

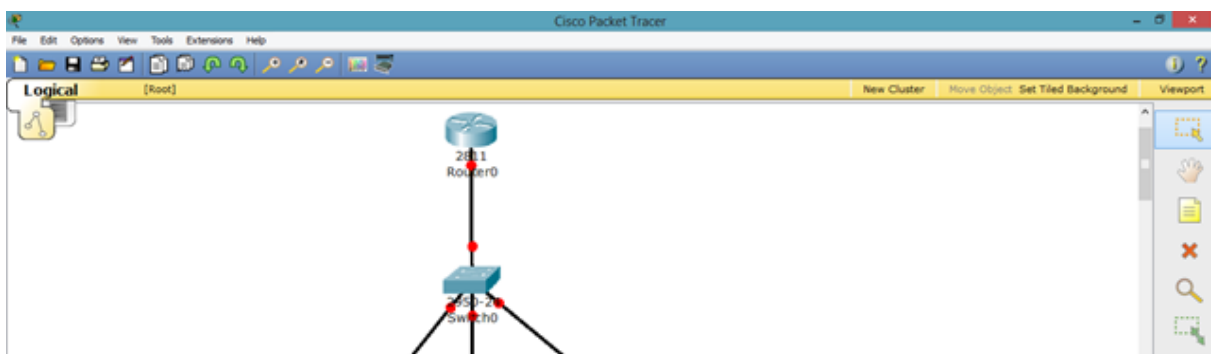
# Voice over IP (VOIP) on packet tracer<sup>[1]</sup>

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Voice over IP (VoIP, or voice over Internet Protocol) commonly refers to the communication protocols, technologies, methodologies, and transmission techniques involved in the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet. Other terms commonly associated with VoIP are IP telephony, Internet telephony, voice over broadband (VoBB), broadband telephony, IP communications, and broadband phone.

Internet telephony refers to communications services —voice, fax, SMS, and/or voice-messaging applications— that are transported via the Internet, rather than the public switched telephone network (PSTN). The steps involved in originating a VoIP telephone call are signaling and media channel setup, digitization of the analog voice signal, encoding, packetization, and transmission as Internet Protocol (IP) packets over a packet-switched network. On the receiving side, similar steps (usually in the reverse order) such as reception of the IP packets, decoding of the packets and digital-to-analog conversion reproduce the original voice stream. Even though IP telephony and VoIP are used interchangeably, IP telephony refers to all use of IP protocols for voice communication by digital telephony systems, while VoIP is one technology used by IP telephony to transport phone calls

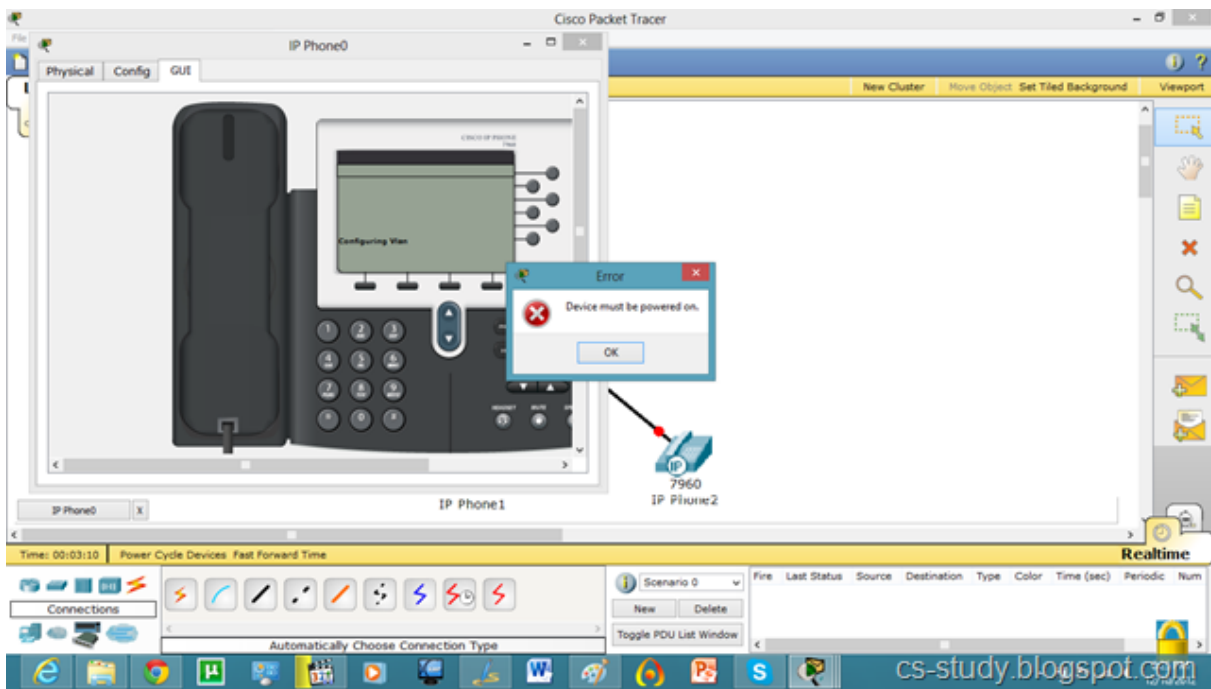
Let us apply it on packet tracer.





