

Pantheon Report

Generated at 2018-04-16 23:01:05 (UTC).

Data path: Stanford ppp0 (*remote*) → AWS California 1 Ethernet (*local*).

Repeated the test of 16 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).

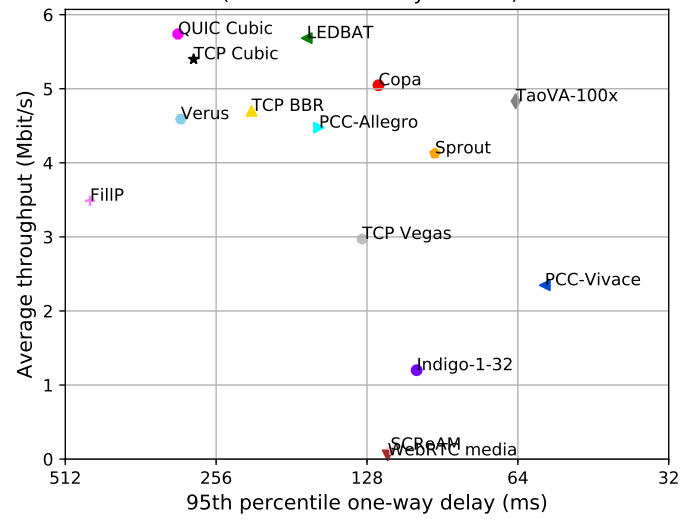
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

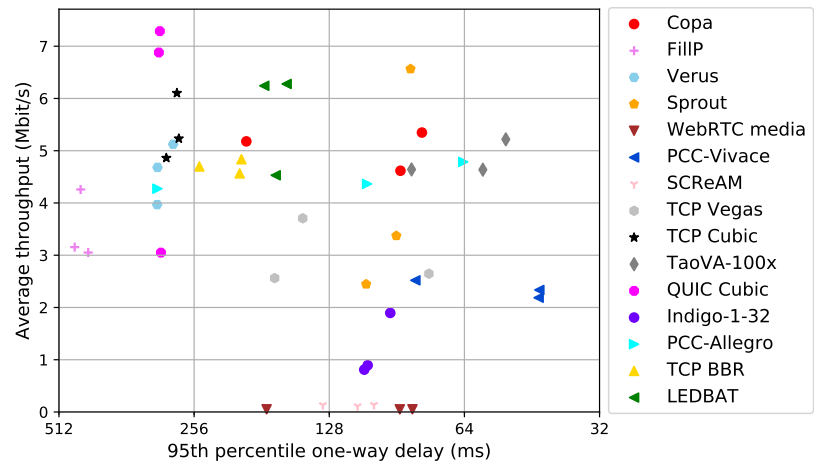
Git summary:

```
branch: master @ 4ed32c0e22b4dd733f97c1d3aaab2e5bb16f66b4
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ 11f8c46a2bf1dc797253db7e8ca04076272b2a44
third_party/genericCC @ d223989828276fa83a807da6e0341dc0c7b89aec
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/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
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 @ f271183af822eee5d0031620f4bebf38aedc5581
```

test from Stanford ppp0 to AWS California 1 Ethernet, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from Stanford ppp0 to AWS California 1 Ethernet, 3 runs of 30s each per scheme



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	4.70	217.58	0.55
TCP Cubic	3	5.40	283.90	1.24
LEDBAT	3	5.68	168.81	0.44
PCC-Allegro	3	4.47	159.60	1.85
QUIC Cubic	3	5.74	305.11	2.80
SCReAM	3	0.13	114.90	0.76
WebRTC media	3	0.05	116.40	0.31
Sprout	3	4.13	93.69	0.33
TaoVA-100x	3	4.83	64.64	0.80
TCP Vegas	3	2.97	130.92	0.09
Verus	3	4.59	301.10	6.54
Copa	3	5.05	121.42	0.32
FillP	3	3.49	457.05	33.72
Indigo-1-32	3	1.20	101.90	0.50
PCC-Vivace	3	2.35	56.55	0.25
PCC-Expr	0	N/A	N/A	N/A

Run 1: Statistics of TCP BBR

Start at: 2018-04-16 21:02:54

End at: 2018-04-16 21:03:24

Local clock offset: 0.208 ms

Remote clock offset: 14.067 ms

Below is generated by plot.py at 2018-04-16 23:00:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.70 Mbit/s

95th percentile per-packet one-way delay: 249.218 ms

Loss rate: 0.82%

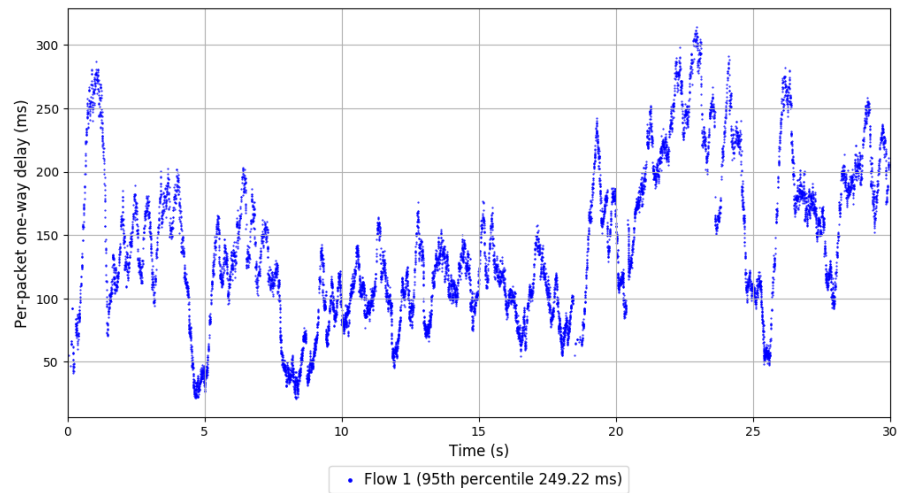
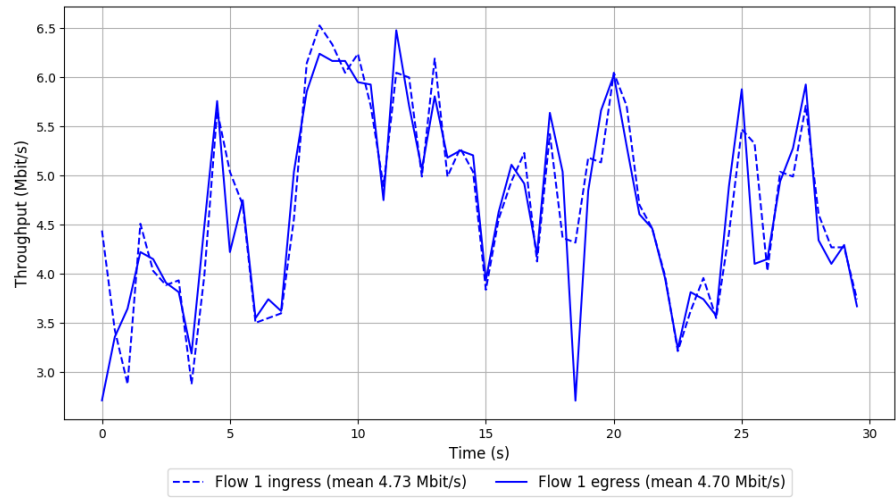
-- Flow 1:

Average throughput: 4.70 Mbit/s

95th percentile per-packet one-way delay: 249.218 ms

Loss rate: 0.82%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-04-16 21:25:09

End at: 2018-04-16 21:25:39

Local clock offset: -0.657 ms

Remote clock offset: 0.664 ms

Below is generated by plot.py at 2018-04-16 23:00:21

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.84 Mbit/s

95th percentile per-packet one-way delay: 200.843 ms

Loss rate: 0.52%

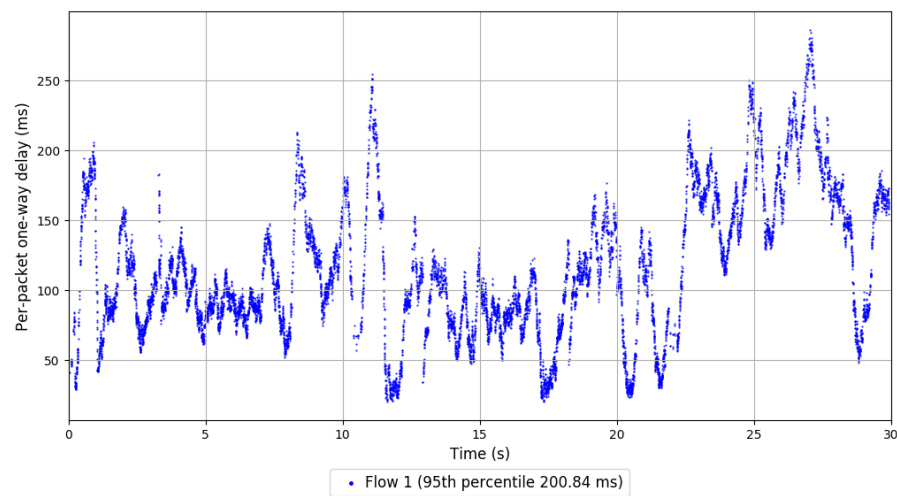
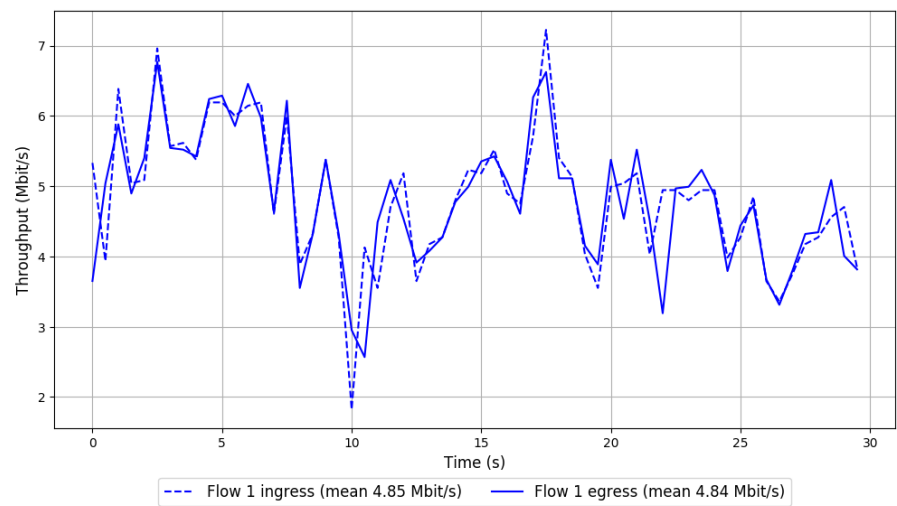
-- Flow 1:

Average throughput: 4.84 Mbit/s

95th percentile per-packet one-way delay: 200.843 ms

Loss rate: 0.52%

Run 2: Report of TCP BBR — Data Link

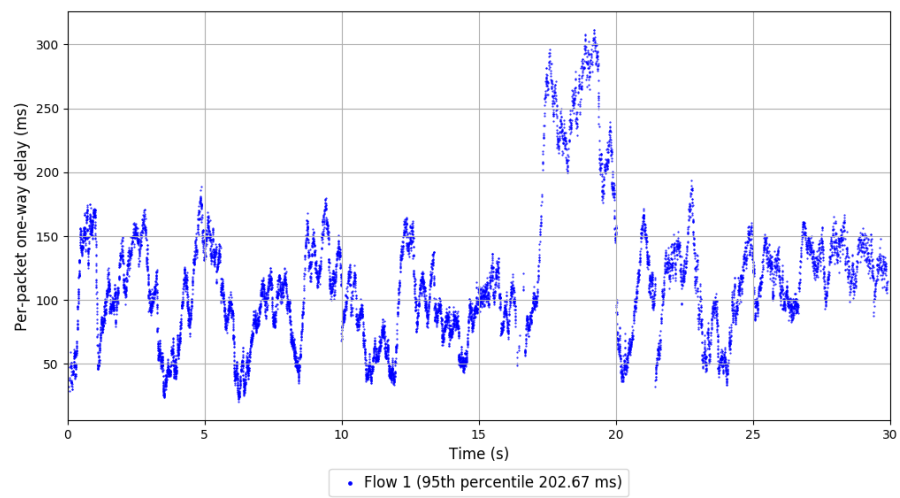
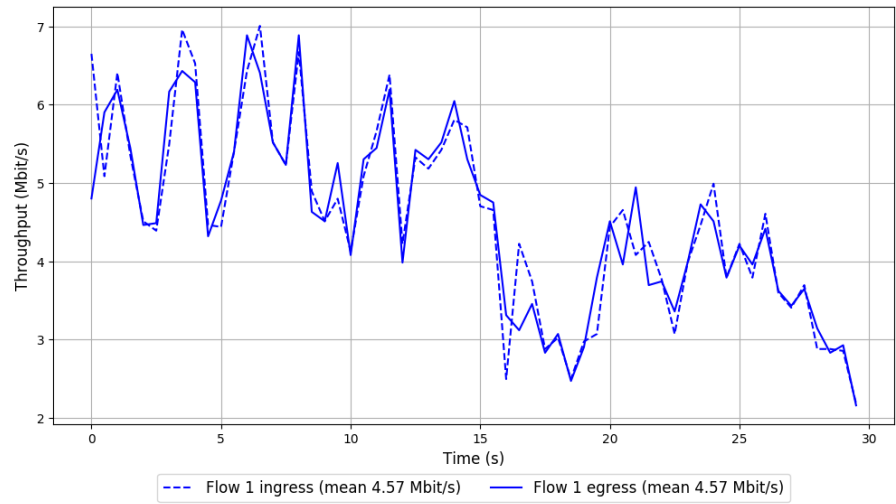


Run 3: Statistics of TCP BBR

Start at: 2018-04-16 21:47:22
End at: 2018-04-16 21:47:52
Local clock offset: -1.195 ms
Remote clock offset: -3.664 ms

Below is generated by plot.py at 2018-04-16 23:00:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 202.672 ms
Loss rate: 0.31%
-- Flow 1:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 202.672 ms
Loss rate: 0.31%

Run 3: Report of TCP BBR — Data Link

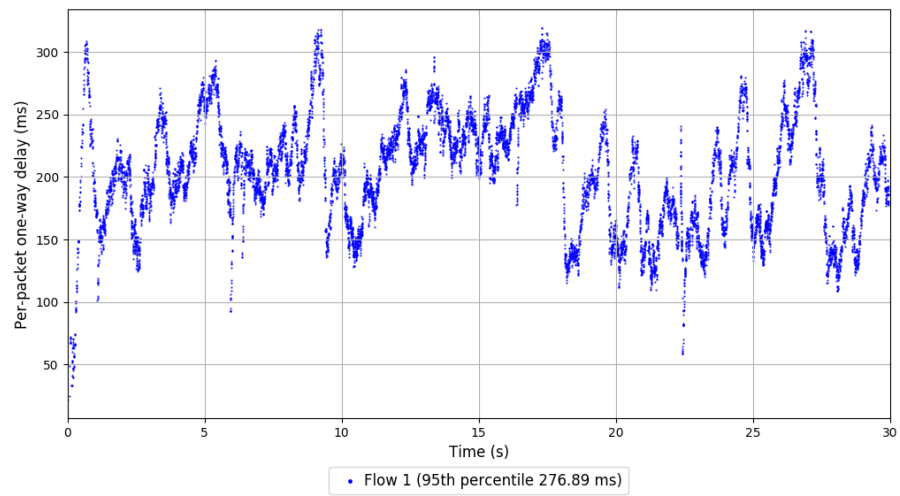
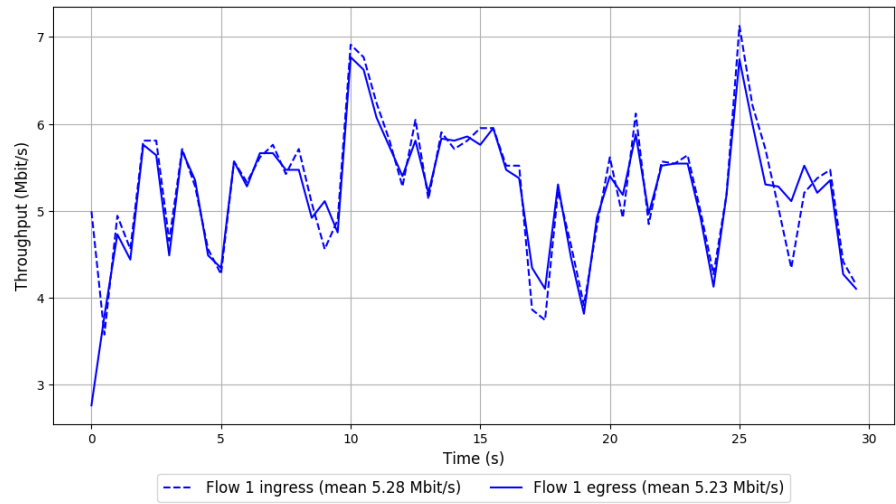


Run 1: Statistics of TCP Cubic

Start at: 2018-04-16 21:00:17
End at: 2018-04-16 21:00:47
Local clock offset: 0.303 ms
Remote clock offset: 20.284 ms

Below is generated by plot.py at 2018-04-16 23:00:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.23 Mbit/s
95th percentile per-packet one-way delay: 276.895 ms
Loss rate: 1.09%
-- Flow 1:
Average throughput: 5.23 Mbit/s
95th percentile per-packet one-way delay: 276.895 ms
Loss rate: 1.09%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-04-16 21:22:31

End at: 2018-04-16 21:23:01

Local clock offset: -0.565 ms

Remote clock offset: 0.754 ms

Below is generated by plot.py at 2018-04-16 23:00:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.10 Mbit/s

95th percentile per-packet one-way delay: 279.593 ms

Loss rate: 1.08%

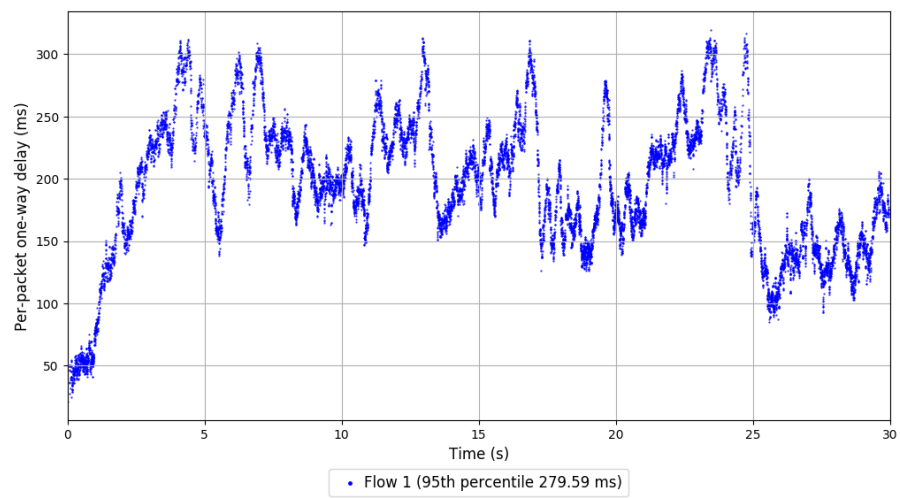
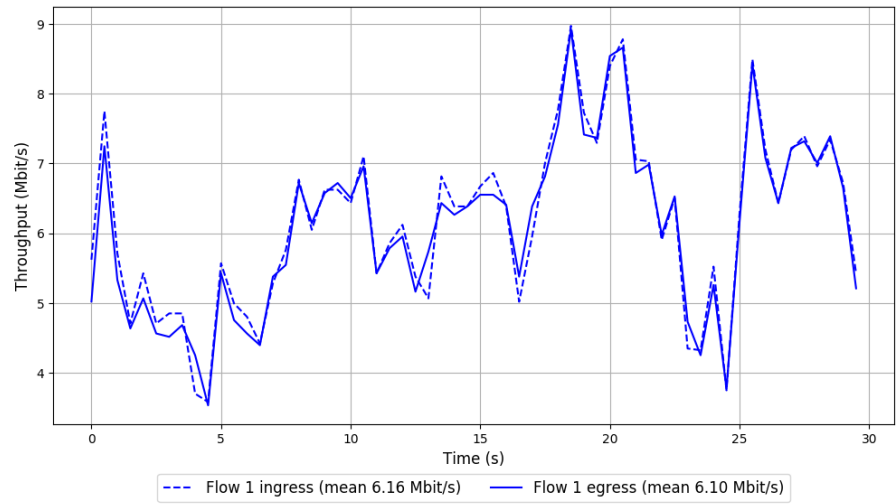
-- Flow 1:

