

A Study Analysis And Survey of Different Performance Testing Tools Used For Cloud Applications

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Abstract— Cloud Computing has evolved as an effective solution for client and business application advancement. It deals with large number of different types of resources. So in order to deliver these cloud facilities and services effectively, testing of the cloud based services turns out to be an essential step before its usage by the clients. For testing cloud applications there are various tools and methods. In this paper we analyze the use of various performance testing tools used in cloud environment and the correlation of the same for testing of cloud applications. Also we had gathered the expert reviews about the tools with the assistance of a review on survey monkey website over a time of one week. A sum of 20 working professionals had demonstrated enthusiasm for our overview that incorporates cloud professionals working in different Information Technology sector. The outcomes depict the tools which are most widely used by the cloud professionals.

Keywords— Cloud Computing; Cloud Testing; Software Testing; Performance Testing; Cloud Application; Benchmarks.

I. INTRODUCTION

Cloud computing is a highly developed technology that is quickly being embraced far and wide in numerous organizations, associations and furthermore by the end user. It refers to configuring, manipulating, and accessing such applications online. It also offers online data storage, infrastructure and application as a service. Cloud computing is a model that gives useful, on-demand access to a common pool of configurable computing resources, like servers, storage networks and services. There are so many leading companies like Google, Amazon, IBM and Microsoft which have a personal stake in the biz word "CLOUD" [1]. As computation, client interactions have already started towards the cloud environment and also various offline and web based software testing methods and strategies can be used for testing cloud based application. Testing new software requires immoderate server, storage space and network device system for a restricted time period. These resources turn out to be extremely expensive as they are not used after testing. So in order to deliver a reliable service, suppliers need to test their services on the entire platform. Cloud testing is a type of evaluation technique in which all the applications are tested by the use of cloud as a computing environment and its framework to suggest real world traffic by using existing cloud computing technologies.

II. BACKGROUND

In this section, first we will discuss about what is cloud testing and later about various types of testing performed on cloud.

Cloud testing is a type of testing method which enables web applications to use cloud computing situations to encourage the tests. It is testing cloud-based applications that use resources available in the cloud such as software, hardware,

platform and infrastructure and any element necessary to carry out the tests [4].

A. Types of Testing

There exist different types of testing performed on cloud applications which are briefly described in this section.

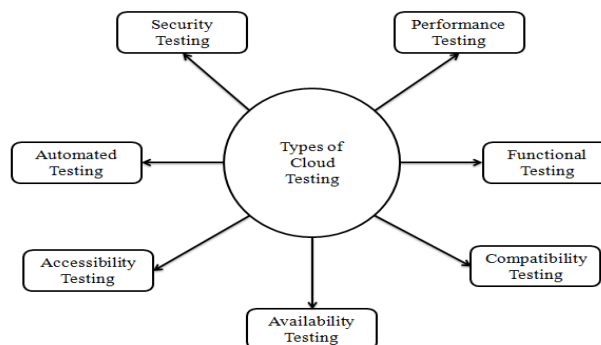


Figure-1 Types of Cloud Testing

1- Security Testing

Cloud stages and applications are presented to a few security vulnerabilities. One of the significant security concerns is traversal vulnerability [1]. It means that one occupant is able to traverse one Virtual Machine (VM) customer environment to other customer environment situations organized by the same hypervisor. This helplessness might allow a client to get the virtual occurrences of other client's applications. So enough testing is required to ensure that the platform is not defenseless against such circumstances. With multi-occupant situations, entrance testing is critical to recreate a pernicious client and to test for all vulnerabilities, for example Cross-Site scripting (XSS), SQL infusion and so on [1].

2- Performance Testing

With the remarkable qualities of Cloud situations, we have to perform the precision of different information present in the Cloud, throughput and latency. Further, flexible load testing and multi-inhabitant execution testing are other key things to be considered. At long last, high accessibility and failover testing are required to test the conduct of the platform and applications under flexibility situations [1].

3- Functional Testing

Functional testing of both online and offline applications can be carried out with the help of cloud testing. The procedure of confirmation against details or framework necessities is done in the cloud rather than on-site software testing [1].

4- Compatibility Testing

Utilizing cloud environment, cases of various operating systems can be made on interest, making this testing easy [1].

