

МИНОБРНАУКИ РОССИИ

Федеральное государственное бюджетное образовательное учреждение высшего образования «САНКТ-ПЕТЕРБУРГСКИЙ ГОСУДАРСТВЕННЫЙ ЭКОНОМИЧЕСКИЙ УНИВЕРСИТЕТ»

Факультет информатики и прикладной математики
Кафедра прикладной математики и экономико-математических методов **ОТЧЁТ**

по дисциплине:

«Сети передачи данных и информационная безопасность» на тему:

«Перехват ответов хостов Wireshark»

Направление (специальность)_	01.03.02_	
	(код, наименование)	
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Задание

Приложить скриншот tracert и файл Wireshark. Дать текстовое пояснение по одному из пакетов.

С помощью утилиты «traceroute» можно просмотреть сколько хостов прошёл пакет который мы отправляем с нашего хоста до конечного хоста получателя.

```
λ traceroute ya.ru
traceroute to ya.ru (87.250.250.242), 30 hops max, 60 byte packets
   _gateway (192.168.1.1) 0.418 ms 0.390 ms
                                              0.407 ms
                                             1.952 ms 1.931 ms
2
   91.201.231.181 (91.201.231.181) 1.857 ms
3
   core-v625.xtrim.ru (91.201.231.234) 1.973 ms
                                                 2.173 ms 1.929 ms
   nat2-c1.xtrim.ru (91.201.230.169)
                                     2.396 ms
                                               2.131 ms
   nat2-j-45-gw.xtrim.ru (91.201.230.173) 2.563 ms
                                                    2.479 ms 2.386 ms
   spb.piter-ix.yandex.ru (185.1.152.57) 3.104 ms 2.831 ms
   * 10.4.8.1 (10.4.8.1) 16.165 ms 10.3.3.1 (10.3.3.1)
   ya.ru (87.250.250.242)
                           13.230 ms
                                      12.545 ms
                                                 12.583 ms
```

Рисунок 1. Результат работы утилиты traceroute на примере ya.ru

Из результата работы утилиты «traceroute» видно, что пакет проходит через 8 хостов прежде чем достигнет итогового хоста получателя.

Далее при помощи фильтра Wireshark перехватим ответы хостов.



Рисунок 2. Фильтр захвата Wireshark

Таким образом, после запуска захвата, мы получили, следующие записи:

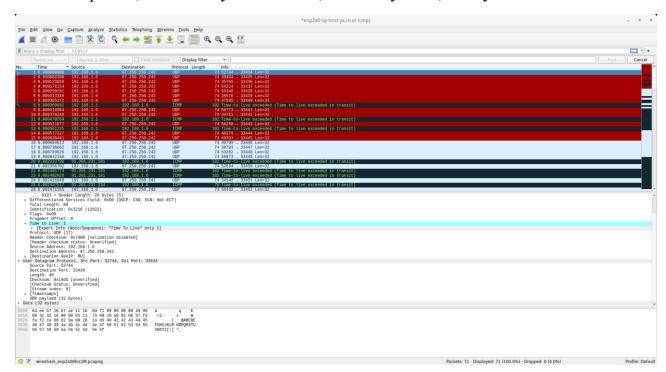


Рисунок 3. Результат захвата

Сначала мы отправляем UDP пакет от нашего хоста 192.168.1.6 до первого роутера 192.168.1.1 с TTL=1. Роутер дропает пакет и сообщает нам о том, что "Time to live exceeded in transit" (Type=11).

Всё это происходит 3 раза до того, как источник отправит следующий пакет с увеличением значения TTL на 1, то есть TTL=2.

