

# Building a Web Server as a Business Media for PT Cipta Puja Mandiri

Nur Khalis Ramadhani<sup>1</sup>, Anwar<sup>2\*</sup>, Aswandi<sup>3</sup>

<sup>(1)(2)(3)</sup> Department of Information and Computer Technology, Politeknik Negeri Lhokseumawe, Indonesia

\*Corresponding Author: [anwar@pnl.ac.id](mailto:anwar@pnl.ac.id)

**Article info:** Received 06/02/2024, Revised 15/02/2024, Accepted 06/03/2024

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



## Abstract

A web server is needed by a company as a medium of information as well as a promotional medium. Web servers are not only for information media but also here the web is used for data storage and streaming media. Web servers can make it easier for employees to get data or send data by uploading and downloading it. This research also discusses the QoS method as a method for measuring network speed. The results of the analysis of the measurement of QoS parameters, network quality during this study, the average value obtained from the results of measuring network speed using the QoS method when performing the upload, download and streaming processes with several scenarios is categorized as very good with the average value obtained Throughput = 11927157 bps, Delay = 0.929 ms, and Jitter = 0.931 ms. 931 ms.

**Keywords:** Server, Web Server, QoS.

## 1. Introduction

The development of technology is now increasingly rapid, the data transmission system is now increasingly sophisticated. But until now there are still companies that still use manual data transmission, data transmission is done by sending data from one computer to another using temporary storage media, such as Flashdisks, External Hard Drives and DVDs. Manual data transmission often occurs errors due to viruses so that it cannot be connected between one computer and another.

To reduce the cause of errors and attacks in data storage, a server is built, where the server is very helpful in storing data. To manage the server, a web server is used. Web server as a web-based interface service management facility can help configure servers through any browser that can support, setup, upload and download, and does not make it difficult for administrators to manage server systems.

Speed and accuracy in sending and obtaining data or information is important today. However, so far the distribution of existing bandwidth is not adjusted to the number of computers or servers in the LAN network.

Network analysis using QoS (Quality of Service), especially delay, throughput and jitter, is able to provide good network analysis, where these aspects are often used in network analysis. QoS is defined as a mechanism or way that allows services to operate according to their respective characteristics in an IP (Internet Protocol) network [1].

QoS refers to the ability of a network to provide better service to certain network traffic through different technologies. QoS offers the ability to define the attributes of the network services provided, both qualitatively and quantitatively [2].

QoS parameters are delay/latency, jitter, packet loss, throughput, MOS, echo cancellation and PDD. QoS is needed to minimize packet loss, delay, latency and delay variation (jitter), ensure performance, mixing data and voice packets on congested networks, and can optimize queues to prioritize services such as voice traffic, traffic shaping/buffering on WAN networks [3].

## 2. Methods

### 2.1. Research Stages

This research was carried out with several stages as shown in Figure 1.



Figure 1. Flowchart

### 2.2. DFD (Data Flow Diagram)

At this stage, a search for various kinds of literature such as books, references both through libraries and the internet and so on related to the title of this research is carried out.

### 2.3. System Design

At this stage, system design is carried out because at this stage a good system design is needed because it involves all the needs of the elements in the system. The form of design can be seen in Figure 2.

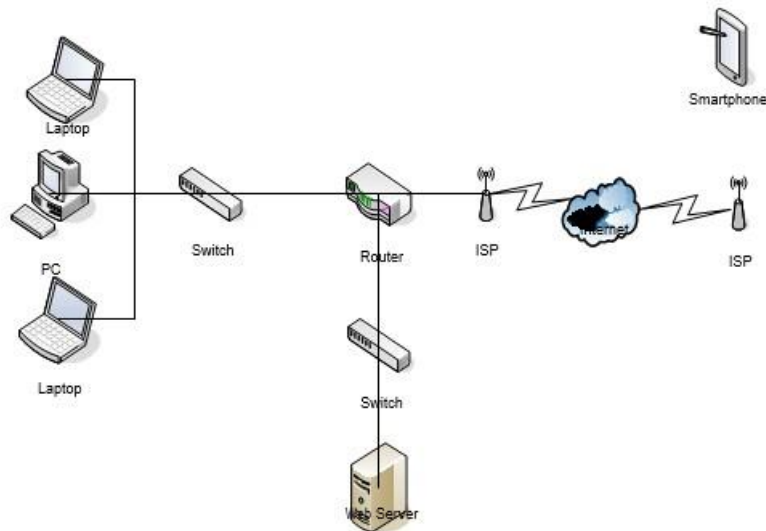


Figure 2. ERD (Entity relationship Diagram)

## 2.4. System Building

At this stage the researcher builds the server by configuring and setting the packages used so that the database server can be accessed. The configurations carried out are as follows:

### 2.4.1 DNS Configuration

In this system design, DNS configuration is carried out as an address assignment used on the internet / intranet.

