Testing as a Service (TaaS): Requirements and Challenges

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Abstract: *Testing is a significant method just not in category list showing knowledge nevertheless even in category listing perform ability, security, and usage. Coming to the environments of tests that more or less represents the environments of production are very costly with regard to peripherals, permissions and much more. Many of the significant attribute that makes cloud computing very work-worthy, just not gave the challenge to the previous security structure, but have also opened newer security issues. Using this paper we all would exhibit some vital security matter of present cloud computing domain.*

Keywords: **Cloud testing, Cloud computing, Cloud Testing Tool, Cloud Testing Deep Dive, Software Testing, Testing as a Service (TaaS)**

1. INTRODUCTION

1.1 Details on Cloud Computing

Added, technology is shifting to the cloud. The change away from previous working exhibits to Saas, which has slowly attained speed in the previous 15 years. Marching ahead, the more years to come, cloud computing assures us much more to join forces from all parts of the world, using portable devices. So First the question that arises in our mind is that what does cloud computing mean? Mainly, cloud computing here refers to a type being redistribution of applications, data storing methods, and many other things to deal with. Users who are using the applications and files and many more sort of documents by getting logged in from each and every device that has an internet connection support in it. Particulars and plan of action are promoted by foreign parties and vests on a global network of much more taut information offices as a substitute of being in the user's portable hard disk or any other storage devices. This leads to lift up the load to the process ability, will facilitate sharing and alliance, and allows mobile sign up with security despite of where the person using it and even does not depend on the device its being used. Cloud computing being a better method to take round computing resources. Cloud computing and all the other services related to it will be on the basis of subscription and on a payroll system for an year or a month — users pay a monthly fee or annual fees for subscribing instead of buying licenses of using the software by the developer. Software and platforms are in the charge of the providers who provide the supply and are continuously updated for maximized performance and secure networking. Computing power is accessible to everyone instead of being only in the center, so users have the option to shift into extra capacity, in the sense , can upgrade their existing capacity if business grows. Many persons can get a way into a shared program or document and contribute collectively from any part of the world. Testing the newly developed software's always would require an expensive server, storing capacity and networking tabs just being for a stipulated time period. One of the reasons is valid that the computing resources are sometimes not being in usage or aren't even utilized after testing, thus additional cost on the scalability price models. Let us take an example, to examine the working and scalability of an application used in banks, the system must be full with appeal from billions of users in a much stipulated amount of time. This is a one-ground storyline which should be examined reason being people run towards their respective bank accounts in a regular basis on every payday. Producing that sort of a plot would need

the service provider to establish up a test harness to listen to the complaints of thousands of users.

1.2 Cloud Testing

So now, what is Cloud testing? It signifies to the testing of available resources such as peripherals, utilities, etc. that are available on being demanded for. Moreover the judging can just here be thought "as a service". Coming to the cloud, it is very necessary to take care of that the article or output that is being provided to the user just not only comes par its abilities to function well but also the non-functional attributes. With a wise variety of applications and software available in the cloud, now it's very necessary to program the cloud examining strategy.

1.3 Advantages of Cloud Testing

The requirement for cloud testing can be seen with closed eyes even with the advantages that we are getting from it, which are out of count. In the next section, we have tried to clarify the most visible benefits which can give us clue that Cloud is the strategy the world needs:

Active attainable testing environment: The hardcore testing method being used in each and every company is to just put money in the peripherals/software that is needed for testing. Nearly, majority of us would agree to the fact that the environment provided to the testing groups seldom comes in correspondence with customer needs on account of fast transforming needs, leading to which it is very hard now for the corporate to keep it . Cloud being the best solution to this problem where, users can copy a customer environment with ease and detect faults early in the age.

Little expenses: Another view to the earlier point is that when corporate put their money in the infrastructure, the customary point of it is many of their servers aren't used all at once. Result of which, they might need to carry supplementary costs on license renewal. Passing to cloud aids in the outline as well, as users can employ instruments as well and whenever they need, hence decreasing large costs for accompany.

