

# UNIVERSITY OF ASIA PACIFIC

Department of Computer Science & Engineering

## DHCP with DNS

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**Course Code** : CSE 320

**Course Title** : Computer Networks Lab

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## **Definition of DHCP**

Dynamic Host Configuration Protocol (DHCP) is an application layer protocol which is used to provide:

1. Subnet Mask (Option 1 – e.g., 255.255.255.0)
2. Router Address (Option 3 – e.g., 192.168.1.1)
3. DNS Address (Option 6 – e.g., 8.8.8.8)
4. Vendor Class Identifier (Option 43 – e.g., ‘unifi’ = 192.168.1.9  
##where unifi = controller)

DHCP is based on a client-server model and based on discovery, offer, request, and ACK.

DHCP is an under-the-covers mechanism that automates the assignment of IP addresses to fixed and mobile hosts that are connected wired or wirelessly.

When a device wants access to a network that's using DHCP, it sends a request for an IP address that is picked up by a DHCP server. The server responds by delivering an IP address to the device, then monitors the use of the address and takes it back after a specified time or when the device shuts down. The IP address is then returned to the pool of addresses managed by the DHCP server to be reassigned to another device as it seeks access to the network.

While the delegation of IP addresses is the central function of the protocol, DHCP also assigns a variety of related networking parameters including subnet mask, default gateway address, and domain name server (DNS). DHCP is an IEEE standard built on top of the older BOOTP (bootstrap protocol), which has become obsolete because it only works on IPv4 networks.

## **How DHCP works**

DHCP runs at the application layer of the TCP/IP protocol stack to dynamically assign IP addresses to DHCP clients/nodes and to allocate TCP/IP configuration information to the DHCP clients.

Information includes subnet mask information, default gateway, IP addresses and domain name system addresses.

DHCP is based on client-server protocol in which servers manage a pool of unique IP addresses, as well as information about client configuration parameters, and assign addresses out of those address pools.

## **Components of DHCP**

When working with DHCP, it is important to understand all of the components. Following are the list of components:

- **DHCP Server:** DHCP server is a networked device running the DHCP service that holds IP addresses and related configuration information. This is typically a server or a router but could be anything that acts as a host, such as an SD-WAN appliance.
- **DHCP client:** DHCP client is the endpoint that receives configuration information from a DHCP server. This can be any device like computer, laptop, IoT endpoint or anything else that requires connectivity to the network. Most of the devices are configured to receive DHCP information by default.
- **IP address pool:** IP address pool is the range of addresses that are available to DHCP clients. IP addresses are typically handed out sequentially from lowest to the highest.
- **Subnet:** Subnet is the partitioned segments of the IP networks. Subnet is used to keep networks manageable.
- **Lease:** Lease is the length of time for which a DHCP client holds the IP address information. When a lease expires, the client has to renew it.
- **DHCP relay:** A host or router that listens for client messages being broadcast on that network and then forwards them to a configured server. The server then sends responses back to the relay agent that passes them along to the client. DHCP relay can be used to centralize DHCP servers instead of having a server on each subnet.

## **Benefits of DHCP**

There are following benefits of DHCP:

**Centralized administration of IP configuration:** DHCP IP configuration information can be stored in a single location and enables that administrator to centrally manage all IP address configuration information.

**Dynamic host configuration:** DHCP automates the host configuration process and eliminates the need to manually configure individual host. When TCP/IP (Transmission control protocol/Internet protocol) is first deployed or when IP infrastructure changes are required.

**Seamless IP host configuration:** The use of DHCP ensures that DHCP clients get accurate and timely IP configuration IP configuration parameter such as IP address, subnet mask, default gateway, IP address of DNS server and so on without user intervention.

**Flexibility and scalability:** Using DHCP gives the administrator increased flexibility, allowing the administrator to move easily change IP configuration when the infrastructure changes.

## **Disadvantages of DHCP**

- Tracing internet activity may be difficult as the same machine may have two or more different IP addresses over a period of time.
- Not having a static IP means computers with DHCP cannot be used as servers as their IP will change.

## **What is DNS?**

The Domain Name System (DNS) is the phonebook of the Internet. Humans access information online through domain names, like nytimes.com or espn.com. Web browsers interact through Internet Protocol (IP) addresses. DNS translates domain names to IP addresses so browsers can load Internet resources.

Each device connected to the Internet has a unique IP address which

other machines use to find the device. DNS servers eliminate the need for humans to memorize IP addresses such as 192.168.1.1 (in IPv4), or more complex newer alphanumeric IP addresses such as 2400:cb00:2048:1::c629:d7a2 (in IPv6).

## **How does DNS work?**

The process of DNS resolution involves converting a hostname (such as `www.example.com`) into a computer-friendly IP address (such as 192.168.1.1). An IP address is given to each device on the Internet, and that address is necessary to find the appropriate Internet device - like a street address is used to find a particular home. When a user wants to load a webpage, a translation must occur between what a user types into their web browser (`example.com`) and the machine-friendly address necessary to locate the `example.com` webpage. In order to understand the process behind the DNS resolution, it's important to learn about the different hardware components a DNS query must pass between. For the web browser, the DNS lookup occurs "behind the scenes" and requires no interaction from the user's computer apart from the initial request.

## **Best DNS Servers**

Here are some of the top DNS servers available:

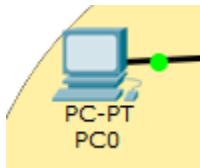
1. **Cloudflare 1.1.1.1.** This is a simple-to-use DNS service that comes with tutorials for all of the most popular operating systems, such as Mac, Windows, Android, iOS, and Linux. Users can also use Cloudflare's service to block adult content.
2. **Google Public DNS.** The Google Public DNS service is different from Cloudflare's in that it is designed for more technically adept users. But you can find tutorials if needed.
3. **Quad9.** Quad9's DNS service is renowned for its fast performance. It also claims to block malicious sites using threat intelligence data.

## How to implement **DHCP with DNS (BASIC)**

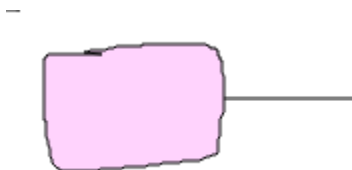
**Step-1:** Open a project in Cisco Packet Tracer. Take a router, switch & PC from the drop down menu. The amount of these equipment's depends on the architecture of the project.



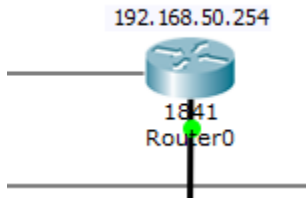
**Step-2:** Rename the equipment's to avoid confusion.



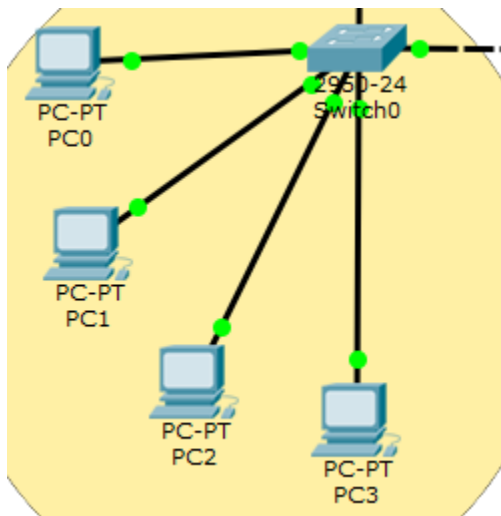
**Step-3:** Draw an ISP area.



**Step-4:** Place the router besides it.



**Step-5:** Assign switch and PC for each department and connect them using straight-through cable (for switch to switch use cross-over cable). Define each department with various color. I'm using 4 pc for IT department, 2 pc for HR department and 3 pc for accounts department. I have 3 switches for those 3 departments.



**Step-6:** Interface between switch and router still not up. Go to switch, then CLI and write down those codes:

```
enable
configure terminal
interface fastEthernet 0/0
ip address 192.168.50.254 255.255.255.0
no shutdown
exit
```

Assign DHCP commands:

```
ip dhcp pool d
network 192.168.50.0 255.255.255.0
default-router 192.168.50.254
dns-server 8.8.8.8
exit
```

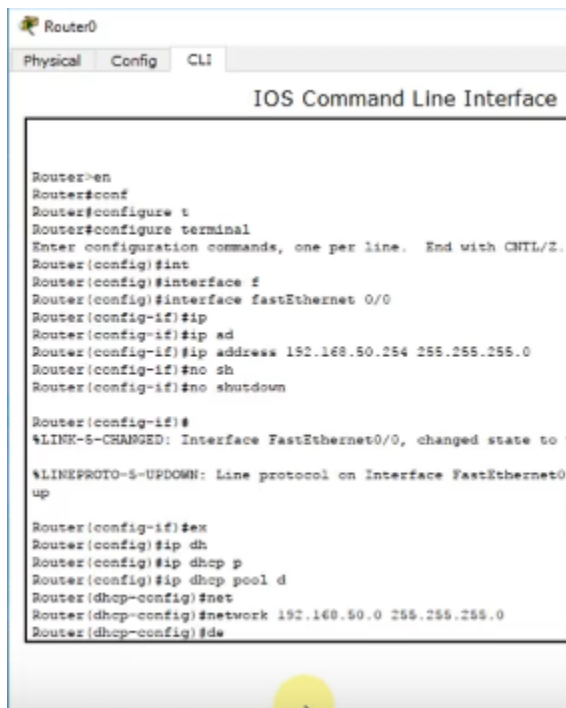
Apply excluded addresses:

```
ip dhcp excluded-address 192.168.50.3 192.168.50.20
exit
```

Write the configuration:

```
wr
```





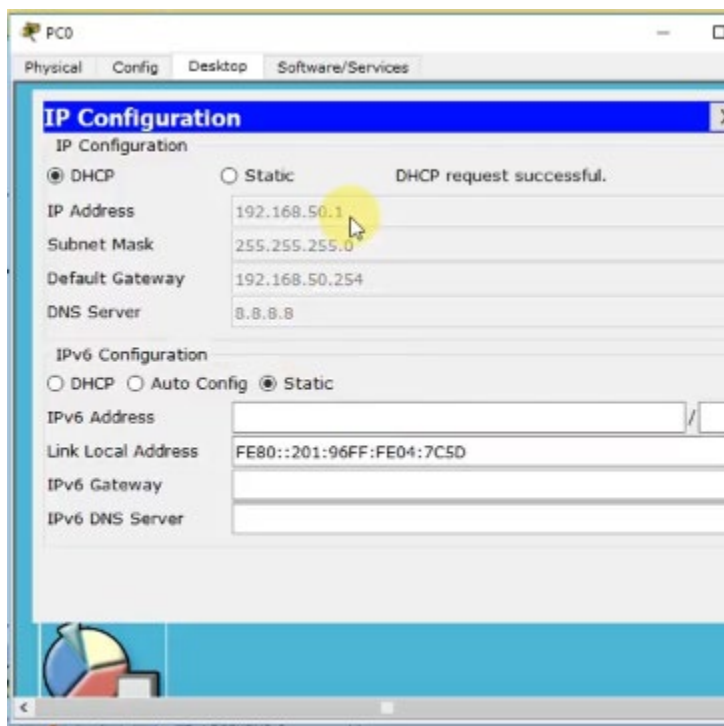
```
Router0
Physical Config CLI
IOS Command Line Interface

Router>en
Router#conf
Router#configure t
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int
Router(config)#interface f
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip
Router(config-if)#ip ad
Router(config-if)#ip address 192.168.50.254 255.255.255.0
Router(config-if)#no sh
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to u
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0,
up

Router(config-if)#ex
Router(config)#ip dh
Router(config)#ip dhcp p
Router(config)#ip dhcp pool d
Router(dhcp-config)#net
Router(dhcp-config)#network 192.168.50.0 255.255.255.0
Router(dhcp-config)#de
```

