Отчёт по лабораторной работе «Механизмы протокола TCP»

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Содержание

1. Установка и разрыв соединения

Выполняем дамп на **c2** и **c3**.

```
c1:~# telnet 10.50.0.2 9
Trying 10.50.0.2...
Connected to 10.50.0.2.
Escape character is '^]'.
str1
str2
^]
telnet> close
Connection closed.
```

```
c2:~# tcpdump -ntvve -s 0 -i eth0 tcp
tcpdump: listening on eth0, link-type EN10MB (Ethernet), capture size 65535 bytes
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 74: (tos 0x10, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 74: (tos 0x0, ttl 61, id
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ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 72: (tos 0x10, ttl 64, i
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c3:~# tcpdump -ntvve -s 0 -i eth0 tcp
tcpdump: listening on eth0, link-type EN10MB (Ethernet), capture size 65535 bytes
3a:89:27:18:b0:96 > f6:7d:1f:b9:80:77, ethertype IPv4 (0x0800), length 74: (tos 0x10, ttl 63, i
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2. Окно получателя

Выполняем tcpdump на **c2**.

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ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
```

```
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 470: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 64, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
```

```
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 64, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 64, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 186: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
ee:40:19:05:85:e9 > f2:3b:18:36:f3:fd, ethertype IPv4 (0x0800), length 590: (tos 0x0, ttl 64, i
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 66: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 54: (tos 0x0, ttl 62, id
f2:3b:18:36:f3:fd > ee:40:19:05:85:e9, ethertype IPv4 (0x0800), length 54: (tos 0x0, ttl 62, id
```

