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A Comparative Study of Performance Testing Tools

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Abstract-In this paper, three different performance testing tools NeoLoad, WAPT and Loadster are compared in terms of their different performance parameters results in different browsers. Performance parameters results generated by these performance testing tools have been evaluated and analyzed. Through this evaluation, behaviour of different testing tools towards performance testing is understood. The same web site has been tested for performance under these performance testing tools then differences in results of various performance parameters like throughput, response time, number of hit pages, error rate, memory and CPU utilization etc. are obtained. The same website has been put under load test for a number of virtual users and results have been analyzed.

Keywords: Performance testing, Load testing, Tools, Virtual Users, throughput, Response Time, Load generation.

I. INTRODUCTION

Now days, various business critical applications are tested for performance before launching to satisfy their customer needs. Web services are used in most of the systems. Customers demand increases rapidly and web services allow multiple users to access simultaneously the system. Therefore there is need to do performance testing of systems. Performance testing is used to determine the time required performing a task by the system and it provides stability of system under different load conditions. It identifies bottlenecks of system and provides good quality of service to users. Performance testing [10] is a non-functional type of testing to determine the speed, stability, reliability and scalability of the system. Various types of performance tests are done to check the system's behaviour and to determine the part that performs poorly. To find out the source of performance problem, various tests are done. There are number of challenges with performance testing such as test environment setup, collection & analysis of data and obtaining accurate results. There are different types of performance testing: Stress test, Load test, Strength test. Load testing is used to check the changes in system performance with increase in load to system. Stress testing is used to determine stability of system. It involves testing up to a breaking point. Stress tests examine the system with the maximum load and help to identify system blockage. Strength test is long time load test or stress test. Strength test should be done for few hours or even days. It is used to find memory leakage, error and so on.Different testing tools are used to test the load of server. Testing tools simulate multiple user access of web server. Through analysis of data tools, performance parameters of web server are obtained. Load generation [11] is an important component in performance testing. There is need to select the testing tool and to analyze the testing result. These tools provide load generation to simulate number of users and input data. Transaction time is measured as load varies on system. Tools have many issues to conduct performance testing such as tools compatibility with system under test, tools installation, tools setup and flexibility in doing test both for client and server side. In this paper, three different performance testing tools are used for performance testing for same web site and results are generated for different performance parameters in different browsers. The research discussion has been organized into different sections. Section II discusses prior related works. In section III, overview of features of three tools that are used for comparison is given. In section IV, results of these tools are discussed and analyzed. Section V concludes the overall work.

II. RELATED WORKS

Most previous work on performance testing tools comparison ignored different results reported by each tool. In the research paper "Performance evaluation and comparison of Software Testing Tools" by Sneha Khoria and Pragati Upadhyay [1], some specific performance testing tools have been compared for their usability and effectiveness. WAPT and RANOXEX performance testing tools inferences, implications and results have been presented and discussed. Different attributes, their ability to compare the results, test cases documentation ability and regression testing performance ability have been compared. In the research paper "Web services testing tools: A Comparative Study" by Shariq Hussain, Zhaoshun Wang, Ibrahima Kalil Toure and Abdoulaye Diop [2], three popular open source web service testing tools have been compared in terms of features, usability, performance and software requirements. In "Web Application–A Study on Comparing Software Testing Tools" by Dr. S. M. Afroz, N. Elezabeth Rani and N. Indira Priyadarshini [3], Dart and Apollo software web tools have been compared in terms of their dynamic test generation ability. A survey has been presented on static and dynamic testing analysis. In the paper "Performance Testing: Analyzing Differences of Response Time between Performance Testing Tools" by Muhammad Dhiauddin Mohamed Suffiani, Fairul Rizal Fahrurazi [4], different performance testing tools response time have been compared and