**Step-7:** Go to any pc, then desktop, select DHCP for IP Configuration, It will show DHCP request successful.

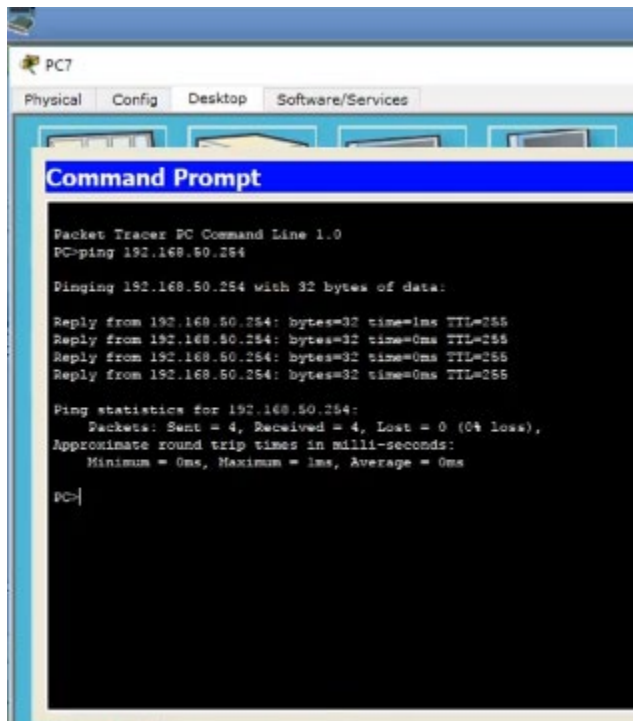


**Step-8:** Go to any pc, and ping. It should succeed with 0% loss.













*ping 192.168.50.254*

*or,*

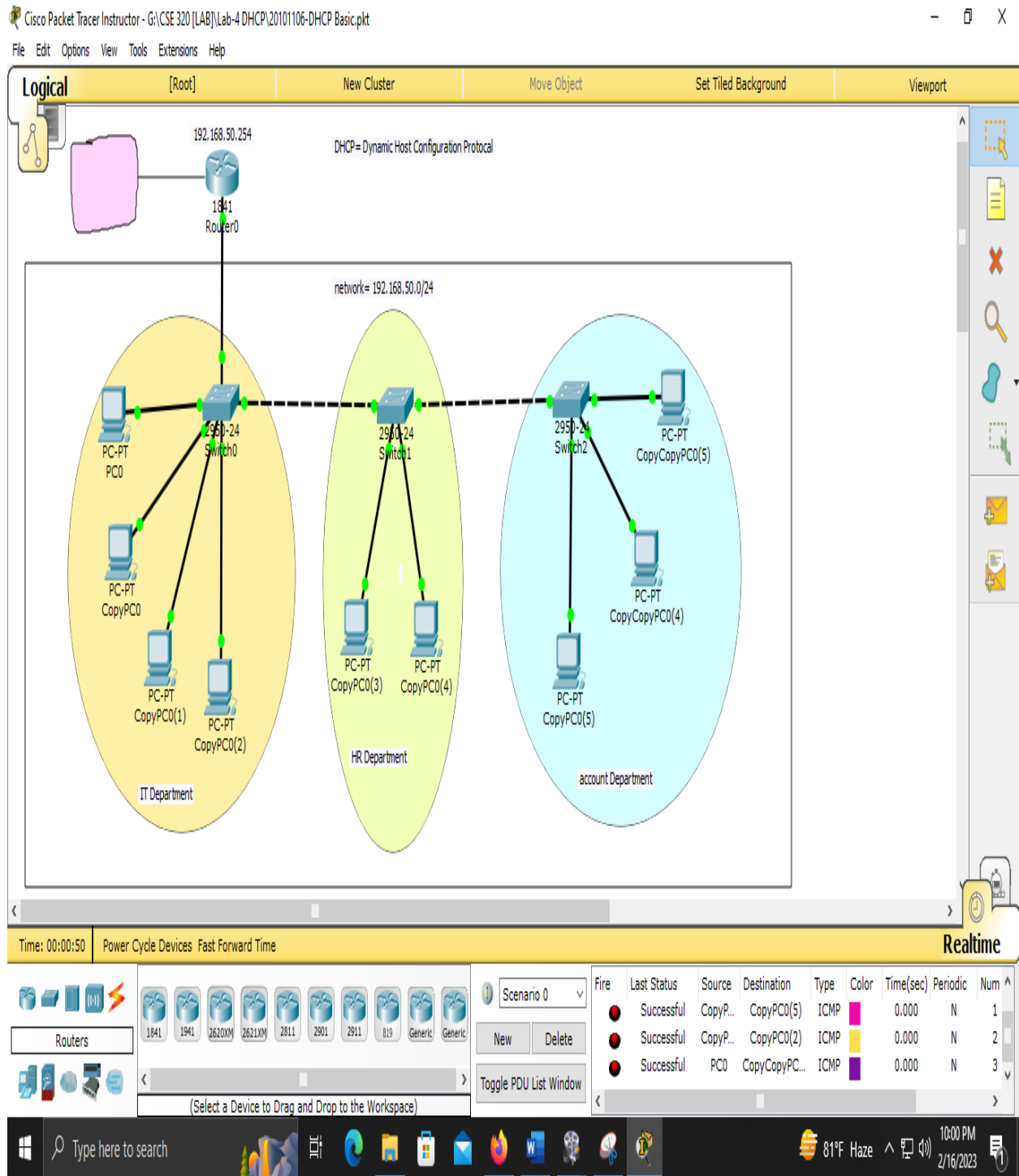
*ping 192.168.50.1*



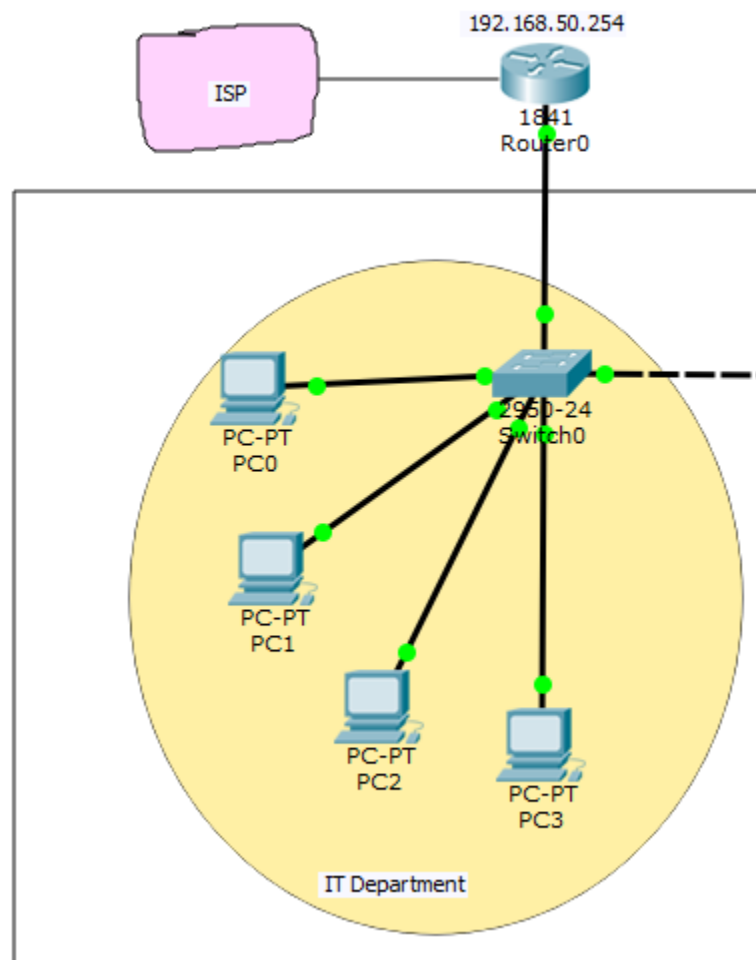
**Step-9:** Try to send packets using different pc's. It should succeed.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	
	Successful	PC5	PC3	ICMP		0.000	N	1	
	Successful	PC6	PC7	ICMP		0.000	N	2	
	Successful	PC0	PC5	ICMP		0.000	N	3	
									

