

# **Empirical Study on Mikrotik Router and Firewall Configuration of Daffodil Online Ltd**

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This Internship report is submitted in some satisfaction of the prerequisites of the level of four year education in Electronics and Telecommunication Engineering

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**DAFFODIL INTERNATIONAL UNIVERSITY  
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*This is to Certify that*

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01<sup>st</sup> February, 2018 to 30<sup>th</sup> April, 2018 on

**"Network and System Administration with Linux & MikroTik" at  
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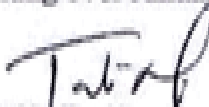


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Daffodil Online Limited

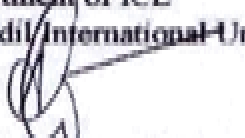
## APPROVAL

In this Internship Title "Empirical Study on Mikrotik Router and Firewall Configuration of Daffodil Online Ltd" is submitted by Abdullah-Al-Mamun from the Information & Communication Engineering Department of Daffodil International University has been avowed as fit for the some satisfaction of the condition of for the Degree of Electronics and Telecommunication Engineering and affirmed as to it is style and guts . The allowance will be hung over January, 2019


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## DECLARATION

I thus climb that this internship report has been finished across me under the supervision of Engr. Md. Zahirul Islam Assistant Professor Department of ICE, Daffodil International University. I additionally charge that neither this report or any piece of it has been submitted away for honor of some degree or certificate.

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I might want to rapid my heartiest gratitude to **Md. TaslimArefin, Associate Professor and Head, Department of Information & Communication Engineering**, for his kind help to surface our thesis and also to other faculty participants, the staffs of the ICE Department of Daffodil International University. I must grant with due esteem the perpetual support and endurance of my family members for final this internship.

Abdullah-Al-Mamun

## **Abstract**

Daffodil Online Limited is a Internet Service Provider (ISP). An ISP is an Internet Service Provider that provides internet to the people. Who is an internet service-based company that resells bandwidth. It pays a monthly or annual fee to an upstream provider for high speed link to the internet backbones and resells connectivity to in smaller chunks to its customer base. The main objective of this internship is to understand the configuration of Mikrotik router and network management as well as to develop my knowledge about this. A computer network is a digital telecommunication network which allows nodes to share resource. In computer networks, computing devices exchangedata with each other using connections between nodes. There are distinctive sort of service in the framework that is the reason in like manner one of a kind sorts of server have. For Example - Firewall, Interfaces, Routes, DNS, DHCP, NAT, ARP and Bridge. Every one of them service contrastingly and without there it is hard to keep up a framework. If framework is related with the Internet and we have to anchor our information they should setup using Mikrotik. The return discussed the purpose behind the appointed server using on ISP, gear essential for the server, picking programming and foundation system of the item, all around requested server course of action process and direct server.

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# CHAPTER 1 INTRODUCTION

## 1.1 Introduction

In the spacious terms, people often view the Internet as a cloud. You put your data in one place, and it comes out the place you want it to on the other side, with what happens in between covered in the fog. In fact the internet is tens of thousands kilometers of fiber optic cable, hundreds of thousands to millions of kilometers of copper wire, and hardware and software connecting them all together in a redundant, fast, and self-sufficient network. In any case, not to stress, its not so much that grisly we just need to stress over a little part of the system, we can let another person stress over the rest.

## 1.2 Company Profile

Name:	Daffodil Online Ltd (DOL)
Address:	102, Sukrabad (3 <sup>rd</sup> floor), Mirpur Road, Dhanmondi Dhaka-1207, Bangladesh
Telephone:	9143258, 9149259
Email:	<a href="mailto:info@daffodilnet.com">info@daffodilnet.com</a>
Web:	<a href="http://www.daffodilnet.com">www.daffodilnet.com</a>

## 1.3 Objectives

At present ICT is one of the most important aspect. ICT is one of the most important means for building a career. For that I chose daffodil online ltd for my internship. Here I can be familiar eighth the various device of networking site. Here are all concepts about mikrotik router.

Mikrotik router plays a role in a data center because in mikrotik managing bandwidth is very easy and effective. That's why I have select this topic for internship.

#### **1.4 Motivation**

I am correct currently looking for after my BSc in Electronics and Telecommunication Engineering at Daffodil International University, I grasp the vital of expanding national data which will continuation the pathway book learning and empower an understudy to get an increasingly broad perspective of the subjects. In the midst of the impermanent activity I have uncovered that I am perfectly skilled in the unpretentious components of MikroTik. As a web get to supplier, I've communicating what is at the forefront of my thoughts to a great degree well, talking with people, considerate their requirements and giving them better organization. My motility gag in my ability to widely peruse and cover this condition and law quickly yet then keenly.

#### **1.5 Internship Goals**

I am correct currently looking for latter my Bachelors in Electronics and Telecommunication Engineering at Daffodil International University, I grasp the vital of expanding national data which will continuation the course book study and empower an understudy to get an increasingly broad perspective of the subjects. In the midst of the impermanent activity I have uncovered that I am perfectly skilled in the unpretentious components of MikroTik. As a web get to supplier, I've communicating what is at the forefront of my thoughts to a great degree well, talking along people.

#### **1.6 Report Layout**

**Section\_1** Relate motive of internship, motivation of internship.

**Section\_2** covered the methodology of my internship and company enterprise.

**Section\_3** Displayed preparing went to, doled out obligations, Mikrotik fundamental charge and portrayed about various kind of steering setup (DHCP, Pppoe, ARP, Firewall) goal

**Section\_4** Portrayed results of internship

**Section\_5** Depict about my report decision and future extent of MikroTik.

### **1.7 Summary of the Report**

The objective of this Internship is to improve an effective knowledge in of Study on mikrotik router and Firewall Configuration at daffodil Online Ltd. In The First chapter, I have termed the Details and objective an overall view that I am going to instrument during this internship work and I would describe the background of Daffodil Online Ltd.

The Second Chapter, mainly discuss about internship enterprise

The Third chapter is describing, About Networking

The forth chapter is describing about Internship Rule and

Responsibilities The fifth chapter is describing about Internship outcome

The last one is Chapter six that is conclusion

## CHAPTER 2

### INTERNSHIP ENTERPRISE

#### 2.1 About Daffodil Online Ltd

Daffodil Online Ltd. prides itself as one of the leading ISP service provider in Bangladesh. This company are the most experienced and oldest company in the ICT field where there basic business ethics is long Tern Relationship with our customers. This company provide best high speed broadband internet connection for corporate user. Registering Domain name is first, simple and affordable with best web hosting. One the other hand this company provide many training secession about server administrator, Linux, Mikrotik router etc. Many types of networking solution providing many organization, easy and reliable support. The impermanent activity promise where I have aching my Training is Daffodil online ltd. Vanity itself as one of the fundamental ISP Service give in Bangladesh. It's the most experienced in the ICT field where its central business ethics are deep Relationship with the customers. Daffodil online ltd is a subsidiary of Daffodil International University. All internet services of Daffodil international university are provided from here. It is also used as an Isp service provider because in the various place the internet service is given. Apart from this ,various information and training relate to networking od different device or courses are provided.

#### 2.2 IT Service

Daffodil Online Ltd give several Services and Professional Training. These are given below:

- a) The solution of the corporate internet.
- b) The solution for Security.
- c) Domain Registration and web Hosting.
- d) The development of the website.
- e) Proficient Courses and Training

- f) The solution of Open Source application.
- g) The supplier of internet service.

### **2.3 Preface of job Market**

Bangladesh is a properly pack making characterizing its aim to be Digital within 2021. That's why each section and each relationship of our country ought to be digitalized. So a huge number of Information Technology specialists are required in the midst of the accompanying couple of years. Imagining a basic part in the action grandstand by giving diverse organizations like

- Internet Solution .
- Safety confirmation .
- Web Site Improvement.
- Creating IT vying.
- Marketing.

So in the long run I want express that DOL. Expecting a key part in the IT based work promotes.



## **CHAPTER 3**

### **NETWORKING**

#### **3.1 Networking**

Networking is also an important thing to communicate in the present time. Without networking, we cannot think of sharing data from one place to another. Through networking we now have easy to exchange data from one place to another. We can build a network by distributing data between several computers.

#### **3.2 Importance of Networking**

Your network can be vital to your professional success. A strong and expansive network gives you insight into trends as well as insider information on job openings within the company. These days social media makes it easier than ever to hone your existing relationships as well as make new contacts. Networking has also never been more essential. Read on to find out some of the advantages of a strong professional network as well as tips on how to build and maintain them.

#### **3.3 Types of Networking**

##### **3.3.1 LAN (Local Area Network)**

We use the local area network in our daily lives. Its main purpose is to use small medium office-courts and business commerce networks to create small medium office lamps and share information and resources between device times, and can be saved for printer modem scanner etc. Local Area Network is used to strengthen computers and other network devices so that devices can share one another's resources. The LaN is the most heavily involved, because the only cable used here is limited by the maximum distance and unneeded features of the LAN due to the building.

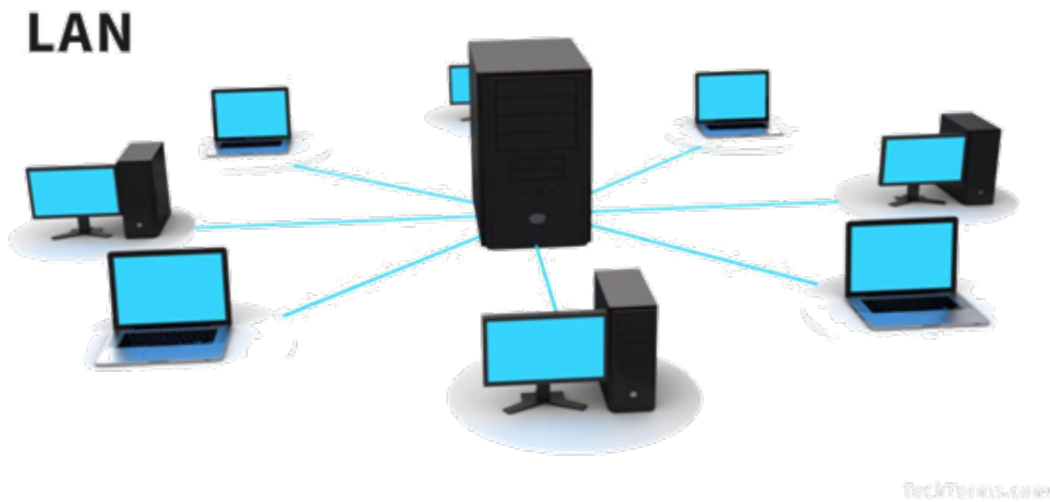


Fig3.1 Local area network

### 3.3.2 Metropolitan Area Networks (MAN)

MAN stands for Metropolitan Area Networks is one of a number of types of networks. A MAN is a relatively new class of network. MAN is larger than a local area network and as its name implies, covers the area of a single city. MANs rarely extend beyond 100 KM and frequently comprise a combination of different hardware and transmission media. It can be single network such as a cable TV network or it is a means of connecting a number of LANs into a larger network so that resources can be shared LAN to LAN as well as device to device. A MAN can be created as a single network such as Cable TV Network, covering the entire city or a group of several Local Area Networks. In this way resource can be shared from LAN to LAN and from computer to computer also. MAN are usually owned by large organizations to interconnect its various branches across a city.

