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Team members

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Suraj Pandey	Sandesh Subedi	Sandesh Giri	Nabin Chhetri
Dragon Block(Second Floor)	Dragon Block(First Floor)	Python Block(Second floor)	Python Block(First Floor)

Acknowledgement

We would like to expresses our genuine grateful to everyone who assisted us to complete this networking project. Primarily, we would like to thank to our subject teacher, Mr. Yuvraj Sharma. Your support goes a long way in helping us to achieve these goal on time with appropriate guidelines. Moreover, we would like to applaud our mates who helped us in collecting required data. Without their support and cooperation, this paper would not be as good.

Introduction

Objectives

Our team focus on creating a uninterrupted and rhythmic communication for the organization. Fulfilling clients expectations, a network design is aimed to be finalized with appropriate system security and maintenance. The group also focus on network system management and monitoring of network operations. Moreover, the aim is also to make the designed system effective in terms of reliability and usability. The system is to be constructed from a applicable simulation software, which can simulate the functionality of system properties and network devices.

Scope

Our team will start project by displaying the scope, purpose ,expectation and limitation of the project work. The corresponding floors were constructed by each of the group members as well as the argument within each floor. The design will be constructed via Microsoft Visio and Wonder-Share Edrawmax by following guidelines to maintain the quality of our system. We addressed the network device utilised and their floor plan along with their configuration. The network section are configured using packet tracer.

Assumption

The establishment of a new branch (ARENA Technology Sdn Bhd of KL Central, Kaula Lumpur, Malaysia)was approached in Johor. Network engineers own competent awareness about subnet mask, Ip address, subnetting plan and default gateway . The updated foundation comprise of two different floors that is Dragon Block ‘A’ and Python Block ‘B’. Each block has several numbers of rooms designed for their specific purpose. The Dragon Block ‘A’ consist of Department like Administration, Reception, Marketing department, etc. Like wise the Python Block ‘B’ consist of server room, meeting room, forensic,etc.

Limitations

The network devices at ARENA Technology Sdn Bhd will far exceed than what our network diagram is demonstrating. Cisco Packet Tracer has been suggested for the configuration . The network diagram that is built in this simulation tool is not an actual perception. So, some of the network devices can encounter connection problems and demand time. The network diagram architecture shown in the network diagram section may not contain all the features of the devices. Some of the important gadgets like smoke detector and fire alarms are absent in the network diagram that we have built.

Floor plan

Floor Plan (Dragon block first Floor) [Sandesh Subedi]

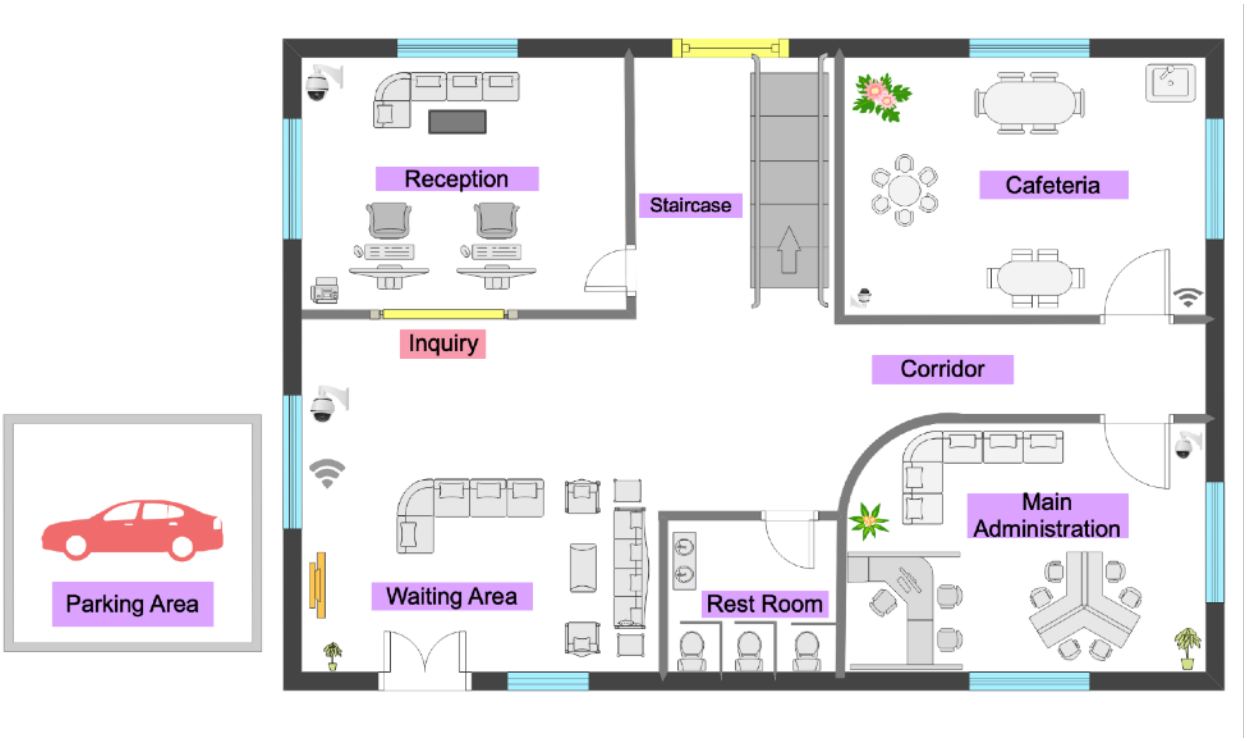


Figure: Dragon Block of First Floor

The first floor of dragon block is designed for both personal and public use. The floor is comprising of distinctive departments for their respective purpose. There are total of four rooms divided as reception, waiting area, cafeteria and the main administration. Reception is the department where clients can ask their queries and get information about the anything they like. Likewise, waiting area or a lobby is located just after the entrance, where clients or guests wait for their meetings. A cafeteria can be seen in the top-right corner of the diagram which is designed for both private and public use it (i.e., both staffs and guests can use it). Across cafeteria lies the main administrative room where the company meetings and other administrative works are conducted. A staircase is present between reception and cafeteria that makes access to the second floor of the Dragon block. Moreover, a restroom and a parking are also present.

Floor Plan (Dragon block second Floor) [Suraj Pandey]

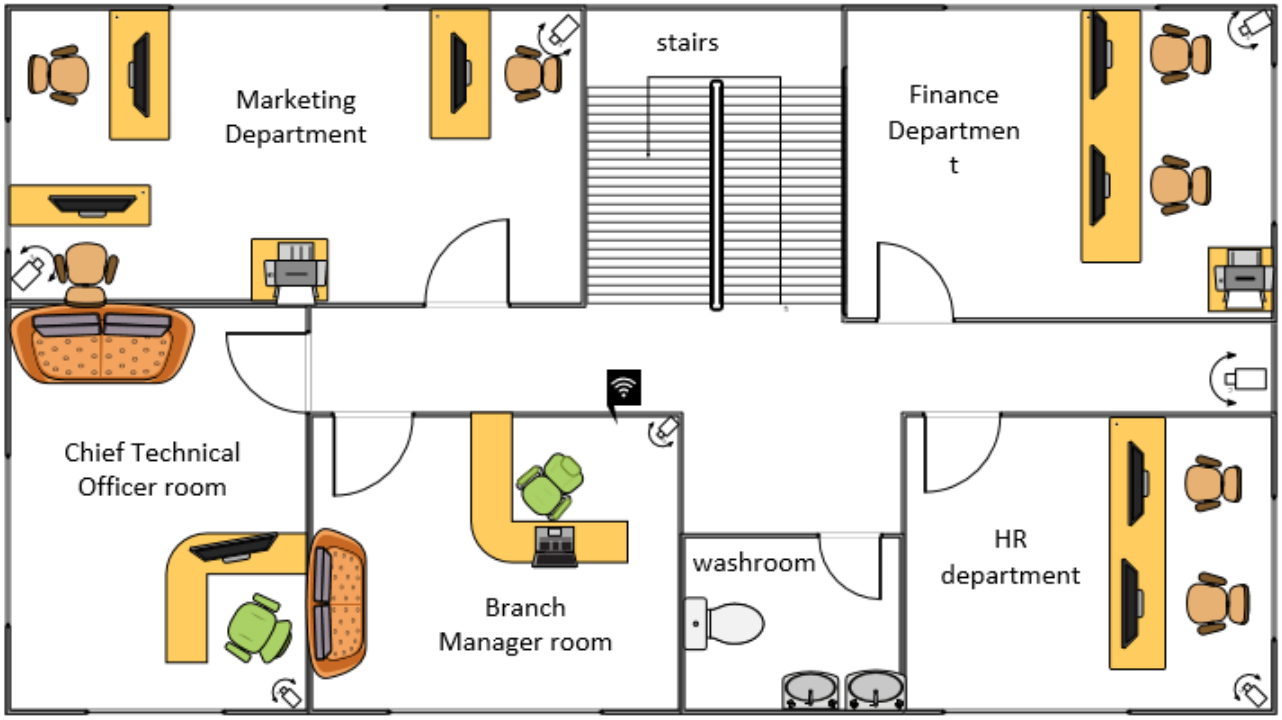


Fig : floor plan of Dragon block 2nd floor.

There are various tools available on internet to draw floor plan. I have used Visio to draw floor plan. I have chosen this tool as it is easy to use and all the required virtual instrument are available.

Before drawing network diagram it is important to draw floor plan which helps to sketch network diagram of respective floor. In second floor of Dragon block the total numbers of rooms are five along with washroom and staircase. The rooms are Branch manager room , chief technical officer room , finance department, marketing department, HR room. The main entrance to this floor is through stair case as this is the second floor of the building.. Since, this floor is restricted to the people other than the office staff so waiting room is not necessary. As there are many rooms in this floor the rooms are a bit congested. In comparison to branch manager room and chief technical room other rooms are bigger in size. So, in branch manager room and chief technical room there are one sofa, chair and table . Similar in finance department there are total of three tables, and chairs for each table. Since, their need large number of furniture this room is bigger in comparison to branch manager and chief technical officer room.

So, floor plan is important as it helps us build the networking diagram for our project.

Floor Plan (Python Block first floor) [Nabin Chhetri]

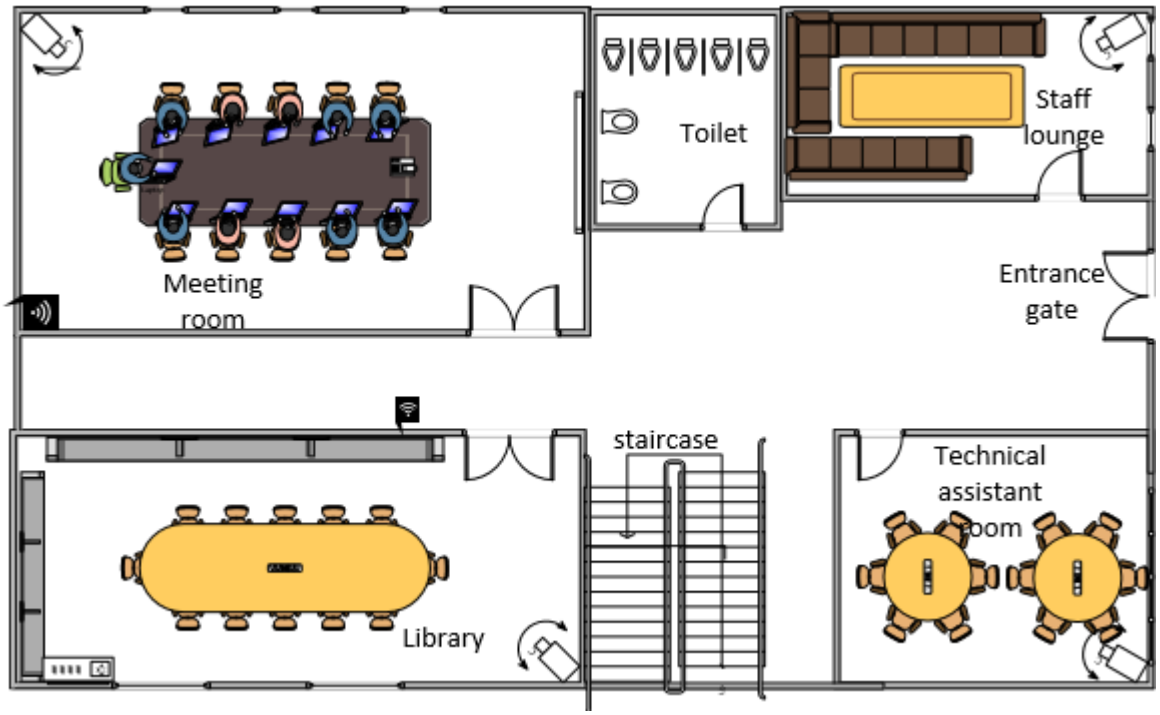


Figure: Python Block of First Floor

The first floor of python block is designed for technical use. The floor is comprising of distinctive departments for their respective purpose. There are total of four rooms divided as meeting room, library, technical assistant room and the staff lounge. Meeting room is at top-right corner of the diagram which is the department where staffs can connect to chairperson for planning and making decision on their future project. Likewise, Library is located just in front of meeting room, where staff and member of the company can access to stored books or files. A technical assistant room can be seen just left after the entrance which is designed for technical use (i.e., staffs use to complete the task technically). Across staff lounge lies the right after the entrance where staff and member of the company can discuss of their project, relax eat, socialise, drink while they get leisure time. A staircase is present between library and staff lounge that makes access to the second floor of the python block. Moreover, a restroom and a parking are also present.

Floor Plan (Python block second Floor) [Sandesh Giri]

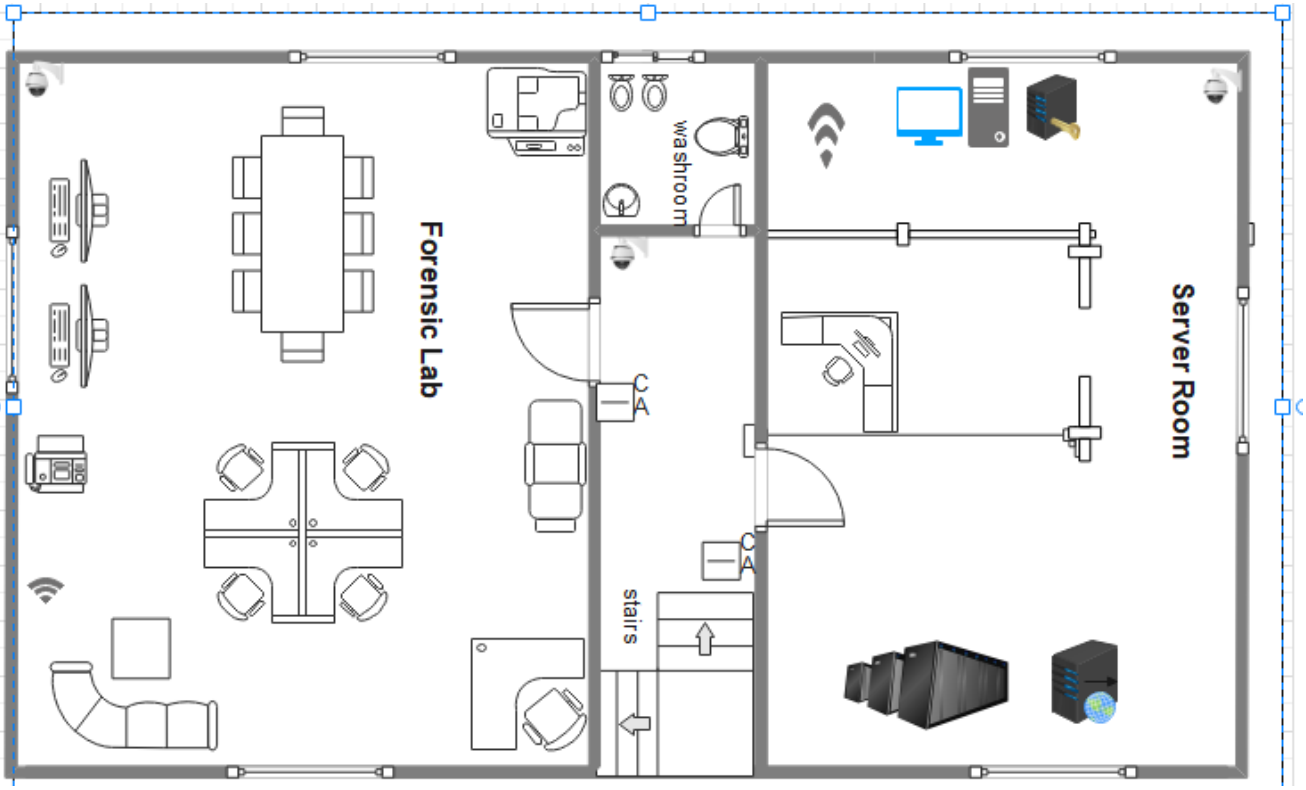


Fig: second floor of Python Block

The first floor of python block is designed for forensic lab and server room. The floor consists of different departments for their respective purpose. This floor is entirely handed to the forensic team for conducting forensic operations. There are total of two rooms divided as forensic lab and server room. A staircase from first floor makes access to this floor. The entrance of forensic lab is more secured and has a biometric security at the entrance of the server room.

Description of Network and Host device

Router

Fig: Cisco 4321 ISR Router

Router is a device which is influential for communication of network that assist to maintain connection between local network and its name “routes” hinted a traffic between devices and the internet. Basically, router is needed to provide a network connection through connecting network wire to switch and then switch will work after connected with other available devices. A router can provide quickest and well-organised way for directly ongoing and outgoing traffic on related network. According to the Fisher T, 2020 “Router connection is configured through dynamic and static routing.” In addition, both dynamic and static routing has their drawback and benefits but according to the assignment, static routing is used to configure the routers because it is best for simple topologies and more secure in in case of security which does not need extra resources rather than dynamic routing. (Services, Centre and Resources, 2021)

Cisco 4321 ISR Router technical specification

Product Code	Cisco 4321 ISR
Total onboard WAN or LAN 10/100/1000 ports	2
SEP – based ports	1
RJ – 45 based ports	2
Onboard ISC slot	1
NIM (Network Interface Modules) slots	2
Flash Memory	4GB (default) / 8GB (Maximum)
Memory	4GB (default) / 8GB (Maximum)
Aggregate Throughput	50 Mbps to 100 Mbps

Rack height	1 RU
Package Weight	9.19 kg
Dimension (H*W*D)	44.55*369.57*294.64 mm
Power – supply options	External: AC and PoE

Switch

Fig: Cisco Catalyst 2960

A switch is a device in which network in computer can connects with other device to forward or receive data from targeted device. It assists to connect network communication with device including in a company like camera, CCTV, PCs, laptops, printers and servers. It is easy for users to share information or communicate with each other from where users are trying send or communicate inside the building. A switch contains many ports in which computer are connected through plugging in that helps to forward or receive data easily. Even small business is not possible

to establish without using switch to connect with related devices. (What are Switches in Computer Network? 2021)

Cisco Catalyst 2960 switch technical specification

Product Code	Cisco Catalyst 2960
Maximum transmission unit (MTU)	Up to 9198 Bytes
Max VLANs	64
Memory DRAM	64GB
Flash Memory	32 MB
Jumbo frames	9016 bytes
VLAN IDs	4000
Forwarding bandwidth	16 Gbps

WAP (Wireless Access Point)

Fig: TL – WA901IND (TP – Link)

WAP or wireless access point is a device of network that permit to connect wireless-capable device with network in device available through wire. It is more secure, more suitable, best device with affordable to install and access. It can provide a local area network which is wireless capable device in related building. A WAP needed Ethernet cables to connect with switch or router for WI-FI signal in specific location. (Support and Points, 2021)

TP – Link TL – WA901IND technical specification

Product Code	TL – WA901IND
Dimension (W*D*H)	194.85mm*129.93mm*36.2mm
Interface	One 10/100M Ethernet Port
Power Consumption	5.8W
Power Supply	12VDC/IA
Wireless security	64/128/152 – bit WEP / WPA / WPA2, WPA – PSK / WPA2 – PSK
Wireless Standard	IEEE 802.11n, IEEE 802.11g, IEEE 802.11b
Signal	11n: Up to 450Mbps(dynamic) 11g: Up to 54Mbps(dynamic) 11b: Up to 11Mbps(dynamic)

CCTV (Closed-Circuit Television):

Fig: Panasonic WV- SPV781L

CCTV (Closed – Circuit Television) is a system of video which is placed in special area to record images of video and provide recording through transmit to a monitor that permit permission for

least number peoples to use it. It also called “Video surveillance”. It is used for detect, both public and property security and crime investigation. Wireless option with including IP address are providing in a latest technology of this device. (CCTV 101: What is CCTV | ACCL, 2021).

Related CCTV technical specification

Product unit name	Panasonic WV – SPV781L
Pixels	12M pixels
Angles for viewing	Horizontal: 101 degrees (Wide) to 18 degrees (Tele)
Fog compensation	Available
Night vision	Available
Digital Noise Reduction	Available
Memory card slot	Available
Resolution	4K at 30fps
Water and dust resistant	IP66 Certified

Laptop

Fig: MacBook Air 2019

Laptop also called notebook which is small or portable computer that can easily carried while travelling and can used it in different places. It is attached with mouse and keyboard having alphanumeric character. It contains thin LCD/LED screen and also have detachable screen which make to work by touching screen like tablet with containing all feature including in tablet. It very light to carried. (Laptop Definition, 2021).

MacBook Air technical specification

Product unit name	MacBook Air 2019
Storage	256GB SSD
RAM	8GB RAM
Processor	1.6GHz dual- core Intel Core i5
Battery	UP to 30 hours of standby time
Screen and Resolution	13.3 inches and 2560 by 1600
Connection	1*USB – C power port
GPU	Intel UHD Graphics 617

Personal Computer(PC)

Fig: HP 24 – dp0158qe AIO PC

Personal computer is used for multi – purpose which is cheap, capabilities and small designed in size for use of individual. The cost of personal computer is depending on the microprocessor technology which permit vender to set complete CPU on a single chip. It includes keyboard, monitor, mouse and system unit (All-in-One Computers, 2021).

Related personal computer technical specification

Product unit name	HP 24 – dp0158qe AIO PC
Storage	256GB
RAM	Upgradeable to 32GB RAM
Processor	Intel Core i7 – 10510U
Network interface	Integrated 10/100/1000 Gigabit Ethernet LAN
Dimensions (W*D*H)	21.29*8.05*16.12 in
Power supply	65W Smart AC power adapter
GPU	Integrated: intel UHD Graphics

Printer

Fig: Canon TS3370S

A printer is an output device that create a hard copy of electronic data in which computer or other device that stored. It is most common used device to print photos and text. There are two types of printer used most, they are inkjet and laser printers. Dot matrix printer are rarely used or rarely increasing use of this printer for basic text print (Definitions and Hope, 2021).

