AN ANALYSIS OF TEAMVIEWER AND ULTRAVNC PERFORMANCE ON WIFI NETWORKS

Aulia Syarif Aziz[1], Syakirun Mukmin[2], Ridwan[3], dan Firmansyah[4]

[1234]Program Studi Pendidikan Teknologi Informasi, UIN Ar-Raniry
E-mail: aulia.aziz@ar-raniry.ac.id

Abstract

One of the challenges that educators faced in online learning during the Covid-19 was the implementation of practicums. Educators have difficulty supervising and controlling student activity during the practicums process. Not to mention that many students are distracted and doing other activities that can interfere with the practicum, such as browsing social media and watching streaming videos. In order to solve this, teachers and educators can utilize application such as a remote desktop to monitor and control student activity. In this study, we compared the performance of remote desktop applications TeamViewer and UltraVNC based on throughput, packet loss, delay, and jitter parameters. Measurements were carried out using a wireshark with a school computer laboratory wifi network. The measurement results show that UltraVNC produces higher throughput and packet loss than TeamViewer. However, TeamViewer has higher delay and jitter than UltraVNC.

Keywords: *TeamViewer, UltraVNC, throughput, packet loss, delay, jitter.*

1. Introduction

The Covid-19 pandemic has had many impacts on the way of human life, one of which is the teaching and learning process in the school environment. Learning that was previously carried out traditionally in classrooms has been transformed into online learning via the internet. To support the online learning process, sufficient facilities are needed, such as computers and a proper network connection.

One of the challenges faced in online learning is the implementation of practicum. In carrying out online practicums, teachers find it difficult to monitor student work. In addition, students also often distracted by other activities that are not related to learning, for example accessing social media, watching video streaming, and others [1]. Therefore, an application is needed that can be used to monitor and control students in carrying out practicums, for example, such as TeamViewer and UltraVNC. TeamViewer and UltraVNC is a remote desktop application that can help teachers to monitor and assist students during practicums.

TeamViewer and UltraVNC both work as remote desktops, but each has its own advantages and disadvantages. Therefore, researchers are interested in examining the performance of TeamViewer and UltraVNC in school laboratory networks based on throughput, packet loss, delay, and jitter parameters. The results of this study are expected to be useful for researchers and specially educators in choosing suitable remote desktop applications for monitoring and controlling student activity.

2. Literature Review
Internet
The internet network is a connection between one computer and other computers around the world. So, the internet can also be interpreted as a global network built from computers that are interconnected and work together to share information and data using the TCP IP protocol. That way it can be said that the Internet is a combination of various types of existing networks, so that one computer with another can communicate with each other. Network models include LAN, MAN, WAN, and Intranet [2]. Generally, to access the Internet, users use a wireless LAN (WLAN) which is connected to an internet service provider (ISP) [3].

Quality of Service
Quality of Service is a mechanism or management technique by doing measurement of parameters such as throughput, delay, and packet loss of data traffic on a network. The purpose of using the QoS mechanism is to find out one or more of the four basic QoS parameters previously mentioned in order to increase the productivity of end users (clients) by ensuring the users to receive good network performance. QoS focuses on the ability of a network to provide better service than a particular network flow through various data transmission technologies [4].

As mentioned earlier, several QoS parameters are throughput, jitter, delay, and packet loss. Throughput is the actual bandwidth that is measured in a certain period of time when transmitting data. It's different than bandwidth even though it has the same units of bits per second (bps) [5]. Jitter can be caused by various aspects, such as data queue length, data processing time, and also the time to reassembly received package at the end of the transmission [6]. Delay is the time required for data for a packet to be sent from one computer to the destination computer. Delay in a packet transmission process in a computer network is caused by long queues or taking other routes to avoid congestion on routing [8]. Packet loss is the percentage of packets lost when transmitting data, for example due to the network transmission media, errors in network hardware, and radiation from the surrounding area.

Remote Desktop
Remote desktop is a technology that allows the users to be able to access and control another computer over connected network. The users of remote desktops have the ability to see the remote computer displays over a network, also control the remote computer using keyboard and mouse from the user computer itself [7].

