

**INDIVIDUAL ASSIGNMENT****JALAN TECHNOLOGY PARK MALAYSIA**

Intake Code	APD1F2109CE
Module Code	CT043-3-1-IN
Module	INTRODUCTION TO NETWORKING
Lecturer Name	Mr. JOSHUA SAMUAL
Hand Out Date	3/04/2022
Hand In Date	26/06/2022
Student Name	PEDRO FABIAN OWONO ONDO MANGUE
Student TP Number	TP063251

Table of Contents

Introduction.....	1
Acknowledgement	1
Objectives	2
Assumptions.....	2
SECOND FLOOR New Building in Penang.....	3
Floor 2 Plan Justification.....	4-6
Network Diagram (Penang 2nd FLOOR)	7
IP Addressing diagram (Penang 2nd FLOOR)	7
Ip Route Command.....	8-10
1st Switch (Tech-Assistant and Develp-Hub)	11-12
2nd Switch (Waiting and Conference)	13-14
3rd Switch (Server and Hallway)	15-16
Conclusion	17
References.....	17

INTRODUCTION

System Auto.com started in 2011 as a one-man-shop and have been growing organically ever since. Most recently the CEO of System Auto.com announces an opening of another branch in Penang by mid of 2022. Meanwhile, The CEO wants to restructure the existing network infrastructure in KL building and wants to lay down a new network infrastructure. The KL building has got two floors and the same with the new building in Penang. The first floor in both the building have a reception area, waiting room, CEO room, CTO room, Administrative office, Cafeteria, Gym, and swimming pool. The second floor in both the buildings contains development hub, Server room, technical assistant to monitor the network, and the conference room. All staff will be using PC's with a suitable office environment and each department contains voice over internet phone (VOIP) to communicate with each other and a printer in each department that is connected in a network. Both blocks have a necessary IoT infrastructure such as CCTV.

This is an individual assignment where I am gonna come out with the layout, design, and configuration on floor number 2 of the new building in Penang.

ACKNOWLEDGEMENT

This assignment has not been completed on its own, but with the help of certain people who have pushed me or motivated me to complete this assignment successfully, and because of the commitment and dedication I have put into this work.

First of all I would like to thank God the Father who makes everything possible and for always giving me the necessary strength to survive and fulfil my responsibilities as well as giving me more life which has allowed me to finish this assignment with life and strength. Secondly I would like to thank my family who despite the long distance have been able to motivate me and keep me in mind as always, especially my parents, grandparents, aunts and uncles who have always been concerned about me. Lastly to my academic teacher Mr Joshua for being a good reference in education and a good teacher who cares about his students. In the same line, I would like to thank my classmates who have contributed to this work and thanks to them I have been able to complete it successfully.

OBJECTIVES

This assignment aim is to allow students to design and configure a LAN topology by applying basic principles of wired and wireless network, together with configuration of network devices (including routers & switches) by using Cisco Packet Tracer simulation tool. Students are also expected to be able to design their IP addressing scheme with subnetting to segment their network.

The CEO wants to restructure the existing network infrastructure in KL building and wants to lay down a new network infrastructure that is in Penang. The main objective is to identify the requirement and conduct research to propose for a suitable topology diagram with necessary network devices and IP addressing scheme to make it work. Basically, in this individual work I will apply the use of VLSM for a good network connection between the end devices on the first floor in Penang

ASSUMPTIONS

This project is intended to apply the basic concepts of IP address configuration, IP routing, SWITCHES, and ROUTER.

It is necessary to emphasize again that this project will target the second floor of the new building located in Penang, where I have developed a representation of the floor using the software called MICROSOFT VISIO, along with the configuration of the end devices, routers, switch, and IP address with the help of Cisco Packet Tracer software.

Introducing this individual project, it is necessary to mention that I have worked on the 2nd floor of the new building located in Penang. First, I have designed the layout of the second floor using Microsoft Visio software. After that I set the IP address of each device through the implementation and use of VLSM, and at the end I configured all the end devices as well as routers and switch from Cisco Packet Tracer.

On the 2nd floor located in Penang there are a total of 7 rooms and a corridor in between (with one end device). Four different departments: Technical Assistant (8 end devices), Development Hub (7 end devices), Conference (7 end devices), and Server department (11 end devices). On the other hand, we have a waiting or relaxation room (6 end devices) and two bathrooms for floor number 2 in Penang. Therefore, there are a total of three Switch type 2960-24TT: The first one connects the Technical Assistant and Development Hub departments, the second one connects to the Conference room and waiting or relaxation room, and the last Switch connects to the server room and the main hallway. In short, the three 2960 switches that connect the departments are linked to the same PT router network, through which all the departments stay connected and communicated with each other. Finally, there are a total of 40 end devices used on the first floor and reserved with a total of 36. The main IP address assigned to the building in Penang, specifically floor number 2, is 192.100.17.128/25 and segmenting this IP address from IPs via VLSM has resulted in the network for the Technical Assistant and Development Hub rooms being 192.100.17.128/27. In this first case the two departments have been merged as they have relatively small amounts of end devices, as well as the Conference and Resting room network has been reduced to 192.100.17.160/28, and finally the Hallway and Server room network has been reduced to 192.100.17.176/28. Additionally, it turns out that each network, as mentioned above, each network has its own network id and subnet mask for a very effective interconnection through its gateway.

