



## A Novel Approach to Extend Selenium DB for Better Compatibility with the Web Based Application Testing

Munish Kumar, Sumedha Arya

**ABSTRACT:** Numerous software is created as the internet based mostly applications (applications that are dead during an internet browser) currently days. Quality is that the main side that must be assured before the software are delivered to the shoppers. several testing tools are accessible in the marketplace for testing of that software. a Selenium element is one such tool accessible. Selenium element RC tool, one in every of the part of Selenium element accessible is employed to make machine-controlled take a look at cases for the internet based mostly applications. This paper provides Associate in the Nursing introduction of a Selenium element and its elements. Selenium element RC one in every of the part of the Selenium element, essentially used for internet application automation testing has some assert functions that facilitate question the information for real-time information. during this paper, I'm aiming to propose a unique approach in Selenium element RC tool. New assert functions are to be supplemental into the tool to extend SeleniumDB management systems, like Oracle or SQL Server. New assert functions are to be supplemental to assist offer totally different tests during an information together with the assert functions that, for Associate in the Nursing instance will be accustomed perform a join among totally different tables during an information.

**Keywords:** Testing tools, Selenium, Data Base

### 1. INTRODUCTION

Software testing may be a method that is employed to spot error or faults in an exceedingly system to form it correctness, completeness and to spot the standard of already developed computer code. Computer code testing may be a method that is employed to discover the bugs and uncover it. Computer code testing may be a method and discipline additionally. It's completely different from computer code development. It ought to be thought-about that's a part of computer code development [7]. Several computer code application square measure these days are written as net based mostly applications. To check the effectiveness of testing these net based mostly applications varies wide among firms and organizations. In an associate era of extremely responsive and interactive computer code processes wherever most of the organizations square measure victimization some style of agile methodology, the automation of the check has been turning into a foremost demand for the computer code comes. thus, check automation is to be adopted. Check automation is outlined as a method to use some computer code tool to run repeatable tests against the appliance that is to be tested. For regression testing, this provides that responsiveness.[1]Software check Automation suggests that to automatize computer code checking activities together with the event and execution of test scripts, verification of testing necessities, and, therefore, the use of machine-driven testing tools [1].Test automation supports:

- Frequent regression testing
- Rapid feedback to developers
- Virtually unlimited iterations of test case execution
- Support for Agile and extreme development methodologies
- Disciplined documentation of test cases
- Customized defect reporting
- Finding defects missed by manual testing

Many automation test tools are available in the market. One such tool is Selenium. Selenium is an open source GUI based testing tool that has the capability to record and playback the test cases. Selenium can be deployed on Windows, Linux and Macintosh platforms.

#### Features of Selenium:

- 1.It is an open source tool
- 2.It supports many languages
- 3.It supports various browsers
- 4.It is very flexible as compared to QTP and other functional tools.



**There are three components of Selenium:**

1. Selenium IDE
2. Selenium RC tool
3. Selenium Grid

**Selenium IDE:**

Selenium IDE provides a complete Integrated Development environment for testing. It provides recording, editing, and debugging tests. It is implemented as an extension of Firefox Add-on. Selenium IDE is the simplest of the tools in the Selenium suite, and one of the quickest way to get started with creating scripts. But it only supports record and playback within Firefox. For the automation of other browsers, Selenium RC or Selenium 2 is to be used.

**Selenium Grid:**

Selenium Grid provides with the capability to run multiple instances of the browsers to allow running tests in parallel on multiple machines. One of the servers acts as a hub, various tests contact the hub to get access to the different instances of the browser instance. It uses a hub-node concept where a single machine called a hub runs the test, but different machines called nodes will do the execution.

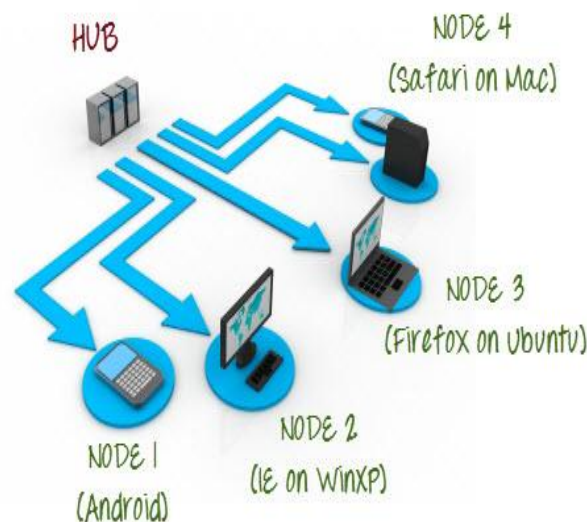


Fig1: Selenium Grid [9]

Selenium Grid should be used in either of the following cases or in both:

1. Running the tests against different browsers, operating systems, and machines all at the same time.
2. Save time in the execution of your test suites.

