

BUDGE BUDGE INSTITUTE OF TECHNOLOGY



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COMPUTER NETWORK ASSIGNMENT

VOIP CONFIGURATION IN CISCO PACKET TRACER

Let's start describing what is VoIP: as the name says, VoIP is Voice over IP. Anything that allows you to communicate, I mean, to transmit your voice over the IP, or the Internet, is VoIP.

There are distinct vendors of VoIP, however, on this tutorial, we will focus on Cisco, we will focus on the following product: Cisco Unified Call Manager Express (commonly known as CUCME)

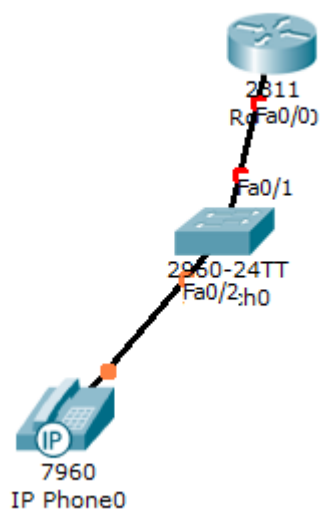
There are Routers called ISR: *Integrated Service Routers*, which come with certain services and features inside it.

CUCME is one example of these features and services that are build-in the router (or are router-based).

There is a technology called PoE: *Power Over Ethernet*, which allows equipment to send data and power at the same time to certain devices that are PoE compatible.

So, knowing these few things, let's get to work.

Let's mount the following topology:

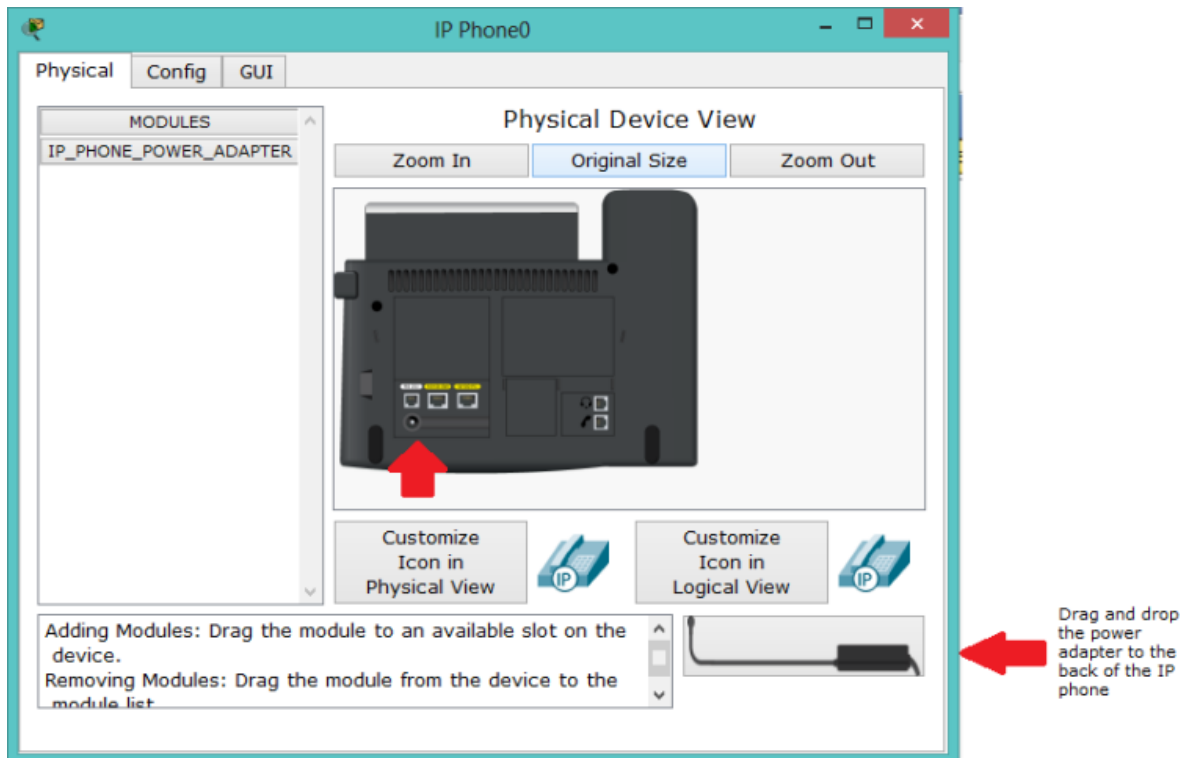


Pay attention that on Packet Tracer the PoE technology isn't implemented yet.

This is why, to power on the IP Phones we will connect a power adapter to it.

