

## Pantheon Report

Generated at 2018-04-16 22:39:43 (UTC).

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

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).

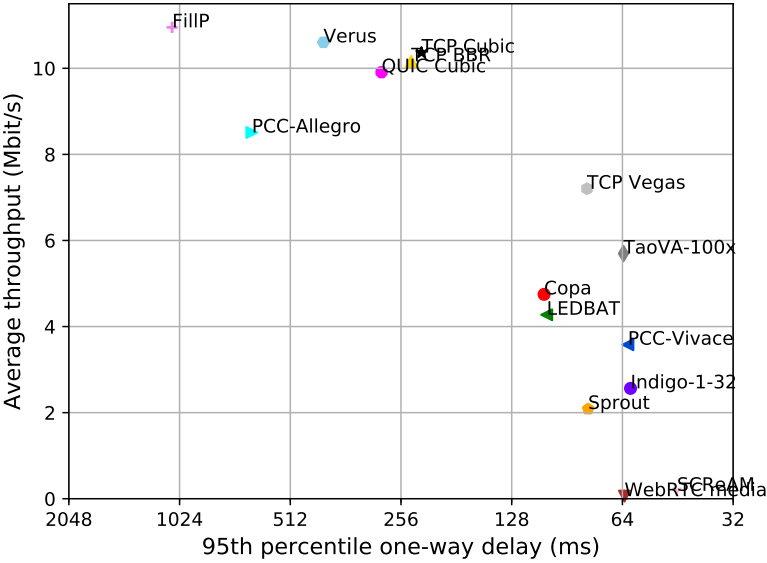
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo\_fast**).

NTP offsets were measured against **nets.org.sg** and have been applied to correct the timestamps in logs.

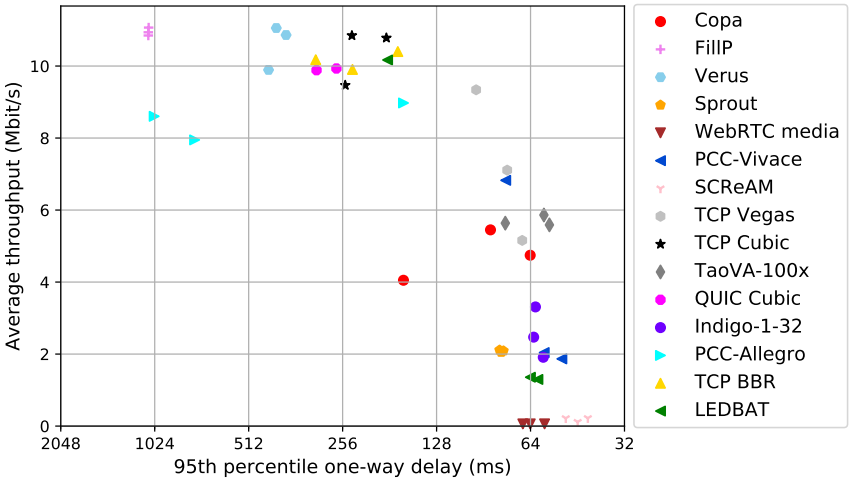
Git summary:

```
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 AWS India 1 Ethernet to India ppp0, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



test from AWS India 1 Ethernet to India 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	10.16	240.21	2.05
TCP Cubic	3	10.37	225.17	0.29
LEDBAT	3	4.28	102.83	1.78
PCC-Allegro	3	8.51	651.32	1.52
QUIC Cubic	2	9.91	289.17	0.61
SCReAM	3	0.18	45.49	0.41
WebRTC media	3	0.06	63.19	0.32
Sprout	3	2.08	79.34	0.93
TaoVA-100x	3	5.70	63.59	0.11
TCP Vegas	3	7.20	79.89	0.15
Verus	3	10.60	416.07	0.80
Copa	3	4.75	104.53	0.09
FillP	3	10.95	1072.73	17.00
Indigo-1-32	3	2.56	60.84	0.95
PCC-Vivace	3	3.58	61.86	0.15
PCC-Expr	0	N/A	N/A	N/A

Run 1: Statistics of TCP BBR

Start at: 2018-04-16 21:58:56

End at: 2018-04-16 21:59:26

Local clock offset: 1.661 ms

Remote clock offset: -8.49 ms

# Below is generated by plot.py at 2018-04-16 22:38:56

# Datalink statistics

-- Total of 1 flow:

Average throughput: 10.40 Mbit/s

95th percentile per-packet one-way delay: 170.363 ms