3. Нейгл и Мишналь

Алгоритм Нейгла. Выполняем tcpdump на **c2**.

```
c1:~# ./nagle default 10.40.0.2 9 0 30

c2:~# tcpdump -n -i eth0 tcp
09:06:22.298749 IP 10.10.0.2.50582 > 10.40.0.2.9: S 294711968:294711968(0) win 5840 <mss 1460,s
09:06:22.524819 IP 10.40.0.2.9 > 10.10.0.2.50582: S 303159576:303159576(0) ack 294711969 win 57
09:06:22.525049 IP 10.10.0.2.50582 > 10.40.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 429496159
09:06:22.525155 IP 10.10.0.2.50582 > 10.40.0.2.9: P 1:101(100) ack 1 win 2920 <nop,nop,timestam
09:06:22.624498 IP 10.10.0.2.50582 > 10.40.0.2.9: . 101:1549(1448) ack 1 win 2920 <nop,nop,time
09:06:22.634944 IP 10.40.0.2.9 > 10.10.0.2.50582: . ack 101 win 2896 <nop,nop,timestamp 4294961
09:06:22.635237 IP 10.10.0.2.50582 > 10.40.0.2.9: P 1549:1701(152) ack 1 win 2920 <nop,nop,time
09:06:22.734774 IP 10.40.0.2.9 > 10.10.0.2.50582: . ack 1549 win 4344 <nop,nop,timestamp 429496
09:06:22.735302 IP 10.10.0.2.50582 > 10.40.0.2.9: FP 1701:3001(1300) ack 1 win 2920 <nop,nop,ti
09:06:22.747689 IP 10.40.0.2.9 > 10.10.0.2.50582: . ack 1701 win 4344 <nop,nop,timestamp 429496
09:06:22.844708 IP 10.40.0.2.9 > 10.10.0.2.50582: F 1:1(0) ack 3002 win 5792 <nop,nop,timestamp
09:06:22.845000 IP 10.10.0.2.50582 > 10.40.0.2.9: . ack 2 win 2920 <nop,nop,timestamp 429496162

c1:~# ./nagle default 10.40.0.2 9 20 30

c2:~# tcpdump -n -i eth0 tcp
10:40:37.725592 IP 10.10.0.2.60936 > 10.40.0.2.9: S 2777469580:2777469580(0) win 5840 <mss 1460
10:40:37.833831 IP 10.40.0.2.9 > 10.10.0.2.60936: S 2776945976:2776945976(0) ack 2777469581 win
10:40:37.834065 IP 10.10.0.2.60936 > 10.40.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 4255 222>
10:40:37.834181 IP 10.10.0.2.60936 > 10.40.0.2.9: P 1:101(100) ack 1 win 2920 <nop,nop,timestam
10:40:37.943783 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 101 win 2896 <nop,nop,timestamp 233 425
10:40:37.943960 IP 10.10.0.2.60936 > 10.40.0.2.9: P 101:501(400) ack 1 win 2920 <nop,nop,timest
10:40:38.053809 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 501 win 3432 <nop,nop,timestamp 244 426
10:40:38.054046 IP 10.10.0.2.60936 > 10.40.0.2.9: P 501:801(300) ack 1 win 2920 <nop,nop,timest
10:40:38.163966 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 801 win 3968 <nop,nop,timestamp 255 427
```

```
10:40:38.164364 IP 10.10.0.2.60936 > 10.40.0.2.9: P 801:1201(400) ack 1 win 2920 <nop,nop,times
10:40:38.273805 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 1201 win 4504 <nop,nop,timestamp 266 42
10:40:38.273953 IP 10.10.0.2.60936 > 10.40.0.2.9: P 1201:1601(400) ack 1 win 2920 <nop,nop,time
10:40:38.383750 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 1601 win 5040 <nop,nop,timestamp 277 42
10:40:38.383939 IP 10.10.0.2.60936 > 10.40.0.2.9: P 1601:1901(300) ack 1 win 2920 <nop,nop,time
10:40:38.493990 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 1901 win 5040 <nop,nop,timestamp 288 43
10:40:38.494463 IP 10.10.0.2.60936 > 10.40.0.2.9: P 1901:2301(400) ack 1 win 2920 <nop,nop,time
10:40:38.603895 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 2301 win 5576 <nop,nop,timestamp 299 43
10:40:38.604180 IP 10.10.0.2.60936 > 10.40.0.2.9: P 2301:2701(400) ack 1 win 2920 <nop,nop,time
10:40:38.713980 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 2701 win 6112 <nop,nop,timestamp 310 43
10:40:38.714320 IP 10.10.0.2.60936 > 10.40.0.2.9: P 2701:3001(300) ack 1 win 2920 <nop,nop,time
10:40:38.724261 IP 10.10.0.2.60936 > 10.40.0.2.9: F 3001:3001(0) ack 1 win 2920 <nop,nop,timest
10:40:38.823685 IP 10.40.0.2.9 > 10.10.0.2.60936: . ack 3001 win 6112 <nop,nop,timestamp 321 43
10:40:38.833830 IP 10.40.0.2.9 > 10.10.0.2.60936: F 1:1(0) ack 3002 win 6112 <nop,nop,timestamp
10:40:38.833945 IP 10.10.0.2.60936 > 10.40.0.2.9: . ack 2 win 2920 <nop,nop,timestamp 4355 322>
```