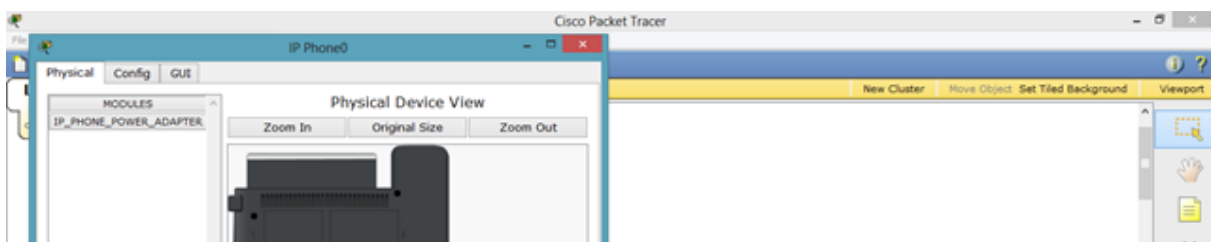
[2]

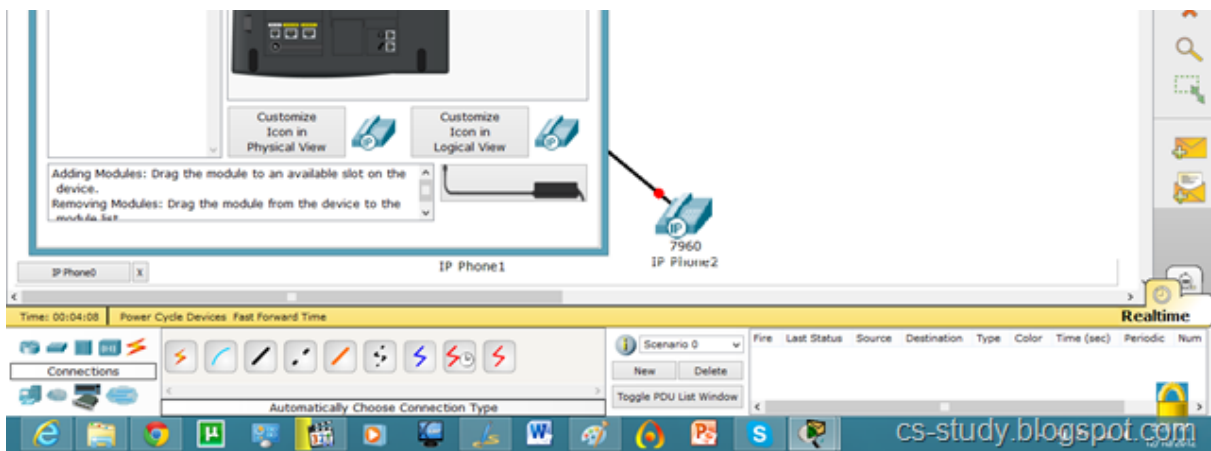
This IP Phone is displayed below. And when we try to go to any other mode its give us error and ask us to switch it on first.



[3]

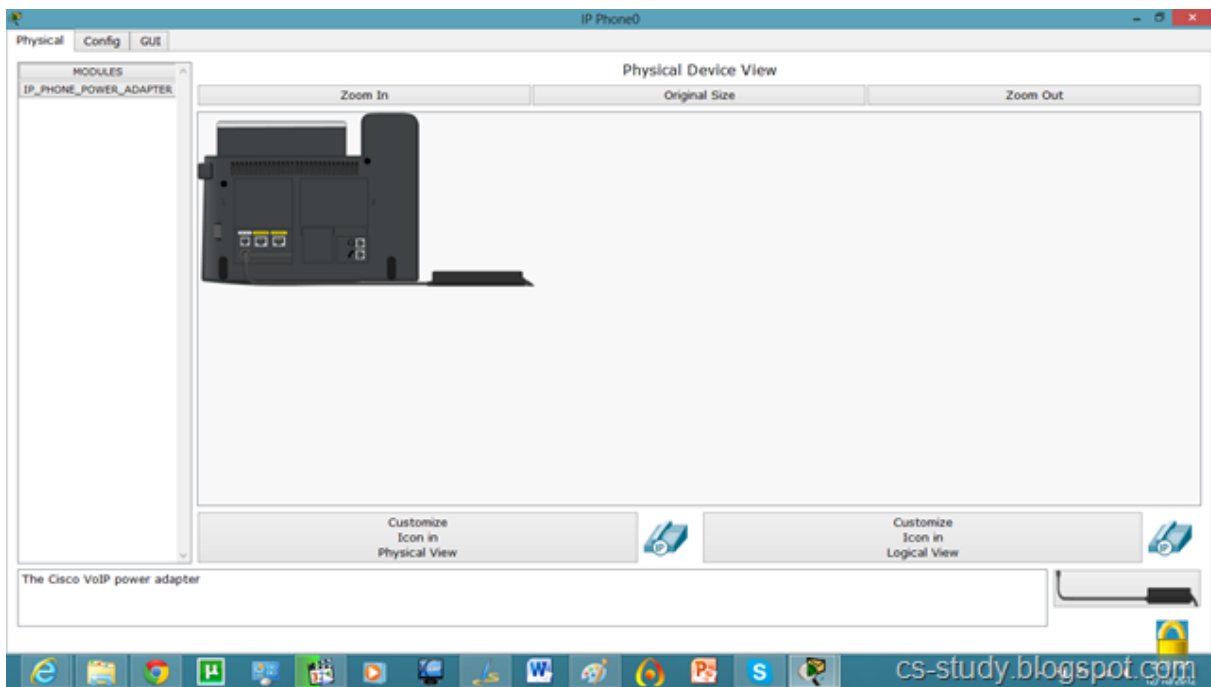
For that, go to Physical mode and put the power adapter (in the bottom right corner) into the phone as shown in figure.





