

Ping

1. ip моего хоста = 192.168.0.101, ip хоста назначения (huawei.com) = 121.37.49.12

No.	Time	Source	Destination	Protocol	Length	Info
687	2022-04-21 19:19:48,899416	192.168.0.101	121.37.49.12	ICMP	74	Echo (ping) request id=0x0001, seq=34/8704, ttl=128 (r
688	2022-04-21 19:19:49,152064	121.37.49.12	192.168.0.101	ICMP	74	Echo (ping) reply id=0x0001, seq=34/8704, ttl=46 (re
689	2022-04-21 19:19:49,918622	192.168.0.101	121.37.49.12	ICMP	74	Echo (ping) request id=0x0001, seq=35/8960, ttl=128 (r
694	2022-04-21 19:19:50,172546	121.37.49.12	192.168.0.101	ICMP	74	Echo (ping) reply id=0x0001, seq=35/8960, ttl=46 (re
696	2022-04-21 19:19:50,934956	192.168.0.101	121.37.49.12	ICMP	74	Echo (ping) request id=0x0001, seq=36/9216, ttl=128 (r
697	2022-04-21 19:19:51,190894	121.37.49.12	192.168.0.101	ICMP	74	Echo (ping) reply id=0x0001, seq=36/9216, ttl=46 (re
702	2022-04-21 19:19:51,948443	192.168.0.101	121.37.49.12	ICMP	74	Echo (ping) request id=0x0001, seq=37/9472, ttl=128 (r
717	2022-04-21 19:19:52,197636	121.37.49.12	192.168.0.101	ICMP	74	Echo (ping) reply id=0x0001, seq=37/9472, ttl=46 (re
735	2022-04-21 19:19:52,959955	192.168.0.101	121.37.49.12	ICMP	74	Echo (ping) request id=0x0001, seq=38/9728, ttl=128 (r
736	2022-04-21 19:19:53,216262	121.37.49.12	192.168.0.101	ICMP	74	Echo (ping) reply id=0x0001, seq=38/9728, ttl=46 (re
741	2022-04-21 19:19:53,974948	192.168.0.101	121.37.49.12	ICMP	74	Echo (ping) request id=0x0001, seq=39/9984, ttl=128 (r
742	2022-04-21 19:19:54,230733	121.37.49.12	192.168.0.101	ICMP	74	Echo (ping) reply id=0x0001, seq=39/9984, ttl=46 (re
743	2022-04-21 19:19:54,985750	192.168.0.101	121.37.49.12	ICMP	74	Echo (ping) request id=0x0001, seq=40/10240, ttl=128 (r

> Frame 687: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF_{AFA1B8C0-2747-4BC5-815A-D8DE55689840}, id 0
> Ethernet II, Src: IntelCom_86:5b:64 (64:5d:86:86:5b:64), Dst: TP-Link_4a:ce:99 (c0:06:c3:4a:ce:99)
> Internet Protocol Version 4, Src: 192.168.0.101, Dst: 121.37.49.12
> Internet Control Message Protocol

0000 c0 06 c3 4a ce 99 64 5d 86 86 5b 64 08 00 45 00 ...]..d] ..[d..E
0010 00 3c 8d 6f 00 00 80 01 42 13 c0 a8 00 65 79 25 ..<O....B....ey%
0020 31 0c 08 00 4d 39 00 01 00 22 61 62 63 64 65 66 1...M9... "abcdef
0030 67 68 69 6a 6b 6c 6d 6e 6f 70 71 72 73 74 75 76 ghijklmn opqrstuv
0040 77 61 62 63 64 65 66 67 68 69 wabcdefg hi

2. Потому что он находится на сетевом уровне, а номера портов нужны для транспортного

- 3.

- a. ICMP-тип = 8 (Echo (ping) request)
- b. Кодовый номер = 0
- c. Checksum, Identifier (BE) + (LE), Sequence Number (BE) + (LE)
- d. По 2 байта на каждое поле

No.	Time	Source	Destination	Protocol	Length	Info
687	2022-04-21 19:19:48,899416	192.168.0.101	121.37.49.12	ICMP	74	Echo (ping) request id=0x0001, seq=34/8704, ttl=128 (r
688	2022-04-21 19:19:49,152064	121.37.49.12	192.168.0.101	ICMP	74	Echo (ping) reply id=0x0001, seq=34/8704, ttl=46 (re
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Destination Address: 121.37.49.12

Internet Control Message Protocol

Type: 8 (Echo (ping) request)

