

Pantheon Report

Generated at 2017-12-05 07:57:52 (UTC).

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

Repeated the test of 14 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).

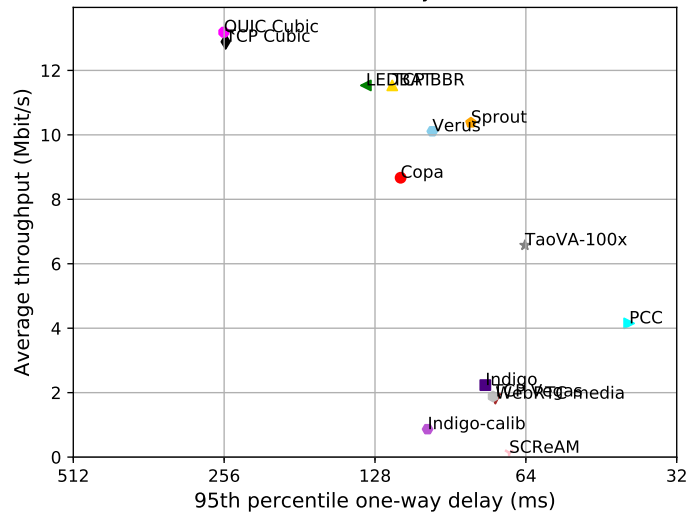
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

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

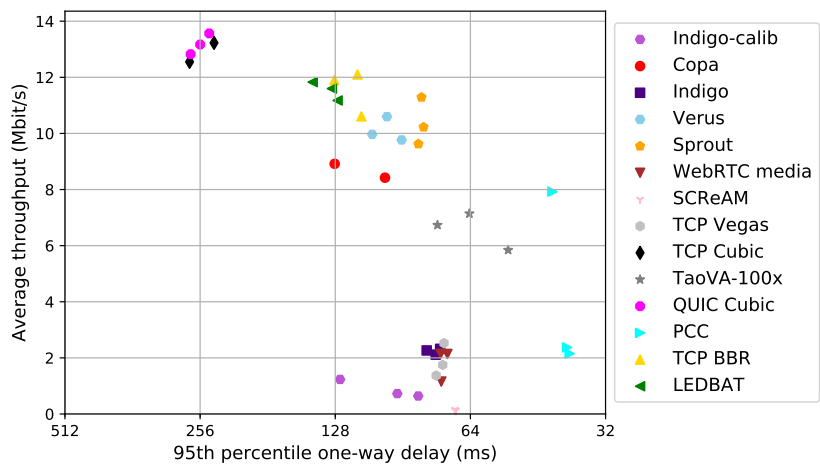
Git summary:

```
branch: indigos @ e3a57ad5ac5cfcaca0e3f983c8dd4cc3509e0262
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/genericCC @ b5b7c38e8391001927dc41c6cfa2627d03dde737
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-cellular @ aee99e8eb842cb053f8c9a80e28cd256a930bbc2
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/indigo-no-cwnd @ 3e58442c04028a11d7b02456e137604633ba2d6c
third_party/indigo-no-delivery-rate @ 57caa40858b964906edff4876d5a7e5bfff666c5
third_party/indigo-no-queuing-delay @ 03455460fd1a8ffbdad86fab936fdca204b80db
third_party/indigo-no-send-rate @ b39dfa6b2c5f19cb7cd89626cb4f5bb81f9fecda
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ baf443516dea3eeddeccaf9b916cc313273ca4f4
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 @ f1a14bffe749737437f61b1eaaeb30b267cde681
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/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

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	11.54	118.24	0.23
TCP Cubic	2	12.89	254.29	0.93
LEDBAT	3	11.53	133.50	0.54
PCC	3	4.15	39.82	0.16
QUIC Cubic	3	13.18	256.35	1.27
SCReAM	3	0.14	69.12	0.39
WebRTC media	3	1.81	73.63	0.27
Sprout	3	10.38	82.40	0.92
TaoVA-100x	3	6.57	64.28	0.75
TCP Vegas	3	1.88	74.44	0.08
Verus	3	10.11	98.38	9.47
Copa	2	8.67	113.79	0.33
Indigo	3	2.23	77.10	0.15
Indigo-calib	3	0.87	100.53	0.21

Run 1: Statistics of TCP BBR

Start at: 2017-12-05 06:27:33

End at: 2017-12-05 06:28:03

Local clock offset: 4.198 ms

Remote clock offset: -3.007 ms

Below is generated by plot.py at 2017-12-05 07:57:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.61 Mbit/s

95th percentile per-packet one-way delay: 111.942 ms

Loss rate: 0.33%

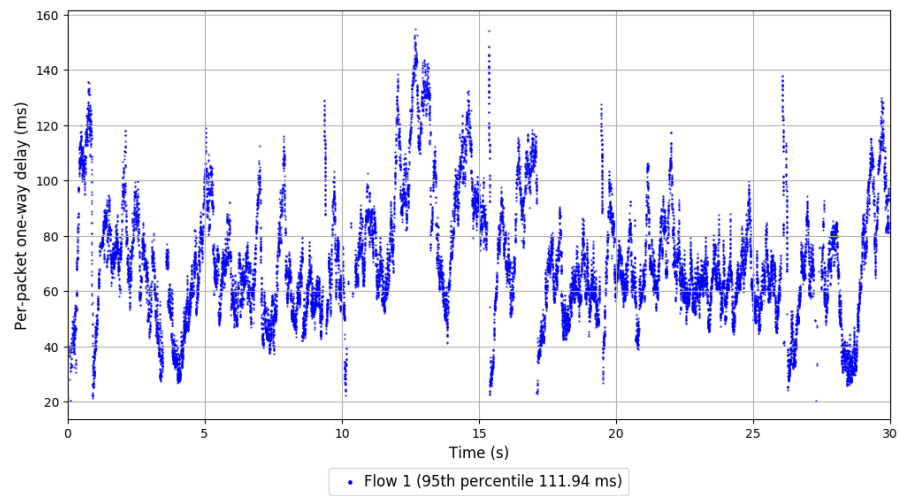
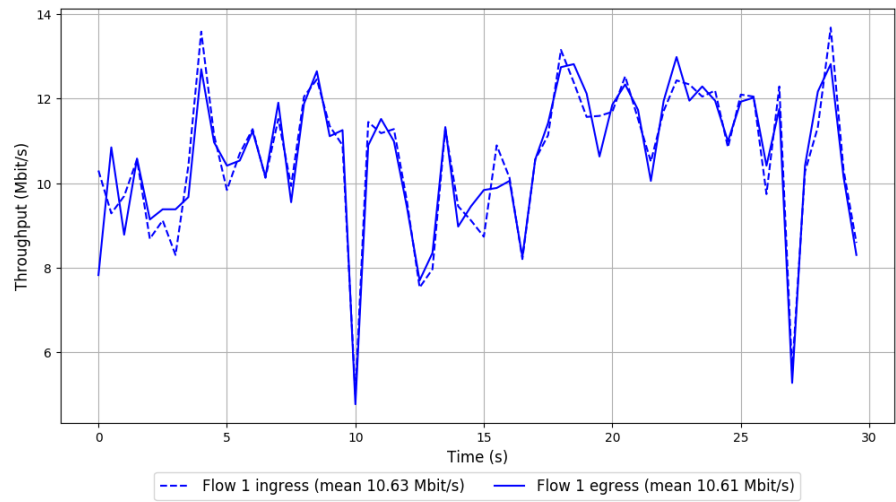
-- Flow 1:

Average throughput: 10.61 Mbit/s

95th percentile per-packet one-way delay: 111.942 ms

Loss rate: 0.33%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2017-12-05 06:44:02

End at: 2017-12-05 06:44:32

Local clock offset: 3.249 ms

Remote clock offset: -3.074 ms

Below is generated by plot.py at 2017-12-05 07:57:05

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.90 Mbit/s

95th percentile per-packet one-way delay: 128.586 ms

Loss rate: 0.30%

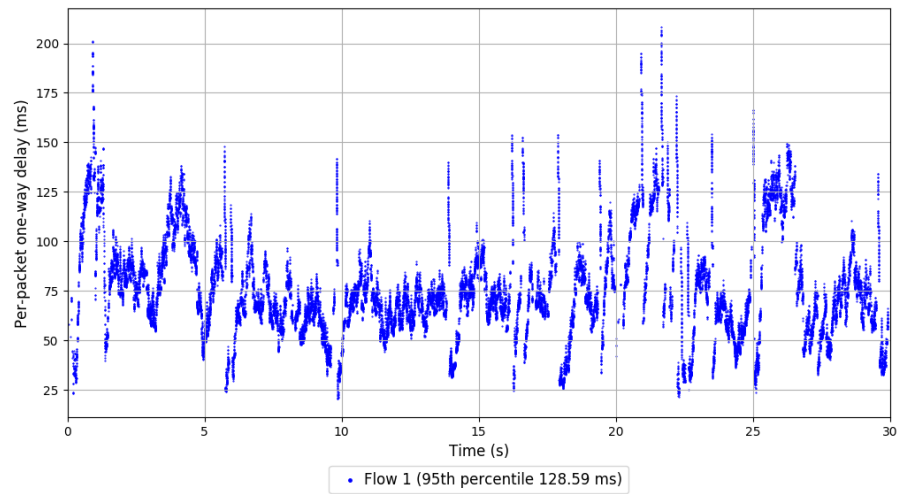
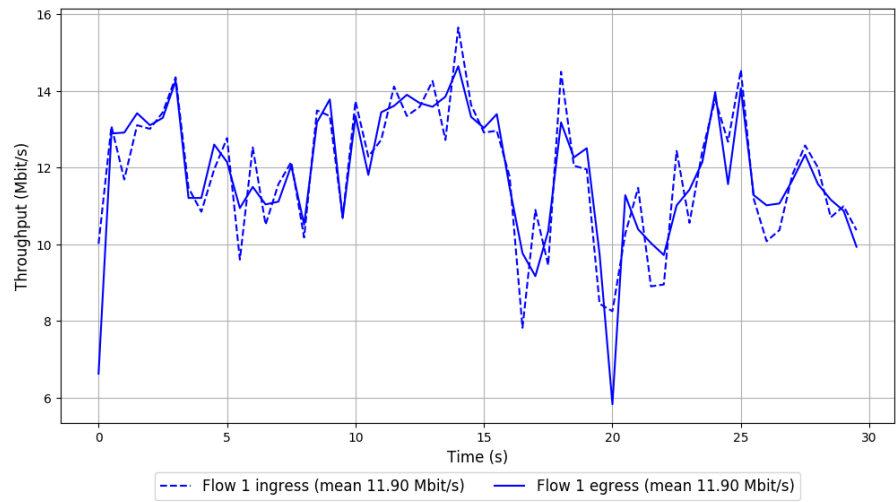
-- Flow 1:

Average throughput: 11.90 Mbit/s

95th percentile per-packet one-way delay: 128.586 ms

Loss rate: 0.30%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2017-12-05 07:00:30

End at: 2017-12-05 07:01:00

