Assignment 2 → Dynamic Host Assignment through server using DHCP & Message passing between devices.

1) What is DHCP in Computer Networks?

→ • DHCP stands for Dynamic Host Configuration Protocol. It is a network management protocol used to automatically assign IP addresses & other network configuration parameters (like subnet mask, default gateway, DNS) to devices on a network.

• Why DHCP is important?:→ Without DHCP, every device on a network would have to be configured manually with a unique IP address, which can be tedious & error-prone - especially on large networks. DHCP automates this process.

• How DHCP works?:→ The basic steps are:→

1) DHCP Discover:→ A client (eg, PC) sends a broadcast to find any DHCP servers available.

2) DHCP Offer:→ The DHCP server replies with an IP address offer.

3) DHCP Request:→ The client requests to accept the offered IP.

4) DHCP Acknowledgment (ACK):→ The server confirms & leases the IP to the client for a set time.

* This is called the DORA process.

• Key Features of DHCP:→

i) Automatic IP assignment.
ii) IP lease management.
iii) Reduces IP conflicts.
iv) Supports dynamic, manual & automatic allocation.
v) Centralized network configuration.

2) Step-by-Step process for setting up DHCP dynamic host assignment through a server

→ Step-by-Step setup :→

i) Create the Network Topology

→ Drag & drop the following devices into the workspace :→

Here I have taken one server, one switch & 10 devices (8 PCs & 2 laptops)

ii) Connect the Devices

→ Used copper straight-through cables to connect :→

- PCs to the switch
- Laptops to the switch
- Server to the switch

iii) Configure the server as a DHCP Server

a) Click the server

- Go to the Desktop tab
- Click IP configuration
  - → Assign a static IP (e.g., 192.168.1.1)
  - → Subnet Mask : 255.255.255.0
  - → Set default gateway : 192.168.1.1

b) Go to the Services tab

- Click on DHCP
- Turn DHCP service ON
- Fill in the Pool details :→
  - → Pool name : eg., LAN
  - → Default Gateway : 192.168.1.1
  - → DNS Server (optional) : (8.8.8.8)
  - → Start IP Address : e.g., 192.168.1.2
  - → Subnet Mask : 255.255.255.0
  - → Maximum Number of Users : e.g., 50
- Click Add.

iv) Configure the PCs & Laptops to Use DHCP

→ For each PC: →

- Click on the PC
- Go to the Desktop tab
- Click IP configuration
- Choose DHCP
- The PC should now receive an IP from the server's DHCP pool.

After this all PCs & Laptops are dynamically assigned an IP address for all different devices. Now the all PCs & Laptops have their own dynamically auto assigned IP addresses.

3) Steps to Send Messages (Packets) Between Devices: →

→ 1. Click the Message (Envelope) Icon present in the top. It looks like a closed envelope. This is called "Add simple PDU." (Used for basic testing like ping).

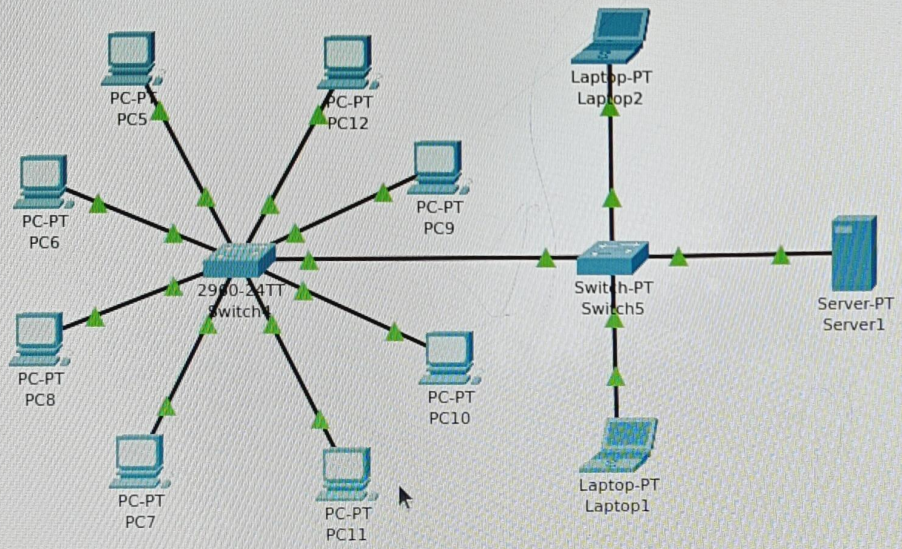
2. Now after clicking the icon, your cursor will change. Now click on the source PC. (eg., PC_0).

3. Next, click on the target PC or server. A simple PDU is automatically created from the source to destination.

4. Now to view the result go to the bottom of the screen, where the simulation log is visible. Here you can see the successful PDU or failed PDU.

★ The test done in the cisco Packet tracer application & the printout of the entire output is shown in the next page.

P.T.O



Time: 00:04:02

Realtime | Simulation

Scenario 0

New | Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC5	Server1	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Server1	PC11	ICMP		0.000	N	1	(edit)	(delete)
	Successful	Laptop1	Laptop2	ICMP		0.000	N	2	(edit)	(delete)
	Successful	Server1	PC7	ICMP		0.000	N	3	(edit)	(delete)