DRAFT

TELECOM ITALIA Group

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TIMquic & QuicGen

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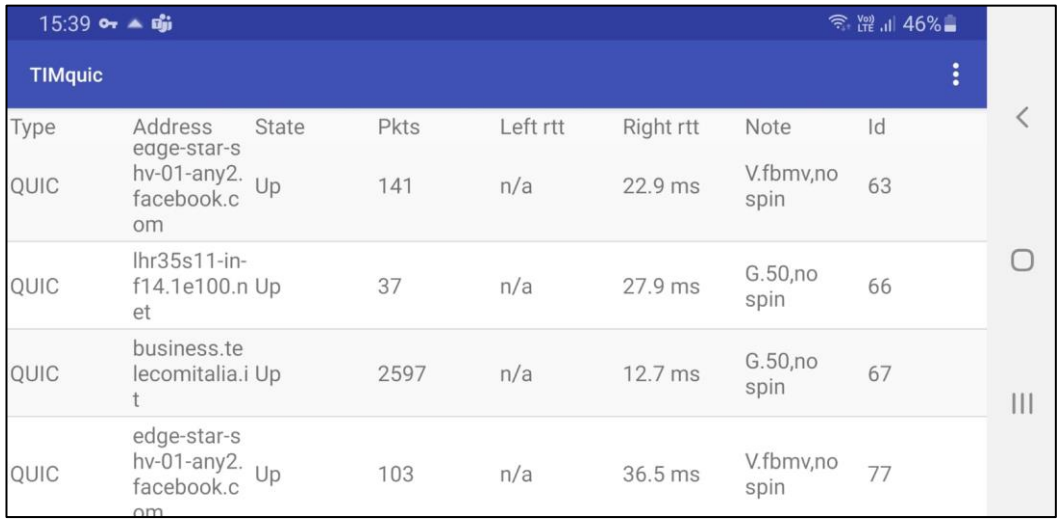
TIM

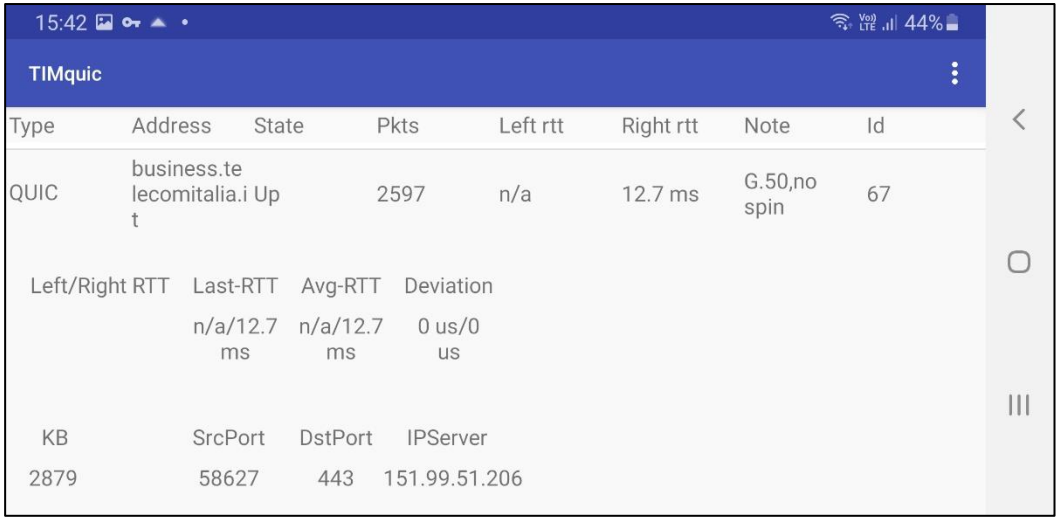
User device explicit monitoring App

https://tools.ietf.org/html/draft-cnbf-ippm-user-devices-explicit-monitoring-01



Placing the Explicit Performance Observer on user devices gives many advantages

Real time mobile traffic monitoring



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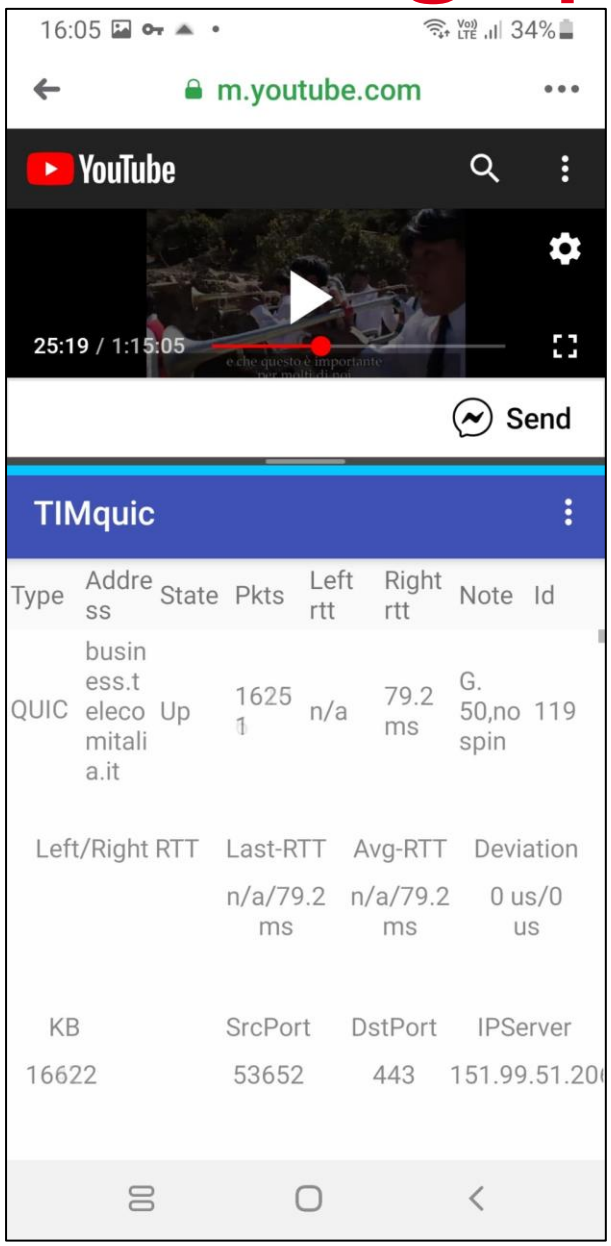
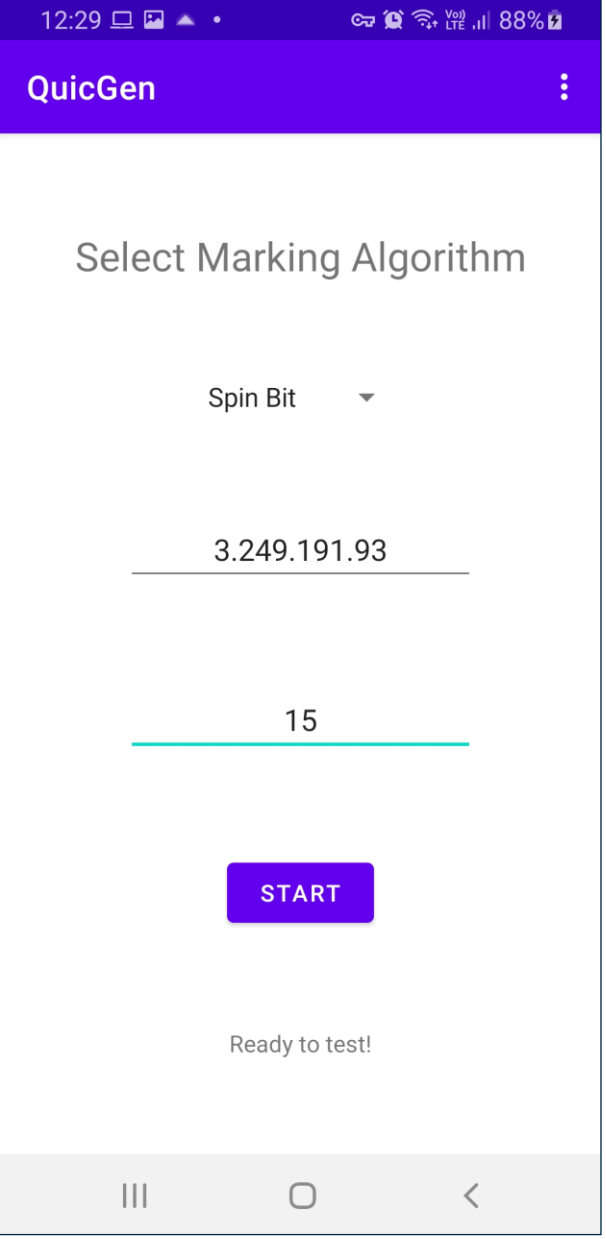
User device explicit monitoring App

