

Design and Implementation of Network Monitoring System with Telegram Bot Using Public IP as Notification Media at The Faculty of Computer Science, Muslim University of Indonesia

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ARTICLE INFORMATION	ABSTRACT
Received : 18 – 12 – 2025 Revised : 22 – 12 – 2025 Published : 22 – 04 – 2026	This study aims to create and implement a network monitoring system with a telegram bot using a public IP on the 2nd floor access point of FIKOM UMI. The method used is the PPDI method. This study aims to monitor the computer network connection system at the nearest access point on the 2nd floor of FIKOM UMI. Currently, the process of monitoring internet network constraints in the laboratory is still being checked manually, so the process is slow and less efficient. The monitoring system uses the Telegram API Bot and L2tp VPN with Mikrotik to obtain information in the form of real-time telegram notification messages to network administrators. The telegram API bot will send notification messages when internet connection problems occur, both down and up. The results of the internet network monitoring system are very helpful for network administrators in searching for information when internet connection problems occur on the 2nd floor of FIKOM UMI.
Keywords: Internet, Network, Monitoring, and Telegram Bots	

I. Introduction

The Faculty of Computer Science has two study programs, namely the undergraduate program in Informatics Engineering and the Information Systems study program. This faculty has six computer laboratories to support learning, especially in practical courses, the availability of internet connections on the vocational campus, especially for lecturers, employees and students to access information. The use of computer laboratories and local area networks continues to increase, resulting in an increased risk of disruption or damage to internet connections, therefore a monitoring system that can work in real-time is needed to ensure optimal internet network needs and also so that This makes it easier for technicians and administrators to monitor the network systems they manage. For example, a proxy integrated with Telegram social media is used for network monitoring.

Related research conducted by Wahyat and Agus Teddyana, entitled "Monitoring Internet Networks Using Telegram Bot API Notifications," found that the internet network monitoring system significantly assisted network administrators in locating information when internet connection issues occurred [1]. In a subsequent study conducted by Nanda Fernando, Humaira, and Erva Asri entitled "Network Monitoring and Notification with Telegram at the Padang City Communications and Informatics Office," the results of this study were a web browser and mobile-based network monitoring system that implemented Cacti with SNMP features for network monitoring and Telegram [2]. Further research conducted by Abd. Rahman Patta and Khalif Al Muzammil entitled "Network Monitoring Using Telegram Notifications, Faculty of Engineering - Makassar State University." The results of this study showed that at a network access speed of 7.14 Mbit/s, the average time for sending Telegram notifications from the prototype to the administrator was 5 seconds for a certain time interval [3]. Related research was also conducted by Boni Agusman, Thomson Mary, and Mourend Devegi, entitled "Designing a Network Monitoring System Using Telegram Bots as a Notification Media at SMK Negeri 3 Pariaman." The results of this study are that Network Monitoring will regularly check network conditions, such as server status, connections, and

bandwidth usage. This will allow early detection of potential network problems or changes [4]. Furthermore, research conducted by Muhammad Aliyul Husna and Perani Rosyani entitled "Implementation of Network and Server Monitoring System Using Zabbix Integrated with Grafana and Telegram" From this research, using Zabbix Network Monitoring, produces real-time data regarding bandwidth usage, problem logs and resource availability [5].

Based on previous research, further research is needed by utilizing the L2TP VPN feature and the Telegram API bot, which provide reliable facilities for monitoring internet network systems and support real-time notification messages. A computer network is a system consisting of several computer units designed in such a way that their main purpose is to be able to share resources, communicate, and be able to access information. A computer network is two or more computers connected to each other and used to share data. A computer network is built with a combination of hardware and software [6]. The various types of computer networks include Wide Area Network (WAN), Metropolitan Area Network (MAN), and Local Area Network [7][8]. This internet network monitoring system can assist and simplify the work of a network administrator. A monitoring system is an integral part of a network infrastructure and a necessity that cannot be postponed. The monitoring system provides early detection and is useful for monitoring the health of the system and network. Network monitoring makes it easy for technicians and administrators to monitor the network system from anywhere and at any time, as long as there is an internet connection [5][9][10]. This research will be implemented at the Faculty of Computer Science, Universitas Muslim Indonesia, to facilitate administrators in monitoring a network using a Telegram bot. Based on this, the author chose the title "Design and Implementation of Network Monitoring Using a Telegram Bot as a Notification Medium at the Faculty of Computer Science, Universitas Muslim Indonesia".

