



An undergraduate internship report submitted

By

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Science in Computer Science

Department of Computer Science & Engineering

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Attestation

Network & IT Support

mehdi hasan

Signature: _____

December 30, 2020

Date: _____

Mehdi Hasan

Name: _____

ACKNOWLEDGEMENTS

First and foremost, I would like to thank Almighty Allah for giving me the endurance and the ability to do work hard. It is my privilege that I had the opportunity to do an internship in **MUNSHI IT Services**. I would like to thank all the people on whom I carry out my internship.

I express my deep gratefulness to my internal supervisor **Md. Fahad Monir**, Lecturer, School of Engineering, Technology and Sciences, **Independent University, Bangladesh (IUB)**, for his invaluable instructions, continuous guidance, constructive criticisms and thoughtful advice during pursuing this internship and preparation of this report.

I express my deep gratefulness to my external supervisor, **Tanvir Imtiaz** (Assistant Manager, MUNSHI IT). Also, I express my deep gratefulness to all employees of **MUNSHI IT Services** for their cooperation and helping me to complete this internship project and report. Last but not the least, I would like to thank my parents and other family members for always giving me their eternal support.

Mehdi Hasan

December 30, 2020

Dhaka, Bangladesh



EXTERNAL SUPERVISOR'S CERTIFICATION

This is to certify that "Mehdi Hasan", ID: 1610241, Department of Computer Science & Engineering (CSE), Independent University Bangladesh, has done this internship report on "Networking and IT Support at Munshi IT Services" as a partial requirement of his Bachelor of Science degree. During his attachment with "Munshi IT Services" as an Intern, he worked in the "Information and Strategic Support (ISS)" under my guidance and supervision. To the best of my knowledge this work has been completed solely by him unless otherwise stated. I wish him every success in life.



Tanvir Imtiaz

Assistant Manager, ISS

Munshi IT Services

Evaluation Committee

Signature: _____

MD. Fahad Monir

Name: _____

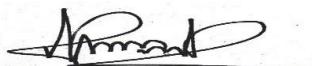
MD. Fahad Monir

Supervisor: _____

Signature: _____

Name: _____

Internal Examiner: _____



Signature: _____

Tanvir Imtiaz

Name: _____

Tanvir Imtiaz

External Examiner: _____

Signature: _____

Name: _____

Convener: _____

ABSTRACT

MikroTik operating system is designed for a network router. These functions include IP Addressing, Firewall & Nat, Routing, Bandwidth Limiter, Point to Point Tunneling Protocol, DNS server, DHCP server, Hotspot, and many other features. It is very useful for our daily life.

In this sector we will know about MikroTik, Windows Server 2012 R2, Active Directory Server, File Sharing Server, IP Class, IP Sub netting, Surveillance System (CCTV), Cabling, etc. Network devices are connected to computers, peripherals, even LOT devices.

Switches, routers and wireless access points are the essential networking basic. Through them device connected to network can communicate with one computer to another computer and with other networks, like the internet.

Now today a large number of people all over the world usage internet technology with their dally life. So, the networking is so much important fact right now. Now-a-days every single people, business and ecommerce, every work station is fully depending on software-based communication and internet technology. That is the reason it's extremely valuable to anchor the system.

Computer system and peripheral are connected to form a network. They provide various advantages, for Example-Instant messaging, parallel computing, video conference, interaction with other users using dynamic web pages, sharing information by using internet or web, monitoring office work via CCTV, point to point file sharing using server, control the users under the domain and so on.

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CHAPTER 1

Introduction

1.1 Introduction:

A network device is connecting to computer, peripherals, even IOT devices. Routers, switches and wireless access points are the essential networking basics. I choose this internship because I wanted to benefit from the experience. Through them device connected to network can communicate with one computer to another computer.

1.2 Motivation:

I am currently pursuing in the final semester of my Bachelor Degree program in CSE. I choose my internship at **MUNSHI IT Services** because I discovered that the **MUNSHI IT Services** has overcome every customer satisfaction & services because of their excellent reputation. **MUNSHI IT Services** is now a well-known and reputed company under the **MUNSHI Enterprise Limited** in Bangladesh. I think that I can successfully prove my experience by the help of **MUNSHI IT Services**.

1.3 Objectives:

Now in the modern world “Basic **MIKRO TIK & Windows Server 2012 R2**” is a very generic term. The internship program is making me as a compatible one in the job market. Temporary job in software engineering is a stage to give better work encounter when an understudy is still in school, to equivalent occupation aptitude with scholarly preparing, and to assist understudy with preparing the change from school to work.

- Install Mikro Tik and perform network configuration.
- Install Windows Server 2012 R2, Active Directory Server, File Sharing Server and so on.

1.4 Layout of the Report:

In this report I shown the introduction, motivation, objective, introduction of company, introduction about my internship organization, and also about the company, and organization structure of the company. After that I show my internship daily task with activities events and project task and activities. At last I described Conclusion & Discussion, Future Career & Scope, and also discussed Future Scopes of the platform MikroTik and Windows Server.

CHAPTER 2

Literature Review

In my four years Bachelor Degree, my university offers major course and many types of optional courses. I took Data Communication & Networking (Major) and Advance Data Communication & Networking (Optional).

So when I started my internship at “**MUNSHI IT Services**” as a Network & IT Support Engineer, I saw most of the topics are similar to those subjects.

In those subjects, I learned: DHCP Server, WAN, LAN, VLAN, IP Configuration, Various kinds of layers, IP Class, Subnet Mask, IPV4, Gateway, Protocol and so on.

In my internship I worked with Mikrotik Router and Windows Server 2012 R2. So I understood easily.

Yes I know study area and real life area are not same. I learned many things in my internship and the working environment are totally different. But I gain my basic things in my student life. If you have no basic you can't gain your goal in real life.

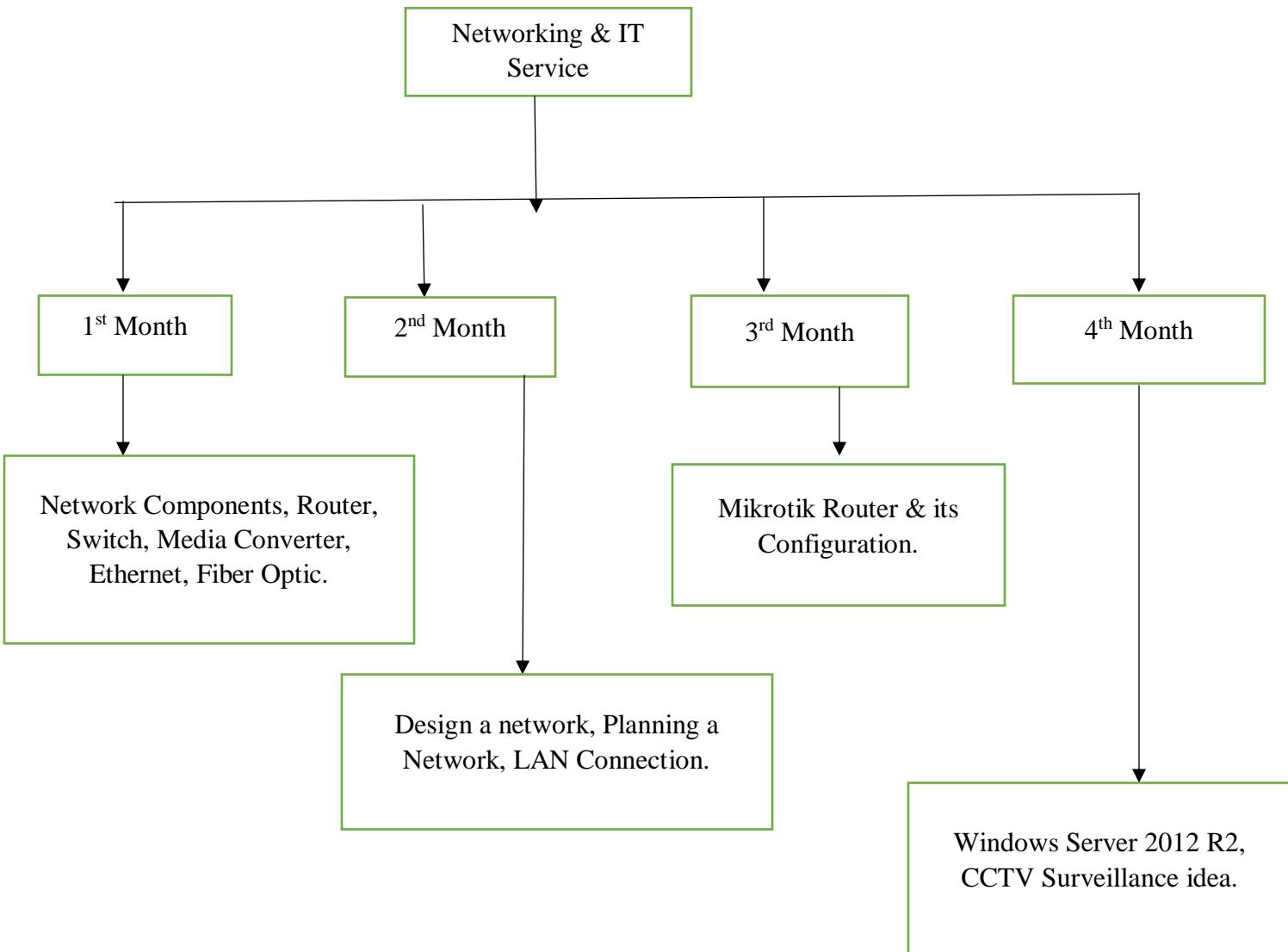
Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure:

Work breakdown structure or WBS in project management is a method for getting a complex, multi-step project done. It's a way to divide and conquer large projects so we can get things done faster and more efficiently.

The goal of a WBS is to make a large project more manageable. Breaking it down into smaller chunks means work can be done simultaneously by different team members, leading to better team productivity and easier project management.



3.2 Process/Activity wise Time Distribution:

Month -1:

- Learning & understanding About Network Components.
- Learning & understanding Basics of Router.
- Learning & understanding Basics of switch.
- Learning & understanding Media Converter.
- Learning & understanding Power over Ethernet.
- Learning & understanding Fiber Optic.

Month -2:

- Design of a network.
- Planning of a network.
- LAN connection.

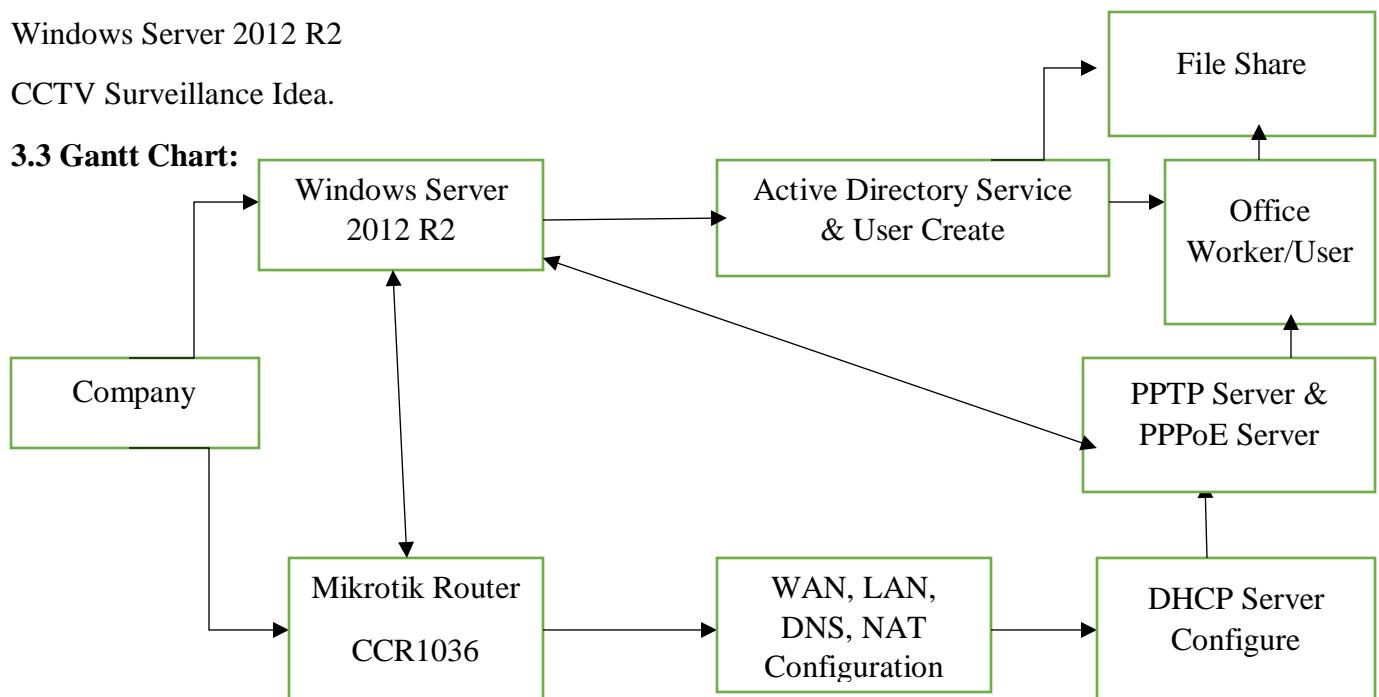
Month -3:

- Mikrotik Router & its Configuration.

Month -4:

- Windows Server 2012 R2
- CCTV Surveillance Idea.

3.3 Gantt Chart:



3.4 Process/Activity wise Resource Allocation:

Resource allocation is the process of assigning assets in a manner that supports your team's goals.

People	5 Engineer	5 Network Support	5 Server Support
Equipment	Mikrotik Router CCR1036	Fiber Cable, Router, Switch, LAN, Computer.	CCTV Equipment's
Facilities	AC Room	Conference Room, Meeting Room	Nice working Environment
Materials	Personal Desktop	Printer	Provides Car for Dropping.
Budget	Lunch	Mobile Cost	

3.5 Estimated Costing:

In my 4 months internship, my company paid 16000taka.

Chapter 4

Methodology

Tackled the issues of the customers with respect to the Internet and to introduce programs in the candidates Pc.

Establishment of important programming and equipment for each customer.

Decide programming and equipment issues and take care of the issues, supplant flawed parts, when essential.

Design Operating framework programming, equipment programming, organizing programming and different segments.

MikroTik, remote switch, NVR and DVR CCTV, Wi-Fi camera, arrangement according to customer necessity.

Keep up PC organizations, PC equipment, frameworks programming, applications programming and all designs.

Client and Group Maintenance

Routinely Security Check Performance Monitoring

As indicated by the vital Using Command Prompt for finding the Problem.

Introduce and use Win box for MikroTik switch design and upkeep. Investigate and resolve issues.

Windows Server 2012 R2 arrangement with dynamic index worker and document sharing worker for clients and customers.

CHAPTER 5

Organization

5.1 Introduction:

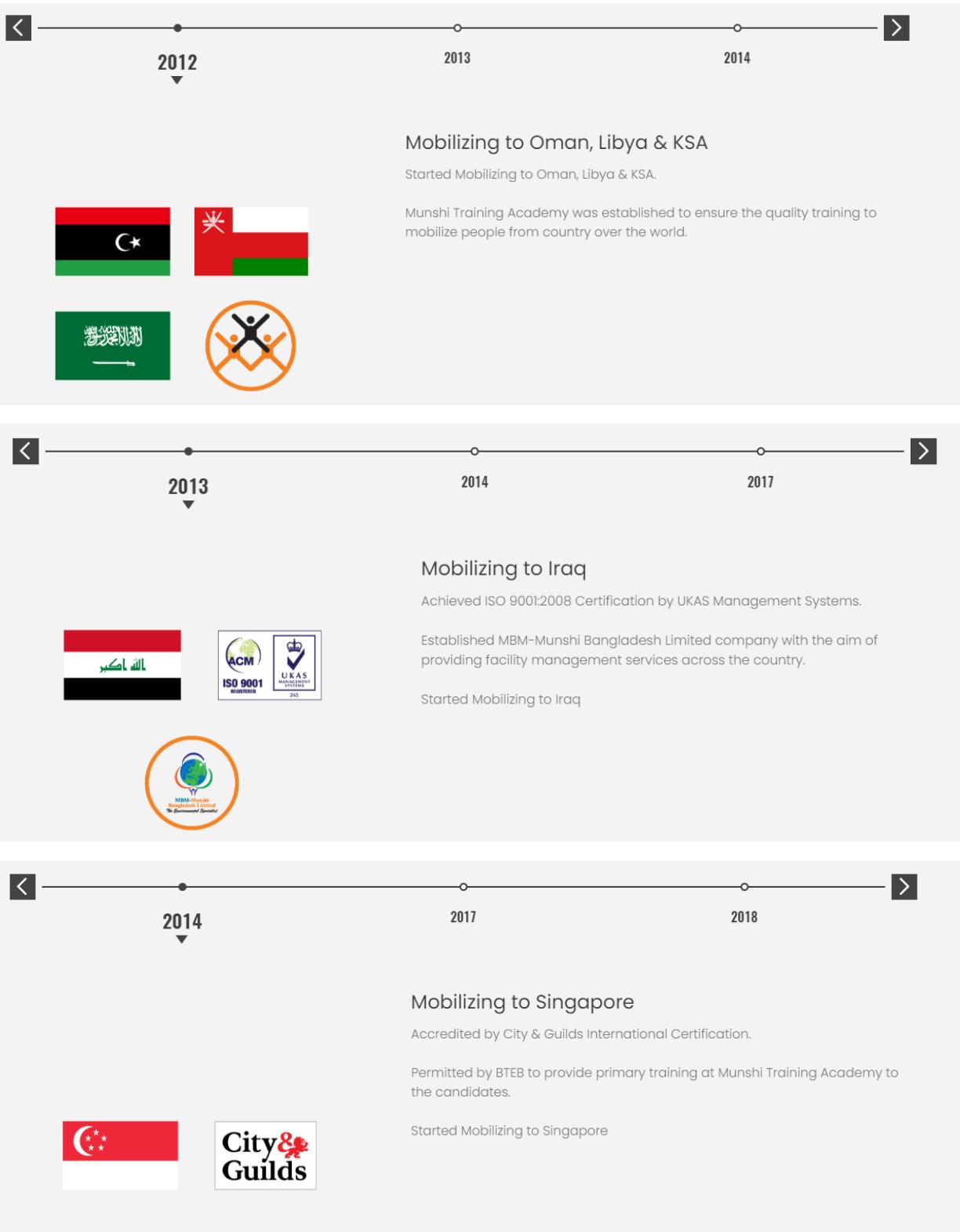
MUNSHI Enterprise Limited

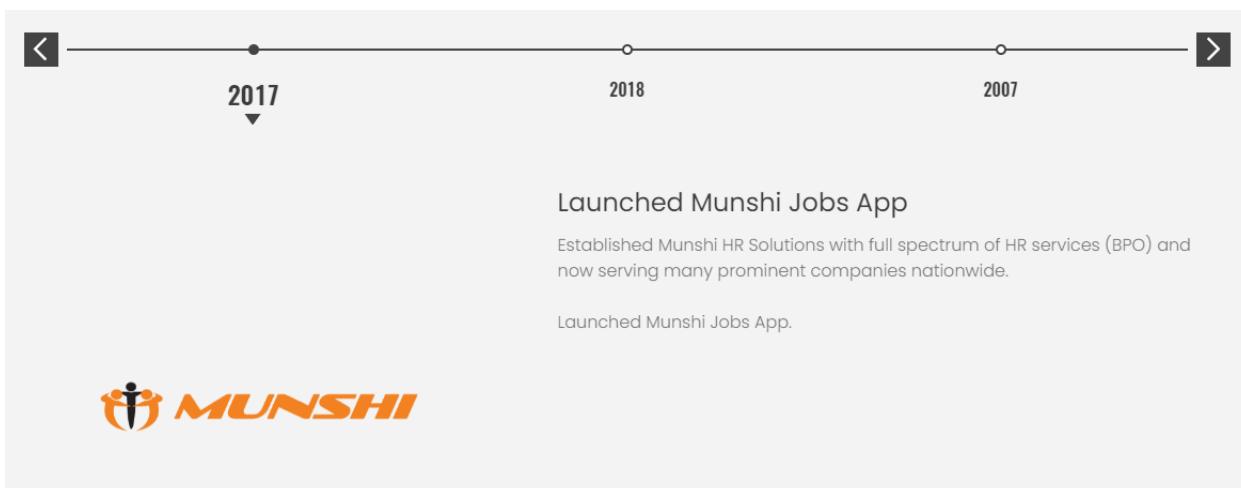
Munshi! A hub of global reach and local expertise combine to deliver an unmatched global perspective with detailed insight into local markets across all major industry sectors. Whether your needs are local or global, we can create the workforce solution you need. Munshi is now working in various sectors like Overseas Human Resource, Facility Management, Business Process Outsourcing (BPO) and Non-Profit Organization. Raquib Mohammad Fakhrul, Managing Director of MUNSHI, has a wide and longer vision to develop the company with helping the society simultaneously. In his words, when our partners succeed, we succeed. We develop a keen understanding of our partner's business so that we can provide the efficient workforce in client's premises.

