AY	**: 2023_24**	**Sem**	**: II**
CLASS	**: BE E&TC**	**DATE**	**:**
SUBJECT	**: Mobile Computing**	**EXPT. No.**	**: 05**

TITLE: DYNAMIC HOST CONFIGURATION PROTOCOL (DHCP)

OBJECTIVE: Configure a Cisco router as a DHCP Server

SOFTWARE USED: Cisco Packet Tracer

THEORY:

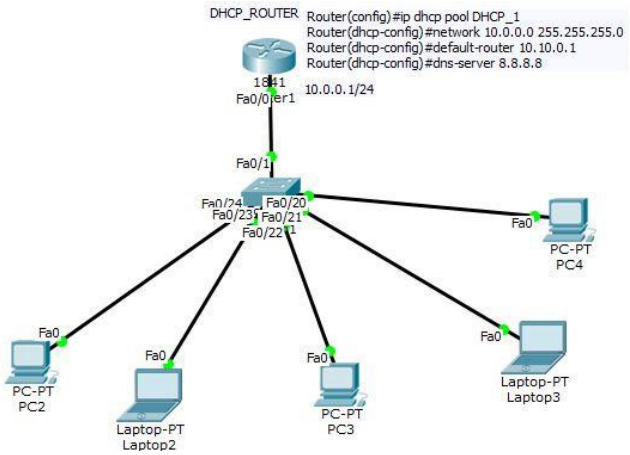
Dynamic Host Configuration Protocol (DHCP) is a standardized client/server network protocol that dynamically assigns IP addresses and other related configuration information to network devices. Every device on a TCP/IP-based network must have a unique unicast IP address to access the network and its resources. Without DHCP, IP addresses for new computers or computers that are moved from one subnet to another must be configured manually.

Configuring the DHCP server:

The DHCP server uses address pools when responding to DHCP client requests. Address pools contains specific IP configuration details that the DHCP server can allocate to a client. You can configure multiple address pools on the device for different networks.

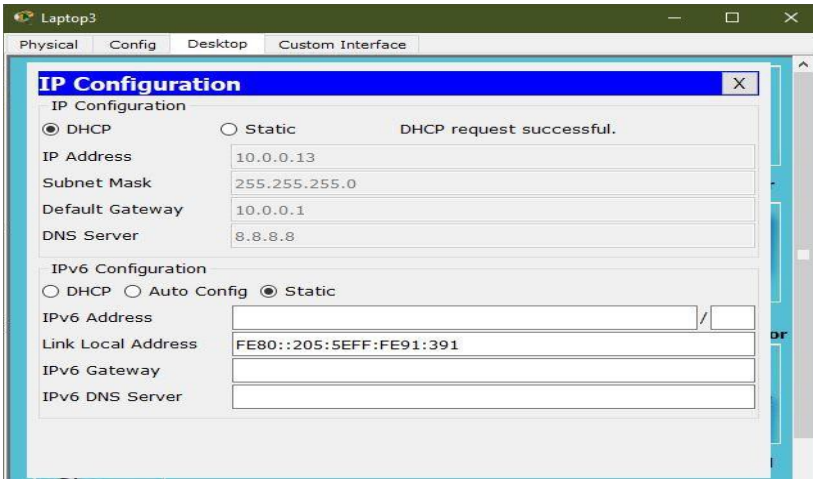
Following are the steps to configure an address pool:

1. Create the pool and enter its configuration mode.
2. Define the network the pool applies to.
3. Define the range of IP addresses that the server can allocate to clients. You can specify multiple address ranges for each pool.
4. Set the lease for the clients. This defines whether the clients receive a dynamic, permanent, or static IP address.
5. Set the options (standard and user-defined) that the clients of a pool require when configuring their IP details.
6. After configuring the address pools, enable the DHCP server by using the command:



On Client Side:

Select IP allocation as a Dynamic allocation.



DORA Process

The following diagram shows the changing port numbers and the source and destination addressused during the DHCP transaction. UDP port 68 is reserved for DHCP clients, and UDP port 67 isreserved for DHCP servers.

Step 1

DHCP Discover

Sent by the client looking for the IP address. The source IP is 0.0.0.0 because the client doesn't have an IP address. The destination is 255.255.255.255, which is the broadcast address, as the client doesn't know where the DHCP server is located, so it broadcasts to all devices on the network.

Step 2

DHCP Offer

Sent by the DHCP server offering an IP address to the client. The source address is the DHCPserver address. The DHCP server doesn't know the client address yet, so it broadcasts the offerto all devices on the network.

Step 3

DHCP Request

Sent by the client to the DHCP server to say "I will take that IP address, thanks." The client IPaddress is still 0.0.0.0 and it is again broadcast to all so that any other servers on the network thatmay have offered an IP address will know to stop communicating with the client for now.

Step 4

DHCP Acknowledgment

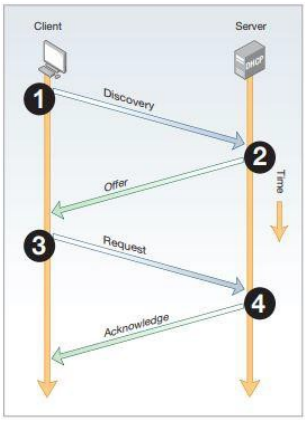
Sent by the DHCP server to the client. It confirms the IP address and other details such as subnetmask, default gateway, and lease time with the client. The source address is the DHCP server and the destination is still the broadcast address.

The DHCP process

There are four basic steps the DHCP process follows when a client connects to the network:

1. The client broadcasts a DHCP Discover message to say "I need an IP address, are there anyDHCP servers out there?"
2. Multiple DHCP servers may respond (via broadcast) with an OFFER for a leased IP address backto the client.

3. The client will choose a DHCP server offer and then broadcast a DHCP REQUEST back to theDHCP server(s) to say "Thanks, I have selected an offer from this DHCP server." All servers willsee which offer the client selected.
4. Finally, the selected DHCP server will send (broadcast) an ACKNOWLEDGEMENT back to theclient to confirm the IP address, lease time, and other details.



CONCLUSION:

SIGNATURE

REFERENCES:

1. "Mobile Communications" – Jochen Schiller