



# Designing A Web-Based Mikrotik Hotspot Server Monitoring Application

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**Abstract:** This research was conducted to build a hotspot network server monitoring system and implement a hotspot network server management system and hotspot network users. In this study using the Experiment research method. In this study, a web-based proxy hotspot server monitoring application was designed. The results of the experiment are then documented to analyze so that the right recommendations are produced for designing a web-based proxy hotspot server monitoring application. From the results of this analysis, conclusions will be drawn about the benefits, functions and advantages of the system that has been built. The results of this study indicate that the web-based proxy hotspot server monitoring application can be applied to hotspot servers on proxy routers, where the test results show that the application can monitor users with the results there is 1 user who is active using user1 login and getting IP address 10.5.50.253 with an uptime of 1 minute 49 seconds. This application will display all users who are using the hotspot network, where the number of users displayed will adjust how many users are currently connected. The hotspot server monitoring application can also monitor the amount of download (RX) traffic of 14.04 MB and upload (TX) of 2.43 MB on the ether1 interface and the amount of download (RX) traffic of 2.44 MB and upload (TX) of 14.47 MB on the ether2 interface. The amount of this traffic depends on the use of the hotspot network by users in the hotspot network. In addition, this application can also monitor hotspot server logs by displaying activities that are happening on the proxy router such as login request activities, IP address requests, login attempts by users and others. This application can also be used for hotspot user management where test results show the application can add and also delete users who can connect to the hotspot network.

**Keywords:** Web-based Application, Monitoring, Management, MikroTik Router

## Introduction

In the current digital era, internet use is very important to support daily activities (Sharma & Kantha, 2020). Because of this, many agencies provide hotspot services for staff and employees to support daily activities. With the existence of a hotspot network, not everyone can connect to the network at the institution or institution that provides the internet network. Because, to connect to a hotspot network you need a username and password to connect (Patel et al., 2022). LPK Sulthoon 4M is a job training institution

located in Central Bengkulu Regency, Bengkulu Province (Haupt & McCormick, 2019). Currently LPK Sulthoon 4M already has an internet network, it's just that the internet network at LPK Sulthoon does not yet use hotspot service technology to connect to the network (Ma et al., 2020). To make it easier to manage the internet network at LPK Sulthoon, technology such as hotspots is needed so that each connected user can be controlled (Cronin et al., 2021). However, the existence of the hotspot network must also be monitored properly to ensure that the hotspot server runs smoothly and users can connect easily (Pasaribu & Ferdiansyah, n.d.). Therefore, we need a system that can monitor hotspots to make it easier to manage the hotspot network. Based on the problem above, hotspot network monitoring can be carried out by a Mikrotik router, where this router also has a feature for monitoring hotspot servers which allows users to monitor the performance of hotspot servers (Guri, 2019). However, the feature requires time and sufficient technical knowledge to use it effectively. Therefore, by developing a web-based Mikrotik hotspot server monitoring application, users can monitor servers more easily and quickly (Lim & Chang, 2021). Where this monitoring is expected to make it easier for network admins to monitor the resources of the hotspot server, activity or logs from the hotspot network (Gao et al., 2020), active hotspot network users and also the total users registered on the hotspot network, as well as data traffic in the hotspot network. By implementing the monitoring system mentioned above, it is hoped that the hotspot network used at LPK Sulthoon 4M can be easily monitored, thereby reducing unwanted risks (Helmiawan et al., 2021).

## Methodology

The research method used is the experimental method. In this research (Yang & Huang, 2019), a web-based Mikrotik hotspot server monitoring application was designed (Haupt & McCormick, 2020). The experimental results are then documented to carry out analysis so that appropriate recommendations are produced for designing a web-based Mikrotik hotspot server monitoring application. From the results of this analysis (Ye et al., 2020), conclusions will be drawn regarding the benefits, functions and advantages of the system that has been built (Israelsen, 2020).