We can see our connections performance while enjoying the service



Operators, with the customer's permission, may use this information to identify network problems and improve the customer experience

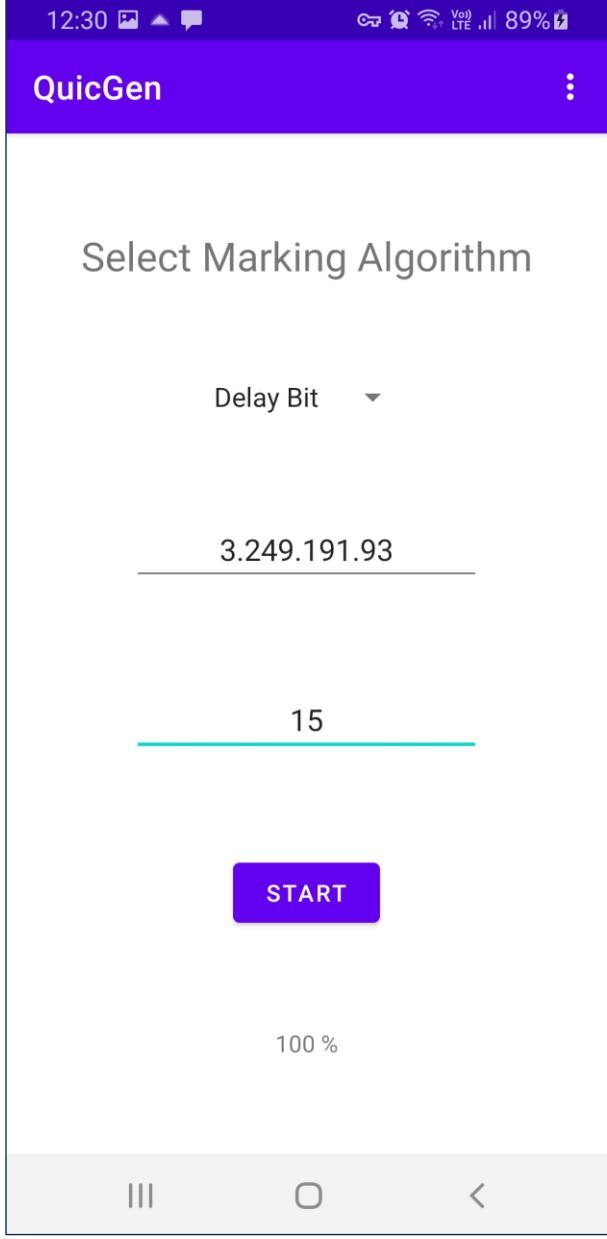


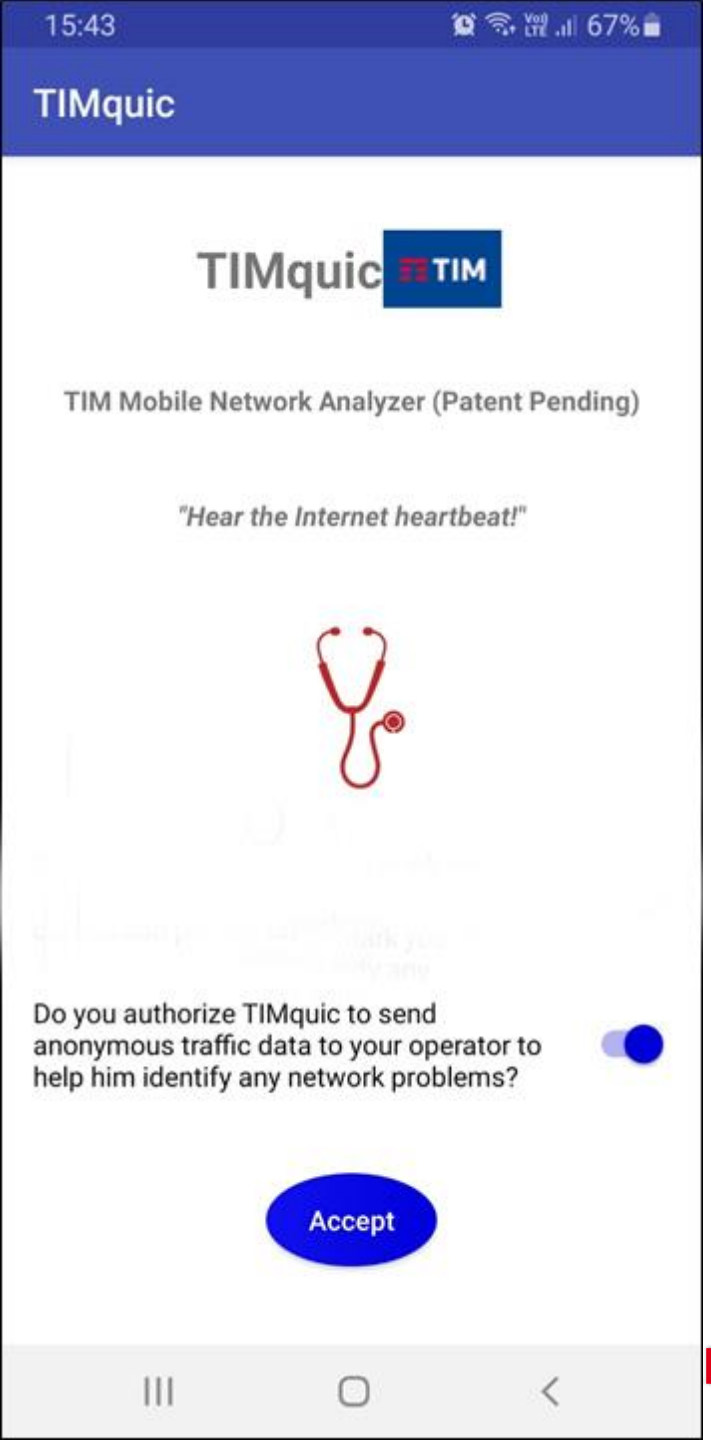
QuicGen

Quic marked traffic generation Android App.

Parameters:

- ***Marking Algorithm***
- ***Server IP address***
- ***MegaBytes to download***





TIMquic

Quic Performance Monitoring Android App

FT

Type	DstDns	State	Pkts	Mov Avg RTT	Note	Id
QUIC	compute.amazonaws.com	Up	6507	46	V29,spinning	22
QUIC	compute.amazonaws.com	Up	6482	45	V.tidb,no spin	25
QUIC	instagram-p3-shv-01-any2.fbcdn.net	Up	59	73	V.fbmv,no spin	43
QUIC	mil04s25-in-f10.1e100.net	Up	25	67	G.50,no spin	47
QUIC	instagram-p3-shv-01-any2.fbcdn.net	Up	22	117	V.fbmv,no spin	33
QUIC	edge-star-shv-01-any2.faceb	Up	20	33	V.fbmv,no	17