SECOND FLOOR New Building in Penang

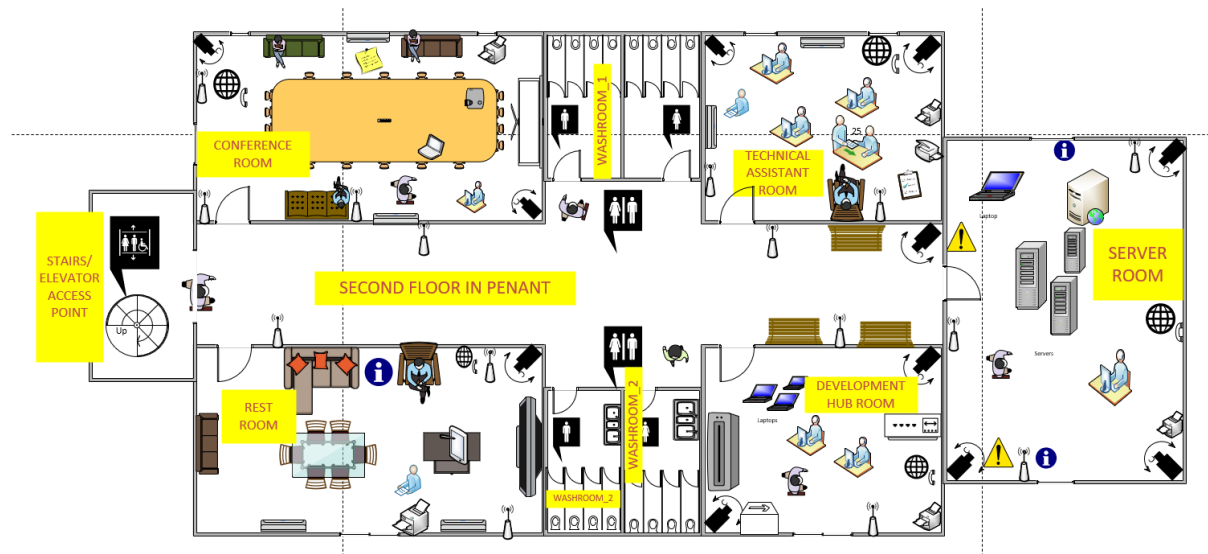


figure 1.1.1

COMPONENTS



figure 1.1.2

Floor 2 Plan Justification

Basically, the layout of the first floor in Penang is quite well accommodated with good material and a good professional atmosphere in which both the working staff and the clients are very satisfied with the services in this building in general. Obviously, there is a connection from floor 1 to floor number 2, so in terms of getting to floor two you need to take the stairs or for convenience there is a lift (**Figure 4.1.1**) to floor number two. Once you are on the first floor of Penang, you will find a lot of rooms (as mentioned above). Basically, to your left you will see the conference room (**Figure 4.1.2**) and to your right, in the opposite direction, you have a rest room (**Figure 4.1.3**). Moving a bit further you will see the two bathrooms (**Figure 4.1.7**). The first one is right next to the conference room, and the second one is next to the Resting room. Further on, after the toilets, you will see two next essential rooms. The first is clearly the Technical Assistant's room (**Figure 4.1.4**) and in the opposite direction is the Development Hub room (**Figure 4.1.5**), the last one is a Server room (**Figure 4.1.6**) connected to the two mentioned rooms, and this is how the site is laid out. In each room you can see or find a printer and CCTV camera, as well as pcs to attend the clients as in the case of the Technical Assistant room.

Stairs and elevator



Figure 4.1.1

Conference room

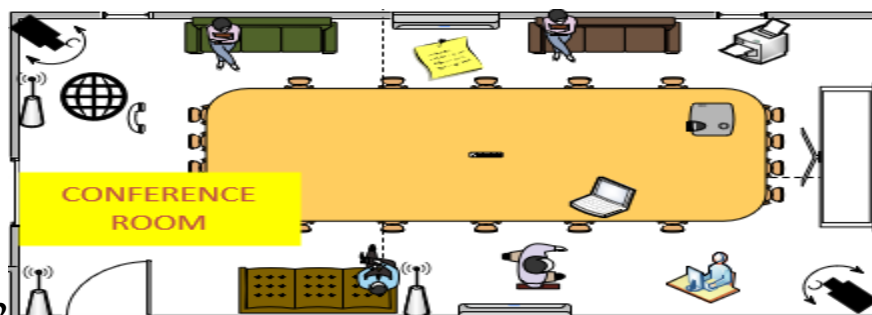


Figure 4.1.2

Resting room

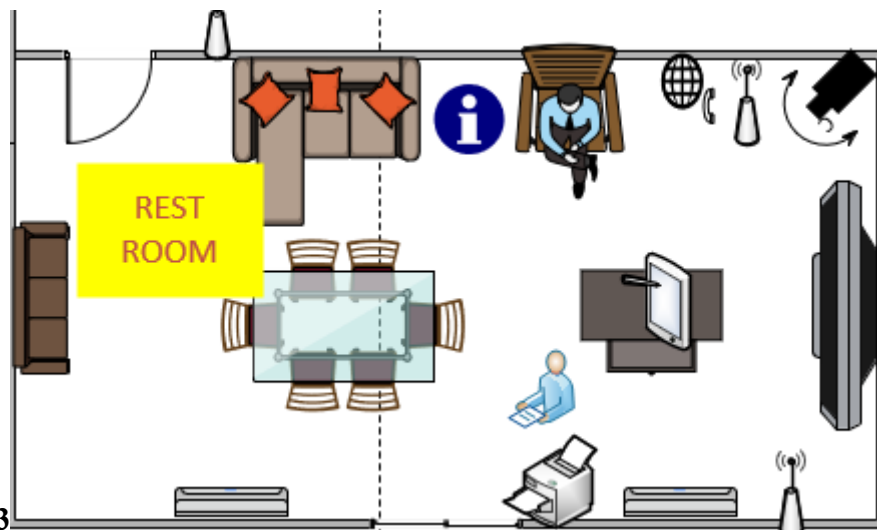


Figure 4.1.3.

