МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

федеральное государственное автономное образовательное учреждение

высшего образования

Санкт-Петербургский национальный исследовательский университет

информационных технологий механики и оптики

Мегафакультет трансляционных информационных технологий

Факультет информационных технологий и программирования

Лабораторная работа №3

По дисциплине «Телекоммуникационные системы и технологии»

Выполнил студенты группы №M33091:

Юнусов Расул С.

Проверила: Шараева Кристина В.

Санкт-Петербург

2022

Артефакты:

- **Часть 1.8**

```
[root@localhost ~]# ping -c 5 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=109 time=13.9 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=109 time=16.10 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=109 time=267 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=109 time=52.8 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=109 time=31.2 ms

--- 8.8.8.8 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 12ms
rtt min/avg/max/mdev = 13.903/76.329/266.817/96.226 ms
[root@localhost ~]#
```

- **Часть 2.2**

```
[root@localhost ~]# ping -c 10 10.0.0.1
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.
64 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=1.07 ms
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=1.55 ms
64 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=1.32 ms
64 bytes from 10.0.0.1: icmp_seq=4 ttl=64 time=1.25 ms
64 bytes from 10.0.0.1: icmp_seq=5 ttl=64 time=1.42 ms
64 bytes from 10.0.0.1: icmp_seq=6 ttl=64 time=1.22 ms
64 bytes from 10.0.0.1: icmp_seq=7 ttl=64 time=1.33 ms
64 bytes from 10.0.0.1: icmp_seq=8 ttl=64 time=1.43 ms
64 bytes from 10.0.0.1: icmp_seq=9 ttl=64 time=1.45 ms
64 bytes from 10.0.0.1: icmp_seq=10 ttl=64 time=1.31 ms

--- 10.0.0.1 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 28ms
rtt min/avg/max/mdev = 1.074/1.336/1.551/0.135 ms
[root@localhost ~]#
```

```
[root@localhost ~]# ping -c 5 -s 1500 10.0.0.1
PING 10.0.0.1 (10.0.0.1) 1500(1528) bytes of data.
1508 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=1.66 ms
1508 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=1.47 ms
1508 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=1.47 ms
1508 bytes from 10.0.0.1: icmp_seq=4 ttl=64 time=1.59 ms
1508 bytes from 10.0.0.1: icmp_seq=5 ttl=64 time=1.49 ms

--- 10.0.0.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 13ms
rtt min/avg/max/mdev = 1.467/1.534/1.659/0.077 ms
[root@localhost ~]#
```

```
[root@localhost ~]# ping -c 10 -i 10 10.0.0.1
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.
64 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=0.710 ms
64 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=1.31 ms
64 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=1.44 ms
64 bytes from 10.0.0.1: icmp_seq=4 ttl=64 time=2.40 ms
64 bytes from 10.0.0.1: icmp_seq=5 ttl=64 time=1.23 ms
64 bytes from 10.0.0.1: icmp_seq=6 ttl=64 time=1.54 ms
64 bytes from 10.0.0.1: icmp_seq=7 ttl=64 time=1.43 ms
64 bytes from 10.0.0.1: icmp_seq=8 ttl=64 time=2.79 ms
64 bytes from 10.0.0.1: icmp_seq=9 ttl=64 time=1.22 ms
64 bytes from 10.0.0.1: icmp_seq=10 ttl=64 time=1.56 ms

--- 10.0.0.1 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 317ms
rtt min/avg/max/mdev = 0.710/1.561/2.786/0.572 ms
[root@localhost ~]#
```

- **Часть 2.7**

$ mtr -u -c 40 www.itmo.ru > file

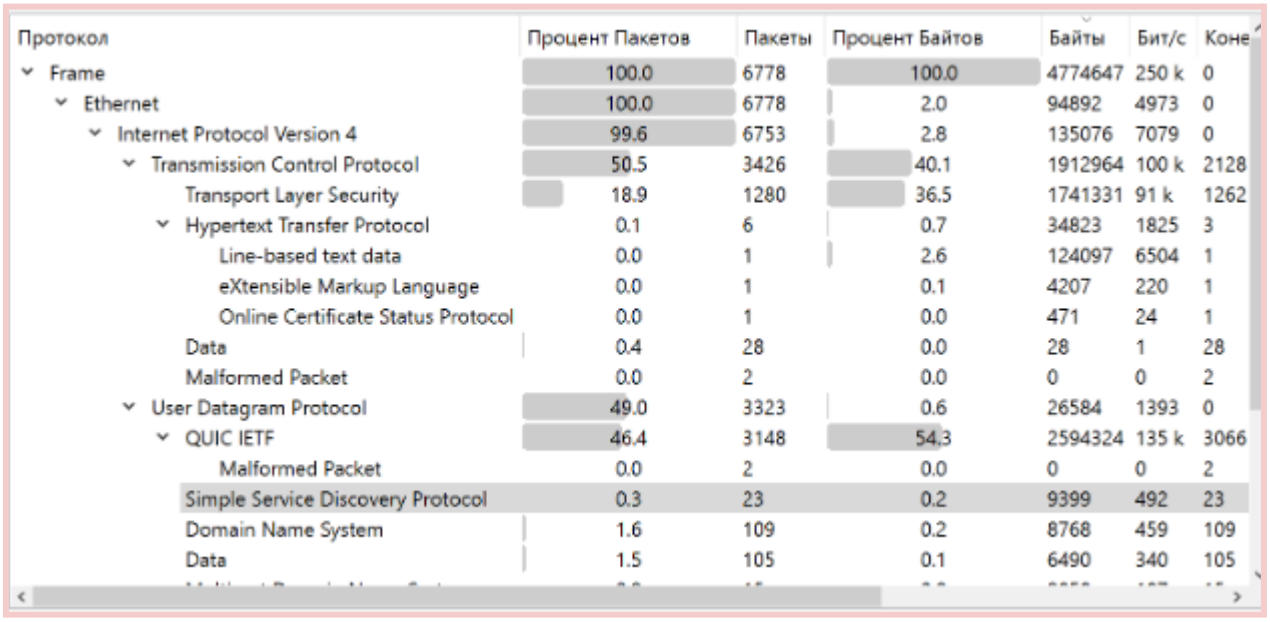
```
HOST: localhost.localdomain          Loss%   Snt   Last   Avg  Best  Wrst StDev
  1.|-- _gateway                      0.0%    40    1.2   1.1   0.4   1.4   0.2
  2.|-- 192.168.0.1                   0.0%    40    3.7   7.2   2.1  29.6   6.5
  3.|-- 127-253.bm18.nwlk.ru          0.0%    40   35.4  27.0   3.4 113.5  30.2
  4.|-- 10.132.59.253                 0.0%    40    5.1  23.5   4.2 233.7  43.7
  5.|-- ???                         100.0    40    0.0   0.0   0.0   0.0   0.0
  6.|-- ae2-298.RT.BM.SPB.RU.retn.net  0.0%    40   12.1  24.0   4.8  98.9  26.1
  7.|-- ae2-11.RT.OV.SPB.RU.retn.net   0.0%    40   54.0  27.6   4.8  84.1  21.7
  8.|-- GW-ITMO.retn.net              0.0%    40   13.3  36.4  11.6 110.2  27.4
  9.|-- 77.234.192.167                0.0%    40   40.4  36.6  12.2 104.9  26.7
 10.|-- 77.234.204.10                 0.0%    40   13.7  32.1  11.9 126.7  27.4
```

$ mtr -wn -c 40 www.itmo.ru > file

```
HOST: localhost.localdomain Loss%   Snt   Last   Avg  Best  Wrst StDev
  1.|-- 10.0.2.2                0.0%    40    0.4   0.7   0.3   1.3   0.2
  2.|-- 192.168.0.1             0.0%    40    3.4   6.6   2.1  41.2   7.1
  3.|-- 178.252.127.253         0.0%    40    9.6  10.6   3.7  68.7  11.0
  4.|-- 10.132.59.253           0.0%    40    4.9   8.7   4.1  37.5   6.3
  5.|-- ???                   100.0    40    0.0   0.0   0.0   0.0   0.0
  6.|-- 87.245.251.8            0.0%    40    4.9   9.3   3.4  59.1  10.8
  7.|-- 87.245.232.0            0.0%    40    5.2   9.6   4.5  49.1   8.3
  8.|-- 87.245.250.79           0.0%    40   14.0  21.3  11.3 113.4  19.1
  9.|-- 77.234.192.167          0.0%    40   14.7  25.6  12.0 206.2  32.3
 10.|-- 77.234.204.10           0.0%    40   17.1  25.3  12.2 122.9  23.6
```

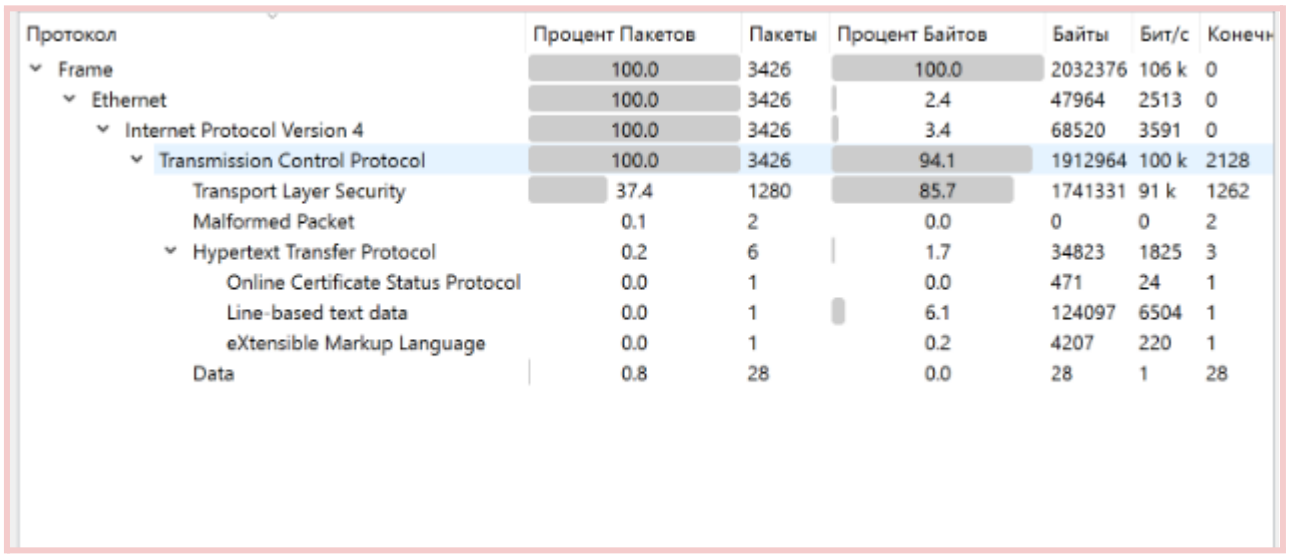
- **Часть 3.2**

  Самый активный узел:

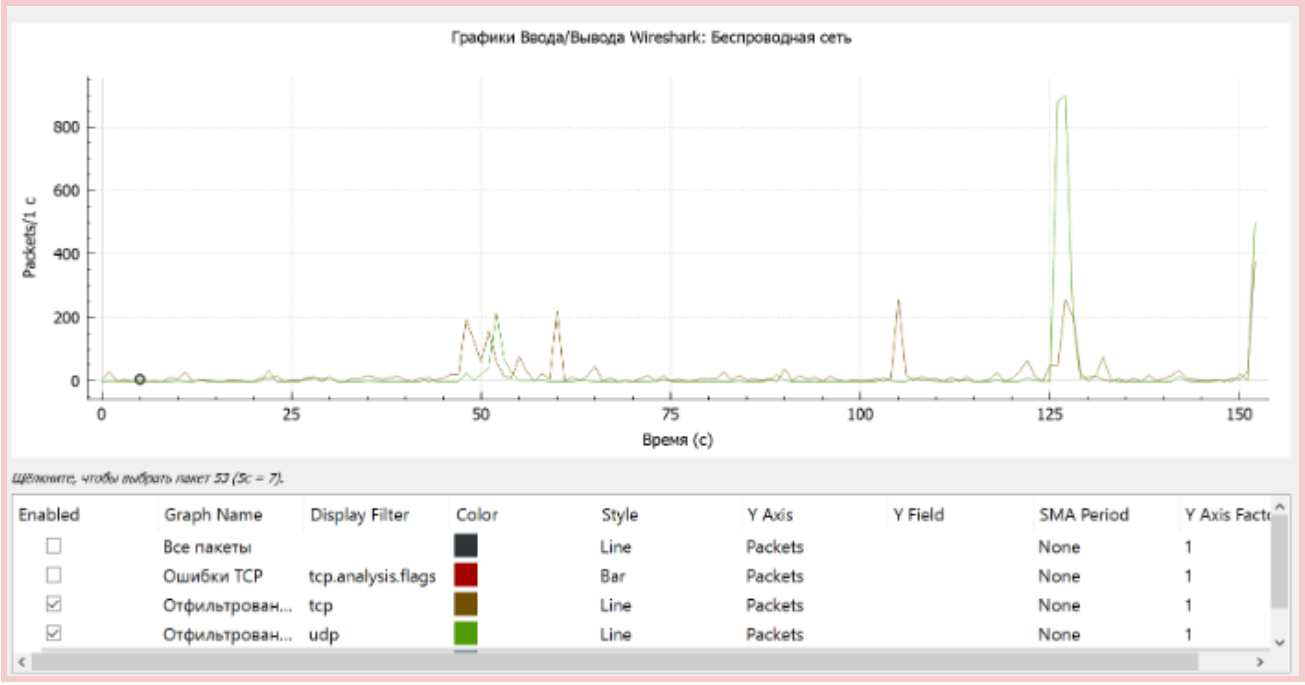


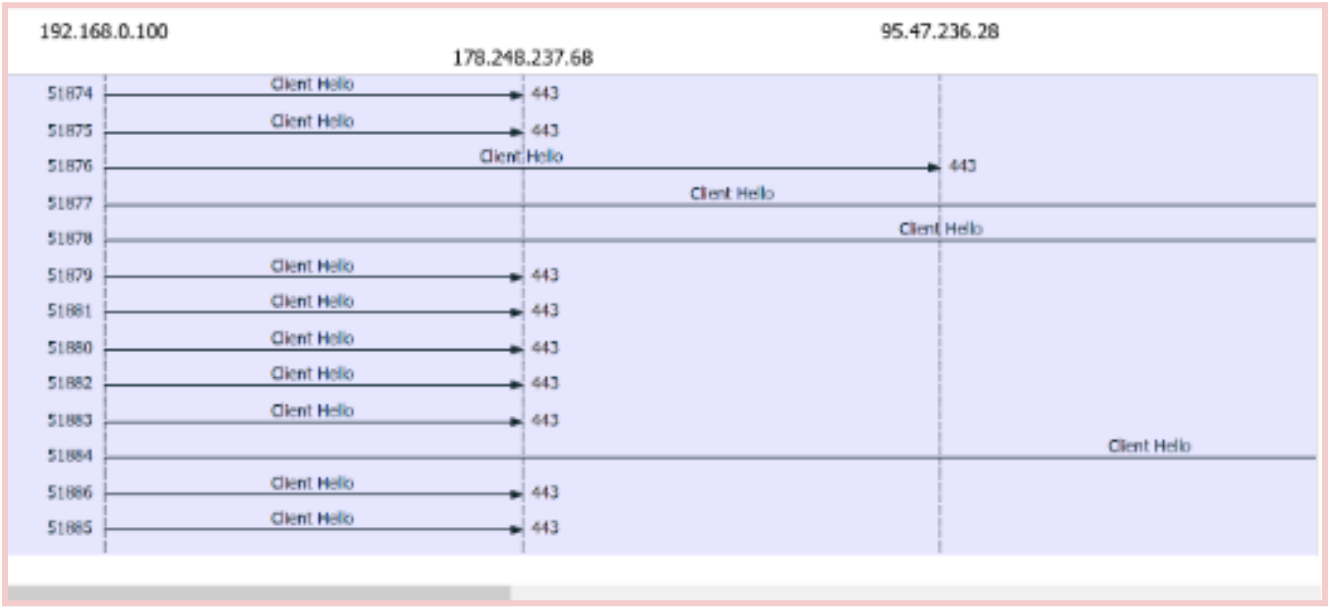
Протокол	Процент Пакетов	Пакеты	Процент Байтов	Байты	Бит/с	Коне
Frame	100.0	6778	100.0	4774647	250 k	0
Ethernet	100.0	6778	2.0	94892	4973	0
Internet Protocol Version 4	99.6	6753	2.8	135076	7079	0
Transmission Control Protocol	50.5	3426	40.1	1912964	100 k	2128
Transport Layer Security	18.9	1280	36.5	1741331	91 k	1262
Hypertext Transfer Protocol	0.1	6	0.7	34823	1825	3
Line-based text data	0.0	1	2.6	124097	6504	1
eXtensible Markup Language	0.0	1	0.1	4207	220	1
Online Certificate Status Protocol	0.0	1	0.0	471	24	1
Data	0.4	28	0.0	28	1	28
Malformed Packet	0.0	2	0.0	0	0	2
User Datagram Protocol	49.0	3323	0.6	26584	1393	0
QUIC IETF	46.4	3148	54.3	2594324	135 k	3066
Malformed Packet	0.0	2	0.0	0	0	2
Simple Service Discovery Protocol	0.3	23	0.2	9399	492	23
Domain Name System	1.6	109	0.2	8768	459	109
Data	1.5	105	0.1	6490	340	105

Самый активный TCP-порт на хосте

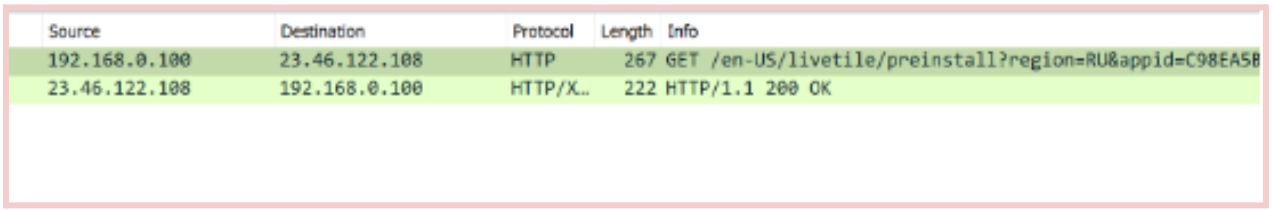


Протокол	Процент Пакетов	Пакеты	Процент Байтов	Байты	Бит/с	Конечн
Frame	100.0	3426	100.0	2032376	106 k	0
Ethernet	100.0	3426	2.4	47964	2513	0
Internet Protocol Version 4	100.0	3426	3.4	68520	3591	0
Transmission Control Protocol	100.0	3426	94.1	1912964	100 k	2128
Transport Layer Security	37.4	1280	85.7	1741331	91 k	1262
Malformed Packet	0.1	2	0.0	0	0	2
Hypertext Transfer Protocol	0.2	6	1.7	34823	1825	3
Online Certificate Status Protocol	0.0	1	0.0	471	24	1
Line-based text data	0.0	1	6.1	124097	6504	1
eXtensible Markup Language	0.0	1	0.2	4207	220	1
Data	0.8	28	0.0	28	1	28

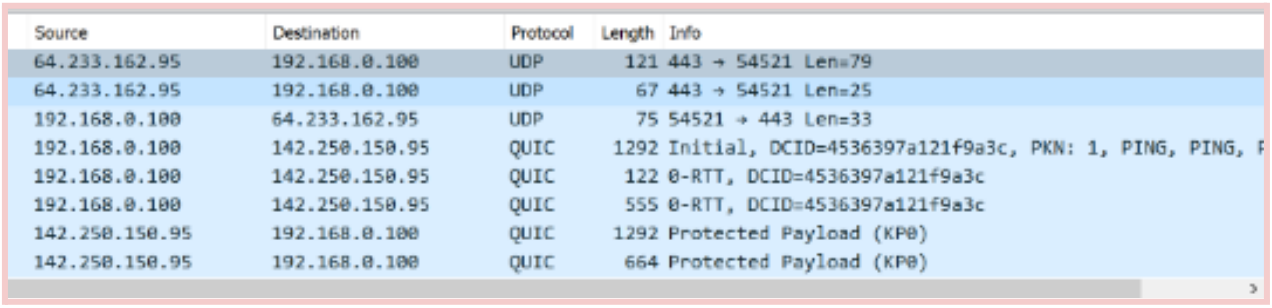

Графики Ввода/Вывода Wireshark: Беспроводная сеть
Packets/1 с
800
600
400
200
0
0
25
50
75
100
125
150
Время (с)
Щёлкните, чтобы выбрать пакет 53 (5с = 7).
Enabled
Graph Name
Display Filter
Color
Style
Y Axis
Y Field
SMA Period
Y Axis Facto
Все пакеты
Line
Packets
None
1
Ошибки TCP
tcp.analysis.flags
Bar
Packets
None
1
Отфильтрован...
tcp
Line
Packets
None
1
Отфильтрован...
udp
Line
Packets
None
1


192.168.0.100
178.248.237.68
95.47.236.28
51874
51875
51876
51877
51878
51879
51881
51880
51882
51883
51884
51886
51885
Client Hello
443

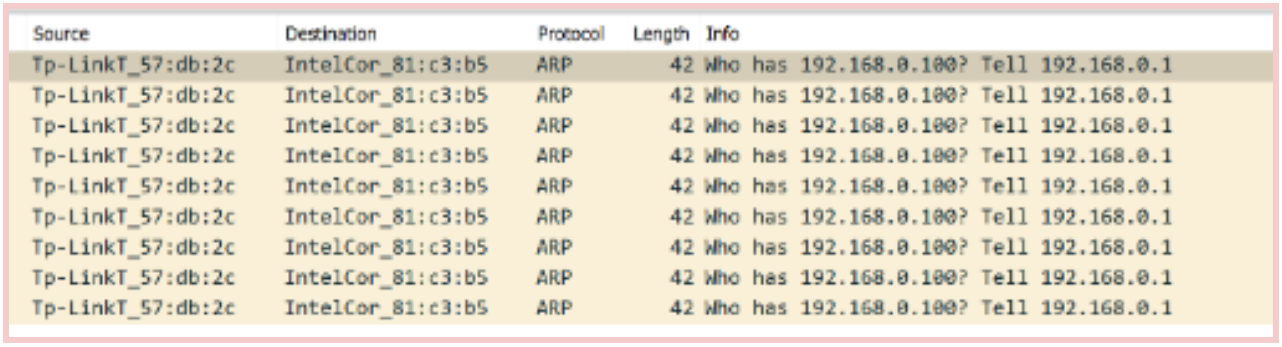
- **Часть 3.3**



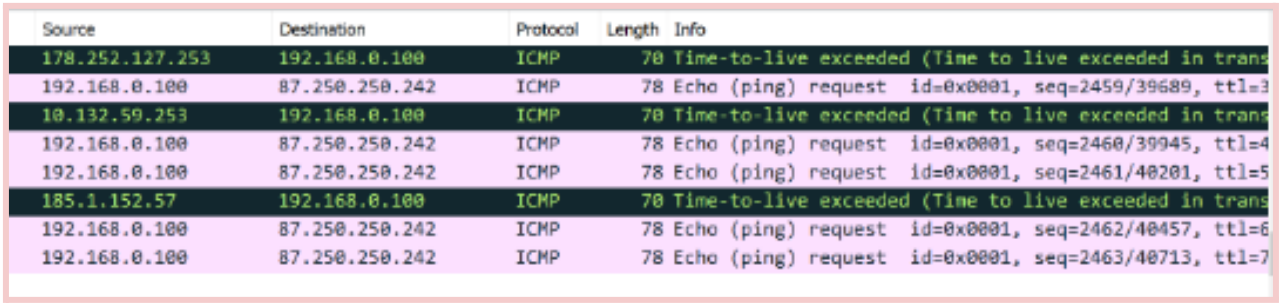
Source	Destination	Protocol	Length	Info
192.168.0.100	23.46.122.108	HTTP	267	GET /en-US/livetile/preinstall?region=RU&appid=C98EA5B
23.46.122.108	192.168.0.100	HTTP/X…	222	HTTP/1.1 200 OK



