

Literature study of Web Based Performance Testing Tools

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Abstract: Testing is one of the phases of Software Development Lifecycle. It is performed to check software for presence of errors so that amendments can be performed accordingly, thereby ensuring its reliability. In order to decide the reliability, response time, error rate, or potentially scalability of a framework in respect to particular workload, performance testing is used. Web service is broadly utilised idea these days due to quick promotion of Web services and less literature is accessible with respect to web administration's performance. Web applications are hard to test in contrast with customary applications particularly as far as Performance testing, for example, unpredictable load, response time and so on. In this investigation correlation of five performances testing tools i.e. HttpRider, NeoLoad, Apache JMeter, Loadster and Grinder will be done based on various parameters and results been assessed. Through the assessment, operation of various performance testing tools in order to performance testing are comprehended.

Index Terms — Apache JMeter, Loadster, HttpRider, NeoLoad, Grinder, web performance (keywords)

INTRODUCTION

Software Testing:

Software testing is a critical period in development lifecycle of software. Software Testing distinguish the errors which when evacuated builds the quality of software that in turn expands the software reliability. It is the way toward breaking down and assessing parts of the framework or a framework itself manually or programmatically intending to check whether the predefined prerequisites are satisfied. In Software testing the distinction amongst expected and real outcomes are analysed [1]. Black box testing includes software testing which depends on proposed output past knowing the inner framework or program code of line [2]. The principle motivation behind testing of software is to assess a characteristic and to discover that it satisfies the quality of service i.e. QOS. Software testing likewise incorporate software quality testing components as in ease of use, proficiency, unwavering quality, security, capacity, practicality, similarity and versatility and so forth [3]. Various testing tools in software are analysed based on parameters namely platform independency, OS support, programming language used and what version is being used now [4].

Performance testing:

Performance Testing is executed to conclude the responsiveness and reliability of web apps [5]. Performance testing device is utilized to decide the time essential to execute out an assignment of framework system [6]. Web Performance testing is to analyse either system meets its non-functional requirements distinguished as by SRS document or not. In the present situation when there are numerous webapp and sites on net it ends up important to evaluate to performance afore propelling [7]. Test device empowers testers to make, oversee & execute test to specific domain, kept up for particular test to specific webapp or website [8].

Web Application:

A web application is an app program which is stored on another remote server and is sent via internet to any

of the browser whosoever is using. In this manner web app keep running on the computer, laptop, mobile phone running OS with the web browser maintaining the specific app [9].

It is inferred that because of the unavoidable circulation, the web services should definitely stand for two factors mainly reliability and security. Along these lines the web apps should be completely tested prior to sending [8].

Testing Tools:

1. Apache JMeter:

Apache JMeter [8] is produced by ASF. In apache JMeter the tester can create various scenarios and also record the test script. In the Test Plan of this tool, the thread group is selected and the thread group consist of the times number of user have hit the site and time is also defined as in when. It also consists of workbench which is used for rough work.

2. Grinder:

The Grinder is a Java Load Testing Framework which is open source. It is primarily based on Java Python and Clojure. It consist of a) Grinder Console and b) GUI app. Complex stats are determined articulations include different stats. Amid the monitoring of test, pre-characterized graphs for time in responding, throughput and furthermore show quantity about result of the test, average, least and extreme response time [13].

3. HttpRider:

HttpRider [12] is an open source and flimsy testing tool for determining the capacity and stress testing of various web apps. It also records the HTTP scenarios by creating HTTP demands utilizing the Fiddler proxy and can produce numerous client threads. It causes client to personalize computerization parameters as in query string and post parameters. It additionally empower client to spare scenarios to the disk.

4. NeoLoad:

NeoLoad [14] utilized for estimating and breaking down the potential of the web apps and websites. It examines the performance of any web app by upgrading the traffic to the particular website and undermines the then performance in overwhelming load. It is accordant with Windows, Solaris as well as Linux.

5. Loadster:

Loadster [15] is a testing tool for stress and load testing for various websites, web apps and HTTP services. It consists of a script recorder that records HTTP and HTTPS scripts from web browser effortlessly. It is convenient and efficient to generate scripts with the help of graphical script editor. Numerous user streams are tested in the meantime with a substantial populace of users.

LITERATURE REVIEW

Dogan et al. [16] focused on identifying the tools and metrics available for testing web applications. They have identified few metrics based on the criteria such as cost and effectiveness in general for testing web applications.

Kanij et al. [17] explained some of the metrics considered while testing the performance attribute. They have addressed two metrics for performance attribute and explained the need for further research in finding the related metrics.

