INTERNSHIP ON CCNA ROUTING AND SWITCHING AT CSL TRAINING CENTER

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This Report Presented in Partial Fulfillment of the Requirements for the

Degree of Bachelor of Science in Computer Science and Engineering.

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APPROVAL

This Internship titled "**Internship on CCNA Routing and Switching at CSL Training Center**", submitted by Debi Mridha, ID No: 183-15-11798 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial and 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 06-01-2022.
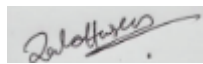
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DECLARATION

I hereby notify that, this internship report is prepared by me, **Debi Mridha, ID: 183-15-11798** to the department of Computer Science and Engineering, Daffodil International University. Under the supervision of **Mr. Gazi Zahirul Islam, Assistant Professor, Department of CSE**, Daffodil International University. I also Declare that neither this internship report nor any part of this internship report has been submitted elsewhere for award of any degree or Bachelor of Science and Engineering.
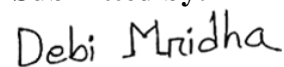
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I want also like to thank my friends who helped me a lot in finishing this training within the limited time.

Finally, must acknowledge with due respect the constant support and patients of my parents.

ABSTRACT

At CSL Training Center, I just completed a four-month internship. CSL Training Center is a well-known training center in the area. We cannot imagine everyday life in the current world without the internet.

I developed an interest in networking while at DIU. My desire to study networking has become greater since then. That is why, in my last year, I decided to complete an internship. "Internship on CCNA Routing and Switching at CSL Training Center," according to the study, is a mixed field of computer networking that looks at the architecture of a network system. There are five chapters in this report. Introduction is the first chapter. The information about the company is included in the second chapter. The third chapter discusses everyday duties and activities. Competencies and conclusions are the focus of the fourth and fifth chapters.

Internship training, CCNA routing, and practical work are all included in the report. The study explains why certain routing, switching, addressing, RIP, EIGRP, OSPF, and VLAN protocols are used, as well as how they may be configured. Network kinds, routing and switching fundamentals, TCP/IP and OSI models, IP address, WAN technology, network security implementation, network extension with VLAN, IP route determination, access to IP traffic with access list, and point configuration, among other topics, are covered.

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CHAPTER 1

INTRODUCTION

1.1 Introduction:

Computer networking's most fundamental role is to connect people in order to communicate. There were 4.70 billion internet users in June 2021, totaling approximately 58.9% population of the globe. To link the rest of the globe to the Internet, network engineers are required. Network engineers are employed by internet companies to connect and manage their networks. The CCNA (Cisco Certified Network Associate) is an entry-level certification in computer network engineering. In the networking industry, it is also the safest and most popular system. CISCO is used in practically every business and bank. To connect to the Internet and manage it, CCNA Routing and Switching is used. Computer networking is a rapidly evolving, sophisticated area that may provide learners a lucrative career path.

1.2 Motivation

I've always been interested in networking as a Computer Science and Engineering student at Daffodil International University. Interning at a firm allows us to gain practical experience in a work context. Internships serve us by providing us with additional information about the career path we wish to pursue. The majority of networking companies all around the world are seeking for CCNA-certified professionals. In Bangladesh, there are several career opportunities in the field of computer networking. If I obtain the CCNA certification, I will be qualified to work as a network professional, IT help desk technician, or other networking-related position. The networking industry provides a framework within which CCNA may strengthen and expand my solidarity in order to enhance my future. That is what drives me to pursue a "CCNA Routing and Switching" internship.

1.3 Internship Objectives

Internships provide me the opportunity to obtain practical experience in real-world settings such as offices, meetings, and events. During my internship, I met a wide range of talented and creative people. The internship's purpose is to provide me with job experience that I may utilize to my future profession. The following are some of the additional objectives:

- Learning about networking is a good thing to do.
- Routers and switches are both important to understand.
- Learn how to set up the whole network of company.
- Confidence Boosting.
- Obtaining a reference or a letter of recommendation, or immediately obtaining employment.
- Above importantly, familiarize myself with the professional workplace.

1.4 Introduction to the Company

To finish my BSc in CSE, I need to undertake an internship at a company. CSL Training Center was my choice for my internship. It is one of the most rapidly growing IT training institutes in Bangladesh. It's the best networking training center in Dhaka. There are two offices of the company in Bangladesh. The first is located in Kuril and the second in Lalmatia. They've worked in the training industry for 15 years. They are associated with nearly a hundred businesses. Cisco, Linux, Juniper, Microsoft, and MikroTik certifications are among the many training that they offer. Job placement, vendor examinations, and other services are also available. Most significantly, they first teach us before offering us internships at their organization.

1.5 Report Layout

There are five chapters in this internship report. The report layout simplifies all chapters. Each chapter was summarized as best I could. The following is a summary of the chapters:

- The first chapter introduces the organization and outlines the internship's objectives, motivations, and report layout.
- The background of the organization is presented in the second chapter.
- the third chapter outlines the daily tasks, challenges, and activities during the internship term.
- Competencies, smart planning, and reflections are discussed in the fourth chapter.
- The fifth chapter concludes with a discussion and potential job options.