# Overall screenshot of the whole architecture-



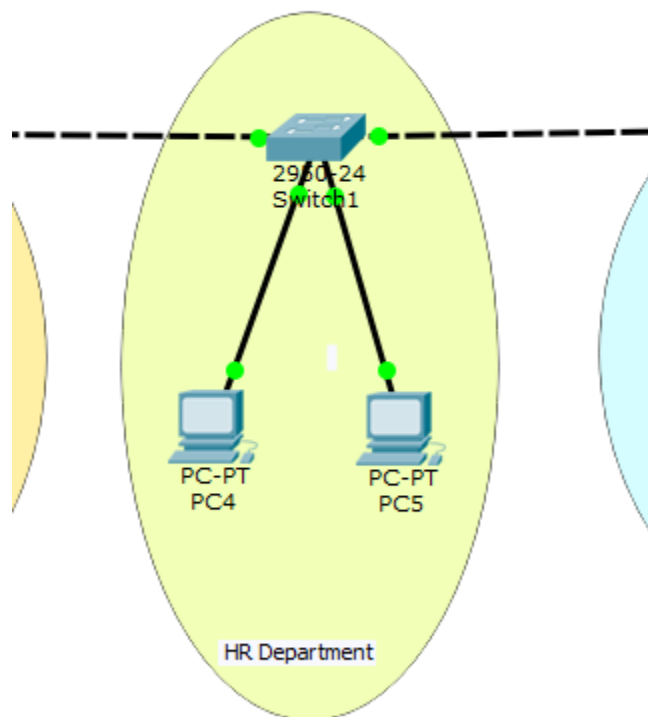
Part by part view-

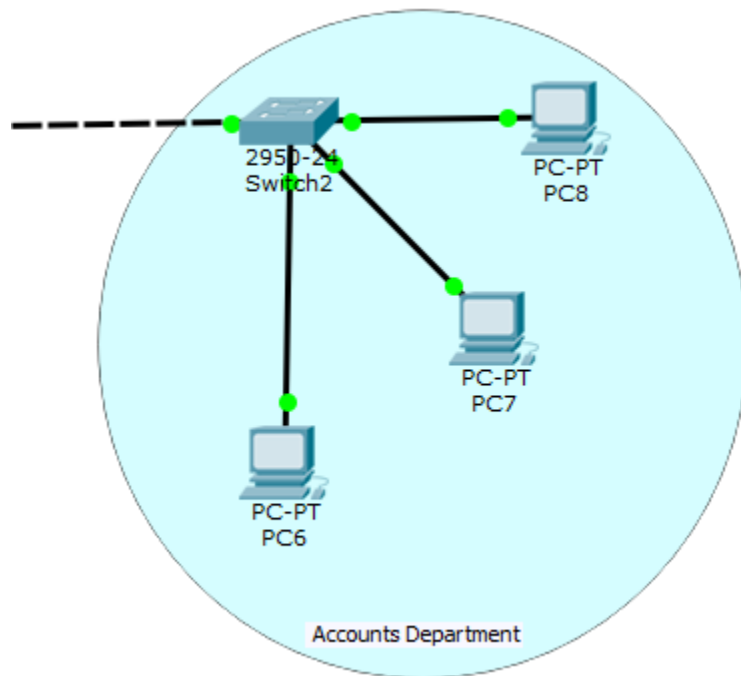


DHCP = Dynamic Host Configuration Protocol

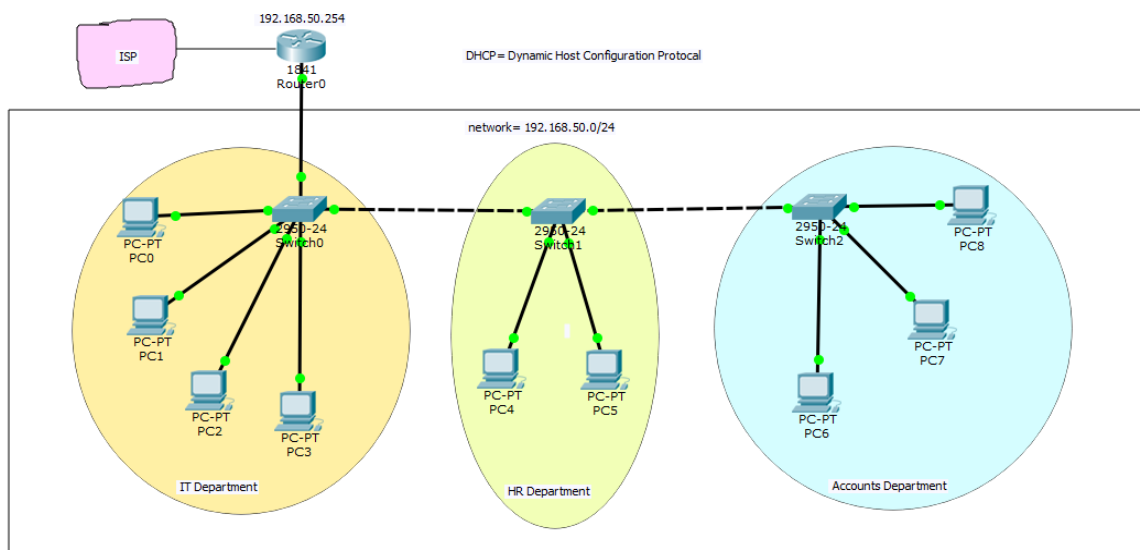
---

network = 192.168.50.0/24



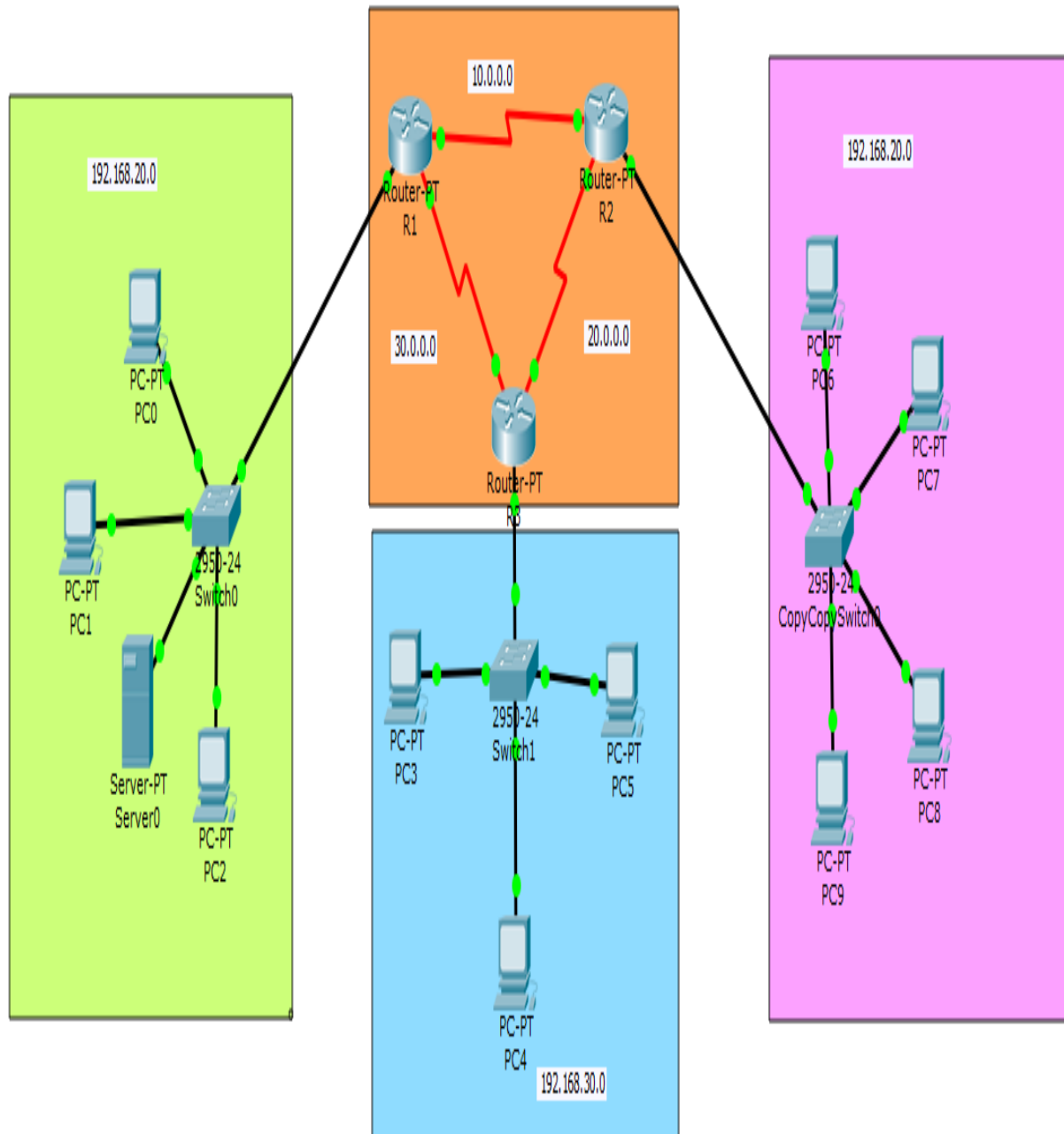


Detailed view-



## How to implement **DHCP with DNS (ADVANCED)**

**Step-1:** Create networks with proper labeling of ports and networks.



**Step-2:** Configure the ports of the routers.

For 1<sup>st</sup> router and FastEthernet 0/0, Serial2/0 and serial3/0:

The screenshot shows the configuration window for router R1 in Cisco Packet Tracer. The window has three tabs: Physical, Config, and CLI. The Config tab is active, and the left sidebar shows a tree view of the router's configuration. The tree view is expanded to the INTERFACE section, and FastEthernet0/0 is selected. The main area shows the configuration for FastEthernet0/0. The Port Status is checked (On). The Bandwidth is set to 100 Mbps, and the Duplex is set to Full Duplex. The MAC Address is 0010.117E.0CD8. The IP Configuration section shows the IP Address as 192.168.20.1 and the Subnet Mask as 255.255.255.0. The Tx Ring Limit is set to 10. Below the configuration area, there is a section titled 'Equivalent IOS Commands' which contains a list of commands to configure the interface.

**FastEthernet0/0**

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0010.117E.0CD8

IP Configuration

IP Address 192.168.20.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

**Equivalent IOS Commands**

```
R1>enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface FastEthernet0/0
R1(config-if)#
R1(config-if)#exit
R1(config)#interface FastEthernet0/0
R1(config-if)#
```



R1

Physical

Config

CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

GigabitEthernet6/0

Serial2/0

Port Status

☒ On

Duplex

☐ Full Duplex

Clock Rate

72000

IP Configuration

IP Address

10.0.0.1

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

Enter configuration commands, one per line. End with CNTRL-Z.  
R1(config)#interface FastEthernet0/0  
R1(config-if)#  
R1(config-if)#exit  
R1(config)#interface FastEthernet0/0  
R1(config-if)#  
R1(config-if)#exit  
R1(config)#interface Serial2/0  
R1(config-if)#

R1

PhysicalConfigCLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

GigabitEthernet6/0

Serial3/0

Port Status

☒ On

Duplex

☐ Full Duplex

Clock Rate

250000

IP Configuration

IP Address

30.0.0.1

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

R1(config-if)#exit

R1(config)#interface FastEthernet0/0

R1(config-if)#

R1(config-if)#exit

R1(config)#interface Serial2/0

R1(config-if)#

R1(config-if)#exit

R1(config)#interface Serial3/0

R1(config-if)#

For 2nd router and FastEthernet 0/0, Serial2/0 and serial3/0:

The screenshot shows a configuration window for a router named R2. The window has three tabs: Physical, Config, and CLI. The Config tab is active, showing the configuration for the FastEthernet0/0 interface. On the left, there is a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), and INTERFACE (FastEthernet0/0, FastEthernet1/0, Serial2/0, Serial3/0, FastEthernet4/0, FastEthernet5/0, GigabitEthernet6/0). The FastEthernet0/0 interface is selected. The configuration fields for FastEthernet0/0 are: Port Status (checked On), Bandwidth (radio buttons for 100 Mbps, 10 Mbps, and checked Auto), Duplex (radio buttons for Half Duplex and checked Full Duplex, with a checked Auto checkbox), MAC Address (00D0.FF03.C2C4), IP Configuration (IP Address: 192.168.10.1, Subnet Mask: 255.255.255.0), and Tx Ring Limit (10). At the bottom, there is a section titled 'Equivalent IOS Commands' with a text area containing the following commands: R2>enable, R2#configure terminal, Enter configuration commands, one per line. End with CNTL/Z., R2(config)#interface FastEthernet0/0, R2(config-if)#, R2(config-if)#exit, R2(config)#interface FastEthernet0/0, and R2(config-if)#.