More than 10 years of total immersion in the changing world of work has given us a deep understanding of the potential of people and expertise in unleashing that potential to drive businesses forward. When we apply that expertise to your specific business opportunities, success happens.

We also trust in the creation and delivery of innovative workforce solutions and services that enable our clients to win in the changing world of work.

Milestone:





5.2 Organizational Structure:

Business Type: Manpower Export to Overseas

Munshi Enterprise Limited [MEL] is one of the leading government approved overseas recruiting agencies established in 2007. We're specialized in providing both skilled and semi-skilled workers and have been successfully catering to several overseas organizations for many years. We are a concern of AP Group, which manufactures herbal medicines, processed foods, and herbal cosmetics, since 1912.

Today, our company has a global network in regions such as UAE, Bahrain, Qatar, Oman, Libya, Singapore, Malaysia, Iraq, and Saudi Arabia. We have also established a training center named Munshi Training Academy to ensure that skills of candidates stay sharp and attitudes remain positive, right up to final selection and well into employment.

COUNTRIES WE MOBILIZE

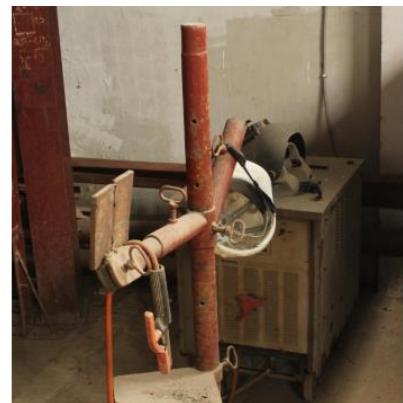


Business Type: Training and Testing Center

Munshi Training Academy is established for the Skill development of human resources. The Academy offers a wide range of training services to prospective candidates for overseas and local employment.

The center is to ensure the candidates are aware of the job requirement with basic and advanced skills necessary for successful employment at home and abroad. After successful completion of candidates training, they are provided the certificates from BTEB.





Business Type: Facility Management Services

MBM-Munshi Bangladesh Limited started its journey in 2014, a front-runner company, when it comes to Facility Management across the country. We have a Technical Collaboration with City Building Management (CBM), Singapore. They are the pioneer in Integrated Facility Management Services, having a strong presence in Thailand, Qatar, Singapore & Taiwan.

MBM-Munshi mainly offers customers a complete solution in facility management. We provide

efficient and skilled janitors with the best equipment, as well as high-quality chemicals to undertake any cleaning, pest control, gardening and support services at any time. Our team is trained to use appropriate chemicals in their correct proportions. After all, we are the environmental specialists.

Our Expertise

- We understand the specific need of our clients.
- We customize our services to the exact need of our clients.
- We use most eco-friendly cleaning materials.
- We employ trained individuals to render our services.
- We are competitive with similar companies in the FM industry.
- We ensure a high standard of quality in the services.
- Our janitors are maintained by the active and efficient operations team.
- In the commercial and industrial cleaning services, we oblige with compliance requirements.
- We have the emergency and quick response team to fulfil our client's need/requirements.
- We maintain our services using hygienic and environment friendly chemicals.
- As our janitors are pre-employed trained, they are capable to serve with professionalism.
- We provide the cost effective services with best quality imported chemicals.
- We ensure Lasting effect of our services.

Business Type: HR Solutions

Munshi HR Solutions (MHRs) Limited, a concern of MUNSHI was established with a vision to provide world-class workforce solutions to local and multinational organizations. MHRs is a one-stop service provider for entire HR Solutions to all categorized organizations. We work with the candidate's seeking Growth, Performance & Satisfaction.

MHRs thrives to be the most entrusted HR Management service provider for Recruitment, Foreign Secondment, Payroll, Manpower Outsourcing, and Training & Skill Development. We offer our clients effective, efficient, and elaborate human resource management. Our services are designed to assist your core business operations through professional partnerships and state-of-the-art Business Process Outsourcing (BPO) solutions.

BENEFITS OF OUTSOURCING MANPOWER TO US

Large CV Bank

One Stop Solutions

Large Training Academy

Competitive Pricing

International Consultant

Recruitment for Highly Skills/Technical Positions

Substantial number of foreign Employees

ISO Certification

Our Services



HEADHUNTING

While human resource (HR) activities have become a part of the internal organization, the outsourcing...



FOREIGN SECONDMENT

As an international business, one of your competitive advantages is your ability to quickly and cost...



MANPOWER OUTSOURCING

All you need to do from your end is, send us the variable monthly details. From here, our operationa...



TRAINING & SKILL DEVELOPMENT

In order to ensure that our employees are equipped with the right kind of skills, knowledge, and cap...

ORGANIZATIONAL DEVELOPMENT

We are dedicated to the improvements of business. To this end, we help companies to become high-perf...



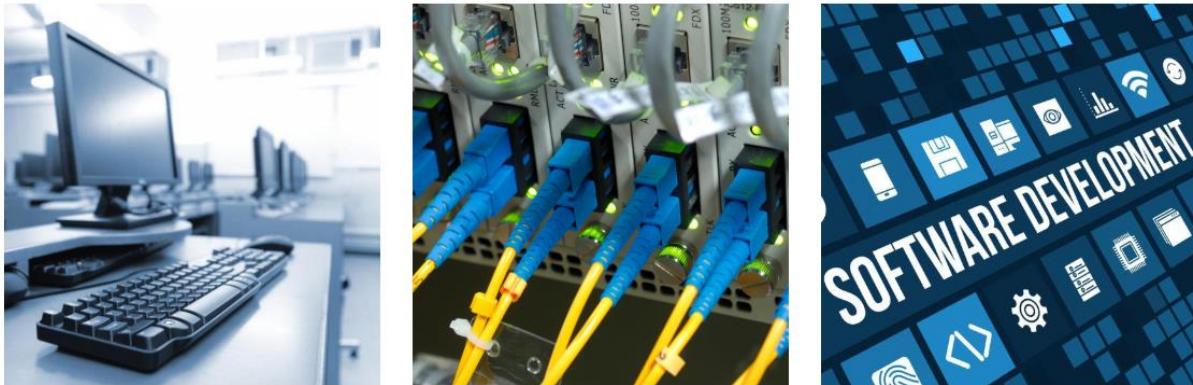
BACKGROUND VERIFICATION

Professional pre-employment screening services are becoming increasingly more essential to employers...

Business Type: IT Services

Munshi IT Services, a concern of MUNSHI and is one of the leading IT solutions & services provider in Bangladesh. The company is established to serve the local and international companies by its expert IT Managers, Support Engineers and Developers.

Since the inception, Munshi IT has been providing quality IT solutions to the organizations and solving their problems of aligning IT with business directions. We offer Software Solution, Development & Deployment Services, Technology Outsourcing Services, Consultancy Services, and Managed IT Services which include Infrastructure Management, Deployment, and System Integration services to the clients. We currently focus on Financial, Education, Development, SME's, Manufacturing & other service sectors in Bangladesh.



CHAPTER 6:

Body of the Project

6.1 Daily Task and Activities:

I have completed four month Internship in an organization MUNSHI IT Services. I have to Task and Activities every day. It was many tasks and activities. Those are given bellow.

- Solved the problems of the clients regarding the Internet and to install programs in the applicants Pc.
- Installation of necessary software and hardware for every client.
- Determine software and hardware problems & solve the problems, replace faulty components, when necessary.
- Configure Operating system software, hardware software, networking software & others components.

- MikroTik, wireless router, NVR & DVR CCTV, Wi-Fi camera, configuration as per client requirement.
- Maintain computer networks, computer hardware, systems software, applications software & all configurations.
- User and Group Maintenance
- Regularly Security Check Performance Monitoring
- According to the necessary Using Command Prompt for find the Problem.
- Install and use Win box for MikroTik router configuration and maintenance.
- Troubleshoot and resolve issues.
- Windows Server 2012 R2 configuration with active directory server and file sharing server for users and clients.

6.2 Events and Activities:

6.2.1 Win box

Win box is a small utility that allows administration of MikroTik Router OS using a fast and simple GUI. It is a native Win32 binary, but can be run on **Linux** and **Mac OS (OSX)** using Wine. All Win box interface functions are as close as possible to Console functions that is why there are no Win box sections in the manual. Some of advanced and system critical configurations are not possible from win box, like MAC address change on an interface.



6.3 Project Task and activities:

Here I give some work which I have done in **MUNSHI IT Services** during Internship. Some Router setup, learning and gain, some software installation and some monitoring system and their configuration procedures are given bellow:

6.3.1 about IP Address

6.3.1.0 IP Classes:

TCP/IP defines five classes of IP addresses: class A, B, C, D, and E. Each class has a range of valid IP addresses. The value of the first octet determines the class. IP addresses from the first three classes (A, B and C) can be used for host addresses. The other two classes are used for other purposes – class D for multicast and class E for experimental purposes.

The system of IP address classes was developed for the purpose of Internet IP addresses assignment. The classes created were based on the network size. For example, for the small number of networks with a very large number of hosts, the Class A was created. The Class C was created for numerous networks with small number of hosts.

Classes of IP addresses are:

Class	First octet value	Subnet mask
A	0-127	8
B	128-191	16
C	192-223	24
D	224-239	-
E	240-255	-

For the IP addresses from Class A, the first 8 bits (the first decimal number) represent the network part, while the remaining 24 bits represent the host part. For Class B, the first 16 bits (the first two numbers) represent the network part, while the remaining 16 bits represent the host part. For Class C, the first 24 bits represent the network part, while the remaining 8 bits represent the host part.

6.3.1.1 IP Sub netting:

Class A Subnets

In Class A, only the first octet is used as Network identifier and rest of three octets are used to be assigned to Hosts (i.e. 16777214 Hosts per Network). To make more subnet in Class A, bits from Host part are borrowed and the subnet mask is changed accordingly.

For example, if one MSB (Most Significant Bit) is borrowed from host bits of second octet and added to Network address, it creates two Subnets ($2^1=2$) with ($2^{23}-2$) 8388606 Hosts per Subnet.

The Subnet mask is changed accordingly to reflect sub netting. Given below is a list of all possible combination of Class A subnets –

Network Bits	Subnet Mask	Bits Borrowed	Subnets	Hosts/Subnet
8	255.0.0.0	0	1	16777214
9	255.128.0.0	1	2	8388606
10	255.192.0.0	2	4	4194302
11	255.224.0.0	3	8	2097150
12	255.240.0.0	4	16	1048574
13	255.248.0.0	5	32	524286
14	255.252.0.0	6	64	262142
15	255.254.0.0	7	128	131070
16	255.255.0.0	8	256	65534
17	255.255.128.0	9	512	32766
18	255.255.192.0	10	1024	16382
19	255.255.224.0	11	2048	8190
20	255.255.240.0	12	4096	4094
21	255.255.248.0	13	8192	2046
22	255.255.252.0	14	16384	1022
23	255.255.254.0	15	32768	510
24	255.255.255.0	16	65536	254
25	255.255.255.128	17	131072	126
26	255.255.255.192	18	262144	62
27	255.255.255.224	19	524288	30
28	255.255.255.240	20	1048576	14
29	255.255.255.248	21	2097152	6
30	255.255.255.252	22	4194304	2

Class B Subnets

By default, using Classful Networking, 14 bits are used as Network bits providing (2^{14}) 16384 Networks and $(2^{16}-2)$ 65534 Hosts. Class B IP Addresses can be sub netted the same way as Class A addresses, by borrowing bits from Host bits. Below is given all possible combination of Class B sub netting –

Network Bits	Subnet Mask	Bits Borrowed	Subnets	Hosts/Subnet
16	255.255.0.0	0	0	65534
17	255.255.128.0	1	2	32766
18	255.255.192.0	2	4	16382
19	255.255.224.0	3	8	8190
20	255.255.240.0	4	16	4094
21	255.255.248.0	5	32	2046
22	255.255.252.0	6	64	1022
23	255.255.254.0	7	128	510
24	255.255.255.0	8	256	254
25	255.255.255.128	9	512	126
26	255.255.255.192	10	1024	62
27	255.255.255.224	11	2048	30
28	255.255.255.240	12	4096	14
29	255.255.255.248	13	8192	6
30	255.255.255.252	14	16384	2

Class C Subnets

Class C IP addresses are normally assigned to a very small size network because it can only have 254 hosts in a network. Given below is a list of all possible combination of sub netted Class B IP address –

Network Bits	Subnet Mask	Bits Borrowed	Subnets	Hosts/Subnet
24	255.255.255.0	0	1	254
25	255.255.255.128	1	2	126
26	255.255.255.192	2	4	62
27	255.255.255.224	3	8	30
28	255.255.255.240	4	16	14
29	255.255.255.248	5	32	6
30	255.255.255.252	6	64	2

6.3.2 Introduction of MikroTik

6.3.2.0 Description:

An advanced 4th generation (core frequency 100MHz or more), 5th generation (Intel Pentium, Cyrix 6X86, AMD K5 or comparable) or newer Intel IA-32 (i386) compatible **motherboard and processor**(dual processors are not supported); from 32MB to 1GB **RAM** (from 48MB suggested); 30MB or more primary master **IDE HDD or IDE flash drive**.

Note: The hard disk will be entirely reformatted during the installation and all data on it will be lost!

Welcome Screen and Command Prompt

After logging into the router you will be presented with the MikroTik RouterOS™ Welcome Screen and command prompt, for example:

```
      MMM      MMM      KKK          TTTTTTTTTTTT      KKK
      MMMM      MMMM      KKK          TTTTTTTTTTTT      KKK
      MMM  MMMM  MMM  III  KKK  KKK  RRRRRR   000000    TTT  III  KKK  KKK
      MMM  MM  MMM  III  KKKKKK  RRR  RRR  000  000    TTT  III  KKKKK
      MMM  MMM  III  KKK  KKK  RRRRRR  000  000    TTT  III  KKK  KKK
      MMM  MMM  III  KKK  KKK  RRR  RRR  000000    TTT  III  KKK  KKK

MikroTik RouterOS v2.7 (c) 1999-2003      http://www.mikrotik.com/
```

```
Terminal xterm detected, using multiline mode
[admin@MikroTik] >
```

The command prompt shows the identity name of the router and the current menu level, for example:

```
[admin@MikroTik] >          Base level menu
[admin@MikroTik] interface>  Interface configuration
[admin@MikroTik] ip address> IP Address management
```

MikroTik RouterOS™ V2.7 Basic Setup Guide

The screenshot shows a Microsoft Internet Explorer window displaying the MikroTik RouterOS V2.7 Basic Setup Guide. The title bar reads "MikroTik RouterOS Managing Webpage - Microsoft Internet Explorer". The address bar shows "http://10.0.0.204/". The main content area has a yellow background with a striped pattern. It features several sections:

- MikroTik WinBox Console**: Includes a screenshot of the WinBox interface and instructions: "Download and run the RouterOS GUI client. WinBox has optional command line arguments:" followed by the command `winbox [<address> [<login> [<password>]]]`.
- RouterOS Terminal Console**: Instructions: "Telnet to the router and use the ASCII Terminal Console."
- MikroTik RouterOS Reference Manual**: Includes a question mark icon and instructions: "Reference Manual is available on the router. Additional documentation is available at <http://www.mikrotik.com/documentation.html>".

At the bottom of the page is a link: [MIKROTIK ROUTER SOFTWARE END-USER LICENCE AGREEMENT](#).

By clicking on the Win box Console link you can start the winbox.exe download. Choose the option “Run this program from its current location” and click “OK”: in the figure shows MicroTik router apps web page.

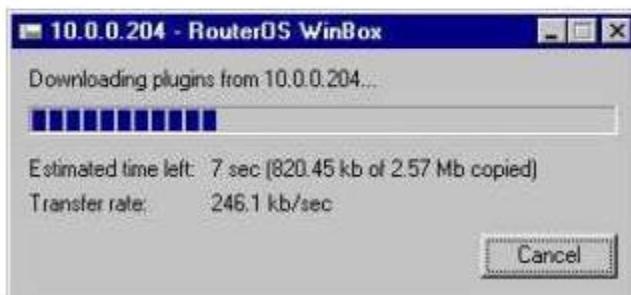


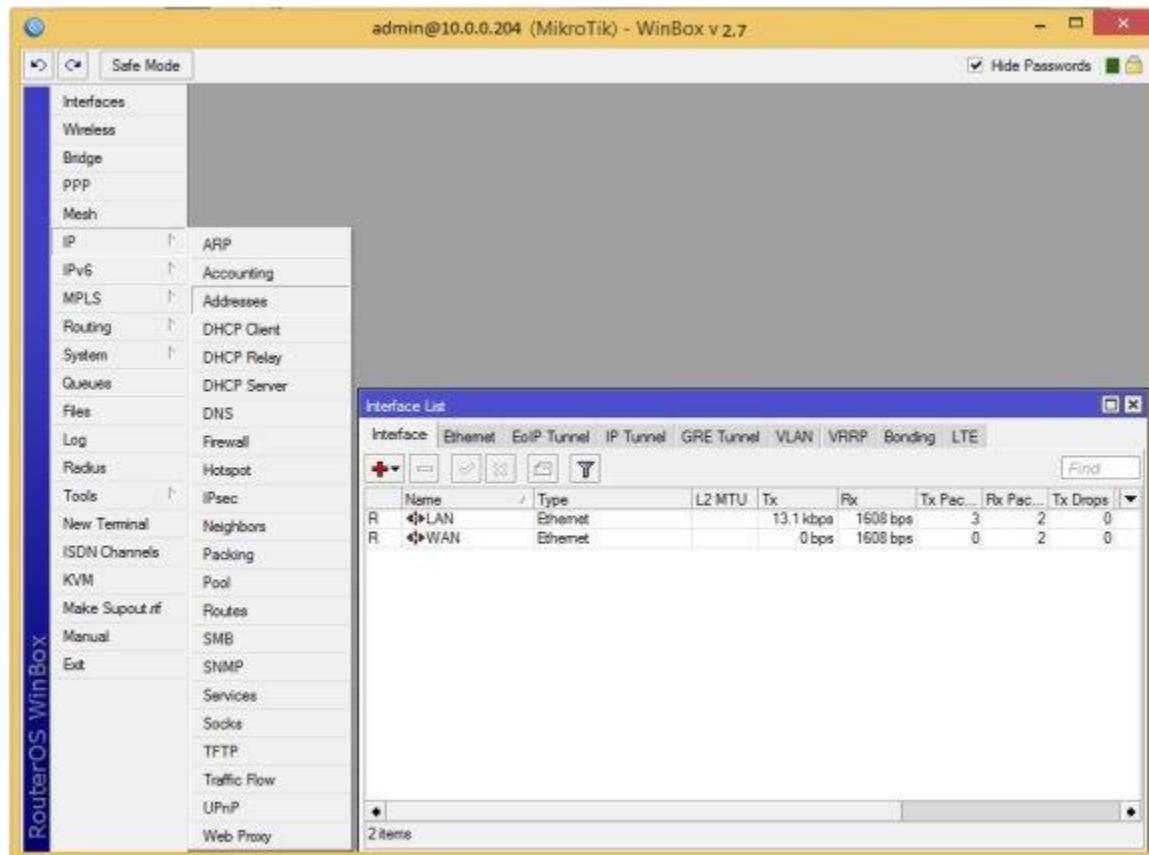


Alternatively, you can save the winbox.exe program to your disk and run it from there. The winbox.exe program opens the Win box login window. Login to the router by specifying the IP address. In the figure 3.9 and 3.10 shows its installation processes.



Watch the download process of Winbox plugins:





6.3.2.1 MikroTik Basic configuration:

MikroTik is one of the most usable routers to any system administrator of any ISP company or any office because of having a lot of networking services which help to make a stable and smooth network. MikroTik router is mainly popular for bandwidth control service, and graphical user interface (GUI) by the win box software which helps to operate MikroTik router so easily as well as cheap price. This report is designed to show the basic configuration of a MikroTik Router and using win box software.

MikroTik router basic configuration includes attributing IP addresses and enabling NAT for using internet. MikroTik router basic configuration can be divided by 5 steps.

