## Тестирование ИТП4

Время проведения теста: Thu Mar 1 16:13:01 MSK 2018

### Тестирование коэффициента использования канала (ИТП4-а)

dd if=/dev/urandom of=data/test\_rand.dat bs=10M count=2

(echo " in ping out -c 5 "; echo " iperf in out "; echo " in curl -o /dev/null http://10.0.0.2:8000/test\_rand.dat "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_1.yaml single-host-udp.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.

64 bytes from 10.0.0.2: icmp\_seq=1 ttl=64 time=39.2 ms

64 bytes from 10.0.0.2: icmp\_seq=2 ttl=64 time=17.0 ms

64 bytes from 10.0.0.2: icmp\_seq=3 ttl=64 time=16.6 ms

64 bytes from 10.0.0.2: icmp\_seq=4 ttl=64 time=16.6 ms

64 bytes from 10.0.0.2: icmp\_seq=5 ttl=64 time=16.5 ms

--- 10.0.0.2 ping statistics ---

5 packets transmitted, 5 received, 0% packet loss, time 4005ms

rtt min/avg/max/mdev = 16.558/21.234/39.219/8.994 ms

mininet> \*\*\* Iperf: testing TCP bandwidth between in and out

\*\*\* Results: ['9.33 Mbits/sec', '9.98 Mbits/sec']

mininet> % Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0  
 2 20.0M 2 521k 0 0 999k 0 0:00:20 --:--:-- 0:00:20 999k  
 8 20.0M 8 1658k 0 0 1090k 0 0:00:18 0:00:01 0:00:17 1089k  
 13 20.0M 13 2798k 0 0 1109k 0 0:00:18 0:00:02 0:00:16 1109k  
 19 20.0M 19 3936k 0 0 1117k 0 0:00:18 0:00:03 0:00:15 1117k  
 24 20.0M 24 5076k 0 0 1122k 0 0:00:18 0:00:04 0:00:14 1122k  
 30 20.0M 30 6214k 0 0 1125k 0 0:00:18 0:00:05 0:00:13 1138k  
 35 20.0M 35 7352k 0 0 1127k 0 0:00:18 0:00:06 0:00:12 1138k  
 41 20.0M 41 8492k 0 0 1129k 0 0:00:18 0:00:07 0:00:11 1138k  
 47 20.0M 47 9630k 0 0 1130k 0 0:00:18 0:00:08 0:00:10 1138k  
 52 20.0M 52 10.5M 0 0 1131k 0 0:00:18 0:00:09 0:00:09 1138k  
 58 20.0M 58 11.6M 0 0 1131k 0 0:00:18 0:00:10 0:00:08 1138k  
 63 20.0M 63 12.7M 0 0 1132k 0 0:00:18 0:00:11 0:00:07 1138k  
 69 20.0M 69 13.8M 0 0 1132k 0 0:00:18 0:00:12 0:00:06 1138k  
 74 20.0M 74 14.9M 0 0 1133k 0 0:00:18 0:00:13 0:00:05 1138k  
 80 20.0M 80 16.0M 0 0 1133k 0 0:00:18 0:00:14 0:00:04 1138k  
 85 20.0M 85 17.1M 0 0 1134k 0 0:00:18 0:00:15 0:00:03 1138k  
 91 20.0M 91 18.3M 0 0 1134k 0 0:00:18 0:00:16 0:00:02 1138k  
 97 20.0M 97 19.4M 0 0 1134k 0 0:00:18 0:00:17 0:00:01 1138k  
100 20.0M 100 20.0M 0 0 1134k 0 0:00:18 0:00:18 --:--:-- 1138k

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

### Тестирование параллельных каналов передачи (ИТП4-б)

#### С использованием одного канала

(echo " out iperf3 -s & "; sleep 2; echo " in iperf3 -c out "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_1.yaml single-host-udp.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> mininet> Connecting to host 10.0.0.2, port 5201

