

INTERNSHIP ON CISCO NETWORKING TECHNOLOGIS WITH SECURITY

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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

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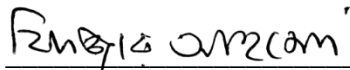
APPROVAL

This Internship titled “**Internship on CISCO Networking Technologies with Security**” submitted by **Rafi Ibn Kalam ID: 191-15-12349** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfilment 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 28-1-2023.

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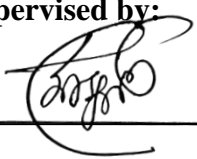
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DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Dewan Mamun Raza, Lecturer, Department of CSE**, and 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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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 first reason and the objective of this report is to know more about Computer Network and ISP Network Devices like Servers, Computers, Cables, Routers and Connections through hands-on experience. In the internship working with CISCO and WINDOWS SERVER and NETWORK SECURITY and ETHICAL HACKING and so on. By learning and hands on working with team, I can gain a lot of working knowledge on how to set up a full network and network-based server system and how provide a proper security. The goal of my internship is achieving good work experience on this field or branch. I can use it of my future career.

There are having some other Learning -

- Gather knowledge about Networking System
- Achieving knowledge about Router and Server configuration, Routing about ISP
- Establishing connection of entire network of organization
- Configuring network of entire network of organization.
- Improve the overall performances of ISP Routing and Switching.
- Learn about latest technology and improve my Skill.

During my internship, I achieve a lot of skill about the real-working environment and requirement.

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CHAPTER 1

Introduction

1.1 Introduction

An internship is a great opportunity to express someone's perfect gift. If you haven't completed your training yet, you should write down some useful information for all of us. Internships are for students who are strong and successful enough to have the opportunity to receive support from faculty and mentors for a bright future. Either way, they always succeeded despite unimaginable obstacles. Above all, it's also about choosing a better internship or internship agency than any other company. You can learn a lot from good clubs. As a computer science and engineering student, my interest in reading this book has not changed much, but it is important to understand how ISP associations and networks work from the book. The language of the book is not so simple, but the inner language. I mainly teach networks, configurations, servers, etc. related to these effects. He also learns how people support networks and work all night to support networks. It helps him to know the effects after the engagement. This experience will help you make an impact after participating in an activity. overall experience and performance. I network, communicate, find problems and try to solve them. Couldn't learn the text. B. Setting up and researching points, running servers, etc. Ideal for future work in network services with Network Director.

1.2 Motivation

An open PC networking is the method involved with interfacing a PC framework to different PCs. A correspondence network that permits a PC to move information starting with one gadget then onto the next. That is advanced association two or various farther than two gadgets. That is can associate through line or remote association among each and different gadgets. However, that doesn't mean we're done at this point, if we can interface our gadget actually. For arrangement an organization which moves information, we You really want to set the convention of how to send the information every second by means of string or remote organization framework. Presently a days web is one of the most famous one for correspondence framework.

Organization can interface I realize that Internet can associate effectively one country site to one more country site all around the world which through by strong web framework. The Internet is similarly as simple, yet it's excessively hazardous on the off chance that you haven't any of idea how to safeguard for utilize your organization. Mainly most issues with the Internet are programmers. In some cases, programmers can hack our PC and different gadgets over the web. Hence, we want to make a strong security framework for office or banking organization. Office area network arrangement framework more vital these days, in light of a wide range of an office (Public or a Private) every one of this involving web and the other systems administration gadget for their correspondence and keeping up with the workplace work management.

1.3 Objectives of the Internship

In the motivation behind my internship training is to acquire superb expert involvement with this field area or in this related industry. I can involve it for my future vocation.

In any case, the primary concern of the entry level position is to introduce the prerequisites of degree of Bachelor of Science in CSE program.

There are having some other thing is-

- Assemble information around the Server based networking
- Accomplishing information of Router, Server setup and ISP Routing
- Lay out an organization wide association for the affiliation Configure an organization wide organization to affiliation.

1.4 Introduction of the Company

To achieve a degree of Bachelor of Science, I really want to face up that necessity. Furthermore, a temporary position at the association is an essential for getting my four-year certification in scientific studies. So, I can join IsDB BISEW Scholarship program as intern trainee. Since it's one of the most famous and great IT scholarship organization. Where they are giving TR1 and the TR2 kinds of administration. Bangladesh Govt and IDB scholarship program make a trust to train up the youth with a strong skill. They are independent and international company. And most significantly, they offer them the chance to show first and afterward do a temporary job at their organization.

1.5 Report Layout

In Chapter One, I provide a short overview of my internship also my thoughts on some related concerns. Chapter one is also includes motivation, objectives of internship, and an introduction to organization. In the last stage to this chapter is explain vision and top mission of this internship.

In Chapter Two, Here I explain main fundamental CCNA lesson. that is primarily an introduction off the internship program. Here is the summary of current market condition and network administrator career opportunities. In this howl chapter, the different types of work and also network employee are important.

In Chapter Three I represent the process of configure MicroTic Router. In this chapter show the skills here and it is the process it has needed.

In the chapter Five I talked about discussions and findings, challenges and the scope of the future.

CHAPTER 2 ORGANIZATION

2.1 Introduction

As a student of internship, First I like to work for recognized international IT scholarship provider that provides full free IT scholarship supporting the Muslim youth. I thought it would be beneficial to me and that I could work with them. I looked into my TSP provider and discovered that it failed to give me with essential information. After learning that they do not teach me from beginning, I begin to consider which organizations will do so. A few days later, I discovered it. I'm looking for an internship opportunity with Islamic Development Bank Limited. Then I had a conversation with them. I'm looking into them and discovered that they're the largest independent and well-known organization. There are numerous TSP of these companies in every country.

2.2 Product and Market Situation

This internship will cover Cisco, Mirotic routers, DHCP, DNS and IIS servers, wireless routers, cloud network methodology and other technologies. Also I learned the more about Cisco packages. Used by Commercial & Industrial Network Corporation. Our product line includes switches, routers, WAN accelerators, unified fabrics, wireless systems, warehouse networks, and pole computing services. We know there are many needs in the networking industry. Every type of group in every industry needs its own network. This company offers great employment opportunities.

2.3 Target Group

The purpose of my training organization was to become a networked institution. This training bandages are presented by the governing board that reviews applications and you will also find client advertisements on social media. The Association cannot treat individual customers individually without the consent of the consumer. If I wanted to start a business or group, I would first find out who my competitors are and who their customers are. I have to. Both service and customer perception are key points. Also, I treat my customers in my own way.

2.4 SWOT Analysis

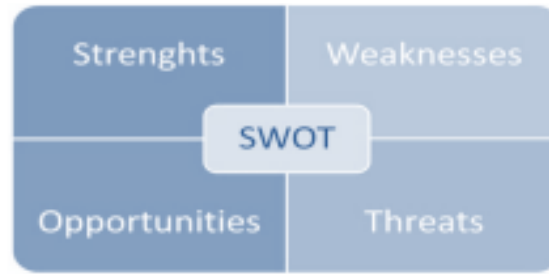


Fig 2.1: SWOT Analyses

Strengths:

- Our course teacher gives us real problems to us to solve and allows for show up productivity.
- We are given better network support for any other people very carefully.
- Our organization respected our time management that value its workforce is good.

Weaknesses:

- We have a small group of trainees in our center.
- Sometime our center faces some small problem.
- Any type of weaknesses could lead the major problems in the planning of the center and can lead to bad situations.

Opportunities:

- Our training center is improving day by day and with lot of future opportunities are coming for goodness.
- will be add upcoming new technologies.
- A lot of work wants our company for help or additional IT support

2.5 Organizational Structure

At first assess the partnership's qualities, flaws, chances, and dangers before deciding on a partnership structure. After you've grasped that, examine its flaws until you've arrived at a solution.

