

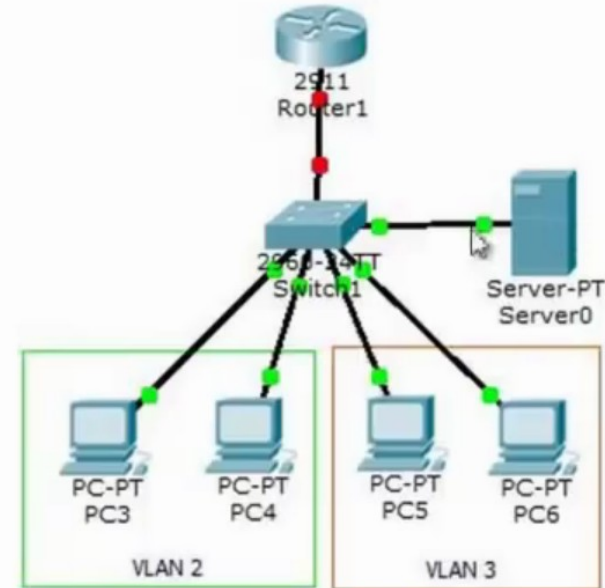
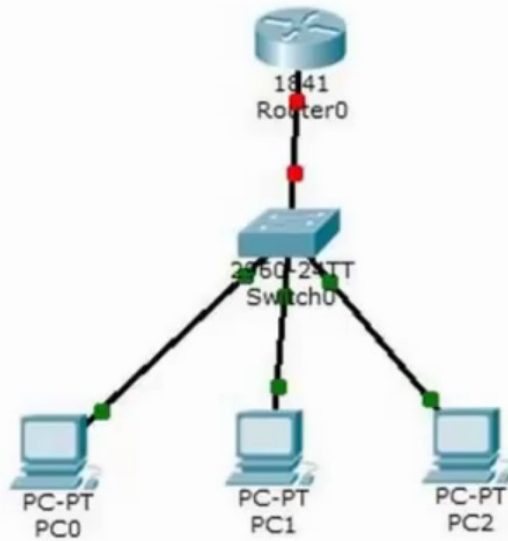
# DHCP



Курс Cisco Packet Tracer <https://habrahabr.ru/post/252085/>

11.Видео уроки Cisco Packet Tracer. Курс молодого бойца. DHCP <https://www.youtube.com/watch?v=MoElaNJn-9w>

# DHCP



```
conf t
interface FastEthernet0/0
ip address 192.168.1.1 255.255.255.0
exit
ip dhcp pool DHCP
network 192.168.1.0 255.255.255.0
default-router 192.168.1.1
dns-server 8.8.8.8
exit
```

```
ip dhcp excluded-address 192.168.1.100
ip dhcp excluded-address 192.168.1.1
exit
show ip dhcp binding
```

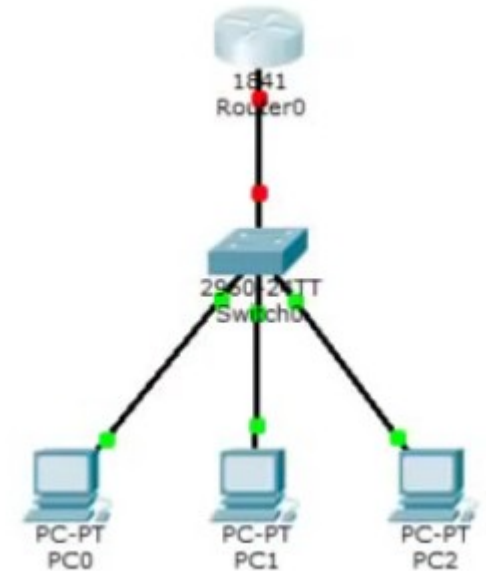
```
interface GigabitEthernet0/1.2
encapsulation dot1Q 2
ip address 192.168.2.1 255.255.255.0
ip helper-address 192.168.4.2
exit
interface GigabitEthernet0/1.3
encapsulation dot1Q 3
ip address 192.168.3.1 255.255.255.0
ip helper-address 192.168.4.2
```

```
exit
interface GigabitEthernet0/1.4
encapsulation dot1Q 4
ip address 192.168.4.1 255.255.255.0
```

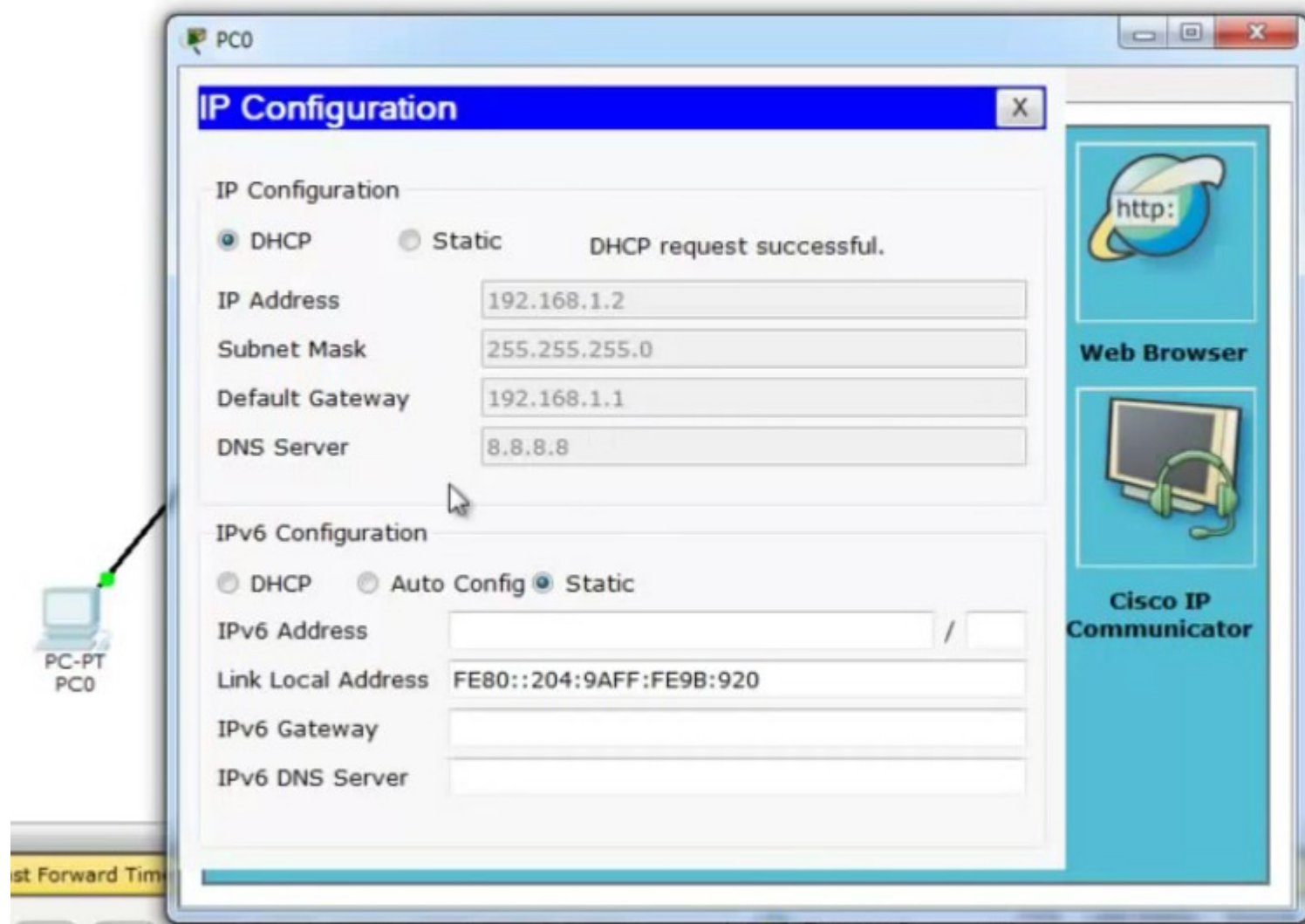
# Настраиваем DHCP-сервер на Router0

## Router0

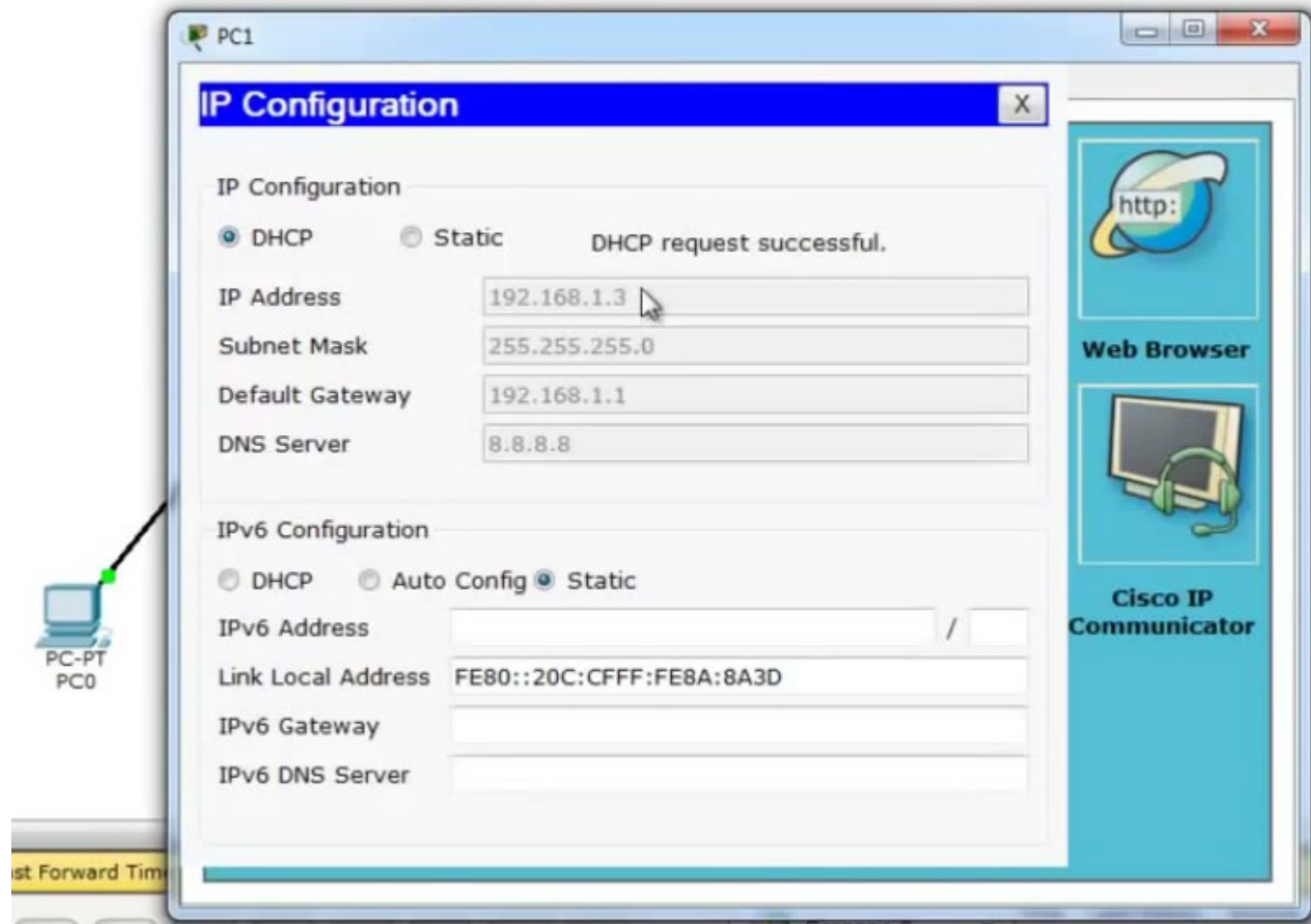
```
> no
> en
# conf t
(config)# int fa0/0
(config-if)# no shutdown
(config-if)# ip address 192.168.1.1 255.255.255.0
(config-if)# exit
(config)# ip dhcp pool DHCP
(dhcp-config)# network 192.168.1.0 255.255.255.0
(dhcp-config)# default-router 192.168.1.1
(dhcp-config)# dns-server 8.8.8.8
(dhcp-config)# exit
(config)# ip dhcp excluded-address 192.168.1.100
(config)# ip dhcp excluded-address 192.168.1.1
(config)# exit
# wr mem
```



Включаем динамическое получение IP - DHCP на клиенте - PC0

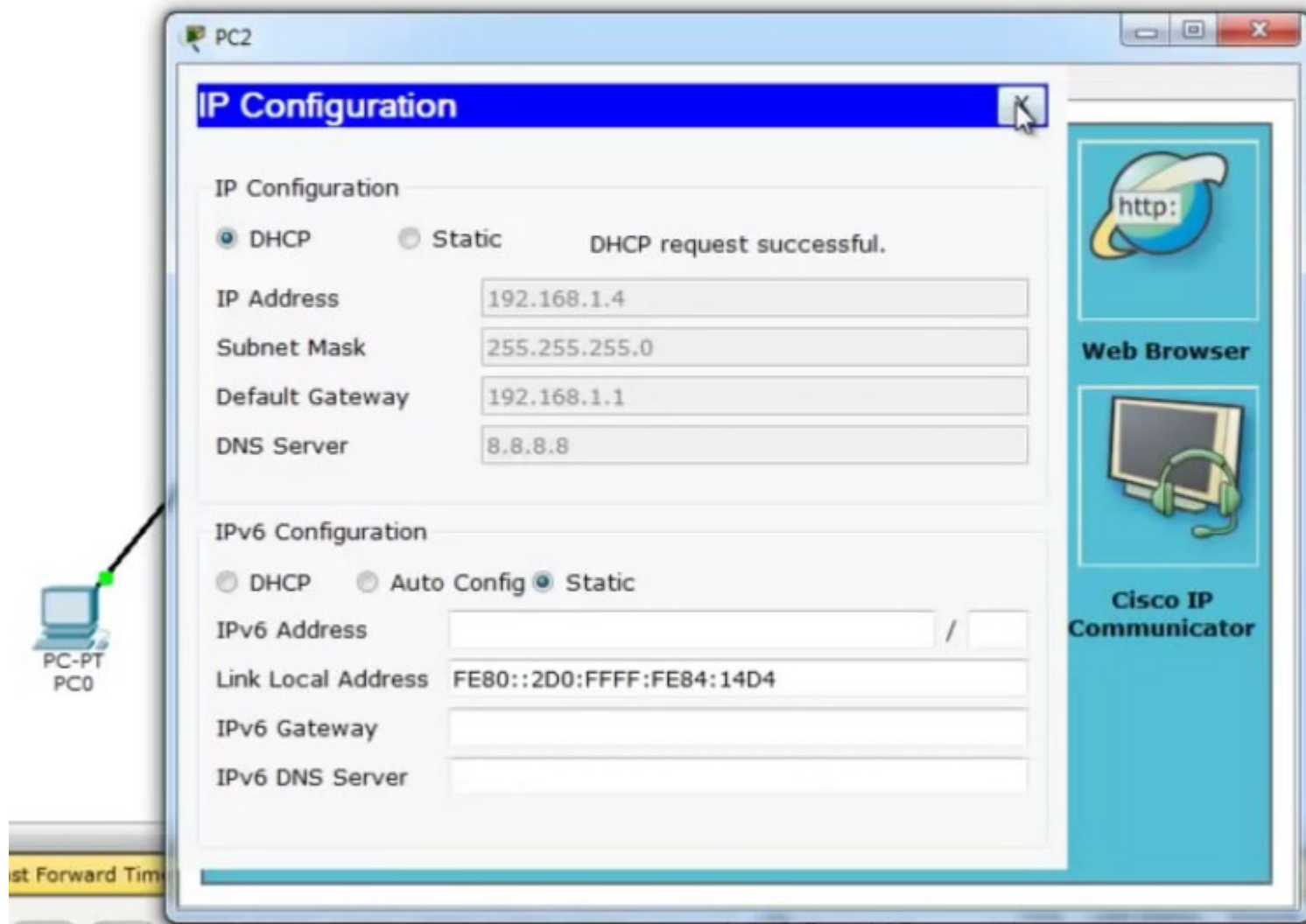


Аналогично поступаем на PC1

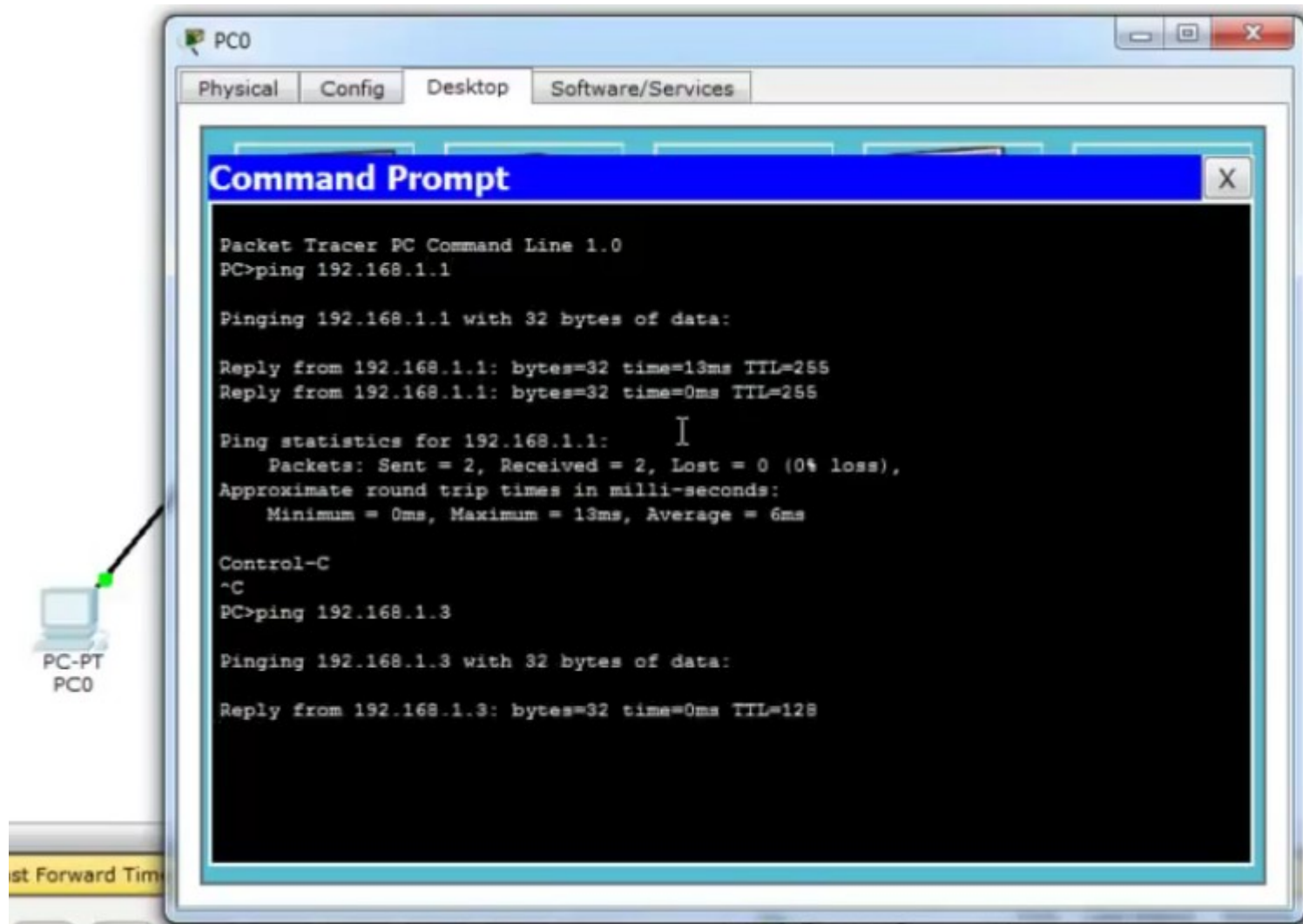




... и на PC2

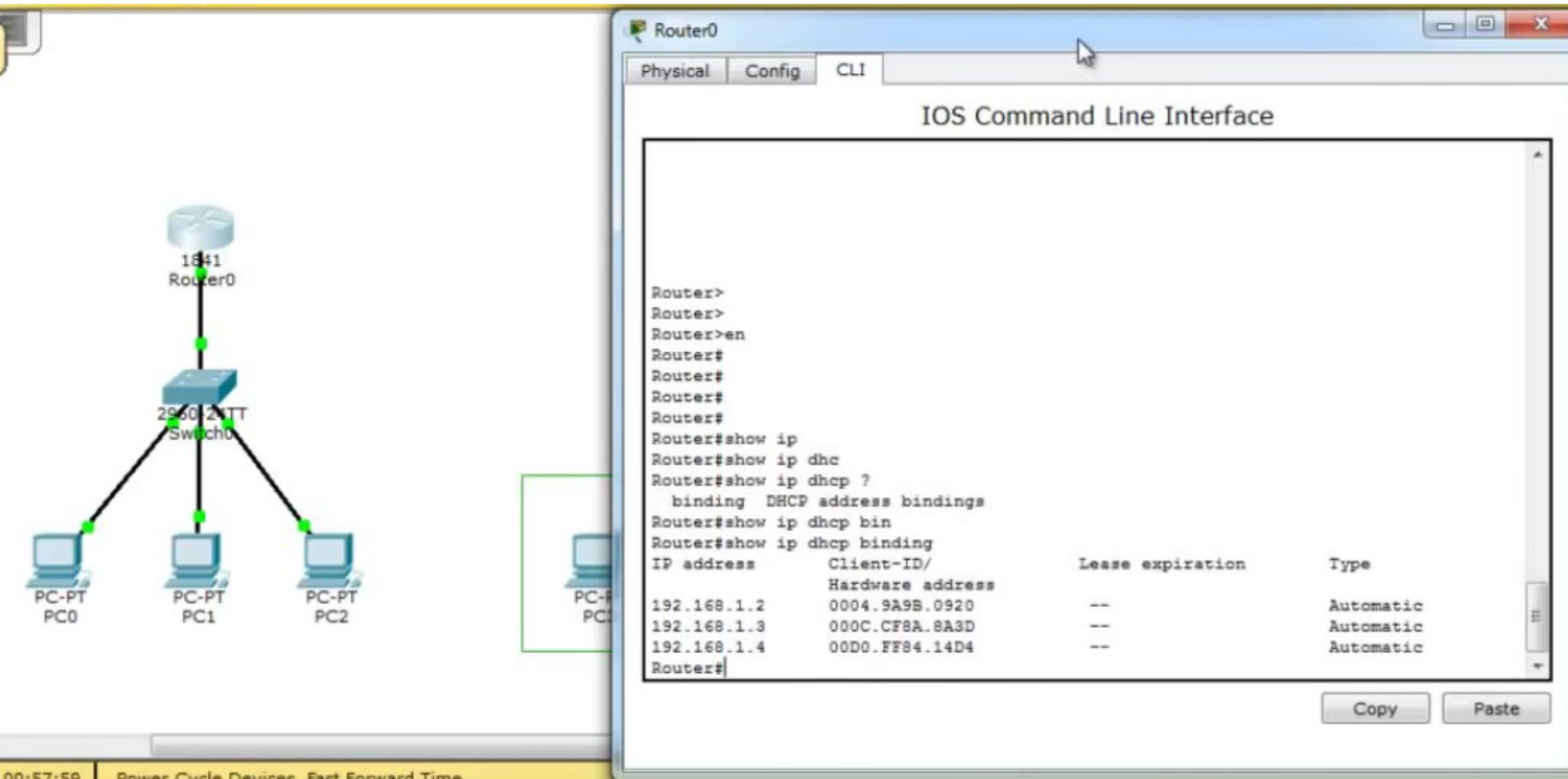


Проверяем взаимодействие. Готово.





