Linux Administration Lab 7

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SY CE, Batch D

Aim:

DHCP Server: Implement a DHCP server to automate IP address assignment.

Process execution:

Installing the DHCP Server:

- Installed the ISC DHCP server using: sudo apt install isc-dhcp-server

```
sysadmin@sysadmin:~$ sudo apt install isc-dhcp-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libllvm17t64 linux-headers-6.8.0-31 linux-headers-6.8.0-31-generic
  linux-image-6.8.0-31-generic linux-modules-6.8.0-31-generic
  linux-modules-extra-6.8.0-31-generic linux-tools-6.8.0-31 linux-tools-6.8.0-31-generic
  linux-tools-6.8.0-47 linux-tools-6.8.0-47-generic python3-netifaces
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  isc-dhcp-common
Suggested packages:
  isc-dhcp-server-ldap policycoreutils
The following NEW packages will be installed:
  isc-dhcp-common isc-dhcp-server
0 upgraded, 2 newly installed, 0 to remove and 1 not upgraded.
Need to get 1,281 kB of archives.
After this operation, 4,281 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu noble/universe amd64 isc-dhcp-server amd64 4.4.3-P1-4ubuntu2 [1,236 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/universe amd64 isc-dhcp-common amd64 4.4.3-P1-4ubuntu2 [45.8 kB]
Fetched 1,281 kB in 1s (942 kB/s)
Preconfiguring packages ...
Selecting previously unselected package isc-dhcp-server.
(Reading database ... 344217 files and directories currently installed.)
Preparing to unpack .../isc-dhcp-server_4.4.3-P1-4ubuntu2_amd64.deb ...
Unpacking isc-dhcp-server (4.4.3-P1-4ubuntu2) ...
Selecting previously unselected package isc-dhcp-common.
Preparing to unpack .../isc-dhcp-common_4.4.3-P1-4ubuntu2_amd64.deb ...
Unpacking isc-dhcp-common (4.4.3-P1-4ubuntu2) ...
Setting up isc-dhcp-server (4.4.3-P1-4ubuntu2) ...
Generating /etc/default/isc-dhcp-server...
Created symlink /etc/systemd/system/multi-user.target.wants/isc-dhcp-server.service → /usr/
lib/systemd/system/isc-dhcp-server.service.
Created symlink /etc/systemd/system/multi-user.target.wants/isc-dhcp-server6.service → /usr
/lib/systemd/system/isc-dhcp-server6.service.
Setting up isc-dhcp-common (4.4.3-P1-4ubuntu2) ...
Processing triggers for man-db (2.12.0-4build2) ...
```

Checking Network Interfaces:

- Ran `ip a` to list all network interfaces and determine which one to use for the DHCP server.
- Identified `eno1` as the primary interface for DHCP configuration.

```
sysadmin@sysadmin:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 30:13:8b:f1:63:15 brd ff:ff:ff:ff:ff:ff
    altname enp0s31f6
    inet 172.18.38.56/23 brd 172.18.39.255 scope global dynamic noprefixroute eno1
       valid_lft 99792sec preferred_lft 99792sec
    inet6 fe80::3213:8bff:fef1:6315/64 scope link
       valid_lft forever preferred_lft forever
3: wlp2s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 28:d0:43:20:37:8a brd ff:ff:ff:ff:ff:ff
    inet 172.18.38.148/23 brd 172.18.39.255 scope global dynamic noprefixroute wlp2s0
       valid_lft 168430sec preferred_lft 168430sec
    inet6 fe80::8f6e:2e55:f33:8f38/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

Setting Up DHCP Server Interface:

- Edited the `/etc/default/isc-dhcp-server` file to specify `eno1` as the DHCP interface for IPv4.

```
sysadmin@sysadmin:~$ sudo nano /etc/default/isc-dhcp-server
```

```
  GNU nano 7.2              /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/dhcpd6.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="eno1"
INTERFACESv6=""
```

Editing the DHCP Configuration File:

- Opened the DHCP configuration file using `sudo nano /etc/dhcp/dhcpd.conf`.
- Added the necessary `option domain-name` and `option domain-name-servers` settings.
- Configured the subnet with appropriate IP ranges and lease times.

