

Comparative Study of Automated Testing Tools: Selenium, HP Unified Functional Testing

¹Mithesh M. Dait, ²Prof. Harshali Patil

^{1,2} MET Institute of Computer Science, Mumbai University, Bandra [West], Mumbai.

ABSTRACT

Testing is more important phase in Software Development Life Cycle (SDLC). For testing any software repetitive steps are perform most of the times. So repetitive steps are automated using Automation Software Testing tools, such as Test Complete, Sahi, HP Unified Functional Testing Tool, Watir, Ranorex, Selenium, Test Studio, etc. The Objective of the paper is to conduct a comparative study of automated testing tools such as HP Unified Function Testing Tool and Selenium. The main aim of this research paper is to find out use of tool, important features of the tool.

Keywords: Reusability, Recording Efficiency, Data driven Testing, Cost, Language Support

1. INTRODUCTION

A Software Development Life Cycle is a blueprint which is used to developed the software[1]. Software testing is a process of executing a program or application within the Environment for finding the software bugs or defects. It can also be stated as the process of validating and verifying the software program or application or product: Meets the User, Business and Technical requirements that guided its design and development. Software testing is also used to test Performance, Quality and Security provide by the software[2].

The aim of Software testing is to find out all possible bugs or flaws present in software product. It is process of checking important or necessary function then all the functionality of the software product by manually or automatically[3]. Testing mainly consist of providing input to software and verify the output with expected output.

Testing is a process by which we can find out defects or bugs to increase the key parameters of software product. The key parameters of software are:

- Performance: The time required to complete task or action of software product.
- Quality: The functionality and features of a software product that bear on its ability to satisfy stated or implied needs.
- Security: Software security is an idea implemented to protect software against malicious attack and other hacker risks. So that, the software continues to function correctly under such potential risks. Security is necessary to provide Authentication, Integrity and Availability[4].

There are two ways of testing that are:

- Manual Testing- Manual testing is performed by the tester i.e. human being. It performed by step by step providing input to the software and compare the expected and actual result. The tester play the role of end user to carried out the testing. The tester follows the predefined procedure or test cases to testing the software product.

The problem with manual testing are, It is time consuming process, not reusable, required high knowledge about the software product, and experienced person.

Manual testing is used to review the application requirements, and to create the high and low level of design documents.

- Automation Testing- Automation testing is performed by use of computer or electronic machines to run program script. Therefore the tester doesn't need a high knowledge of the software. But for creating

script some sort of scripting knowledge is required. Therefore either white box testing or black box testing can be used.

White box testing required the internal knowledge of software and program or code. White box testing is the process by which providing input to the system and checking how the system processes that input and generate the output. White box testing also known as clear box or glass box testing[5]. White box testing is applicable at integration, unit and system level of software testing process[6]. Black box testing don't required internal knowledge of software program or code. In this tester only provide input and compare the expected result with actual result[5]. The combination of black box and white box testing is known as grey box testing. Which required few functions knowledge to the tester.

Recently, the features of automated software testing tools, TC and Selenium have been studied and compared with the QTP[7-8]. The shortcomings in selenium have been discussed[9]. QTP is user friendly both technical and non-technical users can easily access [10]. The important of value design user interfaces has increased a lot so it is important to test these user interfaces before they will be used by untrained customer.

In the present work, I have planned to study the latest version of selenium i.e. Selenium 2.0.0. In this testing we have checked the various controls placed on the graphical user interface of web application and the boundary value analysis [11] of the user inputs.

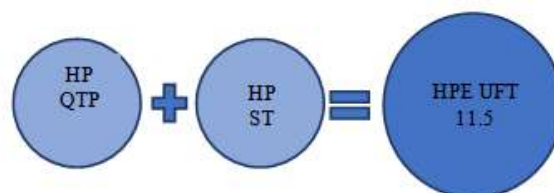
2. LITERATURE SURVEY

For automation testing the tester uses the script for run the program or software. The test script consist of various steps which are required for executing the software product. For Testing of any software product we need to select appropriate testing tool. For selecting testing tool, it is important to create a list of requirements. If we don't have list of requirements, we may waste time for downloading and installing the tools that only meet some of requirements, or may not meet any of them. There are various testing tools are used for test automation[6-7]. Tools are Test Complete, Sahi, HP Unified Functional Testing Tools, Watir, Ranorex, Selenium, Test Studio, etc. In this research paper we mainly focus on HPE Unified Functional Testing and Selenium tool[5-6].

The software testing tools can be compared on the basis of parameters such as recording efficiency, capability of generation of scripts, Data-driven testing, script reusability, execution speed, play back capability, cost and easy to learn[5].