[ 4] local 10.0.0.1 port 35894 connected to 10.0.0.2 port 5201

[ ID] Interval Transfer Bandwidth Retr Cwnd

[ 4] 0.00-1.00 sec 1.48 MBytes 12.4 Mbits/sec 0 90.5 KBytes

[ 4] 1.00-2.00 sec 1.24 MBytes 10.4 Mbits/sec 0 143 KBytes

[ 4] 2.00-3.00 sec 1.37 MBytes 11.5 Mbits/sec 0 194 KBytes

[ 4] 3.00-4.00 sec 1.37 MBytes 11.5 Mbits/sec 0 246 KBytes

[ 4] 4.00-5.00 sec 1.68 MBytes 14.1 Mbits/sec 0 298 KBytes

[ 4] 5.00-6.00 sec 1.37 MBytes 11.5 Mbits/sec 0 349 KBytes

[ 4] 6.00-7.00 sec 764 KBytes 6.25 Mbits/sec 0 402 KBytes

[ 4] 7.00-8.00 sec 1.68 MBytes 14.1 Mbits/sec 0 452 KBytes

[ 4] 8.00-9.00 sec 954 KBytes 7.82 Mbits/sec 0 505 KBytes

[ 4] 9.00-10.00 sec 2.11 MBytes 17.7 Mbits/sec 0 559 KBytes

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[ ID] Interval Transfer Bandwidth Retr

[ 4] 0.00-10.00 sec 14.0 MBytes 11.7 Mbits/sec 0 sender

[ 4] 0.00-10.00 sec 11.6 MBytes 9.77 Mbits/sec receiver

iperf Done.

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

#### С использованием двух каналов

(echo " out iperf3 -s & "; sleep 2; echo " in iperf3 -c out "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_2.yaml single-host-udp.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -b 10.0.2.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -b 10.0.2.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> mininet> Connecting to host 10.0.0.2, port 5201

[ 4] local 10.0.0.1 port 35944 connected to 10.0.0.2 port 5201

[ ID] Interval Transfer Bandwidth Retr Cwnd

[ 4] 0.00-1.00 sec 2.64 MBytes 22.2 Mbits/sec 4 102 KBytes

[ 4] 1.00-2.00 sec 2.24 MBytes 18.8 Mbits/sec 0 117 KBytes

[ 4] 2.00-3.00 sec 2.36 MBytes 19.8 Mbits/sec 0 132 KBytes

[ 4] 3.00-4.00 sec 2.17 MBytes 18.2 Mbits/sec 0 144 KBytes

[ 4] 4.00-5.00 sec 2.17 MBytes 18.2 Mbits/sec 0 156 KBytes

[ 4] 5.00-6.00 sec 2.17 MBytes 18.2 Mbits/sec 0 199 KBytes

[ 4] 6.00-7.00 sec 2.17 MBytes 18.2 Mbits/sec 0 266 KBytes

[ 4] 7.00-8.00 sec 2.76 MBytes 23.1 Mbits/sec 0 354 KBytes

[ 4] 8.00-9.00 sec 2.49 MBytes 20.9 Mbits/sec 0 465 KBytes

[ 4] 9.00-10.00 sec 1.86 MBytes 15.6 Mbits/sec 0 601 KBytes

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[ ID] Interval Transfer Bandwidth Retr

[ 4] 0.00-10.00 sec 23.1 MBytes 19.3 Mbits/sec 4 sender

[ 4] 0.00-10.00 sec 22.7 MBytes 19.1 Mbits/sec receiver

iperf Done.

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

### Тестирование помехозащищенного кодирования (ИТП4-в)

#### Без применения кодов Рида-Соломона на канале с потерей пакетов 10%

(echo " out iperf3 -s & "; sleep 5; echo " in iperf3 -c out -u -b3M "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_1.yaml single-host-udp-loss.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) s12 (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> mininet> Connecting to host 10.0.0.2, port 5201

[ 4] local 10.0.0.1 port 51610 connected to 10.0.0.2 port 5201

[ ID] Interval Transfer Bandwidth Total Datagrams

[ 4] 0.00-1.00 sec 331 KBytes 2.71 Mbits/sec 234

[ 4] 1.00-2.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 2.00-3.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 3.00-4.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 4.00-5.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 5.00-6.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 6.00-7.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 7.00-8.00 sec 365 KBytes 2.99 Mbits/sec 258

[ 4] 8.00-9.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 9.00-10.00 sec 366 KBytes 3.00 Mbits/sec 259

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[ ID] Interval Transfer Bandwidth Jitter Lost/Total Datagrams

[ 4] 0.00-10.00 sec 3.54 MBytes 2.97 Mbits/sec 2.022 ms 239/2564 (9.3%)

[ 4] Sent 2564 datagrams

iperf Done.