CHAPTER 2

INTERNSHIP ORGANIZATION

2.1 Company Introduction

CSL Training Center is one of Bangladesh's fastest-growing IT schools. In Bangladesh, the firm currently has two locations. The first is in Kuril, and the second in Lalmatia. They've been in the training business for 15 years. They have almost a hundred partners. BASIS, BTEB, BITM, e-Cab, RedHat, and Person VUE were among the companies with whom they collaborated. SSF, BTRC, Bangladesh Hi-Tech Park Authority, Global Brand, Tiger IT, THAKRAL information systems private Ltd, NovaCom, BAPEX, AKIJ GROUP, ADN Telecom, Bangladesh Open University, and others are some of the company's corporate clients. They provide high-quality training in Cisco, Linux, Juniper, Microsoft, and MikroTik certifications. They also provide 100% job guarantee trade, vendor exam, Exam Preparation, and other services.

2.2 Product and Market Situation

CSL Training Center is one of Dhaka's top networking institutes. CSL training center offer several professional trainings. such as:

1. CLOUD and VIRTUALIZATION:
   a) AWS solution Architecture -Associate
   b) Microsoft Azure Administrator
   c) DevOps Engineering
   d) Docker and Kubernetes
   e) VMware VSphere 7.0: ICM
   f) AWS Essential
2. Routing and Switching:
   a) CCNA
   b) CCNP ENCORE
   c) CCNP ENARSI
   d) Juniper JNCIA & JNCIS

e) F5 Load Balancer

f) HCIA Routing and Switching

g) MikroTik with ISP setup.

h) FTTx and OLT (V-SOL/BDCOM/C-DATA)

3. Network Security:

a) Cisco CCNP Score

b) Ethical Hacking

c) Cisco CyberOps

d) Cisco VPN

e) PaloAlto Firewall Administration

f) Fortinet FortiGate Firewall

g) Presentation Testing with Kali Linux

4. System Administration:

a) Red Hat system Administration

b) Red Hat server Administration

c) Ubuntu Linux Server

d) Windows Server 2019

e) MS Exchange Server 2019

f) Office 365 Administration

g) Zimbra Mail Server Administration

h) Network Management and Monitoring

5. Hardware and Networking:

a) IT Essentials

b) Networking 101

6. Automation Tools:

a) Automation with Ansible

b) Python for Network Engineer

7. IT security Auditing & MGT:

a) CISA

b) CISSP

8. Others:

a) MS SQL Server Administration

b) Oracle DBA Admin

c) Asterisk IPTSP Setup

2.3 Target Group

Students who want to improve their networking skills are targeted by the organization. The main purpose of the institute is to provide assistance to engineering students and professionals.

My internship company runs a survey, researches their competition, and then advertises on social media to reach out to their customers.

2.4 SWOT Analysis

Strength:

- Exceptional Communication skills
- Positive brand recognition in the marketplace

Professional trainer with vast experience

Weakness:

- Financial resources are insufficient
- A lack of marketing experience

Opportunities:

- For all sorts of people, there are training options.
- There is an opportunity to teach at their institute.
- A job offer has been made.

Threats:

- Every firm is vulnerable to failure. CSL Training Center, on the other hand, appears to be in solid financial shape. They have made good progress in business. I don't see any thread in their business at the moment.

2.5 Organizational Structure
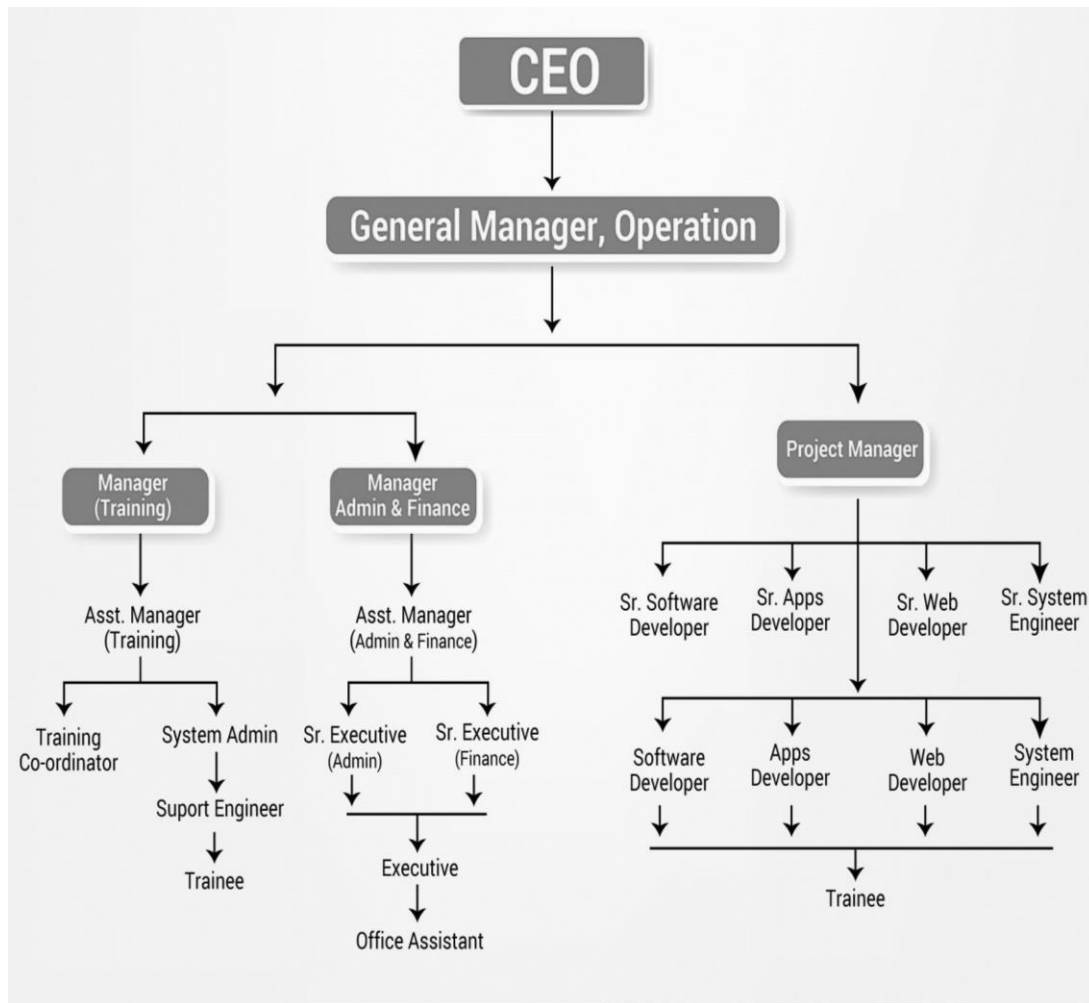
Figure 2.1: Organization Structure

CHAPTER 3

TASKS, EVENTS AND ACTIVITIES

3.1 Daily Task and Activities

The First Month at internship

I learnt and practiced the following fundamental activities during my first month of internship at CSL Training Center:

- Network.
- OSI and TCP/IP.
- IPv4 Addressing and Sub-netting.
- Routing protocol Information.

The Second Month at internship

During the second month of my internship at CSL Training Center, I learnt and performed the following tasks:

- Static & Default Routing
- RIP
- EIGRP
- OSPF

The Third Month at internship

During the first and second months of the internship, I understood the fundamentals, and in the third month, I studied and did the following tasks:

- NAT ant PAT
- Switching Introduction
- VLAN
- Wireless Technology

3.2 Network

Computer Network

A computer network is formed when two or more computers are linked together to exchange files, programs, or resources. A computer network is essential for easy access to information and increased production. Five fundamental components make up a computer network. These are the ones:

- End Devices
- Medium
- Network Device
- Messages
- Rules

A network must meet at least three requirements to increase its functioning. Performance, Reliability, and Security are the most crucial.

Necessity of Computer Network:

A computer network, as we all know, allows us to exchange a wide range of information, applications, and resources. The following are some of the reasons why you'll need a computer network:

i. File sharing
ii. Program sharing
iii. Hardware sharing
iv. User communication

Network Types:

1. **Local area networks:** A tiny geographical region, such as a 10-meter dwelling floor or a 100-meter building or campus, is connected by a local area network.
2. **Metropolitan area networks:** Users are connected to a large area network, using metropolitan area networks. It connects LANs across a large geographical area. It spans a larger geographical area than LAN, but not as much as WAN.

3. **Wide area networks:** To link LANs, Wide Area Networks (WANs) are employed. When the LANs that must be linked are separated by a long distance, WANs are usually employed. It is much larger than a metropolitan area network, which connects the whole country.

3.3 OSI & TCP/IP Model

Figure 3.1: OSI model
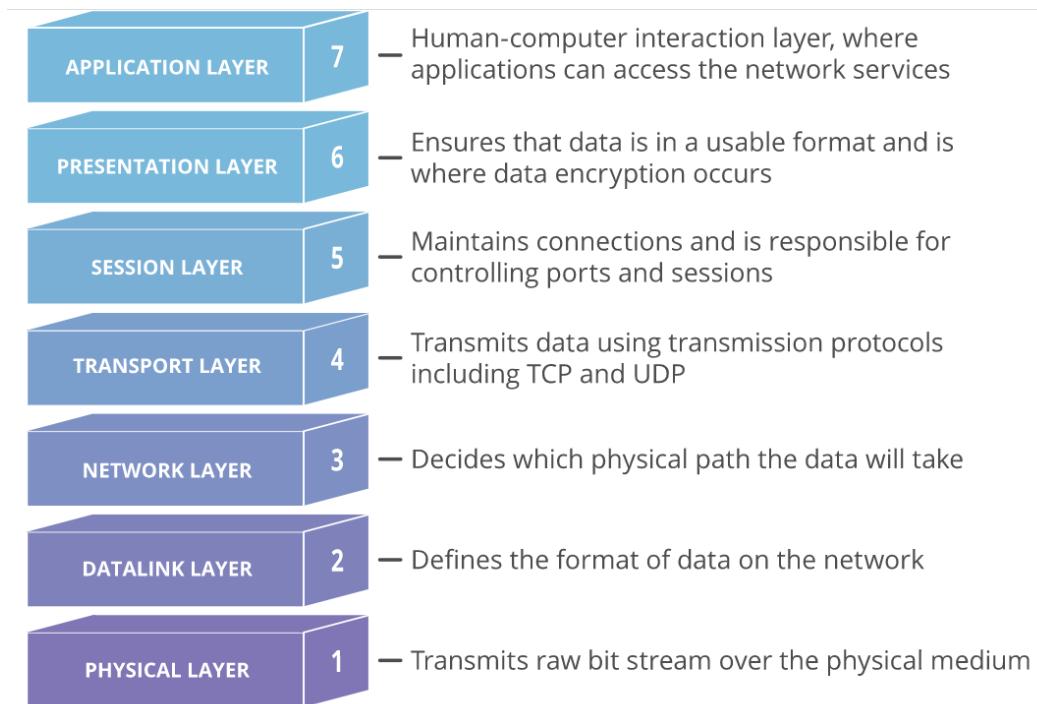
The OSI model

The open System Interconnection model was developed by the International Organization for Standardization. It establishes the initial framework for determining how data should be dispersed throughout a system. The OSI model has a total of 7 layers. These are the following:

1. **Physical Layer:** Through physical layers, separate bit can be sent from one node to another.

2. **Data Link layer:** This layer assures that data frames are sent correctly between nodes.
3. **Network Layer:** This layer handles the transmission of particular data packets from a source host to a destination host using proper addressing and routing.
4. **Transport Layer:** This layer works by transporting the entire message from the source to the destination host.
5. **Session Layer:** It works to set up session and it provide feature such as "dialog control and synchronization".
6. **Presentation Layer:** This layer uses translation, compression and encryption to handle data syntax and semantics.
7. **Application Layer:** This layer provides users with high-level APIs.

TCP/IP: There are four levels to the Transmission Control Protocol and Internet Protocol (TCP/IP). These are the ones:

- Application
- Transport
- Internet
- Network Access

Several protocols are contained within these four layers. For example:

- Application: SMTP, FTP, TELNET, DNS, SNTP, TFTP, etc.
- Transport: TCP, UDP.
- Internet: ICMP, IGMP, ARP, RARP, IP.
- Network Access: ARP, PPP, Ethernet, Interface drive.

Protocols are sets of rules. Which is used to control the communication and information sharing of devices across a network. Several protocols are often used to provide end-to-end network communication.

TCP/IP and OSI Model:

The OSI model is a fundamental concept based on how each layer functions. TCP/IP is a protocol-based system, on the other hand. The Internet's foundations are defined by TCP/IP protocols, whilst the OSI model describes how communication should be carried out. TCP/IP, on the other hand, is a more practical method.
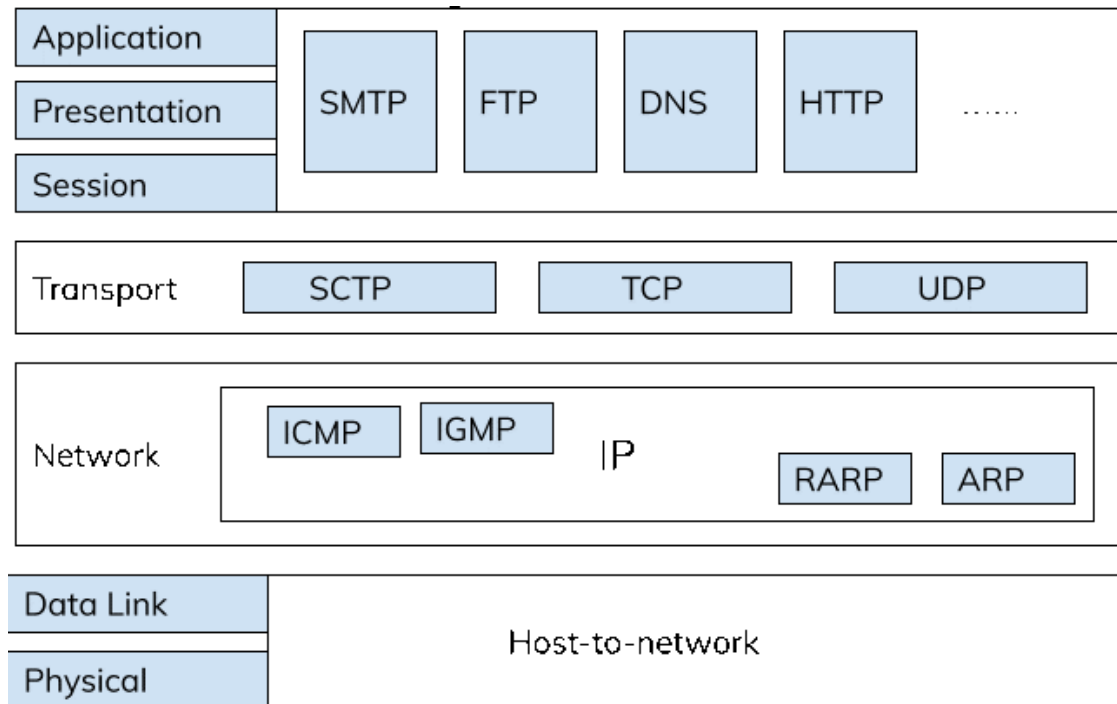
Figure 3.2: TCP/IP Reference Model

3.4 IP Addressing and Sub-netting

In a network every device is assigned with an IP address. IP address is a unique identifier number. The IP address may be different for each device connected to a network. The number of bits in an IP address divides it into two types.

- IPv4 (Internet Protocol Version 4) is a widely used 32-bit protocol.
- IPv6 (Internet Protocol Version 6) has 128 bits. It is a relatively recent technology that is being employed in a variety of nations.

IP addressing:

Hierarchical networks are built using IP addresses. IPv4 is a widely used and straightforward protocol. An IPv4 address is made up of four octets. Each octet is 8 bits long and has a total length of 32 bits. A dot is used to separate each octet.

For example: **192.168.0.0** is an IP address. And if we see:

First Octets	Second Octets	Third Octets	Fourth Octets
192	168	0	0

We know that computers understand and work by binary. When we convert the IP address to binary we get:

First Octets	Second Octets	Third Octets	Fourth Octets
11000000	10101000	00000000	00000000

IPv4 address Class:

Different sorts of IP Addresses exist in the Internet Protocol hierarchy, and they may be used efficiently in a number of circumstances based on the demands of the hosts on the network. Depending on the first octet of an IP address, the IPv4 Addressing System is divided into five IP Address Classes.

Address Class	1st octet range (decimal)	Network (N) & Host (H) bit	Default subnet mask	Address Range
A	1-127	N.H.H.H	255.0.0.0	0.0.0.0 - 127.255.255.255
B	128-191	N.N.H.H	255.255.0.0	128.0.0.0 - 191.255.255.255
C	192-223	N.N.N.H	255.255.255.0	192.0.0.0 - 223.255.255.255
D	224-239	NA (multicast)		224.0.0.0 – 239.255.255.255
E	240-255	NA (experiment)		240.0.0.0 – 247.255.255.255

Figure: 3.3: IP Class

The private address blocks are:

10.0.0.0 to 10.255.255.255 (10.0.0.0 /8)

172.16.0.0 to 172.31.255.255 (172.16.0.0 /12)

192.168.0.0 to 192.168.255.255 (192.168.0.0 /16)

IP Sub-netting

A subnetwork or subnetwork is a logical subdivision of an IP network. The technique of subnetting divides a network into two or more networks. The two parts of an IP address are the network and the host part. In Classless Inter-Domain Routing (CIDR) notation, the network component of an IP address is represented by a slash character (/) as the network's starting address and ends with the bit-length.

192.168.0.0/24, for example, represents the first 24 bits of the network address and the last 8 bits of the host address. The IP addresses subnet mask is 255.255.255.0.

Formula:

Number of subnets = 2^s

Number of hosts per subnet = $2^h - 2$

Subnet mask = sum of n bit value

Subnet Size = 256 – n bit value

3.5 Router & Switching Introduction

Router:

A router is a networking device that joins many networks together. In the form of "data packets" it transmits traffic from one router to another. It works on the third layer of the OSI model (network level) and determines the shortest route.

Figure 3.4: Cisco Router

Repeater

A repeater is an electrical device that receives and retransmits a signal while recovering the data. Frequency and baud rate are used to calculate data transmission rate. There are numerous different varieties of repeaters, each with its own size and shape. A telephone repeater functions as an amplifier in a phone connection. In a fiber optic connection, an optical repeater is an optoelectronic circuit that multiplies a light beam. Both the radio and the dish antenna are radio receivers and transmitters that retransmit the radio signal on a continuous basis.
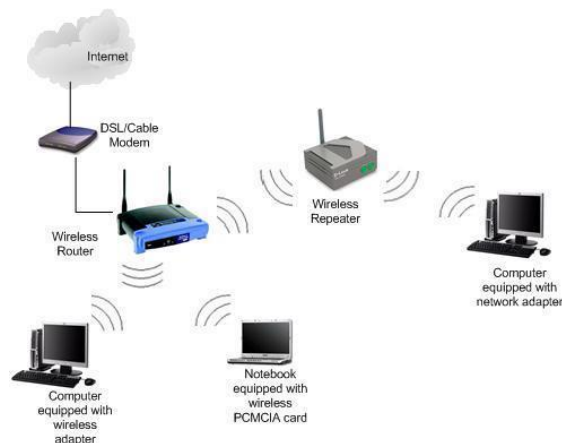

Figure 3.5: Wireless Repeater.

Hub

Hub is a layer 1 half-duplex device. It links many computers and allows data to easily flow from one port to the others. Less secure, with traffic control difficulties. A collision domain is shared by the devices, and they act as a network segment.

Figure 3.6: Network Hub

Bridge

A bridge is a data connection layer device. It can also function as a repeater. It is capable of filtering data by reading the source and destination MAC addresses. It may connect two such LANs using the same protocol. It's a two-port device having one input and one output port.

Figure 3.7: Network Bridge

Switch

A multiport bridge is a type of switch. It features a buffer that helps it run more efficiently and effectively. At the data connection layer, a switch is a device that functions by selecting which segments data should be directed to using a database of MAC addresses, and so lowering network traffic Before forwarding data, the switch may do error checking, which makes it extremely efficient because It does not send errors and just passes valid messages to the appropriate port. While keeping the broadcast domain maintained, the switch splits the host's collision domain. Switches, operate at far quicker speeds and have significantly more possibilities than bridges.

Figure 3.8: Cisco Switch

3.6 Virtual Local Area Network (VLAN):

A VLAN allows different networks to function as if they were all part of the same LAN. It divides a network into logical portions. The feature of a VLAN is that it reduces network latency, saves resources and increases network efficiency. VLANs are also meant to provide segmentation and to help with security, network management, and scalability difficulties. VLANs can also be used to control the flow of traffic.
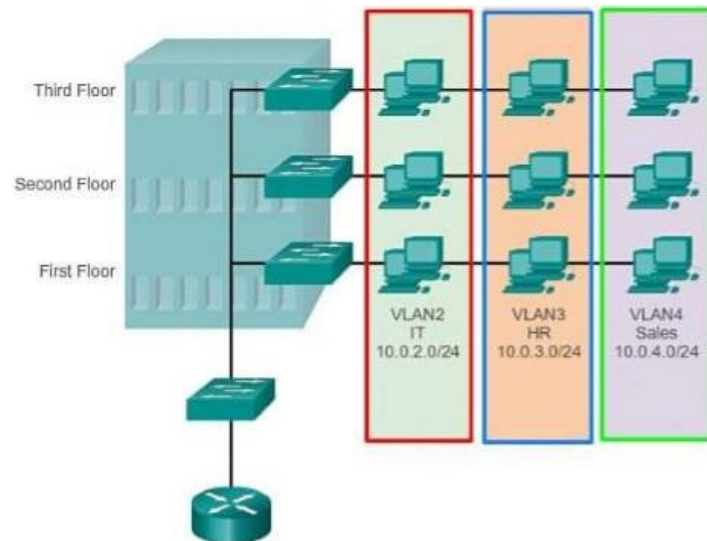

Figure 3.9: VLAN

The syntax of VLAN is:

Syntax
Switch#
Switch#configure terminal
Switch(config)#vlan 2
Switch(config-vlan)#name {*VLAN name*} **[Type the name IT_department]**
Switch(config-vlan)#exit
Switch(config)#vlan 3
Switch(config-vlan)#name{*VLAN name*} **[Type the name HR_department]**
Switch(config-vlan)#exit
Switch(config)#vlan 4
Switch(config-vlan)#name{*VLAN name*} **[Type the name Software_department]**
Switch(config-vlan)#exit

Figure: 3.10: VLAN Syntax

The syntax of adding interface:

Syntax
Switch(config)#int range f0/1-5
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#int range f0/6-10
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#exit
Switch(config)#int range f0/11-15
Switch(config-if-range)#switchport access vlan 4
Switch(config-if-range)#exit

Figure: 3.11: Interface adding in VLAN.

Syntax of Trunk Port:

Syntax
Switch>enable
Switch#configure terminal
Switch(config)#interface fastethernet 0/14
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit

Figure: 3.12: Syntax of Trunk Port:

Syntax of Inter VLAN Routing:

Syntax
Router#configure terminal
Router(config)#interface fastethernet 0/0.1
Router(config-if)#encryption dot1Q 2
Router(config-if)#ip address {*IP address*}{*Subnet mask*} **[VLAN 10 gateway address and mask]**
Router(config-if)#exit
Router#configure terminal
Router(config)#interface fastethernet 0/0.1
Router(config-if)#encryption dot1Q 3
Router(config-if)#ip address {*IP address*}{*Subnet mask*} **[VLAN 20 gateway address and mask]**
Router(config-if)#exit

Figure: 3.13: Syntax of Inter VLAN Routing.

3.7 Routing Protocol Introduction

The Routing Protocol assists in the discovery of possible network routes and the determination of the most cost-effective route to the destination router. The routing discovery data is used to create routing tables for the connected routers, which are subsequently utilized by each router to make routing decisions.

Router's routing decisions may be controlled in three ways. Those are:

- Static Routing
- Default Routing
- Dynamic Routing

Static Routing:

Static routing refers to a routing path that has been manually set on a router. Here are some of the most important characteristics of static routing:

- The administrator makes all of the changes.
- It consumes fewer resources and is extremely safe.
- Ideal for small businesses and networks.
- Configuration and maintenance become more difficult as the network expands.

Default Routing:

The router's default routing setting directs all packets to a single path (to the next router).

Dynamic Routing:

Routes are dynamically adjusted in dynamic routing based on their current state in the routing database. In dynamic routing, protocols are used to find destinations and routes to reach them.

The following are the main characteristics of dynamic routing:

- In real time, the router exchanges routing information and learns and responds to changes.
- Work in any network (big or small).
- Less safe. It may be used in huge networks with ease.
- Consumes more resources than traditional static routing.

Dynamic IP routing protocols:

- RIPv1
- RIPv2
- EIGRP
- OSPFv2
- IS-IS
- BGPv1

3.8 Static and Default Routing

Introduction

Manually inputting routes into a routing database is known as static routing. It is utilized to construct a path for packets to be forwarded from the router to the destination when a new router enters a network. The router is unable to change the path we define; it will always take the path we have chosen.

Static Routing Configuration: Here is some static routing configuration:

- Default Route
- Static Null Route
- Preferred Routes
- Backup Routes
- Static Load Balancing.

The syntax of static and default routing:

Syntax
Router (config)# ip route {*destination network*} {*Subnet mask*} {*Next-hop*}

Figure 3.14: Syntax of Static routing

3.9 Routing Information Protocol (RIP)

RIP is a distance vector routing system that employs hop count as a routing parameter. In a vector routing system, routers share data with their near neighbors by building associations. This protocol allows for a maximum of 15 hops. When building a tiny network architecture or routing independently, we employ this routing protocol.

In IPv4, there are two types of rip. Those are:

1. RIP version 1
2. RIP version 2

And in IPv6, (RIP ng) is used.

The syntax of RIP is:

Syntax
Router>enable
Router#configure terminal
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network {IP address}
Router(config-router)#network {IP address}
Router(config-router)# no auto summary

Figure 3.15: Syntax of RIP

3.10. Enhanced Interior Gateway Routing Protocol (EIGRP)

EIGRP

EIGRP is a classless advanced distance-vector protocol that gives us a clear edge over other Cisco proprietary protocols.

EIGRP (Enhanced Interior Gateway Routing Protocol) is an improved version of the Interior Gateway Routing Protocol (IGRP). The protocol was created in order to address issues with the Routing Information Protocol (RIP). When the EIGRP router is up and running, it saves all of the surrounding routing information and, if necessary, searches for alternate routes. If the router can't find a suitable path, EIGRP helps its neighbors find one.

It's a No-Class Hybrid Routing Protocol. It delivers partial route updates when changes are made. The default bandwidth and latency composite measurements are used.

The syntax of EIGRIP is:

Syntax
Router>enable
Router#configure terminal
Router(config)#router eigrp {autonomous number}
Router(config-router)#network {IP address}
Router(config-router)#network {IP address}
Router(config-router)# no auto summary

Figure 3.16: Syntax of EIGRIP

3.11 Open Shortest Path First (OSPF)

The Interior Gateway Protocol includes the open shortest path first protocol, often known as OSPF, which employs the Link State Routing protocol. OSPF is used to determine the shortest path to the destination. OSPF has the ability to determine the routes of large, complex local area networks (LANs). VLSM and CIDR are supported.

The syntax of OSPF is:

Syntax
Router>enable
Router#configure terminal
Router(config)#router eigrp {autonomous number}
Router(config-router)#network {IP address}
Router(config-router)#network {IP address}
Router(config-router)# no auto summary

Figure 3.17: Syntax of OSPF

3.12 NAT and PAT

NAT

The Network Solve Translation (NAT) protocol was developed to address problems that occurred as a result of the Internet's rapid expansion. NAT allows a single network device to function as a bridge between a private local area network and a public network. A method of changing a private IP address or a local address into a public IP address is known as network address translation (NAT).
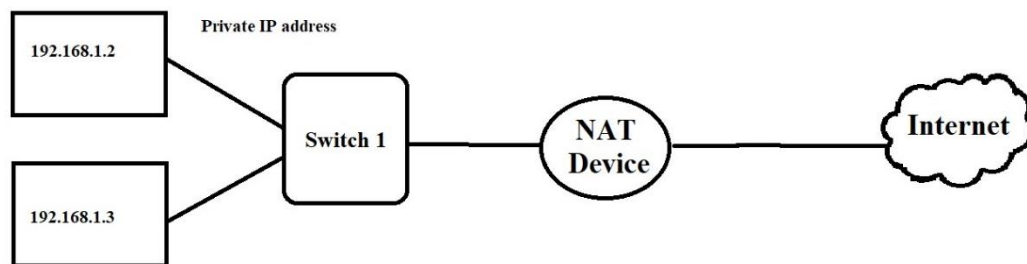

Fig 3.18: NAT

There are three types of NAT and those are:

1. Static NAT
2. Dynamic NAT
3. Overloaded NAT

The syntax of NAT is:

Syntax
Router#configuration terminal
Router(config)#interface {*Choose interface*}
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#interface {*Choose interface*}
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#ip nat inside source static {*privet IP*} {*public IP*}
Router(config)#exit

Figure 3.19: Syntax of Static NAT.

PAT:

PAT converts private IP addresses to public IP addresses by employing port numbers. PAT uses IPv4 addresses with port numbers. The two acronyms NAT and PAT are practically identical.

The syntax of PAT is:

Syntax
Router#configuration terminal
Router(config)#interface {*Choose interface number*}
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#interface {*Choose interface number*}
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#access-list {*list number*} permit {*network IP address*} {*wildcard mask*}
Router(config)#ip nat inside source-list {*list number*} interface {*inside interface*} overload
Router(config)#ip nat pool {*pool name*} {*public IP*} net mask {*subnet mask*}
Router(config)#ip nat inside source-list {*list number*} pool {*pool name*} overload
Router(config)#exit

Figure 3.20: Syntax of Static PAT.

3.13 Challenges

Every workplace is difficult, as my internship has shown me. Early on in my internship, I was given an exciting duty. Around 8:00 a.m., I arrived at work. It was a challenge for me. I thought networking was straightforward when I initially started as an intern: just put in a cable and you're done. I am aware of my misconceptions once I started researching networking. It was a challenging task for me. But, with the help of my tutor, I learned that if I set my mind to it, nothing is impossible. Everything during my internship session was difficult for me, but I was able to overcome it.

It was my first experience working in an office. As a result, I had to quickly master a large number of workplace laws. I had to communicate with a huge number of people every day. I learnt how to work with them and deal with their antics.

After graduating from Daffodil International University, I am aiming to enhance my lifestyle, and I will soon begin my new job. As an alumnus, I will use my expertise and hard work to protect our university's reputation.

CHAPTER 4

COMPETENCIES AND SMART PLAN

4.1 Competencies Earned

Every job, business center, or other source of employment need the hiring of qualified individuals. As a consequence, I decided to do an internship to gain practical experience. I was treated as though I were an employee during my internship. I have a theoretical understanding of networking but no practical experience. I learnt how to configure a router and switch, as well as a VLAN, OSPF, EIGRP, and RIP, during my internship. I was able to keep an eye on the network and fix any problems that arose. I gained a lot more confidence after completing the internship. My personal, interpersonal, and business skills have all increased. Working with my employees boosted my creativity, tenacity, honesty, communication, representation, management, negotiation, leadership, and, most importantly, emotional equilibrium.

4.2 Smart Plan:

I am now motivated and concerned about my career after completing my internship at CSL Training Center. I have a clear goal and mentality in mind. I gain real-world experience during the internship that will help me in my future networking job. It's a difficult and tough field. I learned a lot throughout my internship at the job. Now I'm going to do everything I can to broaden my horizons and increase my practice. My goal is to master advanced network engineering and establish a career.

4.3 Reflection:

Throughout my internship, "CSL Training Center" supplied me with a wealth of practical information and new experiences. In general, I only use Cisco properties when absolutely necessary. I learned about Cisco, how it works, and what the protocol of a Cisco router is. In practice, I configured a Cisco router and created a network that can interact with one another while also being linked to the internet. It will also help me advance in my career as a networking professional.

CHAPTER 5

CONCLUSION AND FUTURE PLAN

5.1 Discussion and Conclusion

After four months of hard work, my internship at CSL Training Center comes to an end on December 30, 2021. Many of the topics discussed in the previous chapter are addressed in this chapter. Cisco networking equipment is currently found in almost every network business. Before committing to a long-term commitment, this internship helps me to get particular profession expertise on "CISCO Routing and Switching." This internship program will help me get work in the future. I'm overjoyed that my internship at CSL Training Center has come to an end.

5.2 Scope for Further Career

Networking is a highly demanding career nowadays, and network engineers are in high demand. It is a rapidly growing business, and the demand for competent employees is rapidly increasing. There are several employment prospects in Bangladesh's networking industry. According to US Bureau of Labor Statistics, certified IT networking specialists such as CCNA are predicted to grow by 8% by 2024. Because of the rising use of cloud-based and networking technology, this is the case. So, in the future, network engineers will have wonderful news.

REFERENCE

[1] CSL Training Center Official Website, available at << https://www.csltraining.com >> last accessed on 27-10-2021 at 11.00 am.

[2] Todd Lammle, Cisco Certified Network Associate Study Guide Seventh Edition.

[3] Learn about CCNA, available at << https://en.wikipedia.org/wiki/CCNA >>, last accessed on 27-10-2021 at 09.00 pm.

[4] Learn about OSI model, available at << https://www.networkworld.com/article/3239677/the-osi-model-explained-and-how-to-easily-remember-its-7-layers.html >>, last accessed on 28-10-2021 at 10.00 am.

[5] Learn about IP Addressing and Subnetting, available at << https://docs.microsoft.com/en-us/troubleshoot/windows-client/networking/tcpip-addressing-and-subnetting >>, last accessed on 29-10-2021 at 11.00 am.

[6] Learn about Cisco Router, available at << https://www.cisco.com/c/en/us/products/routers/index.html >>, last accessed on 30-10-2021 at 07.00 pm.

[7] Learn about Switch, available at << https://www.cisco.com/c/en/us/products/switches/index.html >> last accessed on 01-11-2021 at 10.15 am.

[8] Learn about Basic Rouer Configuration, available at << https://www.cisco.com/c/en/us/td/docs/routers/access/800M/software/800MSCG/routconf.html >> last accessed on 01-11-2021 at 12.35 pm.

[9] Learn about Routing Protocols, available at << https://www.cisco.com/c/en/us/td/docs/net_mgmt/prime/network/3-8/reference/guide/routpro.html >> last accessed on 02-11-2021 at 09.55 pm.

[10] Learn about Static routing, available at << https://geek-university.com/ccna/static-routes >>, last accessed on 02-11-2021 at 10.20pm.

[11] Learn about RIP routing, available at << https://www.certificationkits.com/cisco-certification/ccna-articles/cisco-ccna-distance-vector-routing-protocols-2/cisco-ccna-rip-routing-a-configuration >>, last accessed on 03-11-2021 at 10.00am.

[12] Learn about EIGRIP routing, available at << https://www.computernetworkingnotes.com/ccna-study-guide/eigrp-configuration-step-by-step-guide.html >>, last accessed on 03-11-2021 at 10.40am.

[13] Learn about OSPF routing, available at << https://study-ccna.com/ospf-configuration >>, last accessed on 03-11-2021 at 05.15pm.

[14] Learn about cisco switch configuration, available at << https://www.cisco.com/c/en/us/solutions/small-business/resource-center/networking/how-to-setup-network-switch.html#~setup-guide >> last accessed on 04-11-2021 at 08.20 pm.

[15] Learn about VLAN configuration, available at << https://www.cisco.com/c/en/us/td/docs/switches/datacenter/sw/5_x/nx-os/layer2/configuration/guide/Cisco_Nexus_7000_Series_NX-OS_Layer_2_Switching_Configuration_Guide_Release_5-x_chapter4.html >> last accessed on 05-11-2021 at 11.10 pm.

Internship on CCNA Routing and Switching at CSL Training Center