Easily customizable: Usage of cloud, it would be a cup of tea task for MNCs to create the environment that is end-user centric by setting it on the basis of the usage hence, saving money and the inverse of frequency. Test groups can effortlessly perform load and ability to test environments in various ways and combining numbers like – different browsers

Extensible: This remains to be the crowd puller feature of the cloud hence the computing assets can be grown or diminished wherever it is needed to be done. This is used in a wide range of situations where the corporate needs keep changing frequently.

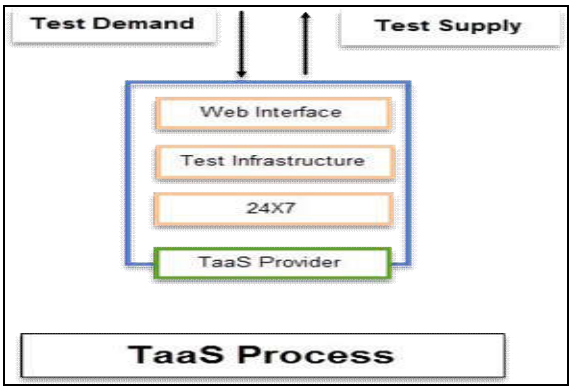

Figure.1 The working process of Taas explained

2. CLOUD TESTING DEEP DIVE

Testing on the basis of a cloud will engage both old and new ways to carry on testing. Testing and cloud are both simultaneously very big domains itself. Let's have a look how we can see the Testing and Cloud in a single container in this following section.

2.1 Cloud Testing Forms

Cloud testing can be majorly bifurcated into four different criteria's on the basis of the experimental works: Testing that is done on whole cloud: In this method the cloud is taken to be as a whole product based on its characteristics and testing is done out based on that. Testing that is done inside of a cloud: This is the type of testing that is processed out within the cloud by testing each and every internal features Testing across the clouds: On the basis of the specifications, the testing here being made out in various types of clouds-like public, private and hybrid clouds. SaaS testing in cloud: Functional and non-functional testing is done based on requirements and needs of the user.

2.2 Cloud Testing Environments

There are 3 divisions of cloud testing environments: A private or public environment in which the main concern is on the grade of applications being posted in by them and all of those needs to be validated. A hybrid structure, in which again the concern is on the quality of applications deployed in them and that needs to be validated.

2.2.1 Divisions of Testing Executed in the Cloud:

Testing in a cloud is just not done to ensure that the functional needs are satisfied, but a clear vision is needed to be lensed on non-functional testing too. Let us take a view on the divisions of testing being carried out.

2.2.2 Functional Testing: Functional testing has its main area of concern in the matter that whether the user is getting the service for what he is solely paying for. Functional tests are done to ensure whether the business needs and demands are being fulfilled. To list some functional tests are briefed in the section.

2.2.3 Testing for System Verification: The testing that is done to verify that whether the tests that are carried out are all together working in a proper manner without any further issues to the companies.

Acceptance Testing: This testing hands out the cloud based section to the user and the user checks for the needful to be done.

Interoperability Testing: Any application that is being developed must have the 360 degree round to lead its job without any issues just not being in different screens but also its needed to work without any problems while the transfer of data is done..

2.2.4CTesting in Non-Functional:

Tests that are non-functional are mainly done to ensure the web compatibility of the software that is being developed and the behavior in web.

Here are few forms of nonfunctional tests discussed below:

- Availability Testing: Primary motive of this testing is to be done by the supervisor of the cloud. He needs to check whether the function is available in the global outsource. It is possible that there are many repair activities that needs to be carried out in every application but that should ensure that no difficulties are faced by the customer.

- Multi-Tenancy Testing: It is possible that within a company the cloud or an application is being accessed by multiple users at a single point of time and that is to be tested in multi-functionality testing that whether the cloud is behaving properly on that interface or not.

- Performance Testing: Performance testing has its role to play in the performance based activities. There it may be possible that there is excessive work load during peak hours and the compatibility needs to be tested that whether the cloud or the application is able to handle the stress in the pressure situations and hence the latency and the execution time of testing also needs to be calculated.

- Security Testing: Cloud despite of having many advantages has this problem even that everything is available every time on cloud. The information shown in the cloud needs to be distinguished and the sensitive to crowd content should be hidden from unauthorized people.

