

ISP NETWORK WITH MIKROTIK ROUTER CONFIGURATION

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Internship report titled is “ISP Network with Mikrotik Router Configuration” submitted by “Md. Fojle Rabbi” & ID is: “172-15-10043” to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 8th October, 2020.

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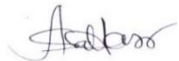
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DECLARATION

I hereby declare that, this Internship report paper has been done by me **Md. Fojle Rabbi**, **Id: 172-15-10043** the department of Computer Science and Engineering, Daffodil International University under the supervision of **Israt Jahan, Lecturer, Department of CSE** Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

I also declare that, I collect information from the **Explore Online ISP**, Books & Internet.

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ABSTRACT

The MikroTik router is a more powerful device than other routers, which has many advantages, including Internet sharing and bandwidth control. It is a device like a switch / router, ranging in size from a small box to a large box. Some of these devices also have wireless facilities. For those who do not want to use such devices, there is another method - MikroTik ISO. It is an operating system, with which the computer can be used as a router by installing this operating system on the computer. Before we go into detail about these two methods, we don't know what are the benefits of using a microscopic router.

My internship goal was learning networking with Mikrotik basically I focused on ISP networking. Winbox is designed for implement Mikrotik. Mikrotik is founded in 1996 by Arnis Riekstins and John Tully. Regardless of which router board or operating system you use as a MikroTik router, the sales representative will set the basic configuration for you. Find out before you buy whether the sales representative will give you an advantage in this regard. Mikrotik router is widely used for Its easy bandwidth management. This Router is easily accessible and cost friendly. Mikrotik router is popular because It can managed big and small network system. Explore online (ISP Company) uses this router in this section.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The Mikrotik router board looks a lot like any other router or switch. This device has one port for internet connection and LAN port for local area network. However, there may be more than one port. In this case you have to configure which port to use for any purpose. This router will act as an internet sharing server and it is possible to use multiple devices on the same network using this device. You need to configure the required features properly. Mikrotik router boards range in price from Tk 4,000 to over Tk 1 lakh. However, the price will depend on the features of the device, the type of license and the size of the router. You can also see the features according to the model on the router board from the internet. There are different types of router boards according to the model. Such as: RB 750, RB 750G, RB 751 (wireless), RB 951 (wireless), RB 450G, RB 1100, RB 1100AH X2 etc. I have managed the network GUI using a Mikrotik command or Winbox.

One is the command prompt, known as the micro terminal, and the other is the graphical mode. Working in graphical mode will require a separate tool called Winbox. At the beginning of the use of Mikrotik, working in text or command mode is difficult for newcomers to understand. For this, the work is shown in a simple way, i.e. through the Winbox, in the Mikrotik router configuration method.

1.2 Motivation

Opportunity to work as a computer networking engineer. There are ISPs in the Internet service provider companies. Besides, there are job opportunities in mobile companies, banks, airlines, travel agencies, stock markets, multinational and national companies, buying houses, i.e. where computer network and internet are used. The job market is getting bigger day by day.

To build a career in computer network engineering, you must have the patience to study the subjects. My opinion is that if you have not studied computer science first, then I will suggest to watch some computer network related video on YouTube.

It will demonstrate about a computer network. And for those who are graduating in computer science, data communication and computer networking courses are two of the best. If you do, you will know something much better. And those are diploma-in-computer Reading this, they have to read e-services and data communication, fundamentals well.

1.3 Objective

The major aim is do the internship to make myself skillful and find a suitable job. So developing my skill in this site is very important to me. I have learned some knowledge to develop me as a human being. I have chosen Mikrotik router networking as internship because it has very good opportunities to build a career in Networking. Currently many organizations are hiring network engineer all over the world. I gather practical skill and my main focus will be represent my practical skill as well as. Bandwidth control is very handy on this router so Mikrotik router play as data center. The main objective is to gather knowledge for higher education. Since, as student of computer engineering I have preferred ISP networking with Mikrotik router.

- ✚ Bandwidth control and distribution,
- ✚ Powerful QoS controls,
- ✚ Auto system backups,
- ✚ IP-MAC address bonding system,
- ✚ Filtering and Firewalls,
- ✚ HotSpot and VPN,
- ✚ RIP, OSPF, BGP, MPLS Routing,
- ✚ Winbox GUI, remote
- ✚ Telnet / Mac-Telnet / SSH service
- ✚ Various benefits including load balancing.

1.4 Role to the company

Explore Online ISP is one of the most important was the Internet service provider in Mohammadpur-Lalmatia-Dhanmondi. The internship program where I took my Intern in Explore Online ISP. The company provides broadband internet in most of Mohammadpur areas. This company created in 2005 with BTRC licensed. Now they have 6k+ faithful clients. The company arrogances itself leading Internet service providers in Mohammadpur, Dhaka, Bangladesh. It makes the field of ICT where its main business policy is long-term relationships with clients the most experienced and most established associations.

1.5 Report Layout

The report is sorted as follows-

Chapter: 1

In this chapter I defined Introduction, Motivation of my Internship and overview the company.

Chapter: 2

In second chapter I determine about Market situation, service in IT and role of the company.

Chapter: 3

In chapter 3, I defined on Systematic activities, Proceedings, Internship tasks and challenges in real life.

Chapter: 4

In this chapter I defined about what I have learned, My Smart plan and the Reflections.

Chapter: 5

I defined Discussion about my whole Internship program and Summarize it with my future career.

CHAPTER 2

ORGANIZATION

2.1 Introduction

Explore Online ISP is a broadband internet company in Mohammadpur, Dhaka. The company provides broadband internet at home and business or offices. The company provides his internet mainly in Mohammadpur maximum areas, Lalmatia and Dhanmondi. The company has great performance in the internet community. Explore Online was started his journey from 2005 licensed under BTRC providing internet services. This is to ensure a quality service and customer satisfaction, and strive to achieve. Explore Online is connected to BDIX and gives variety services to users. Its unique complementary services are Audio Hub, Tube Server, FTP and many more.

Why choose our company:

- ✚ 99% Availability and Constant Speed
- ✚ Extensive Client Support with 6k+ clients
- ✚ Low Latency Video Streaming & Game Play
- ✚ Gamer play Game Friendly and No port Blocking
- ✚ 24 Hours/7 days Support the customers and maintain physical problem
- ✚ Company has skills 15+ years activity
- ✚ Personal and Customs FTP Server and BDIX uses the customers
- ✚ Free Wi-Fi Testing Router Service and Customize bandwidth support

2.2 Product & Market Situations

Explore Online ISP is the bandwidth provider in Mohammadpur, Dhaka. This company delivers broadband connectivity and delivers qualified service with solution from the year 2005. The ISP provides most of the corporate and residential areas in Mohammadpur, Dhaka. This company provides 24 hours high speed bandwidth service with very cheap rate. Networks providing the simplest, most efficient and most effective network and delivers the message, The class is the homebased network of the workplace organization.

Services:

- + Network Connection
- + Protecting System
- + Various Up-stream
- + Client Support 24/7
- + Commercial level Internet authorization
- + Sale of different kinds of Routers
- + Networking cables, TZ networking device
- + PPPoE Client Server

2.3 Target Group

The strategies of the organization is to think about the clients, perfect his goals. The new proposal for the highest increase in the company increases. The count of the business client stand-up creations consists of all clients and all small to middle-sized dealings. This exact values and the essential market create to more customers.

2.4 Organization Structure



Figure 2.1: Organizational Structure

CHAPTER 3

TASK, PROJECTS AND ACTIVITIES

3.1 Daily Task and Activities

First Month: I learned during my internship and achieved some responsibilities completed successfully-

- + Knowledge of Network IP range and class wise address.
- + Knowledge of Networking setup of LAN.
- + Knowledge about Mikrotik company also Mikrotik device.
- + Setup Mikrotik router.

Second Month: In this second month of my Internship I learned and achieved some responsibilities-

- + How an ISP setup in Winbox.
- + Firewall and NAT setup in Winbox.
- + Static IP setup in Winbox.
- + Queue setup in Winbox.
- + D.H.C.P setup in Winbox.

Third Month: In this third month of my Internship I learned and achieved-

- + FTP Server setup.
- + How to block a Site.
- + How to unblock a Site.
- + Bridge configures.
- + Day and Night Bandwidth package create and time setup.

Fourth Month: In this last month of my Internship I performed that-

- + PPPoE setup in Winbox.
- + Overview above all content.

3.2 Events and Activities

From Explore Online ISP I have knowledge physically and practically works in this office. My internship program is a new way of gaining my knowledge and in real life I have achieved the following tasks.

- ✚ I know the Internet protocol range, classes & addresses of all classes.
- ✚ I know about Mikrotik devices, price & capability.
- ✚ I have well knowledge of networking materials.
- ✚ Observe and protecting networks.
- ✚ Create the users account, user password
- ✚ Server, LAN, switch and router solutions.
- ✚ Identify network errors.
- ✚ Observe internet speed via graphs on winbox or links.
- ✚ Signifying IT resolutions services.
- ✚ Managed companies F.T.P server.
- ✚ Supporting the customer over the phone, otherwise going to his house if necessary to solve the problem.
- ✚ Check out Fiber Optic Media Conversion & Devices.

3.3 Project Task and Activities

3.3.1 IP Range and Addresses

IP/Internet Protocol is necessary for separated network or creating network. An IP address is a number that detects the address of a particular computer. Local Area Network IP address of the computer to detect the computer connected to the network.

