

CISCO AND MIKROTIK ROUTER SETUP FOR OFFICE NETWORK

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

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APPROVAL

This Project/internship titled "CISCO AND MIKROTIK ROUTER SETUP FOR OFFICE NETWORK", submitted by MD. KAMRUL HASAN, ID: 173-15-10393 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 31.01.2021

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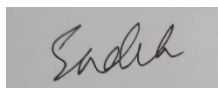


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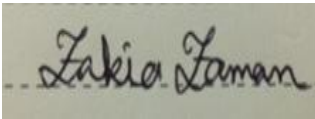
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DECLARATION

I hereby declare that I have to done this project under the supervision of **Ms. Zakia Zaman**, **Lecturer, Department of CSE** Daffodil International University. I also declare that I collect information from my internship organization AAMRA NETWORK LIMITED, Books, the Internet, and my friends also.

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I am thankful to K.M Hafizur, the Senior Network Engineer of AAMRA NETWORK LIMITED. Without his cooperation as a guide, I can't complete my internship training in the company. Also, my batchmate encouraged me to excessively in doing my internship program.

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ABSTRACT

The base of Networking is Routers, Switches, and Wireless Access Points. Routers, Switches, and Wireless Access Points have managed very various functions in a network. Switch: Switches are the most office networks. A switch performs as a controller, connecting computers, printers, and servers to a network in an office or a campus. Router: A router serves as a dispatcher. It illustrates data being sent over a network, picks the best route for data to explore, and sends it on its path. Router defends information from security threats and can even determine which computers get the advantage over others. Depending on my security requirements, you can pick a router with a Firewall, a VPN (Virtual Private Network), an IP (Internet Protocol) communication system. Wireless Access Point: An Access Point (AP) permits devices to join the wireless network without wires. A wireless network executes it to get new devices online and gives flexible help to mobile work. An access point behaves like an amplifier for your network. While a router gives the bandwidth, an access point increases that bandwidth so that the network can assist several devices, and these devices can access the network from a remote away. MikroTik OS is supposed 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 alternative features are constructive for our life-style. Throughout this sector, we'll notice Cisco, MikroTik, Cabling, etc. Network devices square measure connected to computers, peripherals devices.

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CHAPTER 1

INTRODUCTION

1.1 Introduction:

Networking is assigned to as connecting computers and other (networking) devices electronically to distribute information. Resources such as files, applications, printers, and software are general information distributing in Networking. Networking's benefits can be seen sharply in terms of security, ability, manageability, and cost-effectiveness as it provides help to users in a wide range.

1.2 Motivation:

I am at present staying the final semester of my Bachelor's Degree program in CSE. I take my Internship at AAMRA Network Limited because I noticed that the AAMRA Network Limited should overcome each customer satisfaction & service of their excellent reputation. AAMRA Network Limited is now a well-known and so-called Internet Service Provider (ISP) in Bangladesh. The growing demand for skilled manpower in the networking sector. The government of Bangladesh has a plan to spread broadband internet in rural areas and deploy optical fiber networks at the union level. Last but not least, I like Networking.

1.3 Objective:

Resource distribution is the principal objective of the computer network. The aim is to produce all the programs, data, and hardware is available to each on the network except concerning the physical position of the resource and the users.

- Improve my existing skill in Networking.
- To learn specific techniques of Networking.
- It can work with others in the workplace.

1.4 Future Scope:

- Can Design & implement LAN, WAN.
- Be able to solve the different problems which are related to Routing.
- Get skilled in Network Security.

1.5 Layout of the Report:

This report explains the networking introduction, motivation, objective, future scope, and report layout in the first chapter.

Moreover, the second chapter discusses my internship company profiles.

Next to that, in the third chapter, I explain my Internship daily tasks with training events and scheme tasks and activities.

Chapter four: In closing, I described the Conclusion about the platform CISCO and MikroTik's future opportunity.

CHAPTER 2

COMPANY PROFILES

2.1 Introduction to AAMRA Network:

Over the last decade, AAMRA networks limited (formerly Global Online Communications Limited) has continuously supplied its customers with the new IT connectivity solutions. Our customers should rely on our ability to have reliable and trustworthy solutions for communication. We also assured that our consumers have had the least difficulty with their IT connectivity efficiency with the latest-in-class backbone and base. This has in fact ensured us a definite list of clients with blue chips. If it is necessary for the company to use the Internet and related value added services, Corporate Bangladesh has only one clear option, AAMRA.

More than - 327 workers with diverse backgrounds and skills hire AAMRA networks Limited (ANL). With eight years of experience, ANL will reliably analyze evolving client needs constantly, providing the most inclusive and open IT services possible.

With expenditures - 30 percent of its R&D spending, ANL puts great emphasis on selecting the new technologies rapidly. The organization also aims to handle goods and facilities of international quality.

Over the past eight years, ANL has sponsored ISO 9001 2008 certification.

It is one of AAMRA Corporations' eleven businesses. The Bangladesh Group has invested in a number of fields such as ICT, Textile and Living. From 1985 to now.

2.2 Services:

They are high-density broadband networks that offer quicker internet and dedicated bandwidth to aid organizations with mission-critical applications that need guaranteed bandwidth efficiency to support data, video, and internet applications.

AAMRA NETWORK's services are:

Bandwidth:: - 1. Internet. 2. WAN

Infrastructure:: - 1. Data Connectivity. 2. MPLS. 3. IT Infrastructure Management

VAS:: - 1. Video Surveillance. 2. Office Suite. 3. Video Conferencing. 4. Colocation Service. 5. Business E-mail and Hosting Solutions

Software:: - 1. Office Management System. 2. Network Monitoring Solution. 3. Hosted Anti-Spam Firewall

2.3 Vision:

Unlimited excellence and creativity the power of “WE.”

2.4 Mission:

Enabling the best available products, programs and practices for our clients, staff, stakeholders and communities.

CHAPTER 3

ACTIVITIES OF INTERNSHIP

3.1 Monthly Tasks and Activities:

In the first month: my Internship at AAMRA Network Limited, I have learned and Practice the following topics:

1. Learning the primary Network materials for knowledge.
2. Learning the Basics concept of the CISCO.
3. Learning the Basics concept of the MIKROTIK.
4. Knowing about various types of routers.
5. How the routers operate.
6. Idea of IP Addressing.
7. Idea of IP Subnetting.

In the second month: I have learned and Practice the following topics:

1. Learning about routing protocols.
2. Learning about Administrative distance.
3. Learning about RIP basic.
4. Learning about RIP configure version 1.
5. Learning about RIP configure version 2.
6. EIGRP Configuration.
7. Static routing Configuration.

In the third month: I have learned and Practice the following topics:

1. Installation of MikroTik with Winbox.
2. Features of MikroTik.
3. Learning about the DHCP server.
4. DHCP Server Configuration.
5. NAT.
6. Routing.

In the fourth month: I have learned and Practice the following topics:

1. Learning about Windows servers.
2. DNS server Configuration on the Windows server.
3. Learning about Wi-Fi.
4. Wi-Fi Configuration with TP-LINK.

3.2 IP Addressing and Subnetting:



Figure 3.1: IP

3.2.1 IP Addressing:

An Internet Protocol address (IP address) is a logical address and allotted to each device connected to the network that uses the Internet Protocol for communication. An internet protocol (IP) address serves 2 main functions that are unit host or network interface identification and location addressing. The IP version four (IPv4) defines the associated IP address as a 32-bit range. Due to the internet's continuation and the decrease of accessible

IPv4 addresses, a replacement version of an internet protocol is available IPv6, using 128 bits to the IP address.

Table 1: Classification of IP Addresses.

Class	First octet Decimal Range	Default Subnet Mask	Prefix	Number of Networks	Number of Hosts
A	1 – 127	255.0.0.0	/8	126	1,67,77,214
B	128 – 191	255.255.0.0	/16	16,382	65,534
C	192 – 223	255.255.255.0	/24	20,97,150	254
D	224 – 239	Multicast Address			
E	240 – 255	Research/Experimental			

3.2.2 Subnetting:

Creating a subnet permits you to limit the amount of routers that network traffic should suffer. An engineer can effectively produce smaller mini-routes inside a bigger network to permit traffic to travel the shortest distance potential. Organizing a network in an efficient manner is crucial for giant corporations and people companies seeking to expand technologically.

192.168.1.0/27

Subnet Mask = 255.255.255.224

Network = $2^n = 2^3 = 8$ ($n = 27 - 24 = 3$)

Block Size = $2^n = 2^5 = 32$ = Total Host ($n = 32 - 27 = 5$)

Usable Host = Total Host - 2 = $32 - 2 = 30$

<u>Network</u>	<u>Host</u>	<u>B/A</u>
192.168.1.0	1 – 30	31
192.168.1.32	33 – 62	63
192.168.1.64	65 – 94	95
192.168.1.96	97 – 126	127
192.168.1.128	129 – 158	159
192.168.1.160	161 – 190	191
192.168.1.192	193 – 222	223
192.168.1.224	225 – 254	255

Figure 3.2: Class C Subnetting

3.2.3 Routing Protocols:

Routing protocol means that to exchange routing data and reachability from one hop to a different with one another. It suggests that some rules that distribute data and alter

themselves to pick out routes between one another. Some samples of routing protocol are EIGRP, OSPF, RIPv1, RIPv2, etc. There are a unit 2 routing protocol has used. It is static or dynamic. In a static algorithm, it needed to assign IP manually, and in dynamic Routing, it doesn't need to assign IP dynamically. To search out the best path for transport data many algorithms are utilized in routing protocols. Like distance-vector, path vector, link-state, etc.

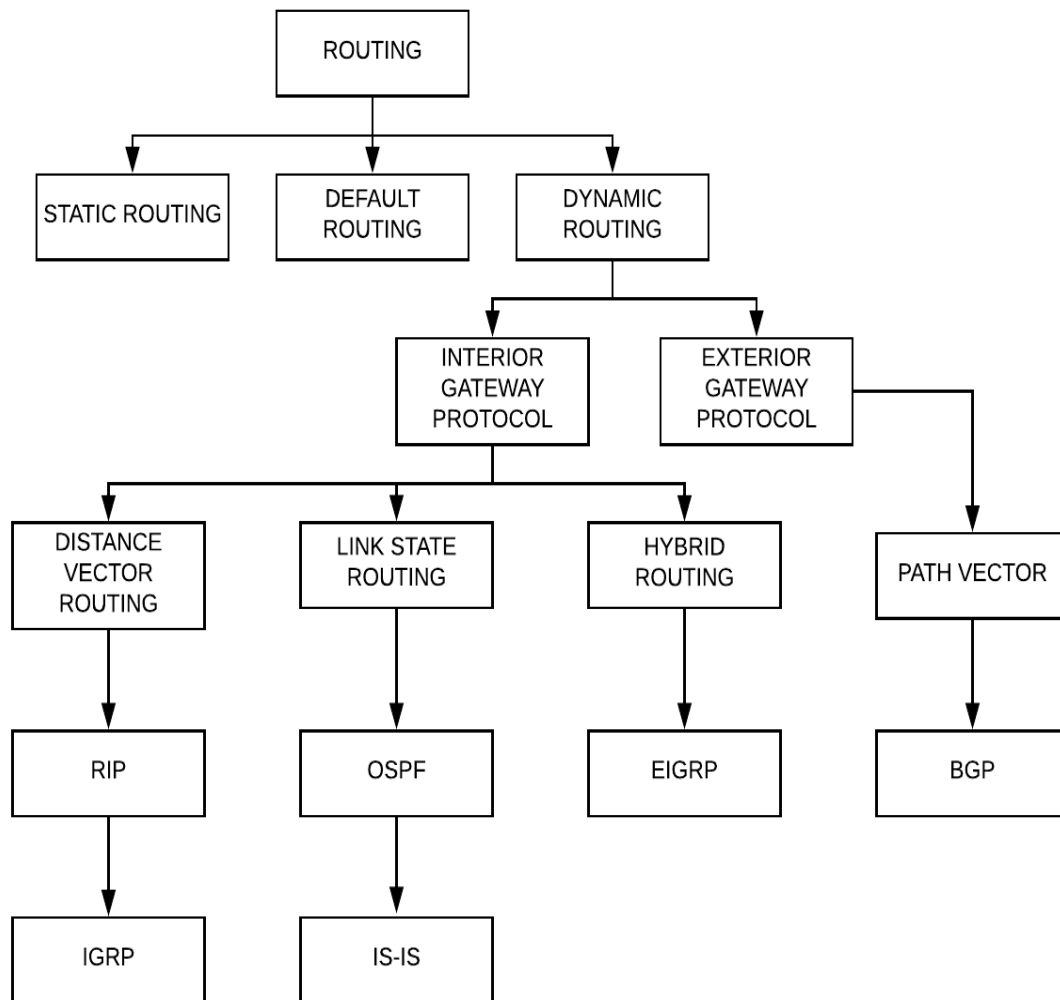


Figure 3.3: Routing Protocols

3.3 CISCO:



CISCO produces a network that can securely and dependably manage all types of traffic, everywhere the entire network, covering virtually whatever media, while producing consistent service delivery to each user.

3.3.1 RIP:

Routing Information Protocol (RIP) is a generally used routing protocol in short to medium TCP/IP networks. It is a static protocol that applies a distance-vector algorithm to compute routes.

