

Pantheon Report

Generated at 2018-03-20 08:12:32 (UTC).

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

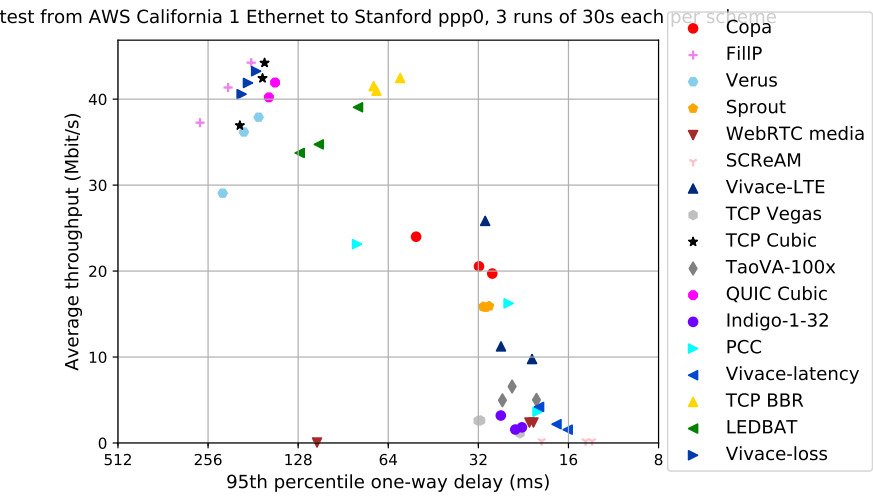
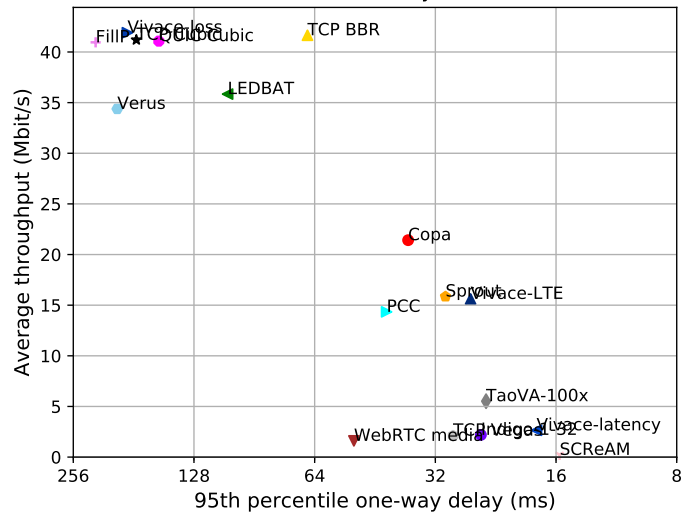
Tested BBR with qdisc of Fair Queuing (*fq*), and other schemes with the default Linux qdisc (*pfifo_fast*).

NTP offsets were measured against `time.stanford.edu` 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 California 1 Ethernet to Stanford 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	41.65	66.70	0.07
TCP Cubic	3	41.20	178.20	0.39
LEDBAT	3	35.84	105.53	0.20
PCC	3	14.34	42.33	0.00
QUIC Cubic	2	41.07	156.62	0.30
SCReAM	3	0.22	15.67	0.00
WebRTC media	3	1.60	51.09	0.00
Sprout	3	15.85	30.19	0.10
TaoVA-100x	3	5.52	23.91	0.00
TCP Vegas	3	2.11	28.91	0.00
Verus	3	34.38	198.86	6.04
Copa	3	21.42	37.42	0.01
FillP	3	40.95	225.16	38.62
Indigo-1-32	3	2.19	24.63	0.00
Vivace-latency	3	2.64	17.90	0.00
Vivace-loss	3	41.90	187.59	13.38
Vivace-LTE	3	15.62	26.14	0.04

Run 1: Statistics of TCP BBR

Start at: 2018-03-20 07:16:04

End at: 2018-03-20 07:16:34

Local clock offset: 2.17 ms

Remote clock offset: -4.844 ms

Below is generated by plot.py at 2018-03-20 08:10:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 41.51 Mbit/s

95th percentile per-packet one-way delay: 71.626 ms

Loss rate: 0.05%

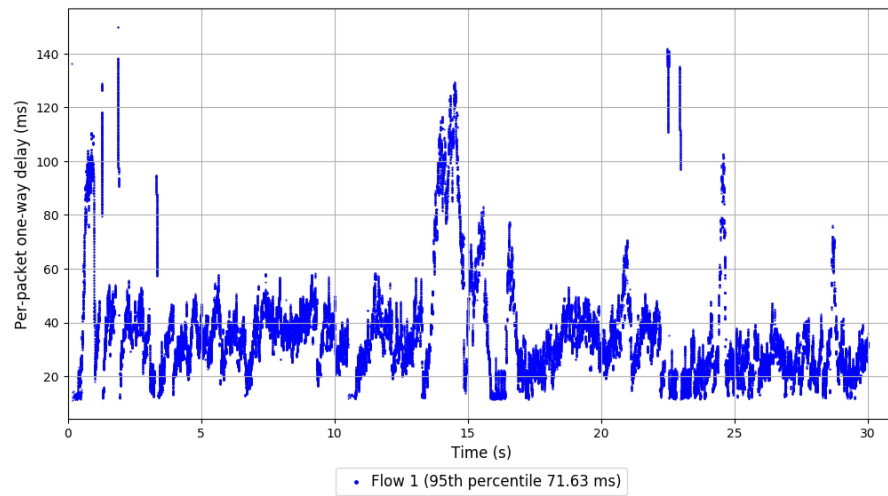
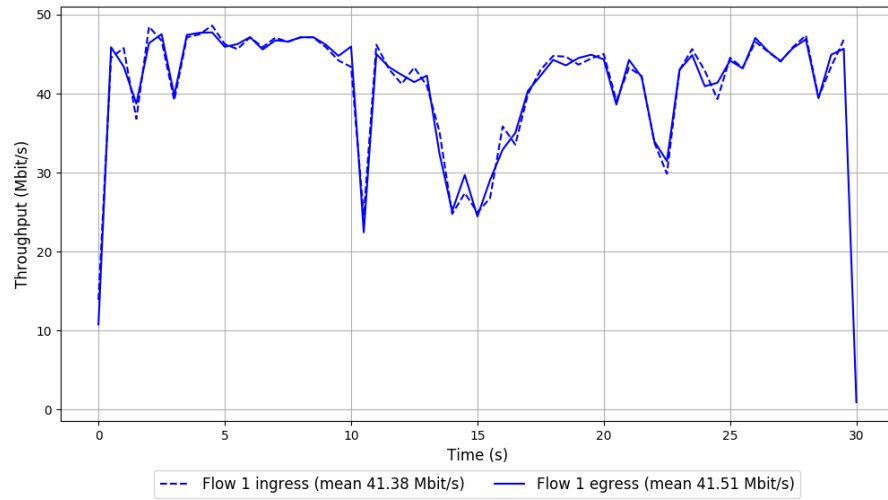
-- Flow 1:

Average throughput: 41.51 Mbit/s

95th percentile per-packet one-way delay: 71.626 ms

Loss rate: 0.05%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-03-20 07:39:48

End at: 2018-03-20 07:40:18

Local clock offset: 9.016 ms

Remote clock offset: -5.314 ms

Below is generated by plot.py at 2018-03-20 08:10:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 42.46 Mbit/s

95th percentile per-packet one-way delay: 58.393 ms

Loss rate: 0.08%

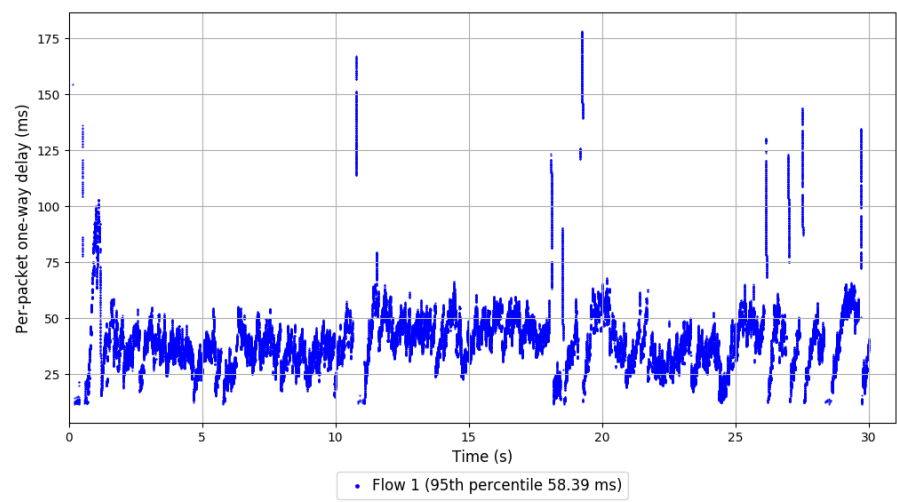
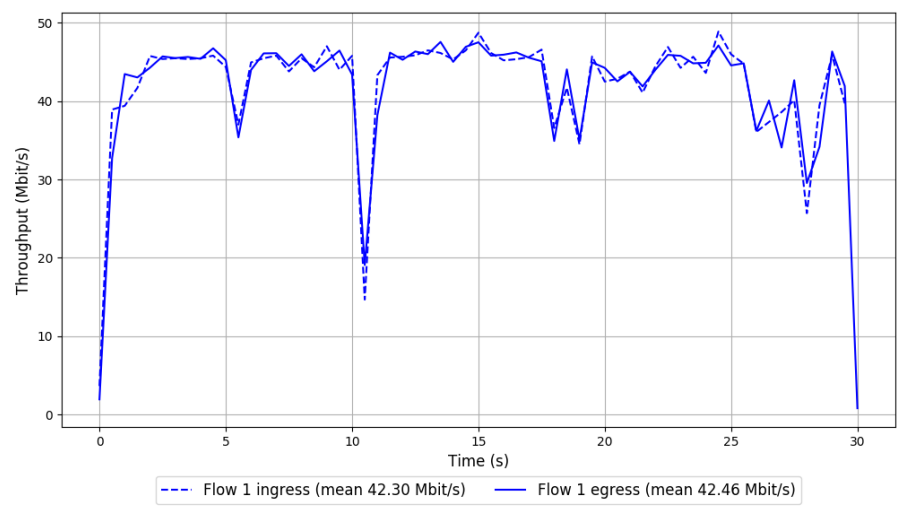
-- Flow 1:

Average throughput: 42.46 Mbit/s

95th percentile per-packet one-way delay: 58.393 ms

Loss rate: 0.08%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-03-20 08:03:33

End at: 2018-03-20 08:04:03

Local clock offset: 9.048 ms

Remote clock offset: -5.672 ms

Below is generated by plot.py at 2018-03-20 08:10:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 40.98 Mbit/s

95th percentile per-packet one-way delay: 70.081 ms

Loss rate: 0.07%

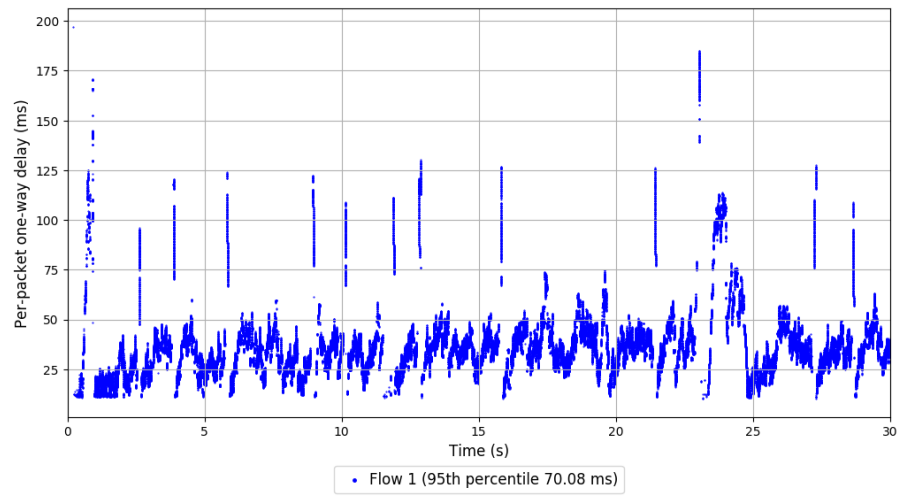
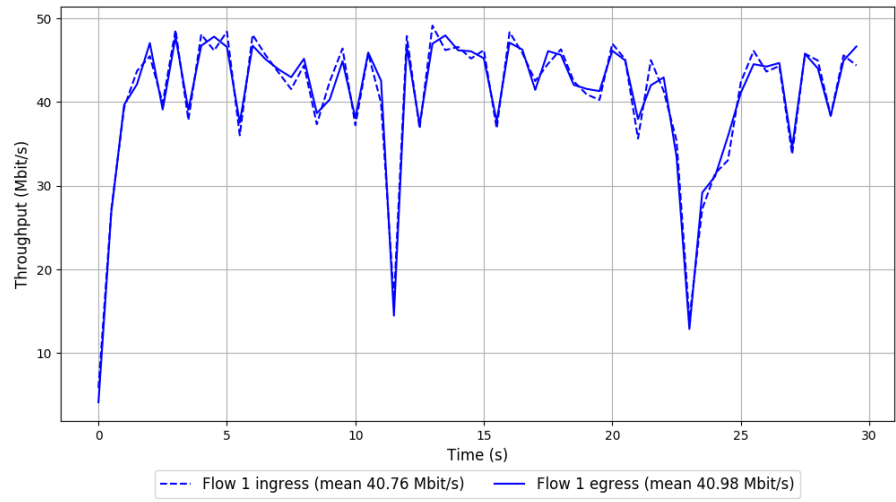
-- Flow 1:

Average throughput: 40.98 Mbit/s

95th percentile per-packet one-way delay: 70.081 ms

Loss rate: 0.07%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-03-20 07:08:09

End at: 2018-03-20 07:08:39

Local clock offset: 2.168 ms

Remote clock offset: -4.81 ms

Below is generated by plot.py at 2018-03-20 08:10:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 36.94 Mbit/s

95th percentile per-packet one-way delay: 200.443 ms

Loss rate: 0.33%

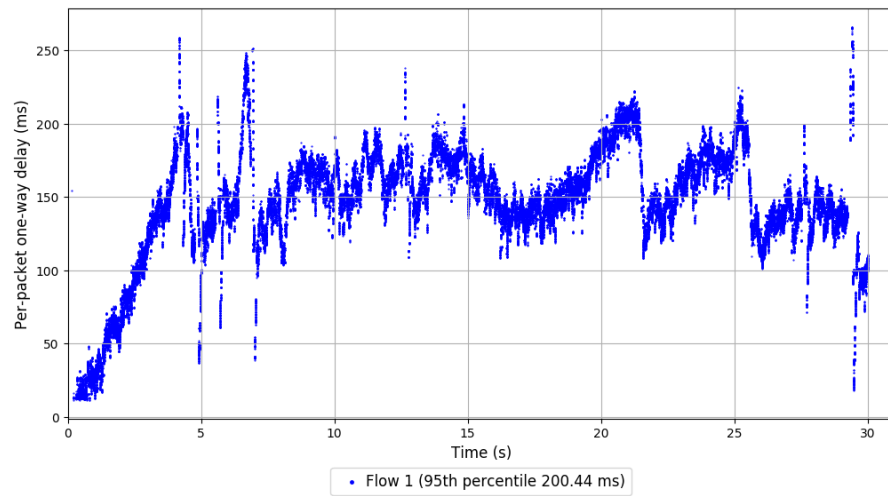
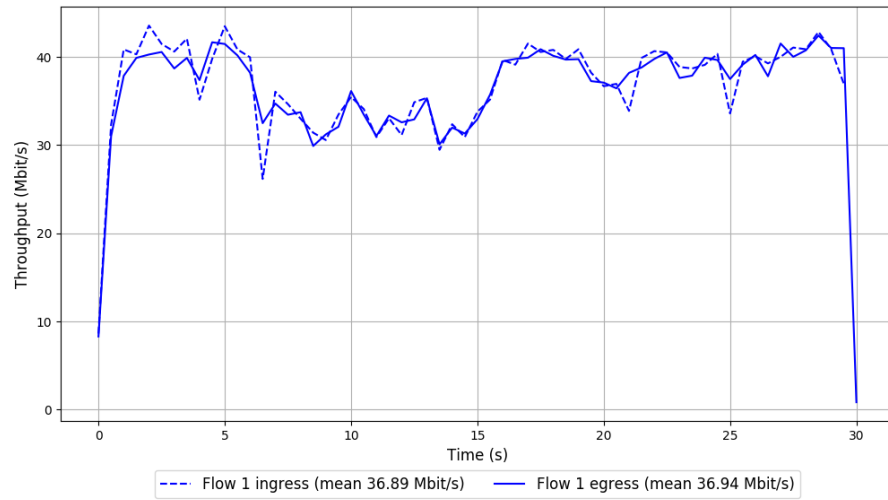
-- Flow 1:

Average throughput: 36.94 Mbit/s

95th percentile per-packet one-way delay: 200.443 ms

Loss rate: 0.33%

Run 1: Report of TCP Cubic — Data Link

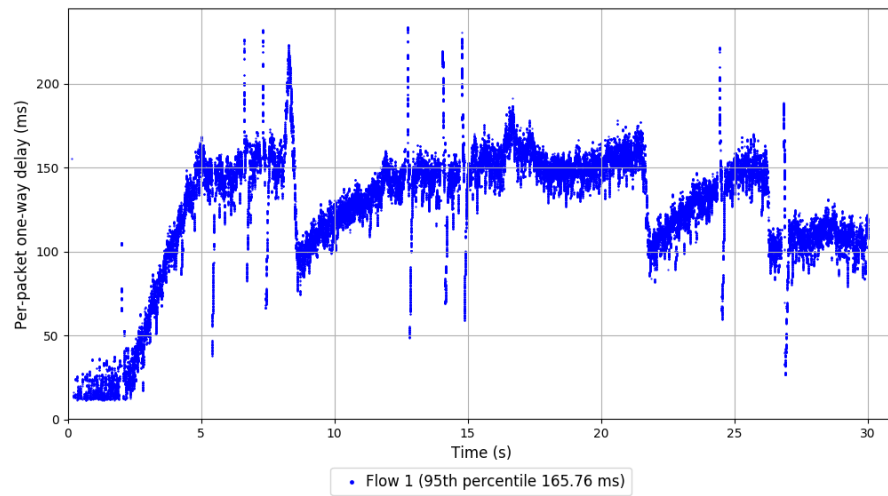
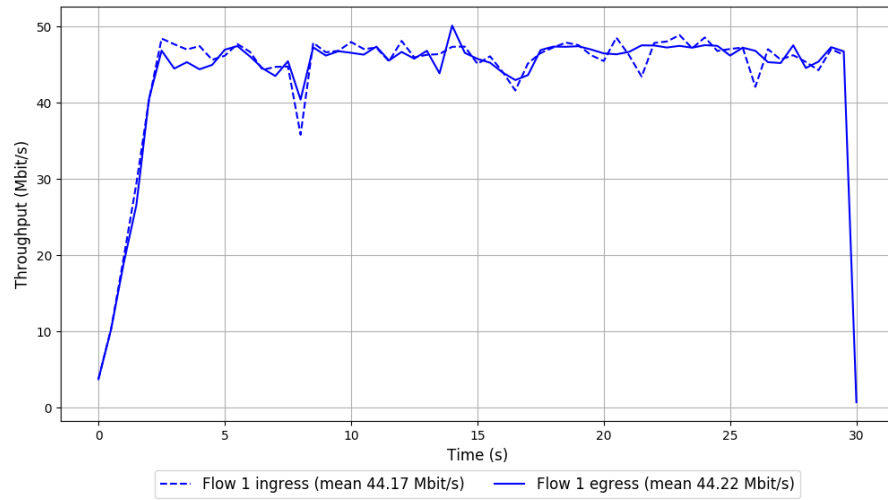


Run 2: Statistics of TCP Cubic

Start at: 2018-03-20 07:31:55
End at: 2018-03-20 07:32:25
Local clock offset: 6.209 ms
Remote clock offset: -5.131 ms

Below is generated by plot.py at 2018-03-20 08:10:42
Datalink statistics
-- Total of 1 flow:
Average throughput: 44.22 Mbit/s
95th percentile per-packet one-way delay: 165.765 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 44.22 Mbit/s
95th percentile per-packet one-way delay: 165.765 ms
Loss rate: 0.33%

