

NSSA Lab - 02

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Activity 1

1.2

```
PS C:\WINDOWS\system32> ipconfig /all

Windows IP Configuration

Host Name . . . . . : DESKTOP-DF2KI00
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet0:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : Intel(R) 82574L Gigabit Network Connection
Physical Address. . . . . : 00-50-56-B0-FF-E1
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::859d:dd43:bc7c:f10c%14(PREFERRED)
IPv4 Address. . . . . : 10.2.255.19(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Saturday, March 9, 2024 6:47:14 AM
Lease Expires . . . . . : Sunday, March 17, 2024 6:47:14 AM
Default Gateway . . . . . : 10.2.255.254
DHCP Server . . . . . : 10.2.255.20
DHCPv6 IAID . . . . . : 33557545
DHCPv6 Client DUID. . . . . : 00-01-00-01-2D-7C-23-50-00-50-56-B0-FF-E1
DNS Servers . . . . . : 8.8.8.8
                                         10.2.255.254
NetBIOS over Tcpip. . . . . : Enabled
```

1.3

```
PS C:\WINDOWS\system32> ipconfig /release

Windows IP Configuration

Ethernet adapter Ethernet0:

Connection-specific DNS Suffix . . . . . :
Link-local IPv6 Address . . . . . : fe80::859d:dd43:bc7c:f10c%14
Default Gateway . . . . . :

PS C:\WINDOWS\system32> ipconfig /renew

Windows IP Configuration

Ethernet adapter Ethernet0:

Connection-specific DNS Suffix . . . . . :
Link-local IPv6 Address . . . . . : fe80::859d:dd43:bc7c:f10c%14
IPv4 Address. . . . . . . . . : 10.2.255.24
Subnet Mask . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : 10.2.255.254
```

1.4

```
Default Gateway . . . . . : 10.2.255.254
PS C:\WINDOWS\system32> ipconfig /release

Windows IP Configuration

Ethernet adapter Ethernet0:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::859d:dd43:bc7c:f10c%14
  Default Gateway . . . . . :

PS C:\WINDOWS\system32> ipconfig /renew

Windows IP Configuration

Ethernet adapter Ethernet0:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::859d:dd43:bc7c:f10c%14
  IPv4 Address. . . . . : 10.2.255.3
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 10.2.255.254
```

1.5

```
Default Gateway . . . . . : 10.2.255.254
PS C:\WINDOWS\system32> ipconfig /all

Windows IP Configuration

Host Name . . . . . : DESKTOP-DF2KI00
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet0:

  Connection-specific DNS Suffix . :
  Description . . . . . : Intel(R) 82574L Gigabit Network Connection
  Physical Address. . . . . : 00-50-56-B0-FF-E1
  DHCP Enabled. . . . . : Yes
  Autoconfiguration Enabled . . . . . : Yes
  Link-local IPv6 Address . . . . . : fe80::859d:dd43:bc7c:f10c%14(Preferred)
  IPv4 Address. . . . . : 10.2.255.3(Preferred)
  Subnet Mask . . . . . : 255.255.255.0
  Lease Obtained. . . . . : Saturday, March 9, 2024 9:32:35 AM
  Lease Expires . . . . . : Saturday, March 9, 2024 9:34:34 AM
  Default Gateway . . . . . : 10.2.255.254
  DHCP Server . . . . . : 10.2.255.1
  DHCPv6 IAID . . . . . : 33557545
  DHCPv6 Client DUID. . . . . : 00-01-00-01-2D-7C-23-50-00-50-56-B0-FF-E1
  DNS Servers . . . . . : 8.8.8.8
                                         10.2.255.254
  NetBIOS over Tcpip. . . . . : Enabled
```

Activity 2

2.1

Pinging test

```
[student@localhost ~]$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=117 time=10.1 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=117 time=10.1 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=117 time=10.2 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=117 time=10.1 ms
^C
--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
```

Commands

```
[root@localhost student]# firewall-cmd --zone=public --add-port=67/udp --permanent
success
[root@localhost student]# firewall-cmd --zone=public --add-port=67/tcp --permanent
success
[root@localhost student]# firewall-cmd --list-services
dhcpcv6-client ssh
```

DHCP Config File

```
# A slightly different configuration for an internal subnet.
subnet 10.1.255.0 netmask 255.255.255.0 {
    range 10.1.255.1 10.1.255.30;
    option domain-name-servers 10.1.255.254;
    option domain-name "Lab2 nssa245.org";
    option routers 10.1.255.254;
    option broadcast-address 10.1.255.255;
    default-lease-time 600;
    max-lease-time 7200;
}
```