The meaning of RIP is the Routing Information Protocol. RIP is a protocol applied by routers to interchange routing information on a network. Its basic functions are to

1. Manage the most effective way to route data on a network and
2. Suspend routing loops.

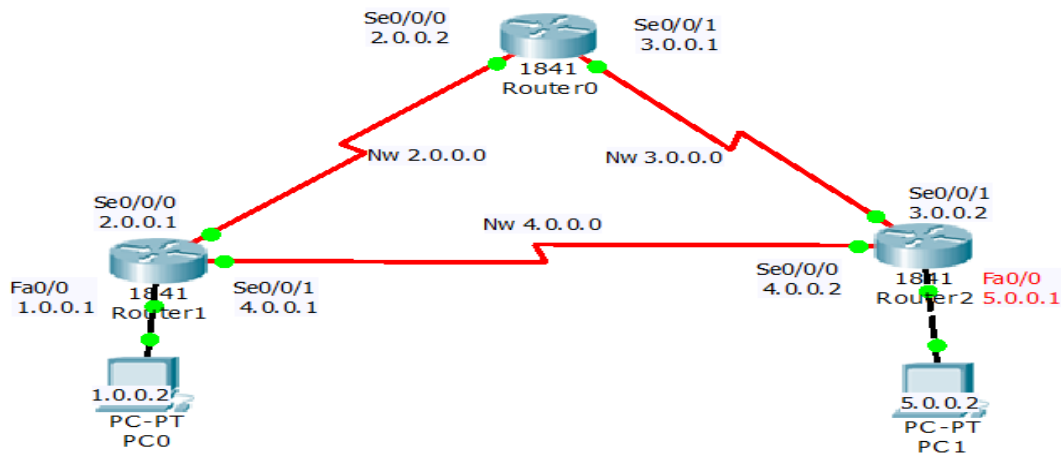


Figure 3.4: RIP in CISCO

Features of RIP:

1. Updates of the network are interchanged regularly.
2. Updates (routing information) are continually broadcast.
3. Complete routing tables are posted in updates.
4. Routers constantly trust routing information collected from neighbor routers. This is too recognized as Routing on rumors.

3.3.2 Configuration Of RIP Version 2:

- Hybrid routing Protocol
- Based on rip V1
- Multicasts to disseminate routing information 224.0.0.9
- Supports triggered update.
- Supports VLSM
- Others are same to rip V1

RIP V2 Configure:

```
Router#configure
```

Configuring from terminal, memory, or network [terminal]?

Enter Configuration commands, one per line. End with CNTL/Z.

```
Router(config)#interface serial 0/3/0
```

```
Router(config-if)#ip address 10.0.0.1 255.0.0.0
```

```
Router(config-if)#no shutdown
```

%LINK-5-CHANGED: Interface Serial0/3/0, changed state to down

```
Router(config-if)#exit
```

```
Router(config)#interface fastEthernet 0/0
```

```
Router(config-if)#ip address 192.168.10.1 255.255.255.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

```
Router(config-if)#exit
```

```
Router(config)#hostname Router-1
```

```
Router-1(config)#exit
```

```
Router-1#
```

%SYS-5-CONFIG_I: Configured from console by console

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up

```
Router-1#configure terminal
```

Enter Configuration commands, one per line. End with CNTL/Z.

```
Router-1(config)#interface serial 0/3/0
```

```
Router-1(config-if)#clock rate ? Speed (bits per second)
```

```
Router-1#configure terminal
```

Enter Configuration commands, one per line. End with CNTL/Z.

```
Router-1(config)#router rip ?
```

<cr>

```
Router-1(config)#router rip
```

```
Router-1(config-router)#version 2?
```

<1-2>

```
Router-1(config-router)#version 2
```

```
Router-1(config-router)#network 10.0.0.0
```

```
Router-1(config-router)#network 192.168.10.0
```

```
Router-1(config-router)#exit
```

Router-1(config)#exit

```
#interface FastEthernet0/0
#ip address -192.168.20.1 255.255.255.0
duplex auto
speed auto
```

```
#interface FastEthernet0/1
#no ip address
duplex auto
speed auto
#shutdown
#interface Serial0/0/0
#no ip address
#clock rate 2000000
#shutdown
```

```
#interface Serial0/0/1
#no ip address
#clock rate 2000000
#shutdown
```

```
#interface Serial 0/1/0
#ip address -10.0.0.2 255.0.0.0
```

```
#interface Serial0/1/1
#ip address -172.16.0.1 255.255.0.0
#clock rate 64000
```

```
#interface Ethernet1/0
#no ip address
duplex auto
speed auto
#shutdown
```

```
#interface Ethernet1/1
#no ip address
duplex auto
speed auto
#shutdown
```

```
#interface Ethernet1/2
#no ip address
duplex auto
speed auto
```

```

#shutdown

#interface Ethernet1/3
#no ip address
duplex auto
speed auto
#shutdown
!
#interface Vlan1
#no ip address
#shutdown
!
#router rip
#version 2
#network 10.0.0.0
#network 172.16.0.0
#network 192.168.20.0
!
#ip classless
!
#ip flow-export version 9
!
router-2#configure terminal
Enter Configuration commands, one per line. End with CNTL/Z.
router-2(config)#router rip
router-2(config-router)#version 2
router-2(config-router)#network 10.0.0.0
router-2(config-router)#network 172.16.0.0
router-2(config-router)#network 10.0.0.0
router-2(config-router)#network 192.168.20.0
router-2(config-router)#exit

#interface FastEthernet0/0
#ip address -192.168.30.1 255.255.255.0
duplex auto
speed auto
!
#interface FastEthernet0/1
#no ip address
duplex auto
speed auto
#shutdown
!
#interface Serial0/3/0
#ip address -172.16.0.2 255.255.0.0
!
#interface Serial0/3/1

```

