

### Lab-2: Objective:

Part A: Design a topology as shown in figure 5, for DHCP through which PC would be able to get IP'S dynamically.

Part B: DHCP on Physical router

## Lab-2 Introduction to DHCP

### Part A: Introduction to DHCP.

Design a topology as shown in figure 5, for DHCP through which PC would be able to get IP'S dynamically.

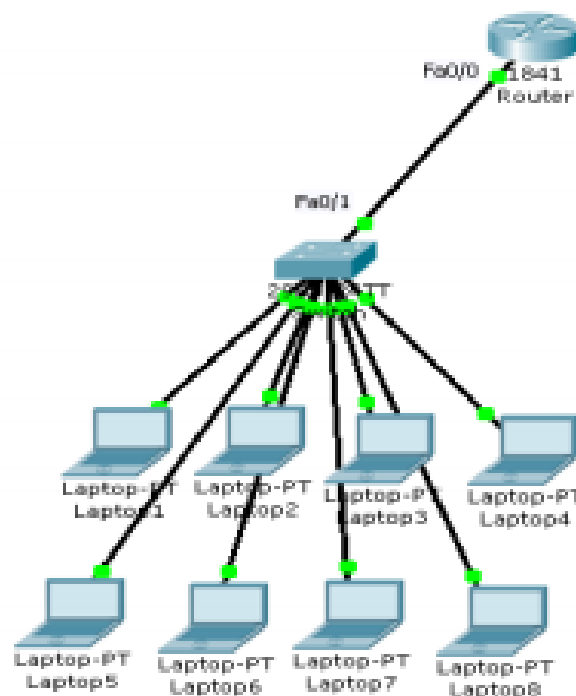


Figure 5

### What is DHCP?

Dynamic Host Configuration Protocol (DHCP) is a network protocol that enables a server to automatically assign an IP address to a computer from a defined range of numbers (that is, a scope) configured for a given network.

## How DHCP assigns IP addresses

DHCP assigns an IP address when a system is started, for example:

1. A user turns on a computer with a DHCP client.
2. The client computer sends a broadcast request (called a DISCOVER or DHCPDISCOVER), looking for a DHCP server to answer.
3. The router directs the DISCOVER packet to the correct DHCP server.
4. The server receives the DISCOVER packet. Based on availability and usage policies set on the server, the server determines an appropriate address (if any) to give to the client. The server then temporarily reserves that address for the client and sends back to the client an OFFER (or DHCPOFFER) packet, with that address information. The server also configures the client's DNS servers, WINS servers, NTP servers, and sometimes other services as well.
5. The client sends a REQUEST (or DHCPREQUEST) packet, letting the server know that it intends to use the address.
6. The server sends an ACK (or DHCPACK) packet, confirming that the client has been given a lease on the address for a server-specified period of time.
7. A DHCP lease is a temporary assignment of an IP address to a device on the network.

## Static IP addresses

When a computer uses a static IP address, it means that the computer is manually configured to use a specific IP address. One problem with static assignment, which can result from user error or inattention to detail, occurs when two computers are configured with the same IP address. This creates a conflict that results in loss of service. Using DHCP to dynamically assign IP addresses minimizes these conflicts.

### Task 1, Assign IP Address

#### Configure the interface of a router with a correct IP address.

```
Router>enable
```

```
Router#configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
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-if)#exit
```

### Task 2, Configuring DHCP

```
Router(config)#ip dhcp excluded-address 192.168.1.2 192.168.1.10
```

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

```
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
```

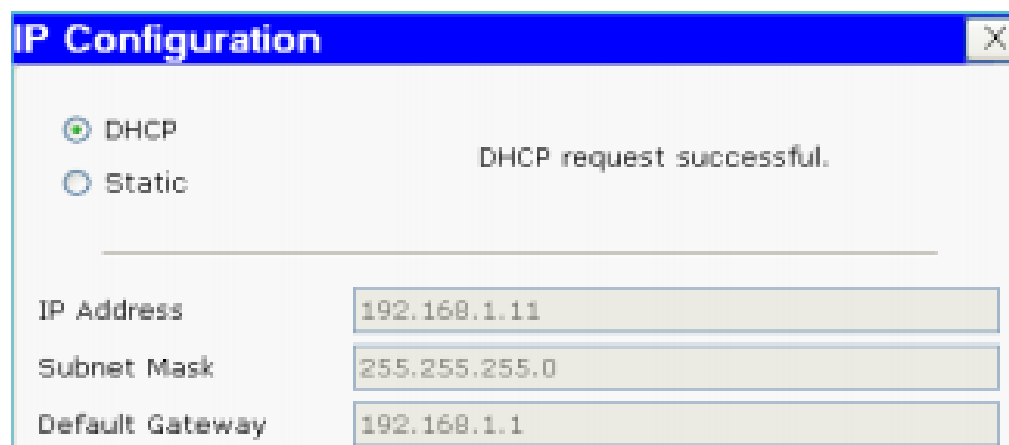
```
Router(dhcp-config)#default-router 192.168.1.1
```

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

### Task 3, PC's get automatic IP's

#### Checking the IP address on attached PC's

When checking the IP address to the PC. The PC would be able to get the IP assigned automatically (as shown in figure 6)



The image shows a window titled "IP Configuration" with a close button (X) in the top right corner. Inside the window, there are two radio buttons: "DHCP" (which is selected) and "Static". To the right of these buttons, the text "DHCP request successful." is displayed. Below a horizontal line, there are three input fields with labels to their left: "IP Address" with the value "192.168.1.11", "Subnet Mask" with the value "255.255.255.0", and "Default Gateway" with the value "192.168.1.1".