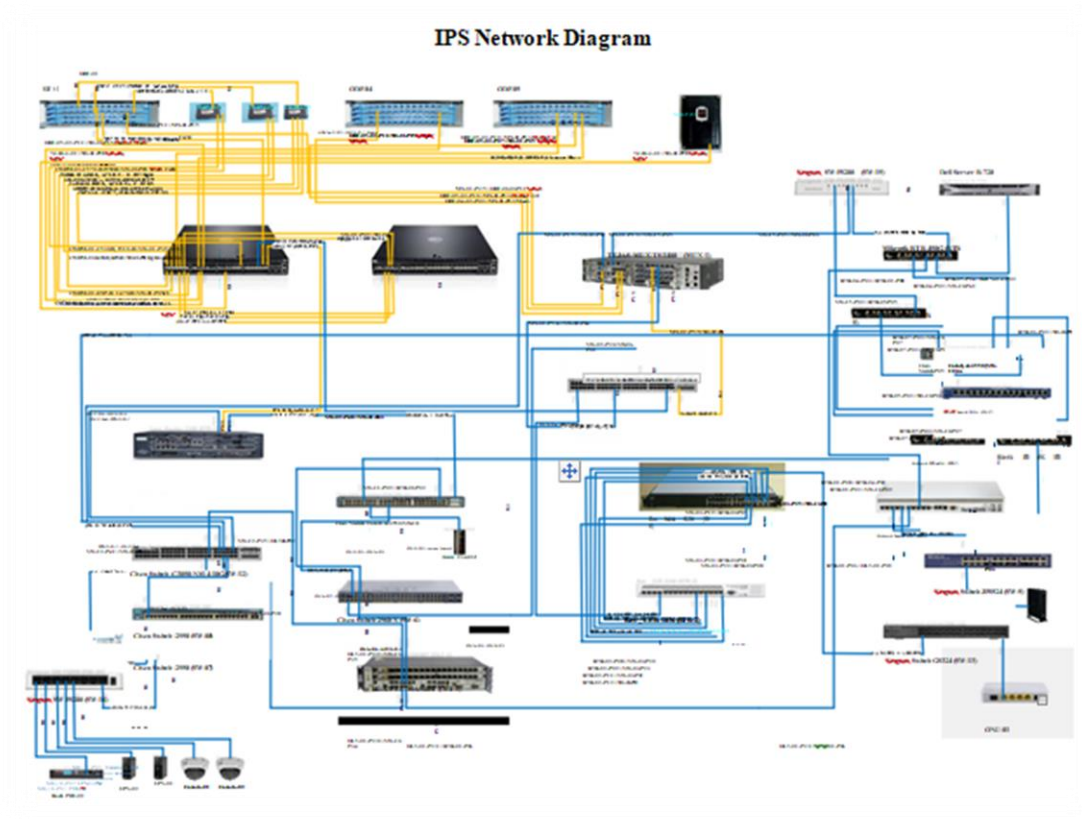


Fig 2.2: ISP Network Setup Diagram

CHAPTER 3 PROJECT TASK AND ACTIVITIES

3.1 Daily Work and Performances

As an intern, I work hard every day and achieve many results. Islamic Development Bank Limited was the name of the internship company where I amassed my knowledge. I put all my intentions into it, learned from everyone, and created a document for each topic. Every day I chat with the team and they support me throughout the semester.

3.2 First after many days do they give me rudimentary knowledge

1. Rules with a knot
2. Network Setups
3. Topology of the network
4. Different modes of transmission
5. Ethernet Cabling

3.2.1 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.

3.2.2 Topology of Network

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

- a. Topology of the mesh
 - b. Topology of stars
 - c. Topology of the bus
 - d. The topology of rings and
 - e. Hybrid topology
- **Mesh Topology:** Mesh topology is a type of point-to-point connection that connects several bumps at the same time. This network contains $n(n-1)/2$ anchors at altitude n .
 - **Star Topology:** The most popular network is the star network. All-star network designs have primary network devices such as switches, computers, and hubs. The main network device acts as like as servers.

- **Bus Topology:** A big cable connects each node. It's known as Bus topology. Bus topology is a basic topology.
- **Ring Topology:** Point-to-Point link (hope to hope) connects the ring topology, It has two bumps on each hope. Data moves around the ring in one direction, from device to device until it reaches its destination.
- **Hybrid Network:** When two or more topologies combinedly build a new topology that's called Hybrid Topology. That is, the advantages of multiple topologies are shared.

3.2.3 Network Categories

- Local Area Network
- Metropolitan Area Network
- Wide Area Network

Local Area Network (LAN):

- ❖ It is in general, unique and personal.
- ❖ In LAN Structures are used in places like small organization, schools, colleges, and homes.
- ❖ Basically, Ring or Bus or Star topologies are most used.

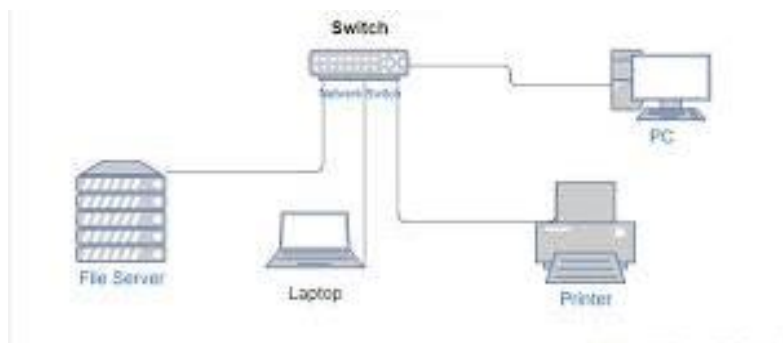


Fig 3.1: LAN Diagram

The Metropolitan Area network (MAN):

- ❖ It is a city-wide network design.
- ❖ Network Internet Service Providers (ISP) and Cables Television Networks
- ❖ It will-be personal or public.

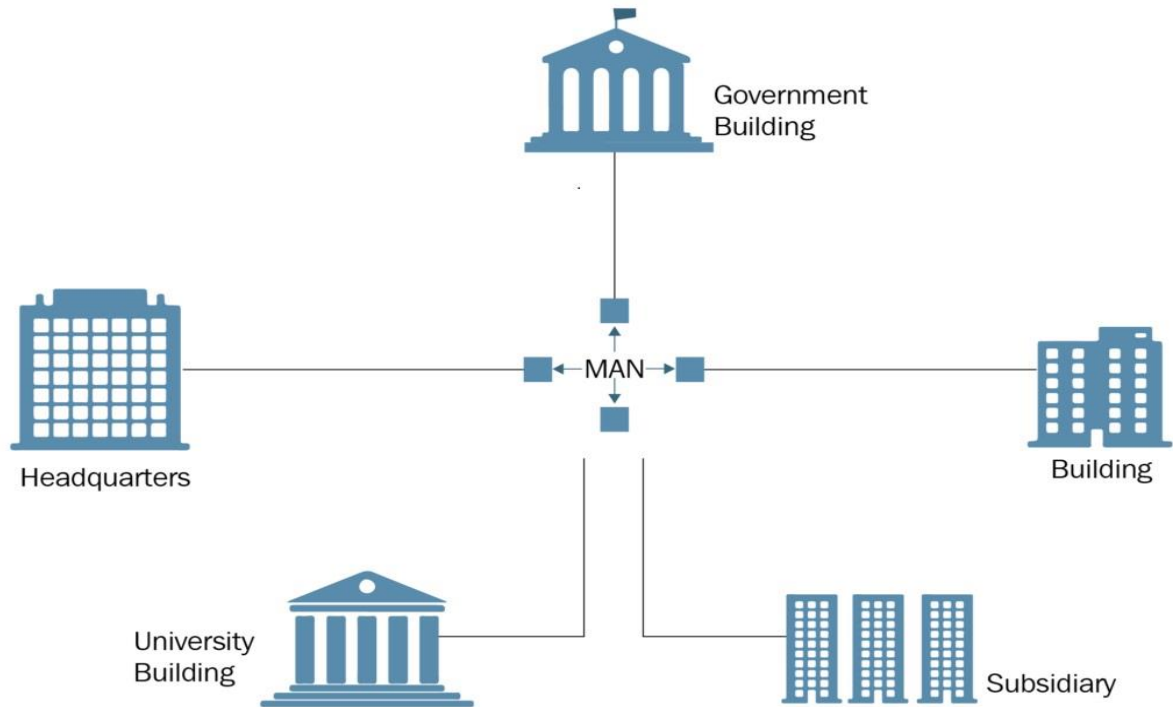


Fig 3.2: MAN Network

Wide Area Network:

- ❖ For long distance transmissions, use this method
- ❖ A single firm owns and implements a WAN

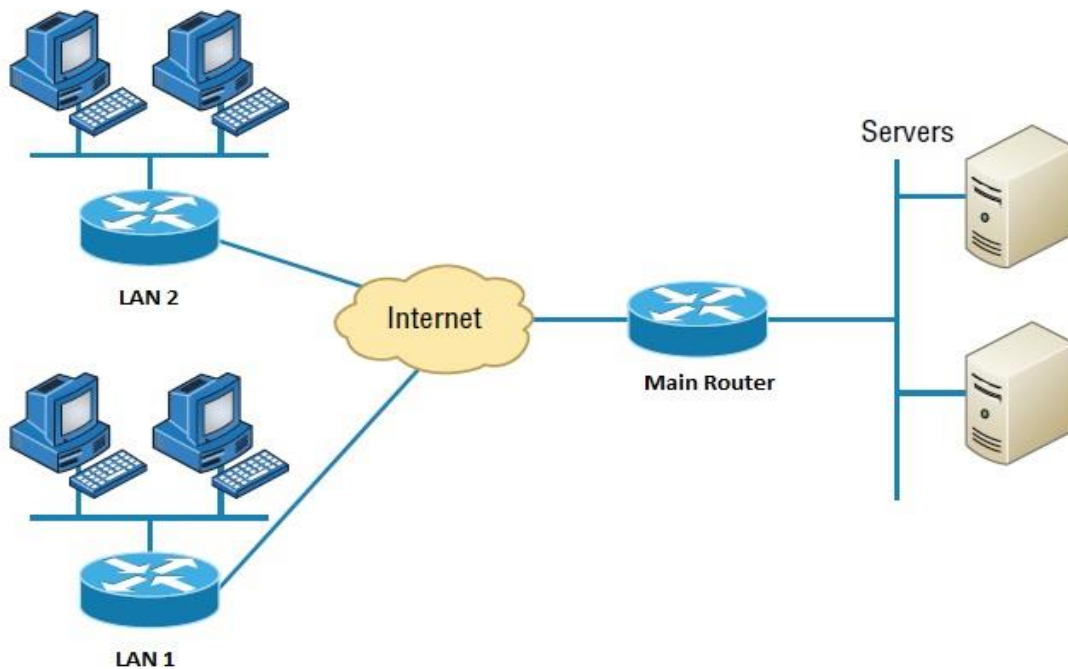


Figure 3.3: Wide field Network

3.2.4 IP Address

The term "IP" is short for "Internet Protocol". The two types of IP (IPv4) and (IPv6) currently used in the universal Internet have dual addresses, and the driving force behind this is the transmission of all data over the Internet. IPv4 addresses are 32 bits, while IPv6 addresses are 128 bits.