### 2.4.2 DHCP Configuration

DHCP configuration is done to arrange so that each client that will connect requests its own IP address to the Server.

### 2.4.3 Web Server Configuration

At this stage of the design, researchers configure the Web server to serve HTTP connections that work on port 80 (default port and can be changed as desired).

## 3. Result and Discussions

### 3.1. Analysis of QoS Qualities on the Network

First Scenario (1 Computer Streaming Video).

Table 1. first scenario capture results

Measurement	Captured	Displayed
Packets	37498	37498
Time span,s	62.002	62.002
Average pps	604.8	604.8
Average packet size, B	1264.5	1264.5
Bytes	47408427	47408427
Average bytes/s	764 k	764 k
Average bits/s	6116 k	6116 k

Second Scenario (2 Computers Streaming Video).

Table 2. second scenario capture results

Measurement	Captured	Displayed
Packets	64601	64601
Time span,s	66.247	66.247
Average pps	975.2	975.2
Average packet size, B	1257.5	1257.5
Bytes	81257426	81257426
Average bytes/s	1226k	1226k
Average bits/s	9812k	9812k

Third scenario (3 Computers Streaming Video).

Table 3. third scenario capture results

Measurement	Captured	Displayed
Packets	95110	95110
Time span,s	78.231	78.231
Average pps	1215.8	1215.8

Average packet size, B	1170.5	1170.5
Bytes	111293271	111293271
Average bytes/s	1422k	1422k
Average bits/s	11 M	11 M

Fourth scenario (4 Computers Streaming Video).

Table 4. fourth scenario capture results

Measurement	Captured	Displayed
Packets	108831	108831
Time span,s	67.597	67.597
Average pps	1610.0	1610.0
Average packet size, B	1154.5	1154.5
Bytes	125651268	125651268
Average bytes/s	1858k	1858k
Average bits/s	14M	14M

Fifth scenario (5 Computers Streaming Video).

Table 5. fifth scenario capture results

Measurement	Captured	Displayed
Packets	146283	146283
Time span,s	78.253	78.253
Average pps	1869.4	1869.4
Average packet size, B	1167.5	1167.5
Bytes	170733211	170733211
Average bytes/s	2181k	2181k
Average bits/s	17M	17M

### 3.2. Troughput Calculation

From the data capture that has been done with wireshark, the throughput is obtained by testing using the equation discussed in the research method, which is as follows:

Testing during the testing process with the first scenario.

$$\begin{aligned}
 \text{Throughput} &= \text{Bytes} / \text{Time between firts and last packet} \\
 &= 47408427 / 62.002 \\
 &= 764627.383 \text{ Bps} \\
 &= 1226582.728 \text{ Bps} \\
 &= 9812662 \text{ bps}
 \end{aligned}$$

Testing during the testing process with the second scenario

$$\begin{aligned}
 \text{Throughput} &= \text{Bytes} / \text{Time between firts and last packet} \\
 &= 81257426 / 66.247 \\
 &= 6117019 \text{ bps}
 \end{aligned}$$

Testing during the testing process with the third scenario

$$\begin{aligned}
 \text{Throughput} &= \text{Bytes} / \text{Time between firts and last packet} \\
 &= 111293271 / 78.231 \\
 &= 1422623.653 \text{ Bps} \\
 &= 11380989 \text{ bps}
 \end{aligned}$$

Testing during the testing process with the fourth scenario  
 Throughput = Bytes / Time between first and last packet  
 = 125651268 / 67.597  
 = 1858829.06 Bps  
 = 14870632 bps

Testing during the testing process with the fifth scenario  
 Throughput = Bytes / Time between first and last packet  
 = 170733211 / 78.253  
 = 2181819.423 Bps  
 = 17454483 bps

Based on the tests that have been described, the Throughput test results when uploading data and streaming video can be summarized into the following Table 6:

Table 6. fifth scenario capture results

Service	Amount of data sent (Bytes)	Time between first and last packet (second)	Throughput (bps)
Skenario Pertama	47408427	62.002	6117019
Skenario Kedua	81257426	66.247	9812662
Skenario Ketiga	111293271	78.231	11380989
Skenario Empat	125651268	67.597	14870632
Skenario Kelima	170733211	78.253	17454483
<b>Average</b>			<b>11927157</b>

### 3.3. Delay Calculation

From the data capture that has been done with wireshark, the average delay is obtained by means of the tests that have been discussed, which are as follows: Testing when the first scenario process is carried out

Average delay = Total delay / Total packets received  
 = 62.62387289 / 37498  
 = 0,001643391 s  
 = 1.643 ms

Testing when the second scenario process is carried out  
 Average delay = Total delay / Total packets received  
 = 66.24257647 / 64601  
 = 0.001025411 s  
 = 1.025 ms

Testing when the third scenario process is carried out  
 Average delay = Total delay / Total packets received  
 = 78.19098804 / 95110  
 = 0.000822111 s  
 = 0.822 ms

Testing when the fourth scenario process is carried out  
 Average delay = Total delay / Total packets received  
 = 67.59655573 / 108831  
 = 0.000621115 s  
 = 0.621 ms

Testing when the fifth scenario process is carried out  
 Average delay = Total delay / Total packet received  
 = 78.07053469 / 146283  
 = 0.000533695 s  
 = 0.534 ms

Based on the tests that have been described in the research method, the Delay test results on video streaming testing can be summarized in Table 7.

