**Available Online at www.ijcsmc.com**

**International Journal of Computer Science and Mobile Computing**

**A Monthly Journal of Computer Science and Information Technology**

**ISSN 2320–088X**

***IJCSMC, Vol. 3, Issue. 10, October 2014, pg.121 – 126***

**RESEARCH ARTICLE**

# Research Study on Web Application Testing using Selenium Testing Framework

**Niranjanamurthy M[1], Arun Kumar R[2], Sahana Srinivas[3], Manoj RK[4]**

[1]Assistant Professor, Department of MCA, MSRIT, Bangalore-54, INDIA

[2]Student, Department of MCA, MSRIT, Bangalore-54, INDIA

[3]Student, Department of MCA, MSRIT, Bangalore-54, INDIA

[4]Student, Department of MCA, MSRIT, Bangalore-54, INDIA

[1] niruhsd@gmail.com; [2] arugowda08@gmail.com; [3] sahanasrinivas92@gmail.com; [4] manojrk2392@gmail.com

***Abstract*— Selenium is a web application testing tool and also it is an open source software. Selenium automation testing framework has gained wide acceptance as a popular and successful mode of website automated testing in a very short span of time. Selenium tools are widely used for testing graphical user interface and functionality of web-based applications developed for all types of industries ranging from travel, pharmaceuticals, biotech, e-commerce and other technologies. Selenium automation testing tool provides a cost-effective way which is an open source testing framework for performance and other parameters to certify compatibility, accuracy, aspect, and assimilation of web applications. This paper we discussed about Selenium, Selenium IDE – Most commonly used commands, Need of Selenium, Selenium Test Package, comparison with QTP, Advantages and disadvantages of Selenium.***

***Keywords*— Selenium Testing, Need of Selenium, Selenium Packages, comparison with QTP, Advantages and disadvantages of Selenium**

## I. INTRODUCTION

Selenium is a portable software testing framework for web applications. Selenium provides a record-recap tool for authoring tests without learning a test scripting language (Selenium IDE). Selenium is a set of different software tools each with a different approach to supporting test automation. Most Selenium Quality Assurance Engineers focus on the one or two tools that most meet the needs of their project, but learning all those tools will give you many different options for approaching different test automation problems. The entire testing suite of tools which is available results in a rich set of testing functions specifically geared to the needs of testing of web applications. These operations are totally flexible, which gives many options for locating User Interface elements and comparing expected test results against actual behaviour of the application. One of Selenium's key features is the support for executing one's tests on multiple browser platforms [8]. It's an open-source software that works on all three major platforms – Windows, Mac and Linux. Selenium supports a wide range of programming languages, which includes most, but not limited to only, Ruby, Perl, Python, Java, C# and PhP. The best part of Selenium is it enables you to test web applications

with zero knowledge of any test scripting language. You can write tests in a number of popular programming languages which includes Java, C#, Perl, PHP, Ruby and Python. The tests can be made in most of the web browsers. Selenium deploys on most of the platforms like Linux, Windows and Macintosh. It is open-source software, which is released under the Apache 2.0 license, and can be downloaded and can be used without charge.

## II. AIM OF THE STUDY

- To Know what is Selenium
- To Understand the Need of Selenium Testing Framework
- Knowledge on Selenium Test Packages.
- Analyse how Selenium is different from QTP-Quick Test Professional.
- Knowledge on pros and cons of Selenium Testing Framework

## III.RELATED WORK

Selenium is an open source automated testing suite for web applications across different browsers and platforms which supports multiple programming language. Selenium is a functional web testing tool. Selenium is not just a single tool which has four components: Selenium Grid, Selenium RC, Selenium IDE and Selenium Web Driver. Selenium IDE is a Firefox plug-in which can be used to develop test cases, Selenium RC run tests inside every JavaScript compatible browser (which is now available on all web browsers) using a wide range of programming language, Web Driver was developed to better support dynamic web pages where elements of a page may change without the page itself being reloaded and Selenium Grid allows you to run your tests on different machines against different browsers.[1]