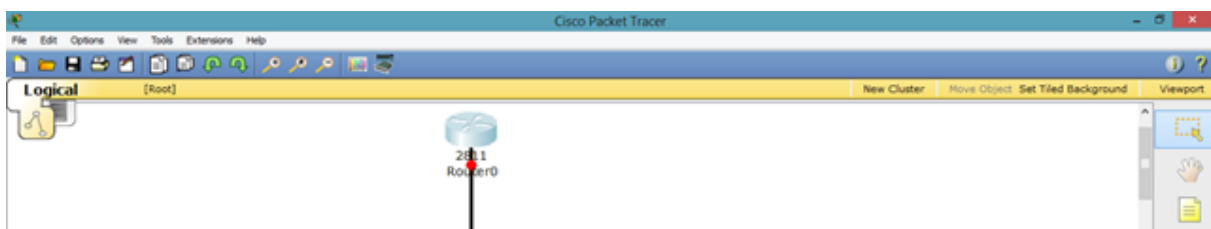
[4]

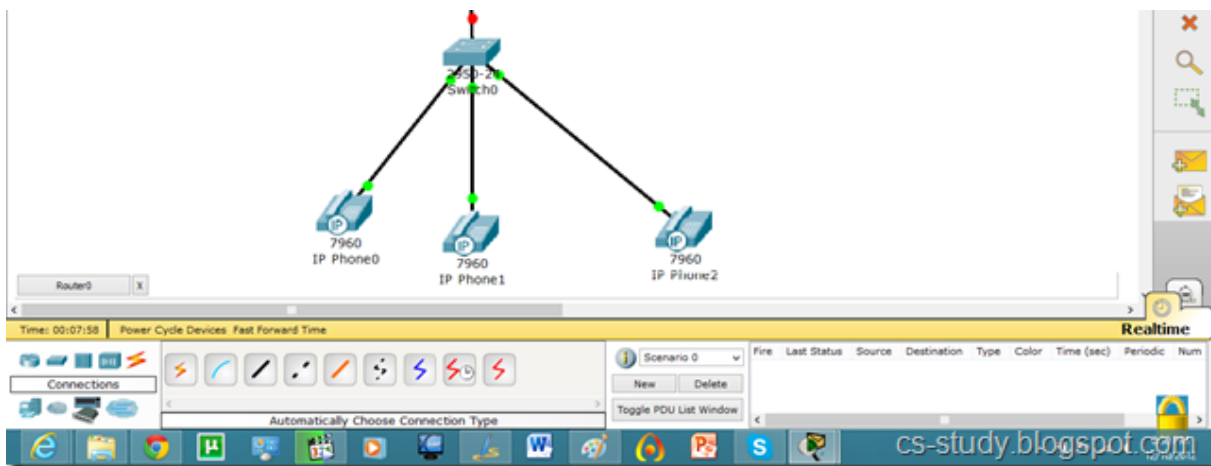
Now, we have inserted the antenna into IP phone. Repeat it for other phones as well.



[5]

Now, we see that interface of IP phone is UP.





[6]

Now, go to router and assign IP address.

```
Router0
Physical Config CLI
IOS Command Line Interface

Press RETURN to get started!

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

%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)#
```

[7]

We will have to set DHCP server on router to assign IP addresses to IP phones.