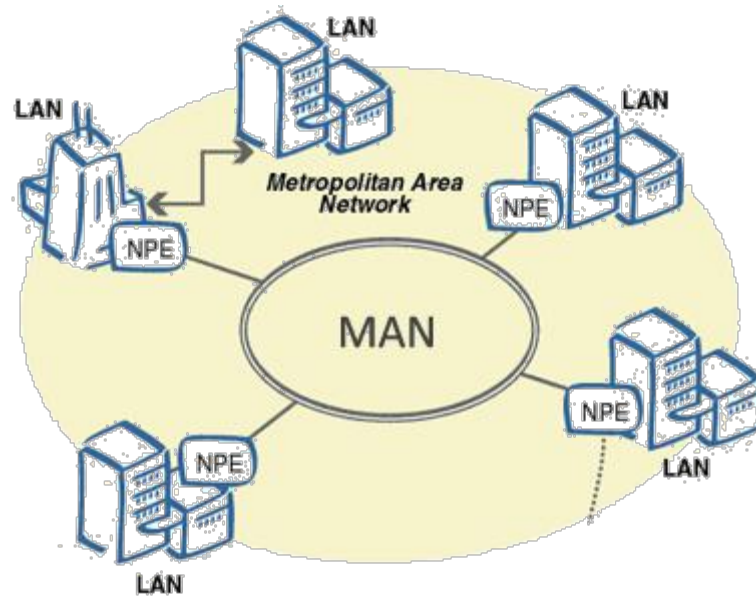


Fig3.2 Metropolitan area network

### 3.3.3 WAN (Wide Area Networks)

Wide Area Network developed in a broad geographical area with LAN and MAN. This type of network was developed using the telephone company only because of which the wide area network is difficult to grow, with special areas and technologies used to connect to different LAN. WAN of the plans to build more than the LAN is really hard to manage, because it is necessary to make a LAN across the globe, then in many cases the satellite is used. Most Wide Area networks work at 56kbps at 1.544 Mbps speed. The features of Wide Area Network are

1. These networks can grow across a vast area and its expanses can be spread all over the world
2. These are generally slower than the local area network
3. Wide Area Network must use any internet wiring device such as router modem switches etc.



Fig3.3 wide area network

### 3.4 Networking Tropology

Looking at a network, the network can be seen like a tens, so that the topology can be seen from the top of the network and connected to computers in different ways. Let's say how connected to each other, the process of connecting with a computer with a computer is called tropology. In the case of network design, this tropology will play a special role, depending on the type of network that the network will use, the appropriate tropology must be selected. Every topology has some advantages and disadvantages to consider that the appropriate tropology should be selected. Now we will discuss various network tropology and their advantages and disadvantages.

### 3.5 Bus Tropology

Bus topology is used simply to make bus poplies easy to be networked and expendable. A mistake in bus coplancies goes straight and goes with each computer. Here the original cable, which goes from one end to the other, is said to be on the other side of the bus, the terminator

which absorbs the electric signal. This type of passive trolley is also called as the computer's signaling app can go directly to the computer, while the common bus network is used only with a type of electronic device such as a repeater or amplifier.

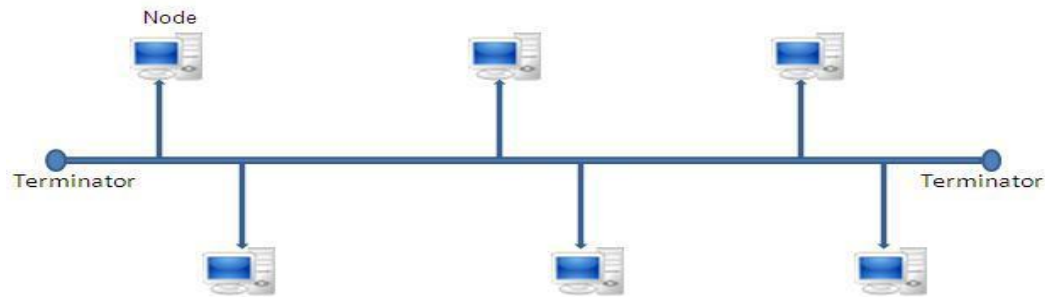


Fig3.4 Bus Topology

### 3.6 Star Topology

Ester Topology comes from all the computers and comes to a central place, a device located in central location called HUB. In this topology, all the computers are connected in one place, because it is a consolidated trolley and it is said to be ready to work on these questions, this question is more convenient, it can easily be expanded to the network by increasing the number of havens. If a computer wants to send a message to another computer in the ester topology, the signal will not be sent directly to the code on all the computers.

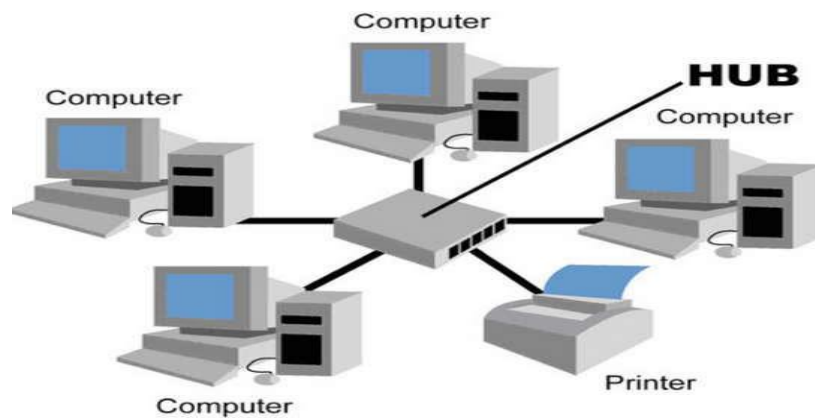


Fig3.5 Star Topology

### 3.7 Ring Topology

In the ring topology, a computer is connected to another and the last computer is connected to the first computer in the same way by creating a link or saying that every computer of this ball has equal access to data flow. Such trolley is used to create a high-powered network. The big advantage of such a network is that every computer gets equal rights here and it is applicable to everyone when the network performance decreases due to excessive computer.

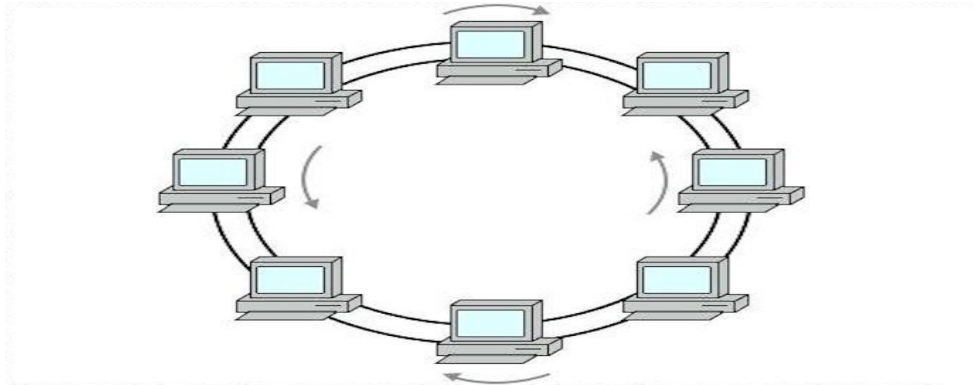


Fig3.6 Ring Topology

### 3.7 Mesh Topology

Mesh computer is connected to each of the Mesh topologies, so many connections have to be made. Because the number of connections is high, the management of large networks in cloud topology is almost done so that most of the time. As the best of mesh installs and a solid network device managed, a number increases, such as if there are 5 devices on a network and want to bring them under the topology, then the connection must be 15.

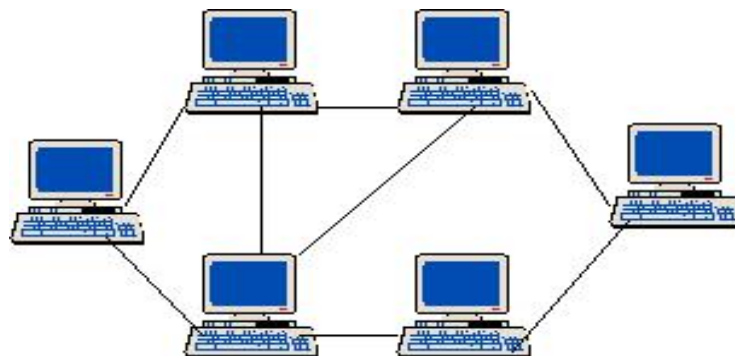


Fig3.7 Mesh Topology

### 3.8 Tree Topology

A tree topology is a special type of a structure in which many connected element are arranged like the branches of tree. For example tree topology is our frequently used to organise the computer it have co-opted network word the information in a database. In a tree topology there can be only connected nodes. Because any two nodes can have only one mutual connection ,tree topologies from a natural parent and child hierarchy.

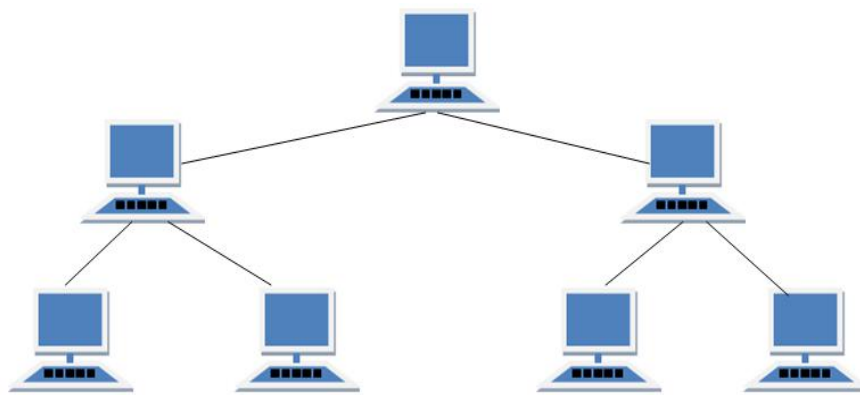


Fig3.8 Tree tropology

### 3.9 Networking device

Networking Device is originally a group of multiple networking devices connected to gather for data sharing. Networking device have single purpose security transfer data as they can. To achieve this goal every networking device has its own functionality.

#### 3.9.1 Repeater

We know that due to the attenuation due to attenuation in different media, due to the attenuation,

the signal becomes increasingly weak, after its distance, its existence disappears, before the disappearance of the signal, the amplifier or more force can make it too far . It works in the OSI Reference Model's physical layer. Repeater Amplifiers and Signal Origination Employer amplify the whole signal. Amplifier Repeater will receive Emblem if this sign is unnecessary. There is a special rule about how many repeaters can be used on a network, called Five Four Three Rules.



Fig3.10 Repeter

### 3.9.2 Hub

Hub is basically a multiport repeater. Hub connects multiple wires coming from different branches, for example, the connector in star topology which connects different place. Hubs cannot filter data, that's why data packets are sent to all connected devices. Otherwise collision domain of all hosts connected through Hub remains one. Also, they do not have intelligence to



find out best path for data packets which leads to inefficiencies and wastage.



Fig3.11 Hub

### 3.9.3 Bridge

Bridge is a device that can be combined with two network segments, just like a hub, but this process works differently OSI reference model can work with Data Link Layer in a data link layer to work with a network adapter OSI address. Depending on the OSI address, it can decide which segments of the network to send that data packet. It is important to remember that the two circles of beryar cannot be connected to Ethernet and token ring networks because hardware addressing is different from architecture.



Fig3.12 Bridge

### 3.9.4 Switch

Switch is actually a multi-port bridge. It works on the data link layer of the OSI reference model. The price of many switches is equal to the price of the hub, because of its usage in the network. That's why the network administrator's decoded switch has become popular. Port in any switch

supports multiple Mac addresses. The switch separates the signal from one of the signals to the other.



Fig3.13 Switch

### 3.9.5 Router

The process of sending the data from one network to another network is known as the device all router used for routing and routing works on the network layer of an OSI reference model. This device is used to connect to a few different networks, it works on the local area network metropolitan area network and wide area networks. If you use it, you can connect to your network and resources outside of your network. It also uses open short paths to connect to a network outside the network



Fig3.14 router

### 3.9.6 Gateway

An gateway is a section to interface two systems together that may work upon various systems administration models. They fundamentally fills in as the errand person operators that take information from one framework, decipher it, and exchange it to another framework. Passages are likewise called convention converters and can work at any system layer. Gateway are commonly more mind boggling than switch or switch.

### 3.9.7 Router

It is otherwise called connecting switch is a gadget which consolidates highlights of both extension and switch. It can work either at information connect layer or at system layer. Filling in as switch, it is fit for steering parcels crosswise over systems and functioning as scaffold.