```
sysadmin@sysadmin:~$ sudo nano /etc/dhcp/dhcpd.conf
```

```
  GNU nano 7.2                    /etc/dhcp/dhcpd.conf
# dhcpd.conf
#
# Sample configuration file for ISC dhcpd
#
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as
# configuration file instead of this file.
#

# option definitions common to all supported networks...
option domain-name "system.lan";
option domain-name-servers 8.8.8.8, 8.8.4.4;
default-lease-time 2400;
max-lease-time 4800;
authoritative;



# The ddns-updates-style parameter controls whether or not the server will
# attempt to do a DNS update when a lease is confirmed. We default to the
# behavior of the version 2 packages ('none', since DHCP v2 didn't
# have support for DDNS.)
ddns-update-style none;

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
#authoritative;
```

```
  GNU nano 7.2                    /etc/dhcp/dhcpd.conf
# set.
#host fantasia {
#  hardware ethernet 08:00:07:26:c0:a5;
#  fixed-address fantasia.example.com;
#}

# You can declare a class of clients and then do address allocation
# based on that.   The example below shows a case where all clients
# in a certain class get addresses on the 10.17.224/24 subnet, and all
# other clients get addresses on the 10.0.29/24 subnet.

#class "foo" {
#  match if substring (option vendor-class-identifier, 0, 4) = "SUNW";
#}

#shared-network 224-29 {
#  subnet 10.17.224.0 netmask 255.255.255.0 {
#    option routers rtr-224.example.org;
#  }
#  subnet 10.0.29.0 netmask 255.255.255.0 {
#    option routers rtr-29.example.org;
#  }
#  pool {
#    allow members of "foo";
#    range 10.17.224.10 10.17.224.250;
#  }
#  pool {
#    deny members of "foo";
#    range 10.0.29.10 10.0.29.230;
#  }
#}
subnet 172.18.38.0 netmask 255.255.254.0 {
    range 172.18.38.100 172.18.38.150;
    option routers 172.18.38.1;
    option subnet-mask 255.255.254.0;
    option broadcast-address 172.18.39.255;
    option domain-name-servers 8.8.8.8, 8.8.4.4;
    default-lease-time 600;
    max-lease-time 7200;
}
```

Restarting and Verifying DHCP Service:

- Restarted the DHCP server using `sudo systemctl restart isc-dhcp-server`.
- Checked the status with `sudo systemctl status isc-dhcp-server` to confirm it was running.

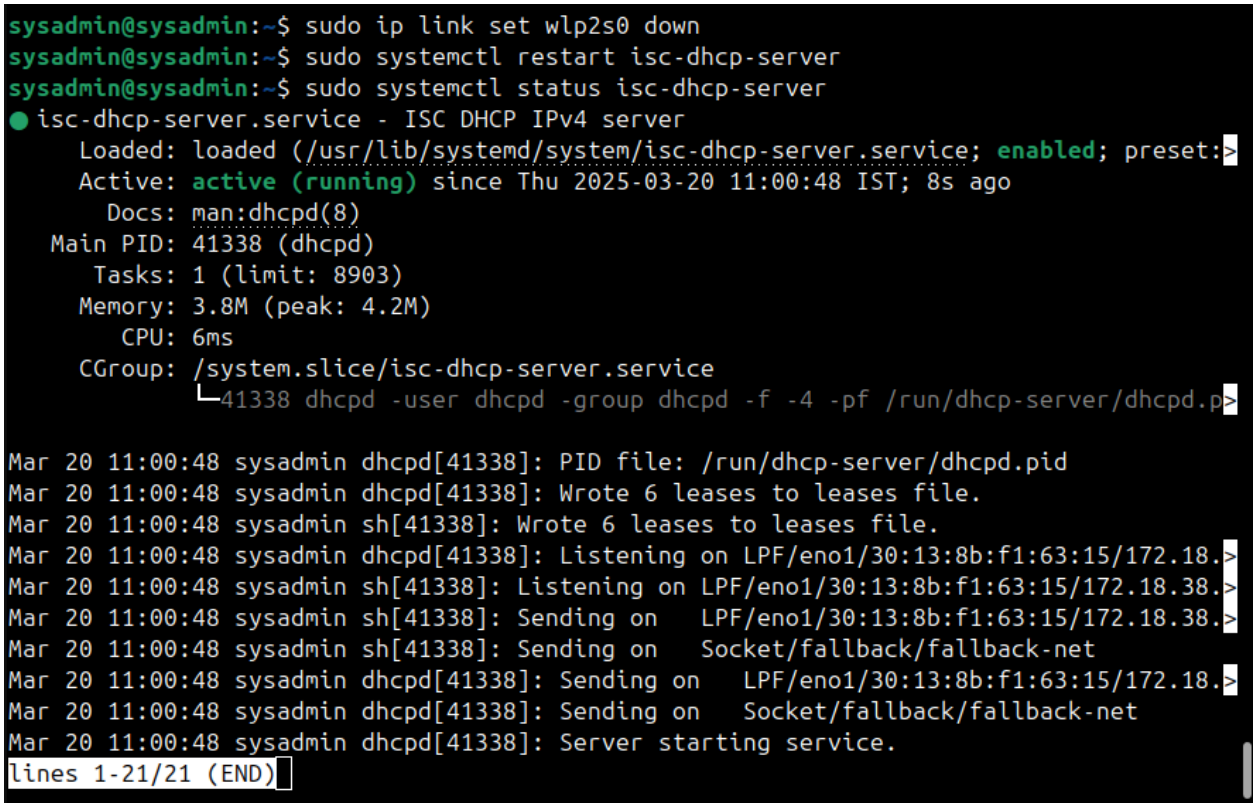
```
sysadmin@sysadmin:~$ sudo systemctl restart isc-dhcp-server
sysadmin@sysadmin:~$ sudo systemctl status isc-dhcp-server
```