QUIC	instagram-p3-shv-01-any2.fbcdn.net	Up	59	73	V.fbmv,no spin	43

Instagram

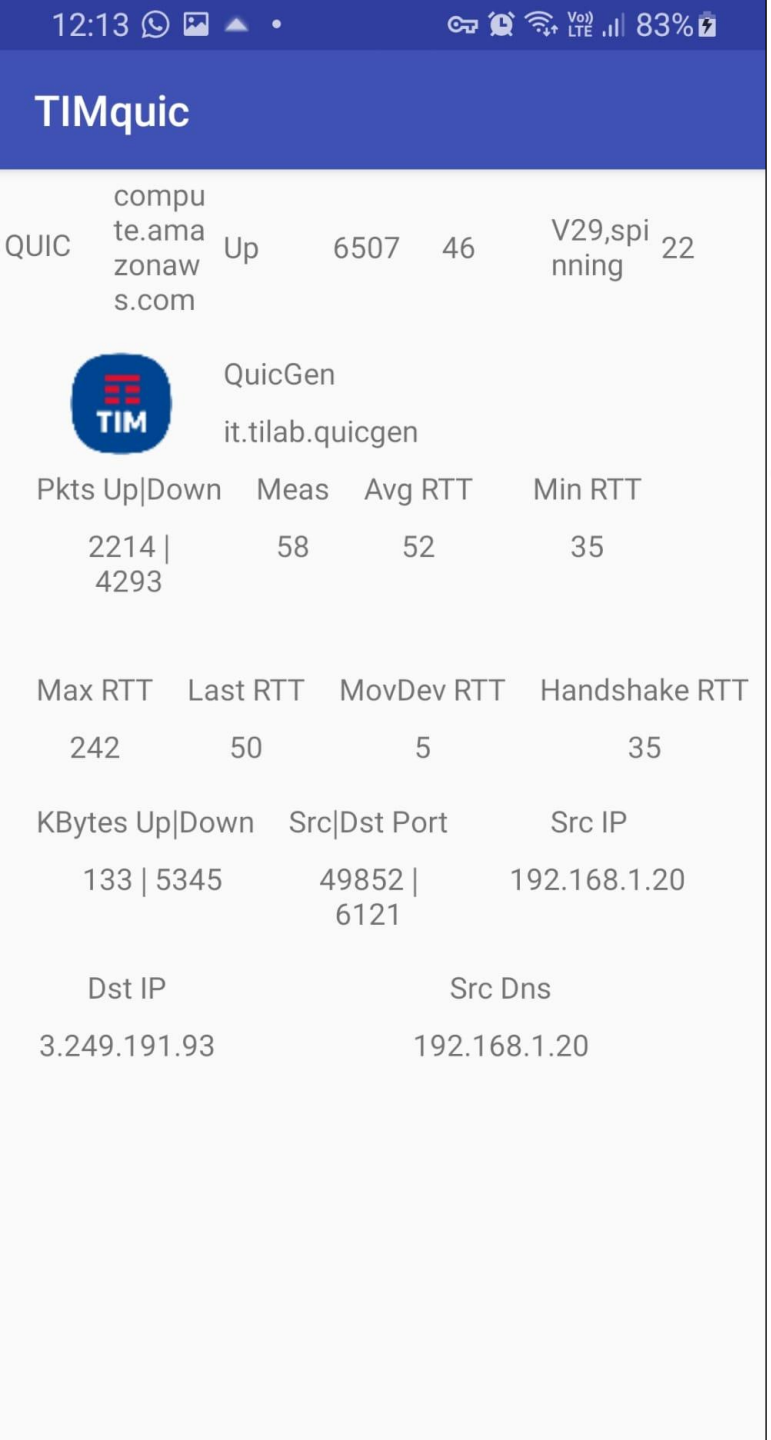
com.instagram.android

Pkts Up|Down	Meas	Avg RTT	Min RTT
41 | 18	1	73	73

Max RTT	Last RTT	MovDev RTT	Handshake RTT
73	73	0	73

KBytes Up|Down	Src|Dst Port	Src IP
37 | 9	51940 | 443	192.168.1.20

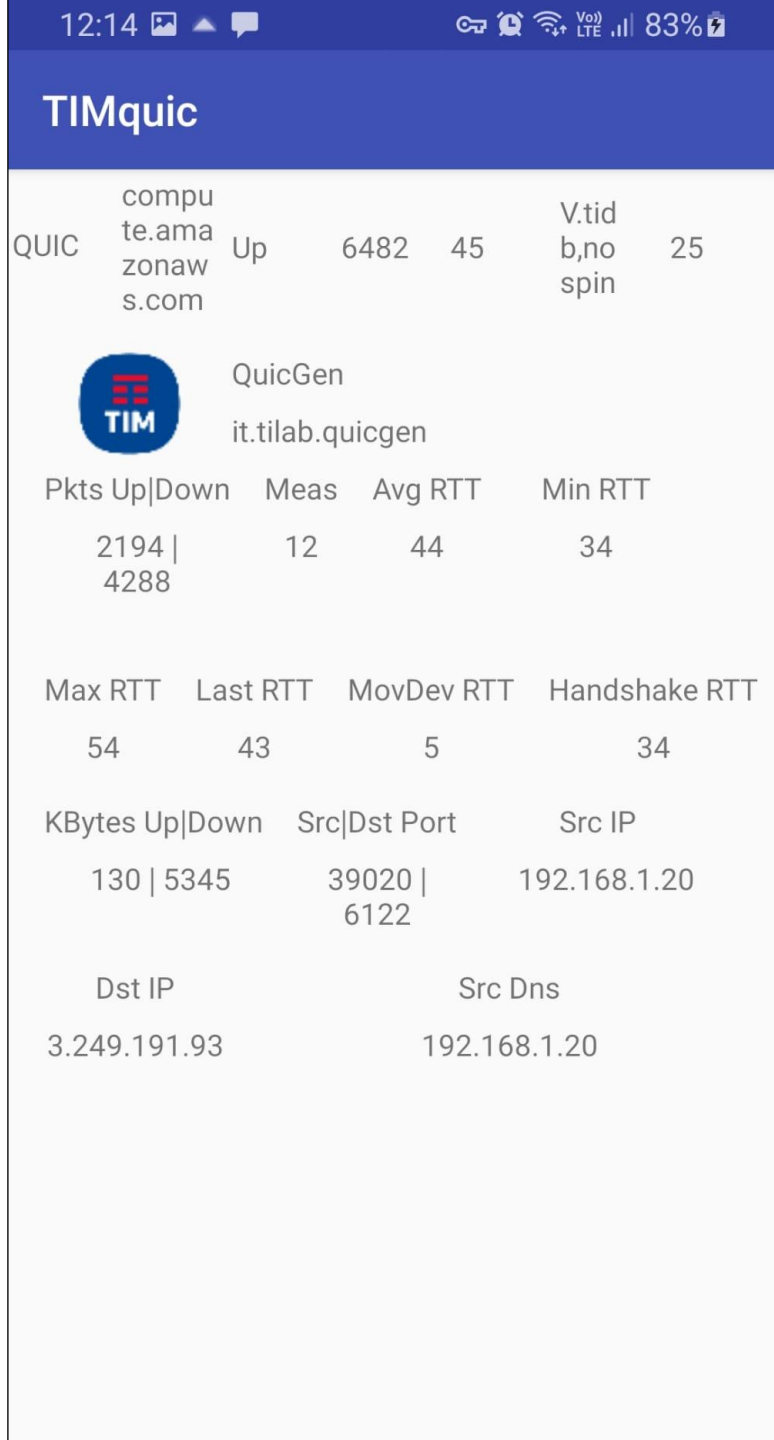
Dst IP	Src Dns
69.171.250.63	192.168.1.20