justification of these differences include architecture and simulation mechanism has been given. In the paper "A comparison of Open Source Load Testing tools" by IDS Australia[5], open source load testing tools have been compared on basics of selection criteria like protocol level, emulation of complex business In the paper "Open Source & Commercial process and emulation of multiple concurrent users. Performance Testing Tools" by Vinod P [6], performance testing tools have been compared based on factors including accuracy, cost and other features. In the paper "Performance Testing Tool Comparison" by Smith[7], HP, Load Runner, Load Test, loadUI and Grinder performance testing tools have been compared in terms of cost, market place skill set, scalability, result reporting etc. In the paper "Comparison between HP, IBM and APACHE –Performance Testing Tools" by Kualitatem [8], HP, IBM and APACHE performance testing tools have been compared in terms of features like supported protocols, script playback monitoring, IP spoofing caching, reporting etc. In the paper "Stress, Load, Volume, Performance, Baseline Testing Tool Evaluation and Comparison" by VCAA [9], stress, load, volume, performance, benchmarking and base line testing tools have been compared in terms of all features and price.

In our research paper, differences in performance parameters resulting in different browsers of different performance testing tools have been analyzed.

III. OVERVIEW OF PERFORMANCE TESTING TOOLS

Performance tools are used for different types of performance testing including load test, stress test, volume test and endurance test. These tools are either open source or proprietary tools. For this research, three performance testing tools Neoload, WAPT and Loadster, have been selected.

Neoload

Neoload [12] used for measuring and analyzing the performance of the website. The performance and the end result can be evaluated by using this tool. This tool analyzes the performance of the web application by increasing the traffic to the website and determines the performance under heavy load. This tool provides all the features that are needed for load testing and to analyze the results. A large number of users are simulated simultaneously. It allows you to analyze both the user response time and Infrastructure's statistics (database, web server, network components etc). It performs testing more quickly, efficiently and frequently. This tool tests rich internet applications such as AJAX, FLEX&AIR, GWT, RTMP, Java Serialization. This tool is compatible with operating systems like Microsoft Windows, Linux and Solaris.

WAPT

WAPT [13] provides load, stress and performance testing of web sites and web applications with web interface. It consists of the workplace component and multiple load agents that can be installed anywhere and managed remotely. This tool provides detailed information about the virtual users and its output to users during the load testing. This tool is considered to be the best cost effective tool for analyzing the performance of the web services. It uses WMI and SNMP interfaces to collect the performance information directly from each server and database. It provides custom java script code that provides dynamic request parameterization. It uses GUI approach for test creation and execution. This tool is having modules for ASP.NET testing, ADOBE FLASH tests and JSDN format testing. This tool is compatible with Microsoft Windows XP/2003/Vista /2008/Win7.

Loadster

Loadster [14] is a load and stress testing tool for testing dynamic web application, websites and HTTP web services. It is having script recorder that records HTTP and HTTPS scripts from web browser easily. It is easy to create scripts with its graphical script editor. Multiple user flows are tested at the same time with a large population of virtual users. HTML test reports are generated. It works from inside the firewall. It provides parameterization of scripts to handle dynamic content with validation rule, custom header and response capturing. Application's performance is measured on interactive dashboard. This tool is compatible with Windows and Mac.

IV. Tools Results

Performance parameters have been compared in three Tools in different browsers as under:

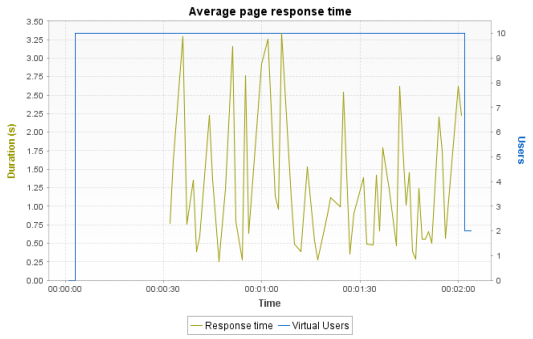
a) Internet Explorer

	NeoLoad	Loadster	WAPT
Total pages	206	1894	701
Total hits	527	1894	1055
Avg response/sec	1.3	3.17	0.46
Error	0	0	0
Total Iteration	113	1894	347 session
Average hit/sec	4.4	2.21	-
Average throughput	220000 bytes	2247.75 bytes	-
Max throughput	1340000 bytes	85250000 bytes	-
Average page/sec	1.7	2.21	-