Both have his IPv4 to IPv6 switch. These two protocols are incompatible, but a "dual stack" system can send data over his IPv4 and IPv6. The most important semantics in IP addressing is TCP/IP. The numbers are written in sharp decimals. Cycle divides 4 okta (192.168.10.1). Each quintet is assigned a number from 0 to 255. Internet communication requires the use of protocols. This preserves the international protocols of the Internet.

3.2.5 IP 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

3.2.6 Class C IP Subnet

192.168.2.0/26

Block of Size = $256 - 192 = 64$ Block of size

Subnet $2^n = 2^2 = 4$ No of Network

Host,

$2^n - 2$

$2^6 - 2 = 64 - 2 = 62$

Mask: 255.255.255.192

Network's	Hosts	B/A
192.168.2.0	1-62	63
192.168.2.64	63-126	127
192.168.2.128	127-190	191
192.168.2.192	193-254	255

Sub-networking musk, B-class

173.17.0.0-/19

Subnet of Mask = (255.255.224.0)

Block of Size = $256 - 224 = 32$

$2^n = 2^3 = 8$ No of Network

$2^{13} - 2 = 8192 - 2 = 8190$ No of Host

Networks	Hosts	B/A
173.17.0.0	173.13.0.1-173.17.31.254	173.17.31.255
173.17.32.0	173.17.32.1-173.17.63.254	173.17.63.255
173.17.64.0	173.17.64.1-173.17.95.254	173.17.95.255
173.17.96.0	173.17.96.1-173.17.127.254	173.17.127.255
173.17.128.0	173.17.128.1-173.17.159.254	173.17.159.255
173.17.160.0	173.17.160.1-173.17.191.254	173.17.191.255
173.17.192.0	173.17.192.1-173.17.223.254	173.17.223.255
173.17.224.0	173.17.224.1-173.17.255.254	173.17.255.255

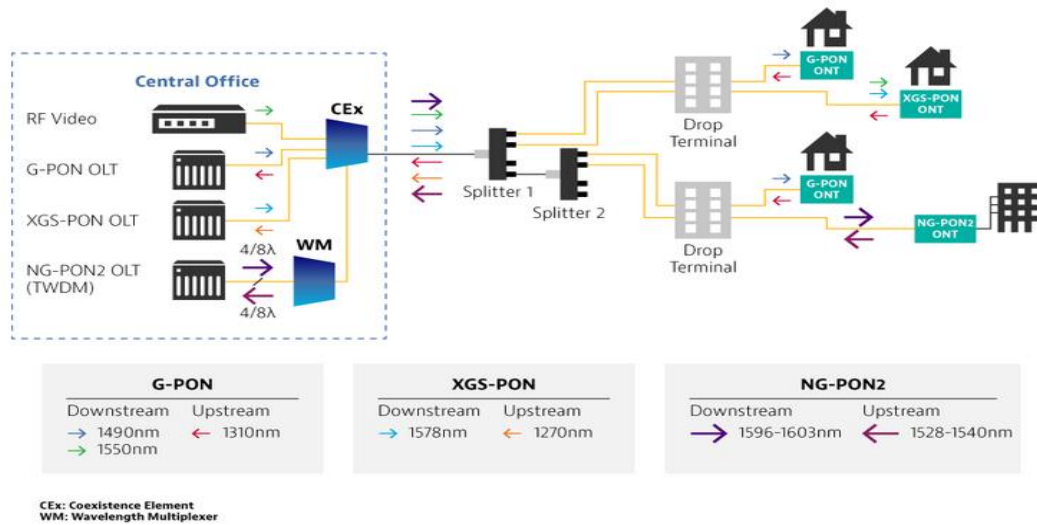


Fig 3.5: FTTx Network

3.4.1 ONU: ONU stands for optical network unit. The optical impulses transferred across fibers are converted to electrical signals by the ONU. These electrical impulses are subsequently distributed to individual subscribers. There is frequently a distance or other access network between ONU and the end user's location.



3.5 VLSM

We'll teach you how to establish many networks from a single network by employing varying length subnet masks for different types of network configurations. The VLSM network is the name for this system.

Given an IP: 173.10.0.0

Requirement host are below.

IT = 509 H

HR = 1015 H

Sales = 220 H

Marketing = 1020 H

Need Marketing=1020 H

(173.10.0.0/ 22)

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

Subnet: 255.255.252.0

HR have: 1015 Host

(173.10.0.0/22)

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

Subnet: 255.255.252.0

Need IT 509 H

(173.10.0.0/23)

$$2^9 - 2 = 512 - 2 = 510$$

Subnet of Mask: (255.255.254.0)

Sales 220 H

(173. 10. 0. 0/ 24)

$$2^8 - 2 = 256 - 2 = 254$$

Subnet of Mask: (255.255.255.0)

3.6 Top Routing Protocol

- ❖ Distance vector Used for RIP Virson-1
- ❖ Link state routing, OSPF, IS-IS
- ❖ Hybrid, EIGP, RIP Virsion-2

Link state Routing Protocol

- ❖ Neighbor of Table
- ❖ Topological Table of Neighbor information
- ❖ Routing of SP

3.6.1 Administrative Distance (AD Value)

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

Configuration of OSPF Single Area

```
Router 01:  
en  
conf t  
in se 2/0  
ip address 192.168.1.1 255.255.255.252  
no sh  
exit  
  
conf t  
in fa 0/0  
ip address 192.168.10.1 255.255.255.248  
no sh  
exit  
  
router ospf 10  
network 192.168.1.0 0.0.0.3 area 51  
network 192.168.10.0 0.0.0.7 area 51  
no auto summary  
exit
```

