EMPIRICAL STUDY ON ISP OPERATION AND MAINTENANCE WITH MIKROTIK

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This Internship Report is presented in partial fulfillment of the requirements of the Degree of Bachelor of Science in Electronics and Telecommunication Engineering.

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CERTIFICATE

APPROVAL

This Project titled **"EMPIRICAL STUDY ON ISP OPERATION AND MAINTENANCE WITH MIKROTIK"**, submitted by **Rafiqul Islam**, ID: **181-19-2031** to the Department of Electronics and Telecommunication Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Electronics and Telecommunication Engineering and approved as to its style and contents. The presentation has been held on (05/01/2025).

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DECLARATION

I hereby declare that this thesis Report has been done by me under the supervision of **Engr. Md. Zahirul Islam, Assistant Professor,** Department of ETE, Daffodil International University. I also declare that neither this report nor any part of it has been submitted elsewhere for the award of any degree or diploma.

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ACKNOWLEDGMENTS

Initially, I wanted to express my appreciation to God for providing me with the correct road while I was attempting the assignment. The path of quality and severe punishment has been completed by the true spirit of accomplishing a goal.

Without the collaboration, assistance, and support of several others, I could not have succeeded in completing my mission on time. This internship report would not have been possible without the guidance and support of Engr. Md. Zahirul Islam, Assistant Professor, Department of Electronics and Telecommunication Engineering, Daffodil International University, Dhaka, under whose supervision I selected this topic. The staff of the ETE Department of Daffodil International University must duly acknowledge the unwavering support and perseverance of my family members for the completion of this internship, as well as the assistance he provided in surfacing our thesis and to other faculty members.

ABSTRACT

This study's primary goal is to clarify how to set up and maintain a network and bandwidth using the network management software Mikrotik. The goal is to become the most appealing and trustworthy online retailer for customers. The Mikrotik router's design is created by Winbox. This system acts as a successful example and is subjected to incremental testing after all the services have been deployed. The Winbox platform's use of a Mikrotik router includes a number of tasks, such as network design, analysis, and troubleshooting. It can also be used for network security, PPPoE deployment, VPN and tunneling, network monitoring, and consultancy. Furthermore, it provides capabilities like firewalls, bridges, DNS, NAT, ARP, and a number of other features. By using cnPilot access points for Wi-Fi with cnMaestro management, network management and maintenance costs can be decreased while user comfort is increased.

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CHAPTER 1

Introduction

1.1 Introduction

Internet Service Providers (ISPs) are the cornerstones of contemporary communication in the rapidly evolving digital landscape. With a focus on MikroTik Networks, this research undertakes an experiential investigation into ISP operation and maintenance. Because they are essential to network efficiency, these technologies require a practical grasp. We discover the complex function of these solutions and their practical implications as we proceed through our investigation. We close the knowledge gap between theory and practice by practical investigation, giving readers practical tools to successfully negotiate the world of ISP operations. The function of Internet service providers (ISPs) is more important than ever in a time when digital connectivity is the foundation of contemporary life. The effectiveness and dependability of ISP networks are critical as society depends more and more on the Internet for information, communication, and business. The need to examine the complex upkeep and operation of ISP networks, with a particular emphasis on the technologies offered by MikroTik Networks, is what spurred this study. This study intends to provide useful insights and enable people to successfully manage ISPs by means of practical investigation and experiential learning. By understanding the motivation behind this project, we set the stage for a comprehensive exploration of ISP networks in action.

1.2 Motivation of Report

The importance of ISPs (Internet Service Providers) in guaranteeing smooth access has been highlighted by the exponential rise of digital exchanges and the broad integration of online services. ISPs confront increasing operational and maintenance difficulties as demand for fast internet and dependable networks rises. This study is driven by the need to thoroughly investigate the operational complexities of ISP networks with a focus on MikroTik Networks. Everyone aims to close the theoretical and practical gaps through experiential learning, empowering experts and amateurs alike to successfully navigate the changing ISP management landscape.

1.3 Objectives

The Internet has become one of the most crucial mechanisms of starting a career. This project's aim is to gain more knowledge about Mikrotik Network:

Effective bandwidth organization is necessary to optimize user success. The MikroTik OS is intended for use as a router. A computer can act as a network router thanks to its operating system and applications. The PC has many built-in IP and wireless network features.

To operate MikroTik router board routers using the recommended Linux-based router operating system. It may also be set up on a computer and used as a VPN server client, firewall, router, and access point. Because the system is built on a wireless access system, it may be used as a captive gateway. to get knowledge on how to use the network security technologies from Mikrotik Network to set up, adjust, maintain, and enhance their solution.

1.4 Report Layout

In Chapter-1, I outline the internship's setting, objective, and purpose.

In Chapter -2, I covered networking, the many networking technologies that Mikrotik employs, a general overview of Mikrotik, and various router types.

In Chapter-3 Setting up various steering setups (such as DHCP, PPPoE, ARP, and Firewall) and delegating tasks were demonstrated.

The conclusions of my report and the probable effects of MikroTik Network are detailed in Chapter 4.

CHAPTER 2

Introduction of Mikrotik

2.1 Networking

A trailblazing Latvian business with a focus on networking and telecommunications technologies, MikroTik was founded in 1996. Focusing on switches, routers, and wireless technologies, MikroTik provides a broad range of solutions that enable service providers and network managers.

Their operating system, RouterOS, which is renowned for its versatility and strong features, turns compatible hardware into effective network devices. From businesses to ISPs, MikroTik's products serve a wide range of industries and offer quality and cost for deployments of different sizes. The unique selling point of MikroTik is its RouterOS operating system, a flexible platform that turns compatible hardware into network devices with a wealth of features. From bandwidth management and VPN support to firewall and dynamic routing features, RouterOS has a lot to offer. Network specialists can customize setups to meet the unique requirements of their environments because to this flexibility.

2.2 TypesNetworking

2.2.1 Local Area Network

The basis of contemporary networked environments is a Local Area Network (LAN), which permits smooth resource sharing and communication between devices in a constrained geographic area. With the help of this network setup, businesses, residences, and institutions may create effective digital ecosystems where computers, gadgets, and accessories can communicate and function together. Ethernet cables and Wi-Fi technology are prominent data transfer channels used in LANs, which rely on wired or wireless connections.

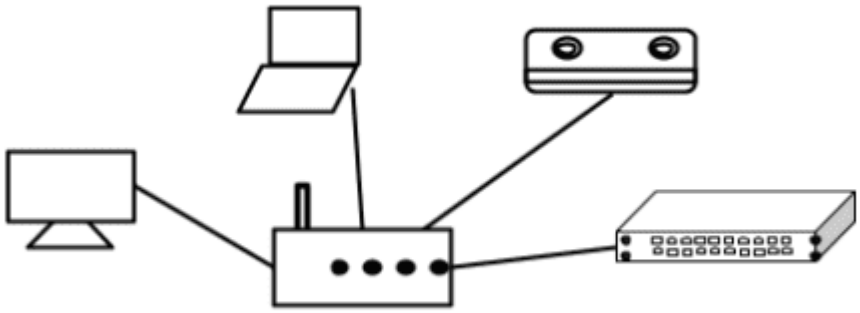

Figure 2.1: Local Area Network

2.2.2 Metropolitan Area Network

By spanning a wider geographic area, like a city or town, a metropolitan area network (MAN) fills the gap between local area networks (LANs) and wide area networks (WANs). MANs are perfect for companies, educational institutions, and governmental organizations that need interconnection on a larger scale since they enable effective data interchange and communication between multiple sites within a metropolitan area. MANs are appropriate for linking geographically separated places inside a city or metropolitan area because of their range, which ranges from several kilometers to tens of kilometers. Depending on the particular needs of the network and the sites being connected, MANs can use a variety of network topologies, such as ring, mesh, and star configurations. MANs can be owned and operated by telecommunication companies, ISPs, government entities, or private enterprises.