Average throughput: 6.10 Mbit/s

95th percentile per-packet one-way delay: 279.593 ms

Loss rate: 1.08%

Run 2: Report of TCP Cubic — Data Link

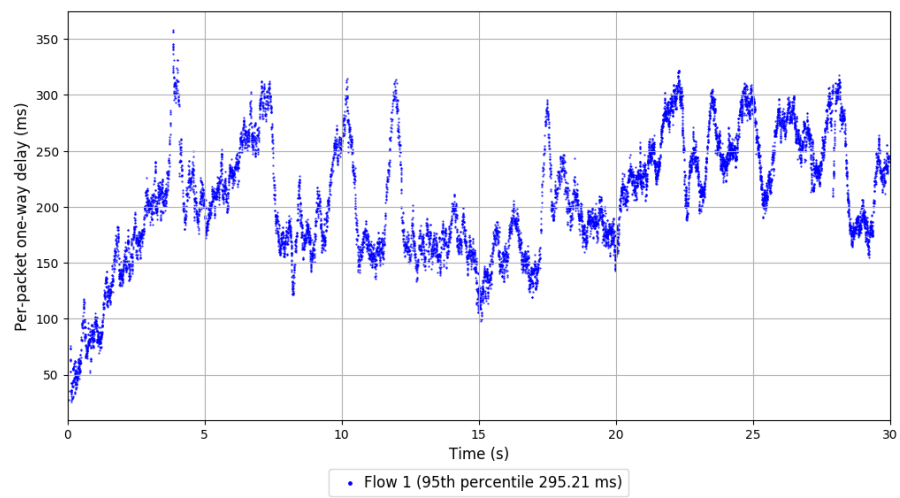
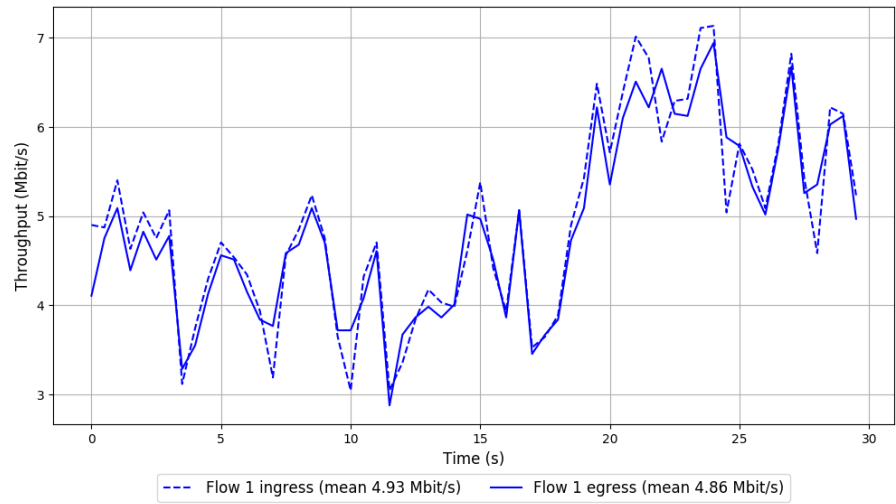


Run 3: Statistics of TCP Cubic

Start at: 2018-04-16 21:44:45
End at: 2018-04-16 21:45:15
Local clock offset: -1.173 ms
Remote clock offset: -3.306 ms

Below is generated by plot.py at 2018-04-16 23:00:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.86 Mbit/s
95th percentile per-packet one-way delay: 295.215 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 4.86 Mbit/s
95th percentile per-packet one-way delay: 295.215 ms
Loss rate: 1.56%

Run 3: Report of TCP Cubic — Data Link

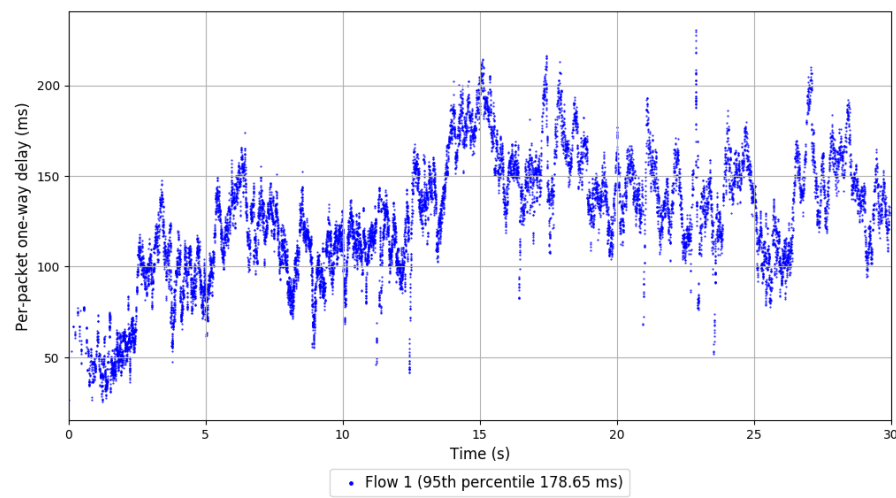
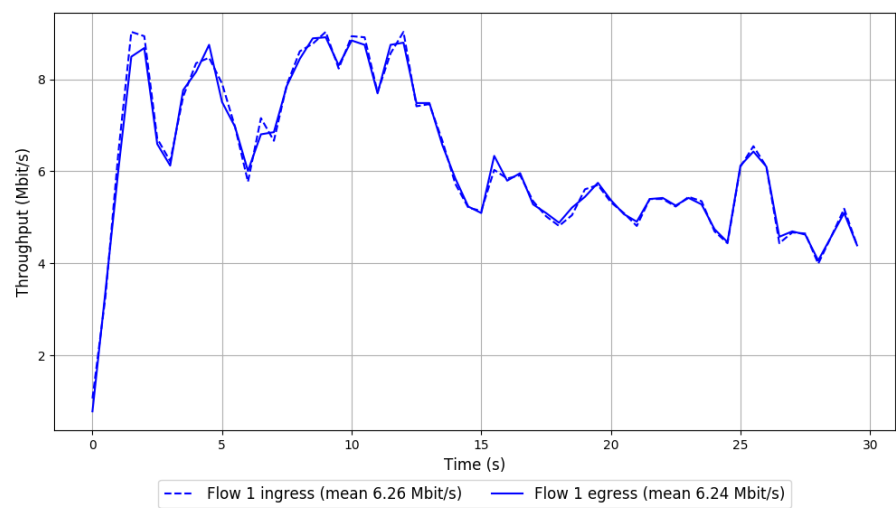


```
Run 1: Statistics of LEDBAT

Start at: 2018-04-16 20:52:27
End at: 2018-04-16 20:52:57
Local clock offset: 0.737 ms
Remote clock offset: 15.924 ms

# Below is generated by plot.py at 2018-04-16 23:00:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.24 Mbit/s
95th percentile per-packet one-way delay: 178.645 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 6.24 Mbit/s
95th percentile per-packet one-way delay: 178.645 ms
Loss rate: 0.38%
```


Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-04-16 21:14:40

End at: 2018-04-16 21:15:10

Local clock offset: -0.378 ms

Remote clock offset: 2.111 ms

Below is generated by plot.py at 2018-04-16 23:00:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.28 Mbit/s

95th percentile per-packet one-way delay: 159.317 ms

Loss rate: 0.46%

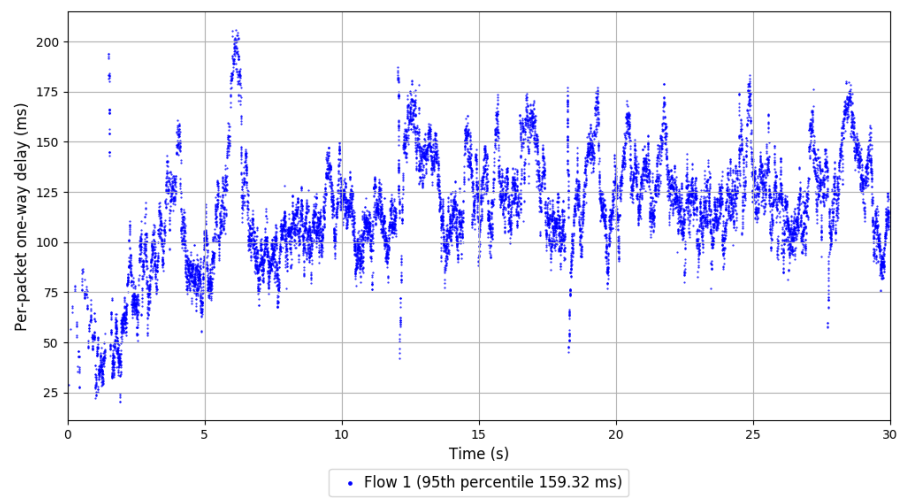
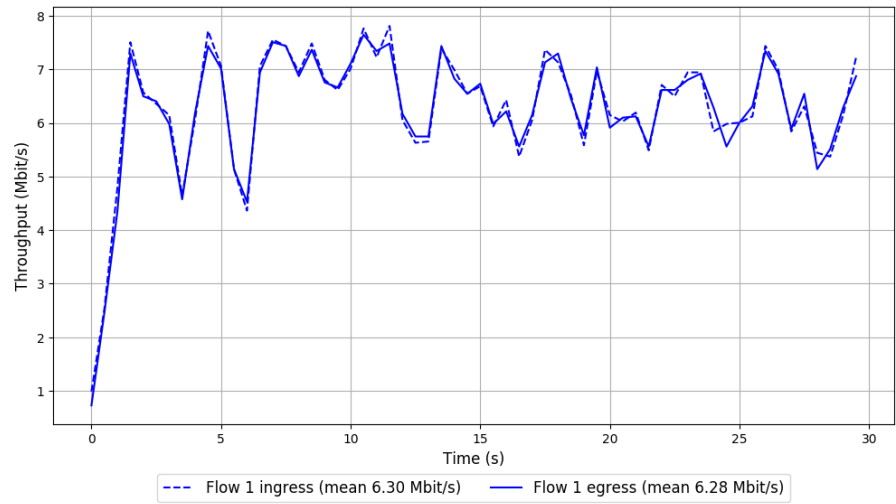
-- Flow 1:

Average throughput: 6.28 Mbit/s

95th percentile per-packet one-way delay: 159.317 ms

Loss rate: 0.46%

Run 2: Report of LEDBAT — Data Link

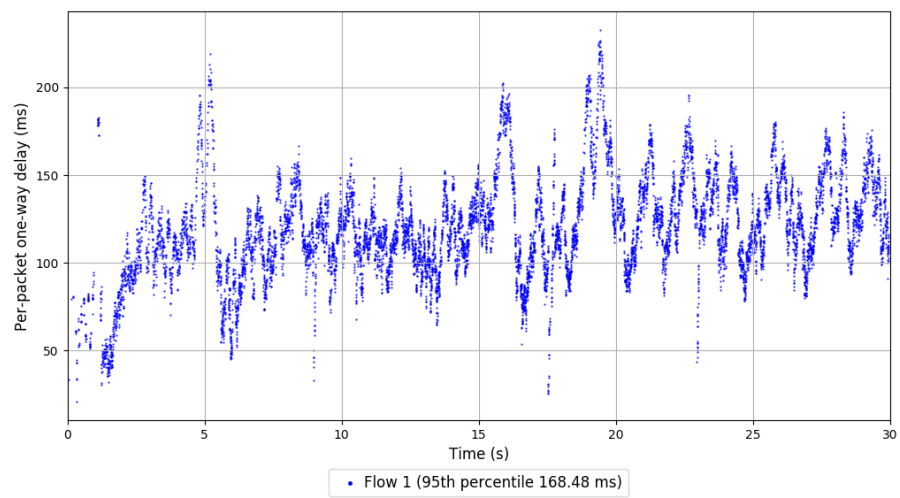
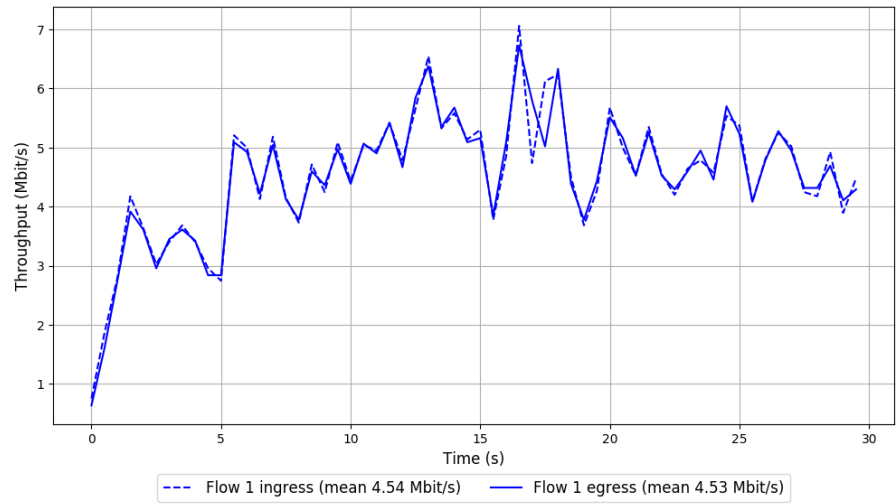


Run 3: Statistics of LEDBAT

Start at: 2018-04-16 21:36:55
End at: 2018-04-16 21:37:25
Local clock offset: -1.12 ms
Remote clock offset: -0.348 ms

Below is generated by plot.py at 2018-04-16 23:00:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.53 Mbit/s
95th percentile per-packet one-way delay: 168.476 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 4.53 Mbit/s
95th percentile per-packet one-way delay: 168.476 ms
Loss rate: 0.47%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2018-04-16 20:55:04

End at: 2018-04-16 20:55:34

Local clock offset: 0.56 ms

Remote clock offset: 17.212 ms

Below is generated by plot.py at 2018-04-16 23:00:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.27 Mbit/s

95th percentile per-packet one-way delay: 309.000 ms

Loss rate: 5.27%

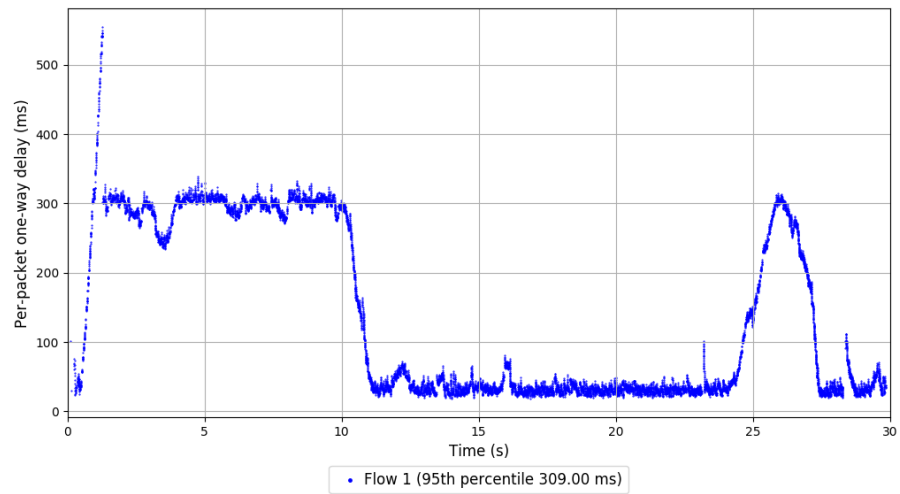
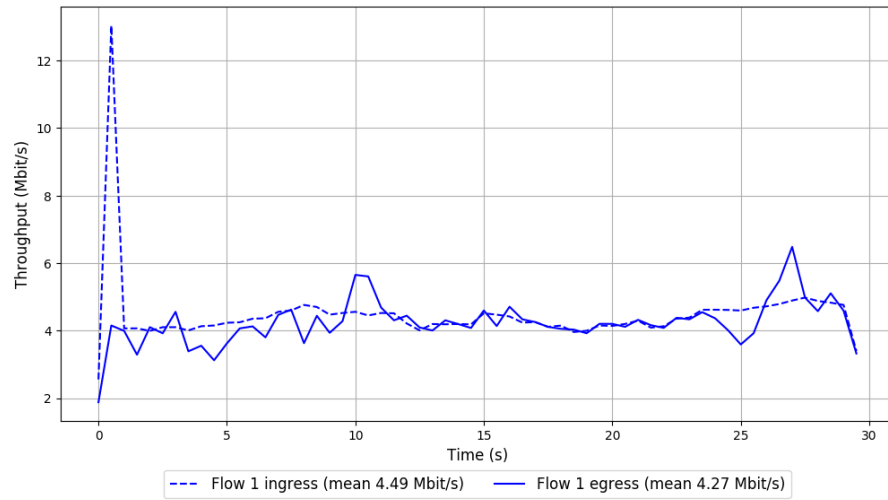
-- Flow 1:

Average throughput: 4.27 Mbit/s

95th percentile per-packet one-way delay: 309.000 ms

Loss rate: 5.27%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-04-16 21:17:17

