

A new testing framework for cloud-based application

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ABSTRACTS

Cloud computing has really been invented to be the most recent figuring standard that will work several particular research regions, for example, software testing. Testing cloud applications will keep its novel attributes that include later testing systems. Software testing lessens the requirement for tools and software administrations furthermore give versatile and significant Cloud stage. Testing inside the cloud phase is smoothly reasonable in light of new test models and criteria. We give an overview regard to fundamental contribution, designs, patterns, reasons for living, challenges and possible research direction. We give a review of software testing over the cloud literature and categorize the body of work in the field.

Keywords: source code; software development; data mining; cloud computing; cloud testing; software testing;

1. INTRODUCTION

“Testing is the process of executing a program with the intention of finding errors.” – Myers. Software Testing is the procedure to uncover prerequisite, outlining and coding mistake and bugs. It is utilized to find the fulfillment, rightness, secure and nature of Software item against determination. Software Testing is the key movement in Software improvement. Testing is the execution of program to discover its deficiencies. Software testing that is assessing Software by watching its executions on genuine esteemed data sources [1]. There is diverse sort of testing like Unit Testing (white-box Testing), Coordinating Testing, and Practical Testing (Discovery Testing), framework Testing, Acknowledgment testing and establishment testing. Cloud computing is a sort of Internet-based figuring that gives shared PC handling assets and information to PCs and different gadgets on request.

A cloud in its most straightforward definition is only a server farm equipment and Software. In portraying this innovation, distributed computing is the utilization of processing assets (equipment and Software) that are conveyed as an administration over a system (commonly the internet), moreover it can be given at an on-request get to and arranged for particular needs [1] as indicated by writing Cloud Testing or all the more formally, Cloud Computing Testing, is a Type of Software testing in which web applications utilize distributed computing situations to encourage the tests.

As stated by Wikipedia, cloud trying will be a manifestation of product testing for which Software and web provisions utilization cloud registering situations (a "cloud") to recreate real-world client movement and the sorts about trying that might help include: anxiety testing, execution testing, load testing, practical testing, similarity testing, program execution testing, inactivity trying.

Cloud registering trying is testing cloud-based provisions that utilization assets found in the cloud for example, such that software, hardware, stage What's more foundation and any component essential with do the tests [2]. As stated by <http://www.CloudTesting.Com>, its end goal will be on backing Also practical trying for web requisitions also cross program.

We present another structure to cloud trying that will be as stated by those prerequisites Also cloud trying steps. Those skeletons incorporate Creating test scenarios, test cases design, select cloud administration provider, setup infrastructure, power cloud servers, begin testing, screen test progress, test report card and at last test conclusion. Every from claiming these steps need aid incorporated a portion exercises. Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., net-works, servers, storage, applications, and services). The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.

2. LITERATURE REVIEW

Cloud computing is a sort of Internet-based figuring that gives shared PC handling assets and information to PCs and different gadgets on request. A cloud in its most straightforward definition is only a server farm equipment and Software. In portraying this innovation, distributed computing is the utilization of processing assets (equipment and Software) that are conveyed as an administration over a system (commonly the internet), moreover it can be given at an on-request get to and arranged for particular needs [1]. In this paper [3] propose a

new framework bases on the ISTQB standards for cloud base application testing. To establish a new framework, we need to follow IEEE 829 standards for testing of any software.

ISTQB is a framework for testing software which is independent from the structure of software. Using V-model based on ISO-IEC 12027 comprise Planning & Control, Analysis & Design, Implementation, Evaluation and Closure. In any test case scenario for software testing numerous factors play a vital role such as, grouping of common goals like performance and security, issues such as environment and required resources should be address in determination of test scenario, based on this test scenario we also collect required information about cost, economic feasibility and availability of resources. In Proposed framework following activities adopt

1. Gather test required information to test
2. Select suitable test cases
3. Check and evaluate the log file

Monitoring process keeps record of run time failure of review state and also checks the condition of test closure. In proposed framework test reports cover the following aspects of cloud software testing process, problem assessment, required goal has been achieved or not and generate reports. The log file maintains the records of

- What goals have failed?
- What goals have been achieved?
- Strategies should be adopted that failed goals considered as achieved goal?