Businesses and organizations that need dependable communication between several locations can use MAN services from these suppliers. Businesses, organizations, and institutions operating within the covered zone can rely on MANs to deliver dependable and fast communication services. [1].

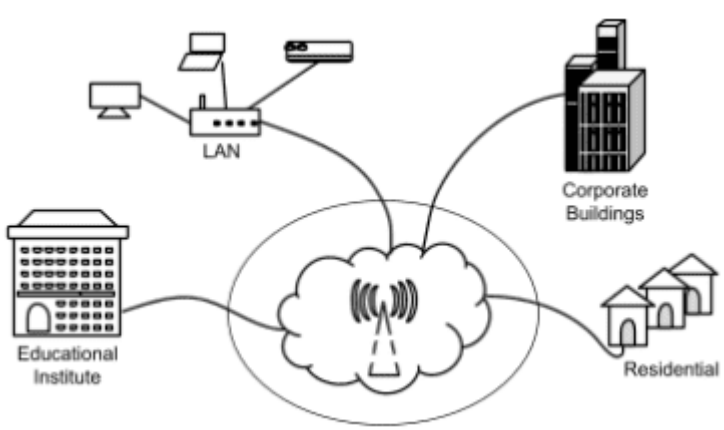

Figure 2.2: Metropolitan Area Network

2.2.3 Wide Area Networks

One kind of computer network that spans a wide geographic region—typically across towns, nations, or even continents—is called a wide area network, or WAN. WANs connect several Local Area Networks (LANs) and Metropolitan Area Networks (MANs) together in order to enable data exchange and communication between remote sites. WANs are essential for facilitating international communication, remote access, and resource sharing for individuals, companies, and organizations. [2].

The characteristics of a wide area network are as follows:

Large Scale: WANs cover vast geographic areas.
Diverse Technologies: Employ various tech for long-distance data transmission.
Global Connectivity: Enable real-time communication worldwide.
Cloud Integration: Integrate with cloud services for efficient access.
Security Measures: Implement encryption and firewalls for data protection.
Scalability: Expand easily to accommodate growing needs.
Redundancy: Ensure reliability with backup mechanisms.
Bandwidth Management: Optimize resources for different applications.

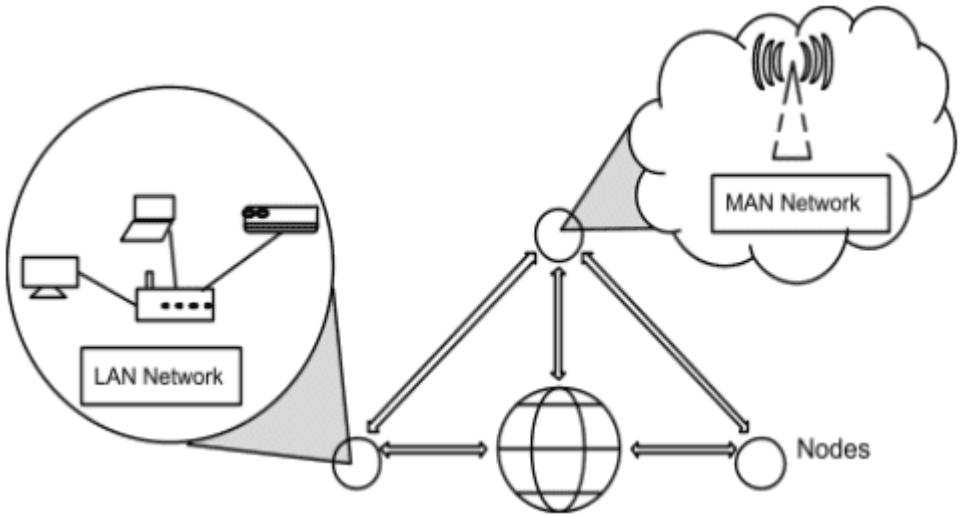

Figure 2.3: WAN

2.3 Training Served

I have decided to intern at Atova Technology. Over four months, Cisco networking MicroTouch switch configuration is taught. The MikroTik router training is now finished. A month later, I showed up, was accepted, and started school. When we originally started, we knew nothing about Cisco networking. First, we'll learn how to configure an IP address. We gather data on IP agreements and subletting from multiple sources.

After that, we started setting up a microrouter inside the virtual box. We also gather generic information regarding micro-routers. Before a MikroTik router can forward a new configuration, the system must be reset. Scan the IP address in the interface to establish a connection before inputting the DNS and gateway on the MikroTik router. In the first month, we go over networking, IP subnetting, switch configuration, VLAN, and switch management.

- Acquiring knowledge about the different parts of the network.
- Acquire and understand the core concepts of MikroTik.
- A Beginner's Guide to Centos Commands

The following month, Atova Technology provides us with commands on how to configure MikroTik Simple and install an OS in VMware.

- Faltering Web Sit
- MikroTik OS installation
- IP Addressing is a concept.

The third month will cover the complete MikroTik setup, which is necessary for handling MikroTik routers.

- Configuring IP
- The term "sub-netting" refers to a specific type of netting that

Binding for Networking

- Cisco
- VLAN
- PPPOE

We went over the same subject one more last month in order to correctly prepare. Mikrotik Static and DHCP for routers

- Firewall
- Firewall security
- Bridges
- Bandwidths optimiation
- ARP/AP
- PPPOE
- Wireless Configuration

2.4 Mikrotik Operating System

RouterOS is a proprietary operating system used by MikroTik routers. The purpose of this customized OS is to maximize network administration and routing capabilities on MikroTik hardware. Advanced protocol compatibility, strong security measures, wireless capabilities, quality of service controls, user management tools, scripting for automation, and a package-based system for customization are just a few of its many features. To improve security and functionality, regular upgrades are offered. Although it may require technical know-how for efficient configuration and management, RouterOS is preferred for its adaptability and control.[3]

2.5 Ethernet Route

2.5.1 HEX lite

The Mikrotik Ethernet Route HEX light is a user-friendly networking solution that helps you move data fast and effectively to its destination. The Mikrotik Ethernet Route HEX light makes connecting various network components easier with its built-in router, four gigabit Ethernet ports, and sophisticated routing protocols. Mikrotik Ethernet Route HEX light makes it easier to connect your devices with dependable performance, whether you're setting up a large business system or a residential network. Additionally, you will be able to quickly configure and administer your network because of its user-friendly interface. Start using Mikrotik Ethernet Route HEX light now to discover how easy networking can be. [4]

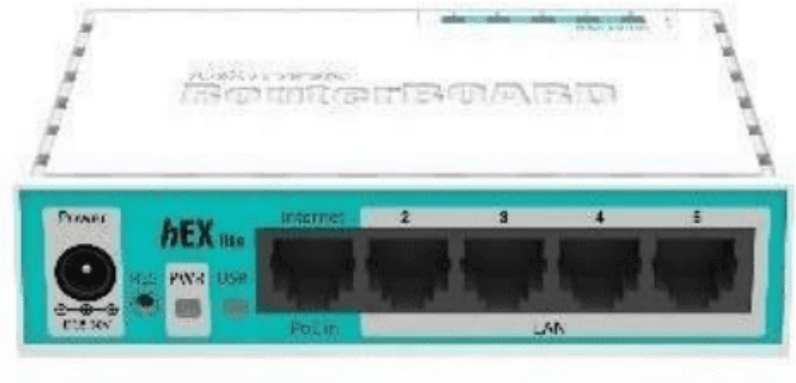

Figure 2.4: HEX lite

2.5.2 HEX PoE

The MikroTik HEX PoE router is a flexible networking solution that combines the ease of Power over Ethernet (PoE) support with strong routing capabilities. This router, which was created by the well-known networking company MikroTik, has sophisticated capabilities and a small form factor. The HEX PoE router, which is powered by MikroTik's RouterOS, ensures effective data flow across networks with its dynamic protocols, extensive routing functions, and VPN compatibility. Installations are made easier by the router's PoE capability, which removes the need for separate power sources for compatible devices, such as wireless access points and IP cameras. PoE-enabled ports offer the convenience of transmitting power alongside data, while several Ethernet ports facilitate smooth data transfer.

