

实验报告 Lab 5

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asdasda asdad

A look at the captured trace

	Time	Source	Destination	Protocol	Length
	6396	1.309784	172.18.41.104	128.119.245.12	UDP
	29127	6.309869	172.18.41.104	128.119.245.12	UDP
	53843	11.315025	172.18.41.104	128.119.245.12	UDP
	80013	16.315407	172.18.41.104	128.119.245.12	UDP
	80019	16.316197	10.44.67.201	172.18.41.104	ICMP

Internet Protocol Version 4, Src: 172.18.41.104 (172.18.41.104), Dst: 128.119.245.12 (128.119.245.12)
0100 = Version: 4
.... 0101 = Header Length: 20 bytes
▼ Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00: Not-ECT (Not ECN-Capable))
0000 00.. = Differentiated Services Codepoint: Default (0x00)
..00 = Explicit Congestion Notification: Not-ECT (Not ECN-Capable Transport) (0x00)
Total Length: 56
Identification: 0xd8f3 (55539)
Flags: 0x00
Fragment offset: 0
Time to live: 1
Protocol: UDP (17)
Header checksum: 0x95c3 [validation disabled]
Source: 172.18.41.104 (172.18.41.104)
Destination: 128.119.245.12 (128.119.245.12)
[Source GeoIP: Unknown]
[Destination GeoIP: Unknown]
User Datagram Protocol, Src Port: 55538 (55538), Dst Port: 33435 (33435)
Source Port: 55538 (55538)
Destination Port: 33435 (33435)
Length: 36
Checksum: 0x5919 [validation disabled]

Figure 1: UDP segment

1. the IP address of my computer: 172.18.41.104, see figure 1. (Note: use tracerout on mac os)
2. upper layer protocol field: UDP (17), see figure 1
3. bytes are in the IP header: 20 bytes, bytes are in the payload of the IP datagram: 36 bytes. Total length: 56 bytes. See figure 1
4. The more fragments bit = 0, so the data is not fragmented.

[illegible]

Figure 2: Internet Protocol portion

5. always change: Identification, Header checksum, fragment offset. some point green rect in figure 2.
6. Stay constant

- Version (since we are using IPv4 for all packets)
- header length (since these are 20 bytes)
- source IP (since we are sending from the same source)
- destination IP (since we are sending to the same dest)
- Differentiated Services (since all packets are UDP they use the same Type of Service class)
- Upper Layer Protocol (since these are UDP packets).some point red rect in figure 2.

Must constant

- Version (since we are using IPv4 for all packets)
- header length (since these are 20 bytes)
- source IP (since we are sending from the same source)
- destination IP (since we are sending to the same dest)
- Differentiated Services (since all packets are UDP they use the same Type of Service class)
- Upper Layer Protocol (since these are UDP packets), some point red rect in figure 2.

Must change

- Identification(IP packets must have different id)
- Time to live (traceroute increments each subsequent packet)
- Header checksum (since header changes, so must checksum)

7. Identification field. The IP header Identification increment with each UDP segment.

309271	59.988705	10.44.67.201	172.18.41.104	ICMP	590	Time-to-live ex
309265	59.987225	10.44.67.201	172.18.41.104	ICMP	590	Time-to-live ex
309246	59.984553	10.44.67.201	172.18.41.104	ICMP	590	Time-to-live ex


```

Frame 309271: 590 bytes on wire (4720 bits), 590 bytes captured (4720 bits) on interface 0
Ethernet II, Src: H3cTechn_e6:0e:0d (38:22:d6:e6:0e:0d), Dst: 00:9a:9f:9d:9c:28 (00:9a:9f:9d:9c:28)
Internet Protocol Version 4, Src: 10.44.67.201 (10.44.67.201), Dst: 172.18.41.104 (172.18.41.104)
  0100 .... = Version: 4
  .... 0101 = Header Length: 20 bytes
  ▶ Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00: Not-ECT (Not ECN-Capable Transport))
  Total Length: 576
  Identification: 0xcf59 (53081)
  ▶ Flags: 0x00
  Fragment offset: 0
  Time to live: 254
  Protocol: ICMP (1)
  ▶ Header checksum: 0xc7f3 [validation disabled]
    Source: 10.44.67.201 (10.44.67.201)
    Destination: 172.18.41.104 (172.18.41.104)
    [Source GeoIP: Unknown]
    [Destination GeoIP: Unknown]

