

## Pantheon Report

Generated at 2017-12-11 09:00:20 (UTC).

Data path: AWS Korea Ethernet (*local*) → China ppp0 (*remote*).

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).

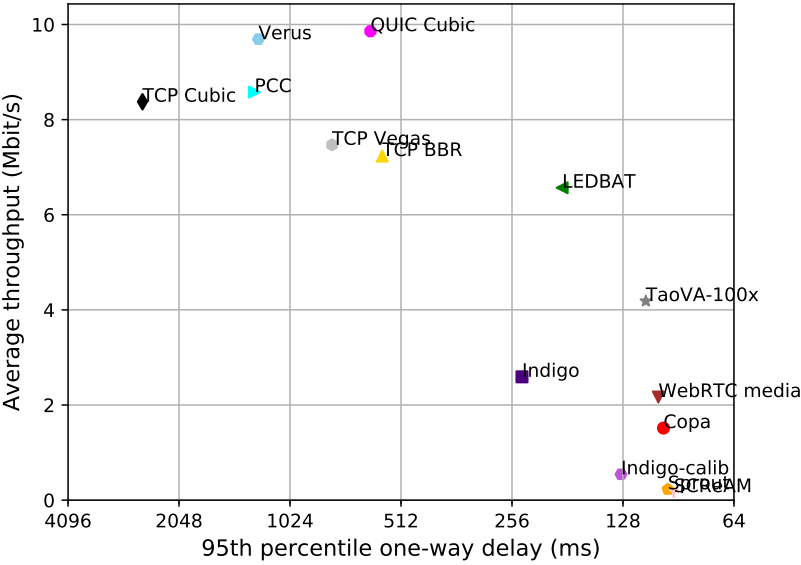
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo\_fast**).

NTP offsets were measured against `ntp.nict.jp` and have been applied to correct the timestamps in logs.

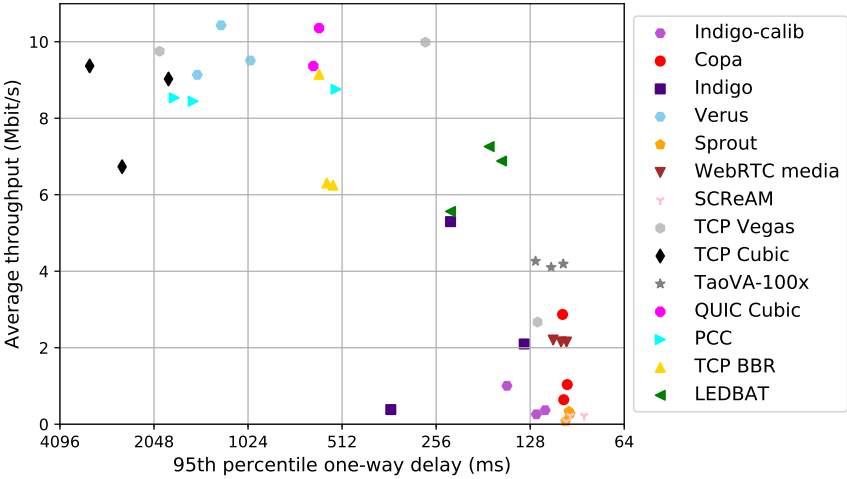
Git summary:

```
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 @ 03455460fd1a8ffbdad86fabb936fdca204b80db
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 AWS Korea Ethernet to China ppp0, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



test from AWS Korea Ethernet to China ppp0, 3 runs of 30s each per scheme



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	7.23	575.55	1.36
TCP Cubic	3	8.38	2573.36	4.91
LEDBAT	3	6.57	187.19	0.53
PCC	3	8.58	1278.32	0.11
QUIC Cubic	2	9.86	619.67	2.09
SCReAM	3	0.17	93.15	0.05
WebRTC media	3	2.17	102.62	0.15
Sprout	3	0.23	96.74	0.02
TaoVA-100x	3	4.18	110.99	0.16
TCP Vegas	3	7.47	787.52	0.78
Verus	3	9.69	1247.98	3.14
Copa	3	1.52	99.39	0.14
Indigo	3	2.59	240.50	0.00
Indigo-calib	3	0.54	129.57	0.00

Run 1: Statistics of TCP BBR

Start at: 2017-12-11 08:13:17

End at: 2017-12-11 08:13:47

Local clock offset: -7.858 ms

Remote clock offset: 1.26 ms

# Below is generated by plot.py at 2017-12-11 08:59:36

# Datalink statistics

-- Total of 1 flow:

Average throughput: 6.25 Mbit/s

95th percentile per-packet one-way delay: 547.315 ms

Loss rate: 1.09%

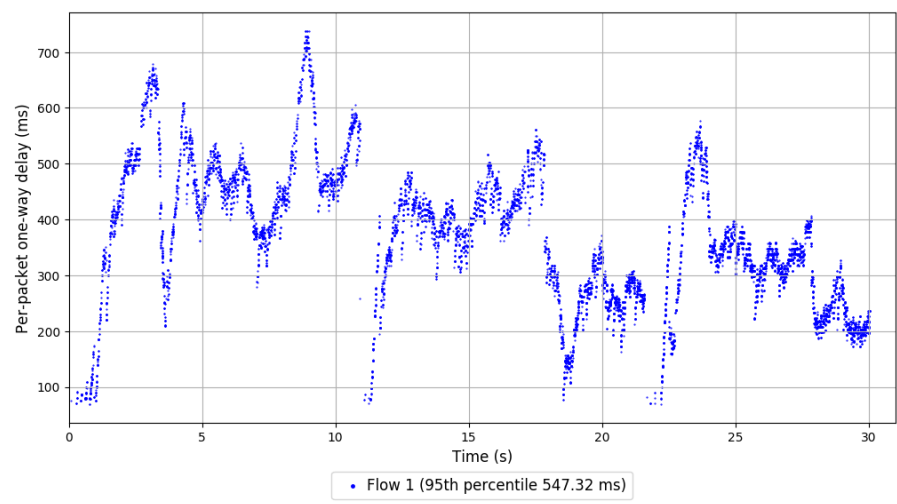
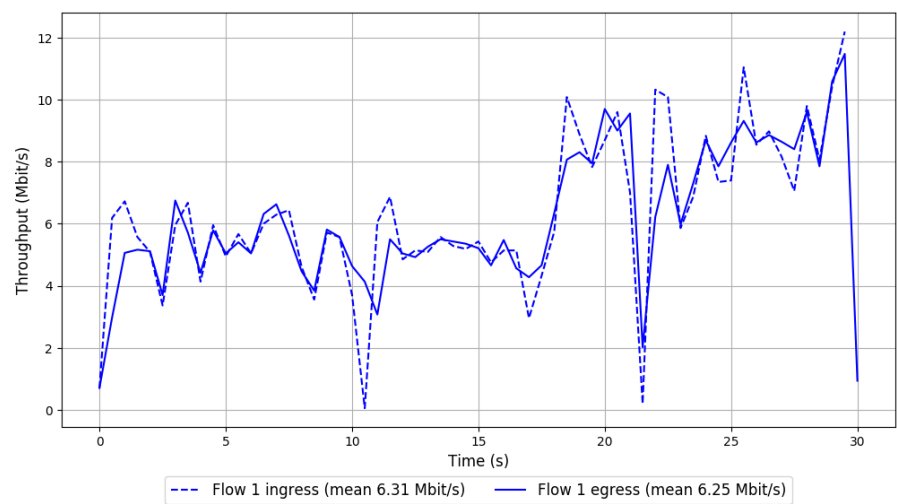
-- Flow 1:

Average throughput: 6.25 Mbit/s

95th percentile per-packet one-way delay: 547.315 ms

Loss rate: 1.09%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2017-12-11 08:30:04

End at: 2017-12-11 08:30:34

Local clock offset: -6.441 ms

Remote clock offset: 1.327 ms

# Below is generated by plot.py at 2017-12-11 08:59:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.15 Mbit/s

95th percentile per-packet one-way delay: 606.583 ms

Loss rate: 0.81%

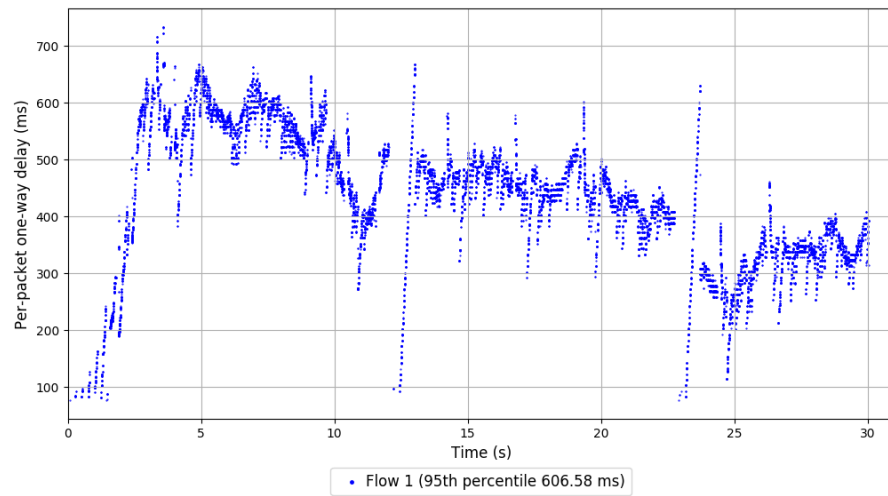
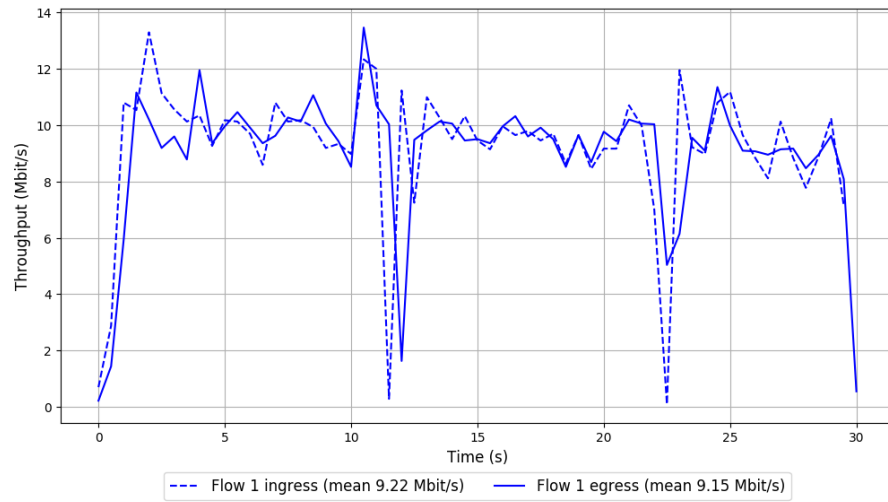
-- Flow 1:

Average throughput: 9.15 Mbit/s

95th percentile per-packet one-way delay: 606.583 ms

Loss rate: 0.81%

## Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2017-12-11 08:46:22

End at: 2017-12-11 08:46:52

Local clock offset: -4.29 ms

Remote clock offset: 1.591 ms

# Below is generated by plot.py at 2017-12-11 08:59:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 6.30 Mbit/s

95th percentile per-packet one-way delay: 572.753 ms

Loss rate: 2.17%

-- Flow 1:

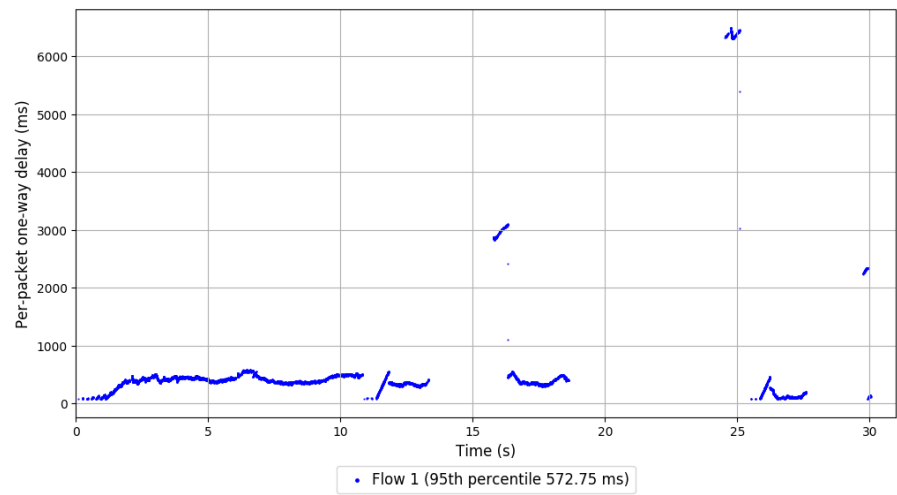
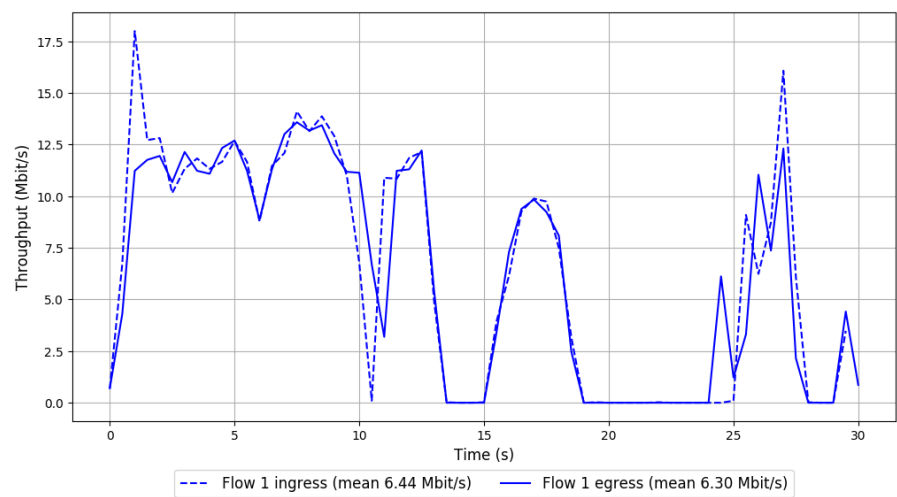
Average throughput: 6.30 Mbit/s

95th percentile per-packet one-way delay: 572.753 ms

Loss rate: 2.17%



Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2017-12-11 08:15:02

End at: 2017-12-11 08:15:32

Local clock offset: -6.992 ms

Remote clock offset: 1.308 ms

# Below is generated by plot.py at 2017-12-11 08:59:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 6.73 Mbit/s

95th percentile per-packet one-way delay: 2589.809 ms

Loss rate: 8.41%

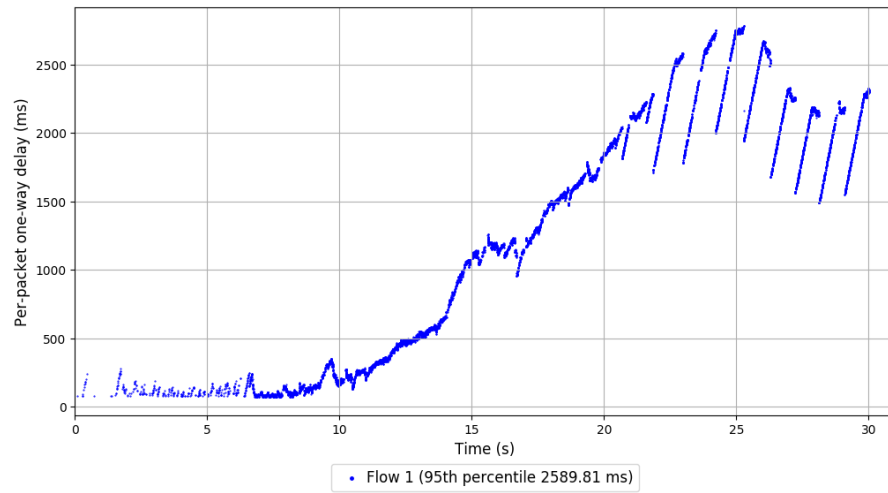
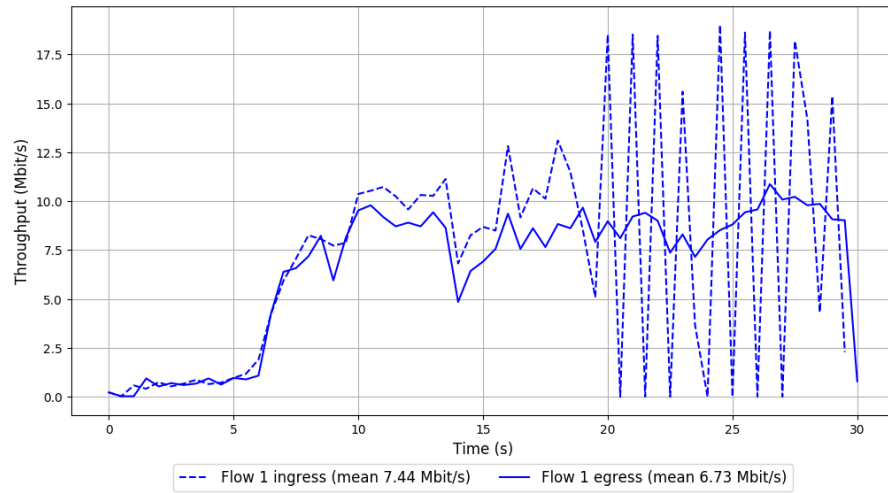
-- Flow 1:

Average throughput: 6.73 Mbit/s

95th percentile per-packet one-way delay: 2589.809 ms

Loss rate: 8.41%

## Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2017-12-11 08:31:13

End at: 2017-12-11 08:31:43

Local clock offset: -5.983 ms

Remote clock offset: 1.419 ms

# Below is generated by plot.py at 2017-12-11 08:59:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.03 Mbit/s

95th percentile per-packet one-way delay: 1840.274 ms

Loss rate: 3.32%

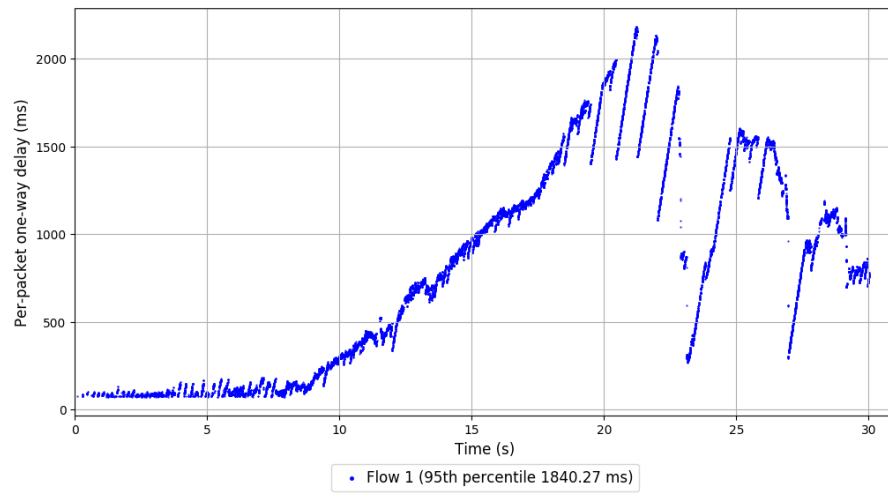
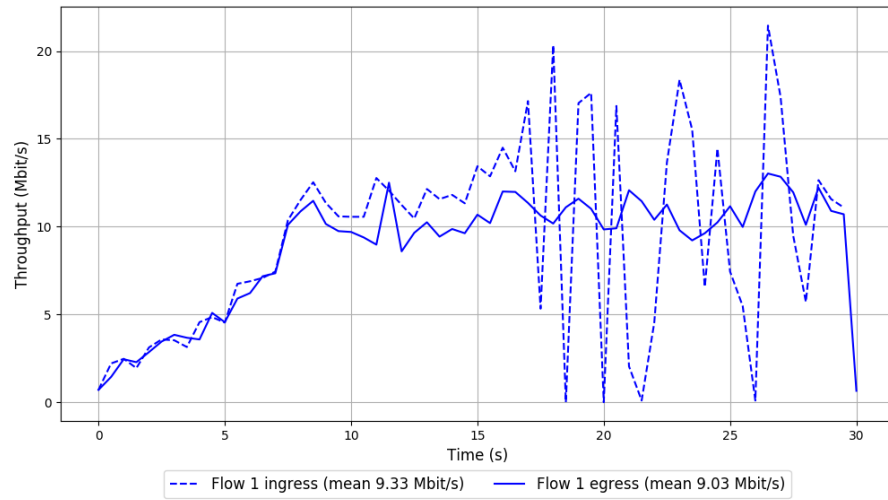
-- Flow 1:

Average throughput: 9.03 Mbit/s

95th percentile per-packet one-way delay: 1840.274 ms

Loss rate: 3.32%

## Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2017-12-11 08:47:31

End at: 2017-12-11 08:48:01

Local clock offset: -3.887 ms

Remote clock offset: 1.641 ms

# Below is generated by plot.py at 2017-12-11 08:59:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.37 Mbit/s

95th percentile per-packet one-way delay: 3289.985 ms

Loss rate: 3.01%

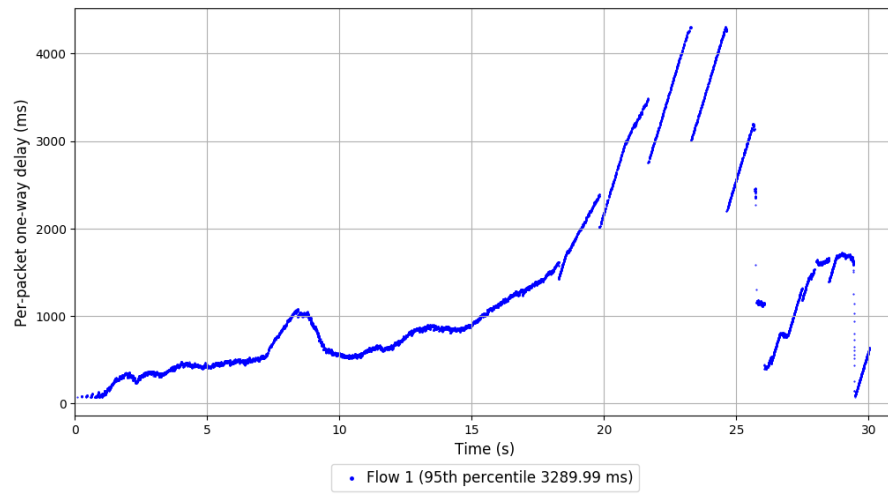
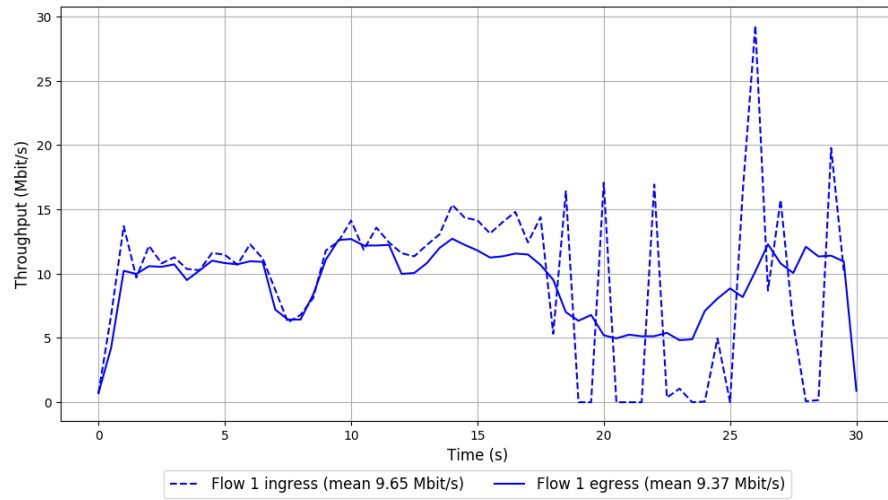
-- Flow 1:

Average throughput: 9.37 Mbit/s

95th percentile per-packet one-way delay: 3289.985 ms

Loss rate: 3.01%

### Run 3: Report of TCP Cubic — Data Link



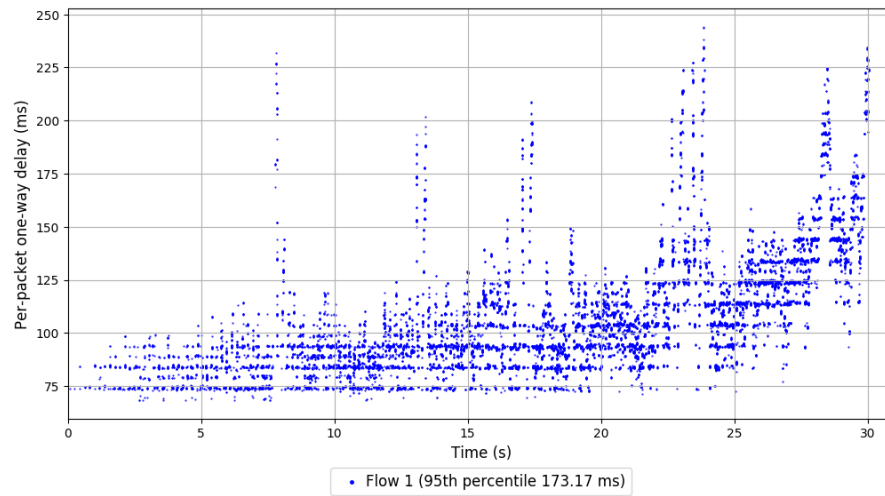
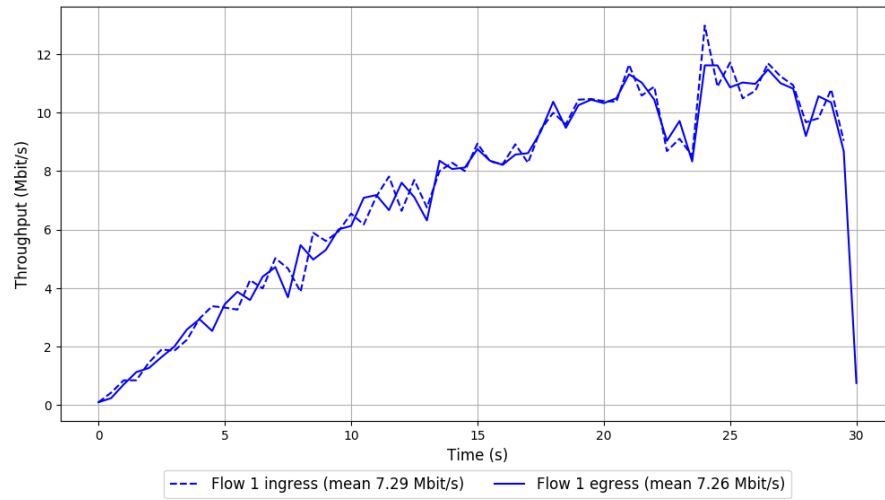
```
Run 1: Statistics of LEDBAT