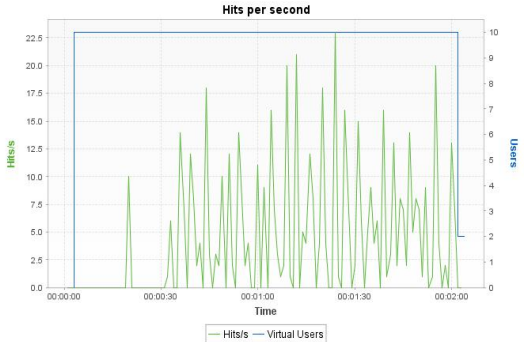
Total bytes	-	1937562	13489 KB
CPU utilization	19.5 avg 93 max	-	14
Memory utilization	17.7 avg 23 max	-	84

Result Graphs of NeoLoad

Average Page Response time

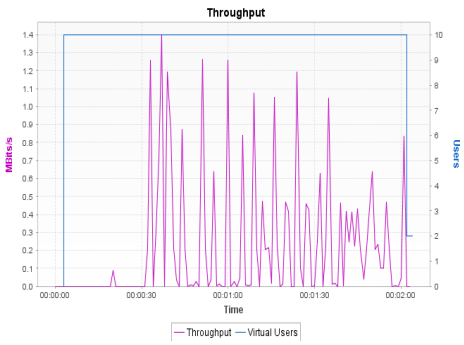


Hits per second



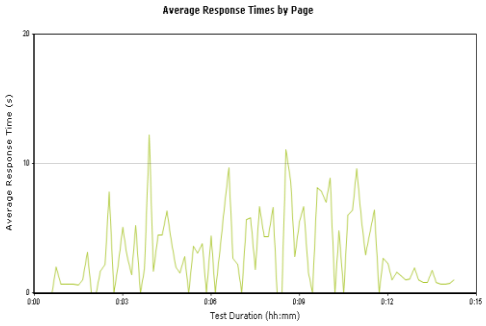
Error

Throughput

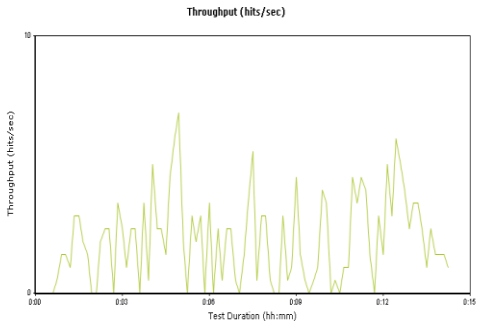


Result graphs of Loadster

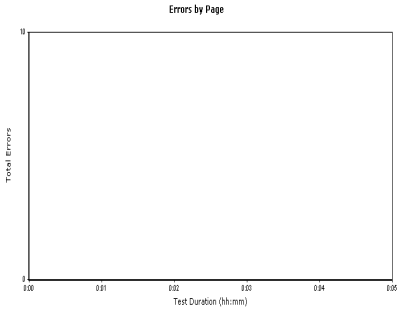
Average Response time by page



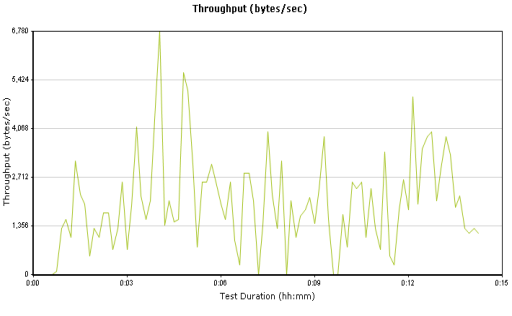
Hits per second



Error by Page

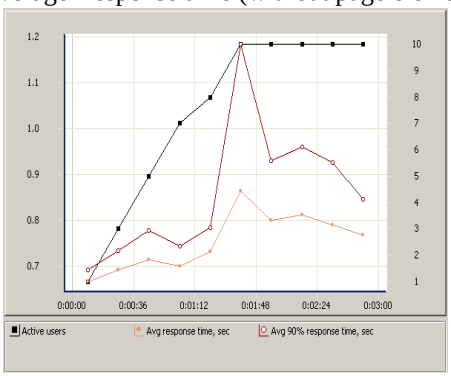


Throughput

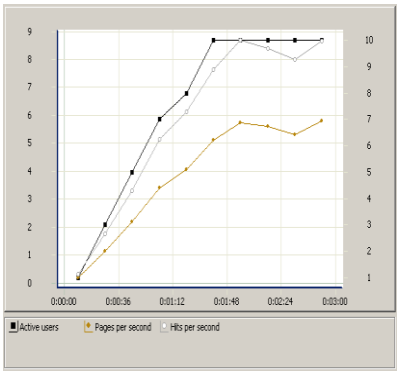


Result Graphs of WAPT