Technical Assistant

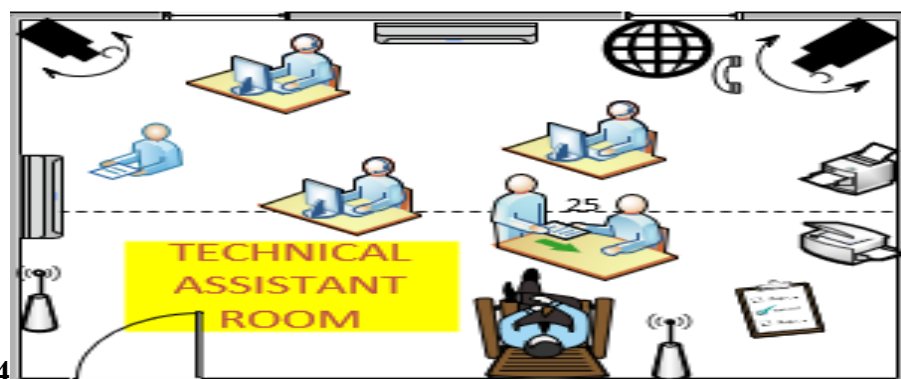


Figure 4.1.4

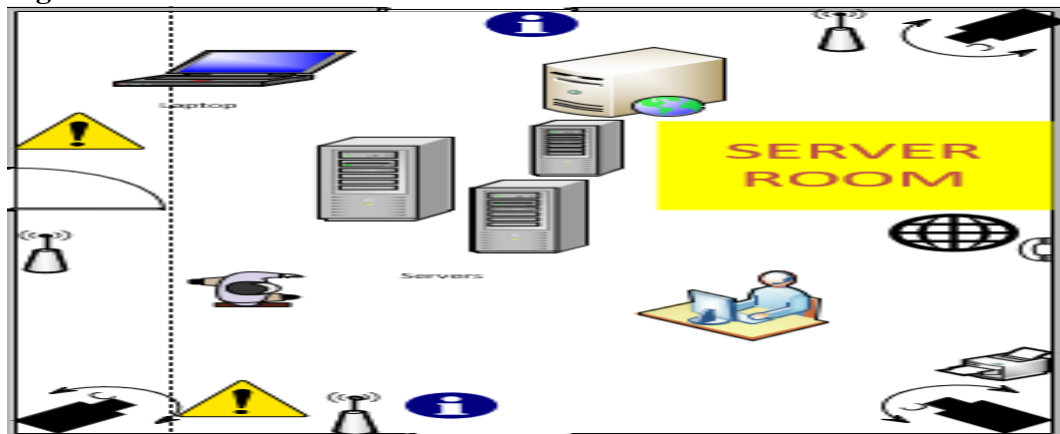
Development Hub



Figure 4.1.5

Server room

Figure 4.1.6



Washroom

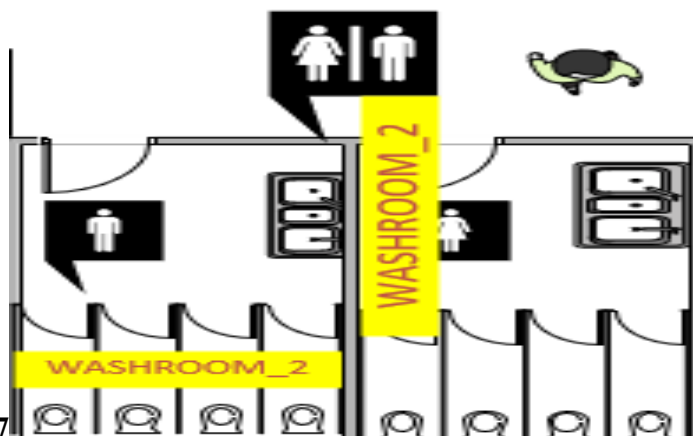


Figure 4.1.7

Network Diagram (Penang 2nd FLOOR)

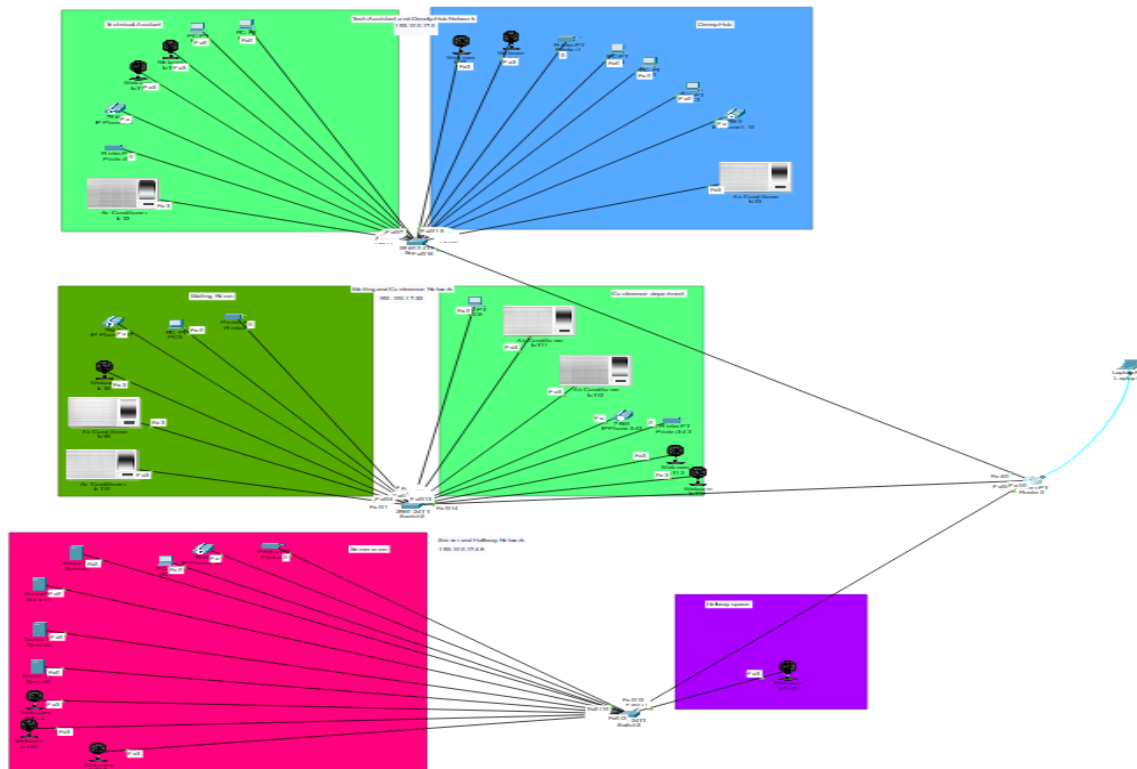


Figure 5.1.1

IP Addressing diagram (Penang 2nd FLOOR)

table 1

Second floor Penang 192.100.17.128/25									
	N host	Netwo ID	Subnet M	1st vHid	last Vhid	Broad id	host available	unused hosts	default gateway
tech_Asis	8	192.100.17.128/27	255.255.255.224	192.100.17.130/27	192.100.17.158/27	192.100.17.159/27	30	15	192.100.17.129/27
devel_hu	7								
confe_ro	7	192.100.17.160/28	255.255.255.240	192.100.17.162/28	192.100.17.174/28	192.100.17.175/28	14	1	192.100.17.161/28
rest_ro	6								
server_ro	11	192.100.17.176/28	255.255.255.240	192.100.17.178/28	192.100.17.190/28	192.100.17.191/28	14	2	192.100.17.177/28
hallway	1								

This is the table that represents the process performed in the VLSM method to segment the IP address of the departmental networks for a smooth connection. The total Ip address used according to this table is 40 and the remaining reserved are 36 Ip addresses.