Start at: 2017-12-11 08:22:01
End at: 2017-12-11 08:22:31
Local clock offset: -5.351 ms
Remote clock offset: 1.383 ms

# Below is generated by plot.py at 2017-12-11 08:59:41
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.26 Mbit/s
95th percentile per-packet one-way delay: 173.166 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 7.26 Mbit/s
95th percentile per-packet one-way delay: 173.166 ms
Loss rate: 0.56%
```



# Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2017-12-11 08:38:10

End at: 2017-12-11 08:38:40

Local clock offset: -5.413 ms

Remote clock offset: 1.543 ms

# Below is generated by plot.py at 2017-12-11 08:59:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.56 Mbit/s

95th percentile per-packet one-way delay: 230.313 ms

Loss rate: 0.53%

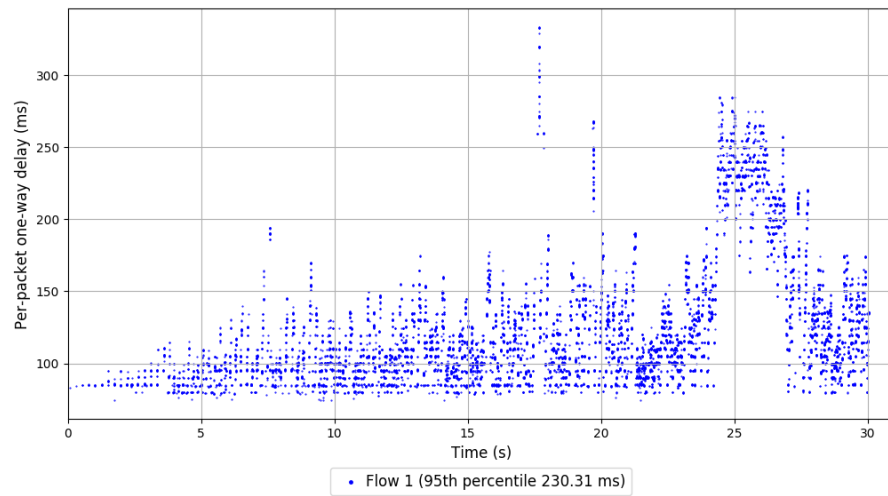
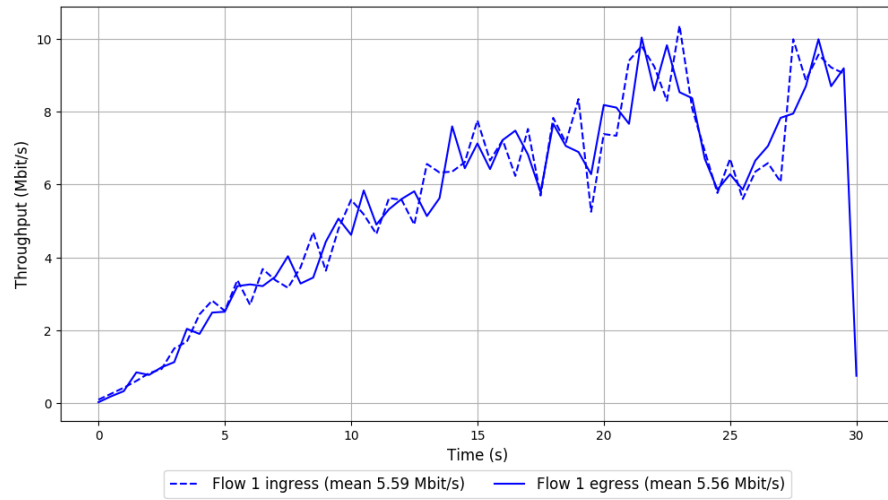
-- Flow 1:

Average throughput: 5.56 Mbit/s

95th percentile per-packet one-way delay: 230.313 ms

Loss rate: 0.53%

## Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2017-12-11 08:54:34

End at: 2017-12-11 08:55:04

Local clock offset: -2.65 ms

Remote clock offset: 1.825 ms

# Below is generated by plot.py at 2017-12-11 08:59:47

# Datalink statistics

-- Total of 1 flow:

Average throughput: 6.88 Mbit/s

95th percentile per-packet one-way delay: 158.082 ms

Loss rate: 0.51%

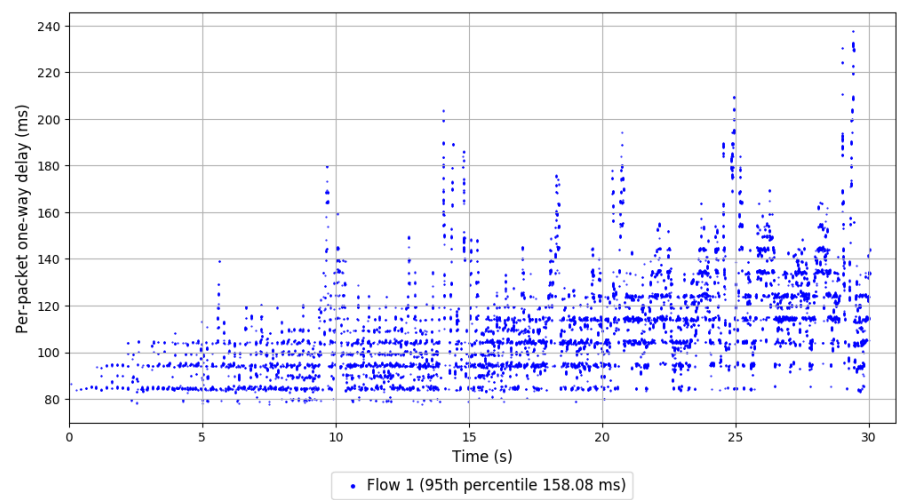
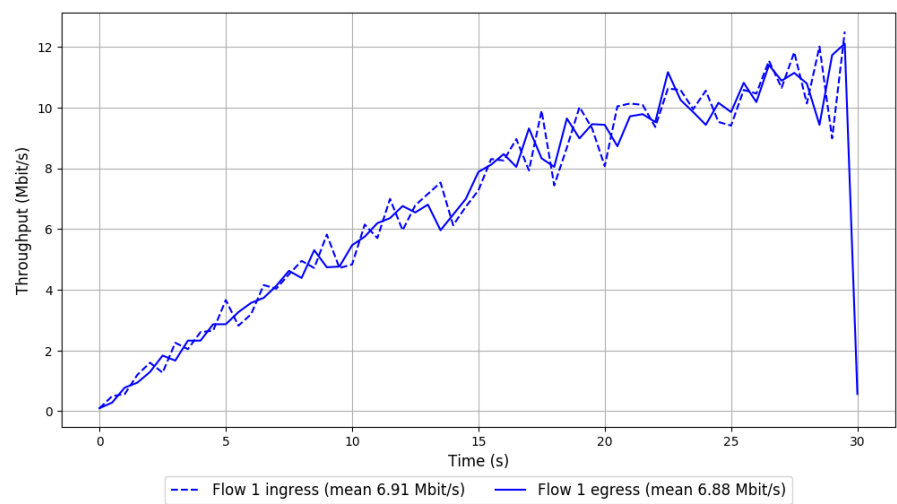
-- Flow 1:

Average throughput: 6.88 Mbit/s

95th percentile per-packet one-way delay: 158.082 ms

Loss rate: 0.51%

Run 3: Report of LEDBAT — Data Link

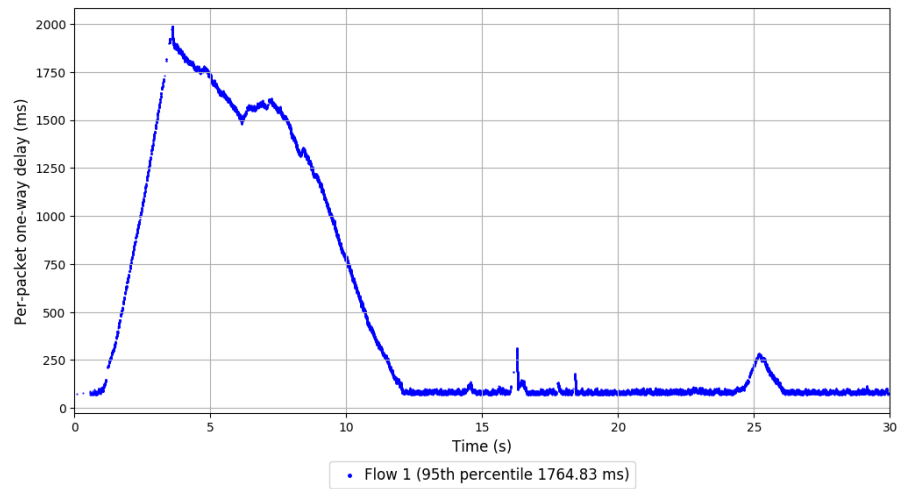
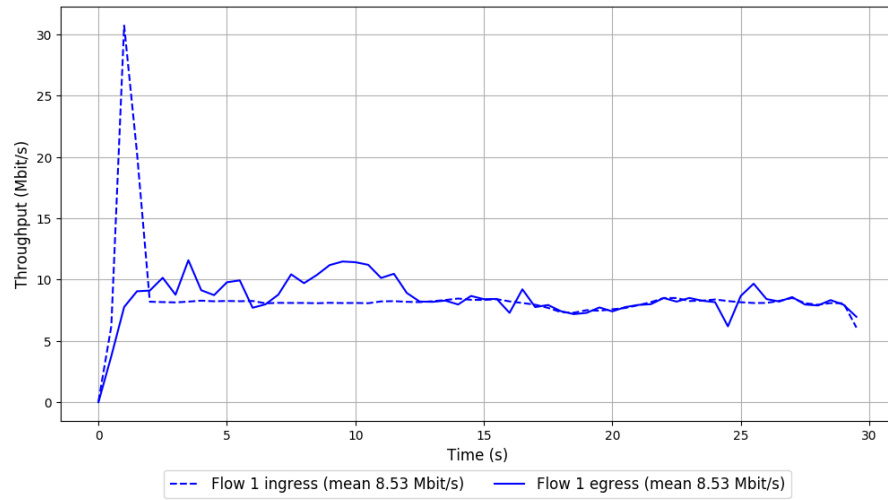