Loss rate: 2.76%

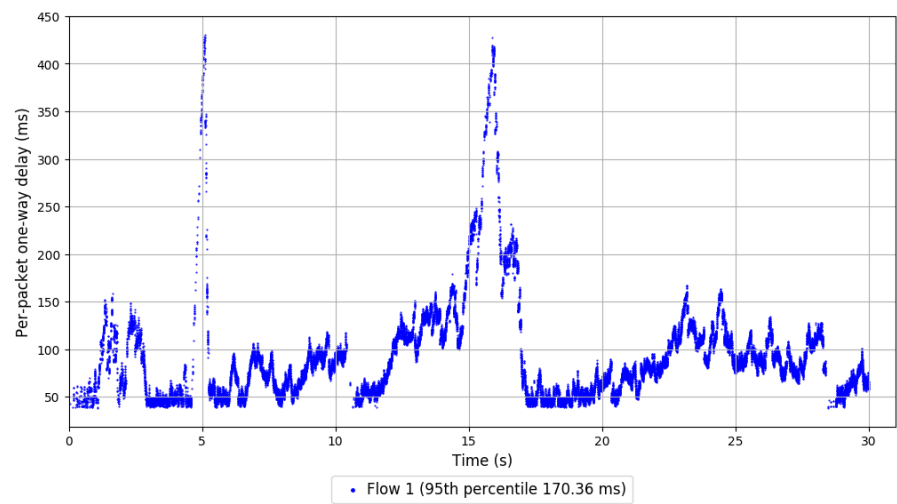
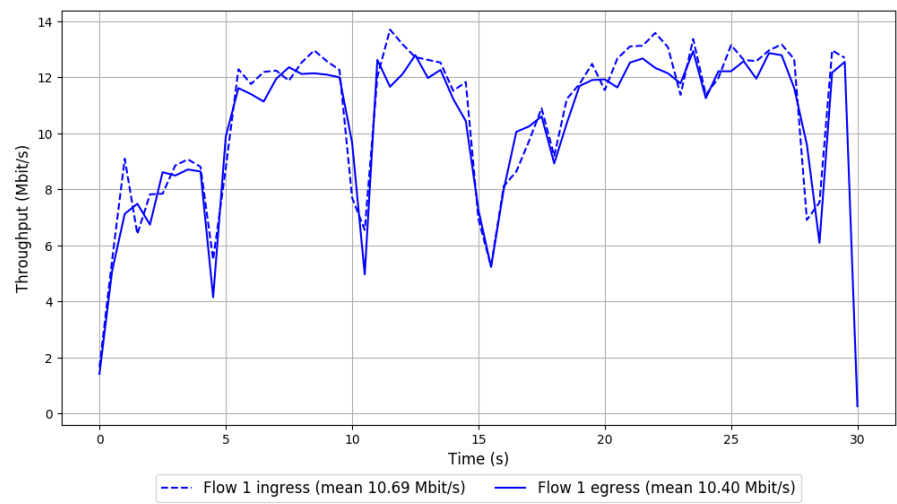
-- Flow 1:

Average throughput: 10.40 Mbit/s

95th percentile per-packet one-way delay: 170.363 ms

Loss rate: 2.76%

Run 1: Report of TCP BBR — Data Link

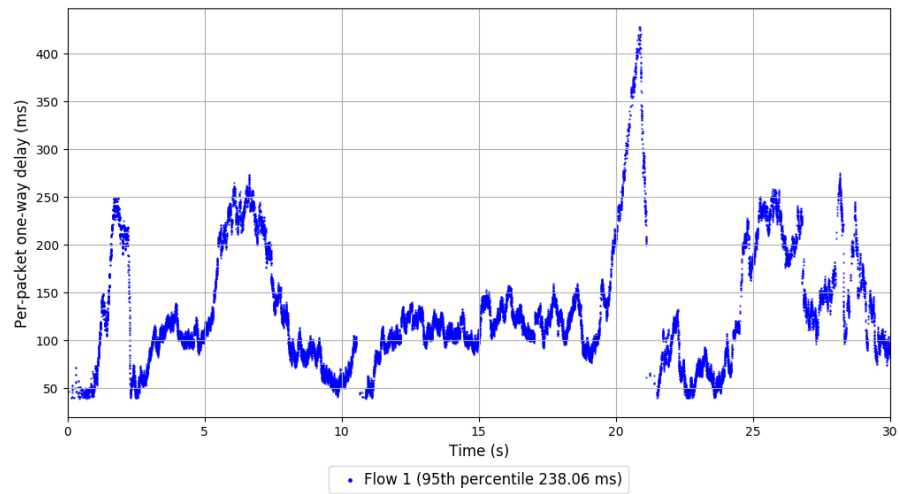
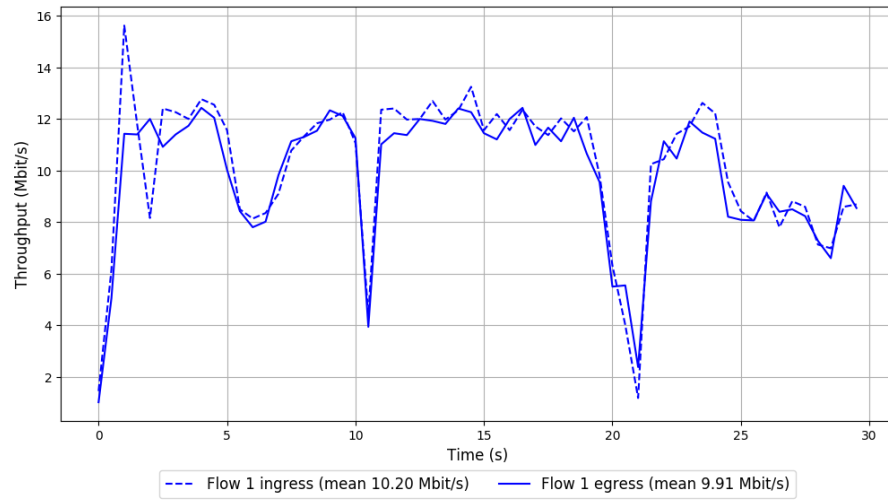


Run 2: Statistics of TCP BBR

Start at: 2018-04-16 22:17:35  
End at: 2018-04-16 22:18:05  
Local clock offset: -4.029 ms  
Remote clock offset: -6.985 ms

# Below is generated by plot.py at 2018-04-16 22:38:56  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 9.91 Mbit/s  
95th percentile per-packet one-way delay: 238.061 ms  
Loss rate: 2.98%  
-- Flow 1:  
Average throughput: 9.91 Mbit/s  
95th percentile per-packet one-way delay: 238.061 ms  
Loss rate: 2.98%

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

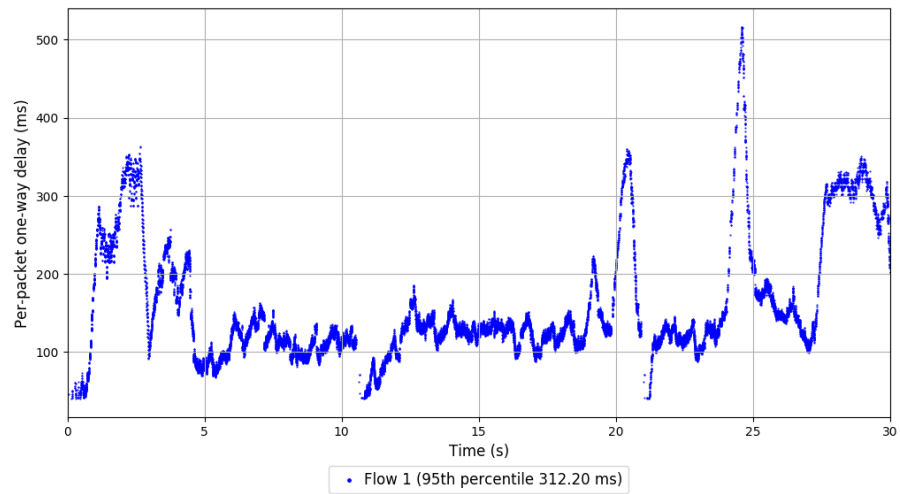
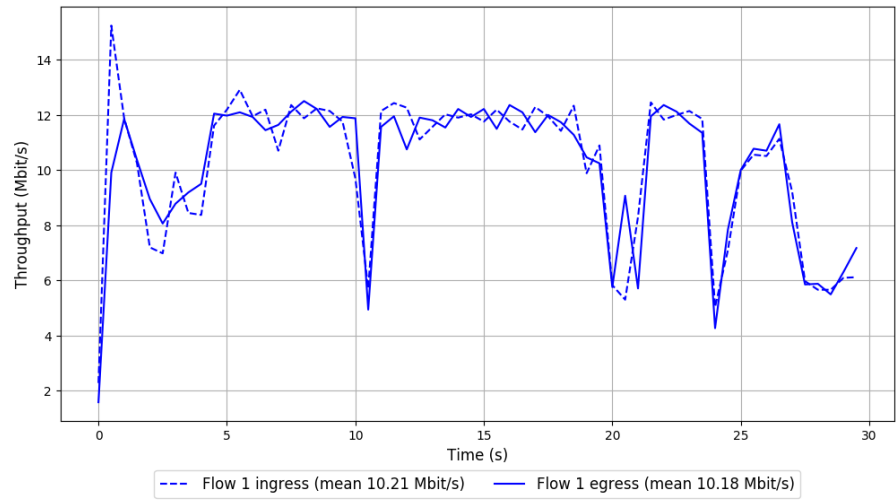


Run 3: Statistics of TCP BBR

Start at: 2018-04-16 22:36:09  
End at: 2018-04-16 22:36:39  
Local clock offset: -4.809 ms  
Remote clock offset: -7.907 ms

# Below is generated by plot.py at 2018-04-16 22:38:56  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 10.18 Mbit/s  
95th percentile per-packet one-way delay: 312.201 ms  
Loss rate: 0.42%  
-- Flow 1:  
Average throughput: 10.18 Mbit/s  
95th percentile per-packet one-way delay: 312.201 ms  
Loss rate: 0.42%