```
#no ip address
#clock rate 2000000
#shutdown
!
#interface Ethernet1/0
#no ip address
duplex auto
speed auto
#shutdown
!
#interface Ethernet1/1
#no ip address
duplex auto
speed auto
#shutdown
!
#interface Ethernet1/2
#no ip address
duplex auto
speed auto
#shutdown
!
#interface Ethernet1/3
#no ip address
duplex auto
speed auto
#shutdown
!
#interface Vlan1
#no ip address
#shutdown
!
#router rip
#version 2
#network 172.16.0.0
#network 192.168.30.0
!
ip classless
!
ip flow-export version 9
```

3.3.3 EIGRP Configuration:

The enhanced internal gateway routing protocol (EIGRP) is an enhanced variant of the internal gateway routing protocol (IGRP) developed by CISCO.

- Cisco proprietary.
- Hybrid routing protocol.
- Based on IGRP.
- Communication among the EIGRP routers are handed by RTP reliable transport protocol.
- Best path are selected using dual (Diffusing update algorithm.
- Fast convergence.
- Loop free topology
- Support VLSM.
- Auto and manual route summarization by default auto summarization.
- Support IP, AppleTalk.
- Metric used Bandwidth, delay, load, reliability MTU.
- Multicast and incremental update multicast address.
- Neighbor table.
- Hellow Message after 5 sec.
- K Values (Means Metric).

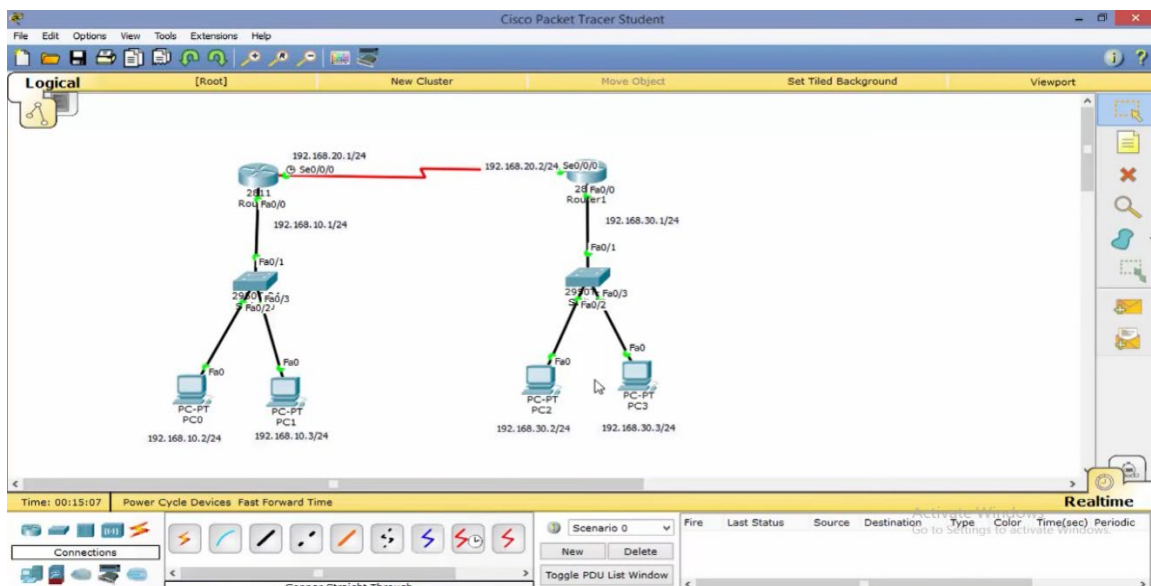


Figure 3.5.1: EIGRP in CISCO Packet Tracer

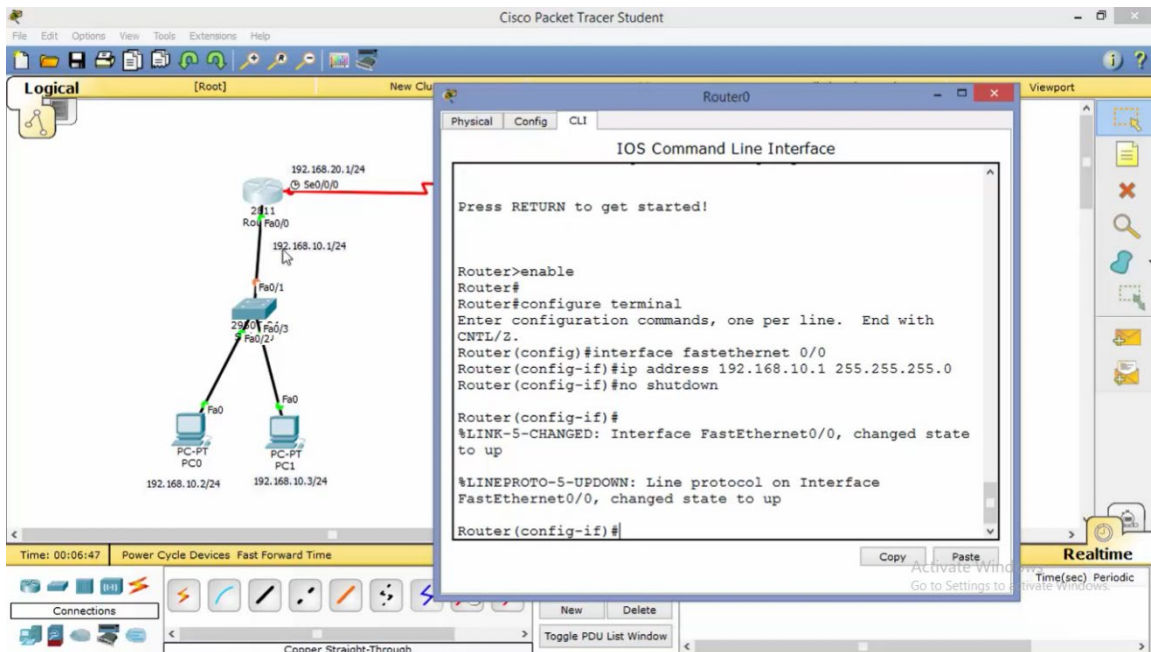


Figure 3.5.2: EIGRP Configuration with CLI command 1

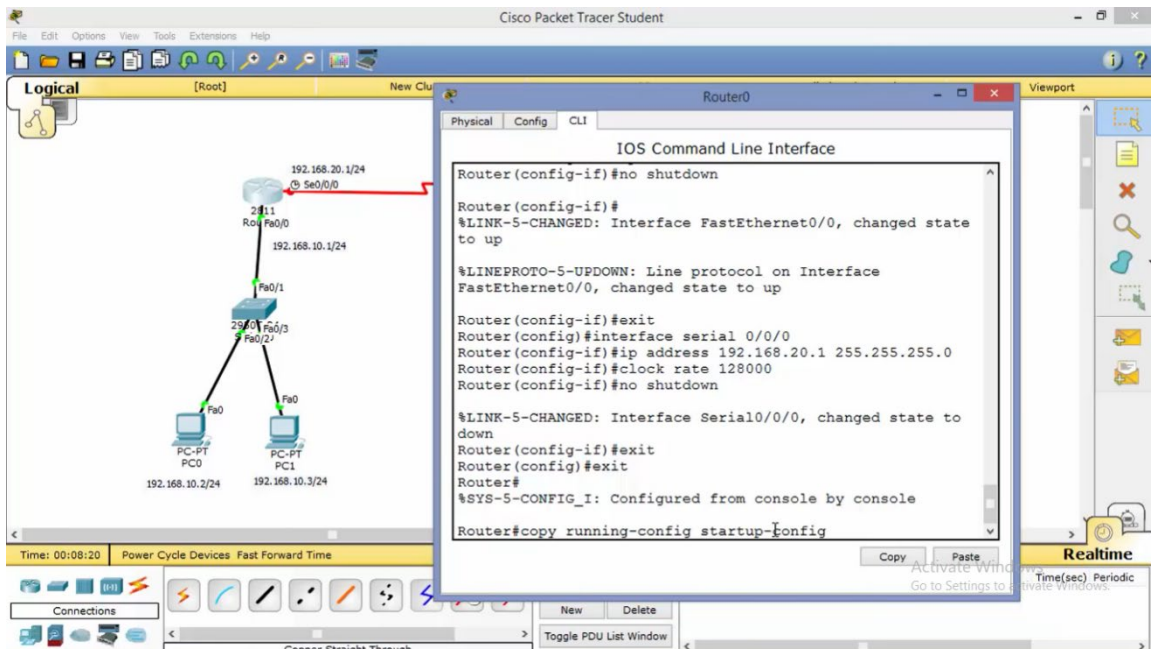


Figure 3.5.3: EIGRP Configuration with CLI command

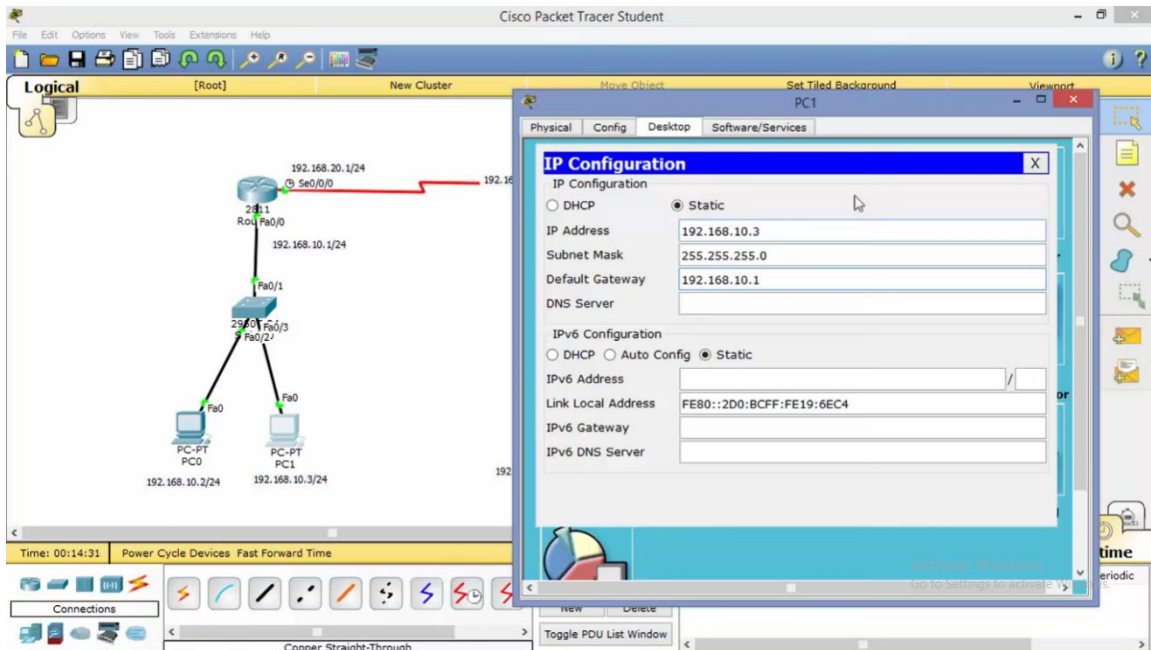


Figure 3.5.4: EIGRP Configuration manual

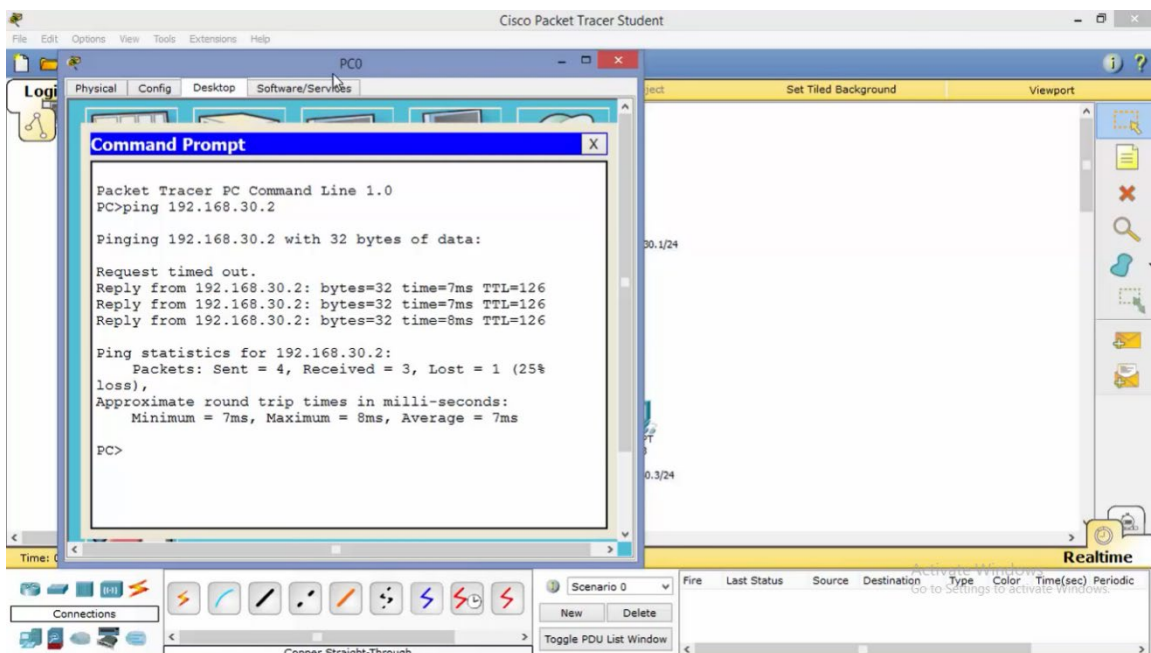


Figure 3.5.5: Ping test in command Prompt

3.3.4 Static Routing Configuration:

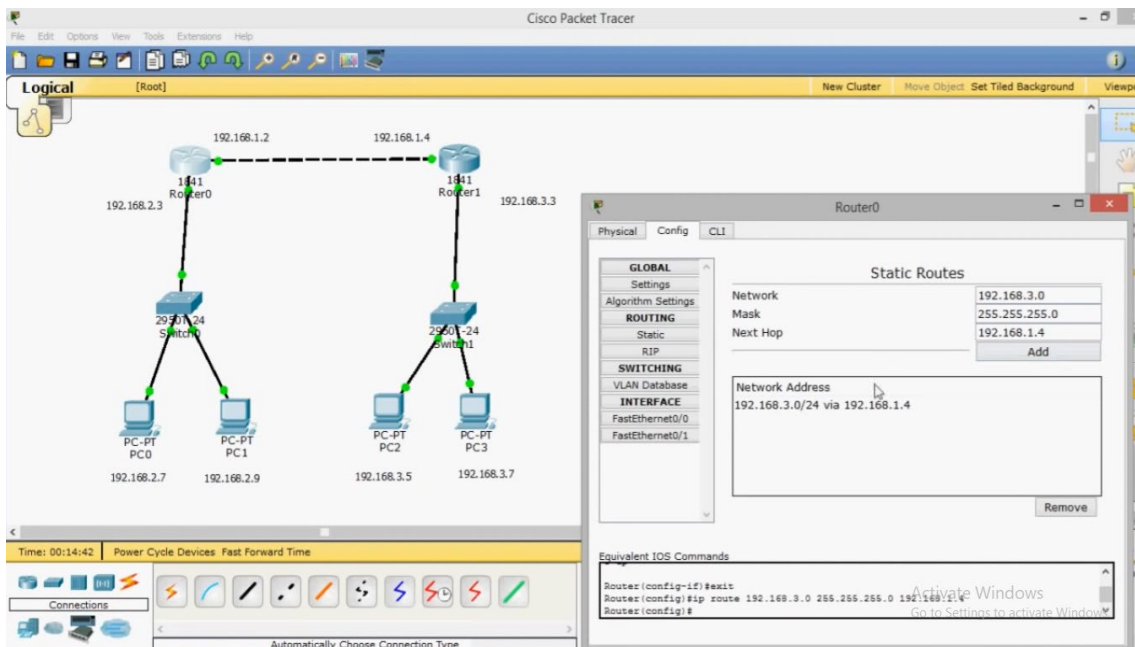


Figure 3.6.1: Static Configuration 1

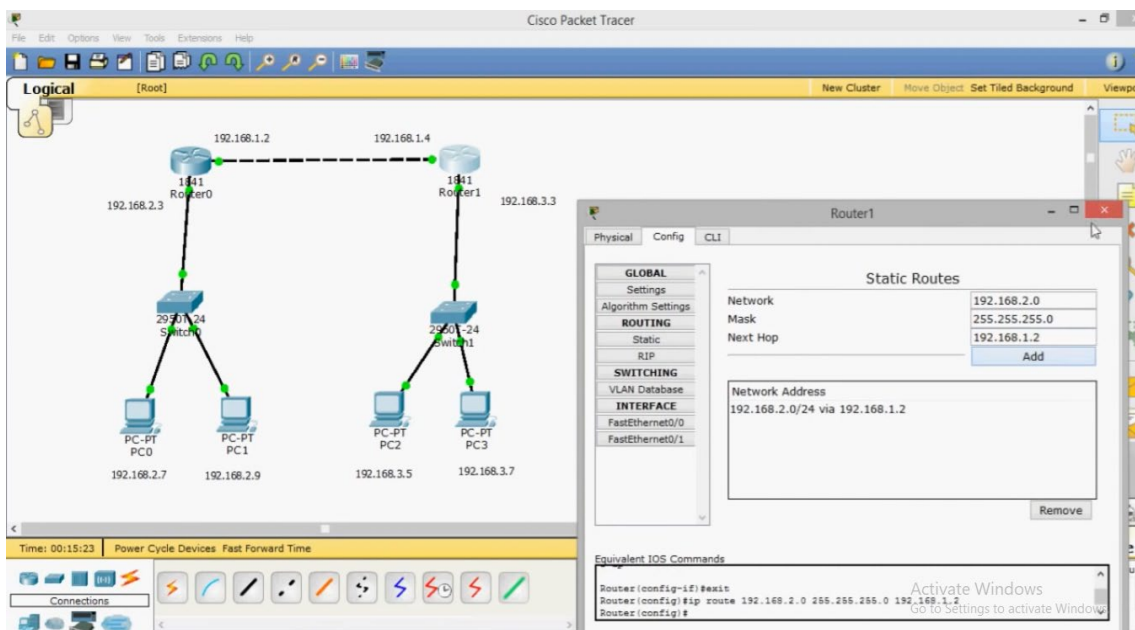


Figure 3.6.2: Static Configuration

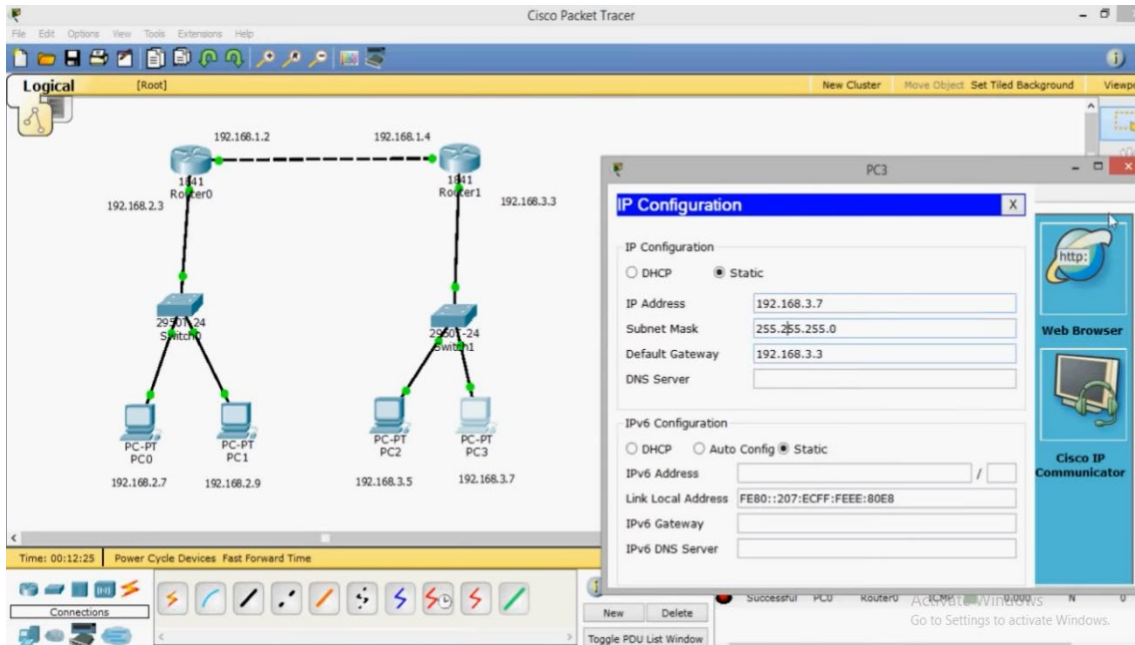


Figure 3.6.3: Static, IP Configuration

3.4 MikroTik Router Features and Configuration in Winbox:

MIKROTIK is a Latvian company that was established in 1996 to improve routers and wireless ISP systems. MIKROTIK presently produces hardware and software for Internet connectivity in the most general of the countries approximately the world.

3.4.1 Features and Interface of MikroTik Router:

Winbox is a small utility that permits the administration of MikroTik Router-OS using the speedy and simple -GUI. It is the native Win32 binary but can be worked on Linux and MacOS-(OSX) using Wine. Every Winbox interface functions are as near as likely mirroring the console functions, that is why there are no Winbox regions in the manual.

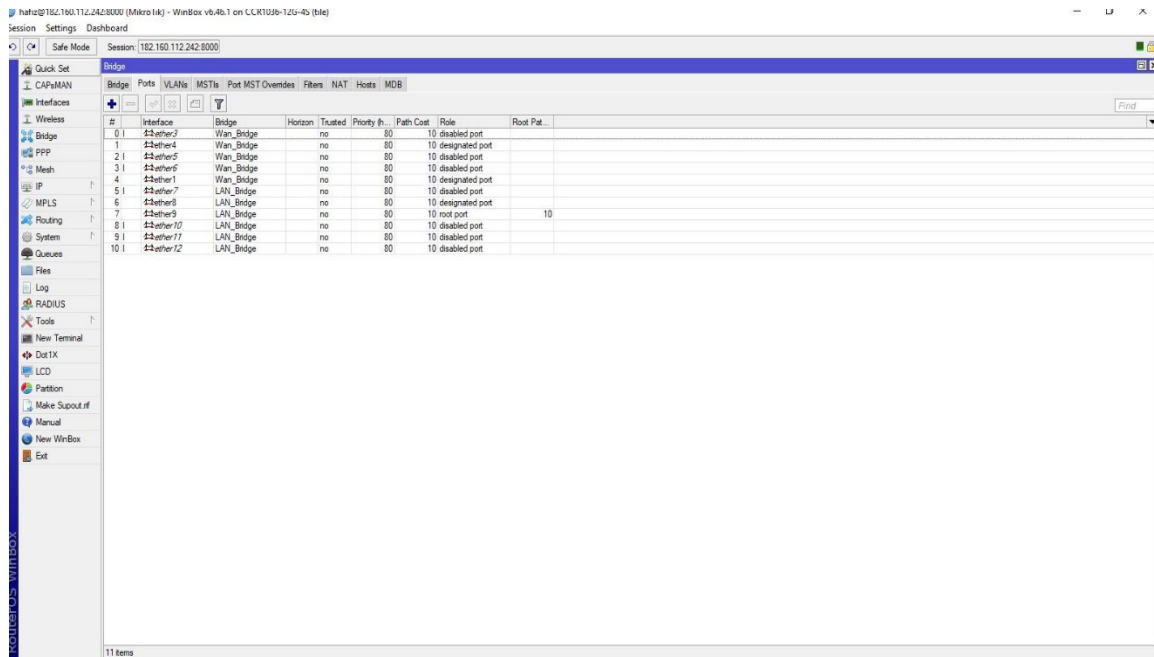


Figure 3.7.3: Bridge Interface of MikroTik

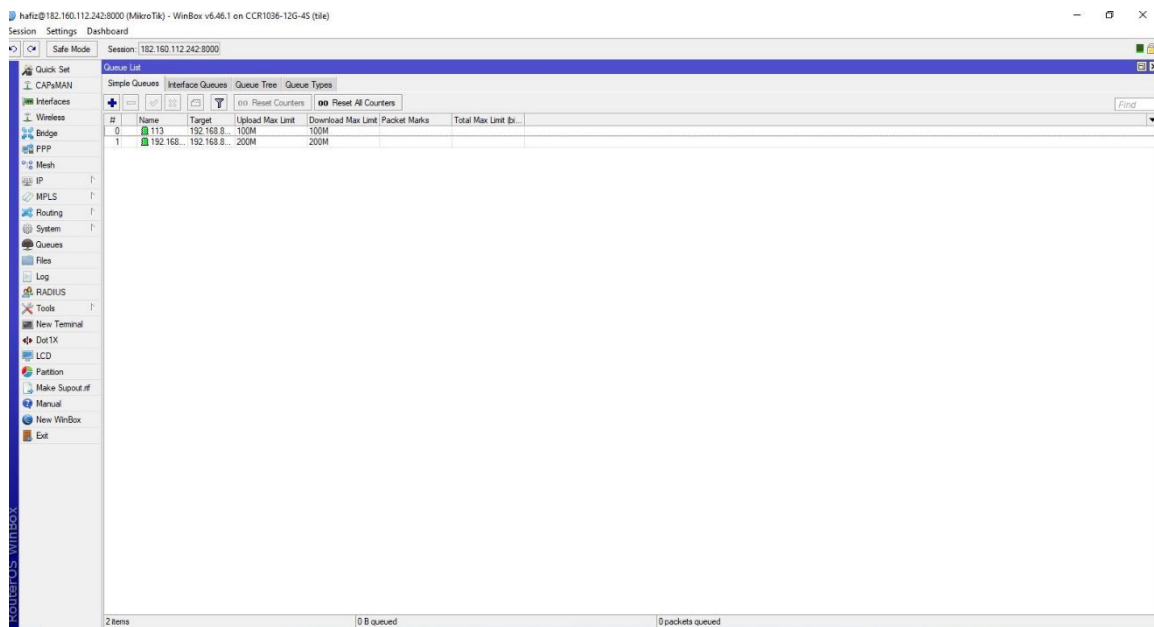


Figure 3.7.4: B/W Control of MikroTik

3.4.2 DHCP Server:

The Dynamic Host Configuration Protocol (DHCP) is applied for the simple configuration of IP addresses in a network. The MikroTik Router-OS implementation combines both server and client sides and is compliant with RFC 2131.

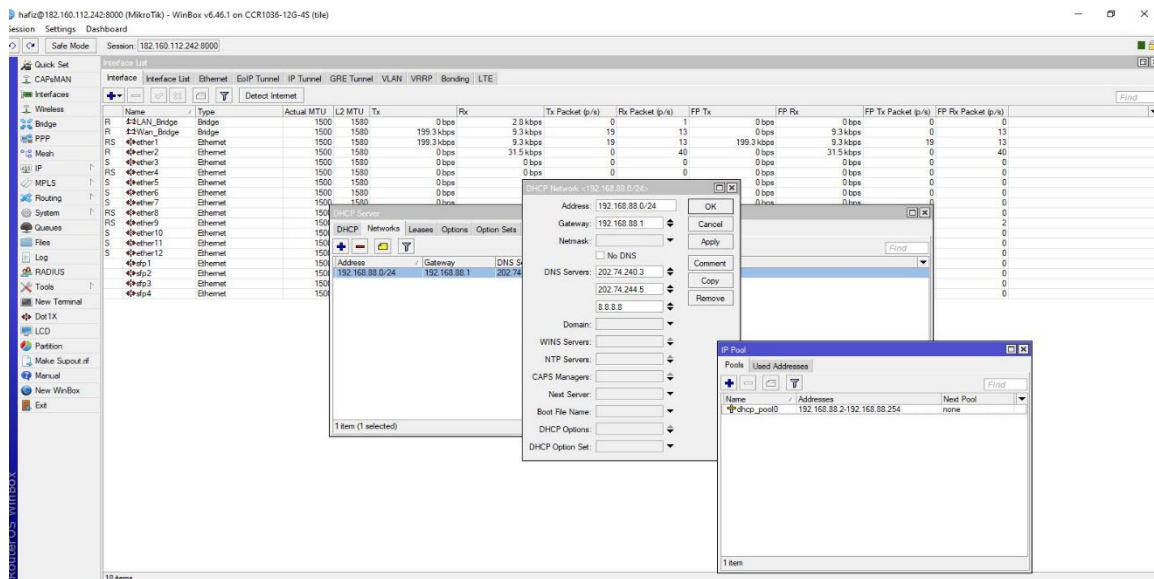


Figure 3.8: DHCP Server

3.4.3 IP Address Assign:

Firstly, open Ip > Addresses dialog; Click on the '+' button, a new dialog will be open; Enter IP address -192.168.88.1/24 select interface local from the drop-down list and click on OK button;

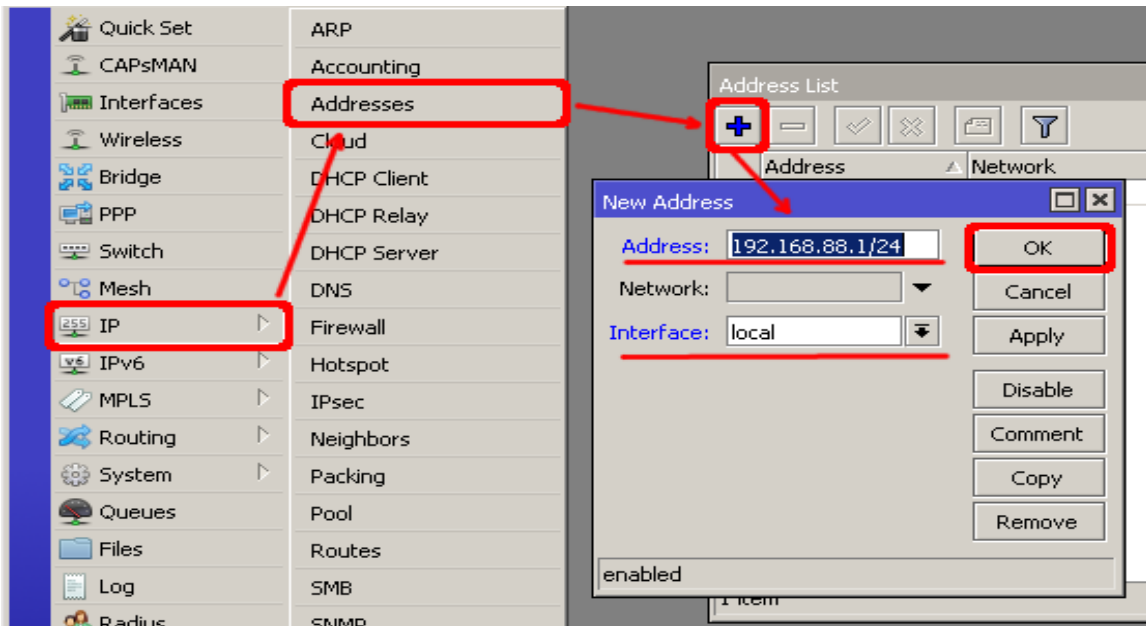


Figure 3.9: IP Address Assign

3.4.4 NAT:

Network Address Translation (NAT) is the Internet standard that permits hosts on Local Area Networks (LAN) use to one set of IP addresses for internal communications and another set of IP addresses for external communications.

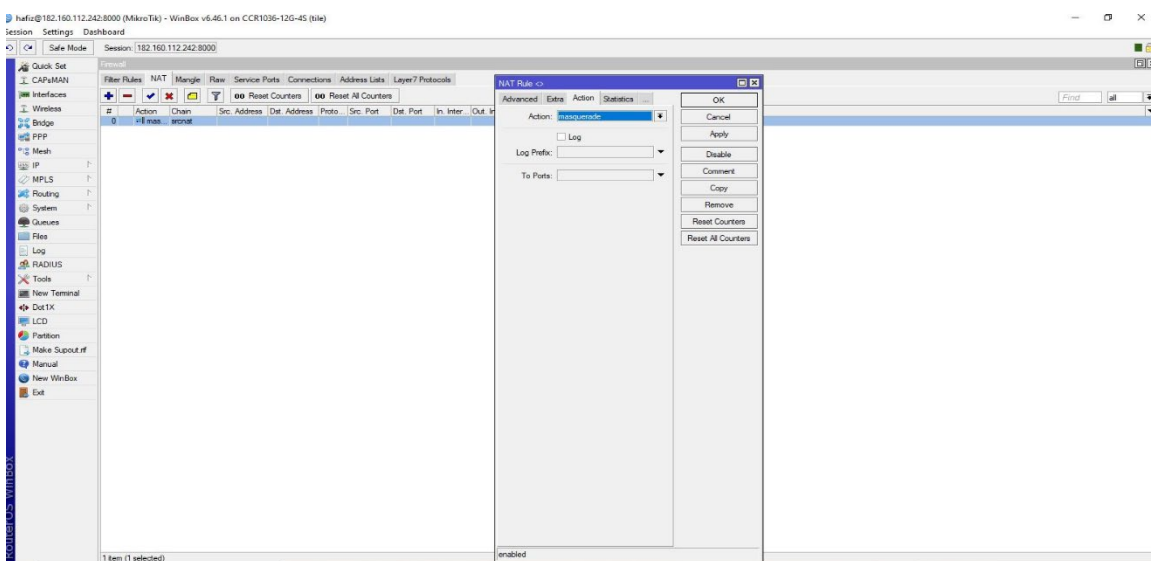


Figure 3.10: NAT

3.4.5 Routing:

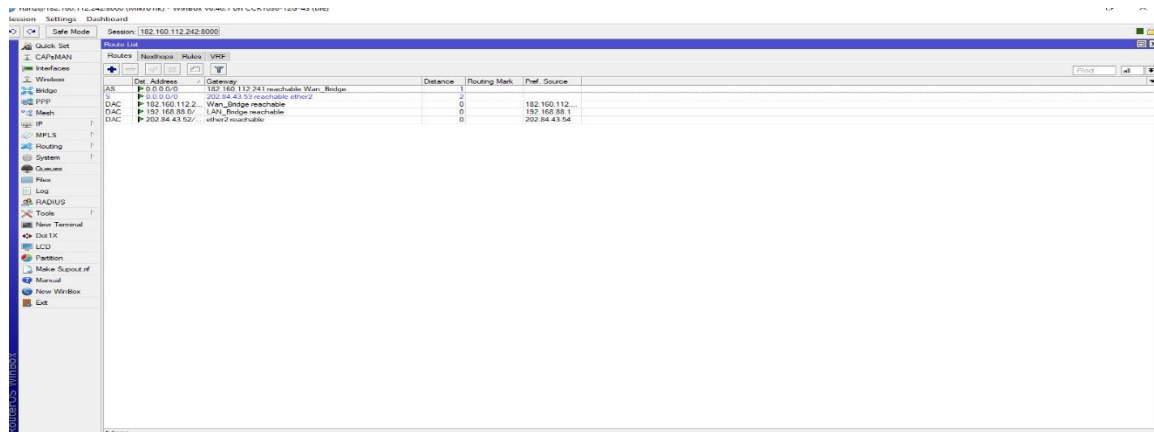


Figure 3.11: Routing

3.5 DHCP and DNS Server Configuration with Windows Server 2016:

Microsoft proceeds to put out Technical Previews of Windows Server 2016 with as-yet-unseen features. The most modern Technical Preview, TP3, launched a number of unique features, such as Docker integration and Windows Server Containers, by improvements to features introduced in former previews. It more produces new security abilities such as Shielded VMs, which defend virtual machine objects in a multitenant environment.

3.5.1 DHCP Server Configuration:

The DHCP Server is a network server that automatically produces and assigns IP addresses, default gateways, and the other network parameters to client devices. It relies on the

conventional protocol identified as Dynamic Host Configuration Protocol (DHCP) to return to broadcast queries on clients.

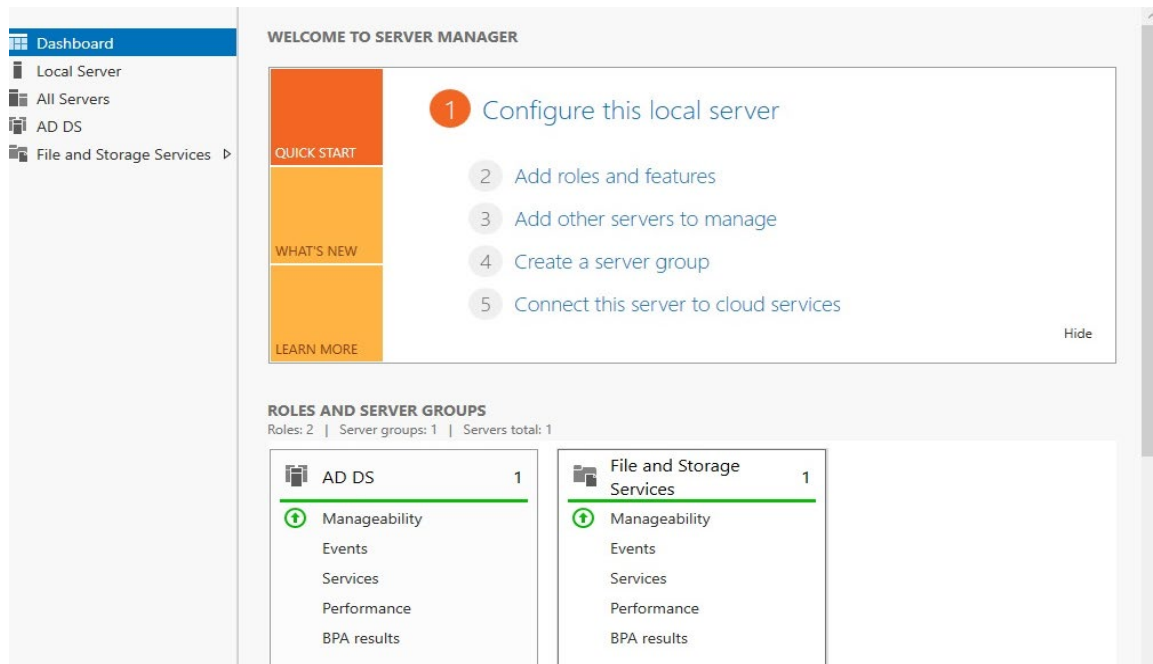


Figure 3.12.1: DHCP Server Configuration in Windows server

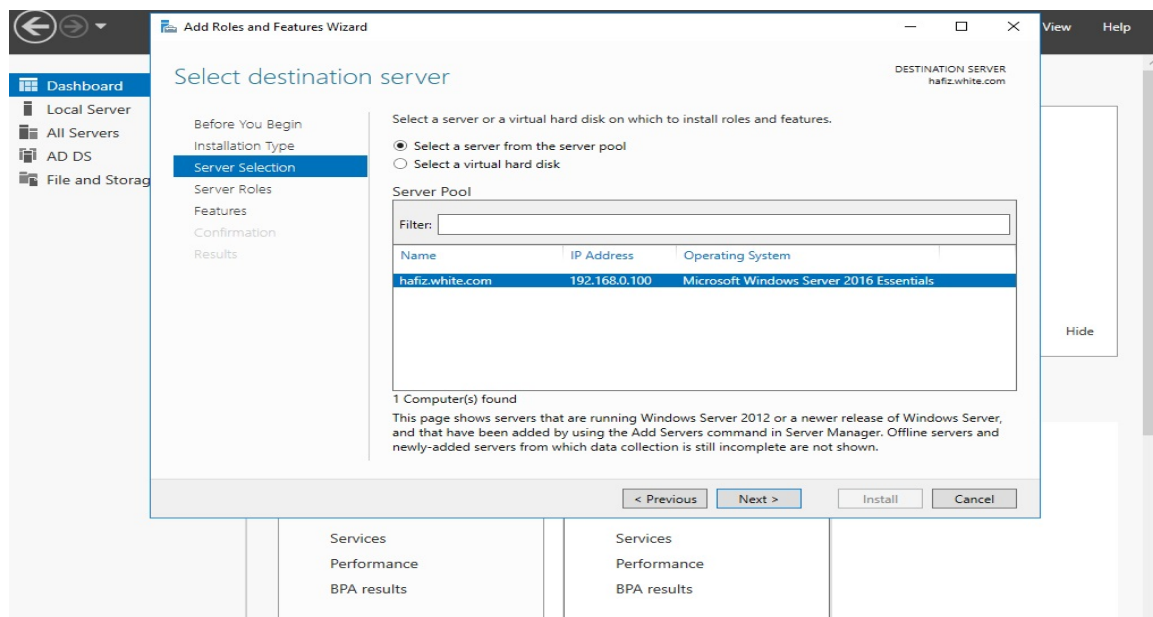


Figure 3.12.2: Select destination server

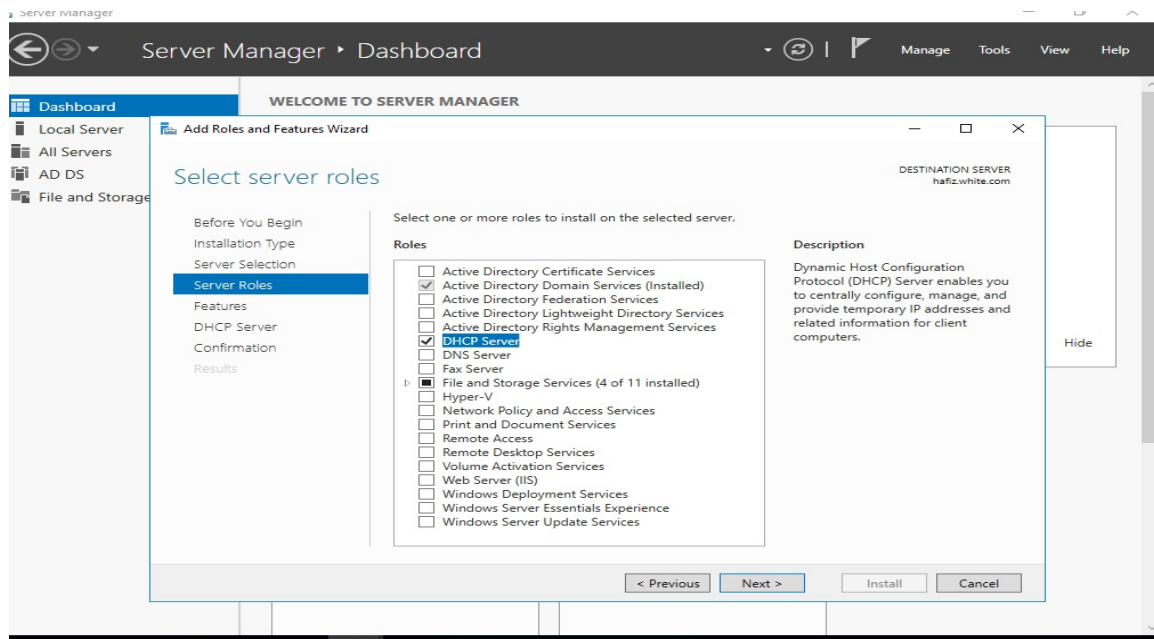


Figure 3.12.3: Select server roles

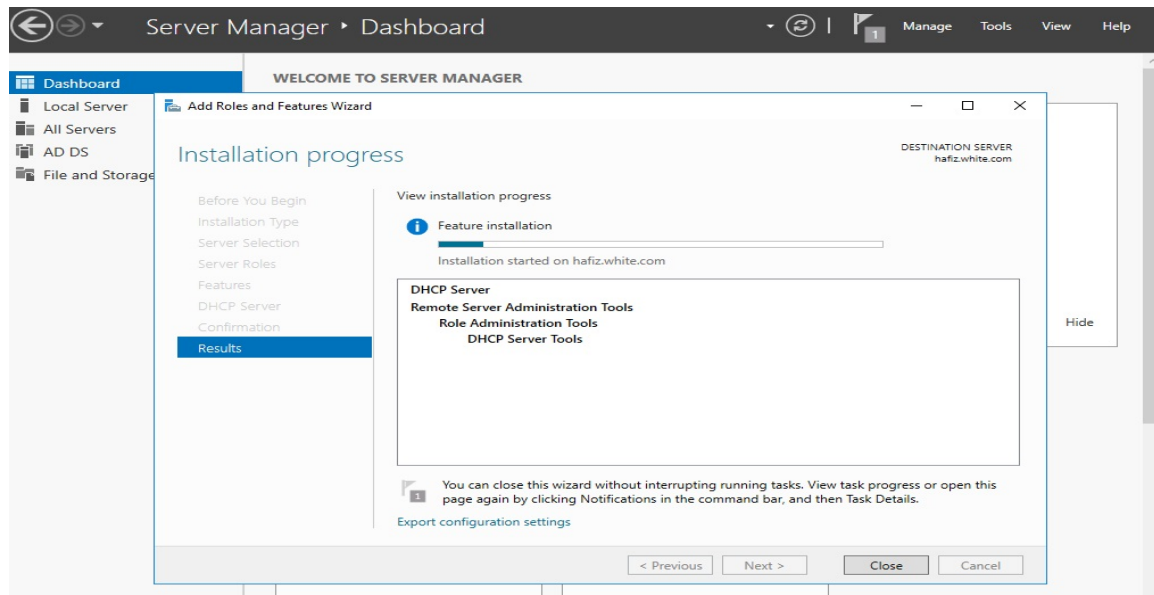


Figure 3.12.4: Installation progress

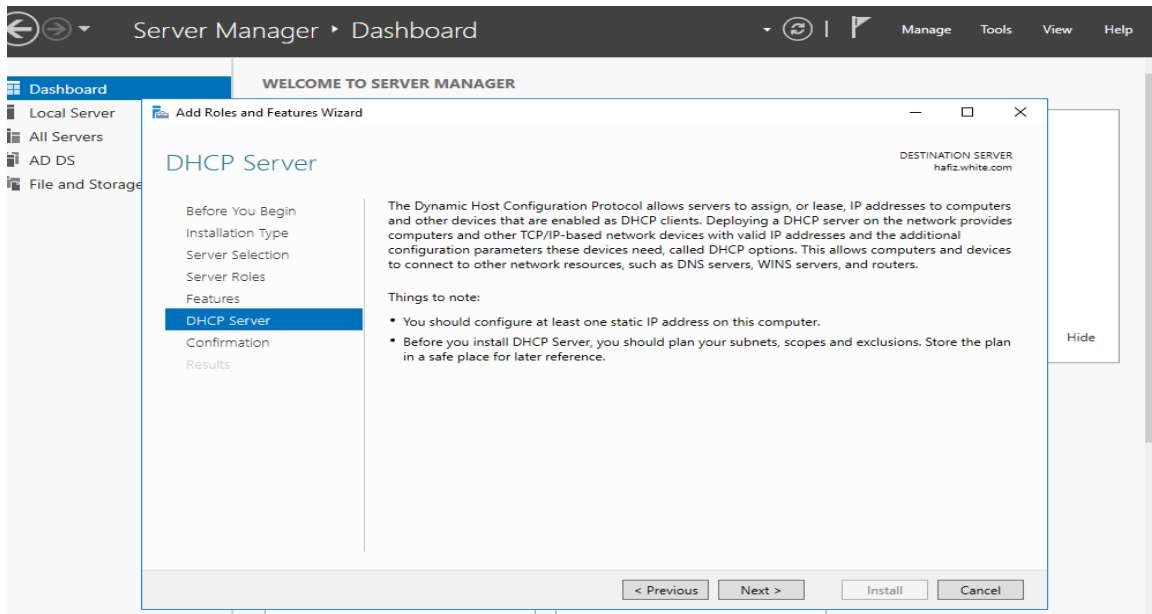


Figure 3.12.5: DHCP server

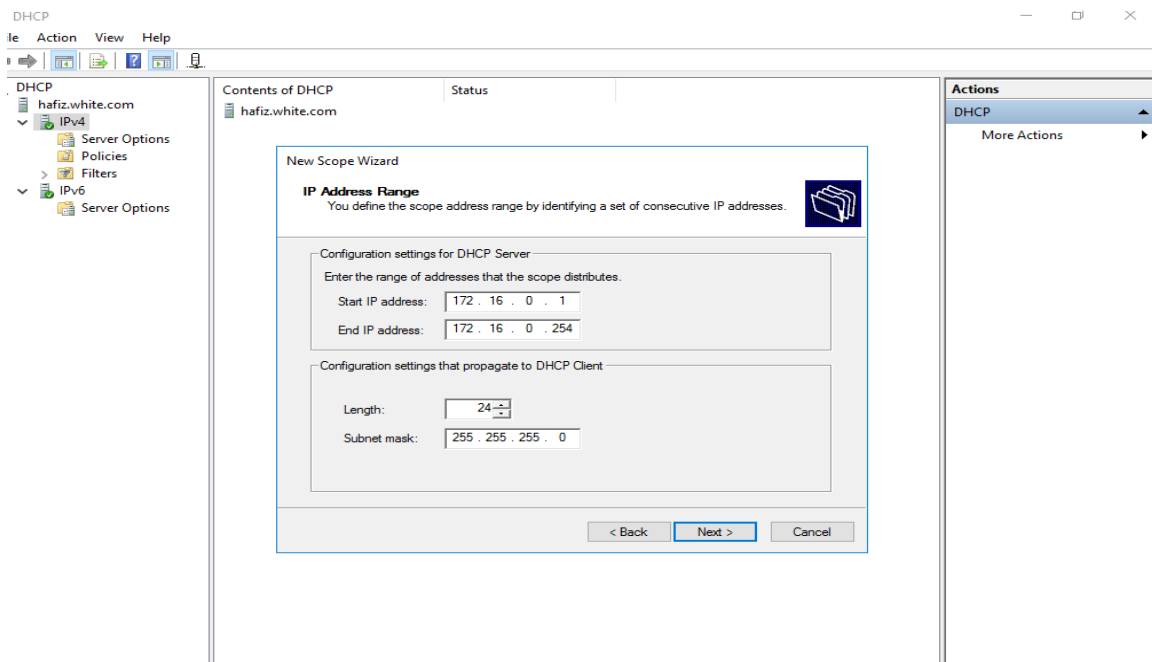


Figure 3.12.6: IP Address Range

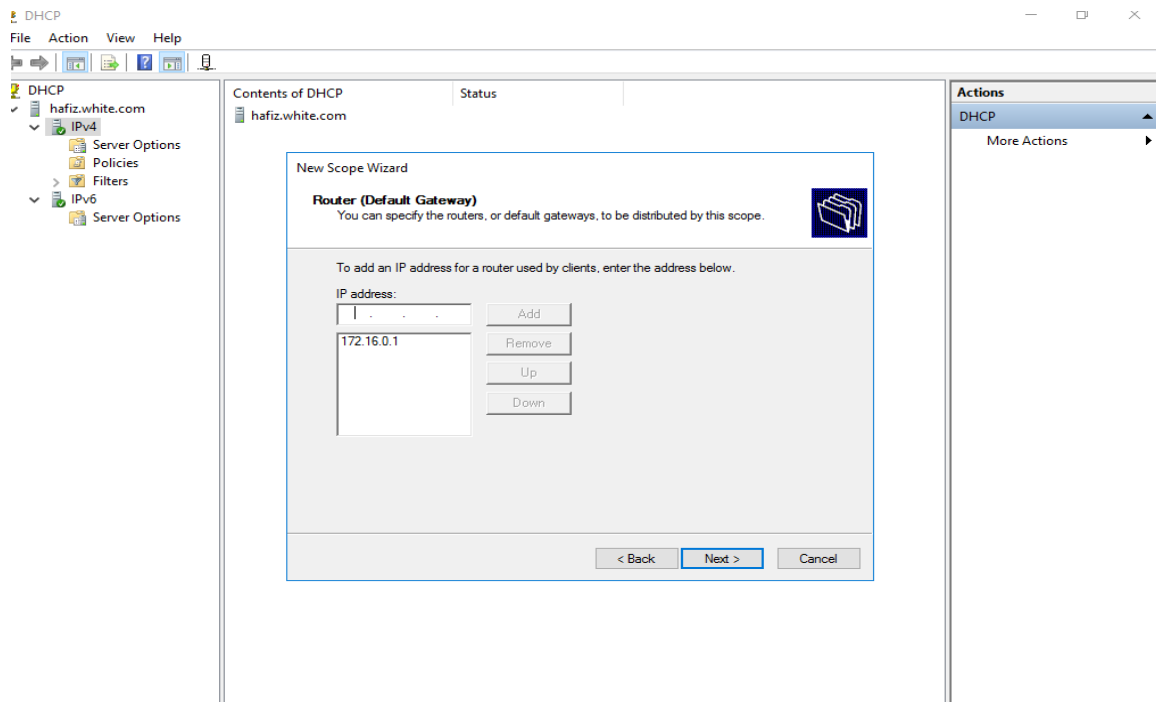


Figure 3.12.7: Router (Default Gateway)

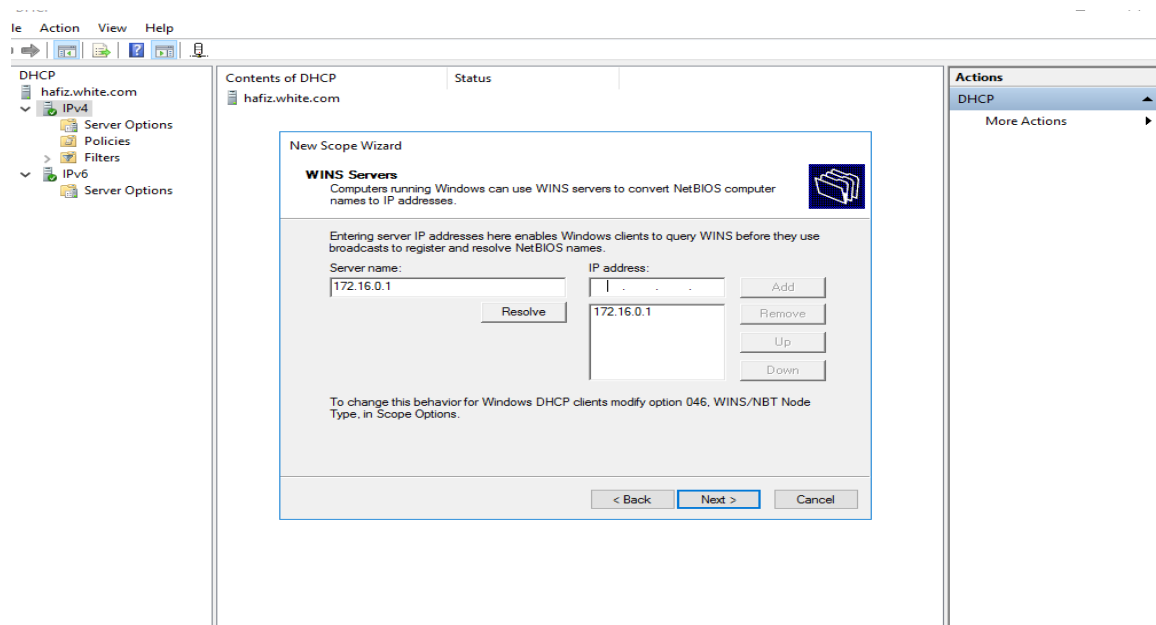


Figure 3.12.8: WINS Server

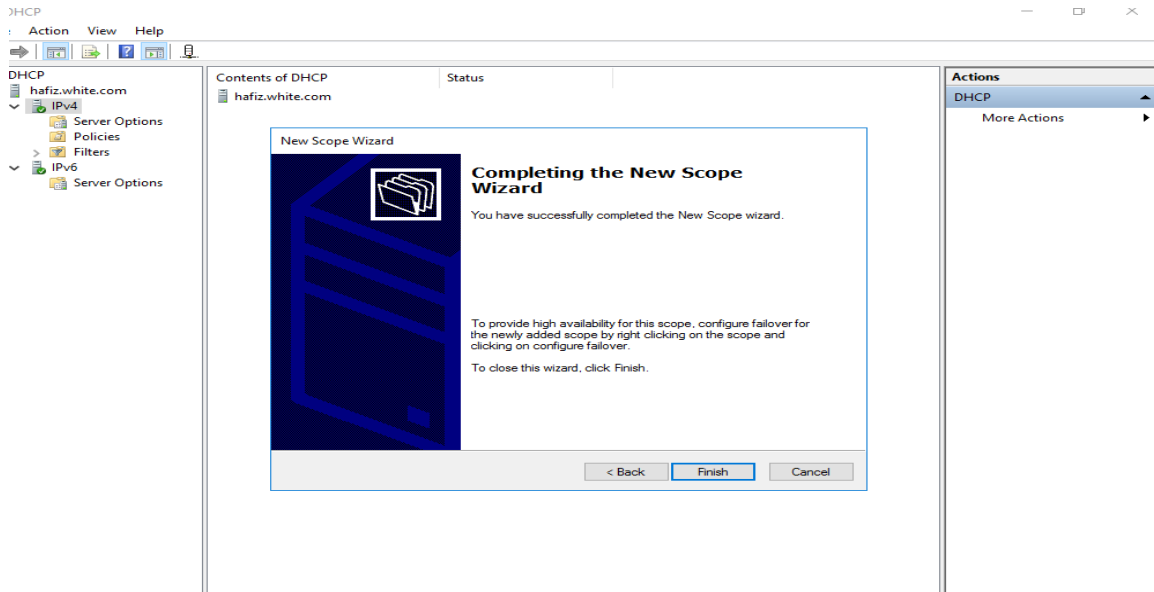


Figure 3.12.9: Completing message

3.5.2 DNS Server Configuration:

The DNS- (Domain Name System) is a central portion of the internet, presenting a way to match names 'a website you're seeking' to numbers 'the address for the website.' Anything joined to the internet laptops, tablets, mobile phones, websites has an Internet Protocol (IP) address assigned up of numbers.

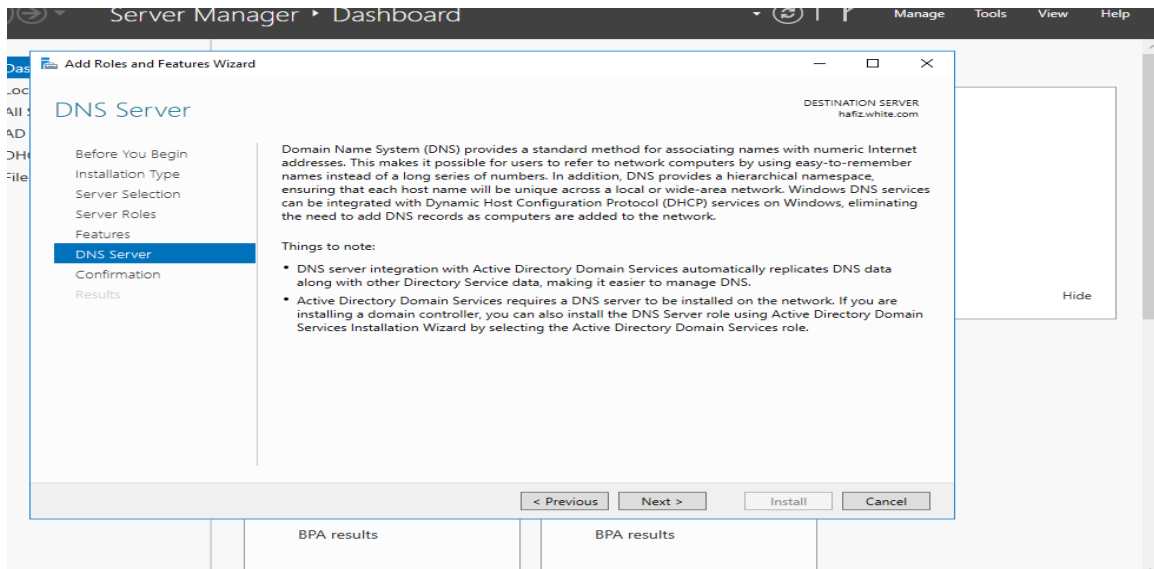


Figure 3.13.1: DNS Server Configuration in Windows server

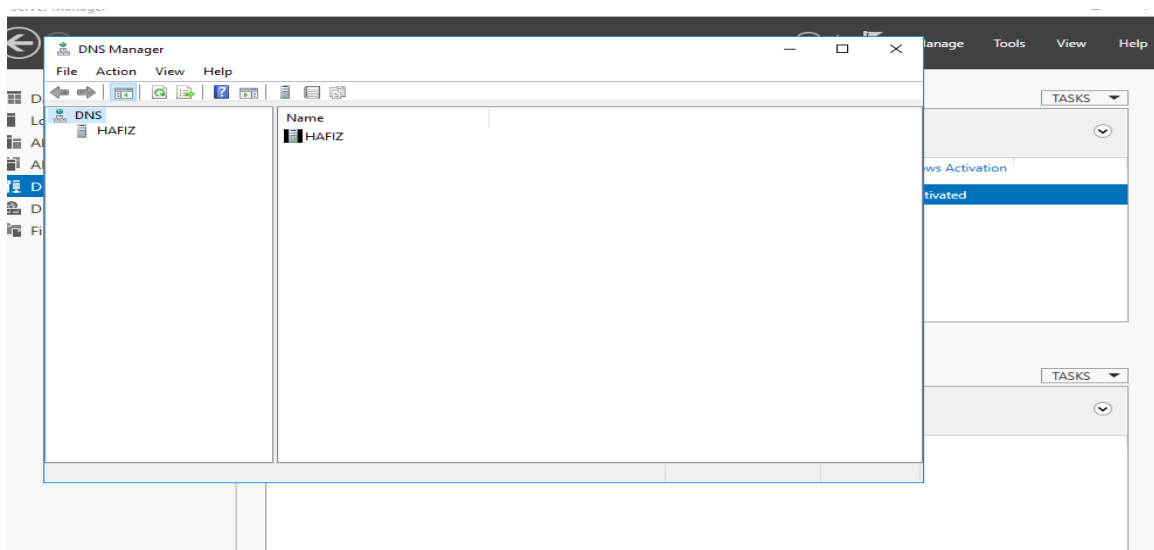


Figure 3.13.2: DNS Manager

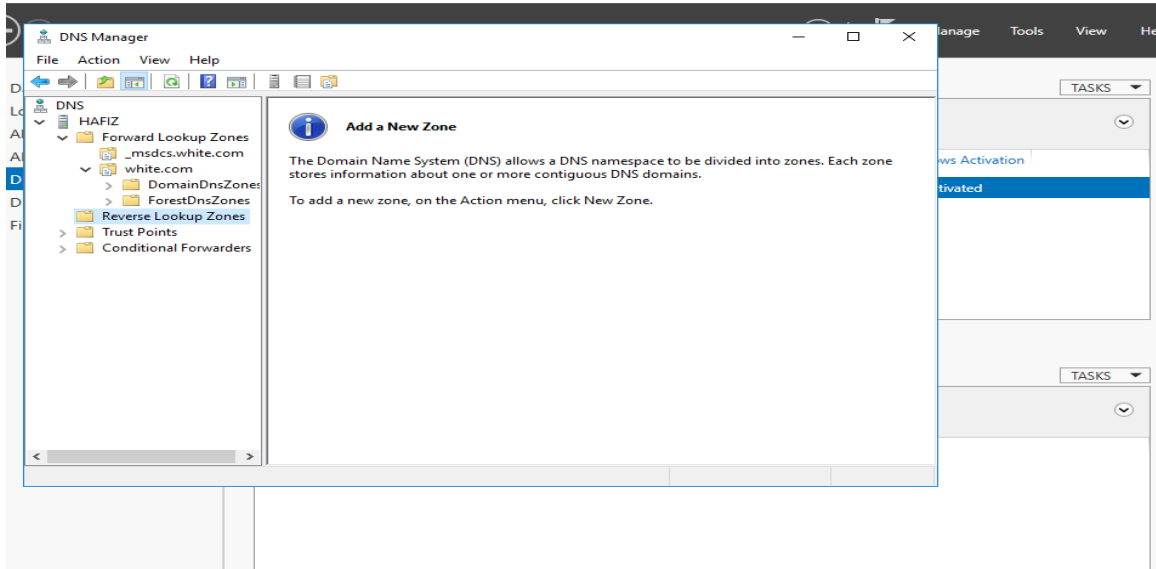


Figure 3.13.3: Add New Zone

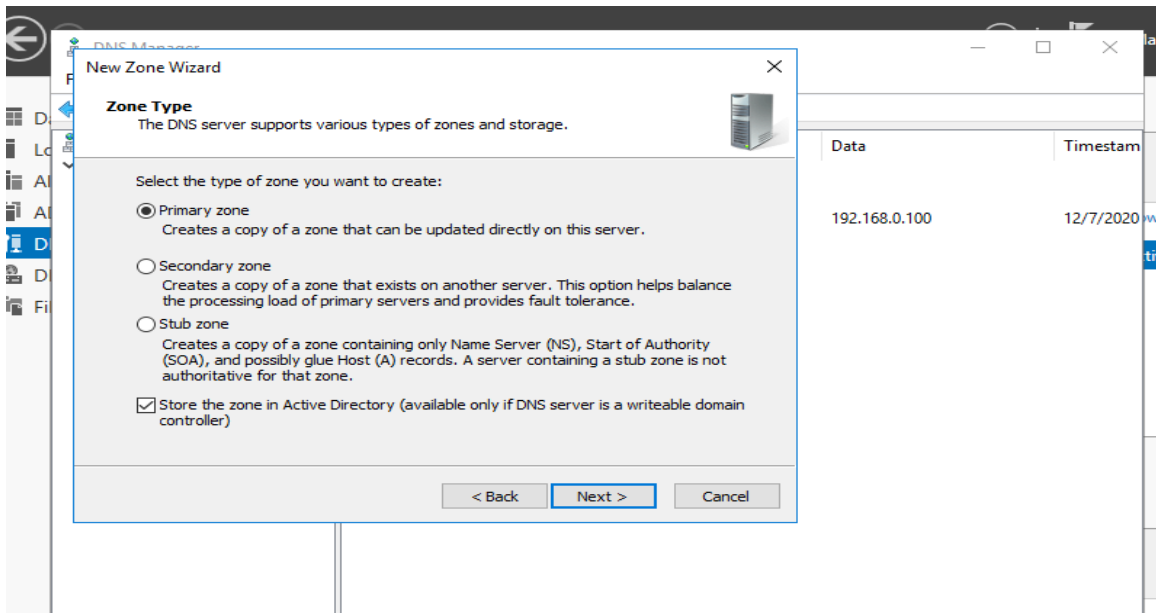


Figure 3.13.4: Zone type

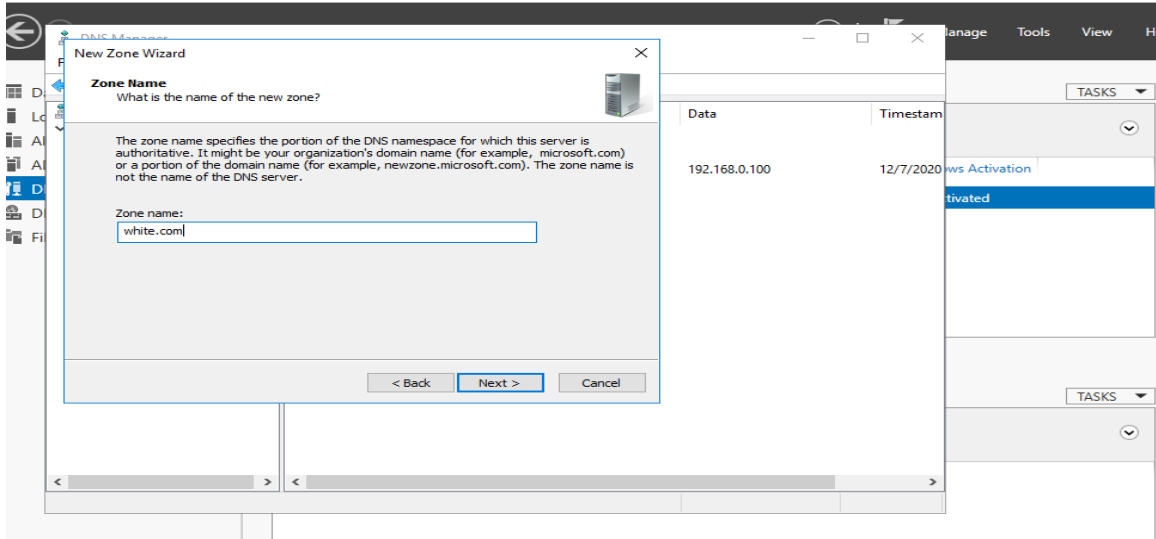


Figure 3.13.5: Zone Name

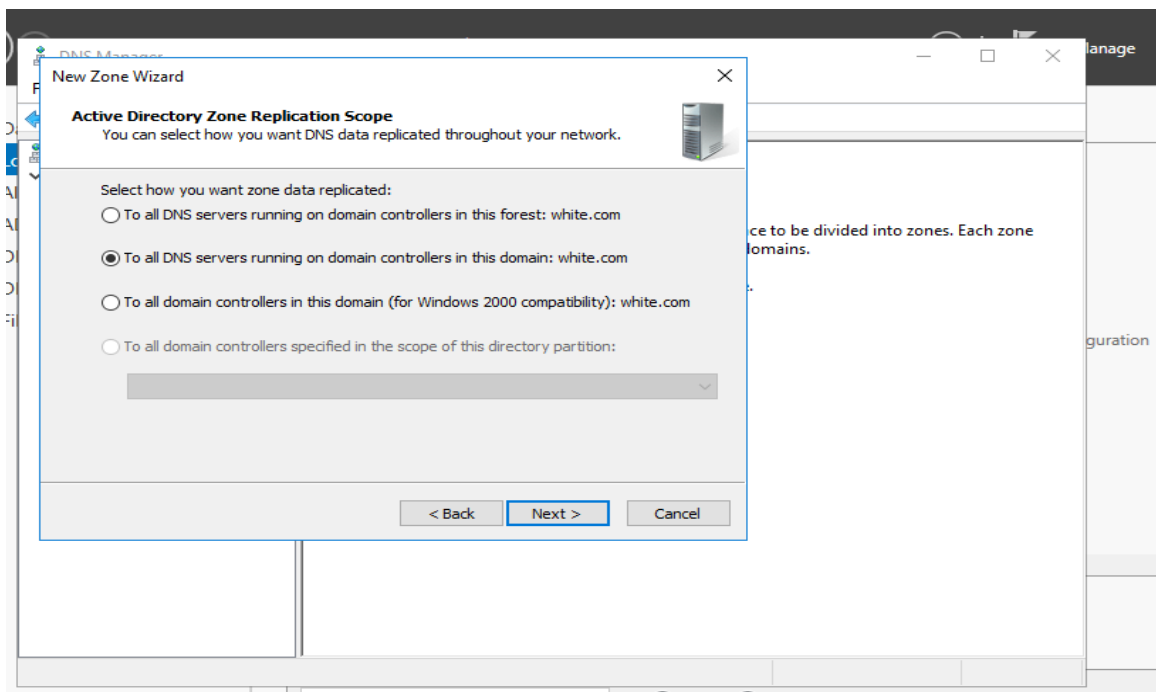


Figure 3.13.6: Scope

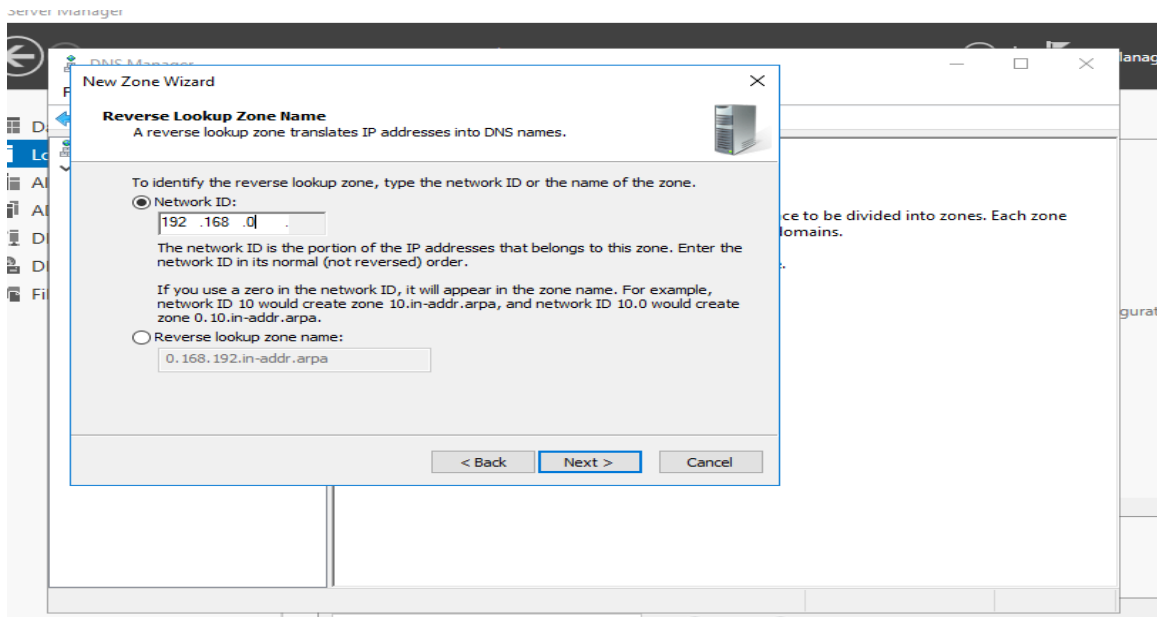


Figure 3.13.7: Reverse lookup zone name

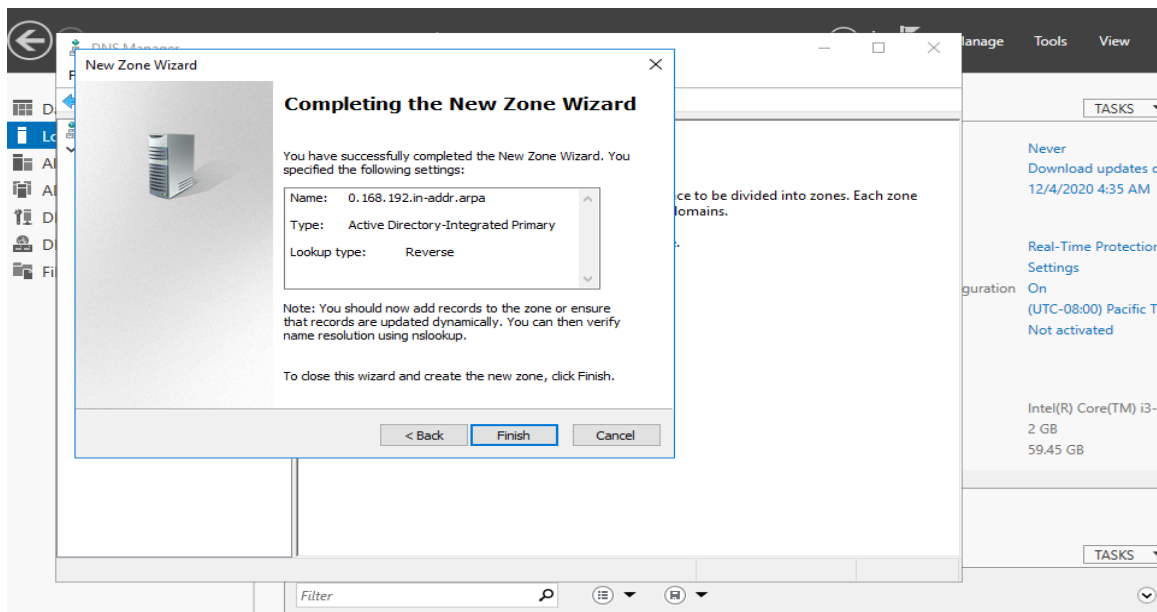


Figure 3.13.8: Zone completing message

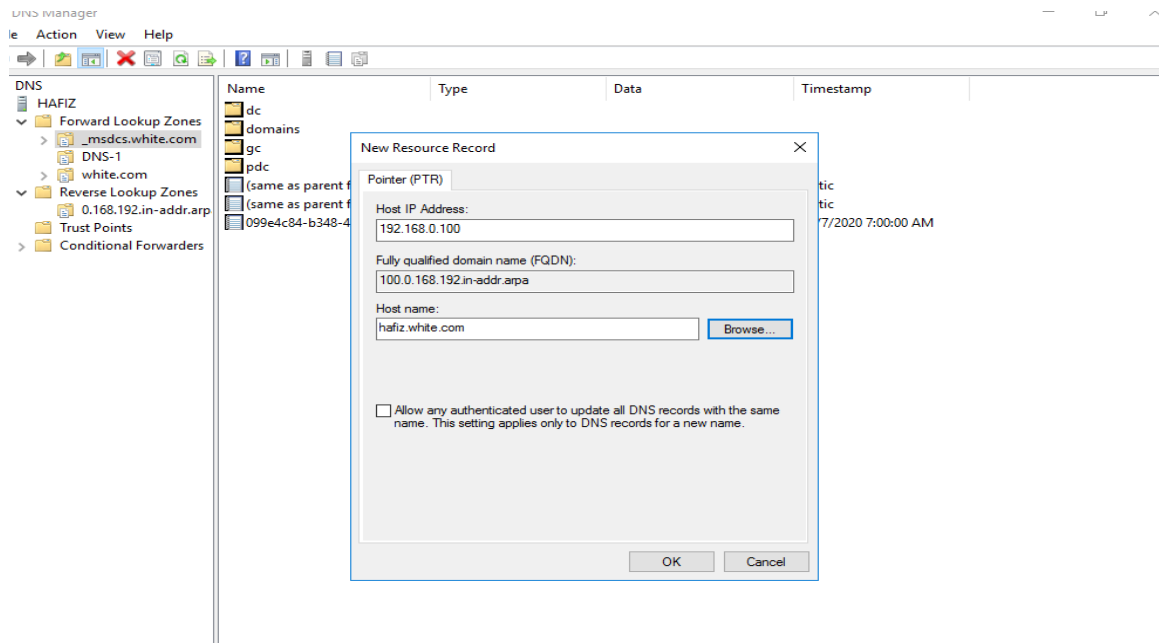


Figure 3.13.9: New Resource record