Related printer technical specification

Product unit name	Canon TS3370S
Dimensions (L*W*H)	43.5*31.6*14.5 cm
Weight	3.9 Kilograms
Type of connection	WI – FI
Net Quantity	7 Unit
Generic Name	Inkjet Printer
Elements available	1 printer, 1 installation CD, 1 USB Cable, 1 User manual, 1 Power Cord, 2 Cartridges
Manufacturer	Canon Inc.

Network diagram definition

Physical Network Diagram

Generally, Physical Network Diagram is providing view as eye of bird's network like floorplan. It contains some physical arrangement of element to create network which includes cables, ports, servers, racks and other hardware's or devices. (What is a Network Diagram, 2021)

Fig: Physical Network Diagram

Logical Network Diagram

A Logical network diagram demonstrate about how information share through network and communication of device with each other. It consists components like routing protocols and domains, network entity and its devices (firewalls and routers), gateway, subnets (which contains masks, address and VLAN IDs), segments of network and traffic flow. Shift of small, medium and

large networks are available in logical network diagrams which helps in templates the network diagram. (Tips for mapping your network diagram, 2021)

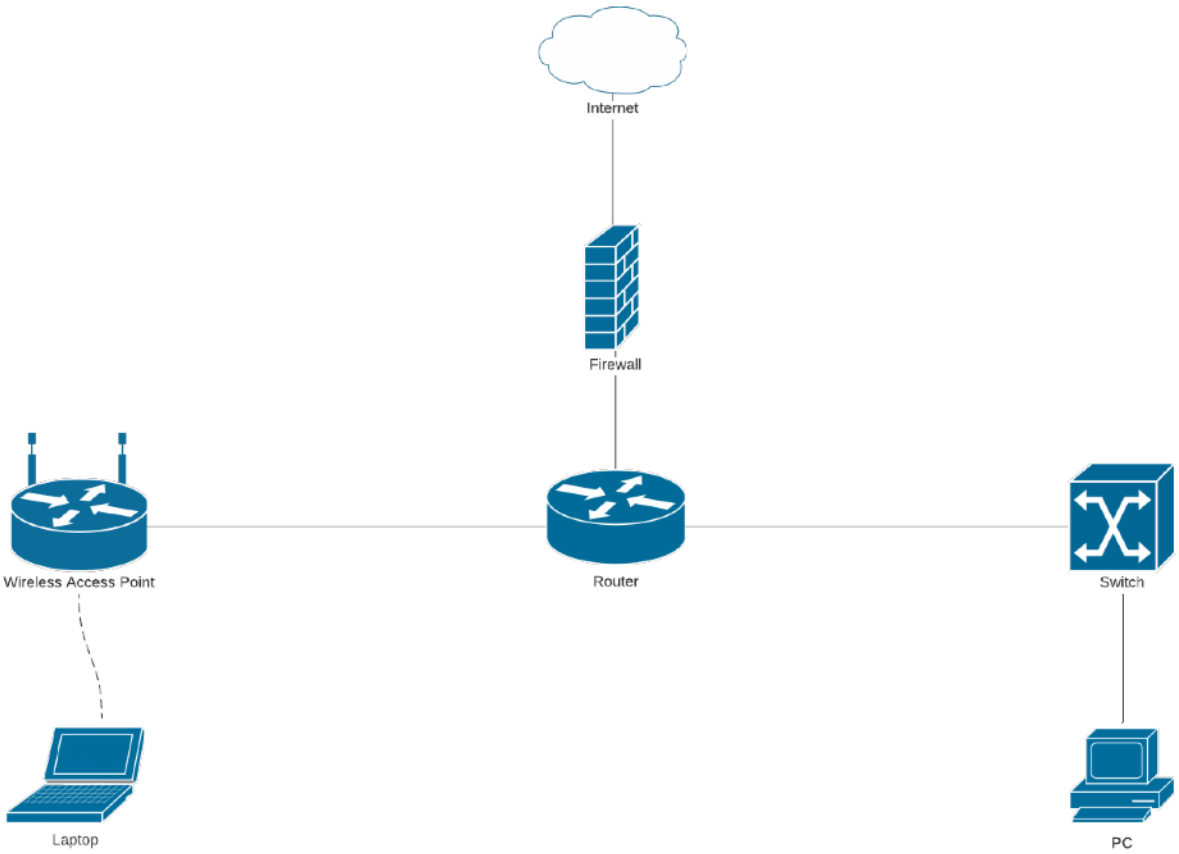
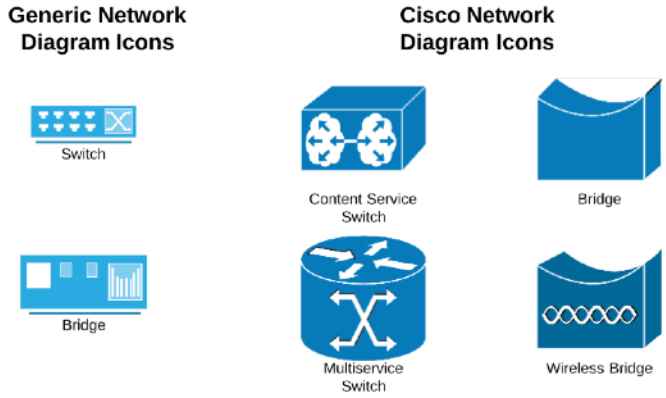


Fig: Logical Network Diagram

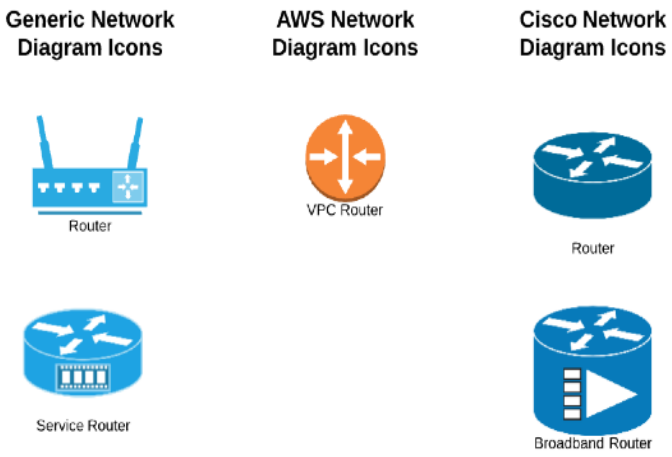
Symbols used in our Network Diagram

Symbols of Network Diagram Icons are categorized into three types: Generic Network Diagram Icons, AWS Network Diagram Icons and Cisco Network Diagram Icons. In our Network diagram, we used Cisco Network Diagram Icons to create Network Diagram. There are some icons of Generic, AWS and Cisco Network Diagram are shown below: (Network Diagram Symbols and Icons, 2021)

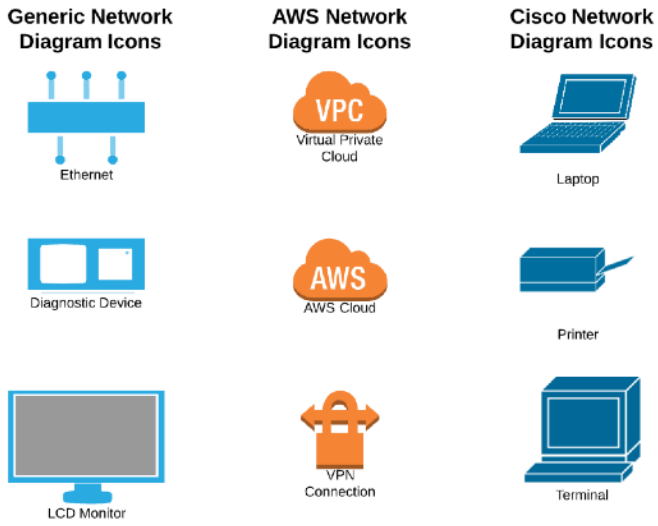
- Switch



- Router



- Connectors and Devices



Advantages of Network Diagram

There are plenty of advantages of network diagrams. Some of them are listed below:

- Network diagram make sure about entry control points, connecting to the closest physical router and switch. Speed of cable or Wi-Fi can be boosted up to allow data flow, even larger-scale operation.
- It makes it easier for future update to visualize layout of network.
- Network device is commonly used in businesses to investigate unauthorized use of network when the network cannot stay under the umbrella.
- Network devices helps to enhance businesses by reducing the spending in hardware

Network diagram and justification

Network Diagram first floor [Dragon Block] (Sandesh Subedi)

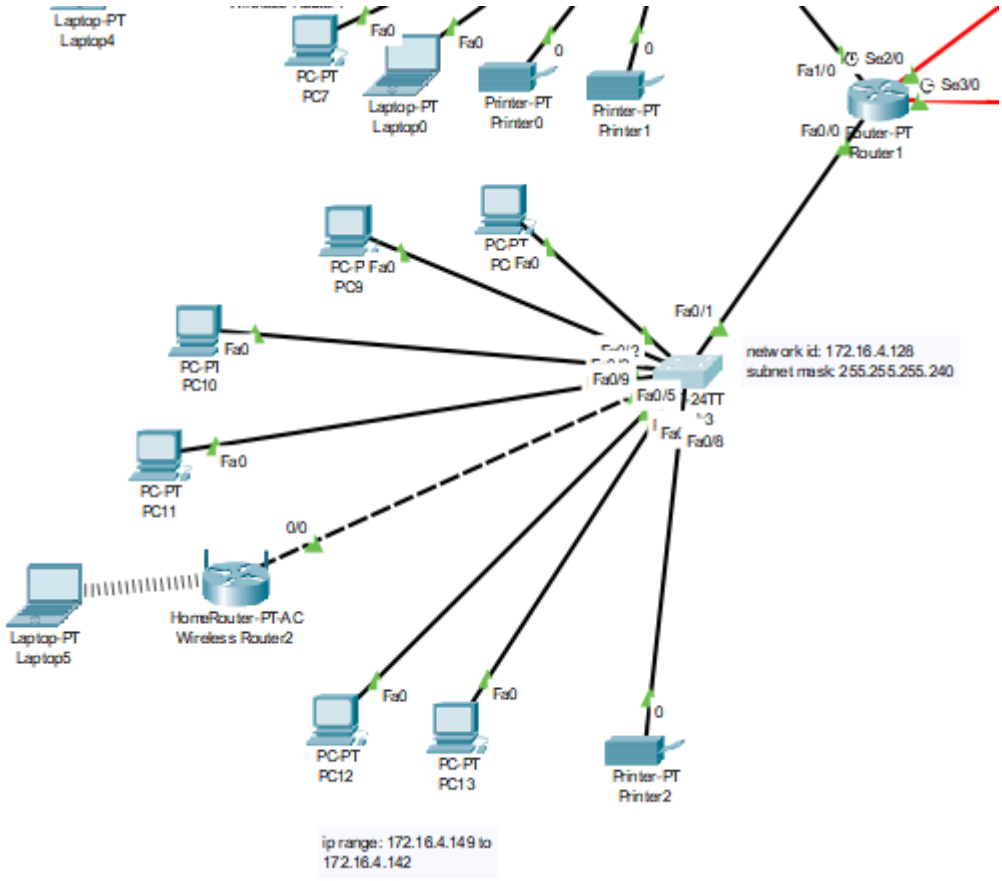


Fig: Network Diagram of Dragon Block

A network diagram is designed with proper study of floor plan. It is designed with the packet tracer application, which is also used for further configuration. The available components are studied from the floor diagram and configuration is done from the network diagram. The network diagram includes routers, cables, and other devices. The network design of first floor (Dragon-block) includes total of 6 personal computers (two in reception and rest in administration room). There is a printer in the reception while a wireless router is also designed for the cafeteria. A switch named 'Switch 3' is present which connects all these devices. Furthermore, the switch is connected to a router called 'Router 1'.

Network Diagram second floor [Dragon block] (Suraj Pandey)

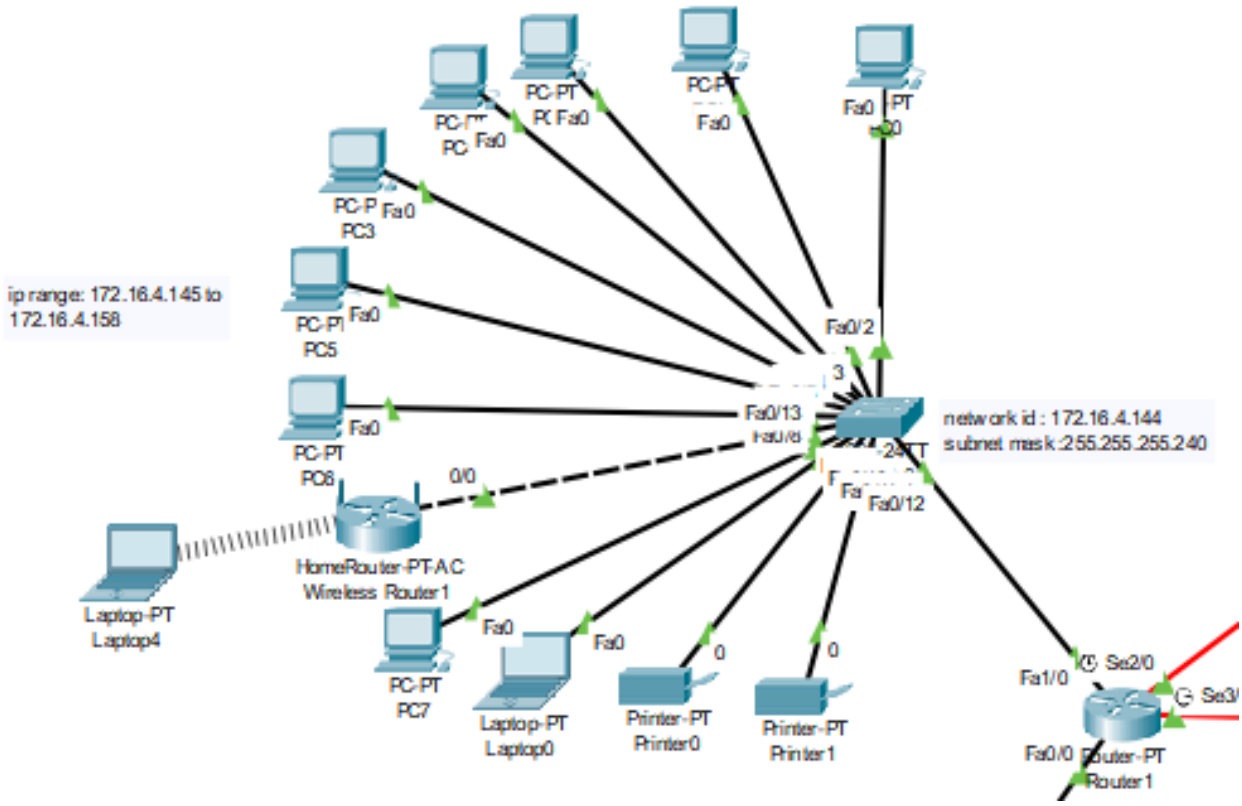


Fig: Network diagram of Dragon Block second floor.

Floor plan of the building helps us in designing network diagram . Network diagram can be designed using various tools . As we need to carry out network configuration using packet tracer so the network diagram for the given project is designed in packet tracer. After reading floor plan we are able to identify the number of devices that we need to include in network diagram. According to the diagram there are total of eleven devices available on the floor which includes seven personal computers , two laptops and two printers. Similarly, there is a wireless router used as wifi containing username and password. All the devices are connected to a single switch named switch 2 which is further connected to the router named router 1. The wire that are used in connections is crossover cable.

Network Diagram first floor [python block] (Nabin Chhetri)

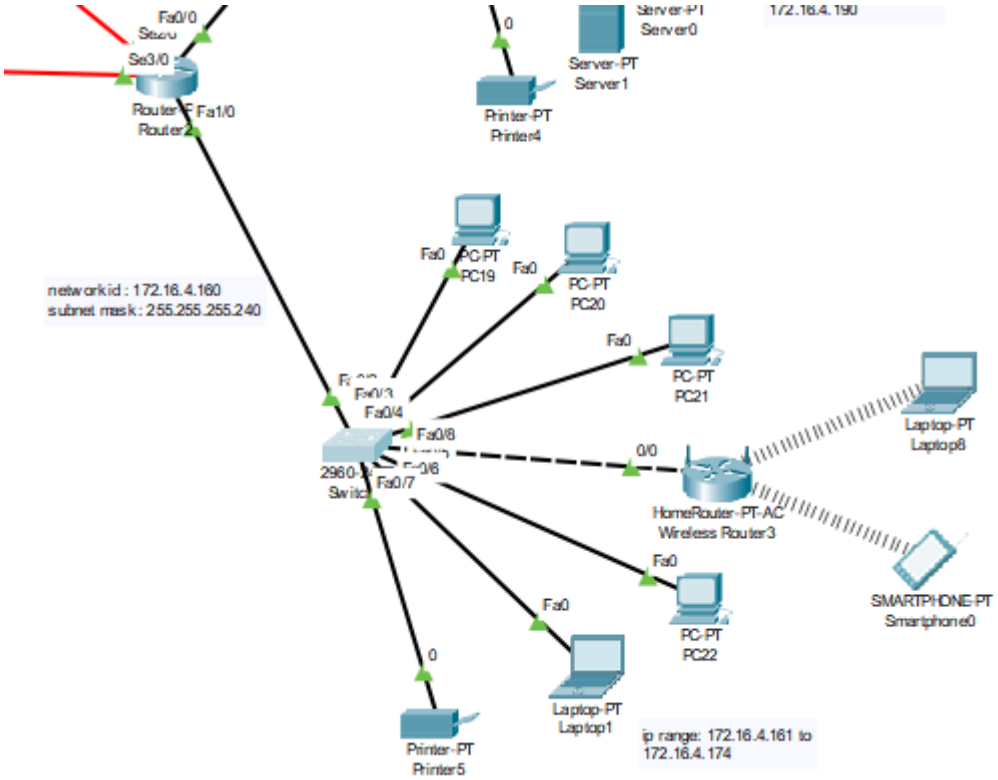


Fig: Network Diagram of Python block

A network diagram is designed with proper study of floor plan. It is designed with the packet tracer application, which is also used for further configuration. The available components are studied from the floor diagram and configuration is done from the network diagram. The network diagram

includes routers, cables, and other devices. The network design of first floor (Python-block) includes total of four personal computers (technical room consist two and each meeting room and library consist one personal computer). There is a printer in the library while a wireless router is also designed for the meeting room. A switch named ‘Switch 5’ is present which connects all these devices. Furthermore, the switch is connected to a router called ‘router 2’.

Network Diagram second floor [python block] Sandesh Giri)

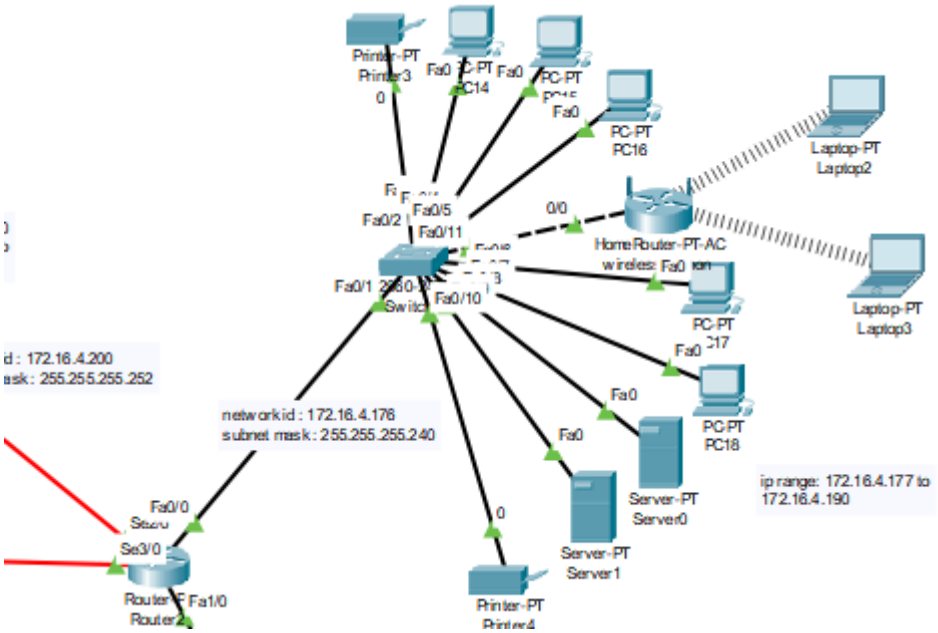


Fig: Network Diagram of Python Block Second Floor

The network diagram of this floor consist of personal computers, printers, servers and CCTV cameras. The forensic lab consists of 4 personal computers. Additionally, it also has two printers and a wireless router. Similarly, the server section has one personal computer, two servers, a CCTV and wireless internet.

Ip(Internet Protocol) configuration and justification

IP address is assigned to each device which are connected to the internet . This allows user to send and receive packets in the internet.

We need to provide ip address to each of the host present in the diagram but each ip address must be unique. After subnetting and using VLSM, we have divided the separate network for each of the floor. Through that network we are able to allocate the unique ip address for each of the host present in the diagram and assign manually, which is the challenging part. Different host are configured differently. We need to provide ip address, subnet mask and gateway to each of the host while doing configuration. Separate steps are followed to configure the router. Without configuring the router we are unable to sent packet from one network to another . Small error can leads towards the failure.

The steps involved while configuring Pc and laptops are as follows:

1. Step 1: First of all ,we need to create a topology with pc and router.
2. Step 2 : click the pc as soon as you click the pc a form like table appears on the screen with the desktop option along with other options at the top of the table. .
3. Step 3 : click the “Desktop” option .
4. Step 4 : And click the Ip configuration option appeared after clicking desktop option.
5. Step 5: as soon as you click Ip configuration option there appear a form with ip address, subnet mask , default gateway along with other option which are not necessary while configuring ip address.
6. Step 6 : assign the ip address for the device with the available ip address present in the network that you have allocated for that LAN.
7. Step 7: click at on button present at the to right corner of the frame which enable ip address, gateway and subnet mask for that host.

Along with ip address you need to enter subnet mask as well as default gate way . Subnet mask determine the number of available ip address in the network while default gateway helps you to send or receive packet with other network. If the gateway is not set then you will be unable to sent packet to another network.