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

#### С применением кодов Рида-Соломона на канале с потерей пакетов 10%

(echo " out iperf3 -s & "; sleep 10; echo " in iperf3 -c out -u -b3M "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_1\_tiny.yaml single-host-udp-tiny-loss.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.22.22.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start tt1 /root/qnet/src/tinyvpn/tinyvpn\_amd64 -s -l0.0.0.0:4096 -f20:10 --sub-net 10.22.22.0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.22.22.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start tt2 /root/qnet/src/tinyvpn/tinyvpn\_amd64 -c -r10.0.1.1:4096 -f20:10 --sub-net 10.22.22.0

\*\*\* Checking tap0

\*\*\* Checking tiny1

\*\*\* Checking tap1

\*\*\* Checking tiny2

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) s12 (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss) (10.00Mbit 4ms delay 5.00000% loss) (10.00Mbit 0ms delay 5.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> mininet> Connecting to host 10.0.0.2, port 5201

[ 4] local 10.0.0.1 port 55051 connected to 10.0.0.2 port 5201

[ ID] Interval Transfer Bandwidth Total Datagrams

[ 4] 0.00-1.00 sec 331 KBytes 2.71 Mbits/sec 234

[ 4] 1.00-2.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 2.00-3.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 3.00-4.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 4.00-5.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 5.00-6.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 6.00-7.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 7.00-8.00 sec 366 KBytes 3.00 Mbits/sec 259

[ 4] 8.00-9.00 sec 365 KBytes 2.99 Mbits/sec 258

[ 4] 9.00-10.00 sec 366 KBytes 3.00 Mbits/sec 259

- - - - - - - - - - - - - - - - - - - - - - - - -

[ ID] Interval Transfer Bandwidth Jitter Lost/Total Datagrams

[ 4] 0.00-10.00 sec 3.54 MBytes 2.97 Mbits/sec 1.374 ms 0/2564 (0%)

[ 4] Sent 2564 datagrams

iperf Done.

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop tt1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop tt2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

### Тестирование уплотнения данных (ИТП4-г)

dd if=/dev/urandom of=data/test\_rand.dat bs=10M count=2

dd if=/dev/zero of=data/test\_zero.dat bs=10M count=2

#### Без использования zlib

##### Файл с повторяющейся информацией

(echo " in curl -o /dev/null http://10.0.0.2:8000/test\_zero.dat "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_2.yaml single-host-udp.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -b 10.0.2.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -b 10.0.2.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> % Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0  
 9 20.0M 9 1961k 0 0 2080k 0 0:00:09 --:--:-- 0:00:09 2079k  
 20 20.0M 20 4237k 0 0 2181k 0 0:00:09 0:00:01 0:00:08 2181k  
 31 20.0M 31 6386k 0 0 2161k 0 0:00:09 0:00:02 0:00:07 2161k  
 42 20.0M 42 8791k 0 0 2229k 0 0:00:09 0:00:03 0:00:06 2229k  
 54 20.0M 54 10.8M 0 0 2239k 0 0:00:09 0:00:04 0:00:05 2239k  
 65 20.0M 65 13.0M 0 0 2245k 0 0:00:09 0:00:05 0:00:04 2277k  
 76 20.0M 76 15.2M 0 0 2250k 0 0:00:09 0:00:06 0:00:03 2277k  
 87 20.0M 87 17.4M 0 0 2253k 0 0:00:09 0:00:07 0:00:02 2307k  
 98 20.0M 98 19.7M 0 0 2256k 0 0:00:09 0:00:08 0:00:01 2277k  
100 20.0M 100 20.0M 0 0 2256k 0 0:00:09 0:00:09 --:--:-- 2277k

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

##### Файл со случайной информацией

(echo " in curl -o /dev/null http://10.0.0.2:8000/test\_rand.dat "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_2.yaml single-host-udp.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -b 10.0.2.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -b 10.0.2.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> % Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0  
 6 20.0M 6 1398k 0 0 2042k 0 0:00:10 --:--:-- 0:00:10 2041k  
 17 20.0M 17 3672k 0 0 2178k 0 0:00:09 0:00:01 0:00:08 2178k  
 29 20.0M 29 5947k 0 0 2215k 0 0:00:09 0:00:02 0:00:07 2215k  
 40 20.0M 40 8222k 0 0 2231k 0 0:00:09 0:00:03 0:00:06 2231k  
 51 20.0M 51 10.2M 0 0 2241k 0 0:00:09 0:00:04 0:00:05 2241k  
 62 20.0M 62 12.4M 0 0 2248k 0 0:00:09 0:00:05 0:00:04 2276k  
 73 20.0M 73 14.7M 0 0 2252k 0 0:00:09 0:00:06 0:00:03 2277k  
 84 20.0M 84 16.9M 0 0 2255k 0 0:00:09 0:00:07 0:00:02 2277k  
 95 20.0M 95 19.1M 0 0 2258k 0 0:00:09 0:00:08 0:00:01 2277k  
100 20.0M 100 20.0M 0 0 2258k 0 0:00:09 0:00:09 --:--:-- 2276k

