



Comparative Analysis of Web Hosting Server Performance

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ABSTRACT

This research discusses the comparison performance of different hosting servers. The hosting server that is used as a comparison consists of four types. Namely, Indonesian shared hosting servers, foreign shared hosting servers, Indonesian virtual private servers, and foreign virtual private servers. The parameters tested in this study are load time, domain name system, connection, and secure socket layer. The tools used for testing the performance comparison of the hosting server are Dotcom-Tools, Pingdom.com, Webpage Test, and sitespeed. The results of this comparison can be an input for potential users who have plans to online their applications using a hosting server. The total value of web server hosting Indonesian shared hosting servers (SH I) is 28.975 milliseconds (ms), foreign shared hosting servers (SH LN) are 8.267 ms, Indonesian virtual private servers (VPS I) are 14.195 ms, Foreign virtual private servers (VPS LN) are 11.835 ms. This research concludes that foreign shared hosting servers (SH LN) are the best web hosting servers because, on some of the parameters tested, this server has the best value because it gets the lowest value with 8.267 ms.

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1. INTRODUCTION

Internet technology and online applications continue to evolve all the time. For example, online technology is used for the education process [1], teaching evaluation process [2], meeting [3], electronic commerce [4], and online banking transaction processing [5]. Millions of websites and online-based applications have been created with various types and functions to meet the needs and support human life. Hosting is an internet service that provides resources in the form of servers [6] and services [7] that can make websites or applications accessible to the public online.

Web hosting is a service that provides a data storage server for website placement [8] which the public can access through a connection to the internet network from personal computers in all corners of the world. Web hosting provides various technologies and features that can provide effective web service and security mechanisms [9]. Currently, there are many web hosting service providers, especially in Indonesia. The packages offered are diverse, ranging from affordable to costly

prices. There are several types of web hosting today, including shared hosting, reseller hosting, VPS, and cloud hosting [10]. Some types have different architectures [11], performance [12], and features. When choosing the hosting service, of course, prospective users will pay attention to the things needed [13], starting from the specifications needed to match the website to be hosted, such as the hosting server capacity, bandwidth provided, processor, RAM, and the number of domains that can be used.

The web hosting server can be interpreted as the centre, both the database centre and the system centre. The server is a computer in charge of serving every request made by the client computer [14], which returns the results of the request to the client computer. A server is a particular device in a computer network that is a place to allow resource sharing [15]. Several types of servers can be tailored to the client's needs to assist the client in doing his job. The type of server can be physical or virtual machine (VM) [16]. Preparing a hosting server requires excessive time and effort [17].

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Shared hosting is web hosting that uses the same web server computer for several hosting users simultaneously[18]. The advantage of shared hosting is that the price is relatively low. The disadvantage of shared hosting is that if there is a problem with one of the web hosting users, it will affect all web hosting users [19]. Therefore, shared hosting is the most popular type of hosting. Usually, web hosting providers offer many attractive packages for this type of web hosting.

A virtual private server (VPS) is a server that uses virtualization [20], which is a strategy to reduce data centre power consumption. By doing virtualization, one physical server host has many virtual servers. Therefore, in addition to better use of hardware, server virtualization can reduce data centre space, making computing with efficiency server usage [21] and reducing energy requirements in the data centre [22].

With so many types of web hosting servers available today, of course, users want to use the most suitable web hosting. Web hosting service providers most widely used and provided are shared hosting services [23] and virtual private servers [24]. Therefore, this research conducted a performance test of the types of web hosting, namely shared hosting and virtual private servers. Thus, the purpose of this research can be formulated to assist hosting users in determining the type of web hosting to be used.

2. RESEARCH METHOD

The research method carried out consists of six stages. The first stage is the determination of the hosting server, the second stage is the determination of the website, the third stage is the determination of the assessment parameters, and the fourth stage is the determination of tools to conduct performance assessments. Finally, the

analysis process is the fifth stage carried out so that the conclusions are obtained from the research, which is the final stage. In general, the stages of the research carried out can be seen in Figure 1.

2. 1. Determining the Hosting Server

Hosting comes from the world host. Computers connected to the network can take advantage of the facilities available on a computer that is the host connected to the network. Hosting provides server resources for rent [25], thus enabling organizations and individuals to place information on the internet. Server hosting consists of a combination of servers or servers connected to a high-speed internet network. For effective utilization, load must be balanced among all resources server[26]. Hosting can be used by organizations and individuals to store web page files that have been created so that they can be accessed online.