Можно посмотреть какие ip адреса каким узлам выданы.  
Командой #show ip dhcp binding



The image displays a network topology on the left and the CLI interface of Router0 on the right. The network diagram shows a central 2950-24TT Switch connected to three PC-PT devices (PC0, PC1, PC2) and a 1841 Router0. The Router0 CLI window shows the command sequence and the output of the 'show ip dhcp binding' command.

```
Router>
Router>
Router>en
Router#
Router#
Router#
Router#show ip
Router#show ip dhc
Router#show ip dhcp ?
    binding  DHCP address bindings
Router#show ip dhcp bin
Router#show ip dhcp binding
```

IP address	Client-ID/ Hardware address	Lease expiration	Type
192.168.1.2	0004.9A9B.0920	--	Automatic
192.168.1.3	000C.CF8A.8A3D	--	Automatic
192.168.1.4	00D0.FF84.14D4	--	Automatic

Router#

Copy Paste

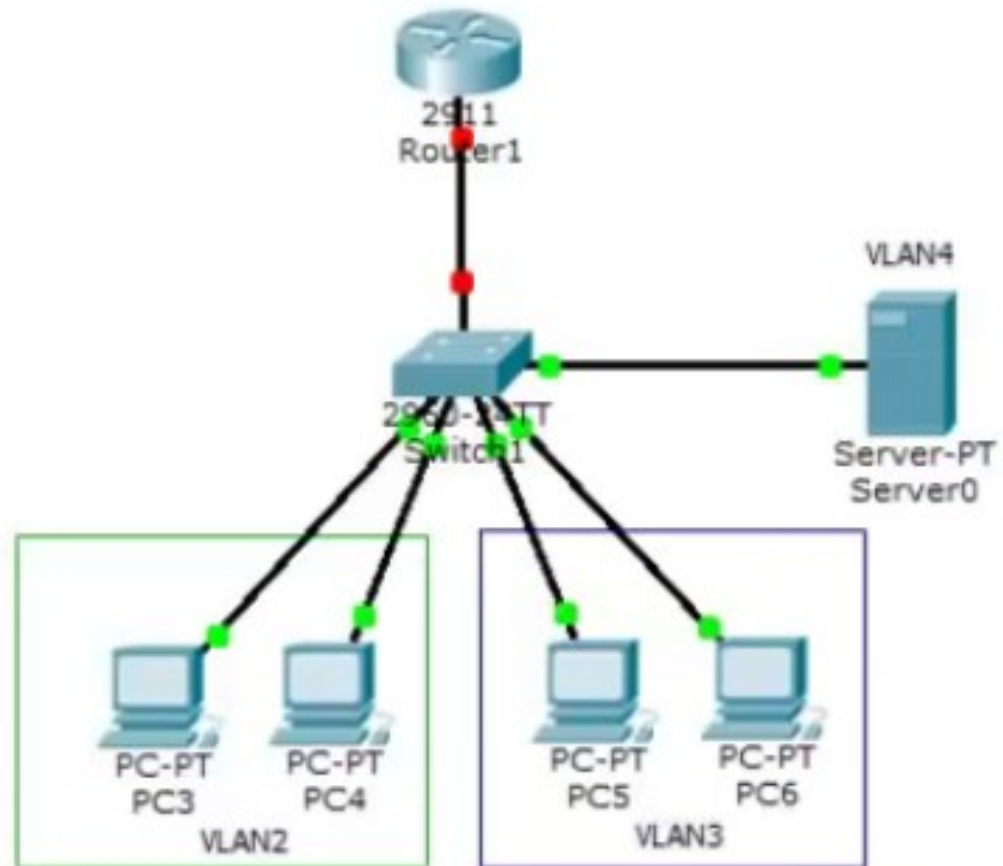
Второй пример.  
Уже есть 2 VLAN'а.  
(На самом деле Server-PT находится в 3-ем VLAN'е)

```
> en
# conf t
(config)# vlan 2
(config-vlan)# name VLAN2
(config-vlan)# exit
(config)# vlan 3
(config-vlan)# name VLAN3
(config-vlan)# exit
(config)# vlan 4
(config-vlan)# name DHCP
(config-vlan)# exit

(config)# int range fastEthernet 0/2-3
(config-if-range)# switchport mode access
(config-if-range)# switchport access vlan 2
(config-if-range)# exit

(config)# int range fastEthernet 0/4-5
(config-if-range)# switchport mode access
(config-if-range)# switchport access vlan 3
(config-if-range)# exit

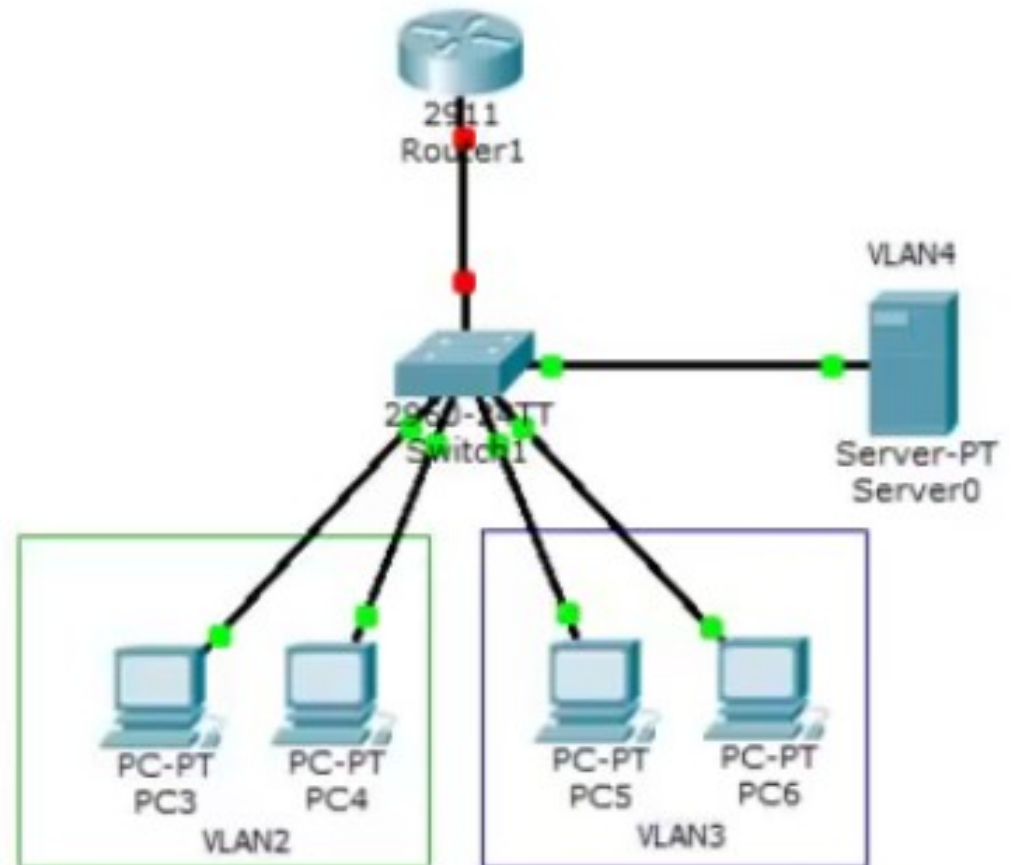
(config)# int range fastEthernet 0/6
(config-if)# switchport mode access
(config-if)# switchport access vlan 4
(config-if)# exit
```



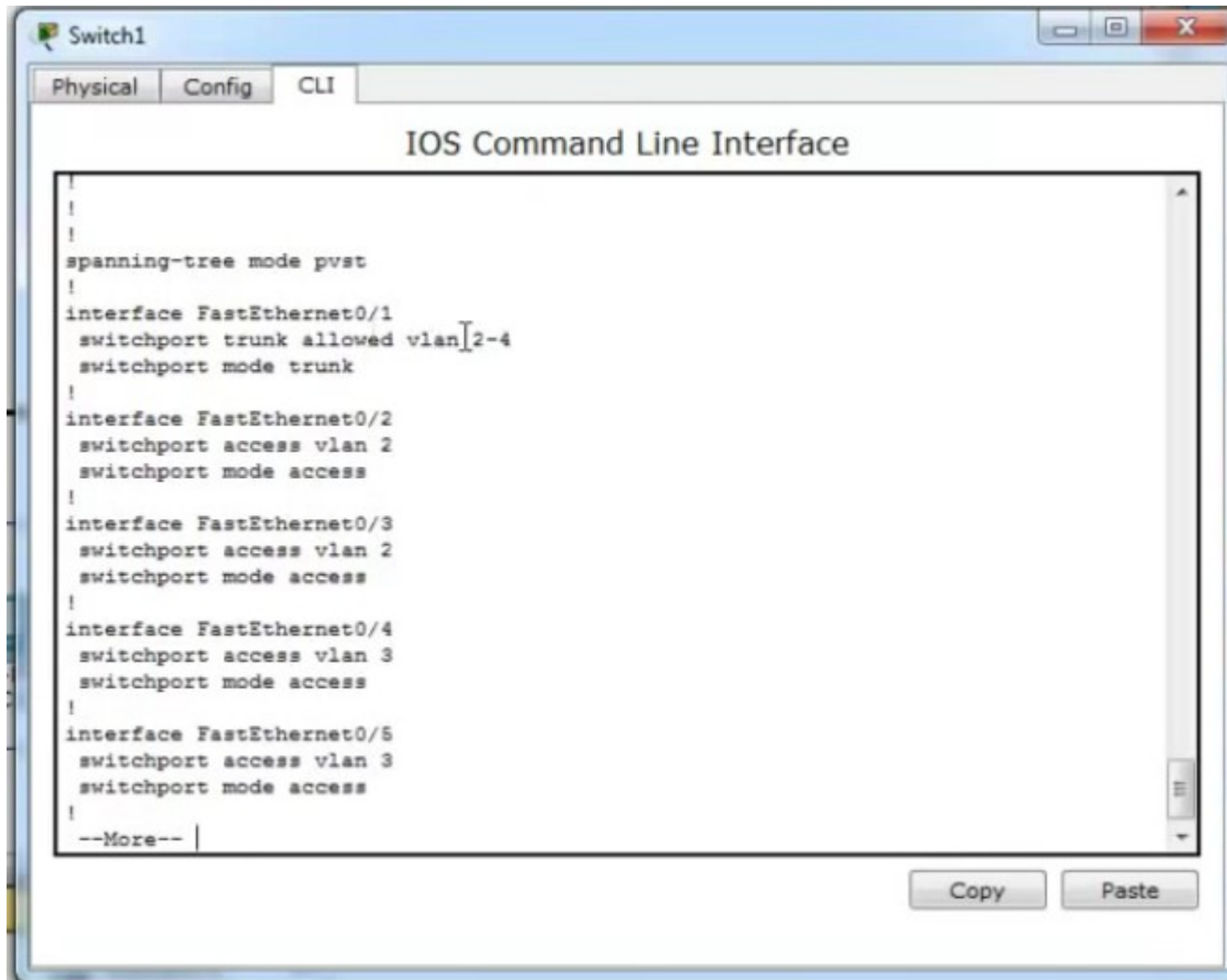
# Настраиваем коммутатор Switch1

```
(config)# int fastEthernet 0/1  
(config-if)# switchport mode trunk  
(config-if)# switchport trunk allowed vlan 2,3,4  
(config)# exit
```

```
# wr mem  
# show run
```



## Проверяем конфигурацию Switch1



The screenshot shows a window titled "Switch1" with three tabs: "Physical", "Config", and "CLI". The "CLI" tab is active, displaying the "IOS Command Line Interface". The configuration text is as follows:

```
!
!
!
spanning-tree mode pvst
!
interface FastEthernet0/1
  switchport trunk allowed vlan 2-4
  switchport mode trunk
!
interface FastEthernet0/2
  switchport access vlan 2
  switchport mode access
!
interface FastEthernet0/3
  switchport access vlan 2
  switchport mode access
!
interface FastEthernet0/4
  switchport access vlan 3
  switchport mode access
!
interface FastEthernet0/5
  switchport access vlan 3
  switchport mode access
!
--More-- |
```

At the bottom right of the CLI window, there are two buttons: "Copy" and "Paste".

# Настраиваем маршрутизатор Router1

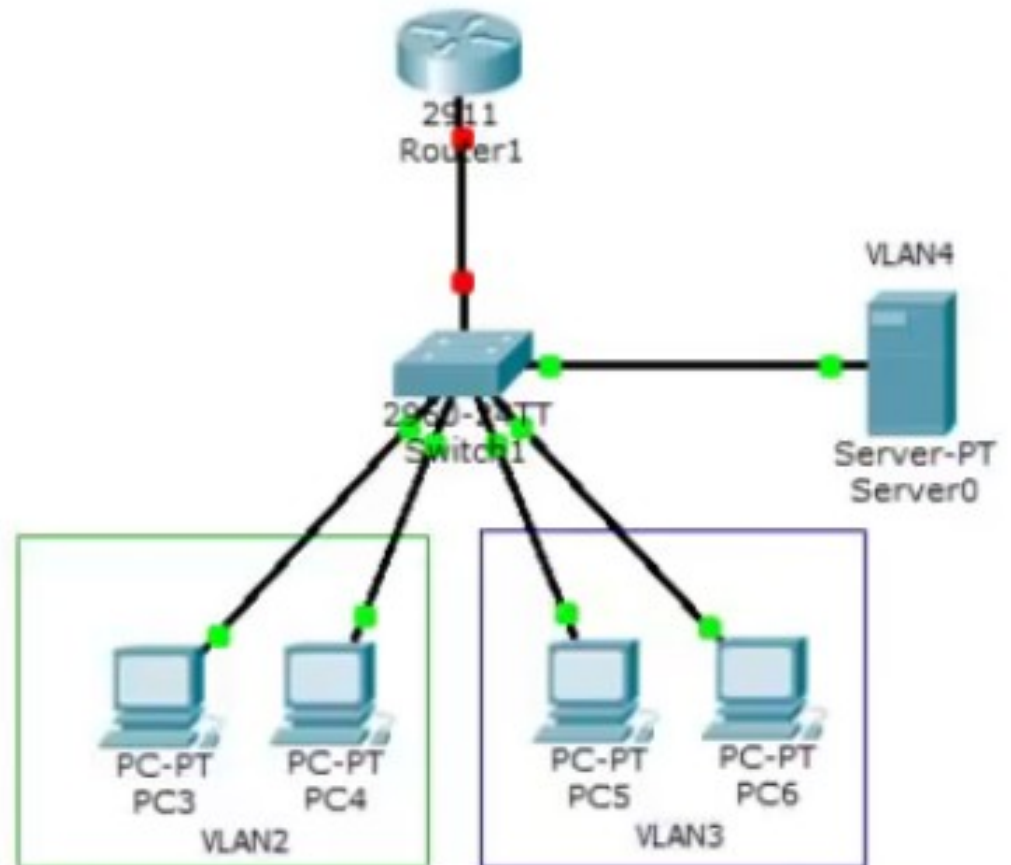
```
> en
# config t
(config)# int gi0/0.2
(config-subif)# encapsulation dot1Q 2
(config-subif)# ip address 192.168.2.1 255.255.255.0
(config-subif)# no shutdown
(config)# exit

(config)# int gi0/0
(config-if)# no shutdown
(config)# exit

(config)# int gi0/0.3
(config-subif)# encapsulation dot1Q 2
(config-subif)# ip address 192.168.3.1 255.255.255.0
(config-subif)# no shutdown
(config)# exit

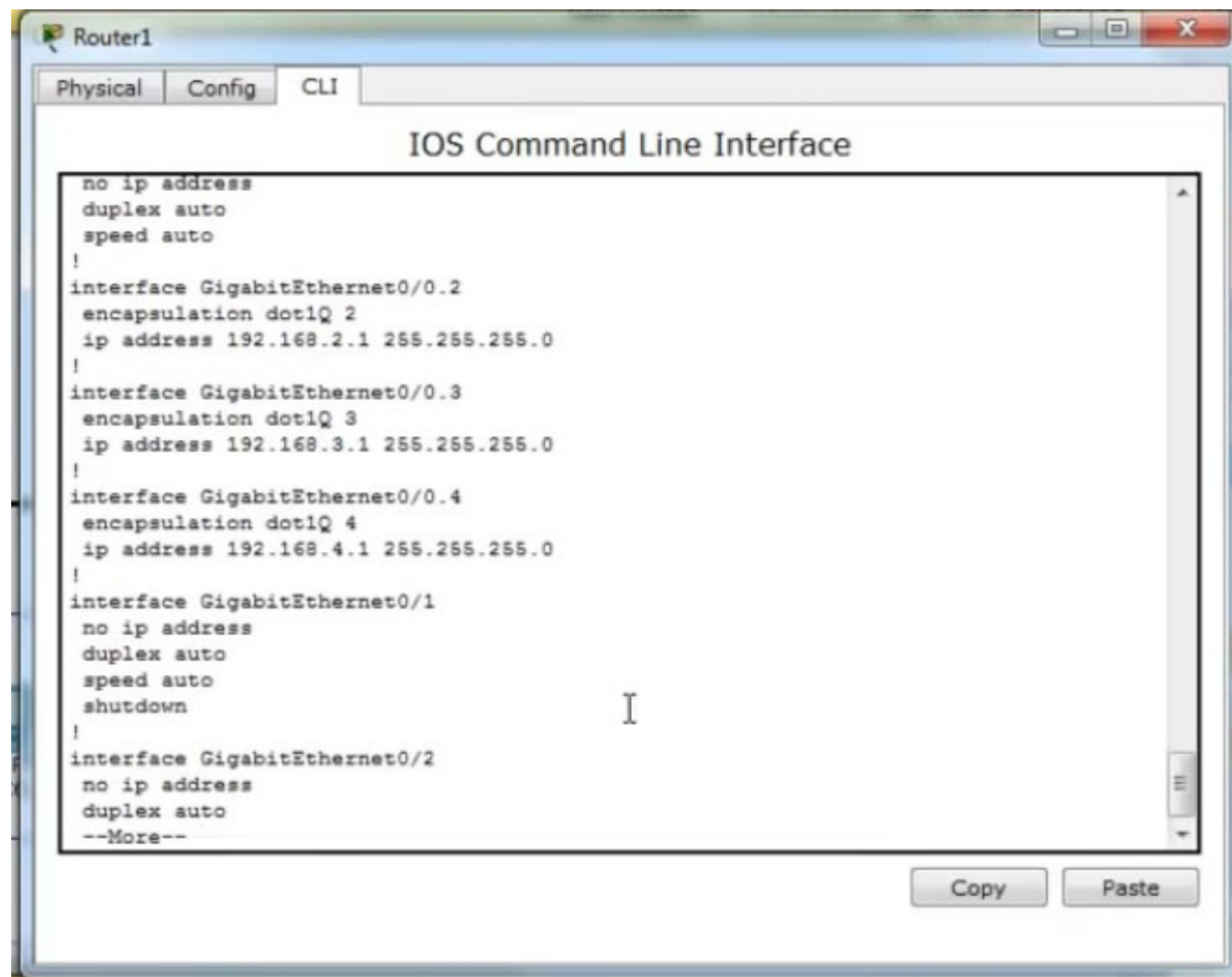
(config)# int gi0/0.4
(config-subif)# encapsulation dot1Q 2
(config-subif)# ip address 192.168.4.1 255.255.255.0
(config-subif)# no shutdown
(config)# end

# wr mem
```

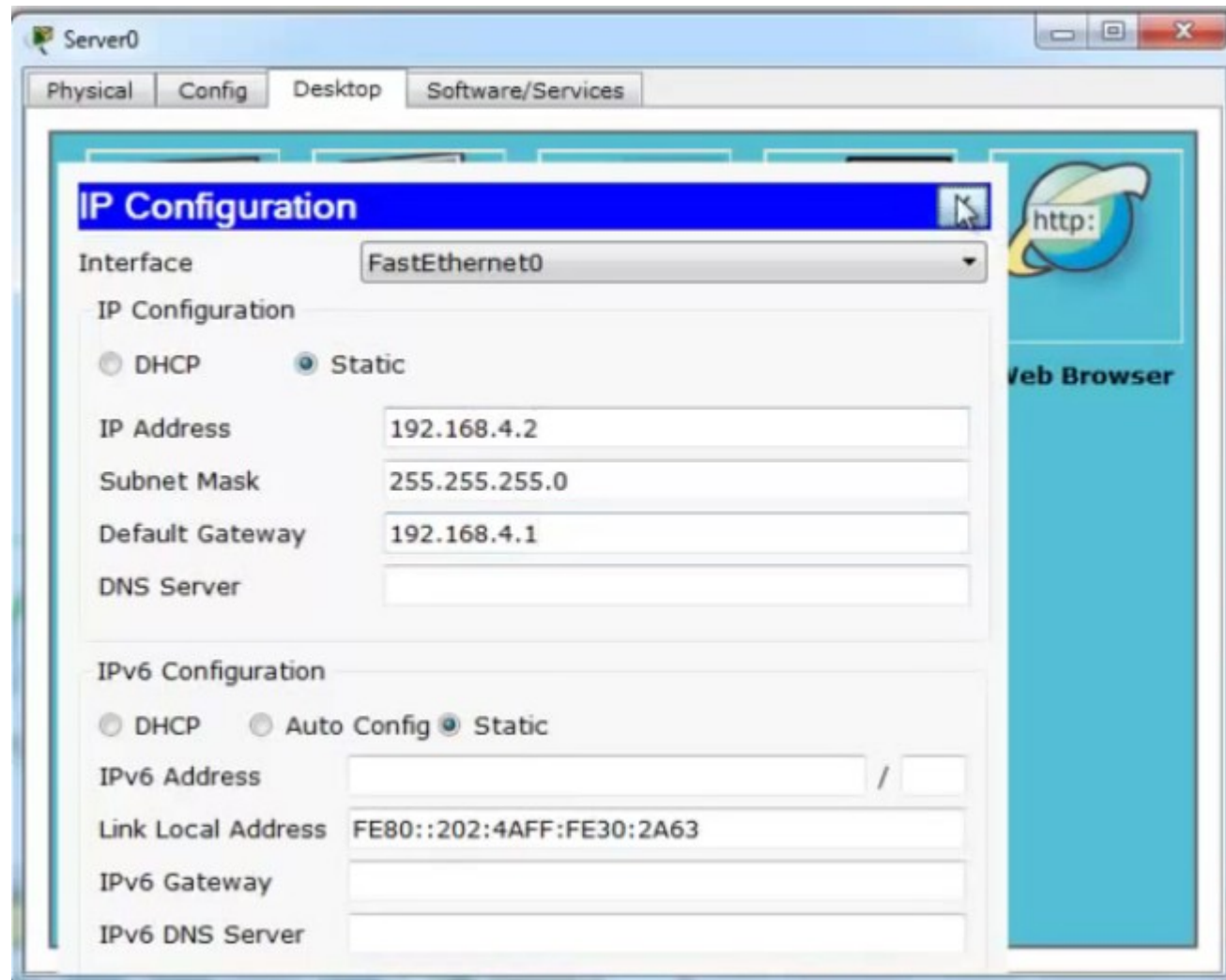


# Проверяем настройки маршрутизатора Router1

# show run

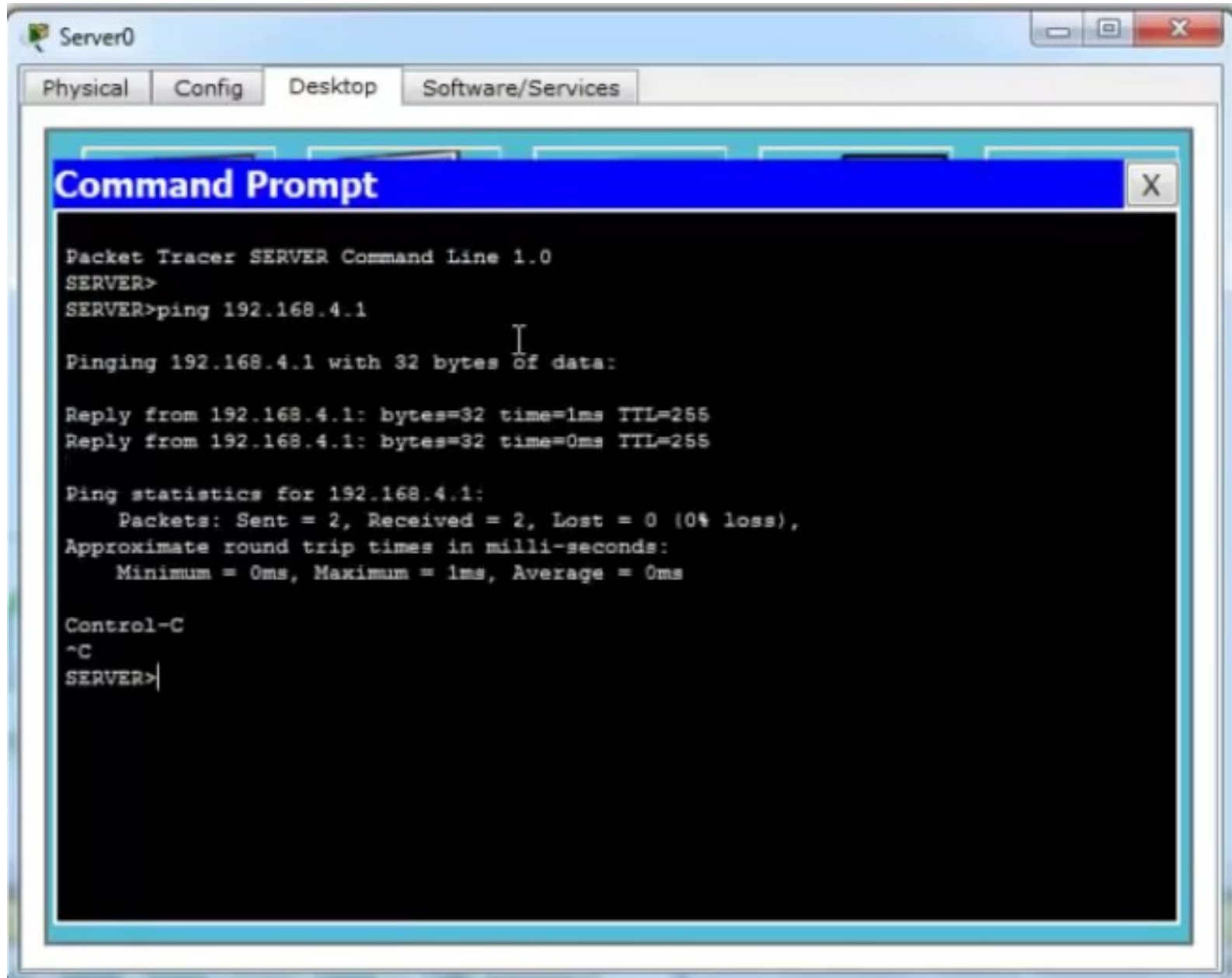


Зададим статический IP для сервера Server0





## Проверим взаимодействие сервера Server0 и маршрутизатора Router1



The screenshot shows a Packet Tracer window titled 'Server0' with tabs for Physical, Config, Desktop, and Software/Services. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The command prompt shows the execution of a ping command to 192.168.4.1, which is successful. The output includes details about the data size (32 bytes), time (1ms), and TTL (255). Ping statistics show 2 packets sent and received with 0% loss. The user then enters 'Control-C' and '^C' to exit the command prompt.

```
Packet Tracer SERVER Command Line 1.0
SERVER>
SERVER>ping 192.168.4.1

Pinging 192.168.4.1 with 32 bytes of data:

Reply from 192.168.4.1: bytes=32 time=1ms TTL=255
Reply from 192.168.4.1: bytes=32 time=0ms TTL=255

Ping statistics for 192.168.4.1:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

Control-C
^C
SERVER>
```



Добавляем еще один DHCP-пул на Server 0.  
Заходим в Config > DHCP ... заполняем, нажимаем Add

Server0

Physical Config Desktop Software/Services

**GLOBAL**

Settings

Algorithm Settings

**SERVICES**

HTTP

DHCP

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

FIREWALL

IPv6 FIREWALL

**INTERFACE**

FastEthernet0

**DHCP**

Service ☒ On ☐ Off

Pool Name DHCP-VLAN2

Default Gateway 192.168.2.1

DNS Server 8.8.8.8

Start IP Address : 192 168 2 0

Subnet Mask: 255 255 255 0

Maximum number of Users : 512

TFTP Server: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max Number of Users	TFTP Server
server...	0.0.0.0	0.0.0.0	192.168.4.0	255.255...	512	0.0.0.0

... аналогично добавляем пул для 3-го VLAN ...

