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Course: CMPE 148 – 01

Lab assignment #2: DHCP

Note: Jump to page 8 to view the answers to the questions.

Command Prompt window showing sequence of *ipconfig* commands entered:

```
Microsoft Windows [Version 10.0.17763.437]
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C:\Users\1swet>ipconfig /release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Ethernet 2 while it has its media disconnected.
An error occurred while releasing interface Wi-Fi : An address has not yet been associated with the network endpoint.

No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter Ethernet 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::5c9a:78a8:444c:f6af%8
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Ethernet adapter Npcap Loopback Adapter:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::50c8:8f9e:9442:b155%3
    Autoconfiguration IPv4 Address. . : 169.254.177.85
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2601:647:5380:2be1::86cd
    IPv6 Address. . . . . : 2601:647:5380:2be1:85d5:649e:f2da:fea2
```

Figure 1. *ipconfig /release* command to display the current IP address (Host's IP address becomes 0.0.0.0.)

```

Temporary IPv6 Address. . . . . : 2601:647:5380:2be1:b025:5b8:3ff8:64d6
Link-local IPv6 Address . . . . . : fe80::85d5:649e:f2da:fea2%11
Autoconfiguration IPv4 Address. . : 169.254.254.162
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : fe80::fe51:a4ff:fe1d:5033%11

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

C:\Users\1swet>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter Ethernet 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::5c9a:78a8:444c:f6af%8
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Ethernet adapter Npcap Loopback Adapter:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::50c8:8f9e:9442:b155%3
    Autoconfiguration IPv4 Address. . : 169.254.177.85
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . :

Wireless LAN adapter Wi-Fi:

```

Figure 2. ipconfig command to check the interface name

```

Connection-specific DNS Suffix . : 
IPv6 Address. . . . . : 2601:647:5380:2be1::86cd
IPv6 Address. . . . . : 2601:647:5380:2be1:85d5:649e:f2da:fea2
Temporary IPv6 Address. . . . . : 2601:647:5380:2be1:b025:5b8:3ff8:64d6
Link-local IPv6 Address . . . . . : fe80::85d5:649e:f2da:fea2%11
Autoconfiguration IPv4 Address. . : 169.254.254.162
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : fe80::fe51:a4ff:fe1d:5033%11

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . : 

C:\Users\lswet>ipconfig /renew

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Ethernet 2 while it has its media disconnected.
An error occurred while renewing interface Npcap Loopback Adapter : unable to contact your DHCP server. Request has timed out.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . : 

Ethernet adapter Ethernet 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . : 

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix . : 
    Link-local IPv6 Address . . . . . : fe80::5c9a:78a8:444c:f6af%8
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Ethernet adapter Npcap Loopback Adapter:

    Connection-specific DNS Suffix . : 

```

Figure 3. ipconfig /renew command to obtain network configuration, including a new IP address

```

Link-local IPv6 Address . . . . . : fe80::50c8:8f9e:9442:b155%3
Autoconfiguration IPv4 Address. . : 169.254.177.85
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . :

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . : hsd1.ca.comcast.net
IPv6 Address. . . . . : 2601:647:5380:2be1::86cd
IPv6 Address. . . . . : 2601:647:5380:2be1:85d5:649e:f2da:fea2
Temporary IPv6 Address. . . . . : 2601:647:5380:2be1:b025:5b8:3ff8:64d6
Link-local IPv6 Address . . . . . : fe80::85d5:649e:f2da:fea2%11
IPv4 Address. . . . . : 10.0.0.131
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : fe80::fe51:a4ff:fe1d:5033%11
                          10.0.0.1

Ethernet adapter Bluetooth Network Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

C:\Users\lswet>ipconfig /renew

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Ethernet 2 while it has its media disconnected.
An error occurred while renewing interface Npcap Loopback Adapter : unable to contact your DHCP server. Request has timed out.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Ethernet adapter Ethernet:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

Ethernet adapter Ethernet 2:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

Ethernet adapter VirtualBox Host-Only Network:

```

Figure 4. ipconfig /renew command executed again

```

Connection-specific DNS Suffix . : 
Link-local IPv6 Address . . . . . : fe80::5c9a:78a8:444c:f6af%8
IPv4 Address. . . . . : 192.168.56.1
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 

Ethernet adapter Npcap Loopback Adapter:

Connection-specific DNS Suffix . : 
Link-local IPv6 Address . . . . . : fe80::50c8:8f9e:9442:b155%3
Autoconfiguration IPv4 Address. . : 169.254.177.85
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : 

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . : hsd1.ca.comcast.net
IPv6 Address. . . . . : 2601:647:5380:2be1::86cd
IPv6 Address. . . . . : 2601:647:5380:2be1:85d5:649e:f2da:fea2
Temporary IPv6 Address. . . . . : 2601:647:5380:2be1:b025:5b8:3ff8:64d6
Link-local IPv6 Address . . . . . : fe80::85d5:649e:f2da:fea2%11
IPv4 Address. . . . . : 10.0.0.131
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : fe80::fe51:a4ff:fe1d:5033%11
                             10.0.0.1

Ethernet adapter Bluetooth Network Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . : 

C:\Users\1swet>ipconfig /release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Ethernet 2 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Ethernet adapter Ethernet:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . : 