Снова отправляем UDP пакет, но уже с TTL=2. В результате уже от 2 хоста – 91.201.231.181, мы получили ICMP ответ, что опять нам не хватило TTL – "Time to live exceeded in transit" (Type 11).

```
8 8 0.000369992 192.168.1.1 192.168.1.6 ICMP 102 Time-to-live exceeded (Time to live exceeded in transit)
    11 0.000470559 192.168.1.1 192.168.1.6 ICMP 102 Time-to-live exceeded (Time to live exceeded in transit)
 13 0.000561225 192.168.1.1 192.168.1.6 ICMP 102 Time to live exceeded (Time to live exceeded in transit)
                                                                                                   74 40799 - 33446 Len=32
74 38793 - 33447 Len=32
74 53262 - 33448 Len=32
74 58873 - 33449 Len=32
                                                                              UDP
UDP
     16 0.000684612
17 0.000736662
                                                    87.250.250.242
87.250.250.242
     18 0.000789626
                         192.168.1.6
                                                    87.250.250.242
                                                                              UDP
                                                                              ICMP
UDP
                                                                                                   102 Time-to-live exceeded (Time
74 52634 → 33450 Len=32
                                                    192.168.1.6
                         91.201.231.181
     24 0.002416848
                                                                              UDP
   0100 .... = Version: 4
.... 0101 = Header Length: 20 bytes (5)
Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
Total Length: 60
Identification: 0x3219 (12825)
   Flags: 0x00
  Fragment Offse
▼ Time to Live:
```

Опять-таки проделываем это 3 раза, после чего увеличиваем TTL на 1, то есть TTL=3. Снова отправляем UDP пакет, но уже с TTL=3. В результате уже от 3 хоста – 91.201.231.234, мы получили ICMP ответ, что опять нам не хватило TTL – "Time to live exceeded in transit" (Type 11).

г	7 0.000365172	192.168.1.6	87.250.250.242	UDP	74 47595 → 33440 Len=32
	8 0.000369692	192.168.1.1	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
	9 0.000416864	192.168.1.6	87.250.250.242	UDP	74 58773 → 33441 Len=32
	10 0.000470240	192.168.1.6	87.250.250.242	UDP	74 44711 → 33442 Len=32
	11 0.000470559	192.168.1.1	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
1	12 0.000521877	192.168.1.6	87.250.250.242	UDP	74 56288 → 33443 Len=32
	13 0.000561225	192.168.1.1	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
	14 0.000577227	192.168.1.6	87.250.250.242	UDP	74 48279 → 33444 Len=32
	15 0.000630441	192.168.1.6	87.250.250.242	UDP	74 49353 → 33445 Len=32
	16 0.000684612	192.168.1.6	87.250.250.242	UDP	74 40799 → 33446 Len=32
	17 0.000736662	192.168.1.6	87.250.250.242	UDP	74 38793 → 33447 Len=32
	18 0.000789626	192.168.1.6	87.250.250.242	UDP	74 53262 → 33448 Len=32
	19 0.000842340	192.168.1.6	87.250.250.242	UDP	74 58873 → 33449 Len=32
1	20 0.002333788	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
1	21 0.002356702	192.168.1.6	87.250.250.242	UDP	74 52634 → 33450 Len=32
	22 0.002401774	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
	23 0.002402029	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
	24 0.002416848	192.168.1.6	87.250.250.242	UDP	74 34148 → 33451 Len=32
L	25 0.002437517	91.201.231.234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
	26 0.002471165	192.168.1.6	87.250.250.242	UDP	74 58492 → 33452 Len=32
	27 0.002626268	91.201.231.234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
	28 0.002894674	91.201.231.234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
	29 0.002953625	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
	30 0.002988902	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
	31 0.003020709	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
	32 0.003626139	91.201.230.173	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
	0100 = Vers	ion: 4	·		000
		ier Length: 20 bytes	(5)		
) (DSCP: CS0, ECN: Not	-FCT)	
,	Total Length: 60		(DOOF. 030, ECN. NOT	-201)	
	Identification:				
	Flags: 0x00	0.0210 (12020)			
	Fragment Offset:	۵			
	Time to Live: 3	0			
•					

Проделываем это 3 раза. Увеличиваем TTL на 1, то есть TTL=4. Снова отправляем UDP пакет, но уже с TTL=4. В результате уже от 4 хоста – 91.201.230.169, мы получили ICMP ответ, что опять нам не хватило TTL – "Time to live exceeded in transit" (Type 11).

