INTERNSHIP ON COMPUTER NETWORKING

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 Project/Internship titled **"INTERNSHIP ON COMPUTER NETWORKING"**, submitted by **SAZZAD HOSEN SHAWAN, ID No 191-15-12173** 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 **13/09/2022.**

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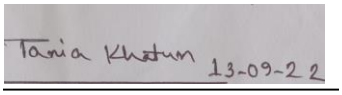

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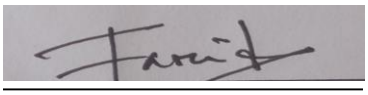

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DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Ms. Subhenur Latif,** Assistant Professor**, Department of CSE,** Daffodil International University. We also announce that neither this project nor any piece of this undertaking has been submitted somewhere else for grant of any degree or diploma.

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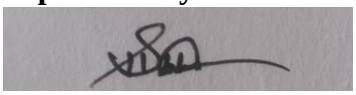

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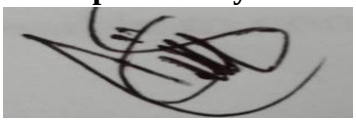

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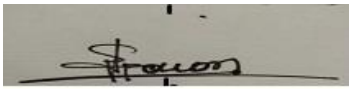

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I'm really grateful and wish of my profound our indebtedness to **Ms. Subhenur Latif**, Assistant Professor of Department of CSE Daffodil International University, Dhaka, deep Knowledge & keen.

Interest of our supervisor in the field of ISP "Networking" to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior draft and correcting them at all stage have made it possible to complete this project.

I would like to express of my heartiest gratitude to **Professor Dr. Touhid Bhuiyan,** Professor, Department of CSE and Head Department of CSE, for his caring assistance to complete our venture and furthermore to other employee and the staff of CSE department of Daffodil International University.

I would like to thank of my entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

At last, we should recognize with due regard the steady help and patients of our folks.

ABSTRACT

This phase represents the operation of the Internet Service Provider (ISP). The main reason and objective of the report is to know more about Computer Networking, ISP Network Devices like Servers, Computers, Cables, Routers and Connections through hands-on experience at Aamra Network Limited Banani, Dhaka.

Limited working with CISCO, NETGEAR, WINDOWS SERVER, and MIKROTIK in Aamra Network. Working with them has provided me with a wealth of information on how to build up a network and how to manage problems with a huge network.

I learned a lot about the working environment during my four-month internship at Aamra Network Limited.

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Introduction of Networking

1.1 Introduction

A once-in-a-lifetime experience to demonstrate one's exceptional skills is an internship. We must save some important information for all of us if our education is not yet complete. Internships are aimed at students who are intellectually solid and successful enough to be recommended for a stylish future by teachers and management. In any case, they triumphed in the face of great challenges. It is, above all, concerning picking an organization or internship that will provide a superior internship than any other corporation. A respectable club can therefore impart a wealth of expertise. She became more motivated to learn as much as she could when I studied Aamra Network Limited while a computer science and engineering student at CSE and graduated with a Bachelor of Science degree. The purpose of study about this book important to do so in order to learn about ISP connections and networks function and practically work to that. Although internal, the vocabulary utilized in text is not straightforward. It focuses almost entirely on networks, setups, servers, and other components of these systems. It's also about figuring out how people help the network and work late at night to do so. It really is beneficial in learning about the ramifications of involvement. This knowledge will help you achieve the intended result after completing the work. Performance and experience on a global scale I build a network, talk with others, identify problems, and try to solve them. The manual can't learn me anything about configuration and point exploration, server operations, and so on. Excellent for my purpose.

1.2 Motivation

The method of attaching one computer to it is known as a computer network. Data can be transported from one device to another via a computer communication network. This is a unique way of joining two or more devices. Such that, each device can connect to the others wirelessly or through a wired connection. Unfortunately, just because we can physically connect our equipment doesn't mean we're done. The protocol for data transfer via a wired or wireless network system must first be created. at each instant before you can set up a data-transfer network. Today, the internet is the most widely used form of communication. Connecting to the internet is doable. We're

all aware that the Internet has the power to unite people from different nations. world. If you don't understand how to defend and to use your network, it's far too dangerous. Hackersare to fault for the majority of Internet issues. Hackers can sometimes use of the internet to get access to our computers and other devices. In order to protect banking and office networks, we must develop a strong security system.A modern office network setup system is very necessary since all workplaces, public and private, utilize the internet or others network equipment for announcement or sustaining office operations.

1.3 Objectives of Internship

My training network's purpose should be to provide me with meaningful industry experience in this subject or industry.
It will be essential in your future profession.

The internship's prime objective, however, is to meet the demand for a Science degree in the CSE program.

There's something else this is happening on-

Study well about ISP Networking System.

acquiring knowledge of ISP connectivity, gateway, and system maintenance

For the organization, construct an international network interconnection. Build a network for the association that takes up an entire network.

1.4 Introduction of Company

If you want to get a Bachelor of Science, you need to meet that requirement. And an internship at the organization is a prerequisite for getting my bachelor of science. So I can opt for Aamra Network Limited to do an internship. Because it's one of the most popular and best Internet Provider. They are provide TR 1 and TR 2 types of service. Bangladesh Government, BCB and BFF got Internet service from them .There are having multiple branches all over the country .They are Independent company. And most importantly, they give them the opportunity to teach first and then do an internship at their company.

1.5 Report Layout

The first cell of this report is an introduction to my training and a brief chat about my stimulants. Another chapter is, in a nutshell, about my internship association. It describes some of my clubs, product and contact locations, target groups, geek analysis, and club structure. Chapter 3 briefly describes my daily work and what I learned from my training sessions. Chapter 4 also explained what I learned from the institute. This continues before the final chapter. In the final chapter about the conclusions and my further life in this area.

CHAPTER 2

ORGANIZATION

2.1 Introduction

I'd want to work for a reputable online firm that offers internet access and manages the client's corporate network, but solely as an intern. I thought it would be beneficial to me and that I would be able to collaborate with them. I looked into my Internet service provider and discovered that it failed to give me with basic information. I begin to consider which institutions will teach me from scratch after learning that they do not teach me from scratch. A few days later, I found it. Aamra Network Limited is offering me an internship. Following that, I had a conversation with them. I'm looking into them and discovered that they're the largest independent Internet service provider. Every country has a large number of these enterprises. (Banani) C / A has its base at 20 Kemal on Ataturk Avenue.