5- Availability Testing

Cloud commitment ought to be accessible 24*7 for the venture or client. It's the key obligations of the trader to keep up according to the SLA (Service Level Agreement) [2].

6- Accessibility Testing

It checks whether client groups over various geographic area are available to the cloud at any time without any interruption [2].

7- Automation Testing

It guarantees that the automation suite can be made and executed with in significant change in the cloud [2].

III. RELATED WORK

There are various performance testing tools available in the market which can be used under different circumstances and cloud environment. In this paper we had studied and analyzed some of these tools which are mentioned below.

A. SOASTA

SOASTA is the global testing infrastructure. Test can be done very quickly and can run very fast on infrastructure or the Global SOASTA test on cloud. You need not to spend more energy, long time and budget investing in infrastructure for a cloud test network. SOASTA is motivated by the requirement to check in production, instead of during a laboratory setting. Today's web applications sometimes follow agile practices with frequent builds and high modification rates [1]. Load testing with present tools within the laboratory may be considerably totally different from testing within the

production setting in terms of scale, configuration, user profiles and network setting. Running tests against production websites therefore can do higher degree of accuracy and confidence, compared with work practices [1]. SOASTA Cloud Test could be a production performance testing tool for internet applications. It will simulate thousands of virtual public cloud infrastructure service. SOASTA delivers a platform for testing, analysis and measurement that permits performance insights across technology and business contexts [1].

B. ITKO LISA

ITKO'S LISA product mainly designed to increase the effectiveness and inefficiency of software development teams, especially those are used in custom application, cloud testing and SOA [1]. ITKO LISA purpose is to provide a virtual service and cloud-based environment for composite application improvement, validation, verification and acceptance [1]. It claims to decrease product delivery timeline by 30% of all the more utilizing its creative way to deal with backing persistent joining for improvement and testing [1].

C. APPERFECT

This tool supports load and functional based test for cloud application using servers which are located globally. Testing can be performed on various hardware and software resources made available by this tool [3]. Design, Development and Execution of various test cases are possible with the assistance of the server provided by this tool [3].

D. LOADSTORM

LoadStorm is good testing tool. In this we can set up and run refined load tests the very same day. The advanced reporting of this tool allows for both high level of overview and smooth analysis of the application performance under load. It supports the automatic crawling (Spider) no scripting language is involved and it's nothing to install. This performance tool applies heavy load on the http traffic which deliver web developers perfect measurements regarding their applications such as throughput, requests per second, average response, time and error rates.

E. JMETER

It is cloud based performance testing tools and platform available as service over an internet. It permit you to test and execute test scripts in cloud utilizing the prominent JMeter tool [2]. This service enables the running of load tests (comprising of a large number of simultaneous virtual clients) with no setup necessities.

Table1 - Comparison of above testing tools with respect to different parameters:

IV. RESULT AND SURVEY ANALYSIS

A survey was conducted to capture views on different performance testing tools on cloud from an organizational point of view. The questionnaire consisted of 9 multiple choice questions which was provided online using 'Survey monkey' and circulated by means of different social network sites.

According to the survey results 61.54 % of testers prefers Jmeter to be used over other cloud testing tools because they believe it's fast, efficient and gives better test results for functional parts and load of the system. Also some believe it

is good for REST based applications. The accurate details of usage for all the tools are mentioned below in the graph.

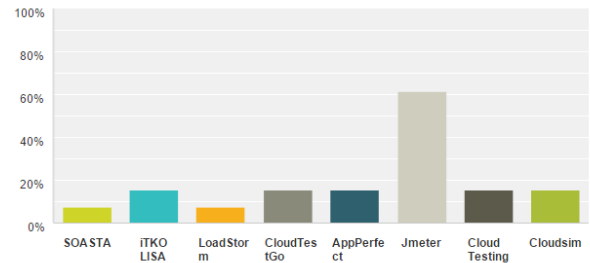


Figure-2 Most widely used tools for cloud applications.

For different cloud environment or circumstances different performance testing tools are used. According to the survey results 53.85 % of testers prefer Jmeter to be the best tool under any circumstances whereas 23.08% of them prefer Apache benchmark and CloudWatch which falls under the others section in the graph. The accurate details for all the tools under different cloud environment are mentioned below in the graph.

