BASIC MIKROTIK & CISCO SWITCHING

BY

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This Report Presented in Partial achievement of the Requirements of the Degree of Bachelor of Computer Science and Engineering.

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APPROVAL

This internship titled "**Basic MikroTik & Cisco Switching**" submitted by Md. Nuruzzaman Mia, ID No: 163-15-8303 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as reasonable for the partial achievement of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its technique and contents. The presentation has been held on 12 September 2019.

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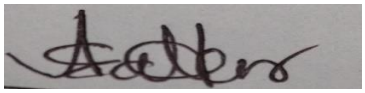

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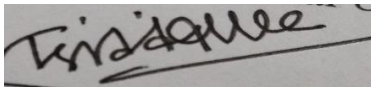

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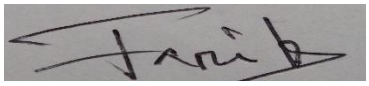

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I hereby announce that, this internship report is organized by me Md. Nuruzzaman Mia, ID No: 163-15-8303 to the department of Computer Science and Engineering, Daffodil International University. I also announce that internship report nor any part of this internship report has been submitted in another place for award of any degree or Diploma. I also announce that, collect information form Daffodil online limited (DOL), Data center and internet Service Provider (ISP) Based Company, Books and Internet.

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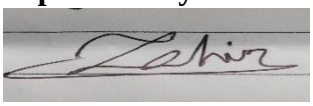

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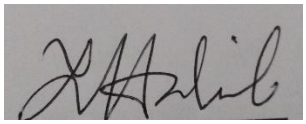

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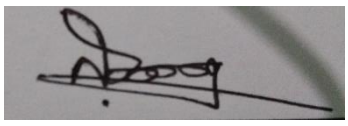

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I would like to express my heartiest gratitude to Dr. Syed Akhter Hossain, Department of CSE, for his kind help to finish my internship and also to other faculty member and the staff of CSE department of Daffodil International University.

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Finally, I must acknowledge with due respect the constant support, motivation and patients of parents

ABSTRACT

MikroTik is simple terms an operating system .It is the software on a Basic computer operator to access the devices on the computer to perform preferred functions. It is very useful for our daily life. In this sector we will know about Cisco Switch, MikroTik, Cabling, Linux System etc. Network devices are connected to computers, peripherals, devices. Switch, routers and wireless access points are the fundamental networking basic during them device connected to network can communicate with one computer to another computer and with other networks, like the internet. Now a day's big number of people all over the world usage internet technology. So networking is so much important. Now-a-days every single people, business and e-commerce, every work station is fully depend on software based communication and internet technology. That is the reason it's extremely helpful to attach the system. Computer system and peripheral are connected to form a network. They provide various advantages, for example Immediate messaging, parallel computing, video conference, interaction with other users using dynamic web pages, sharing information by using internet or web.

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CHAPTER 01

INTRODUCTION

1.1 Introduction

The major goal of learning is to gain wisdom. I choose an internship because I gain to developed skill. Now huge number of people using information technology and server in worldwide over the internet. The Information Technology (IT) industry is one of the most growing industries worldwide. In Bangladesh, the IT sector has started growing particularly after 2000 years because of some positive rules of the government. So our country huge working places would be creating in future. Our country young generation IT learning knowledge apply this station. As a result our country would be developed.

1.2 Objectives

- The major goal of study is to acquire wisdom.
- I choose an internship because I gain to developed skill.
- Everyday learn about latest technology &challenge to improved & developed sets of skills.
- Network Support Engineer performed responsibility and working Action analyzing from different aspects.
- To achieve the internship requirement under the program of CSE.
- To gain detailed Wisdom on MikroTic & Cisco Switch.

1.3 Inspiration

The CSE Program prepares students for a professional career in IT sector. Internship to get the applied knowledge in this sector in computer technology . It is important to gaining practical knowledge. It increases our professional experience in engineering or information technology system & it help to make me professional. I hope internship skill help me face to challenge in job market of my future professional life. That's why I choose internship for my future professional life [2]

1.4 Internship Goals

- ✓ Install MikroTik interactively and with kick start
- ✓ Perform user and group administration
- ✓ Study about every networking device
- ✓ Managing of networking system
- ✓ How to Communication between customer
- ✓ How to allocate excellent facility to Customer Etc.

1.5 Introduction to the organization

Daffodil online Ltd. is single of the outstanding internet service provider (ISP) in our country. They are oldest organization in ICT division. This Company includes Information Communication Technology services & authorization in since July 2002. This Company applies the newest technologies and upgrading the services where it required. This company is very expert and advanced in the field of information communication technology where their initial occupation rules are long-standing concern with our customer. They worked finished many national projects with international organizations [1].

1.6 Report Layout

Chapter-1: I have explained this chapter internship purpose, inspiration, goals of internship And inception to the internship company structure.

Chapter-2: I have explain this chapter about the organization & organization Structure, and also explain this company the offered and roles in job promote of MikroTic & Cisco Switch.

Chapter-3: I have explained & shown this chapter everyday work and activities, Event and Activities, Challenge & Router OS Etc.

Chapter- 4: I have described this chapter Conclusion & Scope for Future Career about MikroTic and Cisco Switch.

CHAPTER 02

INTERNSHIP ORGANIZATION

2.1 About the Company

Daffodil online Ltd. is single of the most important internet service providers (ISP) in our country. They are oldest organization in the ICT division. This Company vision is Proficiency in customer service through potential integration between individual departments. This Company are membership with Bangladesh Computer Samity, Asia Pacific network Information Center etc. This company all employee potential professional skill is very well .they are also certified and linked with Cisco, Linux, Oracle, and Microsoft. This company provides internet services and also deliver training like as Linux, MikroTic, and MTCNA Etc [1], [3].

2.2 Roles in Job Market

The roles in job market of Daffodil Online Limited (DOL) are as following IT Services:

- Linux Administration
- Network Administration
- Web Server Administration
- System Administration
- Security Engineer.
- Technical Support
- Senior Network Engineer
- Manager of Broadband Network (ISP)
- Network Engineer-(CISCO/Juniper/Ethernet)
- Support Engineer As like- (Windows/ Linux /VMware /Network) Etc [2].

2.3 Structure of Organizational

Figure 2.1: Diagram of DOL Structure

CHAPTER 03

TASKS, PROJECT AND ACTIVITIES

3.1 Every day Work and Actions:

Month 1: In the 1'st month I have completed following work and I have learned.

- Learning about basic Network components
- How to Configure internet to a PC
- Computer Network
- Networking Devices
- File & Folder Share Using LAN

Month 2: In the 2nd month I have learned & completed the following Work

- Numbering System
  - Binary
  - Decimal
- IP Addressing
- Cabling
- Networking : Many type of networking concept gaining following this Networking
  - Local Area Network
  - Metropolitan Area Network
  - Wide Area Network

Month 3: In the 3rd month I have learned & completed the following Work

- Configuration of MikroTik Router operating System
- mechanism of installation
- Configuration of Static routing
- Design of Bridging System

- Configuration of DHCP routing
- Bandwidth administration using PCQ
- PPPoE Configuration

Month 4: 4'th month I Have completed following this work

- **Switch Configuration**
    - Hostname Setup
    - Console Password Setup
    - Banner Setup
    - Enable Password Setup
    - Enable Secret Password Setup
    - IP Address Assign to Interface & Comment the Interface
    - Telnet Configuration
    - SSH Configuration
    - Username and Password Configuration
    - VLAN Configuration
    - Port Assign to Single interface
    - Saving and Erasing Configuration

3.2 Events and Activities

In the Education Sector capable and knowledgeable Manpower is important issues for best value education. Daffodil Online Limited prefers the Best superiority Teacher for professional training and Courses. Daffodil Online Limited maintains efficient approach for recruitment. first time candidates have a sit on written test, then written exam test pass candidates again vaiva exam face & finally working or practical exam attend, then will be join this company , otherwise any exam fail the candidates will be rejected. Daffodil Online Ltd (DOL) is very state forward & 0% tolerances rules any Event like as employee appoints. Daffodil Online Ltd. has totally qualified the conventional idea of polytechnic, technological & occupational ability expansion education sector in our country. Now daffodil online Ltd is too much fashionable honor

in the commercial label. It has acquired international recognition too much small time. On the other hand Daffodil Online Limited provided best value professional training. Daffodil Online Limited Provided the Training for Diploma Engineers, business line professional and Human Resource [1].

3.3 MikroTik Router OS

MikriTic Latvian institute was recognized in 1996 .This Company generate switch and distant ISP frame. Now This Company Provide MikroTic internet connectivity provides hardware & software in the various countries [5].

3.3.1 Router OS

Router OS means network manage approach based on Linux design for installation on MikroTik Router Board routers. It know how to be also set up on the PC, Structure into a router through firewall, VPN server and client access point [6]. The system can serve as a interned on a wireless access system.

3.4 Features

Routers OS supports feature are bellow that…

- Hardware Support
- Firewall
- MPLS
- Wireless
- DHCP
- Hotspot
- QoS
- Proxy
- Spanning tree protocol like as (RSTP, STP), Firewall, Bridge, MAC etc.
- It protocol Label switching, etc.
- It protocol Label switching, etc.