```

Figure 5. ipconfig /release command to release the previously-allocated IP address


```

Ethernet adapter Ethernet 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::5c9a:78a8:444c:f6af%8
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Ethernet adapter Npcap Loopback Adapter:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::50c8:8f9e:9442:b155%3
    Autoconfiguration IPv4 Address. . : 169.254.177.85
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2601:647:5380:2be1::86cd
    IPv6 Address. . . . . : 2601:647:5380:2be1:85d5:649e:f2da:fea2
    Temporary IPv6 Address. . . . . : 2601:647:5380:2be1:b025:5b8:3ff8:64d6
    Link-local IPv6 Address . . . . . : fe80::85d5:649e:f2da:fea2%11
    Default Gateway . . . . . : fe80::fe51:a4ff:fe1d:5033%11

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

C:\Users\lswet>ipconfig /renew

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Ethernet 2 while it has its media disconnected.
An error occurred while renewing interface Npcap Loopback Adapter : unable to contact your DHCP server. Request has timed out.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

```

Figure 6. ipconfig /renew command to again be allocated an IP address

```

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :

Ethernet adapter Ethernet 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix . :
    Link-local IPv6 Address . . . . . : fe80::5c9a:78a8:444c:f6af%8
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Ethernet adapter Npcap Loopback Adapter:

    Connection-specific DNS Suffix . :
    Link-local IPv6 Address . . . . . : fe80::50c8:8f9e:9442:b155%3
    Autoconfiguration IPv4 Address. . : 169.254.177.85
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix . : hsd1.ca.comcast.net
    IPv6 Address. . . . . : 2601:647:5380:2be1::86cd
    IPv6 Address. . . . . : 2601:647:5380:2be1:85d5:649e:f2da:fea2
    Temporary IPv6 Address. . . . . : 2601:647:5380:2be1:b025:5b8:3ff8:64d6
    Link-local IPv6 Address . . . . . : fe80::85d5:649e:f2da:fea2%11
    IPv4 Address. . . . . : 10.0.0.131
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::fe51:a4ff:fe1d:5033%11
                                10.0.0.1

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :

C:\Users\1swet>

```

Figure 7. Continuation of renewed IP address information

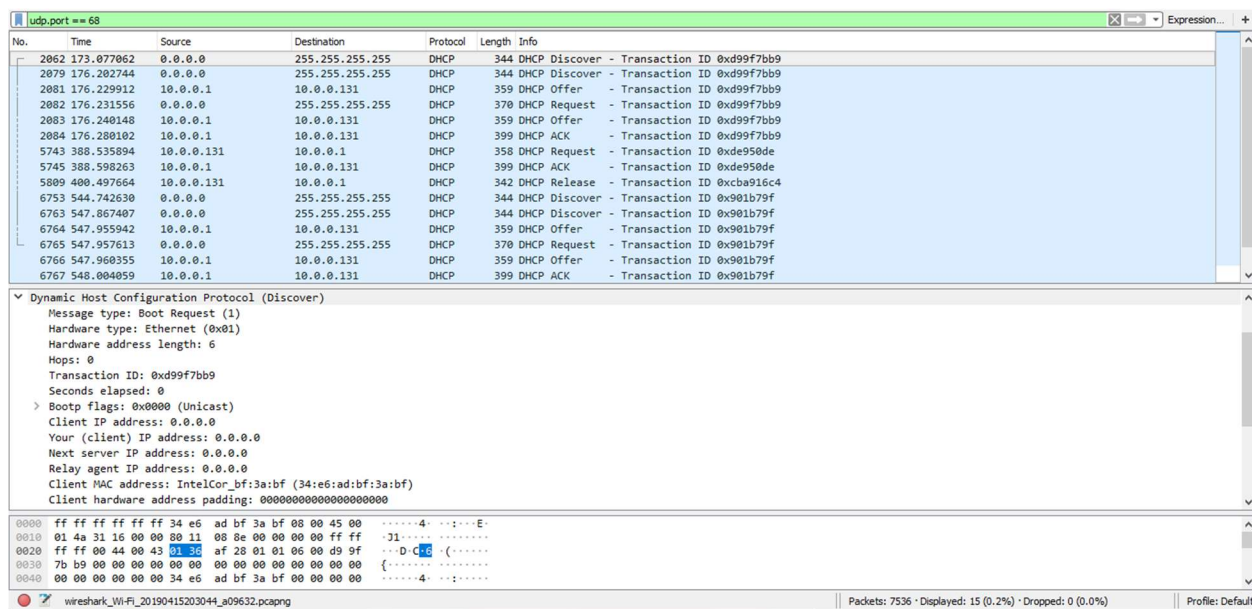


Figure 8. Wireshark window with first DHCP packet - the DHCP Discover packet expanded

Answers to the questions:

1. First, the host broadcasts “**DHCP discover**” message. Next, DHCP server responds with “**DHCP offer**” message. Then, the host requests IP address: “**DHCP request**” message. Finally, the DHCP server sends the address: “**DHCP ack**” message. The protocol field in the IP header contains assigned protocol numbers. In this case, since DHCP messages are sent over **UDP**, the value in the protocol field would be **17**.

