Assignment 4

Dynamic Host Configuration Protocol

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Part 1: Configuring DHCP

R4:
sudo nano /etc/dhcp/dhcpd.conf

add below lines at the end of the file:

```
subnet 10.10.11.0 netmask 255.255.255.240 {
   range 10.10.11.1 10.10.11.14;
  option subnet-mask 255.255.255.240;
  option routers 10.10.11.1;
  option broadcast-address 10.10.11.15;
  default-lease-time 300;
  max-lease-time 7200;
}
```

sudo nano /etc/network /interfaces

```
student@CN-R4:~$ cat /etc/network/interfaces
# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo
iface lo inet loopback

auto eth0
iface eth0 inet static

auto eth1
iface eth1 inet static

auto eth2
iface eth2 inet static
    address 10.10.11.1
    netmask 255.255.255.240
    network 10.10.11.0
    broadcast 10.10.11.15
```

Part 2: Server Interface

```
student@Ubuntu:~$ ping 10.10.11.1
PING 10.10.11.1 (10.10.11.1) 56(84) bytes of data.
64 bytes from 10.10.11.1: icmp_seq=1 ttl=64 time=0.307 ms
64 bytes from 10.10.11.1: icmp_seq=2 ttl=64 time=0.629 ms
64 bytes from 10.10.11.1: icmp_seq=3 ttl=64 time=0.407 ms
64 bytes from 10.10.11.1: icmp_seq=4 ttl=64 time=0.501 ms
64 bytes from 10.10.11.1: icmp_seq=5 ttl=64 time=0.483 ms
64 bytes from 10.10.11.1: icmp_seq=6 ttl=64 time=0.451 ms
^C
--- 10.10.11.1 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 83ms
rtt min/avg/max/mdev = 0.307/0.463/0.629/0.097 ms
```

Part 3: Verifying DHCP and Wireshark

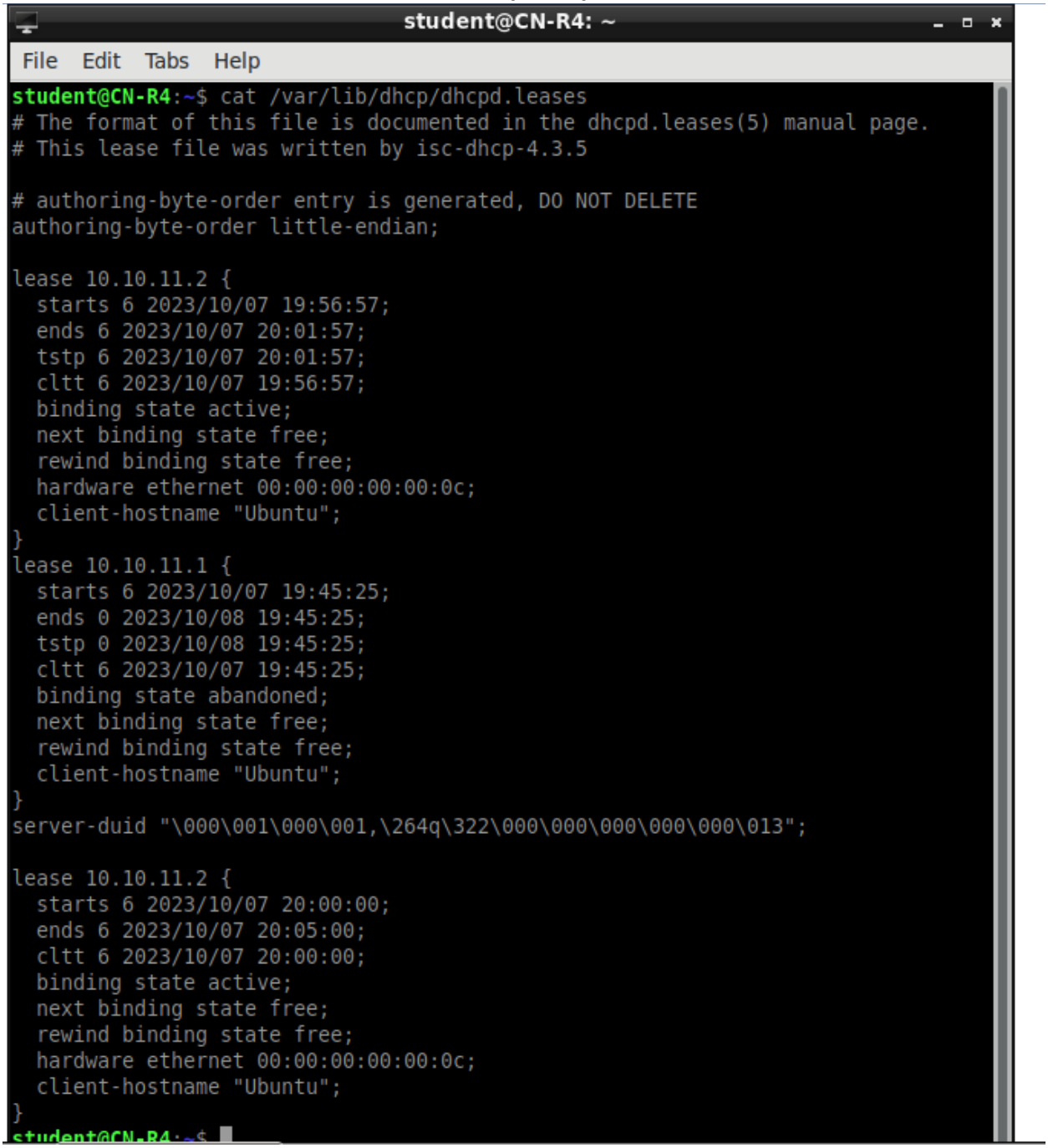
sudo systemctl status isc-dhcp-server.service