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



Run 1: Statistics of TCP Cubic

Start at: 2018-04-16 21:42:29

End at: 2018-04-16 21:42:59

Local clock offset: 0.226 ms

Remote clock offset: -9.7 ms

# Below is generated by plot.py at 2018-04-16 22:38:56

# Datalink statistics

-- Total of 1 flow:

Average throughput: 10.85 Mbit/s

95th percentile per-packet one-way delay: 239.058 ms

Loss rate: 0.48%

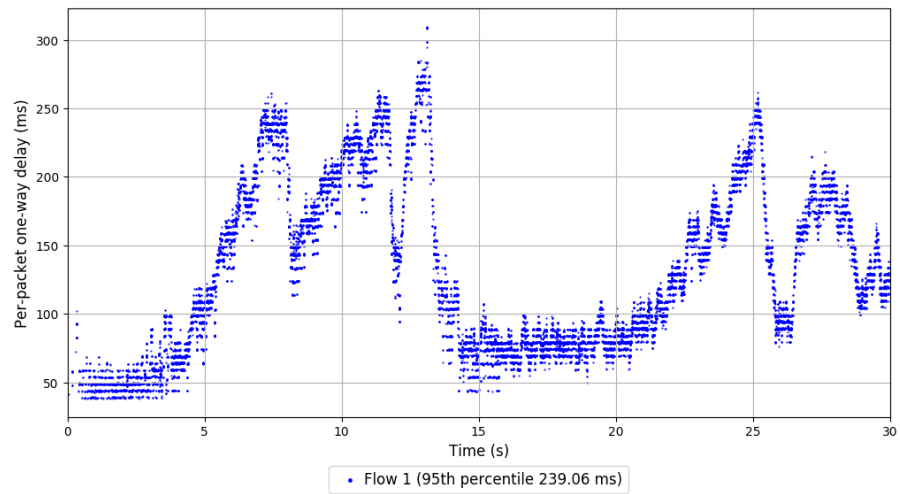
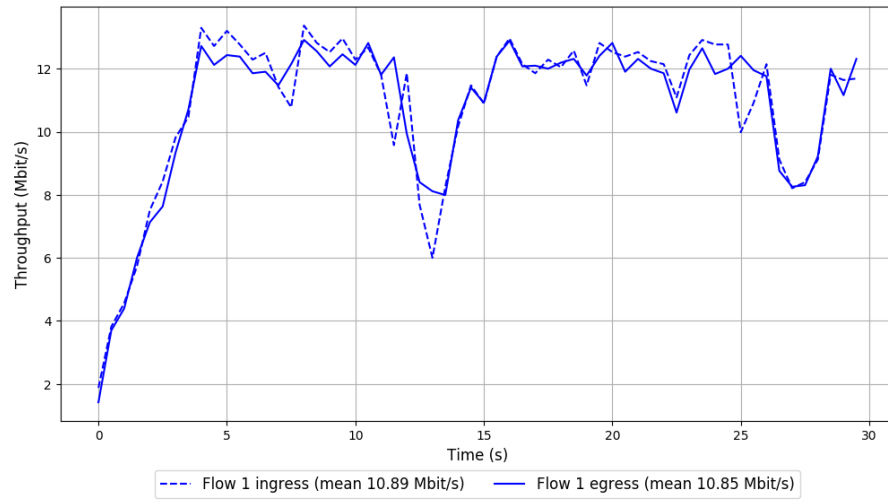
-- Flow 1:

Average throughput: 10.85 Mbit/s

95th percentile per-packet one-way delay: 239.058 ms

Loss rate: 0.48%

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

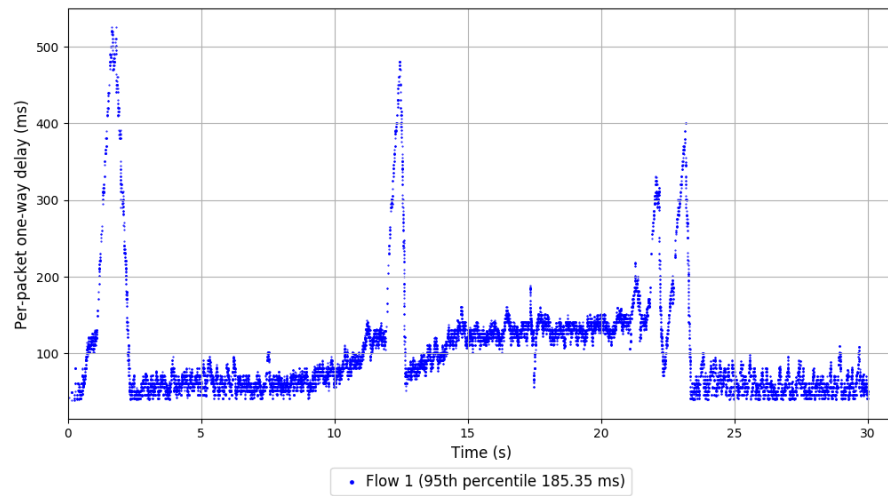
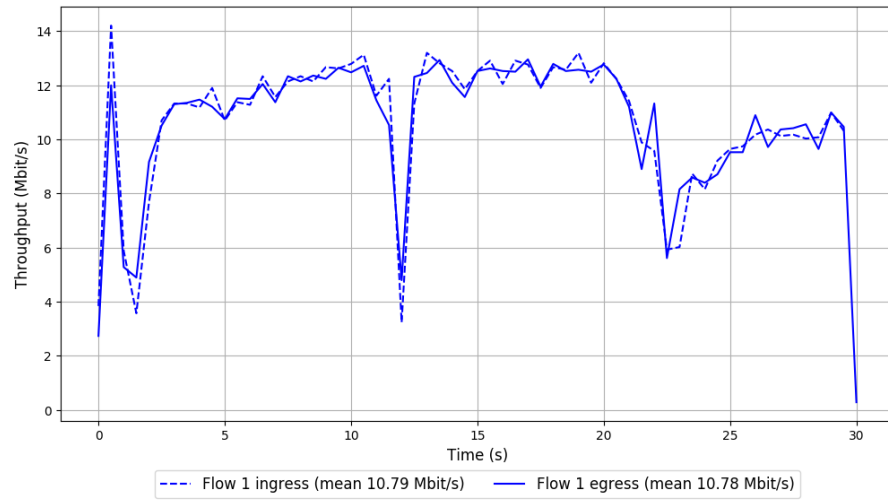


Run 2: Statistics of TCP Cubic

Start at: 2018-04-16 22:01:09  
End at: 2018-04-16 22:01:39  
Local clock offset: 1.34 ms  
Remote clock offset: -7.978 ms

# Below is generated by plot.py at 2018-04-16 22:38:57  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 10.78 Mbit/s  
95th percentile per-packet one-way delay: 185.352 ms  
Loss rate: 0.13%  
-- Flow 1:  
Average throughput: 10.78 Mbit/s  
95th percentile per-packet one-way delay: 185.352 ms  
Loss rate: 0.13%

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

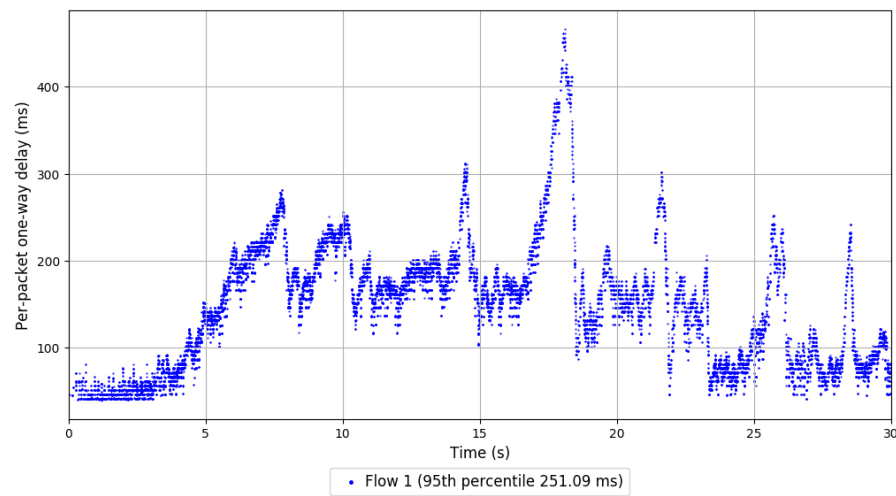
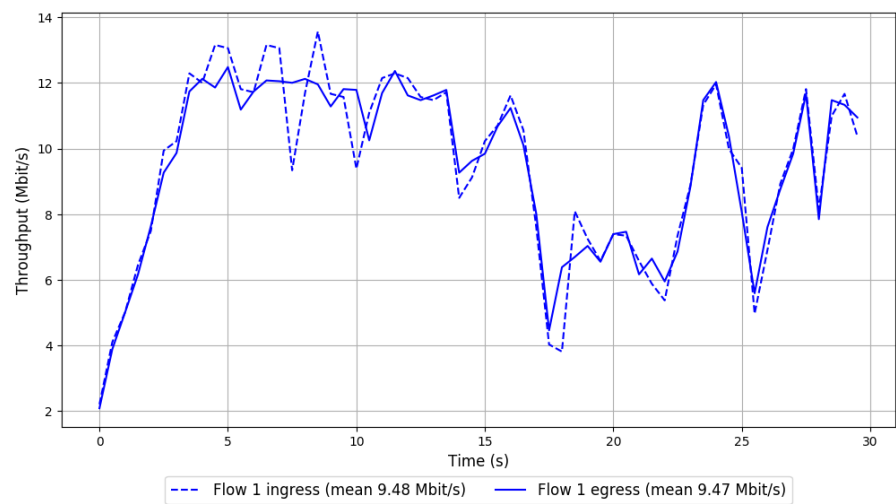


Run 3: Statistics of TCP Cubic

Start at: 2018-04-16 22:19:47  