3.6 WI-FI Configuration with TP-LINK:

Wi-Fi is the wireless networking technology that permits devices such as computers - laptops and desktops, mobile devices, and other equipment - printers and video cameras to interface with the Internet. Internet connectivity happens over a wireless router.

TP-LINK 300M Wireless N Router
Model No. TL-WR540N / TL-WR540ND

Status

LAN

MAC Address: 84-16-F9-A8-DF-42
IP Address: 192.168.0.1
Subnet Mask: 255.255.255.0

Wireless

Wireless Radio: Enable
Name (SSID): 11n High Speed
Mode: 11n High Speed
Channel Width: 40MHz
Channel: Auto (Current channel 3)
MAC Address: 84-16-F9-A8-DF-42
WDS Status: Disable

WAN

MAC Address: 84-16-F9-A8-DF-43
IP Address: 27.147.176.246
Subnet Mask: 255.255.255.0

Figure 3.14.1: Status of TP-LINK

TP-LINK 300M Wireless N Router
Model No. TL-WR540N / TL-WR540ND

WAN

WAN Connection Type: Static IP
IP Address: 27.147.176.246
Subnet Mask: 255.255.255.224
Default Gateway: 27.147.176.241
MTU Size (in bytes): 1500 (The default is 1500, do not change unless necessary)
Primary DNS: 123.200.0.254
Secondary DNS: 203.76.96.5 (Optional)

WAN Help

WAN Connection Type:
If your ISP is running a DHCP server, select the **Dynamic IP** option.
If your ISP provides a static or fixed IP Address, Subnet Mask, Gateway and DNS setting, select the **Static IP** option.
If your ISP provides a PPPoE connection, select **PPPoE/Russia PPPoE** option.
If your ISP provides BigPond Cable (or Heart Beat Signal) connection, please select **BigPond Cable** option.
If your ISP provides L2TP connection, please select **L2TP/Russia L2TP** option.
If your ISP provides PPTP connection, please select **PPTP/Russia PPTP** option.
If you don't know how to choose the appropriate connection type, click the **Default** button to allow the router to automatically search your internet connection for correct and protocols. The connection type will be reported when an active internet service is successfully detected by the Router. This report is for your reference only. To make sure the connection type your ISP provides, please refer to the ISP. The various types of internet connections that the Router can detect are as follows:
• **PPPoE/Russia PPPoE** - Connections which use PPPoE that requires a user name and password.
• **Dynamic IP** - Connections which use dynamic IP address assignment.
• **Static IP** - Connections which use static IP address assignment.
IP Address - Enter the IP address in dotted-decimal notation provided by your ISP.
Subnet Mask - Enter the subnet mask in dotted-decimal notation provided by your ISP.
Default Gateway - Enter the default gateway in dotted-decimal notation provided by your ISP.
MTU Size - If your ISP requires a specific MTU size, enter it here. If you are unsure, click the **Default** button. If you are unsure, click the **Default** button.
Primary DNS - Enter the DNS IP address in dotted-decimal notation provided by your ISP.
Secondary DNS - Enter another DNS IP address in dotted-decimal notation provided by your ISP.

Figure 3.14.2: WAN

TP-LINK 300M Wireless N Router
Model No. TL-WR540N / TL-WR540ND

LAN

MAC Address: 84-16-F9-A8-DF-42
IP Address: 192.168.0.1
Subnet Mask: 255.255.255.0