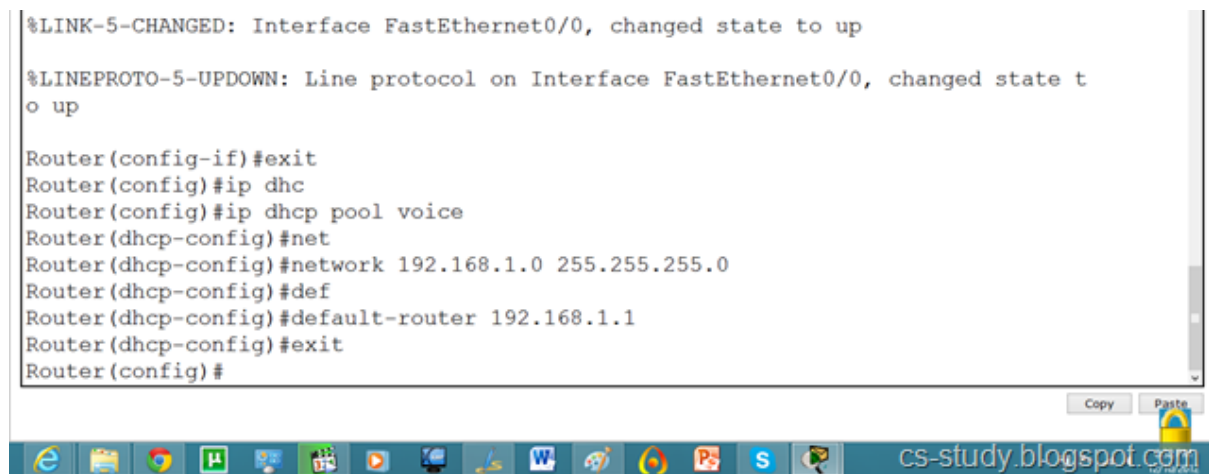
```
Router0
Physical Config CLI
IOS Command Line Interface

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

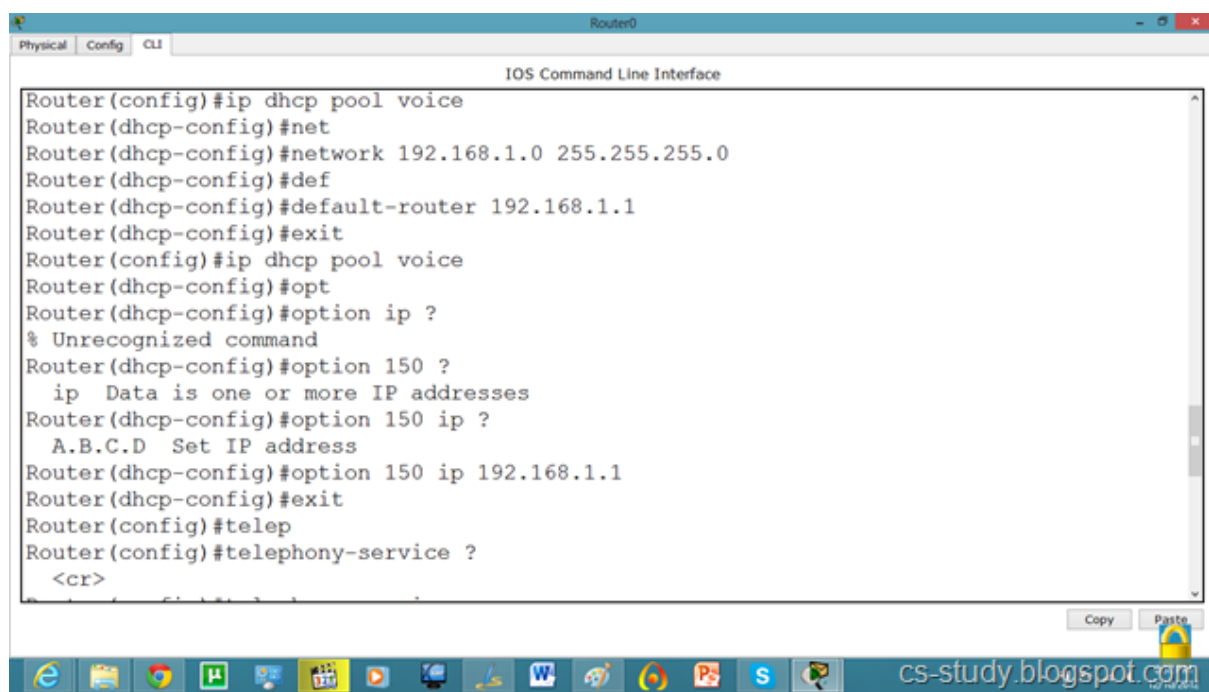
Router(config-if)#exit
Router(config)#ip dhcp
Router(config)#ip dhcp pool voice
Router(dhcp-config)#net
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#def
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#exit
Router(config)#
```



[8]

We will have to give an additional command for voip.

Router(dhcp-config)#option 150 ip 192.168.1.1

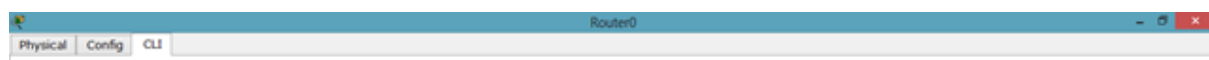


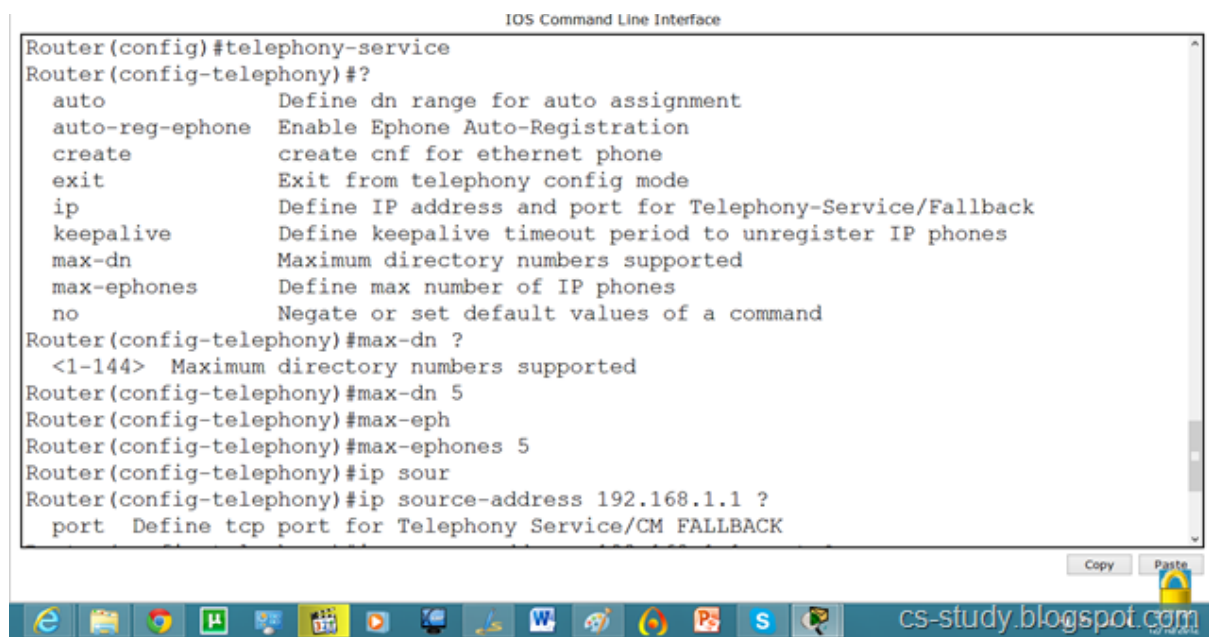
```
Router0
Physical Config CLI
IOS Command Line Interface

Router(config)#ip dhcp pool voice
Router(dhcp-config)#net
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#def
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#exit
Router(config)#ip dhcp pool voice
Router(dhcp-config)#opt
Router(dhcp-config)#option ip ?
% Unrecognized command
Router(dhcp-config)#option 150 ?
  ip Data is one or more IP addresses
Router(dhcp-config)#option 150 ip ?
  A.B.C.D Set IP address
Router(dhcp-config)#option 150 ip 192.168.1.1
Router(dhcp-config)#exit
Router(config)#telep
Router(config)#telephony-service ?
<cr>
```

[9]

Now, let us apply commands to the router for voip. You might have noticed we took 2811 series router because it facilitates the following commands.



