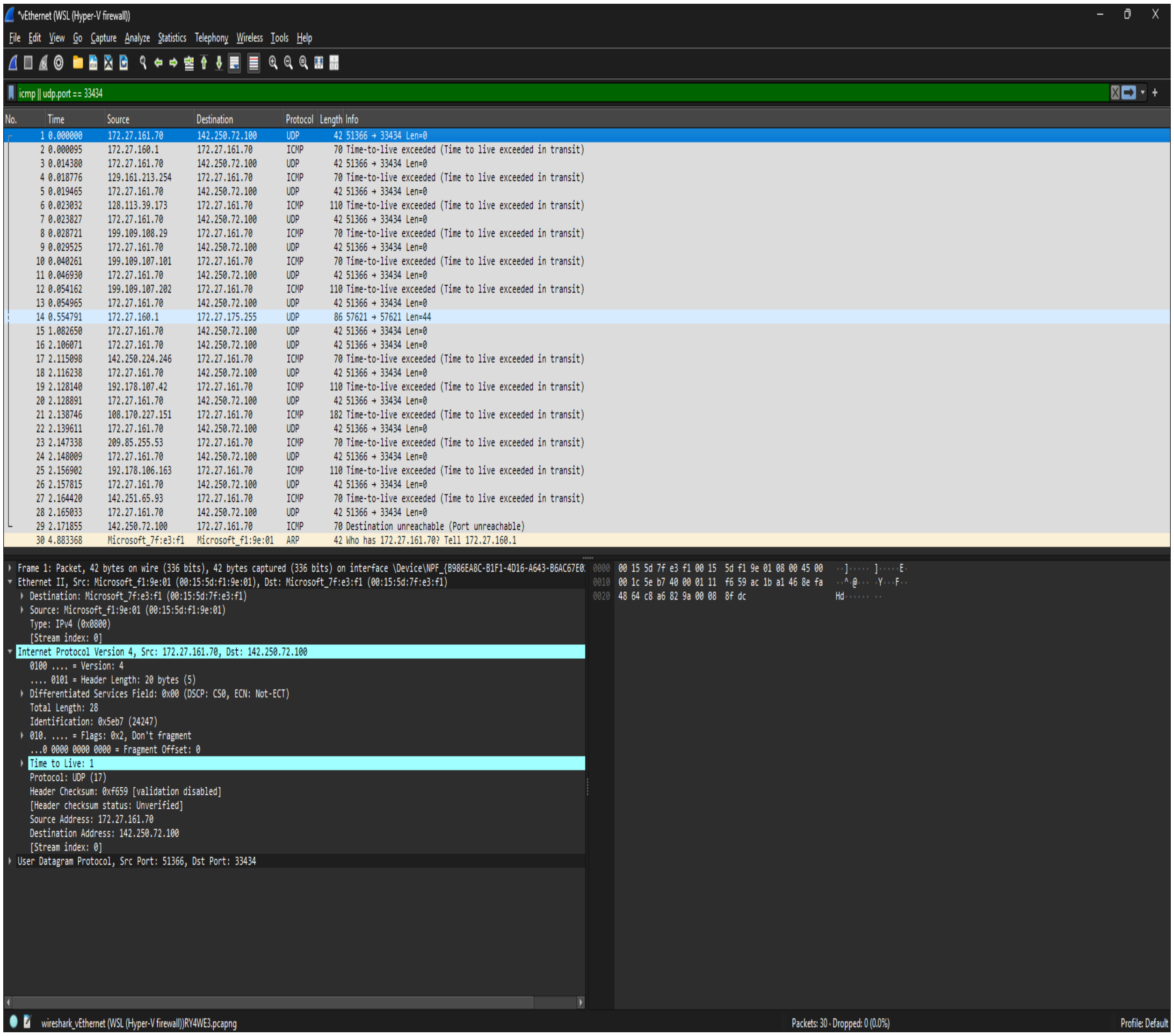

*vEthernet (WSL (Hyper-V firewall))
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

```
icmp || udp.port == 33434
```