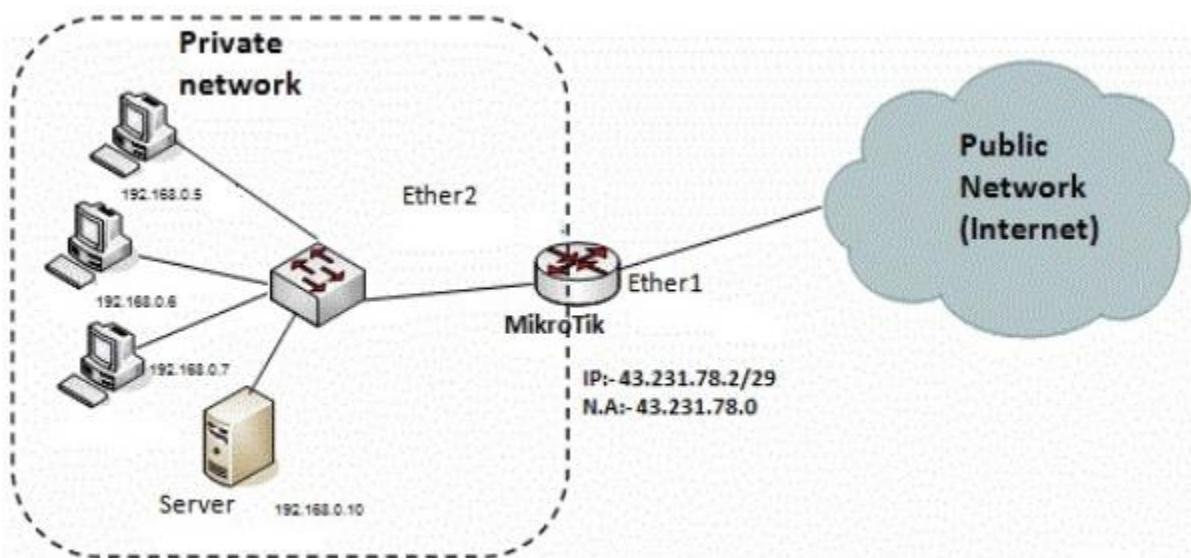
- WAN and LAN configuration
- Gateway configuration
- DNS configuration
- Local IP route by masquerade/NAT
- DHCP Server configuration

Some other MikroTik configuration

- MikroTik Queue and PCQ Management configuration
- MikroTik Day Night Package management configuration
- MikroTik Bridge and Master port configuration
- MikroTik PPPoE server configuration
- MikroTik Port forwarding configuration
- MikroTik Failover configuration
- MikroTik Load balancing configuration
- Mikrotik website restriction configuration
- MikroTik backup and restore

I'm given below information and a simple network diagram where one server and three users are connected to MikroTik router through a network switch and one interface of the router is connected to internet for accessing internet information.

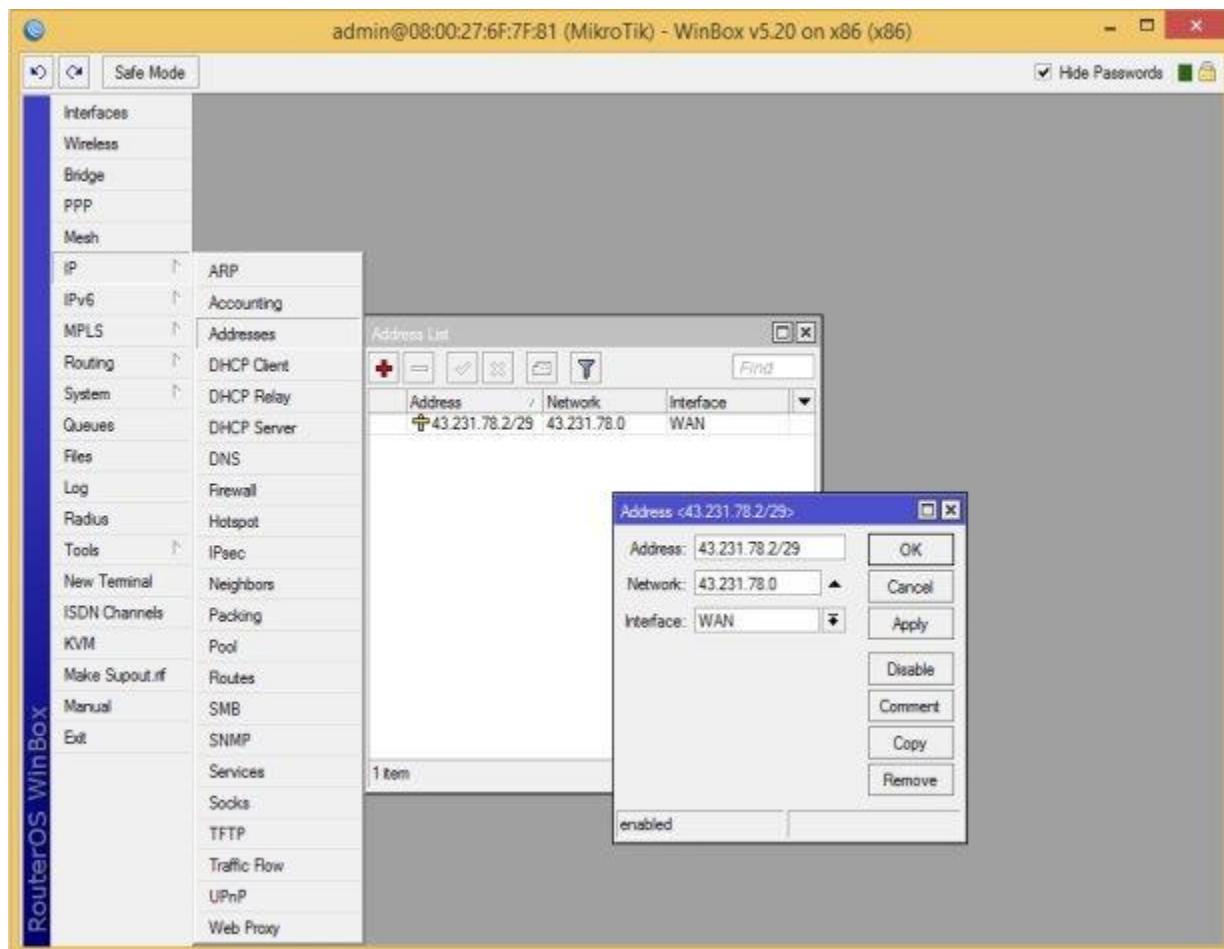
According to simple network diagram, first interface (ether1/ port) is connected to ISP internet and this interface is WAN port. We will set up WAN IP (provided by ISP) in this interface. Second interface (ether2 port) is LAN interface and we will set our LAN Gateway in this interface. The users and server of this network are connected to MikroTik router through a switch for accessing internet.

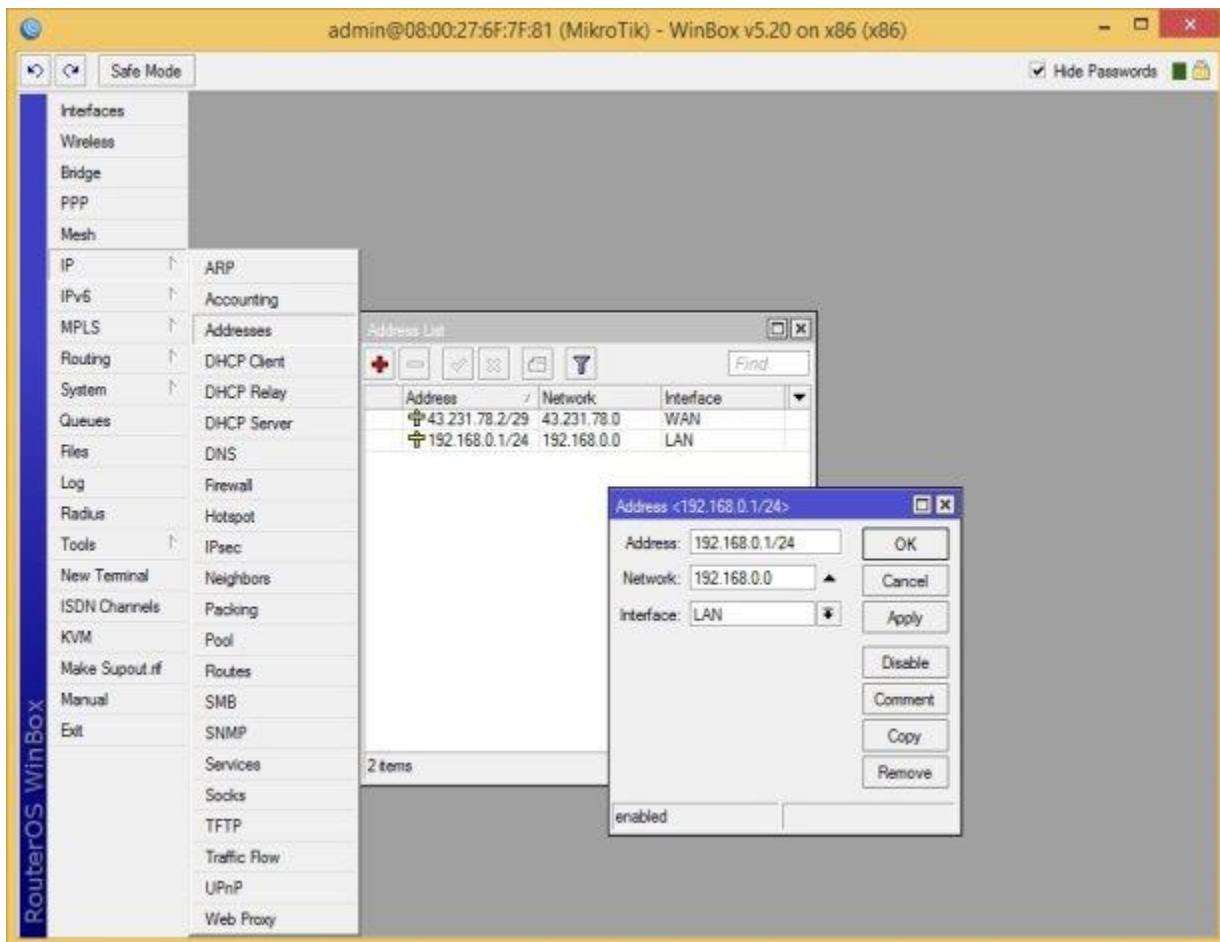


6.3.2.3 MikroTik WAN and LAN configuration:

First step to basic configure a MikroTik router is to configure WAN and LAN IP addresses in WAN and LAN interface consequently. So, follow below steps to set WAN and LAN IP addresses in new MikroTik router.

- Go to IP > Addresses menu. Address List window will appear now. Click on add new button (+) from Address List window. New Address window will show. Put my WAN IP address (In this report: 43.231.78.2/29) which is provided to me by ISP into the Address input box and then select interface (In this report: WAN) on which you want to set WAN IP from the Interface drop-down menu and click Apply and then OK button.
- Click on add new button (+) again and put my LAN Gateway IP address (In this report: 192.168.0.1/24) into the Address input box and choose your LAN interface (In this report: LAN) from Interface drop-down menu and click Apply and OK button.

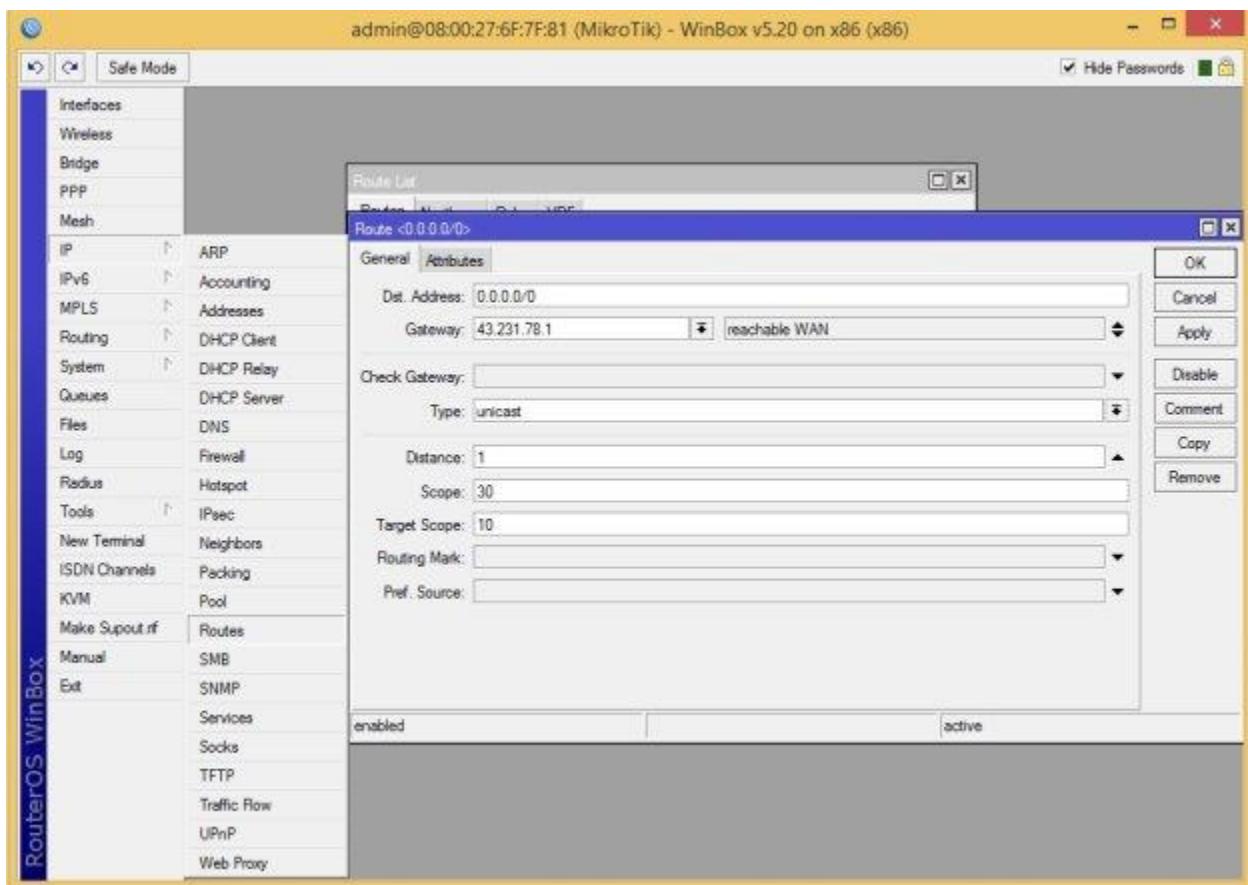




6.3.2.4 MikroTik gateway Configuration:

After completing WAN and LAN IP configuration, then I configure MikroTik gateway which is provided by ISP. So, follow below simple steps to assign gateway IP in MikroTik router.

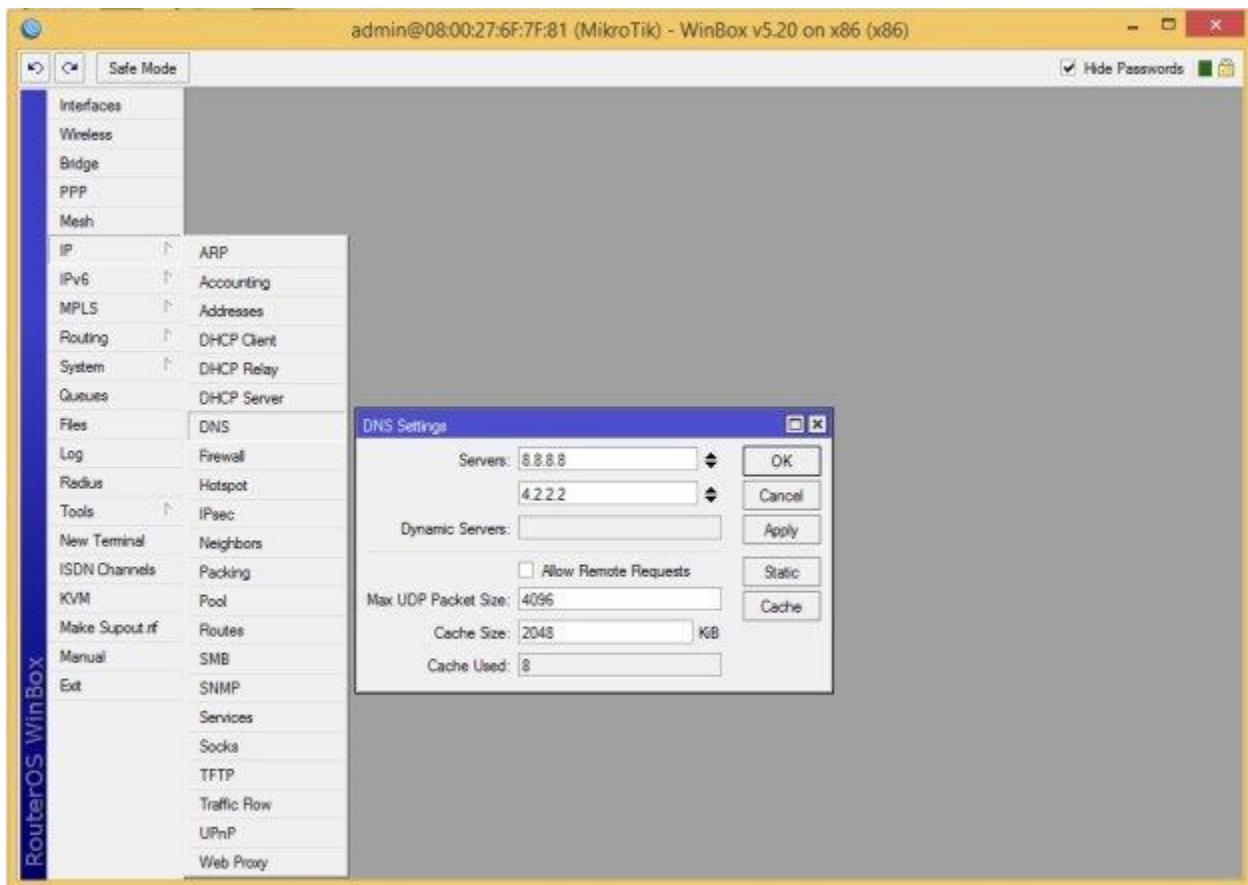
- Go to IP > Routes menu. Route List window will show now. I can see two dynamic routes are already added in this Route List. Click on add new button (+). New Route window will appear as soon as I click the button. Now put gateway address (in this report: 43.231.78.1) which is provided by ISP in Gateway input field. Then click Apply and OK button.



6.3.2.5 MikroTik DNS Configuration:

After completing three important configuration. So now follow the steps to configure DNS in MikroTik router.

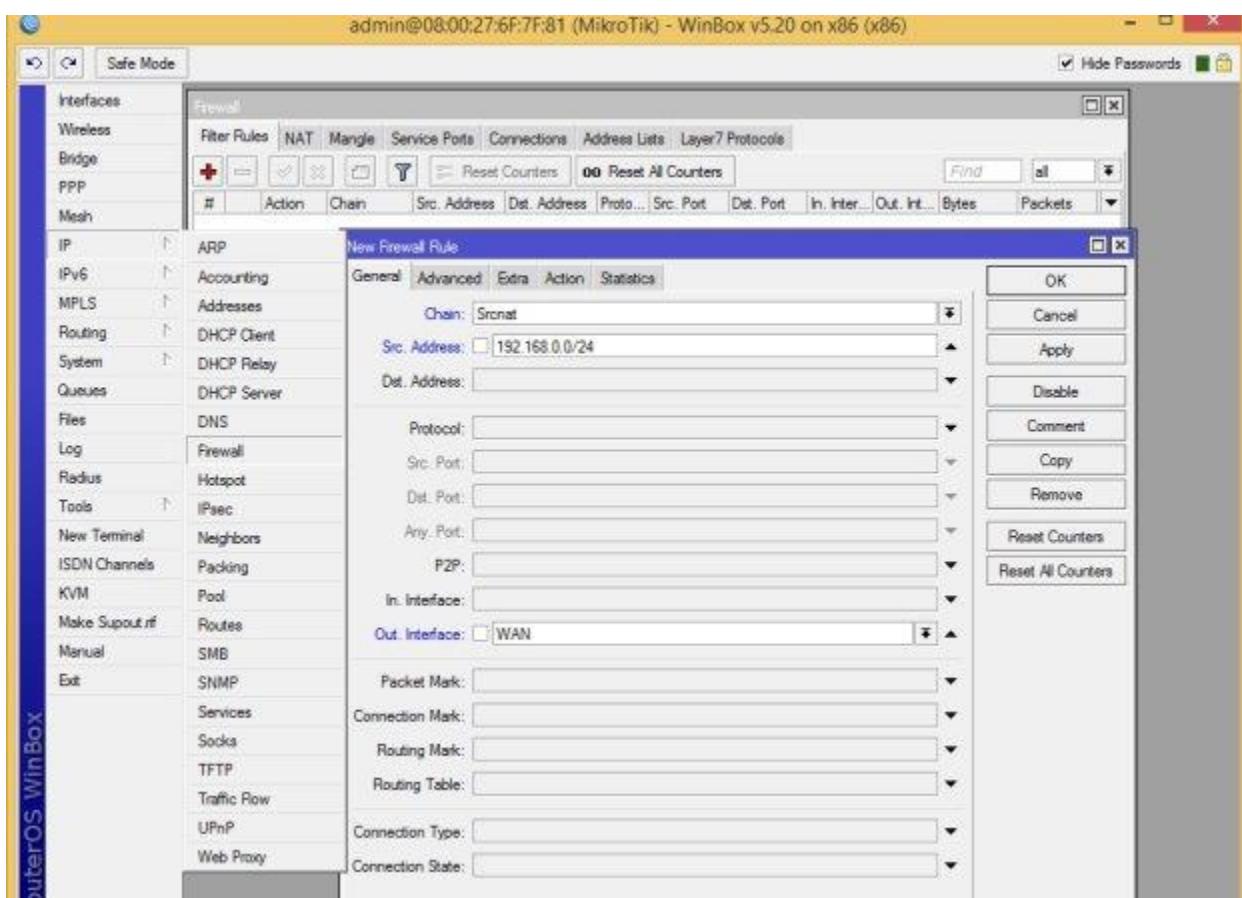
- Go to IP > DNS menu. DNS Settings window will show now. In this window, put DNS server address that you have got from the Company or I can use public DNS IP (8.8.8.8) in Servers input box. I can put secondary DNS IP (4.2.2.2) in Servers input box.



