Network

Dynamic Host Configuration Protocol (DHCP)

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The Dynamic Host Configuration Protocol (DHCP) is a network management protocol used on Internet Protocol (IP) networks for automatically assigning IP addresses *and other communication parameters* to devices connected to the network using a client–server architecture.

Wikipedia ©

DHCP address allocation

Dynamic allocation

A network administrator reserves a range of IP addresses for DHCP, and each DHCP client on the LAN is configured to request an IP address from the DHCP server during network initialization. The request-and-grant process uses a lease concept with a controllable time period, allowing the DHCP server to reclaim and then reallocate IP addresses that are not renewed.

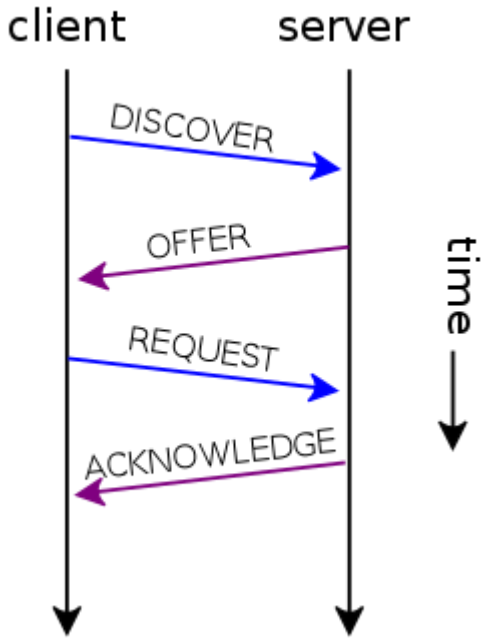
Automatic allocation

The DHCP server permanently assigns an IP address to a requesting client from a range defined by an administrator. This is like dynamic allocation, but the DHCP server keeps a table of past IP address assignments, so that it can preferentially assign to a client the same IP address that the client previously had.

