Methods for Software Testing in Cloud Computing Environment

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***Abstract*-- Normal software application that are developed to run on the desktop and other infrastructure need testing for working efficiently. But when the same software applications that should run or operate in the cloud computing environment need some more testing methodologies because the environment is entirely different when compared to the application that are developed for the desktop environment. so, in this paper we discuss about methodologies and issues related to the cloud testing in the cloud computing environment**.

***Keywords*-- *software* testing, types of testing, benefits of software testing.**

I.INTRODUCTION

Software testing, it plays a major role in the software engineering and their respective application. Software testing is nothing but it is verifying and validating the particular application. Verifying means whether the application is developed in specified format or not, whereas validating means whether the particular application is fulfilling the customer requirements or not. The major tests in the software engineering is used are black box testing and white testing. Black box testing means, here we test the application without knowing the internal logic, we only see the whether the correct output is coming for the specified input, normally it is done in the presence of the customer. And the next major testing method is white box testing it is done in the developer site and this test is conduct by the developer and in the testing we know the internal logic [1]

Cloud computing, it is one of the most emerging technology in these present days, most of the organization following this technology make their computer application to operate through the cloud computing technology. In order to run these applications we need service models they are software as a service, infrastructure as a service, platform as a service, and network as a service. In all these one of the service that indirectly deals with the software testing that is software as a service model because software application in cloud computing operate through this service model [2]

II. WHY SOFTWARE TESTING IN CLOUD ENVIRONMENTS?

Organizations pursuing testing in general and load, performance testing and production service monitoring in particular are challenged by several problems like limited test budget, meeting deadlines. High costs per test, large number of test cases, and little or no reuse of tests and geographical distribution of users add to the challenges. Moreover ensuring high quality service delivery and avoiding outages requires testing in one's datacenter, outside the data-center, or both. Cloud Testing is the solution to all these problems. Effective unlimited storage, quick availability of the infrastructure with scalability, flexibility and availability of distributed testing environment reduce the execution time of testing of large applications and lead to cost-effective solutions[3][4].

III. NEED OF SOFTWARE TESTING

The present approaches which are used for software testing for cloud computing application are very expensive because users can simulate their activities from different geographic location. It is more expensive because it requires expensive hardware when we test firewall and load balancers and also for maintaining them [3][5].cloud testing is more effective, when more number of users for the particular application is unpredictable or there is a different deployment environments as per the customer requirements[3][6].

IV. TYPES OF TESTING

A. Stress testing

It is one of most important testing in the cloud computing because it is used to calculate the effectives of the particular application by setting the break points and it also calculate the ability of the application. The results from this test, make the application to work under stress by maintaining the stability [3][7].

B. Load testing

Load testing, it mainly used to calculate the performance of cloud computing application, for this it introduce the artificial traffic into the application and measures it response. So, this is conducted in order to application to certain standard [15].

C. Performance testing

This type of testing is used to find out the solution to certain problems like threshold, bottle neck etc [3][8].for this testing we need create the artificial work load, so, it can be created by the cloud computing environment. So, by performing this type of tests we can easily reduce the cost and time by simulating thousands of customers throughout the geographical area [3][8].

D. Functional testing

It is another important testing method,in this we conduct the testing process in the cloud environment instead of developers environment. And it is conducted out on both internet and non-internet application.

E. Compatibility testing

In this testing method we come across the virtualization concept because a cloud provider has to create more number of instances for same operating system. So, here we have to test its compatibility.

F. Browser performance testing

As various browsers are used by the cloud users in the cloud computing environment, we should carry out the test in an efficient so, that it works uniquely for all users. For this there are tools in their respective browsers to increase the performance.

G. Latency testing:

Here we discuss about the latency which is nothing but the 'delay'. So, we calculate the time delay between the corresponding user request and the corresponding user response in cloud computing environment.

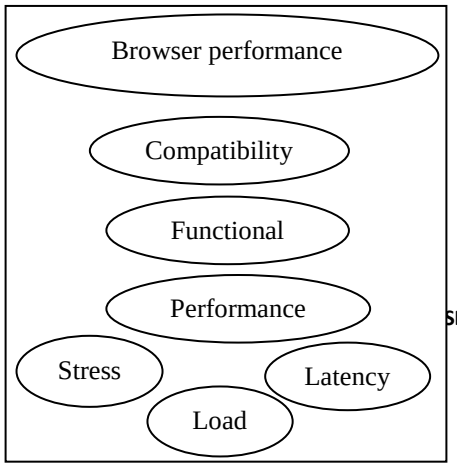

Fig 1. Types of testing

V. STEPS FOR THE TESTING IN CLOUD COMPUTING ENVIRONMENT

For testing the application in the cloud computing environment first we have to develop the user scenario, it is nothing but we have specify, why we are developing this application and what is the main theme of it. after developing the user scenario , we have to design the test cases, in these test case we obtain the results whether the output is coming for particular input or not.

After designing the test cases we have to select the cloud provider in order to implement these test cases and then setup the infrastructure for it and we have to select cloud servers for which we are going to conduct the testing process. And then we start the tests and monitor the tests and deliver the results [14].

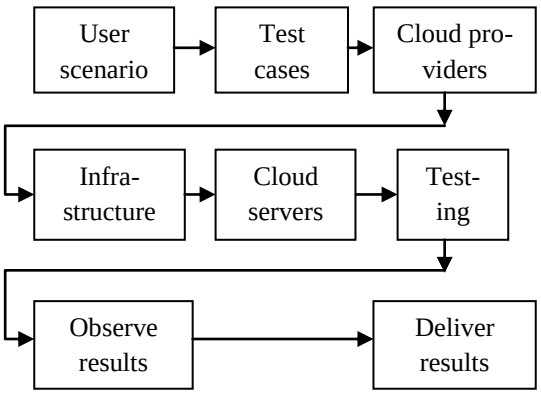

Fig 2. Steps for testing

VI. KEY ISSUES FOR SUCCESSFUL TESTING

- First we have to under the scenario on which we are going to perform testing
- Then understand platform of the cloud providers
- Then design the test cases in a way that it should reduce the cost
- Continuously monitor the services provided by the application

VII. ISSUES RELATED TO THE TESTING IN CLOUD COMPUTING

- Initial cost will be more because normal applications which are worked for the desktop, should be changed to cloud computing environment, for this migration purpose more amount of hard ware is required[3][9].
- Old systems and services need to be modified according to the cloud environment. For this old systems we should use robust interfaces [3][10].
- The test results may not be accurate due to varying performance of service providers' network and internet. In many cases, service virtualization can be applied to simulate the specific performance and behaviors required for accurate and thorough testing [3][11].

VIII. BENEFITS OF THE SOFTWARE TESTING IN CLOUD

Tool license cost: we no need buy the latest updated software's because, it is responsible of service provider to see whether the latest software is using or not, he just update the software whenever new version released instead of buying it [13].

Infrastructure cost: when we use the tools in order to test the applications in cloud computing environment, we need the infrastructure. So, the hardware is provided by the cloud service provider.

Flexibility and wide range: we can choose the service of testing when we require and we have freedom of choosing specified tool to specified product [3][12].

CONCLUSION

Normally in software testing, we test the applications that belong to the desktop, but here we discussed about how applications are tested when there are migrated to cloud computing environment. The above section gives the information how to do testing for the applications in cloud environment. And we came across different testing techniques and we also came to what steps should follow when we test them. And we also discussed the key issues and the benefits of the software testing in cloud. So in order to test the application in cloud environment the above information gives us the brief idea.

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