2.1 HPE Unified Functional Testing

HPE Unified Functional Testing (UFT) Previously known as HP Quick Test Professional (QTP). HPE UFT can be download from its official site. After QTP version 11, the UFT was introduced at 2011 with version 11.5. HPE Unified Functional Testing is available through single-seat licenses, as well as floating or concurrent licenses, it also available at trial version software. HPE Unified Functional Testing is automated testing software designed for testing various software products and environments. It performs functional and regression testing through a Graphical User Interface (GUI) or web interface. It Works by identifying the objects in the application user interface or web page and perform various operation like mouse events or keyboard operations. It can also store object properties like native and identification properties on its object repository. Object repository consist of local and shared objects. Local objects are limited for specific application or script only, in other hand shared objects are used for several applications. HPE Unified Testing mainly uses VBScript scripting language to specify the test procedure and manipulate the objects and control the application under test. We can modify the VBScript to perform different tasks. HPE UFT is mostly used for UI based testing application, Non-UI based application like System operation or database testing also performed by UFT Application.



UFT is Combination of HP Quick Test Professional and HP Service Test package. The major difference between QTP and UFT is, QTP support GUI Testing Whereas UFT support GUI as well as API testing.

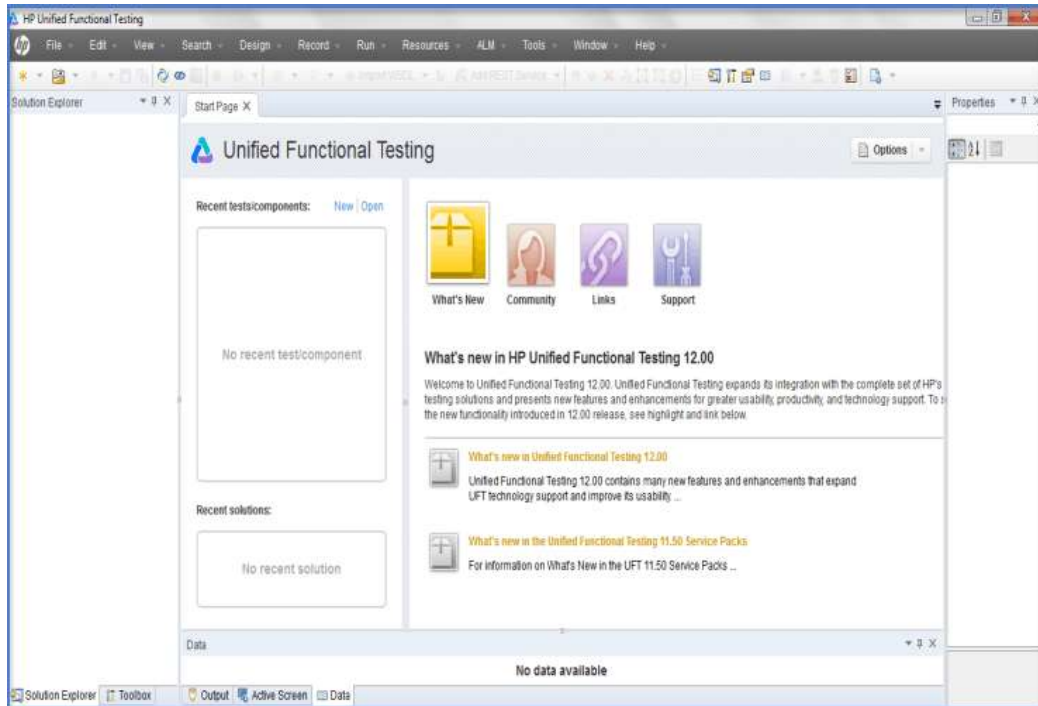


Fig. : HPE Unified Functional Testing Tool version 12.00

3. SELENIUM

Selenium is a portable testing frame work for web applications. Selenium also provide record and run facility for authoring tests without need knowledge of scripting language. It Supports various languages such as Java, Perl, PHP, Python, Ruby, C#, etc. It Supports all modern web browsers. Its works on all Operating System like, Windows, Linux and mac OS.

Selenium is open-source software so any one can download it and used it free of cost. Due to its open-source it provides limited functionality only. Selenium mostly used for web application testing.

