TESTING AS A SERVICE (TAAS) – AN ENHANCED SECURITY FRAMEWORK FOR TAAS IN CLOUD ENVIRONMENT

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Abstract:-Testing becomes an important process not only in terms of exposure but also in terms of performance, safety, usability. Test Environment that directly represents the production environment is too expensive in terms of hardware, software licenses and more people. Cloud computing supports an everything as a service (XaaS) Delivery model. Testing-as-a-service (TaaS) is a new model to provide testing capabilities to end users. Users save the cost of complicated maintenance and upgrade effort, and service providers can upgrade their services without impact on the end-users. Due to uneven volumes of concurrent request, it is important to address lack of security policy and evaluating the right tool for application of TaaS platform in a cloud environment.

Keywords- Testing as a service, Cloud testing, Cloud based software testing, Software as a service (SaaS), Performance testing and evaluation, and Security testing, Test management service.

INTRODUCTION:

Cloud computing received significant attention recently as it changes the way the computation and services to clients, For example, it changes the way of providing and managing computing resources, such as CPUs, databases, and storage systems. Today, leading players, such as Amazon, Google, IBM, Microsoft, and Salesforce.com offer their cloud infrastructure for service.

Small sized and medium sized business companies need to have high – speed, safe and scalable IT infrastructure, in order to manage with their business requirements. But these companies do not have the capability to have this setup in their premise. The recent recession in the market made the organizations to review their approach towards IT

investments in Now –a – dayscompanies are paying attention towards improving efficiencies and return of investments engaged, CEOs need to review how they can reduce their investments in technology, or get high return on the same or addition investments. Testing is a key to enhance user agreement and reduce the maintenance and cost. On the other hand testing requires organizations to spend in people, tools and its environment and can take up a major profit of the available funds. But the quality can never be compromised. A new approach of development and testing makes the organizations to ensure higher quality but with considerably lower funds. Hence the need for migrating to cloud emerged with a solution for rescuing the organizations to focus on their core business than worrying about the funds and maintenances of their IT infrastructure. But the solution has some issues faced in terms of security, consistency and maintenance which the organizations should focus on accurate testing.

CLOUD TESTING AS A SERVICE (TAAS):

According to Wikipedia, "Cloud testing is form of software testing in which web

applications that leverages cloud computing environments("cloud") seek to simulate real-world user traffic as a means of load testing and stress testing web sites.

Testing as a Service(TaaS), a new cloud based global delivery model can help you address these issues more effectively. In the areas of performance testing, security testing, experience in virtualization technologies and investments in hardware infrastructure, the third party independent testing service providers are well suited to do this work.

Cloud computing as having three service models: Software as a service (SaaS). Platform as a service (PaaS) and Infrastructure as a Service(IaaS); and four deployment models: Private clouds, Community clouds, Public clouds and hybrid clouds.

Cloud Testing operates a SaaS(Software as a Service) model, so there is no need to invest in any hardware, software or consultancy, our service provide all you need, leaving you to you concentrate on what you do best – developing, testing and running websites.

Testing in the cloud or cloud testing can have three facets:

1. The system or application under is accessible online. This might be SaaS software or non- SaaS software. In addition, this includes testing at different test levels e.g. performance testing.
2. Testing infrastructure and platforms are hosted across different deployment models of the cloud i.e. public, community, private or hybrid clouds
3. Testing of the cloud itself. Cloud environments should be tested and measured for their performance, availability, security and scalability in order to support efficient delivery of services.[8].
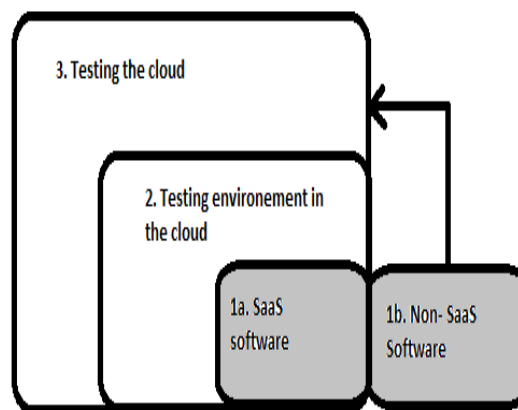
Facets of cloud

Its enables daily operation, maintenance and testing support through web-based browsers, testing frameworks and servers. Testing as a Service delivers application testing services in a highly available, consumable, pay-as-you-go model that provides flexibility in service and pricing. client the on demand and cost effective with overheads especially targeting small and medium scale clients.

