Analysis and Comparison of Performance Testing Tools

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Abstract- **The web application performance testing is gaining wide attention due to popularization of Web application rapidly. Web Applications are difficult to test in comparison to traditional applications especially in terms of Performance testing such as unpredictable load, response time etc. This research focuses on the study and evaluation of differences in responses given by tools used for performance testing. The objective is to understand the behavior of various performances testing tools and determining the accuracy of responses. This research is undertaken with the aim of demonstrating and proving that there exist differences of responses between different performance tools when conducting tests for the same webpage. Analysis of response time will be conducted by recording the time when a user inputs data into the application until the application outputs a response to that input. Web Applications suffer from poor scalability when they cannot handle a wide enough range of users. The findings will be supported with justification and summary will be presented at the end of the research.**

Keywords- **JMeter, LoadRunner, Performance Testing, Testing Tools.**

I.   INTRODUCTION

Web services are widely used in most applications. The number of users is increasing rapidly and applications enable the users with simultaneous access to the system. Therefore the need for Performance Testing.Performance testing is a non-functional type of testing that provides the stakeholders with analysis based on speed, stability and scalability of the application. It is used to identify bottlenecks and ensure good software quality to the users. Common problems faced while conducting performance testing are test environment, testing tool selection, ambiguous requirements, Unavailability of valid data etc. There are a wide variety of performance testing tools available in market. The selection of tool for testing will depend on factors such as, license cost, hardware requirements, platform support etc.

Generic performance testing process includes the following steps:

1. Identifying testing environment.

2. Identifying performance acceptance criteria.

3. Planning & designing performance tests

4. Configuring the test environment

5. Implementation of test design.

6. Run the tests

7. Analyze, tune and retest.

Performance testing is necessary prior to release of any software product. It ensures improved customer satisfaction, loyalty and retention. This paper discusses, different performance testing tools used for performance testing for same web site and results are generated for different performance parameters in different browsers. The research has been organized into different sections.

Section I: Introduction.

Section II: Overview of tools that are used for comparison.

Section III: Results of these tools are discussed and analyzed.

Section IV: Concludes the overall work.

II.   OVERVIEW OF PERFORMANCE TESTING TOOLS

i.   LoadRunner

LoadRunner was pioneered by Mercury in 1999 but later it was acquired by Hewlett-Packard in 2009. LoadRunner from HP is the most widely used performance testing tool. It supports various development tools, technologies and communication protocols.

LoadRunner is the only performance testing tool that supports a large number of protocols. LoadRunner is tightly integrated with other HP Tools like Unified Functional Test (QTP) & ALM (Application Lifecycle Management) with empowers you to perform end to end Testing Processes. HP LoadRunner can simulate thousands

of users concurrently using application software, recording and later analyzing the performance of key components of the application.

LoadRunner works on a principal of simulating Virtual Users on the subject application. These Virtual Users also termed as VUsers, replicate client's requests and expect corresponding response to pass a transaction. LoadRunner allows you to emulate hundreds or thousands of concurrent users in order to performance test how the application works under these conditions. LoadRunner can be used to verify that a new or upgraded application meet specified performance requirements.

LoadRunner is certified to work with ERP/CRM applications as well as web-based applications.

LoadRunner architecture consists of the following three components:

- Vugen - records scripts and generates a series of actions, such as logging on, etc.
- Controller – generates the load as defined in run-time settings
- Analyzer – used to analyze the results of the performance test.

ii.   JMeter

JMeter is an Apache project that can be used as a load testing tool for analyzing and measuring the performance of a variety of services, with a focus on web applications. JMeter is a Java based application with a graphical interface that uses the Swing graphical API. It can therefore run on any environment / workstation that accept a Java virtual machine.

Apache JMeter is an open source testing tool that can measure performance data like response time, throughput, success/failure ratio etc. One of the areas where JMeter differs from some of the other commercial performance testing tools is that it supports plug-in architecture where functionalities can easily be added by writing a Java plug-in. JMeter provides a graphical interface to define the test plan and can present the results graphically, or in tabular format, flat files etc.