_ 12 0.000521877	192.168.1.6	87.250.250.242	UDP	74 56288 → 33443 Len=32			
13 0.000561225	192,168,1,1	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
14 0.000577227	192.168.1.6	87.250.250.242	UDP	74 48279 → 33444 Len=32			
15 0.000630441	192.168.1.6	87.250.250.242	UDP	74 49353 → 33445 Len=32			
16 0.000684612	192.168.1.6	87.250.250.242	UDP	74 40799 → 33446 Len=32			
17 0.000736662	192.168.1.6	87.250.250.242	UDP	74 38793 → 33447 Len=32			
18 0.000789626	192.168.1.6	87.250.250.242	UDP	74 53262 → 33448 Len=32			
19 0.000842340	192.168.1.6	87.250.250.242	UDP	74 58873 → 33449 Len=32			
20 0.002333788	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
21 0.002356702	192.168.1.6	87.250.250.242	UDP	74 52634 → 33450 Len=32			
22 0.002401774	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
23 0.002402029	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
24 0.002416848	192.168.1.6	87.250.250.242	UDP	74 34148 → 33451 Len=32			
25 0.002437517	91.201.231.234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
26 0.002471165	192.168.1.6	87.250.250.242	UDP	74 58492 → 33452 Len=32			
27 0.002626268	91.201.231.234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
28 0.002894674	91.201.231.234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
L 29 0.002953625	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
30 0.002988902	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
31 0.003020709	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
32 0.003626139	91.201.230.173	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
33 0.003626551	91.201.230.173	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
34 0.003693863	91.201.230.173	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
35 0.004546062	185.1.152.57	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
36 0.004546520	185.1.152.57	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
37 0.004614730	185.1.152.57	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
38 0.158694939	192.168.1.1	192.168.1.6	ICMP	106 Time-to-live exceeded (Time to live exceeded in transit)			
0100 = Version: 4 0101 = Header Length: 20 bytes (5) Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT) Total Length: 60 Identification: 0x321f (12831) Flags: 0x00							
	Fragment Offset: 0						
▼ Time_to Live: 4							

Проделываем это 3 раза. Увеличиваем TTL на 1, то есть TTL=5. Снова отправляем UDP пакет, но уже с TTL=5. В результате уже от 5 хоста – 91.201.230.173, мы получили ICMP ответ, что опять нам не хватило TTL – "Time to live exceeded in transit" (Type 11).