**R2**

Physical Config CLI

**FastEthernet0/0**

Port Status ☒ On

Bandwidth ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 00D0.FF03.C2C4

IP Configuration

IP Address 192.168.10.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

**Equivalent IOS Commands**

```
R2>enable
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface FastEthernet0/0
R2(config-if)#
R2(config-if)#exit
R2(config)#interface FastEthernet0/0
R2(config-if)#
```

R2

PhysicalConfigCLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

GigabitEthernet6/0

Serial2/0

Port Status

☒ On

Duplex

☐ Full Duplex

Clock Rate

125000

IP Configuration

IP Address

10.0.0.2

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

Enter configuration commands, one per line. End with CNTRL-Z.  
R2(config)#interface FastEthernet0/0  
R2(config-if)#  
R2(config-if)#exit  
R2(config)#interface FastEthernet0/0  
R2(config-if)#  
R2(config-if)#exit  
R2(config)#interface Serial2/0  
R2(config-if)#


Physical Config CLI

GLOBAL	Serial3/0	
Settings	Port Status	<input checked="" type="checkbox"/> On
Algorithm Settings	Duplex	<input type="radio"/> Full Duplex
ROUTING	Clock Rate	125000
Static	IP Configuration	
RIP	IP Address	20.0.0.1
INTERFACE	Subnet Mask	255.0.0.0
FastEthernet0/0	Tx Ring Limit	
FastEthernet1/0		10
Serial2/0		
Serial3/0		
FastEthernet4/0		
FastEthernet5/0		
GigabitEthernet6/0		

## Equivalent IOS Commands

```
R2(config-if)#exit
R2(config)#interface Serial2/0
R2(config-if)#
R2(config-if)#exit
R2(config)#interface Serial3/0
R2(config-if)#
R2(config-if)#exit
R2(config)#interface Serial3/0
R2(config-if)#
```

For 3rd router and FastEthernet 0/0, Serial2/0 and serial3/0:

 R3

— □ ×

Physical Config CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

GigabitEthernet6/0

FastEthernet0/0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0060.47D3.A903

IP Configuration

IP Address 192.168.30.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

R3>enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface FastEthernet0/0
R3(config-if)#
```

R3

PhysicalConfigCLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

GigabitEthernet6/0

Serial2/0

Port Status

☒ On

Duplex

☐ Full Duplex

Clock Rate

125000

IP Configuration

IP Address

20.0.0.2

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

Enter Configuration Commands, one per line. End with CNTRL-Z.  
R3(config)#interface FastEthernet0/0  
R3(config-if)#  
R3(config-if)#exit  
R3(config)#interface Serial2/0  
R3(config-if)#  
R3(config-if)#exit  
R3(config)#interface Serial2/0  
R3(config-if)#

R3

Physical

Config

CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

GigabitEthernet6/0

Serial3/0

Port Status

☒ On

Duplex

☐ Full Duplex

Clock Rate

125000

IP Configuration

IP Address

30.0.0.2

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Equivalent IOS Commands

R3(config-if)#exit

R3(config)#interface Serial2/0

R3(config-if)#

R3(config-if)#exit

R3(config)#interface Serial2/0

R3(config-if)#

R3(config-if)#exit

R3(config)#interface Serial3/0

R3(config-if)#



**Step-3:** Put routing information in the routers.

The screenshot shows the configuration interface for router R1. The 'CLI' tab is selected. On the left, a sidebar contains a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), and INTERFACE (FastEthernet0/0, FastEthernet1/0, Serial2/0, Serial3/0, FastEthernet4/0, FastEthernet5/0, GigabitEthernet6/0). The 'RIP' option under the ROUTING category is selected. The main area is titled 'RIP Routing'. It features a 'Network' label above a text input field. Below the input field is an 'Add' button. A table below the input field lists the configured network addresses: 10.0.0.0, 30.0.0.0, and 192.168.20.0. A 'Remove' button is located at the bottom right of the table. At the bottom of the window, a section titled 'Equivalent IOS Commands' displays a list of commands in a text area.

**GLOBAL**

- Settings
- Algorithm Settings

**ROUTING**

- Static
- RIP

**INTERFACE**

- FastEthernet0/0
- FastEthernet1/0
- Serial2/0
- Serial3/0
- FastEthernet4/0
- FastEthernet5/0
- GigabitEthernet6/0

### RIP Routing

Network

Add

Network Address
10.0.0.0
30.0.0.0
192.168.20.0

Remove

**Equivalent IOS Commands**