Test if the Windows 10 received the IP from Centos

```
PS C:\Users\student> ipconfig /all

Windows IP Configuration

Host Name . . . . . : DESKTOP-DF2KI00
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : Lab2 nssa245.org

Ethernet adapter Ethernet0:

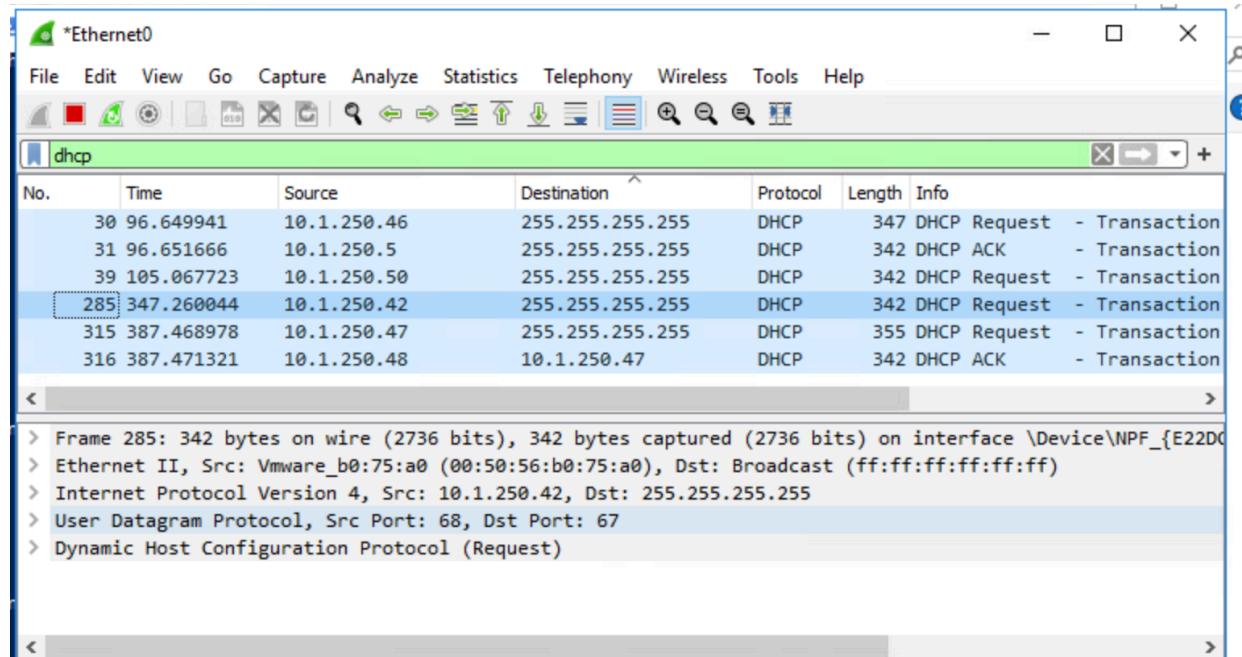
Connection-specific DNS Suffix . : Lab2 nssa245.org
Description . . . . . : Intel(R) 82574L Gigabit Network Connection
Physical Address. . . . . : 00-50-56-B0-3C-DF
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::2041:33a2:8260:af87%14(PREFERRED)
IPv4 Address. . . . . : 10.1.255.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Saturday, March 9, 2024 10:06:16 AM
Lease Expires . . . . . : Saturday, March 9, 2024 10:16:16 AM
Default Gateway . . . . . : 10.1.255.254
DHCP Server . . . . . : 10.1.255.2
DHCPv6 IAID . . . . . : 33557545
DHCPv6 Client DUID. . . . . : 00-01-00-01-2D-7C-23-7E-00-50-56-B0-3C-DF
DNS Servers . . . . . : 10.1.255.254
NetBIOS over Tcpip. . . . . : Enabled
```

2.3

```
# A slightly different configuration for an internal subnet.
subnet 10.1.255.0 netmask 255.255.255.0 {
    range 10.1.255.40 10.1.255.42;
    range 10.1.255.46 10.1.255.60;
    option domain-name-servers 10.1.255.254;
    option domain-name "Lab2.nssa245.org";
    option routers 10.1.255.254;
    option broadcast-address 10.1.255.255;
    default-lease-time 600;
    max-lease-time 7200;
}
```

```
[root@localhost dhcp]# ip add
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
            valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:50:56:b0:3e:cb brd ff:ff:ff:ff:ff:ff
        inet 10.1.255.48/24 brd 10.1.255.255 scope global noprefixroute dynamic ens33
            valid_lft 596sec preferred_lft 596sec
        inet6 fe80::1821:2a54:5805:3187/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:78:cc:ce brd ff:ff:ff:ff:ff:ff
        inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
            valid_lft forever preferred_lft forever
4: virbr0-nic: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
    link/ether 52:54:00:78:cc:ce brd ff:ff:ff:ff:ff:ff
```