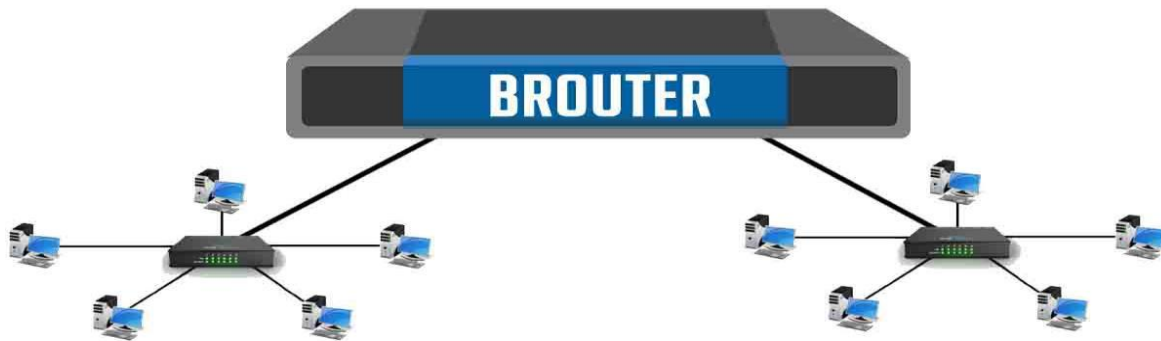


Fig3.15 Router

### 3.10 Networking Cable

There is no need to transport data from this computer to another computer on the network. For those who are connected to network devices, they are called Network Media. The data flows through the media of this network, and the network performance depends on much of it. So

networking requires the use of appropriate network media. There are several features in each network.

### Coaxial cable

Coaxial cable is a type of copper cable specially built with a metal shield and other components engineered to block signal interference. It is primarily used by cable TV companies to connect their satellite antenna facilities to customer homes and businesses. It is also sometimes used by telephone companies to connect central offices to telephone poles near customers. Home and office use coaxial cable too but its widespread use as an Ethernet connectivity medium in enterprises and data centers has been removed by the deployment of twisted pair cable.



Fig3.16 Coaxial Cable

### 3.11 Optical cable

Optical fiber cable is a networking cable that contains strands of glass fibers inside an insulated casing. They are designed for long distance, very high performance data networking, and telecommunication.

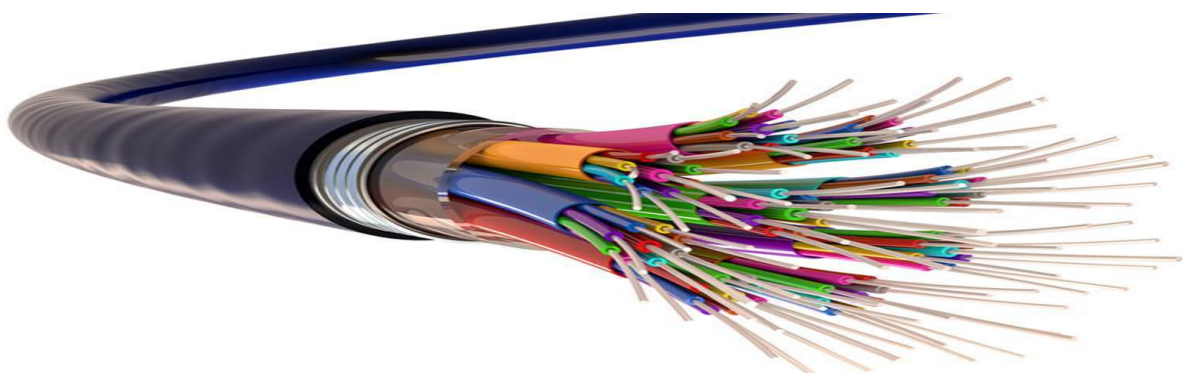


Fig3.17 optical Fiber Cable

### 3.12 Twisted pair cable

Twisted pair cable is a type of wiring in which two conductors of a single circuit are twisted together for the purposes of improving electromagnetic compatibility. Compared to a single conductor or an untwisted balanced pair, a twisted pair reduces electromagnetic radiation.

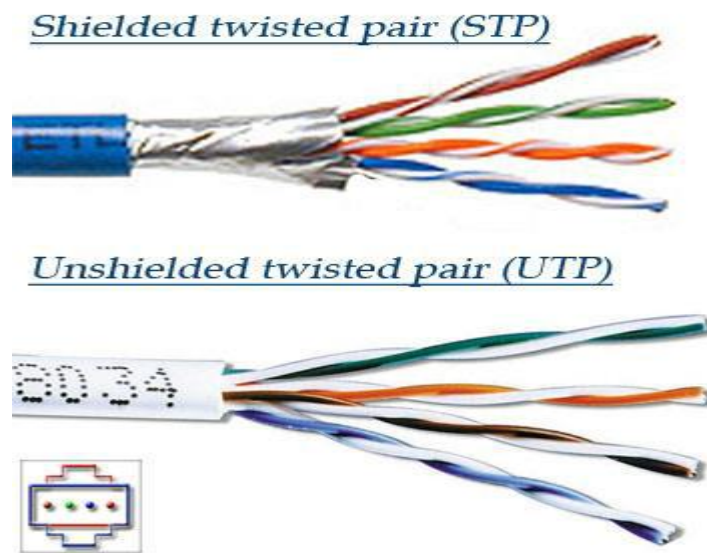


Fig3.18 STP&UDP Cable

### 3.13 Connector

Connector is a device that joining many types of networking device with cable, device, port etc. We have many types of networking connector as like USB connector, RJ 11 registered jack, RJ 45 registered jack, F type, ST (straight tip) and SC (subscriber connector) ,Fiber Lc, MT –RJ etc.

#### USB Connector

Universal Serial Bus is a computer standard designed to eliminate the guesswork in connecting peripherals to a PC .



Fig3.19 USB Connector

### 3.14 RJ-11

Standard telephone cable connector, RJ-11 has 4 wires connector primarily used to connect telephone equipment.



Fig3.20 RJ-11

### 3.15 RJ-45

The acronym for Registered Jack-45 is RJ-45. The RJ-45 connector is an eight-wire connector that is commonly used to connect computers to a local area network (LAN), particularly Ethernet LANs



Fig3.21 RJ-45

### 3.16 F-type

The F connector is a type of RF connector commonly used for cable and universally for satellite television.



Fig3.22 F-type

### 3.17 ST and SC

Network part always want two fiber cables, one for transmitting data, and other for receiving.



Fig3.23 ST and SC

### 3.18 Fiber LC

These connectors are used for single-mode and multimode fiber-optic cables. FC connectors offer extremely precise positioning of the fiber-optic cable with respect to the transmitter's optical source emitter and the receiver's optical detector.

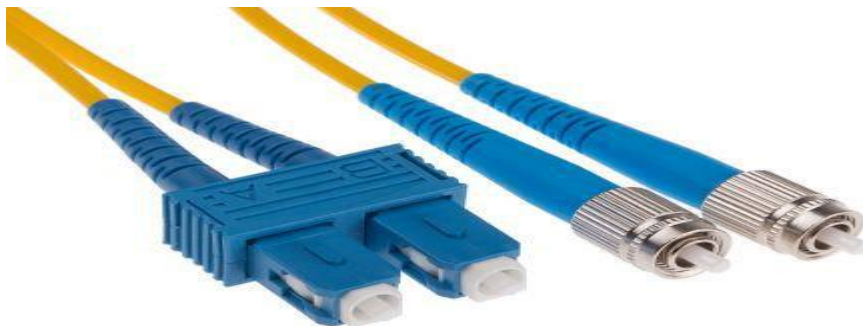


Fig3.24 Fiber LC



### 3.19 MT-RJ

MT-RJ connectors are used with single-mode and multimode fiber-optic cables. The MT-RJ connectors are constructed with a plastic housing and provide for accurate alignment via their



Fig3.25 MT-RJ



## CHAPTER 4

### INTERNSHIP ROLES AND RESPONSIBILITIES

#### 4.1 Training Served

I chose Daffodil Online Ltd for my internship. There are four months of training And here Cisco networking Micro Touch switch configuration mikrotik Router and Linux Operating System Training is done about. Training is done about at first I was admitted here and started classes. At first we have no idea about Cisco networking First we will learn about IP configuration We get various information about IP subletting and reconciliation Then we started installing micro-router in the virtual box And we collect all types of information about micro-router. First, if a mikrotik router is able to do a new configuration forward, then it will have to reset the system to give it first. In the microcytic router, first to get an Internet connection, to scan the IP in the interface and then the DNS and The gateway is required to be given. We have no idea about the various configurations of the mikrotik router, then we have the DHCP configuration Pppoe that service We know all types of configurations about bandwidth management and how we can select or share bandwidth. How to configure and block the bandwidth of Facebook and YouTube via Mikrotik router that does not know from our teacher. After knowing all the types of configurations, we did not shake it again by testing. After completing a four-month course, we take a complete idea about the Mikrotik router

First month we learn about networking and ip sub netting properly and switch configuration VLAN and Switch Management.

- Learning and comprehension about Network Components.
- Study and understanding Basics of Mikrotik.
- Basic Centos Commands.

Second month we learn from Daffodil Online Ltd training Mikrotik Simple configuration and OS installation of Mikrotik in VMware

- OS installing of Mikrotik
- Web Site Filtering
- Concept of IP Addressing.

3<sup>rd</sup> month We Learn Mikrotik configuration that are very important For Mikrotik router management.

- Ip Configuration
- Sub netting
- Networking Binding
- Cisco
- VLAN
- Pppoe

Last month we learn same topic again for good preparation Mikrotik Router

- Static and DHCP
- Bridge
- Bandwidth Management
- ARP/AP
- Pppoe
- Wireless Configuration
- Firewall
- Firewall security
- User ID

## **4.2 Assigned Responsibilities**

In an instruction part, talented and experienced educators are the most essential issues to give quality training. DOL never trade off in such manner. So as to have the best educators, DOL keeps up a deliberate methodology. In the first place, the competitors need to sit for a composed test, at that point a meeting is taken. Finally, the applicant needs to give class from where we take the input from the understudies. Lastly, the applicant is chosen or rejected. We generally give accentuation on the applicant.

## **4.3 Performed Tasks**

For guaranteeing practical advancement in the public eye we should think to build up the human cash-flow to address and training is a standout amongst other weapons to battle destitution and disparity. Since it is commencement, Is working for creating and transmit new abilities and information and giving the capabilities and devices vital for 21st Century work showcase. In this way, finally Daffodil Online Ltd. are delivering specialized master for IT area for home and abroad.

## **4.4 Mikrotik**

Mikrotik is a Latvian company which was founded in 1996 to develop routers and wireless ISP systems. Mikrotik now provides hardware and software for Internet connectivity in most of the countries around the world. They perception in using industry standard PC hardware and complete routing systems allowed us in 1997 to create the Router OS software system that provides extensive stability, controls for all kinds of data interfaces and routing. In 2002 we decided to make there own hardware, and the Router BOARD brand was born. There have resellers in most parts of the world, and customers in probably every country on the planet.

## 4.5 OS of Mikrotik

Mikrotik OS is an operating system .The operating system comes with different license levels ranging from 0 to 6, where 0 is a 24 hour trial version. In trial mode you can test all features of Router OS for free. You can compare the different license level features here. Installing Router OS is very easy. Either download the ISO image, burn it to CD and boot from it. Or Net install will write Router OS to any secondary drive you have attached to our Windows PC. Move the drive to our Router PC and boot it. Both installation methods, plus upgrade files and more can be found here.

## 4.6 Mikrotik Ethernet Route

### 4.6.1 hEX lite

hEX lite is a small five port Ethernet router in a nice plastic case. Its price is lower than the Router OS license alone - there simply is no choice when it comes to managing your wired home network, Not only it's affordable, small, good looking and easy to use - It's probably the most affordable MPLS capable router on the market, Not more compromise between price and features - RB750r2 has both. With its compact design and clean looks, it will fit perfectly into any SOHO environment.

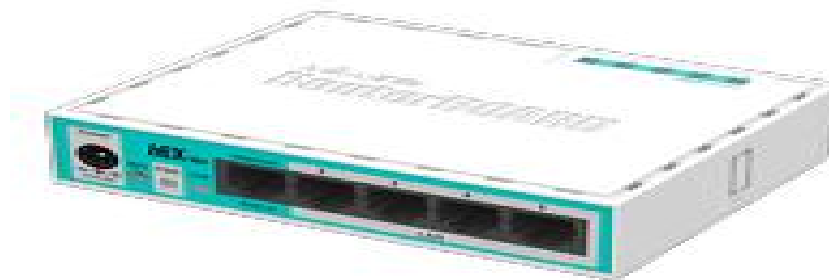


Fig4.1 hEX lite

#### 4.6.2 hEXPoE

hEXPoE is a five port Gigabit Ethernet router for locations where wireless connectivity is not necessary. The device has a USB 2.0 port and a SFP port for adding optical fiber connectivity. The ports 2to5 can power other PoE capable devices with the same voltage as applied to the unit. It is affordable and easy to use, but at the same time comes with a very powerful 800MHz CPU, capable of all the advanced configurations that Router OS supports. Less power adapters and cables to worry about Max current is 1A per port, Ethernet ports are shielded. It also supports passive PoE input and passive or 802.3af/at PoE output. Ethernet ports 2-5 can power other PoE capable devices with the same voltage as applied to the unit.