```
R1(config-if)#  
R1(config-if)#exit  
R1(config)#interface Serial2/0  
R1(config-if)#  
R1(config-if)#exit  
R1(config)#interface Serial3/0  
R1(config-if)#  
R1(config-if)#exit  
R1(config)#router rip  
R1(config-router)#
```

R2

PhysicalConfigCLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

GigabitEthernet6/0

RIP Routing

Network

Network Address

10.0.0.0

20.0.0.0

192.168.10.0

Add

Remove

Equivalent IOS Commands

R2(config-if)#  
R2(config-if)#exit  
R2(config)#interface Serial3/0  
R2(config-if)#  
R2(config-if)#exit  
R2(config)#interface Serial3/0  
R2(config-if)#  
R2(config-if)#exit  
R2(config)#router rip  
R2(config-router)#

R3

Physical

Config

CLI

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

GigabitEthernet6/0

RIP Routing

Network

Add

Network Address

20.0.0.0

30.0.0.0

192.168.30.0

Remove

Equivalent IOS Commands

R3(config-if)#

R3(config-if)#exit

R3(config)#interface Serial2/0

R3(config-if)#

R3(config-if)#exit

R3(config)#interface Serial3/0

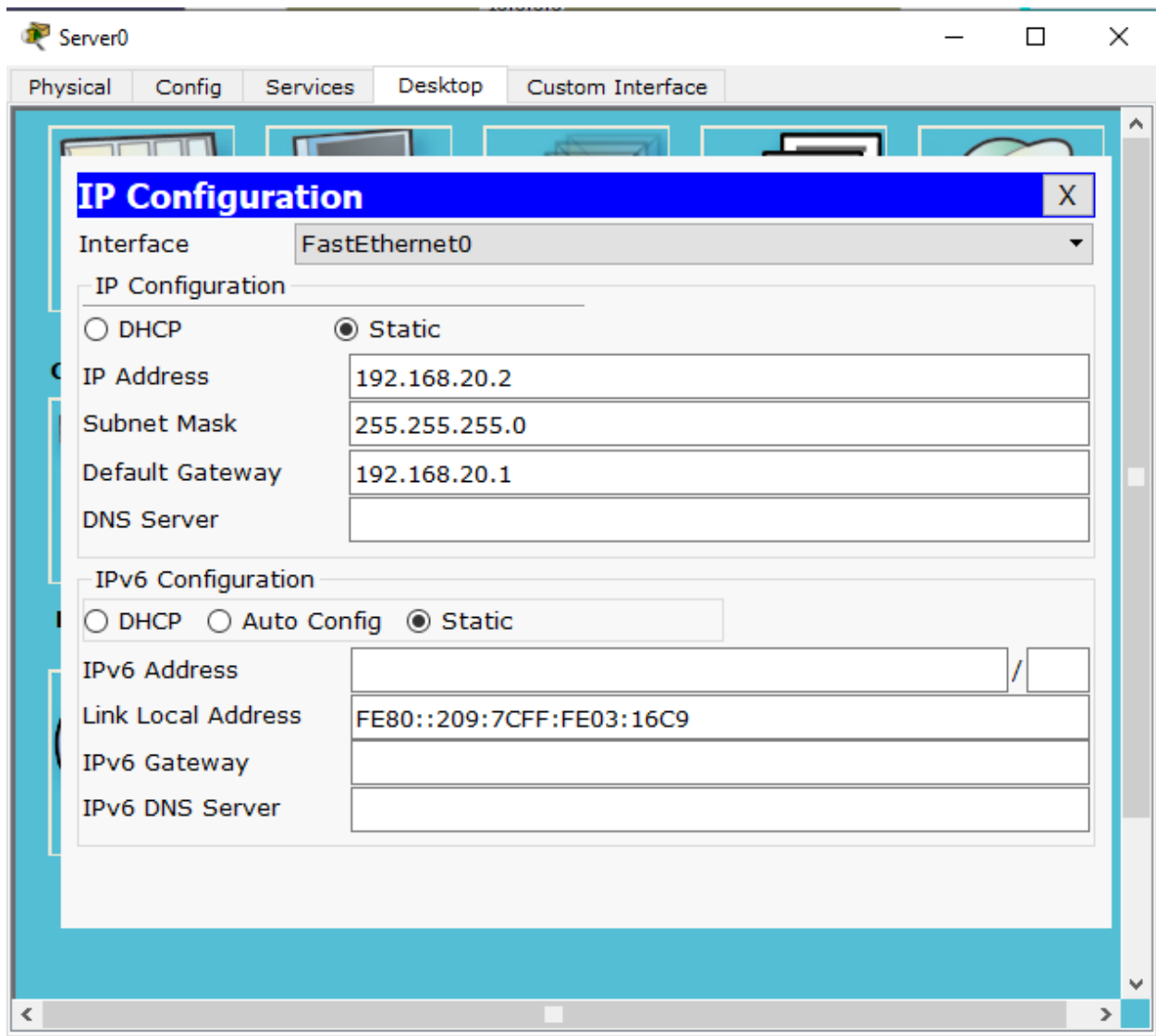
R3(config-if)#

R3(config-if)#exit

R3(config)#router rip

R3(config-router)#

**Step-4:** Configure the DHCP server. Static ip addresses from the range of addresses where we are going to put the DHCP. Put address range of the networks.





Server0



Physical Config Services Desktop Custom Interface

## SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

## DHCP

Interface FastEthernet0 Service ☒ On ☐ Off

Pool Name serverPool

Default Gateway 0.0.0.0

DNS Server 0.0.0.0

Start IP Address : 192 168 20 3

Subnet Mask: 255 255 255 0

Maximum number of Users : 245

TFTP Server: 0.0.0.0

Add

Save

Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP
Pool1	192.168.20.1	0.0.0.0	192.168.10.5	255.255....	245	0.0.0.0
Pool2	192.168.20.1	0.0.0.0	192.168.30.4	255.255....	245	0.0.0.0
server...	0.0.0.0	0.0.0.0	192.168.20.3	255.255....	245	0.0.0.0



**Step-5:** Configure the ports which are gateway of the networks. Go to command line interface (CLI)

*enable*

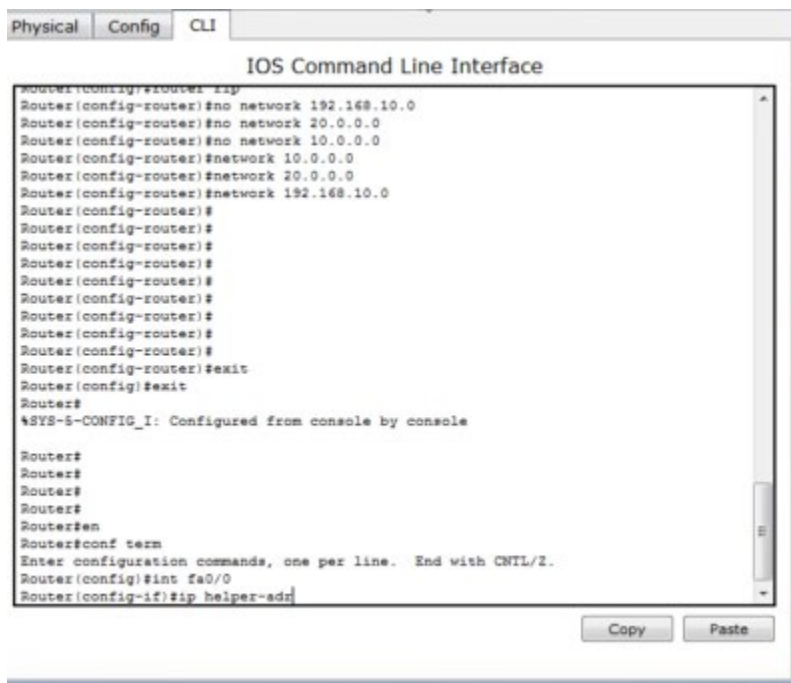
*configure terminal*

*int fa0/0*

*ip helper-address 192.168.20.2*

*exit*

*exit*

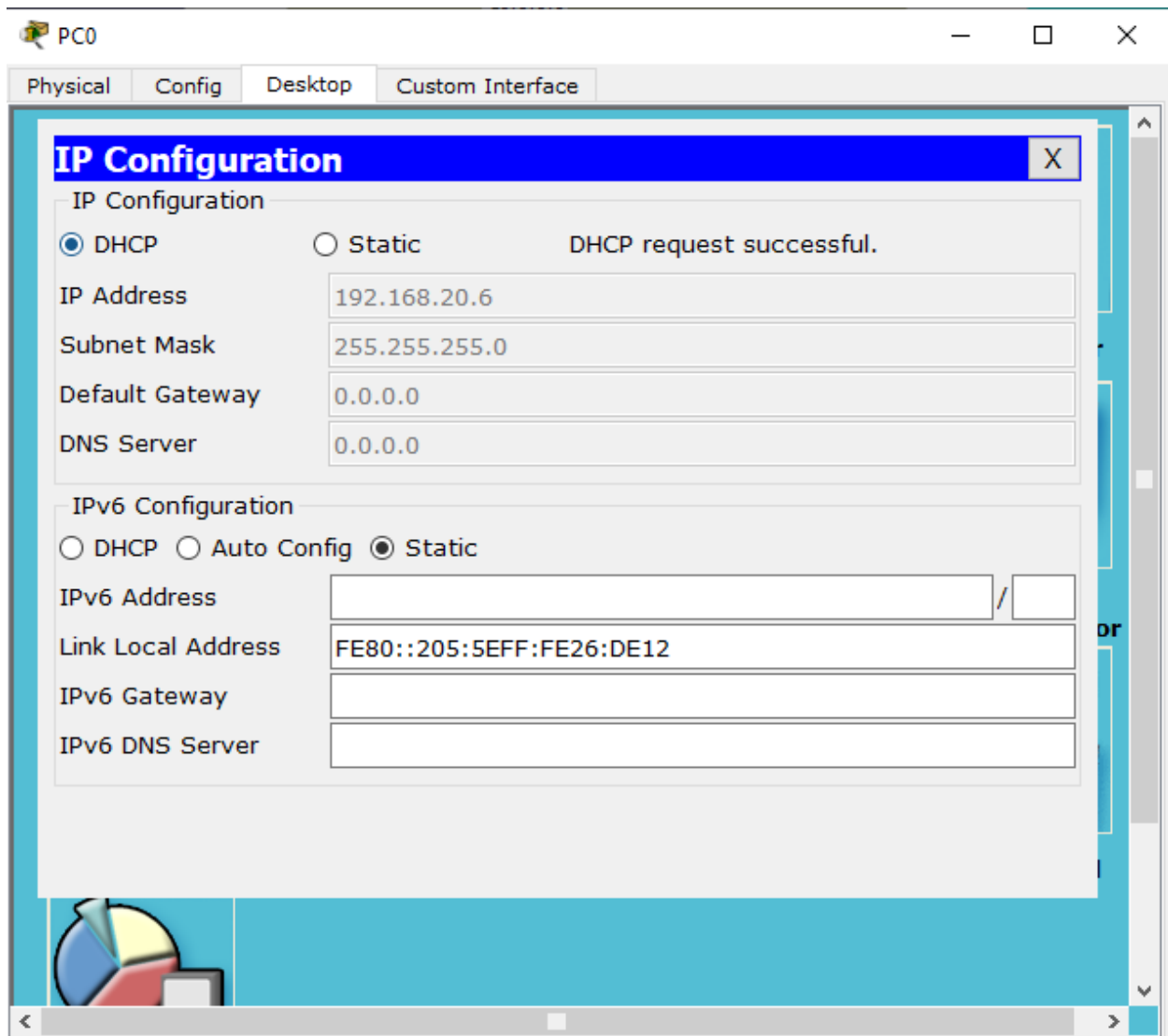


The screenshot shows a window titled "IOS Command Line Interface" with tabs for "Physical", "Config", and "CLI". The CLI tab is active, displaying a series of commands and their outputs. The commands entered are: `Router(config)#router 1ip`, `Router(config-router)#no network 192.168.10.0`, `Router(config-router)#no network 20.0.0.0`, `Router(config-router)#no network 10.0.0.0`, `Router(config-router)#network 10.0.0.0`, `Router(config-router)#network 20.0.0.0`, `Router(config-router)#network 192.168.10.0`, followed by several `Router(config-router)#` prompts. Then `Router(config-router)#exit` is entered, followed by `Router(config)#exit`. The output shows `*SYS-5-CONFIG_I: Configured from console by console`. Below this, there are several `Router#` prompts. Then `Router#en` is entered, followed by `Router#conf term`. The prompt changes to `Router(config)#`. Then `Router(config)#int fa0/0` is entered, followed by `Router(config-if)#ip helper-adr`. At the bottom of the window, there are "Copy" and "Paste" buttons.

```
Router(config)#router 1ip
Router(config-router)#no network 192.168.10.0
Router(config-router)#no network 20.0.0.0
Router(config-router)#no network 10.0.0.0
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 192.168.10.0
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#
Router(config-router)#exit
Router(config)#exit
Router#
*SYS-5-CONFIG_I: Configured from console by console