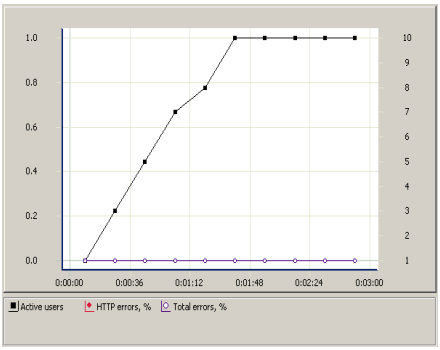
Average Response time (without page element)



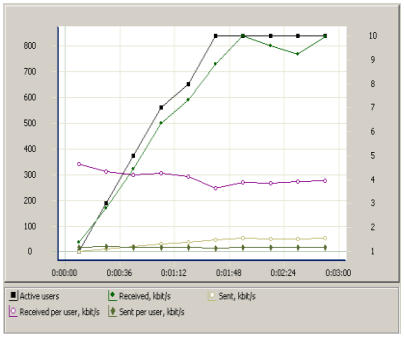
Overall Performance



Error



Average Bandwidth

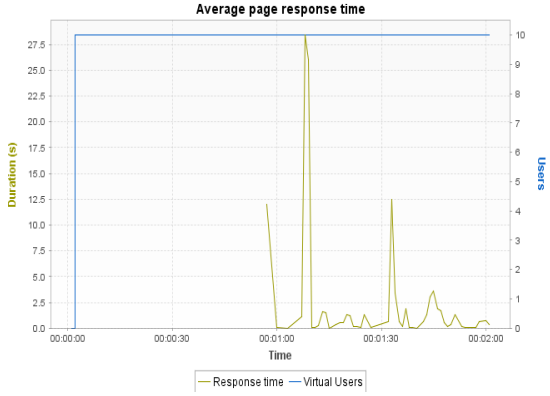


b) Google Chrome

	NeoLoad	Loadster	WAPT
Total pages	103	1025	606
Total hits	391	1025	606
Avg response/sec	3.33	5.83	0.71
Error	0	0	0
Total Iteration	29	1025	94 session
Average hit/sec	3.2	1.19	-
Average throughput	370000 bytes	504.03 bytes	-
Max throughput	4790000 bytes	1487.50 bytes	-
Average page/sec	0.9	1.19	-
Total bytes	-	435485 bytes	5296 KB
CPU utilization	18.6 avg 93max	-	6
Memory utilization	14 avg 20 max	-	87