End at: 2018-04-16 22:20:17  
Local clock offset: -4.93 ms  
Remote clock offset: -8.034 ms

# Below is generated by plot.py at 2018-04-16 22:38:57  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 9.47 Mbit/s  
95th percentile per-packet one-way delay: 251.095 ms  
Loss rate: 0.27%  
-- Flow 1:  
Average throughput: 9.47 Mbit/s  
95th percentile per-packet one-way delay: 251.095 ms  
Loss rate: 0.27%

Run 3: Report of TCP Cubic — Data Link

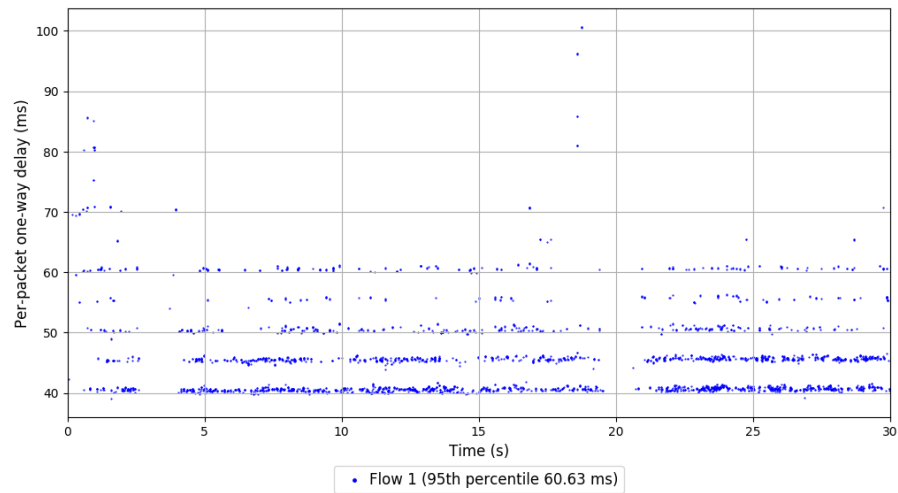
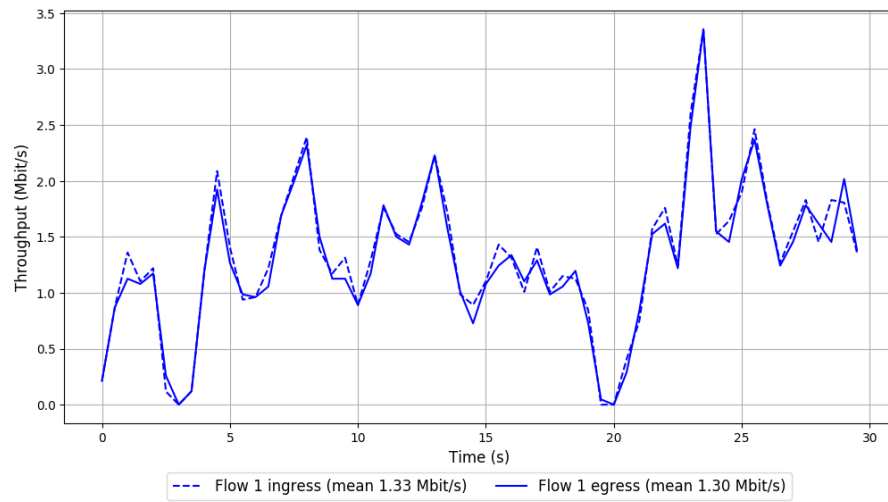


Run 1: Statistics of LEDBAT

Start at: 2018-04-16 21:47:56  
End at: 2018-04-16 21:48:26  
Local clock offset: 0.802 ms  
Remote clock offset: -9.224 ms

# Below is generated by plot.py at 2018-04-16 22:38:57  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.30 Mbit/s  
95th percentile per-packet one-way delay: 60.629 ms  
Loss rate: 2.73%  
-- Flow 1:  
Average throughput: 1.30 Mbit/s  
95th percentile per-packet one-way delay: 60.629 ms  
Loss rate: 2.73%

## Run 1: Report of LEDBAT — Data Link

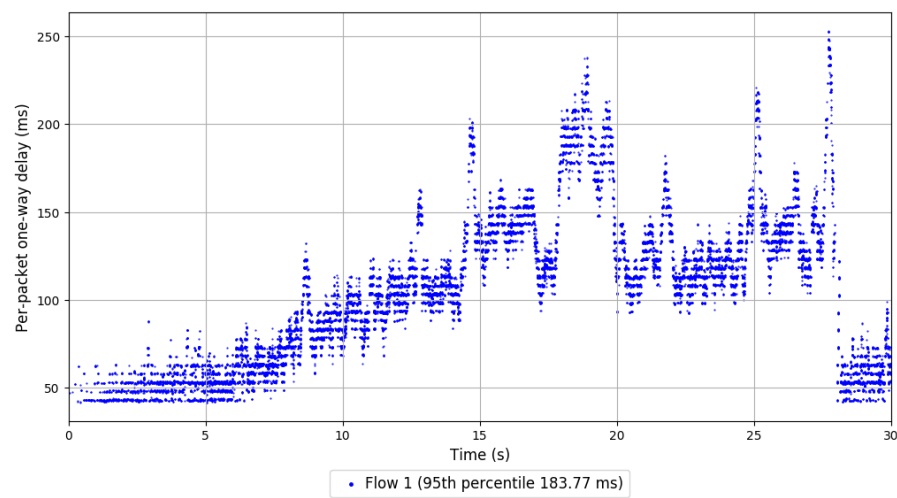
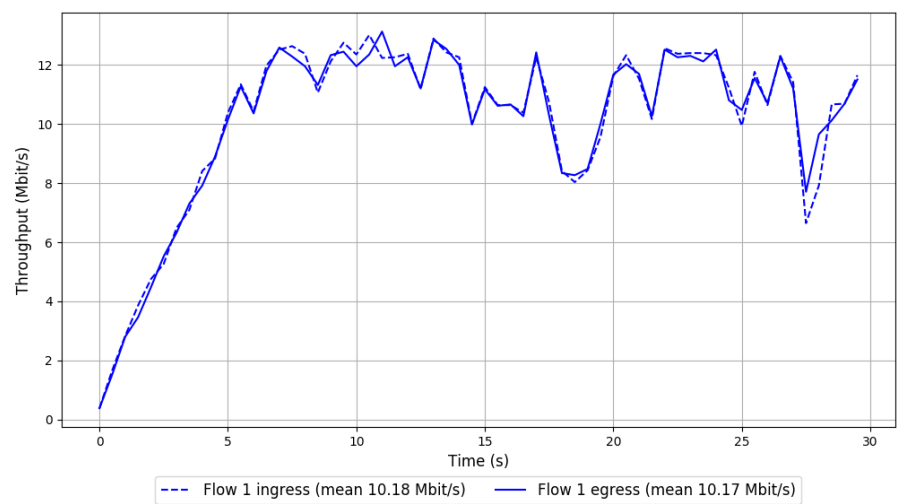


Run 2: Statistics of LEDBAT

Start at: 2018-04-16 22:06:38  
End at: 2018-04-16 22:07:08  
Local clock offset: -1.75 ms  
Remote clock offset: -6.907 ms

# Below is generated by plot.py at 2018-04-16 22:38:57  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 10.17 Mbit/s  
95th percentile per-packet one-way delay: 183.768 ms  