Xia et al. [18] proposed a model to evaluate and analyse the performance attribute of web applications. As the proposed model mainly concentrates on finding the issues that are unidentified during the testing phase. In order to identify the unidentified issues, they have considered a set of metrics for building the model which mainly concentrates on the attribute performance.

Dagar and Gupta [19] mainly focused on addressing the types, tools and methods used for testing web applications. As part of the research, they have also explained some of the metrics related to the performance testing.

Rina and Sanjay [20] compared the testing tools in terms of some metrics. In this research, they have evaluated the testing tools using the parameters by conducting an experiment for choosing the appropriate tool for conducting testing. This research mainly deals with the performance attribute.

Manjula et al.[21] mainly concentrated on the reliability attribute. They have explained the need for reliable web applications and proposed a reliability based approach to evaluate web applications. As part of this research, they have also mentioned some of the reliability parameters used for building this approach.

Lazarevski et al. [22] conducted a case study to evaluate the performance testing tool Grinder. Along with that, they also explained some of the other tools mainly related to performance testing and performance monitoring. Along with these tools, they have also addressed the drawbacks and limitations existing in selected tools. As this research is mainly addressed the issues related to the performance attribute. The research is limited to AJAX based web applications and the tools which may relate to other web applications are not considered.

Iyer et al. [23] explained the process of conducting the web testing and issues in the process while dealing with the quality attributes. They have focused mainly on the quality attributes like performance, scalability and reliability. They have limited their research only to find the issues related to testing methods.

Zhou et al. [24] explained about the testing methods and few traditional performance testing tools present for performance tests. Along with this, they also mentioned some of the challenges related to the area of performance testing tools.

Arora and Sinha [25] stated the need for testing web applications and also about some of the tools and methods. They mainly focused on web testing and provided some of the challenges related to the functionality of web applications.

Wang and Du [26] proposed a framework by integrating the functionalities of the tools like Jmeter and selenium together. This framework mainly concentrates on addressing different types of testing as in UI tests, backend test, load test etc. They have also mentioned some of the tools related to performance testing, but failed to address the other quality attributes.

Hamed and Kafri [27] mainly compared web applications of two different technologies Java and .NET by using performance testing tools and performance metrics. They evaluated both the technologies in terms of response time and throughput. The authors find that the Java technology performs better when compared to

.NET technology in web applications.

Garousi and Mesbah [28] conducted mapping investigation to identify the tools present for test performed on web apps. It also focused on identifying the tools available for testing web apps by conducting systematic literature review. They have identified few tools along with the factor availability of the tool. They mainly concentrated on the performance attribute.

Arora and Sinha [29] stated the need for testing web applications and also focused on two different techniques such as state- based and invariant-based testing. They have mainly focused on web testing and provided information related to tools of both functional and non-functional attributes of web applications which are not clear.

Rina and Sanjay [30] compared some of the performance testing tools in terms of some metrics. In this research, they have evaluated the testing tools by conducting an experiment in order to select the suitable tool for conducting the testing.

Ahlawat and Tyagi [31] investigated three testing tools namely Loadster, WAPT & LOADUI. The comparison is made on parameters as responsiveness and ORR. The paper describes an intensive study of all three tools which in turn help the users in usage and adoption.

Sharma et al. [32] gave a comparative study of JMeter, HP Load Runner, Web LOAD and Grinder on the basis of parameters like Server Monitoring, Unlimited Load generation, ease of use, cost, etc. After comparison the conclusion came out that Apache JMeter is prominently the great tool because of the factor that it's free, with accordance to ample load generation & convenient graphical user interface.

Kaushik and Fageria [33] conducted a comparative study on performance analysis of NeoLoad, WAPT, and LoadUI on the basis of parameters as memory utilisation, response time, number of hit pages, throughput.

Angmo and Sharma [34] gave an evaluation based on performance of testing tools based on web automation namely selenium web driver and Watir web driver. Here the performance of testing tools are analysed, and concluded that Watir web driver is prominent under particular conditions, although selenium web driver is great option in numerous situations as in domain particular language.

Huang and Chen [35] gave a tool to reinforce web based automation testing for websites framework namely WASATT i.e. Web Application Scenario Automated Testing Tool, the tool assisted to automatically test the framework of web-based applications.

Chandel et al. [36] has done a relative work on testing tools Load Runner & Apache JMeter by comparing on the criteria performance, throughput and efficiency and concluded that JMeter is better tool to go forward with.

Kaur and Gupta [37] led a similar investigation of automated testing tools Quick Test Professional, Test complete & Selenium based on their ease of use and viability and presumed that it is possible to choose

testing tool depending upon sort of utilization which has to be tested, spending plan, and productivity necessary.