II. Method

In conducting research on network monitoring at the Faculty of Computer Science, UMI, the research method that will be used is the PPDJ (Prepare, Plan, Design, Implement) method :

1. Literature study

Literature study to obtain information about the research topic. This material can come from books, articles, or other written materials, including theories, research reports, or previous findings, both in online and offline sources.

2. Prepare

It is a problem analysis by conducting a literature study regarding the Telegram Bot API for network notifications as well as the problems and systems required to overcome these problems.

3. Plan

This is the design stage for the system and requirements analysis to determine whether it meets the required requirements. This stage also plans the research structure to ensure it is organized.

4. Design

This is the stage where the system to be built is designed, starting from the topology to the configuration of the system being designed.

5. Implement

This is the stage where network monitoring and implementation of Telegram Bot API notifications are carried out. Conclusion.

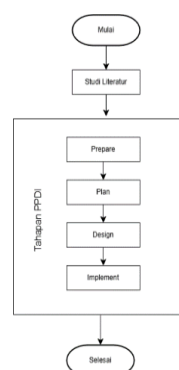


Figure 1. Research Stages**III. Results and Discussion****A. Research Result****1. Prepare**

At this stage, the researcher conducted observations of the research object at the Faculty of Computer Science, Muslim University of Indonesia, as shown in Figure 2.

**Figure 2. Research room**

As we can see in Figure 7, this is the room used by researchers to install tools for monitoring networks on the 2nd floor of the Faculty of Computer Science, especially the nearest access point.

2. Plan

At this stage, researchers began to collect tools including Mikrotik, routers and LAN cables which would be used as materials for conducting research.

**Figure 3. Router****Figure 4. Router**

Figure 5. LAN cable

As we can see in figures 3, 4 and 5, the researcher displays a research tool used in the research, including:

- Mikrotik routerboard 941 HapLite is used to build network administration to monitor the nearest access point on the 2nd floor of the UMI computer science faculty.
- The router functions as a receiver and transmitter of the internet network to Mikrotik at the nearest access point on the 2nd floor of the UMI Faculty of Computer Science.
- The LAN cable is used as a connection between the router and Mikrotik and each is connected to port 1.

3. Design

At this stage, researchers start to design or connect hardware devices, such as routers with Mikrotik which are connected using LAN cables. On Mikrotik, the cable is inserted into port 1, while on the router, the cable is inserted into port 1.



Figure 6. Mikrotik configuration with router

As shown in Figure 6, the researcher installed a MikroTik device to manage the network to be monitored, and the connected router served as both a transmitter and receiver for the nearest access point on the second floor of the Faculty of Computer Science at the Muslim University of Indonesia.

In Figure 7, the researcher entered the public IP address into Winbox, which was used to access the network from outside the Faculty of Computer Science at the nearest access point on the second floor that would be monitored.

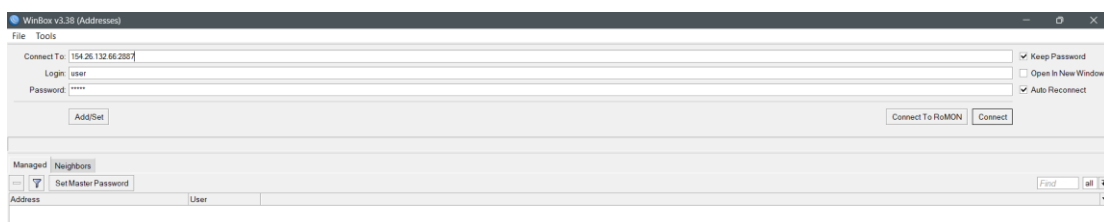


Figure 7. Login to Winbox using public IP

Network monitoring conducted by utilizing this public IP feature allows researchers to easily access the network monitoring being studied from anywhere at the Faculty of Computer Science, Muslim University of Indonesia, specifically at the nearest access point on the 2nd floor.