2.4



```
[root@localhost etc]# 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
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:50:56:b0:3c:dd brd ff:ff:ff:ff:ff:ff
    inet 10.1.250.48/24 brd 10.1.255.255 scope global dynamic ens33
        valid_lft 538sec preferred_lft 538sec
    inet6 fe80::8f3:78c7:4700:6828/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:78:cc:ce brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
        valid_lft forever preferred_lft forever
4: virbr0-nic: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
    link/ether 52:54:00:78:cc:ce brd ff:ff:ff:ff:ff:ff
```

Ethernet adapter Ethernet0:

```
Connection-specific DNS Suffix . : lab2.nssa245.org
Description . . . . . : Intel(R) 82574L Gigabit Network Connection
Physical Address. . . . . : 00-50-56-B0-6C-F2
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::7839:6285:b7a3:ce3f%10(PREFERRED)
IPv4 Address. . . . . : 10.1.250.47(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Wednesday, March 6, 2024 1:15:33 AM
Lease Expires . . . . . : Wednesday, March 6, 2024 2:50:03 AM
Default Gateway . . . . . : 10.1.255.254
DHCP Server . . . . . : 10.1.250.5
DHCPv6 IAID . . . . . : 33557545
DHCPv6 Client DUID. . . . . : 00-01-00-01-2D-5E-5B-61-00-50-56-B0-6C-F2
DNS Servers . . . . . : 10.1.255.254
NetBIOS over Tcpip. . . . . : Enabled
```

Activity 3

3.1

```
C:\Users\student>ipconfig /release

Windows IP Configuration

Ethernet adapter Ethernet0:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::d5be:19c2:5e5b:d56d%14
  Default Gateway . . . . . :

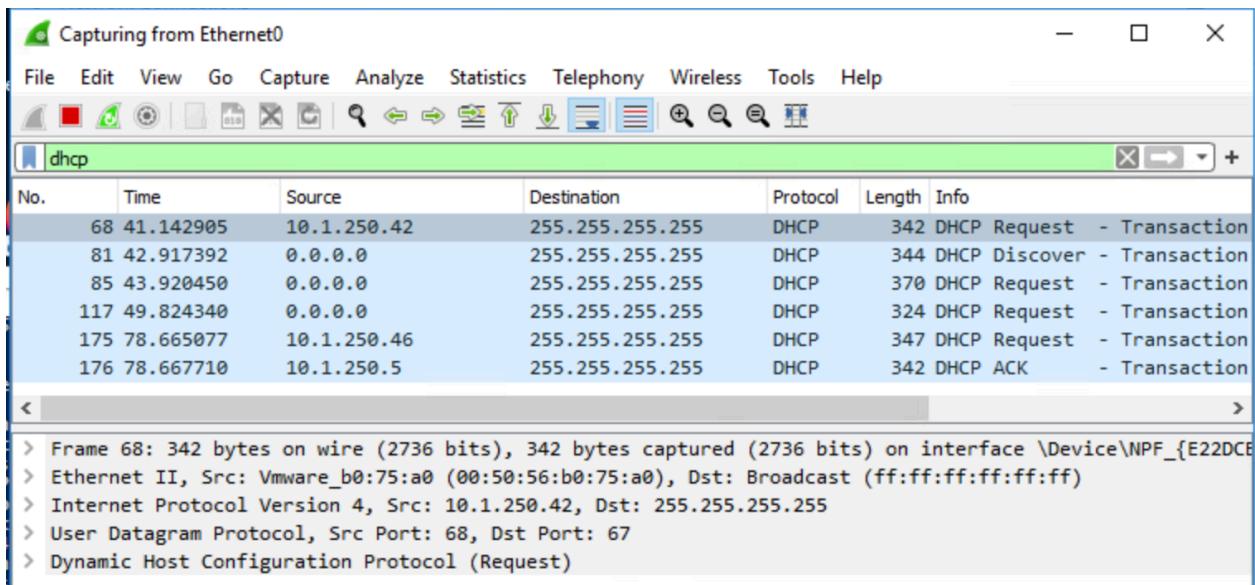
C:\Users\student>ipconfig /renew

Windows IP Configuration

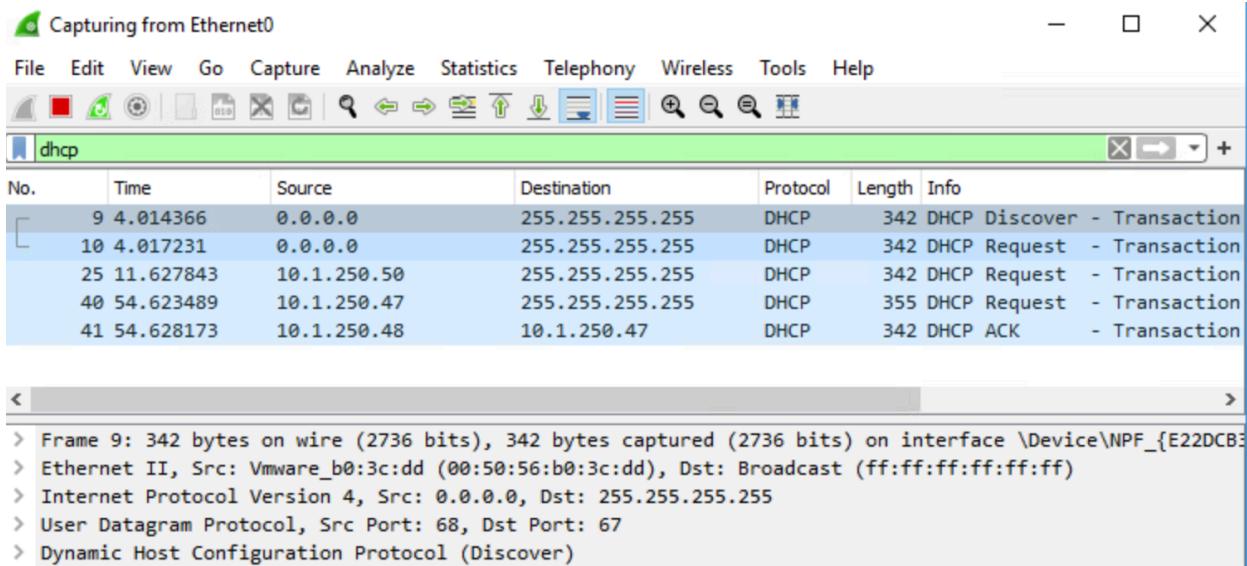
Ethernet adapter Ethernet0:

  Connection-specific DNS Suffix . : lab2.nssa245.org
  Link-local IPv6 Address . . . . . : fe80::d5be:19c2:5e5b:d56d%14
  IPv4 Address. . . . . : 10.1.250.41
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 10.1.255.254
```