Figure 2.5: HEX PoE

2.5.3 RB2011

The MikroTik RB2011 router is a versatile networking device known for its multi-port design, A flexible networking device, the MikroTik RB2011 router is renowned for its multi-port architecture, cutting-edge capabilities, and adaptability. With its strong routing capabilities,

wired and wireless connectivity options, network management tools, security features, and customization possibilities, it is powered by MikroTik's RouterOS. It is appropriate for a range of network configurations due to its small form factor, dependability, and affordability. In order to help with resource efficiency, the RouterOS offers a variety of network management capabilities, such as traffic shaping, bandwidth monitoring, and user access control. By regulating data flow and protecting against unwanted access, the router's integrated firewall feature guarantees network security. Because of the router's QoS characteristics, important network traffic can be prioritized for the seamless operation of vital applications. The RB2011 router is a good option for small to medium-sized networks since it strikes a balance between features and cost.

Fig: 2.6 RB2011

2.5.4 CC1036-8G-2S

It is designed for small to medium businesses and enterprise networks. The switch features a variety of features, including:

- 8 Gigabit Ethernet ports
- SFP slots
- Layer 2 and Layer 3 switching
- VLAN support
- QoS support
- IGMP snooping
- Port mirroring
- 802.1x authentication
- SSH and HTTPS management

Figure 2.7: CC1036-8G-2S

CHAPTER 3

Configuration of Mikrotik

3.1 Interfaces and Menus

A small software program called Winbox was created to make it easier to handle the MikroTik Router OS. The binary that is delivered complies with the Win32 specification. All Winbox combined functions follow the assuage functionalities as closely as possible because the instructions provided lack Winbox portions. a number of the most modern and sophisticated systems.

Quick Setup: Using this menu, you can rapidly set up your MikroTik router's default settings.

Interfaces: The Ethernet ports, wireless interfaces, and loopback interfaces are among the network interfaces on your router that you can manage here.

IP: Using this menu, you may set up your router's IP addressing and routing, including the IP address, gateway, and subnet mask.

PPP: This menu lets you set up your router's PPPoE, PPTP, and L2TP clients and servers.

DHCP: You may setup your router's DHCP server, which gives IP addresses to networked devices, using this menu.

DNS: Using this menu, you may adjust your router's DNS configuration, which is how hostnames are translated to IP addresses.

Routing: Your router uses this menu to set up routing protocols and static routes, which are used to transfer data between networks.

Switch: You can connect devices to your network by configuring the switch ports on your router using this menu.

Wireless: You can construct a wireless network by configuring your router's wireless interfaces using this menu.

Security: You may adjust your router's security settings, including firewall rules and VPNs, using this menu.

Administration: You can adjust your router's administrative settings, including user accounts and logging, using this menu.

3.14 Or above.

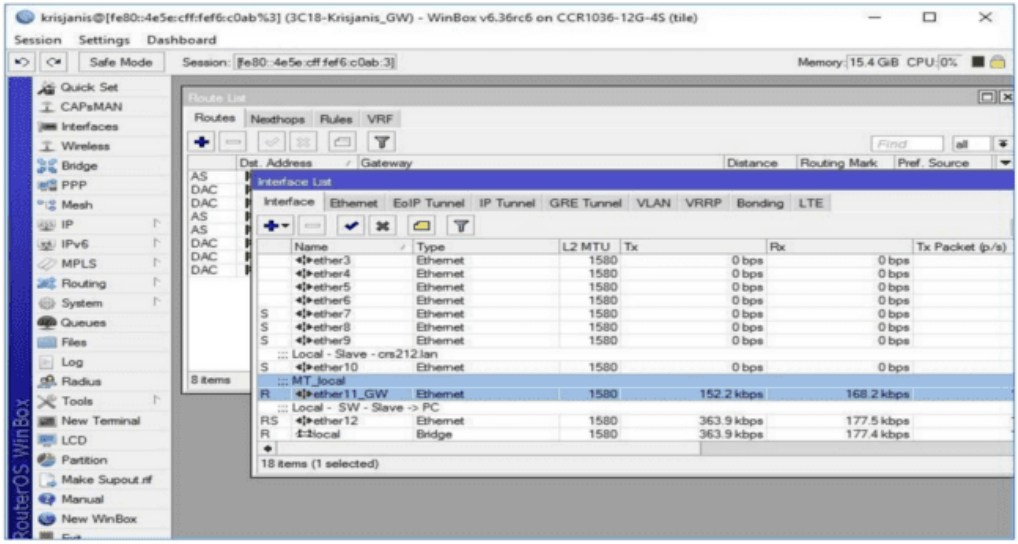

Figure 3.1: Interfaces and Menus

3.2 Initial configure of Mikrotik Menu

On a MikroTik router, we first browse to the dashboard, then IP, and lastly the address to do Basic Configuration.

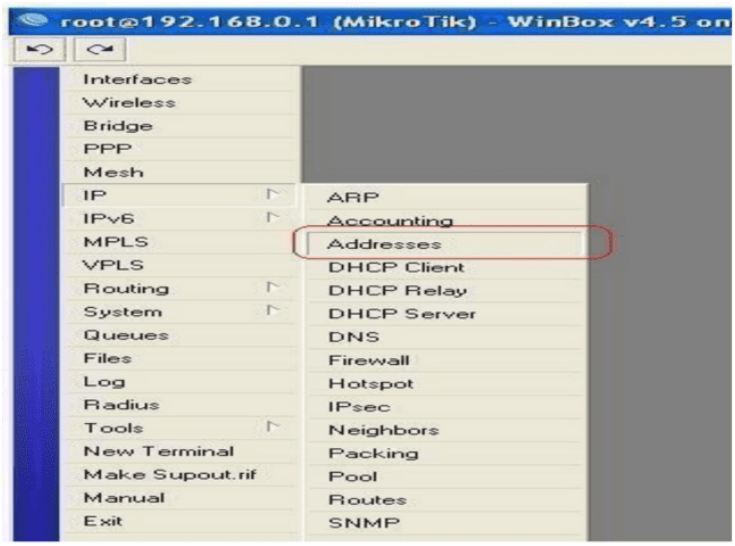

Figure 3.2 MikroTik Configuration

When the Address Book conversation is launched, the user will see a popup like the one below. Clicking the location marker will open the IP address pane.

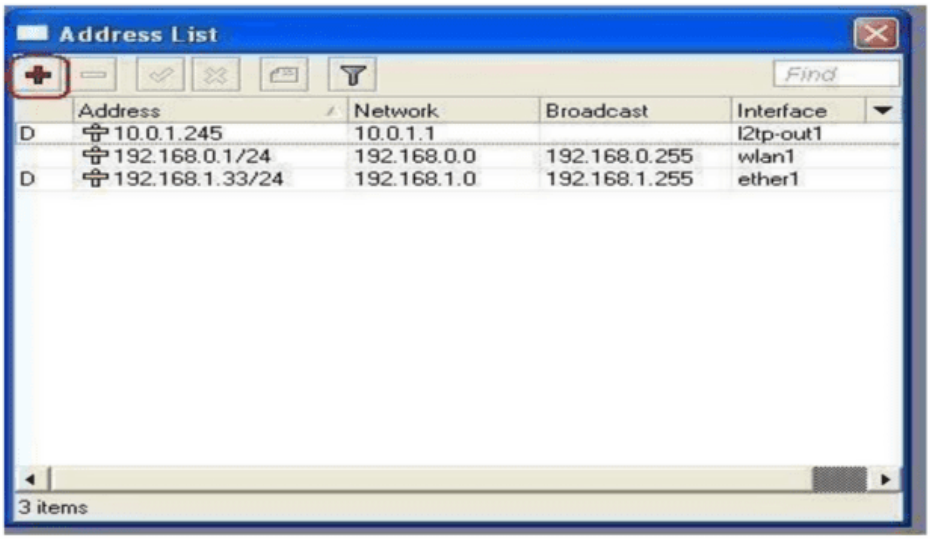

Figure 3.3 Basic Configuration of MikroTik

The user must provide the relevant address information when they first access the IP address dialogue before they can click the "ok" button.

