CIS315: Communications & Network Fundamentals - Project (FINAL)
Term 1 – 2022/2023

Final Project

Group #: 1

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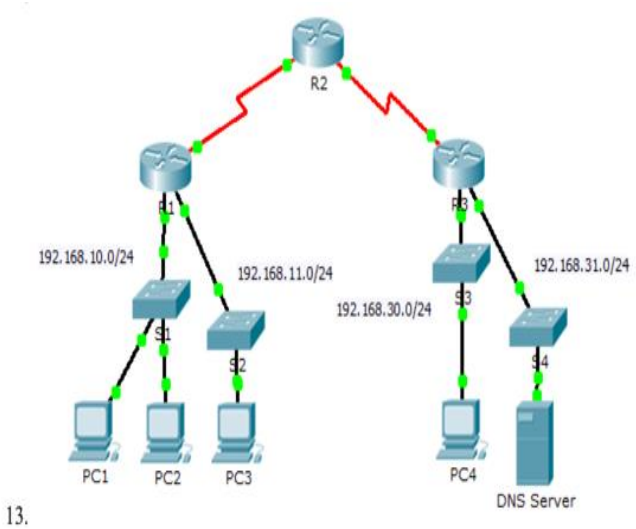
Title and Topology of the Project:

Title : Office network



13.

Topology number 13 :

Abstract:

The report shows the designing and implementation of a network (topology 13). The main goal of this project is to establish connection of an office network which consisting of LANs and their ability to share files between devices. The topology that we used is consisting of different configuration such as Routers Configuration, Routing Table configuration, IP phone (VoIP) configuration, switch for VLANs configuration also, access point configuration.

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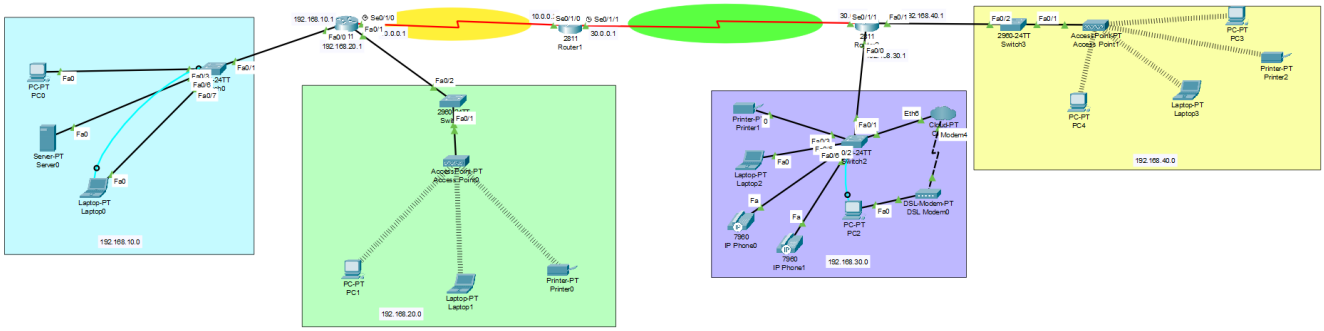
1.0 Introduction:

In this project, we built a network for an office that contains multiple LANs. The office needs to share and exchange information and files, so our topology enables communication and information exchange between different departments.

2.0 Network scenario:

Our topology contains of central router called Router1 that connects two other routers contains their networks. In this scenario let's say you are in the blue building and you are using PC0 and you want to send an important file to someone that is in the yellow building using Laptop4, the massage will go through Switch0 to Router0 to Router1 then to Router2 to the Switch3 and then to Access Point1 then to the Laptop4 where the destination is. Thus, there are lots of other scenarios to happen like using the VoIP phone to call someone from another department and lots more.

