

**FINAL YEAR INTERNSHIP REPORT ISP SETUP & MICROTIC ROUTER
CONFIGURATION**

BY

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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 Internship titled “ISP SETUP & MICROTIC ROUTER CONFIGURATION”, submitted by **Anik Sikder** and **ID: 171-15-8710** 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 08-07-2020.

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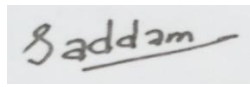
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I hereby declare that, this internship has been done by us under the supervision of **Md. Sazzadur Ahamed, Senior Lecturer, Department of CSE** at Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

This report focuses on the design, implementation, **ISP SETUP & MICROTIC ROUTER CONFIGURATION**. Ensuring minimal downtime and maximum continuity of a network service is the main goal of an Internet Service Provider Company. Internet Service Provider (ISP) can provide various services like data connectivity service, Internet service, Security ensures, Fiber optic networks, Network infrastructure design and maintenances and support. In enterprise network infrastructure, ISPs provide backup links that can keep up a network even when an unplanned outage occurs. To ensure maximum availability of a designed network it is difficult when a power outage or load shedding occurs. If we can design a network that is more beneficial, more secure, highly reliable and faster, then it will be more useful for any organizations. Besides, if we can ensure maximum continuity of a network by using redundant links, power backup by using renewable energy source and proper monitoring then the quality of service of the network will also increase.

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CHAPTER 1

Introduction

1.1 Introduction

Internships are a method of on-the-job training, which is especially really helpful for older college students in technical courses. It can help us study about real-life work. It can help us research about company culture, peer relationships, how to take care of a massive undertaking in actual life.

Daffodil International University has constantly emphasized industrialization in tutorial studies. For this purpose, people from the enterprise are invited to DIU to discuss their corporations and experiences, regularly some technical publications are organized absolutely through them. The four-month internship application is every other perhaps, possibly most effective, way to reap industrialization.

Internships assist students in hyperlink up their educational journey with art practice. I tried my fine to deliver the two together.

The enterprise that dispatched me for the internship was once **Speed tech online**.

1.2 Objective

This is my report on the need to complete my BSc degree. Through the internship program, I have tried to find the main purpose of my life. And I have tried to improve my own skills. Through the report, I have published all the tasks of my internship in writing.

1.3 Scope

This record offers a perception into the experience that I faced in my administrative center at **Speed tech online**. As nicely as it also gives a full description of **Speed tech online** for college students who are interested in **Speed tech online** for their expert boom.

1.4 Motivation

operating with **Speed tech online**, I learn about a way to develop an ISP gadget, how can control the gadget. I learned about the coolest exercise of network designers. They motivate me on how to broaden my career in community engineer and study new generation. The possibility to train with them and work with them was a remarkable enjoy. As I labored there, I found out loads of latest matters about the ISP and Microtic server.

1.5 Report Layout

on this record, I describe the fundamental ideas of some initiatives that I analyze and work through this 4-month time frame. In “chapter 1” I speak the creation of internship, objective, scope, motivation.

In “chapter 2” I provide a brief description of my interned corporation.

In “chapter 3” I in brief describe my assignment Involvement in the period of internship. every painting that I have accomplished I write on it and provide an example of what I have performed.

CHAPTER 2

Company's profile

2.1 About Speed tech online

Speed tech online is a web service provider, operating for the ISP region. **Speed tech online** is a main internet provider supplier, has advanced into a full-range net and commercial enterprise solutions dealer via an in-depth analysis of modern technology, and because of our mixed efforts, it brings extra convenience and delight for our clients. We place unit giving excessive-speed broadband internet access over local place community, Wi-Fi solutions for the housing complex, point to factor Fiber & Radio connectivity for company Wi-Fi. We provide an array of answers for incorporated and customized verbal exchange offerings to adjust the important thing commercial enterprise processes of customers. **Speed tech online.** combines its network enjoy – with its unmatched seamless network reach all advised over Asian countries and suburbs with native aid supplied by means of our partners. We deliver business-class net offerings in and across the Asian nation. **Speed tech online.** is created from advanced, high-overall performance devices and structure. We provide a manner much less complicated technique to wired & Wi-Fi wireless networking. Our solution may be very truthful to apply a product, requiring an awful lot much less configuration. Our twenty-4 hours facilitate desk lets you continue your enterprise the approach you wish to attempt to. We location unit targeted entirely to supply our venerated social unit and employer sector with tailored Broadband services and know-how property.

2.2 Product and Service

Speed tech online has earned a reputation as a reputed service provider in Bangladesh for conducting business with integrity. They regularly conduct various educational activities. They have been organizing internships for students of different universities as an internet service organization for many years.

Services:

- ❖ **Providing Broadband Internet Services.**
- ❖ **Corporate Data Communication.**
- ❖ **Network Design for Corporate User.**
- ❖ **Mikrotik Router/Switch Service**
- ❖ **Cyber Café.**

2.3 Company Strength

Speed tech online has been running the business successfully for many years. They have been providing financial support to their small suppliers and customers in various ways.

- ❖ **Strong Employee Attitude.**
- ❖ **Excellent Customer Services.**
- ❖ **Personal Relationship with Customer.**
- ❖ **High Integrate.**
- ❖ **Extremely Sure-Handed Engineer.**
- ❖ **International customary client Care.**

2.4 Mission

The main purpose of our company is to serve every one of our customers in the right way. Collaborate with the customer with proper service and information. To make our company a first-class company in Bangladesh in the future.

2.5 Vision

With the aid of constantly checking out technological improvements to be able to provide overall performance-enhancing answers for our clients and energy for the pleasant necessities of provider. we will retain to champion the development of net and business solutions carrier issuer in Bangladesh in particular offerings for enterprise customers

2.6 Office Schedule

- ❖ Office start at 09:00 am and ends at 6:00 pm, from Sunday to Thursday.
- ❖ Help Center always open 24 hours in week.

CHAPTER 3

Internship Activities

This chapter is about ISP network design and maintenance from the Network Operation Center (NOC). The main works of NOC are to ensure the proper maintenance service, providing a reliable connection to the clients, ensure high security of the network, and providing required information related to the network to clients.