2.2 Product and Market Situation

DHCP, DNS, TPLINK, Cisco, Mikrotik, and cloud networks are all used throughout my internship. and other technologies. But the most important thing I learnt was about Cisco packages. Commercial & Industries Networking Corporation makes use of it. Switch, router, WAN accelerators, uniform fabrics, wireless systems, warehousing networks, and pole computing infrastructure are all a part of the Cisco range. significant needs. Every form of association, in every field, need its own network. This company offers excellent prospects for a potential career

We recognize that the networking field has

2.3 Target Group

The ambition of my training company was to transform into a network-dependent organization. They receive my training materials via a control committee that is investigating their candidates, but I also discover their client advertisements on social media. The association will be unable to address each client personally without their consent. Finding my rivals and their clients is the first step in starting a business or a group. Both the manner in which they provide service and the level of client respect are crucial. I also handle clients in my own special way

2.4 SWOT Analysis

Finding out a garment architecture's benefits, drawbacks, opportunities, and risks should that is your first step after receiving it. After you've figured out what it is, look at its flaws until you've figured out what the problem is.

2.5 Organizational Structure

You must first assess the partnership's strengths, weaknesses, opportunities, and dangers before settling on a partnership design. Once you grasp that, examine its shortcomings until you are prepared to consider the solution to the issue.

2.6 (ISP) Internet service provider

Isp stands for internet service provider.it is company which provides internet service to its costumers is called isp.

If we want to use internet at fast we have to buy internet from isp.then we use internet.there are many isp company in our country such as Grameenphone,Robi,Airtel,teletok,etc.they are can provide to there costumer.Isp provide 3 types internet service.TR1,TR2,TR3.TR1 provides world based internet service.TR2 provides country based internet service.and TR3 provides city based internet service.and isp provides more advantages like Email,web-hosting,domain,and file transferring.

2.6 ISP Network Diagram

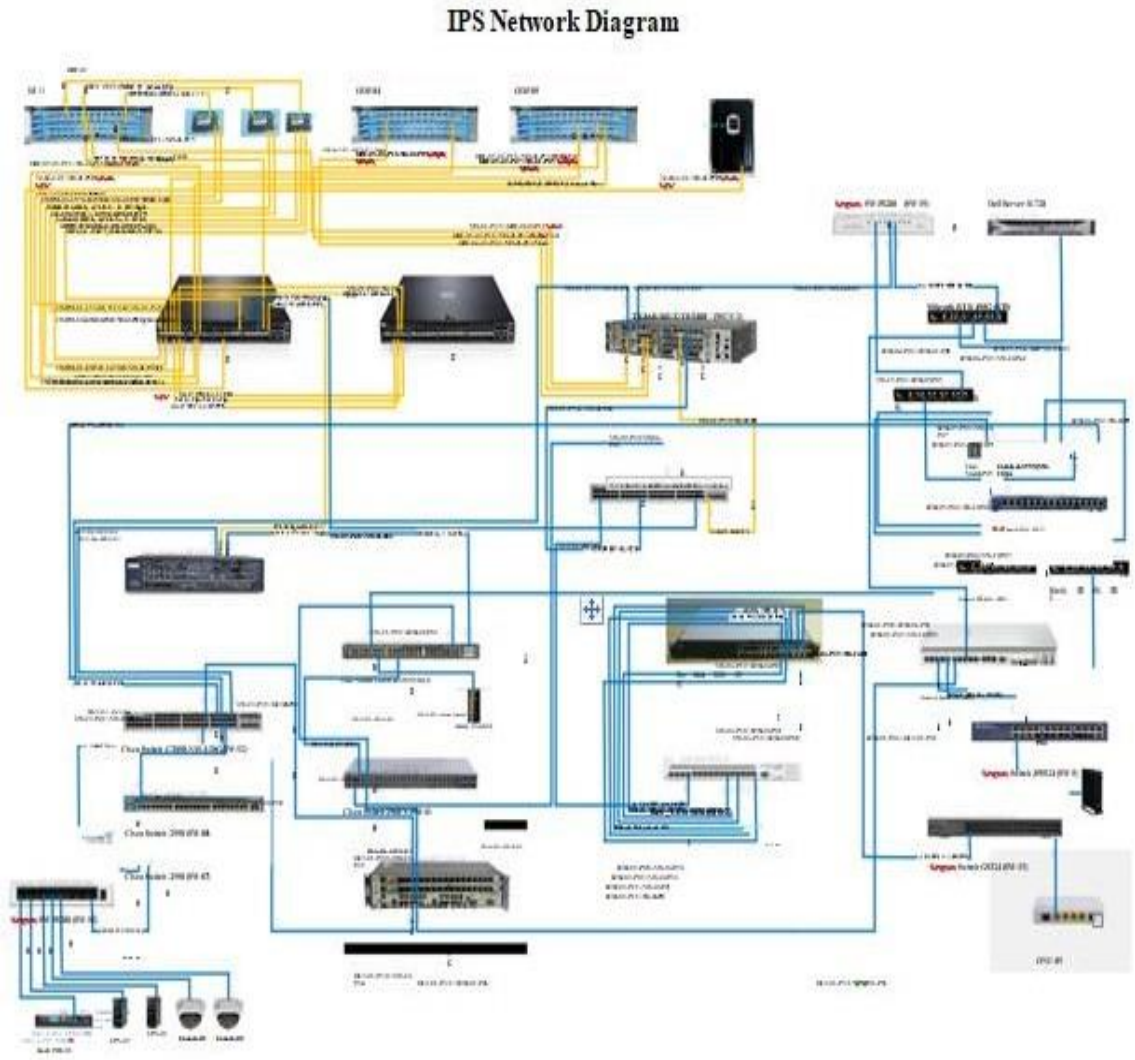


Figure 2.1 ISP Network Diagram

CHAPTER 3

BASIC NETWORKING KNOWLEDGE

3.1 Daily Work and Performances

They were so helpful to each other and even finishing our task we have communicated with each other if we were facing any issues while doing our tasks

3.2 Basic fundamentals knowledge.

1. End the ruse with a knot
2. Network Setups
3. Topology of the network
4. Different modes of transmission

1. 5.Ethernet Cabling

3.3 End the ruse with a knot

Laptop computers, desktop computers, mobile phones, scanners, and any other associated equipment that can shoot and admit data are all acceptable.