The complete Selenium test automation is designed specifically for web testing. It doesn't allow in automating other technologies. The Selenium result is very complex which involves the integration of many other components. The process for Selenium test automation makes necessary for a developer test his skills set. When choosing a tool in this area, it is very important to take into consideration much more the cost. I conclude that selenium may be right for certain specific situation, but QTP can be the better choice in many more situations.[2]

Selenium is a tool designed to generate automated tests and enhance the testing performance. Automated testing is used by software developer to save assets and time. Selenium is an open source automation testing tool for web based application. It runs directly in the web browser and supports almost all available browsers like Google's Chrome, Mozilla Firefox, Microsoft's Internet Explorer, Opera, and Macintosh Safari. It runs on all platforms like Linux, Windows and Mac. It's a very useful tool for System functional testing and browser relationship/compatibility testing. It is really strong as compare to other available automation tools and is very flexible and simple to use.[3]

Today everything is web based thus it is becoming more and more complex. For this huge information platform and quick release cycle quick regeneration of site is required. This requires the web application to be all-inclusive, extensibility and efficiency. For this there exists some framework which includes automation tools. In this paper we will discuss about the Selenium automation testing tool that is used in framework for better results. As we know sometimes there may be a problem arising to choose proper framework for automation testing. Selenium is a set of tools working with many Operating Systems, browsers, programming

languages and different testing framework, individually with different approaches in support of automation test for testing web based application.[4]
Software testing is really a time consuming process and also complex. One way to reduce the effort associated with testing is to generate test data automatically. Testing is very important part of software development. Quality is not an absolute term; it is value to some people or a person. With that in mind, testing can never completely establish the correctness of arbitrary computer software testing furnishes a criticism or comparison that compares the state and behaviour of the product against a specification. Software testing process can produce several artifacts. So, we proposed a model to improve quality and correctness and also we reduce the software testing time. [5]
Writing auto testing is a required engineering technique that can save money and time, and in turn helps businesses better respond to changes in real world. But if we use testing framework is not properly used, there will be more problems to be caused. An auto testing framework based on Selenium is discussed in this article which can help with these problems. The framework use Selenium application frame work to get page value, DbFit to init the database, FitNesse which is used to manage the test component, and a DSL to write test components. This could greatly reduce the amount of lines of testing code and the time taken for project development, lowering the error rate, facilitate writing component/fixture table, improve the productivity of coding, and quality of final product.[6]
Selenium is a set of powerful different software tools working with many browser, programming language, operating system and testing frameworks each with a different approach to supporting automation test for testing web-based applications. JMeter which is used to simulate a heavy load in a server, network, any object to test its strength or to analyse overall performance under different load types. JMeter operates at protocol-level, on the other hand, the Selenium works at the user-level. Here in this paper, authors designed an automatic software testing framework for web applications based on the JMeter and Selenium which is both open-sources. With the use of the software framework, we efficiently improve the reusability and extensibility of automated test.[7]