Malik and Gahlan [38] has led a relative study of automated testing tools namely Sahi, Selenium, Watir and Quick Test Professional for example, endeavours required with creating test scripts, capacity to play back script, report of result, cost, speed and reasoned that Quick Test Professional is by far the prominent tool.

Khan and Gupta [39] have led an investigation on web automation software test tools namely Silk Test, QTP, RFT and Load Runner and also, decide their convenience and productivity and finished up Quick Test Professional to be a decent tool.

Kelkar and Kandalgaonkar [40] has given an analysis and comparison of performance testing tools namely Load Runner and JMeter and determine their accuracy of responses and recommend going ahead with HP Load Runner as it is very stable and robust.

CONCLUSION

Performance evaluation of a web application requires knowledge of its users and their aggregated behaviour – how many users use the application, when, and which operations they perform, at what frequency. Every web developer needs to measure the performance of their web service/application, in order to validate their work. Therefore which tool is better for the validation is a very important factor. That is why in future more work can be performed by developing other performance tests such as stress testing, spike testing, stability testing etc. Since, not all the parameters are considered in all the testing tools being evaluated; thereby it is very difficult to compare them. Also there is a race going on in launching new performance tool every now and then. The research work can be expanded to having new parameters with different new tools for getting reliable and pragmatic solution.

REFERNCES

- [1]Rajendra Bathla and Shallu Bathla, “ Innovative approaches of automated tools in software testing and current technology as compared to manual testing”, Global Journal of Enterprise of Information System, Vol. 1, Issue 1 Jan-Jun 2009.
- [2]Jovanovich and Irena, “Software Testing Methods and Techniques”, May 26, 2008.
- [3]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.
- [4]Ravi Kumar, A Comparative Study and Analysis of Web Service Testing Tools International Journal of Computer Science and Mobile Computing, Vol.4 Issue.1, January- 2015
- [5]S Sharmila and E. Ramadevi,“Analysis of performance testing on web application” International Journal of Advanced Research in Computer and Communication Engineering, 2014.
- [6] Rina and Sanjay Tyagi, “Comparative study of performance testing tools”, International Journal of Advanced Research in Computer Science and Software Engineering , 2013.
- [7]Manju Kaushik, Pratibha Fageria, “Performance testing tools: A comparative study”, International Journal of Innovative Science, Engineering & Technology, 2014.
- [8]Tanuj Wala, “A Comparative Study of Web Service Testing Tools”, International Journal of Advanced

Research in Computer Science and Software Engineering 4(2), February 2014

[9]S. M. Afroz, N. Elizabeth Rani and N. Indira Priyadarshini, "Web application: The study on comparing software testing tools", International Journal of Computer Science and Telecommunications, 2011.

[10] <http://www.w3.org/TR/soap12-part1/>, "W3C - SOAP Version 1.2"

[11] <http://www.w3.org/TR/wsdl/>, "W3C - Web Services Description Language (WSDL) 1.1"

[12]Shagun Bhardwaj, "Performance Testing Tools: A Comparative Analysis", International Journal of Engineering Technology, Management and Applied Sciences, Volume 3 Issue 4, April 2015

[13]<http://grinder.sourceforge.net/g3/features.html#The+Grinder+Architecture>

[14]<http://www.neotys.com/overview-neoload.html>

[15]<http://www.loadsterperformance.com>

[16]Serdar Doğan, Aysu Betin-Can, and Vahid Garousi "Web application testing: A systematic literature review" Journal of Systems and Software, 91:174–201, 2014.

[17]Tanjila Kanij, Robert Merkel, and John Grundy "Performance assessment metrics for software testers" 5th International Workshop on Co-operative and Human Aspects of Software Engineering, CHASE 2012 - Proceedings, pages 63–65, 2012.

[18]Xiaokai Xia, Qihong Pei, Yongpo Liu, Ji Wu, and Chao Liu "Multi-level logs based web performance evaluation and analysis" ICCASM 2010 - 2010 International Conference on Computer Application and System Modelling, Proceedings, 4(Iccasm):37–41, 2010.

[19]Deepak Dagar and Amit Gupta. "Performance testing and evaluation of web applications using wapt pro" International Journal of Innovative Research in Computer and Communication Engineering, 3(7):6965–6975, 2015.

[20]Tyagi, Rina Sanjay. "A Comparative Study of Performance Testing Tools."International Journal of Advanced Research in Computer Science and Software Engineering Research 3.5 (2013).

[21]R Manjula and Eswar Anand Sriram "Reliability evaluation of web applications from click-stream data" International Journal of Computer Applications, 9(5):23–29, 2010.

