শিক্ষা নিয়ে গড়বো দেশ তথ্য-প্রযুক্তির বাংলাদেশ

Bangabandhu Sheikh Mujibur Rahman Digital University, Bangladesh


# LAB REPORT-07

## COURSE NO.-ICT 4256
## COURSE TITLE-COMPUTER NETWORKING LAB

**SUBMITTED BY**

Mehrin Farzana
ID: 2101013
Department of ICT
Session :2021-2022
Bangabandhu Sheikh Mujibur Rahman Digital University, Bangladesh

**SUBMITTED TO**

Md.Toukir Ahmed
Lecturer
Department of ICT, BDU
Bangabandhu Sheikh Mujibur Rahman Digital University, Bangladesh

**Date of Submission: 2 May, 2023**

## Lab Introduction:

In this lab we'll be learning about wireless networking and configuring VoIP phones using Cisco Packet Tracer.

## Objectives:

- To learn what wireless networking is
- How wireless networking works
- To learn about VoIP
- How VoIP works

---

# Index

**Experiment No.: 1**

**Experiment Title: Simulating Wireless Networking in Cisco Packet Tracer.**

---

**Objectives:**

- To learn what wireless networking is
- How wireless networking works

**Discussion:**

Wireless networking is a method or process of connecting network nodes or devices without using cables of any kind. Wireless networks use electromagnetic waves or radio frequency (RF) connections to transmit data through free space. Wireless networking can avoid the costly and difficult installation of cables in buildings or between equipment locations.

**Methodology:**

- Create the network topology.
- Configuration of the Network Nodes.
- Choose the Statistics.
- Run the Simulation.
- Analysis of the Results.

**Working procedure:**

**1. Giving the geometric shape of the topology**

1.1. Taken devices

1. Two desktop PCs
2. 2950-24 Switch
3. 1841 Router
4. Laptop
5. Tablet PC
6. AccessPoint-PT

Connecting 1 PC to the switch, and the switch to the router and the Access Point with straight through copper cable, as they are different typed devices via Fast Ethernet port.

Now turning off PC1, remove the removable port and replace it with WMP300N module, which provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.
Then turn on the PC.

Now turning off laptop0, remove the removable port and replace it with WPC300N module, provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.
Then turn on the laptop.

Fig 1.1: Rear view of the PC after installing WMP300N in CPT.

Fig 1.2: Rear view of the laptop after installing WPC300N in CPT.

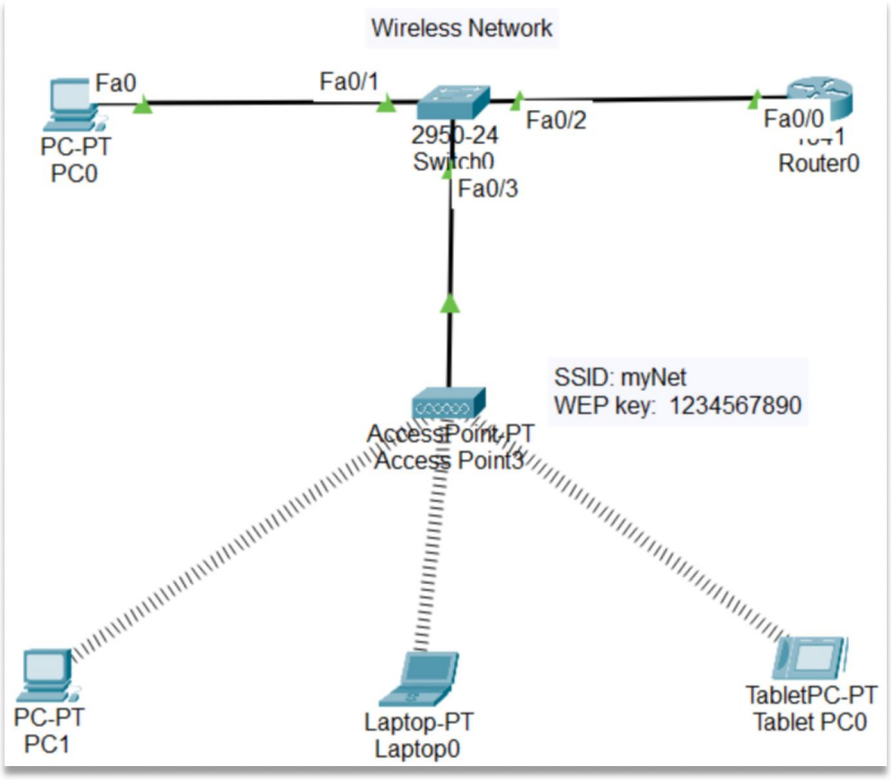


Fig 1.3: Simulating the topology using CPT.