Screenshot:

```
student@CN-R4:~$ sudo systemctl status isc-dhcp-server.service
[sudo] password for student:
studentSorry, try again.
[sudo] password for student:
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor
   Active: active (running) since Sat 2023-10-07 12:59:58 PDT; 21min ago
     Docs: man:dhcpd(8)
 Main PID: 907 (dhcpd)
    Tasks: 1 (limit: 4670)
   Memory: 11.2M
   CGroup: /system.slice/isc-dhcp-server.service
           └─907 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcpd

Oct 07 13:11:28 CN-R4 dhcpd[907]: DHCPREQUEST for 10.10.11.2 from 00:00:00:00:00
Oct 07 13:11:28 CN-R4 dhcpd[907]: DHCPACK on 10.10.11.2 to 00:00:00:00:00:0c (Ub
Oct 07 13:13:49 CN-R4 dhcpd[907]: DHCPREQUEST for 10.10.11.2 from 00:00:00:00:00
Oct 07 13:13:49 CN-R4 dhcpd[907]: DHCPACK on 10.10.11.2 to 00:00:00:00:00:0c (Ub
Oct 07 13:16:20 CN-R4 dhcpd[907]: DHCPREQUEST for 10.10.11.2 from 00:00:00:00:00
Oct 07 13:16:20 CN-R4 dhcpd[907]: DHCPACK on 10.10.11.2 to 00:00:00:00:00:0c (Ub
Oct 07 13:18:21 CN-R4 dhcpd[907]: DHCPREQUEST for 10.10.11.2 from 00:00:00:00:00
Oct 07 13:18:21 CN-R4 dhcpd[907]: DHCPACK on 10.10.11.2 to 00:00:00:00:00:0c (Ub
Oct 07 13:20:49 CN-R4 dhcpd[907]: DHCPREQUEST for 10.10.11.2 from 00:00:00:00:00
Oct 07 13:20:49 CN-R4 dhcpd[907]: DHCPACK on 10.10.11.2 to 00:00:00:00:00:0c (Ub
lines 1-20/20 (END)
```