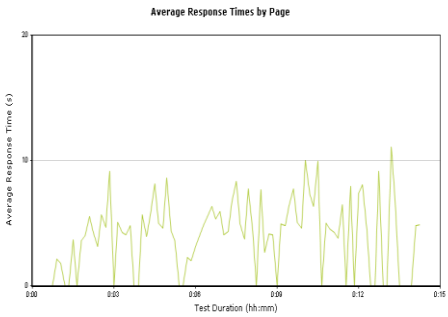
Result Graphs of NeoLoad

Average Page Response Time

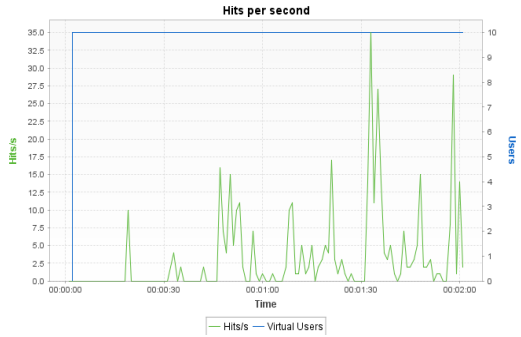


Results Graphs of Loadster

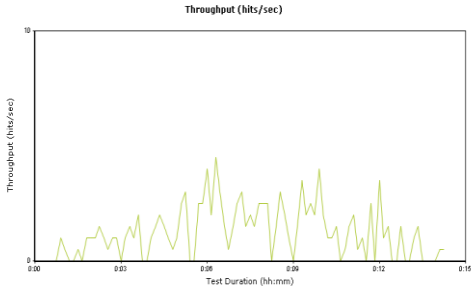
Average response time by page



Hits per second

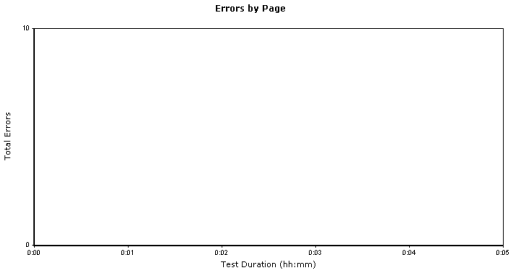


Hits per second

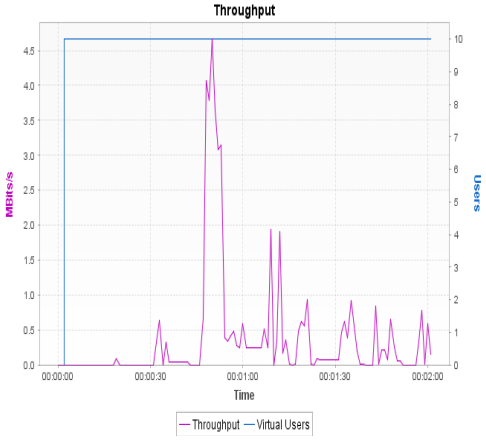


Error

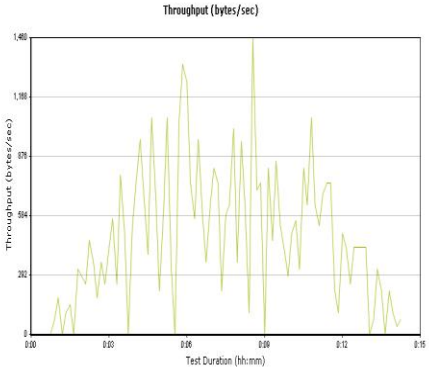
Error by page



Throughput

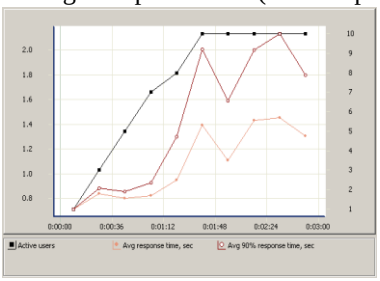


Throughput

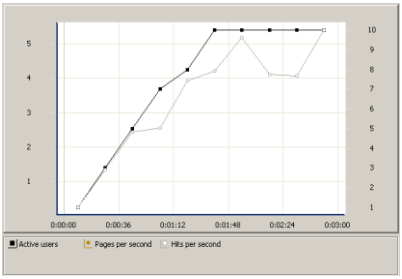


Result graph of WAPT

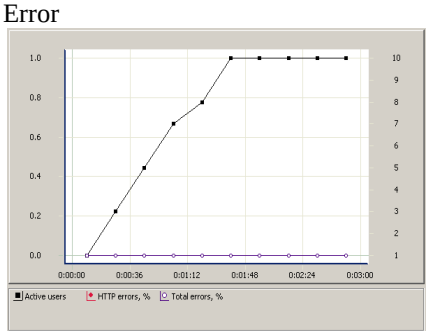