```

Figure 3: ICMP TTL- exceeded replies

8. Identification :53081,TTL:254.
9. Identification always change.But TTL always constant.
Because the identification field is a unique value for each packets except a case that when two or more IP datagrams have the same identification value, then it means that these IP datagrams are fragments of a single large IP datagram, and the TTL of first hop router is always the same,the distance between my computer and router is constant.
10. Packet size of 2000 cause fragmentation,see figure 4.

114159	22.742488	172.18.41.1...	128.119.245...	IPv4
114160	22.742490	172.18.41.1...	128.119.245...	UDP
114280	22.764139	172.18.41.1...	180.149.156...	HTTP
114527	22.809562	180.149.156...	172.18.41.1...	TCP


```

Header checksum: 0x9333 [validation disabled]
Source: 172.18.41.104 (172.18.41.104)
Destination: 128.119.245.12 (128.119.245.12)
[Source GeoIP: Unknown]
[Destination GeoIP: Unknown]
[2 IPv4 Fragments (1980 bytes): #114159(1480), #114160(500)]
  [Frame: 114159, payload: 0-1479 (1480 bytes)]
  [Frame: 114160, payload: 1480-1979 (500 bytes)]
  [Fragment count: 2]
  [Reassembled IPv4 length: 1980]
  [Reassembled IPv4 data: d8f9829b07bc49e2000000000000000]

```

Figure 4: 2000 bytes fragmentation

11. From flags field for more fragments is set, indicating the datagram has been fragmented. From fragment offset is 0, incicating this is the first fragment. And total length is 1500.

114159	22.742488	172.18.41.1...	128.119.245...	IPv4
114160	22.742490	172.18.41.1...	128.119.245...	UDP
114280	22.764139	172.18.41.1...	180.149.156...	HTTP
114527	22.809562	180.149.156...	172.18.41.1...	TCP
114707	22.857705	180.149.156...	172.18.41.1...	UDP

Total Length: 1500
 Identification: 0xd8fa (55546)
 ▼ Flags: 0x01 (More Fragments)
 0... .. = Reserved bit: Not set
 .0.. = Don't fragment: Not set
 1... = More fragments: Set
Fragment offset: 0
 ▼ Time to live: 1
 ▼ [Expert Info (Note/Sequence): "Time To Live" only 1]
 ["Time To Live" only 1]
 [Severity level: Note]
 [Group: Sequence]
 Protocol: UDP (17)
 ▼ Header checksum: 0x7018 [validation disabled]
 [Good: False]
 [Bad: False]
 Source: 172.18.41.104 (172.18.41.104)
 Destination: 128.119.245.12 (128.119.245.12)
 [Source GeoIP: Unknown]
 [Destination GeoIP: Unknown]
[Reassembled IPv4 in frame: 114160](#)

Figure 5: first fragment

12. From fragment offset is 1480 not 0, so isn't first fragment. From flags field for more fragments is not set, indicating the datagram has no more fragments.

114160	22.742490	172.18.41.1...	128.119.245...	UDP
114280	22.764139	172.18.41.1...	180.149.156...	HTTP
114527	22.809562	180.149.156...	172.18.41.1...	TCP
114707	22.857705	180.149.156...	172.18.41.1...	UDP

Total Length: 520
 Identification: 0xd8fa (55546)
 ▼ Flags: 0x00
 0... .. = Reserved bit: Not set
 .0.. = Don't fragment: Not set
 ..0. = More fragments: Not set
Fragment offset: 1480
 ▼ Time to live: 1
 ▼ [Expert Info (Note/Sequence): "Time To Live" only 1]
 ["Time To Live" only 1]
 [Severity level: Note]
 [Group: Sequence]
 Protocol: UDP (17)
 ▼ Header checksum: 0x9333 [validation disabled]
 [Good: False]
 [Bad: False]
 Source: 172.18.41.104 (172.18.41.104)
 Destination: 128.119.245.12 (128.119.245.12)
 [Source GeoIP: Unknown]
 [Destination GeoIP: Unknown]
 ▼ [2 IPv4 Fragments (1980 bytes): #114159(1480), #114160(500)
 [\[Frame: 114159, payload: 0-1479 \(1480 bytes\)\]](#)

Figure 6: second fragment

13. changed: total length, flags, fragment offset, checksum. some point in green rect see figure 7.