3.1. ISP NOC support technique

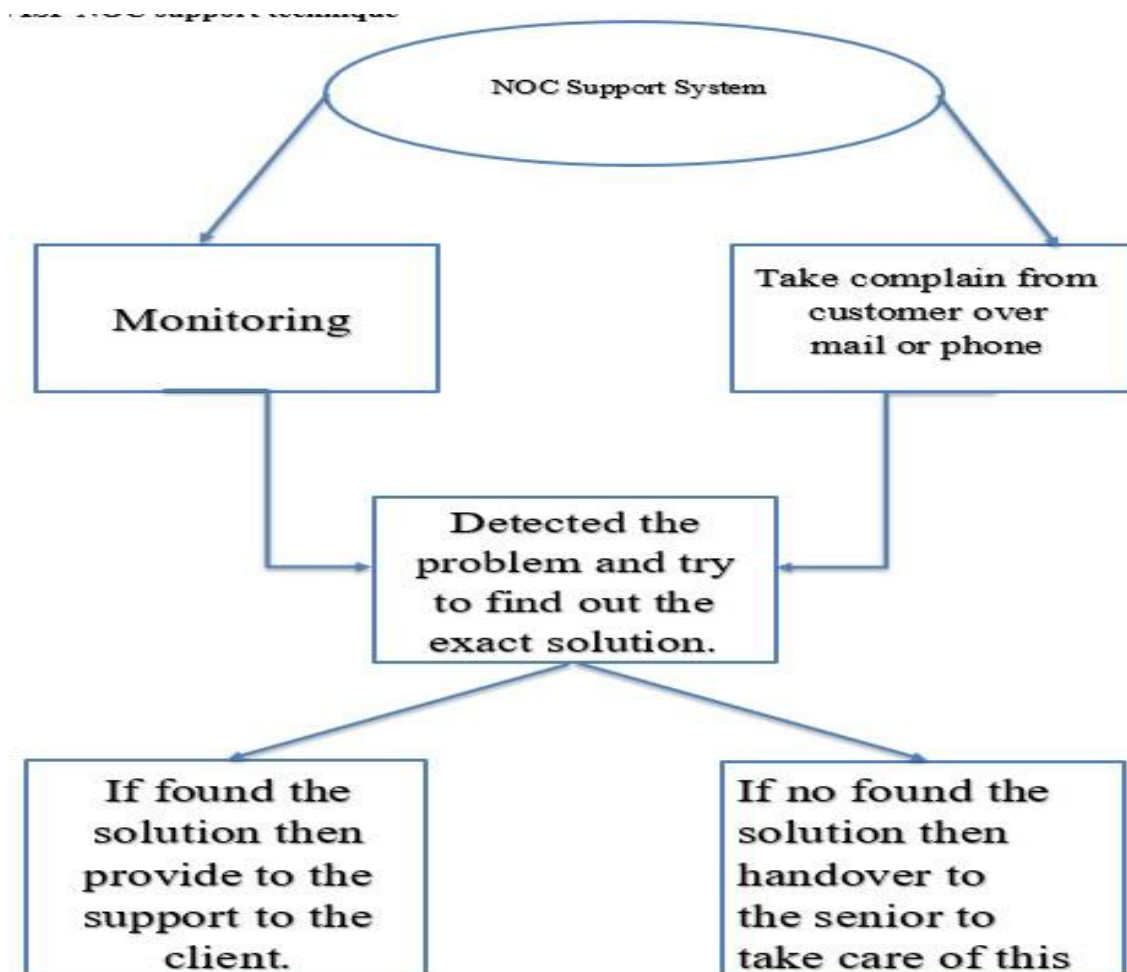


Image 3.1: NOC Support Technique

3.2 Challenges:

I've observed that there are some commonplace assignment interns. I suppose it is one among 3 matters: unpaid / under temporary and they're in a race to advantage revel in. even though companies are moving closer to flexibility in recent times, some workplaces have a few strict policies. alternatively, there are a few internal differences as properly. During my first week of socialization, trying to observe organizational behavior is also a challenge here. My understanding is very important here because accordingly, I make progress in socialization.

3.3 Router OS:

MikroTik's item is a Linux-based running gadget, alluded to as the OS of the MikroTik Router. introduced either on the organization's exclusive equipment (Router board arrangement) or on stylish x86-based absolutely PC frameworks It changes a PC directly into a network switch and comprises of a portion of the additional abilities along with firewall, virtual individual system (VPN) help and client service, data transfer capacity molding and transporter five star, remote get admission to point capacities and other widely utilized network interconnection applications. The framework is in like manner ready to work as a hostage gateway based absolutely hotspot framework. [10]

3.4 Features:

Supports the Router OS of many applications used by Internet service providers. Example as

- ❖ It can be used as a router
- ❖ It affords OSPF, BGP, Multiprotocol Label Switching(VPLS/MPLS), Open Flow, etc.
- ❖ It can be used as a switch or bridge
- ❖ Provides client-server (PPPoE)
- ❖ Provides Virtual Private Network (VPN).
- ❖ Provides pointers for the firewall
- ❖ Provides DHCP Server service
- ❖ Provide Wi-Fi and captive portal based Hotspot System
- ❖ Bandwidth administration is very easy
- ❖ Easy GUI interface
- ❖ Easy administration
- ❖ Supports each IPv4 and IPv6

MikroTik helps the brand by using providing numerous and thematic examples of configurations via discussion board and wiki. Router OS supports model 4 of the Internet Protocol (IPv4) and version 6 of the Internet Protocol (IPv6).

The software program helps almost all network interfaces which might be supplied via the Linux kernel 2.6.16, besides for wireless, where the Atheros and Prism chipsets are the simplest hardware supported as of the 3.x model.

3.5 Release history:

MikroTik released different version of Router OS at different times.

- RouterOS v6: May 2013. Current as of September 2019.
- RouterOS v5: March 2011 - September 2013.
- RouterOS v4: October 2009 - March 2011.
- RouterOS v3: January 2008 - October 2009.

3.6 Router Board:

The agency produces Wi-Fi of protected circuit boards, which are provided as router boards, further to accent modules that include complete hardware working gadgets for Router OS.

combined with Router OS, the Router board line is offered to wireless internet carrier companies of small to medium period three.18, typically providing Wi-Fi broadband connectivity in far off regions.

alternatives encompass pre-assembled small workplace wireless/home workplace (SOHO) routers, 802.11n c084d04ddacadd4b971ae3d98fecfb2a MIMO, and TDMA systems for indoor and outdoor use, in addition to naked routers for incorporation into custom answers inside the shape of discovered circuit forums (PCBs). The router board line additionally includes a sequence of c084d04ddacadd4b971ae3d98fecfb2a Mini PCI and Mini PCI express wireless adapters that help a selection of IEEE 802.11 protocols and are intended for use in mixture with the router board lineup.



