



Communication & Network Fundamentals

Network Project

Network for a small organization

Student	ID Number

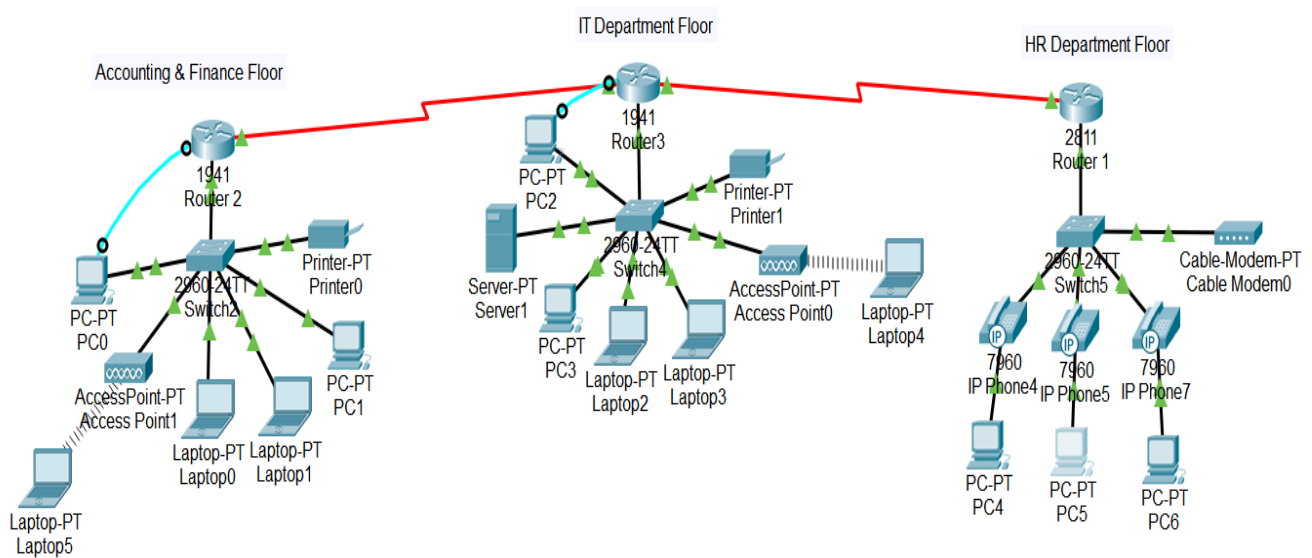
Group: L5F06

Instructor: .

We designed and configured a network for a small business organization that have a small building of three floors. In the organization, each floor has a different department. These departments are the IT department, HR department, and Accounting and Finance department. The organization needed to connect these departments to facilitate collaborative work between employees in different departments and the exchange of information and knowledge.

As for our topology we choose the 5th topology from the project manual and we adjusted the topology according to the organization need. We used the program Packet tracer version 7.1.2 to demonstrate our topology of the network. In the network each router represents a different department on a different floor and each department has it is own local area network.

The demonstrated topology:



As for our work we started by setting up our equipment to match our network topology. Afterward, we filled our addressing table for the network.