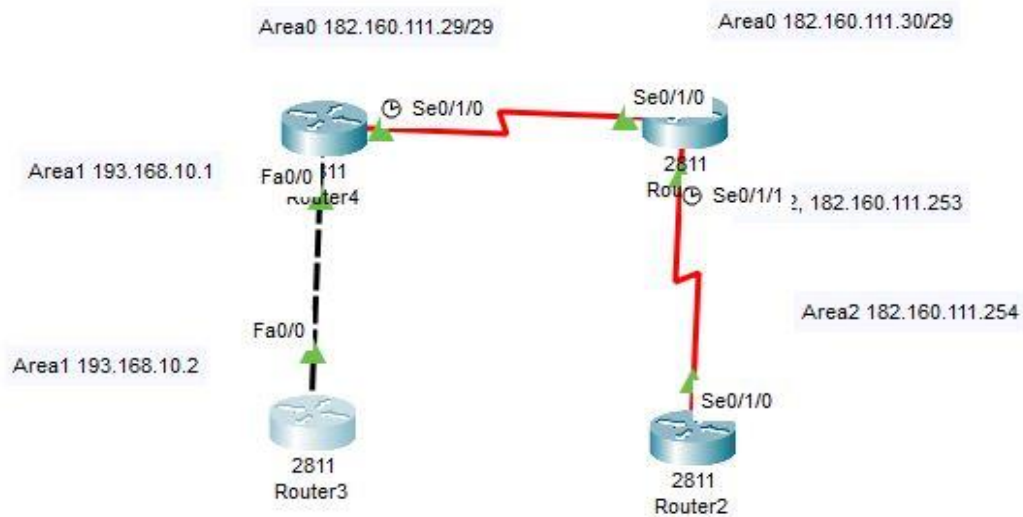


Figure 3.8: OSPF Multi Area

OSPF Multi area Configuration Output

Router_1#

182.160.0.0/29 is subnetted, 2 subnets

C 182.160.111.24 is directly connected, Serial0/1/0

O IA 182.160.111.248 [110/128] via 182.160.111.30, 00:03:51, Serial0/1/0

C 193.168.10.0/24 is directly connected, FastEthernet0/0

Router_2#show ip rou

182.160.0.0/29 is subnetted, 2 subnets

C 182.160.111.24 is directly connected, Serial0/1/0

C 182.160.111.248 is directly connected, Serial0/1/1

O IA 193.168.10.0/24 [110/65] via 182.160.111.29, 00:07:35, Serial0/1/0

Router_3>ena

Router_3>enable

Router_3#show ip rout

O IA 182.160.111.24 [110/128] via 182.160.111.253, 00:10:23, Serial0/1/0

C 182.160.111.248 is directly connected, Serial0/1/0

O IA 193.168.10.0/24 [110/129] via 182.160.111.253, 00:09:43,

Router_4#

182.160.0.0/29

O IA 182.160.111.24 [110/65] via 193.168.10.1, 00:10:46, FastEthernet0/0

O IA 182.160.111.248 [110/129] via 193.168.10.1, 00:10:46, FastEthernet0/0

C 193.168.10.0/24 is directly connected, FastEthernet0/0

3.6.3 EIGRP

1. Improvements to the internal gateway
2. Protocol for hybrid routing
3. Accelerated convergence
4. Cisco's patented technology
5. Based on the EIGRP.
6. Encourage VLSM
7. IP and AppleTalk support
8. The RTP reliable transport protocol is used to communicate between EIGRP routers.
9. EIGRP is the process of determining the optimum way by combining two or more paths (diffusion update algorithm).
10. This is a topology with no loops.
11. Automatic and manual route summary by default Summarization is done automatically.
12. The MTU is used to measure bandwidth, delay, load, and dependability.
13. Multicast and incremental multicast address updating

Three table are maintained by EIGRP.

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

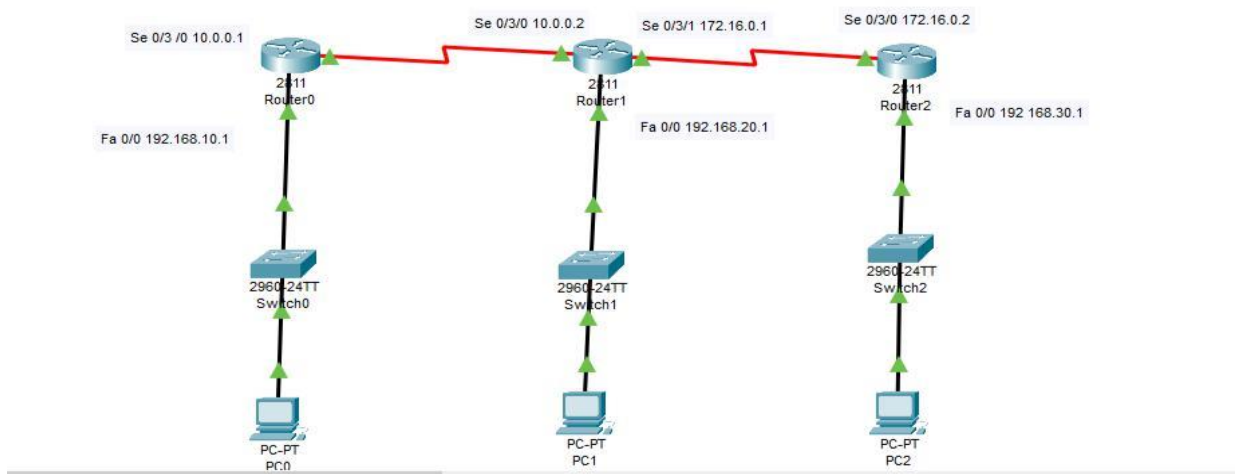


Fig 3.9: EIGRP

Configuration of EIGRP Output

```
Router0#show ip route
```

```
Gateway of last resort is not set
```

```
C 10.0.0.0/8 is directly connected, Serial0/3/0
```

```
D 172.16.0.0/16 [90/2681856] via 10.0.0.2, 00:07:26,
```

```
Serial0/3/0 C 192.168.10.0/24 is directly connected,
```

```
FastEthernet0/0
```

```
D 192.168.20.0/24 [90/2172416] via 10.0.0.2, 00:06:48,
```

```
Serial0/3/0 D 192.168.30.0/24 [90/2684416] via 10.0.0.2,
```

```
00:04:11, Serial0/3/0
```

```
Router1#show ip route
```

```
Gateway of last resort is not set
```

```
C 10.0.0.0/8 is directly connected, Serial0/3/0
```

```
C 172.16.0.0/16 is directly connected, Serial0/3/1
```

```
D 192.168.10.0/24 [90/2172416] via 10.0.0.1, 00:14:37,
```

```
Serial0/3/0 C 192.168.20.0/24 is directly connected,
```

```
FastEthernet0/0
```

```
D 192.168.30.0/24 [90/2172416] via 172.16.0.2, 00:10:59, Serial0/3/1
```

```
Router2#show ip route
```

```
Gateway of last resort is not set
```

```
D 10.0.0.0/8 [90/2681856] via 172.16.0.1, 00:14:10,
```

```
Serial0/3/0 C 172.16.0.0/16 is directly connected,
```

```
Serial0/3/0
```

```
D 192.168.10.0/24 [90/2684416] via 172.16.0.1, 00:14:10,
```

```
Serial0/3/0 D 192.168.20.0/24 [90/2172416] via 172.16.0.1,
```

```
00:14:10, Serial0/3/0 C 192.168.30.0/24 is directly connected,
```

```
FastEthernet0/0
```

3.7 Inter VLAN Routing

A VLAN is a logical grouping of network users and resources connected to administratively controlled switch ports. When building VLANs, you can create small broadcast domains within a Layer 2 switch network by mapping different ports on the switch to different subnets. Only frames sent into the network as if they were on their own subnet or broadcast domain can be logically switched between ports on the same VLAN. Are you saying the router is not an option? The answer could be yes, but it could also be no. It's entirely up to you to decide what you want or need. By default, the server is hosted at a specific location.

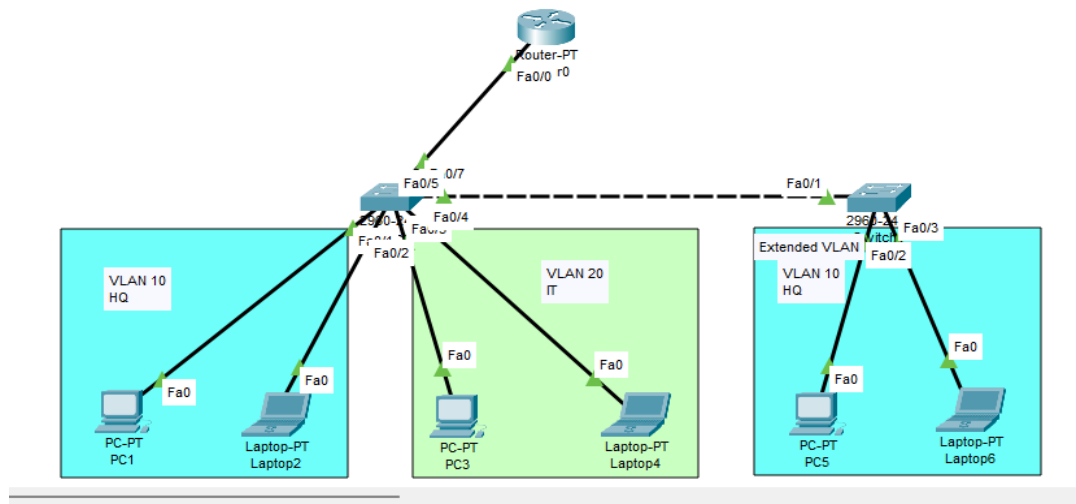


Figure 3.10: Inter VLAN Routing

Configuration of InterVlan routing Output

```
Switch_1#show running-config
Building configuration...
hostname Switch_1
!
interface FastEthernet0/1
switchport mode trunk
!
interface FastEthernet0/2
switchport mode trunk
!
interface FastEthernet0/3
switchport access vlan 10
switchport mode access
!
interface FastEthernet0/4
switchport access vlan 20
switchport mode access
```

```
Switch_2#show running-config
Building configuration...
hostname Switch_2
interface FastEthernet0/1
switchport mode trunk
!
interface FastEthernet0/2
!
interface FastEthernet0/3
switchport access vlan 10
switchport mode access
interface FastEthernet0/4
```



```
switchport access vlan 20
switchport mode access
Router#show run
Router#show running-config
Building configuration...

interface FastEthernet0/0.1
 encapsulation dot1Q 10
 ip address 192.168.10.1 255.255.255.0
!
interface FastEthernet0/0.2
 encapsulation dot1Q 20
 ip address 10.10.10.1 255.0.0.0
```

3.8 DHCP SERVER

DHCP Name Overall Dynamic Host Configuration Protocol. A network server to be exact. Automatically assign IP addresses to clients such as PCs, laptops, and mobile servers. Routes and other network properties are removed from the customer's device. As such, consumers can rely on the convenience protocol DHCP to respond to broadcast requests. A DHCP server knows to provide the settings necessary for clients to communicate automatically and correctly over the network. Otherwise, network administrators would have to manually set up every new client entering the network. This can be difficult, especially in large networks. Each client is typically assigned a dynamic IP address that changes when the IP address expires. DHCP reduces the complexity and amount of administrative work by providing automatic TCP/IP configuration.