3.5 MikroTik Router

Router is the operation directors of the worldwide internet. Routers communication with every Network, and prepared network packets out into a network. It dictates the best way to send data over the Internet. MikroTic router has many types such as cloud core router .this router has up to 4 SFP ports 12 GB Ethernet port, and it also has USB port. This device or router home Access point is a perfect small device for your home or office. This router has high performance scale, unified communication and virtualization ready platform. The commits bandwidth transmitted rate very faster over the internet [4].

Figure 3.1: MikroTic Router

3.6 Network Diagram (MikroTik & Switch Configuration)

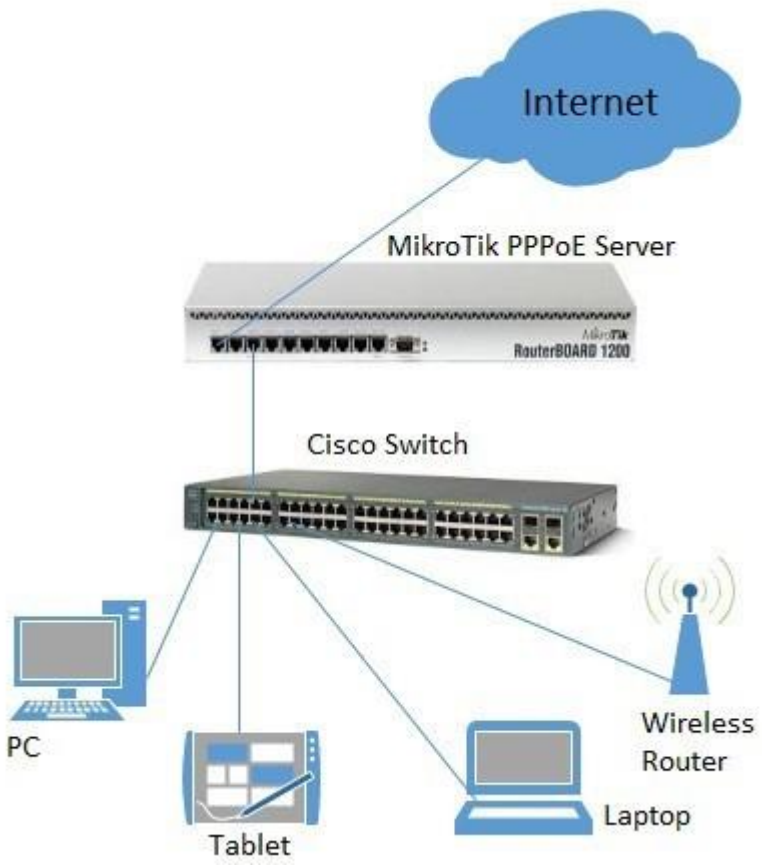


Figure 3.2: Network Diagram

3.7 Configure a Router

- ✓ **Step 1**: At First Time We Connect The MikroTic Router Our PC or Laptop. Then We Working Easily Using Win box Software then Open This Software & Go to New Terminal.
- ✓ **Step 2**: New Terminal Option Click & open the Dialog Box & Reset this Router Show The Reset System Figure 3.3

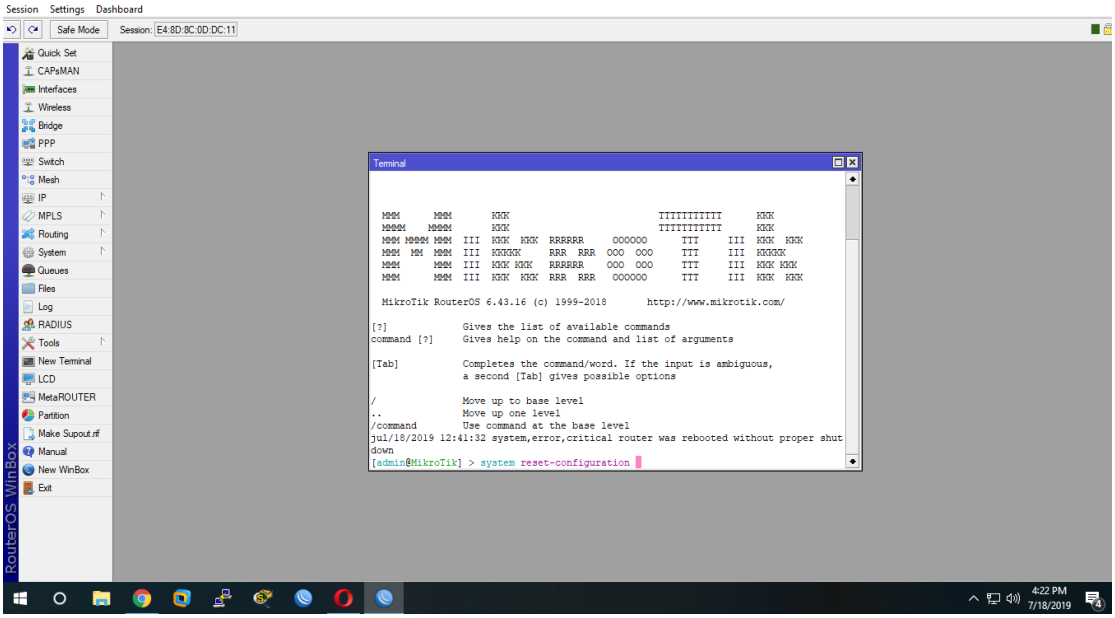


Figure 3.3: System Reset

- ✓ **Step 3**: IP Address Assign System At First click IP>>Address
- ✓ **Step 4**: When it Open Address dialogue Box then click Add (+) Option to open the add IP Address Window.

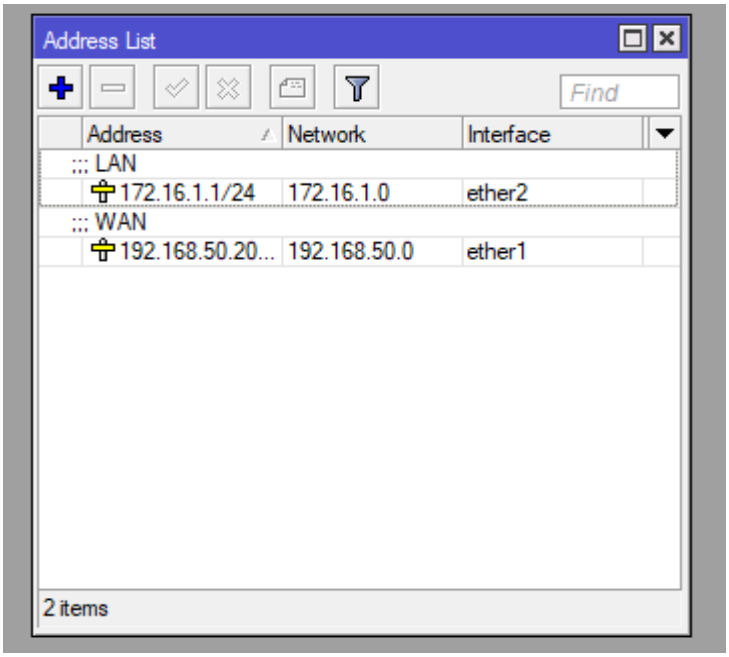


Figure 3.4: IP address allocate

✓ **Step 5**: After the New IP address Box Open & Enter the new Address Details As like Address, Interface Select Then Click OK Option.