Windows server - Windows 10



Windows server - Centos



Centos - Windows

```
[root@localhost student]# sudo tcpdump -i ens33 -n -vvv port 67 or port 68
tcpdump: listening on ens33, link-type EN10MB (Ethernet), capture size 262144 bytes
12:49:55.893351 IP (tos 0x0, ttl 128, id 56335, offset 0, flags [none], proto UDP (17), length 330)
    0.0.0.0.bootpc > 255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from 00:50:56:b0:3c:df (0x8000)
        Client-Ethernet-Address 00:50:56:b0:3c:df
        Vendor-rfc1048 Extensions
        Magic Cookie 0x63825363
        DHCP-Message Option 53, length 1: Discover
        Client-ID Option 61, length 7: ether 00:50:56:b0:3c:df
        Requested-IP Option 50, length 4: 10.1.255.40
        Hostname Option 12, length 15: "DESKTOP-DF2KI00"
        Vendor-Class Option 60, length 8: "MSFT 5.0"
        Parameter-Request Option 55, length 14:
            Subnet-Mask, Default-Gateway, Domain-Name-Server, Domain-Name
            Router-Discovery, Static-Route, Vendor-Option, Netbios-Name-Server
            Netbios-Node, Netbios-Scope, Option 119, Classless-Static-Route
            Classless-Static-Route-Microsoft, Option 252
        END Option 255, length 0
12:49:56.894895 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 328)
```

```

10.1.255.2.bootps > 255.255.255.255.bootpc: [udp sum ok] BOOTP/DHCP, Reply, length 300, x
id 0x15393b13, Flags [Broadcast] (0x8000)
    Your-IP 10.1.255.40
    Client-Ethernet-Address 00:50:56:b0:3c:df
    Vendor-rfc1048 Extensions
        Magic Cookie 0x63825363
        DHCP-Message Option 53, length 1: Offer
        Server-ID Option 54, length 4: 10.1.255.2
        Lease-Time Option 51, length 4: 600
        Subnet-Mask Option 1, length 4: 255.255.255.0
        Default-Gateway Option 3, length 4: 10.1.255.254
        Domain-Name-Server Option 6, length 4: 10.1.255.254
        Domain-Name Option 15, length 16: "Lab2.nssa245.org"
        END Option 255, length 0
        PAD Option 0, length 0, occurs 8
12:49:56.896038 IP (tos 0x0, ttl 128, id 56336, offset 0, flags [none], proto UDP (17), length 356)
    0.0.0.0.bootpc > 255.255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from 00:50:56:b0:3c:df, length 328, xid 0x15393b13, Flags [Broadcast] (0x8000)
        Client-Ethernet-Address 00:50:56:b0:3c:df
        Vendor-rfc1048 Extensions
            Magic Cookie 0x63825363
            DHCP-Message Option 53, length 1: Request
            Client-ID Option 61, length 7: ether 00:50:56:b0:3c:df
            Requested-IP Option 50, length 4: 10.1.255.40
            Server-ID Option 54, length 4: 10.1.255.2
            Hostname Option 12, length 15: "DESKTOP-DF2KI00"
            FQDN Option 81, length 18: "DESKTOP-DF2KI00"
            Vendor-Class Option 60, length 8: "MSFT 5.0"
            Parameter-Request Option 55, length 14:
                Subnet-Mask, Default-Gateway, Domain-Name-Server, Domain-Name
                Router-Discovery, Static-Route, Vendor-Option, Netbios-Name-Server
                Netbios-Node, Netbios-Scope, Option 119, Classless-Static-Route
                Classless-Static-Route-Microsoft, Option 252
            END Option 255, length 0
12:49:56.898357 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 328)
    10.1.255.2.bootps > 255.255.255.255.bootpc: [udp sum ok] BOOTP/DHCP, Reply, length 300, x
id 0x15393b13, Flags [Broadcast] (0x8000)
    Your-IP 10.1.255.40
    Client-Ethernet-Address 00:50:56:b0:3c:df
    Vendor-rfc1048 Extensions
        Magic Cookie 0x63825363
        DHCP-Message Option 53, length 1: ACK
        Server-ID Option 54, length 4: 10.1.255.2
        Lease-Time Option 51, length 4: 600
        Subnet-Mask Option 1, length 4: 255.255.255.0
        Default-Gateway Option 3, length 4: 10.1.255.254
        Domain-Name-Server Option 6, length 4: 10.1.255.254
        Domain-Name Option 15, length 16: "Lab2.nssa245.org"
        END Option 255, length 0
        PAD Option 0, length 0, occurs 8
12:50:08.598879 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 328)