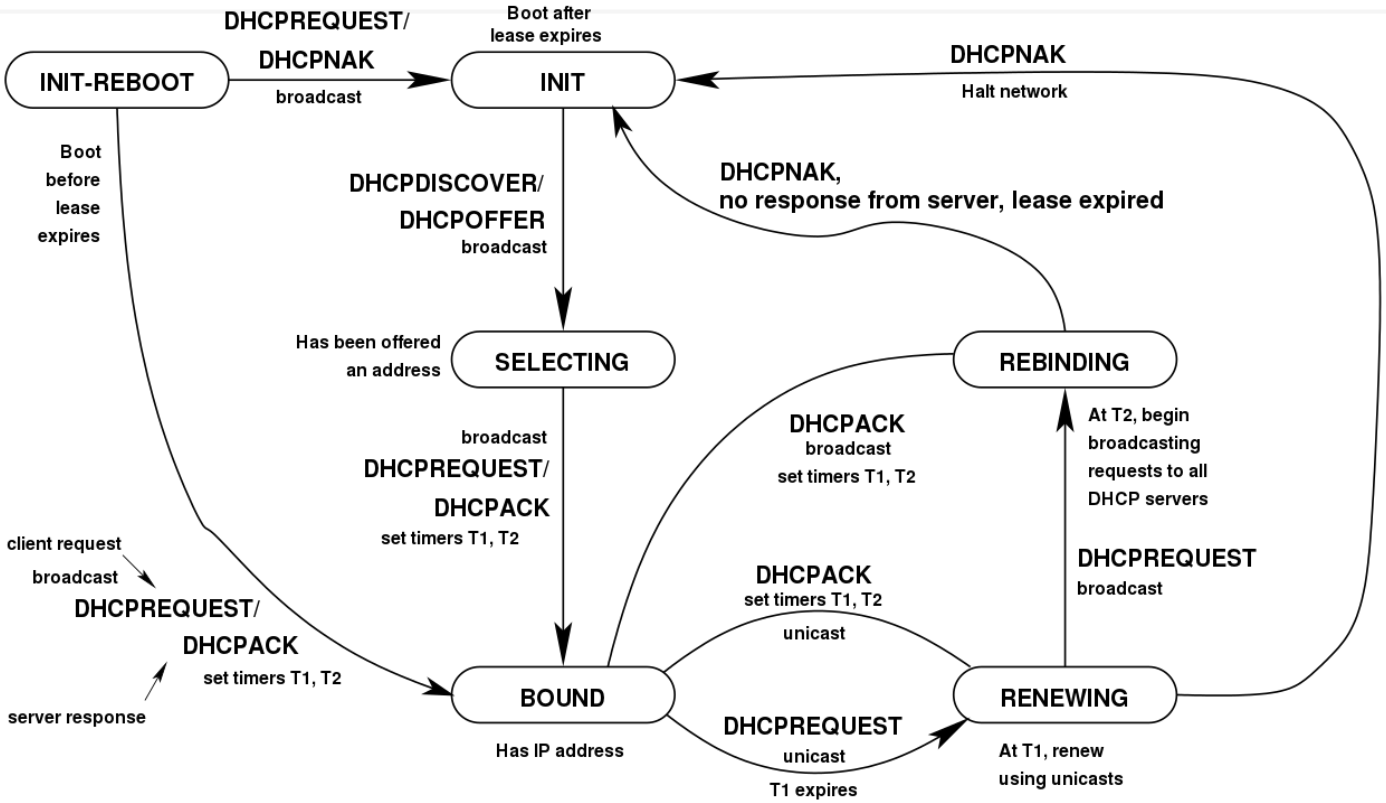
Manual allocation

This method is also variously called static DHCP allocation, fixed address allocation, reservation, and MAC/IP address binding. An administrator maps a unique identifier (a client id or MAC address) for each client to an IP address, which is offered to the requesting client. DHCP servers may be configured to fall back to other methods if this fails.

DHCP Sequence

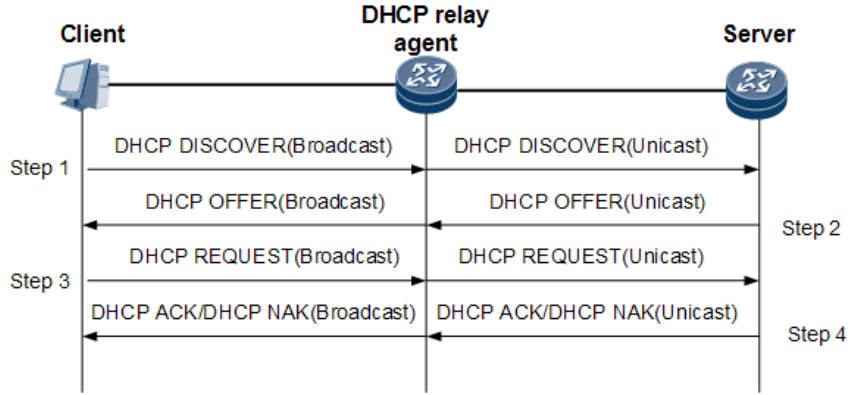


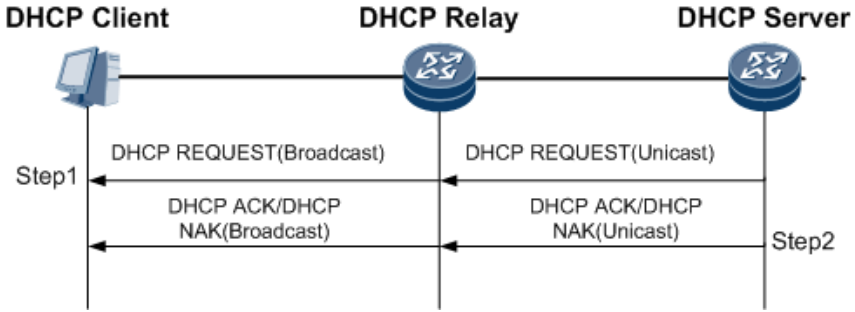
Client states



Relaying

In small networks, where only one IP subnet is being managed, DHCP clients communicate directly with DHCP servers. However, DHCP servers can also provide IP addresses for multiple subnets. In this case, a DHCP client that has not yet acquired an IP address cannot communicate directly with the DHCP server using IP routing, because it does not have a routable IP address, does not know the link layer address of a router and does not know the IP address of the DHCP server.





