

Pantheon Report

Generated at 2018-03-12 22:03:47 (UTC).

Data path: AWS Brazil 2 Ethernet (*local*) → Colombia ppp0 (*remote*).

Repeated the test of 17 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

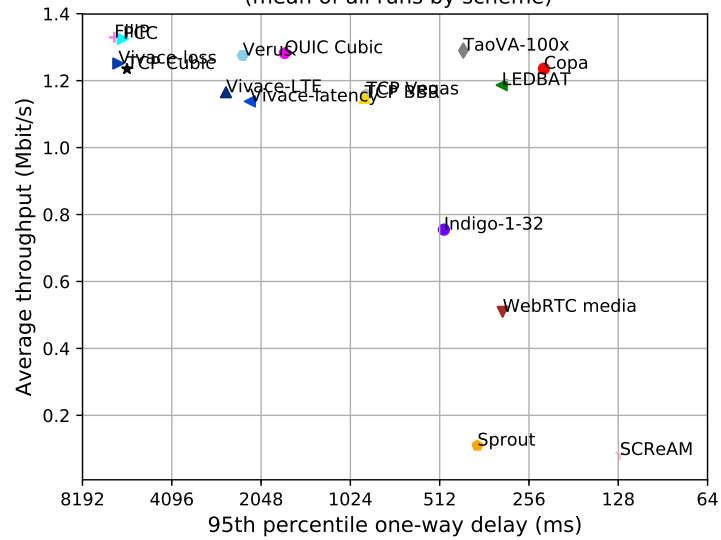
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

NTP offsets were measured against **gps.ntp.br** and have been applied to correct the timestamps in logs.

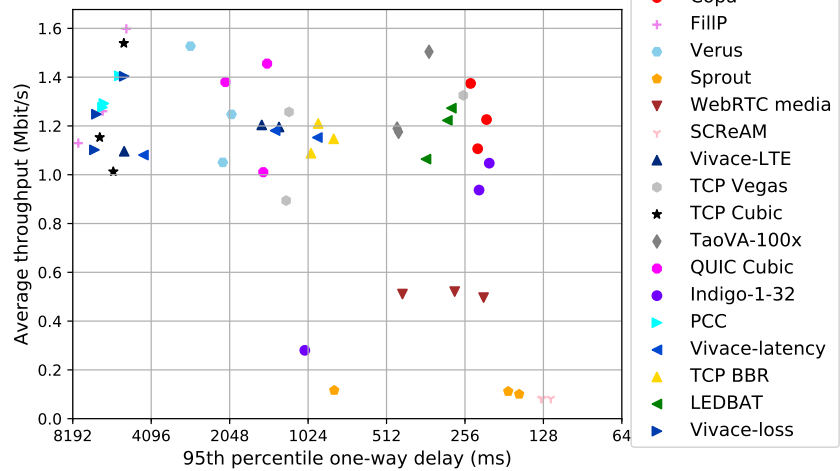
Git summary:

```
branch: master @ f12c42a2c63fdd9a862eefa0468859bf379b6623
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ 828bbf95fd4941149b5cec90f281d1c69ae1a5c6
third_party/genericCC @ 9249eea3238475c4d8cca1443d28df70bff6c4a2
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeab30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/vivace @ 7a4ba531e75b4a6f66f5c4580192120401784ce3
third_party/webRTC @ a488197ddd041ace68a42849b2540ad834825f42
```

test from AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme



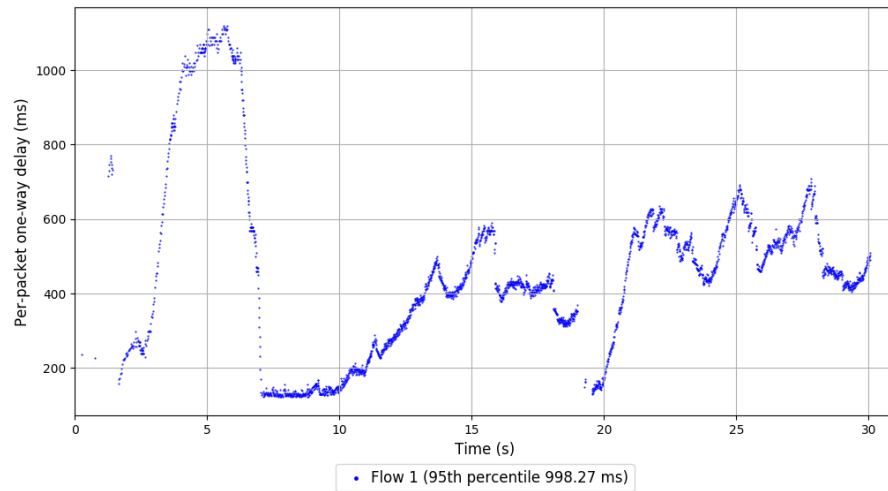
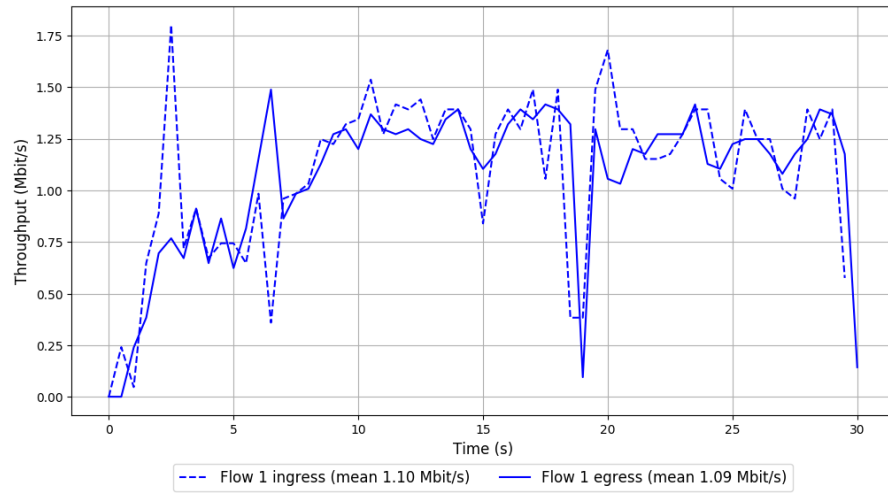
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	1.15	917.28	1.28
TCP Cubic	3	1.23	5798.60	24.00
LEDBAT	3	1.18	316.39	0.39
PCC	3	1.33	5983.39	76.19
QUIC Cubic	3	1.28	1706.14	5.64
SCReAM	3	0.08	126.42	0.09
WebRTC media	3	0.51	314.09	0.34
Sprout	3	0.11	382.05	0.29
TaoVA-100x	3	1.29	426.16	0.77
TCP Vegas	3	1.16	905.01	1.00
Verus	3	1.28	2361.71	4.62
Copa	3	1.24	228.01	0.30
FillP	3	1.33	6398.36	95.99
Indigo-1-32	3	0.76	495.54	0.13
Vivace-latency	3	1.14	2233.86	6.07
Vivace-loss	3	1.25	6203.61	37.41
Vivace-LTE	3	1.17	2689.40	9.76

Run 1: Statistics of TCP BBR

Start at: 2018-03-12 21:16:09
End at: 2018-03-12 21:16:39
Local clock offset: -19.073 ms
Remote clock offset: -1.272 ms

Below is generated by plot.py at 2018-03-12 22:03:09
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 998.274 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 998.274 ms
Loss rate: 0.62%

Run 1: Report of TCP BBR — Data Link

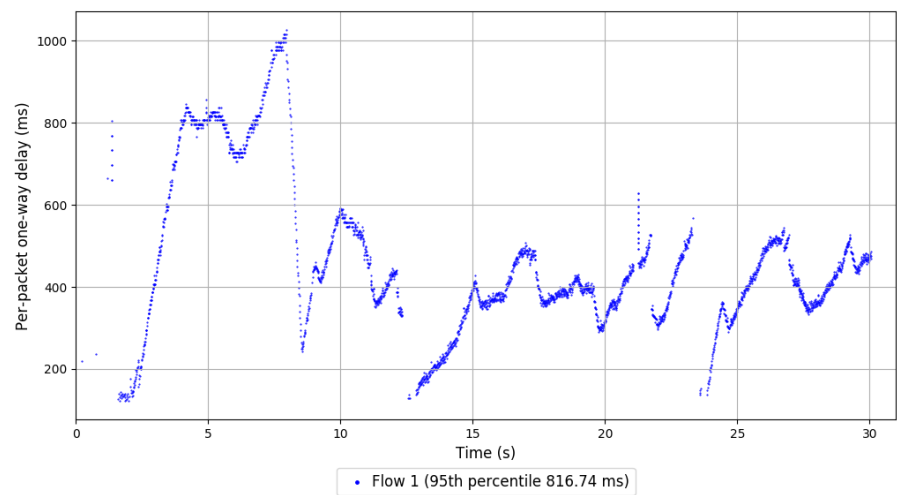
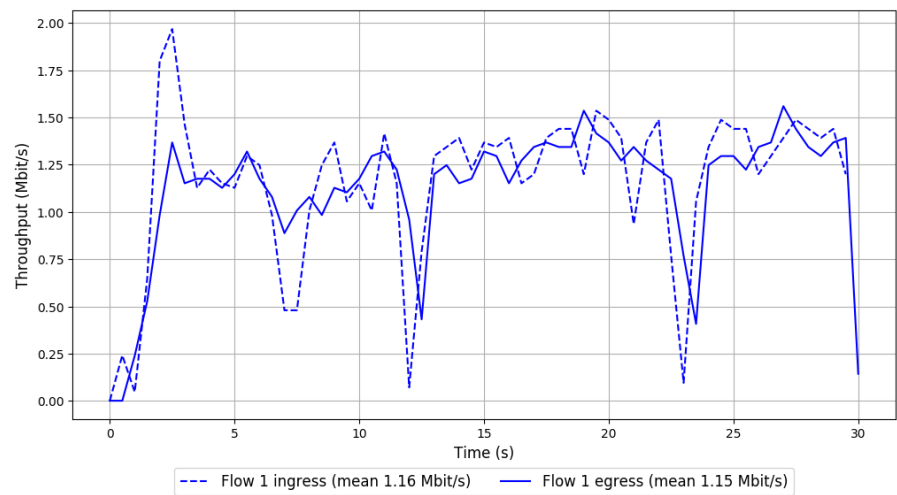


Run 2: Statistics of TCP BBR

Start at: 2018-03-12 21:37:16
End at: 2018-03-12 21:37:46
Local clock offset: -20.897 ms
Remote clock offset: -1.331 ms

Below is generated by plot.py at 2018-03-12 22:03:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 816.736 ms
Loss rate: 1.42%
-- Flow 1:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 816.736 ms
Loss rate: 1.42%

Run 2: Report of TCP BBR — Data Link

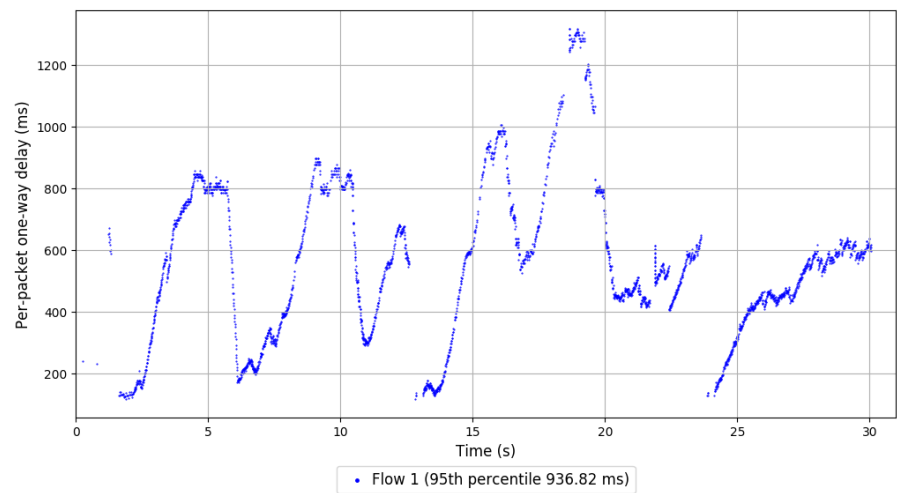
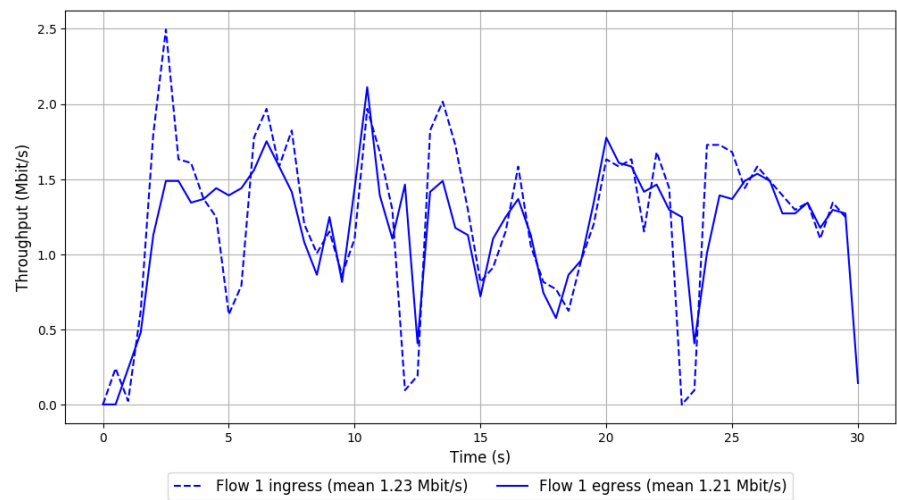


Run 3: Statistics of TCP BBR

Start at: 2018-03-12 21:58:07
End at: 2018-03-12 21:58:37
Local clock offset: -6.188 ms
Remote clock offset: -0.267 ms

Below is generated by plot.py at 2018-03-12 22:03:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 936.819 ms
Loss rate: 1.80%
-- Flow 1:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 936.819 ms
Loss rate: 1.80%

Run 3: Report of TCP BBR — Data Link

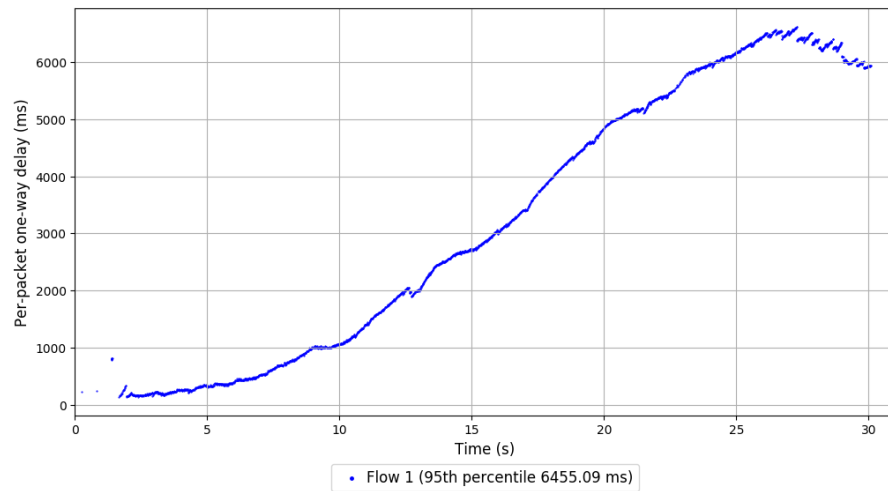
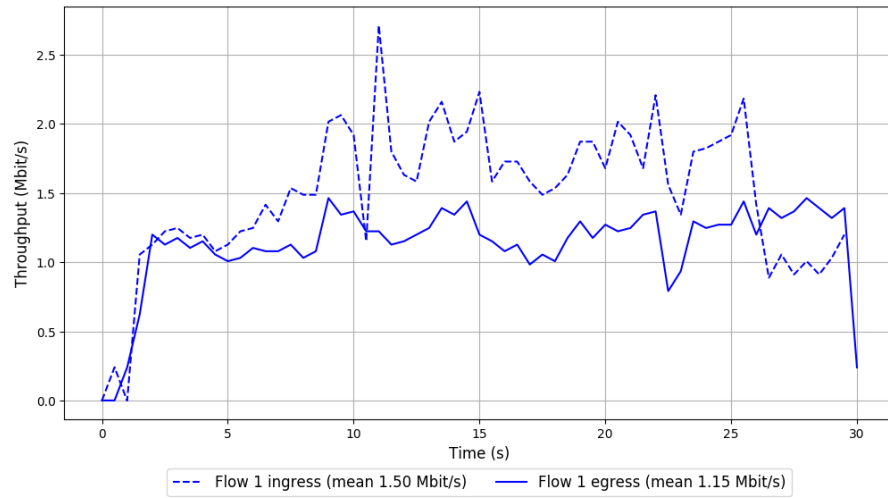


Run 1: Statistics of TCP Cubic

Start at: 2018-03-12 21:12:37
End at: 2018-03-12 21:13:07
Local clock offset: -18.209 ms
Remote clock offset: -1.399 ms

Below is generated by plot.py at 2018-03-12 22:03:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 6455.088 ms
Loss rate: 23.32%
-- Flow 1:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 6455.088 ms
Loss rate: 23.32%

Run 1: Report of TCP Cubic — Data Link

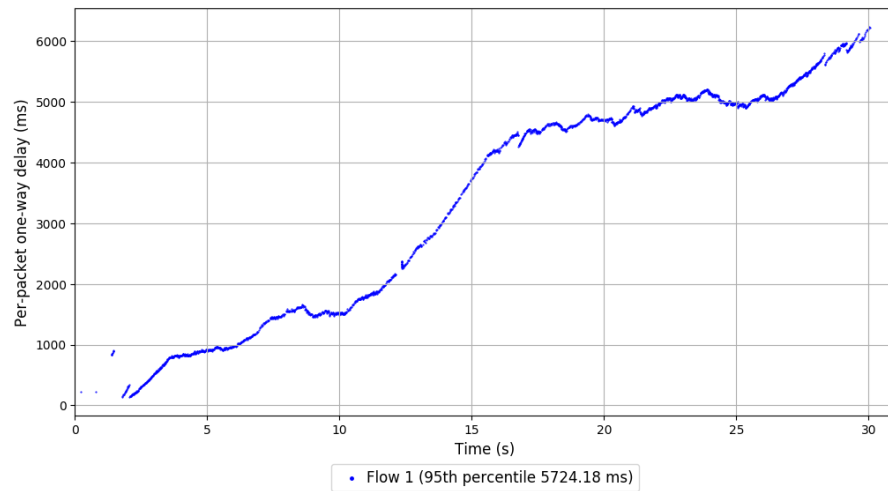
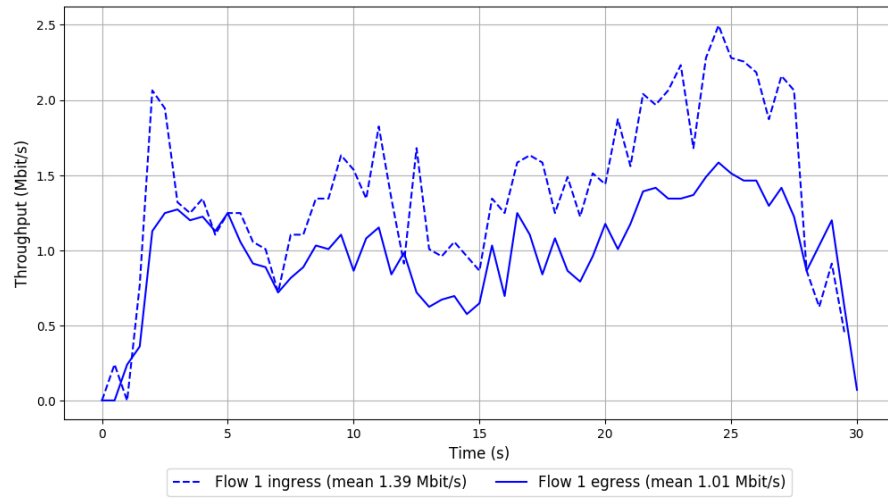


Run 2: Statistics of TCP Cubic

Start at: 2018-03-12 21:33:44
End at: 2018-03-12 21:34:14
Local clock offset: -23.27 ms
Remote clock offset: -6.945 ms

Below is generated by plot.py at 2018-03-12 22:03:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 5724.184 ms
Loss rate: 27.65%
-- Flow 1:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 5724.184 ms
Loss rate: 27.65%