Table 7. delay test results when uploading and streaming video

Service	Total Delay (Second)	Total Packet received (Packets)	Delay (ms)
Scenario First	62.62387289	37498	1.643
Second Scenario	66.24257647	64601	1.025
Third Scenario	78.19098804	95110	0.822
Scenario Fourth	67.59655573	108831	0.621
Scenario Fifth	78.07053469	146283	0.534
<b>Average</b>			<b>0.929</b>

**3.4. Jitter Calculation**

From the data capture that has been done with wireshark, jitter is obtained by testing using the equation discussed in the research method, which is as follows:

Testing during the first scenario process is carried out.

$$\begin{aligned}
 \text{Jitter rata - rata} &= \frac{\text{total variasi delay}}{\text{total packet yang diterima} - 1} \\
 &= \frac{62.00249834}{37498 - 1} = 1.653
 \end{aligned}$$

Testing during the second scenario process is carried out.

$$\begin{aligned}
 \text{Jitter rata - rata} &= \frac{\text{total variasi delay}}{\text{total packet yang diterima} - 1} \\
 &= \frac{66.24671376}{64601 - 1} = 1.025
 \end{aligned}$$

Testing during the third scenario process is carried out.

$$\begin{aligned}
 \text{Jitter rata - rata} &= \frac{\text{total variasi delay}}{\text{total packet yang diterima} - 1} \\
 &= \frac{78.23092572}{95110 - 1} = 0.679
 \end{aligned}$$

Testing during the fourth scenario process is carried out.

$$\begin{aligned}
 \text{Jitter rata - rata} &= \frac{\text{total variasi delay}}{\text{total packet yang diterima} - 1} \\
 &= \frac{67.59691032}{108831 - 1} = 0.621
 \end{aligned}$$

Testing during the fifth scenario process is carried out.

$$\begin{aligned}
 \text{Jitter rata - rata} &= \frac{\text{total variasi delay}}{\text{total packet yang diterima} - 1} \\
 &= \frac{78.252825166}{146283 - 1} = 0.534
 \end{aligned}$$

Based on testing, the results of Jitter in data upload testing and video streaming can be summarized in Table 8.

Table 8. jitter test results when uploading and streaming video

Service	Total Variation Delay (second)	Total Packet received -1 (Packets)	Jitter (ms)
Scenario First	62.00249834	37497	1.653
Scenario Second	66.24671376	64600	1.025

Scenario Third	78.23092572	95109	0.822
Scenario Fourth	67.59691032	108830	0.621
Scenario Fifth	78.252825166	146282	0.534
<b>Average</b>			0.931

## 4. Conclusion

Based on the results and discussion of the research that has been done, it can be concluded that:

1. Data transfer can be done easily by uploading to a server via the web. And other computers can do the download process to get the data simultaneously.
2. The system on the computer runs well even though the computer streaming on the network is >2 pcs. But the server experiences an increase in performance which can be seen in the results of research on QoS parameters.
3. The results of measuring network speed using the QoS method when uploading, downloading and streaming with several scenarios are categorized as very good with the average value obtained Throughput = 11927157 bps, Delay = 0.929 ms, and Jitter = 0.931 ms.

## REFERENCES

- [1] Video Conference on H.323 Traffic Using the Differentiated Service (Diffserv) Method, Syiah Kuala University.
- [2] T. Pratama. (2015). "Comparison of PCQ, SFQ, Red and FIFO Methods on Mikrotik as an Effort to Optimize Network Services at the Faculty of Engineering, Tanjungpura University," Journal of Information Systems and Technology (JustIN), Vol. %1 of %2Vol 3, No . 1 Tanjungpura University, 2015.
- [3] Yanto. (2013). QoS Analysis of Video Streaming on a Wireless Network Using the Htb (Hierarchical Token Bucket) Method. Pekanbaru.
- [4] Aswandi, & Marlina, L. (2015). The Effect of Blog as a Learning Media for Muhammadiyah School of Lhokseumawe City (pp. 611-617). Lombok, Indonesia: Proceeding of the 14th International Conference on QIR (Quality in Research). <https://doi.org/10.17605/OSF.IO/RZ8TB>.
- [5] Aswandi, & Marlina, L. (2012). Techniques of Communication Via Video Conference Using Vpn Technology Based Mpls. Politeknik Negeri Lhokseumawe, 280-286. <https://doi.org/10.17605/OSF.IO/7NC2W>.