Fig4.2 hEX pro

#### 4.6.3 RB2011

The RB2011 is a low cost multiport device series. Designed for indoor use, and available in many different cases, with a multitude of options. The RB2011iL-IN is the most basic model, with five Gigabit Ethernet ports, five Fast Ethernet ports, power jack and PoE support. It's powered by the new Atheros next generation 600MHz 74K MIPS network processor. There is PoE output function for port #10 - it can power other PoE capable devices with the same voltage as applied to the unit. Maximum load on the port is 500mA.

Router BOARD 2011 iL-IN comes with desktop enclosure and power supply. Good mount kit for network closet is available for purchase as an optional accessory.



Fig4.3 RB2011

#### **4.6.4 CCR1036-12G-4S-EM**

CCR1036-12G-4S-EM is an carrier grade router with a cutting edge 36 core Tiller CPU Unprecedented power and unbeatable performance–this is our new flagship device. The device comes in a 1U rack mount case, has four SFP ports, twelve Gigabit Ethernet ports, serial console and a USB port. A color touchscreen displays device status, traffic graphs, or provide access to simple configuration options. It has two SODIMM slots, by default it is shipped with 16GB of RAM, but has no memory limit in Router OS. It comes with power supply and 1U rack mount case. The cloud core router is powered by Router OS, a fully featured routing operating system which has been continuously improved for fifteen years. Dynamic routing, hotspot, firewall, MPLS, VPN, advanced quality of service, load balancing and bonding, real-time configuration and monitoring – just a few of the vast number of features supported by Router OS.



Fig4.4 CCR1036-12G-4S-EM

#### 4.6.5 CC1036-8G-2S

Our fastest router has now become even better - the new CCR1036-8G-2S+ now has two SFP+ ports for 10G interface support (SFP+ module available separately). It uses the same 36 core Tiller CPU as our other CCR1036 model, and delivers the same performance, but now ten gigabit links are probable. The device comes in a 1U rack mount case, has two SFP+ ports, eight Gigabit Ethernet ports, a serial console cable and a USB port. The CCR1036-8G-2S+ has two sodium slots, by default it is shipped with 4GB of RAM, but has no memory limit in Router OS (will accept and utilize 16GB or more). Also available now, the EM model with 16GB of RAM Supports both SFP (1.25G) and SFP+ (10G) modules



Fig4.5 CC1036-8G-2S

#### 4.7 Mikrotik Small SOHO Switch

##### 4.7.1 CRS112-8G-4S-IN

Cloud Router Switch 112-8G-4S-IN is a “small size low cost” member of our CRS series. It comes with eight Gigabit Ethernet ports and four SFP cages. This CRS series separate the best features of a fully functional router and a Layer 3 switch, is powered by the strange Router OS. All the specific Switch configuration options are available in a special Switch menu, but if we want ports can be removed from the switch configuration, and used for routing purposes.



Fig4.6 CRS112-8G-4S-IN

## 4.7.2 CRS125-4G-1S-IN

Cloud Router Switch is a new Smart Switch arrangement. It consolidates the best highlights of a completely useful switch and a Layer 3 switch, is controlled by the natural Router OS. All the explicit Switch arrangement choices are accessible in an exceptional Switch menu, however on the off chance that we need, ports can be expelled from the switch setup, and utilized for steering lack of concern. Pick ports for Wire speed exchanging, or for steering purposes.



Fig4.7 CRS125-4G-1S-IN

## 4.7.3 CRS-1G-16S=RM

The new Cloud Router Switch 317-1G-16S+RM is a rack-mountable manageable switch with Layer3 features, it has 16 SFP+ ports for high performance 10GbE connectivity and a 1GbE copper port for management. CRS317-1G-16S+RM is powered by a next generation switching chip, giving us wire speed performance for all sixteen 10GbE ports with any Ethernet frame size. New features such as hardware-based Spanning Tree Protocol and Link defense (LACP) provide enhanced protection and true professional performance for our demanding network. The unit has dual redundant power supplies and passive cooling case, so it's completely silent - for hot environments two redundant fans will automatically keep the system cool if needed.



Fig4.8 CRS-1G-16S=RM



## 4.8 Mikrotik outdoor wireless system

### 4.8.1 LDF 5

Lite Dish Feed is an outdoor wireless system with a built in antenna, meant to be installed on satellite offset dish antennas. The dish will act as a reflector, amplifying the signal. This means we can use any available satellite TV dish with an offset rock to fast deploy powerful long range wireless links. The offset mount is universal at 40mm diameter, and the LDF can easily be placed inside it. Since the LDF itself is a tiny little package, it makes sail and deployment simple and low cost. Using a dish of up to 100cm in diameter, it is possible to obtain antenna amplification of up to 33dBi. The device comes preinstalled with Router OS and is ready to use.- LDF 5 US (USA) is factory locked for 5170-5250MHz and 5725-5835MHz frequencies.



Fig4.9 LDF 5

### 4.8.2 Groove 52

It is a outdoor series model - a fully featured wireless Router board powered by Router OS. Weather proof, durable and ready to use. It has one 10/100 Ethernet port with PoE support and a built in wireless radio. It has software selectable 2 or 5GHz wireless mode, and high output power With the Nv2 TDMA technology, up to 125Mbit count throughput is possible It has a

built-in N-male connector, and pole attachment points, so we can attach it to an antenna directly, or use a standard antenna cable. LED signal indicators make it easy to install. Box contains Groove unit, ground loops, PoE injector and power adapter.

-Groove 52-US (USA) is factory locked for 2412-2462MHz, 5170-5250MHz and 5725-5835MHz frequencies. This lock cannot be removed.

- Groove 52 (International) supports 2412-2484MHz and 5150MHz-5875MHz range (Specific frequency range can be limited by country regulations).



Fig4.10 Groove 52

#### **4.8.3 LHG 5 ac**

The LHG 5 ac is a compact and light 5GHz 802.11ac wireless device with an integrated dual polarization 24.5 dBI grid antenna at a revolutionary price. It is faithful for point to point links or for use as a CPE at longer distances and supports Nv2 TDMA protocol. The device includes one 10/100/1000 Mbit Ethernet port to fully utilize speeds that 802.11ac protocol give.

- LHG 5 ac-US (USA) is factory locked for 5170-5250MHz and 5725-5835MHz frequencies. This lock cannot be removed.

- LHG 5 ac (International) supports 5150MHz-5875MHz range (Specific frequency range can be limited by country regulations).

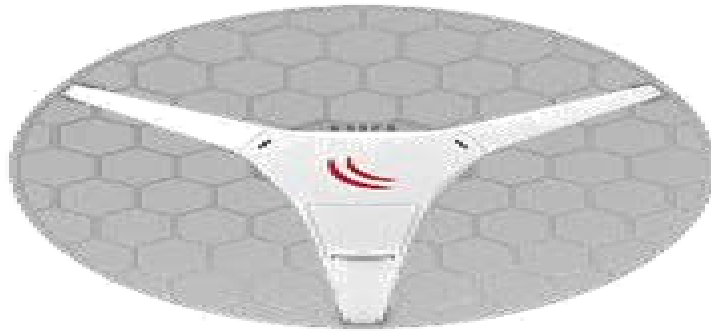


Fig4.11 LHG 5 ac

#### 4.8.4 Wireless Wire Dish

The Wireless Wire Dish is a ground staving solution which offers Fiber speed and quality on distances up to 1500 m for a fraction of the price This arresting kit makes a secure AES encrypted 60 GHz wireless link that is not affected by the crowded Wi Fi spectrum, offering a stable and fast link for distances of 1500 meters or more. Simply point the included devices at one another and power them on, it's already preconfigured to connect automatically and will make a 2 Gb/s aggregate link. The box includes two LHGG-60ad devices that are already paired together, power supplies, PoE injectors and mounting kits for with in two devices.

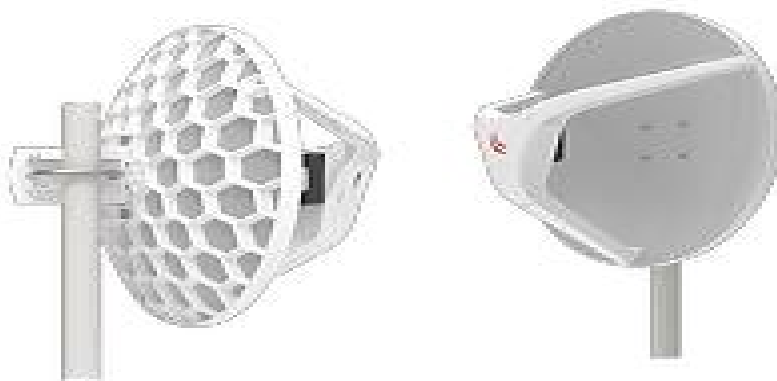


Fig4.12 Wireless Wire Dish

## 4.9 Winbox Interface Menu

Winbox is a small utility that allows administration of MikroTik Router OS using a fast . It is a native Win32 binary. All Winbox interface functions are as close as possible reflect the console functions, that is why there are no Winbox sections in the manual. Some of advanced and system critical configurations are not probable from winbox, like MAC address change on an interface Winbox change log From Winbox v3.14, the following security features are used.

- Winbox is signed with an Extended Validation certificate, issued by SIA Mikrotik is (MikroTik).
- WinBox uses ECSRП for key exchange and authentication.
- Both sides verify that other side knows password.
- Winbox in RoMON mode requires that viceregent is the latest version to be able to connect to latest version routers.
- Winbox uses AES128-CBC-SHA as encryption algorithm (requires winbox version 3.14 or above).

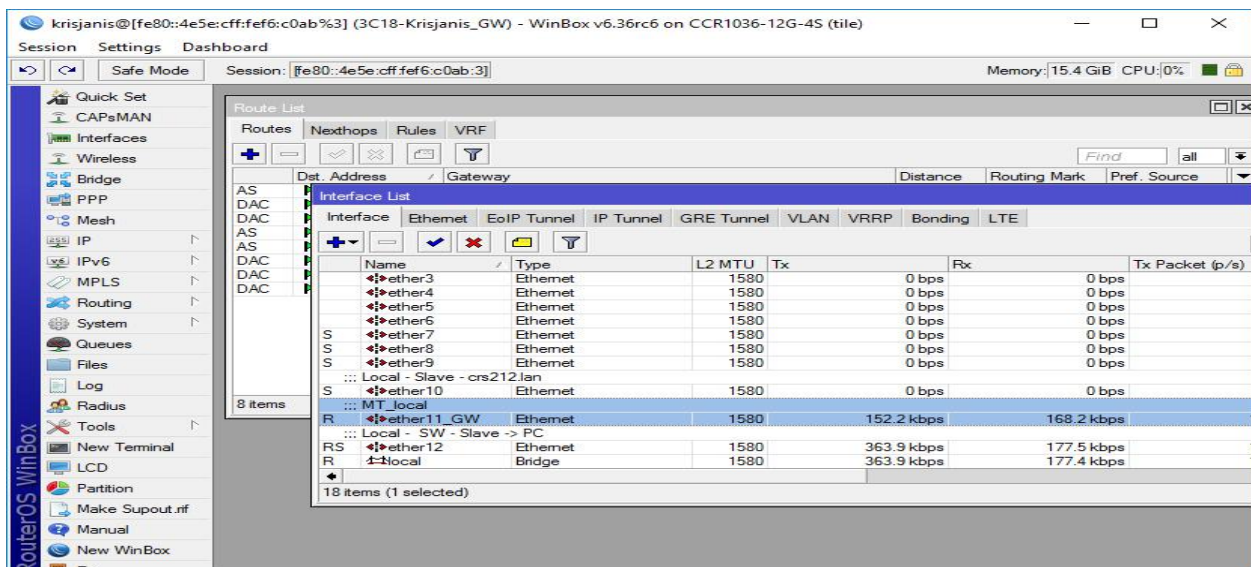


Fig4.13 Winbox Interface Menu

#### 4.10 Basic Configuration of Mikrotik

For Basic Configuration in mikrotik router at first we going to mikrotikdashboard then we go to IP and from here to address.