End at: 2018-04-16 21:17:47

Local clock offset: -0.475 ms

Remote clock offset: 1.269 ms

Below is generated by plot.py at 2018-04-16 23:00:34

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.79 Mbit/s

95th percentile per-packet one-way delay: 64.375 ms

Loss rate: 0.12%

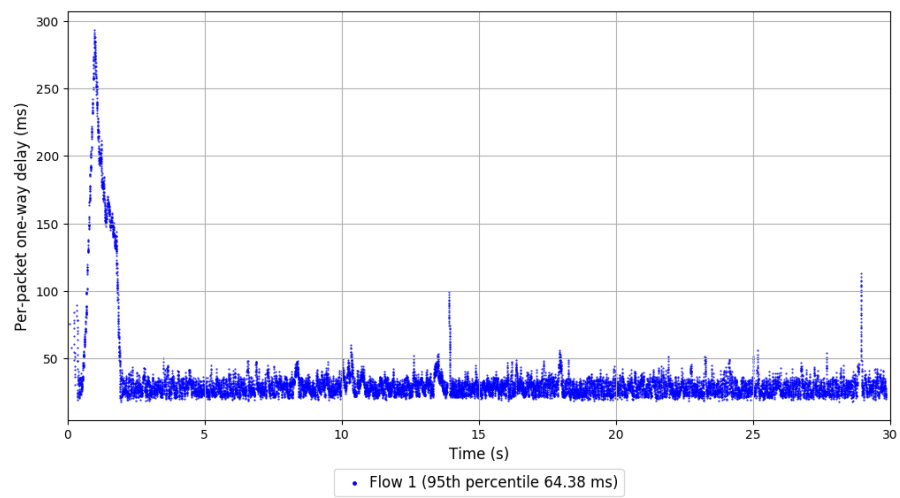
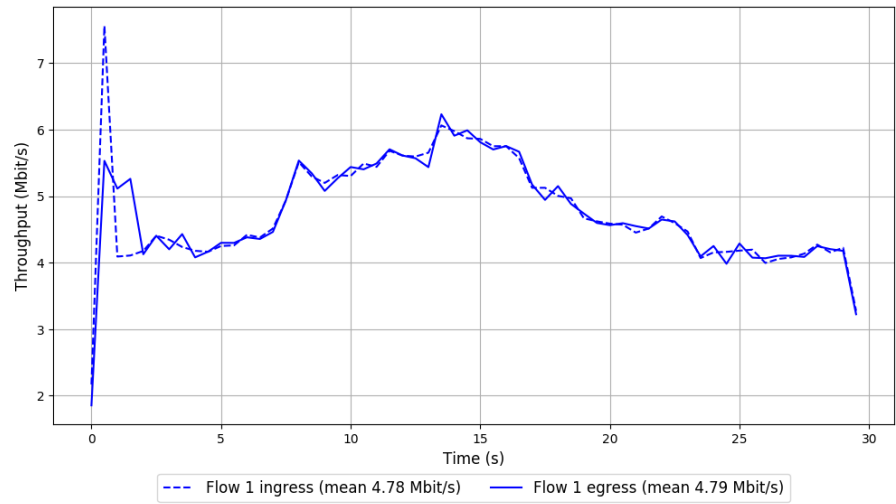
-- Flow 1:

Average throughput: 4.79 Mbit/s

95th percentile per-packet one-way delay: 64.375 ms

Loss rate: 0.12%

Run 2: Report of PCC-Allegro — Data Link

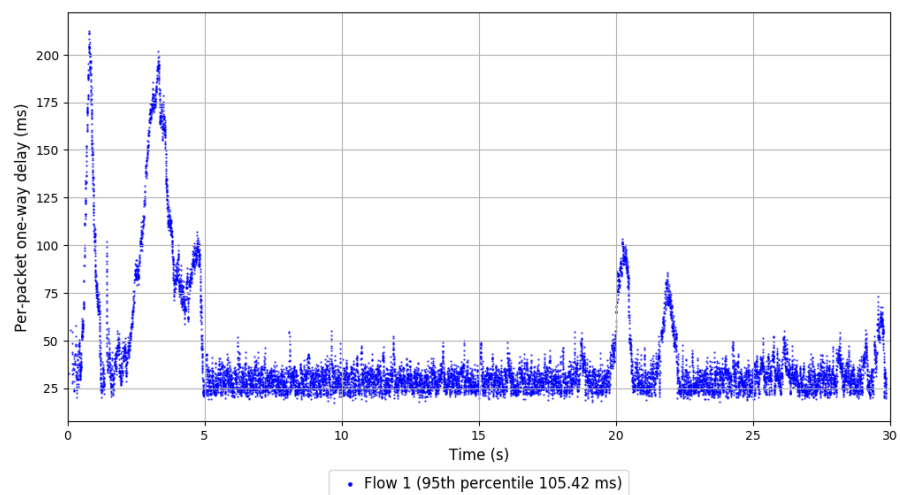
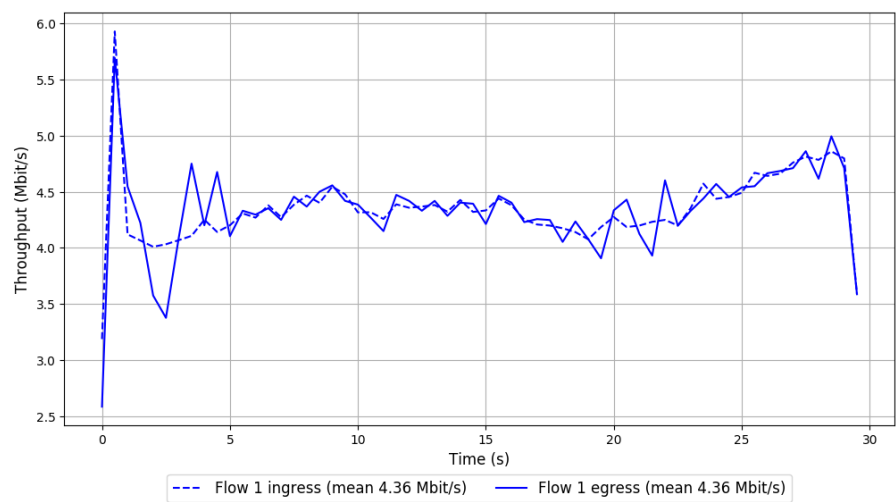


Run 3: Statistics of PCC-Allegro

Start at: 2018-04-16 21:39:32
End at: 2018-04-16 21:40:02
Local clock offset: -1.159 ms
Remote clock offset: -1.659 ms

Below is generated by plot.py at 2018-04-16 23:00:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.36 Mbit/s
95th percentile per-packet one-way delay: 105.416 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 4.36 Mbit/s
95th percentile per-packet one-way delay: 105.416 ms
Loss rate: 0.15%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-04-16 21:04:13

End at: 2018-04-16 21:04:43

Local clock offset: 0.027 ms

Remote clock offset: 11.414 ms

Below is generated by plot.py at 2018-04-16 23:00:34

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.05 Mbit/s

95th percentile per-packet one-way delay: 303.479 ms

Loss rate: 2.86%

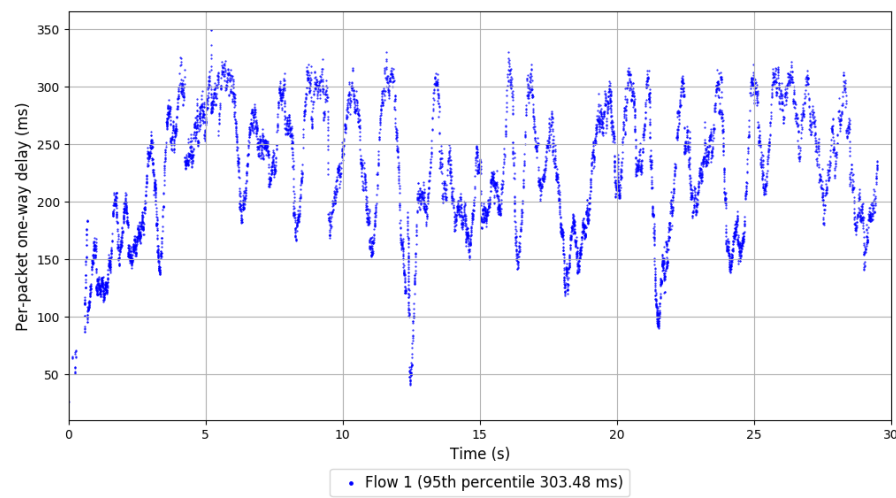
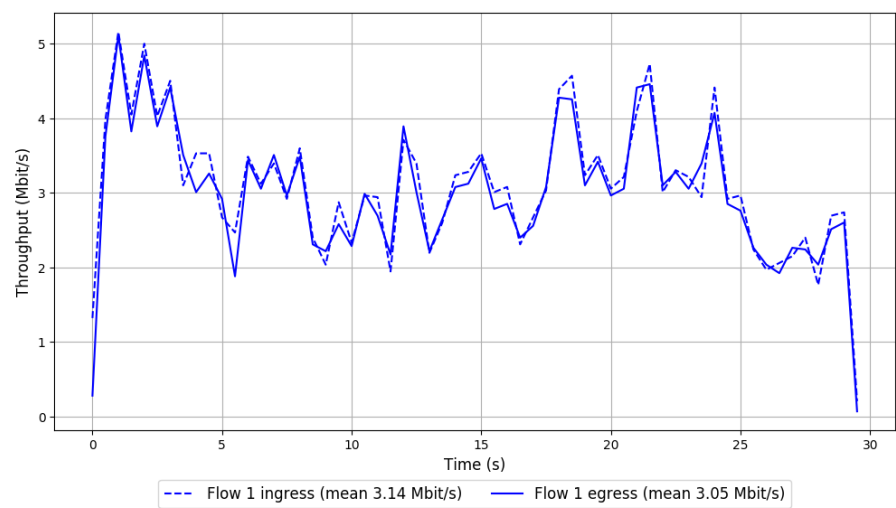
-- Flow 1:

Average throughput: 3.05 Mbit/s

95th percentile per-packet one-way delay: 303.479 ms

Loss rate: 2.86%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-04-16 21:26:27

End at: 2018-04-16 21:26:57

Local clock offset: -0.789 ms

Remote clock offset: 0.821 ms

Below is generated by plot.py at 2018-04-16 23:00:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.29 Mbit/s

95th percentile per-packet one-way delay: 305.157 ms

Loss rate: 2.26%

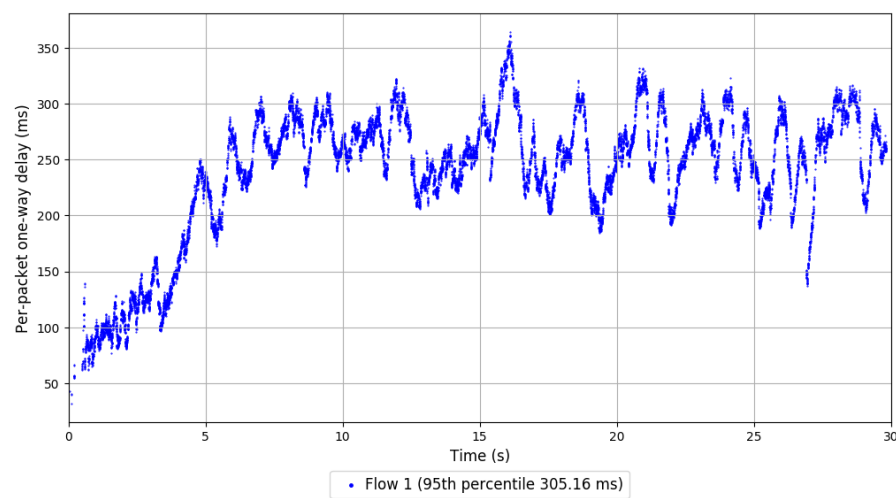
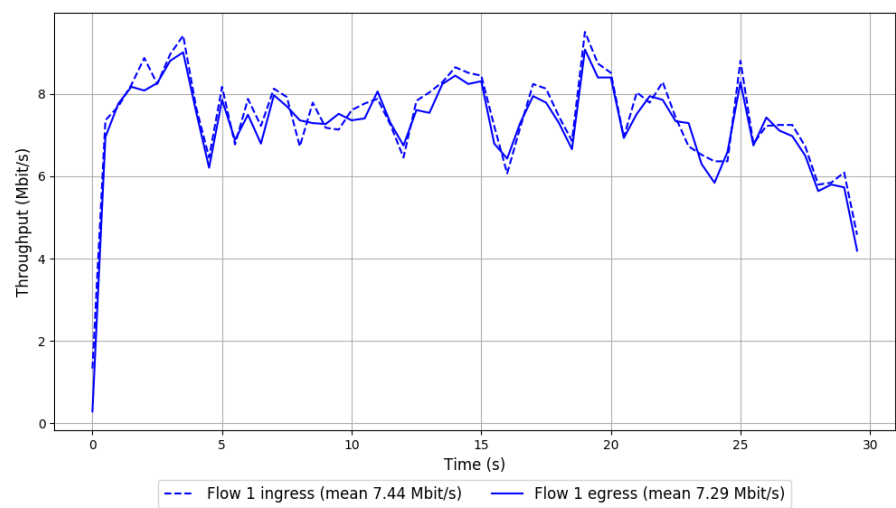
-- Flow 1:

Average throughput: 7.29 Mbit/s

95th percentile per-packet one-way delay: 305.157 ms

Loss rate: 2.26%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-04-16 21:48:41

End at: 2018-04-16 21:49:11

Local clock offset: -1.216 ms

Remote clock offset: -3.78 ms

Below is generated by plot.py at 2018-04-16 23:00:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.88 Mbit/s

95th percentile per-packet one-way delay: 306.705 ms

Loss rate: 3.29%

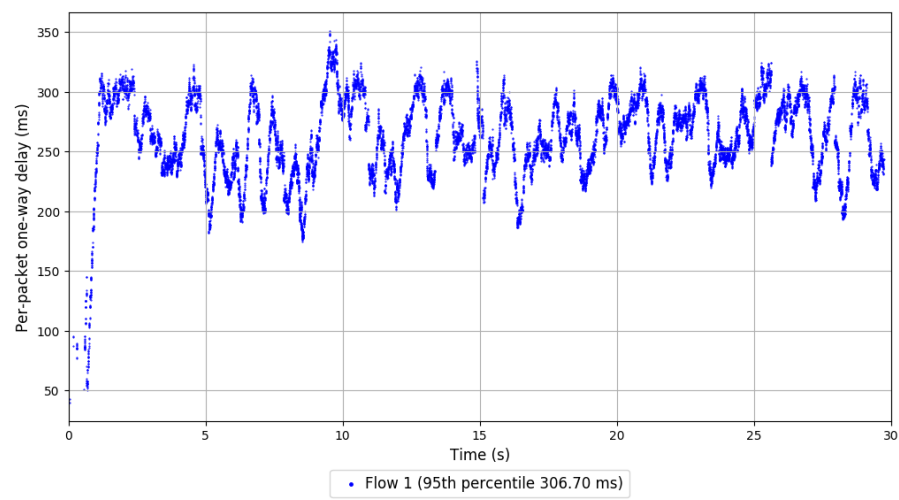
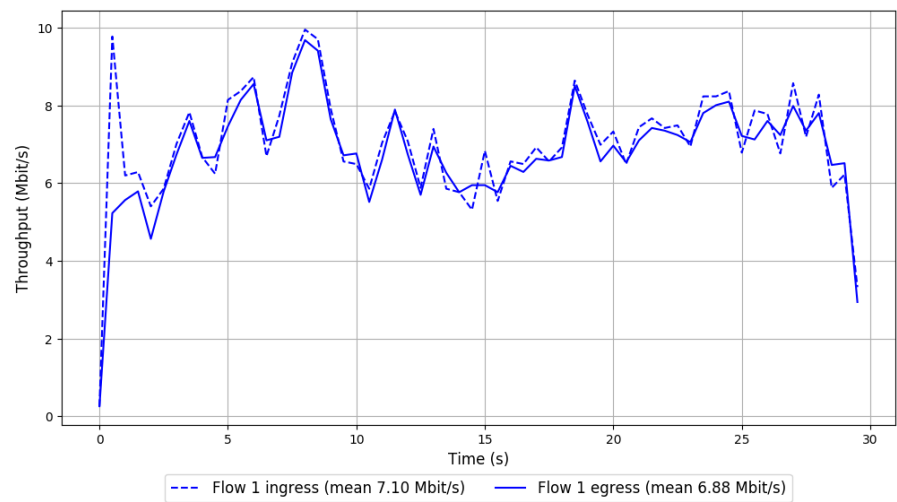
-- Flow 1:

Average throughput: 6.88 Mbit/s

95th percentile per-packet one-way delay: 306.705 ms

Loss rate: 3.29%

Run 3: Report of QUIC Cubic — Data Link

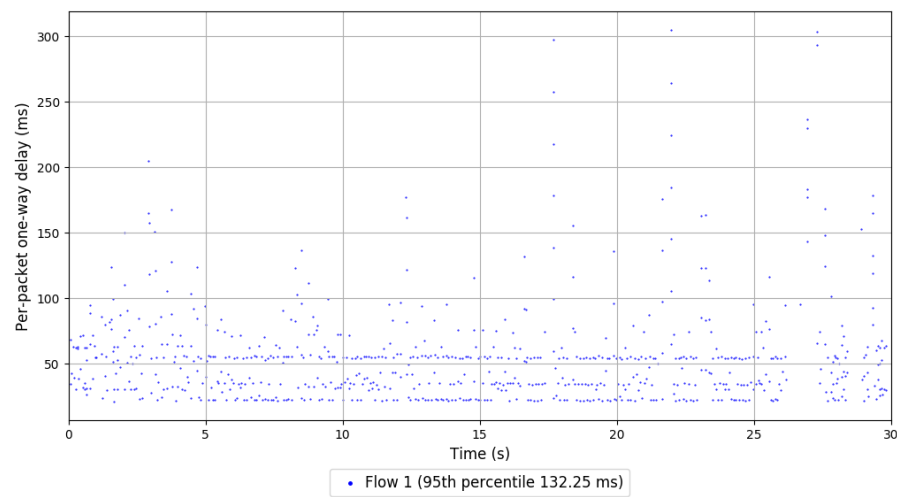
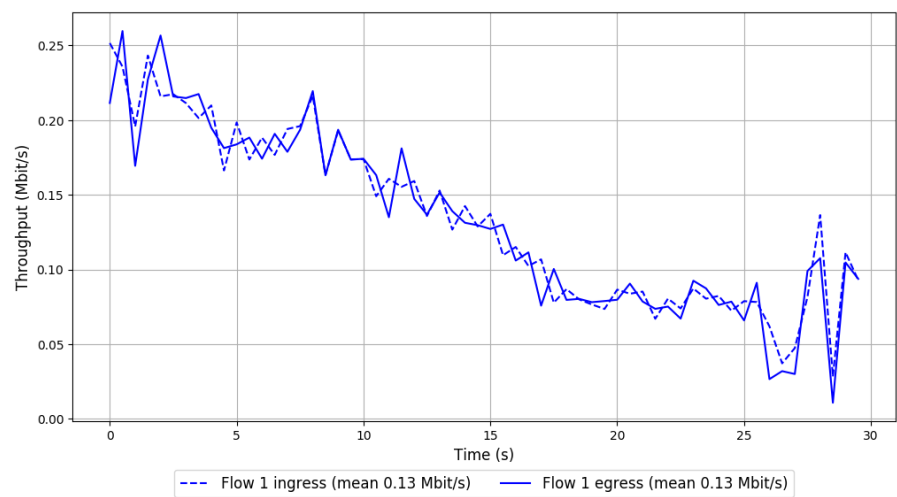


Run 1: Statistics of SCReAM

Start at: 2018-04-16 20:49:50
End at: 2018-04-16 20:50:20
Local clock offset: 0.738 ms
Remote clock offset: 14.814 ms

Below is generated by plot.py at 2018-04-16 23:00:37
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 132.251 ms
Loss rate: 1.26%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 132.251 ms
Loss rate: 1.26%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-04-16 21:12:03

End at: 2018-04-16 21:12:33

Local clock offset: -0.192 ms

Remote clock offset: 3.197 ms

Below is generated by plot.py at 2018-04-16 23:00:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 110.682 ms