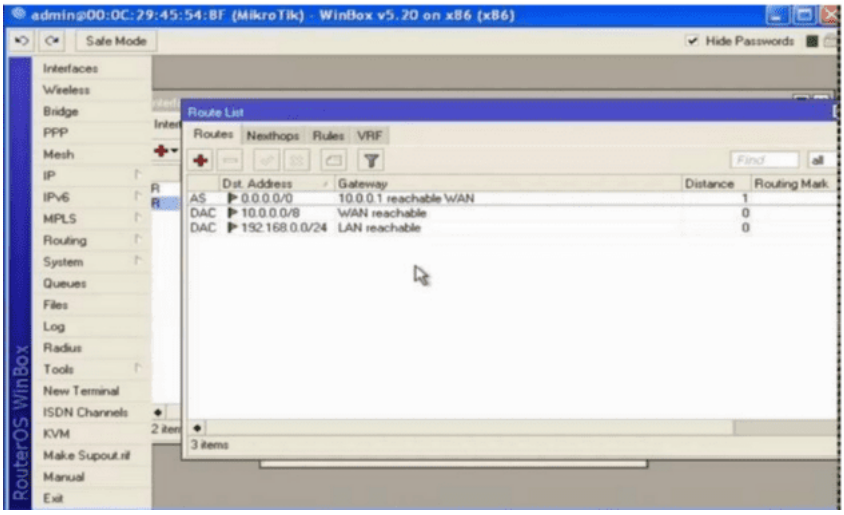

Figure 3.4 Basic Configuration of MikroTik

The procedure for setting up the password for the current Mikrotik Winbox user is demonstrated in this instructional session. As shown in the accompanying image, kindly choose the appropriate menu item:

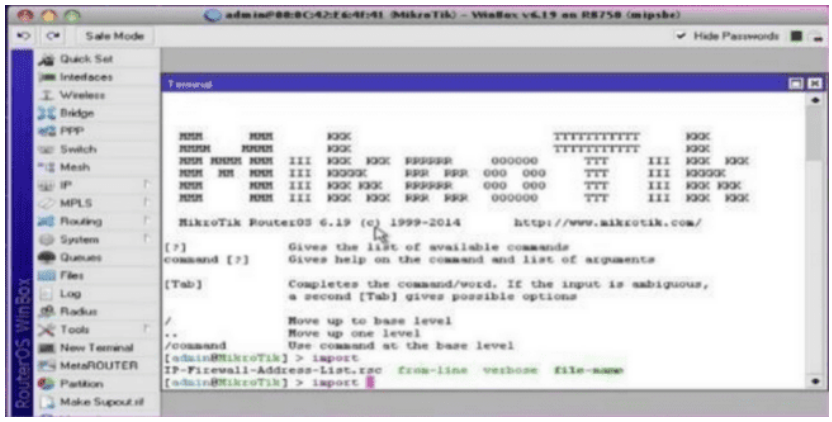

Figure 3.5 Configuration of MikroTik

Please provide the former or existing password, followed by the desired new password that you intend to utilize.

3.3 DHCP Configuration

Step 1: Log in to your MikroTik router and start the Winbox application. Step 2: Select "DHCP Client" from the dropdown menu after navigating to the "IP" menu. Step 3: The DHCP client settings will be shown in a new window.

Step 4: Just click the "Add" button to add a new DHCP client.

Step 5: A new window will popup when you click the red Plus button

Step 6: Next, return to the field labeled "Interface." For instance, if you were using an Ethernet LAN port (let's say Ethernet port 1), you would set up this interface. Think of this interface as your wireless card that is linked to the board's WAN. If you are using an Ethernet connection to connect the MikroTik Ethernet port 1 to an ADSL router, you would set it up as a DHCP client. This is because it will receive its IP address from the ADSL router. If you want to proceed, select "ether1" under Interface, then click "Apply" and "OK."

Step 7: while you can see, "ether1" is now being configured while it searches for an IP address. The act of controlling and guiding network communications, including packets and traffic, in order to avoid overloading the connection is also depicted in the figure below under "ether2."

Step 8: Start Winbox to get things going. Next, go ahead and read each of the subsequent sections: After choosing "Concatenation" and then "Basic Concatenation," click the "Plus" button. The target address should be set to 192.168.0.5 and the name "Concatenation 1" should be assigned in this part. Be aware that you must use the LAN site's IP address if you wish to manage the bandwidth for a specific machine or IP address. [5].

Proceed by applying the following configurations:

- For Target Upload, set the maximum limit to 512k.
- For Target Download, also set the maximum limit to 512k.

After configuring these settings, confirm changes by selecting "Apply" and then

"OK."

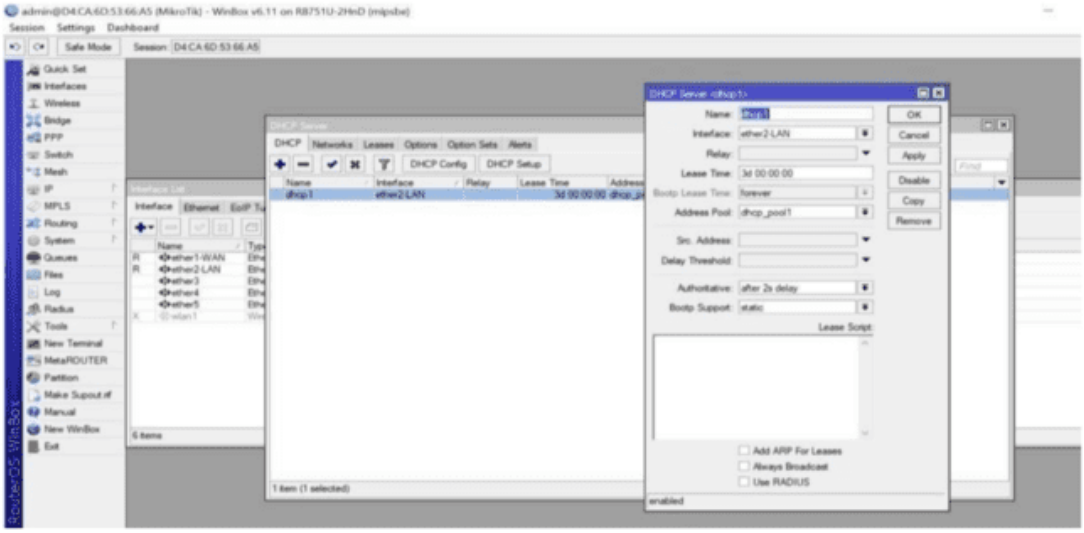

Figure : 3.6 DHCP Configuration

3.4 Bandwidth Management

Simple Queue is an easy way to set up basic bandwidth limits for individual users or devices. To create a simple queue:

- Go to "Queues" in the main menu.
- Click on the "+" button to add a new queue.
- Configure the target address (IP or subnet), upload and download limits, and other relevant settings.