TeamViewer
TeamViewer is a software that is generally used for remote desktop purposes, both for personal and commercial use. This study utilizes the portable version of TeamViewer. By connecting two computers with TeamViewer, it will show the display of the remote computer. TeamViewer allows one to transfer files, chat, and make video calls between computers connected through the network [8].

UltraVNC
UltraVNC is a free and open-source remote desktop software that is simple and easy to operate. UltraVNC can remote other computers and it has access to control the remote computer using mouse and keyboard through the user computer. The users feel like they are directly in front of the remote computer. UltraVNC is an open-source application, this application uses the Microsoft Windows operating system so that it can run the VNC protocol when controlling other computers remotely [9].

Wireshark

Wireshark is software for analyzing computer network activity. Wireshark has useful functions for professional users, network administrators, researchers, and network software developers. Wireshark works in real time in capturing packets of data/information running through the network. All types of information packets in various protocol formats will be easily captured and analyzed [10].

3. Method

This study uses an experimental method by comparing the performance of TeamViewer and UltraVNC on 6 computers. 1 computer is used as a remote desktop client as well as a host to measure the QoS, 1 other computer used as a remote desktop server and to stream YouTube videos, and 4 other computers as remote desktop servers only.

QoS measurements were carried out using Wireshark with the parameters measured namely throughput, jitter, packet loss, and delay. Data collection was carried out seven times, respectively at the first minute, fifth minute, tenth minute, fifteenth minute, twentieth minute, twenty-fifth minute, and thirtieth minute.
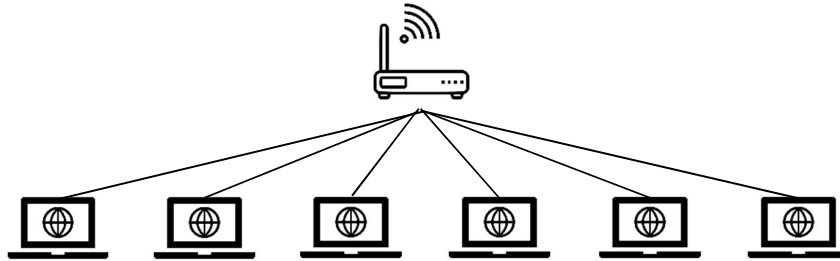

Figure 1. Network topology used in this experiment

4. Results and Discussions

From the data collection that was carried out seven times on TeamViewer, an average throughput value of 936 Kpbs was obtained, packet loss was 0.274%, delay was 5.87 ms, and jitter was 5.87 ms. While UltraVNC has an average throughput of 3279 Kbps, 0.007% packet loss, 1.72 ms delay, and 1.72 ms jitter. The complete data can be seen in table 1.

Table 1. Throughput, packet loss, delay, and jitter in TeamViewer and UltraVNC

Time	TeamViewer				Ultra VNC			
	Throughput (Kbps)	Packet loss (%)	Delay (ms)	Jitter (ms)	Throughput (Kbps)	Packet loss (%)	Delay (ms)	Jitter (ms)
1 minutes	588	0,070	4,51	4,51	5858	0,007	1,72	1,72
5 minutes	385	0,129	11,03	11,03	3	0,003	2,43	2,43
10 minutes	1168	0,563	4,51	4,51	4608	0,000	1,72	1,72
15 minutes	1038	0,583	5,22	5,22	3432	0,006	2,36	2.36
20 minutes	1306	0,564	4,51	4,51	3185	0,002	2,25	2,25
25 minutes	1401	0,000	3,95	3,95	2099	0,000	3,06	3,06
30 minutes	670	0,005	7,42	7,42	3768	0,071	2,16	2,15
Average	936	0,274	5,87	5,87	3279	0,013	2,24	1,90