Loss rate: 0.86%

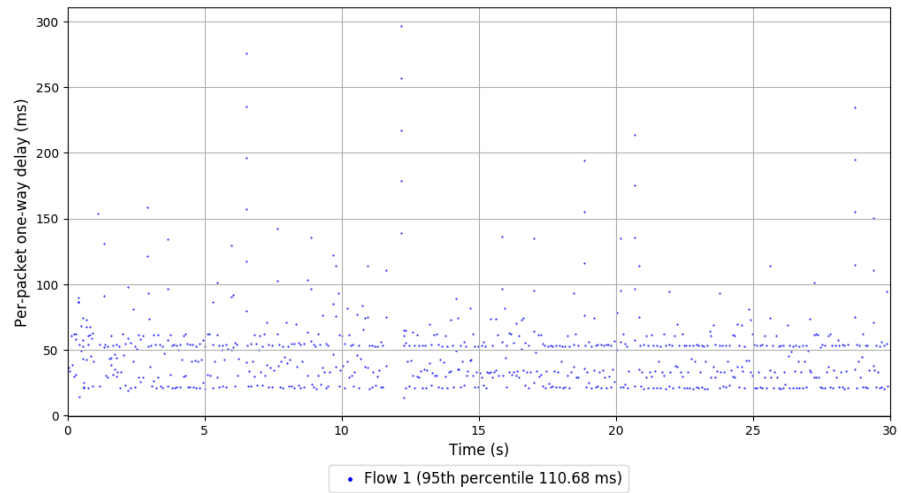
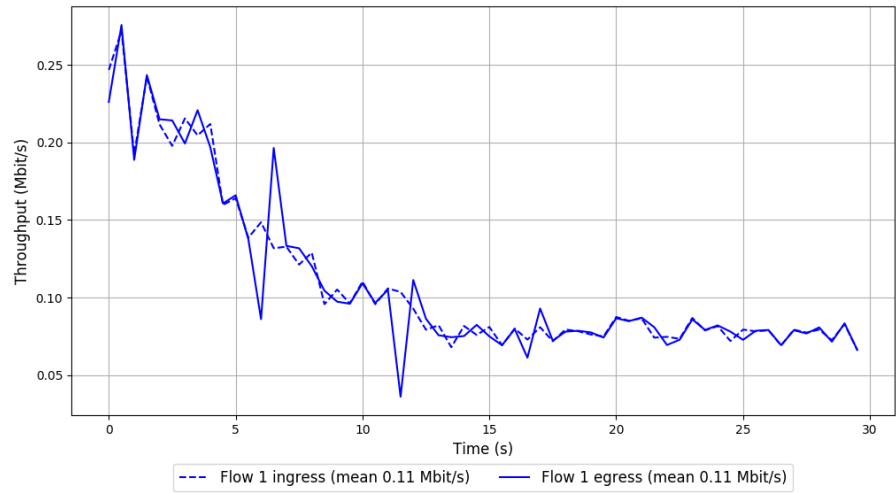
-- Flow 1:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 110.682 ms

Loss rate: 0.86%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-04-16 21:34:18

End at: 2018-04-16 21:34:48

Local clock offset: -0.943 ms

Remote clock offset: 1.529 ms

Below is generated by plot.py at 2018-04-16 23:00:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 101.759 ms

Loss rate: 0.17%

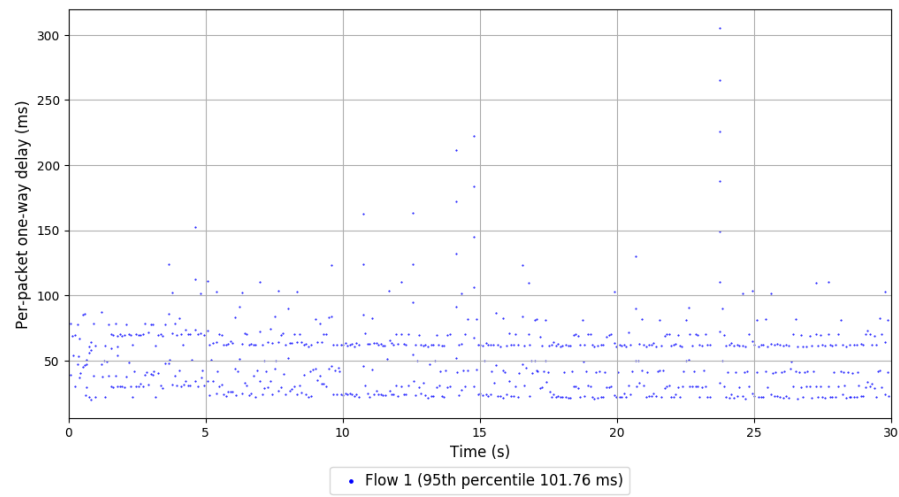
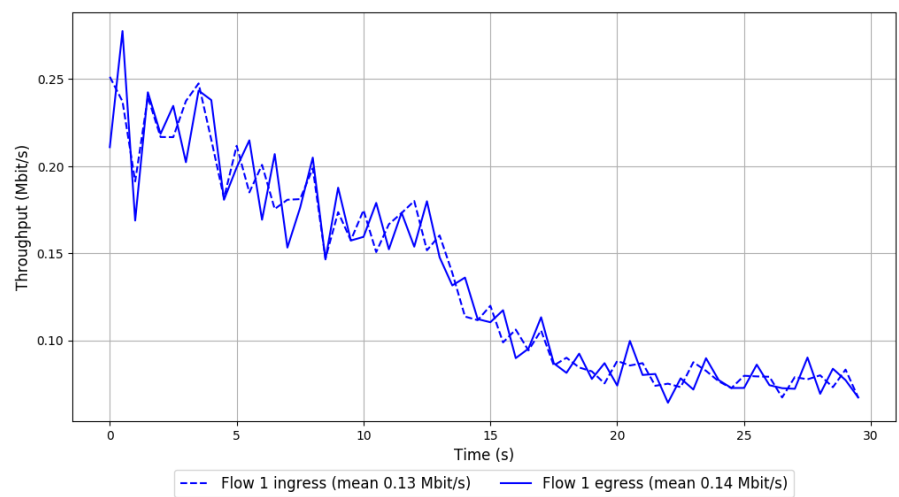
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 101.759 ms

Loss rate: 0.17%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-04-16 21:06:50

End at: 2018-04-16 21:07:20

Local clock offset: -0.019 ms

Remote clock offset: 7.648 ms

Below is generated by plot.py at 2018-04-16 23:00:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 89.148 ms

Loss rate: 0.00%

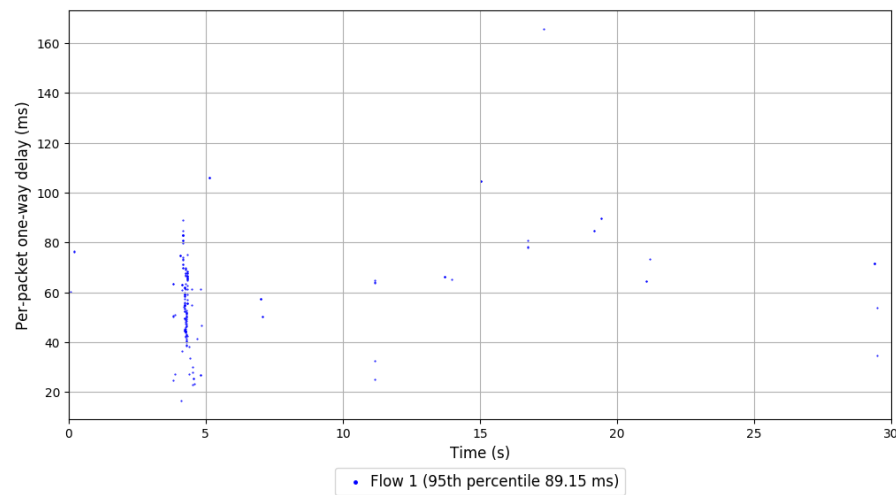
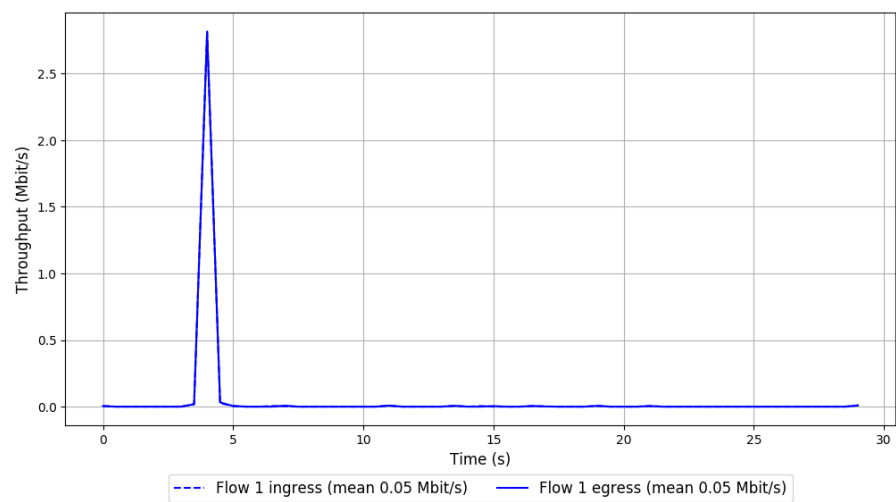
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 89.148 ms

Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-04-16 21:29:04

End at: 2018-04-16 21:29:34

Local clock offset: -0.867 ms

Remote clock offset: 0.897 ms

Below is generated by plot.py at 2018-04-16 23:00:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 83.548 ms

Loss rate: 0.00%

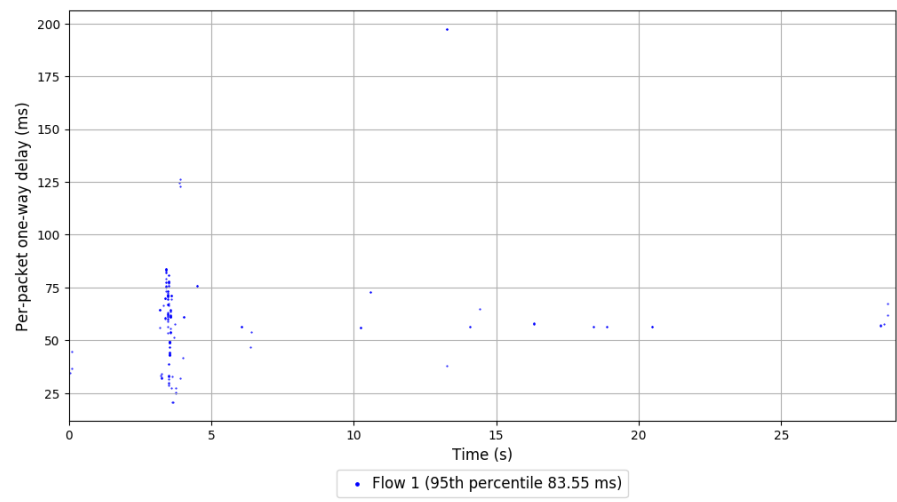
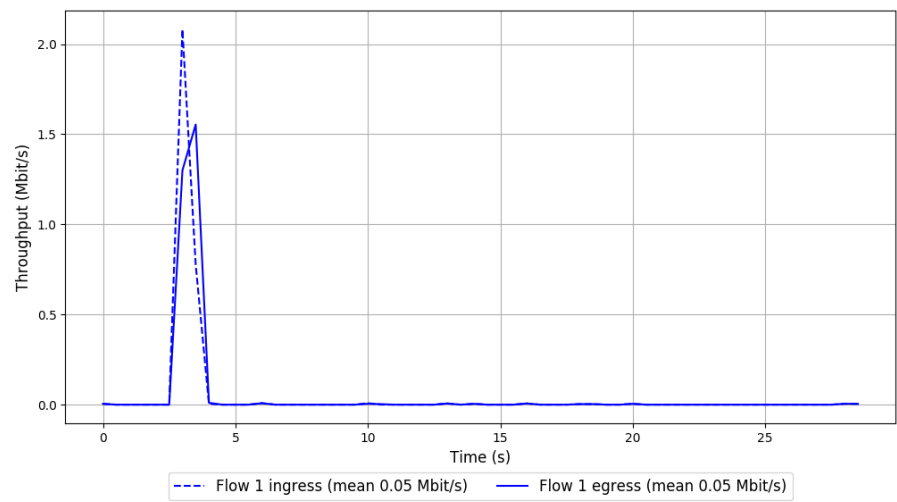
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 83.548 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link

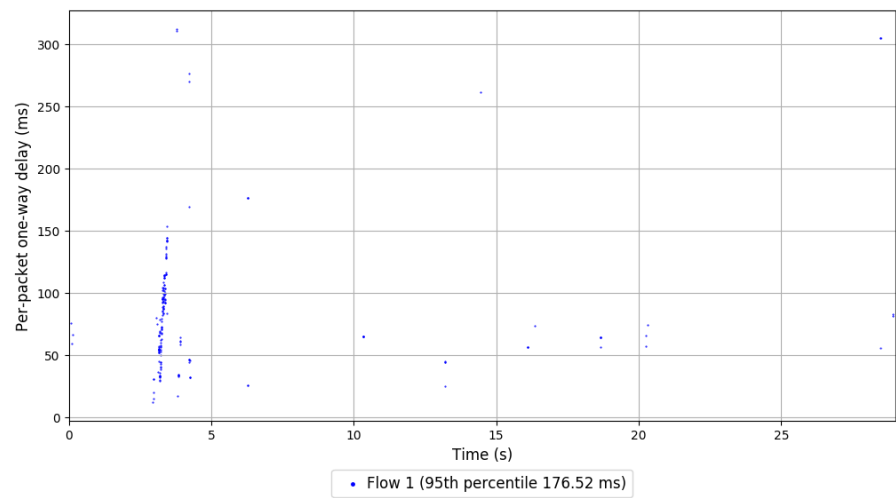
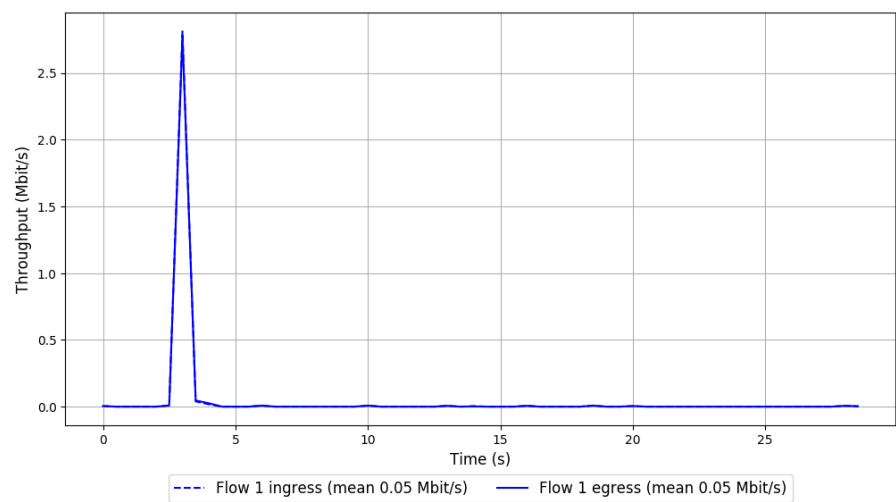


Run 3: Statistics of WebRTC media

Start at: 2018-04-16 21:51:18
End at: 2018-04-16 21:51:48
Local clock offset: -1.285 ms
Remote clock offset: -3.975 ms

Below is generated by plot.py at 2018-04-16 23:00:37
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 176.516 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 176.516 ms
Loss rate: 0.92%

Run 3: Report of WebRTC media — Data Link

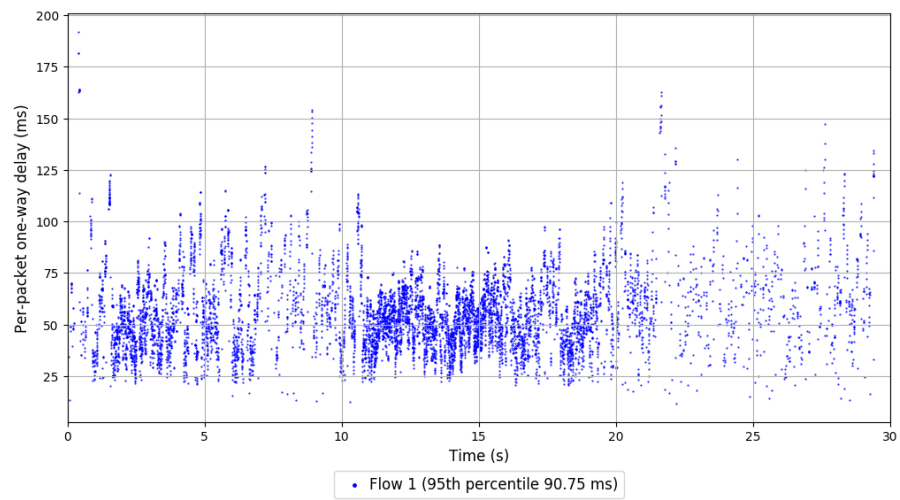
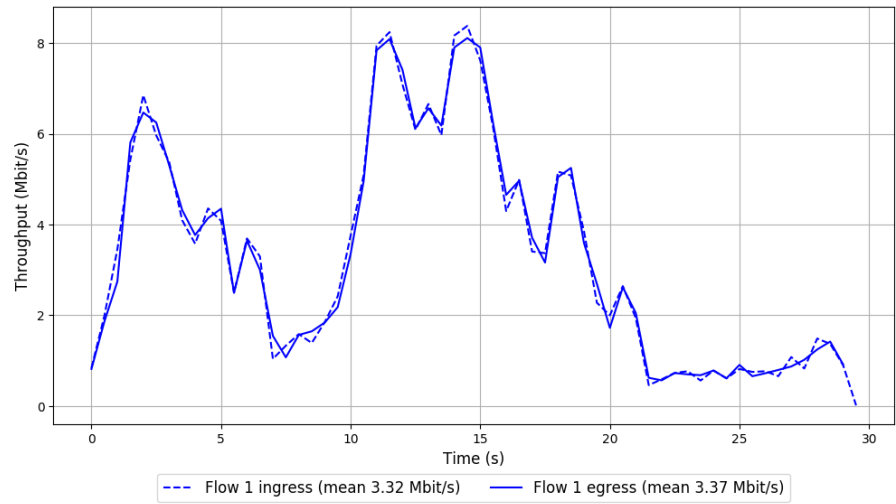


Run 1: Statistics of Sprout

Start at: 2018-04-16 20:56:22
End at: 2018-04-16 20:56:52
Local clock offset: 0.507 ms
Remote clock offset: 17.985 ms

Below is generated by plot.py at 2018-04-16 23:00:37
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.37 Mbit/s
95th percentile per-packet one-way delay: 90.750 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 3.37 Mbit/s
95th percentile per-packet one-way delay: 90.750 ms
Loss rate: 0.12%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2018-04-16 21:18:36

End at: 2018-04-16 21:19:06

Local clock offset: -0.458 ms

Remote clock offset: 1.111 ms

Below is generated by plot.py at 2018-04-16 23:00:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.57 Mbit/s