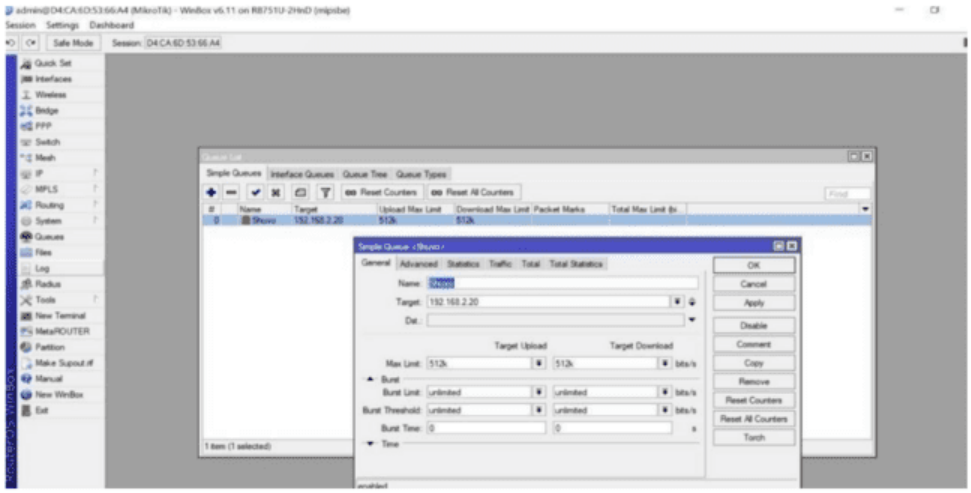

Figure : 3.7 Bandwidth Management

A fair allocation of available bandwidth is provided by PCQ (Per Connection Queue), which is used to split bandwidth equally among several connections:

To mark packets, create mangle rules.

Create a PCQ queue with specified boundaries. Every connection will receive an equitable portion of the available bandwidth thanks to PCQ.

Prioritizing queues (QoS):

To guarantee service quality, give priority to crucial traffic over less important traffic: To label packets for various traffic types (such as VoIP, video streaming, and web surfing), create mangle rules.

Assign the proper priorities and create distinct queues for every kind of traffic.
Bursting and Burst Limits: When available, bursting permits the brief use of additional bandwidth. To limit the amount of additional bandwidth that can be consumed, set burst limits for queues:
Use the "Burst Threshold," "Burst Time," and "Burst Limit" parameters to set burst settings for queues. [6].

3.5 PPPOE Configuration:

By configuring PPPoE on a MikroTik router, you may use Ethernet technology to create a safe and effective connection between your router and your Internet service provider (ISP). In order to manage and authenticate connections for specific users or devices within a network, PPPoE is frequently utilized for DSL and cable modem connections. By following this tutorial, you will be able to configure PPPoE on a MikroTik router and create a dependable internet connection while protecting your network's security and privacy.

To access the router's web interface: Please use a web browser and enter your MikroTik router's IP address in the appropriate address box to start the process.

Please authenticate using your administrator credentials.

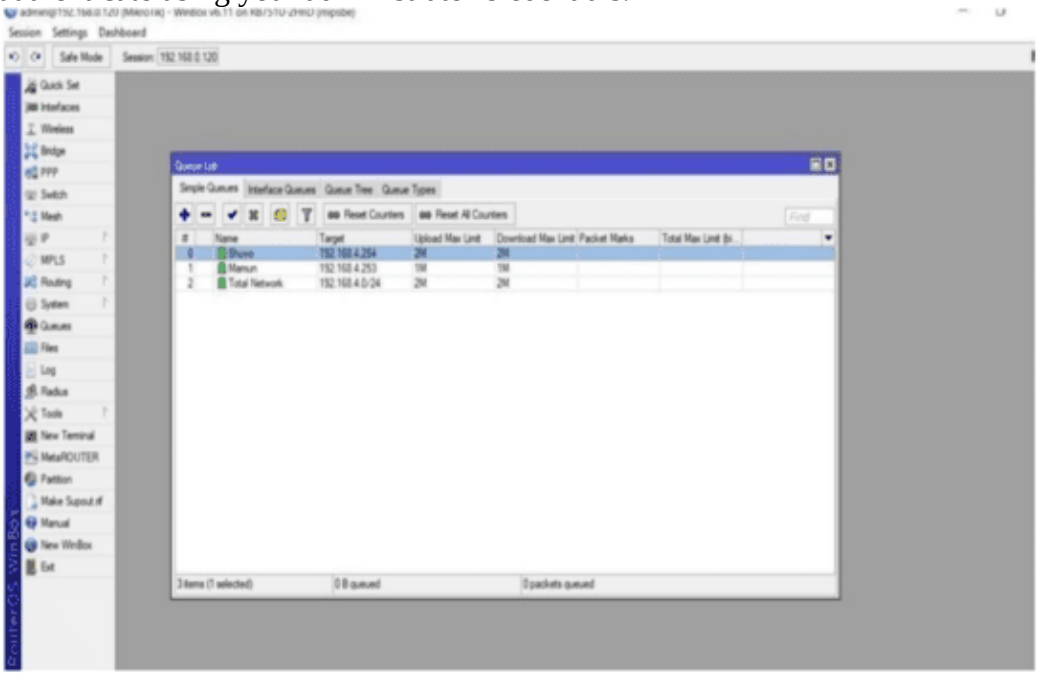

Figure : 3.8 PPPoE Configuration

Create PPPoE Interface:

- Go to the "Interfaces" section of the router's web interface.
- Click on the "+" button to add a new interface.
- Select "PPPoE Client" from the list of available interfaces.

PPPoE Client Configuration:

- Provide a name for the interface in the "Name" field.
- Set the "User" field to your PPPoE username provided by your Internet Service Provider (ISP).
- Set the "Password" field to your PPPoE password.
- Select the relevant "Interface" (usually an Ethernet port) to which your modem or DSL line is connected.

Advanced Settings (if needed):

- You can usually leave most settings at their default values. However, if your ISP requires specific settings, consult their documentation.
- Some ISPs use a specific Service Name (often called "AC Name") for authentication. If required, you can set this in the "Service Name" field.

Firewall/NAT Configuration (if needed):

Make sure to set up any firewall or NAT rules on your MikroTik router so that PPPoE traffic can flow through.

Setting up DNS (optional):

By default, your ISP will constantly send DNS server addresses to your MikroTik router. You can put up custom DNS servers in the "IP" -> "DNS" settings if you choose to utilize them.