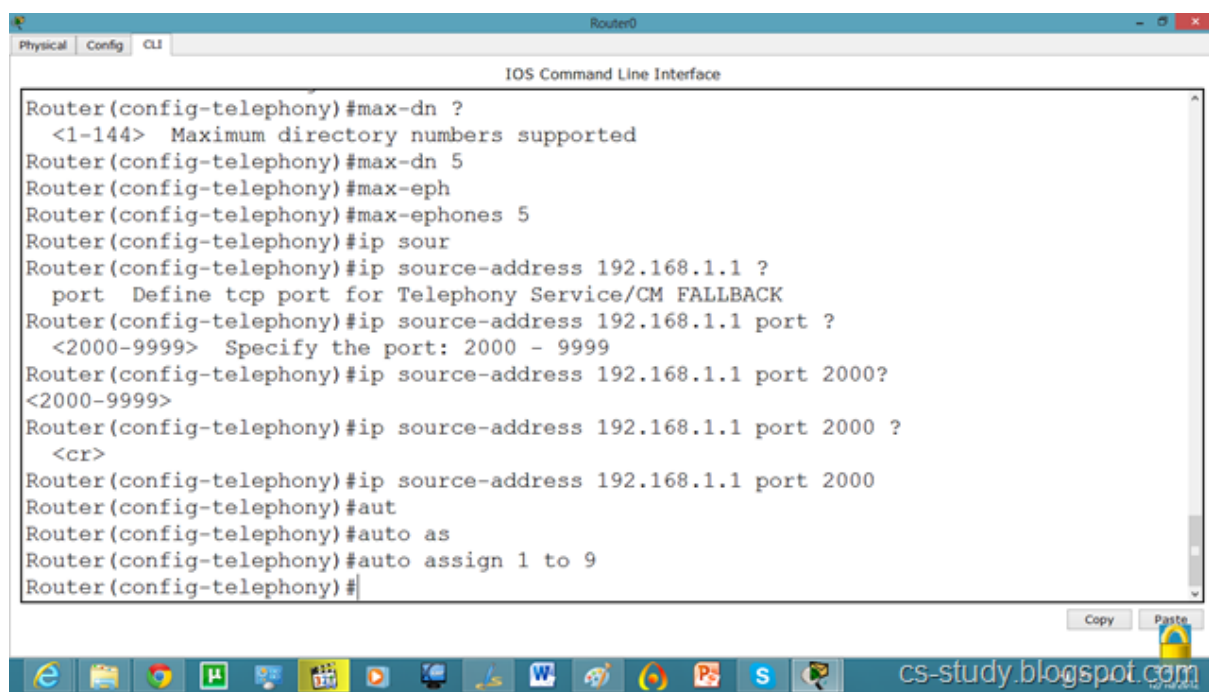


```
IOS Command Line Interface
Router(config)#telephony-service
Router(config-telephony)#?
  auto          Define dn range for auto assignment
  auto-reg-ephone Enable Ephone Auto-Registration
  create        create cnf for ethernet phone
  exit          Exit from telephony config mode
  ip            Define IP address and port for Telephony-Service/Fallback
  keepalive     Define keepalive timeout period to unregister IP phones
  max-dn        Maximum directory numbers supported
  max-ephones   Define max number of IP phones
  no            Negate or set default values of a command
Router(config-telephony)#max-dn ?
  <1-144> Maximum directory numbers supported
Router(config-telephony)#max-dn 5
Router(config-telephony)#max-eph
Router(config-telephony)#max-ephones 5
Router(config-telephony)#ip sour
Router(config-telephony)#ip source-address 192.168.1.1 ?
  port Define tcp port for Telephony Service/CM FALLBACK
```

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[10]

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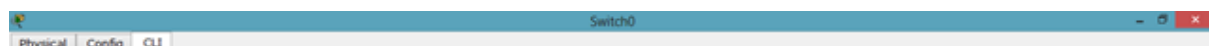


```
Router0
Physical Config CLI
IOS Command Line Interface
Router(config-telephony)#max-dn ?
  <1-144> Maximum directory numbers supported
Router(config-telephony)#max-dn 5
Router(config-telephony)#max-eph
Router(config-telephony)#max-ephones 5
Router(config-telephony)#ip sour
Router(config-telephony)#ip source-address 192.168.1.1 ?
  port Define tcp port for Telephony Service/CM FALLBACK
Router(config-telephony)#ip source-address 192.168.1.1 port ?
  <2000-9999> Specify the port: 2000 - 9999
Router(config-telephony)#ip source-address 192.168.1.1 port 2000?
  <2000-9999>
Router(config-telephony)#ip source-address 192.168.1.1 port 2000 ?
  <cr>
Router(config-telephony)#ip source-address 192.168.1.1 port 2000
Router(config-telephony)#aut
Router(config-telephony)#auto as
Router(config-telephony)#auto assign 1 to 9
Router(config-telephony)#
```