```

Centos - Centos

```
[root@localhost student]# sudo tcpdump -i ens33 -n -vvv port 67 or port 68
tcpdump: listening on ens33, link-type EN10MB (Ethernet), capture size 262144 bytes
12:54:23.147758 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 3
28)
    0.0.0.0.bootpc > 255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from 00:50:56:b
0:3e:cb, length 300, xid 0xf57ebe02, Flags [none] (0x0000)
        Client-Ethernet-Address 00:50:56:b0:3e:cb
        Vendor-rfc1048 Extensions
            Magic Cookie 0x63825363
            DHCP-Message Option 53, length 1: Discover
            Requested-IP Option 50, length 4: 10.1.255.48
            Parameter-Request Option 55, length 13:
                Subnet-Mask, BR, Time-Zone, Classless-Static-Route
                Domain-Name, Domain-Name-Server, Hostname, YD
                YS, NTP, MTU, Option 119
                Default-Gateway
            END Option 255, length 0
            PAD Option 0, length 0, occurs 35
12:54:23.149425 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 3
28)

    10.1.255.2.bootps > 10.1.255.48.bootpc: [udp sum ok] BOOTP/DHCP, Reply, length 300, xid 0
xf57ebe02, Flags [none] (0x0000)
        Your-IP 10.1.255.48
        Client-Ethernet-Address 00:50:56:b0:3e:cb
        Vendor-rfc1048 Extensions
            Magic Cookie 0x63825363
            DHCP-Message Option 53, length 1: Offer
            Server-ID Option 54, length 4: 10.1.255.2
            Lease-Time Option 51, length 4: 600
            Subnet-Mask Option 1, length 4: 255.255.255.0
            BR Option 28, length 4: 10.1.255.255
            Domain-Name Option 15, length 16: "Lab2.nssa245.org"
            Domain-Name-Server Option 6, length 4: 10.1.255.254
            Default-Gateway Option 3, length 4: 10.1.255.254
            END Option 255, length 0
            PAD Option 0, length 0, occurs 2
12:54:23.151782 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 3
28)
```