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

#### С использованием zlib

##### Файл с повторяющейся информацией

(echo " in curl -o /dev/null http://10.0.0.2:8000/test\_zero.dat "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_2\_zlib.yaml single-host-udp.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -b 10.0.2.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1 -z 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -b 10.0.2.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1 -z 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> % Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0  
 30 20.0M 30 6220k 0 0 8598k 0 0:00:02 --:--:-- 0:00:02 8591k  
 80 20.0M 80 16.0M 0 0 9549k 0 0:00:02 0:00:01 0:00:01 9547k  
100 20.0M 100 20.0M 0 0 9622k 0 0:00:02 0:00:02 --:--:-- 9624k

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

##### Файл со случайной информацией

(echo " in curl -o /dev/null http://10.0.0.2:8000/test\_rand.dat "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_2\_zlib.yaml single-host-udp.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -b 10.0.2.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1 -z 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -b 10.0.2.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1 -z 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> % Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0  
 4 20.0M 4 870k 0 0 1902k 0 0:00:10 --:--:-- 0:00:10 1901k  
 15 20.0M 15 3117k 0 0 2138k 0 0:00:09 0:00:01 0:00:08 2138k  
 26 20.0M 26 5373k 0 0 2186k 0 0:00:09 0:00:02 0:00:07 2186k  
 37 20.0M 37 7630k 0 0 2206k 0 0:00:09 0:00:03 0:00:06 2205k  
 48 20.0M 48 9881k 0 0 2216k 0 0:00:09 0:00:04 0:00:05 2216k  
 59 20.0M 59 11.8M 0 0 2223k 0 0:00:09 0:00:05 0:00:04 2253k  
 70 20.0M 70 14.0M 0 0 2228k 0 0:00:09 0:00:06 0:00:03 2254k  
 80 20.0M 80 16.1M 0 0 2211k 0 0:00:09 0:00:07 0:00:02 2223k  
 92 20.0M 92 18.4M 0 0 2234k 0 0:00:09 0:00:08 0:00:01 2253k  
100 20.0M 100 20.0M 0 0 2235k 0 0:00:09 0:00:09 --:--:-- 2254k

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

### Тестирование дедупликации данных (ИТП4-д)

dd if=/dev/urandom of=data/test\_rand.dat bs=10M count=2

mkdir data\_out

(echo " out rsync --daemon --config=/root/qnet/mininet-qnet-tap/rsyncd.conf "; sleep 2; echo " in rsync -vh 10.0.0.2::pickup/test\_rand.dat /root/qnet/mininet-qnet-tap/data\_out/test\_rand.dat "; echo " in rsync -vh 10.0.0.2::pickup/test\_rand.dat /root/qnet/mininet-qnet-tap/data\_out/test\_rand.dat "; echo " out dd if=/dev/urandom bs=1M count=1 >> /root/qnet/mininet-qnet-tap/data/test\_rand.dat "; echo " in rsync -vh 10.0.0.2::pickup/test\_rand.dat /root/qnet/mininet-qnet-tap/data\_out/test\_rand.dat "; echo " out truncate -s -1M /root/qnet/mininet-qnet-tap/data/test\_rand.dat "; echo " in rsync -vh 10.0.0.2::pickup/test\_rand.dat /root/qnet/mininet-qnet-tap/data\_out/test\_rand.dat "; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_2.yaml single-host-udp.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -b 10.0.2.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -b 10.0.2.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

\*\*\* Starting CLI:

mininet> mininet> test\_rand.dat

sent 47 bytes received 20.97M bytes 2.21M bytes/sec

total size is 20.97M speedup is 1.00

mininet> test\_rand.dat

sent 27.55K bytes received 18.43K bytes 91.96K bytes/sec

total size is 20.97M speedup is 456.12

mininet> 1+0 records in

1+0 records out

1048576 bytes (1.0 MB) copied, 0.006403 s, 164 MB/s

mininet> test\_rand.dat

sent 27.55K bytes received 1.07M bytes 732.65K bytes/sec

total size is 22.02M speedup is 20.04

mininet> mininet> test\_rand.dat

sent 28.23K bytes received 20.09K bytes 96.66K bytes/sec

total size is 20.97M speedup is 433.94

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

### Тестирование кодирования данных (ИТП4-е)

grep polkitd data/test.dat

polkitd:x:997:995:User for polkitd:/:/sbin/nologin

#### Перехват пакетов без кодирования

(echo " vhwrong tcpdump -i vhwrong-eth0 udp -w packets.pcap & "; sleep 4; echo " in curl -o /dev/null http://10.0.0.2:8000/test.dat "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_1\_raw.yaml single-host-udp-wrong.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