Run 2: Report of TCP Cubic — Data Link

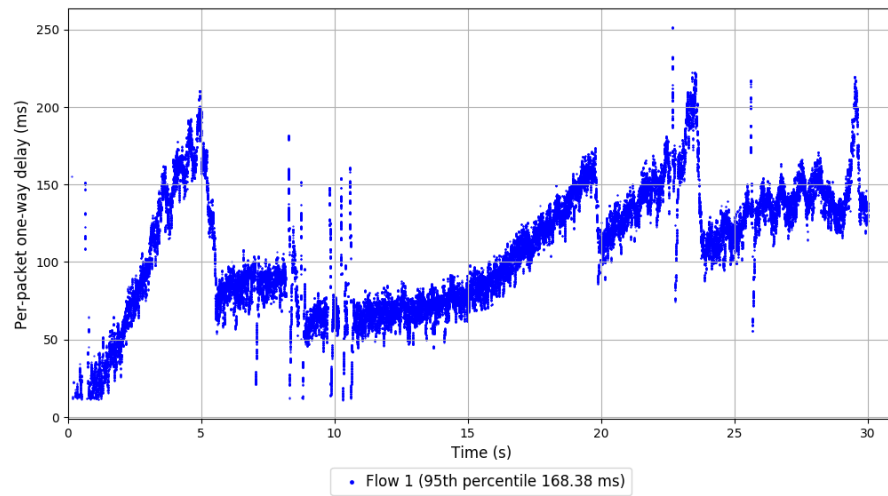
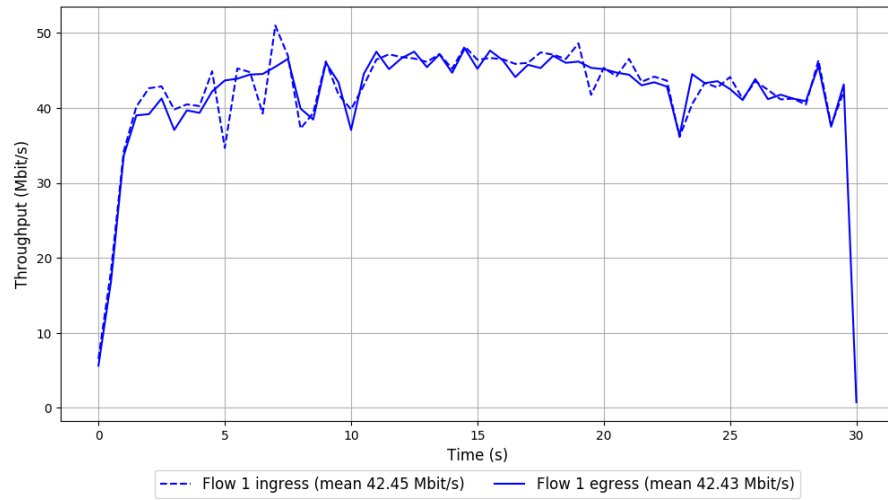


Run 3: Statistics of TCP Cubic

Start at: 2018-03-20 07:55:39
End at: 2018-03-20 07:56:09
Local clock offset: 12.374 ms
Remote clock offset: -5.447 ms

Below is generated by plot.py at 2018-03-20 08:10:42
Datalink statistics
-- Total of 1 flow:
Average throughput: 42.43 Mbit/s
95th percentile per-packet one-way delay: 168.383 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 42.43 Mbit/s
95th percentile per-packet one-way delay: 168.383 ms
Loss rate: 0.50%

Run 3: Report of TCP Cubic — Data Link

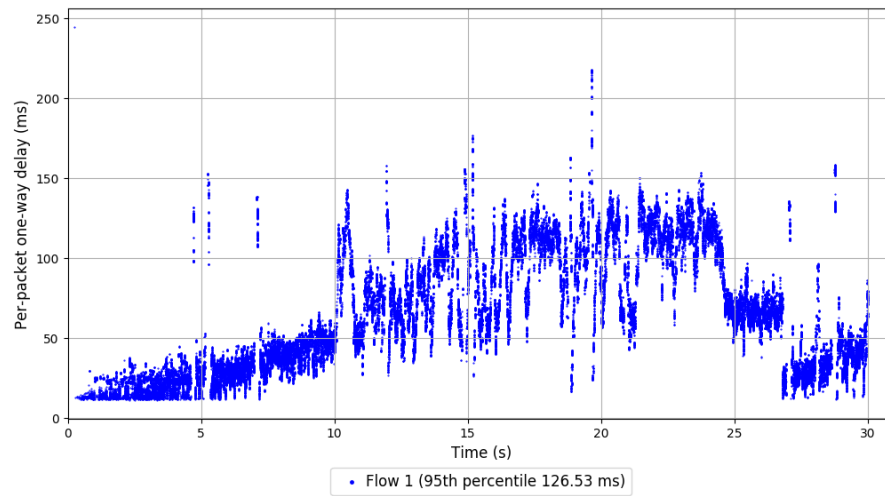
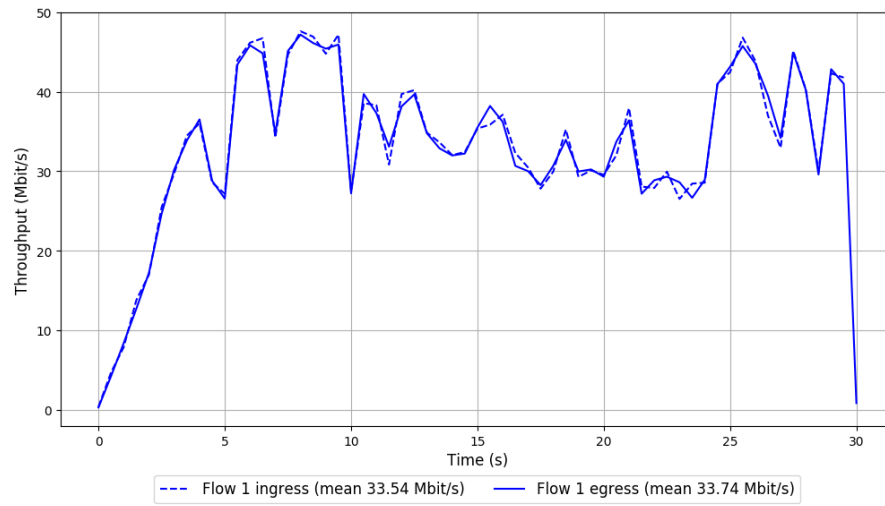


Run 1: Statistics of LEDBAT

Start at: 2018-03-20 06:58:57
End at: 2018-03-20 06:59:27
Local clock offset: 2.988 ms
Remote clock offset: -4.584 ms

Below is generated by plot.py at 2018-03-20 08:10:42
Datalink statistics
-- Total of 1 flow:
Average throughput: 33.74 Mbit/s
95th percentile per-packet one-way delay: 126.526 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 33.74 Mbit/s
95th percentile per-packet one-way delay: 126.526 ms
Loss rate: 0.16%

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-03-20 07:22:42

End at: 2018-03-20 07:23:12

Local clock offset: 2.455 ms

Remote clock offset: -4.768 ms

Below is generated by plot.py at 2018-03-20 08:10:42

Datalink statistics

-- Total of 1 flow:

Average throughput: 34.73 Mbit/s

95th percentile per-packet one-way delay: 109.253 ms

Loss rate: 0.21%

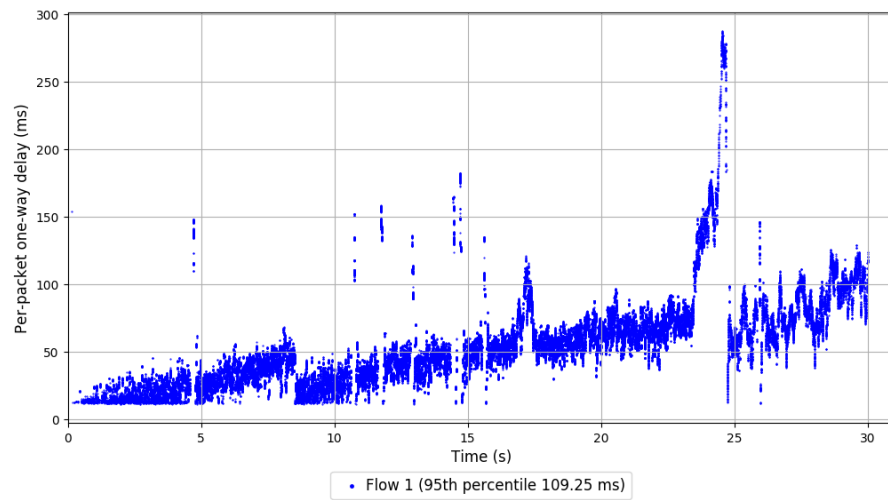
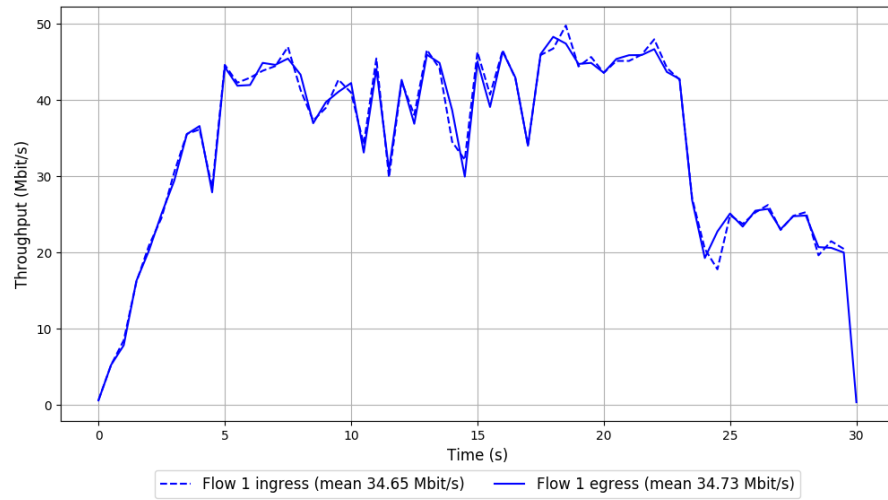
-- Flow 1:

Average throughput: 34.73 Mbit/s

95th percentile per-packet one-way delay: 109.253 ms

Loss rate: 0.21%

Run 2: Report of LEDBAT — Data Link

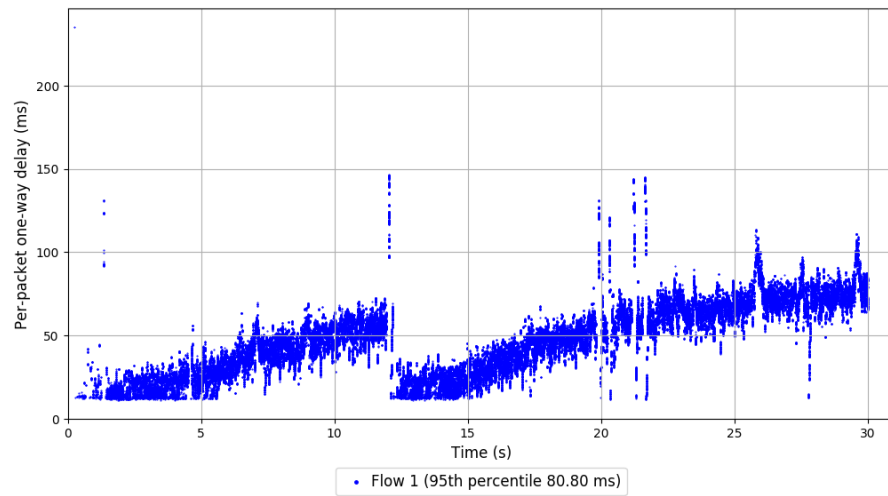
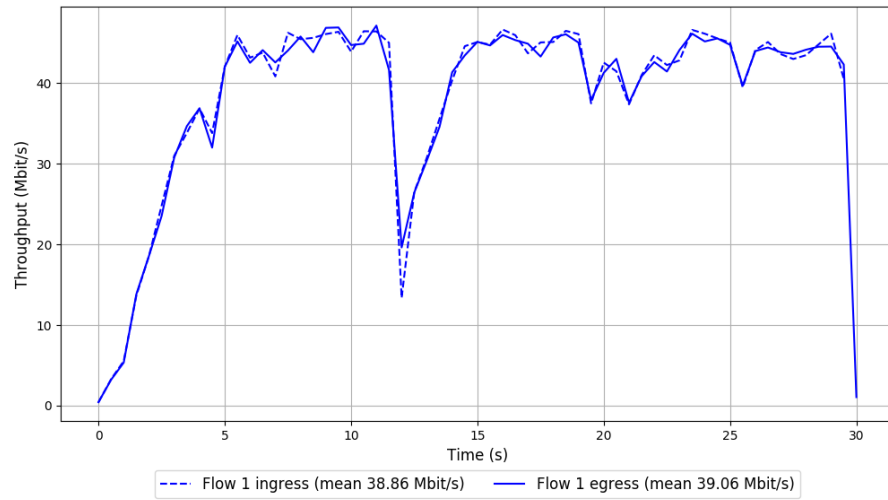


Run 3: Statistics of LEDBAT

Start at: 2018-03-20 07:46:26
End at: 2018-03-20 07:46:56
Local clock offset: 10.601 ms
Remote clock offset: -5.289 ms

Below is generated by plot.py at 2018-03-20 08:11:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 39.06 Mbit/s
95th percentile per-packet one-way delay: 80.800 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 39.06 Mbit/s
95th percentile per-packet one-way delay: 80.800 ms
Loss rate: 0.22%

Run 3: Report of LEDBAT — Data Link

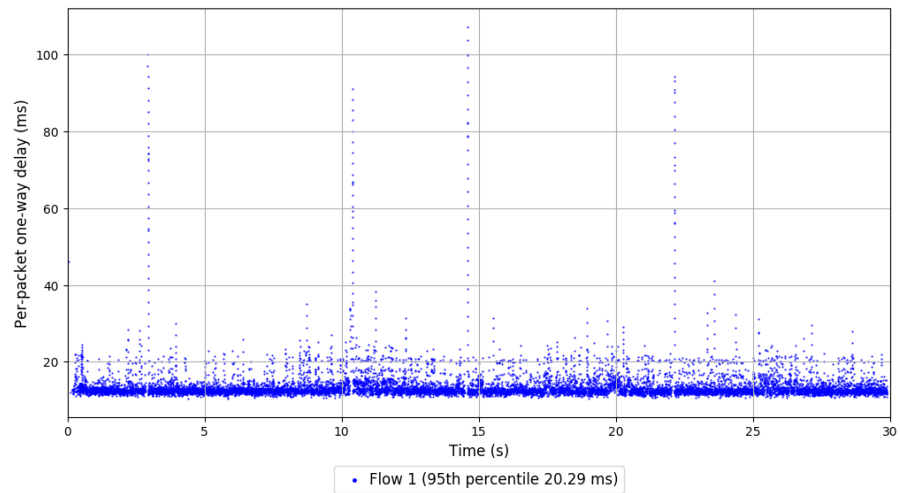
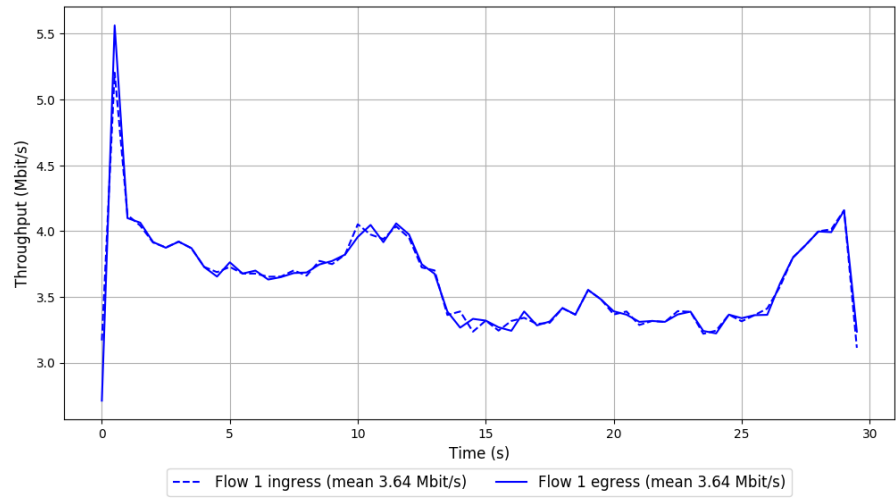


Run 1: Statistics of PCC

Start at: 2018-03-20 07:00:17
End at: 2018-03-20 07:00:47
Local clock offset: 2.742 ms
Remote clock offset: -4.574 ms

Below is generated by plot.py at 2018-03-20 08:11:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.64 Mbit/s
95th percentile per-packet one-way delay: 20.293 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.64 Mbit/s
95th percentile per-packet one-way delay: 20.293 ms
Loss rate: 0.00%

Run 1: Report of PCC — Data Link

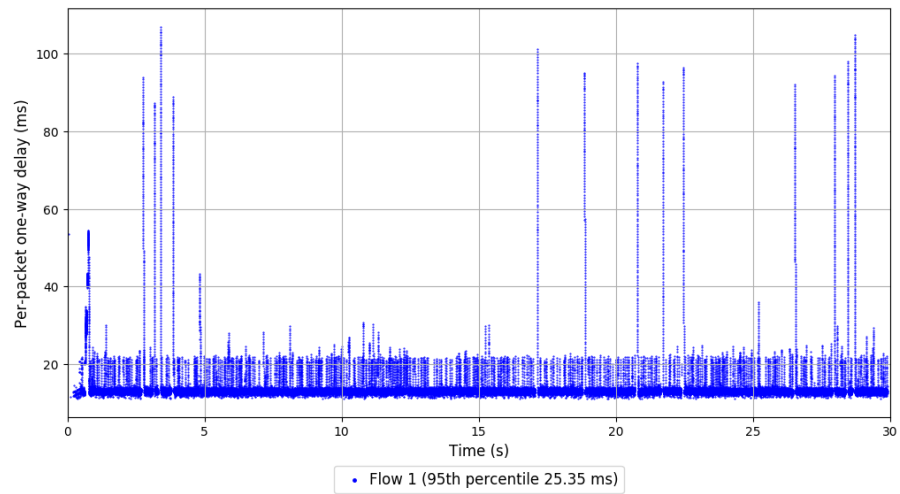
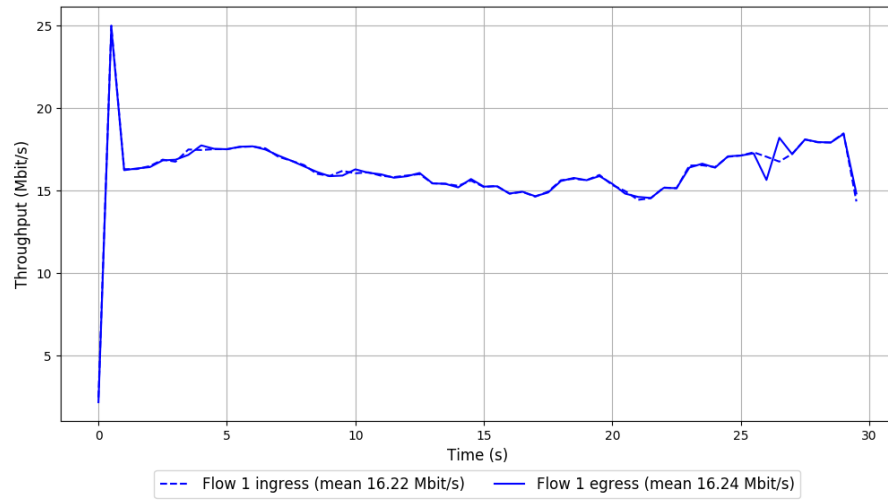


Run 2: Statistics of PCC

Start at: 2018-03-20 07:24:02
End at: 2018-03-20 07:24:32
Local clock offset: 2.412 ms
Remote clock offset: -4.797 ms

Below is generated by plot.py at 2018-03-20 08:11:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 16.24 Mbit/s
95th percentile per-packet one-way delay: 25.349 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 16.24 Mbit/s
95th percentile per-packet one-way delay: 25.349 ms
Loss rate: 0.00%

Run 2: Report of PCC — Data Link

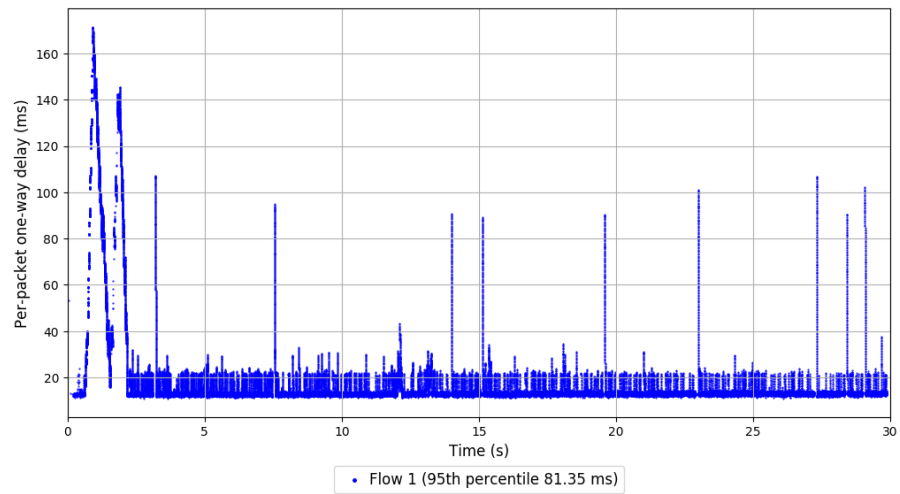
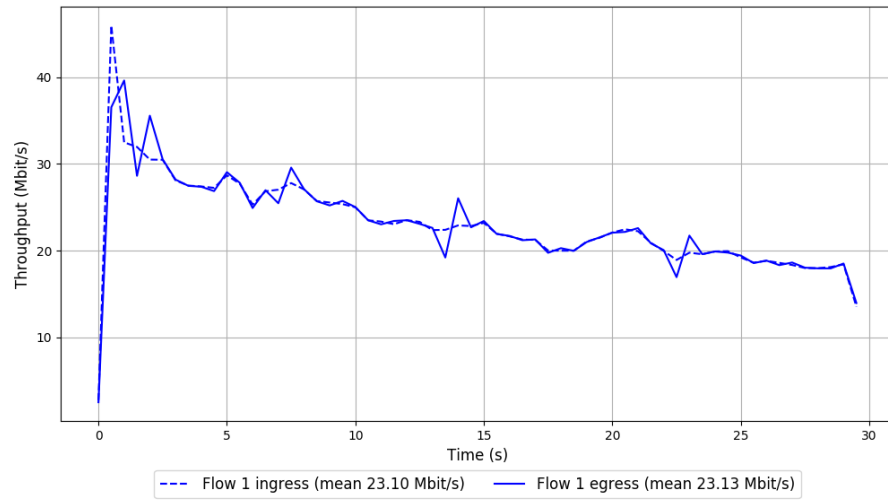