Image 3.2: MikroTik Router CCR1016-12G Series

3.7 Network Diagram (MikroTik Configuration):

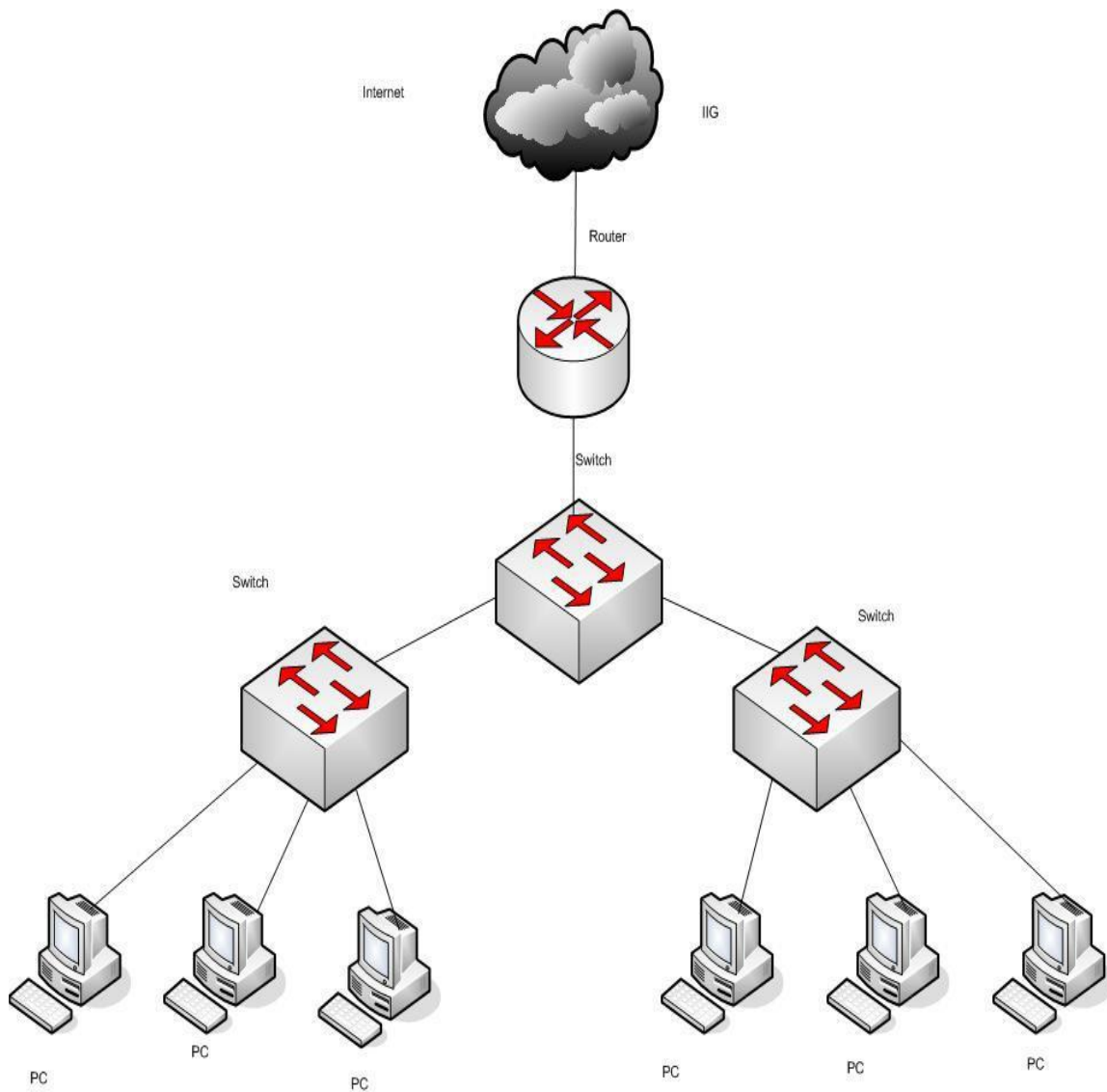


Image 3.3: Network Diagram

Winbox is the graphical configuration software program for MikroTik router OS. at the start we have to download Winbox. After download the Winbox it could be run at once as no installation is wanted 3.3 network diagram.

3.8 Virtual Environment Setup for Linux Operating system.

- ✓ At first download Oracle VM Virtual Box.
- ✓ Setup Oracle VM Virtual Box.
- ✓ Create a virtual Machine for Linux operating system.

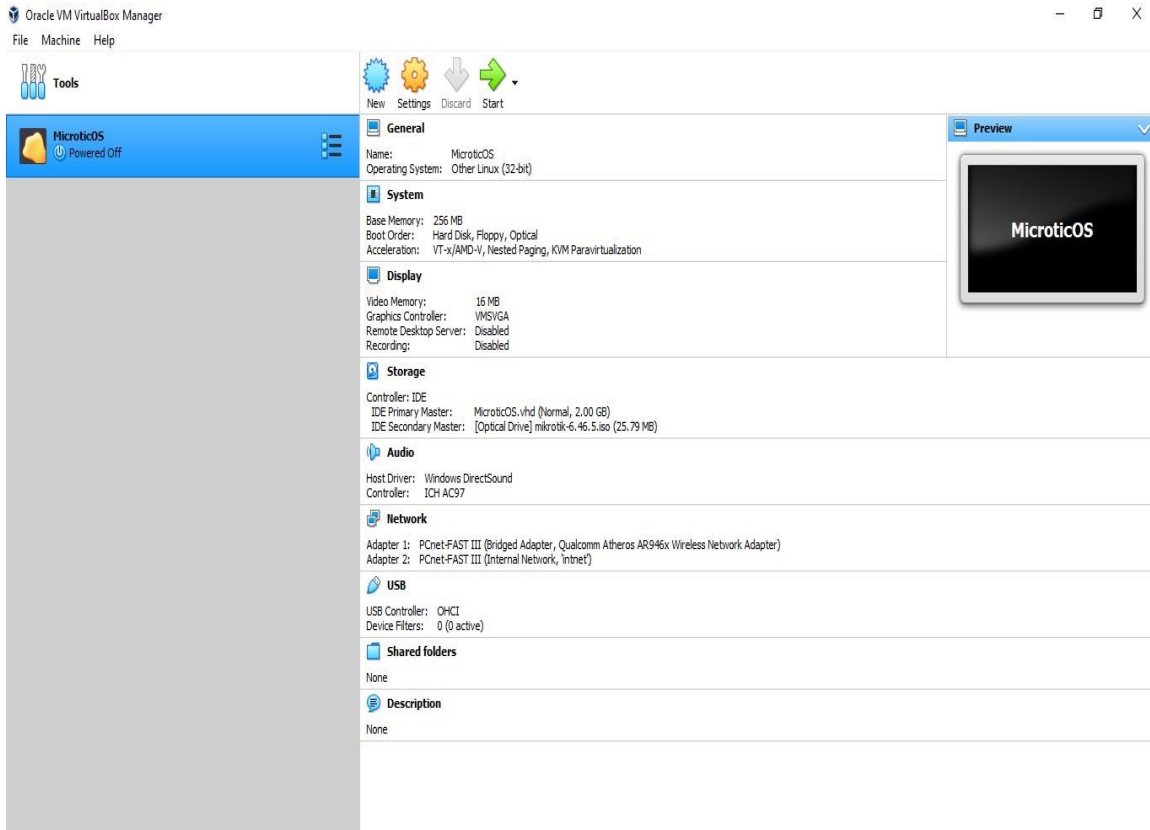


Image 3.4: Oracle VM Virtual Box

3.9 Basic Configuration Microtic Router Step by Step

➤ Physical Configuration

- ❖ Input power in router board.
- ❖ Input WAN Connection (Internet Connection) in port Number 1.
- ❖ Port Number 2 connect to pc.
- ❖ Browse with Winbox.
- ❖ Click to icon and have a IP address and MAC address. Click to Mac address then write 'admin' in login box and don't need to give Password.

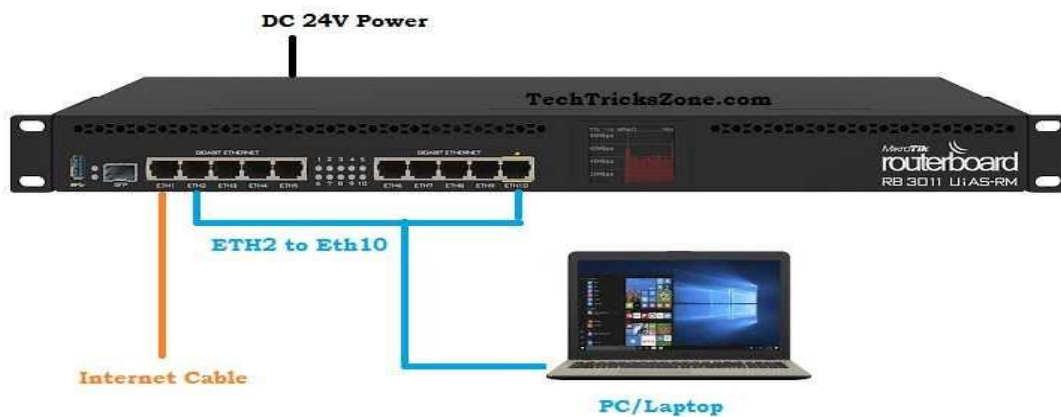


Image 3.5: Microtic Router Physical configuration.

