



COMPUTER NETWORKS LAB

Submitted By:

Sana Shaheen

FA22-BCS-203

Submitted To:

Mam Amna Tariq

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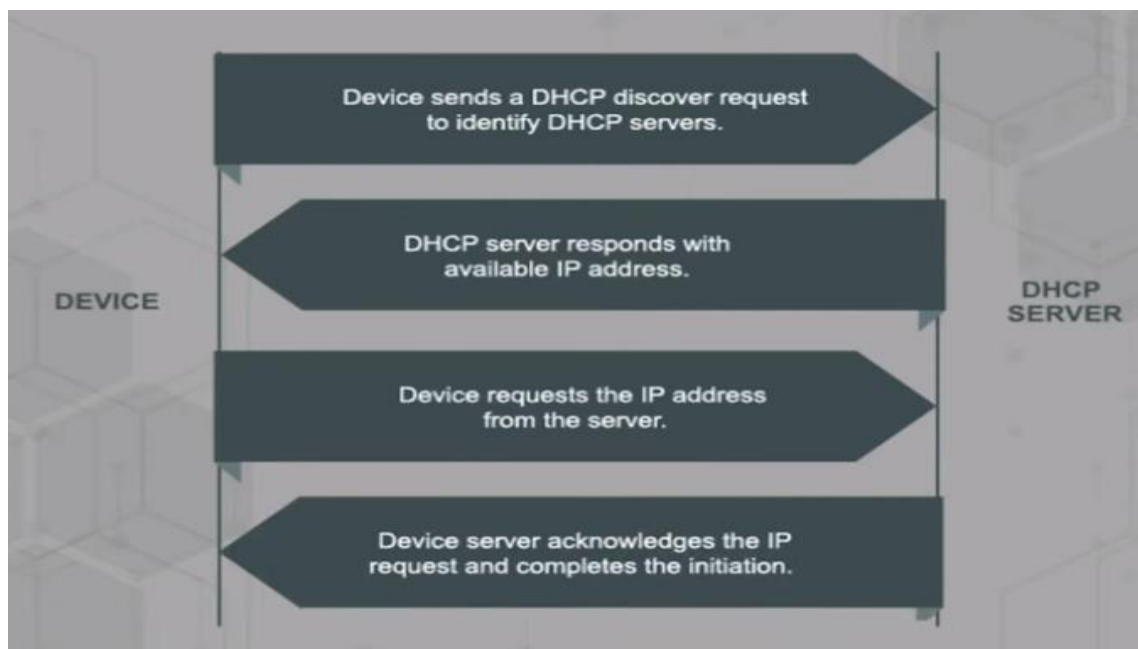
Department of Computer Science

● Dynamic Host Configuration Protocol (DHCP):

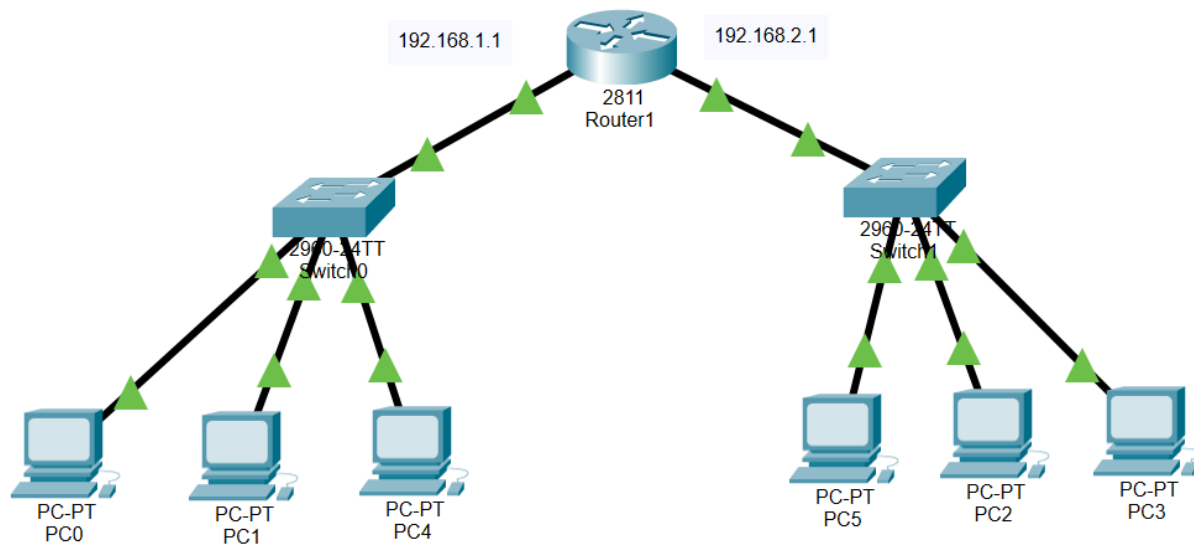
The **Dynamic Host Configuration Protocol (DHCP)** is a network management protocol used on Internet Protocol (IP) networks for automatically assigning IP addresses and other communication parameters to devices connected to the network using a client–server architecture.