Run 3: Statistics of PCC

Start at: 2018-03-20 07:47:46
End at: 2018-03-20 07:48:16
Local clock offset: 10.944 ms
Remote clock offset: -5.288 ms

Below is generated by plot.py at 2018-03-20 08:11:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 23.13 Mbit/s
95th percentile per-packet one-way delay: 81.349 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 23.13 Mbit/s
95th percentile per-packet one-way delay: 81.349 ms
Loss rate: 0.01%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

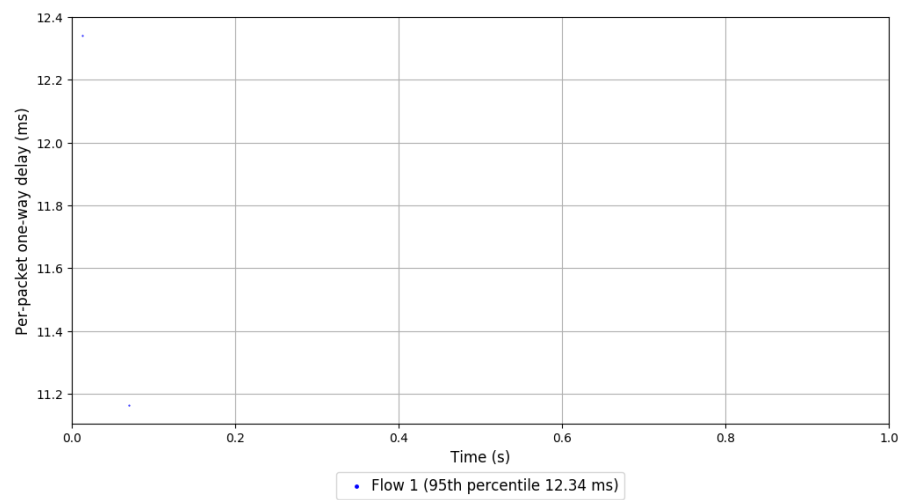
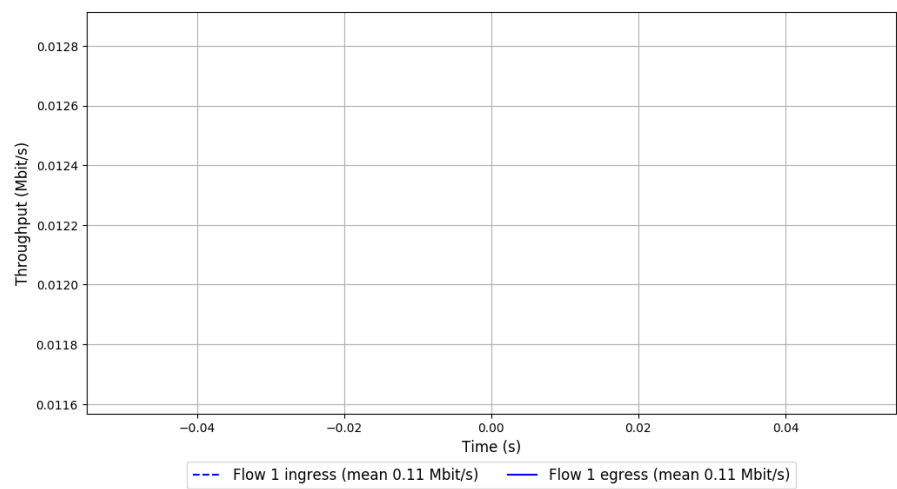
Start at: 2018-03-20 07:18:45

End at: 2018-03-20 07:19:15

Local clock offset: 2.291 ms

Remote clock offset: -4.858 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-03-20 07:42:28

End at: 2018-03-20 07:42:58

Local clock offset: 9.685 ms

Remote clock offset: -5.339 ms

Below is generated by plot.py at 2018-03-20 08:11:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 40.21 Mbit/s

95th percentile per-packet one-way delay: 160.349 ms

Loss rate: 0.10%

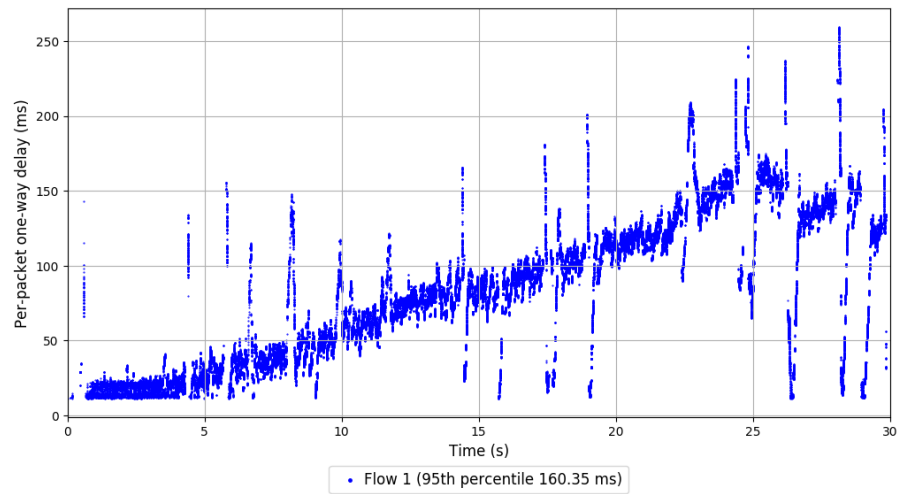
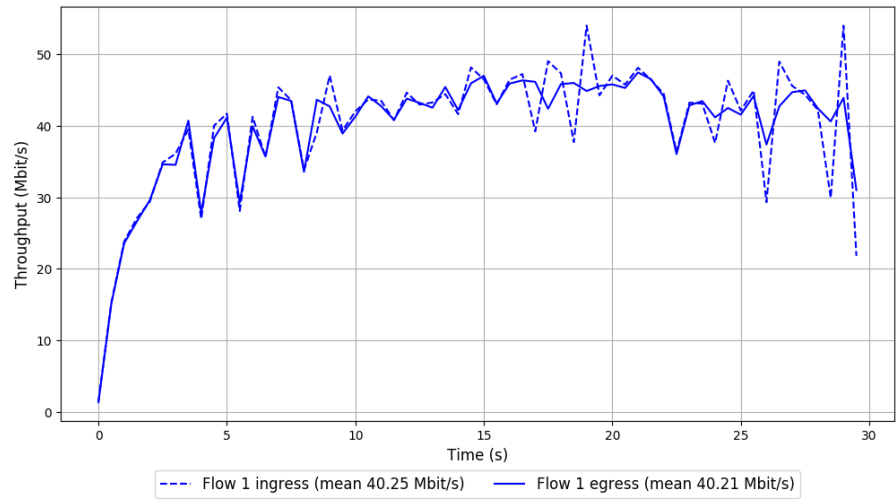
-- Flow 1:

Average throughput: 40.21 Mbit/s

95th percentile per-packet one-way delay: 160.349 ms

Loss rate: 0.10%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-03-20 08:06:13

End at: 2018-03-20 08:06:43

Local clock offset: 6.861 ms

Remote clock offset: -5.85 ms

Below is generated by plot.py at 2018-03-20 08:11:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 41.93 Mbit/s

95th percentile per-packet one-way delay: 152.894 ms

Loss rate: 0.50%

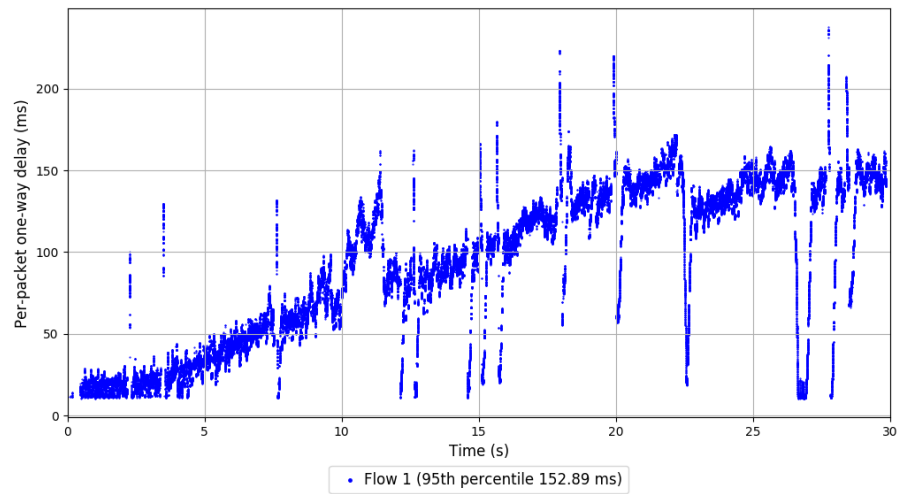
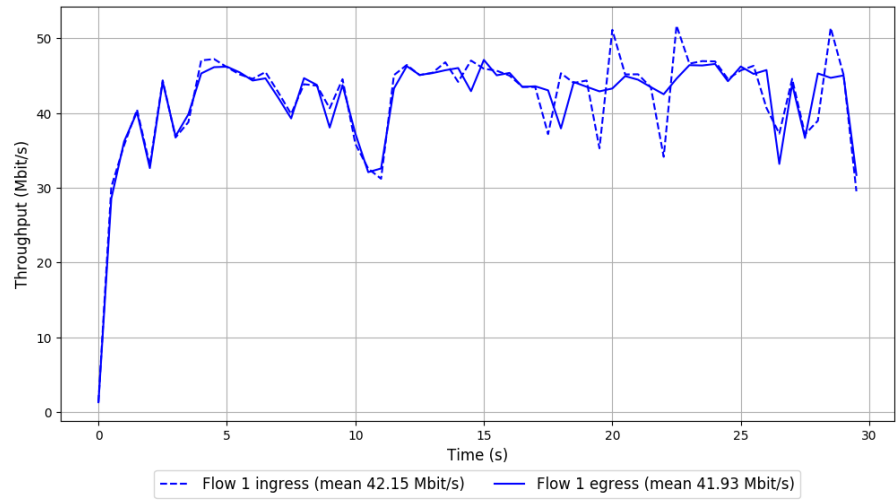
-- Flow 1:

Average throughput: 41.93 Mbit/s

95th percentile per-packet one-way delay: 152.894 ms

Loss rate: 0.50%

Run 3: Report of QUIC Cubic — Data Link

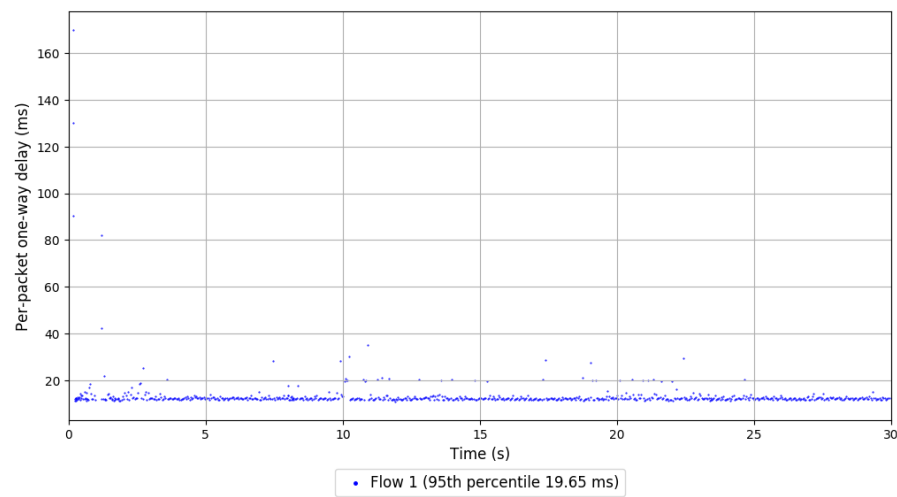
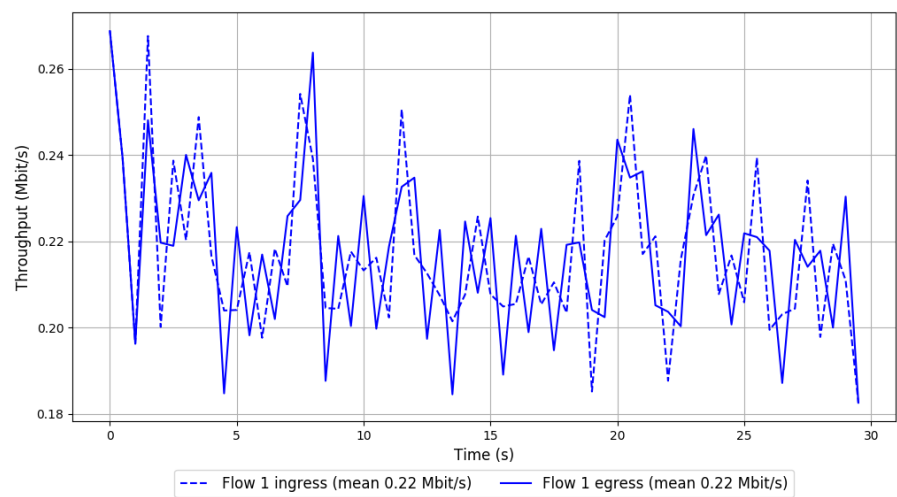


Run 1: Statistics of SCReAM

Start at: 2018-03-20 07:05:31
End at: 2018-03-20 07:06:01
Local clock offset: 2.278 ms
Remote clock offset: -4.702 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 19.652 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 19.652 ms
Loss rate: 0.00%

Run 1: Report of SReAM — Data Link

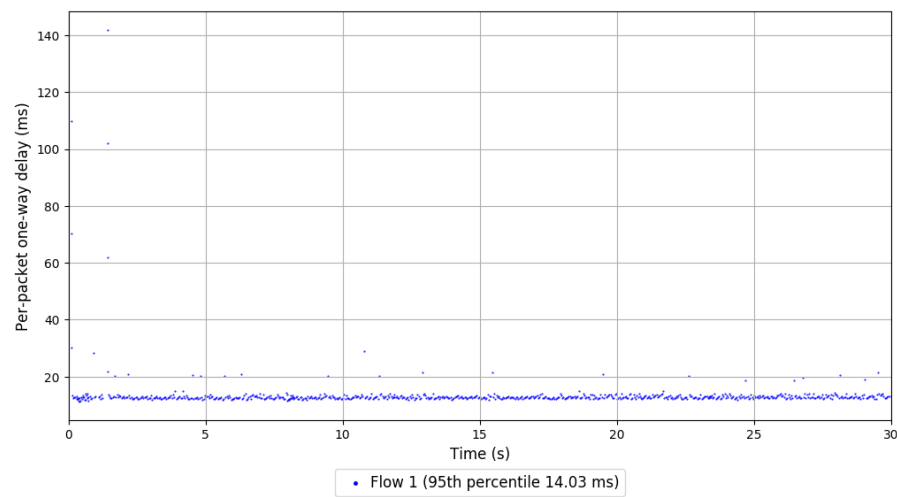
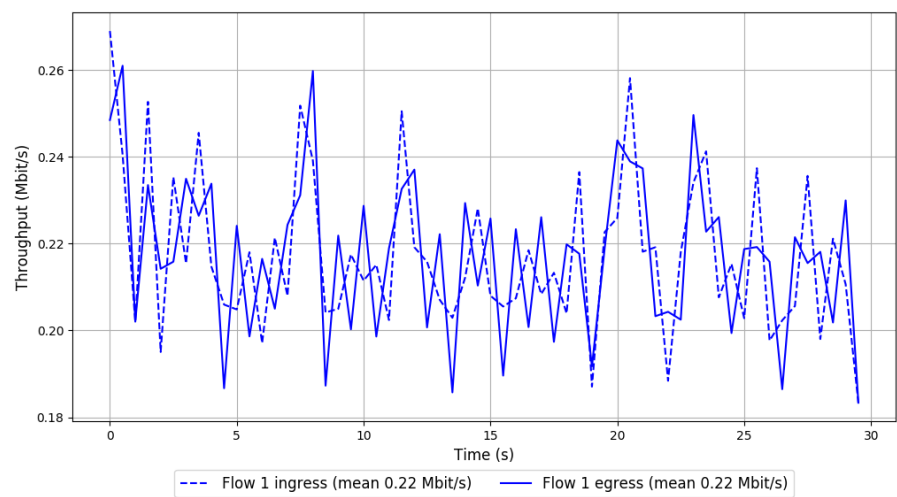


Run 2: Statistics of SCReAM

Start at: 2018-03-20 07:29:17
End at: 2018-03-20 07:29:47
Local clock offset: 4.878 ms
Remote clock offset: -4.973 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 14.032 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 14.032 ms
Loss rate: 0.00%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-03-20 07:53:01

End at: 2018-03-20 07:53:31

Local clock offset: 11.88 ms

Remote clock offset: -5.43 ms

Below is generated by plot.py at 2018-03-20 08:11:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 13.341 ms

Loss rate: 0.00%

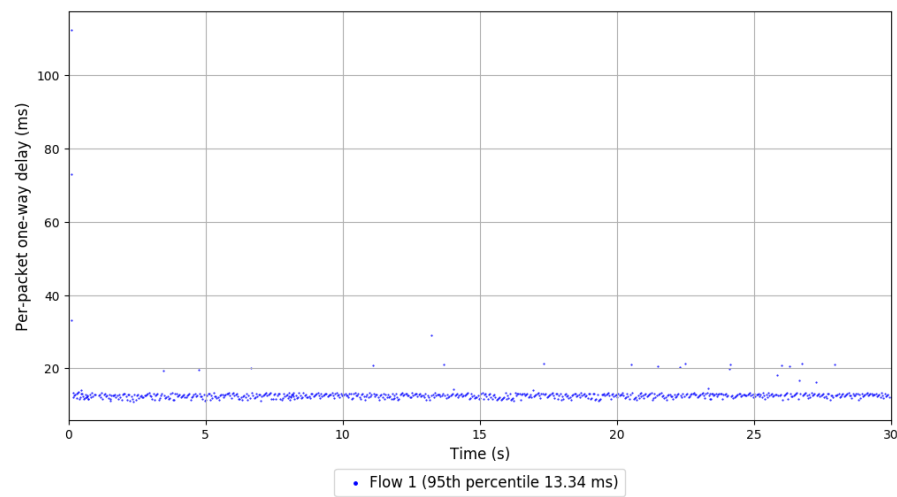
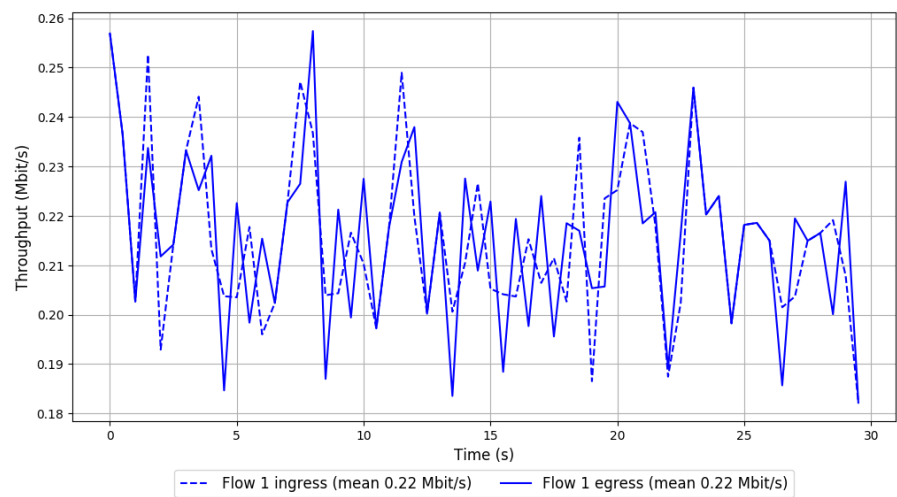
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 13.341 ms

Loss rate: 0.00%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-03-20 07:02:54

End at: 2018-03-20 07:03:24

Local clock offset: 2.458 ms

Remote clock offset: -4.749 ms

Below is generated by plot.py at 2018-03-20 08:11:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 110.707 ms