Local clock offset: 3.976 ms

Remote clock offset: -2.766 ms

Below is generated by plot.py at 2017-12-05 07:57:05

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.10 Mbit/s

95th percentile per-packet one-way delay: 114.196 ms

Loss rate: 0.07%

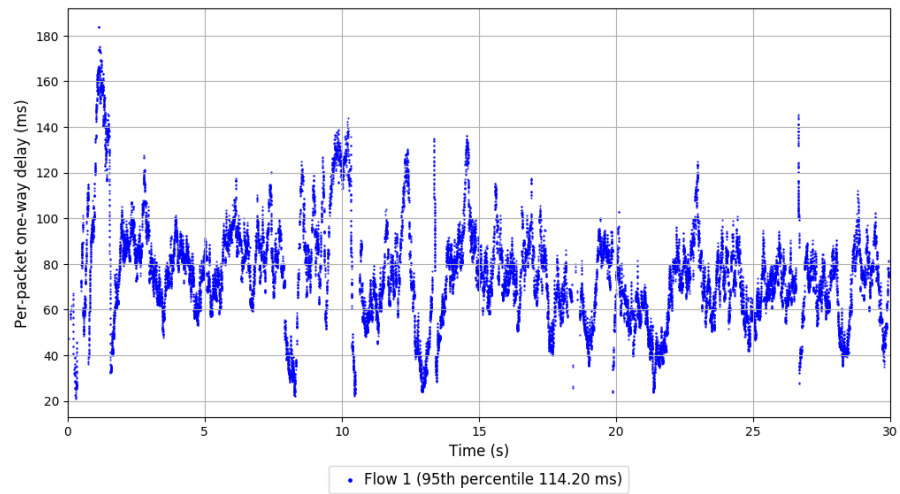
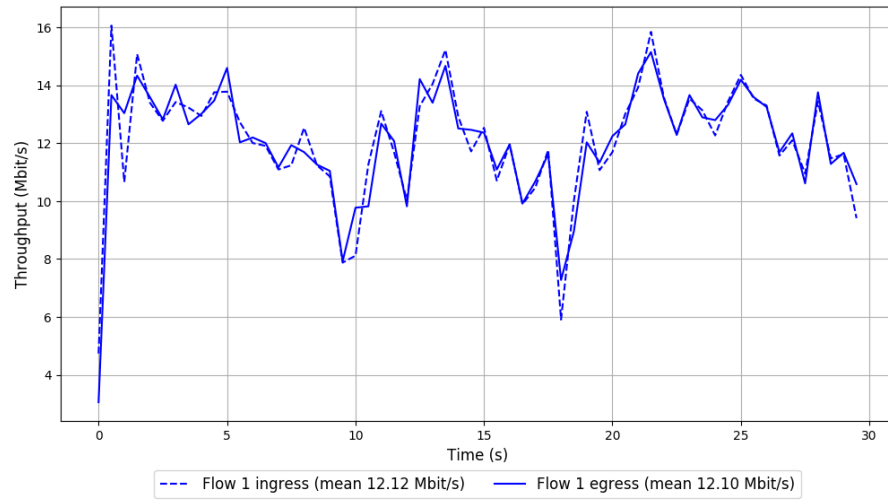
-- Flow 1:

Average throughput: 12.10 Mbit/s

95th percentile per-packet one-way delay: 114.196 ms

Loss rate: 0.07%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

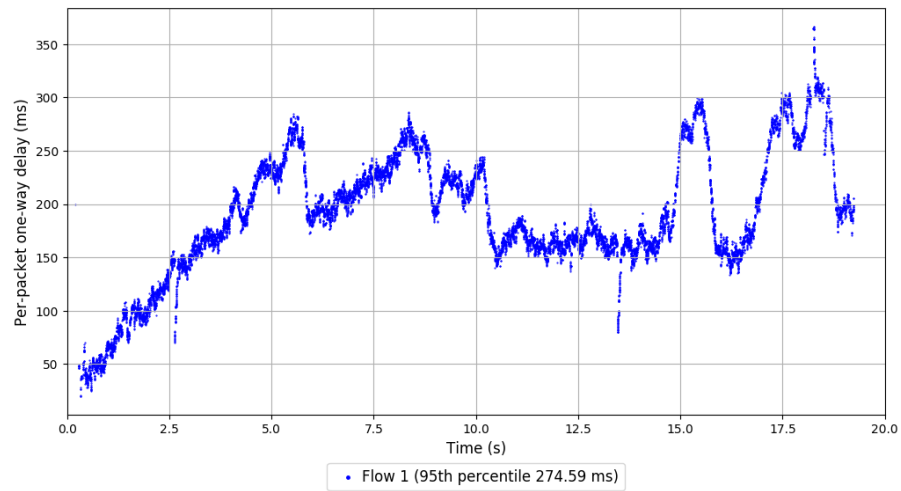
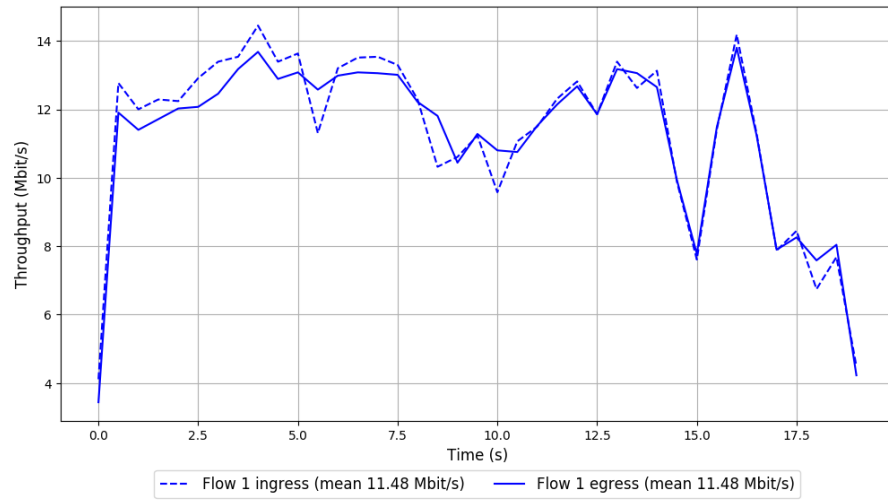
Start at: 2017-12-05 06:31:05

End at: 2017-12-05 06:31:35

Local clock offset: 3.79 ms

Remote clock offset: -2.969 ms

Run 1: Report of TCP Cubic — Data Link

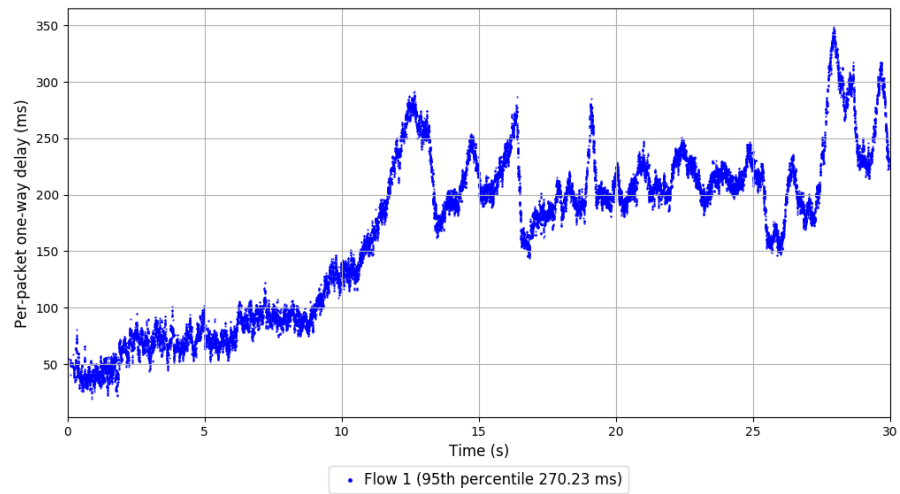
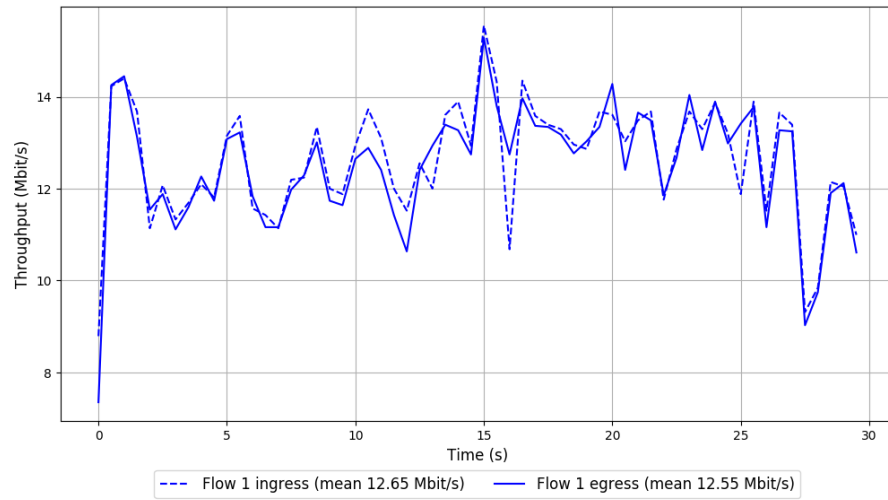


Run 2: Statistics of TCP Cubic

Start at: 2017-12-05 06:47:34
End at: 2017-12-05 06:48:04
Local clock offset: 3.387 ms
Remote clock offset: -3.015 ms

Below is generated by plot.py at 2017-12-05 07:57:06
Datalink statistics
-- Total of 1 flow:
Average throughput: 12.55 Mbit/s
95th percentile per-packet one-way delay: 270.226 ms
Loss rate: 0.99%
-- Flow 1:
Average throughput: 12.55 Mbit/s
95th percentile per-packet one-way delay: 270.226 ms
Loss rate: 0.99%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2017-12-05 07:04:02

End at: 2017-12-05 07:04:32

Local clock offset: 4.008 ms

Remote clock offset: -2.66 ms

Below is generated by plot.py at 2017-12-05 07:57:07

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.23 Mbit/s

95th percentile per-packet one-way delay: 238.349 ms

Loss rate: 0.87%

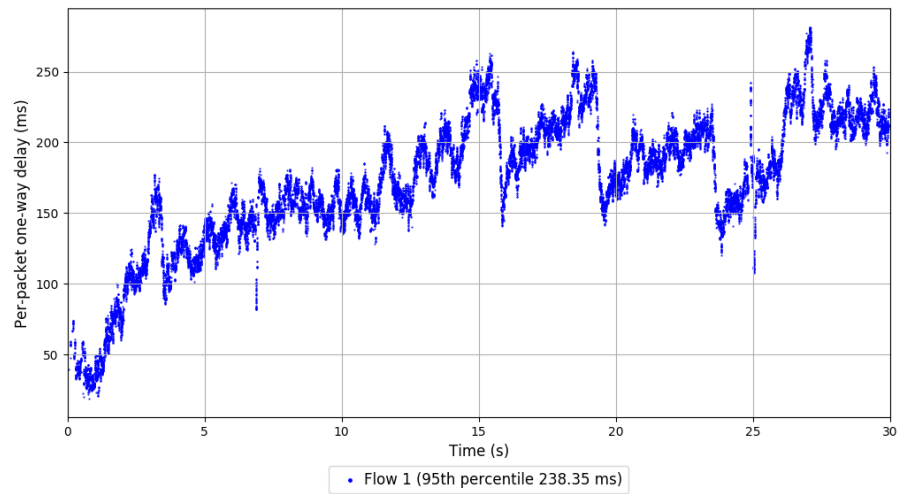
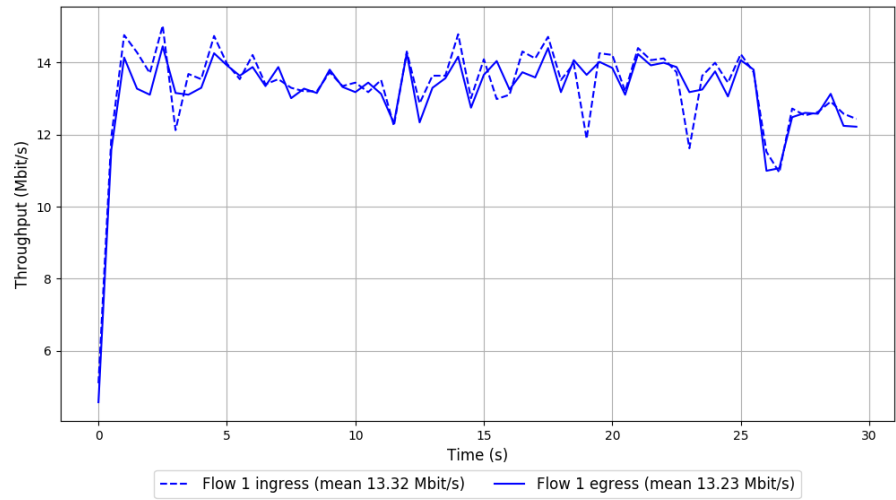
-- Flow 1:

Average throughput: 13.23 Mbit/s

95th percentile per-packet one-way delay: 238.349 ms

Loss rate: 0.87%

Run 3: Report of TCP Cubic — Data Link

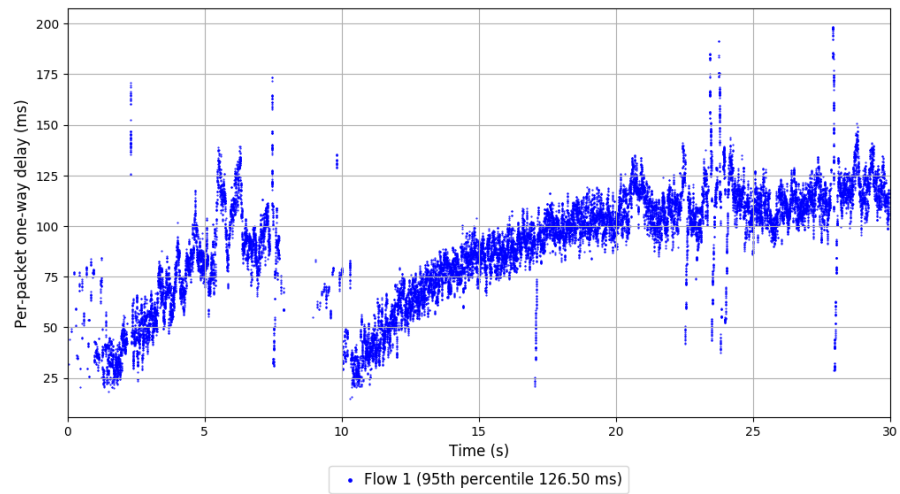
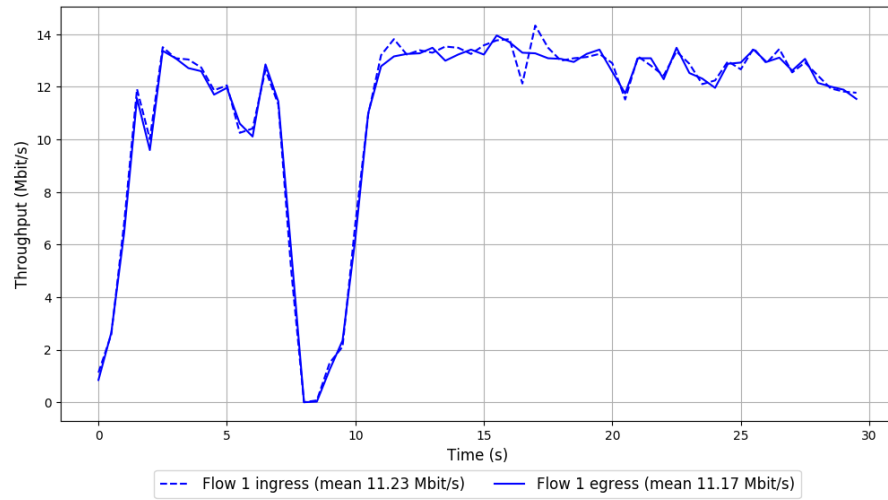


Run 1: Statistics of LEDBAT

Start at: 2017-12-05 06:26:22
End at: 2017-12-05 06:26:52
Local clock offset: 4.327 ms
Remote clock offset: -3.005 ms

Below is generated by plot.py at 2017-12-05 07:57:07
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.17 Mbit/s
95th percentile per-packet one-way delay: 126.499 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 11.17 Mbit/s
95th percentile per-packet one-way delay: 126.499 ms
Loss rate: 0.64%

Run 1: Report of LEDBAT — Data Link

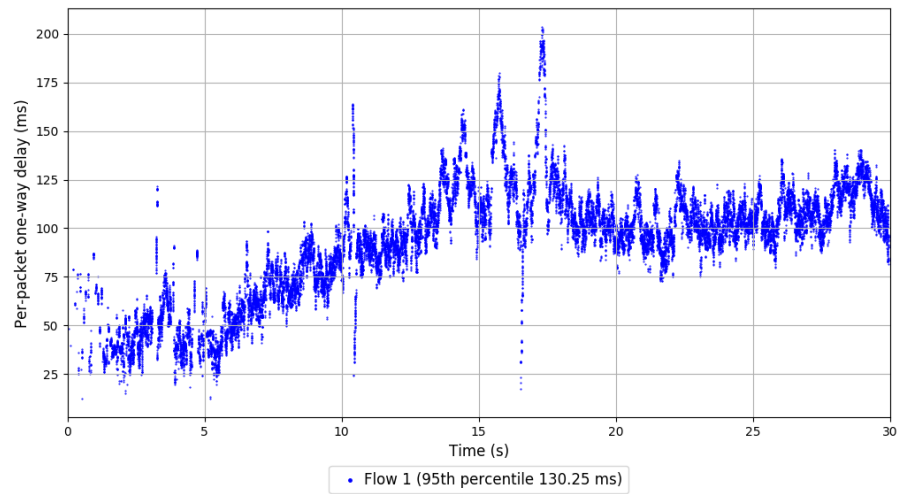
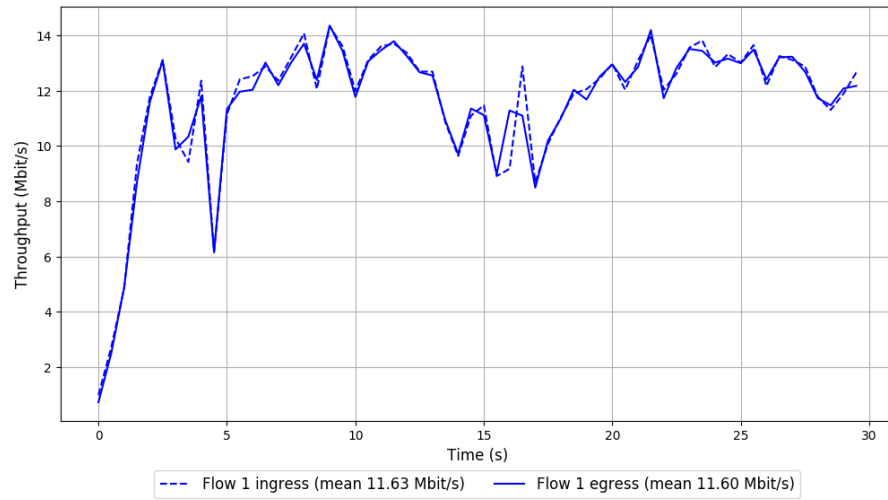


Run 2: Statistics of LEDBAT

Start at: 2017-12-05 06:42:51
End at: 2017-12-05 06:43:21
Local clock offset: 3.269 ms
Remote clock offset: -3.063 ms

Below is generated by plot.py at 2017-12-05 07:57:07
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.60 Mbit/s
95th percentile per-packet one-way delay: 130.254 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 11.60 Mbit/s
95th percentile per-packet one-way delay: 130.254 ms
