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A comparative study on software testing tools based on open source technology

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Abstract
Software testing reduces the risk that the software will not fulfill its desired purpose, caused by the software's ambiguity, assumptions and flawed human communication and is an important aspect of the software development life cycle. The objective of this paper is to conduct a comparative study of software testing tools based on the open source technology, in terms of functionality, testing environment, applicability, scalability, reliability and platform dependency.

Keywords: Testing tools, Open source testing tools, Performance testing.

Introduction

Software testing is a process of executing a program or application with the intent of finding the bugs in software. Software testing is a process to identify all bugs that exist in a software product. It is the process of evaluating all the components of a system verifies that it satisfies specified requirements or to classify differences between expected and actual results. Software testing is also performed to achieving quality by using the software with applicable test cases. Testing can be integrated at various points in the development process. This process takes place throughout the software development life cycle.

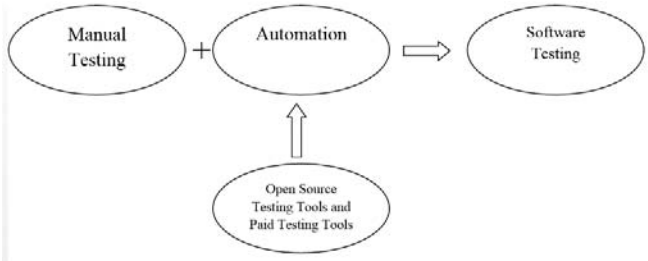

Fig: showing Software Testing mechanism

In software testing, test automation is the use of special software (separate from the software being tested) to control the execution of tests and the comparison of actual outcomes with predicted outcomes. Test automation can automate some repetitive but necessary tasks in a formalized testing process already in place, or add additional testing that would be difficult to perform manually. Test automation is critical for continuous delivery and continuous testing.

Now a day we can get lots of Software Testing Tools in the market. Selection of tools is totally based on the project requirements & commercial (Proprietary/Commercial tools) or free tools (Open Source Tools). Free testing tools may have some limitation in the features list of the product, so it's totally based on what are you looking for & is that your requirement fulfill in free version or go for paid Software Testing Tools. Open source testing tools can be Functional testing tools or Load testing tools such as Selenium, Watir, WatiN, Canoo Web Test, Imprimatur, WET Web tester and Jmeter, FunkLoad.

Review of Literature

There are many open source testing tools. In this paper, some of the open source testing tools have been studied and compared by their functionality.

Selenium

Selenium is a portable software testing framework for web applications. Selenium provides a record/playback tool for authoring tests without learning a test scripting language (Selenium IDE). It also provides a test domain-specific language (Selenese) to write tests in a number of popular programming languages, including Java, C#, Groovy, Perl, PHP, Python and Ruby. The tests can then be run against most modern web browsers. Selenium deploys on Windows, Linux, and Macintosh platforms. It is open-source software, released under the Apache 2.0 license, and can be downloaded and used without charge.

Selenium Components

Selenium IDE: Selenium IDE is a complete integrated development environment (IDE) for Selenium tests. It is implemented as a Firefox Add-On, and allows recording, editing, and debugging tests.

Scripts may be automatically recorded and edited manually providing auto completion support and the ability to move commands around quickly. Scripts are recorded in Selenese, a special test scripting language for Selenium. Selenese provides commands for performing actions in a browser, and for retrieving data from the resulting pages.

Selenium client API: As an alternative to writing tests in Selenese, tests can also be written in various programming languages. These tests then communicate with Selenium by calling methods in the Selenium Client API. Selenium currently provides client APIs for Java, C#, Ruby and Python.

Selenium Remote Control: Selenium Remote Control (RC) is a server, written in Java that accepts commands for the browser via HTTP.

Selenium Web Driver: Selenium Web Driver is the successor to Selenium RC. Selenium Web Driver accepts commands (sent in Selenese, or via a Client API) and sends them to a browser. This is implemented through a browser-specific browser driver, which sends commands to a browser, and retrieves results. Most browser drivers actually launch and access a browser application (such as Firefox or Internet Explorer); there is also an Html Unit browser driver, which simulates a browser using Html Unit.