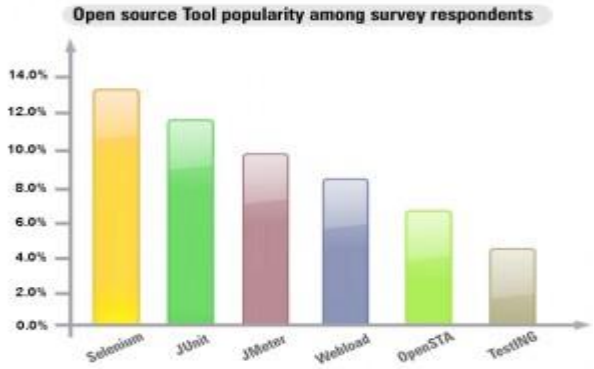
**Selenium IDE – Most commonly used commands**
These are the most commonly used commands in the Selenium IDE:
**open**: Used to open a page using a URL.
**click**: Clicks the object/ element in the page.
**clickAndWait**: Performs a click operation, and then optionally waits for a new page to load.
**verifyTitle**: Verifies the expected title and then continues to run if it fails.
**assertTitle**: Verifies an page title and then stops the execution if it fails.
**verifyTextPresent**: Verifies that whether expected text is present somewhere on the page.
**verifyElementPresent**: Verifies an expected User Interface element, as defined by its HTML tag.
**verifyText**: Verifies whether the expected text and its corresponding HTML tag are present on the page.
**waitForPageToLoad**: Pauses execution until there is an expected new page loads.
**waitForElementPresent:** Pauses execution until an expected User Interface element, as defined by its HTML tag, is present on the page. Used with AJAX calls.[9]

## IV. NEED OF SELENIUM

Selenium is the best tool for automated testing of Web-sites today. It is becoming very popular and it is the first/best choice of automation testers as well as organizations for automating the testing of Web-based applications for both the Graphical User Interface as

well as the functionality. Selenium can also be used as a unit testing tool for JavaScript. The following graph shows the popularity of Selenium along with other open source automation testing tools.




**Selenium Test Package**

Selenium contains various test components which consists of three major tools. Each one has a specific role in aiding the development of test automation for a Web application.

1. Selenium IDE – A Firefox extension to record test-cases and suites.
2. Selenium RC – Used to run tests on different browsers and systems.
3. Selenium Grid – Runs multiple instances of Selenium RC at once.
4. Qualitia and Tellurium – A wrapper for the Selenium engine.

**Selenium Modes:**

Selenium has following three modes for executing the test cases and test suites, based on the components:

**Record-Playback mode (Selenium IDE):**

Only Selenium IDE is used to record the test scenarios in terms of test cases in Firefox, in this mode. This is a great way to get started to writing tests and group them together to form the test suite. The recorded tests can be deployed to many programming languages so that we can tweak them and put them in the testing framework. to check the verifications and validations ,The test cases and test suites can be replayed back or sent to Selenium RC or Grid for further tweaking.

**Selenium Remote Control (RC) Mode**

Selenium opens multiple browsers (one at a time)in this mode and then runs the recorded test-cases which are saved in the language of your choice. This helps in enhancing the test cases with programming techniques to cover all the required checks and test scenarios.

**Test Runner Mode**

Here the test cases are recorded and replayed. This is done in the form of HTML tables. Another way to execute the RC test cases as well as Selenium IDE is this. This helps in checking the test result reports in a better manner if not formatted already. [9]

**Comparison between Selenium and QTP is as follows:-**

| FEATURES | SELENIUM | QTP |
|---|---|---|
| Cost | Open source & Portable | Licensed and very expensive; Ten user license costs approx. 60L |
| Application support | Web Applications only | Client server applications only (like built in TCL/TK and PowerBuilder) |
| Support for web browsers | Supports IE, Firefox, Safari and Opera | Supports IE & Firefox only |
| Object Oriented Language support & Scalability | Supports Java, .Net, Perl, PHP, Python, and Ruby | Supports VB script only |
| Support for operating system/platforms | Supports Windows PC/MAC/UNIX Platforms | Supports Windows Platform only |
| Support for Test management tool integration | Not available. Need to track separately | TD/QC will be easily integrated |
| Test Development Environment | We can use wide range of IDEs like Eclipse, Net beans, Visual Studio etc | Need Separate environment |
| UI object management & Storage | Managed using UI-Element user extension and properties A set of dynamically loaded libraries that is stored in the Java archive file. | Built-in object repository and easy handling |
| Support for Dialog Boxes | Supports partially | Supports all kinds of dialog boxes |
| Support for File upload (system) | Not available | Supports all kinds of File upload |

[10]

## V. ADVANTAGES AND DISADVANTAGES OF SELENIUM

Advantages of Using Selenium:-

- Simple and powerful DOM level testing
- It can be used for continuous integration with agile projects.
- Has great flexibility and extensibility, along with its tight integration with the browser unmatched by available proprietary tools.
- Supports multiple browsers such as IE, Fire fox, Opera or Safari on Mac OS, windows and Linux.
- Supports Object Oriented Programming languages like .NET, Ruby, Perl, JAVA PHP, etc.
- Provides the option of using wide range of IDEs such as net beans, eclipse etc depending on the choice of development language.