Router#
Router#
Router#
Router#
Router#en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip helper-adr
```

**Step-6:** Request for DHCP, It should succeed



PC1

Physical

Config

Desktop

Custom Interface

IP Configuration

IP Configuration

☒ DHCP

☐ Static

DHCP request successful.

IP Address

192.168.20.14

Subnet Mask

255.255.255.0

Default Gateway

0.0.0.0

DNS Server

0.0.0.0

IPv6 Configuration

☐ DHCP

☐ Auto Config

☒ Static

IPv6 Address


/

Link Local Address

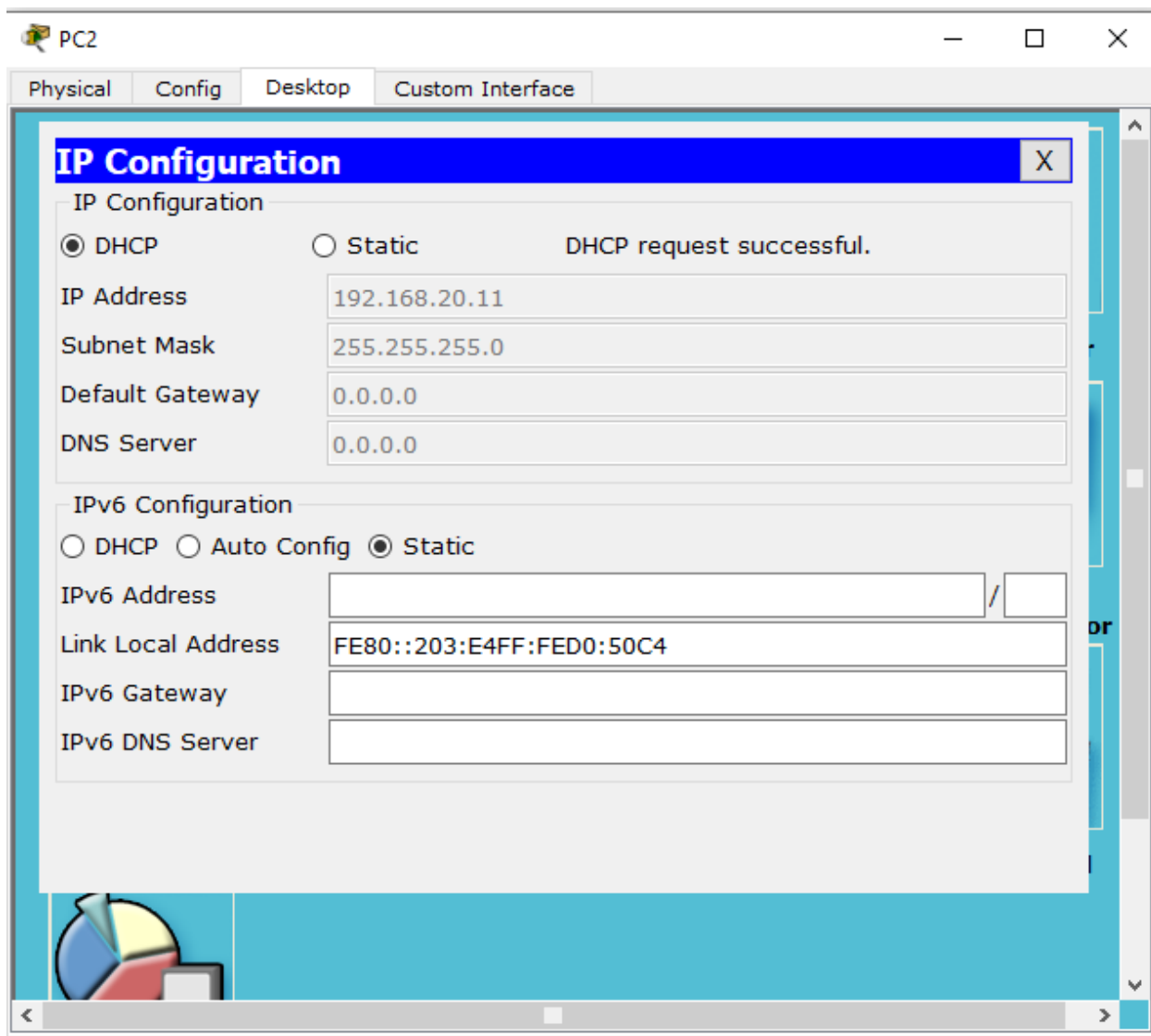
FE80::201:43FF:FE92:AEC2

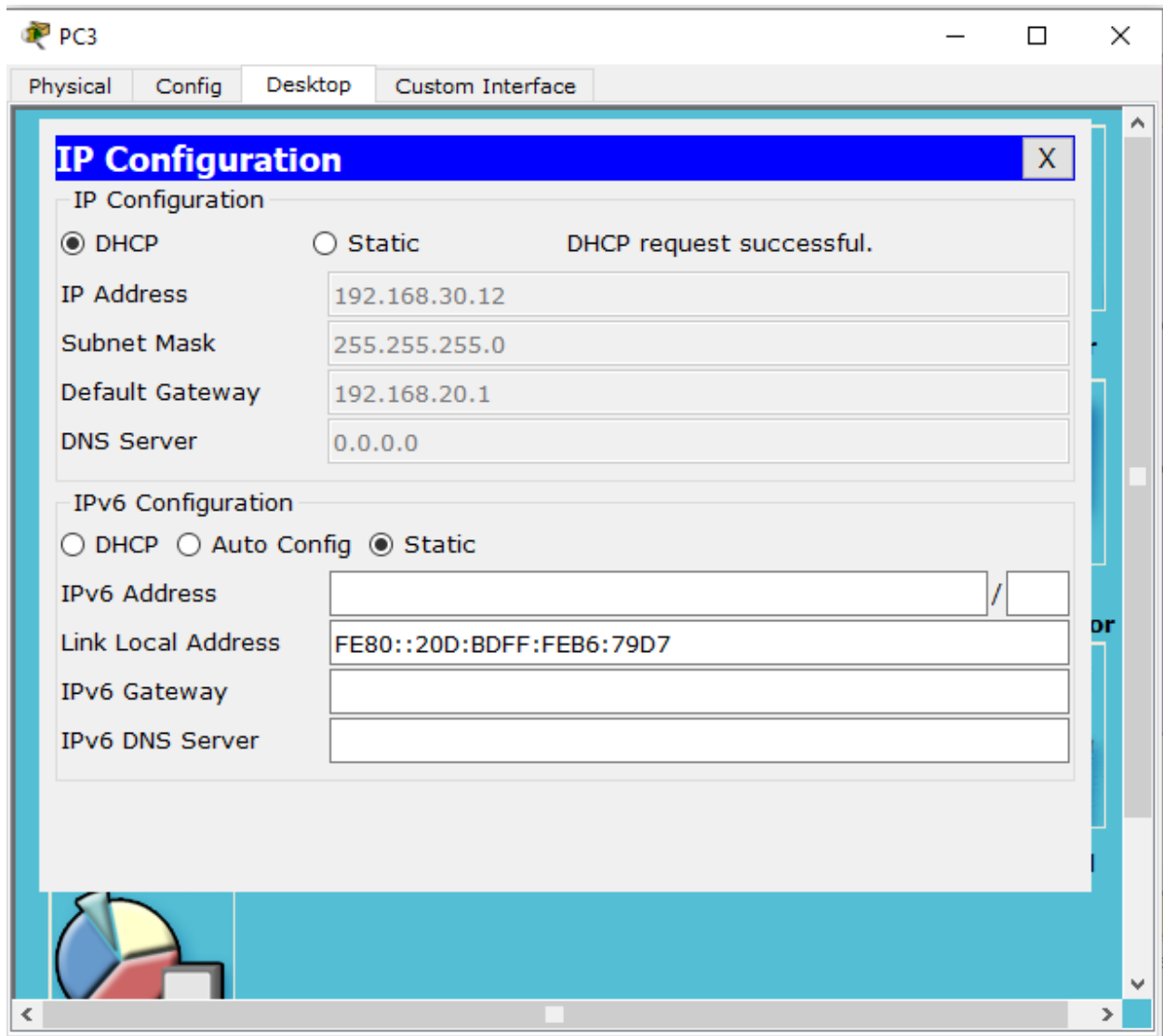
IPv6 Gateway

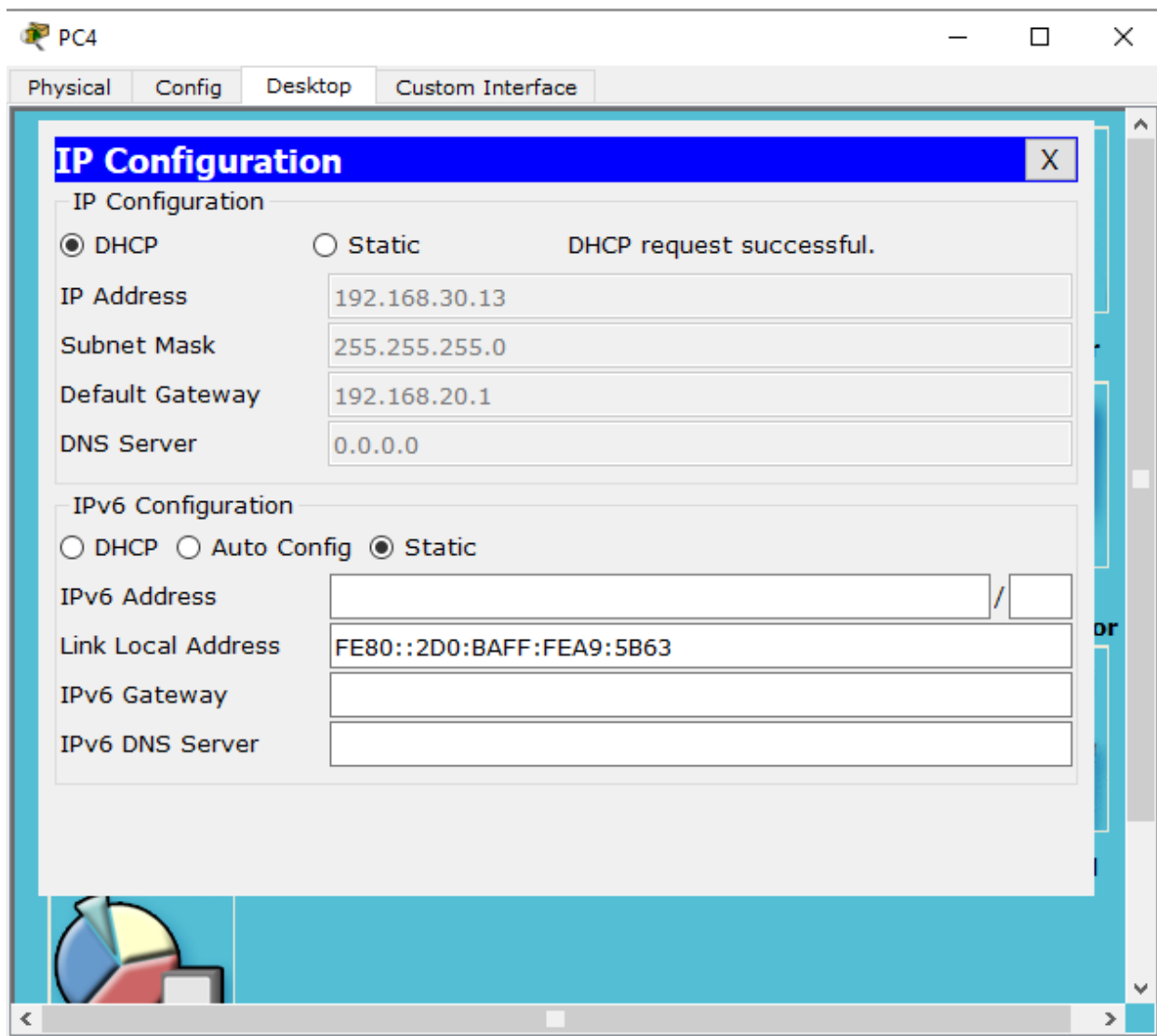
IPv6 DNS Server











PC5

Physical

Config

Desktop