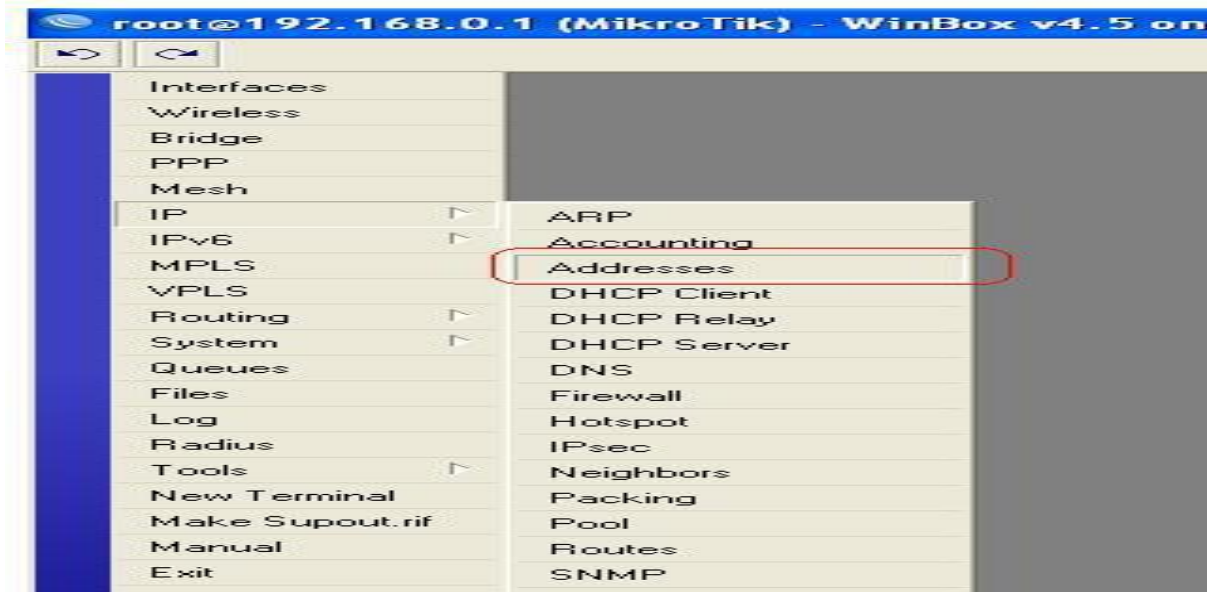


Fig4.14 Basic Configuration of Mikrotik

When open the address list dialog window then this window as seen given below then click on the place point for open the IP address window

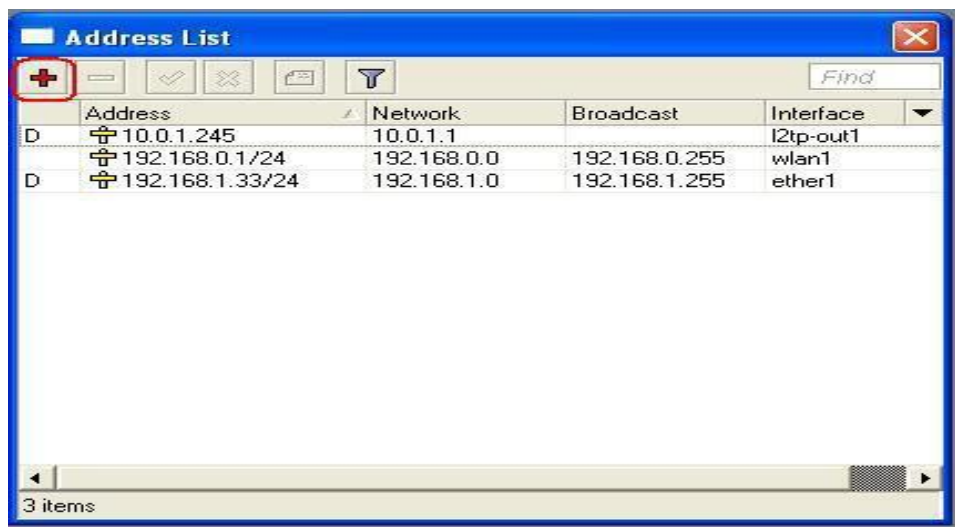


Fig4.15 Basic Configuration of Mikrotik

When open the IP address dialog then enter the address details and then click ok



Fig4.16 Basic Configuration of Mikrotik

This tutorial demonstrates how to set the password of the current Mikrotik Winbox user. Click on the menu item as shown below

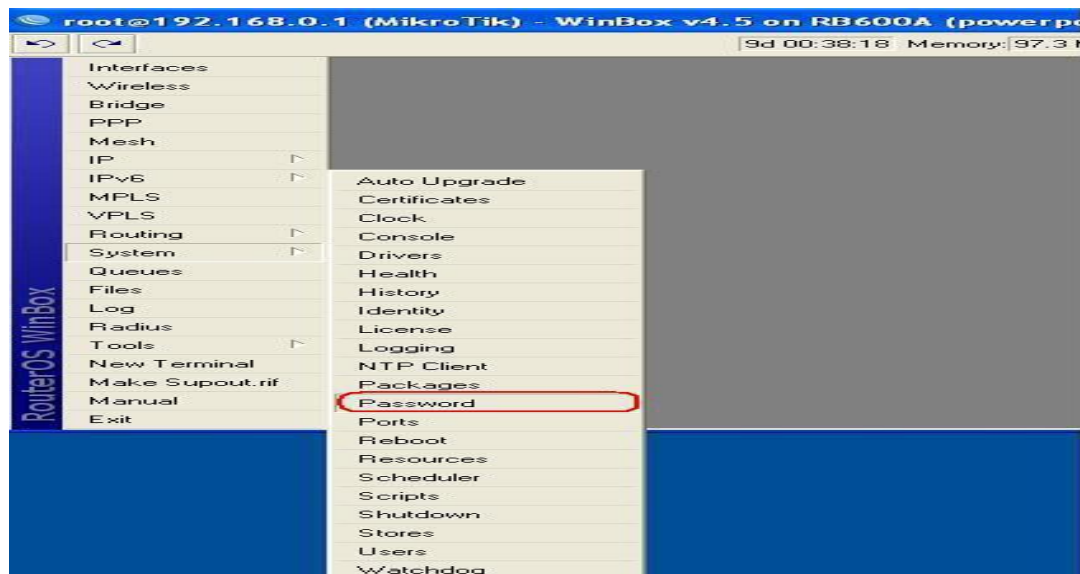


Fig4.17 Basic Configuration of Mikrotik

Enter the old or current password followed by the new password that you wish to use.

## 4.11 DHCP Configuration

**Step 1** : Login with Winbox software

**Step 2** : Go to IP > DHCP Client

**Step 3** : we see a new window.

**Step 4** : Click in the + button to add a DHCP client

**Step 5**: After clicking the red + button, another window will appear.

**Step 6** : Let's stop at the first setting (Interface). Example, Ethernet LAN port 1 is an interface. Our wireless Card that is connected to the board WAN is an interface. If our Mikrotik Ethernet port 1 is connected to our ADSL router with an Ethernet cable, then the Mikrotik Ethernet port 1 should be a DHCP client because this port will receive an IP address from the ADSL router. Under Interface, Select ether1 and press apply and ok.

**Step 7** : Now we see that your ether1 searching for an IP address. In the image below, ether2 is also used as a DHCP client, if the ADSL fails. 4.12 Bandwidth bonding Bandwidth Management is the process of measuring and controlling the communications (traffic, packets) on a network link, to avoid filling the link to capacity.

**Step 1**: open winbox then Queues then simple Queues then click plus then Name= queue1 then Target Address=192.168.0.5( N.B: your LAN site IP if we want to control Bandwidth against of unique PC or unique IP). Target upload, Max Limit=512k, Target Download, Max Limit=512k next Apply at least ok.

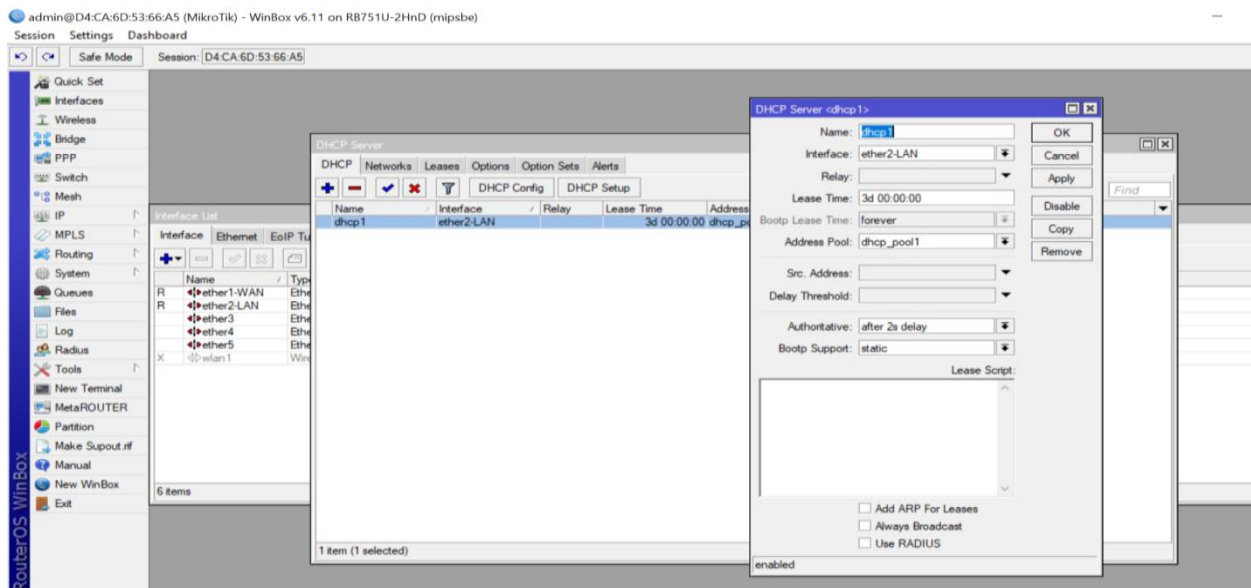


Fig4.18 DHCP Configuration

## 4.13 Bandwidth Management

There are two ways to do that.

i) add multiple queues (1 per IP). (which doesn't seem like a good idea to us)

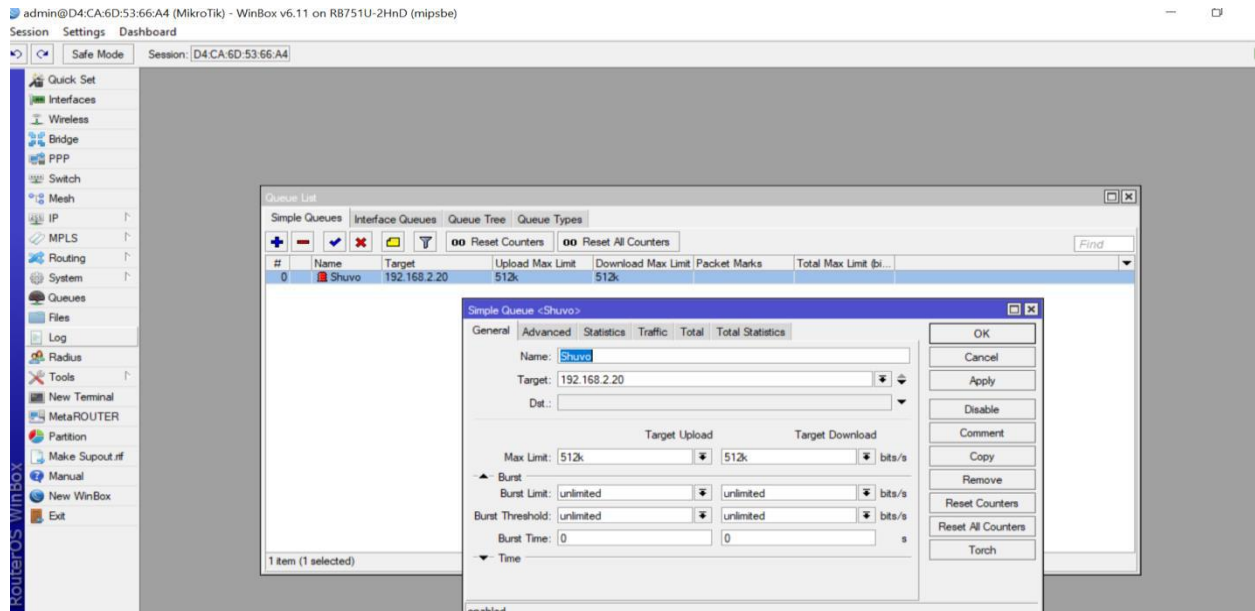


Fig4.19 Bandwidth Management

ii) define two new PCQs queue types. (1 for download and 1 for upload)

I use winbox most of the times . So don't remember the exact cli commands.

but in winbox . We'll have to go to Queues then Queue Types then Add(+)

give it a name say. 10M-Download, kind=pcq, rate=10M, Classifier= Dst. Address for rest defaults are ok

add another one:

name = 10M-Upload, kind=pcq, rate=10M, Classifier=Src Address.

