

## Review Article

## A Review Paper on Comparison of SQL Performance Analyzer Tools: Apache JMeter and HP LoadRunner

Bhoomit Patel<sup>Å\*</sup>, Jay Parikh<sup>Å</sup> and Rushabh Shah<sup>Å</sup>

<sup>Å</sup>Information Technology Department, DJSCOE, Vile Parle (W), Mumbai -400056, India

Accepted 25 Oct 2014, Available online 30 Oct 2014, **Vol.4, No.5 (Oct 2014)**

### Abstract

*Testing automation tools allows testers as well as developers to simply automate the complete process of testing in development of software. This paper is mainly focusing on comparing two renowned automated performance testing tools-Apache JMeter and HP LoadRunner on the basis on following criteria: Load Generating Capacity, installation, Download proficiency, Result Reporting, Cost, Technicality of software and Reliability. The primary objective is to study both the performance testing tools and identify which one of them better, more efficient and require lesser resources.*

**Keywords:** Apache JMeter, HP LoadRunner, performance testing tools, SQL, Software Testing, Performance metrics.

### 1. Introduction

Assessing the functionality of a software program is termed as Software testing. Software testing it is also defined as a process of validating and verifying the product according to its business and technical requirements. Software testing is carried to find the flaws in the software program. The major objectives of software testing are as follows

- To find defects and correct them in the code
- To make sure that the business and technical requirements are met.
- To gain the trust of the customer by delivering a quality product.

In software engineering, Performance testing is defined as a quantitative technique performed to examine the system parameters in terms of reactivity, solidity, scalability, reliability and resource usage under load (SQL). It comes under the category of non-functional testing technique. SQL Performance Testing address challenges like:

- Attaining
- Maximum performance under load testing
- Appropriate plans for realizing the full utility of performance testing.
- Diagnosing software problems.

This paper mainly focuses on 2 SQL Performance Testing software.

1. Apache JMeter
2. HP LoadRunner

*J-meter*

JMeter can be used a SQL Performance Testing tool that is mainly used for testing and analyzing the load on server as well as client applications. JMeter is open source software which measures the performance and inspects the functional behavior. JMeter can perform its tests as FTP servers, servlets, Java objects, SOAP, HTTP, databases, queries etc. on static as well as dynamic platforms.

JMeter is a primarily utilized as a unit test tool for JMS, HTTP, FTP, LDAP, JDBC database. Jmeter bolsters assertions, configuration variables and their parameterization, per thread cookies and other different kinds of reports. It's architecture is plugins based and most of its exclusive features are executed with the help of plugins like BlazeMeter

*Load-Runner*

**HP LoadRunner** has various applications. One of them is SQL Performance Analyzer. LoadRunner examines the performance and performance while creating actual load. LoadRunner has the ability of simulating thousands of concurrent users resulting in the applications to go through rigorous pressure of real-life user loads. It simultaneously collects relevant content from the important key infrastructure and then the result might be analyzed in details for exploring the reasons behind any particular behavior. Loadrunner can detect most of the errors and it collects system as well as component level performance information with the help of an intensive array of diagnostic system monitors and modules. LoadRunner comprises of several tools like:

-Virtual User Generator or

-VuGen Analysis

\*Corresponding author: **Bhoomit Patel**

## 2. LoadRunner vs. Jmeter

### A) Load Generating Capacity

This is the most important criteria to make it a success.

#### a) Load Runner

LoadRunner limits the number of users one can. The rate for 10,000 HTTP users has been INR 1.5 cr. Aggregate of load generated is very efficient as it utilizes less hardware to produce them on a single agent basis. (But one can buy a great deal of Load Generation hardware for the money spent on the LoadRunner license)

#### b) JMeter

One can run as many numbers of agents as the hardware allows you since JMeter is a freeware. As long as there is extra hardware to support it, you can add load computationally. However, repeatedly computing very large files like Piped Schedule, the capacity of agents to cause load falls off quickly due to memory problems.

Winner: JMeter

### B) Installation

#### a) LoadRunner

Installation:

- Installation takes a lot of time
- A lot of disk space
- It works on a particular version of Microsoft Windows.

Perplexing user interface can prove to daunt the users.