6.3.2.6 MikroTik NAT Configuration:

After completing gateway configuration, I have to create a NAT firewall rule to masquerade my LAN IP. Otherwise, LAN user cannot access internet through MikroTik router. So, follow below steps to create the masquerade firewall rule in MikroTik router.

- Go to IP > Firewall menu and click on NAT tab and then click on add new button (+) button. New NAT Rule window will show now.
- Choose Chain: srcnat and Src. Address: 192.168.0.0/24 under General tab and choose Action: masquerade from Action tab and then click Apply and OK button.

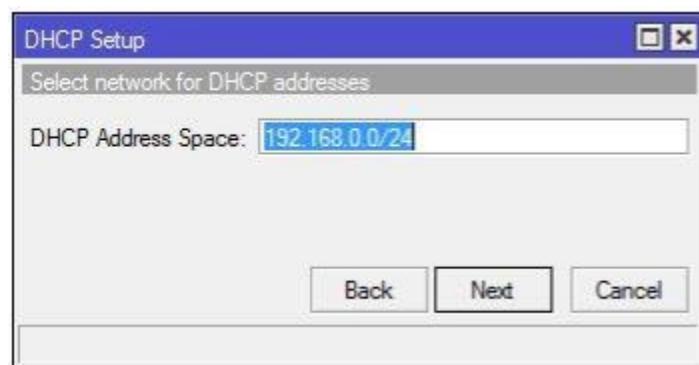
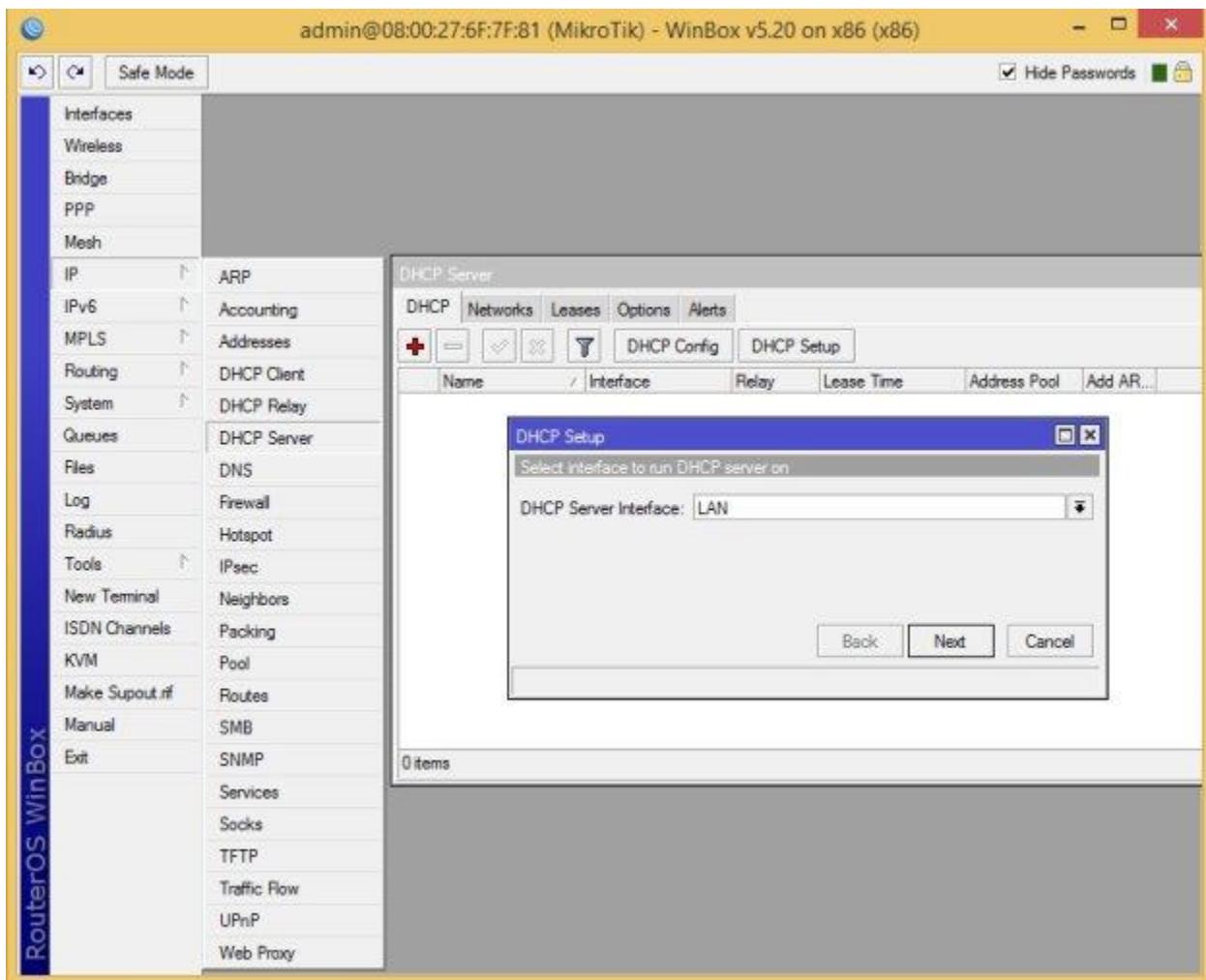


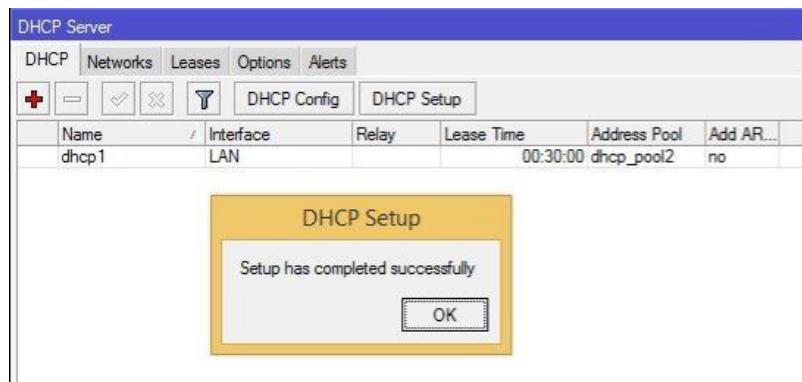
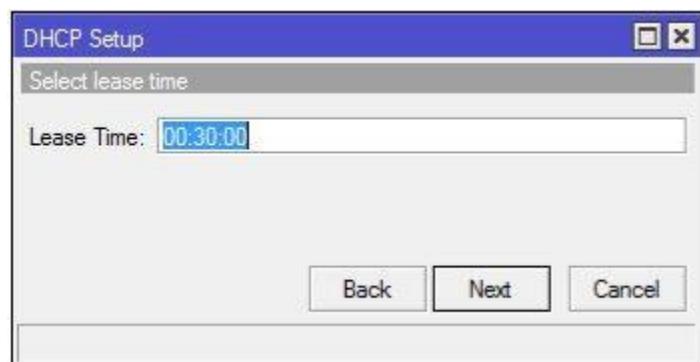
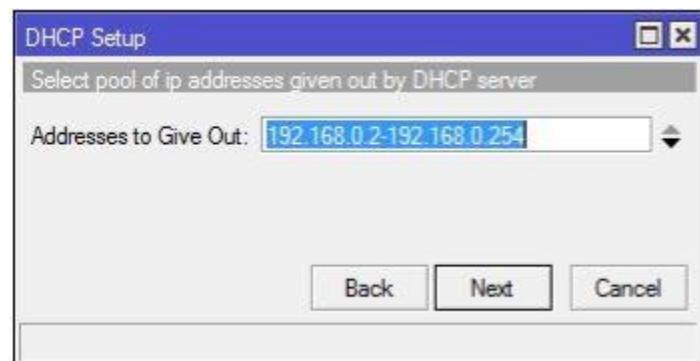
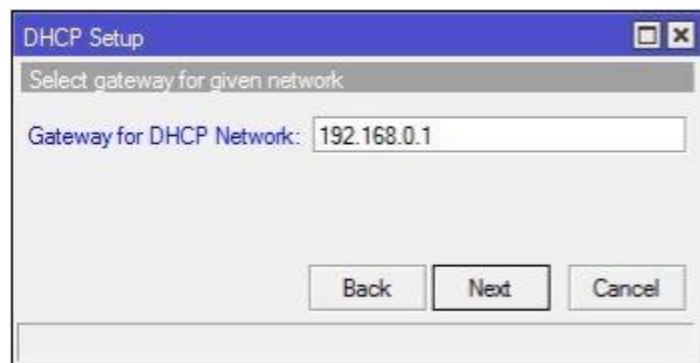
6.3.2.7 MikroTik DHCP Server Configuration:

Dynamic Host Configuration Protocol (DHCP) is a client/server protocol where a DHCP server automatically provides an Internet Protocol (IP) address and other related information such as subnet mask, default gateway and DNS to DHCP clients. Generally, every MikroTik router has a built-in DHCP service. So now follow the steps to configure DHCP in MikroTik router.

- Go to IP > DHCP Server menu from your win box. DHCP Server window will show.
- In DHCP Server window, click on DHCP Setup button and choose the interface (in this report: LAN) in which you want to setup DHCP server from DHCP Server Interface drop-down menu and then click on Next button.
- Now put LAN network block in DHCP Address Space input box and click Next button. DHCP client/LAN user will get IP from this network.
- Choose gateway address for the given network in Gateway for DHCP Network input box and then click Next button.
- Provide IP range from which DHCP client/LAN user will get IP in Address to Give Out input box and click Next button.
- Provide preferred DNS server IP and click Next button.

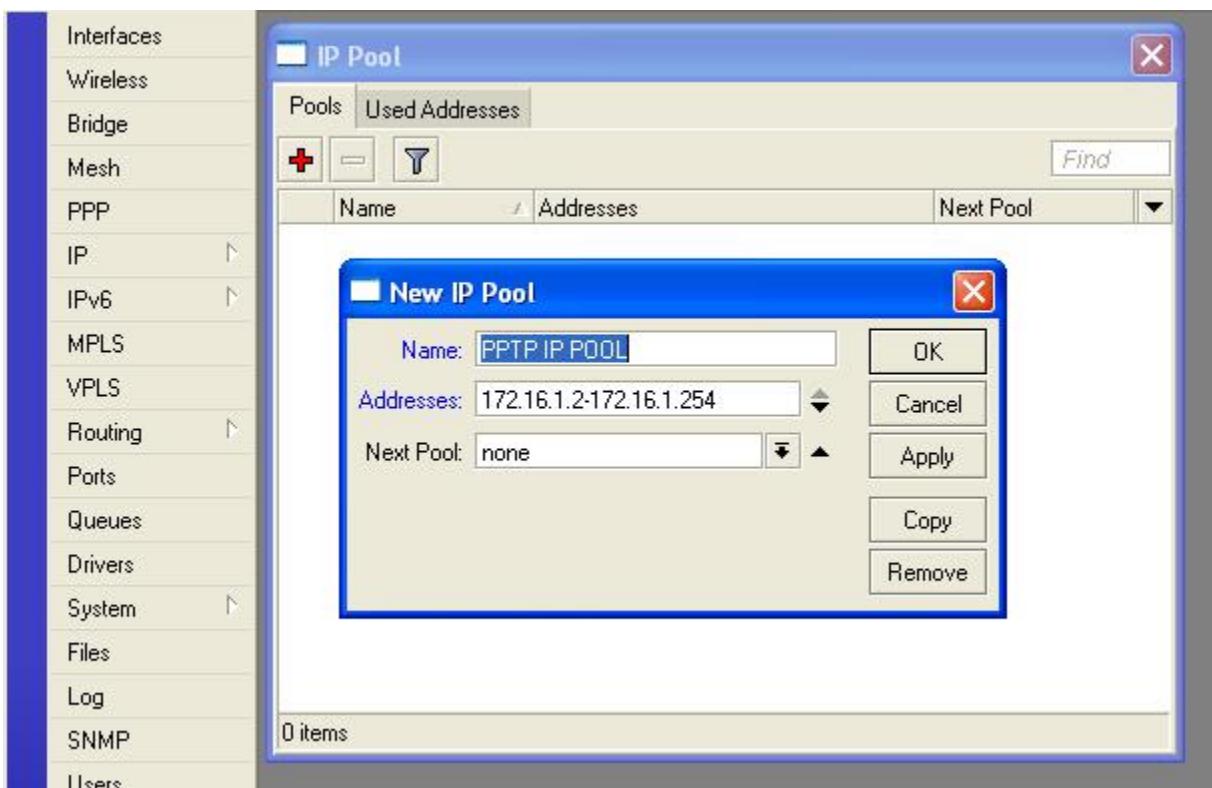
- Now provide IP lease time and click Next button. Default lease time is 30 minute.
- DHCP setup is complete now and a successful message will be shown.



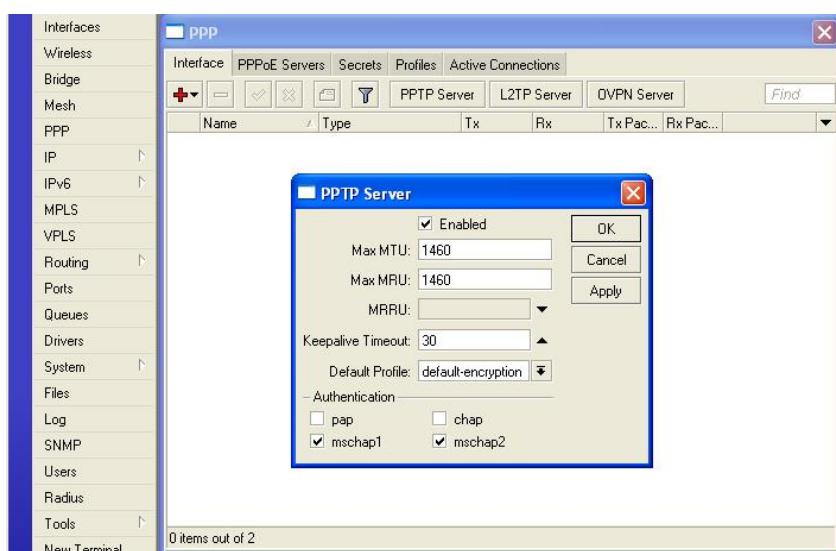


6.3.2.8 MikroTik PPTP Server with Profile:

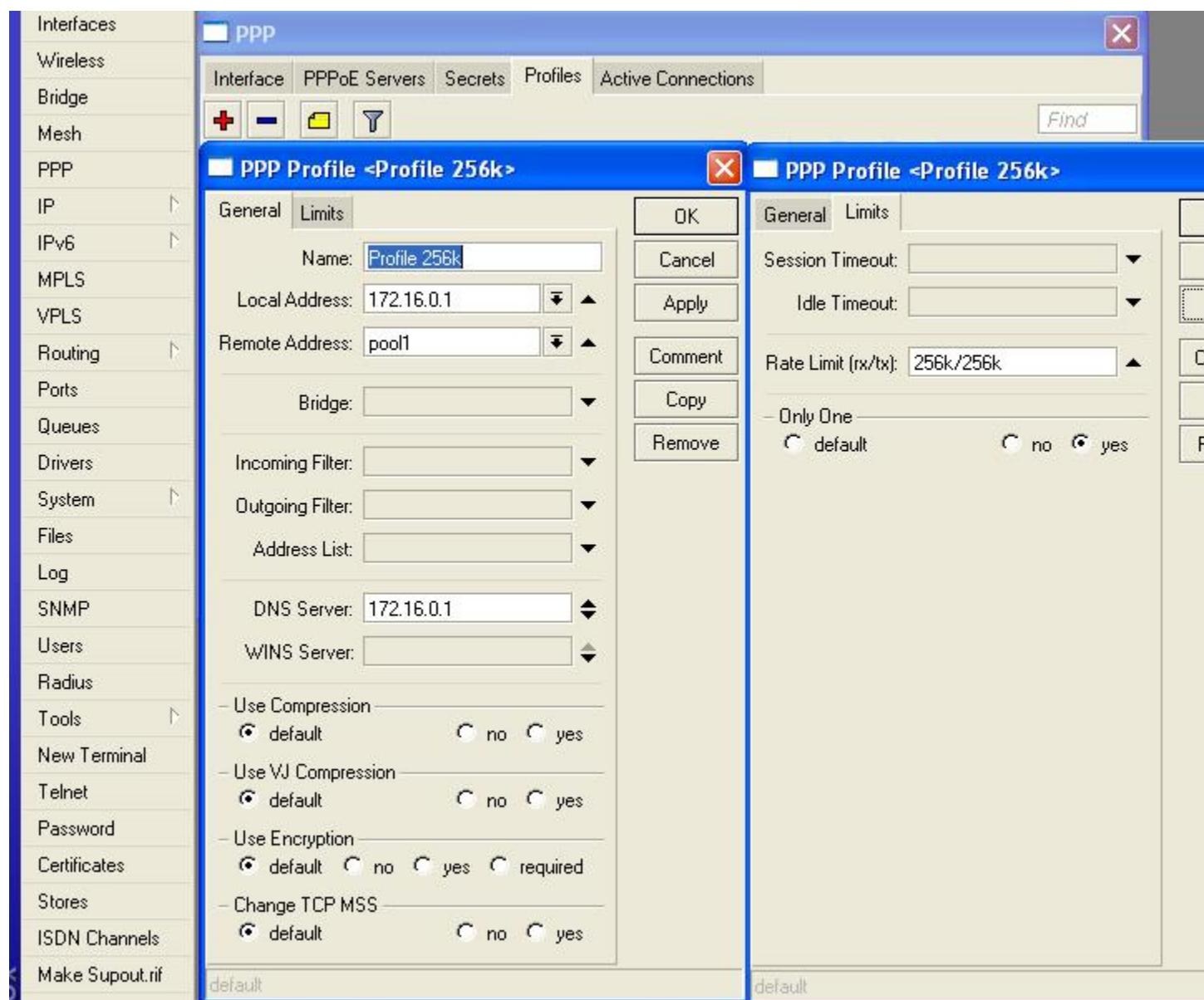
Now go to IP > Pool. Press the PLUS sign in RED, then create a IP Address Pool that will be used by the PPTP to give out IP and Press OK. It should look something like this.