IP configuration of First floor (Dragon Block) [Sandesh Subedi]

There are seven host present on the first floor of Dragon block. So we need to provide seven ip address to the host and one for gateway that is ip for fastethernet port .As switch of first floor is connected to the router through fastethernet0/0, we need to allocate one ip address to it, which is also the default gateway to other host connected to the switch of the same network. The network provided to the first floor LAN is 172.16.4.128/28 . So, the available IP address for that ranges from 172.16.4.129 to 172.16.4.142. Although, there are 16 ip address in this network two ip address are separated for network ID and broadcast ID each.n so the total available ip address for host are 14. So, the IP address assigned to each of the host of the first floor are as follows:

Default gateway :

The default gateway is the gateway ip address of the network through which packets are sent. If the ip address is not assigned to the default gateway then we cannot send packets from that network to other network. The default gateway for all the network are sets through router . Default gateway of first floor of dragon block is 172.16.4.129.

1. PC8 IP configuration :

Ip address : 172.16.4.130

Default gateway : 172.16.4.129

Subnet mask : 255.255.0.0

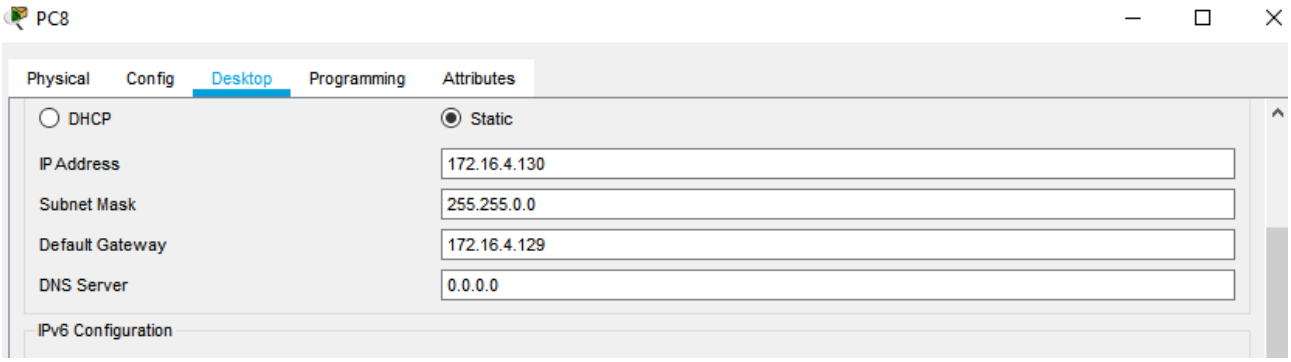


Fig : PC8 IP configuration

2. PC9 IP configuration

Ip address : 172.16.4.131

Default gateway : 172.16.4.161

Subnet mask : 255.255.0.0

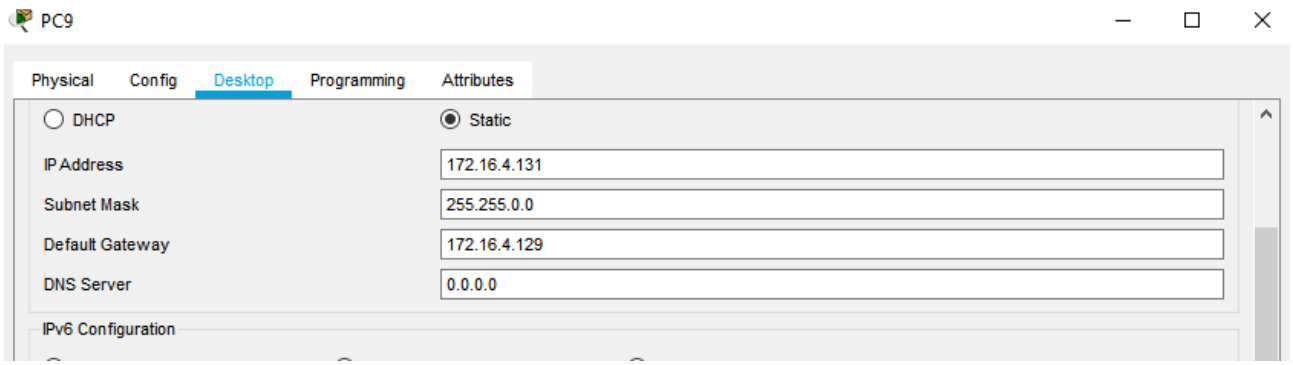


Fig : PC9 IP configuration

3. PC10 IP configuration

Ip address : 172.16.4.133

Default gateway : 172.16.4.129

Subnet mask : 255.255.0.0

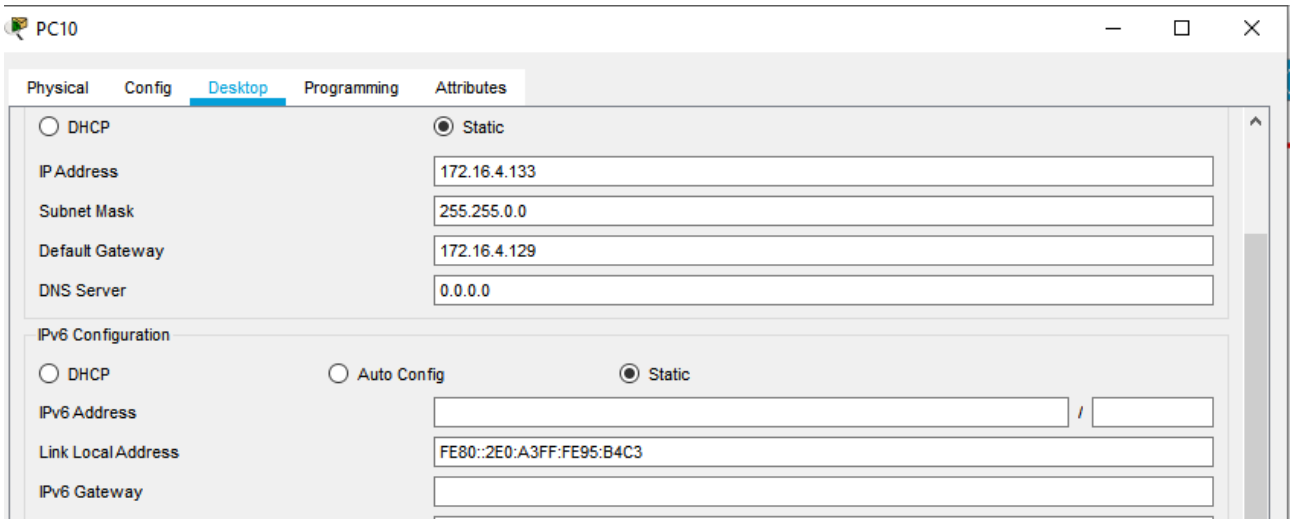


Fig : PC10 IP configuration

4. PC11 IP configuration

Ip address : 172.16.4.134

Default gateway : 172.16.4.129

Subnet mask : 255.255.0.0

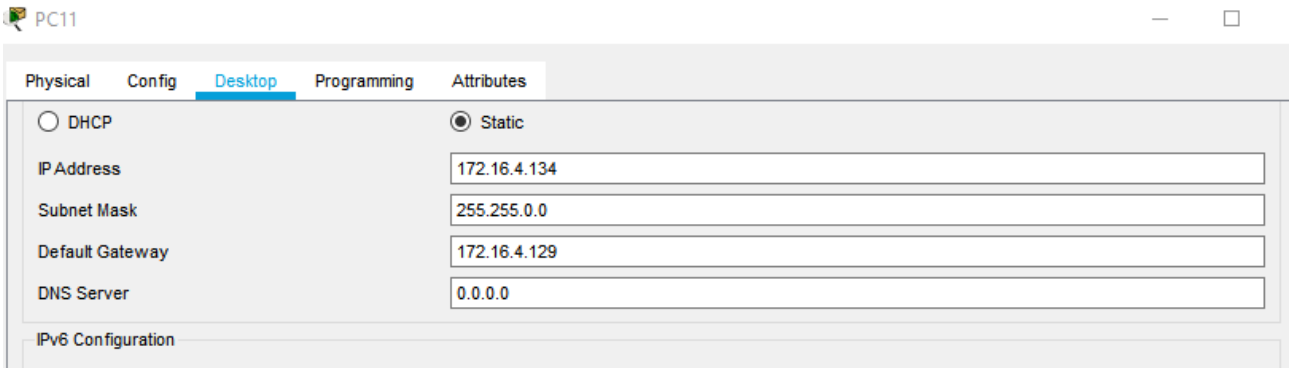


Fig : PC11 IP configuration

5. PC12 IP configuration

Ip address : 172.16.4.135

Default gateway : 172.16.4.129

Subnet mask : 255.255.0.0

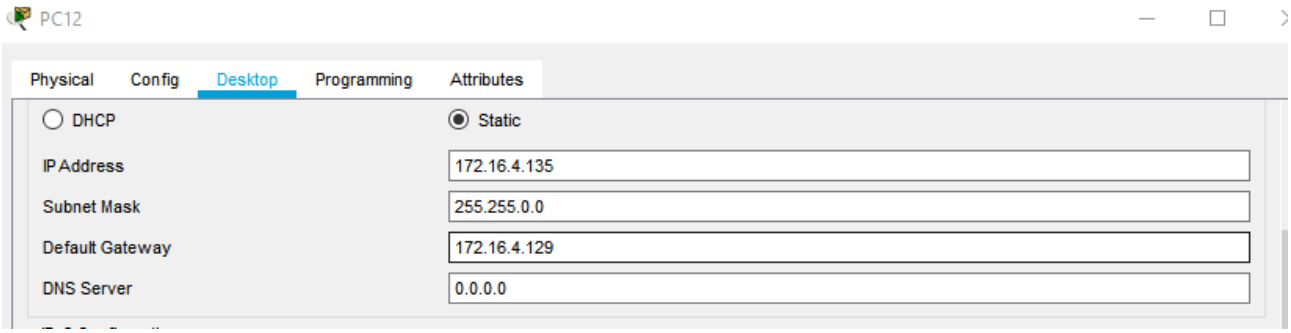


Fig : PC12 IP configuration

6. Printer 1 IP configuration

Ip address : 172.16.4.137

Default gateway : 172.16.4.129

Subnet mask : 255.255.0.0

7. PC13 IP configuration:

Ip address : 172.16.4.136

Default gateway : 172.16.4.129

Subnet mask : 255.255.0.0

Rest of the IP addresses from 172.16.4.136

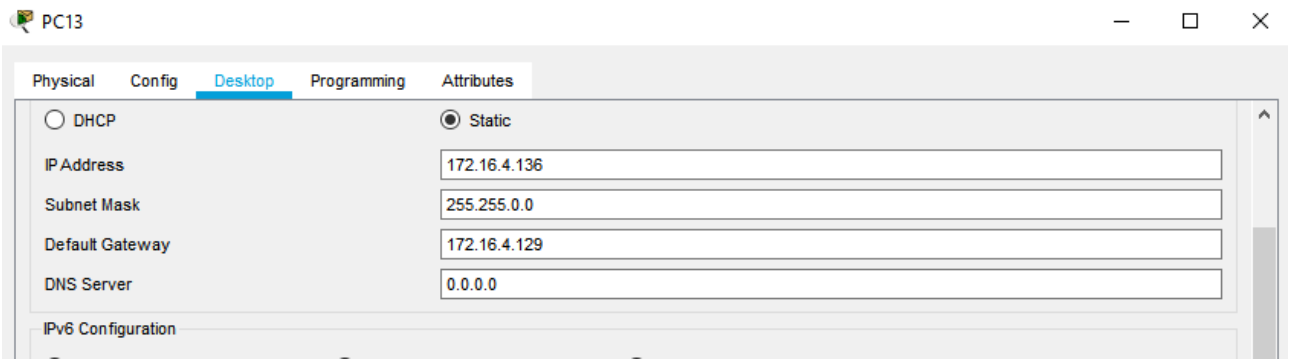


Fig: PC13 IP configuration

8. Wireless router 2 ip configuration:

Ip address: 172.16.4.138

Gateway:172.16.4.129

Subnet mask: 255.255.255

Username: dragon2

Password:0987654321

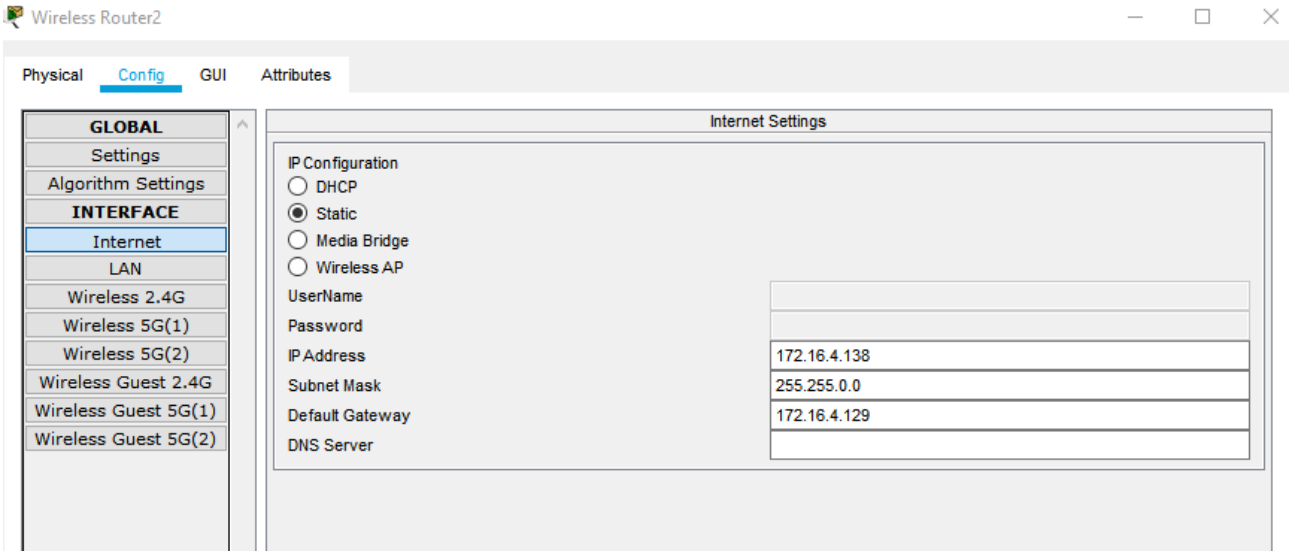


Fig: configuration of wireless router 2

Ip configuration of second floor dragon block [Suraj Pandey]

The total host present in second floor of Dragon block are eleven. Since, separate switch is allocated for this floor the network id is different than that of first floor.so, the network id of this LAN is 172.16.4.144 Although there are eleven host present in this floor but the required ip address are twelve as the network needs separate Ip address for default gateway for the hosts of that network is 172.16.4.145.