Setting up simple tests: for HTTP tests, LoadRunner is strong as it supports browser recording and icon-based scripts.

#### b) JMeter

Installation:

- Sun's JRE needs to be installed
- Unpack the tar file and it is installed.

Setting up Simple tests: Fast and simple.

Start the console, a few clicks of the Mouse, and it is ready to create load.

Running Tests both, distributed and local

Tests can be started from the User Interface. The available agents are displayed in the menu and the busy agents are grayed out. Command line is used to execute standalone tests.

### C) Download Proficiency

The two different performance testing tools which are considered in this paper are Jmeter and LoadRunner. In Software Industry, these tools are used to test the various types of applications which are included in the software.

The efficiency of the applications is tested using these tools. The tools assist by increasing the load on the applications. It is used to check the apex upto which the tested application can work in effective manner.

#### a) Load Runner

It has strong load generation capacity for agents .Actual load generated is limited as the licensing constraints.

#### b) Jmeter

Per agent capacity is descent as compared to LoadRunner. High bandwidth case is the only exception in the case of Jmeter

Winner: LoadRunner

### D) Result Reporting

Generating key graphs manually from log files can be very tedious. Therefore, generating graphs of various parameter at the completion of the scale run such as transactions per second, etc can reduce tediousness to great extent

#### a) Load Runner

It uses integrated ananlysis tool to create real time graphs of infinite measures available to show the performance. This approach uses solaris to gather performance measures which are a drawback.

And gathering of information from different additional servers is problematic as the integration of this information would be challenging.

#### b) Jmeter

Any server-side performance metrics cannot be gathered using Jmeter which shows its disability when it comes to generating reports. Finite number of client-side graphs can be developed while the test is in evolution. Graphs can be saved once the test is finished. The format in which data from the test is stored is standard unlike LoadRunner.

Winner: LoadRunner

### E) Cost

#### a) Load Runner

The cost for Load Runner is expected to start from a low six figure which might climb to a mid six figure. This is the approximate cost required to obtain a license in order to allow various kinds of robust load generation capacity. Apart from this, there are several other costs needed to support the performance of Load Runner. Besides the cost of software itself, running large scale performance tests make it more expensive. But one can get over 100 mighty machines which can be utilized as scale agents and also as associated network switches, cabling and much more.

#### b) Jmeter

Jmeter is free, so it doesn't involve any cost for acquiring a license to allow different kinds of robust load generation

capacity. The Apache Jmeter in fact includes desktop applications that are open source software which adds to its advantage and makes it more likely to be used. Also, it is extensible which contributes in reducing the cost

Winner: Jmeter.

#### F) Technicality of Software

##### a) Load Runner

Load Runner has features like icon-based script development and browser recording which plays a significant role in diminishing the technical hurdles to entry of various products. It also possesses a surprising maturity making it a highly known commercial product. Any Quality Analytic engineer with basic technical knowledge and modest coding abilities can still prove to be productive with Load Runner because of its simplicity and ease of use. Another feature that makes Load Runner more flexible and powerful is its proficiency to load Windows as well as various other efficacious libraries that aids developers during the process.

##### b) Jmeter

JMeter supports form-driven UI. One can exploit this feature of Jmeter to design and create scenarios based on their own defined condition. These user defined scenarios are then deployed automatically to all agents at the time of test initialization. In order to perform tests that are really basic, there is no need for an individual to possess any developer skills. It also supports a lot of protocols out-of-box. Also, it can be extended via Beanshell scripting, Java, JavaScript etc. Jmeter is entirely cross platform making it easier to start with.

Winner: Jmeter

#### G) Stability

##### a) LoadRunner

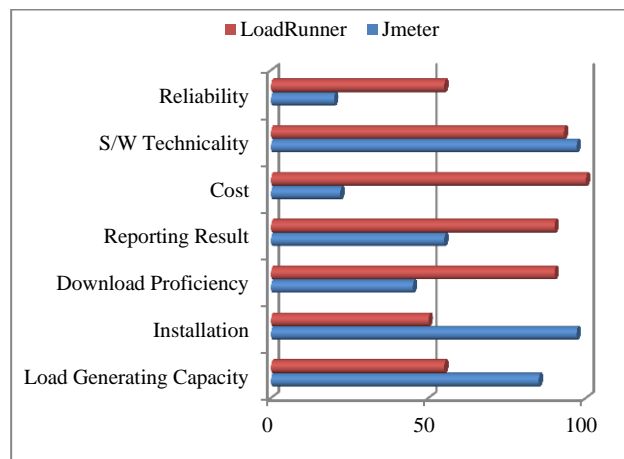
Load Runner is certainly a better choice when the load involved is extremely high. In such situations, the controller might crash on occasions, but then it is highly manageable. Load Runner is expensive but when the projects involve gigantic amount of load, a complex infrastructure and enormous budget, Load Runner is the better option. Also, robustness is one of its features which simply makes it more stable.

##### b) Jmeter

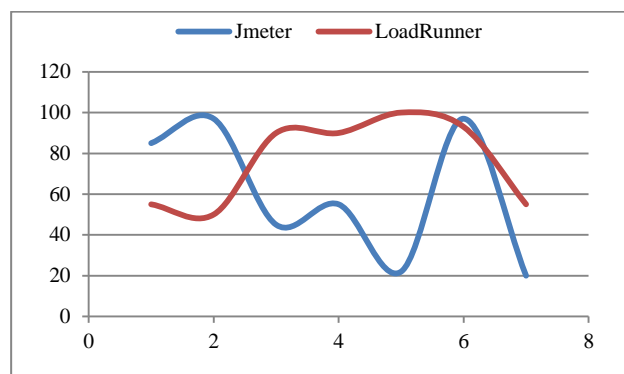
Jmeter isn't better than Load Runner when the stability is the parameter that we are focusing on. J meter can easily handle and monitor a load of 50-100 which is negligible compared to the load that Load Runner can efficiently work with. It can be used only on web applications because of its inability to handle large amount of load. In nutshell, it becomes difficult to work with Jmeter when the scenarios are complex.

Winner: Load Runner

### 3. Graphical Representation



### 4. Line Representation



### Conclusion

Changes are introduced in database all the time and this affects the SQL performance. Therefore, one of the most important tasks for DBAs and the company is to assess the potential impact of any changes to the database environment on SQL performance. It is important for a company because it can save a company time and resources. It is a very difficult task because it is almost impractical to forecast the impression of changes on SQL performance before executing them in the system.

Apache JMeter and LoadRunner have their pros and cons for stress and SQL performance testing. As per our research work, we recommend Apache JMeter over LoadRunner as it has clean and straightforward user interface. It offers great Load Generation capacity. Moreover, it is freeware i.e. it is free of cost and portable. Furthermore, it is completely based in Java.

### Acknowledgement

We would really like to thank Prof. Arjun Jaiswal and Prof. Harshal Dalvi for giving us an opportunity to work and provide us a helping hand. We would also like to thank our honorable principal Dr. Hari Vasudevan of D. J. Sanghvi College of Engineering and Dr. Abhijit Joshi, Head of Department of Information Technology, for

giving us the facilities and providing us with a propitious environment for working in college. We would also like to thank S.V.K.M. for encouraging us in such co-curricular activities.

## References

- Vandana Chandel, Shilpa Patial, Sonal Guleria (May 2013) Comparative Study of Testing Tools: Apache JMeter and Load Runner, Volume 3 Issue 3.
- Xiaojiao Yan, Fuan Wen , Chunmei Fan, Xiao Wang (2011) Performance Testing of Open Laboratory Management System Based on LoadRunner. Instrumentation, Measurement Computer, Communication and Control, First International Conference, 978-0-7695-4519-6.
- Kalita, M. , Khanikar, S. , Bezboruah, T. Investigation on performance testing and evaluation of PReWebN: a java technique for implementing web application. Software, IET (Volume:5 , Issue: 5 ).
- <http://scornik.blogspot.in/2011/05/sql-query-performance-test-with-jmeter.html> .Mohammad Ashik Elahi
- Khaled Yagoub, Pete Belknap, Benoit Dageville, Karl Dias, Shantanu Joshi, and Hailing Yu (2008) Oracle's SQL Performance Analyzer. IEEE Computer Society Technical Committee on Data Engineering.
- H. Packard. LoadRunner. Technical report, <http://www.hp.com>.