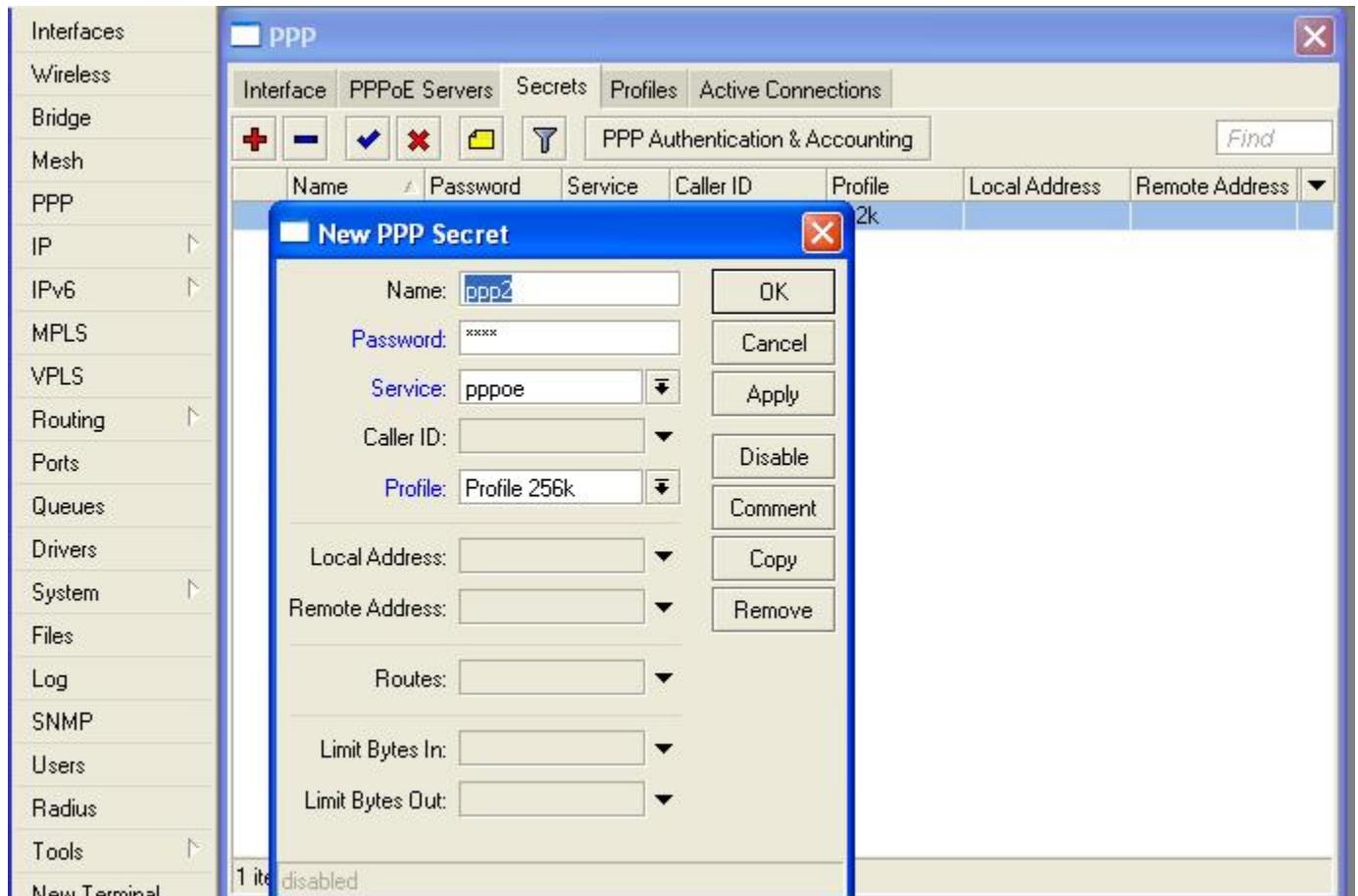
Now we will create a PPTP Server. Go to PPP then press PPTP Server, a new small window will pop up, and select Enabled and just press OK.



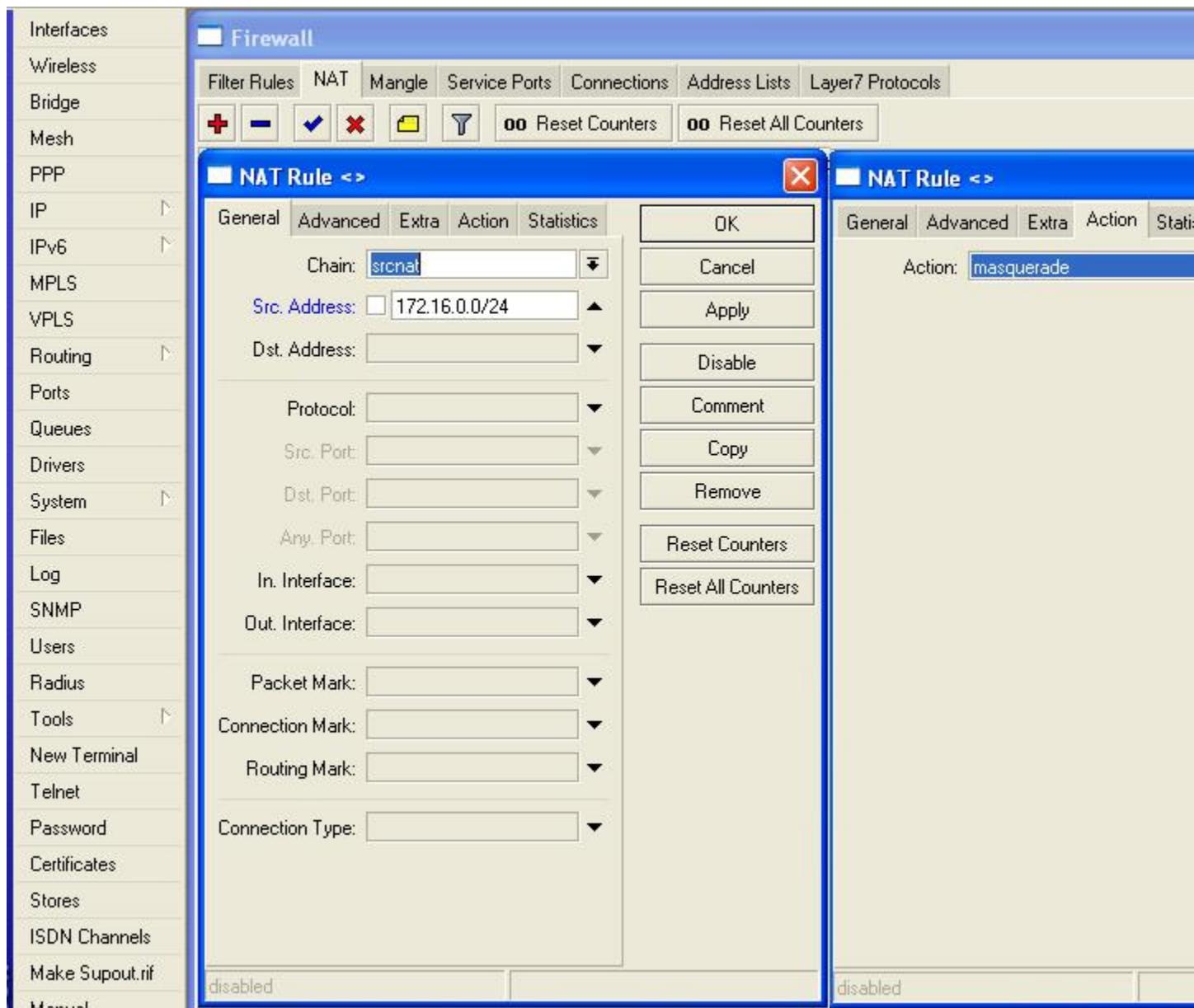
Now we will create a profile that will be used by different users. Go to the main PPP window, go to Profiles tab, here you will see two profiles by default, don't do anything to these default profiles, create a new profile by pressing the PLUS sign. Name the profile whatever you like (here i have named it name=profile 256k). Local Address is the address of the server (here it is 172.16.0.1) local-address=172.16.0.1. In Remote Address box press the down arrow button we will see the name of the pool that we created in the first step, select it. If you don't see the name of the pool don't worry, name type the name of the pool in the Remote Address Location. In the DNS Server, enter the IP of your SERVER (here i am using mikrotik as my DNS Server) DNS-Server=172.16.0.1. Then go to Limits tab in the same window, now here we have to setup the bandwidth rate at which the users using this profile will be restricted at. Here set the Rate Limit (tx/rx) to whatever you like (i am setting it to 256k up/down). Then press APPLY and OK.



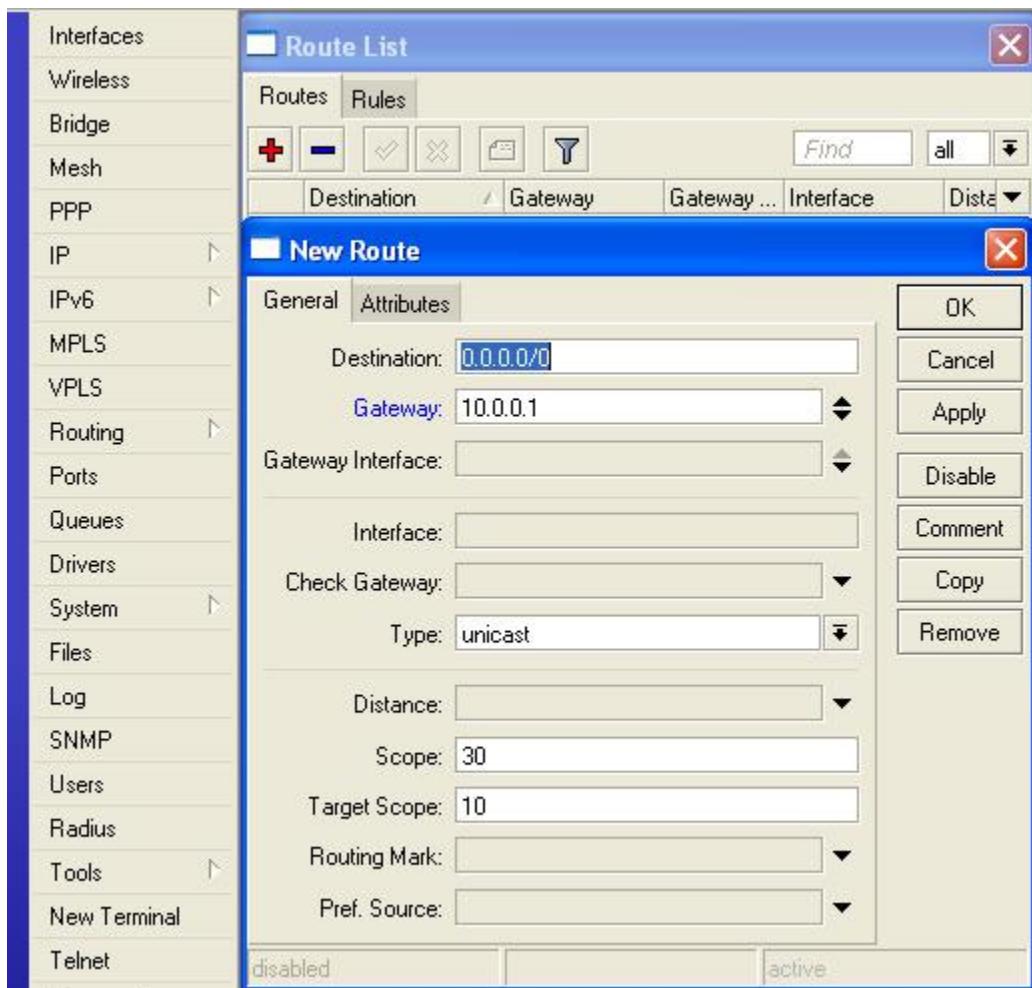
Now we will create users.



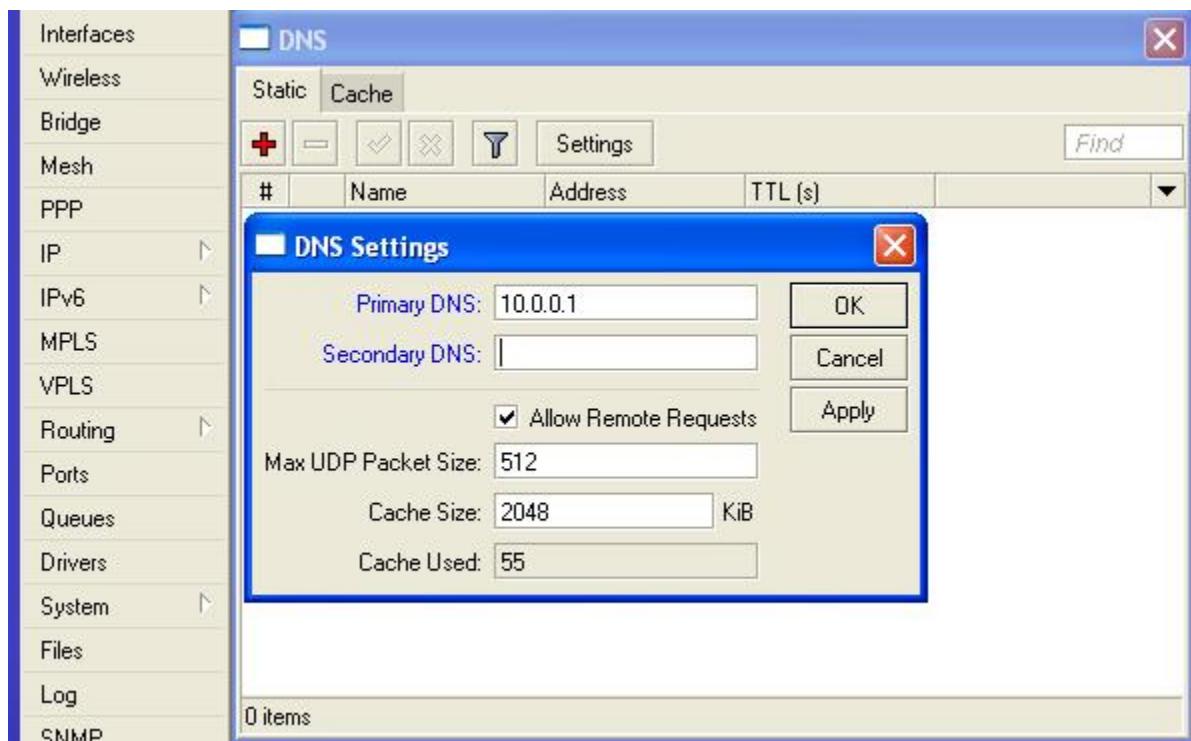
Our PPTP Server Setup is complete. Go to IP > Firewall. In the NAT tab add a new FIREWALL rule, press the PLUS sign. Chain=srcnat, src.address=172.16.0.0/24, then go to Action's tab in the same window, select action=masquerade. Then press APPLY and OK.



Now we will setup Default ROUTE. Go to IP > Routes, in here add a new Static ROUTE by pressing PLUS sign. Destination=0.0.0.0/0, set the gateway to the gateway of the interface connected to INTERNET or the main IP of your ADSL Router (here its 10.0.0.1) gateway=10.0.0.1. Then Press APPLY and OK.



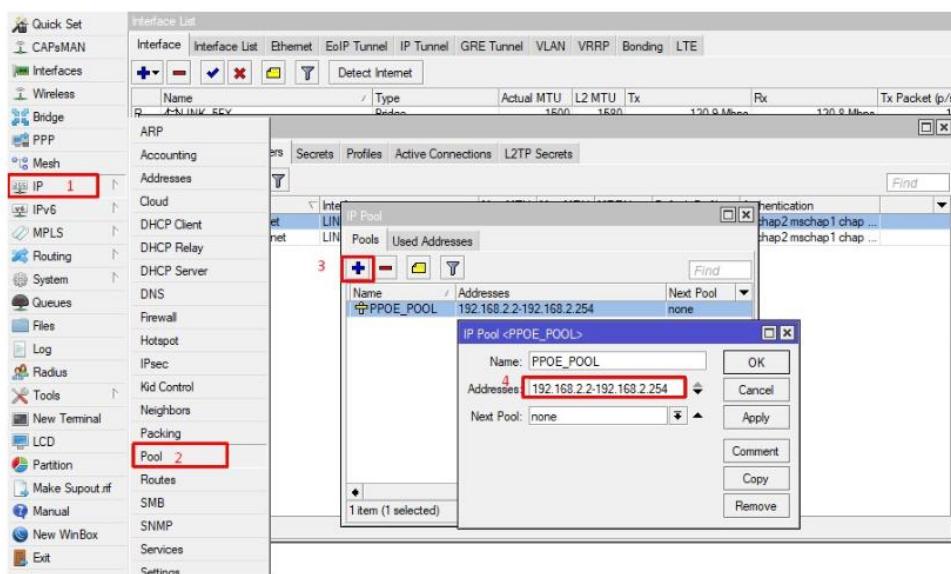
Now the last and final step, setup DNS Server on Mikrotik Router. Go to IP > DNS, press the settings button. Enter the primary and secondary DNS Server's IP provided by your ISP (here i have a DNS Server on my network i am using that) primary DNS=10.0.0.1 , also select "Allow Remote Request" this will make your Mikrotik Router act as a DNS Server. Notice that i have setup the Cache size=2048, Now press APPLY and OK.

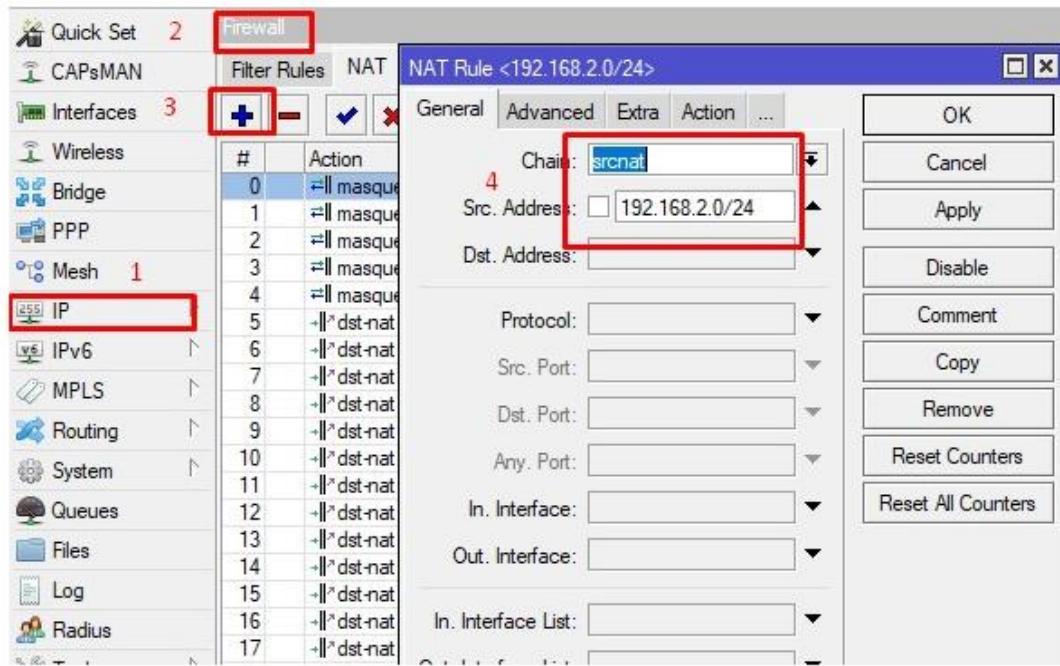


Now our PPTP Server Setup with Profiles is complete.

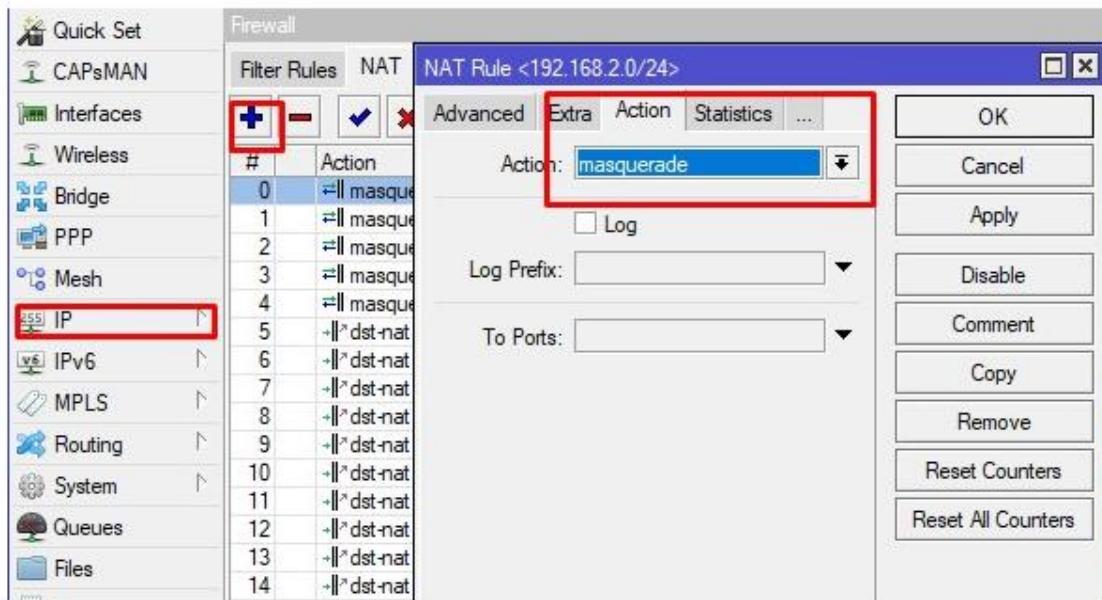
6.3.2.9 MikroTik PPPoE Server Configuration:

Go to IP > Pool menu and click on add new button. New IP Pool window will appear now. Put Name: PPOE_POOL and Addresses: 192.168.2.2-192.168.2.254 in the New IP Pool window and click apply and OK button. When a user will purchase a 512kbps connection, he/she will get an IP from this IP address range.





Go to IP > Firewall menu and snap on add new button. New Nat rule window will show up now.
 Go to IP > Firewall menu and click on add new button. New action masquerade window will appear now.