3.4 Topology of Network

This is a communication network component. **Type of network topology:**

Star Topology: The most common network is the Star network. Each star network design has a principal network device such as a hub, switch, or computer. The primary networking helping us achieve as a domain controller.

Bus Topology: any node is connected to the others through a long cable. It's called Bus topology, as we all know.

Ring Topology: A point-to-point link (P to P) connects the ring topology, which has only two spikes on each end.

Hybrid Network: Multiple topologies are combined in a hybrid network. That is, the benefits of multiple topologies are shared

3.5 Network Categories

- LAN (Local Area Network)
- MAN (Metropolitan Area Network)
- WAN (Wide Area Network)

Local Area Network (LAN):

- That is, in general, unique and personal.
- LAN Structures are used in places like residences, schools, colleges, and homes.
- Ring, Bus, and Star topologies are used.

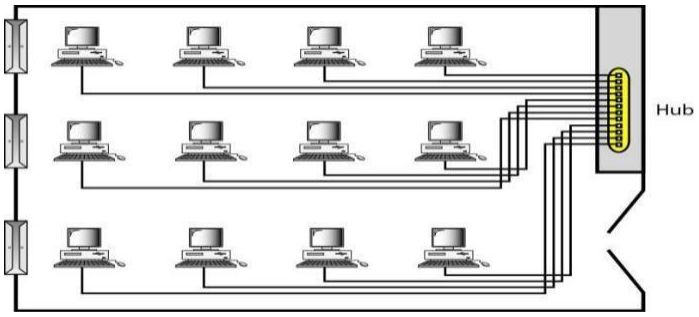
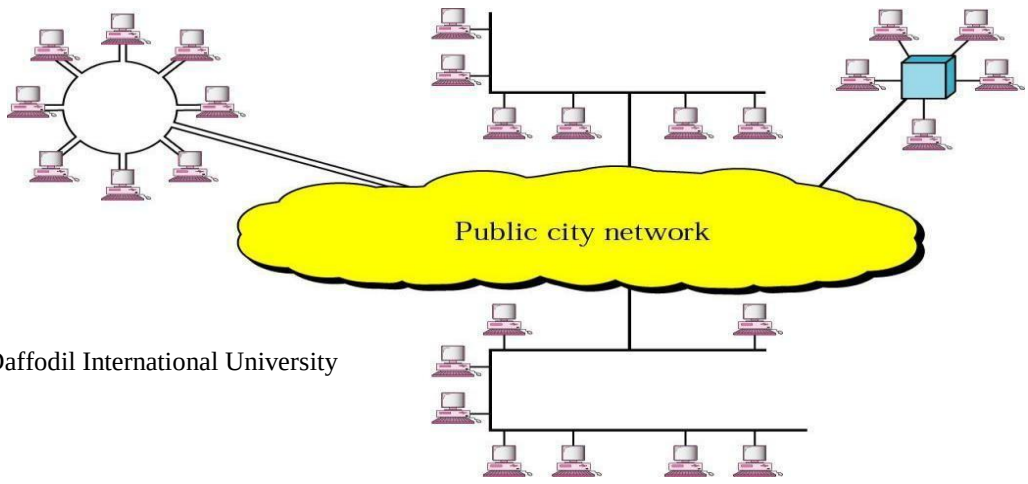


Figure 3.1: LAN

Metropolitan Area network (MAN):

- That is a city-wide design.
- TV Cable Network and Internet Service Provider.
- It might be either private or public.



Wide Area Network (WAN)

- It Use for long-distance transmissions.
- A single firm owns and uses the WAN.

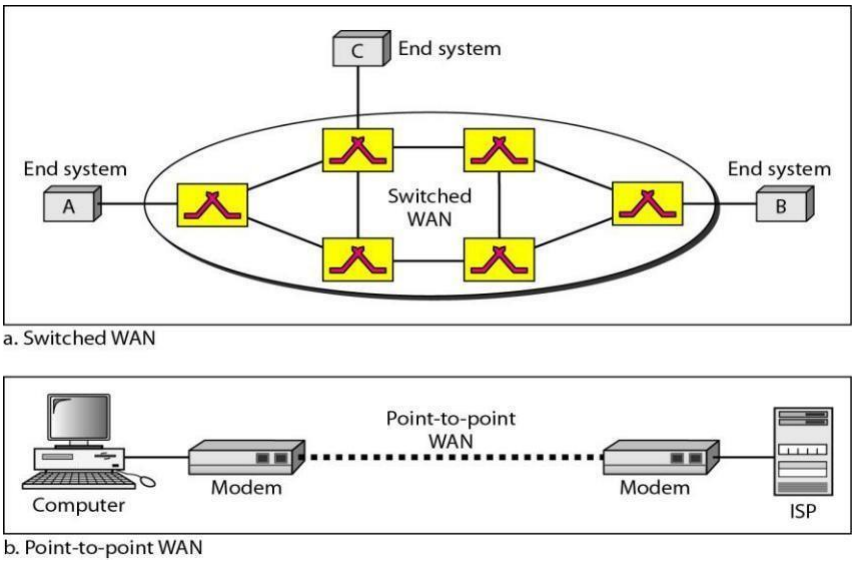


Figure 3.3: Wide Area Network

Show on the figure There Are two technology used in wan.switched wan and point to point wan.switched wan is more then two ends and other hand point-to-point wan is just only two ends. Wide area network is TR1 type internet communication system to the world.when we connect each other one country to another country through to the internet.at first we have to connect to the isp modem from our modem point-to-point wan connection.then we use internet in our pc.

Technology used in wan:

- **Isdn (integrated service digital N/W)**
- **Smds (switched multi megabit data service)**
- **Sonet (synchronous optical N/W)**
- **Hdlc (high data link control)**
- **Sdlc (synchronous data link control)**

3.6 MEDIA CONVERTER

into optical waves for fiber optic cables using this device. If the distance between the two connected devices is greater than the copper cable's transmission distance, fiber optic connectivity is required.