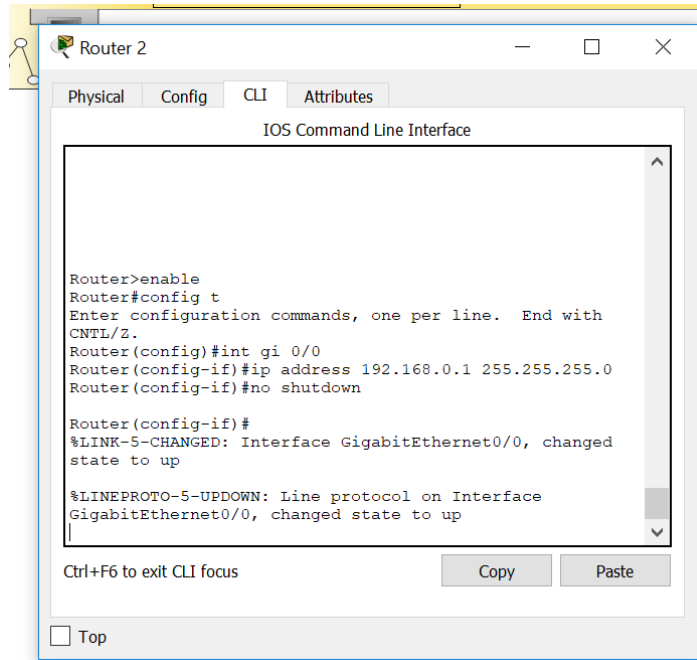


Device	Interface	IP Address	Subnet Mask	Default Gateway
Router 2	Giga Ethernet 0/0	192.168.1.1	255.255.255.0	-
Router 2	Serial 0/0/0	10.1.1.1	255.255.255.252	-
PC 0	Fast Ethernet	192.168.1.2	255.255.255.0	192.168.1.1
PC 1	Fast Ethernet	192.168.1.3	255.255.255.0	192.168.1.1
Laptop 0	Fast Ethernet	192.168.1.4	255.255.255.0	192.168.1.1
Laptop 1	Fast Ethernet	192.168.1.5	255.255.255.0	192.168.1.1
Laptop 5	Wireless	192.168.1.6	255.255.255.0	192.168.1.1
Printer 0	Fast Ethernet	192.168.1.7	255.255.255.0	192.168.1.1
Router 3	Fast Ethernet 0/0	192.168.1.8	255.255.255.0	
Router 3	Serial 0/0	10.1.1.2	255.255.255.252	
Router 3	Serial 0/1/1	10.1.1.3	255.255.255.252	
PC 2	Fast Ethernet	192.168.1.9	255.255.255.0	192.168.1.1
PC 3	Fast Ethernet	192.168.1.10	255.255.255.0	192.168.1.1
Laptop 2	Fast Ethernet	192.168.1.11	255.255.255.0	192.168.1.1
Laptop 3	Fast Ethernet	192.168.1.12	255.255.255.0	192.168.1.1
Laptop 4	Wireless	192.168.1.13	255.255.255.0	192.168.1.1
Printer 1	Fast Ethernet	192.168.1.14	255.255.255.0	192.168.1.1
Server 1	Fast Ethernet	192.168.1.15	255.255.255.0	192.168.1.1
Router 1	Fast Ethernet 0/0	192.168.1.16	255.255.255.0	
Router 1	Serial 0/1/1	10.1.1.4	255.255.255.252	
PC 4	Fast Ethernet	192.168.1.17	255.255.255.0	192.168.1.1
PC 5	Fast Ethernet	192.168.1.18	255.255.255.0	192.168.1.1
PC6	Fast Ethernet	192.168.1.19	255.255.255.0	192.168.1.1

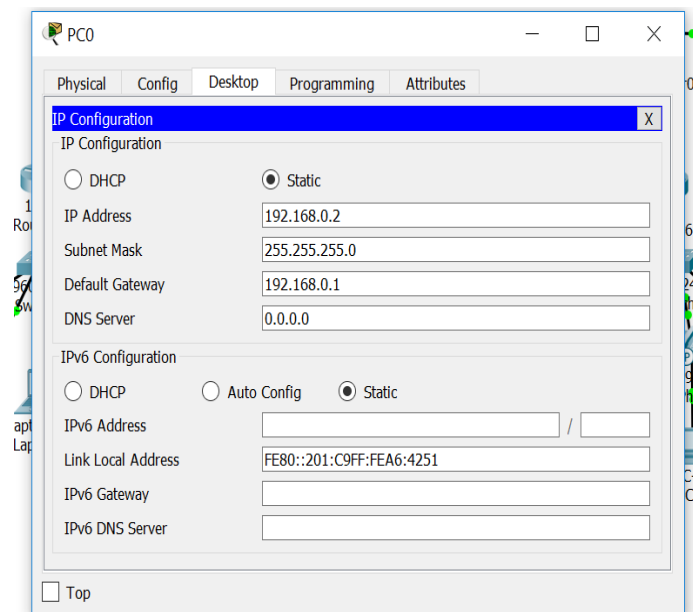


After filling the addressing table, we started configuring our routers and other devices according to the table. We did the following steps for every router and device. (We only captured the process for one device of each type)

1- Configuring the interface IP address and activating the interface of a router.

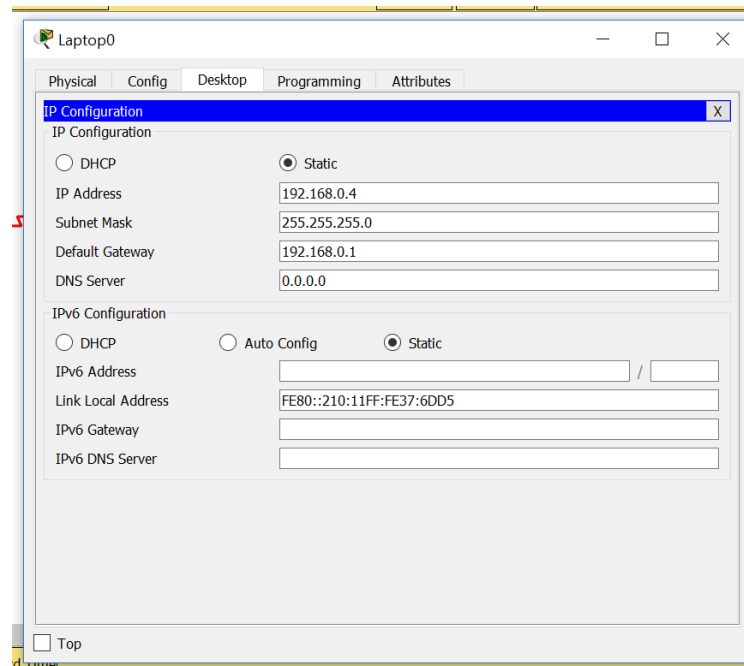


2- Configuring the IP address and default gateway for the PC.