3.9.1 Start WinBox Terminal Mode

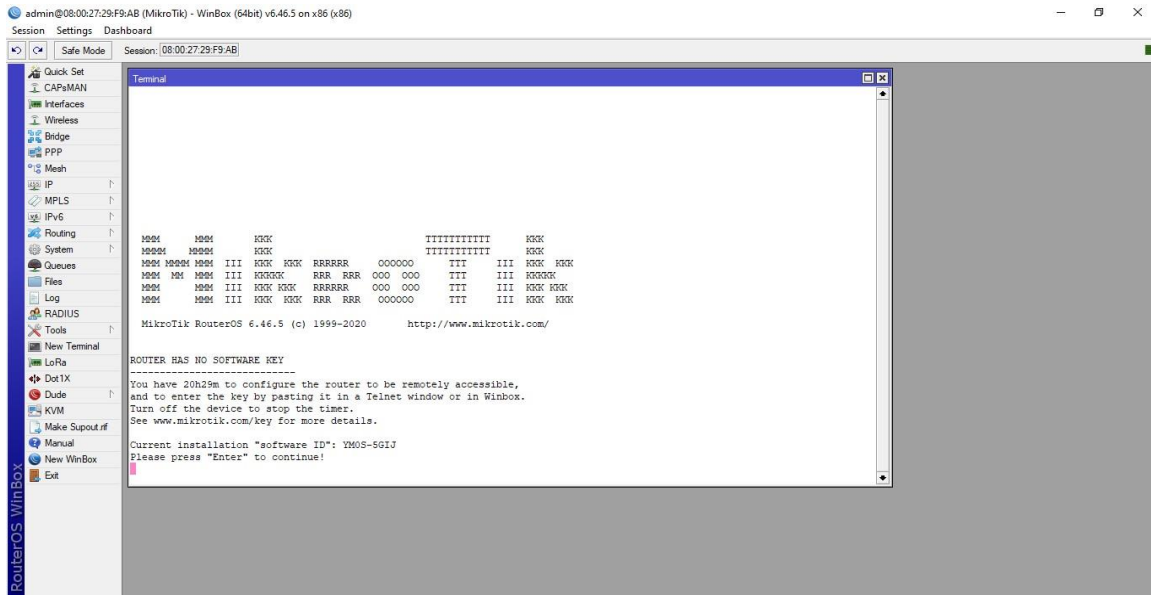


Image 3.6: Microtic Router Terminal Mode in graphical view.

3.9.2 Reset Configuration using command

Process:

- Terminal + [admin@MikroTik] + system reset-configuration
- Press Enter ++

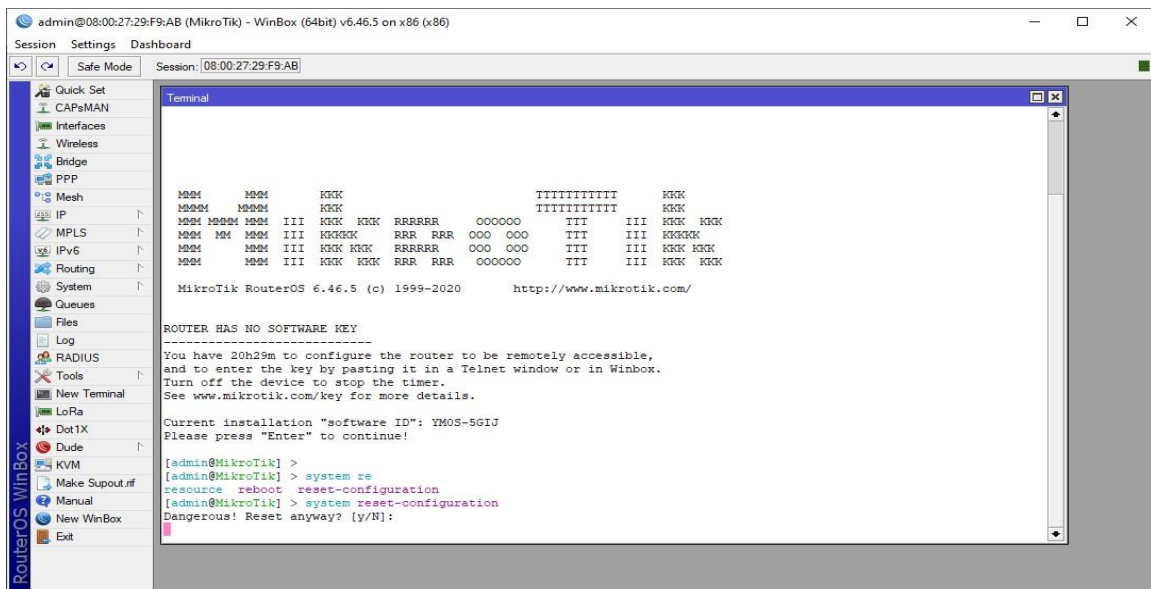


Image 3.7: Microtic Reset Configuration using command.

3.9.3 Ethernet port in my Microtic Router

➤ **Process:** Click Interfaces ++

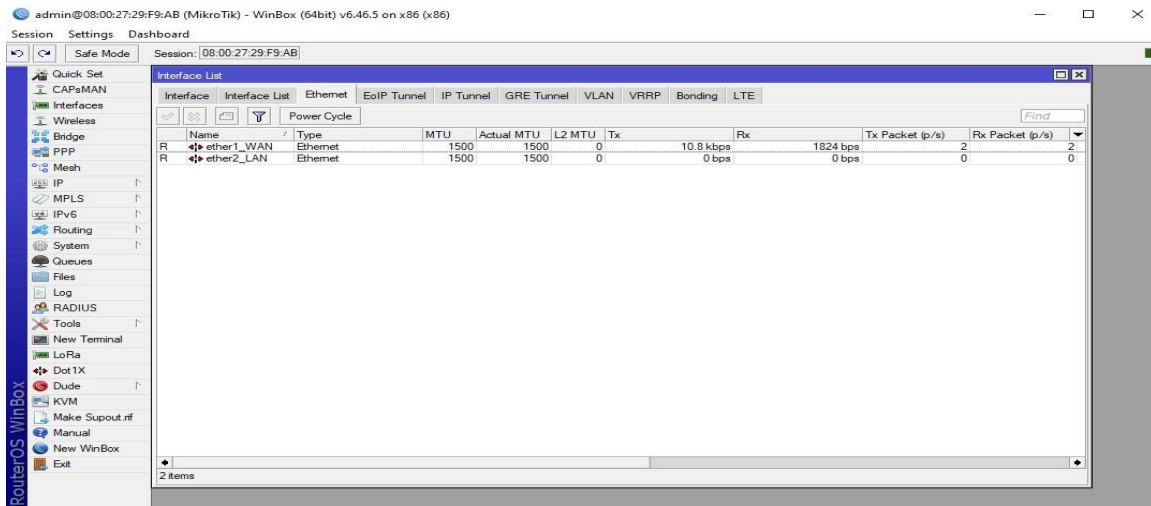


Image 3.8: Ethernet port in my Microtic Router.

3.9.4 Assign IP address in WAN port

Process:

- IP + Address + Click +
- Assign (WAN) IP address + Select Interface + apply and ok