Source	Destination	Protocol	Length	Info
64.233.162.95	192.168.0.100	UDP	121	443 → 54521 Len=79
64.233.162.95	192.168.0.100	UDP	67	443 → 54521 Len=25
192.168.0.100	64.233.162.95	UDP	75	54521 → 443 Len=33
192.168.0.100	142.250.150.95	QUIC	1292	Initial, DCID=4536397a121f9a3c, PKN: 1, PING, PING, P
192.168.0.100	142.250.150.95	QUIC	122	0-RTT, DCID=4536397a121f9a3c
192.168.0.100	142.250.150.95	QUIC	555	0-RTT, DCID=4536397a121f9a3c
142.250.150.95	192.168.0.100	QUIC	1292	Protected Payload (KP0)
142.250.150.95	192.168.0.100	QUIC	664	Protected Payload (KP0)



Source	Destination	Protocol	Length	Info
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1
Tp-LinkT_57:db:2c	IntelCor_81:c3:b5	ARP	42	Who has 192.168.0.100? Tell 192.168.0.1



Source	Destination	Protocol	Length	Info
178.252.127.253	192.168.0.100	ICMP	70	Time-to-live exceeded (Time to live exceeded in trans
192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2459/39689, ttl=3
10.132.59.253	192.168.0.100	ICMP	70	Time-to-live exceeded (Time to live exceeded in trans
192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2460/39945, ttl=4
192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2461/40201, ttl=5
185.1.152.57	192.168.0.100	ICMP	70	Time-to-live exceeded (Time to live exceeded in trans
192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2462/40457, ttl=6
192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2463/40713, ttl=7

- **Часть 3.4**

$ mtr -bc 111 ya.ru

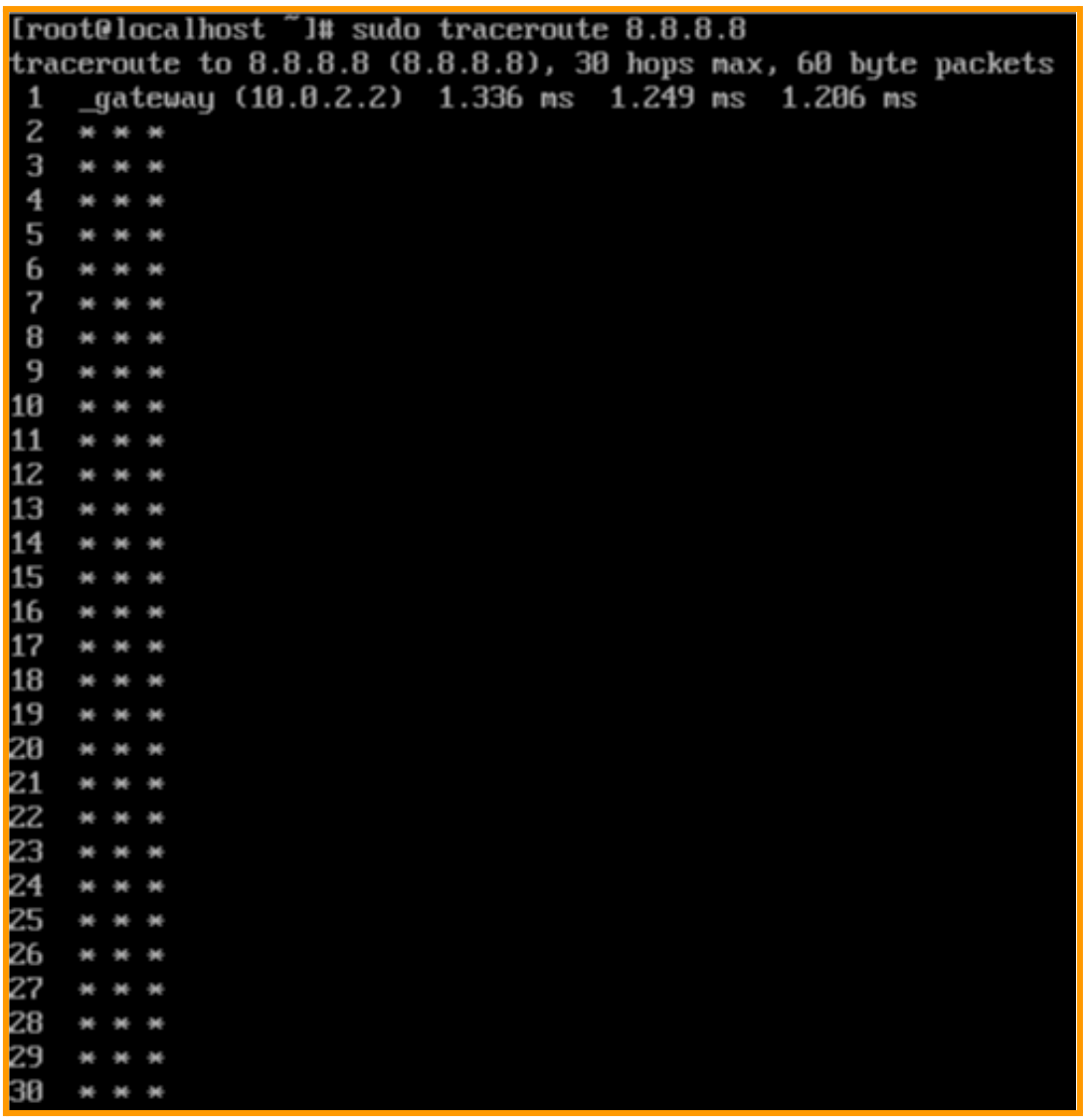
```
                                             Packets               Pings
Host                                       Loss%   Snt   Last   Avg  Best  Wrst StDev
1. _gateway (10.0.2.2)                      0.0%   111    0.4   0.9   0.3   1.3   0.2
2. 192.168.0.1 (192.168.0.1)                0.0%   111    6.9   8.0   1.9  41.7   5.9
3. 127-253.bm18.nwlk.ru (178.252.127.253)   0.0%   111   83.4  31.5   3.5 102.6  31.8
4. 10.132.59.253 (10.132.59.253)            0.0%   111    4.7  21.8   2.9 120.4  28.2
5. ???
6. spb.piter-ix.yandex.ru (185.1.152.57)    0.0%   111   53.1  45.1   2.8 123.9  32.7
7. sas-32z3-ae1-1.yndx.net (87.250.239.183) 0.0%   111   18.8  35.7  17.5 121.4  26.7
8. 10.4.3.1 (10.4.3.1)                      0.0%   111   21.9  24.7  18.6  92.9   7.8
9. ya.ru (87.250.250.242)                   0.0%   111   19.0  22.5  18.2  50.4   5.1
```