IGMP Proxy: Enable

LAN Help

You can configure the IP parameters of LAN on this page.

• **MAC Address** - The physical address of the LAN ports, as seen from the LAN. The value cannot be changed.
• **IP Address** - Enter the IP address of your Router in dotted decimal notation (factory default: 192.168.0.1).
• **Subnet Mask** - An address code that determines the size of the network. Usually it is 255.255.255.0.
• **IGMP Proxy** - If you want to watch TV through IGMP, please Enable it.

Note:

1. If you change the LAN IP address, you must use the new IP address to login to the Router.
2. If the new LAN IP address you set is not in the same subnet with the previous one, the IP Address pool in the DHCP server will be configured automatically, but the Virtual Server and DMZ Host will not take effect until they are re-configured.

Click the **Save** button to save your settings.

Figure 3.14.3: LAN

TP-LINK® 300M Wireless N Router
Model No. TL-WR840N / TL-WR840ND

Wireless Settings

Wireless Network Name: (Also called the SSID)

Mode:

Channel Width:

Channel:

☒ Enable Wireless Router Radio

☒ Enable SSID Broadcast

☐ Enable WDS Bridging

Wireless Settings Help

Note: The operating distance or range of your wireless connection varies significantly based on the physical placement of the Router. For best results, place your Router.

- Near the center of the area in which your wireless stations will operate.
- In an elevated location such as a high shelf.
- Away from the potential sources of interference, such as PCs, microwaves, and cordless phones.
- With the Antenna in the upright position.
- Away from large metal surfaces.

Note: Failure to follow these guidelines can result in significant performance degradation or inability to wirelessly connect to the Router.

Wireless Network Name - Enter a value of up to 32 characters. The same Name (SSID) must be assigned to all wireless devices in your network.

Mode - Select transmission mode according to your wireless devices.

Channel Width - The bandwidth of the wireless channel.

Channel - This field determines which operating frequency will be used. It is not necessary to change the wireless channel unless you notice interference problems with another nearby access point. If you select auto, then AP will choose the best channel automatically.

Enable Wireless Router Radio - The wireless radio of the Router can be enabled or disabled to allow wireless stations access. If enabled, the wireless stations will be able to access the Router. Otherwise, wireless stations will not be able to access the Router.

Enable SSID Broadcast - If you select the **Enable SSID Broadcast** checkbox, the wireless router will broadcast its name (SSID) on the air.

Enable WDS Bridging - You can select this to enable WDS Bridging, with this function, the Router can bridge two or more WLANs. NOTE: If this checkbox is selected, you had better make sure the following settings are correct.

SSID (to be bridged) - The BSSID of the AP your Router is going to connect to as a client. You can also use the survey function to select the BSSID to join.

Survey - Click this button, you can search the AP which runs in the current channel.