In Figure 8, researchers configure the Winbox software by utilizing the Winbox feature itself, namely VPN L2TP.

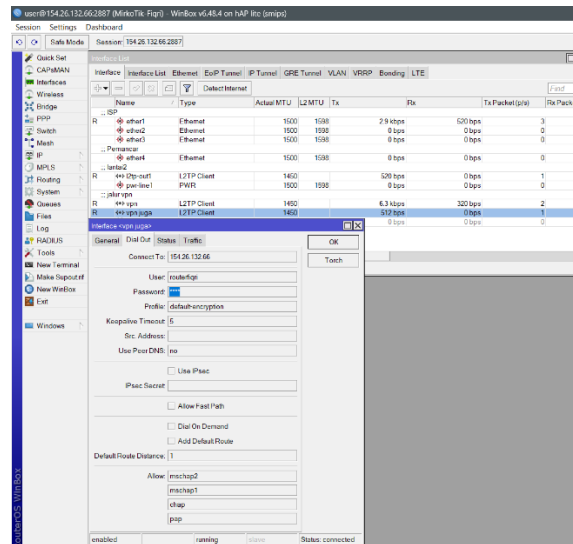


Figure 8. Configuration on Winbox using L2TP VPN

As we can see in Figure 8, the researcher uses the Winbox software application to manage the Mikrotik installed at the Faculty of Computer Science, Muslim University of Indonesia, using L2TP VPN which functions to connect the Telegram bot with the Mikrotik Routerboard Rb941 which will later be used to monitor the network.

In Figure 9, the researcher configures the Winbox software by entering the Telegram bot notification script in the New Terminal menu.

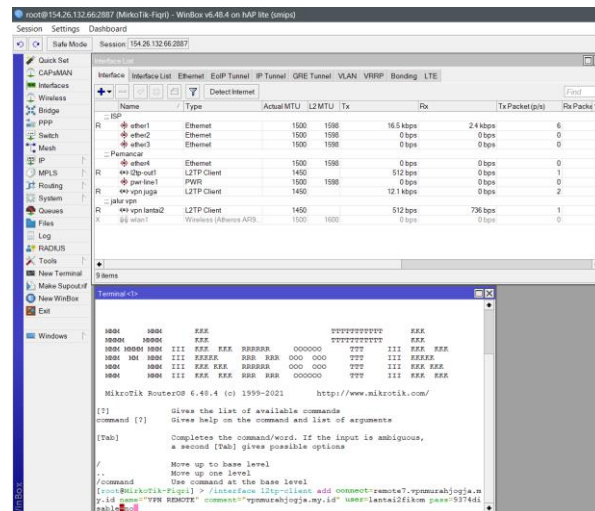


Figure 9. Configure with Winbox by entering the script from the Telegram bot

In Figure 9, the researcher entered the Telegram bot notification script by executing the command (/interface l2tpclientaddconnect=remote7.vpnmurahjogja.my.id name="VPNREMOTE" comment="vpnmurahjogja.my.id" user=lantai2fikom pass=9374 disable=no).

In Figure 10, the researcher configures Winbox by opening the interface menu and accessing the DHCP client.

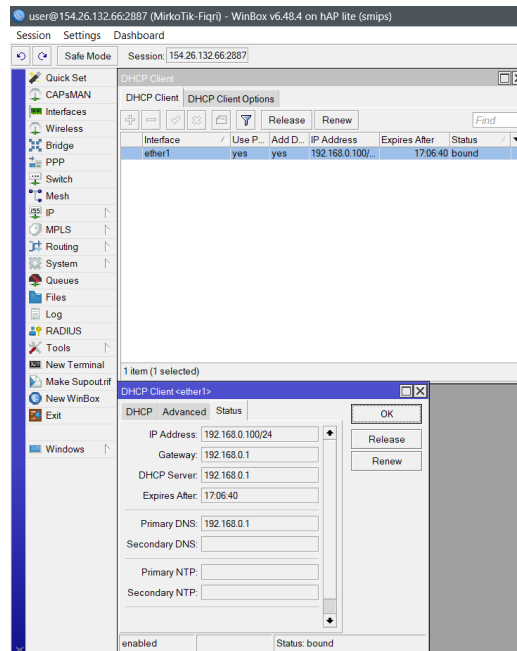


Figure 10. Winbox configuration using DHCP client

As we can see in Figure 10, the researcher configured the system using a DHCP client. The DHCP client itself is used to access the IP address of the router located in the Computer Science Faculty, specifically on the second floor.

