

Performance Testing of e-Payment Website Using JMeter

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Abstract— The performance of a website application that is widely used by the public is very important considering that now electronic services are mandatory in our lives. Performance on the website application can be influenced by one of them is the number of user access. With so many users accessing a website application, it requires having a reliable web server. So that requests from users can be responded to quickly and properly, it is necessary to test the website application using the right web server or not. Electronic payment website is one of the website applications used by users, especially the participants of social security agencies in Indonesia. Performance testing on electronic payment website applications is very important so that all requests are served, JMeter is one of the tools that can help test the performance of a website application. The test is done on a PHP website application that uses the Nginx and Apache web servers.

Keywords— Performance, Web Server, Nginx, Apache, Electronic Payment System, JMeter.

I. INTRODUCTION

The server is a computer system that provides certain types of services in a computer network [1], server system architecture can be categorized into two namely, centralized architecture (client-server) and distributed (P2P). Client-server architecture is a centralized information distribution architecture, where servers with various services in it are requested or accessed by clients. The nature of this architecture is centered because the service or information that is accessed is centralized on the server, usually managed by an organization or agency [2].

Web server is an example of a server that is often accessed by clients, web protocol or HTTP is the most popular communication protocol used on the internet today, almost all popular services ranging from social media, banking, or information systems use this protocol as a mechanism to access resources provided by service providers. Clients as users who access resources provided by the server, browsers such as Chrome and Firefox are the devices used by the client. Meanwhile, the server device can be a web server application such as Apache and Nginx [2].

Apache HTTP server is software with an operating system platform that supports multi-tasking and provides services for other applications connected to it, Apache was first developed to work with the Linux / Unix operating system, but then over time can work on other operating systems like Windows and Mac [3]. Nginx was developed in 2002 by Igor Sysoev, the most widely used web server on the internet. With the same hardware, Nginx can provide a better performance, Nginx has a sophisticated architecture that allows multiple connections simultaneously on standard hardware [4]. Electronic payment

system owned by a social security agency in Indonesia is an electronic payment aid to facilitate social security participants to make payments, this electronic payment system website aims to create a transparent social system that can be accounted well to the participant's social Security. Jmeter, first developed by Stefano Mazzocchi of the Apache Software Foundation, is a desktop application designed for functional behavior testing and performance measurement. By using Jmeter, it can be used to analyze and test the performance of web applications, where testing of heavy loads, the number of users and traffic from users simultaneously [5]. Initially, Jmeter was designed to test developing web applications that could carry out other testing tests such as in journals [5]. With the availability of a website-based electronic discussion system that can be accessed by all users to make payments, then to maintain the availability of electronic services, we need a web server that has good and stable performance. This also did not escape the selection of the use of a web server on an electronic payment system so that all requests can be responded well by testing using Jmeter.

The objective testing of this research to find out the comparison of web server performance for electronic payment systems at social security organization in Indonesia and give the organization standard guidelines for develop a website application.

II. OVERVIEW OF JMETER

Apache Jmeter [6] is developed by Apache Software Foundation (ASF). 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 can be used as a unit test tool for JDBC database connections, FTP, LDAP, Web services, JMS, HTTP, generic TCP connections and OS Native processes. It can be used for some functional testing as well. It can be used to simulate a heavy load on a server by generating multiple user threads at the same time to test its strength or to analyze overall performance under different load types. It also supports recoding browser session through proxy server and replays it to give different performance parameters like response time, throughput, latency, response bytes and load time. It also gives different representations of the results either as a tree or table or graphs. These views are also simultaneously available for use. Test plans can be stored in XML format and can be reused [7]. It can also be used for some functional testing. Jmeter architecture is based on plug-in. Its other features are implemented with plug-ins. Off-site developers can easily extend Jmeter with custom plug-in [8].

III. RESEARCH METHOD

The purpose of this study is to analyze the performance of Nginx and Apache using JMeter on the electronic payment website. The place of research is in a social security agency in Indonesia. The research will be conducted from July to September 2019 with related parties.

This research consists of several steps, namely identification of needs, planning and design, implementation and testing, and analysis of results. The following are the stages of this research method.

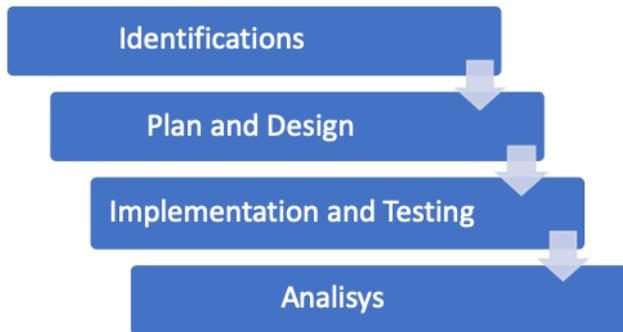


Fig. 1. Research Method

Observation of the architecture of electronic payment websites at social security agencies in Indonesia