## Result and Discussion

This chapter will explain the results of the research that the author conducted (Kweon et al., 2021). The results of designing a web-based Mikrotik hotspot server monitoring application are as follows (Liu et al., 2019).



**Figure 1.** Results of Designing Hotspot Server Monitoring Applications

In Figure 1 above, you can see a web-based application that can be used to monitor and manage hotspot servers. Where to access the application, you can access the address <http://localhost/monit>, because the application is stored on a local web server which can be accessed only on the local network. By using this application, it is possible to monitor the number of users on the hotspot server and also the number of active users as seen in Figure 1 above, the number of hotspot users is 11 while the number of active users is 1. The number of active users will change according to the number. users connected via a hotspot network. Apart from that, the web-based application can also monitor data traffic on each Ethernet on the Mikrotik as seen in the following image.



**Figure 2.** Network Traffic Monitoring

From Figure 2 you can see the Received (RX) and Transmitter (TX) traffic, where RX is usually called download or download while TX is usually called upload or upload. From this image, it can be seen that RX traffic is 2.44 MB and TX is 14.47 MB. This value depends on the network usage that is passed to each ethernet. Apart from monitoring the Ethernet on the Mikrotik router, this application can also display monitoring of users who are active in the hotspot network as seen in the following image.



## 2. Mikrotik Router Interface Configuration

Configuring the Mikrotik router interface is needed to know which interface path the network will be connected to. In this research, the author uses the ether1 interface as a source of internet connection and the ether2 interface as a hotspot network link to the router. The results of the interface configuration on the Mikrotik router can be seen as follows (Vesepogu et al., 2019).

## 3. DHCP Client configuration

The DHCP Client in this research is used on ether port 1 on the Mikrotik router to connect to the internet network, where in this research the internet source used gets a dynamic IP address allocation (DHCP), so that to be able to connect to the internet network the Mikrotik router acts as a DHCP Client. The results of the configuration that has been carried out can be seen as follows (Zhao et al., 2023).

## 4. Configure hotspot network IP address

The IP address for the network needs to be determined according to the design in the previous chapter. To configure the IP address on the ethernet port of the hotspot network, namely ether 2, you can do this by typing the command "ip address add address=10.5.50.1/24 interface=ether2 – to Hotspot" on the proxy router terminal. The results of the Ether 2 IP address configuration are as follows (Madan et al., 2019).

## 5. DHCP Server Configuration

The DHCP Server in this research is used to provide dynamic IP address allocation to clients on the hotspot network, the aim being that clients connected to the hotspot network do not need to enter the IP address manually. The results of the DHCP server configuration can be seen as follows (Liu et al., 2019).

## 6. NAT Firewall Configuration

NAT is needed to translate public IP addresses to private IP addresses or vice versa. The results of the NAT configuration are as follows (Kweon et al., 2021).

## 7. Hotspot Configuration

Configuring a hotspot on a Mikrotik router can be done by clicking the IP > hotspot menu and clicking the hotspot setup menu. The following are things you need to pay attention to when setting up a hotspot on a Mikrotik router:

### a. Hotspot Interface

In determining the interface to be used, make sure it matches the interface that has been created previously, namely ether2 – to Hotspot.

### b. Local Address

The local address will follow the IP address that was previously configured on ether2 – to Hotspot, namely 10.5.50.1/24.

### c. Address Pool

Address pool will also follow the IP address from ether2 – to Hotspot.

d. Certificate

There is no certificate in this research (none) because in this research there is no SSL server or SSL certificate that can be used.

e. SMTP Server

The SMTP server is left at the default, namely 0.0.0.0.

f. DNS

DNS in this research will follow the DNS used by the router, namely Dynamic DNS according to the internet source used (Fried-Gintis, 2020).

g. Local Hotspot User

This local hotspot user is used to log in via the hotspot network. When first setting up the hotspot network, the initial user will be asked as the user to be used, in this study the author used the user "admin" and the password "Admin".