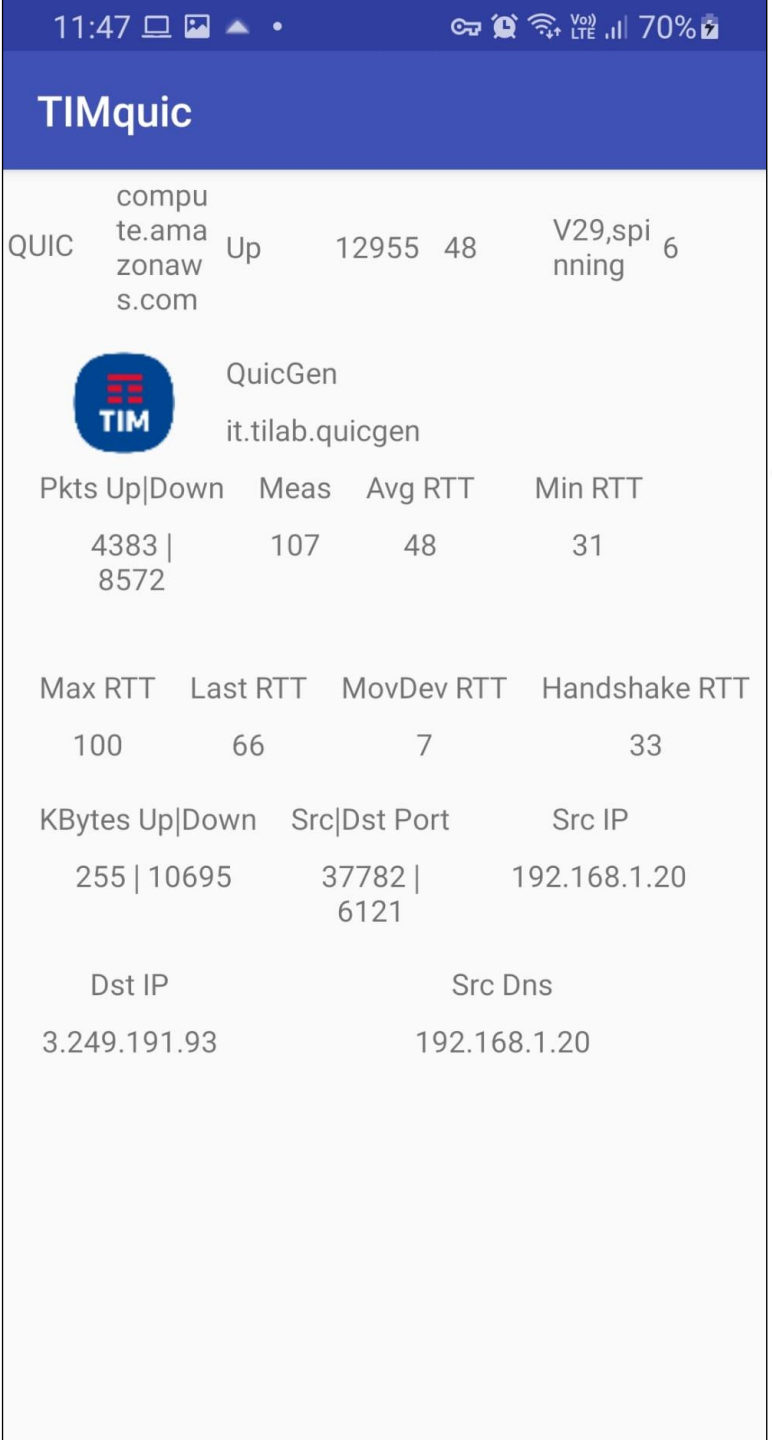


5 MB file download

Spin bit

Delay bit

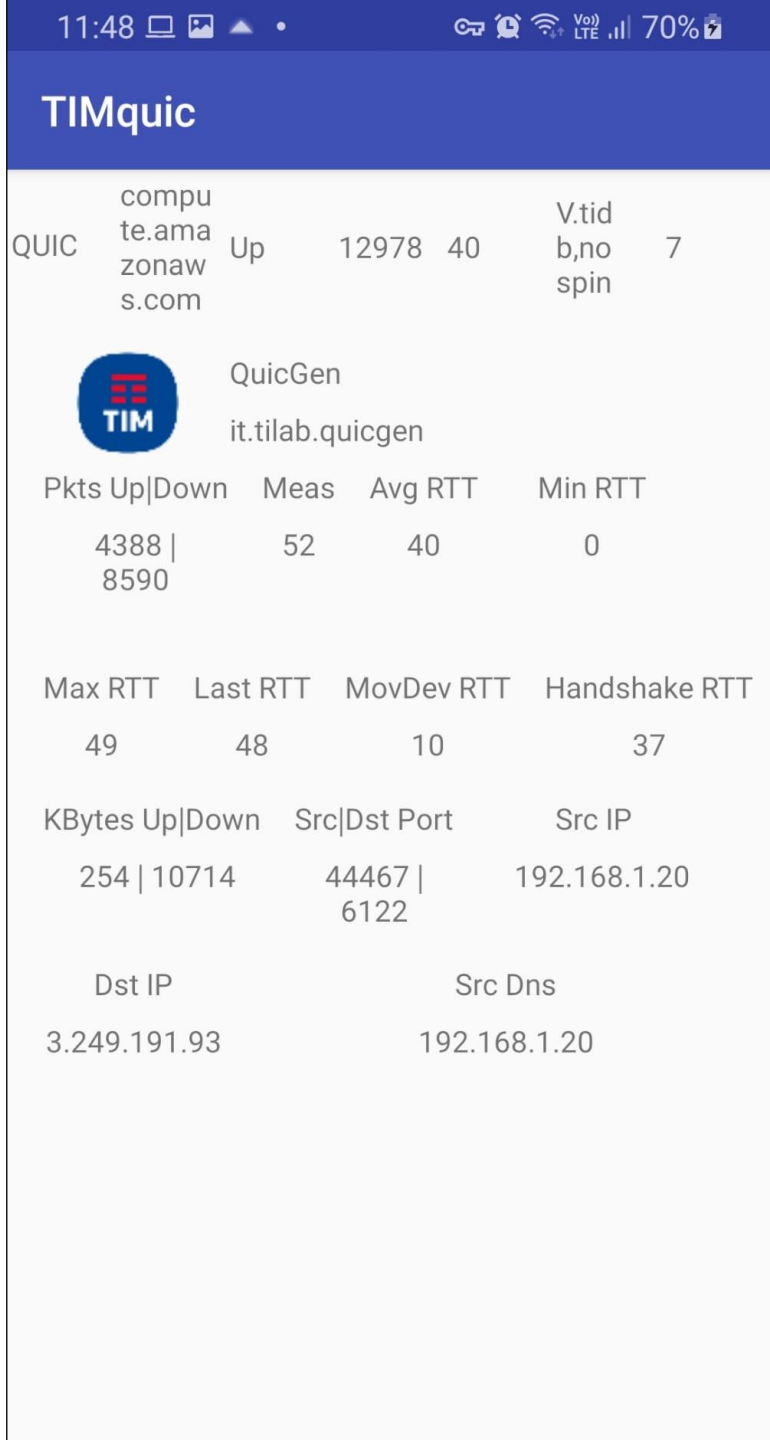


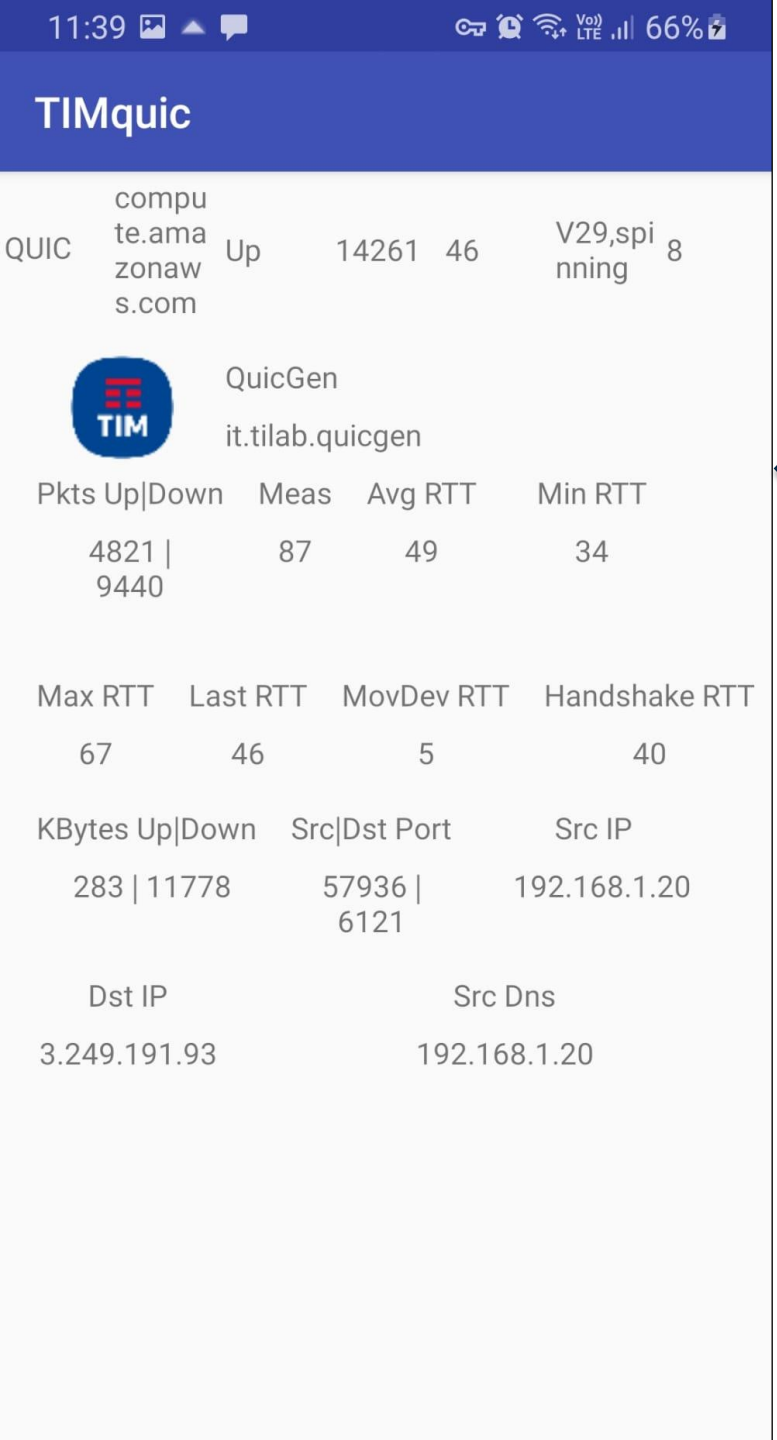


10 MB file download

Spin bit

Delay bit

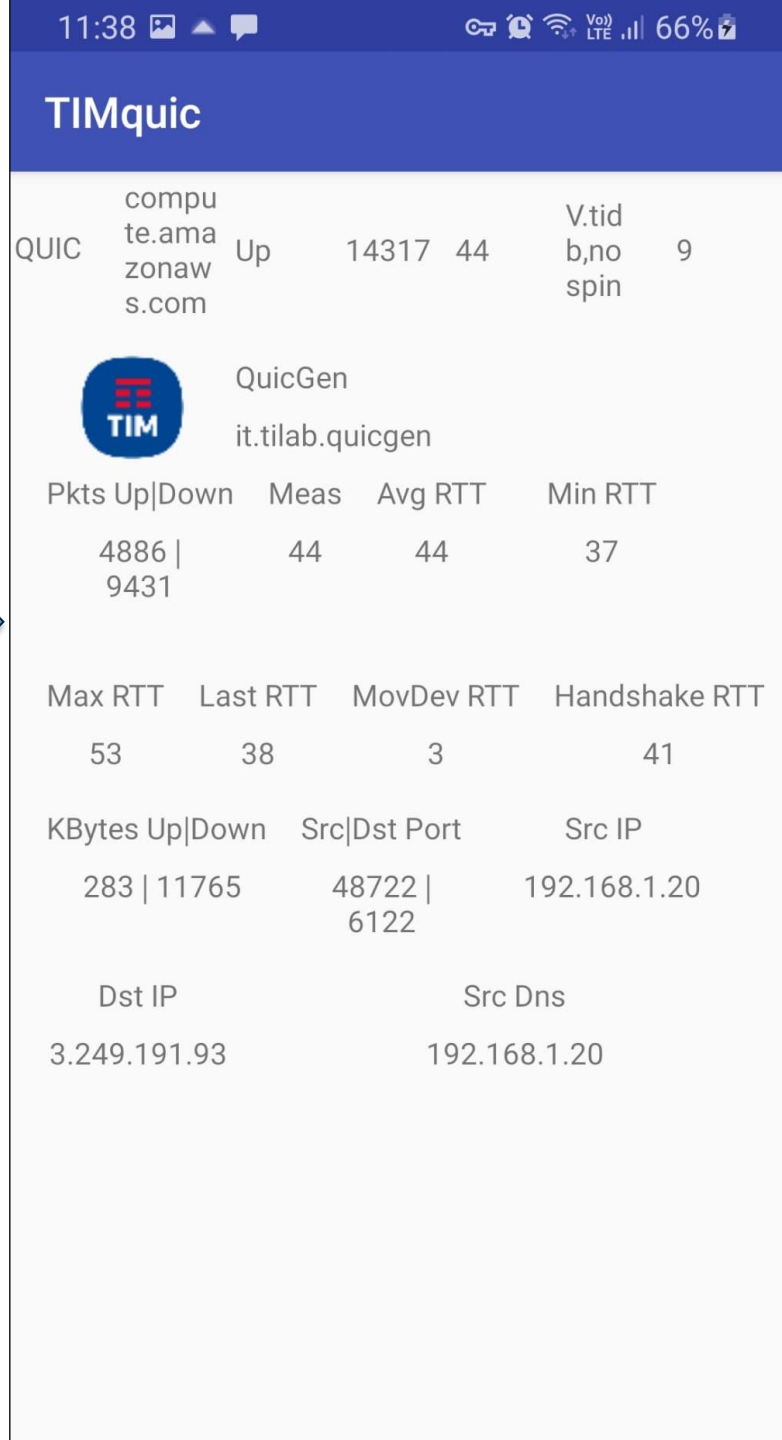


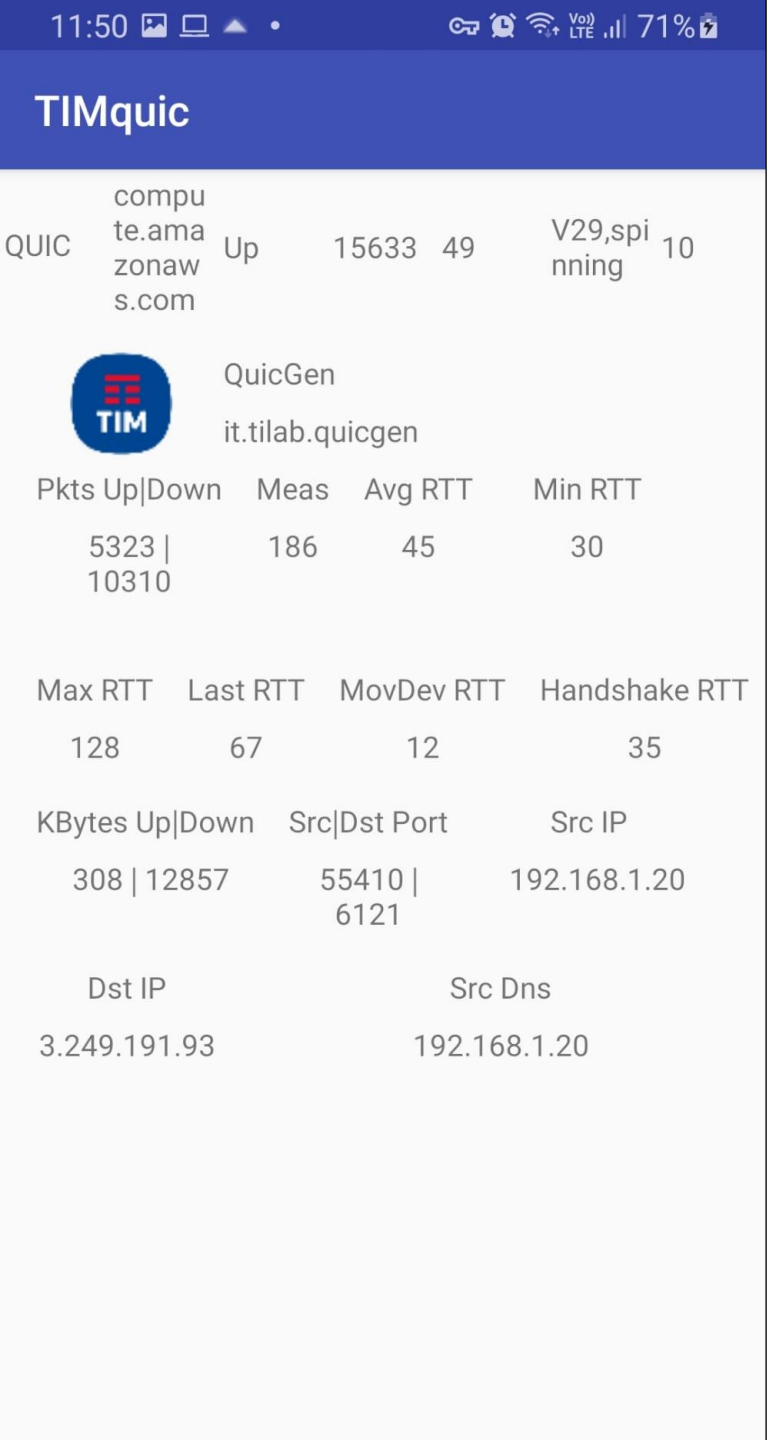


11 MB file download

Spin bit

Delay bit

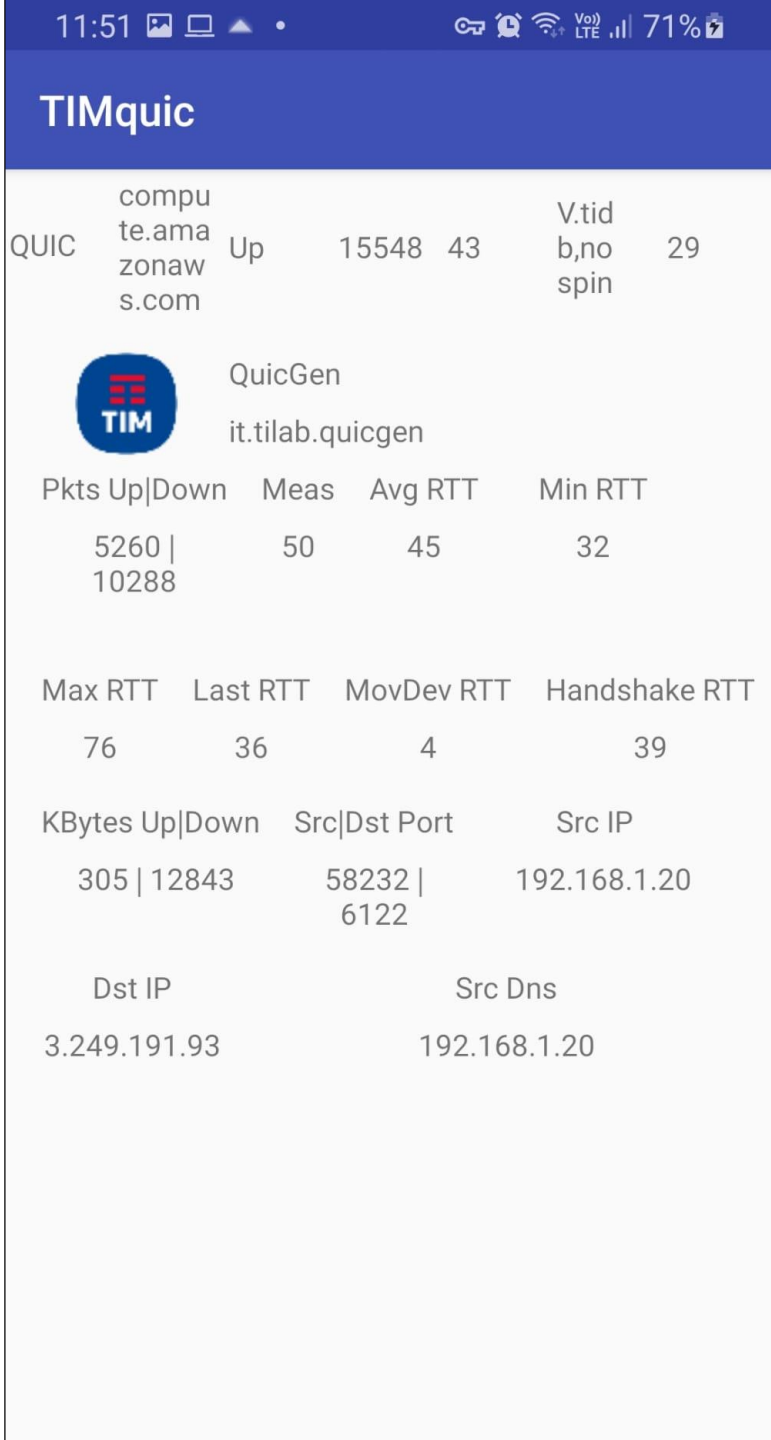


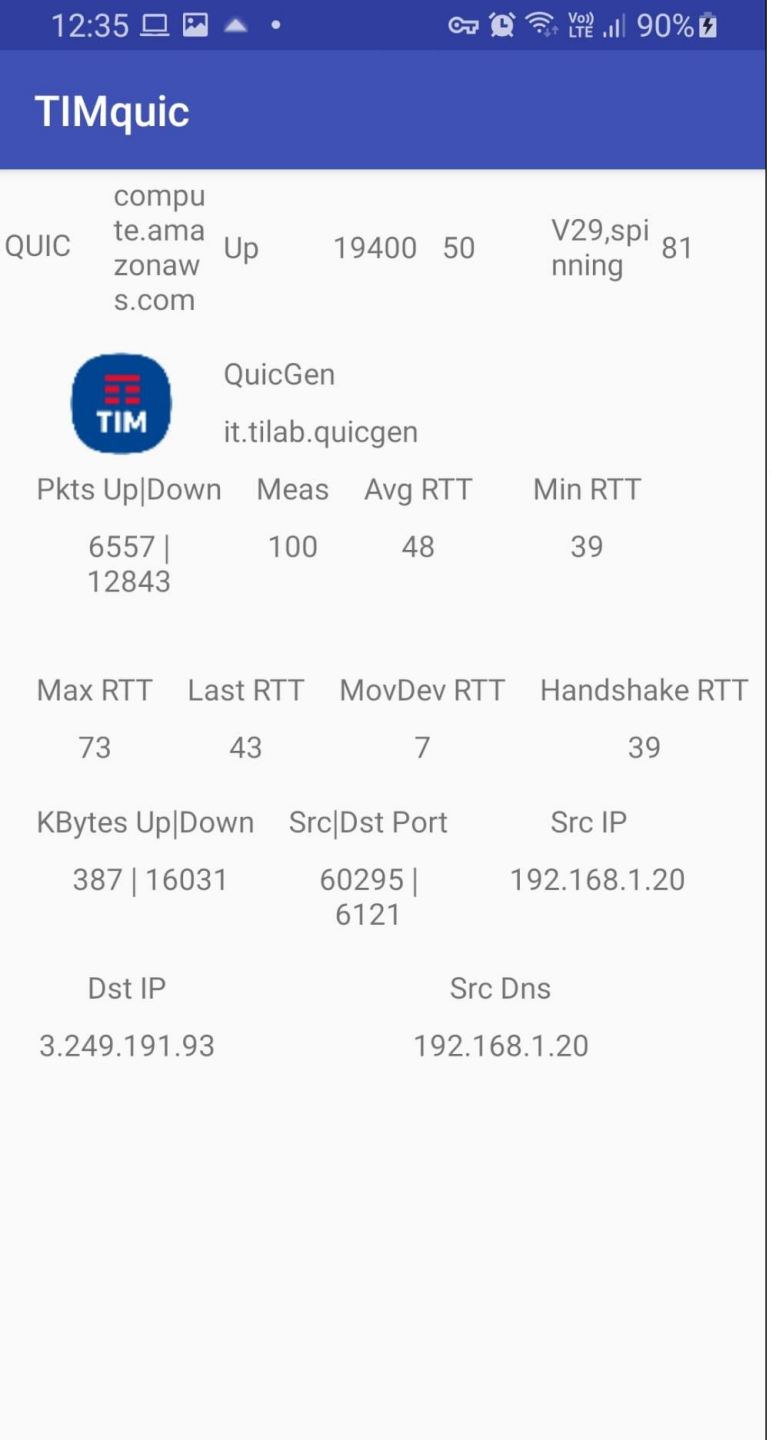


12 MB file download

Spin bit

Delay bit

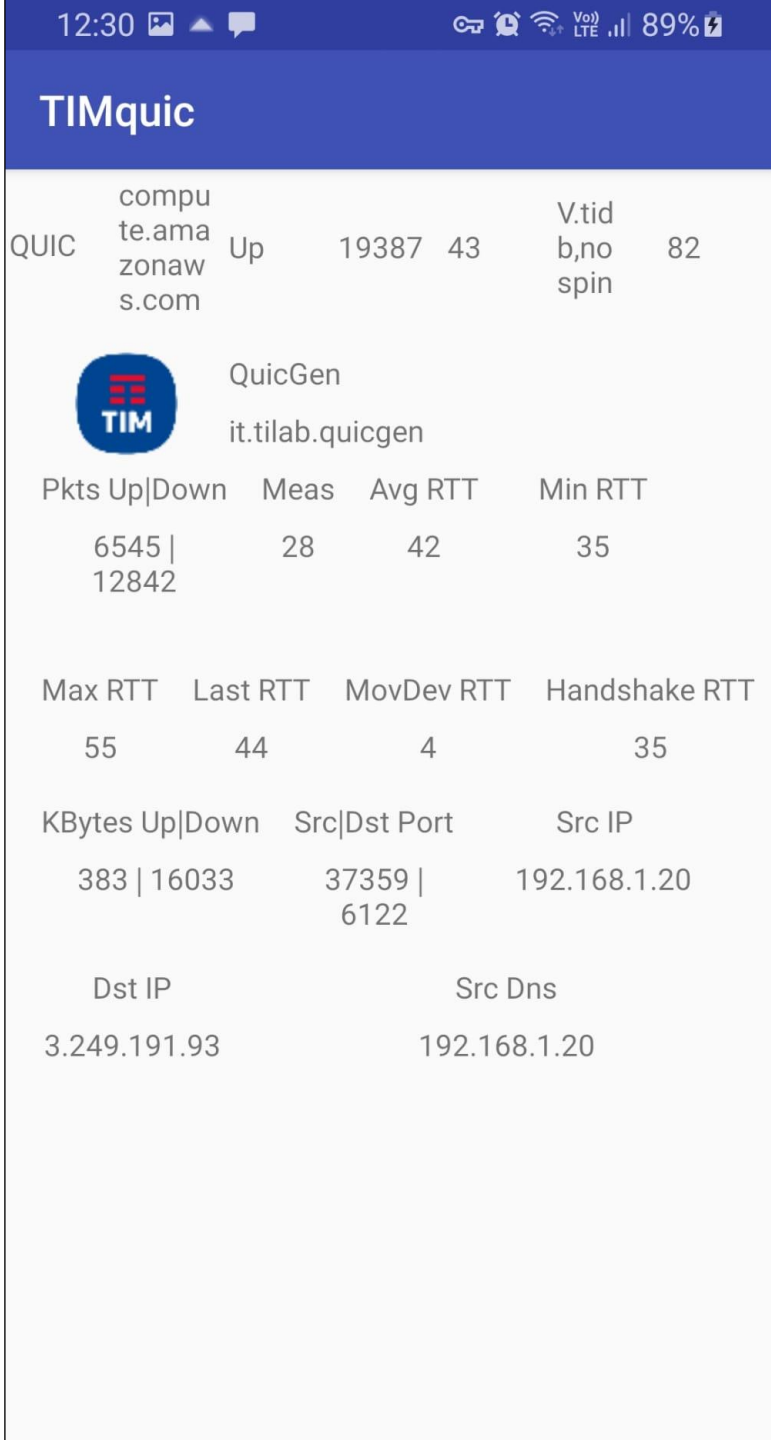


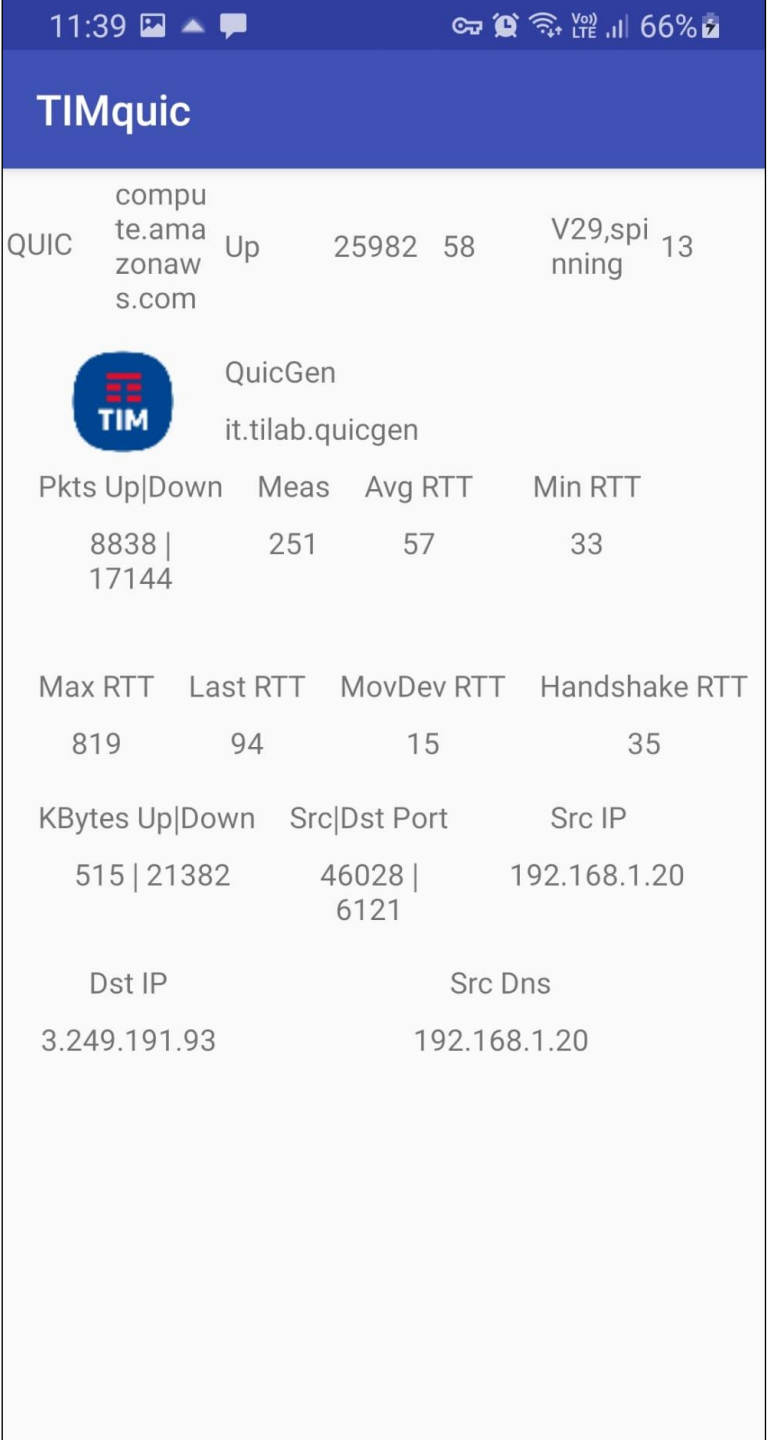


15 MB file download

Spin bit

Delay bit

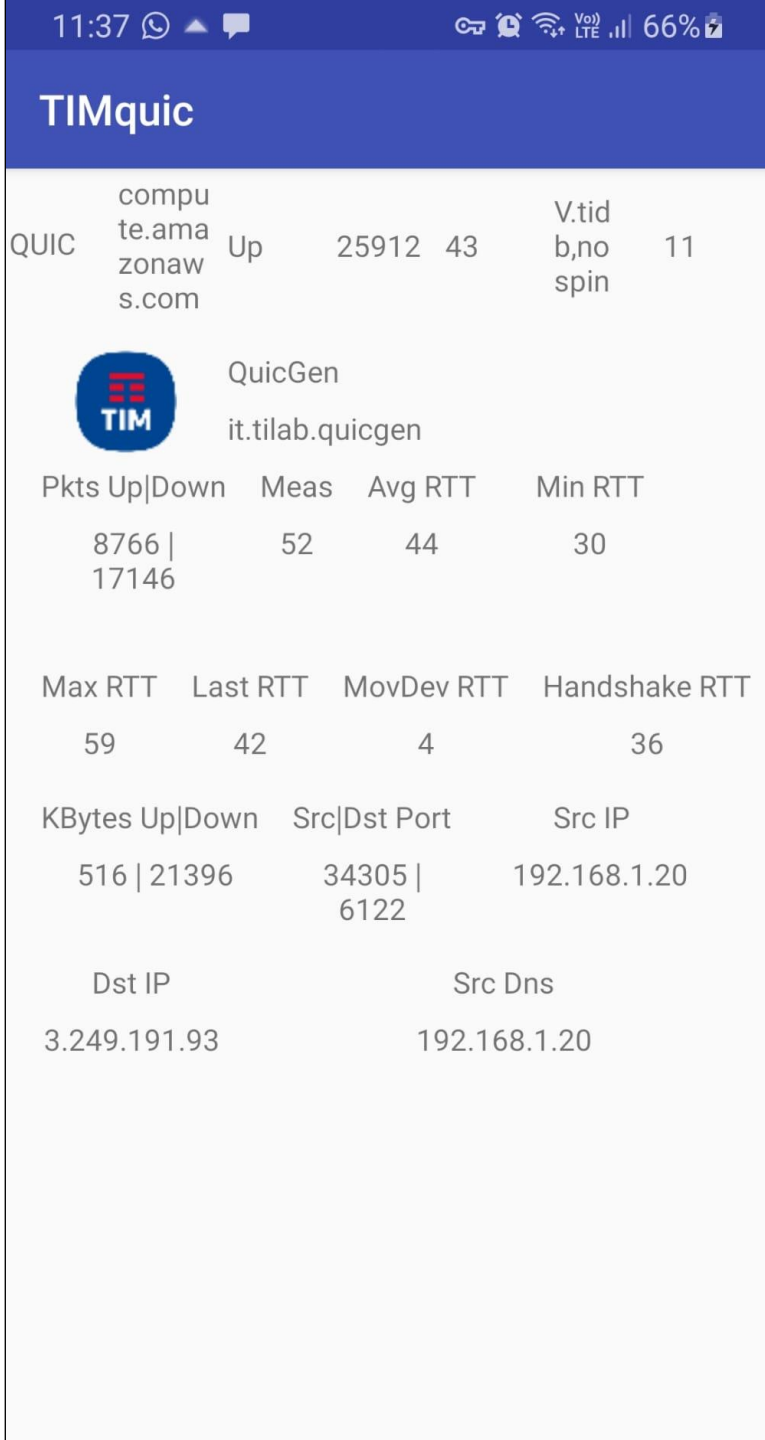


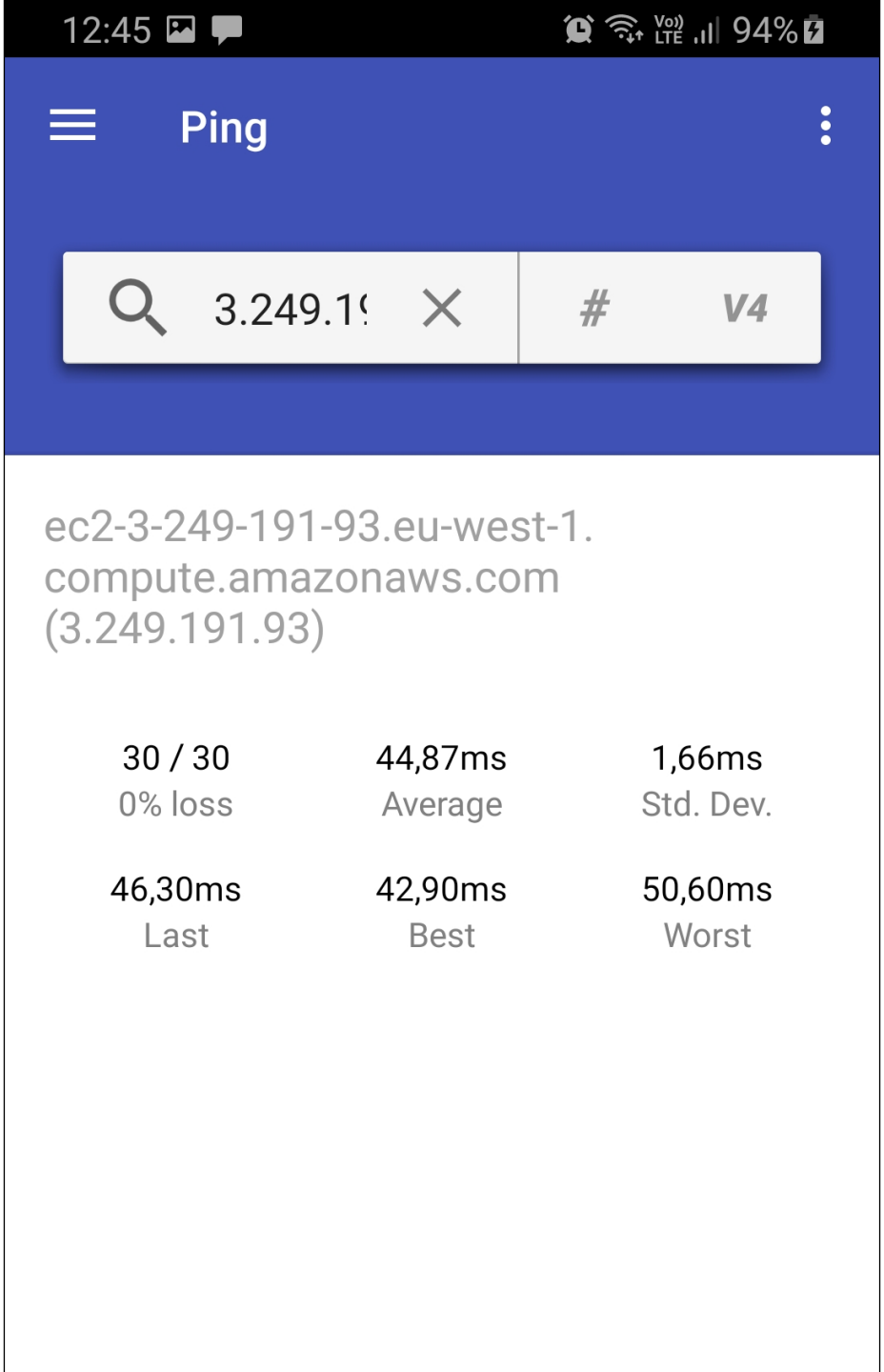


20 MB file download

Spin bit

Delay bit




12:45
94%
Ping
3.249.19
#
V4
ec2-3-249-191-93.eu-west-1.
compute.amazonaws.com
(3.249.191.93)
30 / 30
0% loss
44,87ms
Average
1,66ms
Std. Dev.
46,30ms
Last
42,90ms
Best
50,60ms
Worst

Some tests using Spindump on Linux

fabio@fabio-XPS15: ~

```
SPINDUMP

45 connections 3.4M packets 3.6G bytes (showing latest RTTs, not showing UDP, showing addresses)

TYPE    ADDRESSES                                SESSION                                          STATE   PAKS   LEFT RTT  RIGHT RTT  NOTE