Run 2: Report of TCP Cubic — Data Link

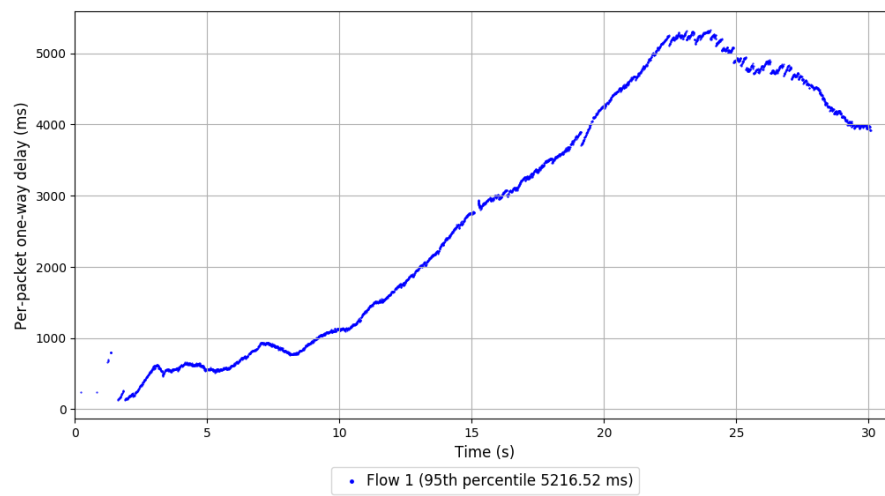
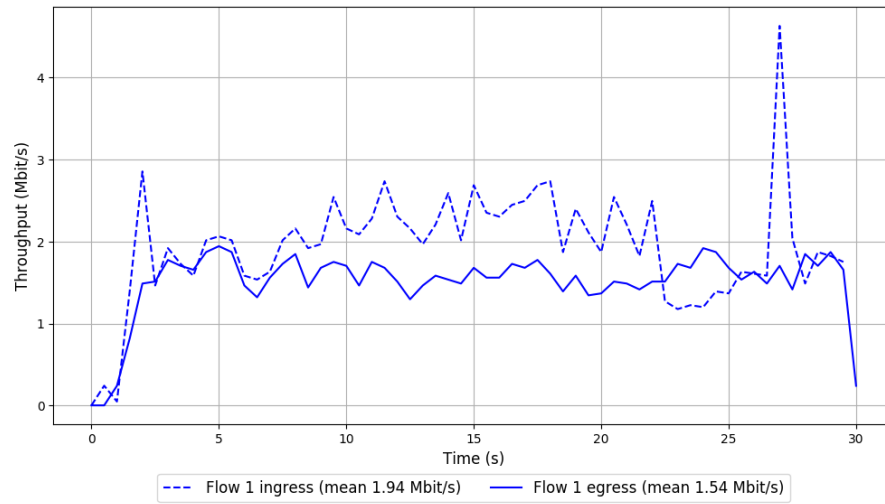


Run 3: Statistics of TCP Cubic

Start at: 2018-03-12 21:54:50
End at: 2018-03-12 21:55:20
Local clock offset: -7.043 ms
Remote clock offset: -2.082 ms

Below is generated by plot.py at 2018-03-12 22:03:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 5216.523 ms
Loss rate: 21.03%
-- Flow 1:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 5216.523 ms
Loss rate: 21.03%

Run 3: Report of TCP Cubic — Data Link

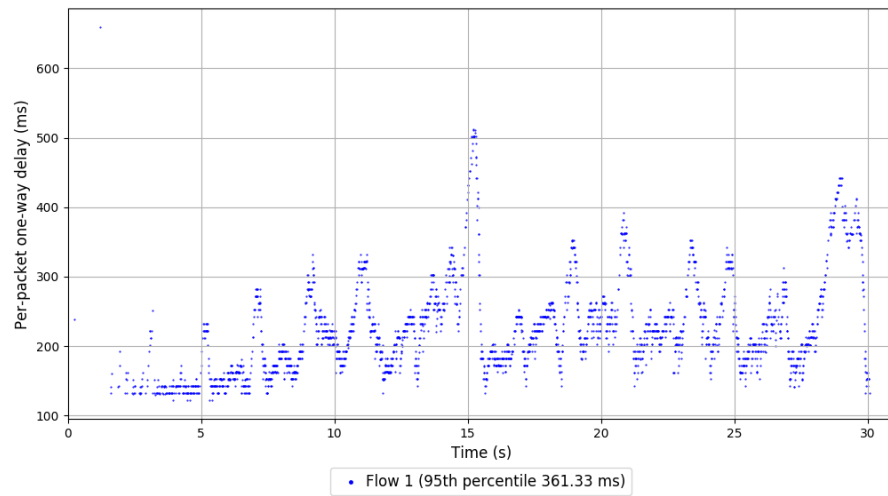
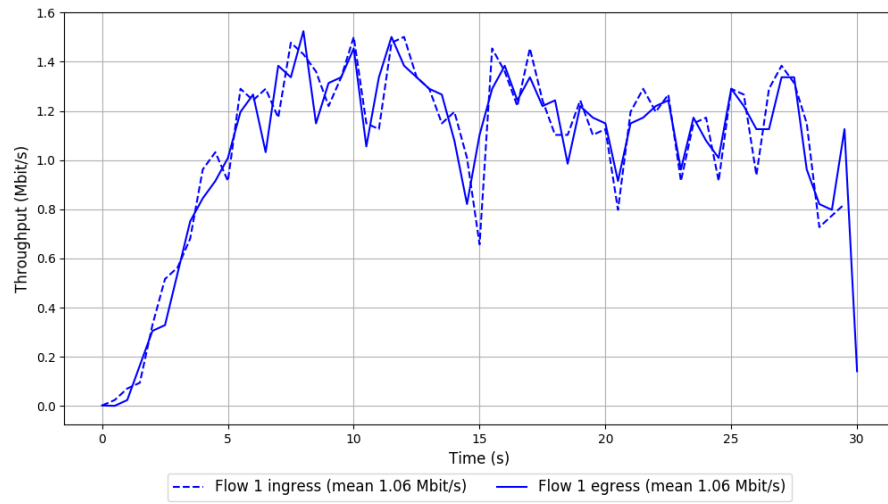


Run 1: Statistics of LEDBAT

Start at: 2018-03-12 21:19:40
End at: 2018-03-12 21:20:10
Local clock offset: -19.89 ms
Remote clock offset: -1.169 ms

Below is generated by plot.py at 2018-03-12 22:03:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 361.333 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 361.333 ms
Loss rate: 0.26%

Run 1: Report of LEDBAT — Data Link

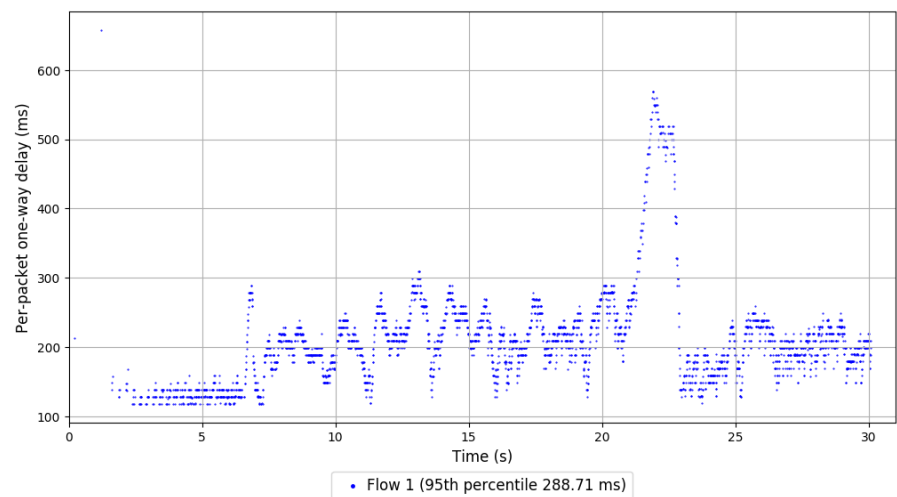
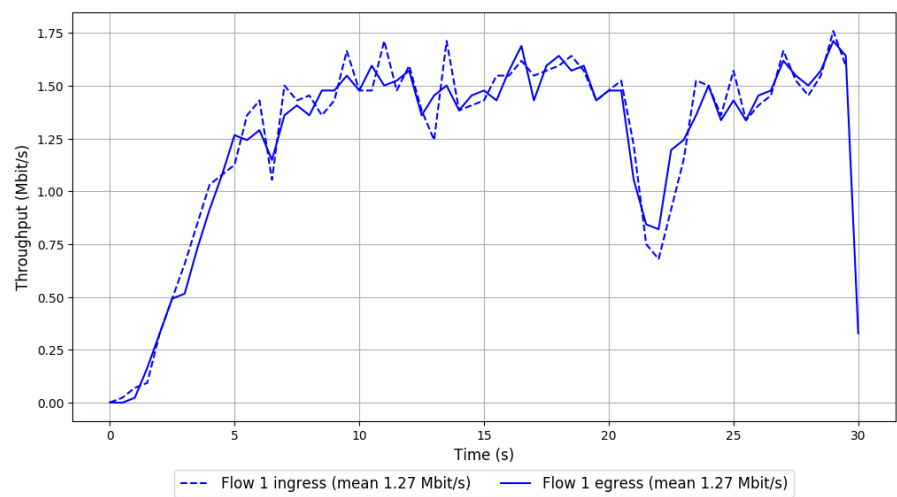


Run 2: Statistics of LEDBAT

Start at: 2018-03-12 21:40:47
End at: 2018-03-12 21:41:17
Local clock offset: -15.728 ms
Remote clock offset: -6.099 ms

Below is generated by plot.py at 2018-03-12 22:03:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 288.710 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 288.710 ms
Loss rate: 0.28%

Run 2: Report of LEDBAT — Data Link

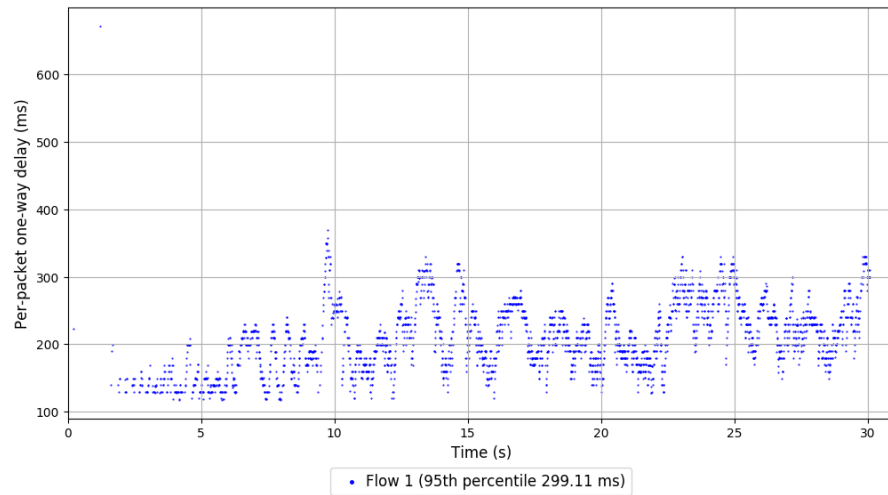
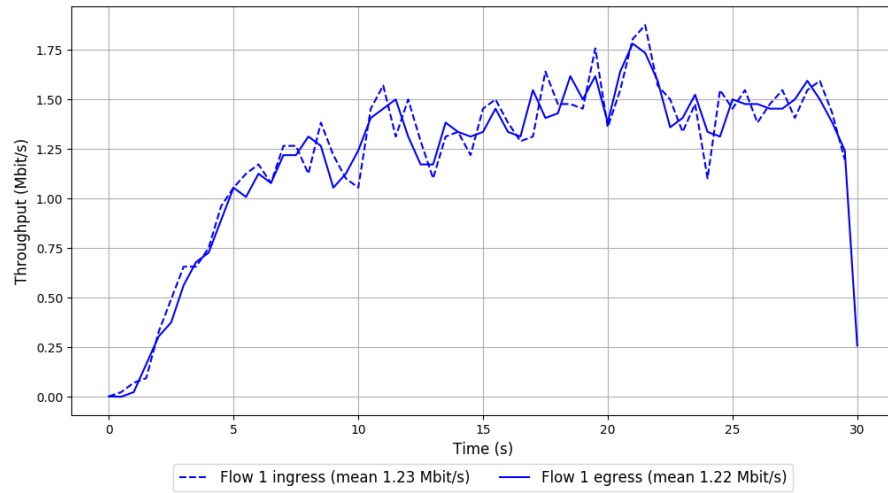


Run 3: Statistics of LEDBAT

Start at: 2018-03-12 22:01:38
End at: 2018-03-12 22:02:08
Local clock offset: -5.506 ms
Remote clock offset: -6.117 ms

Below is generated by plot.py at 2018-03-12 22:03:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 299.114 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 299.114 ms
Loss rate: 0.64%

Run 3: Report of LEDBAT — Data Link

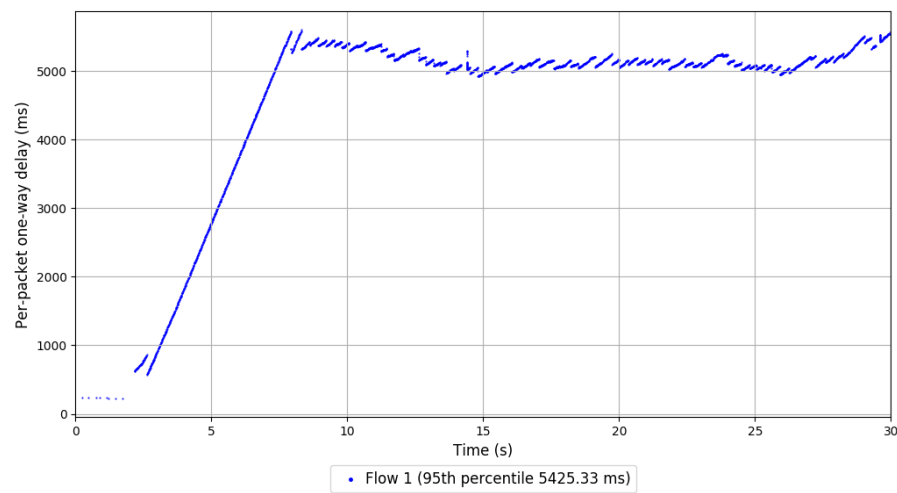
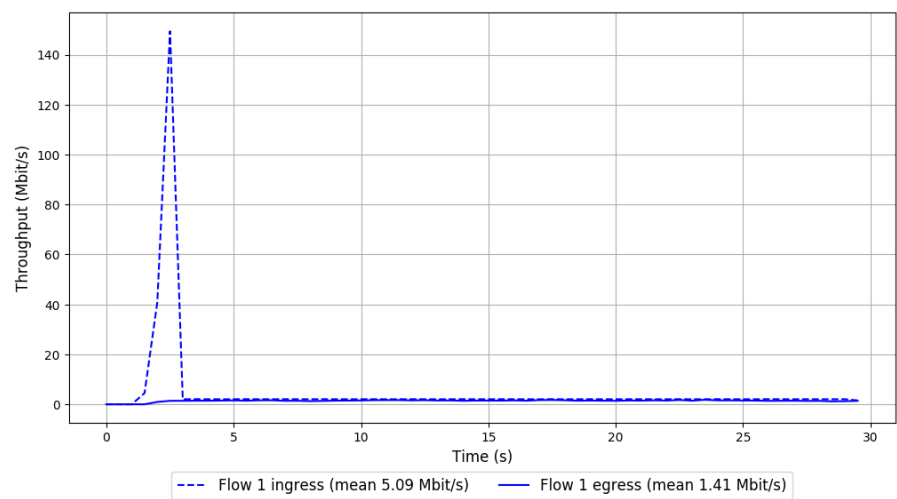


Run 1: Statistics of PCC

Start at: 2018-03-12 21:02:05
End at: 2018-03-12 21:02:35
Local clock offset: -15.747 ms
Remote clock offset: -7.053 ms

Below is generated by plot.py at 2018-03-12 22:03:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 5425.334 ms
Loss rate: 72.51%
-- Flow 1:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 5425.334 ms
Loss rate: 72.51%

Run 1: Report of PCC — Data Link

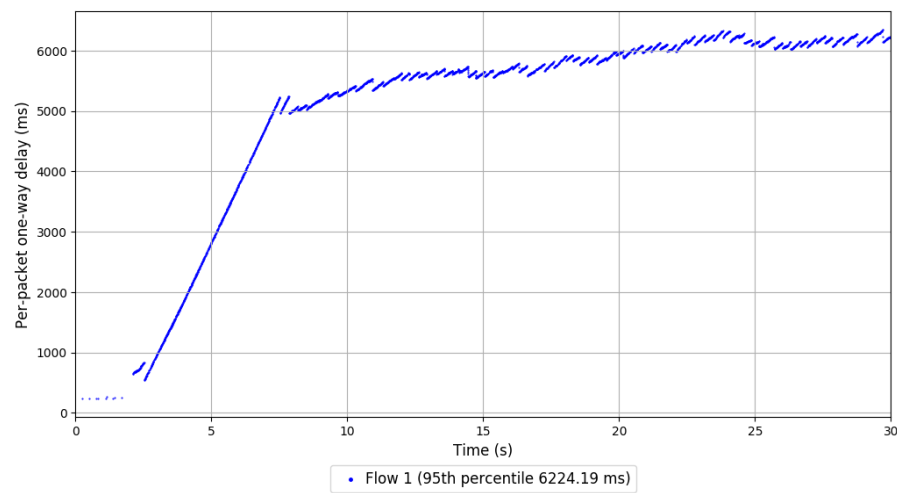
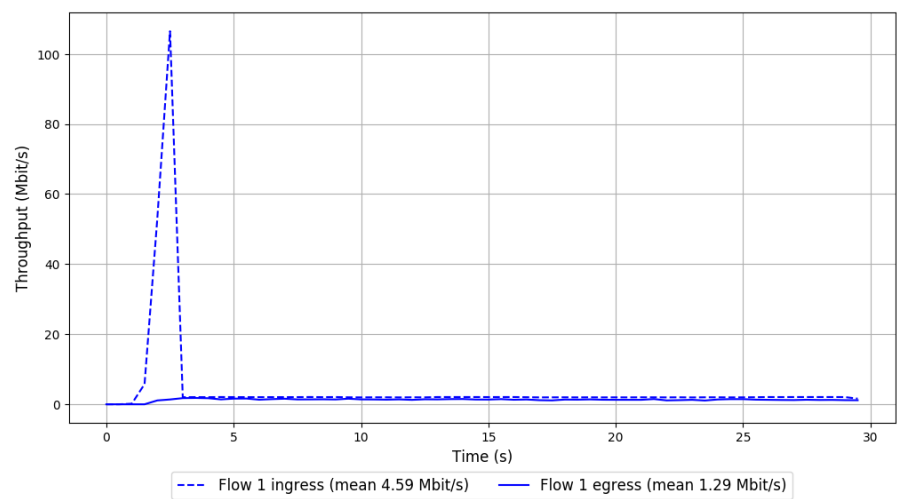


Run 2: Statistics of PCC

Start at: 2018-03-12 21:23:11
End at: 2018-03-12 21:23:41
Local clock offset: -20.722 ms
Remote clock offset: -6.041 ms

Below is generated by plot.py at 2018-03-12 22:03:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 6224.189 ms
Loss rate: 72.02%
-- Flow 1:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 6224.189 ms
Loss rate: 72.02%

Run 2: Report of PCC — Data Link

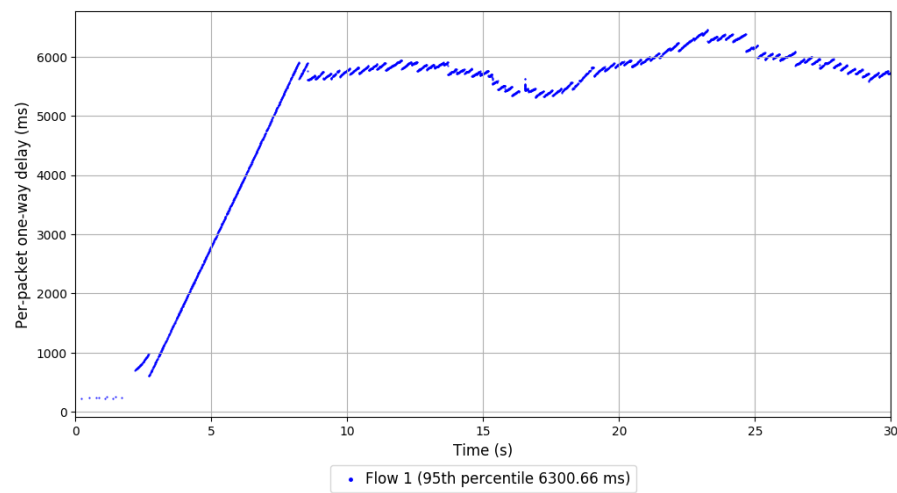
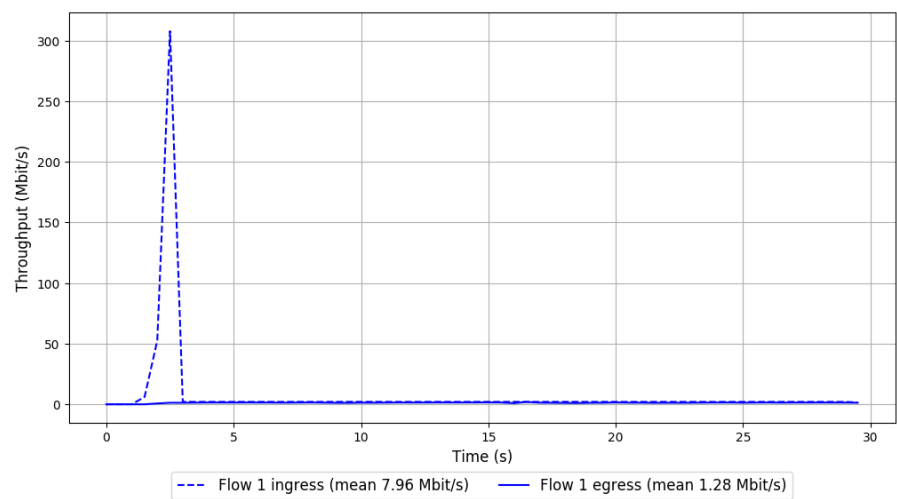