[22]J. Križanić, A. Grgurić, M. Mošmondor, and P. Lazarevski. Load testing and performance monitoring tools in use with Ajax based web applications. In MIPRO, 2010 Proceedings of the 33rd International Convention, pages 428–434, May 2010.

[23]Lakshmi S Iyer, Babita Gupta, and Nakul Johri Performance, scalability and reliability issues in web applications Industrial Management & Data Systems, 105(5):561–576, June 2005.

[24]Junzan Zhou, Shanping Li, Zhen Zhang, and Zhen Ye Position paper Proceedings of the 2013 international workshop on hot topics in cloud services - Hot Topics '13, (April):55, 2013.

[25]Isha Arora. A Brief Survey on Web Application Performance Testing Tools Literature Review International Journal of Latest Trends in Engineering and Technology, 5(3):367–375, 2015.

[26]Fei Wang and Wencai Du. A test automation framework based on WEB. Proceedings - 2012 IEEE/ACIS 11th International Conference on Computer and Information Science, ICIS 2012, pages 683–687, 2012.

[27]Hamed O. and Kafri N. Performance testing for web based application architectures (.NET vs. Java EE). 2009 1st International Conference on Networked Digital Technologies, NDT 2009, pages 218–224, 2009.

[28]Vahid Garousi, Ali Mesbah, Aysu Betin-Can, and Shabnam Mirshokraie, "A systematic mappings study of web application testing" Information and Software Technology" 55(8):1374–1396, 2013.

[29]Arora A and Sinha M. Web Application Testing: A Review on Techniques, Tools and State of Art. International Journal of Scientific & Engineering Research, 3(2):1–6, 2012.

- [30]Tyagi Rina. A Comparative Study of Performance Testing Tools International Journal of Advanced Research in Computer Science and Software Engineering, 3(5):1300–1307, 2013.
- [31]Pooja Ahlawat and Sanjay Tyagi, “A Comparative Analysis of Load Testing Tools Using Optimal Response Rate“, Volume 3, Issue 5, May 2013
- [32]Sharma Monika, Iyer Vaishnavi S., Subramanian Sugandhi, Shetty Abhinandhan, " A Comparative Study on Load Testing Tools" International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE) Volume 4, Issue 2, February 2016.
- [33]Kaushik Manju, Fageria Pratibha,"Performance Testing Tools: A Comparative Study" International Journal of Innovative Science Engineering & Technology (IJSET) Volume 1, Issue 4, and June 2014.
- [34]Angmo Rigzin, Sharma Monika," Performance Evaluation of Web Based Automation Testing Tools" IEEE 2014.
- [35]Huang Cheng-hui, Chan Huo Yan," A Tool to Support Automated Testing for Web Application Scenario" IEEE International Conference on System, Man and Cybernetics, October 2006.
- [36]Chandel Vandana, Patial Shilpa and Guleria Sonal, “Comparative study of Testing Tools: Apache Jmeter and Load Runner” International Journal of Computing and Corporate research (IJCCR) Volume 3, Issue 3, 3May 2013.
- [37]Kaur Harpreet, Gupta Gagan, "Comparative Study for Automated Testing Tools: Selenium, Quick Test Professional and Test Complete" International Journal of Engineering Research and Application (IJERA) Volume 3, Issue 5, Sep-Oct 2013.
- [38]Malik Vinita, Gahlan Mamta," Comparative Study of Automated Web Testing Tools" International Journal of Latest Trends in Engineering and Technology (IJLTET) Volume 6, Issue 3, January 2016.
- [39]Khan Rifa Nizam, Gupta Shobhit, "Comparative Study of Automated Testing Tools: Rational Functional Tester, Quick Test Professional, Silk Test and Load Runner" International Journal of Advanced Technology in Engineering and Science (IJATES) Volume 3, Issue 1, Feb 2015
- [40]Kelkar Dipika, Kandalgaonkar Kavita,"Analysis and Comparison of Performance Testing Tools", International Journal of Advanced Research in Computer Engineering & Technology (IJARCE) Volume 4, Issue 5, May 2015.
- [41] Meenu, Yogesh Kumar “Comparative Study of Automated Testing Tools: Selenium, SoapUI, HP Unified Functional Testing and Test Complete” in International Journal of Emerging Technologies and Innovative Research, Volume 2, Issue 9, Sept-2015, Pg. 42-48.
- [42] Yogesh Kumar, Neeraj Varshney “Comparative analysis of software size estimation techniques in project management”, in International journal for research in applied science engineering technology, Vol. 5, Issue VIII, Aug-2017. Pg 1470-1477.
- [43] Yogesh Kumar “A Review on Effort Estimation Techniques used in Software Projects”, in International Journal of Computer Science & management Studies, Volume 14, Issue 3, March 2014. Pg. 25-31.