QUIC    10.1.1.28 <-> 3.122.249.200              null-0490b02a (35391:6122)                         Up 252.3K     70 us    11,7 ms  V.tidb,no spin
QUIC    10.1.1.28 <-> 3.122.249.200              null-048c9625 (54314:6121)                         Up 207.2K     33 us    13,8 ms  V29,spinning
QUIC    10.1.1.28 <-> 3.122.249.200              null-048af940 (46842:6122)                         Up 201.7K    316 us    11,8 ms  V.tidb,no spin
QUIC    10.1.1.28 <-> 3.122.249.200              null-0493e2c4 (34860:6122)                         Up 147.6K    464 us    12,8 ms  V.tidb,no spin
QUIC    10.1.1.28 <-> 3.122.249.200              null-0454b357 (46129:6122)                         Up 131.2K     27 us    13,2 ms  V.tidb,no spin
QUIC    10.1.1.28 <-> 3.122.249.200              null-04cf830e (59153:6122)                         Up 102.2K     68 us    12,7 ms  V.tidb,no spin
QUIC    10.1.1.28 <-> 3.122.249.200              null-04b953ac (50933:6122)                         Up 100.3K     77 us    12,0 ms  V.tidb,no spin
QUIC    10.1.1.28 <-> 3.122.249.200              null-046282ac (34186:6121)                         Up 100.0K    174 us    16,8 ms  V29,spinning
QUIC    10.1.1.28 <-> 3.122.249.200              null-047a09e3 (34949:6121)                         Up  99.5K     36 us    11,7 ms  V29,spinning
QUIC    10.1.1.28 <-> 3.122.249.200              null-041eb103 (57732:6121)                         Up  96.2K    110 us    13,0 ms  V29,spinning
QUIC    10.1.1.28 <-> 64.233.184.189             null-null (54331:443)                        Starting    576       n/a        n/a  V.0xffffffff,no spin
TCP     10.1.1.28 <-> 156.54.49.52               36984:443                                          Up     77     14 us    15,4 ms
TCP     10.1.1.28 <-> 52.114.104.169             53478:443                                          Up     52     22 us    18,8 ms
TCP     10.1.1.28 <-> 52.114.92.67               49849:443                                          Up     48     54 us    31,2 ms
TCP     10.1.1.28 <-> 140.82.114.25              54906:443                                          Up     29    180 us    96,4 ms
TCP     10.1.1.28 <-> 52.114.92.151              40062:443                                          Up     28     29 us    30,3 ms
TCP     10.1.1.28 <-> 162.125.19.131             49316:443                                          Up     24     67 us   103,9 ms
QUIC    10.1.1.28 <-> 216.58.206.67              null-0875db4f2211c917 (41769:443)                  Up     18       n/a    21,8 ms  V29,no spin
TCP     10.1.1.28 <-> 52.114.132.12              37462:443                                          Up     18     45 us   103,4 ms
QUIC    10.1.1.28 <-> 216.58.206.67              null-082ed9aa8bc15189 (42863:443)                  Up     16       n/a    21,6 ms  V29,no spin
```

Above, Spindump tracking connections carrying spinbit (V29,spinning) and delaybit (V.tidb).
Below, Spindump tracking a connection carrying QR loss bits; ''tot'' is the cumulative Qloss (Rloss) of specified direction.

fabio@fabio-XPS15: ~

```
fabio@fabio-XPS15:~$ sudo spindump --textual --report-qr-loss --interface wlp59s0 | grep qrloss
QUIC 192.168.1.11 <-> 3.122.249.200 null-04025c8f (53000:6123) at 1617109825591304 qrloss up avg (ref) 1.562 (0.000), tot (ref) 1.562 (0.000) (responder) packets 26 76 bytes
 5236 90851 bandwidth 5236 90851 note "V.tiqr,spinning"
QUIC 192.168.1.11 <-> 3.122.249.200 null-04025c8f (53000:6123) at 1617109825705264 qrloss up avg (ref) 1.562 (0.000), tot (ref) 0.337 (0.000) (responder) packets 309 3266 by
tes 23488 4392220 bandwidth 23488 4392220 note "V.tiqr,spinning"
QUIC 192.168.1.11 <-> 3.122.249.200 null-04025c8f (53000:6123) at 1617109825705264 qrloss up avg (ref) 1.562 (1.406), tot (ref) 0.337 (0.361) (responder) packets 309 3266 by