1. Pc0 IP configuration:

Ip address : 172.16.4.146

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

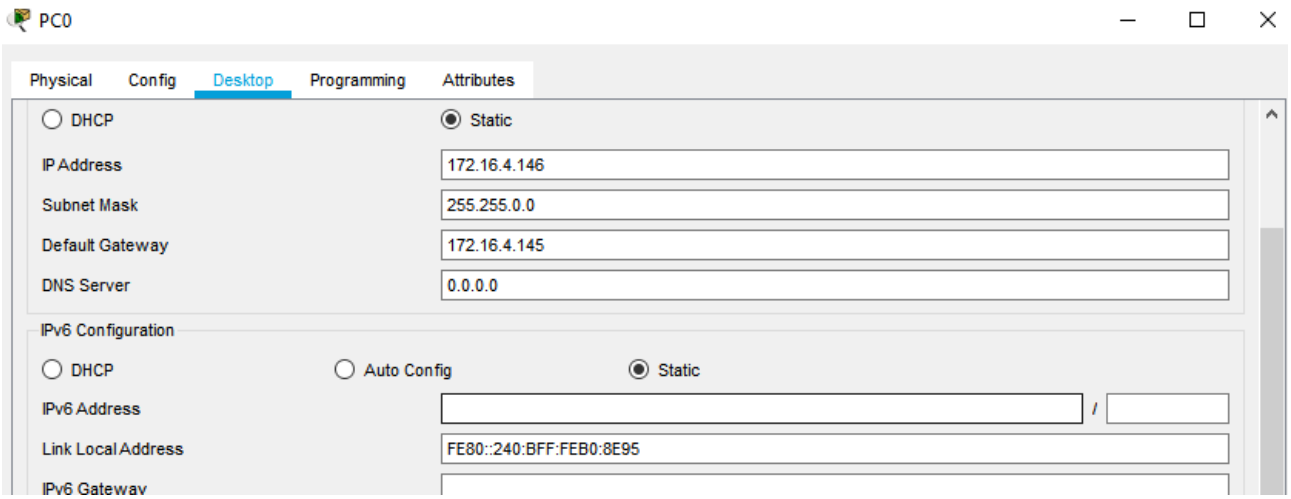


Fig: PC0 IP configuration

2. Pc1 IP configuration :

Ip address : 172.16.4.147

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

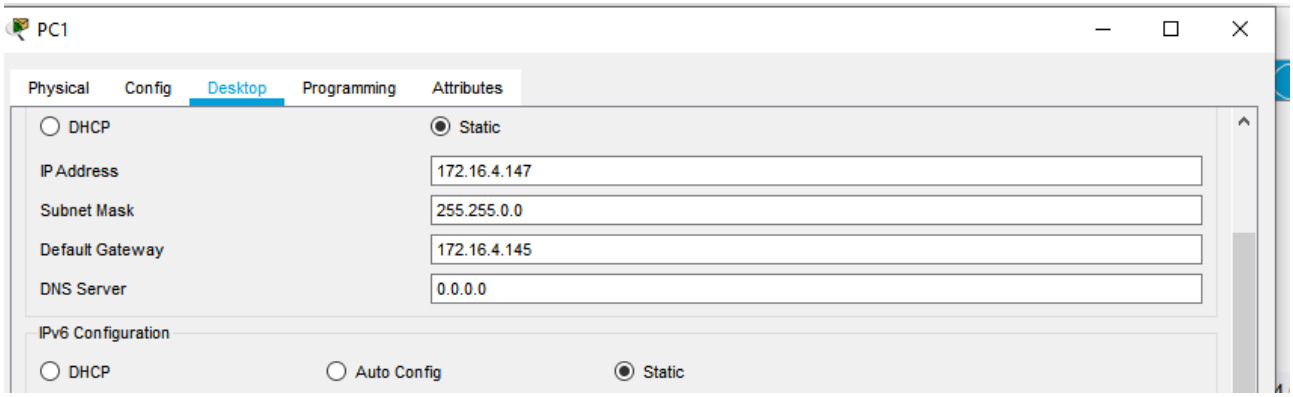


Fig: PC1 IP configuration

3. Pc2 IP configuration :

Ip address : 172.16.4.148

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

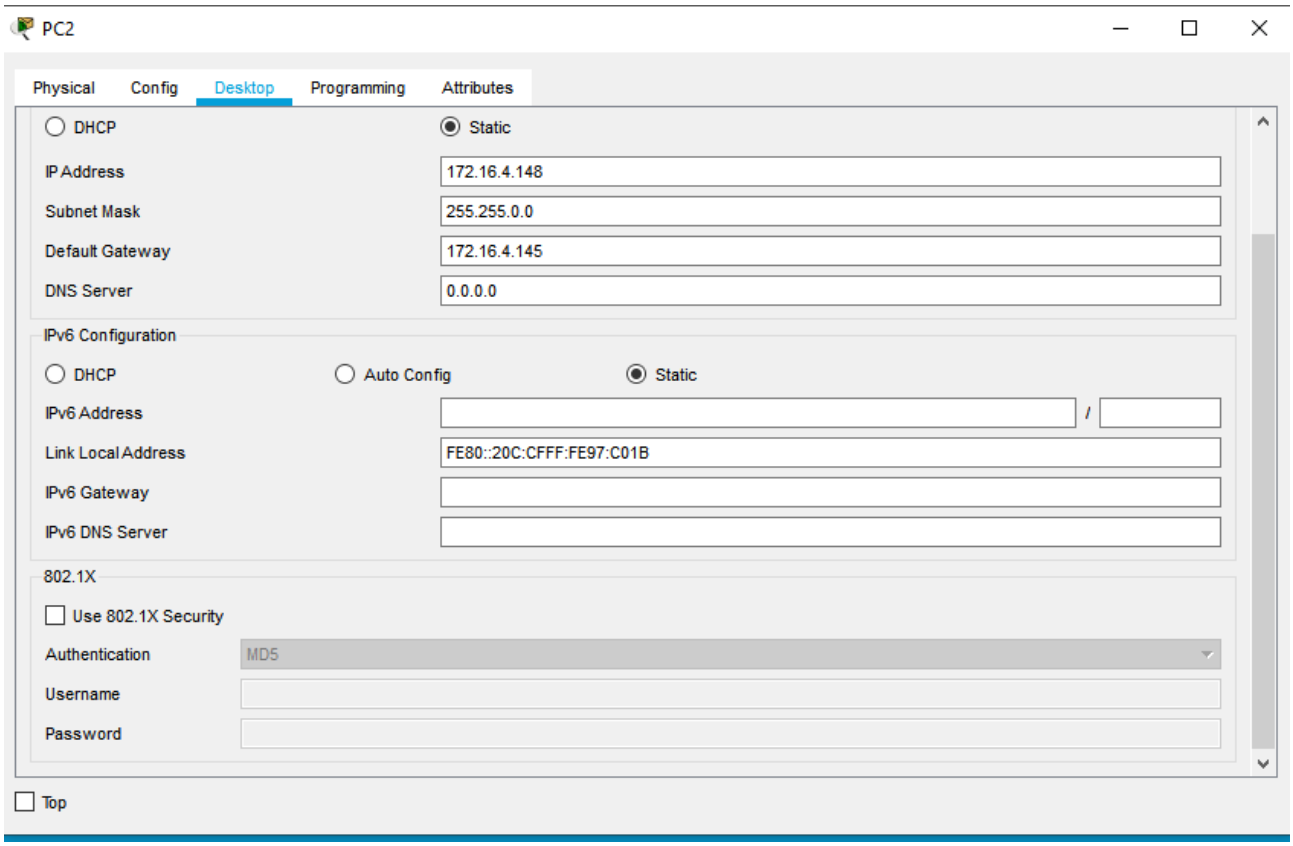


Fig : pc2 IP configuration

4. Pc3 IP configuration :

Ip address : 172.16.4.150

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

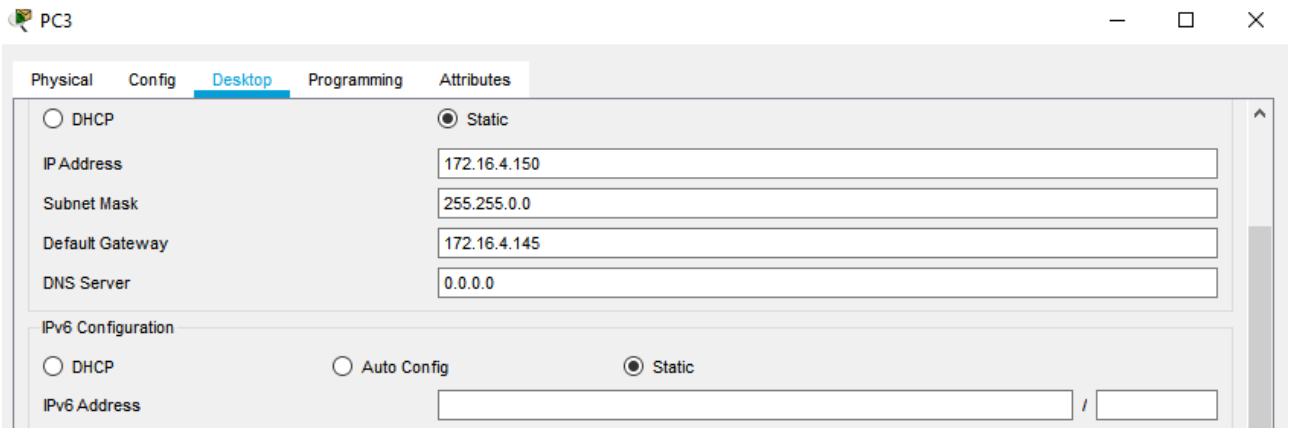


Fig: PC3 IP configuration

5. Pc4 IP configuration :

Ip address : 172.16.4.149

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

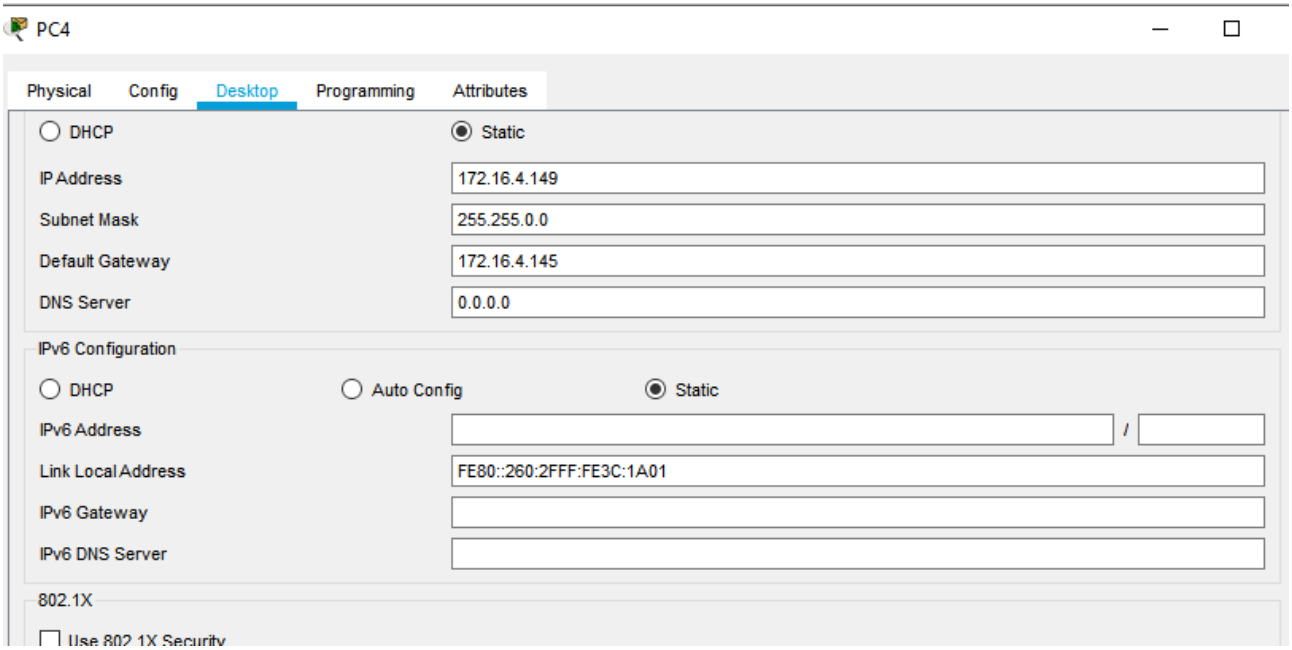


Fig: PC4 configuration

6. Pc5 IP configuration :

Ip address : 172.16.4.151

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

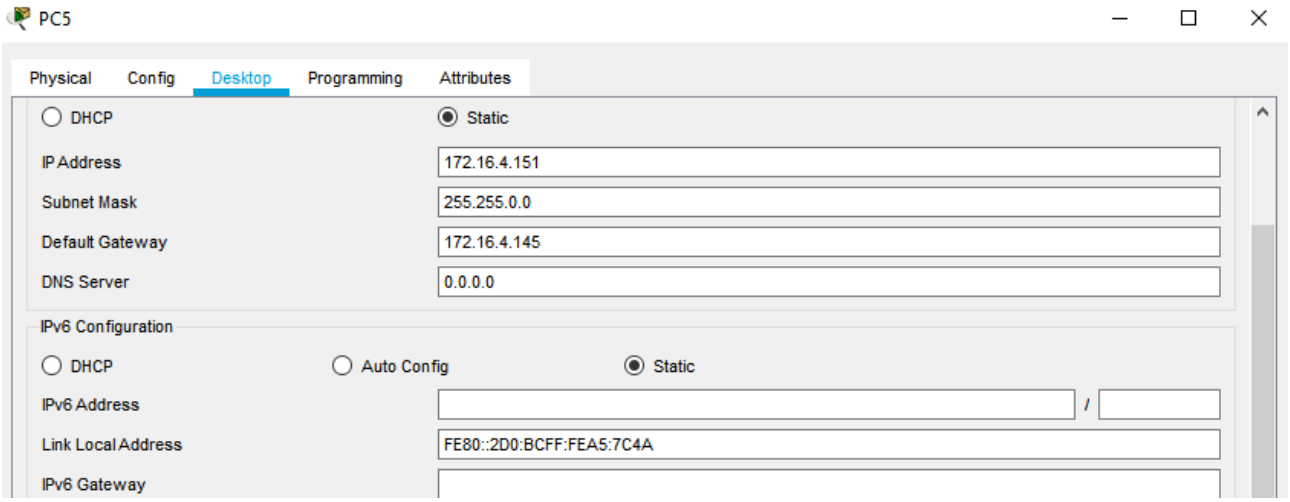


Fig : PC5 IP configuration

7. Pc6 IP configuration :

Ip address : 172.16.4.152

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

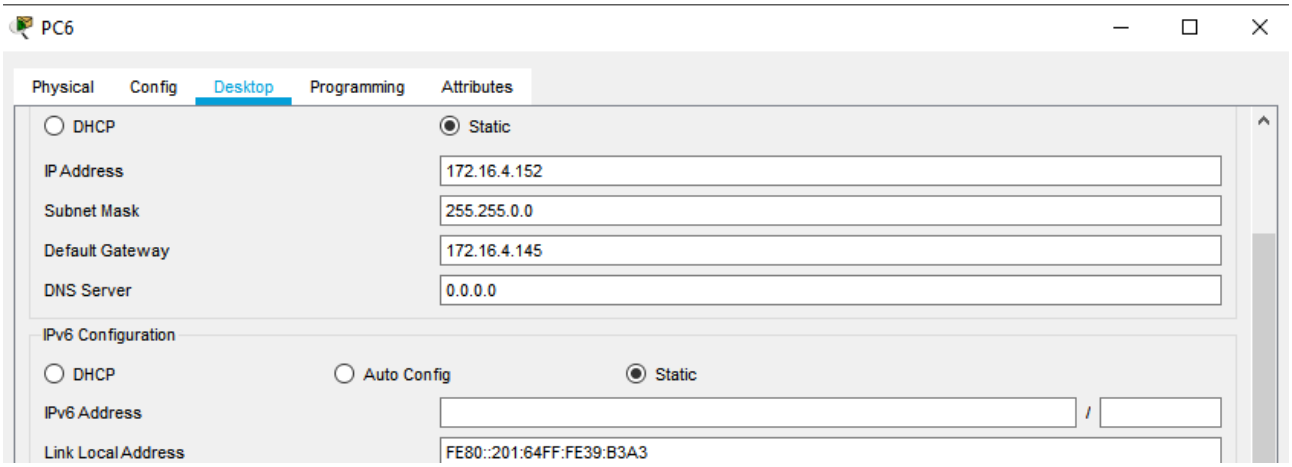


Fig : pc6 IP configuration

8. Pc7 IP configuration :

Ip address : 172.16.4.153

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

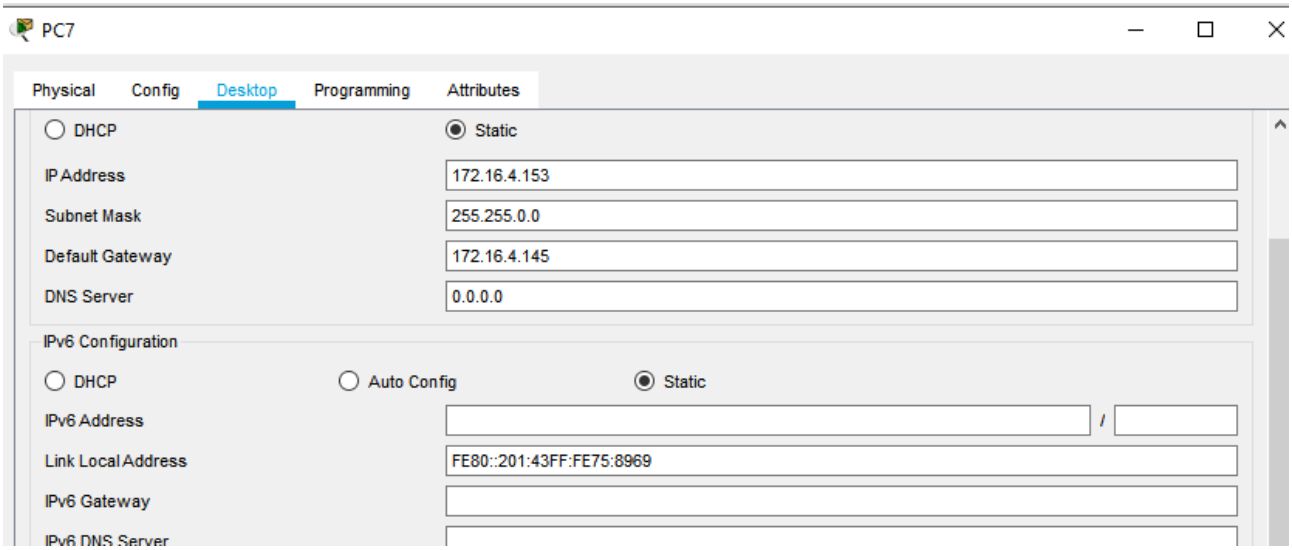


Fig: PC7 IP configuration

9. Laptop0 IP configuration :

Ip address : 172.16.4.154

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

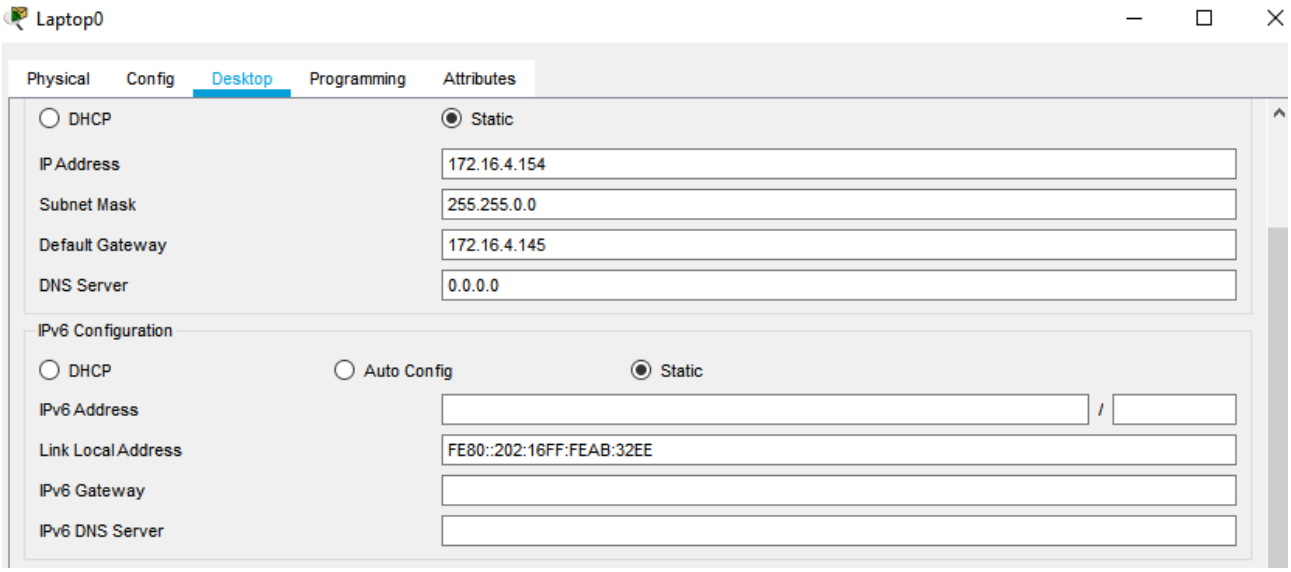


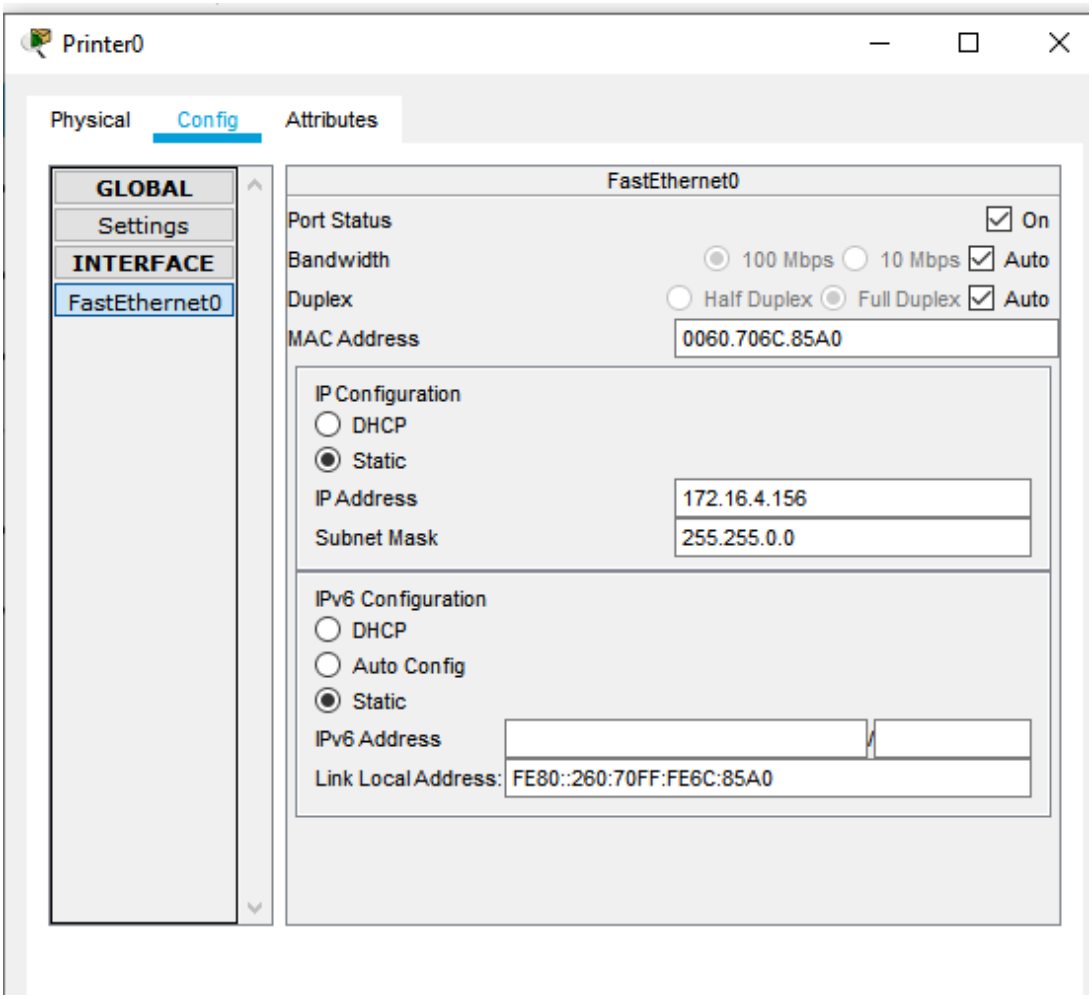
Fig : Laptop0 IP configuration

10. Printer0 IP configuration :

Ip address : 172.16.4.156

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0



11. Printer1 IP configuration :

Ip address : 172.16.4.157

Default gateway : 172.16.4.145

Subnet mask : 255.255.0.0

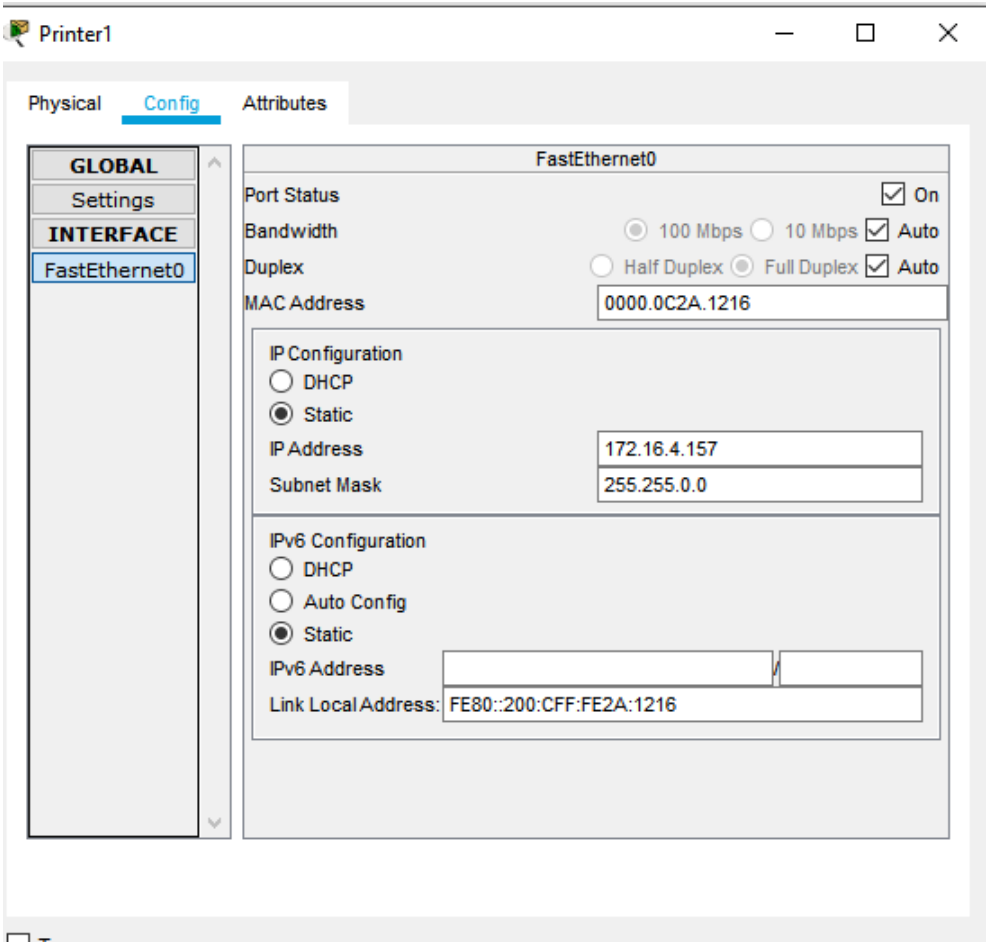


Fig: printer1 IP configuration

12. Wireless router 1 ip configuration:

Ip address : 172.16.4.155

Default gateway: 172.16.4.145

Subnet mask: 255.255.0.0

Username: dragon2

Password:1234567891

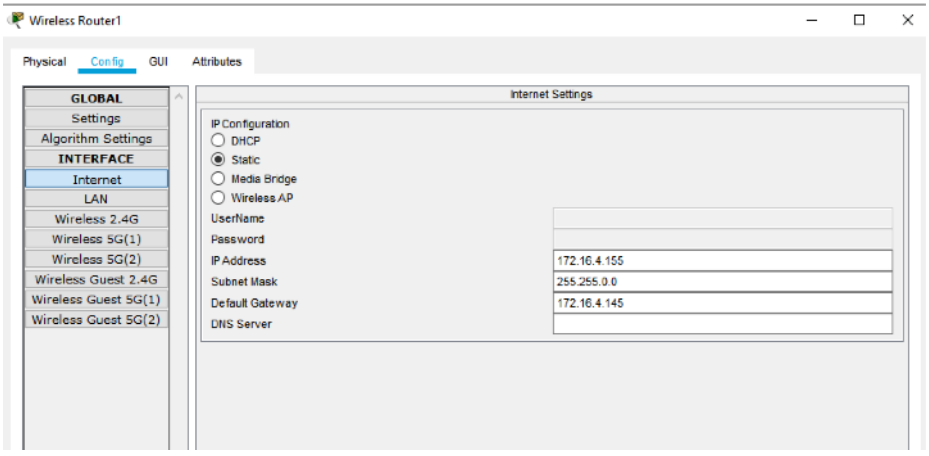


Fig: Wireless router 1 ip configuration

Ip address configuration in router1 [dragon block]

Router 1 that is the router of dragon block is connected with two WAN and two LAN. The WAN interface are serial2/0 and serial3/0 where as interface that are connected to LAN are fastEthernet 1/0 and fastEthernet0/0. The ip address assigned to LAN interface is the gateway ip for the devices within the network. Similarly, the ip address assigned to WAN interface.the ip configuration of each of the interface of router1 is shown below:

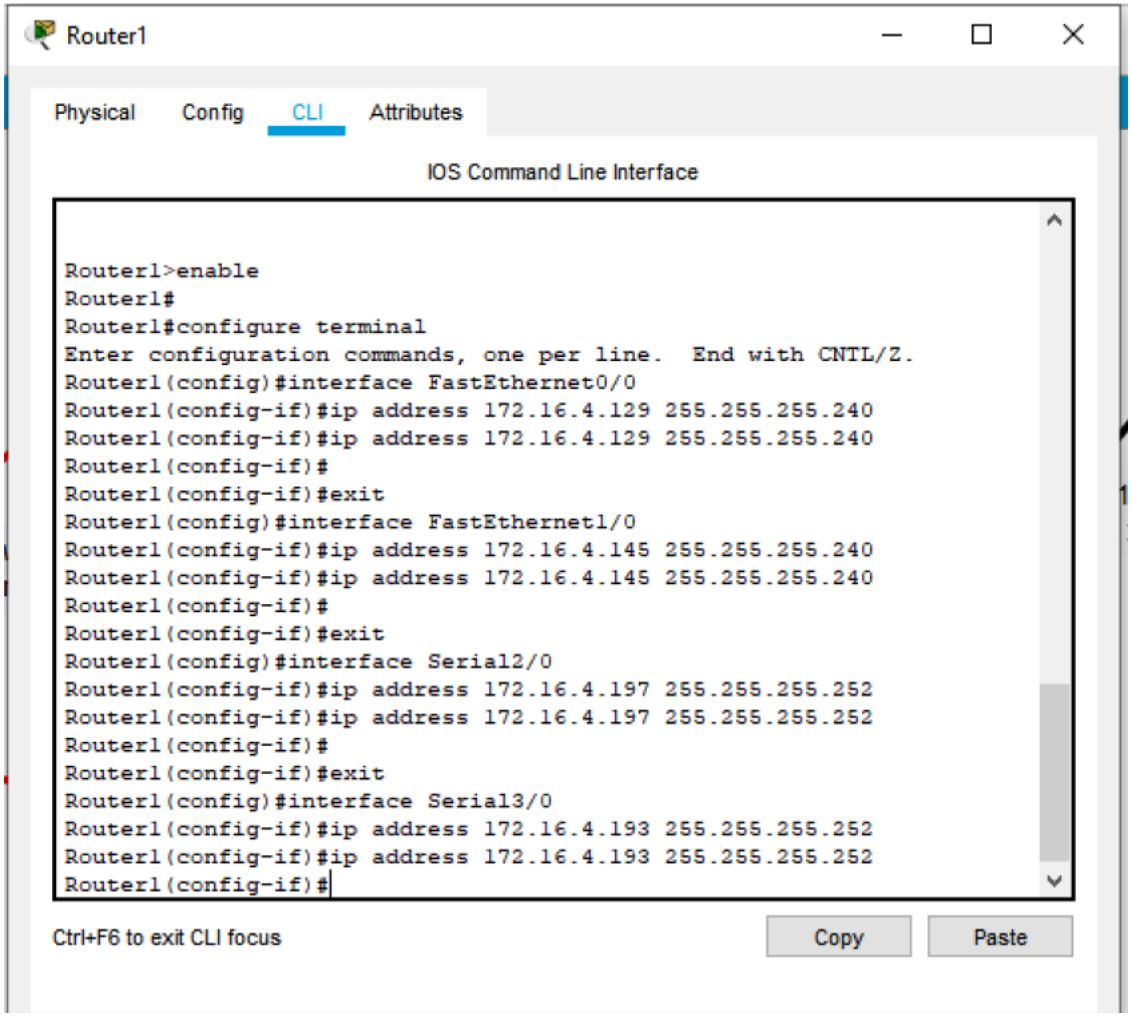


Fig: IP address configuration of router 1.

