

**INTERNSHIP PROJECT ON PROFESSIONAL ISP SETUP AND  
ADMINISTRATION WITH MIKROTIK ROUTER**

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This Report Presented in Partial Fulfillment of the Requirements of the  
Degree of Bachelor of Science in Computing and Information System

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This title 'Professional ISP Setup and Administration with Mikrotik' Router submitted by FARIA ALAM TUNNA, ID NO 183-16-388 to the department of computing and information system daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in computing and information system and approved as to its style and contents. The presentation was held on 14-11-22.



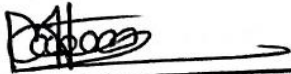
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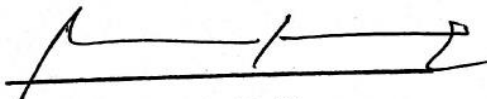
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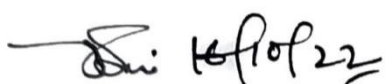
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## DECLARATION

I hereby declare that; this project has been done by me under the supervisor of **Dr. MD Nadir Bin Ali, register or Daffodil International University** .I am also declaring that this project or any part of it has never been submitted anywhere else for the award of any educational degree like B.Sc, M.Sc, Diploma or other qualification .

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First of all I express deep respect and thankfulness to Almighty Allah and also express to my deep respect and thankfulness parents and teachers for their blessings and efforts and help I have been able to complete my final year internship successfully.

I am really grateful and wish my considerable debt to Supervisor **Dr. Md Nadir Bin Ali, Registrar, Daffodil International University Dhaka**. To complete this internship project my supervisor used his huge knowledge, deep interest in the topic of internship on professional ISP setup and administration with mikrotik router. His never-ending patience, academic advice, persistent encouragement, frequent and robust supervision, and constructive criticism, useful counsel, reading several poor drafts and improving them at all levels made this internship possible.

I am also grateful to **MD Sarwar Hossain Mollah, Professor and Head, Department of CIS**, as well as to the other faculty members and employees of the CIS department of Daffodil International University, for your kind assistance in helping me to complete my internship.

In order to complete the course work, I'd want to express my thankfulness to all of my Daffodil International University classmates who engaged in this discussion.

## ABSTRACT

This internship report is intended for the completion of a BSc in computing and information systems. That's what I heard. Daffodil Online Limited changed my ISP setup and administration configuration on my Mikrotik router, Cisco switch, Cambium network Platform, and other devices. The most often used routers right now are MikroTik models. This Router comes with a wide range of networking features that make it easy to create a solid and efficient network. No ISP (Internet service provider) is reported to be able to operate without a MikroTik Router. Also popular among system administrators is the MikroTik Router due to its graphical user interface (GUI) software, Win box, which makes it simple to manage MikroTik Router. Because of the many types of work that are done in the system through this router, there are also various kinds of servers. FTP server, DNS, DHCP, NAT, ARP, firewall, interfaces, router, and bridge are a few examples. During my internship as a technical support, I ran across most of the problems with data connectivity, internet service, and fiber optics network. It was able to see the information about that client and find a solution by using the "WINBOX" software program. It is incredibly helpful in our day-to-day lives. We will learn about Cisco, MikroTik, cabling, etc. in this area. One of the most widely used platforms in Bangladesh's digital economy is MikroTik. Using MikroTik, we can perform practically all tasks, such as blocking websites, PPPoE, DHCP, and router static connections. Typically, this report provides thorough instructions for setting up and configuring the MikroTik. With the help of this internship, I was able to gain experience, learn about certain software and hardware design, and develop a solid grasp of network system-based issues and how to identify workable solutions.

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## **LIST OF ABBREVIATIONS**

NOC	Network Operation Center
ISP	Internet Service Provider
ICT	Information and Communications Technology
PTP	Precision Time Protocol
DNS	Domain Name System
FTP	File Transfer Protocol
DHCP	Dynamic Host Configuration Protocol
LAN	Local Area Network
WAN	Wide Area Network
IP	Internet Protocol
MAN	Metropolitan Area Network
PoE	Power over Ethernet
SNMP	Simple Network Management Protocol
PoP	Point of Presence or Post office protocol
PPPOE	Point-to-Point Protocol over Ethernet
TCP	Transmission control protocol
UDP	User datagram protocol

# CHAPTER 1

## INTRODUCTION

### 1.1 Indication

Computer networks in the era of knowledge Technology. Web technology is used by many people worldwide. IT is the century in which we currently live. Technology and information have become an integral aspect of daily life in this century. Without information and technology, progress is impossible. ISP setup, management, and configuration using the MikroTik platform. My application for an internship is primarily intended to help me establish myself as a qualified professional. Therefore, I absolutely need an internship. To prove myself, I desire to achieve a certain fine.

### 1.2 Motivation

I already know how to set up a Network Diagram for a Mikrotik. Currently, 3.2 billion people worldwide utilize the Internet. Therefore, there are several opportunities to work on Mikrotik. The majority of networks are created by Mikrotik. It's demand in the recent market. While doing an internship, I run across a number of problems. I will try my best to find a solution to every issue I run across. I believe it's a fantastic learning opportunity, and I am well-versed in the complexities of Mikrotik configuration and server administration. I was able to interact with a wide range of individuals when I went out into the field as an ISP provider and fully comprehend their demands. Because Daffodil Online Limited (DOL) is a reputable Internet service provider, I chose to intern there. Due to the positive reputation of the nation, it surpasses all customer satisfaction and services. In any ISP industry, I believe I can successfully demonstrate my experience.

### **1.3 Objective:**

In today's world, "Basic ISP SETUP WITH MIKROTIK" is a very broad term. The internship program is preparing me to be marketable in the job market. I think right now, the networking industry is the best and secure for launching a career.

**This internship project's primary objective is:**

- On a Mikrotik router, obtaining the primary and backup internet connections from the ISP that will be for wide area clients, to provide internet connection service to all clients via proper bandwidth management, IP addressing, dynamic host IP addressing, client account, username, and password.
- Configure port Vlan for network distribution to devices, World Wide Web hosting through port forwarding from private network to be accessed globally.

### **1.4 Report Layout:**

**Chapter-1:** In this chapter has a description of Objectives, Motivation, and Introduction of my internship project at the corporate.

**Chapter-2:** This chapter, I showed the internship company's introduction, their services, organization strangeness and structure.

**Chapter-3:** In this chapter I briefly describe my project Involvement in the period of internship. Every painting that I have accomplished and i also have described Events, features, devices & Challenges.

**Chapter-4:** This chapter, I showed Diagram Configuration, terms and figures of my Internship Project.

**Chapter-5:** This chapter, I showed the result/output OF My Project Configuration.

**Chapter-6:** This chapter, I've explained the Conclusion & Future Scope of this Project.

## **CHAPTER 2**

### **INTERNSHIP ENTERPRISE**

#### **2.1 About:**

Internet service provider Daffodil Online Limited also serves as a data center for many businesses and organizations. It is in Dhanmondi, Bangladesh. Since July 2002, Daffodil Online Limited (DOL), an example of Bangladesh's ISP/ASPs, has offered comprehensive integrated ICT services and solutions. Daffodil online collaborated in several local, regional, and global projects. It makes use of the most recent technology and refreshes the services as needed. According to customer recommendations and the demands of the time, they have recently expanded their operation and service offering. For the benefit of both corporate and private clients, it has its own radio link and fiber optic WAN infrastructure. DOL offers local customers a range of bundles that include internet connection. Both internal and external service firms may be found in Dhaka. It boasts a top-notch management and expert engineering staff that is accredited by Cisco, Microsoft, Linux, and Oracle, as well as active in key global computing groups. Through its activities and services, DOL supports three main platforms, including nation development, education, and the environment. Employees of DOLs, such as those that provide internet services, are adept at troubleshooting for their customers and provide a range of customer services. Both students and employees have access to lab resources and internship training. Employing networking equipment, teach beginners to experts the fundamentals of networking

#### **2.2 Products and Services:**

One of the top national Internet service providers in Bangladesh is Daffodil Online Ltd. (ISPs). In the ICT industry, it is the oldest and most seasoned business, with a main emphasis on building long term client relationships. They are tremendously pleased of their accomplishments when they reflect on the last ten years. Additionally, Daffodil Online Limited offers a range of IT services and expert training.

## **Services:**

- ISP support.
- Datacenter
- IT Security protection.
- Web Hosting & Domain Registration.
- Corporate level Internet Solution.
- IT based Professional Courses & Training.
- Open Source application solution.
- Website Development.
- Remote troubleshooting
- Engineer certified by Red HAT.
- Ethical Hacking Training Program
- Certified Security Specialist by Red Hat
- Linux for Configuration and administration of an ISP.
- ISP configuration & Administration by using mikrotik.
- WLAN domain
- DNS, proxy, and mail server services.

## **2.3 Company Strength:**

- Management builds and maintains good relationships with clients.
- Setting up an online business.
- Information gathering.
- Expert trainer.
- Expert employees for 24/7 services and customer support.
- High-Security answer.
- Distinctive plan based mostly answer



## 2.4 Organizational Structure of Daffodil Online Limited:

Chairmen
Managing Director
CEO
General Manager
Secretary
Manager
Deputy Manager
Assistance Manager
Senior Officer
Officer
Office Staff

Table: 2.1: Organizational Structure of Daffodil Online Limited

## **CHAPTER 3**

### **INTERSHIP PROJECT TASK AND ACITIVIES**

#### **3.1 Daily Task and Activities:**

**Month – 1: I practiced the following throughout my first month of the Daffodil online restricted internship:**

- IP address introduction to the network.
- Recognizing the router's fundamental concept.
- Setup of the router and its operation.
- Investigating the Mikro-Tik router.
- About being aware of the many router kinds.
- About the setting of static routing.
- About the configuration of dynamic routing.

**Month- 2: When I finished a one-month internship, I learnt and did the following:**

- Acquired knowledge about Mikrotik PPPoE settings.
- Knowing how to configure NTP.
- Learning and comprehending local ISP configuration.
- Understanding how to configure the Bridge mode.
- WI-FI configuration is introduced.
- Trying to learn about the important two routes

**Month – 3: During my third month of internship, I learnt and completed the following tasks at Daffodil online limited:**

- Understanding of Cisco switch and router setup.
- Studying network cabling systems.
- I will be familiar with IPV6 concepts and configuration.
- Learn about cambium networks.

**Month – 4: Daffodil online limited fourth month internship, I will learn and perform these tasks:**

- Mikrotik web filtering

- Mikrotik VLAN
- Mikrotik load balance
- Mikrotik failover
- Mikrotik bandwidth control
- QoS of Mikrotik
- Virtual AP wireless
- VPN
- WISP
- Radius
- Hotspot
- Mikrotik Mesh

### **3.2 Events and Activates:**

- Upkeep and monitoring of the office network
- Set up user net permissions.
- Maintain vigilance over your computer systems and network.
- Set up user accounts and passwords.
- Correctional servers and routers
- Correction of the local area network and switches
- Resolving network faults
- Technical support for network users.
- Customer assistance via phone or in person is no longer available.
- Examine administrative and network consumption on a daily basis.
- Resolving network faults

### **3.3 Planning and Activities of my Project isp setup:**

- For Four Mikrotik routers core router, backup router, pppoe router and distribution router for clients to provide internet
- Two Mkirotik small devices for bridge mode switch(CISCO SWITCH), VLANs into office ,and lab connection
- Laptop/Desktop, cables, labs PCs implement and test connection.