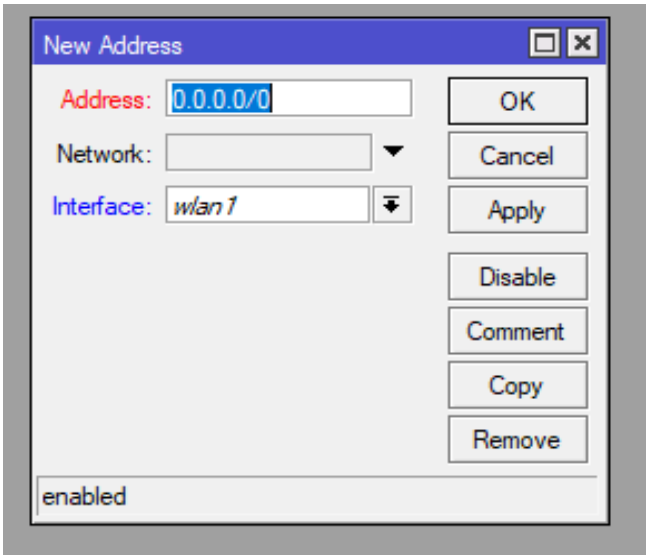


Figure 3.5: Enter the Address Details

3.8 Configuration of Static Routing

✓ **Step** 1: Method

At first Go to IP > Route > Add (+) > Gateway

Then > Click OK Option

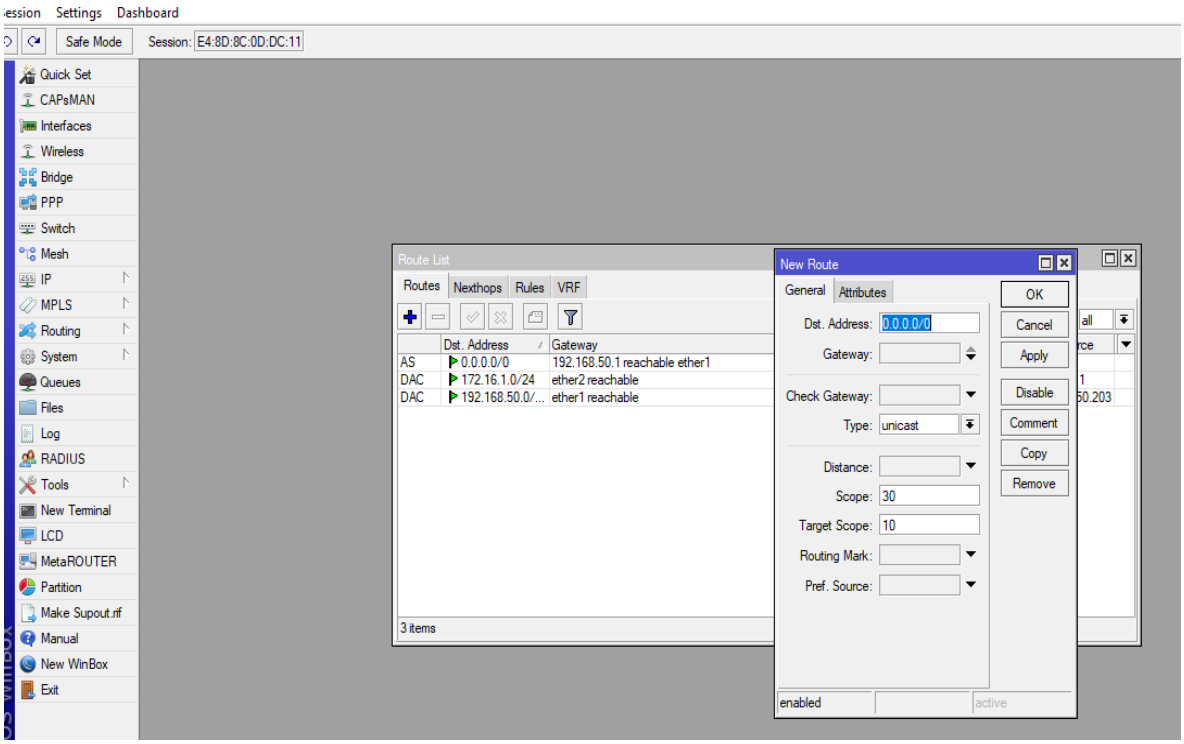


Figure3.6: Gateway setup

✓ **Step** 2: Method

Go to IP > DNS Then DNS Select & Click

Apply > OK Option

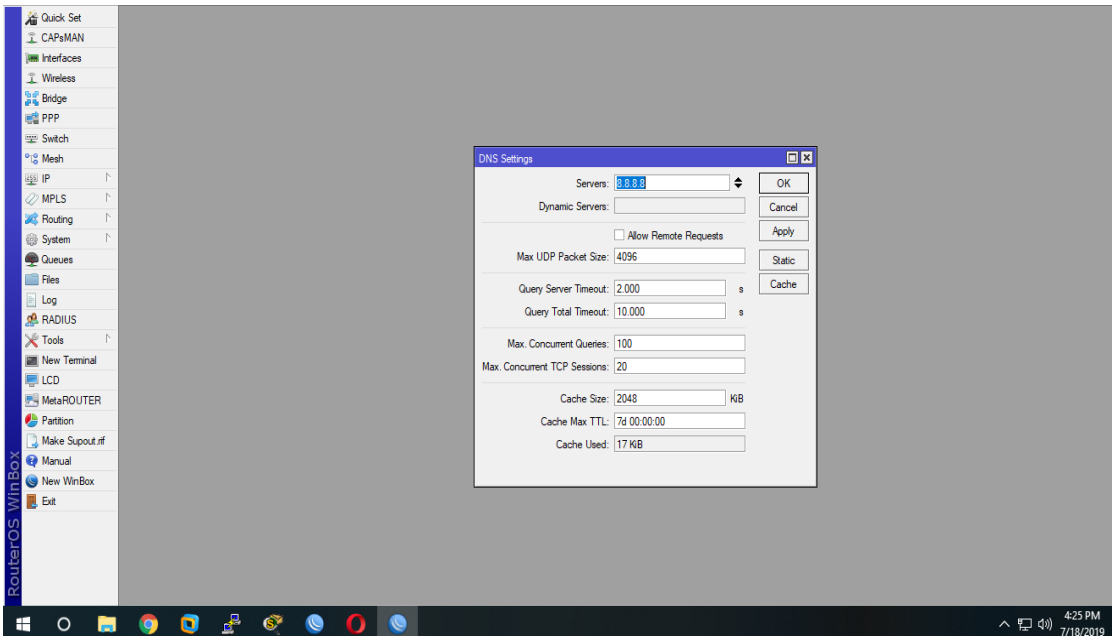


Figure3.7: Domain name system setting

✓ **Step** 3: Method:

Go to IP Then > Firewall > Then NAT > Add > Action

Masquerade Then Click Apply OK

Show Network address translation rule setting in Figure 3.8

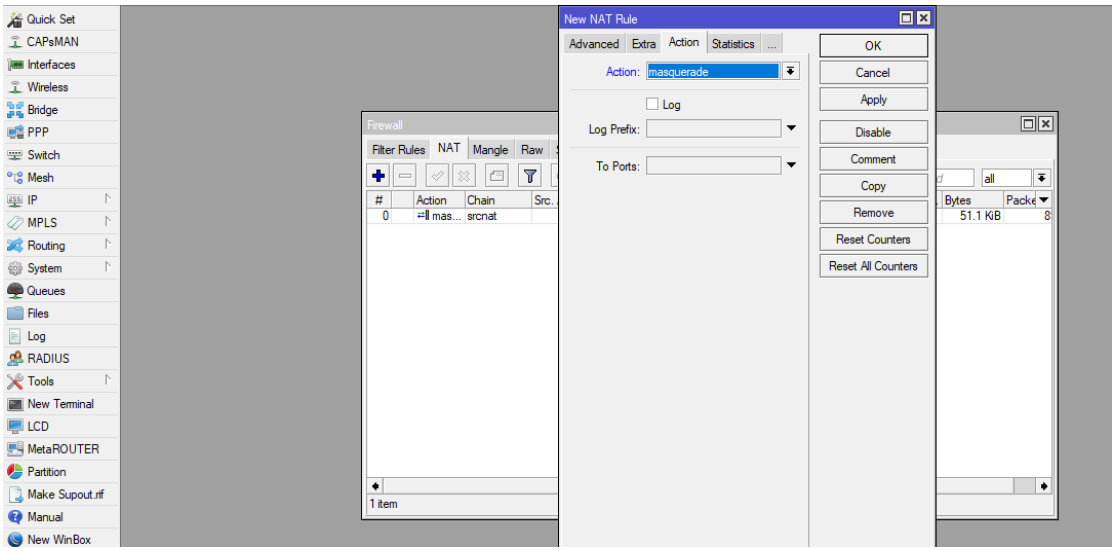


Figure3.8: Network address translation rule

3.9 Configuration of Bridge Routing

✓ **Step** 1: At First Click The Bridge option >Then Add (+) Write Bridge Name Of Action