The screenshot shows the 'Server0' configuration window with the 'Config' tab selected. The left sidebar contains a tree view with categories: GLOBAL, SERVICES, and INTERFACE. Under SERVICES, 'DHCP' is selected. The main area is titled 'DHCP' and shows the 'Service' status as 'On'. The configuration fields for a new pool are as follows:

- Pool Name: DHCP-VLAN3
- Default Gateway: 192.168.3.1
- DNS Server: 8.8.8.8
- Start IP Address: 192.168.3.0
- Subnet Mask: 255.255.255.0
- Maximum number of Users: 512
- TFTP Server: 0.0.0.0

At the bottom, there are 'Add', 'Save', and 'Remove' buttons. Below these is a table listing existing DHCP pools:

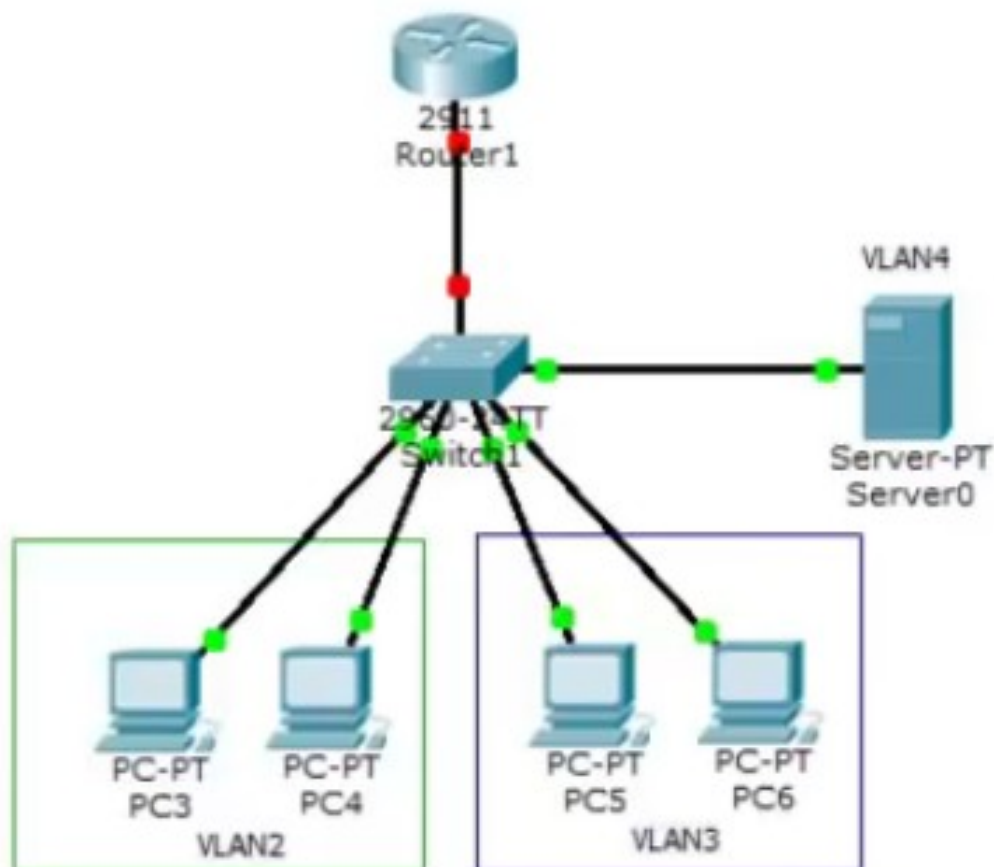
Pool Name	Default Gate	DNS Serv	Start IP Add	Subnet Mask	Max Nurr
serverPool	0.0.0.0	0.0.0.0	192.168.4.0	255.255.255.0	512
DHCP-VLAN2	192.168.2.1	8.8.8.8	192.168.2.0	255.255.255.0	256

# Настраиваем переадресацию DHCP запросов с компьютеров на сервер - на маршрутизаторе Router1

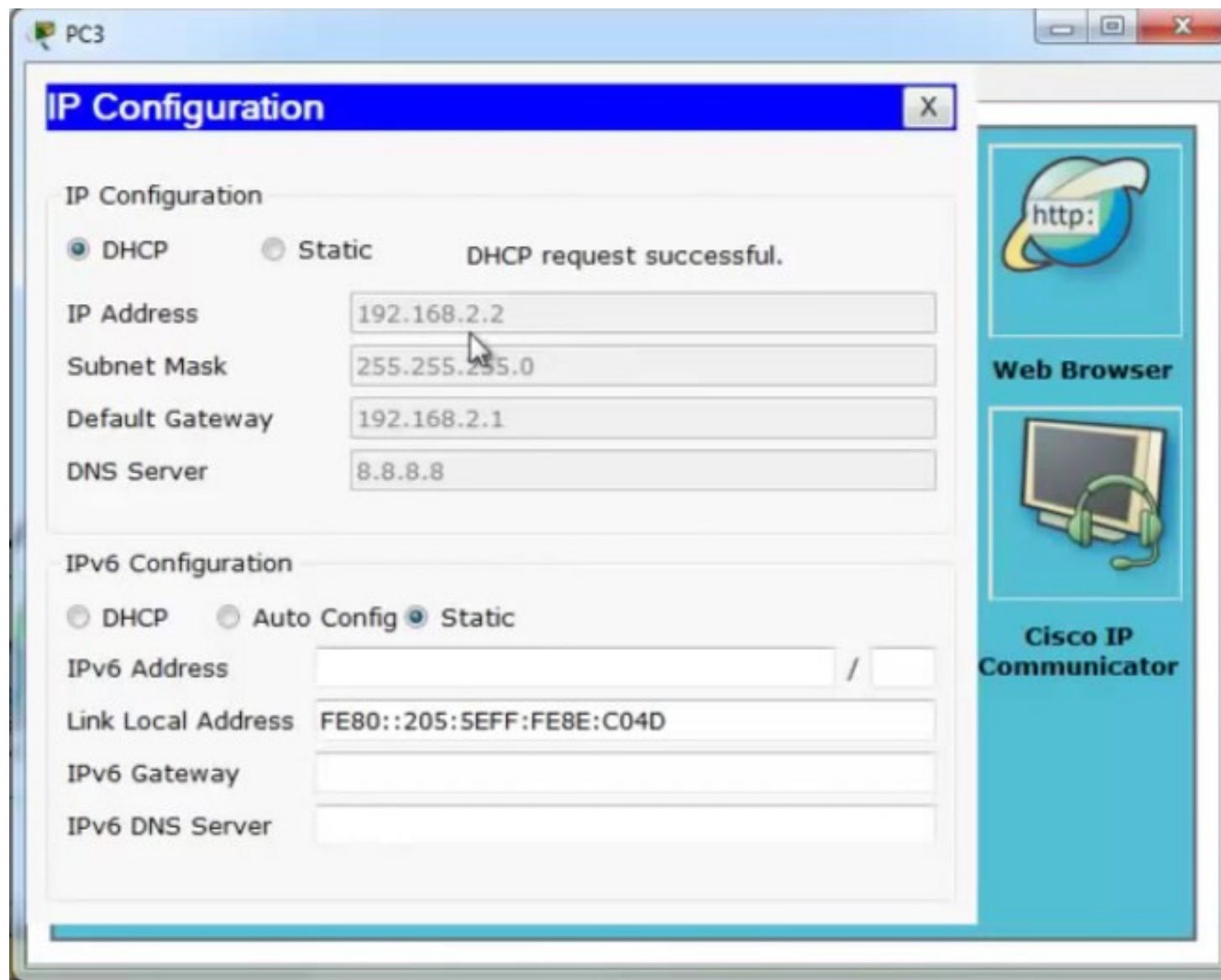
```
#conf t  
(config)# int gi 0/0.2  
(config-subif)# ip helper-address 192.168.4.2  
(config)# exit
```

```
#conf t  
(config)# int gi 0/0.3  
(config-subif)# ip helper-address 192.168.4.2  
(config)# end
```

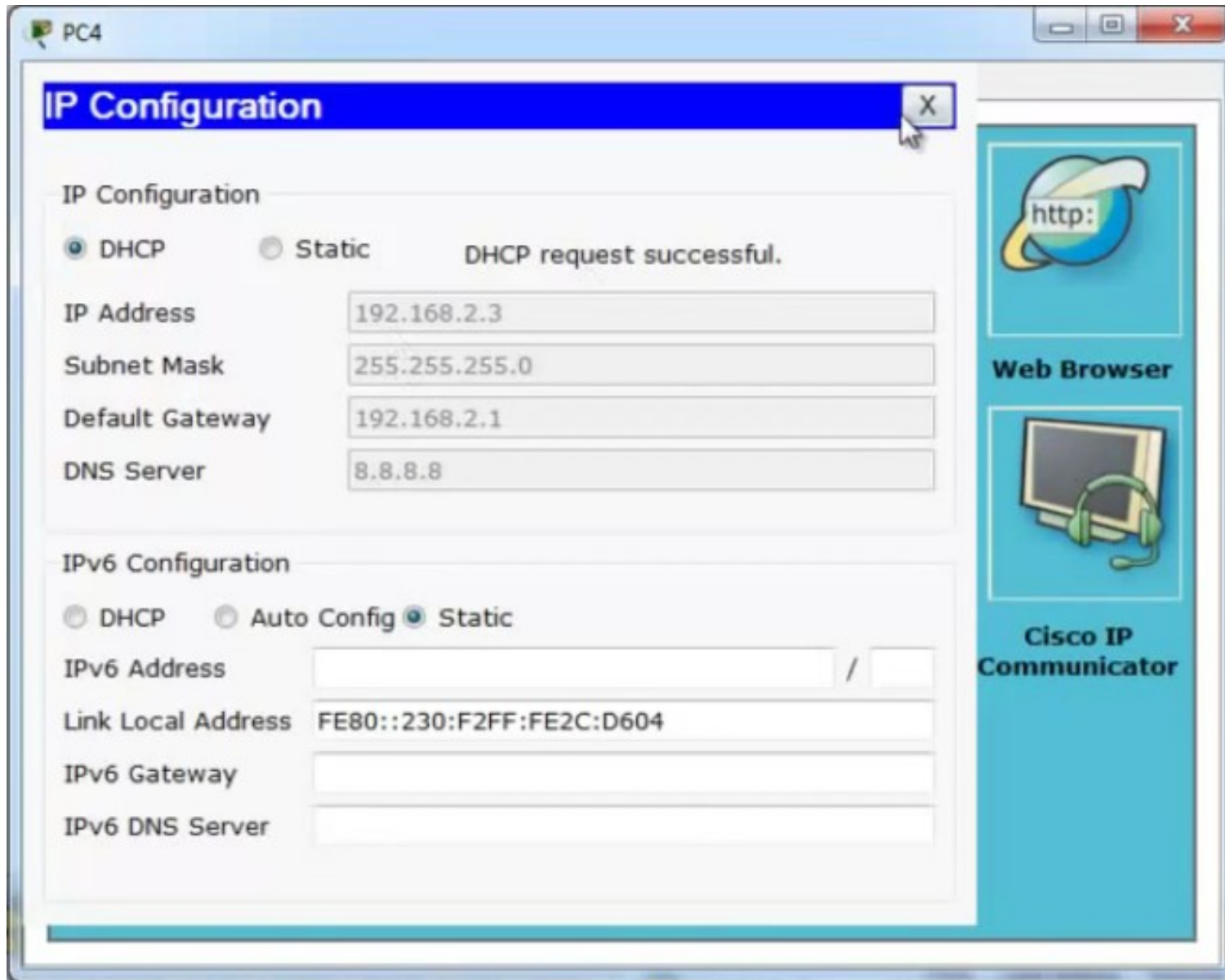
```
#wr mem
```



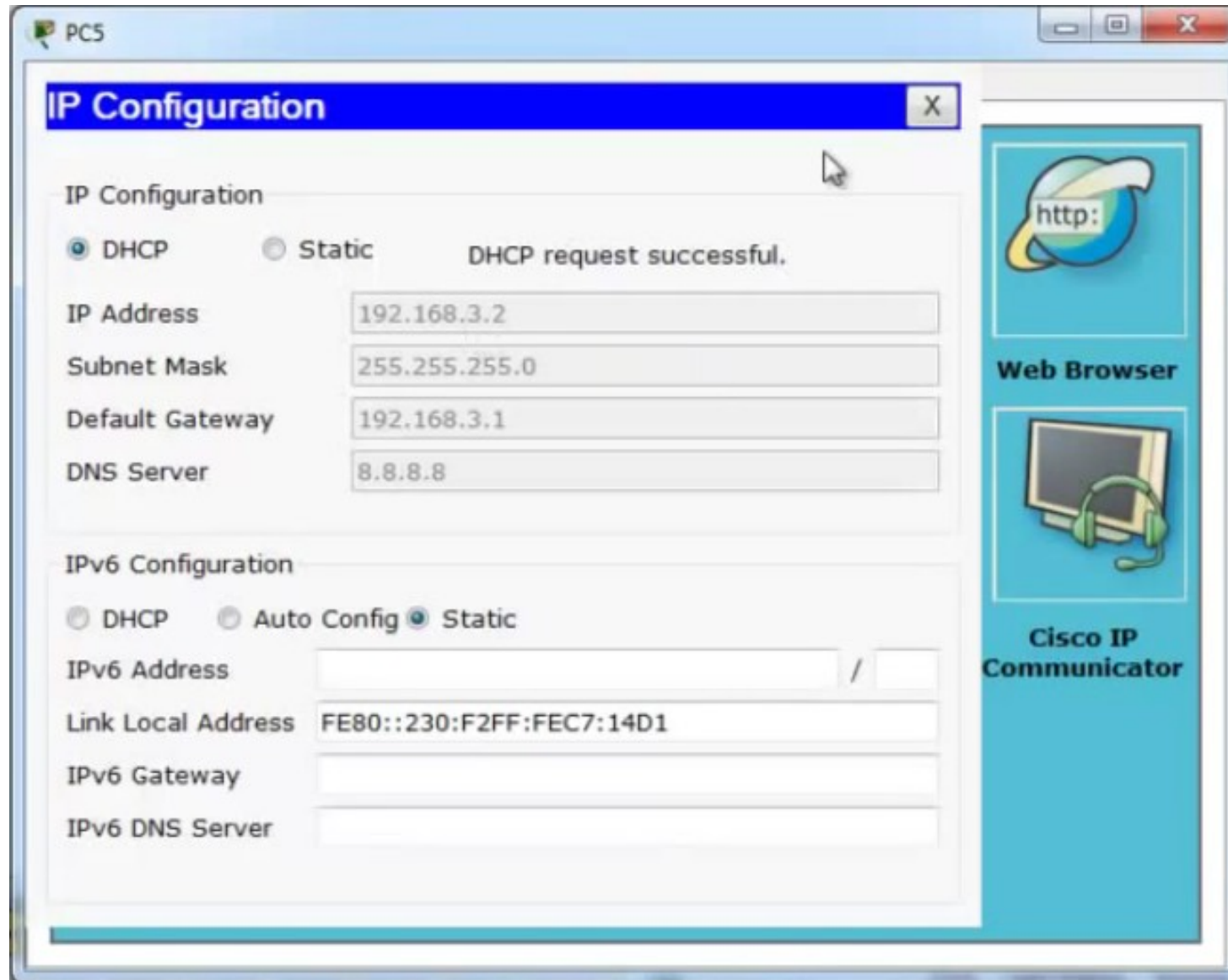
Пробуем получить IP адрес на компьютерах по DHCP



Пробуем получить IP адрес на компьютерах по DHCP

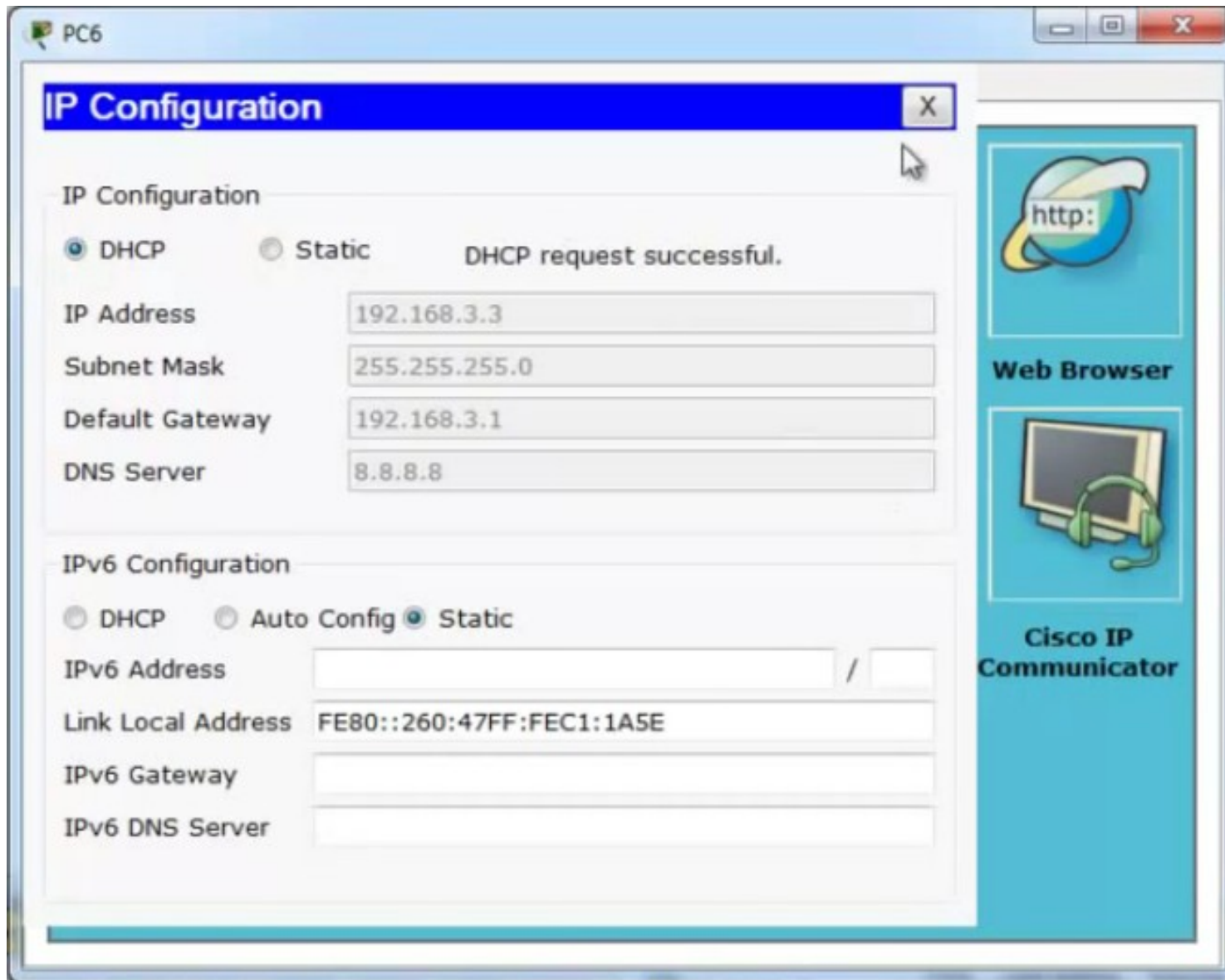


Пробуем получить IP адрес на компьютерах по DHCP

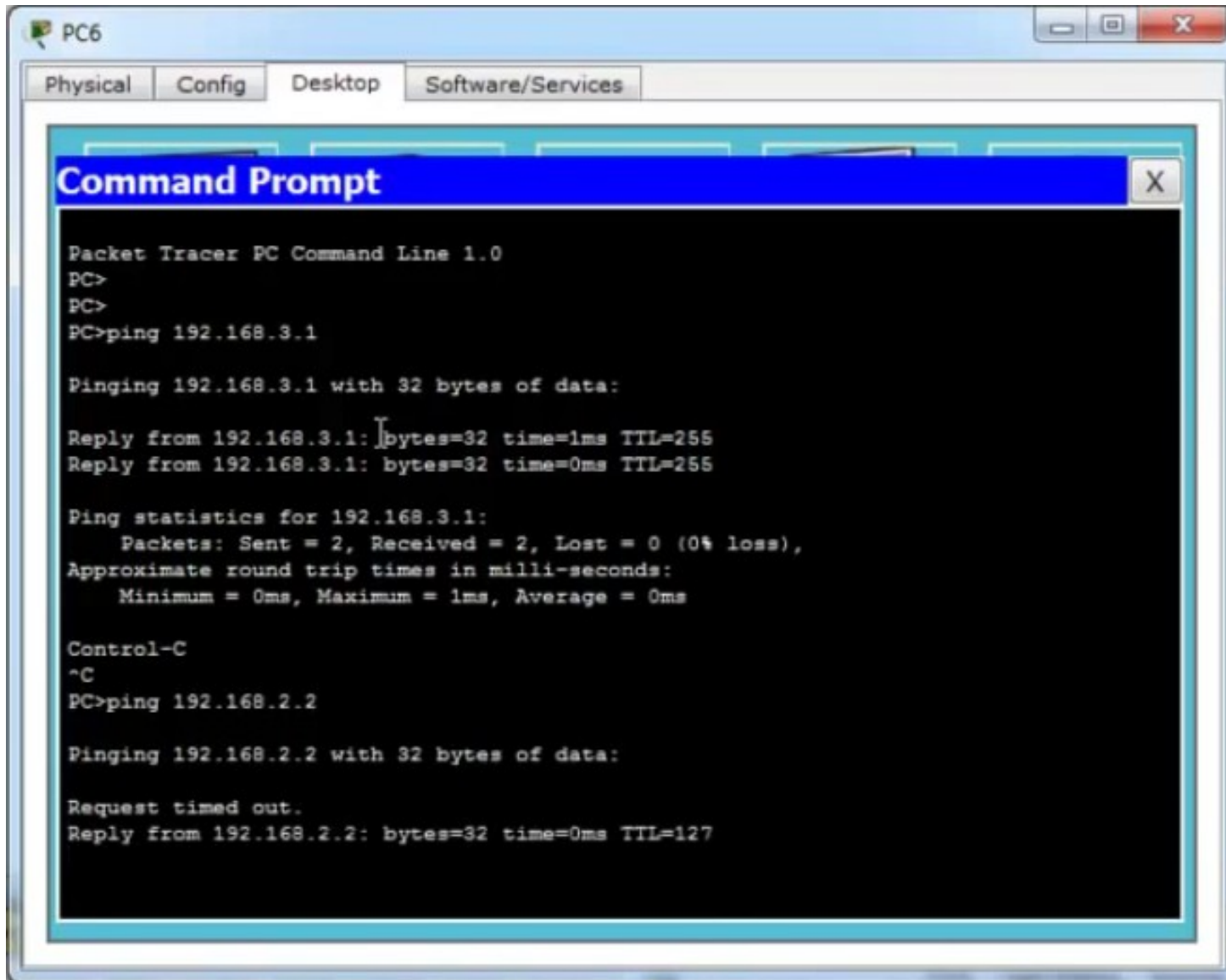




Пробуем получить IP адрес на компьютерах по DHCP



Проверим взаимодействие с коммутатором и соседними узлами



The screenshot shows a Packet Tracer PC window titled 'PC6' with tabs for 'Physical', 'Config', 'Desktop', and 'Software/Services'. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The command prompt shows the following text:

```
Packet Tracer PC Command Line 1.0
PC>
PC>
PC>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

Reply from 192.168.3.1: bytes=32 time=1ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255

Ping statistics for 192.168.3.1:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

Control-C
^C
PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
```