Loss rate: 0.19%  
-- Flow 1:  
Average throughput: 10.17 Mbit/s  
95th percentile per-packet one-way delay: 183.768 ms  
Loss rate: 0.19%

Run 2: Report of LEDBAT — Data Link

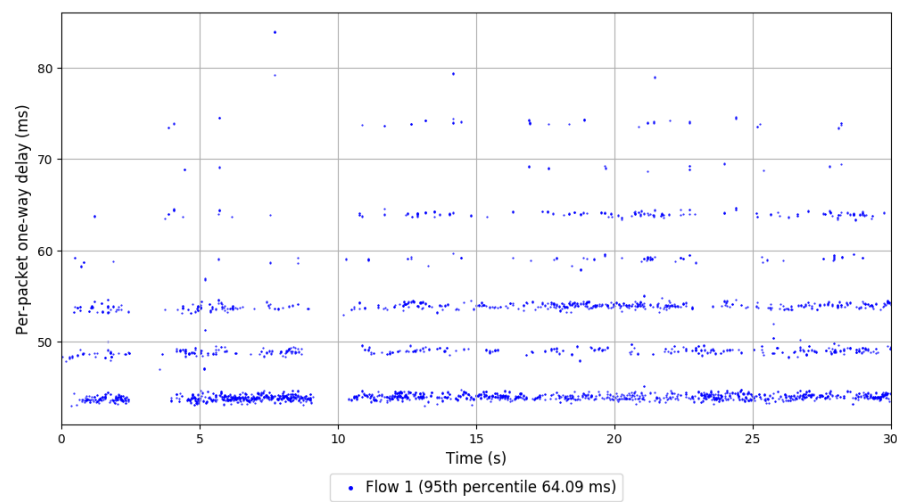
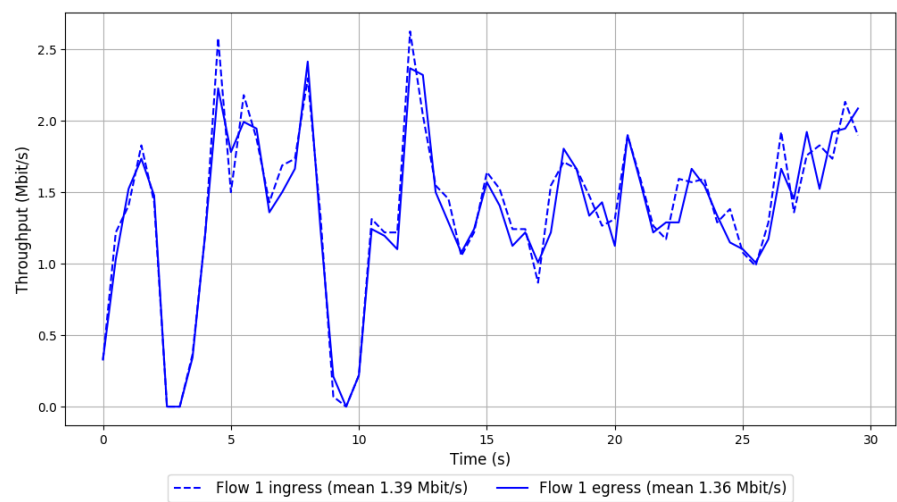


Run 3: Statistics of LEDBAT

Start at: 2018-04-16 22:25:14  
End at: 2018-04-16 22:25:44  
Local clock offset: -4.816 ms  
Remote clock offset: -6.683 ms

# Below is generated by plot.py at 2018-04-16 22:38:57  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.36 Mbit/s  
95th percentile per-packet one-way delay: 64.088 ms  
Loss rate: 2.42%  
-- Flow 1:  
Average throughput: 1.36 Mbit/s  
95th percentile per-packet one-way delay: 64.088 ms  
Loss rate: 2.42%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2018-04-16 21:56:44

End at: 2018-04-16 21:57:14

Local clock offset: 1.246 ms

Remote clock offset: -7.8 ms

# Below is generated by plot.py at 2018-04-16 22:39:00

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.95 Mbit/s

95th percentile per-packet one-way delay: 762.649 ms

Loss rate: 0.80%

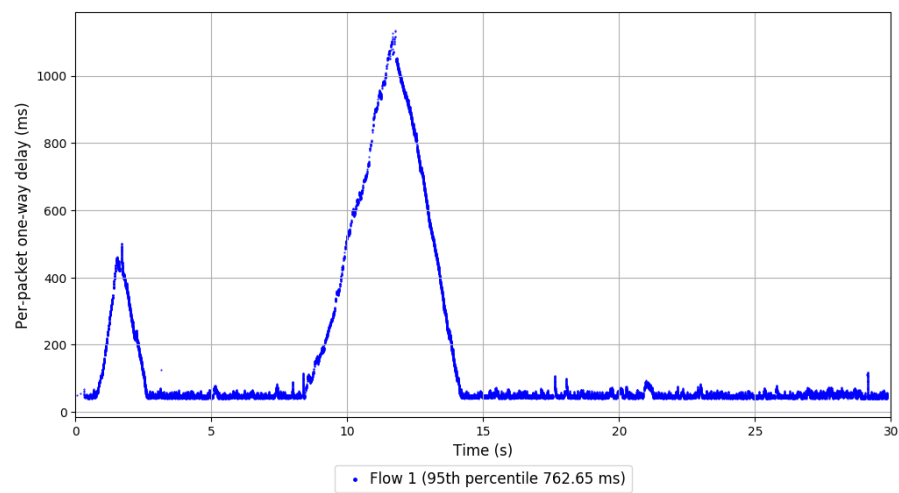
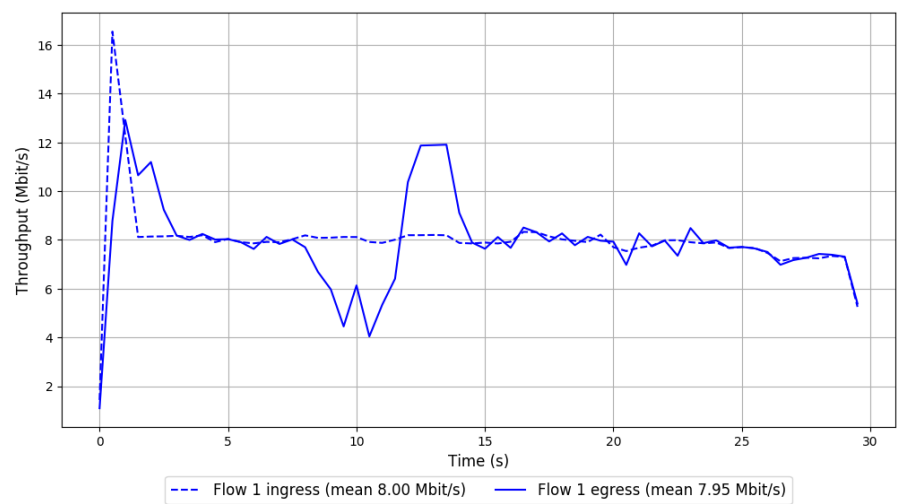
-- Flow 1:

Average throughput: 7.95 Mbit/s

95th percentile per-packet one-way delay: 762.649 ms

Loss rate: 0.80%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-04-16 22:15:24

End at: 2018-04-16 22:15:54

Local clock offset: -3.806 ms

Remote clock offset: -7.715 ms