16 0.000684612				
	192.168.1.6	87.250.250.242	UDP	74 40799 → 33446 Len=32
17 0.000736662	192.168.1.6	87.250.250.242	UDP	74 38793 → 33447 Len=32
18 0.000789626	192.168.1.6	87.250.250.242	UDP	74 53262 → 33448 Len=32
19 0.000842340	192.168.1.6	87.250.250.242	UDP	74 58873 → 33449 Len=32
20 0.002333788	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
21 0.002356702	192.168.1.6	87,250,250,242	UDP	74 52634 → 33450 Len=32
22 0.002401774	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
23 0.002402029	91.201.231.181	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
24 0.002416848	192,168,1,6	87.250.250.242	UDP	74 34148 → 33451 Len=32
25 0.002437517	91,201,231,234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
26 0.002471165	192.168.1.6	87,250,250,242	UDP	74 58492 - 33452 Len=32
27 0.002626268	91.201.231.234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
28 0.002894674	91.201.231.234	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
29 0.002953625	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
30 0.002988902	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
31 0.003020709	91.201.230.169	192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)
32 0.003626139	91.201.230.173	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
33 0.003626551	91.201.230.173	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
34 0.003693863	91.201.230.173	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
35 0.004546062	185.1.152.57	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
36 0.004546520	185.1.152.57	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
37 0.004614730	185.1.152.57	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
		192.168.1.6	ICMP	106 Time-to-live exceeded (Time to live exceeded in transit)
38 0 158604030				
38 0.158694939	192.168.1.1		LIDD	
39 0.161068510	192.168.1.6	87.250.250.242	UDP	74 42390 → 33453 Len=32
39 0.161068510 40 0.161139748	192.168.1.6 192.168.1.6	87.250.250.242 87.250.250.242	UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510	192.168.1.6	87.250.250.242		74 42390 → 33453 Len=32
39 0.161068510 40 0.161139748 41 0.161218569	192.168.1.6 192.168.1.6 192.168.1.6	87.250.250.242 87.250.250.242	UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4	87.250.250.242 87.250.250.242 87.250.250.242	UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 Her Length: 20 bytes	87.250.250.242 87.250.250.242 87.250.250.242	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 Her Length: 20 bytes Hervices Field: 0x06	87.250.250.242 87.250.250.242 87.250.250.242	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head Differentiated S Total Length: 60	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 Her Length: 20 bytes ervices Field: 0x06	87.250.250.242 87.250.250.242 87.250.250.242	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head Differentiated S Total Length: 60 Identification:	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 Her Length: 20 bytes ervices Field: 0x06	87.250.250.242 87.250.250.242 87.250.250.242	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head > Differentiated S Total Length: 60 Identification: > Flags: 0x00	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes services Field: 0x06) 0x3222 (12834)	87.250.250.242 87.250.250.242 87.250.250.242	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head > Differentiated S Total Length: 80 Identification: > Flags: 0x00 Fragment Offset:	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes services Field: 0x06) 0x3222 (12834)	87.250.250.242 87.250.250.242 87.250.250.242	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head > Differentiated S Total Length: 60 Identification: > Flags: 0x00 Fragment Offset: Time to Live: 5	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes bervices Field: 0x06 0x3222 (12834)	87.250.250.242 87.250.250.242 87.250.250.242	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head > Differentiated S Total Length: 60 Identification: > Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes bervices Field: 0x06 0x3222 (12834) 0	87.250.250.242 87.250.250.242 87.250.250.242 6 (5) 0 (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head > Differentiated S Total Length: 80 Identification: > Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1 Header Checksum:	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes services Field: 0x06 0x3222 (12834) 0	87.250.250.242 87.250.250.242 87.250.250.242 (5) (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head b Differentiated S Total Length: 60 Identification: Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1 Header Checksum: [Header checksum:	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes bervices Field: 0x06 0x3222 (12834) 0 0x6464 [validation status: Unverified	87.250.250.242 87.250.250.242 87.250.250.242 (5) (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head > Differentiated S Total Length: 60 Identification: > Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1 Header Checksum: [Header checksum: Source Address:	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes Services Field: 0x06 0x3222 (12834) 0 0x66f4 [validation 15 status: Univerified 192.168.1.6	87.250.250.242 87.250.250.242 87.250.250.242 6 (5) 0 (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218509 0100 = Vers 0101 = Head Differentiated S Total Length: 60 Identification: Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1 Header Checksum: [Header checksum: Source Address: Destination Address:	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes bervices Field: 0x06 0 0x3222 (12834) 0 0x6ef4 [validation 1status: Unverified 192.168.1.6 eess: 87.250.250.242	87.250.250.242 87.250.250.242 87.250.250.242 6 (5) 0 (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head > Differentiated S Total Length: 60 Identification: > Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1 Header Checksum: [Header checksum Source Address:	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes bervices Field: 0x06 0 0x3222 (12834) 0 0x6ef4 [validation 1status: Unverified 192.168.1.6 eess: 87.250.250.242	87.250.250.242 87.250.250.242 87.250.250.242 6 (5) 0 (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head bifferentiated S Total Length: 60 Identification: Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1 Header Checksum: [Header checksum: Source Address: Destination Addr [Destination Geo	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes bervices Field: 0x06 0 0x3222 (12834) 0 0x6ef4 [validation 1status: Unverified 192.168.1.6 eess: 87.250.250.242	87.250.250.242 87.250.250.242 87.250.250.242 6.(5) 0 (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head bifferentiated S Total Length: 60 Identification: Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1 Header Checksum: Greater checksum: Source Address: Destination Addr [Destination Geo	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes ervices Field: 0x06 0) 0x3222 (12834) 0 0x6ef4 [validation 192.168.1.6 ess: 87.250.250.242 01P: RU]	87.250.250.242 87.250.250.242 87.250.250.242 6.(5) 0 (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32
39 0.161068510 40 0.161139748 41 0.161218569 0100 = Vers 0101 = Head) Differentiated S Total Length: 60 Identification: > Flags: 0x00 Fragment Offset: Time to Live: 5 Protocol: UDP (1 Header Checksum: [Header Checksum: Course Address: Destination Addr > [Destination Geo	192.168.1.6 192.168.1.6 192.168.1.6 sion: 4 ler Length: 20 bytes iervices Field: 0x06 0x3222 (12834) 0 0x3222 (12834) 0 0x66f4 [validation 152.168.1.6 ess: 87.250.250.242 JIP: RU]	87.250.250.242 87.250.250.242 87.250.250.242 6.(5) 0 (DSCP: CS0, ECN: Not	UDP UDP	74 42390 → 33453 Len=32 74 44570 → 33454 Len=32

Проделываем это 3 раза. Увеличиваем TTL на 1, то есть TTL=6. Снова отправляем UDP пакет, но уже с TTL=6. В результате уже от 6 хоста – 185.1.152.57, мы получили ICMP ответ, что опять нам не хватило TTL – "Time to live exceeded in transit" (Type 11).

_ 19 0.0008423	340 192.168.1.6	87.250.250.242	UDP	74 58873 → 33449 Len=32			
20 0.0023337			ICMP				
21 0.0023567		192.168.1.6 87.250.250.242	UDP	102 Time-to-live exceeded (Time to live exceeded in transit) 74 52634 → 33450 Len=32			
22 0.0024017			ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
23 0.0024026		192.168.1.6 192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
24 0.0024168		87,250,250,242	UDP	74 34148 \rightarrow 33451 Len=32			
25 0.0024375		192.168.1.6	ICMP	74 54146 → 35451 Len-52 70 Time-to-live exceeded (Time to live exceeded in transit)			
26 0.0024711		87.250.250.242	UDP	74 58492 → 33452 Len=32			
27 0.0026262		192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
28 0.0028946		192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
29 0.0029536		192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
30 0.0029889		192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
31 0.0030207		192.168.1.6	ICMP	102 Time-to-live exceeded (Time to live exceeded in transit)			
32 0.0036261		192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
33 0.0036265		192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
34 0.0036938		192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
35 0.0045466		192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
36 0.0045465		192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
37 0.0046147		192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)			
38 0.1586949		192.168.1.6	ICMP	106 Time-to-live exceeded (Time to live exceeded in transit)			
39 0.1610685		87.250.250.242	UDP	74 42390 → 33453 Len=32			
40 0.1611397		87.250.250.242	UDP	74 44570 - 33454 Len=32			
41 0.1612185		87.250.250.242	UDP	74 53592 → 33455 Len=32			
42 0.1612777		87.250.250.242	UDP	74 60566 → 33456 Len=32			
43 0.1652325	80 192.168.1.6	87.250.250.242	UDP	74 33018 → 33457 Len=32			
44 0.1653076	84 192.168.1.6	87.250.250.242	UDP	74 39353 → 33458 Len=32			
0100 = Version: 4 0101 = Header Length: 20 bytes (5) Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT) Total Length: 60 Identification: 0x3225 (12837) Flags: 0x00 Fragment Offset: 0 Time to Live: 6 Protocol: UDP (17) Header Checksum: 0x6df1 [validation disabled]							
Šource Addre Destination	ksum status: Unverifie ss: 192.168.1.6 Address: 87.250.250.24	•					
▶ [Destination GeoIP: RU] User Datagram Protocol, Src Port: 58873, Dst Port: 33449							
Course Don't	50070	, 200 10101 00440					