A virtual private server divides a physical server into several virtual private servers [27] so that each VPS looks and works like a standalone server. Each VPS has full root access, an operating system, and its settings for scripts, users, processing, filesystems, and server resource management such as standalone CPU and RAM. In contrast to share hosting, which uses server resources and influences each other. VPS allows multiple operating systems to run simultaneously on a single physical server machine. Using a virtual private server can improve the server's performance, but the costs involved when renting a VPS are more expensive than shared hosting.

Several hosting servers are determined at this stage, which will be analyzed for performance comparisons.

The public, namely, often uses four hosting servers:

- a. Indonesian shared hosting servers (SH I)
- b. Foreign shared hosting servers (SH LN)
- c. Indonesian virtual private servers (VPS I)
- d. Foreign virtual private servers (VPS LN)

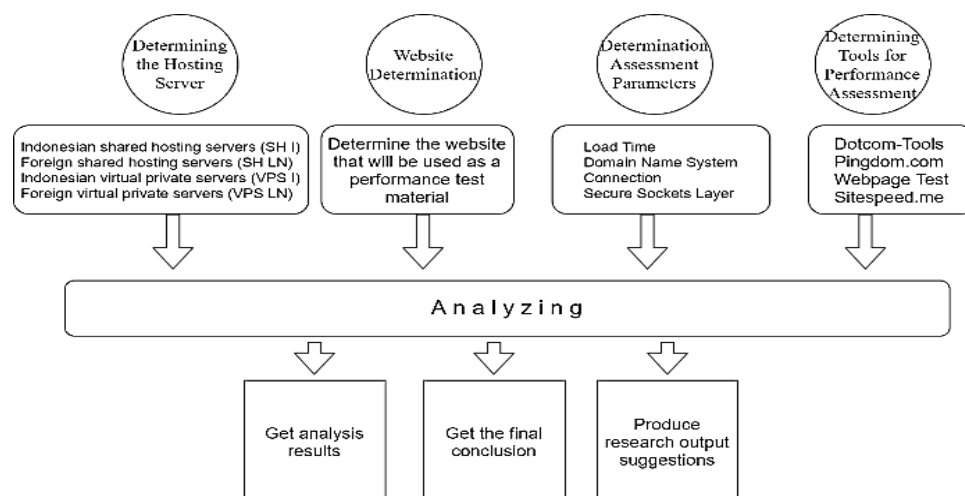


Figure 1. Stages of the research conducted

2. 2. Website Determination At this stage, a website determined to be stored on the four servers. The online website is the same website on each server. The selected website only consists of a few pages and only displays information. A website is a collection of pages that convey information that contains text, still or moving images, animation, sound, and a combination of all of them, both static and dynamic. The website forms a series of interconnected buildings from these pages. The relationship of these pages is called a hyperlink, while the text used as a connecting medium is called hypertext. Things that must be prepared to build a website are a domain name, website hosting and content management system (CMS). In this study, one website was hosted on four different servers.

2. 3. Determination of Assessment Parameters

Tests are carried out to find out which type of hosting is better, carried out with the same internet connection conditions and website page loads so that it is expected to get precise and accurate results. The test in determining which type of hosting is better in this study is to use a comparison method.

The parameters to be tested in this study are as follows:

1). Load Time

Load time is the time it takes for a website to display a website page to completion [28]. Long load times can lead to poor service experiences [29]. The amount of multimedia content contained in a website can aggravate the load time of a website [30].

2). Domain Name System

A Domain Name System (DNS) is a service application on the internet that translates a domain name into an IP address [31]. DNS helps map a computer's hostname to an IP address. DNS can have an effect on web performance [32].

3). Connection

A server is a particular computer with a socket connected to a unique port number. The server waits for the socket to accept a connection request (request) from a client (passive open). The connection parameter is the speed of the server and client to communicate and make requests-responses [33]. Average server connection time can be used to determine the performance of a website and web hosting server [34].

4). Secure Socket Layer

Secure Socket Layer (SSL) is a protocol used for secure web browsing [35]. SSL is designed to protect data on the Internet. In general, the function of SSL is to secure personal data, such as names, addresses, or credit card numbers, from cybercriminals. The workings of SSL is to lock the cryptographic key into the information to be identified. The data will also be well encrypted during the transfer process so that third parties will not be

able to enter and steal sensitive information. SSL has significant impact on the web hosting performance [36].

