

A Study of Potent Cloud Automation Testing Tools with Selenium

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Abstract – Cloud Automation Testing is a concept which involves testing of the applications which are deployed on the cloud and uses cloud-based resources. By using a cloud infrastructure system for testing, companies can shorten the provisioning time as the cloud allows test servers to be supplied as per requirement. Selenium, is an open source testing tool which is used to test various web applications. But, there are several limitations of selenium like not being able to generate formatted reports, cross browser testing. To overcome these hitches, selenium is usually integrated with several other tools like JMeter, Junit, Test-NG. This paper provides a study of some of the tools which are estimated to be effective for cloud automation testing along with selenium by aggregating and comparing various technologies together.

Key Words: Cloud Automation Testing, Selenium, JMeter, JUnit, Test-NG.

1. INTRODUCTION

With increased use of cloud-based applications, it is overwhelming to set up software and hardware resources every time we need to test. Cloud Automation testing eliminates this need by automatically setting up the environment. This promise testing of applications faster and with reduced overhead.

The important features of cloud automation testing estimated are:

1. Decreased cost of testing
2. Reduced time for testing
3. Improved product quality
4. Ability to provision resources as per need
5. Enables parallel testing
6. Support of various platforms

Selenium works is seen as a promising tool for cloud automation testing. Many other tools are being integrated to Selenium in order to further improve cloud automation testing.

The paper is organized as follows. In section 2, overview of various tools potent for cloud automation testing is briefed. In section 3, the current work and discussion on the tools are discussed. Section 4 of the paper is the conclusion of the study. The last Section lists the references used for this study.

2. OVERVIEW OF PROSPECTIVE TOOLS FOR CLOUD AUTOMATION TESTING

2.1 Selenium

Selenium is an open source software package which is designed to test various cloud-based web applications. It consists of various tools like Selenium IDE, Selenium RC, Selenium WebDriver, Selenium Grid. These tools have different characteristic uses which are used according to the testing requirements. Selenium supports different languages, platforms and browsers which further makes is convenient to use. Selenium web driver is widely used for web application testing, which when integrated with different tools assures a promising solution for automated cloud testing.

2.2 JMeter

JMeter is an open source software which is used to perform different kinds of testing mainly, performance testing and stress testing. JMeter is typically used to test different websites, REST APIs, Simple Object Access Protocol, JDBC, TCP server. Groovy is usually used to write scripts. Performance testing of both dynamic and static components can be carried out using JMeter. It provides various functions like record and playback, distributed load testing.

2.3 JUnit

It is an open source software which is primarily used for Unit Testing of java applications. It is often combined with a mocking framework, Mockito which helps in improving unit testing. With the help of assertion statements JUnit allows you to test state of code and its behaviour. It is used to create regression tests and tests which can be repeatedly run. JUnit provides faster and easier code writing and thereby providing good quality with immediate response and feedbacks.

2.4 Test-NG

Test-NG was primarily used for Unit Testing. Today, it is refined to perform various range of testing including integration and system testing. It provides annotations for making testing easier, also generates reports and cross browser testing. It covers various other features like a parallel testing, load testing and functional testing which offers variability. Test files for Test-NG tools are .xml files and the test report outputs can be of both XML and HTML types.

The tool is integrated with Jenkins, Maven for improved performance.

3. STUDY OF POTENT TOOLS FOR CLOUD AUTOMATION TESTING

3.1 Cloud Automation Testing with Selenium

[1] discusses about various automated testing tools. They have compared the tools based on factors like recording capability, data driven testing, capability of generating scripts, test result reports, execution speed, playback speed, ease of learning and cost. They have mentioned that Selenium is a tool to go when there is no high reporting requirements and the users have experience in programming skills.

In [2] authors have tested an online application with the help of web based automation testing tool Selenium. They have mentioned about the need of automation testing and have explained about the working of selenium IDE, architecture and process to export scripts from the IDE. They have also given an architecture which has two main components mainly selenium server and selenium client.

In [3], authors have discussed on various types of testing which can be performed by selenium like functional testing, sanity testing, regression testing, UI(Black Box Testing), smoke testing, Integration testing, etc. They have also discussed about selenium web driver usage, development and running of scripts. They have mentioned that if test automation can be performed by more experienced tester using modern tools, there will be better results for the company.