The technology eliminates the need for individually configuring network devices manually, and consists of two network components, a centrally installed network DHCP server and client instances of the protocol stack on each computer or device. When connected to the network, and periodically thereafter, a client requests a set of parameters from the server using DHCP.

DHCP services exist for networks running Internet Protocol version 4 (IPv4), as well as version 6 (IPv6). The IPv6 version of the DHCP protocol is commonly called DHCPv6.



● ARCHITECTURE AND CONFIGURATION:



● Configure DHCP Server through CLI:

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
--- System Configuration Dialog ---
Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>
Router>
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
Router(config)#host
% Incomplete command.
Router(config)#hostname dhcp-server
dhcp-server(config)#int f0/0
dhcp-server(config-if)#ip add 192.168.1.1 255.255.255.0
dhcp-server(config-if)#no sh

dhcp-server(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

dhcp-server(config-if)#
dhcp-server(config-if)#int f0/1
dhcp-server(config-if)#ip add 192.168.2.1 255.255.255.0
dhcp-server(config-if)#no sh
```

```

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

```

```

dhcp-server(config-if)#exit
dhcp-server(config)#do sh ip int br
Interface                IP-Address      OK? Method Status      Protocol
FastEthernet0/0          192.168.1.1     YES manual up          up
FastEthernet0/1          192.168.2.1     YES manual up          up
Vlan1                    unassigned      YES unset  administratively down down
dhcp-server(config)#
dhcp-server(config)#ip dhcp ex
% Incomplete command.
dhcp-server(config)#ip dhcp excluded-address 192.168.1.1
dhcp-server(config)#ip dhcp excluded-address 192.168.2.1
dhcp-server(config)#
dhcp-server(config)#
dhcp-server(config)#
dhcp-server(config)#ip dhcp pool 192.168.1.1
dhcp-server(dhcp-config)#net
% Incomplete command.
dhcp-server(dhcp-config)#network 192.168.1.0 255.255.255.0
dhcp-server(dhcp-config)#de
% Incomplete command.
dhcp-server(dhcp-config)#default-router 192.168.1.1
dhcp-server(dhcp-config)#dns-server 8.8.8.8
dhcp-server(dhcp-config)#exit
dhcp-server(config)#ip dhcp pool 192.168.2.1
dhcp-server(dhcp-config)#network 192.168.2.0 255.255.255.0
dhcp-server(dhcp-config)#default-router 192.168.2.1
dhcp-server(dhcp-config)#dns-server 8.8.8.8
dhcp-server(dhcp-config)#|
" " " "

```

```

dhcp-server(dhcp-config)#dns-server 8.8.8.8
dhcp-server(dhcp-config)#|
dhcp-server(dhcp-config)#
dhcp-server(dhcp-config)#
dhcp-server(dhcp-config)#z
% Ambiguous command: "z"
dhcp-server(config)#^Z
dhcp-server#
%SYS-5-CONFIG_I: Configured from console by console