4. Аггрессивная буферизация

CORK. Выполняем tcpdump на **c2**.

```
c1:~# ./nagle cork 10.40.0.2 9 400 30

c2:~# tcpdump -n -i eth0 tcp
10:45:00.513664 IP 10.10.0.2.49250 > 10.40.0.2.9: S 2598291440:2598291440(0) win 5840 <mss 1460
10:45:00.623714 IP 10.40.0.2.9 > 10.10.0.2.49250: S 2582813027:2582813027(0) ack 2598291441 win
10:45:00.623829 IP 10.10.0.2.49250 > 10.40.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 30534 265
10:45:01.353561 IP 10.10.0.2.49250 > 10.40.0.2.9: P 1:201(200) ack 1 win 2920 <nop,nop,timestam
10:45:01.463902 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 201 win 3432 <nop,nop,timestamp 26585 3
10:45:02.183567 IP 10.10.0.2.49250 > 10.40.0.2.9: P 201:401(200) ack 1 win 2920 <nop,nop,timest
10:45:02.293990 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 401 win 3968 <nop,nop,timestamp 26668 3
10:45:02.973640 IP 10.10.0.2.49250 > 10.40.0.2.9: P 401:601(200) ack 1 win 2920 <nop,nop,timest
10:45:03.083924 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 601 win 4504 <nop,nop,timestamp 26747 3
10:45:03.733628 IP 10.10.0.2.49250 > 10.40.0.2.9: P 601:801(200) ack 1 win 2920 <nop,nop,timest
10:45:03.843729 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 801 win 4504 <nop,nop,timestamp 26823 3
10:45:04.493621 IP 10.10.0.2.49250 > 10.40.0.2.9: P 801:1001(200) ack 1 win 2920 <nop,nop,times
10:45:04.603907 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 1001 win 4504 <nop,nop,timestamp 26899
10:45:05.253624 IP 10.10.0.2.49250 > 10.40.0.2.9: P 1001:1201(200) ack 1 win 2920 <nop,nop,time
10:45:05.363790 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 1201 win 4504 <nop,nop,timestamp 26975
10:45:06.033548 IP 10.10.0.2.49250 > 10.40.0.2.9: P 1201:1401(200) ack 1 win 2920 <nop,nop,time
10:45:06.143751 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 1401 win 4504 <nop,nop,timestamp 27053
10:45:06.823751 IP 10.10.0.2.49250 > 10.40.0.2.9: P 1401:1601(200) ack 1 win 2920 <nop,nop,time
10:45:06.933692 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 1601 win 4504 <nop,nop,timestamp 27132
10:45:07.593615 IP 10.10.0.2.49250 > 10.40.0.2.9: P 1601:1801(200) ack 1 win 2920 <nop,nop,time
10:45:07.703763 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 1801 win 4504 <nop,nop,timestamp 27209
10:45:08.383876 IP 10.10.0.2.49250 > 10.40.0.2.9: P 1801:2001(200) ack 1 win 2920 <nop,nop,time
10:45:08.493702 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 2001 win 4504 <nop,nop,timestamp 27288
10:45:09.183485 IP 10.10.0.2.49250 > 10.40.0.2.9: P 2001:2101(100) ack 1 win 2920 <nop,nop,time
10:45:09.293797 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 2101 win 4504 <nop,nop,timestamp 27367
10:45:09.683558 IP 10.10.0.2.49250 > 10.40.0.2.9: P 2101:2301(200) ack 1 win 2920 <nop,nop,time
```

```
10:45:09.793765 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 2301 win 4504 <nop,nop,timestamp 27418
10:45:10.383620 IP 10.10.0.2.49250 > 10.40.0.2.9: P 2301:2401(100) ack 1 win 2920 <nop,nop,time
10:45:10.493716 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 2401 win 4504 <nop,nop,timestamp 27488
10:45:10.853693 IP 10.10.0.2.49250 > 10.40.0.2.9: P 2401:2601(200) ack 1 win 2920 <nop,nop,time
10:45:10.963797 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 2601 win 4504 <nop,nop,timestamp 27535
10:45:11.583594 IP 10.10.0.2.49250 > 10.40.0.2.9: P 2601:2701(100) ack 1 win 2920 <nop,nop,time
10:45:11.693824 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 2701 win 4504 <nop,nop,timestamp 27608
10:45:12.043745 IP 10.10.0.2.49250 > 10.40.0.2.9: P 2701:2801(100) ack 1 win 2920 <nop,nop,time
10:45:12.153821 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 2801 win 4504 <nop,nop,timestamp 27654
10:45:12.503568 IP 10.10.0.2.49250 > 10.40.0.2.9: P 2801:3001(200) ack 1 win 2920 <nop,nop,time
10:45:12.613802 IP 10.40.0.2.9 > 10.10.0.2.49250: . ack 3001 win 4504 <nop,nop,timestamp 27700
10:45:12.874657 IP 10.10.0.2.49250 > 10.40.0.2.9: F 3001:3001(0) ack 1 win 2920 <nop,nop,timest
10:45:12.983808 IP 10.40.0.2.9 > 10.10.0.2.49250: F 1:1(0) ack 3002 win 4504 <nop,nop,timestamp
10:45:12.984026 IP 10.10.0.2.49250 > 10.40.0.2.9: . ack 2 win 2920 <nop,nop,timestamp 31770 277
```