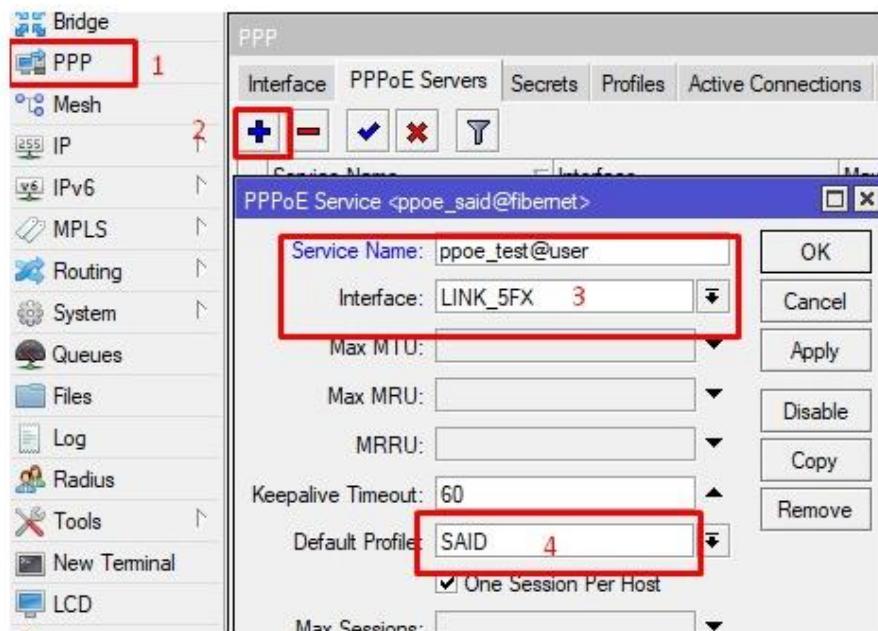


Now we'll configure our PPPoE server in MikroTik router. Follow below steps carefully for proper PPPoE server configuration in the MikroTik router.

Click on PPP menu item from the left menu. PPP window will appear now. Choose the PPPoE Server. In the event that you need, you can change your interface name or keep it default. Click Apply and OK button.

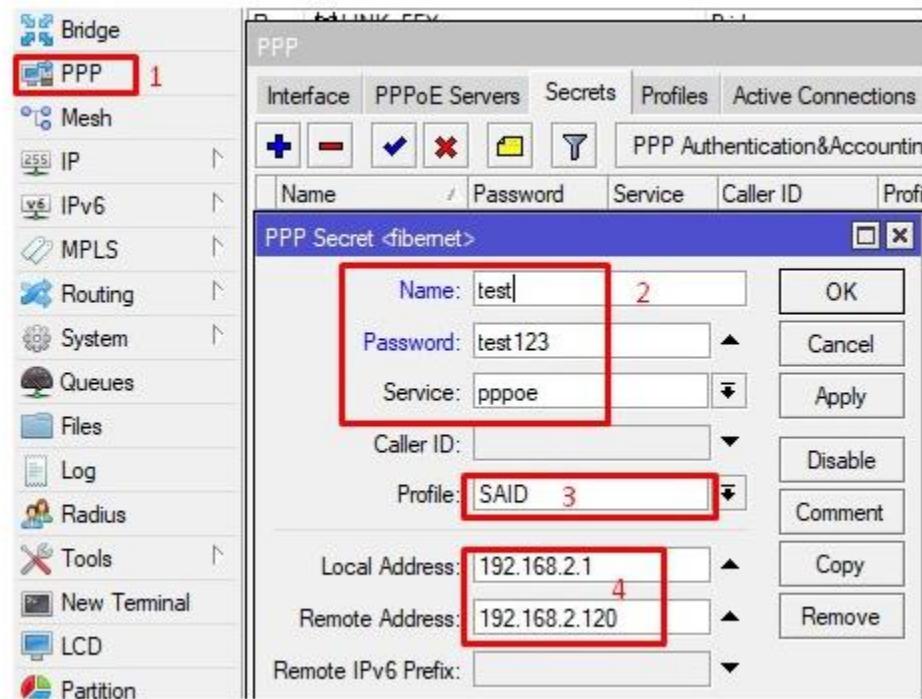
Now click on PPPoE Servers tab and then click add new button. New PPPoE Service window will appear now. In this window, put your PPPoE server name as you like in Service Name input box.

Presently pick your LAN interface where PPPoE server will be made from Interface drop-down menu. In the event that you make connect interface, your extension interface will be accessible in this rundown. In this way, pick connect interface on the off chance that you need to make PPPoE server in your extension interface.

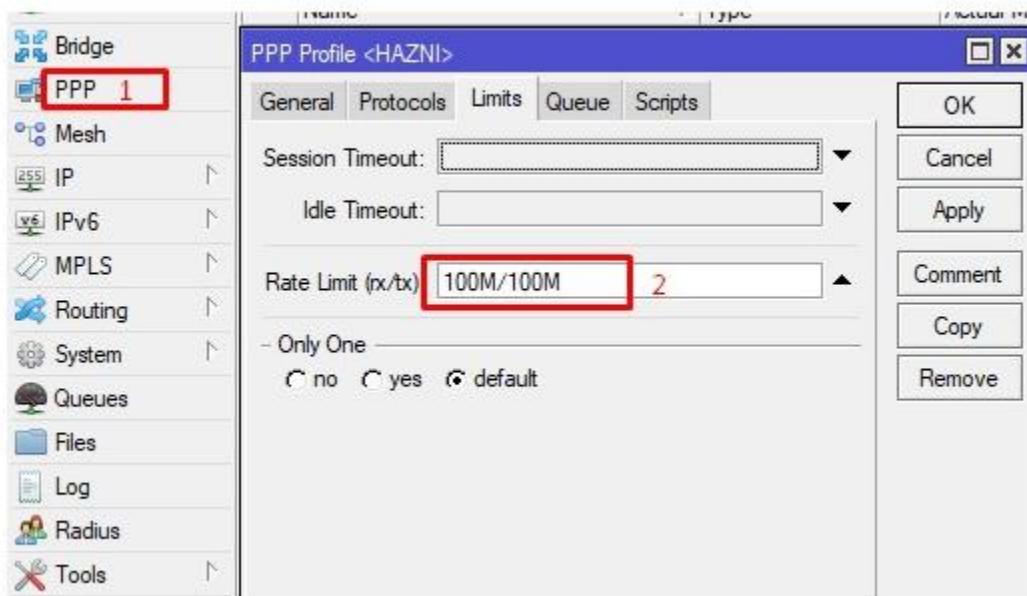


Click on One Session per Host If you left it blank, multiple host/devices can be connected with the same username and password. Obviously, you don't want it.

At the bottom of this window, you can see there are 4 authentication methods. Here only select PAP, and unselect all others. Now click Apply and OK.

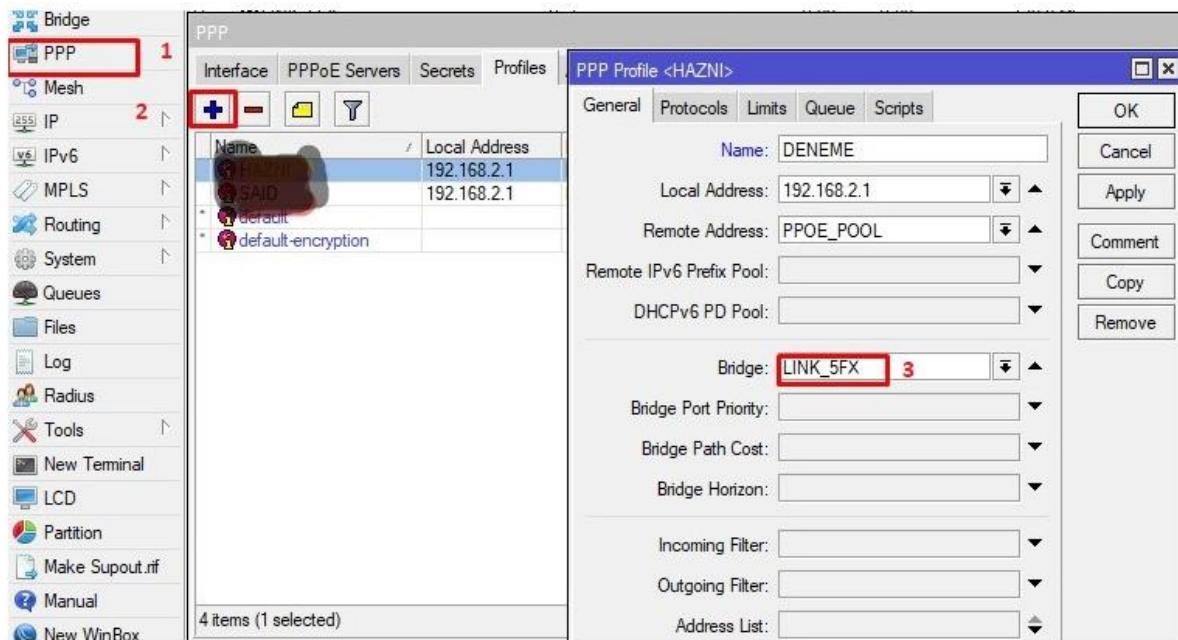


Select a PPP profile and set the limit to 100MB / 100MB, giving the desired value.



PPP menu from MikroTik menu bar and then click on the Profiles tab. You will see already two default profiles are created by MikroTik. We will do nothing these default profiles. We will create a new profile here. For this, click on add new button. New PPP Profile window will appear now.

In New PPP Profile window, put your profile name as you, I am using. Now put Local Address: 192.168.2.1.



6.3.2.10 MikroTik Configuration with WAN PPPoE Client:

We will now start our MikroTik Router configuration with WAN PPPoE client according to the above network diagram. Complete MikroTik configuration with PPPoE WAN connection can be divided into four steps.

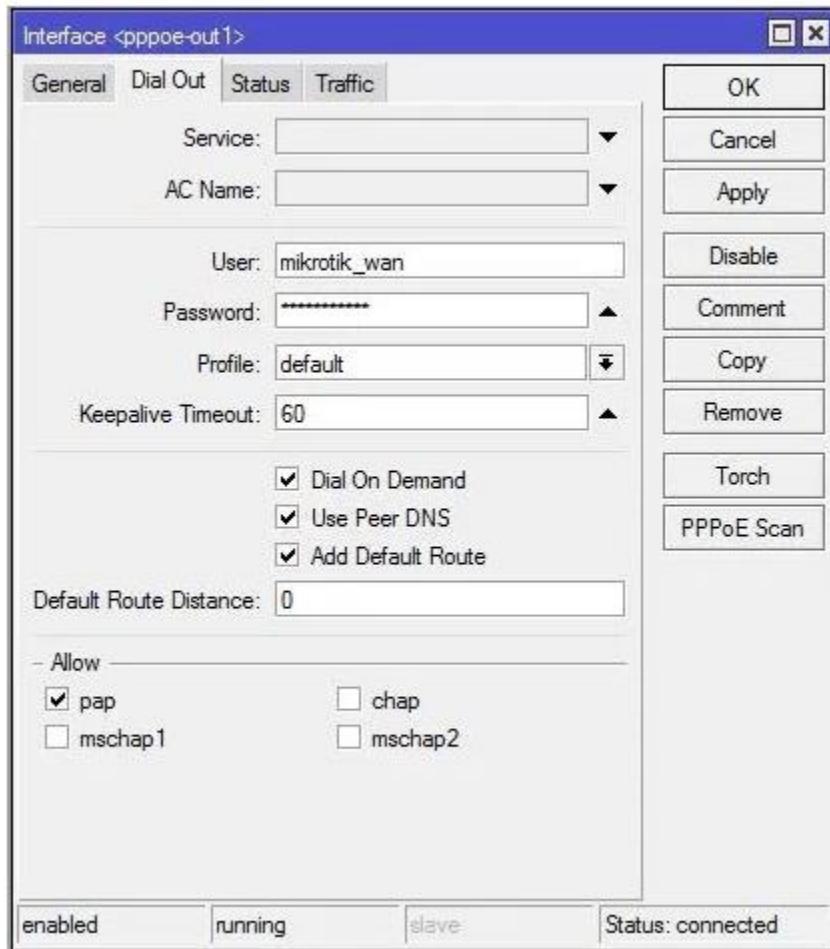
- MikroTik PPPoE Client Configuration on WAN Interface
- Assigning LAN Gateway
- Assigning DNS IP and
- NAT configuration

My company provides PPPoE connection, you must configure MikroTik PPPoE Client on your WAN interface. The following steps will show how to configure PPPoE Client on MikroTik WAN interface.

- Login to MikroTik Router using Win box with admin privilege credential.
- Click on PPP menu item. PPP window will appear. From Interface tab, click on PLUS SIGN (+) dropdown menu and then choose PPPoE Client. New Interface window will appear.
- Under General tab, put your PPPoE interface name (pppoe-wan) in Name input field and then choose your WAN interface (ether1) from Interfaces dropdown menu.
- Click on Dial Out tab and put your ISP given username (mikrotik_wan) in User input field and password (mikrotik123) in Password input field. Click on Dial On Demand checkbox

and Use Peer DNS checkbox. Also ensure that Add Default Route checkbox is checked. Also uncheck all the checkboxes except pap checkbox from Allow panel.

- Click Apply and OK button.



MikroTik PPPoE Client will be connected now and you can see PPPoE Client status from Status tab. You will find that a dynamic IP is added in IP > Address list and you will also find a default route is automatically added in IP > Routes list by MikroTik PPPoE client.

After MikroTik PPPoE Client configuration, we will now assign LAN Gateway IP so that LAN user can communicate with MikroTik Router. The following steps will show how to assign LAN Gateway IP in MikroTik Router.

- Go to IP > Addresses menu item. Address List window will appear.
- Click on PLUS SIGN (+) and put your LAN gateway IP (192.168.10.1/24) in Address input field.
- Choose your LAN interface (ether2) from Interface dropdown menu.
- Click Apply and OK button.

LAN Gateway IP has been assigned. Now we will assign DNS IP in our MikroTik Router.

According to our PPPoE Client configuration, DNS IP will be assigned dynamically if ISP provides DNS IP with their PPPoE Server's user profile. However, we will assign DNS Server IP manually in our MikroTik Router because they may forget to assign DNS Server IP with their user profile. The following steps will show how to assign DNS IP in your MikroTik Router.

- Go to IP > DNS menu item and put DNS Server IP (8.8.8.8 or 8.8.4.4) in Servers input field.
- Click on Apply and OK button.

Assigning DNS IP has been completed. Now we will configure NATing so that LAN user can get internet through MikroTik Router.

In the last step, we will create a NAT firewall rule to masquerade our LAN IP block. Otherwise, our LAN user cannot access internet through our MikroTik router. The following steps will show how to create the masquerade firewall rule in your MikroTik router.

- Go to IP > Firewall menu and click on NAT tab and then click on PLUS SIGN (+). New NAT Rule window will appear now.
- Choose srcnat from Chain dropdown menu and put LAN IP block (192.168.10.0/24) in Address input field.
- Click on Action tab and choose masquerade from Action dropdown menu.
- Click Apply and OK

NAT configuration in MikroTik router has been completed as well as all our necessary steps to configure MikroTik Router with WAN PPPoE Client have been completed. Now connect your LAN users to MikroTik Router through a LAN switch. If everything is OK, my LAN users will be able to get internet through MikroTik Router.

6.3.3 Windows Server 2012 R2

6.3.3.0 Installation Windows Server 2012 R2:

1. Download Windows Server 2012 – <http://aka.ms/getwin2012>
2. Follow Step-By-Step Instructions to configure BIOS – [Configure BIOS Before Installing Windows Server 2012 and Hyper-V](#)
3. Press **ENTER** to boot from DVD.

Press any key to boot from CD or DVD.....

Files will start loading.

Loading files...

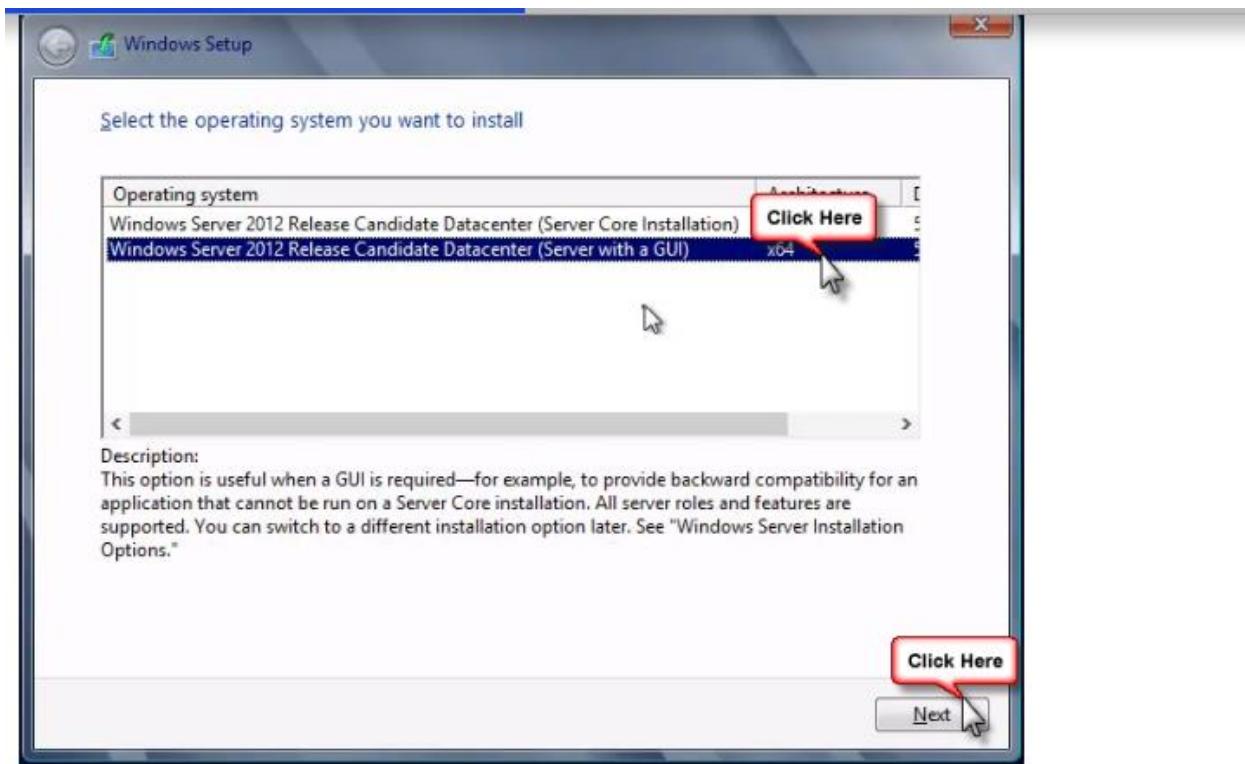
4. Take the defaults on the Language screen, and click **Next**.



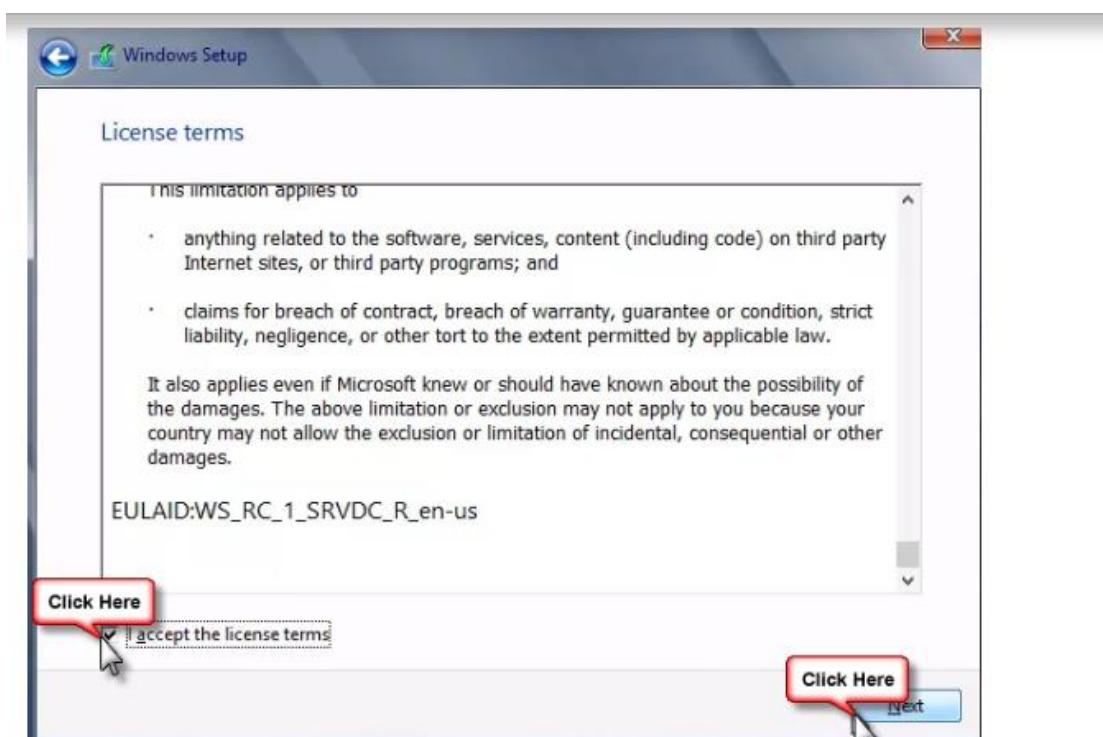
5. Click **Install now** on the install screen.