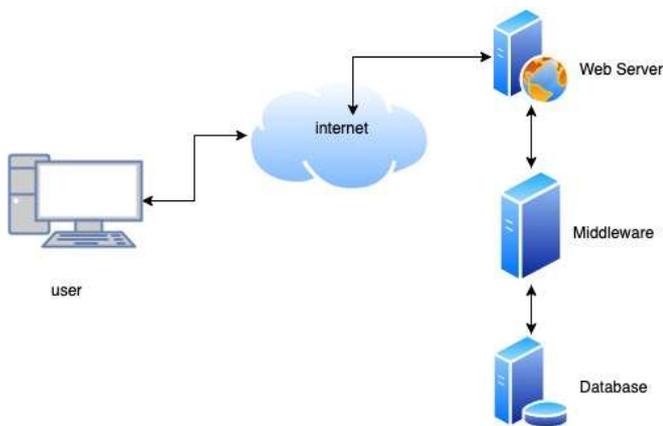


Fig. 2. Architecture of Application Elektronik Payment Website

IV. PLAN AND DESIGN

A. Parameters Testing

Performances testing of web server Nginx and Apache uses three parameters: the first is response time or measurement of response time, the second is latency or measurement of delay time, and the last is throughput or measurement of the amount of data transferred.

B. Scenario Testing

- Scenario 1, a test using JMeter will be performed on the home page of the electronic payment website that uses the Nginx and apache webserver with 100 threads of users with a period between users 0.5 seconds and a duration of 60 seconds.
- Scenario 2, a test using JMeter will be performed on the registration page of the electronic payment website that

uses the Nginx and apache webserver with 100 threads of users with a period between users 0.5 seconds and a duration of 60 seconds.

- Scenario 3, a test using JMeter will be performed on the home page of the electronic payment website that uses the Nginx and apache webserver with 250 threads of users with a period between users 0.5 seconds and a duration of 60 seconds.
- Scenario 4, a test using JMeter will be performed on the registration page of the electronic payment website that uses the Nginx and apache webserver with 250 threads of users with a period between users 0.5 seconds and a duration of 60 seconds.
- Scenario 5, a test using JMeter will be performed on the home page of the electronic payment website that uses the Nginx and apache webserver with 500 threads of users with a period between users 0.5 seconds and a duration of 60 seconds.
- Scenario 6, a test using JMeter will be performed on the registration page of the electronic payment website that uses the Nginx and apache webserver with 500 threads of users with a period between users 0.5 seconds and a duration of 60 seconds.
- Scenario 7, a test using JMeter will be performed on the home page of the electronic payment website that uses the Nginx and apache webserver with 1000 threads of users with a period between users 0.5 seconds and a duration of 60 seconds.
- Scenario 8, a test using JMeter will be performed on the registration page of the electronic payment website that uses the Nginx and apache webserver with 1000 threads of users with a period between users 0.5 seconds and a duration of 60 seconds.
- Scenario 9, a test using JMeter will be performed on the home page of the electronic payment website that uses the Nginx and apache webserver with 10 threads of users with a period between users simultaneously and 60 seconds.
- Scenario 10, a test using JMeter will be performed on the registration page of the electronic payment website that uses the Nginx and apache webserver with 10 threads of users with a period between users simultaneously and 60 seconds.

V. RESULT AND ANALYSIS

From the results of the implementation and testing of the electronic payment website home page which uses the Nginx and apache web server with the server operating system using ubuntu server 14.

NGINX	Response Time (ms)	Latency (ms)	Throughput (KB/s)
SCENARIO 1	768	739	149
SCENARIO 2	755	776	77
SCENARIO 3	766	793	39
SCENARIO 4	933	886	32
SCENARIO 5	765	742	36
SCENARIO 6	782	699	43
SCENARIO 7	804	740	52
SCENARIO 8	779	714	53
SCENARIO 9	146	143	67
SCENARIO 10	139	136	71

Evaluate the results of the implementation and testing of the electronic payment website with webserver Nginx

APACHE	Response Time (ms)	Latency (ms)	Throughput (KB/s)
SCENARIO 1	772	653	74
SCENARIO 2	745	703	78
SCENARIO 3	765	711	39
SCENARIO 4	928	863	32
SCENARIO 5	1026	882	58
SCENARIO 6	787	694	61
SCENARIO 7	832	721	50
SCENARIO 8	784	676	50
SCENARIO 9	148	143	67
SCENARIO 10	146	142	67

Evaluate the results of the implementation and testing of the electronic payment website with webserver Apache.

The results of the implementation and testing of the electronic payment website in terms of Apache latency are superior to scenario 1 for scenario 4, as evidenced by the smaller numbers coming out for this latency. It can be sent smaller than the number generated faster requests are served.

The results of the implementation and testing of the electronic payment website from Apache throughput are superior in scenario 5 and scenario 6, while in testing scenario 1 Nginx is superior, it is proven by more numbers coming out for this throughput. Can reply more than the amount generated the faster requested.

The results of implementation and testing of electronic payment websites in terms of response time Nginx is superior in scenario 5, it is proven by the smaller number that comes out for response time. You could say the smaller the number the faster the request is served

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