IP Range:

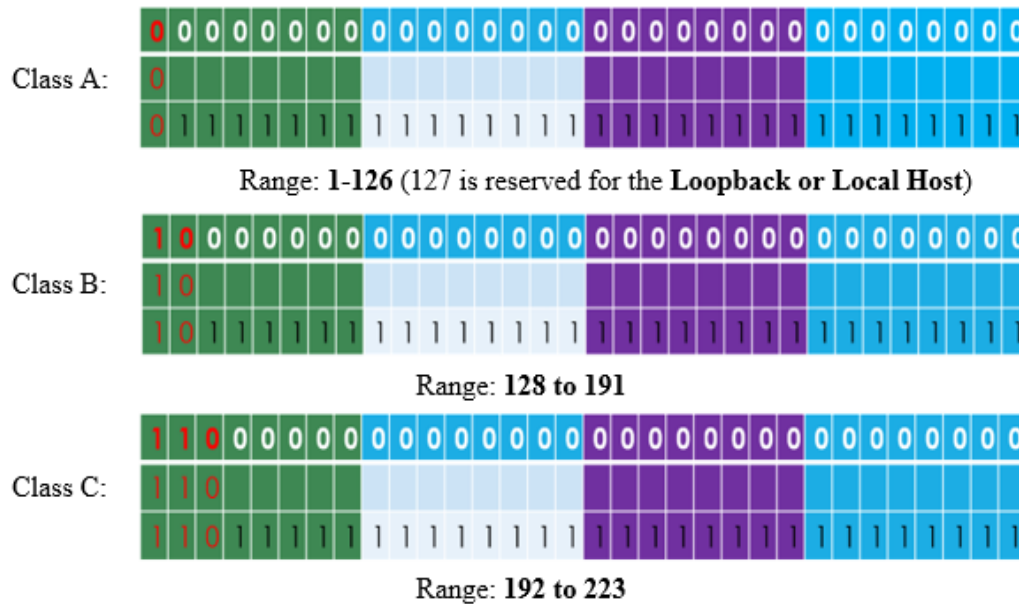


Figure 3.1: Ranges of IP Addresses

IP address are 5 classes & have 4 octet. Each Octet has 8bit. IP addresses are over-all 32bit. Class--A has only one Network & three Host octet. Class--B has two Network & two host octet. Class--C has three Network & one host octet and Class D&E is using for multicasting & researching for experiments.

3.3.2 Local Area Network System

Local area network involves of under wired and wireless end positions, To configure a LAN need to PCs, Router, Switch, Server, Wireless Access Point, and Devices.

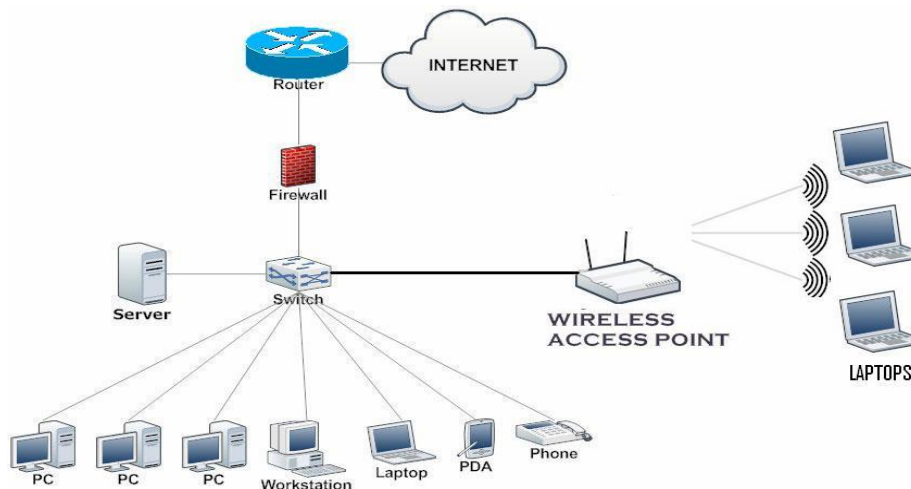


Figure 3.2: LAN Networking System

3.3.3 About of Mikrotik

The most common mistake we make is to use a Mikrotik router. Mikrotik and Mikrotik routers are two different things. Microtek is a router or a company name. Who usually make networking products. It is a Latvian company based in Riga, Latvia. The company started its journey in 1996. Mikrotik companies get the most popular because of their routers. Their routers have become popular with everyone because of their low price and very good quality. Mikrotik Router is a router made by Microtek Company. One of the most popular routers today is the Mikrotik Router. What makes it so popular is its wizard interface. It is very easy to configure and manage. With the help of Mikrotik router, network bandwidth management and network administration work can be done.

3.3.4 Structure of Mikrotik Router

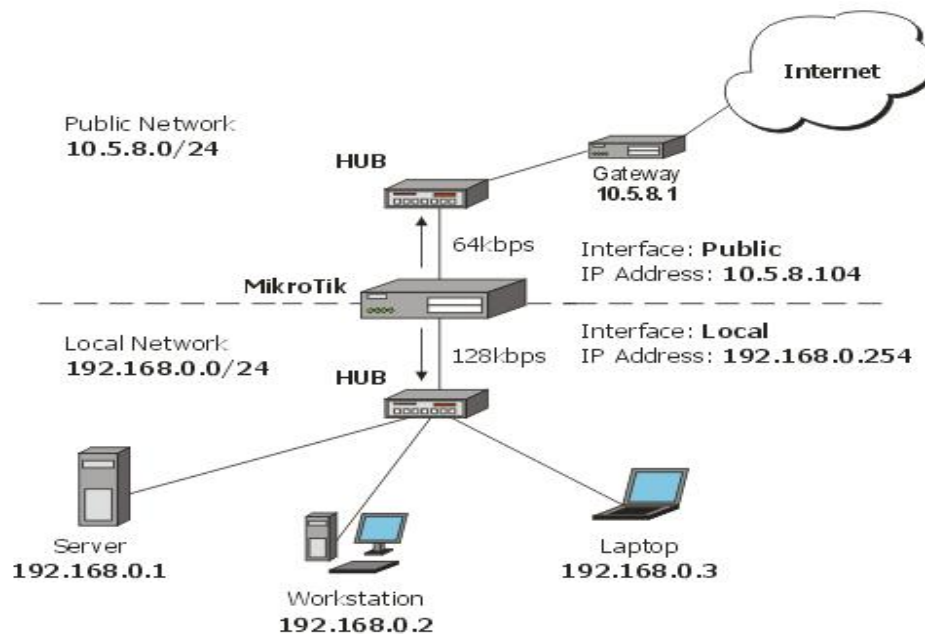


Figure 3.3: Structure of Mikrotik Router

Log-in Interface:



Figure 3.4: Log in Interface

Installation process of Mikrotik RouterOS for PC using Virtual Machine=VMware
at home installation material:

- ✚ Virtual Machine=VMware Software.
- ✚ Application of .iso file
- ✚ WinBox Application

Not required for my Internship place cause, My Internship place has already there Mikrotik router. Virtual Machine essential at home exercise else arrangement Mikrotik router.



Figure 3.5: Installation Console of Mikrotik

Interface of WinBox:

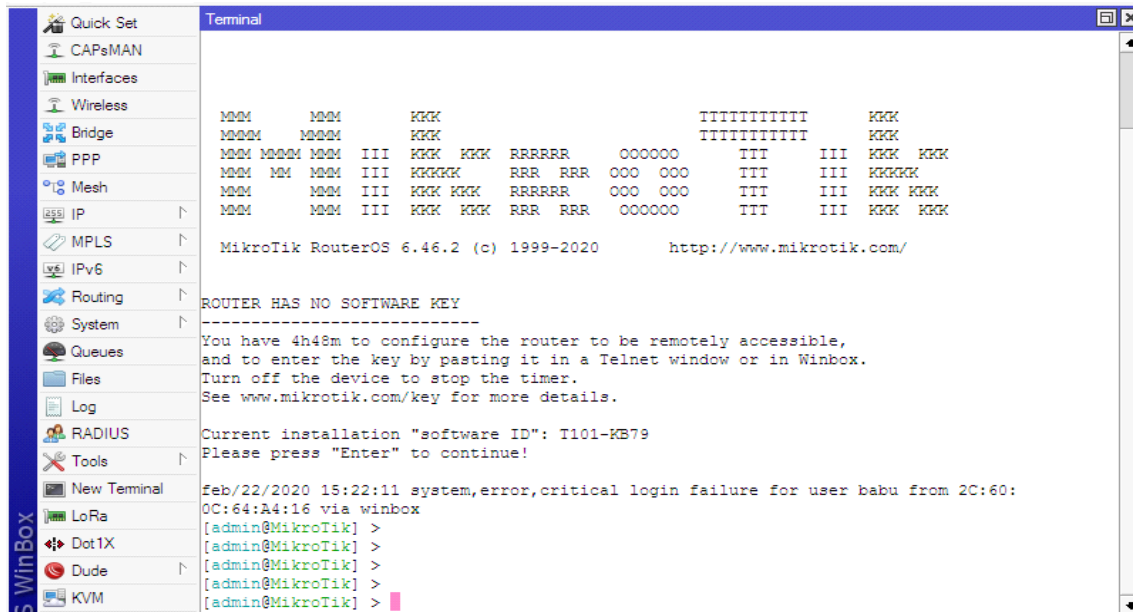


Figure 3.6: Terminal of Winbox

3.3.5 Configuration of Static IP

'Interface >> then select Ethernet >> General >> and select LAN then OK'

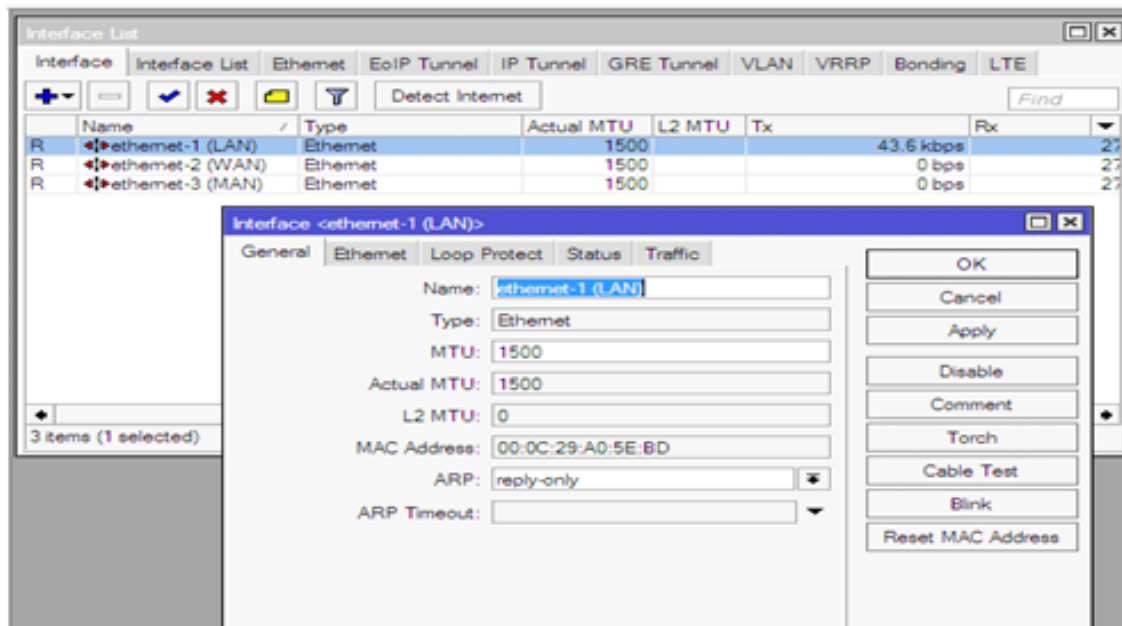


Figure 3.7: Ethernet -1 (LAN)

'IP - Address - type Address - type Network for LAN, MAN, WAN then OK'

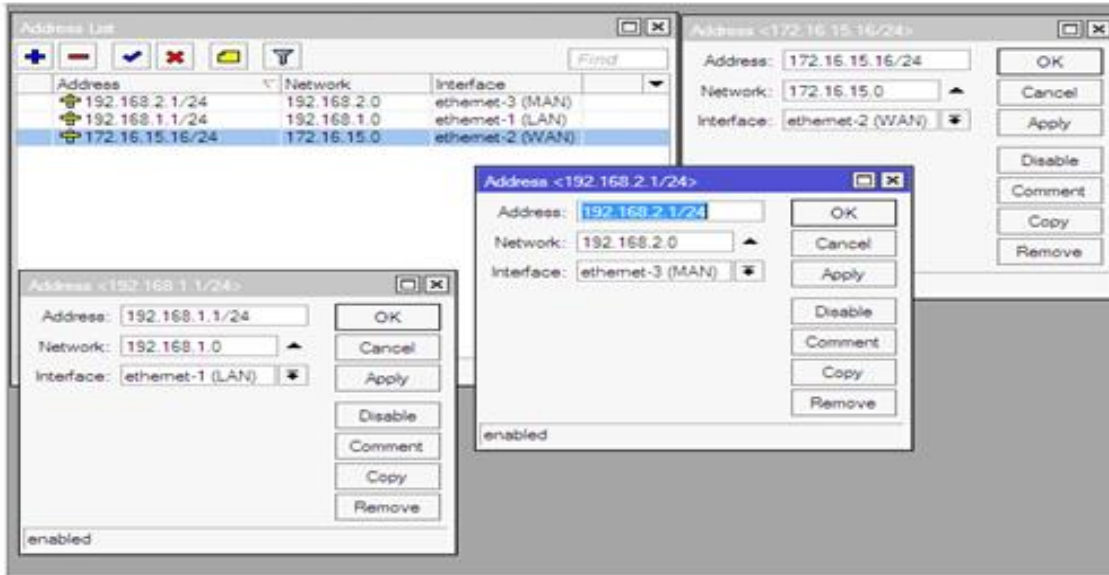


Figure 3.8: Interface of Ethernet -1, Ethernet -2, Ethernet -3

Now 'IP to DNS to (+) to Servers finally OK'

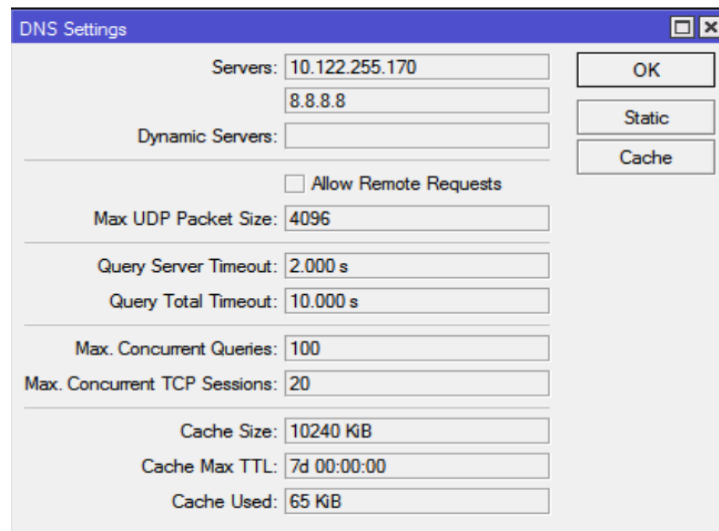


Figure 3.9: Domain Name Server Settings

Go to IP—Firewall—NAT then follow below same as Action tap

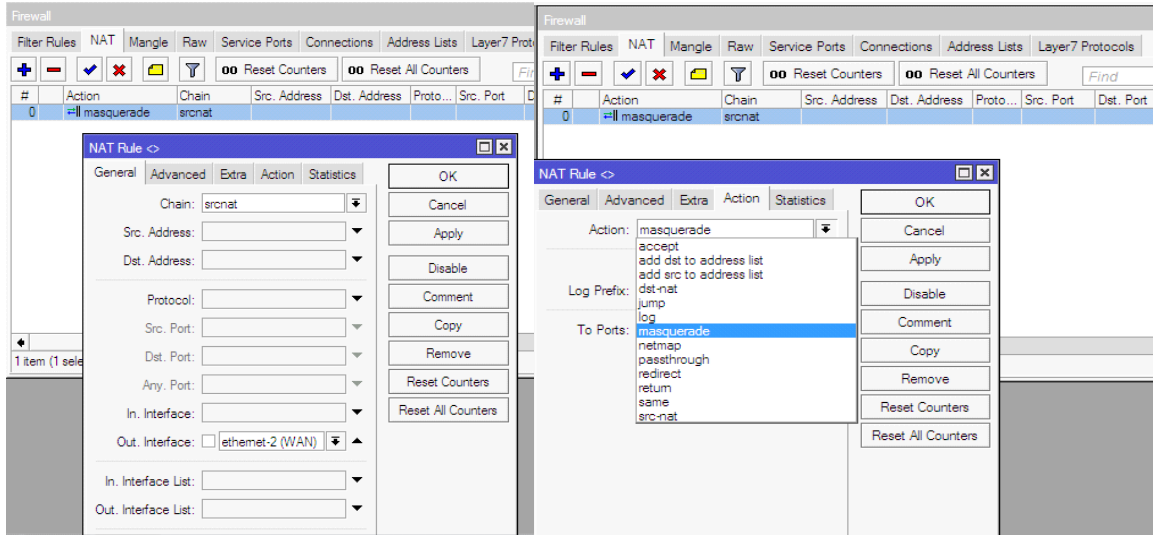


Figure 3.10: Firewall & NAT Rule

‘IP to Routes to General - type Dst. Address and type Gateway then OK’

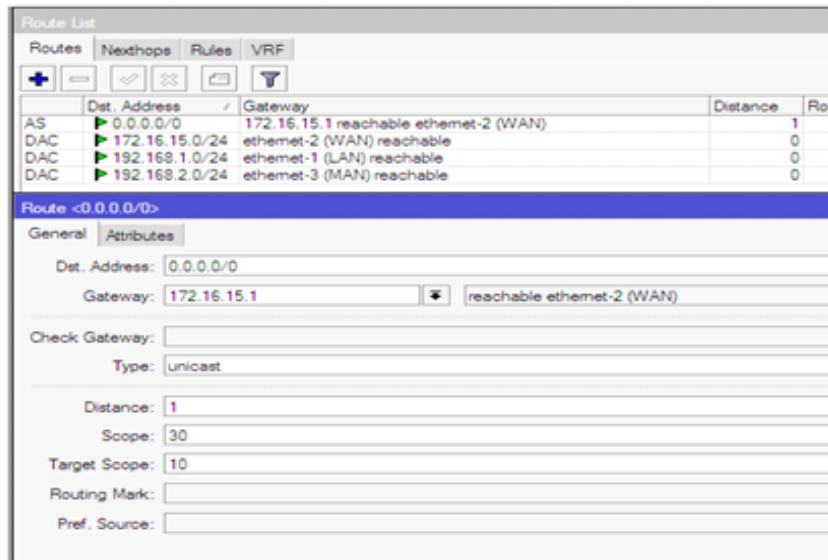


Figure 3.11: Route Configure

Ping process to check Internet connectivity

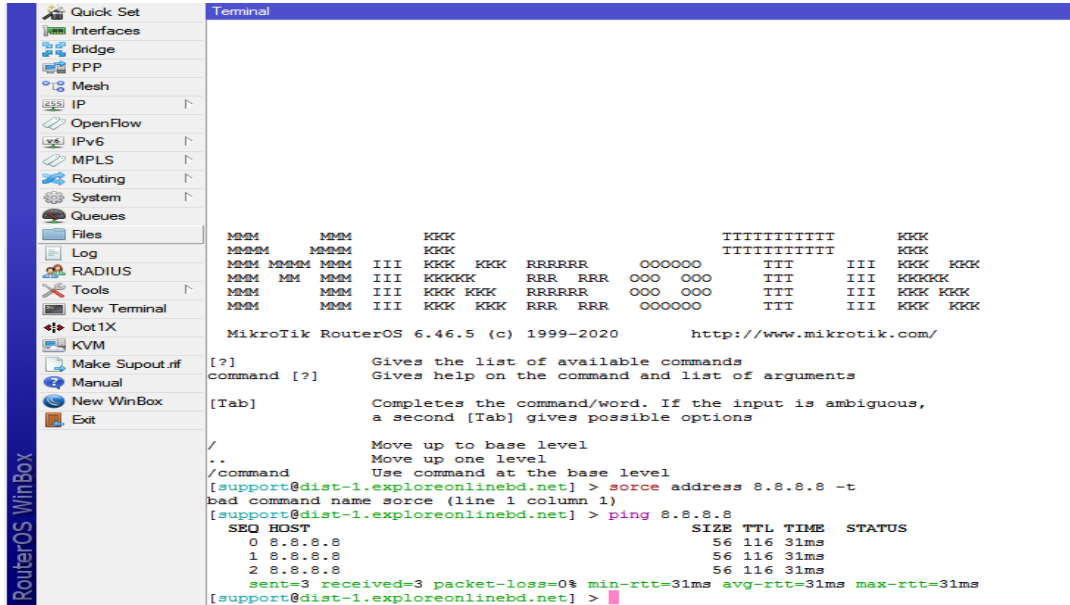


Figure 3.12: Ping Interface

Configuring process of TCP/IPv4 below the process:

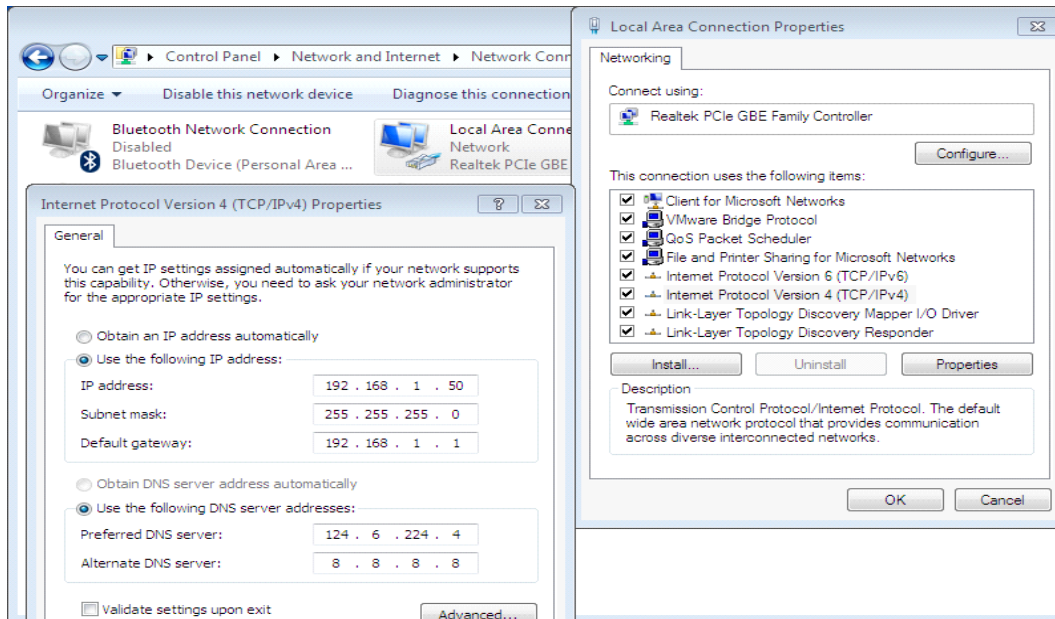


Figure 3.13: Configure of TCP/IPv4

3.3.6 Mikrotik Queue Process

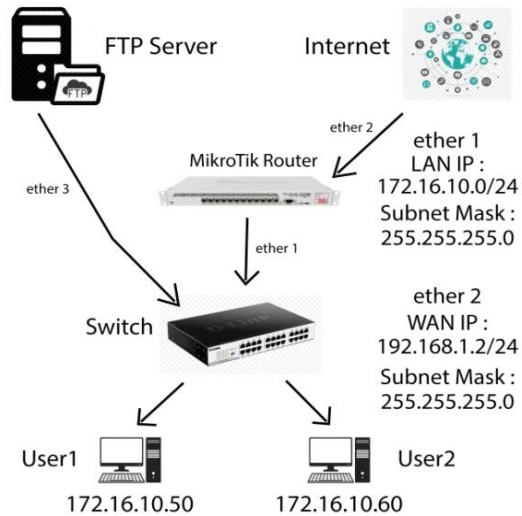


Figure 3.14: Queue Process

Client1: 5 M.B Up, 5 M.B Down

Client2: 8 M.B Up, 8 M.B Down

Configuring process:

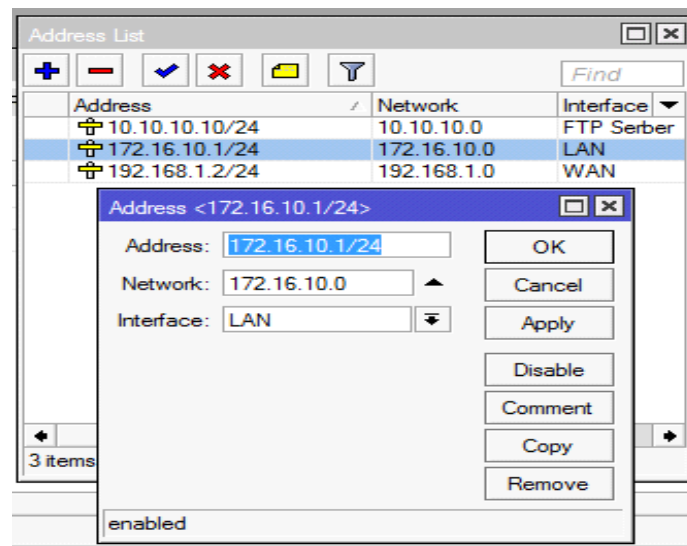


Figure 3.15: Addresses Queue

Same configure process for user1 & 2 (Also same Upload & Download)

Configuring of User1

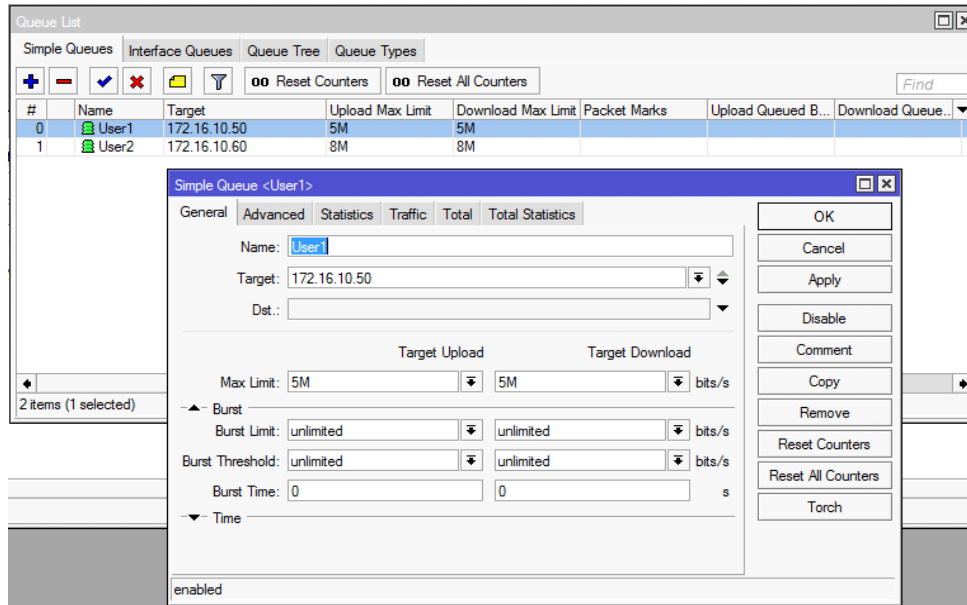


Figure 3.16: Configure of User1

Priority of Queue

Priority value is 1 to 8. Queue priority as 8; the value is defaults. **The lowest priority of users is calculated as the highest priority.**

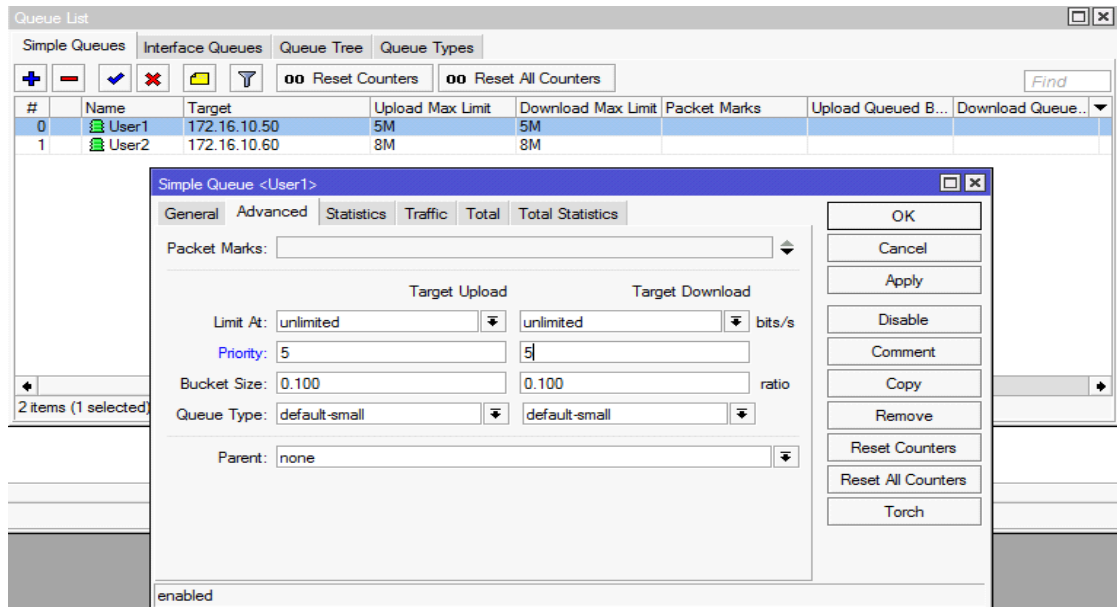


Figure 3.17: Priority of Queue

3.3.7 D.H.C.P Server Interface

DHCP setup process:

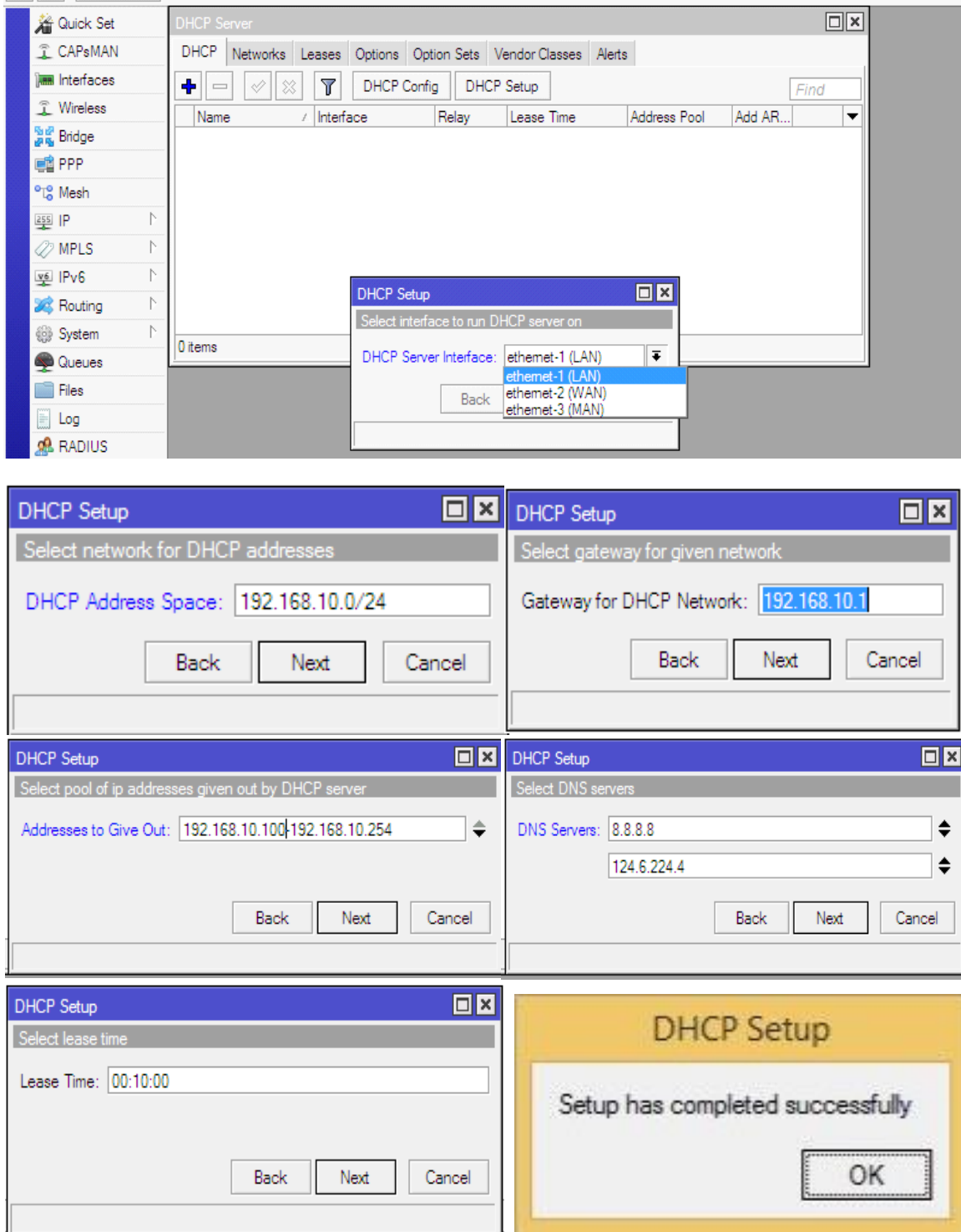
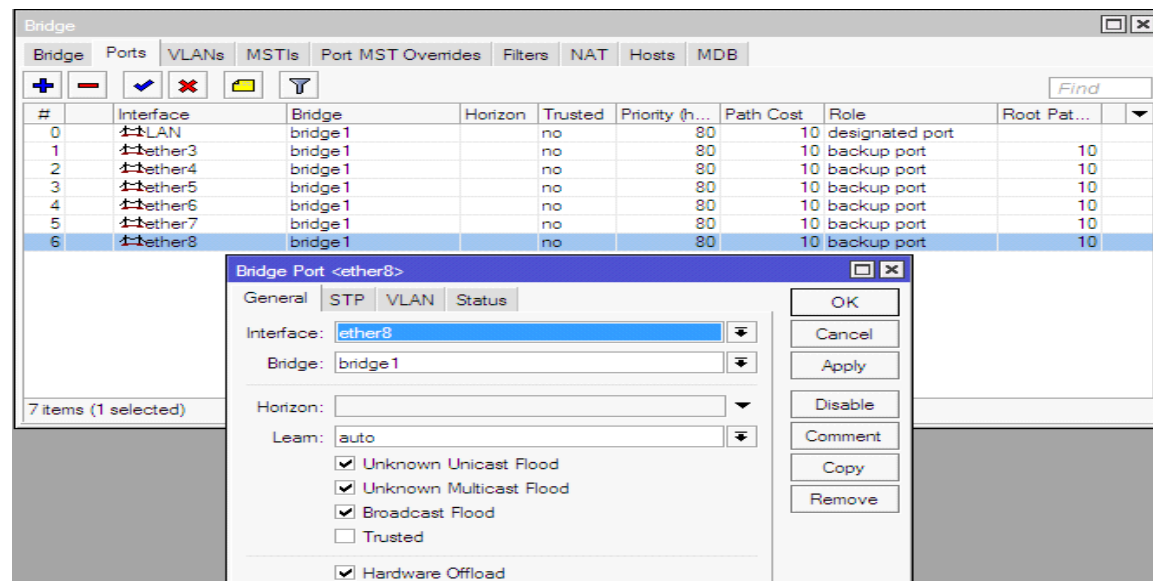
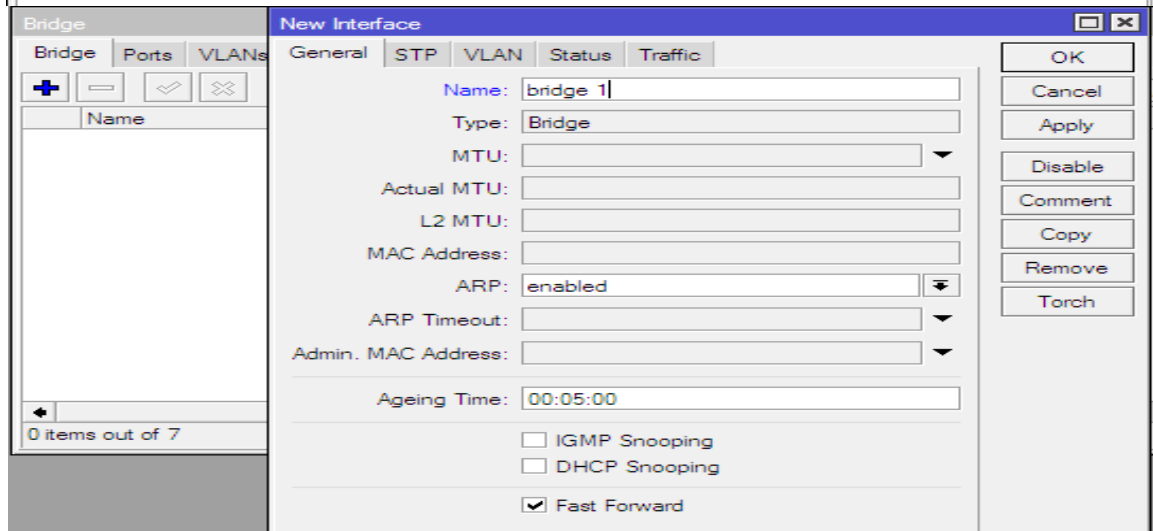
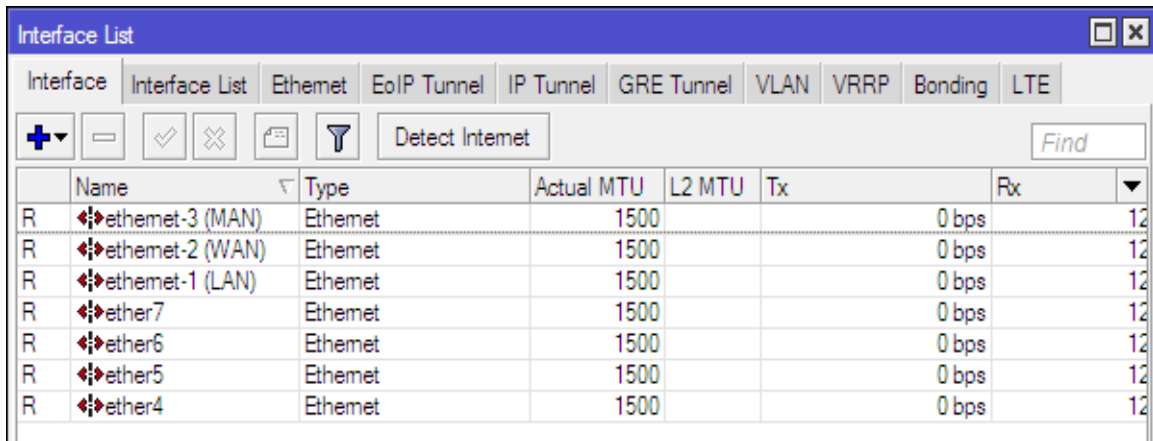


Figure 3.18: D.H.C.P config. process

3.3.8 Bridge Setup Process

Bridge setup by step to step:



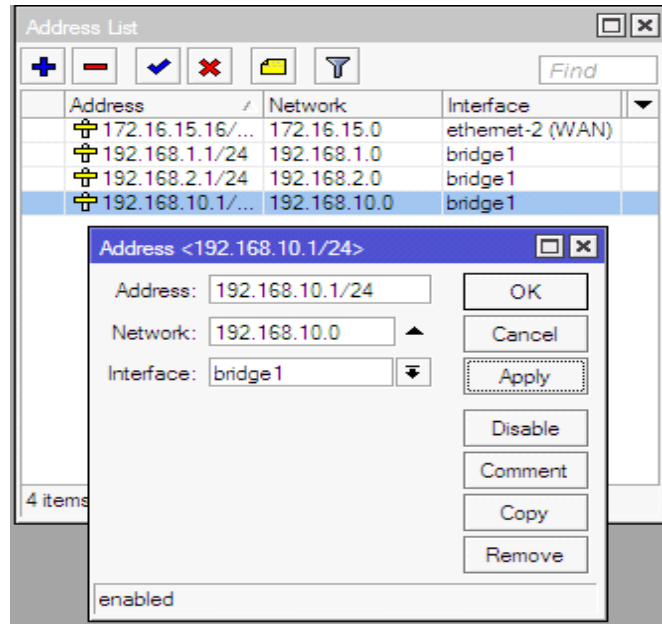


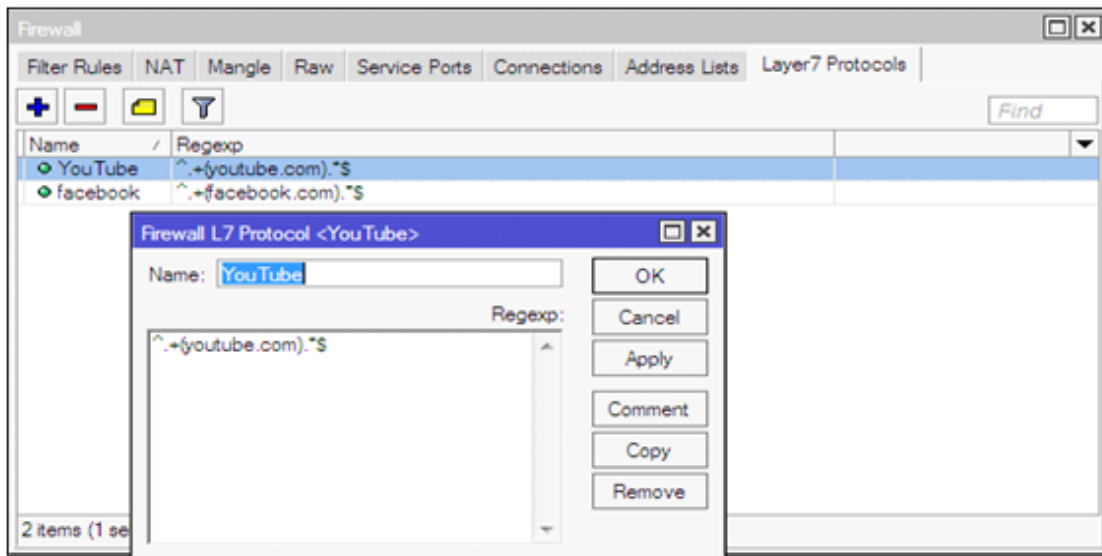
Figure 3.19: Bridge Configuring

3.3.9 Setup of website URL Blocked/Unblocked

Url Blocked

Following:

'IP>>Firewall>>Layer7Protocols>>(+ icon)>>Name: YouTube/Facebook - Regexp:
 $\wedge.+(youtube.com).*\$$ or $\wedge.+(facebook.com).*\$$ - OK'



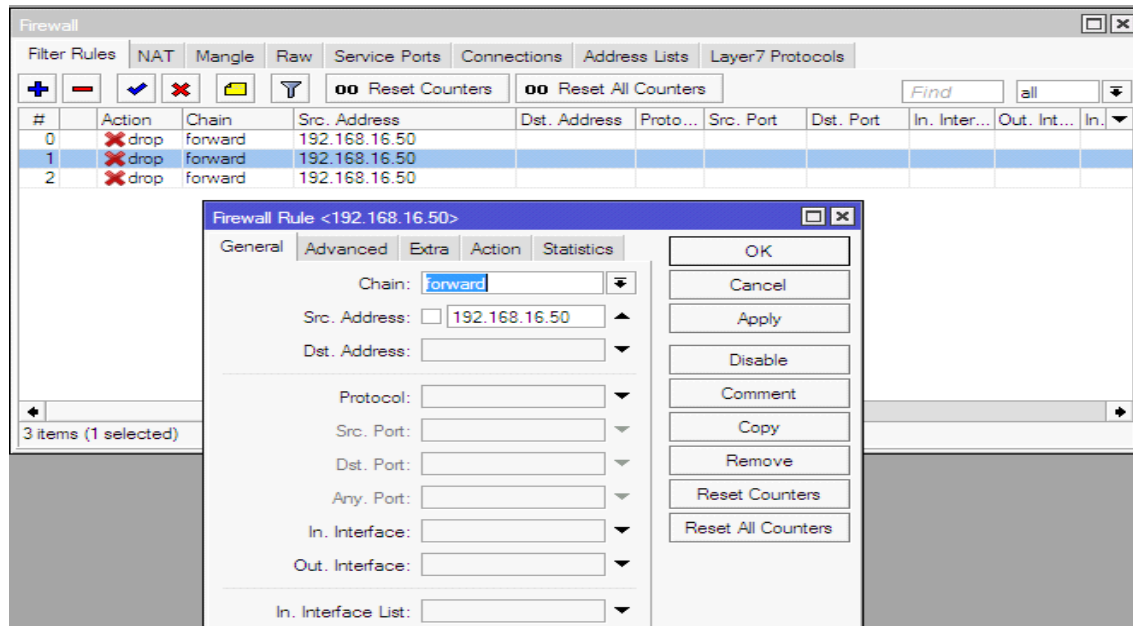


Figure 3.20: Blocked url

Url Unblocked

Following:

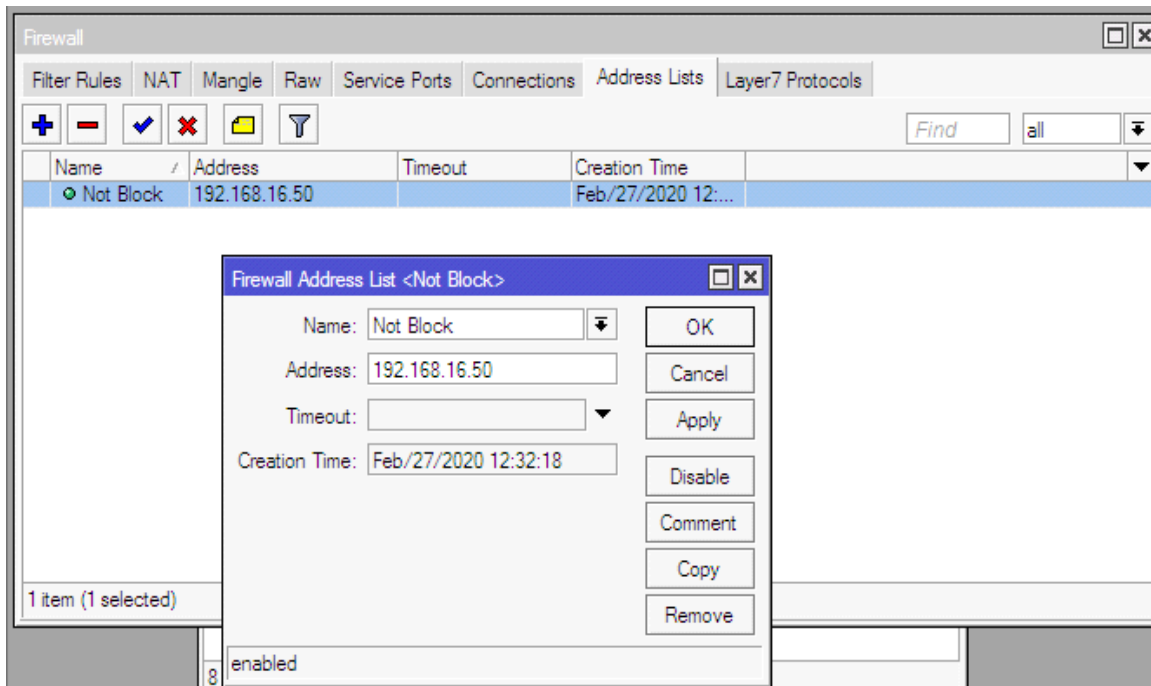


Figure 3.21: Unblocked url

3.3.10 Bandwidth Plan

My Internship company build up for user different Bandwidth Packages:



Figure 3.22: Bandwidth Plan

3.3.11 Day & Night Scheduling bandwidth: (For Package 6)

Day configure down:

Queues to Add icon then following below:

The screenshot shows a window titled "Queue Type <day_down>". The "Type Name" field contains "day_down" and the "Kind" dropdown is set to "pcq". The "Rate" is 20M bits/s, "Queue Size" is 50 KB, and "Total Queue Size" is 2000000 KB. The "Burst Rate" and "Burst Threshold" fields are empty, and "Burst Time" is 00:00:10. The "Classifier" section has "Src. Address" checked and "Dst. Address", "Src. Port", and "Dst. Port" unchecked. The "Src. Address Mask" is 32, "Dst. Address Mask" is 32, "Src. Address6 Mask" is 64, and "Dst. Address6 Mask" is 64. On the right side, there are buttons for "OK", "Cancel", "Apply", "Copy", and "Remove".

Figure 3.23: Day Interface (Down)

Day configure up: Like as Day down configure

The screenshot shows a window titled "Queue Type <day_Up>". The "Type Name" field contains "day_Up" and the "Kind" dropdown is set to "pcq". The "Rate" is 20M bits/s, "Queue Size" is 50 KB, and "Total Queue Size" is 2000000 KB. The "Burst Rate" and "Burst Threshold" fields are empty, and "Burst Time" is 00:00:10. The "Classifier" section has "Src. Address" checked and "Dst. Address", "Src. Port", and "Dst. Port" unchecked. The "Src. Address Mask" is 32, "Dst. Address Mask" is 32, "Src. Address6 Mask" is 64, and "Dst. Address6 Mask" is 64. On the right side, there are buttons for "OK", "Cancel", "Apply", "Copy", and "Remove".

Figure 3.24: Day Interface (Up)

Night configure down:

Queues to Add icon then following below:

The screenshot shows a dialog box titled "Queue Type <night_down>". It contains the following fields and controls:

- Type Name:
- Kind:
- Rate: bits/s
- Queue Size: KiB
- Total Queue Size: KiB
- Burst Rate: bits/s
- Burst Threshold:
- Burst Time:
- Classifier: Src. Address Dst. Address
- Src. Port Dst. Port
- Src. Address Mask:
- Dst. Address Mask:
- Src. Address6 Mask:
- Dst. Address6 Mask:

On the right side, there are buttons for OK, Cancel, Apply, Copy, and Remove.

Figure 3.25: Night Interface (Down)

Night configure up: Like as Night down configure

The screenshot shows a dialog box titled "Queue Type <night_up>". It contains the following fields and controls:

- Type Name:
- Kind:
- Rate: bits/s
- Queue Size: KiB
- Total Queue Size: KiB
- Burst Rate: bits/s
- Burst Threshold:
- Burst Time:
- Classifier: Src. Address Dst. Address
- Src. Port Dst. Port
- Src. Address Mask:
- Dst. Address Mask:
- Src. Address6 Mask:
- Dst. Address6 Mask:

On the right side, there are buttons for OK, Cancel, Apply, Copy, and Remove.

Figure 3.26: Night Interface (Up)

Day Scheduled Time

Queues to Simple Queues then following below:

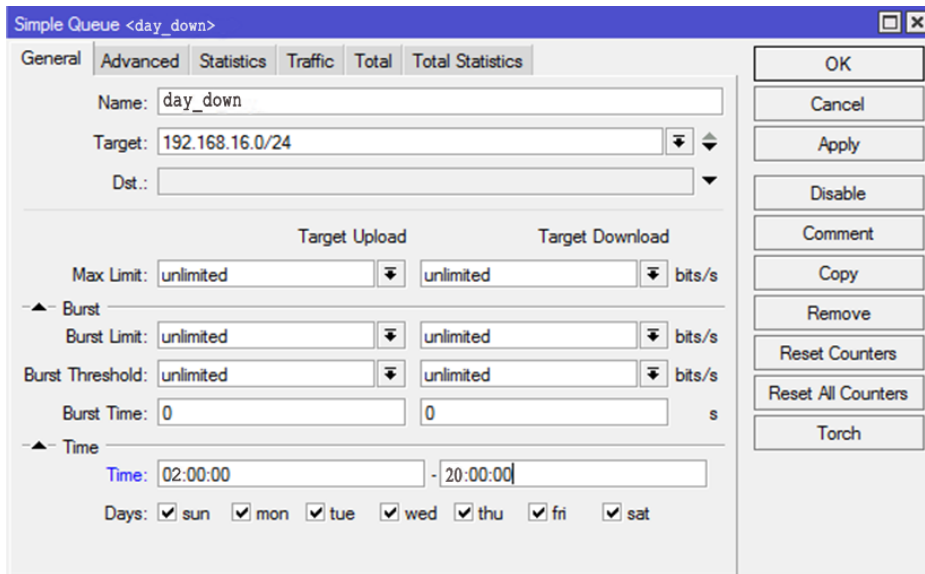


Figure 3.27: Day Scheduled Time Download

Like as Day Schedule Time,

Night Scheduled Time

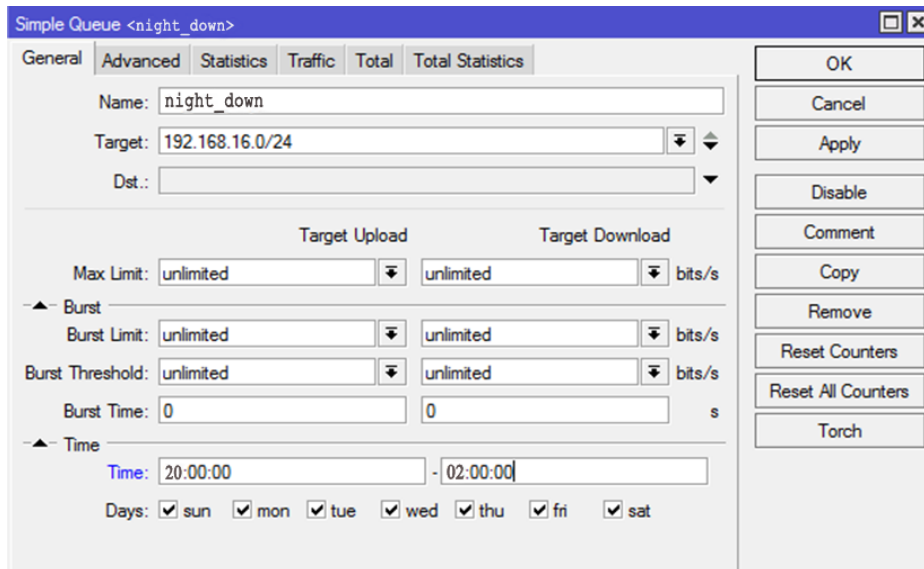


Figure 3.28: Night Scheduled Time Download

Like as Day and Night Schedule Time [Fig. 3.27, 3.28]

3.3.12 Point-to-Point Protocol over Ethernet Configuration

Go to IP>Address Add button [+] after configure goto PPP>PPPoE Add button [+] following below

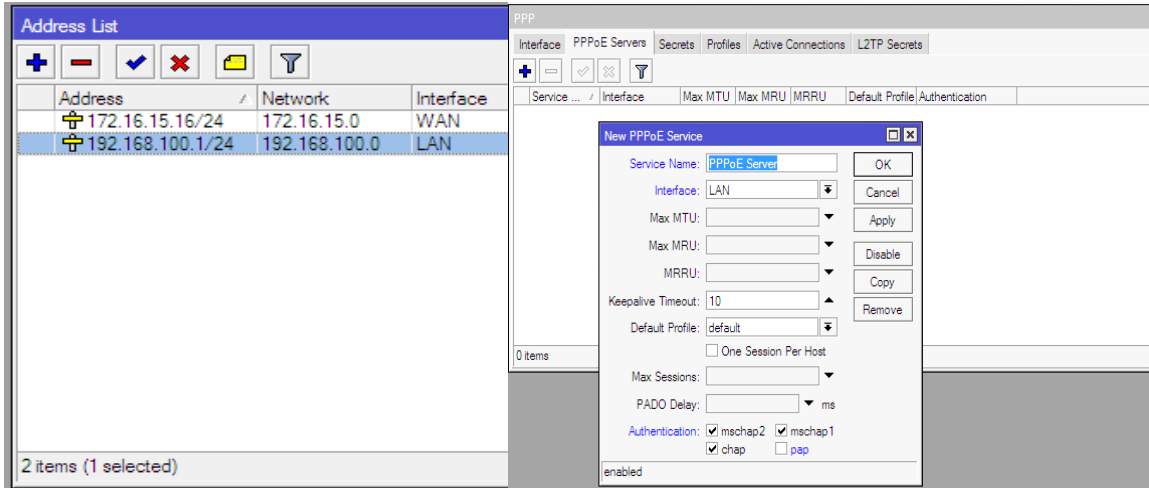


Figure 3.29: Addresses of PPPoE Server

Go to IP> Pool Add button [+] after configure goto PPP>Profiles Add button [+] following below

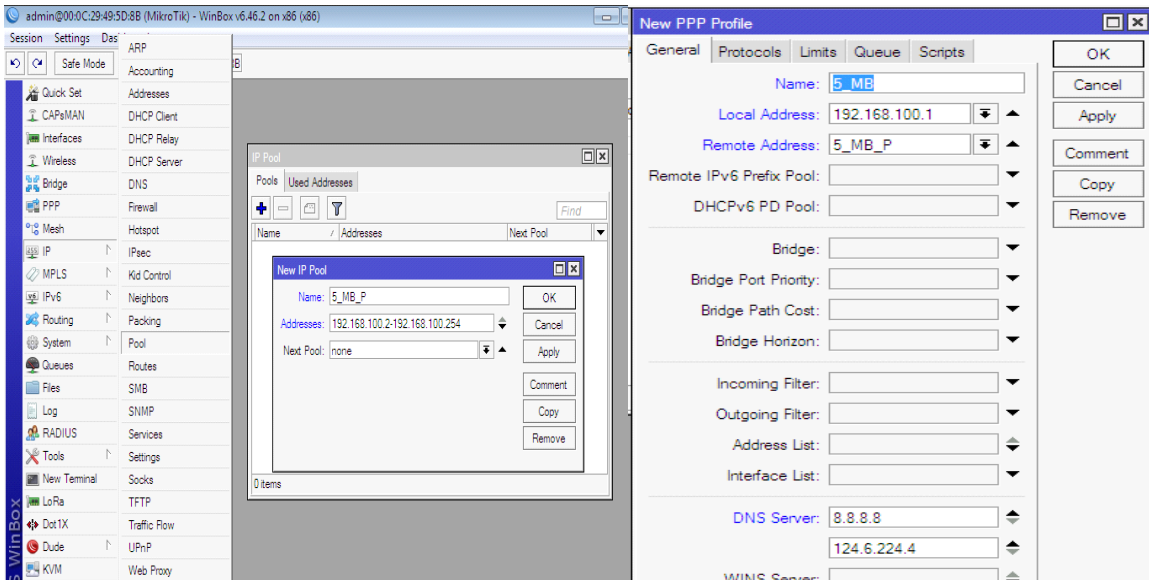


Figure 3.30: IP Pool PPP Configure

Go to PPP>Secrets> following below

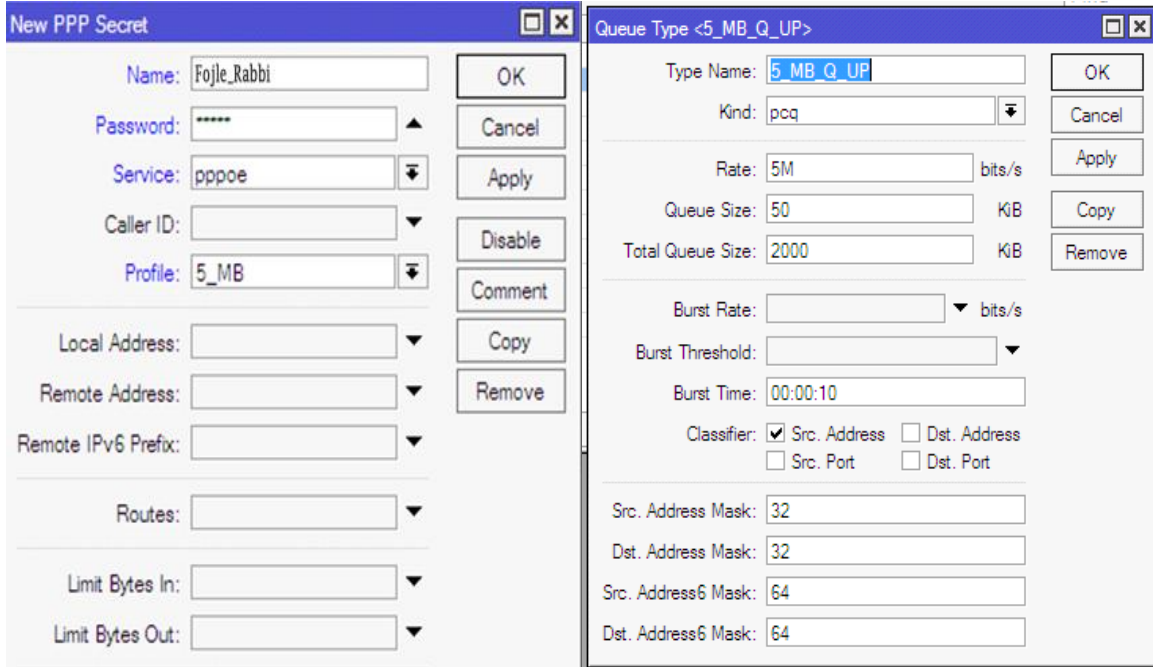


Figure 3.31: PPP Interface

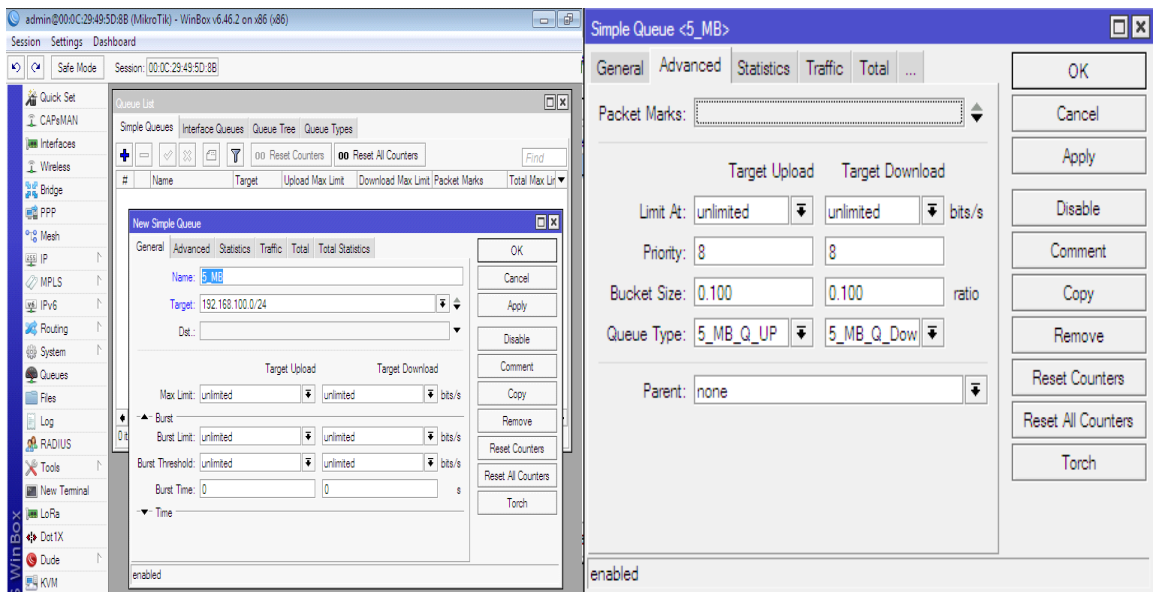


Figure 3.32: Queue of PPPoE

3.4 Challenges

I didn't have much opportunity to do internship, I did diploma before, The experience then was not very good. But this time I have worked very well and sincerely. What I have done here enables me to understand and what is a working life like; I learned how an companies daily works. In the office desk seat regularly is a lot of hardship and a lot of patience I got this experience from here. It was the most thrilling and rewarding experience of my life. Nevertheless internship period I have faced with some difficult issues and identified the issues and solved them.

- ✚ Need to working environment.
- ✚ Compatible with office rules.
- ✚ Gained some organized potency.
- ✚ Creating social relationships with colleague and officials.
- ✚ Habit for comfortable language to communicate each other's.

CHAPTER 4

Competencies and Smart Plan

4.1 Competencies

As a result of acquiring skills due to a teaching method, a student must have the ability to know, understand or do. Contribute in network lab of an internship plan that gathers and places data, keeps a small number of low excellence internship outcomes in the student institution office. To learn the results, re-identify and configure the designs, test the installation and employer services. Knowledge of results onsite internship supervisor contribute to the approval of this approach. Completion of my internship in Explore Online ISP. I've collected a variety of knowledge to solve problems or issues. Faced a lot of practical work effectiveness. During my internship, I set some competencies that I achieved also I was trying to achieve this successfully.

4.2 Smart Plan

A organization does not become a big company at overnight. To become a big company, you have to have a smart plan behind it and all the companies have a clever mind. The grouping of multiple concepts made a smart plan.

- ✚ Each router should have backed up server and user documentation.
- ✚ Speed up the internet.
- ✚ Reduce costs.
- ✚ Hire an IT or business professional in management.
- ✚ Upgrading of human resources.
- ✚ Centralize and appropriate time planning.
- ✚ Spread more advertising.
- ✚ Understand the necessary steps to solve customers' problems and issues.
- ✚ Clients informed about the progress made.
- ✚ Improve old features to good services.
- ✚ Powerful user safety and avoid bogus billing.
- ✚ Door-to-door collection of bills by the company.
- ✚ Need to arrange maximum services and offers from other companies.

4.3 Reflections

A job is a real challenge for the workplace, especially if I have no experience. A successful internship can help me build experience for a profession. So, doing my future reflection planning internship as a success.

Think of a great idea that will be like a future job or a good job. I hope these internships in positions are available through a variety of and many career paths. Internship purposes as a network engineers, network managers, support engineer in the area, and IT engineer of any kind of organizations.

CHAPTER 5

Conclusion and Future Career

5.1 Discussion and Conclusion

In my internship brief I know about configuring a network by Mikrotik. I have a lot of ideas about IP class, how to create a lot of IP by breaking the network. After completing my academic life, this internship played a very important role. It has actually taught me a lot. This internship seemed like a great opportunity for me to gain skills in the present life. ISP during my internship gained a lot of skills about the company. The strategy and graph of computer networks, data connection, protection of network, interface and maintains of the best opportunities in a variety of applications. My trainers and supervisors are very good and I got a lot of new ideas from them which will come in handy later. I've been able to create different kinds of routers, which is very helpful for my future. This is my real life networking system experience which gives me the opportunity to meet very effectively in the future. Various IT training institutes in Dhaka and other cities have started training on MikroTik. There are many different types of MikroTik the vendor certification.

5.2 Scope for Further Career

It is very difficult to get a job in our country. More difficult I have no work or job experience. I did the internship so that with the internship I would have a work experience and would have the patience to sit in the office for so many hours. In my experience, which can help to take the advanced stage of the extreme values. I believe that this internship will bring something good for my future. What I will get from this internship-

- ✚ To work in any ISP company.
- ✚ Becoming an engineer in the security sector.
- ✚ Opportunity to join as a Network Engineer.
- ✚ Opportunity to join as an IT Security Engineer.
- ✚ Bank job in IT sector.

References

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[4] Learn about System Zone, available at <<<http://www.systemzone.net/category/computer-networking/mikrotik-router>>>, last accessed on 02-10-2020 at 02:05 PM.

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APPENDICES

Appendix: Information of Organization



Head Office

Name	Explore Online ISP
Address	A/15 (Ground Floor), Zakir Hossain Road, Block: E, Mohammadpur, Dhaka-1207
Telephone	09614338822, 01711313391
E-mail	exploreonline@gmail.com
Website	www.exploreonlinebd.net
Employees	25

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SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

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3	www.ukessays.com Internet Source	1%
4	www.comjagat.com Internet Source	1%
5	exam-hub.com Internet Source	<1%
6	dspace.daffodilvarsity.edu.bd:8080 Internet Source	<1%