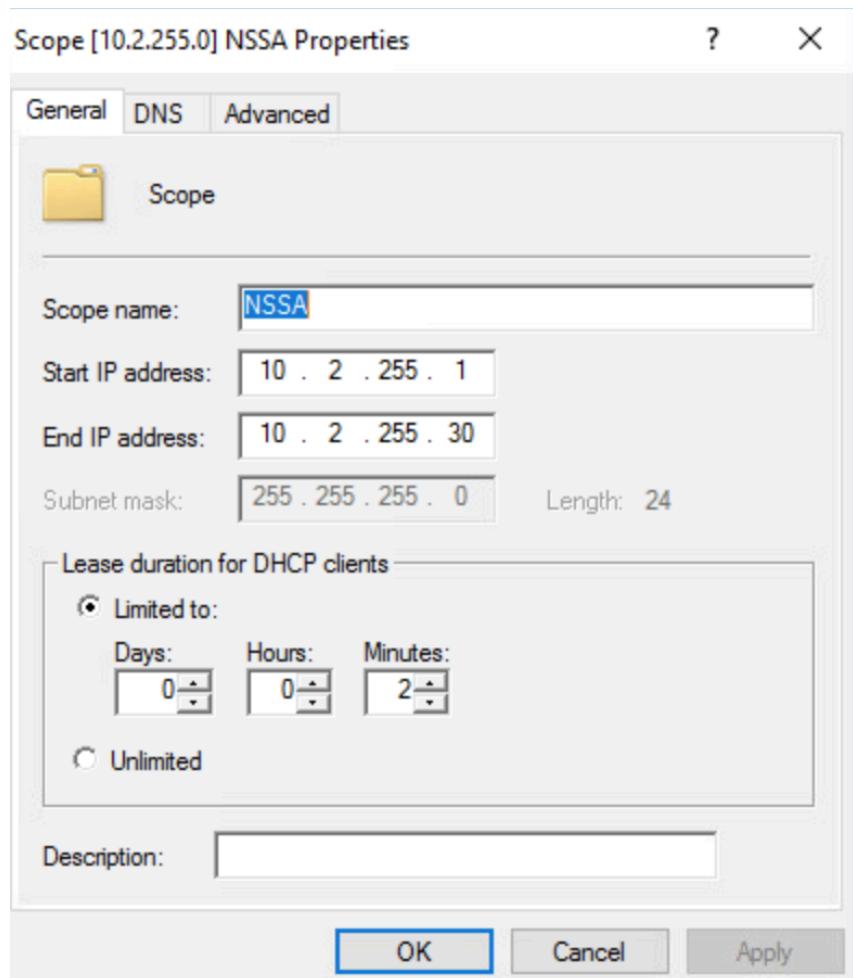
```
0.0.0.0.bootpc > 255.255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from 00:50:56:b  
0:3e:cb, length 300, xid 0xf57ebe02, Flags [none] (0x0000)  
    Client-Ethernet-Address 00:50:56:b0:3e:cb  
    Vendor-rfc1048 Extensions  
        Magic Cookie 0x63825363  
        DHCP-Message Option 53, length 1: Request  
        Server-ID Option 54, length 4: 10.1.255.2  
        Requested-IP Option 50, length 4: 10.1.255.48  
        Parameter-Request Option 55, length 13:  
            Subnet-Mask, BR, Time-Zone, Classless-Static-Route  
            Domain-Name, Domain-Name-Server, Hostname, YD  
            YS, NTP, MTU, Option 119  
            Default-Gateway  
        END Option 255, length 0  
        PAD Option 0, length 0, occurs 29  
12:54:23.151999 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 3  
28)
```

```
10.1.255.2.bootps > 10.1.255.48.bootpc: [udp sum ok] BOOTP/DHCP, Reply, length 300, xid 0  
xf57ebe02, Flags [none] (0x0000)  
    Your-IP 10.1.255.48  
    Client-Ethernet-Address 00:50:56:b0:3e:cb  
    Vendor-rfc1048 Extensions  
        Magic Cookie 0x63825363  
        DHCP-Message Option 53, length 1: ACK  
        Server-ID Option 54, length 4: 10.1.255.2  
        Lease-Time Option 51, length 4: 600  
        Subnet-Mask Option 1, length 4: 255.255.255.0  
        BR Option 28, length 4: 10.1.255.255  
        Domain-Name Option 15, length 16: "Lab2.nssa245.org"  
        Domain-Name-Server Option 6, length 4: 10.1.255.254  
        Default-Gateway Option 3, length 4: 10.1.255.254  
        END Option 255, length 0  
        PAD Option 0, length 0, occurs 2
```

Activity 4

4.1

Changing the Lease Time to 2 min



Capturing traffic during the process of release and renew

Windows Server -Windows 10

No.	Time	Source	Destination	Protocol	Length	Info
17	6.445400	0.0.0.0	255.255.255.255	DHCP	324	DHCP Request - Transaction ID 0x92a4eb
27	12.699054	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xfeb0954d
28	12.700011	10.1.255.1	255.255.255.255	DHCP	342	DHCP Offer - Transaction ID 0xfeb0954d
29	12.700555	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xfeb0954d
30	12.702286	10.1.255.1	255.255.255.255	DHCP	342	DHCP ACK - Transaction ID 0xfeb0954d
376	171.741562	10.1.255.42	255.255.255.255	DHCP	355	DHCP Request - Transaction ID 0x4ab95182
449	237.759197	10.1.255.41	255.255.255.255	DHCP	347	DHCP Request - Transaction ID 0x952b573a
493	281.514332	10.1.255.47	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x191ebe69
522	315.381229	10.1.255.50	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x409a8678
530	320.633269	10.1.255.49	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0xe8cda32e

Changing the lease time to 2 minutes.

```
# dhcpcd.conf
#
# Sample configuration file for ISC dhcpcd
#
# option definitions common to all supported networks...
# option domain-name "example.org";
# option domain-name-servers ns1.example.org, ns2.example.org;

default-lease-time 120;
max-lease-time 120;
```