- Disaster recovery Testing: The disaster recovery testing serves a major part of the testing. It has its concern over the data loss or network loss whenever the cloud breaks down. It is possible that the cloud gets broken down due to many severe network issues and the testing serves its purpose here.

- Scalability Testing: This test being done to ensure that whether the customer gets all the facilities of scale up and even scale down at the time when customer demands.

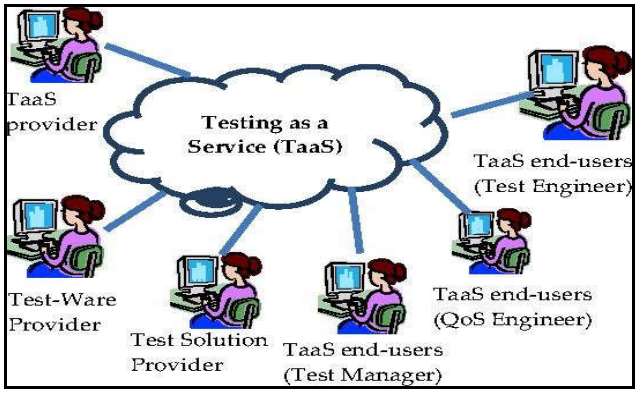

Figure 2. The Network of Taas

3. CLOUD TESTING CHALLENGES

Cloud might have seemed you a very interesting stuff till now reading this paper but, all is not a cup of tea here. There are many challenges with and using the cloud that challenges the whole cloud infrastructure. Let us keep an eye on some major concerns while we use the cloud.

3.1 Security Reasons in Cloud

Everything in cloud is available in fingertips and will all of these facilities and many advantages security have remained to be a main part of concern and a lot of research is done on this issue. With all available things for the businesses and the companies the data that is being uploaded to the cloud faces many security concerns and hence the ethics of the provider who is providing the service needs to be very clear and even aggremented.

3.2 Environment Construction

Bit by bit construction of test environment needs to be done on the basis to find the cost effective way of finding the solutions of it. It is very necessary to look after the ways of cost effective testing that customer's pay for what they opt for not for the whole package. This would lead to small companies to grow in their own. It is necessary to give an test environment on the basis of customer interests to users. For executing this, TaaS sellers need to give a methodological salvation which is a proper methodology based for secure an obliged test environment that mainly focuses in what the client selects.

3.3 Integration testing in Clouds

Now here comes the major concern of integration testing in the cloud. Cloud holds many applications and software and many Saas. The integration protocols of the cloud testing can be kept in a black box and authorized to be accessed by everyone who is the part of the cloud. The companies here only access their own application and neither keeping an eye over the other cloud members.

3.4 Standards in Cloud

To attain compatibility within the clouds and also to look upon their compatibility, security and many other issues, it is much needed for global organizations to conceptualize. Looking into the example, the present storage services by a company that provides the access to the cloud may be not compatible with those of other providers. Hence, with the goal of keeping their customers intact, cloud providers are in a much possible way to introduce ''sticky services'' that creates problems in the user point of view. Like if they have come upon a decision to change the service providers they are using, e.g., Amazon's S3 is not compatible with Blue Cloud of IBM or even by storage provided by Google. There exist a large number of organizations, to look over our goal to work together in a single way towards increasing the number of people using the cloud, the big cloud service providers need to sit within a roof to look over all the issues that are stopping people or MNCs to opt for the cloud based computing. The major those needed to be discussed are as follows:

– Architecture of networks,
– Format of Data,
– Pricing and Billing,
– Service Quality.

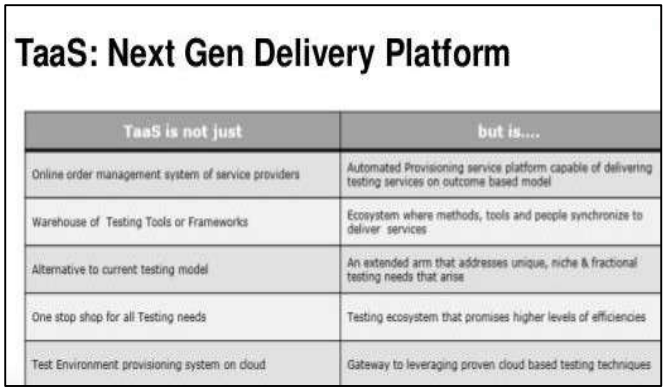

Figure.3. Next Gen Taas

4. WORKING OF TAAS

Extending to TaaS platform - Consumers have the provision here to reach out the cloud platform sitting at any place over the earth through internet.