Проделываем это 3 раза. Увеличиваем TTL на 1, то есть TTL=7. Снова отправляем UDP пакет, но уже с TTL=7. В результате этот товарищ нам решил ничего не отвечать и просто проигнорировать. (ну и не хотелось ☺)

Отправляем ещё раз UDP пакет с TTL=7 и всё-таки уже от 7 хоста — 10.4.7.1, мы получили ICMP ответ, что опять нам не хватило TTL — "Time to live exceeded in transit" (Type 11).

```
40 0.161139748
41 0.161218569
                                                                                                                                                                                                                                                                                                                                                              33453 Len=32
33454 Len=32
33455 Len=32
33456 Len=32
33457 Len=32
33458 Len=32
33459 Len=32
                                                                                                                                                          87.250.250.242
87.250.250.242
87.250.250.242
87.250.250.242
                                                                                                                                                                                                                                                                                                                    74 44570
74 53592
74 60566
                                                                       192.168.1.6
192.168.1.6
                                                                                                                                                                                                                                              UDP
UDP
   42 0.161277700
                                                                       192.168.1.6
                                                                                                                                                                                                                                                                                                                    74 33018
74 39353
74 38412
   43 0.165232580
44 0.165307684
                                                                                                                                                          87.250.250.242
87.250.250.242
                                                                       192.168.1.6
   45 0.165362423
                                                                       192.168.1.6
                                                                                                                                                          87.250.250.242
                                                                                                                                                                                                                                                                                                                    74 38412
74 56342
74 43242
74 52167
74 45110
74 35493
74 45672
  46 0.165414661
47 0.165467417
48 0.165519370
                                                                      192.168.1.6
192.168.1.6
                                                                                                                                                          87.250.250.242
87.250.250.242
87.250.250.242
                                                                                                                                                                                                                                              UDP
UDP
                                                                                                                                                                                                                                                                                                                                                               33460 Len=32
33461 Len=32
33462 Len=32
                                                                       192.168.1.6
                                                                                                                                                                                                                                               UDP
  49 0.165570814
50 0.165622597
51 0.165674679
                                                                      192.168.1.6
192.168.1.6
192.168.1.6
                                                                                                                                                          87.250.250.242
87.250.250.242
87.250.250.242
                                                                                                                                                                                                                                                                                                                                                               33463 Len=32
33464 Len=32
33465 Len=32
                                                                                                                                                                                                                                               UDP
  52 0.165727587
53 0.165779030
                                                                      192.168.1.6
192.168.1.6
                                                                                                                                                          87.250.250.242
87.250.250.242
                                                                                                                                                                                                                                                                                                           74 52289 - 33467 Len=32
74 50172 - 33467 Len=32
70 Time-to-live exceeded (Time to live exceeded)
102 Destination unreachable (Port unreachable)
70 Time-to-live exceeded (Time to live exceeded in transit)
70 Time-to-live exceeded (Time to live exceeded in transit)
102 Destination unreachable (Port unreachable)
102 Destination unreachable (Port unreachable)
103 Destination unreachable (Port unreachable)
104 Destination unreachable (Port unreachable)
                                                                                                                                                                                                                                                                                                                               52289
50172
                                                                                                                                                                                                                                                                                                                                                              33466 Len=32
33467 Len=32
                                                                                                                                                                                                                                               UDP
 53 0.1657/9038

54 0.177478560

55 0.17757724

56 0.178269999

57 0.178349898

58 0.178389414

59 0.178445280

60 0.179235186

61 0.180316599

62 0.181428571

63 0.181467863

64 0.182995525

65 0.182146684
                                                                                                                                                          192.168.1.6
192.168.1.6
192.168.1.6
192.168.1.6
192.168.1.6
192.168.1.6
192.168.1.6
192.168.1.6
192.168.1.6
192.168.1.6
                                                                      87.250.250.242
87.250.250.242
10.4.7.1
10.4.2.1
87.250.250.242
87.250.250.242
87.250.250.242
Flags: 0x00
Fragment Offset: 0
```

Fragment Offset: 0
Time to Live: 7
Protocol: UDP (17)
Header Checksum: 0x6cbc [validation disabled]
[Header checksum status: Unverified]

Отправляем ещё раз UDP пакет с TTL=7 и уже от другого хоста – 87.250.239.183, мы получили ICMP ответ, что опять нам не хватило TTL – "Time to live exceeded in transit" (Type 11).