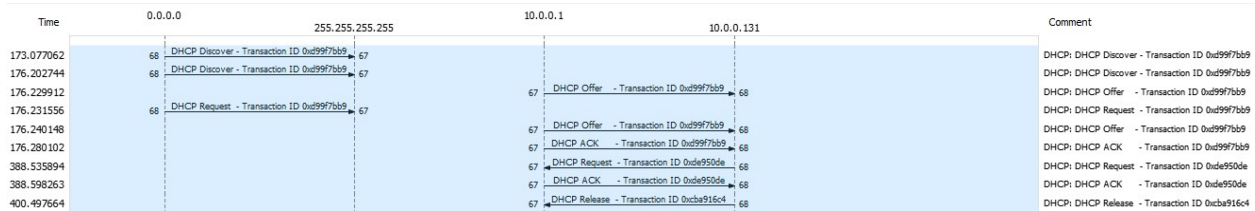
Protocol	Length	Info
DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
DHCP	358	DHCP Request - Transaction ID 0xde950de
DHCP	399	DHCP ACK - Transaction ID 0xde950de
DHCP	342	DHCP Release - Transaction ID 0xcba916c4
DHCP	344	DHCP Discover - Transaction ID 0x901b79f
DHCP	344	DHCP Discover - Transaction ID 0x901b79f
DHCP	359	DHCP Offer - Transaction ID 0x901b79f
DHCP	370	DHCP Request - Transaction ID 0x901b79f
DHCP	359	DHCP Offer - Transaction ID 0x901b79f
DHCP	399	DHCP ACK - Transaction ID 0x901b79f


```

User Datagram Protocol, Src Port: 68, Dst Port: 67
  Source Port: 68
  Destination Port: 67
  Length: 310
  Checksum: 0xaf28 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 235]
  [Timestamps]
    [Time since first frame: 0.000000000 seconds]
    [Time since previous frame: 0.000000000 seconds]
  > Dynamic Host Configuration Protocol (Discover)

```

- Timing datagram illustrating the sequence of the first four-packet Discover/Offer/Request/ACK DHCP exchange between the client and the server:



- The link layer (e.g., Ethernet) address of my DHCP server is (34:e6:ad:bf:3a:bf).

udp.port == 68

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6764	547.955942	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0x901b79f
6765	547.957613	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0x901b79f
6766	547.960355	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0x901b79f
6767	548.004059	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0x901b79f

> Frame 2062: 344 bytes on wire (2752 bits), 344 bytes captured (2752 bits) on interface 0

> Ethernet II, Src: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

> Destination: Broadcast (ff:ff:ff:ff:ff:ff)

> Source: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

> Type: IPv4 (0x0800)

> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255

> User Datagram Protocol, Src Port: 68, Dst Port: 67

> Dynamic Host Configuration Protocol (Discover)

```

0000  ff ff ff ff ff ff 34 e6 ad bf 3a bf 08 00 45 00  ..4.....E
0010  01 4a 31 16 00 00 08 11 08 8e 00 00 00 00 ff ff  ..J1.....
0020  ff ff 00 44 00 43 01 36 af 28 01 01 06 00 d9 9f  ..D.C.6.(.....
0030  7b b9 00 00 00 00 00 00 00 00 00 00 00 00 00  ..{.....
0040  00 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 00  ..4.....

```

wireshark-Wi-Fi_20190415203044_a09632.pcapng

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

- As shown in the figures below, the value in the DHCP discover message that differentiates this message from the DHCP request message is **option 53**, more specifically, in the DHCP discover message, it's **DHCP: discover (1)** and in the DHCP request message, it's **DHCP: request (3)**.

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 0
Transaction ID: 0xd99f7bb9
Seconds elapsed: 0
> Bootp flags: 0x0000 (Unicast)
Client IP address: 0.0.0.0
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 0.0.0.0
Client MAC address: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option (53) DHCP Message Type (Discover)
Length: 1
DHCP: Discover (1)

0000 ff ff ff ff ff 34 e6 ad bf 3a bf 00 00 45 004.....E
0010 01 64 31 17 00 00 00 11 08 0d 00 00 00 ff ffJ1.....
0020 ff ff 00 44 00 43 01 36 af 28 01 01 06 00 d9 9fD C 6
0030 7b b9 00 00 00 00 00 00 00 00 00 00 00 00 00{.....
0040 00 00 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 004.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 0
Transaction ID: 0xd99f7bb9
Seconds elapsed: 0
> Bootp flags: 0x0000 (Unicast)
Client IP address: 0.0.0.0
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 0.0.0.0
Client MAC address: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option (53) DHCP Message Type (Request)
Length: 1
DHCP: Request (3)

0000 ff ff ff ff ff 34 e6 ad bf 3a bf 00 00 45 004.....E
0010 01 64 31 18 00 00 00 11 08 72 00 00 00 00 00d1.....
0020 7b b9 00 00 00 00 00 00 00 00 00 00 00 00 00D C 6
0030 7b b9 00 00 00 00 00 00 00 00 00 00 00 00 00{.....
0040 00 00 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 004.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

5. As shown and highlighted in the figures below, the value of the Transaction-ID in each of the first four (Discover/Offer/Request/ACK) DHCP messages is **0xd99f7bb9**.

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255

> User Datagram Protocol, Src Port: 68, Dst Port: 67

> Dynamic Host Configuration Protocol (Discover)

Message type: Boot Request (1)

Hardware type: Ethernet (0x01)

Hardware address length: 6

Hops: 0

Transaction ID: 0xd99f7bb9

Seconds elapsed: 0

> Bootp flags: 0x0000 (Unicast)

Client IP address: 0.0.0.0

Your (client) IP address: 0.0.0.0

Next server IP address: 0.0.0.0

Relay agent IP address: 0.0.0.0

Client MAC address: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

Client hardware address padding: 00000000000000000000

Server host name not given

Boot file name not given

Message length: 359

0000 ff ff ff ff ff 34 e6 ad bf 3a bf 00 00 45 004.....E

0010 01 4a 31 17 00 00 00 11 00 0d 00 00 00 ff ffJL.....