Ip Route Command

Router Basic Configuration

Figure 5.1.2

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname Penang(2nd-Floor)
Penang(2nd-Floor)(config)#line console 0
Penang(2nd-Floor)(config-line)#password penang
Penang(2nd-Floor)(config-line)#login
Penang(2nd-Floor)(config-line)#exit
Penang(2nd-Floor)(config)#enable secret penang
Penang(2nd-Floor)(config)#service password-encryption
Penang(2nd-Floor)(config)#banner motd "Hey! This is a secured Network"
Penang(2nd-Floor)(config)#^Z
Penang(2nd-Floor)#
%SYS-5-CONFIG_I: Configured from console by console
```

Figure 5.1.3 shows the basic configuration of the router configured in Cisco Network Packet. In this figure you can see the name and password of the second-floor router. Basically, the commands are as follows, first you need to go to privilege executed mod with “en” and then it will allocate you to the next line where you must put config t to be able to make the configuration in the router such as the hostname, start-up password, and finally we enter the line to encrypt the password

Figure 5.1.3

```
Hey! This is a secure Network.







User Access Verification







Password:
Password:

Penang(2nd-Floor)>
```

User Access for Verification

This message will appear on the main screen so that the user can access the system, and it is only and exclusively accessible to authorized users.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	Techn...	Dev-IoT7-...	ICMP		0.000	N	0	(edit)	(delete)
	Successful	IoT0-...	Dev-IoT5-...	ICMP		0.000	N	1	(edit)	(delete)
	Successful	IoT0-...	Tech-PC0-...	ICMP		0.000	N	2	(edit)	(delete)

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	Techn...	Dev-PC3-...	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Tech-...	Server-Pri...	ICMP		0.000	N	1	(edit)	(delete)
	Successful	Serve...	Hallway-Io...	ICMP		0.000	N	2	(edit)	(delete)

The figures above show the end device connection paths, which gives a good signal for profitable and productive work. Thus, the different departments are interconnected, and data can be transmitted from one side to another at a good time or in less time due to the well-designed configuration of the floor 2.

Show IP Route Command

Figure 5.1.4

```

Penang(2nd-Floor)>en
Password:
Penang(2nd-Floor)#config t
Enter configuration commands, one per line. End with CNTL/Z.
Penang(2nd-Floor)(config)#int f0/0
Penang(2nd-Floor)(config-if)#ip address 192.100.17.129 255.255.255.224
Penang(2nd-Floor)(config-if)#no shutdown
Penang(2nd-Floor)(config-if)#exit
Penang(2nd-Floor)(config)#int f1/0
Penang(2nd-Floor)(config-if)#ip address 192.100.17.161 255.255.255.240
Penang(2nd-Floor)(config-if)#no shutdown
Penang(2nd-Floor)(config-if)#int f2/0
Penang(2nd-Floor)(config-if)#ip address 192.100.17.177 255.255.255.240
Penang(2nd-Floor)(config-if)#no shutdown
Penang(2nd-Floor)(config-if)#exit
Penang(2nd-Floor)(config)#exit
Penang(2nd-Floor)#
%SYS-5-CONFIG_I: Configured from console by console

```

Basically, in the case of figure 5.1.4, it shows the information or connection of the interfaces set for the configuration of the three selected Switches. The main interfaces to focus on are interface f0/0 (192.100.17.129), interface f1/0 (192.100.17.161), and finally interface f2/0 (192.100.17.177) together with their subnet mask and gateway.

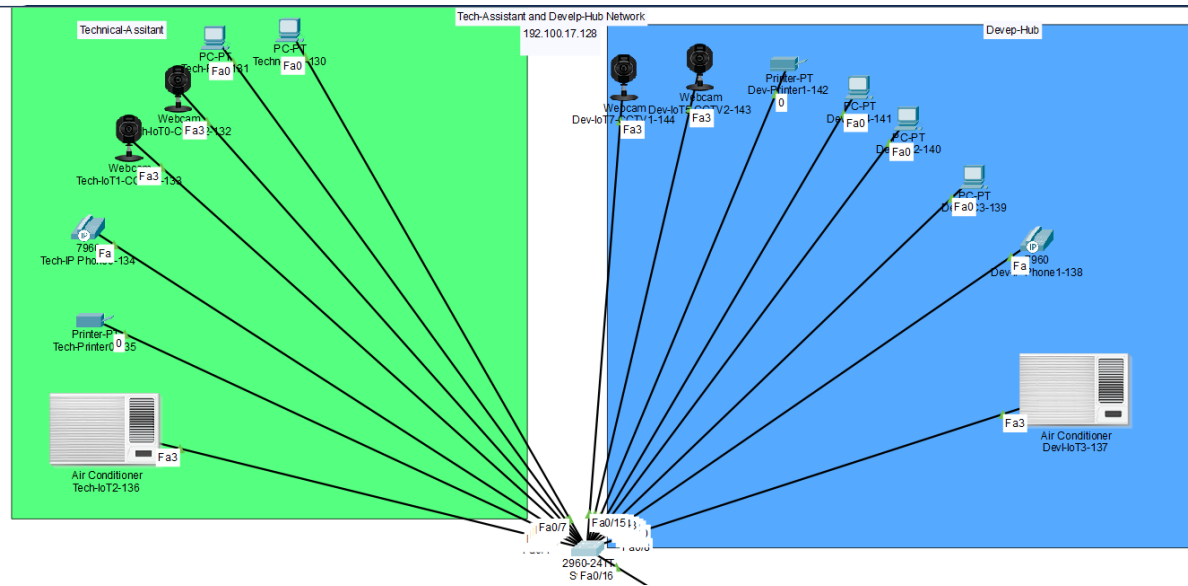
Show Run Command

Figure 5.1.5