**Selenium RC:**

RC stands for Remote Control. Selenium RC tool allows for the automated tests for the web applications. Selenium RC allows writing automation tests in any supported programming language. It is an open source and free tool. Selenium RC has support for almost all browsers as well as support for several programming languages like Java, C#, Ruby, Python, Pearl, Javascript, and PHP. Selenium RC is the server version of Selenium. You write your tests using a programming language (say Java) and client library. Your tests issue commands which are sent to the server by the client library. The server then performs actions in the browser and reports the results back to your client. Selenium RC has two components: Selenium server and client libraries.

Related work has been presented in section 2. Details of Selenium RC is written in section 3. Section 4 and 5 gives the present and proposed work. Whereas conclusion is included in section 6 followed by references.



## 2. RELATED WORK

Gregory M. Kapfhammer mentioned concerning the various sorts of package testing and their subclasses. The thanks to generating take a look at cases, a way to execute them conjointly explained during this paper. The execution method of taking a look at cases, a way to place them mistreatment regressing testing and numerous sorts of connected testing techniques square measure mentioned during this paper. However the testing is finished for the graphical computer program is mentioned during this paper. On the basis of the prevailing techniques new techniques square measure projected.[10]Gaurav Duggal and Mrs. Bharti Suri have conferred {the numerous|thevaried the assorted} sorts of regression testing techniques and their classification conferred by various researchers. The reason of selective and prioritizing take a look at cases for regression testing is outlined. Conjointly discuss concerning search algorithmic rule that is my key plan. During this paper tried to clarify the entire structure of regression testing to form scientist perceive its importance and scope. Regression takes a look at choice is split into 3 classes and explains them. Action prioritization downside and technique is explained. Then mentioned concerning the search algorithmic rule of various varieties their approaches and challenges. [11]. Jovanovic bird genus mentioned concerning the 2 sorts of package testing techniques white box and recording machine testing techniques. These classes square measure more divided into subcategories like equivalence partitioning, multidimensional language testing, searching testing etc. The goal of testing and comparison between 2 techniques with represented illustration is additionally mentioned during this paper. Then concerning the package quality assurance is additionally mentioned within the paper. The responsibilities of the testing also are explained within the paper. The comparison between agile versus ancient, searching versus written, manual versus package is justified within the last section of the paper. [12] Corina S. Pasareanu have introduced the new analysis trends in symbolic execution, a way to take a look at generation and program analysis. Initial describe a procedure that handles complicated programming constructs like input algorithmic, arrays, in addition to multithreading, information structures. Conjointly describe latest hybrid techniques to beat a number of the inherent limitations of symbolic execution, like handling native code or handiness of call procedures for the appliance domain that mixes concrete and symbolic execution. Finally, asurvey of prophetic testing, invariant illation conjointly mentioned. Some ancient application like take a look at generation and analysis is additionally mentioned. Parallelizing and lengthening the abstraction and composition is additionally conferred within the paper. Some new heuristics techniques that handle the standard approaches and provides useful results for the long run also are mentioned. [13] Praveen Ranjan Srivastava has mentioned concerning the It consists of estimating testing effort, choosing applicable take a look at theteam, coming up with taking a look at cases, corporal punishment the package with those take a look at cases and examining the results created by those executions. It indicates thevalue of package development is committed to testing, with the share for testing important package being even higher. This paper makes an endeavor mistreatment symbolic logic to estimate reliable package testing effort. During this paper triangular membership functions square measure chosen with monotonic constraints. [5]

## 3. Selenium RC

Selenium Remote Control (RC) is a server, which is written in Java, which accepts commands via HTTP for the browser. RC makes it possible to write automated tests for a web application in any programming language, which allows for better integration of Selenium in existing unit test frameworks. To make writing tests easier, Selenium project currently provides client drivers for PHP, Python, Ruby,NET,Perl, and Java. The Java driver can also be used with JavaScript (via the Rhino engine). A new instance of selenium RC server is needed to launch HTML test case - which means that the port should be different for each parallel run. However, for Java/PHP test case only one Selenium RC instance needs to be running continuously. [6]

### **Selenium RC components are: SeleniumServer**

Selenium server accepts commands from the test program, interprets them, executes them and send back the result to the program. The RC server bundles Selenium Core and automatically injects it into the browser. This occurs when your test program opens the browser (using a client library API function). Selenium-Core is a JavaScript program, actually a set of JavaScript functions which interprets and executes Selenese commands using the browser's built-in JavaScript interpreter.

