

Pantheon Report

Generated at 2018-02-19 18:12:56 (UTC).

Data path: AWS India 1 Ethernet (*local*) → India 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).

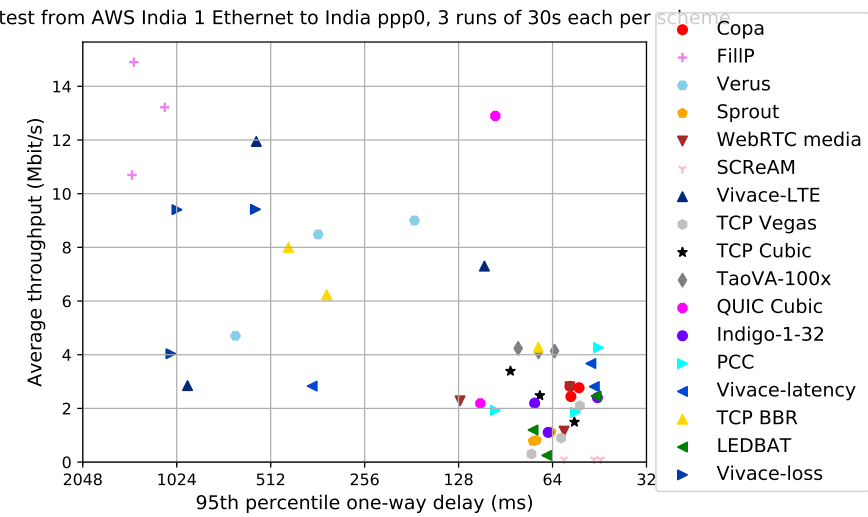
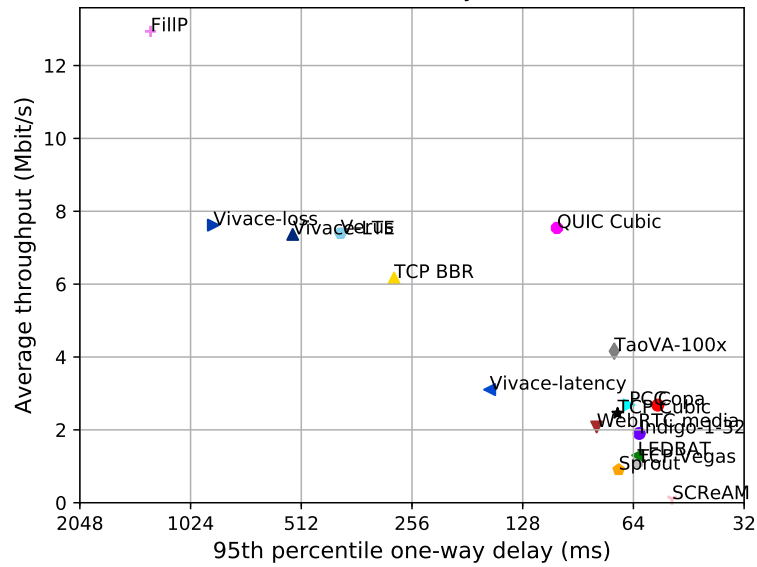
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

NTP offsets were measured against **nets.org.sg** 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-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eae30b267cde681
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 India 1 Ethernet to India ppp0, 3 runs of 30s each per scheme
(mean of all runs by scheme)



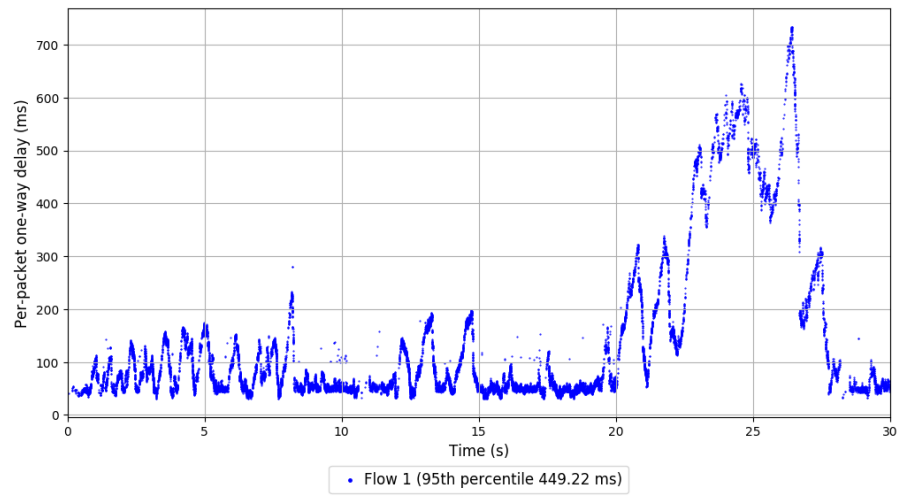
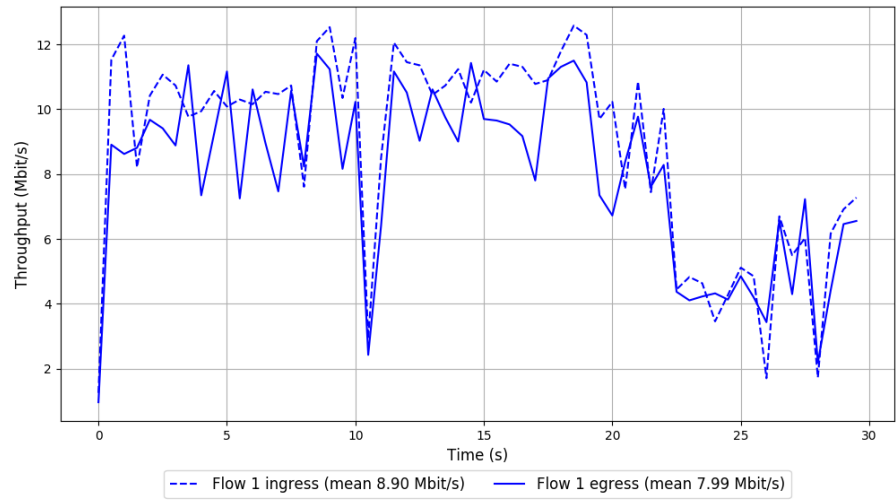
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	6.17	286.34	11.15
TCP Cubic	3	2.45	70.68	2.84
LEDBAT	3	1.30	62.36	6.25
PCC	3	2.69	65.74	5.20
QUIC Cubic	2	7.54	103.29	1.55
SCReAM	3	0.10	50.26	3.25
WebRTC media	3	2.08	80.57	4.18
Sprout	3	0.91	70.20	5.25
TaoVA-100x	3	4.16	72.17	5.60
TCP Vegas	3	1.10	62.38	7.98
Verus	3	7.39	400.47	27.00
Copa	3	2.68	54.94	2.88
FillP	3	12.94	1315.41	75.66
Indigo-1-32	3	1.90	61.70	17.63
Vivace-latency	3	3.10	157.42	2.26
Vivace-loss	3	7.62	887.80	11.85
Vivace-LTE	3	7.37	540.15	3.09

Run 1: Statistics of TCP BBR

Start at: 2018-02-19 17:20:59
End at: 2018-02-19 17:21:29
Local clock offset: -31.315 ms
Remote clock offset: -19.113 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 7.99 Mbit/s
95th percentile per-packet one-way delay: 449.221 ms
Loss rate: 10.33%
-- Flow 1:
Average throughput: 7.99 Mbit/s
95th percentile per-packet one-way delay: 449.221 ms
Loss rate: 10.33%

Run 1: Report of TCP BBR — Data Link

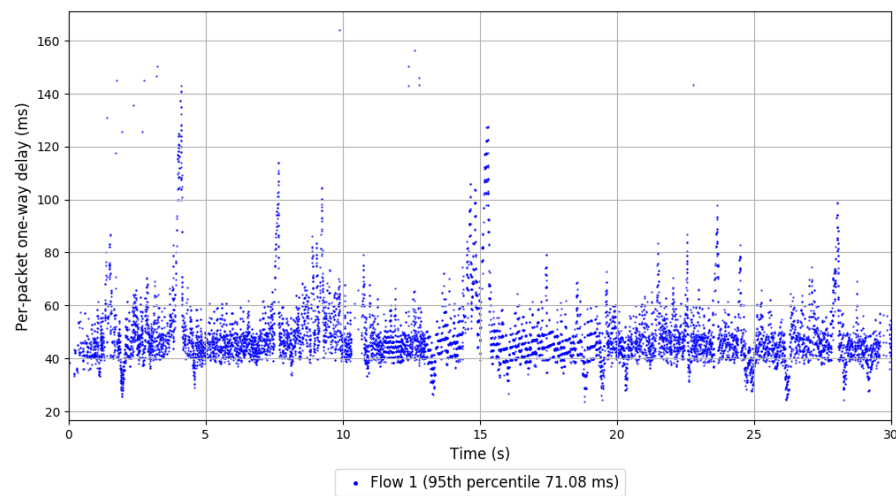
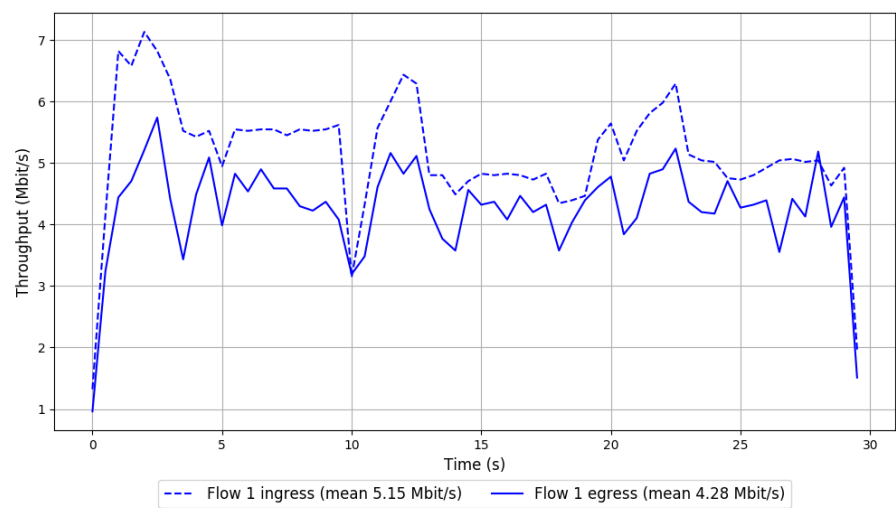


Run 2: Statistics of TCP BBR

Start at: 2018-02-19 17:40:46
End at: 2018-02-19 17:41:16
Local clock offset: -12.814 ms
Remote clock offset: -18.963 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.28 Mbit/s
95th percentile per-packet one-way delay: 71.076 ms
Loss rate: 16.97%
-- Flow 1:
Average throughput: 4.28 Mbit/s
95th percentile per-packet one-way delay: 71.076 ms
Loss rate: 16.97%

Run 2: Report of TCP BBR — Data Link

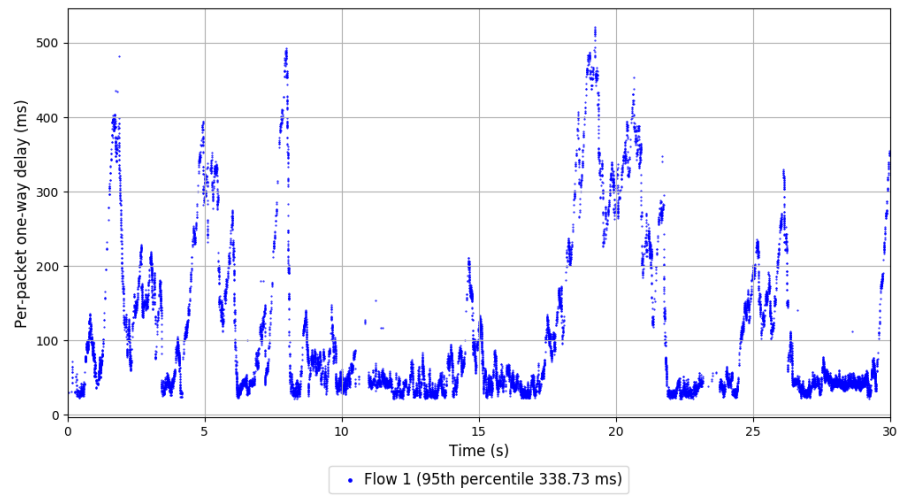
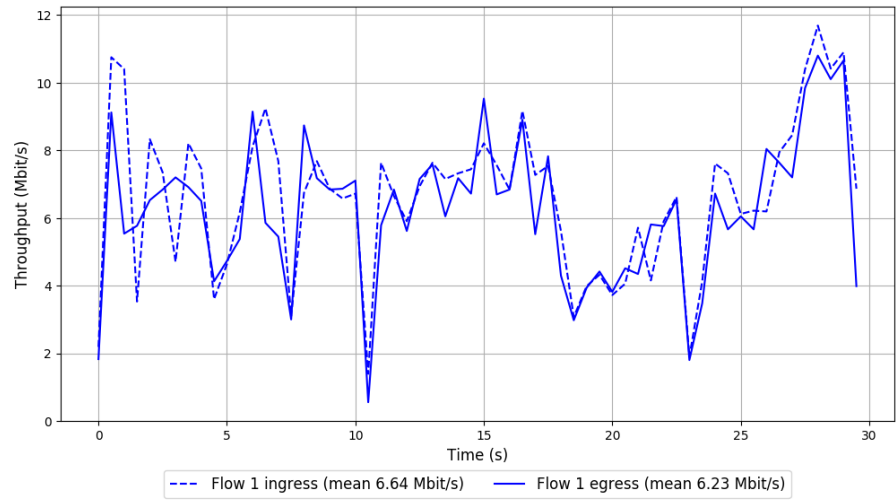


Run 3: Statistics of TCP BBR

Start at: 2018-02-19 18:00:29
End at: 2018-02-19 18:00:59
Local clock offset: -8.965 ms
Remote clock offset: -22.235 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.23 Mbit/s
95th percentile per-packet one-way delay: 338.728 ms
Loss rate: 6.15%
-- Flow 1:
Average throughput: 6.23 Mbit/s
95th percentile per-packet one-way delay: 338.728 ms
Loss rate: 6.15%

Run 3: Report of TCP BBR — Data Link

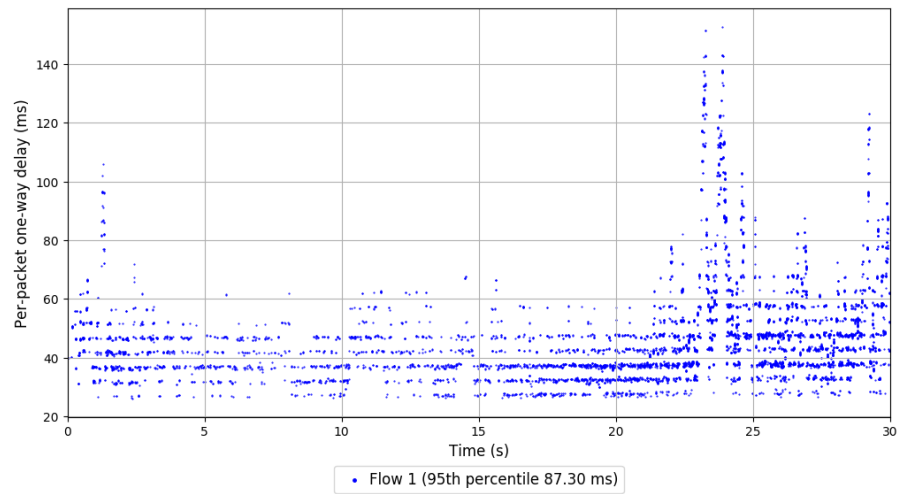
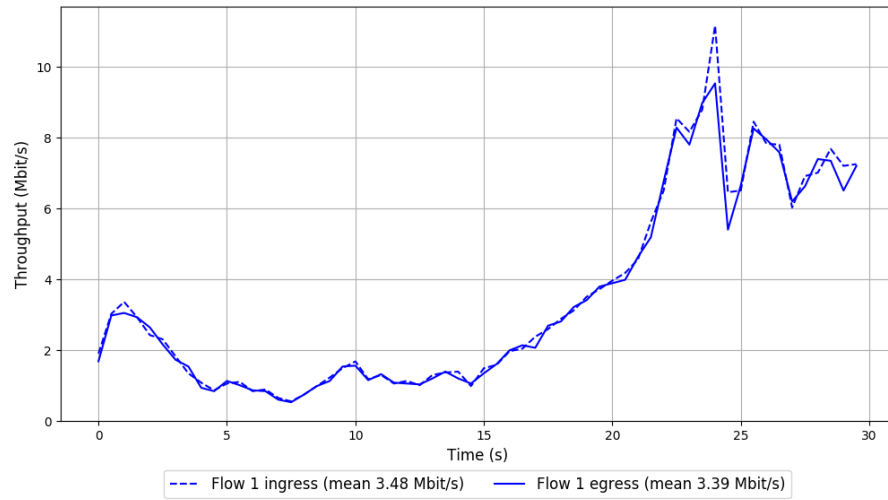


Run 1: Statistics of TCP Cubic

Start at: 2018-02-19 17:22:05
End at: 2018-02-19 17:22:35
Local clock offset: -25.948 ms
Remote clock offset: -17.873 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.39 Mbit/s
95th percentile per-packet one-way delay: 87.297 ms
Loss rate: 2.75%
-- Flow 1:
Average throughput: 3.39 Mbit/s
95th percentile per-packet one-way delay: 87.297 ms
Loss rate: 2.75%

Run 1: Report of TCP Cubic — Data Link

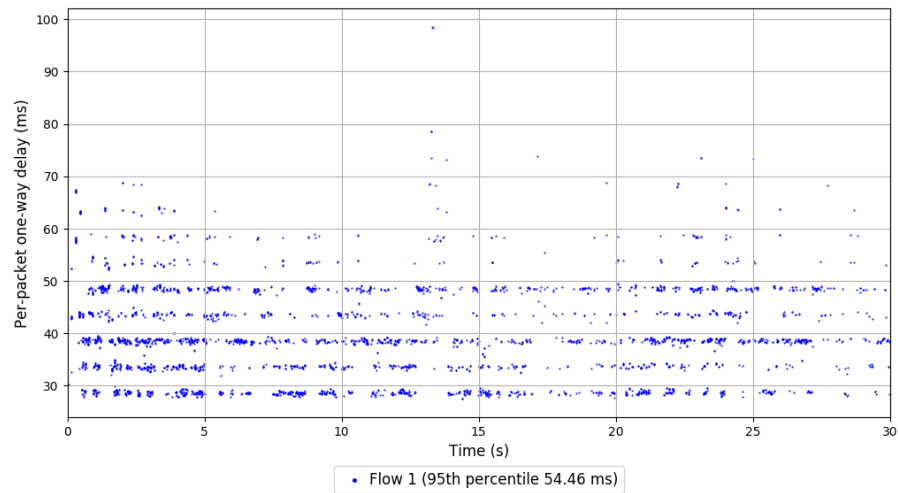
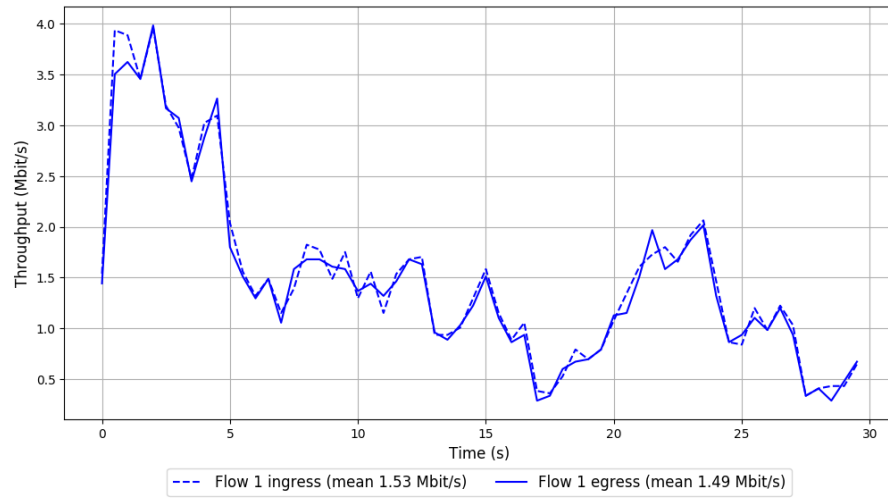


Run 2: Statistics of TCP Cubic

Start at: 2018-02-19 17:41:52
End at: 2018-02-19 17:42:22
Local clock offset: -14.221 ms
Remote clock offset: -18.436 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 54.462 ms
Loss rate: 2.56%
-- Flow 1:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 54.462 ms
Loss rate: 2.56%