```
!
interface FastEthernet0/0
  ip address 192.100.17.129 255.255.255.224
  duplex auto
  speed auto
!
interface FastEthernet1/0
  ip address 192.100.17.161 255.255.255.240
  duplex auto
  speed auto
!
interface FastEthernet2/0
  ip address 192.100.17.177 255.255.255.240
  duplex auto
  speed auto
!
interface FastEthernet3/0
  no ip address
  duplex auto
  speed auto
!
interface FastEthernet4/0
  ip address 192.100.17.1 255.255.255.224
  duplex auto
  speed auto
  shutdown
!
```

The command of show run (sh run) allows you to see the configuration that you have done in the network such as interfaces, password, login, etc., in figure above(5.1.5) you are able to see the interfaces used o Cisco Packet Tracer that are showed in said figure above: int f0/0 with its IP address(192.100.17.129), the next one is int f1/0 with 192.100.17.161 and the last one is configured as int f2/0 with 192.100.17.177. Besides the gateways you can see the values of their subnet mask as well.

1st Switch (Tech-Assistant and Develop-Hub)



Technical Assistant				
Device	IP address	Subnet mask	Broad.id	Default gateway
Techn-PC1	192.100.17.130	255.255.255.224	192.100.17.159	192.100.17.129
Tech-PC0	192.100.17.131			
Tech-IoT0-CCTV2	192.100.17.132			
Tech-IoT1-CCTV1	192.100.17.133			
Tech-IP Phone0-	192.100.17.134			
Tech-Printer0	192.100.17.135			
Tech-IoT2	192.100.17.136			

Table 2

Development Hub				
Device	IP address	Subnet mask	Broad.id	Default gateway
Dev-IOT3	192.100.17.137	255.255.255.224	192.100.17.159	192.100.17.129
Dev-IP Phone1	192.100.17.138			
Dev-IP Phone1	192.100.17.139			
Dev-PC2	192.100.17.140			
Dev-PC4	192.100.17.141			
Dev-Printer1	192.100.17.142			
Dev-IOT5-CCTV2	192.100.17.143			
Dev-IOT7-CCTV1	192.100.17.144			

Table 3

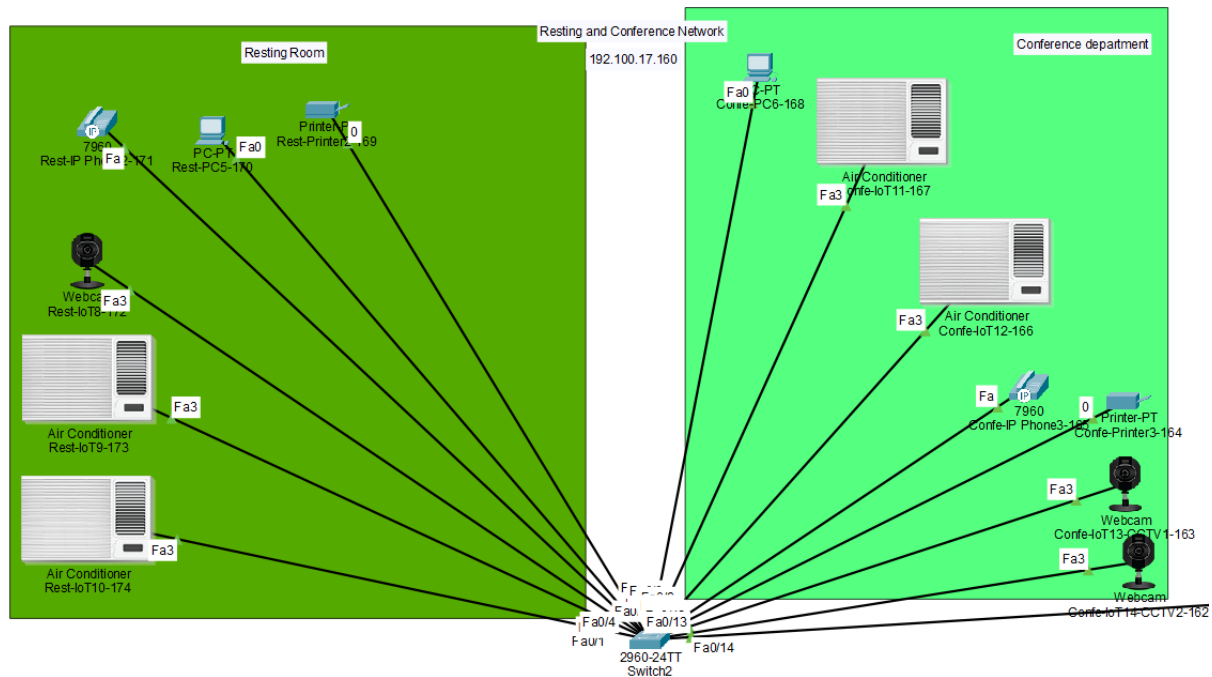
```

Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname Dev-Tech-Room
Dev-Tech-Room(config)#line console 0
Dev-Tech-Room(config-line)#password penang
Dev-Tech-Room(config-line)#login
Dev-Tech-Room(config-line)#exit
Dev-Tech-Room(config)#enable secret penang
Dev-Tech-Room(config)#service password-encryption
Dev-Tech-Room(config)#banner motd "Hey! This is a secured network."
Dev-Tech-Room(config)#^Z
Dev-Tech-Room#
%SYS-5-CONFIG_I: Configured from console by console

```

As I mentioned previously in here, we are having a connection of two different rooms, the one of Technical Assistant and the other one that is Development Hub. So, both rooms have a total of 15 host machines since Technical Assistant got 8 host machines and Development Hub is providing 7 host machines. The IP address provided by Internet Service Provider by default is 192.100.17.128/25 but through VLSM method we got two different IP addresses: Technical Assistant with IP address of 192.100.17.128/27 and Development Hub with 192.100.128/27, both have the same network id. So, they are connected to the same network. In the tables above (table 2 and 3), you can clearly see the information of both rooms such as subnet mask, default gateway, IP address of each end device, etc. Moreover, on the other hand, you can see the configuration of Switch for this specific network.

2nd Switch (Resting--room and Conference)



Resting room				
Device	IP address	Subnet mask	Broad.id	Default gateway
Rest-Printer2	192.100.17.169	255.255.255.240	192.100.17.175	192.100.17.161
Rest-PC5	192.100.17.170			
Rest-IP Phone	192.100.17.171			
Rest-Webcam	192.100.17.172			
Rest-Webcam	192.100.17.173			
Rest-Webcam	192.100.17.174			

Table 4

Conference -room				
Device	IP address	Subnet mask	Broad.id	Default gateway
Confe-IoT14-CCTV2	192.100.17.162	255.255.255.240	192.100.17.175	192.100.17.161
Confe-IoT13-CCTV1	192.100.17.163			
Confe-Printer3	192.100.17.164			
Confe-IP Phone3	192.100.17.165			
Confe-IoT12	192.100.17.166			
Confe-IoT11	192.100.17.167			
Confe-PC6	192.100.17.168			

Table 5

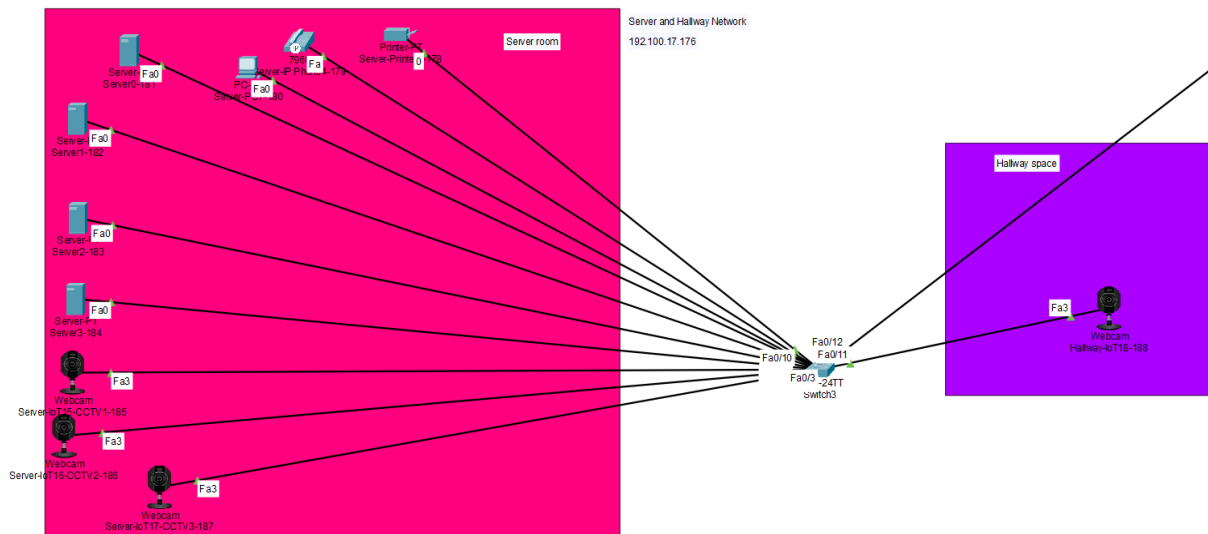
```

Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname Con-Wa-Room
Con-Wa-Room(config)#line console 0
Con-Wa-Room(config-line)#password penang
Con-Wa-Room(config-line)#login
Con-Wa-Room(config-line)#exit
Con-Wa-Room(config)#enable secret penang
Con-Wa-Room(config)#service password-encryption
Con-Wa-Room(config)#banner motd "Hey! This is a secured network.
Con-Wa-Room(config)#^Z
Con-Wa-Room#
%SYS-5-CONFIG_I: Configured from console by console

```

Here, we are having a connection of two different rooms, the one of Conference and the other one that is Resting room. So, both rooms have a total of 13 used host machines since Conference got 7 host machines and Resting room is providing 6 host machines. The IP address provided by Internet Service Provider by default is 192.100.17.128/25 but through VLSM method we got same addresses: Conference with IP address of 192.100.17.160/28 and Resting room with 192.100.160/28, both have the same network id. So, they are connected to the same network. In the tables above (table 4 and 5), you can clearly see the information of both rooms such as subnet mask, default gateway, IP address of each end device, etc. Moreover, on the other hand, you can see the configuration of Switch for this specific network.

3rd Switch (Server and Hallway)



Server and -Hallway				
Device	IP address	Subnet mask	Broad.id	Default gateway
Server-Printer4	192.100.17.178	255.255.255.240	192.100.17.191	192.100.17.177
Server-IP Phone4	192.100.17.179			
Server-PC7	192.100.17.180			
Server0	192.100.17.181			
Server1	192.100.17.182			
Server2	192.100.17.183			
Server3	192.100.17.184			
Server-IoT15-CCTV1	192.100.17.185			
Server-IoT16-CCTV2	192.100.17.186			
Server-IoT17-CCTV3	192.100.17.187			
Hallway-IoT18	192.100.17.188			

Table 6

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname ser-hall-Room
ser-hall-Room(config)#line console 0
ser-hall-Room(config-line)#password penang
ser-hall-Room(config-line)#login
ser-hall-Room(config-line)#exit
ser-hall-Room(config)#enable secret penang
ser-hall-Room(config)#service password-encryption
ser-hall-Room(config)#banner motd "Hey! This is a secured network"
ser-hall-Room(config)#^Z
ser-hall-Room#
%SYS-5-CONFIG_I: Configured from console by console
```

Here, we are having a connection of two different rooms, the one of Server and the other one that is Hallway. So, both rooms have a total of 12 used host machines since Server got 11 host machines and Hallway is providing just one host machines. The IP address provided by Internet Service Provider by default is 192.100.17.128/25 but through VLSM method we got same network id: Server with network id of 192.100.17.176/28 and Hallway with 192.100.176/28, both have the same network id. So, they are connected to the same network. In the tables above (table 6), you can clearly see the information of both rooms such as subnet mask, default gateway, IP address of each end device, etc. Moreover, on the other hand, you can see the configuration of Switch for this specific network.

CONCLUSION

At the end of everything, it has been possible to verify the success in the configuration of the new building in Penang, specifically on the second floor. The connection between different department is very fluid due to a good segmentation of IP addresses and three different switches connected to the same network or router where data can be transferred from one department to another through the gateway of each switch. The computer or laptop has played a very important role in this project because it has been useful in configuring both the switches and the router as well as the interfaces of the network. Additionally, this work has been concluded. The basic concepts of introduction to Networking have been applied from the configuration of the Router, Switch, interfaces to each end device connected to the network of floor 2 in Penang. In this work I have applied necessary knowledge I have acquired on Introduction to Networking. The company of this project is called System.com which is a premier enterprise software company offering multiple products at scale in the B2B SaaS space.

REFERENCES

None.