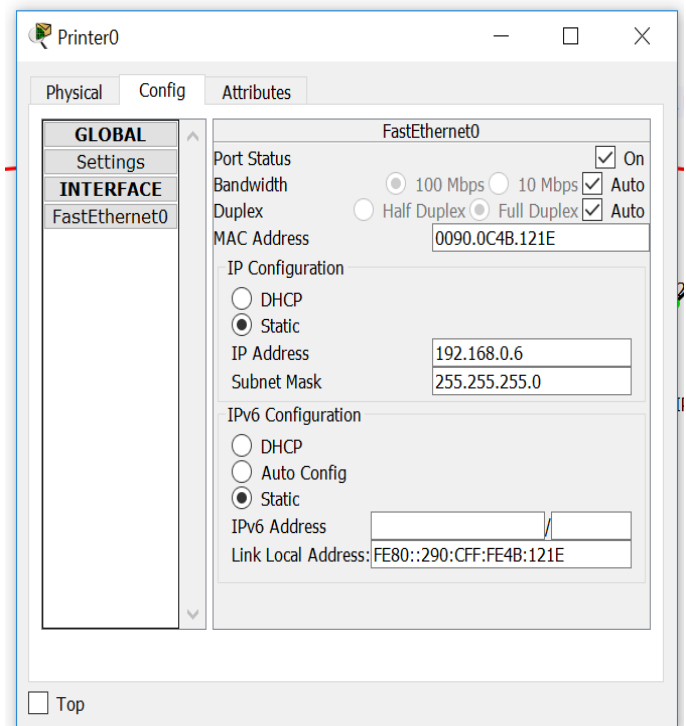
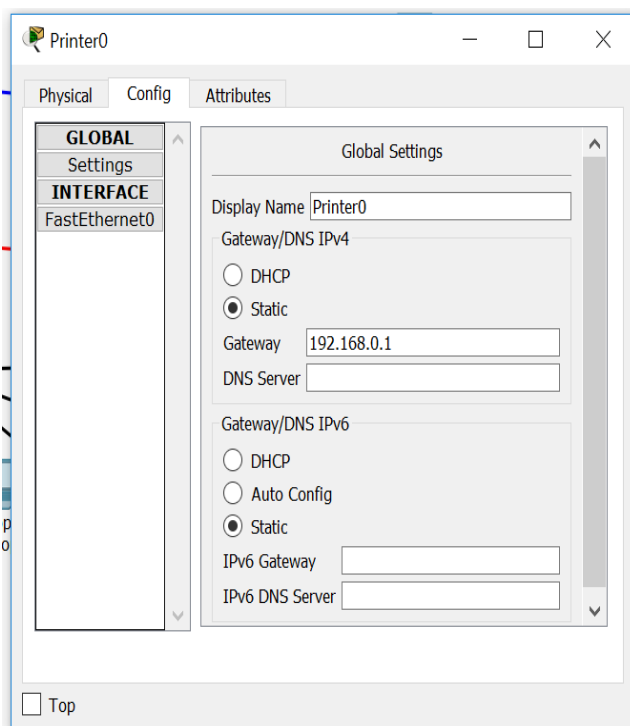




3- Configuring the IP address and default gateway for the Laptop.



4- Configuring the IP address and default gateway for the Printer (and we did the same for the server).





5- Configuring the serial interface IP address and activating the serial interface of a router. (to enable connect routers together)

```
Router 2
Physical Config CLI Attributes
IOS Command Line Interface

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int ser 0/0/0
Router(config-if)#ip address 255.255.255.252
% Incomplete command.
Router(config-if)#ip address 10.1.1.1 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to
up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up

Ctrl+F6 to exit CLI focus
Copy Paste
 Top
```