# Below is generated by plot.py at 2018-04-16 22:39:10

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.97 Mbit/s

95th percentile per-packet one-way delay: 163.349 ms

Loss rate: 0.10%

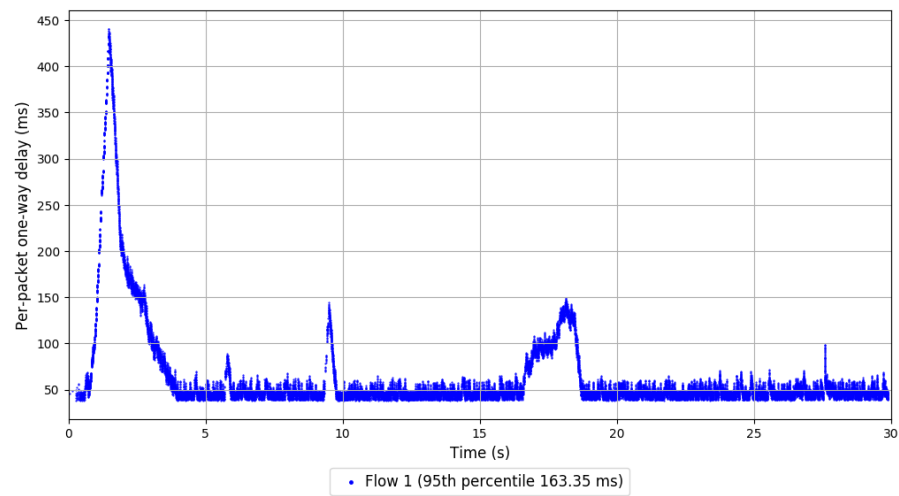
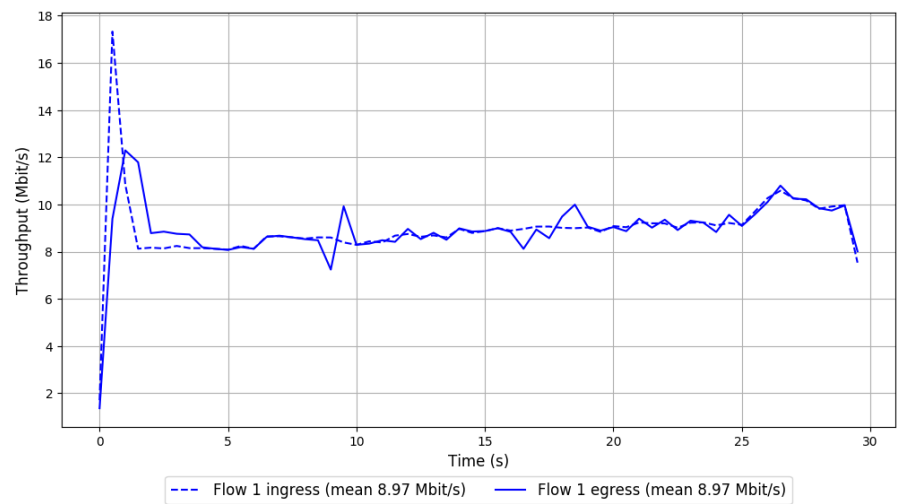
-- Flow 1:

Average throughput: 8.97 Mbit/s

95th percentile per-packet one-way delay: 163.349 ms

Loss rate: 0.10%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-04-16 22:33:58

End at: 2018-04-16 22:34:28

Local clock offset: -5.371 ms

Remote clock offset: -7.636 ms

# Below is generated by plot.py at 2018-04-16 22:39:10

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.60 Mbit/s

95th percentile per-packet one-way delay: 1027.950 ms

Loss rate: 3.66%

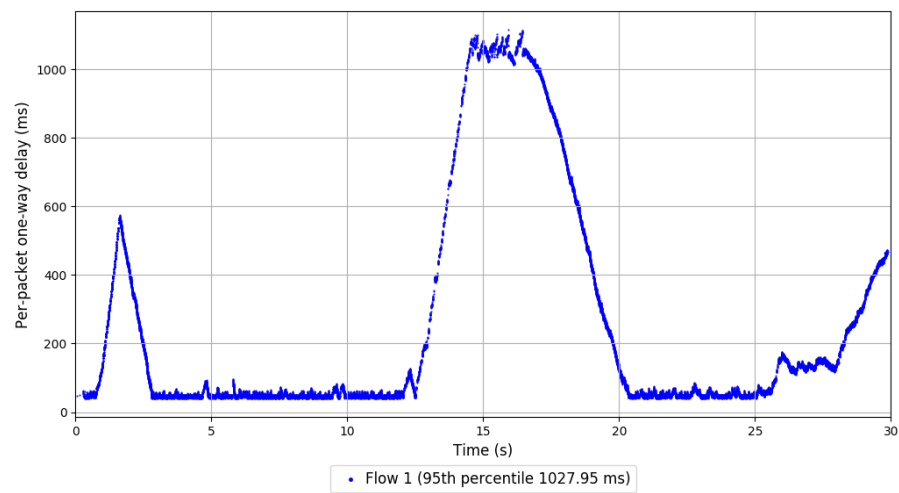
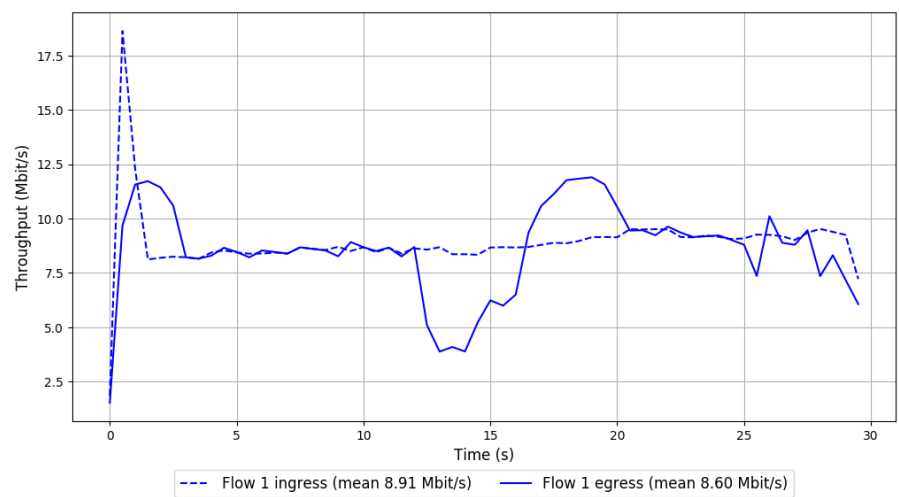
-- Flow 1:

Average throughput: 8.60 Mbit/s

95th percentile per-packet one-way delay: 1027.950 ms

Loss rate: 3.66%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of QUIC Cubic

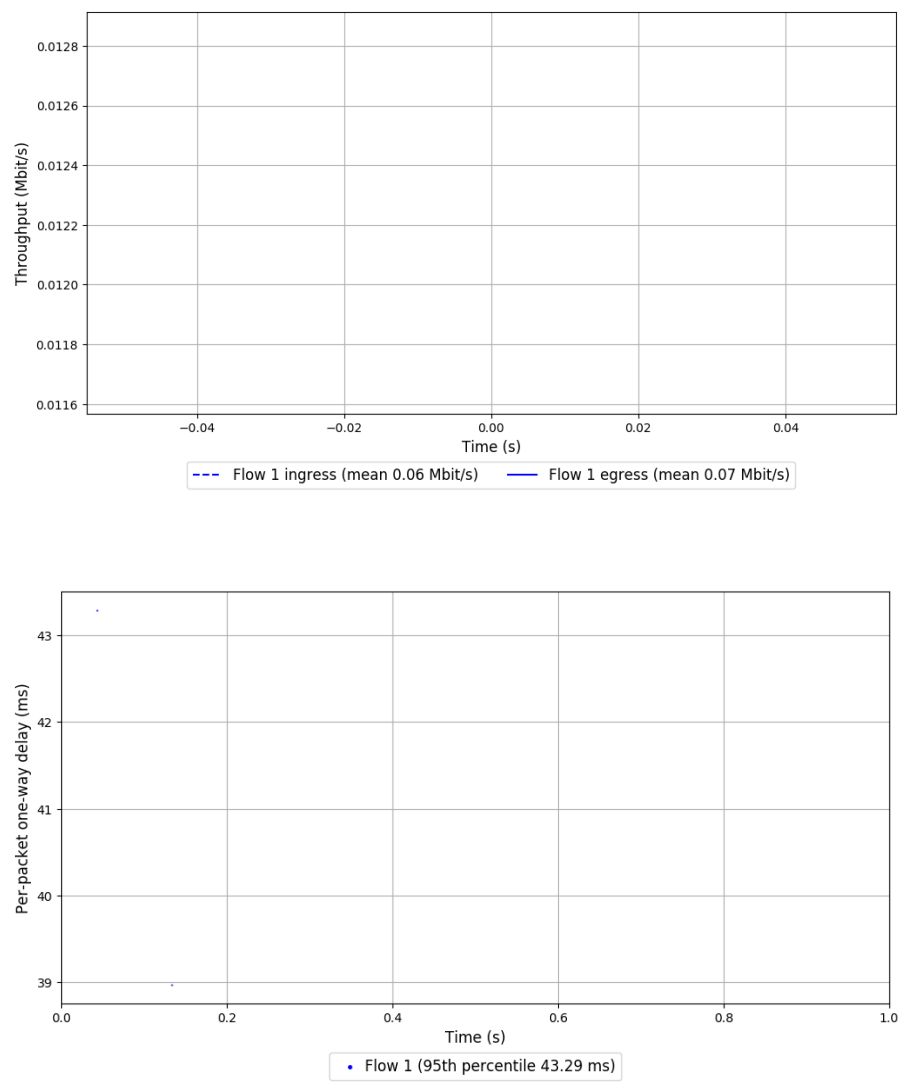
Start at: 2018-04-16 21:46:51

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

Local clock offset: -0.19 ms

Remote clock offset: -10.169 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-04-16 22:05:32

End at: 2018-04-16 22:06:02

Local clock offset: -0.597 ms

Remote clock offset: -7.512 ms

# Below is generated by plot.py at 2018-04-16 22:39:13

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.88 Mbit/s