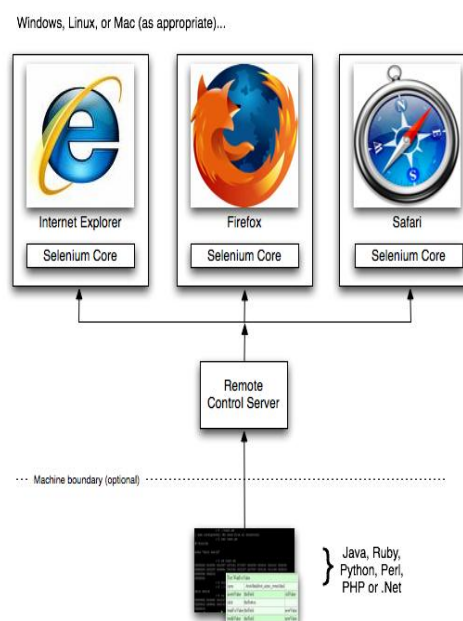
By using HTTP GET/POST requests the Server receives the Selenese commands from your test program. This allows any language that can send HTTP request to automate the Selenium tests on the browser.



### Client Libraries

The client libraries provide the programming support that allows you to run Selenium commands from your own designed program. Every supporting language has its own client library. A Selenium client library provides a programming interface (API), i.e., a set of functions, which run Selenium commands from your own program. Within each interface, there is a programming function that supports each Selenese command.

The client library takes a Selenese command and passes it to the Selenium Server for processing a specific action or test against the application under test (AUT). The client library also receives the result of that command and passes it back to your program. Your program can receive the result and store it into a program variable and report it as a success or failure, or possibly take corrective action if it was an unexpected error. So to create a test program, you simply write a program that runs a set of Selenium commands using a client library API. And, optionally, if you already have a Selenese test script created in the Selenium-IDE, you can generate the Selenium RC code. The Selenium-IDE can translate (using its Export menu item) its Selenium commands into a client driver's API function calls. See the Selenium-IDE chapter for specifics on exporting RC code from Selenium-IDE.



**Fig 2: Architectural representation[8]**

Fig 2 illustrates the architecture of Selenium RC. It shows how the client libraries communicate with the Server by passing each Selenium command for execution. Then the server passes the Selenium command to the browser using Selenium-Core JavaScript commands. The browser, using its JavaScript interpreter, executes the Selenium command. This runs the Selenese action or verification you specified in your test script.

### 4. PRESENT WORK

As Selenium IDE is only compatible with the Firefox so this acts as a limitation on its usage as one can check only a small subsection of the browsers used by the users. But the users are not limited to the use of only a single browser but make use of many different browsers as google chrome, Opera, Internet Explorer. Selenium RC tool was initially developed by Patrick Lightbody. This tool was developed basically to test these different browsers without the need to install the selenium core on the web server. Selenium RC tool acts as a proxy between the test scripts and the application under test. Selenium core instead of being installed on the server is bundled with the selenium RC tool.

With the introduction of this tool, developers are being provided with a chance to directly interact with the proxy by using the language of their own choice as a means to send the commands to the browsers. The main languages used to create Selenium tests are Java and C#. This is due to the fact that most web applications are being created in these languages. There is increased rate of language bindings for the dynamic languages which are created and supported mostly as the developers are moving their web applications to those languages. Languages that people are moving to are Ruby and Python.



Robustness is the main reason why preference is given to writing test cases in programming languages and not using HTML-style tests with the Selenium IDE. And also to get the advantage of all the setups that are common in most testing frameworks.

#### **4.1 Selenium DB-an extension to selenium core framework to support database testing**

Presently, Selenium RC tool makes use of various assert functions to deal with test data checking in databases. These functions are applied to different scenarios where data need to be checked in databases, such as: searching for primary keys, non-primary keys columns, or the last record inserted into a table. An interesting and very relevant aspect of this from a practical viewpoint is that it would be able to be used in real software projects.[1]

### **5. PROPOSED WORK**

The proposed work is an extension of a very popular functional testing tool for user interface like Selenium to support database testing in web-based applications. We called this solution Selenium DB. The proposed tool implements new assert functions into the Selenium framework's core to deal with test data checking in databases. These functions are applied to different scenarios where data need to be checked in databases, such as: searching for primary keys, non-primary keys columns, or the last record inserted into a table. An interesting and very relevant aspect of this proposed tool from a practical viewpoint is that it would be able to be used now in real software projects. In the existing work, it deals with dynamic websites which are not compatible with MS Access and MYSQL and SQL Server to connect to the database. But our proposed work will be able to support MS Access and SQL Server after modification in functions.

### **6. CONCLUSION**

Many automation tools are available in the market. SIKORA, dart, JUnit and RAGS are a few to be named. But each one has some limitations that are in some way overcome in the Selenium tool. Selenium RC tool has some assert functions that check real-time user entries from the database. An extension to this tool so as to make it compatible with the some more web based applications having real-time database entries is been proposed. Some new assets will be added to the Selenium RC tool so as to provide different tests in a database.

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