Comparison of throughput values between TeamViewer and UltraVNC looks quite significant. TeamViewer throughput values range from 385 Kbps to 1401 Kbps. Meanwhile, UltraVNC throughput values range from 3 Kbps to 5858 Kbps.
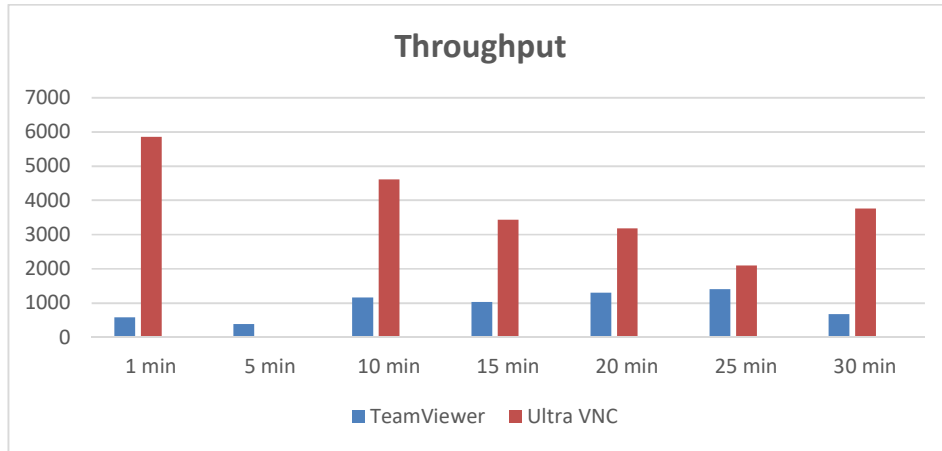

Figure 2. Throughput Chart of TeamViewer and UltraVNC

The smallest packet loss value on TeamViewer is 0.000% and the largest is 0.583%. Whereas on UltraVNC, the smallest packet loss is 0.000% and the largest is 0.071%.
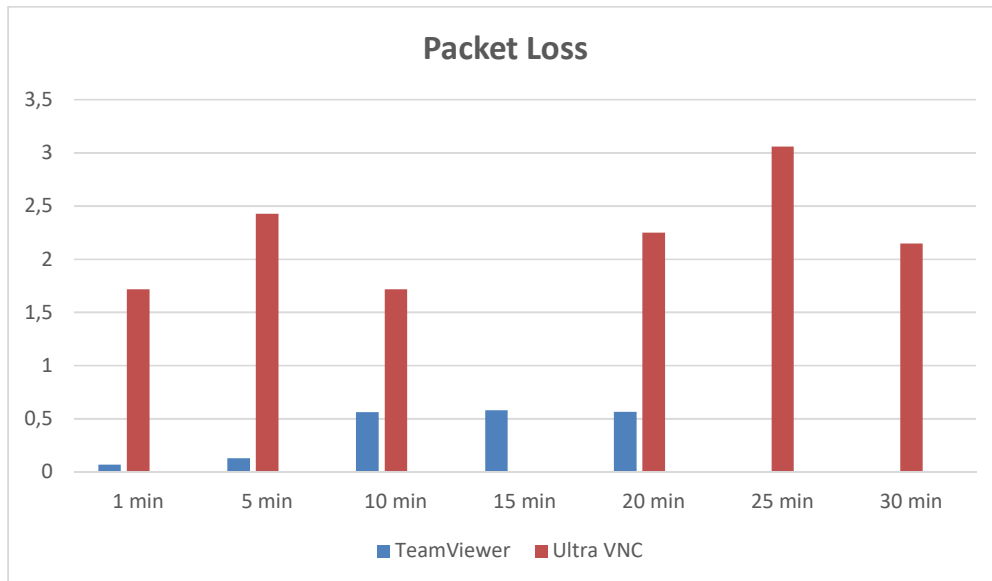