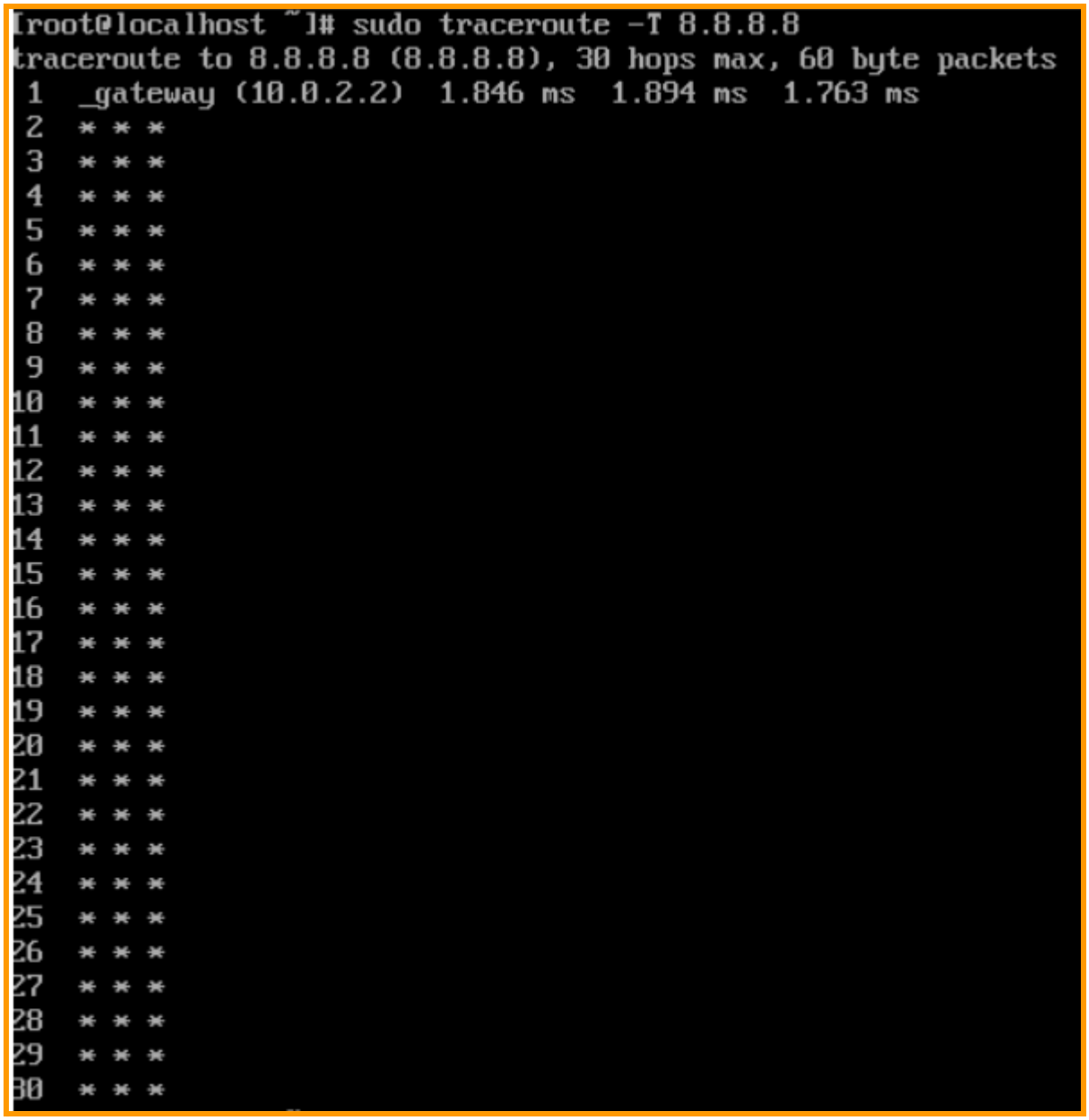
- **Часть 3.5**

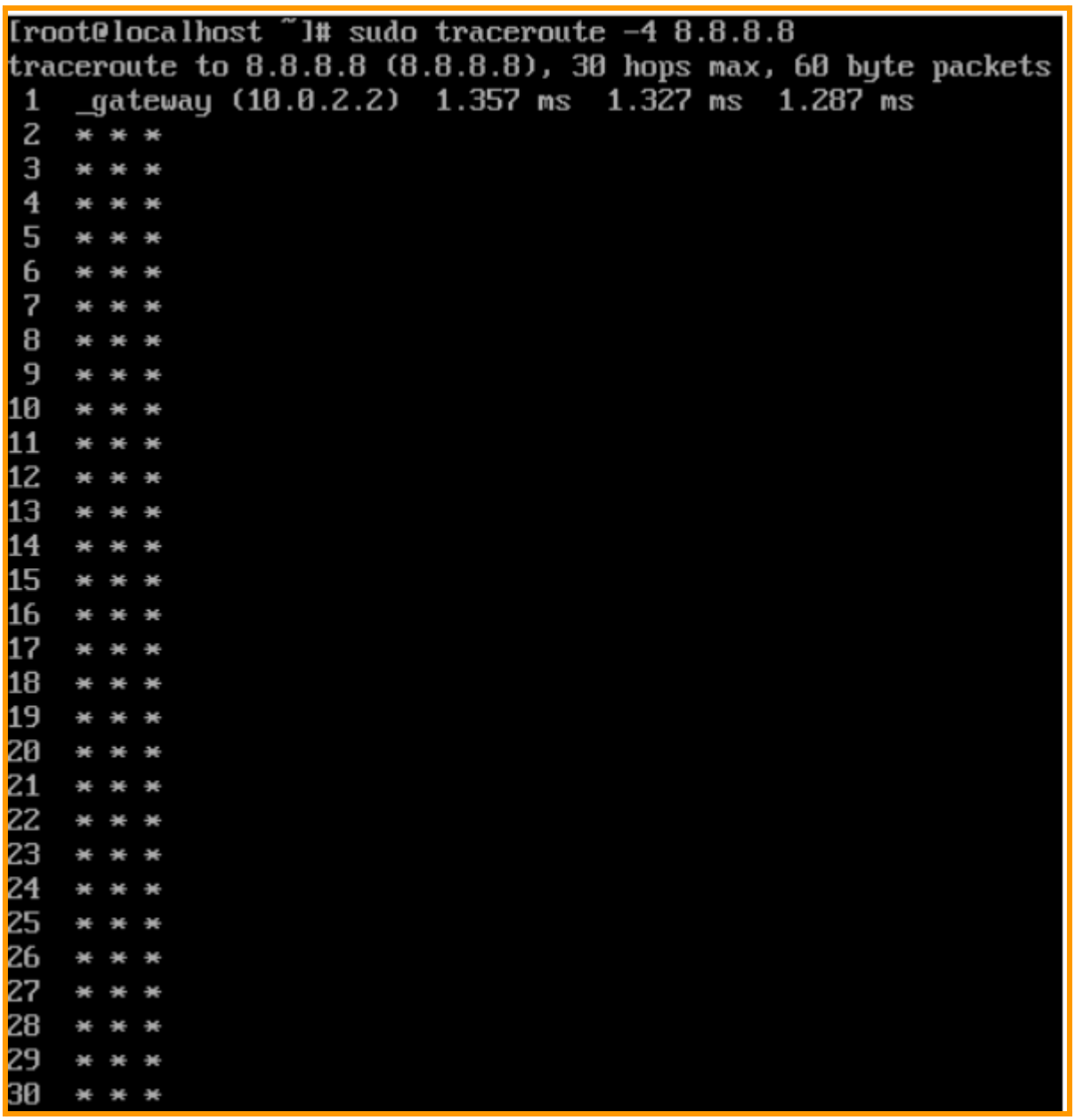
	Time	Source	Destination	Protocol	Length	Info
20	1.199487	192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2259/54024,
24	1.301214	192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2260/54280,
28	1.402157	192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2261/54536,
29	1.502989	192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2262/54792,
35	1.604643	192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2263/55048,
39	1.705856	192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2264/55304,
40	1.807914	192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2265/55560,
44	1.908836	192.168.0.100	87.250.250.242	ICMP	78	Echo (ping) request id=0x0001, seq=2266/55816,

- **Часть 4.2**

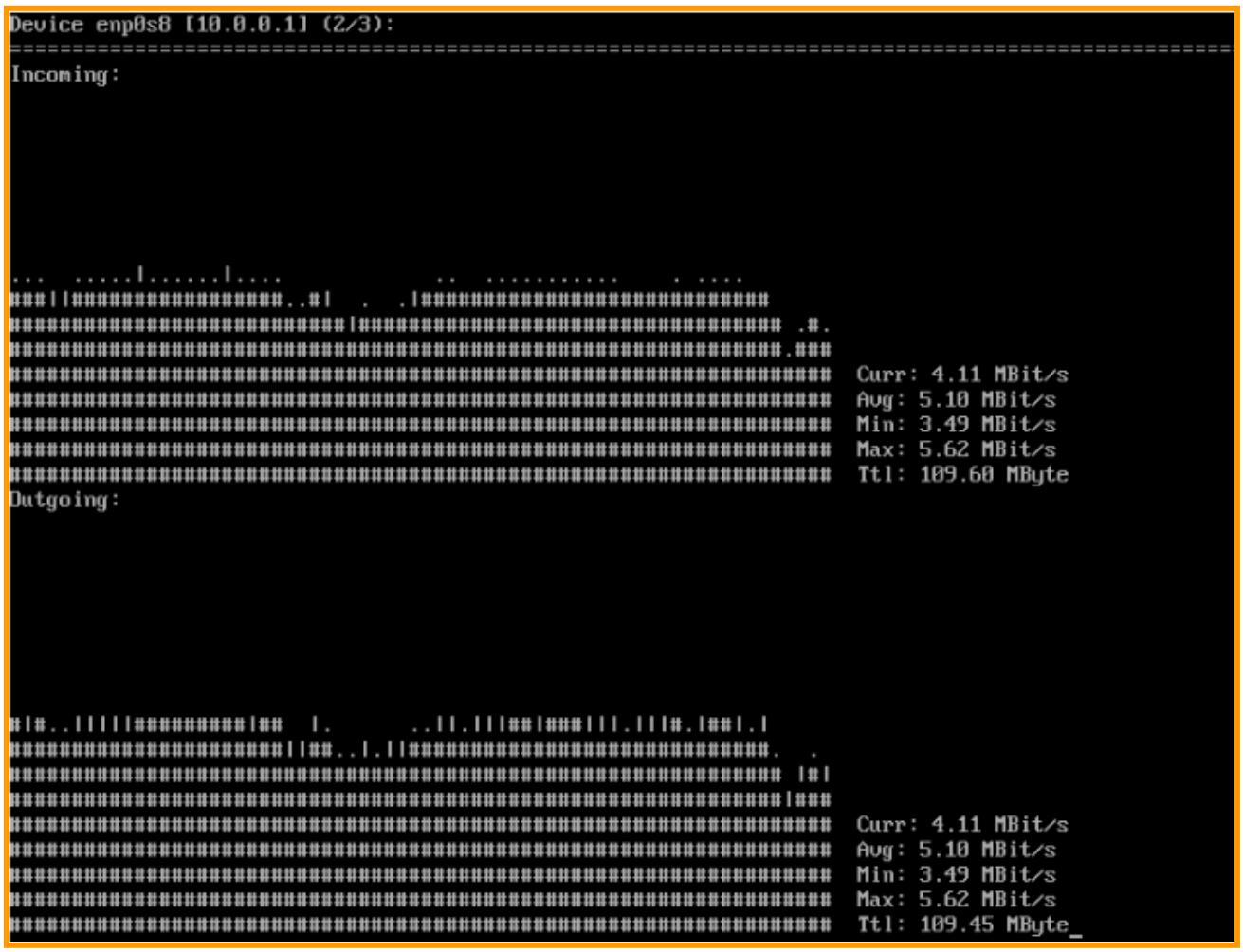
```
[root@localhost ~]# sudo traceroute -I 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
 1  _gateway (10.0.2.2)  0.776 ms  0.743 ms  0.734 ms
 2  192.168.0.1 (192.168.0.1)  16.035 ms  16.759 ms  16.898 ms
 3  127-253.bm18.nwlk.ru (178.252.127.253)  53.206 ms  53.231 ms  53.235 ms
 4  10.132.59.253 (10.132.59.253)  53.127 ms  53.187 ms  53.131 ms
 5  * * *
 6  * * *
 7  74.125.244.132 (74.125.244.132)  41.501 ms  28.082 ms  29.133 ms
 8  216.239.48.163 (216.239.48.163)  52.505 ms  53.524 ms  53.533 ms
 9  172.253.51.221 (172.253.51.221)  33.602 ms  37.158 ms  41.677 ms
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  dns.google (8.8.8.8)  11.623 ms  12.782 ms  16.074 ms
```

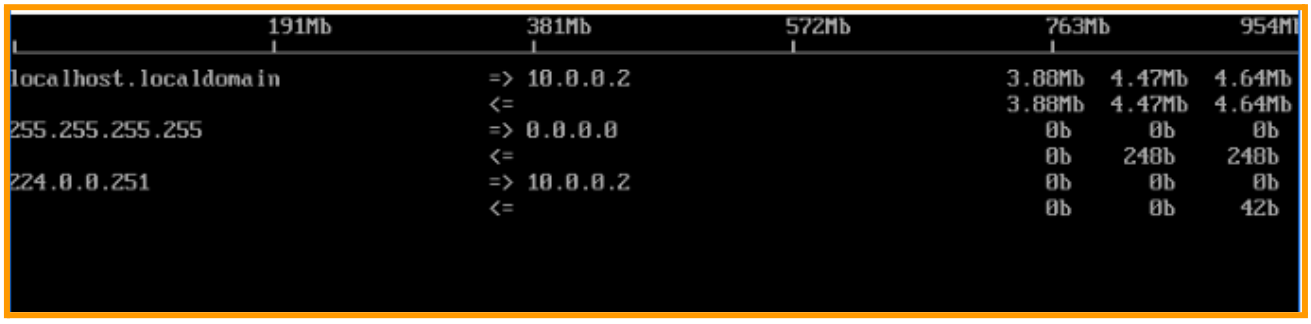

[root@localhost ~]# sudo traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
1 _gateway (10.0.2.2) 1.336 ms 1.249 ms 1.206 ms
2 * * *
3 * * *
4 * * *
5 * * *
6 * * *
7 * * *
8 * * *
9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
28 * * *
29 * * *
30 * * *

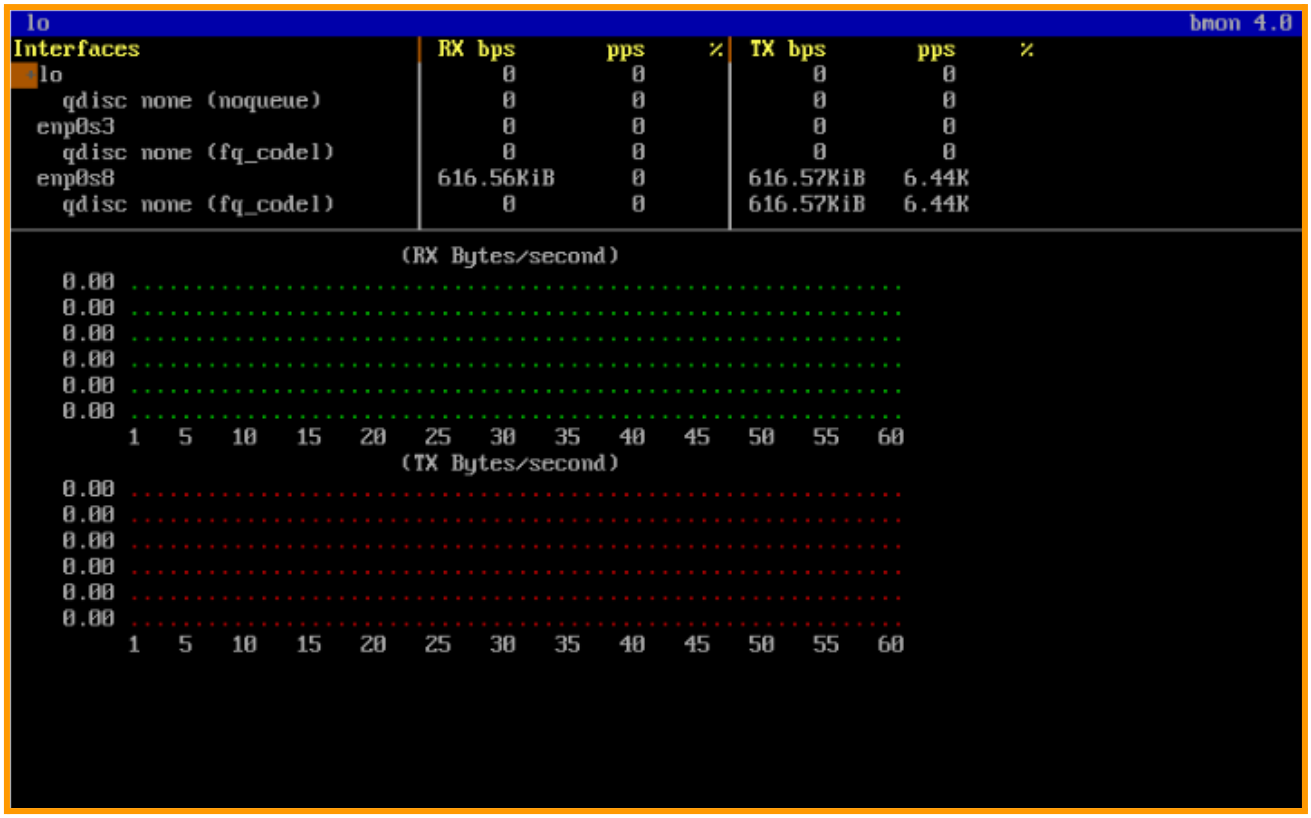

[root@localhost ~]# sudo traceroute -T 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
1 _gateway (10.0.2.2) 1.846 ms 1.894 ms 1.763 ms
2 * * *
3 * * *
4 * * *
5 * * *
6 * * *
7 * * *
8 * * *
9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
28 * * *
29 * * *
30 * * *

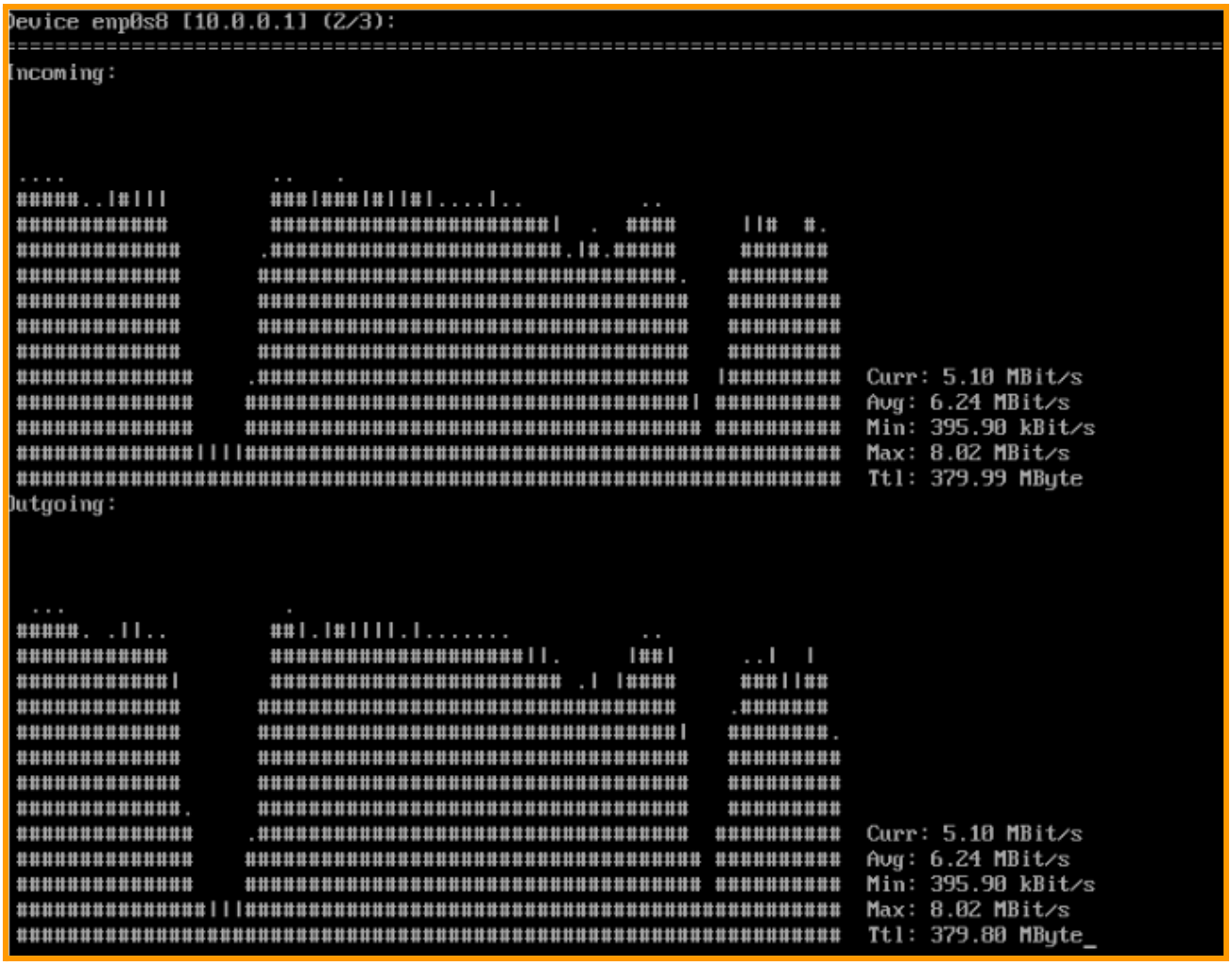

[root@localhost ~]# sudo traceroute -4 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
1 _gateway (10.0.2.2) 1.357 ms 1.327 ms 1.287 ms
2 * * *
3 * * *
4 * * *
5 * * *
6 * * *
7 * * *
8 * * *
9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
28 * * *
29 * * *
30 * * *

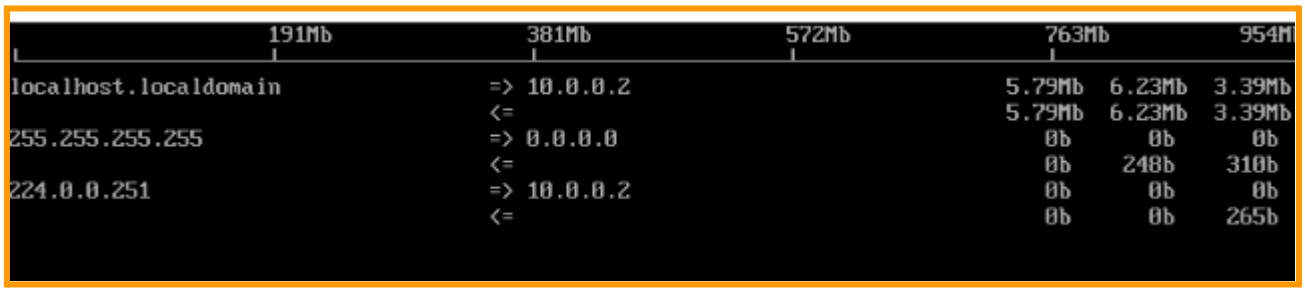
- **Часть 5.2**

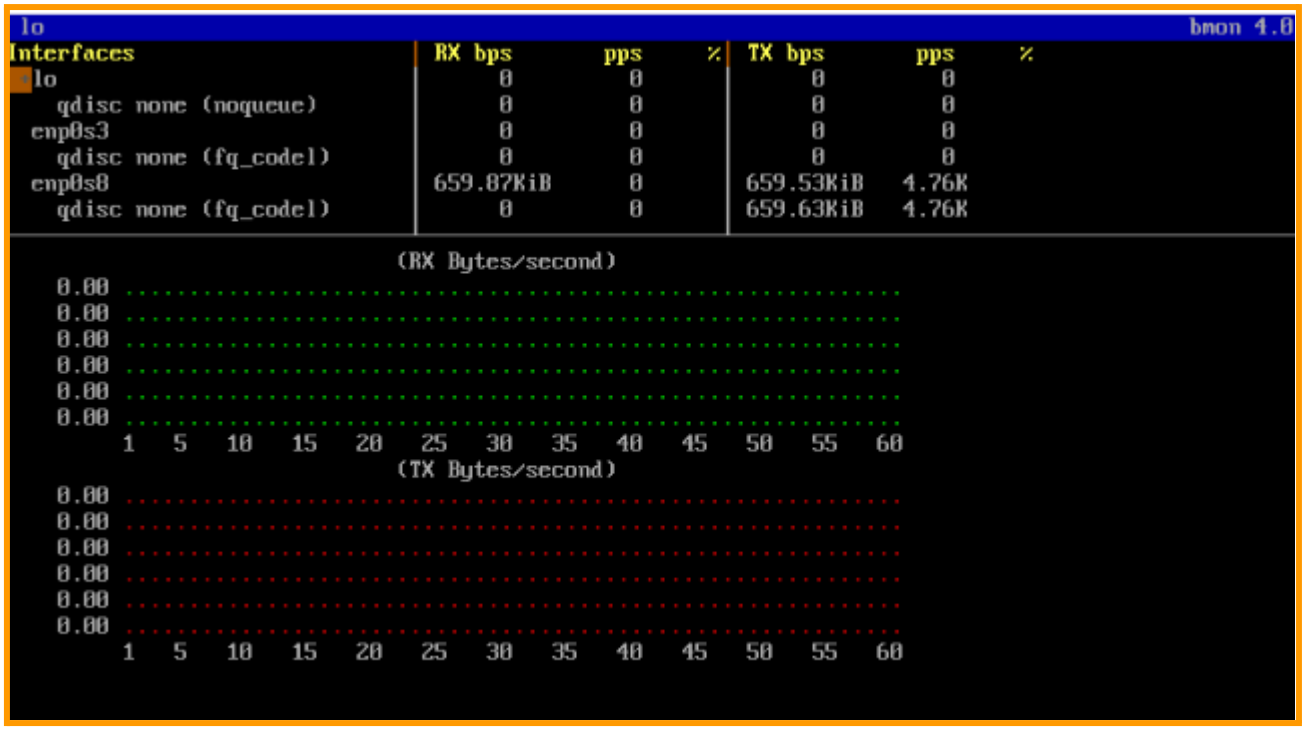

Device enp0s8 [10.0.0.1] (2/3):
Incoming:
Curr: 4.11 MBit/s
Avg: 5.10 MBit/s
Min: 3.49 MBit/s
Max: 5.62 MBit/s
Ttl: 109.60 MByte
Outgoing:
Curr: 4.11 MBit/s
Avg: 5.10 MBit/s
Min: 3.49 MBit/s
Max: 5.62 MBit/s
Ttl: 109.45 MByte

