CS 224(M): Tutorial 9

ARP, ICMP, NAT & IPv6

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1.

```
 96 24.05050100( 14:dd:a9:37:fe:8f   Broadcast           ARP    42 Who has 192.168.1.3?  Tell 192.168.1.73
135 43.59041100( ac:e0:10:e0:2f:3f   WibhuTec_dc:55:f0   ARP    42 Who has 192.168.1.3?  Tell 192.168.1.19
136 43.59190600( WibhuTec_dc:55:f0   ac:e0:10:e0:2f:3f   ARP    42 192.168.1.3 is at 00:11:74:dc:55:f0
145 49.59656200( WibhuTec_dc:55:f0   ac:e0:10:e0:2f:3f   ARP    42 Who has 192.168.1.19?  Tell 192.168.1.3
146 49.59659000( ac:e0:10:e0:2f:3f   WibhuTec_dc:55:f0   ARP    42 192.168.1.19 is at ac:e0:10:e0:2f:3f
```

2. Source MAC and Destination MAC can be seen on the left. IPs are a part of the message, seen on the right.

3.

```
dhruv @ {~} says $ arp -n
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.1.3              ether   00:11:74:dc:55:f0   C                     wlan0
```

4.

The ARP packets are generated again, after the arp –d.

5.

```
2090 14.28318600( ac:e0:10:e0:2f:3f   Broadcast           ARP    42 Who has 10.196.23.168?  Tell 10.196.9.60
2105 14.37339500( e4:f8:9c:e8:76:46   ac:e0:10:e0:2f:3f   ARP    42 10.196.23.168 is at e4:f8:9c:e8:76:46
2824 19.38877900( e4:f8:9c:e8:76:46   ac:e0:10:e0:2f:3f   ARP    42 Who has 10.196.9.60?  Tell 10.196.23.168
2825 19.38881600( ac:e0:10:e0:2f:3f   e4:f8:9c:e8:76:46   ARP    42 10.196.9.60 is at ac:e0:10:e0:2f:3f
```

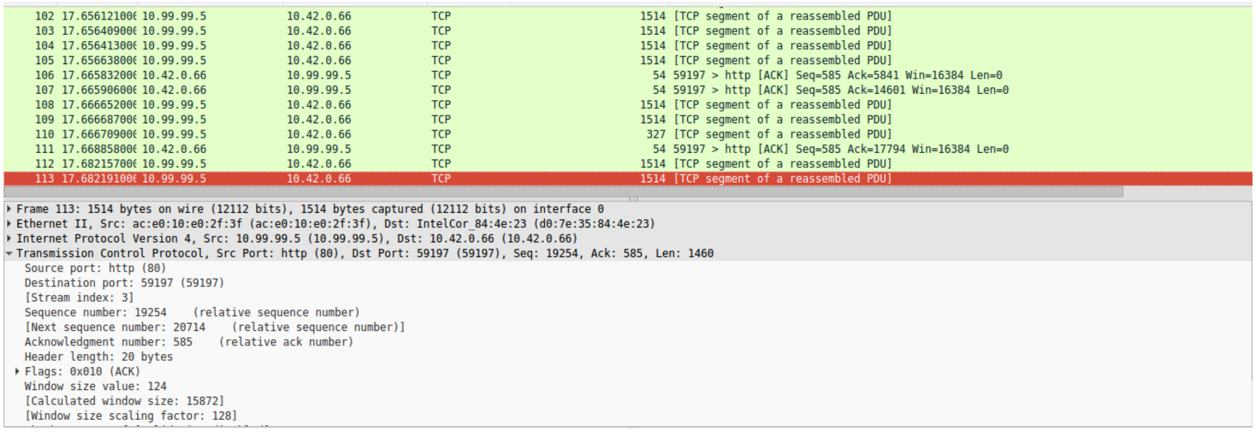
```
2106 14.37341000( 10.196.9.60     10.196.23.168   ICMP   98 Echo (ping) request  id=0x4f19, seq=1/256, ttl=64 (reply in 2107)
2107 14.37564500( 10.196.23.168   10.196.9.60     ICMP   98 Echo (ping) reply    id=0x4f19, seq=1/256, ttl=64 (request in 2106)
2236 15.28499500( 10.196.9.60     10.196.23.168   ICMP   98 Echo (ping) request  id=0x4f19, seq=2/512, ttl=64 (reply in 2248)
2248 15.38540400( 10.196.23.168   10.196.9.60     ICMP   98 Echo (ping) reply    id=0x4f19, seq=2/512, ttl=64 (request in 2236)
2345 16.28669700( 10.196.9.60     10.196.23.168   ICMP   98 Echo (ping) request  id=0x4f19, seq=3/768, ttl=64 (reply in 2349)
2349 16.29119200( 10.196.23.168   10.196.9.60     ICMP   98 Echo (ping) reply    id=0x4f19, seq=3/768, ttl=64 (request in 2345)
2511 17.28828100( 10.196.9.60     10.196.23.168   ICMP   98 Echo (ping) request  id=0x4f19, seq=4/1024, ttl=64 (reply in 2512)
2512 17.29137500( 10.196.23.168   10.196.9.60     ICMP   98 Echo (ping) reply    id=0x4f19, seq=4/1024, ttl=64 (request in 2511)
```

6.

```
dhruv @ {~} says $ ping 10.129.5.185
PING 10.129.5.185 (10.129.5.185) 56(84) bytes of data.
From 10.250.129.2 icmp_seq=5 Destination Host Unreachable
From 10.250.129.2 icmp_seq=10 Destination Host Unreachable
```

7.

```
38 3.996599000 ac:e0:10:e0:2f:3f   IntelCor_84:4e:23   ARP    42 Who has 10.42.0.66?  Tell 10.42.0.1
39 3.997406000 IntelCor_84:4e:23   ac:e0:10:e0:2f:3f   ARP    42 10.42.0.66 is at d0:7e:35:84:4e:23
```



(*My machine was used as the NAT router. This is the traffic on my machine*)

8.

IPv6 has a fixed header size of 40 bytes, unlike IPv4 which has a header of 20 bits + options. Since the given case has no options, and the total size is limited by the MTU, IPv4 would have more payload capacity than IPv6.

9.

IPv6 routers do not support fragmentation or the Don't Fragment option. For IPv6, Path MTU Discovery works by initially assuming the path MTU is the same as the MTU on the link layer interface where the traffic originates. Then, similar to IPv4, any device along the path whose MTU is smaller than the packet will drop the packet and send back an ICMPv6 Packet Too Big (Type 2) message containing its MTU, allowing the source host to reduce its Path MTU appropriately. The process is repeated until the MTU is small enough to traverse the entire path without fragmentation.