Average Response time (without page element)



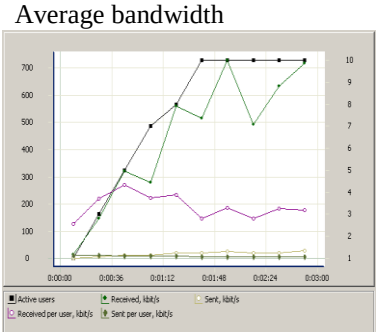
Overall Performance



Error



Average bandwidth

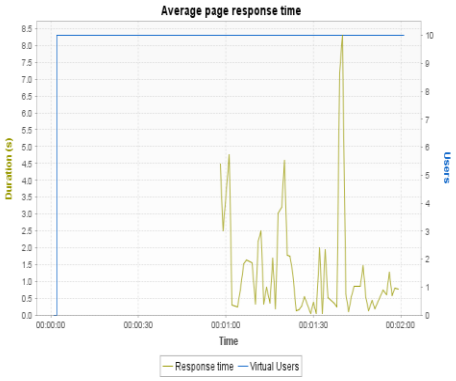


c) Mozilla Firefox

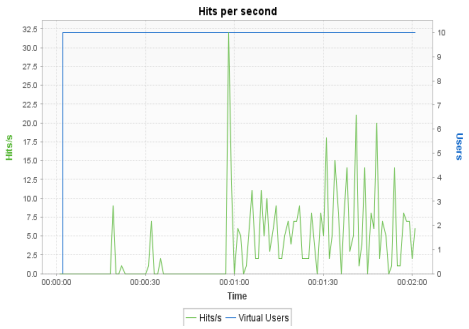
	NeoLoad	Loadster	WAPT
Total pages	142	18	295
Total hits	428	39	1024
Avg response/sec	1.23	248.84	0.35
Error	0	82	0
Total Iteration	28	10	95 session
Average hit/sec	3.5	0.07	-
Average throughput	350000 bytes	2236.73	-
Max throughput	5630000bytes	9014.58	-
Average page/sec	1.2	0.03	-
Total bytes	-	1682021 bytes	8582 KB
CPU utilization	21.2 avg 84 max	-	39
Memory utilization	18.5 avg 22 max	-	85