0020 ff ff 00 44 00 43 01 36 af 28 01 01 06 00 d9 9fD C 6.....

0030 7b b9 00 00 00 00 00 00 00 00 00 00 00 00 00{.....

0040 00 00 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 004.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

> Frame 2081: 359 bytes on wire (2872 bits), 359 bytes captured (2872 bits) on interface 0

> Ethernet II, Src: ArrisGro Id:50:33 (fc:51:a4:1d:50:33), Dst: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

> Internet Protocol Version 4, Src: 10.0.0.1, Dst: 10.0.0.131

> User Datagram Protocol, Src Port: 67, Dst Port: 68

> Dynamic Host Configuration Protocol (Offer)

Message type: Boot Reply (2)

Hardware type: Ethernet (0x01)

Hardware address length: 6

Hops: 0

Transaction ID: 0xd99f7bb9

Seconds elapsed: 0

> Bootp flags: 0x0000 (Unicast)

Client IP address: 0.0.0.0

Your (client) IP address: 10.0.0.131

Next server IP address: 10.0.0.1

Relay agent IP address: 0.0.0.0

Client MAC address: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

Client hardware address padding: 00000000000000000000

Message length: 359

0000 34 e6 ad bf 3a bf fc 51 a4 1d 50 33 00 00 45 c0 4.....Q.....E

0010 01 59 97 bc 00 00 40 11 cc 94 0a 00 00 01 0a 00Y.....@.....

0020 00 83 00 43 00 44 01 45 ee fc 02 01 06 00 d9 9fC D E.....

0030 7b b9 00 00 00 00 00 00 00 00 00 00 00 00 00{.....

0040 00 01 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 004.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

udp.port == 68

No.

Time

Source

Destination

Protocol

Length

Info

2062

173.077862

0.0.0.0

255.255.255.255

DHCP

344

DHCP Discover - Transaction ID 0xd99f7bb9

2079

176.202744

0.0.0.0

255.255.255.255

DHCP

344

DHCP Discover - Transaction ID 0xd99f7bb9

2081

176.229912

10.0.0.1

10.0.0.131

DHCP

359

DHCP Offer - Transaction ID 0xd99f7bb9

2082

176.231556

0.0.0.0

255.255.255.255

DHCP

370

DHCP Request - Transaction ID 0xd99f7bb9

2083

176.240148

10.0.0.1

10.0.0.131

DHCP

359

DHCP Offer - Transaction ID 0xd99f7bb9

2084

176.280102

10.0.0.1

10.0.0.131

DHCP

399

DHCP ACK - Transaction ID 0xd99f7bb9

5743

388.535894

10.0.0.131

10.0.0.1

DHCP

358

DHCP Request - Transaction ID 0xde950de

5745

388.598263

10.0.0.1

10.0.0.131

DHCP

399

DHCP ACK - Transaction ID 0xde950de

5809

400.497664

10.0.0.131

10.0.0.1

DHCP

342

DHCP Release - Transaction ID 0xcba916c4

6753

544.742630

0.0.0.0

255.255.255.255

DHCP

344

DHCP Discover - Transaction ID 0x901b79f

6763

547.867407

0.0.0.0

255.255.255.255

DHCP

344

DHCP Discover - Transaction ID 0x901b79f

>

Frame 2082: 370 bytes on wire (2960 bits), 370 bytes captured (2960 bits) on interface 0

>

Ethernet II, Src: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

>

Destination: Broadcast (ff:ff:ff:ff:ff:ff)

>

Source: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

>

Type: IPv4 (0x0800)

>

Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255

>

User Datagram Protocol, Src Port: 68, Dst Port: 67

>

Dynamic Host Configuration Protocol (Request)

>

Message type: Boot Request (1)

>

Hardware type: Ethernet (0x01)

>

Hardware address length: 6

>

Hops: 0

>

Transaction ID: 0xd99f7bb9

>

Seconds elapsed: 0

>

Bootp flags: 0x0000 (Unicast)

>

Client IP address: 0.0.0.0

>

Your (client) IP address: 0.0.0.0

>

Next server IP address: 0.0.0.0

0000

ff

ff

ff

ff

ff

34

e6

ad

bf

3a

bf

00

00

45

00

.....4.....E

0010

01

64

31

18

00

00

00

11

00

72

00

00

00

ff

ff

..d1.....P.....

0020

ff

ff

00

44

00

43

01

50

00

00

01

01

06

00

d9

9f

....D.C.P.....

0030

7b

b9

00

00

00

00

00

00

00

00

00

00

00

00

00

00

{.....:.....

0040

00

00

00

00

00

00

34

e6

ad

bf

3a

bf

00

00

00

00

.....4.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

udp.port == 68

No.