5. Отправка без задержки

Где что дампим. Дампить без -t обязательно!

```
c1:~# ./nagle nodelay 10.40.0.2 9 0 30

c2:~# tcpdump -n -i eth0 tcp
10:48:10.282414 IP 10.10.0.2.49251 > 10.40.0.2.9: S 1282506011:1282506011(0) win 5840 <mss 1460
10:48:10.383733 IP 10.40.0.2.9 > 10.10.0.2.49251: S 1267588748:1267588748(0) ack 1282506012 win
10:48:10.383911 IP 10.10.0.2.49251 > 10.40.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 49510 454
10:48:10.383994 IP 10.10.0.2.49251 > 10.40.0.2.9: P 1:101(100) ack 1 win 2920 <nop,nop,timestam
10:48:10.393370 IP 10.10.0.2.49251 > 10.40.0.2.9: P 101:201(100) ack 1 win 2920 <nop,nop,timest
10:48:10.393415 IP 10.10.0.2.49251 > 10.40.0.2.9: P 201:301(100) ack 1 win 2920 <nop,nop,timest
10:48:10.493774 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 101 win 2896 <nop,nop,timestamp 45488 4
10:48:10.493783 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 201 win 2896 <nop,nop,timestamp 45488 4
10:48:10.493786 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 301 win 2896 <nop,nop,timestamp 45488 4
10:48:10.493930 IP 10.10.0.2.49251 > 10.40.0.2.9: P 301:1501(1200) ack 1 win 2920 <nop,nop,time
10:48:10.504030 IP 10.10.0.2.49251 > 10.40.0.2.9: P 1501:1601(100) ack 1 win 2920 <nop,nop,time
10:48:10.513677 IP 10.10.0.2.49251 > 10.40.0.2.9: P 1601:1701(100) ack 1 win 2920 <nop,nop,time
10:48:10.513879 IP 10.10.0.2.49251 > 10.40.0.2.9: P 1701:1801(100) ack 1 win 2920 <nop,nop,time
10:48:10.523627 IP 10.10.0.2.49251 > 10.40.0.2.9: P 1801:1901(100) ack 1 win 2920 <nop,nop,time
10:48:10.523846 IP 10.10.0.2.49251 > 10.40.0.2.9: P 1901:2001(100) ack 1 win 2920 <nop,nop,time
10:48:10.584237 IP 10.10.0.2.49251 > 10.40.0.2.9: FP 2001:3001(1000) ack 1 win 2920 <nop,nop,ti
10:48:10.595707 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 1501 win 4096 <nop,nop,timestamp 45499
10:48:10.613741 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 1601 win 4096 <nop,nop,timestamp 45501
10:48:10.623782 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 1701 win 4096 <nop,nop,timestamp 45501
10:48:10.623813 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 1801 win 4096 <nop,nop,timestamp 45501
10:48:10.633790 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 1901 win 4096 <nop,nop,timestamp 45502
10:48:10.633825 IP 10.40.0.2.9 > 10.10.0.2.49251: . ack 2001 win 4096 <nop,nop,timestamp 45502
10:48:10.693733 IP 10.40.0.2.9 > 10.10.0.2.49251: F 1:1(0) ack 3002 win 5296 <nop,nop,timestamp
10:48:10.693886 IP 10.10.0.2.49251 > 10.40.0.2.9: . ack 2 win 2920 <nop,nop,timestamp 49541 455

c1:~# ./nagle nodelay 10.40.0.2 9 -1 30
```

```
c2:~# tcpdump -n -i eth0 tcp
10:49:45.258647 IP 10.10.0.2.49252 > 10.40.0.2.9: S 2758866196:2758866196(0) win 5840 <mss 1460
10:49:45.363705 IP 10.40.0.2.9 > 10.10.0.2.49252: S 2758798267:2758798267(0) ack 2758866197 win
10:49:45.363841 IP 10.10.0.2.49252 > 10.40.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 59008 549
10:49:45.363892 IP 10.10.0.2.49252 > 10.40.0.2.9: P 1:101(100) ack 1 win 2920 <nop,nop,timestam
10:49:45.363929 IP 10.10.0.2.49252 > 10.40.0.2.9: P 101:201(100) ack 1 win 2920 <nop,nop,timest
10:49:45.363941 IP 10.10.0.2.49252 > 10.40.0.2.9: P 201:301(100) ack 1 win 2920 <nop,nop,timest
10:49:45.473891 IP 10.40.0.2.9 > 10.10.0.2.49252: . ack 101 win 2896 <nop,nop,timestamp 54986 5
10:49:45.473900 IP 10.40.0.2.9 > 10.10.0.2.49252: . ack 201 win 2896 <nop,nop,timestamp 54986 5
10:49:45.473902 IP 10.40.0.2.9 > 10.10.0.2.49252: . ack 301 win 2896 <nop,nop,timestamp 54986 5
10:49:45.474118 IP 10.10.0.2.49252 > 10.40.0.2.9: . 301:1749(1448) ack 1 win 2920 <nop,nop,time
10:49:45.474126 IP 10.10.0.2.49252 > 10.40.0.2.9: FP 1749:3001(1252) ack 1 win 2920 <nop,nop,ti
10:49:45.583747 IP 10.40.0.2.9 > 10.10.0.2.49252: . ack 1749 win 4344 <nop,nop,timestamp 54997
10:49:45.583756 IP 10.40.0.2.9 > 10.10.0.2.49252: F 1:1(0) ack 3002 win 5792 <nop,nop,timestamp
10:49:45.583883 IP 10.10.0.2.49252 > 10.40.0.2.9: . ack 2 win 2920 <nop,nop,timestamp 59030 549
```

6. Быстрый повтор

tcpdump на **c1**.

```
c1:~# tcpdump -n -i eth0 tcp
10:56:18.994443 IP 10.10.0.2.40029 > 10.30.0.2.9: S 362578965:362578965(0) win 5840 <mss 1460,s
10:56:21.965055 IP 10.10.0.2.40029 > 10.30.0.2.9: S 362578965:362578965(0) win 5840 <mss 1460,s
10:56:21.976394 IP 10.30.0.2.9 > 10.10.0.2.40029: S 400469531:400469531(0) ack 362578966 win 20
10:56:21.976443 IP 10.10.0.2.40029 > 10.30.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 98673 985
10:56:21.978264 IP 10.10.0.2.40029 > 10.30.0.2.9: P 1:101(100) ack 1 win 2920 <nop,nop,timestam
10:56:21.979221 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 101 win 1048 <nop,nop,timestamp 98576 9
10:56:21.988779 IP 10.10.0.2.40029 > 10.30.0.2.9: P 101:201(100) ack 1 win 2920 <nop,nop,timest
10:56:21.989260 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 201 win 1048 <nop,nop,timestamp 98576 9
10:56:21.995000 IP 10.10.0.2.40029 > 10.30.0.2.9: P 201:301(100) ack 1 win 2920 <nop,nop,timest
10:56:21.995480 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 301 win 1048 <nop,nop,timestamp 98579 9
10:56:22.005042 IP 10.10.0.2.40029 > 10.30.0.2.9: P 301:401(100) ack 1 win 2920 <nop,nop,timest
10:56:22.015314 IP 10.10.0.2.40029 > 10.30.0.2.9: P 401:501(100) ack 1 win 2920 <nop,nop,timest
10:56:22.016907 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 301 win 1048 <nop,nop,timestamp 98580 9
10:56:22.027103 IP 10.10.0.2.40029 > 10.30.0.2.9: P 501:601(100) ack 1 win 2920 <nop,nop,timest
10:56:22.028591 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 301 win 1048 <nop,nop,timestamp 98582 9
10:56:22.036799 IP 10.10.0.2.40029 > 10.30.0.2.9: P 601:701(100) ack 1 win 2920 <nop,nop,timest
10:56:22.038261 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 301 win 1048 <nop,nop,timestamp 98582 9
10:56:22.038293 IP 10.10.0.2.40029 > 10.30.0.2.9: P 301:401(100) ack 1 win 2920 <nop,nop,timest
10:56:22.039557 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 701 win 1048 <nop,nop,timestamp 98582 9
10:56:22.048495 IP 10.10.0.2.40029 > 10.30.0.2.9: P 701:801(100) ack 1 win 2920 <nop,nop,timest
10:56:22.265257 IP 10.10.0.2.40029 > 10.30.0.2.9: P 701:801(100) ack 1 win 2920 <nop,nop,timest
10:56:22.266287 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 801 win 1048 <nop,nop,timestamp 98605 9
10:56:22.266318 IP 10.10.0.2.40029 > 10.30.0.2.9: . 801:1325(524) ack 1 win 2920 <nop,nop,times
10:56:22.266347 IP 10.10.0.2.40029 > 10.30.0.2.9: . 1325:1849(524) ack 1 win 2920 <nop,nop,time
10:56:22.267415 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 1325 win 1572 <nop,nop,timestamp 98605
10:56:22.267442 IP 10.10.0.2.40029 > 10.30.0.2.9: . 1849:2373(524) ack 1 win 2920 <nop,nop,time
10:56:22.267469 IP 10.10.0.2.40029 > 10.30.0.2.9: . 2373:2897(524) ack 1 win 2920 <nop,nop,time
10:56:22.267481 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 1849 win 2096 <nop,nop,timestamp 98605
```

```
10:56:22.267494 IP 10.10.0.2.40029 > 10.30.0.2.9: P 2897:3001(104) ack 1 win 2920 <nop,nop,time
10:56:22.268661 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 2897 win 3144 <nop,nop,timestamp 98605
10:56:22.268681 IP 10.30.0.2.9 > 10.10.0.2.40029: . ack 3001 win 3144 <nop,nop,timestamp 98605
10:56:22.279754 IP 10.10.0.2.40029 > 10.30.0.2.9: F 3001:3001(0) ack 1 win 2920 <nop,nop,timest
10:56:22.284618 IP 10.30.0.2.9 > 10.10.0.2.40029: F 1:1(0) ack 3002 win 3144 <nop,nop,timestamp
10:56:22.284644 IP 10.10.0.2.40029 > 10.30.0.2.9: . ack 2 win 2920 <nop,nop,timestamp 98703 986
```