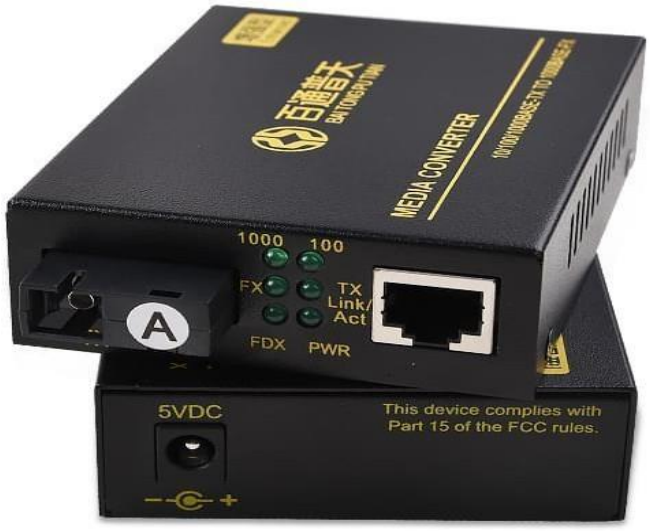


Figure 3.4: Media converter

3.7 FTTx NETWORK

FTTx connections are the most critical element of ISP networks. It cuts down on fiber optic cable. OLT & PON units will be centrally connected through fiber optic cable, and PON modules will be connected as well. Splitter with fiber. Fiber splitter can be different type 1:4, 1:8: 1:16. 1:32, 1:64 2:4, 2:8: 2:16. 2:32, 2:64 last mile connected splitter to ONU.

3.7 ONU: The term ONU refers to an optical network unit. ONU is a device that converts optical impulses sent across fibers into electrical signals. Individual subscribers are then supplied these electrical impulses. Between ONU and the end user's premises, there is usually a distance or other access network.

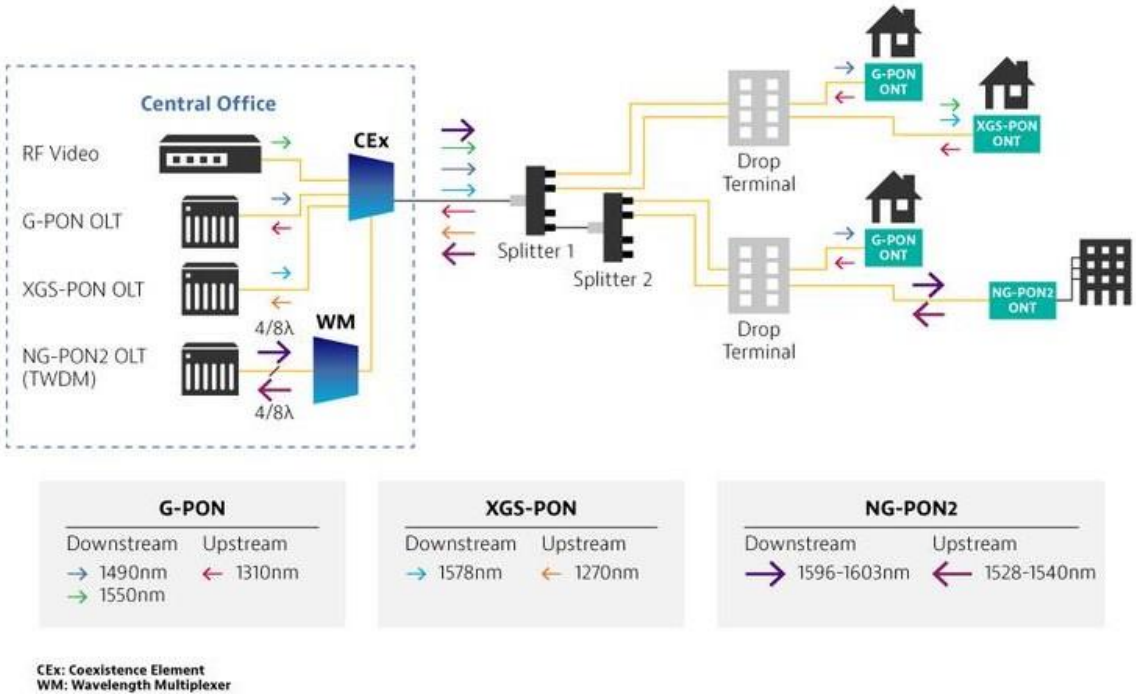


Figure 3.5: FTTx Network

Chapter 4

CISCO

4.1 IP Address

The term "IP" stands for "Internet Protocol." At the moment, the two IP types used in the Universal Internet (IPv4 and IPv6) are The address is configured twice, and its driving force is the transmission of all data over the Internet[1]. IPv4 addresses are 32 bits in length, whereas IPv6 addresses are 128 bits in length. Both have an IPv4 to IPv6 switch. Although these two protocols cannot communicate directly with each other, a "dual stack" system can exchange data between IPv4 and IPv6. The most important meaning in IP addressing is TCP / IP. Written with sharp decimal points. The period is divided by 4 Octea (192.168.10.1). Each quintet is assigned a number ranging from 0 to 255.

An internet protocol is required for internet communication. This preserves the Internet's international protocol.

4.2 IP address classes

Class	Address range
Class A	1.0.0.1 to 126.255.255.254
Class B	128.1.0.1 to 191.255.255.254
Class C	192.0.1.1 to 223.255.254.254
Class D	224.0.0.0 to 239.255.255.255

4.3 IP Subnet Class C

192.168.1.1/28

Block Size =240-256=16 Block size

$2^n=2^4=16$ Network

Host					
$2^n - 2$					
$2^4–2=16–2=14$					
Subnet Mask:	255.255.255.240				
Network	Host	B/A	192.168.1.112	113-126	127
192.168.1.0	1-14	15	192.168.1.128	129-142	14
192.168.1.16	17-30	31	192.168.1.144	145-158	159
192.168.1.32	33-46	47	192.168.1.160	161-174	175
192.168.1.48	49-62	63	192.168.1.176	177-190	191
192.168.1.64	65-78	79	192.168.1.192	193-206	207
192.168.1.80	81-94	95	192.168.1.208	209-222	223
192.168.1.96	97-110	111	192.168.1.224	225-238	239
192.168.1.112	113-126	127	192.168.1.240	241-254	255

4.5 Sub-netting class-B

172.16.0.0/19

Subnet Mask = 255.255.224.0

Block Size= 256-224=32

$2^n=2^3=8$ Network

$2^{13}-2=8192-2=8190$ Host

Network	Host	B/A
172.16.0.0	172.16.0.1-172.16.31.254	172.16.31.255
172.16.32.0	172.16.32.1-172.16.63.254	172.16.63.255
172.16.64.0	172.16.64.1-172.16.95.254	172.16.95.255
172.16.96.0	172.16.96.1-172.16.127.254	172.16.127.255
172.16.128.0	172.16.128.1-172.16.159.254	172.16.159.255
172.16.160.0	172.16.160.1-172.16.191.254	172.16.191.255
172.16.192.0	172.16.192.1-172.16.223.254	172.16.223.255
172.16.224.0	172.16.224.1-172.16.255.254	172.16.255.255

4.4 VLSM

using varying lengths of subnet masks for different types of network design, we'll demonstrate how simple it is to split a current network into multiple shorter size. The network for this is called as VLSM.