2. 4. Determining Tools for Performance Assessment

Several supporting tools are used to determine the performance of various parameters. The assessment tools used are Dotcom Tools, Pingdom.com, Webpage test and sitespeed. Dotcom-Tools is a free website speed and performance testing and tools and used to determine the loading time of a web hosting server [37]. Pingdom is a website performance and availability monitoring [38]. A webpage test is a website performance and optimization test [39]. Finally, Sitespeed is an open-source tool that helps analyze and optimize the website speed and web performance [40] based on best practices.

2. 5. Comparative Result Analysis

This stage analyses the results of the performance comparison of the four hosting servers where the test website is stored. The analysis process is carried out by comparing the values and numbers of the assessment results from each tool and parameter used.

2. 6. Getting a Conclusion

The comparisons made in the previous stage are used to conclude the research conducted. However, the research results depend on other parameters that will change in the future.

3. RESULT AND DISCUSSION

Tests conducted in this study have limitations, namely:

1. There are four types of hosting servers to be tested, namely: Indonesian shared hosting servers (SH I), foreign shared hosting servers (SH LN), Indonesian virtual private servers (VPS I), Foreign virtual private servers (VPS LN).
2. Tests on four types of hosting servers are carried out on one computer with the same internet connection and the same website.
3. Testing using four tools, namely: dotcom-tools, pingdom.com, webpage test, and sitespeed
4. The test uses load time, Domain Name System, connection and Secure Socket Layer criteria.
5. The internet connection used for testing is a data package from same internet service provider.
6. Testing using the same website.
7. The browser used for testing is Google Chrome.

The testing process carried out using the dotcom-tools tools can be seen in Figure 2, the pingdom.com tools can be seen in Figure 3, the webpage-test tools can be seen in Figure 4, and the testing process using sitespeed can be seen in Figure 5.

Sum of DNS times in ms	0.04
Sum of Connection times in ms	1.57
Sum of SSL times in ms	1.62
Sum of Request times in ms	0.01
Sum of FirstPacket times in ms	18.06
Sum of Download times in ms	4.76

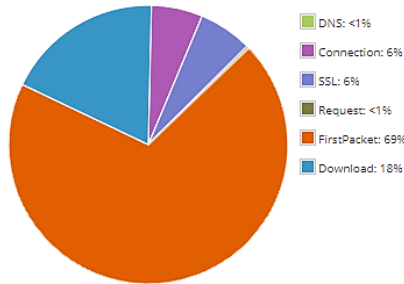


Figure 2. Testing process using Dotcom-tools

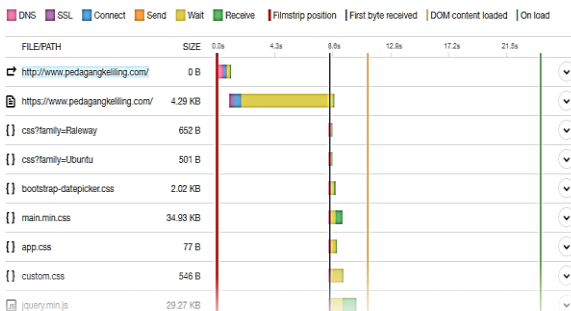


Figure 3. Testing process using Pingdom.com

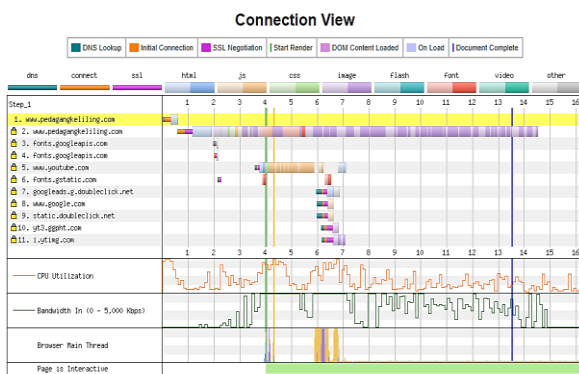


Figure 4. Testing process using Webpage-test

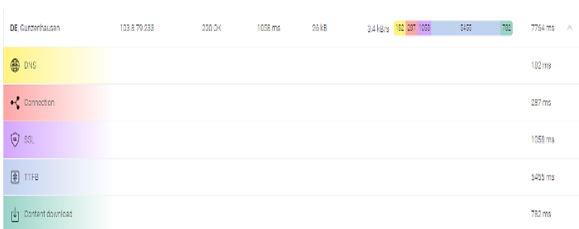


Figure 5. Testing process using Sitespeed

From the tests carried out in this research on four types of hosting servers using four web performance measuring tools and a website for testing, the following results were obtained for the test material parameters. The smaller the value obtained from these parameters, the better the hosting server. In presenting the test results, milliseconds are used. The test results for the load time parameters can be seen in Table 1 and Figure 6. It can see that foreign shared hosting has the best load time performance with total value 4977 milliseconds.