4. Implement

At this implementation stage, researchers began to create notifications from the Telegram bot which would later display the results of connected and disconnected notifications with information in the form of time, user name, connected and disconnected status on the 2nd floor of the UMI Faculty of Computer Science.

In Figure 11, the researcher begins creating an account by sending a username to the Telegram bot. After that, the Telegram bot performs a check. One minute later, the Telegram bot sends a script that reads (/interfaceL2tpclientaddconnect=remote7.vpnmurahjogja.my.id name="VPN.REMOTE.comment="vpnmurahjogja.my.id" user=lantai2fikom pass=9374 disable=no).

- / interface L2tp client add to add a path (vpn path).
- Connect = remote to connect to host server 7 on vpn service.
- Vpnmurahjogja.my.id.name= VPN REMOTE is the host address of the VPN page.
- Comment="vpnmurahjogja.my.id" as a marker.
- User= lantai 2 fikom is the bot username and password.

This script integrates both connection and disconnection notifications. After creating an account, the Telegram VPN bot starts checking. After a few minutes, a connection status notification appears, along with the time and username displayed, as shown in Figure 12 above.

As we can see in figures 15 and 16 above, the results of the research are in the form of notifications from the Telegram bot, such as connected and disconnected notifications.



Figure 11. Telegram bot account creation



Figure 12. Connected notification



Figure 13. Connected notification



Figure 14. Notification disconnected

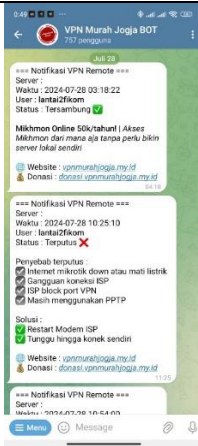


Figure 15. Connected notification

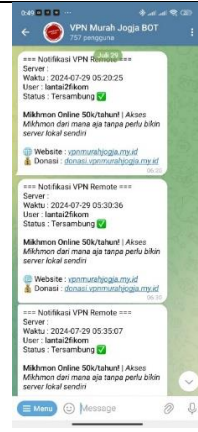


Figure 16. Notification disconnected



Figure 17. Connected notification



Figure 18. Notification disconnected

B. Discussion

Based on test results, the notification system developed can provide a response to internet connection status notification messages, including connected/active and disconnected/inactive status. Notification messages are automatically sent via a Telegram bot.

1. Telegram bot notification response time testing

Testing was conducted to measure the response time of internet connection status notification messages, from active/up to inactive/down. The monitoring system's notification messages were automatically sent via a Telegram bot.

The following are the test results in table form, the test was carried out 10 times, the internet connection monitoring system utilizes the L2tp VPN feature and the Telegram API bot.

Table 1. Testing the monitoring system time

Testing	Response Time
1	5 seconds
2	5 seconds
3	5 seconds
4	5 seconds
5	5 seconds
6	5 seconds
7	5 seconds
8	5 seconds
9	5 seconds
10	5 seconds
Average	= 5 seconds

Table 1, from the response results in the table, it can be concluded that the average response to notification messages when there is trouble/internet connection problems is every 5 seconds the Telegram API bot responds by sending a notification message via the Telegram bot.

2. Notification time

Configure with Winbox by entering the <vpn also> interface menu by entering the keeplive timeout (live time limit) which is 5 seconds as shown in figure 24.

