC benchmark. In this paper we consider the cost reducing and time reducing providing more free space compared to existing work.

**REFERENCES**