95th percentile per-packet one-way delay: 310.339 ms

Loss rate: 0.54%

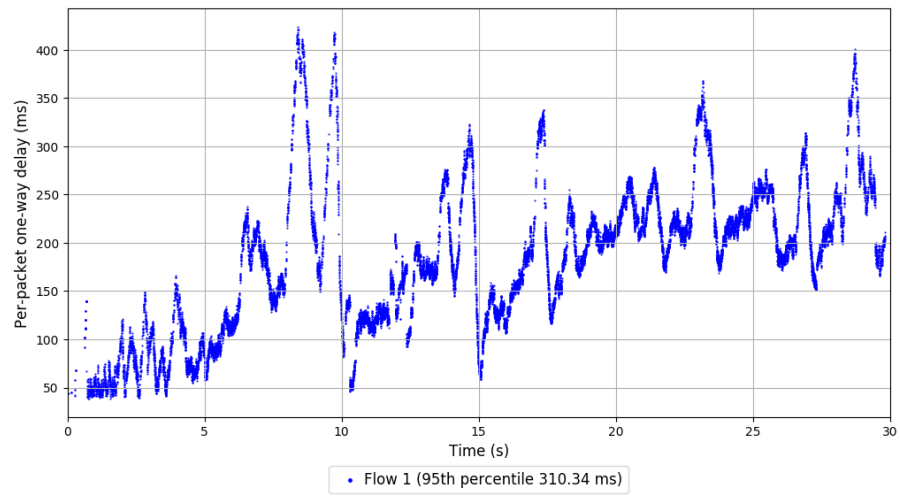
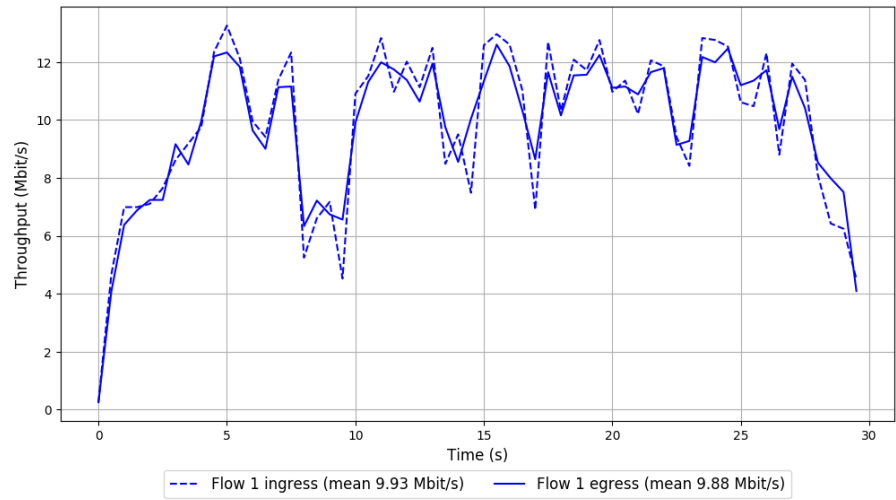
-- Flow 1:

Average throughput: 9.88 Mbit/s

95th percentile per-packet one-way delay: 310.339 ms

Loss rate: 0.54%

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



Run 3: Statistics of QUIC Cubic

Start at: 2018-04-16 22:24:08

End at: 2018-04-16 22:24:38

Local clock offset: -5.568 ms

Remote clock offset: -7.315 ms

# Below is generated by plot.py at 2018-04-16 22:39:13

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.93 Mbit/s

95th percentile per-packet one-way delay: 268.010 ms

Loss rate: 0.68%

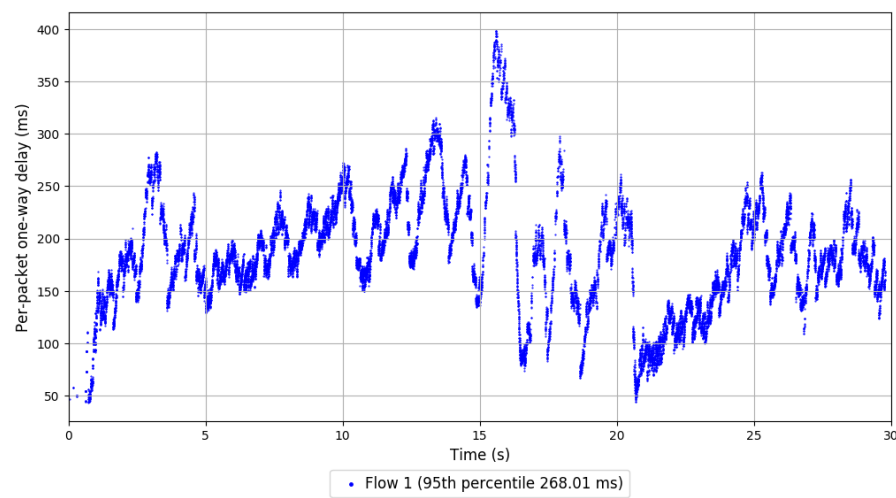
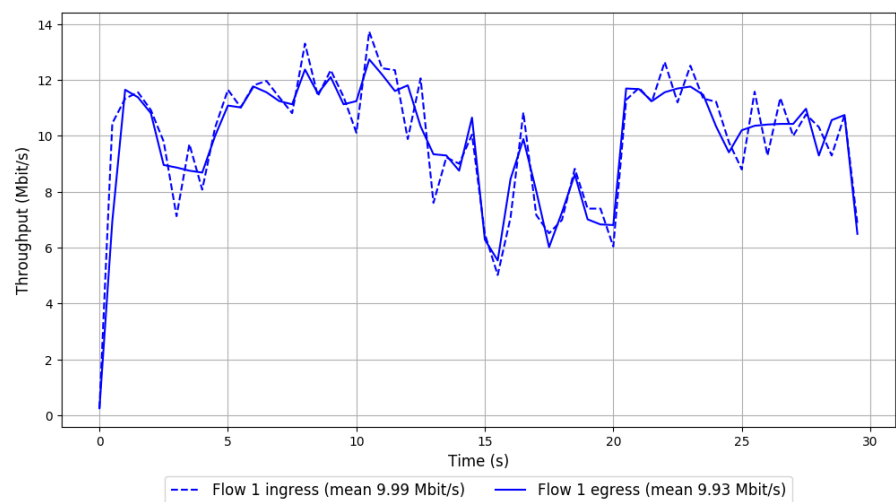
-- Flow 1:

Average throughput: 9.93 Mbit/s

95th percentile per-packet one-way delay: 268.010 ms

Loss rate: 0.68%

Run 3: Report of QUIC Cubic — Data Link

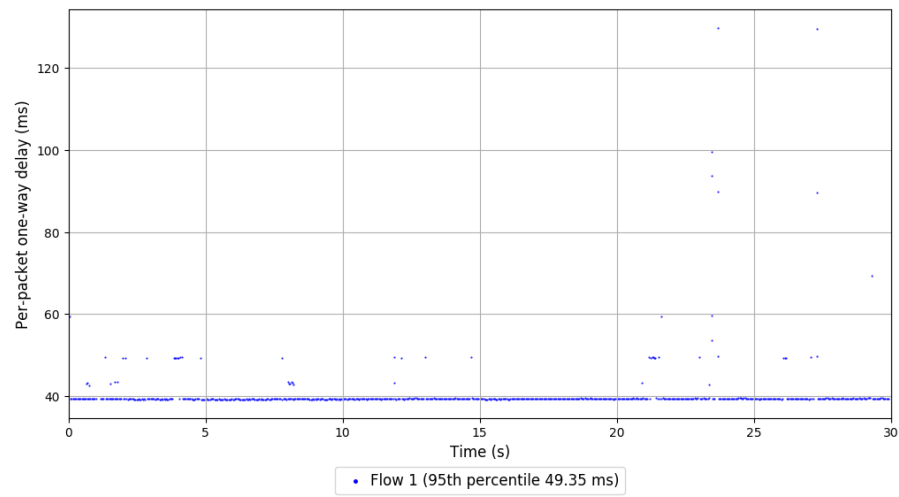
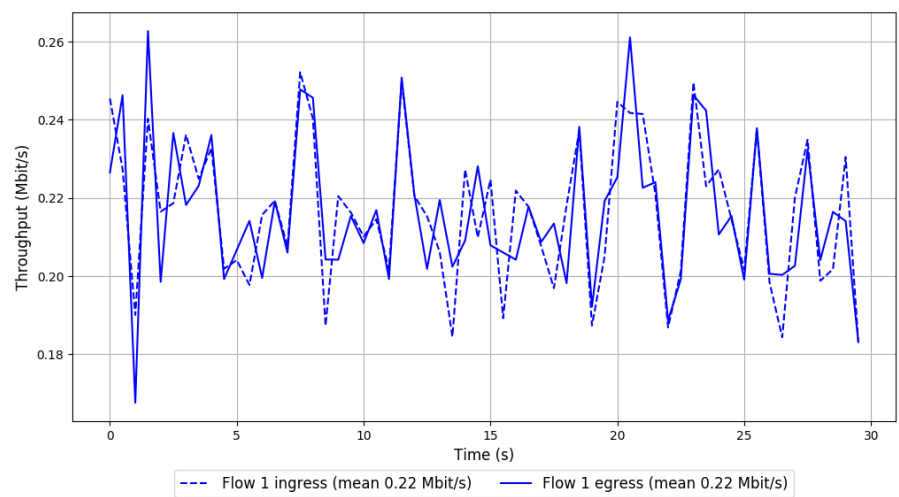


```
Run 1: Statistics of SCReAM

Start at: 2018-04-16 21:55:39
End at: 2018-04-16 21:56:09
Local clock offset: 1.588 ms
Remote clock offset: -8.8 ms

# Below is generated by plot.py at 2018-04-16 22:39:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 49.348 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 49.348 ms
Loss rate: 0.13%
```

Run 1: Report of SReAM — Data Link