The evaluation of proposed testing framework has been done against C-Meter [4] and found following advantages over it.

- Better understanding of requirements
- The system has better control for designing test cases.
- System has been designed in such a way that creates dynamic feedback to the system through log files.

As compare with C-Meter [4] the proposed method is more efficient and effective input process and this system not only report and store errors but also correct it too. The proposed testing framework is a suitable and effective model for appraise cloud application testing. This Proposed model is still an abstract model.

In Cloud computing has risen as another processing worldview that effects a few distinctive research fields, including Software testing. Testing cloud applications has its own peculiarity that interest for novel testing strategies. Then again, cloud computing similarly encourages and gives chances to the improvement of more viable and marketable software testing methods. This paper gives an account of an orderly overview of cloud outcomes achieved by the collaboration of these two research fields. We give a review in regards to primary promise, patterns, holes, openings, difficulties and conceivable research bearings. We give a review of software testing over the cloud literature and arrange the assemblage of work in the field. In this paper writer discuss different things like cloud computing, software testing, automation of software testing and major drivers of cloud computing in details.

The principle motivation behind this paper is to characterize inquire about exercises performed in cloud-based testing territory, clarify the terminology used, identify any gaps or open issues that remain, and address those issues at a high level. There are at present two alternate points of view on "cloud tests" and both cases can be considered as legitimate types of "Testing as a Service". Researcher found different key works and terminologies to be useful during the literature review as following.

- cloud application validation
- cloud application verification
- cloud computing testing
- software testing cloud
- testing cloud applications
- verification cloud

Cloud computing [5] has really been invented to be the most recent figuring standard that will work a few particular research zones, for example, Software testing. Testing cloud applications will keep its interesting attributes that include later testing systems. Software testing reduces the requirement for tools and software management furthermore gives versatile and profitable cloud stage. Testing inside the cloud stage is effortlessly reasonable in light of new test models and criteria. Prioritization approach is improved receptive to assemble much relationship between testing. These testing are grouped reliant on need level. The assets can be utilized legitimately by applying load adjusting calculation. Cloud ensures most extreme utilization of existing resources.

In any case, security characterized as an essential issue in cloud. At the present time, organizations are progressively moving excited about deploying and making use of ready-prepared business applications, with particular short-term to the marketplace. The conceivable absence of capital spending plans for software arranging and on rule organizations, alongside the quick movement of cloud these are the reasons why one ought to make the enthusiasm on business application. In any case, these are the interests that make the SaaS construct business application with respect to request. In this paper [6] diverse methodologies has been examined that will expand the cloud environment. Likewise, the investigation of a few surely understood software testing approaches.

In [7] Cloud computing is the recently developed technology which has picked up ubiquity among associations and corporate. For better services of the cloud; there is requirement for some sort of testing. Cloud testing then appeared which alluded as a type of testing in which distributed computing environment is utilized by web applications to reenact genuine client activity. Testing by one means or other recovers the cost of upkeep which is useful for the clients. This paper furnishes us with different cloud testing methods, difficulties, issues and advantages in testing regions. It likewise explains all the principal ideas in regards to components and necessities in cloud testing. Moreover, different cloud testing stages are likewise talked about quickly. Cloud testing has been clarified broadly in this paper would comprehend different parts of cloud testing in a greatly improved manner.

Jata [8] “is an object-oriented framework for implementing cloud application tests in Java”. Since it is free and open-source [9], none of the license issues of running TTCN-3 policy to execute test cases in a cloud environment. Jata supports numerous ideas from TTCN-3, for example, test parts ports, alternatives, timers, and verdicts. Consequently, Jata can be utilized to execute a unique TTCN-3 test suite, along these lines transforming it into an ETS. Giving the TTCN-3 ideas as classes of a Java system has the preferred standpoint that a Java software engineer quickly feels commonplace when actualizing circulated tests. Despite the fact that experiments can be specifically executed utilizing Jata without a TTCN-3 ATS as middle stride, the test ideas that are obtained from TTCN-3 should be seen, so a Java software engineer needs all things considered some information of TTCN-3. Using Java has the disadvantage that not all TTCN-3 concepts can be mapped well on the Java syntax. In addition, Jata does not support all TTCN-3 concepts: for example, the template pattern matching mechanism needs to be implemented on low-level in Java as well as defaults. Likewise, Jata does not support all TTCN-3 ideas: for instance, the layout design coordinating component should be executed on low-level in Java and defaults. “Furthermore, it has to be noted that while Jata supports distributed testing involving multiple test nodes, only the ports of a TC themselves can be physically distributed (the behaviors of all TCs still run on one single node as multiple concurrent threads within one process). In case of such remote ports, the Java RMI middleware technology is used by default for communication between the TCs and the ports that reside on remote nodes”.

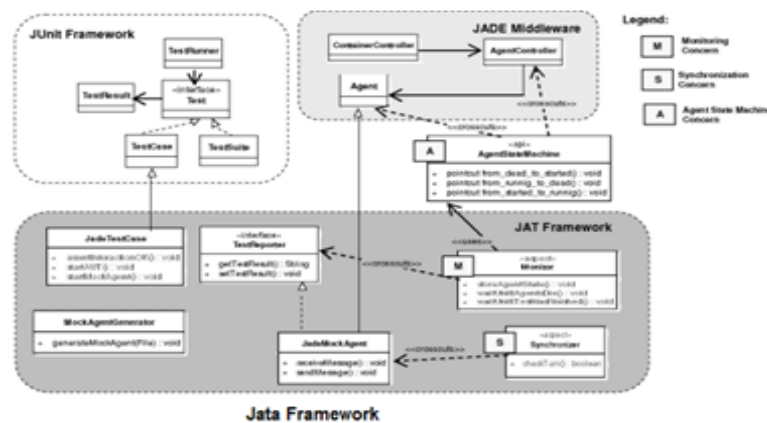


Figure. 1 Jata framework

Jata's main benefits can be summarized in the following list:

- Light-weight
- Free of charge
- Common vocabulary (by using TTCN-3 concepts)
- Systematic way of defining test cases (by using TTCN-3 concepts)
- Java library

In this paper [10] gives a far reaching Review on cloud testing by talking about the related ideas, issues, advantages and difficulties. The real commitments of this paper incorporate its wise dialog about cloud testing as far as its prerequisites, advantages, and components. In future, as it is getting more developed engineering for

distributed computing and more testing on the cloud applications there is each plausibility of additionally testing challenges.

3. LIMITATIONS OF JATA FRAMEWORK

As Jata is new, there is not much experience and a lack of documentation. Furthermore, Jata does not implement all TTCN-3 features. The limitation of Jata test framework that it only support java application source code, which is major lacking, because it does not support any other languages like C, C++, C#, VB etc. source code.

In [7], this paper gives us different cloud testing procedures, challenges, issues and benefits in testing areas. It likewise explains all the major ideas in regards to features and requirements in cloud testing. Furthermore, various cloud testing platforms are also discussed briefly. Cloud testing has been explained widely in this paper that would help to understand various aspects of cloud testing in a much better way. It also refers to testing of cloud based applications by using resources as hardware, software and infrastructure. “Cloud testing in some or the other way boosts the competitiveness of organization and testing costs. Cloud testing is gaining popularity due to reduce costs, speed and better quality of the applications”.

In this paper [7], research concentrate just at giving discourse about the cloud testing i.e. all its essential ideas as its degree, components, highlights, benefits, challenges and so on. It gives a complete Review on cloud testing by talking about the related ideas, issues, advantages and difficulties. The real commitments of this paper include its know-how examination about cloud testing as far as its prerequisites, advantages, and components. In future, as it is getting more developed design for cloud computing and more testing on the cloud applications there is each plausibility of all the more testing difficulties.

Table. 1 Comparison between different testing tools and techniques

Test type	SaaS Oriented Testing inside a Cloud	Cloud-Based Application Testing over Clouds	Online Application-Based Testing on a Cloud
Functional Testing	Cloud based examine functions inside a cloud (Testing SaaS)	Testing cloud-based application service functions over a cloud environment	Testing online-based application service functions on a cloud
Integration Testing	Vendor-specific section and service incorporation inside a private/public cloud	End-to-end application integration over clouds Integration with legacy systems over clouds environment	Integration between online clients and back-end servers on a cloud
Security Testing	Cloud security features and user privacy in a cloud (SaaS Testing)	System-level end-to-end security over clouds environment	User-oriented security and privacy on a cloud
Performance & Scalability Testing	Cloud performance and scalability testing in a cloud based on the given SLA (SaaS Testing)	User-oriented application performance and scalability testing on a cloud	End-to-end system-level performance and scalability inside/on/over cloud based on a given SLA

In this paper [11], we accommodate a short literature works of the proposed Besides realized cloud-based testing frameworks systems, settled on an Examination of the by and by found cloud-based testing models against cloud-based suppliers, our suggested parameters that need help required ought to be made under thought while performing cloud-based testing close by their required valuable impacts. Here we plate solid correlation of Testing sorts.

Table. 2 Cost and benefit analysis of conventional software testing and cloud based testing [11]

COST AND BENEFIT ANALYSIS OF CONVENTIONAL SOFTWARE TESTING AND CLOUD BASED TESTING	
Conventional Software Testing	Cloud Based Software Testing
“Testing setup time is generally minutes or days or weeks or more’	“Cuts down its testing setup time from weeks to minutes “
“It is not that of a large-scale as in Cloud based software testing”.	“Enables large-scale and valuable real-time online testing for internet-based software in clouds.”
“Mostly, kind of lab testing”	“Easily leverage scalable cloud computing infrastructure to test and evaluate system (SaaS) performance and scalability.”
“Costs are higher in the long run, but may seem to be cheaper when cloud based software testing is still in its initial set up phases”	“Reduced costs since it utilizes the same computing resources in cloud(s) for its testing purposes. “
“Not that flexible”	“More flexibility enhanced collaboration”
“No cases of data security challenges”	“Data security challenges “
“No standards challenges”	“Challenge of lack of standards”

4. BENEFITS OF CLOUD BASED TESTING

The benefits of the cloud based testing are written below:

- Flexibility
- Simplicity
- Comprehensive and symbolic testing
- Cleaner, Greener Testing
- Geographic Transparency and Traceability
- Driving Standardization
- Support for complex apps
- Improved test quality
- Time-to-market
- Real-time testing
- Scalability
- Testing efficiency will be improved

5. CHALLENGES OF CLOUD-BASED TESTING

The challenges of cloud-based testing are highlighted below:

- i. Integration issues can be difficult due to the existence of several environments.
- ii. Lack of standards: Presently there are no standard/universal means to join together public cloud resources with consumer companies' data center resources.
- iii. Test data is difficult to manage, for instance data creation and data masking.
- iv. Service Level Agreements (SLAs) are difficult to reach: Terms and conditions of cloud-based testing service are at times hard to understand, and in most of the cases, they are misleading as well as biased towards the vendor.
- v. Usage: Misuse/improper usage of cloud-based test environments can further costs.
- vi. Defect isolation plus resolution is a bit complex

a. Problem Statement

In existing framework support only and only one language code like java. So it fails where other application that is in different languages like C, C#, VB etc.

b. Research Questions

RQ1: what are the open challenges of testing and running testing framework in the cloud environment?

RQ2: What is Cloud computing and which are other well-known models?

RQ3 (a): Which testing frameworks are available for cloud based testing?

RQ3 (b): Which testing framework is applicable and more feasible for cloud based application?

RQ4: Which Testing Framework is feasible for Multiple Language code at Cloud based environment?

