

# DHCP (DYNAMIC HOST CONFIGURATION PROTOCOL) - CHEATSHEET

DHCP stands for Dynamic Host Configuration Protocol. DHCP is used to control the network configuration of a host through a remote server. It comes installed as a default feature in most of the contemporary operating systems. DHCP is an excellent alternative to the time-consuming manual configuration of network settings on a host or a network device. DHCP works on a client-server model. Being a protocol, it has its own set of messages that are exchanged between client and server.

## DHCP MESSAGE TYPES

DHCP MESSAGE	USE
DHCPDISCOVER	Client broadcast to locate available servers
DHCPOFFER	Server to client response offering config parameters
DHCPREQUEST	Client broadcast requesting offered parameters
DHCPDECLINE	Client to server notification that IP address is in use
DHCPACK	Server to client response confirming a request
DHCPNAK	Server to client response denying a request
DHCPRELEASE	Client to server request to relinquish IP address
DHCPINFORM	Client to server request for config parameters

## DORA PROCESS



DORA is a sequence of messages of DHCP process. The DHCP Server and DHCP Client exchanges message and after that DHCP provide an IP address to DHCP client. DORA process has four messages namely Discover, Offer, Request and Acknowledge. Hence, the name DORA is given.

- ❖ **DISCOVER:** DHCP client sends a DHCP Discover (broadcast message) to discover DHCP servers on the LAN segment.
- ❖ **OFFER:** DHCP server receive the DHCP Discover packet and respond with DHCP Offer packets, offering IP addressing information.
- ❖ **REQUEST:** If the client receives the DHCP Offer packets from multiple DHCP servers, the first DHCP Offer packet is accepted. The client responds by broadcasting a DHCP Request packet, requesting the network parameters from the server that responded first.
- ❖ **ACKNOWLEDGE:** The DHCP server approves the lease with a DHCP Acknowledgement packet. The packet includes the lease duration and other configuration information.

## DHCP vs RARP

PARAMETER	DHCP	RARP
Standard	RFC2131	RFC903
Latest In Technology	New technology	Old technology and obsolete now.
Operation Sequence	Discover, Offer, Request, Acknowledgement	ARP request, ARP reply, RARP request, RARP reply
Assignment & config	Automatic	Static
Assigns NS & Def GW	Yes	No
Different LAN for Client and Server	Yes	No
Mgmt. & Implementation	Easy	Cumbersome
Scalability	High	Limited to VLAN
OSI Layer	Layer 7	Layer 2

## DHCP COMPONENTS

- ❖ **DHCP SERVER:** Any networked device running with DHCP service is known as DHCP Server. It provides IP addresses and related configuration information like default gateways and other network parameters to client devices. This is predominantly a server or a router but could be anything acting as a host e.g.- SD-WAN appliance.
- ❖ **DHCP CLIENT:** Any network device (a computer/IoT endpoint /mobile device) that has DHCP settings enabled on it. A DHCP client obtain an interface IPv4 address from an upstream DHCP service.
- ❖ **IP ADDRESS POOL/SCOPE:** It refers to the range of addresses that are available to DHCP clients. These addresses are handed out sequentially from lowest to highest.
- ❖ **SUBNET/SUPER-SCOPE:** IP networks can be partitioned into more manageable segments known as subnets.
- ❖ **LEASE:** It is the length of time for which a DHCP client can use a dynamically assigned IP address. When the lease duration expires, the client has to renew it.
- ❖ **DHCP RELAY AGENT:** DHCP relay agent is a TCP/IP host that forwards request and replies between DHCP server and DHCP client when the server is present on the different network. DHCP Relay agents receive DHCP messages and generate a new DHCP message to send out other Interface. DHCP servers can be centralized instead of having a server on each subnet.

## BENEFITS OF DHCP

- ❖ Centralized administration minimising the administrative burden.
- ❖ Dynamic host configuration eliminates the need for entering IP address manually.
- ❖ By using DHCP relay agent, IP address can be provided to another network.
- ❖ Seamless IP host configuration as the process is automatic with no user intervention.
- ❖ Scalability - The scalable design of DHCP makes it easier to add unlimited number of hosts to your network as your organization grows.
- ❖ Flexibility- Easier to make changes in the IP configuration as the infrastructure changes.

## KEY POINTS

- ❖ PROTOCOL: UDP
- ❖ OSI LAYER: Layer 7
- ❖ STANDARD : RFC2131
- ❖ Port Number: 67 (Server), 68 (Client)
- ❖ Exclusion Range: ensures any IP address listed in that range is not offered to any DHCP clients.
- ❖ Reservation: Creates a permanent address lease assignment to the client thereby ensuring that a specified device on the subnet can always use the same IP address.