6 - Adding to the route table to allow communication between devices on different networks.

```
Router 2
Physical Config CLI Attributes
IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up

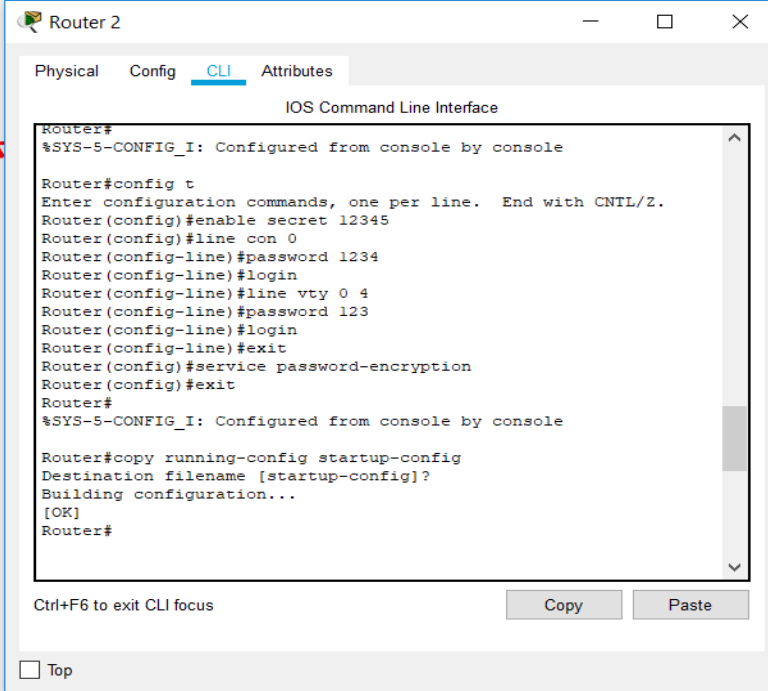
Router>enable
Router#config t
Enter configuration commands, one per line. End with
CNTL/Z.
Router(config)#ip route 192.168.1.0 255.255.255.0
10.1.1.2
Router(config)#
Router(config)#interface GigabitEthernet0/0
Router(config-if)#

Ctrl+F6 to exit CLI focus
Copy Paste
 Top
```



7- Assigning different types of passwords on the privileged and the terminal mode for router and switch.

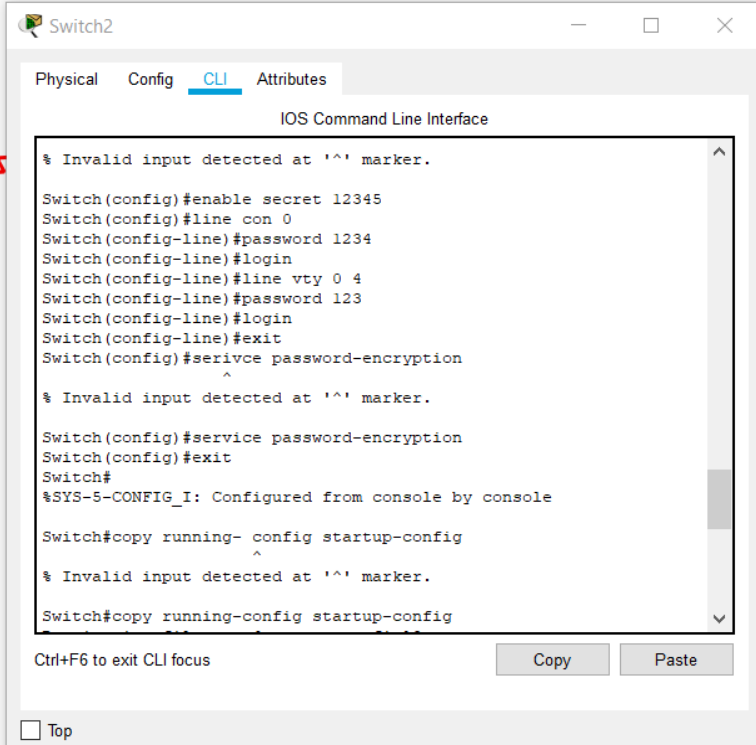
- On the privileged EXEC password is 12345.
- On the console password is 1234.
- On the VTY password is 123.



```
Router 2
Physical Config CLI Attributes
IOS Command Line Interface
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#enable secret 12345
Router(config)#line con 0
Router(config-line)#password 1234
Router(config-line)#login
Router(config-line)#line vty 0 4
Router(config-line)#password 123
Router(config-line)#login
Router(config-line)#exit
Router(config)#service password-encryption
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

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

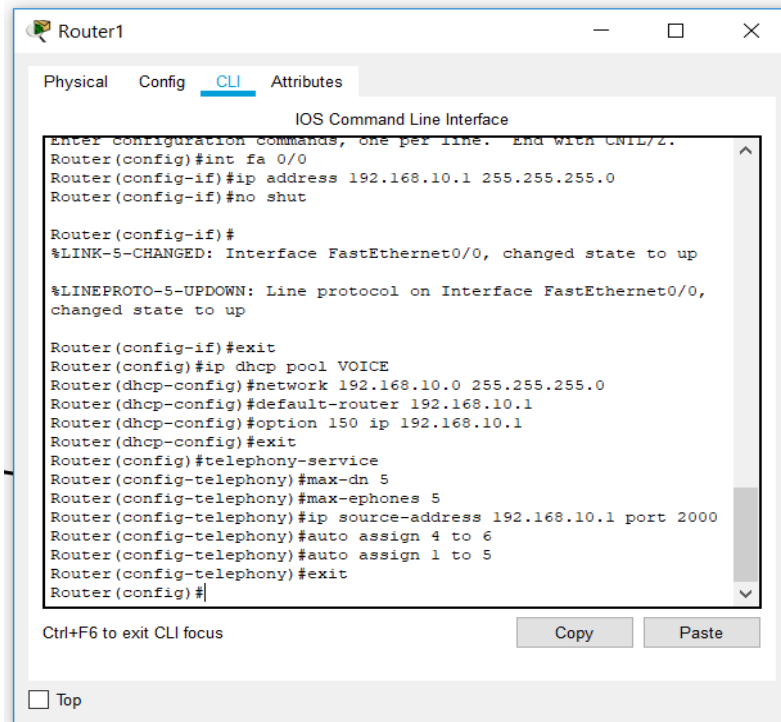


```
Switch2
Physical Config CLI Attributes
IOS Command Line Interface
% Invalid input detected at '^' marker.
Switch(config)#enable secret 12345
Switch(config)#line con 0
Switch(config-line)#password 1234
Switch(config-line)#login
Switch(config-line)#line vty 0 4
Switch(config-line)#password 123
Switch(config-line)#login
Switch(config-line)#exit
Switch(config)#service password-encryption
Switch(config)#
% Invalid input detected at '^' marker.
Switch(config)#service password-encryption
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#copy running- config startup-config
Switch#
% Invalid input detected at '^' marker.
Switch#copy running-config startup-config
```



8- The configurations of IP-voice for the phones.

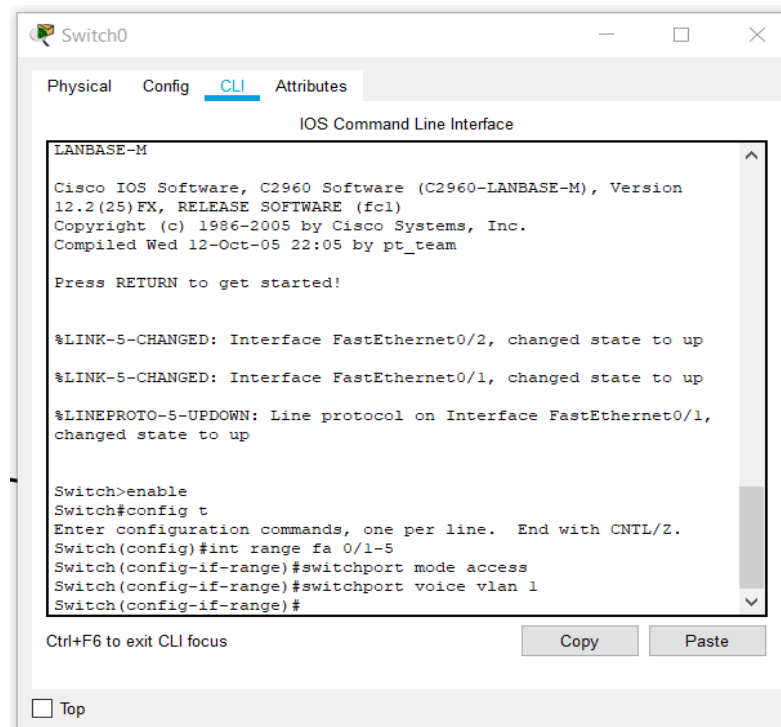


```
Router1
Physical Config CLI Attributes
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa 0/0
Router(config-if)#ip address 192.168.10.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up

Router(config-if)#exit
Router(config)#ip dhcp pool VOICE
Router(dhcp-config)#network 192.168.10.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.10.1
Router(dhcp-config)#option 150 ip 192.168.10.1
Router(dhcp-config)#exit
Router(config)#telephony-service
Router(config-telephony)#max-dn 5
Router(config-telephony)#max-ephones 5
Router(config-telephony)#ip source-address 192.168.10.1 port 2000
Router(config-telephony)#auto assign 4 to 6
Router(config-telephony)#auto assign 1 to 5
Router(config-telephony)#exit
Router(config)#
Ctrl+F6 to exit CLI focus
Copy Paste
Top
```



```
Switch0
Physical Config CLI Attributes
IOS Command Line Interface
LANBASE-M
Cisco IOS Software, C2960 Software (C2960-LANBASE-M), Version
12.2(25)FX, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 12-Oct-05 22:05 by pt_team