Loss rate: 0.50%

Run 2: Report of LEDBAT — Data Link

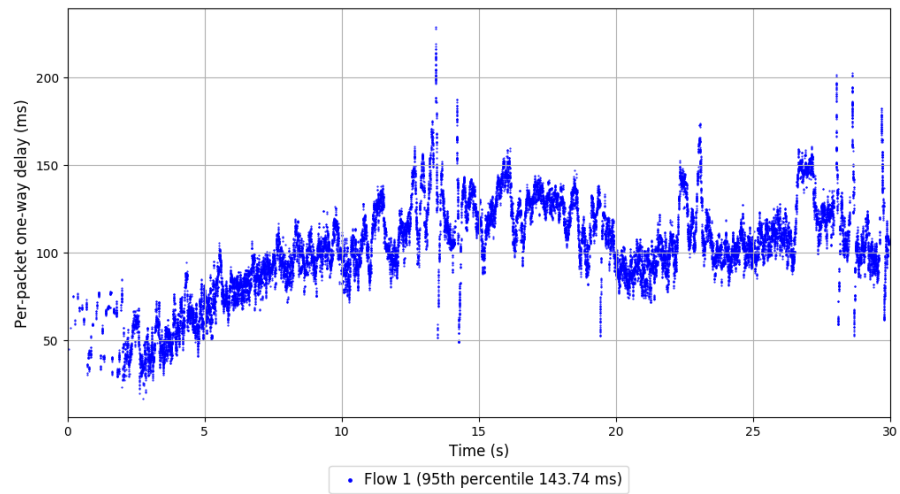
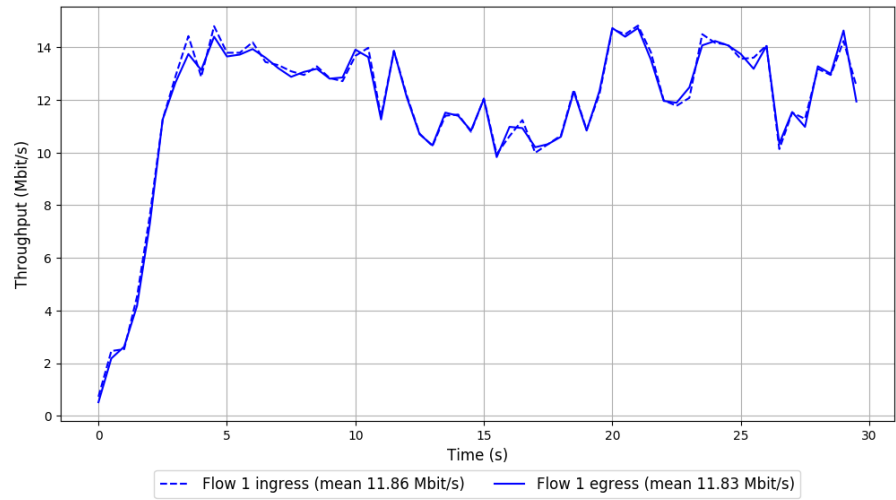


Run 3: Statistics of LEDBAT

Start at: 2017-12-05 06:59:19
End at: 2017-12-05 06:59:49
Local clock offset: 4.105 ms
Remote clock offset: -2.745 ms

Below is generated by plot.py at 2017-12-05 07:57:17
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.83 Mbit/s
95th percentile per-packet one-way delay: 143.738 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 11.83 Mbit/s
95th percentile per-packet one-way delay: 143.738 ms
Loss rate: 0.48%

Run 3: Report of LEDBAT — Data Link

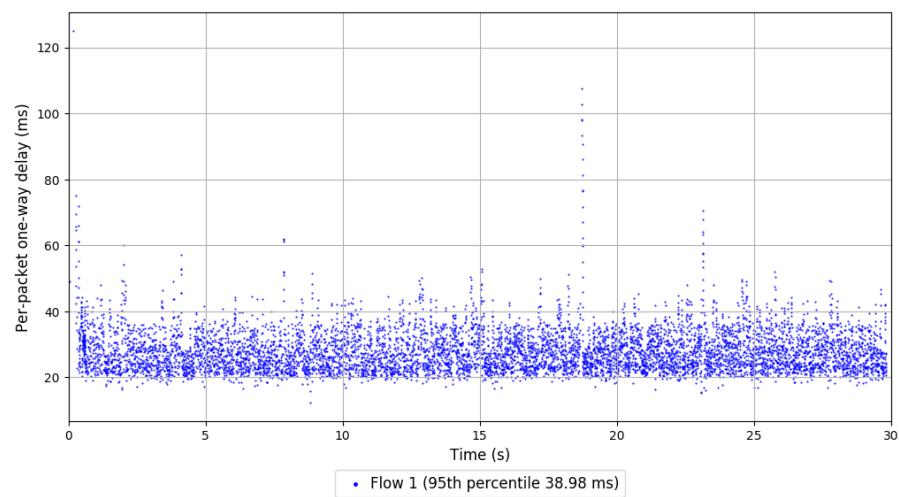
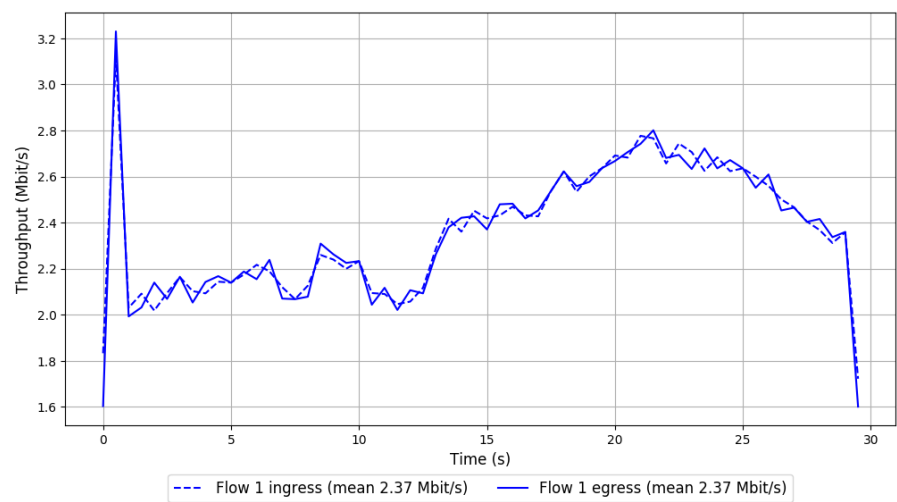


Run 1: Statistics of PCC

Start at: 2017-12-05 06:25:12
End at: 2017-12-05 06:25:42
Local clock offset: 4.676 ms
Remote clock offset: -2.989 ms

Below is generated by plot.py at 2017-12-05 07:57:17
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 38.977 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 38.977 ms
Loss rate: 0.15%

Run 1: Report of PCC — Data Link

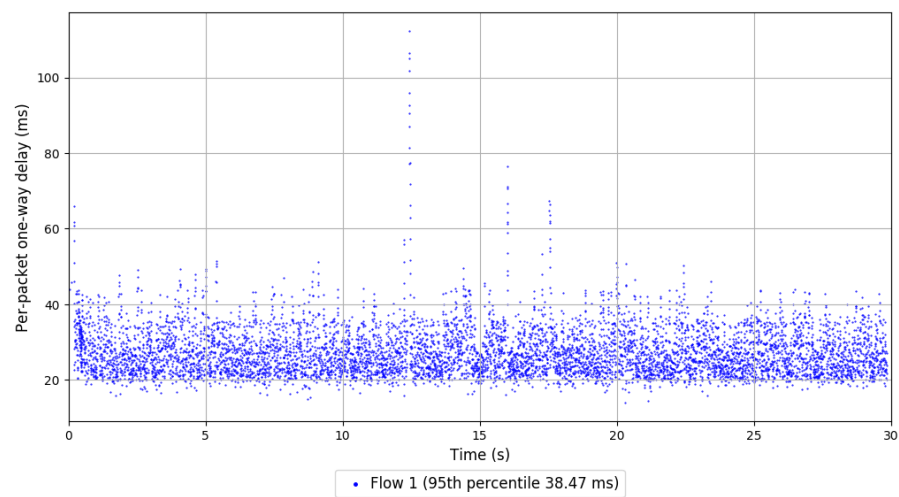
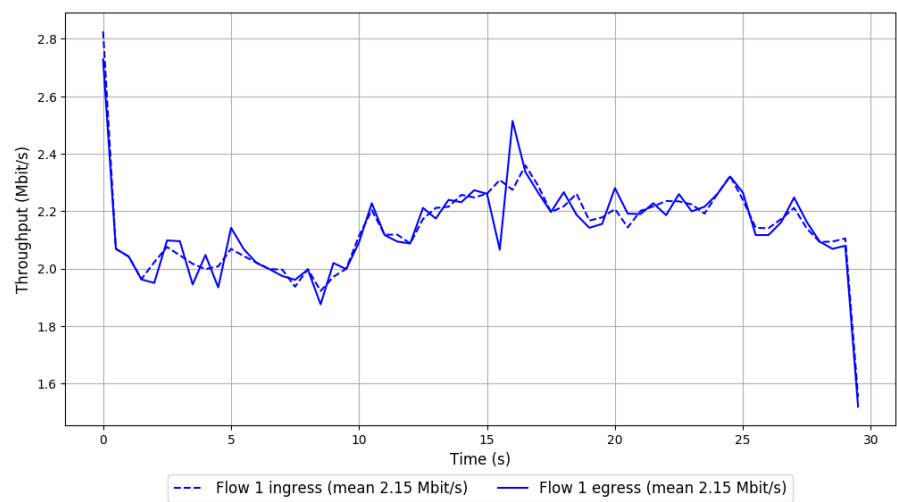


Run 2: Statistics of PCC

Start at: 2017-12-05 06:41:40
End at: 2017-12-05 06:42:11
Local clock offset: 3.269 ms
Remote clock offset: -3.002 ms

Below is generated by plot.py at 2017-12-05 07:57:17
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 38.470 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 38.470 ms
Loss rate: 0.14%

Run 2: Report of PCC — Data Link

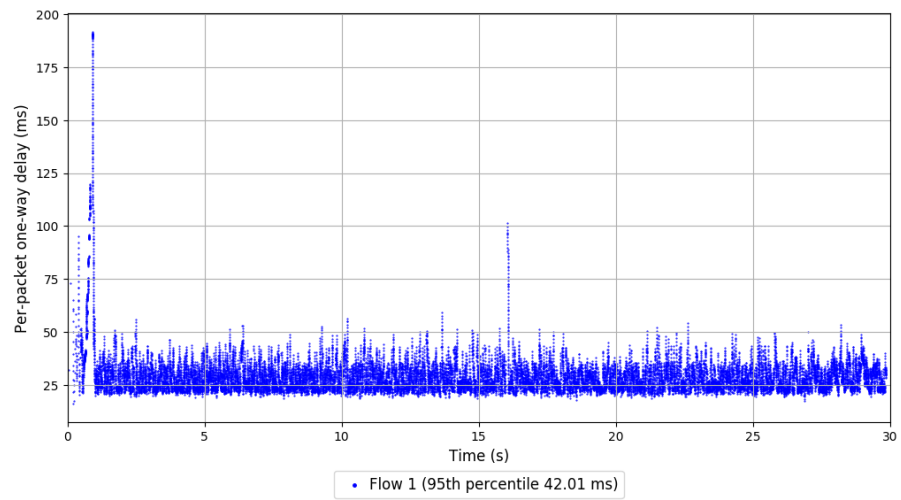
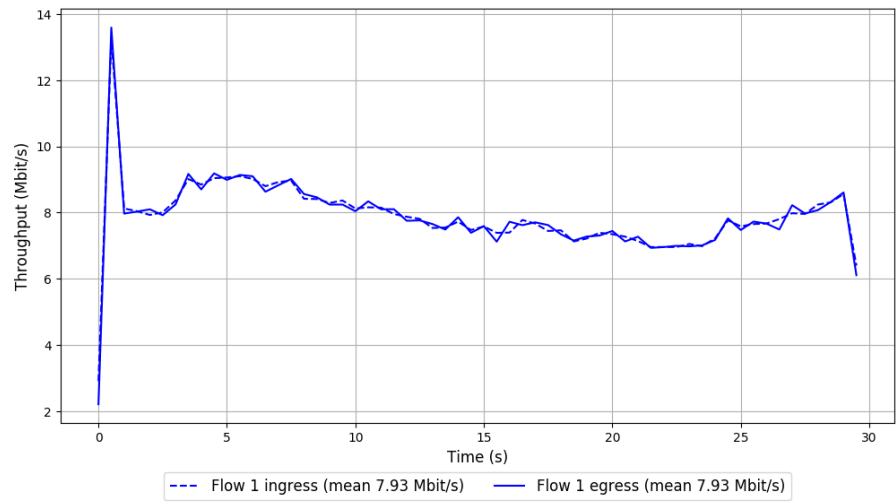


Run 3: Statistics of PCC

Start at: 2017-12-05 06:58:09
End at: 2017-12-05 06:58:39
Local clock offset: 4.003 ms
Remote clock offset: -2.765 ms

Below is generated by plot.py at 2017-12-05 07:57:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 7.93 Mbit/s
95th percentile per-packet one-way delay: 42.009 ms
Loss rate: 0.18%
-- Flow 1:
Average throughput: 7.93 Mbit/s
95th percentile per-packet one-way delay: 42.009 ms
Loss rate: 0.18%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2017-12-05 06:22:51

End at: 2017-12-05 06:23:21

Local clock offset: 4.617 ms

Remote clock offset: -2.944 ms

Below is generated by plot.py at 2017-12-05 07:57:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.82 Mbit/s

95th percentile per-packet one-way delay: 268.800 ms

Loss rate: 1.42%

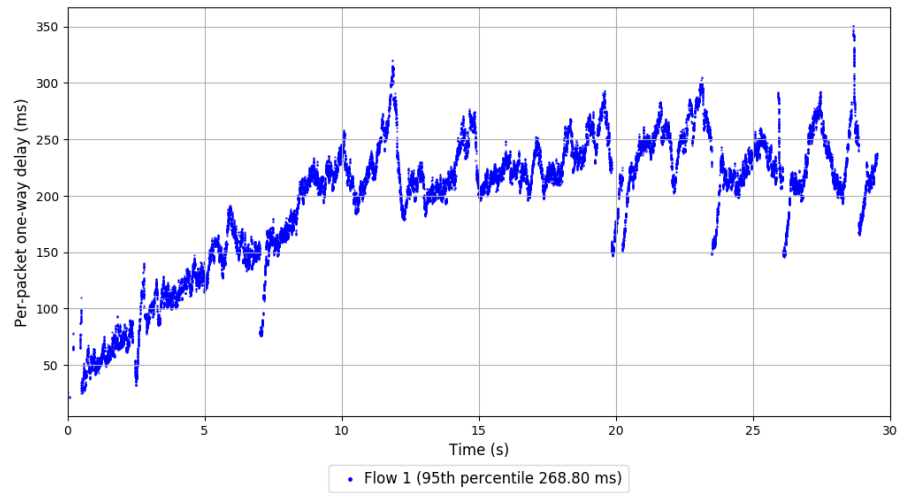
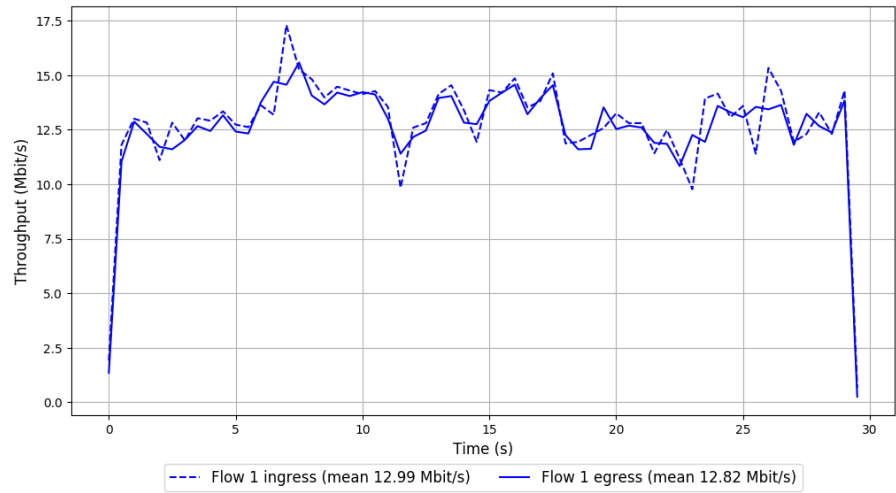
-- Flow 1:

Average throughput: 12.82 Mbit/s

95th percentile per-packet one-way delay: 268.800 ms

Loss rate: 1.42%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2017-12-05 06:39:20

End at: 2017-12-05 06:39:50

Local clock offset: 3.57 ms

Remote clock offset: -3.068 ms

Below is generated by plot.py at 2017-12-05 07:57:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.17 Mbit/s

95th percentile per-packet one-way delay: 255.937 ms

Loss rate: 1.21%

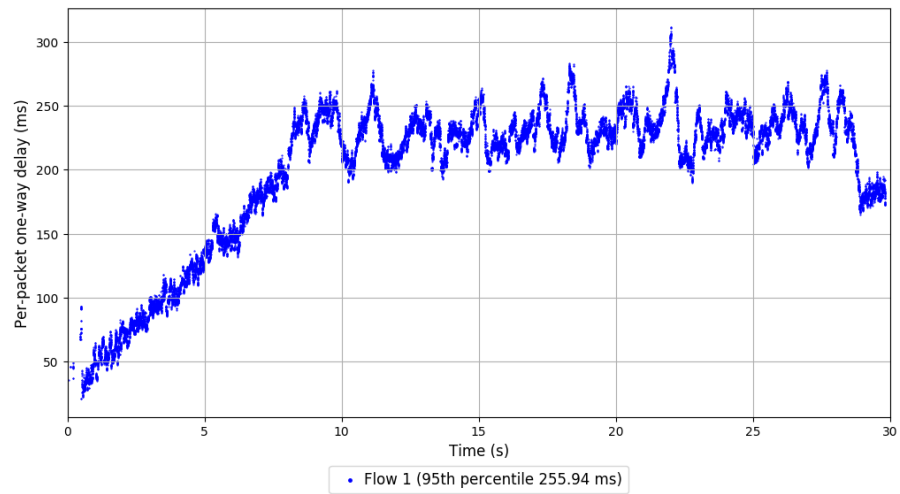
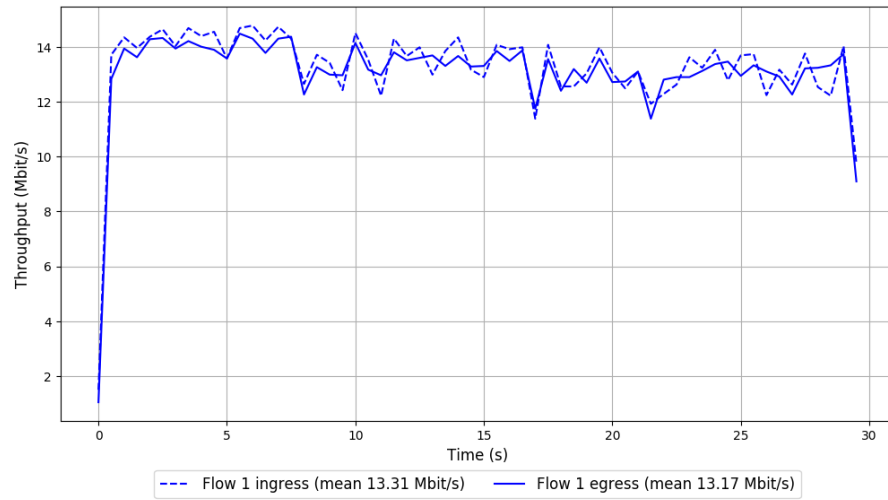
-- Flow 1:

Average throughput: 13.17 Mbit/s

95th percentile per-packet one-way delay: 255.937 ms

Loss rate: 1.21%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2017-12-05 06:55:48

End at: 2017-12-05 06:56:18

Local clock offset: 4.055 ms

Remote clock offset: -2.957 ms

Below is generated by plot.py at 2017-12-05 07:57:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.56 Mbit/s

95th percentile per-packet one-way delay: 244.299 ms

Loss rate: 1.19%

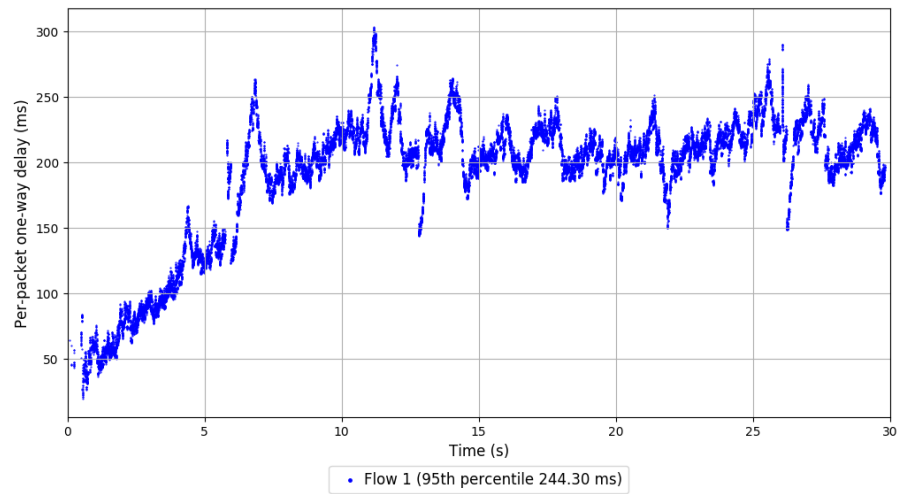
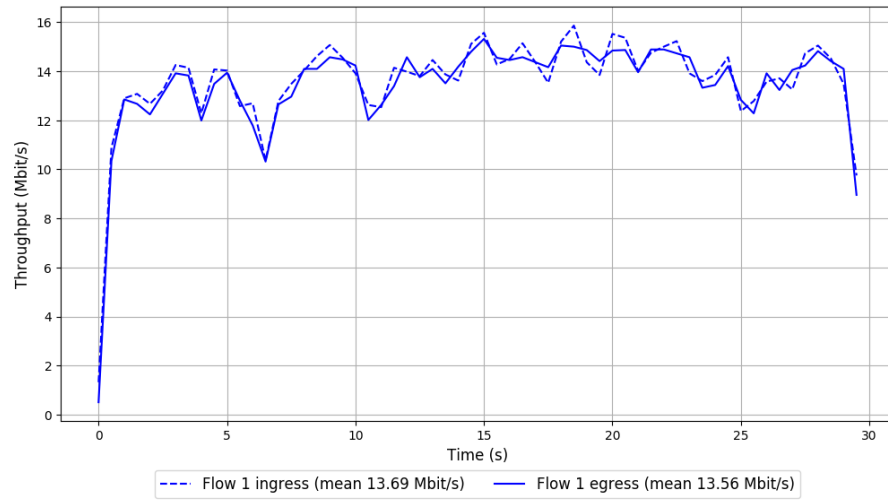
-- Flow 1:

Average throughput: 13.56 Mbit/s

95th percentile per-packet one-way delay: 244.299 ms

Loss rate: 1.19%

Run 3: Report of QUIC Cubic — Data Link

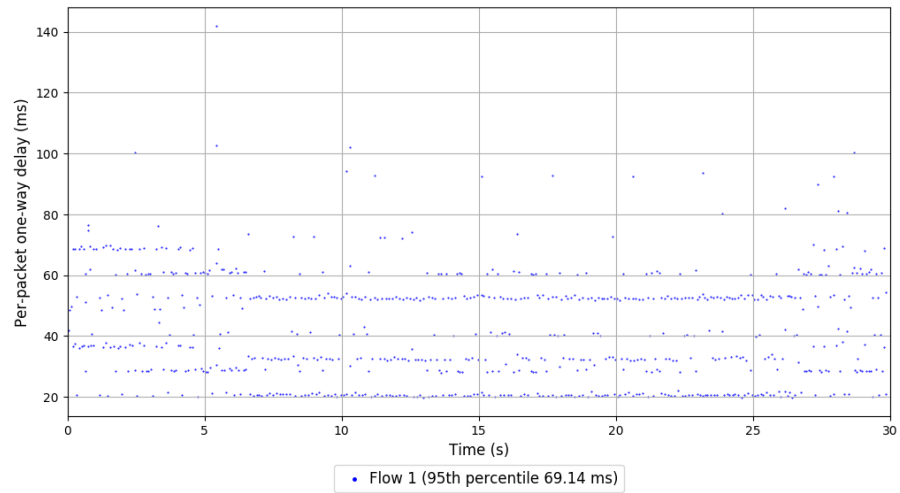
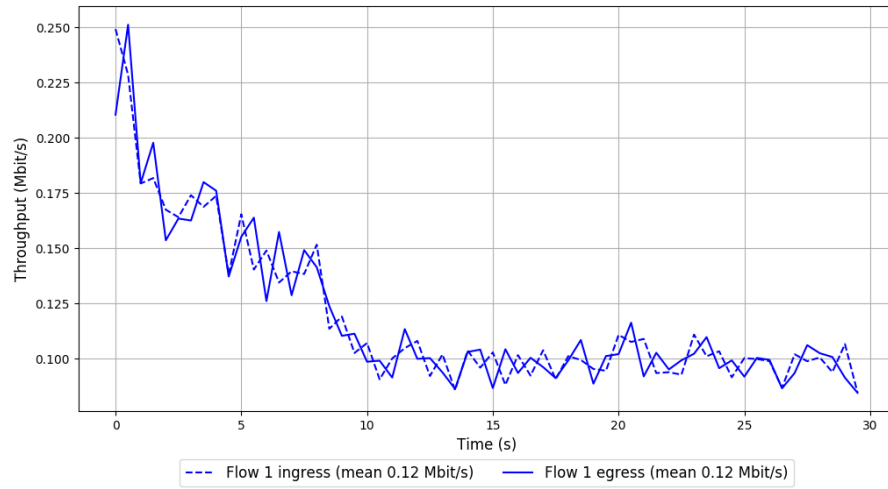


Run 1: Statistics of SCReAM

Start at: 2017-12-05 06:21:40
End at: 2017-12-05 06:22:10
Local clock offset: 4.461 ms
Remote clock offset: -3.052 ms

Below is generated by plot.py at 2017-12-05 07:57:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 69.143 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 69.143 ms
Loss rate: 0.22%

Run 1: Report of SReAM — Data Link

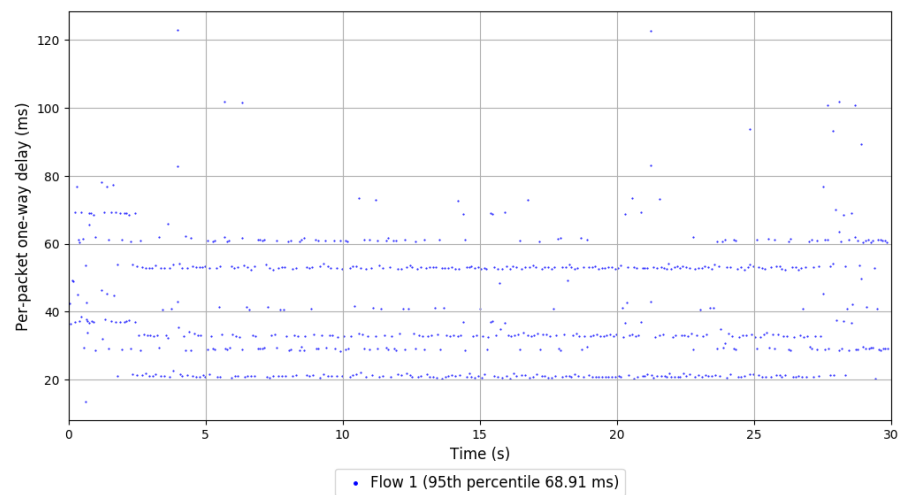
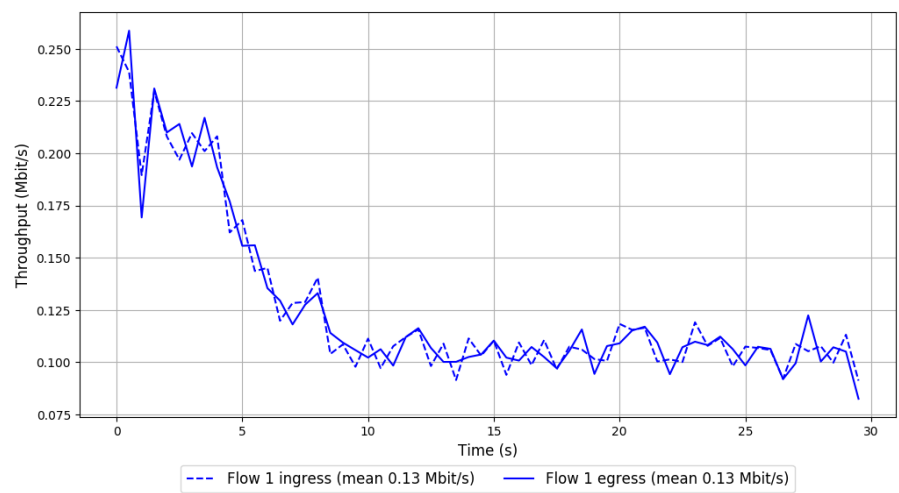


Run 2: Statistics of SCReAM

Start at: 2017-12-05 06:38:09
End at: 2017-12-05 06:38:39
Local clock offset: 3.767 ms
Remote clock offset: -3.068 ms

Below is generated by plot.py at 2017-12-05 07:57:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 68.913 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 68.913 ms
Loss rate: 0.22%

Run 2: Report of SReAM — Data Link

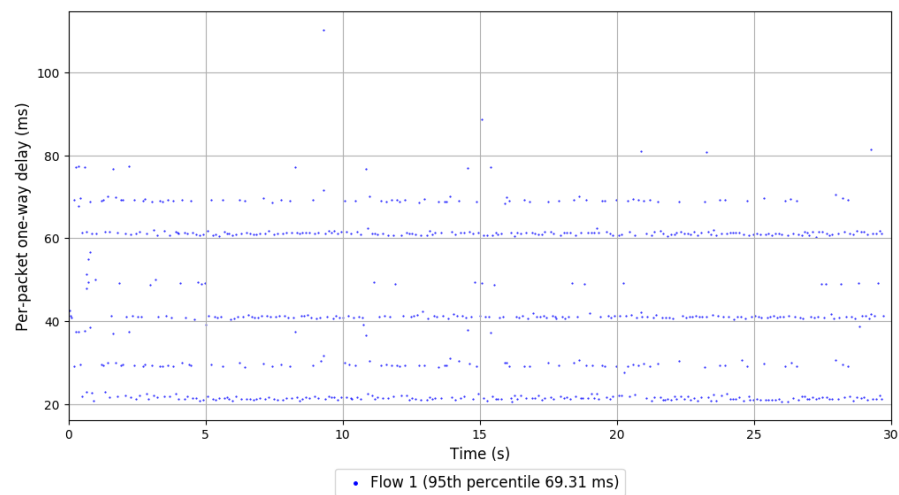
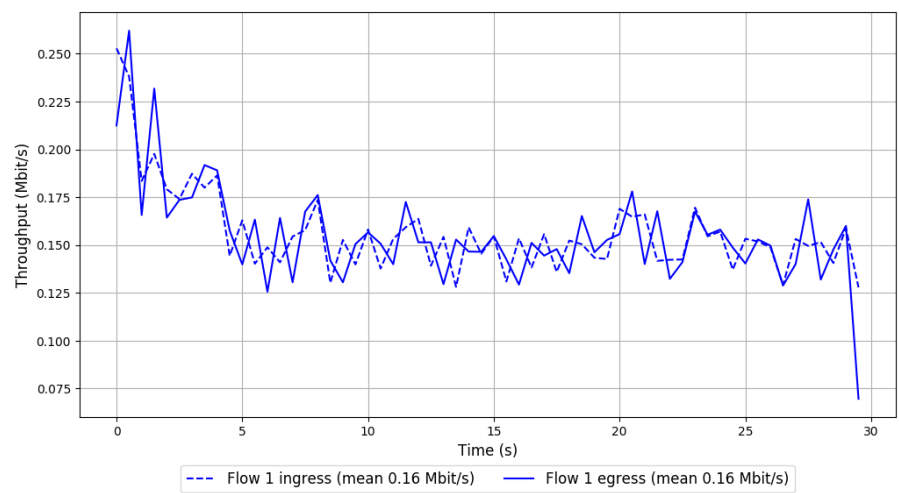


Run 3: Statistics of SCReAM

Start at: 2017-12-05 06:54:37
End at: 2017-12-05 06:55:07
Local clock offset: 3.834 ms
Remote clock offset: -2.937 ms

Below is generated by plot.py at 2017-12-05 07:57:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 69.311 ms
Loss rate: 0.74%
-- Flow 1:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 69.311 ms
Loss rate: 0.74%

Run 3: Report of SReAM — Data Link

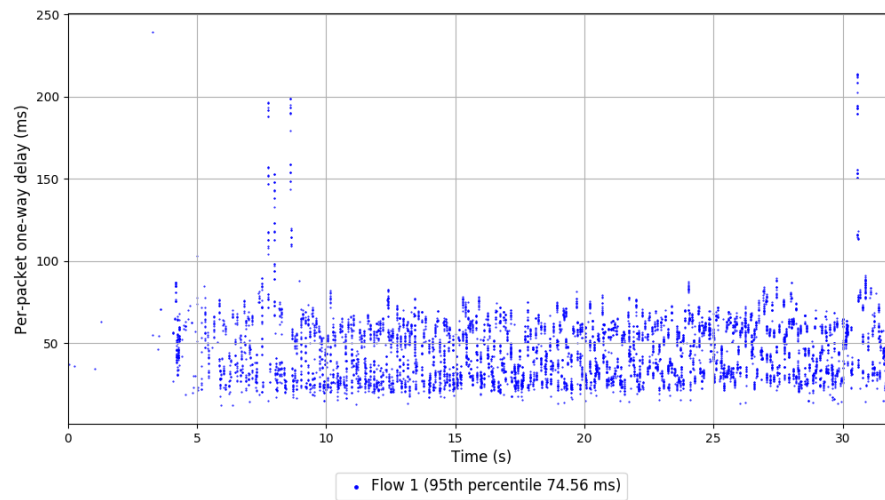
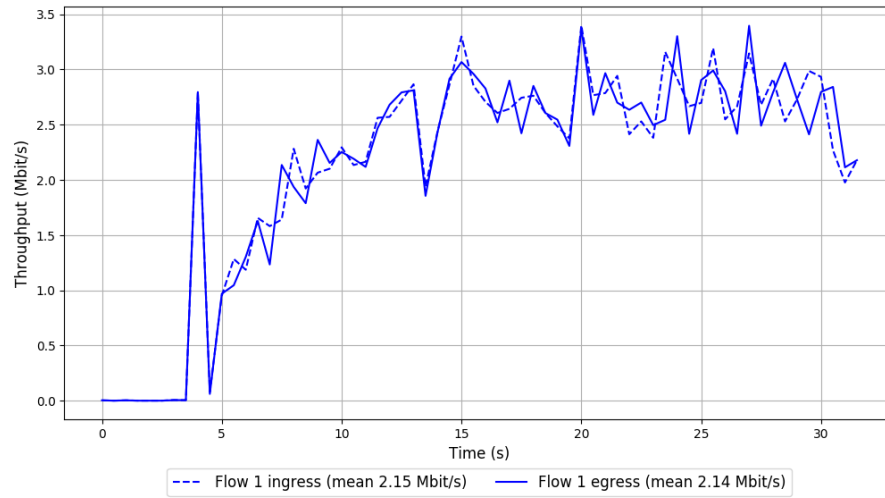


Run 1: Statistics of WebRTC media

Start at: 2017-12-05 06:19:19
End at: 2017-12-05 06:19:49
Local clock offset: 4.189 ms
Remote clock offset: -3.108 ms

Below is generated by plot.py at 2017-12-05 07:57:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 74.562 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 74.562 ms
Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link

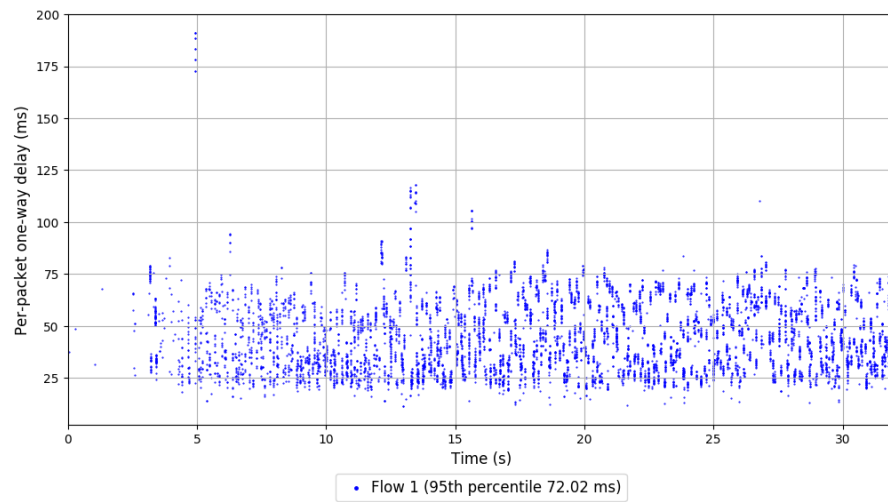
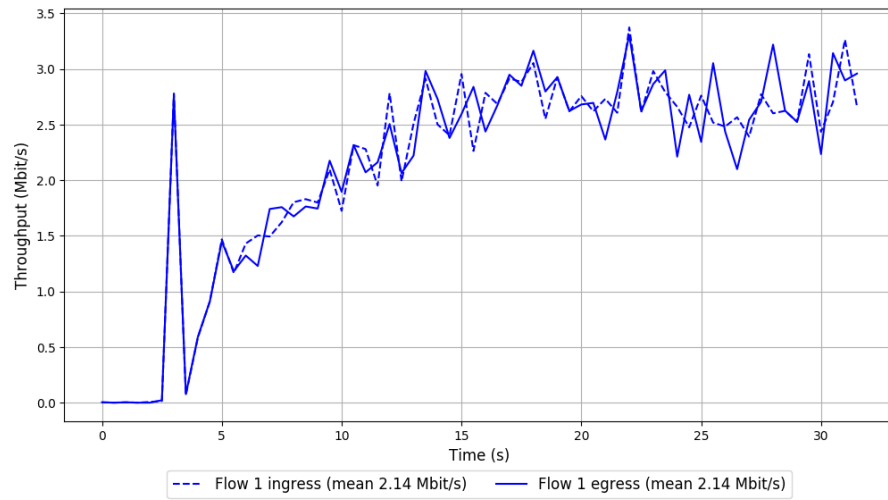


Run 2: Statistics of WebRTC media

Start at: 2017-12-05 06:35:48
End at: 2017-12-05 06:36:18
Local clock offset: 3.755 ms
Remote clock offset: -3.053 ms

Below is generated by plot.py at 2017-12-05 07:57:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 72.015 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 72.015 ms
Loss rate: 0.05%

Run 2: Report of WebRTC media — Data Link

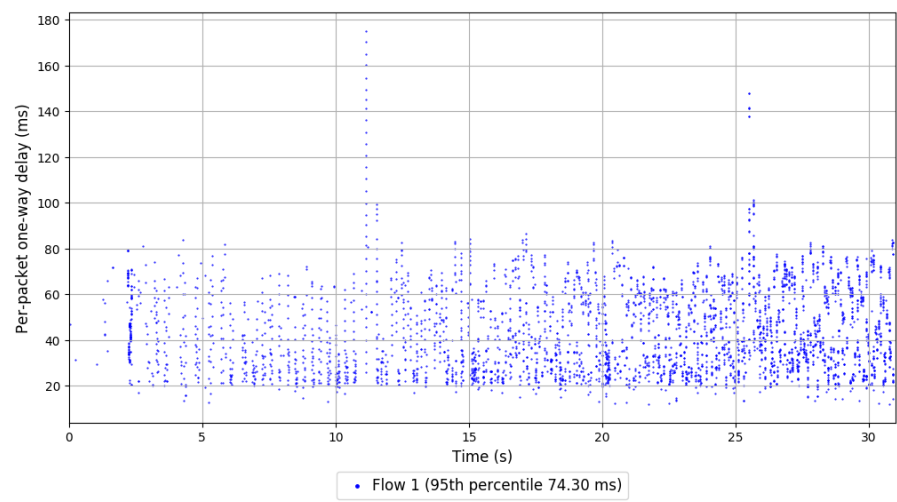
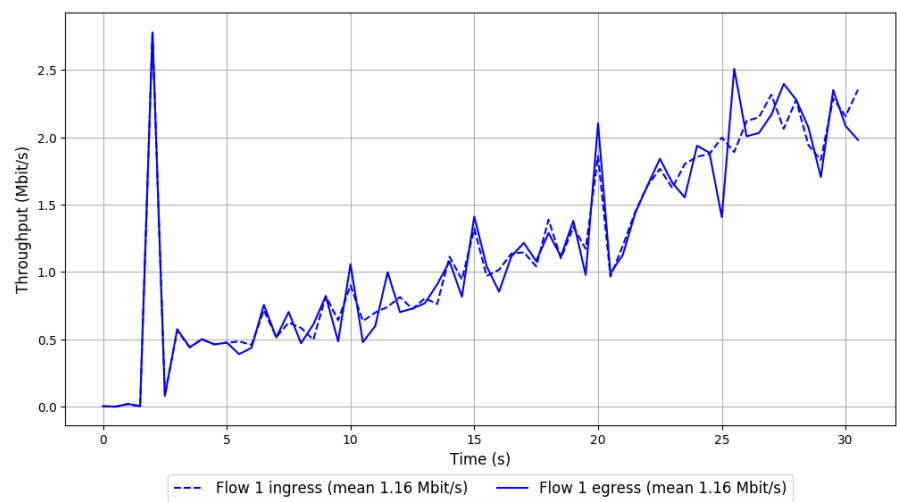


Run 3: Statistics of WebRTC media

Start at: 2017-12-05 06:52:17
End at: 2017-12-05 06:52:47
Local clock offset: 3.64 ms
Remote clock offset: -2.993 ms

Below is generated by plot.py at 2017-12-05 07:57:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 74.302 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 74.302 ms
Loss rate: 0.76%

Run 3: Report of WebRTC media — Data Link

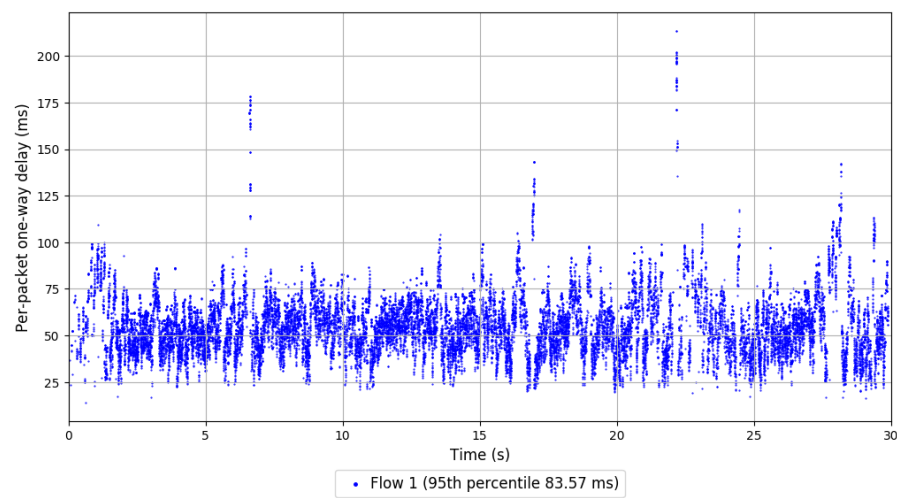
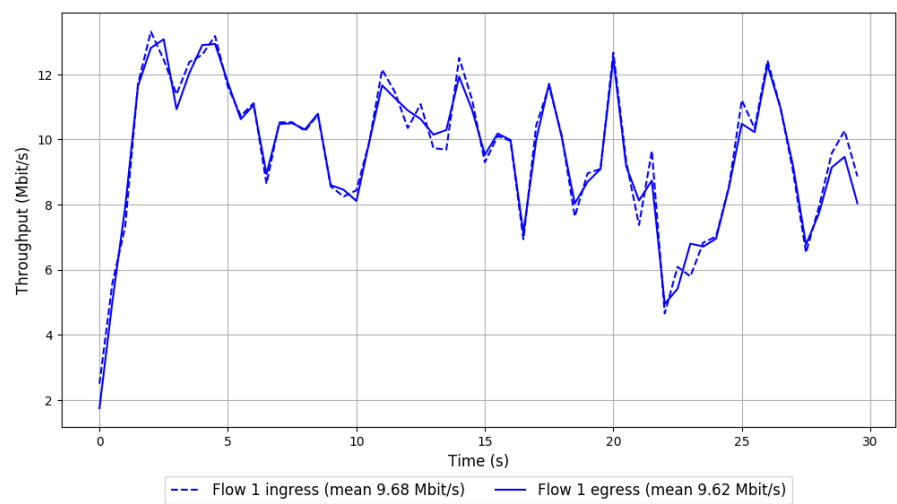


Run 1: Statistics of Sprout

Start at: 2017-12-05 06:18:08
End at: 2017-12-05 06:18:38
Local clock offset: 4.113 ms
Remote clock offset: -3.159 ms

Below is generated by plot.py at 2017-12-05 07:57:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.62 Mbit/s
95th percentile per-packet one-way delay: 83.568 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 9.62 Mbit/s
95th percentile per-packet one-way delay: 83.568 ms
Loss rate: 0.75%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2017-12-05 06:34:37

End at: 2017-12-05 06:35:07

Local clock offset: 3.678 ms

Remote clock offset: -3.04 ms

Below is generated by plot.py at 2017-12-05 07:57:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.22 Mbit/s

95th percentile per-packet one-way delay: 81.383 ms

Loss rate: 0.49%

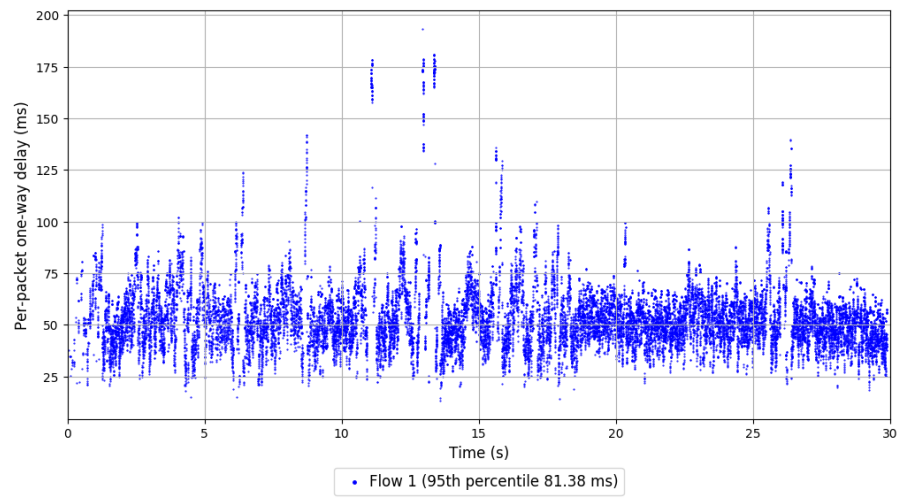
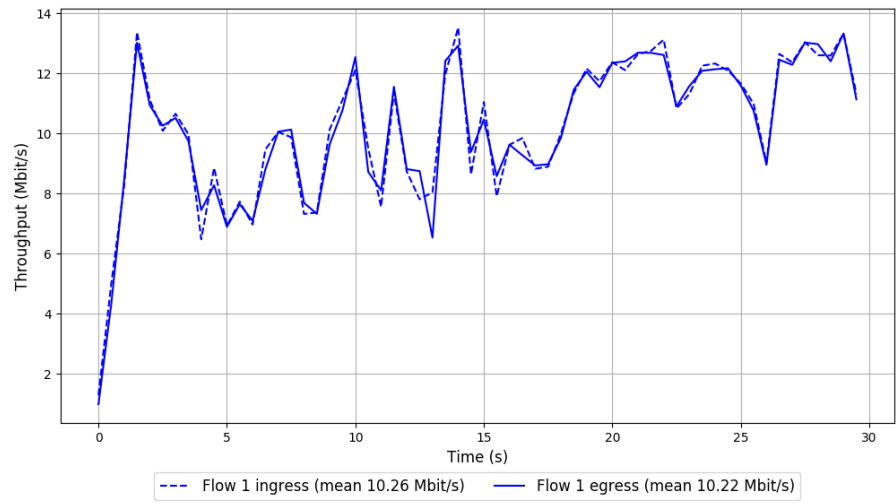
-- Flow 1:

Average throughput: 10.22 Mbit/s

95th percentile per-packet one-way delay: 81.383 ms

Loss rate: 0.49%

Run 2: Report of Sprout — Data Link

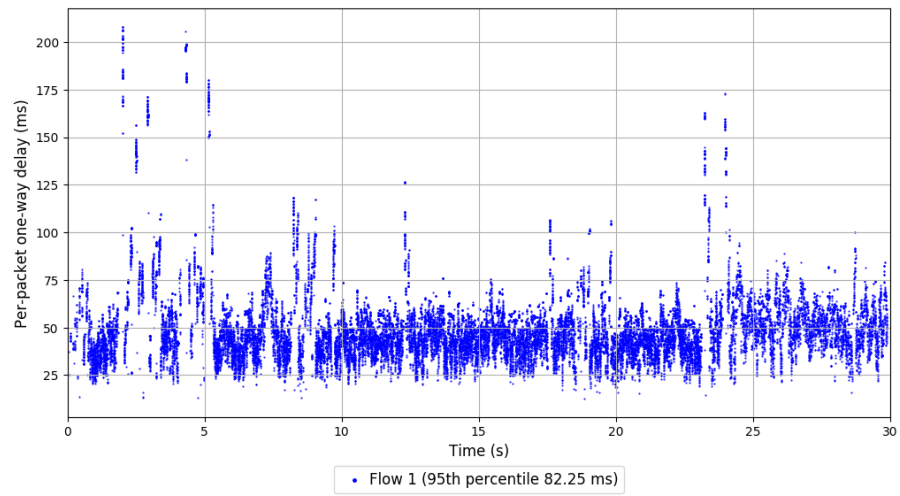
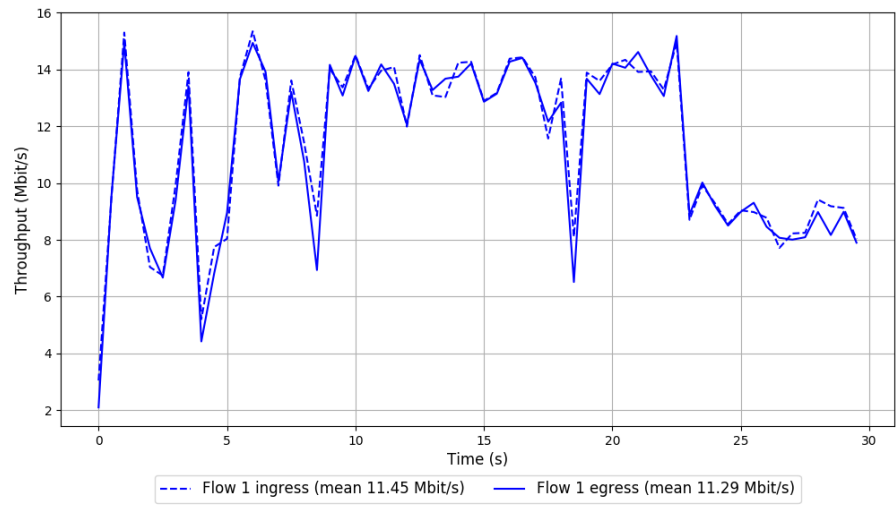


Run 3: Statistics of Sprout

Start at: 2017-12-05 06:51:06
End at: 2017-12-05 06:51:36
Local clock offset: 3.538 ms
Remote clock offset: -2.966 ms

Below is generated by plot.py at 2017-12-05 07:57:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.29 Mbit/s
95th percentile per-packet one-way delay: 82.249 ms
Loss rate: 1.52%
-- Flow 1:
Average throughput: 11.29 Mbit/s
95th percentile per-packet one-way delay: 82.249 ms
Loss rate: 1.52%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2017-12-05 06:33:26

End at: 2017-12-05 06:33:56

Local clock offset: 3.638 ms

Remote clock offset: -3.029 ms

Below is generated by plot.py at 2017-12-05 07:57:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.73 Mbit/s

95th percentile per-packet one-way delay: 75.770 ms

Loss rate: 0.66%

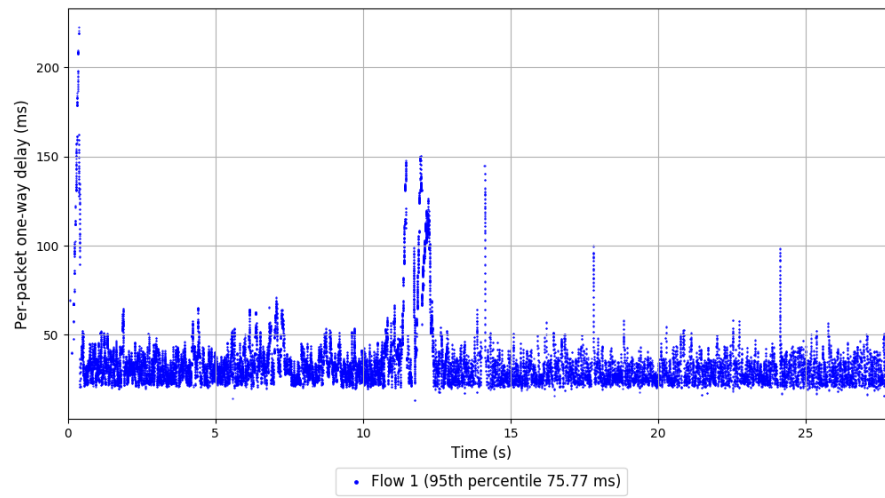
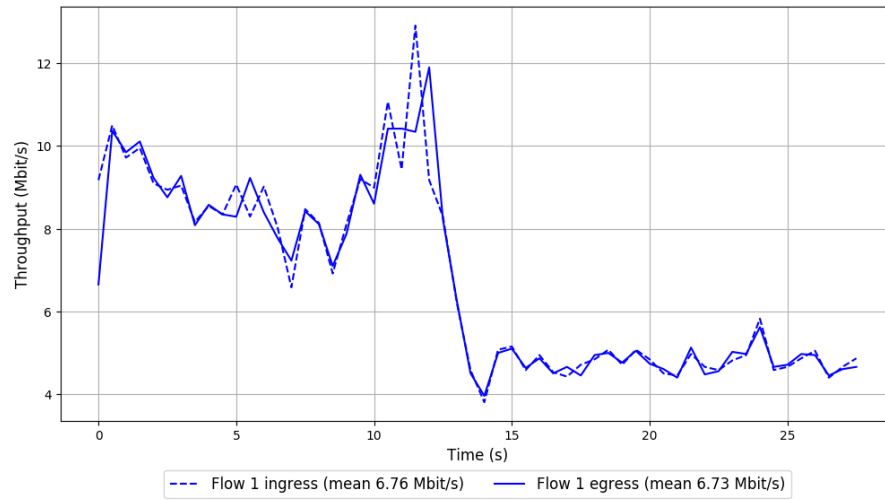
-- Flow 1:

Average throughput: 6.73 Mbit/s

95th percentile per-packet one-way delay: 75.770 ms

Loss rate: 0.66%

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



Run 2: Statistics of TaoVA-100x

Start at: 2017-12-05 06:49:55

End at: 2017-12-05 06:50:25

Local clock offset: 3.446 ms

Remote clock offset: -3.034 ms

Below is generated by plot.py at 2017-12-05 07:57:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.85 Mbit/s

95th percentile per-packet one-way delay: 52.742 ms

Loss rate: 0.87%

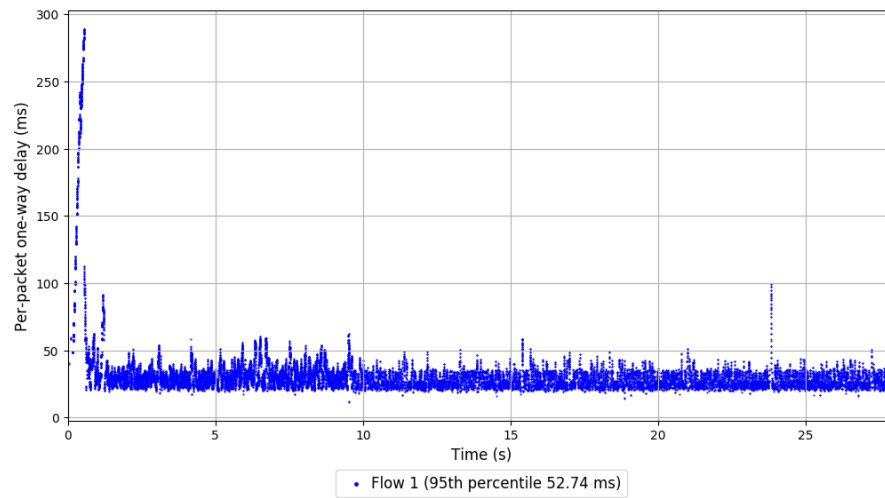
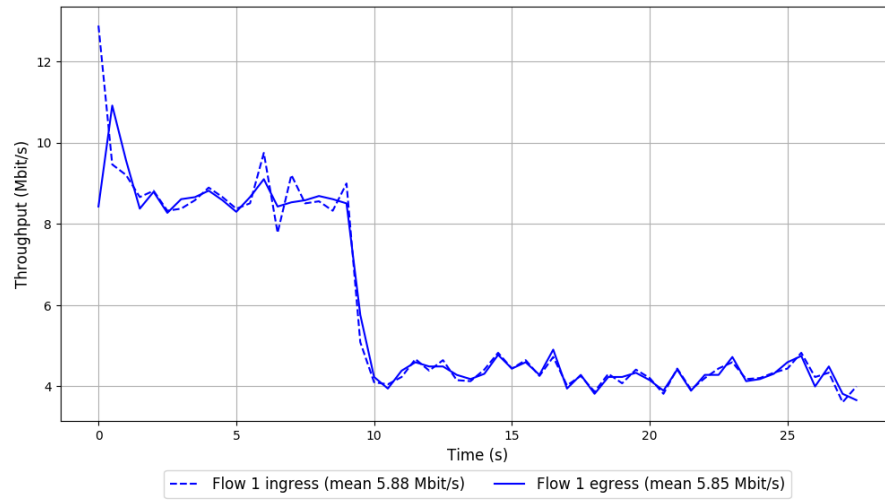
-- Flow 1:

Average throughput: 5.85 Mbit/s

95th percentile per-packet one-way delay: 52.742 ms

Loss rate: 0.87%

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



Run 3: Statistics of TaoVA-100x

Start at: 2017-12-05 07:06:23

End at: 2017-12-05 07:06:53

Local clock offset: 3.903 ms

Remote clock offset: -2.577 ms

Below is generated by plot.py at 2017-12-05 07:57:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.14 Mbit/s

95th percentile per-packet one-way delay: 64.337 ms

Loss rate: 0.71%

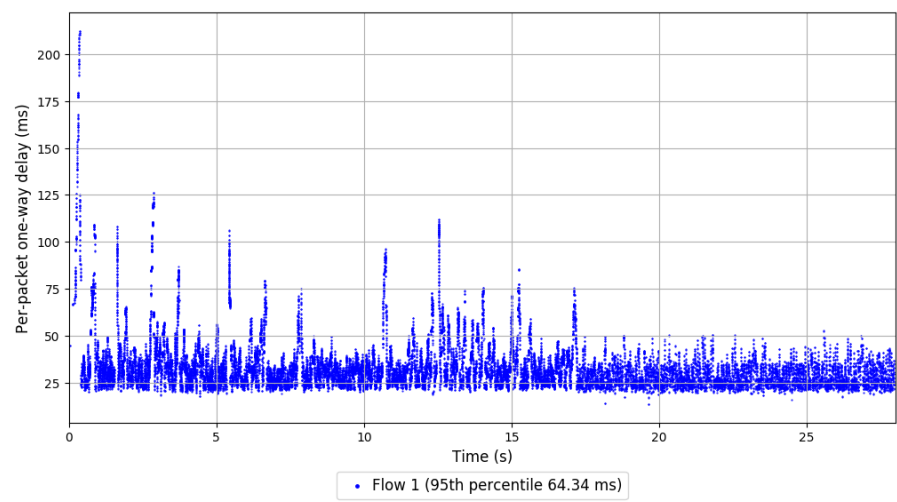
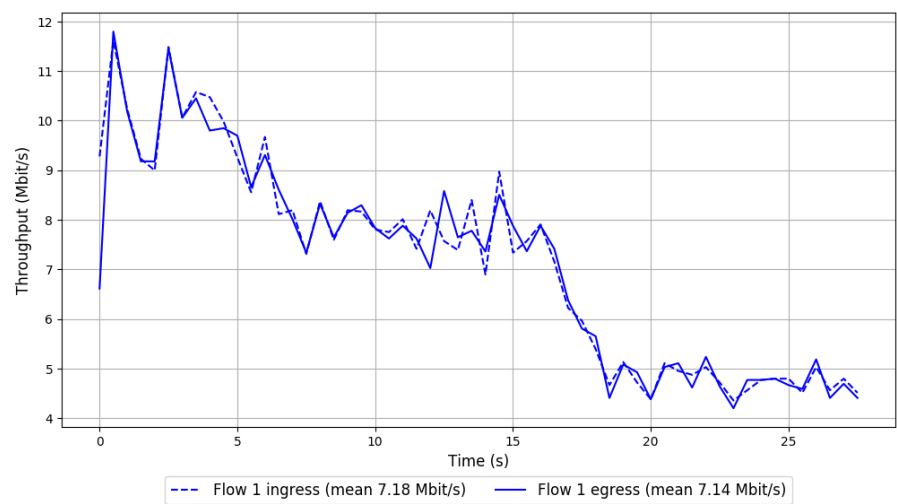
-- Flow 1:

Average throughput: 7.14 Mbit/s

95th percentile per-packet one-way delay: 64.337 ms

Loss rate: 0.71%

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

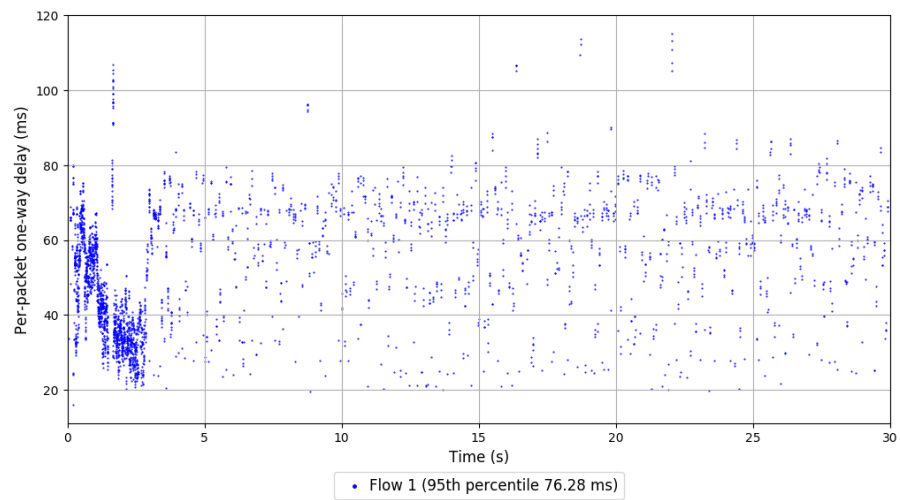
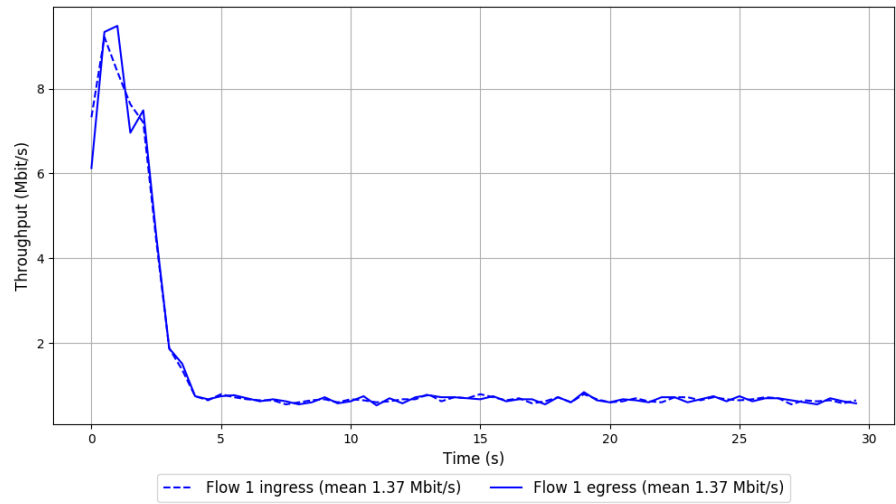


Run 1: Statistics of TCP Vegas

Start at: 2017-12-05 06:32:15
End at: 2017-12-05 06:32:45
Local clock offset: 3.682 ms
Remote clock offset: -3.034 ms

Below is generated by plot.py at 2017-12-05 07:57:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 76.276 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 76.276 ms
Loss rate: 0.12%

Run 1: Report of TCP Vegas — Data Link

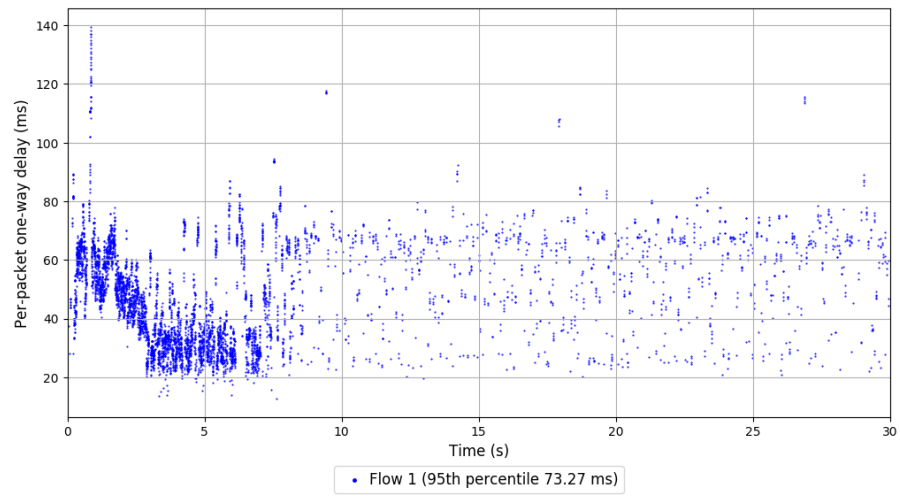
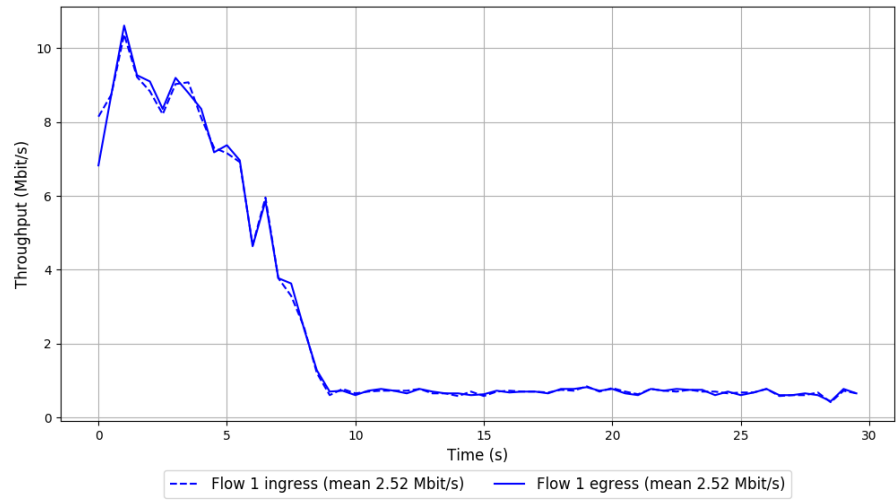


Run 2: Statistics of TCP Vegas

Start at: 2017-12-05 06:48:45
End at: 2017-12-05 06:49:15
Local clock offset: 3.353 ms
Remote clock offset: -3.079 ms

Below is generated by plot.py at 2017-12-05 07:57:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.52 Mbit/s
95th percentile per-packet one-way delay: 73.273 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 2.52 Mbit/s
95th percentile per-packet one-way delay: 73.273 ms
Loss rate: 0.03%

Run 2: Report of TCP Vegas — Data Link

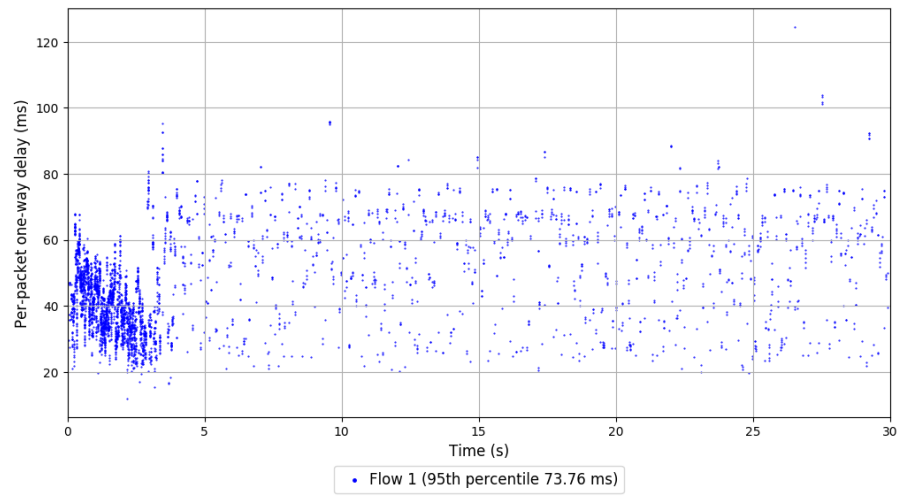
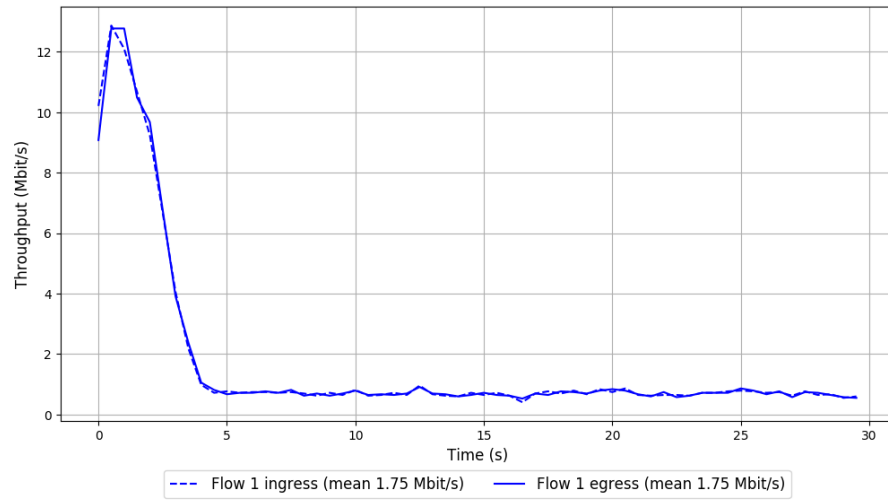


Run 3: Statistics of TCP Vegas

Start at: 2017-12-05 07:05:13
End at: 2017-12-05 07:05:43
Local clock offset: 3.904 ms
Remote clock offset: -2.562 ms

Below is generated by plot.py at 2017-12-05 07:57:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.75 Mbit/s
95th percentile per-packet one-way delay: 73.764 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 1.75 Mbit/s
95th percentile per-packet one-way delay: 73.764 ms
Loss rate: 0.09%

Run 3: Report of TCP Vegas — Data Link

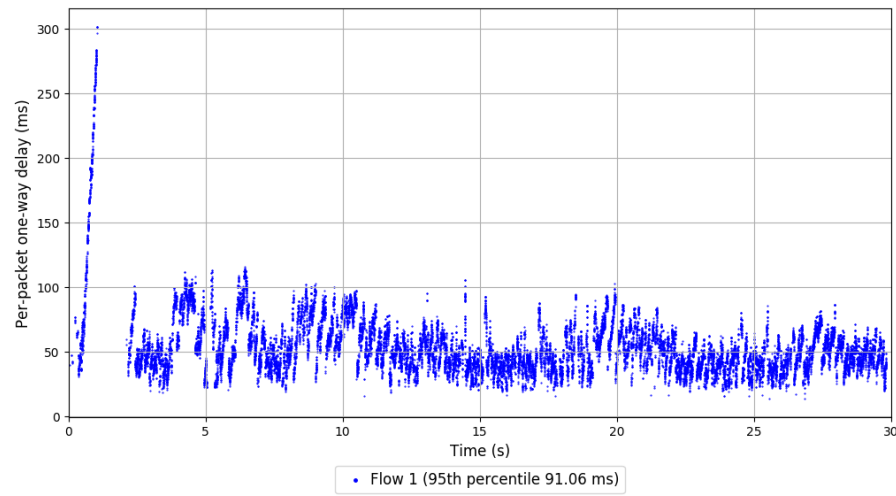
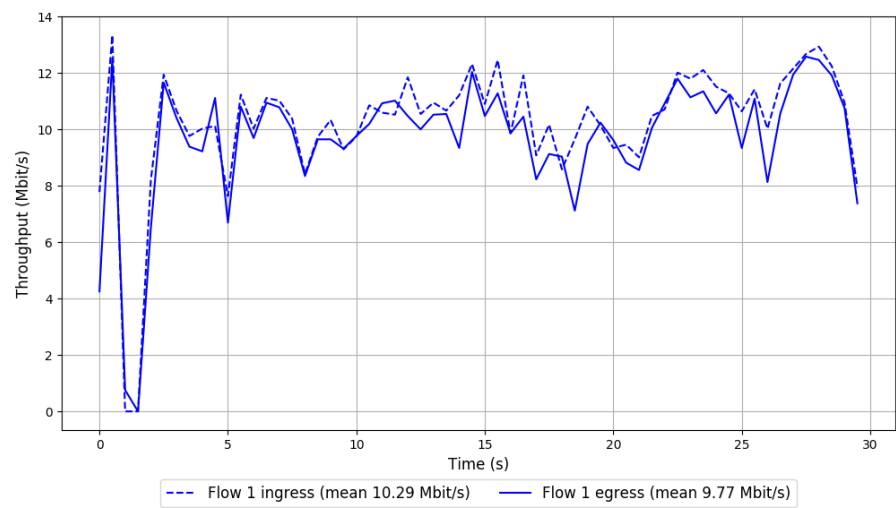


Run 1: Statistics of Verus

Start at: 2017-12-05 06:29:54
End at: 2017-12-05 06:30:24
Local clock offset: 3.958 ms
Remote clock offset: -3.014 ms

Below is generated by plot.py at 2017-12-05 07:57:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.77 Mbit/s
95th percentile per-packet one-way delay: 91.062 ms
Loss rate: 5.23%
-- Flow 1:
Average throughput: 9.77 Mbit/s
95th percentile per-packet one-way delay: 91.062 ms
Loss rate: 5.23%

Run 1: Report of Verus — Data Link

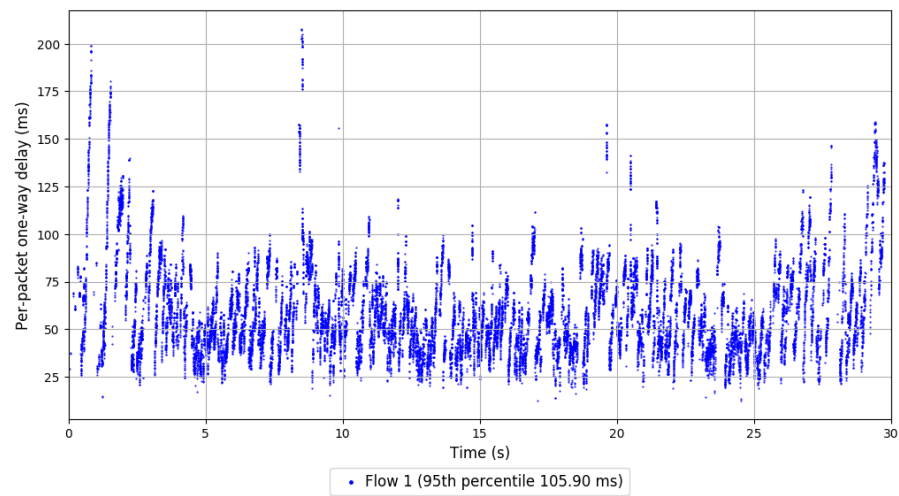
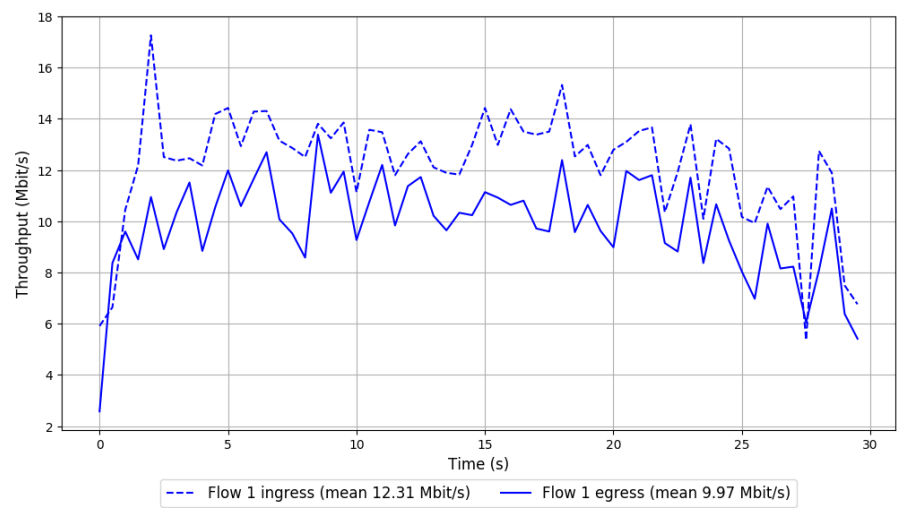


Run 2: Statistics of Verus

Start at: 2017-12-05 06:46:23
End at: 2017-12-05 06:46:53
Local clock offset: 3.222 ms
Remote clock offset: -3.016 ms

Below is generated by plot.py at 2017-12-05 07:57:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.97 Mbit/s
95th percentile per-packet one-way delay: 105.902 ms
Loss rate: 19.21%
-- Flow 1:
Average throughput: 9.97 Mbit/s
95th percentile per-packet one-way delay: 105.902 ms
Loss rate: 19.21%

Run 2: Report of Verus — Data Link

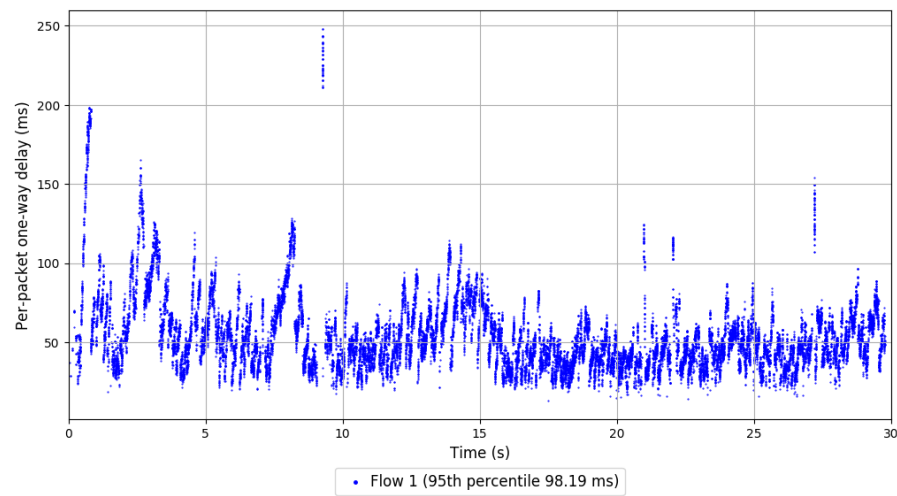
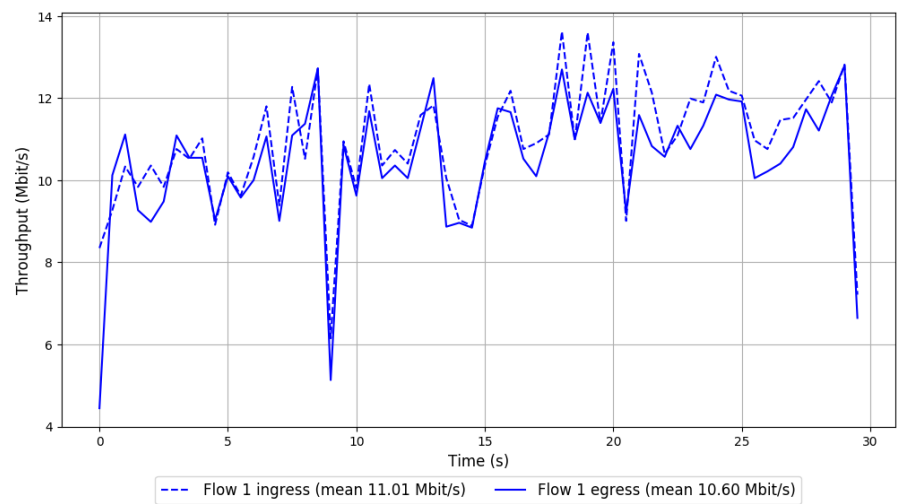


Run 3: Statistics of Verus

Start at: 2017-12-05 07:02:51
End at: 2017-12-05 07:03:21
Local clock offset: 4.012 ms
Remote clock offset: -2.695 ms

Below is generated by plot.py at 2017-12-05 07:57:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 10.60 Mbit/s
95th percentile per-packet one-way delay: 98.189 ms
Loss rate: 3.96%
-- Flow 1:
Average throughput: 10.60 Mbit/s
95th percentile per-packet one-way delay: 98.189 ms
Loss rate: 3.96%

Run 3: Report of Verus — Data Link

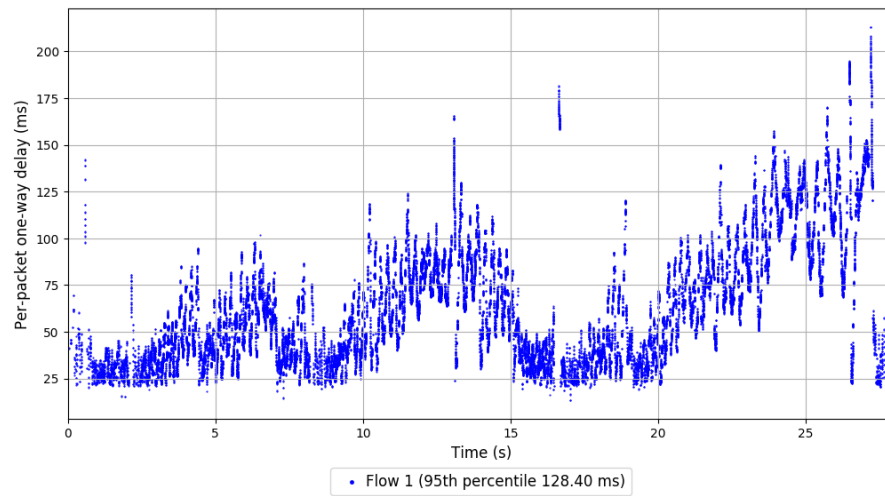
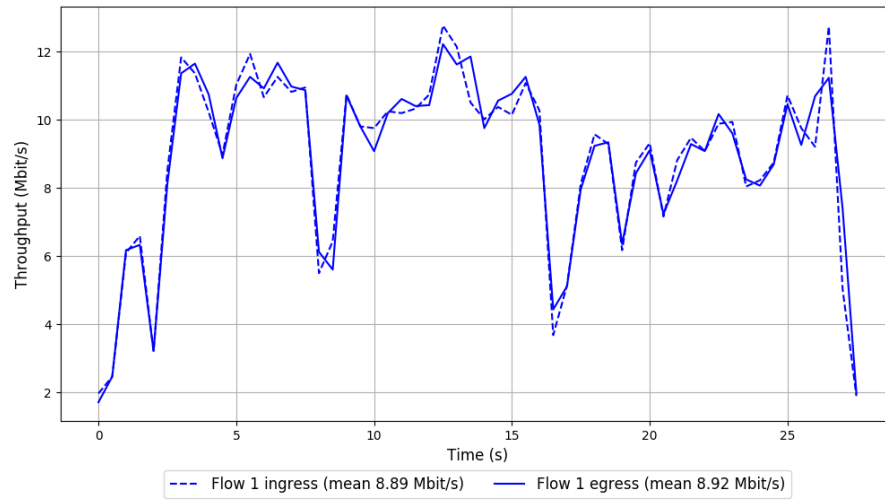


Run 1: Statistics of Copa

Start at: 2017-12-05 06:20:29
End at: 2017-12-05 06:20:59
Local clock offset: 4.417 ms
Remote clock offset: -3.101 ms

Below is generated by plot.py at 2017-12-05 07:57:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 8.92 Mbit/s
95th percentile per-packet one-way delay: 128.397 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 8.92 Mbit/s
95th percentile per-packet one-way delay: 128.397 ms
Loss rate: 0.04%

Run 1: Report of Copa — Data Link

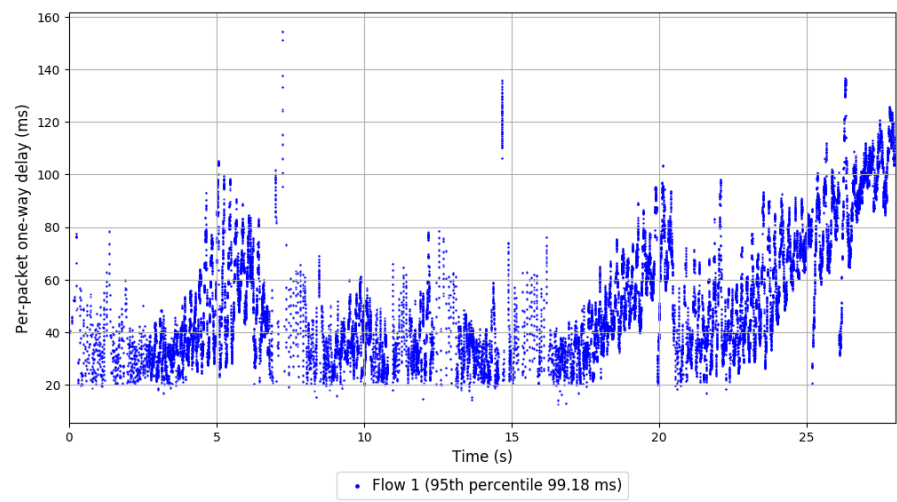
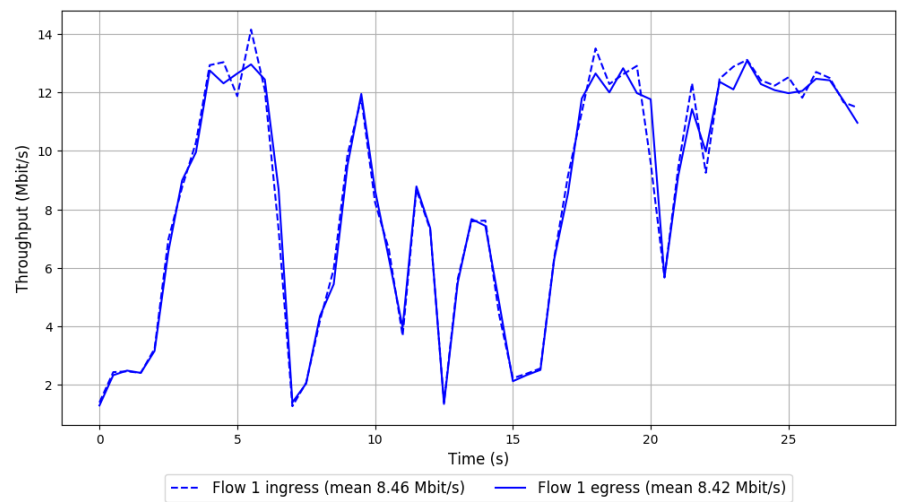


Run 2: Statistics of Copa

Start at: 2017-12-05 06:36:58
End at: 2017-12-05 06:37:28
Local clock offset: 3.773 ms
Remote clock offset: -3.018 ms

Below is generated by plot.py at 2017-12-05 07:57:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 8.42 Mbit/s
95th percentile per-packet one-way delay: 99.182 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 8.42 Mbit/s
95th percentile per-packet one-way delay: 99.182 ms
Loss rate: 0.62%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

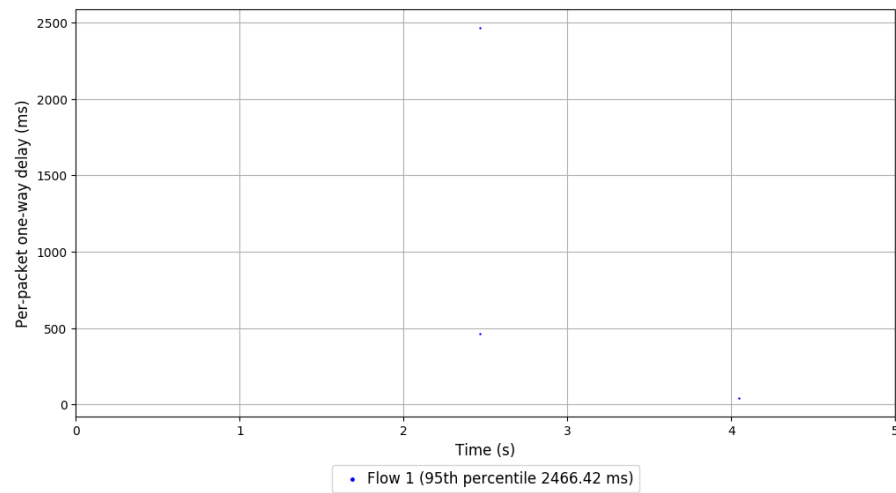
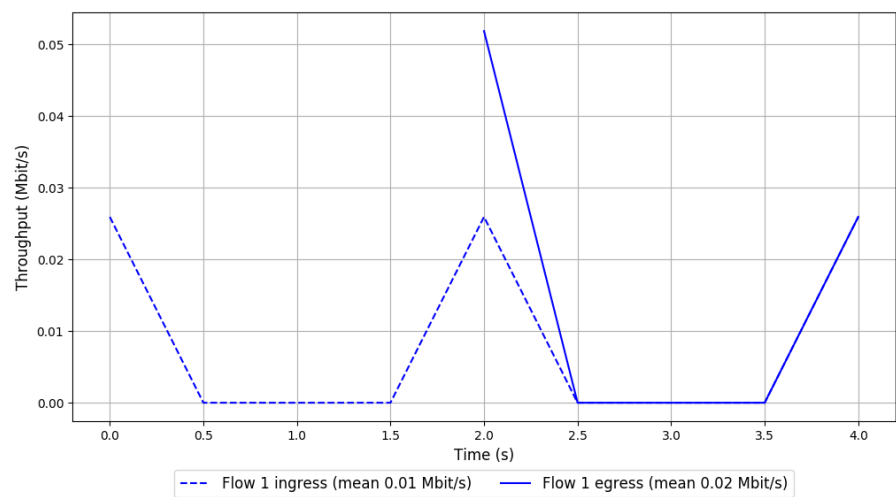
Start at: 2017-12-05 06:53:27

End at: 2017-12-05 06:53:57

Local clock offset: 3.818 ms

Remote clock offset: -3.031 ms

Run 3: Report of Copa — Data Link

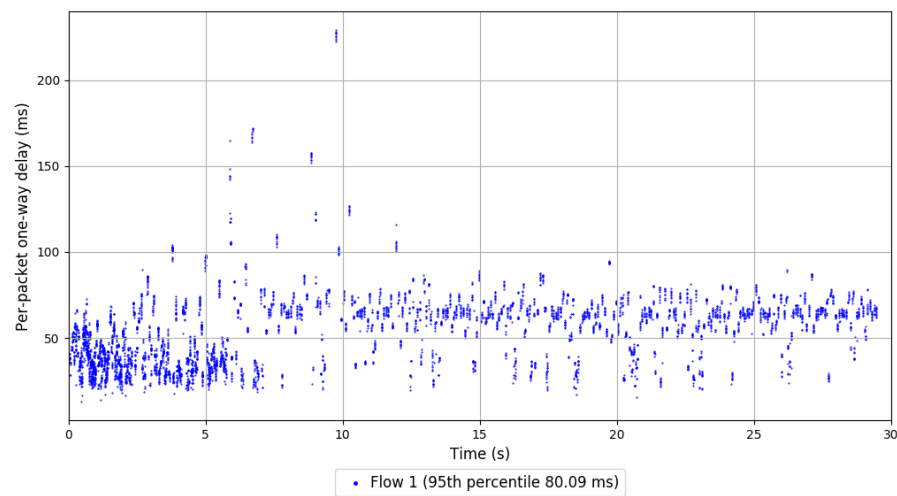
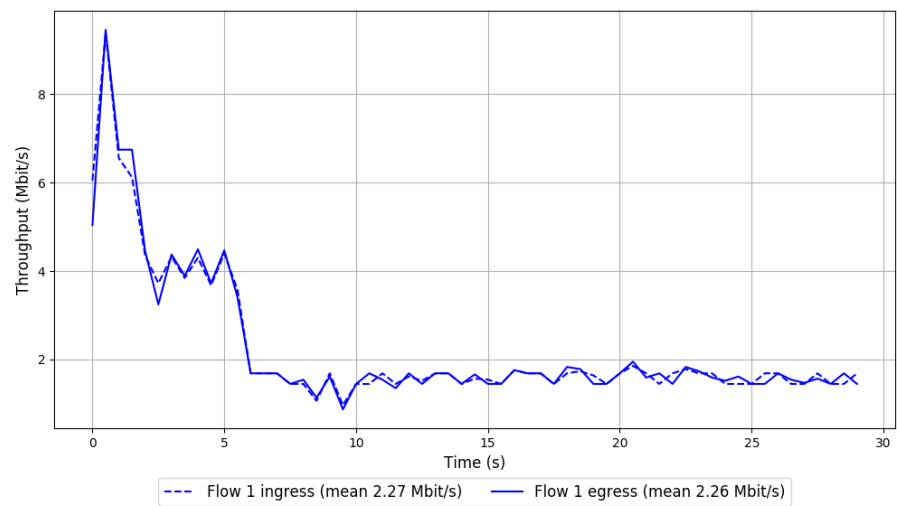


```
Run 1: Statistics of Indigo

Start at: 2017-12-05 06:24:01
End at: 2017-12-05 06:24:31
Local clock offset: 4.935 ms
Remote clock offset: -2.886 ms

# Below is generated by plot.py at 2017-12-05 07:57:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.26 Mbit/s
95th percentile per-packet one-way delay: 80.088 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 2.26 Mbit/s
95th percentile per-packet one-way delay: 80.088 ms
Loss rate: 0.20%
```

Run 1: Report of Indigo — Data Link

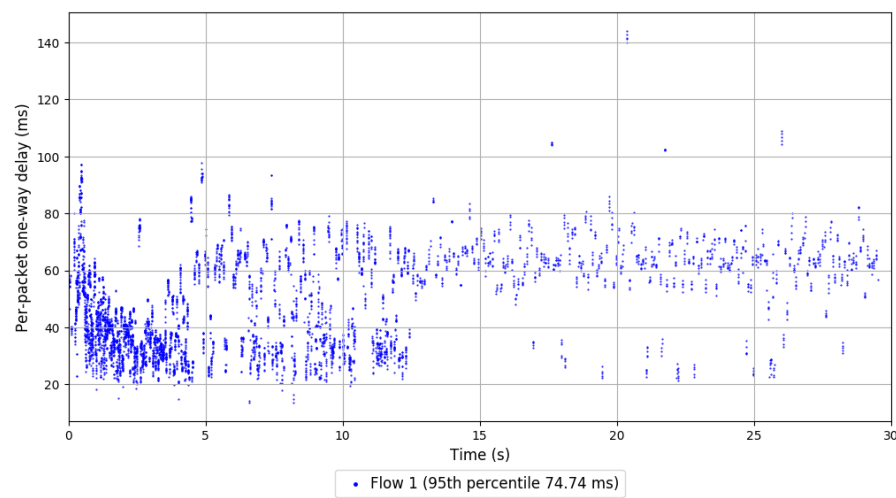
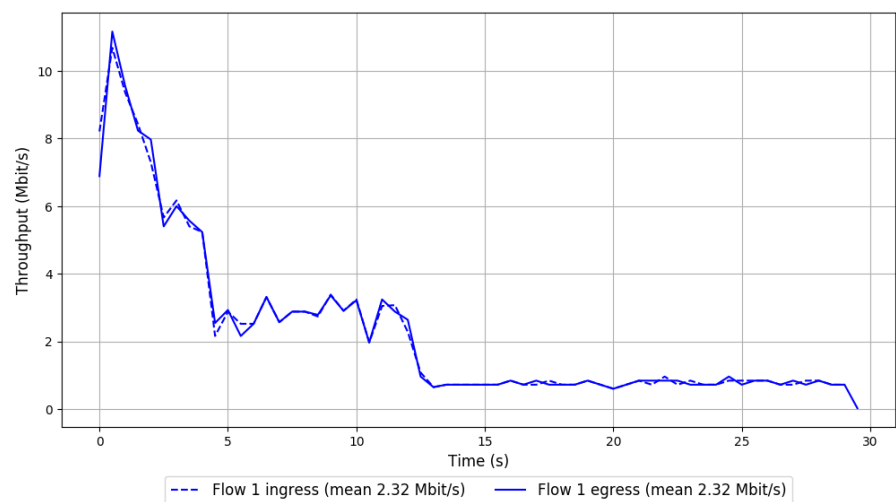


Run 2: Statistics of Indigo

Start at: 2017-12-05 06:40:30
End at: 2017-12-05 06:41:00
Local clock offset: 3.504 ms
Remote clock offset: -3.066 ms

Below is generated by plot.py at 2017-12-05 07:57:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.32 Mbit/s
95th percentile per-packet one-way delay: 74.739 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 2.32 Mbit/s
95th percentile per-packet one-way delay: 74.739 ms
Loss rate: 0.07%

Run 2: Report of Indigo — Data Link

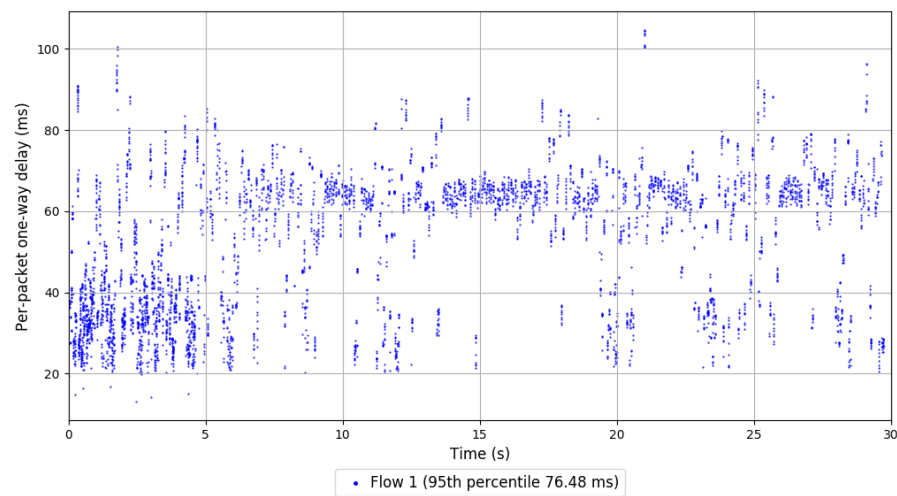
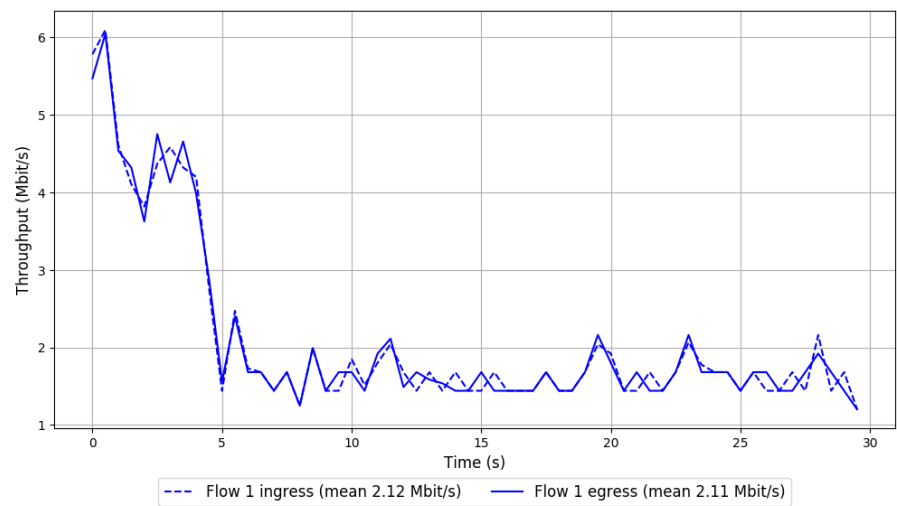


Run 3: Statistics of Indigo

Start at: 2017-12-05 06:56:58
End at: 2017-12-05 06:57:28
Local clock offset: 4.145 ms
Remote clock offset: -2.851 ms

Below is generated by plot.py at 2017-12-05 07:57:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 76.476 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 76.476 ms
Loss rate: 0.19%

Run 3: Report of Indigo — Data Link

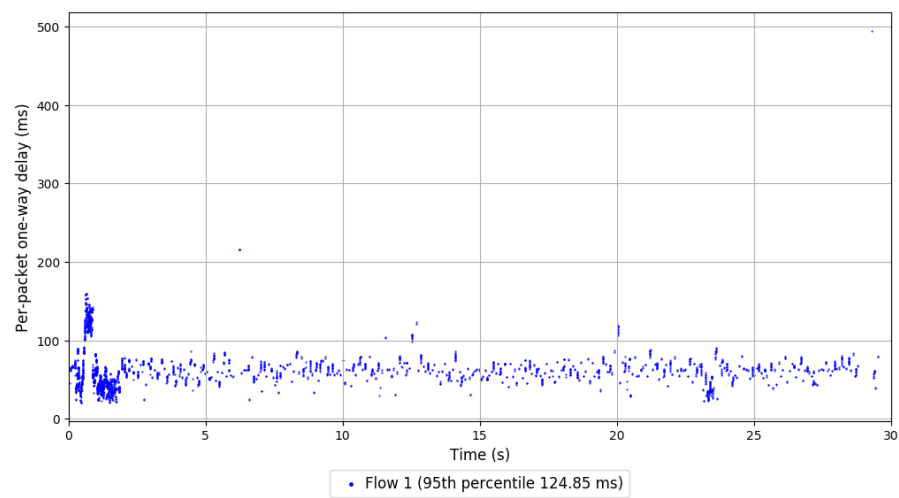
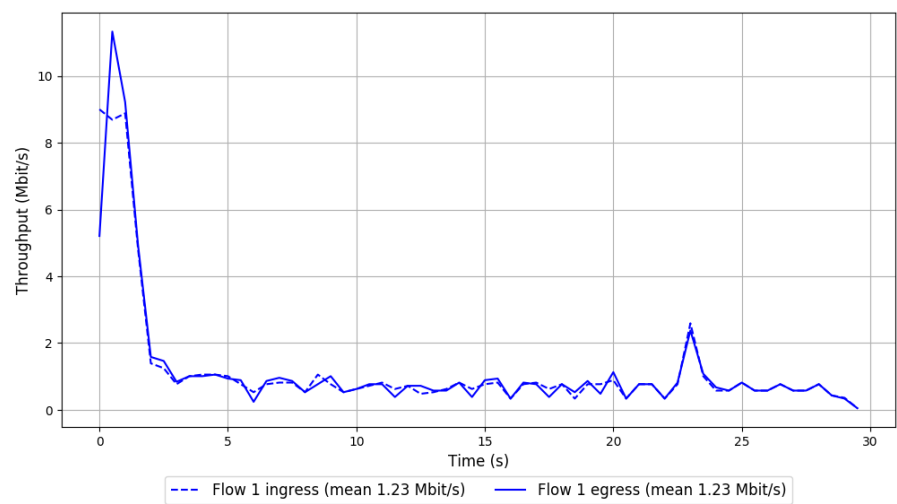


```
Run 1: Statistics of Indigo-calib

Start at: 2017-12-05 06:28:43
End at: 2017-12-05 06:29:14
Local clock offset: 4.177 ms
Remote clock offset: -3.026 ms

# Below is generated by plot.py at 2017-12-05 07:57:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 124.852 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 124.852 ms
Loss rate: 0.39%
```

Run 1: Report of Indigo-calib — Data Link



Run 2: Statistics of Indigo-calib

Start at: 2017-12-05 06:45:13

End at: 2017-12-05 06:45:43

Local clock offset: 3.272 ms

Remote clock offset: -3.085 ms

Below is generated by plot.py at 2017-12-05 07:57:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 83.631 ms

Loss rate: 0.13%

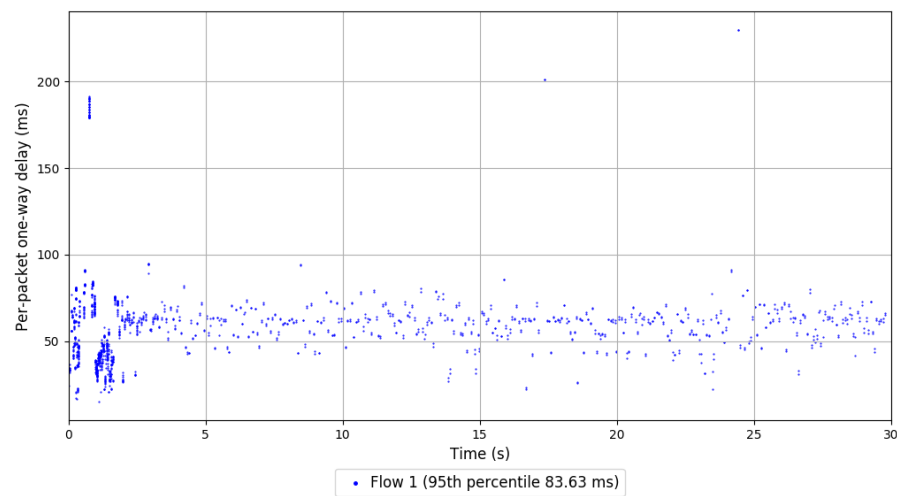
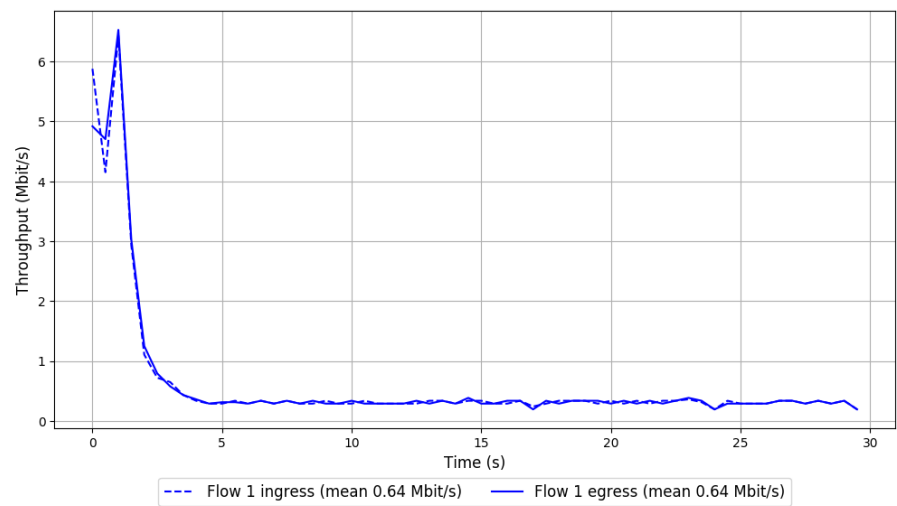
-- Flow 1:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 83.631 ms

Loss rate: 0.13%

Run 2: Report of Indigo-calib — Data Link



Run 3: Statistics of Indigo-calib

Start at: 2017-12-05 07:01:41
End at: 2017-12-05 07:02:11
Local clock offset: 3.939 ms
Remote clock offset: -2.741 ms

Below is generated by plot.py at 2017-12-05 07:57:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 93.107 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 93.107 ms
Loss rate: 0.11%

Run 3: Report of Indigo-calib — Data Link