# NAT — Network Address Translation

## NAT - Network Address Translation

Более подробно читайте [здесь](#)

## Публичный IP адрес (Белый IP)

Более подробно читайте [здесь](#)

## Частный IP адрес (Серый IP)

От 10.0.0.0 до 10.255.255.255 с маской 255.0.0.0 (сеть класса А - около 16 млн. адресов)

От 172.16.0.0 до 172.31.0.0 с маской 255.255.0.0 (сеть класса В - около 65 тыс. адресов)

От 192.168.0.0 до 192.168.255.255 с маской 255.255.255.0 (сеть класса С - около 256 адресов)

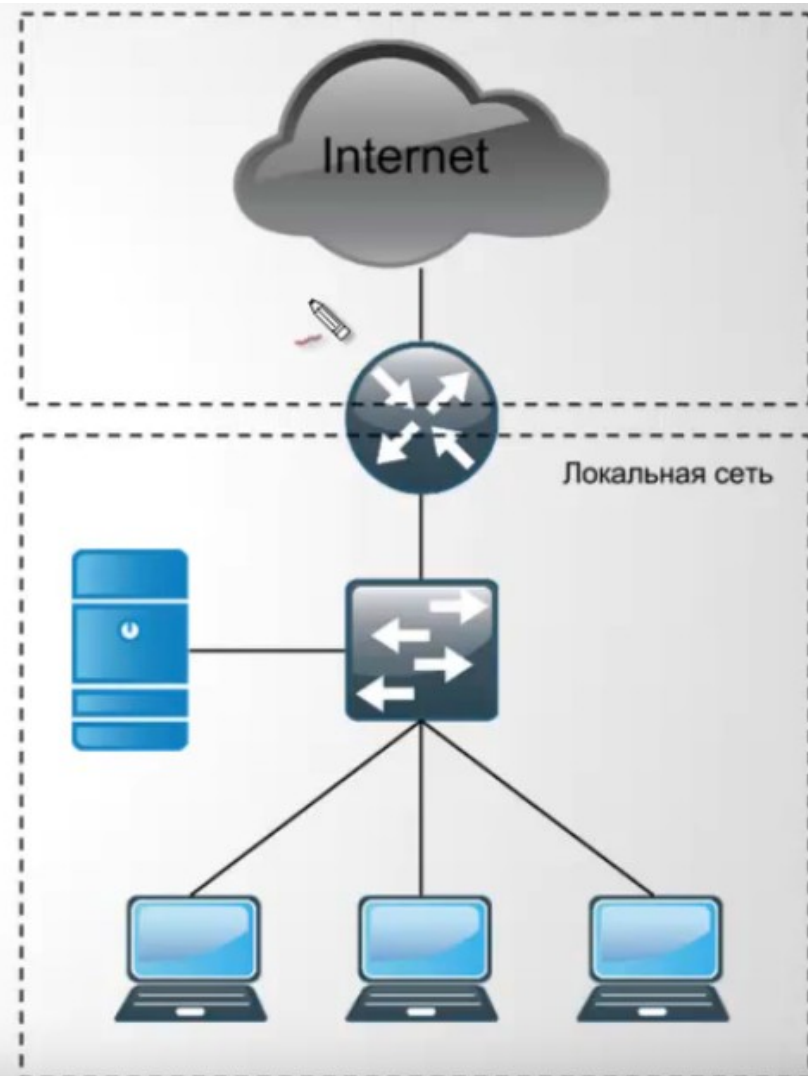
Более подробно читайте [здесь](#)

## Статический NAT

## Динамический NAT

## Перегруженный NAT

Более подробно читайте [здесь](#)



# NAT — Network Address Translation

## Настройка PAT

```
interface FastEthernet0/0
```

```
ip nat outside
```

```
interface FastEthernet0/1.2
```

```
ip nat inside
```

```
interface FastEthernet0/1.3
```

```
ip nat inside
```

```
ip access-list standard FOR-NAT
```

```
permit 192.168.2.0 0.0.0.255
```

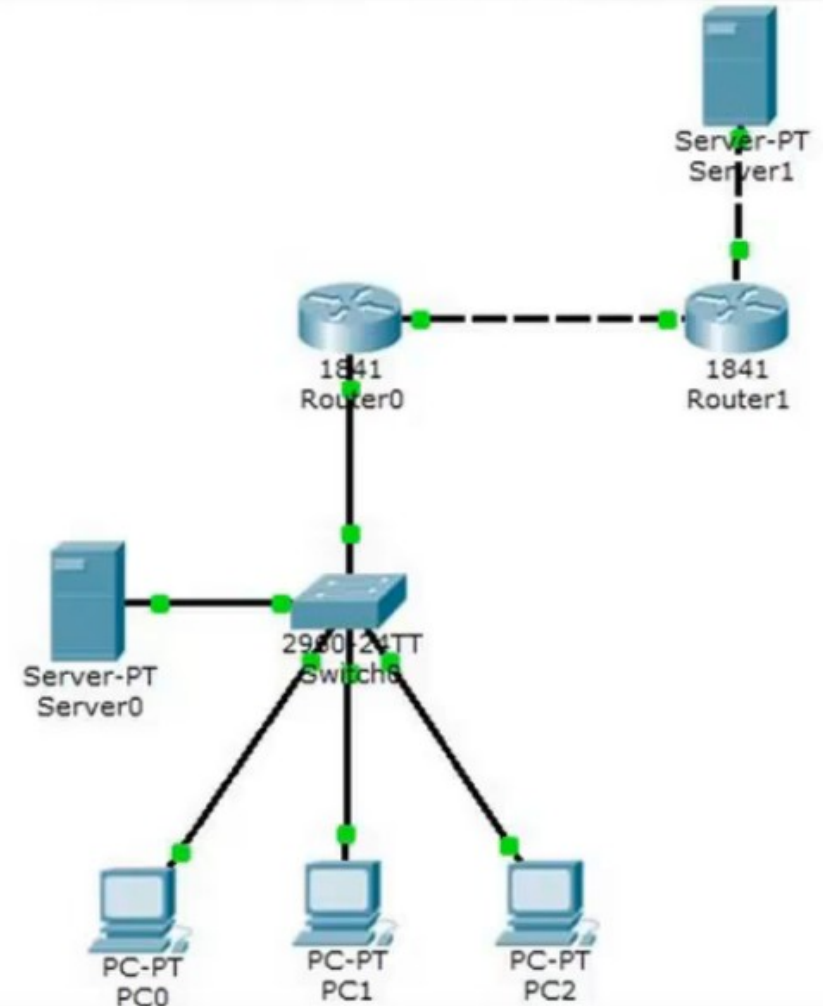
```
permit 192.168.3.0 0.0.0.255
```

```
ip nat inside source list FOR-NAT interface FastEthernet0/0 overload
```

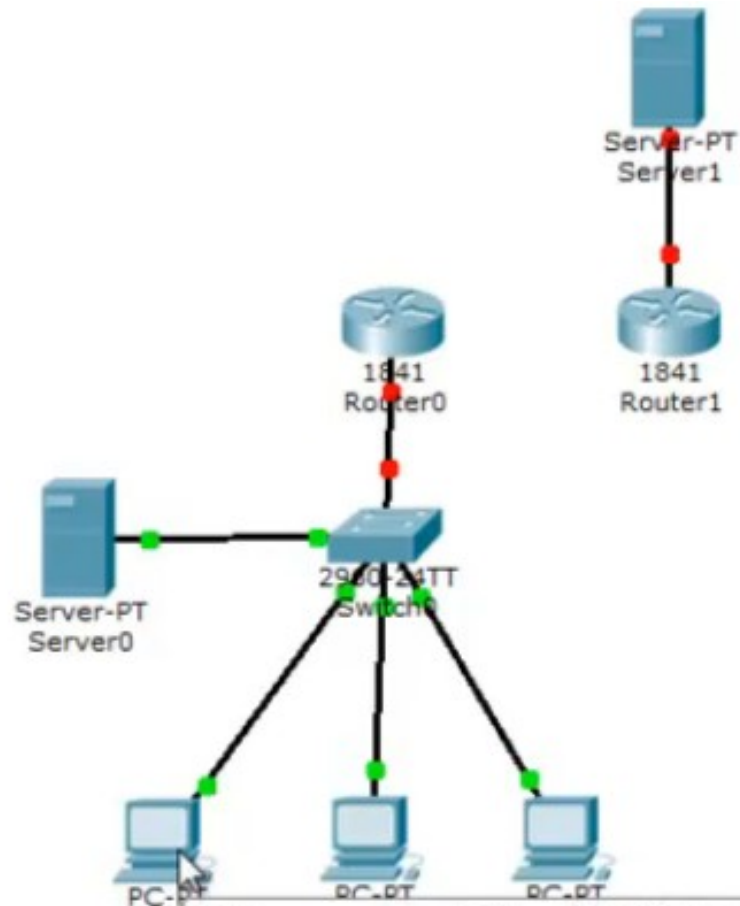
## Настройка Static NAT

```
ip nat inside source static tcp 192.168.3.2 80 213.234.10.2 80
```

```
show ip nat translations
```

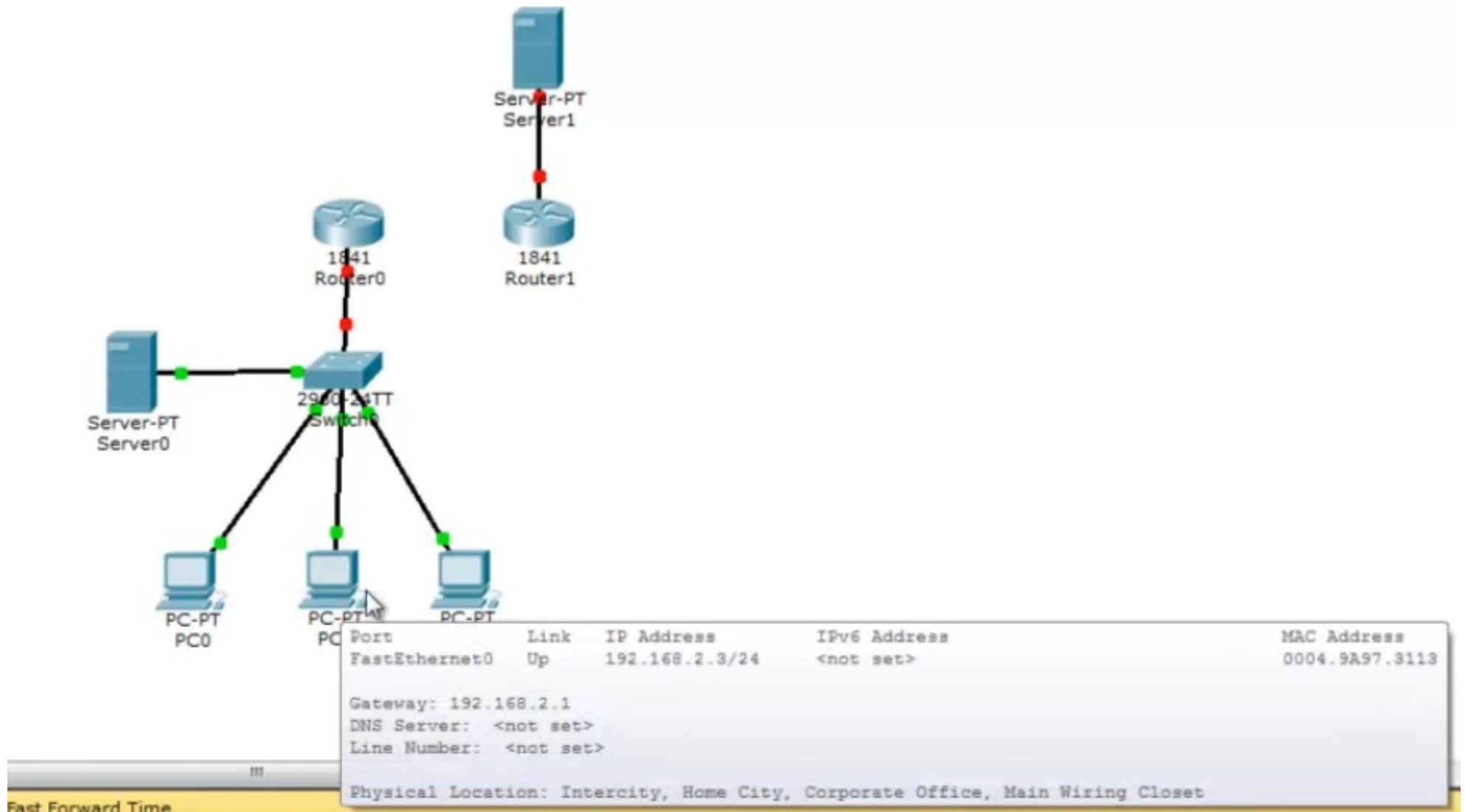


## Ip адрес PC0

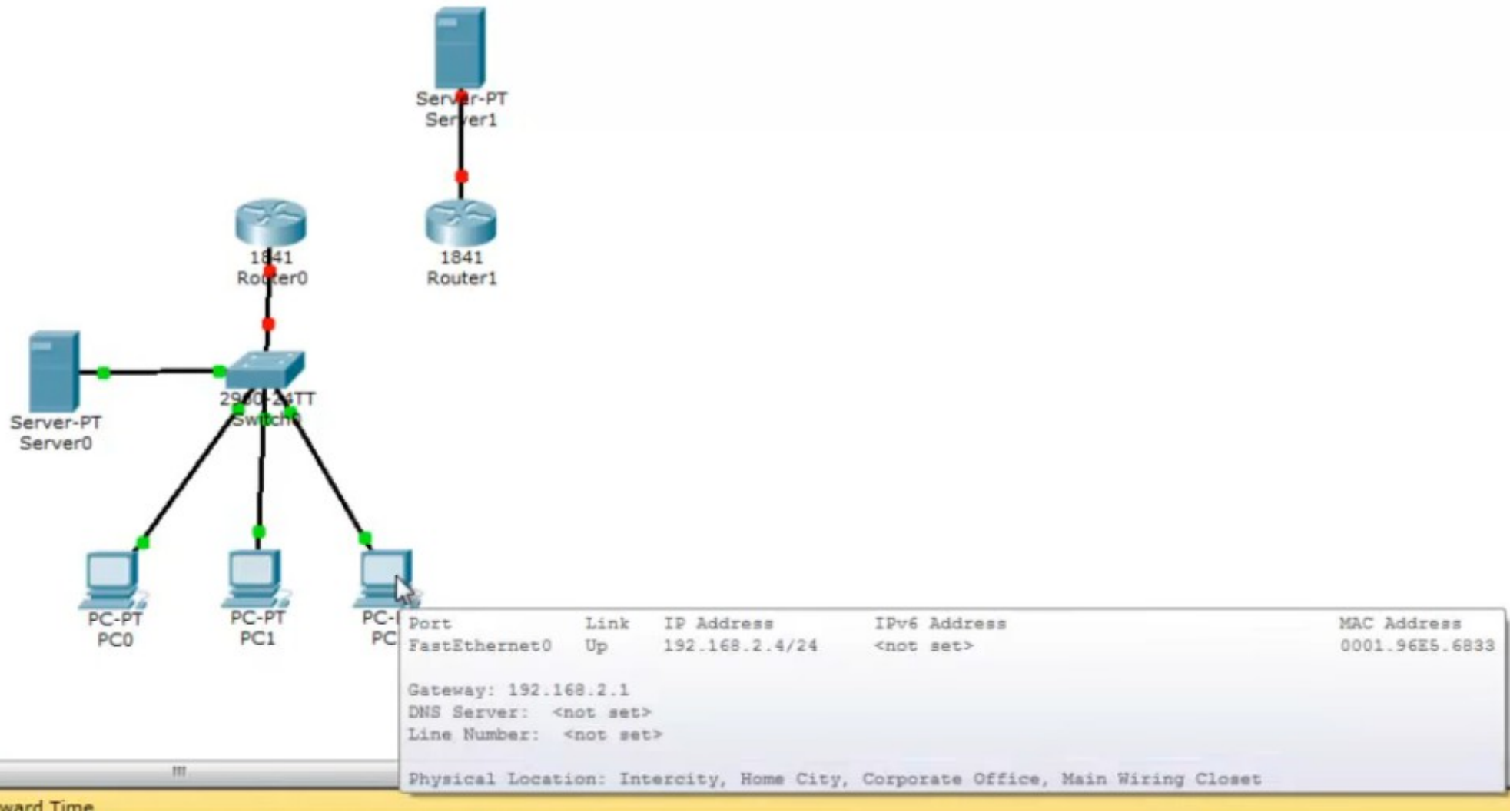


Port	Link	IP Address	IPv6 Address	MAC Address
FastEthernet0	Up	192.168.2.2/24	<not set>	0005.5E08.BD7E
Gateway: 192.168.2.1				
DNS Server: <not set>				
Line Number: <not set>				
Physical Location: Intercity, Home City, Corporate Office, Main Wiring Closet				