## 2. Configuring the devices

2.1. Configuring the access point
Go to ‘Prt 1’;
Set SSID such as, “myNet”
From the Authentication field, select WEP and give a 10 hexadecimal digits long WEP key such as, “1234567890”

If the end devices are configured before connecting them with the wireless network, we're going to have to configure them again after setting up the wireless connection. So, it’s better to configure them later in this packet tracer tool.

2.2. connecting PC1, Laptop0 and Tablet PC0 with the access point remotely
For PC1 and Laptop0, go to from the ‘Desktop’ field to the ‘PC wireless’, from which enter the ‘Connect’ field and hit ‘Refresh’ button. In a matter of seconds, the SSID given in the access point, “myNet”, will show up to the left-side-box. Select “myNet” and hit the ‘Connect’ button.
Then in the next window, in the ‘WEP key 1’ field enter the WEP key given in the access point, “1234567890”.

Now, for TabletPC0, from the ‘Config’ field, go to ‘Wireless0’ INTERFACE , enter the SSID “myNet”, select WEP from ‘Authentication’ and give the WEP key “1234567890”.

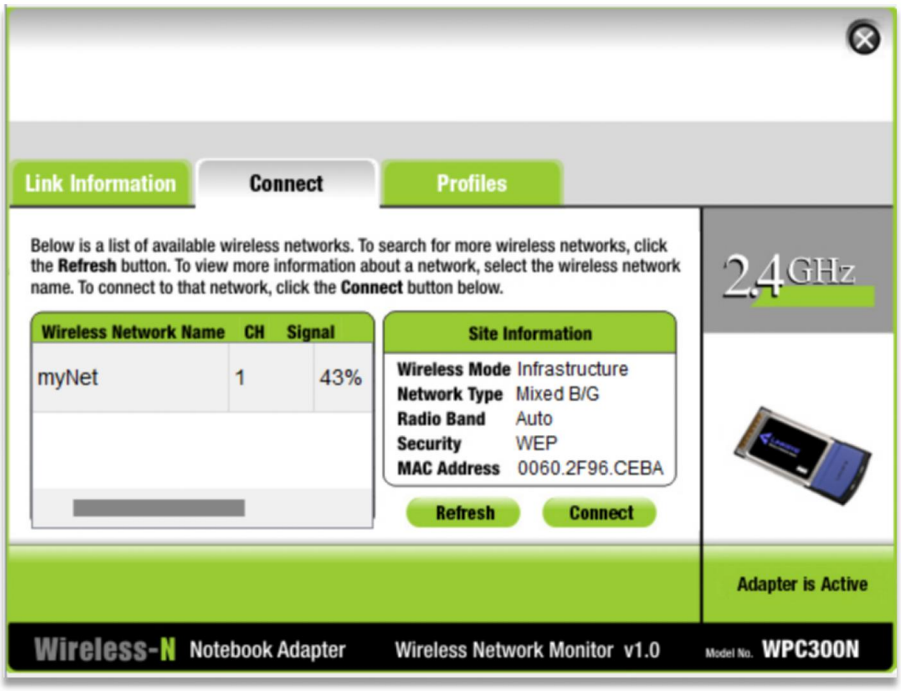


Fig 1.4: Connect field from Wireless PC window in CPT.