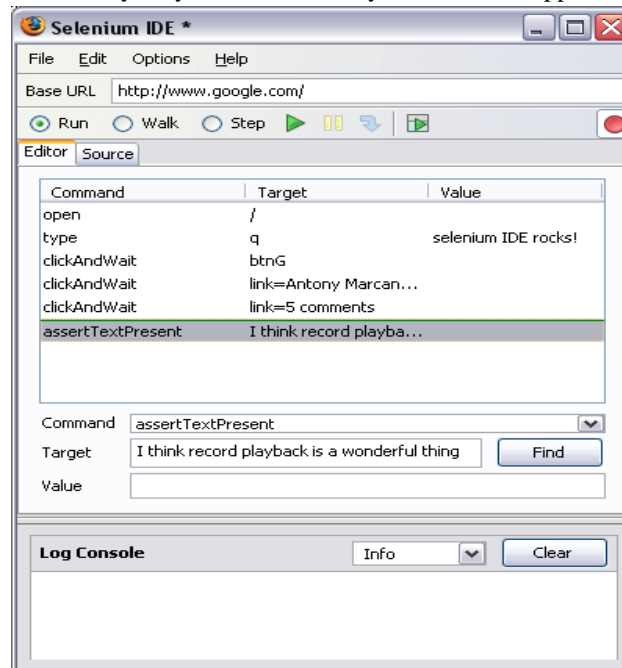


Fig. : Selenium IDE 2.0.0

Selenium IDE is an integrated development environment for Selenium scripts. It is implemented as a Firefox extension, and allows you to record, edit, and debug tests. Selenium IDE includes the entire Selenium Core, allowing you to easily and quickly record and play back tests in the actual environment that they will run in.

Selenium IDE is not only a recording tool: it is a complete IDE. You can choose to use its recording capability, or you may edit your scripts by hand. With autocomplete support and the ability to move commands around quickly, Selenium IDE is the ideal environment for creating Selenium tests no matter what style of tests you prefer.

4. RESEARCH METHODOLOGY

There are number of open source web testing and window application tools available in the software market. Although the core functions of these tools are similar, they differ in functionality, features, usability. Keeping in view the above mentioned aspects, we have selected two web testing tools for comparison which are Selenium and Quick Test professional.

For this study we use the current version of selenium that is 2.0.0 and HPE UFT 12.00. we will discuss the following parameters of Selenium 2.0.0., HPE UFT 12.00. Comparison between these two tools is made on the basis of parameters:

- Reusability
- Easy to Learn
- Recording Efficiency
- Capability of generation of scripts
- Playback of the scripts
- Data driven Testing
- Execution Speed
- Test Result Reports
- Cost
- Capability with Browsers
- Language Support

5. COMPARISON BETWEEN SELENIUM AND HP UNIFIED FUNCTIONAL TESTING

Features	Selenium	HP Unified Functional Testing
Licensing Cost	It is open source. So, there is no licensing or renewal cost for this tool. Its free of cost.	It available for Trial period of 60 Days. For Seat based License cost is \$800 and Concurrent License cost is \$1200 for 3 month period for both.
Browser support	Selenium support Firefox, Internet Explorer (version 7-11), Safari 5.1+, Opera, HtmlUnit.	UFT runs on all main browsers that user uses regularly for their daily task, like; Internet Explorer v6 -v11, Firefox v3.0 – v31 (uses appropriate patches and service packs), Google Chrome v12 – v35, and Apple Safari (on remote Mac PC) v6, v6.10, v7.00.
Platform / Operating System Support	Microsoft Windows, Apple OS X, Linux.	UTF runs on OS: Windows XP/Vista/2003/7/8/8.1 and Windows Server 2008/Windows Server 2012 R2.
Language Support	Supports Java, .Net, Perl, PHP, Python and Ruby.	UFT uses VBScript as a scripting language, this is only a language fully supported by IDE. Apart from VBScript, it also supports JavaScript and Windows shell script.
Application Support	Using Selenium only web applications can be automated.	UFT is used for testing client-server applications. It can test web-based as well as desktop applications.

Object Identification / Storage	Selenium does not have such built in object repository, but object can be managed by using UI element user extension.	HP UFT comes with built in object repository. Object repository development and maintenance is quite easy in HP ALM.
Framework	Selenium + Eclipse + Maven / ANT + Jenkins / Hudson & its plugins / Cruise Control + TestNG + SVN.	HP UFT integrates with test management tool like HP Quality Center.
Mobile (Phones & Tablets) support	Different commercial product i.e. HP UFT Mobile (formerly known as MobileCloud for QTP)	Android, iPhone and iPad, Blackberry, Headless WebKit.
Script Creation Time	More time required to create a script.	Less time required to create a script.
Hardware resource (CPU + RAM) consumption during script execution	Low amount RAM and CPU used during Script Execution.	High amount of RAM and CPU used during Script Execution.
User	User need some sort of knowledge about Selenium software.	Anyone can used UFT, who have basic scripting knowledge.
Database Operation	The database operation are complex in Selenium.	The database operation are very is in HP UFT.
Reports Generation	Integration with Jenkins can give good reporting & dashboard capabilities.	Quality Center has in-built awesome dashboards. With UFT we can easily generate most comprehensive reports due to the availability of an efficient online help.
Product Support	Open Source Community.	Dedicate HP support along with support forums.

6. CONCLUSION

From above research paper we can select a testing tool based on the type of application need to be tested, budget, and the efficiency required. If your test automation requirements are getting fulfilled with selenium, there is no need to go for HPE UFT at a higher cost. And if your testing Desktop application then no use of Selenium. If test scenario is based on various web browser then wasting money on UFT is not feasible, it can done using Selenium. But software which required high quality then need to pay extra money on UFT is fine.

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