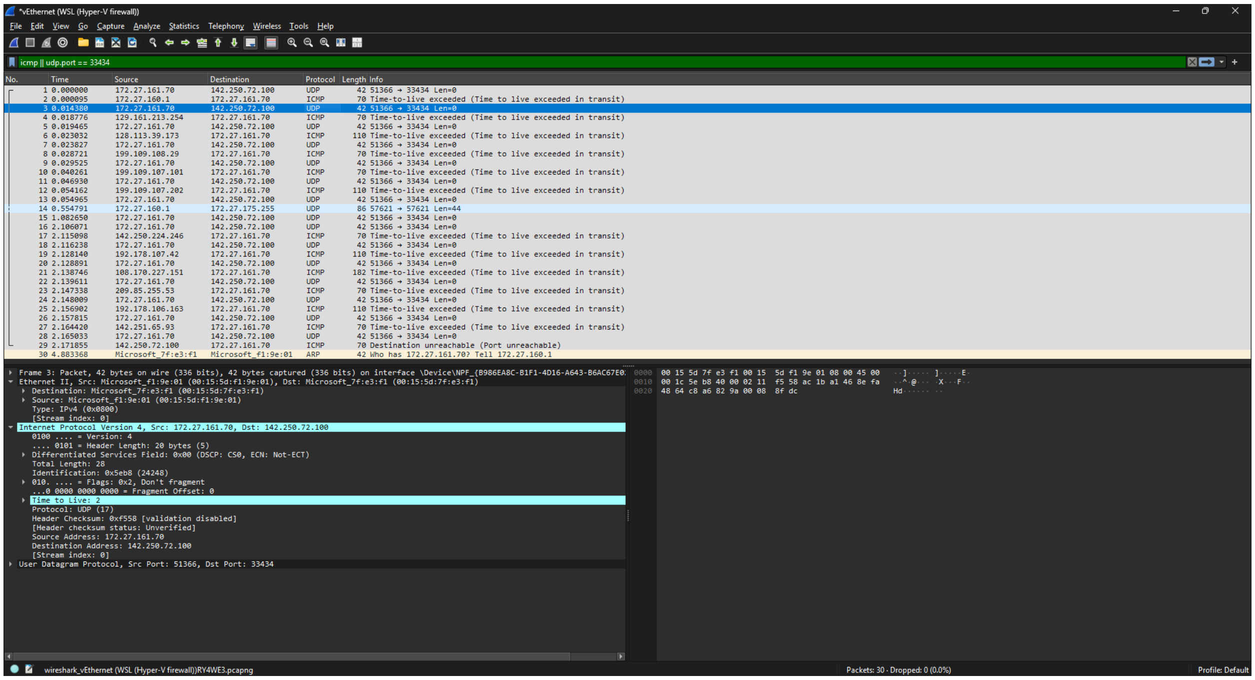
```
No.   Time      Source             Destination        Protocol Length Info
    1 0.000000  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
    2 0.000095  172.27.160.1       172.27.161.70      ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
    3 0.014380  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
    4 0.018776  129.161.213.254    172.27.161.70      ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
    5 0.019465  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
    6 0.023032  128.113.39.173     172.27.161.70      ICMP      110 Time-to-live exceeded (Time to live exceeded in transit)
    7 0.023827  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
    8 0.028721  199.109.108.29     172.27.161.70      ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
    9 0.029525  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   10 0.040261  199.109.107.101    172.27.161.70      ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
   11 0.046930  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   12 0.054162  199.109.107.202    172.27.161.70      ICMP      110 Time-to-live exceeded (Time to live exceeded in transit)
   13 0.054965  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   14 0.554791  172.27.160.1       172.27.175.255     UDP        86 57621 → 57621 Len=44
   15 1.082650  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   16 2.106071  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   17 2.115098  142.250.224.246    172.27.161.70      ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
   18 2.116238  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   19 2.128140  192.178.107.42     172.27.161.70      ICMP      110 Time-to-live exceeded (Time to live exceeded in transit)
   20 2.128891  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   21 2.138746  108.170.227.151    172.27.161.70      ICMP      182 Time-to-live exceeded (Time to live exceeded in transit)
   22 2.139611  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   23 2.147338  209.85.255.53      172.27.161.70      ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
   24 2.148009  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   25 2.156902  192.178.106.163    172.27.161.70      ICMP      110 Time-to-live exceeded (Time to live exceeded in transit)
   26 2.157815  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   27 2.164420  142.251.65.93      172.27.161.70      ICMP       70 Time-to-live exceeded (Time to live exceeded in transit)
   28 2.165033  172.27.161.70      142.250.72.100     UDP        42 51366 → 33434 Len=0
   29 2.171855  142.250.72.100     172.27.161.70      ICMP       70 Destination unreachable (Port unreachable)
   30 4.883368  Microsoft_7f:e3:f1 Microsoft_f1:9e:01 ARP        42 Who has 172.27.161.70? Tell 172.27.160.1
```

```
Frame 1: Packet, 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\NPF_{B986EA8C-B1F1-4D16-A643-B6AC67E0
Ethernet II, Src: Microsoft_f1:9e:01 (00:15:5d:f1:9e:01), Dst: Microsoft_7f:e3:f1 (00:15:5d:7f:e3:f1)
  Destination: Microsoft_7f:e3:f1 (00:15:5d:7f:e3:f1)
  Source: Microsoft_f1:9e:01 (00:15:5d:f1:9e:01)
  Type: IPv4 (0x0800)
  [Stream index: 0]
Internet Protocol Version 4, Src: 172.27.161.70, Dst: 142.250.72.100
  0100 .... = Version: 4
  .... 0101 = Header Length: 20 bytes (5)
  Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
  Total Length: 28
  Identification: 0x5eb7 (24247)
  010. .... = Flags: 0x2, Don't fragment
  ...0 0000 0000 0000 = Fragment Offset: 0
  Time to Live: 1
  Protocol: UDP (17)
  Header Checksum: 0xf659 [validation disabled]
  [Header checksum status: Unverified]
  Source Address: 172.27.161.70
  Destination Address: 142.250.72.100
  [Stream index: 0]
User Datagram Protocol, Src Port: 51366, Dst Port: 33434
```

```
0000  00 15 5d 7f e3 f1 00 15  5d f1 9e 01 08 00 45 00   ··]····· ]·····E·
0010  00 1c 5e b7 40 00 01 11  f6 59 ac 1b a1 46 8e fa   ··^·@··· ·Y···F··
0020  48 64 c8 a6 82 9a 00 08  8f dc                     Hd······ ··
```