Run 3: Statistics of PCC

Start at: 2018-03-12 21:44:18
End at: 2018-03-12 21:44:48
Local clock offset: -12.465 ms
Remote clock offset: -0.346 ms

Below is generated by plot.py at 2018-03-12 22:03:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 6300.660 ms
Loss rate: 84.05%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 6300.660 ms
Loss rate: 84.05%

Run 3: Report of PCC — Data Link

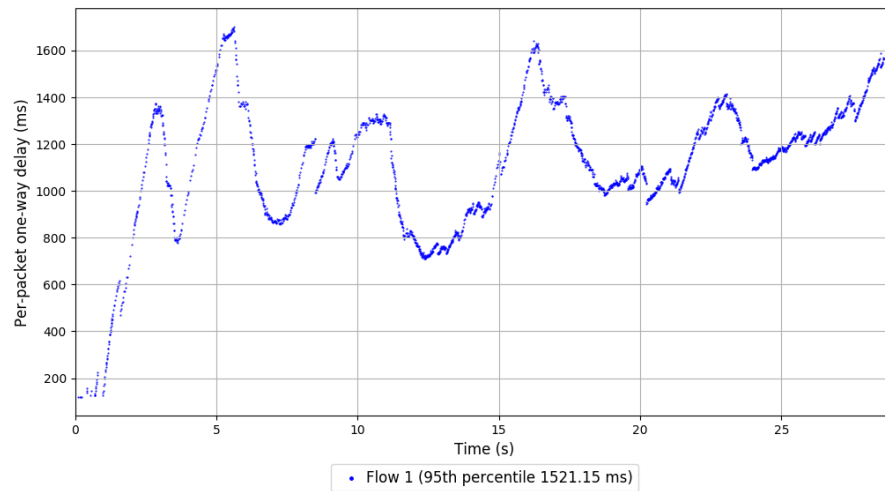
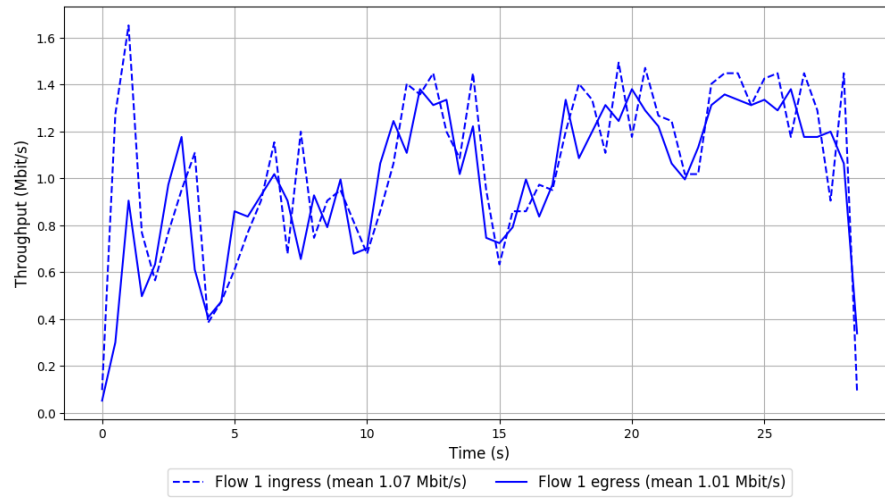


Run 1: Statistics of QUIC Cubic

Start at: 2018-03-12 21:17:20
End at: 2018-03-12 21:17:50
Local clock offset: -19.284 ms
Remote clock offset: -1.111 ms

Below is generated by plot.py at 2018-03-12 22:03:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 1521.147 ms
Loss rate: 5.74%
-- Flow 1:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 1521.147 ms
Loss rate: 5.74%

Run 1: Report of QUIC Cubic — Data Link

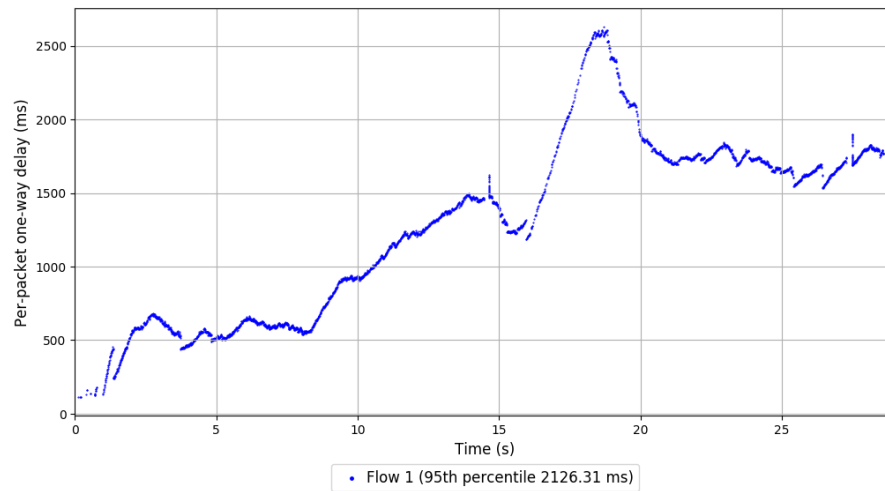
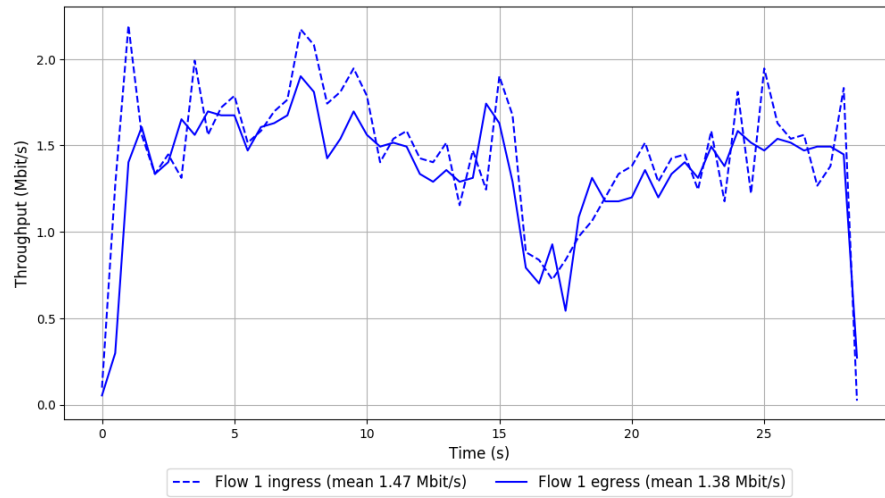


Run 2: Statistics of QUIC Cubic

Start at: 2018-03-12 21:38:26
End at: 2018-03-12 21:38:56
Local clock offset: -19.159 ms
Remote clock offset: -1.289 ms

Below is generated by plot.py at 2018-03-12 22:03:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 2126.306 ms
Loss rate: 6.21%
-- Flow 1:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 2126.306 ms
Loss rate: 6.21%

Run 2: Report of QUIC Cubic — Data Link

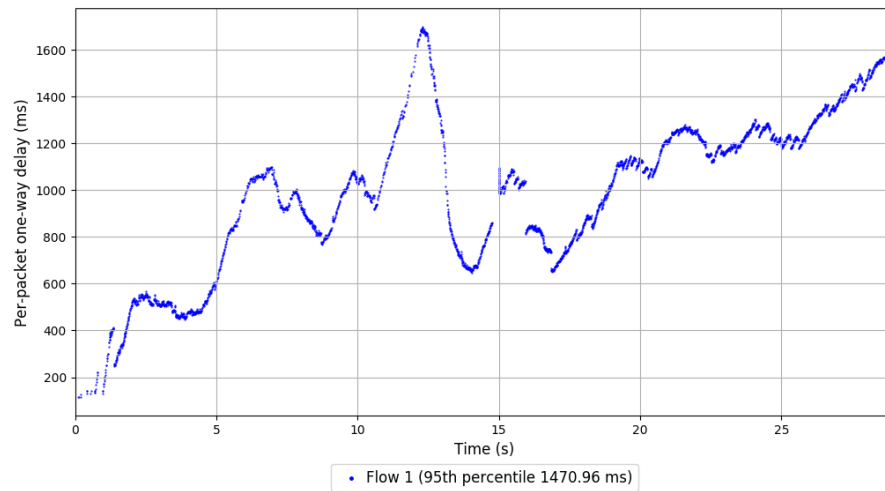
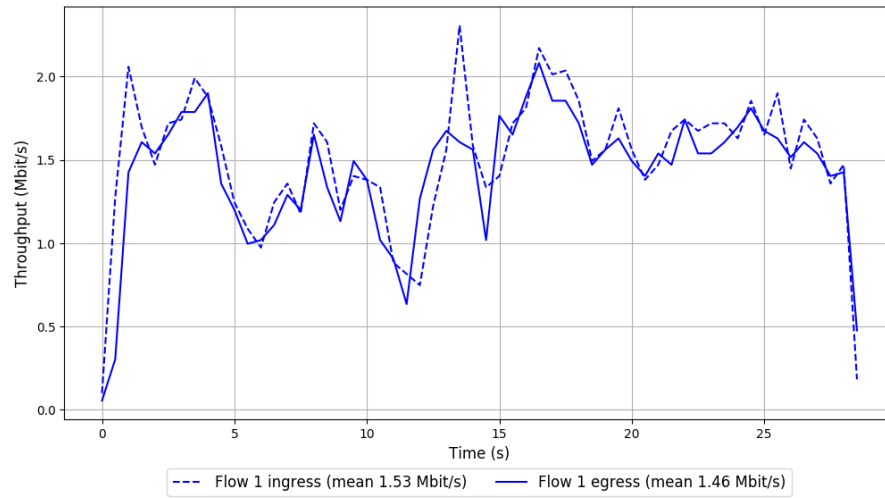


Run 3: Statistics of QUIC Cubic

Start at: 2018-03-12 21:59:17
End at: 2018-03-12 21:59:47
Local clock offset: -6.047 ms
Remote clock offset: -1.213 ms

Below is generated by plot.py at 2018-03-12 22:03:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 1470.957 ms
Loss rate: 4.97%
-- Flow 1:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 1470.957 ms
Loss rate: 4.97%

Run 3: Report of QUIC Cubic — Data Link

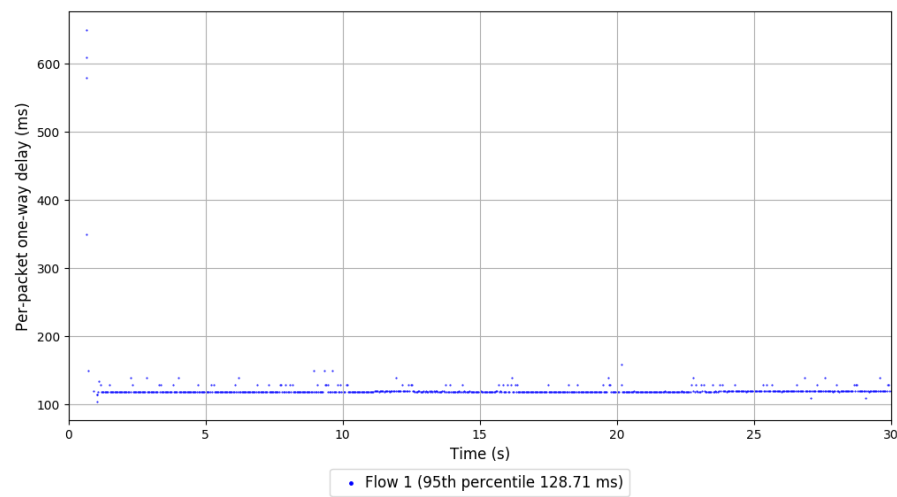
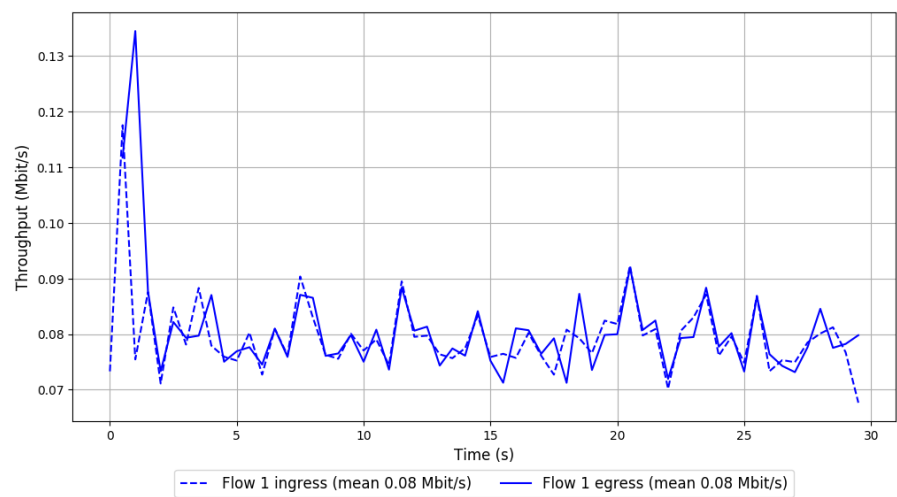


```
Run 1: Statistics of SCReAM

Start at: 2018-03-12 21:00:55
End at: 2018-03-12 21:01:25
Local clock offset: -15.484 ms
Remote clock offset: -7.005 ms

# Below is generated by plot.py at 2018-03-12 22:03:21
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 128.714 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 128.714 ms
Loss rate: 0.13%
```

Run 1: Report of SReAM — Data Link

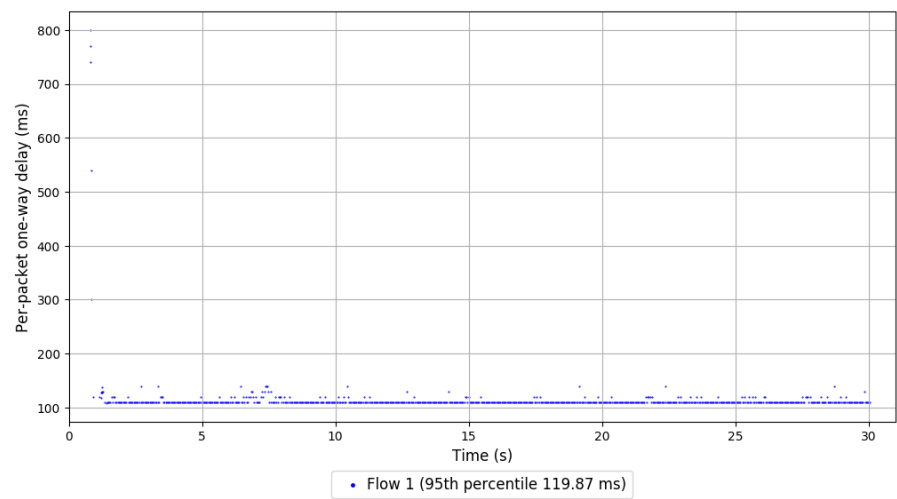
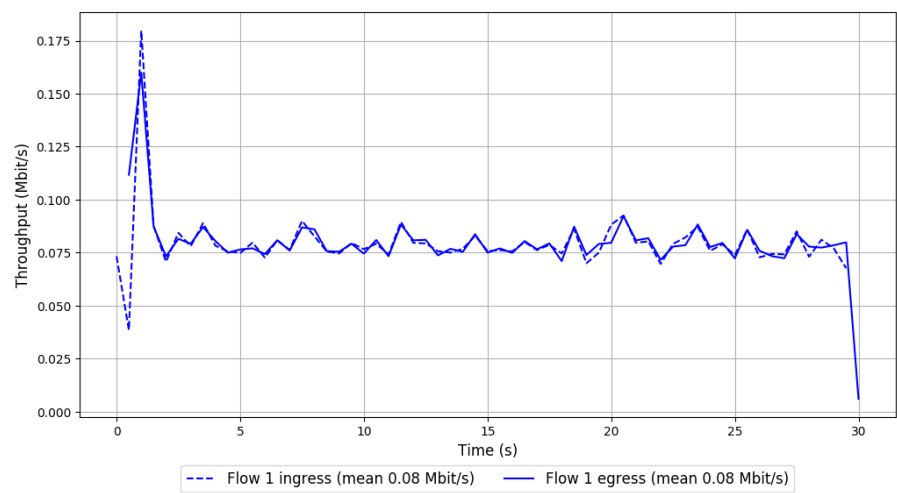


Run 2: Statistics of SCReAM

Start at: 2018-03-12 21:22:01
End at: 2018-03-12 21:22:31
Local clock offset: -20.388 ms
Remote clock offset: -6.921 ms

Below is generated by plot.py at 2018-03-12 22:03:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 119.873 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 119.873 ms
Loss rate: 0.00%

Run 2: Report of SReAM — Data Link

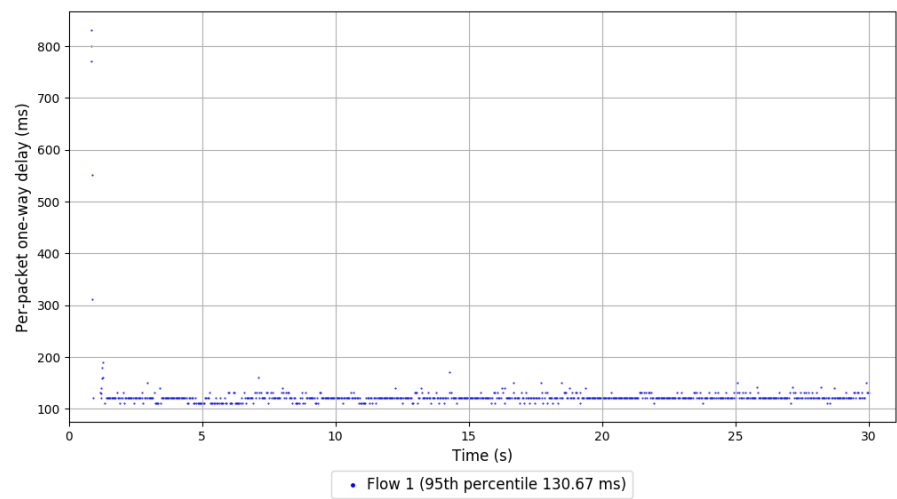
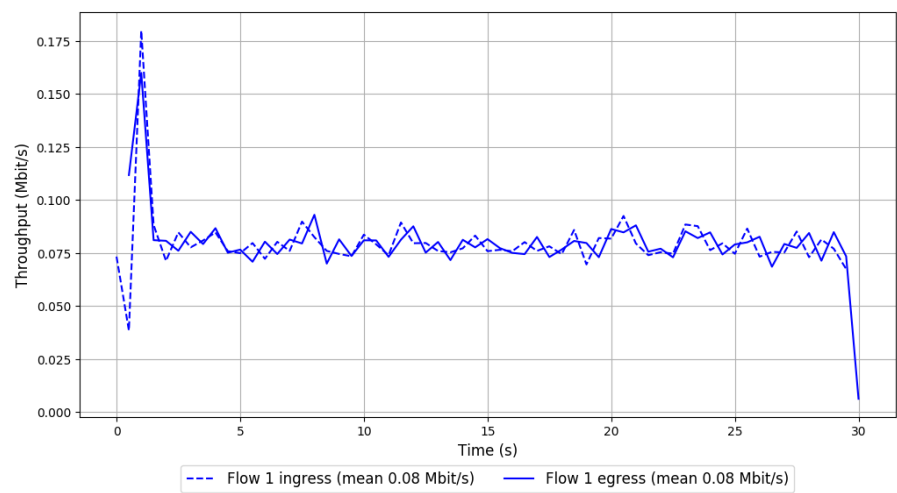


Run 3: Statistics of SCReAM

Start at: 2018-03-12 21:43:08
End at: 2018-03-12 21:43:38
Local clock offset: -13.36 ms
Remote clock offset: -7.031 ms

Below is generated by plot.py at 2018-03-12 22:03:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 130.668 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 130.668 ms
Loss rate: 0.13%