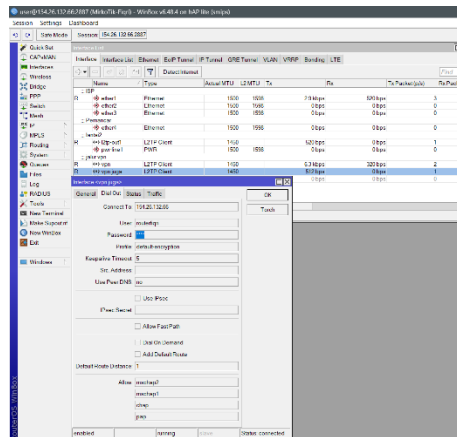


Figure 19. Notification time

IV. Closing

A. Conclusion

- 1). This research was successfully conducted on the 2nd floor of FIKOM UMI with a telegram bot using a public IP which produced good connected and disconnected notifications.
- 2). Has successfully monitored changes in network conditions using a telegram bot with a public IP with a response time of 5 seconds.

B. Suggestion

Based on the above conclusions, the author provides a suggestion to network administrators at the Faculty of Computer Science, UMI. Because the researcher only used Mikrotik Rb941 haP Lite, which is only capable of monitoring one nearby access point, therefore, if the network administrator of the Faculty of Computer Science, UMI, wants to create a monitoring tool for the entire Faculty, it is better to use a larger scale and create their own Telegram bot.

BIBLIOGRAPHY

- [1] Wahyat and Agus Teddyana, "Monitoring Jaringan Internet Menggunakan Notifikasi Bot API Telegram," *SATIN - Sains dan Teknologi Informasi*, vol. 7, no. 1, pp. 144–153, Jun. 2021, doi: 10.33372/stn.v7i1.713.
- [2] N. Fernando, H. Humaira, and E. Asri, "Monitoring Jaringan dan Notifikasi dengan Telegram pada Dinas Komunikasi dan Informatika Kota Padang," *Jurnal Ilmiah Teknologi Sistem Informasi*, vol. 1, no. 4, pp. 121–126, 2020, [Online]. Available: <http://jurnal-itsi.org>
- [3] A. Rahman Patta and K. Al Muzammil, "Monitoring Jaringan Menggunakan Notifikasi Telegram Fakultas Teknik-Universitas Negeri Makassar," *Prosiding Seminar Nasional LP2M UNM*, pp. 948–950, 2019.
- [4] B. Agusman, T. Mary, and M. Devegi, "Perancangan Sistem Monitoring Jaringan Menggunakan BOT Telegram Sebagai Media Notifikasi Pada SMK Negeri 3 Pariaman", doi: 10.31604/ptk.v6i4.812-817.
- [5] M. A. Husna and P. Rosyani, "Implementasi Sistem Monitoring Jaringan dan Server Menggunakan Zabbix yang Terintegrasi dengan Grafana dan Telegram," *JURIKOM (Jurnal Riset Komputer)*, vol. 8, no. 6, p. 247, Dec. 2021, doi: 10.30865/jurikom.v8i6.3631.
- [6] M. A. Husna and P. Rosyani, "Implementasi Sistem Monitoring Jaringan dan Server Menggunakan Zabbix yang Terintegrasi dengan Grafana dan Telegram," *JURIKOM (Jurnal Riset Komputer)*, vol. 8, no. 6, p. 247, Dec. 2021, doi: 10.30865/jurikom.v8i6.3631.
- [7] D. Balasubramaniam, M. Benaiah Deva Kumar, B. Deepa, and A. Professor, "Computer Networking: A Survey." [Online]. Available: www.ijtrd.com
- [8] I. Riyana Rahadjeng, "Analisis Jaringan Local Area Network (LAN) Pada PT. Mustika Ratu Tbk Jakarta Timur," *Jurnal PROSISKO*, vol. 5, no. 1, 2018, [Online]. Available: <http://techradar.com>
- [9] R. Satra and A. Rachman, "Pengembangan Sistem Monitoring Pencemaran Udara Berbasis Protokol Zigbee Dengan Sensor CO," *ILKOM Jurnal Ilmiah*, vol. 8, no. 1, 2016.

- [10] A. Rachmansyah, R. Satra, and M. A. Mude, "Perancangan Alat Pemberi Makan dan Monitoring Sisa Pakan Hewan Pemeliharaan Berbasis Microcontroller," *Buletin Sistem Informasi dan Teknologi Islam*, vol. 3, no. 1, p. 26, 2022.