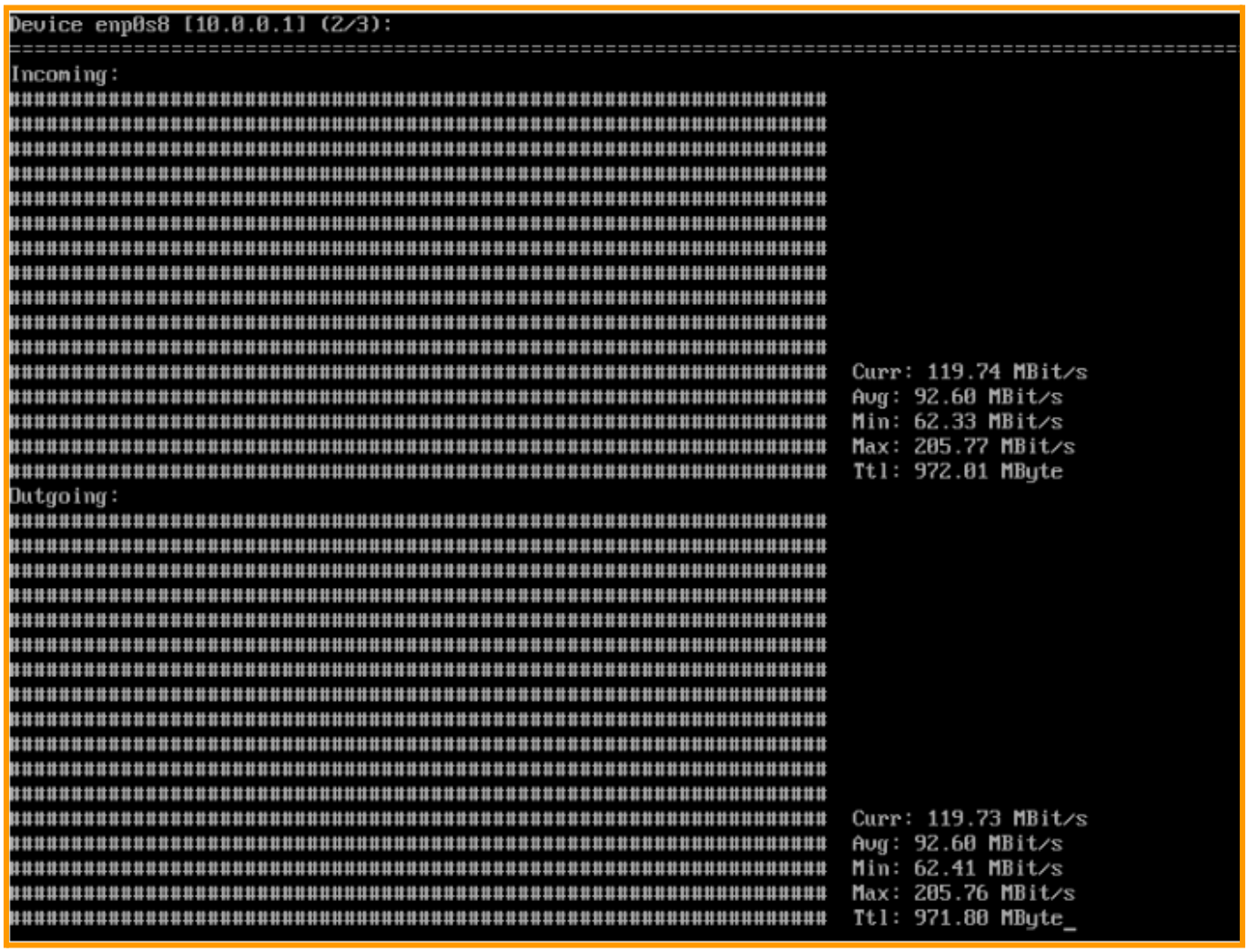

191Mb
381Mb
572Mb
763Mb
954Mb
localhost.localdomain => 10.0.0.2 3.88Mb 4.47Mb 4.64Mb
<= 3.88Mb 4.47Mb 4.64Mb
255.255.255.255 => 0.0.0.0 0b 0b 0b
<= 0b 248b 248b
224.0.0.251 => 10.0.0.2 0b 0b 0b
<= 0b 0b 42b

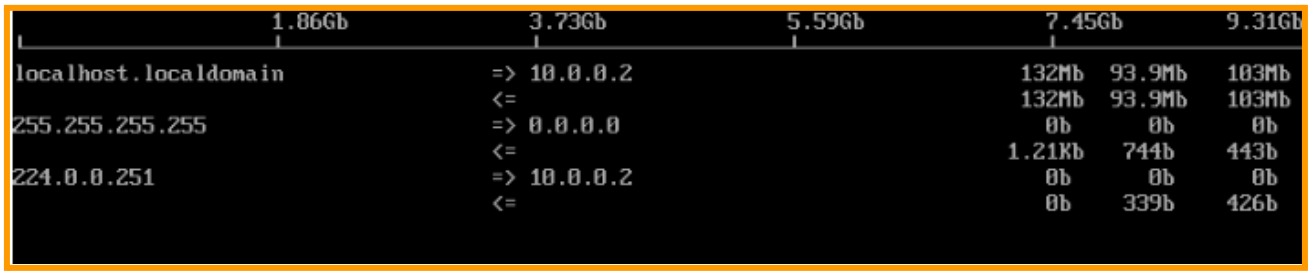

lo
bmon 4.0
Interfaces
RX bps
pps
%
TX bps
pps
%
lo
0
0
0
0
qdisc none (noqueue)
0
0
0
0
enp0s3
0
0
0
0
qdisc none (fq_codel)
0
0
0
0
enp0s8
616.56KiB
0
616.57KiB
6.44K
qdisc none (fq_codel)
0
0
616.57KiB
6.44K
(RX Bytes/second)
0.00
0.00
0.00
0.00
0.00
0.00
1 5 10 15 20 25 30 35 40 45 50 55 60
(TX Bytes/second)
0.00
0.00
0.00
0.00
0.00
0.00
1 5 10 15 20 25 30 35 40 45 50 55 60

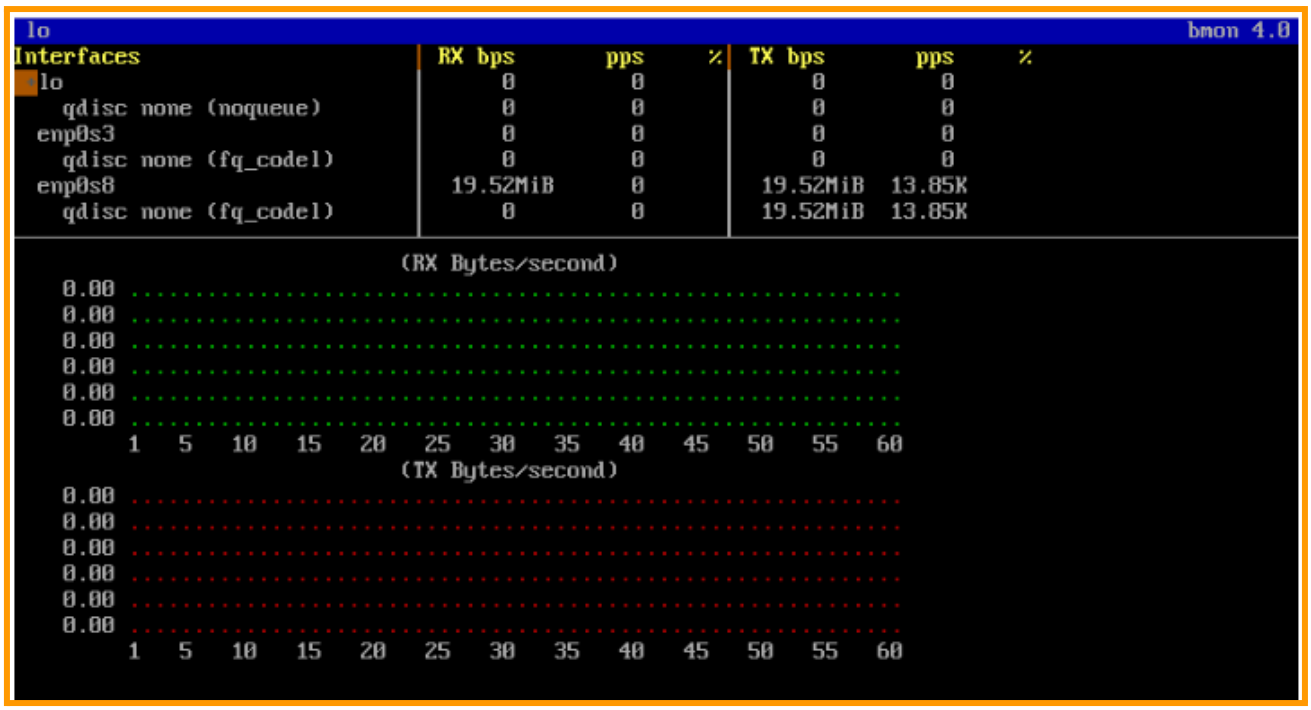

Device enp0s8 [10.0.0.1] (2/3):
Incoming:
Curr: 5.10 MBit/s
Avg: 6.24 MBit/s
Min: 395.90 kBit/s
Max: 8.02 MBit/s
Ttl: 379.99 MByte
Outgoing:
Curr: 5.10 MBit/s
Avg: 6.24 MBit/s
Min: 395.90 kBit/s
Max: 8.02 MBit/s
Ttl: 379.80 MByte

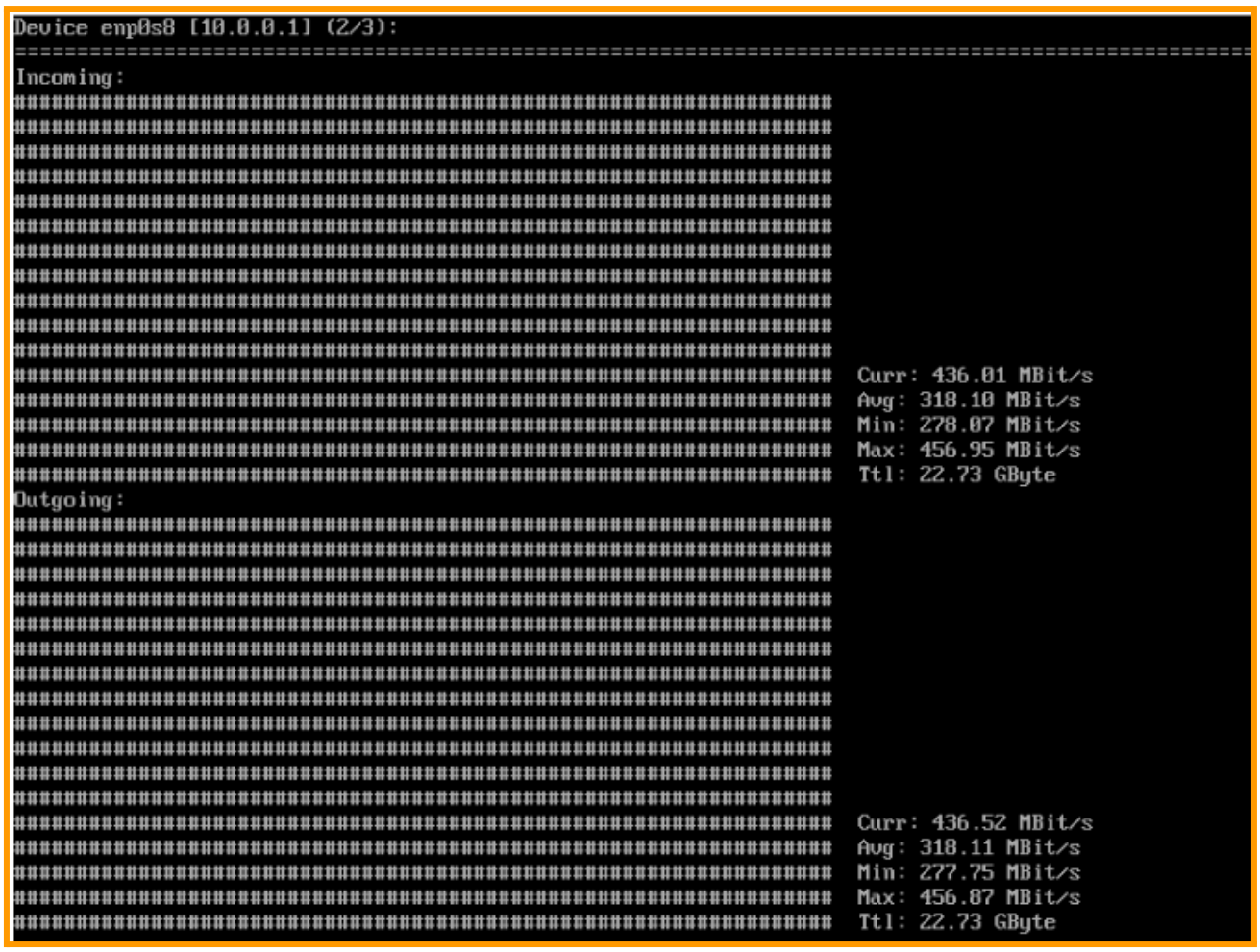

191Mb
381Mb
572Mb
763Mb
954Mb
localhost.localdomain => 10.0.0.2 5.79Mb 6.23Mb 3.39Mb
<= 5.79Mb 6.23Mb 3.39Mb
255.255.255.255 => 0.0.0.0 0b 0b 0b
<= 0b 248b 310b
224.0.0.251 => 10.0.0.2 0b 0b 0b
<= 0b 0b 265b