Loss rate: 0.00%

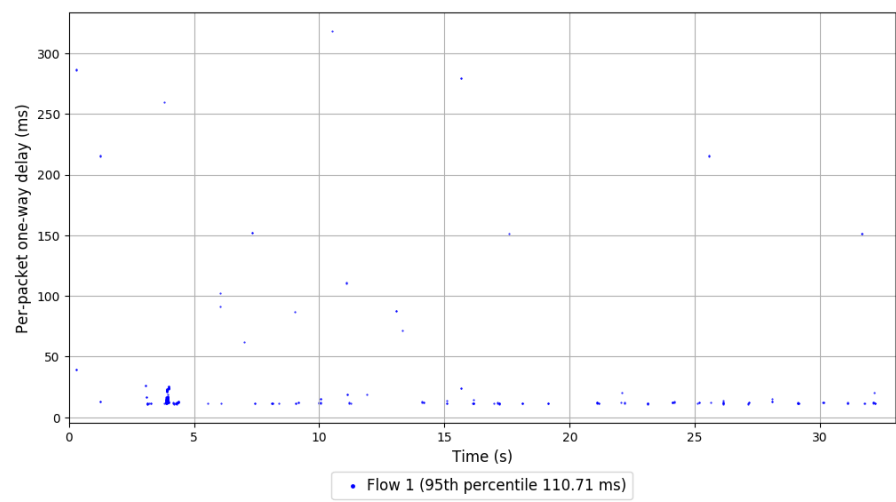
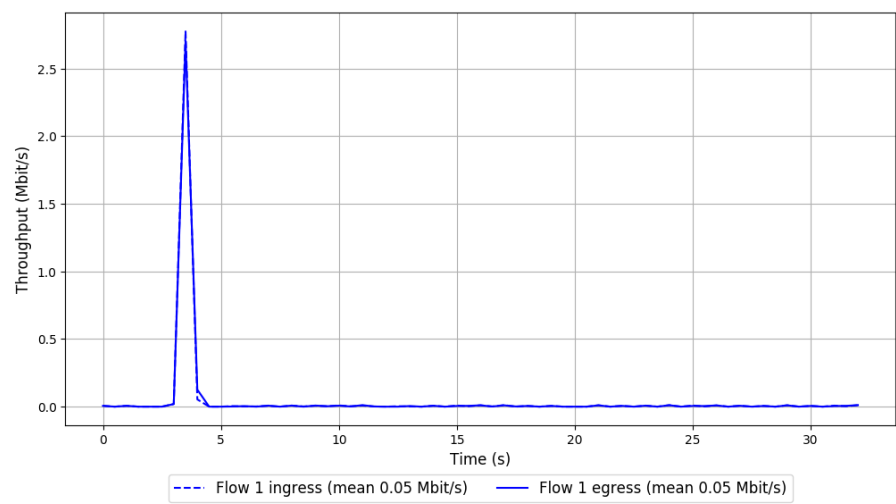
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 110.707 ms

Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-03-20 07:26:39

End at: 2018-03-20 07:27:09

Local clock offset: 3.113 ms

Remote clock offset: -4.94 ms

Below is generated by plot.py at 2018-03-20 08:11:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.37 Mbit/s

95th percentile per-packet one-way delay: 21.604 ms

Loss rate: 0.00%

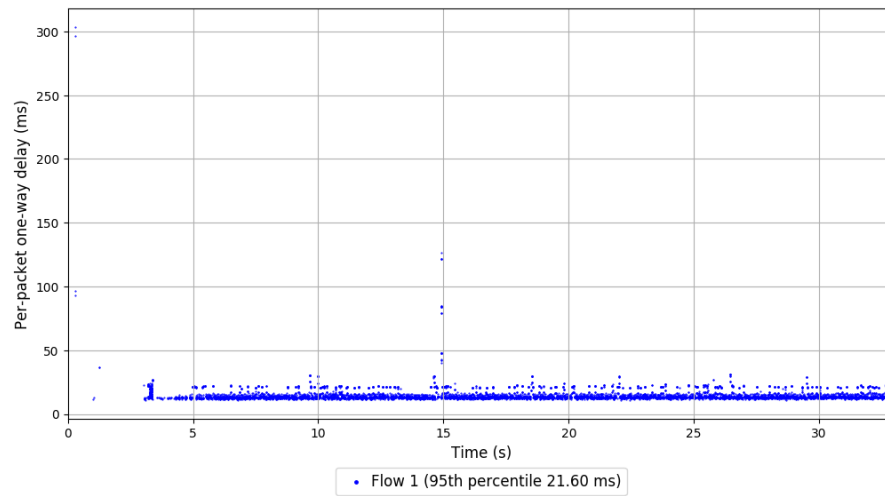
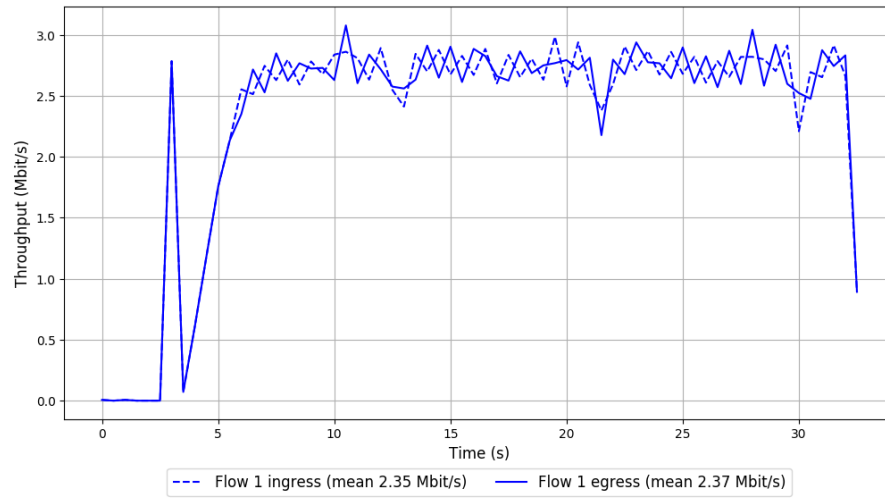
-- Flow 1:

Average throughput: 2.37 Mbit/s

95th percentile per-packet one-way delay: 21.604 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link

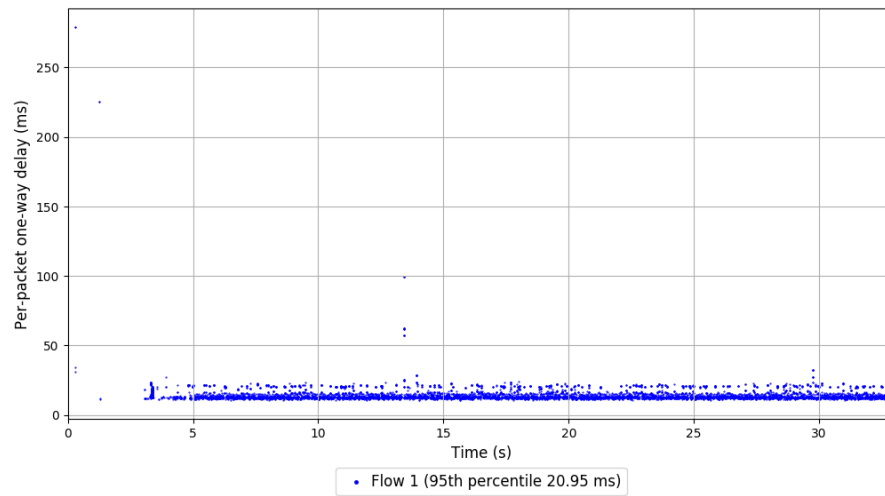
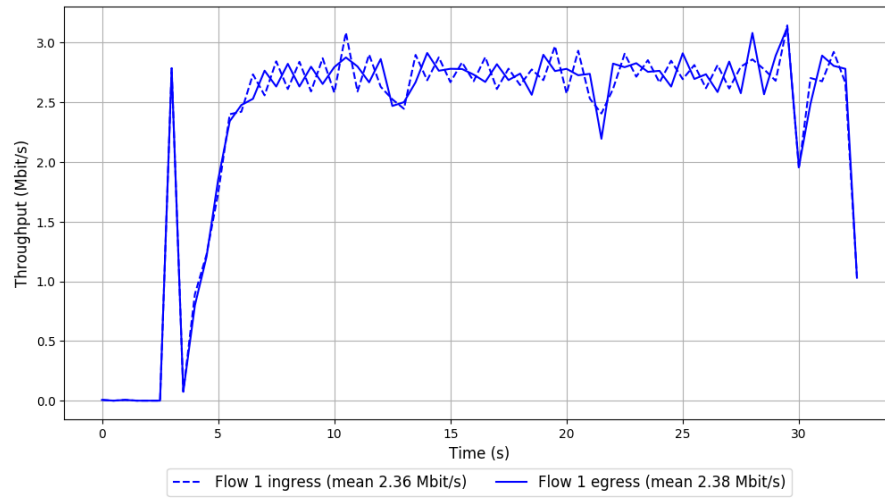


Run 3: Statistics of WebRTC media

Start at: 2018-03-20 07:50:24
End at: 2018-03-20 07:50:54
Local clock offset: 11.465 ms
Remote clock offset: -5.338 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 20.945 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 20.945 ms
Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

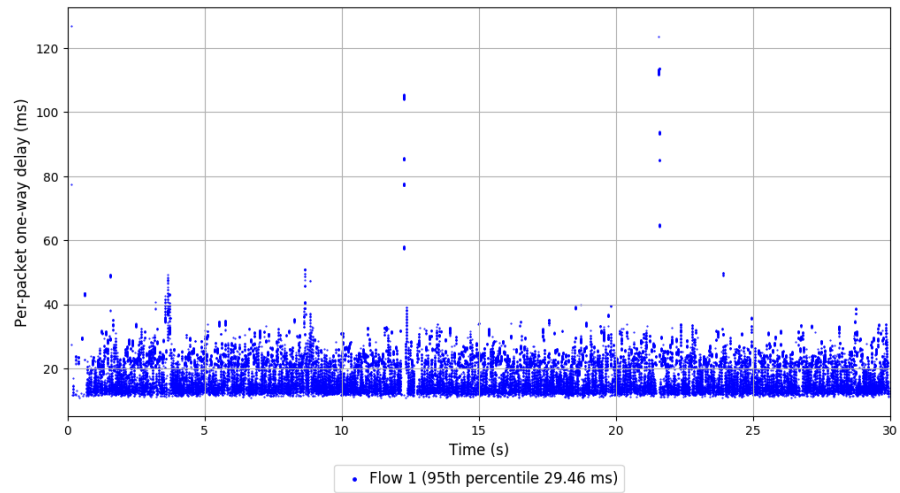
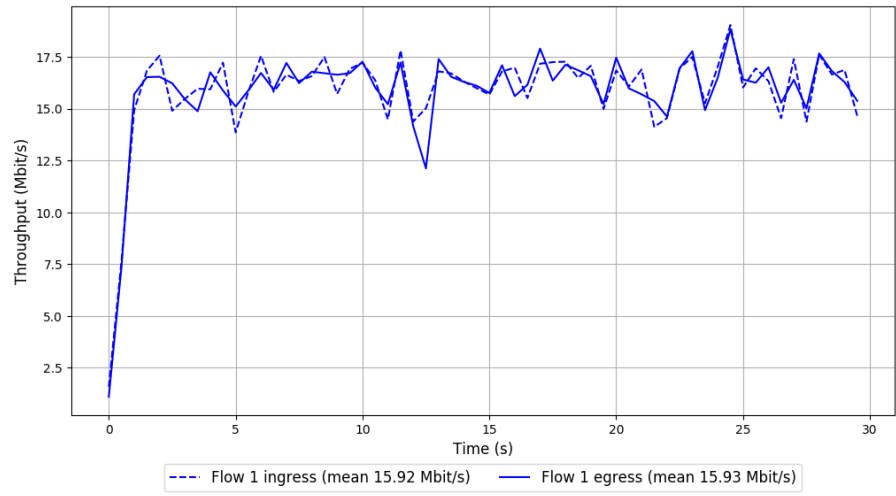


Run 1: Statistics of Sprout

Start at: 2018-03-20 07:01:35
End at: 2018-03-20 07:02:05
Local clock offset: 2.649 ms
Remote clock offset: -4.724 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 15.93 Mbit/s
95th percentile per-packet one-way delay: 29.456 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 15.93 Mbit/s
95th percentile per-packet one-way delay: 29.456 ms
Loss rate: 0.30%

Run 1: Report of Sprout — Data Link

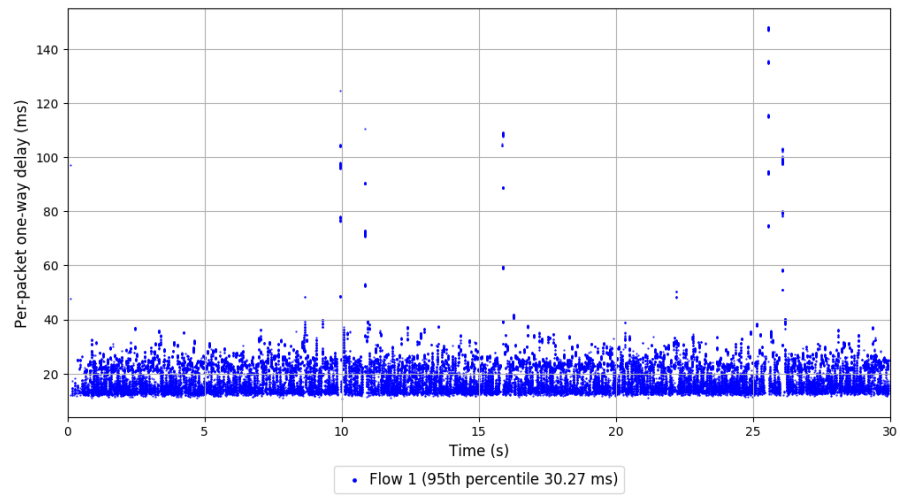
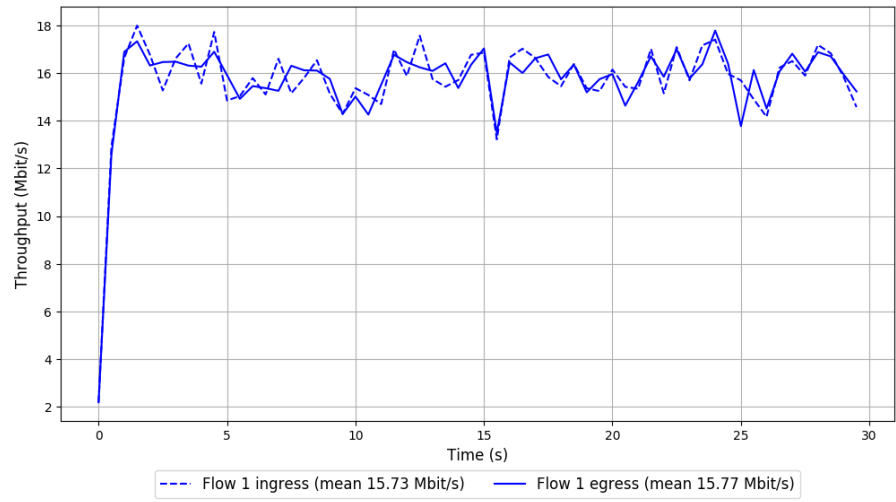


Run 2: Statistics of Sprout

Start at: 2018-03-20 07:25:21
End at: 2018-03-20 07:25:51
Local clock offset: 2.495 ms
Remote clock offset: -4.753 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 15.77 Mbit/s
95th percentile per-packet one-way delay: 30.267 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 15.77 Mbit/s
95th percentile per-packet one-way delay: 30.267 ms
Loss rate: 0.00%

Run 2: Report of Sprout — Data Link

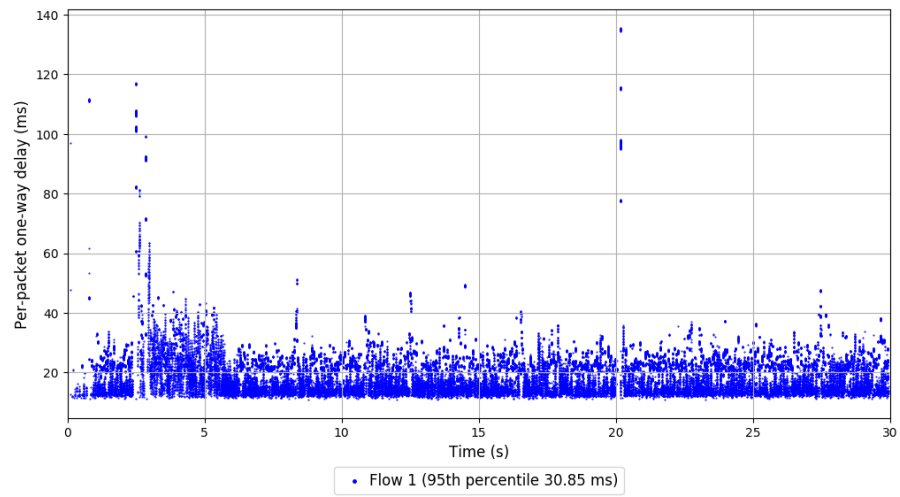
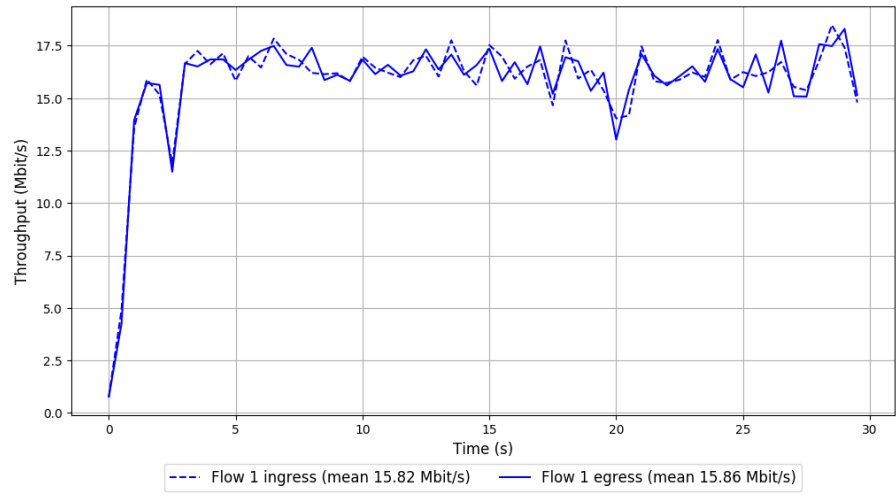


Run 3: Statistics of Sprout

Start at: 2018-03-20 07:49:05
End at: 2018-03-20 07:49:35
Local clock offset: 11.222 ms
Remote clock offset: -5.394 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 15.86 Mbit/s
95th percentile per-packet one-way delay: 30.850 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 15.86 Mbit/s
95th percentile per-packet one-way delay: 30.850 ms
Loss rate: 0.00%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2018-03-20 07:04:12

End at: 2018-03-20 07:04:42

Local clock offset: 2.267 ms

Remote clock offset: -4.693 ms

Below is generated by plot.py at 2018-03-20 08:11:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.97 Mbit/s

95th percentile per-packet one-way delay: 26.593 ms

Loss rate: 0.00%

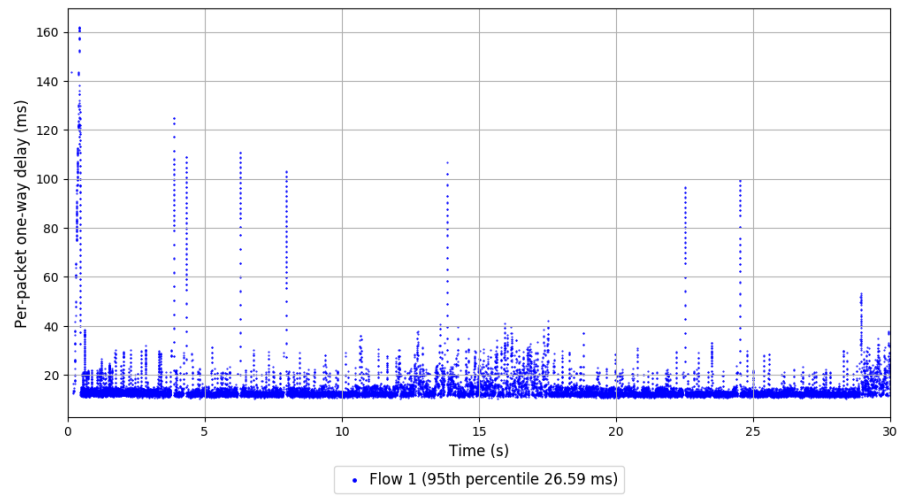
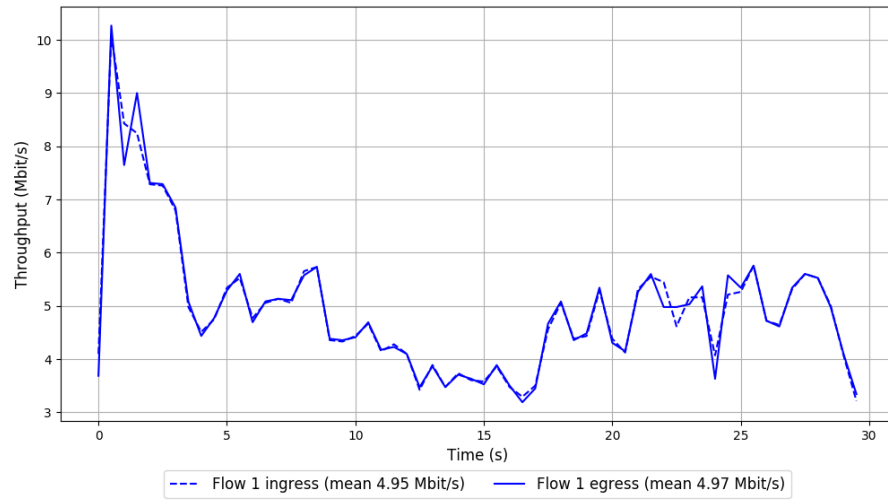
-- Flow 1:

Average throughput: 4.97 Mbit/s

95th percentile per-packet one-way delay: 26.593 ms

Loss rate: 0.00%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-03-20 07:27:58

End at: 2018-03-20 07:28:28

Local clock offset: 4.041 ms

Remote clock offset: -5.0 ms

Below is generated by plot.py at 2018-03-20 08:11:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.57 Mbit/s

95th percentile per-packet one-way delay: 24.688 ms

Loss rate: 0.00%

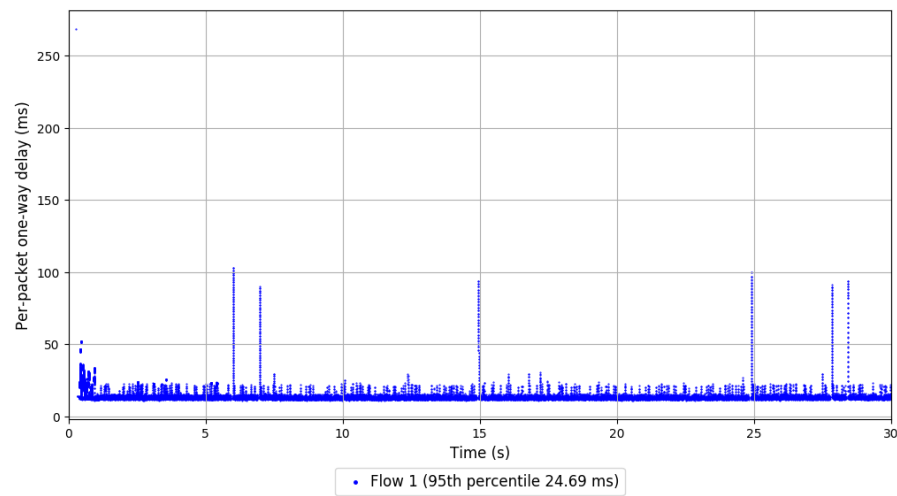
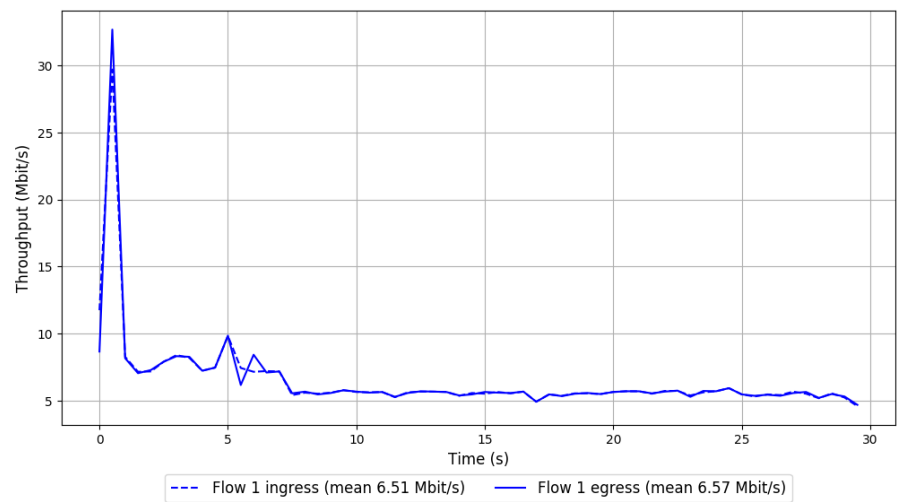
-- Flow 1:

Average throughput: 6.57 Mbit/s

95th percentile per-packet one-way delay: 24.688 ms

Loss rate: 0.00%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-03-20 07:51:42

End at: 2018-03-20 07:52:12

Local clock offset: 11.57 ms

Remote clock offset: -5.407 ms

Below is generated by plot.py at 2018-03-20 08:11:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.02 Mbit/s

95th percentile per-packet one-way delay: 20.463 ms

Loss rate: 0.00%

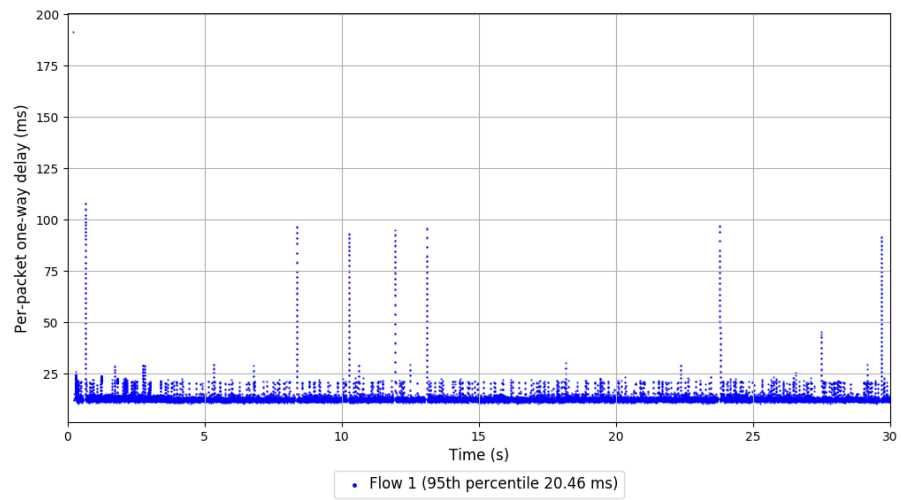
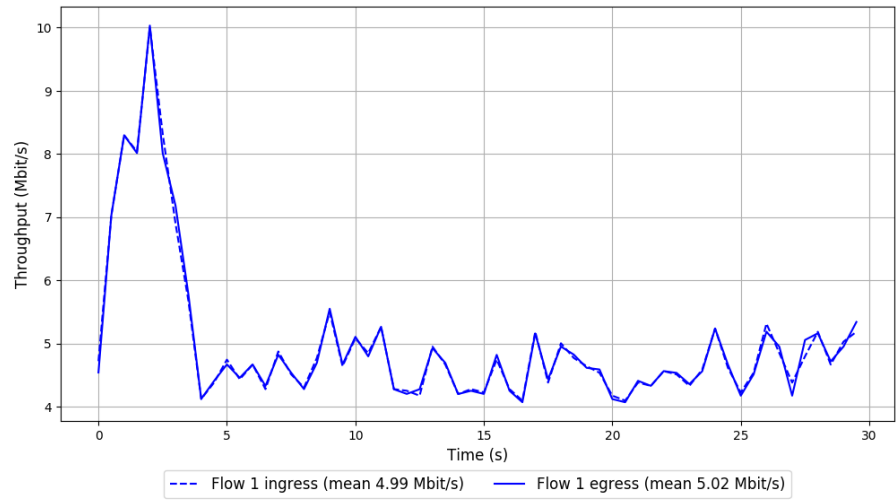
-- Flow 1:

Average throughput: 5.02 Mbit/s

95th percentile per-packet one-way delay: 20.463 ms

Loss rate: 0.00%

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

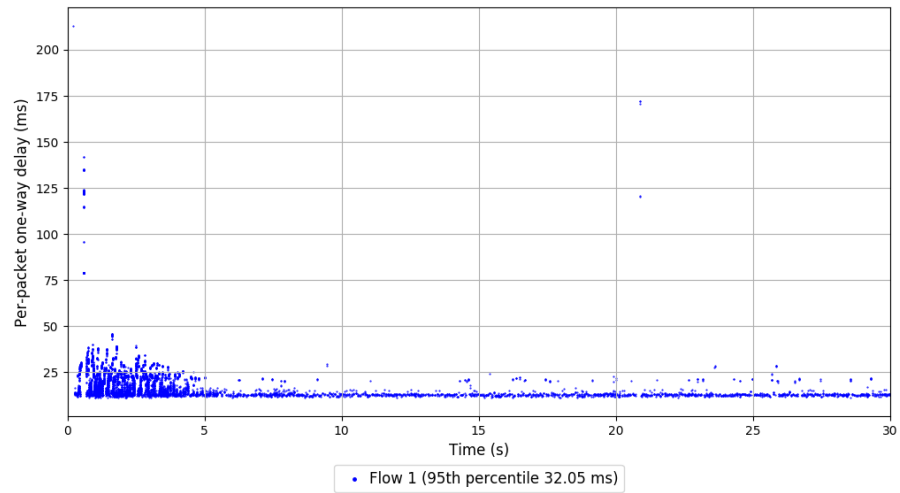
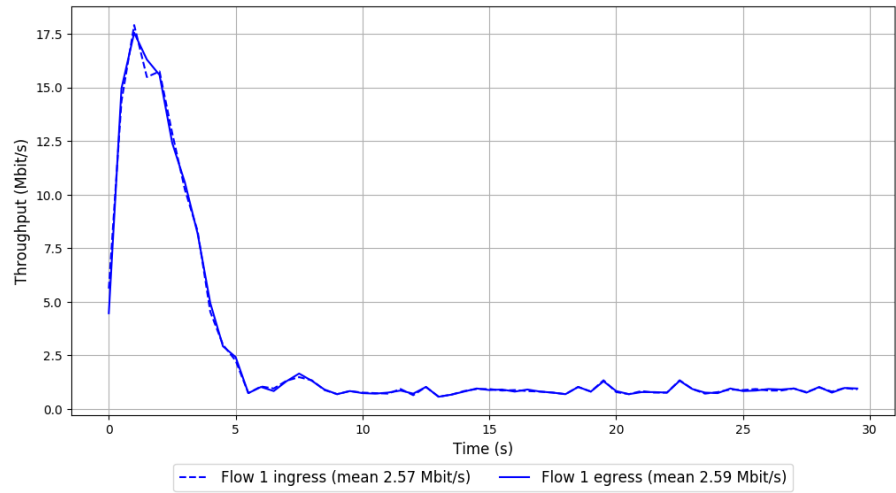


Run 1: Statistics of TCP Vegas

Start at: 2018-03-20 07:10:47
End at: 2018-03-20 07:11:17
Local clock offset: 2.014 ms
Remote clock offset: -4.774 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.59 Mbit/s
95th percentile per-packet one-way delay: 32.050 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.59 Mbit/s
95th percentile per-packet one-way delay: 32.050 ms
Loss rate: 0.00%

Run 1: Report of TCP Vegas — Data Link

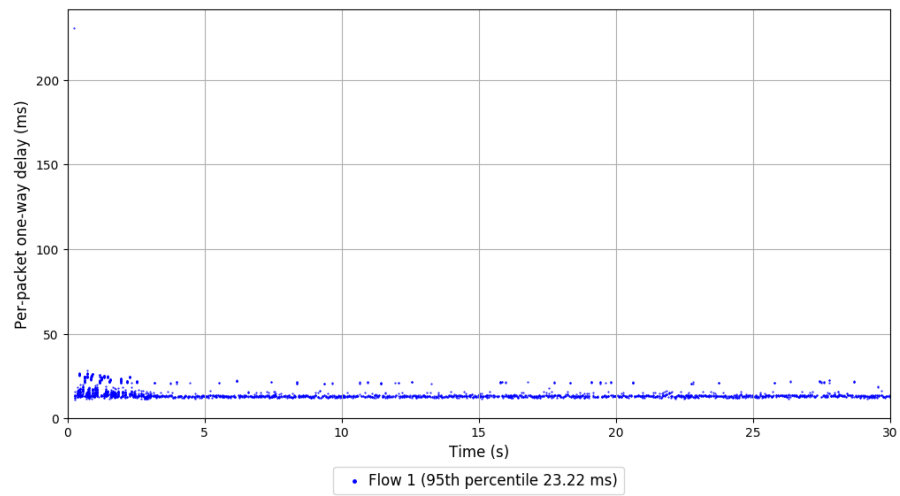
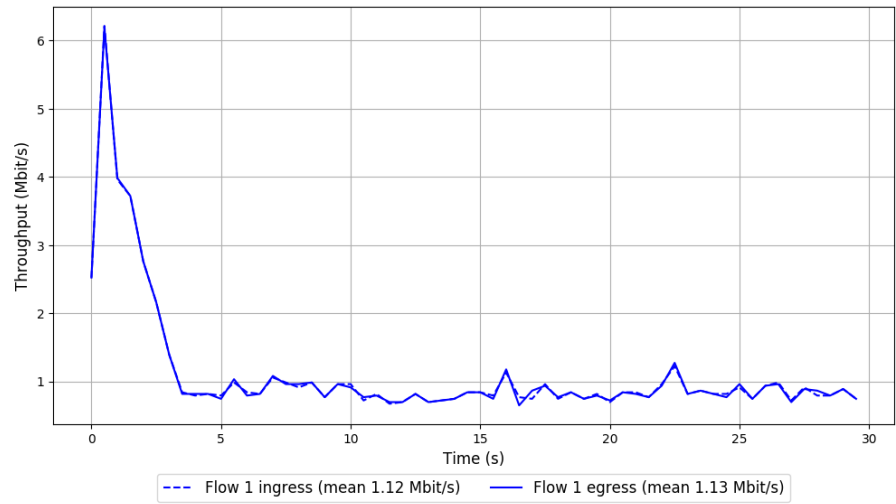


Run 2: Statistics of TCP Vegas

Start at: 2018-03-20 07:34:33
End at: 2018-03-20 07:35:03
Local clock offset: 7.266 ms
Remote clock offset: -5.152 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 23.216 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 23.216 ms
Loss rate: 0.00%

Run 2: Report of TCP Vegas — Data Link

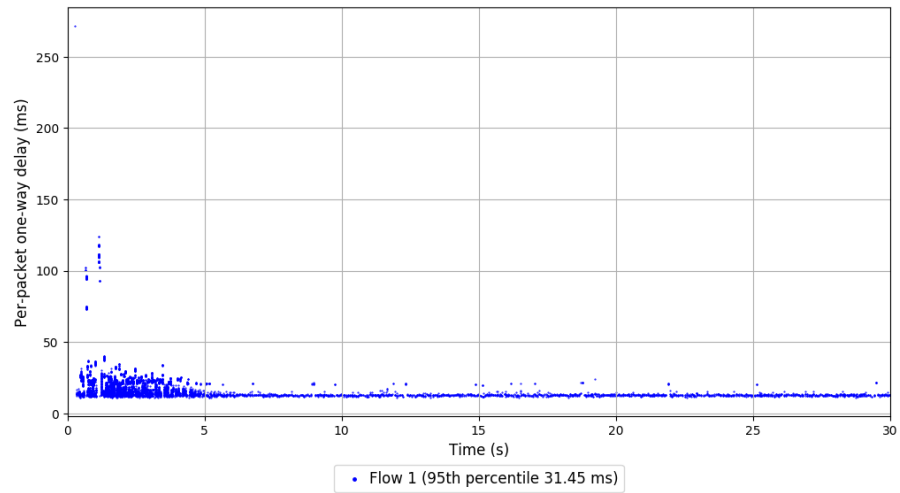
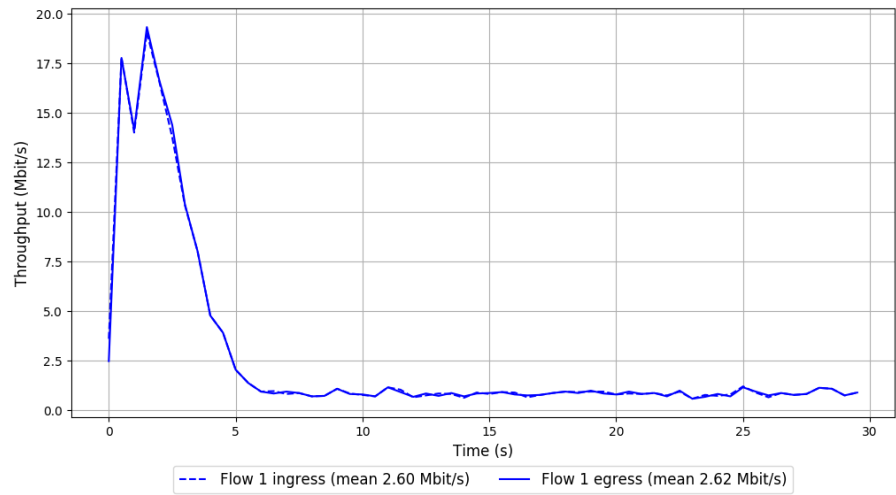


Run 3: Statistics of TCP Vegas

Start at: 2018-03-20 07:58:17
End at: 2018-03-20 07:58:47
Local clock offset: 12.778 ms
Remote clock offset: -5.396 ms

Below is generated by plot.py at 2018-03-20 08:11:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.62 Mbit/s
95th percentile per-packet one-way delay: 31.453 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.62 Mbit/s
95th percentile per-packet one-way delay: 31.453 ms
Loss rate: 0.00%

Run 3: Report of TCP Vegas — Data Link

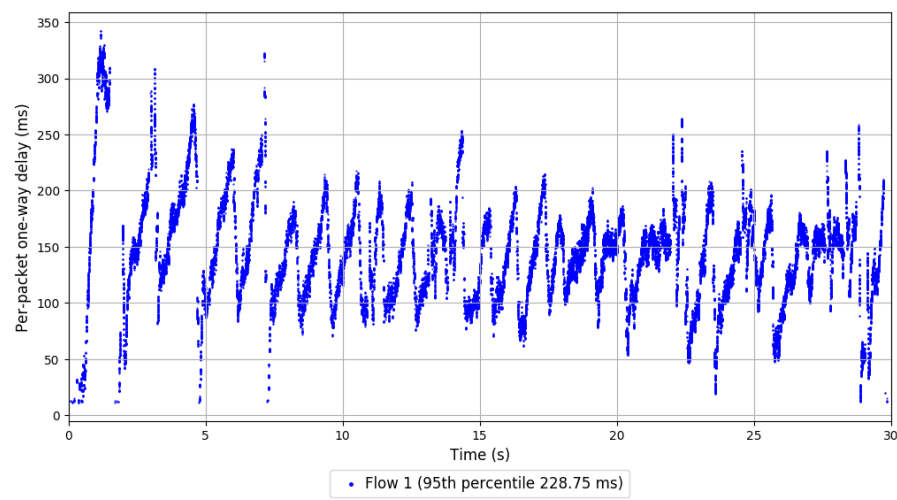
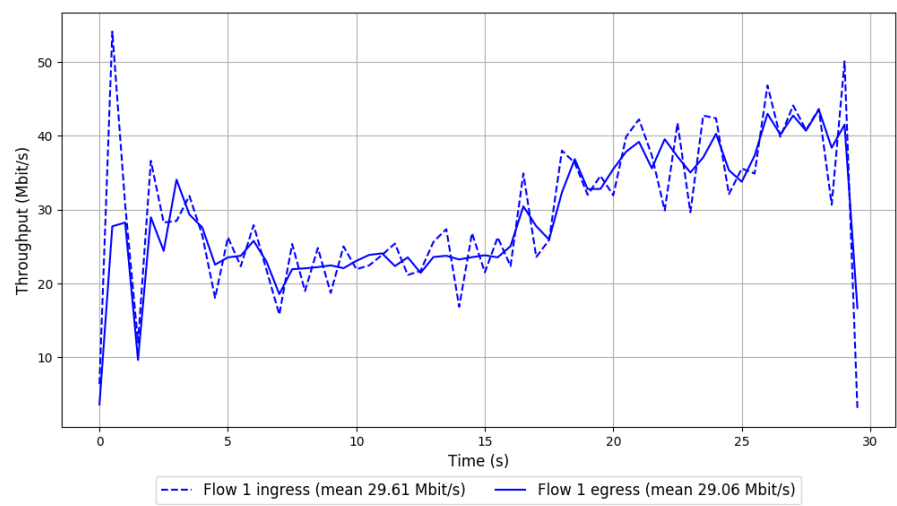


Run 1: Statistics of Verus

Start at: 2018-03-20 07:06:49
End at: 2018-03-20 07:07:19
Local clock offset: 2.194 ms
Remote clock offset: -4.803 ms

Below is generated by plot.py at 2018-03-20 08:11:32
Datalink statistics
-- Total of 1 flow:
Average throughput: 29.06 Mbit/s
95th percentile per-packet one-way delay: 228.754 ms
Loss rate: 1.84%
-- Flow 1:
Average throughput: 29.06 Mbit/s
95th percentile per-packet one-way delay: 228.754 ms
Loss rate: 1.84%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-03-20 07:30:35

End at: 2018-03-20 07:31:05

Local clock offset: 5.563 ms

Remote clock offset: -5.07 ms

Below is generated by plot.py at 2018-03-20 08:11:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 37.90 Mbit/s