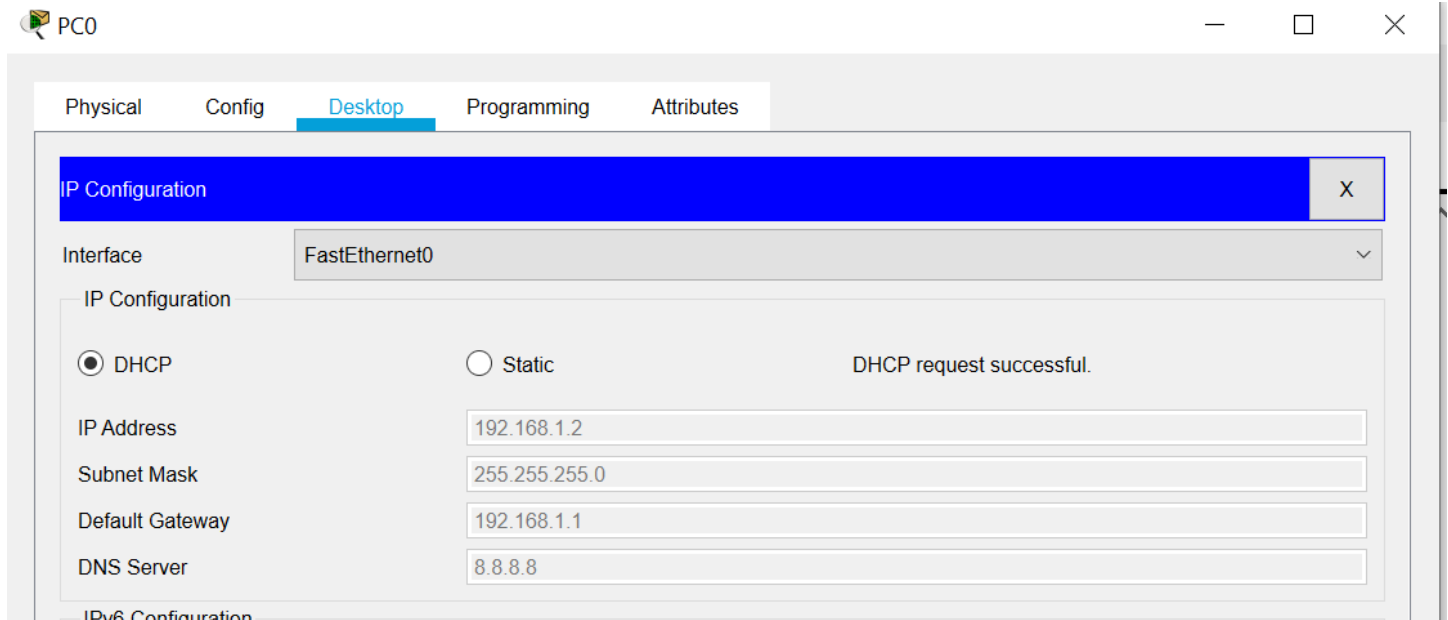
```

```

dhcp-server#sh run | sec dhcp
hostname dhcp-server
ip dhcp excluded-address 192.168.1.1
ip dhcp excluded-address 192.168.2.1
ip dhcp pool 192.168.1.1
    network 192.168.1.0 255.255.255.0
    default-router 192.168.1.1
    dns-server 8.8.8.8
ip dhcp pool 192.168.2.1
    network 192.168.2.0 255.255.255.0
    default-router 192.168.2.1
    dns-server 8.8.8.8
dhcp-server#
dhcp-server#

```

● PC0 IP Configuration through DHCP:



The screenshot shows the 'PC0' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is highlighted in blue. Below it, the 'Interface' is set to 'FastEthernet0'. The 'IP Configuration' sub-section shows 'DHCP' selected with a radio button, and 'Static' is