3.0 Network design:



3.1 Devices Used in the topology:

Assist	Quantity
Laptop	4
printer	2
Access point	2
PC	5
Switches	3
Routers	3
Serial DCE cables	2
Straight-through cables	15
IP Phone	2
Server	1
Modem	1
Cloud	1
Console Cable	2

3.2 Addressing Table:

Device	Interface	IP Address	Subnet Mask	Default Gateway
Router0	Fa0/0	192.168.10.1	255.255.255.0	-
Router0	Fa0/1	192.168.20.1	255.255.255.0	-
Router0	Se0/1/0	10.0.0.1	255.255.255.0	-
Router1	Se0/1/0	10.0.0.2	255.255.255.0	-
Router1	Se0/1/1	30.0.0.1	255.255.255.0	-
Router2	Se0/1/1	30.0.0.2	255.255.255.0	-
Router2	F0/0	192.168.30.1	255.255.255.0	-
Router2	F0/1	192.168.40.1	255.255.255.0	-
PC0	NIC	192.168.10.2	255.255.255.0	192.168.10.1
PC1	Wireless	192.168.20.5	255.255.255.0	192.168.20.1
PC2	NIC	192.168.30.3	255.255.255.0	192.168.30.1
PC3	Wireless	192.168.40.5	255.255.255.0	192.168.40.1
PC4	Wireless	192.168.40.12	255.255.255.0	192.168.40.1
Laptop0	NIC	192.168.10.3	255.255.255.0	192.168.10.1
Laptop1	Wireless	192.168.20.9	255.255.255.0	192.168.20.1
Laptop2	NIC	192.168.30.2	255.255.255.0	192.168.30.1
Laptop3	Wireless	192.168.40.4	255.255.255.0	192.168.40.1
Printer0	Wireless	192.168.50.3	255.255.255.0	192.168.50.1
Printer1	Wireless	192.168.20.7	255.255.255.0	192.168.20.1
Printer2	Wireless	192.168.40.6	255.255.255.0	192.168.40.1
IP Phone1	Switch	192.168.50.2	-	192.168.50.1
IP Phone 2	Switch	192.168.50.3	-	192.168.50.1
Server0	**Fa0/2**	**192.168.10.5**	**255.255.255.0**	192.168.10.1

4.0 Configuration of the network devices:

4.1 Configuring the Routers

4.1.1 Configuring Router0

```
Router0>enable
Router0#configure terminal
Router0(config)#interface FastEthernet0/0
Router0(config-if)#ip address 192.168.10.1 255.255.255.0
Router0(config-if)#no shutdown
Router0(config)#interface FastEthernet0/1
Router0(config-if)#ip address 192.168.20.1 255.255.255.0
Router0(config-if)#no shutdown
Router0(config)#interface se0/1/0
Router0(config-if)#ip address 10.0.0.1 255.255.255.0
Router0(config-if)#no shutdown
```

4.1.2 Configuring Router1

```
Router1>enable
Router1#configure terminal
Router1(config)#interface se0/1/0
Router1(config-if)#ip address 10.0.0.2 255.255.255.0
Router1(config-if)#no shutdown
Router1(config)#interface se0/1/1
Router1(config-if)#ip address 30.0.0.1 255.255.255.0
Router1(config-if)#no shutdown
```

4.1.3 Configuring Router2

```
Router2>enable
Router2#configure terminal
Router2(config)#interface FastEthernet0/0
Router2(config-if)#ip address 192.168.30.1 255.255.255.0
Router2(config-if)#no shutdown
Router2(config)#interface FastEthernet0/1
Router2(config-if)#ip address 192.168.40.1 255.255.255.0
Router2(config-if)#no shutdown
Router2(config)#interface se0/1/1
Router2(config-if)#ip address 30.0.0.2 255.255.255.0
Router2(config-if)#no shutdown
```

4.2 Routing Table

4.2.1 Create Routing Table for Router0

```
Router0(config)# ip route 30.0.0.0 255.255.255.0 10.0.0.2
Router0(config)# ip route 192.168.30.0 255.255.255.0 10.0.0.2
Router0(config)# ip route 192.168.40.0 255.255.255.0 10.0.0.2
```