## 4.14 Pppoe Configuration

Pppoe stands for Point-to-Point Protocol over Ethernet, a network protocol for encapsulating Point-to-Point Protocol (PPP) frames inside Ethernet frames. It is used mainly with DSL services where separate users connect to a DSL modem over Ethernet. Ethernet networks are packet-



based and have no capacity for a connection. They also lack basic security features to protect against IP and MAC conflicts and rogue DHCP servers.

### Step1.

Create PPPoE client We assume that our WAN port is ether1. Plug our WAN cable into ether1 – Click on ppp then Click on plus sign. Add +. Then choose .Pppoe Client. Next In .General tab, we will see Interface then choose it as ether1

Now go to Dial Out tab and then fill in User and Password then Click on Apply then we will see Status connected on the bottom.

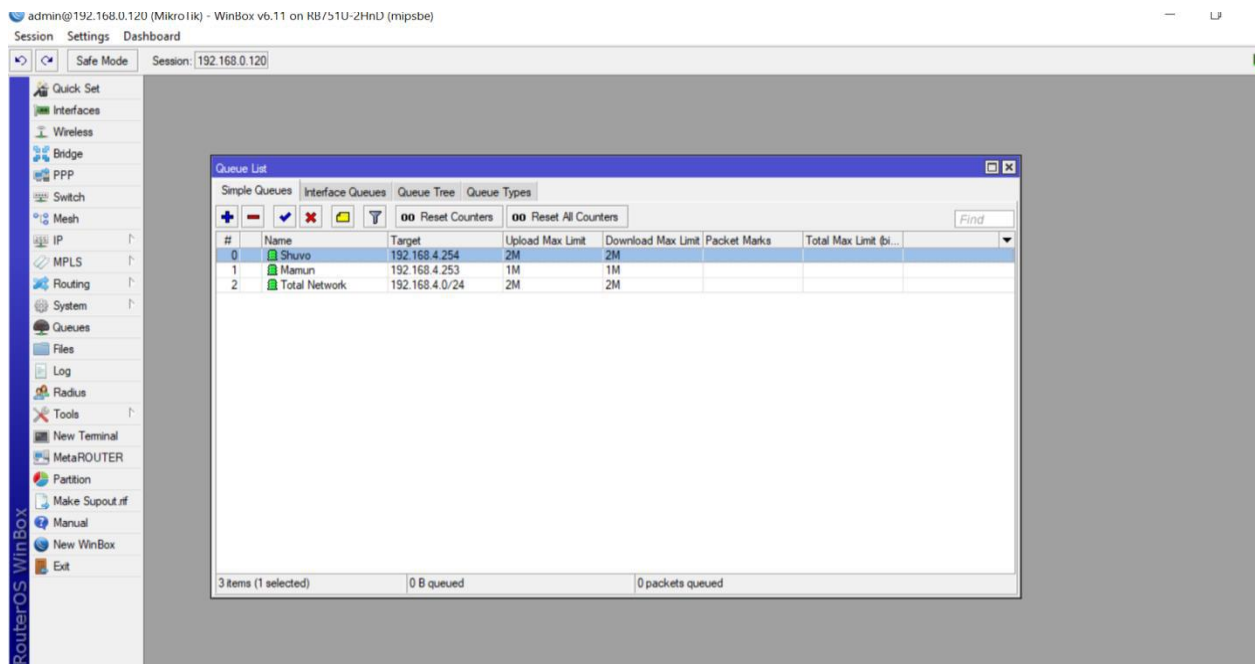


Fig4.20 Pppoe Configuration

### Step2.

Set DNS - click on “IP” and choose “DNS” - Fill in the DNS IP addresses

### Step3.

Set DNS - click on “IP” and then choose DNS - Fill in the DNS IP addresses

Then In “Ports” tab, click on add “+” sign to add port into bridge - Select interface that we want to add into bridge (Ex: ether2, ether3, ether4, waln1) then choose bridge that we have created earlier and click ok.

#### Step4.

Add IP address for LAN - Click on “IP” then choose “Addresses”

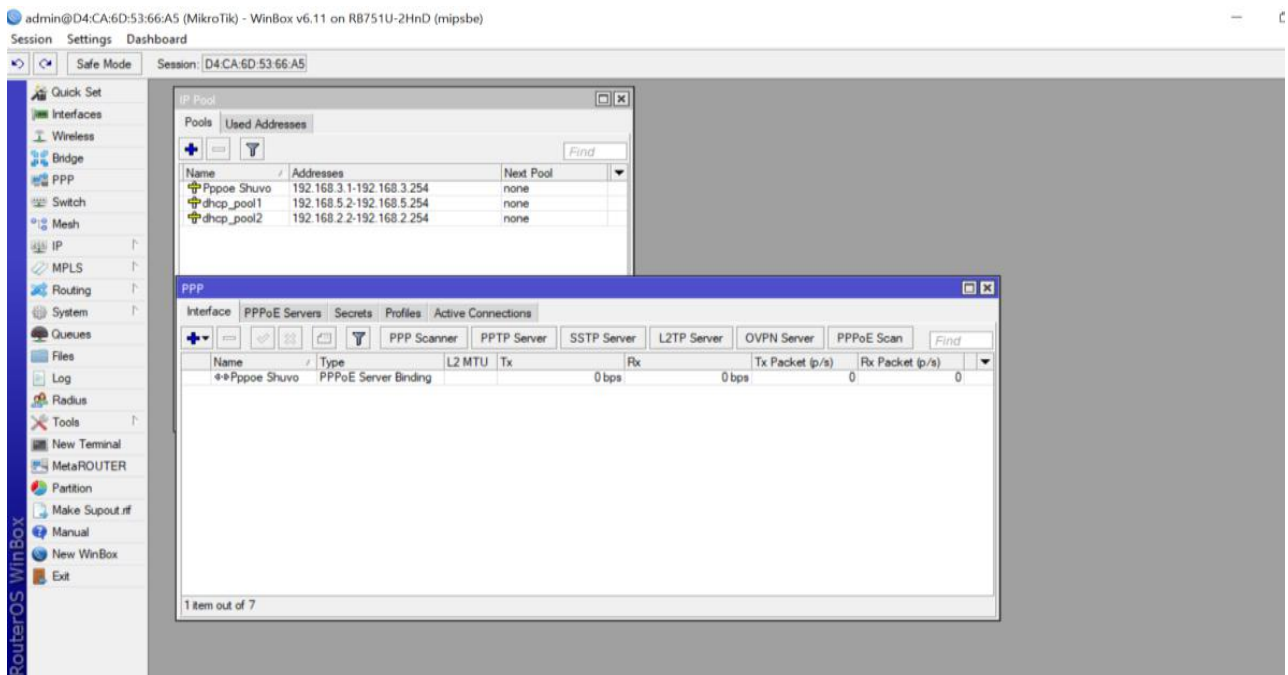
Click on “add+” sign to add new IP address - Fill in the IP address and then choose the bridge name that we have created earlier.

#### Step5.

Create DHCP Server - Click on “IP” then choose “DHCP Server” - Click on “DHCP Setup”, then choose our bridge and click next .

#### Step6.

NAT LAN network - Click on “IP” then choose “Firewall” - In general tab, select “scant” and choose pppoe-out1 (PPPoE name that we have created earlier) in “out interface”. - In action tab, choose “masquerade” then click ok.



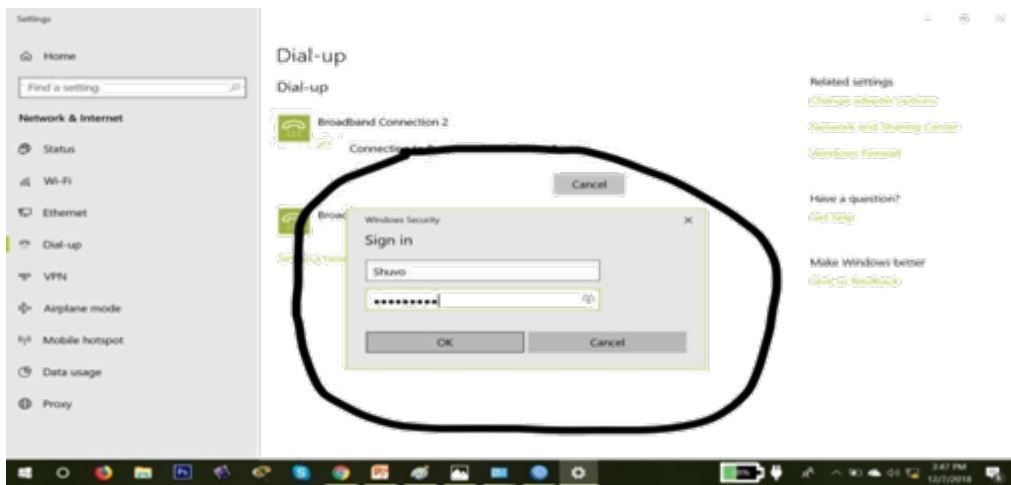


Fig4.22 Pppoe Configuration

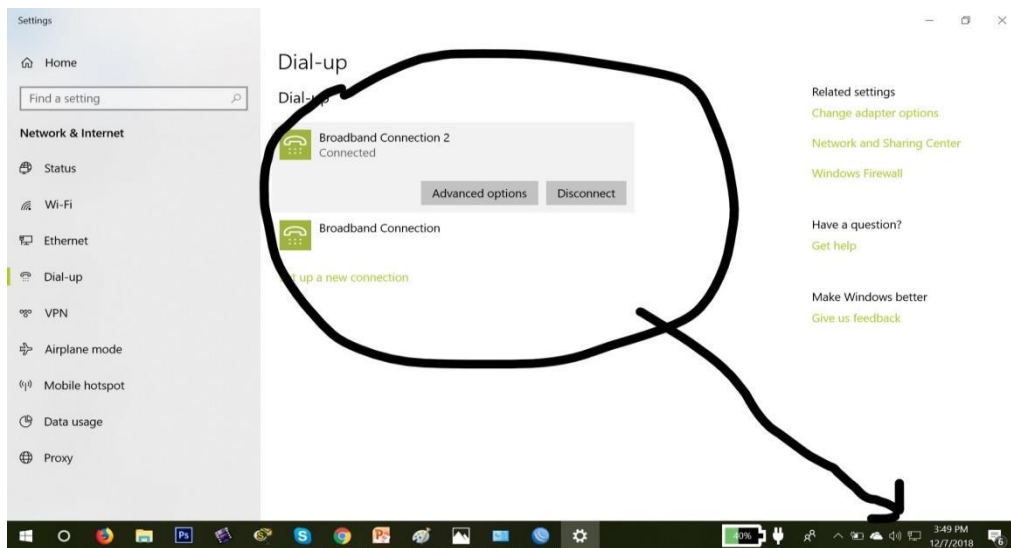


Fig4.23 Pppoe Configuration

#### 4.15 Wireless Configuration

A wireless local-area network (LAN) uses radio waves to connect devices such as laptops and mobile phones to the Internet and to your business network and its applications. When you connect to a Wi-Fi hotspot at a cafe, a hotel, an airport lounge, or another public place, you're connecting to that business's wireless network.

##### Step1

create a new security profile: Go to **Wireless ->Security Profiles** and add a new profile.

Then create a virtual access point: Go to **Wireless ->Interfaces** and then add a Virtual AP.