wireshark_vEthernet (WSL (Hyper-V firewall))RY4WE3.pcapng   Packets: 30 · Dropped: 0 (0.0%)   Profile: Default

This is for TTL=1, the time exceeded one is below it.


*vEthernet (WSL (Hyper-V firewall))
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

icmp || udp.port == 33434

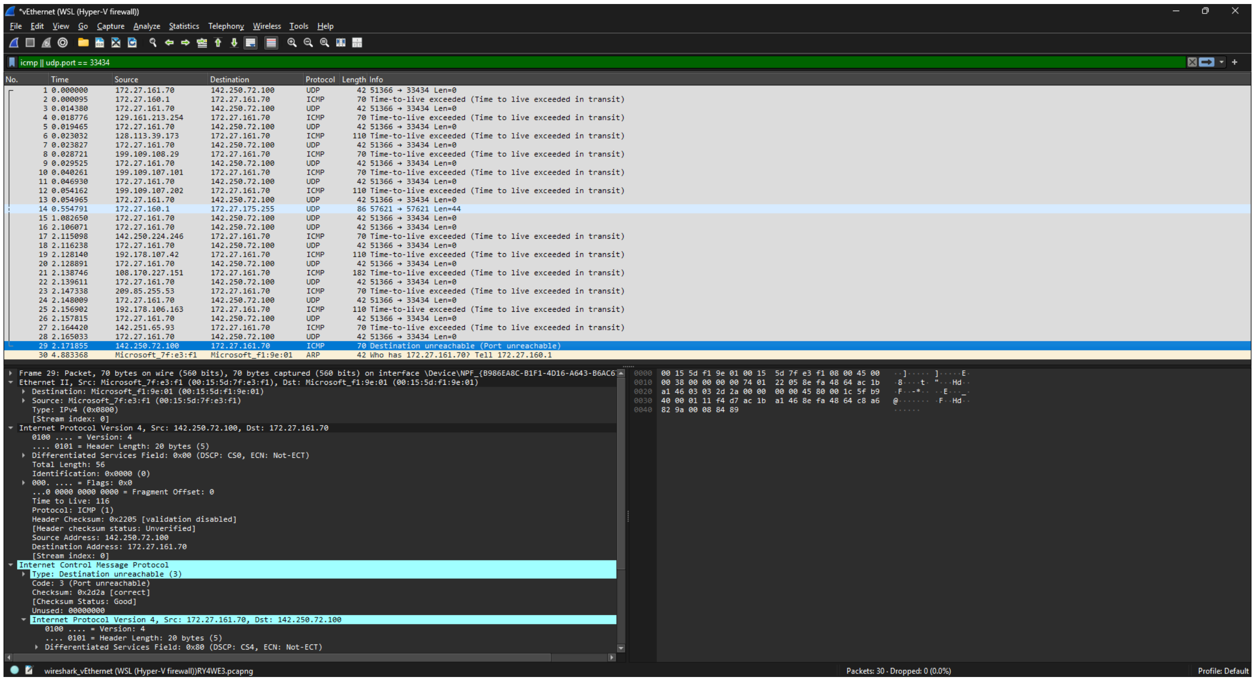
```
No.   Time      Source            Destination       Protocol Length Info
    1 0.000000  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
    2 0.000095  172.27.160.1      172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
    3 0.014380  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
    4 0.018776  129.161.213.254   172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
    5 0.019465  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
    6 0.023032  128.113.39.173    172.27.161.70     ICMP     110 Time-to-live exceeded (Time to live exceeded in transit)
    7 0.023827  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
    8 0.028721  199.109.108.29    172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
    9 0.029525  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   10 0.040261  199.109.107.101   172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
   11 0.046930  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   12 0.054162  199.109.107.202   172.27.161.70     ICMP     110 Time-to-live exceeded (Time to live exceeded in transit)
   13 0.054965  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   14 0.554791  172.27.160.1      172.27.175.255    UDP       86 57621 → 57621 Len=44
   15 1.082650  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   16 2.106071  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   17 2.115098  142.250.224.246   172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
   18 2.116238  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   19 2.128140  192.178.107.42    172.27.161.70     ICMP     110 Time-to-live exceeded (Time to live exceeded in transit)
   20 2.128891  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   21 2.138746  108.170.227.151   172.27.161.70     ICMP     182 Time-to-live exceeded (Time to live exceeded in transit)