After the above configuration is complete, the hotspot server is ready to use. The results of the hotspot server configuration can be seen as follows (Jiang et al., 2021).

8. Planning Hotspot Login Page

The hotspot login page is used as a login display on the WLAN network which is packaged into Hotspot. In designing this hotspot login, the author used the HTML programming language which uses the bootstrap framework (code listing can be seen in the attachment). The results of designing a hotspot login can be seen as follows.

**Table 1.** Blackbox Method Test Results

No	Test Type	Criteria	Results	Information
1.	User Monitoring Testing	Testing is carried out to determine the number of total users, active users and inactive users	The results of this test show that there is 1 active user using user1 login and getting the IP address 10.5.50.253 with an uptime of 1 minute 49 seconds. This application will display all users who are currently using the hotspot network, where the number of users displayed will depend on how many users are	Application Can monitor users

			currently connected.	
2.	Hotspot Network Traffic Monitoring Testing	Testing is carried out to monitor traffic activity used in the hotspot network	The results of this test show that the amount of download (RX) traffic is 14.04 MB and upload (TX) is 2.43 MB on the ether1 interface and the amount of download (RX) traffic is 2.44 MB and upload (TX) is 14.47 MB on the ether2 interface. The amount of this traffic depends on the use of the hotspot network by users in the hotspot network.	The application can monitor hotspot network traffic
3.	Hotspot Log Monitoring Testing	Testing is carried out to monitor user login activities	The hotspot server monitoring application displays activities that are occurring on the Mikrotik router such as login request activity, IP address requests, login attempts by users and others.	The application can monitor hotspot logs
4.	User Management Testing	Testing is carried out to add or delete hotspot users without having to log in to the router	Test results show that the application can add and delete users who can connect to the hotspot network	The application can carry out user management

From the test results that have been carried out in accordance with the test results table using the black box method as above, it shows that the application monitoring The web-based Mikrotik hotspot server can be applied to the hotspot server on the Mikrotik router, where the test results show that the application can monitor users with the result that there is 1 active user using user1 login and getting the IP address 10.5.50.253 with an uptime of 1 minute 49 seconds. This application will display all users who are currently using the hotspot network, where the number of users displayed will depend on how

many users are currently connected. The hotspot server monitoring application can also monitor the amount of download (RX) traffic of 14.04 MB and upload (TX) of 2.43 MB on the ether1 interface and the amount of download (RX) traffic of 2.44 MB and upload (TX) of 14.47 MB on the ether2 interface. The amount of this traffic depends on the use of the hotspot network by users in the hotspot network. Apart from that, this application can also monitor hotspot server logs by displaying activities that are occurring on the Mikrotik router such as login request activity, IP address requests, login attempts by users and others. This application can also be used for hotspot user management where test results show the application can add and delete users who can connect to the hotspot network.

### **Conclusion**

Based on the research that the author has conducted, it can be concluded that:

1. The web-based Mikrotik hotspot server monitoring application can be implemented and runs according to expectations where the application can monitor hotspot users, monitor hotspot network traffic, monitor hotspot server logs, as well as user management in the hotspot network.
2. User monitoring can display all users who are currently using the hotspot network, where the number of users displayed will depend on how many users are currently connected.
3. Monitoring hotspot network traffic displays the amount of download (RX) traffic of 14.04 MB and upload (TX) of 2.43 MB on the ether1 interface and the amount of download (RX) traffic of 2.44 MB and upload (TX) of 14.47 MB on the ether2 interface . The amount of this traffic depends on the use of the hotspot network by users in the hotspot network.
4. Hotspot server monitoring displays activities that are occurring on the Mikrotik router such as login request activity, IP address requests, login attempts by users and others.
5. User management can be done to add and delete users who can connect to the hotspot network

### **Suggestion**

From the research that has been carried out, the author can provide the following suggestions.



1. To further optimize network use, a real-time notification system can be created for hotspot network use and errors that occur on the network.
2. For commercial use, you can apply a voucher system and limit bandwidth and usage time

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