Figure 3. Packet loss chart of TeamViewer and UltraVNC

TeamViewer's delay ranges from 3.95 ms to 11.03 ms. Meanwhile, the delay on UltraVNC ranges from 1.72 ms to 3.06 ms.
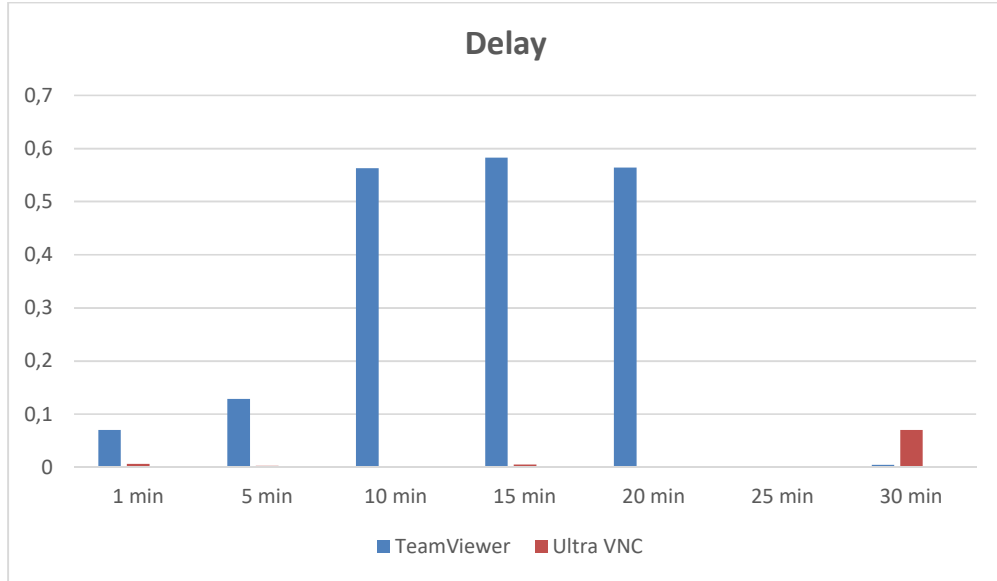
Figure 4. Delay of TeamViewer and UltraVNC

Meanwhile for jitter, in TeamViewer the value ranges from 3.95 ms to 11.03 ms. And the jitter on UltraVNC ranges from 1.72 ms to 3.06 ms.
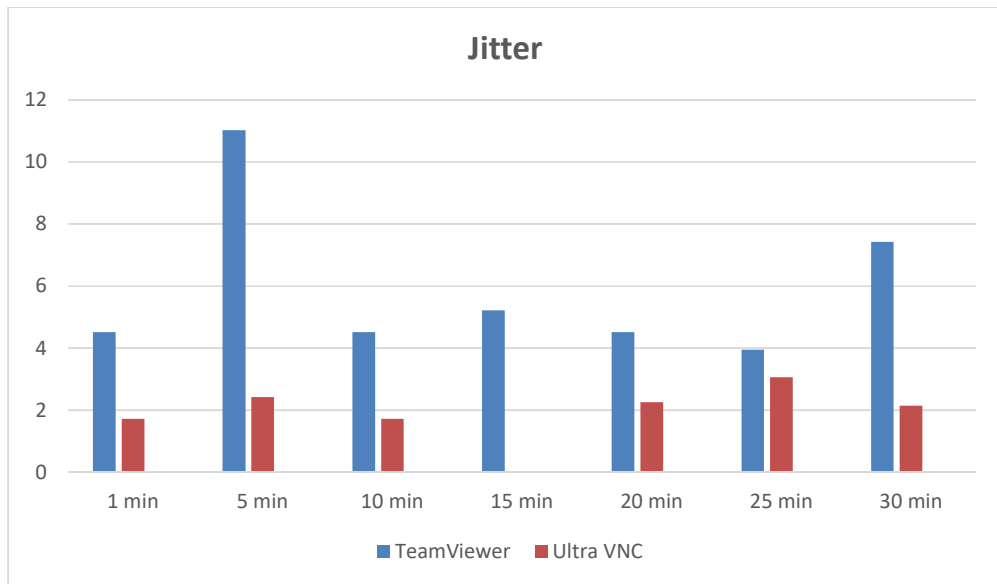

Figure 5. Jitter of TeamViewer and UltraVNC

Based on the tests that have been carried out, it can be concluded that UltraVNC produces higher throughput and packet loss than TeamViewer. However, TeamViewer has higher delay and jitter than UltraVNC. It can be concluded that UltraVNC produces a higher display quality by utilizing more network throughput. Besides, each of them also has different feature. Both applications can be used according to users' needs.