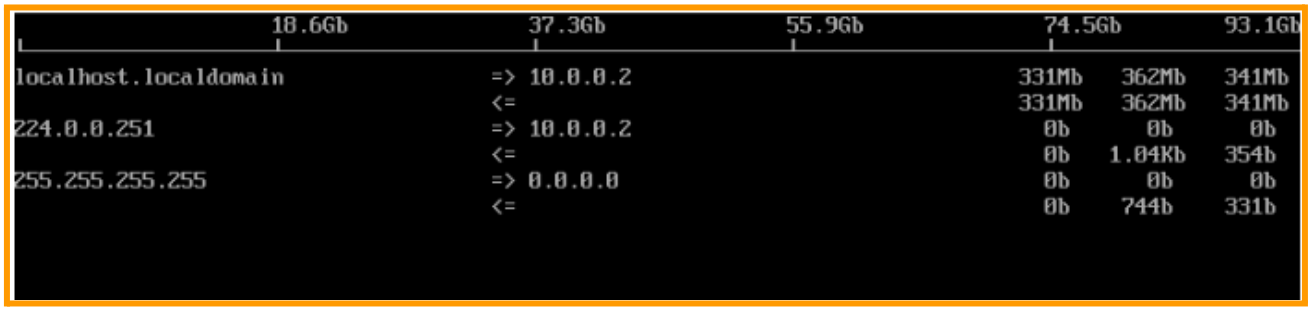

lo
bmon 4.0
Interfaces
RX bps
pps
%
TX bps
pps
%
lo
0
0
0
0
qdisc none (noqueue)
enp0s3
qdisc none (fq_codel)
enp0s8
659.87KiB
659.53KiB
4.76K
qdisc none (fq_codel)
659.63KiB
4.76K
(RX Bytes/second)
0.00
1 5 10 15 20 25 30 35 40 45 50 55 60
(TX Bytes/second)
0.00
1 5 10 15 20 25 30 35 40 45 50 55 60

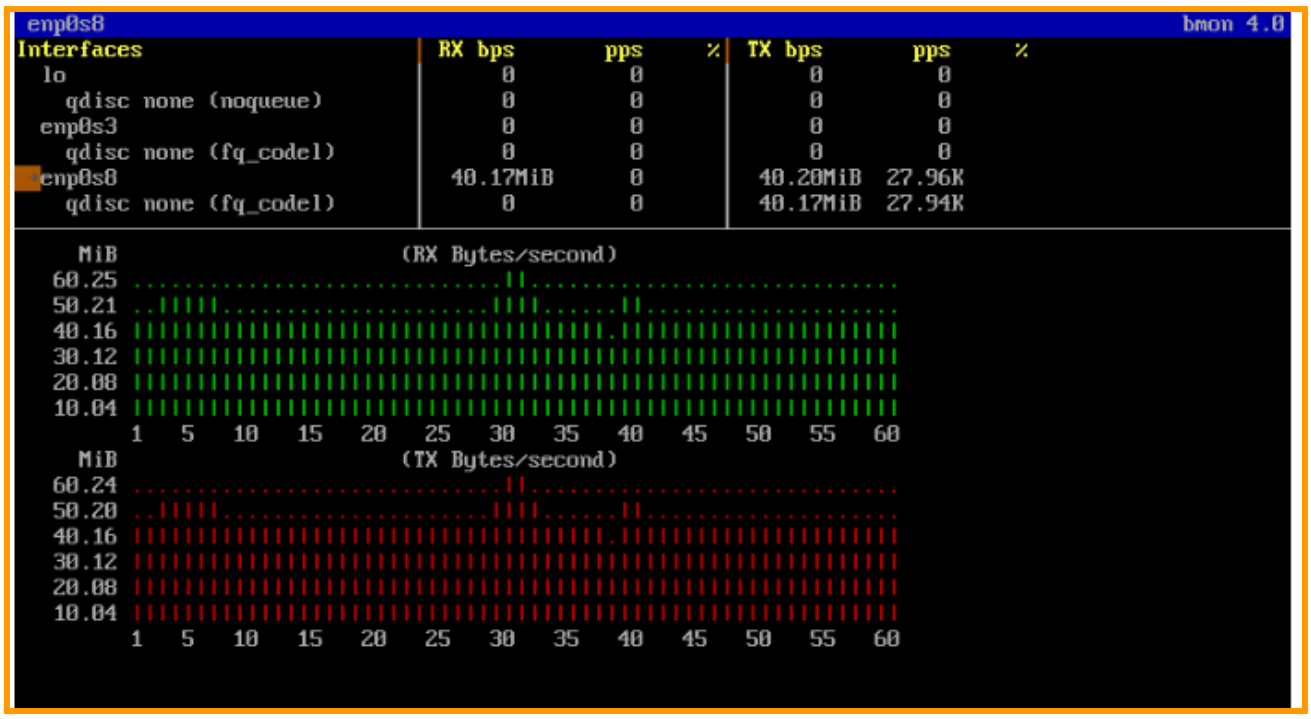

Device enp0s8 [10.0.0.1] (2/3):
Incoming:
Curr: 119.74 MBit/s
Avg: 92.60 MBit/s
Min: 62.33 MBit/s
Max: 205.77 MBit/s
Ttl: 972.01 MByte
Outgoing:
Curr: 119.73 MBit/s
Avg: 92.60 MBit/s
Min: 62.41 MBit/s
Max: 205.76 MBit/s
Ttl: 971.80 MByte

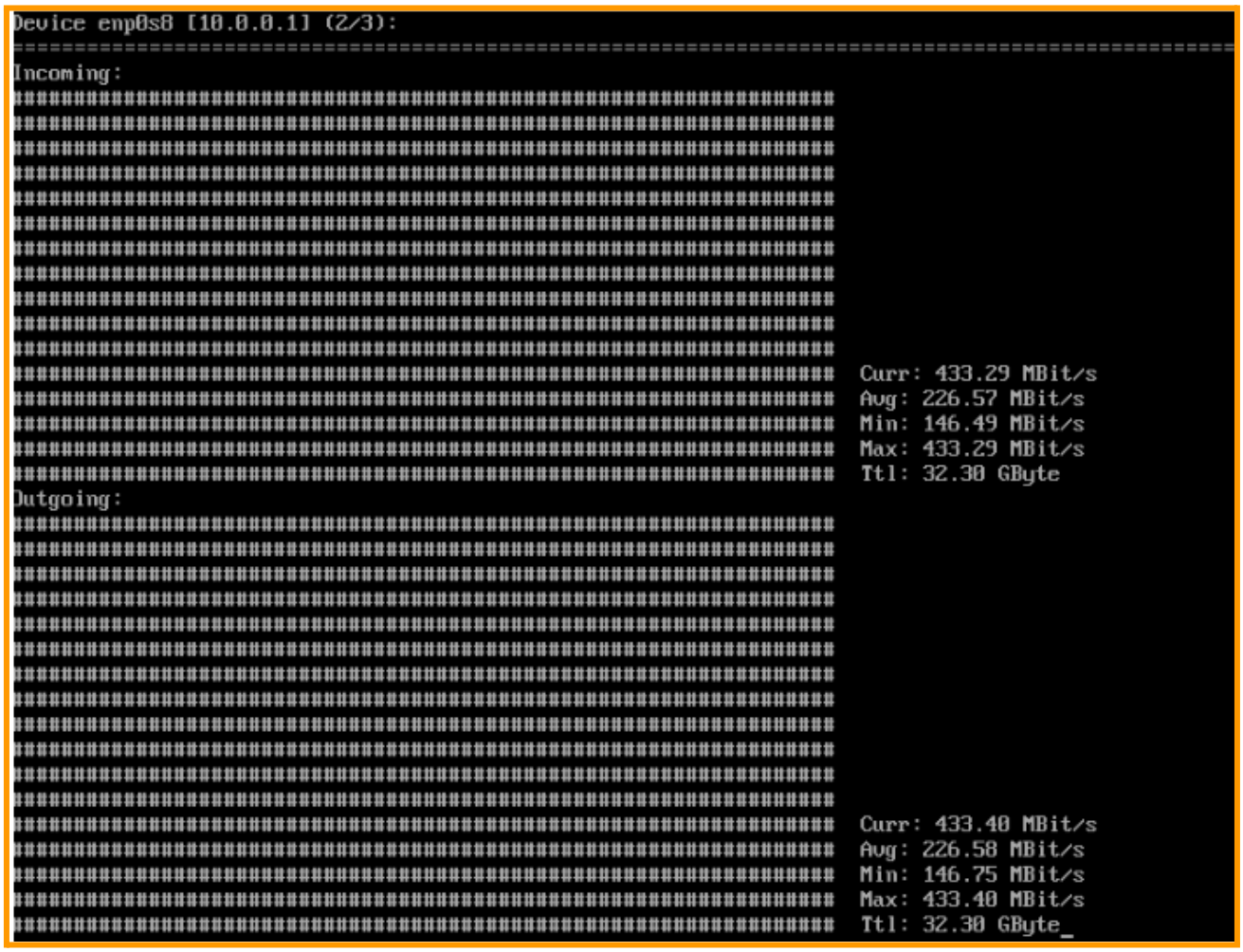

1.86Gb
3.73Gb
5.59Gb
7.45Gb
9.31Gb
localhost.localdomain => 10.0.0.2 132Mb 93.9Mb 103Mb
<= 132Mb 93.9Mb 103Mb
255.255.255.255 => 0.0.0.0 0b 0b 0b
<= 1.21Kb 744b 443b
224.0.0.251 => 10.0.0.2 0b 0b 0b
<= 0b 339b 426b

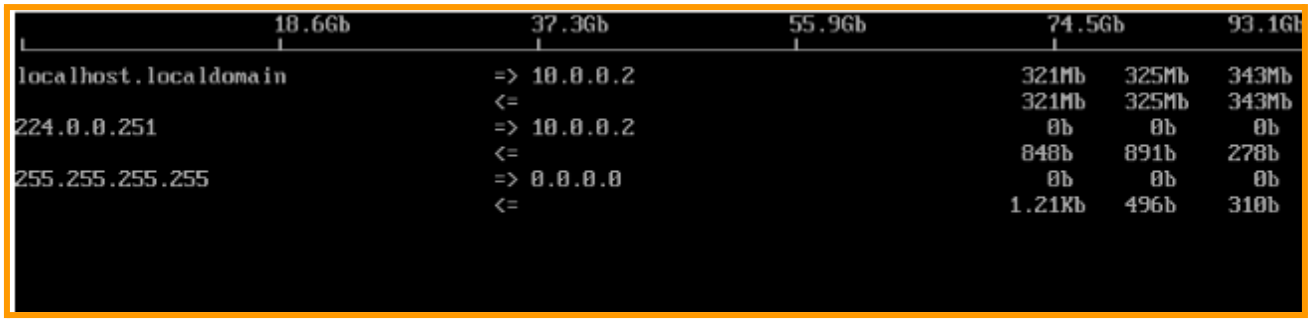

lo
bmon 4.0
Interfaces
RX bps pps %
TX bps pps %
lo 0 0 0 0
qdisc none (noqueue) 0 0 0 0
enp0s3 0 0 0 0
qdisc none (fq_codel) 0 0 0 0
enp0s8 19.52MiB 0 19.52MiB 13.85K
qdisc none (fq_codel) 0 0 19.52MiB 13.85K
(RX Bytes/second)
0.00
0.00
0.00
0.00
0.00
0.00
1 5 10 15 20 25 30 35 40 45 50 55 60
(TX Bytes/second)
0.00
0.00
0.00
0.00
0.00
0.00
1 5 10 15 20 25 30 35 40 45 50 55 60