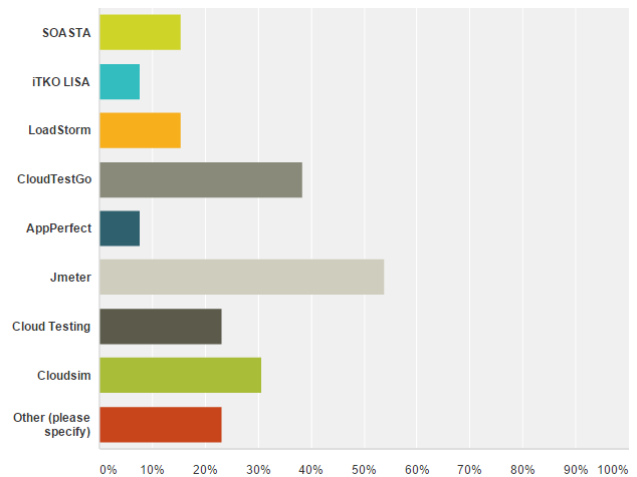


Figure-3 Tools used under different circumstances.

There are many benefits of performance testing to make and understand the application better in terms of simplicity, Flexibility, cost reduction and perform further other types of testing. According to the survey results 84.62 % of testers believe that performance testing helps them to conduct other types of testing. The accurate details of benefits for all the tools are mentioned below in the graph.

Tools	Parameters		
	Advantages	Disadvantages	Fault Tolerance Testing
SOASTA	It is an open source tool. Users only need to pay the hardware cost for server hours they needed. Real time load analysis is simple with the help of graphs.	It requires some initial setup to load the test environment.	No
ITKO LISA	Parallel development and testing ability.	Continuous validation and monitoring required.	No
LOADSTORM	It is an easy and cost effective tool. Response and volume metrics gives a detailed explanation of the performance.	Less number of protocols is supported. In-house test ability not possible. Not easy to develop load scenarios which are complex in nature.	No
APPPERFECT	Comprehensive performance report. Test execution can be scheduled.	Customer support is not good.	No
JMETER	It is an open source tool. Addition, Deletion and Modification of new features are simple.	It is hard and time consuming to create reports. It is difficult to learn. Regular maintenance is needed.	Yes
CLOUD TESTING	It is a scripting based and cost and cost effective tool.	No support for parallel execution.	No

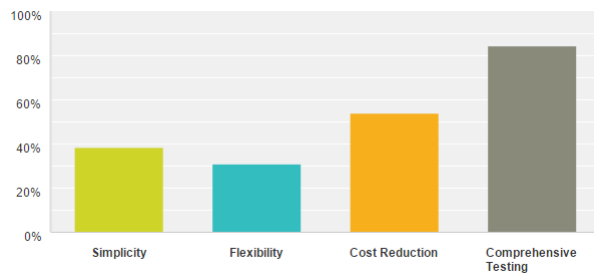


Figure-4 Benefits of testing tools.

Every tester uses different performance testing tools depending upon the test requirements and environment. According to the survey 53.85% of testers are satisfied with the tools they used and their results. The precise details are mentioned below in the graph.

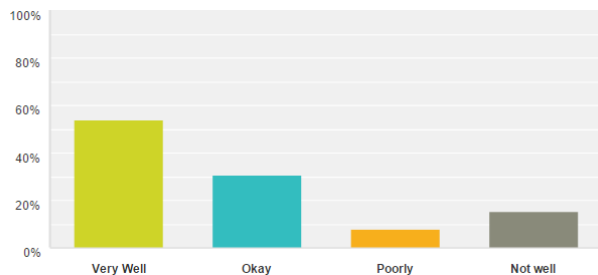


Figure-5 Testers satisfaction for the tools.

V. CONCLUSION

Performance testing is very important in determining or improving the quality of the cloud based products. As there are wide varieties of testing tools available testers must be aware about the capabilities of tools to get the best and accurate performance results under different test environments. In this paper we have discussed about different performance testing tools which are widely used for testing cloud application in terms of its pros, cons and fault tolerance factor and also we had collected reviews about these tools from professional cloud testers which depict that Jmeter tool turns out to be the best tool for any cloud application under almost all the circumstances.

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