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

Switch>enable
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range fa 0/1-5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport voice vlan 1
Switch(config-if-range)#
Ctrl+F6 to exit CLI focus
Copy Paste
Top
```



```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

Router(config-if)#exit
Router(config)#ip dhcp pool VOICE
Router(dhcp-config)#network 192.168.10.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.10.1
Router(dhcp-config)#option 150 ip 192.168.10.1
Router(dhcp-config)#exit
Router(config)#telephony-service
Router(config-telephony)#max-dn 5
Router(config-telephony)#max-ephones 5
Router(config-telephony)#ip source-address 192.168.10.1 port 2000
Router(config-telephony)#auto assign 4 to 6
Router(config-telephony)#auto assign 1 to 5
Router(config-telephony)#exit
Router(config)#ephone-dn 1
Router(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone_dsp DN
1.1, changed state to up

Router(config-ephone-dn)#number 54001
Router(config-ephone-dn)#%DHCPD-4-PING_CONFLICT: DHCP address
conflict: server pinged 192.168.10.1.

%IPPHONE-6-REGISTER: ephone-1 IP:192.168.10.2 Socket:2
DeviceType:Phone has registered.

Ctrl+F6 to exit CLI focus
Copy Paste
 Top
```

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

Router(config)#telephony-service
Router(config-telephony)#max-dn 5
Router(config-telephony)#max-ephones 5
Router(config-telephony)#ip source-address 192.168.10.1 port 2000
Router(config-telephony)#auto assign 4 to 6
Router(config-telephony)#auto assign 1 to 5
Router(config-telephony)#exit
Router(config)#ephone-dn 1
Router(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone_dsp DN
1.1, changed state to up

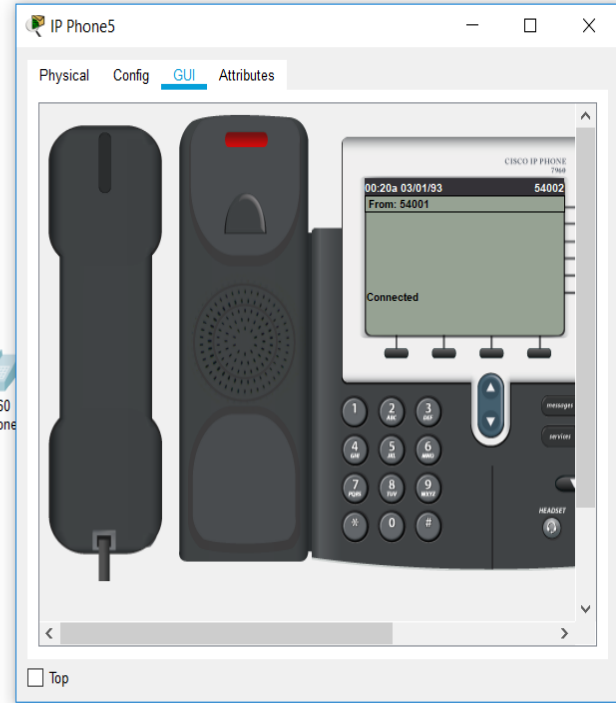
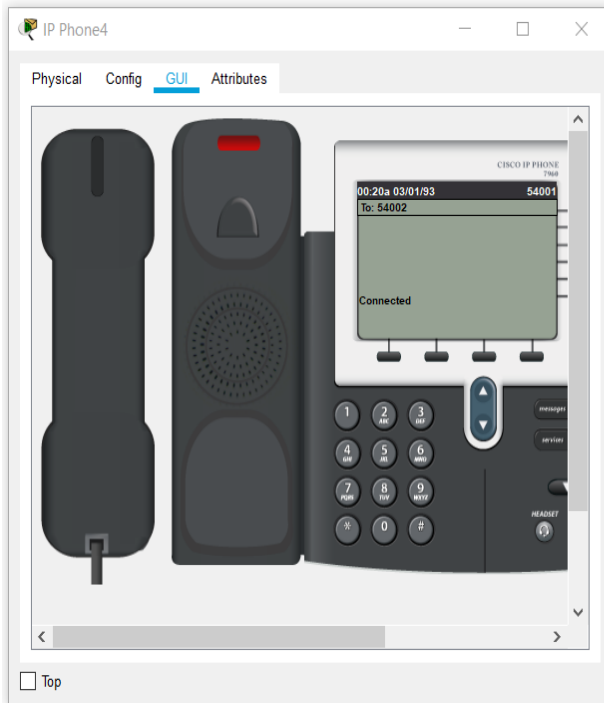
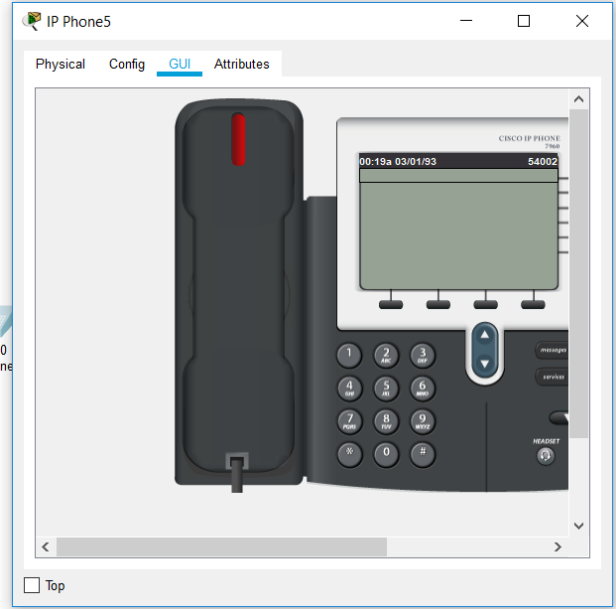
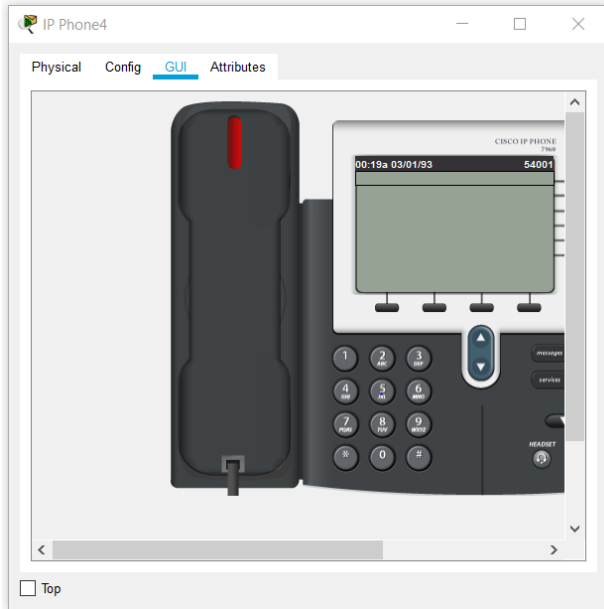
Router(config-ephone-dn)#number 54001
Router(config-ephone-dn)#%DHCPD-4-PING_CONFLICT: DHCP address
conflict: server pinged 192.168.10.1.

%IPPHONE-6-REGISTER: ephone-1 IP:192.168.10.2 Socket:2
DeviceType:Phone has registered.

Router(config-ephone-dn)#exit
Router(config)#ephone-dn 2
Router(config-ephone-dn)#%LINK-3-UPDOWN: Interface ephone_dsp DN
2.1, changed state to up

Router(config-ephone-dn)#number 54002
Router(config-ephone-dn)#exit

Ctrl+F6 to exit CLI focus
Copy Paste
 Top
```





9- Verifying the connectivity between devices through the command Ping:

1- Device on the network 192.168.0.0 and verifying its connectivity to other devices on other networks in the topology.

```
Laptop0
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\> ping 192.168.10.77

Pinging 192.168.10.77 with 32 bytes of data:

Request timed out.
Reply from 192.168.10.77: bytes=32 time=2ms TTL=125
Reply from 192.168.10.77: bytes=32 time=2ms TTL=125
Reply from 192.168.10.77: bytes=32 time=2ms TTL=125

Ping statistics for 192.168.10.77:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 2ms, Average = 2ms

C:\> ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Request timed out.
Reply from 192.168.1.4: bytes=32 time=1ms TTL=126
Reply from 192.168.1.4: bytes=32 time=1ms TTL=126
Reply from 192.168.1.4: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
```

2- Device on the network 192.168.1.0 and verifying its connectivity to other devices on other networks in the topology.

```
Laptop2
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\> ping 192.168.10.77

Pinging 192.168.10.77 with 32 bytes of data:

Reply from 192.168.10.77: bytes=32 time=1ms TTL=126
Reply from 192.168.10.77: bytes=32 time=1ms TTL=126
Reply from 192.168.10.77: bytes=32 time=1ms TTL=126
Reply from 192.168.10.77: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.10.77:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\> ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

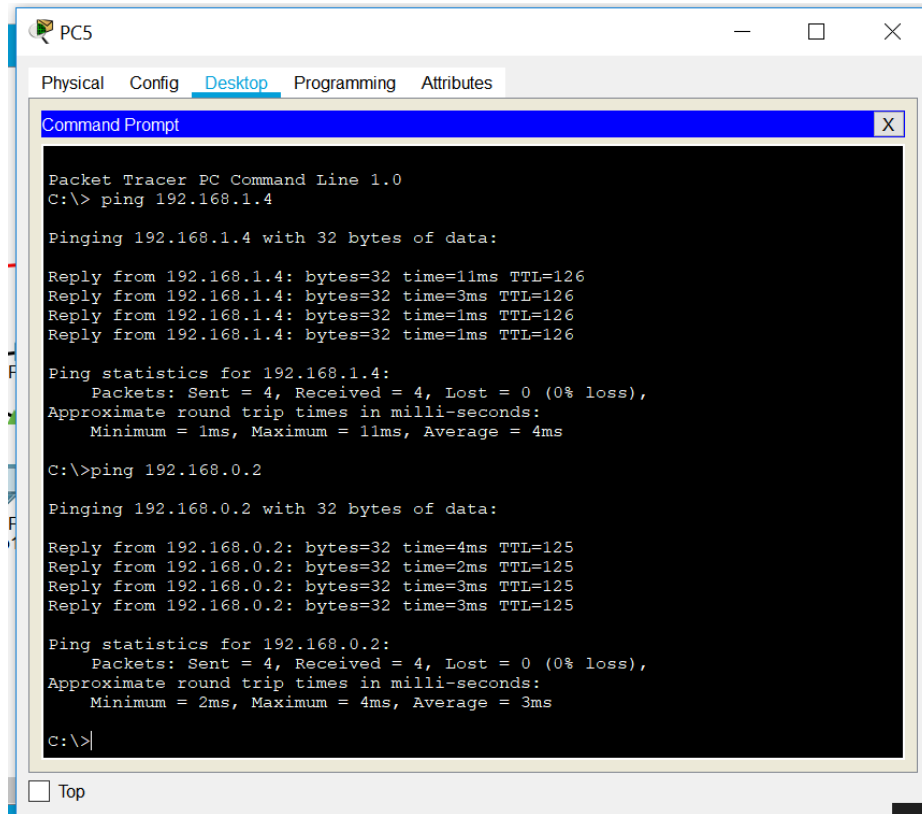
Request timed out.
Reply from 192.168.0.2: bytes=32 time=5ms TTL=126
Reply from 192.168.0.2: bytes=32 time=1ms TTL=126
Reply from 192.168.0.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 5ms, Average = 2ms

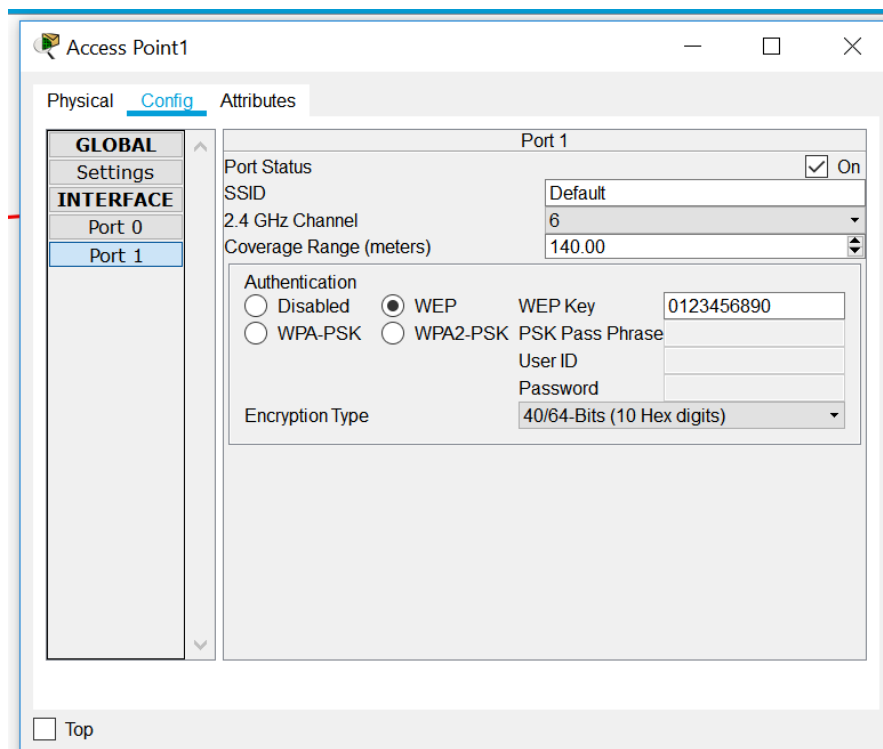
C:\>
```



3- Device on the network 192.168.10.0 and verifying its connectivity to other devices on other networks in the topology.



10- For the access point we assigned a password for the port:



By configuring each router, switch and device on the topology we created a fully connected and functional network for the organization. The demonstrated topology is as shown down below.