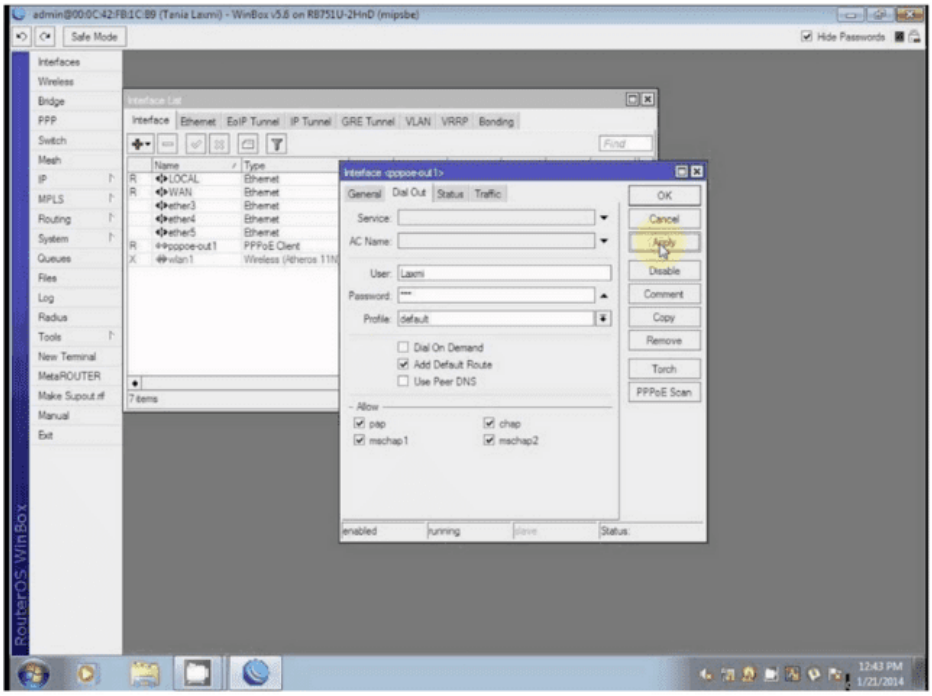

Figure : 3.9 PPPOE Configuration

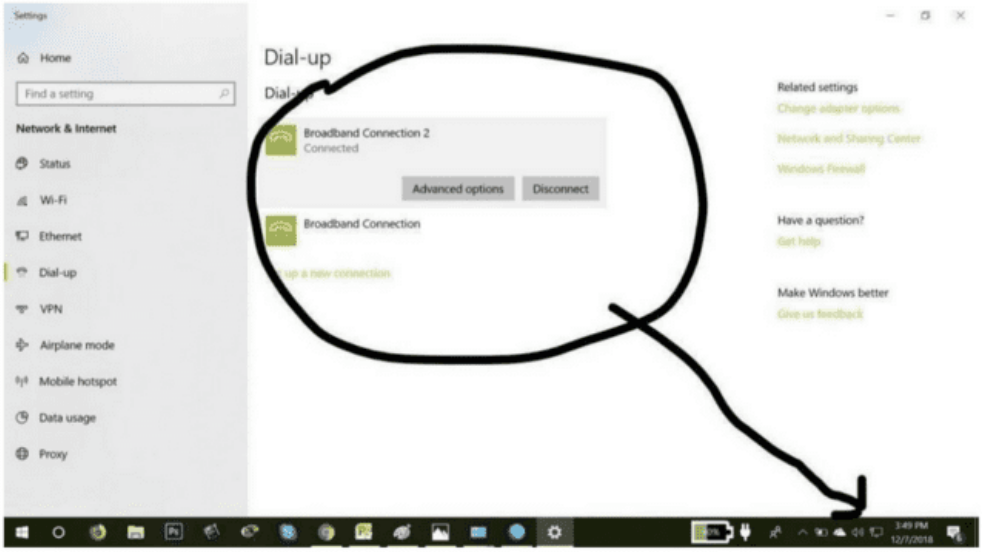

Figure: 3.10 PPPOE Configuration

3.6 Wireless Connection:

Wireless connectivity, which provides the ease of connecting devices without the limitations of physical wires, has become a crucial component of contemporary networking. By setting up a wireless connection on a MikroTik router, you may establish a wireless network, or Wi-Fi network, that facilitates wireless internet access and communication between gadgets like smartphones, laptops, tablets, and Internet of Things devices. This tutorial will show you how

to use a MikroTik router to create a safe and effective wireless connection. With the powerful wireless features that MikroTik routers provide, you may customize your wireless network to meet your unique requirements. Every stage, from configuring the wireless interface to protecting the network and enhancing efficiency, helps ensure that consumers have a dependable and smooth wireless experience. [6].

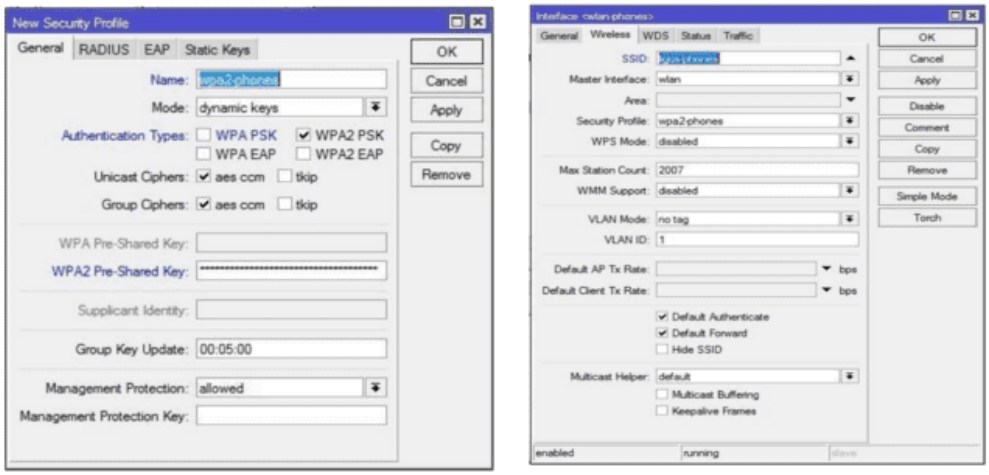

Figure : 3.11 Wireless connection

Step-1

Add a new address by selecting IP -> Address first. Add a new pool by going to IP -> Pool and doing so.

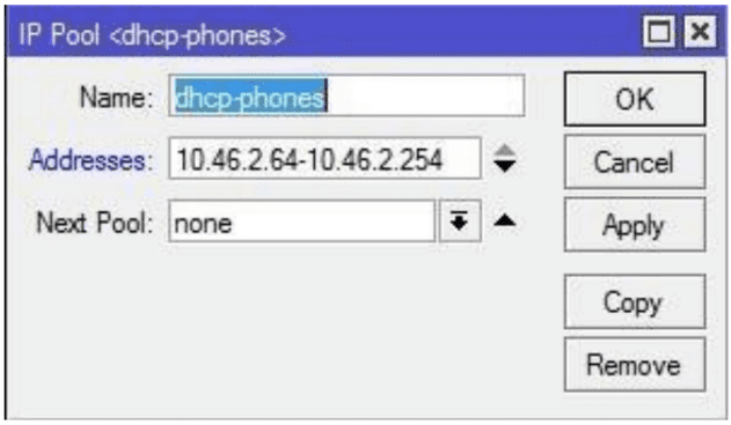

Figure 3.12 Wireless Configuration

Step-2

When a device joins a Wi-Fi network, DHCP is used to allocate addresses to the connected devices. We'll give them access to the pool we just made. Don't forget to assign a couple additional unique addresses. To add a new DCHP Server, go to IP -> DHCP Server - DHCP Tab.

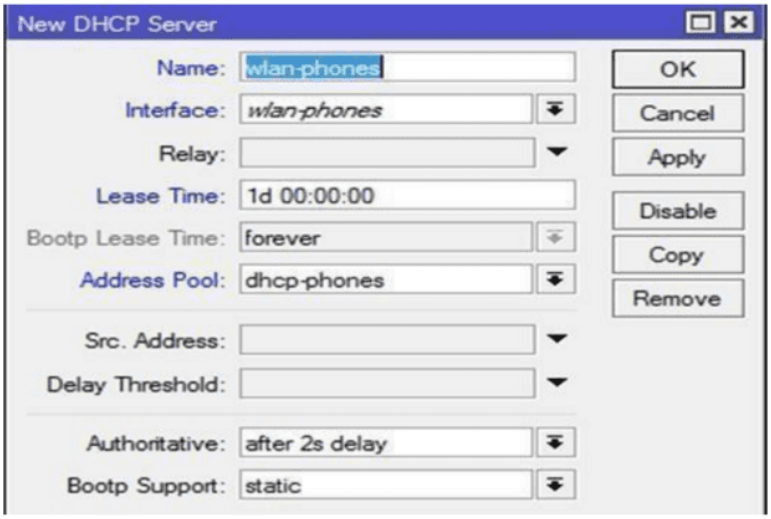

Figure 3.13: Wireless Configuration

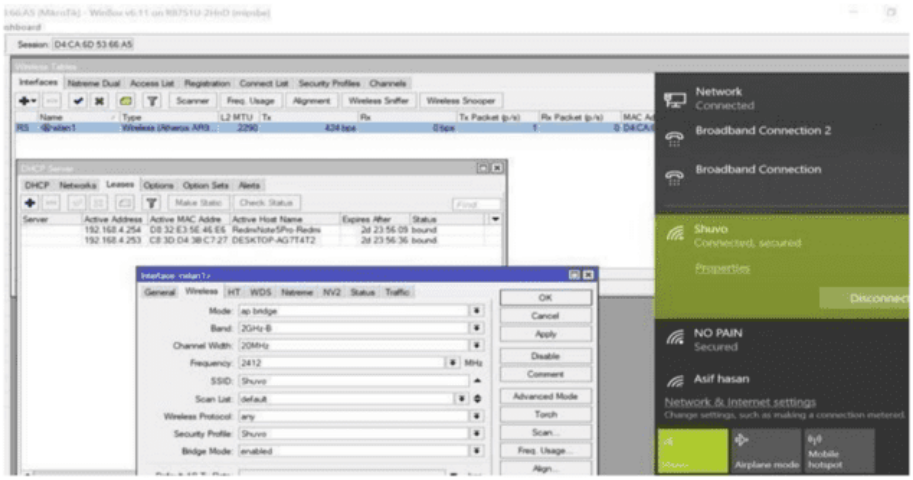

Figure 3.14: Wireless Configuration

3.7 ARP/AP Configuration

Through ARP binding, a device's ARP table generates a static IP to MAC address record. When a device on the network sends a DHCP request, DHCP limitations ensure that it always gets the same IP address. They have nothing to do with one other.

Take a step

After selecting ARP under IP and clicking the plus sign, input the data as it appears on the screen and click OK. Next, pick Ether2 LAN as the border after selecting the Device MAC Address and Static IP Address (which must bind). On that device, select IP first, followed by DHCP Server, and then repeat the process.

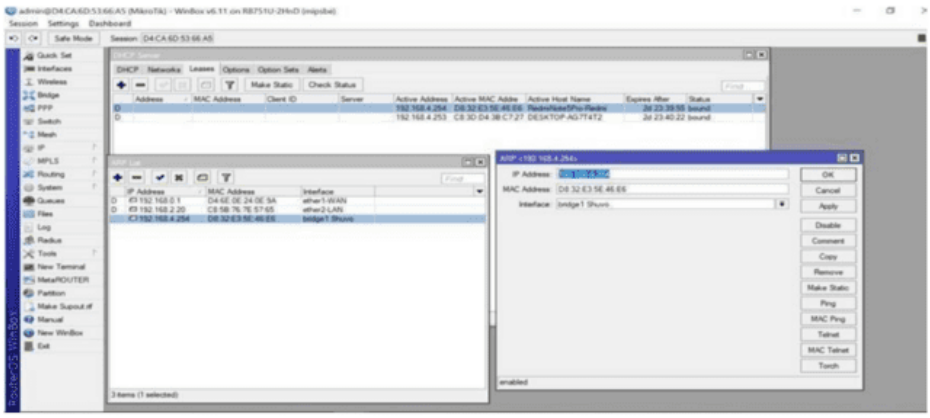

Figure 3.15 ARP/AP Configuration

Next, on the DHCP Server page, click the Plus sign next to Static IP Address and MAC Address, and then enter the necessary data. Finally, check the box next to "Employed a Static IP Server: dhcp1" in the comments section. Please include the login.

3.8 Firewall's configuration

The firewall's packet filtering implementation establishes security measures that regulate data flow to, from, and via the router. The router itself acts as an outgoing traffic filter in addition to Network Address Translation, providing a complete defense against illegal access to networks that are directly mounted.

Rule 1: Chain: 203.99.15.100/30 (the IP/IP Block on your WAN Side) should be the source address. Select Accept on the following screen, then click the OK button. This will directly result in the creation of a filter rule. This rule will allow you to use that IP address or that IP block to connect to your router.

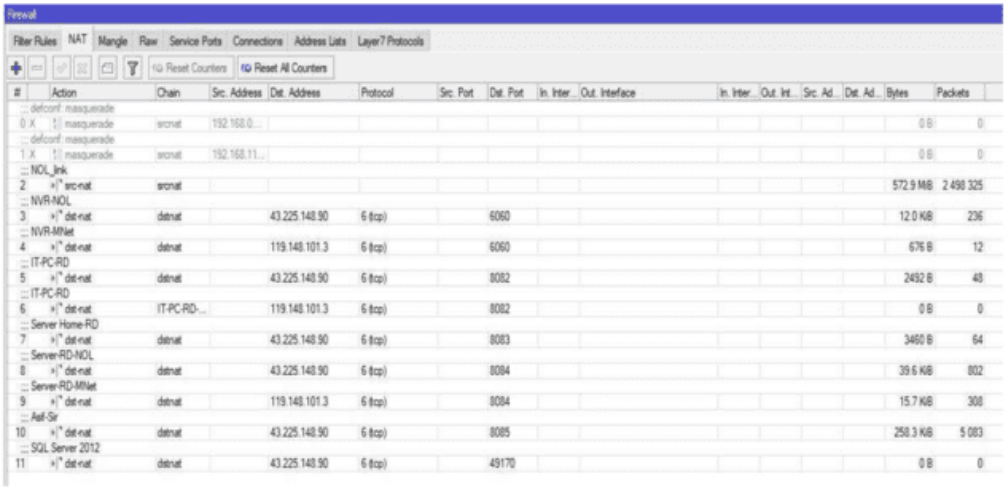

Figure 3.16 Firewall Configuration

Rule-2:

192.168.1.0/24 is a frequently used private network address. 192.168.1.0/24 is a Class C private

IP address. 192.168.1.0/24 is a Class C private IP address. The IP address 192.168.1.0/24 represents the local area network (LAN) IP block. The user is asking for help with the application and acceptance processes. Moving forward with the assignment is the appropriate course of action. Both the IP or IP block on the wide area network (WAN) side and the IP block on the local area network (LAN) side can now access the router. You may access a lot more materials on the Internet in addition to the previously stated ones. However, two special restrictions must be established in order to protect routers from unauthorized IP access. It is required that the device have an IP block separate from the IP in order to deny access from the router. In the same way, choose Add (+) and then.

Rule 3: Process: Please file an application to remove Tec Tunes Ads's ads. 203.99.15.100/30 is the input source address that was supplied.

Rule-4:

192.168.1.0/24 192.168.1.0/24 192.168.1.0/24 192.168.1.0/24 192.168.1.0/Drop Apply> OK is the appropriate course of action.

Our router can no longer receive IP addresses or IP blocks other than 203.99.15.100/30 and 192.168.1.0/24. A port block for various virus-spamming ports, a custom port block for any network, or a brute force assault on your router are examples of additional filter rules that may be created. The images below show many port barriers that are used by virus-spammers. The 192.168.1.0/24 3129 ports on this IP block are restricted by Rule 14. As a result, the 3131 ports will not be available to the port. This port is typically used by a proxy server.

A network controller can prevent users from utilizing a proxy server by blocking the necessary ports. 192.168.1.0/24 is a private IP address that is commonly used. 192.168.1.0/24 is an example of a private network address. 192.168.1.0/24 is an example of a private network address. 192.168.1.0/24 is an example of a private network address. The network address 192.168.1.0/ has been allocated to dropping or rejecting network communication.

It is correct to click "OK" after choosing the "Apply" option. Only specified IP addresses or IP blocks, namely 203.99.15.100/30 and 192.168.1.0/24, may access our router. Implementing a router brute force attack protection system, implementing port blocking policies that target particular ports that are commonly used for virus-spamming, and other filter rules can be developed.

and building a block of custom ports to restrict access to particular networks or network ranges. The screenshots above illustrate a range of port barriers that are used to disseminate computer viruses via spam. Rule 14 has been implemented to restrict access to the 3129 ports in the IP block 192.168.1.0/24. It will thus be unable to use the 3131 ports that were previously listed within the designated port. This port is commonly used when a proxy server is present. Network controllers can employ port-blocking techniques to stop users from

accessing proxy servers.

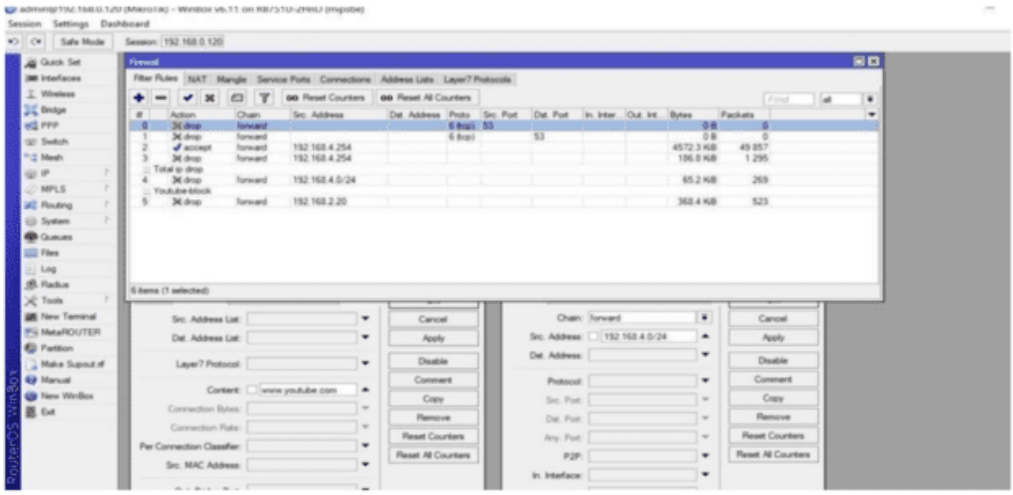

Figure : 3.17 Firewall Configuration

3.9 IP Services:

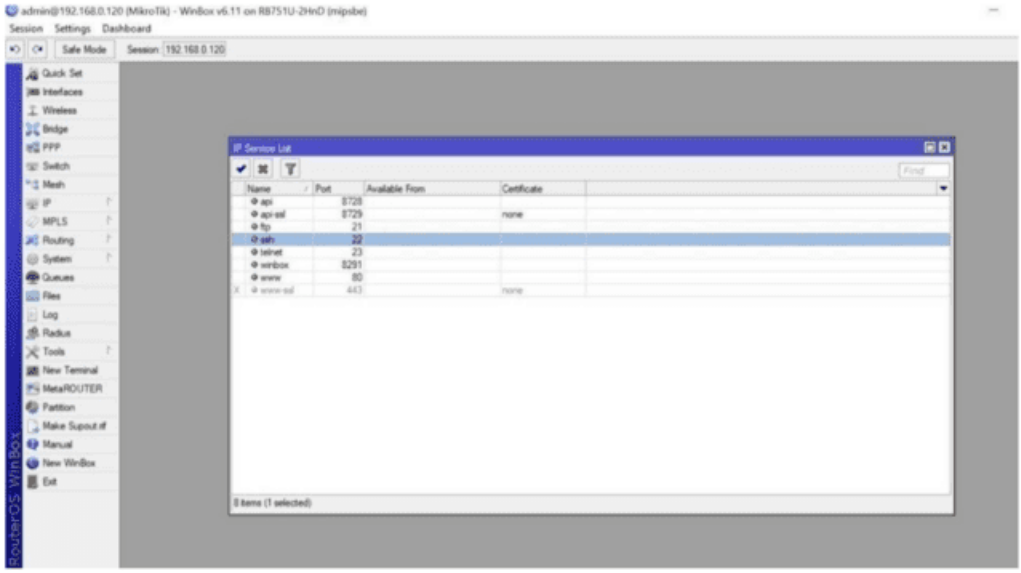

Figure : 3.18 IP Service

3.10 User ID

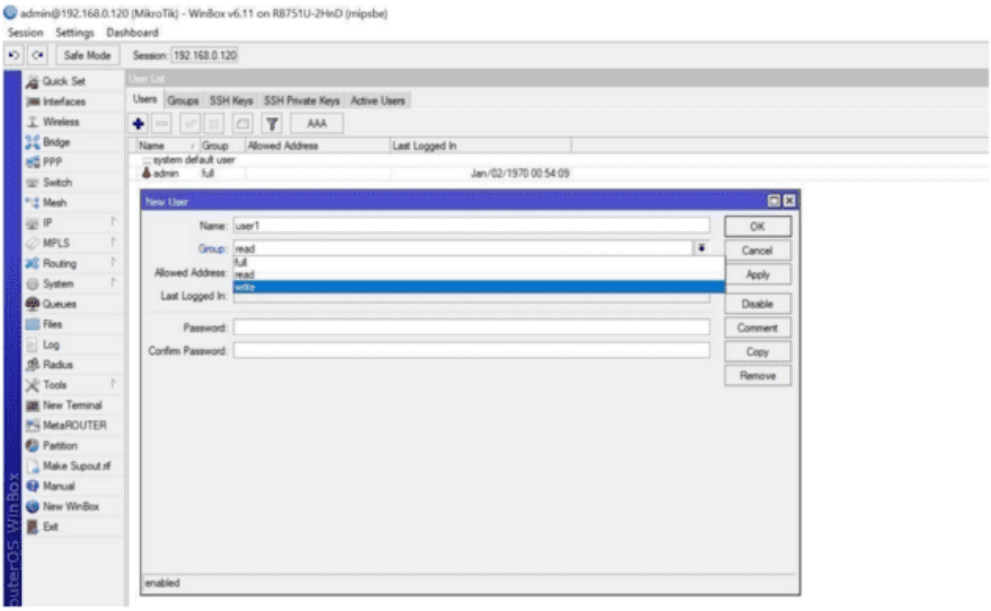

Figure 3.19 User ID

CHAPTER 4

Conclusion

4.1 Conclusion:

Within the specified section-level region, the file rotates. Among other relevant topics, network security and services are the study's subjects. It can be concluded from my internship experience that those who have received training at Atova Technology possess the abilities needed to operate Mikrotik routers with ease. Additionally, because of their thorough preparations, they are able to consistently manage a variety of work obligations. After completing my internship successfully, I became adept in operating a Mikrotik router. I've learned to operate the Mikrotik router on my own as I'm skilled at setting up a variety of microcontroller routers. I learned about the creation of a network enterprise through the use of an Internet service provider during this lecture. With the help of my gift, I will be able to use my inner experiences to better the world, develop my leadership abilities, and become ready for a life of service.

4.2 Future Scope:

Numerous job benefits are offered by the internet. The development of device drivers, kernels, and desktop applications is examined in this study. Open source developers and software are in high demand right now, and they must possess the necessary network knowledge. Information technology infrastructure, IT intelligence services (ITES), data center management, network solutions, database and software administration, information security (IS), backup solutions, and equipment distribution are among the specialized services that businesses in Bangladesh are providing in increasing numbers. MikroTik condition that is now shown within the system gives customers the chance to quickly activate their issue. It is assumed that a technological tool that makes utilizing the Internet more convenient will be available in the current environment. Make it feasible for customers to browse the internet without having to install Windows on their PCs. MikroTik is now available on portable Internet devices (MIDs).In order to enable people, companies, and communities to make a positive effect on the world, it offers affordable wireless broadband connectivity. In addition to netbooks—miniaturized desktop computers that condense the functionality of their bigger counterparts into a compact form—this also covers cell phones and other stationary devices.

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