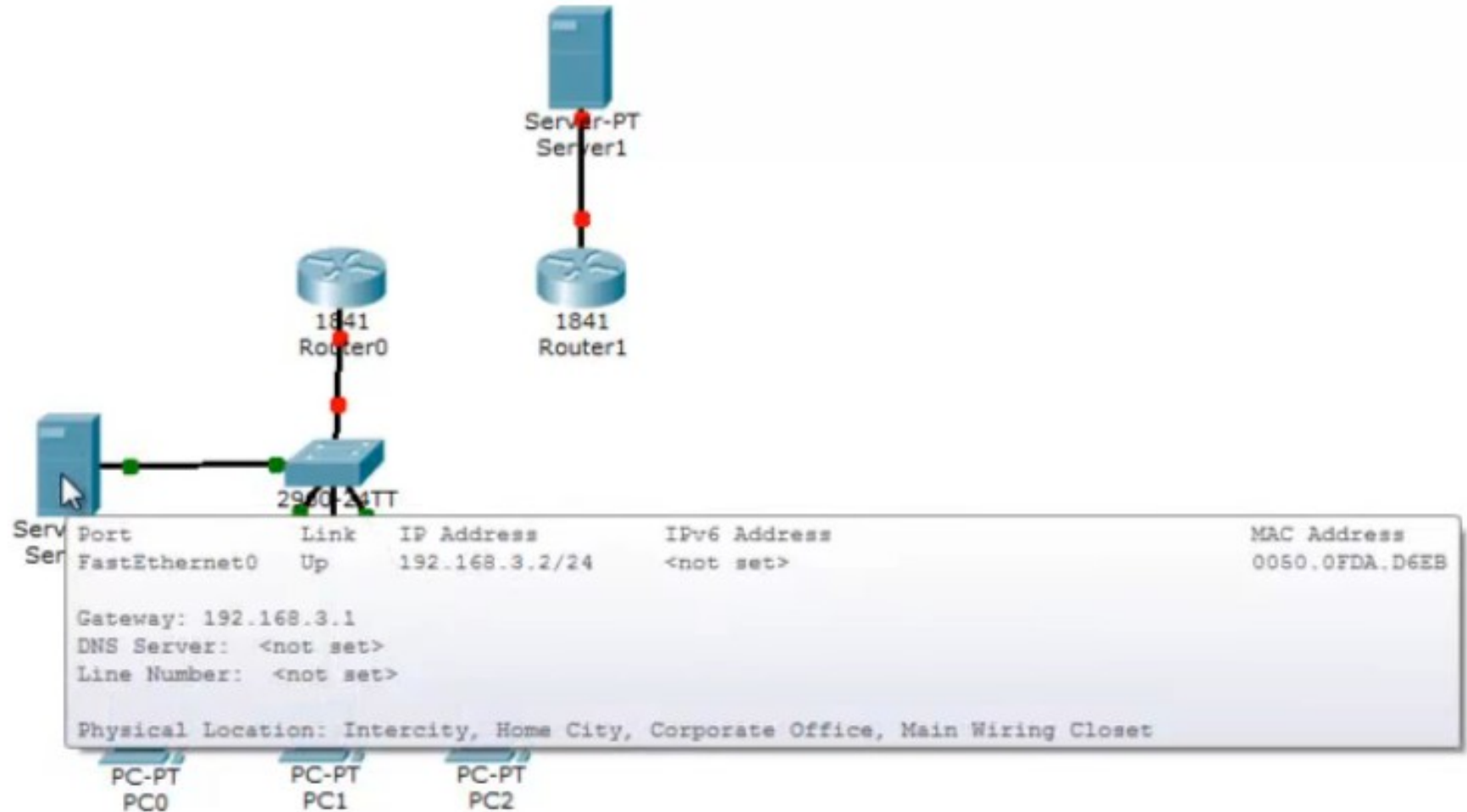
## Ip адрес PC1



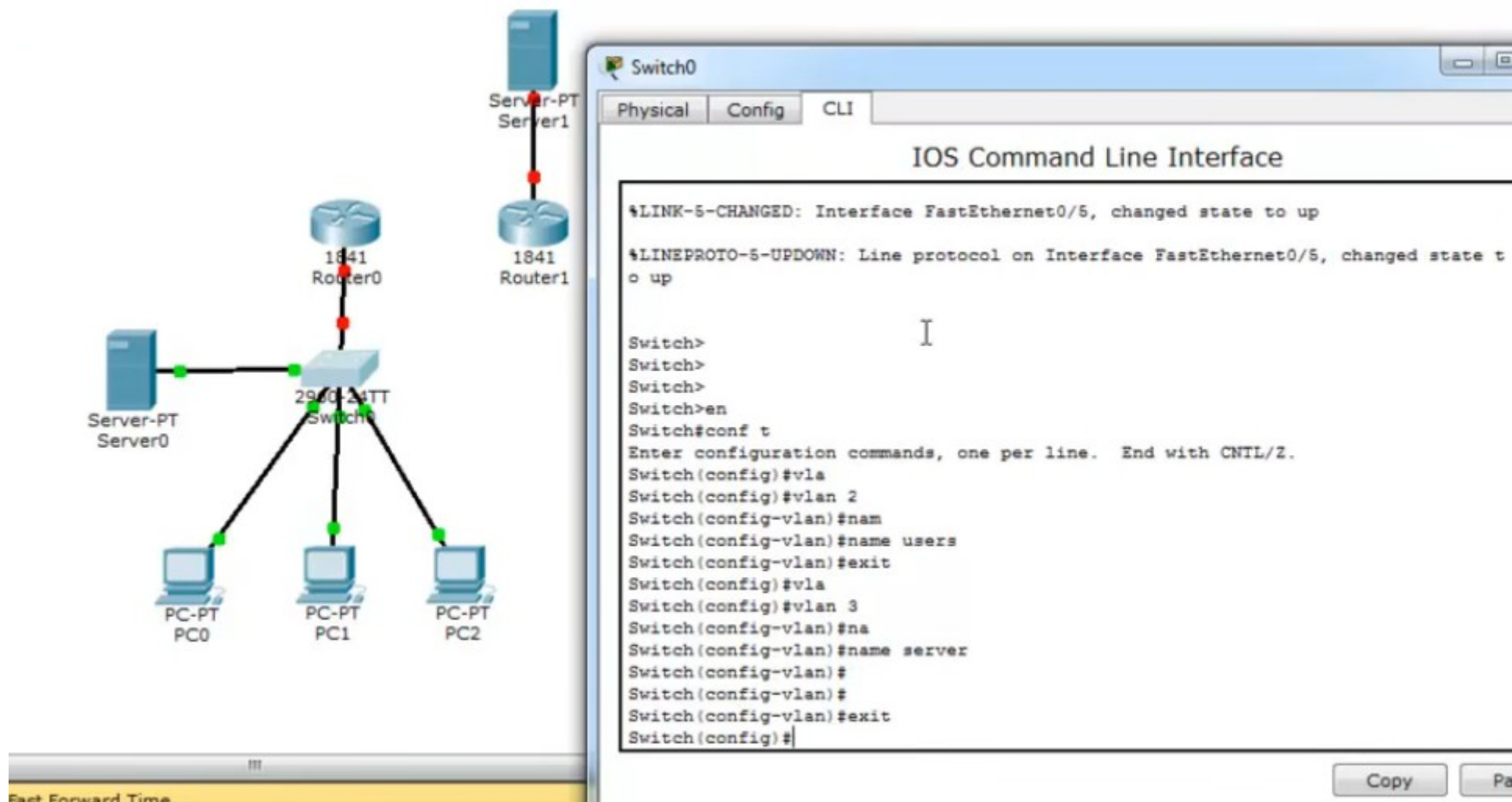
## Ip адрес PC2



## Ip адрес Sever0

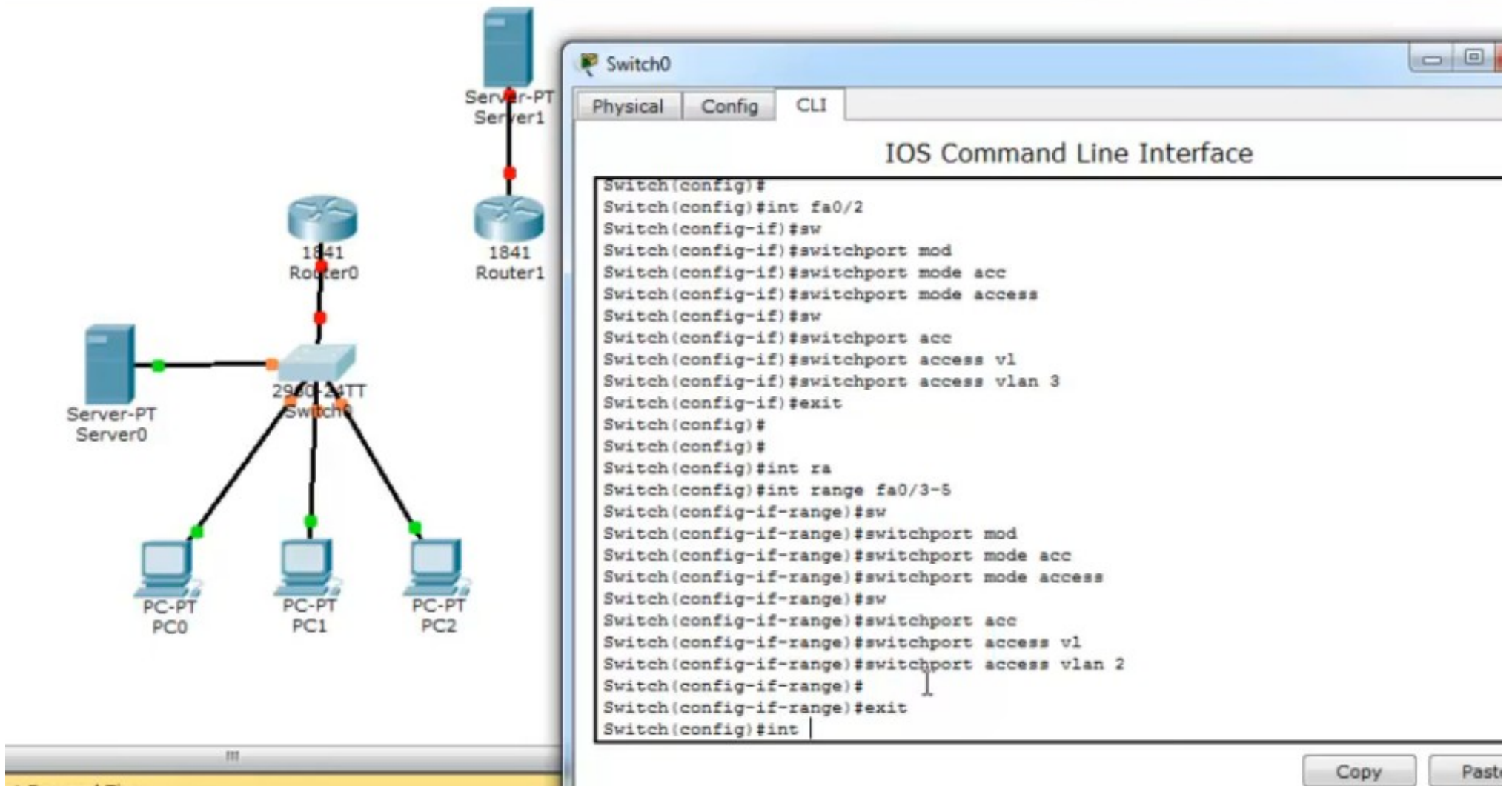


На коммутаторе создадим VLAN 2 для компьютеров и VLAN 3 для серверов



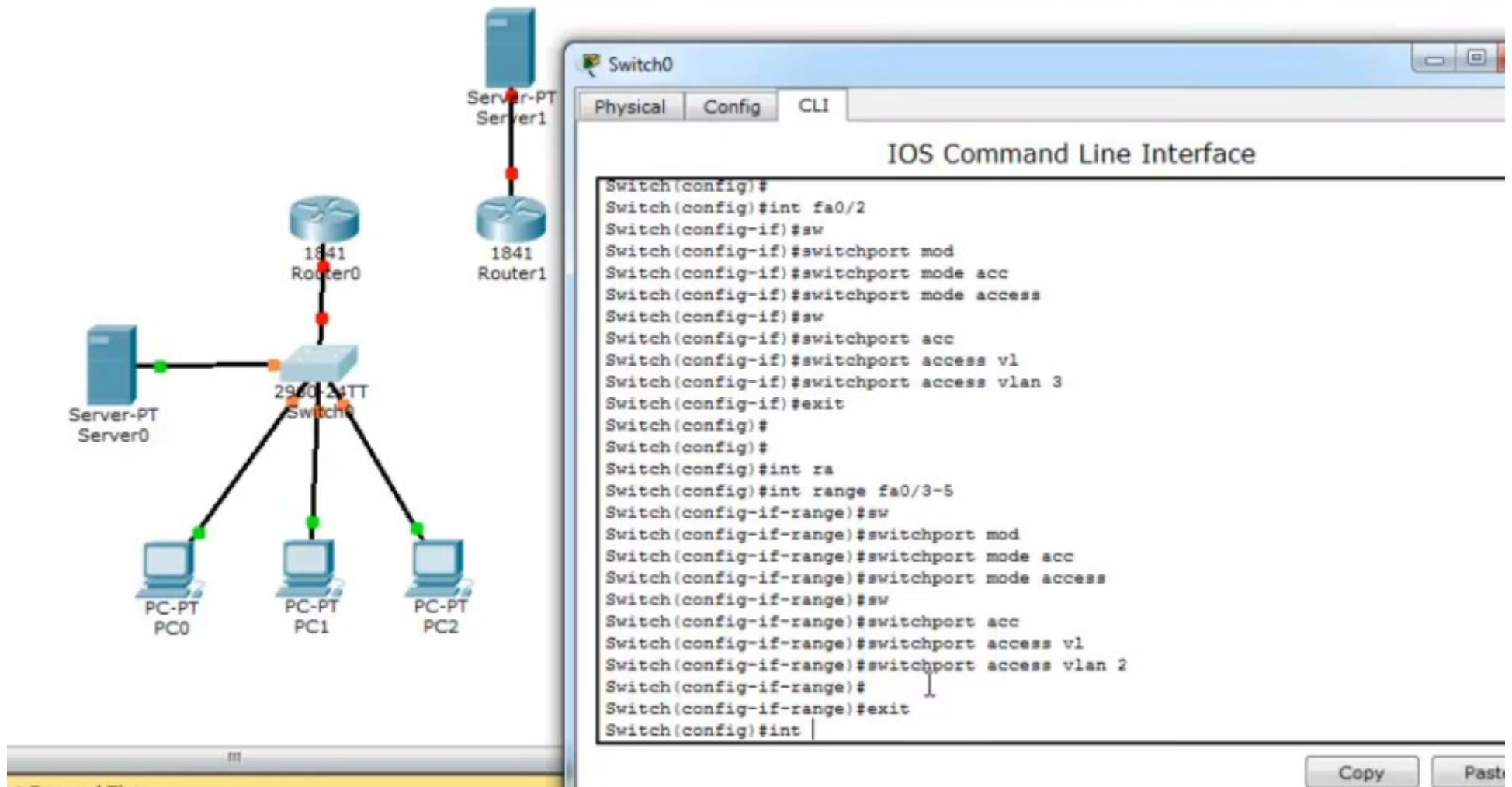


## Назначаем VLAN на порты коммутатора

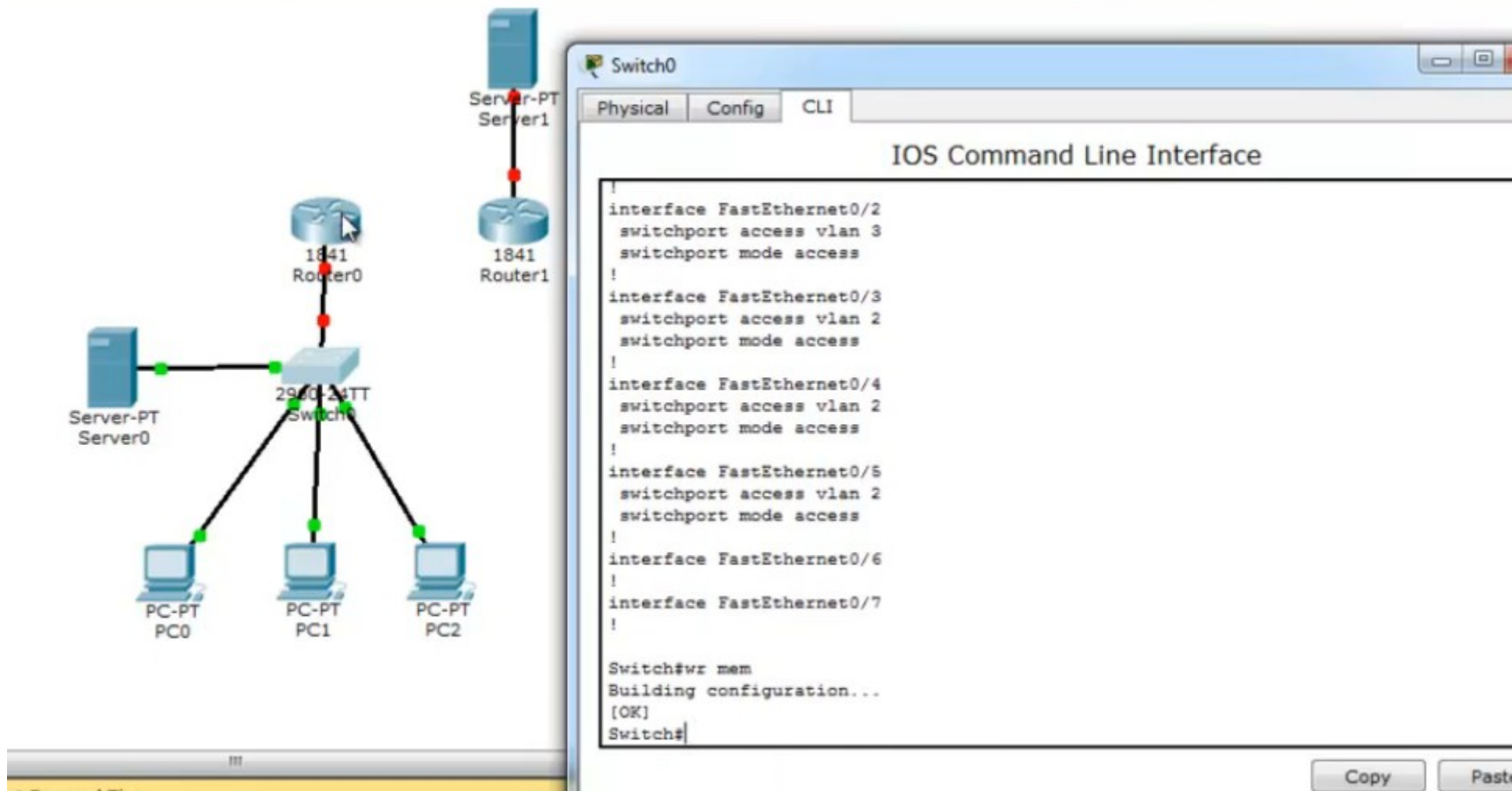




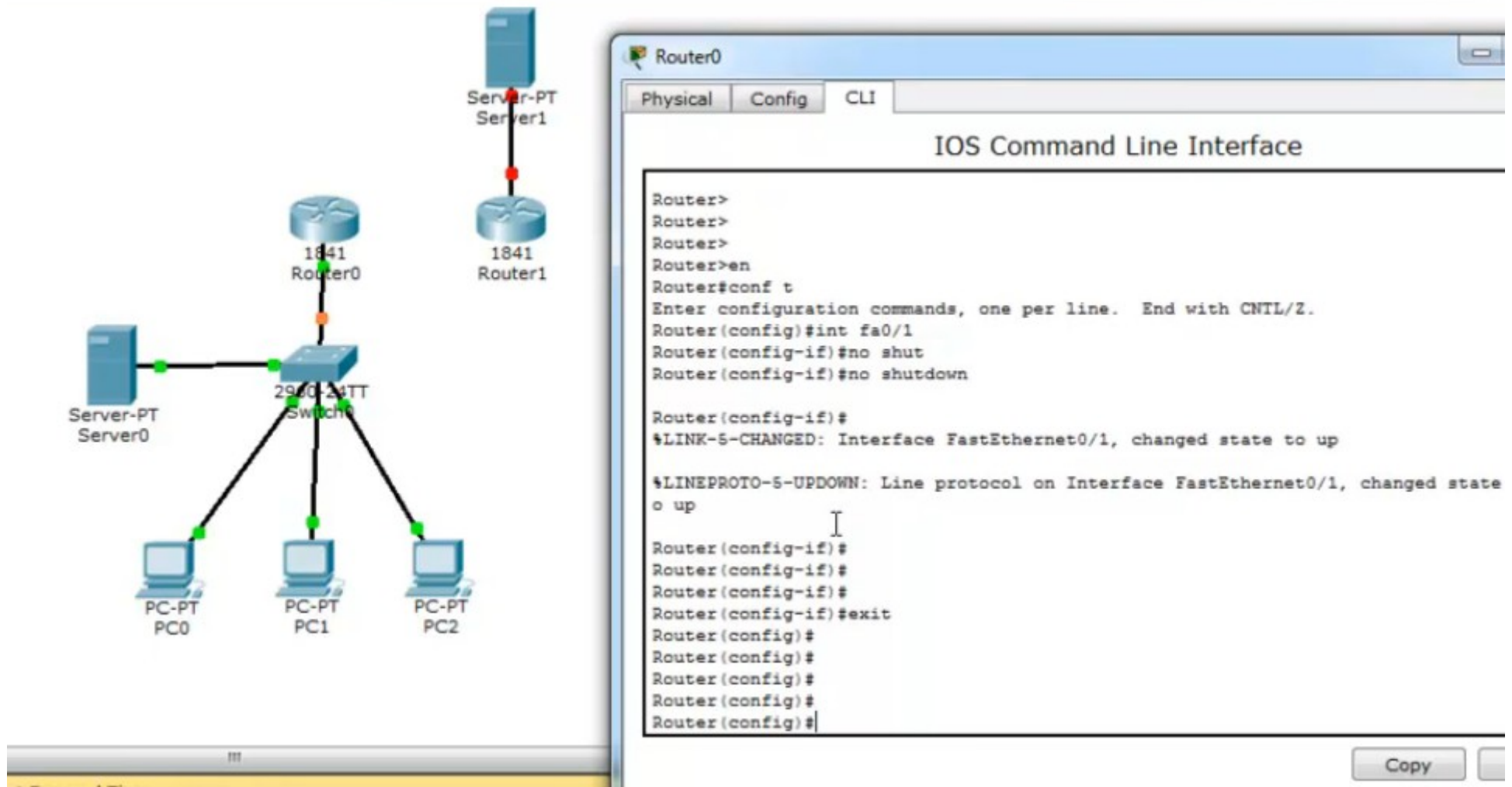
## Назначаем trunk порт, проверяем конфигурацию



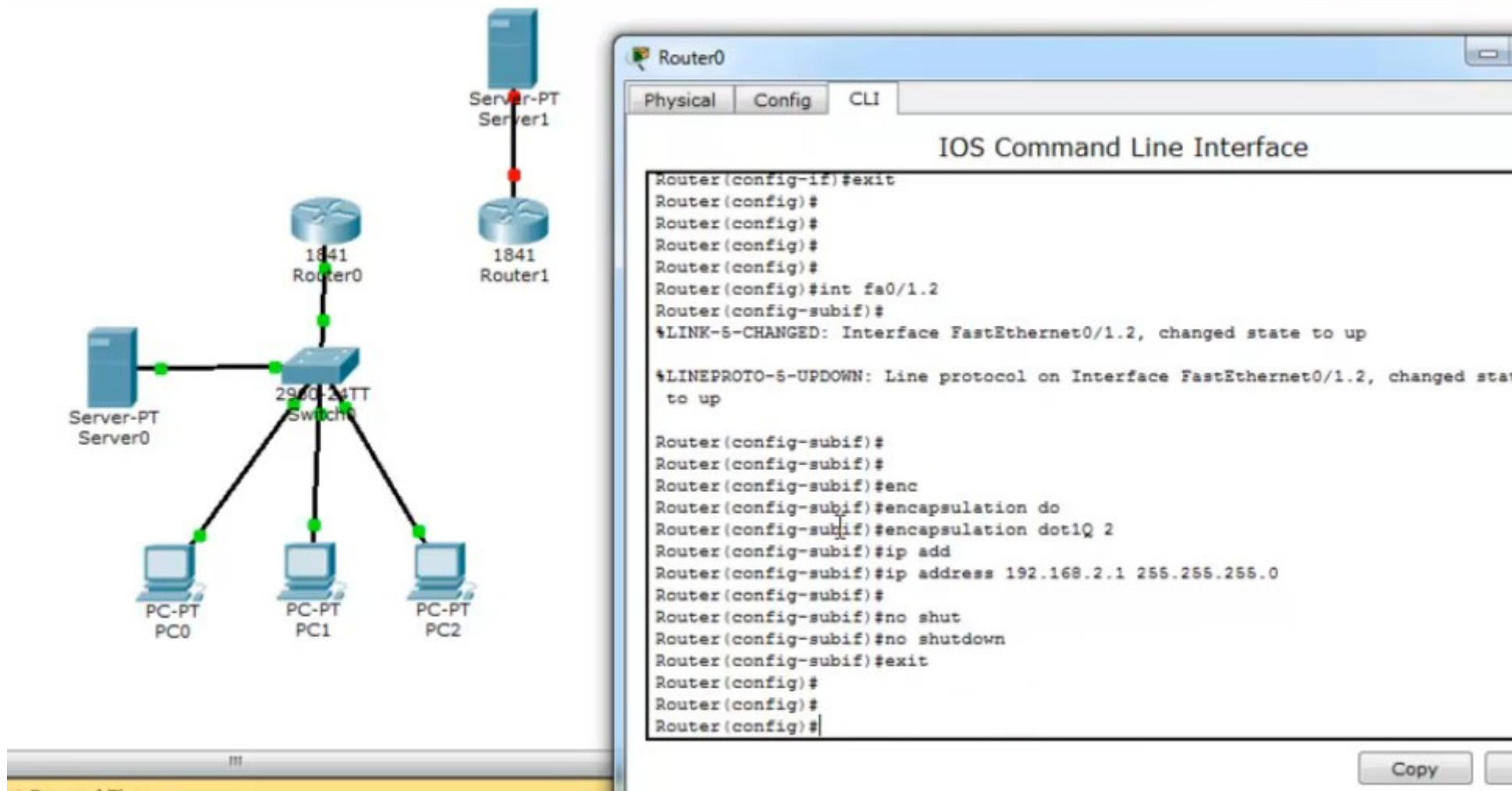
Проверяем конфигурацию, сохраняем



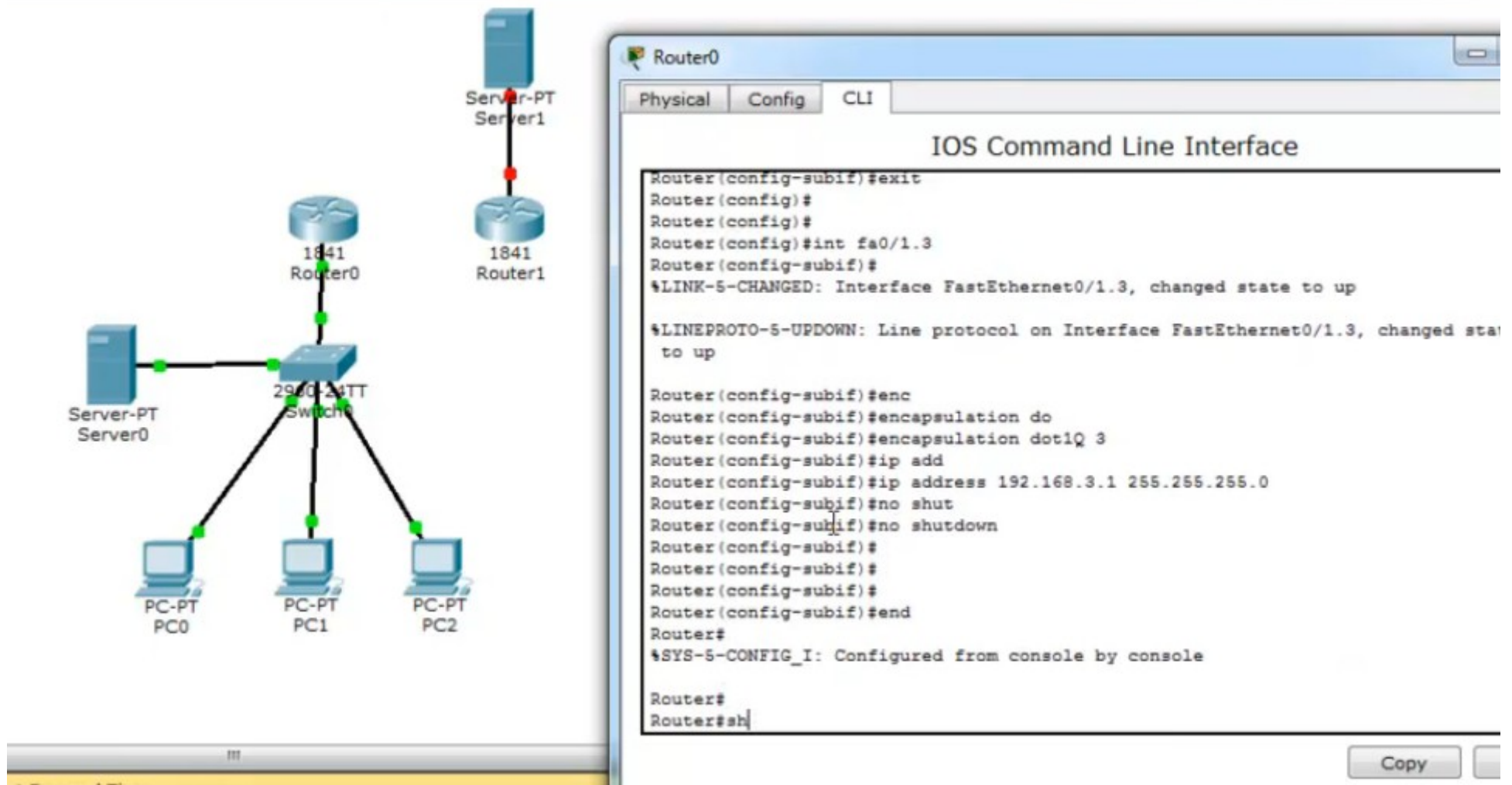
## Настраиваем Router0, активируем интерфейс fa0/1