Selenium Grid: Selenium Grid is a server that allows tests to use web browser instances running on remote machines. With Selenium Grid, one server acts as the hub. Tests contact the hub to obtain access to browser instances. The hub has a list of servers that provide access to browser instances (WebDriver nodes), and lets tests use these instances. Selenium Grid allows running tests in parallel on multiple machines, and to manage different browser versions and browser configurations centrally (instead of in each individual test).

WATIR: Watir (Web Application Testing in Ruby, pronounced water), is an open-source (BSD) family of Ruby libraries for automating web browsers. It drives Internet Explorer, Firefox, Chrome, Opera and Safari, and is available as a Ruby Gems. Watir was primarily developed by Bret Pettichord and Paul Rogers.

Wati N: Inspired by Watir development of Wati N started in December 2005 to make a similar kind of Web Application Testing possible for the .Net languages. Since then Wati N has grown into an easy to use, feature rich and stable framework. Wati N is developed in C# and aims to bring you an easy way to automate your tests with Internet Explorer and Fire Fox using .Net.

Canoo Web test: Canoo Web Test is a free open source tool for automated testing of web applications. It calls web pages and verifies the results, giving comprehensive reports on success and failure.

Wet Web Tester: WET Web Tester is a web testing tool that drives an IE Browser directly and so the automated testing done is equivalent to how a user would drive the web pages. The tool allows a user to perform all the operations required for testing web applications – like automatically clicking a link, entering text in a text field, clicking a button etc. One may also perform various checks as a part of the testing process by using Checkpoints. WET sits on top of Watir, an automated test tool which uses the Ruby scripting language. WET retains all the features that Watir has and adds many usability related functionality like Data table support, Object depot and inbuilt Html reporting.

Imprimatur: Imprimatur is a web application testing tool. The tests are described in a simple XML file. Along with the standard GET and POST actions, Imprimatur handles HTTP sessions and file uploads. The responses can be validated using regular expressions and response code checks.

Results

Features	Selenium	Watir	Wati N	Canoo Web test	Wet Web Tester	Imprimatur
Application Support	Web Applica-tions only it supports addition of plug-ins to achieve desired results that are not provided by Selenium Core. Since, selenium is open source, plug-ins are also available free of cost.	Web applications like web browsers; It drives Internet Explorer, Firefox, Chrome, Opera and Safari, and is available as a RubyGems gem.	WatiN is similar to WATIR and is used for Internet Explorer and Fire Fox.	Web applications only	Web browsers; It drives Internet Explorer, Firefox, Chrome, Safari and Opera and is available as a RubyGems gem.	Functional testing tool for web applications using http methods
Object Orient-ed Language support and Scalability	Supports Java, .Net, Perl, PHP, Python and Ruby.	Supports Java and .Net.	Supports .NET Framework	Java 5, Groovy 1.6, and HtmlUnit 2.4	Supports Java and .Net.	Supports Jave and .Net
Applicability	Supports Windows PC/MAC/ UNIXPlatforms	Supports Windows PC/MAC/ UNIXPlatforms	All window releases. supports Linux or Apple systems.	Scriping language, Java applications and other web applications	Supports Windows PC/MAC/ UNIX Platforms.	Linux, Mac operating system, windows
Usage	Selenium needs quite a bit of expertise	Needs an expert for usage	Simple usage	Needs an expert to some level	This tool is very easy to use	The tests are described in a simple test script.
Latest Versions	Selenium 2.50.1	-	Watin– 3.0	WebTest 3.0	WET 1.0.0	Ima-0.23.16

Conclusion

This paper presents a study on various open source automated testing tools that used on different platforms. Automation testing tools helps the tester to easily automate the whole testing process. Automation testing improves the accuracy and also saves time of the tester as compared to the manual testing. Open source testing tools are not versatile but are selective. Selection of tools is totally based on the project and commercial

requirements. Free testing tools may have some limitation in the features list of the product, so it’s totally based on what are you looking for & is that your requirement fulfill in free version.

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