Run 2: Report of TCP Cubic — Data Link

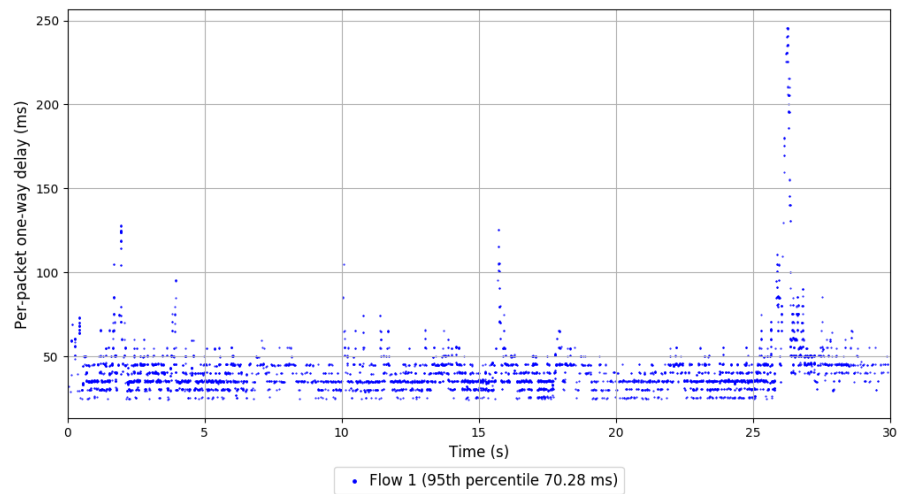
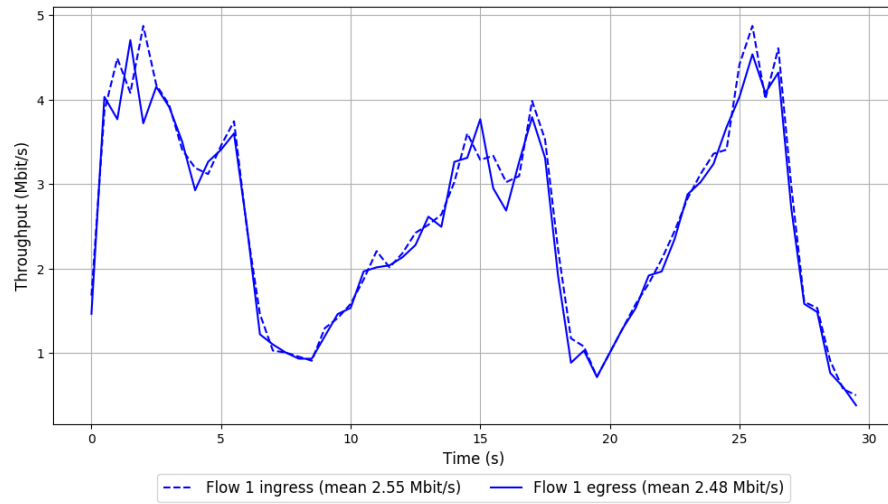


Run 3: Statistics of TCP Cubic

Start at: 2018-02-19 18:01:34
End at: 2018-02-19 18:02:04
Local clock offset: -10.11 ms
Remote clock offset: -20.73 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 70.281 ms
Loss rate: 3.20%
-- Flow 1:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 70.281 ms
Loss rate: 3.20%

Run 3: Report of TCP Cubic — Data Link

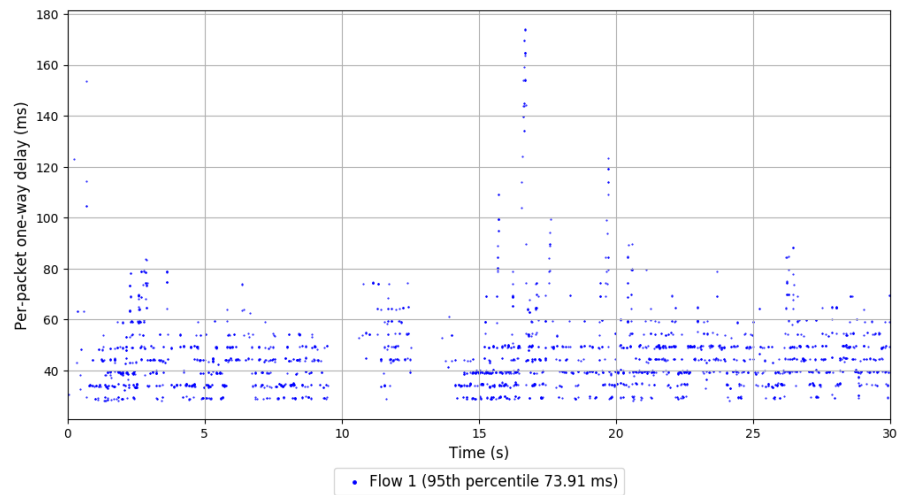
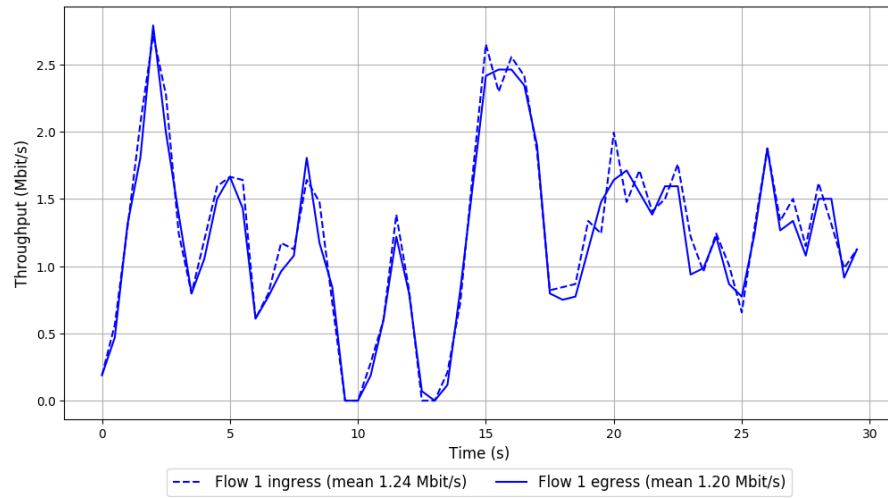


```
Run 1: Statistics of LEDBAT

Start at: 2018-02-19 17:28:43
End at: 2018-02-19 17:29:13
Local clock offset: -18.105 ms
Remote clock offset: -19.6 ms

# Below is generated by plot.py at 2018-02-19 18:12:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 73.911 ms
Loss rate: 3.84%
-- Flow 1:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 73.911 ms
Loss rate: 3.84%
```


Run 1: Report of LEDBAT — Data Link

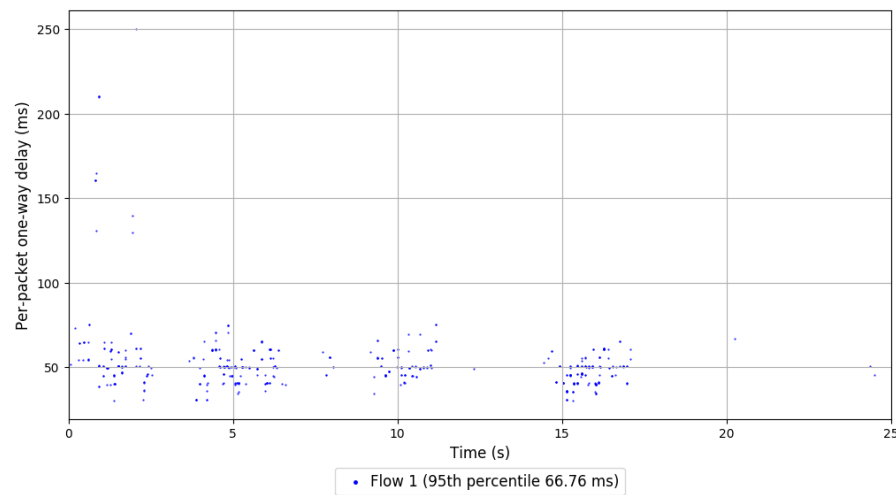
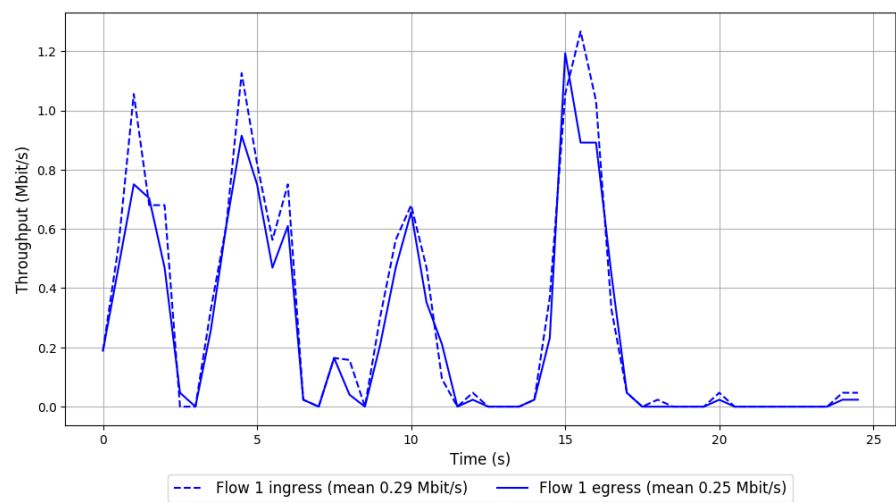


Run 2: Statistics of LEDBAT

Start at: 2018-02-19 17:48:30
End at: 2018-02-19 17:49:00
Local clock offset: -15.846 ms
Remote clock offset: -19.951 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 66.762 ms
Loss rate: 13.77%
-- Flow 1:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 66.762 ms
Loss rate: 13.77%

Run 2: Report of LEDBAT — Data Link

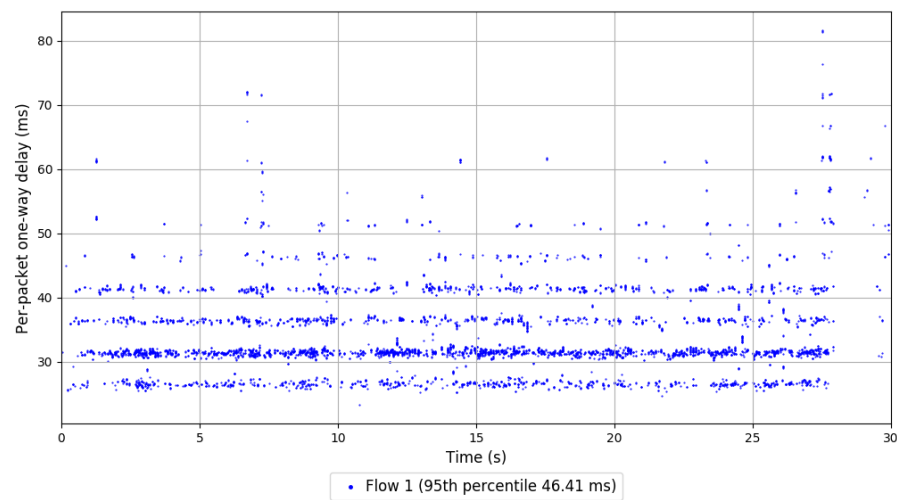
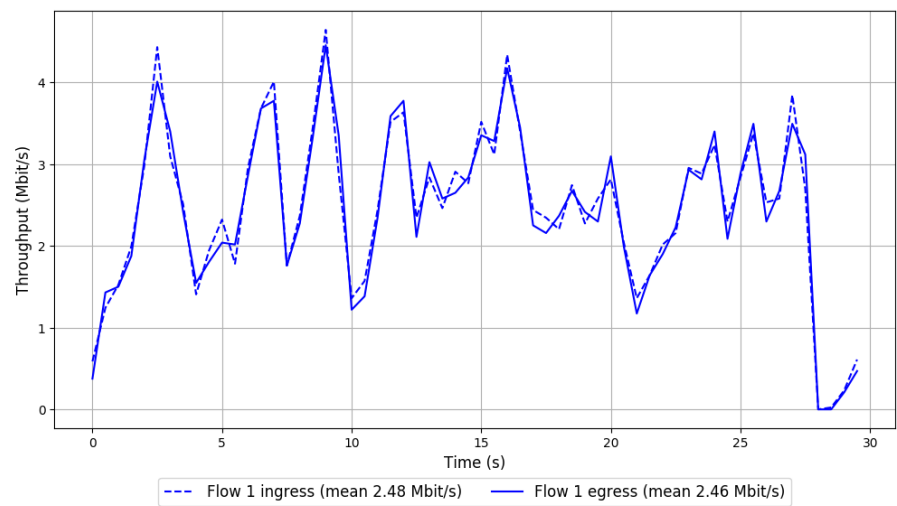


Run 3: Statistics of LEDBAT

Start at: 2018-02-19 18:08:11
End at: 2018-02-19 18:08:41
Local clock offset: -9.411 ms
Remote clock offset: -22.092 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 46.410 ms
Loss rate: 1.15%
-- Flow 1:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 46.410 ms
Loss rate: 1.15%

Run 3: Report of LEDBAT — Data Link

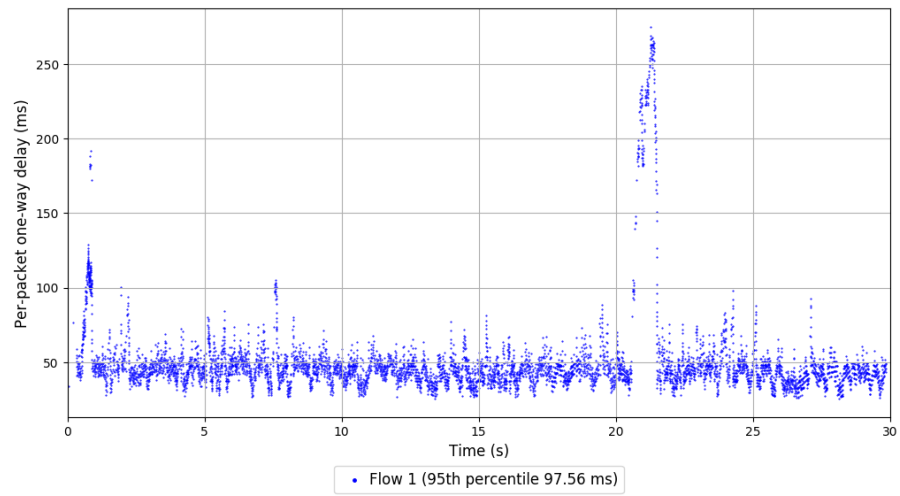
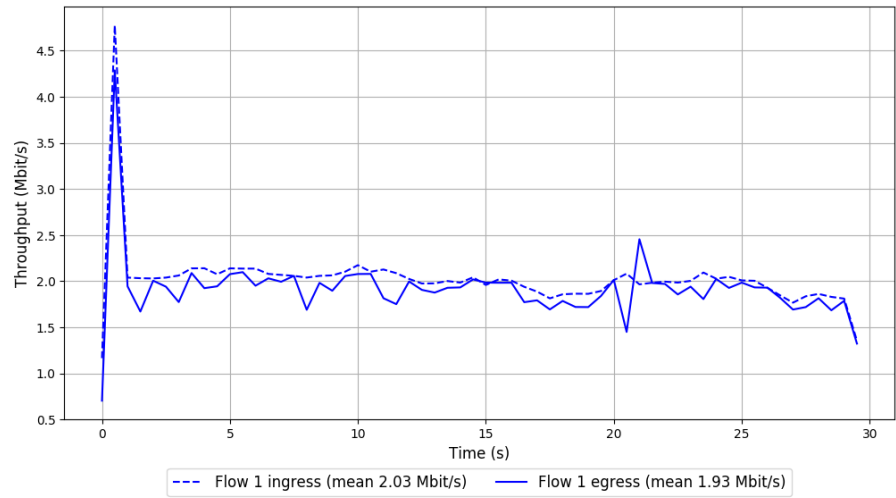


Run 1: Statistics of PCC

Start at: 2018-02-19 17:29:48
End at: 2018-02-19 17:30:18
Local clock offset: -14.968 ms
Remote clock offset: -19.313 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 97.561 ms
Loss rate: 5.38%
-- Flow 1:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 97.561 ms
Loss rate: 5.38%

Run 1: Report of PCC — Data Link

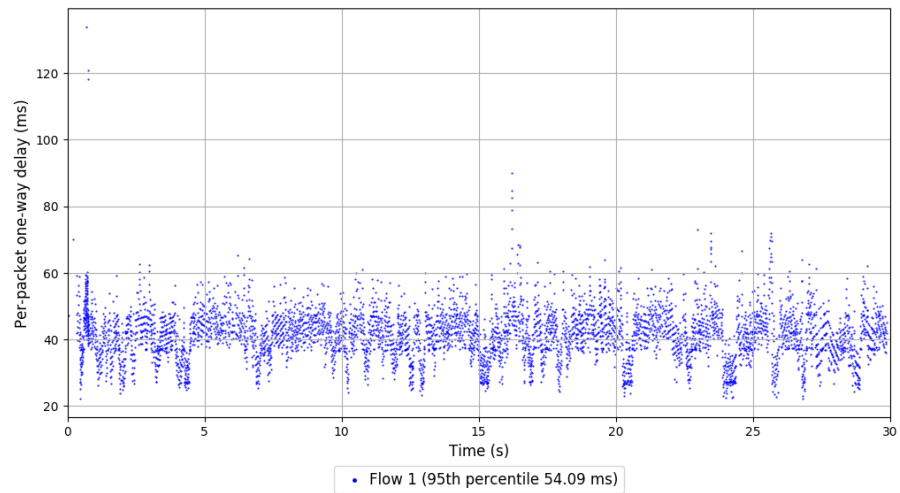
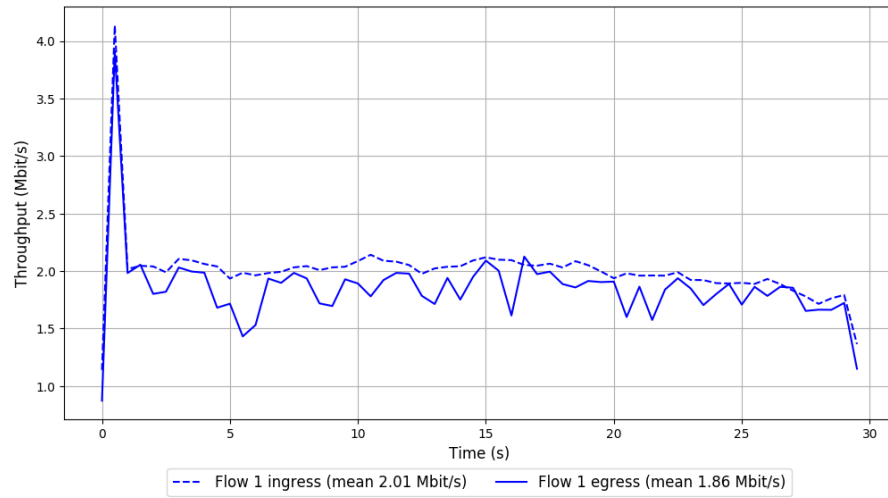


Run 2: Statistics of PCC

Start at: 2018-02-19 17:49:36
End at: 2018-02-19 17:50:06
Local clock offset: -18.92 ms
Remote clock offset: -26.859 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.86 Mbit/s
95th percentile per-packet one-way delay: 54.087 ms
Loss rate: 7.77%
-- Flow 1:
Average throughput: 1.86 Mbit/s
95th percentile per-packet one-way delay: 54.087 ms
Loss rate: 7.77%

Run 2: Report of PCC — Data Link

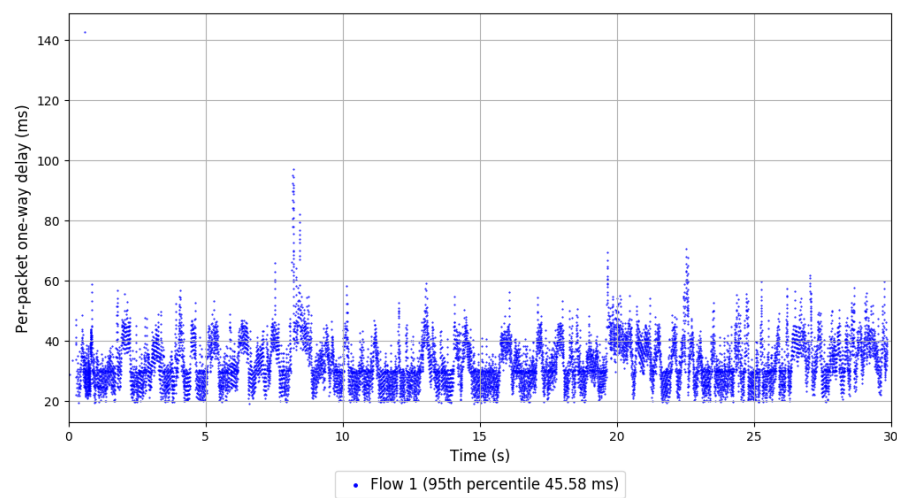
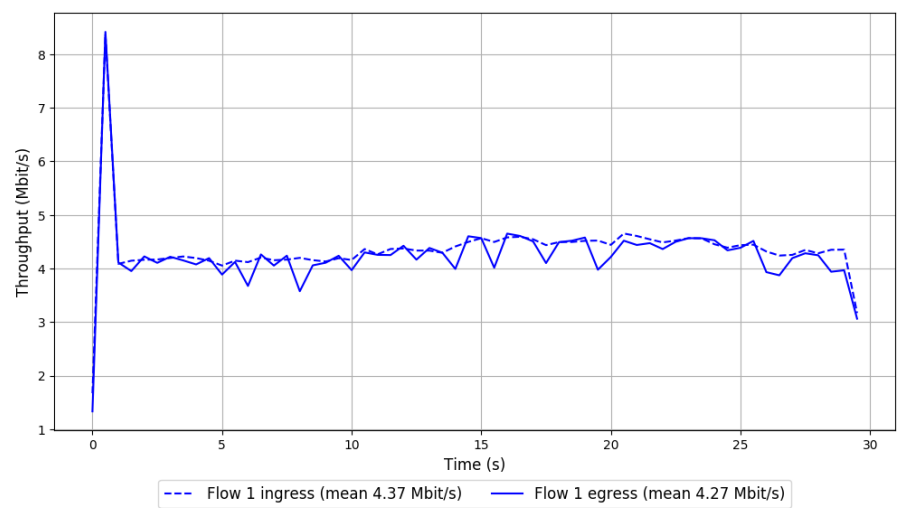