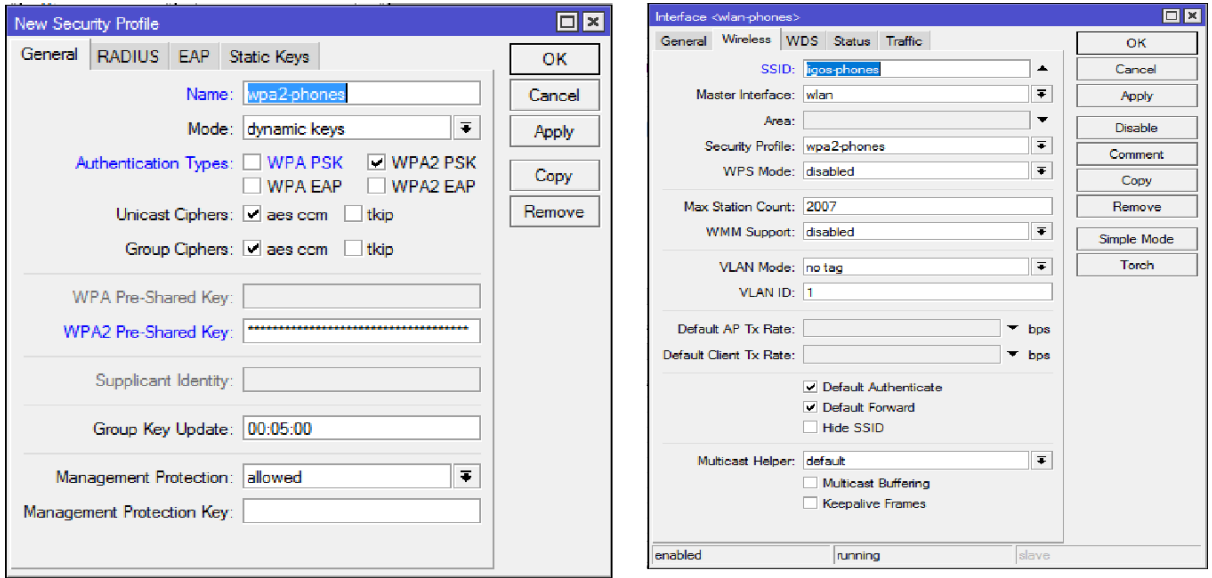


Fig4.24 Wireless Configuration

**Step2**

A network interface isn't much use without an IP address.

Go to **IP ->Address** and then add a new address. Go to **IP ->Pool** and then add a new pool.



Fig4.25 Wireless Configuration

**Step3**

DHCP is used to assign addresses to devices as they connect to the Wi Fi network. They will use the pool we just created. And also assign a few other special addresses. Go to **IP ->DHCP Server** - DHCP Tab and add a new DCHP Server.

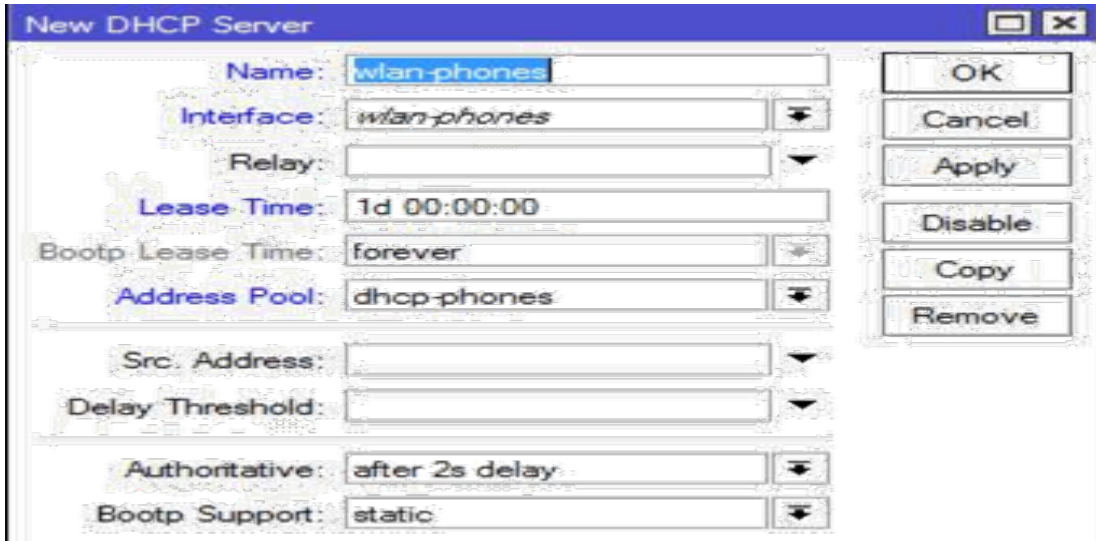


Fig4.26 Wireless Configuration

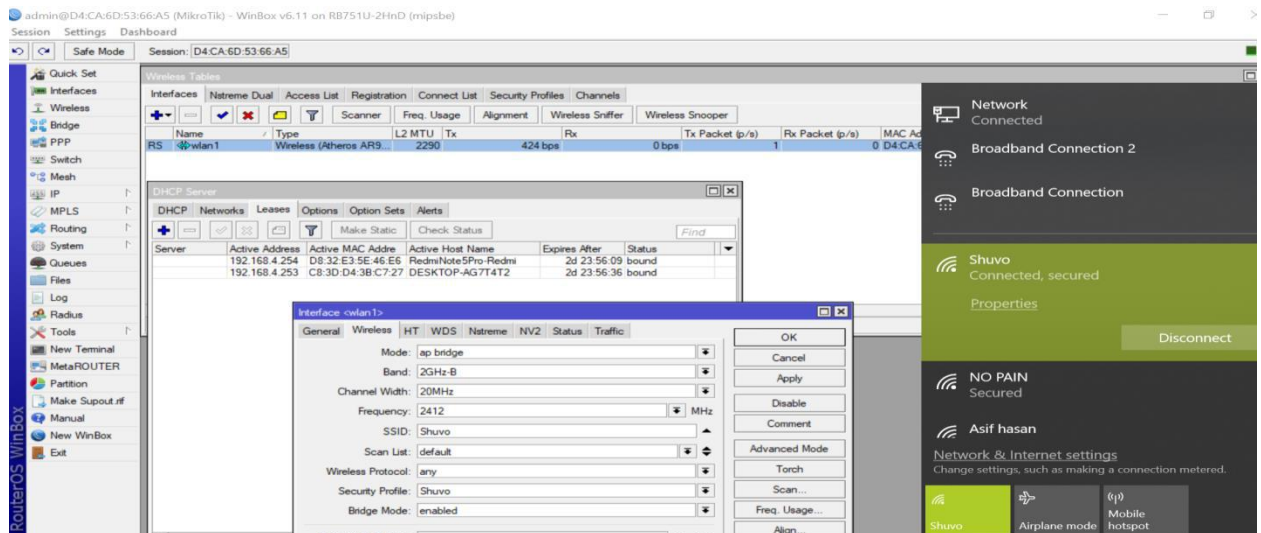


Fig4.27 Wireless Configuration

## 4.16 ARP/AP Configuration

ARP binding puts a static IP to MAC address entry in a device's ARP table. DHCP reservations allow a device on the network to always get the same IP assignment when making DHCP requests. They are not really related.

## Step

At first we go to IP select ARP then Click + sign and add information as on screen and press ok .then we select Static IP Address ,Device MAC Address (which need to bind ) Interface: Ether2\_LAN Same steps need to repeat on DHCP Server so click IP and select DHCP Server

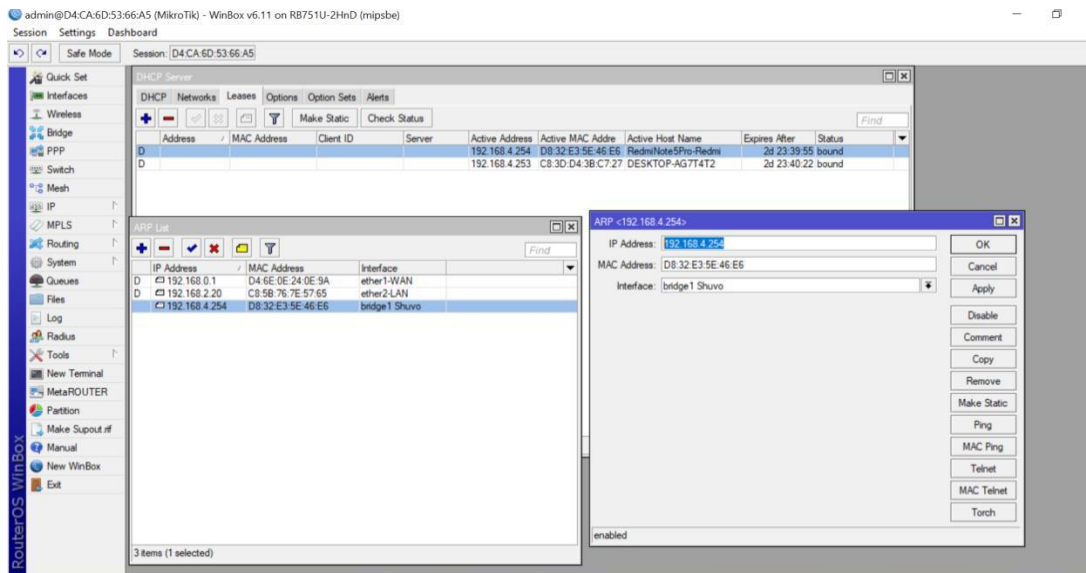


Fig4.28 ARP/AP Configuration

Then

Click on + sign and also add required information on DHCP Server tab, Static IP Address and

MAC Address then Click tick on Use Static IP

Server: dhcp1

Comments: mention the username to identify

## 4.17 Fire wall Configuration

The firewall implements packet filtering and thereby provides security functions that are used to manage data flow to, from and through the router. Along with the Network Address Translation it serves as a tool for preventing unauthorized access to directly attached networks and the router itself as well as a filter for outgoing traffic.

### Rule-1:

Chain: Input

Src Address: 203.99.15.100/30 (IP / IP Block on your WAN Side)

Then go to Action tab and select Accept and click OK. This will create a rule in filter rules. This rule will allow you to access your router with that IP or IP block.

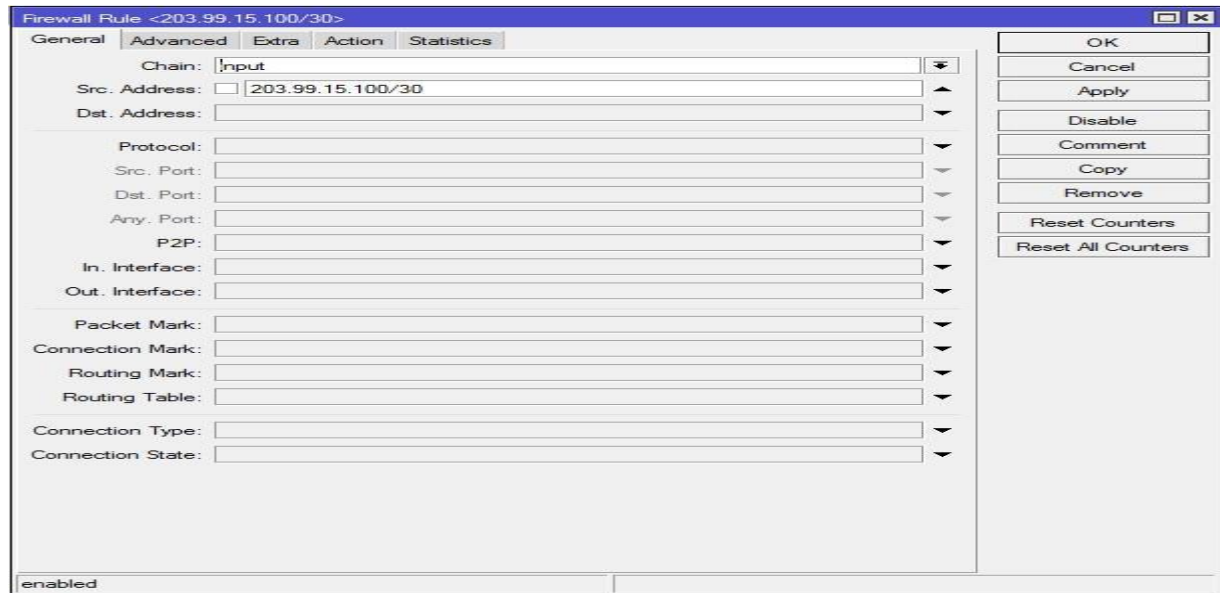


Fig4.29 Firewall Configuration

### Rule-2:

Chain: Input

Src Address: 192.168.1.0/24 (IP block of your LAN)

Action: Accept

Apply> OK.