   22 2.139611  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   23 2.147338  209.85.255.53     172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
   24 2.148009  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   25 2.156902  192.178.106.163   172.27.161.70     ICMP     110 Time-to-live exceeded (Time to live exceeded in transit)
   26 2.157815  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   27 2.164420  142.251.65.93     172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
   28 2.165033  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   29 2.171855  142.250.72.100    172.27.161.70     ICMP      70 Destination unreachable (Port unreachable)
   30 4.883368  Microsoft_7f:e3:f1 Microsoft_f1:9e:01 ARP     42 Who has 172.27.161.70? Tell 172.27.160.1
```

```
Frame 3: Packet, 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\NPF_{B986EA8C-B1F1-4D16-A643-B6AC67E0
Ethernet II, Src: Microsoft_f1:9e:01 (00:15:5d:f1:9e:01), Dst: Microsoft_7f:e3:f1 (00:15:5d:7f:e3:f1)
    Destination: Microsoft_7f:e3:f1 (00:15:5d:7f:e3:f1)
    Source: Microsoft_f1:9e:01 (00:15:5d:f1:9e:01)
    Type: IPv4 (0x0800)
    [Stream index: 0]
Internet Protocol Version 4, Src: 172.27.161.70, Dst: 142.250.72.100
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
    Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 28
    Identification: 0x5eb8 (24248)
    010. .... = Flags: 0x2, Don't fragment
    ...0 0000 0000 0000 = Fragment Offset: 0
    Time to Live: 2
    Protocol: UDP (17)
    Header Checksum: 0xf558 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 172.27.161.70
    Destination Address: 142.250.72.100
    [Stream index: 0]
User Datagram Protocol, Src Port: 51366, Dst Port: 33434
```

```
0000  00 15 5d 7f e3 f1 00 15  5d f1 9e 01 08 00 45 00   ··]····· ]·····E·
0010  00 1c 5e b8 40 00 02 11  f5 58 ac 1b a1 46 8e fa   ··^·@··· ·X···F··
0020  48 64 c8 a6 82 9a 00 08  8f dc                     Hd······ ··
```

wireshark_vEthernet (WSL (Hyper-V firewall))RY4WE3.pcapng   Packets: 30 · Dropped: 0 (0.0%)   Profile: Default

This is for TTL=2, with the next-hop router response below it


*vEthernet (WSL (Hyper-V firewall))
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