95th percentile per-packet one-way delay: 84.375 ms

Loss rate: 0.35%

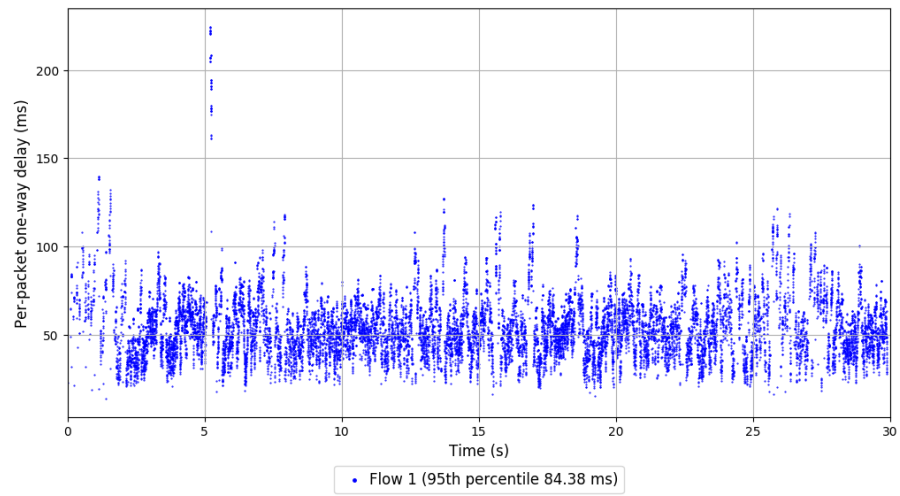
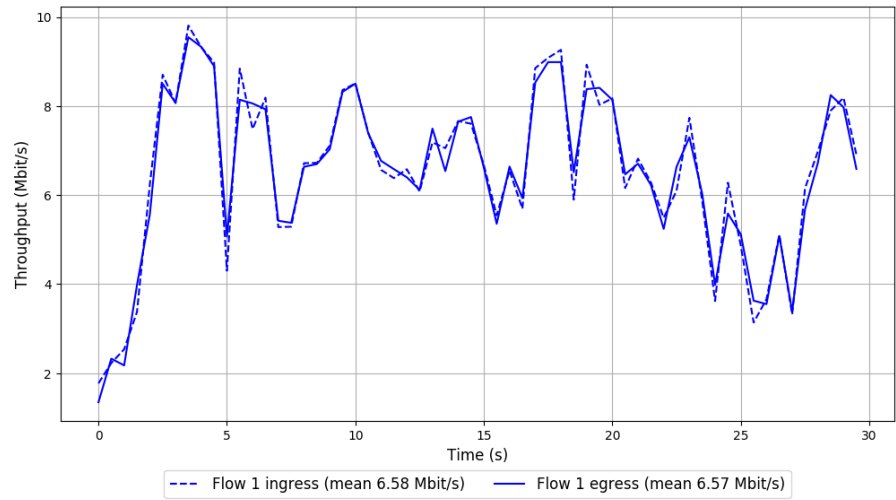
-- Flow 1:

Average throughput: 6.57 Mbit/s

95th percentile per-packet one-way delay: 84.375 ms

Loss rate: 0.35%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2018-04-16 21:40:50

End at: 2018-04-16 21:41:20

Local clock offset: -1.184 ms

Remote clock offset: -2.19 ms

Below is generated by plot.py at 2018-04-16 23:00:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.45 Mbit/s

95th percentile per-packet one-way delay: 105.934 ms

Loss rate: 0.53%

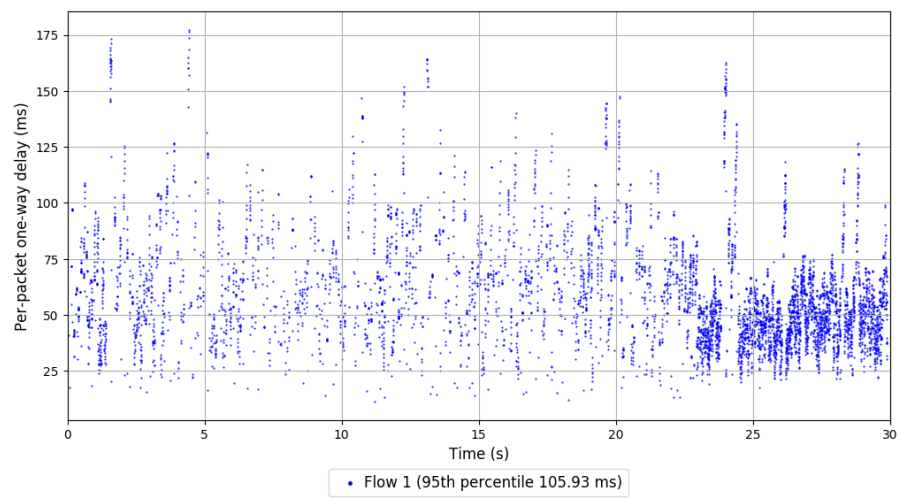
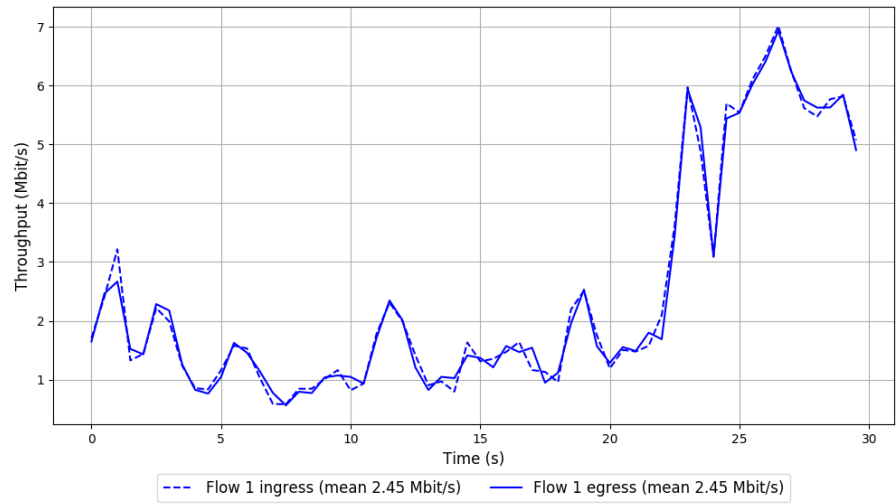
-- Flow 1:

Average throughput: 2.45 Mbit/s

95th percentile per-packet one-way delay: 105.934 ms

Loss rate: 0.53%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2018-04-16 20:51:08

End at: 2018-04-16 20:51:38

Local clock offset: 0.772 ms

Remote clock offset: 15.32 ms

Below is generated by plot.py at 2018-04-16 23:00:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.22 Mbit/s

95th percentile per-packet one-way delay: 51.760 ms

Loss rate: 1.04%

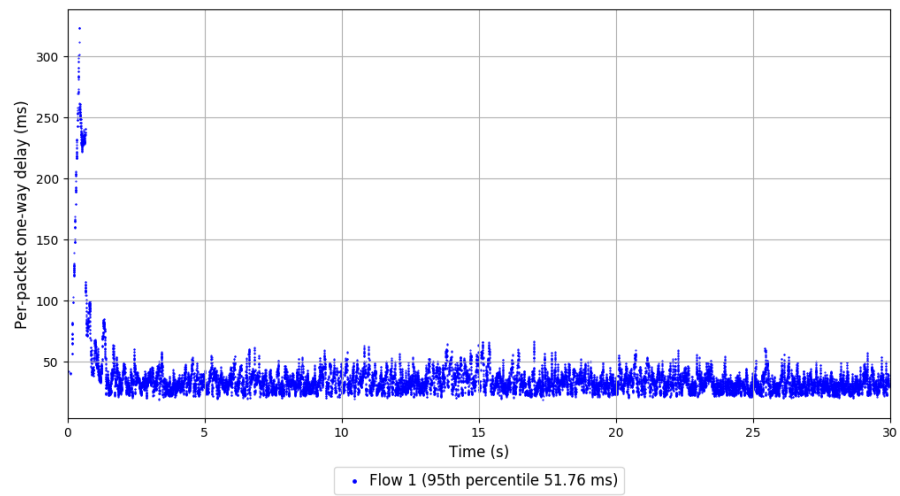
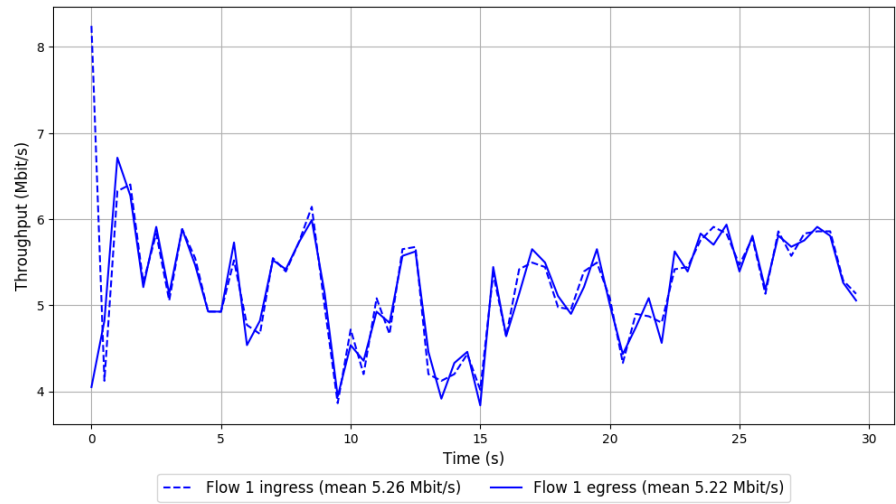
-- Flow 1:

Average throughput: 5.22 Mbit/s

95th percentile per-packet one-way delay: 51.760 ms

Loss rate: 1.04%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-04-16 21:13:21

End at: 2018-04-16 21:13:51

Local clock offset: -0.346 ms

Remote clock offset: 2.624 ms

Below is generated by plot.py at 2018-04-16 23:00:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.64 Mbit/s

95th percentile per-packet one-way delay: 83.931 ms

Loss rate: 1.20%

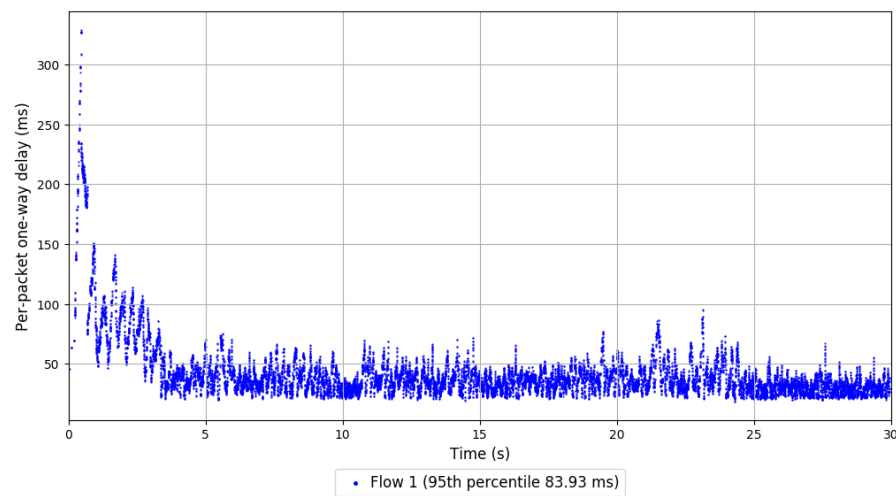
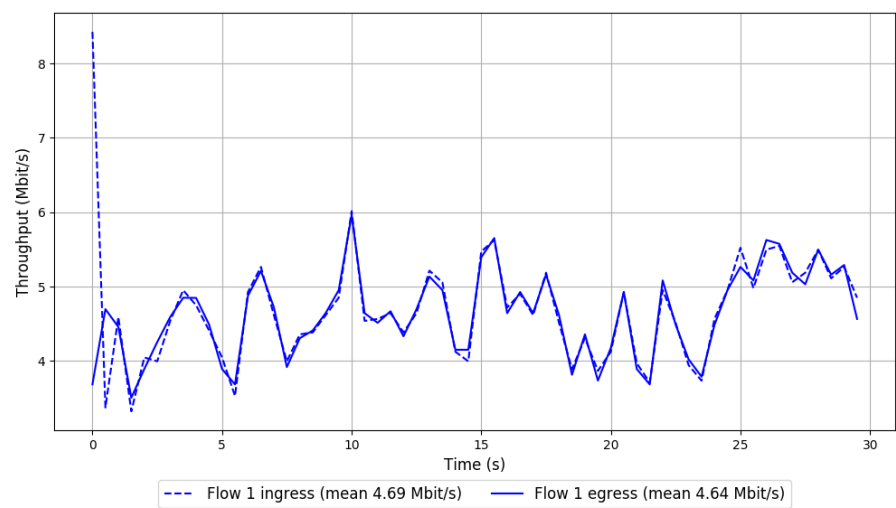
-- Flow 1:

Average throughput: 4.64 Mbit/s

95th percentile per-packet one-way delay: 83.931 ms

Loss rate: 1.20%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-04-16 21:35:36

End at: 2018-04-16 21:36:06

Local clock offset: -0.986 ms

Remote clock offset: 0.617 ms

Below is generated by plot.py at 2018-04-16 23:00:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.64 Mbit/s

95th percentile per-packet one-way delay: 58.224 ms

Loss rate: 0.17%

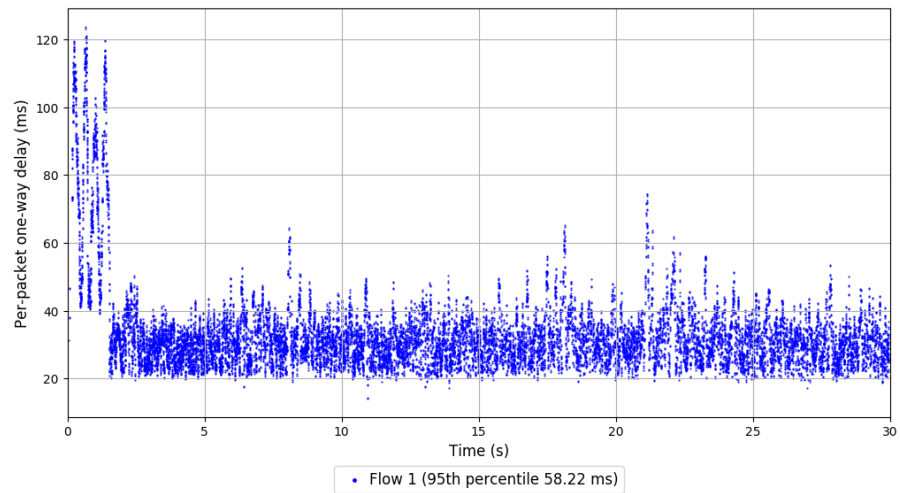
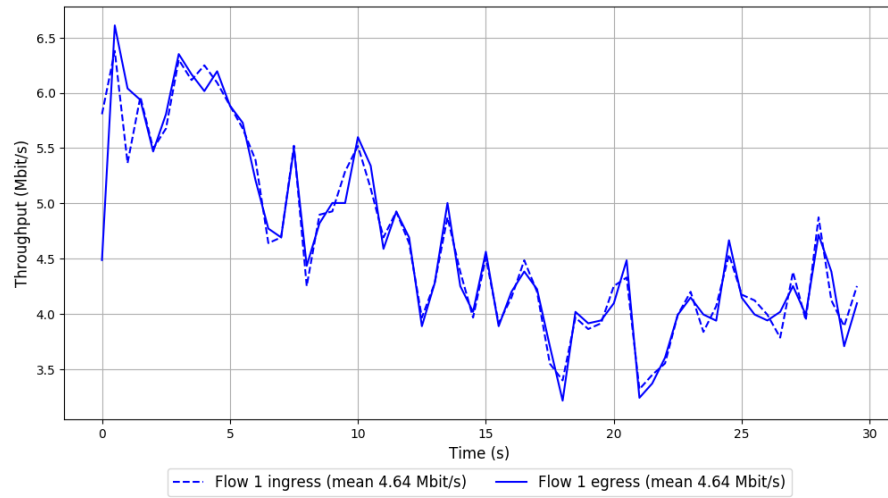
-- Flow 1:

Average throughput: 4.64 Mbit/s

95th percentile per-packet one-way delay: 58.224 ms

Loss rate: 0.17%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-04-16 21:08:08

End at: 2018-04-16 21:08:38

Local clock offset: -0.126 ms

Remote clock offset: 6.089 ms

Below is generated by plot.py at 2018-04-16 23:00:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.65 Mbit/s

95th percentile per-packet one-way delay: 76.775 ms

Loss rate: 0.06%

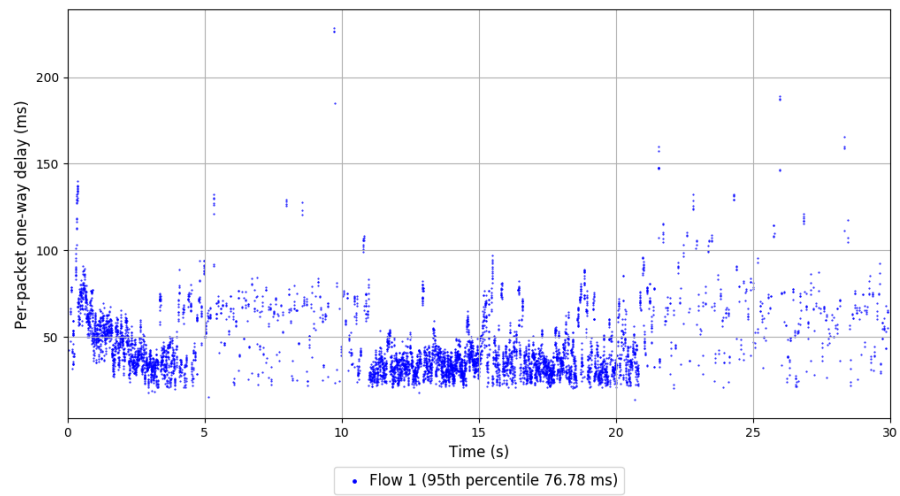
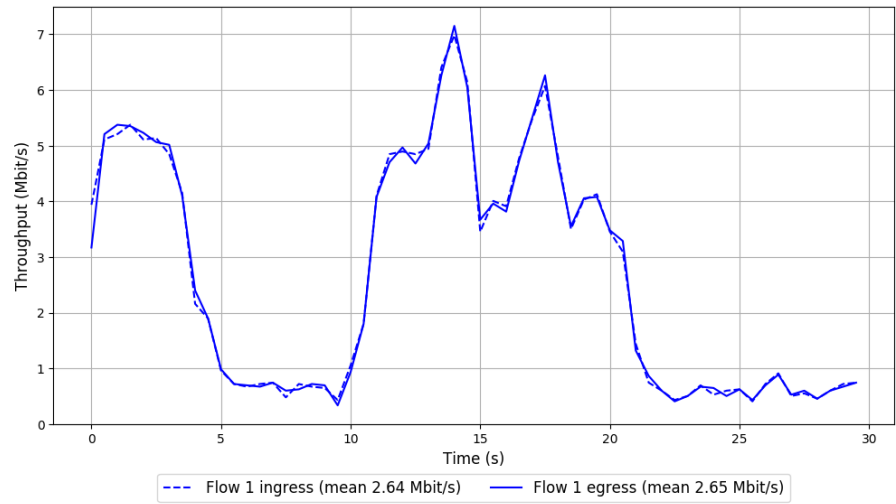
-- Flow 1:

Average throughput: 2.65 Mbit/s

95th percentile per-packet one-way delay: 76.775 ms

Loss rate: 0.06%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-04-16 21:30:22

End at: 2018-04-16 21:30:52

Local clock offset: -0.925 ms

Remote clock offset: 1.038 ms

Below is generated by plot.py at 2018-04-16 23:00:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.56 Mbit/s

95th percentile per-packet one-way delay: 169.361 ms

Loss rate: 0.06%

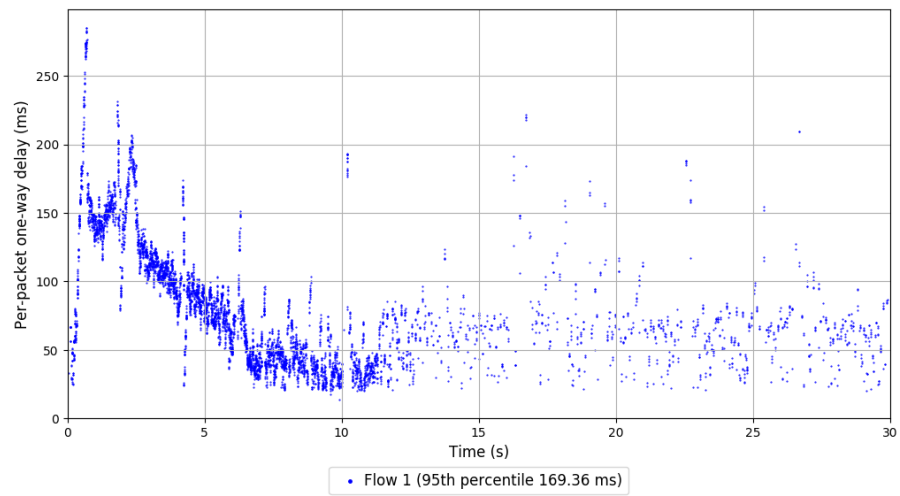
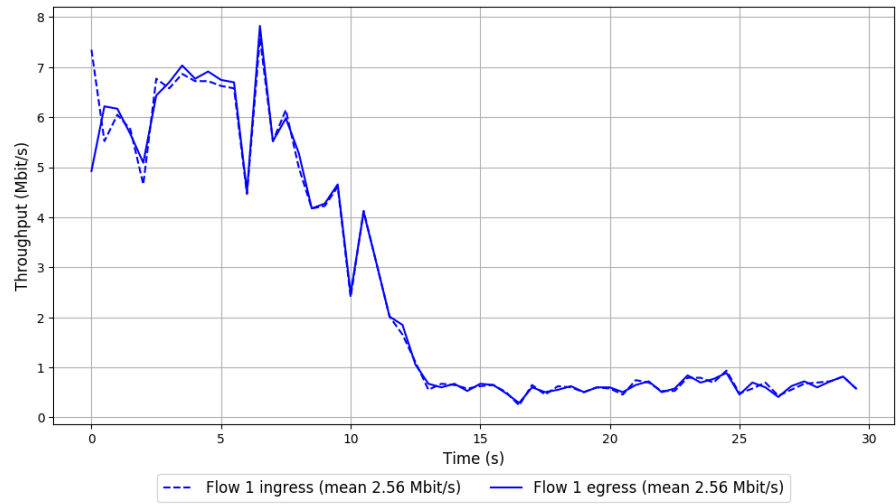
-- Flow 1:

Average throughput: 2.56 Mbit/s

95th percentile per-packet one-way delay: 169.361 ms

Loss rate: 0.06%

Run 2: Report of TCP Vegas — Data Link

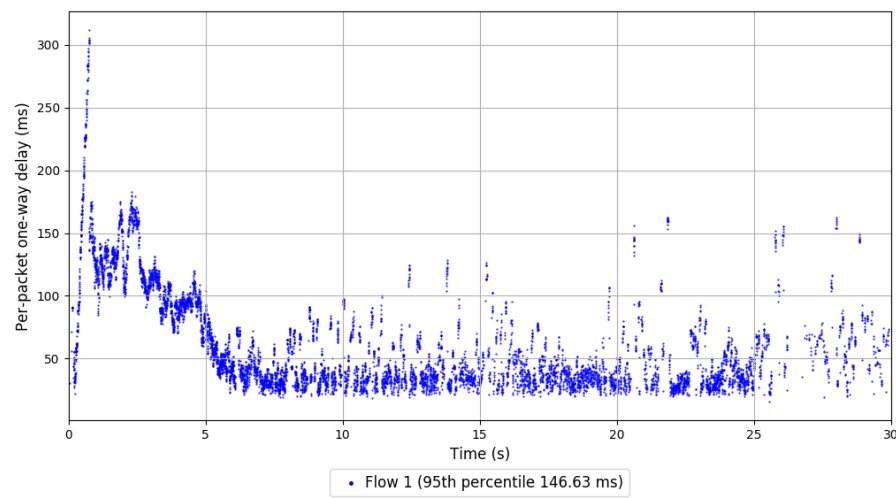
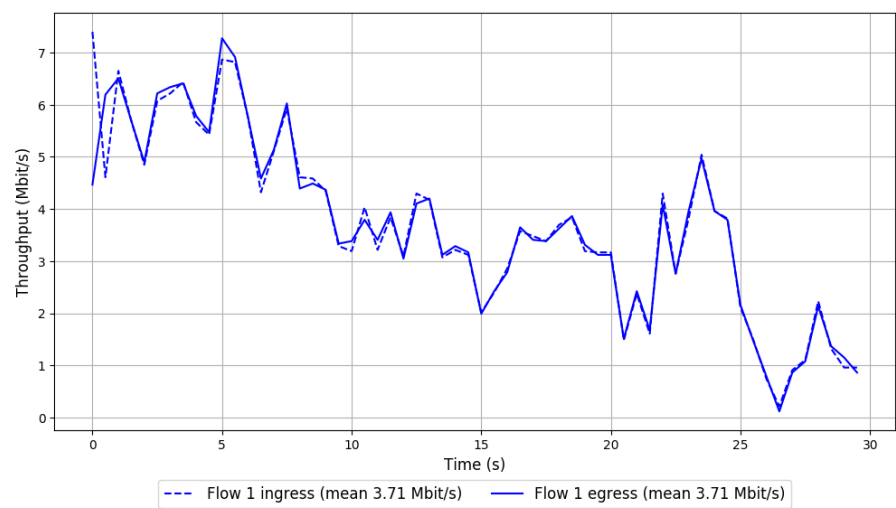


Run 3: Statistics of TCP Vegas

Start at: 2018-04-16 21:52:36
End at: 2018-04-16 21:53:06
Local clock offset: -1.254 ms
Remote clock offset: -3.999 ms

Below is generated by plot.py at 2018-04-16 23:00:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.71 Mbit/s
95th percentile per-packet one-way delay: 146.632 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 3.71 Mbit/s
95th percentile per-packet one-way delay: 146.632 ms
Loss rate: 0.16%

Run 3: Report of TCP Vegas — Data Link

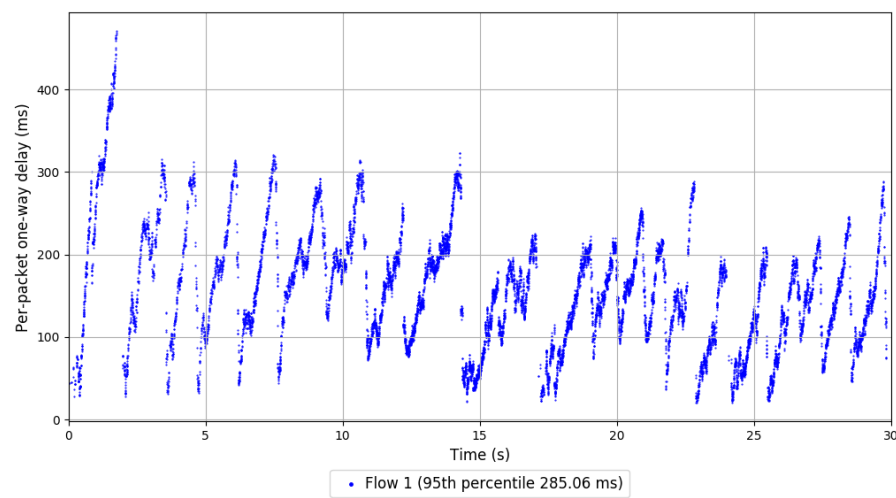
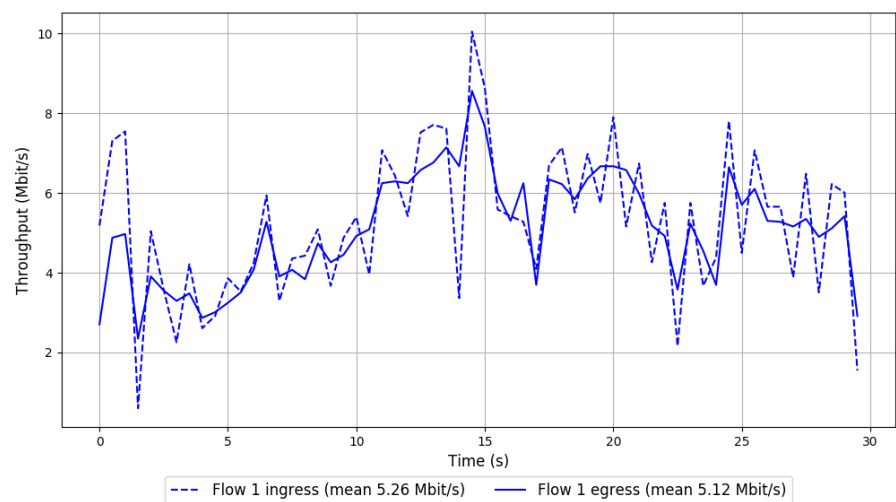


Run 1: Statistics of Verus

Start at: 2018-04-16 20:53:46
End at: 2018-04-16 20:54:16
Local clock offset: 0.617 ms
Remote clock offset: 16.683 ms

Below is generated by plot.py at 2018-04-16 23:00:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.12 Mbit/s
95th percentile per-packet one-way delay: 285.064 ms
Loss rate: 2.79%
-- Flow 1:
Average throughput: 5.12 Mbit/s
95th percentile per-packet one-way delay: 285.064 ms
Loss rate: 2.79%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-04-16 21:15:58

End at: 2018-04-16 21:16:29

Local clock offset: -0.309 ms

Remote clock offset: 1.616 ms

Below is generated by plot.py at 2018-04-16 23:00:51

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.68 Mbit/s

95th percentile per-packet one-way delay: 308.839 ms

Loss rate: 8.67%

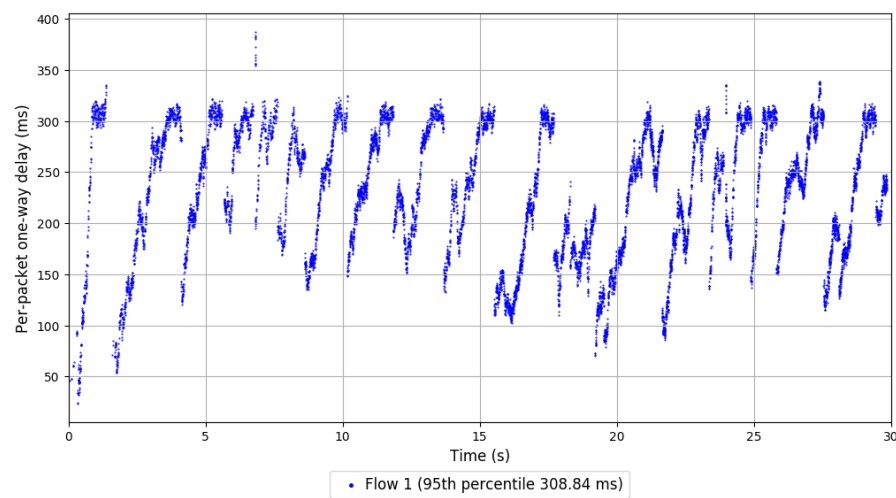
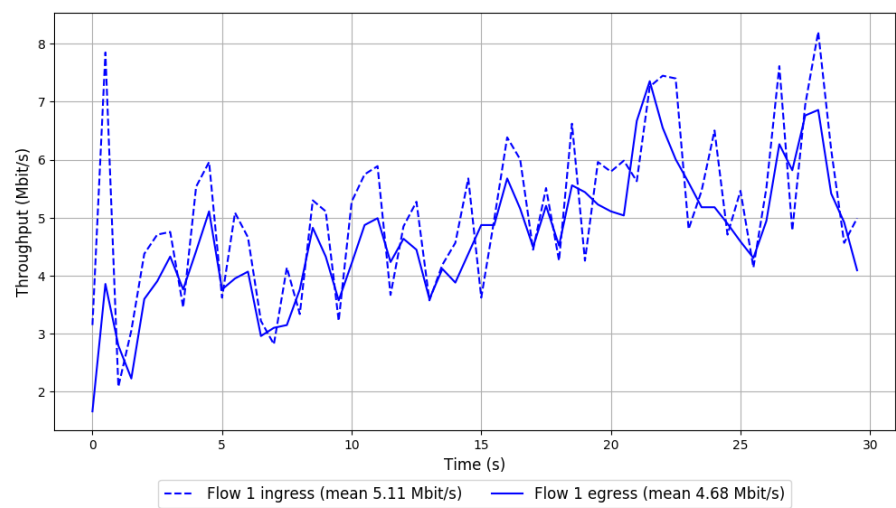
-- Flow 1:

Average throughput: 4.68 Mbit/s

95th percentile per-packet one-way delay: 308.839 ms

Loss rate: 8.67%

Run 2: Report of Verus — Data Link

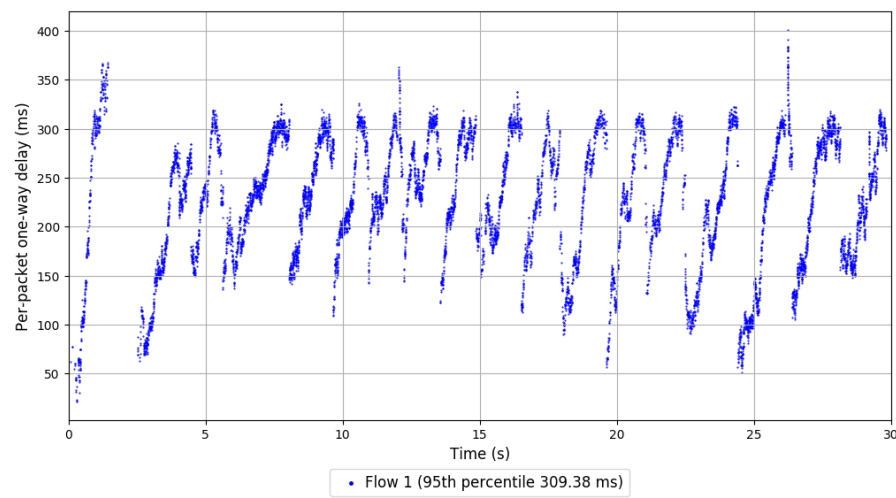
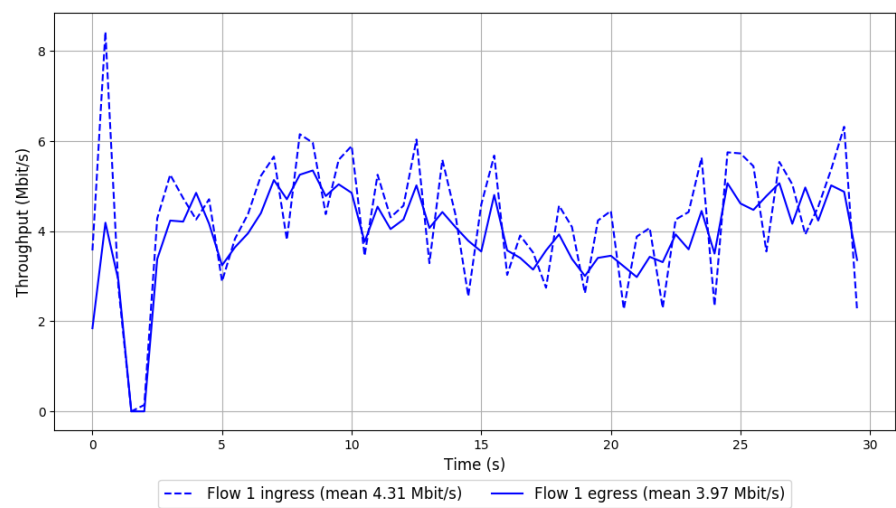


Run 3: Statistics of Verus

Start at: 2018-04-16 21:38:13
End at: 2018-04-16 21:38:43
Local clock offset: -1.015 ms
Remote clock offset: -1.049 ms

Below is generated by plot.py at 2018-04-16 23:00:51
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.97 Mbit/s
95th percentile per-packet one-way delay: 309.384 ms
Loss rate: 8.15%
-- Flow 1:
Average throughput: 3.97 Mbit/s
95th percentile per-packet one-way delay: 309.384 ms
Loss rate: 8.15%

Run 3: Report of Verus — Data Link

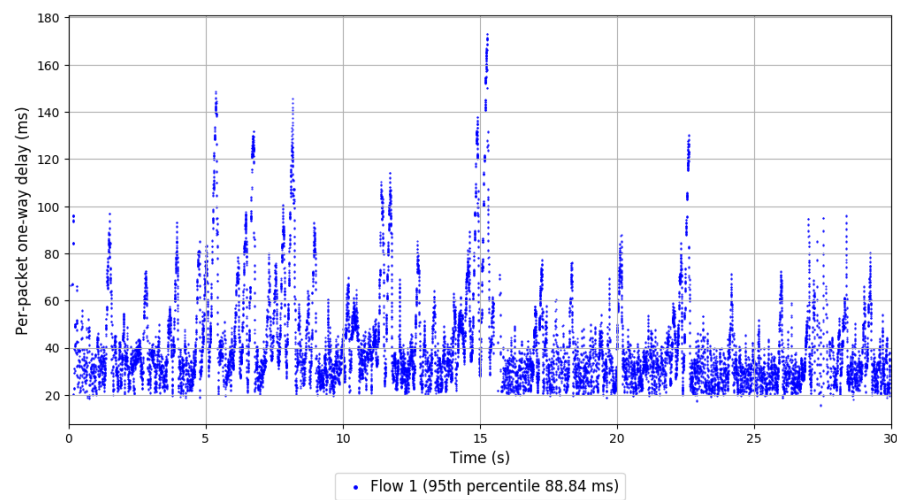
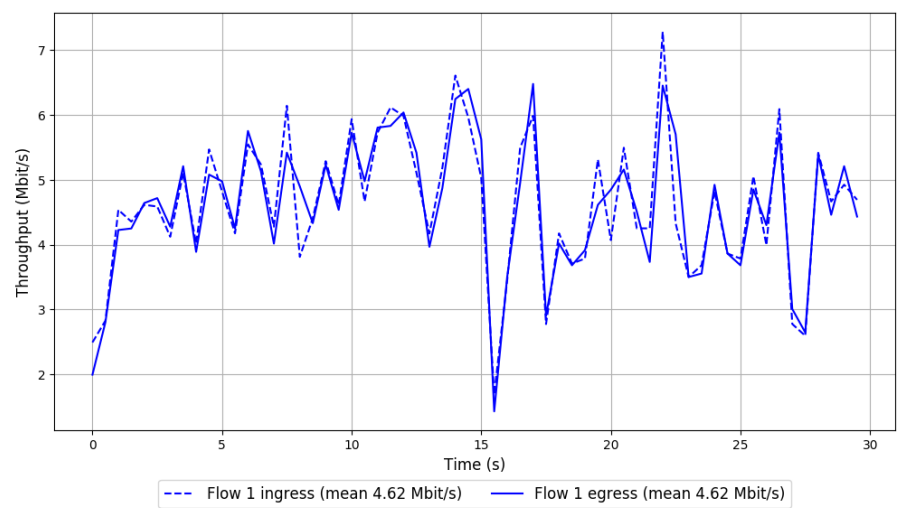