Given that below:

Given IP: 173.10.0.0

Requirement host are below.

HR= 509 Host

IT= 1015 Host

Sales= 220

Marketing= 1020

Need HR department 509 host

173.10.0.0/23

2^9-2=512-2=510

Subnet: 255.255.254.0

IT: 1015 Host

173.10.0.0/22

2^{10}-2=1024-2=1022

Subnet: 255.255.252.0

Sales 220 Host

173.10.0.0/24

2^8-2=256-2=254

Subnet: 255.255.255.0

Marketing=1020

173.10.0.0/22

2^{10}-2=1024-2=1022

Subnet: 255.255.252.0

4.5 Routing Protocols

- Protocol for distance vector routing utilized the RIP V-1 bellman ford algorithm
- OSPF link state and IS-IS
- EIGP RIP V-2 hybrid

4.7 Link state Routing Protocols

- Friend Table
- Neighbor information in a topology table
- SP Routing

Administrative Distance

Connected	0
Static	0/1
EIGRP	90
EIGRP	100
OSPF	110
RIP	120
EIGRP EX	170

4.8 Open Shortest Path First Protocol Basic OSPF

- Version 2 is a standard that is open to the public.
- Convergence
- Triggered update
- LSA is used to connect with other routers
- Classless
- Manual route summarization is supported by VLSM.
- Greetings! DR to DR others router 224.0.0.5
- DR others to DR&BDR 224.0.0.0.6
- Metric used: 10 sec dead timer40 sec
- Multicasts update to multicast address 108/bits per second (bps) of interface bandwidth
- Area is the term used in OSPF to describe how a large network is divided into smaller networks.
- OSPF
- Area 0 (The Backbone)
- Range 1-65535 Implement two layers, Hierarchy

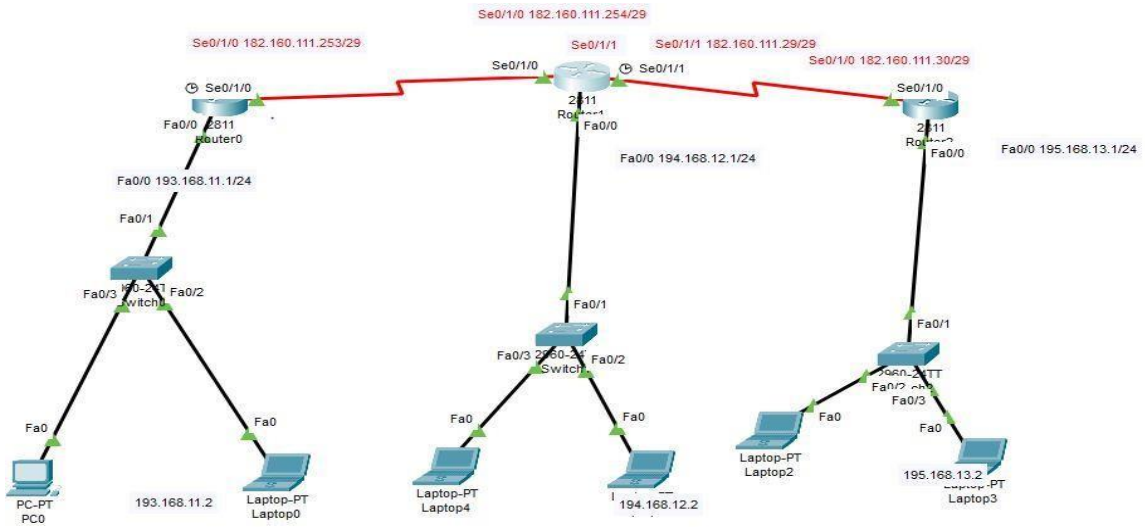


Figure 4.2: OSPF Single Area

4.9 EIGRP

1. Enhanced interior gateway routing protocol
2. Based on EIGRP
3. Cisco proprietary
4. Hybrid routing protocol
5. Fast convergence
6. Support VLSM
7. Support IP, AppleTalk
8. Communication between EIGRP routers is handled by the reliable transport protocol RTP.
9. EIGRP is the selection of the best path using dual (diffusion update algorithm).
10. 10 This is a loopless topology
11. Default manual and automatic route summarization Automatic summarization
12. The bandwidth, delay, load, and reliability metrics used here are the MTU.
13. Multicast and incremental update of multicast addresses