IP configuration of first floor ,Python block [Nabin Chhetri]

There are 6 end devices on first floor of python block. So, the required number of IP address for that floor is seven. Since we need to provide separate ip for default gateway. Ip given to the interface port of the router through which the entire network is connected.the network id provided to this network is 172.16.4.160 that means the default getaway for this network is 172.16.4.161.This default gateway ip address must be assigned to each and every host present on this network. The ip configuration of each of the device of this network is:

1. **Pc19 IP configuration :**

Ip address :172.16.4.162

Default gateway :172.16.4.161

Subnet mask :255.255.0.0

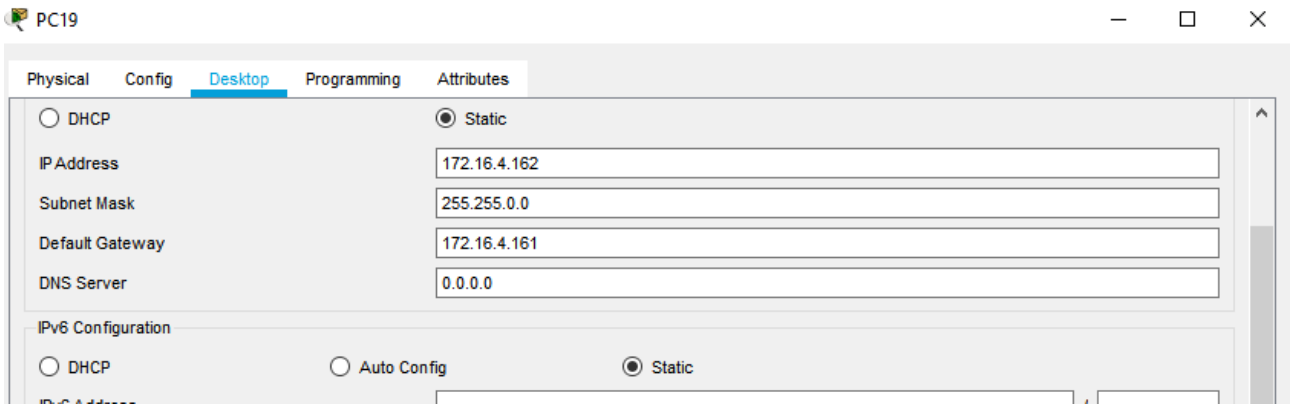


Fig: Pc19 IP configuration

2. **Pc20 IP configuration :**

Ip address :172.16.4.163

Default gateway :172.16.4.161

Subnet mask :255.255.0.0

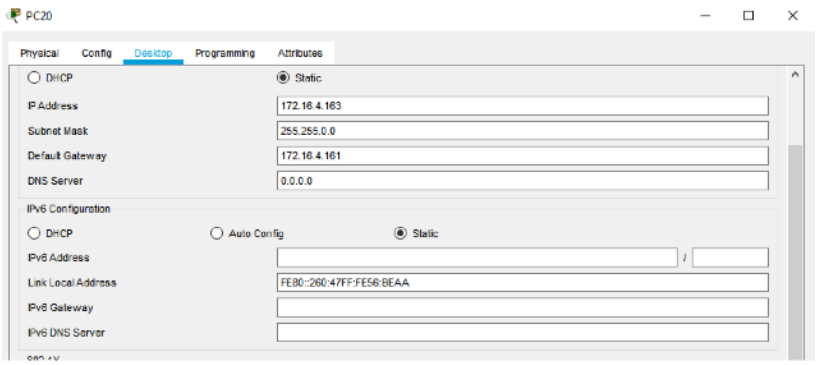


Fig: PC20 IP configuration

3. **Pc21 IP configuration :**

Ip address :172.16.4.164

Default gateway :172.16.4.161

Subnet mask :255.255.0.0

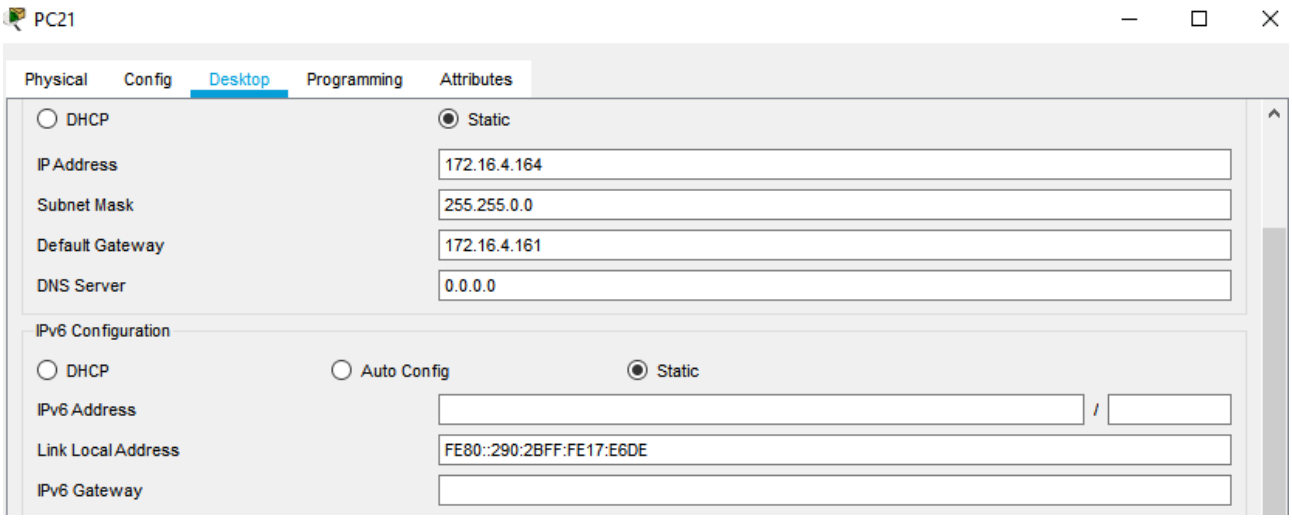


fIG: PC21 IP configuration

4. **Pc22 IP configuration :**

Ip address :172.16.4.165

Default gateway :172.16.4.161

Subnet mask :255.255.0.0

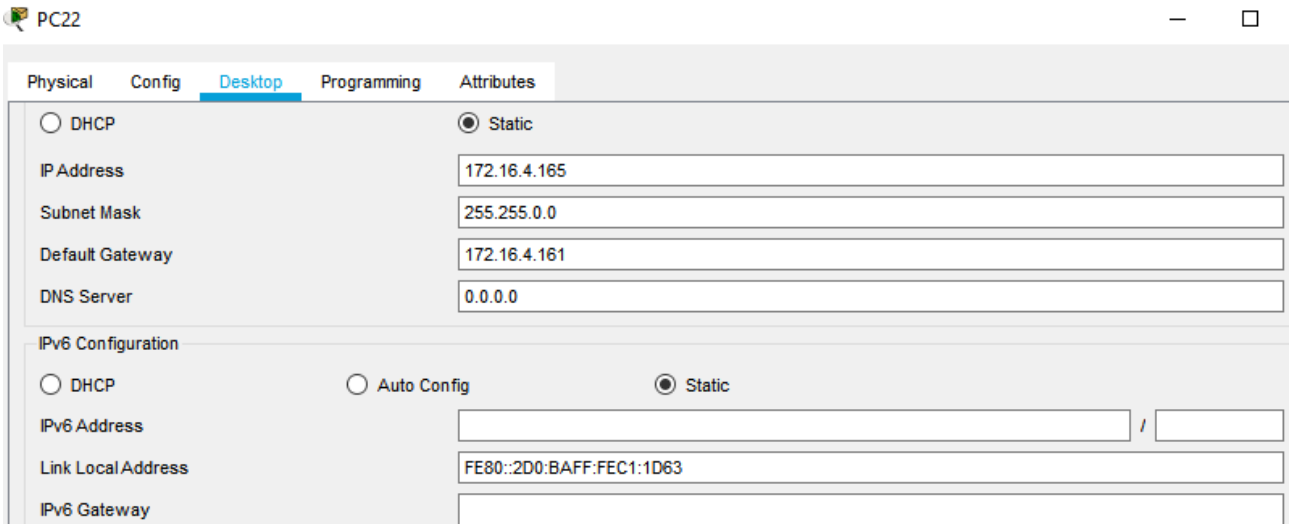


Fig: PC 22 IP configuration

5. **Laptop1 IP configuration :**

Ip address :172.16.4.166

Default gateway :172.16.4.161

Subnet mask :255.255.0.0

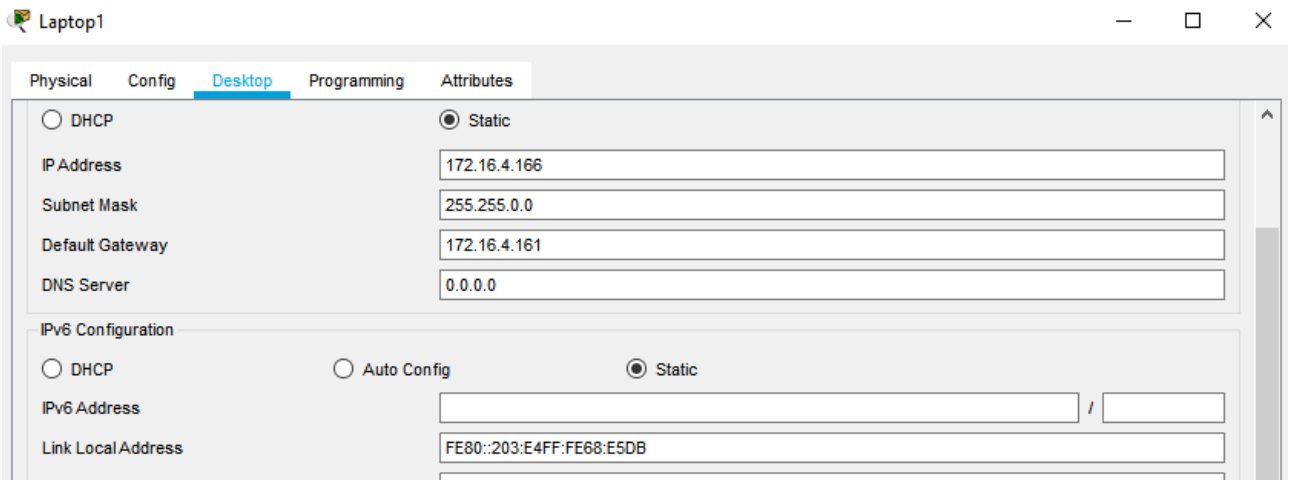


Fig: Laptop1 IP configuration

6. **Printer5 configuration :**

Ip address :172.16.4.167

Default gateway :172.16.4.161

Subnet mask :255.255.0.0

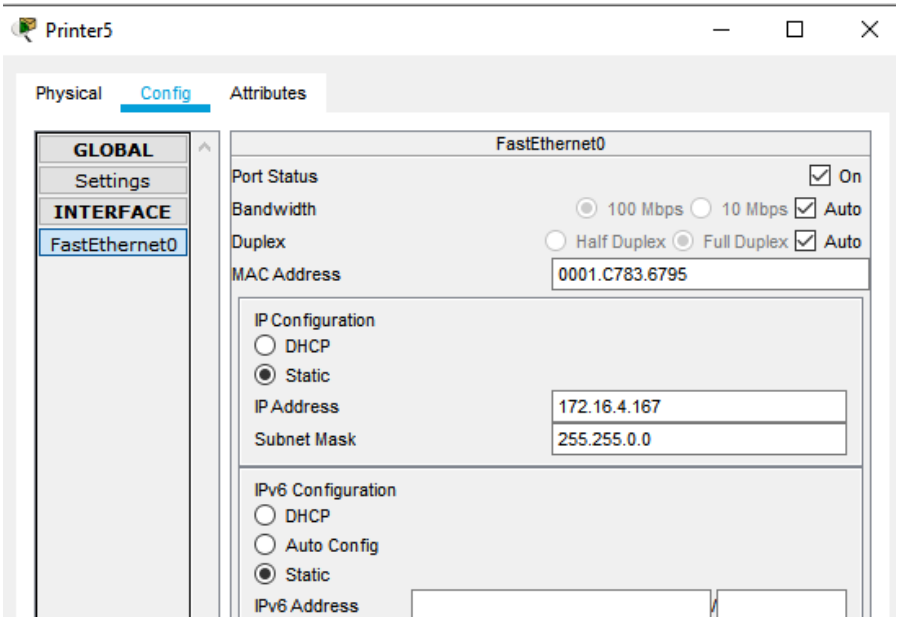


Fig:Printer5 configuration

7. Wireless router 3 ip configuration:

Ip address : 172.16.4.168

Default gateway: 172.16.4.161

Subnet mask: 255.255.0.0

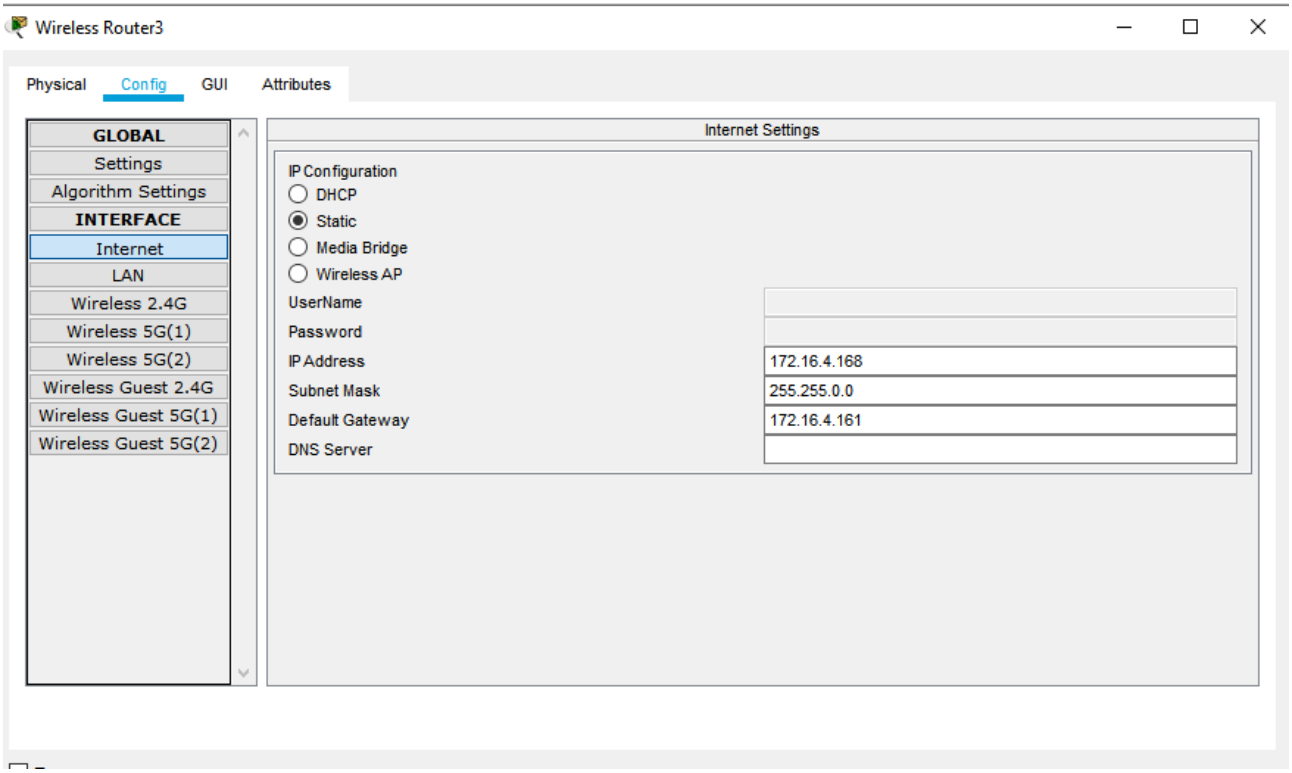


Fig: Wireless router IP configuration

IP configuration of second floor, python block [Sandesh Giri]

Similar to that of first floor separate ip address as network id is assigned to this floor too. As, server room is present on this floor we need to provide ip address for them too. The network id assigned to this LAN is 172.16.4.176. The IP address available in this network are 16 among them 14 are available for host. The requirement of this floor is nine as nine host are present so separate ip is assigned to each of the host along with default gateway and subnet mask. The default gateway of this network is 172.16.4.177 through which devices can share packets with the device of other network.