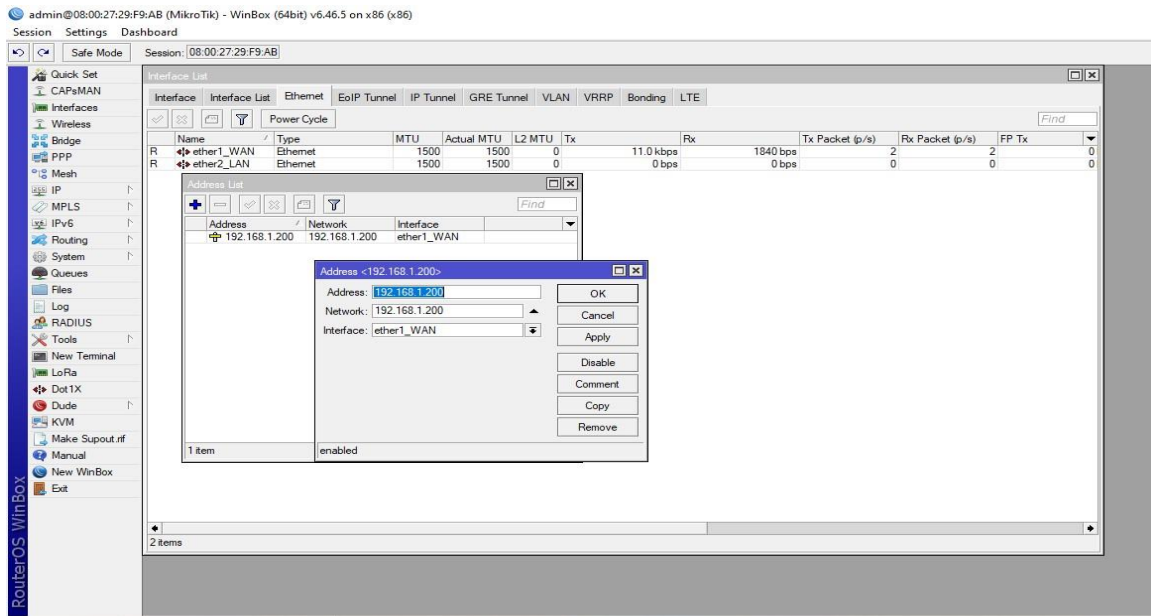


Image 3.9: Assign IP Address in WAN port.

3.9.5 Setting up Gateway

Process:

- IP + Routes + Click +
- Assign Gateway address + Apply + ok

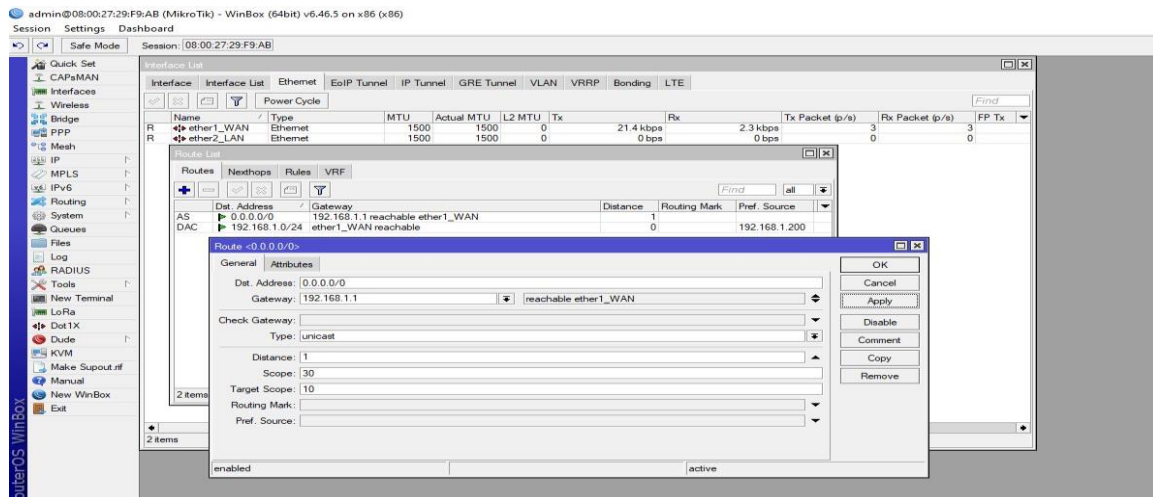


Image 3.9.1: Setting up Gateway.

3.9.6 Setting up DNS

Process:

- IP + DNS + Assign DNS id (Apply 2 or more DNS id)
- Click + apply + Ok

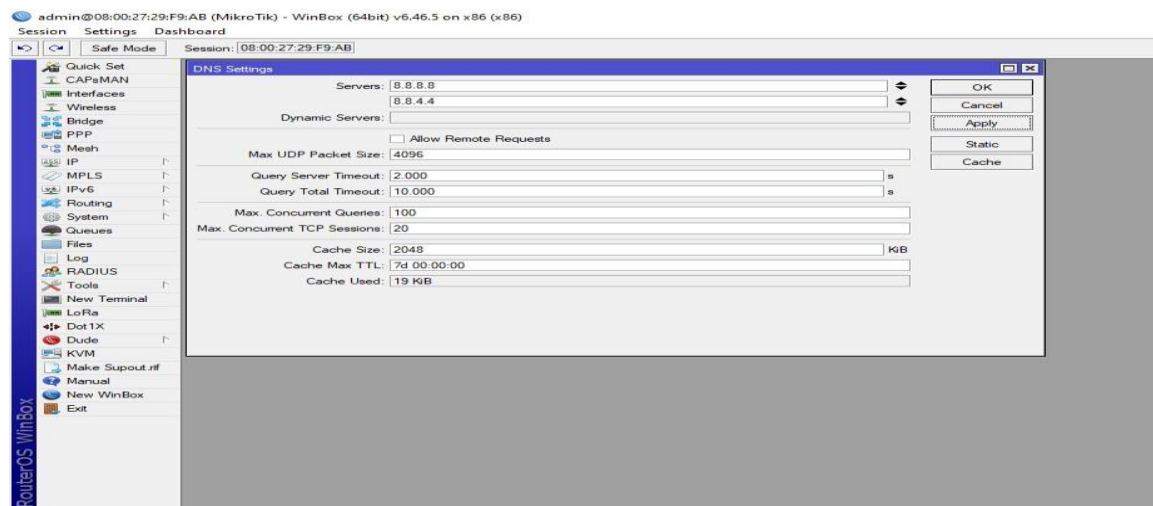


Image 3.9.2: Setting up DNS Id.

3.9.7 Setting up IP Address in LAN Port

- IP + Address + Click +
- Assign (LAN) IP address + Select Interface + Apply + ok

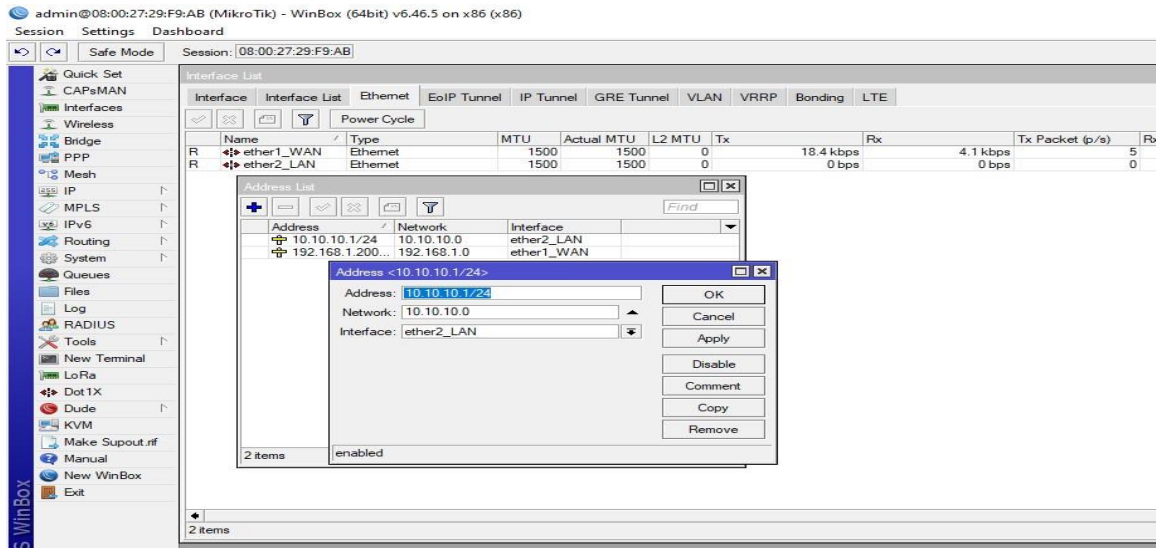


Image 3.9.3: Setting up IP Address in LAN Port.