Based on the results of testing the DNS parameters as shown in Table 2 and Figure 7, Indonesia's shared hosting server (SH I) has better DNS performance compared to other types of hosting servers with 276 milliseconds.

The test results for the connection parameter can be seen in Table 3 and Figure 8. It can see that foreign shared hosting has the best connection performance with 1081 milliseconds.

The test results for SSL parameters can be seen in Table 4 and Figure 9. It can see that Foreign Virtual

TABLE 1. Load Time Parameter Test Results

Server	Dotcom-tools	Pingdom.com	Webpage test	Sitespeed	Total
SH I	6410	7830	737	7764	22741
SH LN	3660	883	187	247	4977
VPS I	4420	1350	316	1096	7182
VPS LN	5280	613	542	935	7370

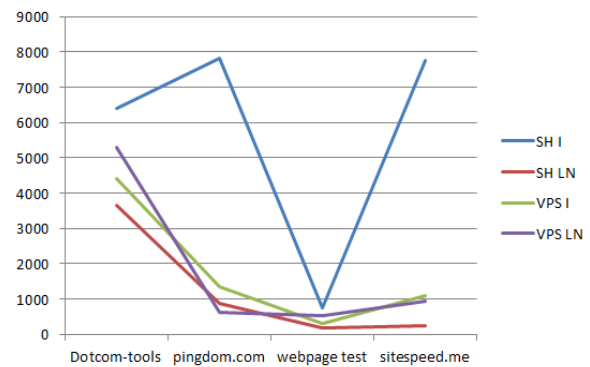


Figure 6. Graph of Load Time Test Results

TABLE 2. DNS Parameter Test Result

Server	Dotcom-tools	Pingdom.com	Webpage test	Sitespeed	Total
SH I	40	27	27	182	276
SH LN	310	731	28	5	1074
VPS I	880	495	28	536	1939
VPS LN	250	312	27	186	775

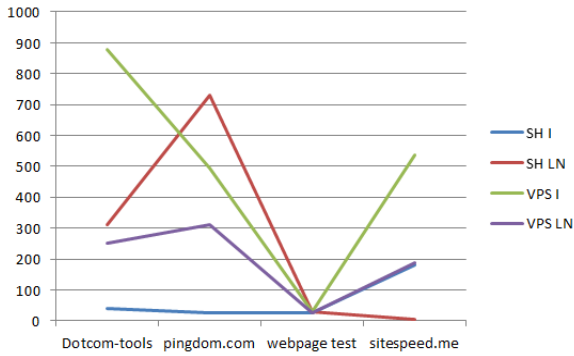


Figure 7. Graph of DNS Test Results

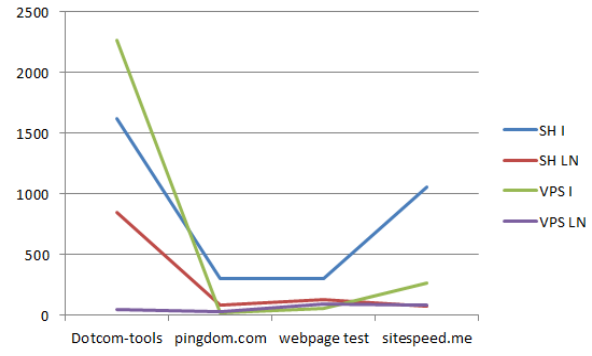


Figure 9. Graph of SSL Test Results

TABLE 3. Connection Parameter Test Result

Server	Dotcom-tools	Pingdom.com	Webpage test	Sitespeed	Total
SH I	1570	559	263	287	2679
SH LN	800	158	110	13	1081
VPS I	1740	273	282	171	2466
VPS LN	3320	7	37	82	3446

