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A Survey on working with open source software testing frameworks

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Abstract: *In software development lifecycle (SDLC), the testing phase can play an important role to ensure the quality of the software. If the testing tool is open source, we can easily install into our system and test software applications effectively to find the error/bug. In open source testing frameworks, the test cases are generated efficiently done all kinds of black box testing. A survey on working with open source software testing framework mainly used to analyze the testing tools, performance and characteristics of the various open source testing tool frameworks. The objective of the paper is to present a number of open source testing framework processes in order to provide researches proudly informed choices when they are selecting a better open source testing framework for increasing their performance.*

Keywords: *Error/Bug, Open source testing framework, performance of testing tool, SDLC, Test case.*

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I. Introduction

Software testing is the process of ensuring quality of software and increase the software performance. In software testing, performance calculated based on expected results are checked with actual results. Software testing framework is an open source means that can be downloaded from the internet and installed in the computer. The open source testing tools are performing functional testing, performance testing, integration testing, unit testing, system testing. The benefits of open source software testing are fast, reliable, comprehensive and reusable. The rest of the paper contains as following information. Section II describes related works, section III represents background, section IV formulates techniques supported by open source software testing tools, section V contains comparison table and finally section VI concludes this survey paper.

II. Related Works

There are already exist several surveys of open source software testing evaluation, strategic approach and testing tools for software testing frameworks available in the literature [11],[13],[14],[19],[20].

The early survey proposed by T. Amruthavalli et al in [11] contains the information about software testing techniques include, but are not limited to the process of executing a test case (or) program with the intent of finding software bugs. Software testing levels are verification, validation , includes black box, white box testing and gray box testing process, then this paper evaluates testing time, quality assurance and quality control.

In [8] rational test tools are used for checking the functionality of the software. It is an open source software testing tool. This is mainly used for functional testing of software. The features of this tool are recording a script, verify the test script, run the test script, play back a test script and view results and recognize the objects. The advantages of this tool are handling test map, creating data driven test, handling data driven commands and handling data pools.

In [12], selenium testing framework and QTP is a type of functional web testing tool. The complete selenium test automation is designed specifically for web application testing. It will not allow automating other technologies like setup file application. It is really a time consuming process and also complex. Testing is the most important part of software development process and it checks the quality of the software. Selenium is a set of powerful different software tools working with many browsers, operating systems, testing frameworks and programming languages. It executes the test cases very effectively and this paper explains the composition of selenium such as selenium IDE, selenium RC, selenium web driver, selenium grid and features of selenium are, effective test case execution, reducing testing time but it gives less security to the application.

In [14], this paper presents the comparative analysis of three different tools like selenium, sikuli , watir in terms of their recording capabilities, efficiency, language supported, code reusability, data driven testing. Dr. Leelavathi Rajamanickam[16] say that object oriented software testing tool represent the process of exercising the goal of uncovering errors in the implementation of the routines (or) state of the object . The object oriented

system requires regression testing on the application. Object oriented software requires reconsidering and adapting approaches to software test and analysis.

In [17], mutation testing is a software engineering methodology where code mutation is used to assess the quality of a testing technique. It is a time consuming process, as tests need to be run on many variants of the code that is called as mutation. A cloud based mutation testing tool that reuses the map reduce programming model according to increase the construction and testing of mutants by using Hadoop mutator. It is an open source framework and increases the effectiveness of executing test cases.

Bhagyashree Bhandokar et al[18] explains about a hybrid test automation framework for web application. It will be useful to run test cases given in the input file that has an excel file containing keywords and data. Then generate reports automatically with minimal human intervention. Then this paper explains the features of hybrid test automation frameworks such as saves time and scope of tests, optimizes speed efficiency and quality of tests.

III. Background

1. characteristics of open source software testing tool

Open source is freeware; we can directly downloaded from internet to system. Tools from software testing context can be defined as a product that supports one or more activities from planning, requirements, constructing a build, test execution, defect logging and test analysis.

2. Issues affecting software testing technique

2.1. Unrealistic expectations from the tool

It may be one of the greatest risks to success with tools. Then there are many problems associated with any kind of software. It is important to have clear and realistic approaches for open source software testing tools.

2.2. Over-reliance on the tool

Test engineers started to depend on the tool, but the tools are just software they can do only what they have been designed to do.

2.3. Underestimating the time, cost and effort for the initial introduction of a tool

In this open source software testing tool, there will be some technical issues to overcome, but there will be resistance from other people – both need to be handled in such a way that the tool will be of great success.

3. Metrics of open source software testing tool

3.1. Identifying bugs/errors

Developers send the software application to the test environment, the test engineer's starts to doing tests on the particular application. Testing tool is open source means easily downloaded from the internet to the system and test the application and execute the test case effectively and find an error/bug from the application and send back to the developer's team.

3.2. Reduction of rework

Repetitive work is very boring if it is done manually. Testers tend to make mistakes when doing the same task over and over. The open source testing tools overcome this disadvantage.