Run 3: Statistics of PCC

Start at: 2018-02-19 18:09:16
End at: 2018-02-19 18:09:46
Local clock offset: -7.224 ms
Remote clock offset: -21.941 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.27 Mbit/s
95th percentile per-packet one-way delay: 45.576 ms
Loss rate: 2.45%
-- Flow 1:
Average throughput: 4.27 Mbit/s
95th percentile per-packet one-way delay: 45.576 ms
Loss rate: 2.45%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

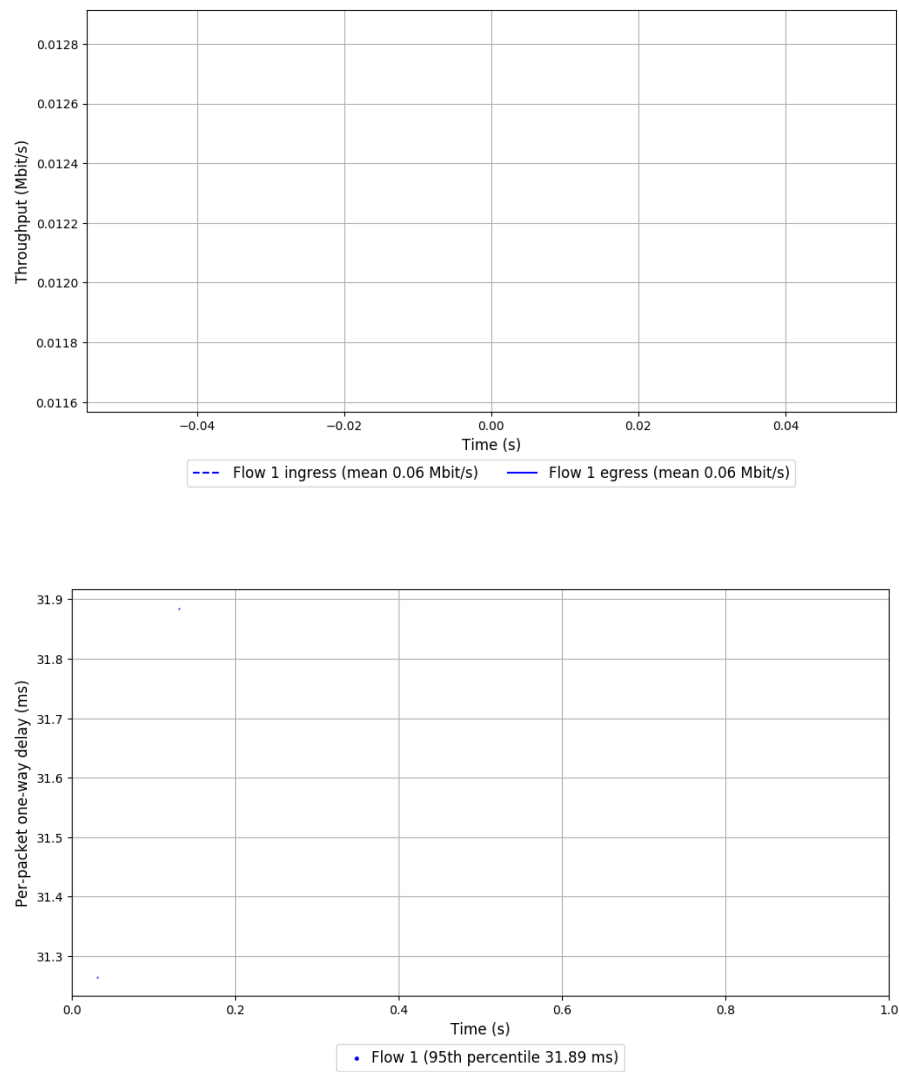
Start at: 2018-02-19 17:27:38

End at: 2018-02-19 17:28:08

Local clock offset: -18.787 ms

Remote clock offset: -20.251 ms

Run 1: Report of QUIC Cubic — Data Link

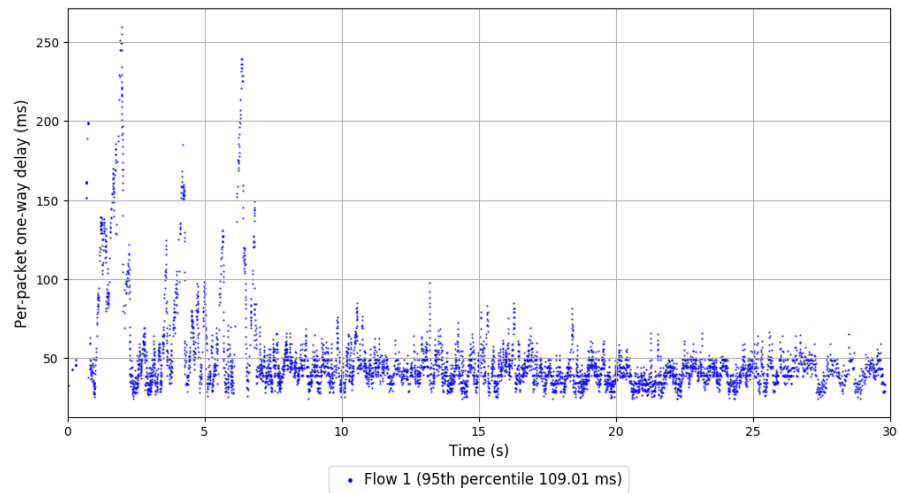
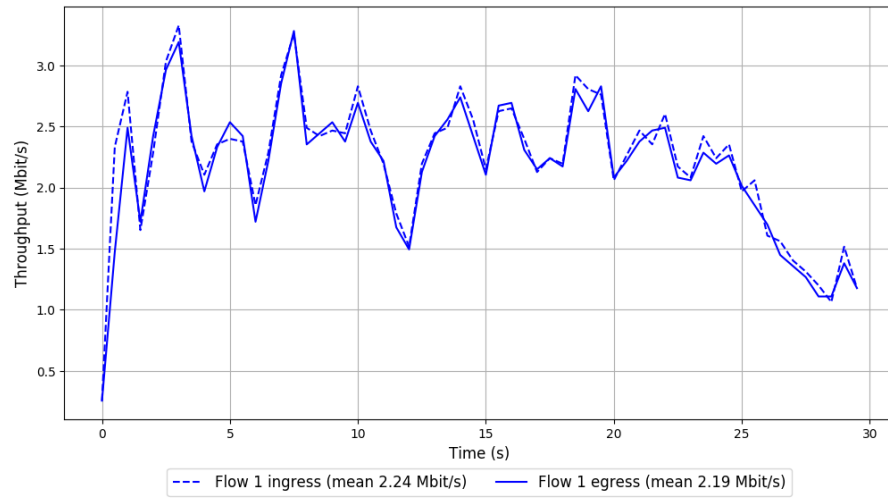


Run 2: Statistics of QUIC Cubic

Start at: 2018-02-19 17:47:20
End at: 2018-02-19 17:47:50
Local clock offset: -13.892 ms
Remote clock offset: -18.936 ms

Below is generated by plot.py at 2018-02-19 18:12:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 109.007 ms
Loss rate: 2.44%
-- Flow 1:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 109.007 ms
Loss rate: 2.44%

Run 2: Report of QUIC Cubic — Data Link

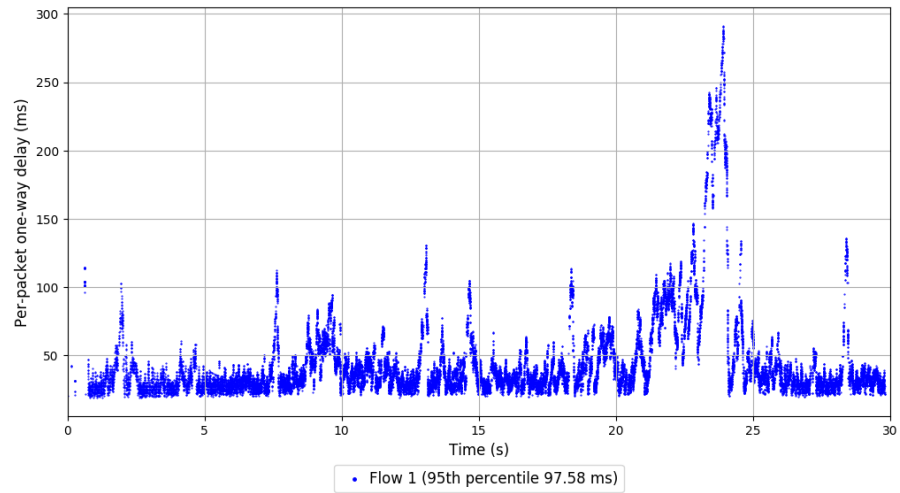
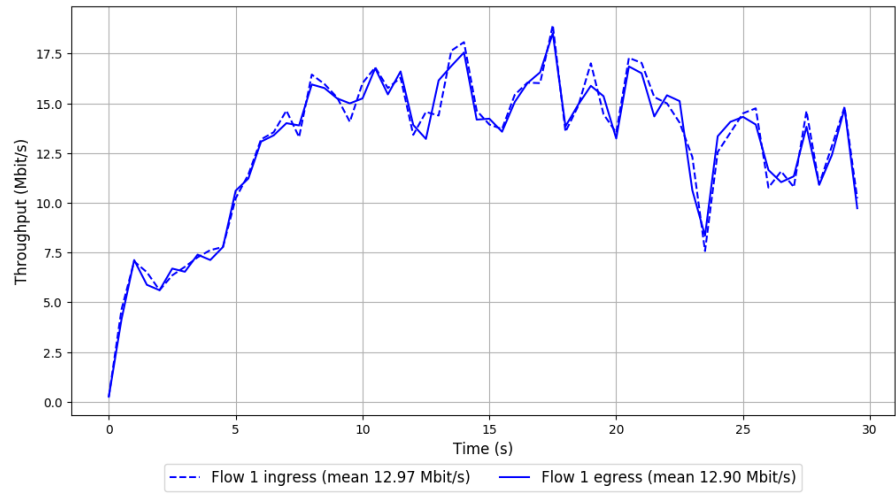


Run 3: Statistics of QUIC Cubic

Start at: 2018-02-19 18:07:04
End at: 2018-02-19 18:07:34
Local clock offset: -6.26 ms
Remote clock offset: -22.034 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 12.90 Mbit/s
95th percentile per-packet one-way delay: 97.576 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 12.90 Mbit/s
95th percentile per-packet one-way delay: 97.576 ms
Loss rate: 0.67%

Run 3: Report of QUIC Cubic — Data Link

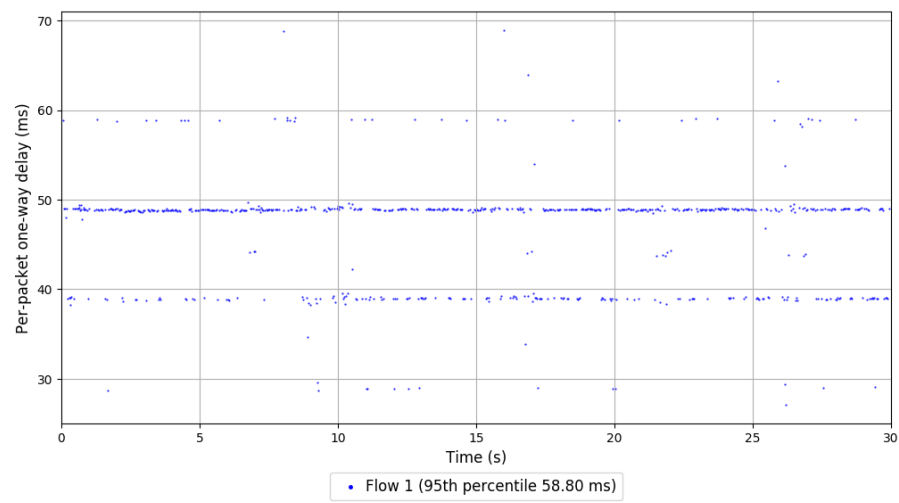
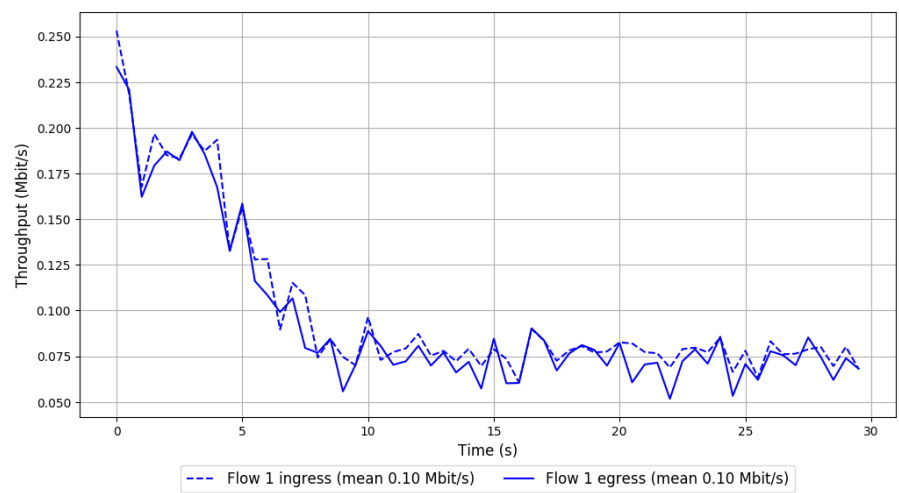


Run 1: Statistics of SCReAM

Start at: 2018-02-19 17:12:11
End at: 2018-02-19 17:12:41
Local clock offset: -40.519 ms
Remote clock offset: -19.085 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 58.795 ms
Loss rate: 5.34%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 58.795 ms
Loss rate: 5.34%

Run 1: Report of SReAM — Data Link

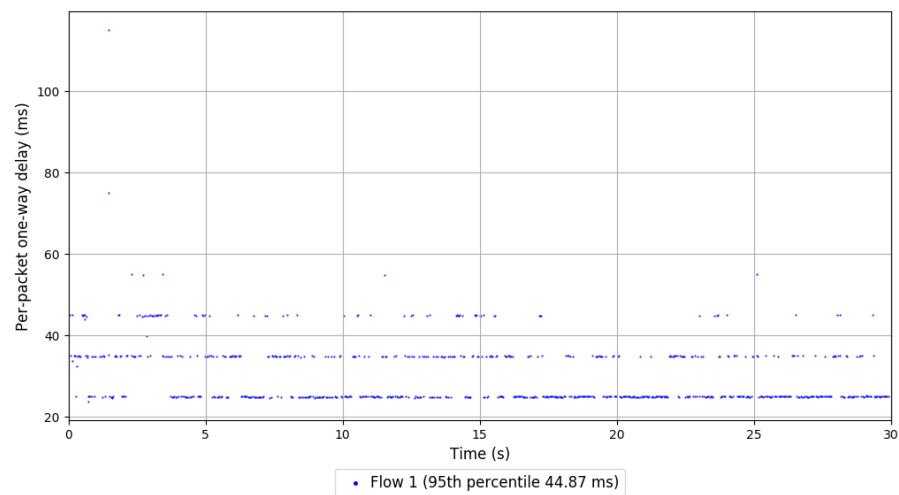
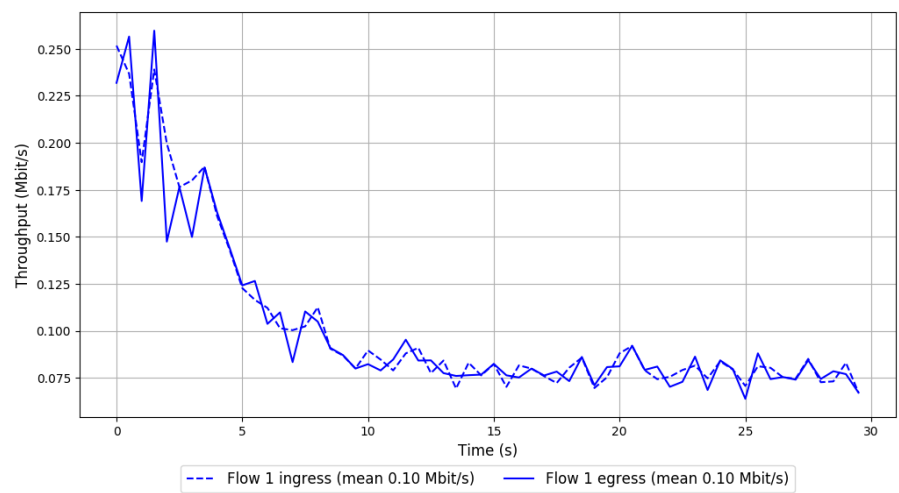


Run 2: Statistics of SCReAM

Start at: 2018-02-19 17:31:59
End at: 2018-02-19 17:32:29
Local clock offset: -11.922 ms
Remote clock offset: -21.029 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 44.867 ms
Loss rate: 1.67%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 44.867 ms
Loss rate: 1.67%

Run 2: Report of SReAM — Data Link

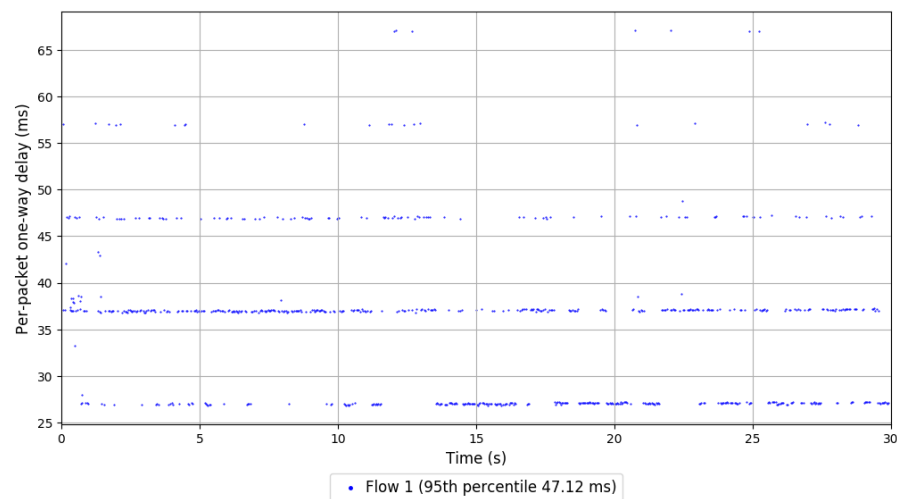
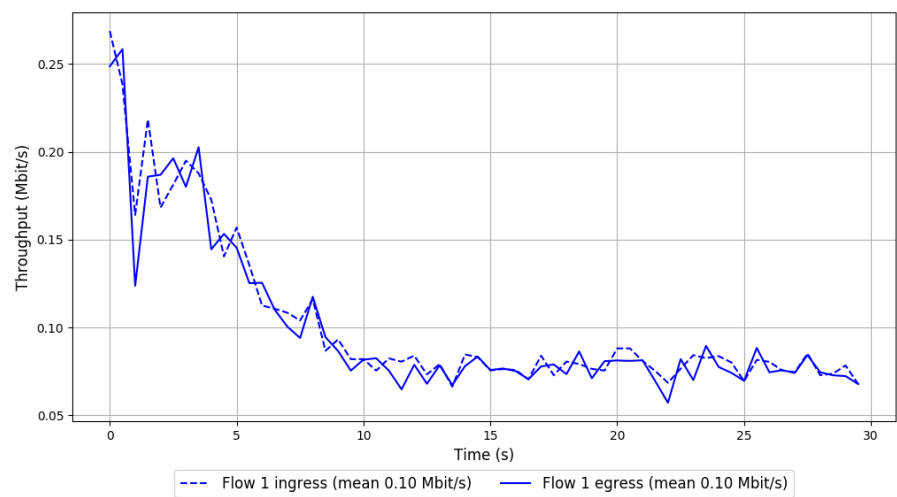


Run 3: Statistics of SCReAM

Start at: 2018-02-19 17:51:46
End at: 2018-02-19 17:52:16
Local clock offset: -13.171 ms
Remote clock offset: -21.108 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 47.125 ms
Loss rate: 2.74%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 47.125 ms
Loss rate: 2.74%