IP address configuration for each of the host are :

1. Pc14 ip configuration:

IP address: 172.16.4.179

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

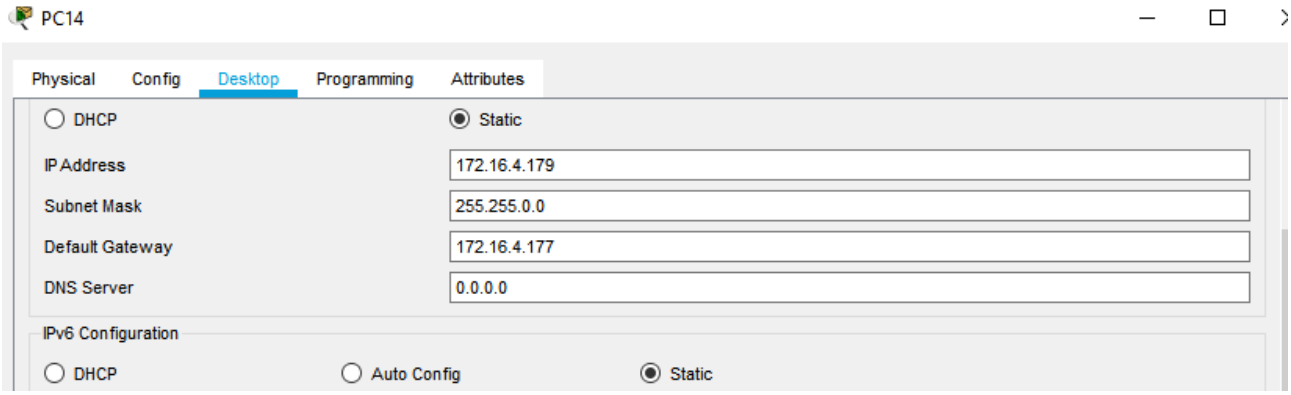


Fig: PC14 IP configuration

2. Pc15 ip configuration:

IP address: 172.16.4.180

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

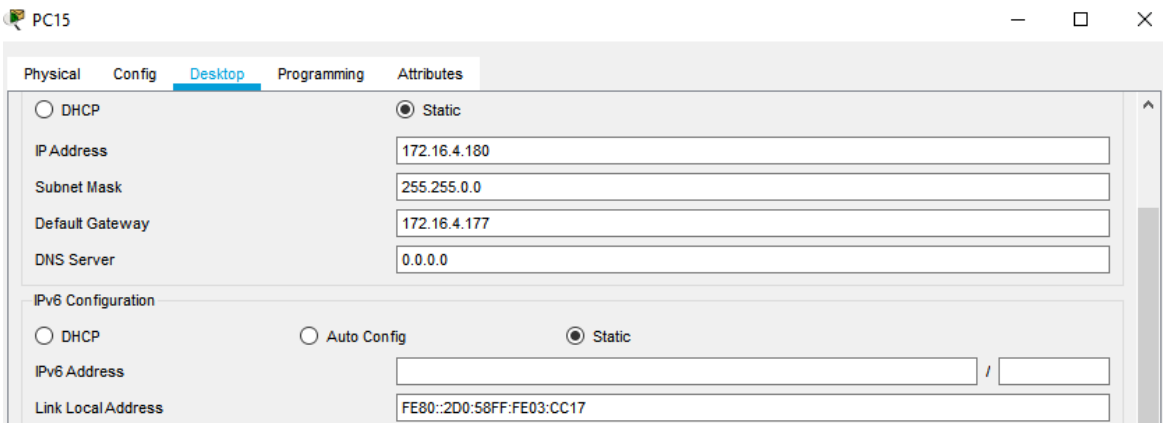


Fig : PC15 IP Configuration

3. Pc16 ip configuration:

IP address: 172.16.4.181

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

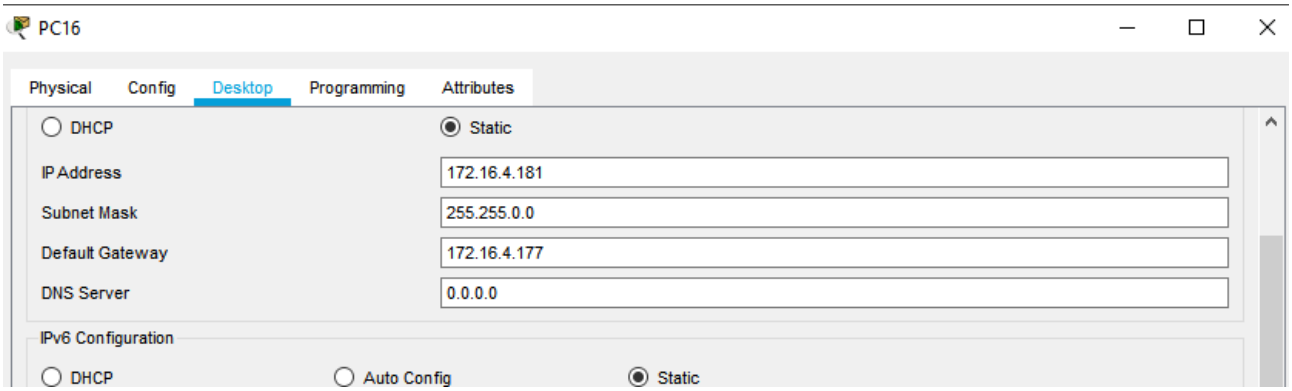


Fig: Pc16 IP configuration

4. Pc17 ip configuration:

IP address: 172.16.4.182

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

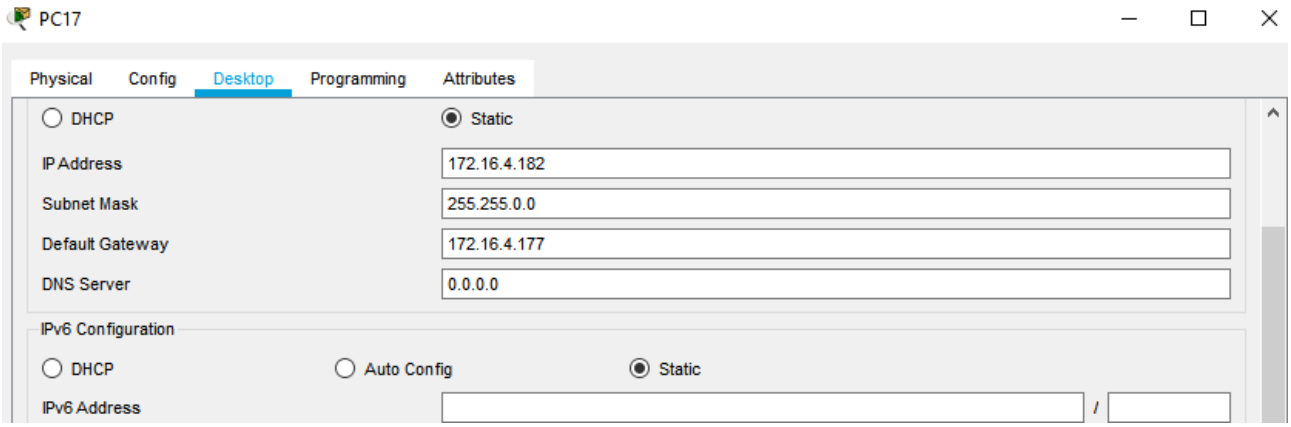


Fig: PC17 IP configuration

5. Pc18 ip configuration:

IP address: 172.16.4.183

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

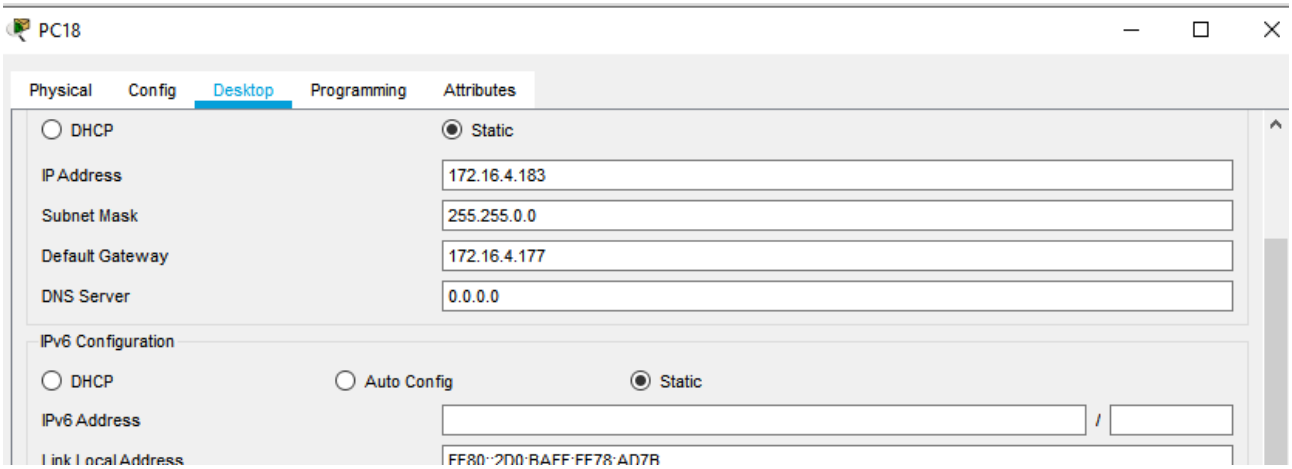


Fig: PC18 IP configuration

6. Server0 ip configuration:

IP address: 172.16.4.184

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

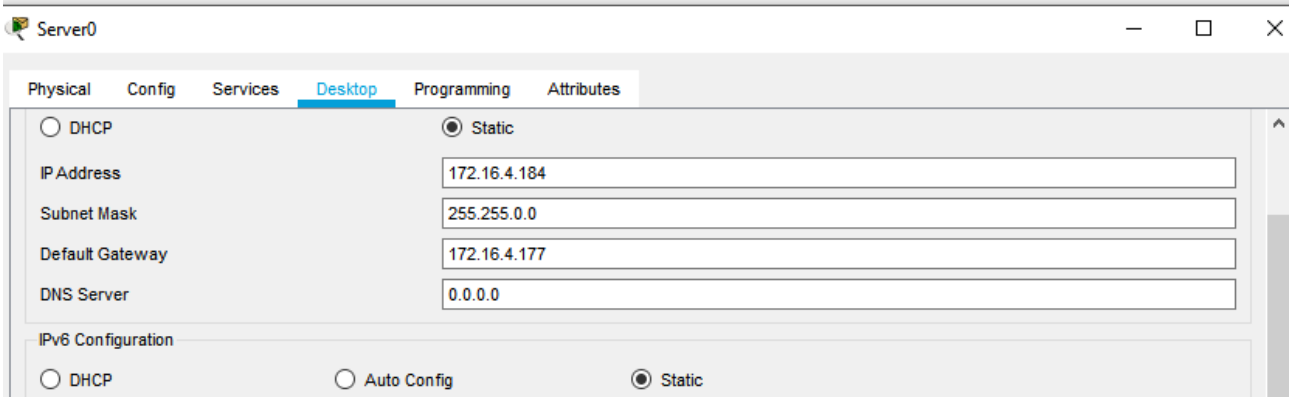


Fig: Server0 IP configuration

7. Server1 ip configuration:

IP address: 172.16.4.185

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

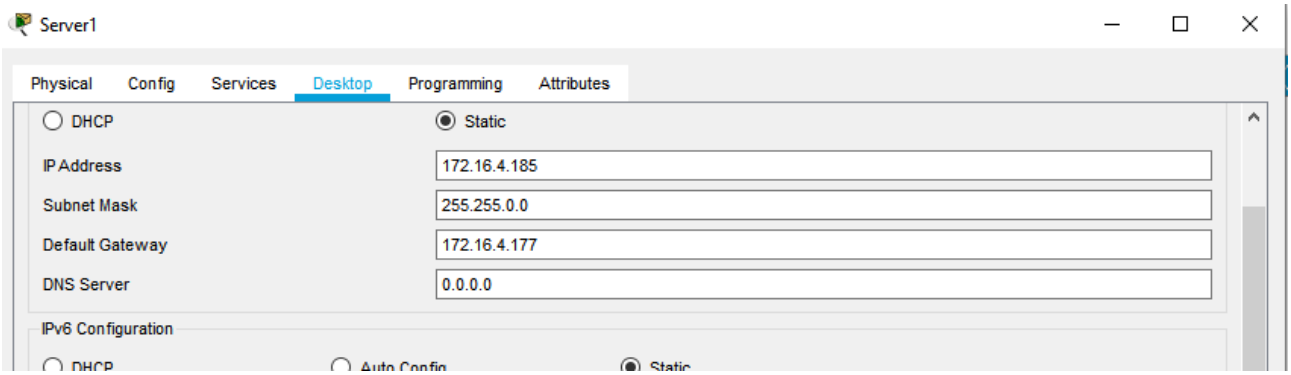


Fig: Server IP configuration

8. Printer4 ip configuration:

IP address: 172.16.4.186

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

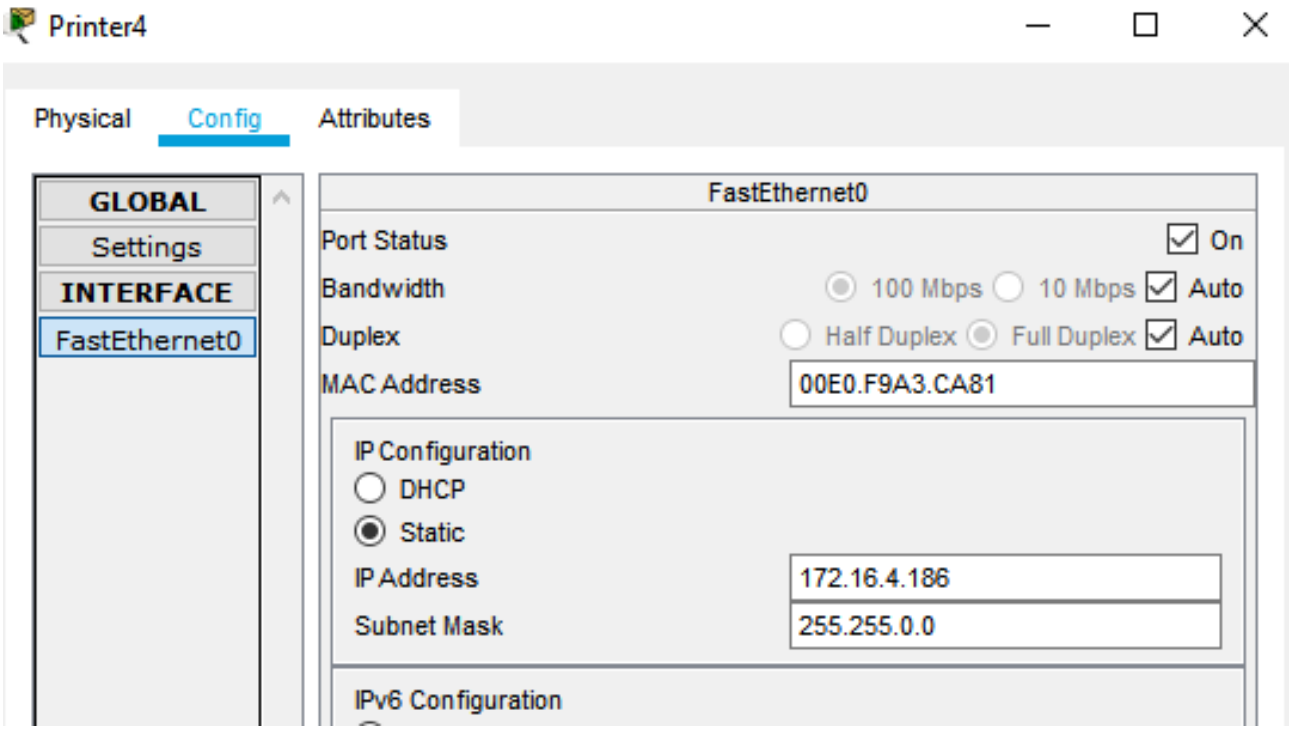


Fig: printer 4 ip configuration

9. Printer3 ip configuration:

IP address: 172.16.4.178

Default gateway: 172.16.4.177

Subnet mask: 255.255.0.0

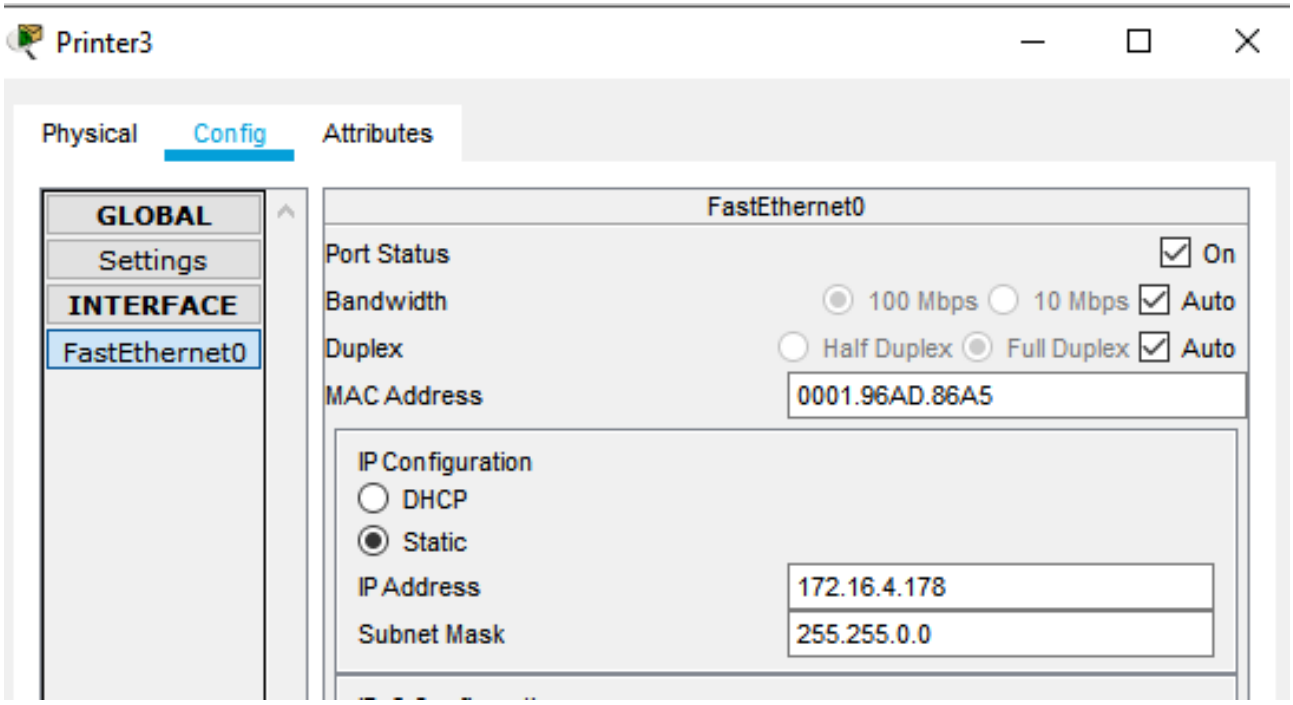


Fig: Configuration of printer3

Ip address configuration in router2: [dragon block]

Router of Block B that is dragon block is connected to router1 and router 3 through serial3/0 port and serial2/0 port respectively. Similar , the router is connected to the switch of first floor LAN and second floor LAN through FastEthernet 0/0 port and FastEthernet1/0 port respectively. The address provided to the FastEthernet port of the LAN is consider as gateway address of respective network.

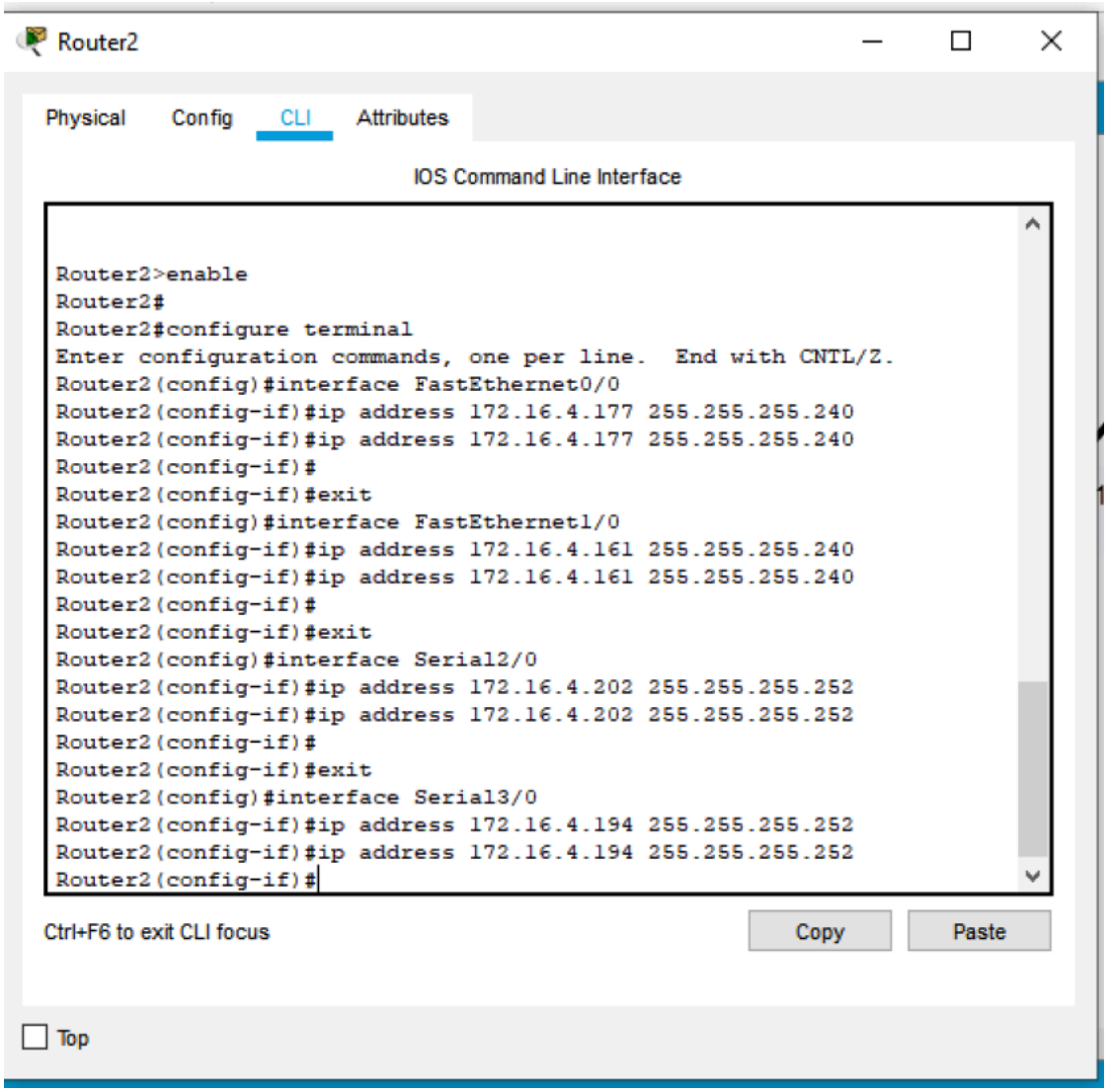


Fig: IP address configuration of router 2

IP address configuration in router 3 [headquarter]

There are three network that are connected with the router 3 which are listed below:

Network : 172.16.4.1

Network:172.16.4.198

Network:172.16.4.201

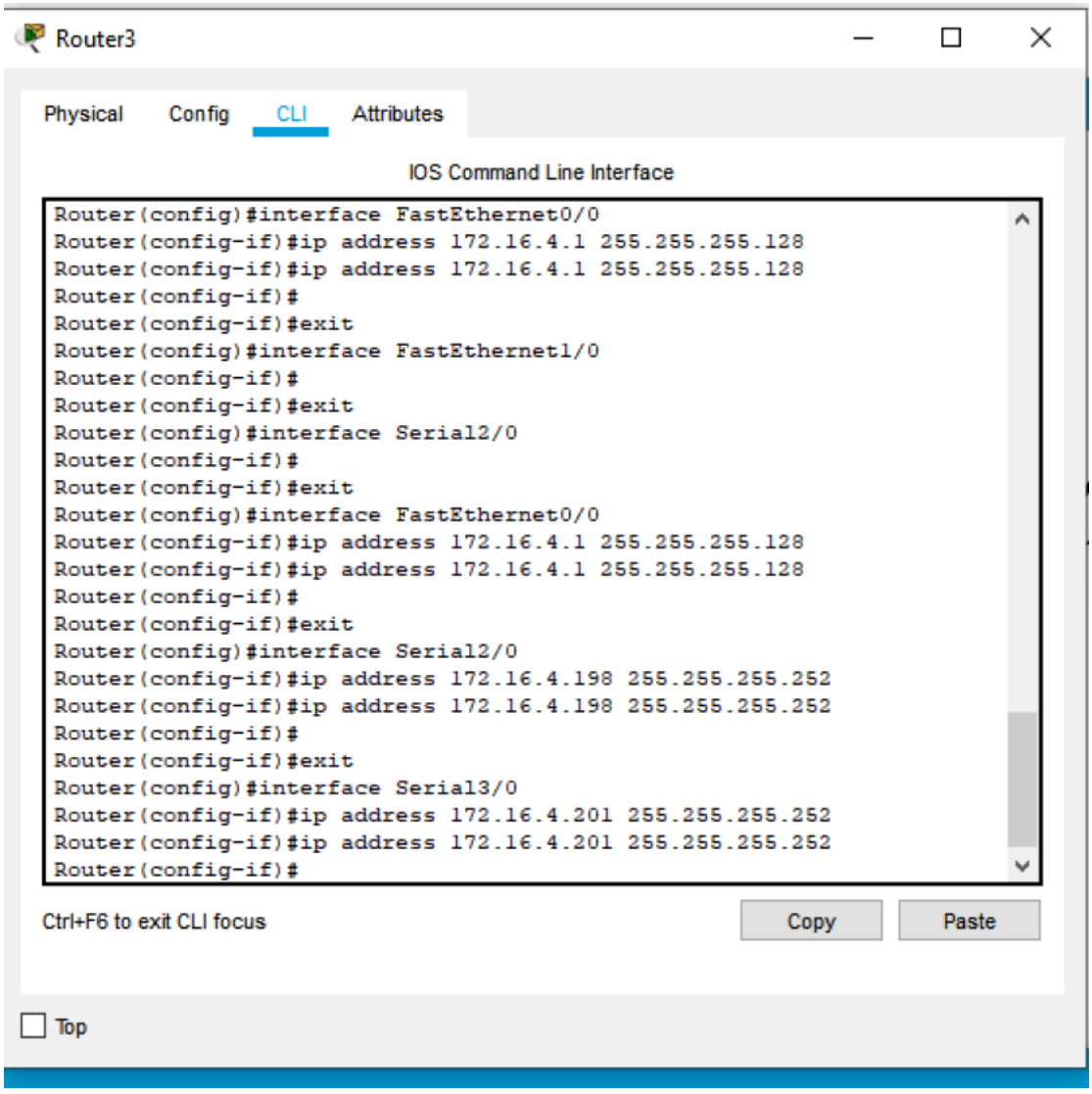


Fig: Ip address configuration in router 3.