Time

Source

Destination

Protocol

Length

Info

2062

173.077862

0.0.0.0

255.255.255.255

DHCP

344

DHCP Discover - Transaction ID 0xd99f7bb9

2079

176.202744

0.0.0.0

255.255.255.255

DHCP

344

DHCP Discover - Transaction ID 0xd99f7bb9

2081

176.229912

10.0.0.1

10.0.0.131

DHCP

359

DHCP Offer - Transaction ID 0xd99f7bb9

2082

176.231556

0.0.0.0

255.255.255.255

DHCP

370

DHCP Request - Transaction ID 0xd99f7bb9

2083

176.240148

10.0.0.1

10.0.0.131

DHCP

359

DHCP Offer - Transaction ID 0xd99f7bb9

2084

176.280102

10.0.0.1

10.0.0.131

DHCP

399

DHCP ACK - Transaction ID 0xd99f7bb9

5743

388.535894

10.0.0.131

10.0.0.1

DHCP

358

DHCP Request - Transaction ID 0xde950de

5745

388.598263

10.0.0.1

10.0.0.131

DHCP

399

DHCP ACK - Transaction ID 0xde950de

5809

400.497664

10.0.0.131

10.0.0.1

DHCP

342

DHCP Release - Transaction ID 0xcba916c4

6753

544.742630

0.0.0.0

255.255.255.255

DHCP

344

DHCP Discover - Transaction ID 0x901b79f

6763

547.867407

0.0.0.0

255.255.255.255

DHCP

344

DHCP Discover - Transaction ID 0x901b79f

>

Frame 2084: 399 bytes on wire (3192 bits), 399 bytes captured (3192 bits) on interface 0

>

Ethernet II, Src: ArrisGro_1d:50:33 (fc:51:a4:1d:50:33), Dst: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

>

Destination: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

>

Source: ArrisGro_1d:50:33 (fc:51:a4:1d:50:33)

>

Type: IPv4 (0x0800)

>

Internet Protocol Version 4, Src: 10.0.0.1, Dst: 10.0.0.131

>

User Datagram Protocol, Src Port: 67, Dst Port: 68

>

Dynamic Host Configuration Protocol (ACK)

>

Message type: Boot Reply (2)

>

Hardware type: Ethernet (0x01)

>

Hardware address length: 6

>

Hops: 0

>

Transaction ID: 0xd99f7bb9

>

Seconds elapsed: 0

>

Bootp flags: 0x0000 (Unicast)

>

Client IP address: 0.0.0.0

>

Your (client) IP address: 10.0.0.131

>

Next server IP address: 10.0.0.1

0000

34

e6

ad

bf

3a

bf

fc

51

a4

1d

50

33

00

00

45

c0

.....4.....P.....E

0010

01

81

97

be

00

00

40

11

cc

6a

0a

00

00

01

0a

00

.....@.....j.....

0020

00

83

00

43

00

44

01

6d

aa

50

02

01

06

00

d9

9f

....C.D.M.P.....

0030

7b

b9

00

00

00

00

00

00

0a

00

00

00

83

0a

00

{.....:.....

0040

00

01

00

00

00

00

34

e6

ad

bf

3a

bf

00

00

00

00

.....4.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

>	Frame 2084: 399 bytes on wire (3192 bits), 399 bytes captured (3192 bits) on interface 0
>	Ethernet II, Src: ArriaGro_id:50:33 (fc:51:a4:1d:50:33), Dst: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)
>	Destination: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)
>	Source: ArriaGro_id:50:33 (fc:51:a4:1d:50:33)
>	Type: IPv4 (0x0800)
>	Internet Protocol Version 4, Src: 10.0.0.1, Dst: 10.0.0.131
>	User Datagram Protocol, Src Port: 67, Dst Port: 68
>	Dynamic Host Configuration Protocol (ACK)
>	Message type: Boot Reply (2)
>	Hardware type: Ethernet (0x01)
>	Hardware address length: 6
>	Hops: 0
>	Transaction ID: 0xd99f7bb9
>	Seconds elapsed: 0
>	Bootp flags: 0x0000 (Unicast)
>	Client IP address: 0.0.0.0
>	Your (client) IP address: 10.0.0.131
>	Next server IP address: 10.0.0.1

0000	34	e6	ad	bf	3a	bf	fc	51	a4	1d	50	33	00	00	45	c0	4.....Q.....E
0010	01	81	97	be	00	00	40	11	cc	6a	0a	00	00	01	0a	00	.....@.....j.....
0020	00	83	00	43	00	44	01	6d	aa	50	02	01	06	00	d9	9f	....C.D.m.P.....
0030	7b	b9	00	00	00	00	00	00	00	00	0a	00	00	83	0a	00	{.....:.....
0040	00	01	00	00	00	34	e6	ad	bf	3a	bf	00	00	00	00	00	.....4.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

The value of the Transaction-ID in the second set (Request/ACK) set of DHCP messages is **0x0de950de**.

udp.port == 68

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

> Frame 5743: 358 bytes on wire (2864 bits), 358 bytes captured (2864 bits) on interface 0

Ethernet II, Src: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf), Dst: ArrisGro_id:50:33 (fc:51:a4:1d:50:33)

> Destination: ArrisGro_id:50:33 (fc:51:a4:1d:50:33)

> Source: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

Type: IPv4 (0x0800)

> Internet Protocol Version 4, Src: 10.0.0.131, Dst: 10.0.0.1

> User Datagram Protocol, Src Port: 68, Dst Port: 67

> Dynamic Host Configuration Protocol (Request)

Message type: Boot Request (1)

Hardware type: Ethernet (0x01)

Hardware address length: 6

Hops: 0

Transaction ID: 0xde950de

Seconds elapsed: 0

> Bootp flags: 0x0000 (Unicast)

Client IP address: 10.0.0.131

Your (client) IP address: 0.0.0.0

Next server IP address: 0.0.0.0

0000 fc 51 a4 1d 50 33 34 e6 ad bf 3a bf 08 00 45 Q P34E

0010 01 50 20 00 00 00 11 05 06 0a 00 00 83 0a 00 X

0020 00 01 00 44 00 43 01 44 5e 1f 01 01 06 00 0d e9 ..C:D ^.....

0030 50 de 00 00 00 00 0a 00 00 83 0a 00 00 00 00 00 P.....

0040 00 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 004.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 - Displayed: 15 (0.2%) - Dropped: 0 (0.0%)

Profile: Default

udp.port == 68

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

> Frame 5745: 399 bytes on wire (3192 bits), 399 bytes captured (3192 bits) on interface 0

Ethernet II, Src: ArrisGro_id:50:33 (fc:51:a4:1d:50:33), Dst: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

> Destination: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

> Source: ArrisGro_id:50:33 (fc:51:a4:1d:50:33)

Type: IPv4 (0x0800)

> Internet Protocol Version 4, Src: 10.0.0.1, Dst: 10.0.0.131

> User Datagram Protocol, Src Port: 67, Dst Port: 68

> Dynamic Host Configuration Protocol (ACK)

Message type: Boot Reply (2)

Hardware type: Ethernet (0x01)

Hardware address length: 6

Hops: 0

Transaction ID: 0xde950de

Seconds elapsed: 0

> Bootp flags: 0x0000 (Unicast)

Client IP address: 10.0.0.131

Your (client) IP address: 10.0.0.131

Next server IP address: 10.0.0.1

0000 34 e6 ad bf 3a bf fc 51 a4 1d 50 33 08 00 45 c0 4.....Q P34E

0010 01 81 97 bf 00 00 40 11 cc 69 0a 00 00 01 0a 00@.....

0020 00 83 00 43 00 44 01 6d 91 1c 02 01 06 00 0d e9 ..C:D ^.....

0030 50 de 00 00 00 00 0a 00 00 83 0a 00 00 00 00 00 P.....

0040 00 01 00 00 00 34 e6 ad bf 3a bf 00 00 00 004.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 - Displayed: 15 (0.2%) - Dropped: 0 (0.0%)

Profile: Default

The Transaction-ID is primarily used by the DHCP server to **distinguish between the client requests** during the DHCP Request message process.

6.

DHCP messages	IP address	
	Source	Destination
Discover	0.0.0.0	255.255.255.255
Offer	10.0.0.1	10.0.0.131
Request	0.0.0.0	255.255.255.255
ACK	10.0.0.1	10.0.0.131

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

>	Frame 2079: 344 bytes on wire (2752 bits), 344 bytes captured (2752 bits) on interface 0
>	Ethernet II, Src: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
>	Destination: Broadcast (ff:ff:ff:ff:ff:ff)
>	Source: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)
>	Type: IPv4 (0x0800)
>	Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
>	User Datagram Protocol, Src Port: 68, Dst Port: 67
>	Dynamic Host Configuration Protocol (Discover)
>	Message type: Boot Request (1)
>	Hardware type: Ethernet (0x01)
>	Hardware address length: 6
>	Hops: 0
>	Transaction ID: 0xd99f7bb9
>	Seconds elapsed: 0
>	Bootp flags: 0x0000 (Unicast)
>	Client IP address: 0.0.0.0
>	Your (client) IP address: 0.0.0.0
>	Next server IP address: 0.0.0.0
>	Relay agent IP address: 0.0.0.0

0000	ff ff ff ff ff ff 34 e6 ad bf 3a bf 00 00 45 00	.....4.....E
0010	01 4a 31 17 00 00 00 11 00 0d 00 00 00 00 ff ff	..J1.....
0020	ff ff 00 44 00 43 01 36 af 28 01 01 06 00 d9 9f	...D.C.6.....
0030	7b b9 00 00 00 00 00 00 00 00 00 00 00 00 00	{.....
0040	00 00 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 00	.....4.....

7. The IP address of my DHCP server is **10.0.0.1**. It sends **DHCP ACK** messages.

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

>	Source: Arri5Gro_id:50:33 (fc:51:a4:1d:50:33)
>	Type: IPv4 (0x0800)
>	Internet Protocol Version 4, Src: 10.0.0.1, Dst: 10.0.0.131
>	User Datagram Protocol, Src Port: 67, Dst Port: 68
>	Dynamic Host Configuration Protocol (ACK)
>	Message type: Boot Reply (2)
>	Hardware type: Ethernet (0x01)
>	Hardware address length: 6
>	Hops: 0
>	Transaction ID: 0xd99f7bb9
>	Seconds elapsed: 0
>	Bootp flags: 0x0000 (Unicast)
>	Client IP address: 0.0.0.0
>	Your (client) IP address: 10.0.0.131
>	Next server IP address: 10.0.0.1
>	Relay agent IP address: 0.0.0.0
>	Client MAC address: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)
>	Client hardware address padding: 00000000000000000000
>	Server boot agent address: 0.0.0.0

0000	34 e6 ad bf 3a bf fc 51 a4 1d 50 33 00 00 45 c0	4.....Q..P3..E
0010	01 81 97 be 00 00 40 11 cc 6a 0a 00 00 01 0a 00	.....@..j.....
0020	00 63 00 43 00 44 01 6d aa 50 02 01 06 00 d9 9f	...C.D.m.P.....
0030	7b b9 00 00 00 00 00 00 00 00 00 00 00 00 00	{.....
0040	00 01 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 00	.....4.....

8. The IP address that the DHCP server is offering to my host in the DHCP Offer message is **10.0.0.131**. In option **53**, the **DHCP Message Type (Offer)** is given along with **Length (1)** and **DHCP: Offer (2)**.

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f


```

Seconds elapsed: 0
> Bootp flags: 0x0000 (Unicast)
Client IP address: 0.0.0.0
Your (client) IP address: 10.0.0.131
Next server IP address: 10.0.0.1
Relay agent IP address: 0.0.0.0
Client MAC address: IntelCor bf:3a:bf (34:e6:ad:bf:3a:bf)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (Offer)
  Length: 1
  DHCP: Offer (2)
Option: (54) DHCP Server Identifier (10.0.0.1)
Option: (51) IP Address Lease Time
Option: (58) Renewal Time Value
Option: (59) Rebinding Time Value
Option: (55) Subnet Mask (255.255.255.0)

```



```

0000 34 e6 ad bf 3a bf fc 51 a4 1d 50 33 00 00 45 c0 4.....0...P3...E
0010 01 59 97 bc 00 00 40 00 cc 94 0a 00 00 01 0a 00 ..Y...@.....
0020 00 03 00 43 00 44 01 45 ee fc 02 01 06 00 d9 9f ...C D E .....
0030 7b b9 00 00 00 00 00 00 00 00 0a 00 00 83 0a 00 {...D C 6 {...
0040 00 01 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 00 .....4...

```

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

9. The value “0.0.0.0” for the Relay agent IP address in the trace indicate the absence of a relay agent. There is no relay agent in my experiment.

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f


```

> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
> User Datagram Protocol, Src Port: 68, Dst Port: 67
> Dynamic Host Configuration Protocol (Discover)
  Message type: Boot Request (1)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xd99f7bb9
  Seconds elapsed: 0
  Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0
  Your (client) IP address: 0.0.0.0
  Next server IP address: 0.0.0.0
  Relay agent IP address: 0.0.0.0
  Client MAC address: IntelCor bf:3a:bf (34:e6:ad:bf:3a:bf)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP

```



```

0000 ff ff ff ff ff ff 34 e6 ad bf 3a bf 00 00 45 00 .....4...:....E
0010 01 4a 31 16 00 00 00 11 08 8e 00 00 00 00 ff ff ...J1.....
0020 ff ff 00 44 00 43 01 36 af 28 01 01 06 00 d9 9f ...D C 6 {...
0030 7b b9 00 00 00 00 00 00 00 00 0a 00 00 83 0a 00 {...D C 6 {...
0040 00 00 00 00 00 00 34 e6 ad bf 3a bf 00 00 00 00 .....4...

```

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

10. Yes, the client accepts the IP address offered by the DHCP server – 10.0.0.131. In the client’s response to the first server OFFER message, the client sends back a DHCP Request message requesting the specific IP address. The client’s requested address is in option (50) in the trace.

udp.port == 68

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077062	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.598263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

Option: (53) DHCP Message Type (Request)
Length: 1
DHCP: Request (3)

Option: (61) Client identifier
Length: 7
Hardware type: Ethernet (0x01)
Client MAC address: IntelCor_bf:3a:bf (34:e6:ad:bf:3a:bf)

Option: (50) Requested IP Address (10.0.0.131)
Length: 4
Requested IP Address: 10.0.0.131

Option: (54) DHCP Server Identifier (10.0.0.1)
Length: 4
DHCP Server Identifier: 10.0.0.1

Option: (12) Host Name
Length: 15
Host Name: DESKTOP-A9A5F2L

Option: (81) Client Fully Qualified Domain Name
Length: 18
Client Fully Qualified Domain Name:

0000ff ff ff ff ff ff34 e6ad bf 3a bf 08 00 45 00.....4.....E..

001001 64 31 18 00 00 00 1108 72 00 00 00 00 ff ff.....d1.....

0020ff ff 00 44 00 43 01 5009 f0 01 01 06 00 d9 9f.....D.C.P.....

00307b b9 00 00 00 00 00 0000 00 00 00 00 00 00 00.....{.....

004000 00 00 00 00 34 e6ad bf 3a bf 00 00 00 00.....4.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

11. The offer message also includes the **IP Address Lease Time: (604800s) 7 days** although this is not the main information that the client requires apart from the client IP address to start communicating.

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077062	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	388.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde950de
5745	388.590263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde950de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

Option: (53) DHCP Message Type (Offer)
Length: 1
DHCP: Offer (2)
Option: (54) DHCP Server Identifier (10.0.0.1)
Length: 4
DHCP Server Identifier: 10.0.0.1
Option: (51) IP Address Lease Time
Length: 4
IP Address Lease Time: (604800s) 7 days
Option: (58) Renewal Time Value
Length: 4
Renewal Time Value: (302400s) 3 days, 12 hours
Option: (59) Rebinding Time Value
Length: 4
Rebinding Time Value: (529200s) 6 days, 3 hours
Option: (1) Subnet Mask (255.255.255.0)
Length: 4
Subnet Mask: 255.255.255.0

0000	34 e6 ad bf 3a bf fc 51	a4 1d 50 33 00 00 45 c0	4.....Q...P3...E..
0010	01 59 97 bc 00 00 40 11	cc 94 0a 00 00 01 0a 00	.....Y...@.....
0020	00 83 00 43 00 44 01 45	ee fc 02 01 06 00 d9 9f	.....C.D.E.....
0030	7b b9 00 00 00 00 00 00	00 00 0a 00 00 83 0a 00{.....
0040	00 01 00 00 00 34 e6	ad bf 3a bf 00 00 00 00	.....4.....