Run 3: Report of SReAM — Data Link

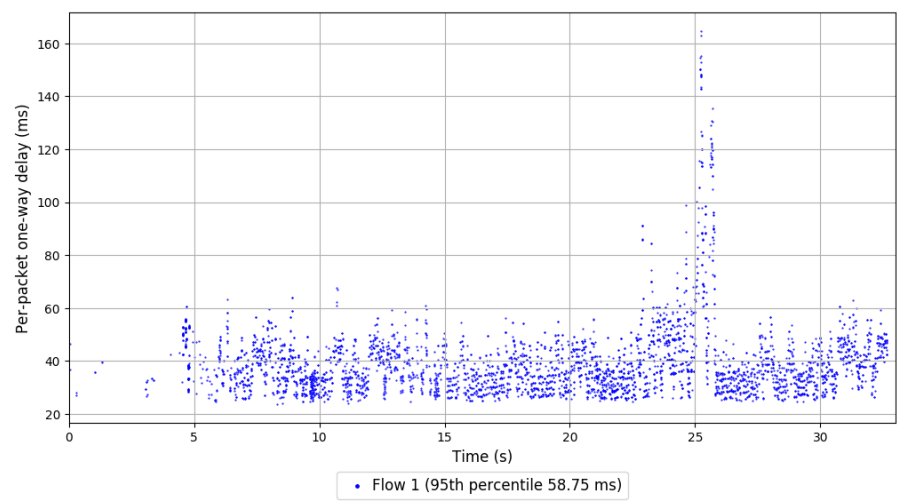
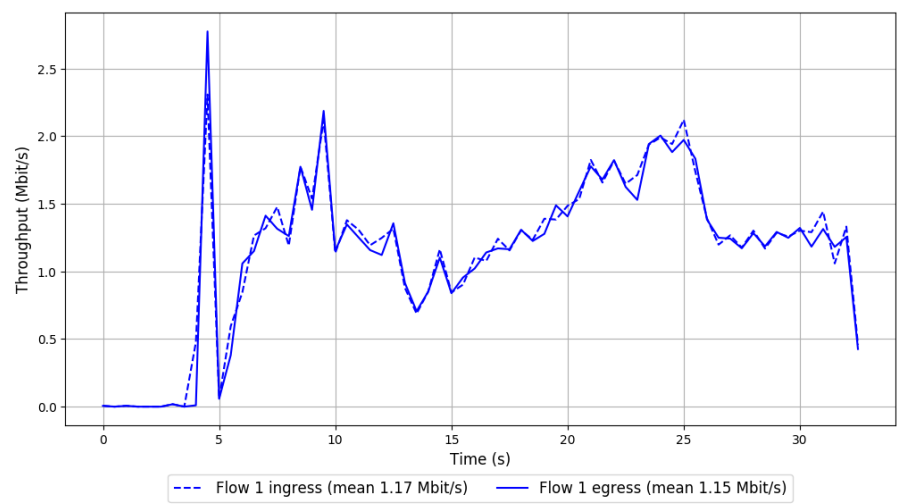


Run 1: Statistics of WebRTC media

Start at: 2018-02-19 17:26:32
End at: 2018-02-19 17:27:02
Local clock offset: -17.57 ms
Remote clock offset: -17.637 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 58.752 ms
Loss rate: 1.20%
-- Flow 1:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 58.752 ms
Loss rate: 1.20%

Run 1: Report of WebRTC media — Data Link

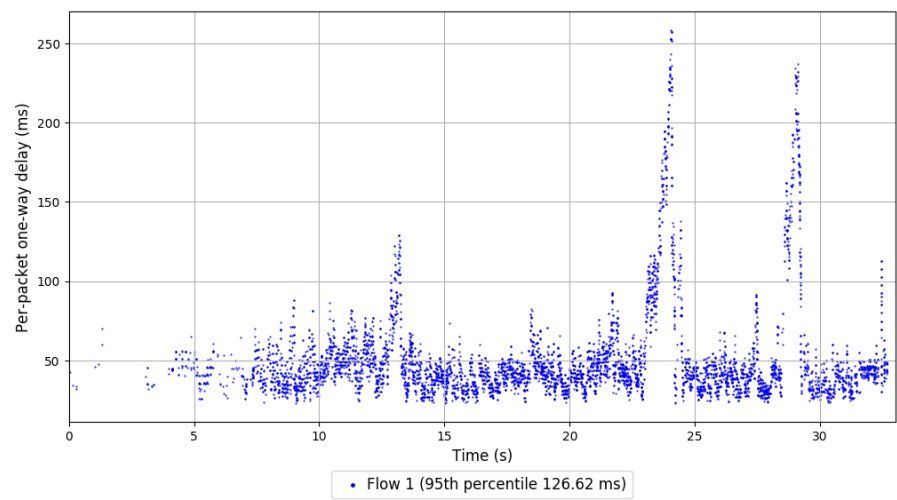
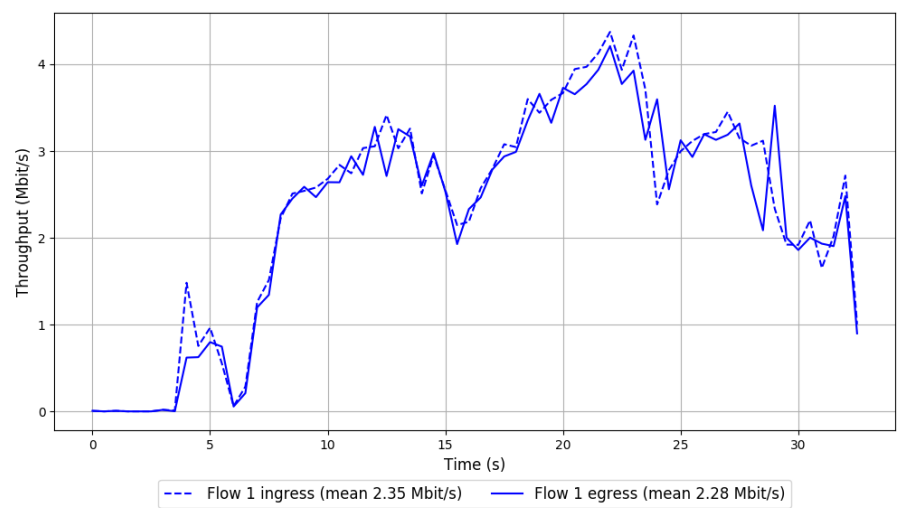


Run 2: Statistics of WebRTC media

Start at: 2018-02-19 17:46:15
End at: 2018-02-19 17:46:45
Local clock offset: -11.766 ms
Remote clock offset: -20.205 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 126.622 ms
Loss rate: 2.92%
-- Flow 1:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 126.622 ms
Loss rate: 2.92%

Run 2: Report of WebRTC media — Data Link

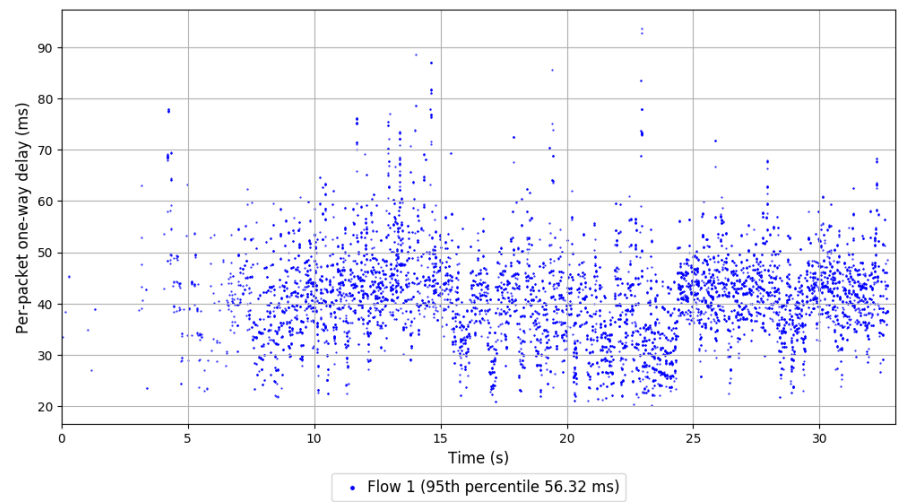
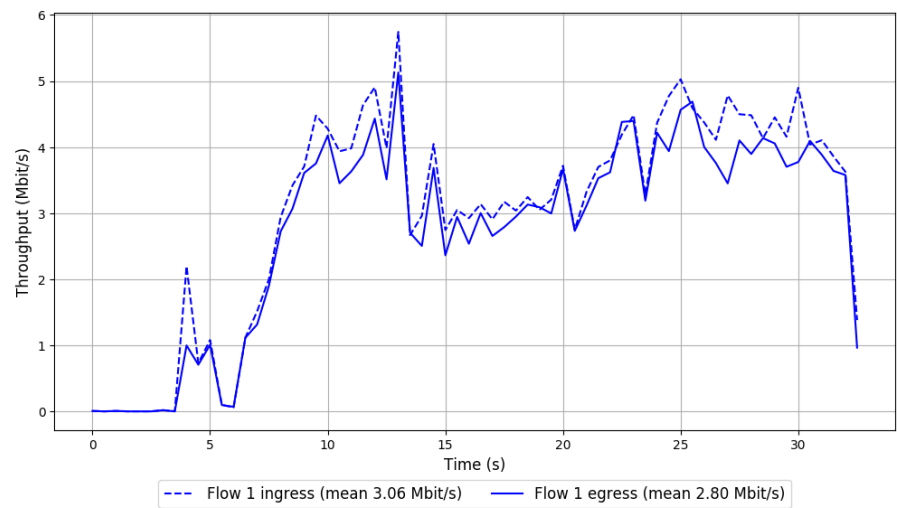


Run 3: Statistics of WebRTC media

Start at: 2018-02-19 18:05:59
End at: 2018-02-19 18:06:29
Local clock offset: -7.172 ms
Remote clock offset: -21.42 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.80 Mbit/s
95th percentile per-packet one-way delay: 56.324 ms
Loss rate: 8.43%
-- Flow 1:
Average throughput: 2.80 Mbit/s
95th percentile per-packet one-way delay: 56.324 ms
Loss rate: 8.43%

Run 3: Report of WebRTC media — Data Link

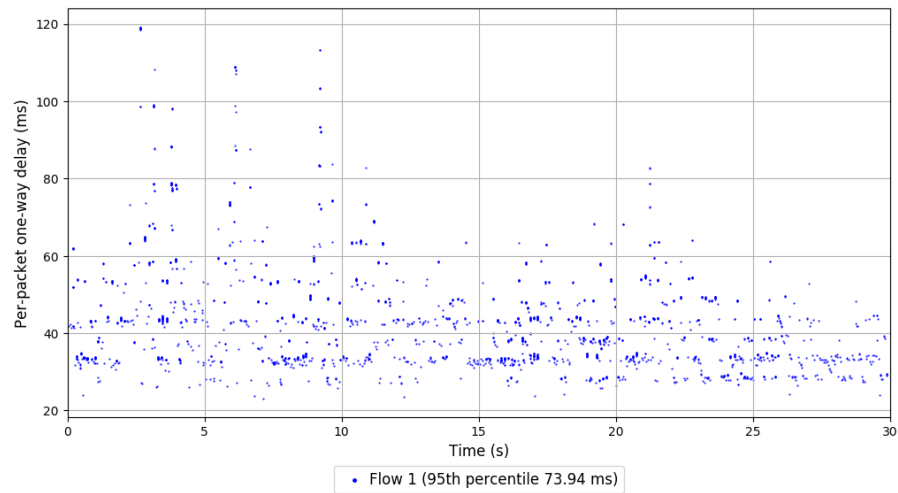
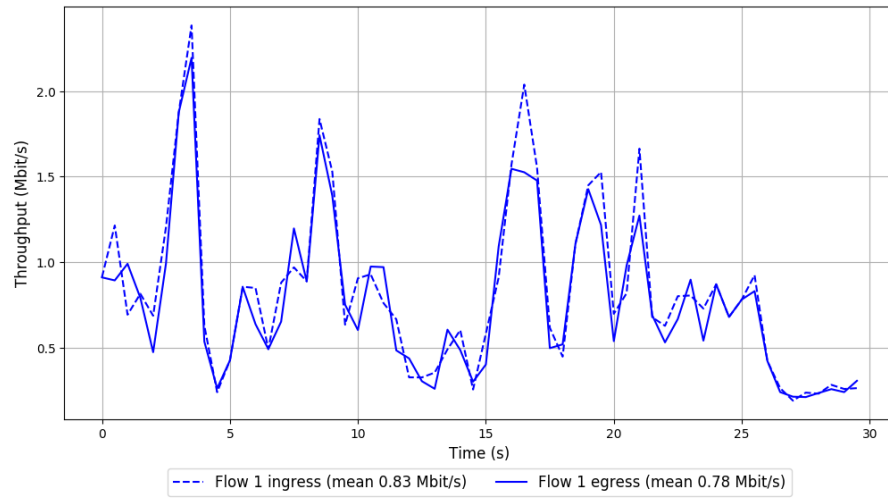


Run 1: Statistics of Sprout

Start at: 2018-02-19 17:16:37
End at: 2018-02-19 17:17:07
Local clock offset: -42.956 ms
Remote clock offset: -18.662 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 73.937 ms
Loss rate: 6.19%
-- Flow 1:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 73.937 ms
Loss rate: 6.19%

Run 1: Report of Sprout — Data Link

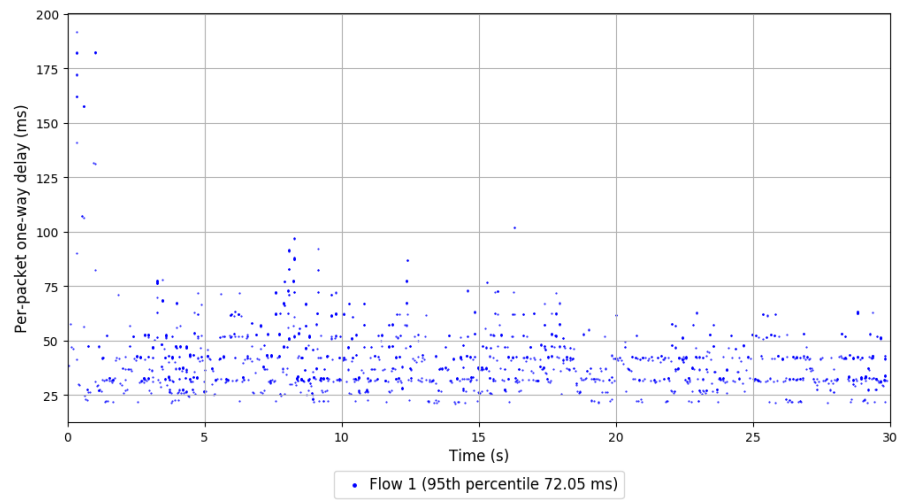
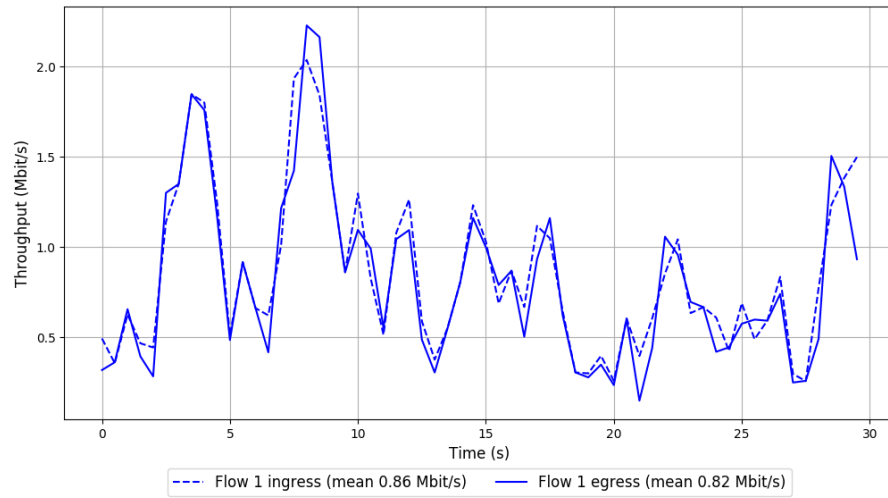


Run 2: Statistics of Sprout

Start at: 2018-02-19 17:36:21
End at: 2018-02-19 17:36:51
Local clock offset: -11.111 ms
Remote clock offset: -19.623 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 72.045 ms
Loss rate: 4.41%
-- Flow 1:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 72.045 ms
Loss rate: 4.41%

Run 2: Report of Sprout — Data Link

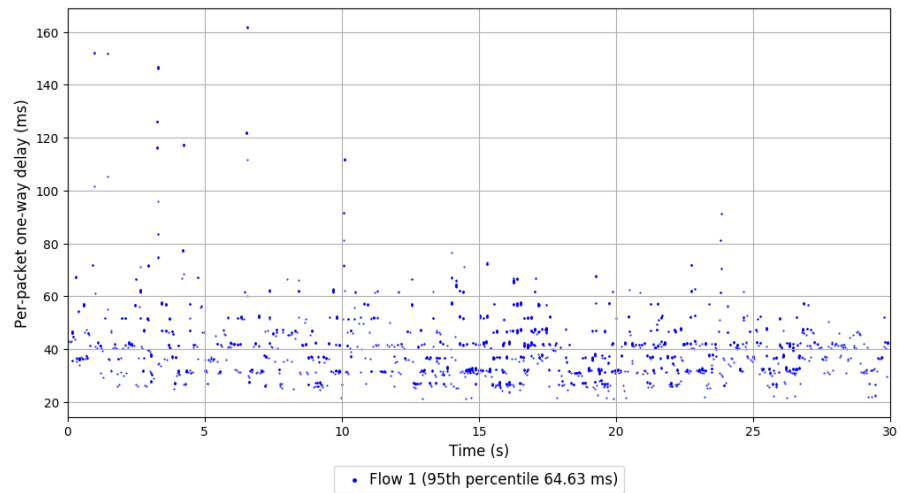
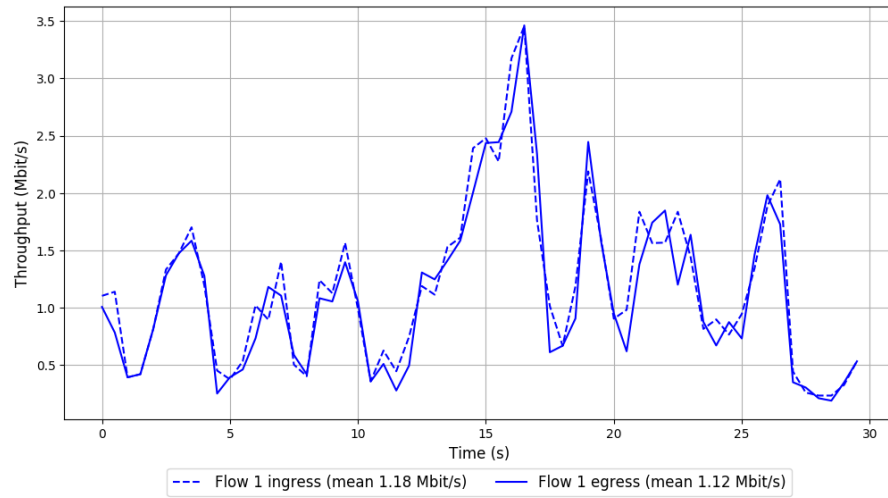


Run 3: Statistics of Sprout

Start at: 2018-02-19 17:56:08
End at: 2018-02-19 17:56:38
Local clock offset: -11.808 ms
Remote clock offset: -21.0 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 64.628 ms
Loss rate: 5.14%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 64.628 ms
Loss rate: 5.14%

Run 3: Report of Sprout — Data Link

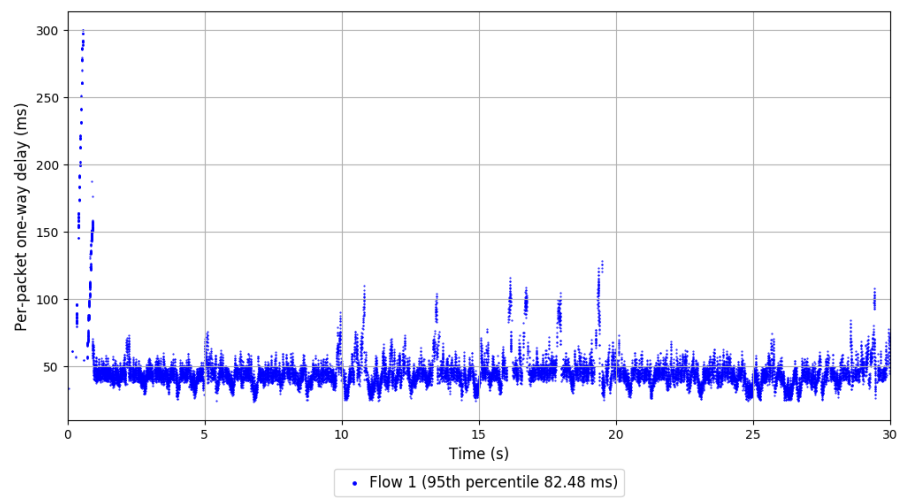
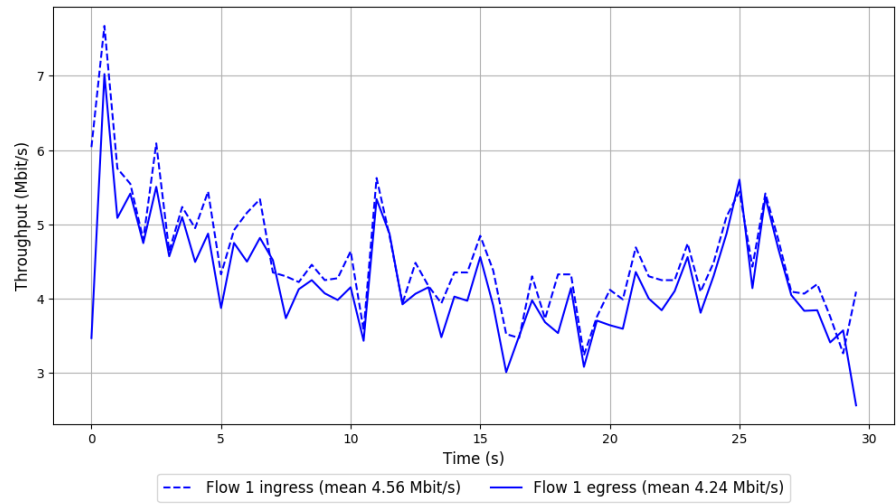


Run 1: Statistics of TaoVA-100x

Start at: 2018-02-19 17:13:17
End at: 2018-02-19 17:13:47
Local clock offset: -39.259 ms
Remote clock offset: -19.253 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.24 Mbit/s
95th percentile per-packet one-way delay: 82.484 ms
Loss rate: 7.16%
-- Flow 1:
Average throughput: 4.24 Mbit/s
95th percentile per-packet one-way delay: 82.484 ms
Loss rate: 7.16%

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

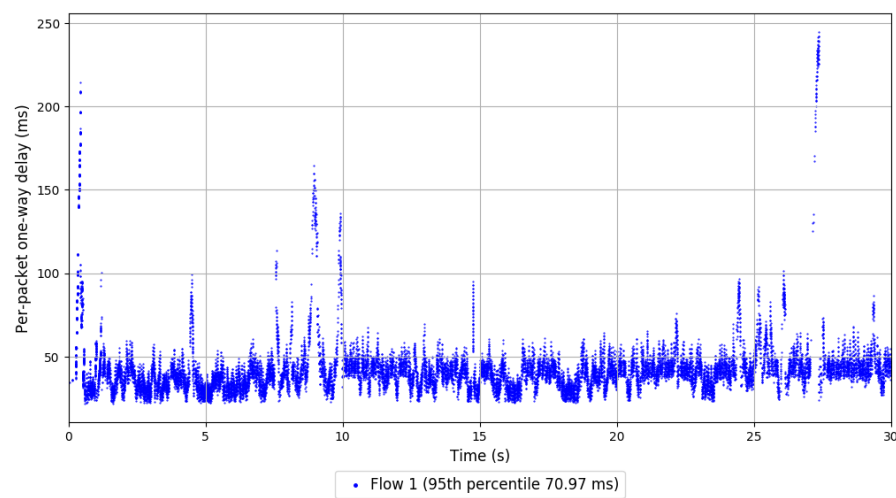
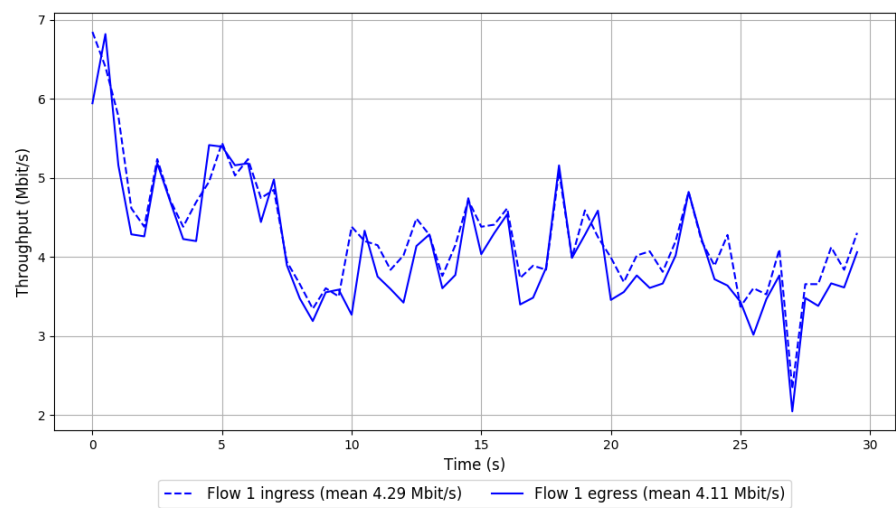


Run 2: Statistics of TaoVA-100x

Start at: 2018-02-19 17:33:04
End at: 2018-02-19 17:33:34
Local clock offset: -11.745 ms
Remote clock offset: -19.097 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.11 Mbit/s
95th percentile per-packet one-way delay: 70.974 ms
Loss rate: 4.50%
-- Flow 1:
Average throughput: 4.11 Mbit/s
95th percentile per-packet one-way delay: 70.974 ms
Loss rate: 4.50%

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

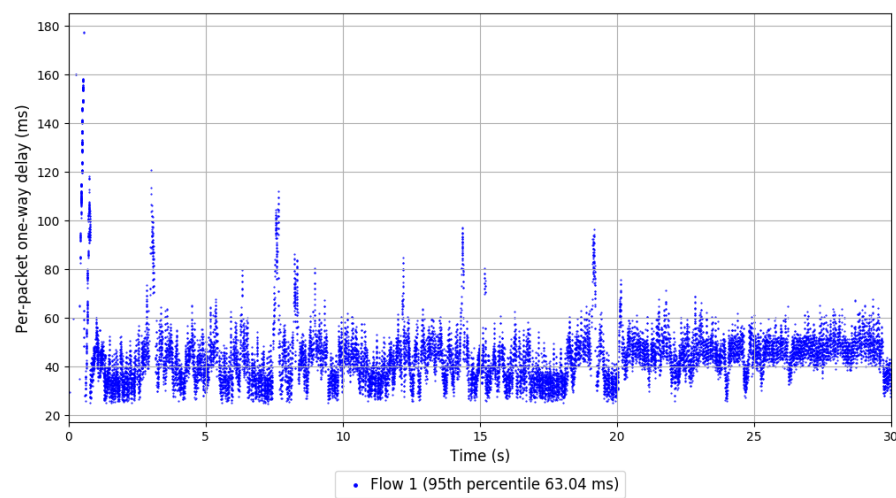
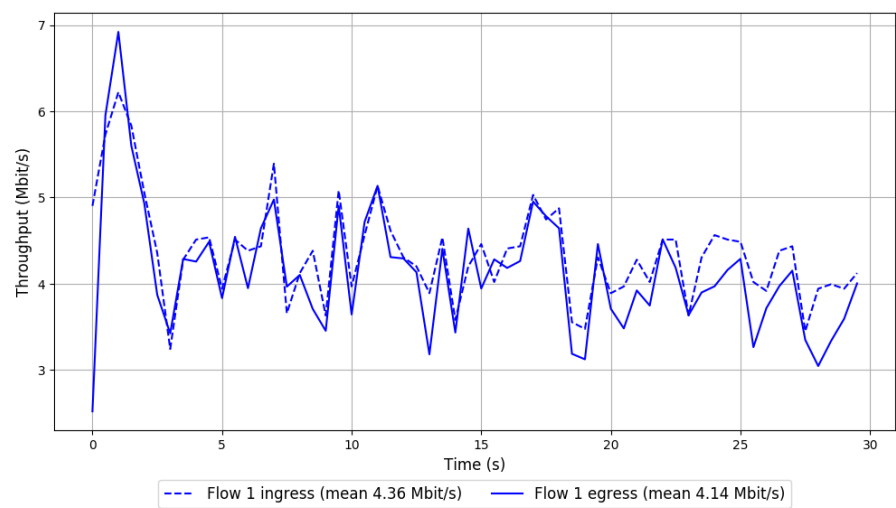


Run 3: Statistics of TaoVA-100x

Start at: 2018-02-19 17:52:51
End at: 2018-02-19 17:53:21
Local clock offset: -13.333 ms
Remote clock offset: -19.622 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.14 Mbit/s
95th percentile per-packet one-way delay: 63.043 ms
Loss rate: 5.14%
-- Flow 1:
Average throughput: 4.14 Mbit/s
95th percentile per-packet one-way delay: 63.043 ms
Loss rate: 5.14%

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

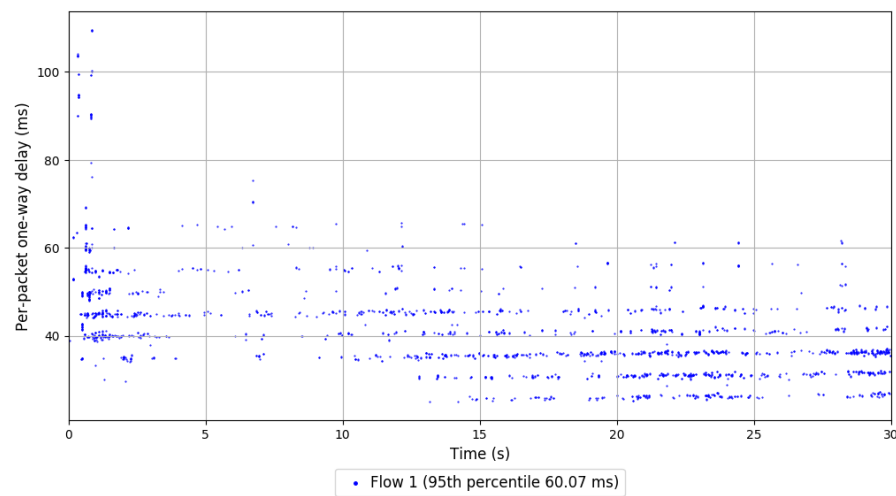
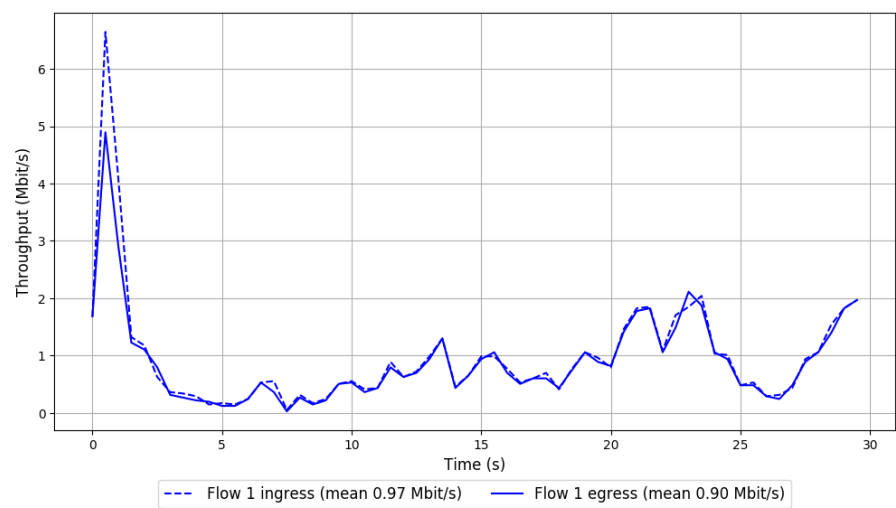


Run 1: Statistics of TCP Vegas

Start at: 2018-02-19 17:19:53
End at: 2018-02-19 17:20:23
Local clock offset: -33.483 ms
Remote clock offset: -20.863 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 60.072 ms
Loss rate: 7.74%
-- Flow 1:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 60.072 ms
Loss rate: 7.74%

Run 1: Report of TCP Vegas — Data Link

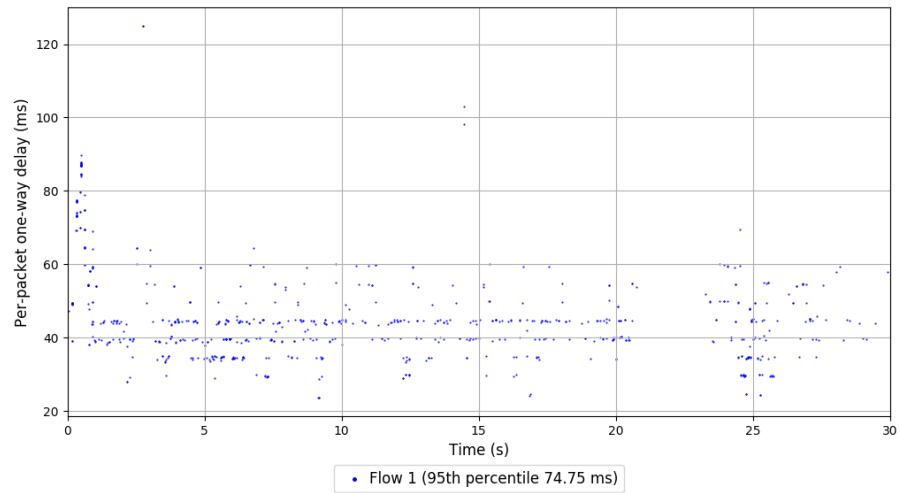
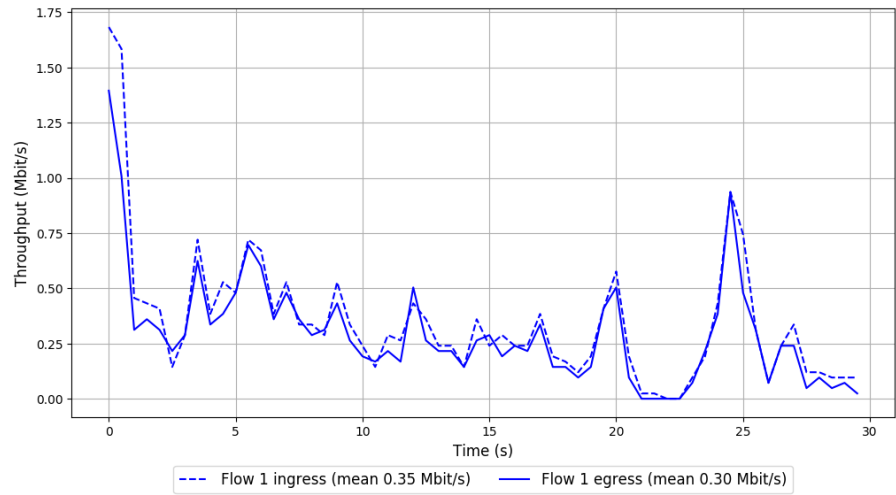


Run 2: Statistics of TCP Vegas

Start at: 2018-02-19 17:39:38
End at: 2018-02-19 17:40:08
Local clock offset: -12.714 ms
Remote clock offset: -20.323 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 74.755 ms
Loss rate: 15.23%
-- Flow 1:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 74.755 ms
Loss rate: 15.23%

Run 2: Report of TCP Vegas — Data Link

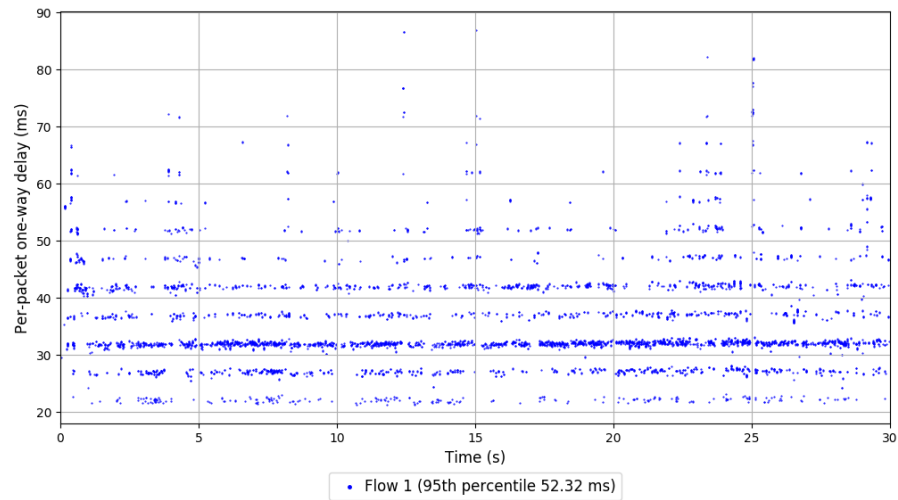
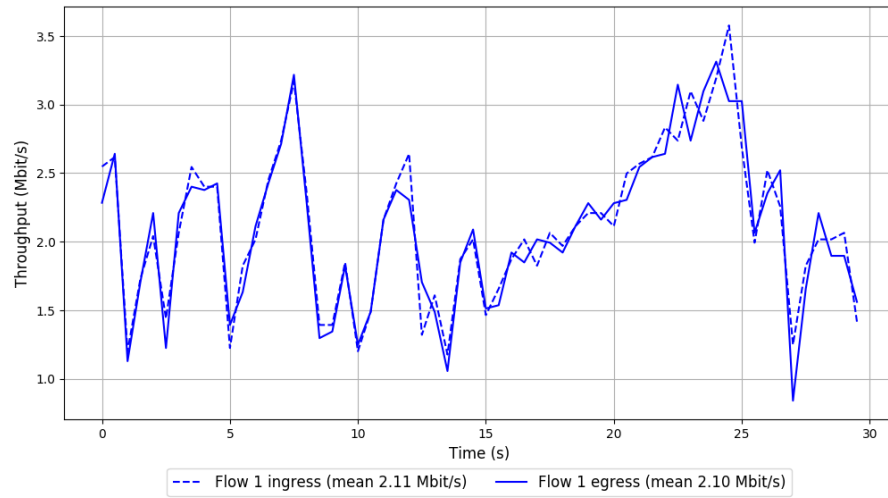


Run 3: Statistics of TCP Vegas

Start at: 2018-02-19 17:59:23
End at: 2018-02-19 17:59:53
Local clock offset: -9.058 ms
Remote clock offset: -21.653 ms

Below is generated by plot.py at 2018-02-19 18:12:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 52.318 ms
Loss rate: 0.97%
-- Flow 1:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 52.318 ms
Loss rate: 0.97%

Run 3: Report of TCP Vegas — Data Link

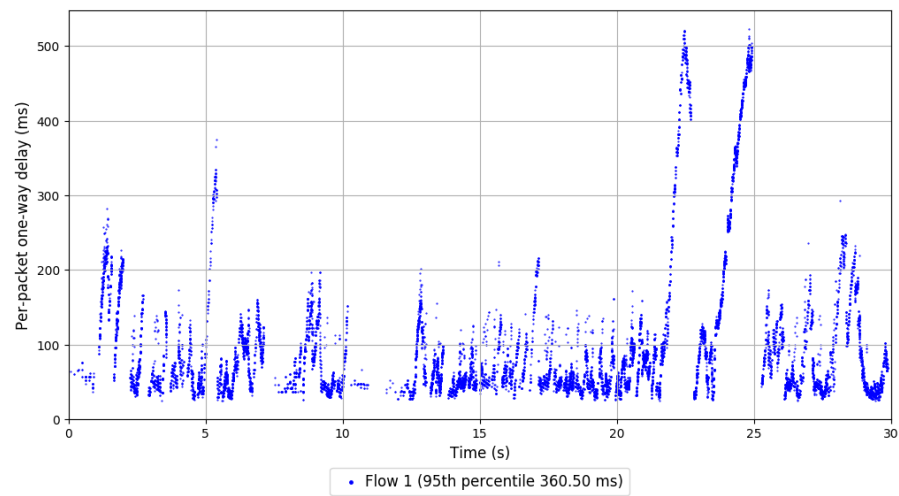
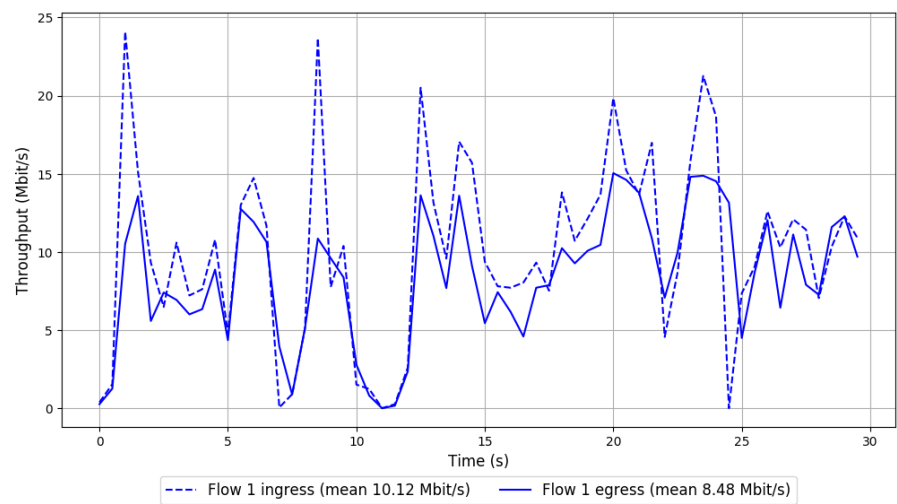


Run 1: Statistics of Verus

Start at: 2018-02-19 17:15:30
End at: 2018-02-19 17:16:00
Local clock offset: -40.931 ms
Remote clock offset: -19.269 ms

Below is generated by plot.py at 2018-02-19 18:12:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 8.48 Mbit/s
95th percentile per-packet one-way delay: 360.496 ms
Loss rate: 16.39%
-- Flow 1:
Average throughput: 8.48 Mbit/s
95th percentile per-packet one-way delay: 360.496 ms
Loss rate: 16.39%

Run 1: Report of Verus — Data Link

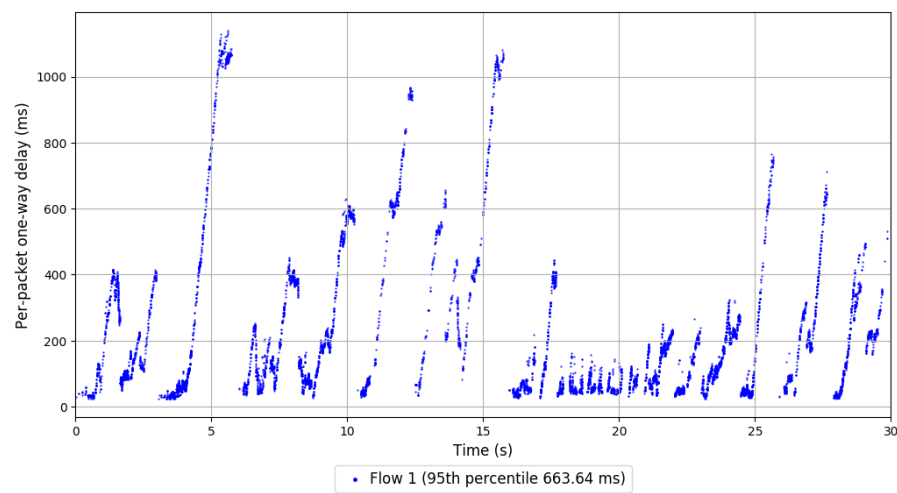
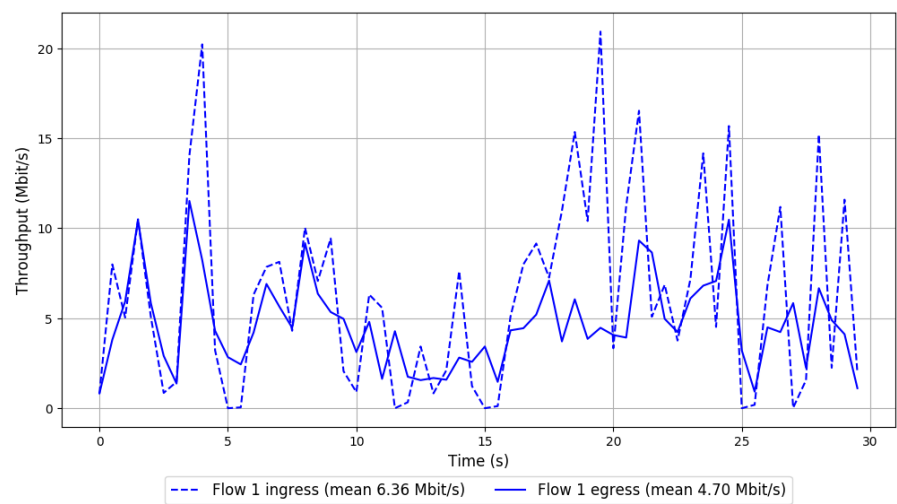


Run 2: Statistics of Verus

Start at: 2018-02-19 17:35:15
End at: 2018-02-19 17:35:45
Local clock offset: -12.425 ms
Remote clock offset: -18.961 ms

Below is generated by plot.py at 2018-02-19 18:12:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.70 Mbit/s
95th percentile per-packet one-way delay: 663.642 ms
Loss rate: 25.96%
-- Flow 1:
Average throughput: 4.70 Mbit/s
95th percentile per-packet one-way delay: 663.642 ms
Loss rate: 25.96%

Run 2: Report of Verus — Data Link

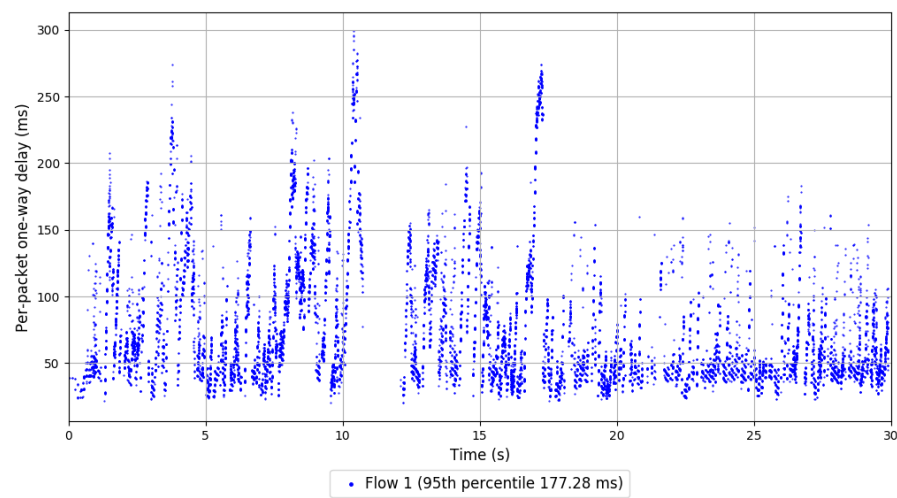
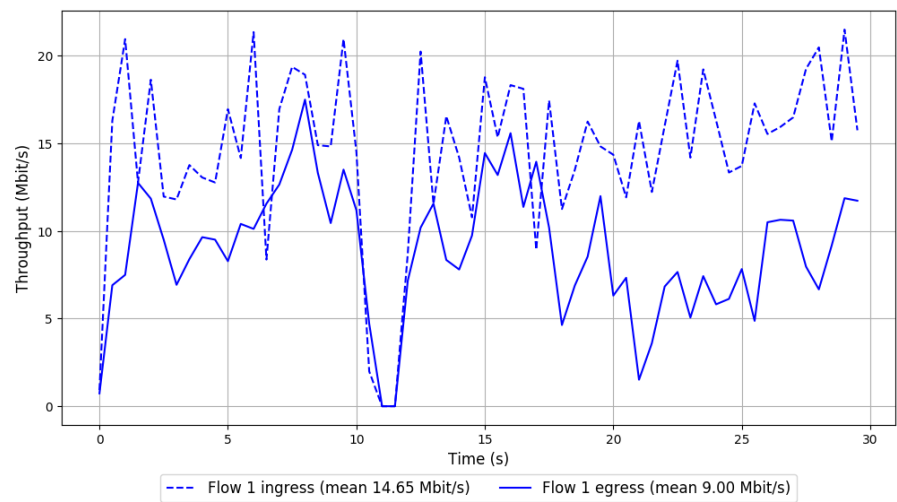


Run 3: Statistics of Verus

Start at: 2018-02-19 17:55:02
End at: 2018-02-19 17:55:32
Local clock offset: -10.782 ms
Remote clock offset: -20.942 ms

Below is generated by plot.py at 2018-02-19 18:12:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.00 Mbit/s
95th percentile per-packet one-way delay: 177.277 ms
Loss rate: 38.65%
-- Flow 1:
Average throughput: 9.00 Mbit/s
95th percentile per-packet one-way delay: 177.277 ms
Loss rate: 38.65%

Run 3: Report of Verus — Data Link

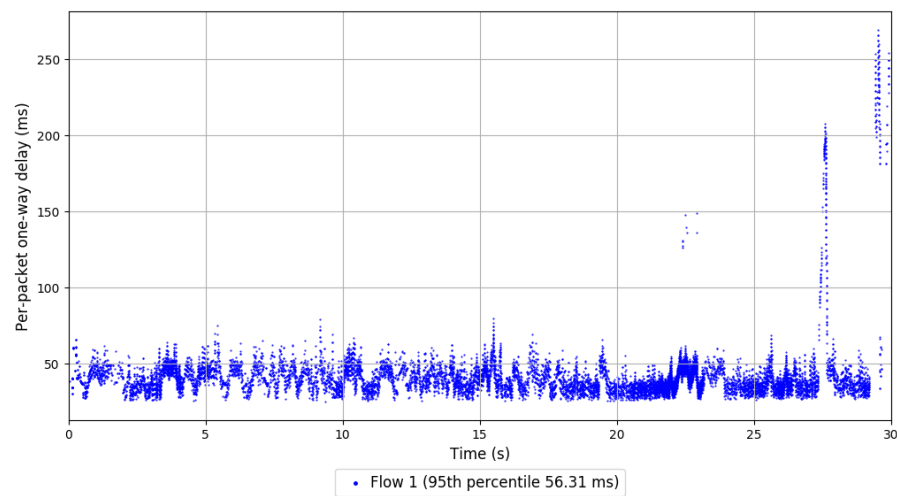
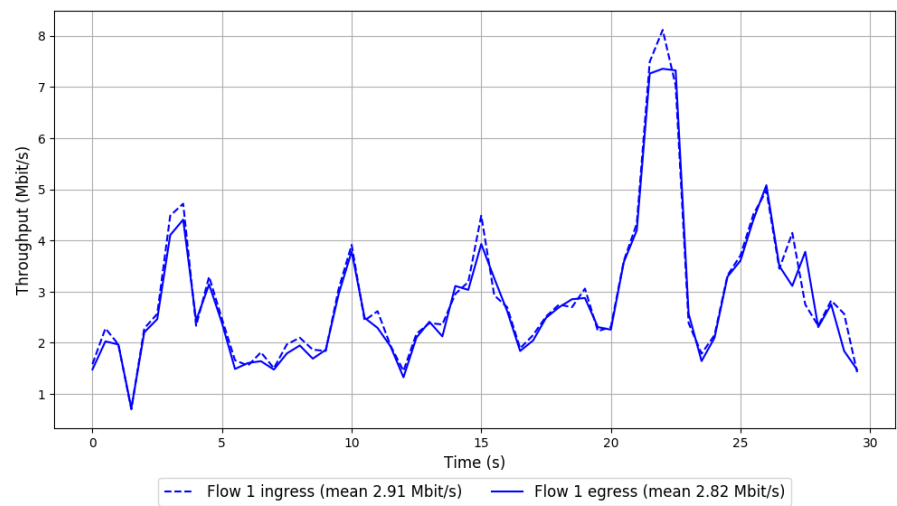


Run 1: Statistics of Copa

Start at: 2018-02-19 17:17:42
End at: 2018-02-19 17:18:12
Local clock offset: -41.727 ms
Remote clock offset: -19.251 ms

Below is generated by plot.py at 2018-02-19 18:12:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.82 Mbit/s
95th percentile per-packet one-way delay: 56.307 ms
Loss rate: 3.06%
-- Flow 1:
Average throughput: 2.82 Mbit/s
95th percentile per-packet one-way delay: 56.307 ms
Loss rate: 3.06%

Run 1: Report of Copa — Data Link

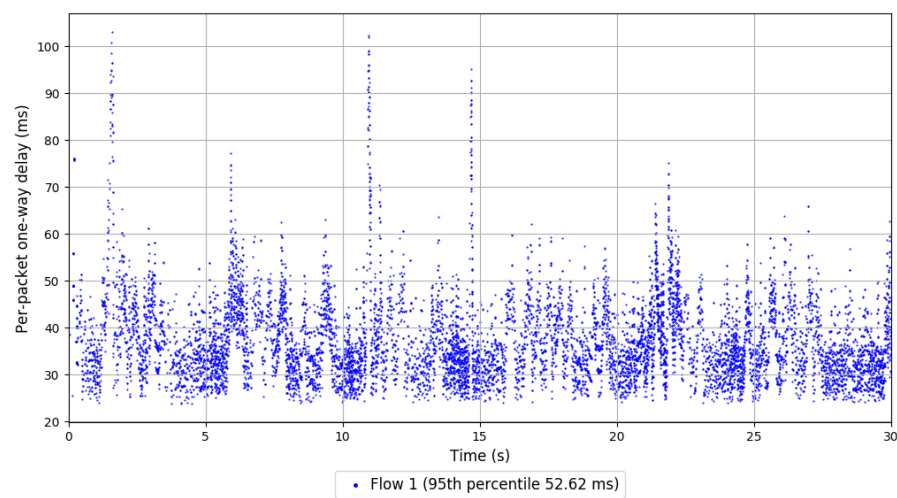
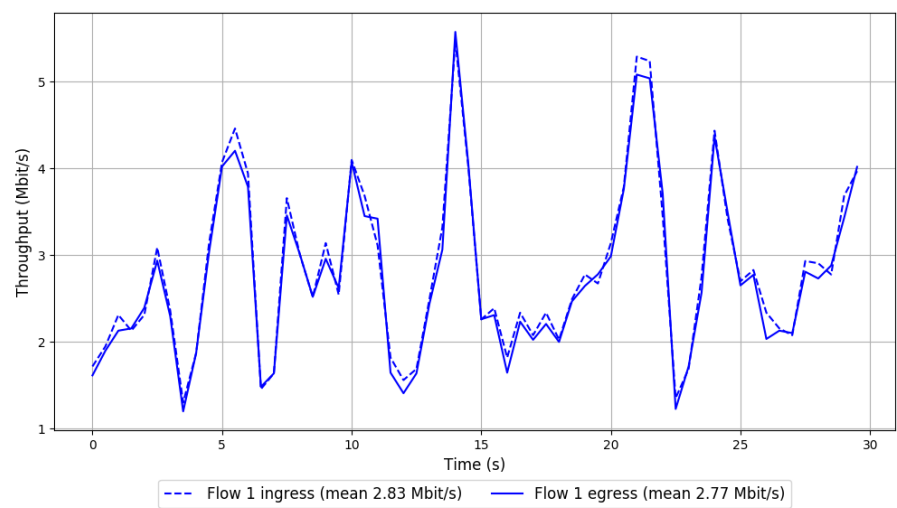


Run 2: Statistics of Copa

Start at: 2018-02-19 17:37:26
End at: 2018-02-19 17:37:56
Local clock offset: -12.07 ms
Remote clock offset: -16.836 ms

Below is generated by plot.py at 2018-02-19 18:12:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.77 Mbit/s
95th percentile per-packet one-way delay: 52.624 ms
Loss rate: 2.30%
-- Flow 1:
Average throughput: 2.77 Mbit/s
95th percentile per-packet one-way delay: 52.624 ms
Loss rate: 2.30%

Run 2: Report of Copa — Data Link

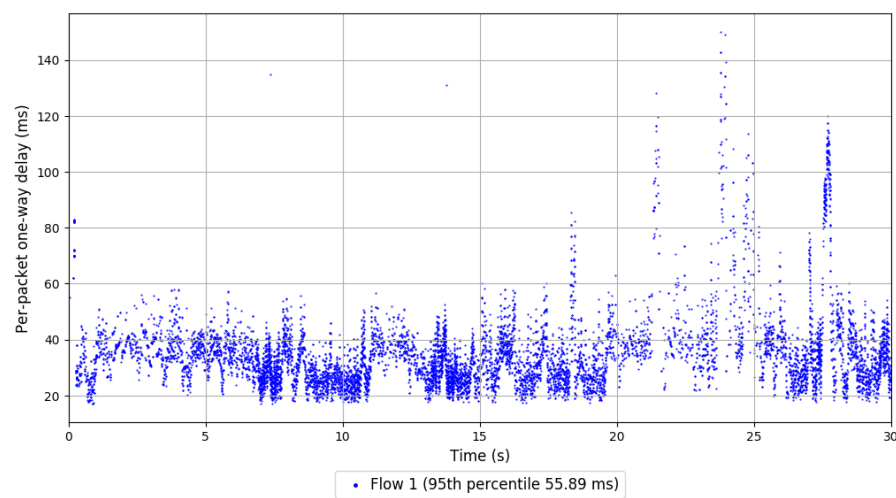
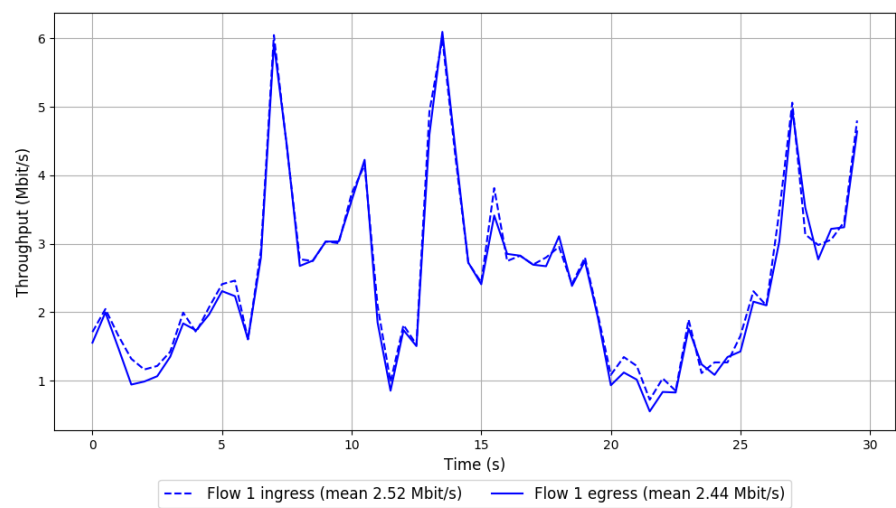


Run 3: Statistics of Copa

Start at: 2018-02-19 17:57:13
End at: 2018-02-19 17:57:43
Local clock offset: -8.557 ms
Remote clock offset: -22.597 ms

Below is generated by plot.py at 2018-02-19 18:12:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.44 Mbit/s
95th percentile per-packet one-way delay: 55.894 ms
Loss rate: 3.27%
-- Flow 1:
Average throughput: 2.44 Mbit/s
95th percentile per-packet one-way delay: 55.894 ms
Loss rate: 3.27%

Run 3: Report of Copa — Data Link

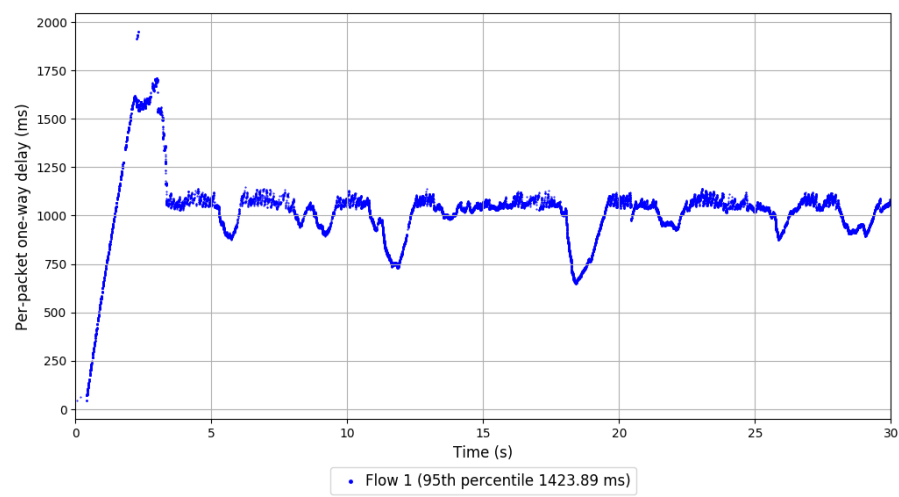
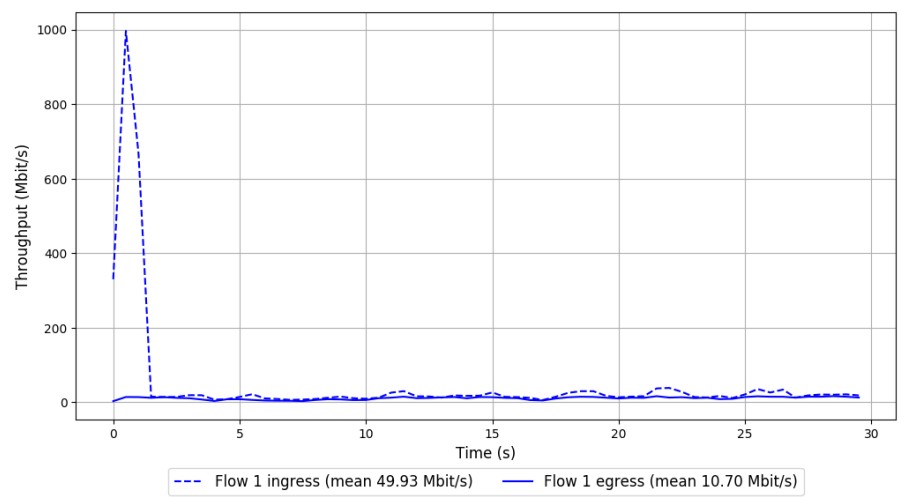


Run 1: Statistics of FillP

Start at: 2018-02-19 17:23:12
End at: 2018-02-19 17:23:42
Local clock offset: -25.598 ms
Remote clock offset: -18.411 ms

Below is generated by plot.py at 2018-02-19 18:12:52
Datalink statistics
-- Total of 1 flow:
Average throughput: 10.70 Mbit/s
95th percentile per-packet one-way delay: 1423.890 ms
Loss rate: 78.61%
-- Flow 1:
Average throughput: 10.70 Mbit/s
95th percentile per-packet one-way delay: 1423.890 ms
Loss rate: 78.61%

Run 1: Report of FillP — Data Link

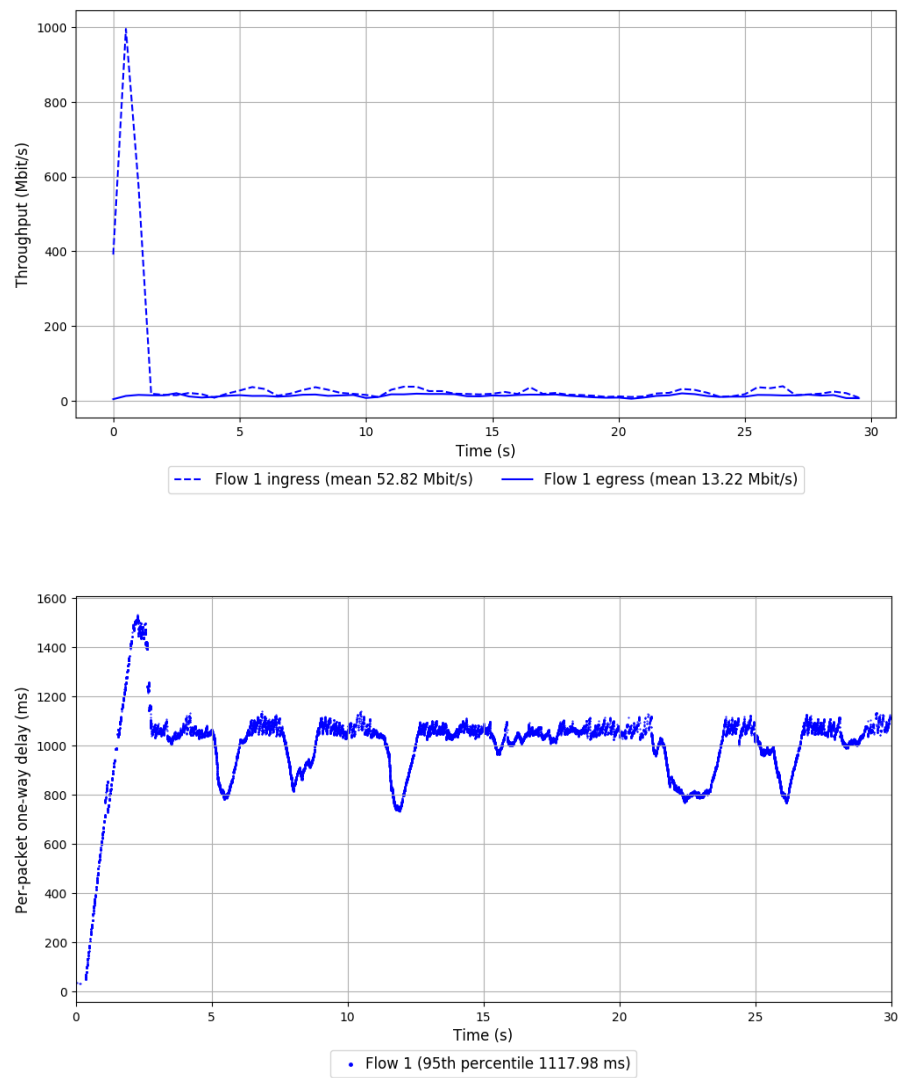


Run 2: Statistics of FillP

Start at: 2018-02-19 17:42:57
End at: 2018-02-19 17:43:28
Local clock offset: -12.134 ms
Remote clock offset: -18.116 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 13.22 Mbit/s
95th percentile per-packet one-way delay: 1117.978 ms
Loss rate: 75.01%
-- Flow 1:
Average throughput: 13.22 Mbit/s
95th percentile per-packet one-way delay: 1117.978 ms
Loss rate: 75.01%

Run 2: Report of FillP — Data Link

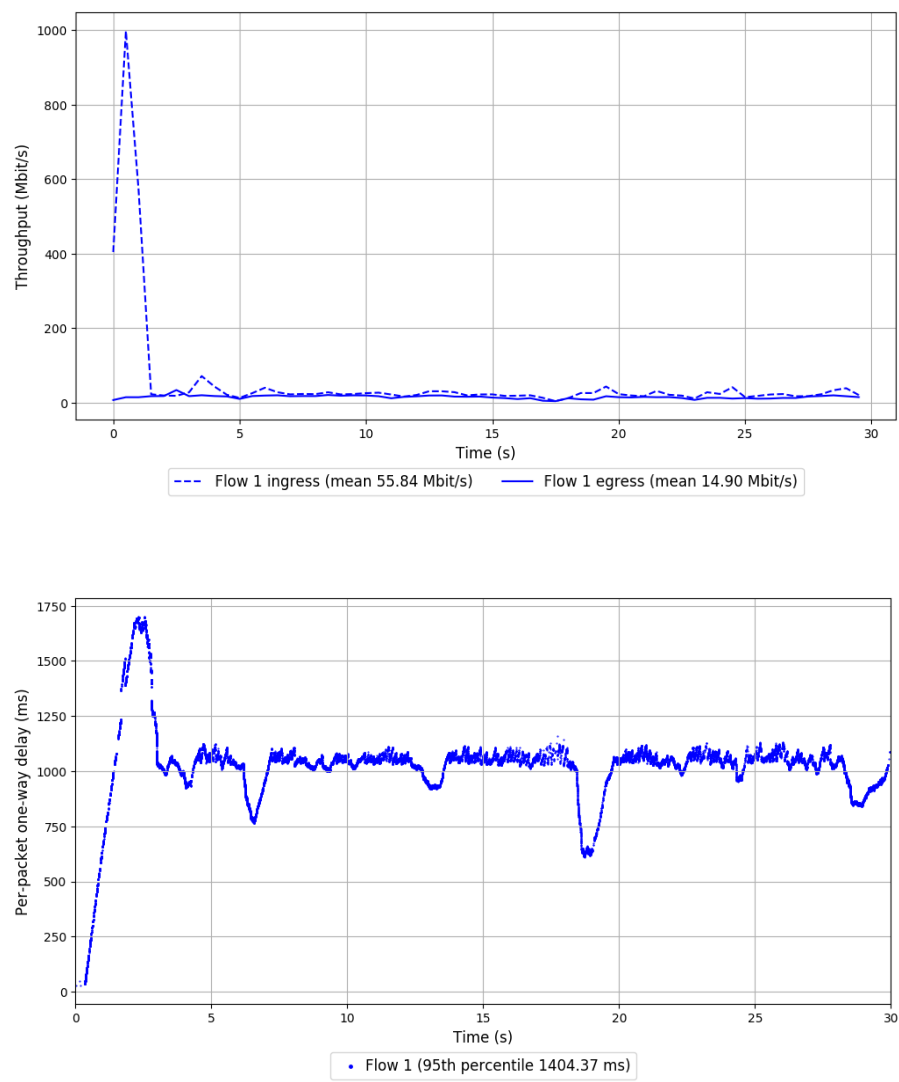


Run 3: Statistics of FillP

Start at: 2018-02-19 18:02:40
End at: 2018-02-19 18:03:10
Local clock offset: -9.12 ms
Remote clock offset: -20.599 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 14.90 Mbit/s
95th percentile per-packet one-way delay: 1404.367 ms
Loss rate: 73.35%
-- Flow 1:
Average throughput: 14.90 Mbit/s
95th percentile per-packet one-way delay: 1404.367 ms
Loss rate: 73.35%

Run 3: Report of FillP — Data Link

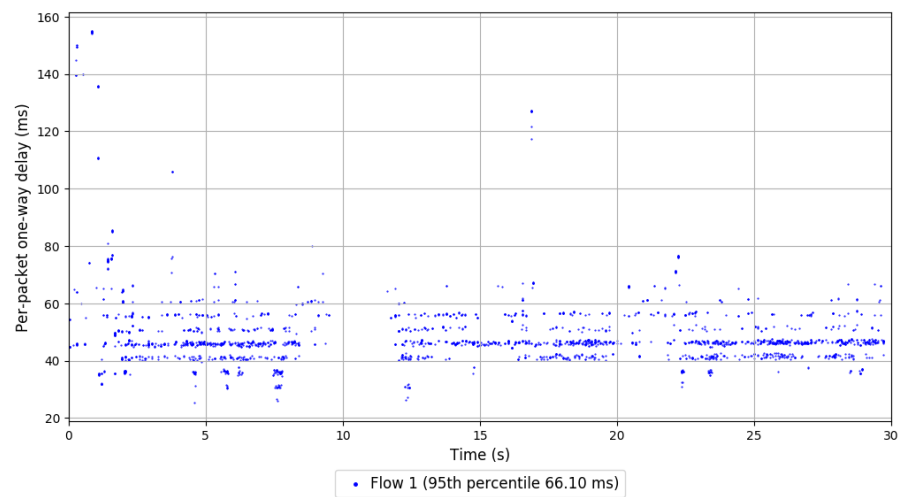
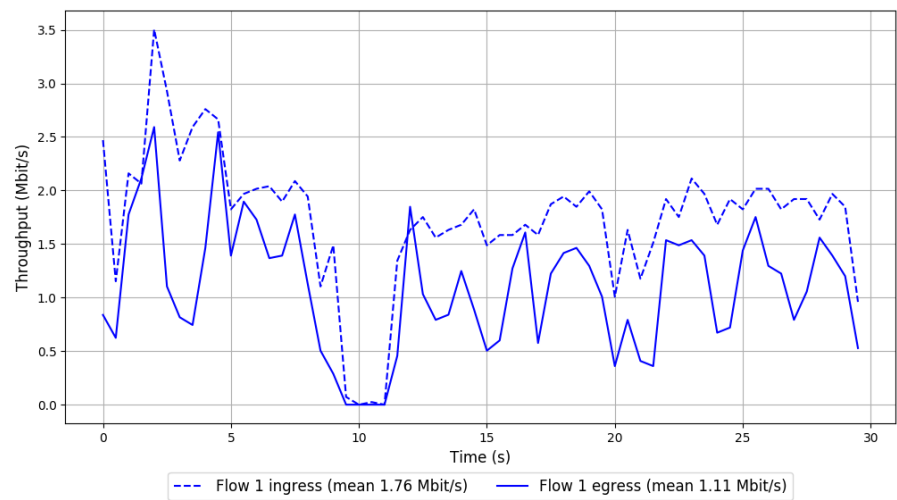


```
Run 1: Statistics of Indigo-1-32

Start at: 2018-02-19 17:25:26
End at: 2018-02-19 17:25:56
Local clock offset: -19.45 ms
Remote clock offset: -18.986 ms

# Below is generated by plot.py at 2018-02-19 18:12:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 66.104 ms
Loss rate: 37.21%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 66.104 ms
Loss rate: 37.21%
```

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

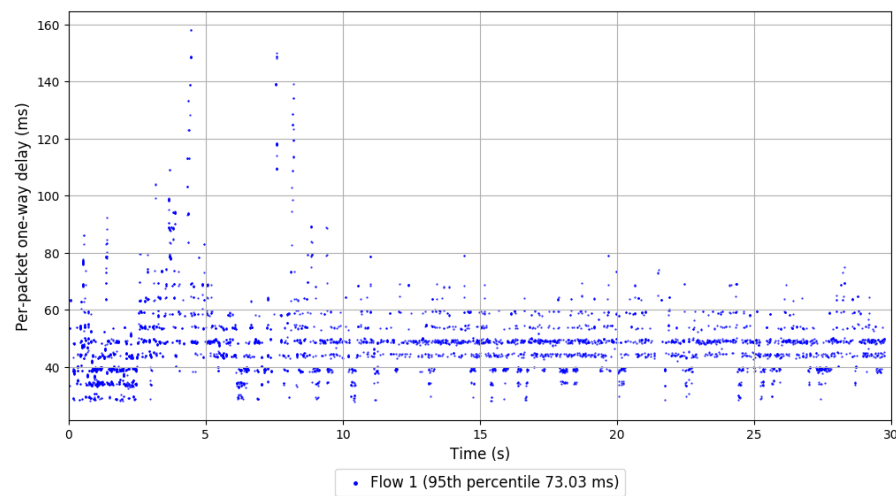
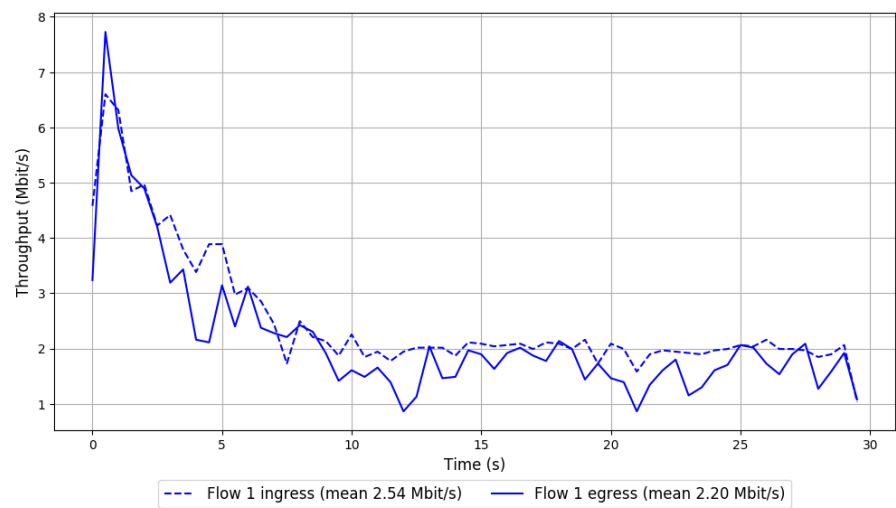


Run 2: Statistics of Indigo-1-32

Start at: 2018-02-19 17:45:10
End at: 2018-02-19 17:45:40
Local clock offset: -14.855 ms
Remote clock offset: -18.964 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 73.033 ms
Loss rate: 13.62%
-- Flow 1:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 73.033 ms
Loss rate: 13.62%

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

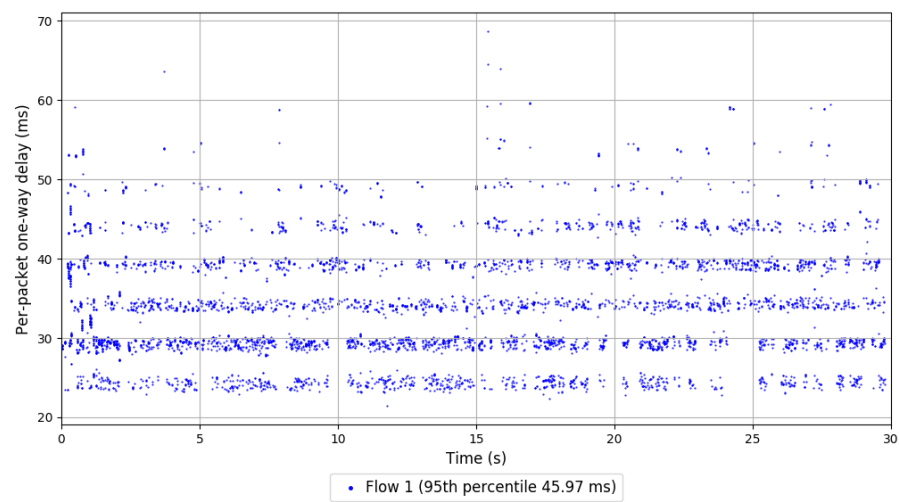
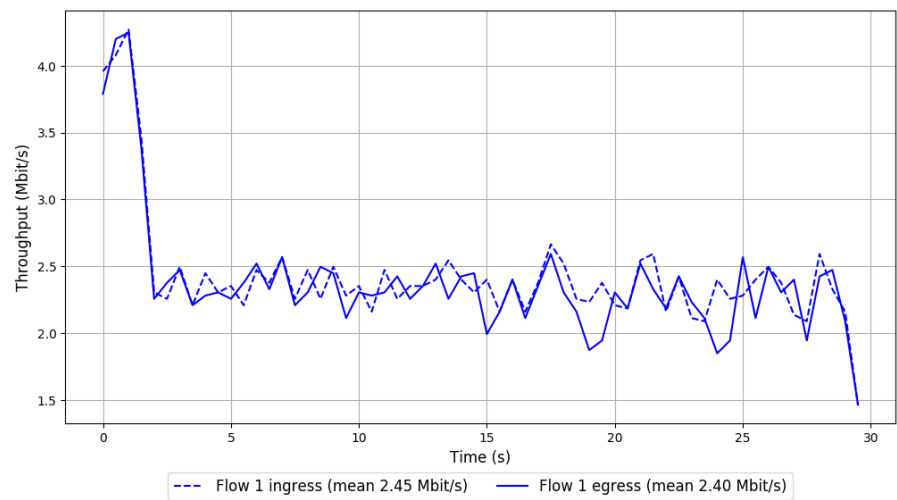


Run 3: Statistics of Indigo-1-32

Start at: 2018-02-19 18:04:53
End at: 2018-02-19 18:05:23
Local clock offset: -7.747 ms
Remote clock offset: -20.913 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.40 Mbit/s
95th percentile per-packet one-way delay: 45.969 ms
Loss rate: 2.06%
-- Flow 1:
Average throughput: 2.40 Mbit/s
95th percentile per-packet one-way delay: 45.969 ms
Loss rate: 2.06%

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

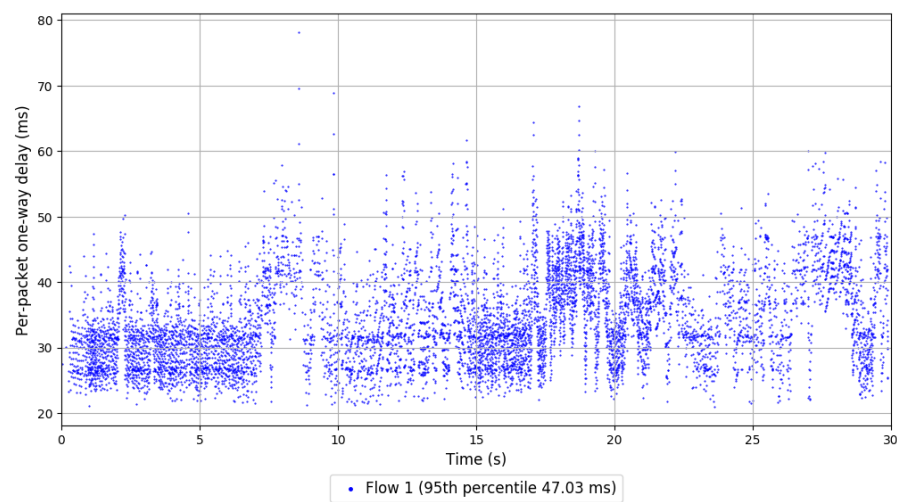
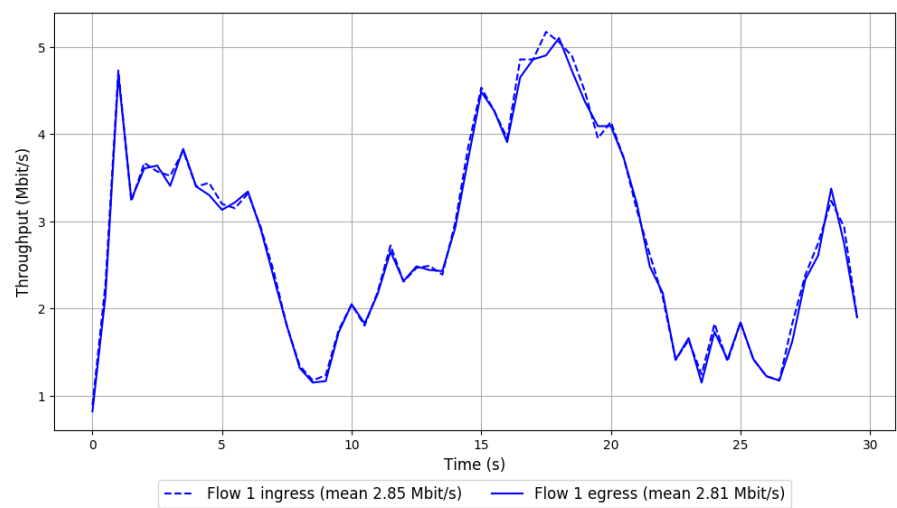


Run 1: Statistics of Vivace-latency

Start at: 2018-02-19 17:30:53
End at: 2018-02-19 17:31:23
Local clock offset: -13.612 ms
Remote clock offset: -20.138 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.81 Mbit/s
95th percentile per-packet one-way delay: 47.030 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 2.81 Mbit/s
95th percentile per-packet one-way delay: 47.030 ms
Loss rate: 1.33%

Run 1: Report of Vivace-latency — Data Link

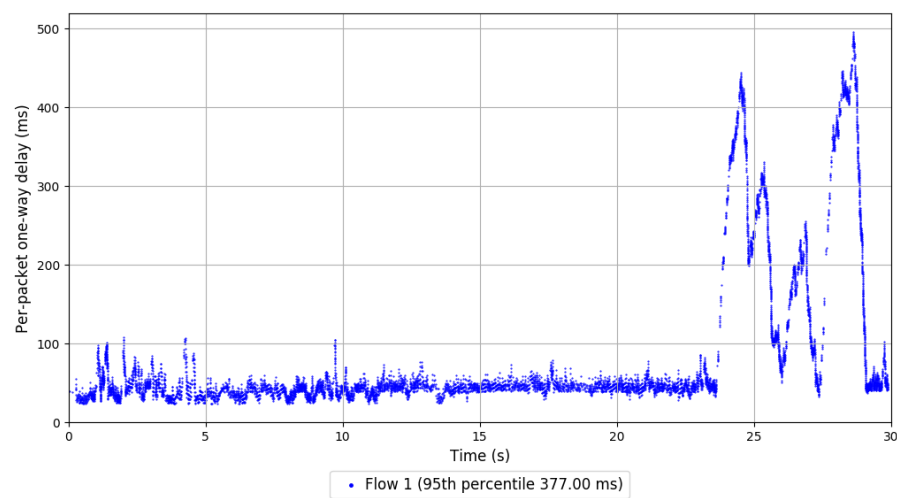
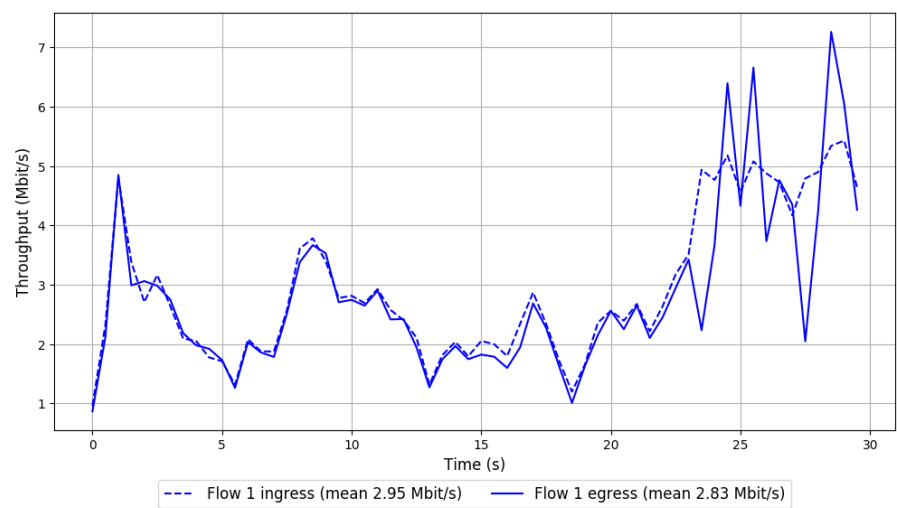


Run 2: Statistics of Vivace-latency

Start at: 2018-02-19 17:50:41
End at: 2018-02-19 17:51:11
Local clock offset: -15.268 ms
Remote clock offset: -20.733 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.83 Mbit/s
95th percentile per-packet one-way delay: 377.001 ms
Loss rate: 4.19%
-- Flow 1:
Average throughput: 2.83 Mbit/s
95th percentile per-packet one-way delay: 377.001 ms
Loss rate: 4.19%

Run 2: Report of Vivace-latency — Data Link

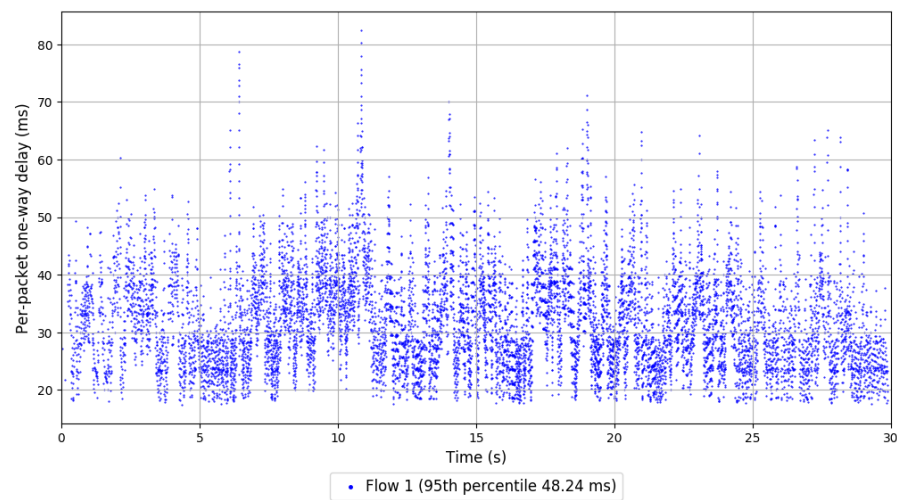
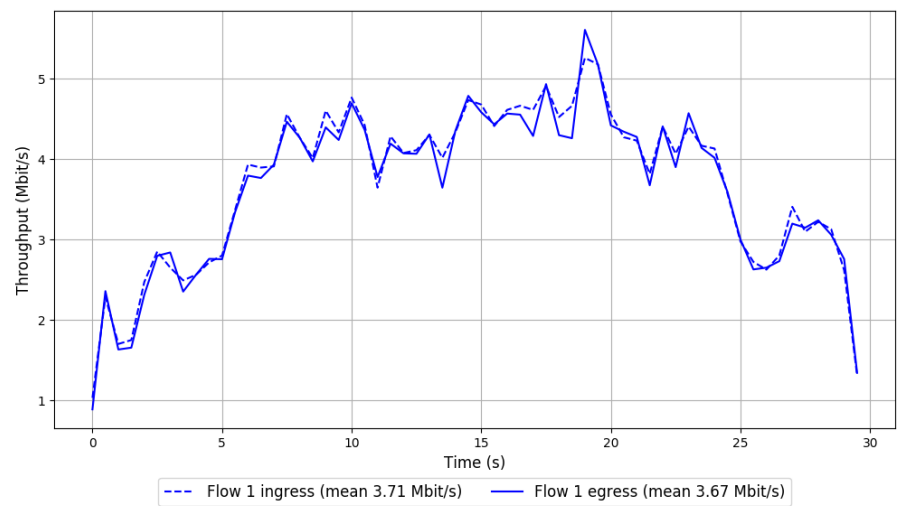


Run 3: Statistics of Vivace-latency

Start at: 2018-02-19 18:10:21
End at: 2018-02-19 18:10:51
Local clock offset: -7.003 ms
Remote clock offset: -23.405 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.67 Mbit/s
95th percentile per-packet one-way delay: 48.243 ms
Loss rate: 1.26%
-- Flow 1:
Average throughput: 3.67 Mbit/s
95th percentile per-packet one-way delay: 48.243 ms
Loss rate: 1.26%

Run 3: Report of Vivace-latency — Data Link

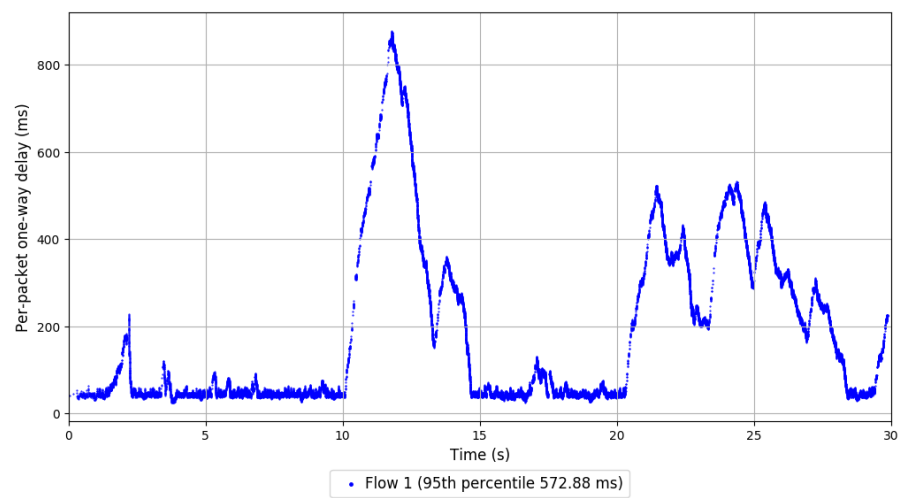
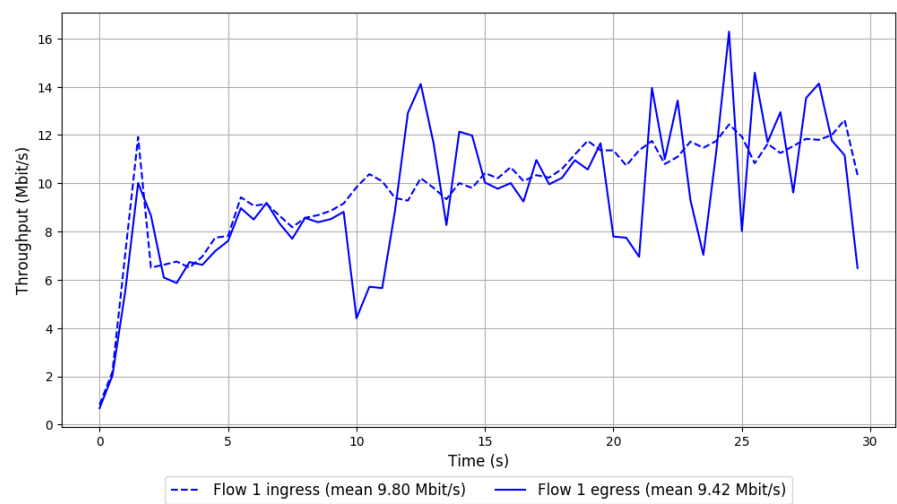


Run 1: Statistics of Vivace-loss

Start at: 2018-02-19 17:14:24
End at: 2018-02-19 17:14:54
Local clock offset: -39.894 ms
Remote clock offset: -20.729 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.42 Mbit/s
95th percentile per-packet one-way delay: 572.878 ms
Loss rate: 4.13%
-- Flow 1:
Average throughput: 9.42 Mbit/s
95th percentile per-packet one-way delay: 572.878 ms
Loss rate: 4.13%

Run 1: Report of Vivace-loss — Data Link

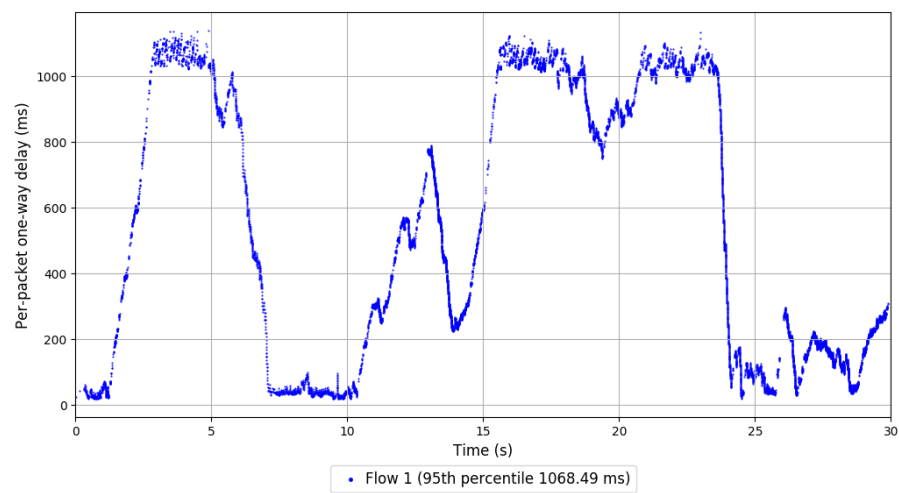
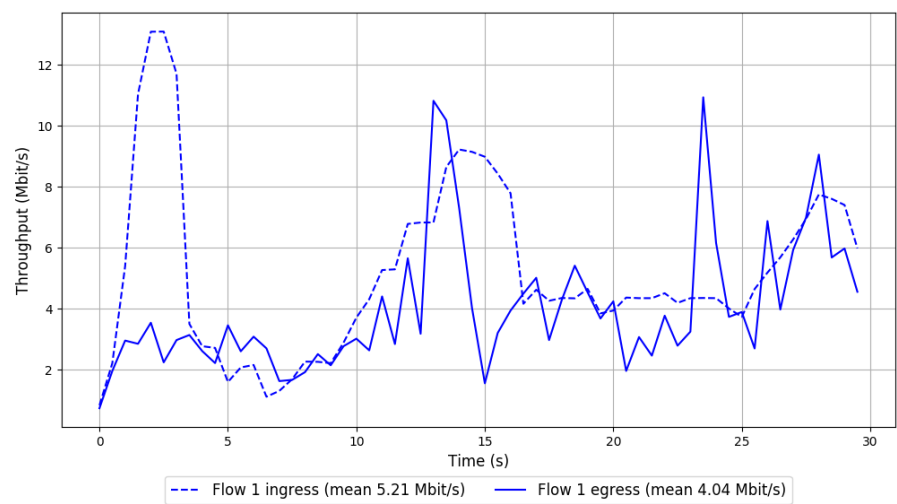


Run 2: Statistics of Vivace-loss

Start at: 2018-02-19 17:34:10
End at: 2018-02-19 17:34:40
Local clock offset: -10.813 ms
Remote clock offset: -20.806 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.04 Mbit/s
95th percentile per-packet one-way delay: 1068.486 ms
Loss rate: 22.61%
-- Flow 1:
Average throughput: 4.04 Mbit/s
95th percentile per-packet one-way delay: 1068.486 ms
Loss rate: 22.61%

Run 2: Report of Vivace-loss — Data Link

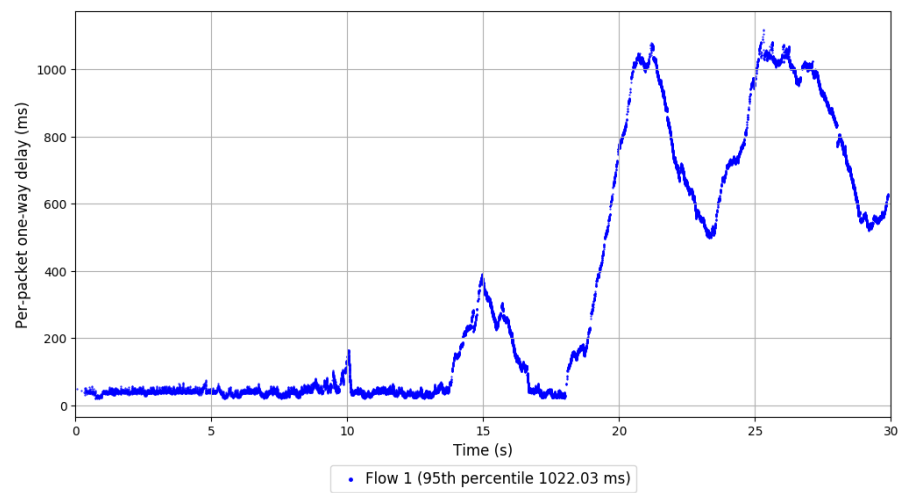
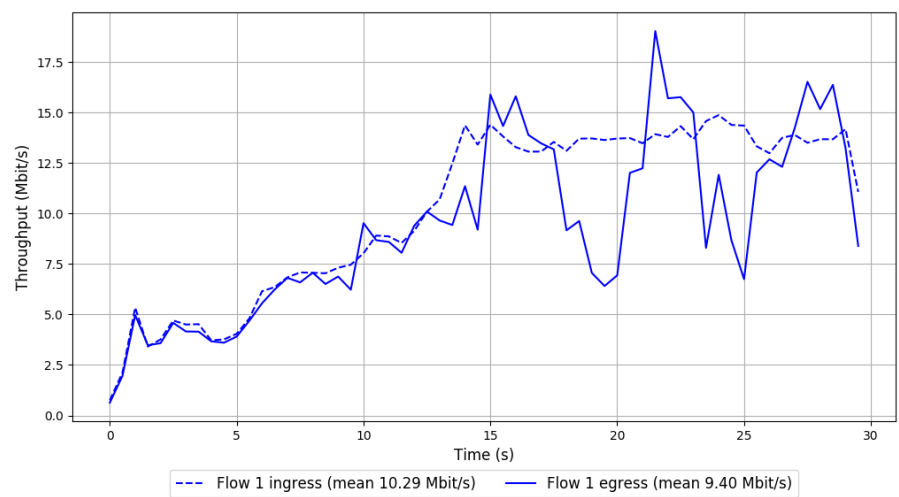


Run 3: Statistics of Vivace-loss

Start at: 2018-02-19 17:53:56
End at: 2018-02-19 17:54:26
Local clock offset: -11.74 ms
Remote clock offset: -20.955 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.40 Mbit/s
95th percentile per-packet one-way delay: 1022.035 ms
Loss rate: 8.80%
-- Flow 1:
Average throughput: 9.40 Mbit/s
95th percentile per-packet one-way delay: 1022.035 ms
Loss rate: 8.80%

Run 3: Report of Vivace-loss — Data Link

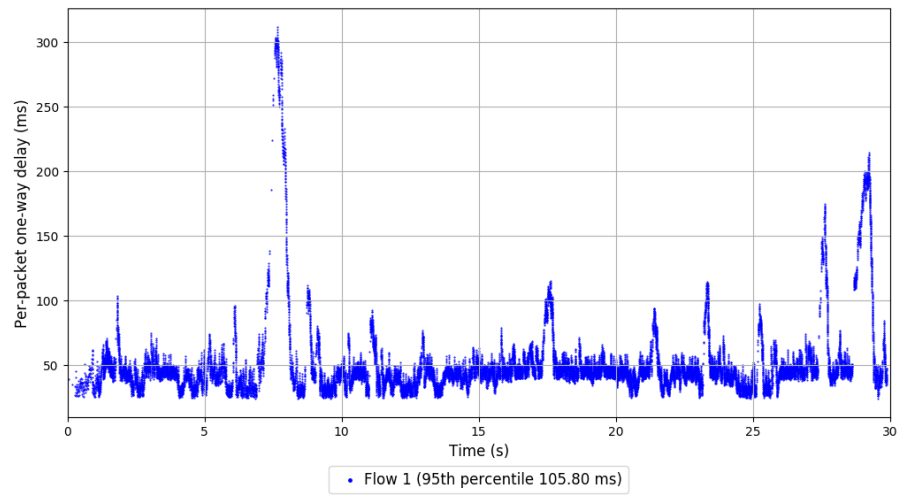
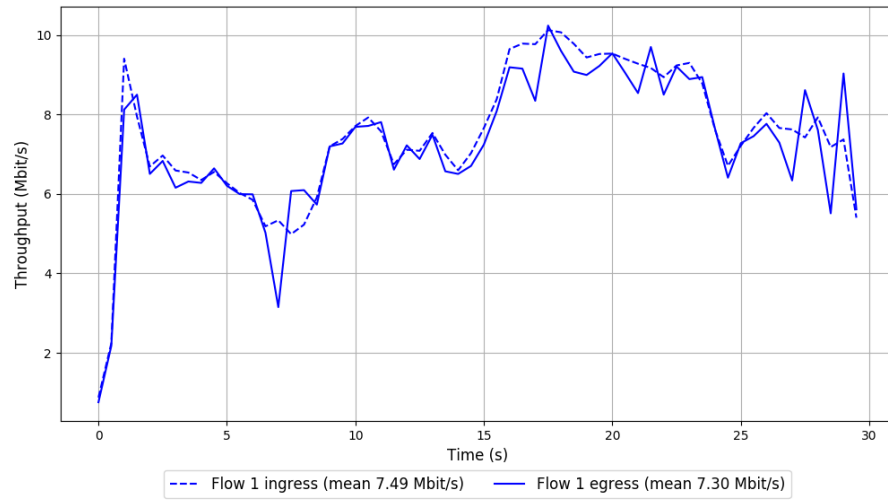


Run 1: Statistics of Vivace-LTE

Start at: 2018-02-19 17:24:19
End at: 2018-02-19 17:24:49
Local clock offset: -22.78 ms
Remote clock offset: -20.375 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 7.30 Mbit/s
95th percentile per-packet one-way delay: 105.800 ms
Loss rate: 2.50%
-- Flow 1:
Average throughput: 7.30 Mbit/s
95th percentile per-packet one-way delay: 105.800 ms
Loss rate: 2.50%

Run 1: Report of Vivace-LTE — Data Link

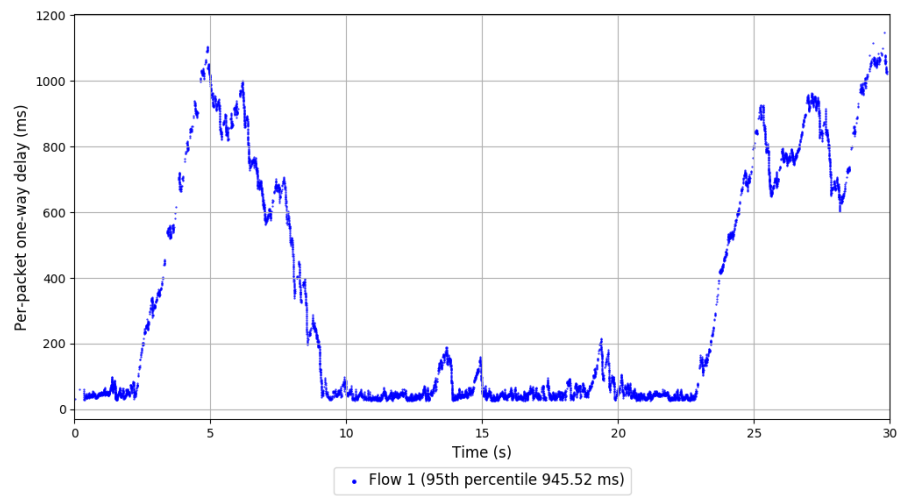
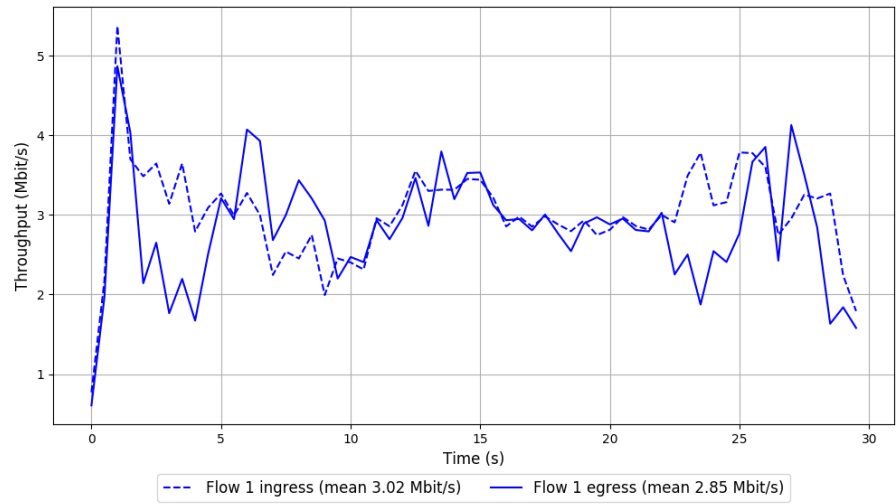


Run 2: Statistics of Vivace-LTE

Start at: 2018-02-19 17:44:05
End at: 2018-02-19 17:44:35
Local clock offset: -13.183 ms
Remote clock offset: -17.776 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.85 Mbit/s
95th percentile per-packet one-way delay: 945.519 ms
Loss rate: 5.79%
-- Flow 1:
Average throughput: 2.85 Mbit/s
95th percentile per-packet one-way delay: 945.519 ms
Loss rate: 5.79%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-02-19 18:03:47
End at: 2018-02-19 18:04:17
Local clock offset: -9.095 ms
Remote clock offset: -23.133 ms

Below is generated by plot.py at 2018-02-19 18:12:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.95 Mbit/s
95th percentile per-packet one-way delay: 569.142 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 11.95 Mbit/s
95th percentile per-packet one-way delay: 569.142 ms
Loss rate: 0.98%

Run 3: Report of Vivace-LTE — Data Link