4.10 Three table are maintained by EIGRP.

1. Adjacent table.
2. Hello message after 5 seconds
3. K value (mean value)

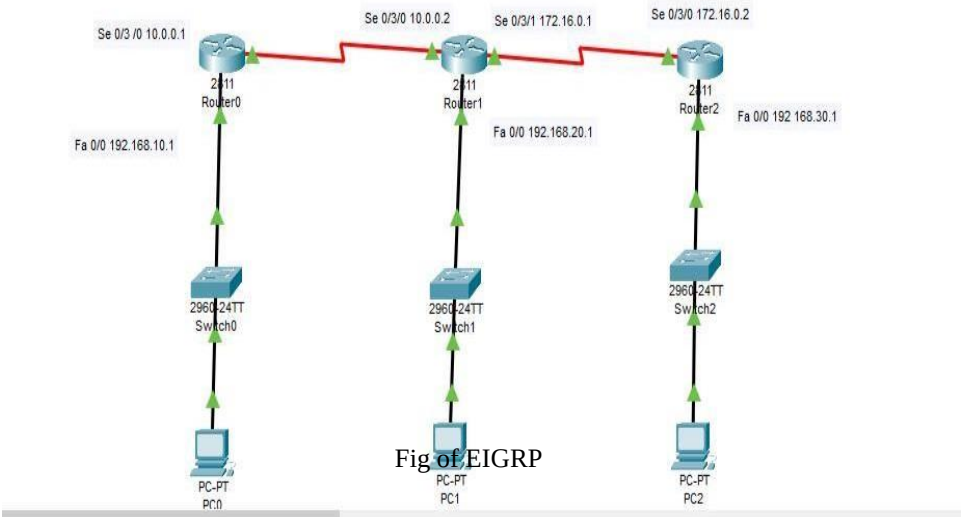


Fig of EIGRP

4.11 Inter VLAN Routing

A VLAN is a logical grouping of network users and resources connected to an administratively controlled switch port. When building a VLAN, you may create a small broadcast domain within a Layer 2 switched network by mapping different ports on the switch to distinct subnets. Only frames sent to the network, as if they were on their own subnet or broadcast domain, can be logically switched across ports in the same VLAN. Does this mean that routers aren't an option? It's possible that the answer is yes, but it's also possible that it's no. It is totally up to you to decide what you want or need. The server is hosted at a certain location by default. You won't be able to communicate with hosts on another VLAN since a VLAN can't interact with hosts on another VLAN you will have to utilize another VLAN to communicate with them.

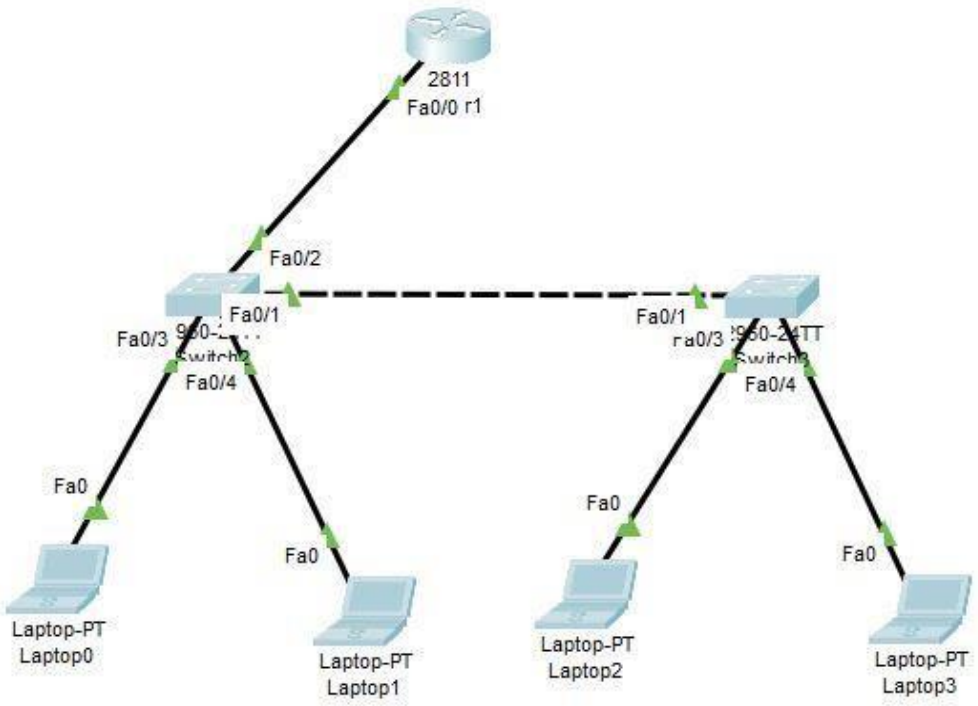


Figure 4.5: Inter VLAN Routing

4.12 DHCP SERVER

Complete DHCP server. A network server, It simply generates IP to clients via PCs, laptops, mobile devices, servers, etc. Root and other network parameters are sufficient for customer devices. In order to reply to customer broadcast queries, DHCP is recognized, which is a valuable protocol.

In order for the client to automatically and correctly communicate over the network because the DHCP server is clear that it should send the activities that are necessary. Without it, every client joining the network would require manual configuration by the network administrator. On big networks in particular, this can be challenging. Each client is often tied to a dynamic IP address, which changes when it becomes invalid.

DHCP reduces the complexity and frequency of administrative work by implementing automatic TCP/IP configuration.TCP/IP configuration by manually:

- The IP address of every local computer is entered manually There's a chance you'll type in an IP address that is incorrect or invalid
- An erroneous setting could lead to communication and network issues.
- There is an administrative burden on networks where PCs are frequently moved.

Configuration of TCP/IP automatically:

• IP addresses are automatically given to client machines.

• Assures customers are constantly utilizing the most recent configuration information.

• The client configuration is immediately updated when the network structure changes.