Then Apply > OK Option

Showing The Bridge Path Assigning figure 3.9

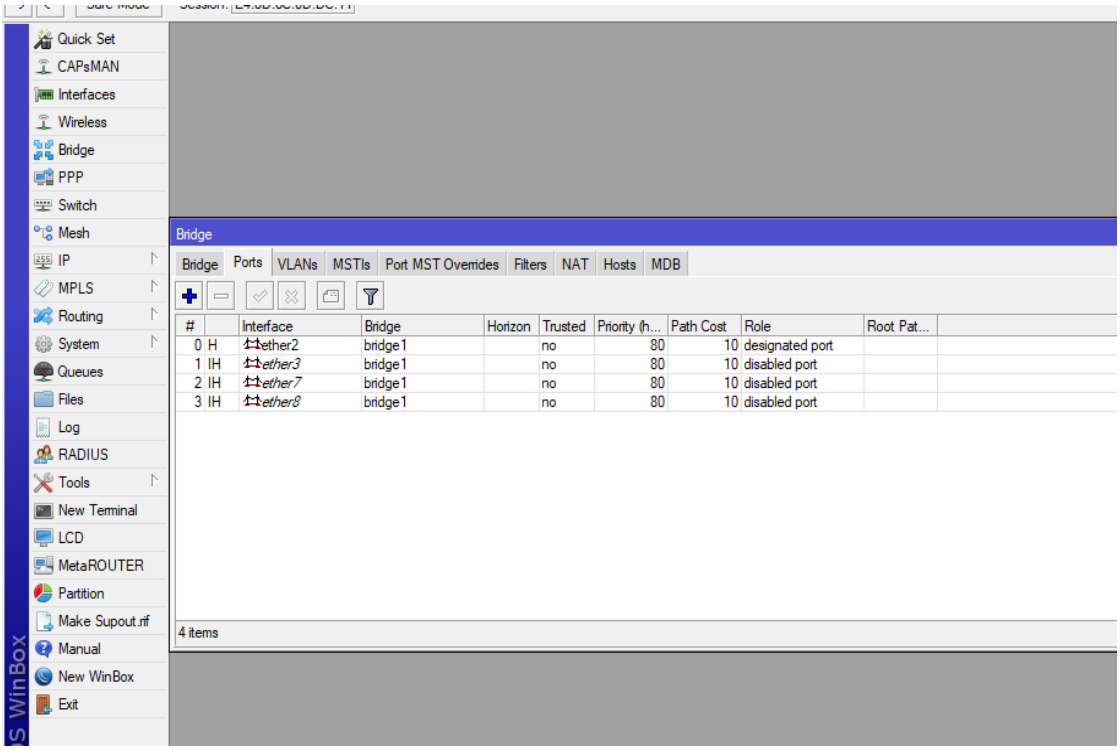


Figure 3.9 Allocate of Bridge port

✓ **Step** 2: IP Address allocate of bridge configuration bellow this figure

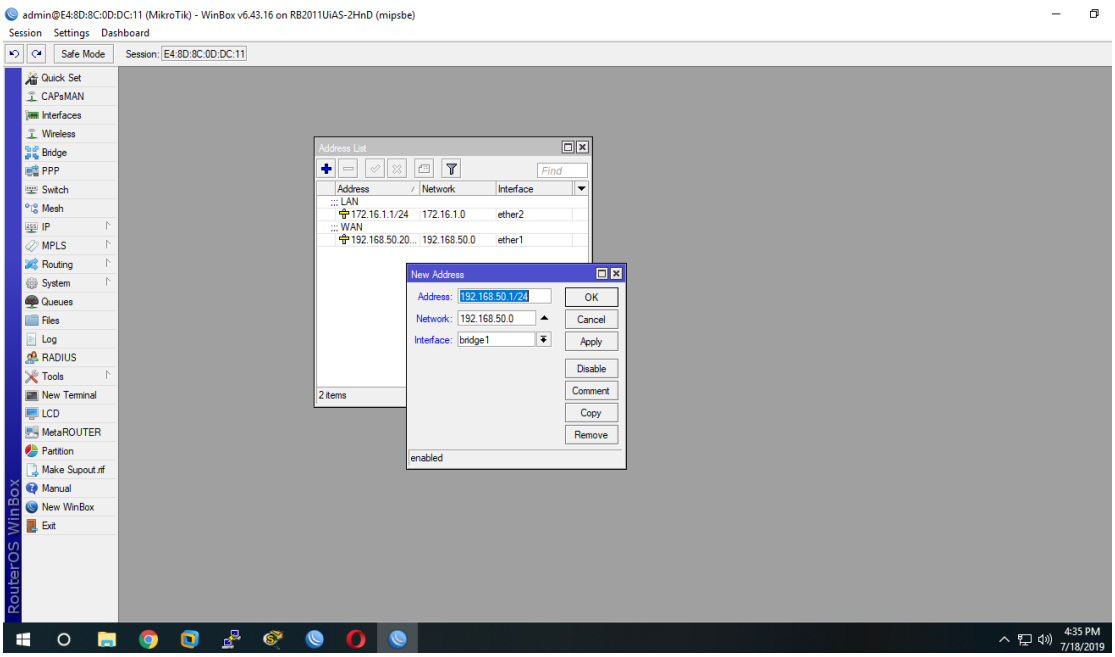


Figure 3.10: IP Allocate for Bridge

3.10 DHCP Configuration of MikroTic Router

Dynamic Host Configuration Protocol (DHCP) is a client server protocol. It is also Network Management protocol provides by IP Address & another subnet, Gateway and also DNS to DHCP server. Every MikroTic Router has working in DHCP perfection.

3.10.1 DHCP Setup

- ✓ **Step** 1: Method**:**

At first Go to IP then >DHCP > Add (+) > Action
Then choose DHCP Server Interface showing figure bellow