As the Switch is not PoE.

See how to connect the power adapter to the IP Phone on the picture below:



So the first thing to be done is to configure the IP address of the router:

```
Router>enable
Router#configure terminal
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
```

A DHCP server is used to assign IP addresses to the IP Phones.

A TFTP server is used to allow the phones to get the firmware and certain configurations files from the router, this is done by the option 150 of the DHCP.

```
1. Router(config)#ip dhcp pool VOICE
2. Router(dhcp-config)#network 192.168.1.0 255.255.255.0
3. Router(dhcp-config)#default-router 192.168.1.1
4. Router(dhcp-config)#option 150 ip 192.168.1.1
```

CLI description:

1. Giving a name to the DHCP pool, in this case, this pool is for the phones only,
2. The network that is covered by the DHCP
3. The default router for this IP distribution
4. Configuration of the TFTP

Next step to do is to configure the Call Manager Express itself on the router,

```
1. Router(config)#telephony-service
2. Router(config-telephony)#max-dn 5
3. Router(config-telephony)#max-ephones 5
4. Router(config-telephony)#ip source-address 192.168.1.1 port 2000
5. Router(config-telephony)#auto assign 1 to 5
```

CLI description:

1. Enters to the telephony services
2. max number of phone lines
3. max number of telephones
4. The IP of the router where the telephones will be registered and the source address where is running the DHCP and TFTP services, which will be the router itself. And the port used for the phones, the default one is 2000 (for SCCP phones)
5. is to automatically register the phones, on this case is from phone 1 to 5 (you can register the IP Phones yourself, next time I will show how to do it)

Next step is to configure the Switch, on this case, there is not too much to do, just configure a VLAN for voice traffic. We must add this VLAN to separate the data traffic from the Voice traffic. Data will be sent to the computers and voice traffic will be sent to the IP Phones.

As we configured 5 max IP Phones, so we will configure 5 interfaces of the switch to the Voice VLAN.

As you can see on the image below,

```
Switch#sh vlan
```

VLAN	Name	Status	Ports
1	default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4 Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9, Fa0/10, Fa0/11, Fa0/12 Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/23, Fa0/24 Gig1/1, Gig1/2

P.S.: The first interface of the switch on my scenario, is connected to my router, so we will exclude it on this VLAN configuration.

```
Switch(config)#int range fastEthernet 0/2-6
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport voice vlan 1
Switch(config-if-range)#
```

Despite being on the same VLAN (data and voice), virtually the traffic will be separated. (If you wish, you can create another VLAN for the VOICE traffic)

Now is time to give numbers to the lines that will be used on the IP Phones:

P.S: We have configured 5 max IP Phones, so we will configure 5 max numbers for the lines.

```
Router(config)#ephone-dn 1
Router(config-ephone-dn)#number 10

Router(config)#ephone-dn 2
Router(config-ephone-dn)#number 20

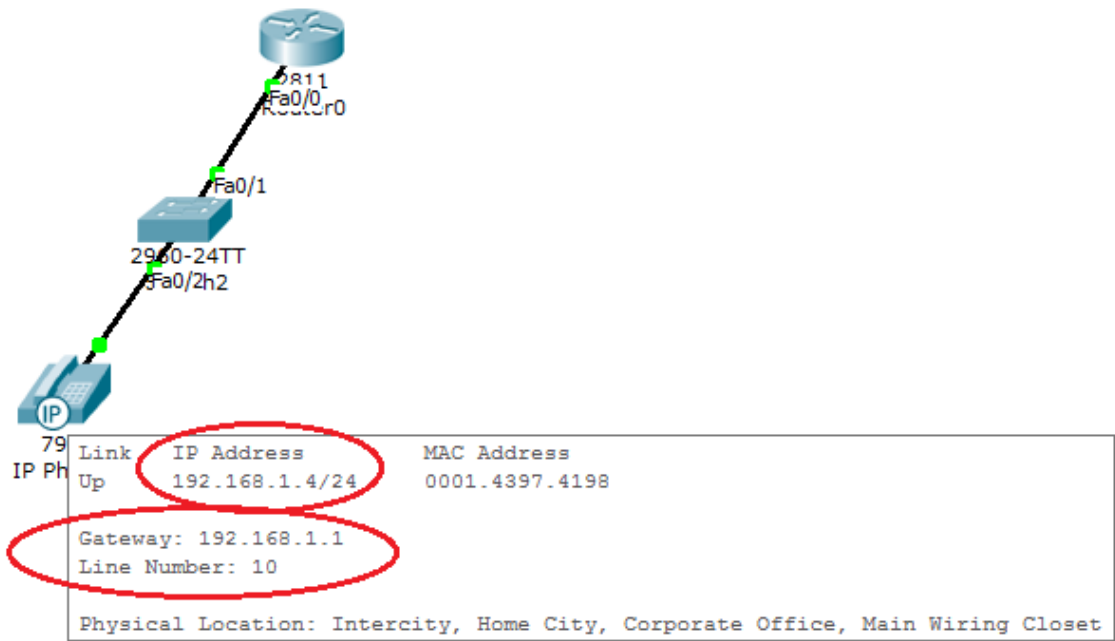
Router(config)#ephone-dn 3
Router(config-ephone-dn)#number 30

Router(config)#ephone-dn 4
Router(config-ephone-dn)#number 40

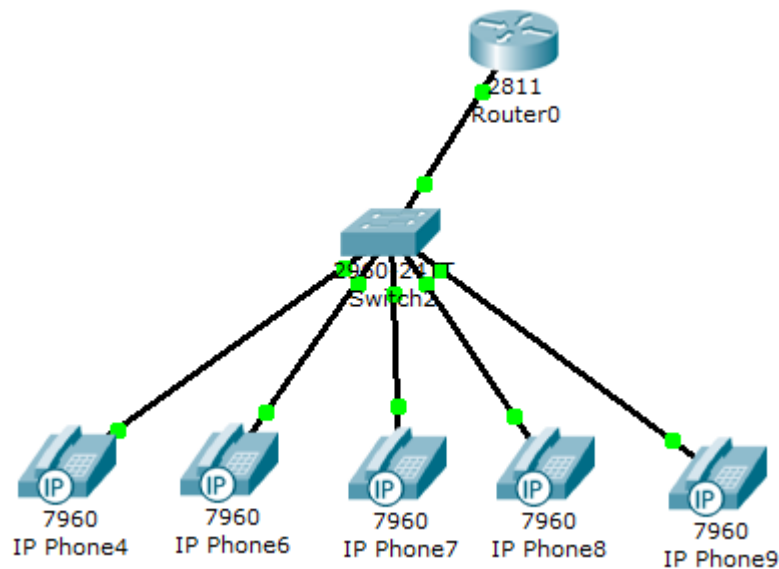
Router(config)#ephone-dn 5
Router(config-ephone-dn)#number 50
```

Its almost there, the only confirmation we need is that the IP Phones were successfully registered on the CUCME (This process can take a while).

Hover the mouse on the IP Phone to see if it successfully received the IP address and the phone number (If not, wait a little bit more. P.S.: This process can take a while).