Access to Services – Customers now have the provision to look after the services that are being provided by the cloud and list and catalogue out the services that are required for their infrastructure.

Choice of Service consumption - Depending upon the needs for the MNCs the companies can either choose between the whole bundled services of testing or TEMS or just the service they want for their company.

Provisioning of Service and its Fulfillment -On the basis being on the test service packages that are chosen by the service taker, the service provider develops the respective service testing environment.

Service Execution - The resources that are required by the service are provided on board. The resources will either be given control off in a service model or on the criteria's of the testing packages

4.1 Characteristics of System Architecture

- An Interactive layer that provides the user a whole set of catalogue to choose from the services that the company offers in a Portal View
- Access on the basis of subscription and user administration that is multi-tenant.
- Flawless Integration to the infrastructure of the cloud
- Automated management of the cloud that is done by engines and the customers get the data automatically.

4.2 Advantages being the Cloud Customer

- This will reduce the cost of the test tools that are on demand and can be used by companies through the cloud.
- Reduction of management cost chiefly for SMB in which we have a rapid and maximized budget constraint to work with.
- You only pay for what you use. The value based pricing is the best feature a customer could get from the cloud
- Infrastructures in which the tests are carried out are not manual and this leads to better working because of the automated operation.

5. TESTING ENVIRONMENT CONSISTING CLOUDS

The topic here indicates to make in use of a handpicked cloud platform as a manifesto to feature a test which is furnished with sundry and ascendable computing resources, system infrastructures, and licensed tools, that are assigned using auto-provision based on static/dynamic entreaty. Both effective and physical computing resources can be incorporated and positioned inside.

5.1 SLA

SLA stands for Service level agreements. In the method the users are provided with an agreement and the cloud service provider promises to keep the data, raw data, and information, applications that are encrypted or uploaded to the cloud end-to-end encrypted and even agrees not to disclose to information to even the employees working for the cloud service provider without permission.

5.2 Price models and service billing

Cloud computing has its roots from utility computing. Service billings and price areas are some of the majors that the cloud computing needs to deal with. Dynamic service charges are what companies want for and the dynamicity of billings is only possible by the service providers and hence the small companies would have a huge benefit.

5.3 Traffic and Data Simulation on the Clouds

There will come many situation where thousands of customers of a single service provider are accessing the cloud for their work and testing's. The major concern remains doing the traffic simulation so that all the users get an on time service so that no one lags behind as each one pays equally for it.

6. RESULTS AND CONCLUSION

Cloud testing has grabbed the current market and are headlines in the world of technology and advancements. As this research paper focuses on all the challenges that are faced by cloud and focused on the solutions for those challenges too. Further researches can also take place and also in topics like Paas. New and more innovative testing methodology and solutions, and Qos standards are in a much need to carry on on-demand testing services in a method that should be scalable and both persist the cloud infrastructure. Cloud computing and Cloud testing are surely an much burning and less crowd pulled research grounds in the for coming future. Looking over the other side of the coin, cloud computing and infrastructures are study about Testing as a service (TaaS) on cloud. Opportunities, challenges and possible research directions researchers in this field can benefit from under rigorous development and is under constant evolution, and this leading to continuously bringing out new topics for software researches. In this paper we have presented in a huge depth the solutions in selecting their research direction and even leaving a certain research topic that can be further processed on new opportunities. We even have made a small look into the Test task management which also has the capability to be one of the best non-kinetic areas to research on. Our further research studies also would be lensing on same directives and refilling these voids for achievement of a further no challenge testing model and an accurate model in cloud computing. Also we would try to work on the issues to facilitate cloud being a better platform of computer world modifying to achieve the maximum is alive mechanized test tools for more rapid use over the cloud.

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