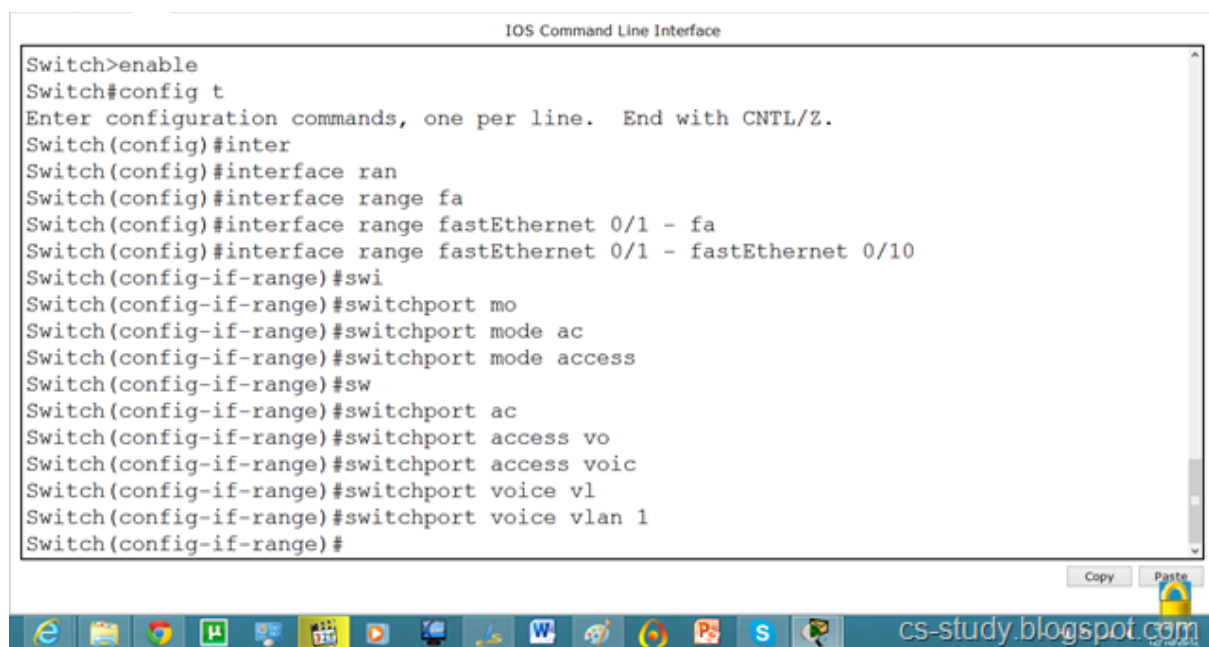
cs-study.blogspot.com

[11]

Now, we will go to the switch and make the interfaces support voip as follows.







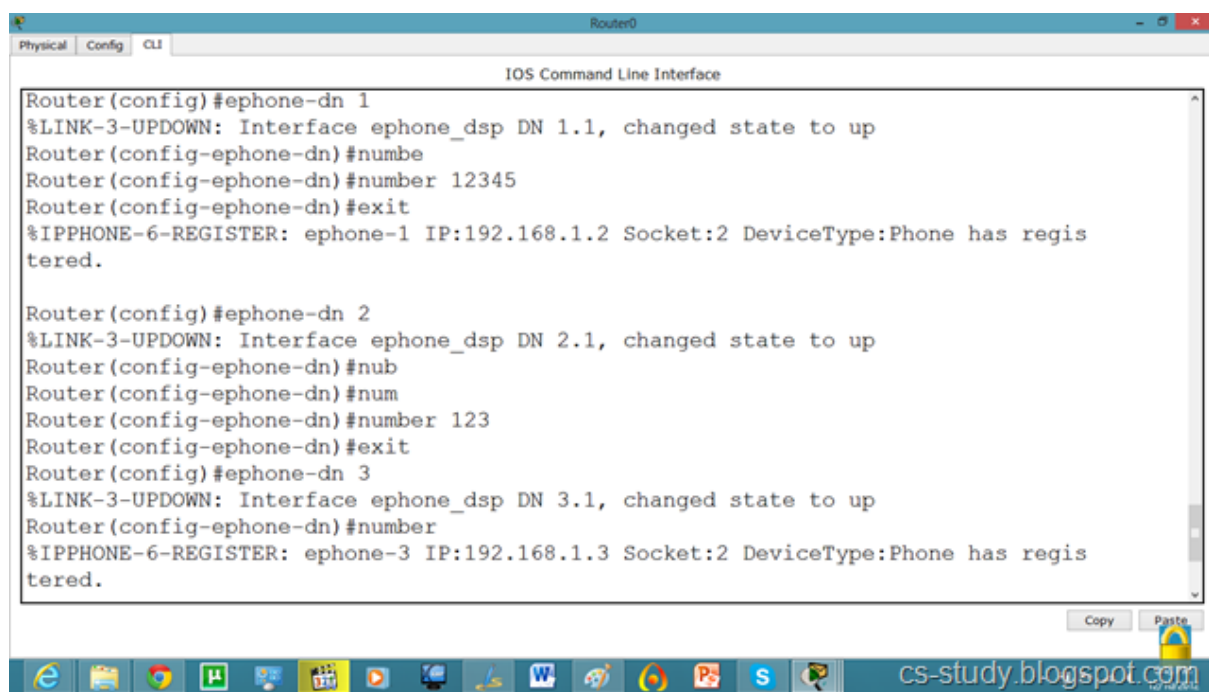
The screenshot shows a Windows desktop with a taskbar at the bottom containing icons for Internet Explorer, Firefox, Google Chrome, and several other applications. The main window is titled "IOS Command Line Interface" and displays the following commands and output:

```
Switch>enable
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#inter
Switch(config)#interface ran
Switch(config)#interface range fa
Switch(config)#interface range fastEthernet 0/1 - fa
Switch(config)#interface range fastEthernet 0/1 - fastEthernet 0/10
Switch(config-if-range)#swi
Switch(config-if-range)#switchport mo
Switch(config-if-range)#switchport mode ac
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#sw
Switch(config-if-range)#switchport ac
Switch(config-if-range)#switchport access vo
Switch(config-if-range)#switchport access voic
Switch(config-if-range)#switchport voice vl
Switch(config-if-range)#switchport voice vlan 1
Switch(config-if-range)#
```