40.0.404400740	400 400 4 6	07 050 050 040	LIDD	74 44570 00454 1 00
_ 40 0.161139748		87.250.250.242	UDP	74 44570 → 33454 Len=32
41 0.161218569	192.168.1.6	87.250.250.242	UDP	74 53592 → 33455 Len=32
42 0.161277700	192.168.1.6	87.250.250.242	UDP	74 60566 → 33456 Len=32
43 0.165232580	192.168.1.6	87.250.250.242	UDP	74 33018 → 33457 Len=32
44 0.165307684	192.168.1.6	87.250.250.242	UDP	74 39353 → 33458 Len=32
45 0.165362423	192.168.1.6	87.250.250.242	UDP	74 38412 → 33459 Len=32
46 0.165414661	192.168.1.6	87.250.250.242	UDP	74 56342 → 33460 Len=32
47 0.165467417	192.168.1.6	87.250.250.242	UDP	74 43242 → 33461 Len=32
48 0.165519370	192.168.1.6	87.250.250.242	UDP	74 52167 → 33462 Len=32
49 0.165570814	192.168.1.6	87.250.250.242	UDP	74 45110 → 33463 Len=32
50 0.165622597	192.168.1.6	87.250.250.242	UDP	74 35493 → 33464 Len=32
51 0.165674679	192.168.1.6	87.250.250.242	UDP	74 45672 → 33465 Len=32
52 0.165727587	192.168.1.6	87.250.250.242	UDP	74 52289 → 33466 Len=32
53 0.165779030	192.168.1.6	87.250.250.242	UDP	74 50172 → 33467 Len=32
L 54 0.177478560	87.250.239.183	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
55 0.177577204	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)

Отправляем ещё раз UDP пакет с TTL=7 и уже от другого хоста -10.4.2.1, мы получили ICMP ответ, что опять нам не хватило TTL — "Time to live exceeded in transit" (Type 11).

- 41 0.161218569	192.168.1.6	87.250.250.242	UDP	74 53592 → 33455 Len=32
42 0.161277700	192.168.1.6	87.250.250.242	UDP	74 60566 → 33456 Len=32
43 0.165232580	192.168.1.6	87.250.250.242	UDP	74 33018 → 33457 Len=32
44 0.165307684	192.168.1.6	87.250.250.242	UDP	74 39353 → 33458 Len=32
45 0.165362423	192.168.1.6	87.250.250.242	UDP	74 38412 → 33459 Len=32
46 0.165414661	192.168.1.6	87.250.250.242	UDP	74 56342 → 33460 Len=32
47 0.165467417	192.168.1.6	87.250.250.242	UDP	74 43242 → 33461 Len=32
48 0.165519370	192.168.1.6	87.250.250.242	UDP	74 52167 → 33462 Len=32
49 0.165570814	192.168.1.6	87.250.250.242	UDP	74 45110 → 33463 Len=32
50 0.165622597	192.168.1.6	87.250.250.242	UDP	74 35493 → 33464 Len=32
51 0.165674679	192.168.1.6	87.250.250.242	UDP	74 45672 → 33465 Len=32
52 0.165727587	192.168.1.6	87.250.250.242	UDP	74 52289 → 33466 Len=32
53 0.165779030	192.168.1.6	87.250.250.242	UDP	74 50172 → 33467 Len=32
54 0.177478560	87.250.239.183	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
55 0.177577204	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
56 0.178260909	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
57 0.178349898	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
58 0.178389414	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
59 0.178445280	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
60 0.179235186	10.4.7.1	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
L 61 0.180316509	10.4.2.1	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)