Result Graphs of NeoLoad

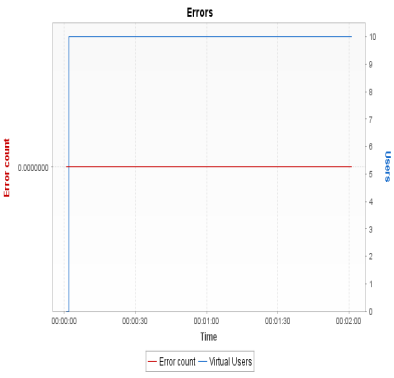
Average Page Response Time



Hits per second

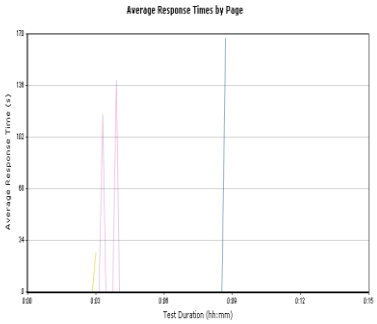


Error

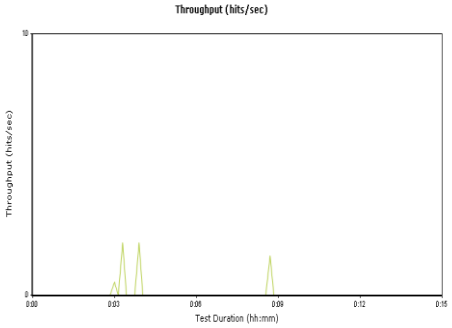


Result Graphs of Loadster

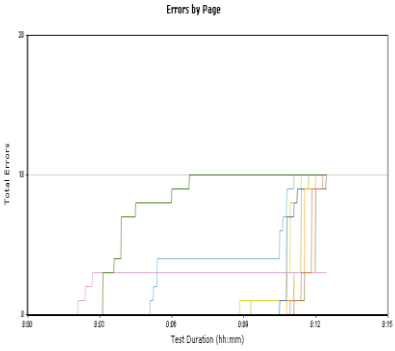
Average Response time by page



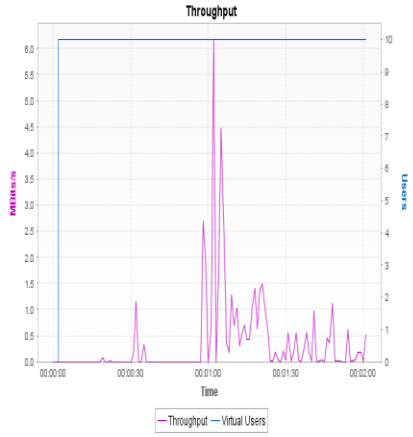
Hits per second



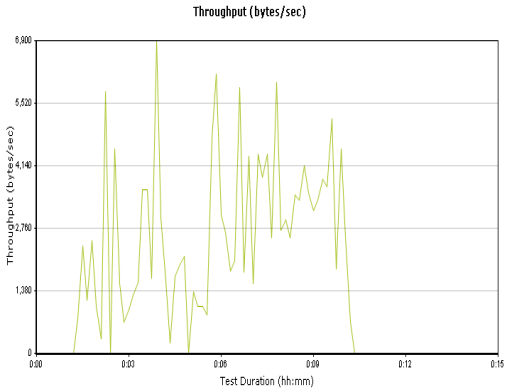
Error by Page



Throughput

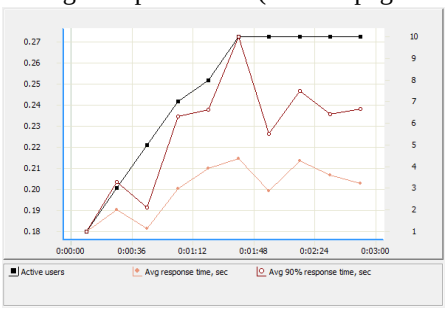


Throughput

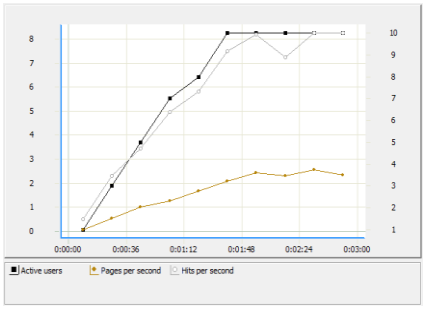


Result Graph of WAPT

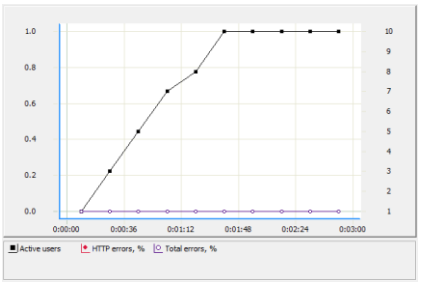
Average Response time (without page element)



