A Literature Review on Load and Performance Testing Methods for Website Optimization

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Load testing is one of the important parts during software development and it is included on the SDLC (Software Development Life Cycle) on testing section. This research is about literature review on several paper which discussed about load testing tools, method, and objective. From this research, it is known that during the load testing phase there are several tools that can be used to conduct load testing along with standard load testing procedures to get accurate results so that the web application can be optimized in accordance with the amount of usage.

In this research there are four research paper that already collected. Each discuss about load test and performance test with different methodologies and tools

The methodology for each performance and load testing from all four-research paper are similar which is black box testing which mean the test person is only test the application without knowing the detail backend of the application. All research paper also using tools to support the performance and load testing activity

The tools that are used during the research mainly used to simulate mass amount of user and also get resource usage. Some tools even able provides the suggestion for application improvement. On the SOTA table also, it is already mentioned the improvement area so that future research may refer to this suggestion and might combine each research parameter to get broader load testing and performance testing result.

To get better overview of the literature review, below are the SOTA table per each research paper

Source Information	I Gusti Ngurah Putu Devtian Dicky Diastama (2021)	Desy Intan Permatasari (2020)	Agung Suprapto (2021)	Doni Andriansyah (2019)
Research Topic	Load testing script for web performance using software testing life cycle	Load testing using JMeter on Sistem Informasi Pertanian	Load testing using Load Impact tool on IAIN Salatiga Website	Performance and Stress Testing during Website Optimization
Methodology	- Grey box method - Load testing using JMeter tool - STLC method (Software Testing Life Cycle) for JMeter script	- Black box method - Gorilla testing method - Load testing using JMeter tool	- Black box method - Web Traffic Observation - Test scenario design - Website load testing using Load Impact - Test result analysis	- Black box method - Website response time analysis using GTMetrix and PageSpeed Insight - Website performance & stress test using Web Application Testing (WAPT) tool - Website optimization & Re-test
Findings	JMeter test scenario is created based on STLC which is more accurate to simulate user accessing the website	- Server resource usage is identified per user amount from 100-1000 users - Website response time is identified in average around 3 second for login	- Concurrent 50 user - Bounce rate 45-65% - Max CPU usage in 6-11% - Max memory usage in 2-4% - No HTTP error during load test	- Website optimization suggestion from GTMetrix & PageSpeed insight is successful, website performance is improved
Limitations	No test result is shown on the research paper	Test scenario definition is limited and only for login function	Currently using free version of Load Impact tool which is maximum of 50 concurrent user	Details of stress testing scenario is not well defined
Areas for Future Research	Implement STLC JMeter script for actual performance testing research	Expand the test scenario, not only for login function of the website	Expand the amount of user for Load Testing, also expand the test into Soak Test, Spike Test, and Stress Test	Expand the performance testing with stress test or load testing scenario

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