icmp || udp.port == 33434

```
No.   Time      Source            Destination       Protocol Length Info
    1 0.000000  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
    2 0.000095  172.27.160.1      172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
    3 0.014380  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
    4 0.018776  129.161.213.254   172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
    5 0.019465  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
    6 0.023032  128.113.39.173    172.27.161.70     ICMP     110 Time-to-live exceeded (Time to live exceeded in transit)
    7 0.023827  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
    8 0.028721  199.109.108.29    172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
    9 0.029525  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   10 0.040261  199.109.107.101   172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
   11 0.046930  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   12 0.054162  199.109.107.202   172.27.161.70     ICMP     110 Time-to-live exceeded (Time to live exceeded in transit)
   13 0.054965  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   14 0.554791  172.27.160.1      172.27.175.255    UDP       86 57621 → 57621 Len=44
   15 1.082650  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   16 2.106071  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   17 2.115098  142.250.224.246   172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
   18 2.116238  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   19 2.128140  192.178.107.42    172.27.161.70     ICMP     110 Time-to-live exceeded (Time to live exceeded in transit)
   20 2.128891  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   21 2.138746  108.170.227.151   172.27.161.70     ICMP     182 Time-to-live exceeded (Time to live exceeded in transit)
   22 2.139611  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   23 2.147338  209.85.255.53     172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
   24 2.148009  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   25 2.156902  192.178.106.163   172.27.161.70     ICMP     110 Time-to-live exceeded (Time to live exceeded in transit)
   26 2.157815  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   27 2.164420  142.251.65.93     172.27.161.70     ICMP      70 Time-to-live exceeded (Time to live exceeded in transit)
   28 2.165033  172.27.161.70     142.250.72.100    UDP       42 51366 → 33434 Len=0
   29 2.171855  142.250.72.100    172.27.161.70     ICMP      70 Destination unreachable (Port unreachable)
   30 4.883368  Microsoft_7f:e3:f1 Microsoft_f1:9e:01 ARP     42 Who has 172.27.161.70? Tell 172.27.160.1
```

```
Frame 29: Packet, 70 bytes on wire (560 bits), 70 bytes captured (560 bits) on interface \Device\NPF_{B986EA8C-B1F1-4D16-A643-B6AC6
Ethernet II, Src: Microsoft_7f:e3:f1 (00:15:5d:7f:e3:f1), Dst: Microsoft_f1:9e:01 (00:15:5d:f1:9e:01)
    Destination: Microsoft_f1:9e:01 (00:15:5d:f1:9e:01)
    Source: Microsoft_7f:e3:f1 (00:15:5d:7f:e3:f1)
    Type: IPv4 (0x0800)
    [Stream index: 0]
Internet Protocol Version 4, Src: 142.250.72.100, Dst: 172.27.161.70
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
    Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 56
    Identification: 0x0000 (0)
    000. .... = Flags: 0x0
    ...0 0000 0000 0000 = Fragment Offset: 0
    Time to Live: 116
    Protocol: ICMP (1)
    Header Checksum: 0x2205 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 142.250.72.100
    Destination Address: 172.27.161.70
    [Stream index: 0]
Internet Control Message Protocol
    Type: Destination unreachable (3)
    Code: 3 (Port unreachable)
    Checksum: 0x2d2a [correct]
    [Checksum Status: Good]
    Unused: 00000000
    Internet Protocol Version 4, Src: 172.27.161.70, Dst: 142.250.72.100
        0100 .... = Version: 4
        .... 0101 = Header Length: 20 bytes (5)
        Differentiated Services Field: 0x80 (DSCP: CS4, ECN: Not-ECT)
```

```
0000  00 15 5d f1 9e 01 00 15  5d 7f e3 f1 08 00 45 00   ··]····· ]·····E·
0010  00 38 00 00 00 00 74 01  22 05 8e fa 48 64 ac 1b   ·8····t· "···Hd··
0020  a1 46 03 03 2d 2a 00 00  00 00 45 80 00 1c 5f b9   ·F··-*·· ··E···_·
0030  40 00 01 11 f4 d7 ac 1b  a1 46 8e fa 48 64 c8 a6   @······· ·F··Hd··
0040  82 9a 00 08 84 89                                  ······
```

wireshark_vEthernet (WSL (Hyper-V firewall))RY4WE3.pcapng   Packets: 30 · Dropped: 0 (0.0%)   Profile: Default

This is for the unreachable from destination

Answers for 3 questions:

1) Intermediate routers send ICMP type 11, meaning time exceeded. The code used by the routers is code 0.
2) When TTL=30 but no ICMP reply is received, it will print an asterisk as a timeout marker for that hop and continue. However, if no hop replies up to the maximum TTL (which

here is 30), the traceroute will stop after that maximum TTL and will report that the destination wasn't reached.

3) Across hops, RTTs often increase with each hop count, but the amount they increase by for each hop varies; there is no pattern to how much they will increase by. Causes:
    a) Sometimes there is transmission delay when hopping across routers that are very far away from each other.
    b) At times, routers may be congested with other processes, which can increase RTT.
    c) Sometimes the ICMP reply arrives at the router in different routing patterns, which can increase RTT.