Submission

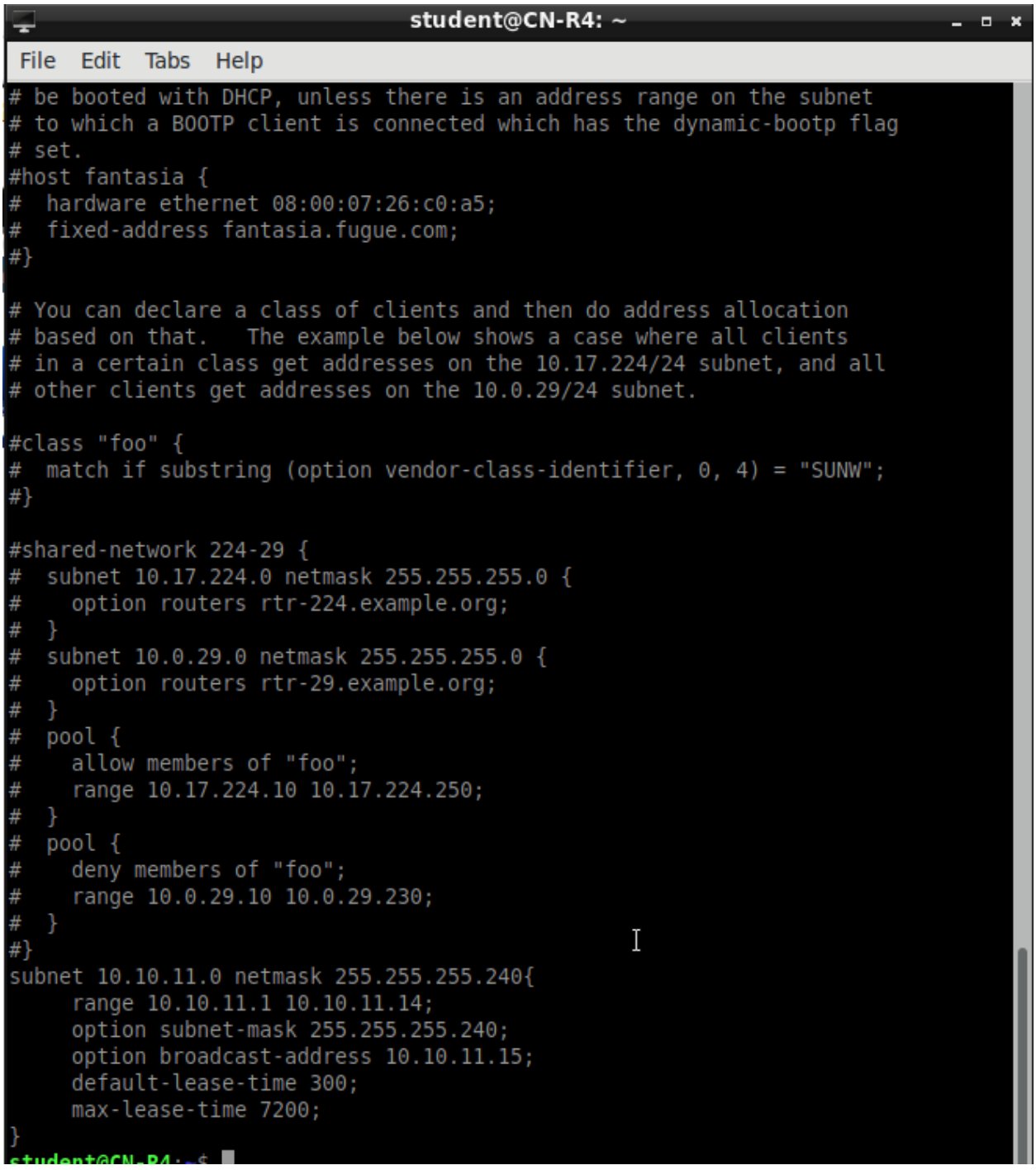
a. **The leases file on R4 found in /var/lib/dhcp/dhcpd.leases.**