114159	22.742488	172.18.41.1...	128.119.1...
114160	22.742490	172.18.41.1...	128.119.1...
114280	22.764139	172.18.41.1...	180.149.156...
114527	22.809562	180.149.156...	172.18.41...
114787	22.857305	180.149.156...	172.18.41...
Total Length: 1500			
Identification: 0xd8fa (55545)			
Flags: 0x01 (More Fragments)			
0... = Reserved bit: Not set			
.0... = Don't fragment: Not set			
...0... = More fragments: Set			
Fragment offset: 0			
Time to live: 1			
▼ [Expert Info (Note/Sequence): "Time To Live"			
["Time To Live" only 1]			
[Severity level: Note]			
[Group: Sequence]			
Protocol: UDP (17)			
▼ Header checksum: 0x7018 [validation disabled]			
[Good: False]			
[Bad: False]			
Source: 172.18.41.104 (172.18.41.104)			
Destination: 128.119.245.12 (128.119.245.12)			
[Source GeoIP: Unknown]			
[Destination GeoIP: Unknown]			

Figure 7: changed fields

14. Packet size of 3500 has 3 fragments see figure 8.

```

230532 44.975750      172.18.41.1... 128.119.245... UDP          554 S
230828 45.030999      172.18.41.1... 180.149.156... TCP          54 3
230831 45.031365      172.18.41.1... 112.90.140... TCP          54 4

```

```

[3 IPv4 Fragments (3480 bytes): #230530(1480), #230531(1480), #230532(520)]
[Frame: 230530, payload: 0-1479 (1480 bytes)]
[Frame: 230531, payload: 1480-2959 (1480 bytes)]
[Frame: 230532, payload: 2960-3479 (520 bytes)]
[Fragment count: 3]
[Reassembled IPv4 length: 3480]
[Reassembled IPv4 data: d903829b0d983e20000000000000000000000000000000000000000000000000...]

```

Figure 8: changed fields

15. Fields have changed among the fragments are Total length, Fragment offset, Header checksum.
Detail:

Total length of first fragment and second fragment was the same value 1500, the last is 540.

Fragment offset of three fragments are 0, 1480, 2960.

Header checksum are unique in each fragment.

Internet Protocol Version 4	Internet Protocol Version 4, S	Internet Protocol Version 4, S
0100 = Version: 4	0100 = Version: 4	0100 = Version: 4
... 0101 = Header Length: 2	... 0101 = Header Length: 2	... 0101 = Header Length: 2
► Differentiated Services	Differentiated Services Field	Differentiated Services Field
Total Length: 1500	Total Length: 1500	Total Length: 540
Identification: 0xd904 (5555)	Identification: 0xd904 (5555)	Identification: 0xd904 (5555)
► Flags: 0x01 (More Fragments)	Flags: 0x01 (More Fragments)	Flags: 0x00
Fragment offset: 0	Fragment offset: 1480	Fragment offset: 2960
▼ Time to live: 1	Time to live: 1	Time to live: 1
▼ [Expert Info (Note/Sequence)]	▼ [Expert Info (Note/Sequence)]	▼ [Expert Info (Note/Sequence)]
["Time To Live" only]	["Time To Live" only]	["Time To Live" only]
[Severity Level: Note]	[Severity Level: Note]	[Severity Level: Note]
[Group: Sequence]	[Group: Sequence]	[Group: Sequence]
Protocol: UDP (17)	Protocol: UDP (17)	Protocol: UDP (17)
► Header checksum: 0x700e	Header checksum: 0x6f55	Header checksum: 0x925c

Figure 9: changed fields