Running post-script ovs-vsctl -- --id=@p get port s11-eth1 -- --id=@m create mirror name=m0 select-all=true output-port=@p -- set bridge s11 mirrors=@m

6a14627b-209f-469f-a788-fbb02ca038a1

\*\*\* Starting CLI:

mininet> mininet> % Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0  
 0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0  
100 2366 100 2366 0 0 39819 0 --:--:-- --:--:-- --:--:-- 39433

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

echo ""

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

grep polkitd packets.pcap

Binary file packets.pcap matches

#### Перехват пакетов с кодированием

(echo " vhwrong tcpdump -i vhwrong-eth0 udp -w packets.pcap & "; sleep 4; echo " in curl -o /dev/null http://10.0.0.2:8000/test.dat "; sleep 1; echo " quit "; sleep 2) | stdbuf -o0 -e0 python mininet-qnet-tap.py defaults\_1.yaml single-host-udp-wrong.yaml h1 2>&1 | python makeword.py -c CodeStyle -f $filenamedocx

Creating controller: c0

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw1 /root/qnet/src/keyworker/keyworker -p 55550 -n kw1/kw1.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start kw2 /root/qnet/src/keyworker/keyworker -p 55551 -n kw2/kw2.db

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct1 /root/qnet/src/nextctapudp/ctapudp -s 0.0.0.0 -p 1001 -t 10.0.1.2 -k 1000 -q 127.0.0.1 -r 55550 -i tap0 -e 1000 -a 1

Running pre-script python /root/qnet/mininet-qnet/run\_daemon.py start ct2 /root/qnet/src/nextctapudp/ctapudp -c 0.0.0.0 -p 1000 -t 10.0.1.1 -k 1001 -q 127.0.0.1 -r 55551 -i tap1 -e 1000 -a 1

\*\*\* Checking tap0

\*\*\* Checking tap1

(100.00Mbit 0ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh1 s1 tap0

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Linking vh2 s2 tap1

(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) \*\*\* Configuring hosts

in (cfs -1/100000us) out (cfs -1/100000us) vhwrong (cfs -1/100000us) vh1 (cfs -1/100000us) vh2 (cfs -1/100000us)

\*\*\* Starting controller

c0

\*\*\* Starting 4 switches

s1 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s2 (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) s11 (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) s12 (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) ...(1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (1000.00Mbit 1ms delay 0.00000% loss) (100.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss) (10.00Mbit 4ms delay 0.00000% loss) (10.00Mbit 0ms delay 0.00000% loss)

Running post-script cd /root/qnet/mininet-qnet-tap/data; python /root/qnet/mininet-qnet/run\_daemon.py start httpd-out python -m SimpleHTTPServer 8000

Running post-script ovs-vsctl -- --id=@p get port s11-eth1 -- --id=@m create mirror name=m0 select-all=true output-port=@p -- set bridge s11 mirrors=@m

eee20dfd-2768-43b9-95c3-19fb593b8d84

\*\*\* Starting CLI:

mininet> mininet> % Total % Received % Xferd Average Speed Time Time Time Current

Dload Upload Total Spent Left Speed

0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0  
100 2366 100 2366 0 0 38149 0 --:--:-- --:--:-- --:--:-- 38786

mininet> python /root/qnet/mininet-qnet/run\_daemon.py stop kw1

python /root/qnet/mininet-qnet/run\_daemon.py stop kw2

python /root/qnet/mininet-qnet/run\_daemon.py stop ct1

python /root/qnet/mininet-qnet/run\_daemon.py stop ct2

python /root/qnet/mininet-qnet/run\_daemon.py stop httpd-out

echo ""

\*\*\* Stopping 1 controllers

c0

\*\*\* Stopping 9 links

.........

\*\*\* Stopping 4 switches

s1 s2 s11 s12

\*\*\* Stopping 5 hosts

in out vhwrong vh1 vh2

\*\*\* Done

grep polkitd packets.pcap