Run 1: Statistics of Copa

Start at: 2018-04-16 21:01:35
End at: 2018-04-16 21:02:05
Local clock offset: 0.138 ms
Remote clock offset: 16.438 ms

Below is generated by plot.py at 2018-04-16 23:01:00
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.62 Mbit/s
95th percentile per-packet one-way delay: 88.844 ms
Loss rate: 0.31%
-- Flow 1:
Average throughput: 4.62 Mbit/s
95th percentile per-packet one-way delay: 88.844 ms
Loss rate: 0.31%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-04-16 21:23:50

End at: 2018-04-16 21:24:20

Local clock offset: -0.604 ms

Remote clock offset: 0.765 ms

Below is generated by plot.py at 2018-04-16 23:01:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.35 Mbit/s

95th percentile per-packet one-way delay: 79.581 ms

Loss rate: 0.36%

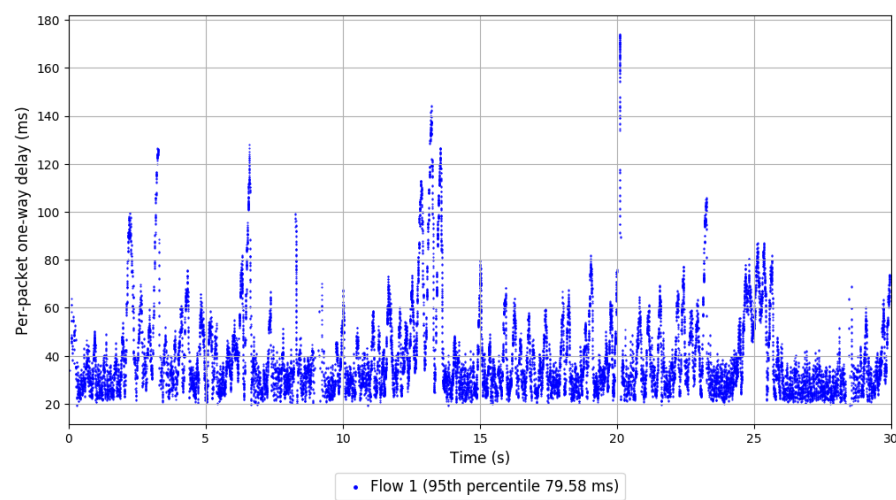
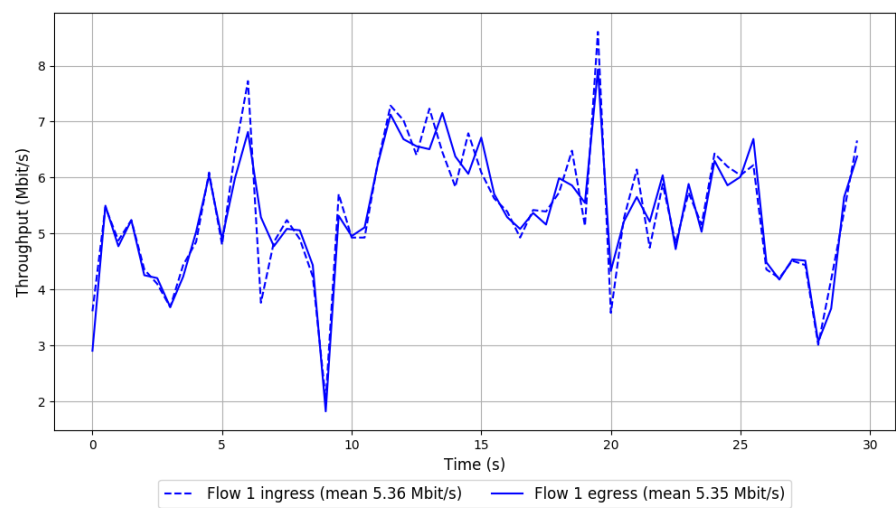
-- Flow 1:

Average throughput: 5.35 Mbit/s

95th percentile per-packet one-way delay: 79.581 ms

Loss rate: 0.36%

Run 2: Report of Copa — Data Link

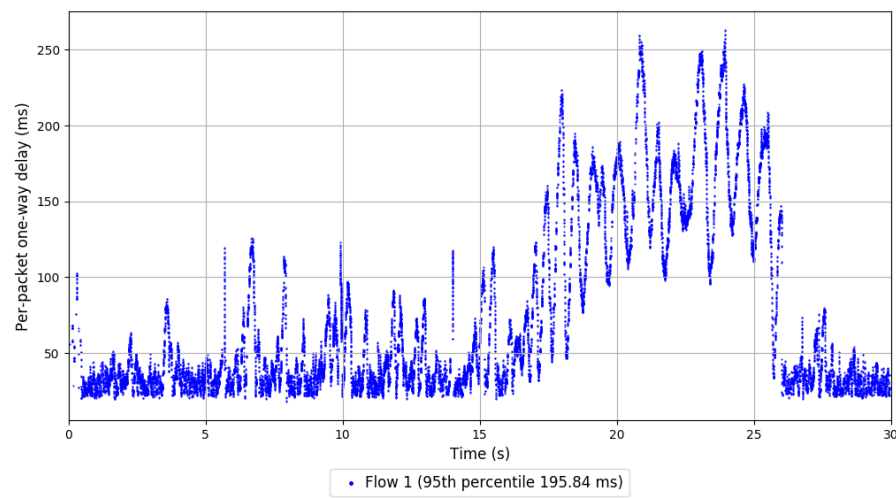
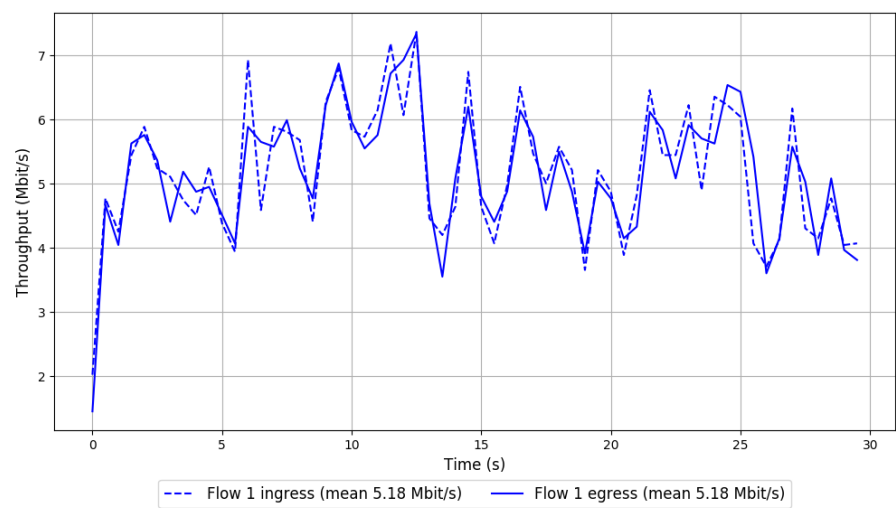


Run 3: Statistics of Copa

Start at: 2018-04-16 21:46:04
End at: 2018-04-16 21:46:34
Local clock offset: -1.264 ms
Remote clock offset: -3.466 ms

Below is generated by plot.py at 2018-04-16 23:01:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.18 Mbit/s
95th percentile per-packet one-way delay: 195.842 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 5.18 Mbit/s
95th percentile per-packet one-way delay: 195.842 ms
Loss rate: 0.30%

Run 3: Report of Copa — Data Link

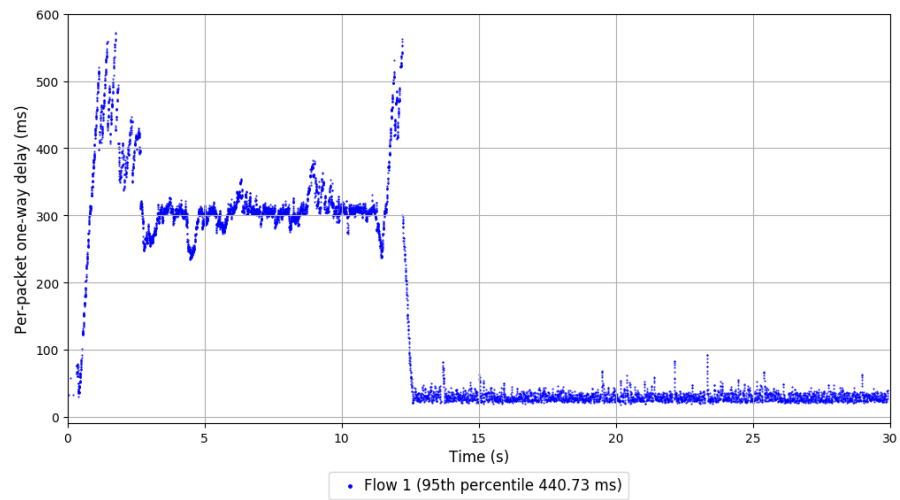
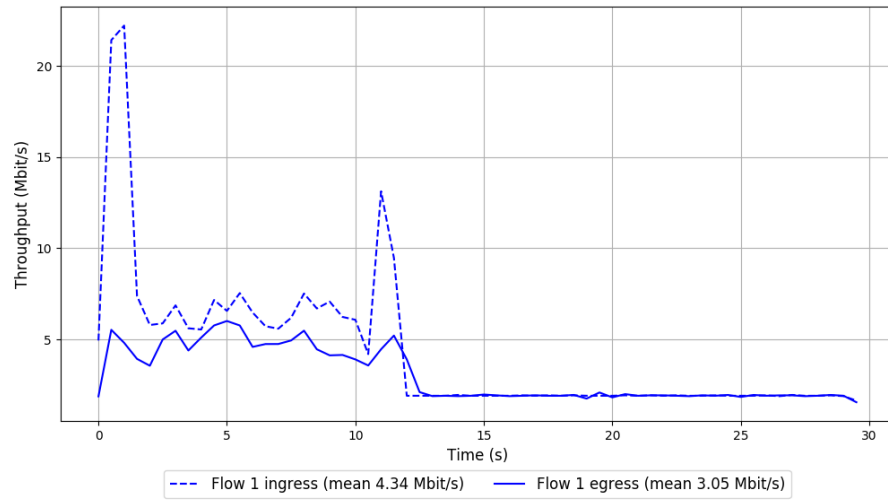


Run 1: Statistics of FillP

Start at: 2018-04-16 20:58:59
End at: 2018-04-16 20:59:29
Local clock offset: 0.377 ms
Remote clock offset: 19.521 ms

Below is generated by plot.py at 2018-04-16 23:01:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.05 Mbit/s
95th percentile per-packet one-way delay: 440.729 ms
Loss rate: 29.83%
-- Flow 1:
Average throughput: 3.05 Mbit/s
95th percentile per-packet one-way delay: 440.729 ms
Loss rate: 29.83%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-04-16 21:21:13

End at: 2018-04-16 21:21:43

Local clock offset: -0.603 ms

Remote clock offset: 0.731 ms

Below is generated by plot.py at 2018-04-16 23:01:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.26 Mbit/s

95th percentile per-packet one-way delay: 458.070 ms

Loss rate: 36.76%

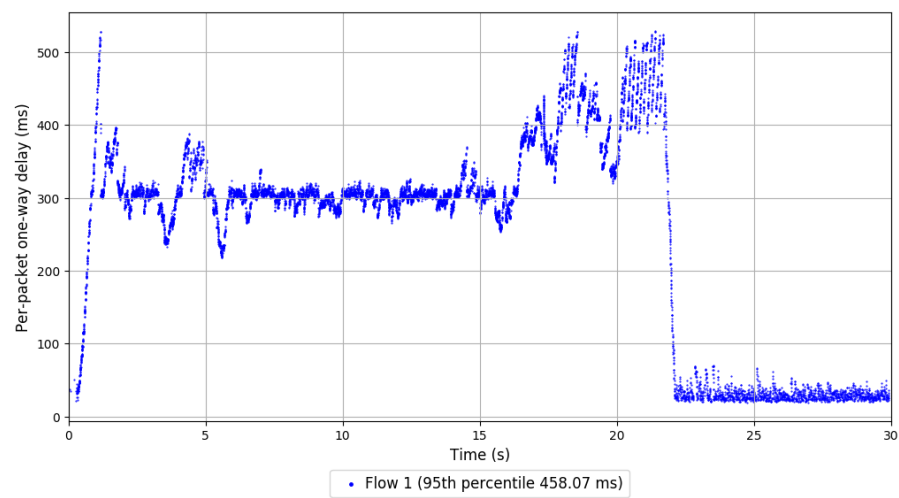
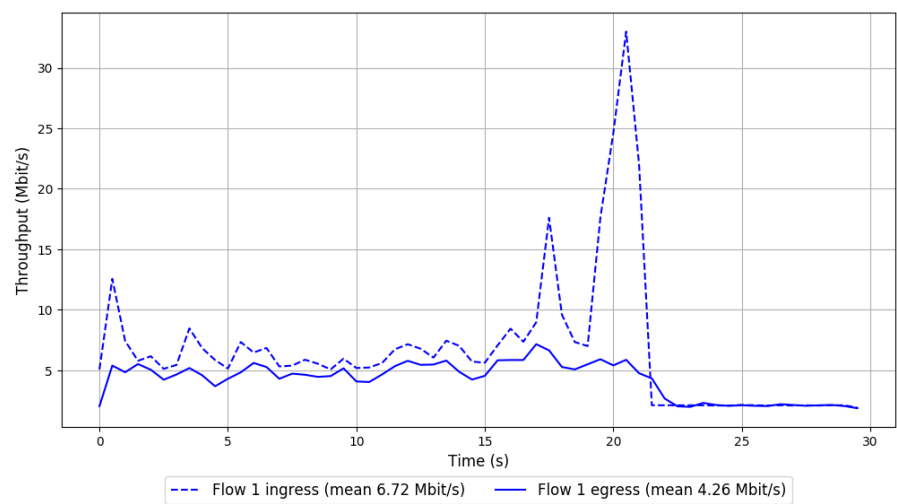
-- Flow 1:

Average throughput: 4.26 Mbit/s

95th percentile per-packet one-way delay: 458.070 ms

Loss rate: 36.76%

Run 2: Report of FillP — Data Link

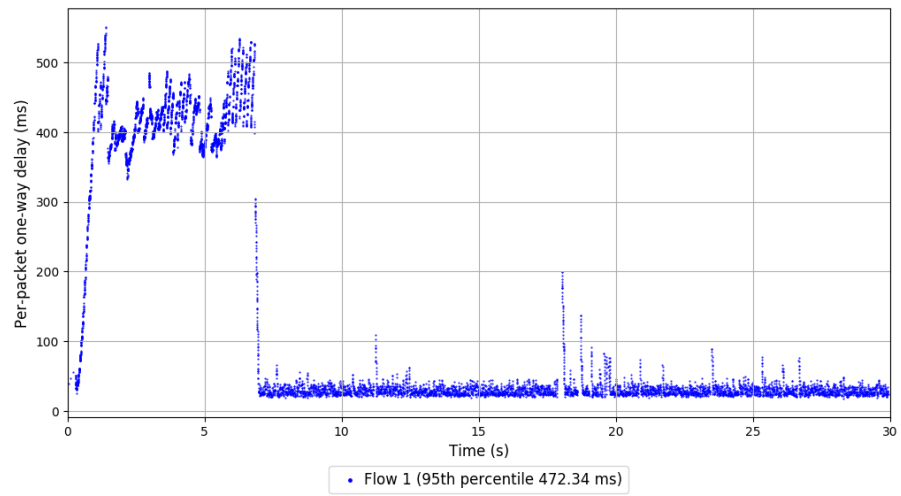
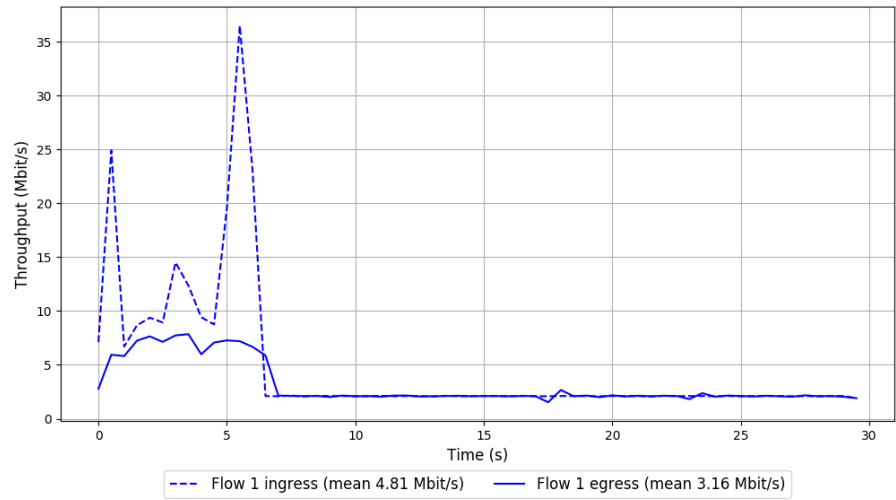


Run 3: Statistics of FillP

Start at: 2018-04-16 21:43:27
End at: 2018-04-16 21:43:57
Local clock offset: -1.141 ms
Remote clock offset: -2.993 ms

Below is generated by plot.py at 2018-04-16 23:01:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.16 Mbit/s
95th percentile per-packet one-way delay: 472.342 ms
Loss rate: 34.57%
-- Flow 1:
Average throughput: 3.16 Mbit/s
95th percentile per-packet one-way delay: 472.342 ms
Loss rate: 34.57%

Run 3: Report of FillP — Data Link



Run 1: Statistics of Indigo-1-32

Start at: 2018-04-16 20:47:14

End at: 2018-04-16 20:47:44

Local clock offset: 0.692 ms

Remote clock offset: 14.024 ms

Below is generated by plot.py at 2018-04-16 23:01:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.90 Mbit/s