tes 23488 4392220 bandwidth 23488 4392220 note "V.tiqr,spinning"
QUIC 192.168.1.11 <-> 3.122.249.200 null-04025c8f (53000:6123) at 1617109825705426 qrloss up avg (ref) 1.562 (7.031), tot (ref) 0.337 (1.758) (responder) packets 314 3294 by
tes 23805 4430860 bandwidth 23805 4430860 note "V.tiqr,spinning"
QUIC 192.168.1.11 <-> 3.122.249.200 null-04025c8f (53000:6123) at 1617109825705426 qrloss up avg (ref) 7.031 (7.031), tot (ref) 1.382 (1.758) (responder) packets 314 3295 by
tes 23805 4432240 bandwidth 23805 4432240 note "V.tiqr,spinning"
QUIC 192.168.1.11 <-> 3.122.249.200 null-04025c8f (53000:6123) at 1617109825706550 qrloss up avg (ref) 7.031 (8.750), tot (ref) 1.382 (2.134) (responder) packets 331 3347 by
tes 25293 4504000 bandwidth 25293 4504000 note "V.tiqr,spinning"
QUIC 192.168.1.11 <-> 3.122.249.200 null-04025c8f (53000:6123) at 1617109825706551 qrloss up avg (ref) 8.750 (8.750), tot (ref) 1.680 (2.134) (responder) packets 331 3348 by
tes 25293 4505380 bandwidth 25293 4505380 note "V.tiqr,spinning"
QUIC 192.168.1.11 <-> 3.122.249.200 null-04025c8f (53000:6123) at 1617109825716688 qrloss up avg (ref) 0.000 (1.562), tot (ref) 0.000 (1.562) (initiator) packets 351 3853 by
tes 28586 5202280 bandwidth 28586 5202280 note "V.tiqr,spinning"
```