3.3. Ease of access to information about tests

The information presented visually is much easier for the human mind to understand and interpret. The open source testing tools give more features directly for the information testing people process

3.4. Objective assessment

If a test engineer calculates a value from the software or incident reports, by mistake they may omit something or convictions may lead them to interpret that data incorrectly using a tool means that subjective preconceived notion is eliminated and the assessment is more and consistently calculated.

3.5. Greater Consistency

A test engineer repeating something exactly while testing the application. An open source tool will exactly reproduce what did before, so each time the result is consistent.

IV. Techniques Supported By Open Source Software Testing Tool Types

1. Software testing techniques

Ankita Dwivedi et al [6], introduces quality assurance indicator (Qi) is based on the concept of control call graph quality assurance indicator (Qi) is an open source framework process. This indicator is based on different intrinsic characteristics of the class. A call graph is nothing but control flow graph where the node representing instructions. The Quality assurance indicator has to estimate the quality of the software. So we analyze the importance of testing and increase the performance and quality of the software. A. Nirmal Kumar et al [8], introduces IBM rational functional tester. It is one of the open source testing tool which is used for functional testing on the software application. Then this functional tester tool will generate the test cases

efficiently to test the software. While comparing with other open source testing tools, rational rose tool will generate the test cases effectively to test the software application.

Jagannatha S, et al [12], introduces comparative study on automation testing using selenium testing framework and QTP. Here discussing the various components of selenium such as selenium IDE, Selenium RC, Selenium Webdriver, Selenium Grid. It is the free software that works on three major platforms such as Windows, Mac, Linux. Dr. Leelavathi Rajamanickam [16] introduces object oriented software testing tool. It is an open source tool which is mainly used to give the information about testing, design specifications for object oriented software UML (Unified Modeling Language) has become the defect standard for analysis and design of object oriented software.

Bhagyashree Bhondokar et al [18], introduces a hybrid test automation framework. This framework tests the web application. It significantly increases the accuracy and speed of the testing process by implementing the appropriate automation framework.

2. Test Automation

Jagannatha S, et al [12], introduces the auto testing framework based on selenium. The framework will use the selenium application framework to get the value of the page. Dr.Leelavathi Rajamanickam [16], introduces the rational rose are used by the tool as input. This tool contains a test order generator for class, test case generator for state-based class testing and change impact identification for classes to improve the quality of the software by doing functional testing process.

Bhagyashree Bhondolear et al [18], introduces a hybrid test automation framework. It is a part of both testing and development item which needs programming concepts as well as testing strategies. Then the requirement of the test automation such as saves time and money and increase scope of test and quality of tests.

Mohamad Monier et al [20], introduces test automation of web testing tools. Testing automation enables developers and testers to easily automate the entire process of testing in software development saving cost and time. It increases the quality, efficiency of the software applications.

V. Comparison

Here we must compare all the open source software testing tools described in the survey and then proceed to examine the software quality. The following table summarizes the metrics and disadvantages of open source software testing tools. Comparison of open source software testing tool is shown in table 1.
The following diagram represents the open source software testing tools used from 2007 to 2015.

S.No	Software tool	Year	Test case Execution	Testing Type	Throughput	Software Type	Impact on development phase	High probability of finding error	Error detection effectiveness
1.	NIST approach	2014	Moderate	Functional testing	Moderate	Open source	Low	Yes	Moderate
2.	Yin-Yang approach	2014	High	Unit test, integration test, system test	High	Open source	Low	Yes	High
3	Integrated testing strategy	2014	High	Network test	High	Open source	Moderate	Yes	Moderate
4	Quality assurance indicator	2014	High	Performance test	High	Open source	Low	Yes	High
5	Rational rose functional tester	2014	High	Functional test	High	Open source	Low	Yes	High
6	Quantitative software testing	2014	High		Moderate	Open source	Moderate	Yes	Moderate
7	GUI automation testing	2014		system test	Moderate	Open source	Moderate	Yes	Moderate
8	Selenium testing framework and QTP	2014	High	Functional test, integration test, system test	High	Open source	Low	Yes	High
9	Selenium, sikuli and watir	2014	High	Functional test, integration test, system test	High	Open source	Low	Yes	High

10	Object oriented software testing	2014	High	Unit test, method test, class test, integration test, system test	High	Open source	Low	Yes	High
11	Cloud based mutation testing framework	2014	High	Mutation test	High	Open source	Low	Yes	High
12	Hybrid test automation framework	2015	Moderate	Functional test	Moderate	Open source	High	Yes	High

Table 1. Comparison Of Open Source Software Testing Tools

VI. Conclusion

Our purpose scheme survey of working with open source software testing tools. No need of paying money for installing and user friendly. This process mainly used to compare different open source software testing tool to find metrics and disadvantages. This survey scheme used to choose suitable open source software testing tool and how doing the effective test case execution. Further in the future, this software testing tool used to construct hybrid testing tool for performing functional, integration and performance testing on the application to improve the quality of the software.

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