3.9.8 Setting up NAT

Process:

- IP + Firewall + NAT + Click + + General + srcnat + Address + Out.Interface + ether1-WAN
- Click Action + masquerade + apply + ok

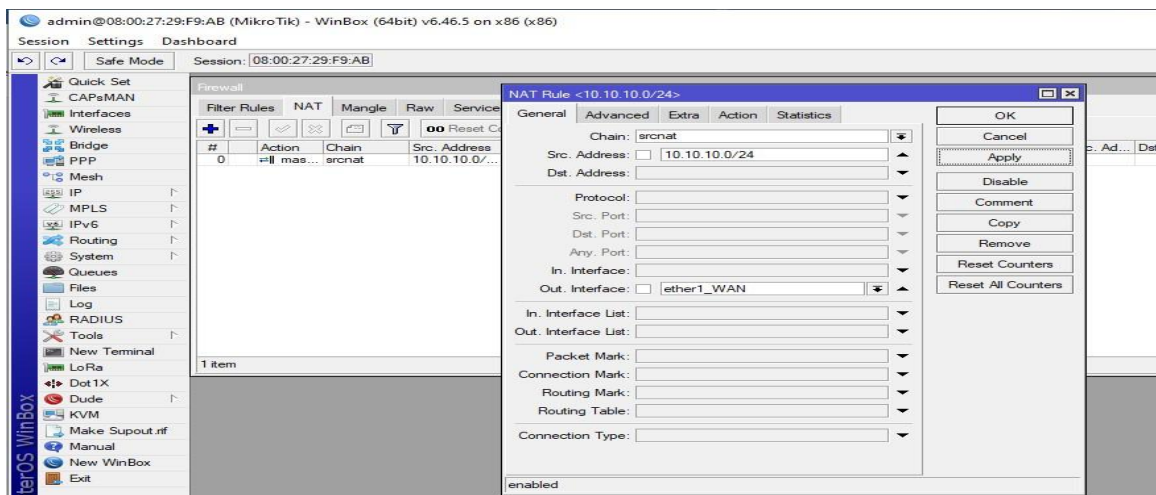


Image 3.9.4: Setting up NAT.

3.9.9 Doing the task of bridging the related ports with each other in Image

Process:

- Bridge + (bridge n, here n=1,2,3)
- Setting
- Mark to the 3 options

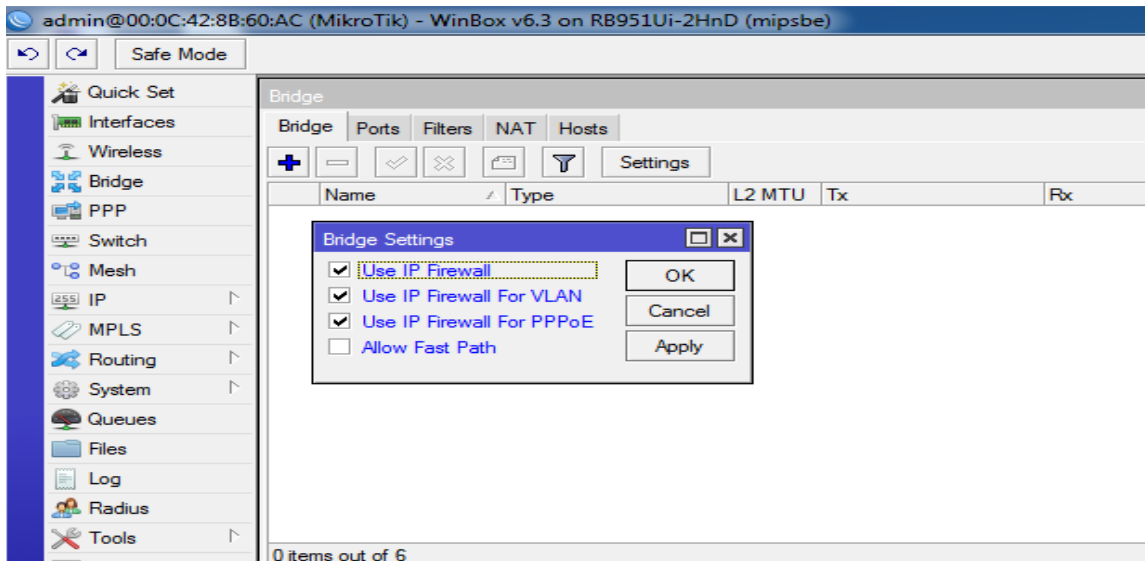


Image 3.9.5: Bridge Settings

3.9.9 Understanding the profile of the bridge with the DHCP Server Setup

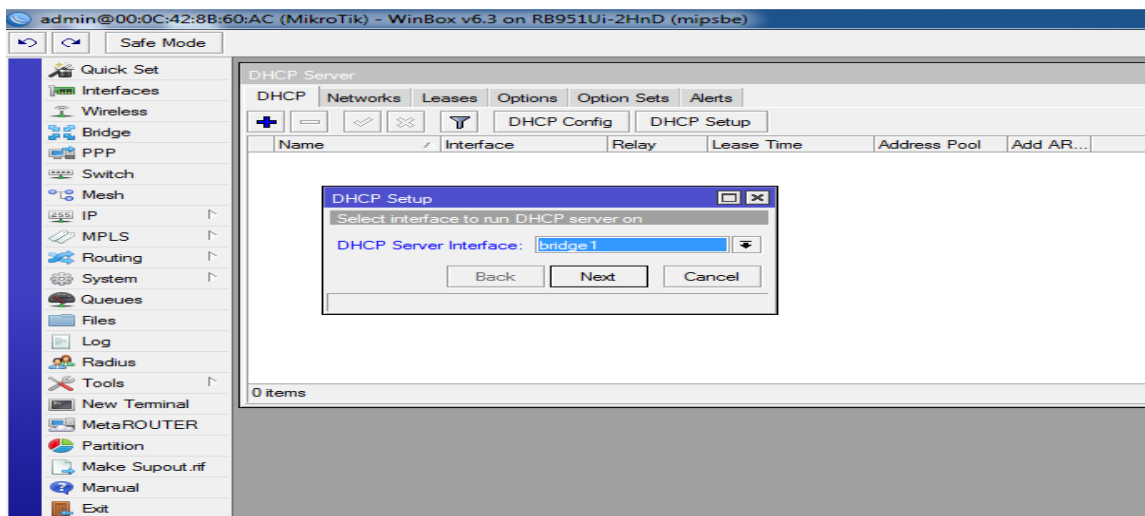


Image 3.9.6: Screen DHCP Setup

CHAPTER 4

Design a Small Office Network

My Contribution to this company is designing a network topology that connects all the devices and the office is always active.

4.1 Network design methodology

The following steps should be always maintained to design and full fill all the requirement of a corporate office network.