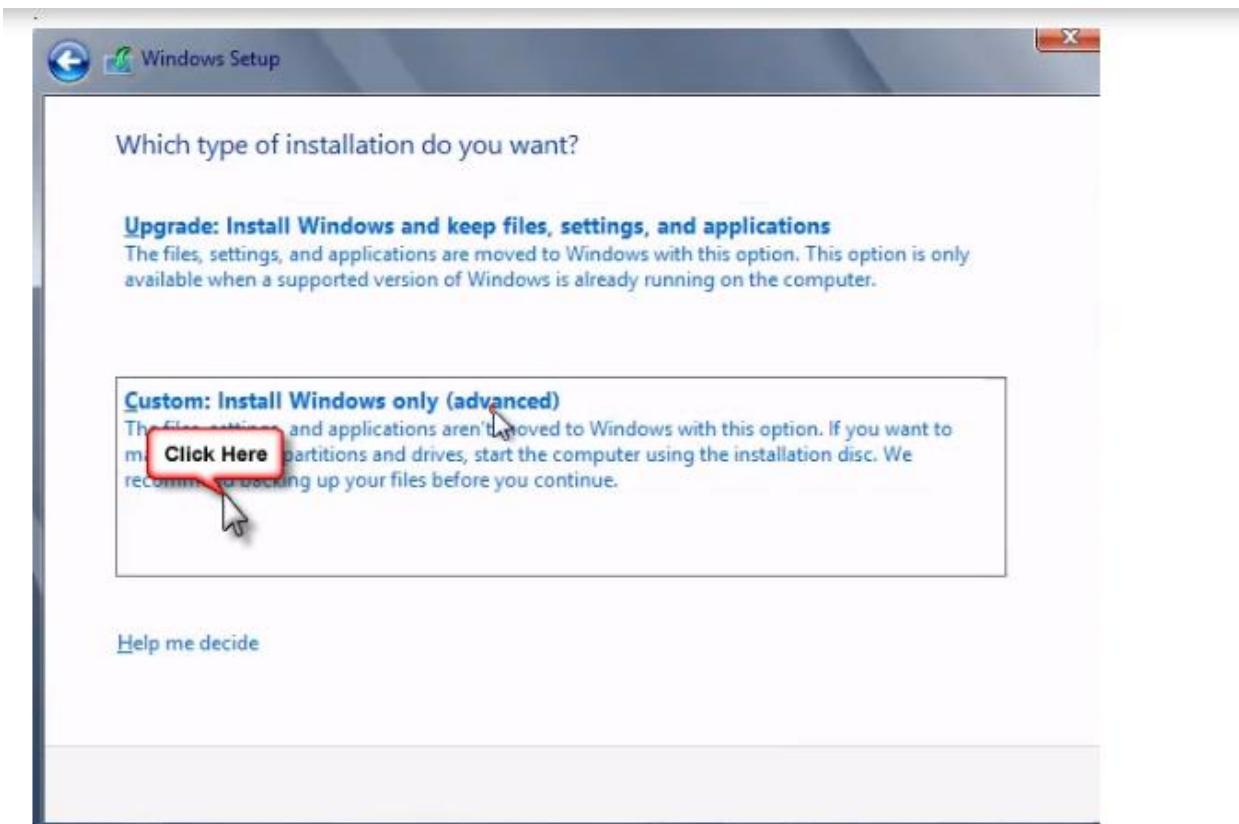
6. Click the **second line** item for the GUI. The default install is now Server Core. Then click **Next**.



7. Read License Agreement, Turn on Checkbox “I accept the license terms,” and then click Next.



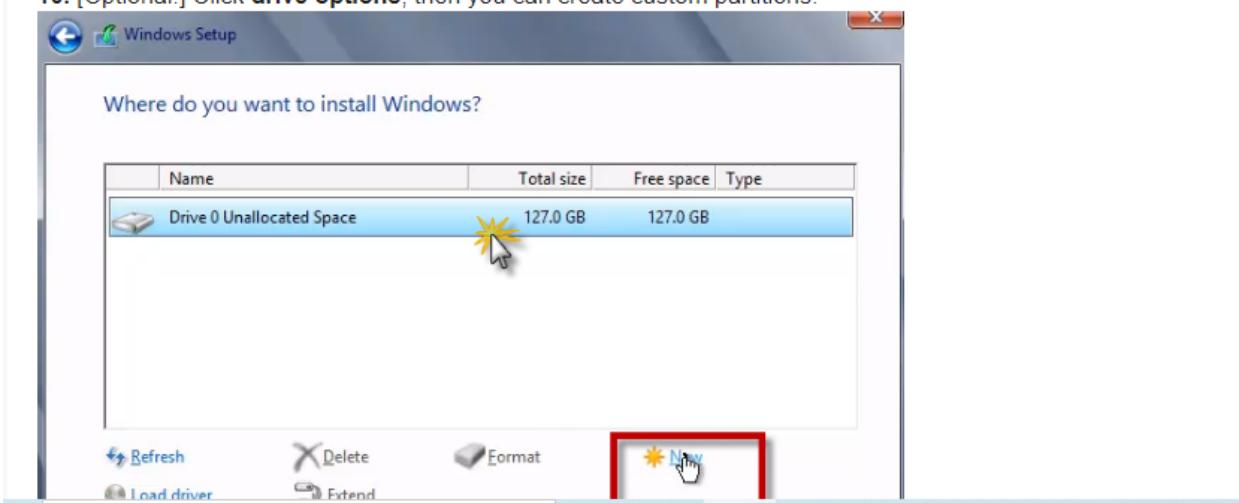
8. Click **Custom: Install Windows only (Advanced)**.



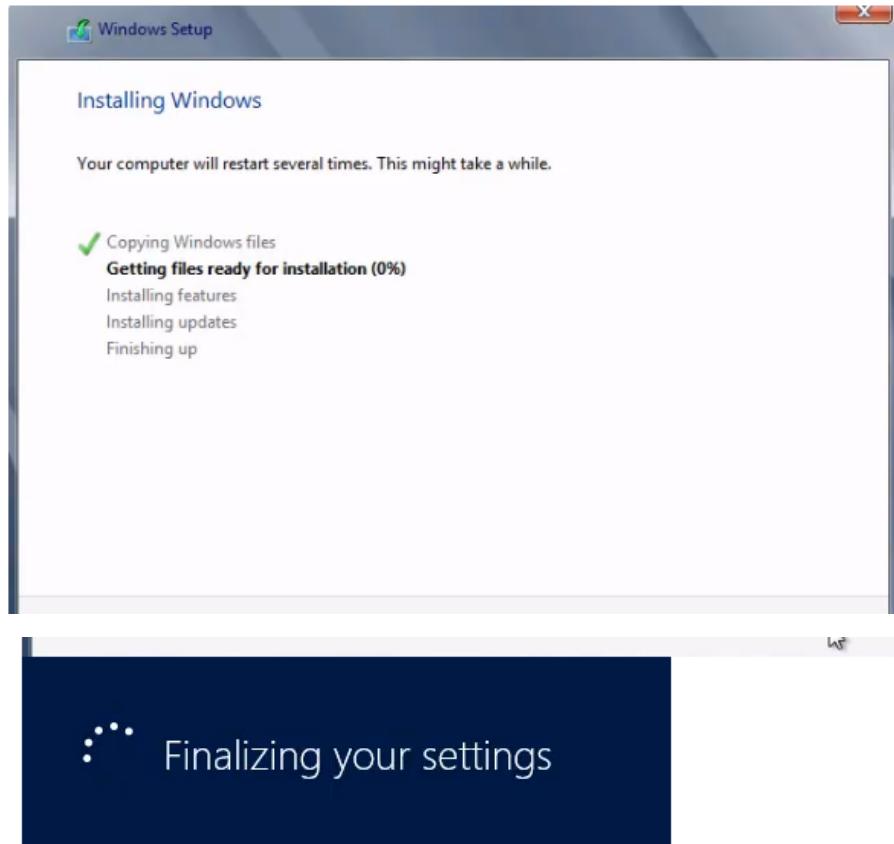
9. The disk you are using should be listed. If not, you will need to Load driver. Select the disk you will be installing on. If you do not want to change drive options (optional), Click **Next**. If you want to use Dual boot using Native Boot To VHD (Boot2VHD), see below:

Dual boot using Native Boot to VHD

10. [Optional:] Click **drive options**; then you can create custom partitions.



12. It will then start copying files. This will take a while (could be 20 mins or so depending on hardware performance). It will reboot a couple times (automatically). After the first reboot, it will no longer be running off of the DVD.

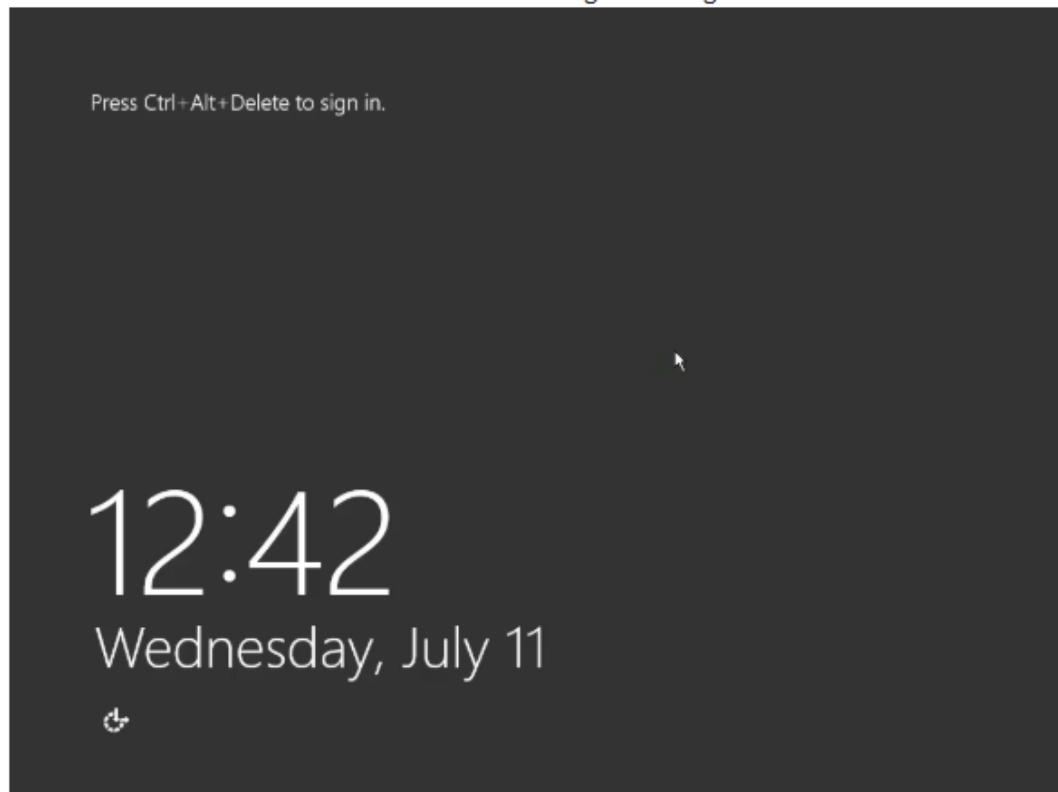


13. In the **Password** box, enter a new password for this computer. It must meet complexity requirements. Re-enter the password in the second password box, and then click **Finish**.

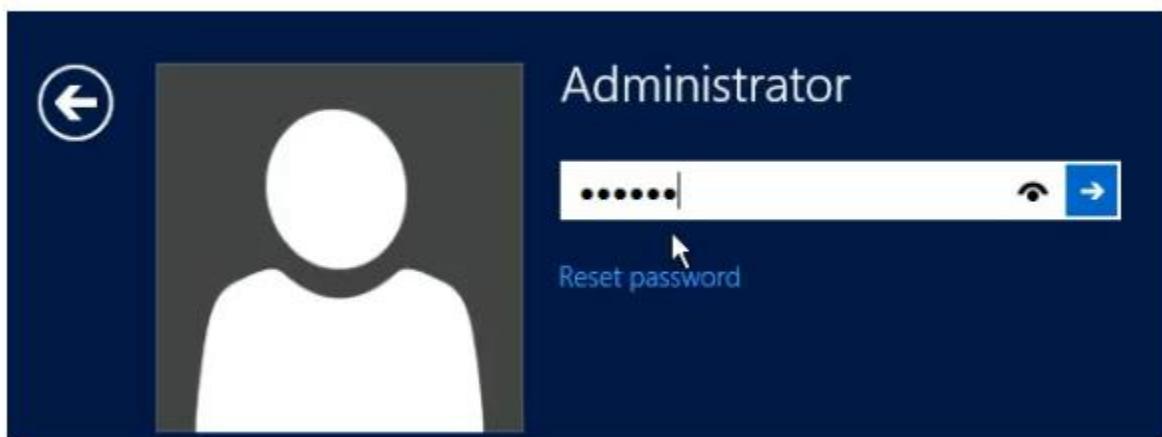


14. Press Ctrl-Alt-Delete at the same time to get the login screen

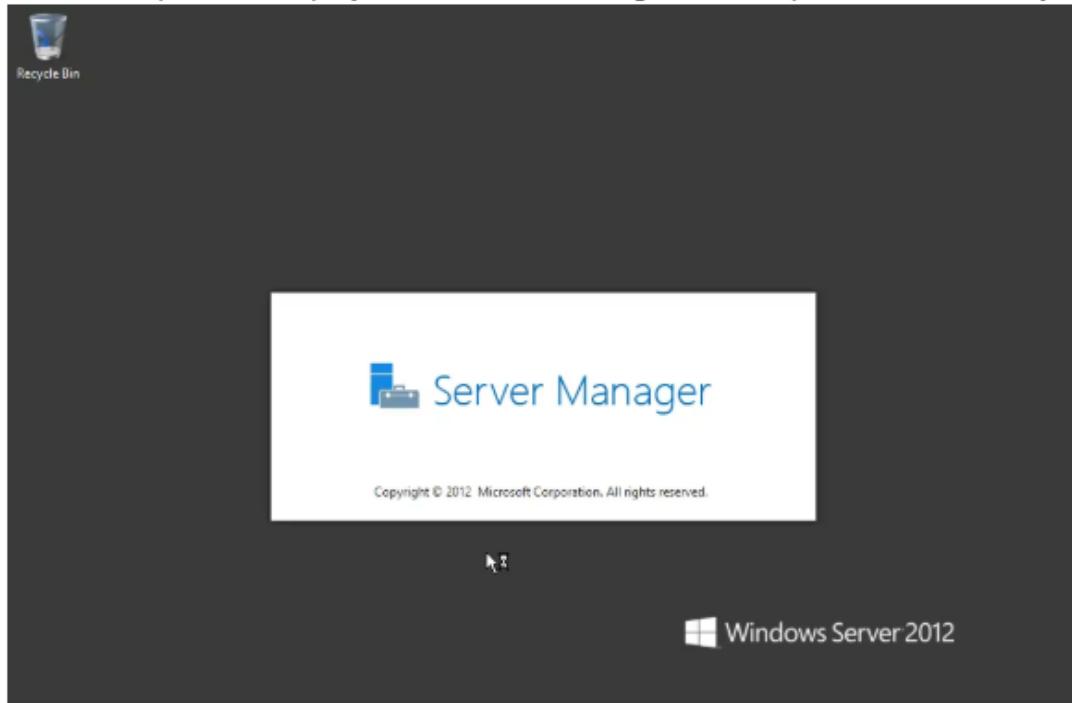
14. Press Ctrl-Alt-Delete at the same time to get the login screen



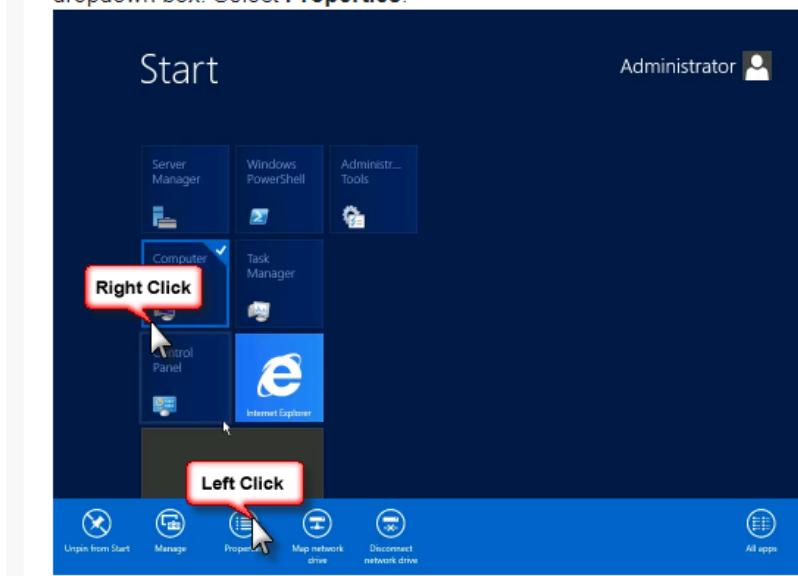
15. Enter password and press enter.



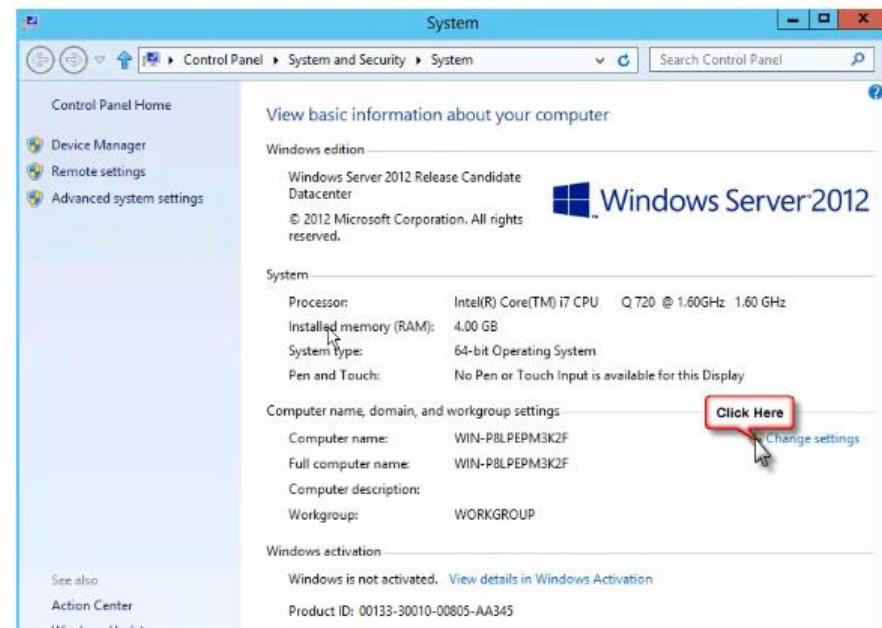
The Desktop will be displayed and Server Manager will be opened automatically.



16. Pressing **Windows Key** on the keyboard will bring up the start screen (formerly known as Start Menu). If you **Right-Click** on **Computer**, you will see the new right-click menu is on the bottom of the screen instead of in a dropdown box. Select **Properties**.



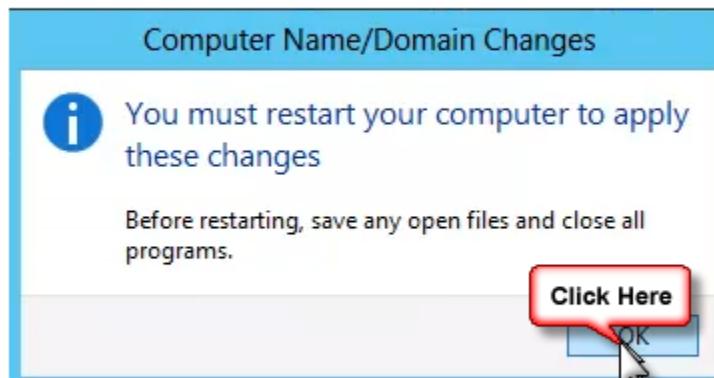
17. You will see that the System Properties screen looks almost identical to prior versions of windows. We can now change the computer name by clicking on **Change Settings**.