TCP/IP configuration by manually:

- The IP address of each client machine is manually entered.
- It's possible that you'll key in an incorrect or invalid IP address.
- As a result of wrong setting, communication and network issues may emerge.
- There is an administrative overburden on networks where PCs are often transferred.
- TCP/IP configuration is done automatically:
- IP addresses are given to client computers automatically.

- Assures that clients are always working with the most recent configuration data.
- Client setup configuration change as soon as the network structure changes.
- Eliminates a typical source of network problems.

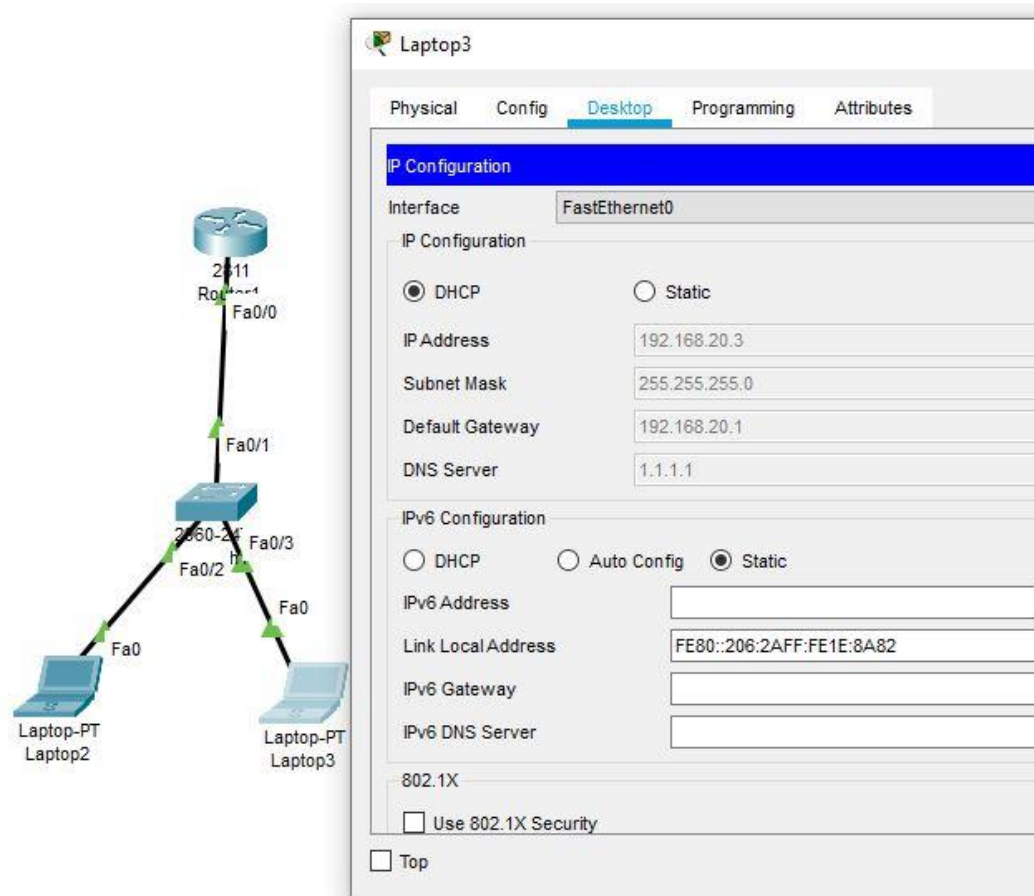


Figure 3.11: DHCP Server

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
```

3.9 NAT

Similar to Classless Inter-Domain Routing CIDR, the original purpose of NAT was to prevent exhaustion of available IP address space by allowing a large number of private addresses to be represented by a small number of public IP addresses. was

NAT is currently proving beneficial for network relocation and consolidation, as well as load balancing and server deployment.

NAT can, in some cases, minimize the number of public IP addresses required in your network configuration. NAT is very effective when merging two organizations that have overlapping internal address systems.

NAT facilities are:

1. Save money while providing a public IP address.
2. Internet access required. However, the host does not have a global IP address.
3. I have changed ISPs and need to renumber my networks. I need to connect two internets with the same address.

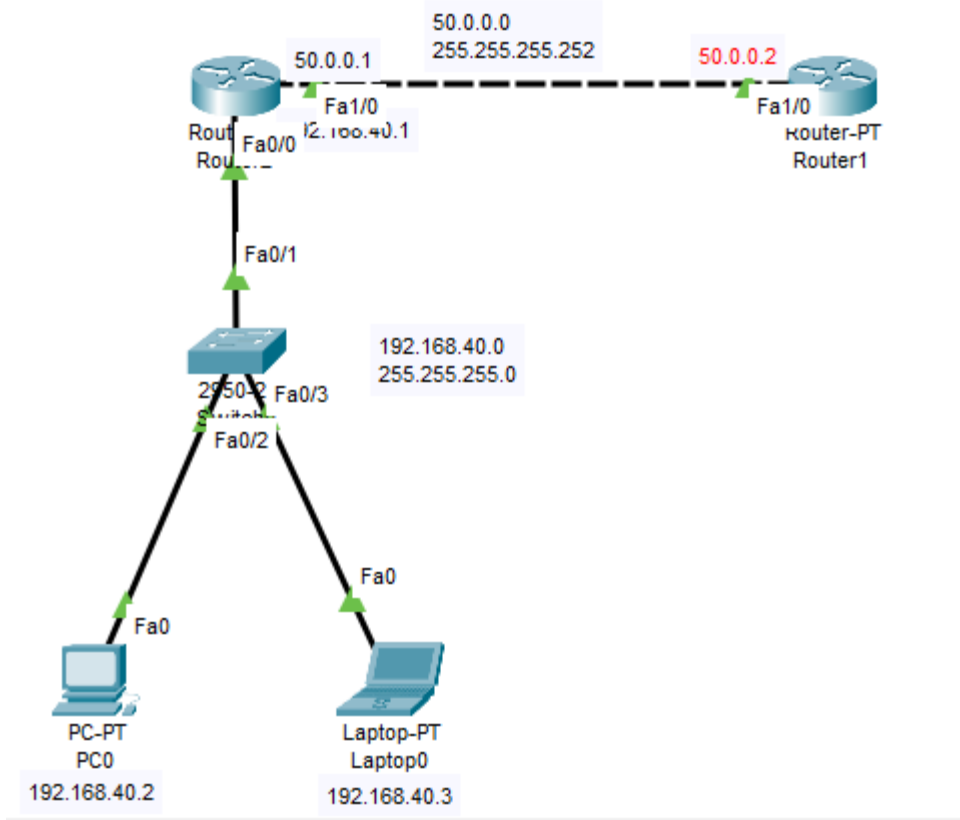


Figure 3.12: NAT

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
```

3.10 Access Control List (ACL)

These days, we rarely search for anything that isn't connected to the internet. The Internet is obviously a public network that anyone can connect to, but business and personal

networks are definitely non-public networks. The problem is that whenever you connect to the Internet from a private network (where everyone is welcome), you are immediately vulnerable to security breaches. This is what is often called a firewall. A firewall is essentially a tool that can be easily implemented to prevent users roaming on a public network from accessing a private network.

ACLs typically used on routers to work out which devices are allowed to access them based on requesting device's Internet Protocol (IP) address.

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(config)#access-list 10 deny 193.168.11.2 ?
A.B.C.D Wildcard bits
<cr>
Router_3(config)#access-list 10 deny 193.168.11.2 0.0.0.0 ?
<cr>
Router_3(config)#access-list 10 deny 193.168.11.2 0.0.0.0
Router_3(config)#acc
Router_3(config)#access-list perm
Router_3(config)#access-list 10 per
Router_3(config)#access-list 10 permit an
Router_3(config)#access-list 10 permit any ?
<cr>
Router_3(config)#access-list 10 permit any
Router_3(config)#inter
Router_3(config)#interface fas
Router_3(config)#interface fastEthernet 0/0
Router_3(config-if)#ip acc
Router_3(config-if)#ip access-group 10 ?
in inbound packets
out outbound packets
Router_3(config-if)#ip access-group 10 ou
Router_3(config-if)#ip access-group 10 out ?
<cr>
Router_3(config-if)#ip access-group 10 out
Router_3(config-if)#exit
Router_3(config)#exit
Router_3#
%SYS-5-CONFIG_I: Configured from console by console

Router_3#wr

```

```

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)

```

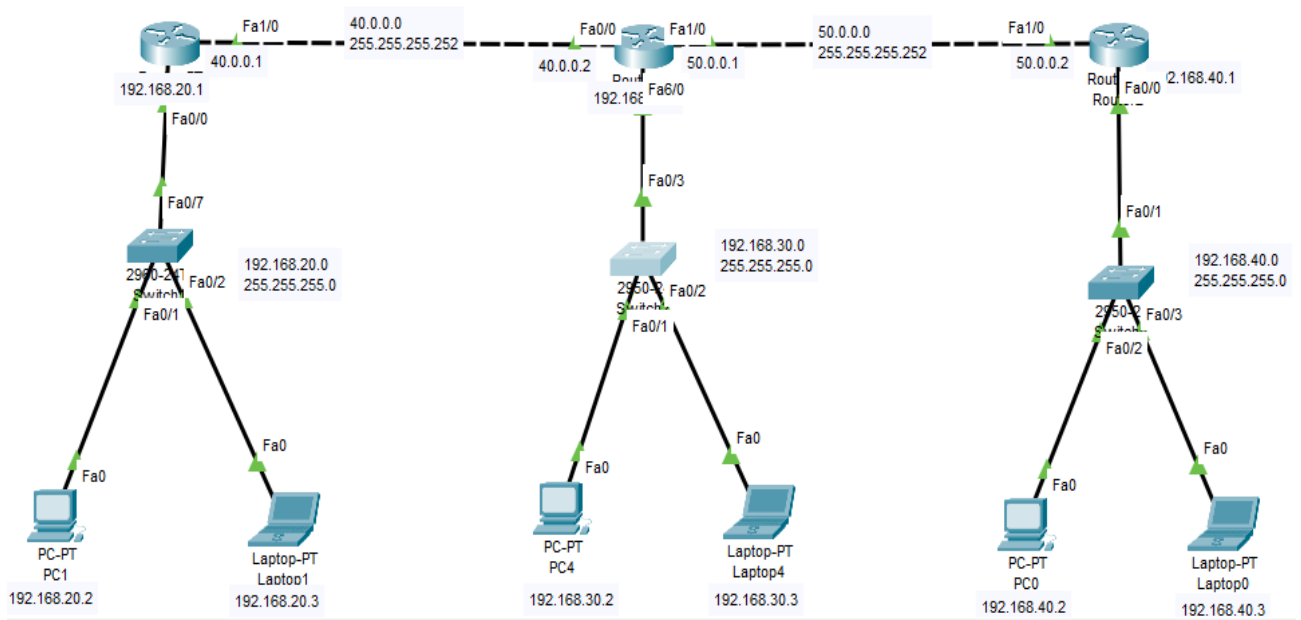


Figure 3.13: ACL

3.11 MikroTik Router

3.11.1 Definition of Mikrotik Router

One of the branded routers is MikroTik. This is a Linux based router. It was started in 1996 to develop routers and wireless internet service provider systems. We currently offer hardware and software consulting services.

This is suitable for all sizes. Customers who want an expensive router with all the features a network administrator needs to protect and monitor their network. I have not found an ADSL model that came with it and would not recommend it for such a network connection.

3.11.2 Router Setup Steps

- Step 1: At first take Decide to where places the router
- Step 2: Now, Connect with the network.
- Step 3: Configure the wireless router gateway
- Step 4: Connect with gateway to the router.
- Step 5: App or web dashboard using here.
- Step 6: Make a username and set up password

3.11.3 MikroTik Router Features

1. Support for Hardware Devices
2. Setup
3. Configuration
4. Restart or backup device
5. Control of Firewall
6. Devices for Routing
7. MPLS\s
8. VPN Connection
9. Wireless Connection
10. DHCP Server Setup
11. Making the use of a hotspot
12. QOS
13. Tools
14. Internet Proxy and
15. A variety of various options

3.11.4 MikroTik Router Interface

MikroTik router operator systems can handle a wide variety of network interface cards, including virtual interfaces. Features such as bridge interfaces, VLANs, and bonding are available. Each has a separate submenu. The general interface menu allows you to set and read all interfaces and they all have the same quality attributes.

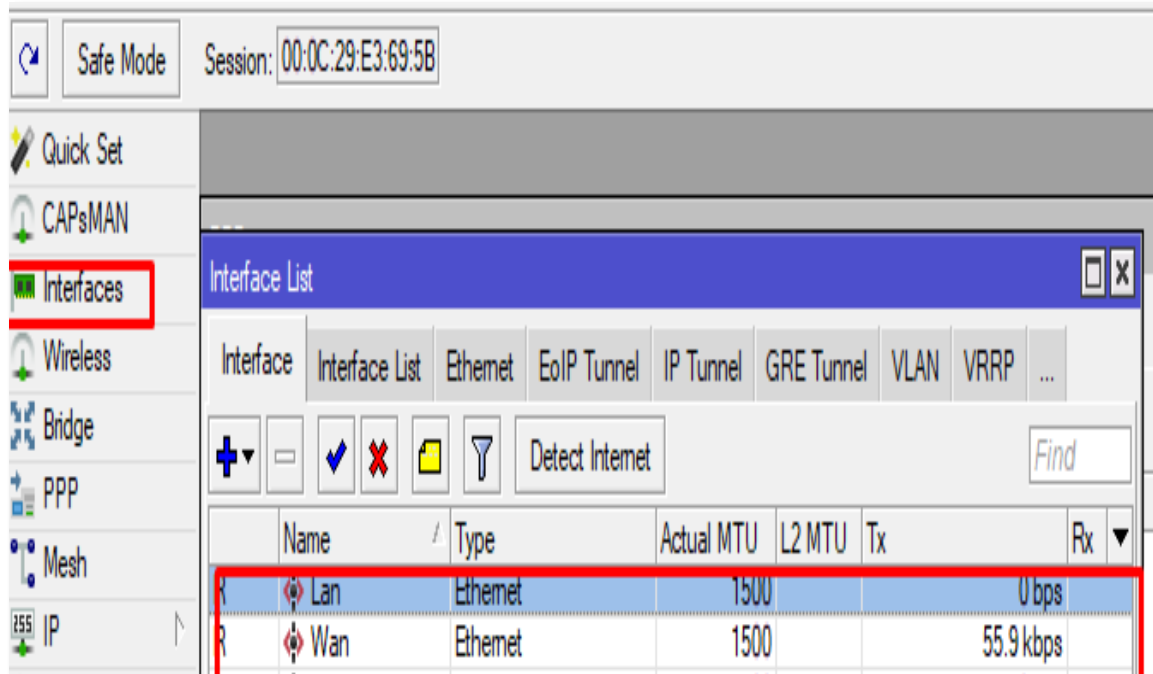


Figure 3.14: Mikrotik Interface

3.11.5 Bridge Interface

Bridge Interface supports various interfaces. There is only one virtual interface and there is a bridge connecting these interfaces. This is the function definition. Each physical segment is connected to a hosted interface. This section is managed as a unit. You can add interfaces to your bridge. First open the network configuration system and then add a new interface which is a bridge. Then connect the new bridge connection. After completing this step, select the MAC address. The MAC address of the device has been added to the bridge.

Name	Type	Actual MTU	L2 MTU	Tx	Rx	Tx Pkts (k/s)	Rx Pkts (k/s)	PP Tx	PP Rx	PP Tx Pkts (k/s)	PP Rx Pkts (k/s)
eth1	Bridge	1500	1500	19.2 kbps	10.4 kbps	15	15	0 bps	10.4 kbps	0	15
eth2	Bridge	1500	1500	190.2 kbps	24.4 kbps	31	24	0 bps	24.4 kbps	0	24
eth3	Ethernet	1500	1500	194.4 kbps	24.4 kbps	25	25	194.4 kbps	24.4 kbps	35	25
eth4	Ethernet	1500	1500	3.6 kbps	43.7 kbps	4	44	0 bps	43.7 kbps	4	44
eth5	Ethernet	1500	1500	3.6 kbps	0 bps	0	0	0 bps	0 bps	0	0
eth6	Ethernet	1500	1500	480 bps	0 bps	4	1	3.6 kbps	480 bps	4	1
eth7	Ethernet	1500	1500	0 bps	0 bps	0	0	0 bps	0 bps	0	0
eth8	Ethernet	1500	1500	0 bps	0 bps	0	0	0 bps	0 bps	0	0
eth9	Ethernet	1500	1500	3.3 kbps	0 bps	3	0	3.3 kbps	0 bps	3	0
eth10	Ethernet	1500	1500	0 bps	0 bps	0	0	0 bps	0 bps	0	0
eth11	Ethernet	1500	1500	0 bps	0 bps	0	0	0 bps	0 bps	0	0
eth12	Ethernet	1500	1500	0 bps	0 bps	0	0	0 bps	0 bps	0	0
eth13	Ethernet	1500	1500	0 bps	0 bps	0	0	0 bps	0 bps	0	0
eth14	Ethernet	1500	1500	0 bps	0 bps	0	0	0 bps	0 bps	0	0

Figure 3.15: Bridge Interface

3.11.6 DHCP Server on MikroTik Router Basic:

The screenshot shows the Mikrotik WinBox interface with the 'New DHCP Client' dialog box open. The 'Interface' is set to 'Wan'. The 'Advanced' tab is selected, and the following options are checked: 'Use Peer DNS' and 'Use Peer NTP'. The 'Add Default Route' is set to 'yes'. The 'Status' is 'stopped'. The 'OK' and 'Apply' buttons are highlighted with red boxes.

Fig 3.16: DHCP Server Configuration

3.11.7 DHCP Server

DHCP is a dynamic host configuration mechanism that uses full names. A server that connects to the Internet. It is automatically assigned and has an IP address. Your device has penalty routes and other network factors. This is due to his DHCP, a convenient technique for responding to broadcast requests from consumers.

A DHCP server knows to provide the settings necessary for clients to communicate automatically and correctly over the network. Without it, network administrators would have to manually configure every new customer. This is a challenge, especially in large networks. Each client is often assigned a dynamic IP address that changes when the IP address expires.

3.11.8 NAT

Similar to Classless Inter-Domain Routing (CIDR), NAT aims to prevent IP address exhaustion by allowing a large number of private IP addresses to be represented by a small number of public IP addresses. Increase Since then, it has been discovered that NAT is beneficial for network rearrangement and consolidation, as well as server load balancing and restructuring.

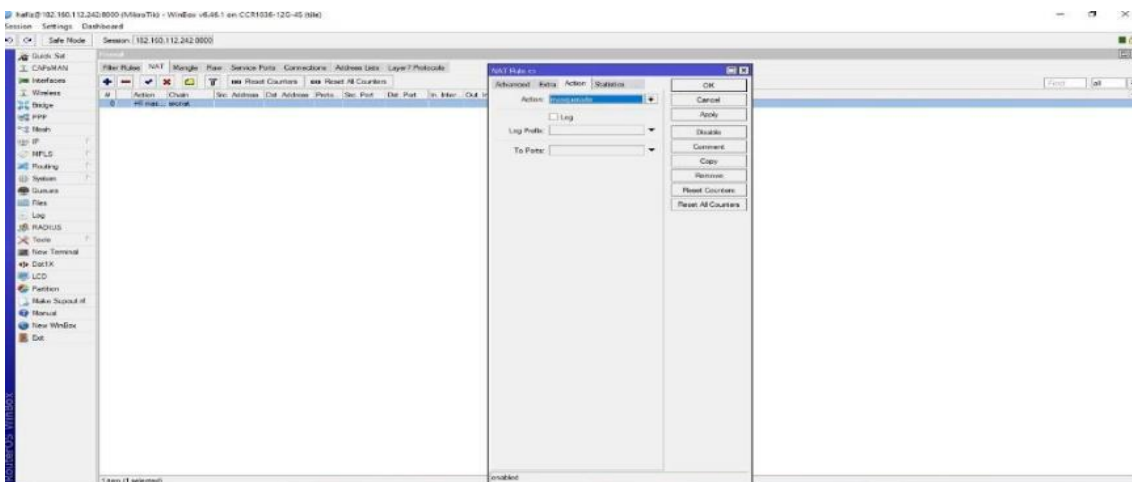


Figure 3.17: NAT Routing

3.11.9 Working Procedure of NAT

In some cases, using NAT can minimize the number of public IP addresses required in your network setup. NAT is very effective when two companies with overlapping internal address systems join forces.

NAT facilities are:

1. Save money and get a public IP address at the same time.
2. Internet access is required, but the host does not have a global IP address.
3. Changing internet providers will change the number of networks.
4. I need to connect two internets with the same address.

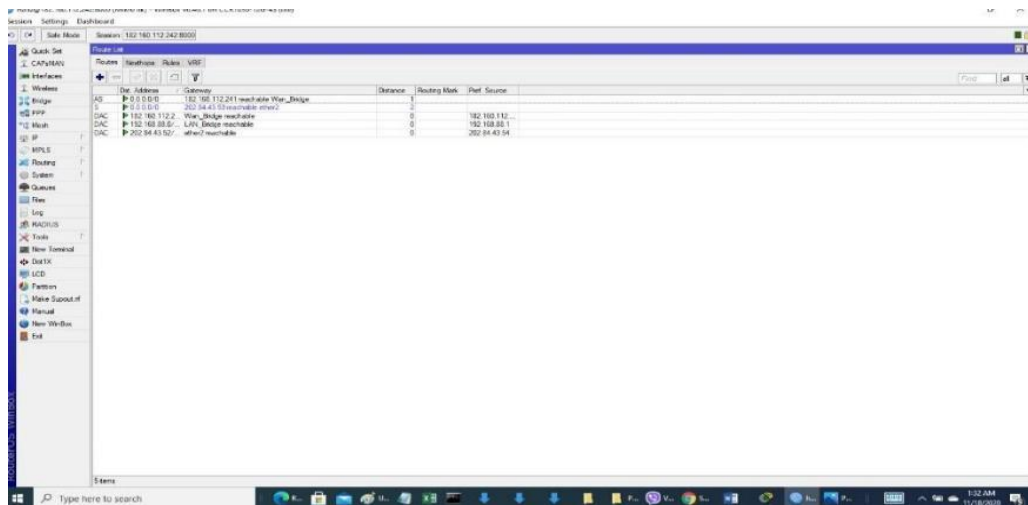


Figure 3.18: NAT Routing Configuration

CHAPTER 4

COMPLETENCIES AND SMART PLAN

4.1 Bandwidth Management

Bandwidth control (B/W control) is a term that refers to the ability to control the amount of data sent. We recognize that MikroTik routers have many unique features. ISPs and local area network (LAN) points of sale offer fixed-bandwidth services. If I accept or provide 50Mbps bandwidth from my ISP and I have 20 PCs, how do I provide bandwidth to all of them? Important for overall data distribution.

MikroTik router is a powerful and powerful S/W monitoring device. Given that there are many employees in an office, each of whom needs internet bandwidth, some may not necessarily need it, while others may need it regularly as part of their official duties. Think about it, then adjust your bandwidth. You get 20MB of bandwidth from your ISP, which he can distribute to 20 computers. All computers send data at a rate of 1024 kbps.

Some of them cannot use enough bandwidth. Still, some users have limited bandwidth and need to use S/W management. Here is a step-by-step guide on how to configure your MikroTik router.

4.2 Configuration

Step 1:

At first on the win box software > Queues > simple Queues > click plus >

Name = queue1 > Target Address = 192.168.10.1

Target upload, Max Limit = 1024kbps, Target Download

Max Limit = 1024kbps > Apply > Okay

Step2:

Again on win box > Queues > simple Queues > click plus >
Name = queue 2 > Target Address = 192.168.10.2
Target upload, Max Limit = 1024k, Target Download,
Max Limit = 1024 k > Apply > Okay

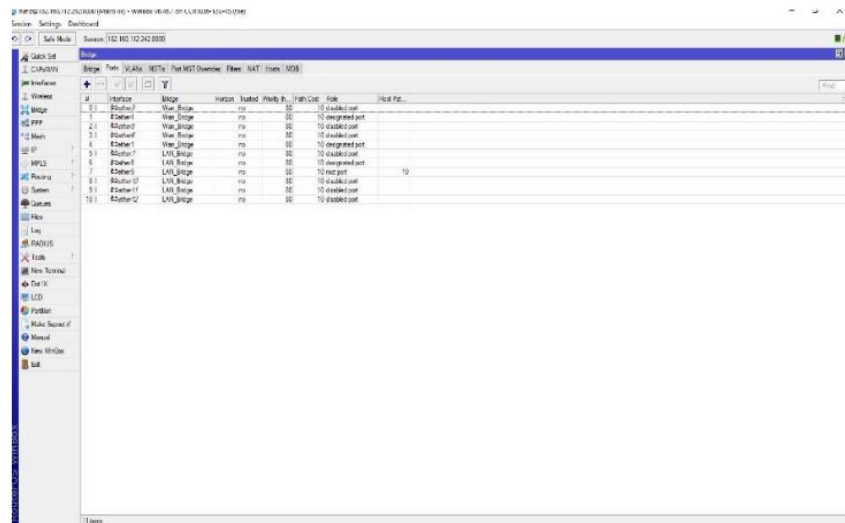


Fig 4.1: B/W Control

4.3 DHCP Configuration

- At first go to the IP > DHCP server menu from the win box. Then DHCP server window will present.
- Now DHCP Server window, then touch on the DHCP Setup button and choose the interface which is necessary for setup DHCP server from same quality server. Drop down the interface and then click the next button.
- LAN and close the DHCP address Space on the input box. Now click on the next step button. Client got IP address.