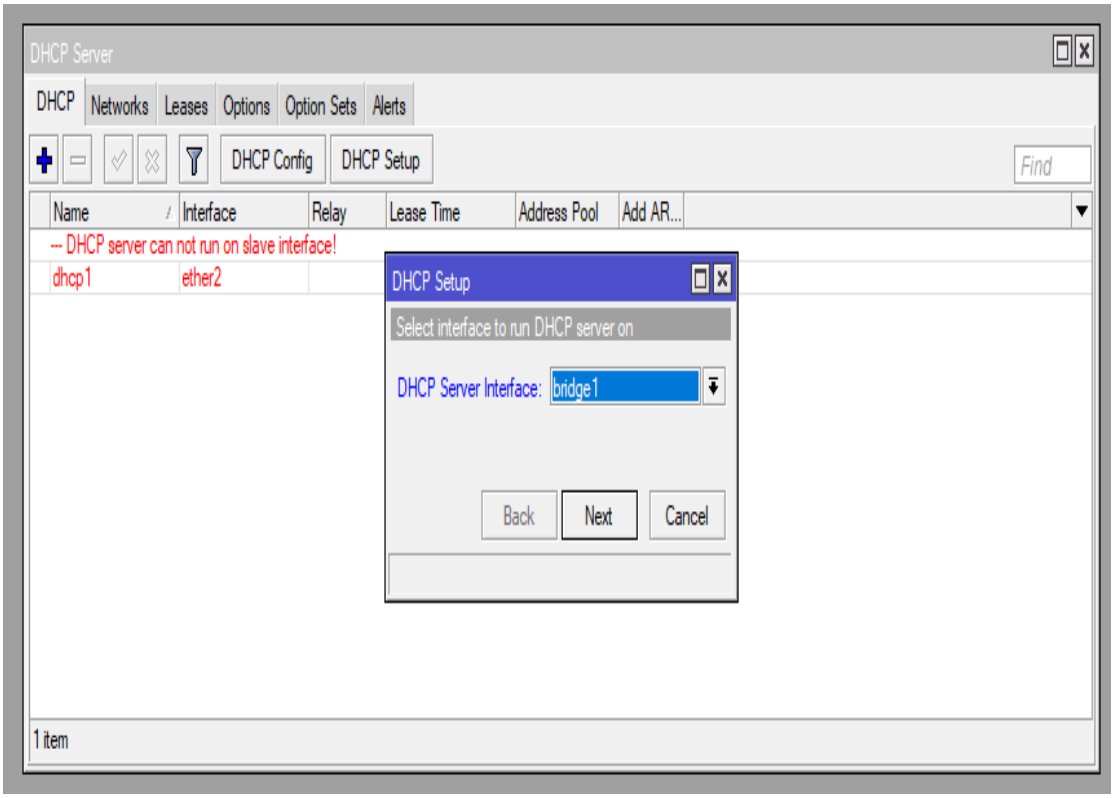


Figure 3.11: DHCP server interface

✓ **Step** 2: Method

Go to IP > DHCP> DHCP setup then Next Option Click & DHCP address assign

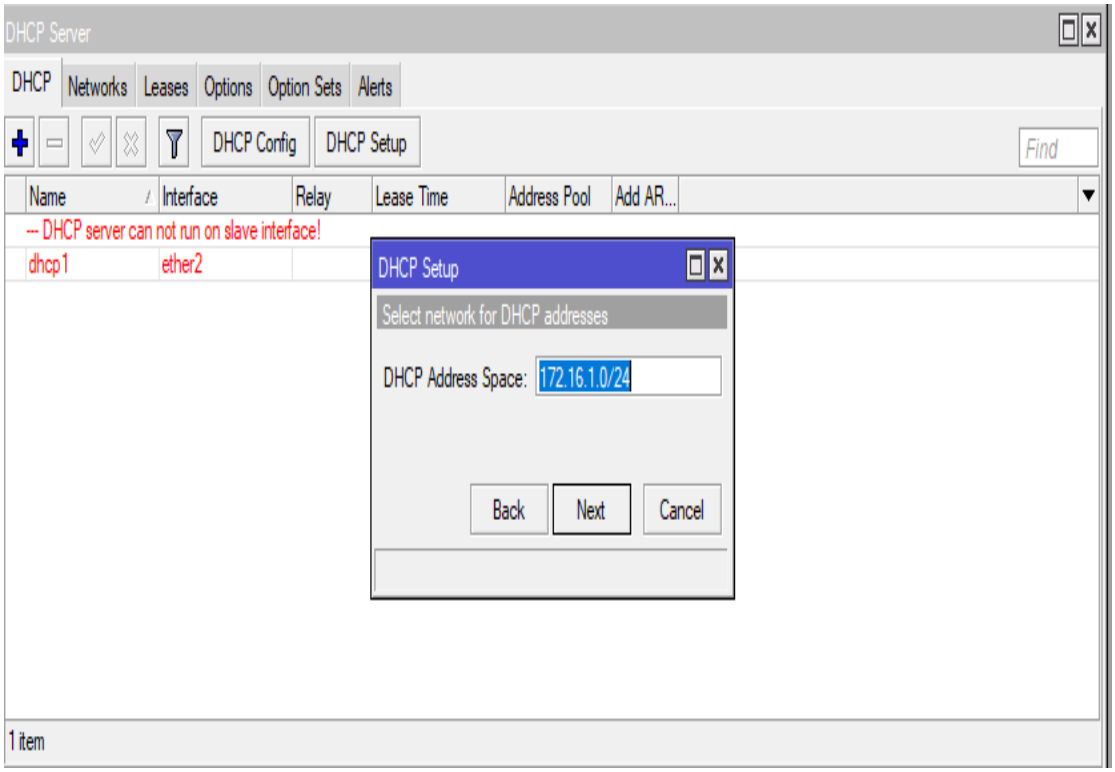


Figure 3.12: IP Address assign for DHCP setup

✓ **Step** 3: Method

IP > DHCP > DHCP Setup Then

Gateway for DHCP Network as like 172.16.1.1 then Next Option Click

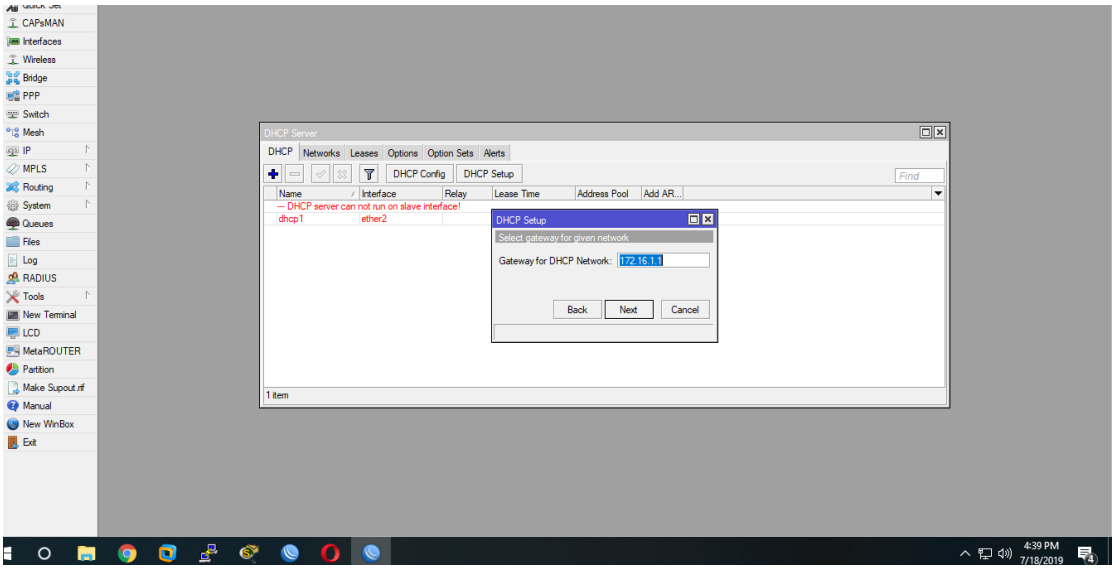


Figure 3.13: Gateway DHCP Network

✓ **Step 4**: Method

Go to IP > DHCP > DHCP setup > Then every Process Complete have Next button

DNS Setup Show in figure 3.14

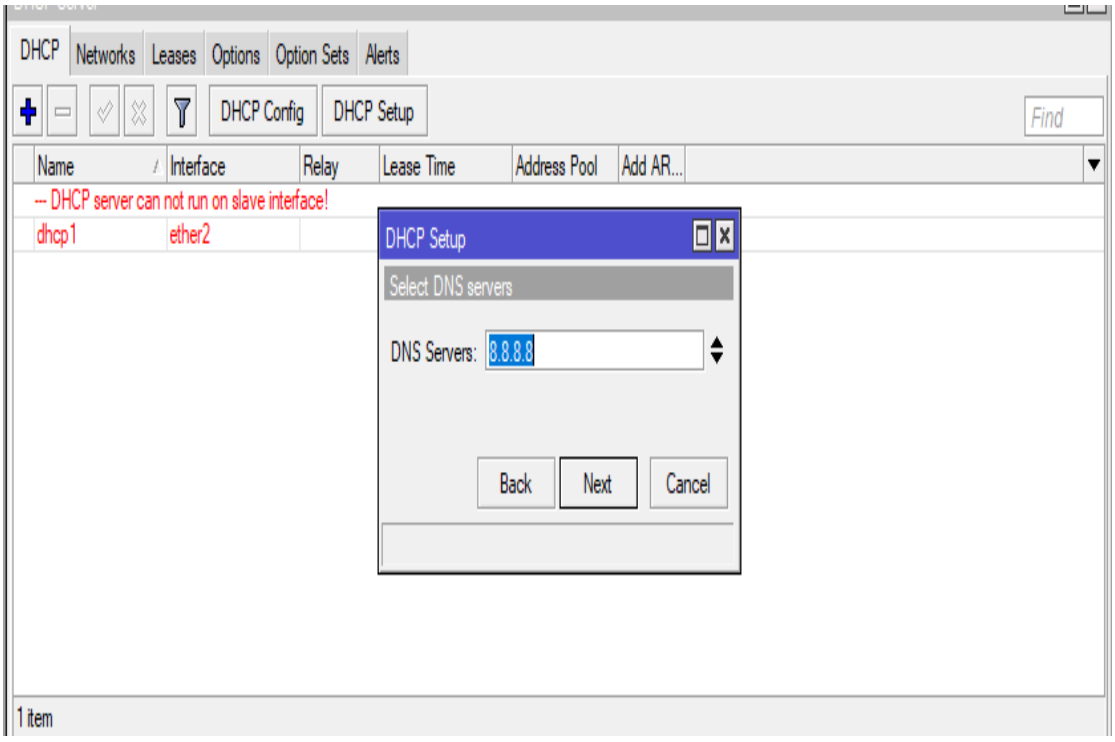


Figure 3.14: DNS Setup

✓ **Step 5**: Finely DHCP setup has Completed Show in Figure 3.15

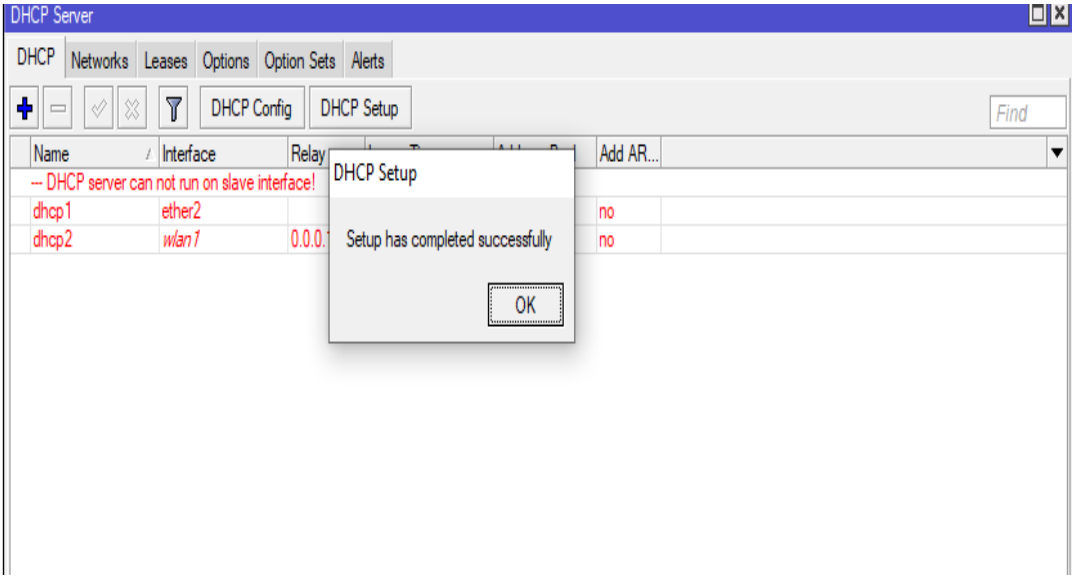


Figure 3.15: DHCP Setup Completed

3.11 Bandwidth Management or Sharing of PCQ

✓ **Step 1**: At first Go to IP > Firewall then > Mangle option & click Add (+) >> General: chain then routing Action then press apply >Ok

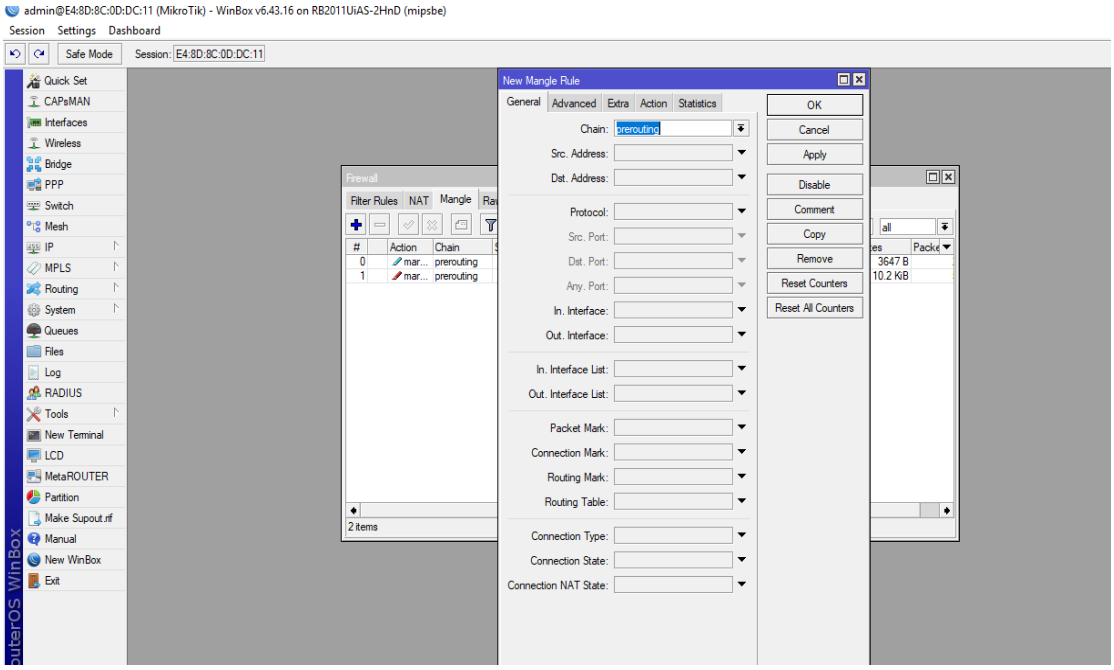


Figure 3.16: Create Mangle Rule

✓ **Step 2: Method**

IP > Firewall >> then Mangle >> Add (+) then Advanced General Option Click & address List