95th percentile per-packet one-way delay: 93.612 ms

Loss rate: 0.22%

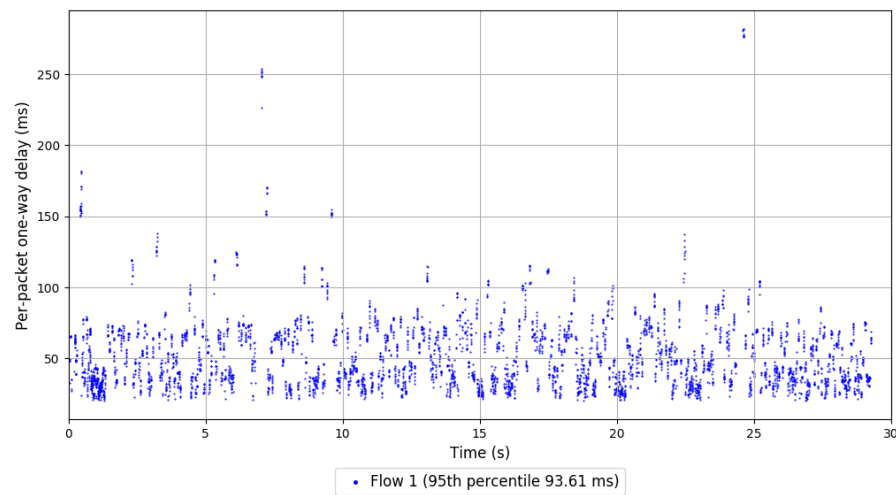
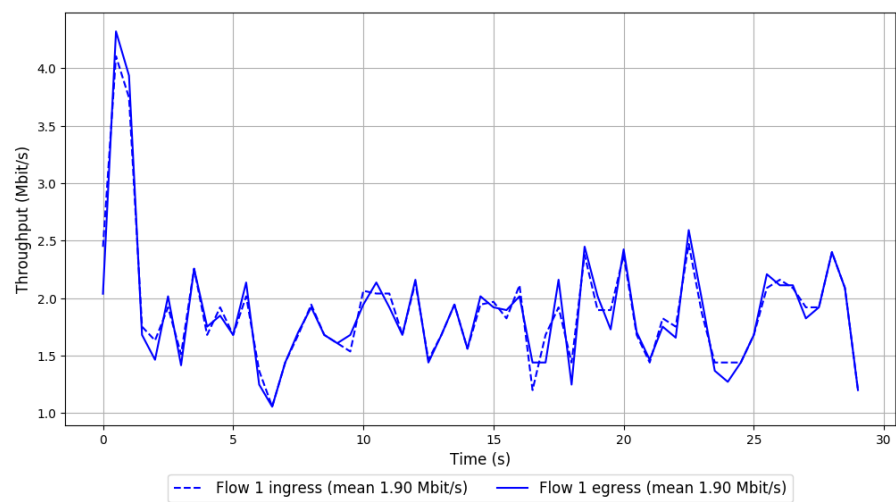
-- Flow 1:

Average throughput: 1.90 Mbit/s

95th percentile per-packet one-way delay: 93.612 ms

Loss rate: 0.22%

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



Run 2: Statistics of Indigo-1-32

Start at: 2018-04-16 21:09:27

End at: 2018-04-16 21:09:57

Local clock offset: -0.184 ms

Remote clock offset: 5.092 ms

Below is generated by plot.py at 2018-04-16 23:01:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.81 Mbit/s

95th percentile per-packet one-way delay: 106.972 ms

Loss rate: 0.35%

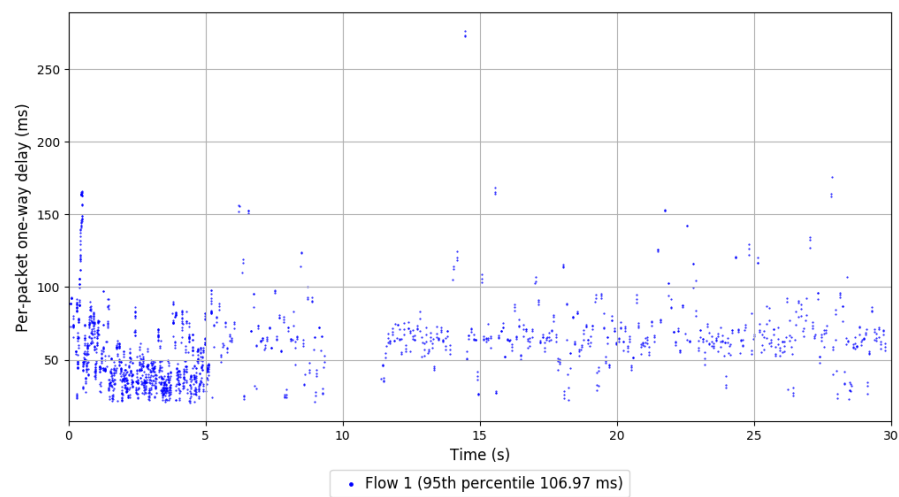
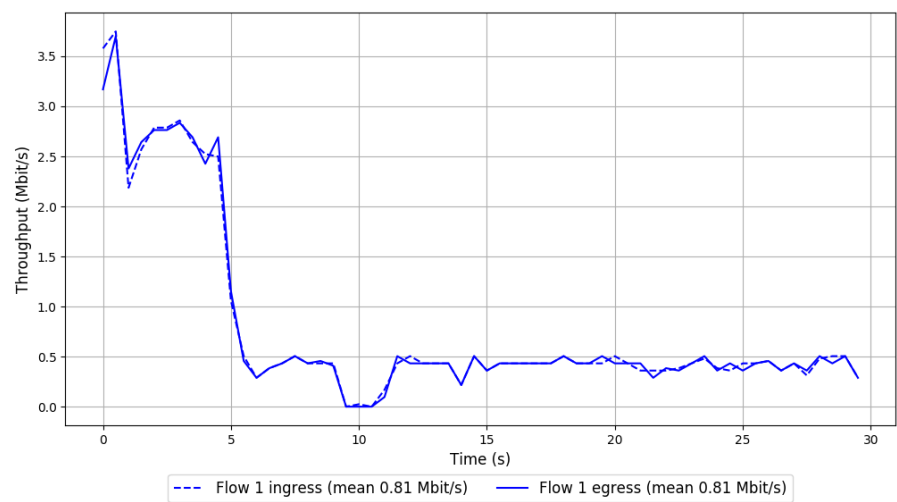
-- Flow 1:

Average throughput: 0.81 Mbit/s

95th percentile per-packet one-way delay: 106.972 ms

Loss rate: 0.35%

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



Run 3: Statistics of Indigo-1-32

Start at: 2018-04-16 21:31:41

End at: 2018-04-16 21:32:11

Local clock offset: -0.953 ms

Remote clock offset: 1.274 ms

Below is generated by plot.py at 2018-04-16 23:01:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.89 Mbit/s

95th percentile per-packet one-way delay: 105.113 ms

Loss rate: 0.94%

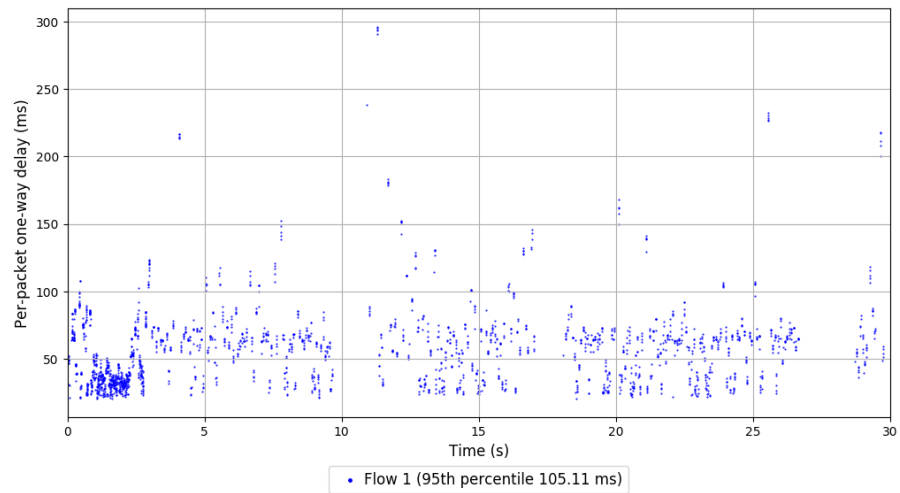
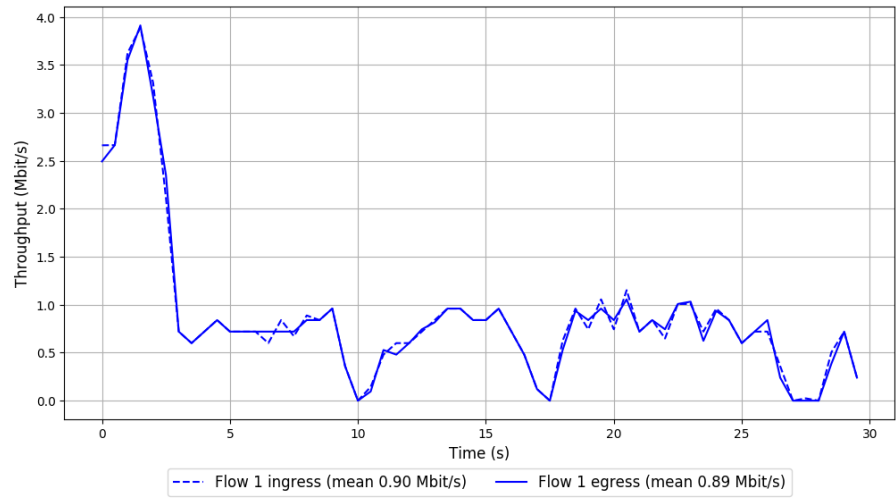
-- Flow 1:

Average throughput: 0.89 Mbit/s

95th percentile per-packet one-way delay: 105.113 ms

Loss rate: 0.94%

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



Run 1: Statistics of PCC-Vivace

Start at: 2018-04-16 21:05:31

End at: 2018-04-16 21:06:01

Local clock offset: 0.056 ms

Remote clock offset: 9.599 ms

Below is generated by plot.py at 2018-04-16 23:01:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.52 Mbit/s

95th percentile per-packet one-way delay: 82.308 ms

Loss rate: 0.50%

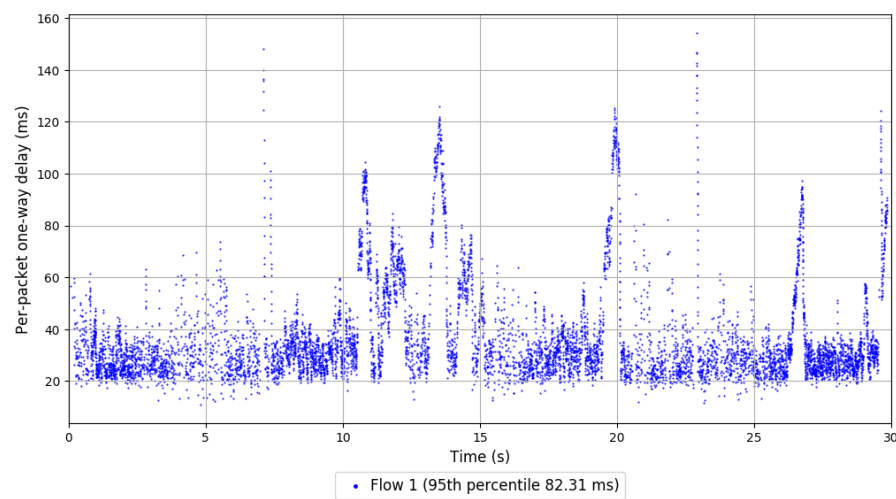
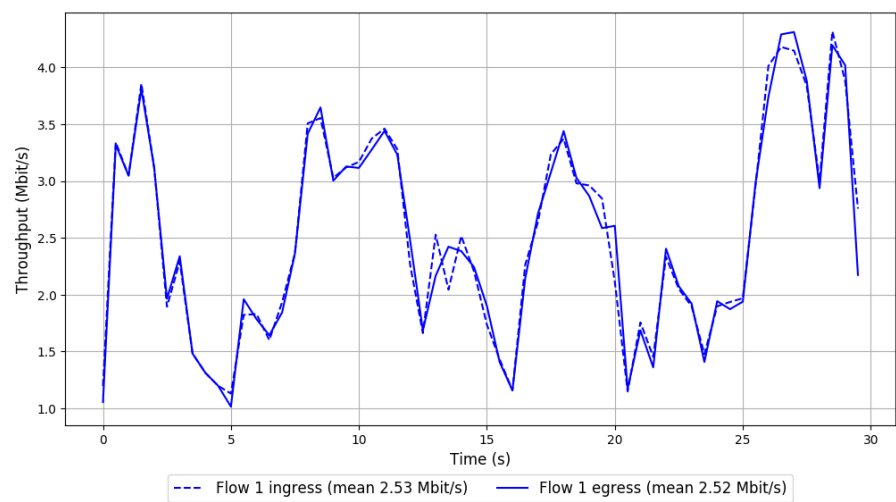
-- Flow 1:

Average throughput: 2.52 Mbit/s

95th percentile per-packet one-way delay: 82.308 ms

Loss rate: 0.50%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-04-16 21:27:46

End at: 2018-04-16 21:28:16

Local clock offset: -0.75 ms

Remote clock offset: 0.908 ms

Below is generated by plot.py at 2018-04-16 23:01:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 43.745 ms

Loss rate: 0.14%

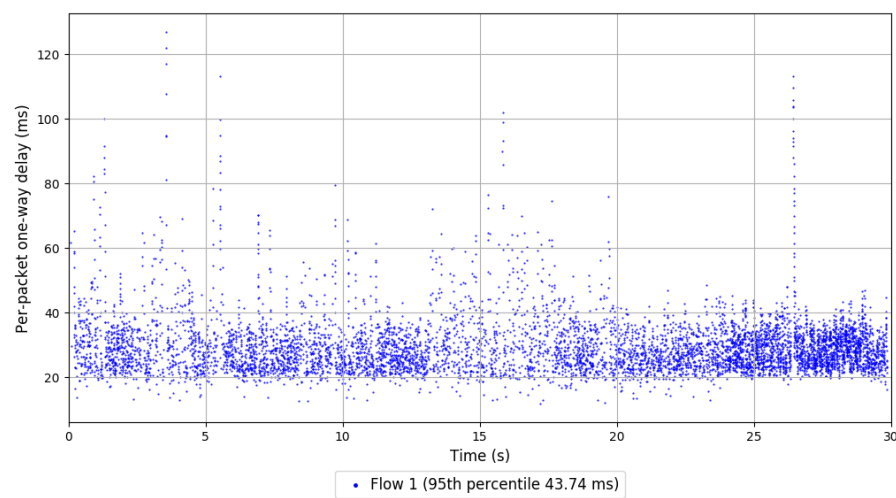
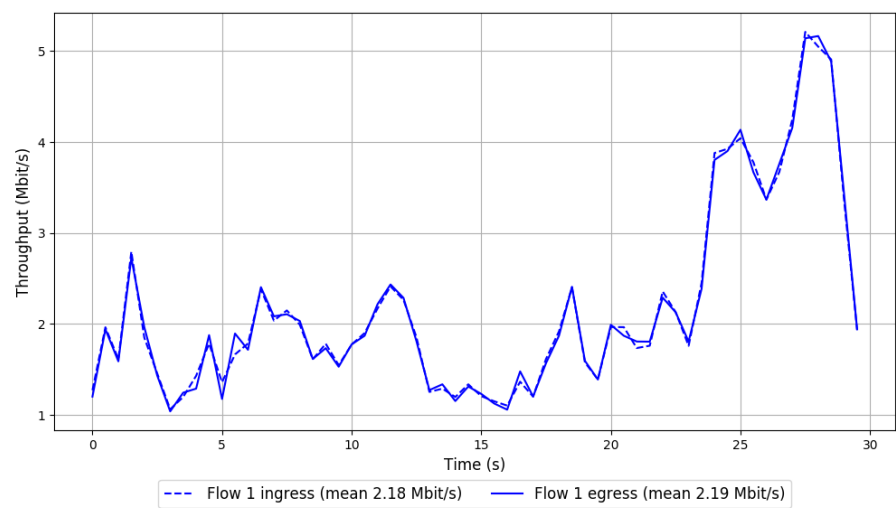
-- Flow 1:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 43.745 ms

Loss rate: 0.14%

Run 2: Report of PCC-Vivace — Data Link

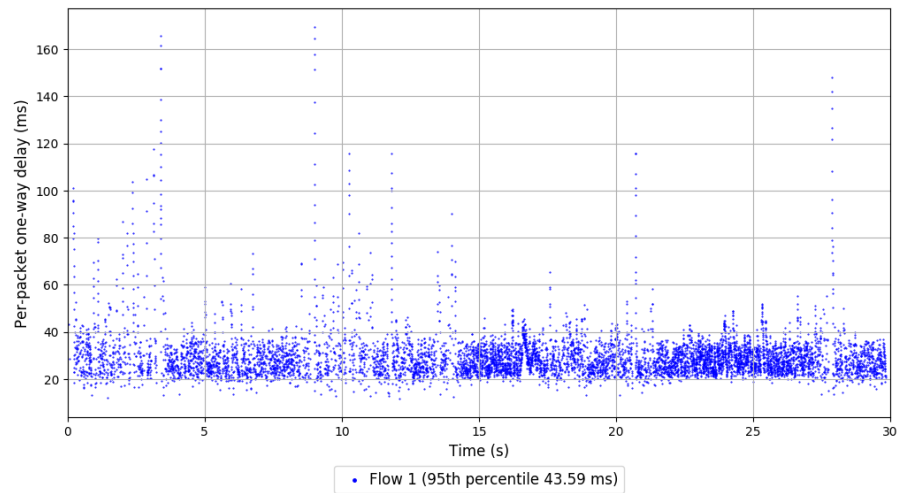
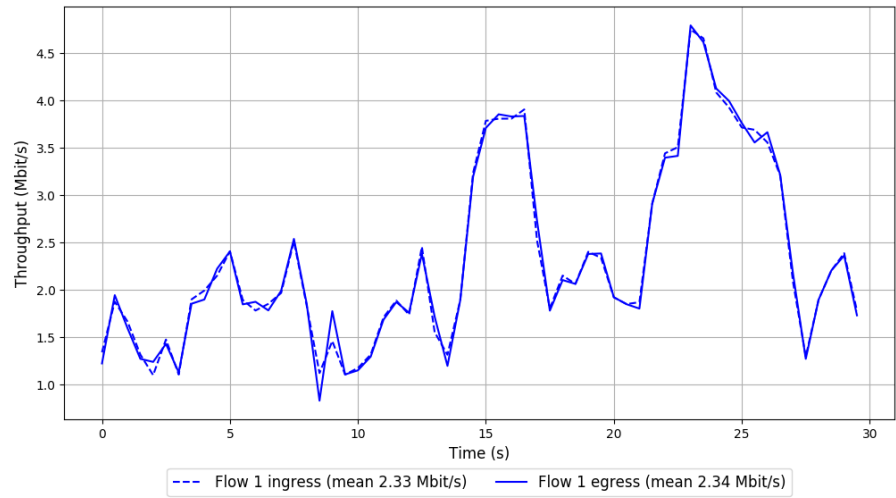


Run 3: Statistics of PCC-Vivace

Start at: 2018-04-16 21:50:00
End at: 2018-04-16 21:50:30
Local clock offset: -1.292 ms
Remote clock offset: -3.929 ms

Below is generated by plot.py at 2018-04-16 23:01:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 43.589 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 43.589 ms
Loss rate: 0.12%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2018-04-16 20:57:41
End at: 2018-04-16 20:58:11
Local clock offset: 0.343 ms
Remote clock offset: 18.838 ms

Run 1: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of PCC-Expr

Start at: 2018-04-16 21:19:54

End at: 2018-04-16 21:20:24

Local clock offset: -0.454 ms

Remote clock offset: 0.896 ms

Run 2: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of PCC-Expr

Start at: 2018-04-16 21:42:09

End at: 2018-04-16 21:42:39

Local clock offset: -1.131 ms

Remote clock offset: -2.612 ms

Run 3: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing