INTERNSHIP ON CISCO CERTIFIED NETWORK ASSOCIATE (CCNA) IN NEW HORIZON BANGLADESH

SUBMITTED

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 CCNA IN NEW HORIZON BANGLADESH", submitted by Md. Saniul Islam, ID No: 172-15-9950 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 7oct. 2020.
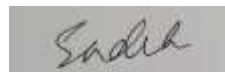
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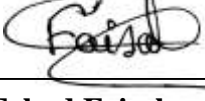Department of Computer Science and Engineering
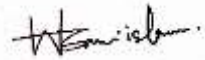United International University

DECLARATION

I hereby declare that this project has been done by us under the supervision of **Fahad Faisal, Assistant Professor Department of CSE** Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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

ABSTRACT

This Internship titled" CISCO CERTIFIED NETWORK ASSOCIATE-CCNA (Routing & switching)" is mixed various field of computer networking. If two or more PCs are interconnected and ready to trade and share information or data, then we call Network. We need a lot of computer connected to. At present and future, we can't think anymore without internet. So, we should take it seriously and achieve it for our future life. That's why I pick this subject of my report is "Internship on CCNA Routing and Switching" on Computer Networking. The report talked about the reason for the Routing, switching, Addressing, RIP, EIGRP, OSPF and VLAN. The context include connecting to a WAN, implementing network security, network types, network media, routing and switching fundamentals, the TCP/IP and OSI models, IP addressing, WAN technologies, operating and configuring IOS devices, extending switched networks with VLANs, determining IP routes, managing IP traffic with access lists, and establishing point to point internet connections. And configures all communication system or networking type.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Now we are living in the time of Information Technology. So, all that technology depends on Networking. Without internet we can't think to any extent further about our future. CCNA is most familiar and secure networking system in the world. We can't do anything without Internet. Today every business, every office, bank and trade are especially based correspondence and Networking. CCNA routing & switching is very important for an office, a company and all ISP companies for maintaining the Internet. In present and will be in future we will not able think anymore without internet. So, we have to take it seriously and learn it for our future life. In this report there are many topics I have included which is important for networking. CCNA routing and switching is mostly common and familiar to the communication engineering for communicate.

1.2 Motivation

At present I am an understudy of Daffodil International University and considering Bachelor of Computer Science and Engineering. In Bangladesh there is an enormous activity segment for PC organizing. I fathom the centrality of expanding practical realizing which will enhance the course understanding data and empower an understudy to get a broader perspective of the subjects. CCNA is a system that expansion my solidarity to best for my future. So I pick and spur to do temporary position about area of PC organizing on CCNA Routing and Switching as a Network administrator what is on my mind extremely well, and good to handle for problem solving, speaking with individuals, understanding their needs and know about how to maintain problem and giving them better administration.

1.3 Internship Objectives

Internship is incredibly important for our future life and also for successful in job. So, I have got completed my internship supported CCNA routing and switching. Extreme target of my Internship is to line myself up as a professional one within the focused activity advertises. So, this can be exceptionally compelling of experience advancement. During this internship I have got learned lots of latest things which is incredibly important for my career.

The Internship in applied science and engineering is meant to relinquish work understanding and while understudies remains at school, to coordinate the task experience with academic training and to assist study to form the progress from classroom to figure properly.

1.4 Introduction to the Company

The whole educational program is completed under New Horizon Bangladesh. Networking Academy Routing and Switching is an IT skills and career building program for learning institutions and individual worldwide technology. New Horizon Bangladesh technical team consists of qualified and well experience professionals. New Horizon Bangladesh is incredibly strictly controlled their customer and serviced their service. Our technology employees are more capable than your imagination. They have already got proven their skills within the fields of Design, Computer Networking, Marketing& Sales, Installation, Commissioning and Maintenance

This Company provides the latest courses on the Networking domain to its students inside the company to keep them updated about the latest advancements.

1.5 Report Layout

This Internship report consists of 5 Chapters. In report layout all chapter is condensed. We tried to summarize all the chapters. The summarization is given below:

In the chapter one (1) I have talk about the goal of internship, Motivation of internship, Internship Objectives, Introduction to the Company.

In the chapter two (2) I have talk about the Organization from I have completed my internship.

In the chapter three (3) I have talk about the Events, Activities, Challenges, Daily tasks

In the chapter four (4) I have talk about the Competencies Earned, Smart Plan, and Reflections.

In the chapter five (5) I have talk about the Conclusion and Future Scope. Future demand on job place.

Chapter 2

Organization

2.1 Introduction

"New Horizon Bangladesh" is one in all the main learning administrations and expert improvement arrangements supplier in Bangladesh. It is been set up to create the required learning arrangement flexibly to help proficient information and abilities inside the field of specialized employment segment. Their learning programs, regardless of whether intended for an overall association or a private expert, assist organizations with shutting aptitudes holes and cultivate a domain of consistent ability advancement. With a huge number of courses spreading over from essential preparing to specific accreditations, the center IT preparing is focused on innovation accomplices like Amazon Web Services, Cisco, Microsoft, Red Hat and VMware

2.2 Product and Market Situation

Professional Training Services

- Red Hat Certified Engineering (RHCE)

- Cisco Certified Network Associate (CCNA)

- Java Programming

- C# and .Net

- Python Programming

- High School Programming with C/C++

- PHP & MySQL

- Introduction to networking for beginners

- Webpage design and Development

- VMware

2.3 Target Group

The institute is targeting those people whose are unskilled and want to improve their skill. The institute also works for engineering students and professionals.

2.4 SWOT Analysis

Strength:

- Good communication skill
- Good reputation in
  marketplace Good trainer

Weakness:

- Lack of experience
- Lack of Capital
- Lack of marketing

Opportunities:

- Training for all kind of people
- Become an instructor

Threats:

Economic problem to increase their area of training and area of the institute.

CHAPTER 3

TASKS, EVENTS AND ACTIVITIES

3.1 Daily Tasks and Activities

Month - 1: First month of my internship in the New Horizon Bangladesh I have gained and Exercise the following topics properly:

- Network
- OSI & TCP/IP Model
- IPv4 Addressing & Sub-netting
- Routing protocol Information

Month - 2: First month of my internship in the New Horizon Bangladesh I have gained and did the following topics properly:

- Static & Default Routing
- RIP
- EIGRP
- OSPF

Month – 3: First month of my internship in the New Horizon Bangladesh I have gained and did the following topics properly:

- Switching Introduction
- VLAN
- STP
- VTP
- Wireless Technology

3.2 Network

A network like a Group of Computer systems and other computing Hardware Devices that are linked together through Communication Channels to promote Communication and Resource sharing among a Wide range of users.
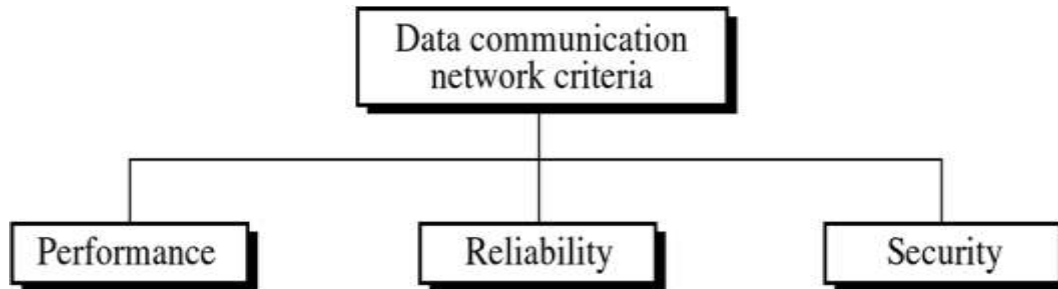
Fig 3.1: Network Criteria [12]

Why we need computer networks?

Now the world without the internet we can't imagine the situation. Computer networks help us to share data and communication on the network.

There are so many advantages for computer networks, some essential advantages are given below:

i.   File sharing

ii.   Hardware sharing

iii.   Application sharing

iv.   User communication

Network Types

•   Personal area networks: That is used to connect a networking device which is cover around 1 meter. Such as mobile phones, computers, tablets, etc.

- Local area networks: local area network that connects a small area into a network like a 10-meter room or 100-meter building or a campus.

- Metropolitan area networks: Metropolitan area networks are a network that connects users with a large area network like a city. In a geographical area, it covered larger than LAN but smaller than WAN.

- Wide area networks: Bigger than metropolitan area network, which is covered a country into a network. It can be covered 100 km country or 1000 km continent

Internetworking Devices

Fig 3.2: Internetworking [13]

CISCO Router

The router could be a functional networking Router which sends data packets from one network to a different. a knowledge packet is shipped from one router to a different router through the network by creating an internetwork between them until it reaches its destination.

Fig 3.3: CISCO Router [14]

A router contains a Central Processing Unit, many kinds of digital memory, and I/O (Input/output) interfaces. A software operating system is stored within the storage of the router. Cisco, Juniper, Net gear, Nortel, Red back, D-Link, and many other companies that make router companies are manufacturer's router.

When a router turned on first of all it loads Operating System from the storage. Then its load the configuration file last saved to NVRAM and setup the network interfaces and protocols. The router put the network address and subnet for every interface to its routing table together with the name of the interface itself. When the router gets an information packet first of all its checks the destination address by its routing table. Then the router sent the information packet to the proper interface to the following router and this process is continued until the information packet reaches its destination.

Cisco Switch

A switch is a network connectivity Router that connects one more Router in a computer network by using packet switching to receive, process, and forward data to the destination address. A switch is a multiport network bridge that uses physical address process data packets at the Data Link Layer of the OSI reference model. Some switches can process data at Network Layer. Switches manage the data flow of a network with transmitting and receiving data. Different models of network switch support the different numbers of ports to connect Routers. The consumer-grade network switch provides eight or four connections for Ethernet Routers, while corporate switch supports 32 to 128 connections. A network

switch can be additionally connected by a daisy chaining method. By this method, we can connect a large number of Routers in one network.

Fig 3.4: Switch [14]

Cisco Hub

Hub is a Network hardware device. That used to connect devices into a network. There are several kinds of a hub like an Ethernet hub, active hub, network hub, repeater hub, multiport repeater, or simply hub they are connecting multiple devices that work like a single network segment.

Fig 3.5: Hub [14]

Cables

Optical Fiber Cable: Optical Fiber Cable is a cable that contains one or more fiber that's want to carry light. Two kinds of materials mainly used for optical fiber plastic and glass.

Generally plastic fiber employed in short-range communication and glass fiber employed in medium and large range telecommunication. There are two kinds of fiber multi-mode and single-mode. NTT Japan demonstrated one fiber cable which will ready to transfer 1 data bit per second within a distance of fifty kilometers.
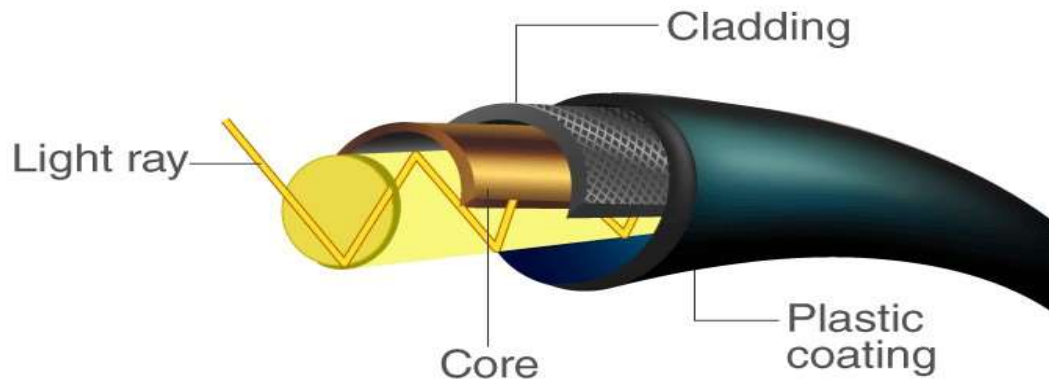
Fig 3.6: Optical Fiber Cable [11]

Twisted Pair Cable: The twisted pair cable is largely used in different types of data and voice transmission. There two different types of twisted pair cable Unshielded Twisted Pair and Shielded Twisted Pair. Generally, Unshielded Twisted Pair is used in Ethernet installation and Shielded Twisted Pair used in different types of networks to block crosstalk and electromagnetic interference.
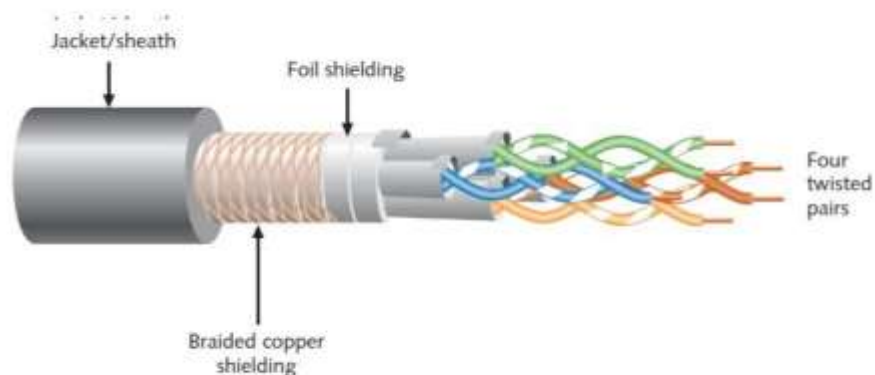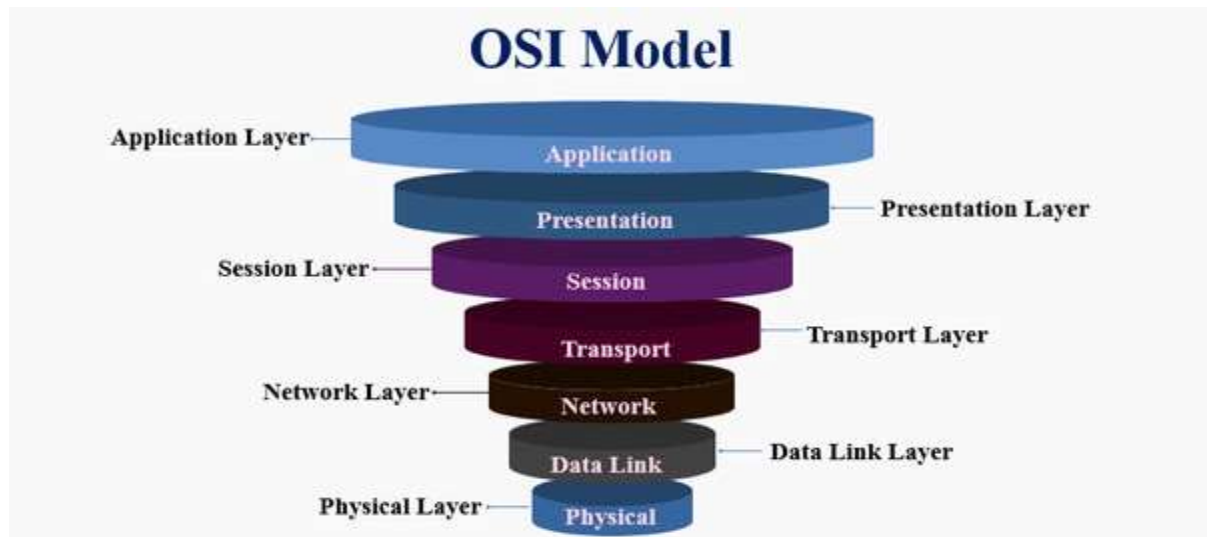

Fig 3.7: Twisted Pair Cable [11]

3.3 The OSI Model

Application Layer

This is often the sole layer that interacts with data from the user directly. To initiate communication, application software like the application program depends upon the application layer. The application layer is answerable for protocol and data manipulation.

Presentation Layer

This layer makes the info presentable so the info is utilized by the application layer. The presentation layer is answerable for encoding, translation, and compression. Session Layer: This layer establishes, terminates, and manages connections between computer/applications. This layer provides the transmission mode as simplex, half-duplex, or full-duplex operation.

Transport Layer

This layer provides data transfer between the host or end systems transparently. This layer is answerable for data flow control and an end to finish error recovery. During this layer all data spit into some smaller units if need, then pass these to the network layer and it makes sure that all the units/packets arrived or not. This layer carries data all the way source to destination so we are able to say that this layer could be a true end to finish layer.

Network Layer

This layer controls the subnet operation. Basically, this layer maintains how the info packets routed from source to destination. This layer provides routing and switching technologies and creates a logical path called virtual circuits to transfer data from node to node. The main function of this layer is routing and switching moreover as addressing, error handling, congestion control, packet sequencing, and internetworking.

Data Link Layer

This layer works on TCP (Transmission Control Protocol) and handles an error, flow control, and frame synchronization within the physical layer. This layer is split into two layers one is that the MAC (Media Access Control) layer another is LLC (Logical Link Layer).

Physical Layer

This layer is a figure with transmission and reception of bits over any communicating. This layer converts the digital bits into electrical impulse, light or radio emission through a network. This layer may define the transmission mode as simplex, half-duplex, and full-duplex.

TCP and UDP

Table 3.1: TCP and UDP
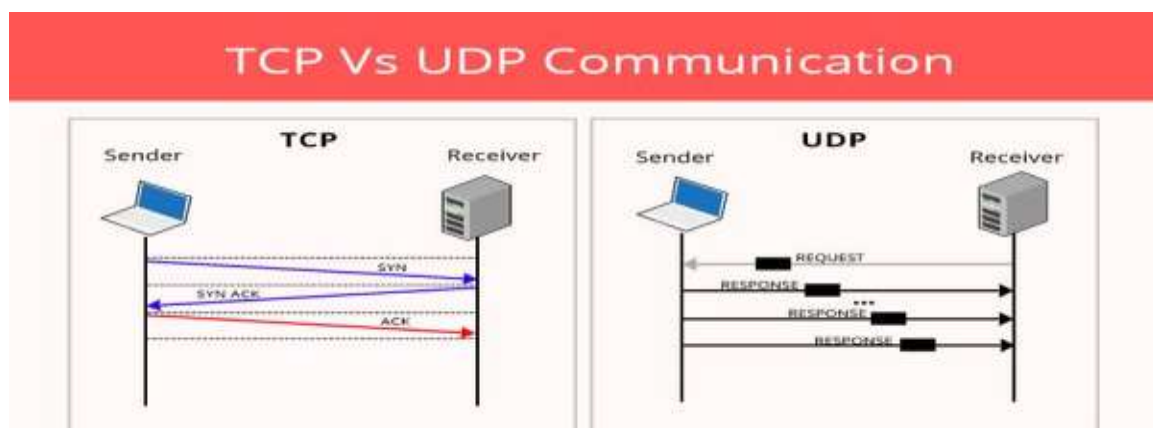
TCP and OSI Model

TCP/IP stands for Transmission Control Protocol/Internet Protocol it's also a conceptual model just like the OSI reference model that standardizes the functions of communication of a telecommunication or ADP system. TCP/IP reference model is sort of a universal language for computer networking. The modern telecom system follows the TCP/IP model. TCP/IP reference model has 4 different layers but within the OSI reference model there have been 7 layers. Three-layer presentation, session, and physical are minimized within the TCP/IP model. Each layer handles some specific tasks and communicates with one another below and above themselves.

The TCP/IP reference model is employed in wide area networks, the ARPANET, the worldwide Internet. An exploration network was sponsored by DOD (Department of Defense) is that the ARPANET. Finally, it's connected to many government installations and universities, using leased telephone lines. Then existing protocols had trouble

TCP/IP and OSI Model

Table 3.2: TCP/IP and OSI
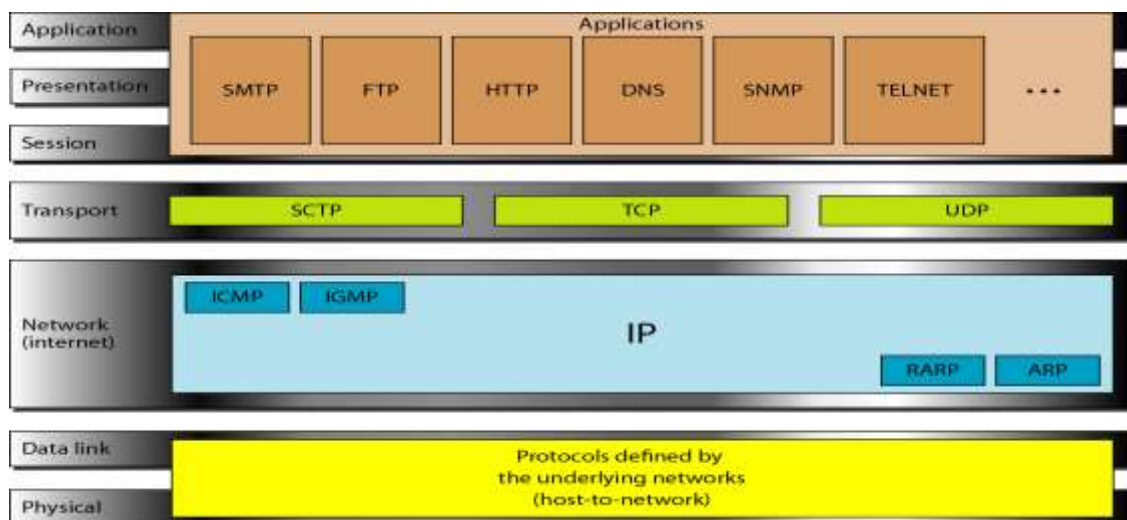
The Cisco Three-Layer Hierarchical Model
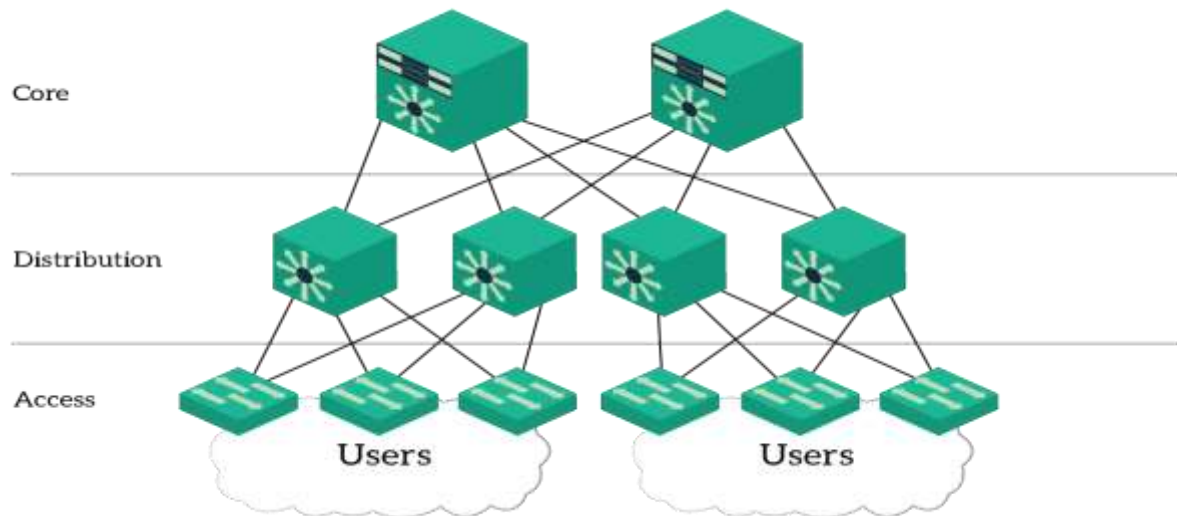
Fig 3.8: Cisco Three-Layer [15]

3.4 IP Addressing

An Internet Protocol Address (IP) is an identifying number of each Router connected to a network. This address may be a unique address for each Router connected to a network. Without an IP address no Router can communicate with other Router over an IP based network because of the internet. IP address appears as if 192.168.10.12 in IPv4 and 2006:db9:0:1234:0:557:5:3 in IPv6.

There are two types of IP address

IP version 4 (IPv4) and

IP version 6 (IPv6).

IPv4 has a 32-bit address bit which is currently most common. On the other hand, IPv6 has a 128-bit IP address which is also used.

Dotted Decimal Notation

| 10000000 | 00001011 | 00000011 | 00011111 |

128.11.3.31

Hexadecimal Notation

| 01110101 | 00011101 | 10010101 | 11101010 |
| 75 | 1D | 95 | EA |

0x751D95EA
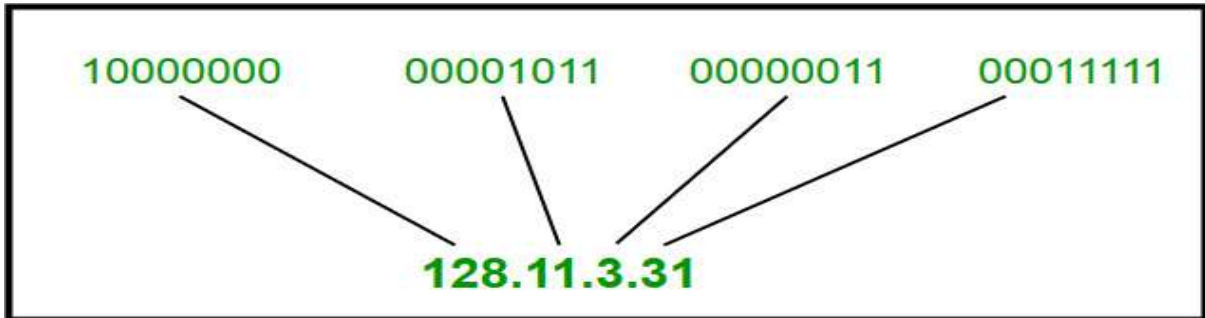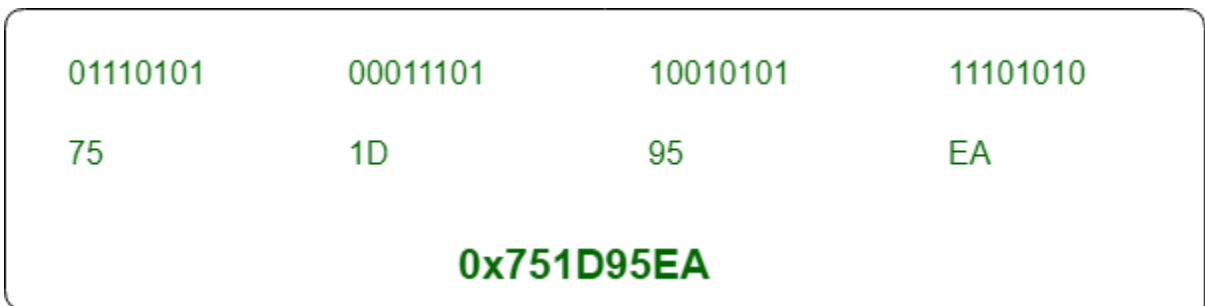
Classes of IP

Table 3.3: IP Allocations

	Byte 1	Byte 2	Byte 3	Byte 4
Class A	NET ID	HOST ID		
Class B	NET ID		HOST ID	
Class C	NET ID			HOST ID
Class D	MULTICAST ADDRESS			
Class E	RESERVED			
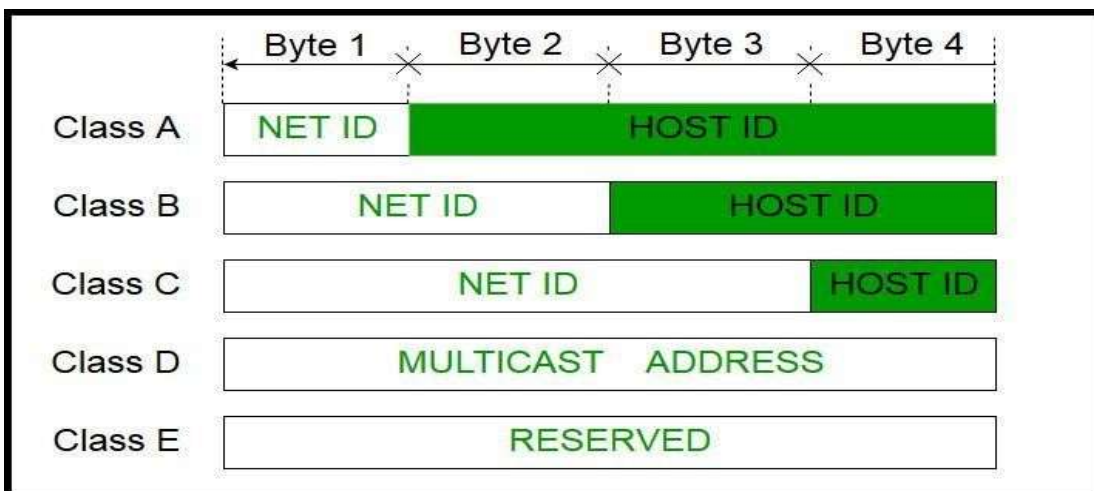
Bit Value

Table 3.4: Bit Value
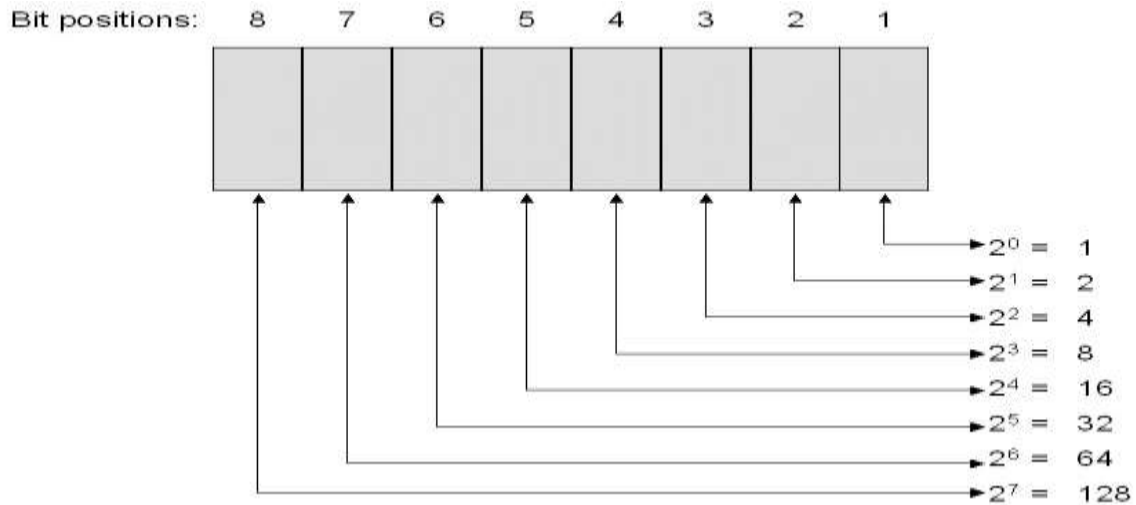
Network Address Range

Table 3.5: Network Address Range

Rule	Minimums And maximums	Decimal Range
Class A: **First bit is 0.**	**00000000 = 0** **01111111 = 127**	**1-126** ***0 and 127 are reserved**
Class B: **First two bits 110.**	**10000000 =128** **10111111 =191**	**128-191**
Class C: **First three bits 110.**	**11000000 = 192** **11011111 =223**	**192-223**
Class D: **First four bits 1110.**	**11100000 = 224** **11101111 =239**	**224-239**

Classful Address

Table 3.6: Classful Address & Range

Network Class	Beginning Digits in Binary	Natural Prefix Length	Range of Addresses	Example Major Networks
Class A	10XX	8	1.0.0.0/8 through 126.0.0.0/8	11.0.0.0/8 100.0.0.0/8 120.0.0.0/8
Class B	110X	16	128.0.0.0/16 through 191.0.0.0/16	130.1.0.0/16 148.45.0.0/16 190.100.0.0/16
Class C	1110	24	192.0.0.0/24 through 223.0.0.0/24	193.1.3.0/24 193.1.4.0/24 192.2.5.0/24

3.5 Sub netting

A subnetwork or subnet is a logical subdivision of an IP network. The practice of dividing a network into two or more networks is called sub netting. Computers that belong to a subnet are addressed with a common, identical, most-significant bit-group in their IP address.
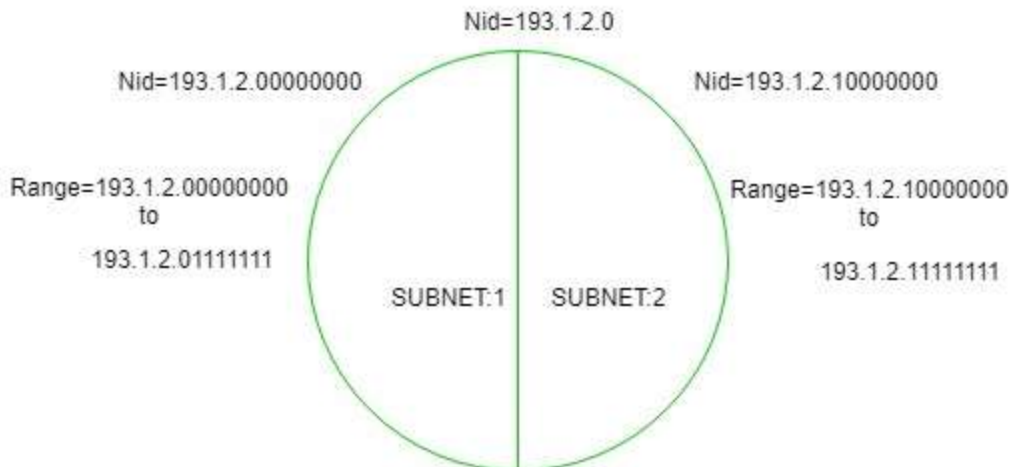
Formula

Number of subnets = 2^s

Number of hosts per subnet = 2^h-2

Subnet mask = sum of on bit value

Subnet Size = 256 –on bit value

Fig 3.9: Network Identify [10]

Total of Five (5) Subnets

211.212.10.0 Allows for a single network of 254 hosts

211.212.10.0 with a mask 255.255.255.0

Mask in Binary 11111111. 11111111. 11111111. 00000000

Subnet Calculation

Number of subnets = $2^s = 2^3 = 8$ ($2^2 = 4$)

11111111. 11111111. 11111111. 11100000

Host per subnet Calculation

Number of hosts per subnet = $2^h–2 = 2^5- 2 = 30$

New Mask Calculation

Subnet mask = 128+64+32 = 224

Subnet size Calculation
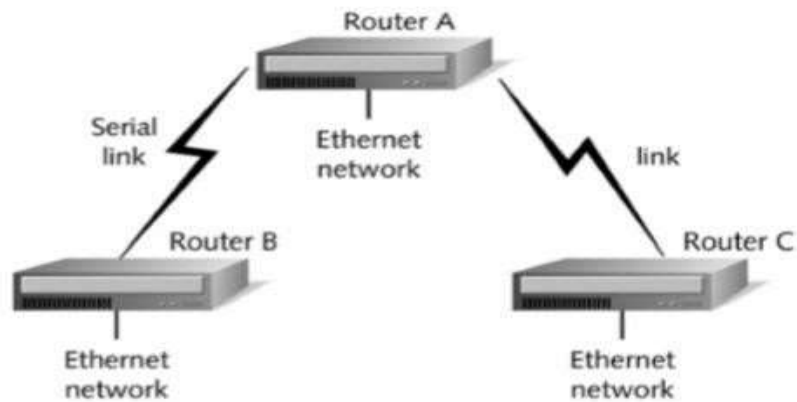
Subnet Size = 256 –224 = 32

IP with new mask

211.212.10.0 with a mask 255.255.255.224

Subnet ID	First IP	Last IP	Broadcast IP
211.212.10.0	211.212.10.1	211.212.10.30	211.212.10.31
211.212.10.32	211.212.10.33	211.212.10.62	211.212.10.63
211.212.10.64	211.212.10.65	211.212.10.94	211.212.10.95
211.212.10.96	211.212.10.97	211.212.10.126	211.212.10.127
211.212.10.128	211.212.10.129	211.212.10.158	211.212.10.159
211.212.10.160	211.212.10.161	211.212.10.190	211.212.10.191
211.212.10.192	211.212.10.193	211.212.10.222	211.212.10.223
211.212.10.224	211.212.10.225	211.212.10.254	211.212.10.255

VLSM

A Variable Length Subnet Mask (VLSM) is a numerical masking sequence, or IP address subset, based on overall network requirements. A VLSM allows a network administrator to use long masks for networks with few hosts and short masks for networks with multiple hosts.

10.1.1.0/24
10.1.2.0/25
10.1.2.128/

Working with VLSM Network
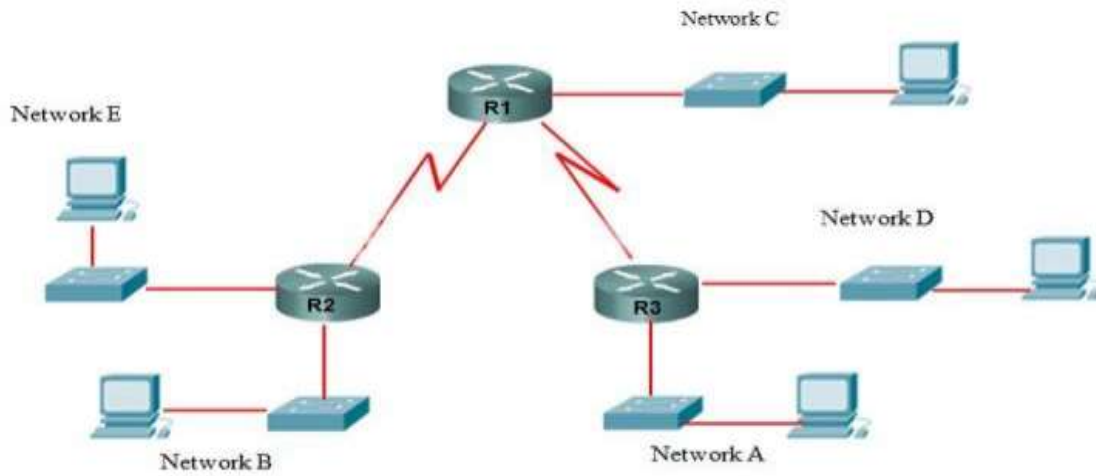
Fig 3.10: VLSM Network [10]

Suppose ISP allocated a class C network. Which is 192.168.1.0/24

HQ = 50 host   R1 = 30 hosts   R2 = 10 hosts   LAN links = 6 Table 6: VLSM Calculation

HQ = 50 host R1 = 30 hosts R2 = 10 hosts LAN links = 6	IP 192.168.1.0 Mask 1111 1111. 1111 1111. 1111 1111.00000000 Host 2^5- 2= 30 Host 26- 2= 62 Mask 1111 1111. 1111 1111. 1111 1111.11000000 Network Mask = 128+64=192 size 256- 192=64 Waste/Future use = 62- 50=1

HQ = 50 host R1 = 30 hosts R2 = 10 hosts LAN links = 6	IP 192.168.1.64 Mask 1111 1111. 1111 1111. 1111 1111.1100 0000 Host 2^5- 2= 30 Mask 1111 1111. 1111 1111. 1111 1111.1110 0000 Network Mask = 128+64+32=224 Size 256- 224=32 Waste/Future use = 30- 30=0
HQ = 50 host R1 = 30 hosts R2 = 10 hosts LAN links = 6	IP 192.168.1.96 Mask 1111 1111. 1111 1111. 1111 1111.1110 0000 Host 2^4- 2= 14 Mask 1111 1111. 1111 1111. 1111 1111.1111 0000 Network Mask = 128+64+32+16=240 size 256- 240=16 Waste/Future use = 14- 10=4
HQ = 50 host RO1 = 30 hosts RO2 = 10 hosts LAN/WAN links = 6	IP 192.168.1.112 Mask 1111 1111. 1111 1111. 1111 1111.11110000 Host 2^3- 2= 6 Mask 1111 1111. 1111 1111. 1111 1111.1111 1000 Network Mask = 128+64+32+16+8=248 size 256- 248=8 Waste/Future use = 6- 6=0

Table 3.7: After VLSM Calculation

Subnet IP	Host per IP	Required	Waste
192.168.1.0/26	62	50	12
192.168.1.64/27	32	30	2
192.168.1.96/28	14	10	4
192.168.1.112/29	6	6	0

3.6 Routing Protocol Introduction

Routing is the process of choosing a path for traffic in a network or between or across multiple networks.

When a packet comes into an interface on a router destination addresses it's up the destination IP address within the packet header and compares it with its routing table. The routing table which is stored in RAM to the pc, tells the router which outgoing interface the packet should go out to reach the destination network

There are three ways to control routing decisions on your router-

1. Static Router
2. Default Router
3. Dynamic Router

Static Routing
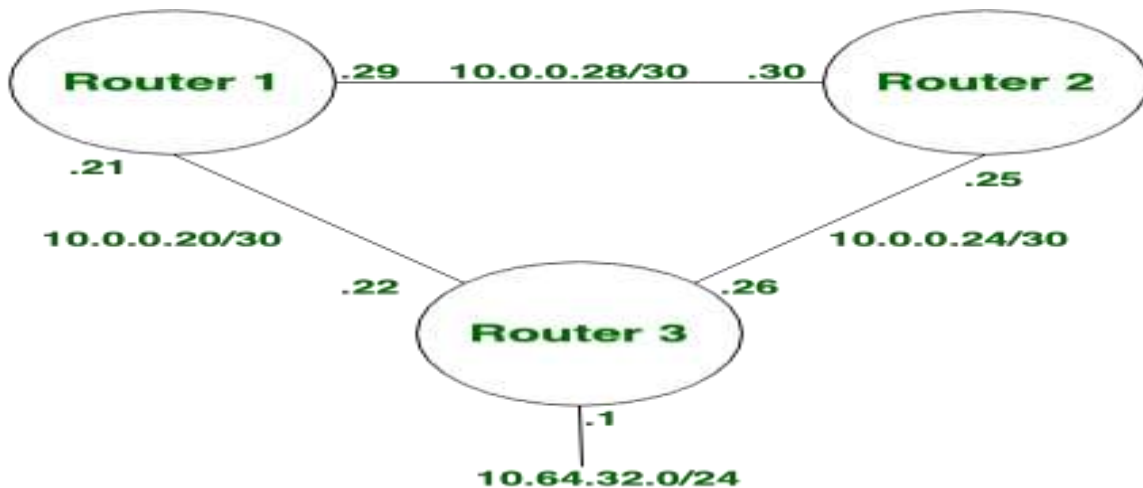
- Route path are manually set by administrator

- Any changes should be made by the administrator

- Good for small networks.

- Scalability becomes complex in terms of configuration and maintenance.

- Highly secured because only the administrator knows the routing paths.

- Consumes Less Resources (CPU, RAM)

Dynamic Routing
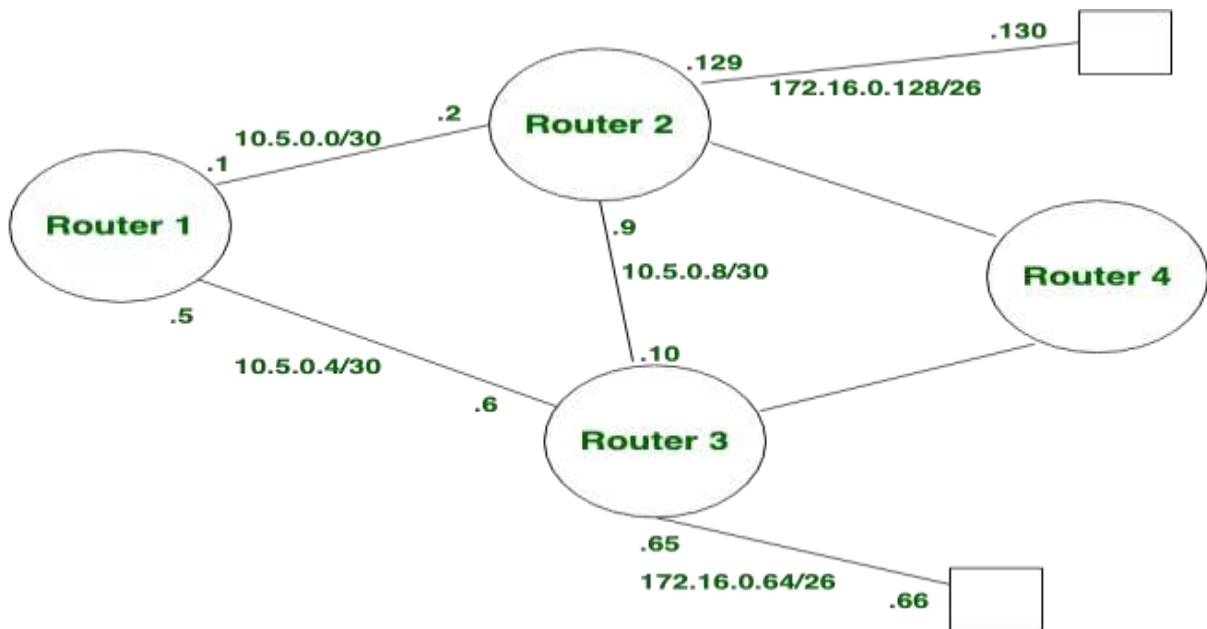
- Router exchange routing information dynamically.

- Router dynamically learns the changes.

- Can perform Small to Large (Any network).

- Scalable and configuration is easy. Router dynamically performs.

- Less Secured compared to static routing. But works fine for large network infrastructure.

- Consumes more resources (CPU, RAM) because router has to work dynamically.

Routing Concepts

Networks allow people to speak and collaborate and interact in some ways for networking. Routing could be a process by which a packet gets from the situation to a different

Networks are wont to access sites, talk using IP telephones, participate in video conferences, compete in online gaming, shop using the net, complete online coursework, and more of network access.

Characteristic of dynamic IP routing protocols

- RIPv1

- RIPv2

- EIGRP

- OSPFv2

- IS-IS

- BGPv1

Static Routing

Introduction: When one more router connected to a network all routers don't know the entire network so that we have to signify all the networks to the routers. In static routing we have to define the path that the packets from the router can be forwarded to the destination. In static routing, the router can't change the path that we provided it always maintain the provided rout that's why it's a problem also because the router can't find the best path by itself.

Static Routing Configuration:

- Default Route

- Static Null Route

- Preferred Routes

- Backup Routes

- Static Load Balancing.

Configuring Static Router

The basic syntax for a static router

Mon Feb 3 15:01:11 2020   Router1   Router>end

Mon Feb 3 15:01:13 2020   Router1   Router#conf t

Mon Feb 3 15:01:19 2020   Router1   Router (config) #hostname R1

Mon Feb 3 15:01:36 2020   Router1   R1 (config) #int s0/0/0

Mon Feb 3 15:01:38 2020   Router1   R1 (config-if) #no shutdown

Mon Feb 3 15:01:46 2020 Router1 R1 (config-if) #ip address 192.168.12.1 255.255.255.252

Mon Feb 3 15:01:47 2020   Router1   R1 (config-if) #exit

Mon Feb 3 15:01:50 2020   Router1   R1 (config) #int f0/0

Mon Feb 3 15:01:51 2020   Router1   R1 (config-if) #no shutdown

Mon Feb 3 15:02:00 2020   Router1   R1 (config-if) #ip address 192.168.10.1 255.255.255.0

Mon Feb 3 15:02:02 2020   Router1   R1 (config-if) #exit

Routing Information Protocol (RIP)

Routing Information Protocol (RIP): The Routing Information Protocol (RIP). This protocol uses distance vector algorithm is one of the oldest distance vector routing protocols which employ the hop count as a routing metric. The maximum hop are 15 hopes.

The largest number of hops allowed for RIP is 15, which limits the size of networks that RIP can support

When you utilize this protocol:

- When you want to make a small-scale network

- When your network is not supported to have scalability

- when you route in one autonomous

RIP is still utilized now. These protocols are the oldest among others.

The types of RIP are-

      a. RIP version 1
      b. RIP version 2 and

RIP next generation for IPv6 (RIP ng).

RIP Configuration

Wed Feb 5 15:45:54 2020   Router1   Router>enable

Wed Feb 5 15:45:55 2020   Router1   Router#conf t

Wed Feb 5 15:45:58 2020   Router1   Router (config) #int s0/0/0

Wed Feb 5 15:45:59 2020   Router1   Router (config-if) #no shutdown

Wed Feb 5 15:46:07 2020   Router1 Router (config-if) #ip address 192.168.12.2 255.255.255.252

Wed Feb 5 15:46:09 2020   Router1   Router (config-if) #int s0/0/1

Wed Feb 5 15:46:10 2020   Router1   Router (config-if) #no shutdown

Wed Feb 5 15:46:21 2020 Router1 Router (config-if) #ip address 192.168.23.1 255.255.255.252

Wed Feb 5 15:46:23 2020   Router1   Router (config-if) #int f0/0

Wed Feb 5 15:46:25 2020   Router1   Router (config-if) #no shutdown

Wed Feb 5 15:53:35 2020   Router1   Router (config-if) #exit

Wed Feb 5 15:53:39 2020   Router1   Router (config) #router rip

Wed Feb 5 15:53:42 2020   Router1   Router (config-router) #version 2

Wed Feb 5 15:53:50 2020   Router1   Router (config-router) #network 192.168.12.0

Wed Feb 5 15:53:52 2020   Router1   Router (config-router) #network 192.168.23.0

Wed Feb 5 15:53:59 2020   Router1   Router (config-router) #network 172.17.0.0

Wed Feb 5 15:54:01 2020   Router1   Router (config-router) #exit

3.7 Enhanced Interior Gateway Routing Protocol (EIGRP)

EIGRP stands for Enhanced Interior Gateway Routing Protocol and its works only in Cisco Routers. This protocol doesn't send periodic route updates like RIP. A router that running EIGRP stores all the routing information of its neighbor to search out the alternate routes when needed. If the router doesn't get an appropriate route, EIGRP queries its neighbors to get an alternate route. These queries continue until an alternate route is found. All the routers don't get the partial updates, only those routers which require information get the partial updates. This protocol uses four key algorithm technologies these are neighbor discovery, neighbor recovery, Reliable Transport Protocol (RTP), and DUAL. DUAL stores all the destination routs within the topology table.

Characteristics of EIGRP (Enhanced interior gateway routing protocol)

- Metric value…………………… 5K value (10100 -Default)

- Information shearing …………… Multicast (224.0.0.10)

- Convergence…………………… Very Fast

- Administrative Value ……………. LAN-90, WAN-170

- Maximum Hop …………………. 100 (Default)

- Standard ………………………... Partially Open Standard

- Hello timer ……………………. LAN- 5sec WAN–40 sec

- Hold timer …………………….. LAN- 15 sec WAN- 120 s

EIGRP Neighbors Conditions

- Same AS (Autonomous System Number)

- Same 5K (10100) value

- Password (If configured)

EIGRP Configuration

Mon Feb 17 14:47:26 2020   Router0   Router>enable

Mon Feb 17 14:47:28 2020   Router0   Router#conf t

Mon Feb 17 14:47:31 2020   Router0   Router (config) #int s0/0/0

Mon Feb 17 14:47:32 2020   Router0   Router (config-if) #no shutdown

Mon Feb 17 14:47:39 2020   Router0   Router (config-if) #ip address 192.168.12.1 255.255.255.252

Mon Feb 17 14:47:42 2020   Router0   Router (config-if) #int f0/0

Mon Feb 17 14:47:43 2020   Router0   Router (config-if) #no shutdown

Mon Feb 17 14:47:50 2020   Router0   Router (config-if) #ip address 192.168.10.1 255.255.255.0

Mon Feb 17 15:10:19 2020   Router0   Router (config) #hostname R1

Mon Feb 17 15:10:33 2020   Router0   R1 (config) #ip dhcp pool DHAKA

Mon Feb 17 15:11:16 2020   Router0   R1 (dhcp-config) #network 192.168.10.0 255.255.255.0

Mon Feb 17 15:11:29 2020   Router0   R1 (dhcp-config) #default-router 192.168.10.1

Mon Feb 17 15:11:38 2020   Router0   R1 (dhcp-config) #exit

Mon Feb 17 15:26:17 2020   Router0   R1>end

Mon Feb 17 15:26:19 2020   Router0   R1#conf t

Mon Feb 17 15:26:36 2020   Router0   R1 (config) #ip dhcp excluded-address 192.168.10.4

Mon Feb 17 15:27:06 2020   Router0   R1 (config) #ip dhcp excluded-address 192.168.10.4 192.168.10.7

Mon Feb 17 15:28:56 2020   Router0   R1 (config) #do show ip route

Mon Feb 17 15:29:50 2020   Router0   R1 (config) #router eigrp?

Mon Feb 17 15:34:05 2020   Router0   R1 (config) #router eigrp 10

Mon Feb 17 15:37:09 2020   Router0   R1 (config-router) #eigrp router-id 1.1.1.1

Mon Feb 17 15:47:02 2020   Router0   R1 (config-router) #network 192.168.12.0 0.0.0.3

Mon Feb 17 15:47:18 2020   Router0   R1 (config-router) #network 192.168.10.0 0.0.0.255

Mon Feb 17 15:53:11 2020   Router0   R1 (config) #do show ip route

Mon Feb 17 15:58:51 2020   Router0   R1 (config) #do show ip protocols

Mon Feb 17 16:02:43 2020   Router0   R1 (config) #router eigrp 10

Mon Feb 17 16:02:46 2020   Router0   R1 (config-router) #no auto-summary

Mon Feb 17 16:02:50 2020   Router0   R1 (config-router) #exit

Mon Feb 17 16:03:31 2020   Router0   R1 (config) #do show ip protocols

Mon Feb 17 16:03:41 2020   Router0   R1 (config) #do show ip route

Mon Feb 17 16:36:23 2020   Router0   R1>enable

Mon Feb 17 16:36:26 2020   Router0   R1#show ip route

Mon Feb 17 16:40:53 2020   Router0   R1#show ip eigrp neighbors

Mon Feb 17 16:42:04 2020   Router0   R1#show ip eigrp neighbors

Mon Feb 17 16:42:06 2020   Router0   R1#show ip eigrp neighbors

Mon Feb 17 16:45:37 2020   Router0   R1#show ip eigrp topology

Mon Feb 17 16:58:30 2020   Router0   R1>enable

Mon Feb 17 16:58:34 2020   Router0   R1#conf t

Mon Feb 17 16:58:40 2020   Router0   R1 (config) #router eigrp 10

Mon Feb 17 16:59:55 2020   Router0   R1 (config-router) #metric weights 0 1 1 1 0 0

Mon Feb 17 17:00:16 2020   Router0   R1 (config-router) #do show ip route

Mon Feb 17 17:00:36 2020   Router0   R1 (config-router) #metric weights 0 1 1 0 00

Mon Feb 17 17:00:39 2020   Router0   R1 (config-router) #metric weights 0 1 0 1 0 00

Mon Feb 17 17:00:51 2020   Router0   R1 (config-router) #do show ip route

3.8 Open Shortest Path First (OSPF)

This protocol uses Link State Routing (LSR) algorithm and it belongs to Interior Gateway Protocols (IGPs), operating with a single Autonomous System (AS). OSPF version 2 is used in IPv4 and OSPF version 3 is used in IPv6. OSPF also supports Classless Inter-Domain Routing (CIDR). This protocol calculates the shortest paths/routes from source to destination through the based on an algorithm. RIP protocol is a dynamic routing protocol, it can change the routing table if the topology is changed on the contrary OSPF can calculate the shortest path based on the cost of the route, taking into account bandwidth, delay and load. OSPF is reliable to calculate routes through large and complex Local Area Network (LAN)

Characteristics of OSPF (open shortest path fast)

- Metric value……………………. Bandwidth
- Information shearing …………… Multicast (224.0.0.5, 224.0.0.6)
- Convergence……………………. Fast

- Administrative Value …………… 110

- Maximum Hop …………………. Unlimited

- Standard ………………………... Open Standard

- Hello timer ……………………. LAN- 10sec WAN–30 sec

- Hold timer ……………………. LAN- 40sec WAN- 120 s

OSPF Neighbors Conditions

- Same Area

- Same Hello timer and Hold timer

- password (If configured)

OSPF TOPOLOGY

- LSA Type 1: Router LSA.

- LSA Type 2: Network LSA.

- LSA Type 3: Summary LSA.

- LSA Type 4: Summary ASBR LSA.

- LSA Type 5: Autonomous system external LSA

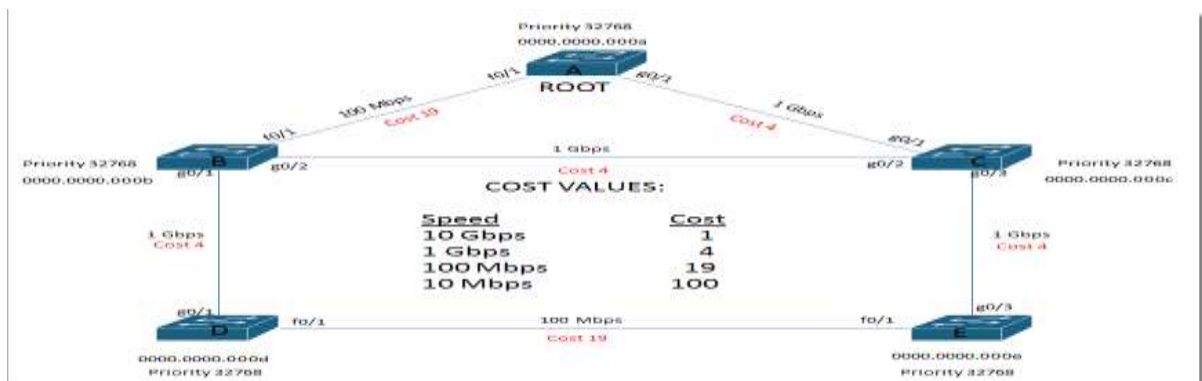# Spanning Tree Protocol

Fig 3.11: STP

Spanning-tree Port States

- Blocking: 20s

- Listening: 15s

- Learning: 15s

- Forwarding:

Port Types

- Root port

- Designated port

- Alternate Port

Five administrative mode

- 1. Dynamic Desirable

- 2.Dynamic Auto (default)

- 3.Access

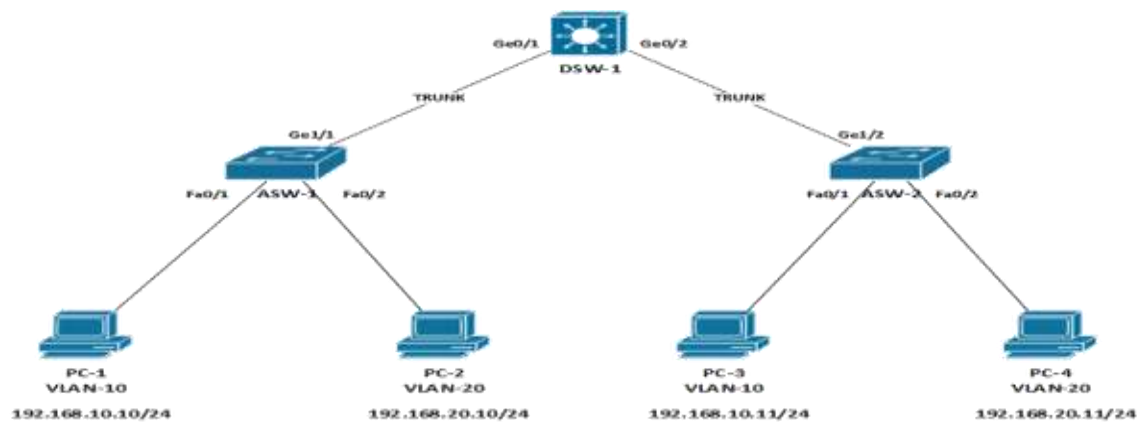- 4.Trunk

- 5.Negotiate

VLAN Trunk Protocol (VTP)

Fig 3.12: VTP

VTP MODE

- **Server:** VLAN create, VLAN delete, VLAN edit, update receive, update own

- **Client:** No VLAN create, no VLAN delete, no VLAN edit, update receive, update own.

- **Transparent:** VLAN create, VLAN delete, VLAN edit, update receive, but not update own.

VTP Configuration

Mon Mar 16 15:49:52 2020   Switch0   Switch>EN

Mon Mar 16 15:51:08 2020   Switch0   Switch#conf t

Mon Mar 16 15:52:16 2020   Switch0Switch (config) #vtp mode client

Mon Mar 16 15:52:31 2020   Switch2   Switch>enable

Mon Mar 16 15:52:33 2020   Switch2   Switch#conf t

Mon Mar 16 15:52:42 2020   Switch2   Switch (config) #vtp mode client

Mon Mar 16 15:52:50 2020   Switch3   Switch>enable

Mon Mar 16 15:52:51 2020   Switch3   Switch#conf t

Mon Mar 16 15:52:54 2020   Switch3   Switch (config) #vtp mode client

Mon Mar 16 15:53:10 2020   Switch4   Switch#cof t

Mon Mar 16 15:53:14 2020   Switch4   Switch#conf t

Mon Mar 16 15:53:25 2020   Switch4   Switch (config) #int range f0/1-f0/4

Mon Mar 16 15:53:30 2020   Switch4   Switch (config-if-range) #switch port mode trunk

Mon Mar 16 15:53:32 2020   Switch4   Switch (config-if-range) #exit

Mon Mar 16 15:54:37 2020   Switch4   Switch (config) #vtp domain DHAKA

Mon Mar 16 15:55:48 2020   Switch4   Switch (config) #vlan 2

Mon Mar 16 15:55:51 2020   Switch4   Switch (config-vlan) #name IT

Mon Mar 16 15:55:53 2020   Switch4   Switch (config-vlan) #vlan 3

Mon Mar 16 15:56:00 2020   Switch4   Switch (config-vlan) #name SALES

Mon Mar 16 15:56:27 2020   Switch4   Switch (config-vlan) #vlan 4

Mon Mar 16 15:56:34 2020   Switch4   Switch (config-vlan) #name HR

Mon Mar 16 15:56:38 2020   Switch4   Switch (config-vlan) #vlan 5

Mon Mar 16 15:56:57 2020   Switch4   Switch (config-vlan) #name finance

3.9 Challenges

In every workplace is very challenge full. There is no work without challenges. So, we should take our work properly and make it seriously. In four months, internship is very positive to get knowledge and share companions in finding out our weakness about our training time. It is very important to pick up and understanding unknown things and many more problems to solve the solutions.

In my training periods to the company there have insufficient works to solve. Some of work I complete to my own skill and it send to my company supervisor to his mail. Some of works done by me, some of my supervisors and some of works are done by labors. So as a youthful labor I done some of works in training periods.

I know how to complete my work without injuries. So, in every work at first, I am careful to about injuries and avoid of it. I don't know everything, but I try to my best to know about all topics how catch as possible to know. And I feel free to asking any questions and feel free to independent laborer.

In the internship contend luckily, I have completed the internship periods without any problems. In this period, I known how to co-operate work with other, and make relationship to customer. As a future employee I have get many tricks about corporate life and how to maintain office courtesy and keep me cool.

After completing my graduation from this university, I will get a new lifestyle. As an alumnus I will try to my best to achieve reputation of our varsity in my knowledge and by hard work. When i will start my new life with job for a huge hour is 9 am to 5 pm, so I am abiding this habit by this internship periods.

CHAPTER 4

COMPETENCIES AND SMART PLAN

4.1 Competencies Earned

At present every job marketplace or any place if full of competencies. That is why we should make sure our practical skill. Skills Earned or learning result is an announcement of what a student is required to know, comprehend or have the capacity to do because of a learning procedure. Computer networking is the part of my future earned place. Introduce and decommission of both system and server machines at two datacenters. Lead part in Configuring Router. Internship periods time I have complete more than problem solutions, so it will help me to future for maintaining big problem in cool head. So, it is my big achievement from this internship. In this internship Introduce and Configure Routers and Switches; Configure, and Employer Services to more, VLAN configure, OSPF configure, EIGRP configures and RIP configures. Furthermore, steady with the learning results from this, the Internship on Site Supervisor will give an introduction concerning authoritative strategies and methodology technological skill.

4.2 Smart Plan

For getting more and a better achievement gain and an organization set their top label management to make their plan unique and more effectively and innovative from the other Organization. To make my bright career and successful life. This internship is very helpful for smart plan.

4.3 Reflections

New Horizon Bangladesh is served their service very carefully to customer. They are very concern from their launch date to provide their service. And they are very careful to take their customer and keep them to their service more. They are corporate Network solution and telecommunication companies they provide their network to highly and most effective art of network to their technical group.

CHAPTER 5

CONCLUSION AND FUTURE CAREER

5.1 Discussion and Conclusion

I have successfully completed my internship. This internship is very important to achieve practical knowledge. In this internship is teaches me to how survive 8 to 9 hours in an office. And self-inspiration to do work properly and solve the problems. Daily 8-9 hours and 5 or 6 days in a week to work hard, so I have this habit and practiced by this internship. I have revealed the main issues of time is maintain by self-inspiration and motivated by internship. Time sense is very common and important in every corporate and business life which is maintained by this training periods.

In this internship periods teaches me many important features of my course related topics and many others important things which will be needed in make future career. It helps me to when the work pressure is too much then how to keep cool my mind in working place. I got the knowledge to and keep on working hard from my position and plans for next work. I know how to get my bosses mind and how to get promotion by my work and personality. This internship makes me sincere and impress to work hard. In the end I just want to say in every educational institution, or a work place the importance of internship is very important to get real life practice and skill knowledge.

5.2 Scope for Further Career

At present Computer networking is a sector which is very demandable for job place. There is various zone of IT sector. There is huge workplace for in this IT, like CCNA Routing and Switching, Linux etc. And it has several various types of networking wireless networking, router and switching, Computer to computer networking, Network system engineer or administrator. In every office, bank, or any business company need one or more IT specialist. So, this is another positive news for the network engineer. A skillful worker is very demandable person in every place, so at first to make skillful career, and then it will be gone to me a higher place of my life.

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APPENDIX

Appendix A: Internship Reflection

Internship is how important in our corporate level or our knowledge achievement is to unsayable. So, the internship time is very useful for our skill developed in our real life. When I was training in the company, I work every step very carefully. The internship learns to me how to maintain the customer, how to deal a project, and how maintain to solve the problem. In the internship time I work and connect with another expert worker who teaches me very carefully. I know how to handle a hard project to easily solve. I am an association central goal or vision is actualized, how control is shared, how to contact with partners, how to organize, how to choose the best way and maintain input and output association. The internship encourages me to plan for life and worldwide society, Career plan. The internship teaches me how to manage bosses and expert manner and different representative gain from this training. The internship reflection influence in my whole life to know how maintain practical life and how to behave to corporate life, how to cool my head in a critical place. Also, it improves our real-life situation and how to handle it to make a bright future. Internship is a way to meet the professional level expert and it's a chance to work of them. Which is very important to know how to they solve many critical works.

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