References

[1] N. W.-J. P. A. (JPAK) and undefined 2015, "Pengaruh Computer Knowlegde, Computer Attitude, Dan Fasilitas Laboratorium Komputer Terhadap Hasil Belajar Komputer Akuntansi Siswa Kelas XI Akuntansi," *ejournal.unesa.ac.id*, Accessed: Dec. 09, 2022. [Online]. Available: https://ejournal.unesa.ac.id/index.php/jpak/article/view/32744

[2] Ikhsan, "Pengendalian Kontrol PC Jarak Jauh dengan Memanfaatkan Media Internet Berbasis Client Server," *Teknoif*, vol. 2, no. 1, 2014, Accessed: May 22, 2022. [Online]. Available: https://teknoif.itp.ac.id/index.php/teknoif/article/view/323

[3] F. Firmansyah, I. Bajili, H. Ahmadian, and A. S. Aziz, "Implementasi Dan Analisis kinerja Antena Wajan Bolic Sebagai penerima Sinyal Wi-Fi," *Cyberspace: Jurnal Pendidikan Teknologi Informasi*, vol. 6, no. 2, p. 96, Oct. 2022.

[4] Aprianto Budiman, M. Ficky Duskarnaen, and Hamidillah Ajie, "ANALISIS QUALITY OF SERVICE (QOS) PADA JARINGAN INTERNET SMK NEGERI 7 JAKARTA," *PINTER J. Pendidik. Tek. Inform. dan Komput.*, vol. 4, no. 2, pp. 32–36, 2020, doi: 10.21009/pinter.4.2.6.

[5] P. R. Utami, "ANALISIS PERBANDINGAN QUALITY OF SERVICE JARINGAN INTERNET BERBASIS WIRELESS PADA LAYANAN INTERNET SERVICE PROVIDER (ISP) INDIHOME DAN FIRST MEDIA," *J. Ilm. Teknol. dan Rekayasa*, vol. 25, no. 2, pp. 125–137, 2020, doi: 10.35760/tr.2020.v25i2.2723

[6] A. R. Hakim, N. Tjahjamooniarsih, and D. Suryadi, "Analisis Kualitas Jaringan Internet Dengan Sinyal 4G LTE Dengan Metode QOS," *J. Tek. Elektro Univ. Tanjungpura*, vol. 2, no. 1, pp. 1–9, 2021, Accessed: Jun. 25, 2022. [Online]. Available: https://jurnal.untan.ac.id/index.php/jteuntan/article/view/48187

[7] E. Penggunaan *et al.*, "Efektivitas penggunaan aplikasi remote control teamviewer sebagai monitoring praktek di laboratorium komputer kelas xi smk negeri 1 wera," *academia.edu*, 2019, Accessed: May 22, 2022. [Online]. Available: https://www.academia.edu/download/60222445/SKRIPSI_ANDI_PTI_201920190806-66314-80qmxm.pdf

[8] S. Saeed and M. Alam, "PERFORMANCE ANALYSIS OF SECURE & EFFICIENT REMOTE DESKTOP MANAGER," *jict.ilmauniversity.edu.pk*, Accessed: Dec. 27, 2022. [Online]. Available: http://jict.ilmauniversity.edu.pk/journal/jict/11.1/4.pdf

[9] K. Saleh, "RANCANGAN PERANGKAT LUNAK PENGENDALI ROBOT PEMANTAU BERBASIS PONSEL PINTAR ANDROID," *Saintek ITM*, vol. 32, no. 2, 2019, doi: 10.37369/si.v32i2.56.

[10] R. Hanipah and H. Dhika, "Analisa Pencegahan Aktivitas Ilegal Didalam Jaringan Dengan Wireshark," *DoubleClick J. Comput. Inf. Technol.*, vol. 4, no. 1, p. 11, 2020, doi: 10.25273/doubleclick.v4i1.5668.