Soho Network

In this project, I am taking one of the lab from Guru Tech networking training YouTube channel Gurutech Networking Training - YouTube playlist. The task is to create SOHO network topology for a new branch with minimal nodes.

XYZ company is a fast-growing company in Eastern Australia with more than 2 million customers globally. The company deals with selling and buying of food items, which are basically operated from the headquarters. The company is intending to open a branch near the local village Bonalbo. Thus, the company requires young IT graduates to design the network for the branch. The network is intended to operate separately from the HQ network.

Being a small network, the company has the following requirements during implementation;

a) One router and one switch to be used (all CISCO products).
b) 3 departments (Admin/IT, Finance/HR and Customer service/Reception)
c) Each department is required to be in different VLANS.
d) Each department is required to have wireless network for the users.
e) Host devices in the network are required to obtain IPv4 address automatically.
f) Devices in all the departments are required to communicate with each other.

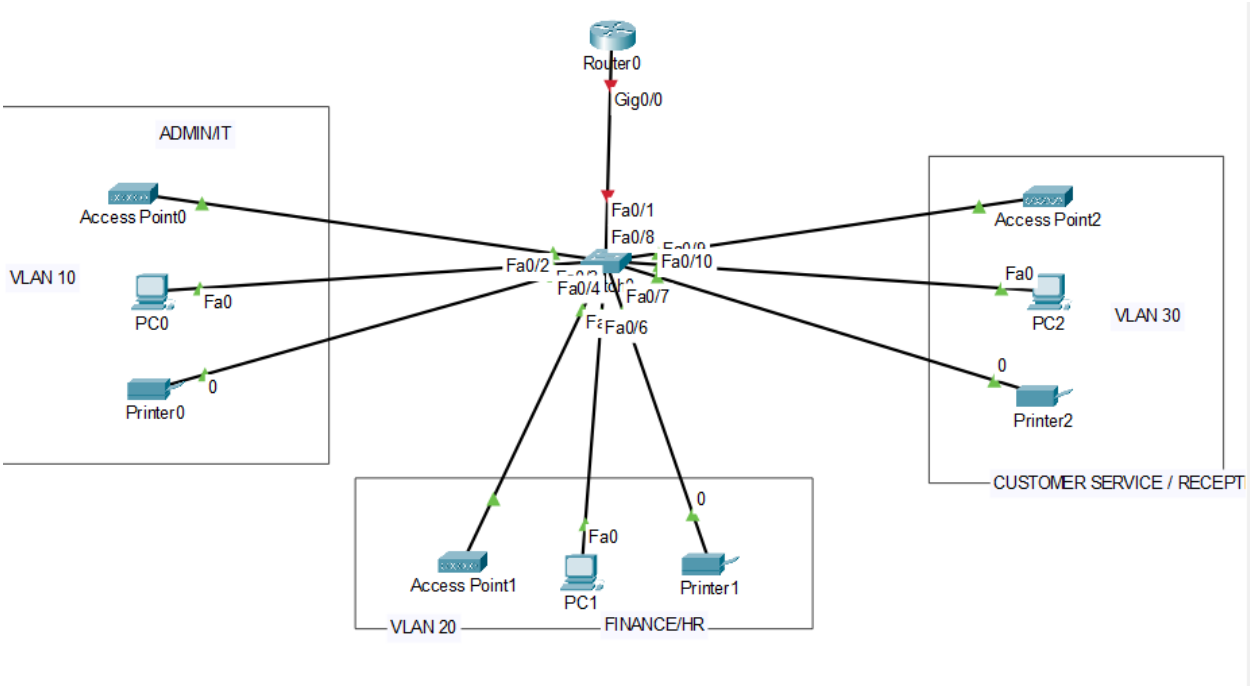
Assume the ISP gave out a base network of 192.168.1.0, you as the young network engineer who has been hired, design and implement a network considering the above requirements.