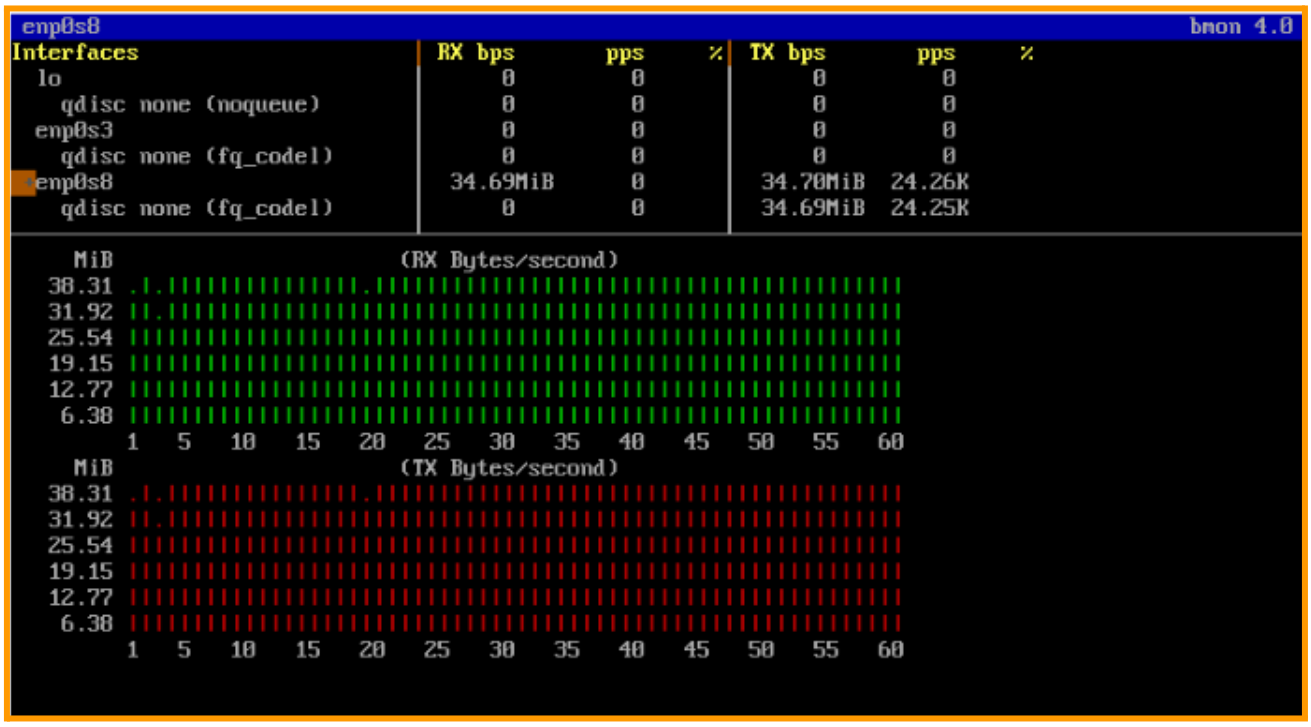

Device enp0s8 [10.0.0.1] (2/3):
Incoming:
Curr: 436.01 MBit/s
Avg: 318.10 MBit/s
Min: 278.07 MBit/s
Max: 456.95 MBit/s
Ttl: 22.73 GByte
Outgoing:
Curr: 436.52 MBit/s
Avg: 318.11 MBit/s
Min: 277.75 MBit/s
Max: 456.87 MBit/s
Ttl: 22.73 GByte


18.6Gb
37.3Gb
55.9Gb
74.5Gb
93.1Gb
localhost.localdomain => 10.0.0.2 331Mb 362Mb 341Mb
<= 331Mb 362Mb 341Mb
224.0.0.251 => 10.0.0.2 0b 0b 0b
<= 0b 1.04Kb 354b
255.255.255.255 => 0.0.0.0 0b 0b 0b
<= 0b 744b 331b


enp0s8
bmon 4.0
Interfaces
RX bps
pps
%
TX bps
pps
%
lo
0
0
0
0
qdisc none (noqueue)
0
0
0
0
enp0s3
0
0
0
0
qdisc none (fq_codel)
0
0
0
0
enp0s8
40.17MiB
0
40.20MiB
27.96K
qdisc none (fq_codel)
0
0
40.17MiB
27.94K
MiB
(RX Bytes/second)
60.25
50.21
40.16
30.12
20.08
10.04
1 5 10 15 20 25 30 35 40 45 50 55 60
MiB
(TX Bytes/second)
60.24
50.20
40.16
30.12
20.08
10.04
1 5 10 15 20 25 30 35 40 45 50 55 60


Device enp0s8 [10.0.0.1] (2/3):
Incoming:
Curr: 433.29 MBit/s
Avg: 226.57 MBit/s
Min: 146.49 MBit/s
Max: 433.29 MBit/s
Ttl: 32.30 GByte
Outgoing:
Curr: 433.40 MBit/s
Avg: 226.58 MBit/s
Min: 146.75 MBit/s
Max: 433.40 MBit/s
Ttl: 32.30 GByte


18.6Gb
37.3Gb
55.9Gb
74.5Gb
93.1Gb
localhost.localdomain => 10.0.0.2 321Mb 325Mb 343Mb
<= 321Mb 325Mb 343Mb
224.0.0.251 => 10.0.0.2 0b 0b 0b
<= 848b 891b 278b
255.255.255.255 => 0.0.0.0 0b 0b 0b
<= 1.21Kb 496b 310b


enp0s8
bmon 4.0
Interfaces RX bps pps % TX bps pps %
lo 0 0 0 0
qdisc none (noqueue) 0 0 0 0
enp0s3 0 0 0 0
qdisc none (fq_codel) 0 0 0 0
enp0s8 34.69MiB 0 34.70MiB 24.26K
qdisc none (fq_codel) 0 0 34.69MiB 24.25K
MiB (RX Bytes/second)
38.31
31.92
25.54
19.15
12.77
6.38
1 5 10 15 20 25 30 35 40 45 50 55 60
MiB (TX Bytes/second)
38.31
31.92
25.54
19.15
12.77
6.38
1 5 10 15 20 25 30 35 40 45 50 55 60

- **Часть 7.2**

```
[root@localhost ~]# netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:sunrpc          0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp6       0      0 [::]:sunrpc             [::]:*                  LISTEN
tcp6       0      0 [::]:ssh                [::]:*                  LISTEN
udp        0      0 0.0.0.0:sunrpc          0.0.0.0:*
udp        0      0 0.0.0.0:54387           0.0.0.0:*
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp6       0      0 [::]:41496              [::]:*
udp6       0      0 [::]:sunrpc             [::]:*
udp6       0      0 [::]:mdns               [::]:*
raw6       0      0 [::]:ipv6-icmp          [::]:*                  7
Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ACC ]     STREAM     LISTENING     22542    /var/run/mcelog-client
unix  2      [ ACC ]     STREAM     LISTENING     15193    @/org/kernel/linux/storage/multipathd
unix  2      [ ACC ]     STREAM     LISTENING     14867    /run/systemd/private
unix  2      [ ACC ]     STREAM     LISTENING     22315    /var/run/lsm/ipc/sim
unix  2      [ ACC ]     SEQPACKET  LISTENING     14910    /run/udev/control
unix  2      [ ACC ]     SEQPACKET  LISTENING     14912    /run/systemd/coredump
unix  2      [ ACC ]     STREAM     LISTENING     14915    /run/lvm/lvmpolld.socket
unix  2      [ ACC ]     STREAM     LISTENING     21698    @ISCSID_UIP_ABSTRACT_NAMESPACE
unix  2      [ ACC ]     STREAM     LISTENING     22182    /var/lib/gssproxy/default.sock
unix  2      [ ACC ]     STREAM     LISTENING     22749    /var/lib/sss/pipes/private/sbus-monito
r
unix  2      [ ACC ]     STREAM     LISTENING     22840    /var/lib/sss/pipes/private/sbus-dp_imp
licit_files.856
unix  2      [ ACC ]     STREAM     LISTENING     22879    /var/lib/sss/pipes/nss
unix  2      [ ACC ]     STREAM     LISTENING     11150    /run/systemd/journal/stdout
unix  2      [ ACC ]     STREAM     LISTENING     26774    /run/user/0/systemd/private
unix  2      [ ACC ]     STREAM     LISTENING     26783    /run/user/0/bus
unix  2      [ ACC ]     STREAM     LISTENING     22183    /run/gssproxy.sock
unix  2      [ ACC ]     STREAM     LISTENING     22181    /var/run/lsm/ipc/simc
unix  2      [ ACC ]     STREAM     LISTENING     21684    /run/dbus/system_bus_socket
unix  2      [ ACC ]     STREAM     LISTENING     21692    /var/run/.heim_org.h5l.kcm-socket
unix  2      [ ACC ]     STREAM     LISTENING     21694    /run/avahi-daemon/socket
unix  2      [ ACC ]     STREAM     LISTENING     21699    @ISCSIADM_ABSTRACT_NAMESPACE
unix  2      [ ACC ]     STREAM     LISTENING     15252    /run/rpcbind.sock
Active Bluetooth connections (only servers)
Proto  Destination       Source            State         PSM DCID   SCID      IMTU    OMTU Securi
ty
Proto  Destination       Source            State     Channel
[root@localhost ~]#
```

- **Часть 7.3**

```
[root@localhost ~]# ss -lt
State       Recv-Q      Send-Q           Local Address:Port               Peer Address:Port
LISTEN      0           128                    0.0.0.0:sunrpc                  0.0.0.0:*
LISTEN      0           128                    0.0.0.0:ssh                     0.0.0.0:*
LISTEN      0           128                       [::]:sunrpc                     [::]:*
LISTEN      0           128                       [::]:ssh                        [::]:*
[root@localhost ~]#
```

- **Часть 7.4**

```
[root@localhost ~]# netstat -tnpa | grep 'ESTABLISHED.*sshd'
tcp        0      0 10.0.0.1:22             10.0.0.1:47888          ESTABLISHED 2019/sshd: root [
pr
tcp        0     64 192.168.43.211:22       192.168.43.143:62581    ESTABLISHED 2063/sshd: root [
pr
tcp6       0      0 ::1:22                  ::1:47962               ESTABLISHED 1990/sshd: root [
pr
[root@localhost ~]#
```

- **Часть 7.8**

```
  PID USER      PROGRAM                                  DEV        SENT      RECEIVED
 2067 root      sshd: root@pts/3                         enp0s3  12264.000     4728.000 B
```

- **Часть 7.9**

```
[root@localhost ~]# tcpdump -i enp0s3
[ 6035.638098] device enp0s3 entered promiscuous mode
dropped privs to tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
14:44:05.911825 ARP, Request who-has DESKTOP-40VEKUI tell _gateway, length 46
14:44:05.914104 IP localhost.localdomain.40135 > _gateway.domain: 32237+ PTR? 143.43.168.192.in-addr
.arpa. (45)
14:44:05.921387 IP _gateway.domain > localhost.localdomain.40135: 32237* 1/0/0 PTR DESKTOP-40VEKUI.
(74)
14:44:05.922072 IP localhost.localdomain.54682 > _gateway.domain: 53602+ PTR? 1.43.168.192.in-addr.a
rpa. (43)
14:44:05.930833 IP _gateway.domain > localhost.localdomain.54682: 53602 NXDomain 0/0/0 (43)
14:44:05.934194 IP localhost.localdomain.36966 > _gateway.domain: 5705+ PTR? 211.43.168.192.in-addr.
arpa. (45)
14:44:05.941125 IP _gateway.domain > localhost.localdomain.36966: 5705 NXDomain 0/0/0 (45)
14:44:11.025501 ARP, Request who-has localhost.localdomain tell _gateway, length 46
14:44:11.025548 ARP, Reply localhost.localdomain is-at 08:00:27:38:e6:e4 (oui Unknown), length 28
14:44:11.194297 ARP, Request who-has _gateway tell localhost.localdomain, length 28
14:44:11.200872 ARP, Reply _gateway is-at 8e:45:00:00:99:45 (oui Unknown), length 46
14:44:20.001433 ARP, Request who-has DESKTOP-40VEKUI tell _gateway, length 46
```