Run 3: Report of SReAM — Data Link

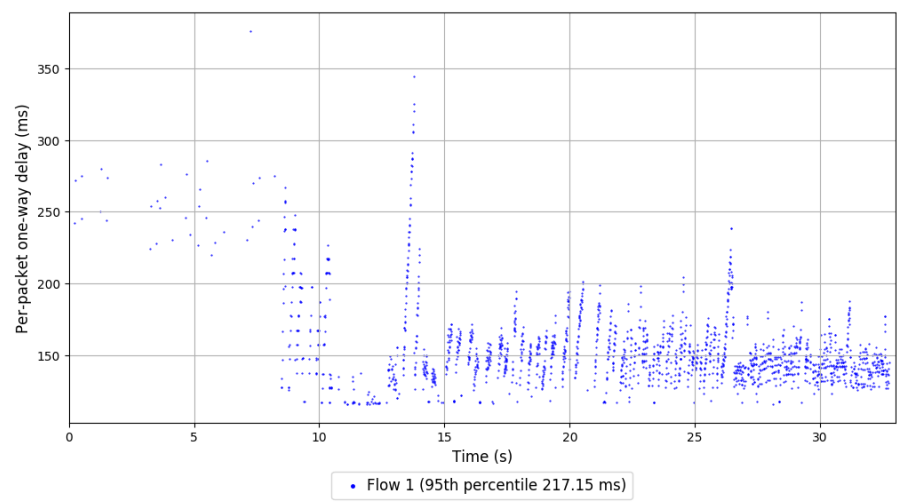
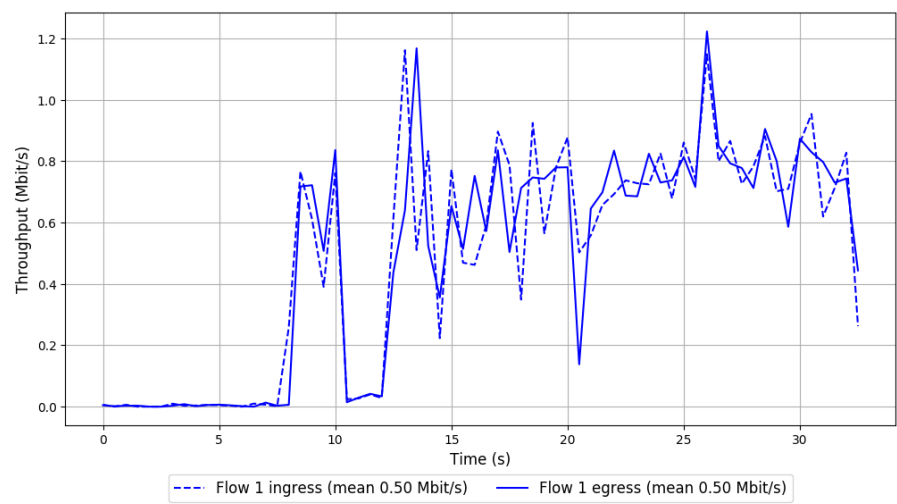


```
Run 1: Statistics of WebRTC media

Start at: 2018-03-12 21:11:27
End at: 2018-03-12 21:11:57
Local clock offset: -17.917 ms
Remote clock offset: -2.359 ms

# Below is generated by plot.py at 2018-03-12 22:03:21
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 217.152 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 217.152 ms
Loss rate: 0.26%
```

Run 1: Report of WebRTC media — Data Link

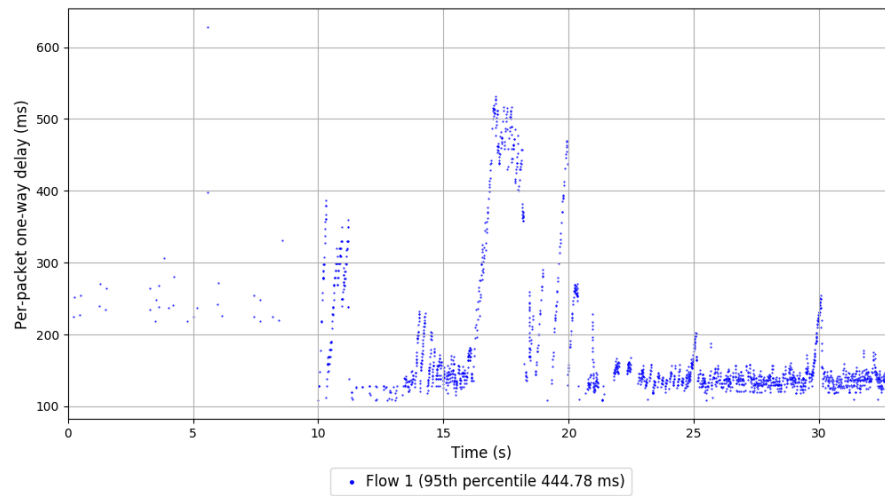
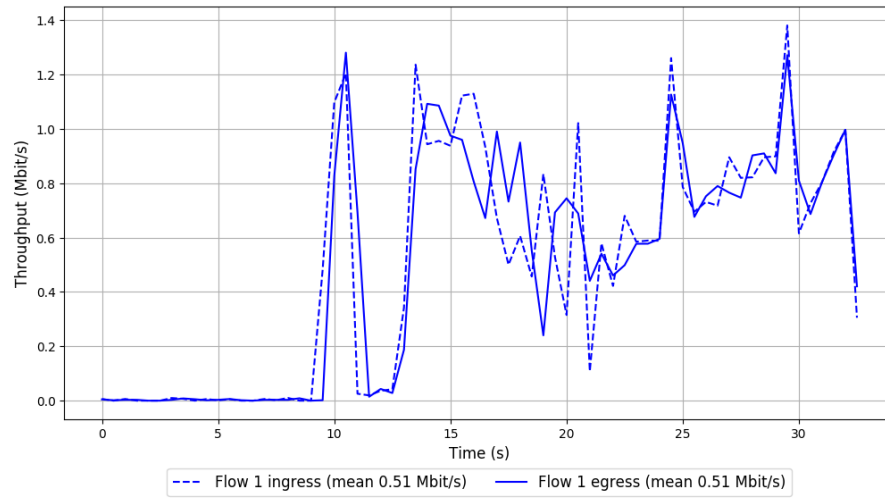


Run 2: Statistics of WebRTC media

Start at: 2018-03-12 21:32:34
End at: 2018-03-12 21:33:04
Local clock offset: -23.017 ms
Remote clock offset: -2.169 ms

Below is generated by plot.py at 2018-03-12 22:03:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 444.776 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 444.776 ms
Loss rate: 0.34%

Run 2: Report of WebRTC media — Data Link

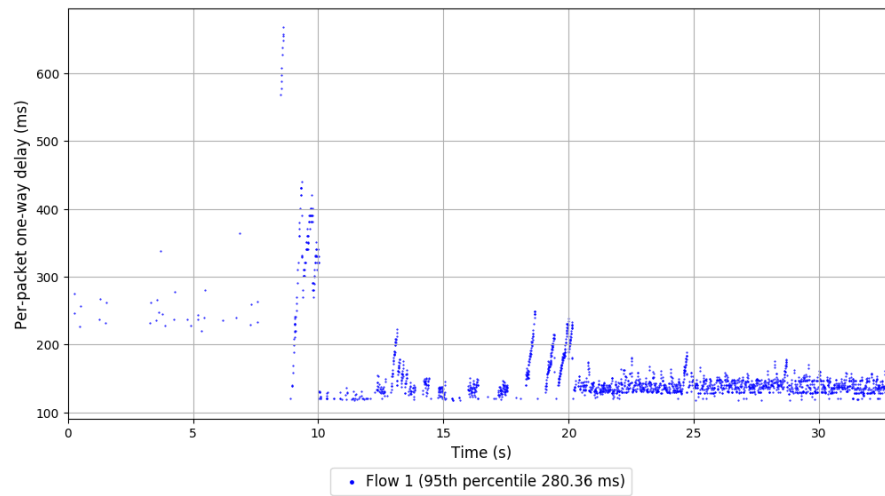
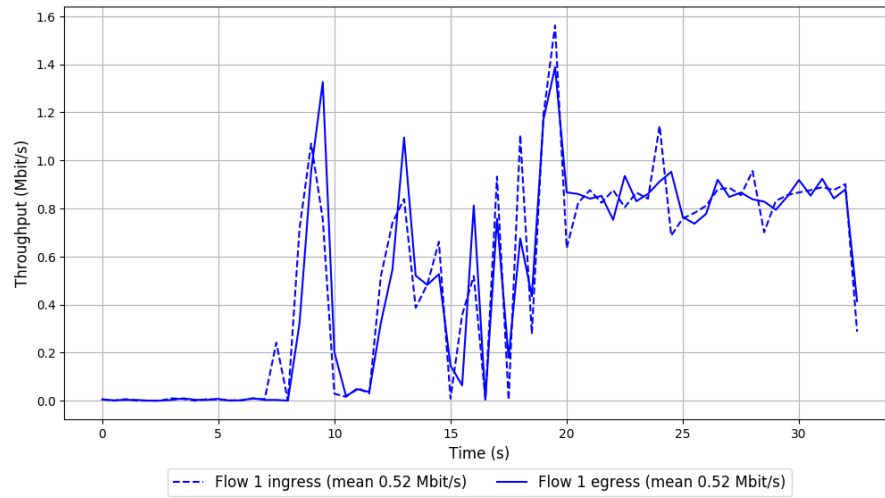


Run 3: Statistics of WebRTC media

Start at: 2018-03-12 21:53:40
End at: 2018-03-12 21:54:10
Local clock offset: -7.444 ms
Remote clock offset: -1.207 ms

Below is generated by plot.py at 2018-03-12 22:03:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 280.356 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 280.356 ms
Loss rate: 0.42%

Run 3: Report of WebRTC media — Data Link

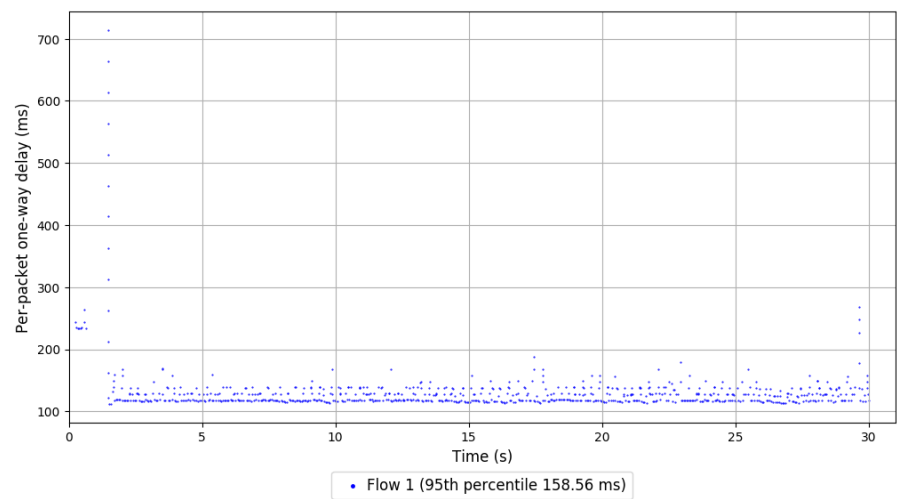
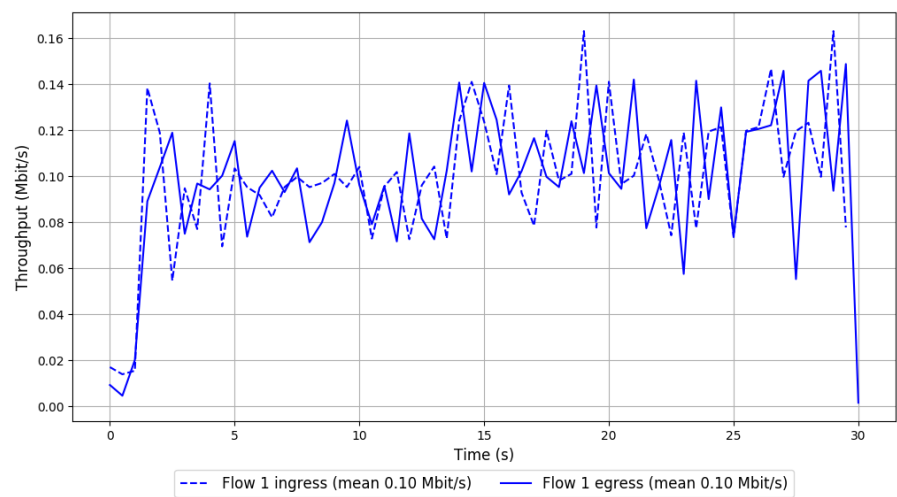


Run 1: Statistics of Sprout

Start at: 2018-03-12 21:09:07
End at: 2018-03-12 21:09:37
Local clock offset: -17.409 ms
Remote clock offset: -6.301 ms

Below is generated by plot.py at 2018-03-12 22:03:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 158.562 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 158.562 ms
Loss rate: 0.16%

Run 1: Report of Sprout — Data Link

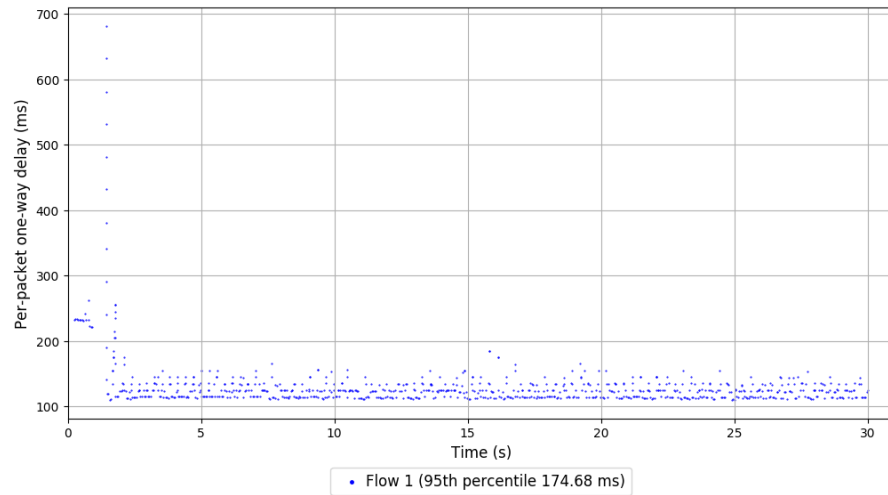
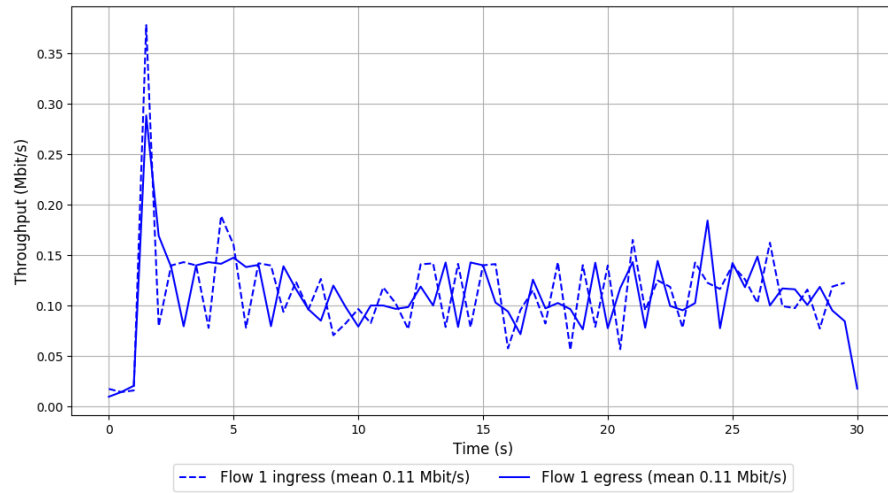


Run 2: Statistics of Sprout

Start at: 2018-03-12 21:30:14
End at: 2018-03-12 21:30:44
Local clock offset: -22.393 ms
Remote clock offset: -6.897 ms

Below is generated by plot.py at 2018-03-12 22:03:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 174.677 ms
Loss rate: 0.71%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 174.677 ms
Loss rate: 0.71%

Run 2: Report of Sprout — Data Link

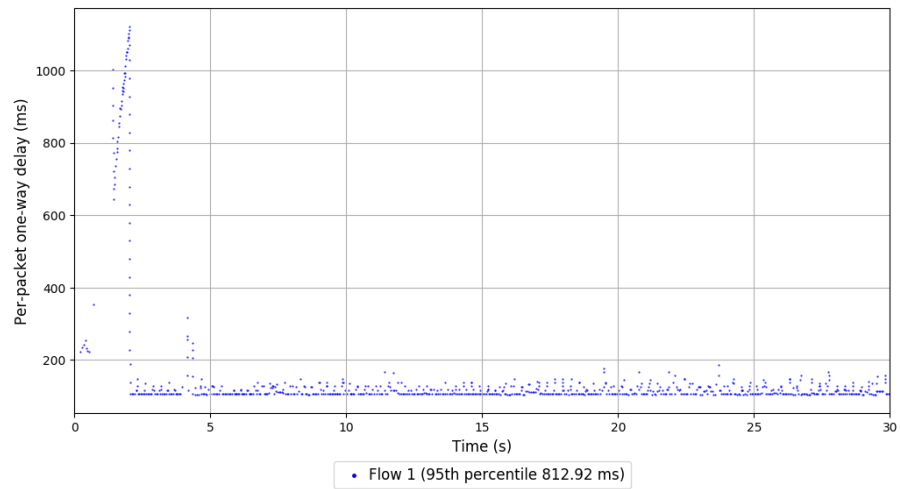
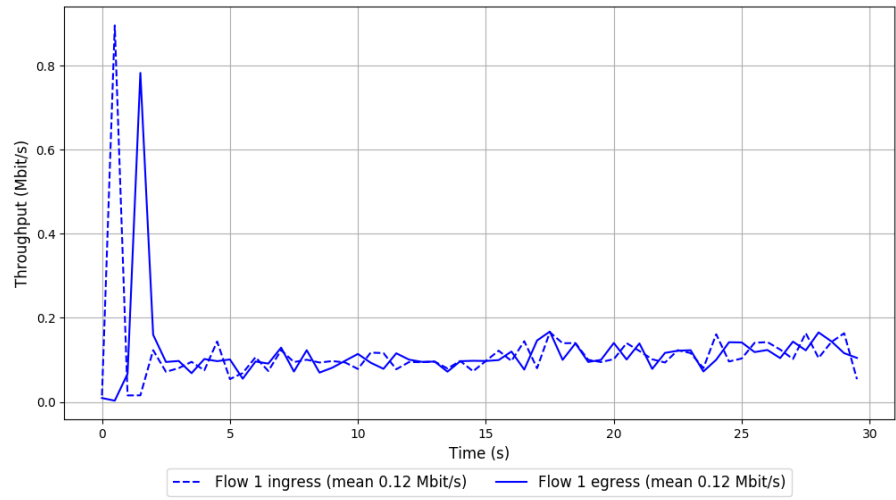


Run 3: Statistics of Sprout

Start at: 2018-03-12 21:51:20
End at: 2018-03-12 21:51:50
Local clock offset: -8.198 ms
Remote clock offset: -7.006 ms

Below is generated by plot.py at 2018-03-12 22:03:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 812.917 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 812.917 ms
Loss rate: 0.00%

Run 3: Report of Sprout — Data Link

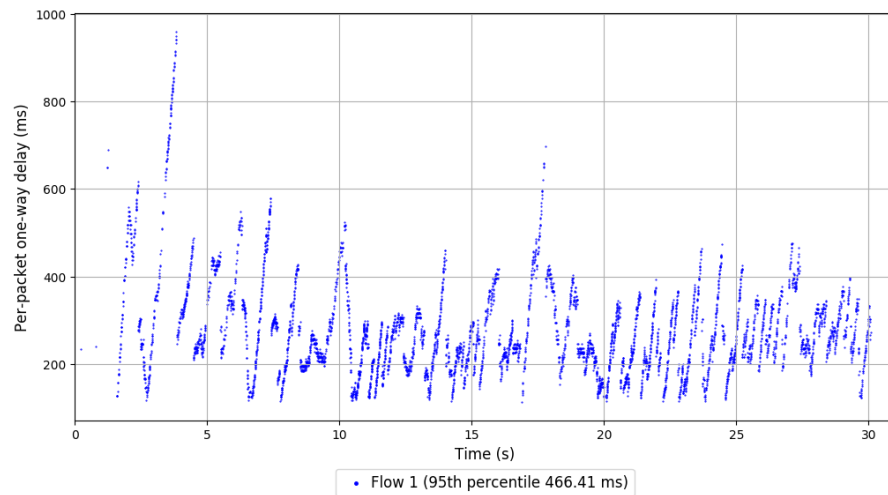
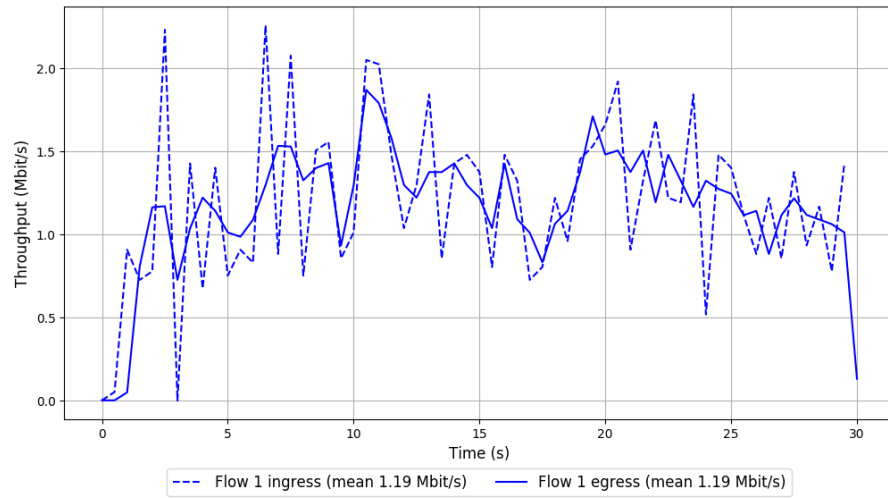