12. The lease time is mentioned in **option (51) IP Address Lease Time** in the trace. The lease time in my experiment is 604800s (7 days).

No.	Time	Source	Destination	Protocol	Length	Info
2062	173.077862	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2079	176.202744	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xd99f7bb9
2081	176.229912	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2082	176.231556	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xd99f7bb9
2083	176.240148	10.0.0.1	10.0.0.131	DHCP	359	DHCP Offer - Transaction ID 0xd99f7bb9
2084	176.280102	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xd99f7bb9
5743	308.535894	10.0.0.131	10.0.0.1	DHCP	358	DHCP Request - Transaction ID 0xde958de
5745	308.590263	10.0.0.1	10.0.0.131	DHCP	399	DHCP ACK - Transaction ID 0xde958de
5809	400.497664	10.0.0.131	10.0.0.1	DHCP	342	DHCP Release - Transaction ID 0xcba916c4
6753	544.742630	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f
6763	547.867407	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x901b79f

Server host name not given
 Boot file name not given
 Magic cookie: DHCP
 Option: (53) DHCP Message Type (ACK)
 Length: 1
 DHCP: ACK (5)
 Option: (54) DHCP Server Identifier (10.0.0.1)
 Length: 4
 DHCP Server Identifier: 10.0.0.1
 Option: (51) IP Address Lease Time
 Length: 4
 IP Address Lease Time: (604800s) 7 days
 Option: (58) Renewal Time Value
 Length: 4
 Renewal Time Value: (302400s) 3 days, 12 hours
 Option: (59) Rebinding Time Value
 Length: 4
 Rebinding Time Value: (529200s) 6 days, 3 hours
 Option: (33) Subnet Mask (255.255.255.0)

0000 34 e6 ad bf 3a bf fc 51 a4 1d 50 33 08 00 45 c0 4...:Q:P3:E
 0010 01 81 97 be 00 00 40 11 cc 6a 0a 00 00 01 0a 00@:j.....
 0020 00 03 00 43 00 44 01 6d aa 50 02 02 06 00 d9 9f ...C:D:m:P.....
 0030 7b b9 00 00 00 00 00 00 00 0a 00 00 83 0a 00:.....
 0040 00 01 00 00 00 34 e6 ad bf 3a bf 00 00 00 004:.....

Source Hardware Address (eth.src), 6 bytes

Packets: 7536 · Displayed: 15 (0.2%) · Dropped: 0 (0.0%)

Profile: Default

13. The purpose of the DHCP release message is to **cancel the lease given to an IP address** by the DHCP server. The DHCP release message is sent by the client. The DHCP server **does not** issue an acknowledgement of receipt of the client's DHCP request. If the client's DHCP release message is lost, the DHCP server must **wait** until the end of the IP address' lease period so it can be reused for another client.
14. ARP requests were made by the DHCP server during the DHCP packet-exchange period. The purpose of the ARP packets is to ensure that the IP address is not used by another client. This request process is done before an IP address is offered to a client.

No.	Time	Source	Destination	Protocol	Length	Info
57	1.624066	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
58	3.671985	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
65	5.720007	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
76	7.767990	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
77	9.815854	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
80	11.863769	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
83	13.809325	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
86	15.857286	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
98	19.953213	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
100	22.001047	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135
106	24.048987	SamsungE_44:85:06	Broadcast	ARP	60	who has 10.0.0.1? Tell 10.0.0.135

> Frame 2075: 56 bytes on wire (448 bits), 56 bytes captured (448 bits) on interface 0
 > Ethernet II, Src: ArrisGro_Id:50:33 (fc:51:a4:1d:50:33), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
 > Destination: Broadcast (ff:ff:ff:ff:ff:ff)
 > Source: ArrisGro_Id:50:33 (fc:51:a4:1d:50:33)
 Type: ARP (0x0806)
 > Address Resolution Protocol (request)
 Hardware type: Ethernet (1)
 Protocol type: IPv4 (0x0800)
 Hardware size: 6
 Protocol size: 4
 Opcode: request (1)
 Sender MAC address: ArrisGro_Id:50:33 (fc:51:a4:1d:50:33)
 Sender IP address: 10.0.0.1
 Target MAC address: 00:00:00:00:00:00 (00:00:00:00:00:00)
 Target IP address: 10.0.0.131
 > VSS-Monitoring ethernet trailer, Timestamp: 16:51:35.000000000, Source Port: 0

0000 ff ff ff ff ff fc 51 a4 1d 50 33 08 06 00 01Q:P3....
 0010 00 00 06 04 00 01 fc 51 a4 1d 50 33 0a 00 00 01Q:P3....
 0020 00 00 00 00 00 0a 00 00 83 00 00 0c 17 00 00:.....
 0030 00 00 00 00 00 01 20 01:.....

Target IP address (arp.dst.proto_ipv4), 4 bytes

Packets: 7536 · Displayed: 415 (5.5%) · Dropped: 0 (0.0%)

Profile: Default

References

Chapter_4_V7.01.ppt, Canvas

Computer Networking, Kurose, Ross