3.2 Integration of Selenium with JMeter for Cloud Automation Testing

[4] proposes the integration of selenium and JMeter by sharing the data of the testing between the various testing such as loading testing, UI testing. Since JMeter can be made to work in the distributed mode, using it in cloud automation testing will ensure that none of the server remain idle in the cloud, that is because one master JMeter sever will monitor all the other servers. JMeter can also manage the heavy load on the server, this can be achieved by distributing the load to all the servers present in cloud using any scheduling algorithm.

In [5], paper focuses on the advantages and disadvantages of the JMeter. Considering the advantages, JMeter can be used along with the other frameworks and also it is a tool which is light weighted. JMeter is used to perform the load testing and also Selenium has the ability to do the load testing. So, integrating the selenium and JMeter for automation testing will help in performing the load testing altogether in which

selenium will be used for the testing of the load and later JMeter can measure the performance of the same.

3.3 Integration of Selenium with Test-NG for Cloud Automation Testing

In [6], authors discuss about the currently available automation testing tools along with the challenges faced in manual testing and the need of automation testing tools to overcome the manual tester problems. It focuses on the approach of using TestNG for the execution of the automation script.

In traditional automation testing, instead of using any of the java compiler to run the test scripts, the TestNG is used as the plugin for the execution of these scripts. As Test-NG is opensource, it can be downloaded and deployed on the cloud easily. While testing any of the cloud deployed applications, it can make use of this Selenium and TestNG as plugin to execute these scripts and to generate the test reports, as selenium is not equipped to generate the test reports by itself. Usually TestNG is used to execute less than three test files as it generates a new XML file each time a java file is run which will consume a lot of local storage space due to this it takes more time for executing large number of files. When Test-NG is deployed in cloud since cloud storage can be expected to greater than the local storage it can be expected that it takes less time when compared to the above said situation.[6]

[7] proposes and implements a framework for testing with selenium and Test-NG. The architecture contains several modules. The Object repository module contains various web elements and objects which might be used in the flow. The maintenance will be easier as the object repository holds information of all objects which tester might use. The input file component serves as a repository for all the test inputs the cloud-based application may need. The utility functions module contains utility file and user action module which contains some repetitive functions like login, logout. The screenshot generation is carried out by integration with Test-NG to further check if the test case is passed or failed. After the test suite is executed reports are generated by Test-NG. These reports are customised to be given to the respective person. This architecture is valued to provide an overall pass rate of 95.42% compared to 71.7% in traditional approach.

3.4 Integration of Selenium with Junit and Test-NG for Cloud Automation Testing

In [8], authors have provided a comparative study of selenium with Test-NG and JUnit. Test-NG is an improvement on the JUnit and provides various advantages comparatively. The annotation table in the paper provides conclusive evidence that annotations are much more detailed and customisable in Test-NG. Few of the advantages of Test-NG with selenium is the provision of parallel testing, report

generation, parameterised test and support for data driven approach.

In [9], authors have tested and provided a comparative study of Selenium with Test-NG and Selenium with JUnit. The paper describes about the automated software testing and provides brief description of various terms including Selenium, Verification, Black-Box Testing and Validation. The authors have implemented and described both the tools Test-NG and JUnit along with selenium and have concluded that both are promising solution for cloud automated testing. The paper also has compared the test results to conclude Test-NG is better in case of group test, parameterised test and dependency test.

4. CONCLUSIONS

Increased number of cloud-based applications in today's life pose a challenge to perform manual testing of all these applications. So, there is incorporations of automated cloud testing of these applications. Selenium is evidently, a promising tool for automated testing. Various other tools are often integrated with selenium for other features required. Selenium when integrated with JMeter provides lesser overhead, distributed load testing, and thus manage heavy load. Selenium integration with Test-NG supports generation of formatted reports, allowance of annotations in code, and also cross browser testing. Selenium when integrated with Test-NG and JUnit is useful for creating unit test case scripts, parallel testing, report generation and allowance of annotations. In conclusion, integration of all the above tools as per requirement will tackle the needs of automated cloud testing in today's world.

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