Select As like Address List: Facebook Action

Then Apply> > Ok

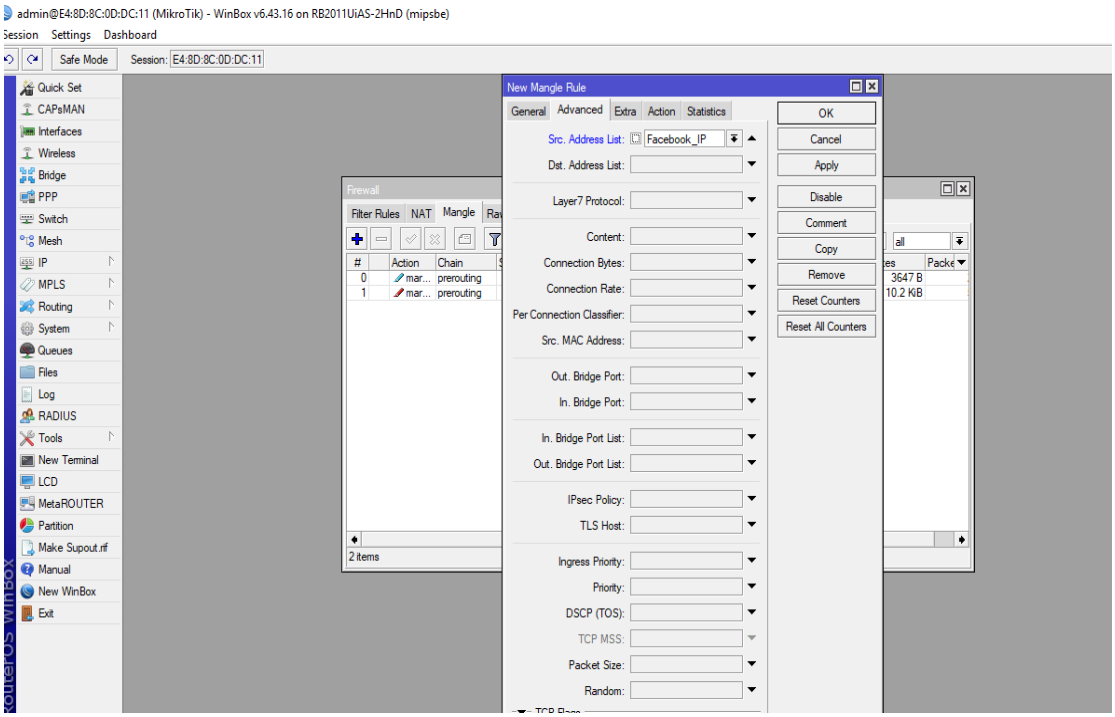


Figure 3.17: Advanced Setting of Mangle

✓ **Step 3**: Procedure

Press Queues Option >> Add (+) then

General Name:

Queue: 1 Action

Then Apply >> Click OK Button

Creating Queue figure Bellow That

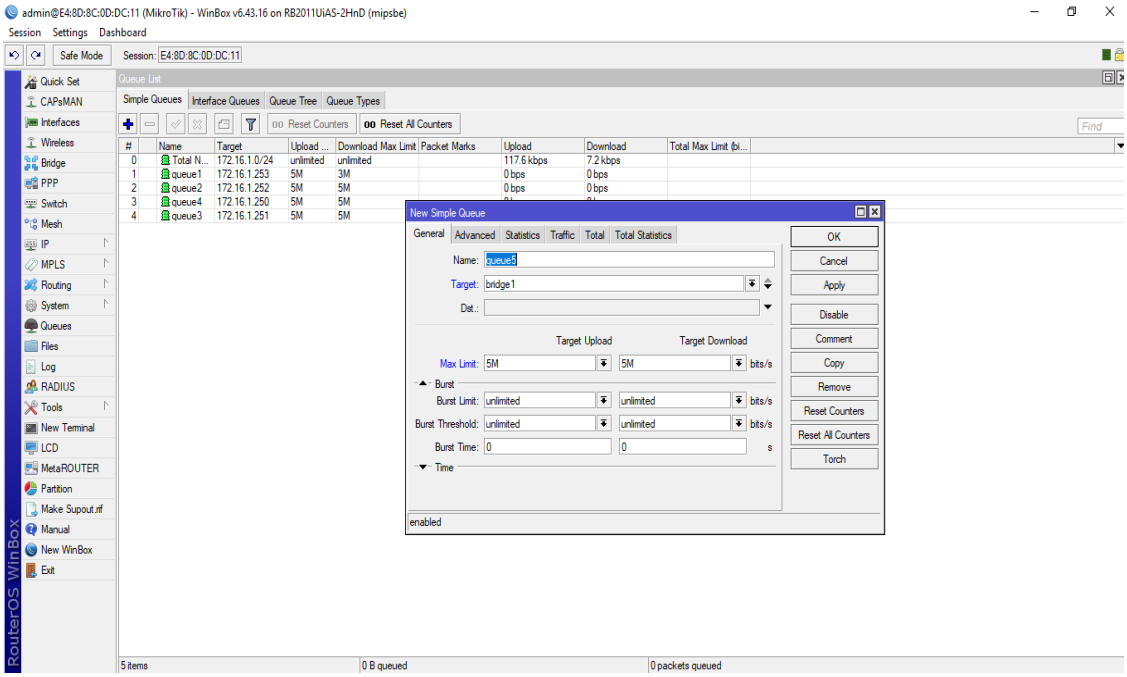


Figure 3.18: Creating Queue

✓ **Step 4**: Process

Press Queues Option Then >> Queue Type

General: Setting then press Address Action & finally

Apply >> Ok button

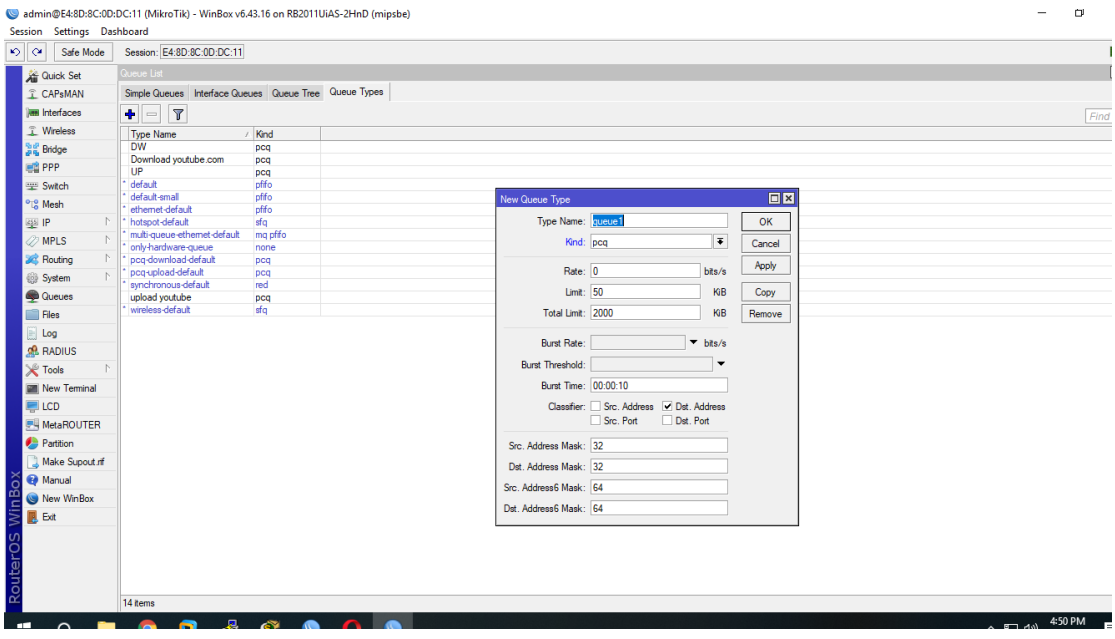


Figure 3.19: Queue Type

- ✓ **Step 5**: Procedure

Finally previous all process saving or backup file this system flow this rule

At first go to New Terminal then>> Type import address.src then press Enter.

Show this figure 3.20 import address.src

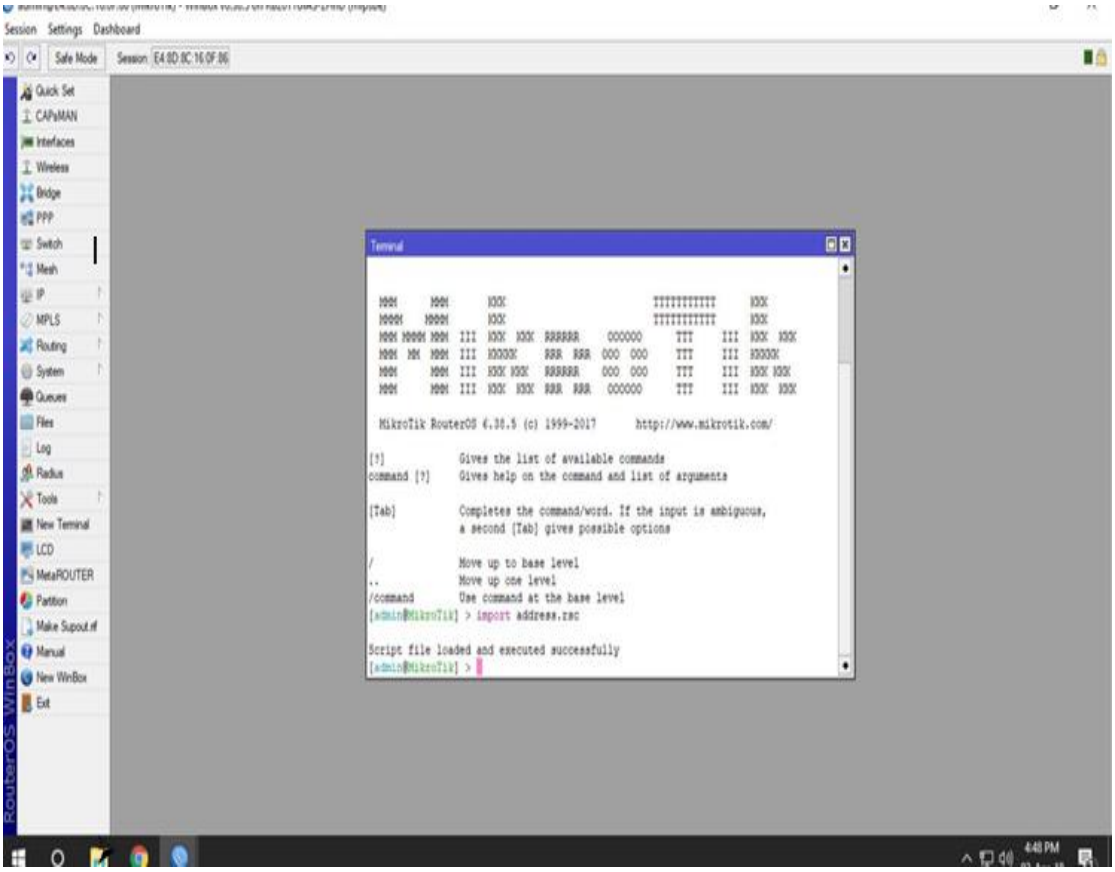


Figure 3.20: Import Address.rsc

3.12 Configuration of PPPoE

- ✓ **Step 1**: Method

At first Go to Pool > Add (+) > >PPPoE

- ✓ **Step2**: Process

Go to PPP> PPPoE Server then > Add (+)

Show the figure 3.21 PPPoE Setup

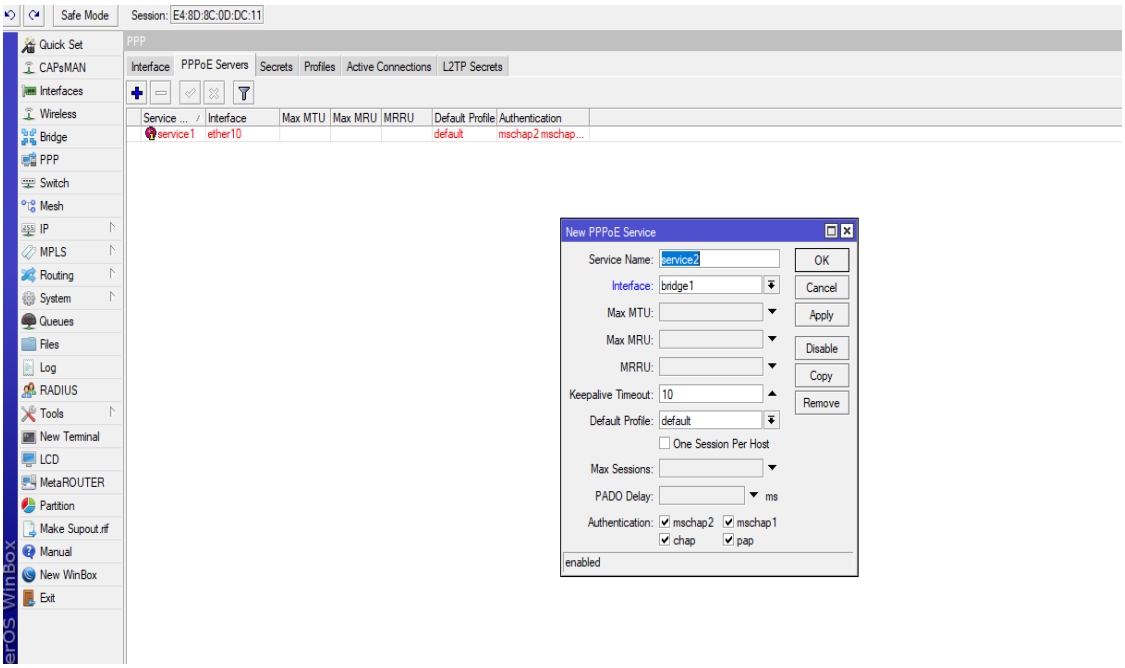


Figure 3.21: Setup of PPPoE

- ✓ **Step 3**: Process

Go to PPP > PPPoE Profile Create > Action

Name > Local Address > Remote Address then >Limit

Show the figure 3.22 PPPoE Profile Create

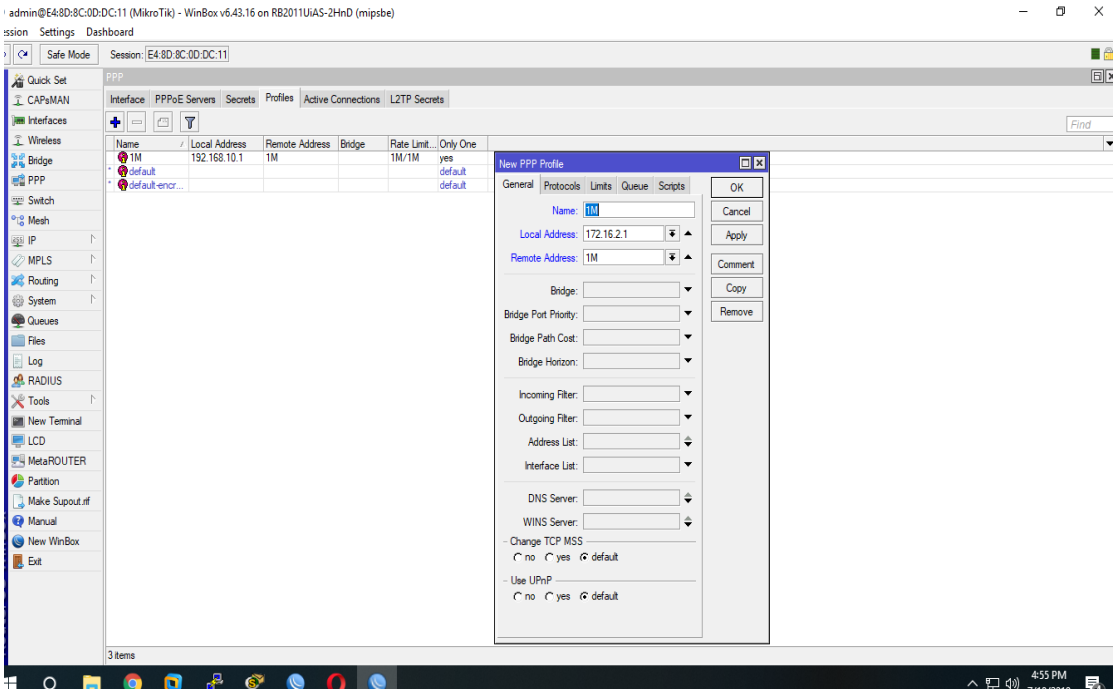


Figure 3.22: PPPoE Profile Create

3.13 Classes of IP Address

We know many various Class of IP Address like as class A, class B ,class C ,class D And Class E.

Class A IP address has include 24 bit host ID and 8 bit Network ID

Class B IP address has include 16 bit host ID and 16 bit Network ID

Class C IP address has include 8 bit host ID and 24 bit Network ID

Class D & E Reserved for Multicasting & Research.

3.1 Table 1: Class of IP Address

Class	Decimal Range	1'st Octet High Order Bits	Network/Host ID (N=Network, H= Host)	Default Subnet Mask	Number of Network	Host Per Network
A	1-126	0	N.H.H.H	255.0.0.0	126	16777214
B	128 -191	10	N.N.H.H	255.255.0.0	16382	65534
C	192 -223	110	N.N.N.H	255.255.255.0	2097150	254
D	224 -239	1110	Used for reserved multicasting			
E	240 -254	1111	Used for research			

3.14 Fiber Optic Wire:

Fiber optic wire prepared has two types masking using. One for inside another for outside thickness. This wire forward signal is leaser lighting's his cable using depend on network size. The fiber optic cable is very protective and reliability any another media or cable .Fiber optic Cable is very pricey connection [9].

Figure 3.23: Fiber Optic Wire

3.15 Crossover Wire for color Coding

Show This Process color crossover connecting for RJ45 connector starting will be right side.