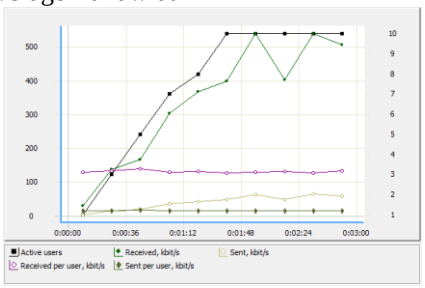
Overall Performance



Error



Average Bandwidth



d) Result and discussions

These performance testing tools NeoLoad, Loadster and WAPT generate different parameters results in different browsers. By using comparison result tables it concludes that WAPT takes less average response time than Loadster and NeoLoad. Errors are zero in all browsers. Total hits are higher in WAPT than other two tools. CPU utilization is less than NeoLoad. In NeoLoad average response time is less, Average hits value is high and average throughput is higher than Loadster in all browsers. NeoLoad is better than Loadster. From this discussion it is found that WAPT performance testing tool is best in all these three tools.

V. Conclusion and Future Work

In this paper performance parameters results of different performance testing tools NeoLoad, WAPT and Loadster in different browsers have been analyzed. The same Web site has been tested for performance under these performance testing tools and performance results of different tools have been compared. These comparisons provide information to select the better tool for performance testing of web applications according to performance requirement. It is difficult to compare tools because many parameters values are not considers in all tools. This research work can be extended to more experiments with more tools and different comparison parameters to provide more realistic results.

References

[1] Sneha Khoria and Pragati Upadhyay, "Performance evaluation and comparison of software testing tools", VSRD International Journal of Computer Science & Information Technology, Vol. 2 No. 10, October 2012.

[2] Shariq Hussain, Zhaoshun Wang, Ibrahima Kalil Toure and Abdoulaye Diop, "Web Service Testing Tools: A Comparative Study", IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 3, January 2013.

[3] Dr. S. M. Afroz, N. Elezabeth Rani and N. Indira Priyadarshini, "Web Application– A Study on Comparing Software Testing Tools", International Journal of Computer Science and Telecommunications, Volume 2, Issue 3, June 2011.

[4] Muhammad Dhiauddin Mohamed Suffiani, Fairul Rizal Fahrurazi, "Performance Testing: Analyzing Differences of Response Time between Performance Testing Tools", in proceeding of International Conference on Computer & Information Science (ICCIS) 2012.

[5] IDS Australia (2009), A comparison of Open Source Load Testing tools [Online].Available: http://www.jds.net.au/tech-tips/load testing tool comparison.

[6] Vinod, P. (2008), Open Source & Commercial Performance Testing Tools [Online].Available: http://www.scribd.com/doc/27765939/Performance-Test-Tools-Comparison.

[7] Smith (2012), Performance Testing Tool Comparsion [Online].Avilable:http://www.shooter-smith.co.uk/performance-testing-tool-comparison/.

[8] Kualitatem (2012), Comparison between HP, IBM and APACHE –Performance Testing Tools [Online].Avialable:http://www.kualitatem.com/comparison-between-performance-testing-tool/.

[9] VCAA (2005), Stress, Load, Volume, Performance, Baseline Testing Tool Evaluation and comparison [Online].Available:http://www.vcaa.com/tools/loadtesttoolevaluationchart-023.pdf.

[10] AgileloadBlog (2012), Application Performance testing basics [Online].Available: http://www.agileload.com/agileload//blog/2012/11/09/application-performance-testing-basics.

[11] Lakshmi Narayan (2011), Overview of Performance Testing Concepts [Online].Available:http://nonfunctionaltestingtools.blogspot.in/2011/01/overview-of-performance-testing.html

[12] http://www.neotys.com/overview-neoload.html

[13] http://www.loadtestingtool.com/index.html

[14] http://www.loadsterperformance.com