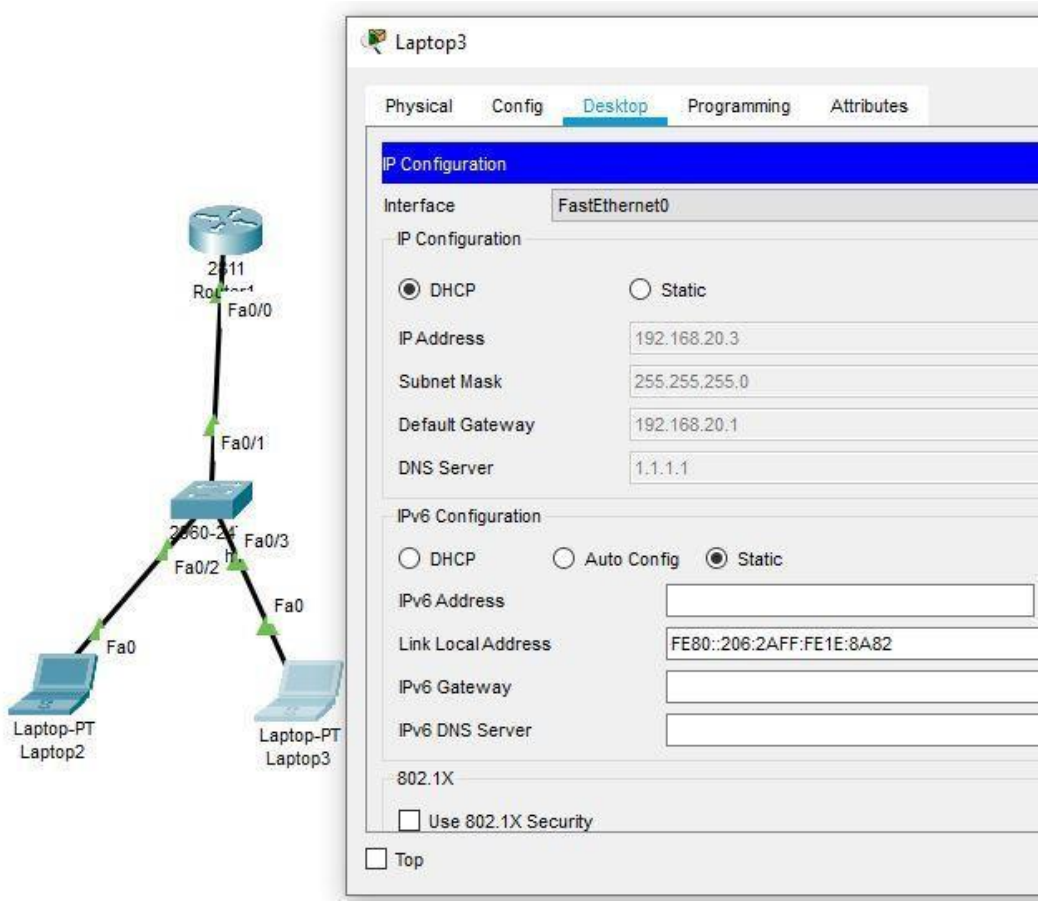


Figure 4.6: DHCP Server

4.13 Configuration of DHCP Server Output

```
DHCP_Router#show
DHCP_Router#show ru
DHCP_Router#show running-config
hostname DHCP_Router
ip dhcp pool DHCP_New_Server
network 192.168.20.0 255.255.255.0
default-router 192.168.20.1
dns-server 1.1.1.1
interface FastEthernet0/0
ip address 192.168.20.1 255.255.255.0
duplex auto
speed auto
```

4.14 NAT

Since then, it has been discovered that NAT is helpful for server building and load balancing, network relocation, and network consolidation. The quantity of public IP addresses needed for network design may occasionally be greatly decreased through NAT. NAT is quite helpful when two organizations that have duplicate internal address systems come together.

NAT facilities are given below:

- You get a public IP address and save money.
- The host does not have a global IP address, but I need to connect to the internet.
- Your network will need to be renumbered because you are changing ISPs. Two internets with identical addresses must be combined

4.7 Network Address Transformer

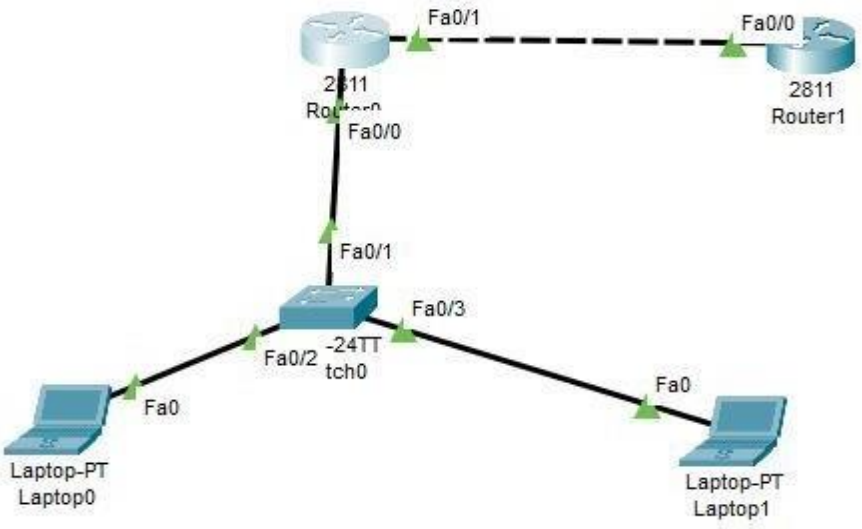


Figure 4.7: NAT

4.15 NAT Configuration Output

```
Router>ena
Router>enable
Router#show run
Router#show running-config
Building configuration...
hostname NAT_Router

interface FastEthernet0/0
ip address 192.168.10.1 255.255.255.0
ip nat inside
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 182.160.111.250 255.255.255.248
ip nat outside
duplex auto
speed auto
!
ip nat pool abc 182.160.111.250 182.160.111.250 netmask 255.255.255.248
ip nat inside source list 10 pool abc overload

access-list 10 permit 192.168.10.0 0.0.0.255
```

4.16 Access Control List (ACL)

Cisco ACL are given below

Standard ACL, Work only source

Extended ACL, Source and destination, Protocol

Standard ACL 1-99, 1300-1999

Extended ACL 100-199, 2000-2699

```
Router_3>
Router_3>confi
Router_3>ena
Router_3>enable
Router_3#conf
Router_3#configure ter
Router_3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router_3(config)#acc
Router_3(config)#access-list ?
<1-99> IP standard access list
<100-199> IP extended access list
Router_3(config)#access-list 1300 ?
% Unrecognized command
Router_3(config)#access-list 10 per
Router_3(config)#access-list 10 permit any
Router_3(config)#access-list 10 de
```

Router_3#write

Building configuration...

[OK]

Router_3#ping 192.168.11.2

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.11.2, timeout is 2 seconds:

.....

Success rate is 0 percent (0/5)

4.8 Fig of Access control list

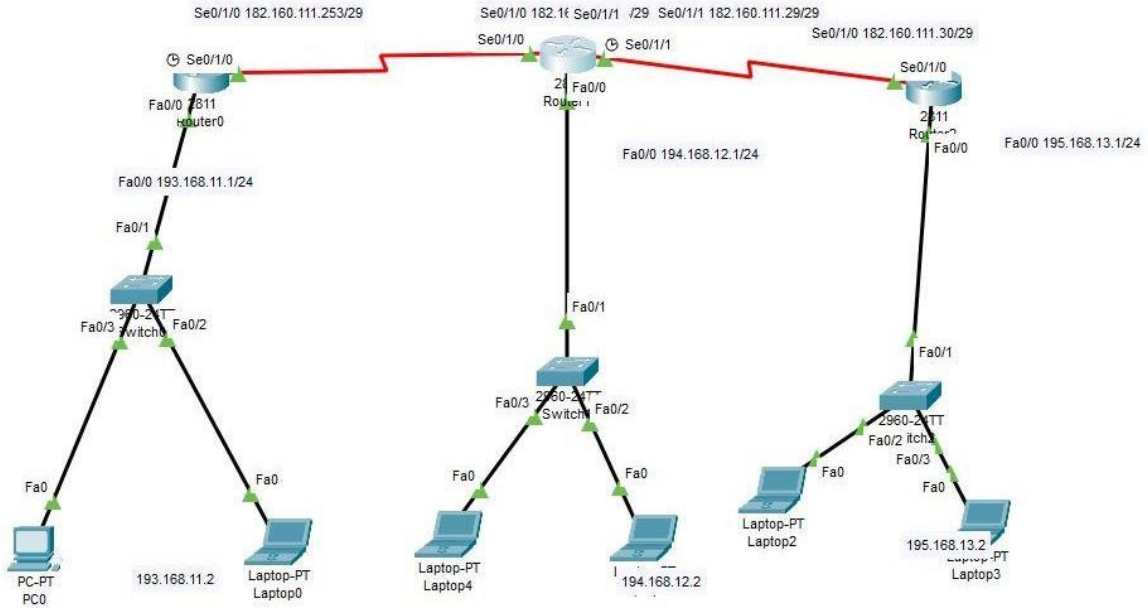


Figure 4.8: ACL

CHAPTER 6

Conclusions

I had many opportunities to work at Aamra Network Limited. Throughout the training sessions, you have many opportunities and many experiences. There are areas of work in this area of computer office network planning and design. Data and internet connectivity, ensuring network security, different types of application configuration and maintenance. The report also shared experience in setting up, designing, and optimizing office networks. I learned a lot of good processes from my boss, performed some tasks as usual during the internship, and finally gained the confidence to face the risks myself. I think this is a great opportunity to utilize the knowledge and skills gained from them. I also learned how to deal with big mistakes and found new ideas every day. This kind of work is very useful for my future profession and I am trying this form of painting again.

Future Outcome:

I achieve a lot of knowledge about the network through by in this internship. It was helpful for me. May it will be help me for my future life and professional career also.

- For this internship experiences help me for got a good job.
- I can start a ISP business.
- I gather knowledge about this field, so that I can try work on this area such as a skilled.
- This internship can may help for Bank Job.
- I can take preparation for CCNA Exam.

Help me for make a network design.

Appendixes

Appendix A: Internship Reflection

The true knowledge is that I have put an end to the length of the work. Used to give compliments to the consider what I saw and what gifts I gave Search guidance and internship. I abuse that the proper trade behavior. Think with the help of clients and efficient behavior and picking Ways to communicate with the master caregiver and another. A bunch of experts, as well as a master within the teacher. I'm pressing the key. An entrepreneurial approach, how to engage with colleagues, ways to increase resources, some special knowledge work on how to orchestrate, how to make choices. The environment of trade enterprise, and the duties of the organization and Feedback Internship Glad knitting by my internship director. An evaluation medium and offers an indulgence to look for individual assemblies Guess a master.

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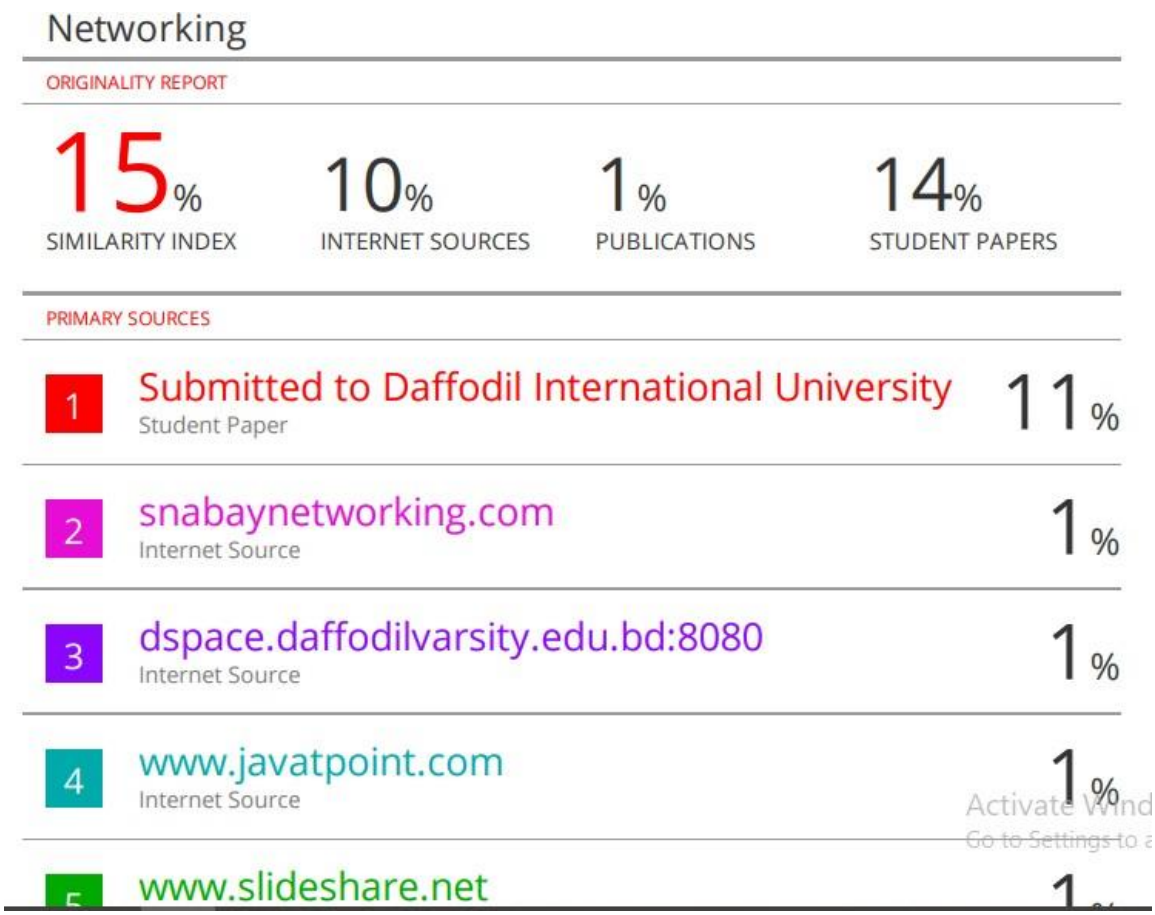

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