Windows Server -Centos

```
[root@localhost dhcp]# sudo tcpdump -i ens33 -n -vvv port 67
tcpdump: listening on ens33, link-type EN10MB (Ethernet), capture size 262144 bytes
)5:30:32.596261 IP (tos 0x0, ttl 128, id 26134, offset 0, flags [none], proto UDP (17), length 333)
  10.1.255.41.bootpc > 255.255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from 00:50:56:b0:e6:ce, length 3
    Client-IP 10.1.255.41
    Client-Ethernet-Address 00:50:56:b0:e6:ce
    Vendor-rfc1048 Extensions
      Magic Cookie 0x63825363
      DHCP-Message Option 53, length 1: Request
      Client-ID Option 61, length 7: ether 00:50:56:b0:e6:ce
      Hostname Option 12, length 10: "W2K12R2001"
      FQDN Option 81, length 13: "W2K12R2001"
      Vendor-Class Option 60, length 8: "MSFT 5.0"
      Parameter-Request Option 55, length 13:
        Subnet-Mask, Domain-Name, Default-Gateway, Domain-Name-Server
        Netbios-Name-Server, Netbios-Node, Netbios-Scope, Router-Discovery
        Static-Route, Classless-Static-Route, Classless-Static-Route-Microsoft, Option 252
        Vendor-Option
        END Option 255, length 0
)5:30:32.600223 IP (tos 0x0, ttl 64, id 64540, offset 0, flags [DF], proto UDP (17), length 328)
  10.1.255.48.bootps > 10.1.255.41.bootpc: [bad udp cksum 0x13a2 -> 0x4a48!] BOOTP/DHCP, Reply, length 300, xid
    Client-IP 10.1.255.41
    Your-IP 10.1.255.41
    Client-Ethernet-Address 00:50:56:b0:e6:ce
    Vendor-rfc1048 Extensions
      Magic Cookie 0x63825363
      DHCP-Message Option 53, length 1: ACK
      Server-ID Option 54, length 4: 10.1.255.1
      Lease-Time Option 51, length 4: 600
      Subnet-Mask Option 1, length 4: 255.255.255.0
      Domain-Name Option 15, length 16: "Lab2.nssa245.org"
      Default-Gateway Option 3, length 4: 10.1.255.254
      Domain-Name-Server Option 6, length 4: 10.1.255.254
      END Option 255, length 0
      PAD Option 0, length 0, occurs 8
)5:31:28.951709 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 328)
```