WDS Mode - This field determines which WDS Mode will be used. It is not necessary to

Figure 3.14.4: Wireless Settings

TP-LINK® 300M Wireless N Router
Model No. TL-WR840N / TL-WR840ND

DHCP Settings

DHCP Server: ☐ Disable ☒ Enable

Start IP Address:

End IP Address:

Address Lease Time: minutes (1~2880 minutes, the default value is 120)

Default Gateway: (Optional)

Primary DNS: (Optional)

Secondary DNS: (Optional)

DHCP Settings Help

This device is set up by default as a DHCP (Dynamic Host Configuration Protocol) server, which provides the TCP/IP configuration for all the PCs that are connected to this device in the LAN.

- DHCP Server** - Enable or Disable the server. If you disable the Server, you must have another DHCP server within your network or else you must configure the IP address of the computer manually.
- Start IP Address** - This field specifies the first address in the IP Address pool.
- End IP Address** - This field specifies the last address in the IP Address pool.
- Address Lease Time** - The Address Lease Time is the length of time a network user will be allowed to keep connecting to this device with the current DHCP address. Enter the amount of time, in minutes, that the DHCP address will be "leased". The time range is 1~2880 minutes. The default value is 120 minutes.
- Default Gateway** - (Optional) Suggest to input the IP Address of the LAN port of this device. The default value is 192.168.0.1.
- Default Domain** - (Optional) Input the domain name of your network.
- Primary DNS** - (Optional) Input the DNS IP address provided by your ISP. Or consult your ISP.
- Secondary DNS** - (Optional) You can input the IP Address of another DNS server if your ISP provides two DNS servers.

Note: To use the DHCP server function of this device, you should configure all computers in the LAN to "Obtain an IP Address automatically" mode. This function will take effect until this device reboots.

Click **Save** to save the changes.

Figure 3.14.5: DHCP Settings

TP-LINK® 300M Wireless N Router
Model No. TL-WR840N / TL-WR840ND

Wireless Security

☐ Disable Security

☒ WPA/WPA2 - Personal (Recommended)

Version:

Encryption:

Wireless Password:

(You can enter ASCII characters between 8 and 63 or Hexadecimal characters between 0 and 64.)

Group Key Update Period: (Keep it default if you are not sure, minimum is 30, 0 means no update)

☐ WPA/WPA2 - Enterprise

Version:

Encryption:

Radius Server IP:

Radius Port: (1-65535, 0 stands for default port 1812)

Radius Password:

Group Key Update Period: (in second, minimum is 30, 0 means no update)

☐ WEP

Type:

WEP Key Format:

Key Selected:

WEP Key:

Key Type:

Wireless Security Help

You can select one of the following security options:

- Disable Security** - The wireless security function can be enabled or disabled. If disabled, the wireless stations will be able to connect this device without encryption. It is recommended strongly that you choose one of following options to enable security.
- WPA/WPA2 - Personal** - Select WPA based on pre-shared passphrase.
- WPA/WPA2 - Enterprise** - Select WPA based on Radius Server.
- WEP** - Select 64/128/152 WEP security.