7. Обычный повтор

tcpdump на **c1**. /etc/delay на **c3**.

```
c1:~# tcpdump -n -i eth0 tcp
11:19:34.598644 IP 10.10.0.2.42088 > 10.40.0.2.9: S 640075332:640075332(0) win 5840 <mss 1460,s
11:19:34.800453 IP 10.40.0.2.9 > 10.10.0.2.42088: S 643518773:643518773(0) ack 640075333 win 57
11:19:34.800494 IP 10.10.0.2.42088 > 10.40.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 15769 362
11:19:34.801971 IP 10.10.0.2.42088 > 10.40.0.2.9: P 1:101(100) ack 1 win 2920 <nop,nop,timestam
11:19:35.007962 IP 10.10.0.2.42088 > 10.40.0.2.9: P 101:201(100) ack 1 win 2920 <nop,nop,timest
11:19:35.013995 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 101 win 2896 <nop,nop,timestamp 3645 15
11:19:35.210224 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 201 win 2896 <nop,nop,timestamp 3666 15
11:19:35.218656 IP 10.10.0.2.42088 > 10.40.0.2.9: P 201:301(100) ack 1 win 2920 <nop,nop,timest
11:19:35.420550 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 301 win 2896 <nop,nop,timestamp 3686 15
11:19:35.431367 IP 10.10.0.2.42088 > 10.40.0.2.9: P 301:401(100) ack 1 win 2920 <nop,nop,timest
11:19:35.637865 IP 10.10.0.2.42088 > 10.40.0.2.9: P 401:501(100) ack 1 win 2920 <nop,nop,timest
11:19:35.643815 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 401 win 2896 <nop,nop,timestamp 3709 15
11:19:35.840585 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 501 win 2896 <nop,nop,timestamp 3729 15
11:19:35.850014 IP 10.10.0.2.42088 > 10.40.0.2.9: P 501:601(100) ack 1 win 2920 <nop,nop,timest
11:19:36.057856 IP 10.10.0.2.42088 > 10.40.0.2.9: P 601:701(100) ack 1 win 2920 <nop,nop,timest
11:19:36.060359 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 601 win 2896 <nop,nop,timestamp 3750 15
11:19:36.260570 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 701 win 2896 <nop,nop,timestamp 3771 15
11:19:36.271307 IP 10.10.0.2.42088 > 10.40.0.2.9: P 701:801(100) ack 1 win 2920 <nop,nop,timest
11:19:36.477807 IP 10.10.0.2.42088 > 10.40.0.2.9: P 801:901(100) ack 1 win 2920 <nop,nop,timest
11:19:36.484236 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 801 win 2896 <nop,nop,timestamp 3793 15
11:19:36.680459 IP 10.40.0.2.9 > 10.10.0.2.42088: . ack 901 win 2896 <nop,nop,timestamp 3812 15
```

8. Неудачная попытка соединения с портом

```
c2:~# tcpdump -n -i eth0 tcp or icmp
11:35:06.418147 IP 10.10.0.2.36532 > 10.50.0.2.15: S 2336358280:2336358280(0) win 5840 <mss 146
11:35:06.635388 IP 10.50.0.2.15 > 10.10.0.2.36532: R 0:0(0) ack 2336358281 win 0
```

9. Опыт с PMTU

PMTU при попытке соединится с c1 на c6.

```
c2:~# tcpdump -n -i eth0 tcp or icmp
11:28:37.170950 IP 10.10.0.2.38034 > 10.50.0.2.9: S 523390004:523390004(0) win 5840 <mss 1460,s
11:28:37.625218 IP 10.50.0.2.9 > 10.10.0.2.38034: S 524787216:524787216(0) ack 523390005 win 57
11:28:37.625579 IP 10.10.0.2.38034 > 10.50.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 6763 6739
```

```
11:28:37.626007 IP 10.10.0.2.38034 > 10.50.0.2.9: P 1:101(100) ack 1 win 2920 <nop,nop,timestam
11:28:37.626248 IP 10.10.0.2.38034 > 10.50.0.2.9: P 101:201(100) ack 1 win 2920 <nop,nop,timest
11:28:37.835136 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 101 win 2896 <nop,nop,timestamp 6761 67
11:28:37.835172 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 201 win 2896 <nop,nop,timestamp 6761 67
11:28:37.835547 IP 10.10.0.2.38034 > 10.50.0.2.9: . 201:1649(1448) ack 1 win 2920 <nop,nop,time
11:28:37.835616 IP 10.10.0.1 > 10.10.0.2: ICMP 10.50.0.2 unreachable - need to frag (mtu 1492),
11:28:37.835636 IP 10.10.0.2.38034 > 10.50.0.2.9: FP 1649:3001(1352) ack 1 win 2920 <nop,nop,ti
11:28:37.836049 IP 10.10.0.2.38034 > 10.50.0.2.9: . 201:1641(1440) ack 1 win 2920 <nop,nop,time
11:28:37.836071 IP 10.10.0.2.38034 > 10.50.0.2.9: . 1641:1649(8) ack 1 win 2920 <nop,nop,timest
11:28:38.045233 IP 10.20.0.2 > 10.10.0.2: ICMP 10.50.0.2 unreachable - need to frag (mtu 576),
11:28:38.045271 IP 10.20.0.2 > 10.10.0.2: ICMP 10.50.0.2 unreachable - need to frag (mtu 576),
11:28:38.045284 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 201 win 2896 <nop,nop,timestamp 6782 67
11:28:38.045728 IP 10.10.0.2.38034 > 10.50.0.2.9: . 201:725(524) ack 1 win 2920 <nop,nop,timest
11:28:38.045768 IP 10.10.0.2.38034 > 10.50.0.2.9: . 725:1249(524) ack 1 win 2920 <nop,nop,times
11:28:38.045778 IP 10.10.0.2.38034 > 10.50.0.2.9: . 1249:1641(392) ack 1 win 2920 <nop,nop,time
11:28:38.045786 IP 10.10.0.2.38034 > 10.50.0.2.9: . 1649:2173(524) ack 1 win 2920 <nop,nop,time
11:28:38.255152 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 725 win 3432 <nop,nop,timestamp 6803 68
11:28:38.255177 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 1249 win 3956 <nop,nop,timestamp 6803 6
11:28:38.255188 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 1649 win 4480 <nop,nop,timestamp 6803 6
11:28:38.255196 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 2173 win 5004 <nop,nop,timestamp 6803 6
