

Recent Trends in Test Automation

Vikas Chaurasia¹, Dr. P. R. Gundalwar²

^{1,2} Department of Computer Science MET College, Bandra West, Mumbai

ABSTRACT

This study paper “Recent Trends In test Automation” involves a deep study of the researches carried out on the topic of Automation testing. Testing is very important phase in Software Development Life Cycle (SDLC). Software testing is expensive in terms of time and effort, yet is an essential part of IT service delivery. Software Testing ensures that software meets user requirements and specifications which works as expected as it should be. For testing any software repetitive steps are perform most of the times. So repetitive steps are automated using Automation Software Testing tools, such as HP Unified Functional Testing Tool, Selenium, Test Complete, Test Studio, Cucumber, Apache JMeter etc. The main reason of this research 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.

1. INTRODUCTION

A Software Development Life Cycle is a blueprint which is used to develop 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:** The aim of Security in Testing is to protect software against malicious attack and other hacker risks. In order to let the software 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. It performed by step by step providing input to the software and compares 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. Hence they can use either black box testing or black box testing.

1.1 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].

1.2 Black Box Testing

Doesn't require internal knowledge of software program or code. In this tester only provides input and compares the expected result with actual result [5]. The black box and white box testing combination is known as grey box testing. This requires 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].

In the present work, I have planned to study the latest version of Selenium. In this testing we have tested the various combinations of 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 to run the program or software. The test script consists 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 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].

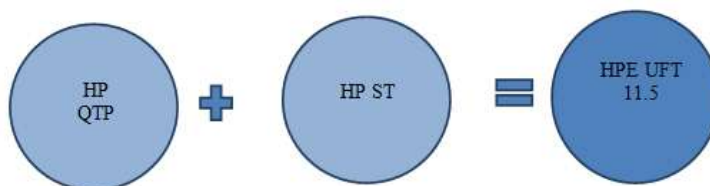
The comparison of software testing tools can be done using the following parameters:-

- Recording efficiency
- Capability of generation of scripts
- Data-driven testing
- Script reusability
- Execution speed
- Play back capability
- Cost
- 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 downloaded 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 is 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. By identifying the objects in the web page or application user interface and performing various operations like mouse events or keyboard operations this is how it works. It can also store object properties like native and identification properties on its object repository. Object repository consists 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 supports GUI Testing Whereas UFT supports GUI as well as API testing.



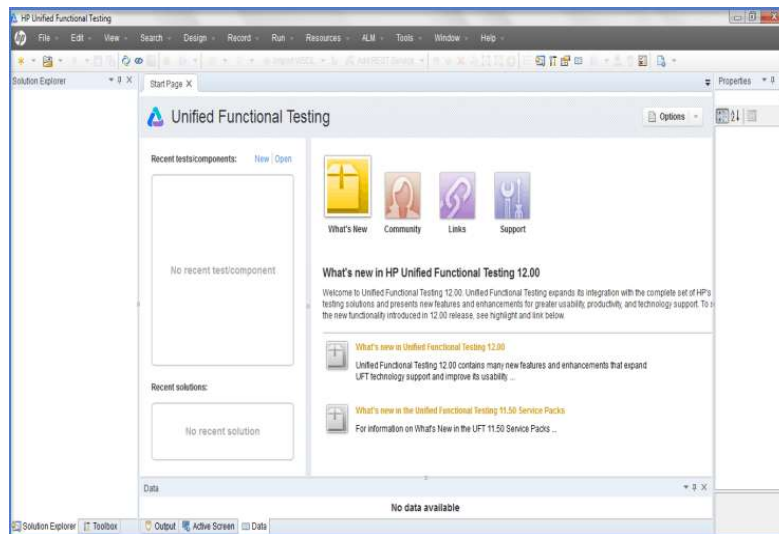


Fig. 1: HPE Unified Functional Testing Tool version 12.53

2.2 Selenium

Selenium is a portable testing frame work for web applications. Selenium also provides 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. Its works on all modern web browsers, 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.

For Selenium scripts Selenium IDE is an integrated development environment it is implemented as a Firefox extension with the following features which allows us to:

- 1) Record
- 2) Edit
- 3) Debug tests

Selenium IDE includes the entire Selenium Core, allowing you to easily and quickly do the recording of the test and play back tests in the actual environment that they will run in.

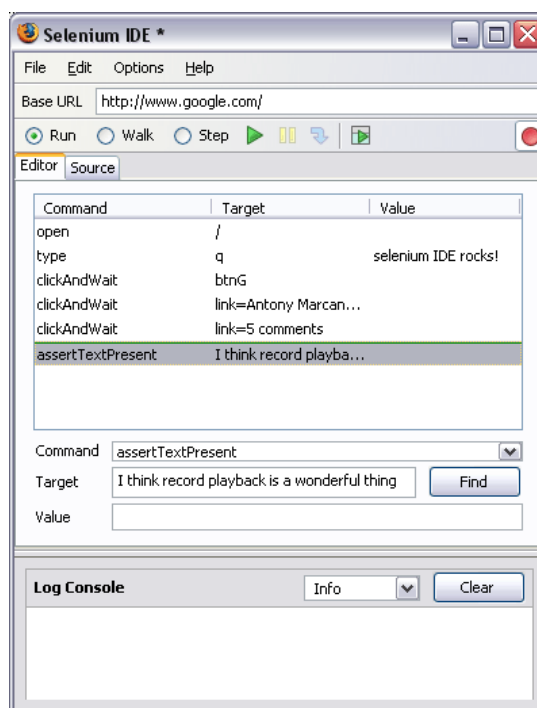


Fig.2 : Selenium IDE 3.14.0

Selenium IDE is also known as a complete IDE. You may choose any of its capabilities which include recording capability, or you also have option to edit your scripts by hand. With auto complete support and the ability to move commands around quickly, Selenium IDE is the one of the best environment you can choose for creating Selenium tests irrespective of style of test you prefer.

3. RESEARCH METHODOLOGY

There are number of open source web testing and window application tools available in the software market. The core functions of many of tools could be similar but they may differ in the functionality they provide, 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 3.14.0 and HPE UFT 12.53. We will discuss the following parameters of Selenium 3.14.0., HPE UFT 12.53. 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

4. 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. It's 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 Fire fox, Internet Explorer (version 7-11), Safari 5.1+, Opera, HtmlUnit.	UFT is supported on all main browsers that user mostly use for their daily task, like; Internet Explorer version 6 - version 11, Firefox version 3.0 – version 31 (uses appropriate patches and service packs), Google Chrome version 12 – version 35, and Apple Safari (on remote Mac PC) version6, version6.10, version 7.00.
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 the following languages Java, . Net, Perl, PHP, Python, 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 on both types of applications.(Web-based & desktop applications)
Object Identification / Storage	Selenium does not have such built in object repository, but by using UI element user extension the object can be managed.	HP UFT already has the built in object repository. It is quite easy in HP ALM to develop Object repository and its maintenance is also easy.

Framework	Selenium + Eclipse + Maven / ANT + Jenkins / Hudson & its plugins / Cruise Control + TestNG + SVN.	The test management tool like HP Quality Center can be integrated with HP UFT.
Mobile support	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 needs some sort of knowledge about Selenium software.	Anyone can use UFT, who have basic scripting knowledge.
Database Operation	The database operation is complex in Selenium.	The database operation are very is in HP UFT.
Reports Generation	Integration with Jenkins can give good reporting & dashboard capabilities.	There is a in-built dashboards in Quality center. With UFT we can easily generate most comprehensive reports due to the availability of an efficient online help.
Product Support	Open Source Community.	It has HP support and Support forums for support.
Object Oriented Language support and Scalability	Supports Java, Python, PHP, Ruby and .Net, Perl.	Scripts can be developed using these languages: - VBScript or JavaScript.

5. CONCLUSION

So the conclusion from the above research paper is that we can select a testing tool based on the following key parameters: -

- Type of application need to be tested
- Budget
- Efficiency required

If you can fulfil your test automation requirements with Selenium there is no need to go for HPE UFT at a higher cost. And if you are testing the Desktop application then there is no need of Selenium. In conclusion, automated software testing has become necessity of companies because it saves both time and money. HPE Unified Functional Testing Tool is the best tool as compared with Selenium.

6. REFERENCES

- [1] <http://istqbexamcertification.com/what-is-software-testing/>
- [2] Ms. Shikha Maheshwari "A Comparative Analysis of Different types of Models in Software Development Life Cycle International Journal of Advanced Research in Computer Science and Software Engineering Volume 2, Issue 5, May 2012.
- [3] Innovative approaches of automated tools in software testing and Innovative approaches of automated tools in software testing and current technology as compared to manual testing Global journal of enterprise of information system, an 2009-jan 2009.
- [4] <https://www.techopedia.com/>
- [5] Jovanovich and Irena, "Software Testing Methods and Techniques," May 26, 2008.
- [6] Mohd. Ehmer Khan, "Different Forms of Software Testing Techniques for Finding Errors," IJCSI International Journal of Computer Science Issues, Vol. 7, Issue 3, No 1, May 2010.

- [7] Mercury Quick Test Professional tutorial, version 8.0. Mercury Interactive Corporation, Documentation, 2004.
- [8] www.guru99.com/automationtesting.html
- [9] Richa Rattan, Department of Computer Science, Hindu Engineering College, Sonapat, Haryana, INDIA, Comparative study of automation testing tools: Quick Test Professional & Selenium, VSRD International Journal of Computer Science & Information Technology, Vol. 3 No. 6 June 2013.
- [10] Manjit Kaur, Raj Kumar, Department of IT, UIET, Panjab University, Chandigarh, India, Comparative study of automated testing Tools: Test Complete and Quick Test Pro, International Journal of Computer Applications (0975-8887) Volume 24-No. 1, June 2011.
- [11] Nidhika Uppal, AP, may 2012, Design & Implementation in Selenium IDE, IT Department, GIMET, Amritsar, International Journal of Computer Applications (0975 – 8887) Volume 46– No.