



What is DHCP?

DHCP (Dynamic Host Configuration Protocol) is a **network protocol** used to automatically assign **IP addresses** and other **network configuration** (like subnet mask, default gateway, DNS server) to devices on a network.

Instead of manually assigning IP addresses to each device (called static IP), **DHCP automates this process**, making network management easier and more efficient.



How DHCP Works – Step by Step

Here's the **4-step DORA process**:

Step	Name	Explanation
1	Discover	Client sends a DHCP Discover broadcast to find DHCP servers
2	Offer	DHCP server replies with DHCP Offer (available IP and config)
3	Request	Client responds with DHCP Request , accepting the offer
4	Acknowledge	Server confirms with DHCP Acknowledgement (ACK) and leases the IP



DORA Process in Detail:

1. DHCP Discover

- Sent by: **Client**
- Type: Broadcast
- Purpose: “Is there any DHCP server available?”

2. DHCP Offer

- Sent by: **DHCP Server**
- Includes: IP address, subnet mask, lease time, default gateway, DNS
- Purpose: “Here is an IP for you.”

3. DHCP Request

- Sent by: **Client**
- Purpose: “I accept the offer from Server X.”

4. DHCP Acknowledgement (ACK)

- Sent by: **Server**
- Purpose: “IP is now assigned to you for a specific lease time.”



What DHCP Provides to Clients

- IP Address
- Subnet Mask
- Default Gateway
- DNS Server Address
- Lease Duration
- Optional parameters like NTP server, domain name



DHCP Lease

- **Lease** = Time duration for which an IP is assigned

- Clients renew lease before expiration to keep the IP



DHCP Example in Network

Suppose 10 computers connect to a switch, and a router with DHCP enabled is present:

1. All PCs start with no IP
2. Each PC sends DHCP Discover
3. Router replies with DHCP Offer
4. PC accepts and gets IP + network settings
5. They can now communicate in the network



Key Points

Term	Meaning
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Dynamic IP	IP address assigned automatically
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Static IP	IP assigned manually
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Lease Time	Duration an IP remains assigned
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DHCP Server	Device that assigns IPs (e.g., router)
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DHCP Client	Device that receives IP (e.g., PC)
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