

INTERNSHIP ON COMPUTER NETWORKING

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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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DAFFODIL INTERNATIONAL UNIVERSITY

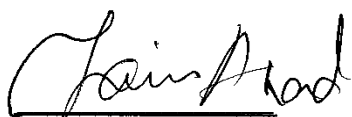
DHAKA, BANGLADESH

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APPROVAL

This Internship titled “**Internship on Computer Networking**”, submitted by **Avishek Mondal**, and ID No: 213-15-4469 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 **16 July 2024**.

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Hereby, I declare that this report has been prepared by me without the assistance of any outside source with the guidance of **Md. Abbas Ali Khan, Assistant Professor, Department of CSE** of Daffodil International University. I also hereby certify that neither this internship report nor any part thereof has been submitted for any other award of any other degree.

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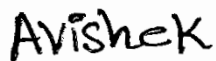
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First of all, I want to thank the name of the great God who has given me the yourt so that I can write this letter keeping myself healthy and is always blessing us with his mercy. First and foremost, I would like to express my sincere gratitude towards my supervisor Sir Respected **Md. Abbas Ali Khan, Assistant Professor, Department of CSE Daffodil International University, Dhaka**. It would have been difficult for me to complete the entire work without this man's support and encouragement. When anyone has encouraged me to carry myself forward and assist me with the right direction. Her tireless and consistent encouragement, direction, consistent supervision, helpful critiques, wise counsel, reading through many poor versions, and correcting them at each step have all contributed toward enabling the completion of this Internship.

Finally, let me express my heartfelt gratitude to the management of One Sky Communication Limited for extending the opportunity to do internship in your reputable company.

I would like to express my gratitude to my Department Head – **Prof. Dr. Sheak Rashed Haider Noori** – sir to let me work under his supervision. I would like to express my gratitude to my colleagues, to whom I have committed the actions of concentrating on the real issue. I extend my heartfelt appreciation to all the members of our course mate in Daffodil International University who contributed to this discussion while they were finishing the course work.

In conclusion, we could not but pay our due respect to parents, who have always been supporting and waiting for us.

ABSTRACT

Here it is necessary to describe skilling or lack of it during the internship and what was learnt from doing it. When i was interning as a Network engineer My field of concentration was to gain more knowledge about the networking and switching, routing, IP addressing, and there are different kind of routing and protocols altogether. Currently new technology is providing chance for many network engineers to be hired. In the same light, the use of the team concept is stretch up to the level of even responding to even minor problems that the Network engineers come across. Personally, in day-to-day working, I have come across different kinds of vendors including CISCO, Juniper, Fortinet, NETGEAR, among others. Wireless have essentially given me reasonable picture of how it is possible to scan a site, what could be the right course for the installation of a new server into the network and Wi-Fi link and the manner in which one can configure an Access Point, Switches Router and how to design a network. For me to be more effective in what I am doing I think that I will have to do further research on what life real project involves. Consequently, I will have to know how an actual project actually will react and is going to be dealt with. Having worked with One Sky Communication Limited the experience earned there can be said to have helped or summed up my future or subsequent careers. The actual problems of the client were the cases being used in the process, another which had to be worked on in the process, another was to gain experiences. The two internships are described here in a chronological breakdown and experiences and Project Analysis of the real-life project aspects and lessons of those internships are also given.

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CHAPTER 1

Introduction

1.1 Introduction of Internship

Nowadays we cannot imagine a single second without internet. The entire period of B.Sc. went well and i opted for internship as i wanted to build my career. An excellent way to develop one's talents is through an internship or real work experience. This can easily be a great opportunity for students who usually get busy packing themselves after university. If every student's had a good mentor during the internship, it would have been better for everyone.

According to the current global business environment, every business organization will be obsolete or will not survive if it does not invest on Information Technology Product and Services. One Sky communication Limited (OSCL) knows that the customers in today's world may be having a big question mark in selecting the right partner or a solution provider who could cater to all their Information and Communication solution needs. NISP stands for Nationwide ISP Company, whose services are distributed in all over the Bangladesh.

They mean that through Internship I get an opportunity to participate in real life office meetings and other functions.

1.2 Objective of Internship

Through Internship I can have an opportunity to work, address real life office meeting and any other occurrence. As a result of the internship, I am able to go to the field through the company's support team and gain real work experience. That's why I can talk to a professional person who may help me to find new contact and explain how to behave in particular situations in business. Communication Skills is most needed in this sector if you want to take yourself to a big place. Coming here, I see some people whom you can smile a lot even if you talk for a while.

1. Know about internet, Cable, Router, Switch, LAN & WAN.
2. To know about different types of Vendors and their devices.
3. The market price of Router.
4. The environment of the industry and manners of the client.
5. Understand the image of networking practical fields.
6. I Saw how the company's own server bandwidth was reaching the customers.

1.3 Motivation of Internship

As a CSE student first of all every one want to be a software engineer or programmer. But I like to be a network engineer. It is really interesting as our whole life is based on computer networks and there are so many things depends on them it is vital to know the functioning of these things. My internship place is One Sky Communication Ltd, which company is doing maintenance every customer requirement with their bandwidth connection all over Bangladesh. In this company most of employers uses win box for Configuration. Firstly, my team members showed me how to set up Box. While doing an internship, i faces across a number of problems. I expected that it's a visional learning opportunity, And I think this job I will become proficient enough to do server maintenance myself. One Sky Communication Limited (OSCL) is an honorable Internet service provider, getting internship option here is a big chance for me.

1.4 Report Layout of Internship

I have Organized my report based on five chapters. Here Each chapter in the report is written with the company standards. Here I Summarizing the chapter with proper details.

1.In the First chapter, I discuss about the introduction of internship, motivation and internship objectives of One Sky Communication Limited. Where I mentioned work with support team.

2.In the Second chapter, I have tried to share a brief overview overall and have laid out a structure of the company.

3.In the middle-of- the chapter, I described the continuity of work from the beginning to end of the company.

4.In the fourth chapter, I highlighted my achievements, smart plan, and reflection in the company.

5.The last chapter, I mention the Conclusion and how to build the company in light of the bright future.

CHAPTER 2

INTERNSHIP ORGANIZATION

2.1 Company Introduction

One Sky Communication Limited (OSCL) is a one stop IT solution company with its services ranging from connectivity, solution and power. The company is running its operation through innovation, respect, accountability, reliability and many more. It started its journey with these 3 Strategic Business Units.

Its connectivity wing ensures the internet and Data connectivity across the country, targeting the enterprise segment over confirming 99.98% up time backed by 24/7 call center along the highly specialized support and solution technical team. Established prudent technology enables OSCL to ensure connectivity quality for scalability, smooth trouble identifying and shooting and onward maintenance.

2.2 One Sky Communication Limited Services

Currently, One Sky Communication Limited is one of the top ISPs in Bangladesh with a reputation for reliability. They Provide the highest quality service to their clients.



Figure2.2: Company services

2.3 SWOT Analysis

SWOT stands for strengths, Weaknesses, Opportunities, and Threats. SWOT analysis captures forces inside the environment as well as forces outside the environment and those presently facing an organization and those that may emerge in the future.

Strengths and weakness are the internal part of an organization. For a company to survive in this competitive market, these two are first and foremost necessary.

Opportunities and threats are the external part of an organization. To improve management and business performance, Opportunities are never missed. The threat is enough to jeopardize any company's competitive advantages.



Figure 2.3: Swot analysis

2.4 Organizational Structure: Organizational structure of One Sky Communication Limited shows given below in figure:

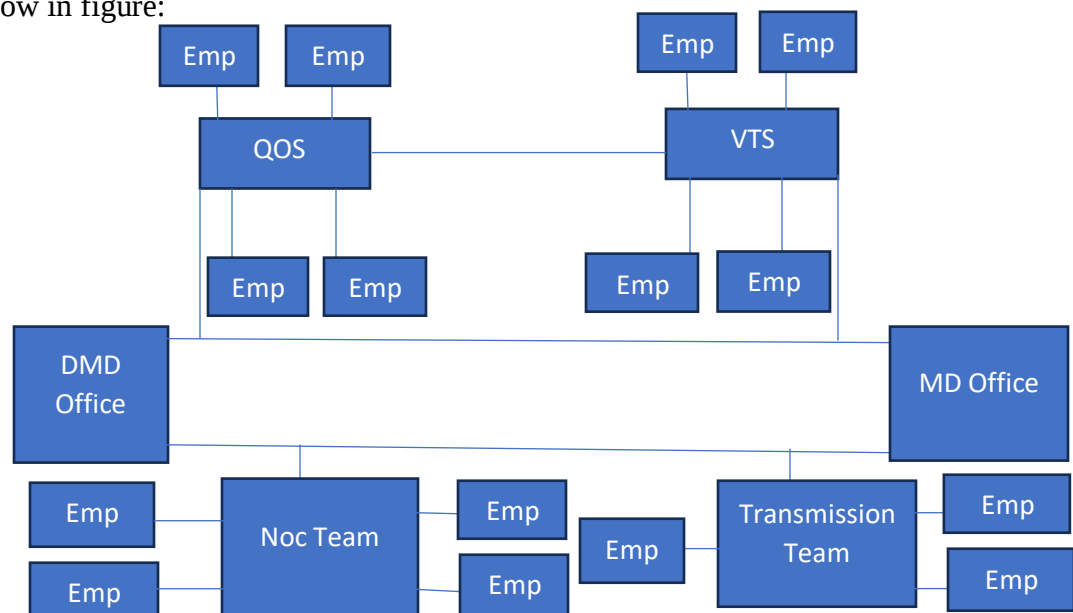


Figure 2.4: Organization Structure

CHAPTER 3

TASKS, EVENTS AND ACTIVITIES

3.1 Daily: Tasks and activities

Month1: During the time I have spent working at One Sky Communication Ltd I have gained extensive knowledge on the following topics, starting from the basic understanding of networking.

- The OSI with respect to the TCP/IP model
- IP Addressing and Subnetting
- Information Of Routing and It's Protocol

Month2: In the Second Month at One Sky Communication Ltd I learned about the following steps from helping the company with various tasks to how an internet connection reaches to a client.

- Static
- Dynamic
- Rip version 1
- Rip version 2
- Eigrp
- Vlan
- Ospf
- Cisco Enterprise Level Router and Its Functionality

Month3: In the Third Month at One Sky Communication Ltd I realized the different images of real work.

- MikroTik Router Configuration
- MikroTik Wan and Lan Connectivity up

3.2 OSI Model And TCP/IP Protocol

OSI Model:

Open System interconnection Stands for OSI. OSI Mode is basically an open standard. Based on which networking devices are built. When a sending computer sends data, the data travels through many medium to reach the destination computer. Certain rules are defined to ensure that data travels from source to destination without errors. These rules are called protocol. And the model made with this protocol is called OSI Model. The OSI data model provides a universal language for computer networking, so diverse technologies can communicate using standard protocols or rules of communication. Every technology in a specific layer must provide certain capabilities and perform specific functions to be useful in networking.

The OSI Model can be subdivided into the following seven Layers:

7. Application Layer
6. Presentation Layer
5. Session Layer
4. Transport Layer
3. Network Layer
2. Data Link Layer
1. Physical Layer

OSI Model-The Upper Layers:

A large portion of OSI Models top three layers is often loaded at the top which deals with application tasks:

- The seventh layer is known as Application Layer.
- The sixth layer is commonly referred as a presentation Layer.
- The fifth layer is session Layer from the bottom.

OSI Model-The Lower Layers:

The rest of the layers of the OSI model are bottom – loaded which have to do the related job.

- Transport Layer (layer 4)
- Network Layer (layer 3)
- Data Link Layer (layer2)
- Physical Layer (layer1)

Application Layer:

- Excluding remote sharing and file access.
- Inter Process Communication
- Directory services
- Electronic messaging
- Remote Procedure call support

Presentation Layer:

- Presentation layer format of data to be transmitted across the network while it also encrypts the data.
- Presentation layer also includes function of translating, converting, and presenting the data for processing.

Session Layer:

- Inter-have correspondence
- Establishment, oversees information
- It can also give session closer between many applications as well.

Transport Layer:

- Data transport unwavering quality framework
- End to end association unwavering quality
- Information and stream control

Network Layer:

- Handles the routing and sending of data between different networks.
- The most important protocols at this layer are IP and ICMP.
- Full duplex operation control Handle on data packet sizing as it is within flexibility but constrained by the network.

Data link Layer:

- Framing and Synchronization of data bits.
- Controlling data errors
- Controlling the flow of data
- Arrange the Links

Physical Layer:

- Binary transmission data
- Connectors
- Voltages
- Data rates
- Through wires

TCP/IP Model:

The main work of TCP/IP is to transfer the data of a computer from one device to another. The main condition of this process is to make data reliable and accurate so that the receiver will receive the same information which is sent by the sender. To ensure that, each message reaches its final destination accurately, the TCP/IP model divides its data into packets and combines them at the other end, which helps in maintaining the accuracy of the data while transferring from one end to another end.

Protocols:

A network protocol is a standard that describes the way of organizing data into packages, transmitting and receiving these packages between endpoints of a computer network, which can be a computer, a server or a router and can be a virtual one. We know different types of protocol's are using in OSI Model.

- i. HTTP-Hypertext Transfer Protocol.
- ii. FTP-File Transfer Protocol.
- iii. SMTP-Simple Mail Transfer Protocol.

3. 3 IP Addressing and Subnetting

IP Address:

IP address means internet protocol address. It is an identifying number that is associated with a specific computer or computer network. It is basically used to contain anything related to location. No pairing of devices to enhance two-way communication. The internet requires a process to distinguish between different networks, routers, and websites. The internet has special needs for different networks, routers and web sites. Therefore, IP addresses provide the mechanism of doing so, and it forms an indispensable part in the working of the internet.

The process of IP address works in the following way:

- i. My computer, smartphone or any other wi-fi enabled devices are all connected to a network first and then connected to the internet. The network is responsible for the giving the device access to the internet.
- ii. Your ISP is responsible to generate the IP address for your device.
- iii. Your IP address can change. The ISP can change the range of this IP address if it wants.
- iv. As soon as you leave home, your address changes and the IP also changes. Then the network on your device changes.

There are two types of IP Address:

- 1. IPV4 (32bits).
- 2. IPV6 (128bits).

We are most familiar with IPV4, because we still see most of the ISP using IPV4 version IP.

1. IPv4:

The IPv4 address is a 32-bit number that uniquely identifies a network interface on a machine. An IPv4 address is typically written in decimal digits, formatted as four 8-bit fields that are separated by periods. Each 8-bit field represents a byte of the IPv4 address. It is represented by 4 numbers separated by dots in the range of 0-255, which have to be converted to 0 and 1, to be understood by Computers. For Example, An IPv4 Address can be written as 192.168.10.100.



Figure 3.3.1: IPv4 address format

2. IPv6:

IPv6 operates with 128-bit addresses. Each address includes eight different groups of strings, and every group has four characters divided by a colon. IPv6 is a latest version of Internet Protocol and as we can clearly see it is less complicated and more efficient as compared to IPv4. IPv6 is eight hexadecimal numbers put together in a group.

ABCD: EF01: 2024: 6789: ABCD: B201: 5482: D024

Figure 3.3.2: IPv6 address format

We can divide the IP address into 3 main categories based on the class. They are -

- Class A
- Class B
- Class C

Class A: Class A Configuration has 8 bits for network and 24 bits for host.

TABLE 1: This means Class A network bit and host bit

Octonary 1(8bit)	Octonary 2 (8bit)	Octonary 3 (8bit)	Octonary 4 (8bit)
Network	Host	Host	Host

Class B: The format of Class B is the network bit is 16 and the host bit is 16.

TABLE 2: In the class B the network bit and the host bit are present

Octonary 1 (8bit)	Octonary 2 (8bit)	Octonary 3 (8bit)	Octonary 4 (8bit)
Network	Network	Host	Host

Class C: In Class C, the network portion is 24 bits and host portion are 8 bits.

TABLE 3: The class C network bit and host bit refer to the network addresses

Byte 1 (8bit)	Byte 2 (8bit)	Byte 3 (8bit)	Byte 4 (8bit)
Network	Network	Network	Host

3.4 Public IP Address

A public IP address is an address that is provided by your internet service provider (ISP) to your network. On the internet, it recognizes your device. The internet is accessed through your router's public IP address. Public IP addresses are commonly used by publicly accessible enterprises or companies such as websites, DNS server.

3.5 Private IP Address

A private IP is a type of IP address that acts like a local network. We can see the network connection in enterprises, offices, or residents. All devices such as smartphones, printers, computers, or tablets connected through this private IP address. A private IP address helps routers and devices identify each other and the ISP company change the client router IP address when they face slow netting issue.

Address ranges to be use by private networks are:

Class A: 10.0.0.0 to 10.255.255.255

Class B: 172.16.0.0 to 172.31.255.255

Class C: 192.168.0.0 to 192.168.255.255

3.6 Subnetting

Subnetting is the division of a large enterprise -level network into smaller segments for security purposes. Subnets are the legal small parts of IP (Internet Protocol) Addressing process Subnetting should be done in such a way that does not gets affected by the enterprise- level network. Subnets are intended by permissive portion from the IP address host portion and in these use to the great greater and small subnetwork for the first network. Subnetting assists the organization to deal with traffic since it is used to conceal complications in a network. Sub network is elemental when a retired association number, as should be cornered over all to the LAN, is providing.

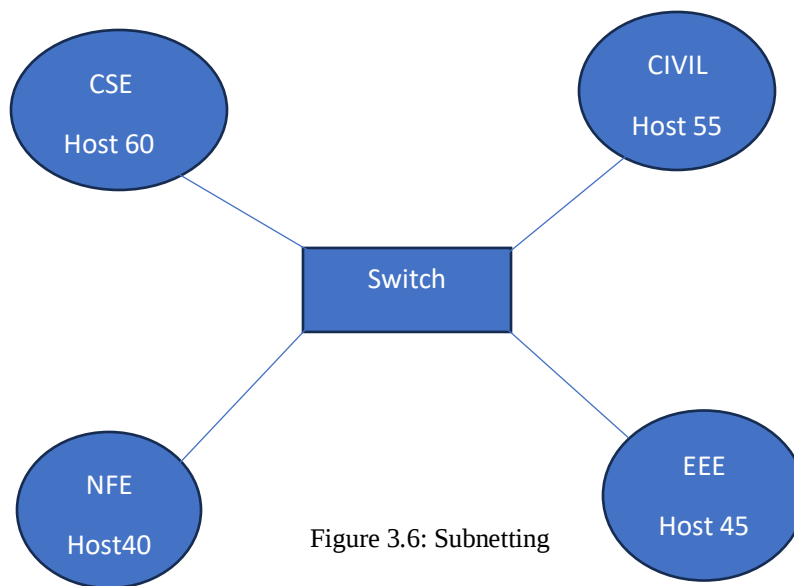


Figure 3.6: Subnetting

ISP company provides the IP 172.16.10.0/16

CSE Host-60

Number of hosts = $2^6 - 2$
= 62

Network Address = 172.16.10.0/18

Subnet Mask = 11111111. 11111111. 11000000. 00000000
= 255.255.192.0

1st subnet = 172.16.1.0

last subnet = 172.16.62.0

Broadcast Address = 172.16.63.0

Civil Host-55

Number of hosts= 2^6-2

=62

Network Address=172.16.10.0/18

Subnet Mask= 11111111. 11111111. 11000000. 00000000

= 255.255.192.0

1st subnet =172.16.65.0

last subnet =172.16.126.0

Broadcast Address =172.16.127.0

NFE Host-40

Number of hosts= 2^6-2

=62

Network Address=172.16.10.0/18

Subnet Mask= 11111111. 11111111. 11000000. 00000000

= 255.255.192.0

1st subnet =172.16.129.0

last subnet =172.16.190.0

Broadcast Address =172.16.191.0

EEE Host-30

Number of hosts= 2^5-2

=30

Network Address=172.16.10.0/19

Subnet Mask= 11111111. 11111111. 11100000. 00000000

=255.255.224.0

1st subnet =172.16.193.0

last subnet =172.16.222.0

Broadcast Address =172.16.223.0

3.7 Routing Information and Routing Protocol

Router:

A Router is a device that connects two or more packet-switched networks or subnetworks. It serves two primary functions: (i) Managing traffic between these networks by forwarding data packets to their intended IP addresses (ii) Allowing multiple devices to use the same Internet connection.

The Best Wi-Fi Routers List:

1. TP-Link Archer AX55.
2. Asus ROG Rapture GT-AX11000.
3. Net gear Orbi Wi-Fi 6E (RBKE963)
4. TP-Link Deco X20.

The Main Routing Protocol are:

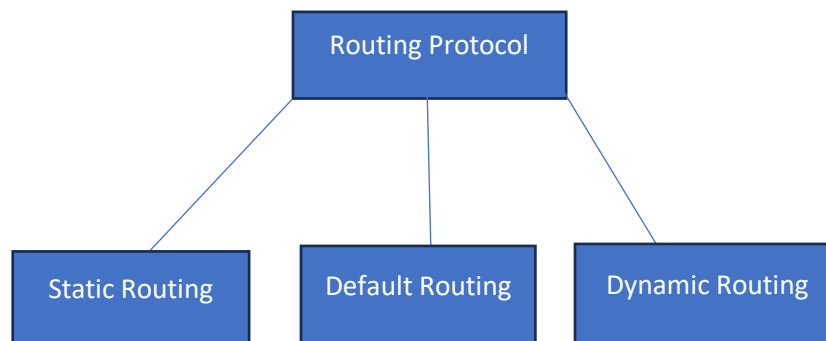


Figure 3.7: Types of Routing protocol

3.8 Static Routing

Network administrators typically choose static routing when there is only one path from router and traffic is controlled through that path. A small routing table is sufficient since static routing entries are usually not multiple.

Static Routing Configuration for R1= 50, R3=10 & R2=2 hosts:

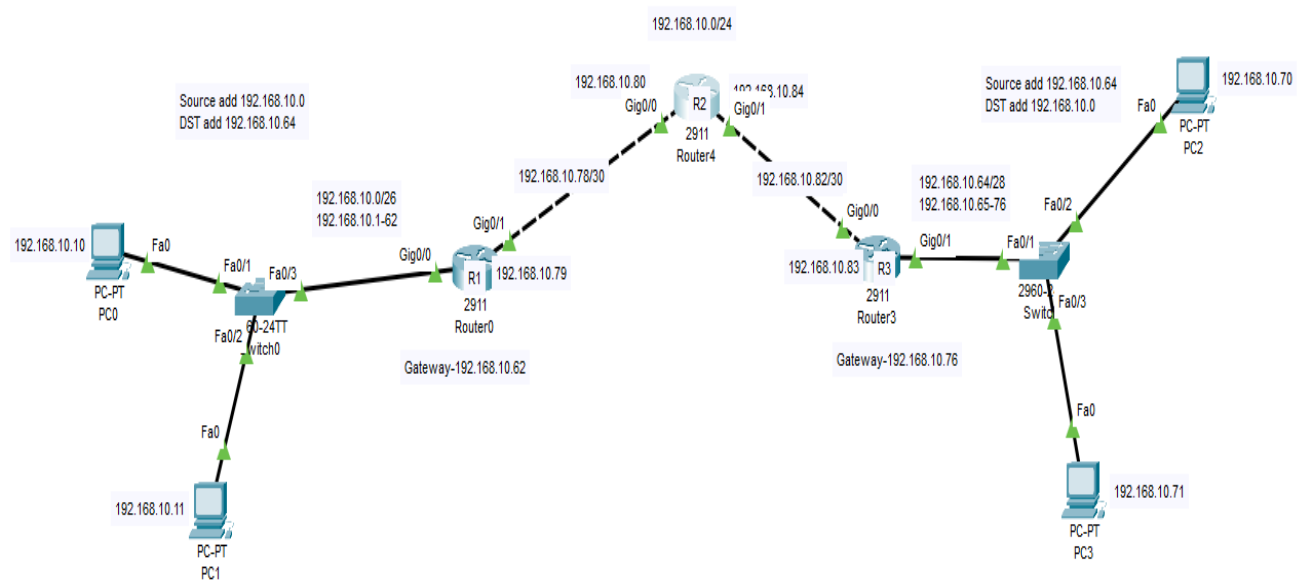


Figure 3.8: Static Routing

During Configuration in static router here using with IP route as a command in R1 Router:

```

Physical  Config  CLI  Attributes
IOS Command Line Interface

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/3
%Invalid interface type and number
Router(config)#hostname R1
R1(config)#interface gi0/0
R1(config-if)#ip address 192.168.10.62 255.255.255.192
R1(config-if)#no shut

R1(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface gi0/1
R1(config-if)#ip address 192.168.10.79 255.255.255.252
Bad mask /30 for address 192.168.10.79
R1(config-if)#no shut

R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip route 192.168.10.0 255.255.255.252 192.168.10.64
R1(config)#no ip add
^
% Invalid input detected at '^' marker.

R1(config)#
R1(config)#ip route 192.168.10.64 255.255.255.252 192.168.10.80
R1(config)#
  
```

3.9 Default Routing

When a router doesn't have a predetermined destination, by default a path is created from one hop to the next hop count. This method is called default routing. The main reason for using the default router is to ensure that packets are sent equally at each hop.

Default routing configuration:

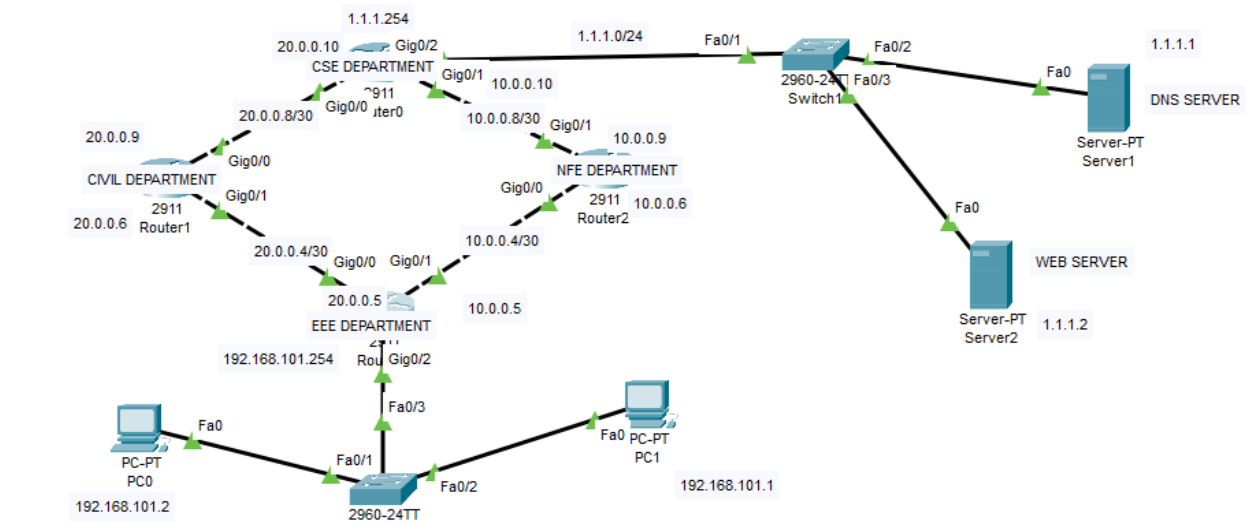


Figure 3.9: Default Routing

During Configuration in default router using default network IP in EEE router:

```
Physical Config CLI Attributes
IOS Command Line Interface

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname EEE
EEE(config)#inter
EEE(config-if)#ip address 192.168.101.254 255.255.255.0
EEE(config-if)#exit
EEE(config)#interface gi0/0
EEE(config-if)#ip address 20.0.0.5 255.255.255.252
EEE(config-if)#no shut

EEE(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

EEE(config-if)#exit
EEE(config)#interface 10.0.0.5 255.255.255.252
% Invalid input detected at '^' marker.

EEE(config)#interface gi0/1
EEE(config-if)#ip address 10.0.0.5 255.255.255.252
EEE(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

EEE(config-if)#no shut

EEE(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

EEE>ena
EEE#conf t
Enter configuration commands, one per line. End with CNTL/Z.
EEE(config)#ip route 0.0.0.0 0.0.0.0 20.0.0.6
EEE(config)#
```

3.10 RIP version 1

Rip version 1 is a type of classful routing protocol information that doesn't specify the subnet of a hierarchical router.

Rip version 1 configuration:

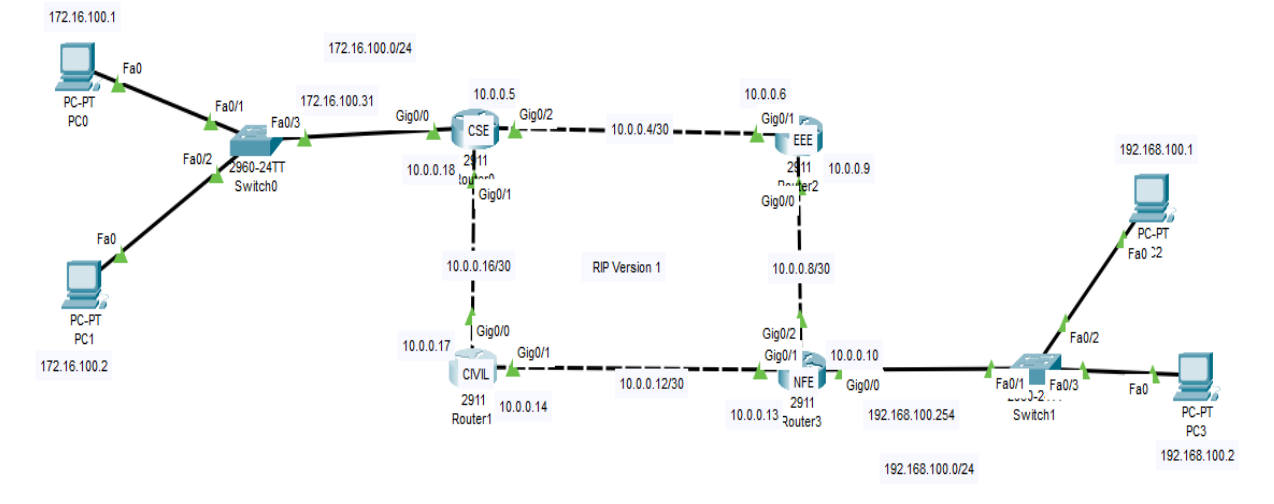


Figure 3.10: Rip version 1

During configuration in Rip version 1 using only router rip command in CSE router:

```
Physical  Config  CLI  Attributes
IOS Command Line Interface

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname CSE
CSE(config)#interface gi0/0
CSE(config-if)#ip address 172.16.100.31 255.255.255.0
CSE(config-if)#no shut

CSE(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

CSE(config-if)#exit
CSE(config)#interface gi0/2
CSE(config-if)#ip address 10.0.0.5 255.255.255.252
CSE(config-if)#no shut

CSE(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/2, changed state to up

CSE(config-if)#exit
CSE(config)#interface gi0/1
CSE(config-if)#ip address 10.0.0.10 255.255.255.252
CSE(config-if)#no shut

CSE(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/1, changed state to up

CSE>en
CSE#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CSE(config)#router rip
CSE(config-router)#no auto
CSE(config-router)#no auto-summary
CSE(config-router)#network 10.0.0.4
CSE(config-router)#network 10.0.0.16
CSE(config-router)#network 172.16.100.31
CSE(config-router)#passive
CSE(config-router)#passive-interface gi0/0
CSE(config-router)#
```

3.11 RIP version 2

Rip version 2 is a classless and distance vector routing protocol that includes all subnet masks with update to routers on the network.

Rip version 2 Configuration:

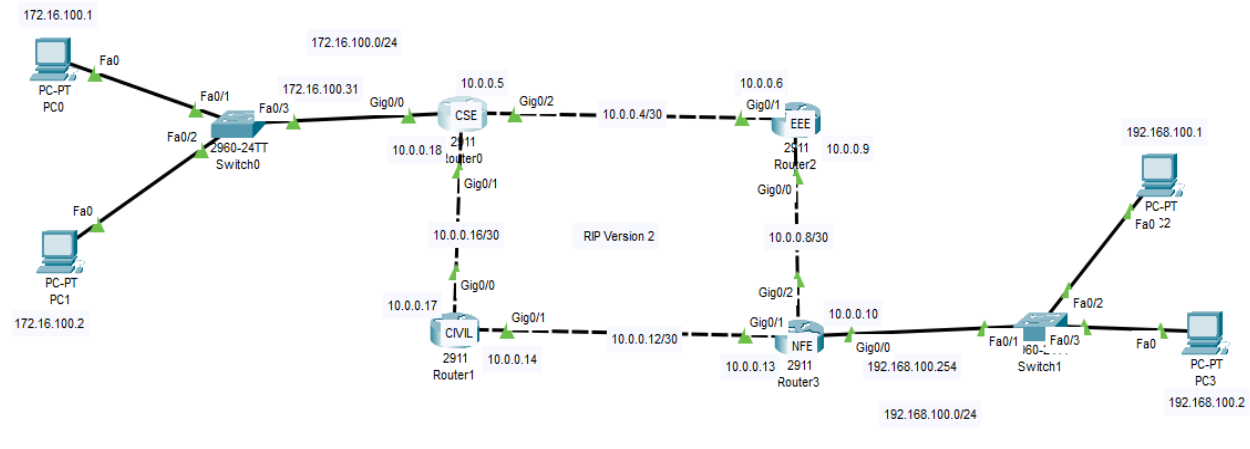


Figure 3.11: RIP version 2

During configuration in Rip version 2 using router rip and must use version 2 command in CSE router:

```
Physical Config CLI Attributes
IOS Command Line Interface

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname CSE
CSE(config)#interface gi0/0
CSE(config-if)#ip address 172.16.100.31 255.255.255.0
CSE(config-if)#no shut

CSE(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

CSE(config-if)#exit
CSE(config)#interface gi0/2
CSE(config-if)#ip address 10.0.0.5 255.255.255.252
CSE(config-if)#no shut

CSE(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/2, changed state to up

CSE(config-if)#exit
CSE(config)#interface gi0/1
CSE(config-if)#ip address 10.0.0.18 255.255.255.252
CSE(config-if)#no shut

CSE(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/1, changed state to up

CSE>en
CSE#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CSE(config)#router rip
CSE(config-router)#version 2
CSE(config-router)#no auto
CSE(config-router)#no auto-summary
CSE(config-router)#network 10.0.0.4
CSE(config-router)#network 10.0.0.16
CSE(config-router)#network 172.16.100.0
CSE(config-router)#passive
CSE(config-router)#passive-interface gi0/0
CSE(config-router)#
```

3.12 EIGRP

Enhanced Interior Gateway Routing Protocol is a new Cisco invention where wild card masks are used to eliminate the complexity of using subnet masks and establish connections from one router to its neighboring routers. EIGRP carries the characteristics of both distance vector and link state simultaneously. EIGRP is widely used in enterprise level networks.

EIGRP Configuration:

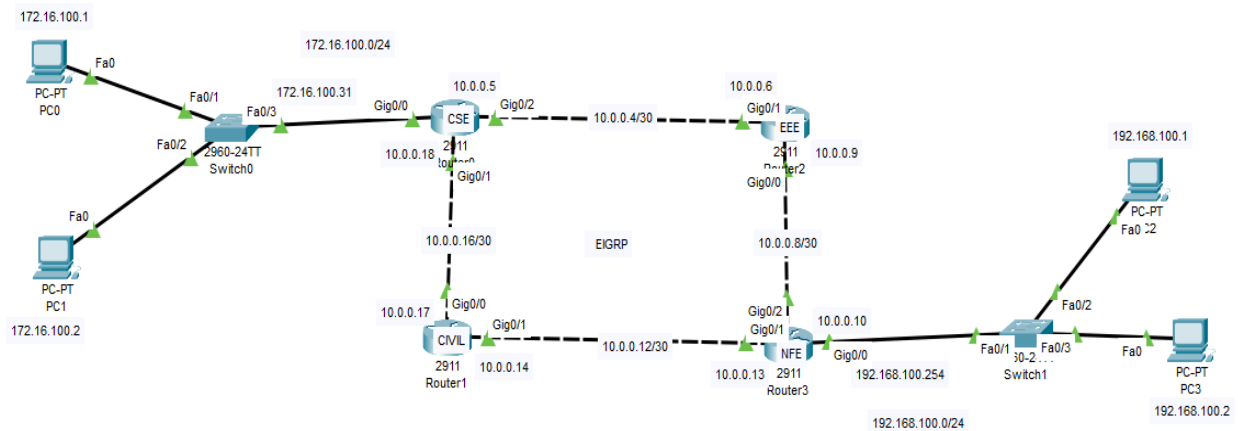


Figure 3.12: EIGRP

During Configuration of EIGRP using wild card mask as an alternative to subnet mask in CSE Router:

```
Physical Config CLI Attributes
IOS Command Line Interface

Would you like to enter the initial configuration dialog? [yes/no]: no
Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname CSE
CSE(config)#interface gi0/0
CSE(config-if)#ip address 172.16.100.31 255.255.255.0
CSE(config-if)#no shut

CSE(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

CSE(config-if)#exit
CSE(config)#interface gi0/2
CSE(config-if)#ip address 10.0.0.5 255.255.255.252
CSE(config-if)#no shut

CSE(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up

CSE(config-if)#exit
CSE(config)#interface gi0/1
CSE(config-if)#ip address 10.0.0.18 255.255.255.252
CSE(config-if)#no shut

CSE(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

CSE#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CSE(config)#router eigrp 60
CSE(config-router)#no auto
CSE(config-router)#no auto-summary
CSE(config-router)#network 172.16.100.0 0.0.0.255
CSE(config-router)#network 10.0.0.4 0.0.0.3
CSE(config-router)#network 10.0.0.16 0.0.0.3
CSE(config-router)#passive
CSE(config-router)#passive-interface gi0/0
CSE(config-router)#
```

3.13 VLAN

Commonly, the concept of customizing the network or sharing the network between multiple local areas is called VLAN. The process of sharing through broadcast domain switches on layer 3 devices is VLAN.

Configuration of VLAN:

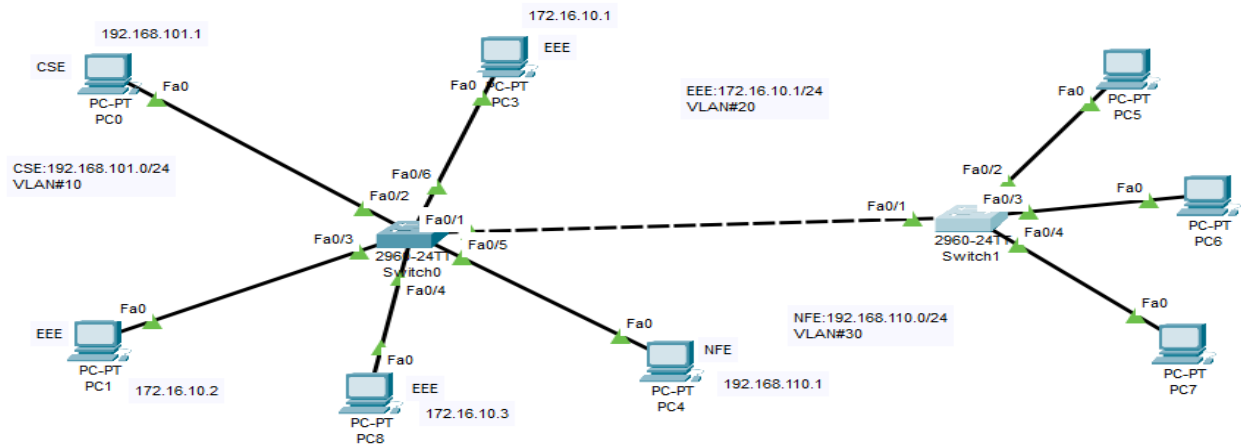


Figure 3.13: VLAN

During Configuration in VLAN CSE under 10 VLAN , EEE under 20 VLAN and NFE under 30 VLAN for Switch 1 :

```
Physical  Config  CLI  Attributes
IOS Command Line Interface

Switch(config)#hostname SW-1
SW-1(config)#vlan 10
SW-1(config-vlan)#name CSE
SW-1(config-vlan)#exit
SW-1(config)#int fa0/2
SW-1(config-if)#des
SW-1(config-if)#description CSE
SW-1(config-if)#sw
SW-1(config-if)#switchport m
SW-1(config-if)#switchport mode a
SW-1(config-if)#switchport mode access
SW-1(config-if)#sw
SW-1(config-if)#switchport a
SW-1(config-if)#switchport access vlan 10
SW-1(config-if)#exit
SW-1(config)#vlan 20
SW-1(config-vlan)#name EEE
SW-1(config-vlan)#exit
SW-1(config)#int fa0/6
SW-1(config-if)#des
SW-1(config-if)#description EEE
SW-1(config-if)#sw
SW-1(config-if)#switchport m
SW-1(config-if)#switchport mode a
SW-1(config-if)#switchport mode access
SW-1(config-if)#sw
SW-1(config-if)#switchport a
SW-1(config-if)#switchport access vlan 20
SW-1(config-if)#exit
SW-1(config)#vlan 30
SW-1(config-vlan)#name NFE
SW-1(config-vlan)#exit
SW-1(config)#int fa0/5
SW-1(config-if)#des
SW-1(config-if)#description NFE
SW-1(config-if)#swit
```

During Configuration in VLAN Trunk access mode use in Switch 2 :

Physical Config **CLI** Attributes

IOS Command Line Interface

```

SW-2(config-if)#exit
SW-2(config)#vlan 20
SW-2(config-vlan)#name EEE
SW-2(config-vlan)#exit
SW-2(config)#int fa0/3
SW-2(config-if)#des
SW-2(config-if)#description EEE
SW-2(config-if)#switchport mode access
SW-2(config-if)#switchport access vlan 20
SW-2(config-if)#exit
SW-2(config)#vlan 30
SW-2(config-vlan)#name NFE
SW-2(config-vlan)#exit
SW-2(config)#int fa0/4
SW-2(config-if)#des
SW-2(config-if)#description NFE
SW-2(config-if)#switchport mode access
SW-2(config-if)#switchport access vlan 30
SW-2(config-if)#exit
SW-2(config)#int
SW-2(config)#interface fa0/1
SW-2(config-if)#sw
SW-2(config-if)#switchport m
SW-2(config-if)#switchport mode tr
SW-2(config-if)#switchport mode trunk

SW-2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

SW-2(config-if)#
SW-2(config-if)#sw
SW-2(config-if)#switchport tr
SW-2(config-if)#switchport trunk allo
SW-2(config-if)#switchport trunk allowed vlan all
SW-2(config-if)#

```

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3.14 OSPF

The full form of the lettering OSPF is Open Shortest Path First. It used the Link state algorithm where if the router domain has to be decided, then the next step is to find path. Normally here the router sends LSA information to another router LSA.

Configuration of OSPF:

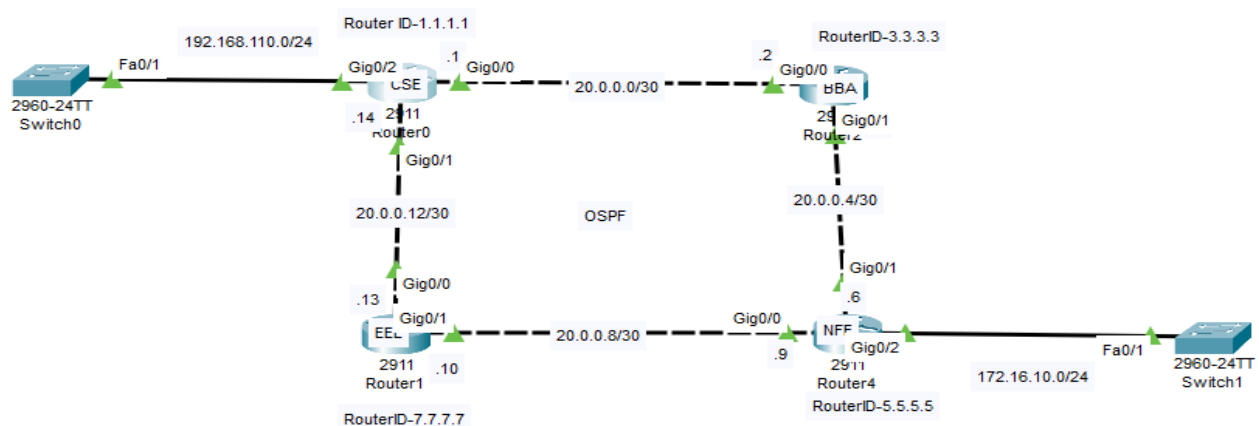


Figure 3.14: OSPF

During Configuration in OSPF a single area network is add with the network address:

```
Physical  Config  CLI  Attributes

IOS Command Line Interface

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname CSE
CSE(config)#interface gi0/0
CSE(config-if)#ip address 172.16.100.31 255.255.255.0
CSE(config-if)#no shut

CSE(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
CSE(config-if)#exit
CSE(config)#interface gi0/2
CSE(config-if)#ip address 10.0.0.5 255.255.255.252
CSE(config-if)#no shut

CSE(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up
CSE(config-if)#exit
CSE(config)#interface gi0/1
CSE(config-if)#ip address 10.0.0.18 255.255.255.252
CSE(config-if)#no shut

CSE(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
CSE#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
CSE(config)#router eigrp 60
CSE(config-router)#no auto
CSE(config-router)#no auto-summary
CSE(config-router)#network 172.16.100.0 0.0.0.255
CSE(config-router)#network 10.0.0.4 0.0.0.3
CSE(config-router)#network 10.0.0.16 0.0.0.3
CSE(config-router)#passive
CSE(config-router)#passive-interface gi0/0
CSE(config-router)#
```

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3.15 Cisco Enterprise Router and Its Functionality



Figure 3.15: Cisco 4000 Series Enterprise Router

01.Performance:

- i. Aggregate Throughput: Ranges from 50 Mbps to 100 Gbps depending on the model and configuration.
- ii. Forwarding Performance: Up to 2 Gbps to 200 Gbps.
- iii. Cisco UCS-E Series Integrated Services Module (ISM) Performance Varies by module type and configuration.

02.Form Factors:

- i. Rack Unit (RU) Models: ISR 4321, ISR 4331
- ii. Rack Unit (RU) Models: ISR 4351, ISR 4431, ISR 4451

03.Routing and Services:

- i. Supported Protocols: IPv4, IPv6, BGP, OSPF, EIGRP, MPLS, etc.
- ii. Integrated Services: VPN, Zone-Based Firewall, Quality of Service (QoS), Application Visibility and Control, Network Address Translation (NAT), etc.

04.Scalability:

- i. Interface Types: Ethernet, T1/E1, T3/E3, Serial, etc.
- ii. Service Containers: Support for hosting network services directly on the router.

05.Security:

- i. Hardware-based Encryption
- ii. Secure Boot
- iii. Control Plane Protection
- iv. Access Control Lists (ACLs)

06.Management:

- i. Management Protocols: SNMP, SSH etc.
- ii. Cisco Prime Infrastructure Support.

07.Redundancy and High Availability:

- i. Redundant Power Supplies
- ii. In-Service Software Upgrade

08.Vendor Home in Bangladesh:

- i. StartechBD
- ii. BdSTALL
- iii. Flora limited etc.

3.16 MikroTik Router Configuration

MikroTik is a company that offers hardware and software solutions for networks. Its flexibility, security, scalability or simple on update method. MikroTik devices support a variety of network protocols and standards, ensuring compatibility with a variety of environments and equipment. Working as a support engineer must know Mikrotik configuration. Routers that can be used at home or in large industrial factories, if for some reason they draw less load, they immediately inform the company and we always have to be ready.

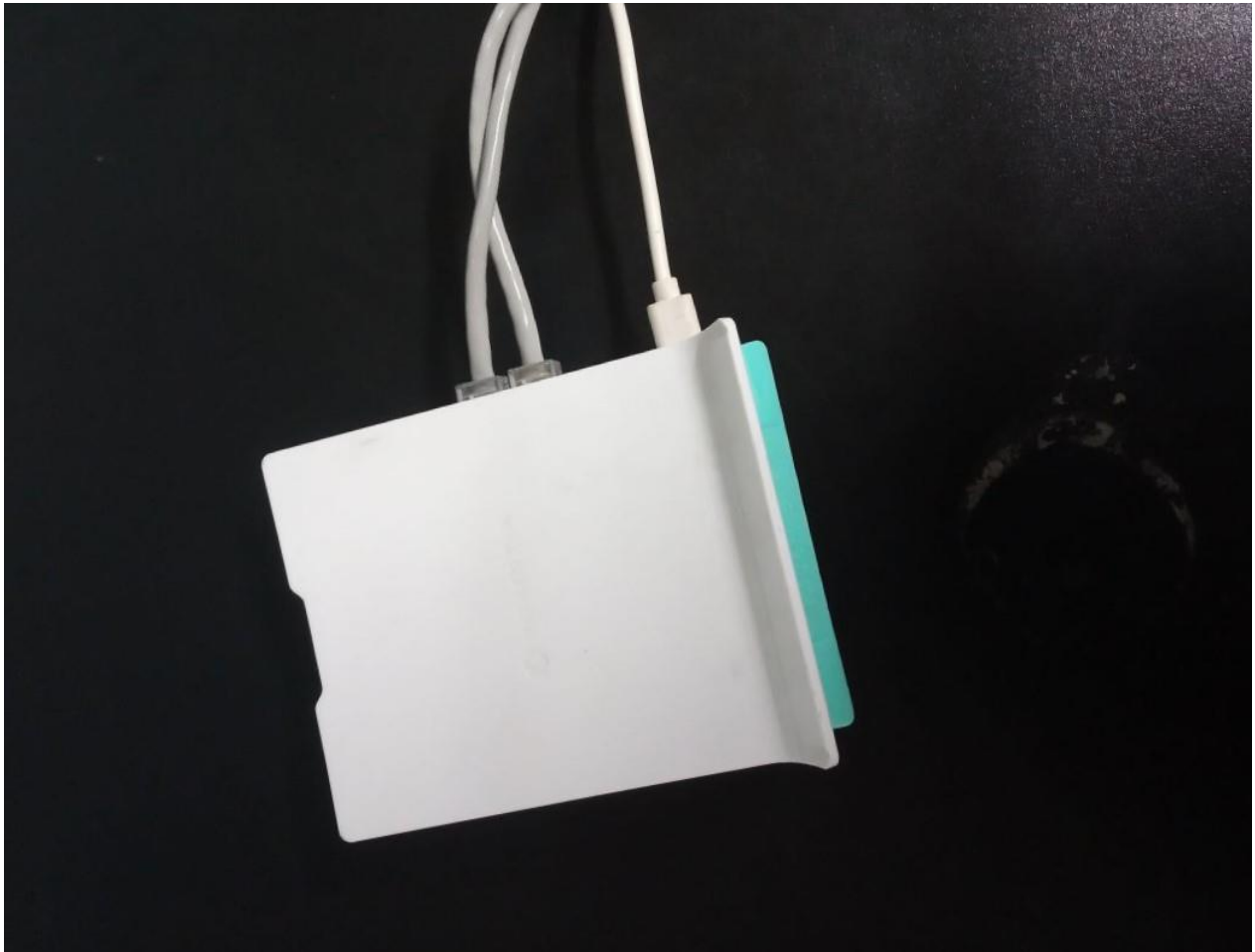


Figure 3.16: Mikrotik Router

At the time of configuration with Mikrotik router we first check if Win Box app is present from our laptop and we have to check if Win Box app is reset. Because many times the password may be set on the router. If a password is set on the router for any reason, no one can access it without its permission.

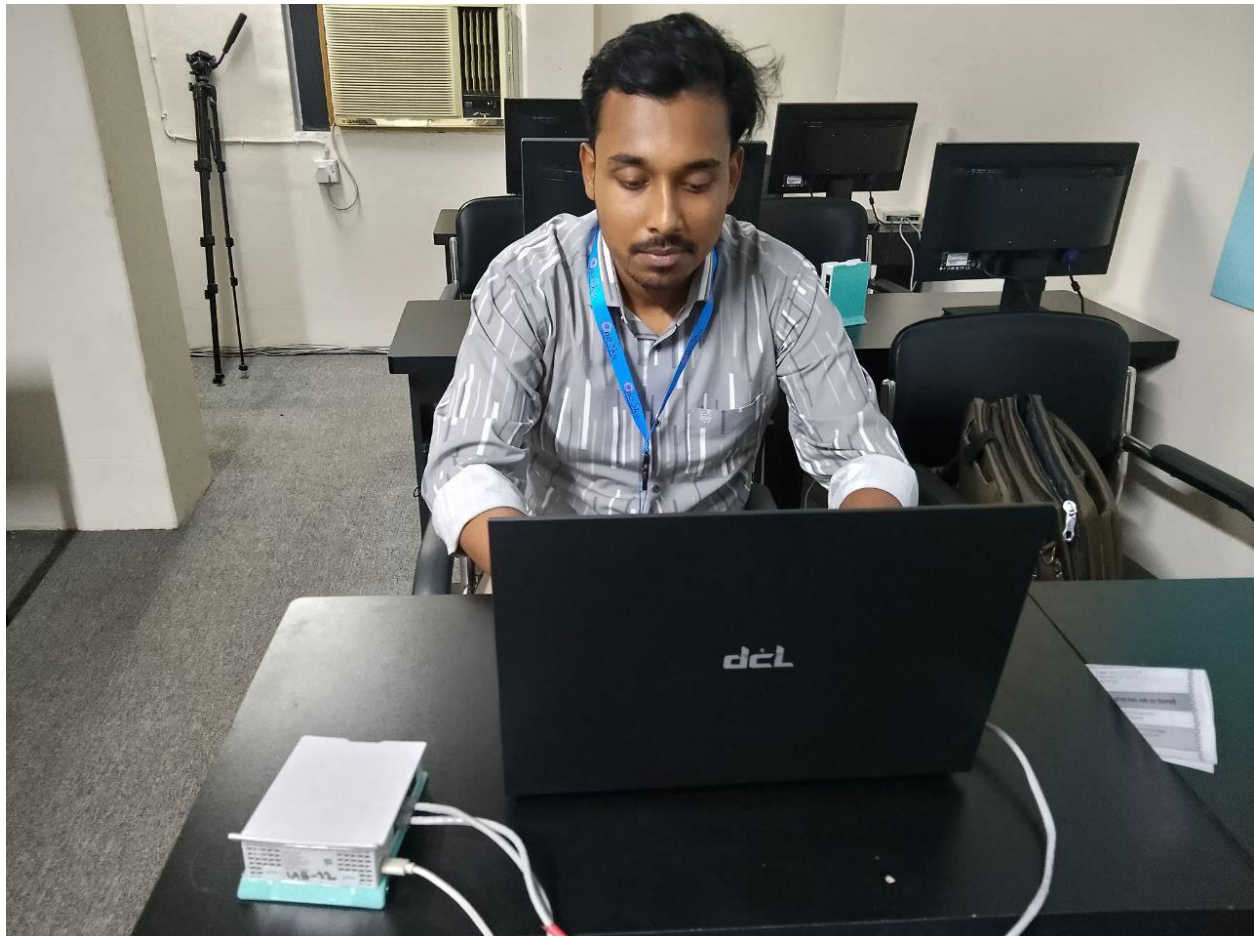


Figure 3.16.1: MikroTik Router configuration

3.17 MikroTik Wan Connectivity Up

The equipment used to connect my office, data center and cache memory together is called a wide Area Network or Wan for short. We receive a kind of auto IP from ISP. This is our company's own IP which ensures the use of company's MD sir to all employees. Learn how to configure IP static using a company's own IP and a gateway using One configuration. Spreading the network from one company to different locations is the basic premise of one configuration.

Wan configuration part in the MikroTik Router:

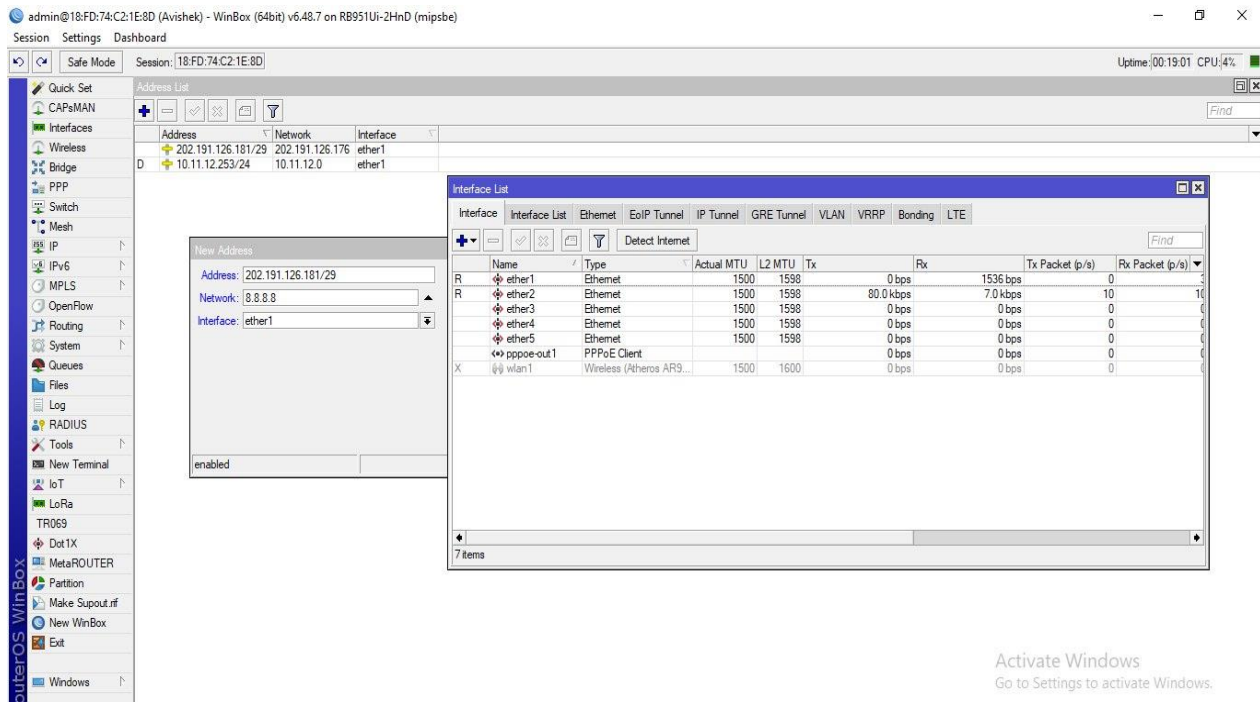


Figure 3.17: Wan configuration

3.18 MikroTik Lan Connectivity Up

IP distribution from server to client can be done both statically and wirelessly.

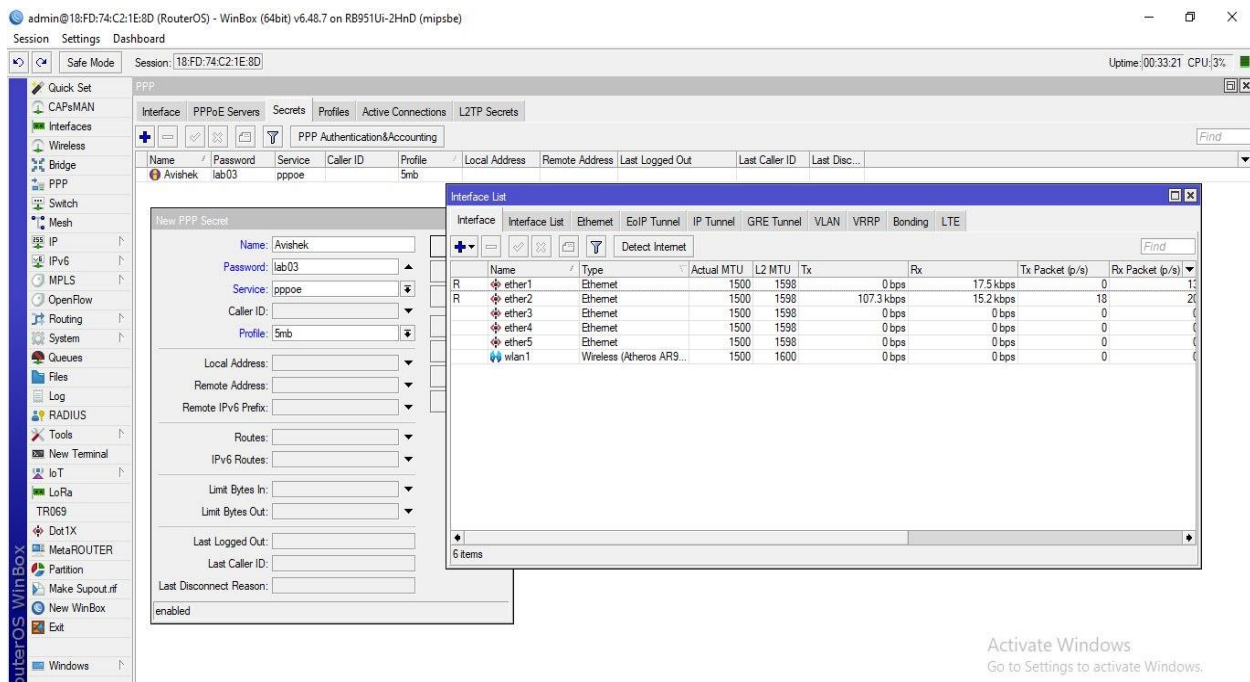


Figure 3.18: Lan configuration

3.19 Challenges

From the beginning of my internship, I faced many challenges. First, I try to be present in the company by 10 AM in the morning and after that my seniors come to office and go to their desks and start working with them. Although it becomes more difficult for me because it becomes tough for me to continue office in between my university classes but it is a lot for my career. Even since I joined the company I had to stay within a discipline. I have met many kinds of people here since morning. Getting along with everyone in this environment is a big achievement for me. I am in support team and tasks of this team are divided according to the shift. Usually during office hours, I receive the highest number of client calls.

CHAPTER 4

SMART PLAN AND COMPETENCIES

4.1 Competencies Earned

As days go by, companies are becoming more and more efficient. The only reason to come for internship in the company is that company will give me an opportunity based on my work skills. By working in this company, my mind will be more towards work when I spend free time. Any Company wants a skilled engineer if they find it in me then will try their best to employ me in the company. This company introduced me to their routers, cisco switches all devices and also showed me how we do OSPF, ERGIP, VLAN configuration. I have seen which protocol is associated with a company's Router and a company.

4.2 Smart Plan

Doing my internship at One Sky Communication Limited, I am now more active than ever in thinking about my future. This internship period will help me to more career oriented in future. A support engineer doesn't only provide support to the company but in many cases, he may have to visit the client's home to check the problem of his Router. This internship I have always tried to adapt myself to the office environment. I will practice this way so that I can become a professional network engineer very soon. My desire is that someday I can become the dedicated soul of the company and I am preparing myself for the purpose.

4.3 Reflections

By engaging in Internship with One Sky Communication Limited we get the practical experience and knowledge in the field of Network Engineering. This internship saw me work on support related and had the opportunity to sit and work with my team. The network sector is currently a sector with huge job opportunity. Without internship in this sector, there is no scope to learn work. This sector is where most of the work is hands-on learning because there is a difference between learning by seeing and learning by doing. Internship are now one way to present yourself as smart, where uniqueness matters a lot. There is a difference between learning by working with a team and working alone. The benefits of working with a team that if I don't understand a task, when they tell me the problem, they make a path that I can follow that path to get the job done.

Here are the support team members of One Sky Communication Limited Company:



Figure 4.3: Support Team

When I work's together with support team members:



Figure 4.3.1: Working at office

CHAPTER 5

CONCLUSION AND FUTURE CAREER

5.1 Conclusion

I managed to finish my internship by doing something good. I have recorded in the previous chapters what I was able to gain from internship from start to finish. Today, the network is a very large form of communication. If I am a very large engineer and can't expand my network, to make themselves big in the sector. The real motive of the internship is so that I can claim myself as a educated engineer, so that I can start something even if it is small. The opportunity of free internship in One Sky Communication Limited company is a great opportunity for me. I always wanted an organization that would give me an opportunity to future enrich my skills.

5.2 Future Scope

Number of small and big IT companies are being established in our Bangladesh day by day. One Sky Communication company is the most reputable ISP companies across the country. They provide VTS system as well as ISP provide. The main target is to spread their network cables across the country. When I first went to One Sky Communication Limited company, they took me to their company's data server room and in the server room, I saw a lot of switches arranged in mount rack and next to it was a cash server. First of all, I strongly believe that this internship will take me to a better place of myself. I joined One Sky Company Limited from that day when they offered me internship. My aim is to cement my place in this company as soon as possible. That's better than celery what I need most is to excel in practical work.

REFERENCES

[1] Following report paper Link:

<<http://dspace.daffodilvarsity.edu.bd:8080/bitstream/handle/123456789/3980/P14343%20%2823_%29.pdf?sequence=1&isAllowed=y>> (Last accessed on 12-04-24 11.30pm).

[2] One Sky Communication Limited Website:

<<<https://onesky.com.bd/about-us>>> (Last accessed on 14-04-24 7.00pm).

[3] IP Addressing and Subnetting:

<<<http://dspace.daffodilvarsity.edu.bd:8080/bitstream/handle/123456789/8334/191-15-12501.pdf?sequence=1&isAllowed=y>>> (Last accessed on 18-04-24 9.00 pm).

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<<<https://www.geeksforgeeks.org/router-configuration-with-cisco-packet-tracer/>>> (Last accessed on 02-05-24 8.00 pm).

[5] Cisco Enterprise level router information:

<<https://www.cisco.com/c/en/us/products/collateral/routers/4000-series-integrated-services-routers-isr/data_sheet-c78-732542.html>> (Last accessed on 06-05-24 10.50 pm).

[6] MikroTik router configuration video link:

<< <https://www.youtube.com/playlist?list=PLIXRP9ryuaFDROCwIHbnra8bLsbzJuplh>>> (Last accessed on 20-05-2024 11.00 pm).

APPENDIX

Appendix A: Internship Reflection

Quite sincerely, I am very eager to complete with my internship. Initially of my speech, And I would like to thank my great supervisor who is Md. Abbas Ali Khan sir, I can say that this man was the key element to all of my processes and I could not finish the internship without him, for sure. He is actively undertaking ant the thoughts that conflict with me and uncertainties both at the same time. If I say the motive of the internship, then I have to say that these few months of company teaching behavior, discipline will take me higher. One thing I have come to know during my time at One Sky Communication Limited company is how to handle a client and master the mindset of listening to him and talking to him about the problems. If you consider the work aspect rather than the qualification aspect, the one who comes to mind is support engineer. The service of the company is always provided through them.

Appendix B: Company Details



One Sky Communication Limited

House No. S. A Bhaban, on the 6th number floor.

115/23 Motijheel Circular Road,

Dhaka, Bangladesh

Cell: +8801711-312770

Email: info@onesky.com.bd

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