1	White/Orange		Transmit+
2	Orange		Transmit-
3	White/Green		Receive+
4	Blue		Unused
5	White/Blue		Unused
6	Green		Receive-
7	White/Brown		Unused
8	Brown		Unused

Table 3.2: Network Cable Crossover

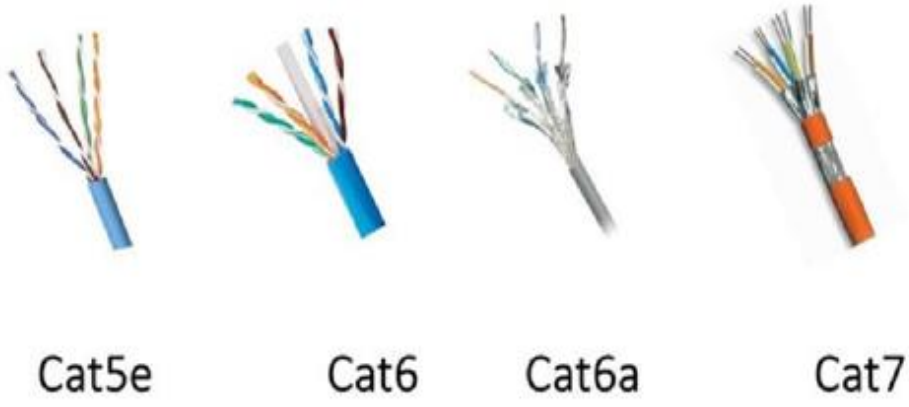


Figure 3.24: Network Cable

3.16 Challenges

If I do not any work then no challenge will come. I have encountered many obstacles during my internship and I have completed all the hurdles well. Even though I am very tired at work, I still find myself in a new way every day to build myself. Working together with many was a first for me. Talking in English with everyone was very challenging. It was very challenging how I would present my work in the best way possible. Understanding working environment well. Understand talk to clients. Work in new environment. Best way to solved client problems.

CHAPTER 04

CONCLUSION AND FUTURE CAREER

4.1 Discussion and Conclusion

Investigate this internship we known a lovely expertise have MikroTic & Cisco switching. First Time we don't know any idea of Cisco Switching & MikroTic .Now a days we learn known has Cisco switches And MikroTic router working. I have observed the to-be and I will be efficient to help the any ISP base Company .Through this temporary working principle Issues administration abilities and external self-inspiration gaining helping us. Initially beginning me was seven hours every day will be attend an office it did not imagine that. Ensure this temporary work dignified and recoup backdrop. Now I have realized this internship big chance corporate label job helping us. There is an increase for the capable authority in MikroTic, Cisco and so aloud.

4.2 Scope for Future Career

These internship goals provide a clear theory about ISP .this internship knowledge also provide any corporate office Network Diagram designing and it also configuring system. IT section has big opportunities available for the big number of students who want to work in this field. Now we know our country is very little developing so this country high developing IT section knowledge priority unbounded. So our country has developing many working principle be accepted like as many high-tech park creating. This working station big number of students their future career starting opportunities. On average only 25 % graduating have job offers facing graduation; however, once done an internship that shape rises to 75%. So our country technical knowledge people various work station have job like as ICT Division, ISP base company, many Networking company etc.

REFERENCES

[1] Dffodil online Ltd, Online Available <<https://daffodil.family/business-ventures/ict-ventures/daffodil-online-ltd-dol>>, last accessed on 12 March 2019 at 3.30pm.

[2] Career opportunities in MikroTic, Available<< https://www.linkedin.com/jobs/mikrotik-jobs?position=1&pageNum=0>>, last accessed on 29 March 2019 at 12.20pm.

[3] About internship, Online Available, << http://ashleydotson .blogspot.sg/2009/08/in-review-this-internship-has-been.html>>, last accessed on 02 April 2019 at 11.20am.

[4] MikroTik Router, online Available << https://mikrotik.com/training/about25>>, last accessed on 20 April 2019 at 11.00 am.

[5] MikroTic Release history, online available <<https://en.wikipedia.org/wiki/MikroTik>>, last accessed on 2 May 2029 at 10.30pm.

[6] MikeoTic RouterOS, online available << http://www.mikrotik-routeros.net/routeros.aspx, >>last accessed on 04 Jun 2019 at 11.00pm.

[7] Switch Configuration, online available << https://www.networkstraining.com/basic-cisco-switch-configuration>>, last accessed on 28 Jun 2019 at 11.10pm.

[8] Switch Configuration, online available << https://courses.cs.ut.ee/2012/NT/juh/2_1.pdf>>, last accessed on 10 July 2019 at 11.10pm.

[9] Fiber Optic Cable, online available <<_https://en.wikipedia.org/wiki/Optical_fiber_cable> last accessed on 15 July 2019 at 1.10pm.

[10] Concept about IP address, online available << https://en.wikipedia.org/wiki/IP_address>> last accessed on 20 July 2019 at 12.10am.

Appendix:

Appendix A: Company Detail

Head Office Name Daffodil Online Limited

Address 102, Shukrabad (3rd floor), Mirpur Road, Dhanmondi,
Dhaka - 1207, Bangladesh

Telephone 02-9143258-60

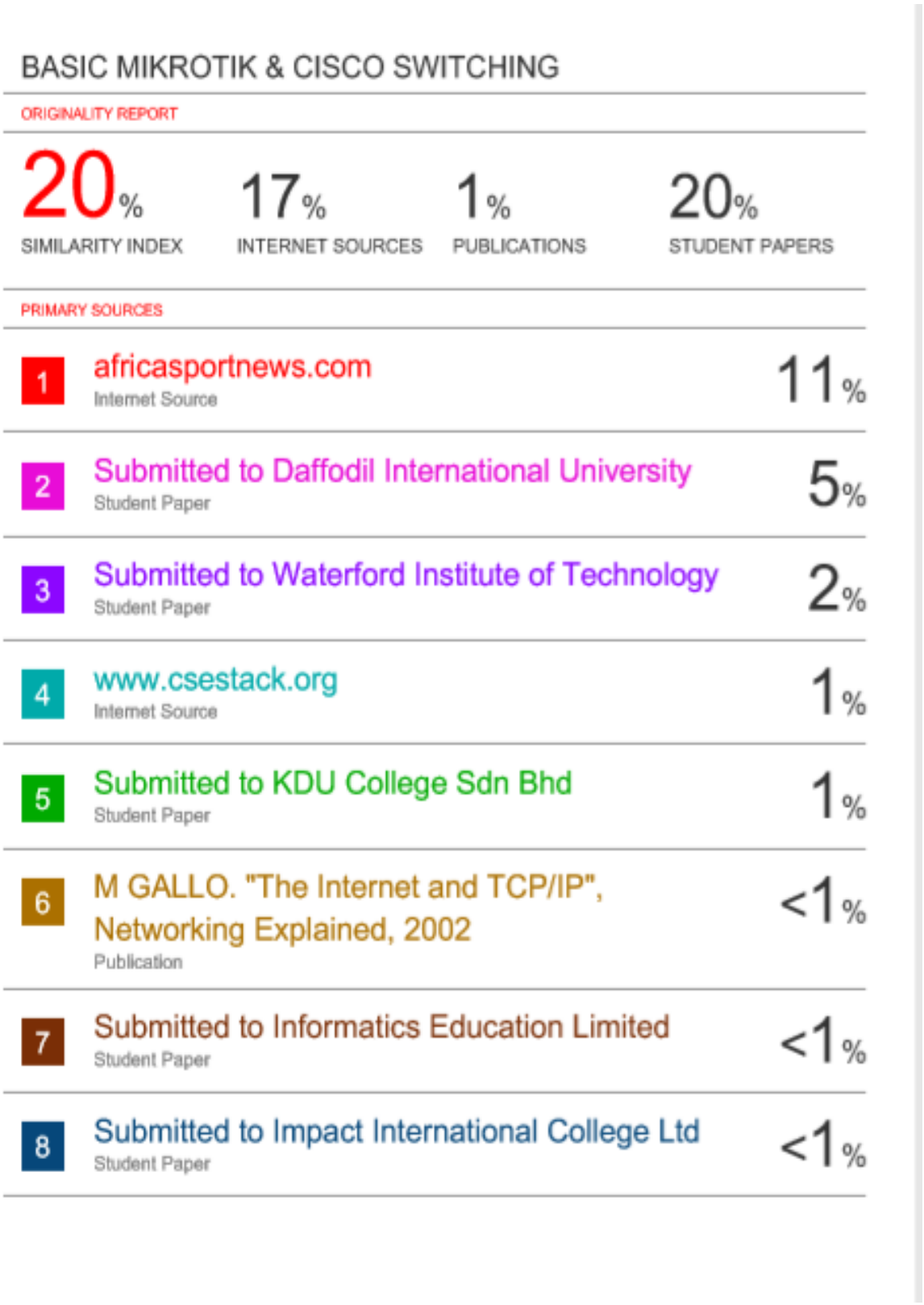
Fax 880-2-8116103

E-mail info@daffodilnet.com

Website www.daffodilnet.com

Type of Organization Nationwide Internet Service Provider (ISP)

Employees 12



BASIC MIKROTIK & CISCO SWITCHING

ORIGINALITY REPORT

20%	17%	1%	20%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	africasportnews.com Internet Source	11%
2	Submitted to Daffodil International University Student Paper	5%
3	Submitted to Waterford Institute of Technology Student Paper	2%
4	www.csestack.org Internet Source	1%
5	Submitted to KDU College Sdn Bhd Student Paper	1%
6	M GALLO. "The Internet and TCP/IP", Networking Explained, 2002 Publication	<1%
7	Submitted to Informatics Education Limited Student Paper	<1%
8	Submitted to Impact International College Ltd Student Paper	<1%