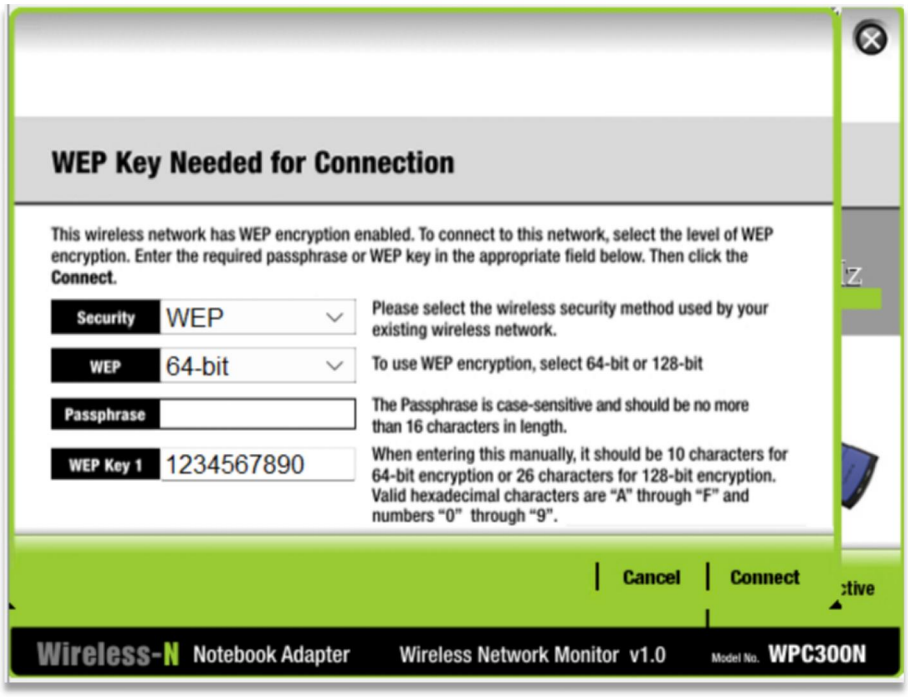


Fig 1.5: Giving the WEP key at Wireless PC window in CPT.

2.3. Configure the devices with the following IP addresses and Subnet Masks
First, from IP configuration, click on the ‘Static” bullet to select ‘static’, then assign these IP addresses and default gateway.

| Host | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|
| Router0 | 10.10.10.1 | 255.0.0.0 | |
| PC0 | 10.10.10.2 | 255.0.0.0 | 10.10.10.1 |
| PC1 | 10.10.10.3 | 255.0.0.0 | 10.10.10.1 |
| Laptop0 | 10.10.10.4 | 255.0.0.0 | 10.10.10.1 |
| Tablet PC0 | 10.10.10.5 | 255.0.0.0 | 10.10.10.1 |

## 3. Sending data across PCs and Router

3.1. Connection tests across devices

Ping PCs and Router by there IP addresses from another PC or Router in Command Prompt. If connection is there, four replies will come.

Command: ping<space>’IP address of some other PC or Router’

For first time communication, some packets may be lost.

Check that with all the other PCs and Router.

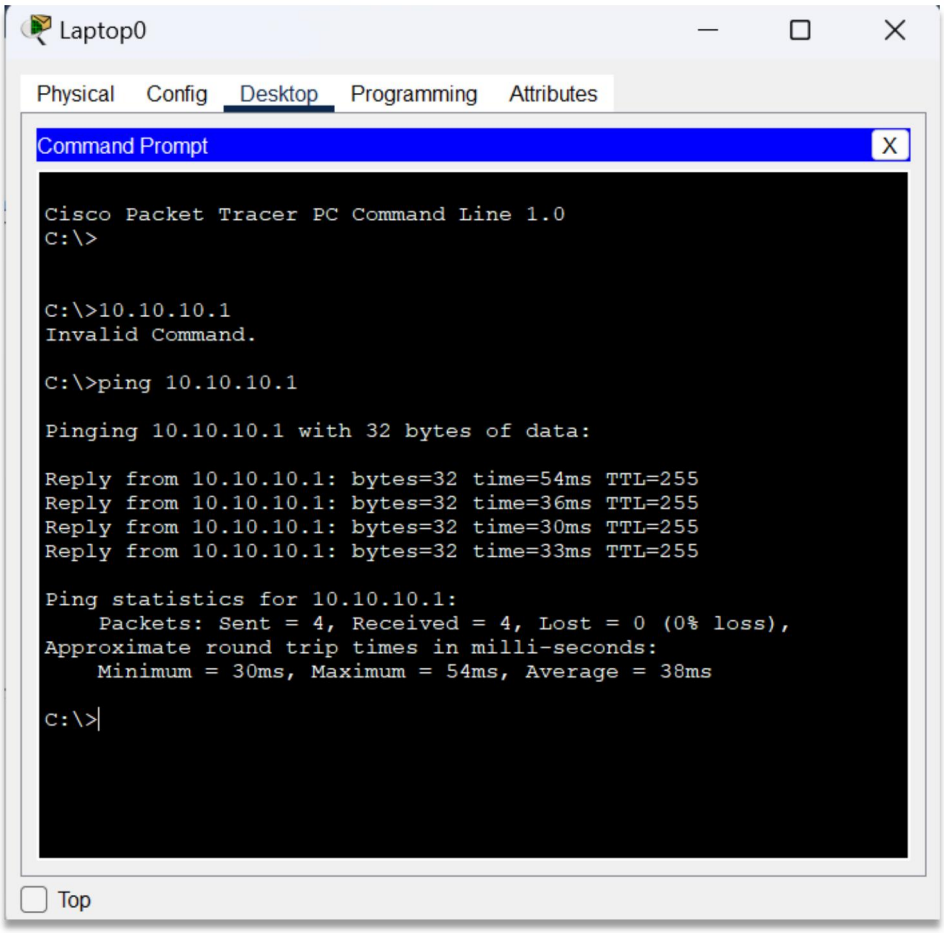


Fig 1.6: Pinging Router0 from Laptop0

## 4. Simulation:

| Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete |
|---|---|---|---|---|---|---|---|---|---|---|
| | Successful | Laptop0 | Router0 | ICMP | | 0.000 | N | 0 | (edit) | (delete) |
| | Successful | Tablet... | PC0 | ICMP | | 0.000 | N | 1 | (edit) | (delete) |
| | Successful | PC1 | Laptop0 | ICMP | | 0.000 | N | 2 | (edit) | (delete) |
| | Successful | Tablet... | PC1 | ICMP | | 0.000 | N | 3 | (edit) | (delete) |

Fig 1.7: Successful packets travel across PCs

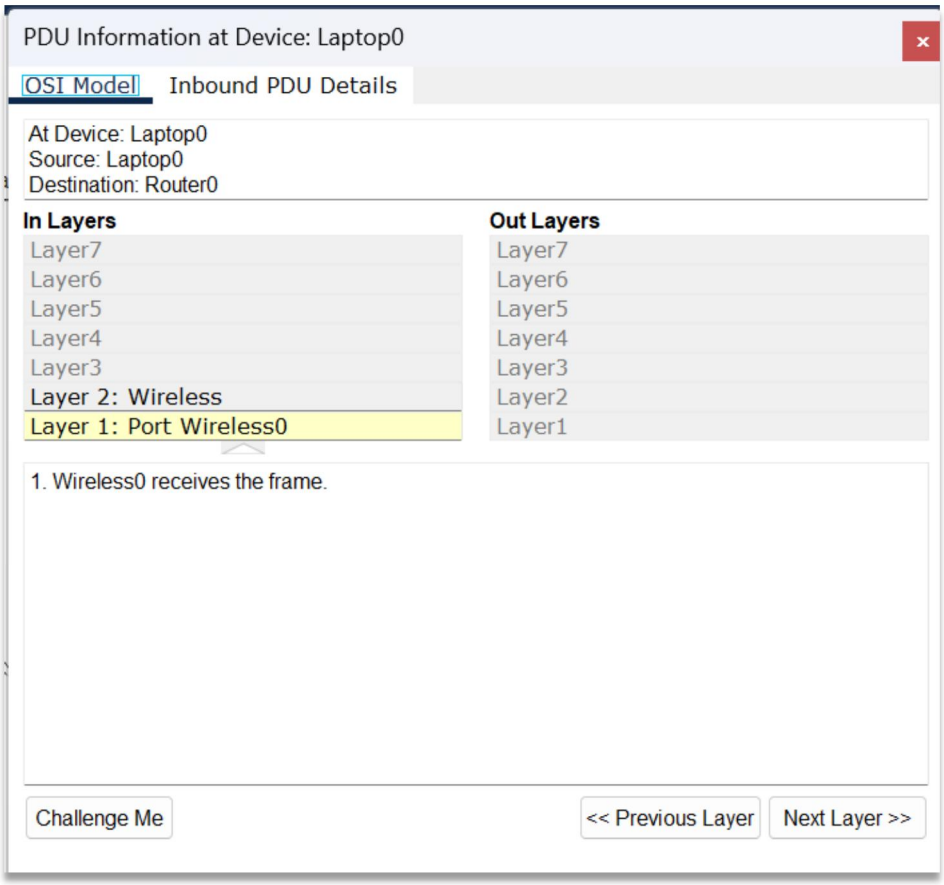


Fig 1.8: PDU information at the OSI model at Laptop0

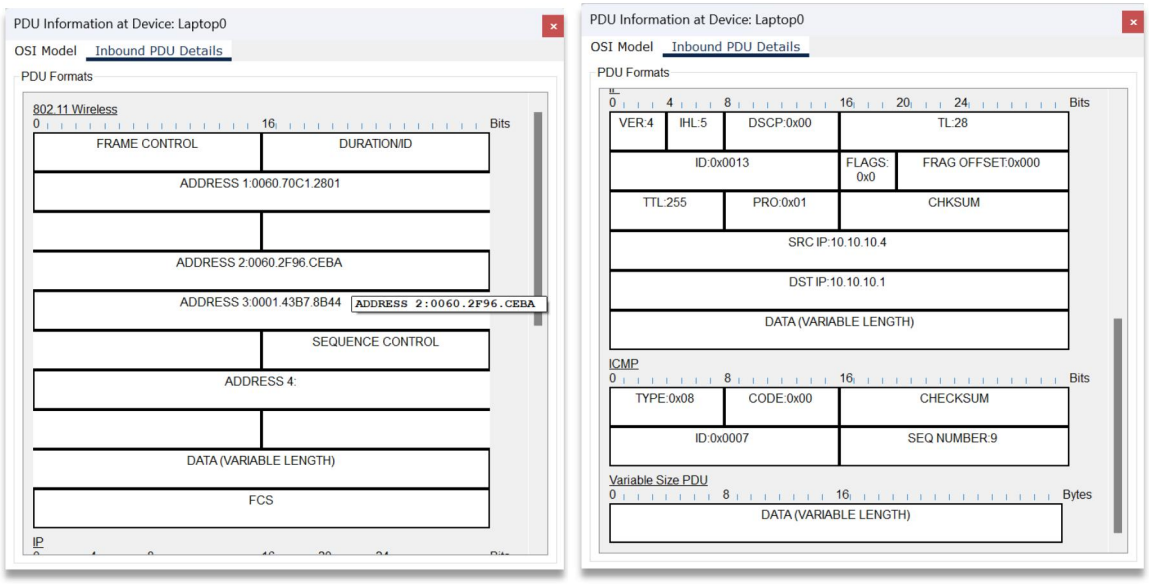


Fig 1.9: Inbound Protocol data unit details at Router0

**Conclusion:**

Wireless networks are established without using cables of any kind. It uses radio waves to transmit data through free space. Wireless networking can avoid the costly and difficult installation of cables in buildings or between equipment locations.

Caution:

- Configure the devices after connecting them to the wireless access point.

**Experiment No.: 2**

**Experiment Title:** Configuring VoIP phones using Cisco Packet Tracer.

---

**Objectives:**

- To learn what VoIP is
- How VoIP works

**Discussion:**

VoIP stands for Voice over Internet Protocol. Voice over Internet Protocol (VoIP), also called IP telephony, is a method and group of technologies for the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet.

**Methodology:**

- Create the network topology.
- Configuration of the Network Nodes.
- Choose the Statistics.
- Run the Simulation.
- Analysis of the Results.

**Working procedure:**

**1. Giving the geometric shape of the topology**

1.1. Taken devices

1. Three desktop PCs
2. 2960-24TT Switch
3. 2811 Router
4. Three 7960 IP Phones

1.2. Creating the topology

Connecting the three PCs to the three IP phones via the PC port, and then the three IP phones to the switch via Switch port, and the switch to the router with straight through copper cable, as they are different typed devices via Fast Ethernet port.
In each IP phone, install the VoIP power adapter.

Fig 2.1: Rear view of the IP phone after installing VoIP power adapter in CPT.


Fig 2.2: GUI(graphical user interface) of IP Phone0 in CPT.

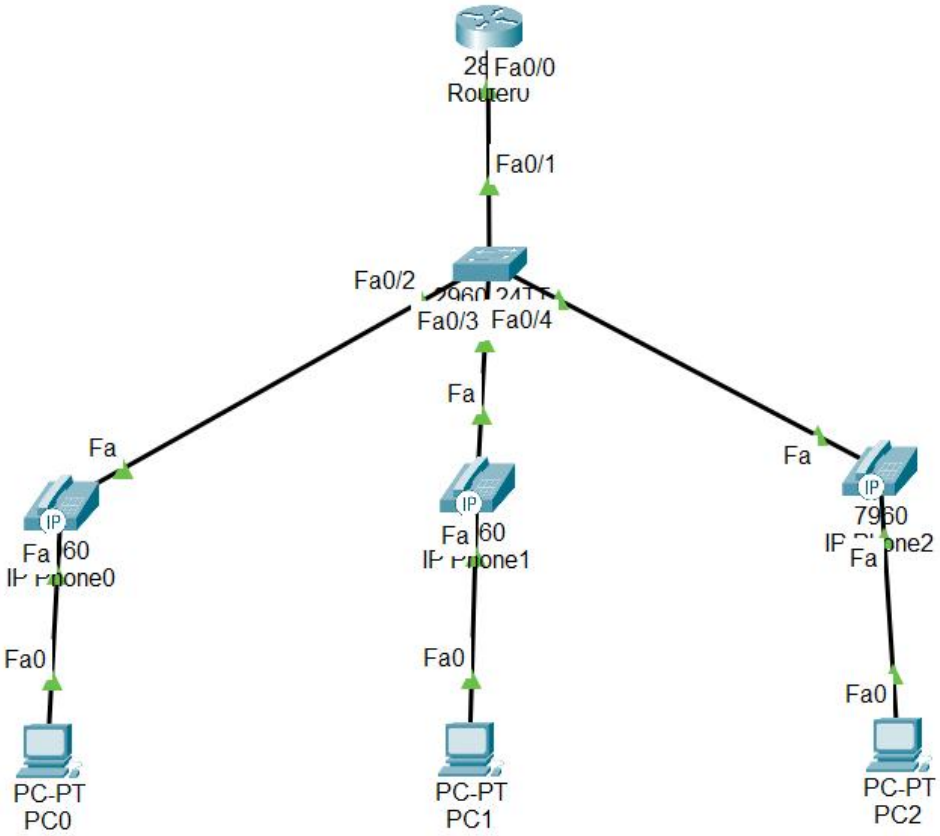


Fig 1.3: Simulating the topology using CPT.

## 2. **Configuring the devices**

2.1. Configuring the PCs
Select DHCP (Dynamic Host configuration Protocol) from IP configuration.

2.2. Configure the Switch in CLI:

```
Switch>enable
Switch#configure terminal
Switch(config)#vlan 10
Switch(config-vlan)#name DATA
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name VOICE
Switch(config-vlan)#vlan 30
Switch(config-vlan)#name MGT
Switch(config-vlan)#vlan 40
Switch(config-vlan)#name MISC
Switch(config-vlan)#vlan 50
Switch(config-vlan)#name NATIVE

Switch(config)#interface fa0/1
```

```
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport native vlan 50

Switch(config)#interface range fa0/2-4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#switchport voice vlan 20

Switch(config)#interface range fa0/5-24
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 40

Switch(config)#interface range gig0/1-2
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 40

Switch#copy running-config startup-config
```

2.3. Configure the Router in CLI:

```
Router>en
Router>enable
Router#configure terminal
Router(config)#interface f0/0.10
Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip add 192.168.10.1 255.255.255.0

Router(config)#interface f0/0.20
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip add 192.168.20.1 255.255.255.0

Router(config)#interface f0/0.50
Router(config-subif)#encapsulation dot1Q 50 native

Router(config)#interface f0/0
Router(config-if)#no shutdown

Router(config)#ip dhcp excluded-address 192.168.10.1 192.168.10.5
Router(config)#ip dhcp excluded-address 192.168.20.1 192.168.20.5

Router(config)#ip dhcp pool DATA10
Router(dhcp-config)#network 192.168.10.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.10.1

Router(config)#ip dhcp pool VOICE20
Router(dhcp-config)#network 192.168.20.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.20.1

Router(dhcp-config)#option 150 ip 192.168.20.1
```

```
Router(config)#telephony-service
Router(config-telephony)#max-dn 3
Router(config-telephony)#max-ephones 3
Router(config-telephony)#ip source-address 192.168.20.1 port 2000
Router(config-telephony)#ephone-dn 1
Router(config-ephone-dn)#number 1010
Router(config-telephony)#ephone-dn 2
Router(config-ephone-dn)#number 1020
Router(config-telephony)#ephone-dn 3
Router(config-ephone-dn)#number 1030

Router(config)#ephone 1
Router(config-ephone)#type 7960
Router(config-ephone)#button 1:1
Router(config)#ephone 2
Router(config-ephone)#type 7960
Router(config-ephone)#button 1:2
Router(config)#ephone 3
Router(config-ephone)#type 7960
Router(config-ephone)#button 1:3

Router#copy running-config startup-config
```

### 3. Calling over VoIP

Call one IP Phone from another by dialing the number and then picking up the phone. If connection is there the other phone will ring.

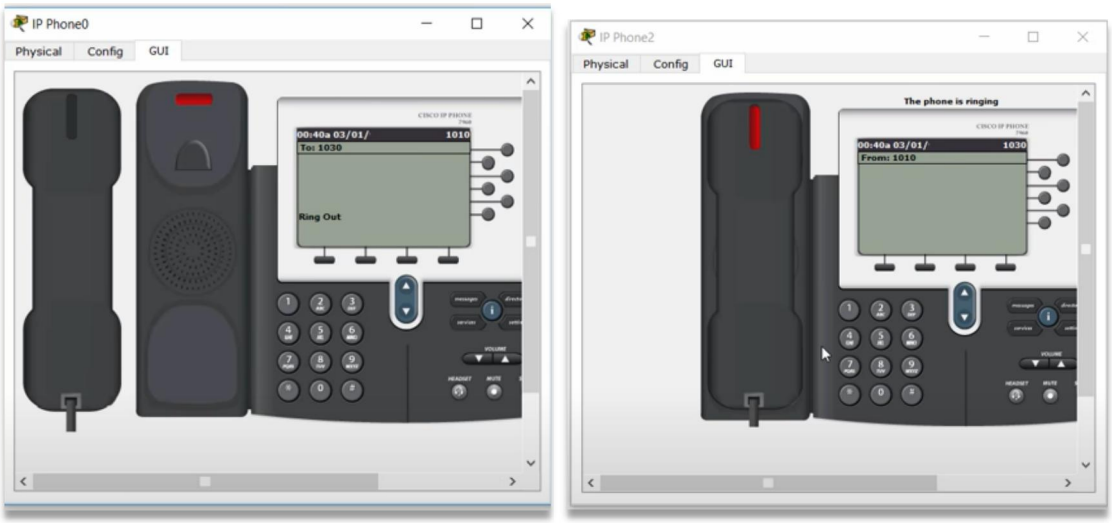


Fig 2.4: Calling Phone2 from Phone0 in CPT.

**Conclusion:**

VoIP stands for Voice over Internet Protocol and it allows one to make calls over the internet instead of traditional phone lines or cellular connections. For homeowners, VoIP provides benefits such as keeping the existing landline phone number and cost savings on local and long-distance calling.VoIP requires less maintenance than traditional phone lines

## Lab Conclusion:

From this lab we got to know about,

- Wireless Networking
  - The networking where no cable is needed; communication can be established through free space.
  - Reduces cable cost.
  - Gives easy remote access.
  - Less secure.

- VoIP
  - VoIP stands for Voice Over Internet Protocol
  - It is a way to make phone calls over the internet
  - With VoIP, analog voice calls are converted into packets of data. The packets travel like any other type of data, such as e-mail, over the public Internet and/or any private Internet Protocol (IP) network.
  - Using a VoIP service, one can call landline or cell phones. One can also call computer-to-computer, with both parties speaking into a computer microphone and listening through computer speakers or headsets.