unselected. A message 'DHCP request successful.' is displayed. The IP Address is 192.168.1.2, Subnet Mask is 255.255.255.0, Default Gateway is 192.168.1.1, and DNS Server is 8.8.8.8.

PC0

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static DHCP request successful.

IP Address 192.168.1.2

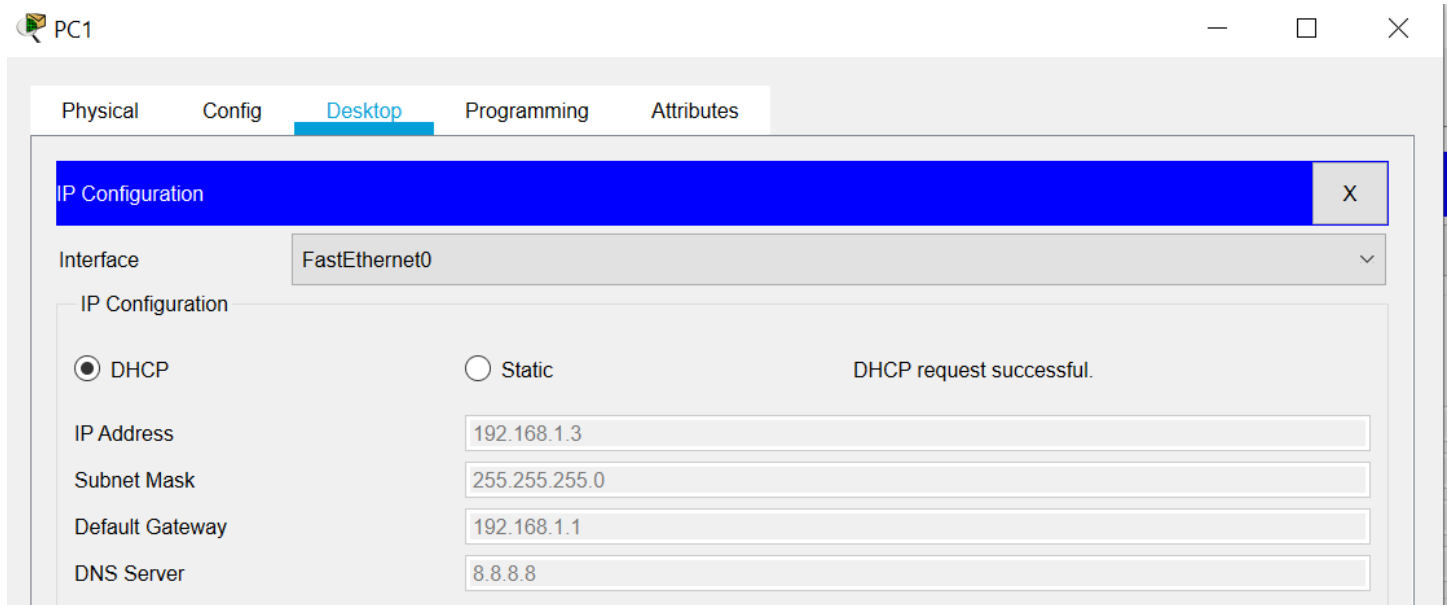
Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 8.8.8.8

IPv6 Configuration

● PC1 IP Configuration through DHCP:



The screenshot shows the 'PC1' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is highlighted in blue. Below it, the 'Interface' is set to 'FastEthernet0'. The 'IP Configuration' sub-section shows 'DHCP' selected with a radio button, and 'Static' is unselected. A