QUALITY OF SERVICE TO ANALYZE INTERNET NETWORK QUALITY

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Article Information

Abstract

The role of sharing bandwidth quota greatly affects the QoS of traffic. Therefore, to get good QoS, it is necessary to manage bandwidth usage in the network as best as possible. The method that can be used is the CBQ (Class Based Queue) data packet classification technique that has been implemented or the HTB (Hierarchy Token Bucket) which is the newest technique. Basically, it meets the Quality of Service standards if it implements Quota Bandwidth, this is because the Bandwidth Controller system is implemented so that the performance of the internet network is very good. The recommended solution to reduce the occurrence of overloaded bandwidth usage is by limiting entertainment web pages such as social media and YouTube. Besides that, there is also a separator for local and international connection lines. Network usage exceeding the total bandwidth will result in packet loss. This research emphasizes the importance of providing QoS guarantees that are equipped with the EtE QM monitoring application.

Keywords: Quality Of Service, Networking, Internet

1. Introduction

The development of technology in the field of internet-based information is so rapid. To get fast information about something has become a necessity for many people. Unfortunately, technological developments that should be able to be enjoyed by many elements have not materialized due to several things, including the quality of the internet network service itself. Today's Internet technology is not a new thing for most people[1]. Likewise, the use of this technology has been applied to most agencies, both government companies, private companies and educational institutions[2]. The internet network is a computer network consisting of thousands of independent computer networks connected to one another. The Internet also uses the TCP/IP protocol. This protocol allows a computer to send and address data to other computers while ensuring the delivery of data to the destination without missing anything[3].

Bandwidth (band width) indicates the amount of data that can be transmitted for one unit of time expressed in units of bits per second (bps) or characters per second (cps). Bandwidth can be used to measure analog data streams and digital data streams[4]. The greater the need for a network connection for a work unit, the greater the bandwidth quota provided by technicians[5]. The quality service of an internet network plays an important role in completing several tasks that can only be completed through a computer network connection. For this reason, the evaluation of the performance of the existing internet network needs great attention for the smooth running of

the tasks of all existing work units[6]. Service Quality (Quality of Service-QoS) of an internet network is an absolute thing that needs to be considered for its reliability to get quality network connectivity[7].

2. Method

This study uses the quality of service method. The stages consist of:

a) Monitoring Applications. Monitoring application functions as an interface Internet network application users.

b) QoS Monitoring. QoS monitoring mechanism for EtE QM measurements on Internet network scheme for measuring bandwidth and throughput parameters using Biznet Speed Meter, throughput parameters, Delay and Packet loss using the Axence NetTools Professional application while for jitter parameters using Iperf.

The parameters used in determining QoS include Throughput, Delay, Jitter and Packet Loss [1]. Then the QoS parameter assessment is based on the Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON), a standard used as a QoS assessment issued by the European Telecommunications Standards Institute (ETSI) [9]. The explanation of the parameters of the Quality of Service is as follows.

1. Throughput

Throughput is the bandwidth that is actually measured at a certain time size in transmitting files [1]. Throughput also describes the total arrival of packets that can be observed successfully with orientation during a certain time interval and divided by the duration of that time interval [1].

2. Delays

Delay is a QoS parameter indicating the total time that it takes packets to travel the distance from source to destination. Things that can affect delay are hardware, distance and congestion.

3. Jitters

Jitter or delay variation is related to latency, which explains the many variations of delay in data transmission on the network. Queuing delays in routers and switches result in jitter. This is generated by variations in data processing time, queue length and the time it takes to reload packets at the end of the jitter trip.

The first stage in this research is to collect literature studies related to network quality assessment, to find out the mechanism of implementing this method. Then the second stage identifies the network problems found in the research object. The next stage was to collect data related to research by observing and interviewing administrators of the Kesato Digital Agency computer network. Next, describe the network topology contained in the research object. Then the fifth stage is observing data packets on a computer network using the wireshark application and assessing network quality with QoS parameters. The final process analyzes the quality of the network.
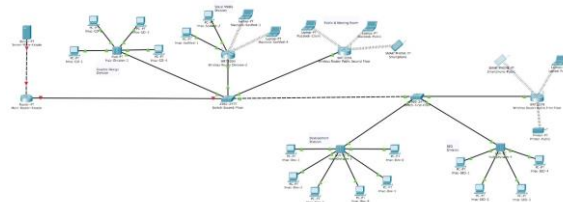
3. Result

Figure 1. Network Topologi

After the implementation (action taking) with the QoS monitoring system model for measuring each enduser device on the QoS parameters of the network model has been completed, then the next step is to do an evaluation (evaluating). The results of QoS parameter measurements consisting of Bandwidth, throughput, Delay, Jitter and Packet loss can be evaluated and analyzed with the following explanation:

1) Quota Bandwidth for Applications

The method of implementing QoS on the network, for the Bandwidth parameter is to control network traffic by performing bandwidth management. The amount of Bandwidth obtained from ASTINET is 8 Mps arranged in such a way by granting Quota Bandwidth as follows:
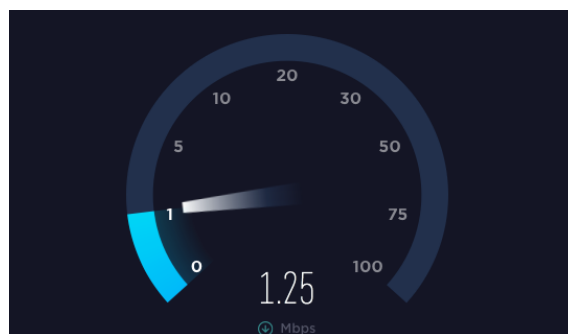

Figure 2. Speed Test Original Network

The use of the two existing monitoring models taking into account measurements at the same time shows a clear difference that is not too stark between measurements with speedy and the speed test, with an average download speed of 0.83 Mbps obtained while an average upload speed of 1,25 Mbps.

Quality of Service (QoS) or Quality of service is a measurement method used to determine the capabilities of a network such as; network application, host or router with the aim of providing a better and planned network service so that it can meet the needs of a service[8].

Poin Criteria	Percentage	Index
3.8-4	95-100	Very Good
3-3.79	75-94.75	Good
2-2.99	50-74.75	Enough
1-1.99	25-49.75	Poor

Table 1. QoS Table Criteria

The test results will display data as below. The data obtained from the cURL process can be seen in total time, size_upload, size_download, speed_download, speed_upload, the time needed to access the website. The following is a complete description of the results of the analysis process.
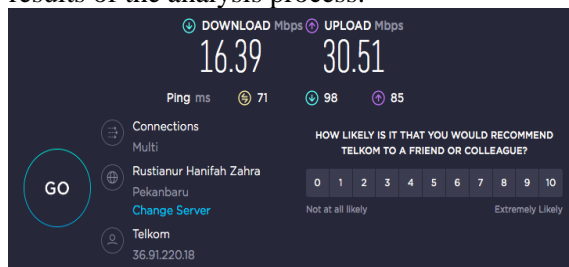

Figure 3. Result Of Analys Process

After retrieving information related to the campus internet by calling the website which was carried out for 2 consecutive days at different hours. Then the results of the QOS analysis can be seen in detail as follows.

Throughput	Index (%)	Throughput Categories
4	76%-100%	Very Good
3	51%-75%	Good
2	26%-50%	Moderate
1	< 25%	Bad

Table 2. Throughput Categories

4. Conclusion

The measurement results in one building the average results during busy hours and quiet hours get the following conclusions:
1. Throughput: the throughput parameter is classified as of poor quality in the morning, afternoon and evening, namely 1.5.
2. Delay: the delay parameter belongs to good quality in the morning, afternoon and evening, namely 2.25.
3. Jitter: the jitter parameter belongs to good quality in the morning, afternoon and evening, namely 2.25.
4. Package loss: the package loss parameter belongs to good quality in the morning, afternoon and evening, namely 2.25.

References

[1] W.-K. Chen, *Linear Networks and Systems*. 2nd ed., R. M. Osgood, Jr., Ed. Belmont, CA: Wadsworth, 1993, pp. 23–35.

[2] G. O. Young, "Synthetic structure," in *Plastics*, 2nd ed., vol. 3, J. Peters, Ed. New York: McGraw-Hill, 1964, pp. 15–64.

[3] J. U. Duncombe, "Infrared navigation—Part I: An assessment of feasibility," *IEEE Trans. Electron Devices*, vol. ED-11, pp. 34–39, Jan. 1959.

[4] E. P. Wigner, "Theory of traveling-wave optical laser," *Phys. Rev.*, vol. 134, pp. A635–A646, Dec. 1965.

[5] E. H. Miller, "A note on reflector arrays," *IEEE Trans. Antennas Propagat.*, to be published.

[6] D. B. Payne and J. R. Stern, "Wavelength-switched passively coupled single-mode optical network," in *Proc. IOOC-ECOC*, 1985, pp. 585–590

[7] D. Ebehard and E. Voges, "Digital single sideband detection for interferometric sensors," presented at the 2nd Int. Conf. Optical Fiber Sensors, Stuttgart, Germany, 1984

[8] G. Brandli and M. Dick, "Alternating current fed power supply," U.S. Patent 4 084 217, Nov. 4, 1978.

[9] E. E. Reber, R. L. Mitchell, and C. J. Carter, "Oxygen absorption," Aerospace Corp., Los Angeles, CA, Tech. Rep. TR-0200 (4230-46)-3, Nov. 1968

[10] J. Jones. (1991, May 10). *Networks Architechture*. (2nd Ed.) [Online]. Available: http://www.atm.com/

[11]   R. J. Vidmar. (1992, Aug.). On the use of atmospheric plasmas. *IEEE Trans Plasma Sci.* [Online]. *21(3)*, pp. 876–880. Available: http://www.halcyon.com/pub/jos/

[12]   PROCESS Corp., MA. Intranets: Internet technologies deployed. Presented at INET96 Annu. Meeting. [Online]. Available: http://home.process.com/wp2.htp

[13]   S. L. Talleen. (1996, Apr.). The Intranet Architecture. Amdahl Corp., CA. [Online]. Available: http://amdahl.com/ infra/