INTERNSHIP ON CISCO CERTIFIED NETWORK ASSOCIATE

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 internship titled "**Internship on Cisco Certified Network Associate** ", submitted by **Md. Mahi Chowdhory** 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 31 MARCH 2022.

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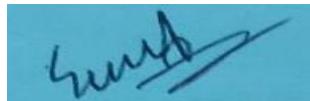
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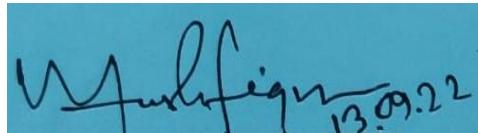
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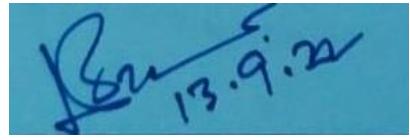
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DECLARATION

I hereby declare that this project has been done by me under the supervision of **MD. ZABIRUL ISLAM,** lecturer, **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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I would like to thank our entire course mate in Daffodil International University, who took part in this discussion while completing the course work.

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

ABSTRACT

This internship titled CISCO CERTIFIED NETWORK ASSOCIATE-CCNA is a mixture of various fields of computer networking. This is a special quite networking course. The Cisco Certified Networking courses are the best of the current networking courses. Its course curriculum is very modern and timely. This course Provides network knowledge of the latest technology with maximum support in network skills development and this course will be able to address the growing global demand of Multinational companies CCNA Security Certification provides knowledge of all security related issues such as network security, installation process, troubleshooting etc. 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.

TABLE OF CONTENTS

CONTENTS   **PAGE**

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

1.1 Introduction

We now live in the age of information technology. So, all of that technology depends on networks. Without the Internet we cannot think of our future to any extent. CCNA is the most popular and secure network system in the world. We can't do anything without internet. Today, every business, office, bank and commerce is based on a special Correspondence and networking. CCNA Routing and switching are very important to a file office, a company and all ISP companies for Internet maintenance. In the present and the will we wouldn't be able to think about the future anymore without the internet. So, we have to take it seriously and learn it for our future life. In this report there are many topics that I have included which are Important to communicate. CCNA Routing and switching are common and often familiar Communication engineering to communicate.

1.2 Motivation

At the moment, I am an alumnus of Daffodil International University and I am thinking about a Bachelor's degree in Computer Science and Engineering. There is a huge activity department for PC organizations in Bangladesh. To understand the centrality of expanding practical awareness this will enhance the course understanding data and enable the student to obtain a broader perspective on topics. CCNA It is a system that expands my solidarity for the better for my future. I therefore choose and urge to make a temporary stand around PC regulation area in it CCNA Routing and switching as a network administrator is what's on my mind the most Good, good at dealing with problem solving, talking to people, and understanding their needs and know how to maintain the problem and give them better Administration.

1.3 Internship Objective

Training is very important for our future life and also for success at work. So, I completed my internship supporting training CCNA in Routing and Switching. Extreme target one of my internships is to line up as a professional within the focused activity announced.

Therefore, this can be exceptionally compelling to advance the experience. During this instructable, I learned a lot of the latest things that are very important to me Professional life. These internships aim to give up work understanding and while students are in school, to coordinate the task experience with academic training and to help study for the formation of progress from the semester to the form correctly.

1.4 Introduction to the company

The entire tutorial has been completed under "Flora Telecom Limited". Networks the Orientation and Switching Academy is an IT program for building skills and careers for learning individual institutions and technology around the world. Flora Telecom Limited Technical Team consists of well-qualified and experienced professionals. New Horizons Bangladesh incredibly tightly controls their customers and serves their customers. Our technology and the employees are more capable than your imagination. They have already proven skills in the areas of design, computer networks, marketing, sales and installation, commissioning and maintenance.

This company offers the latest training courses in the field of networking to its students inside the company to keep them up to date with the latest developments.

1.5 Report Layout

This training report consists of 5 chapters. In the layout report each chapter is intensive. I try to summarize all the chapters. The summary is given below:

In the first chapter, I talked about the goal of training, the motive behind the training, Training objectives, Introduction to the company.

In the second chapter, I talked about the organization of my country's training time.

In Chapter Three, I talked about daily events, activities, challenges and tasks

In Chapter Four, I talked about the competencies gained, the smart plan, and

Thoughts.

In Chapter Five, I talked about the conclusion and future scope. future demand at work.

CHAPTER 2

INTERNSHIP ORGANIZATION

2.1 Company Introduction

"Flora Telecom Limited" is one of the experts and experts in major learning departments and supplier of improvement arrangements in Bangladesh. Prepared to create a file flexibly arrange learning to help master information and capabilities within a field professional employment sector. Their learning programs, regardless of whether they are intended for a general assembly or a private expert, help organizations close capacity holes and field cultivation of continuous progress in capacity. With a huge number of courses spanning from basic preparation to specific credits, center IT the setup focuses on innovation partners such as Amazon Web Services, Cisco, and Microsoft, Red Hat, and VMware.

2.2 Services and Market Situation

Professional Training Services

- Red Hat Certified Engineering (RHCE)
- Cisco Certified Network Associate (CCNA)
- Java Programming
- Network system Administrator (NSA)

2.3 Target Group

The institute is aimed at unskilled people who want to improve their skills. The institute also works for engineering students and professionals.

2.4 SWOT Analysis

Strength:

- Good Communication Skill
- Good reputation in
- Good coach market

Weakness:

- lack of experience
- Capital Shortage
- Lack of Marketing

Chances:

- Training for all kinds of people
- Be a coach

Threats:

An economic problem to increase the field of their training and the field of the institute.

CHAPTER 3

TASK, EVENT AND ACTIVITIES

3.1 Daily Tasks and Activities

1st - month: In first month of my internship in the people n Tec, I learn
- Network topologies.
- OSI and TCP/IP model.
- IPv4 and Subnetting.
- Routing protocol Information.

2nd - month: In second month of my internship in the people N Tec, I learn
- Static and Default Routing
- RIP
- EIGRP
- OSPF

3rd - month: In third month of my internship in the people N Tec, I learn
- Switching
- VLAN
- Inter VLAN
- STP
- Wireless technology

3.2 Network

A as a group of computer systems and other computers linked to each other through communication channels to enhance communication and share resources among a wide range of users.
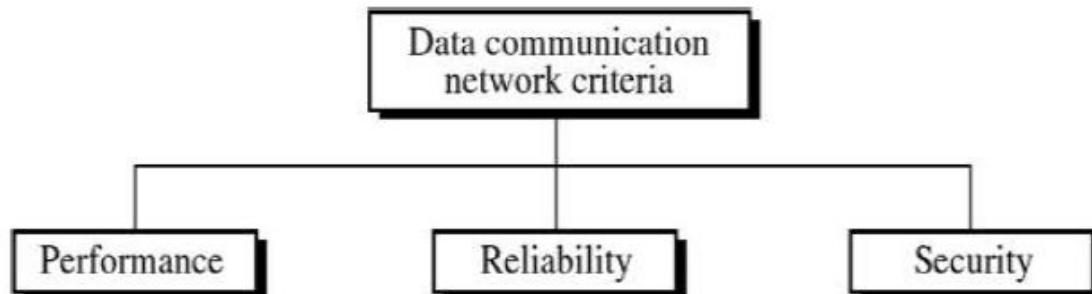
Figure 3.2.1: Network Criteria

Why do we need computer networks?

Now in a world without the Internet we can not imagine the situation. Computer networks help us share data and communications on the network.

There are many advantages to computer networks, and some basic advantages are given less:

- File sharing.
- Device sharing.
- Share the app.
- Communicate with the user.

Network Types:

- **Personal Area Networks:** Used to connect a covered network device about 1 meter. Such as mobile phones, computers, tablets, etc.

- **Local Area Networks:** A local area network that connects a small area to a network like a 10-meter room, a 100-meter building, or a university campus.

- **Metropolitan Area Networks**: Metropolitan area networks are a network connecting users to a network as wide as a city. In a geographical area is Coverage greater than LAN but smaller than WAN.

- Wide area networks: larger than the metropolitan area network, which covers a country in a network. The country can cover 100 km or 1000 km continent

Internetworking Devices:

Figure 3.2.2: Internetworking

6

Cisco router: A router can be a functional networking router that sends data packets from a single device to a different network. The knowledge packet is shipped from a router to a different router through the network by creating an Internet between them until you reach destination.

Figure 3.2.3: Cisco Router

The A router has a CPU, many types of digital memory, and I/O ports interfaces (input / output). The program's operating system is stored within a storage space Router. Cisco, Juniper, Net gear, Nortel, Red back, D-Link and many others make router companies. When the router first boots up, it loads the operating system from storage. Then it loads the configuration file that was recently saved in NVRAM and sets up the network interfaces and protocols. The router puts the network address and subnet of each interface in its own router table with the same interface name. When the router gets information the packet first of all checks the destination address through its routing table. Then send the router information packet to the appropriate interface for the next router and this process continues until the information packet reaches its destination.

Cisco Switch: A is a network router that connects another router to the computer network using packet switching to receive, process, and forward data to the destination tabuk is a multiport network bridge that uses physical address processing data packages in the data link layer of the reference model OSI. Some keys can process data at the network layer. Switches manage the data flow of a network through transmission and data is being received. Different models of network adapter support a different number of ports to connect routers. A consumer-level network adapter provides eight or four connections for Ethernet routers, while the company's adapter supports 32 to 128 connections network. The switch can be additionally connected by daisy-chain method. This way we can connect a large number of routers in one network**.**

Figure 3.2.4: Cisco Switch

Cisco HUB: Hub is a network device. It is used to connect devices to the network. Over there severalb types of hubs such as Ethernet hub, active hub, network hub, repeater hub, A multiport repeater, or simply a hub, it connects multiple devices that act like a coil one piece mesh.
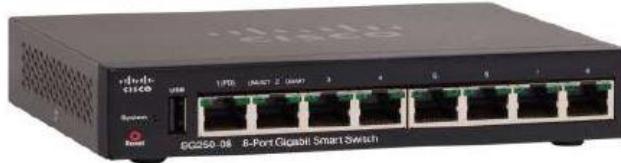
Figure 3.2.5: Cisco HUB

Cables:

Optical Fiber Cable: Optical fiber cable: An optical fiber cable is a cable that contains one or more fibers i want to carry the light. Two kinds of materials mainly used for plastic and glass fiber. Generally speaking, plastic fibers used in short-range communications and glass fibers used in medium and long range communications. There are two types of multimode fibers and individual situations. NTT Japan offered one fiber cable that will be ready to transfer 1 data bits per second within a distance of fifty kilometers.
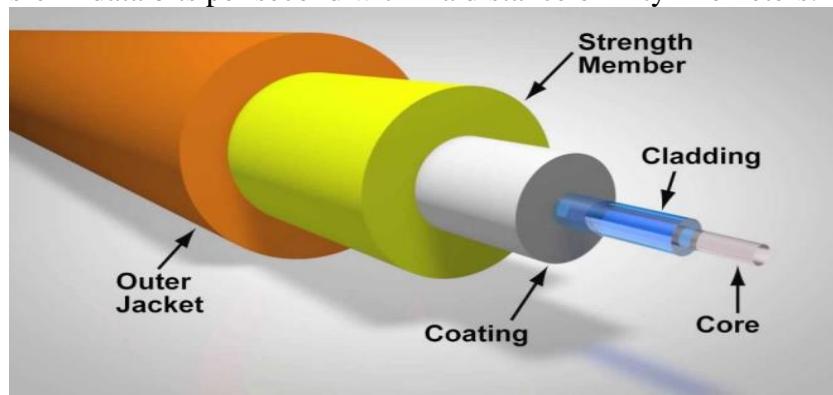
Figure 3.2.6: Optical Fiber Cable

Twisted Pair Cable: Twisted pair cable is widely used in various types of data and audio transmission. There are two different types of unshielded twisted pair: cable twisted pair and shielded twisted pair. Generally, unshielded twisted pairs are used in ethernet installation and Shielded Twisted Pair are used in various types of networks to prevent crosstalk and electromagnetic interference.
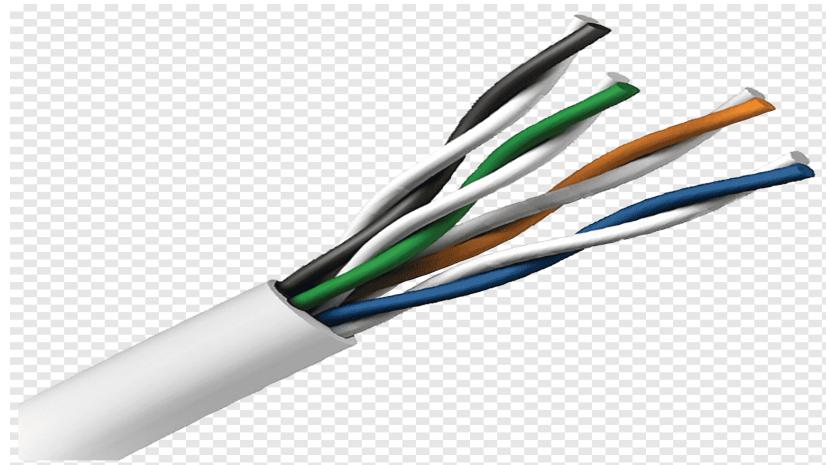
Figure 3.2.7: Twisted Pair Cable

3.3 The OSI Model
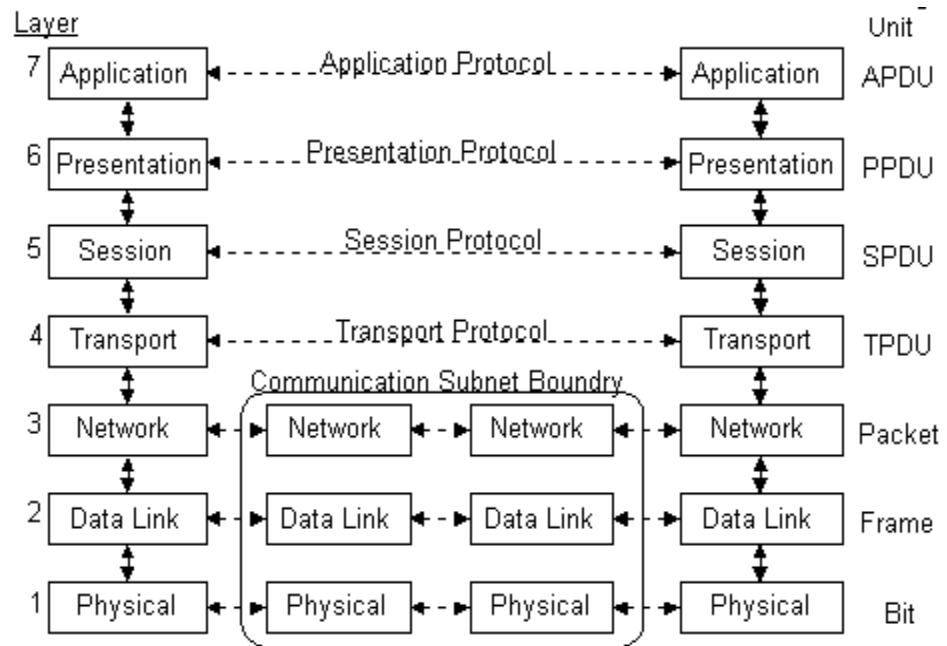
Figure 3.3.1: OSI Model

Application Layer: This is often the only layer that interacts with data from the user directly. To start communication, application software such as application software depends on the application layer. The application layer is responsible for handling the protocol and data**.**

Presentation Layer: This layer makes the information presentable so that the information is used by the application layer. The presentation layer is responsible for encoding, translation, and compression. This layer creates, terminates and manages communications between computer applications. This layer provides transmission mode such as simplex, unidirectional, Or a two-way operation.
.

Transport Layer: This layer provides transparent transmission of data between host or end systems. this layer responsible for controlling data flow and end-to-end error recovery. Through this layer all data is broken down into smaller units if necessary, and then passed to the network layer which makes sure all modules/packages arrive or not. This layer carries data all the way to the source to the destination so we can say that this layer can be a real end of the end layer

Network Layer:
This layer controls the subnetwork operation. Essentially, this layer maintains how information packets are routed from the source to the 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 in addition to addressing, error handling, congestion control, packet sequencing and working on the Internet.

Data-link Layer: This layer operates on TCP (Transmission Control Protocol) and handles error, flow control, and frame synchronization within the physical layer. This layer is divided into two layers one of which is MAC (media access control) and another layer is LLC (logical link layer).

Physical Layer: This layer is a form with bits sent and received over any communication. This layer converts the digital bits into an electrical or optical pulse or a radio emission over the network. This layer may define the transmission mode as unidirectional, unidirectional, and bidirectional.

The Cisco Three-Layer Hierarchical Model:
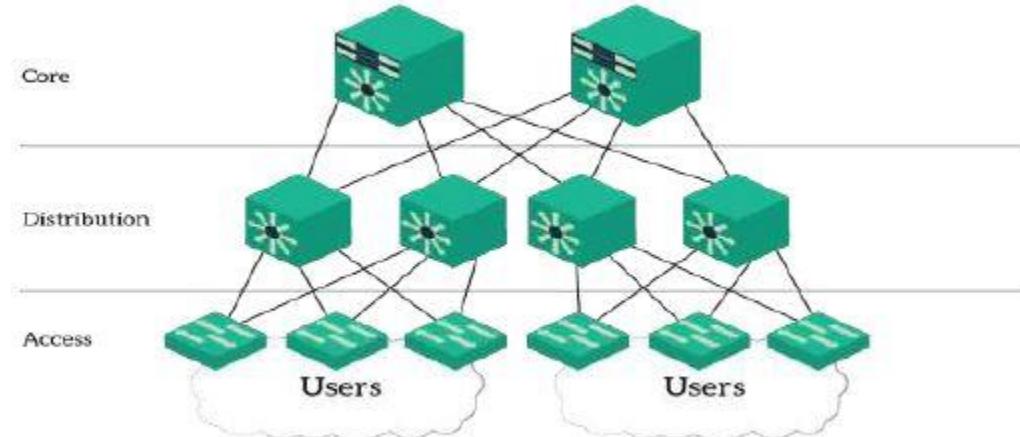
Figure 3.3.2: Cisco three layer

3.4 IP Addressing

An IP address is an identification number for 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 connect to another router over an IP based network because of the Internet. The address IP appears as 192.168.10.12 in IP v4 and 2006: db9: 0: 1234: 0: 557: 5: 3 in IP v6.

There are two types of address IP
- IP version 4 (IPv4) and
- IP version 6 (IPv6).

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

IP Terminology

IP Address: An IP address is a logical address that is used to identify a single host; however, IP addresses may also be used to refer to many or all hosts. IPv4 is referred to when anything is written as merely IP. IPv6 shall be written as IPv6 at all times.

Several key terminology necessary to your comprehension of the Internet Protocol will be discussed in this section. To get you started, here are a few suggestions.:

Bit: A bit is one binary digit, either a 1 or a 0.

Byte: Depending on whether parity is employed, a byte is 7 or 8 bits long. Always assume a byte is 8 bits for the rest of this chapter.

Octet: An octet is an ordinary 8-bit binary number made consisting of 8 bits. The words byte and octet are used interchangeably in this chapter, and they are commonly represented in decimal up to 255.

Network Address: This is the designation used in routing to send packets to a remote network—for example, 10.0.0.0, 172.16.0.0, and 192.168.10.0.

Broadcast Address: Applications and hosts utilize the broadcast address to deliver information to all hosts on a network. All networks and all hosts are designated by 255.255.255; all subnets and hosts on network 172.16.0.0 are specified by 172.16.255.255; and all subnets and hosts on network 10.0.0.0 are broadcast by 10.255.255.255.

Classes of IP Address:

i.	Class A	(0-127)	/8
ii.	Class B	(128-191)	/16
iii.	Class C	(192-223)	/24
iv.	Class D	(224-239)	
v.	Class E	(240-255)	

Summary of the three classes of networks.
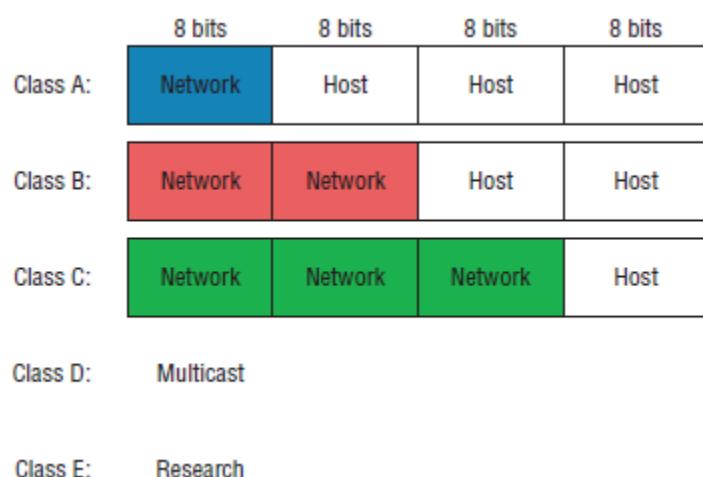
Figure 3.4.1: Summary of the three classes of networks

3.5 Routing Protocol Introduction

Routing protocol could be a protocol that selects one among the 2 nodes of a network and specifies however the router communicates with one another and transmits data. This task of routing is accomplished by routing algorithms. every router has solely Associate in Nursing approximate information to attach it on to the network. These protocols exchange network, route, and metric data between routers in order that every router will prefer the most effective route. supported this data obtained with the assistance of routing protocols, routers build their own routing tables.
i. Static Routing
ii. Dynamic Routing

Static Routing: A static route could be a routing protocol wherever every routing route should be outlined manually within the router's routing table. If there's any amendment within the network for any reason, then the information within the routing table has got to be updated once more. just in case of static route, it doesn't amendment mechanically every routing protocol has Associate in Nursing body distance. within the case of static routing, this body distance is one.

Dynamic Routing: Dynamic routes square measure routes that amendment the routing table mechanically over time. As a result, there's no have to be compelled to do something manually. Any route changes square measure mechanically additional to the routing table.
**Static Routing:**
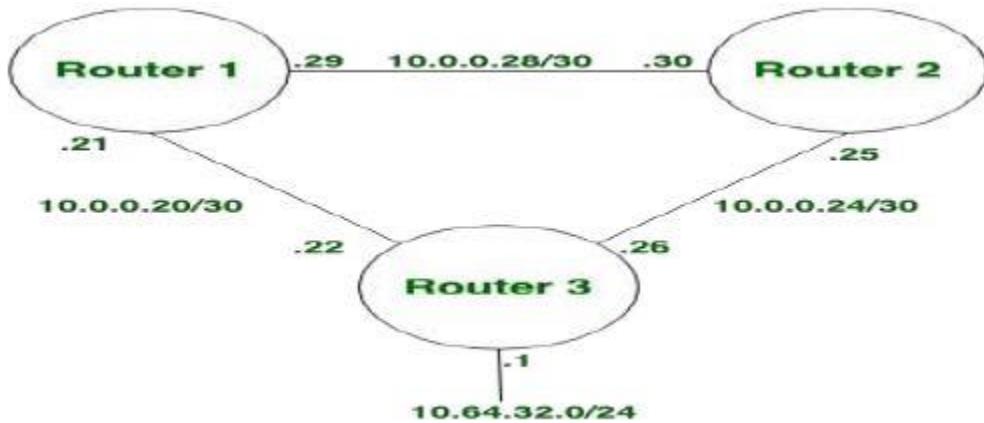
Figure 3.5.1: Static routing diagram

- The route path is set manually by the administrator
- Any changes must be made by the administrator
- Good for small networks.
- Scalability becomes complex in terms of configuration and maintenance.
- It is highly secured because only the administrator knows the routing paths.

● Consume less resources (CPU and RAM)

Dynamic Routing:
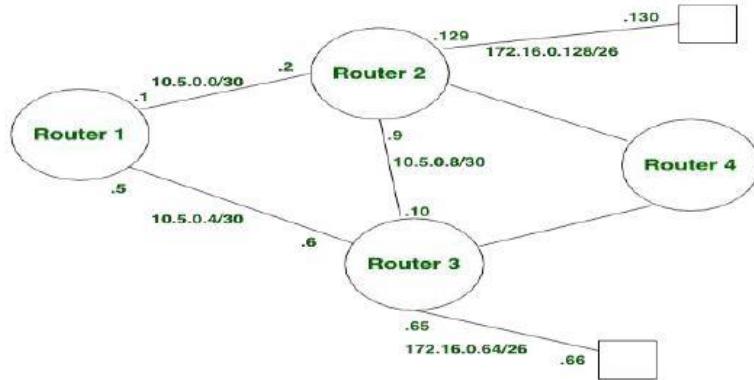
Figure 3.5.2: Dynamic Routing diagram

● Dynamically exchange routing information.
● The router learns changes dynamically.
● Can lead from small to large (ie network).
● Scalable and easy configuration. The router works dynamically.
● Less secure compared to static routing. But it works well for large network infrastructure.
● It consumes more resources (CPU, RAM) because the router has to work dynamically.

Routing Concept: Networking allows people to talk, collaborate, and interact in some way to communicate. Routing may be a process by which a packet travels from a situation to different networks that will not be able to access websites, talk on IP phones, participate in video conferences, compete in online games, shop using the network, and complete online courses, And more network access.

Characteristic of dynamic IP routing protocols,

● RIPv1

- RIPv2
- EIGRP
- OSPFv2
- BGPv1

Static Routing: When another router connects to a network, not all routers know a complete network so that we have to indicate all the networks for the routers. In static routing we specify the path that can forward packets from the router to destination. In static routing, the router cannot always change the path we gave it to keep the provided path and that's why it's also a problem because the router can't find The best route per se.

Static Routing Configuration:
- Default Route
- Static Null Route
- Preferred Routes

Configuring Static Router

The basic syntax for a static router:

```
Router1 Router>end
Router1 Router#conf t
Router1 (config) #hostname R1
Router1 R1 (config) #int s0/0/0
Router1 (config-if) #no shutdown
Router1(config-if) #ip address 192.168.12.1   255.255.255.252
Router1 (config-if) #exit
Router1 (config) #int f0/0
Router1 (config-if) #no shutdown
Router1 (config-if) #ip address 192.168.10.1  255.255.255.0
Router1 (config-if) #exit
```

Figure: Basic syntax for a static router

Routing Information Protocol (RIP): This protocol uses the distance vector algorithm, one of the oldest distance vector routing protocols that uses the number of hops as a routing

metric. The maximum jump is 15 hopes. The largest number of hops allowed for RIP is 15, which limits the size of networks that can be used.

When you use this protocol:

- When you want to create a small scale network
- When your network is not supported for scalability
- When you go in a standalone one

RIP is still in use. These protocols are the oldest among others.

Region types RIP.

- RIP Version 1
- NS. RIP version 2 and

RIP Next Generation IPv6 (RIP).

RIP Configuration:

```
Router>enable
Router#conf t
Router (config) #int s0/0/0
Router (config-if) #no shutdown
Router (config-if) #ip address 192.168.12.2   255.255.255.252
Router (config-if) #int s0/0/1
Router (config-if) #no shutdown
Router (config-if) #ip address 192.168.23.1  255.255.255.252
Router (config-if) #int f0/0
Router (config-if) #no shutdown
Router (config-if) #exit
Router (config) #router rip
Router (config-router) #version 2
Router (config-router) #network 192.168.12.0
Router (config-router) #network 192.168.23.0
Router (config-router) #network 172.17.0.0
Router (config-router) #exit
```

3.6 Enhanced Interior Gateway Routing Protocol (EIGRP)

EIGRP stands for Enhanced Internal Gateway Routing Protocol and works only in Cisco routers. This protocol does not send periodic path updates like RIP. A router that works EIGRP stores all routing information of the neighborhood to search for alternate routes when needed. If the router does not get the appropriate path, EIGRP queries its neighbors for an alternate route. These queries continue until an alternate path is found. All the Routers do not get partial updates, only those routers that require information get Partial updates. This protocol uses four main algorithm techniques that are adjacency Discovery, Neighbor Recovery, Reliable Transport Protocol (RTP), DUAL. Double Stores all destination paths inside the hierarchy table**.**

Characteristics of EIGRP (Enhanced interior gateway routing protocol)
Metric value……………………. 5K value (10100 -Default)
Information sharing …………… 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 the timer ……………………. LAN- 15 sec WAN- 120 s

EIGRP Neighbors Conditions
- Same AS (Autonomous System Number)
- Same 5K (10100) value
- Password (If configured)

EIGRP Configuration

```
Router0>enable
Router0#conf t
Router0 (config) #int s0/0/0
Router0 (config-if) #no shutdown
Router0 (config-if) #ip address 192.168.12.1 255.255.255.252
Router0 (config-if) #int f0/0
Router0 (config-if) #no shutdown
Router0 (config-if) #ip address 192.168.10.1 255.255.255.0
Router0 (config) #hostname R1
Router0 (config) #ip dhcp pool DHAKA
Router0 (dhcp-config) #network 192.168.10.0 255.255.255.0
Router0 (dhcp-config) #default-router 192.168.10.1
Router0 (dhcp-config) #exit
Router0>end
Router0#conf t
Router0 (config) #ip dhcp excluded-address 192.168.10.4
Router0 (config) #ip dhcp excluded-address 192.168.10.4 192.168.10.7
Router0 (config) #router eigrp 10
Router0 (config-router) #eigrp router-id 1.1.1.1
Router0  (config-router) #network 192.168.12.0 0.0.0.3
Router0 (config-router) #network 192.168.10.0 0.0.0.255
Router0 (config) #router eigrp 10
Router0 (config-router) #no auto-summary
Router0 (config-router) #exit
Router0 #conf t
Router0 (config) #router eigrp 10
Router0 (config-router) #metric weights 0 1 1 1 0 0
Router0 (config-router) #metric weights 0 1 1 0 00
Router0 (config-router) #metric weights 0 1 0 1 0 00
Router0 (config-router) #do show ip route
```

3.7 Open Shortest Path First (OSPF)

This protocol uses the Link State Routing (LSR) algorithm and belongs to the internal gateway. Protocols (IGPs), running a single independent system (AS). OSPF Version 2 is used in IPv4 and OSPF version 3 used in IPv6. OSPF also supports Classless Inter-Domain Routing (CIDR). This protocol computes the shortest paths/paths from source to through the destination based algorithm. RIP The protocol is a dynamic routing protocol, It can change the routing table if the chassis is changed in contrast to OSPF can Calculate the shortest path based on the cost of the path, taking into account the bandwidth, delay and load. OSPF is reliable for calculating paths over a large and complex local area network (LAN)

Characteristics of OSPF (open shortest path fast)

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

- Administrative value   …   110
- Maximum Hop   …   Unlimited
- Standard   …   Open Standard
- Hello timer   …   Lan- 10 sec WAN-30 sec
- Hold the timer   …   Lan- 40 sec WAN-120s

OSPF Neighbors Conditions

- same area
- Same timer Hello and Hold timer
- Password (if configured)

OSPF TOPOLOGY

- Router LSA
- Network LSA
- Summary LSA
- Summary ASBR LSA
- Autonomous system external LSA

Spanning Tree Protocol
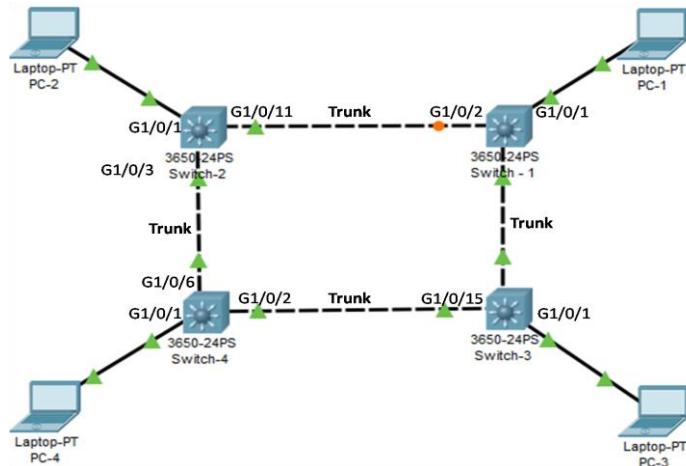
Figure 3.7.1: Spanning Tree Protocol

STP Port States
- Listening 15s
- Blocking 20s
- Learning 15s

- Forwarding

Port Types
- Root Port
- Alternate Port
- Designated port
- **Five Administrative mode**
- Dynamic Auto
- Dynamic Desirable
- Access
- Negotiate
- Trunk

VLAN Trunk Protocol (VTP)
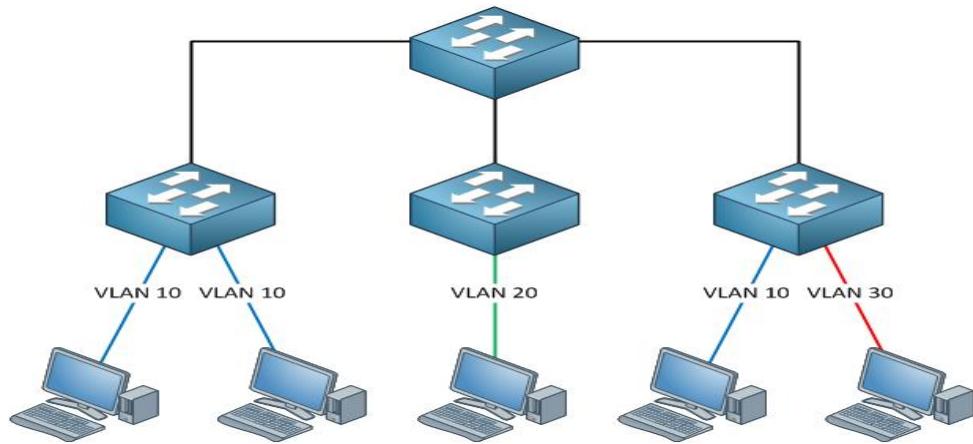
VTP Mode:

- **Client:** No VLAN edit, no VLAN create, no VLAN delete, update own, update receive
- **Server:** VLAN edit, VLAN delete, VLAN create, update own, update receive.
- **Transparent:** VLAN delete, VLAN create, VLAN edit, update receive, but not update own.

VTP Configuration

```
Switch0 Switch>EN
Switch0 Switch#conf t
Switch0Switch (config) #vtp mode client
Switch2 Switch>enable
Switch2 Switch#conf t
Switch2 Switch (config) #vtp mode client
Switch3 Switch>enable
Switch3 Switch#conf t
Switch3 Switch (config) #vtp mode client
Switch4 Switch#cof t
Switch4 Switch (config) #int range f0/1-f0/4
Switch4 Switch (config-if-range) #switch port mode trunk
Switch4 Switch (config-if-range) #exit
Switch4 Switch (config) #vtp domain DHAKA
Switch4 Switch (config) #vlan 2
Switch4 Switch (config-vlan) #vlan 3
Switch4 Switch (config-vlan) #name SALES
Switch4 Switch (config-vlan) #vlan 4
Switch4 Switch (config-vlan) #name HR
Switch4 Switch (config-vlan) #vlan 5
Switch4 Switch (config-vlan) #name finance
```
Figure: VTP Configuration

Lastly, we can check now by *(ping or trace) command that all are works or not.

3.8 SSH Configuration

We usually use Telnet when enabling remote access to a Cisco device. The Telnet protocol uses the TCP 23 port and transmits data transmitted through it to Plaintext. Hackers can capture such data packets, decode the packets with various protocol analyzing tools, such as Wireshark, and capture important information and passwords. It is therefore advisable to use Secured Shell (SSH) instead of Telnet for remote access. This SSH protocol allows secure remote access to devices that use the TCP 22 port and transmit data in encrypted state.

How to configure SSH in different ways

Now I discuss SSH versions:

Version 1.55: It uses DES algorithm, for this password can be decrypted by few hours-6/7 hours by using powerful servers like 64GB RAM.

Version 1.99: It is old compatibility also and it supports versions 1.55 and 2 both.

Version 2: All latest CISCO router uses this version.

Version 3: For E-mail Security Appliance, Firewall- like checkpoint.

How we can configure SSH?

We can configure SSH by 3 ways.

1. **By using hostname and domain name**

Crypto   = Encryption and Decryption, Hashing etc.

Key   = A mathematical algorithm used to perform a certain task.

Example: Hashing key = is used to perform hashing

          Encryption key = is used to perform authenticate

Generate = For generating the key by the algorithm

RSA   = An algorithm named by Rivest, Shamir and Adlemen (it is the asymmetric also)

The name of Key is combination is Hostname + Domain name.

2. **By not using domain name**

3. **By enabling SSH and HTTPs on the router. It uses 1024 bits key.** (Key name will be generated randomly here).
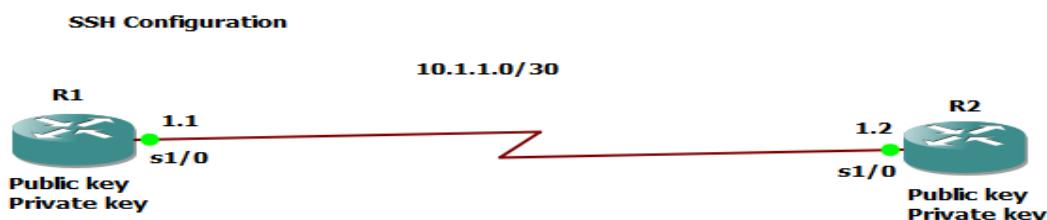


Figure 3.8.1: SSH Configuration

22

R1
R1#
R1#configure terminal
R1(config)#int s1/0
R1(config-if)#ip add 10.1.1.1 255.255.255.252
R1(config-if)#no sh

```
R1#
R1#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int s1/0
R1(config-if)#ip add 10.1.1.1 255.255.255.252
R1(config-if)#no sh
R1(config-if)#
*Jun 26 00:29:31.243: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R1(config-if)#
*Jun 26 00:29:32.251: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
 changed state to up
```

R2
R2#
R2#configure terminal
R2(config)#int s1/0
R2(config-if)#ip address 10.1.1.2 255.255.255.252
R2(config-if)#no sh

```
R2#
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#int s1/0
R2(config-if)#ip add 10.1.1.2 255.255.255.252
R2(config-if)#no sh
R2(config-if)#
*Jun 26 00:31:08.795: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R2(config-if)#
*Jun 26 00:31:09.799: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
```

1. **By using hostname and domain name**

Using version 1.55
R2(config)#hostname Dhaka
Dhaka(config)#ip domain-name it-training.tech
Dhaka(config)#crypto key generate rsa

```
R2(config)#hostname Dhaka
Dhaka(config)#ip d
Dhaka(config)#ip do
Dhaka(config)#ip domain-n
Dhaka(config)#ip domain-name it-training.tech
Dhaka(config)#crypto key generate rsa
The name for the keys will be: Dhaka.it-training.tech
Choose the size of the key modulus in the range of 360 to 4096 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 560
% Generating 560 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 0 seconds)

Dhaka(config)#
*Jun 26 01:01:09.959:  RSA key size needs to be atleast 768 bits for ssh version 2
Dhaka(config)#
*Jun 26 01:01:09.959: %SSH-5-ENABLED: SSH 1.5 has been enabled
Dhaka(config)#
```

Using version 2 in same router:

Dhaka(config)#no crypto key zeroize
Dhaka(config)#crypto key generate rsa
How many bits in the modulus [512]: 761

```
Dhaka(config)#no crypto key zeroize
% All keys will be removed.
% All router certs issued using these keys will also be removed.
Do you really want to remove these keys? [yes/no]: yes
Dhaka(config)#
*Jun 26 01:09:21.223: %SSH-5-DISABLED: SSH 1.5 has been disabled
Dhaka(config)#cryp
Dhaka(config)#crypto l
Dhaka(config)#crypto k
Dhaka(config)#crypto key g
Dhaka(config)#crypto key generate r
Dhaka(config)#crypto key generate rsa
The name for the keys will be: Dhaka.it-training.tech
Choose the size of the key modulus in the range of 360 to 4096 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 761
% Generating 761 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)

Dhaka(config)#
*Jun 26 01:11:20.099: %SSH-5-ENABLED: SSH 1.99 has been enabled
Dhaka(config)#ip ssh va
Dhaka(config)#ip ssh var
Dhaka(config)#ip ssh ve
Dhaka(config)#ip ssh version 2
Dhaka(config)#li
Dhaka(config)#lin
Dhaka(config)#line vt
Dhaka(config)#line vty 0 2
Dhaka(config-line)#login local
Dhaka(config-line)#exit
Dhaka(config)#username itbd password itbd
Dhaka(config)#ena
Dhaka(config)#enable pa
Dhaka(config)#enable password cisco
Dhaka(config)#
```

Dhaka(config)#
Dhaka(config)#ip ssh version 2
Dhaka(config)#line vty 0 2
Dhaka(config-line)#login local
Dhaka(config-line)#exit
Dhaka(config)#username itbd password itbd
Dhaka(config)#enable password cisco

```
R1#
R1#ssh -l itbd 10.1.1.2
Password:

Dhaka>
```

Successfully logged into router Dhaka that's means R2 from R1

By not using domain-name

Dhaka(config)#no ip ssh version 2
Dhaka(config)#no crypto key zeroize
Dhaka(config)#crypto key generate rsa general-keys label itbd

```
Dhaka(config)#no ip ssh version 2
Dhaka(config)#no crypt
Dhaka(config)#no crypto z
Dhaka(config)#no crypto k
Dhaka(config)#no crypto keyz
Dhaka(config)#no crypto key z
Dhaka(config)#no crypto key zeroize
% All keys will be removed.
% All router certs issued using these keys will also be removed.
Do you really want to remove these keys? [yes/no]: yes
Dhaka(config)#
*Jun 26 01:40:19.091: %SSH-5-DISABLED: SSH 1.99 has been disabled
Dhaka(config)#
Dhaka(config)#
Dhaka(config)#
Dhaka(config)#cryp
Dhaka(config)#crypto k
Dhaka(config)#crypto keyg
Dhaka(config)#crypto key g
Dhaka(config)#crypto key generate ra
Dhaka(config)#crypto key generate rs
Dhaka(config)#crypto key generate rsa l
Dhaka(config)#crypto key generate rsa ge
Dhaka(config)#crypto key generate rsa general-keys l
Dhaka(config)#crypto key generate rsa general-keys label itbd
The name for the keys will be: itbd
Choose the size of the key modulus in the range of 360 to 4096 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)
```

Then we will check this command whether working properly.

```
R1#
R1#ssh -l itbd 10.1.1.2
Password:

Dhaka>ena
Password:
Dhaka#
```

Now we can see that the command has worked properly.

By enabling SSH and HTTPs

Dhaka(config)#ip http secure-server

```
Dhaka(config)#ip http sec
Dhaka(config)#ip http secure-s
Dhaka(config)#ip http secure-server
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)
Failed to generate persistent self-signed certificate.
    Secure server will use temporary self-signed certificate.

Dhaka(config)#
*Jun 26 02:53:48.055: %SSH-5-ENABLED: SSH 1.99 has been enabled
Dhaka(config)#
```

By default, generating 1024bit RSA keys and enabled SSH 1.99 version.

Now, we will SSH login into the R2 that's means Dhaka from the R1.

```
R1#
R1#ssh -l itbd 10.1.1.2
Password:

Dhaka>en
Password:
Dhaka#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Dhaka(config)#
```

We can also see that Successfully logged into router Dhaka

```
Dhaka#sh crypto key mypubkey ?
  all   Show all public keys
  ec    Show ec public keys
  rsa   Show RSA public keys

Dhaka#sh crypto key mypubkey r
Dhaka#sh crypto key mypubkey rsa
% Key pair was generated at: 04:00:43 UTC Jun 26 2021
Key name: TP-self-signed-4279256517
Key type: RSA KEYS
 Storage Device: not specified
 Usage: General Purpose Key
 Key is not exportable. Redundancy enabled.
 Key Data:
  30819F30 0D06092A 864886F7 0D010101 05000381 8D003081 89028181 00C4B69F
  73BBA2F1 B1509491 1325E106 F31B4A53 B4A6A81D B057C291 A4739C72 72FC3A84
  C49D5F50 956AB328 F172F21C B1D2A8BD 6279C470 03EFA43E 6A1CF008 A17D6F55
  15C62E26 87E4496F B43C211D A30AA33C 42BAB58F 14474E5E 8A8AB42B 60BBA34B
  84DE8F13 C2EE9F7A E952C6F3 B654276C A4104F3C 8F230718 291C9050 41020301 0001
% Key pair was generated at: 04:00:45 UTC Jun 26 2021
Key name: TP-self-signed-4279256517.server
Key type: RSA KEYS
Temporary key
 Usage: Encryption Key
 Key is not exportable. Redundancy enabled.
 Key Data:
  307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00AAFADC 8131EF61
  F41F98E0 978675A2 8539810A FC65BCE5 3D00D45D C461F6A7 45D13554 AA4FE0F2
  8D8324B5 88F0EE95 91E7B1E0 B7C48EEA 9ADFB5E6 E654AB71 AFC87958 FB2F9E99
```

Now, we can see above this picture, the key name automatically has generated this way.

3.8 Challenges

Every workplace is full of challenges. No business is without challenges. So we must take our work properly and take it seriously. In four months, training is so great Positive to gain knowledge and share comrades in discovering our weakness about training time. It is very important to capture and understand unknown and many things More problems to solve
In my training periods at the company there is insufficient work to solve.
Some of the work I complete to my own skill and it is sent to my company supervisor in his mail. Some of the work is done by me, some of my supervisors and some of the work is done by laborers. So as a youthful labor I done some of works in training periods

I know how to complete my work without injury. Therefore, in every work in the beginning, I take care about injuries and avoiding them. I don't know everything, but I do my best to find out About all topics how to catch it and I feel free to ask any questions and Feel free to work as a freelancer Fortunately, I completed training periods without any time problems. In this period, I knew how to cooperate in working with others and establishing relationships with the customer. As a future employee, I have many tricks about the life of the company and how maintain the office courtesy and keep me calm.
After completing my graduation from this university, I will get. As a graduate I will do my best to achieve the reputation of our university in my knowledge and through hard work. When I start my new life with a huge hour job which is from 9AM-5PM, so I AM Stick to this habit during these training periods.

CHAPTER 4

COMPETENCIES AND SMART PLAN

4.1 Competencies Earned

Nowadays every job market or any place is full of talent. That's why you must make sure of our practical skills. Acquired skills or as a result of learning announce what the student is required to know, understand, or have the ability to do because of a learning procedure. Computer networking is part of my future place. I present and shutdown both system and server devices in two data centers. Play a role in router configuration. Internships completed more than just problem solving, so it will help me in the future to keep a big problem in a calm head. . In this instructable, enter and configure routers and switches; Configure and Employer Services for more VLAN configuration OSPF, EIGRP, and RIP. Furthermore, consistent with learning outcomes from this, the on-site Internship Supervisor will provide an introduction regarding reliable strategies and systematic technological prowess.

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 effective and innovative the other Organization. To make my career bright and a successful life. This internship is very helpful for smart planning.

4.3 Reflections

Flora Telecom Limited Bangladesh serves their service very carefully to customers. They are very concerned 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 solutions and telecommunication companies. They provide their network to the highly and most effective art of networking 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 it teaches me how to survive 8 to 9 hours in an office. And self-inspiration to do work properly and solve 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 are maintained by self-inspiration and motivated by internship. Time sense is very common and important in every corporate and business life which is maintained by these training periods.

This internship period teaches me many important features of my course related topics and many other important things which will be needed in my future career. It helps me when the work pressure is too much then how to keep my mind cool in the 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 boss's mind and how to get promotion by my work and personality. This internship makes me sincere and impressed me to work hard. In the end I just want to say in every educational institution, or a workplace 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 a job place. There are various zones of the IT sector. There is a huge workplace for 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. Every office, bank, or any business company needs one or more IT specialists. So, this is often another positive news for the network engineer. A skillful worker is a very demanding person in every place, so at first to make a skillful career, and then it will go to a higher place in my life.

References

[1]   T. Lammle, CompTIA Network+, Third Edition.

[2]   T. Lammle, Cisco Certified Network Associate Study Guide, Sixth Edition.

Website:

[3]   "Learn about Network," [Online]. Available: https//:w3programmers.com. [Accessed 16 February 2022].

[4]   "Learn about OSI Layer," [Online]. Available: https//:en.wikipedia.org/wiki/OSI_model. [Accessed 20 January 2022].

[5]   "Learn about Internship," [Online]. Available: http://dspace.bracu.ac.bd/bitstream/handle/10361/719/06204008.pdf. [Accessed 22 March 2022].

[6]   "Learn About Switch," [Online]. Available: https://en.wikipedia.org/wiki/Network_switch. [Accessed 20 january 2022].

[7]   "Learn about Cisco," [Online]. Available: https://www.cisco.com/c/en/us/products/switches/index.html. [Accessed 22 March 2022].

[8]   "Learn about Router," [Online]. Available: https://www.cloudflare.com/learning/network-layer/what-is-a-router. [Accessed 20 February 2022].

[9]   Learn about Cisco, available at << https://www.cisco.com/c/en/us/support/docs/ip/enhanced-interior-gateway-routing-protocol-eigrp/16406-eigrp-toc.html>>

[10] Learn about Cisco, available at << https://www.cisco.com/c/en/us/support/docs/ip/access-lists/26448-ACLsamples.html>>

[11] Learn about Cisco, available at << https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html>>

[12] "Learn About Dynaminc Routing," [Online]. Available: https://www.cisco.com/c/en/us/support/docs/ip/routing-information protocol-rip/13788-3.html#anc5. [Accessed 25 January 2022].

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