- Choose gateway address for the given network in gateway for DHCP Network input box and then click the next button.
- Give IP range from the DHCP client or LAN user will be get IP address to provide outside input box and now click on the next button.
- Give DNS server IP and then click Next button.
- IP lease time. Now click on the up next button. Default lease time is 3 days, which is automatically setup.
- DHCP setup is complete now and this is successful message will be shown here.
Now connect any IP device as like Laptop, Desktop, Smartphone and so on to the network.

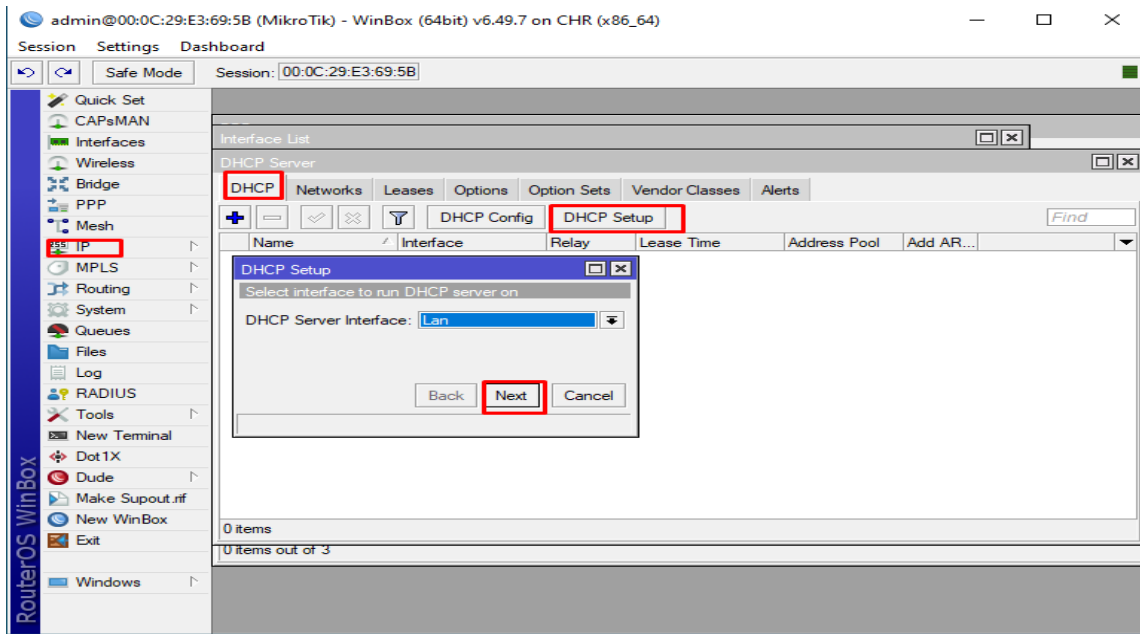


Fig 4.2: DHCP Server Conf

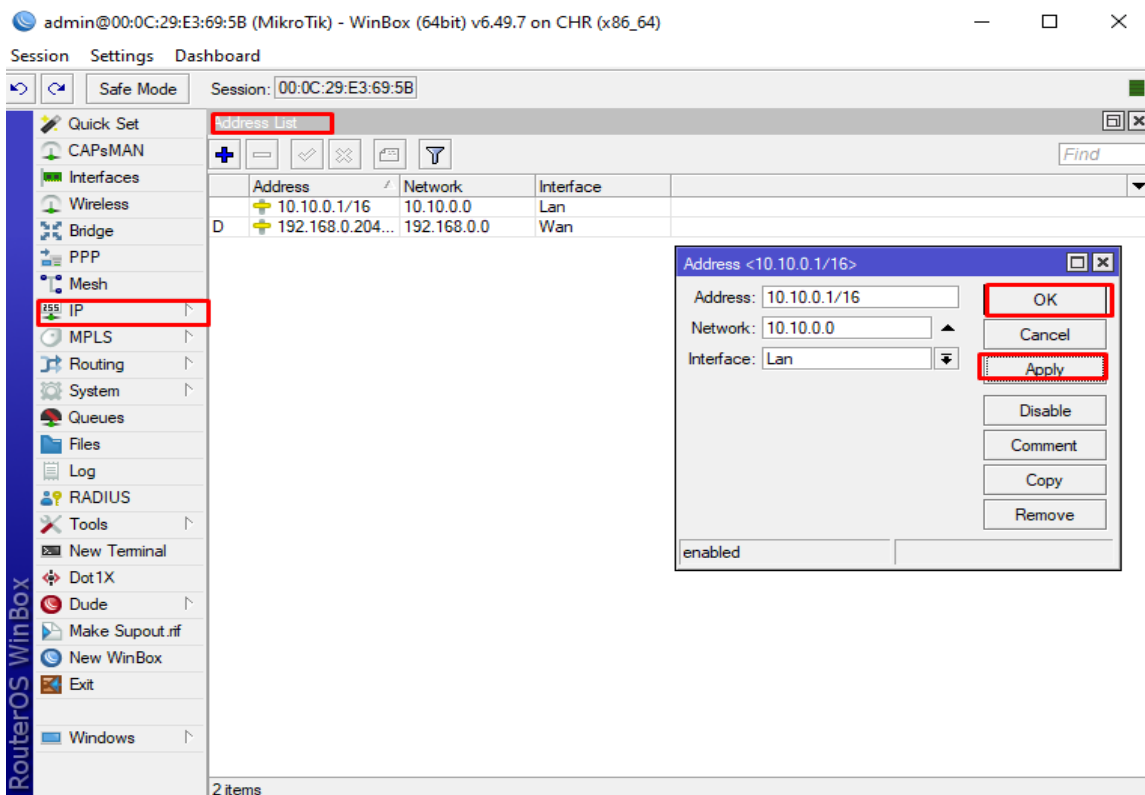


Fig 4.3: IP Address Assign

CHAPTER 5

CONCLUSION AND FUTURE CARAREER

Discussion and Conclusion

At IsDB BISEW IT Scholarship Program, I had several possibilities and experiences during the training sessions to work. This area of organizable or industrial network planning and design has many areas of activity. Data and internet connectivity, Network security, Network troubleshooting and many sorts of application configuration and maintenance are all part of the job. The white paper also included information on setting up, configuring, and optimizing workplace networks. During my internship, I learned a lot of useful exercises from my manager, did certain tasks as usual, and finally developed the courage to start my own business. I also learned how to deal with big setbacks and come up with new ideas every day. This kind of work will greatly benefit my future career. So, I will try this style again.

Scope for Further Career

This internship gave me practical knowledge about networking. that's very good for me. It can be useful in your future life and career.

- ✓ I am collecting information on this subject in order to test myself as a skilled worker in this field.
- ✓ I can create your own network-based IT center.
- ✓ These internship experiences will help you achieve a suitable career.
- ✓ This internship will help you in your job as a network administrator.
- ✓ I am ready to take the CCNA and MCSA exams.
- ✓ Help create network designs and fix problems.

References

- [1] Todd Lammle, Cisco Certified Network Associate, Sixth Edition, Wiley publishing 2007, Page, 115-134, 417-482, 552-607.
- [2] Todd Lammle, CompTIA Network+, 2nd Edition, Wiley publishing 2009, ISBN 978-0-470-42747-7 Page, 110-139, 607.
- [3] IP/DHCP Server, available at <<https://wiki.mikrotik.com/wiki/Manual:IP/DHCP_Server>> 3-26-2021, 5:00PM.
- [4] IP/Firewall/NAT available at <<<https://wiki.mikrotik.com/wiki/Manual:IP/Firewall/NAT>>> 12-8-2022 3:30PM.
- [5] Media Converter available at <<<https://www.omnitron-systems.com/education/media-converter-overview>>> 26-6-2022, 4:40PM.

Appendixes

Appendix A: Internship Reflection

The real knowledge is that the tanning period is over. I admired the people I worked with and reflected on the observations I made and the gifts I gave them. Think about how you can interact with your primary caregiver and others by acting efficiently with the help of your customers. A specialist group and a master teacher. button is pressed. An entrepreneurial spirit, how to collaborate with others, how to improve resources, and some expertise in orchestration and decision-making. Trading company environment, organizational work, individual work Internship feedback The person in charge of the internship knitted it for me. An evaluation medium that allows you to search for a specific assembly. Identifies the master.

Appendix B: Company Details



Fig. 5.1: IsDB BISEW IT Scholarship Project

The IsDB-BISEW-IT Scholarship Project is an educational and Training organization consisting of more than 20 training institutes, a complete research and development cell dedicated to the development of training resources and curricula, and an administrative body headed by an administrative office composed by IsDB. training network. BISEW. A full-time, intensive training program of 6 to 12 months training allows the trainee to keep her IT skills up-to-date, and most of the time, her classes are rewarding in a variety of national and international organizations. lead to a successful career.

INTERNSHIP ON CISCO NETWORKING TECHNOLOGIS WITH SECURITY

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