TABLE 5. Total Value of Server Hosting Type

Server Hosting	Total Value
SH I	28975
SH LN	8267
VPS I	14195
VPS LN	11835

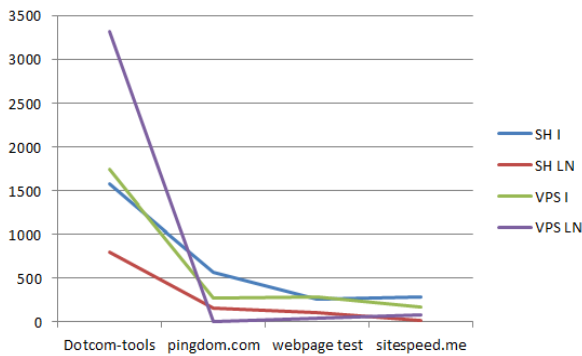


Figure 8. Graph of Connection Test Results

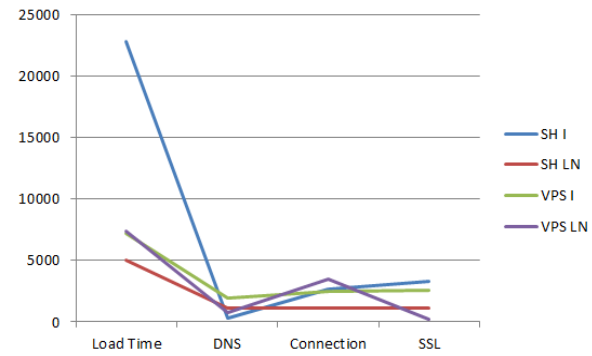


Figure 10. Hosting server test results

TABLE 4. SSL Test Result

Server	Dotcom-tools	Pingdom.com	Webpage test	Sitespeed	Total
SH I	1620	301	300	1058	3279
SH LN	850	82	132	71	1135
VPS I	2270	19	57	262	2608
VPS LN	50	24	90	80	244

Private Server has the best SSL performance compared to other types of server hosting with 244 milliseconds.

After testing, the values for each type of hosting server can be obtained which can see in Table 5.

The test results on four parameters to measure the performance of four types of hosting servers can see in Figure 10.

The total value of the hosting server type is obtained to see which hosting server is the best. After testing the four types of hosting servers using 4 tools to measure web performance against the following four measurement parameters, a list of the best hosting server sequences is made:

1. Foreign shared hosting server, total 8.267 ms
2. Foreign virtual private server, total 11.835 ms
3. Indonesian virtual private server, total 14.195 ms
4. Indonesian shared hosting server, total 28.975 ms

Foreign shared hosting server is the best hosting server because on several parameters tested, this type of server is superior to other servers and has the smallest (best) value with total 8.267 milliseconds. With the smaller the total value obtained, the performance of the web hosting is faster so that it has better performance. The results obtained can be used as a reference for choosing the hosting server, but many performance

measurement parameters were still not tested in this study.

4. CONCLUSION

Based on the results of the research that has been done, it is concluded that foreign shared hosting server is the best hosting server several tools and parameters can be used to test the performance of the types of web hosting. This test will be significantly influenced by various factors that can make different results. The results of this study will vary with different infrastructure conditions.

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Persian Abstract

چکیده

این تحقیق عملکرد مقایسه سرورهای میزبانی مختلف را مورد بحث قرار می دهد. سرور میزبانی که به عنوان مقایسه استفاده می شود از چهار نوع تشکیل شده است. یعنی سرورهای میزبانی مشترک اندونزیایی، سرورهای میزبانی مشترک خارجی، سرورهای خصوصی مجازی اندونزیایی و سرورهای خصوصی مجازی خارجی. پارامترهای تست شده در این مطالعه زمان بارگذاری، سیستم نام دامنه، اتصال و لایه سوکت امن است. ابزارهای مورد استفاده برای آزمایش مقایسه عملکرد سرور میزبانی Dotcom-Tools، Pingdom.com، Webpage Test و Sitespeed هستند. نتایج این مقایسه می تواند ورودی برای کاربران بالقوه ای باشد که قصد دارند برنامه های خود را با استفاده از یک سرور میزبان آنلاین آنلاین کنند. ارزش کل وب سرورهای میزبانی وب سرورهای میزبانی مشترک اندونزی (SH I) 28.975 میلی ثانیه (ms)، سرورهای میزبانی مشترک خارجی (SH LN) 8.267 میلی ثانیه، سرورهای خصوصی مجازی اندونزیایی (VPS I) 14.195 میلی ثانیه، سرورهای خصوصی مجازی خارجی هستند (VPS LN) 11.835 میلی ثانیه است. این تحقیق نتیجه می گیرد که سرورهای میزبانی مشترک خارجی (SH LN) بهترین سرورهای میزبانی وب هستند، زیرا در برخی از پارامترهای آزمایش شده، این سرور بهترین مقدار را دارد زیرا کمترین مقدار را با ۸.۲۶۷ میلی ثانیه دریافت می کند.