95th percentile per-packet one-way delay: 173.489 ms

Loss rate: 8.36%

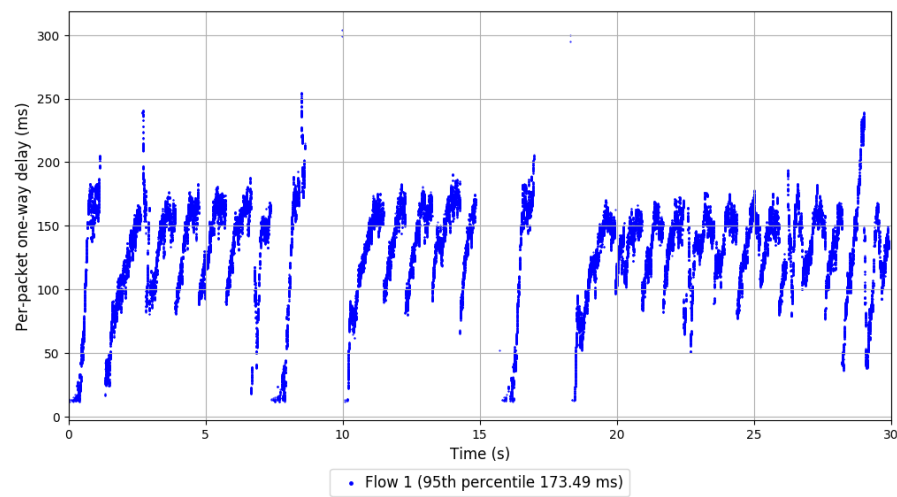
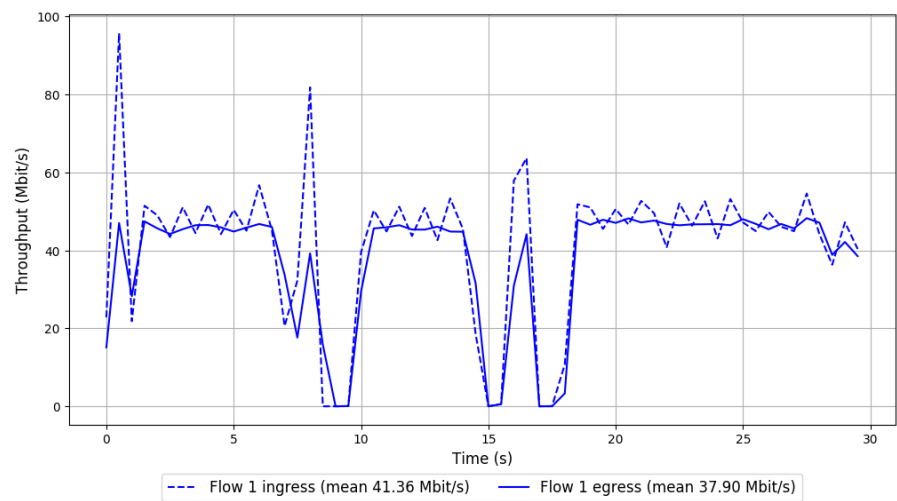
-- Flow 1:

Average throughput: 37.90 Mbit/s

95th percentile per-packet one-way delay: 173.489 ms

Loss rate: 8.36%

Run 2: Report of Verus — Data Link

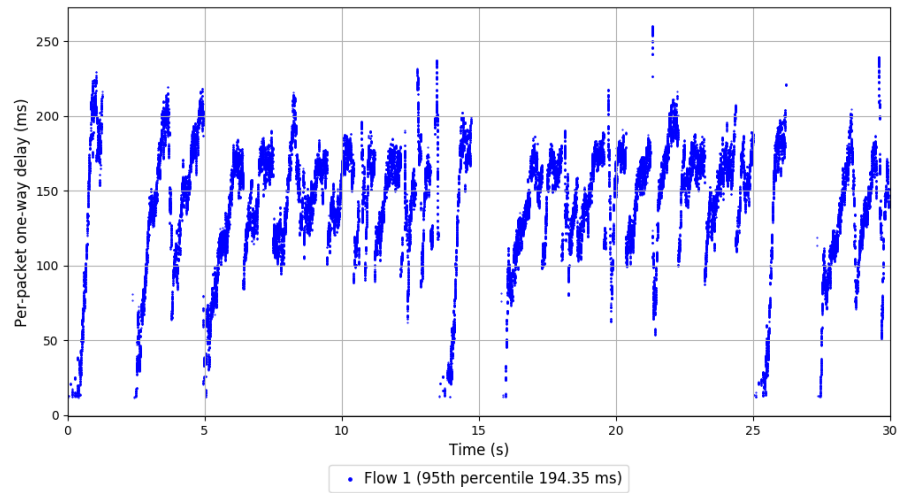
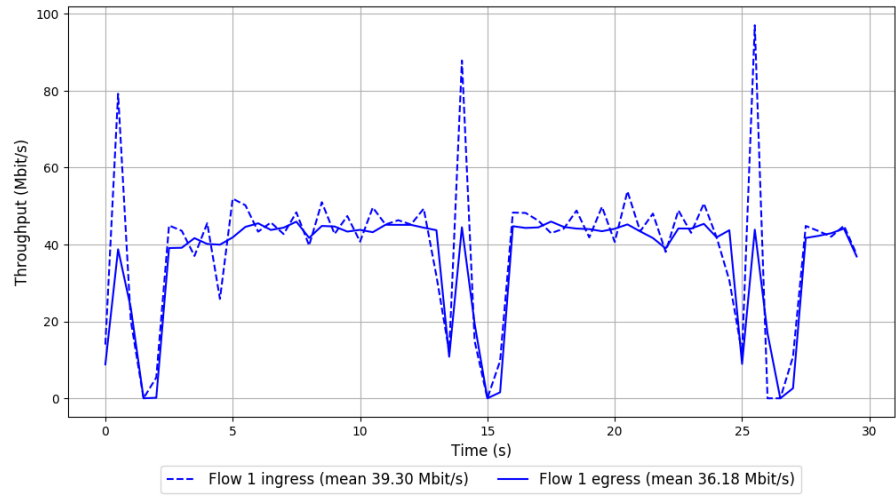


Run 3: Statistics of Verus

Start at: 2018-03-20 07:54:19
End at: 2018-03-20 07:54:49
Local clock offset: 12.036 ms
Remote clock offset: -5.444 ms

Below is generated by plot.py at 2018-03-20 08:11:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 36.18 Mbit/s
95th percentile per-packet one-way delay: 194.347 ms
Loss rate: 7.92%
-- Flow 1:
Average throughput: 36.18 Mbit/s
95th percentile per-packet one-way delay: 194.347 ms
Loss rate: 7.92%

Run 3: Report of Verus — Data Link



Run 1: Statistics of Copa

Start at: 2018-03-20 07:20:04

End at: 2018-03-20 07:20:34

Local clock offset: 2.337 ms

Remote clock offset: -4.86 ms

Below is generated by plot.py at 2018-03-20 08:11:58

Datalink statistics

-- Total of 1 flow:

Average throughput: 24.00 Mbit/s

95th percentile per-packet one-way delay: 51.660 ms

Loss rate: 0.04%

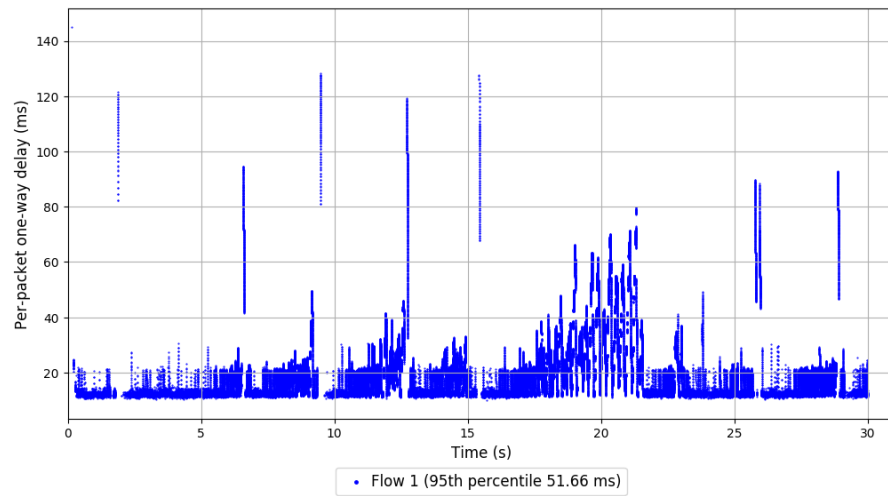
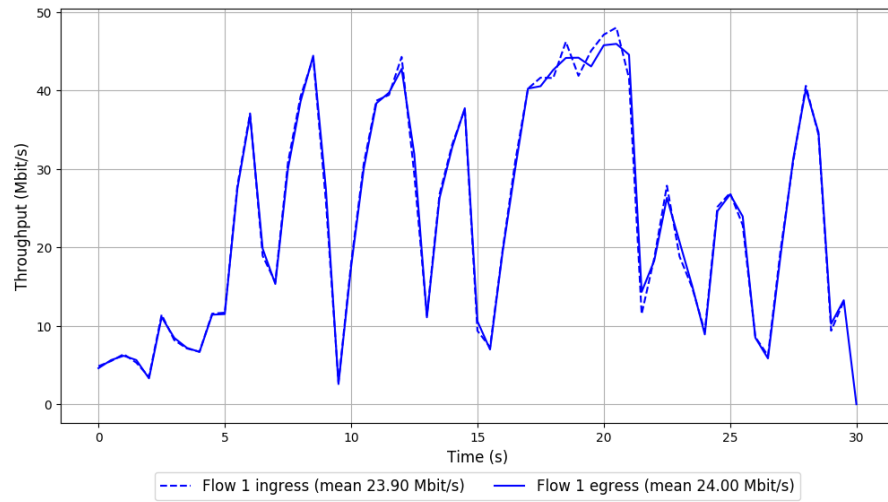
-- Flow 1:

Average throughput: 24.00 Mbit/s

95th percentile per-packet one-way delay: 51.660 ms

Loss rate: 0.04%

Run 1: Report of Copa — Data Link

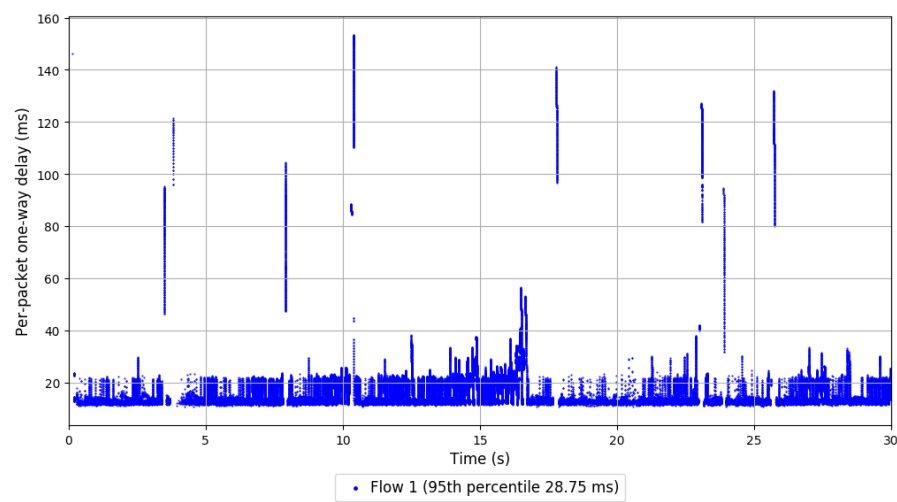
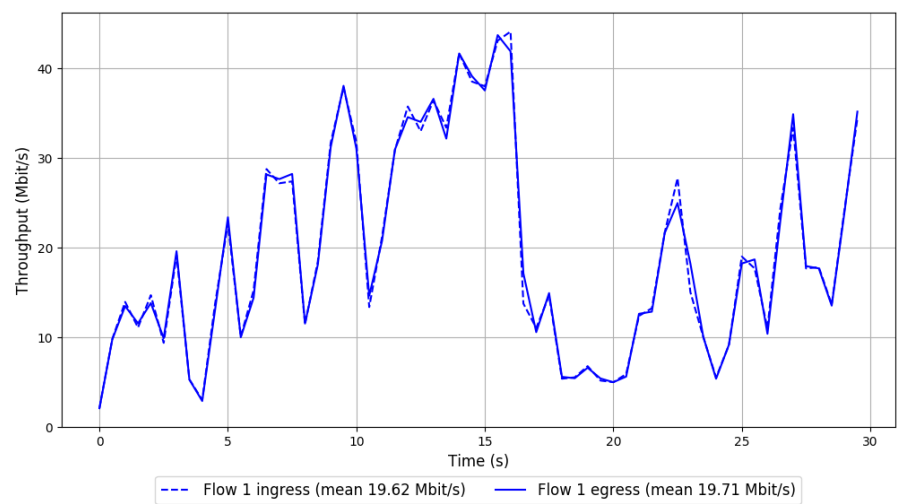


Run 2: Statistics of Copa

Start at: 2018-03-20 07:43:48
End at: 2018-03-20 07:44:18
Local clock offset: 10.13 ms
Remote clock offset: -5.293 ms

Below is generated by plot.py at 2018-03-20 08:11:58
Datalink statistics
-- Total of 1 flow:
Average throughput: 19.71 Mbit/s
95th percentile per-packet one-way delay: 28.755 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 19.71 Mbit/s
95th percentile per-packet one-way delay: 28.755 ms
Loss rate: 0.00%

Run 2: Report of Copa — Data Link

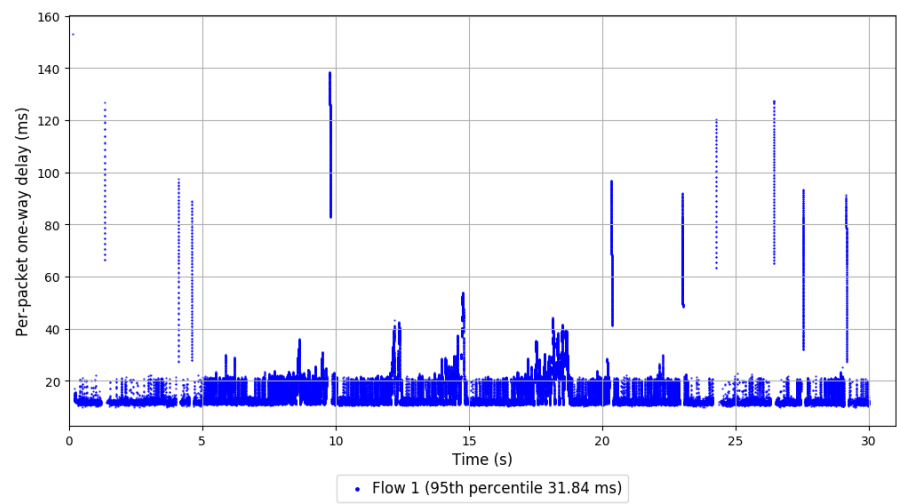
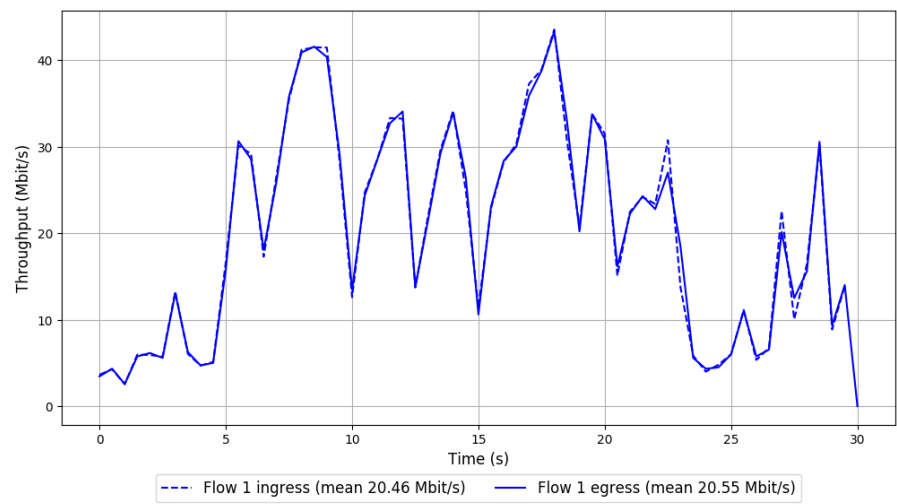


Run 3: Statistics of Copa

Start at: 2018-03-20 08:07:33
End at: 2018-03-20 08:08:03
Local clock offset: 5.821 ms
Remote clock offset: -5.852 ms

Below is generated by plot.py at 2018-03-20 08:11:58
Datalink statistics
-- Total of 1 flow:
Average throughput: 20.55 Mbit/s
95th percentile per-packet one-way delay: 31.841 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 20.55 Mbit/s
95th percentile per-packet one-way delay: 31.841 ms
Loss rate: 0.00%

Run 3: Report of Copa — Data Link

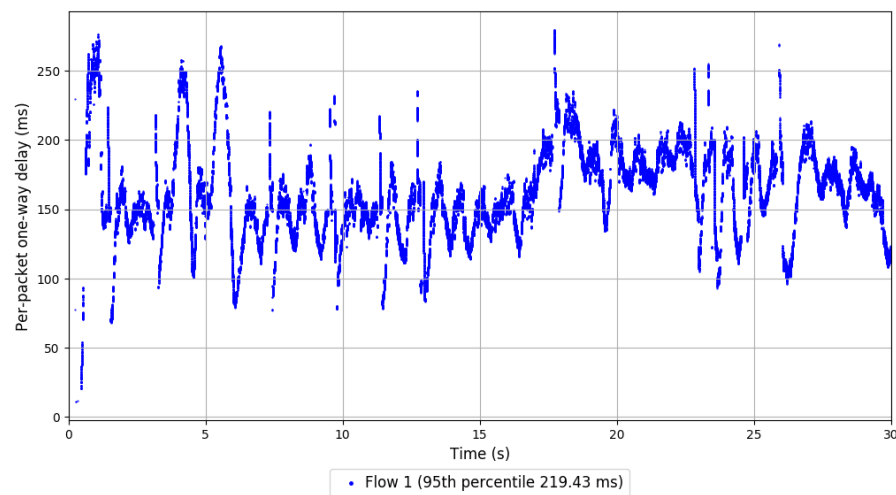
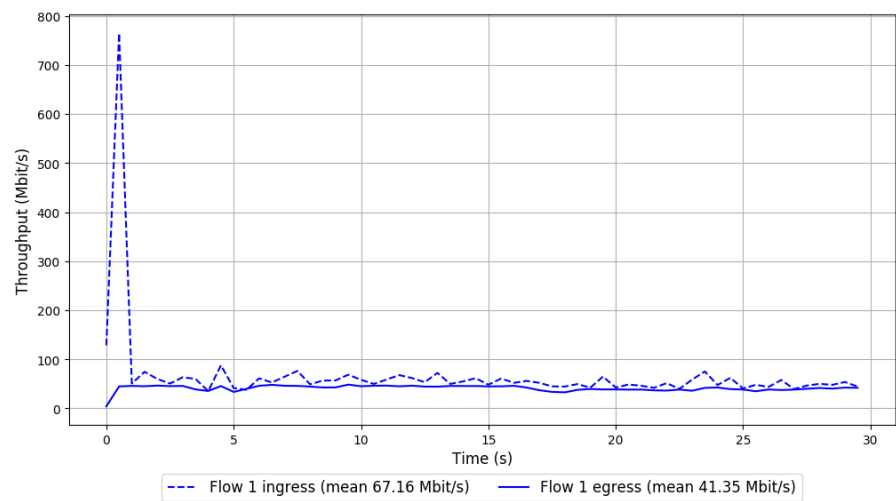


Run 1: Statistics of FillP

Start at: 2018-03-20 07:12:06
End at: 2018-03-20 07:12:36
Local clock offset: 2.109 ms
Remote clock offset: -4.756 ms

Below is generated by plot.py at 2018-03-20 08:12:16
Datalink statistics
-- Total of 1 flow:
Average throughput: 41.35 Mbit/s
95th percentile per-packet one-way delay: 219.430 ms
Loss rate: 38.87%
-- Flow 1:
Average throughput: 41.35 Mbit/s
95th percentile per-packet one-way delay: 219.430 ms
Loss rate: 38.87%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-03-20 07:35:51

End at: 2018-03-20 07:36:21

Local clock offset: 7.773 ms

Remote clock offset: -5.15 ms

Below is generated by plot.py at 2018-03-20 08:12:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 37.26 Mbit/s

95th percentile per-packet one-way delay: 272.351 ms

Loss rate: 40.09%

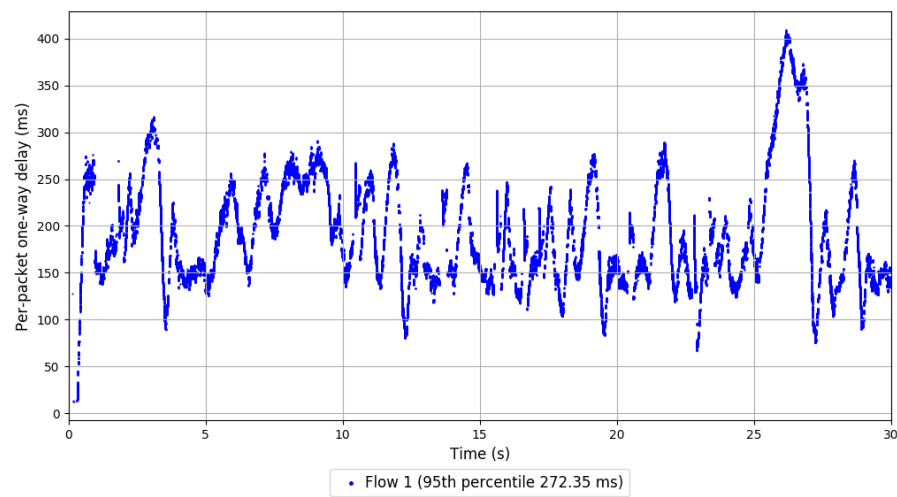
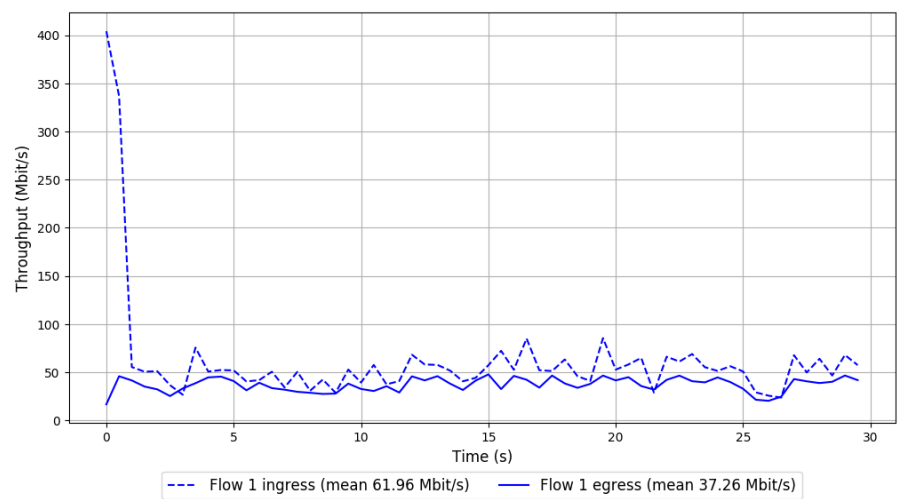
-- Flow 1:

Average throughput: 37.26 Mbit/s

95th percentile per-packet one-way delay: 272.351 ms

Loss rate: 40.09%

Run 2: Report of FillP — Data Link

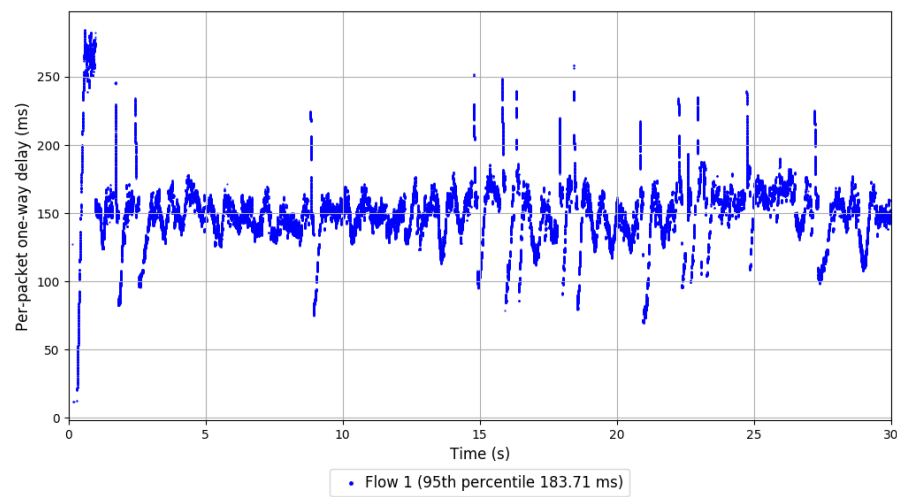
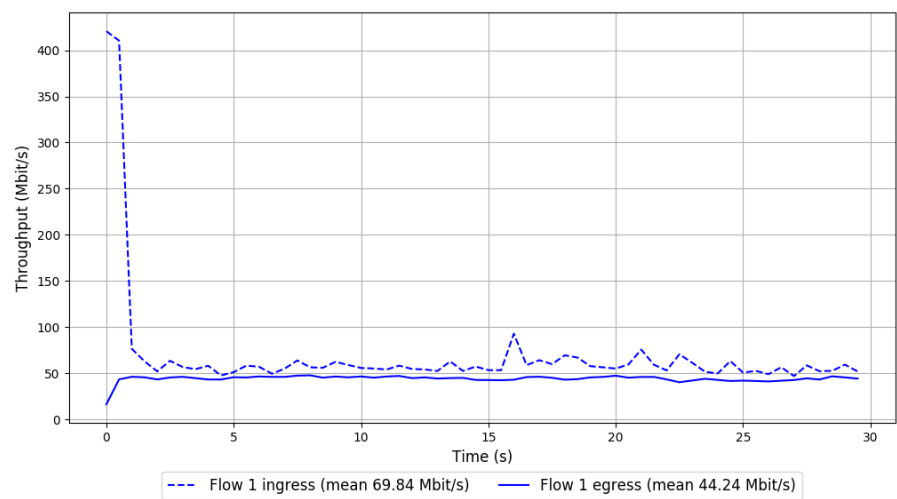


Run 3: Statistics of FillP

Start at: 2018-03-20 07:59:35
End at: 2018-03-20 08:00:05
Local clock offset: 12.973 ms
Remote clock offset: -5.338 ms

Below is generated by plot.py at 2018-03-20 08:12:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 44.24 Mbit/s
95th percentile per-packet one-way delay: 183.709 ms
Loss rate: 36.89%
-- Flow 1:
Average throughput: 44.24 Mbit/s
95th percentile per-packet one-way delay: 183.709 ms
Loss rate: 36.89%

Run 3: Report of FillP — Data Link



Run 1: Statistics of Indigo-1-32

Start at: 2018-03-20 07:09:29

End at: 2018-03-20 07:09:59

Local clock offset: 2.033 ms

Remote clock offset: -4.82 ms

Below is generated by plot.py at 2018-03-20 08:12:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.82 Mbit/s

95th percentile per-packet one-way delay: 22.888 ms

Loss rate: 0.00%

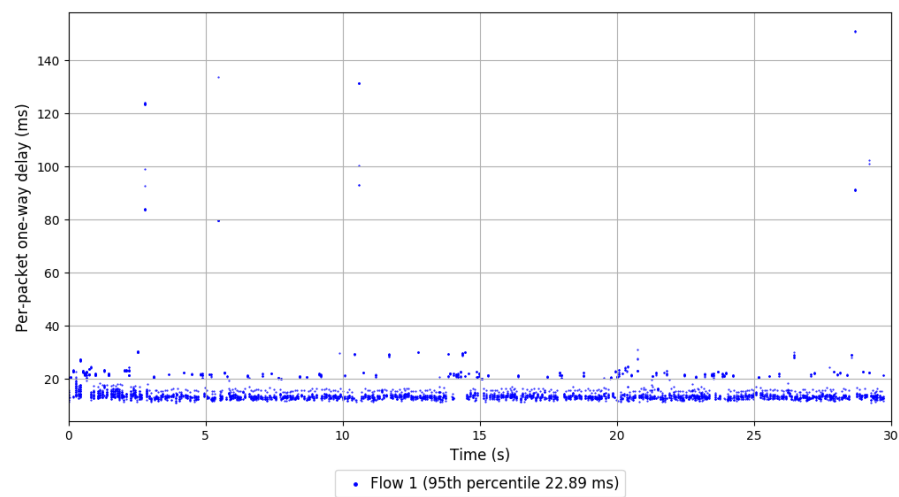
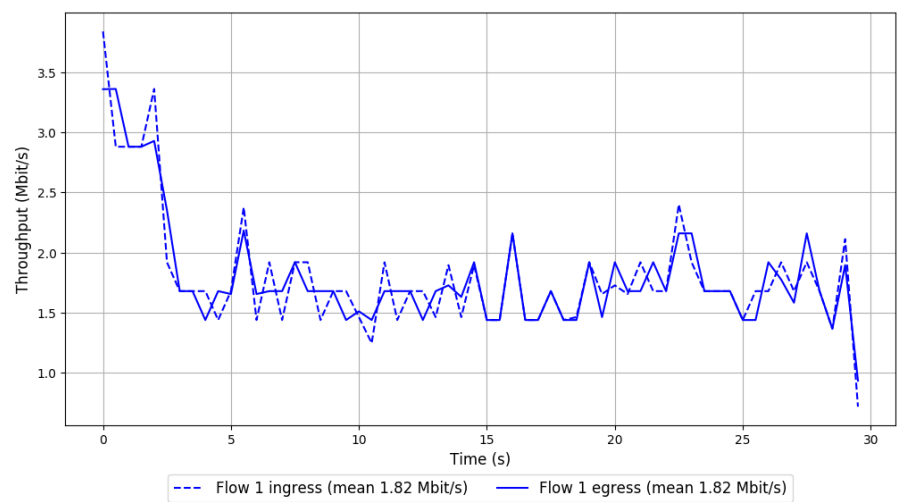
-- Flow 1:

Average throughput: 1.82 Mbit/s

95th percentile per-packet one-way delay: 22.888 ms

Loss rate: 0.00%

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



Run 2: Statistics of Indigo-1-32

Start at: 2018-03-20 07:33:15

End at: 2018-03-20 07:33:45

Local clock offset: 6.762 ms

Remote clock offset: -5.178 ms

Below is generated by plot.py at 2018-03-20 08:12:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 24.085 ms

Loss rate: 0.00%

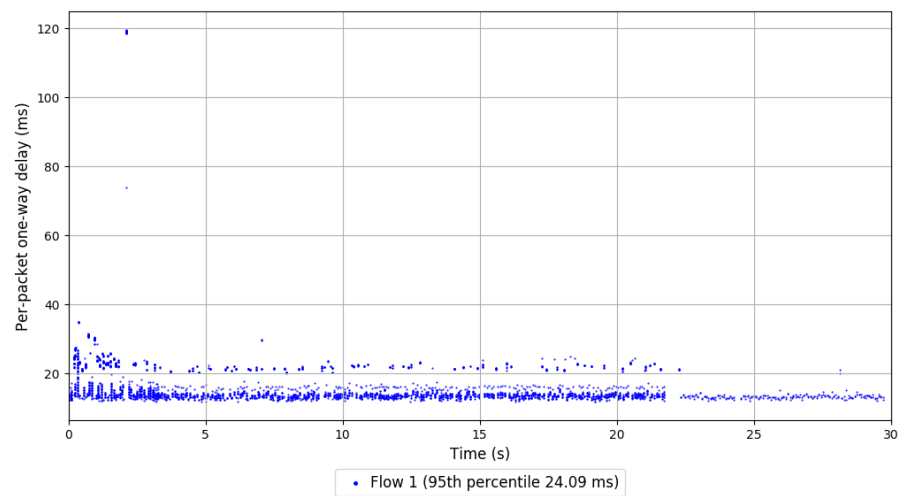
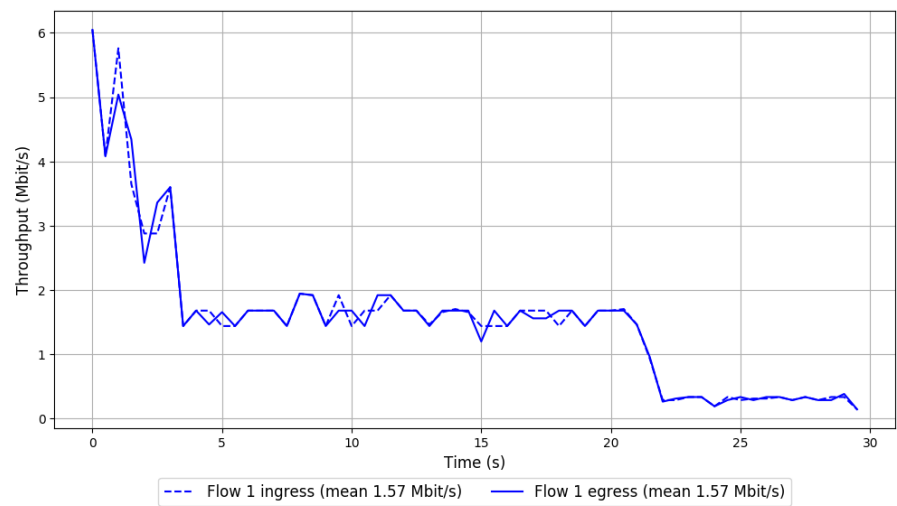
-- Flow 1:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 24.085 ms

Loss rate: 0.00%

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

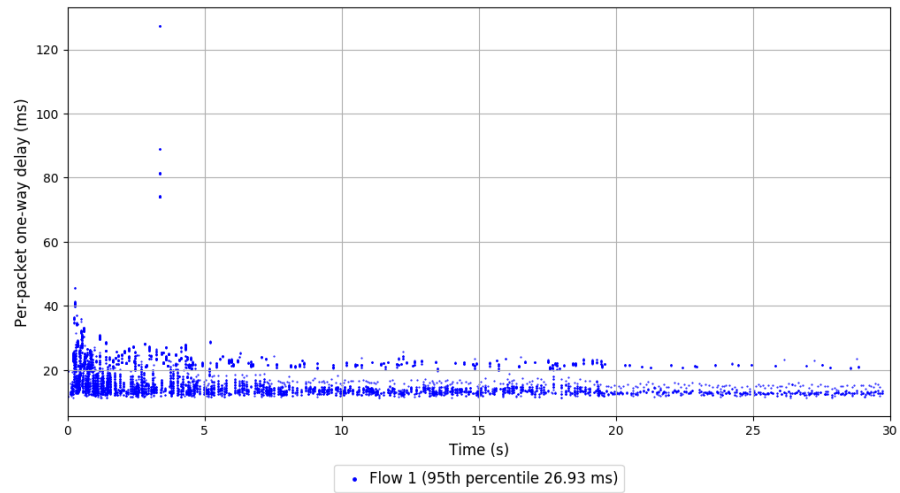
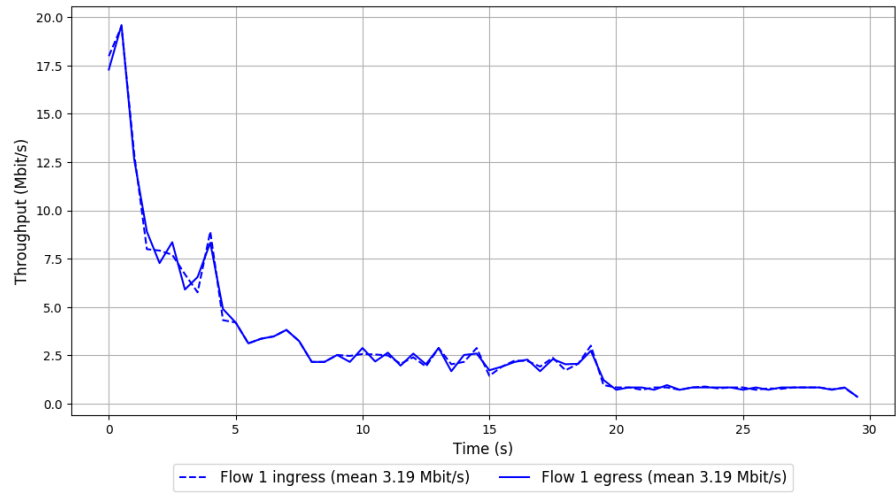


Run 3: Statistics of Indigo-1-32

Start at: 2018-03-20 07:56:59
End at: 2018-03-20 07:57:29
Local clock offset: 12.562 ms
Remote clock offset: -5.441 ms

Below is generated by plot.py at 2018-03-20 08:12:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.19 Mbit/s
95th percentile per-packet one-way delay: 26.926 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.19 Mbit/s
95th percentile per-packet one-way delay: 26.926 ms
Loss rate: 0.00%

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

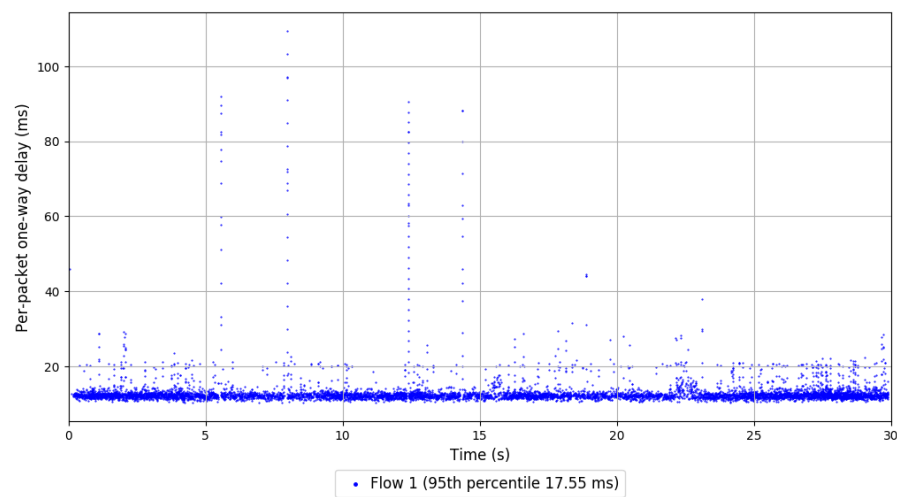
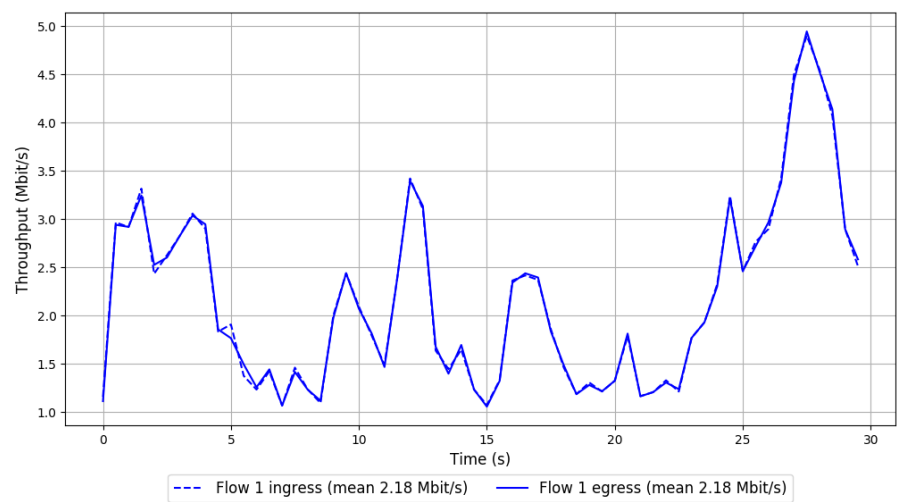


Run 1: Statistics of Vivace-latency

Start at: 2018-03-20 06:57:39
End at: 2018-03-20 06:58:09
Local clock offset: 3.377 ms
Remote clock offset: -4.628 ms

Below is generated by plot.py at 2018-03-20 08:12:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 17.546 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 17.546 ms
Loss rate: 0.00%

Run 1: Report of Vivace-latency — Data Link

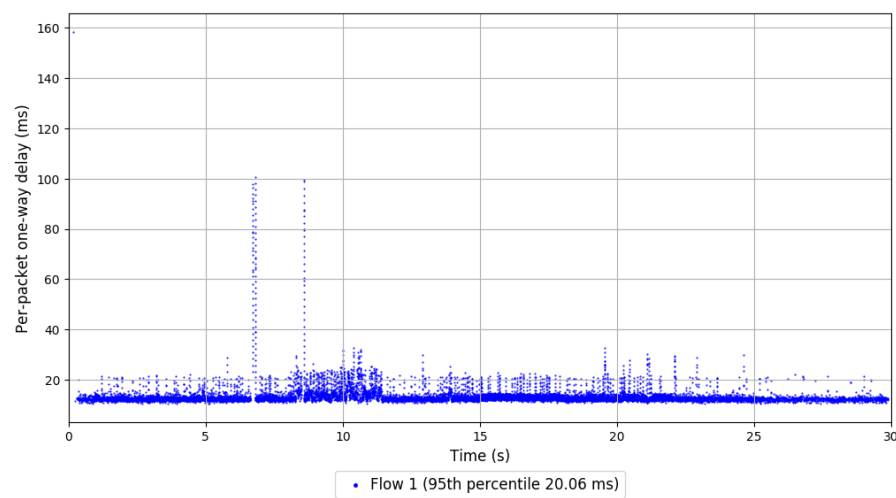
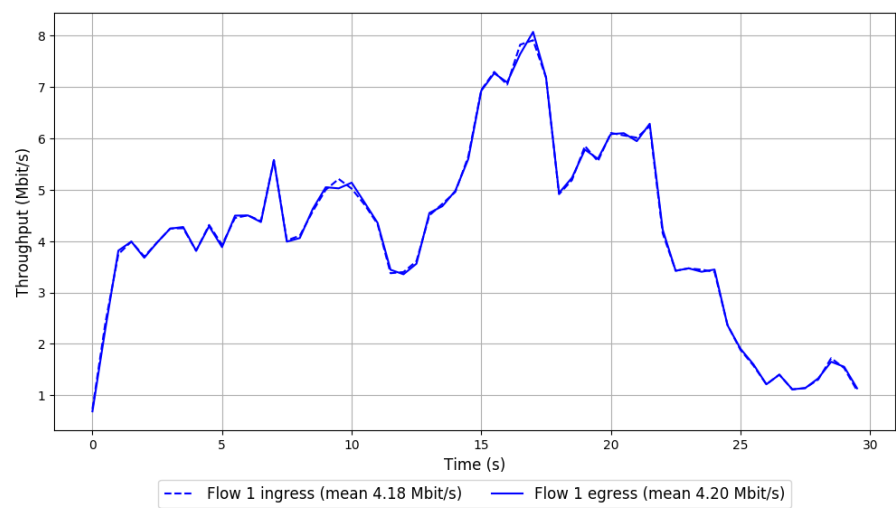


Run 2: Statistics of Vivace-latency

Start at: 2018-03-20 07:21:23
End at: 2018-03-20 07:21:53
Local clock offset: 2.32 ms
Remote clock offset: -4.848 ms