Увеличиваем TTL на 1, то есть TTL=8. Снова отправляем UDP пакет, но уже с TTL=8. В результате этот товарищ нам решил ничего не отвечать и просто проигнорировать. (ну и не хотелось ☺)

42 0.161277700	192.168.1.6	87.250.250.242	UDP	74 60566 → 33456 Len=32
43 0.165232580	192,168,1,6	87,250,250,242	UDP	74 33018 → 33457 Len=32
44 0.165307684	192.168.1.6	87.250.250.242	UDP	74 39353 → 33458 Len=32
45 0.165362423	192.168.1.6	87.250.250.242	UDP	74 38412 - 33459 Len=32
46 0.165414661	192.168.1.6	87.250.250.242	UDP	74 56342 - 33460 Len=32
47 0.165467417	192.168.1.6	87.250.250.242	UDP	74 43242 - 33461 Len=32
48 0.165519370	192.168.1.6	87.250.250.242	UDP	74 52167 → 33462 Len=32
49 0.165570814	192.168.1.6	87.250.250.242	UDP	74 45110 - 33463 Len=32
50 0.165622597	192.168.1.6	87.250.250.242	UDP	74 35493 → 33464 Len=32
51 0.165674679	192.168.1.6	87.250.250.242	UDP	74 45672 → 33465 Len=32
52 0.165727587	192.168.1.6	87.250.250.242	UDP	74 52289 → 33466 Len=32
53 0.165779030	192.168.1.6	87.250.250.242	UDP	74 50172 → 33467 Len=32
54 0.177478560	87.250.239.183	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
55 0.177577204	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
56 0.178260909	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
57 0.178349898	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
58 0.178389414	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
59 0.178445280	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
60 0.179235186	10.4.7.1	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
61 0.180316509	10.4.2.1	192.168.1.6	ICMP	70 Time-to-live exceeded (Time to live exceeded in transit)
62 0.181428571	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
63 0.181467863	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
64 0.182095525	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
65 0.182146634	87.250.250.242	192.168.1.6	ICMP	102 Destination unreachable (Port unreachable)
Flags: AxAA		<u> </u>		

Flags: 0x00 Fragment Offset: 0

Protocol: UDP (17)
Header Checksum: 0x6bb9 [validation disabled]

Отправляем ещё раз UDP пакет с TTL=8 и уже от другого хоста — 87.250.239.183, мы получили ICMP ответ — "Destination unreachable" (Туре 3). (правда непонятно почему)

```
87.250.250.242
87.250.250.242
87.250.250.242
                                                                                                                   74 38412
74 56342
74 43242
45 0.165362423
                         192.168.1.6
                                                                                         UDP
                                                                                                                                   33459 Len=32
46 0.165414661
47 0.165467417
                                                                                                                                   33461 Len=32
                         192.168.1.6
                                                        87.250.250.242
87.250.250.242
48 0.165519370
                         192.168.1.6
                                                                                         UDP
                                                                                                                    74 52167
                                                                                                                                   33462 Len=32
                         192.168.1.6
192.168.1.6
                                                                                                                   74 45110
74 35493
                                                                                                                                   33463 Len=32
33464 Len=32
49 0.165570814
50 0.165622597
                                                         87.250.250.242
                                                                                         UDP
51 0.165674679
52 0.165727587
                         192.168.1.6
192.168.1.6
                                                        87.250.250.242
87.250.250.242
                                                                                                                   74 45672
74 52289
                                                                                                                                 → 33465 Len=32
→ 33466 Len=32
                                                                                         UDP
53 0.165779030
                         192.168.1.6
                                                         87.250.250.242
                                                                                                                    74 50172
                                                                                                                                   33467 Len=32
```

Далее мы наращиваем TTL последовательно до 12, то есть TTL=12, но каждый раз получаем получили ICMP ответ – "Destination unreachable" (Туре 3). (правда непонятно почему)

Получилось немного странно, не то что я ожидал, но я пытался несколько раз перезапускать $\langle traceroute\ ya.ru \rangle$, но получал всегда один и тот же ответ +-.