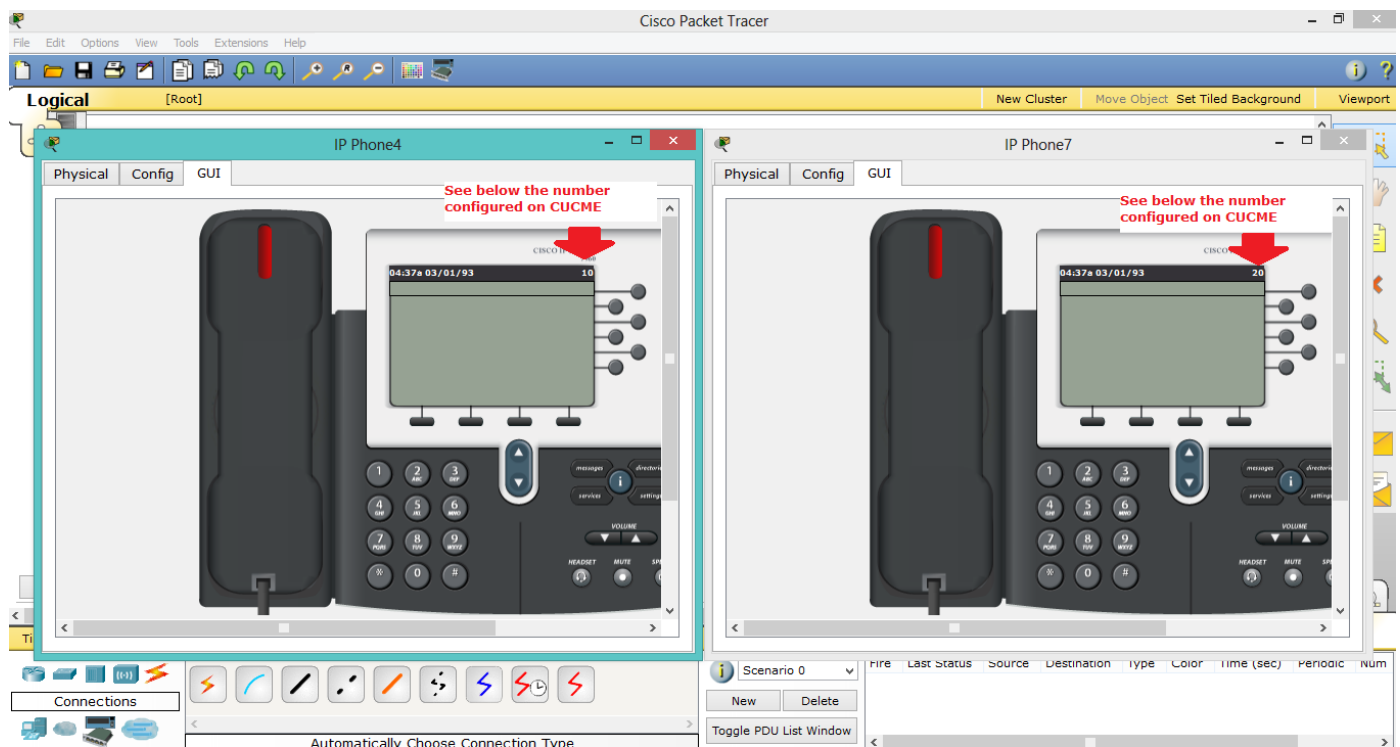


Once you have the confirmation, you can add the remaining 4 IP Phones on the switch, remembering that these IP Phones must be added on the same interfaces were have configured the Voice VLAN.

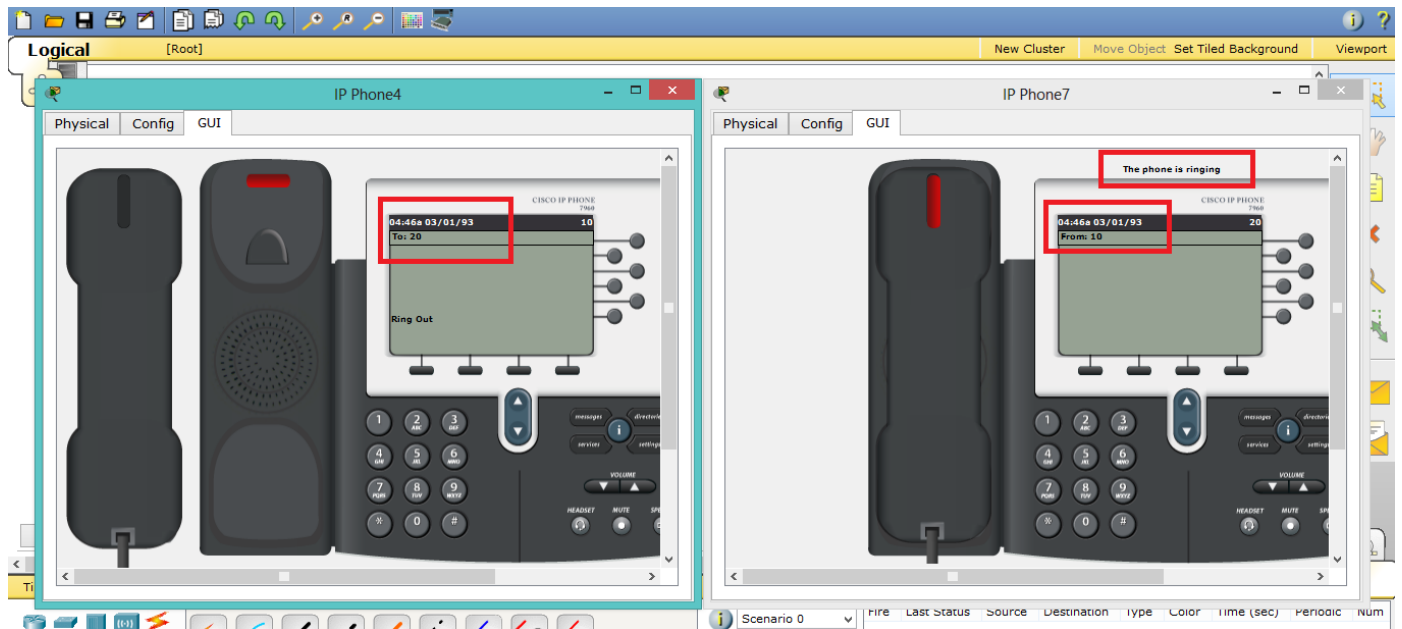


Make a call to test the configurations

1. Look at the pictures below:



2. Dial from one phone to another, on this case we will dial from IP Phone number 10 to IP Phone number 20 (to dial, just mark the number and click on the earphone)



To pick up the call on the other phone, just click on the earphone too and...VOILA