Code: 0

Checksum: 0x4d39 [correct]

[Checksum Status: Good]

Identifier (BE): 1 (0x0001)

Identifier (LE): 256 (0x0100)

Sequence Number (BE): 34 (0x0022)

Sequence Number (LE): 8704 (0x2200)

[Response frame: 688]

> Data (32 bytes)

0000 c0 06 c3 4a ce 99 64 5d 86 86 5b 64 08 00 45 00 ...]..d] ..[d..E
0010 00 3c 8d 6f 00 00 80 01 42 13 c0 a8 00 65 79 25 ..<O....B....ey%
0020 31 0c 08 00 4d 39 00 01 00 22 61 62 63 64 65 66 1...M9... "abcdef
0030 67 68 69 6a 6b 6c 6d 6e 6f 70 71 72 73 74 75 76 ghijklmn opqrstuv
0040 77 61 62 63 64 65 66 67 68 69 wabcdefg hi

- 4.

- a. ICMP-тип = 0 (Echo (ping) reply)
- b. Кодовый номер = 0
- c. Checksum, Identifier (BE) + (LE), Sequence Number (BE) + (LE)
- d. По 2 байта на каждое поле

Traceroute

1. Отличается:

- В ping поле ttl = 128, а в traceroute ttl = 1 (или другое число в соответствии с правилом, в моём случае — от 1 до 26)
- В ping размер data 32 байта, а в traceroute — 64 байта

No.	Time	Source	Destination	Protocol	Length	Info
43	2022-04-21 19:42:57,797591	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=44/11264, ttl=1 (no
44	2022-04-21 19:42:57,798891	192.168.0.1	192.168.0.101	ICMP	126	Time-to-live exceeded (Time to live exceeded in transit
45	2022-04-21 19:42:57,799562	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=45/11520, ttl=1 (no
46	2022-04-21 19:42:57,800632	192.168.0.1	192.168.0.101	ICMP	126	Time-to-live exceeded (Time to live exceeded in transit
47	2022-04-21 19:42:57,801312	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=46/11776, ttl=1 (no
48	2022-04-21 19:42:57,802343	192.168.0.1	192.168.0.101	ICMP	126	Time-to-live exceeded (Time to live exceeded in transit
82	2022-04-21 19:43:03,342301	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=47/12032, ttl=2 (no

> Frame 43: 106 bytes on wire (848 bits), 106 bytes captured (848 bits) on interface \Device\NPF_{AFA1B8C0-2747-4BC5-815A-D8DE55689840}, id 0
> Ethernet II, Src: IntelCor_86:5b:64 (64:5d:86:86:5b:64), Dst: TP-Link_4a:ce:99 (c0:06:c3:4a:ce:99)
> Internet Protocol Version 4, Src: 192.168.0.101, Dst: 121.37.49.12
▼ Internet Control Message Protocol
Type: 8 (Echo (ping) request)
Code: 0
Checksum: 0xf7d2 [correct]
[Checksum Status: Good]
Identifier (BE): 1 (0x0001)
Identifier (LE): 256 (0x0100)
Sequence Number (BE): 44 (0x002c)
Sequence Number (LE): 11264 (0x2c00)
> [No response seen]
> Data (64 bytes)

0000 c0 06 c3 4a ce 99 64 5d 86 86 5b 64 08 00 45 00 ...J..d] ..[d..E
0010 00 5c 8d 79 00 00 01 01 c0 e9 c0 a8 00 65 79 25 ..\y.....ey%
0020 31 0c 08 00 f7 d2 00 01 00 2c 00 00 00 00 00 00 1.....,.....

2. Добавилось 2 поля: данные IPv4 и ICMP исходного эхо-запроса

No.	Time	Source	Destination	Protocol	Length	Info
43	2022-04-21 19:42:57,797591	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=44/11264, ttl=1 (no
44	2022-04-21 19:42:57,798891	192.168.0.1	192.168.0.101	ICMP	126	Time-to-live exceeded (Time to live exceeded in transit
45	2022-04-21 19:42:57,799562	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=45/11520, ttl=1 (no
46	2022-04-21 19:42:57,800632	192.168.0.1	192.168.0.101	ICMP	126	Time-to-live exceeded (Time to live exceeded in transit
47	2022-04-21 19:42:57,801312	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=46/11776, ttl=1 (no
48	2022-04-21 19:42:57,802343	192.168.0.1	192.168.0.101	ICMP	126	Time-to-live exceeded (Time to live exceeded in transit
82	2022-04-21 19:43:03,342301	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=47/12032, ttl=2 (no