```
● isc-dhcp-server.service - ISC DHCP IPv4 server
     Loaded: loaded (/usr/lib/systemd/system/isc-dhcp-server.service; enabled; preset:
enable>
     Active: active (running) since Thu 2025-03-20 10:52:51 IST; 1min 49s ago
       Docs: man:dhcpd(8)
   Main PID: 41034 (dhcpd)
      Tasks: 1 (limit: 8903)
     Memory: 3.8M (peak: 4.4M)
        CPU: 6ms
     CGroup: /system.slice/isc-dhcp-server.service
             └─41034 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcpd.pi
d -cf >

Mar 20 10:52:52 sysadmin dhcpd[41034]: Multiple interfaces match the same shared networ
k: eno>
Mar 20 10:52:52 sysadmin dhcpd[41034]: Listening on LPF/eno1/30:13:8b:f1:63:15/172.18.3
8.0/23
Mar 20 10:52:52 sysadmin sh[41034]: Listening on LPF/eno1/30:13:8b:f1:63:15/172.18.38.0
/23
Mar 20 10:52:52 sysadmin sh[41034]: Sending on   LPF/eno1/30:13:8b:f1:63:15/172.18.38.0
/23
Mar 20 10:52:52 sysadmin sh[41034]: Sending on   Socket/fallback/fallback-net
Mar 20 10:52:52 sysadmin dhcpd[41034]: Sending on   LPF/eno1/30:13:8b:f1:63:15/172.18.3
8.0/23
Mar 20 10:52:52 sysadmin dhcpd[41034]: Sending on   Socket/fallback/fallback-net
Mar 20 10:52:52 sysadmin dhcpd[41034]: Server starting service.
Mar 20 10:53:04 sysadmin dhcpd[41034]: DHCPREQUEST for 172.18.38.168 from d4:f3:2d:66:1
f:02 v>
Mar 20 10:54:41 sysadmin dhcpd[41034]: DHCPDISCOVER from 6a:72:8e:f9:01:bd via eno1
~
~
```

Fixing Interface Conflict:

- Disabled the `wlp2s0` interface using `sudo ip link set wlp2s0 down` to resolve a potential multi-interface conflict.
- Restarted the DHCP server and confirmed successful operation.



Conclusion:

The DHCP server was installed and set up to automatically assign IP addresses to devices. The correct network interface was chosen and configured for proper communication. Important settings like the domain name, DNS servers, and subnet were added. After restarting the server, checks showed it was running without errors and giving IP addresses to clients. A small issue was fixed by turning off an unused network interface, ensuring everything worked smoothly.