Создадим субинтерфейс для VLAN 2, назначим ip

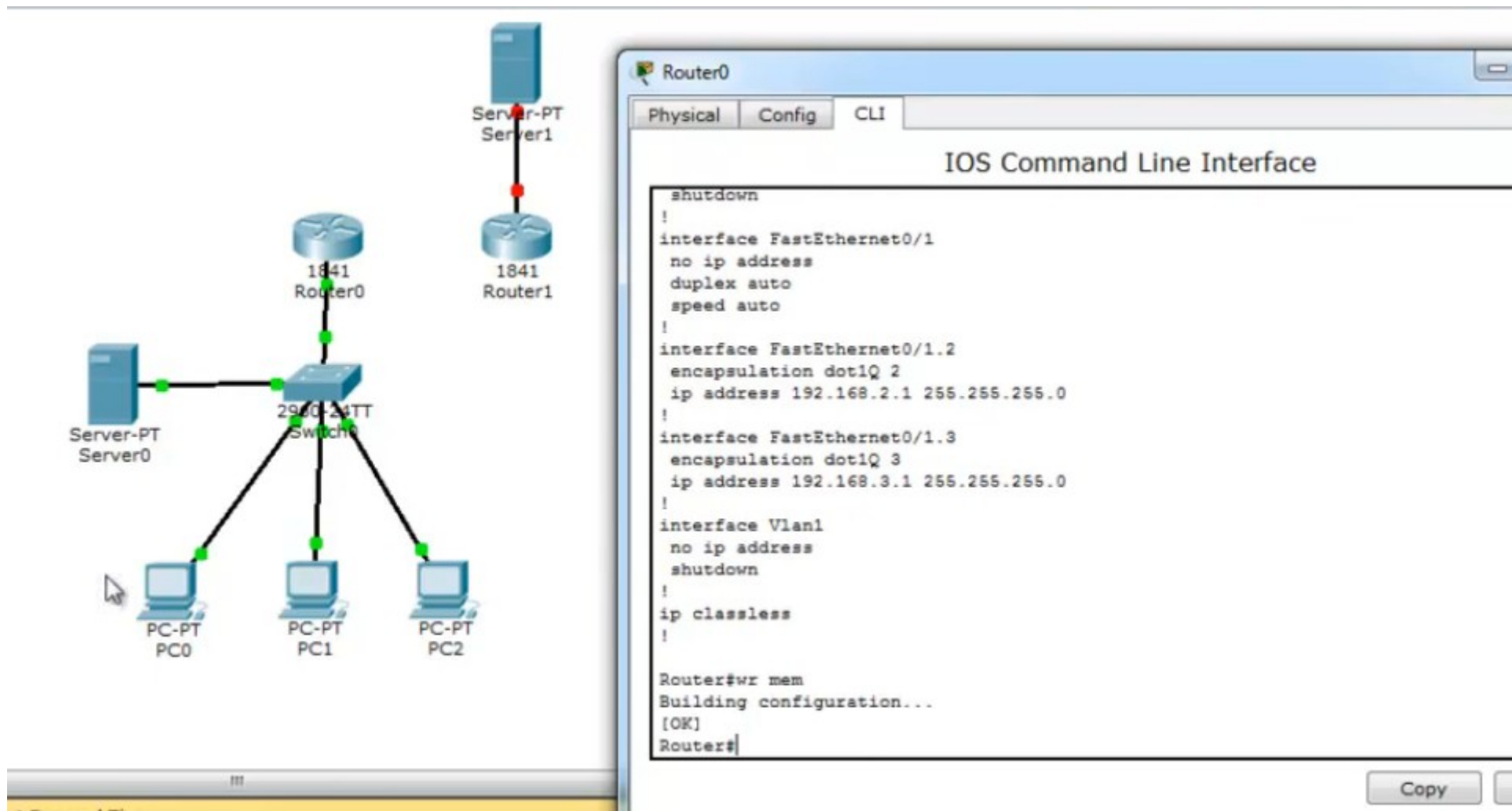


Создадим еще один субинтерфейс для VLAN3, назначим ip

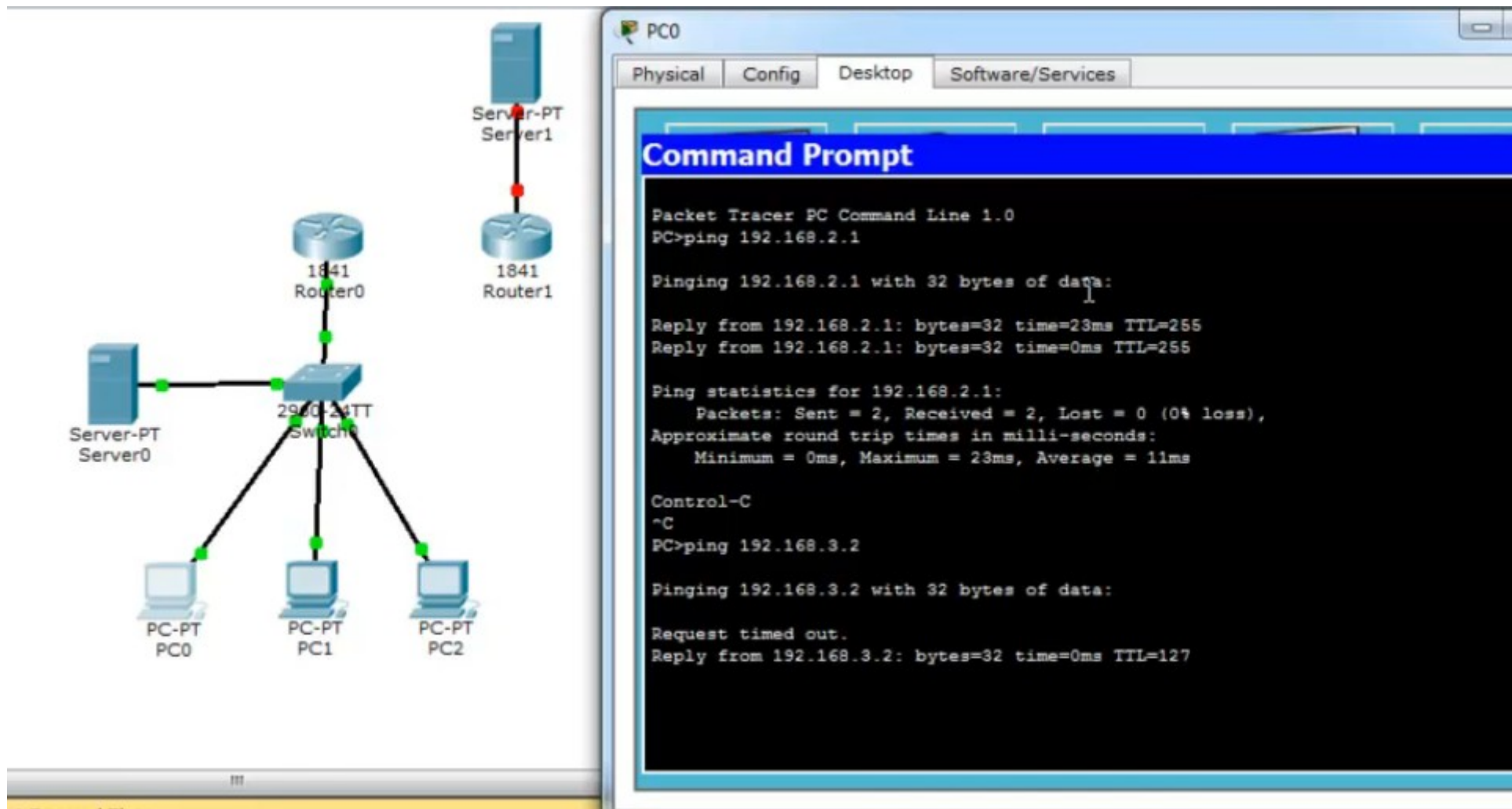




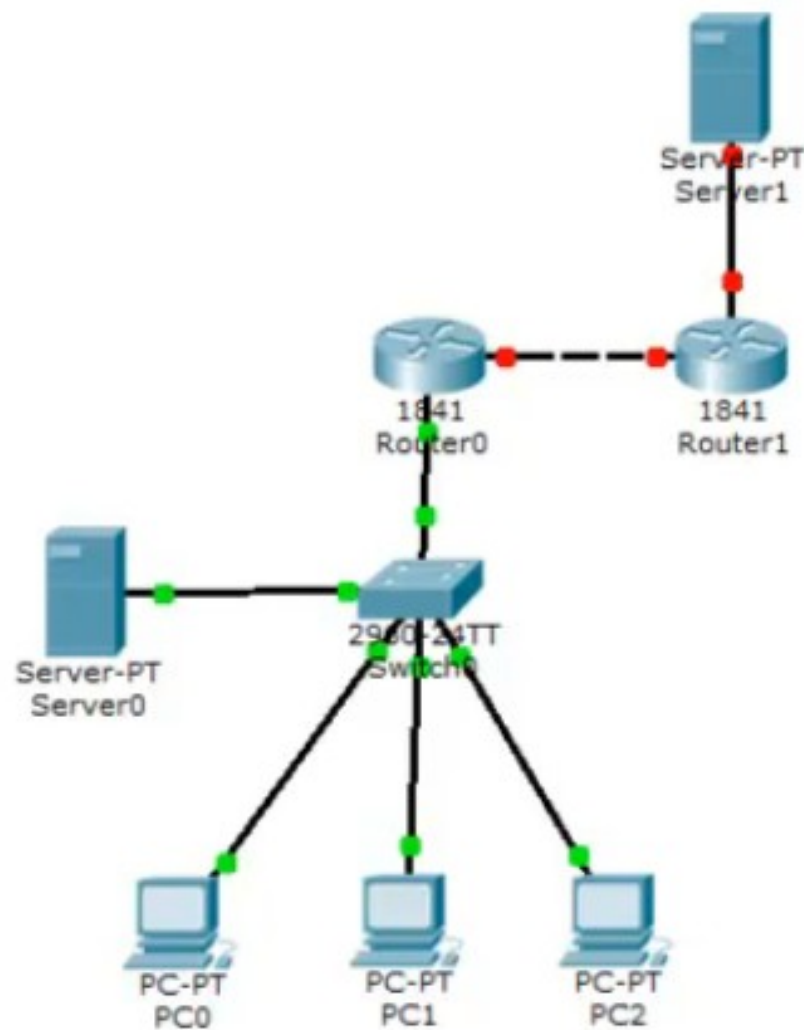
Проверяем, что созданы два субинтерфейса, записываем конфигурацию



Проверяем, что шлюз и сервер доступны с PC0

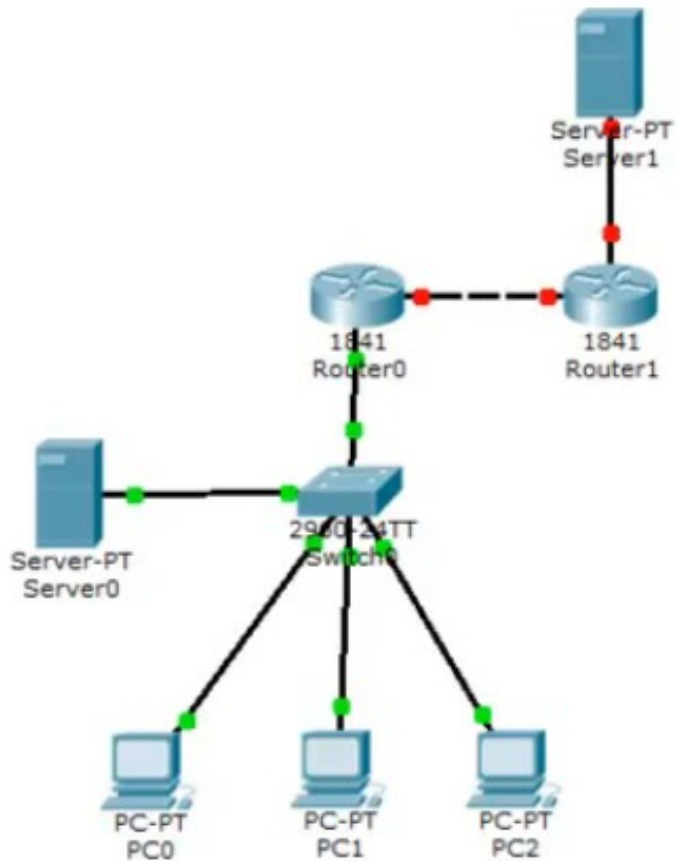


Далее роутер нашей сети подсоединяют к «интернету» в виде сервера и второго роутера, у которых есть статические белые ip адреса





Зададим ip адрес на интерфейсе Router1, обращенного к Router0



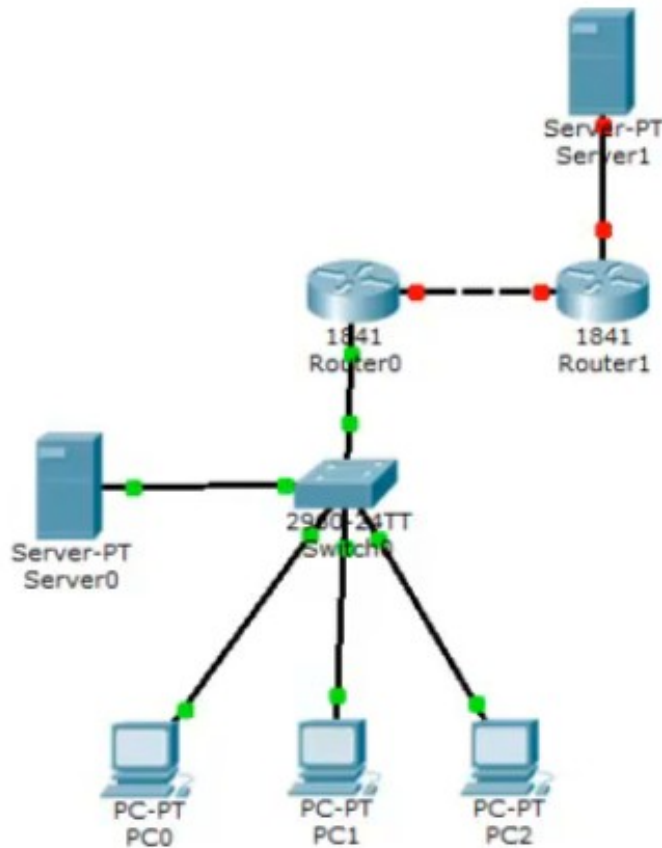
```
Router1
Physical Config CLI
IOS Command Line Interface

Router>
Router>en
Router#
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int
Router(config)#interface fa0/0
Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#ip add
Router(config-if)#ip address 213.234.10.1 255.255.255.252
Router(config-if)#
Router(config-if)#no shut
Router(config-if)#no shutdown

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

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

Зададим ip адрес на интерфейсе Router1, обращенного к Server1



Router1

Physical Config CLI

IOS Command Line Interface

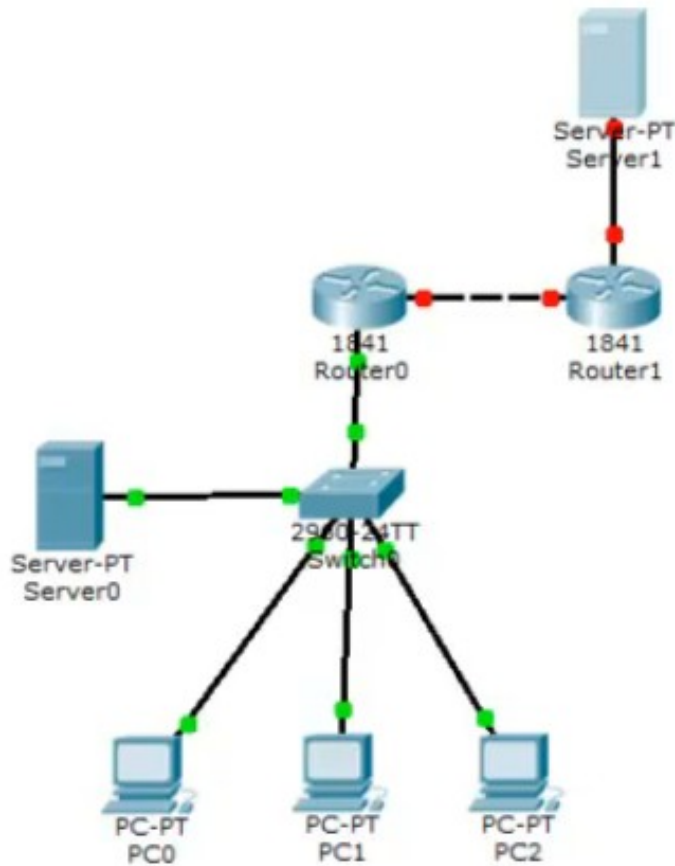
```
Router(config)#
Router(config)#int fa0/1
Router(config-if)#
Router(config-if)#
Router(config-if)#ip a
Router(config-if)#ip ad
Router(config-if)#ip address 213.234.20.1 255.255.255.252
Router(config-if)#no shut
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#wr mem
~
% Invalid input detected at '^' marker.

Router(config)#
```

Зададим ip адрес для Server1



Server1

Physical Config Desktop Software/Services

### IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address: 213.234.20.2

Subnet Mask: 255.255.255.252

Default Gateway: 213.234.20.1

DNS Server:

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

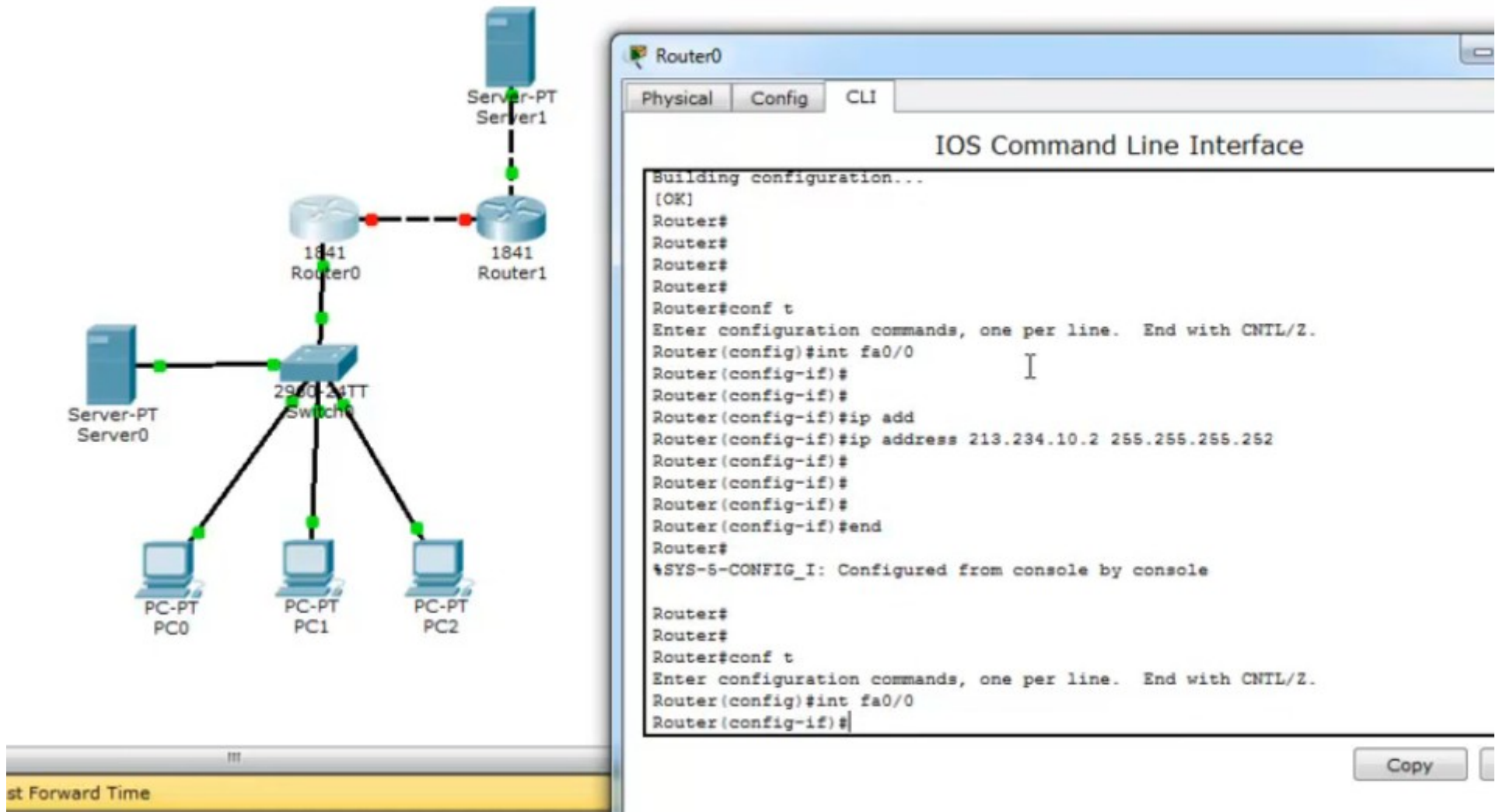
IPv6 Address: /

Link Local Address: FE80::260:2FFF:FEE8:D3C3

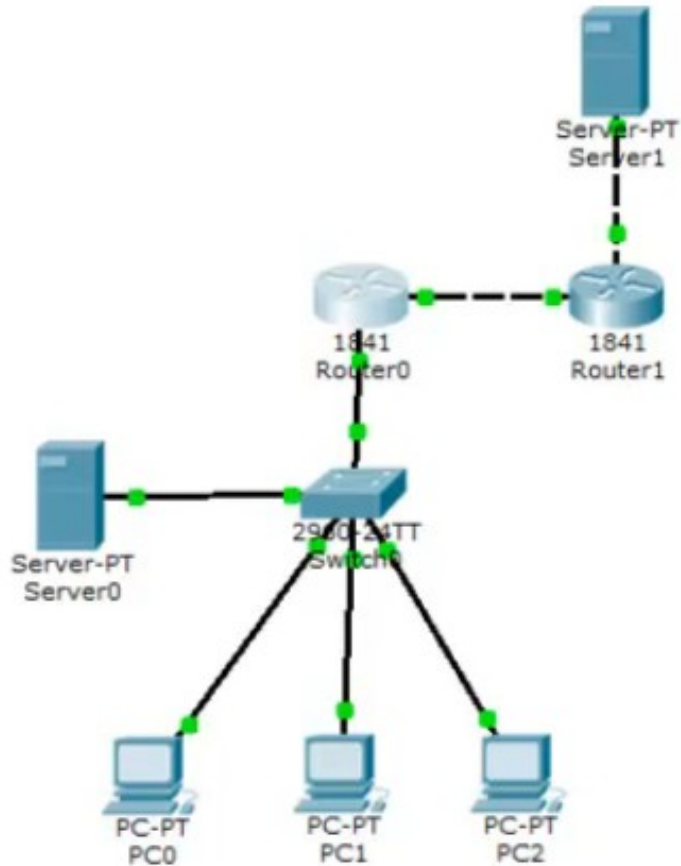
IPv6 Gateway:

IPv6 DNS Server:

Заменим тип кабеля между Server1 и Router1. Зададим ip на Router0.



Зададим шлюз по умолчанию на Router0



```
Router0
Physical Config CLI
IOS Command Line Interface
Router(config)#int fa0/0
Router(config-if)#no shut
Router(config-if)#no shutdown

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

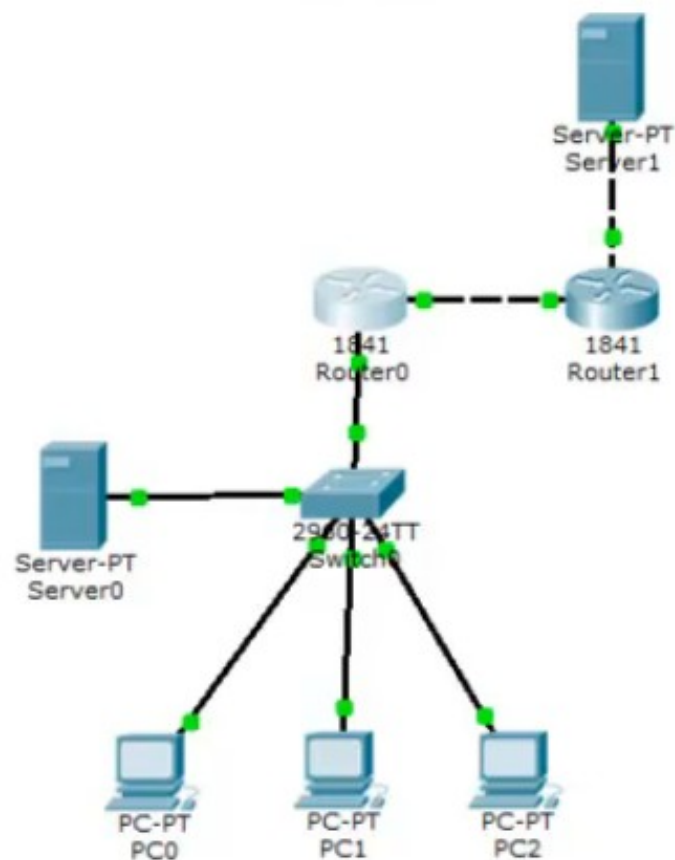
Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#ip route 0.0.0.0 0.0.0.0 213.234.10.1
Router(config)#
Router(config)#
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
Router#
```

Copy



Сохраняем. Проверяем связанность с Server1, Router1



```
Router0
Physical Config CLI
IOS Command Line Interface

Router#
Router#
Router#wr mem
Building configuration...
[OK]
Router#
Router#
Router#
Router#ping 213.234.10.1