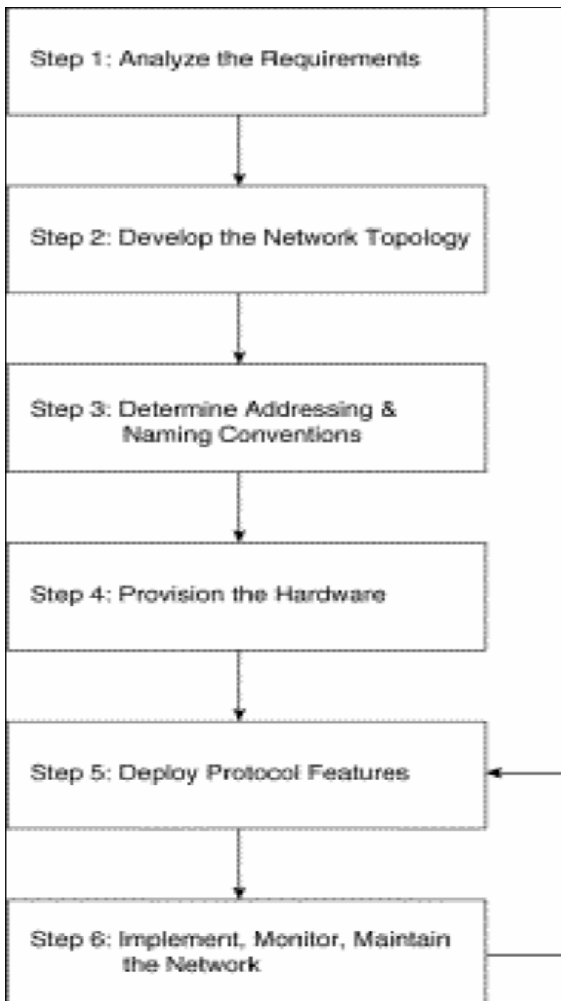


Image 4.1: Design Steps of a Corporate Office Network.

4.2 Requirements for Office

FOR OFFICE:

- Official Use 6 Computer.
- 1 IP Printer.
- 2 IP Phone.
- 1 Data Server.
- 1 Wi-Fi Router.

FOR LAB:

- Lab 1 has Ten Computer and 1 IP Printer.
- Lab 2 has Ten Computer and 1 IP Printer.
- Lab 3 has Ten Computer and 1 IP Printer.

Office Design: Right Side of the Network Diagram.

- Use Computer 4 for Official.
- Use IP Printer for Official.
- Use Two IP Telephone for Official.
- Use One Data Server for Official.
- One Wireless Access Point.
- Use Laptop Connected Over Wi-Fi.
- Use Smartphone for Employee

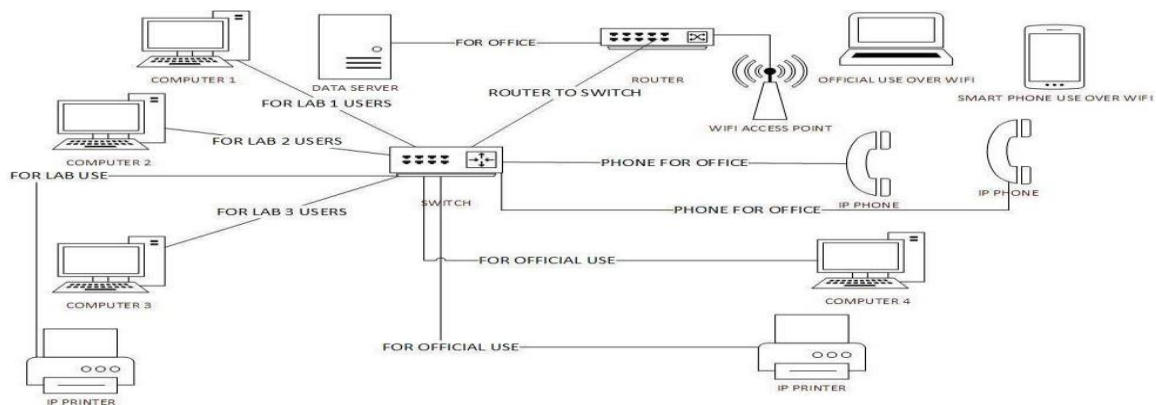


Image 4.2: Network Diagram

CHAPTER 5

Results

5.1 Cisco Packet Tracer

Cisco bundle tracer is a system test system that might be applied in training for arranging affirmations including CompTIA Network+ and Cisco CCENT or CCNA confirmation tests. The product program licenses undergrads to make virtual systems with a large number of a sort organizing devices from switches, switches, end-client contraptions, or even structures reconciliation devices comprehensive of security cameras, movement sensors, lights, and cautions. notwithstanding conventional systems administration labs, I'm ready to furthermore show you how to establish a lab for any of your gadget Integrations guardians turning into an individual from this way with the goal that you can exploit this compelling programming [9]. I exploit the parcel tracer programming project to structure this system. toward the start download the parcel tracer programming program then establishment on my PC physically then I begin to structure the system physically.

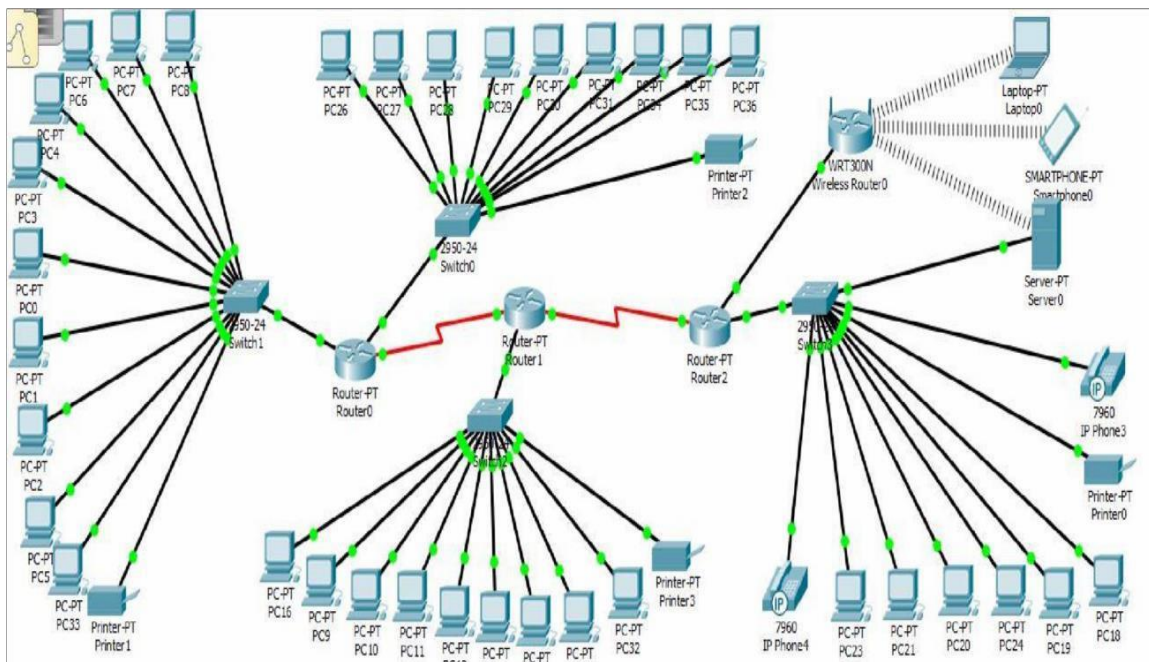
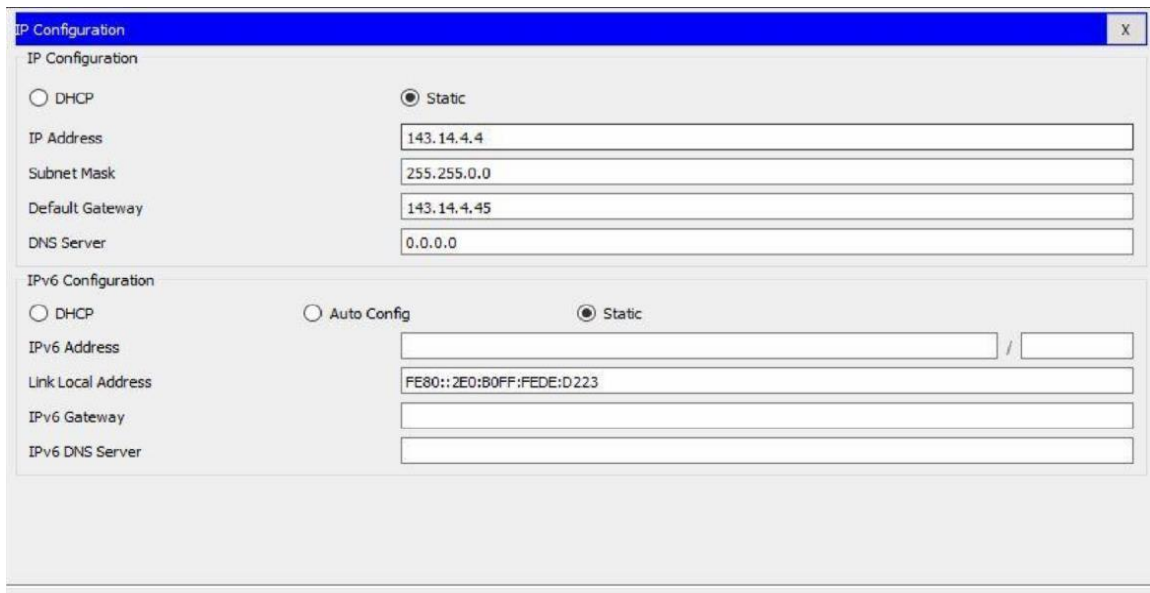