### **3.4 Challenges:**

- ISP setup will be for wide area clients, to provide internet connections.
- ISP setup will be based on backed up connections and multiple routers.
- Internal network of ISP will be based on the best protocol of routing, so connections, distance are stable.
- Internal network routing protocol will be configured in best manner, so later external routing protocol connections can be built.
- ISP will not provide only internet connections to clients. It will also provide bandwidth as per packages, web, ftp server facilities.
- ISP maintenance like router configurations backup will be kept up to date.

### **3.5 ISP NOC Support :**

This chapter discusses the design and maintenance of ISP networks from the Network Operation Center. The main functions of the NOC are to ensure proper maintenance service, reliable connection to clients, high network security, and providing necessary network information to clients. NOCs have a significant impact in the IT management strategy of a Technology Service Provider or a Large Enterprise. Now i will explain how NOC supports a small isp network as i am designing and implement my internship project.

### 3.6 ISP NOC Support Methodologies:

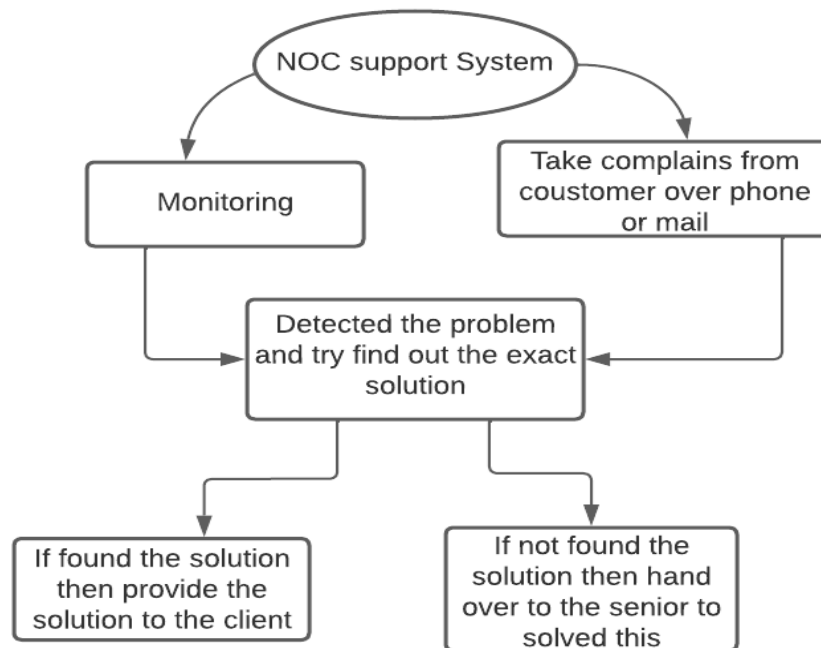


Figure 3.1: ISP NOC Support Technique

**ISP:** A device that offers various types of internet access or help providers is known as an Internet service provider (ISP). Internet service providers can be categorized as commercial, community-owned, nonprofit, or otherwise owned by an individual. Various ISP connection types

- Dial-up.
- Line of digital subscribers (DSL).
- Broadband through cable.
- Broadband via fiber optics.
- Broadband Wi-Fi.
- Mobile and satellite broadband.
- Exclusive leased line
-

### 3.7 Mikrotik Router:

Mikrotik hardware is mostly used for routers. Take bandwidth in the primary router than it is provided by a separate mikrotik router in any employer .Any employer that requests bandwidth will first receive it through their principal mikrotik router. It's used in LANs, mobile hotspots, and many other places for users to share data.

#### **MikroTik Router Rb2011UiAS:**

From all of our wireless routers, the MikroTik Router Rb2011UiAS has the most feathers and interface. It features a community processor running at 600MHz. 5GB LAN ports, Ethernet ports, SFP cage, 128 MB RAM. 802.11 WiFi at 2.4 GHz. Micro USB ports and RJ45 serial interfaces. It is a low cost router device with 10 ether ports that displays light according on their usages. This device router powered by router os.

Fig (3.2)



Fig: 3.2: Rb2011UiAS mikrotik router image.

### **3.8 Router OS:**

An operating system for routers is called Mikrotik. The primary product from Mikrotik is called Router OS, and it is based on the Linux kernel. On corporate hardware installed (Router board series). With features such as a firewall, bandwidth management, virtual private network operation, customer experience, and WI - fi, it may be converted into a computer network router. In addition, the system offers captive portal-based hotspot service. In addition, it is capable of using a hotspot, a bridge, a firewall, and DHCP. It integrates with swap, allowing for very smooth data transfer to the buyer. By offering a wealth of topical setup examples on its wiki and discussion board, MikroTik supports the brand. Both Internet Protocol version 6 (IPv6) and Internet Protocol model 4 (IPv4) are supported by router OS (IPv6).

### **3.9 Features:**

Many services utilized by Internet service providers are aided by router operating systems.

For example:

- It has a router function.
- It supports Open Flow, VPLS/MPLS, OSPF, BGP, and other protocols.
- It can serve as a bridge or switch.
- Offering client-server (PPPoE).
- Gives access to a virtual private network (VPN).
- Offers DHCP Server service and points for the firewall.
- Offering captive portal-based Wi-Fi Hotspot System.
- The management of bandwidth is fairly simple.
- A simple GUI interface.
- Simple to administer.
- Both IPv4 and IPv6 are supported.

### **3.10 Mikrotik Advantage:**

- Win box Web interface, telnet, SSH, and GUI over IP and MAC.
- Configurations for static, DHCP, PPPoE, and hotspots.
- Configuring a VLAN
- Layer 7 Protocol setup, NAT, Port forwarding, Address List, and firewall rules.
- The routing mode setup supports Mikrotik, RIPv1 and v2, OSPF v2, and BGPv4.
- PPPoE, PPTP, L2TP, Open VPN, GRE Tunnel, etc. VPN setup
- Network setup for wireless Access Control List, WEP, WPA, and WPA2 encryption, as well as AP mode and virtual APs.
- Bandwidth control management.
- Setting of a web proxy.
- Monetary efficient.
- A stable network connection.

### **3.11 Basic configuration Mikrotik Router physically Step by Step:**

- Input power in router board.
- Input WAN Connection (Internet Connection) in port Number 1.
- Port Number 2 connects to PC.
- Use the Winbox to browse

Open Win BOX at first. Now press the Refresh and Neighbors button. After that it's displaying the IP Address and Mac Address for the router. Admin username and password are empty by default. Click the connect button after that to configure all routers/devices step by step.



# CHAPTER 4

## DIAGRAM AND CONFIGURATION OF MY NETWORK ISP PROJECT

### 4.1 ISP Setup Project Diagram:

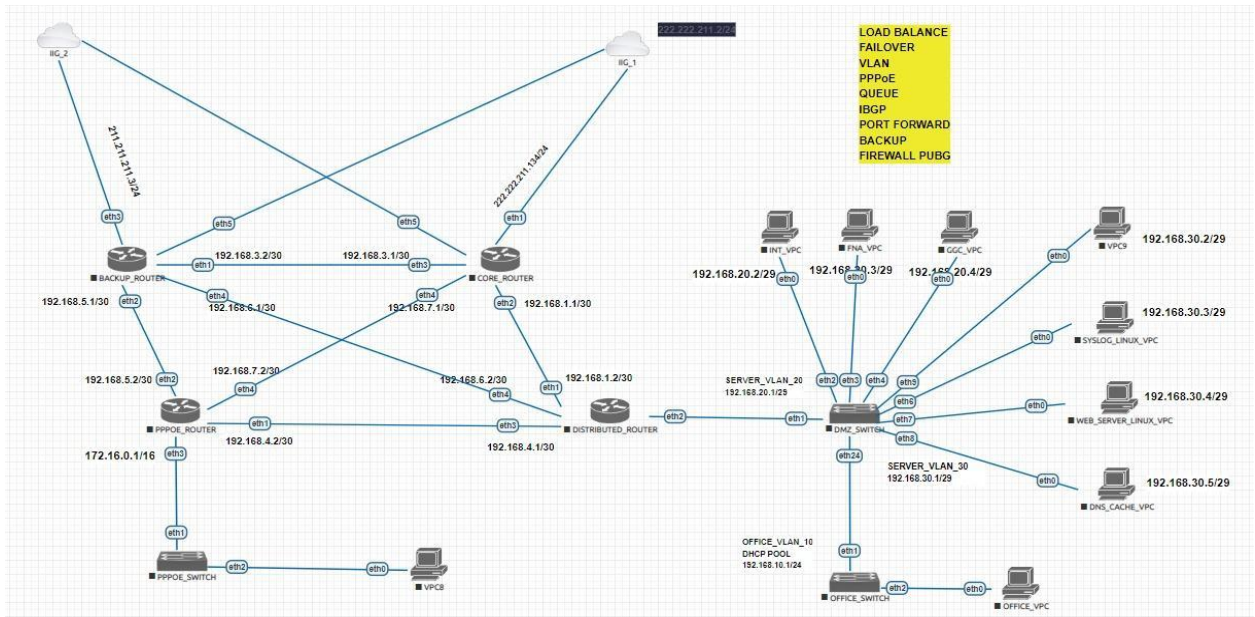


Figure 4.1: Diagram on ISP setup with Mikrotik

### 4.2 Core Router Configuration:

#### Step 1:

- ACCESSING CORE ROUTER WinBox INTERFACE:

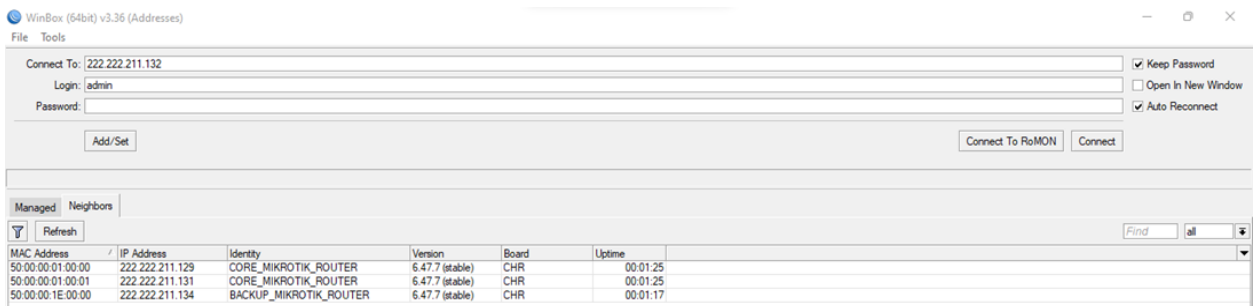
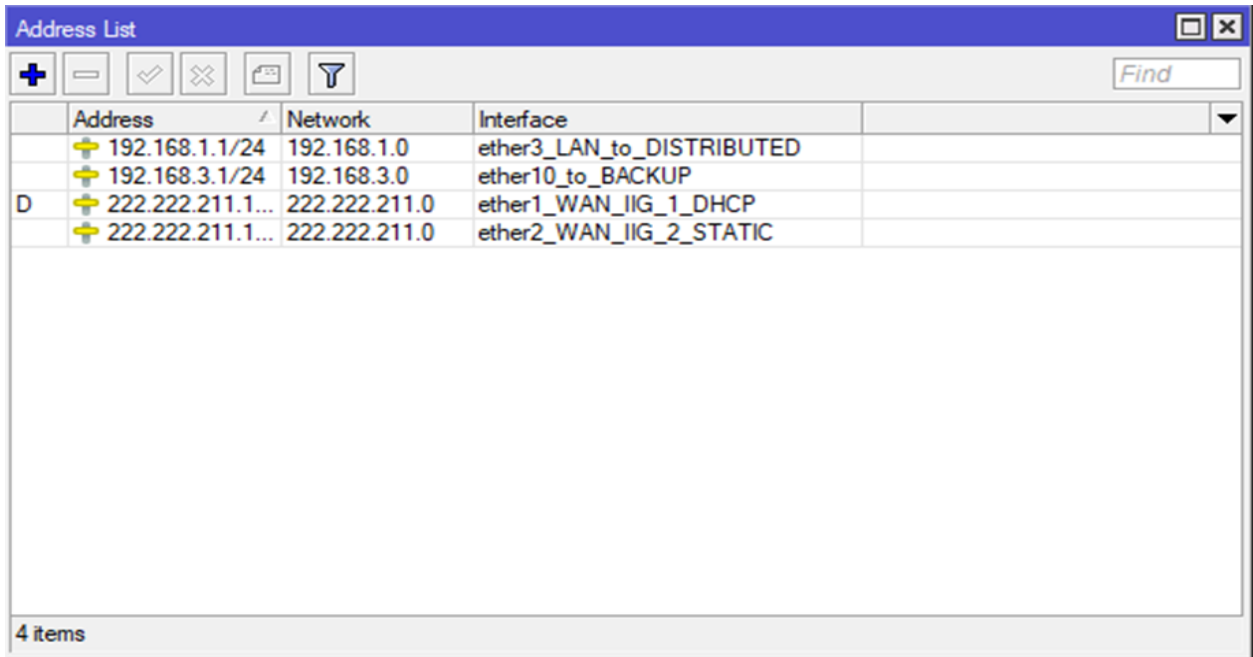


Figure 4.2: WinBox interface and connected Mikrotik routers

**Step2:**

- CORE ROUTER INTERFACE AND ADDRESSES, TWO WAN ADDRESSES FROM IIG, ONE ADDRESS LINKED TO BACKUP MIKROTIK ROUTER AND ONE ADDRESS FOR DISTRIBUTED LAN:

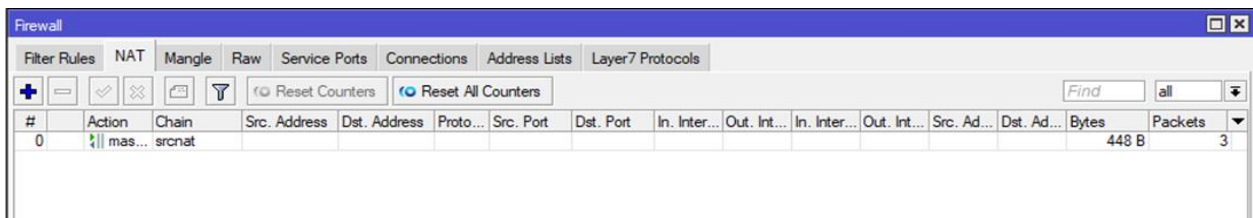


	Address	Network	Interface
	192.168.1.1/24	192.168.1.0	ether3_LAN_to_DISTRIBUTED
	192.168.3.1/24	192.168.3.0	ether10_to_BACKUP
D	222.222.211.1...	222.222.211.0	ether1_WAN_IIG_1_DHCP
	222.222.211.1...	222.222.211.0	ether2_WAN_IIG_2_STATIC

Figure 4.3: Mikrotik routers interface, ip addresses

**Step 3:**

- CORE ROUTER NAT SETTING FOR LAN:



#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Inter...	Out. Int...	In. Inter...	Out. Int...	Src. Ad...	Dst. Ad...	Bytes	Packets
0	mas...	srcnat												448 B	3

Figure 4.4: Firewall NAT configured

#### Step 4:

- CORE MIKROTIK ROUTER LOAD BALANCE FIREWALL MANGLE RULES:

#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Interface	Out. Int...	In. Inter...	Out. Int...	Src. Ad...	Dst. Ad...	Bytes	Packets
0	mar...	input						ether1_WAN_IIG_1_DHCP						57.0 KB	509
1	mar...	input						ether2_WAN_IIG_2_STATIC						8.0 KB	54
2	mar...	output												660.2 KB	351
3	mar...	output												0 B	0
4	acc...	prerouting		222.222.211.0/24				ether3_LAN_to_DISTRIBUTED						0 B	0
5	acc...	prerouting		222.222.211.0/24				ether3_LAN_to_DISTRIBUTED						0 B	0
6	mar...	prerouting						ether3_LAN_to_DISTRIBUTED						1642 B	9
7	mar...	prerouting						ether3_LAN_to_DISTRIBUTED						0 B	0
8	mar...	prerouting						ether3_LAN_to_DISTRIBUTED						1642 B	9
9	mar...	prerouting						ether3_LAN_to_DISTRIBUTED						0 B	0

Figure 4.5: Firewall routing, load balance configured

#### Step 5:

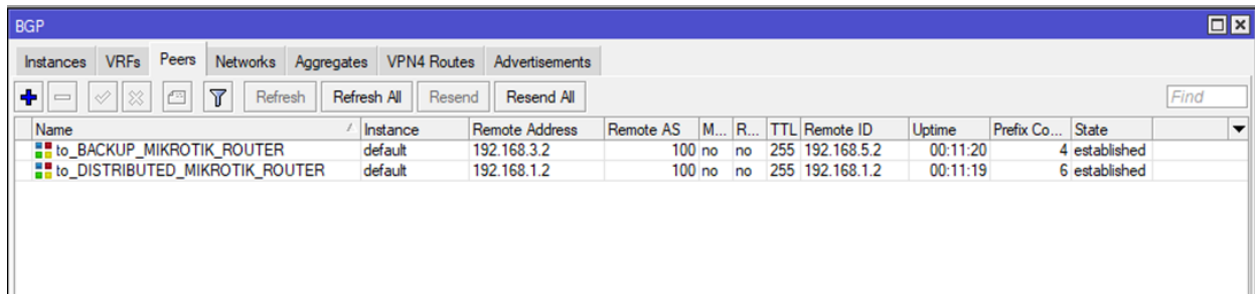
- CORE MIKROTIK ROUTER IBGP, ROUTES AND FAILOVER:

	Dst. Address	Gateway	Distance	Routing Mark	Pref. Source
XS	0.0.0.0/0	222.222.211.2	2		
S	0.0.0.0/0	192.168.3.2 reachable ether10_to_BACKUP	2		
DAS	0.0.0.0/0	222.222.211.2 reachable ether1_WAN_IIG_1_DHCP	1		
DAb	172.16.0.0/16	192.168.1.2 reachable ether3_LAN_to_DISTRIBUTED	200		
DAC	192.168.1.0/24	ether3_LAN_to_DISTRIBUTED reachable	0		192.168.1.1
Db	192.168.1.0/24	192.168.1.2 reachable ether3_LAN_to_DISTRIBUTED	200		
DAb	192.168.2.0/24	192.168.1.2 reachable ether3_LAN_to_DISTRIBUTED	200		
DAC	192.168.3.0/24	ether10_to_BACKUP reachable	0		192.168.3.1
Db	192.168.3.0/24	192.168.3.2 reachable ether10_to_BACKUP	200		
Db	192.168.4.0/24	192.168.3.2 reachable ether10_to_BACKUP	200		
DAb	192.168.4.0/24	192.168.1.2 reachable ether3_LAN_to_DISTRIBUTED	200		
DAb	192.168.5.0/24	192.168.3.2 reachable ether10_to_BACKUP	200		
DAb	192.168.100.0...	192.168.1.2 reachable ether3_LAN_to_DISTRIBUTED	200		
DAb	192.168.200.0...	192.168.1.2 reachable ether3_LAN_to_DISTRIBUTED	200		
DAC	222.222.211.0...	ether2_WAN_IIG_2_STATIC reachable, ether1_WAN_IIG_...	0		222.222.211....
Db	222.222.211.0...	192.168.3.2 reachable ether10_to_BACKUP	200		

Figure 4.6: iBGP routes list, failover configured

**Step 6:**

- CORE ROUTER IBGP ON SAME AS NUMBER:



The screenshot shows the Mikrotik WinBox BGP configuration window. The 'Peers' tab is active, displaying a table of configured BGP peers. Both peers are iBGP peers on the same AS (100).

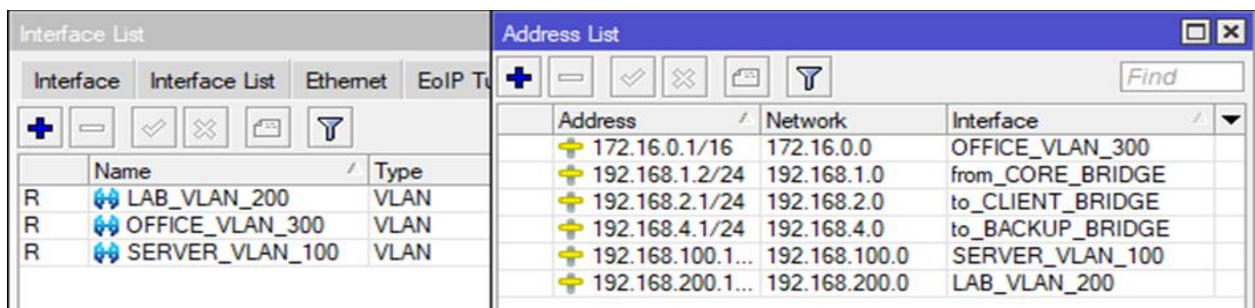
Name	Instance	Remote Address	Remote AS	M...	R...	TTL	Remote ID	Uptime	Prefix Co...	State
to_BACKUP_MIKROTIK_ROUTER	default	192.168.3.2	100	no	no	255	192.168.5.2	00:11:20	4	established
to_DISTRIBUTED_MIKROTIK_ROUTER	default	192.168.1.2	100	no	no	255	192.168.1.2	00:11:19	6	established

Figure 4.7: Configured iBGP, AS number

**4.3 Distributed Router Configuration:**

**Step 1:**

- DISTRIBUTED MIKROTIK ROUTER INTERFACE ADDRESSES WITH DECLARED VLANS:



The screenshot shows two windows from Mikrotik WinBox. The 'Interface List' window shows three VLAN interfaces. The 'Address List' window shows IP addresses assigned to these interfaces.