message 'DHCP request successful.' is displayed. The IP Address is 192.168.1.3, Subnet Mask is 255.255.255.0, Default Gateway is 192.168.1.1, and DNS Server is 8.8.8.8.

PC1

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static DHCP request successful.

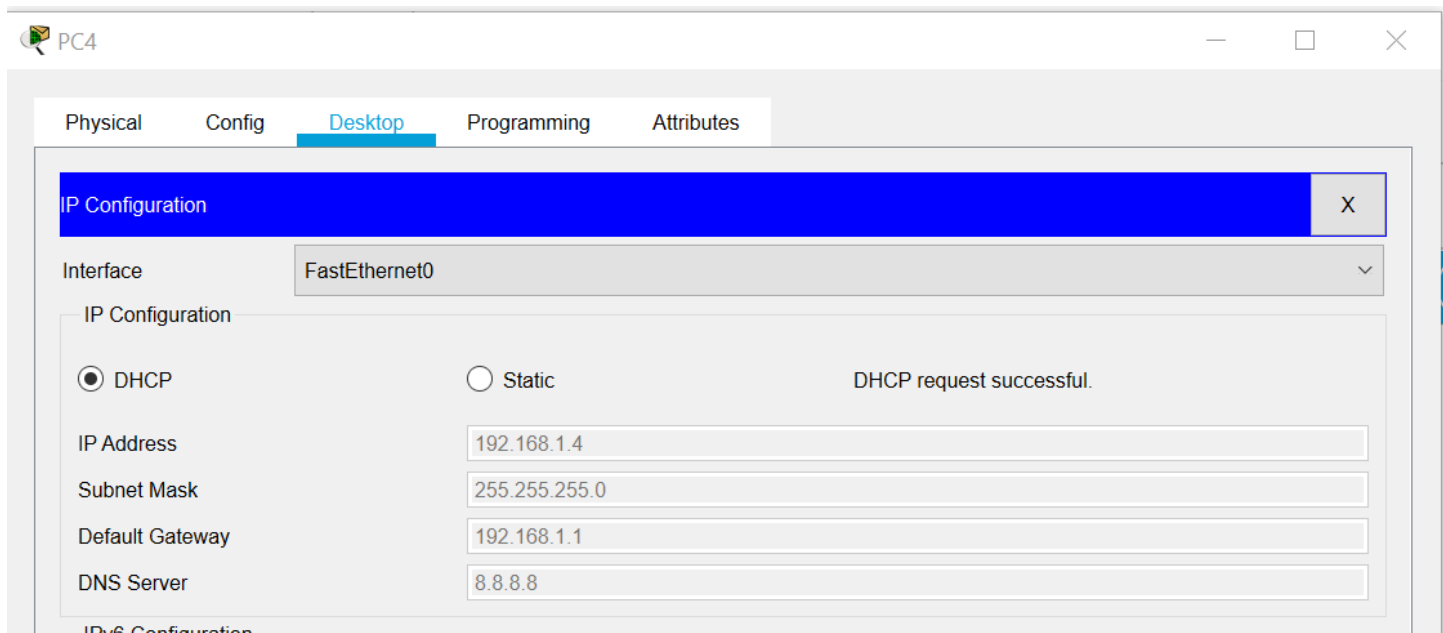
IP Address 192.168.1.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 8.8.8.8

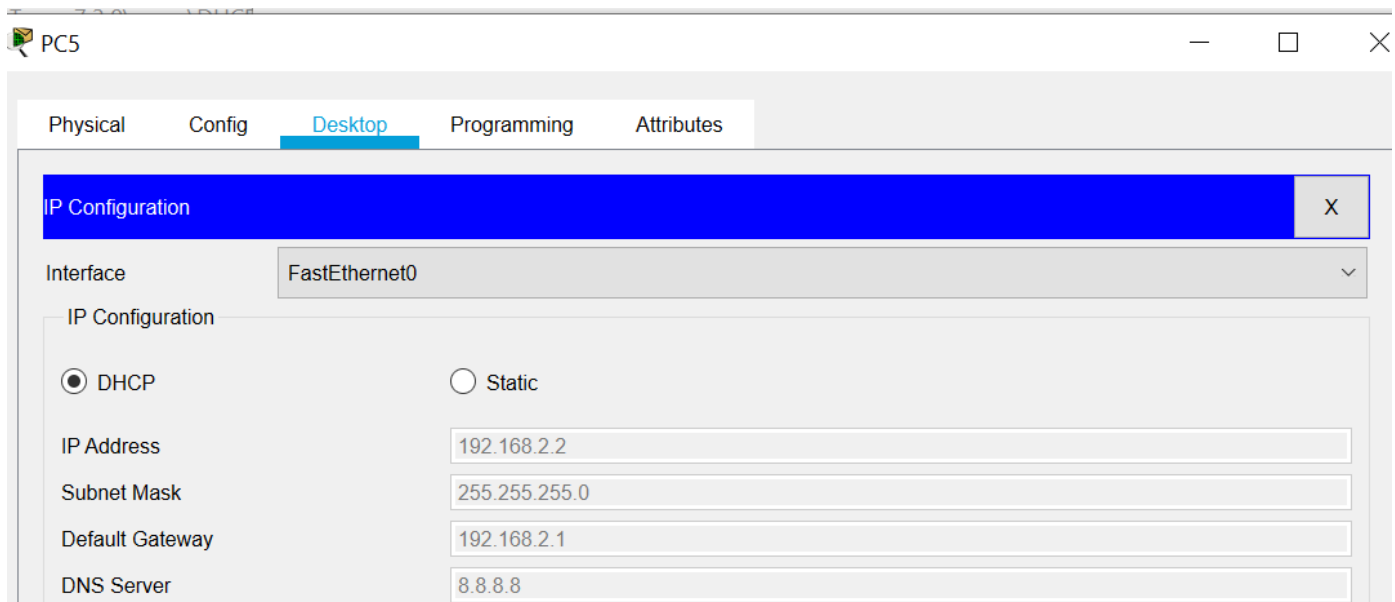
● PC5 IP Configuration through DHCP:



The screenshot shows the 'IP Configuration' window for PC4. The 'Desktop' tab is selected. The 'Interface' dropdown is set to 'FastEthernet0'. Under 'IP Configuration', the 'DHCP' radio button is selected, and the 'Static' radio button is unselected. A message 'DHCP request successful.' is displayed. The configuration fields are as follows:

Field	Value
IP Address	192.168.1.4
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	8.8.8.8

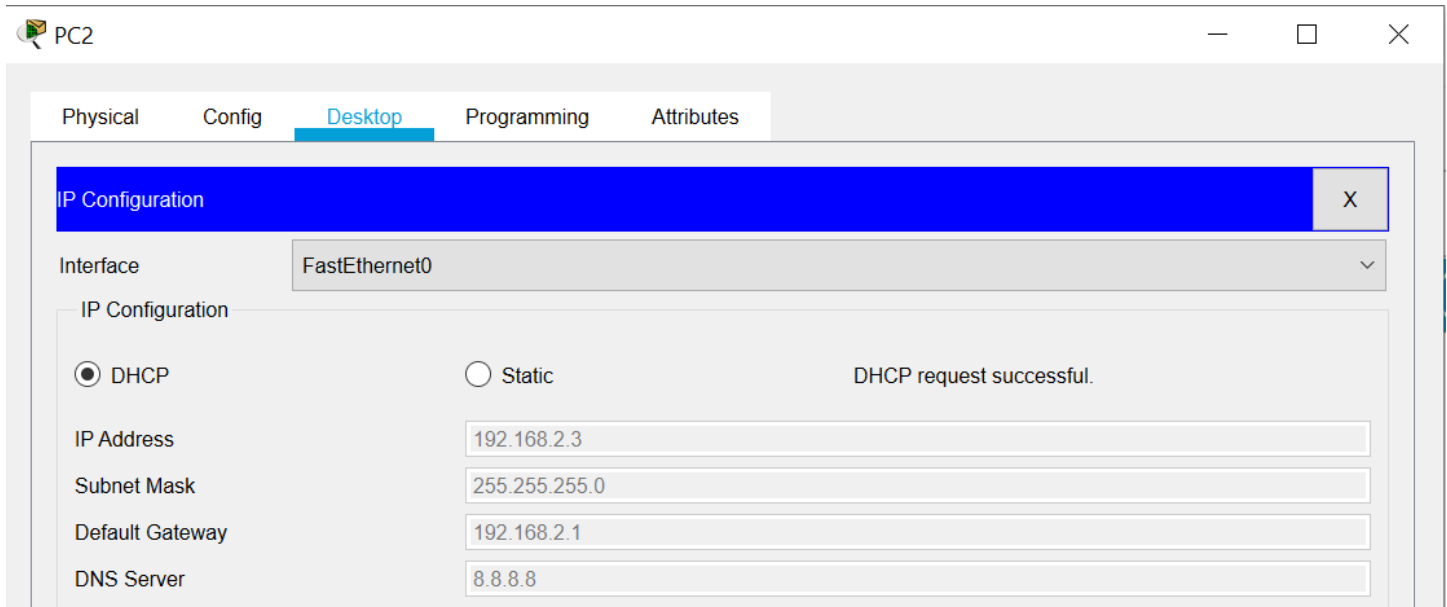
● PC5 IP Configuration through DHCP:



The screenshot shows the 'IP Configuration' window for PC5. The 'Desktop' tab is selected. The 'Interface' dropdown is set to 'FastEthernet0'. Under 'IP Configuration', the 'DHCP' radio button is selected, and the 'Static' radio button is unselected. The configuration fields are as follows:

Field	Value
IP Address	192.168.2.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.1
DNS Server	8.8.8.8

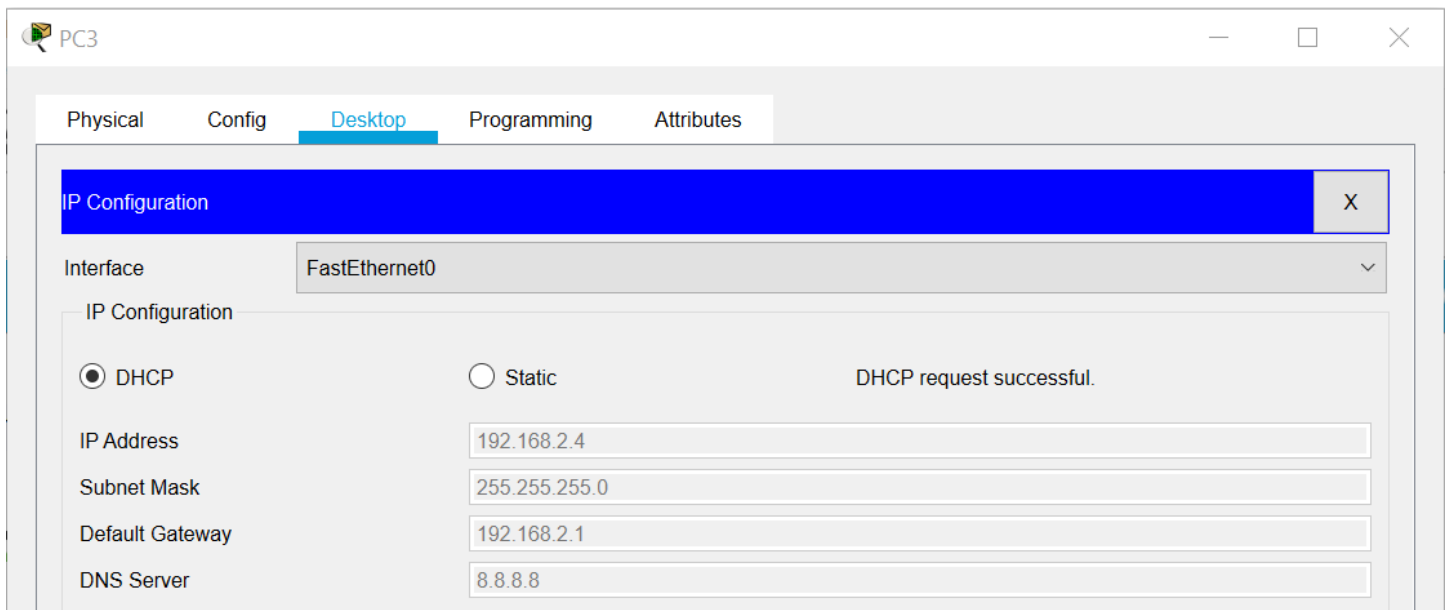
● PC2 IP Configuration through DHCP:



The screenshot shows the 'PC2' configuration window with the 'Desktop' tab selected. A blue 'IP Configuration' dialog box is open, showing the 'FastEthernet0' interface. The 'DHCP' radio button is selected, and the 'Static' option is unselected. The 'DHCP request successful.' message is displayed. The IP Address is 192.168.2.3, Subnet Mask is 255.255.255.0, Default Gateway is 192.168.2.1, and DNS Server is 8.8.8.8.

Interface	FastEthernet0
IP Configuration	
<input checked="" type="radio"/> DHCP	<input type="radio"/> Static
DHCP request successful.	
IP Address	192.168.2.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.1
DNS Server	8.8.8.8

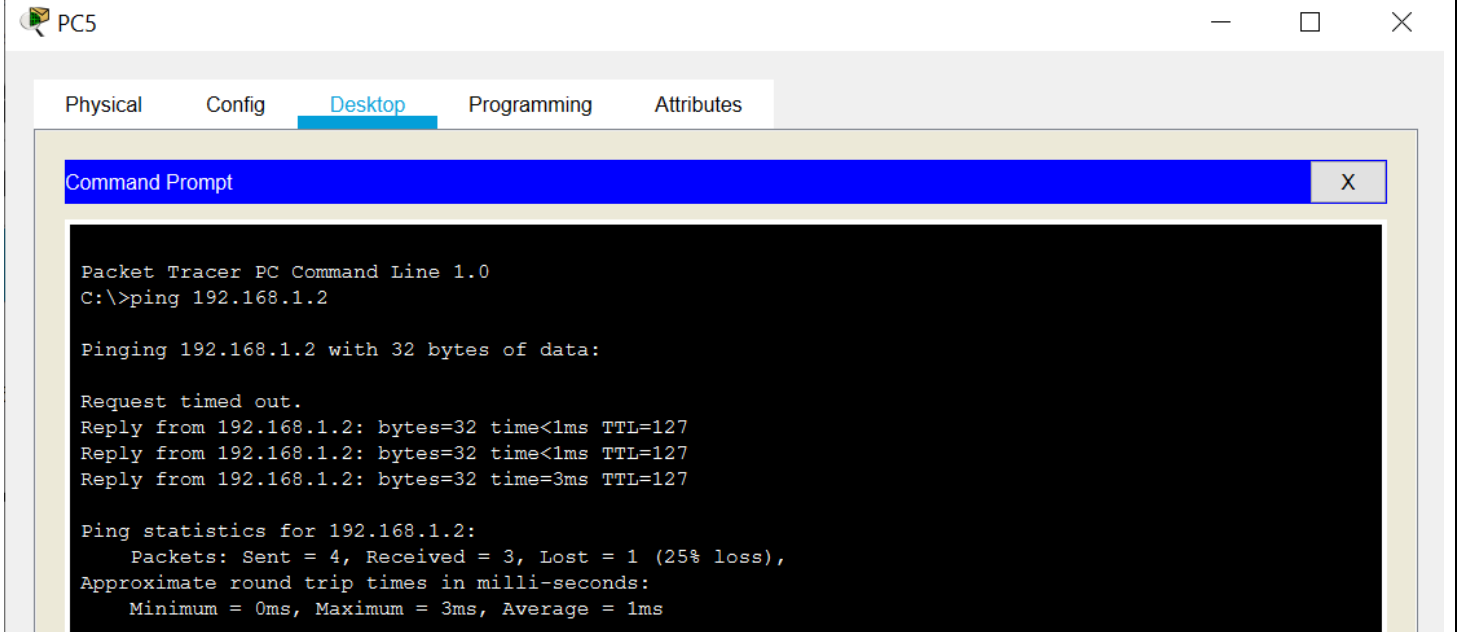
● PC3 IP Configuration through DHCP:



The screenshot shows the 'PC3' configuration window with the 'Desktop' tab selected. A blue 'IP Configuration' dialog box is open, showing the 'FastEthernet0' interface. The 'DHCP' radio button is selected, and the 'Static' option is unselected. The 'DHCP request successful.' message is displayed. The IP Address is 192.168.2.4, Subnet Mask is 255.255.255.0, Default Gateway is 192.168.2.1, and DNS Server is 8.8.8.8.

Interface	FastEthernet0
IP Configuration	
<input checked="" type="radio"/> DHCP	<input type="radio"/> Static
DHCP request successful.	
IP Address	192.168.2.4
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.1
DNS Server	8.8.8.8

● PING Command from PC0 to PC5 :



● PING Command from PC1 to PC2:

