CONFIGURING DHCP SERVER ON CISCO ROUTER

IN PACKET TRACER

HANDS-ON LAB

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Table of Contents

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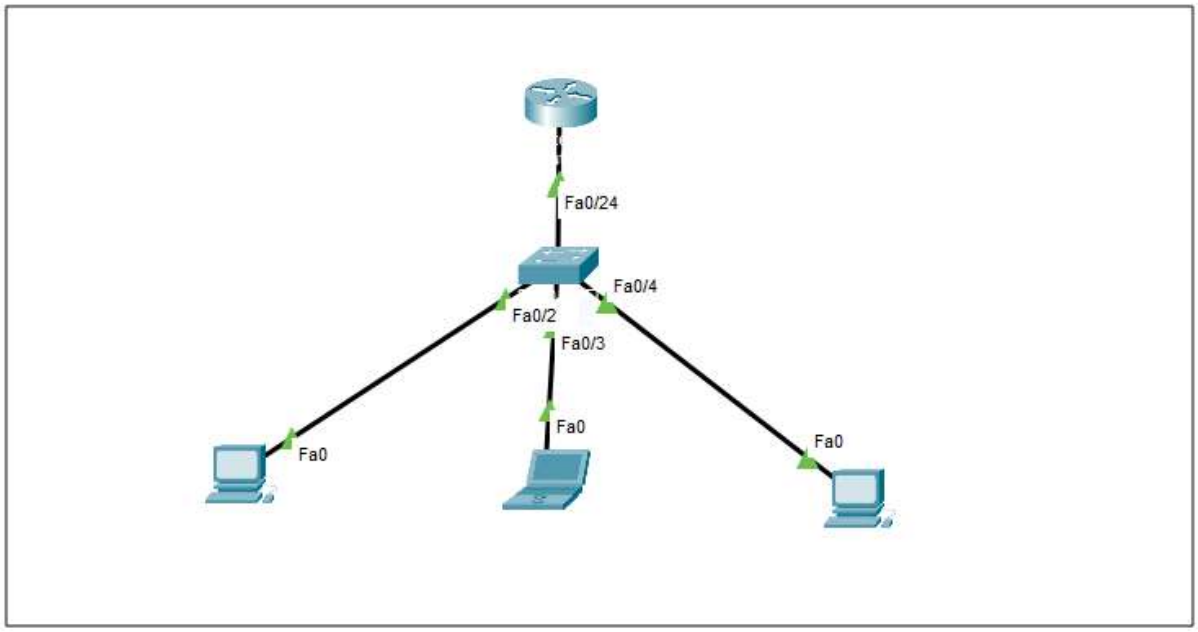
1. Introduction

Dynamic Host Configuration Protocol (DHCP) is a network management protocol used to automatically assign IP addresses, subnet masks, default gateways, and other network parameters to devices (clients) on a network. This eliminates the need for manual configuration of IP addresses on each device.

In Cisco Packet Tracer, a router can be configured as a DHCP server to provide IP addressing services to PCs and other hosts connected to its interfaces.

2. Network Topology Example



Router: Acts as DHCP Server.

Switch: Connects multiple end devices.

End Devices (PCs/Laptops): DHCP clients that will receive IP addresses dynamically.

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3. DHCP Configuration Steps on a Cisco Router

Step 1: Access Router CLI

Open the router in Packet Tracer → Go to CLI tab.

Step 2: Enter Global Configuration Mode

```
Router> enable
Router# configure terminal
```

Step 3: Exclude IP Addresses

Before creating a DHCP pool, you should exclude the IP addresses that should not be assigned to clients (e.g., the router's own interface or reserved addresses).

```
Router(config)# ip dhcp excluded-address 192.168.1.1 192.168.1.10
```

This excludes addresses 192.168.1.1 through 192.168.1.10 from the DHCP pool.

Step 4: Create a DHCP Pool

```
Router(config)# ip dhcp pool LAN-POOL
Router(dhcp-config)# network 192.168.1.0 255.255.255.0
Router(dhcp-config)# default-router 192.168.1.1
Router(dhcp-config)# dns-server 8.8.8.8
Router(dhcp-config)# domain-name example.local
```

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip dhcp excluded-address 192.168.1.1 192.168.1.10
Router(config)#ip dhcp pool LAN-POOL
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#domain-name example.local
```

Explanation of Commands:

network: Defines the network range and mask for DHCP.

default-router: Specifies the gateway clients will use (usually router's IP).

dns-server: Sets the DNS server (can use public servers like 8.8.8.8).

domain-name: Assigns a domain name to the clients.

Step 5: Configure Router Interface

Router(config)#	interface fastethernet 0/0
Router(config-if)#	ip address 192.168.1.1 255.255.255.0
Router(config-if)#	no shutdown

```
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
```

4. Verifying DHCP Configuration On Router

Use the following show commands:

Router#	show running-config
Router#	show ip dhcp pool
Router#	show ip dhcp binding

Explanation:

show running-config → Displays current DHCP configuration.

