Cloud Based Testing: Need of Testing in Cloud Platforms

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ABSTRACT
Cloud computing is delivery of service rather than product. Cloud testing is a form of software testing in which web applications that use cloud computing environments. Cloud computing in general defined as delivering of services to clients based on internet it delivers services are like resources, software, information etc. Cloud-testing leverages cloud computing resources and models to enable all aspects of load-testing in a highly cost-effective manner. Cloud computing is a new approach of distributed computing where it uses cloud infrastructures for automatically supporting the user requirements. Testing is performed in three distinct areas of cloud they are infrastructure, platform and service. Cloud infrastructure will help to identify configuration and optimization opportunities for each cloud vendor. In this paper we discuss about cloud based testing and need of testing in cloud computing. Systems can be scaled to a high factor at a low operational cost. Cloud testing solutions are compatible with multiple form factors. The Cloud enables accessible testing assets globally at any time.

Keywords: Cloud computing, cloud testing, cloud infrastructure.

1. INTRODUCTION
Cloud computing changes the way of computation and services to customers which received significant attention, For example, it changes the way of providing and managing computing resources, such as CPUs, databases, and storage systems. The concept of cloud built upon the three such as Infrastructure, Platform and the Software. The cloud provide the business benefit of “On demand Service” which helps to full fill the demand of chain execution which cause of reducing expenses of implementation of multiple processing units. Cloud provides the concept of updating of resources without affecting the underlying infrastructure, which reduce the need of backup system and encourage the continuous execution of application. Cloud provides potential “Reliability” and “Scalability” for the applications either deployed or are running on cloud. Since, cloud use to assure out most security for any business application, it provides a “Private Cluster” for each application. Organizations are finding it difficult to execute test cases and monitor performance of a new breed of cloud applications. Leverage cloud testing to augment traditional practices and open the door to a higher level of software testing.

2. CLOUD TESTING OVERVIEW
According to Wikipedia, “Cloud Testing uses cloud infrastructure for software testing."¹ 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 datacentre, 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. CLOUD TESTING
Cloud testing is most important part of cloud system, it is based on cloud infrastructure. According to Wikipedia, "cloud testing is a form of software testing in which Web applications that leverage Cloud computing environments ("cloud") seek to simulate real-world user traffic as a means of load testing and stress testing web sites. The ability and costs to simulate Web traffic for software testing purposes has been an inhibitor to overall Web reliability." Based on our recent literature survey, there is a few of published papers addressing cloud-testing concepts, issues, and challenges. Cloud-based software testing refers to testing and measurement activities on a cloud-based environment and infrastructure by leveraging cloud technologies and solutions. It has major objectives. To assure the quality of cloud-based applications deployed in a cloud, including their functional services, business processes, and system performance as well as scalability based on a set of application-based system requirements in a cloud. In a cloud environment to
validate software as a service (SaaS), including security issues, performance of software, scalability, and measurement based on certain economic scales. To check the provided automatic cloud-based functional services. To test cloud compatibility and inter-operation capability in a cloud infrastructure.

4. IMPORTANCE OF CLOUD TESTING

Cloud platform provides various technologies and features which are need to be tested, so the cloud testing done on the following some points.

4.1 Availability

The first challenge of providing cloud services is service availability. If organization adopting cloud services rather than maintain local installations, cloud system must have to be convinced the organizations can access the services and data they need whenever they need them without experiencing undue delays. The cloud service must look like local, despite the fact that it’s remotely hosted. Cloud computing solutions rely heavily on the availability of their infrastructure and the necessary business applications for their customers to be able to function effectively. Imagine a scenario where a business critical Cloud Solution be unavailable for some time, what will be its impact on business. Service availability leads to the second challenge: service assurance. How can cloud services provider assure timely delivery and even service availability when it doesn’t control the data communication connection between the cloud service and organization.

4.2 Data Integrity

Cloud storage moves the user’s data to large data centers, which are remotely located, on which user does not have any control. However, this unique feature of the cloud poses many new security challenges which need to be clearly understood and resolved. As the data is physically not accessible to the user the cloud should provide a way for the user to check if the integrity of his data is maintained or is compromised.

4.3 Acceptability

How sure can a business be that their third party solution is suitable for its intended use? Easily leverage scalable cloud system infrastructure to test and evaluate system (SaaS/Cloud/Application) performance and scalability.

4.4 Privacy concerns

The most important part of the cloud testing is that how businesses ensure that the privacy of their users and information is maintained when using the cloud platform.

Using a combination of these models, there are many opportunities for software testing notably in three distinct areas: Infrastructure, Platform and finally Software.

1. Infrastructure as a Service (IaaS) :- Infrastructure as a Service, delivers computer infrastructure – typically a platform virtualization environment - as a service. Rather than purchasing servers, software, data-center space or network equipment, clients instead buy those resources as a fully outsourced service on demand. Infrastructure as a Service (IaaS) is a way of delivering Cloud Computing infrastructure – servers, storage, network and operating systems – as an on-demand service. Rather than purchasing servers, software, datacentre space or network equipment, clients instead buy those resources as a fully outsourced service on demand. Depending on the cloud provider and commercial model, these resources can be highly flexible and scalable, responding and billing the client, according to demand and load. On one hand, this approach gives the client an extraordinary amount of freedom, but on the other hand, the client needs to exercise close management. Availability and reliability of the rented infrastructure, including fall over“ and data protection, is the responsibility of the cloud provider.[13]