Custom Interface

IP Configuration

X

IP Configuration

☒ DHCP

☐ Static

DHCP request successful.

IP Address

192.168.30.14

Subnet Mask

255.255.255.0

Default Gateway

192.168.20.1

DNS Server

0.0.0.0

IPv6 Configuration

☐ DHCP

☐ Auto Config

☒ Static

IPv6 Address


/

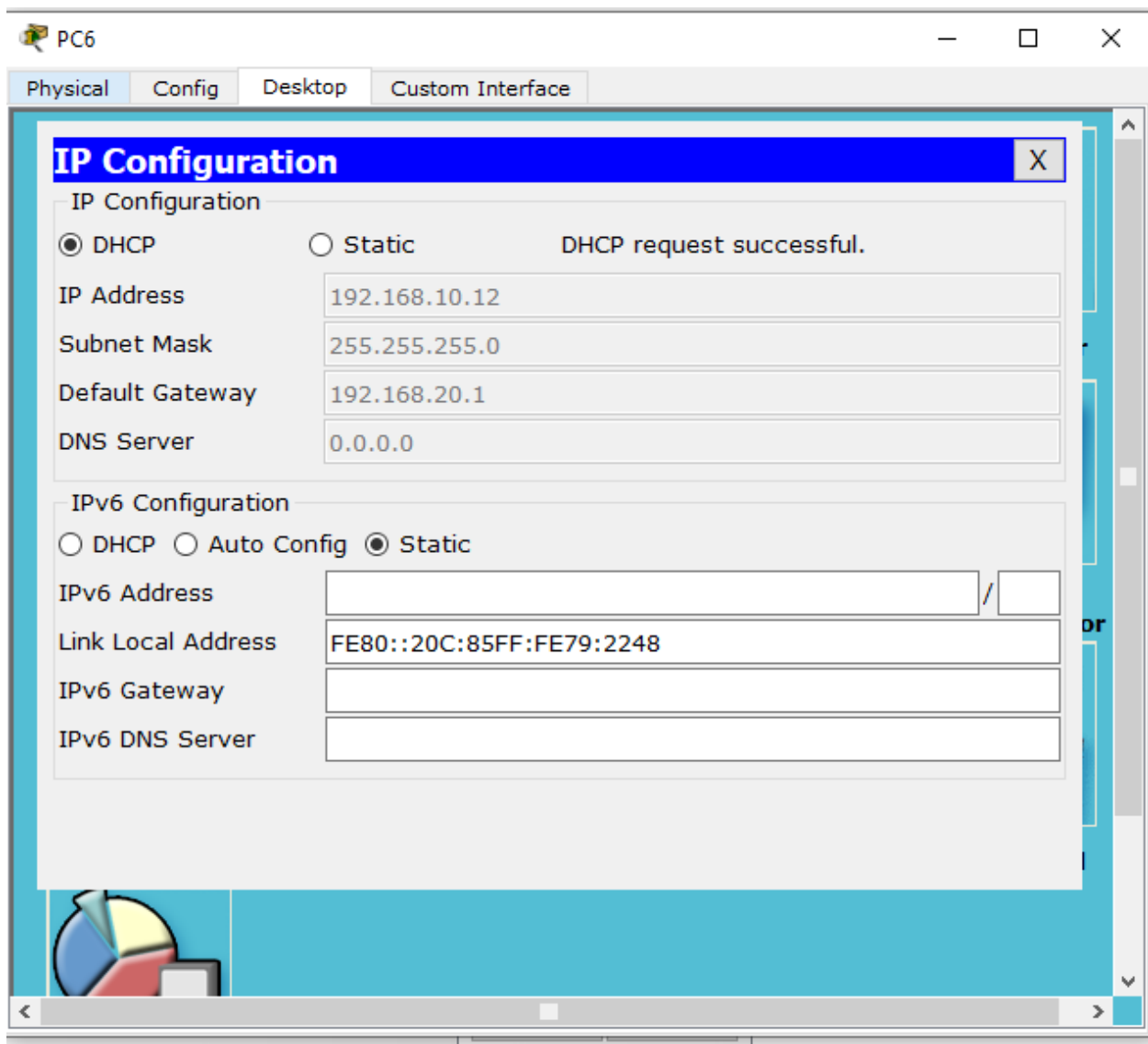
Link Local Address

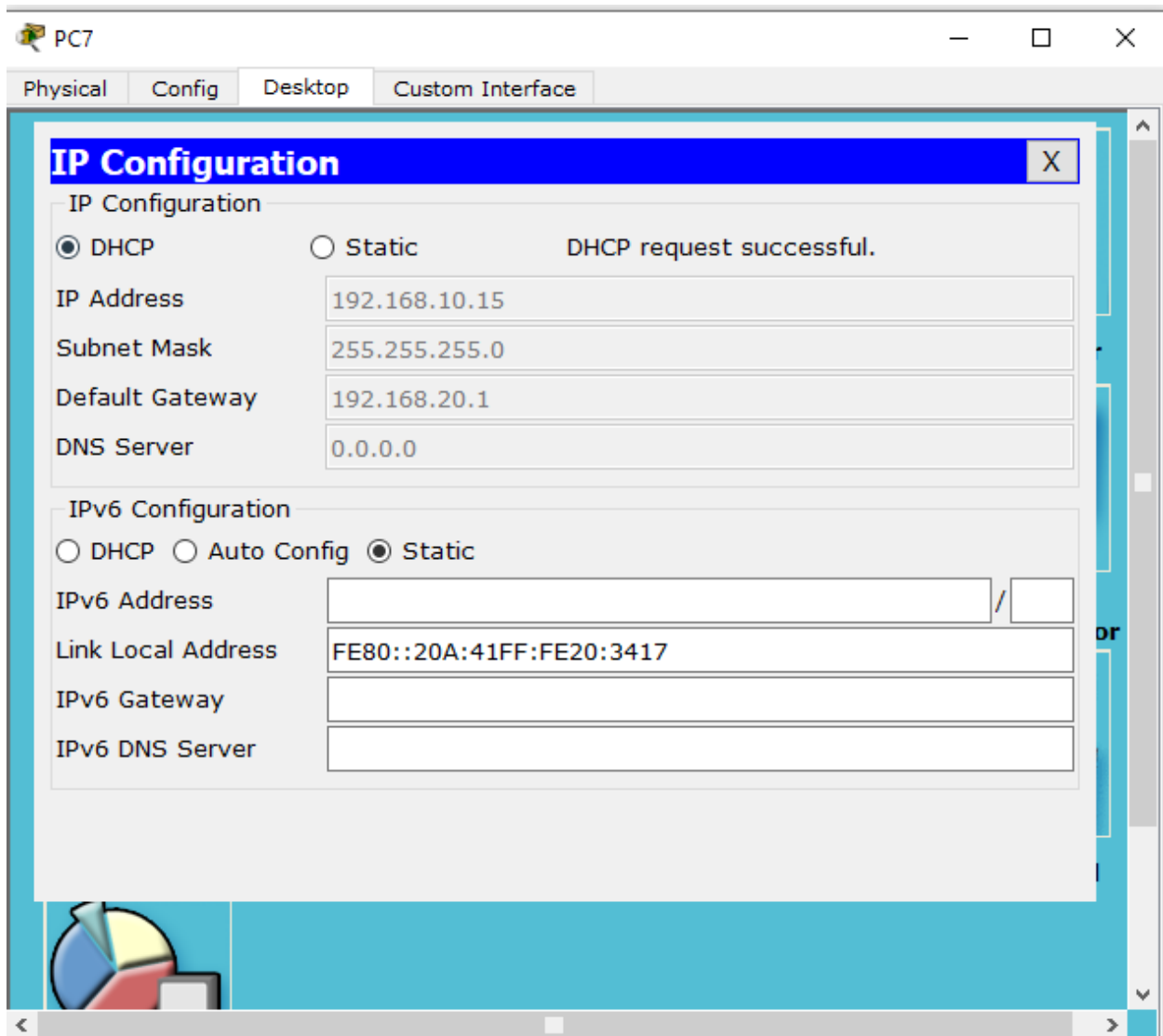
FE80::204:9AFF:FECA:6372

IPv6 Gateway

IPv6 DNS Server







**IP Configuration**

## IP Configuration

☒ DHCP☐ Static

DHCP request successful.

IP Address

192.168.10.14

Subnet Mask

255.255.255.0

Default Gateway

192.168.20.1

DNS Server

0.0.0.0

## IPv6 Configuration

☐ DHCP☐ Auto Config☒ Static