END Option 255, length 0
05:30:32.600223 IP (tos 0x0, ttl 64, id 64540, offset 0, flags [DF], proto UDP (17), l
10.1.255.48.bootps > 10.1.255.41.bootpc: [bad udp cksum 0x13a2 -> 0x4a48!] BOOTP/DH
Client-IP 10.1.255.41
Your-IP 10.1.255.41
Client-Ethernet-Address 00:50:56:b0:e6:ce
Vendor-rfc1048 Extensions
 Magic Cookie 0x63825363
 DHCP-Message Option 53, length 1: ACK
 Server-ID Option 54, length 4: 10.1.255.1
 Lease-Time Option 51, length 4: 600
 Subnet-Mask Option 1, length 4: 255.255.255.0
 Domain-Name Option 15, length 16: "Lab2.nssa245.org"
 Default-Gateway Option 3, length 4: 10.1.255.254
 Domain-Name-Server Option 6, length 4: 10.1.255.254
 END Option 255, length 0
 PAD Option 0, length 0, occurs 8
05:31:28.951709 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), l
10.1.255.48.bootpc > 255.255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from
Client-IP 10.1.255.48
Client-Ethernet-Address 00:50:56:b0:3e:cb
Vendor-rfc1048 Extensions
 Magic Cookie 0x63825363
 DHCP-Message Option 53, length 1: Request
 Parameter-Request Option 55, length 13:
 Subnet-Mask, BR, Time-Zone, Classless-Static-Route
 Domain-Name, Domain-Name-Server, Hostname, YD
 YS, NTP, MTU, Option 119
 Default-Gateway
 END Option 255, length 0
 PAD Option 0, length 0, occurs 41
05:31:42.791053 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), l

```
10.1.255.48.bootpc > 255.255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from (Client-IP 10.1.255.48
Client-Ethernet-Address 00:50:56:b0:3e:cb
Vendor-rfc1048 Extensions
    Magic Cookie 0x63825363
    DHCP-Message Option 53, length 1: Request
    Parameter-Request Option 55, length 13:
        Subnet-Mask, BR, Time-Zone, Classless-Static-Route
        Domain-Name, Domain-Name-Server, Hostname, YD
        YS, NTP, MTU, Option 119
        Default-Gateway
    END Option 255, length 0
    PAD Option 0, length 0, occurs 41
05:32:03.190373 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), len 136) to 10.1.255.48.bootpc > 255.255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from (Client-IP 10.1.255.48
Client-Ethernet-Address 00:50:56:b0:3e:cb
Vendor-rfc1048 Extensions
    Magic Cookie 0x63825363
    DHCP-Message Option 53, length 1: Request
    Parameter-Request Option 55, length 13:
        Subnet-Mask, BR, Time-Zone, Classless-Static-Route
        Domain-Name, Domain-Name-Server, Hostname, YD
        YS, NTP, MTU, Option 119
        Default-Gateway
    END Option 255, length 0
    PAD Option 0, length 0, occurs 41
05:32:08.210533 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), len 136) to 10.1.255.48.bootpc > 255.255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request from (Client-IP 10.1.255.48
Client-Ethernet-Address 00:50:56:b0:3e:cb
Vendor-rfc1048 Extensions
    Magic Cookie 0x63825363
    DHCP-Message Option 53, length 1: Request
    Parameter-Request Option 55, length 13:
        Subnet-Mask, BR, Time-Zone, Classless-Static-Route
        Domain-Name, Domain-Name-Server, Hostname, YD
        YS, NTP, MTU, Option 119
        Default-Gateway
    END Option 255, length 0
    PAD Option 0, length 0, occurs 41
```

```

10.1.255.47.bootpc > 255.255.255.255.bootps: [udp sum ok] BOOTP/DHCP, Request
  Client-IP 10.1.255.47
  Client-Ethernet-Address 00:50:56:b0:5e:50
  Vendor-rfc1048 Extensions
    Magic Cookie 0x63825363
    DHCP-Message Option 53, length 1: Request
    Parameter-Request Option 55, length 19:
      Subnet-Mask, BR, Time-Zone, Classless-Static-Route
      Domain-Name, Domain-Name-Server, Hostname, YD
      YS, NTP, MTU, Option 119
      Default-Gateway, Classless-Static-Route, Classless-Static-Route-Micr
      Option 252, NTP, RP
    END Option 255, length 0
    PAD Option 0, length 0, occurs 35
15:32:08.211969 IP (tos 0x0, ttl 64, id 22469, offset 0, flags [DF], proto UDP (17)
  10.1.255.48.bootps > 10.1.255.47.bootpc: [bad udp cksum 0x13a8 -> 0x1745!] B00
    Client-IP 10.1.255.47
    Your-IP 10.1.255.47
    Client-Ethernet-Address 00:50:56:b0:5e:50
    Vendor-rfc1048 Extensions
      Magic Cookie 0x63825363
      DHCP-Message Option 53, length 1: ACK
      Server-ID Option 54, length 4: 10.1.255.1
      Lease-Time Option 51, length 4: 600
      Subnet-Mask Option 1, length 4: 255.255.255.0
      BR Option 28, length 4: 10.1.255.255
      Domain-Name Option 15, length 16: "Lab2.nssa245.org"
      Domain-Name-Server Option 6, length 4: 10.1.255.254
      Default-Gateway Option 3, length 4: 10.1.255.254
    END Option 255, length 0
    PAD Option 0, length 0, occurs 2
15:32:22.802126 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17)
  10.1.255.48.bootpc > 10.1.255.47.bootpc: [bad udp cksum 0x13a8 -> 0x1745!] B00
    PAD Option 0, length 0, occurs 29
05:33:09.859153 IP (tos 0x10, ttl 128, id 0, offset 0, flags [none], proto UDP (17), length 32
  10.1.255.1.bootps > 10.1.255.48.bootpc: [udp sum ok] BOOTP/DHCP, Reply, length 300, xid 0x
    Your-IP 10.1.255.48
    Client-Ethernet-Address 00:50:56:b0:3e:cb
    Vendor-rfc1048 Extensions
      Magic Cookie 0x63825363
      DHCP-Message Option 53, length 1: ACK
      Server-ID Option 54, length 4: 10.1.255.1
      Lease-Time Option 51, length 4: 600
      Subnet-Mask Option 1, length 4: 255.255.255.0
      BR Option 28, length 4: 10.1.255.255
      Domain-Name Option 15, length 16: "Lab2.nssa245.org"
      Domain-Name-Server Option 6, length 4: 10.1.255.254
      Default-Gateway Option 3, length 4: 10.1.255.254
    END Option 255, length 0
    PAD Option 0, length 0, occurs 2
^C
21 packets captured
21 packets received by filter

```

Activity 5

```
[root@localhost dhcp]# systemctl stop dhcpcd.service
[root@localhost dhcp]# cp /lib/systemd/system/dhcrelay.service /etc/systemd/system/dhcrelay.service
cp: overwrite '/etc/systemd/system/dhcrelay.service'? y
[root@localhost dhcp]# nano /etc/systemd/system/dhcrelay.service
```

```
[Unit]
Description=DHCP Relay Agent Daemon
Documentation=man:dhcrelay(8)
Wants=network-online.target
After=network-online.target

[Service]
Type=notify
ExecStart=/usr/sbin/dhcrelay -d --no-pid 10.1.255.50

[Install]
WantedBy=multi-user.target
```

```
[root@localhost dhcp]# systemctl --system daemon-reload
[root@localhost dhcp]# systemctl restart dhcrelay
```