```
Router#show running-config
```

```
!
ip dhcp excluded-address 192.168.1.1 192.168.1.10
!
ip dhcp pool LAN-POOL
 network 192.168.1.0 255.255.255.0
 default-router 192.168.1.1
 dns-server 8.8.8.8
 domain-name example.local
!
```

show ip dhcp pool → Shows details of the created DHCP pool, including total addresses.

```
Router#show ip dhcp pool

Pool LAN-POOL :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 3
 Excluded addresses             : 1
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                  Leased/Excluded/Total
 192.168.1.1          192.168.1.1      - 192.168.1.254     3    / 1     / 254
```

show ip dhcp binding → Shows IP addresses leased to clients.

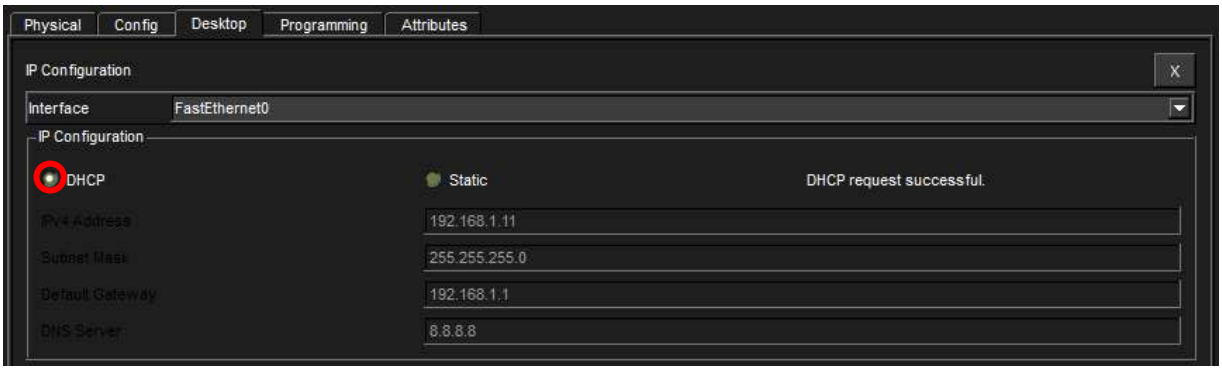
```
Router#show ip dhcp binding
IP address       Client-ID/              Lease expiration        Type
                 Hardware address
192.168.1.11     00D0.970D.EAC7           --                     Automatic
192.168.1.12     00D0.BC4B.B136           --                     Automatic
192.168.1.13     00D0.58C7.C6BD           --                     Automatic
```

On Client PC

Open the PC Desktop → IP Configuration.

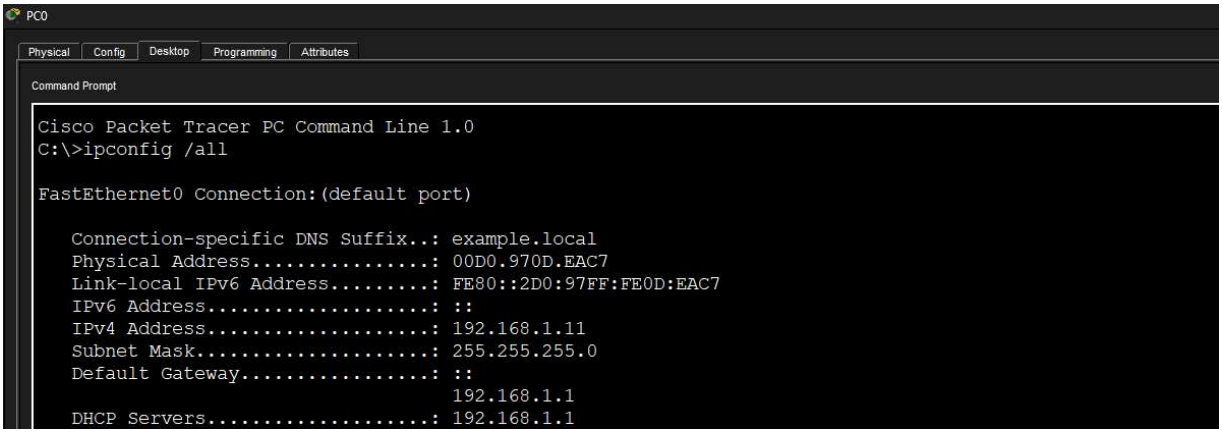
Select DHCP.

The PC should automatically receive an IP address, subnet mask, gateway, and DNS.



Verify by using the command prompt:

ipconfig or ipconfig /all



5. Common Issues and Troubleshooting

Clients not receiving IP → Ensure router interface is up (no shutdown).

Wrong default gateway → Verify correct IP in default-router command.

Overlapping pools → Avoid configuring multiple DHCP pools for the same network.

Excluded addresses missing → Confirm with show running-config.

Summary

- DHCP automates IP address assignment.
- Cisco router in Packet Tracer can act as a DHCP server.
- Key steps include excluding addresses, creating a DHCP pool, and verifying.
- Always check with show commands to confirm functionality.

End.