> Frame 44: 126 bytes on wire (1008 bits), 126 bytes captured (1008 bits) on interface \Device\NPF_{AFA1B8C0-2747-4BC5-815A-D8DE55689840}, id 0
> Ethernet II, Src: TP-Link_4a:ce:99 (c0:06:c3:4a:ce:99), Dst: IntelCor_86:5b:64 (64:5d:86:86:5b:64)
> Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.101
▼ Internet Control Message Protocol
Type: 11 (Time-to-live exceeded)
Code: 0 (Time to live exceeded in transit)
Checksum: 0xf4ff [correct]
[Checksum Status: Good]
Unused: 00000000
> Internet Protocol Version 4, Src: 192.168.0.101, Dst: 121.37.49.12
▼ Internet Control Message Protocol
Type: 8 (Echo (ping) request)
Code: 0
Checksum: 0xf7d2 [unverified] [in ICMP error packet]
[Checksum Status: Unverified]

0020 00 65 0b 00 f4 ff 00 00 00 00 45 00 00 5c 8d 79 ..E...y
0030 00 00 01 01 c0 e9 c0 a8 00 65 79 25 31 0c 08 00 ..ey1...
0040 f7 d2 00 01 00 2c 00 00 00 00 00 00 00 00 00 00 ,.....

3. Ответ отличается, потому что 3 наших запроса дошли до нужного хоста, и тот нам ответил. То есть никаких time-to-live exceeded не произошло
 - a. Другой ICMP-тип: 0 (Echo (ping) reply)
 - b. ttl = 30
 - c. Нет полей с данными IPv4 и ICMP исходного эхо-запроса

No.	Time	Source	Destination	Protocol	Length	Info
1224	2022-04-21 19:46:08,400351	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=118/30208, ttl=25 (f
1234	2022-04-21 19:46:12,403649	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=119/30464, ttl=26 (f
1235	2022-04-21 19:46:12,652690	121.37.49.12	192.168.0.101	ICMP	106	Echo (ping) reply id=0x0001, seq=119/30464, ttl=46 (f
1236	2022-04-21 19:46:12,655264	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=120/30720, ttl=26 (f
1237	2022-04-21 19:46:12,905680	121.37.49.12	192.168.0.101	ICMP	106	Echo (ping) reply id=0x0001, seq=120/30720, ttl=46 (f
1238	2022-04-21 19:46:12,907972	192.168.0.101	121.37.49.12	ICMP	106	Echo (ping) request id=0x0001, seq=121/30976, ttl=26 (f
1239	2022-04-21 19:46:13,163982	121.37.49.12	192.168.0.101	ICMP	106	Echo (ping) reply id=0x0001, seq=121/30976, ttl=46 (f


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> Frame 1235: 106 bytes on wire (848 bits), 106 bytes captured (848 bits) on interface \Device\NPF_{AFA1B8C0-2747-48C5-815A-D8DE55689840}, id 0
> Ethernet II, Src: TP-Link_4a:ce:99 (c0:06:c3:4a:ce:99), Dst: IntelCor_86:5b:64 (64:5d:86:86:5b:64)
> Internet Protocol Version 4, Src: 121.37.49.12, Dst: 192.168.0.101
> Internet Control Message Protocol
  Type: 0 (Echo (ping) reply)
  Code: 0
  Checksum: 0xff87 [correct]
  [Checksum Status: Good]
  Identifier (BE): 1 (0x0001)
  Identifier (LE): 256 (0x0100)
  Sequence Number (BE): 119 (0x0077)
  Sequence Number (LE): 30464 (0x7700)
  [Request frame: 1234]
  [Response time: 249,041 ms]
  Data (64 bytes)
0000  64 5d 86 86 5b 64 c0 06 c3 4a ce 99 08 00 45 00  d]...[d...[d...E-
0010  00 5c 9e 9f 00 00 2e 01 82 c3 79 25 31 0c c0 a8  .\.....y%1...
0020  00 65 00 00 ff 87 00 01 00 77 00 00 00 00 00 00  -e.....w.....
  
```

4. Большая разница в задержках была между 6 и 7 запросами. Оба хоста находятся в Великобритании

6	13 ms	14 ms	13 ms	et-3-0-2-xcr1.skt.cw.net [195.89.102.45]
7	120 ms	120 ms	132 ms	ae32-xcr1.att.cw.net [195.2.8.206]