11:28:38.255539 IP 10.10.0.2.38034 > 10.50.0.2.9: . 2173:2697(524) ack 1 win 2920 <nop,nop,time
11:28:38.255575 IP 10.10.0.2.38034 > 10.50.0.2.9: FP 2697:3001(304) ack 1 win 2920 <nop,nop,tim
11:28:38.464926 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 2697 win 5528 <nop,nop,timestamp 6824 6
11:28:38.464935 IP 10.50.0.2.9 > 10.10.0.2.38034: F 1:1(0) ack 3002 win 5528 <nop,nop,timestamp
11:28:38.465051 IP 10.10.0.2.38034 > 10.50.0.2.9: . ack 2 win 2920 <nop,nop,timestamp 6847 6824

c6:~# tcpdump -n -i eth0 tcp or icmp
11:28:37.411156 IP 10.10.0.2.38034 > 10.50.0.2.9: S 523390004:523390004(0) win 5840 <mss 1460,s
11:28:37.411267 IP 10.50.0.2.9 > 10.10.0.2.38034: S 524787216:524787216(0) ack 523390005 win 57
11:28:37.621867 IP 10.10.0.2.38034 > 10.50.0.2.9: . ack 1 win 2920 <nop,nop,timestamp 6763 6739
11:28:37.622259 IP 10.10.0.2.38034 > 10.50.0.2.9: P 1:101(100) ack 1 win 2920 <nop,nop,timestam
11:28:37.622288 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 101 win 2896 <nop,nop,timestamp 6761 67
11:28:37.622311 IP 10.10.0.2.38034 > 10.50.0.2.9: P 101:201(100) ack 1 win 2920 <nop,nop,timest
11:28:37.622317 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 201 win 2896 <nop,nop,timestamp 6761 67
11:28:37.832348 IP 10.10.0.2.38034 > 10.50.0.2.9: . 1641:1649(8) ack 1 win 2920 <nop,nop,timest
11:28:37.832411 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 201 win 2896 <nop,nop,timestamp 6782 67
11:28:38.042202 IP 10.10.0.2.38034 > 10.50.0.2.9: . 201:725(524) ack 1 win 2920 <nop,nop,timest
11:28:38.042222 IP 10.10.0.2.38034 > 10.50.0.2.9: . 725:1249(524) ack 1 win 2920 <nop,nop,times
11:28:38.042225 IP 10.10.0.2.38034 > 10.50.0.2.9: . 1249:1641(392) ack 1 win 2920 <nop,nop,time
11:28:38.042228 IP 10.10.0.2.38034 > 10.50.0.2.9: . 1649:2173(524) ack 1 win 2920 <nop,nop,time
11:28:38.042300 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 725 win 3432 <nop,nop,timestamp 6803 68
11:28:38.042331 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 1249 win 3956 <nop,nop,timestamp 6803 6
11:28:38.042342 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 1649 win 4480 <nop,nop,timestamp 6803 6
11:28:38.042352 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 2173 win 5004 <nop,nop,timestamp 6803 6
11:28:38.251712 IP 10.10.0.2.38034 > 10.50.0.2.9: . 2173:2697(524) ack 1 win 2920 <nop,nop,time
11:28:38.251732 IP 10.10.0.2.38034 > 10.50.0.2.9: FP 2697:3001(304) ack 1 win 2920 <nop,nop,tim
11:28:38.251774 IP 10.50.0.2.9 > 10.10.0.2.38034: . ack 2697 win 5528 <nop,nop,timestamp 6824 6
11:28:38.255857 IP 10.50.0.2.9 > 10.10.0.2.38034: F 1:1(0) ack 3002 win 5528 <nop,nop,timestamp
11:28:38.460960 IP 10.10.0.2.38034 > 10.50.0.2.9: . ack 2 win 2920 <nop,nop,timestamp 6847 6824
```

10. Соединение с неверным портом