At the bottom right of the window, there are "Copy" and "Paste" buttons, and a watermark for "cs-study.blogspot.com".

[12]

After that, we will have to assign phone number to our IP phone by applying following commands.



The screenshot shows a Windows desktop with a taskbar at the bottom containing icons for Internet Explorer, Firefox, Google Chrome, and several other applications. The main window is titled "Router0" and displays the following commands and output:

```
Router0
Physical Config CLI
IOS Command Line Interface

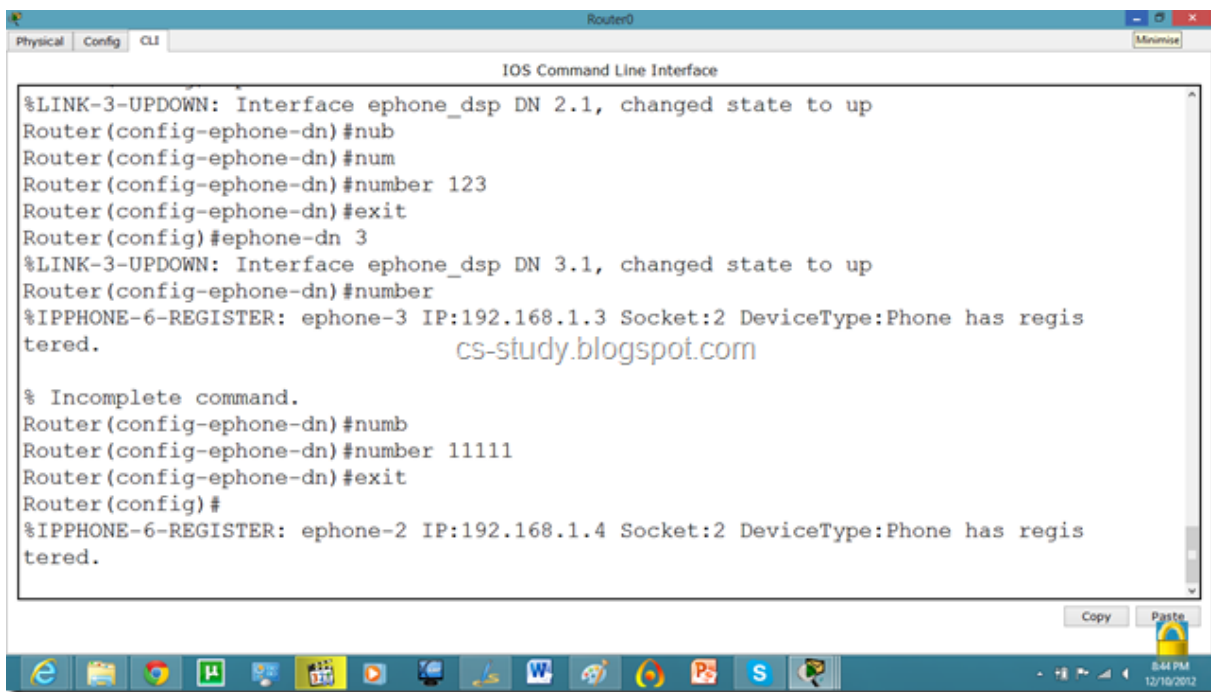
Router(config)#ephone-dn 1
%LINK-3-UPDOWN: Interface ephone_dsp DN 1.1, changed state to up
Router(config-ephone-dn)#numbe
Router(config-ephone-dn)#number 12345
Router(config-ephone-dn)#exit
%IPPHONE-6-REGISTER: ephone-1 IP:192.168.1.2 Socket:2 DeviceType:Phone has regis
tered.

Router(config)#ephone-dn 2
%LINK-3-UPDOWN: Interface ephone_dsp DN 2.1, changed state to up
Router(config-ephone-dn)#nub
Router(config-ephone-dn)#num
Router(config-ephone-dn)#number 123
Router(config-ephone-dn)#exit
Router(config)#ephone-dn 3
%LINK-3-UPDOWN: Interface ephone_dsp DN 3.1, changed state to up
Router(config-ephone-dn)#number
%IPPHONE-6-REGISTER: ephone-3 IP:192.168.1.3 Socket:2 DeviceType:Phone has regis
tered.
```

At the bottom right of the window, there are "Copy" and "Paste" buttons, and a watermark for "cs-study.blogspot.com".

[13]

Continued...



[14]

Now, we can see that in GUI mode of Phone, we have a phone number available.



[15]

This means that we can call from one phone to the other. Lets do that.





[16]

And when we pick up the receiver, it says that we are connected :).