Image 5.1: Final Office Network Tropology

5.2 IP Configuration



IP Configuration

IP Configuration

☐ DHCP ☒ Static

IP Address: 143.14.4.4

Subnet Mask: 255.255.0.0

Default Gateway: 143.14.4.45

DNS Server: 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address: /

Link Local Address: FE80::2E0:B0FF:FEDE:D223

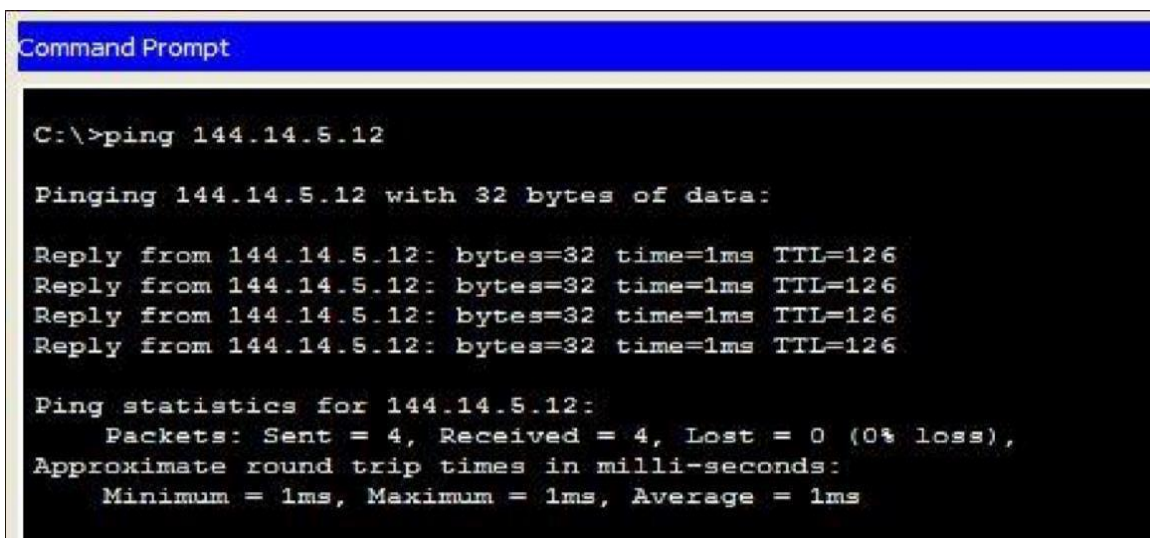
IPv6 Gateway:

IPv6 DNS Server:

Image 5.2: IP Configuration in packet tracer

5.3 Link Check

Ping responds successful



```
C:\>ping 144.14.5.12

Pinging 144.14.5.12 with 32 bytes of data:

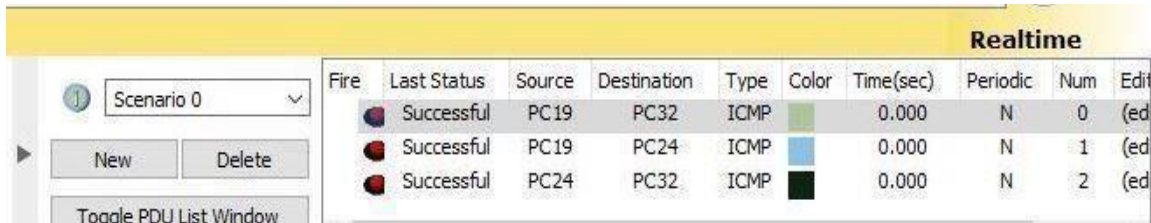
Reply from 144.14.5.12: bytes=32 time=1ms TTL=126
Reply from 144.14.5.12: bytes=32 time=1ms TTL=126
Reply from 144.14.5.12: bytes=32 time=1ms TTL=126
Reply from 144.14.5.12: bytes=32 time=1ms TTL=126

Ping statistics for 144.14.5.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

Image 5.3: Link check using Command Prompt.

5.4 Packet Check

Packet sending successful



Realtime									
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PC19	PC32	ICMP		0.000	N	0	(ed
	Successful	PC19	PC24	ICMP		0.000	N	1	(ed
	Successful	PC24	PC32	ICMP		0.000	N	2	(ed

Image 5.4: Message Sending Check

5.5 Results

I describe project results and will analyze them particularly. We will also describe redundant links and power and backbone monitoring and their backup system to reduce downtime of a network. At last network design topology is runs correctly for small training offices. My contribution is only network design. This project working till now the installation part is not started. All hardware parts and fiber setup works for the transmission team. My assignment is successfully complete.

CHAPTER 6

Conclusion

I got an opportunity to serve the Speed tech online. In many ways and gathered a lot of experience throughout the entire internship period. There was a scope in the field of computer network planning and designing, data and internet connectivity, ensuring network security, different types of application configuration, and maintenance. In this report, I have explained my experiences with Network Designing and Optimization. I have discovered so many good sized processes from my supervisors and co-workers and carried out some duties on an ordinary basis during my complete Internship duration and ultimately earned the confidence to address venture myself. it's far an outstanding possibility to apply the knowledge and skills that I had acquired. I also learned the way to take care of essential faults and got new thoughts. Doing this sort of work is virtually useful for my profession and I love to try this form of paintings once more.

➤ **Appendix:**

➤ **Appendix A: Internship Reflection**

actual getting to know comes on the cease of the working length while I used to be given the possibility to consider what I saw and what I skilled in experimental teaching and internships. I exploit the proper business etiquette to study with the aid of gazing clients and professional etiquette and gaining knowledge of the way to communicate with expert caregivers and another group of workers, as well as an expert within the discipline. I'm imposing the strategic vision of a corporation, how to connect to colleagues, a way to proportion assets, how to arrange, how to make choices, a few technical cognizance's of the business enterprise's surroundings, and the organization's responsibility and responsiveness. The internship revel in on the quilt of my internship manager via an assessment and individual meetings offers a possibility of searching for an expert opinion.

Appendix B: Company Details

Name:	Speed tech online
Address:	Level-02, Speed tech online, Hazi Tower, Badda link road.
Telephone:	02-56522445
E-mail:	info@speedtechonline.com
Website:	www.speedtechonline.com
Organization Type:	Internet Service Provider (ISP)
Number of Employees:	10

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