Disadvantages of Selenium: -

- Supports only browser application and not windows application
- Does not support uploading of files from local machine
- Provides partial support for the dialog boxes
- Being an open source, Selenium has no official technical support.[10]

## VI. CONCLUSIONS

Selenium is an open source software and also a web application testing tool. In a very short span of time, Selenium automation testing framework is gaining wide acceptance as a popular and successful mode of website automated testing. Has great flexibility and extensibility. Along with its tight integration with the browser unmatched by available proprietary tools. Today everything is web based thus it is becoming more and more complex. For this, huge information platform, quick release cycle as well as quick regeneration is required. This requires the web application to be comprehensive, expansibility and efficiency. For this some framework also includes automation tools. You can reduce the cost incurred for licensing using QTP Using Selenium as the Functional Test Automation Tool.

## ACKNOWLEDGEMENT

I thank Dr. T. V. Suresh Kumar, Prof. and Head, Dept. of MCA, MSRIT, Bangalore-54. For his continuous support and encouragement for completing this research paper and also thanks to MSRIT management.

I thank Dr. Jagannatha, Associate Professor. of Dept. of MCA, MSRIT, Bangalore-54, for his valuable guidance and support for completing this paper.

## REFERENCES

[1] Chandraprabha, Ajeet Kumar, Sajal Saxena -"SYSTEMATIC STUDY OF A WEB TESTING TOOL: SELENIUM". IJARSE -ISSN-2319-8354(E), Vol. No.2, Issue No.11,Pages-113-120 , November 2013

[2] Richa Rattan- "COMPARATIVE STUDY OF AUTOMATION TESTING TOOLS : QUICK TEST PRO AND SELENIUM". VSRD International Journal of Computer Science & Information Technology, Vol. 3 N o. 6 June 2013

[3] Sherry Singla, Harpreet Kaur. "Selenium Keyword Driven Automation Testing Framework". IJARCSSE ISSN: 2277 128X, Volume 4, Issue 6, June 2014

[4] Ms. Rigzin Angmo, Mrs. Monika Sharma-"Selenium Tool: A Web based Automation Testing Framework". IJETCAS-ISSN (Online): 2279-0055. 8(4),March-May, 2014

[5] Deepti Gaur, Dr. Rajender Singh Chhillar-"Implementation of Selenium with JUNIT and Test-Ng". IJCSMS International Journal of Computer Science and Management Studies, Vol. 12, Issue 03,ISSN (Online): 2231-5268. Sept 2012

[6] Xinchun Wang, Peijie Xu, "Build an Auto Testing Framework Based on Selenium and FitNesse". International Conference on Information Technology and Computer Science, 2009. ITCS 2009. Page(s):436 - 439 ISBN:978-0-7695-3688-0 IEEE 25-26 July 2009

[7] Fei Wang, Wencai Du-"A Test Automation Framework Based on WEB" 11th International Conference on Computer and Information Science (ICIS), ISBN:978-1-4673-1536-4 IEEE/ACIS May 30 2012-June 1 2012

[8] http://docs.seleniumhq.org/docs/01_introducing_selenium.jsp

[9] http://www.xoriant.com/blog/software-testing-and-qa/selenium-open-source-test-automation-tool-an-overview.html

[10] http://automationinqtp.blogspot.in/2013/01/qtp-vs-selenium.html