Below is generated by plot.py at 2018-03-20 08:12:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.20 Mbit/s
95th percentile per-packet one-way delay: 20.064 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 4.20 Mbit/s
95th percentile per-packet one-way delay: 20.064 ms
Loss rate: 0.00%

Run 2: Report of Vivace-latency — Data Link

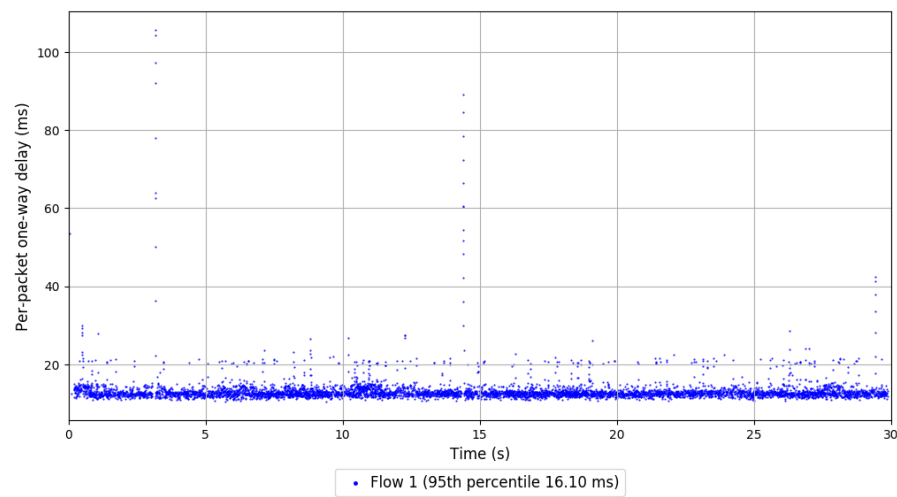
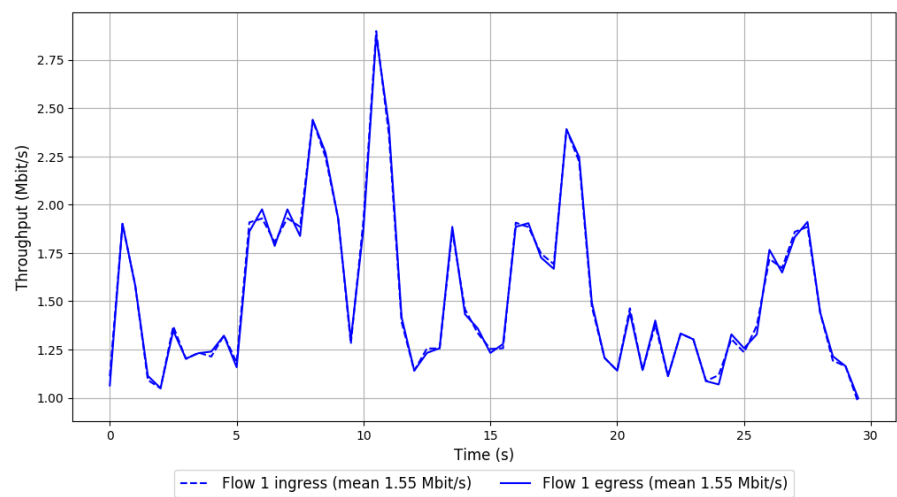


Run 3: Statistics of Vivace-latency

Start at: 2018-03-20 07:45:07
End at: 2018-03-20 07:45:37
Local clock offset: 10.439 ms
Remote clock offset: -5.313 ms

Below is generated by plot.py at 2018-03-20 08:12:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.55 Mbit/s
95th percentile per-packet one-way delay: 16.096 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.55 Mbit/s
95th percentile per-packet one-way delay: 16.096 ms
Loss rate: 0.00%

Run 3: Report of Vivace-latency — Data Link



Run 1: Statistics of Vivace-loss

Start at: 2018-03-20 07:17:24

End at: 2018-03-20 07:17:54

Local clock offset: 2.224 ms

Remote clock offset: -4.846 ms

Below is generated by plot.py at 2018-03-20 08:12:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 43.25 Mbit/s

95th percentile per-packet one-way delay: 176.779 ms

Loss rate: 8.37%

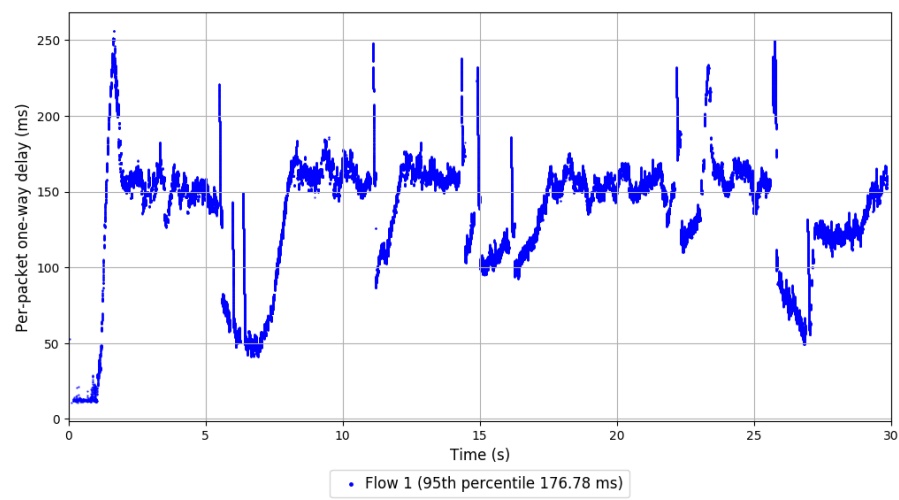
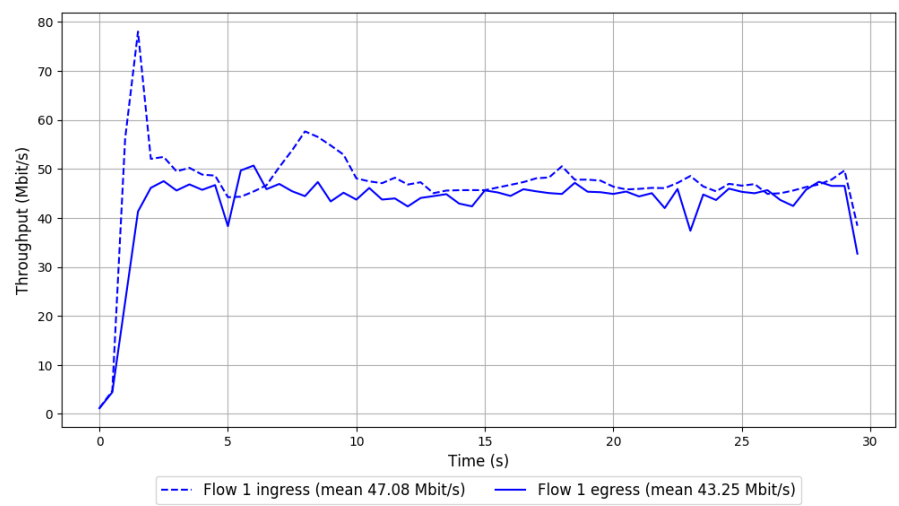
-- Flow 1:

Average throughput: 43.25 Mbit/s

95th percentile per-packet one-way delay: 176.779 ms

Loss rate: 8.37%

Run 1: Report of Vivace-loss — Data Link



Run 2: Statistics of Vivace-loss

Start at: 2018-03-20 07:41:08

End at: 2018-03-20 07:41:38

Local clock offset: 9.498 ms

Remote clock offset: -5.302 ms

Below is generated by plot.py at 2018-03-20 08:12:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 40.58 Mbit/s

95th percentile per-packet one-way delay: 197.705 ms

Loss rate: 17.66%

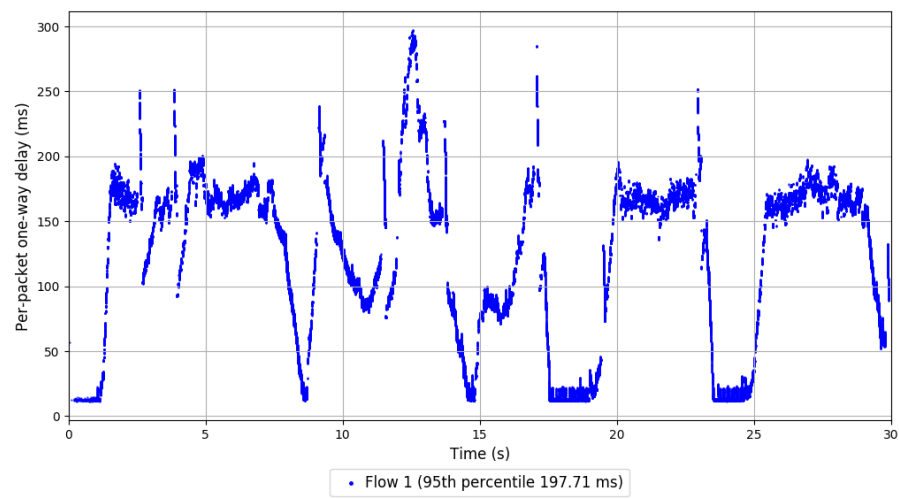
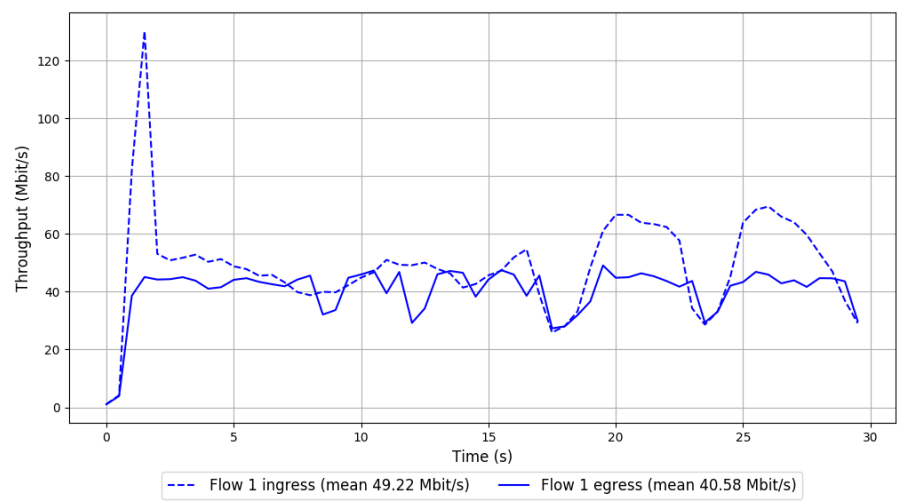
-- Flow 1:

Average throughput: 40.58 Mbit/s

95th percentile per-packet one-way delay: 197.705 ms

Loss rate: 17.66%

Run 2: Report of Vivace-loss — Data Link



Run 3: Statistics of Vivace-loss

Start at: 2018-03-20 08:04:53

End at: 2018-03-20 08:05:23

Local clock offset: 7.739 ms

Remote clock offset: -5.786 ms

Below is generated by plot.py at 2018-03-20 08:12:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 41.88 Mbit/s

95th percentile per-packet one-way delay: 188.285 ms

Loss rate: 14.12%

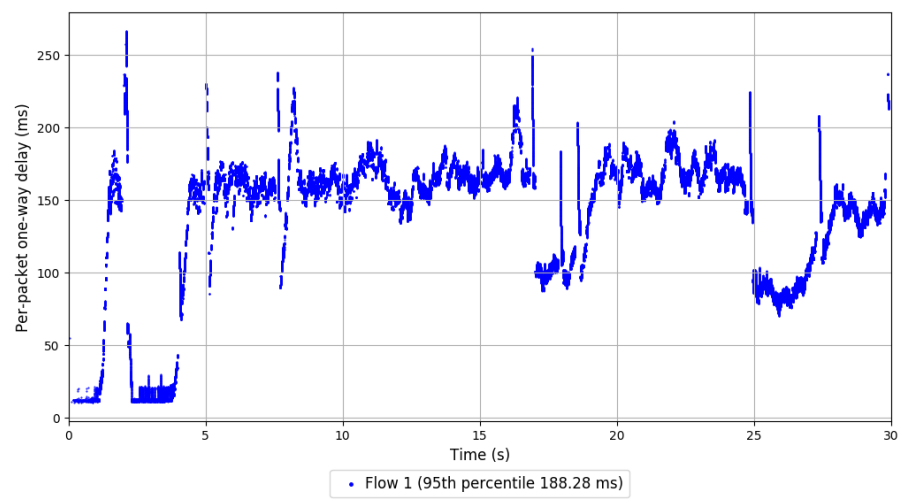
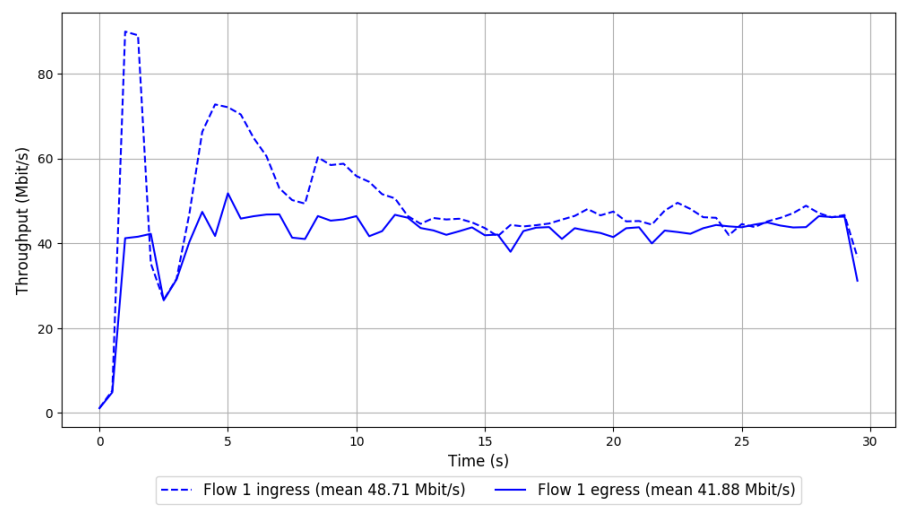
-- Flow 1:

Average throughput: 41.88 Mbit/s

95th percentile per-packet one-way delay: 188.285 ms

Loss rate: 14.12%

Run 3: Report of Vivace-loss — Data Link



Run 1: Statistics of Vivace-LTE

Start at: 2018-03-20 07:14:45

End at: 2018-03-20 07:15:15

Local clock offset: 2.154 ms

Remote clock offset: -4.773 ms

Below is generated by plot.py at 2018-03-20 08:12:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 25.84 Mbit/s

95th percentile per-packet one-way delay: 30.359 ms

Loss rate: 0.00%

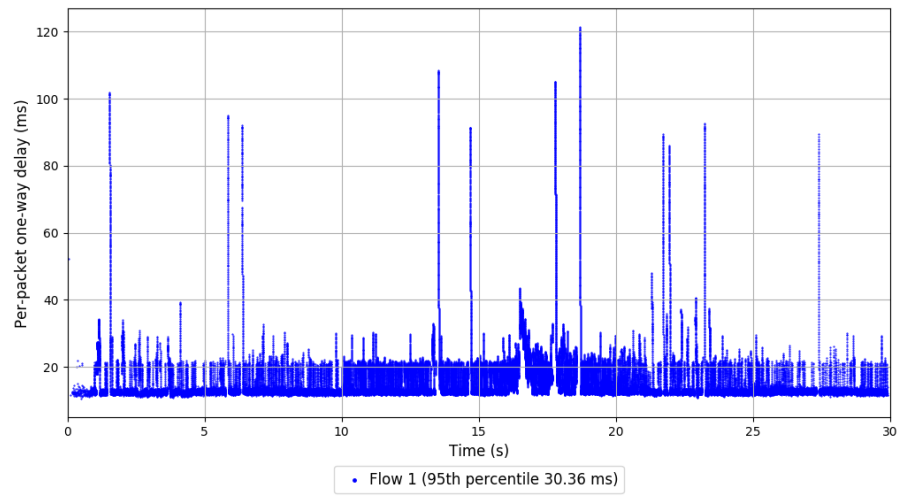
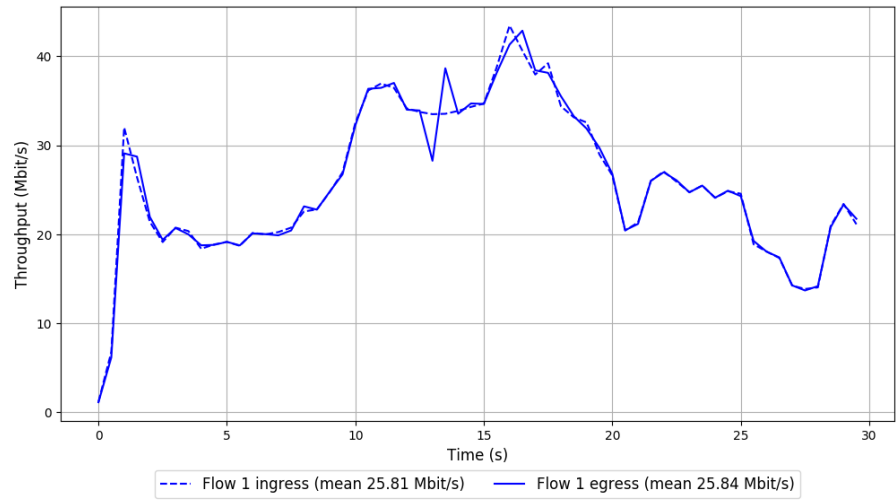
-- Flow 1:

Average throughput: 25.84 Mbit/s

95th percentile per-packet one-way delay: 30.359 ms

Loss rate: 0.00%

Run 1: Report of Vivace-LTE — Data Link

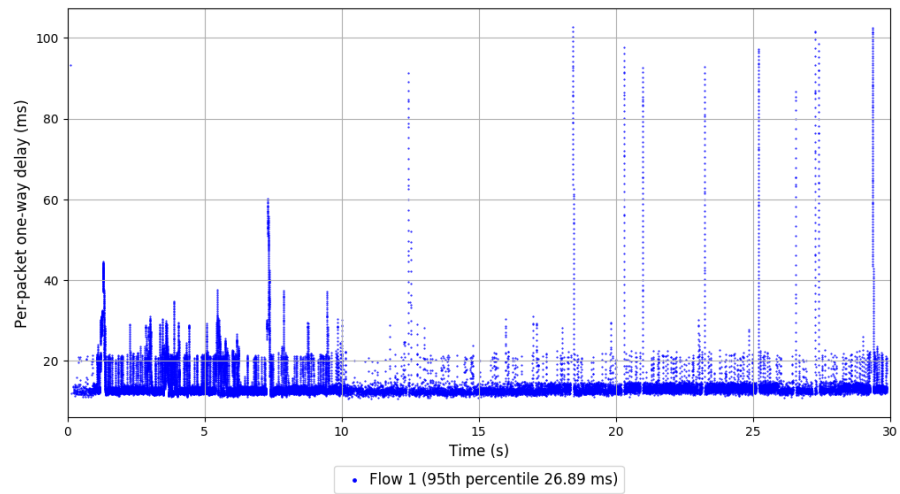
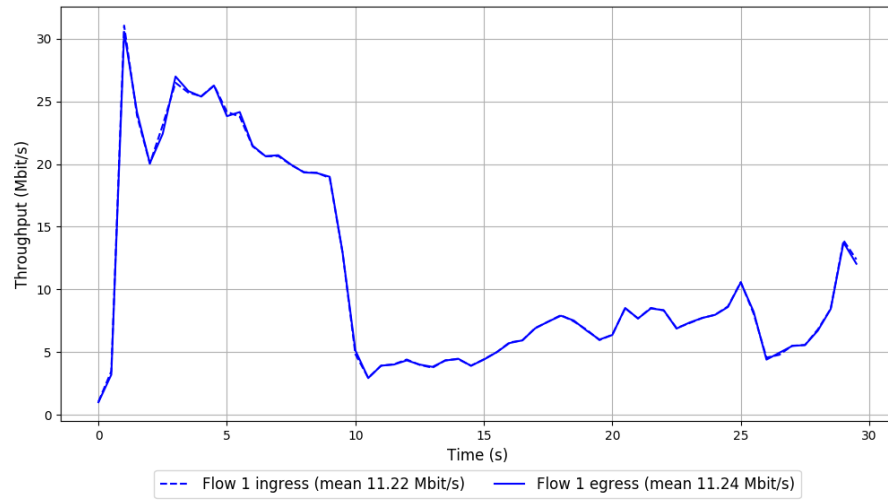


Run 2: Statistics of Vivace-LTE

Start at: 2018-03-20 07:38:29
End at: 2018-03-20 07:38:59
Local clock offset: 8.752 ms
Remote clock offset: -5.299 ms

Below is generated by plot.py at 2018-03-20 08:12:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.24 Mbit/s
95th percentile per-packet one-way delay: 26.885 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 11.24 Mbit/s
95th percentile per-packet one-way delay: 26.885 ms
Loss rate: 0.11%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-03-20 08:02:14
End at: 2018-03-20 08:02:44
Local clock offset: 10.423 ms
Remote clock offset: -5.656 ms

Below is generated by plot.py at 2018-03-20 08:12:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.77 Mbit/s
95th percentile per-packet one-way delay: 21.174 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 9.77 Mbit/s
95th percentile per-packet one-way delay: 21.174 ms
Loss rate: 0.00%

Run 3: Report of Vivace-LTE — Data Link