```
Run 1: Statistics of PCC

Start at: 2017-12-11 08:18:33
End at: 2017-12-11 08:19:03
Local clock offset: -5.541 ms
Remote clock offset: 1.349 ms

# Below is generated by plot.py at 2017-12-11 08:59:55
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.53 Mbit/s
95th percentile per-packet one-way delay: 1764.826 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 8.53 Mbit/s
95th percentile per-packet one-way delay: 1764.826 ms
Loss rate: 0.09%
```

### Run 1: Report of PCC — Data Link



Run 2: Statistics of PCC

Start at: 2017-12-11 08:34:42

End at: 2017-12-11 08:35:12

Local clock offset: -5.391 ms

Remote clock offset: 1.568 ms

# Below is generated by plot.py at 2017-12-11 08:59:55

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.44 Mbit/s

95th percentile per-packet one-way delay: 1534.750 ms

Loss rate: 0.14%

-- Flow 1:

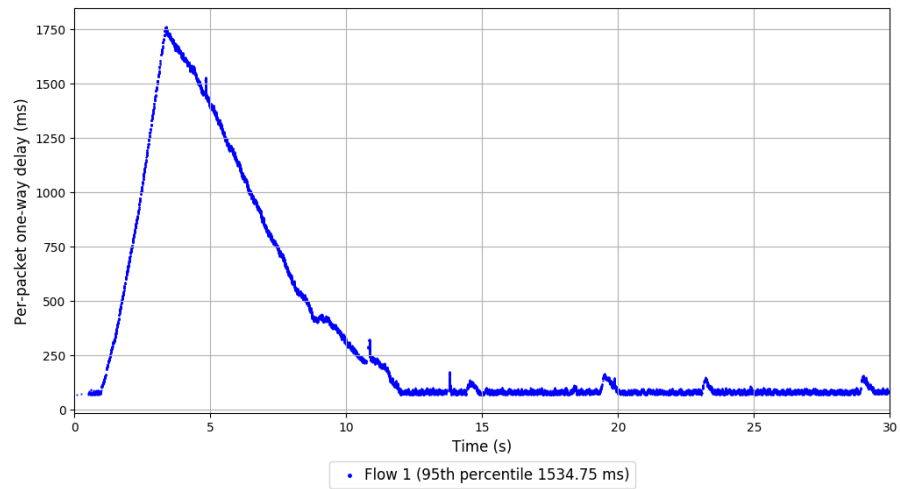
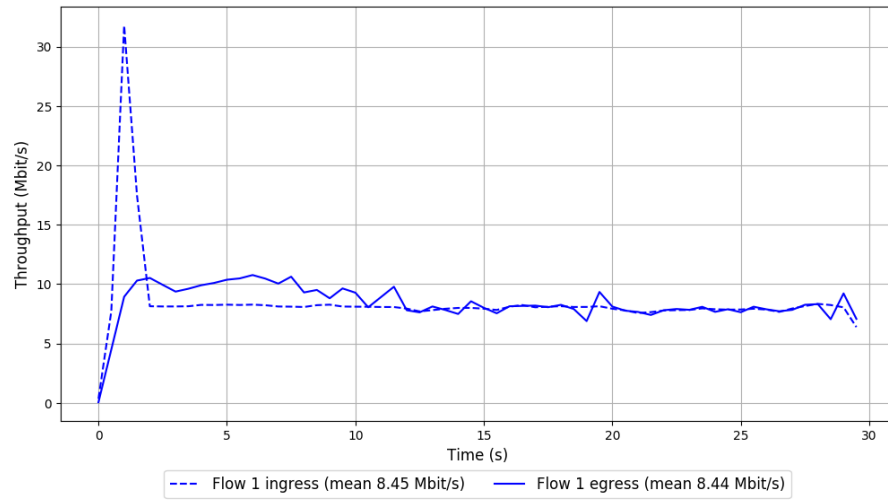
Average throughput: 8.44 Mbit/s

95th percentile per-packet one-way delay: 1534.750 ms

Loss rate: 0.14%



## Run 2: Report of PCC — Data Link



Run 3: Statistics of PCC

Start at: 2017-12-11 08:51:05

End at: 2017-12-11 08:51:35

Local clock offset: -2.949 ms

Remote clock offset: 1.671 ms

# Below is generated by plot.py at 2017-12-11 08:59:57

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.76 Mbit/s

95th percentile per-packet one-way delay: 535.396 ms

Loss rate: 0.11%

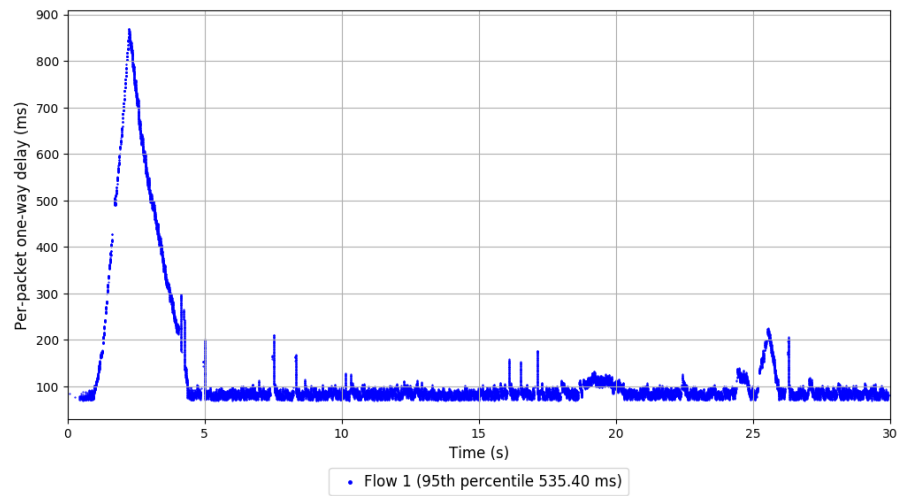
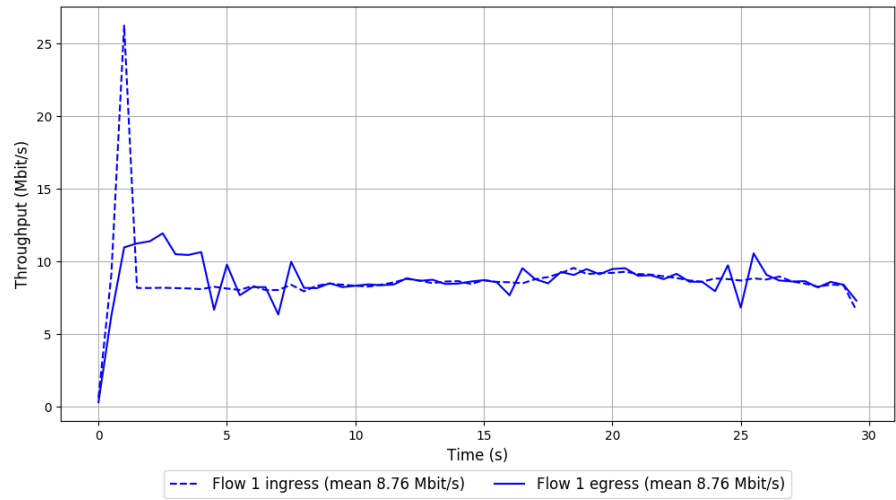
-- Flow 1:

Average throughput: 8.76 Mbit/s

95th percentile per-packet one-way delay: 535.396 ms

Loss rate: 0.11%

### Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

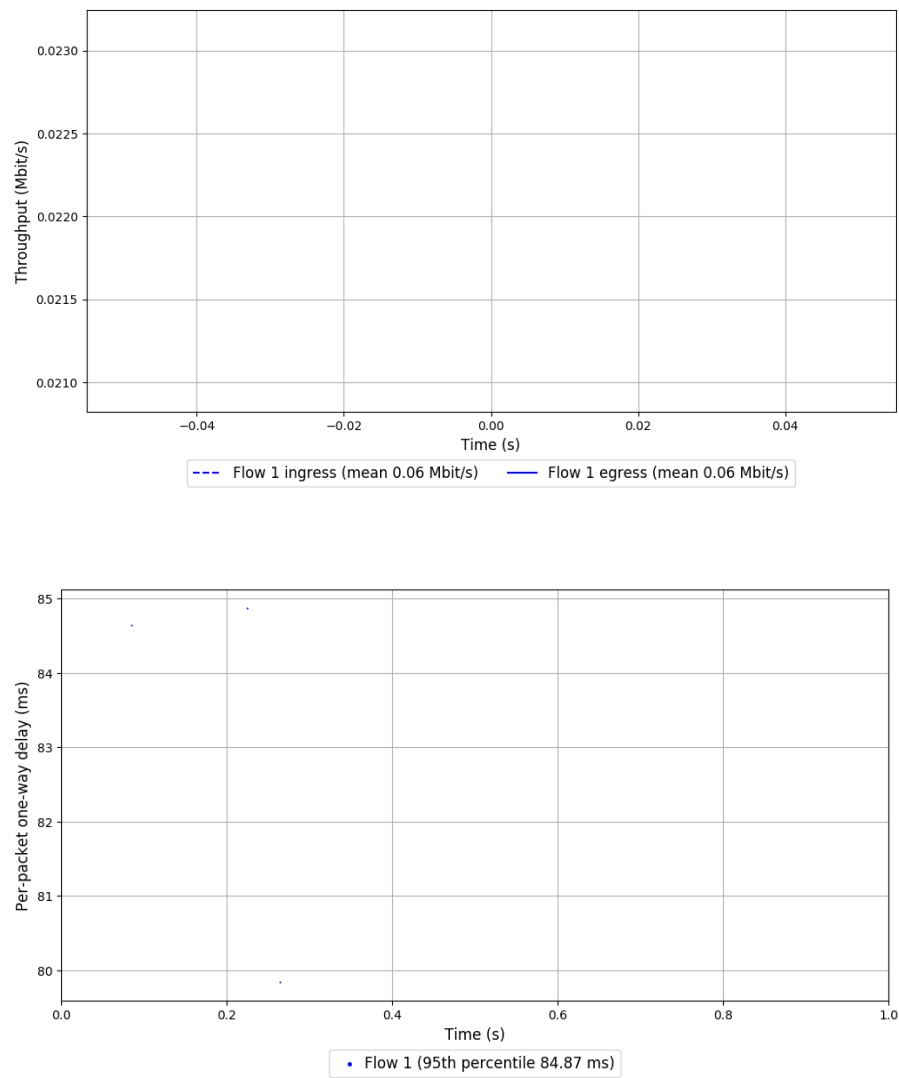
Start at: 2017-12-11 08:23:10

End at: 2017-12-11 08:23:40

Local clock offset: -5.437 ms

Remote clock offset: 1.388 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2017-12-11 08:39:20

End at: 2017-12-11 08:39:50

Local clock offset: -5.54 ms

Remote clock offset: 1.561 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 10.36 Mbit/s

95th percentile per-packet one-way delay: 606.577 ms

Loss rate: 2.26%

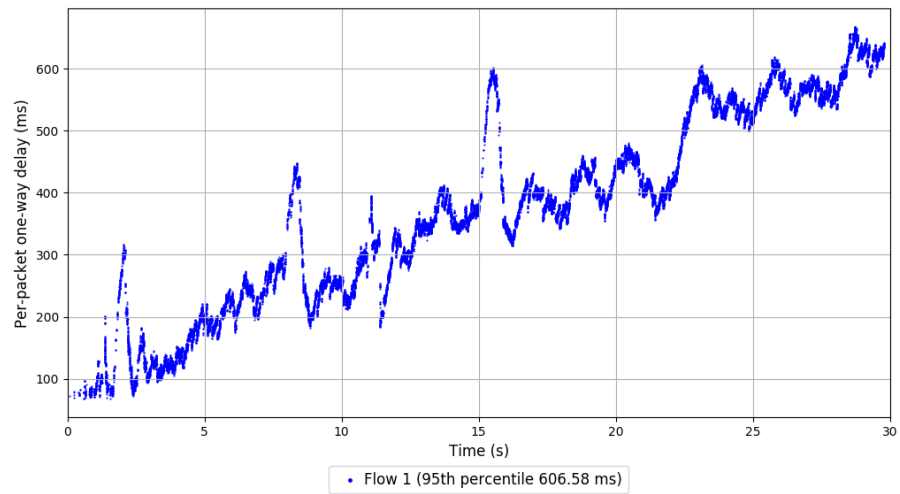
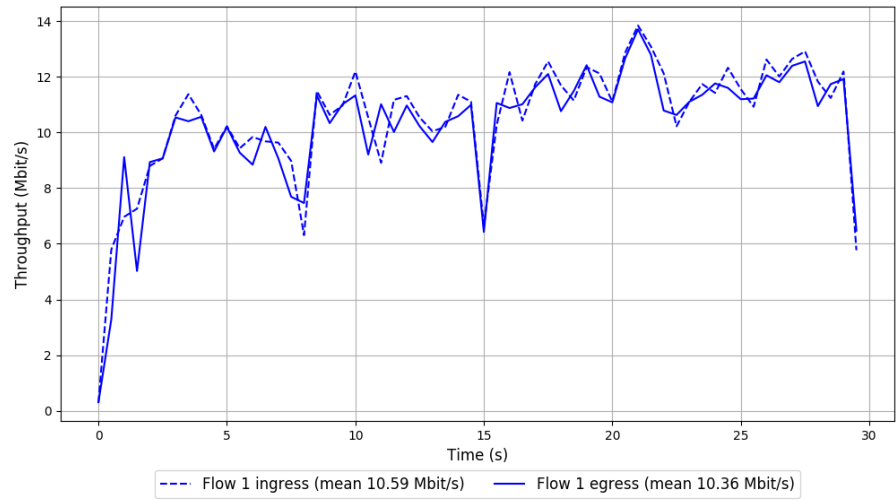
-- Flow 1:

Average throughput: 10.36 Mbit/s

95th percentile per-packet one-way delay: 606.577 ms

Loss rate: 2.26%

## Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2017-12-11 08:55:43

End at: 2017-12-11 08:56:13

Local clock offset: -2.691 ms

Remote clock offset: 1.666 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.36 Mbit/s

95th percentile per-packet one-way delay: 632.759 ms

Loss rate: 1.93%

-- Flow 1:

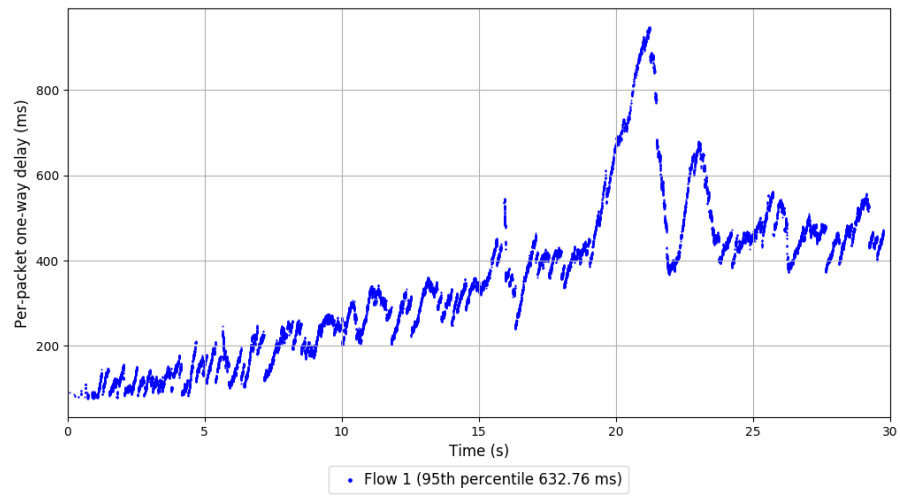
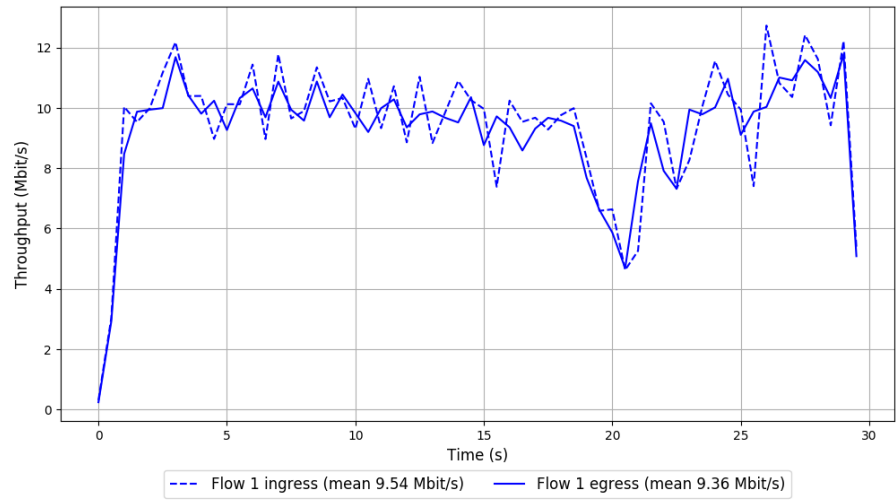
Average throughput: 9.36 Mbit/s

95th percentile per-packet one-way delay: 632.759 ms

Loss rate: 1.93%



### Run 3: Report of QUIC Cubic — Data Link

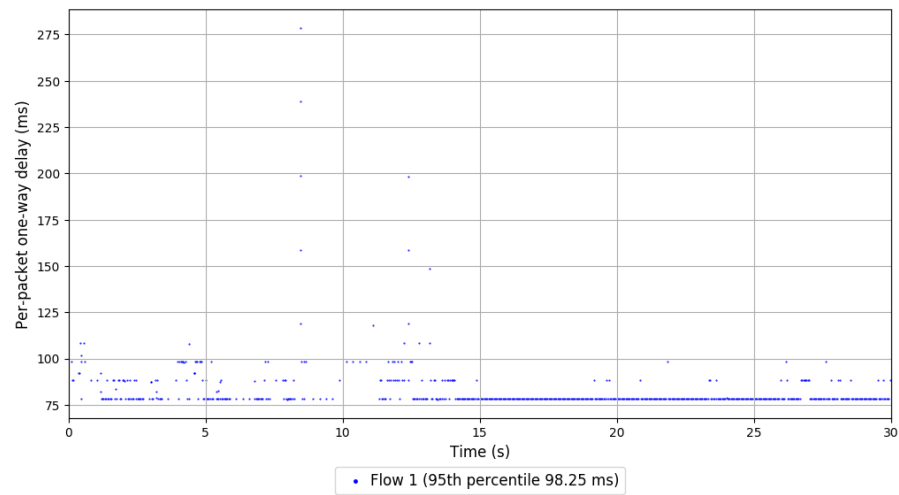
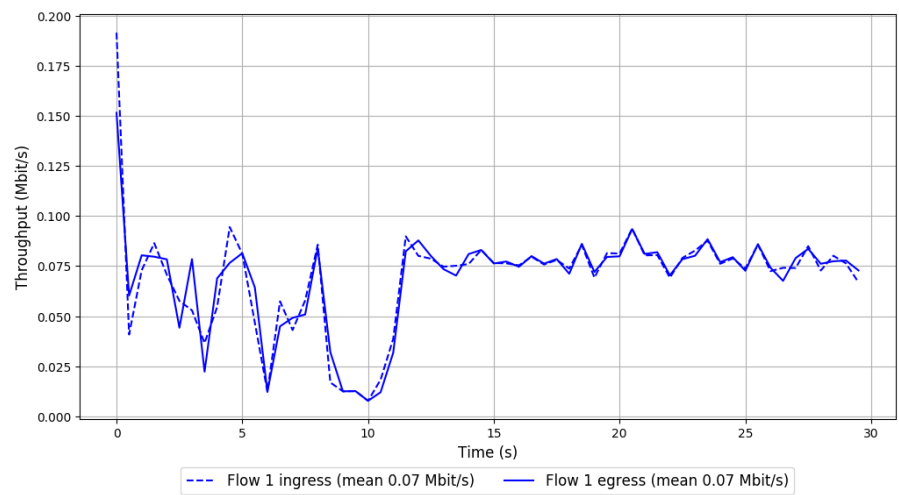


```
Run 1: Statistics of SCReAM

Start at: 2017-12-11 08:20:52
End at: 2017-12-11 08:21:22
Local clock offset: -5.326 ms
Remote clock offset: 1.338 ms

# Below is generated by plot.py at 2017-12-11 08:59:59
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 98.248 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 98.248 ms
Loss rate: 0.14%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2017-12-11 08:37:01

End at: 2017-12-11 08:37:31

Local clock offset: -5.36 ms

Remote clock offset: 1.57 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 85.943 ms

Loss rate: 0.00%

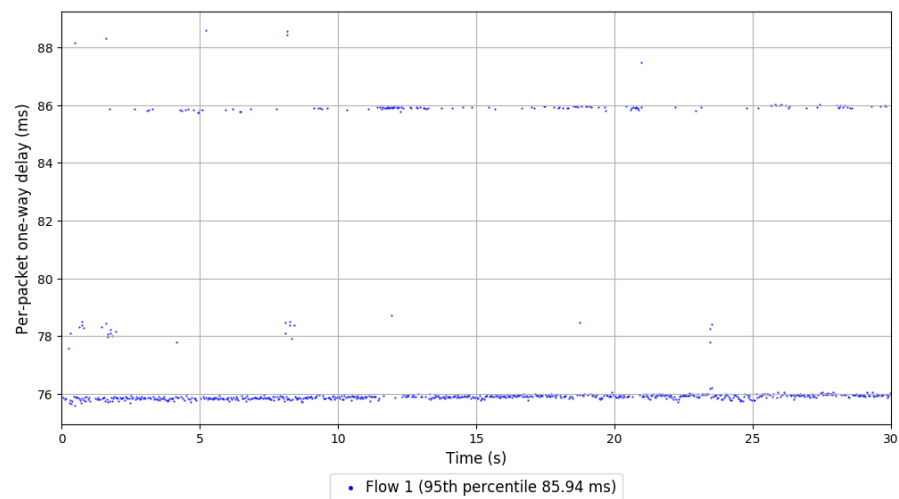
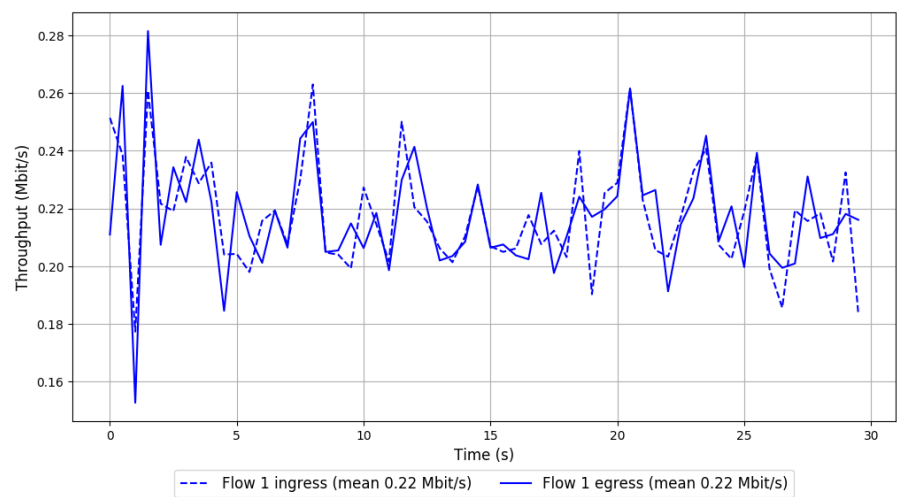
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 85.943 ms

Loss rate: 0.00%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2017-12-11 08:53:25

End at: 2017-12-11 08:53:55

Local clock offset: -2.701 ms

Remote clock offset: 1.732 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 95.261 ms

Loss rate: 0.00%

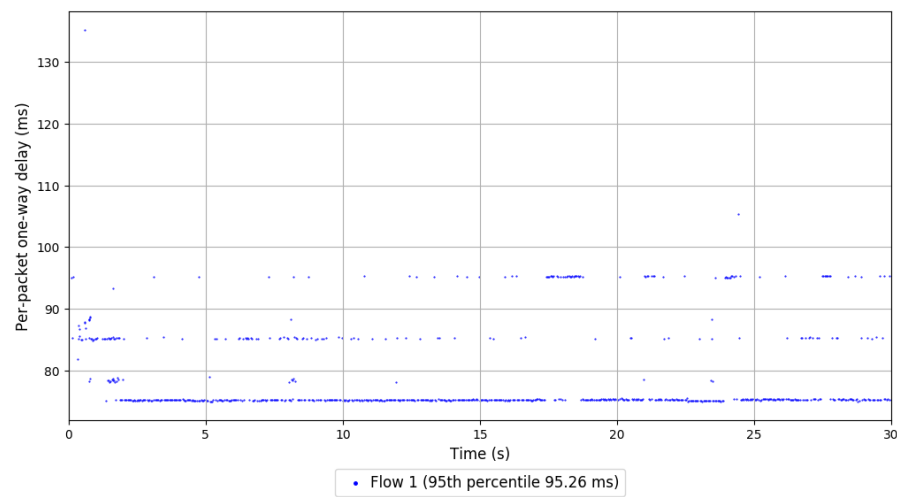
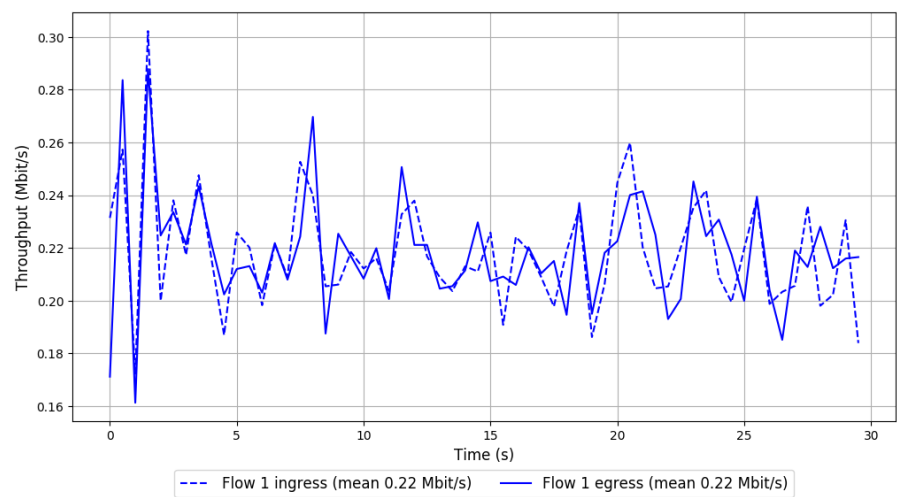
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 95.261 ms

Loss rate: 0.00%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of WebRTC media

Start at: 2017-12-11 08:19:42

End at: 2017-12-11 08:20:12

Local clock offset: -5.371 ms

Remote clock offset: 1.369 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.15 Mbit/s

95th percentile per-packet one-way delay: 97.914 ms

Loss rate: 0.15%

-- Flow 1:

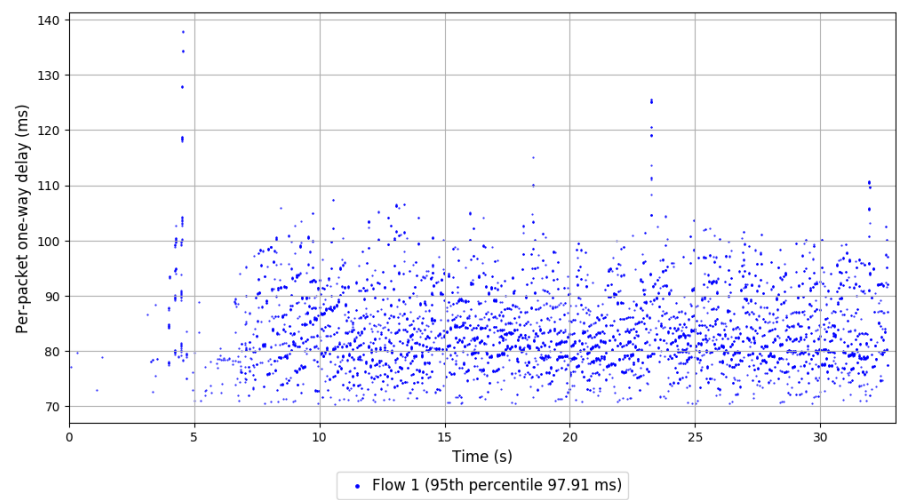
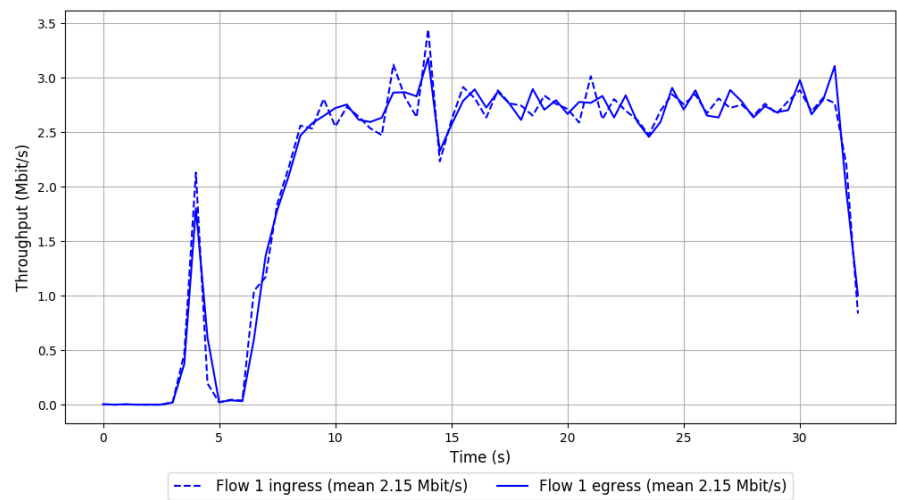
Average throughput: 2.15 Mbit/s

95th percentile per-packet one-way delay: 97.914 ms

Loss rate: 0.15%



Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2017-12-11 08:35:52

End at: 2017-12-11 08:36:22

Local clock offset: -5.346 ms

Remote clock offset: 1.554 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.20 Mbit/s

95th percentile per-packet one-way delay: 108.048 ms

Loss rate: 0.15%

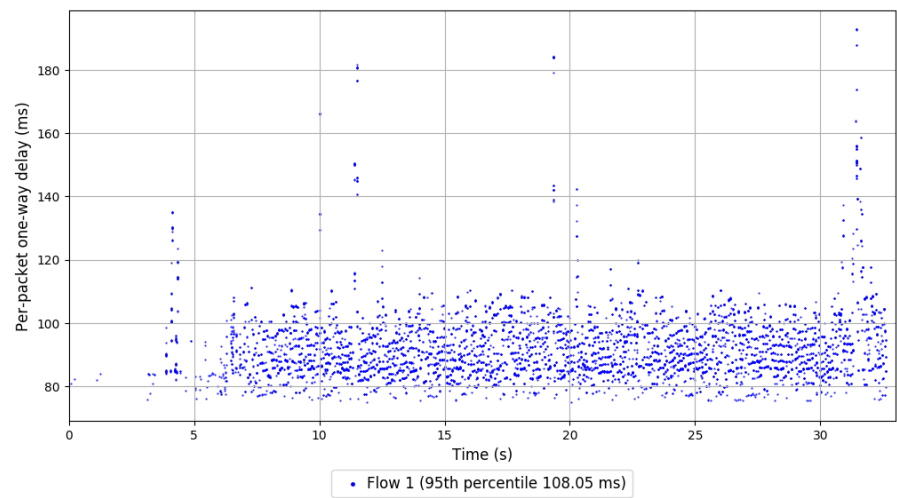
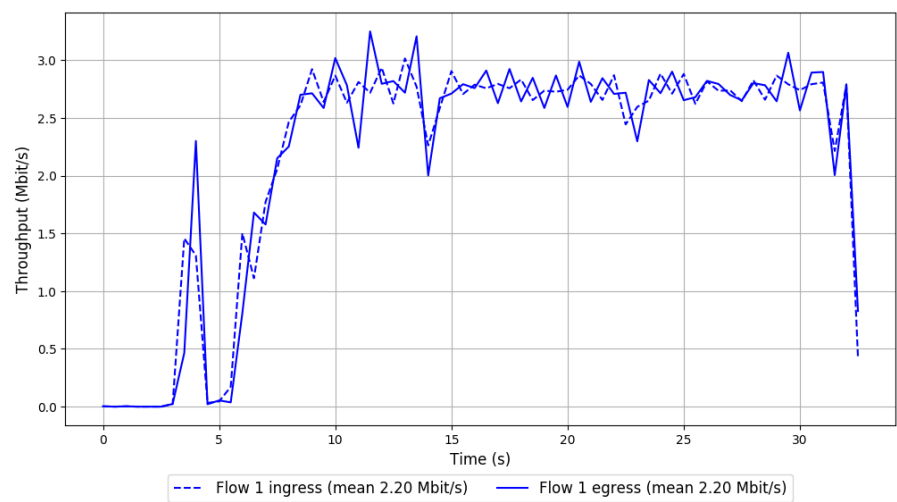
-- Flow 1:

Average throughput: 2.20 Mbit/s

95th percentile per-packet one-way delay: 108.048 ms

Loss rate: 0.15%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2017-12-11 08:52:14

End at: 2017-12-11 08:52:44

Local clock offset: -2.79 ms

Remote clock offset: 1.754 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.15 Mbit/s

95th percentile per-packet one-way delay: 101.906 ms

Loss rate: 0.15%

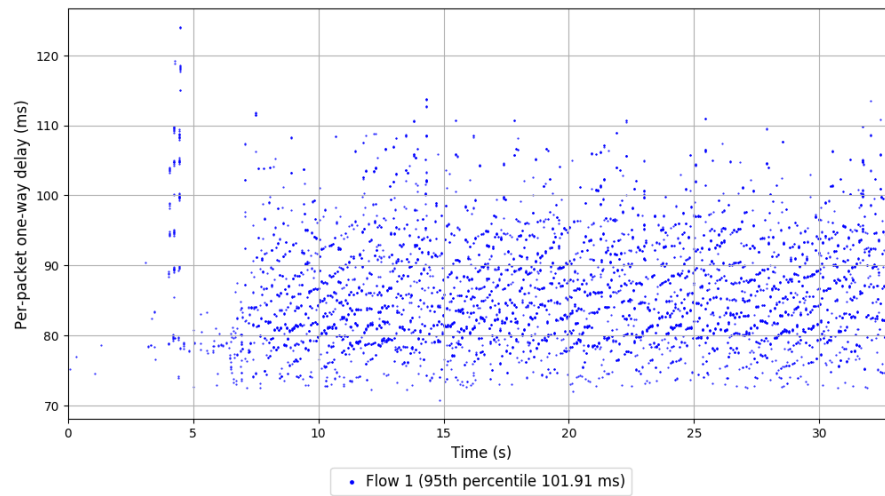
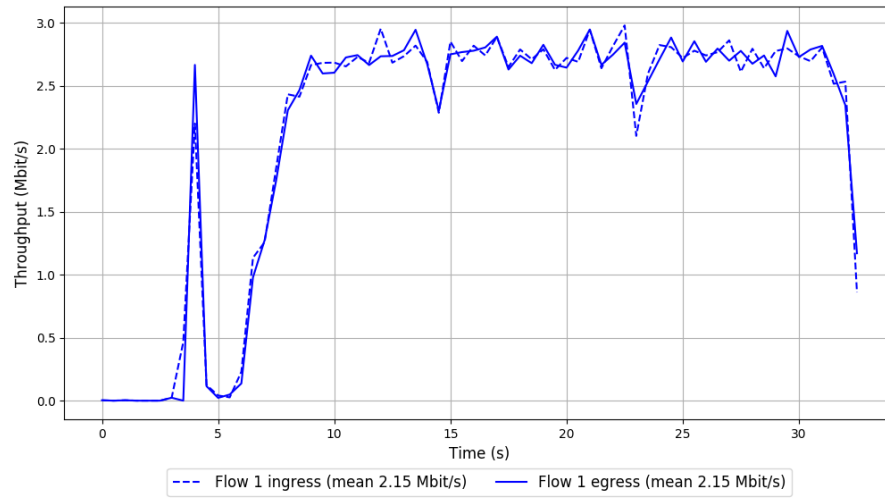
-- Flow 1:

Average throughput: 2.15 Mbit/s

95th percentile per-packet one-way delay: 101.906 ms

Loss rate: 0.15%

### Run 3: Report of WebRTC media — Data Link



Run 1: Statistics of Sprout

Start at: 2017-12-11 08:25:28

End at: 2017-12-11 08:25:58

Local clock offset: -5.839 ms

Remote clock offset: 1.378 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.27 Mbit/s

95th percentile per-packet one-way delay: 95.420 ms

Loss rate: 0.01%

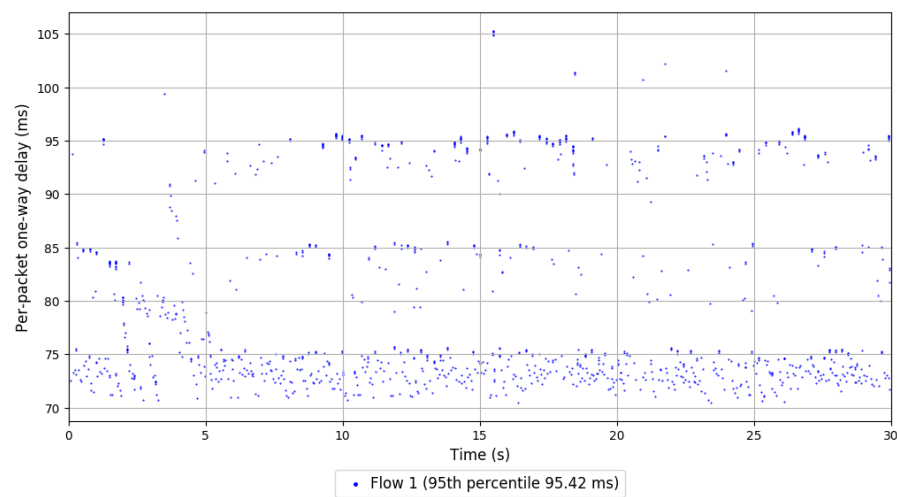
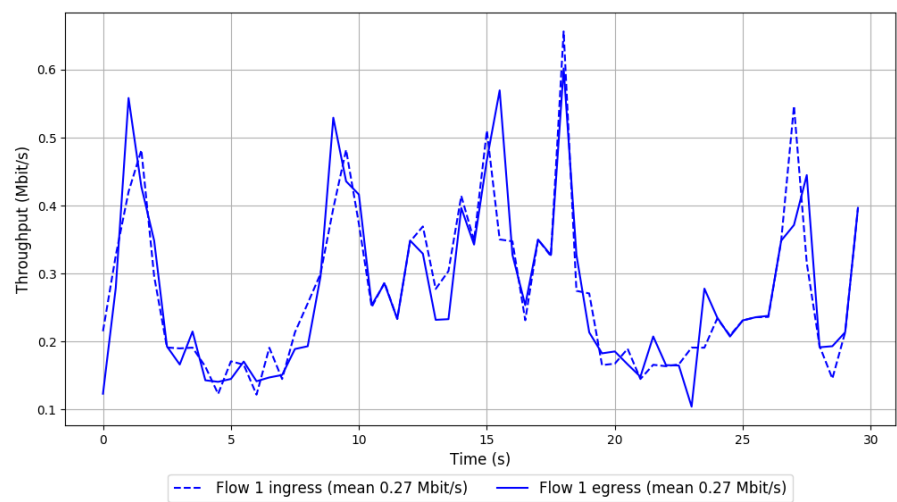
-- Flow 1:

Average throughput: 0.27 Mbit/s

95th percentile per-packet one-way delay: 95.420 ms

Loss rate: 0.01%

Run 1: Report of Sprout — Data Link



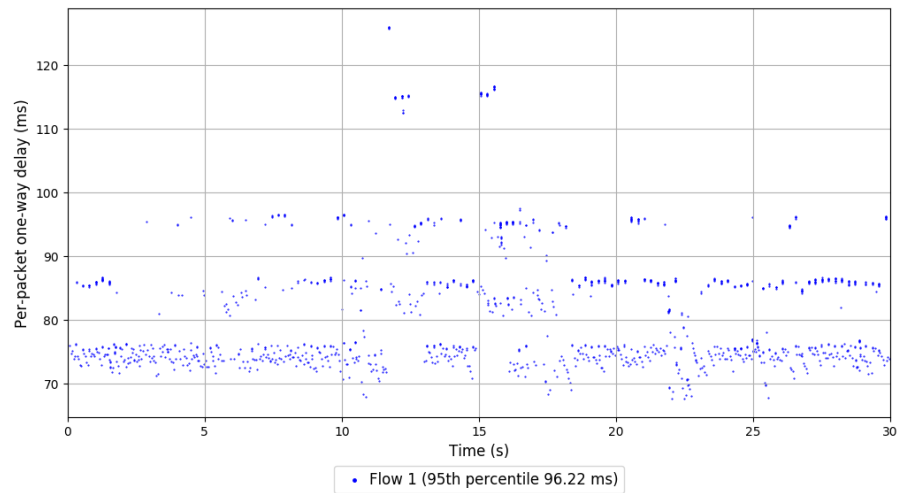
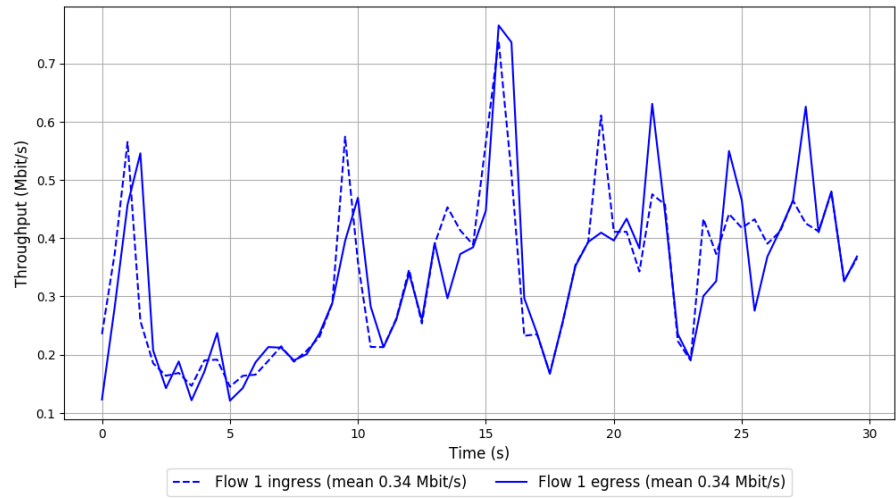
Run 2: Statistics of Sprout

Start at: 2017-12-11 08:41:42  
End at: 2017-12-11 08:42:12  
Local clock offset: -5.945 ms  
Remote clock offset: 1.579 ms

# Below is generated by plot.py at 2017-12-11 08:59:59  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.34 Mbit/s  
95th percentile per-packet one-way delay: 96.219 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 0.34 Mbit/s  
95th percentile per-packet one-way delay: 96.219 ms  
Loss rate: 0.00%



## Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2017-12-11 08:58:07

End at: 2017-12-11 08:58:37

Local clock offset: -2.824 ms

Remote clock offset: 1.761 ms

# Below is generated by plot.py at 2017-12-11 08:59:59

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 98.570 ms

Loss rate: 0.04%

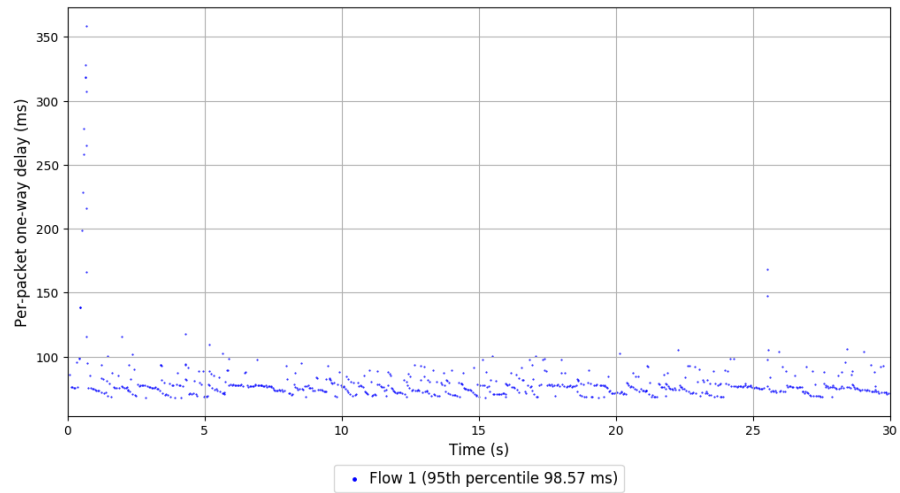
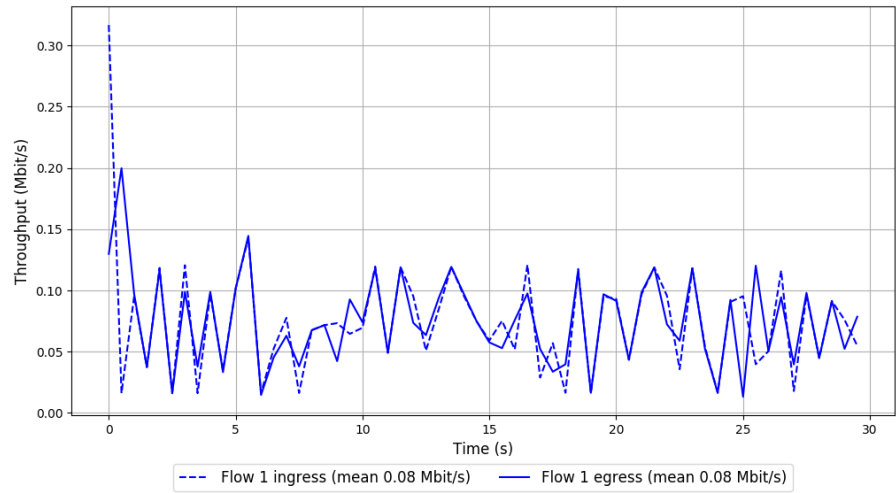
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 98.570 ms

Loss rate: 0.04%

### Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2017-12-11 08:16:12

End at: 2017-12-11 08:16:42

Local clock offset: -6.165 ms

Remote clock offset: 1.271 ms

# Below is generated by plot.py at 2017-12-11 09:00:04

# Datalink statistics

-- Total of 1 flow:

Average throughput: 4.26 Mbit/s

95th percentile per-packet one-way delay: 123.019 ms

Loss rate: 0.18%

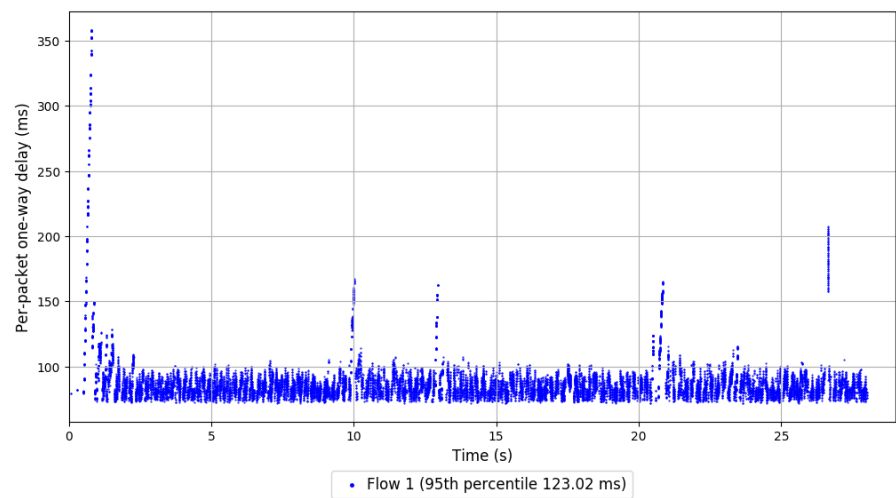
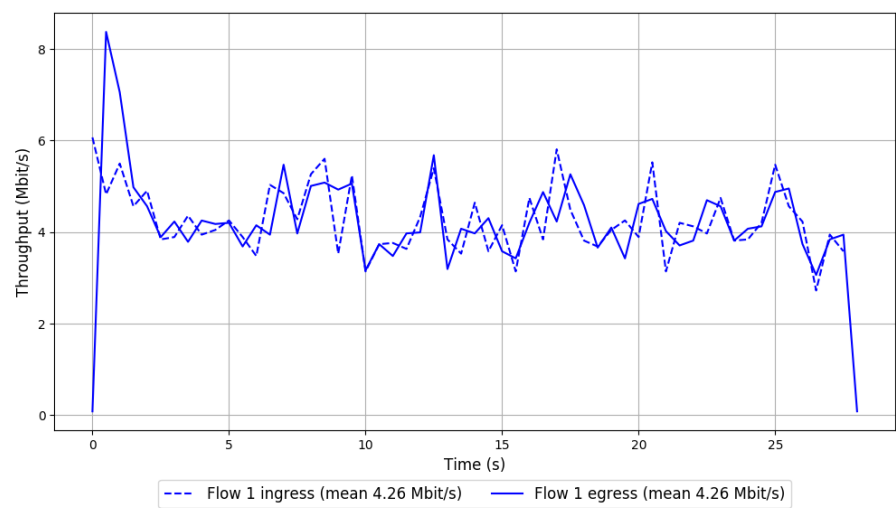
-- Flow 1:

Average throughput: 4.26 Mbit/s

95th percentile per-packet one-way delay: 123.019 ms

Loss rate: 0.18%

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



Run 2: Statistics of TaoVA-100x

Start at: 2017-12-11 08:32:23

End at: 2017-12-11 08:32:53

Local clock offset: -5.688 ms

Remote clock offset: 1.383 ms

# Below is generated by plot.py at 2017-12-11 09:00:05

# Datalink statistics

-- Total of 1 flow:

Average throughput: 4.19 Mbit/s

95th percentile per-packet one-way delay: 100.273 ms

Loss rate: 0.10%

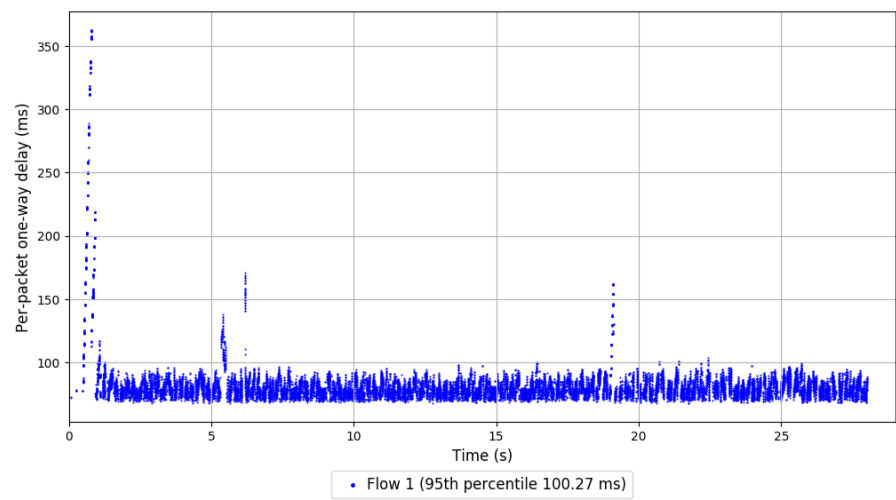
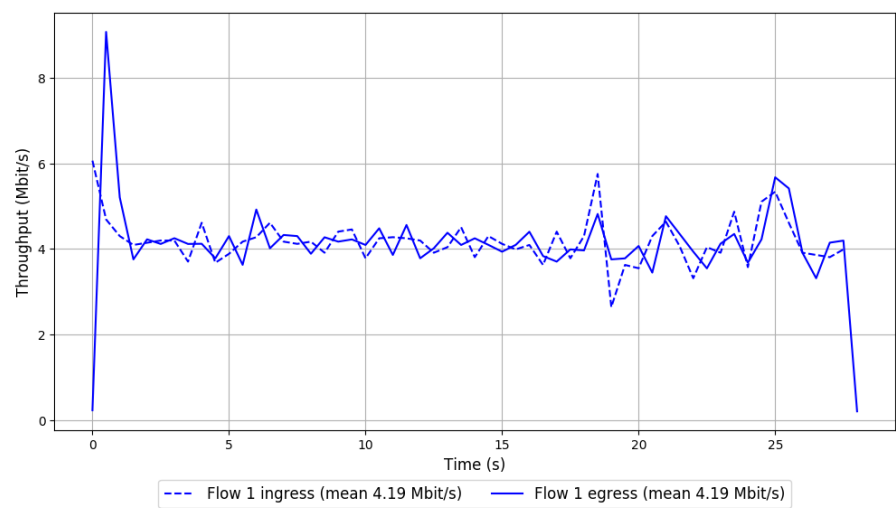
-- Flow 1:

Average throughput: 4.19 Mbit/s

95th percentile per-packet one-way delay: 100.273 ms

Loss rate: 0.10%

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



Run 3: Statistics of TaoVA-100x

Start at: 2017-12-11 08:48:44

End at: 2017-12-11 08:49:15

Local clock offset: -3.451 ms

Remote clock offset: 1.515 ms

# Below is generated by plot.py at 2017-12-11 09:00:05

# Datalink statistics

-- Total of 1 flow:

Average throughput: 4.10 Mbit/s

95th percentile per-packet one-way delay: 109.672 ms

Loss rate: 0.20%

-- Flow 1:

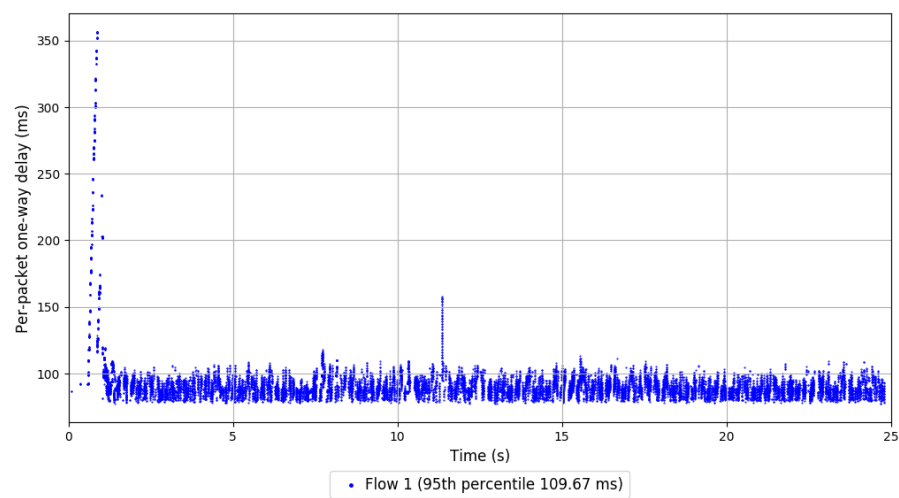
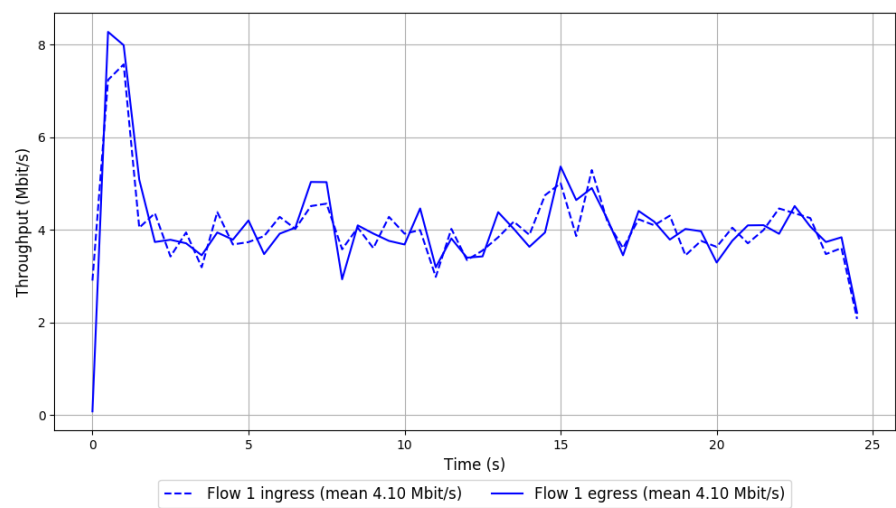
Average throughput: 4.10 Mbit/s

95th percentile per-packet one-way delay: 109.672 ms

Loss rate: 0.20%



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



Run 1: Statistics of TCP Vegas

Start at: 2017-12-11 08:12:07

End at: 2017-12-11 08:12:37

Local clock offset: -8.779 ms

Remote clock offset: 0.169 ms

# Below is generated by plot.py at 2017-12-11 09:00:05

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.67 Mbit/s

95th percentile per-packet one-way delay: 121.247 ms

Loss rate: 0.00%

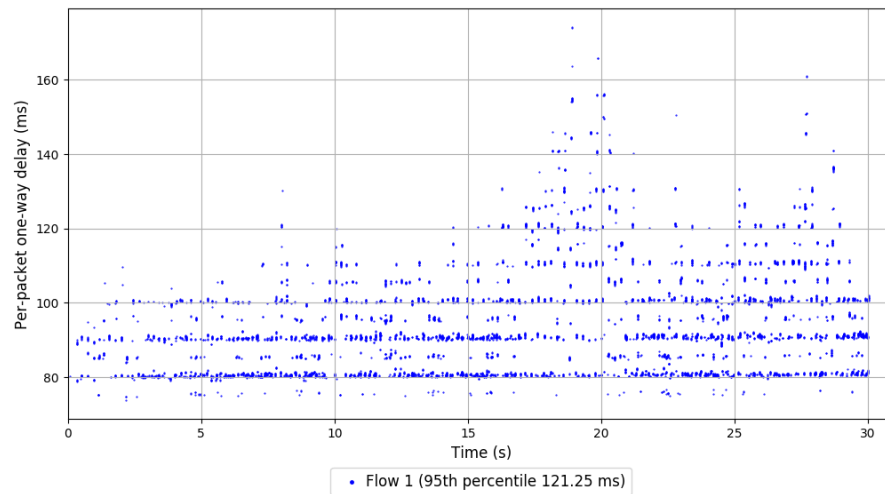
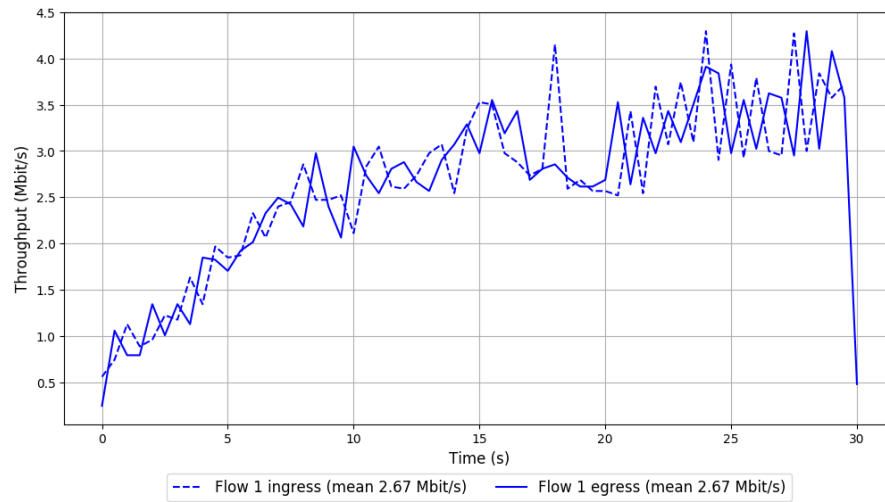
-- Flow 1:

Average throughput: 2.67 Mbit/s

95th percentile per-packet one-way delay: 121.247 ms

Loss rate: 0.00%

### Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2017-12-11 08:28:55

End at: 2017-12-11 08:29:25

Local clock offset: -6.706 ms

Remote clock offset: 1.495 ms

# Below is generated by plot.py at 2017-12-11 09:00:11

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.75 Mbit/s

95th percentile per-packet one-way delay: 1964.320 ms

Loss rate: 1.84%

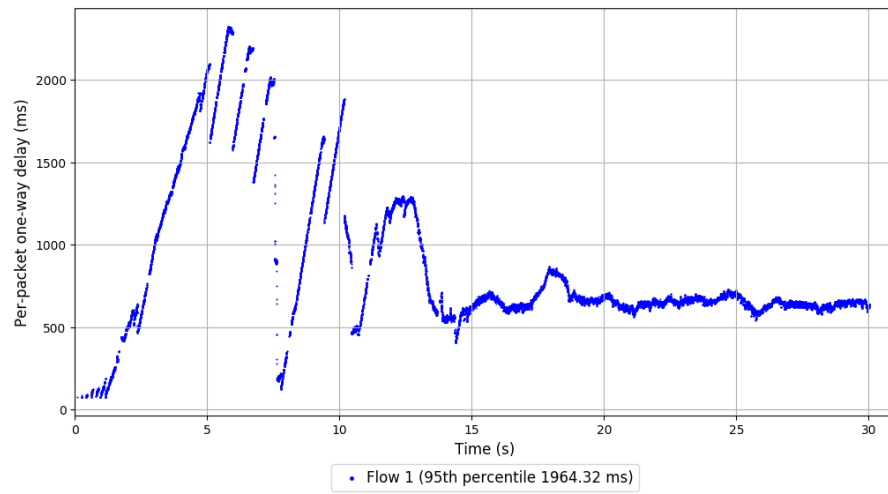
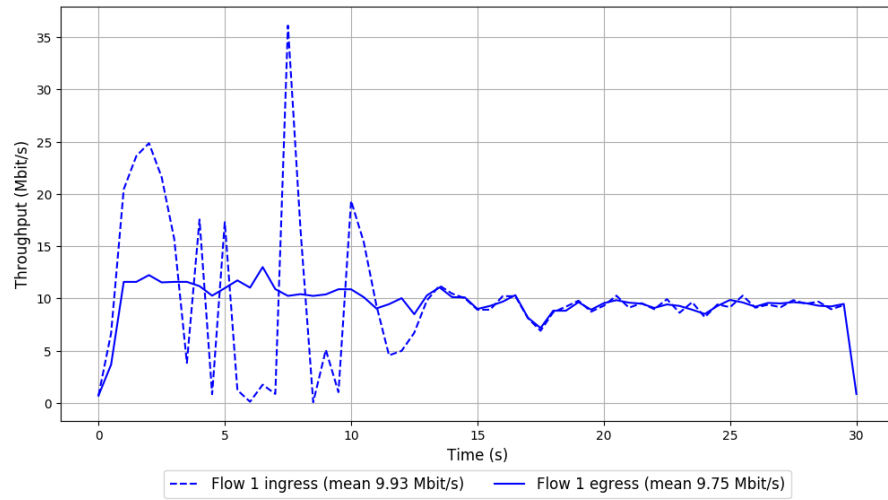
-- Flow 1:

Average throughput: 9.75 Mbit/s

95th percentile per-packet one-way delay: 1964.320 ms

Loss rate: 1.84%

## Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2017-12-11 08:45:09

End at: 2017-12-11 08:45:39

Local clock offset: -4.732 ms

Remote clock offset: 1.827 ms

# Below is generated by plot.py at 2017-12-11 09:00:12

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.99 Mbit/s

95th percentile per-packet one-way delay: 276.994 ms

Loss rate: 0.51%

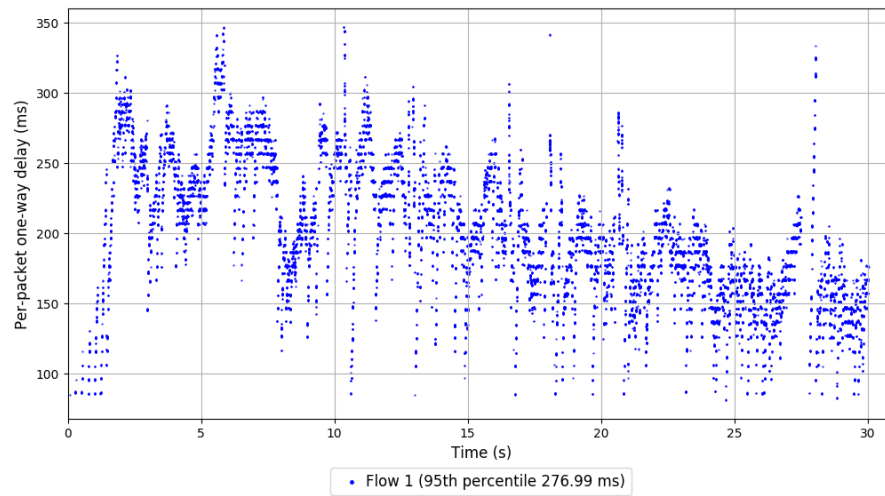
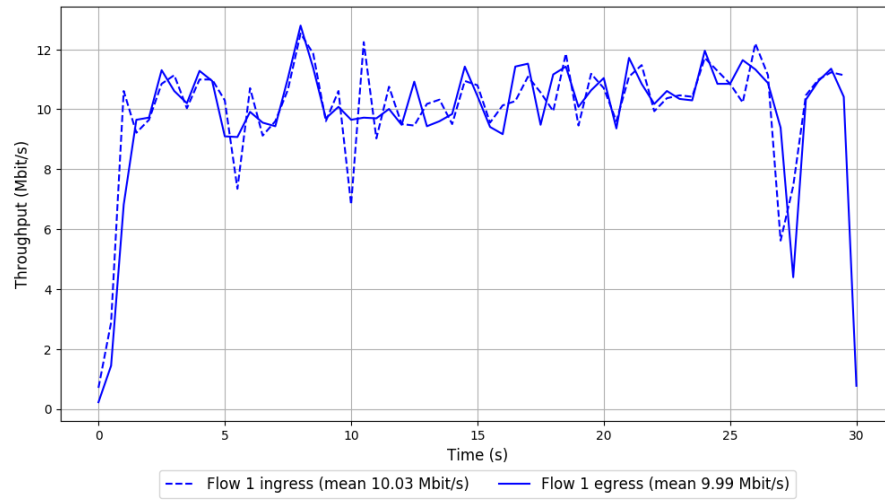
-- Flow 1:

Average throughput: 9.99 Mbit/s

95th percentile per-packet one-way delay: 276.994 ms

Loss rate: 0.51%

### Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2017-12-11 08:17:23

End at: 2017-12-11 08:17:53

Local clock offset: -5.816 ms

Remote clock offset: 1.352 ms

# Below is generated by plot.py at 2017-12-11 09:00:17

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.51 Mbit/s

95th percentile per-packet one-way delay: 1006.772 ms

Loss rate: 3.40%

-- Flow 1:

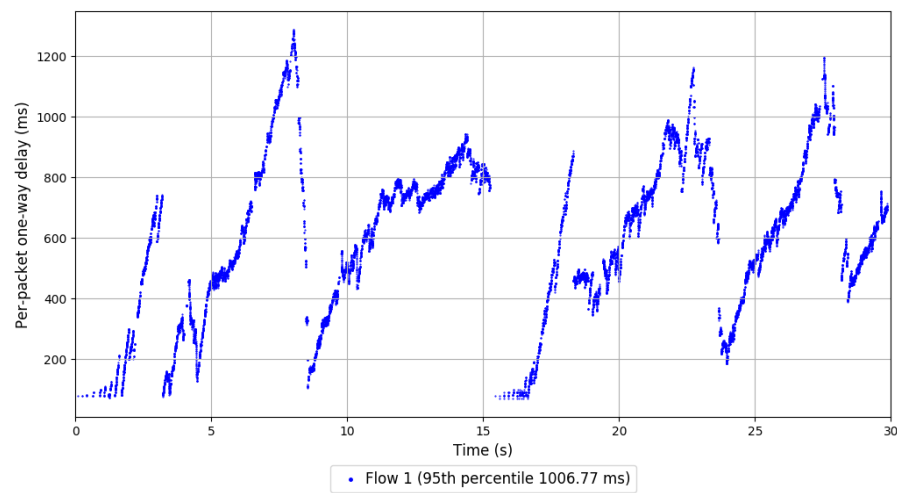
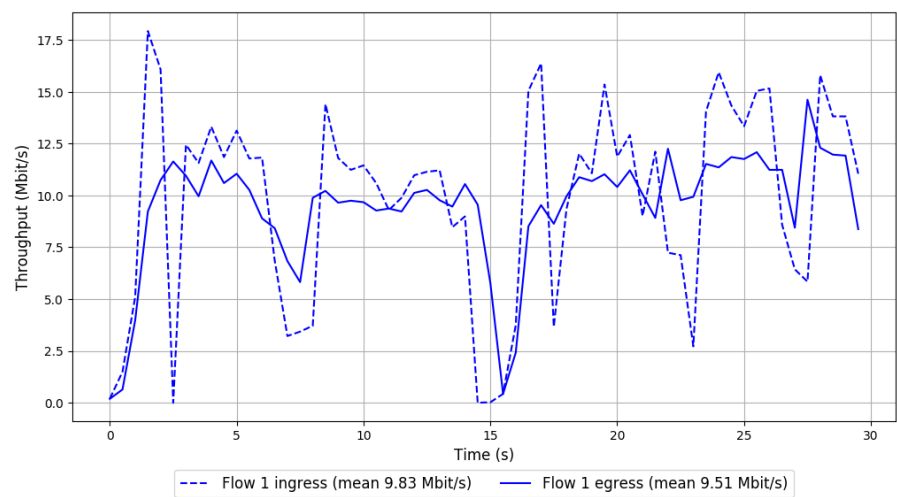
Average throughput: 9.51 Mbit/s

95th percentile per-packet one-way delay: 1006.772 ms

Loss rate: 3.40%



Run 1: Report of Verus — Data Link

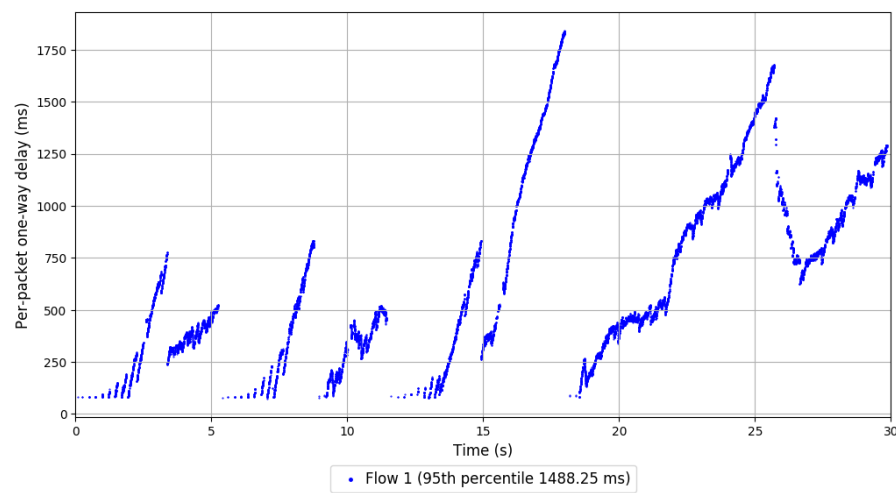
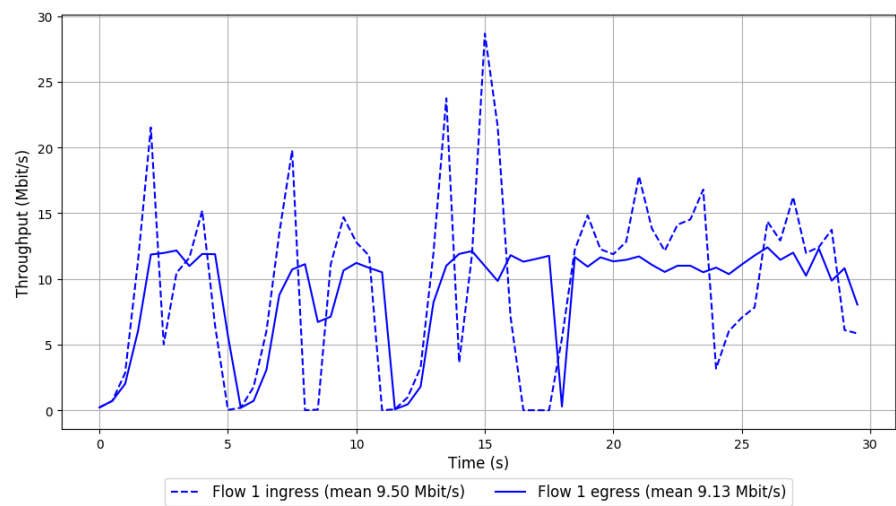


Run 2: Statistics of Verus

Start at: 2017-12-11 08:33:32  
End at: 2017-12-11 08:34:02  
Local clock offset: -5.527 ms  
Remote clock offset: 1.541 ms

# Below is generated by plot.py at 2017-12-11 09:00:17  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 9.13 Mbit/s  
95th percentile per-packet one-way delay: 1488.251 ms  
Loss rate: 3.93%  
-- Flow 1:  
Average throughput: 9.13 Mbit/s  
95th percentile per-packet one-way delay: 1488.251 ms  
Loss rate: 3.93%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2017-12-11 08:49:54

End at: 2017-12-11 08:50:24

Local clock offset: -3.112 ms

Remote clock offset: 1.681 ms

# Below is generated by plot.py at 2017-12-11 09:00:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 10.43 Mbit/s

95th percentile per-packet one-way delay: 1248.914 ms

Loss rate: 2.09%

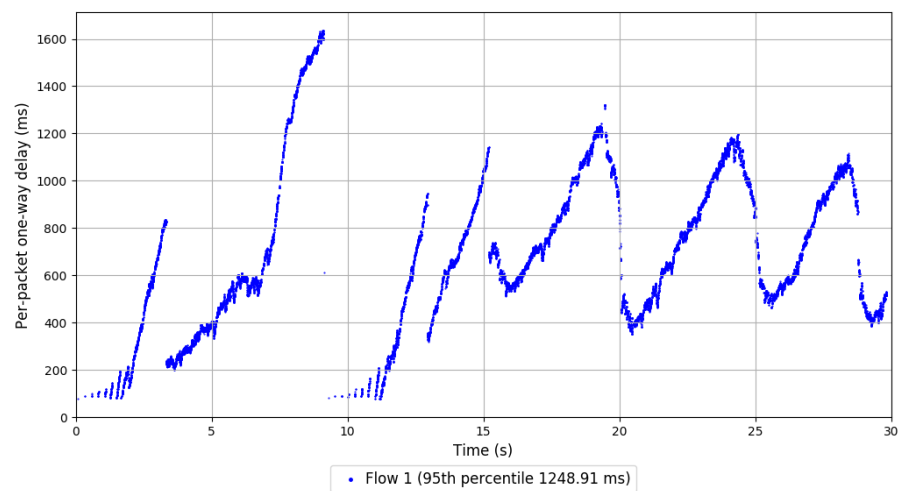
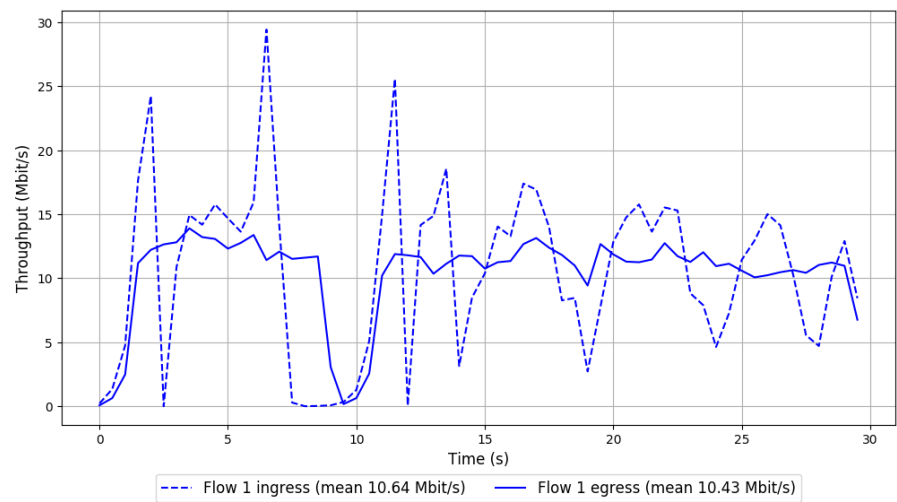
-- Flow 1:

Average throughput: 10.43 Mbit/s

95th percentile per-packet one-way delay: 1248.914 ms

Loss rate: 2.09%

Run 3: Report of Verus — Data Link

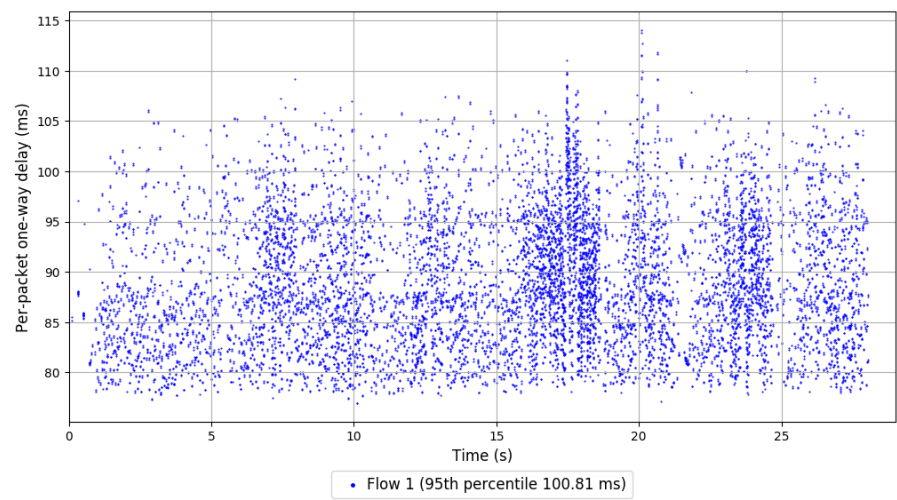
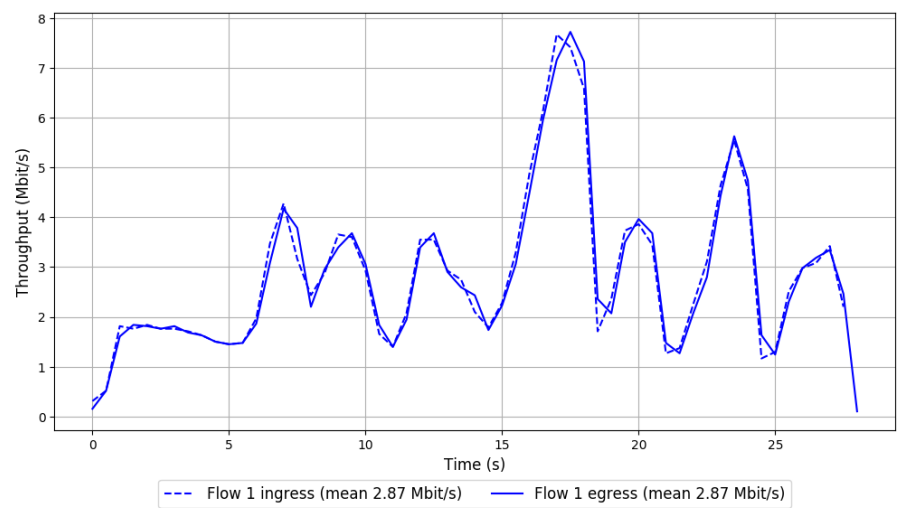


Run 1: Statistics of Copa

Start at: 2017-12-11 08:09:48  
End at: 2017-12-11 08:10:18  
Local clock offset: -10.347 ms  
Remote clock offset: 1.359 ms

# Below is generated by plot.py at 2017-12-11 09:00:18  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.87 Mbit/s  
95th percentile per-packet one-way delay: 100.813 ms  
Loss rate: 0.08%  
-- Flow 1:  
Average throughput: 2.87 Mbit/s  
95th percentile per-packet one-way delay: 100.813 ms  
Loss rate: 0.08%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2017-12-11 08:26:37

End at: 2017-12-11 08:27:07

Local clock offset: -6.103 ms

Remote clock offset: 1.373 ms

# Below is generated by plot.py at 2017-12-11 09:00:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.04 Mbit/s

95th percentile per-packet one-way delay: 97.387 ms

Loss rate: 0.13%

-- Flow 1:

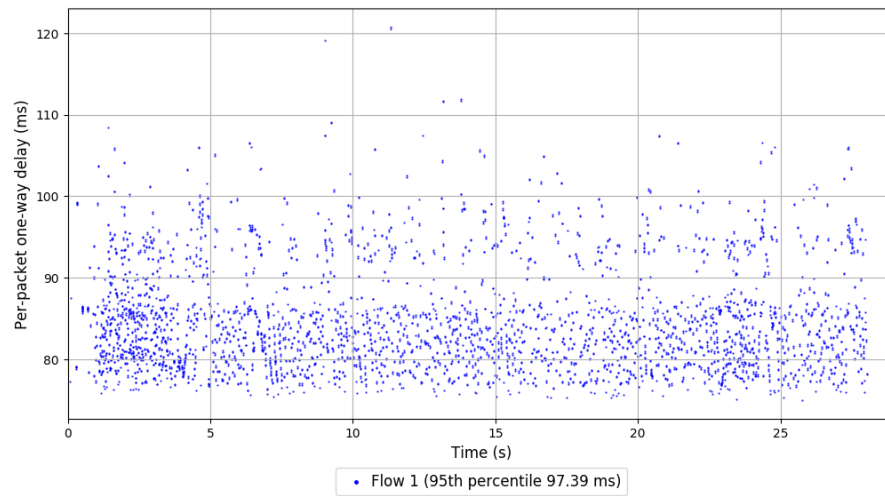
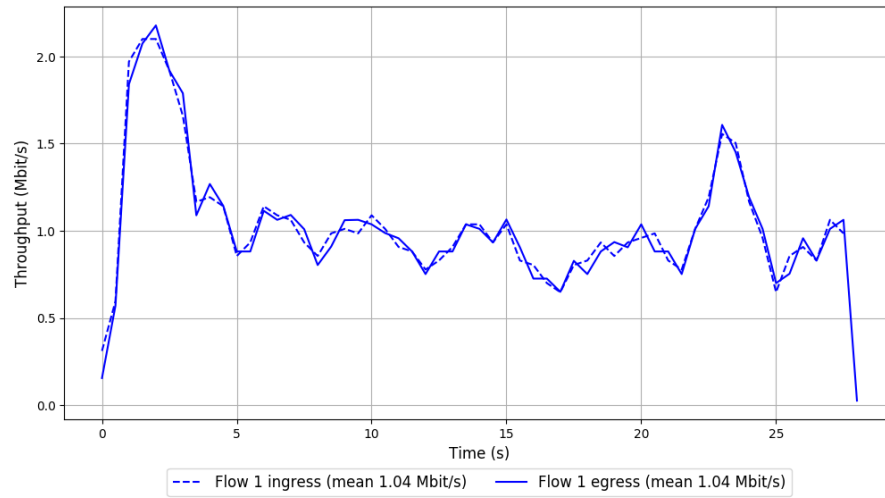
Average throughput: 1.04 Mbit/s

95th percentile per-packet one-way delay: 97.387 ms

Loss rate: 0.13%



## Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2017-12-11 08:42:51

End at: 2017-12-11 08:43:21

Local clock offset: -5.934 ms

Remote clock offset: 1.582 ms

# Below is generated by plot.py at 2017-12-11 09:00:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 99.976 ms

Loss rate: 0.22%

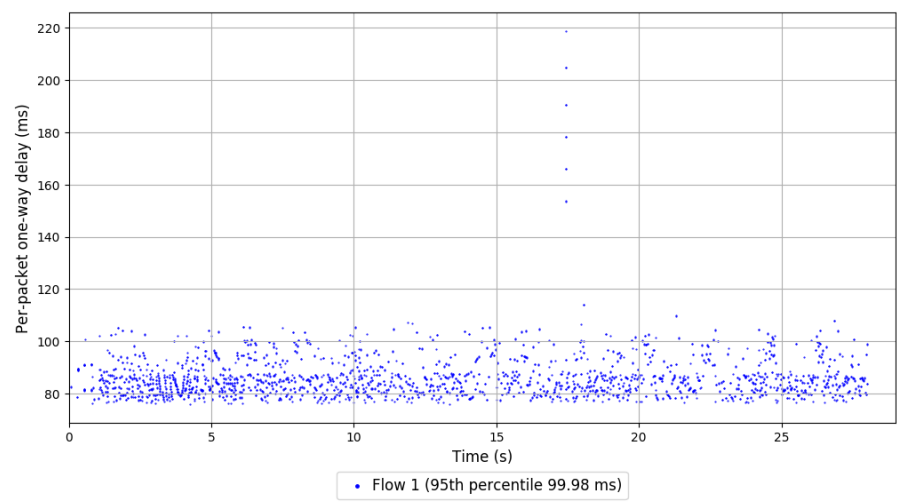
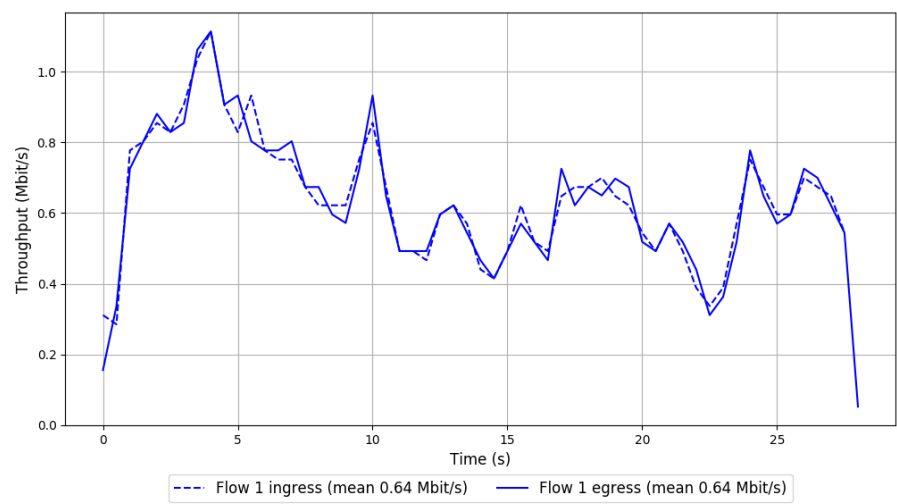
-- Flow 1:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 99.976 ms