Label	Value
IP Address	192.168.1.11
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1

Figure 6

## Part B: DHCP on Physical router

Part B:Configure DHCP on Physical router.

Attach a router and a PC so that PC can get Dynamic IP from attached router.

### Task 1, Assign IP Address to Router

**Steps to configure the IP address of a router interface.**

**Step 1:** Enter privileged EXEC mode:

Router>enable

**Step 2:** Enter the configure terminal command to enter global configuration mode.

Router#configure terminal

**Step 3:** Enter the interface type slot/port Example:

Router (config)#interface fast ethernet 0/0

**Step 4:** Enter the IP address and subnet mask of the interface  
Example,

Router (config-if)# ip address 192.168.2.1 255.255.255.0

**Step 5:** Turn on the port status, as an example

Router (config-if)#no shutdown

**Step 6:** Exit the configuration mode

Router(config-if)#exit

### Task 2, Configuring DHCP

Router(config)#ip dhcp excluded-address 192.168.2.2 192.168.2.15

Router(config)#ip dhcp pool cisco1

Router(dhcp-config)#network 192.168.2.0 255.255.255.0

Router(dhcp-config)#default-router 192.168.2.1

Router(dhcp-config)#exit

- 1- Next, go to Network and Sharing Center
- 2- Click Change Adapter Settings on left side
- 3- Right Click on the LOCAL AREA NETWORK and click on Disable and then click on Enable in order to get Dynamic IP's.

- 4- Now click on status of network (as shown in figure 7) and hit Details so you can get dynamic IP's from router (as shown in figure 8).

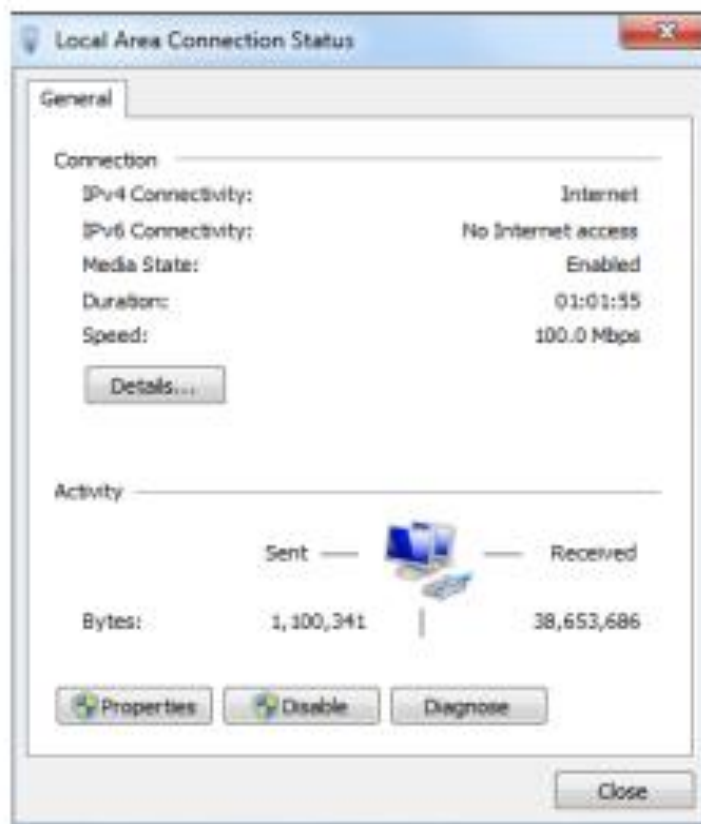


Figure 7

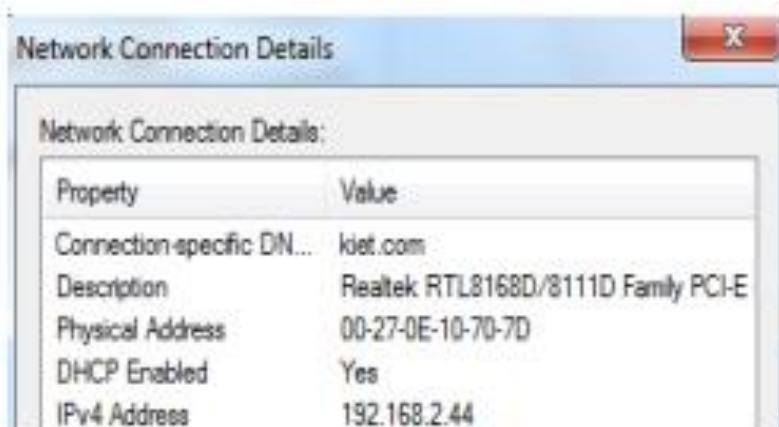


Figure 8

You can see that, DHCP is enabled and an IP address has been detected.

### Lab-2 Exercise:

Design a ring network which consists of 3 routers. Use serial cable between routers. Attach 3 PC's with each router with the help of switch. Configure DHCP on this network so that all the attached devices should be able to get dynamic IP's. Apply VLSM in this environment so that IP addresses should not be wasted. Each student will use DHCP pool name on his/her name.