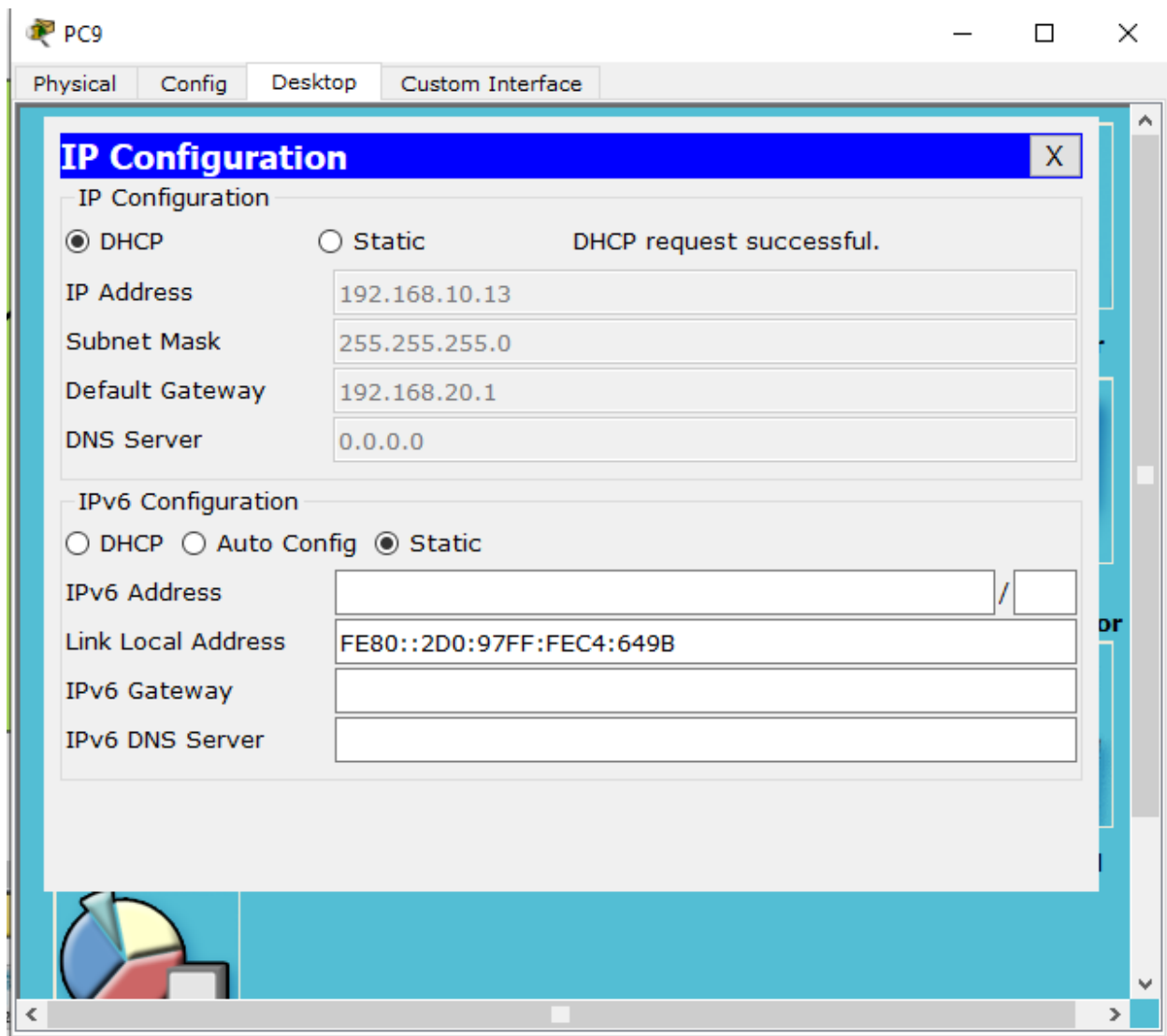
IPv6 Address

Link Local Address

FE80::20A:F3FF:FEB4:6B78

IPv6 Gateway

IPv6 DNS Server

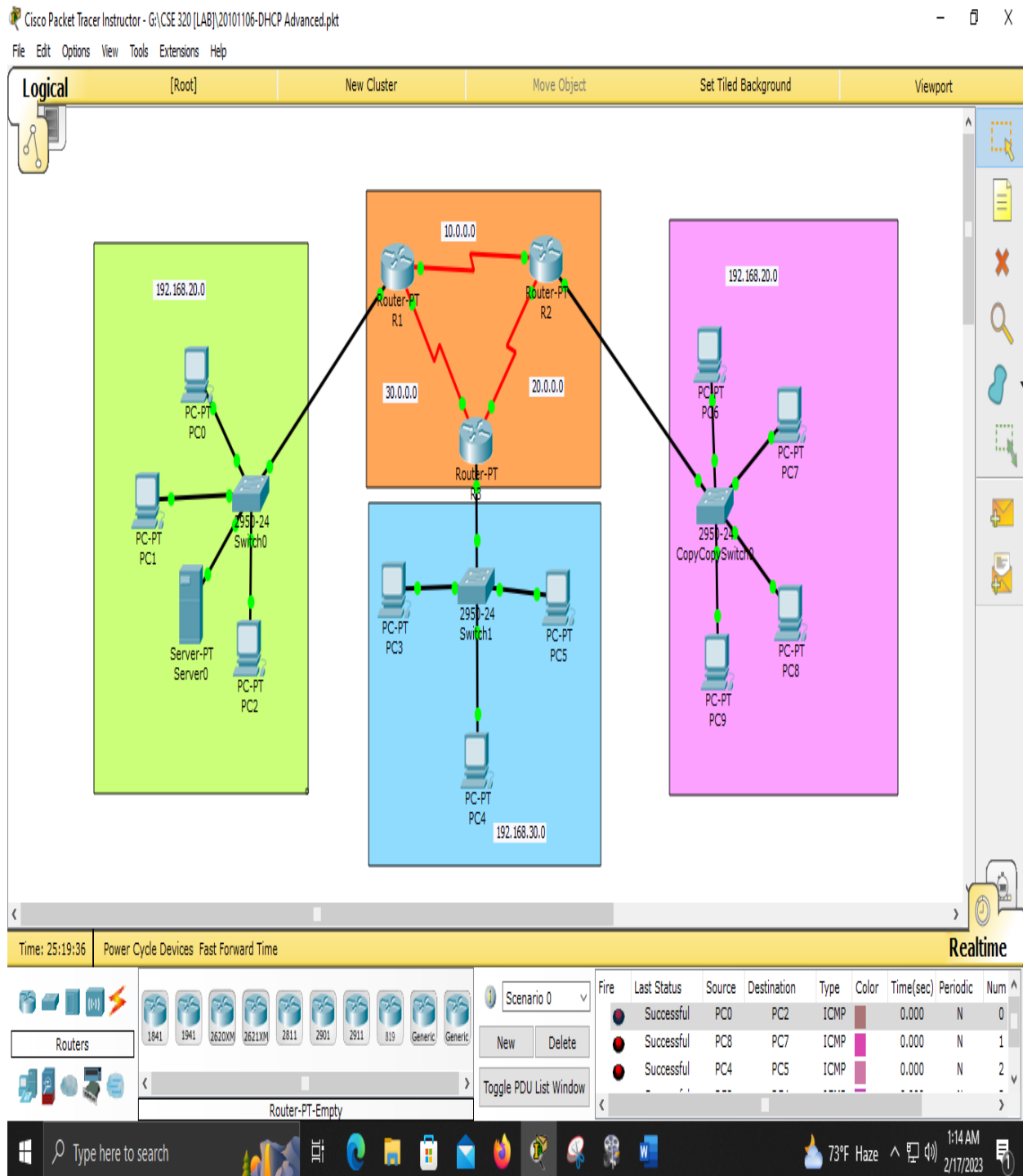


**Step-7:** Try to send packets using different pc's. It should succeed.

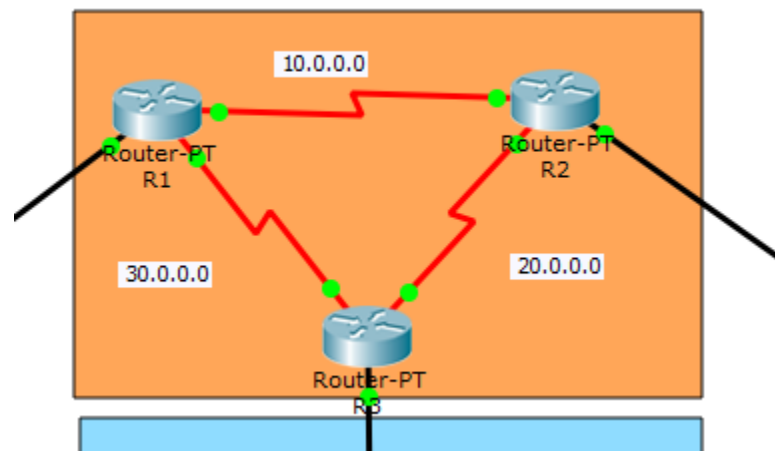
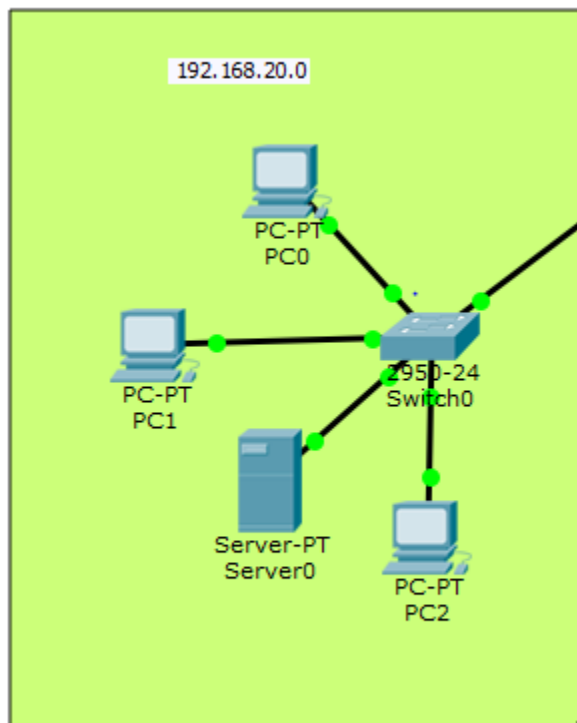
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC0	PC2	ICMP		0.000	N	0
	Successful	PC3	PC5	ICMP		0.000	N	1
	Successful	PC6	PC9	ICMP		0.000	N	2

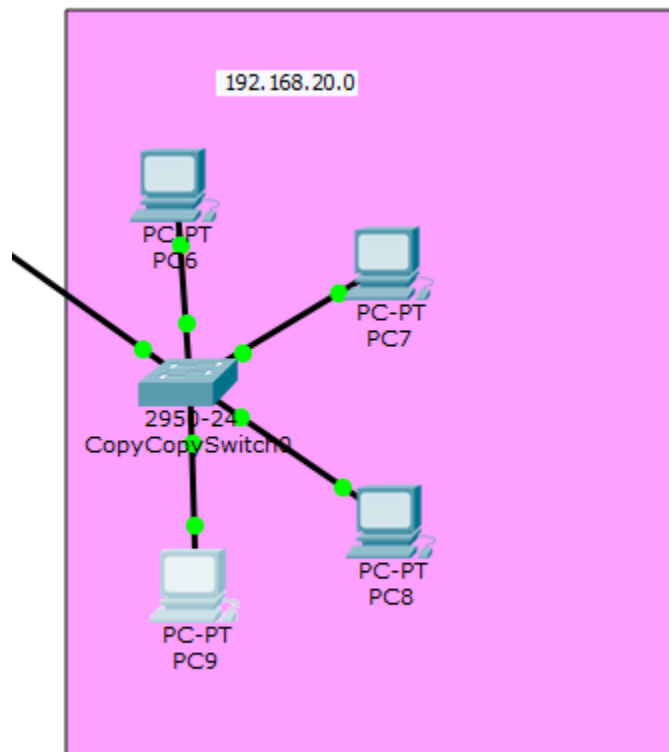
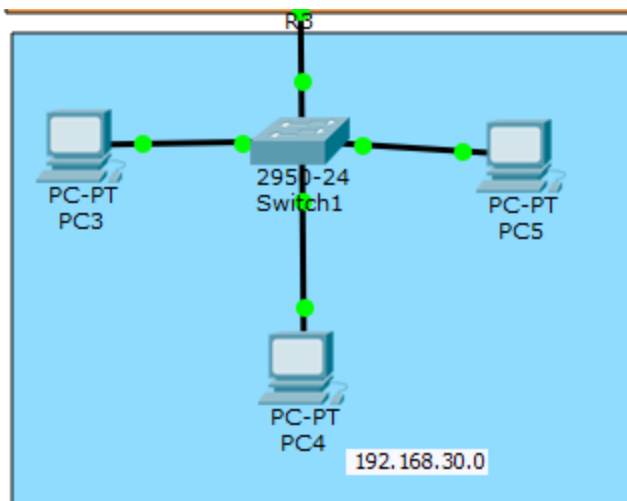


# Overall screenshot of the whole architecture-

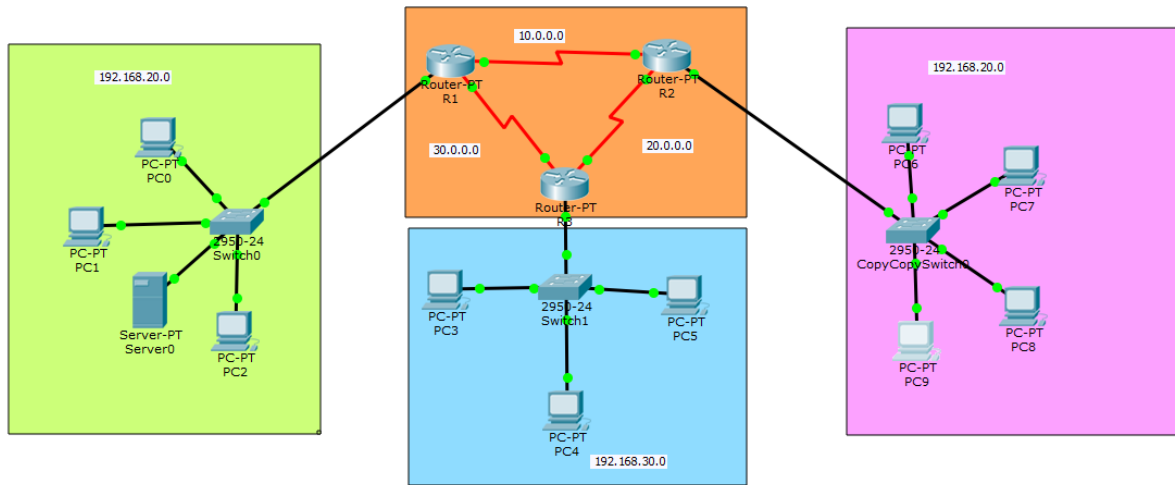


Part by part view-





Detailed view-



-----THANK YOU FOR READING-----