Name	Type
LAB_VLAN_200	VLAN
OFFICE_VLAN_300	VLAN
SERVER_VLAN_100	VLAN

Address	Network	Interface
172.16.0.1/16	172.16.0.0	OFFICE_VLAN_300
192.168.1.2/24	192.168.1.0	from_CORE_BRIDGE
192.168.2.1/24	192.168.2.0	to_CLIENT_BRIDGE
192.168.4.1/24	192.168.4.0	to_BACKUP_BRIDGE
192.168.100.1...	192.168.100.0	SERVER_VLAN_100
192.168.200.1...	192.168.200.0	LAB_VLAN_200

Figure 4.8: Configured VLANs and VLAN ip addresses

### Step 2:

- DISTRIBUTED ROUTER'S DHCP SERVER WITH VLANS DHCP IP POOL:

The screenshot shows two windows from Mikrotik WinBox. The 'DHCP Server' window displays a table of DHCP servers:

Name	Interface	Relay	Lease Time	Address Pool	Add AR...
LAB_VLAN_DHCP	LAB_VLAN_200		60d 00:10:00	LAB_VLAN_...	no
OFFICE_VLAN_DHCP	OFFICE_VLAN_300		60d 00:10:00	OFFICE_VLA...	no
SERVER_VLAN_DHCP	SERVER_VLAN_100		60d 00:10:00	SERVER_VL...	no

The 'IP Pool' window displays a table of IP pools:

Name	Addresses	Next Pool
LAB_VLAN_POOL	192.168.200.2-192.168.200.254	none
OFFICE_VLAN_POOL	172.16.0.2-172.16.255.254	none
SERVER_VLAN_POOL	192.168.100.2-192.168.100.254	none

Figure 4.9: Configured VLANs DHCP server and ip pool addresses

### Step 3:

- DISTRIBUTED ROUTERS VLAN NAT TCP, UDP BLOCKS FOR LAB VLAN USERS:

The screenshot shows the 'Firewall' configuration window in Mikrotik WinBox. The 'Filter Rules' tab is active, showing a table of firewall rules:

#	Action	Chain	Src. Address	Dst. Address	Protocol	Src. Port	Dst. Port	In. Inter...	Out. Int...	In. Inter...	Out. Int...	Src. Address List	Dst. Ad...	Bytes	Packets
0	drop	forward		172.16.0.0/16								LAB_VLAN_200		0 B	0
1	log	forward			6 (tcp)									0 B	0
2	log	forward			17 (udp)									0 B	0

Figure 4.10: Configured VLANs DHCP server and ip pool addresses

### Step 4:

- DISTRIBUTED MIKROTIK ROUTER TO CORE AND PPPOE ROUTER, GLOBAL PORT FORWARDING OF FTP, SYSLOG SERVERS:

The screenshot shows the 'Firewall' configuration window in Mikrotik WinBox. The 'NAT' tab is active, showing a table of NAT rules:

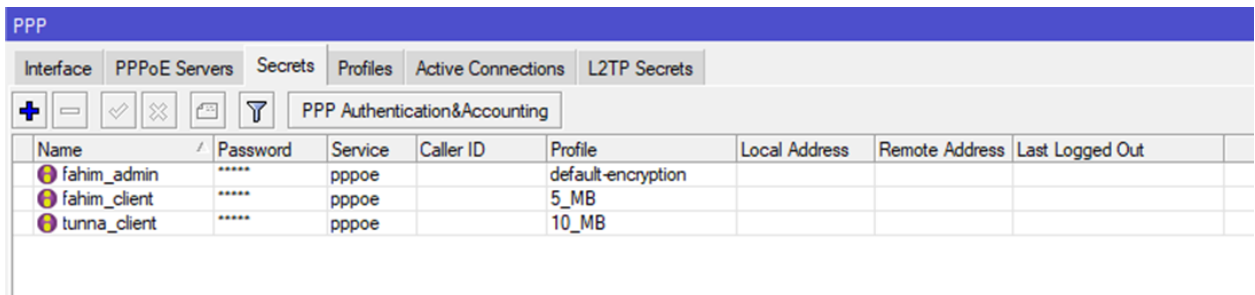
#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Inter...	Out. Int...	In. Inter...	Out. Int...	Src. Ad...	Dst. Ad...	Bytes	Packets
0	mas...	srcnat												180 B	3
1	dst...	dstnat		222.222.21...	6 (tcp)		21							0 B	0
2	dst...	dstnat		222.222.21...	6 (tcp)		514							0 B	0

Figure 4.11: Firewall NAT, port-forwarding configured.

#### 4.4 PPPOE Router Configuration:

##### Step 1:

- PPPOE MIKROTIK ROUTER PPPOE SERVER:

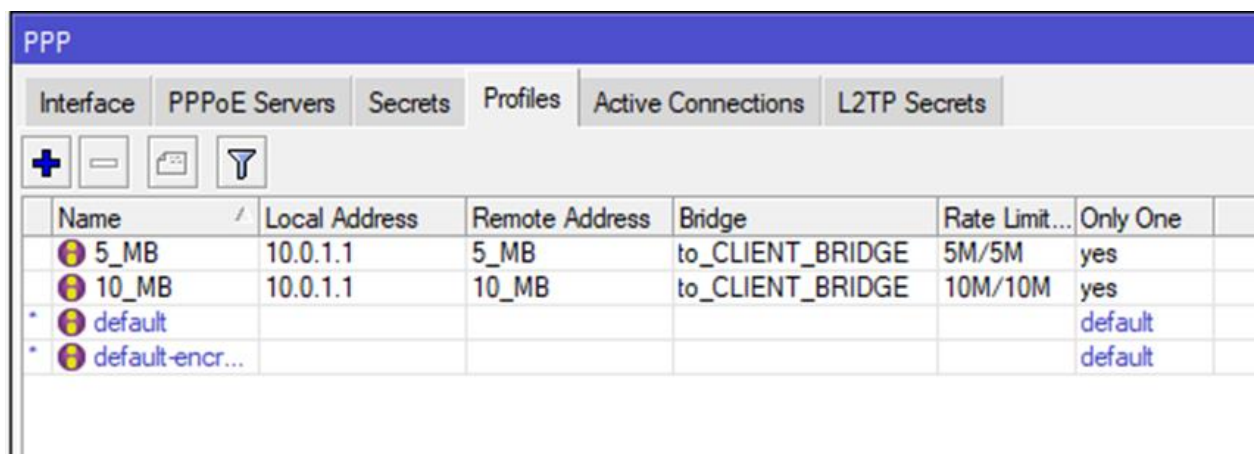


Name	Password	Service	Caller ID	Profile	Local Address	Remote Address	Last Logged Out
fahim_admin	*****	pppoe		default-encryption			
fahim_client	*****	pppoe		5_MB			
tunna_client	*****	pppoe		10_MB			

Figure 4.12: Configured PPPoE server, username, passwords

##### Step 2:

- PPPoE USER BANDWIDTH PACKAGE CONFIGURATION

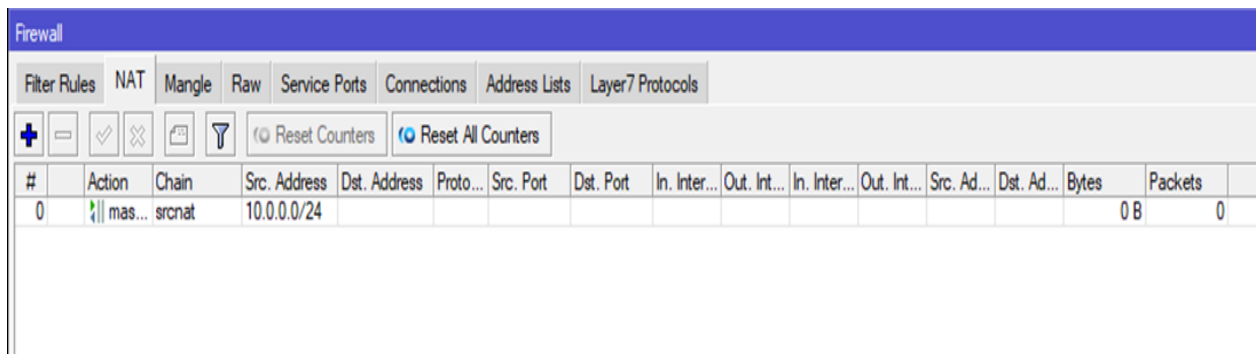


Name	Local Address	Remote Address	Bridge	Rate Limit...	Only One
5_MB	10.0.1.1	5_MB	to_CLIENT_BRIDGE	5M/5M	yes
10_MB	10.0.1.1	10_MB	to_CLIENT_BRIDGE	10M/10M	yes
* default					default
* default-encr...					default

Figure 4.13: PPPoE user's bandwidth package configured

### Step 3:

- PPPOE ROUTERS LAN NAT RULE FOR A RANGE OF PPPOE CLIENTS:



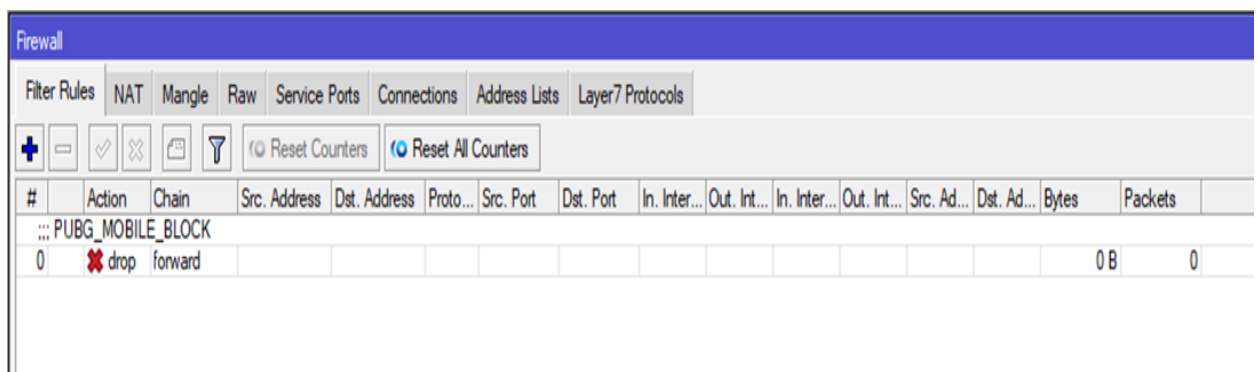
The screenshot shows the Mikrotik WinBox Firewall configuration interface. The 'NAT' tab is selected. A single rule is visible in the table below. The rule has an action of 'mas...' and a chain of 'srcnat'. The source address is '10.0.0.0/24'. The statistics show 0 Bytes and 0 Packets.

#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Inter...	Out. Int...	In. Inter...	Out. Int...	Src. Ad...	Dst. Ad...	Bytes	Packets
0	mas...	srcnat	10.0.0.0/24											0 B	0

Figure 4.14: Firewall NAT rule for PPPoE users

### Step 4:

- PUBG BAN FIREWALL RULES FOR PPPOE CLIENTS:



The screenshot shows the Mikrotik WinBox Firewall configuration interface. The 'Filter Rules' tab is selected. A rule named 'PUBG\_MOBILE\_BLOCK' is visible. The action is 'drop' and the chain is 'forward'. The statistics show 0 Bytes and 0 Packets.

#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Inter...	Out. Int...	In. Inter...	Out. Int...	Src. Ad...	Dst. Ad...	Bytes	Packets
0	drop	forward												0 B	0

Figure 4.15: Firewall rules for pppoe users to block PUBG

**Step 5:**

- QUEUES BANDWIDTH MANAGEMENT:

#	Name	Target	Upload Max Limit	Download Max Limit	Packet Marks	Total Max Lin
0	FTP_PPPOE	10.0.0.0/24	50M	50M		
1	FNA_PPPOE	10.0.0.0/24	30M	30M		
2	GGC_PPPOE	10.0.0.0/24	20M	20M		
3	10_MB_PPPOE	10.0.2.0/24	10M	10M		
4	5_MB_PPPOE	10.0.1.0/24	5M	5M		

Figure 4.16: Queue bandwidth configured for PPPoE users

**Step 6:**

- PPPOE CLIENT CONNECTING TO THEIR USERNAME AND PASSWORD:

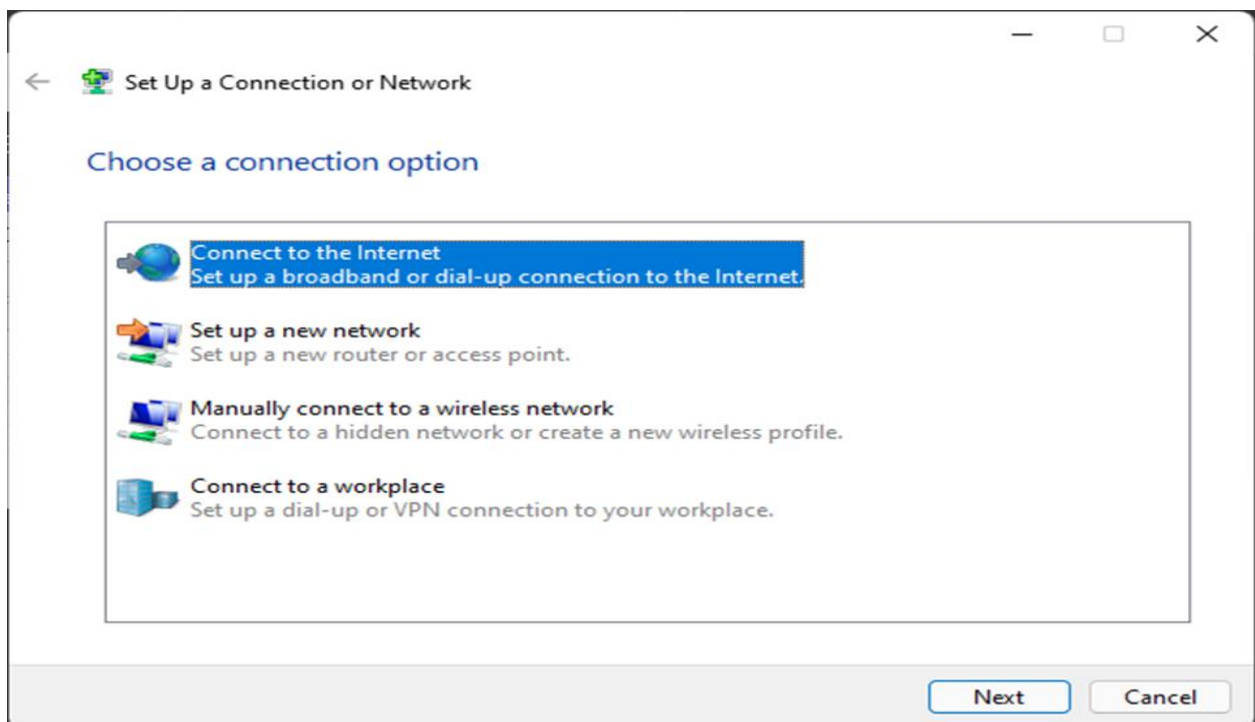


Figure 4.17: PPPoE username, password connection for internet



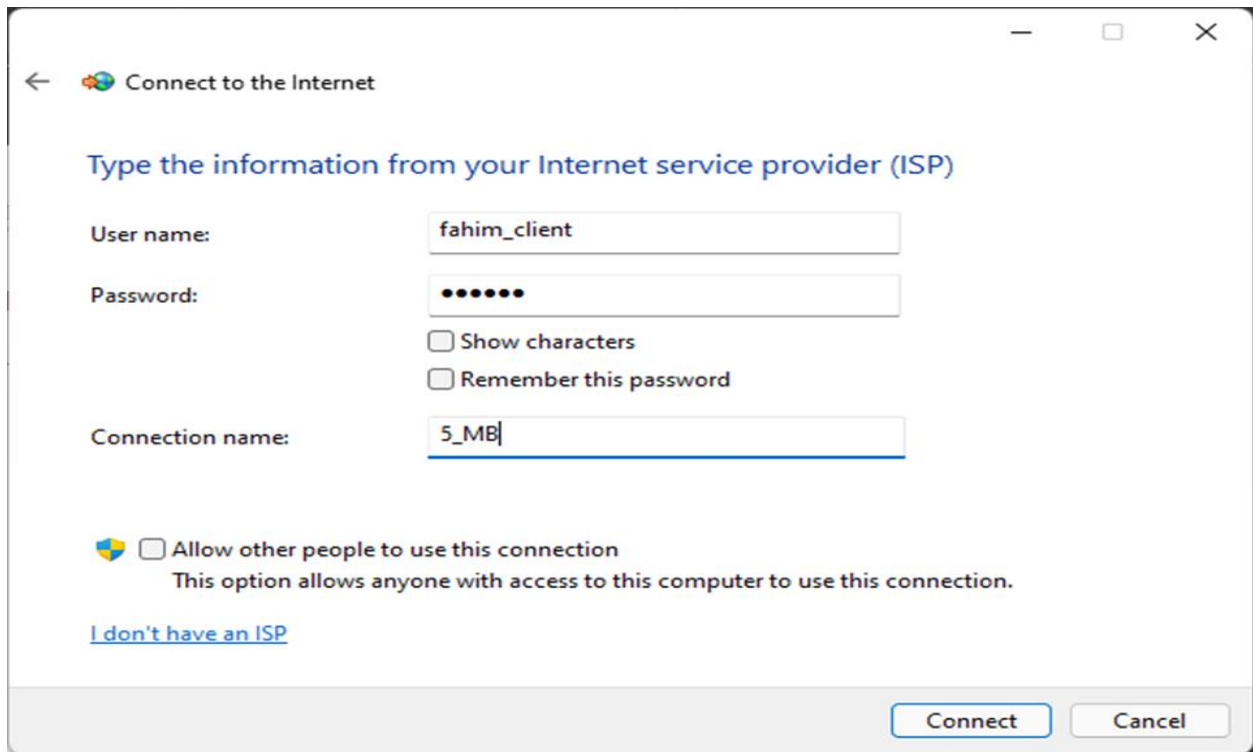


Figure 4.18: PPPoE username, password connection of bandwidth package.

## 4.5 Backup Router Configuration:

### Step 1:

- SCRIPT BACKUP TO EMAIL

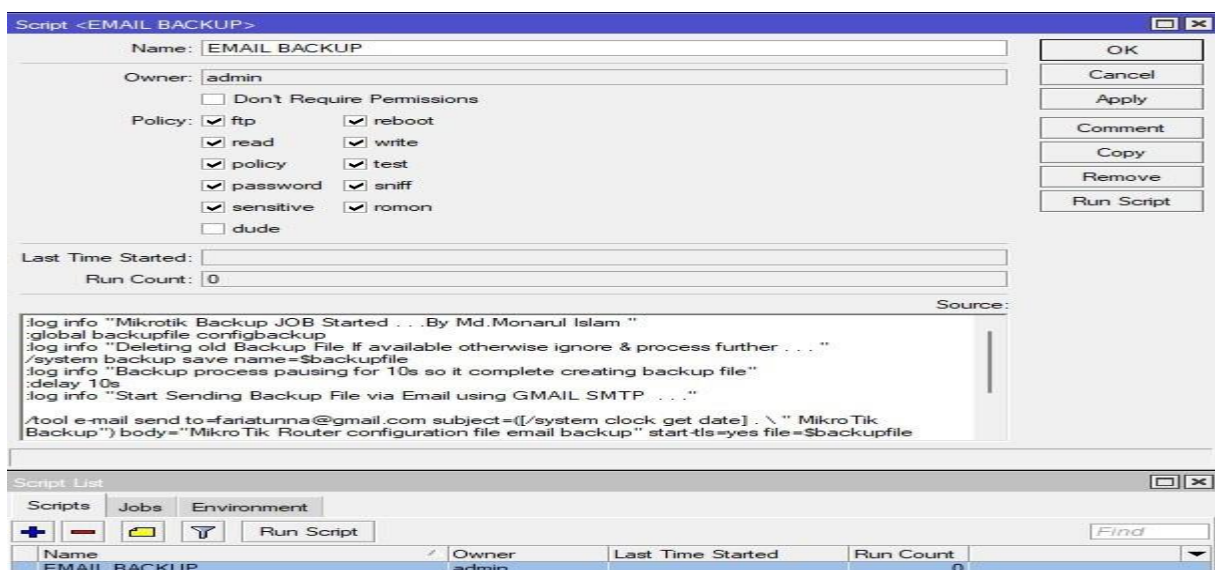


Figure 4.19: Routers script to backup configurations

## **Step 2:**

- Manual Router Backup:

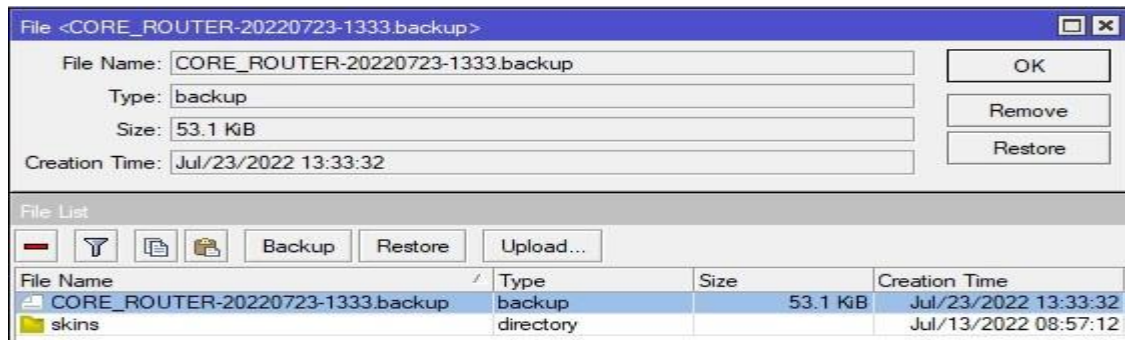


Figure 4.20: Routers manual backup

## **4.6 ISP Setup configuration issues:**

- If win box access cannot be executed after connecting the Mikrotik device, it's not clear whether the problem is where the problem is this cable or port problem?
- After connecting the Mikrotik router, if several Mikrotik neighbors are shown in the win box .But if they are not identified the connected device can be understood by looking at the uptime router board model.
- One of the reasons for not being able to access the win box even after connecting the MikroTik device is that the VMware Ethernet port is enabled on the PC, after disabling it can be connected to the Mikrotik device lan port without any problem.
- Not renaming the MikroTik router's interface requires repeated physical checks of the device port number.
- Can be connected to the Mikrotik device LAN port without any problem.
- Not renaming the MikroTik router's interface requires repeated physical checks of the device port number.

# CHAPTER 5

## RESULT

### 5.1 Ping Connectivity Test

- Ping connectivity to www.yahoo.com test from Core Router:

```
Terminal <1>
MikroTik RouterOS 6.47.7 (c) 1999-2020      http://www.mikrotik.com/

[?] Gives the list of available commands
command [?] Gives help on the command and list of arguments

[Tab] Completes the command/word. If the input is ambiguous,
a second [Tab] gives possible options

/ Move up to base level
.. Move up one level
/command Use command at the base level
[admin@CORE_ROUTER] > ping www.yahoo.com
SEQ HOST                               SIZE TTL TIME  STATUS
0 202.165.107.50                        56 128 51ms
1 202.165.107.50                        56 128 48ms
2 202.165.107.50                        56 128 48ms
3 202.165.107.50                        56 128 48ms
4 202.165.107.50                        56 128 217ms
5 202.165.107.50                        56 128 615ms
6 202.165.107.50                        56 128 252ms
sent=7 received=7 packet-loss=0% min-rtt=48ms avg-rtt=182ms max-rtt=615ms
[admin@CORE_ROUTER] >
```

Figure 5.1: ping connectivity test

### 5.2 Router load balance, failover connectivity test by ping

- Core Router, Load balance and Failover ping test to gateway:

```
[admin@CORE_ROUTER] > ping 222.222.211.2
SEQ HOST                               SIZE TTL TIME  STATUS
0 222.222.211.2                        56 128 1ms
1 222.222.211.2                        56 128 0ms
2 222.222.211.2                        56 128 0ms
3 222.222.211.2                        56 128 0ms
4 222.222.211.2                        56 128 0ms
5 222.222.211.2                        56 128 0ms
6 222.222.211.2                        56 128 0ms
7 222.222.211.2                        56 128 0ms
sent=8 received=8 packet-loss=0% min-rtt=0ms avg-rtt=0ms max-rtt=1ms
[admin@CORE_ROUTER] >
```

Figure 5.2: Router load balance, failover connectivity test by ping

### 5.3 Ping Test to Gateway

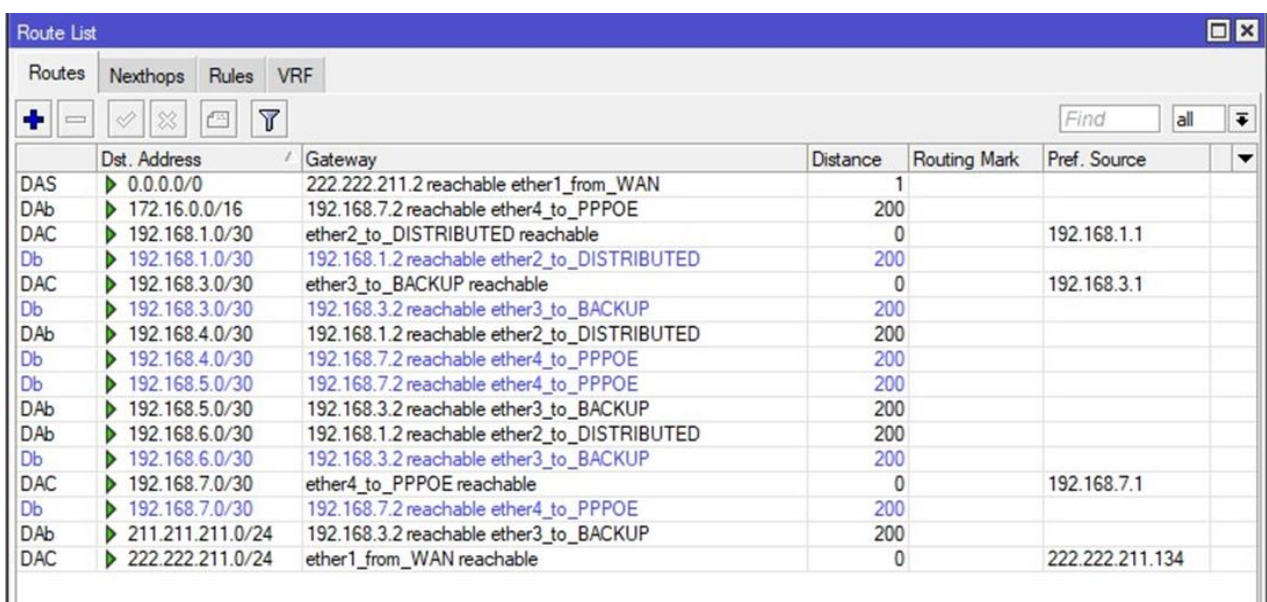
- Backup Router, Load balance and Failover ping test to gateway:

```
[admin@BACKUP_ROUTER] > ping 211.211.211.33
SEQ HOST                               SIZE TTL TIME  STATUS
0 222.222.211.2                        56 128 1ms
1 222.222.211.2                        56 128 0ms
2 222.222.211.2                        56 128 0ms
3 222.222.211.2                        56 128 0ms
4 222.222.211.2                        56 128 0ms
5 222.222.211.2                        56 128 0ms
6 222.222.211.2                        56 128 0ms
7 222.222.211.2                        56 128 0ms
sent=8 received=8 packet-loss=0% min-rtt=0ms avg-rtt=0ms max-rtt=1ms
[admin@BACKUP_ROUTER] >
```

Figure 5.3: Ping test to gateway

### 5.4 Route List ip Addresses Of iBGP Routing

- Core Router iBGP all routes:



	Dst. Address	Gateway	Distance	Routing Mark	Pref. Source
DAS	0.0.0.0/0	222.222.211.2 reachable ether1_from_WAN	1		
DAb	172.16.0.0/16	192.168.7.2 reachable ether4_to_PPPOE	200		
DAC	192.168.1.0/30	ether2_to_DISTRIBUTED reachable	0		192.168.1.1
Db	192.168.1.0/30	192.168.1.2 reachable ether2_to_DISTRIBUTED	200		
DAC	192.168.3.0/30	ether3_to_BACKUP reachable	0		192.168.3.1
Db	192.168.3.0/30	192.168.3.2 reachable ether3_to_BACKUP	200		
DAb	192.168.4.0/30	192.168.1.2 reachable ether2_to_DISTRIBUTED	200		
Db	192.168.4.0/30	192.168.7.2 reachable ether4_to_PPPOE	200		
Db	192.168.5.0/30	192.168.7.2 reachable ether4_to_PPPOE	200		
DAb	192.168.5.0/30	192.168.3.2 reachable ether3_to_BACKUP	200		
DAb	192.168.6.0/30	192.168.1.2 reachable ether2_to_DISTRIBUTED	200		
Db	192.168.6.0/30	192.168.3.2 reachable ether3_to_BACKUP	200		
DAC	192.168.7.0/30	ether4_to_PPPOE reachable	0		192.168.7.1
Db	192.168.7.0/30	192.168.7.2 reachable ether4_to_PPPOE	200		
DAb	211.211.211.0/24	192.168.3.2 reachable ether3_to_BACKUP	200		
DAC	222.222.211.0/24	ether1_from_WAN reachable	0		222.222.211.134

Figure 5.4: Route list ip addresses of iBGP routing.

## 5.5 VLAN address, DNS address on PC

- VLAN DHCP IP addresses from Distributed Router:

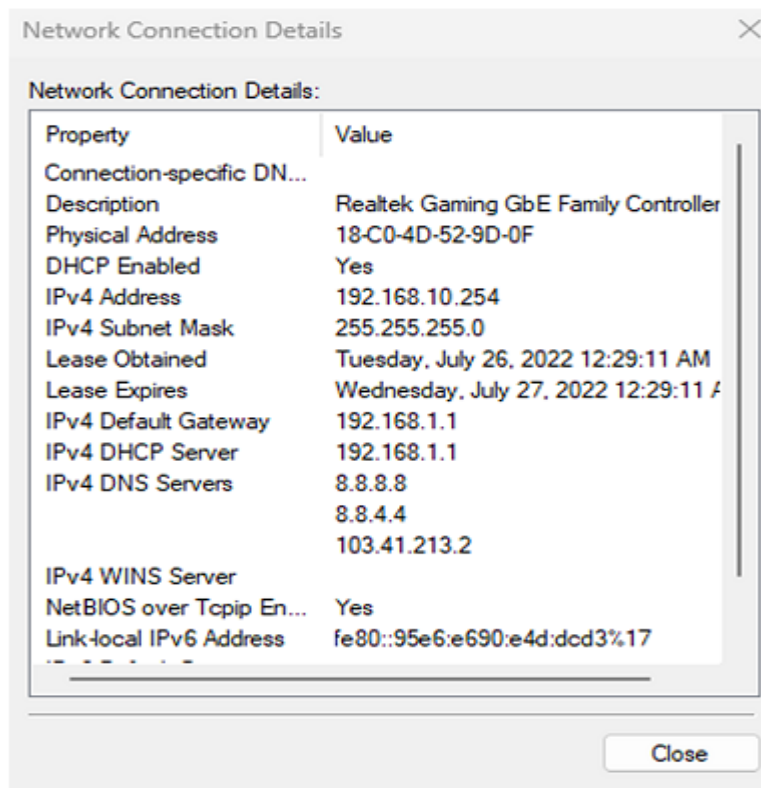


Figure 5.5: VLAN address, DNS address on PC

## 5.6 VLAN DHCP leases, mac addresses

- Distributed Router Mikrotik DHCP Server leases:

The screenshot shows the Mikrotik DHCP Server interface with the following table of leases:

	Address	MAC Address	Client ID	Server	Active Address	Active MAC Address	Active Host Name	Expires After	Status
D	192.168.1.252	00:50:79:66:68:02	1:0:50:79:66:68:2	VLAN_10_DHCP	192.168.1.252	00:50:79:66:68:02	DCL	60d 00:09:39	bound
D	192.168.2.253	00:50:79:66:68:08	1:0:50:79:66:68:b	VLAN_10_DHCP	192.168.2.253	00:50:79:66:68:08	DCL	47d 21:24:07	bound
D	192.168.2.254	00:50:79:66:68:0A	1:0:50:79:66:68:a	VLAN_10_DHCP	192.168.2.254	00:50:79:66:68:0A	DCL	48d 18:48:01	bound
D	192.168.3.254	00:50:79:66:68:0D	1:0:50:79:66:68:d	VLAN_10_DHCP	192.168.3.254	00:50:79:66:68:0D	DCL	48d 18:35:50	bound

Figure 5.6: VLAN DHCP leases, mac addresses.

## 5.7 PPPoE users 5MBPS, 10MBPS bandwidth:

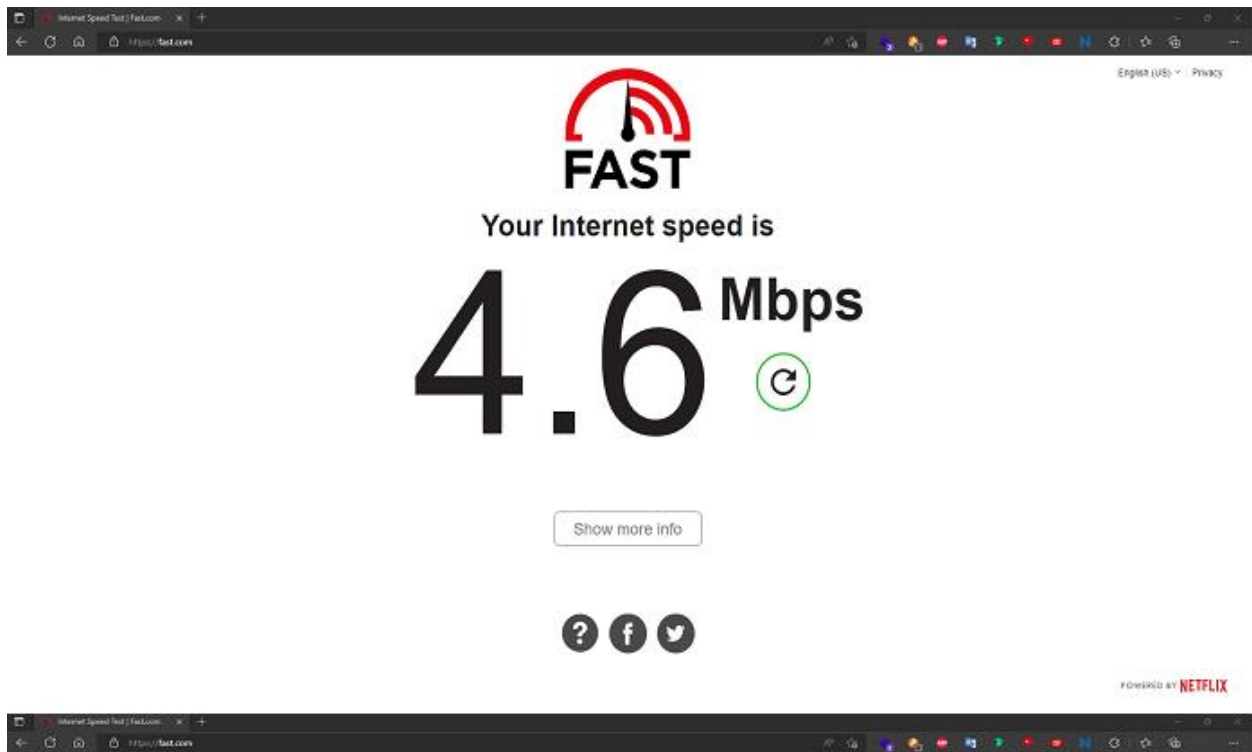


Figure 5.7.1: 5 MBPS bandwidth test



Figure 5.7.2: 10 MBPS bandwidth test

## 5.8 PPPoE users YouTube bandwidth testing from GGC server:

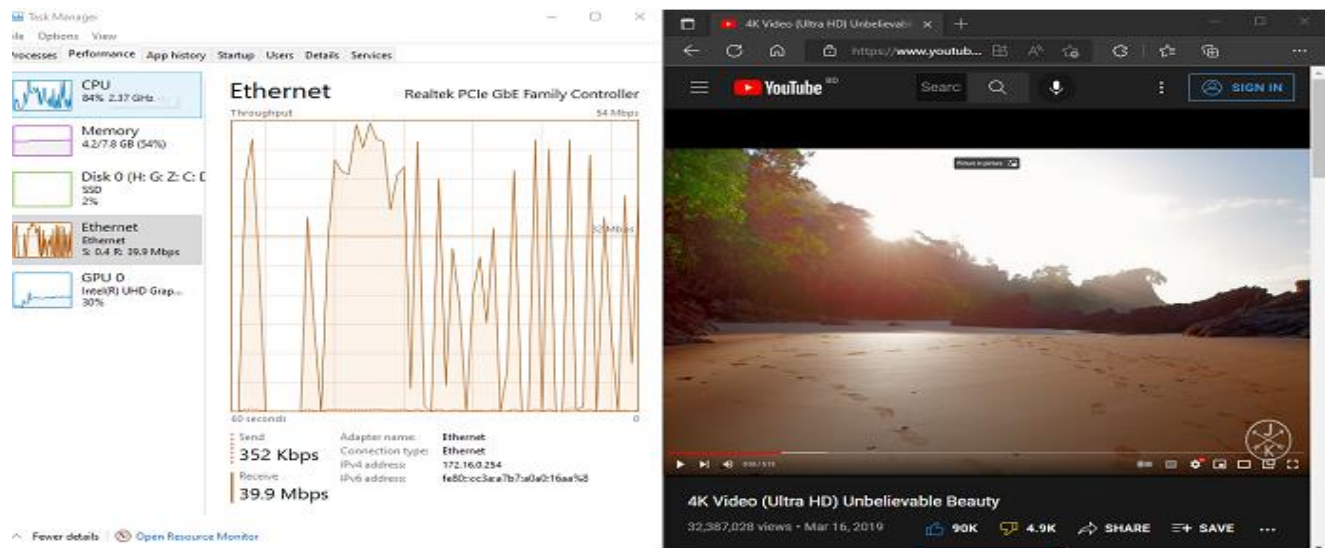


Figure 5.8: YouTube bandwidth testing

## 5.9 PPPoE users FNA bandwidth testing:

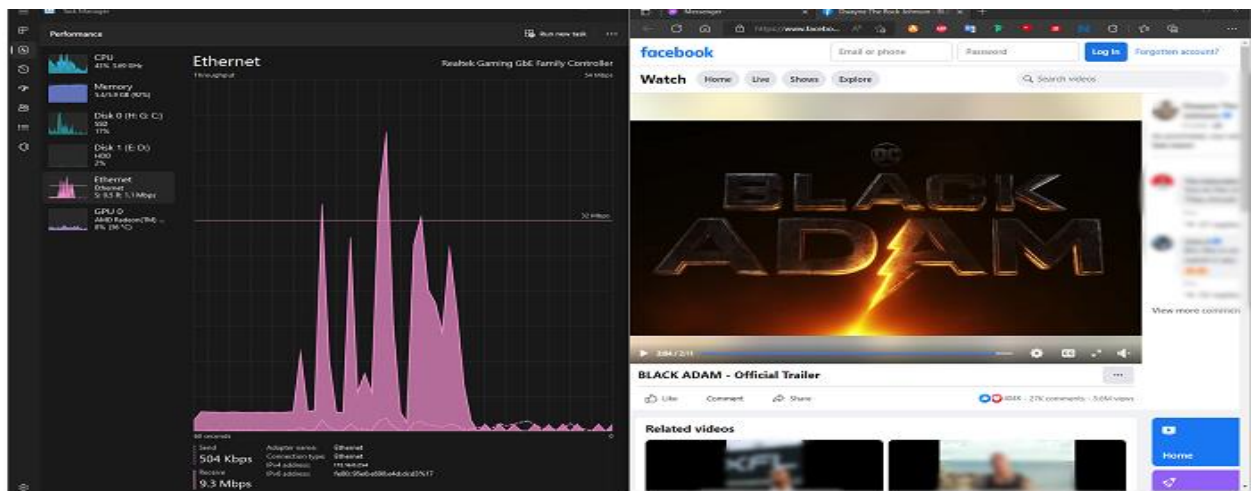


Figure 5.9: FNA bandwidth testing

## 5.10 PUBG block testing from PPPoE Routers Firewall rules:

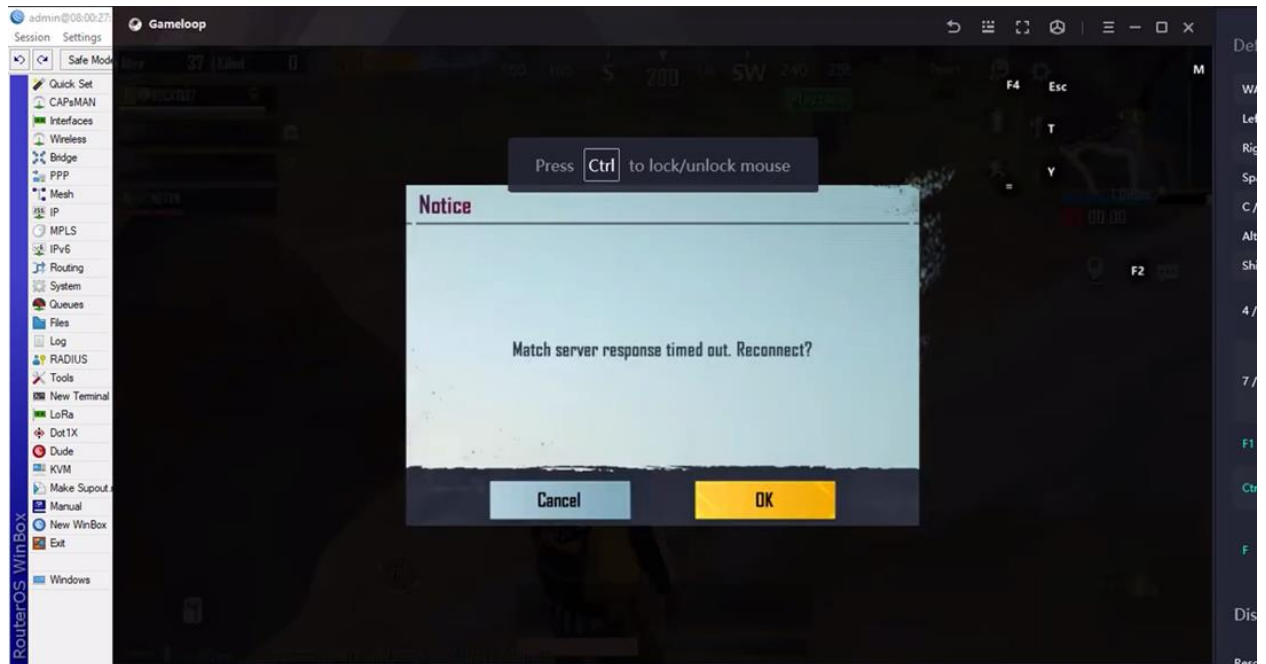


Figure 5.10: PUBG block testing from PPPoE Routers

## 5.11 Port Forward:

- All routers port forward, FTP port 21:

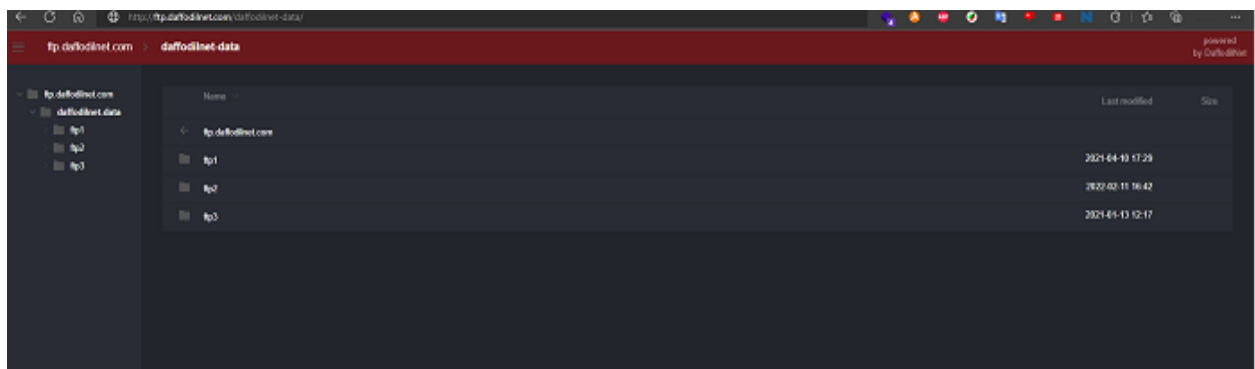


Figure 5.11.1: FTP port 21



- **Web port 80:**

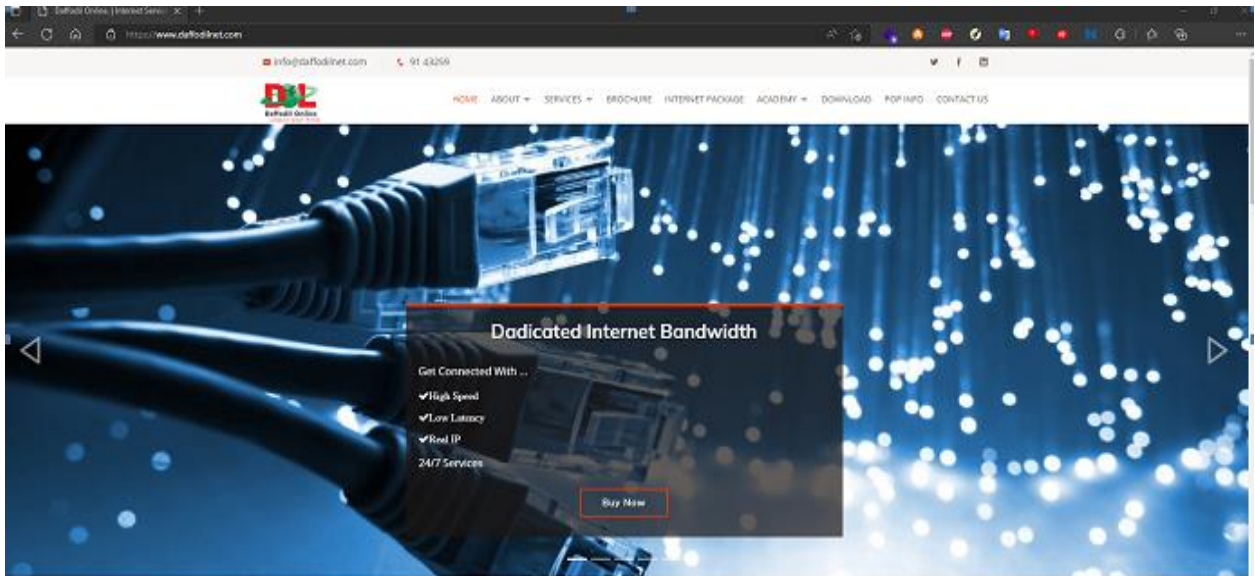


Figure 5.11.2: Web port 80.

## 5.12 Routers Email Scheduled Backups:

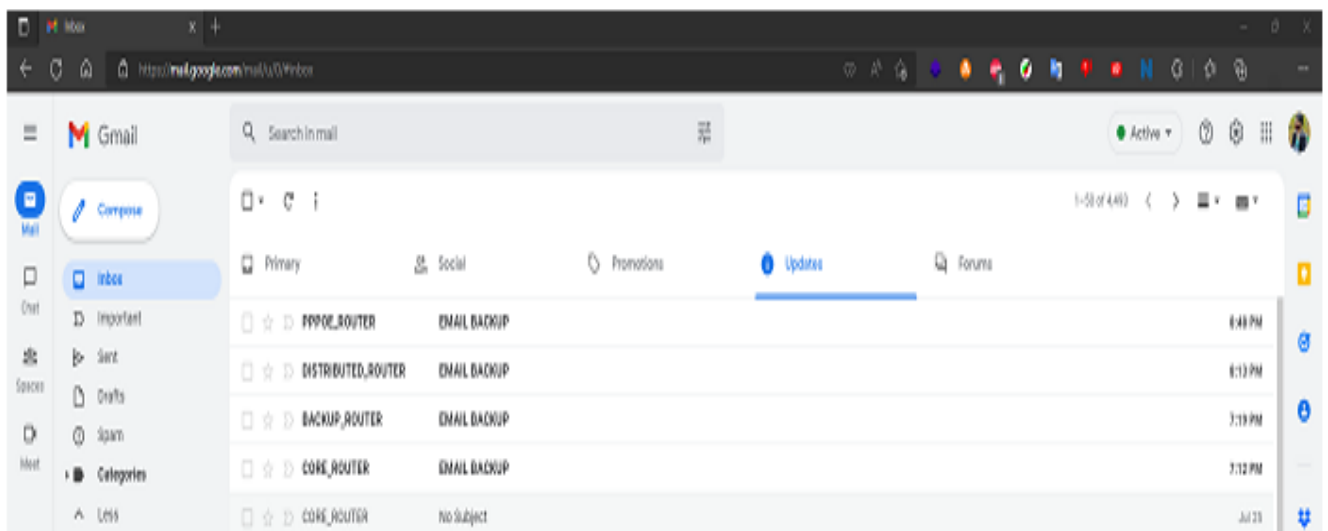


Figure 5.12: Routers Email Scheduled Backup

### 5.13 All routers Syslog backup to Syslog server:

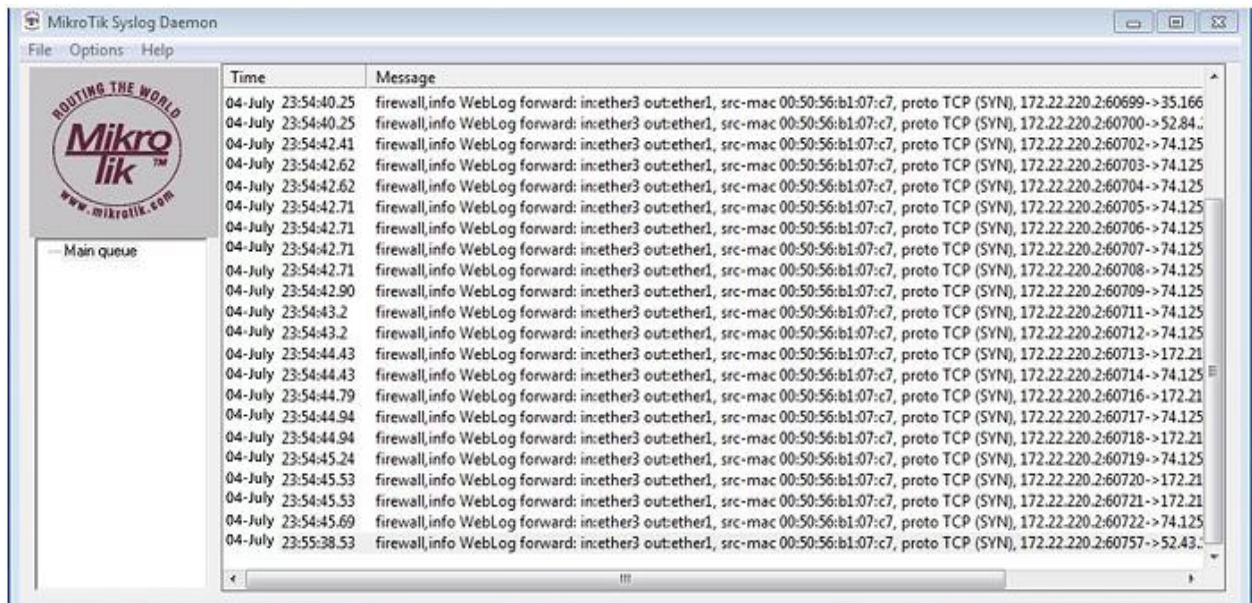


Figure 5.13: All routers Syslog backup to Syslog server

## **CHAPTER 6**

### **CONCLUSION AND FUTURE SCOPE**

#### **6.1 Conclusion:**

The internship has been a great and rewarding experience in my life. I will learn about Mikrotik network configuration and network creation and configuration throughout the course of my internship project. Additionally, I'll learn and fully comprehend IP courses. The main lessons learned from working on this project were how to configure an ISPS link, bandwidth control management, bridge mood, firewall and Nat, VLAN, queue BGP, etc. Also learn Full ISP full setup. All of the teaching has helped and enhanced my employment goals and career skills. As a result I can create a professional ISP setup and administration with mikrotik .I will be able to give you with opportunities to network with a great number of people, and I can see the future of it. It is essential to raise the operation and administration process' degree of quality in the age of science and information technology. Businesses desire training in a range of topics to boost client offers, expand talent sharing, speed up new business initiatives, and improve customer service. IT is a straightforward but efficient tool for attaining each of these goals. Simply said, internships are a step up in the professional world. An internship acts as a bridge between academic learning and real-world experience. Throughout the internship, several practical experiences were obtained while carrying out activities simultaneously.

#### **6.1 Future Career & Scopes:**

Anyone who wants to work in our nation may find it challenging, especially if they lack expertise. Because it would enable me to transform my job chance into an experience, that's why I decided to pursue an internship. Therefore, I believe that this internship will help me discover a future job. Some examples include working for an ISP-based platform, network engineer, technical support manager, and security manager for the organization.

## REFERENCES

- Details on Daffodil Online Limited (DOL), at << <https://www.daffodilnet.com/>; >> last accessed on 20-07-2022 at 12:00 PM.
- MikroTik Router Configuration File Auto Backup via Email at << <https://backdoordhaka.blogspot.com/2019/01/mikrotik-router-configuration-file-auto.html> >> last accessed on 03-8-2022 at 9:42 PM.
- Learn about MikroTik: < <<https://mikrotik.com/>>> last accessed on 23-09-2022 at 9:00 PM.
- About win box use, <<<https://systemzone.net/mikrotik-router-basic-configuration-using-winbox>>> last accessed on 23-08-2022 at 9:00 PM.
- Get Concept about RouterOS, <<<http://www.revolvy.com/main/index.php?s=MikroTik>>>
- Most of the Information", <<En.wikipedia.org>>, <<[https://en.wikipedia.org/wiki/IP\\_address](https://en.wikipedia.org/wiki/IP_address)>> last accessed on 26-10-2022 at 11:00 PM.

## APPENDICES

### Appendix A

#### Internship Reflection:

My internship's main objective is to offer workable answers to difficulties encountered in the real world. Real-world applications are made of classroom knowledge. Relating to the workplace learning how to deal with new information, talents, and skills, and making and executing strategies. To ensure that they could learn from and comprehend via the acts of other Professional Supervisors and Employees, the network had to be expanded. I recommend the appropriate business strategy, how to communicate with teammates, and the organization's overall goal in order to complete my internship. After my internship experience is over, consider the professional judgment of my internship supervisor. Internship experience is necessary, along with transferable leadership and service skills, to get ready for life in a global society.

### Appendix B:

#### Company Details:



#### Head Office

Name	Daffodil online Limited
Address	120, Shukrabad, Mirpur road, Dahanmondi. Dhaka-1207, Bangladesh.
Telephone	60 02-9143258-60
Fax	880-2-8116103
Email	<a href="mailto:info@daffodilnet.com">info@daffodilnet.com</a>
Website	<a href="http://www.daffodilnet.com">www.daffodilnet.com</a>
Type of Organization	Nationwide Internet Services Provider

## Internrnship Report(183-16-388)

### ORIGINALITY REPORT

<b>14%</b>	<b>13%</b>	<b>1%</b>	<b>11%</b>
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

### PRIMARY SOURCES

<b>1</b>	<b>Submitted to Daffodil International University</b> Student Paper	<b>8%</b>
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