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CST 311

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Lab 6

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Command Prompt
Microsoft Windows [Version 10.0.10130]
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C:\Users\Vanessa>ipconfig/release

Windows IP Configuration

No operation can be performed on Local Area Connection* 3 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Tunnel adapter isatap.socal.rr.com:

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

Wireless LAN adapter Local Area Connection* 3:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2605:e000:2d88:5a00:7c3f:1c3f:b79:4678
    Temporary IPv6 Address. . . . . : 2605:e000:2d88:5a00:29fc:760b:aa8c:dc8a
    Link-local IPv6 Address . . . . . : fe80::7c3f:1c3f:b79:4678%10
    Default Gateway . . . . . : fe80::21d:d3ff:fe89:d941%10

Ethernet adapter Bluetooth Network Connection:

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

Tunnel adapter Teredo Tunneling Pseudo-Interface:

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

C:\Users\Vanessa>ipconfig/renew

Windows IP Configuration

No operation can be performed on Local Area Connection* 3 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Wireless LAN adapter Local Area Connection* 3:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : socal.rr.com
    IPv6 Address. . . . . : 2605:e000:2d88:5a00:7c3f:1c3f:b79:4678
    Temporary IPv6 Address. . . . . : 2605:e000:2d88:5a00:29fc:760b:aa8c:dc8a
    Link-local IPv6 Address . . . . . : fe80::7c3f:1c3f:b79:4678%10
    IPv4 Address. . . . . : 192.168.5.9
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::21d:d3ff:fe89:d941%10
                                192.168.5.1

Ethernet adapter Bluetooth Network Connection:

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

Tunnel adapter isatap.socal.rr.com:

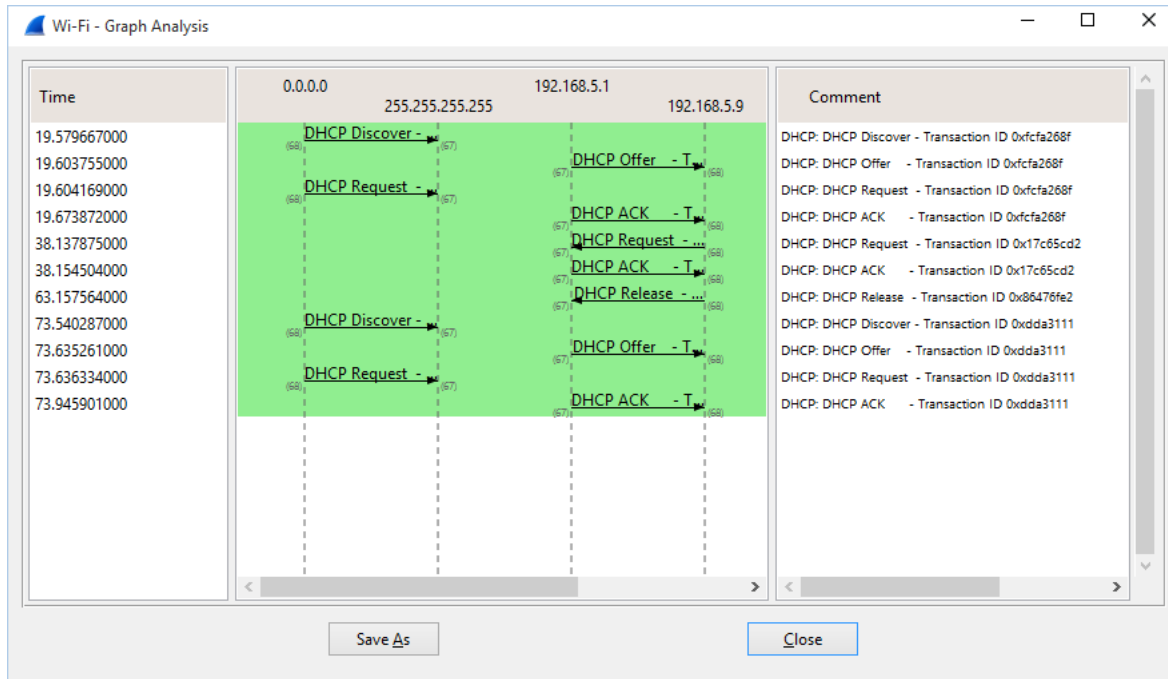
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : socal.rr.com

Tunnel adapter Teredo Tunneling Pseudo-Interface:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2001:0:9d38:90d7:493:2d64:b355:b471
    Link-local IPv6 Address . . . . . : fe80::493:2d64:b355:b471%4
    Default Gateway . . . . . :

C:\Users\Vanessa>ipgconfig/renew
'ipgconfig' is not recognized as an internal or external command,
operable program or batch file.
```

1. Are DHCP messages sent over UDP or TCP?
 - a. UDP
2. Draw a timing datagram illustrating the sequence of the first four-packet Discover/Offer/Request/ACK DHCP exchange between the client and server. For each packet, indicated the source and destination port numbers. Are the port numbers the same as in the example given in this lab assignment?



- a. Not quite, 255.255.255.255 is the same however 192.168.2.1 is 192.168.5.9
3. What is the link-layer (e.g., Ethernet) address of your host?

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+ Frame 141: 342 bytes on wire (2736 bits), 342 bytes captured (2736 bits) on interface 0
+ Ethernet II, Src: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
+ Destination: Broadcast (ff:ff:ff:ff:ff:ff)
+ Source: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73)
  Type: IP (0x0800)
+ Internet Protocol Version 4, Src: 0.0.0.0 (0.0.0.0), Dst: 255.255.255.255 (255.255.255.255)
+ User Datagram Protocol, Src Port: 68 (68), Dst Port: 67 (67)
+ Bootstrap Protocol (Discover)
  
```

- a. 50:1a:c5:ec:d6:73
4. What values in the DHCP discover message differentiate this message from the DHCP request message?
 - a. The discover message has Option: (53) DHCP Message Type (Discover)
 - b. The request message has Option: (53) DHCP Message Type (Request)
5. What is the value of the Transaction-ID in each of the first four (Discover/Offer/Request/ACK) DHCP messages? What are the values of the Transaction-ID in the second set (Request/ACK) set of DHCP messages? What is the purpose of the Transaction-ID field?

No.	Time	Source	Destination	Protocol	Length	Info
141	19.5796670	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0xfcfa268f
142	19.6037550	192.168.5.1	192.168.5.9	DHCP	334	DHCP Offer - Transaction ID 0xfcfa268f
143	19.6041690	0.0.0.0	255.255.255.255	DHCP	359	DHCP Request - Transaction ID 0xfcfa268f
144	19.6738720	192.168.5.1	192.168.5.9	DHCP	334	DHCP ACK - Transaction ID 0xfcfa268f
933	38.1378750	192.168.5.9	192.168.5.1	DHCP	347	DHCP Request - Transaction ID 0x17c65cd2
934	38.1545040	192.168.5.1	192.168.5.9	DHCP	334	DHCP ACK - Transaction ID 0x17c65cd2
1166	63.1575640	192.168.5.9	192.168.5.1	DHCP	342	DHCP Release - Transaction ID 0x86476fe2
1549	73.5402870	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0xdda3111
1589	73.6352610	192.168.5.1	192.168.5.9	DHCP	334	DHCP Offer - Transaction ID 0xdda3111
1590	73.6363340	0.0.0.0	255.255.255.255	DHCP	359	DHCP Request - Transaction ID 0xdda3111
1607	73.9459010	192.168.5.1	192.168.5.9	DHCP	334	DHCP ACK - Transaction ID 0xdda3111

- 0xfcfa268f
 - 0x17c65cd2
 - It keeps the “sets” of requests separate from one another
6. A host uses DHCP to obtain an IP address, among other things. But a host’s IP address is not confirmed until the end of the four-message exchange! If the IP address is not set until the end of the four message exchange, then what values are used in the IP datagrams in the four-message exchange? For each of the four DHCP messages (Discover/Offer/Request/ACK DHCP), indicate the source and destination IP addresses that are carried in the encapsulating IP datagram.

No.	Time	Source	Destination	Protocol	Length	Info
141	19.579667000	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0xfcfa268f
142	19.603755000	192.168.5.1	192.168.5.9	DHCP	334	DHCP Offer - Transaction ID 0xfcfa268f
143	19.604169000	0.0.0.0	255.255.255.255	DHCP	359	DHCP Request - Transaction ID 0xfcfa268f
144	19.673872000	192.168.5.1	192.168.5.9	DHCP	334	DHCP ACK - Transaction ID 0xfcfa268f

- The client and server both use 255.255.255.255, the client uses 0.0.0.0 as a source and the server uses 255.255.255.255
7. What is the IP address of your DHCP server?

No.	Time	Source	Destination	Protocol	Length	Info
141	19.579667000	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0xfcfa268f
142	19.603755000	192.168.5.1	192.168.5.9	DHCP	334	DHCP Offer - Transaction ID 0xfcfa268f
143	19.604169000	0.0.0.0	255.255.255.255	DHCP	359	DHCP Request - Transaction ID 0xfcfa268f
144	19.673872000	192.168.5.1	192.168.5.9	DHCP	334	DHCP ACK - Transaction ID 0xfcfa268f

- 192.168.5.1
8. What is the IP address is the DHCP server offering to your host in the DHCP Offer message? Indicate which DHCP message containers the coffered DHCP address.

```

+ Frame 142: 334 bytes on wire (2672 bits), 334 bytes captured (2672 bits) on interface 0
+ Ethernet II, Src: ArrisInt_00:00:03 (00:00:ca:00:00:03), Dst: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73)
+ Internet Protocol Version 4, Src: 192.168.5.1 (192.168.5.1), Dst: 192.168.5.9 (192.168.5.9)
+ User Datagram Protocol, Src Port: 67 (67), Dst Port: 68 (68)
- Bootstrap Protocol (offer)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xfcfa268f
  Seconds elapsed: 0
+ Bootp flags: 0x0000 (unicast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 192.168.5.9 (192.168.5.9)
  Next server IP address: 0.0.0.0 (0.0.0.0)
  Relay agent IP address: 0.0.0.0 (0.0.0.0)
  Client MAC address: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
+ Option: (53) DHCP Message Type (offer)
+ Option: (54) DHCP Server Identifier
+ Option: (51) IP Address Lease Time
+ Option: (1) Subnet Mask
+ Option: (3) Router
+ Option: (6) Domain Name Server
+ Option: (15) Domain Name

```

- a. 192.158.243.92
 - b. Message containers Option: (53) DHCP Message Type (Offer)
9. In the example screenshot in this assignment, there is no relay agent between the host and the DHCP server. What values in the trace indicate the absence of a relay agent? Is there a relay agent in your experiment? If so what is the IP address of the agent?

```

+ Frame 144: 334 bytes on wire (2672 bits), 334 bytes captured (2672 bits) on interface 0
+ Ethernet II, Src: ArrisInt_00:00:03 (00:00:ca:00:00:03), Dst: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73)
+ Internet Protocol Version 4, Src: 192.168.5.1 (192.168.5.1), Dst: 192.168.5.9 (192.168.5.9)
+ User Datagram Protocol, Src Port: 67 (67), Dst Port: 68 (68)
- Bootstrap Protocol (ACK)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xfcfa268f
  Seconds elapsed: 0
+ Bootp flags: 0x0000 (unicast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 192.168.5.9 (192.168.5.9)
  Next server IP address: 0.0.0.0 (0.0.0.0)
  Relay agent IP address: 0.0.0.0 (0.0.0.0)
  Client MAC address: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
+ Option: (53) DHCP Message Type (ACK)
+ Option: (54) DHCP Server Identifier
+ Option: (51) IP Address Lease Time
+ Option: (1) Subnet Mask
+ Option: (3) Router
+ Option: (6) Domain Name Server
+ Option: (15) Domain Name
+ Option: (255) End

```

- a. There is no IP address identified for the Relay agent IP address in the ACK message.
10. Explain the purpose of the router and the subnet mask lines in the DHCP offer message

```

Frame 144: 334 bytes on wire (2672 bits), 334 bytes captured (2672 bits) on interface 0
Ethernet II, Src: ArrisInt_00:00:03 (00:00:ca:00:00:03), Dst: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73)
Internet Protocol Version 4, Src: 192.168.5.1 (192.168.5.1), Dst: 192.168.5.9 (192.168.5.9)
User Datagram Protocol, Src Port: 67 (67), Dst Port: 68 (68)
Bootstrap Protocol (ACK)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xfcfa268f
  Seconds elapsed: 0
  Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 192.168.5.9 (192.168.5.9)
  Next server IP address: 0.0.0.0 (0.0.0.0)
  Relay agent IP address: 0.0.0.0 (0.0.0.0)
  Client MAC address: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
  Option: (53) DHCP Message Type (ACK)
  Option: (54) DHCP Server Identifier
  Option: (51) IP Address Lease Time
  Option: (1) Subnet Mask
    Length: 4
    Subnet Mask: 255.255.255.0 (255.255.255.0)
  Option: (3) Router
    Length: 4
    Router: 192.168.5.1 (192.168.5.1)

```

- a. The Router line tells the client what the default is
- b. The Subnet Mask line tells the client what the mask should be

11. In the DHCP trace file noted in footnote 2, the HDCP server offers a specific IP address to the client (see also question 8. Above). In the client's response to the first server OFFER message, does the client accept this IP address? Where in the client's RESPONSE is the client's requested address?

```

Frame 143: 359 bytes on wire (2872 bits), 359 bytes captured (2872 bits) on interface 0
Ethernet II, Src: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Internet Protocol Version 4, Src: 0.0.0.0 (0.0.0.0), Dst: 255.255.255.255 (255.255.255.255)
User Datagram Protocol, Src Port: 68 (68), Dst Port: 67 (67)
Bootstrap Protocol (Request)
  Message type: Boot Request (1)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xfcfa268f
  Seconds elapsed: 0
  Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 0.0.0.0 (0.0.0.0)
  Next server IP address: 0.0.0.0 (0.0.0.0)
  Relay agent IP address: 0.0.0.0 (0.0.0.0)
  Client MAC address: Microsof_ec:d6:73 (50:1a:c5:ec:d6:73)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
  Option: (53) DHCP Message Type (Request)
  Option: (61) Client identifier
  Option: (50) Requested IP Address
    Length: 4
    Requested IP Address: 192.168.5.9 (192.168.5.9)
  Option: (54) DHCP Server Identifier
  Option: (12) Host Name
  Option: (81) Client Fully Qualified Domain Name
  Option: (60) Vendor class identifier

```

- a. The host requested IP address 192.168.5.9

12. Explain the purpose of the lease time. How long is the lease time in your experiment?

- a. The least time is how long the client is assigned the IP address, the IP address will not be assigned to another client during this time or until it is released.
- 13. What is the purpose of the DHCP release message? Does the DHCP server issue an acknowledgment of receipt of the client's DHCP request? What would happen if the client's DHCP release message is lost?
 - a. The release message is basically a cancellation notice on the IP address assigned to the client by the server. If it is lost then the IP address will be automatically released when the lease time is up.
- 14. Clear the bootp filter from your Wireshark window. Were any ARP packets sent or received during the DHCP packet-exchange period? If so, explain the purpose of those ARP packets.
 - a. Yes, these are sent to make sure the IP address is not already assigned to another client.