Loss rate: 0.22%

Run 3: Report of Copa — Data Link

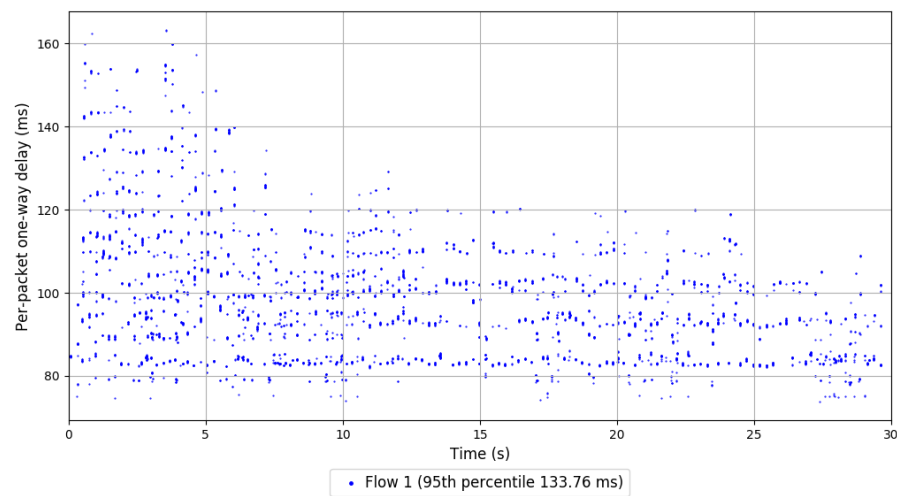
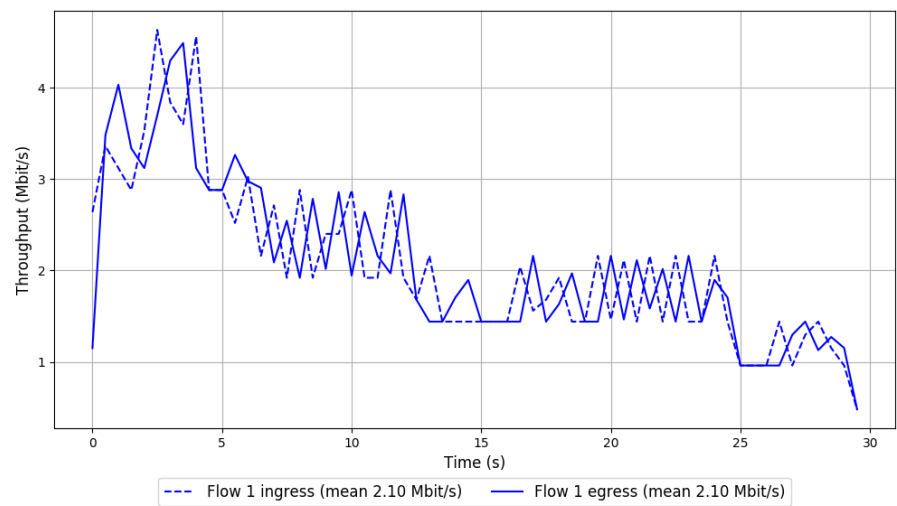


```
Run 1: Statistics of Indigo

Start at: 2017-12-11 08:24:19
End at: 2017-12-11 08:24:49
Local clock offset: -5.575 ms
Remote clock offset: 1.416 ms

# Below is generated by plot.py at 2017-12-11 09:00:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 133.757 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 133.757 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2017-12-11 08:40:33

End at: 2017-12-11 08:41:03

Local clock offset: -5.748 ms

Remote clock offset: 1.65 ms

# Below is generated by plot.py at 2017-12-11 09:00:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.30 Mbit/s

95th percentile per-packet one-way delay: 230.176 ms

Loss rate: 0.00%

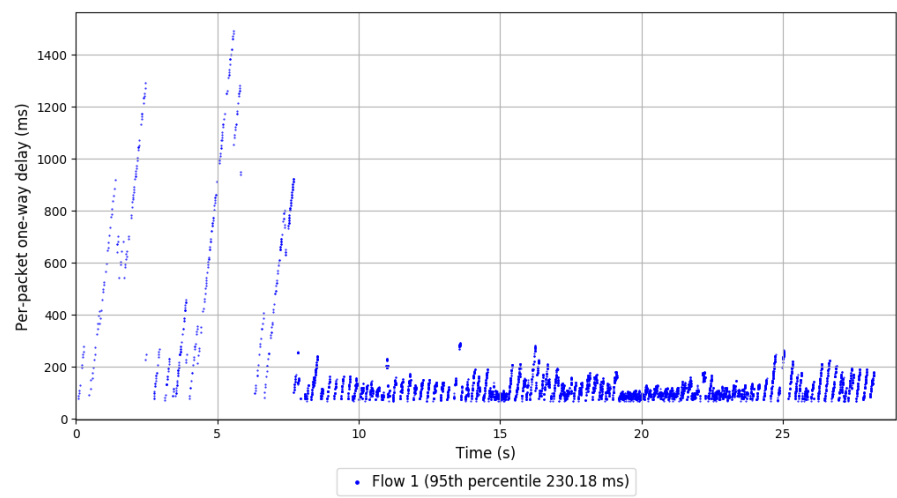
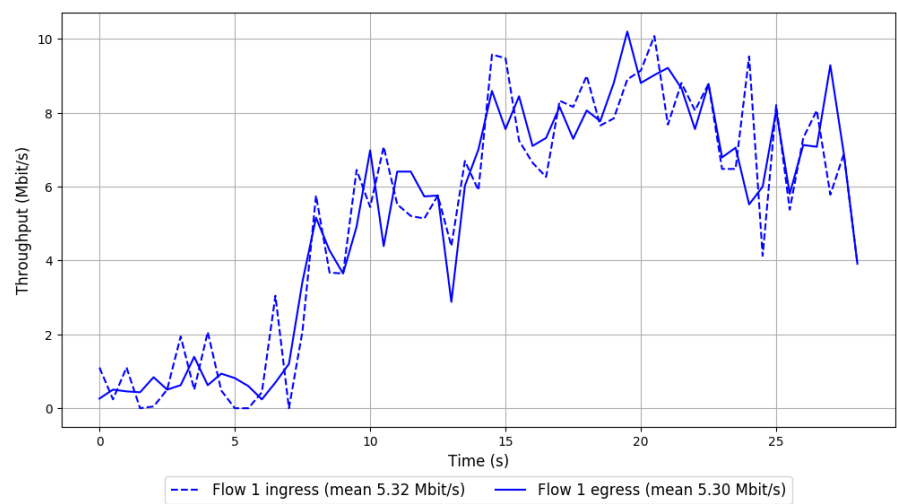
-- Flow 1:

Average throughput: 5.30 Mbit/s

95th percentile per-packet one-way delay: 230.176 ms

Loss rate: 0.00%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2017-12-11 08:56:58

End at: 2017-12-11 08:57:28

Local clock offset: -2.721 ms

Remote clock offset: 1.661 ms

# Below is generated by plot.py at 2017-12-11 09:00:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 357.574 ms

Loss rate: 0.00%

-- Flow 1:

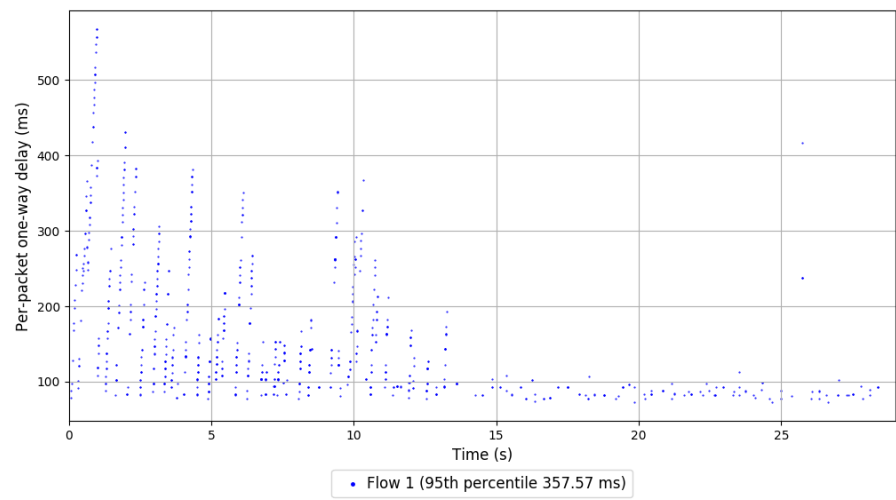
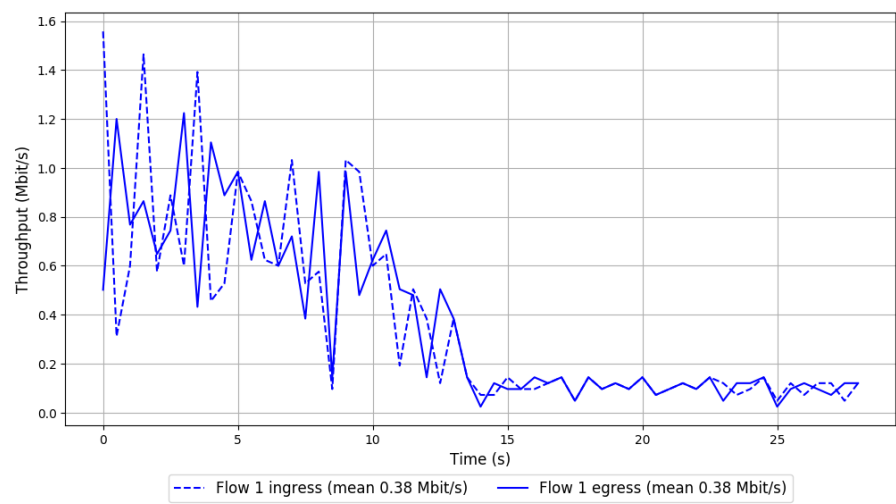
Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 357.574 ms

Loss rate: 0.00%



Run 3: Report of Indigo — Data Link

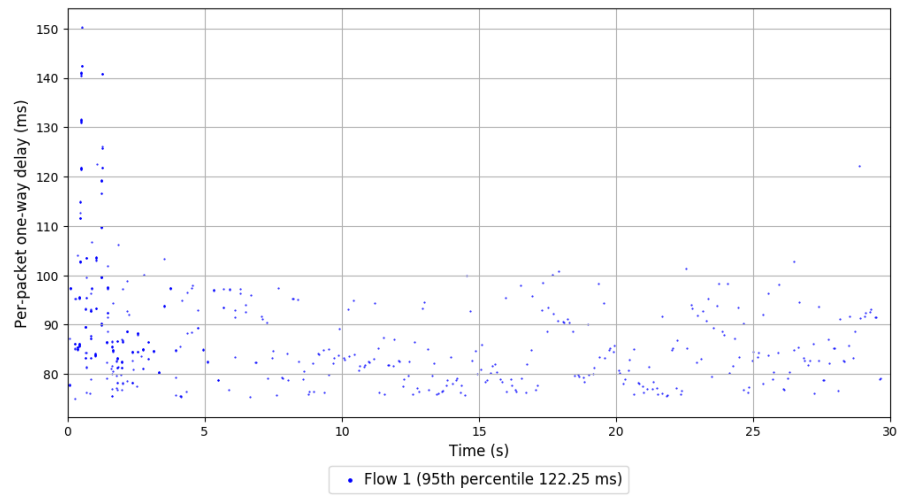
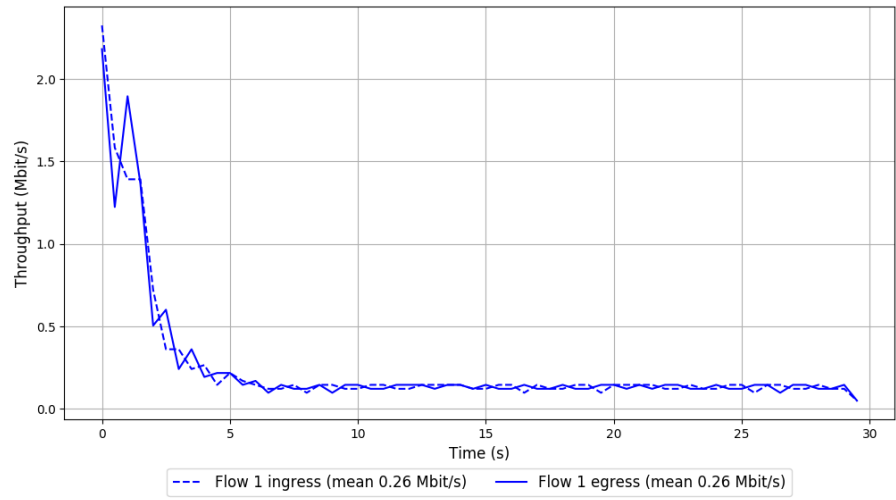


```
Run 1: Statistics of Indigo-calib

Start at: 2017-12-11 08:10:58
End at: 2017-12-11 08:11:28
Local clock offset: -9.669 ms
Remote clock offset: 1.395 ms

# Below is generated by plot.py at 2017-12-11 09:00:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 122.255 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 122.255 ms
Loss rate: 0.00%
```

# Run 1: Report of Indigo-calib — Data Link



Run 2: Statistics of Indigo-calib

Start at: 2017-12-11 08:27:46

End at: 2017-12-11 08:28:16

Local clock offset: -6.365 ms

Remote clock offset: 1.441 ms

# Below is generated by plot.py at 2017-12-11 09:00:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.37 Mbit/s

95th percentile per-packet one-way delay: 114.582 ms

Loss rate: 0.00%

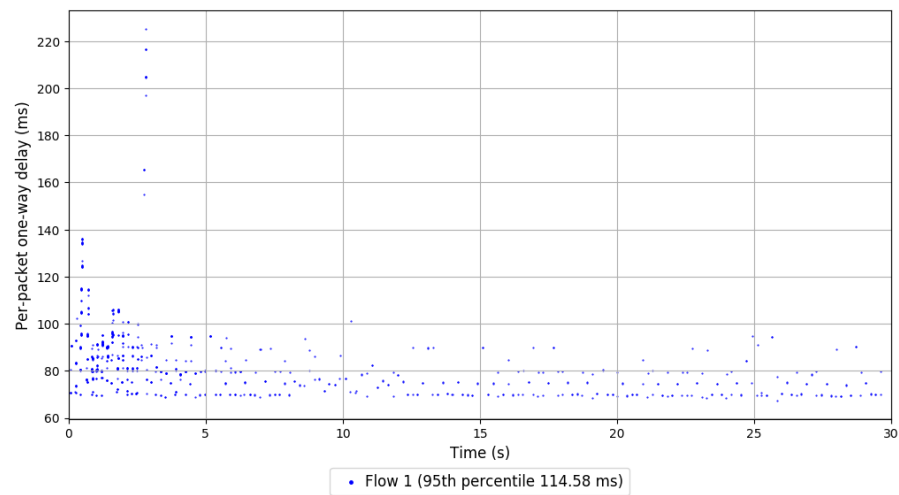
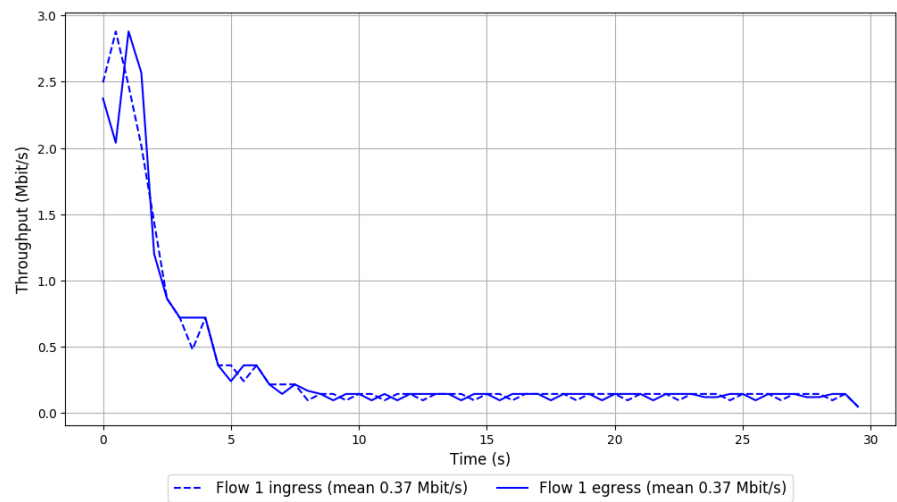
-- Flow 1:

Average throughput: 0.37 Mbit/s

95th percentile per-packet one-way delay: 114.582 ms

Loss rate: 0.00%

Run 2: Report of Indigo-calib — Data Link



```
Run 3: Statistics of Indigo-calib

Start at: 2017-12-11 08:44:00
End at: 2017-12-11 08:44:30
Local clock offset: -5.271 ms
Remote clock offset: 1.659 ms

# Below is generated by plot.py at 2017-12-11 09:00:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 151.880 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 151.880 ms
Loss rate: 0.00%
```

### Run 3: Report of Indigo-calib — Data Link