Run 1: Statistics of TaoVA-100x

Start at: 2018-03-12 21:14:59
End at: 2018-03-12 21:15:29
Local clock offset: -18.817 ms
Remote clock offset: -1.221 ms

Below is generated by plot.py at 2018-03-12 22:03:25
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 466.411 ms
Loss rate: 0.87%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 466.411 ms
Loss rate: 0.87%

Run 1: Report of TaoVA-100x — Data Link

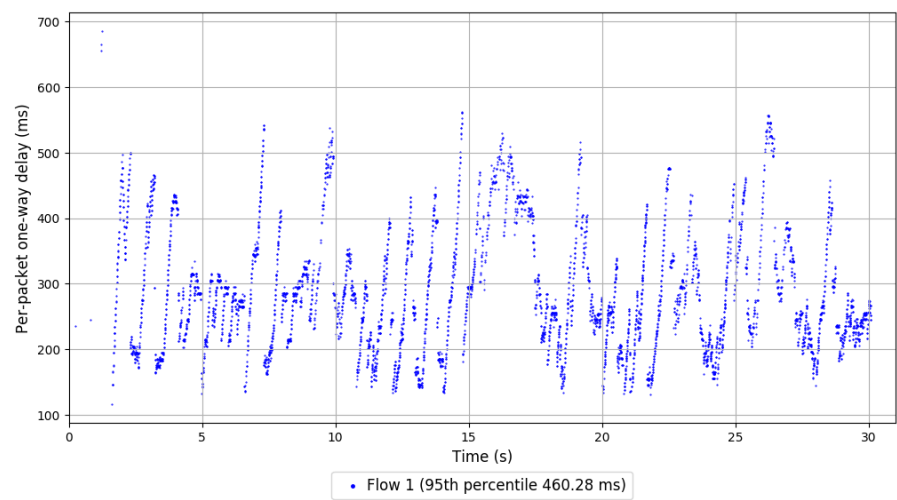
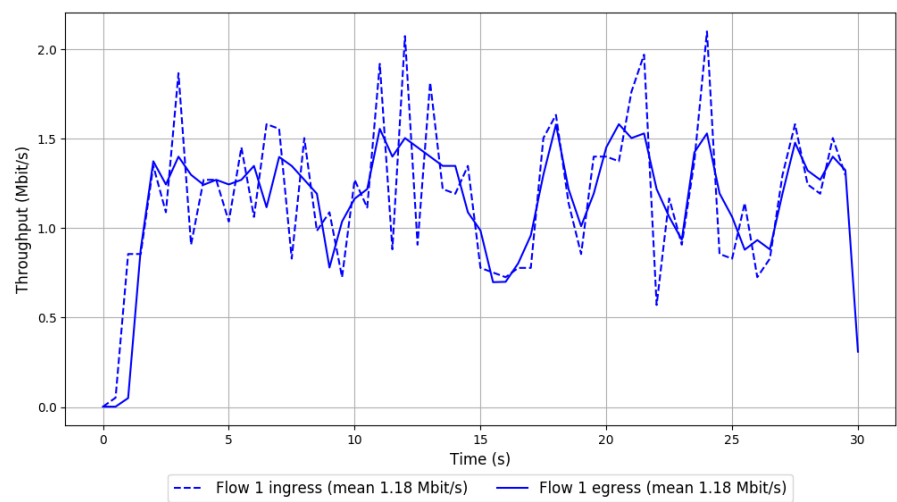


Run 2: Statistics of TaoVA-100x

Start at: 2018-03-12 21:36:05
End at: 2018-03-12 21:36:35
Local clock offset: -23.219 ms
Remote clock offset: -1.279 ms

Below is generated by plot.py at 2018-03-12 22:03:26
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 460.281 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 460.281 ms
Loss rate: 0.51%

Run 2: Report of TaoVA-100x — Data Link

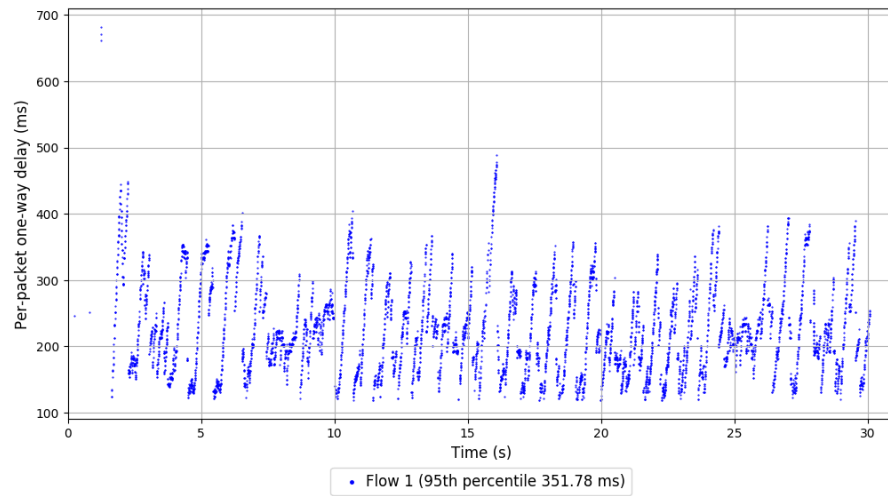
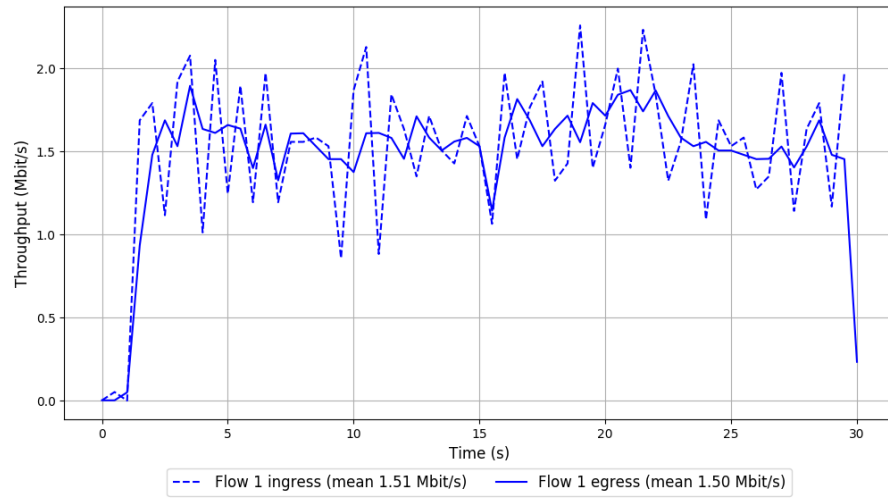


Run 3: Statistics of TaoVA-100x

Start at: 2018-03-12 21:56:56
End at: 2018-03-12 21:57:26
Local clock offset: -6.473 ms
Remote clock offset: -0.206 ms

Below is generated by plot.py at 2018-03-12 22:03:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 351.779 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 351.779 ms
Loss rate: 0.94%

Run 3: Report of TaoVA-100x — Data Link

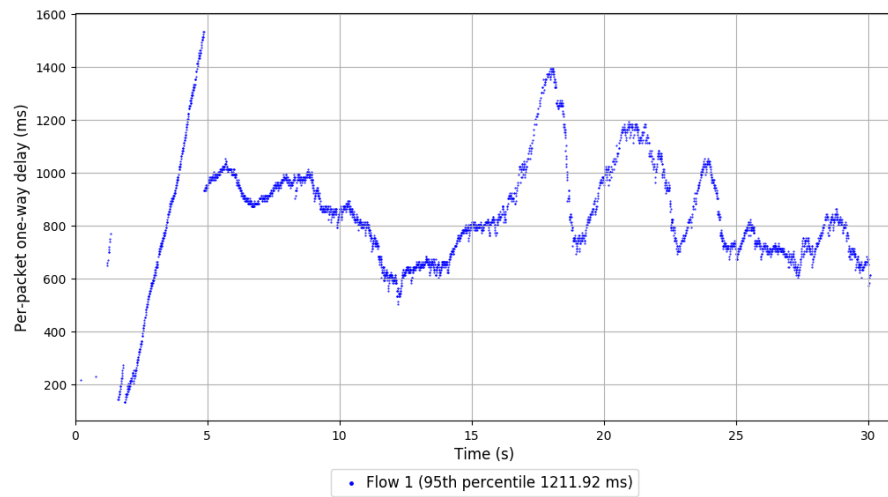
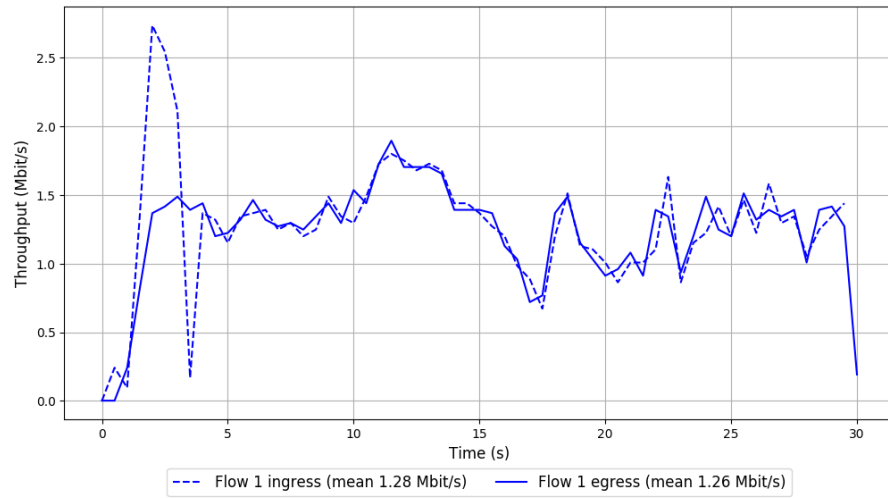


Run 1: Statistics of TCP Vegas

Start at: 2018-03-12 21:03:15
End at: 2018-03-12 21:03:45
Local clock offset: -15.99 ms
Remote clock offset: -2.244 ms

Below is generated by plot.py at 2018-03-12 22:03:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 1211.921 ms
Loss rate: 2.28%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 1211.921 ms
Loss rate: 2.28%

Run 1: Report of TCP Vegas — Data Link

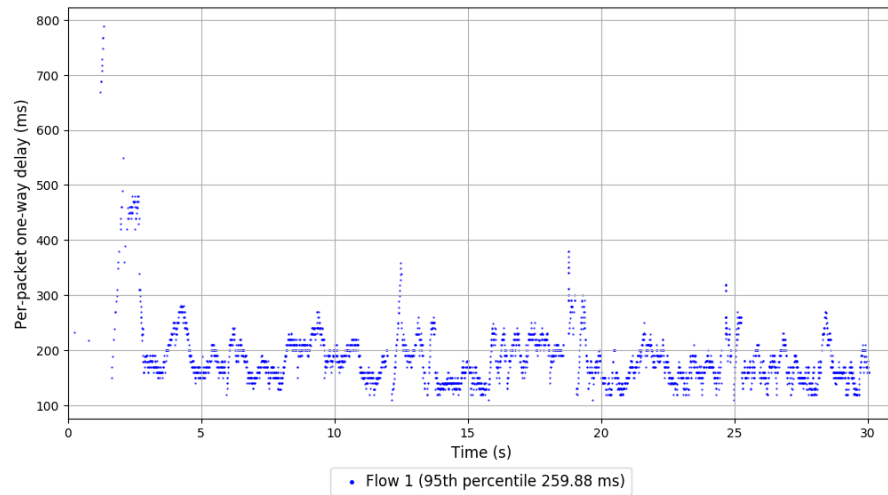
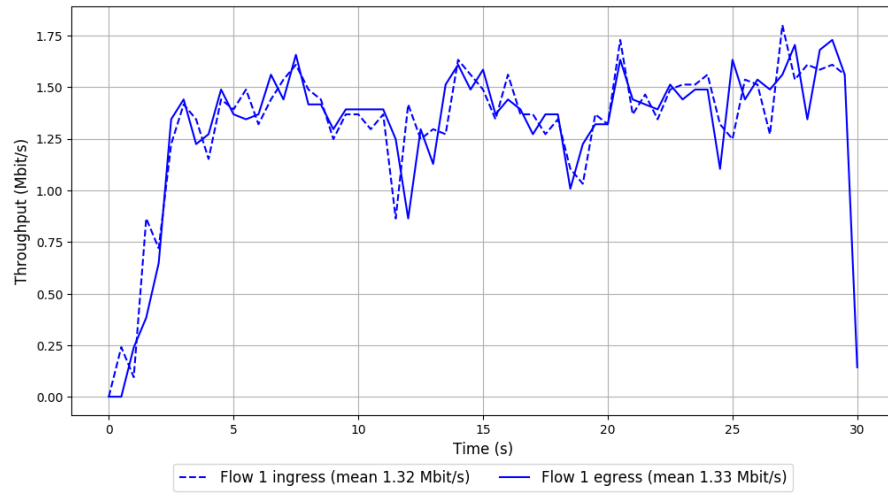


Run 2: Statistics of TCP Vegas

Start at: 2018-03-12 21:24:21
End at: 2018-03-12 21:24:51
Local clock offset: -20.976 ms
Remote clock offset: -6.09 ms

Below is generated by plot.py at 2018-03-12 22:03:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 259.876 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 259.876 ms
Loss rate: 0.33%

Run 2: Report of TCP Vegas — Data Link

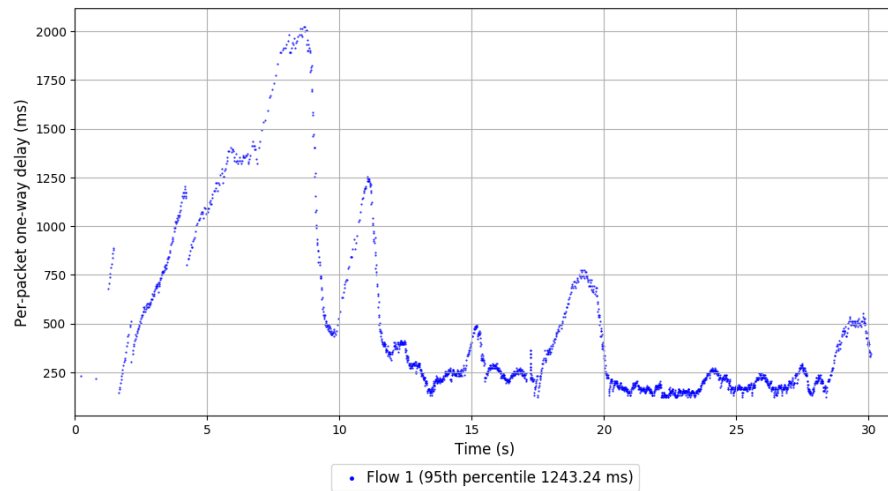
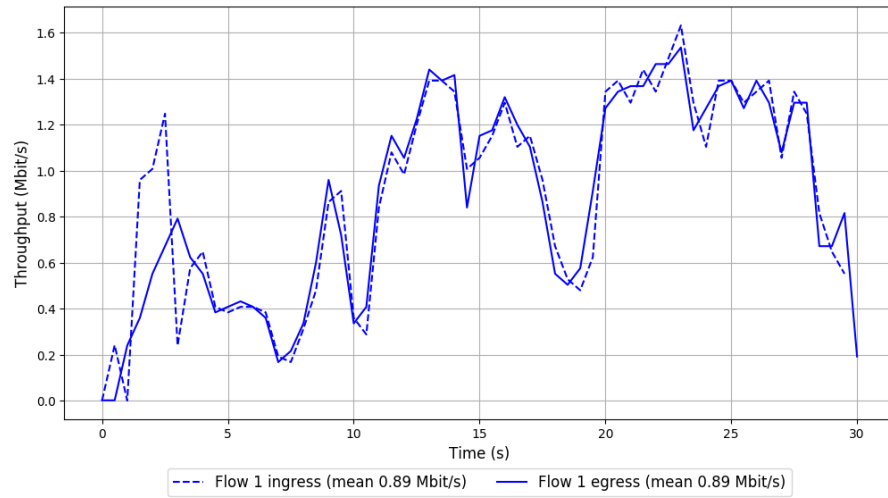


Run 3: Statistics of TCP Vegas

Start at: 2018-03-12 21:45:28
End at: 2018-03-12 21:45:58
Local clock offset: -11.496 ms
Remote clock offset: -6.115 ms

Below is generated by plot.py at 2018-03-12 22:03:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 1243.244 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 1243.244 ms
Loss rate: 0.40%

Run 3: Report of TCP Vegas — Data Link

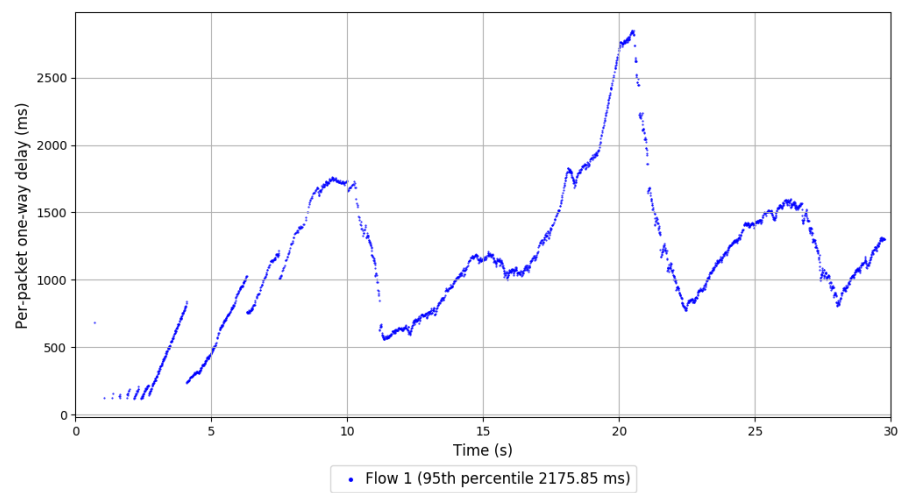
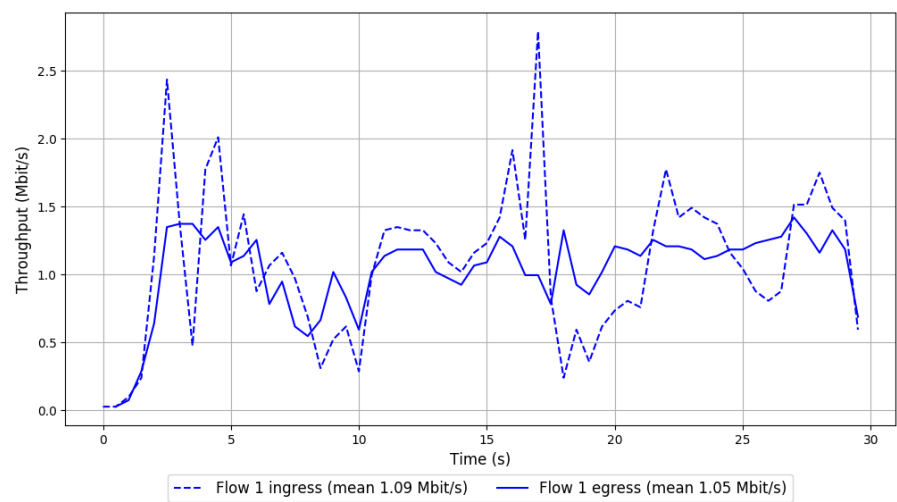


Run 1: Statistics of Verus

Start at: 2018-03-12 21:13:48
End at: 2018-03-12 21:14:18
Local clock offset: -18.46 ms
Remote clock offset: -7.064 ms

Below is generated by plot.py at 2018-03-12 22:03:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 2175.846 ms
Loss rate: 5.56%
-- Flow 1:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 2175.846 ms
Loss rate: 5.56%

Run 1: Report of Verus — Data Link

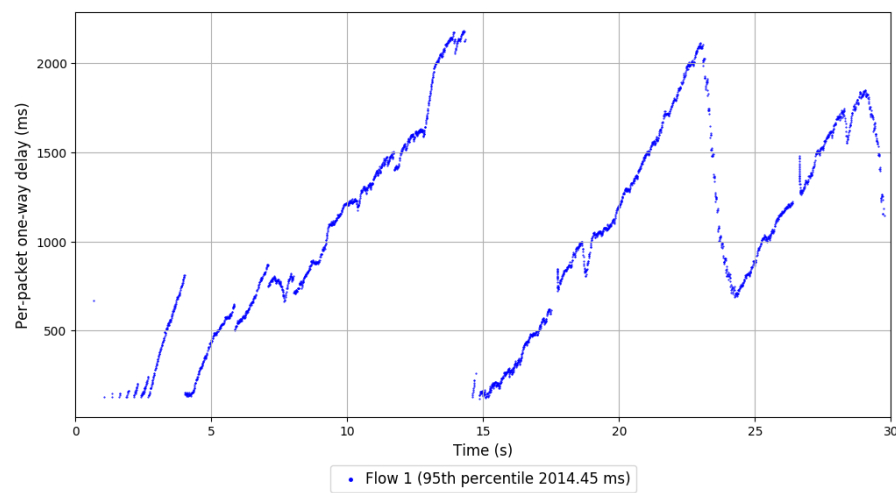
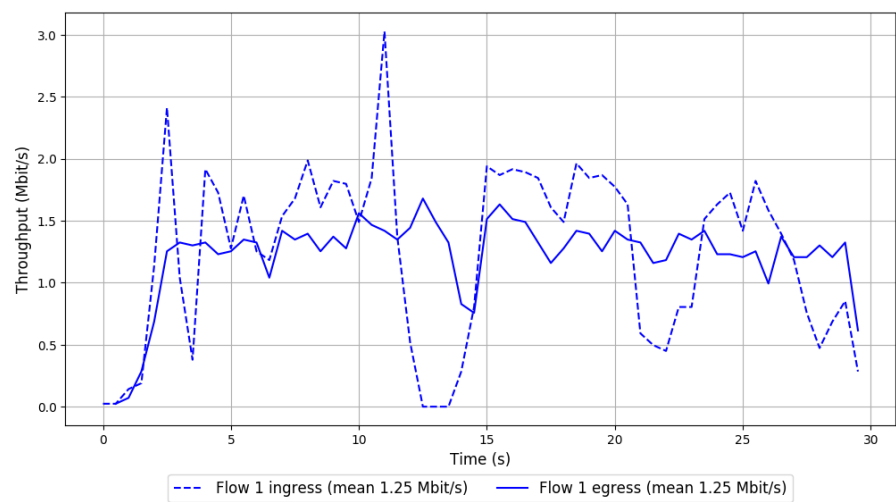


Run 2: Statistics of Verus

Start at: 2018-03-12 21:34:55
End at: 2018-03-12 21:35:25
Local clock offset: -23.541 ms
Remote clock offset: -6.083 ms

Below is generated by plot.py at 2018-03-12 22:03:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 2014.449 ms
Loss rate: 2.32%
-- Flow 1:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 2014.449 ms
Loss rate: 2.32%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-03-12 21:55:46

End at: 2018-03-12 21:56:16

Remote clock offset: -0.234 ms

Below is generated by plot.py at 2018-03-12 22:03:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.53 Mbit/s

95th percentile per-packet one-way delay: 2894.846 ms

Loss rate: 5.98%

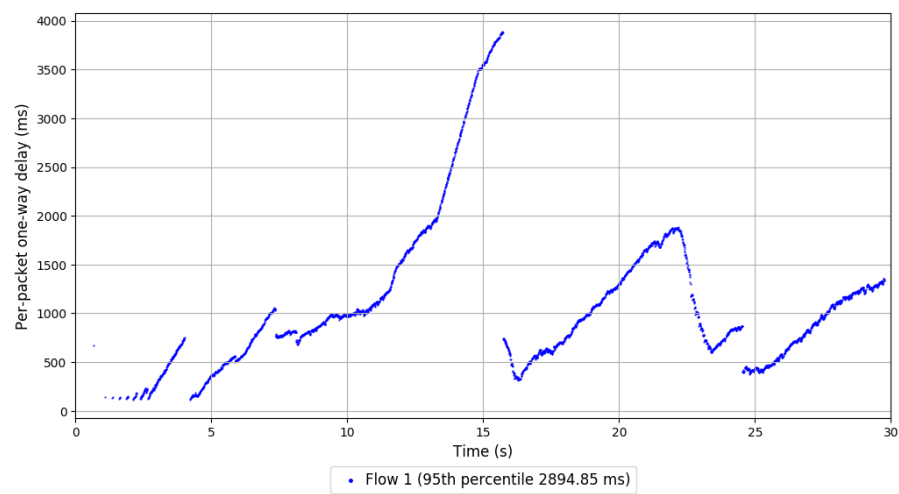
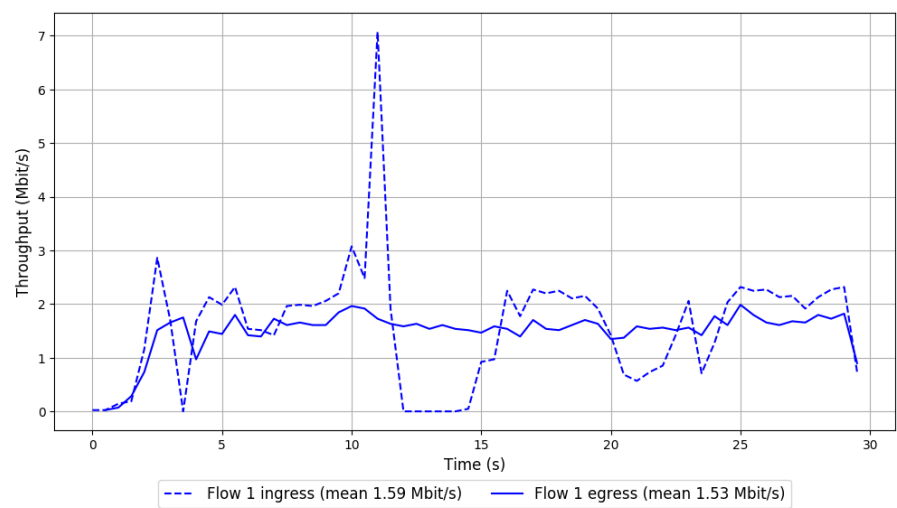
-- Flow 1:

Average throughput: 1.53 Mbit/s

95th percentile per-packet one-way delay: 2894.846 ms

Loss rate: 5.98%

Run 3: Report of Verus — Data Link

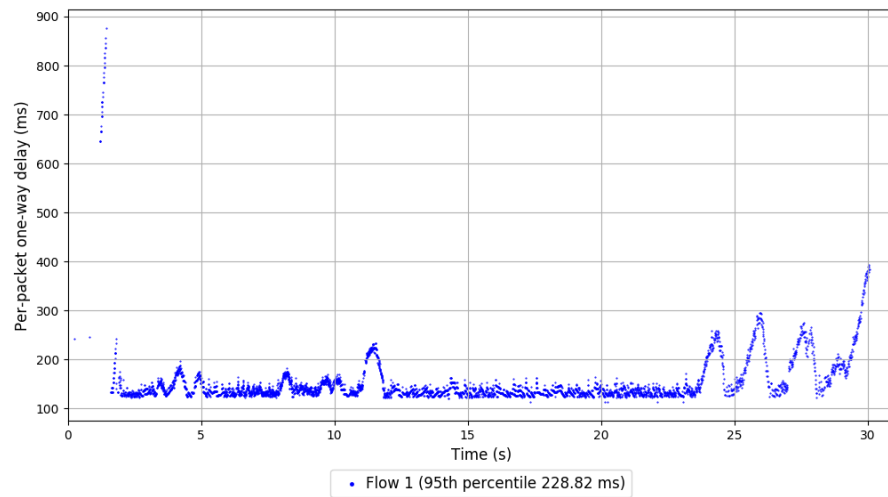
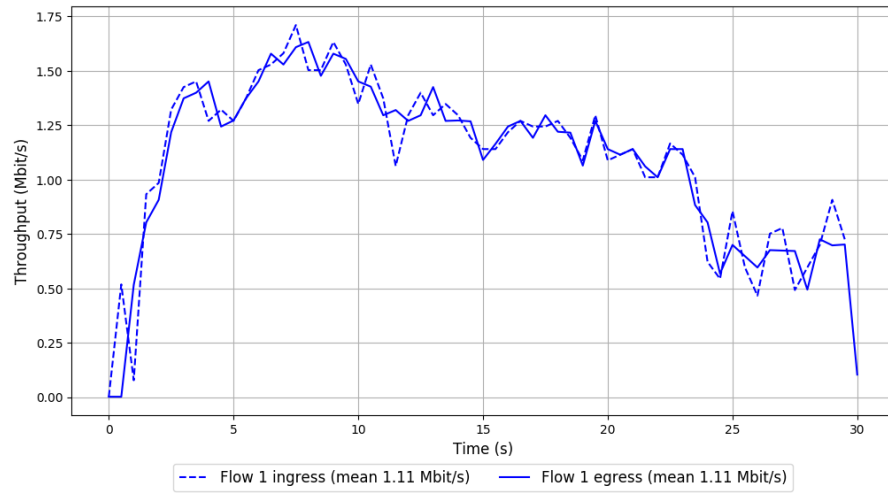


Run 1: Statistics of Copa

Start at: 2018-03-12 21:06:46
End at: 2018-03-12 21:07:16
Local clock offset: -16.808 ms
Remote clock offset: -1.336 ms

Below is generated by plot.py at 2018-03-12 22:03:32
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 228.821 ms
Loss rate: 0.58%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 228.821 ms
Loss rate: 0.58%

Run 1: Report of Copa — Data Link

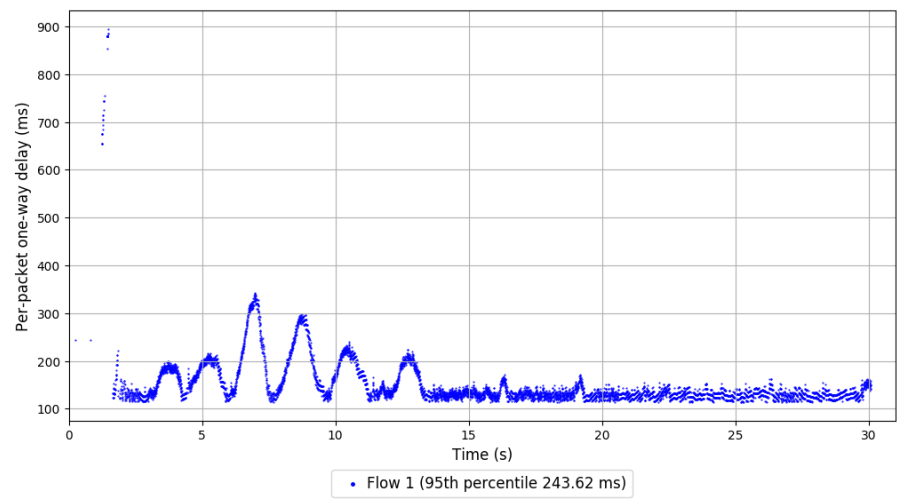
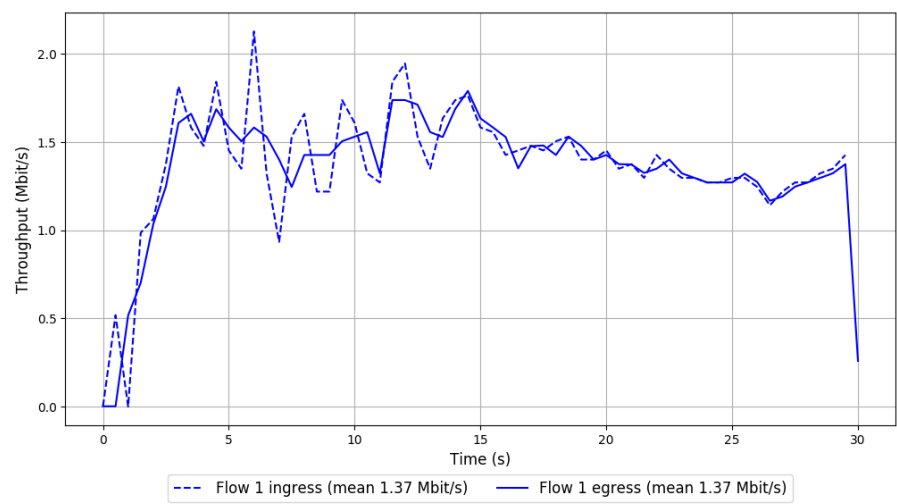


Run 2: Statistics of Copa

Start at: 2018-03-12 21:27:53
End at: 2018-03-12 21:28:23
Local clock offset: -21.843 ms
Remote clock offset: -1.33 ms

Below is generated by plot.py at 2018-03-12 22:03:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 243.620 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 243.620 ms
Loss rate: 0.22%

Run 2: Report of Copa — Data Link

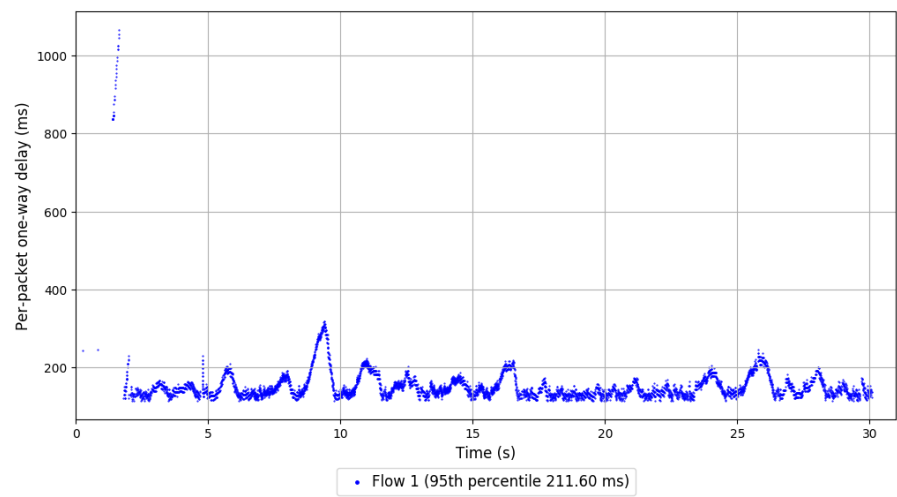
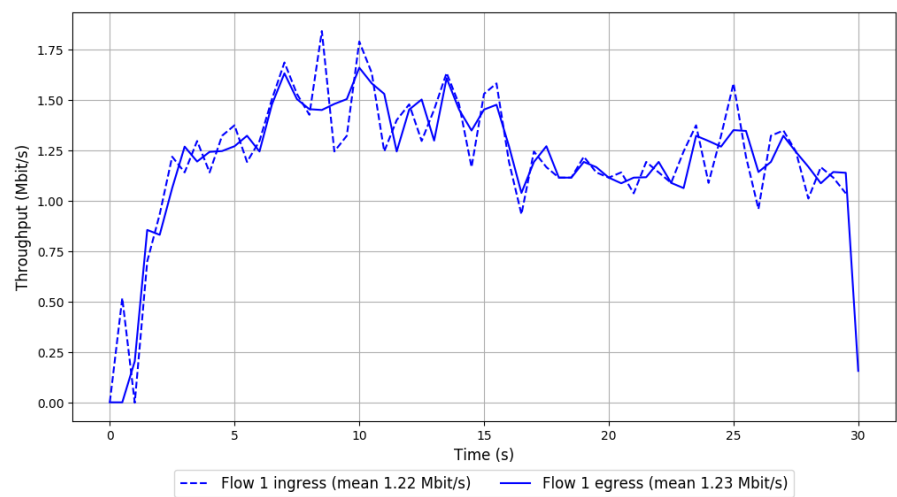


Run 3: Statistics of Copa

Start at: 2018-03-12 21:48:59
End at: 2018-03-12 21:49:29
Local clock offset: -9.325 ms
Remote clock offset: -2.157 ms

Below is generated by plot.py at 2018-03-12 22:03:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 211.596 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 211.596 ms
Loss rate: 0.10%

Run 3: Report of Copa — Data Link

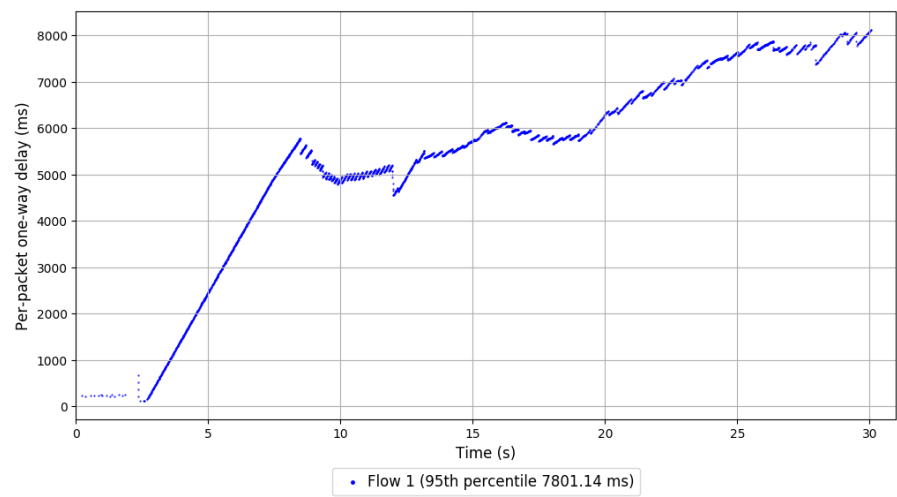
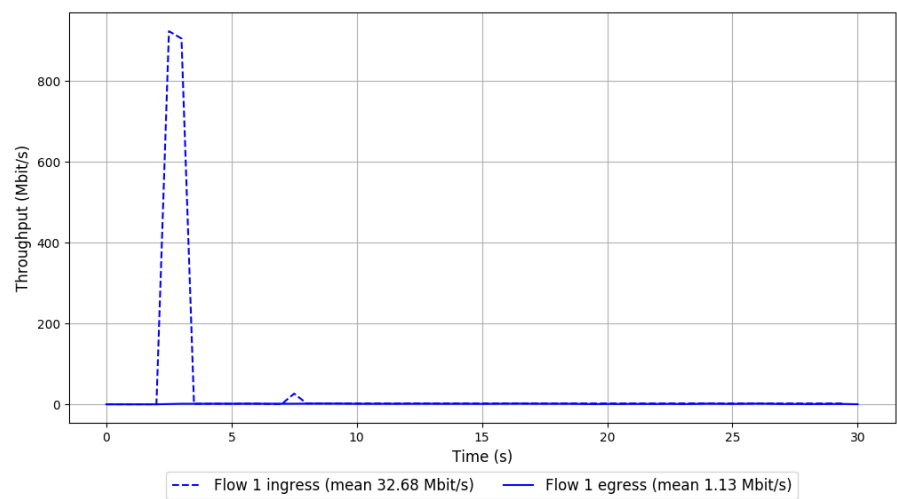


Run 1: Statistics of FillP

Start at: 2018-03-12 21:05:35
End at: 2018-03-12 21:06:05
Local clock offset: -16.486 ms
Remote clock offset: -1.369 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 7801.142 ms
Loss rate: 96.56%
-- Flow 1:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 7801.142 ms
Loss rate: 96.56%

Run 1: Report of FillP — Data Link

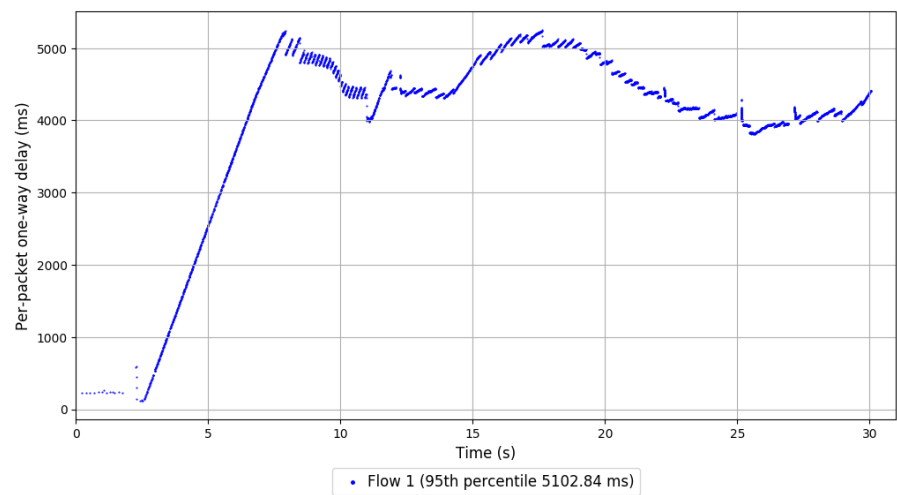
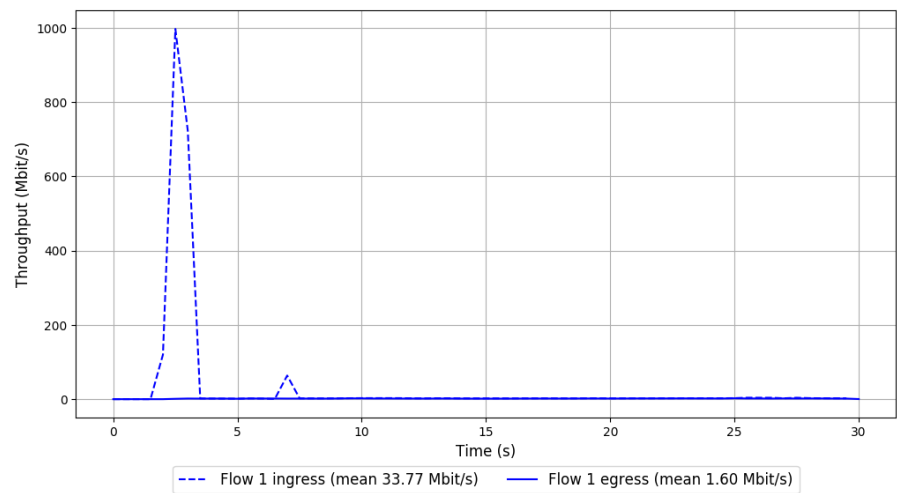


Run 2: Statistics of FillP

Start at: 2018-03-12 21:26:42
End at: 2018-03-12 21:27:12
Local clock offset: -21.669 ms
Remote clock offset: -1.286 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.60 Mbit/s
95th percentile per-packet one-way delay: 5102.839 ms
Loss rate: 95.29%
-- Flow 1:
Average throughput: 1.60 Mbit/s
95th percentile per-packet one-way delay: 5102.839 ms
Loss rate: 95.29%

Run 2: Report of FillP — Data Link

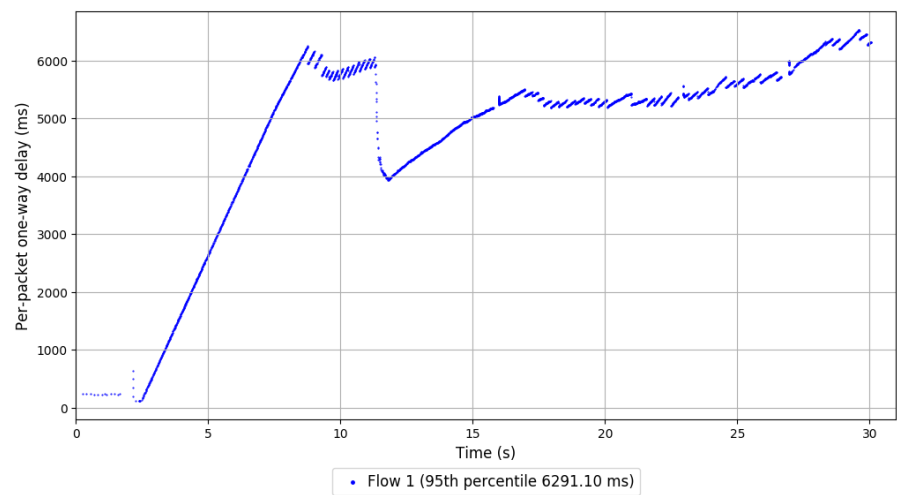
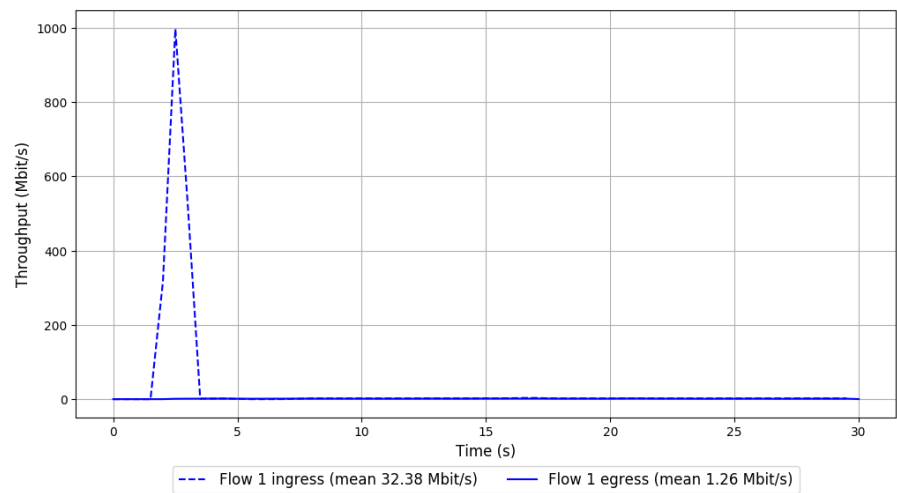


Run 3: Statistics of FillP

Start at: 2018-03-12 21:47:48
End at: 2018-03-12 21:48:18
Local clock offset: -9.964 ms
Remote clock offset: -6.189 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 6291.097 ms
Loss rate: 96.13%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 6291.097 ms
Loss rate: 96.13%

Run 3: Report of FillP — Data Link

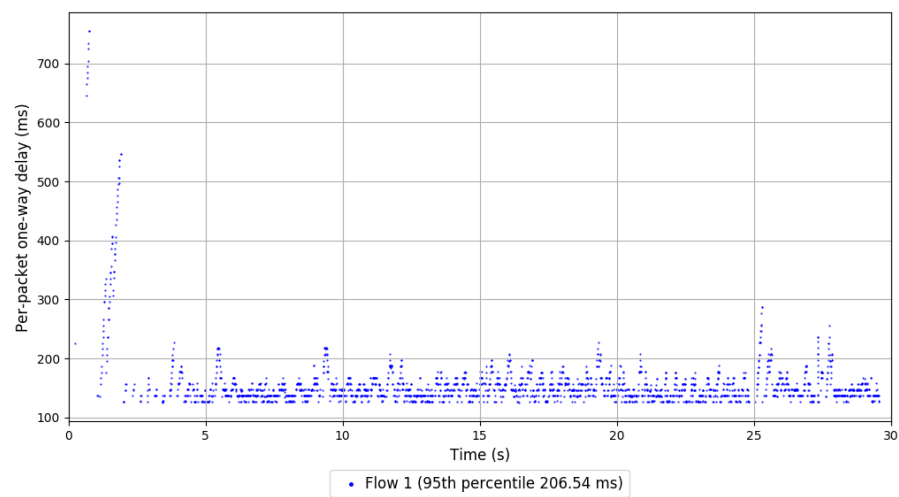
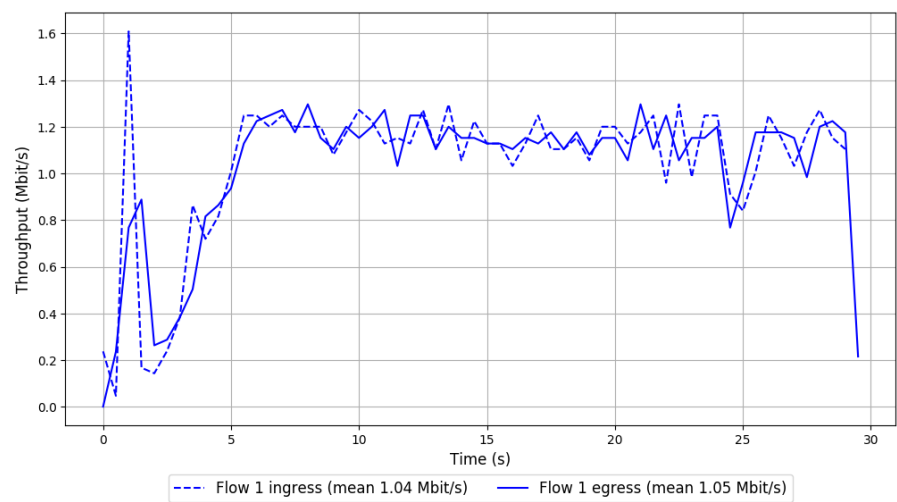


```
Run 1: Statistics of Indigo-1-32

Start at: 2018-03-12 21:04:25
End at: 2018-03-12 21:04:55
Local clock offset: -16.228 ms
Remote clock offset: -1.15 ms

# Below is generated by plot.py at 2018-03-12 22:03:45
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 206.536 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 206.536 ms
Loss rate: 0.16%
```

Run 1: Report of Indigo-1-32 — Data Link

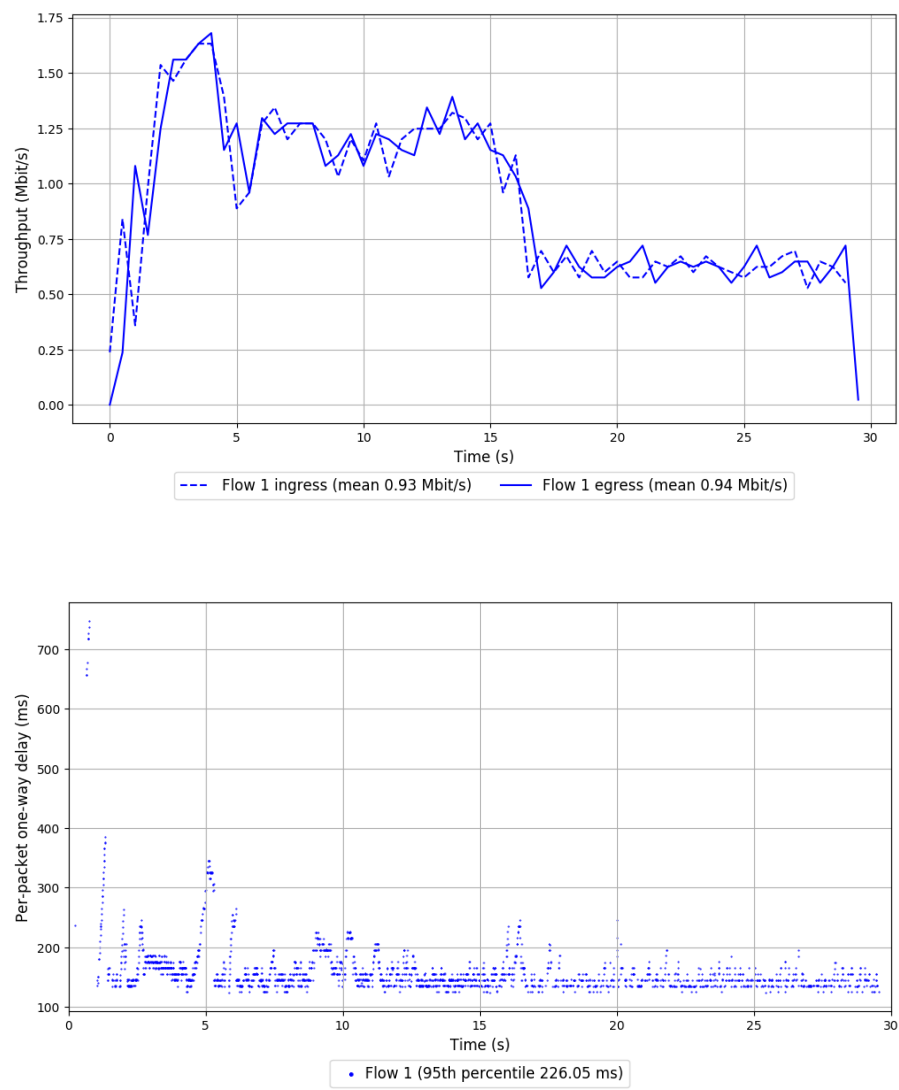


Run 2: Statistics of Indigo-1-32

Start at: 2018-03-12 21:25:32
End at: 2018-03-12 21:26:02
Local clock offset: -21.266 ms
Remote clock offset: -2.156 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 226.047 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 226.047 ms
Loss rate: 0.09%

Run 2: Report of Indigo-1-32 — Data Link

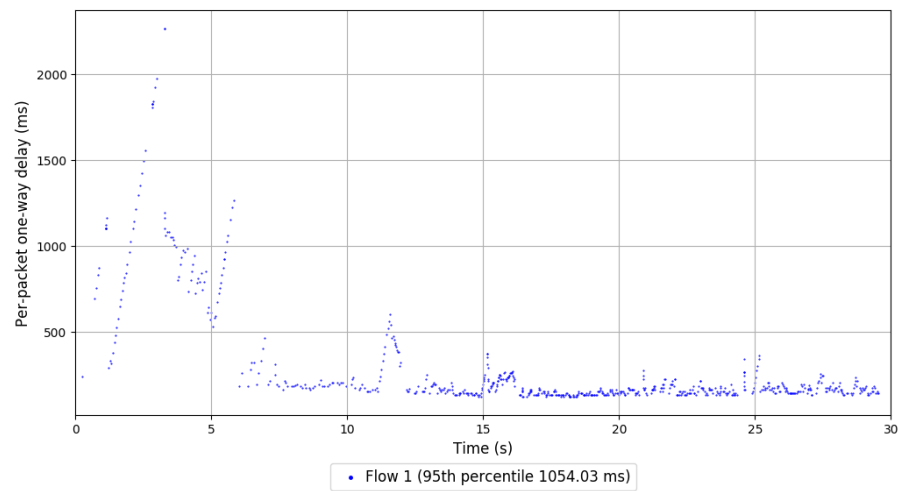
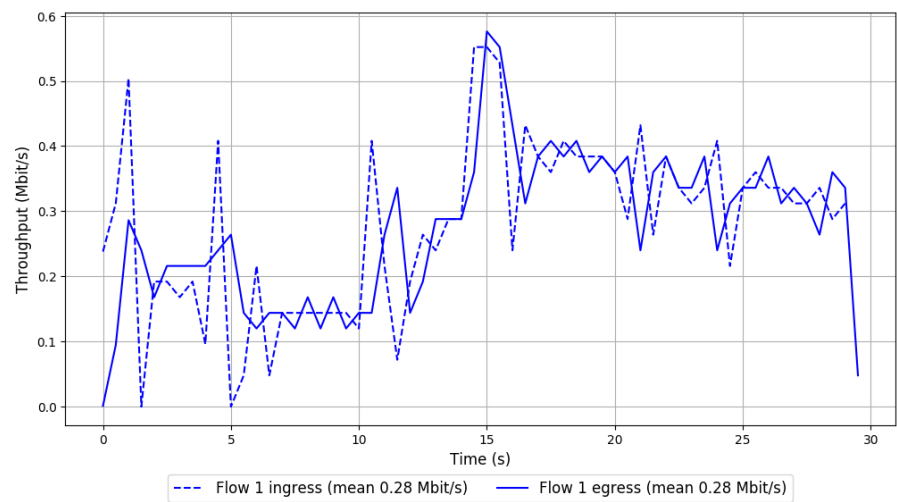


Run 3: Statistics of Indigo-1-32

Start at: 2018-03-12 21:46:38
End at: 2018-03-12 21:47:08
Local clock offset: -10.502 ms
Remote clock offset: -6.894 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 1054.030 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 1054.030 ms
Loss rate: 0.15%

Run 3: Report of Indigo-1-32 — Data Link

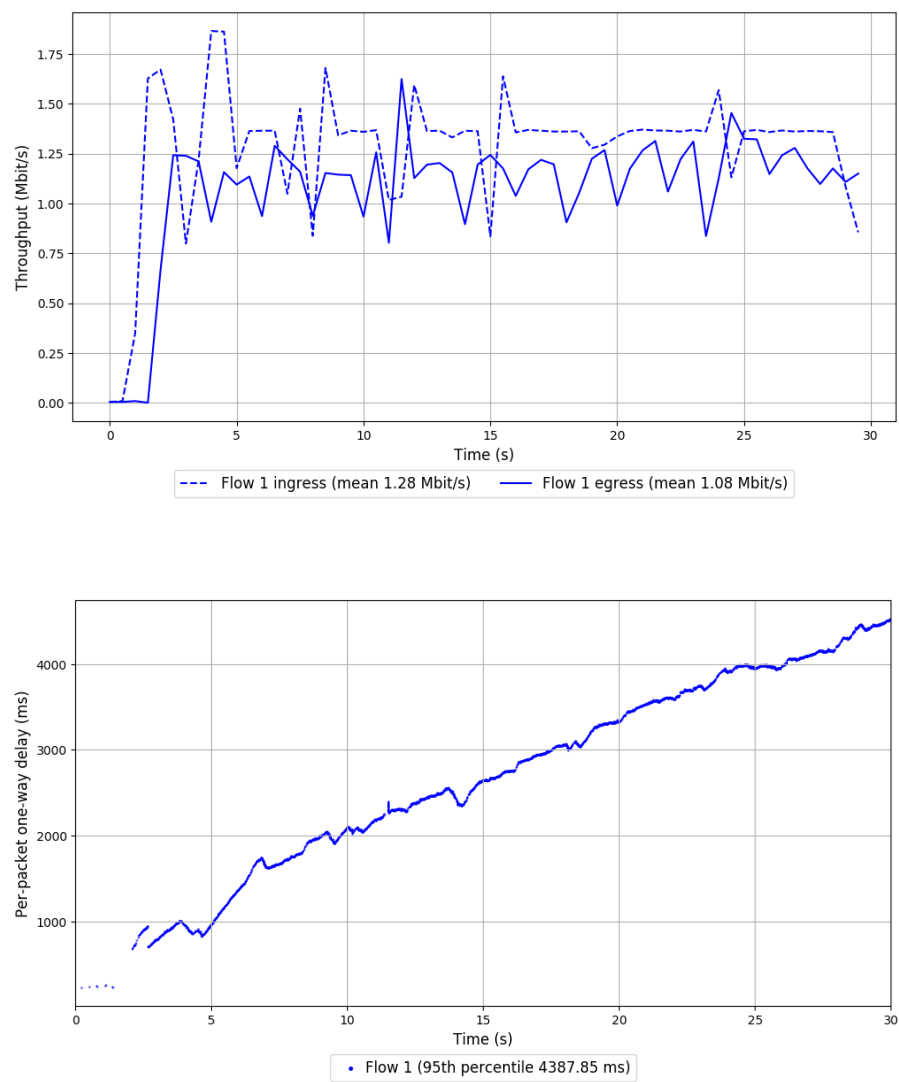


Run 1: Statistics of Vivace-latency

Start at: 2018-03-12 21:18:30
End at: 2018-03-12 21:19:00
Local clock offset: -19.687 ms
Remote clock offset: -0.283 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 4387.846 ms
Loss rate: 16.11%
-- Flow 1:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 4387.846 ms
Loss rate: 16.11%

Run 1: Report of Vivace-latency — Data Link

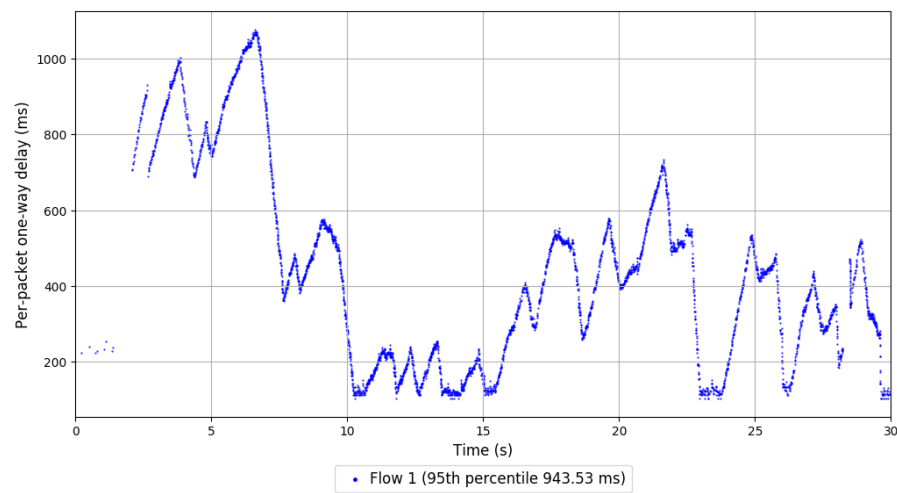
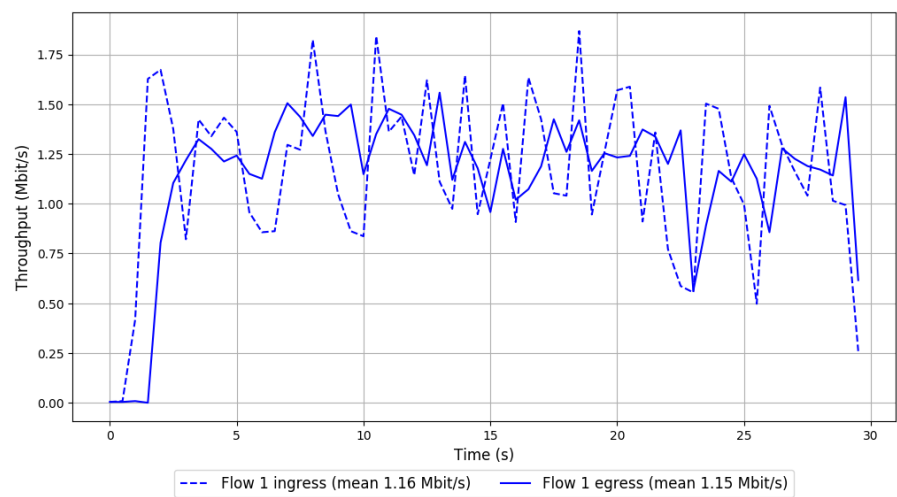


Run 2: Statistics of Vivace-latency

Start at: 2018-03-12 21:39:36
End at: 2018-03-12 21:40:06
Local clock offset: -17.206 ms
Remote clock offset: -6.081 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 943.530 ms
Loss rate: 1.22%
-- Flow 1:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 943.530 ms
Loss rate: 1.22%

Run 2: Report of Vivace-latency — Data Link

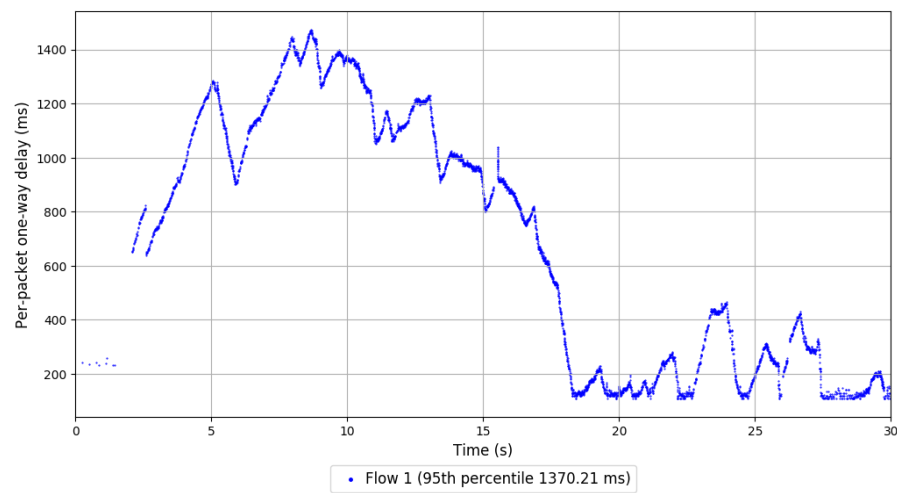
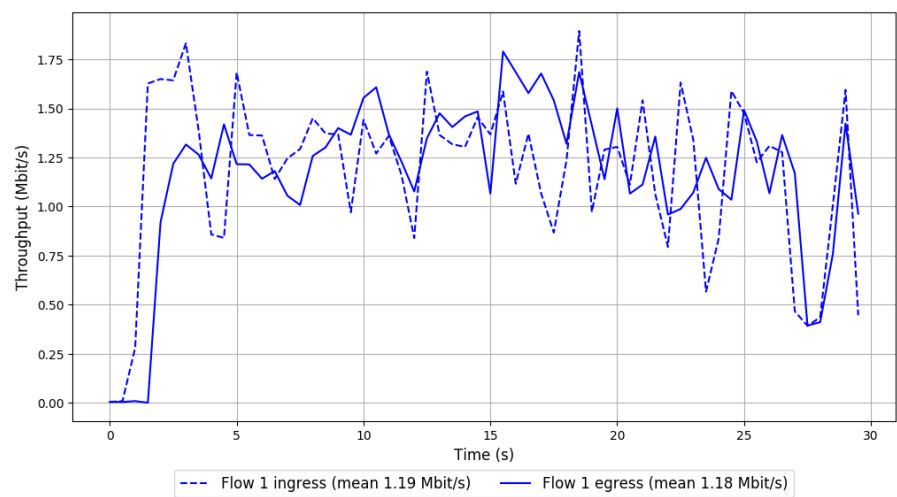


Run 3: Statistics of Vivace-latency

Start at: 2018-03-12 22:00:27
End at: 2018-03-12 22:00:57
Local clock offset: -5.723 ms
Remote clock offset: -6.067 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 1370.208 ms
Loss rate: 0.87%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 1370.208 ms
Loss rate: 0.87%

Run 3: Report of Vivace-latency — Data Link

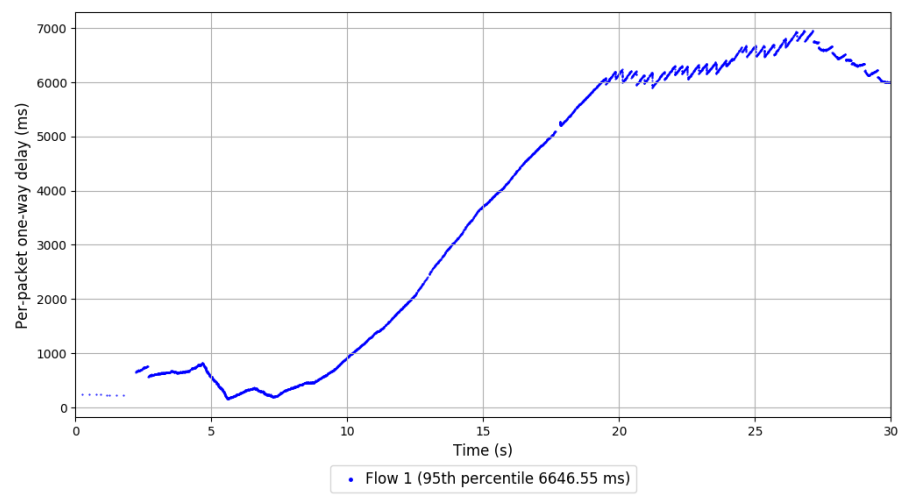
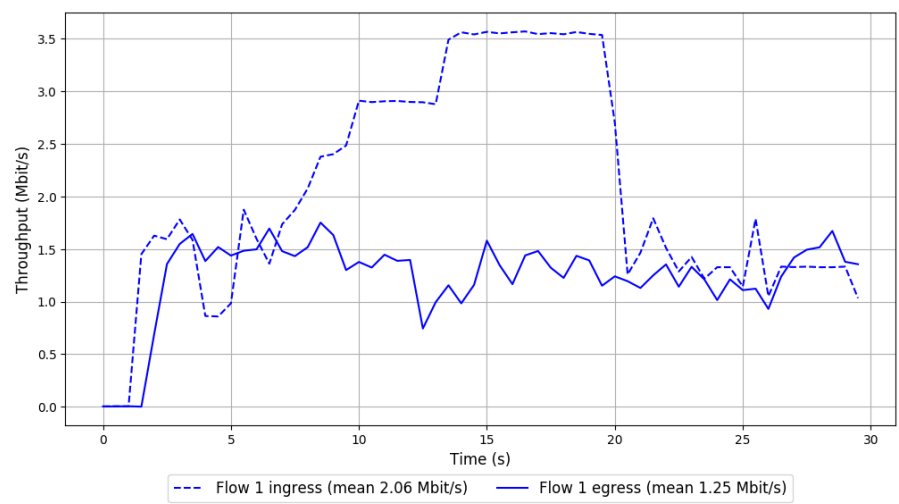


Run 1: Statistics of Vivace-loss

Start at: 2018-03-12 21:07:57
End at: 2018-03-12 21:08:27
Local clock offset: -17.072 ms
Remote clock offset: -1.399 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 6646.551 ms
Loss rate: 39.78%
-- Flow 1:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 6646.551 ms
Loss rate: 39.78%

Run 1: Report of Vivace-loss — Data Link

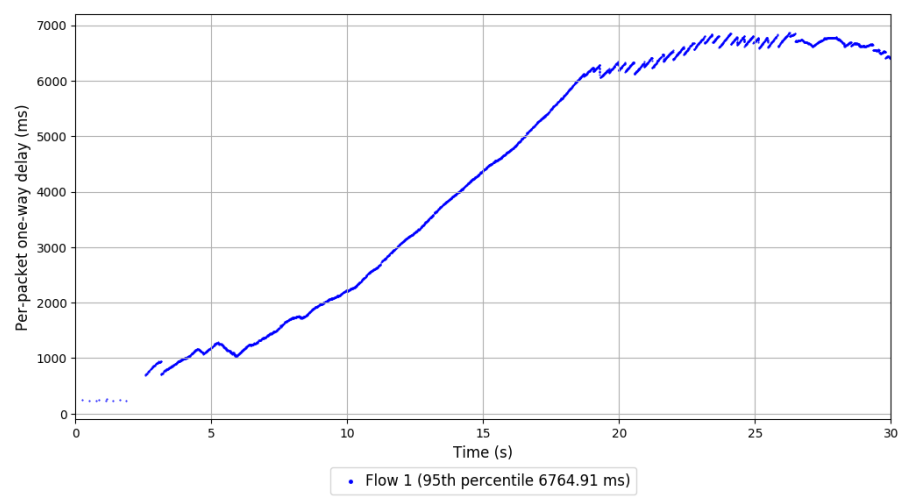
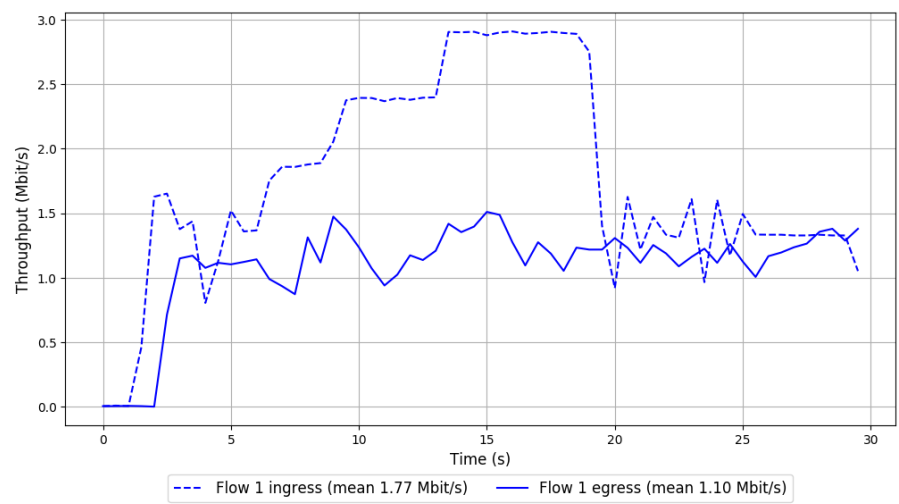


Run 2: Statistics of Vivace-loss

Start at: 2018-03-12 21:29:03
End at: 2018-03-12 21:29:33
Local clock offset: -22.22 ms
Remote clock offset: -6.934 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 6764.908 ms
Loss rate: 37.94%
-- Flow 1:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 6764.908 ms
Loss rate: 37.94%

Run 2: Report of Vivace-loss — Data Link

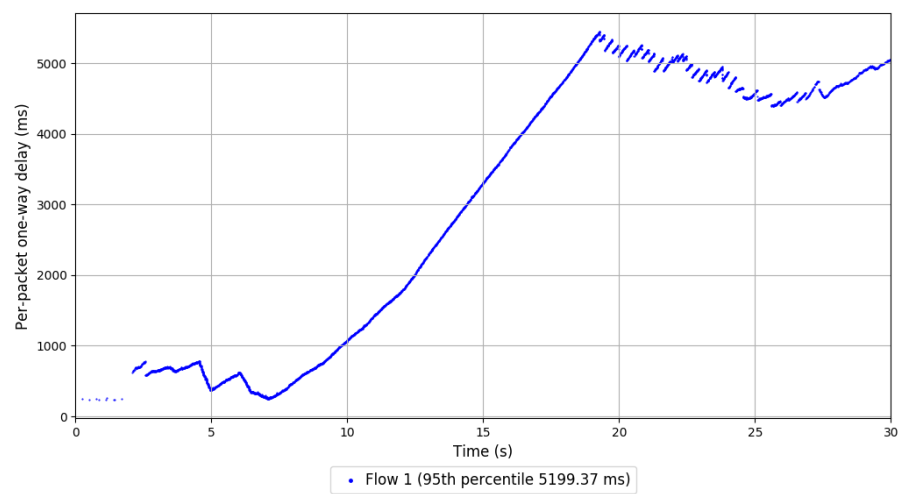
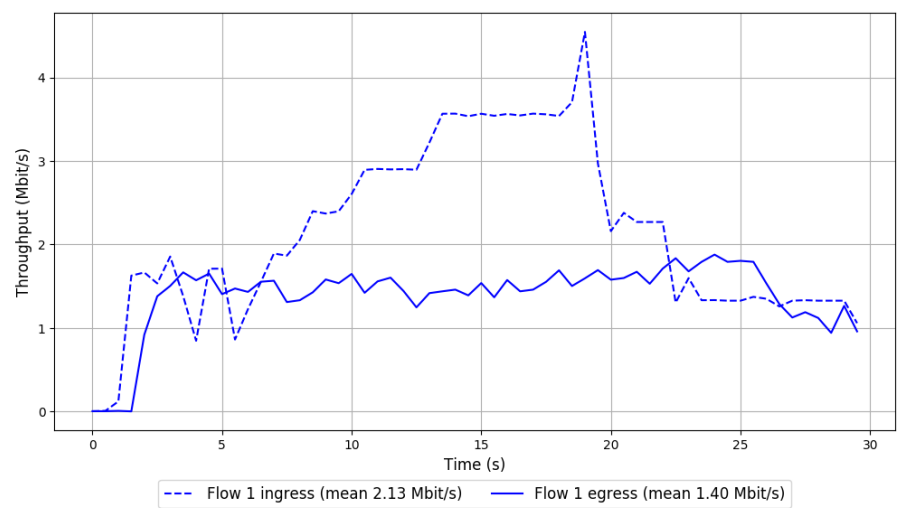


Run 3: Statistics of Vivace-loss

Start at: 2018-03-12 21:50:09
End at: 2018-03-12 21:50:39
Local clock offset: -8.659 ms
Remote clock offset: -6.937 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 5199.367 ms
Loss rate: 34.50%
-- Flow 1:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 5199.367 ms
Loss rate: 34.50%

Run 3: Report of Vivace-loss — Data Link

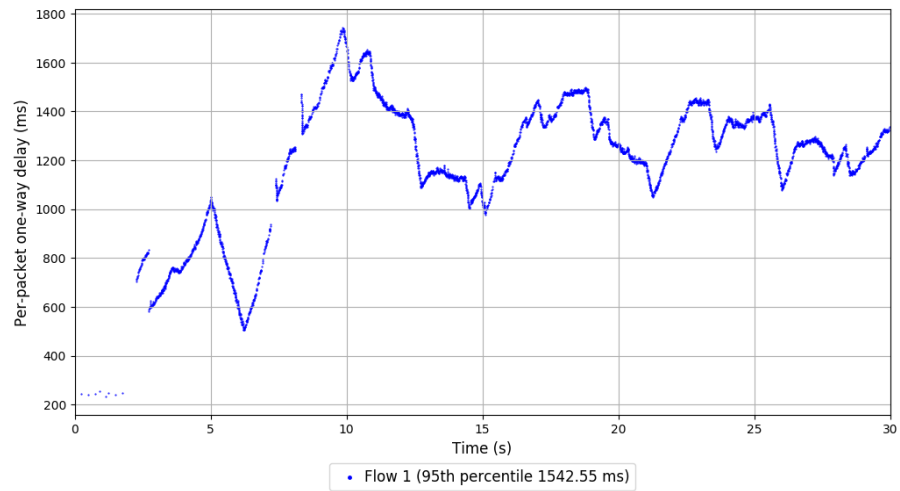
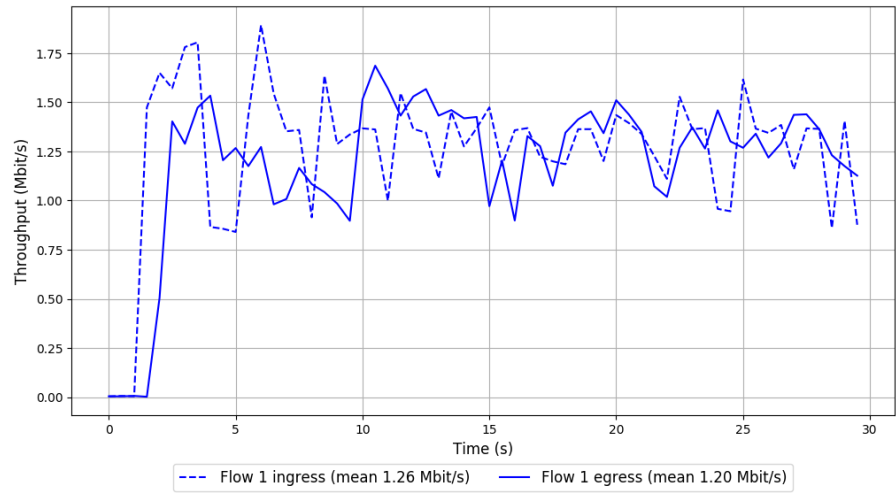


Run 1: Statistics of Vivace-LTE

Start at: 2018-03-12 20:59:44
End at: 2018-03-12 21:00:14
Local clock offset: -15.189 ms
Remote clock offset: -1.261 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 1542.546 ms
Loss rate: 4.72%
-- Flow 1:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 1542.546 ms
Loss rate: 4.72%

Run 1: Report of Vivace-LTE — Data Link

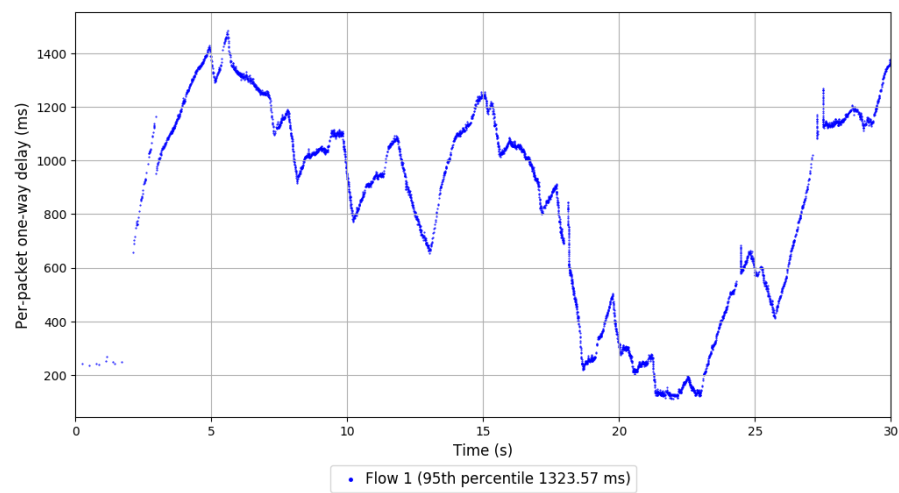
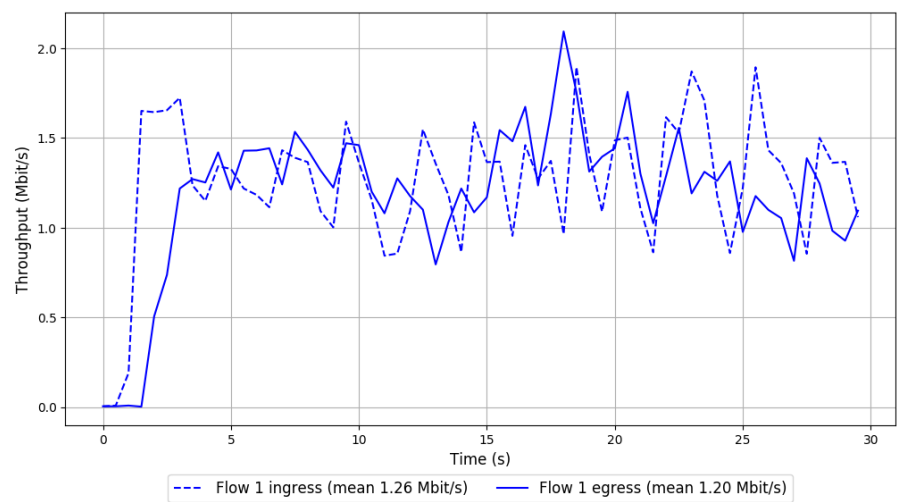


Run 2: Statistics of Vivace-LTE

Start at: 2018-03-12 21:20:51
End at: 2018-03-12 21:21:21
Local clock offset: -20.147 ms
Remote clock offset: -6.169 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 1323.569 ms
Loss rate: 5.50%
-- Flow 1:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 1323.569 ms
Loss rate: 5.50%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-03-12 21:41:57
End at: 2018-03-12 21:42:27
Local clock offset: -14.615 ms
Remote clock offset: -6.142 ms

Below is generated by plot.py at 2018-03-12 22:03:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 5202.079 ms
Loss rate: 19.06%
-- Flow 1:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 5202.079 ms
Loss rate: 19.06%

Run 3: Report of Vivace-LTE — Data Link