2. Platform as a Service (PaaS):- Platform as a service is a form of cloud computing that holds considerable potential to help enterprise developers quickly write and test customer- or employee-facing Web applications, something that companies of all stripes will be under growing pressure to deliver. This development platform is mostly based on .NET or Java, extended with cloud-specific services. The platforms promise more efficient coding through automation of tasks such as setting up a newly composed app as a Web service. As such, it has great appeal for organizations who want to build their own software, without the need or costs of building and running their own data centers. In addition, they benefit from effectively outsourcing the management and maintenance of the underlying cloud infrastructure.[12]

3. Software as a Service (SaaS):- Here the cloud provider offers complete applications over the internet with SaaS for end users, a provider licenses an application to customers either as a service on demand, through a subscription, in a “pay-as-you-go” model, or at no charge when there is opportunity to generate revenue from streams other than the user, such as from advertisement. Only the service is paid for, normally on a unit cost basis. The software does not run locally on a machine but in the cloud and is delivered via a browser.
example of this would be Google Appz. The client only needs to very lightly configure the application before its immediate use.

5. TYPES OF CLOUD TESTING

5.1 Stress testing
Stress testing, in general, should put computer hardware under exaggerated levels of stress in order to ensure stability when used in a normal environment. In software testing, a system stress test refers to tests that put a greater emphasis on robustness, availability, and error handling under a heavy load, rather than on what would be considered correct behaviour under normal circumstances. In particular, the goals of such tests may be to ensure the software does not crash in conditions of insufficient computational resources such as memory or disk space, unusually high concurrency, or denial of service attacks.

5.2 Load test and Performance Test
As the traffic on the internet increase, in terms of number of users as well as the size of data, an application may get hits from all corners of the world. Cisco reports that the global data center traffic to grow fourfold between 2011 and 2016, reaching a total of 6.6 zettabytes annually. The company also predicts global cloud traffic, the fastest-growing component of data center traffic, to grow sixfold – a 44% combined annual growth rate (CAGR) – from 683 Exabyte’s of annual traffic in 2011 to 4.3 zettabytes by 2016.[14] That means that two-thirds of all data center traffic will be cloud-based. In order to tackle all the users, the performance of the application needs to be measured in peak traffic. So it is essential to Performance testing in cloud infrastructure can help test engineers to take the right step in evaluating more effective, large scale and realistic tests.

Benefits of Performance Testing - Performance testing benefits greatly from cloud environments and all other testing are performed on cloud infrastructure.
Flexibility - Performance testers no longer have to wait until the end of the testing phase in order to move to a production-like environment for their performance and stress tests. Different levels of tests can be executed on discrete environments at the convenience of an enterprise. The bug fixing Environments provides a new level of simplicity in cloud model that can be launched as quickly as the configuration can be put in place.

5.3 Functional Testing & Browser Testing
Compatibility Testing - This type of testing focuses on the validation. It valeted different client interfaces and technologies and diverse compatibilities on different platforms and browsers. It provide SaaS oriented testing in cloud for connectivity protocols and UI/client technologies inside a cloud. It also provides Online Application-Based Testing on a Cloud by testing user-centered interoperability, compatibility of platforms/OS/browsers, and client technologies on a cloud.

5.4 Latency Testing
The growing importance of cloud testing has received attention in recent years due to two specialized research workshops in the area of software testing in the cloud [1, 2]. Recent research has focused on general approaches to cloud testing [3, 4] as well as cloud testing for specific types of systems, such as distributed systems [5] and network management systems [6]. A review of the latest results in cloud testing is also available in [7]. However, most research to date is focused on testing cloud applications or using testing tools in the cloud rather than the testing of cloud platforms and infrastructures. Cloud providers, in general, have their own unique approaches to infrastructure testing, which are typically internal to the company and not necessarily revealed to the public. Often this information is not published as an official report, but instead is available via the Internet through blogs, video presentations, etc. One such testing technique and framework is for Google App Engine, which can be found in [8].
6. ISSUES WITH TRADITIONAL TESTING

Physical machines restrict the number of replicable test labs. This contributes to high capital costs when a large number of testing labs are needed. Mobile introduces functionalities, tools, and applications that testing teams are not prepared for with existing tools. Organizations are caught off guard by the growth of multiple platforms, particularly mobile. Tests are conducted on-premise in a closed environment with limited access. Off-shore locations are required to conduct their own tests locally, even if systems are identical.

New Features in Cloud Testing: Cloud based testing has several unique advantages listed below comparing with current software testing. Take the advantage of on-demand test services (by a third-party) to conduct large-scale and effective real-time online validation for internet based software in clouds. Reduce costs by leveraging with computing resources in clouds, this refers to effectively using virtualized resources and shared cloud infrastructure to eliminate required computer resources and licensed software costs in a test laboratory.

7. CONCLUSION

The future is going to be Cloud computing solutions for large as well as small businesses. And that will bring a major wave in technology infrastructure. The benefits are already realized by many IT majors worldwide thanks to cloud providers like Amazon [10]. As the advance of cloud technology and testing as services, more research work must be done to address the open issues and challenges in cloud testing. Innovative testing techniques and solutions, and QoS standards are needed to support on-demand testing services in a cloud infrastructure. This paper include its discussion about cloud testing in terms of its special requirements, benefits, and features as well as the comparison with conventional testing.

REFERENCES

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