Router configuration and justification

Router configurations one of the important part of networking. Without configuring router we will not be able to send or receive packet to and from other network. Router provide a path for the packet to travel from a device of one network to the other device of another network . As we have used rip routing protocol background of RIP routing is briefly described below:

RIP routing

Distance vector algorithm is uses by RIP in order to decide the path for the packet to travel. While configuring router, according to RIP routing protocol, neighbour network are listed. Those network which are connected to the router are called neighbour or local network. So, while sending packets , packets are sent from the shortest path available in the loop. The two main versions of RIP which are briefly described below:

RIPv1

This is version one of RIP(Routing Information Protocol). This version of RIP follow classful routing protocol that is the subnets must be of equal size. Hence,this version does not support VLSM(Variable Length Subnet Mask). This is the oldest version of RIP(B. Kate,2000). In order to configure RIP version 1 routing protocol following commands are followed:

Step 1: click on the router which you want to configure.
Step 2 : click the config option.
Step 3: click RIP option .
Step 4 : write down the neighbour network id and click on add.

Similar, we can configure rip version one through command line which appears after clicking CLI option . Ignorer to add network you just need to write network and network id of neighbour network.

RIPv2

This version of RIP is called classless routing protocol so, this version support VLSM(Variable Length Subnet Mask). Recently, this version is more in practice than version one as this version support VLSM.

The steps to configure RIPv2 routing protocol is similar to that of version one . The only thing you need to add is version after router rip command. This enable RIPv2 configuration in the router. The sample command for rip version 2 routing is:

Rn(config)#router rip

Rn(config-router)# version 2

Rn(config-router)# network ‘neighbour network id’

Rn(config-router)# network ‘neighbour network id’

Rn(config-router)#

Similarly, to view the network id assigned to the router during RIP routing, we need to enter the “show ip route” command . This displays all the network id connected to that router through which the packets are transmitted from one network to other network.

Over static routing we chooses RIP routing in our project because it is easy to configure

---

RIP routing of router 1 and justification

Router 1 is the router connected to the switch of dragon block . This router is further connect to the building ‘B’ that is python block and headquarter router. So there are total four network connected to this router. So the network that are connected to this router are :

172.16.4.128

172.16.4.144

172.16.4.192 and

172.16.4.196

The commands used in configuring RIPv2 in router 1 are :

```
Router1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router1(config)#router rip
Router1(config-router)#version 2
Router1(config-router)#network 172.16.4.128
Router1(config-router)#network 172.16.4.144
Router1(config-router)#network 172.16.4.192
Router1(config-router)#network 172.16.4.196
Router1(config-router)#
```

Command+F6 to exit CLI focus

Fig: RIPv2 routing of router1

RIP routing of router 2 and justification

According to the network diagram shown above router 2 is connected to switches of first and second floor of python block . Also, this router is connected with the headquarter router (router 3) and dragon block router(router 1). Thus, this router is also connected with four network. The network which are connected with the python block router are:

Network between router 1 and router 2 is 172.16.4.196

Network between router 2 and router 3 is 172.16.4.200

First floor(Python block) network id is 172.16.4.160

Second floor(python block) network is 172.16.4.176

The commands used in configuring RIPv2 in router 2 is:

```
Router2#
Router2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router2(config)#router rip
Router2(config-router)#version 2
Router2(config-router)#network 172.16.4.196
Router2(config-router)#network 172.16.4.200
Router2(config-router)#network 172.16.4.160
Router2(config-router)#network 172.16.4.176
Router2(config-router)#
```

Command+F6 to exit CLI focus

Fig: RIPv2 routing of router2.

RIP routing of router 3 and justification

This is the router of headquarter office where 125 employees are working . So the separate network of 126 available ip address are separated for headquarter office. The router is connected with router 1(dragon block) and router2 (python block). Similarly, switch of the headquarter office is connect to this router. So, there are three network which are connected to this router. The network id of the subnet which are connected with router3 are:

Network between router3 and router1 is 172.16.4.196

Network between router3 and router 2 is 172.16.4.200

Network id of Headquarter office is 172.16.4.0

Commands are:

```
Router3#
Router3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router3(config)#router rip
Router3(config-router)#version 2
Router3(config-router)#network 172.16.4.196
Router3(config-router)#network 172.16.4.200
Router3(config-router)#network 172.16.4.0
Router3(config-router)#
```

Command+F6 to exit CLI focus

Fig: RIPv2 routing of router 3.

Network topology

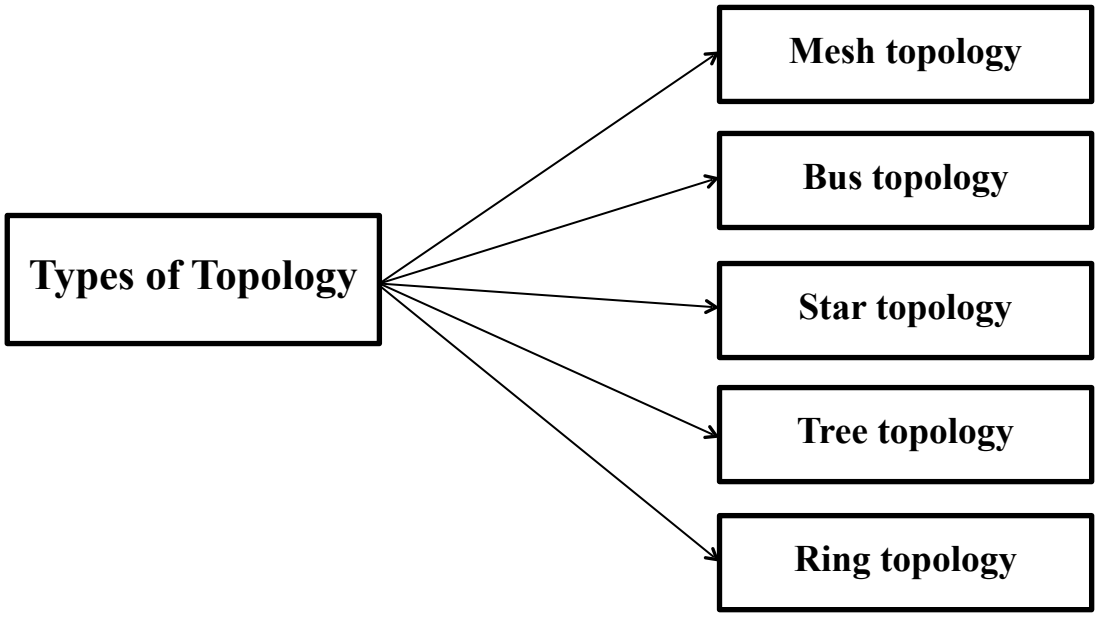


Fig: Types of topology (GeeksfrGeeks.org, 2021)

Network is a group of computers, network devices and servers linked which use a set of usual communication protocols in order to share resources. Local Area Network (LAN), Metropolitan Area Network (MAN), and Wide Area Network (WAN) are major 3 types of network. Topology relates to the structure of network. Networking topology is the schematic representation of networking arrangement connected through physically and logically flow of information. A topology mainly describes how network devices are linked using communications link and communicate with each other. Topology relates to a structure of the network, just how various nodes in such a network are linked, and how they interact with each other. Topologies either can be tangible (the physical configuration of the equipment on the network) or conceptual (the manner the data travels through the network from one computer to another) (Beal, 2019).

As seen in figure, there are five types of topology of network. They are: Mesh, Bus, Star, Tree and Ring topology which are described below;

1. Mesh topology

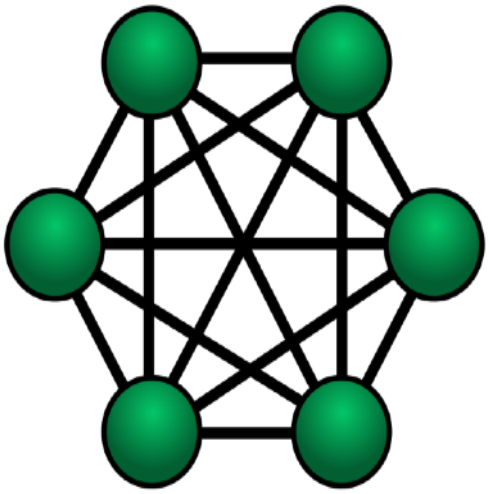


Fig: Every device connected with each other in Mesh topology

In a mesh topology, there are 2 types of schema. One is full mesh and another one is partial mesh. All workstations or nodes are directly connected to each other via dedicated channels which are known as links in full mesh topology. But in a partial topology, only some workstation are connected to each other but other workstation are connected to only to 1 or 2 devices. There is no data traffic problems since the connection between the two devices is dedicated which means link is only accessible to those two devices. Mesh topology is reliable and stable which means the failure of one connection does not affect other link or network communications. It is very secure since fault observation is simple in mesh topology (BeginnersBook.com, 2020).

In mesh topology, the amount of wires needs to connect in each system is time consuming and inconvenient. Number of input/output (I/O) port is enormous because each device must communicate with other devices. Cost of maintenance is too expensive as cost of cables is too expensive. Since a dedicated point to point connection cannot connect a device to a large number of devices, scalability problems arise.

2. Bus topology

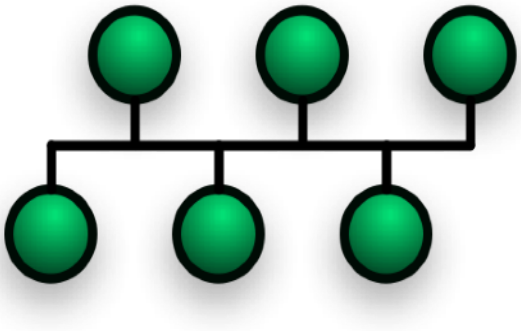


Fig: Bus topology (Wickipedia, 2019)

In bus topology, all host workstations are directly connected along a connector line which is commonly mentioned as Bus. The drop line is connected to the main cable by a device known as tap. Bus topology is easy to install in which each cable is connected with backbone cable. It comparatively requires less cable. It is very simple to understand used in small networks.

The length of cable is limited in bus topology. When network traffic is high or there are many nodes then the performance of network suffers. It has problems in detection of fault and limit of nodes which is connect with backbone cells. It is comparatively slower than other topology.

3. Star topology

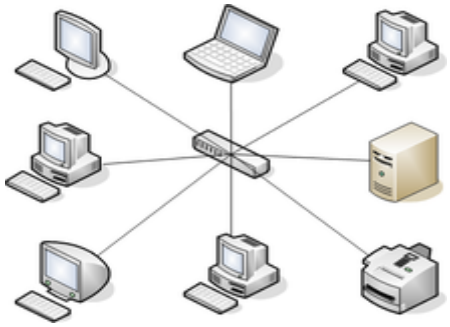


Fig: Devices connected through star topology

In star topology, each node is separately connected to a main connection point. Each device is connected to the switch through a cable (Telecomabc.com, 2019). All workstations have to pass through the central machine to communicate with other machines through hub. A star network is often integrated with a bus topology, which then results in a tree topology. As we can see in above figure, each device is linked to central point. This topology can be used in twisted pair or optical fibre. If one device wants to send data to another, it must send the data to the hub, which will then send the data to the designated device. It is also simple to setup.

In star topology, none of the devices will work without hub i.e. if hub goes down then every device goes down. Since hub is the core structure of star topology, it needs more resources and frequent maintenance. It is so expensive to use and installation cost is also too high (Omnisecu.com, 2019).

4. Tree topology

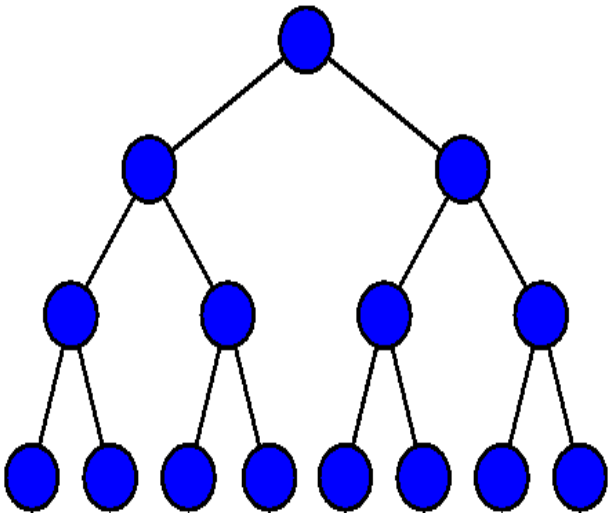


Fig: Devices connected by tree topology of network

This topology is mainly used in Wide Area Network (WAN). It is optimal if workstations are clustered together. Also, it can be called as hierarchical topology. It has only a root node and all other nodes are linked to its which form a hierarchy. The hierarchy should have at least three tiers. It is usually the extension of bus and star topologies and expansion of nodes is also simple and possible. Tree topology can be easily administered and maintained. The detection of mistake can be easily done in this topology (Singh, 2019). It is assisted by many software and hardware vendors. If one of the nodes gets damages then other nodes in a network are not distressed.

The cost of installation of this topology is too expensive. Whole performance mainly depends on single connector i.e. hub. If a hub gets damaged then entire system fails to operate. This network topology is comparatively hard to configure than other network topologies. It requires heavily cabling.

5. Ring topology

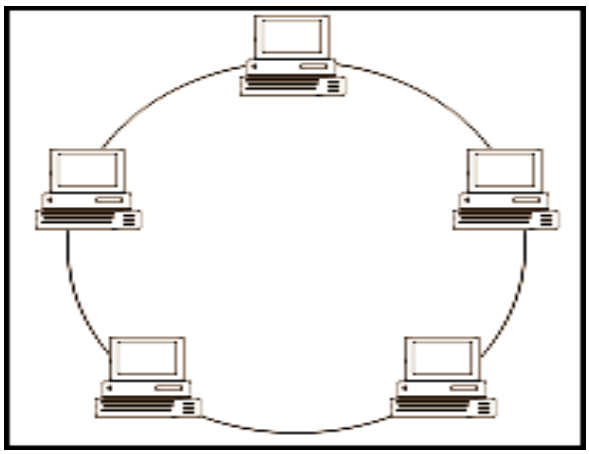


Fig: Devices connected through ring topology of network

In ring topology of network, each and every device is connected to other corresponding devices. A ring topology is a configuration of a network where in the devices are connected in such a way that it makes the data path in a circular motion. Many of the ring topologies access the data to be travelled in a single direction which is known as Unidirectional ring network and others permit the movement of data in any direction also known as Bidirectional. It is so simple to understand and cheap to install. Transferring network does not get affected by high traffic because only nodes which have token can transfer data (geeksforgeeks.org, 2021).

Troubleshooting of network is so difficult or hard in tree topology. Addition or deletion of a device can disturb the entire system of topology.

Among five topology of network which are described above, we had identified two topologies of network i.e. Ring topology and Tree topology for our assignment which are described below according to network diagram;

Dragon Block A (Topology)

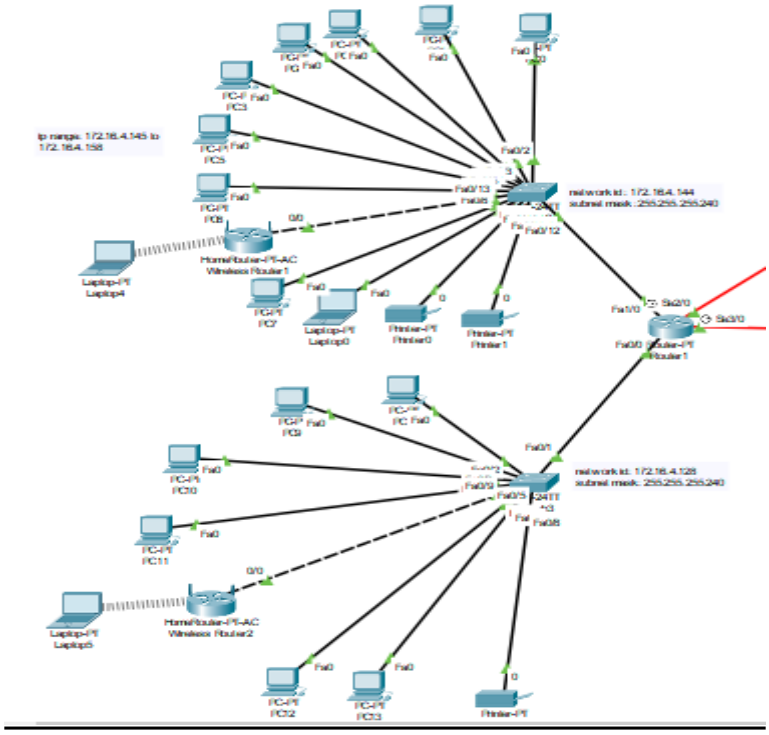


Fig: Tree Topology of Dragon Block A

Topology that we have used to build network diagram in dragon block 'A' is tree topology. In this tree topology of DRAGON BLOCK A, each node is separately connected to the hub and each part of a network is linked to the main cable .This topology is actually the form of star topology. According to above figure, each and every device is indirectly connected to a central connection point. Firstly, each device is individually connected to the switch and the switches are further connected to the router which represents tree topology. These connections are similar for both floor of DRAGON BLOCK A i.e. both first floor and second floor.

A main advantage of the tree topology is that it is easy to manage and maintain. Expansion of nodes can be easily done without disrupting the entire system (TREE TOPOLOGY: ADVANTAGES AND DISADVANTAGES, n. d.). Error observation can be easily done if there is any mistake in this topology of network. Since the errors can be easily found, troubleshooting will be much easier to detect it. For example, if the network connection to a PC in the second floor of dragon block is faulty, then it will be easy to trace the location of the problem and troubleshoot it. If one of the nodes gets damages then other nodes in a network are not disturbed. This topology is more efficient.

Python Block B (Topology)

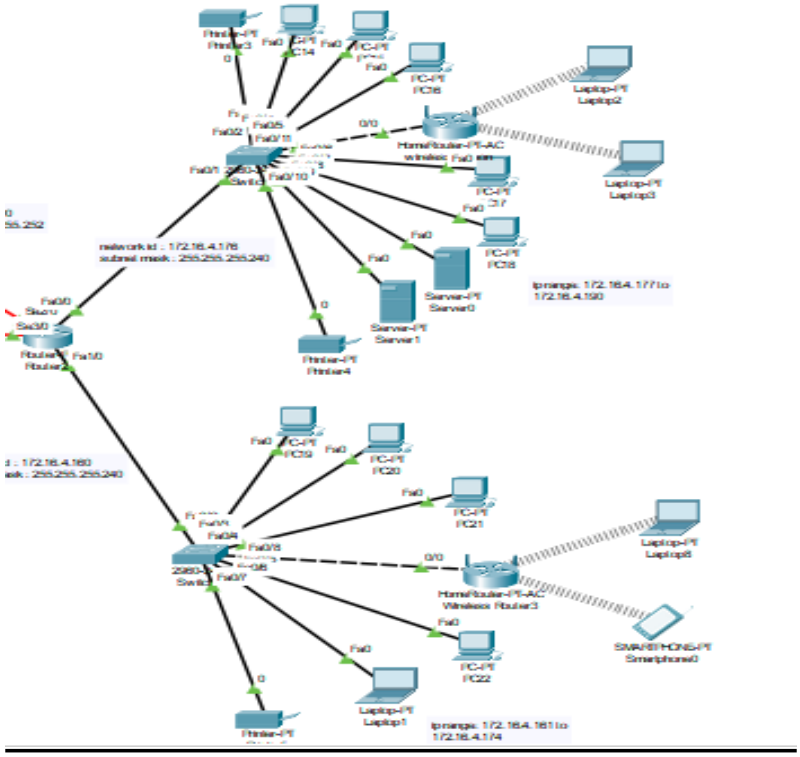


Fig: Tree Topology of Python Block

Network diagram of python block is in tree topology in which each node is separately connected to the hub and each part of a network is linked to the main cable (Telecomabc.com, 2019). This topology is the variation of star topology. As we can see in above figure, each device is indirectly connected to a central connection point. Firstly, each device is individually connected to the switch and the switches are further connected to the router which represents tree topology. These connections are similar for both floor i.e. first floor and second floor. The PC of first floor 1 is connected to the switch then the switch is individually connected to the router.

A major advantage of the tree topology is that it is simple to manage and maintain owing to its simplicity (omnisecu.com, 2020). Expansion of nodes can be easily done without disrupting the entire system (TREE TOPOLOGY: ADVANTAGES AND DISADVANTAGES, n. d.). Error observation can be easily done if there is any mistake in this topology of network. Since the errors can be easily found, troubleshooting will be much easier to detect it. For example, if the network connection to a PC in the second floor of python block is faulty, then it will be easy to trace the location of the problem and troubleshoot it. If one of the nodes gets damages then other nodes in a network are not disturbed. Comparatively, it is more efficient topology as going through all the devices in the network

Router topology

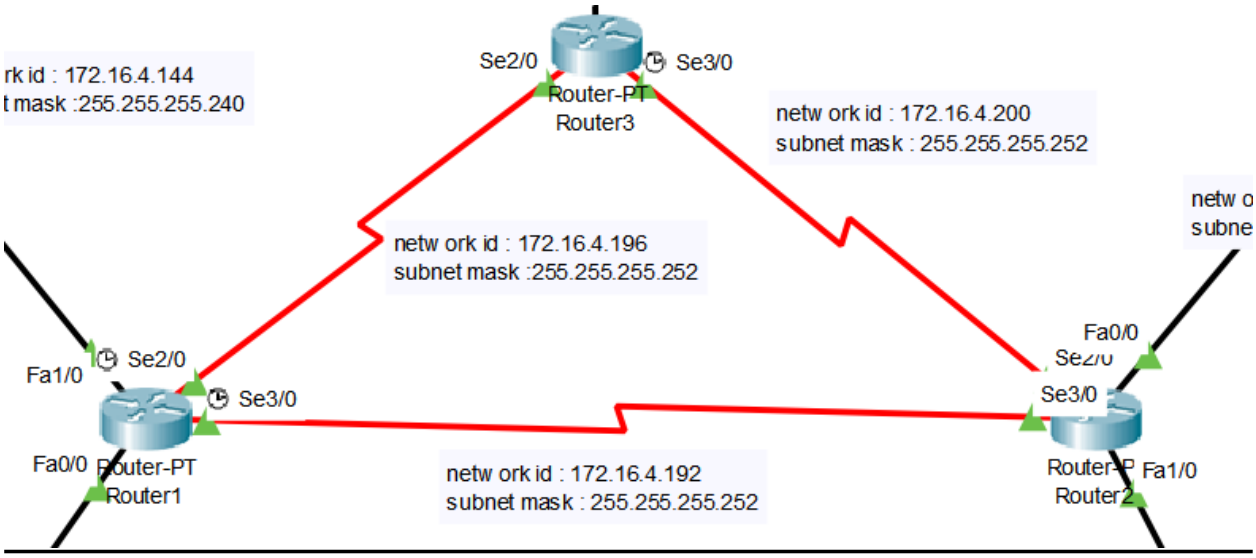


Fig: Ring topology of router network

As in above figure, the network diagram represents the routers which will have the main focus because each router is linked to various floors which have stored all the information of the particular floors. The devices of each floors is connected to a switch and the switches are connected to the specific router of the particular floor. In this specific network, travelling of data packets takes place from a device to another device till it reaches its favoured destination. As seen in figure, data flow can be seen in clockwise direction or anti-clockwise direction that results in ring topology. Ring topology either occurs in Local Area Network (LAN) or Wide Area Network (WAN) (Computer hope, 2020).

The benefits of a ring topology is that they work in a organised manner as they follow the token system in which the data can circulate only after it receives the empty token (Sparrow,2019). Thus, all nodes get to exchange data only at a specific time which will help in decreasing collisions. Every machine has good control on the resources. A server is not needed for the control of network connection between each workstation.

The performance of ring topology is greater than the performance of other topology even after there is an increase in the network due to the load. Additional or extra parts do not affect efficiency of network. Every machine has fair control over resources. Also the installation cost of this topology is economical. The transmission of network does not get affected by high traffic because only nodes having token can transfer data.

Ip address subnetting and Justification

lp(Internet Protocol) address

An IP address is an exceptional identifier used to find a gadget on the IP organisation. If a device is logged into a network then it receives unique ip address which identify that device distinctly. There are total of five classes of ip address that is class A, B, C D and E. Similarly there are two versions of ip address that is IPv4 and IPv6. There are total of 32 bits and 128 bit address space in IPv4 and IPv6, respectively. We need to assign ip address to each and every device to identify them uniquely in the network. In every network two ip addresses are separated one for network id and broadcast id so the total number of available network are always 2 less than the total ip address the network can give.

subnetting

Division of single network into two or more network is called subnetting of network. This makes network more efficient and fast. Similarly, helps to minimise the network traffic which helps in upgrading overall performance and contribute in top network management.

This is especially beneficial for large companies with branches in various places. They can simply breakdown solo network into various subnets to reduce the traffic which cause network to run slowly. Not only for better performance and to control traffic, subnetting is also done in order to improve network security and minimise the wastage of ip address.

Subnet mask

Subnet mask is determine by observing bit of network portion of the network class. Let us suppose there is a class B ip address which contain total 16 bits as the network portions and rest of the bits up to 32 bits are host portion. So, the default subnet mask for that ip address is 255.255.0.0 or it can either be shown in binary or CIDR (classless inter domain routing). So the binary notation for class B network is 11111111.11111111.00000000.00000000 and CIDR notation is /16 which means the network portion of class B contains 16 bits and host portion contains 16 bits. Subnet mask of any ip address helps us to identify the available ip address for that network.

VLSM(Variable length subnet mask) and FLSM(Fixed length subnet mask)

VLSM stands for Variable Length Subnet Mask . In VLSM more than one subnet mask are used in single network which helps in minimising the wastage of ip address. Subnet mask of the network determine the available ip address in that network. In VLSM we need to subnet a subnet multiple time to fulfil the requirement without wasting ip addresses. This ip addressing technique is also called classless ip addressing. So, in VLSM there is variable subnet mask while in FLSM all the subnets are of same size. So, there is greater chance of wastage of ip addresses in one network and may not meet the requirements of another network with more host in case of FLSM(Fixed Length Subnet Mask). For example, you have subnet with 126 available ip address but you need 130 ip addresses in one network and only 20 ip addresses in another network. So, if we use FLSM with 126 available ip addresses then this does not meets the requirement of network with 130 host while large number of ip address are unused in a network with 20 host. So, we have chosen VLSM method over FLSM some can fulfil requirement and does not waste ip addresses unnecessarily.

How subnet is done?

Subnetting is done by borrowing bits from the host portion of the network. Even there is a formula to calculate total number of subnets after borrowing bits from host portion which is given below:

$subnet=2^n$ (where n is the total number of bits borrowed from the hot portion)

How did we do subnetting?

According to the question, we need to pick a private IPv4 address for our project. The IP network is further divided into various subnets according to the requirements. So, the network that we have chosen for our project is 172.16.4.0 with subnet mask 255.255.252.0 . This classify that the prefix is /22. So , before subnetting the network we need to observe the network diagram of our project to

identify the required number of network for our project. The diagram with total number of network required for out project is shown below:

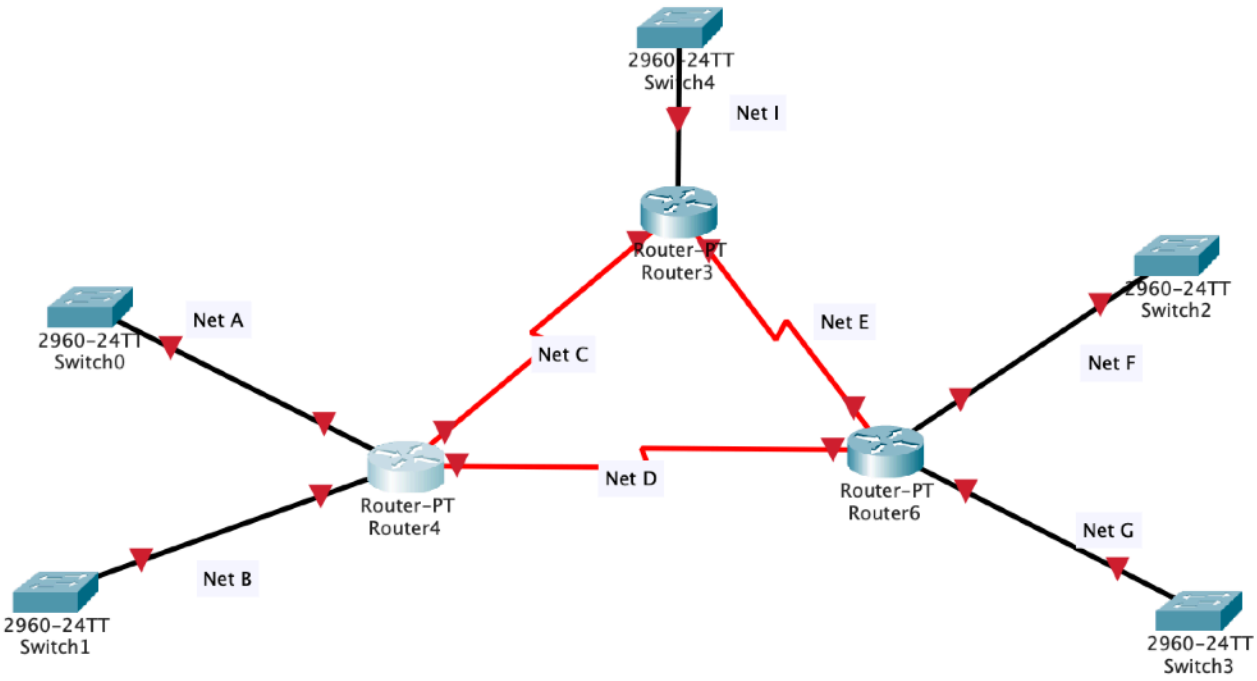


fig:1

From above figure it is clear that required number of network for our network diagram is eight along wit the headquarter network. So, we need to borrow total of three bits from host portion . So, the number of subnets formed after borrowing 3 bits from the host portion of 172.16.4.0 network is :

Using formula,

$$subnet=2^n$$

so, $subnet=2^3=8$.

Hence, the total number of subnets formed after borrowing three bits from host portion is 8, which fulfils the requirement. So, the subnet and subnet mask of the subnets formed is:

S. N	Sub net	Subnet mask	Prefix
1	172.16.4.0	255.255.255.128	/25
2	172.16.4.128	255.255.255.128	/25
3	172.16.5.0	255.255.255.128	/25
4	172.16.5.128	255.255.255.128	/25
5	172.16.6.0	255.255.255.128	/25
6	172.16.6.128	255.255.255.128	/25
7	172.16.7.0	255.255.255.128	/25
8	172.16.7.128	255.255.255.128	/25

Prefix number is increased from 22 to 25 as we have borrowed total of 3 bits from the host portion to fulfil the requirement of our network diagram. So, each of the network formed above can support up to 128 ip address, among them 126 can only be assigned to the host while other two address are reserved for network ID and broadcast ID. Very first network that is 172.16.4.0/25 is assigned to headquarter where 125 employees are working as 126 ip address are available in this network. As required ip address for headquarter network is 126 ,172.16.4.0/25 network can fulfil this requirements without wasting ip address so we need not to do VLSM for rest o the subnets . Remaining seven networks are assigned to rest of the network . If needed VLSM is done in order to decrease unused ip address.

The subnets formed above are arrange in our network as follows:

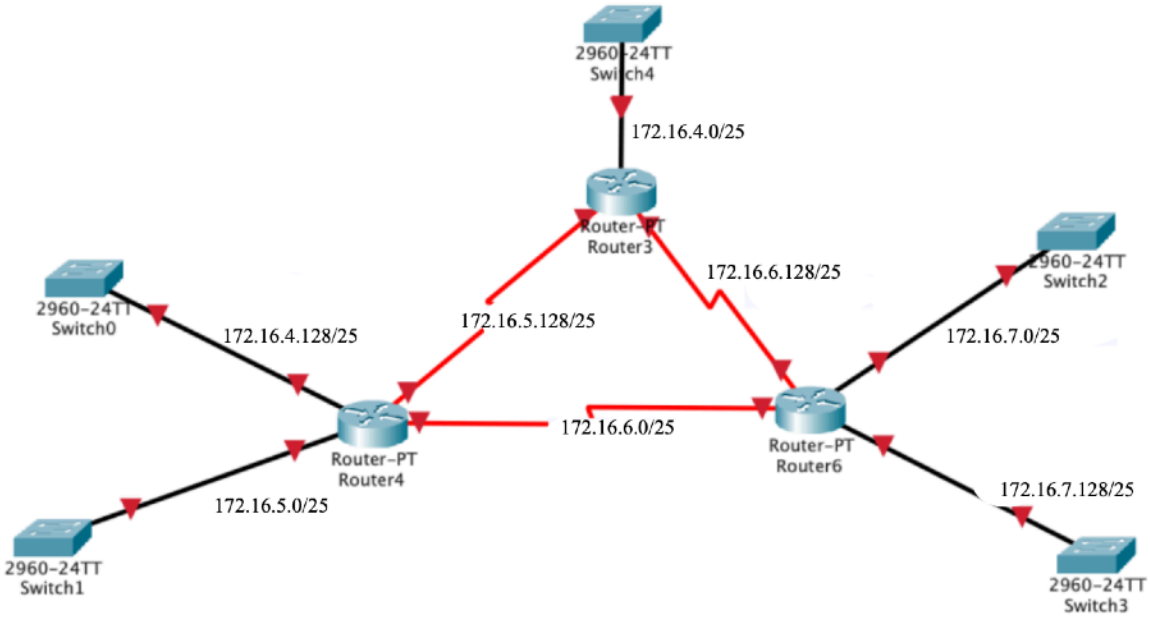


fig:2

All the subnets that are assigned to each of the network above supports up to 126 addresses. While required ip address for of the each network are :

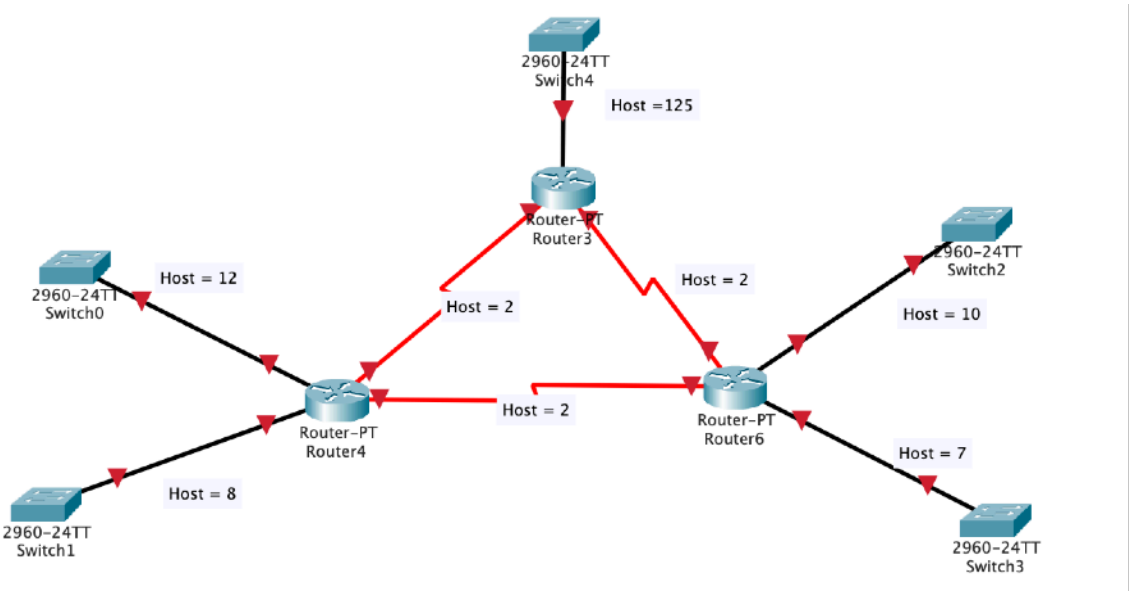


fig:3

Comparing fig 2 and fig 3 we can identify the available ip address, required ip address for our network and unused ip address.

Network	Available IP	Required IP	Unused IP
Net A=172.16.4.128 /25	126	12	114
Net B=172.16.5.0/25	126	8	118
Net C=172.16.5.128/25	126	2	124
Net D=172.16.6.0/25	126	2	124
Net E=172.16.6.128 /25	126	2	124
Net F=172.16.7.0/25	126	10	116
Net G=172.16.7.128/25	126	7	119

From the table above, it is cleared that large number of ip addresses are unused . So , in order to minimise such wastage of ip addresses we have used VLSM(Variable Length Subnet Mask) .

To use VLSM(Variable Length Subnet Mask) we need to first identify the total number of host present in each network which helps us to determine the required number of ip addresses for that network. So, same process is applied for our project too. After observing the number of host in each floor of the blocks we are able to do VLSM. The host present in each network of our project are listed below:

1. Net A : 12 host
2. Net B : 8 host
3. Net C: 2 host
4. Net D: 2 host
5. Net E: 2 host
6. Net F: 10 host
7. Net G: 7 host
8. Net I: 125 host

Since, separate subnet formed after subletting allocated for Net I.so, the network assigned to Net I is 172.16.4.0/25. Similarly, the network ID and ip address for rest of the network are determine after doin VLSM, for that first we need to point out prefix or CIDR(Classless Inter-domain Routing) to

support the number of host. So, the prefix required for each of the network of our network diagram are as follows:

Net A : requires a /28 (255.255.255.240) mask to support 12 host.
Net B : requires a /28 (255.255.255.240) mask to support 8 host.
Net C : requires a /30 (255.255.255.252) mask to support 2 host.
Net D : requires a /30 (255.255.255.252) mask to support 2 host.
Net E : requires a /30 (255.255.255.252) mask to support 2 host.
Net F : requires a /28 (255.255.255.252) mask to support 10 host.
Net G : requires a /28 (255.255.255.252) mask to support 7 host.

Let us take 172.16.4.128/25 subnet formed above and further subnet it using VLSM technique in order to minimise the unused ip addresses. As, to do VLSM we need to first identify the subnet for the network with highest number of host and to the network with the host in descending order. So, the network ID, broadcast ID and range of assignable ip addresses for each of the floor are described below:

IP addressing Scheme and justification

Dragon Block

First floor

Network ID: 172.16.4.128
Subnet mask: 255.255.255.240
Default gateway: 172.16.4.129
Broadcast ID: 172.16.4.143
Ip addresses range: 172.16.4.129 to 172.16.4.142

Justification:

First floor of dragon block contains seven host . Each of the host contains ip address between 172.16.4.129 and 172.16.4.142. Available ip addresses of this network are 14 . Since the required ip address is 8 along with interface ip address then unused ip address are six .

Second Floor

Network ID: 172.16.4.144

Subnet mask: 255.255.255.240

Default gateway: 172.16.4.145

Broadcast ID: 172.16.4.159

Ip addresses range: 172.16.4.145 to 172.16.4.158

Justification:

In second floor of dragon block there are total of 12 host present . Each of the host are assigned with the ip address ranging from 172.16.4.145 to 172.16.4.158. Total available ip address of network id given to the first floor are 14 while required ip addresses are for 12 host.

Python Block

Python block is consist of two floor that is first floor and second floor. There are two switch used for each floor which is further connected to a single router which confirms that there are total two networks present. So, after doing subnetting and VLSM the subnets distributed to each LAN are:

First floor

Network ID: 172.16.4.160

Subnet mask: 255.255.255.240

Default gateway: 172.16.4.161

Broadcast ID: 172.16.4.175

Ip addresses range: 172.16.4.161 to 172.16.4.174

Justification:

First floor of dragon block contains total seven host. Since, we need to assign unique ip to each host the required number of ip address for first floor is 7 and one ip for interface connection .So, there are 14 usable ip address present in this network, among them 8 are in use while rest of the ip address are unused.

Second floor

Network ID:172.16.4.176

Subnet mask: 255.255.255.240

Default gateway: 172.16.4.177

Broadcast ID: 172.16.4.191

Ip addresses range : 172.16.4.177 to 172.16.4.190

Rip routing configuration justification

Between router1 and router 2:

Network ID: 172.16.4.192

Subnet mask: 255.255.255.252

Broad cast ID:172.16.4.195

Ip address range: 172.16.4.193 to 172.16.4.194

Between router1 and router 3:

Network ID: 172.16.4.196

Subnet mask: 255.255.255.252

Broad cast ID:172.16.4.199

Ip address range: 172.16.4.197 to 172.16.4.197

Between router2 and router3:

Network ID: 172.16.4.200

Subnet mask: 255.255.255.252

Broad cast ID:172.16.4.203

Ip address range: 172.16.4.201 to 172.16.4.202

Conclusion

With the help of this assignment we are able to learn more about the networking especially ip addressing . Cisco packet tracer used as simulation tools to build our own virtual network helped us to learn basic concepts of networking and technologies. By the help of all the group members we are able to complete our mission which was to design a network system for the new branch (ARENA Technology Sdn Bhd of KL Central, Kaula Lampur Malaysia). Similarly, to minimise the wastage of ip addresses VLSM(Variable Length Subnet Mask) is used but this increases the use of hardware such as router, switch and other gadgets. So, this project helped us on understanding the idea of designing floor plan , network diagram design and subnetting.

Work load matrix

Assessment Criteria	Group Assignment				
	Marks Awarded				
Digital Skills (60 marks)	**Weight**	**NABIN CHHETRI (NPI000032)**	**SANDESH GIRI (NPI000041)**	**SANDESH SUBEDI (NPI000040)**	**SURAJ PANDEY (NPI000051)**
Floor Plan	**10**	**25%**	**25%**	**25%**	**25%**
Analysis & Justification	**10**	**25%**	**25%**	**25%**	**25%**
Network Diagram	**10**	**25%**	**25%**	**25%**	**25%**
Configuration	**10**	**25%**	**25%**	**25%**	**25%**
Demonstration	**10**	**25%**	**25%**	**25%**	**25%**
Referencing	**10**	**25%**	**25%**	**25%**	**25%**
Teamwork Skills (40 marks)	**Weight**				
Topology Justification	**10**	**25%**	**25%**	**25%**	**25%**
IP Addressing Plan & Justification	**10**	**25%**	**25%**	**25%**	**25%**
Documentation	**10**	**25%**	**25%**	**25%**	**25%**
Alternate Roles	**5**	**25%**	**25%**	**25%**	**25%**
Peer Evaluation	**5**	**25%**	**25%**	**25%**	**25%**
Total Marks	**100**				

Peer Evaluation Form

PEER EVALUATION FORM

	NABIN CHHETRI (NPI000032)	SANDESH GIRI (NPI000041)	SANDESH SUBEDI (NPI000040)	SURAJ PANDEY (NPI000051)
Participated in group discussion	yes	yes	yes	yes
Helped to monitor group progress	yes	yes	yes	yes
Contributed useful ideas	yes	yes	yes	yes
Completed work on time	yes	yes	yes	yes
Submitted good quality of work	yes	yes	yes	yes
Communicated effectively with group members	yes	yes	yes	yes
Helped others with their work when needed	yes	yes	yes	yes
Good relationship with group members	yes	yes	yes	yes
Overall was a valuable member of the team	yes	yes	yes	yes
SIGNATURE	Nabin	Sandy	Sandesh	Suraj

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