Requirements:

1. One Router and one switch to be used.
    a. The disadvantage here, the company can face Single point of failure anytime in future. if either switch or router is deactivated, the whole company can lose connectivity to other branches.
2. 3 Departments (Admin/IT/, Finance/HR and Customer service/Reception)
3. Each department is required to be in different VLANS.
4. Each department is required to have wireless network for users.
5. Host devices in the network are required to obtain IPV4 address automatically.
6. Devices in all departments are required to communicate with each other.

The Internet Service Provider has given an IP address to new branch - 192.168.1.0 255.255.255.0

Lab Topology



Step 1: Create 3 subnets from given IP address

Subnets	1	2	3	Subnet Mask
Network IP	192.168.1.0	192.168.1.64	192.168.1.128	255.255.255.192
Broadcast IP	192.168.1.63	192.168.1.127	192.168.1.191	255.255.255.192
Host Range	192.168.1.1 - 192.168.1.62	192.168.1.65- 192.168.1.126	192.168.1.129- 192.168.1.190	255.255.255.192

Step 2: Configure 3 VLANs in switch and allocate PC's to unused ports

Also, change f0/1 port which connects the router to trunk port.

Vlan 10:

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int range f0/2-4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
Switch(config-if-range)#
```

Vlan 20:

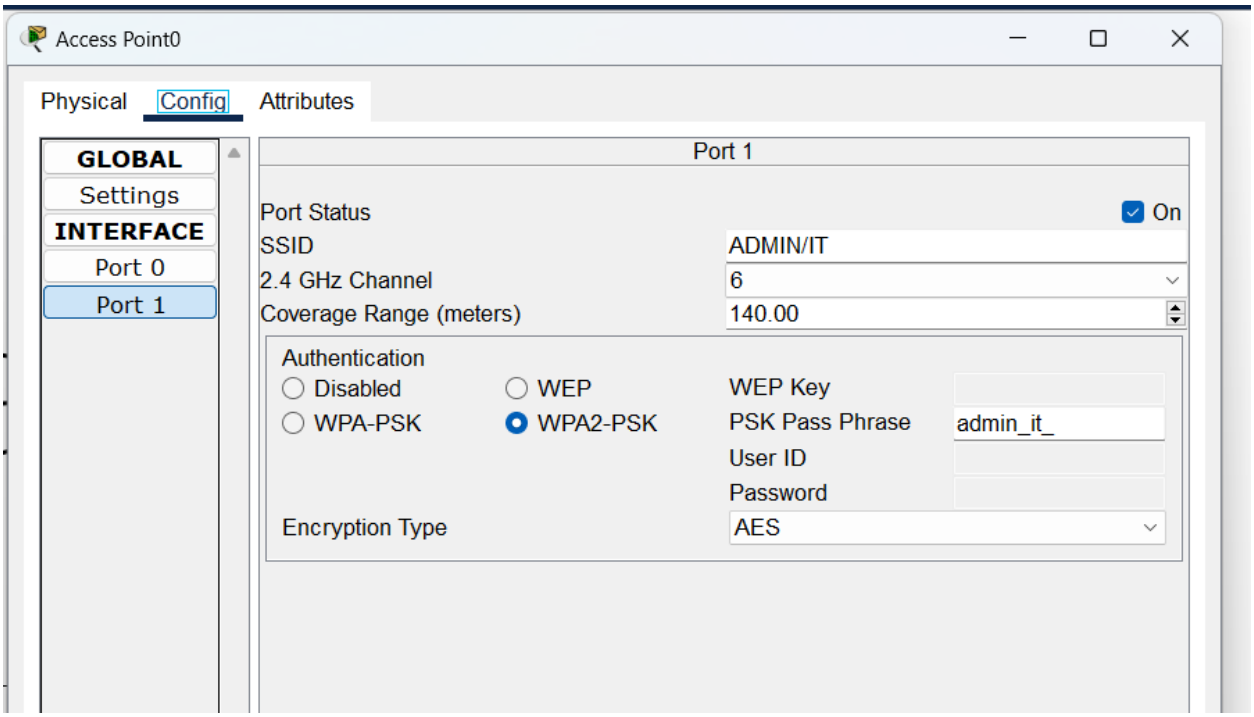
```
Switch(config-if-range)#
Switch(config-if-range)#ex
Switch(config)#int range f0/5-7
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan20
                                               ^
% Invalid input detected at '^' marker.

Switch(config-if-range)#switchport access vlan 20
% Access VLAN does not exist. Creating vlan 20
Switch(config-if-range)#
```

Vlan 30:

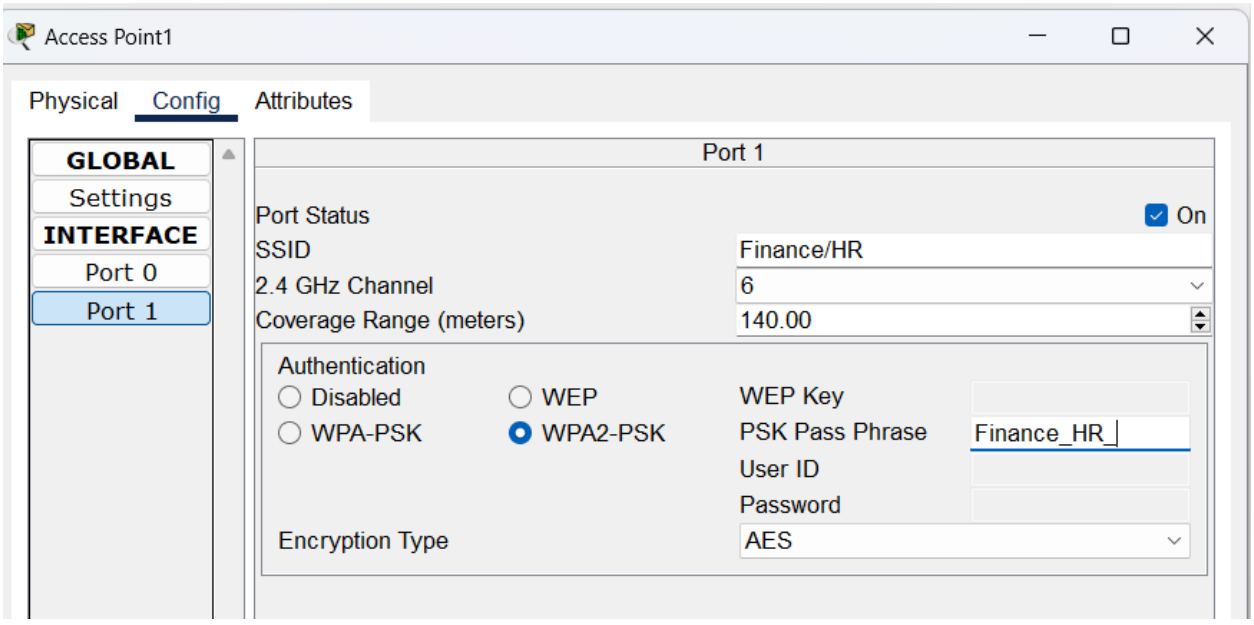
```
Switch(config)#int range f0/8-10
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 30
% Access VLAN does not exist. Creating vlan 30
Switch(config-if-range)#
```

Step 3: Assign 3 Access points SSID name and activate Layer 2 security WPA2-psk. Provide PSK password of minimum 8 characters.

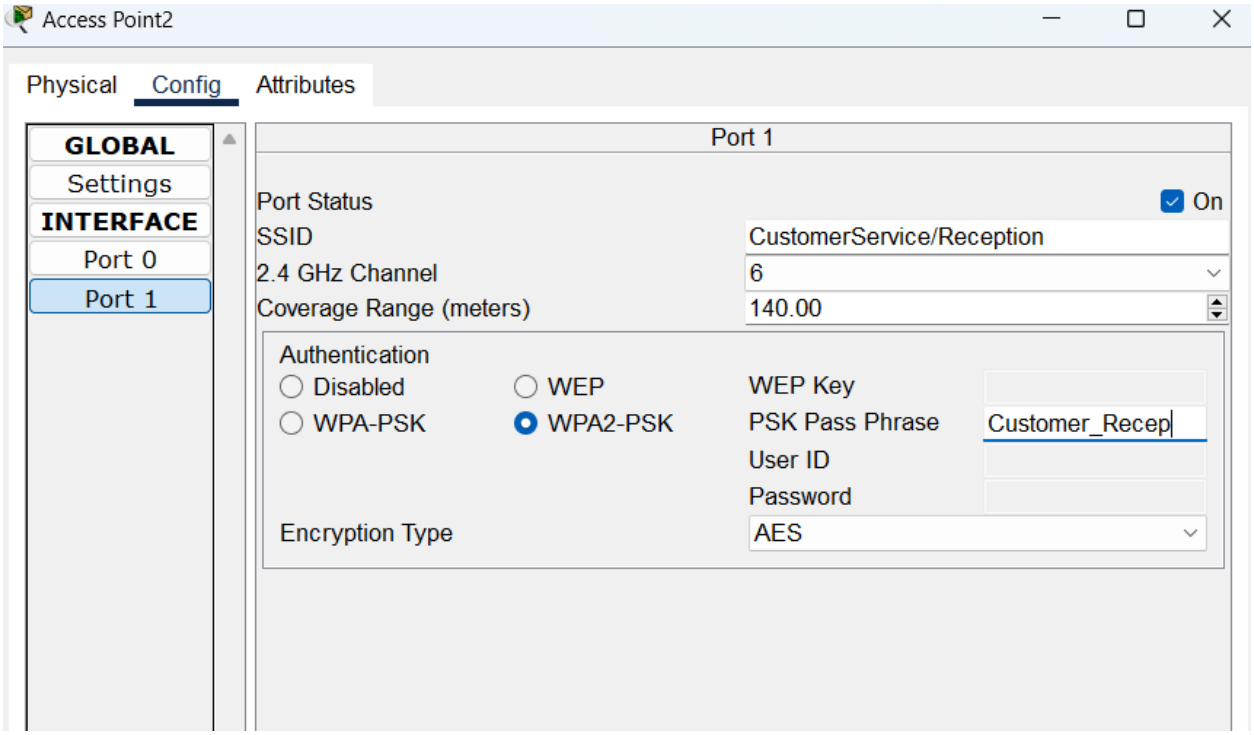
Access Point in Admin/IT section :



Access Point in Finance/HR section:



Access Point in CustomerService/Reception



Step 4: Configure Router gigabit port 0/0 as no shutdown. Also, Divide the port into sub interfaces to allocate 3 VLANS. This let's individual VLAN PC to route to a different VLAN PC.

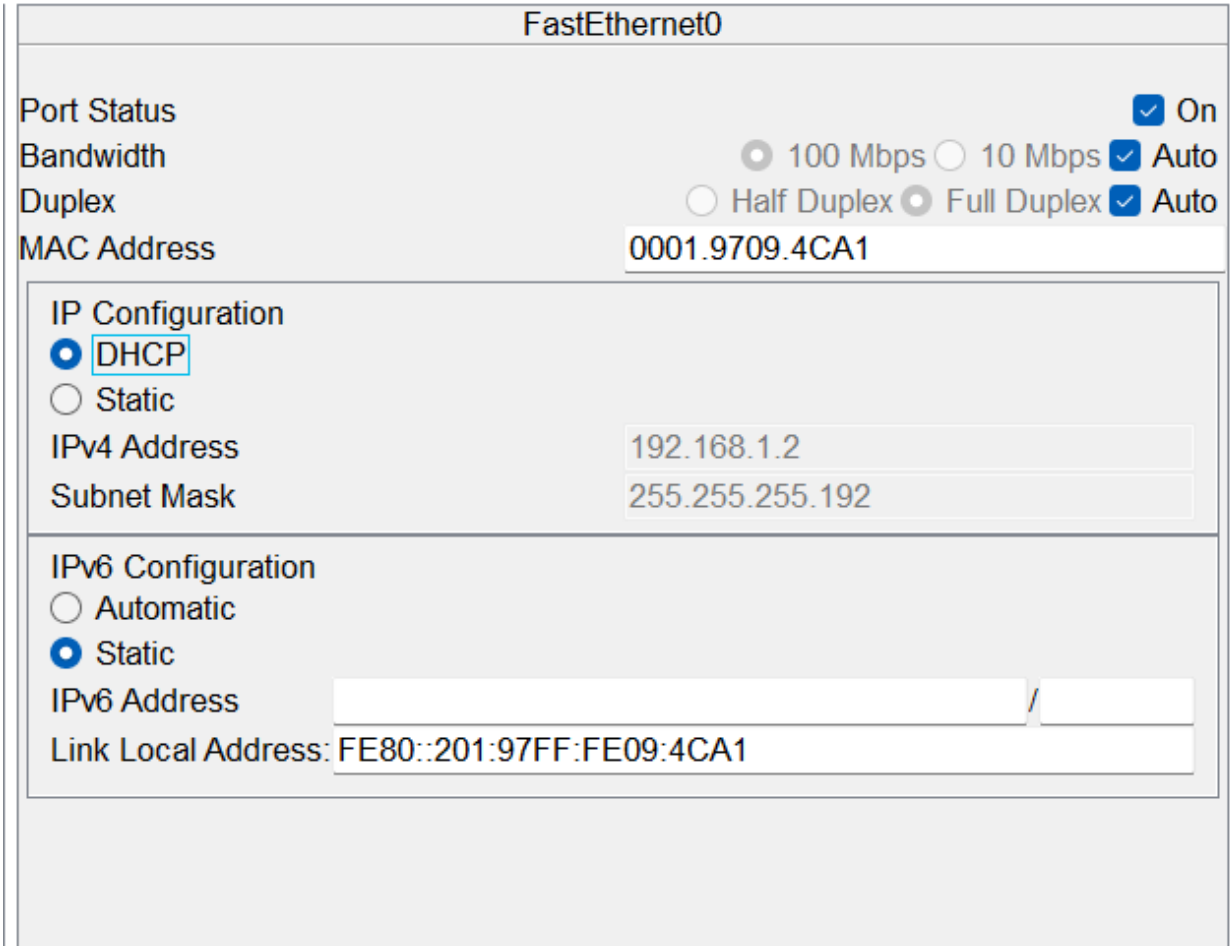
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed
state to up
```

```
Router>
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int g0/0.10
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.10, changed state to
up

Router(config-subif)#encap
Router(config-subif)#encapsulation dot1q 10
Router(config-subif)#ip add 192.168.1.1 255.255.255.192
Router(config-subif)#ex
Router(config)#int g0/0.20
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.20, changed state to
up

Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip add 192.168.1.65 255.255.255.192
Router(config-subif)#ex
Router(config)#int g0/0.30
Router(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.30, changed state to
up

Router(config-subif)#encapsulation dot1q 30
Router(config-subif)#ip add 192.168.1.129 255.255.255.192
Router(config-subif)#
```

Step 5: Create DHCP pool addresses for each VLAN and assign default router address.

```
Router(config)#service dhcp
Router(config)#ip dhcp pool VLAN_10
Router(dhcp-config)#network 192.168.1.0 255.255.255.192
Router(dhcp-config)#default-router 192.168.1.1 ?
  <cr>
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#domain-name admin.com
Router(dhcp-config)#exit
Router(config)#ip dhcp pool VLAN_20
Router(dhcp-config)#network 192.168.1.64 255.255.255.192
Router(dhcp-config)#default-router 192.168.1.65
Router(dhcp-config)#domain-name Finance_HR.com
Router(dhcp-config)#ex
Router(config)#ip dhcp pool VLAN_30
Router(dhcp-config)#network 192.168.1.128 255.255.255.192
Router(dhcp-config)#default-router 192.168.1.129
Router(dhcp-config)#domain-name Customer_Service.com
Router(dhcp-config)#ex
```

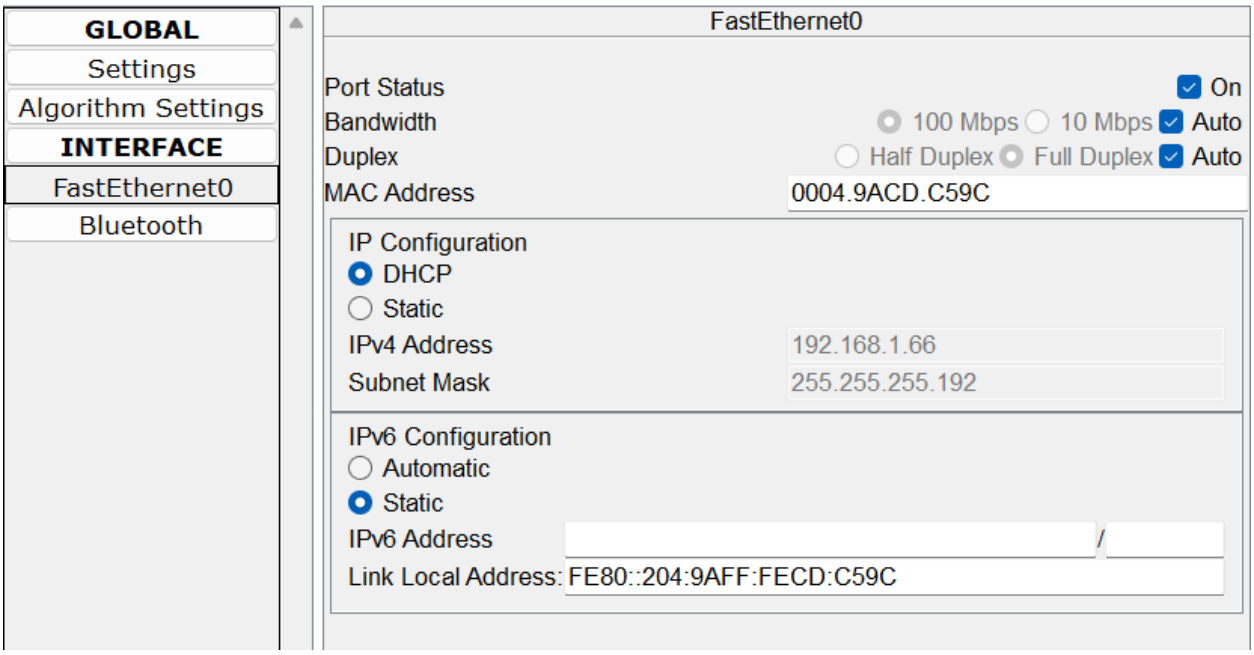
Step 6: Assign IP address to PC using DHCP service.



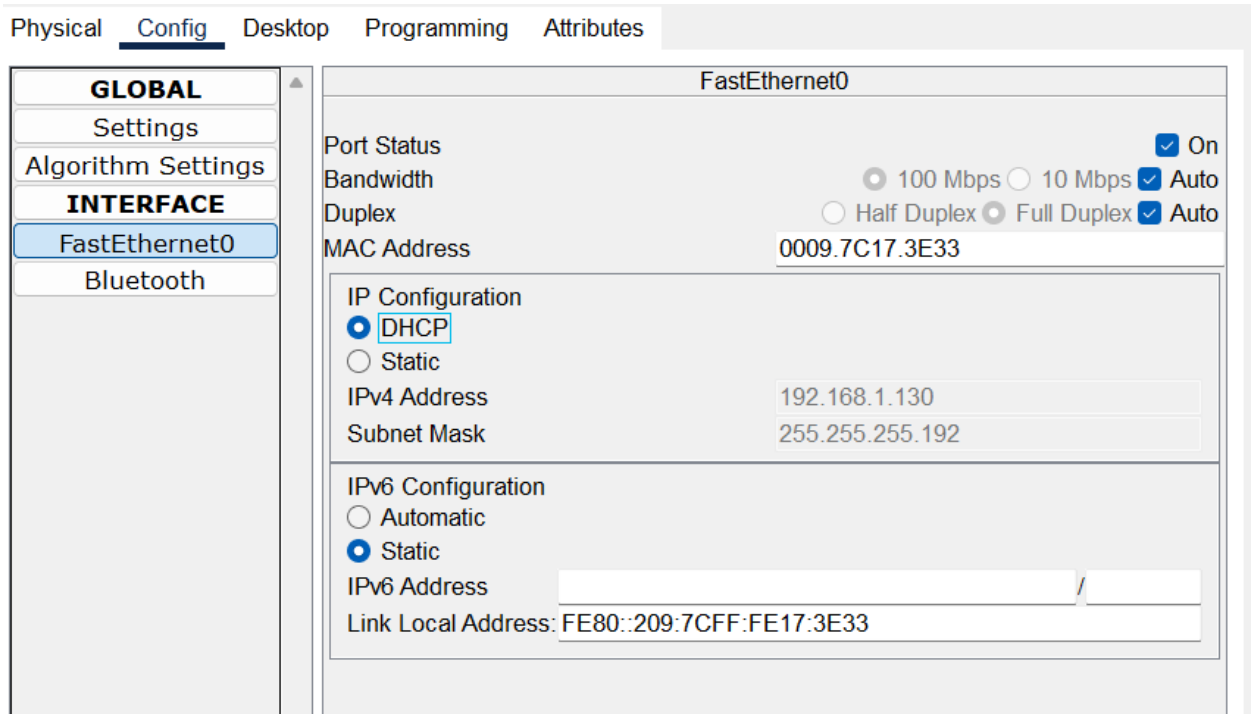
PC-0 is allocated the first available IP from DHCP pool VLAN_10.

Repeat the same steps for other PC's.

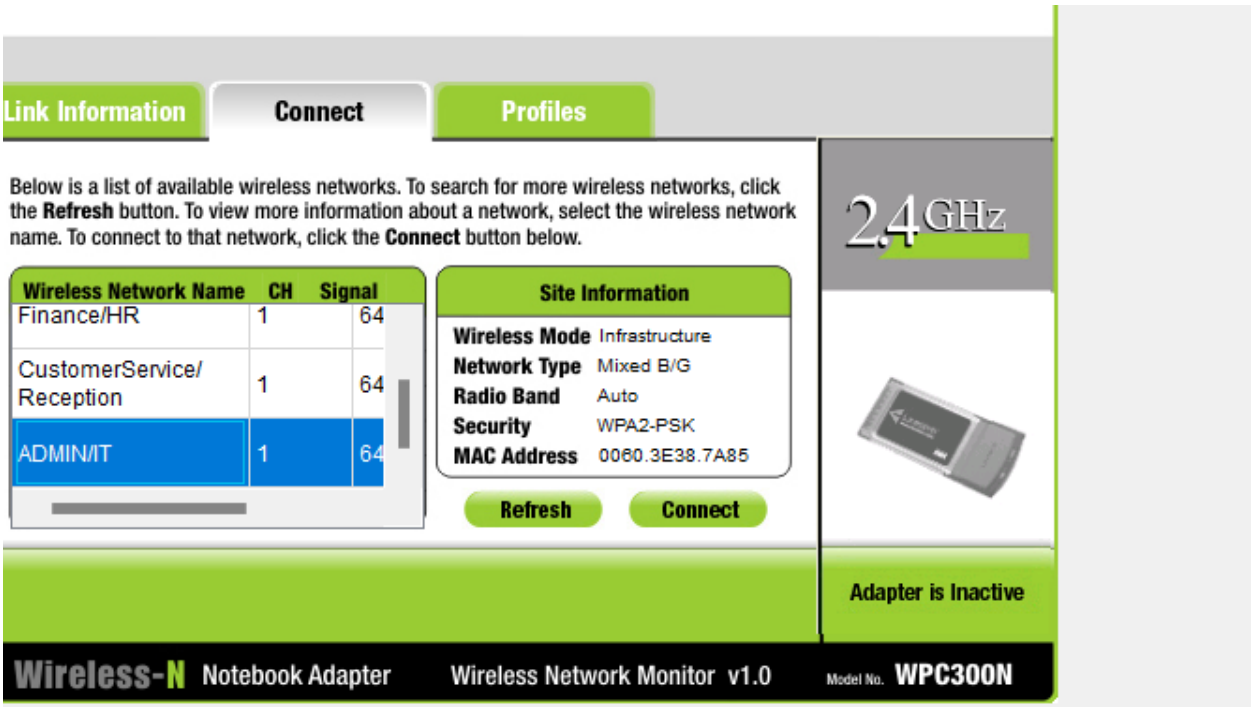
PC-1 in Finance sector:



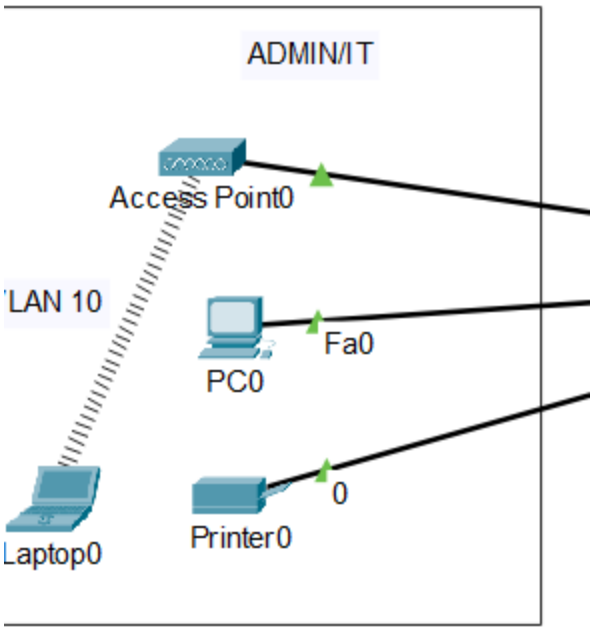
PC-2 in Customer_service sector:



Step 7: Connect Wireless clients to their respective access point.


Link Information
Connect
Profiles
Below is a list of available wireless networks. To search for more wireless networks, click the Refresh button. To view more information about a network, select the wireless network name. To connect to that network, click the Connect button below.
Wireless Network Name
CH
Signal
Finance/HR
1
64
CustomerService/ Reception
1
64
ADMIN/IT
1
64
Site Information
Wireless Mode Infrastructure
Network Type Mixed B/G
Radio Band Auto
Security WPA2-PSK
MAC Address 0060.3E38.7A85
Refresh
Connect
2.4GHz
Adapter is Inactive
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
Model No. WPC300N


WPA2-Personal Needed for Connection
This wireless network has WPA2-Personal enabled. To connect to this network, enter the required passphrase in the appropriate field below. Then click the Connect button.
Security
WPA2-Perso
Please select the wireless security method used by your existing wireless network.
Pre-shared Key
admin_it_
Please enter a Pre-shared Key that is 8 to 63 characters in length.
Cancel
Connect
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
Model No. WPC300N


ADMIN/IT
Access Point0
LAN 10
Fa0
PC0
0
Printer0
Laptop0