Each security option has its own settings as described follows.

WPA/WPA2 - Personal

Version - You can select one of following versions.

- Automatic** - Select WPA-PSK or WPA2-PSK automatically based on the wireless station's capability and request.
- WPA-PSK** - Pre-shared key of WPA.
- WPA2-PSK** - Pre-shared key of WPA2.

Encryption - You can select either Automatic, or TKIP or AES.

Wireless Password - You can enter ASCII or Hexadecimal characters. For Hexadecimal, the length should be between 8 and 64 characters, for ASCII, the length should be between 8 and 63 characters.

Group Key Update Period - Specify the group key update interval in seconds. The value can be either 0 or at least 30. Enter 0 to disable the update.

WPA/WPA2 - Enterprise

Version - You can select one of following versions.

- Automatic** - Select WPA or WPA2 automatically based on the wireless station's capability and request.
- W** - IEEE 802.11i WPA.
- W2** - IEEE 802.11r WPA2.

Encryption - You can select either Automatic, or TKIP or AES.

Radius Server IP - Enter the IP address of the Radius Server.

Radius Port - Enter the port that radius service used.

Figure 3.14.6: Wireless Security

CHAPTER 4

CONCLUSIONS

I got the opportunity to do an internship at AAMRA Network Limited. During the Internship, I have gained a lot of experience and knowledge in different ways. In this report, I describe my experiences with network designing and optimization and various things inside it, including Windows Server Configuration, Cisco, and MikroTik routing. I had to received a lot of help from my supervisors and classmate and have performed some responsibilities on a routine basis during my internship period and have finally achieved the confidence to inspire myself. I want to move ahead by applying the knowledge and skills I have gained. I learned and came up with different concepts on how to fix the necessary tiny errors.

In my Internship, I had learned how to configure networks through Cisco, Windows Server, Wi-Fi, and MikroTik router configured, and how to create networks. Learned about the IP classifications and sufficiently known it. In the principal portion of this project, I had learned how to configure ISP link, bandwidth control in several forms, bridge mode-Configuration, firewall, and NAT Configuration, network security, and Windows server besides DHCP, and DNS configured. All of the guidelines have the support and improved my work goals and professional skills. Presently, most of the companies rely on their thought networks. During this, it is very important for an organization to think of the accurate network design, without which it is not probable to handle all network support.

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APPENDIX

Company Details:



Company Name: AAMRA Network Limited

Address: Safura tower (12th Floor),

20 Kemal Ataturk Avenue, Banani C/A,

Dhaka -1213, Bangladesh.

Telephone: +8802222281100

E-mail: info.networks@AAMRA.com.bd

dhakasupport.networks@AAMRA.com.bd

Website: www.AAMRAnetworks.com

www.ticket.AAMRAnetworks.com

Organization Type: Internet Service Provider (ISP)

Employees: 150.

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