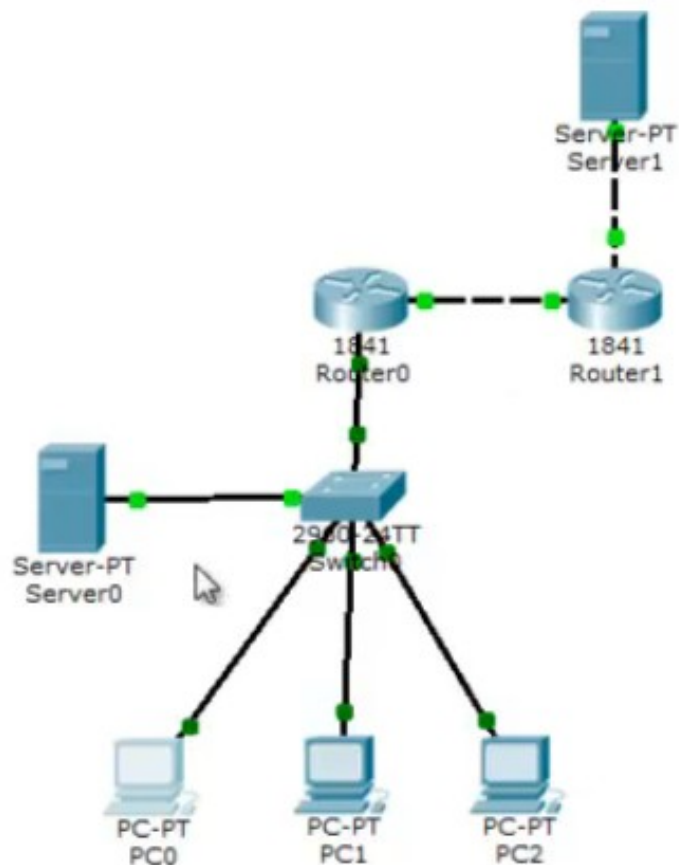
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 213.234.10.1, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms

Router#ping 213.234.20.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 213.234.20.2, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms

Router#
Router#
Router#
```

Пингуем Server1 с PC0 — не проходит. Router1 не знает как работать с «серыми» ip адресами PC0, PC1, PC2



PC0

Physical Config Desktop Software/Services

### Command Prompt

```
Control-C
^C
PC>ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.3.2: bytes=32 time=0ms TTL=127
Reply from 192.168.3.2: bytes=32 time=0ms TTL=127
Reply from 192.168.3.2: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

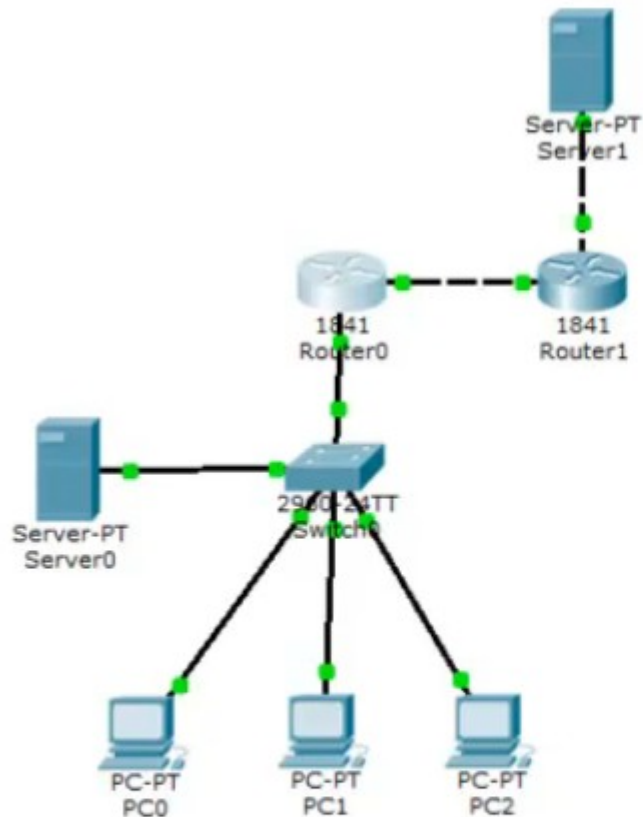
PC>
PC>
PC>
PC>
PC>ping 213.234.20.2

Pinging 213.234.20.2 with 32 bytes of data:

Request timed out.
Request timed out.
```



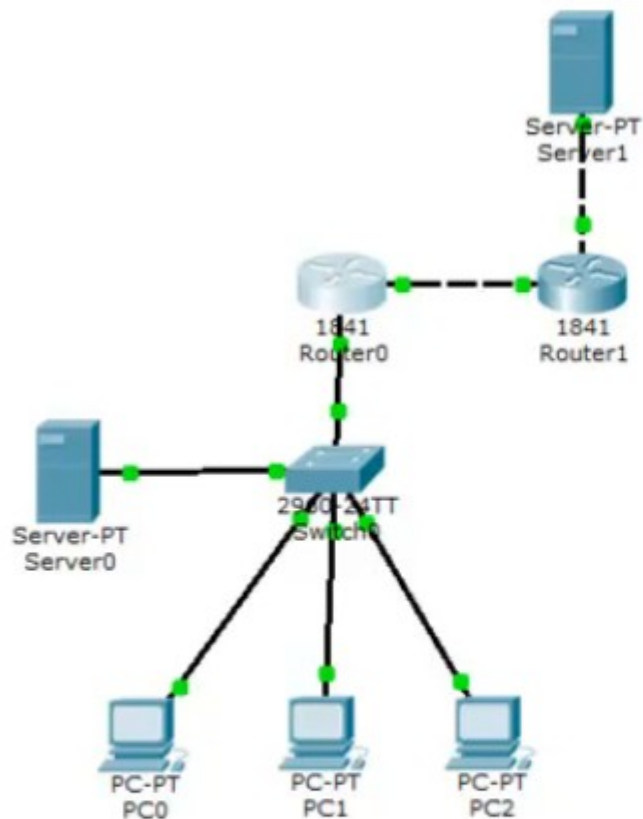
На Router0 определяем fa0/0 как внешний, fa0/1.2 как внутренний интерфейс



```
Router0
Physical Config CLI
IOS Command Line Interface

Router#
Router#
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#int fa0/0
Router(config-if)#
Router(config-if)#
Router(config-if)#ip na
Router(config-if)#ip nat outs
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#int fa0/1.2
Router(config-subif)#ip na
Router(config-subif)#ip nat ins
Router(config-subif)#ip nat inside
Router(config-subif)#exit
Router(config)#
Router(config)#
Router(config)#
Router(config)#
```

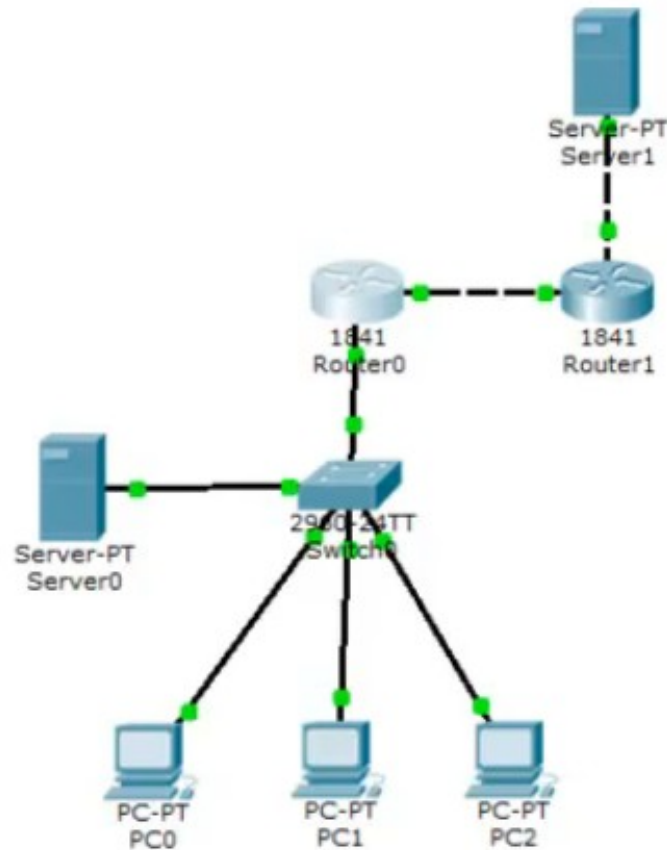
определяем fa0/1.3 тоже как внутренний



```
Router0
Physical Config CLI
IOS Command Line Interface
Router(config)#
Router(config)#
Router(config)#int fa0/1.2
Router(config-subif)#ip na
Router(config-subif)#ip nat ins
Router(config-subif)#ip nat inside
Router(config-subif)#exit
Router(config)#
Router(config)#
Router(config)#int fa0/1.3
Router(config-subif)#ip na
Router(config-subif)#ip nat ins
Router(config-subif)#ip nat inside
Router(config-subif)#
Router(config-subif)#
Router(config-subif)#
Router(config-subif)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
Router#
Router#
Router#
Router#
Router#
```

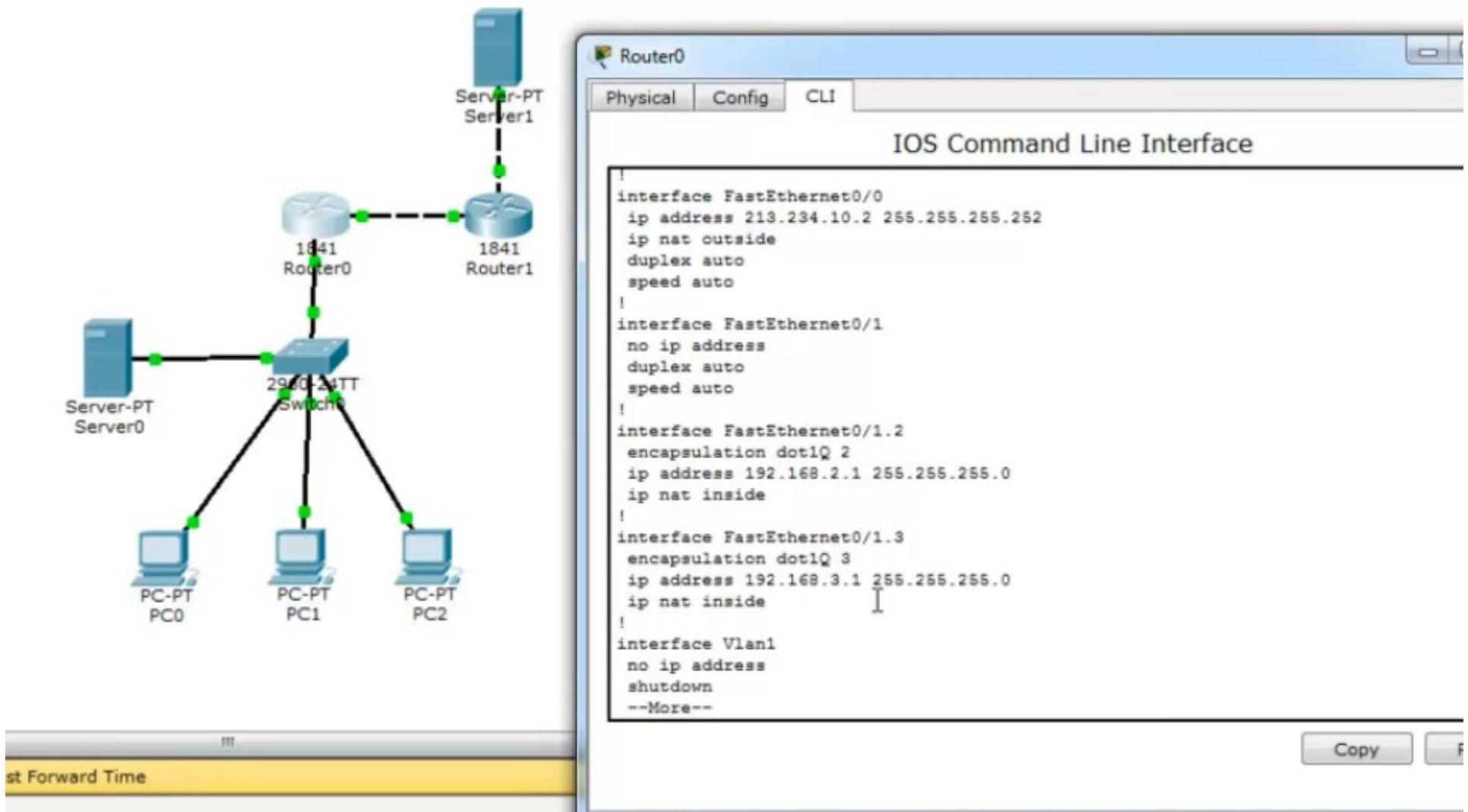
Добавляем ассес-list, указывающий, какие сети за NAT. Проверяем.



```
Router0
Physical Config CLI
IOS Command Line Interface
Router#
Router#
Router#
Router#
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip acc
Router(config)#ip access-list st
Router(config)#ip access-list standard FOR-NAT
Router(config-std-nacl)#per
Router(config-std-nacl)#permit 192.168.2.0 ?
A.B.C.D Wildcard bits
<cr>
Router(config-std-nacl)#permit 192.168.2.0 0.0.0.255
Router(config-std-nacl)#permit 192.168.3.0 0.0.0.255
Router(config-std-nacl)#
Router(config-std-nacl)#
Router(config-std-nacl)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
Router#
Router#show run
```

В конфигурации — какие интерфейсы inside, какие outside.



# Настраиваем Port-Address-Translation

## Настройка PAT

```
interface FastEthernet0/0
ip nat outside
interface FastEthernet0/1.2
ip nat inside
interface FastEthernet0/1.3
ip nat inside
```

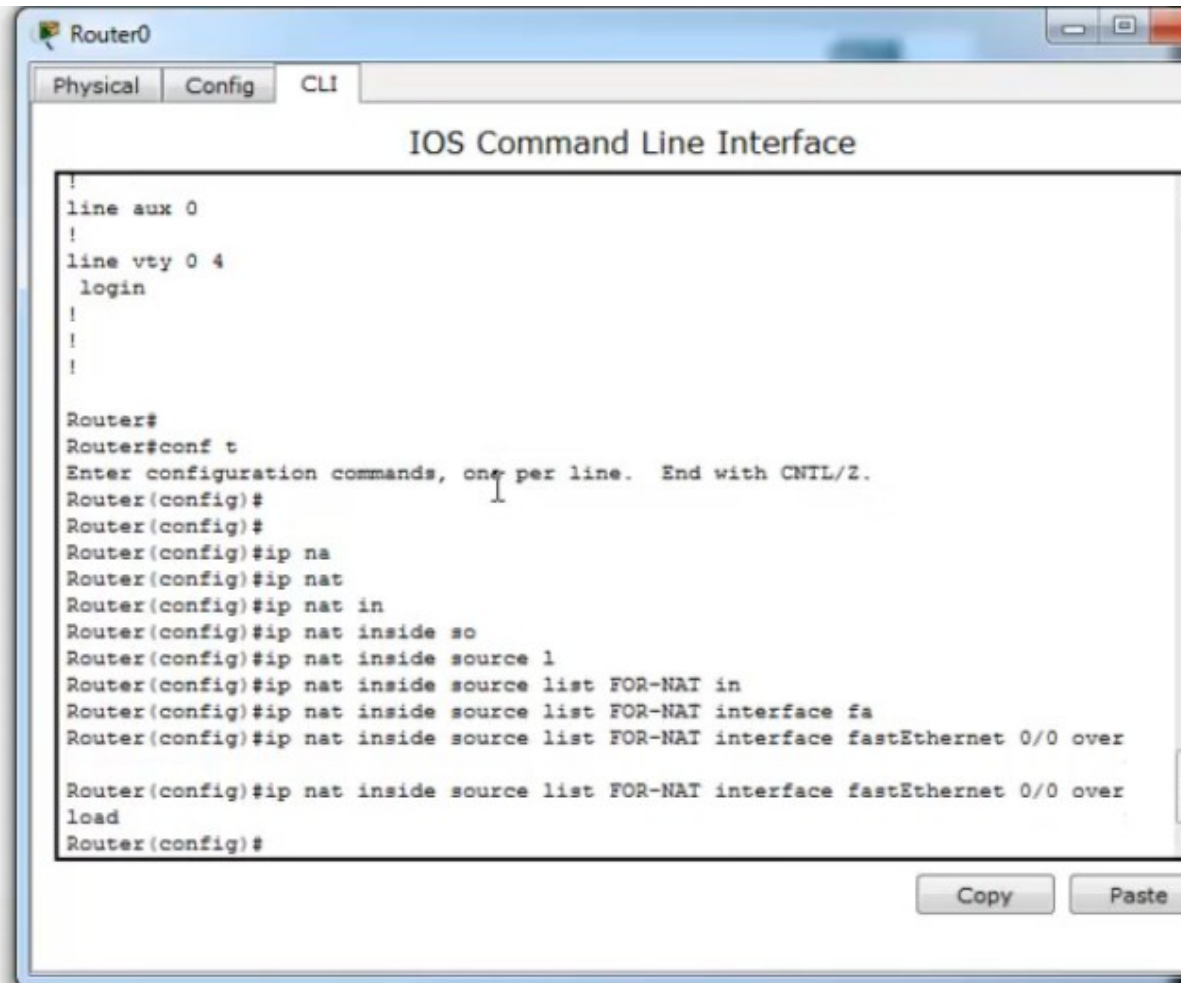
```
ip access-list standard FOR-NAT
permit 192.168.2.0 0.0.0.255
permit 192.168.3.0 0.0.0.255
```

```
ip nat inside source list FOR-NAT interface FastEthernet0/0 overload
```

## Настройка Static NAT

```
ip nat inside source static tcp 192.168.3.2 80 213.234.10.2 80
```

```
show ip nat translations
```





# Сохраняем

## Настройка PAT

```
interface FastEthernet0/0
ip nat outside
interface FastEthernet0/1.2
ip nat inside
interface FastEthernet0/1.3
ip nat inside
```

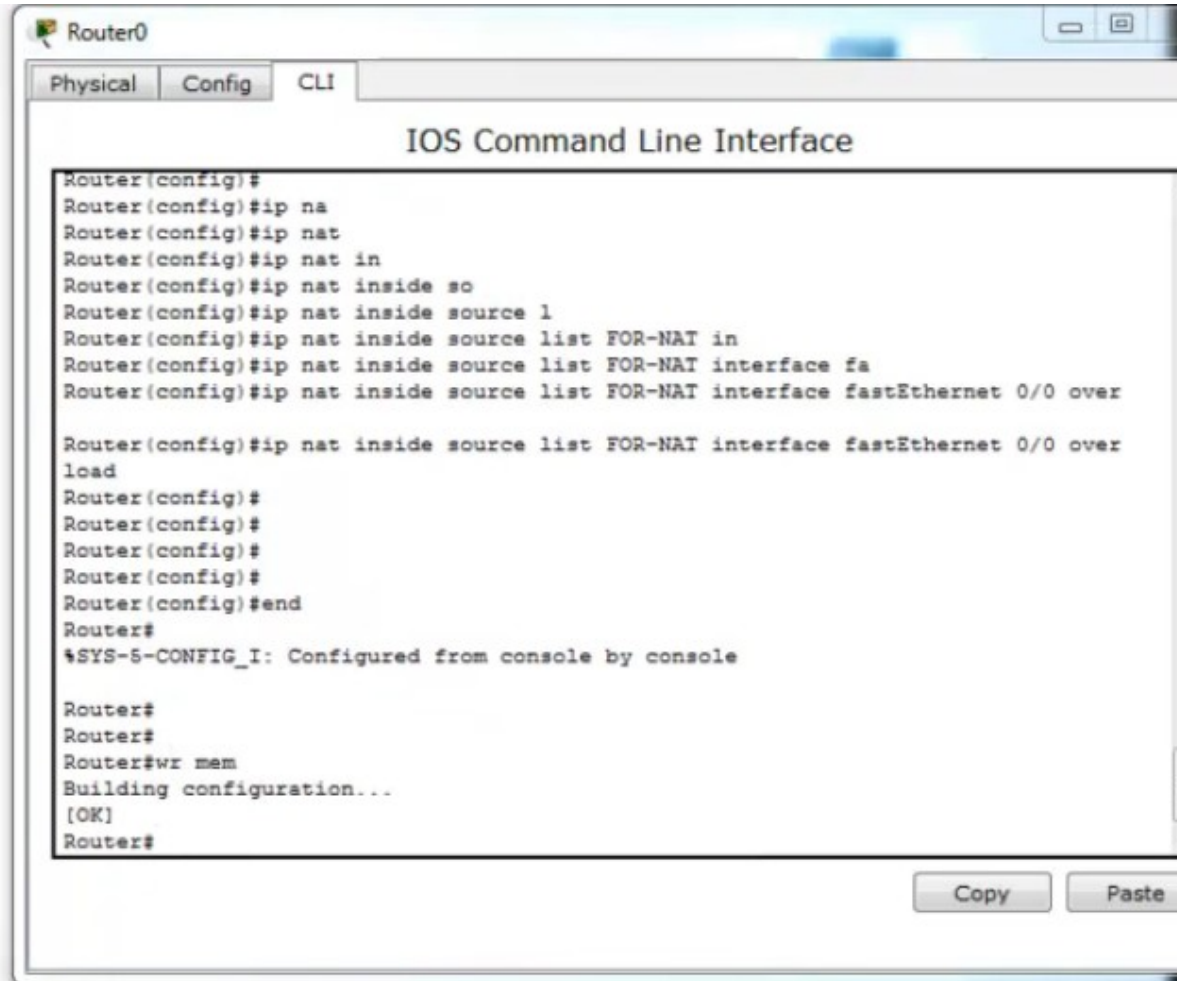
```
ip access-list standard FOR-NAT
permit 192.168.2.0 0.0.0.255
permit 192.168.3.0 0.0.0.255
```

```
ip nat inside source list FOR-NAT interface FastEthernet0/0 overload
```

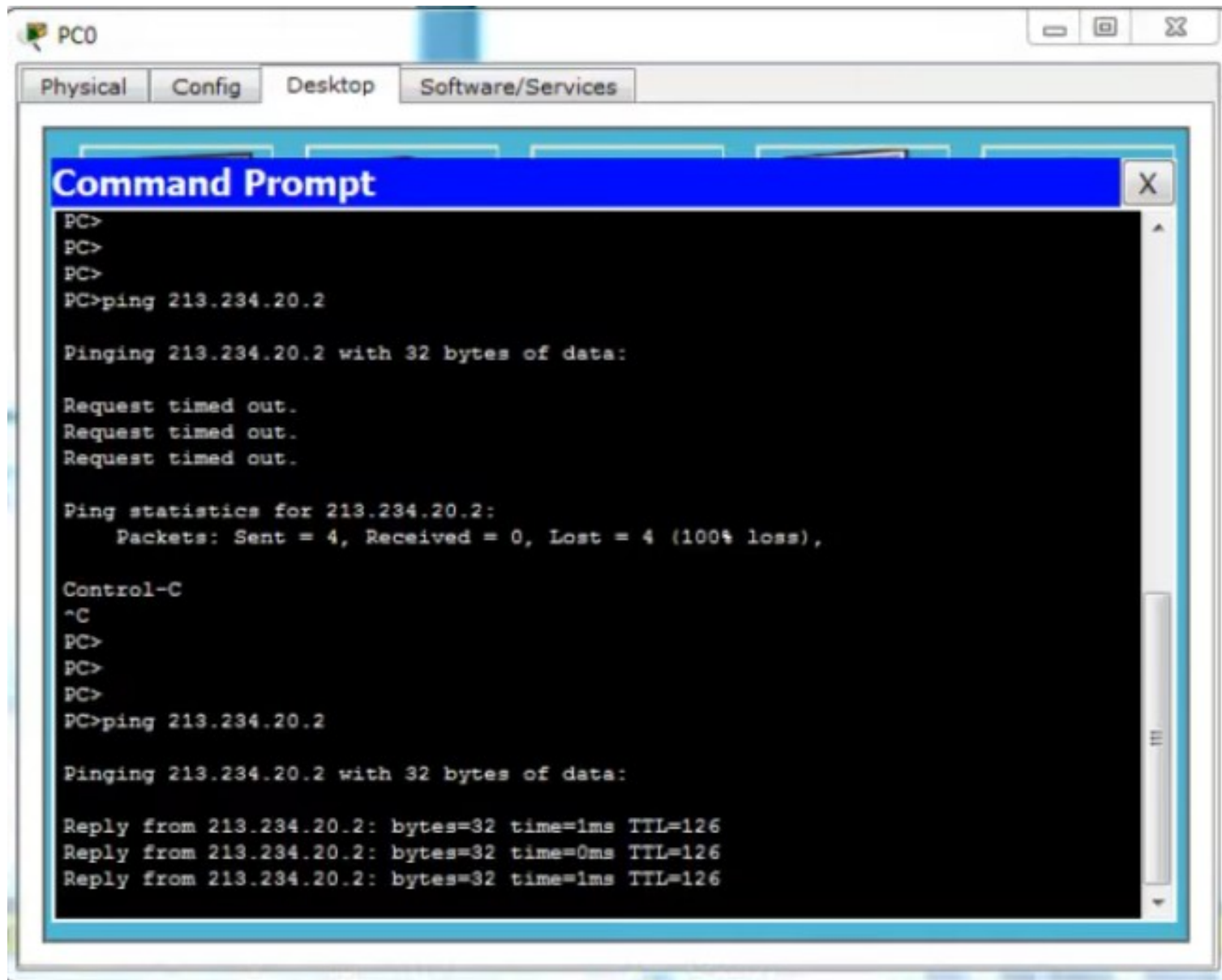
## Настройка Static NAT

```
ip nat inside source static tcp 192.168.3.2 80 213.234.10.2 80
```

```
show ip nat translations
```



Проверяем доступность Sever1 с PC0 — пинг проходит.

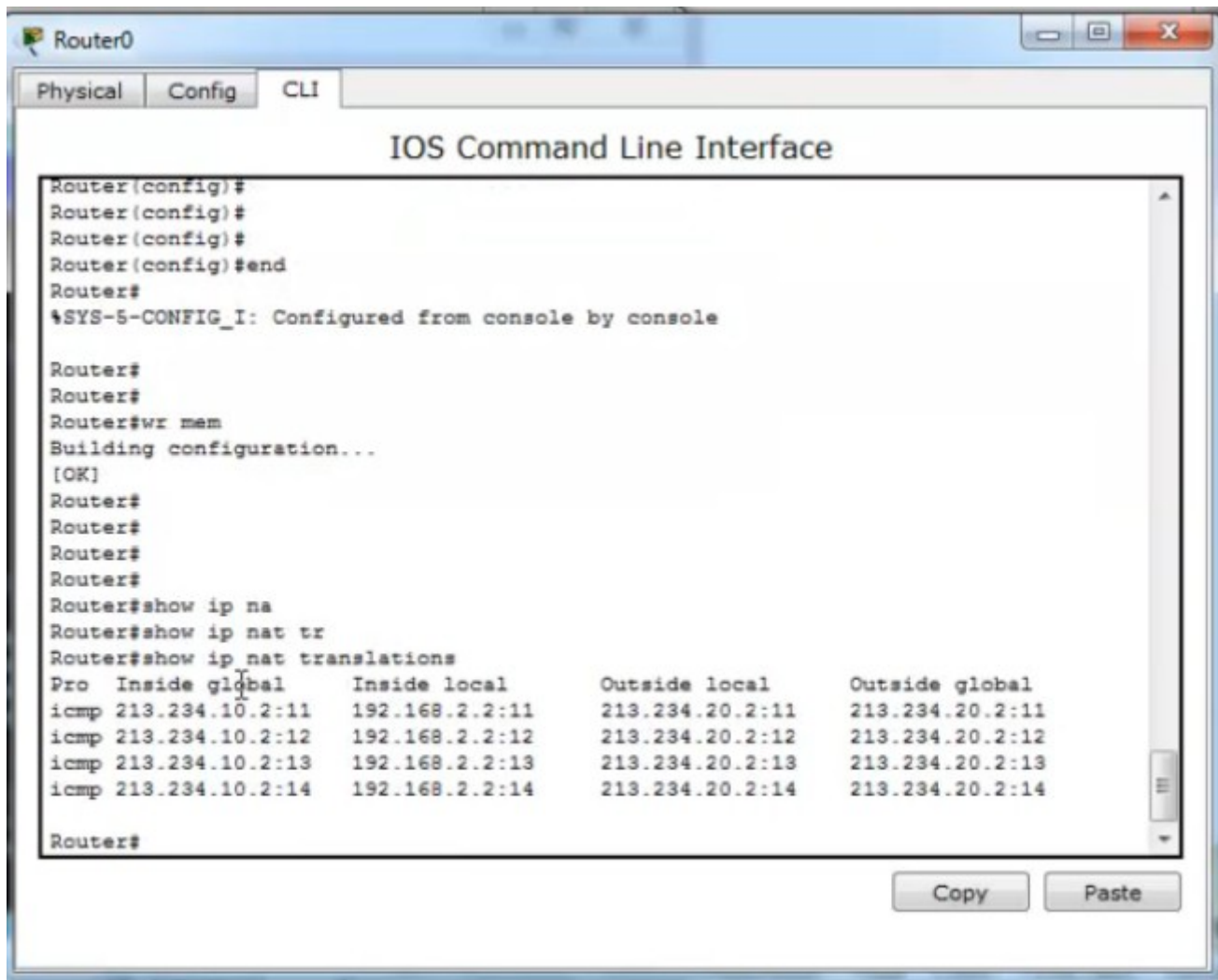


The screenshot shows a Packet Tracer interface with a PC0 icon in the top left. The 'Software/Services' tab is selected. A 'Command Prompt' window is open, displaying the following text:

```
PC>  
PC>  
PC>  
PC>ping 213.234.20.2  
  
Pinging 213.234.20.2 with 32 bytes of data:  
  
Request timed out.  
Request timed out.  
Request timed out.  
  
Ping statistics for 213.234.20.2:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
  
Control-C  
^C  
PC>  
PC>  
PC>  
PC>ping 213.234.20.2  
  
Pinging 213.234.20.2 with 32 bytes of data:  
  
Reply from 213.234.20.2: bytes=32 time=1ms TTL=126  
Reply from 213.234.20.2: bytes=32 time=0ms TTL=126  
Reply from 213.234.20.2: bytes=32 time=1ms TTL=126
```



## На Router0 видим настройки NAT



The screenshot shows the IOS Command Line Interface (CLI) for Router0. The interface has tabs for Physical, Config, and CLI. The CLI tab is active, displaying the following commands and output:

```
Router(config)#
Router(config)#
Router(config)#
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

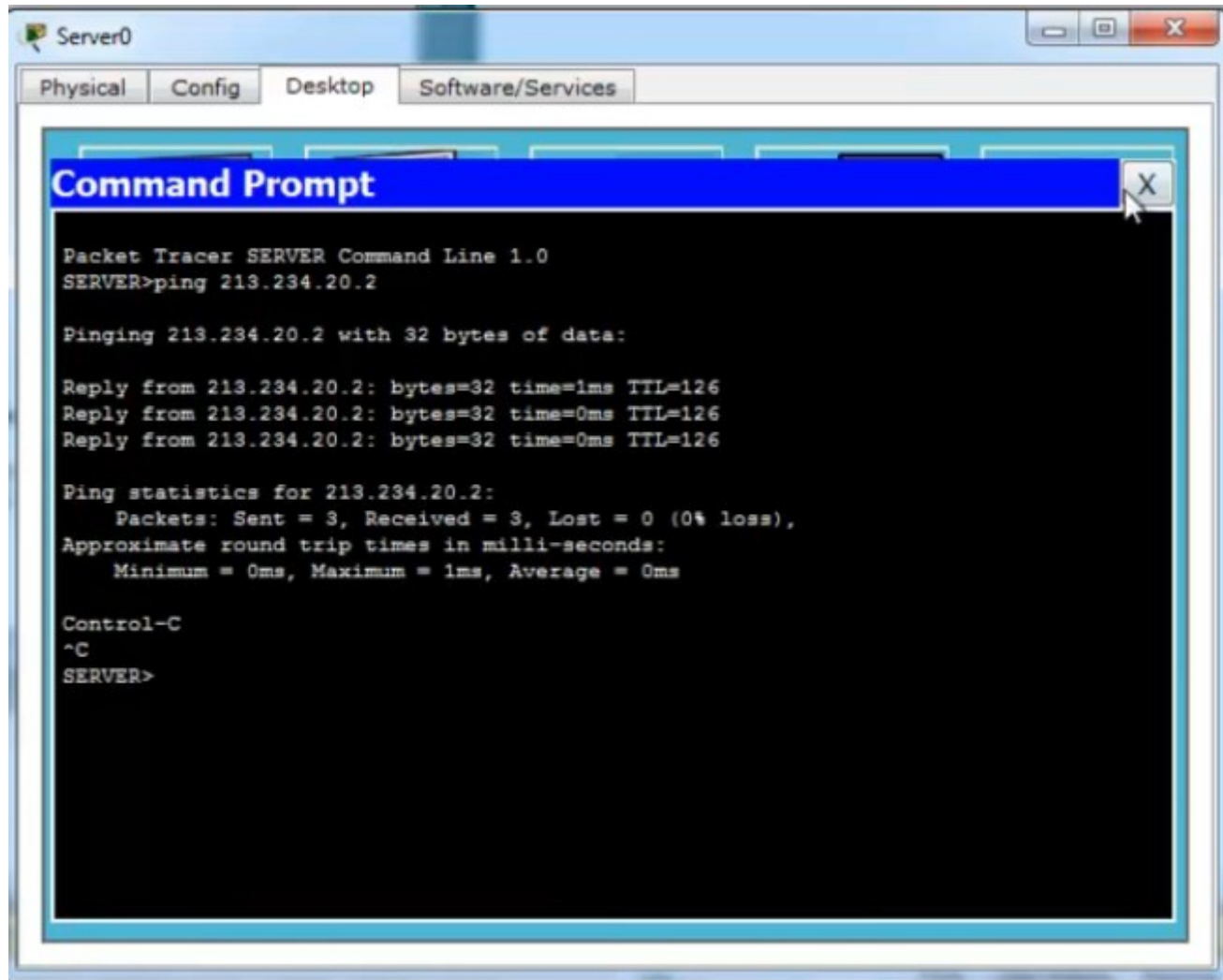
Router#
Router#
Router#wr mem
Building configuration...
[OK]
Router#
Router#
Router#
Router#
Router#show ip na
Router#show ip nat tr
Router#show ip nat translations
```

Pro	Inside global	Inside local	Outside local	Outside global
icmp	213.234.10.2:11	192.168.2.2:11	213.234.20.2:11	213.234.20.2:11
icmp	213.234.10.2:12	192.168.2.2:12	213.234.20.2:12	213.234.20.2:12
icmp	213.234.10.2:13	192.168.2.2:13	213.234.20.2:13	213.234.20.2:13
icmp	213.234.10.2:14	192.168.2.2:14	213.234.20.2:14	213.234.20.2:14

Router#

Copy Paste

Проверяем, что с Server1 доступен PC0



The screenshot shows a Packet Tracer window titled 'Server0' with tabs for 'Physical', 'Config', 'Desktop', and 'Software/Services'. The 'Software/Services' tab is active, displaying a 'Command Prompt' window. The command prompt shows the execution of a ping command to the IP address 213.234.20.2. The output indicates that the ping was successful, with three replies received, each with 32 bytes of data, a time of 0ms, and a TTL of 126. The ping statistics show that all three packets were sent and received, with no loss and an average round trip time of 0ms.

```
Packet Tracer SERVER Command Line 1.0
SERVER>ping 213.234.20.2

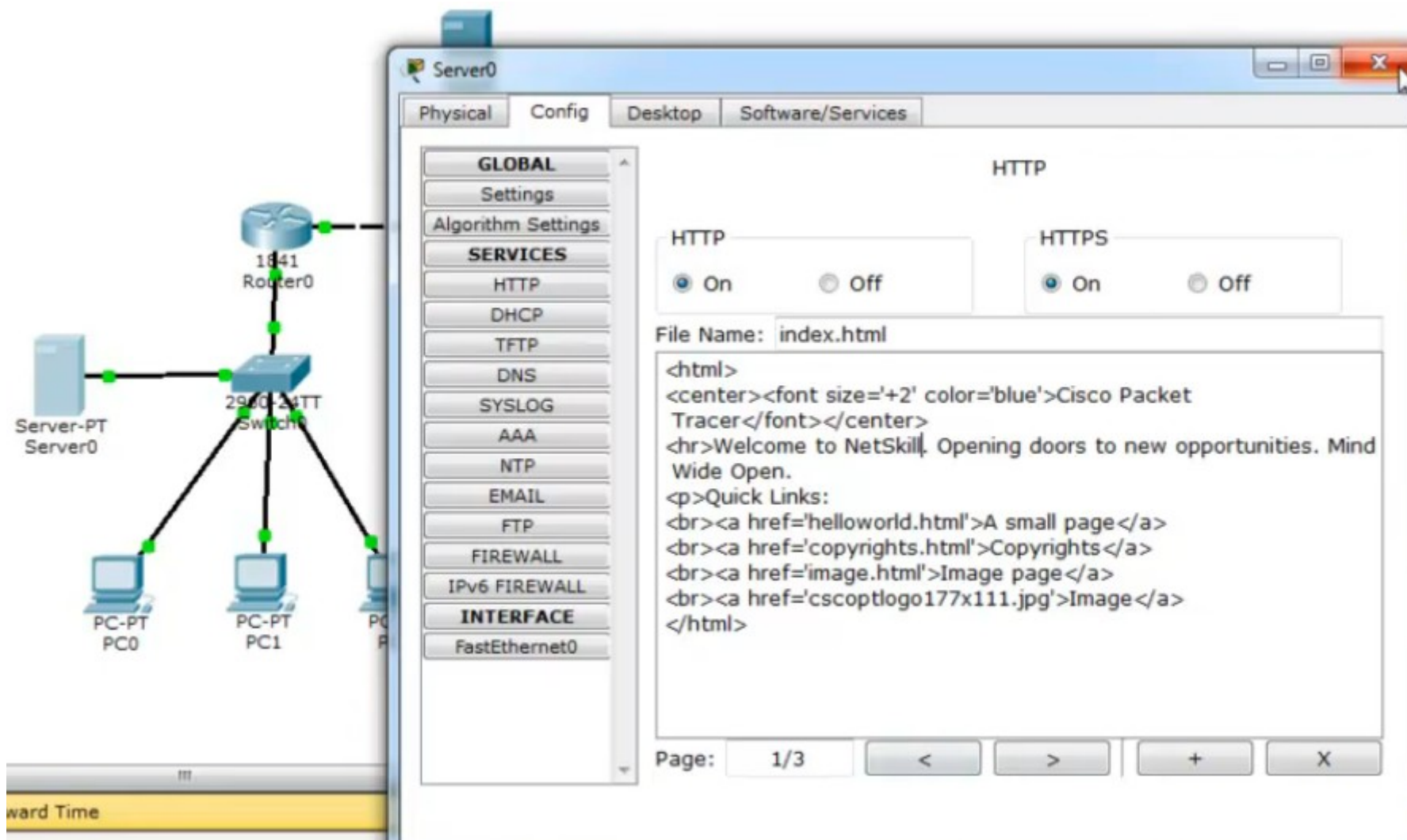
Pinging 213.234.20.2 with 32 bytes of data:

Reply from 213.234.20.2: bytes=32 time=1ms TTL=126
Reply from 213.234.20.2: bytes=32 time=0ms TTL=126
Reply from 213.234.20.2: bytes=32 time=0ms TTL=126

Ping statistics for 213.234.20.2:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

Control-C
^C
SERVER>
```

Далее настроим статический NAT для доступа к Server0 из внешней сети. Изменим содержание index.html в Config > HTTP у Server0



The image displays a network topology and the configuration interface for a Cisco Packet Tracer server named Server0.

**Network Diagram:**

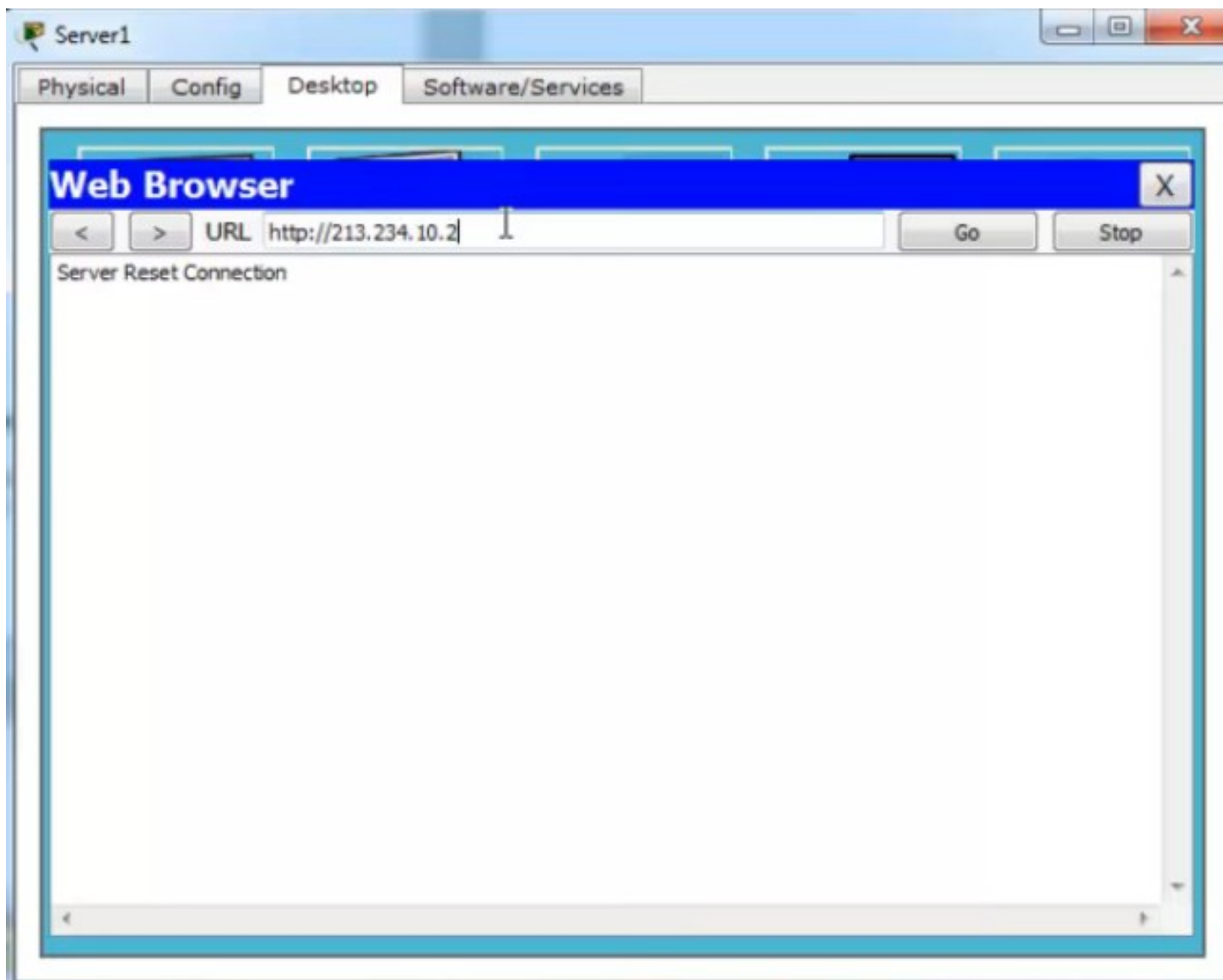
- A central 2960 24TT Switch is connected to a 1841 Router0.
- The Router0 is connected to an external Server-PT Server0.
- The Switch is connected to three PC-PT devices: PC0, PC1, and PC2.

**Server0 Configuration Window:**

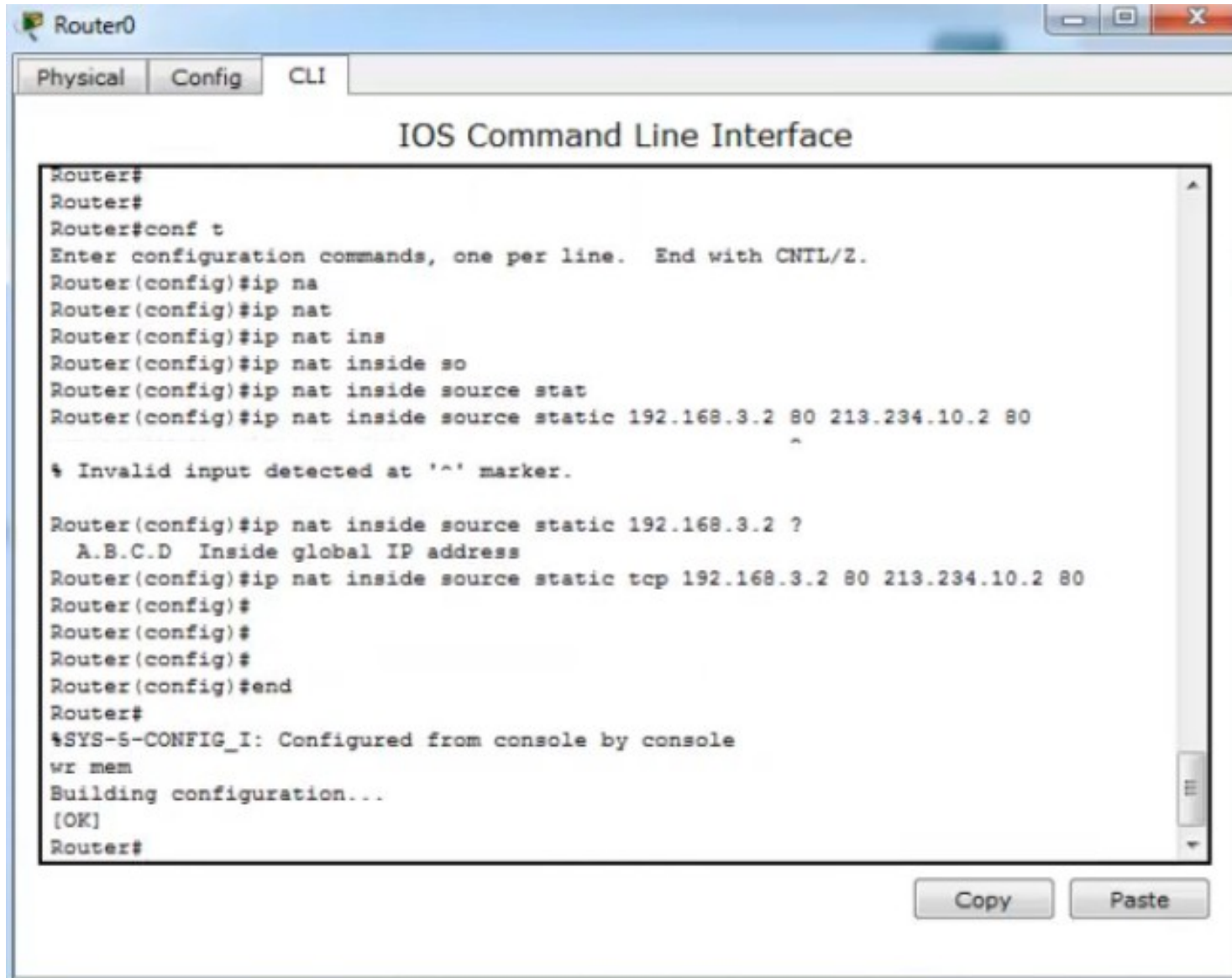
- The window is titled "Server0" and has tabs for Physical, Config, Desktop, and Software/Services.
- The "Config" tab is active, showing a left sidebar with categories: GLOBAL, SERVICES, and INTERFACE.
- Under "SERVICES", the "HTTP" service is selected.
- The "HTTP" configuration area shows:
  - HTTP: ☒ On, ☐ Off
  - HTTPS: ☒ On, ☐ Off
  - File Name: index.html
  - HTML Content:

```
<html>
<center><font size='+2' color='blue'>Cisco Packet
Tracer</font></center>
<hr>Welcome to NetSkill. Opening doors to new opportunities. Mind
Wide Open.
<p>Quick Links:
<br><a href='helloworld.html'>A small page</a>
<br><a href='copyrights.html'>Copyrights</a>
<br><a href='image.html'>Image page</a>
<br><a href='cscoptlogo177x111.jpg'>Image</a>
</html>
```
- At the bottom, there is a "Page:" indicator showing "1/3" and navigation buttons: "<", ">", "+", and "X".

Проверяем доступность веб-сервера на Server0 с Server1 —  
недоступен.



## Настроим static NAT на Router0



The screenshot shows a window titled "Router0" with three tabs: "Physical", "Config", and "CLI". The "CLI" tab is active, displaying the "IOS Command Line Interface". The terminal text is as follows:

```
Router#
Router#
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip na
Router(config)#ip nat
Router(config)#ip nat ins
Router(config)#ip nat inside so
Router(config)#ip nat inside source stat
Router(config)#ip nat inside source static 192.168.3.2 80 213.234.10.2 80
^
% Invalid input detected at '^' marker.

Router(config)#ip nat inside source static 192.168.3.2 ?
  A.B.C.D  Inside global IP address
Router(config)#ip nat inside source static tcp 192.168.3.2 80 213.234.10.2 80
Router(config)#
Router(config)#
Router(config)#
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr mem
Building configuration...
[OK]
Router#
```

At the bottom right of the window, there are two buttons: "Copy" and "Paste".

Снова пробуем обратиться к веб-серверу на Server0 с сервера Server1 — получилось.