[17]

### Commands on Router for VOIP

```
Router(config)#ip dhcp pool voice
```

```
Router(dhcp-config)#option 150 ip 192.168.1.1
```

```
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 192.168.1.1 port 2000
```

```
Router(config-telephony)#auto assign 1 to 9
```

```
Router(config-telephony)#exit
```

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

```
%LINK-3-UPDOWN: Interface ephone_dsp DN 1.1, changed state to up
```

```
Router(config-ephone-dn)#number 12345
```

```
Router(config-ephone-dn)#exit
```

```
%IPPHONE-6-REGISTER: ephone-1 IP:192.168.1.2 Socket:2 DeviceType:Phone has  
registered.
```

```
Router(config)#ephone-dn 2
```

```
%LINK-3-UPDOWN: Interface ephone_dsp DN 2.1, changed state to up
```

```
Router(config-ephone-dn)#number 123
```

```
Router(config-ephone-dn)#exit
```

```
Router(config)#ephone-dn 3
```

```
%LINK-3-UPDOWN: Interface ephone_dsp DN 3.1, changed state to up
```

```
Router(config-ephone-dn)#number 11111
```

```
Router(config-ephone-dn)#exit
```

### **Commands on Switch for VOIP**

```
Switch(config)#interface range fastEthernet 0/1 - fastEthernet 0/10
```

```
Switch(config-if-range)#switchport mode access
```

```
Switch(config-if-range)#switchport voice vlan 1
```

1. <http://cs-study.blogspot.mx/2012/12/voice-over-ip-voip-on-packet-tracer.html>
2. <http://lh6.ggpht.com/-VVCvAGG0DyU/UMZBqtatVuI/AAAAAAAAACnE/JDcyawP-2kw/s1600-h/17.png>
3. <http://lh5.ggpht.com/-wYxoz9U3ElU/UMZBwi34AVI/AAAAAAAAACnY/D8aLqoH6DOE/s1600-h/24.png>
4. <http://lh6.ggpht.com/-54pdfeZUEkM/UMZB2gfJb4I/AAAAAAAAACns/O3xymwq9540/s1600-h/34.png>
5. <http://lh5.ggpht.com/-1uBkmgdUJP4/UMZB8yPzUTI/AAAAAAAAACoA/IGNHw1PUvzg/s1600-h/44.png>
6. [http://lh3.ggpht.com/-uu5\\_mqGTpV8/UMZCCkpyoAI/AAAAAAAAACoU/DYkOaOtFkQE/s1600-h/54.png](http://lh3.ggpht.com/-uu5_mqGTpV8/UMZCCkpyoAI/AAAAAAAAACoU/DYkOaOtFkQE/s1600-h/54.png)
7. <http://lh6.ggpht.com/-DOxu3KoAPEE/UMZCKsJNVII/AAAAAAAAACoo/7vZdjOKno3U/s1600-h/64.png>
8. [http://lh5.ggpht.com/-Pk5rp6hYQ9c/UMZCR5\\_X-wI/AAAAAAAAACo8/R6hN6\\_k03Hk/s1600-h/74.png](http://lh5.ggpht.com/-Pk5rp6hYQ9c/UMZCR5_X-wI/AAAAAAAAACo8/R6hN6_k03Hk/s1600-h/74.png)
9. <http://lh6.ggpht.com/-vO8BIAZs1K0/UMZCYzKwCpI/AAAAAAAAACpQ/hpHhAaQSLDc/s1600-h/84.png>
10. [http://lh6.ggpht.com/-NhxRPeT1gaY/UMZCgb\\_eDDI/AAAAAAAAACpk/DOCf2Tubs8c/s1600-h/94.png](http://lh6.ggpht.com/-NhxRPeT1gaY/UMZCgb_eDDI/AAAAAAAAACpk/DOCf2Tubs8c/s1600-h/94.png)
11. <http://lh4.ggpht.com/-pwnVfmfdqPg/UMZCnUu0wII/AAAAAAAAACp4/7Rf479q--wQ/s1600-h/104.png>
12. <http://lh4.ggpht.com/-kLFTD3Pda5Q/UMZCu2MKR8I/AAAAAAAAACqM/B7sGOVTu0s8/s1600-h/114.png>
13. [http://lh3.ggpht.com/-immd\\_GIpv6k/UMZC2NvgkCI/AAAAAAAAACqg/gSdTVeO6CLg/s1600-h/124.png](http://lh3.ggpht.com/-immd_GIpv6k/UMZC2NvgkCI/AAAAAAAAACqg/gSdTVeO6CLg/s1600-h/124.png)
14. <http://lh6.ggpht.com/-jW-NqoWRBa0/UMZC9epqjWI/AAAAAAAAACq0/WHasHpGQ6Ds/s1600-h/135.png>
15. [http://lh5.ggpht.com/-DECb1BwNPkQ/UMZDFU\\_V7JI/AAAAAAAAACrI/9pV1pRh3CiU/s1600-h/145.png](http://lh5.ggpht.com/-DECb1BwNPkQ/UMZDFU_V7JI/AAAAAAAAACrI/9pV1pRh3CiU/s1600-h/145.png)
16. <http://lh5.ggpht.com/-qA5DReAiMXI/UMZDMCXOCqI/AAAAAAAAACrc/Evc9yjFKhzU/s1600-h/154.png>
17. [http://lh4.ggpht.com/-3\\_PWB3FO-Tc/UMZDSmRzarI/AAAAAAAAACrw/39yNn-WY7os/s1600-h/164.png](http://lh4.ggpht.com/-3_PWB3FO-Tc/UMZDSmRzarI/AAAAAAAAACrw/39yNn-WY7os/s1600-h/164.png)

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