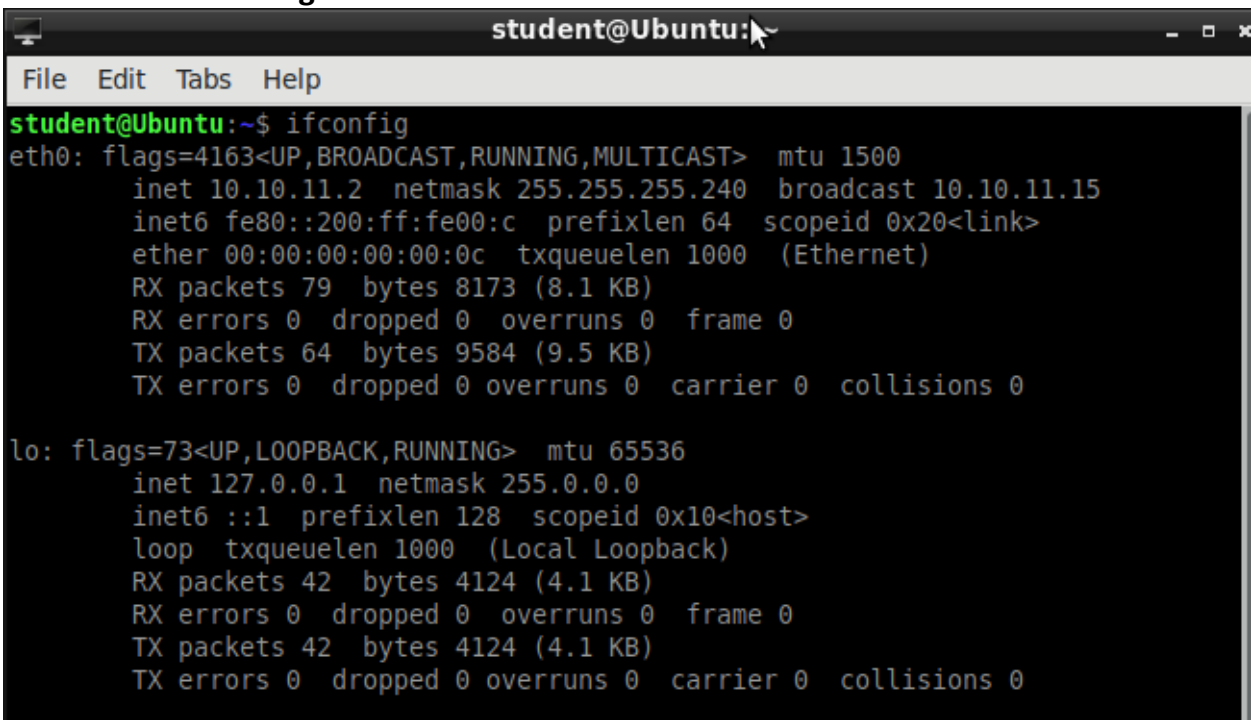
b. Your configuration for the DHCP.

```
student@CN-R4:~$ cat /etc/dhcp/dhcpd.conf
#
# Sample configuration file for ISC dhcpd for Debian
#
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as
# configuration file instead of this file.
#
#

# 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;

# option definitions common to all supported networks...
#option domain-name "example.org";
#option domain-name-servers ns1.example.org, ns2.example.org;

#option domain-name "example.org";
#option domain-name-servers ns1.exaple.org, ns2.exaple.org;


#default-lease-time 600;
#max-lease-time 7200;

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

# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
log-facility local7;

# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.

#subnet 10.152.187.0 netmask 255.255.255.0 {
```

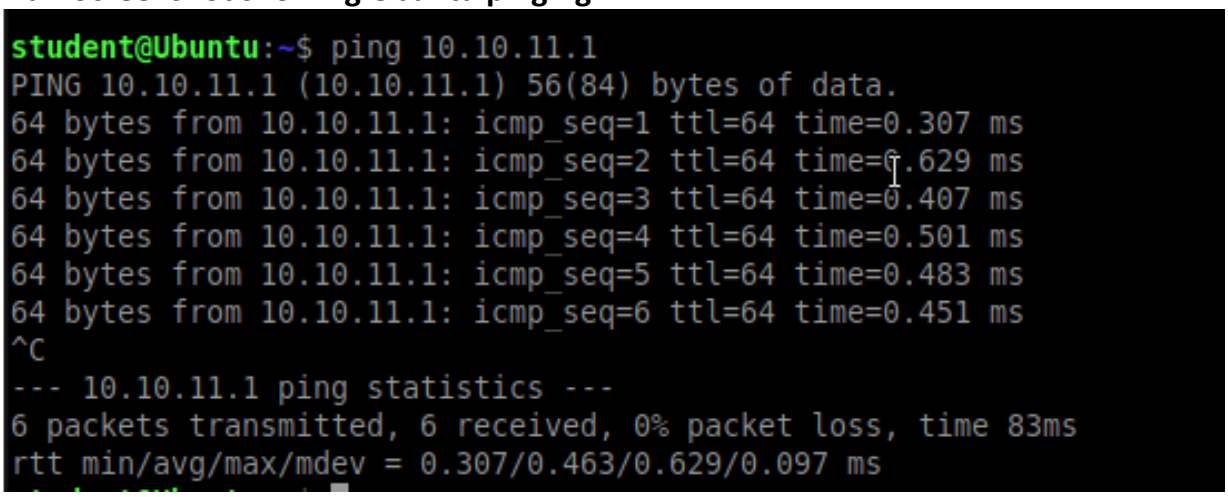
```
# which we don't really recommend.

#subnet 10.254.239.32 netmask 255.255.255.224 {
#  range dynamic-bootp 10.254.239.40 10.254.239.60;
#  option broadcast-address 10.254.239.31;
#  option routers rtr-239-32-1.example.org;
#}

# A slightly different configuration for an internal subnet.
#subnet 10.5.5.0 netmask 255.255.255.224 {
#  range 10.5.5.26 10.5.5.30;
#  option domain-name-servers ns1.internal.example.org;
#  option domain-name "internal.example.org";
#  option subnet-mask 255.255.255.224;
#  option routers 10.5.5.1;
#  option broadcast-address 10.5.5.31;
#  default-lease-time 600;
#  max-lease-time 7200;
#}

# Hosts which require special configuration options can be listed in
# host statements.   If no address is specified, the address will be
# allocated dynamically (if possible), but the host-specific information
# will still come from the host declaration.

#host passacaglia {
#  hardware ethernet 0:0:c0:5d:bd:95;
#  filename "vmunix.passacaglia";
#  server-name "toccata.fugue.com";
#}

# Fixed IP addresses can also be specified for hosts.   These addresses
# should not also be listed as being available for dynamic assignment.
# Hosts for which fixed IP addresses have been specified can boot using
# BOOTP or DHCP.   Hosts for which no fixed address is specified can only
# be booted with DHCP, unless there is an address range on the subnet
# to which a BOOTP client is connected which has the dynamic-bootp flag
# set.
#host fantasia {
#  hardware ethernet 08:00:07:26:c0:a5;
#  fixed-address fantasia.fugue.com;
```