RELATED WORKS:

There are many published papers discussed cloud-based software infrastructure, management, technologies, and standards. However, there is a very few of articles discussing cloud testing and cloud-based application testing. Although there are a number of vendors offering cloud testing services to support cloud-based applications, there is a lack of clear understanding about cloud testing in terms of concepts, issues, challenges, and needs.

Test modeling for clouds and cloud-based applications - T.Vengattaraman et al [1]. in purpose their initial work on modeling of cloud-based application environment for software testing by focusing On-Premises Applications over clouds. Its major objective is to present the relationships between different application services over clouds and external consumer service. The details about this model in cloud testing are not addressed yet. [2]

Cloud testing as a service – K. Priyadarshini in [10] provides her architecture based on ontology modeling and SOA was developed which provides the renters on testing service like submitting the task, auto generation of test cases and execution. Various task scheduling and dispatching algorithms are analyzed to improve the utilization of computer resources and evaluated the scalability of the platform by increasing the test task load. In this paper they highlight issues related to security.

Software testing as a service (STaaS) - Leo vander Aalst in [3] provides his STaaS definition, process, infrastructure and some experience results. In [4], Leah MuthoniRiungu et al. reports their recent study on software testing as online services from practitioners in the industry. The paper summarizes the findings based on their interviews with software testing providers and clients. The underlying research question was: "What conditions influence software testing as an online service?" Based on the received responses, they discuss the requirements, benefits, challenges, and some research issues from the perspectives of online business vendors and practitioners. Yang Yang at al. [5] discussed that software testing can be conceptualized as a service rather than being viewed as a sequential line of responsibility in software development. In their view, TaaS has two key aspects: (1) a service to developers, and (2) a service to end users. Their paper discusses software testing as a service from software quality assurance perspectives. George Candea, et al [7] discusses three types of TaaS services. These include (1) a public certification service, which independently assesses the reliability, safety, and security of software; (2) a "home edition" on-demand testing service for consumers before product deployment; and (3) a "programmer's sidekick" enab+ling developers to thoroughly and promptly test a developed program with minimal upfront resource investment. Recently, IBM reports their experience and benefits in cloud testing by leveraging cloud software and environments[14].

TYPICAL WORKFLOW OF TAAS:

TaaS has wide attention [9] due to its scalable testing environment, cost reduction, utility-based service models and on-demand testing services. The work-flow of TaaS includes the following major TaaS service capabilities.
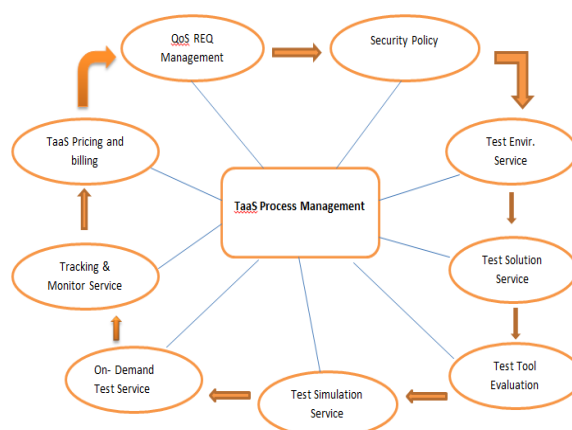
The workflow of TaaS

- ➢ TaaS process management, which offers test project management and process control.

- ➢ QoSrequirements management, which supports book keeping and modeling of software testing and QoS requirements, including qualityassurance modeling.

- ➢ Test environment service, which provides on-demand test environment services to establish. The required virtual (or physical) cloud-based computing resources and infrastructures, as well as the necessary tools.

- ➢ Test solution service, which offers diverse systematic testing solution (such as, test modeling and test methods), and test-ware generation and management services.

> Test simulation service, which establishes on-demand test simulation environments with selected facilitates (such as tools), and supports the necessary test data/message generation.

> On-demand test service, which provides on-demand test execution services based on selected schedules and test wares.

> Tracking and monitor service, which allows test engineers to track and monitor diverse program behaviors at different levels in/on/over clouds for the testing purpose.

> TaaS pricing and billing, which enables TaaS vendors to offer clients with selectable testing servicecontracts based pre-defined pricing models, and billing service.

ARCHITECTUREOF TAAS PLATFORM

The purposed architecture gives a platform for testing the application. The TaaS architecture purposed of consists of four main entities.

Architecture of TaaS

The client can access the TaaS platform into two ways by online or in person. The application provided by client can be with cloud or without cloud based on application. The client can use platform based three scenarios. Client can upload the application on the TaaS platform and can ask their own tester to test the application and pay for the tools that are provided on the cloud or client can upload the application on cloud and ask the other testing company to test application and pay for the usage or client can directly go with the testing company for testing their application without uploading the application on cloud.

The first layer in the TaaS architecture is unified view in which the user can directly access to TaaSplatform [10]through online or through help desk. Service catalogue gives the information about the services offered by the TaaS. Based on the service the tools for testing will be provided.There are both commercial and open source tools available. Based on the application and enterprise the tools can be used.

The second layer, Before entering into the main platform first the client need to get registered with the TaaS platform for availing the services offered by TaaS. After logging in to the platform client can create request. In the request page client need to enter his application details for which the testing has to done. In this page client can select the type of service and type of testing. Once he submits his request a request id will be generated for that particular request the pricing information and billing information will be generated based on the no of hits. Here we apply the security policy by mean of generating id and designing encryption and decryption algorithm while client uploading his application for testing.

Then evaluating the right tools for application which going to be test. There are both commercial and open source tools available. Based on the enterprise application the tools can be evaluated to the client.

The third layer is the satisfaction of management activities in which the client needs to sign in the SLA. It is necessary to make an agreement between the client and the TaaS providing company. The client will
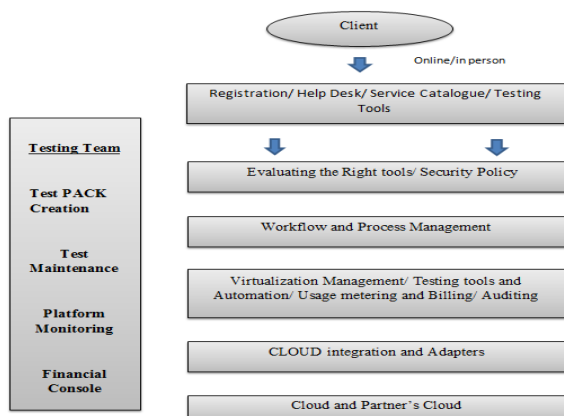
have to sign in the least cost policy agreement in which cost details will be available.

Then the fourth layer will be the provisioning management in which the virtualization is done. Dealing the virtual machine is like dealing our physical system. Usage and metering billing and auditing is done for the application that is submitted by the client in the platform. And the pricing information and billing information will be calculated based on the no of hits on application.

Final layer will be the cloud adapter. The TaaS platform is integrated in the cloud using cloud adapters. The TaaS platform can be integrated with other provides like Amazon EC2, Azure.

CONCLUSION:

Cloud testing is becoming a hot research topic computing and software engineering community. 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 and TaaS. More innovative testing techniques and solutions, and Qos standards are needed to support on-demand testing services in a scalable cloud infrastructure.

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