18. Type new computer name you would like to use and click **OK**.



19. Click **OK** on the information box. Click **OK** to allow a restart.



20. Then click **Restart Now** on the final dialog box.

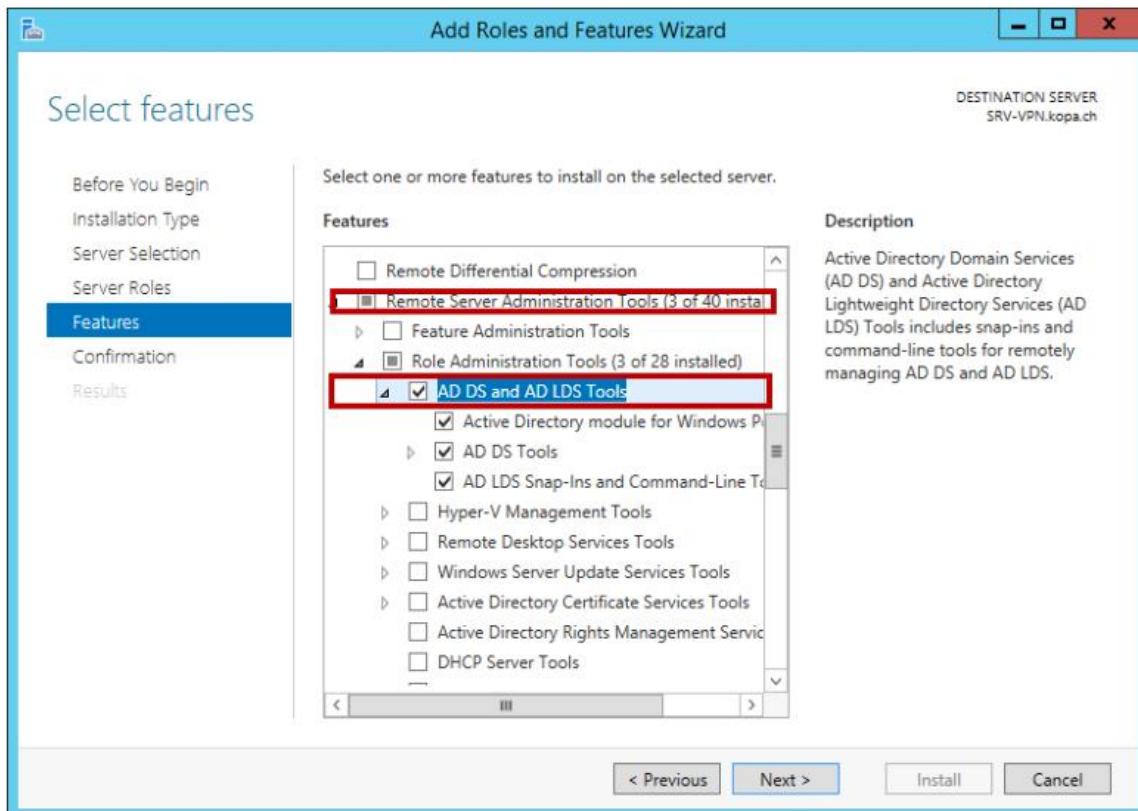


21. When the computer restarts it will have the new name, just login.

6.3.3.1 Active Directory on Windows Server 2012 R2:

In this Article we see how to install Active Directory Users and Computers in Windows Server 2012. Just do the following:

- Start “Server Manager”
- Choose “Add roles and features”
- Click through the wizard until “Features”
- Go to “Remote Serer Administration Tools” and expand it
- Select “AD DS and AD LDS Tools”



- Click through the rest of the wizard
- Then it will work.

6.3.3.2 Active Directory with Domain Controller:

A domain controller is a server that responds to authentication requests and verifies users on computer networks. Domains are a hierarchical way of organizing users and computers that work together on the same network. The domain controller keeps all of that data organized and secured.

The domain controller (DC) is the box that holds the keys to the kingdom- Active Directory (AD). While attackers have all sorts of tricks to gain elevated access on networks, including attacking the DC itself, you can not only protect your DCs from attackers but actually use DCs to detect cyberattacks in progress.

The primary responsibility of the DC is to authenticate and validate user access on the network. When users log into their domain, the DC checks their username, password, and other credentials to either allow or deny access for that user.

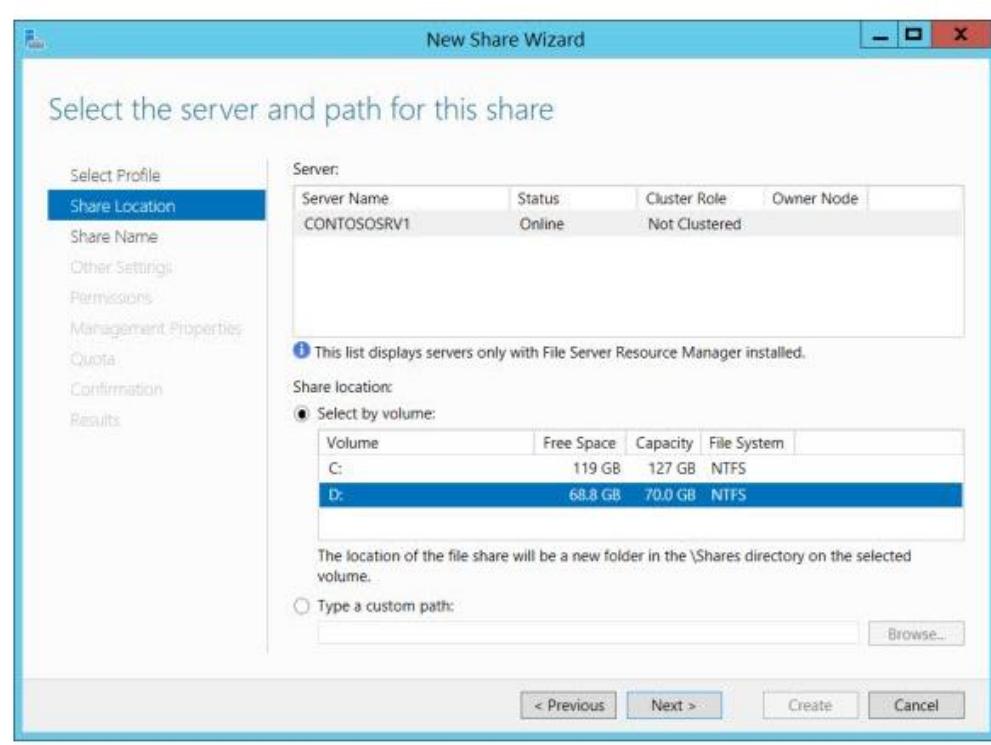
6.3.3.3 Create a File Share in Windows Server 2012 R2 Using Server Manager:

Server Manager in Windows Server 2012 and R2 provides an easy way for administrators to create file shares. In this Ask an Admin, I'll show how to create new file shares using Server Manager and configure advanced options

For the purposes of this article, I'm using Windows Server 2012 R2 with the File Server and File Server Resource Manager (FSRM) sub-roles installed on my server. This gives me access to some of the advanced configuration options when creating a new file share.

Log on to Windows Server with a local administrator account:

- Open Server Manager using the icon on the desktop taskbar, or from the Start screen.
- In the left pane of Server Manager, click File and Storage Services.
- In the column to the right, click Shares.
- To the right of Shares in the main window, click the Tasks menu and New Share.
- In the New Share Wizard, select the SMB Share – Advanced profile and click Next.
- On the *Select the server and path for this share* screen, make sure that Select by volume is selected under *Share location*, and then chose the volume where you want to create the new share. Now click next.



- On the *Specify share name* screen, type a name for the new share in the Share name box and click next. The local and remote paths will be generated automatically.
- On the *Configure share settings* screen, check or deselect any of the additional options for the share as required, such as *Enable access-based enumeration* and *Encrypt data access*. Click Next to continue.
- To change the default NTFS folder or share permissions, click Customize permissions on the *Specify permissions to control access* screen, set the permissions as required in the dialog box and click OK when you're done. Now click next to continue.
- On the Management Properties screen, you can optionally select a folder usage value for the share if you plan to use classification rules. Click Next to continue.
- Finally, on the *Apply a quota to a folder or volume* screen, you can chose to apply a quota template to the share. Click next when you're done.
- Click Create on the Confirmation screen.
- Click Close when the share has been successfully created.

6.3.4 CCTV Surveillance

6.3.4.0 Description:

CCTV, or closed-circuit television, is a system that allows you to keep an eye on what's going on in and around your business. Cameras and monitors enable you to view events live, and recorders archive footage for later reference. Don't mistake a CCTV monitor for an ordinary television.

6.3.4.1 Basic Idea about DVR & NVR:

At the core, both NVR and DVRs are responsible for video recording. DVR stands for Digital Video Recorder, whereas NVR stands for Network Video Recorder. The difference between NVR and DVR is how they process video data.

DVR systems process the video data at the recorder, whereas NVR systems encode and process the video data at the camera, then stream it to the NVR recorder which is used for storage and remote viewing. As DVRs and NVRs handle the video data differently, they require different types of cameras.

Most NVRs are used with IP cameras whereas DVRs are used with analog cameras. It's important to note that a DVR based system is a wired security system, whereas NVR systems can be a wired or wireless system.

DVR vs NVR

What's the Difference?



1x coaxial cable with BNC connector & 1x power cable per camera



VS

1x Ethernet or POE Cable for power, video & audio with RJ56 connector per camera



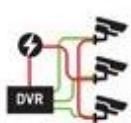
Coaxial cable: fatter, use BNC connectors (larger, harder to thread, take longer to install)



VS

Ethernet cable is slimmer, smaller RJ59 connectors, easier to run and install

Each camera needs power source (via splitter): messier, uses more power



VS

Power over Ethernet (PoE): power from NVR. No need for power splitters or wall sockets for



Analogue cameras. DVR processes images.



VS

Digital cameras process the images, hence higher price



DVR Security System – Pros & Cons

Advances in analog high definition within the last five years have reduced the gap in resolution between the two systems. You'll probably notice that DVR based security systems are priced lower than NVR systems. The lower price point is an attractive advantage of DVR systems, but what are the tradeoffs? To answer this, we need to break down each of the components of a DVR system. The cameras used by a DVR system must be analog security cameras, better known as CCTV cameras.

NVR Security System – Pros & Cons

NVR security camera systems incorporate the newest technology to provide an enhanced, feature-rich security system. Also known as POE security camera systems, NVR based systems are more flexible and complex than DVR systems. NVR systems use IP cameras which are standalone image capturing devices.

6.4 System Analysis:

6.4.0 Six Elements Analysis:

Six elements is one kind of process where we can find the total process. It is very much unique and help us to proper understand.

The process of six elements are given below:

	<i>process</i>	<i>Human</i>	<i>Non-computing hardware</i>	<i>Computing Hardware</i>	<i>Software</i>	<i>Database</i>	<i>Comm & Network</i>
<i>Windows Server 2012 R2</i>	Engineer	N/A		Browser/PC	2012 R2	Cloud	Internet
<i>Mikrotik Router</i>	Engineer	N/A		Browser/PC	PDF	Cloud	Internet
<i>Company</i>	Authority	N/A		Browser/PC	N/A	N/A	Internet
<i>File Share</i>	Engineer	N/A		Browser/PC	Folder	Cloud	Internet
<i>Data Collector</i>	Engineer	N/A		Browser/PC	Excel, Doc	Cloud	Internet
<i>Data Analyst</i>	Engineer	N/A		PC/Browser	PDF	Cloud	Internet

6.4.1 Feasibility Analysis

A feasibility analysis evaluates the project's potential for success; therefore, perceived objectivity is an essential factor in the credibility of the study for potential investors and lending institutions. There are five types of feasibility study—separate areas that a feasibility study examines, described below:

Technical Feasibility:

Here the technical instrument I use in this company are given below:

Computer, Mikrotik Router CCR1036, Router, Switch, LAN, Fiber Cable, Printer, Cloud Database Machine,

Economic Feasibility:

This company is a Man-Power Company. Every month they sent abroad many employees and workers. They benefits a lot for this sector.

Legal Feasibilities:

This company aspect of the proposed project conflicts with legal requirements like zoning laws, data protection acts or social media laws.

Operational Feasibility:

In this company involves undertaking a study to analyze and determine whether—and how well—the organization's needs can be met by completing the project.

Scheduling Feasibility:

Man sourcing is the main theme of this company, so each and every projects they are very effective and reach their goal fulfill.

This company is connected in many countries like: Dubai, Malaysia, Qatar, Kuwait and so on.

6.4.2 Problem Solutions Analysis

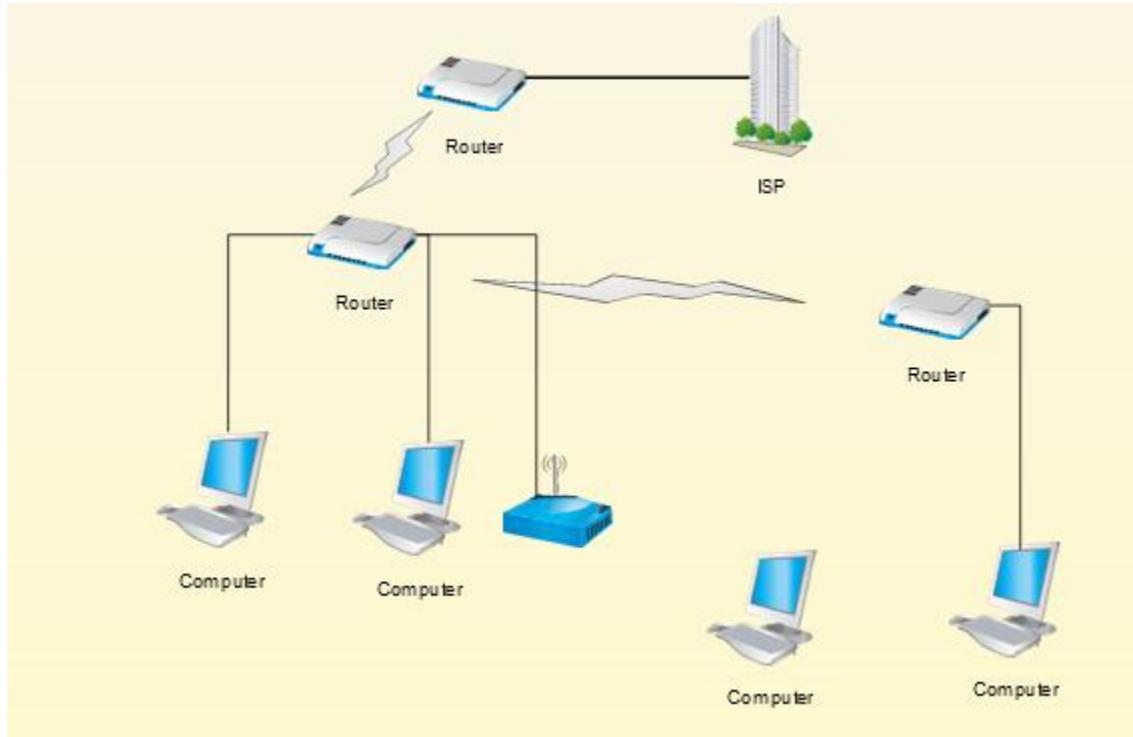


6.4.3 Effect & Constraints Analysis

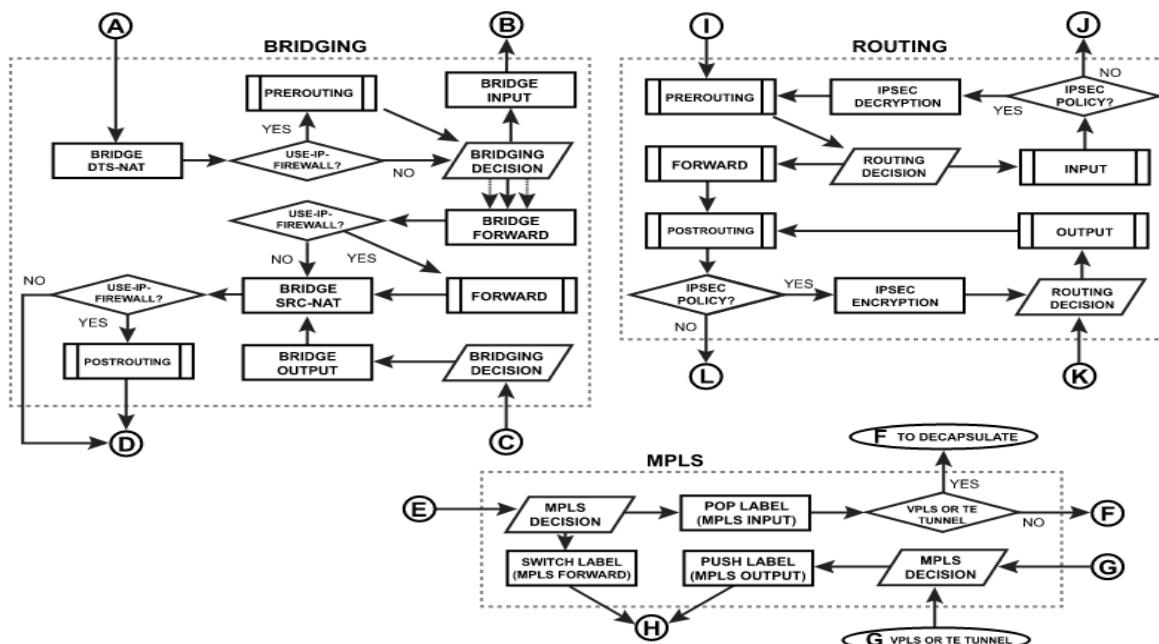


6.5 System Design:

6.5.0 Rich Picture

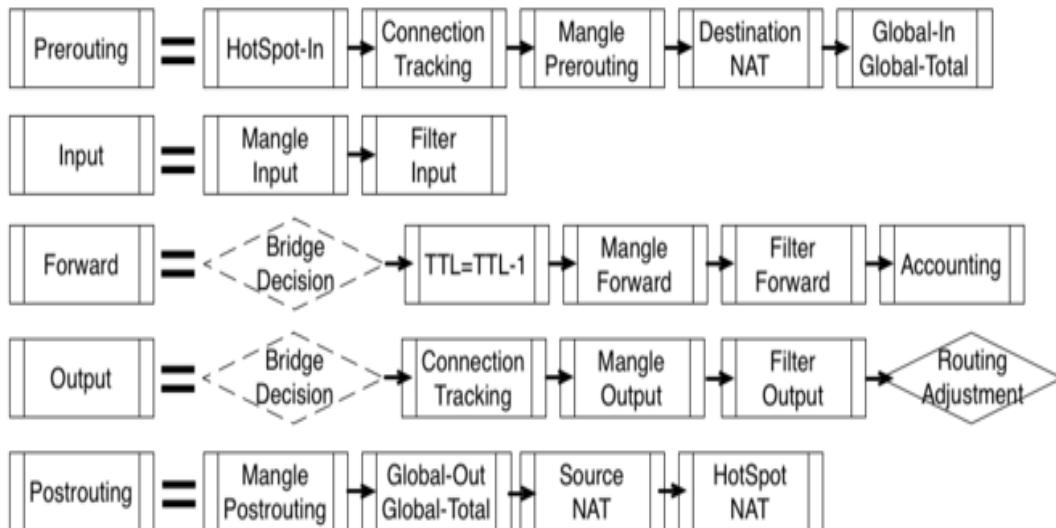


6.5.1 UML Diagrams



6.6 Product Features:

6.6.0 Input, Output & Architecture



CHAPTER 8

PROBLEM ANALYSIS

In my 4 months internship I face some kind of problems:

Sometimes the windows server 2012 R2 is crashed and missing the DNS. So the user work properly.

Sometimes the CCTV surveillance system getting off through the network issue. Then it also a massive problem in the office.

I think the company will use a different windows server to get rid of this issue and I hope they get a nice feedback.

CHAPTER 9

CONCLUSION, RESULT AND FUTURE CAREER & SCOPE

4.1 Conclusion and Result:

In short of my internship project I will learn about configuring network by MikroTik and Windows platform and how to make and configure network. I will also learn and complete understanding about IP Classes. Main learning of this project was how to configure bandwidth Control in different ways, bridge mode configuration, Firewall and NAT Configuration, Network Security, Windows Server 2012 R2, Active Directory Server, File Sharing Server, User Control, CCTV Surveillance and so on.

All of the instruction helps and improved me to increase build my job aims and career skillful. That's why now I can create Mikro Tik setup and administration on the Windows platform and provide entry-level work and support.

This project is completely hand course and provides information and aptitudes which will introduce me to a Windows 2012 server for informative and basic system administration. Along with improving the most recent forms and server security, we always see the reconstruction and role of the programming department. The MikroTik and Windows operating system provide us a comprehensive introduction of steady, reliable and successful administration. The Windows system provide us almost all system administrators, Web server pioneer, SS, Telnet, DNS, FTP, mail server and so on.

Now, today most of the organizations are highly dependent on their work on the network thought Internet. Therefor a proper network design is very important think of an organization, without this it is not possible to manage all network support.

4.2 Future Career & Scope:

In real life finding a job can be a big challenge of anyone of our country, especially if we have no experience. That's why I choose internship, because it can help me to improve my career opportunity into an experience. So, this internship provides me to find scope in future life:

- Work in ISP based platform.
- Work at as an IT manager of a company.
- Work at as a Network Engineer.
- Work at as a technical support and security manager.

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