

## Assignment : 4

### Problem Statement:

Installing and configure DHCP server and write a program to install the software on remote machine.

### Objectives:

- 1) Understand and configure DHCP.
- 2) What are advantages of DHCP.

### Requirements :-

- 1) Ubuntu, dhcp-config.

### Theory:

DHCP stands for Dynamic Host Configuration Protocol. DHCP is a standardized network protocol used on Internet protocol networks for dynamically distributing network configuration parameters, such as IP addresses for interfaces and services. DHCP server can be any server (Linux / Windows) that is used to distribute IP addresses automatically to the clients in the network. Since DHCP server assigns IP addresses automatically to all systems, a system or Network administrator need not to assign IP addresses manually to every single machine in the network. DHCP is opt for system or Network administrator who is managing thousands of systems. The most common settings provided by a DHCP server to DHCP clients include:

- 1) IP address and netmask.
- 2) IP address of default gateway.
- 3) IP address of Domain Naming system.
- 4) However, a DHCP server can also supply configuration properties such as
- 5) Host Name
- 6) Domain Name
- 7) Time Server.
- 8) Print Server.

The advantage of using DHCP is that changes to the network, for example a change in the address of DNS server, need only be changed at the DHCP server and all network hosts will be configured the next time their DHCP clients poll the DHCP server. As an added advantage, it is also easier to integrate new computers into the network, as there is no need to check for availability of an IP address. Conflicts in IP address allocation are also reduced.

### Installation and configuring DHCP.

1) `yum install dhcp.`

2) `vi /etc/dhcp/dhcpd.conf`

press i

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```
Subnet 192.168.8.0 netmask 255.255.255.0 {  
    range 192.168.8.10 192.168.8.20;  
    option domain-name-servers  
        ns1.internal.example.org;  
    option domain-name "internal.example.org";  
    option routers 192.168.8.254;  
    option broadcast-address 192.168.8.255;  
    default-lease-time 600;  
    max-lease-time 7200;  
}
```

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3) `ip server 192.168.8.1`

4) `chkconfig dhcpd on`

5) `service dhcpd restart`

In DHCP the client & server exchange mainly 4 DHCP messages in order to make a connection, also called DORA process

1) DHCP discover message:

This is a message generated in communication process between server & client to discover if there is any DHCP server / servers are present in a network or not. This message is broadcasted to all device present in a network.



## 2) DHCP offer message:

The server will respond to host in this message specifying the unleased IP address & other TCP configuration information. This message is broadcasted by server size of msg is 342 bytes.

## 3) DHCP request message:

When a client receives an offer message, it responds by broadcasting a DHCP request. The client will produce a gratuitous ARP in order to find if there is any host present in the network with the same IP address.

## 4) DHCP acknowledgement message:

In response to the request message received the server will create an entry with specific client ID & bind the IP address offered with lease time.

## Conclusion:

Hence, we successfully installed and configured DHCP servers in Ubuntu & learnt about DHCP and its advantages.

ActivitiesTerminalNov 6 14:49kkanekei@kkanekei: ~

GNU nano 4.8/etc/default/isc-dhcp-server

# Defaults for isc-dhcp-server (sourced by /etc/init.d/isc-dhcp-server)  
  
# Path to dhcpd's config file (default: /etc/dhcp/dhcpd.conf).  
#DHCPDv4\_CONF=/etc/dhcp/dhcpd.conf  
#DHCPDv6\_CONF=/etc/dhcp/dhcpd.conf  
  
# Path to dhcpd's PID file (default: /var/run/dhcpd.pid).  
#DHCPDv4\_PID=/var/run/dhcpd.pid  
#DHCPDv6\_PID=/var/run/dhcpd6.pid  
  
# Additional options to start dhcpd with.  
# Don't use options -cf or -pf here; use DHCPD\_CONF/ DHCPD\_PID instead  
#OPTIONS=""  
  
# On what interfaces should the DHCP server (dhcpd) serve DHCP requests?  
# Separate multiple interfaces with spaces, e.g. "eth0 eth1".  
INTERFACESv4="wlp2s0"  
INTERFACESv6=""

Read 18 lines

Get HelpExitWrite OutRead FileWhere IsReplaceCut TextPaste TextJustifyTo SpellCur PosGo To LineUndoRedoMark TextCopy TextTo BracketWhere WasPreviousNext

ActivitiesTerminalNov 6 14:50kkaneki@kkaneki: ~

```
enp3s0f1: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 98:29:a6:46:44:83 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 4071 bytes 428466 (428.4 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 4071 bytes 428466 (428.4 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.43.208 netmask 255.255.255.0 broadcast 192.168.43.255
    inet6 fe80::70c1:eace:9d1d:da6f prefixlen 64 scopeid 0x20<link>
    inet6 2401:4900:36c1:df8d:553a:97a1:16db:190 prefixlen 64 scopeid 0x0<global>
    inet6 2401:4900:36c1:df8d:9774:5b1:8e31:2e10 prefixlen 64 scopeid 0x0<global>
    ether 98:22:ef:70:59:47 txqueuelen 1000 (Ethernet)
    RX packets 292618 bytes 221888704 (221.8 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 100107 bytes 19398696 (19.3 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

kkaneki@kkaneki:~$ sudo cat /etc/dhcp/dhcpd.conf
authoritative;
subnet 192.168.43.0 netmask 255.255.255.0 {
    range 192.168.43.130 192.168.43.230;
    option broadcast-address 192.168.43.255;
    option routers 192.168.43.1;
    option subnet-mask 255.255.255.0;
    default-lease-time 600;
    max-lease-time 7200;
    option domain-name "local";
}
kkaneki@kkaneki:~$
kkaneki@kkaneki:~$
kkaneki@kkaneki:~$
kkaneki@kkaneki:~$
kkaneki@kkaneki:~$
kkaneki@kkaneki:~$
```



```

kkanekei@kkanekei:~$ sudo service isc-dhcp-server start
kkanekei@kkanekei:~$ sudo systemctl status isc-dhcp-server
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2020-11-06 14:26:24 IST; 26min ago
     Docs: man:dhcpd(8)
   Main PID: 10877 (dhcpd)
    Tasks: 4 (limit: 9346)
   Memory: 5.3M
   CGroup: /system.slice/isc-dhcp-server.service
           └─10877 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcpd.pid -cf /etc/dhcp/dhcpd.conf

Nov 06 14:26:24 kkaneki dhcpd[10877]: No subnet declaration for enp3s0f1 (no IPv4 addresses).
Nov 06 14:26:24 kkaneki dhcpd[10877]: ** Ignoring requests on enp3s0f1. If this is not what
Nov 06 14:26:24 kkaneki dhcpd[10877]: you want, please write a subnet declaration
Nov 06 14:26:24 kkaneki dhcpd[10877]: in your dhcpd.conf file for the network segment
Nov 06 14:26:24 kkaneki dhcpd[10877]: to which interface enp3s0f1 is attached. **
Nov 06 14:26:24 kkaneki dhcpd[10877]: Sending on Socket/fallback/fallback-net
Nov 06 14:26:24 kkaneki dhcpd[10877]: Server starting service.
Nov 06 14:29:11 kkaneki dhcpd[10877]: DHCPREQUEST for 192.168.43.208 from 98:22:ef:70:59:47 via wlp2s0
Nov 06 14:29:11 kkaneki dhcpd[10877]: DHCPACK on 192.168.43.208 to 98:22:ef:70:59:47 (kkanekei) via wlp2s0
kkanekei@kkanekei:~$
```