Now our router can be accessed from the IP / IP block of WAN Side and from the IP block of your LAN side. Apart from this, you can access anywhere through the Internet, but since our purpose is to prevent routers from unauthorized IP access, we have to create two rules as well as two rules. So that it can not be accessed from router without any other IP block other than IP. Similarly, click Add (+) then,

### Rule-3:

Chain: Input Src Address 203.99.15.100/30 Action: Drop ADs by Tec tunes Ads Apply> OK.

### Rule-4:

Chain: Input Src Address 192.168.1.0/24 Action: Drop Apply> OK

Now our router can not be accessed from other IP / IP blocks except 203.99.15.100/30 and 192.168.1.0/24 IP blocks. You can create more such filter rules such as brute force attack on your router, port block of different virus-spamming, special ports block of any specific network of networks. Below are the screen shots of some virus-spamming port blocks

Here the 192.168.1.0/24 3129 ports of this IP block have been blocked through rule-14. That means those 3131 ports cannot be used in the port. Normally this port is used in a proxy server. Many network administrators want to prevent their users from using a proxy server, they can block the necessary ports in this way.

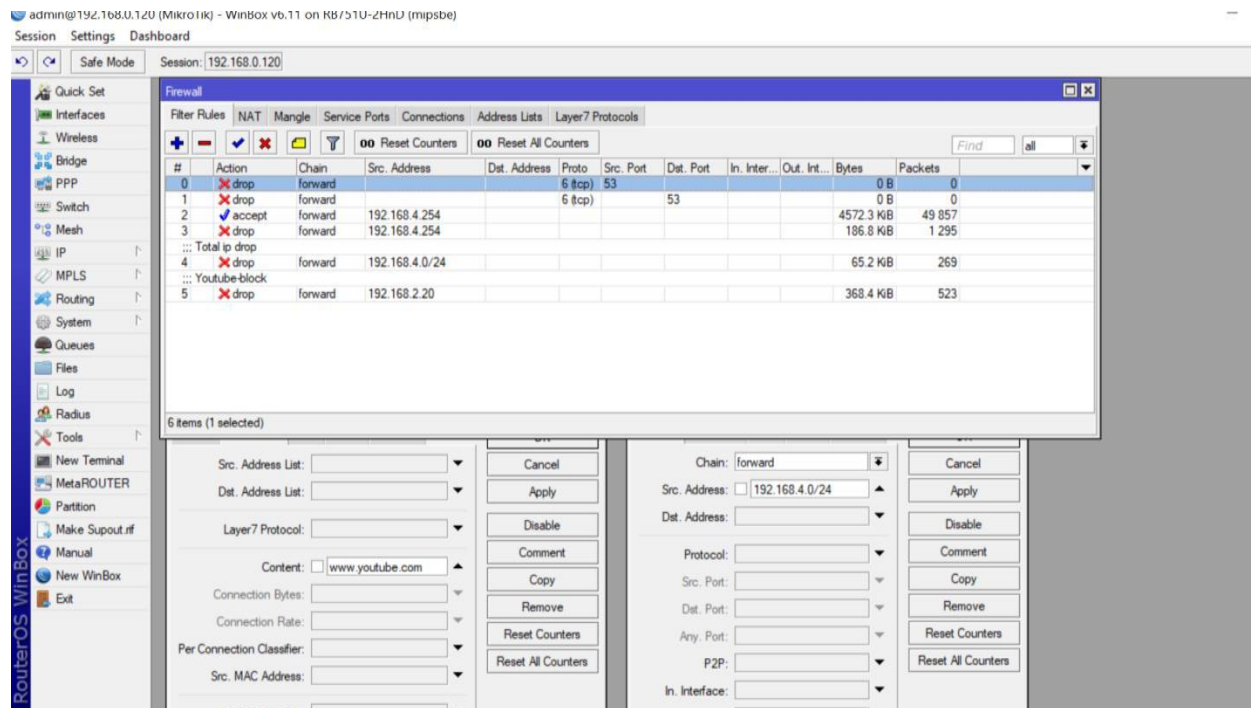


Fig4.30 Firewall Configuration



## 4.18 Ip service

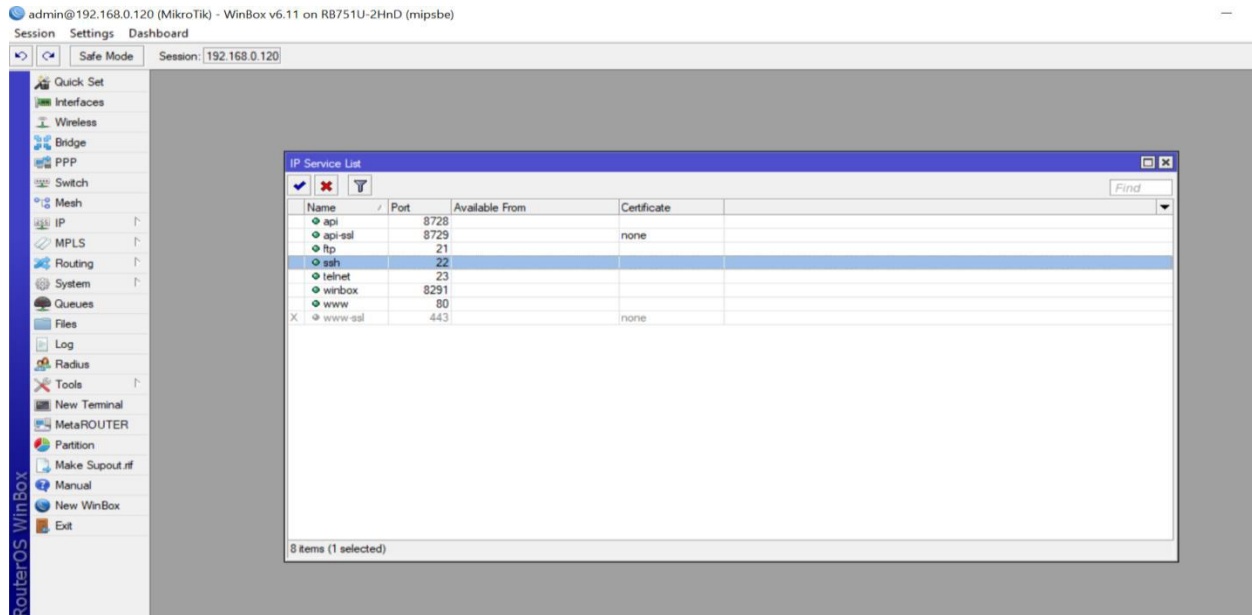


Fig4.31 IP Service

## 4.19 User ID

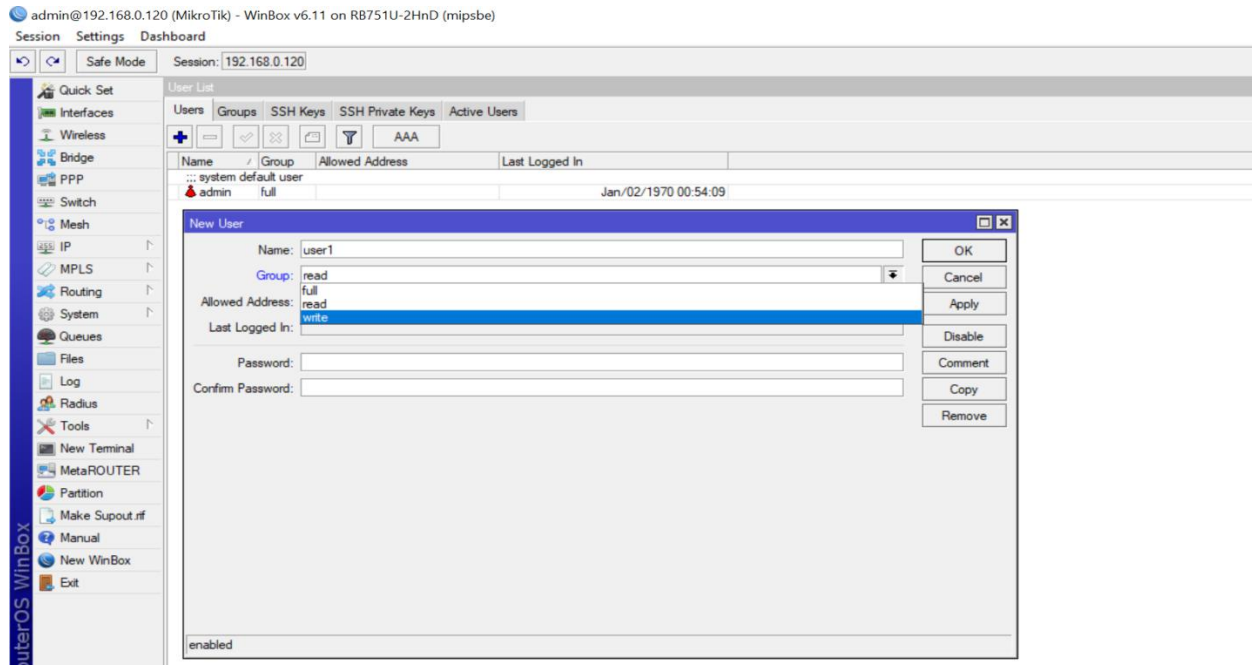


Fig4.32 User ID

## CHAPTER 5

### INTERNSHIP OUTCOMES

#### 5.1 Problems and Solution

We encounter various types of problems while configuring microcytic router, and we do solved it in different ways. The first thing we need to notice when deciding on microtique router is that the IP is exactly the same process. You must also check whether the DNS and gateway IPs are properly installed. Because if any IP is misplaced today then the configuration is not correct. While configuring the firewall, we must be sure that the site that is blocking it should be below all. Our first goal should be to keep in mind that when we have configured the SSID and password. When we make LAN and WAN configuration, we must note that our mesquites have been queued because of the reason If this is not done we can not connect between LAN and WAN. In order to solve all kinds of problems, we must properly configure while configuring and should be kept in mind that there are no mistakes. If incorrect, then all the configurations should be checked again.

#### 5.2 Learning Outcomes

After fully completing the microcytic router configuration, I can say that Mikrotik Router is an important device for data center. Mikrotik Router can manage bandwidth through a variety of configurations in a data center. After training from Daffodil Online Ltd, I have collected all types of information about Mikrotik router. Now I can manually configure the Mikrotik router and enjoy various types of facilities. After trading, I have the confidence that I can do all kinds of Mikrotik router in one data center and provide ISP services. And I think that I have achieved the capability that I need to win as a microprocessor operator in various ISP companies.

### 5.3 Challenges

As compensating your impermanent position can be, there are troubles to think about when joining a promoting firm as an aide. Brief employments are opportunities to get critical association in the workplace yet occasionally they can be trying and you'll have to make sense of how to investigate the system. Brief positions are not without their very own obstructions I will cover a couple of stresses that various collaborator's fight with. Notwithstanding, remember that all. An Intern can confront diverse difficulties these are

Given underneath:

- Get with the working environment.
- Earn some organizing limit.
- Set cum the official fairness and principles.
- Founded social relations with the specialists.
- Make himself capable with the forceful action feature.
- Develop Corresponding utmost with different dimension of customers.
- At last an understudy needs to go up against various distinctive troubles including all above.

Finally, we can express that if there is no test, there is no accomplishment. Thusly, we need to step through every exam vehemently in the technique for your flourishing.

## CHAPTER 6

### CONCLUSION

#### 6.1 Conclusion

The section level position revolves around Fundamental of Data Communication, and Arranging Network Security and Services and some more. After completing my internship, I can say that if someone has done his training from Daffodil Online Ltd he can fully operate the Mikrotik router to be able to operate and he will be able to keep the various jobs he / she can regularly with all his arrangements. After completing internship from Daffodil International University's Daffodil Online Ltd team, Mikrotik router very well Able to operate. Because of all types of microcontroller router's configuration well, I can now operate the Mikrotik router itself. Besides, due to trading from Daffodil Online Ltd, I have visited the Tata Center of Daffodil One Lite Limited and have been known about various devices.

## References

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