student@CN-R4: ~
File Edit Tabs Help
be booted with DHCP, unless there is an address range on the subnet
to which a BOOTP client is connected which has the dynamic-bootp flag
set.
#host fantasia {
hardware ethernet 08:00:07:26:c0:a5;
fixed-address fantasia.fugue.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 10.10.11.0 netmask 255.255.255.240{
     range 10.10.11.1 10.10.11.14;
     option subnet-mask 255.255.255.240;
     option broadcast-address 10.10.11.15;
     default-lease-time 300;
     max-lease-time 7200;
}
student@CN-R4:~$

c. Screenshot of ifconfig on Ubuntu.

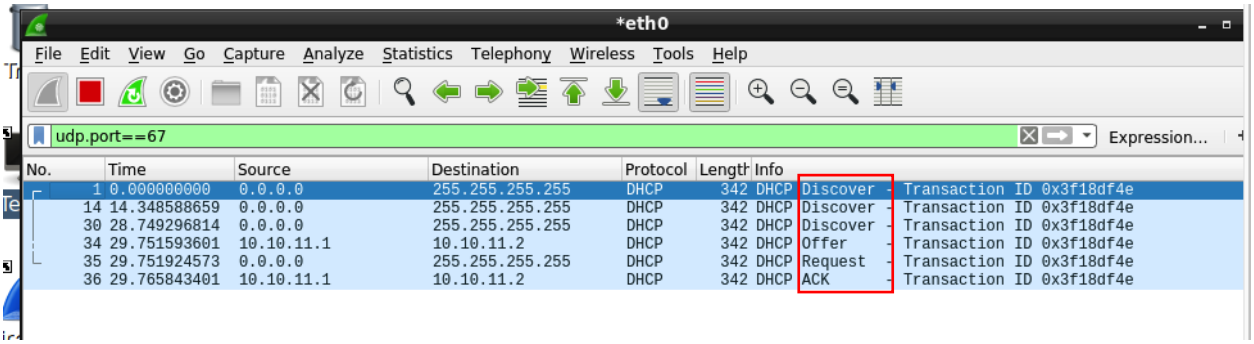


d. Screenshot showing Ubuntu pinging R4.



e. Screenshot showing Wireshark DHCP messages (4 Types).

4 Types: Discover, Offer, Request, ACK


*eth0
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
udp.port==67
Expression...
No. Time Source Destination Protocol Length Info
1 0.000000000 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x3f18df4e
14 14.348588659 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x3f18df4e
30 28.749296814 0.0.0.0 255.255.255.255 DHCP 342 DHCP Discover - Transaction ID 0x3f18df4e
34 29.751593601 10.10.11.1 10.10.11.2 DHCP 342 DHCP Offer - Transaction ID 0x3f18df4e
35 29.751924573 0.0.0.0 255.255.255.255 DHCP 342 DHCP Request - Transaction ID 0x3f18df4e
36 29.765843401 10.10.11.1 10.10.11.2 DHCP 342 DHCP ACK - Transaction ID 0x3f18df4e