Install DHCP Server

Install like other :

```
$ yum install dhcp
```

Edit the DHCP demon config:

```
$ vi /etc/dhcp/dhcpd.conf
```

Check config can by command:

```
dhcpd -t -cf /etc/dhcp/dhcpd.conf
```

Do not forget open firewall:

```
firewall-cmd --permanent --add-service=dhcp
```

dhcpd,.config sample:

```
subnet 192.168.0.0 netmask 255.255.255.0 {
  range 192.168.0.100 192.168.0.200;
  option domain-name-servers 192.168.0.10,
192.168.0.11;
  option domain-name "dmosk.local";
  option routers 192.168.0.1;
  option broadcast-address 192.168.0.255;
  default-lease-time 600;
  max-lease-time 7200;
}
```

DHCP Client

For release IP:
$ dhclient –r

For request IP:
$ dhclient -v eth0

Config dhclient at CentOS 7 in file:
/etc/dhcp/dhclient.conf

Change file place:
$ dhclient -v eth0 -lf /tmp/dhcp.file

Vulnerabilities

The base DHCP does not include any mechanism for authentication. Because of this, it is vulnerable to a variety of attacks. These attacks fall into three main categories:

- Unauthorized DHCP servers providing false information to clients.
- Unauthorized clients gaining access to resources.
- Resource exhaustion attacks from malicious DHCP clients.

Homework task

GOAL:

Config DHCP Server with manual allocation IP address and options such as: Default gateway; DNS Server; BOOTP;

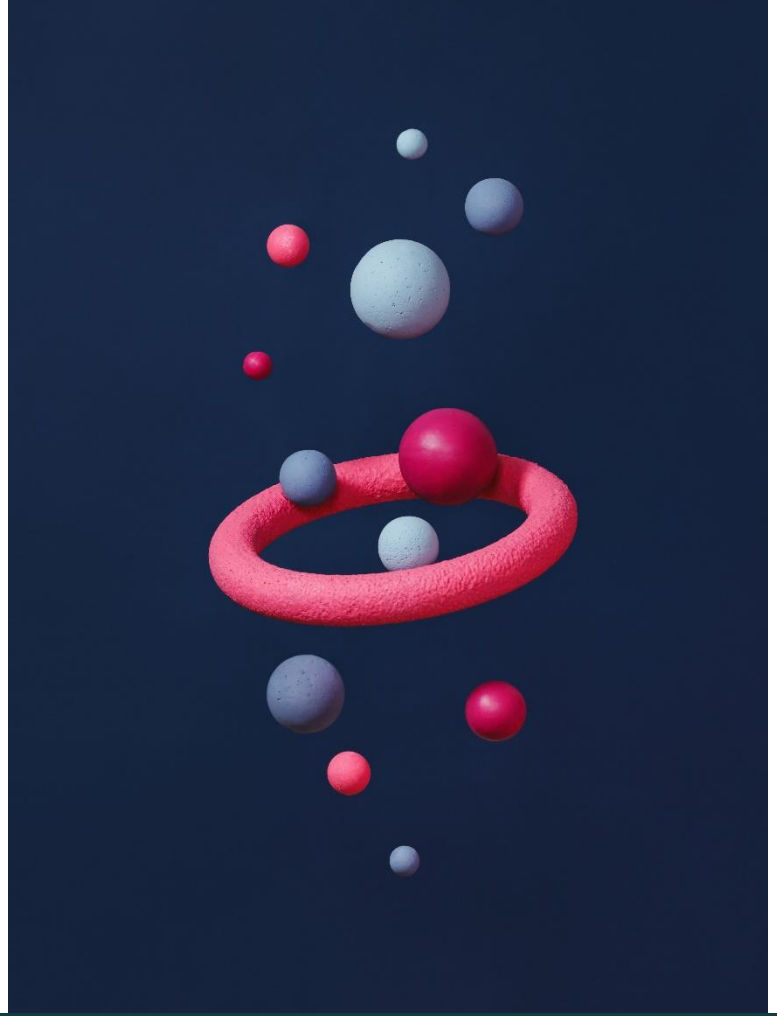
What to do:

- Install the DHCP Server on 1st VM
- Connect 2nd VM and get MAC from adapter with configured to DHCP address receive.
- Edit the config file on DHCp server.

Environment:
2 Virtual Machines (VM) with ethernet adapter in some LAN.

Suggest use VirtualBox and CentOS 7 image's.

How to check:
check IP address and options by command on 2nd VM:
$ sudo dhclient -v



THANK YOU