The protocols supported by JMeter are –

- Web − HTTP, HTTPS sites 'web 1.0' web 2.0
- Web Services − SOAP / XML-RPC
- Database via JDBC drivers
- Directory – LDAP
- Messaging Oriented service via JMS
- Service − POP3, IMAP, SMTP
- FTP Service

III.   ANALYSIS OF TOOLS

Parameters	LoadRunner	JMeter
Procurement Cost	Licensed tool with high maintenance cost	Open-Source free tool
Installation	Time consuming High disk usage	Quick Low disk usage
Load Generation	Restricts number of users although licensed tool	No restriction on number of users. Allows as many users as hardware supports
Scripts	Hides scripts in levels in order to make script look better	Shows entire script describing the HTTP flow of the scenario
Result	Excellent analysis, dynamic graph generation, server-side metrics	Limited graph generation with no server-side metrics
Transaction Response Time	More as response time includes image download time	Less as it excludes image download time
Analysis and	Features	Not very strong

Monitoring	provided are market leading	in this category
Record and Re-play Feature	Provides unmatched record and replay feature compared to any open source tool	Record and replay feature not very strong
Preferred Use	When working with different types of IT applications, dealing with different protocols	When working extensively on web protocols
Resolutions	Faster	Slow as testers have to find ways to resolve issues

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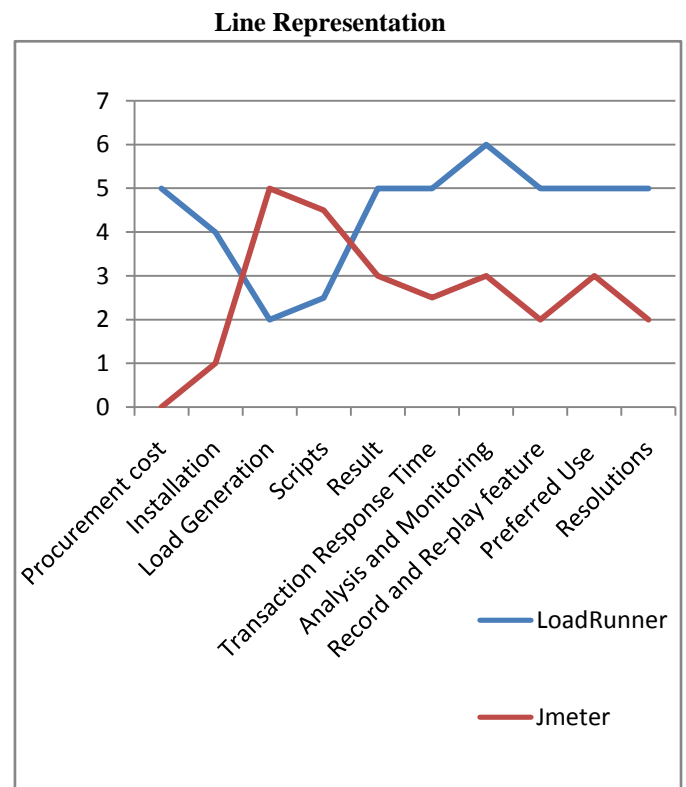
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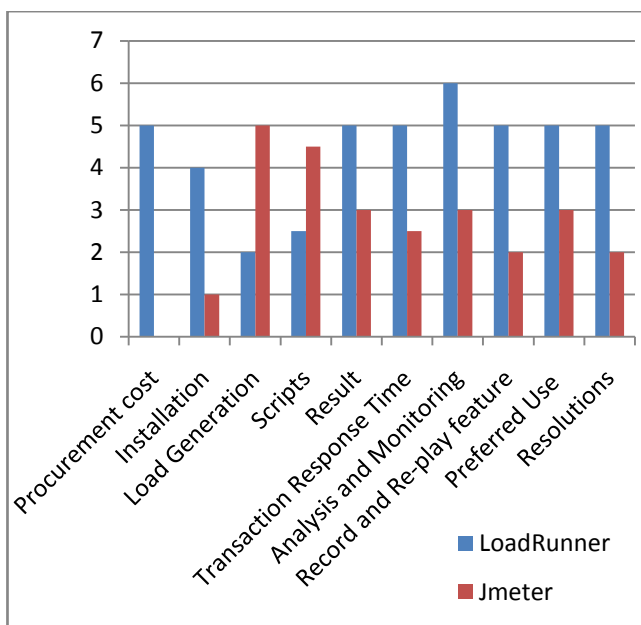
IV. CONCLUSION

Software performance testing has become an integral part of projects. HP LoadRunner and Apache JMeter are good performance testing tools available in the market but which tool is ultimately best depends on a number of factors like your budget, type of system, testers, no of users etc. The low cost advantage may not be very helpful if we are dealing with legacy systems where lots of scripts are developed, compared to the efforts required for re-scripting. On the other hand if we are working on different types of applications and using different protocols then going with LoadRunner will be preferred as it supports many protocols.

Based on this research we recommend to go ahead with HP LoadRunner as it is very stable and robust. LoadRunner provides faster resolution of scripting issues. Recent study says that, efficiency of software professionals working on licensed tool is more than those working on open source tools. LoadRunner provides excellent monitoring and analysis features which are leading in the market. Its only disadvantage is high procurement and maintenance cost. But if you have budget crisis then you can stick to JMeter.

ACKNOWLEDGMENT

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