6. RESEARCH MYTHOLOGY

The research methodology chosen for this research was a review, for the reason that this is one effective way of identifying, evaluating, interpreting and comparing all available studies that are relevant to a particular question. The main purpose of this paper is to organize research events executed in cloud-based testing area, clarify the terminology used, identify any gaps or open issues that remain, and address those issues at a high level. There are currently two different perspectives on “cloud testing” and both cases can be considered as valid forms of “Testing as a Service”

- 1) Testing the cloud-resident applications,
- 2) Providing testing software as services in the cloud, and
- 3) Both of the above, i.e., testing cloud-resident applications by means of cloud-resident testing services.

7. PROPOSED METHODOLOGY

Here we proposed a new framework that support for testing of cloud application that is developed in different languages like C, C#, Java, VB. It will be the first technique (“to the best of our knowledge”) to automatically test and support commonly existent multiple languages source code on cloud environment. It will be first framework that supports multiple types' application on cloud environment on single platform and single method. The focus of this case study is on black-box functional testing of distributed computing systems using the Jata test framework, it will not test the white-box testing.

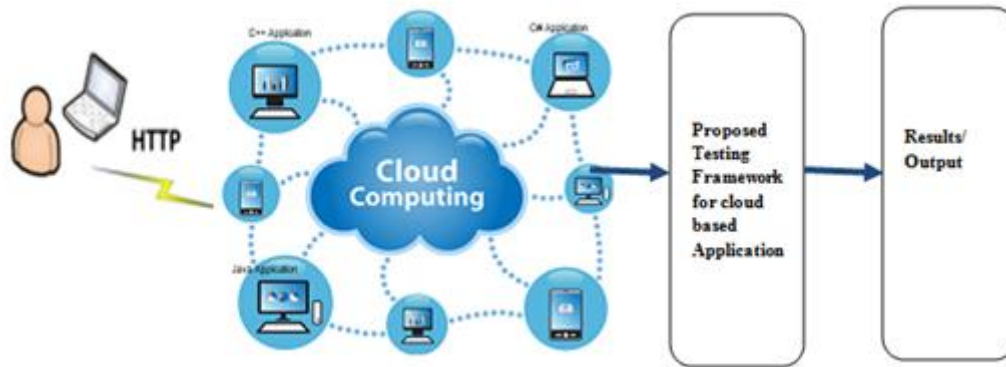


Figure. 2 Proposed test framework for cloud based application

8. CONCLUSIONS AND FUTURE WORK

This paper presents the results of an SR on New testing framework for cloud application. A total of 150 results were returned, of which 15 were initially selected and three discarded later on due to their low quality. As a result, 15 studies were selected for the SR. Data were extracted from these studies and then synthesized against the defined research questions. Our results showed that testing framework, as understood in the context loud application, was in conformance to the definition provided by IEEE; the commonly used testing of cloud application was based on algorithmic techniques, tools and there was no distinction of which tools or technique or framework should be applied to which cloud application. The most commonly used testing framework were those based on size, complexity and coupling, and gathered at source code level; the use of prediction framework accuracy measures and cross-validation methods was found scarce for validating testing prediction framework.

For future work, we suggest the creation of more robust and reliable new testing framework for cloud application. We also suggest further exploration of the treatment of cloud application prediction framework and their applicability on different testing methods for cloud application. The effective use of accuracy measures for the frameworks has not been observed providing a possible threat to the successful application of these models. There is, therefore, a need to further validate new testing framework and suggest framework that are not completely domain specific. Our future research will be focusing on filling these gaps for achieving a comprehensive framework that will support multiple language code. We will specifically work on issues that facilitate cloud as multiple performances testing of cloud based application. Here we proposed a new framework that support for testing of cloud application that is developed in different languages like C, C#, Java, VB. It will be the first technique (“to the best of our knowledge”) to automatically test and support commonly existent multiple languages source code on cloud environment. It will be first framework that supports multiple types’ application on cloud environment on single platform and single method. The focus of this case study is on black-box functional testing of distributed computing systems using the Jata test framework, it not test the white-box testing.

ACKNOWLEDGEMENT

Author gave special thanks to Department of Computer Science and Software Engineering at International Islamic University, Islamabad, Pakistan for supporting this research in terms of providing resources.

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