4.2.2 Create Routing Table for Router1

```
Router1(config)# ip route 192.168.10.0 255.255.255.0 10.0.0.1
Router1(config)# ip route  192.168.20.0 255.255.255.0 10.0.0.1
Router1(config)# ip route 192.168.30.0 255.255.255.0 30.0.0.2
Router1(config)# ip route 192.168.40.0 255.255.255.0 30.0.0.2
```

4.2.3 Create Routing Table for Router2

```
Router2(config)# ip route 10.0.0.0 255.255.255.0 30.0.0.1
Router2(config)# ip route 192.168.10.0 255.255.255.0 30.0.0.1
Router2(config)# ip route 192.168.20.0 255.255.255.0 30.0.0.1
```

4.3 VoIP configuration

4.3.1 Configuring DHCP pool server on Router2

```
Router2(config)#ip dhcp pool Phone
Router2(dhcp-config) #network 192.168.30.0 255.255.255.0
Router2(dhcp-config)#default-router 192.168.30.1
Router2(dhcp-config)#option 150 ip 192.168.30.1
Router2(dhcp-config)#exit
```

4.3.2 Configuring the call manger on Router2

```
Router2(config)#telephony-service
Router2(config-telephony)#max-dn 5
Router2(config-telephony)#max-ephones 5
Router2(config-telephony)#ip source-address 192.168.30.1 port 2000
Router2(config-telephony)#auto assign 4 to 6
Router2(config-telephony)#auto assign 1 to 5
Router2(config-telephony)#exit
Router2(config)#ephone-dn 1
Router2(config-ephone-dn)#number 1001
Router2(config)#ephone-dn 2
Router2(config-ephone-dn)#number 1002
Router2(config-ephone-dn)# exit
```

4.3.3 Configure a voice vlan on Switch2

```
Switch2>enable

Switch2# configure terminal

Switch2(config)#interface range fa0/1 – 24

Switch2(config-if-range)#switchport mode access

Switch2(config-if-range)#switchport voice vlan 1

Switch2(config-if-range)#end
```

4.4 Saving running configurations:

4.4.1 Saving running configurations in Router0

```
Router0#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

4.4.2 Saving running configurations in Router1

```
Router1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

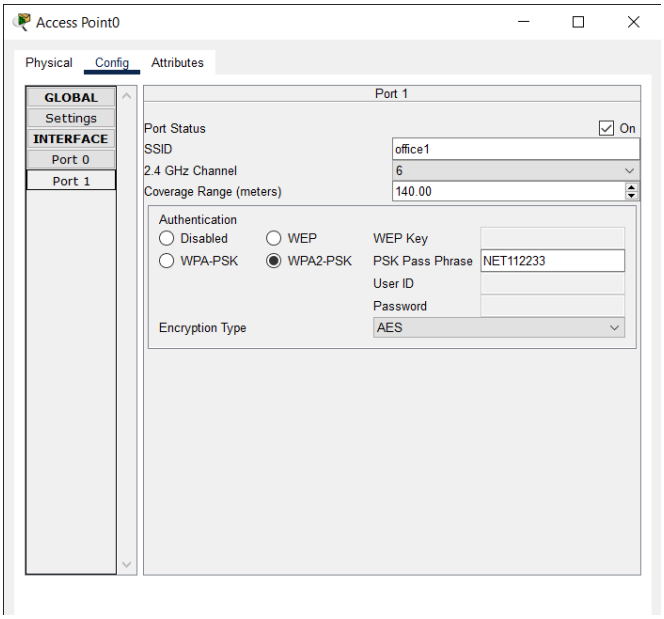
4.4.3 Saving running configurations in Router2

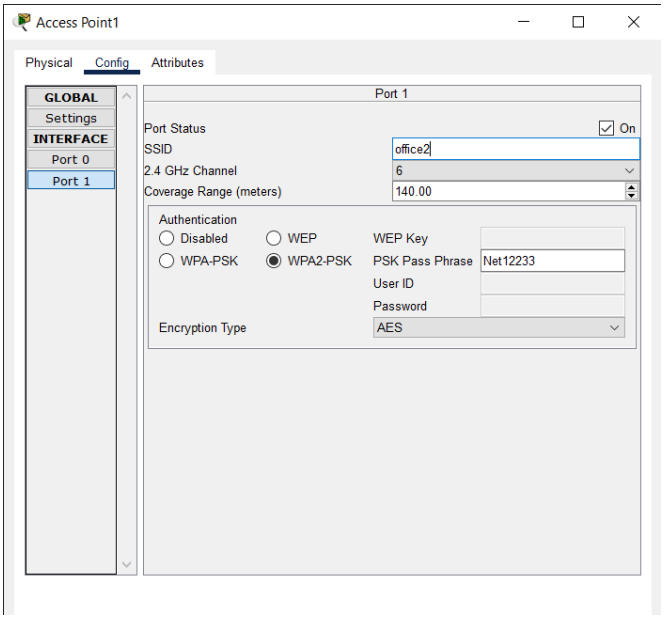
```
Router2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

4.5 Access point configuration

4.5.1 Access point

In the access point devices Config>Port 1 then we gave the devise and SSID and WPA2 PSK pass key.

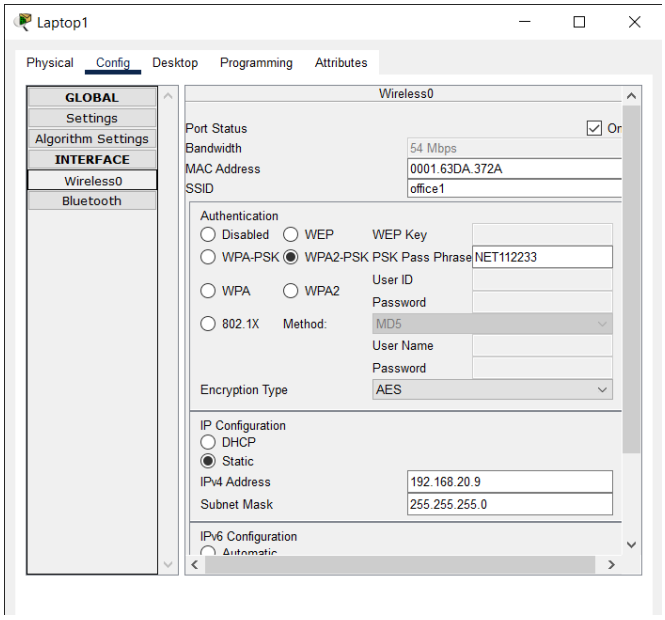




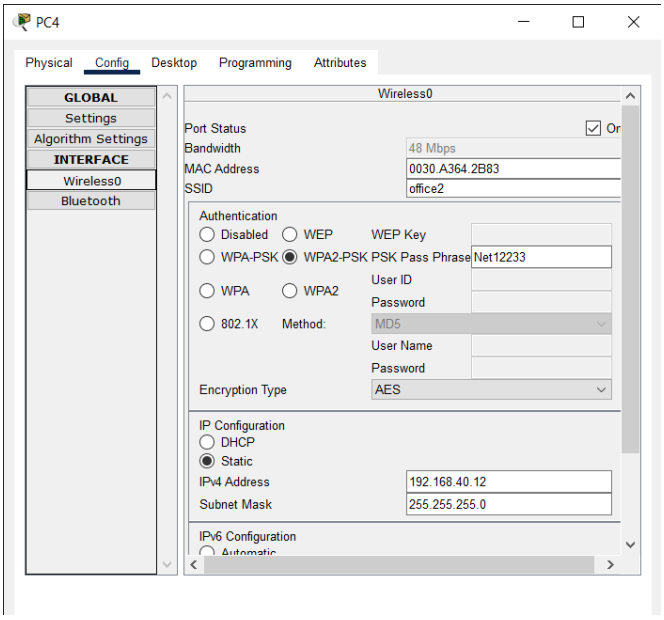
4.5.2 Connected devices

After we gave the access point the SSID and pass key we enter in the devices the SSID and the pass key to connect in the access point.

The device> config> Wireless> then enter SSID and the pass key.



Laptop1 in AccessPoint0



PC4 in AccessPoint1

5.0 Connections Verification:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC4	ICMP		0.000	N	0	(edit)	
	Successful	PC3	Printer0	ICMP		0.000	N	1	(edit)	

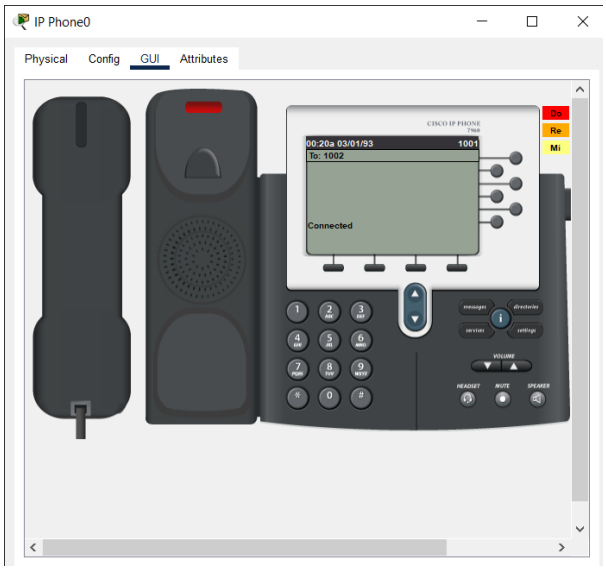
Sending message from PC0 to PC4 (Successful)

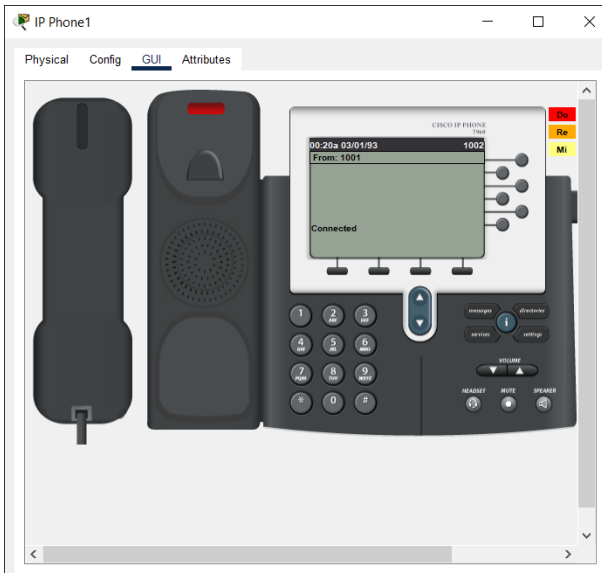
Sending message from PC3 to Printer0 (Successful)

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	Laptop3	Laptop2	ICMP		0.000	N	2	(edit)	
	Successful	Laptop1	Printer1	ICMP		0.000	N	3	(edit)	

Sending message from Laptop3 to Laptop2 (Successful)

Sending message from Laptop1 to Printer1 (Successful)





IP Phone0 calling IP Phone1 (Connected)

6.0 Conclusion:

In our organization, we have created four offices each with a LAN-LAN network, and made the configuration in each of them, including Routers Configuration, Routing Table configuration, IP phone (VoIP) configuration, switch for VLANs configuration also, access point configuration. And the network is working effectively. Each connection can be configured so that it will work efficiently between every two points.