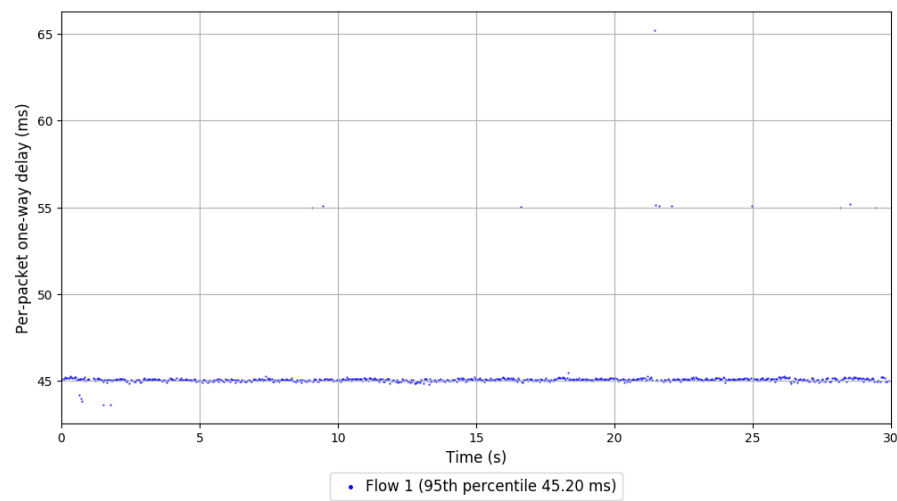
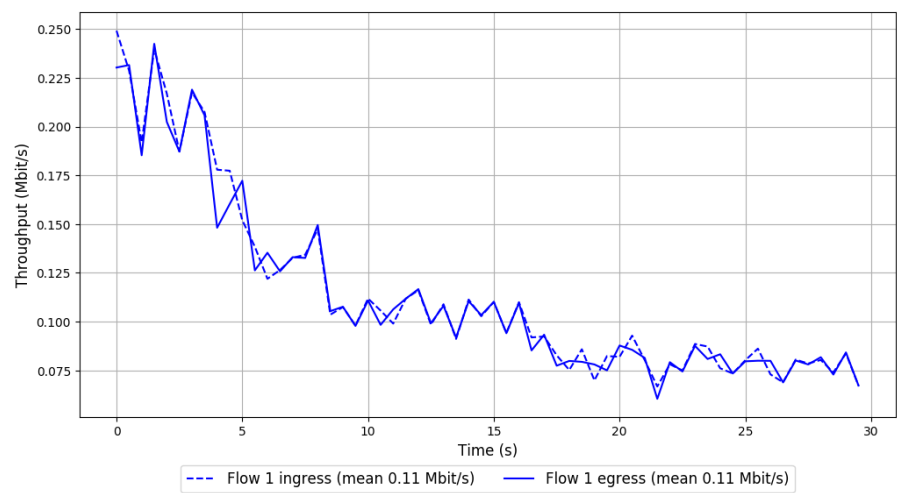


Run 2: Statistics of SCReAM

Start at: 2018-04-16 22:14:19  
End at: 2018-04-16 22:14:49  
Local clock offset: -3.706 ms  
Remote clock offset: -8.014 ms

# Below is generated by plot.py at 2018-04-16 22:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 45.199 ms  
Loss rate: 1.11%  
-- Flow 1:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 45.199 ms  
Loss rate: 1.11%

Run 2: Report of SReAM — Data Link

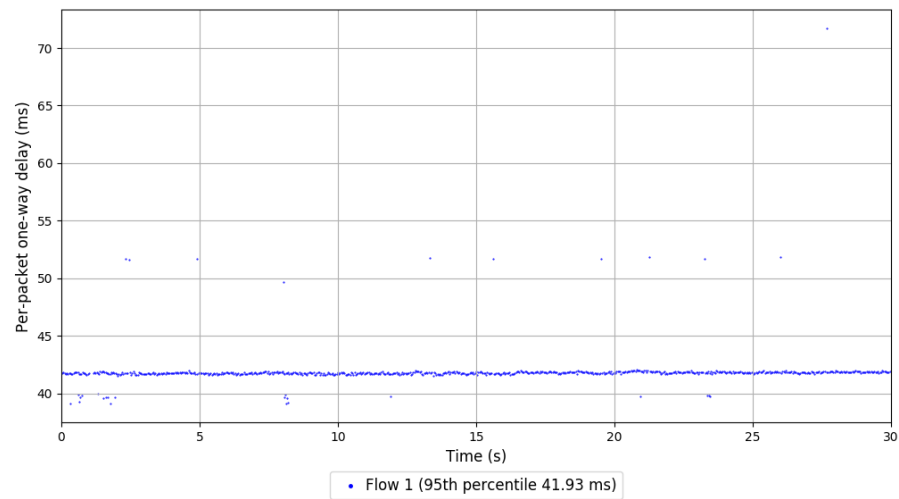
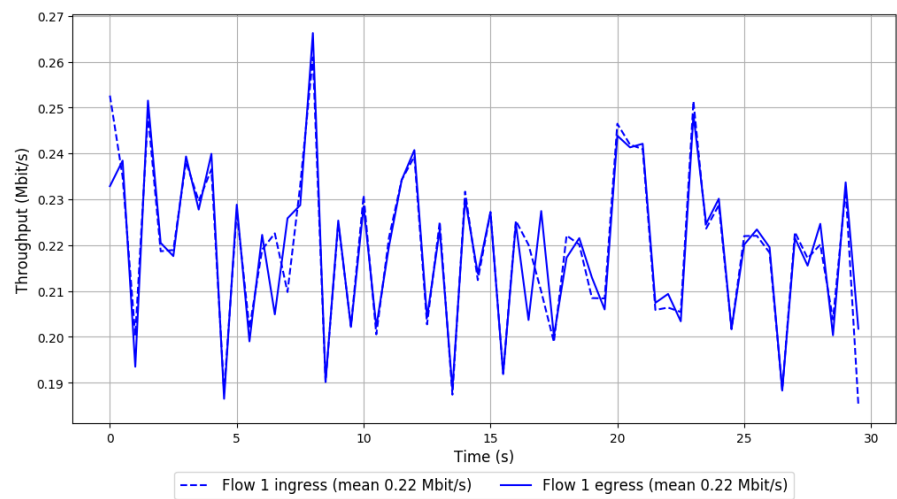


Run 3: Statistics of SCReAM

Start at: 2018-04-16 22:32:53  
End at: 2018-04-16 22:33:23  
Local clock offset: -5.454 ms  
Remote clock offset: -8.294 ms

# Below is generated by plot.py at 2018-04-16 22:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 41.927 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 41.927 ms  
Loss rate: 0.00%

Run 3: Report of SReAM — Data Link

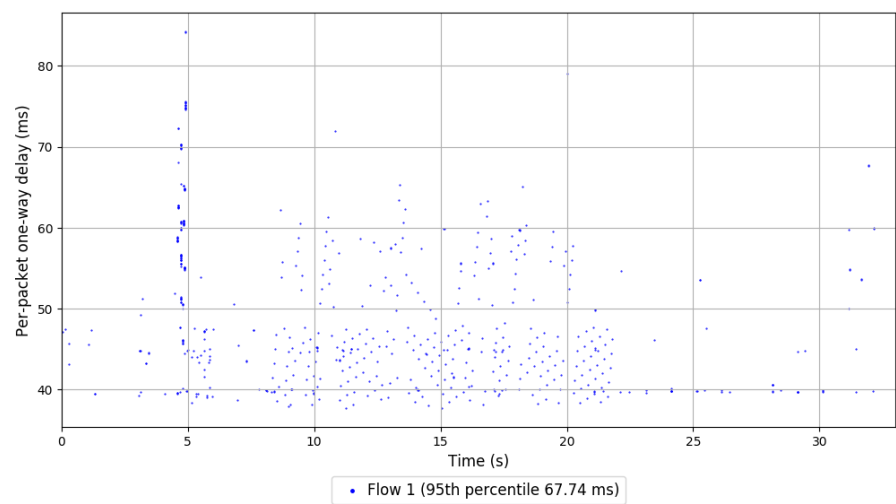
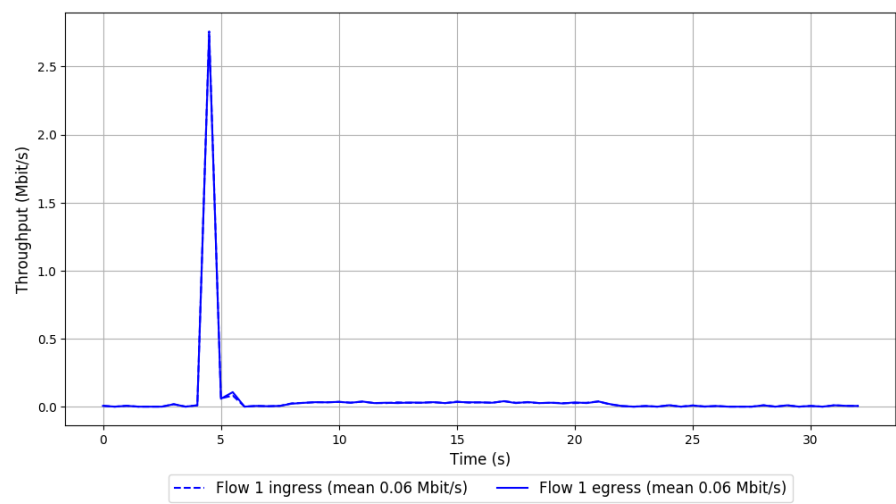


Run 1: Statistics of WebRTC media

Start at: 2018-04-16 21:45:46  
End at: 2018-04-16 21:46:16  
Local clock offset: 0.037 ms  
Remote clock offset: -9.715 ms

# Below is generated by plot.py at 2018-04-16 22:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 67.738 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 67.738 ms  
Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link

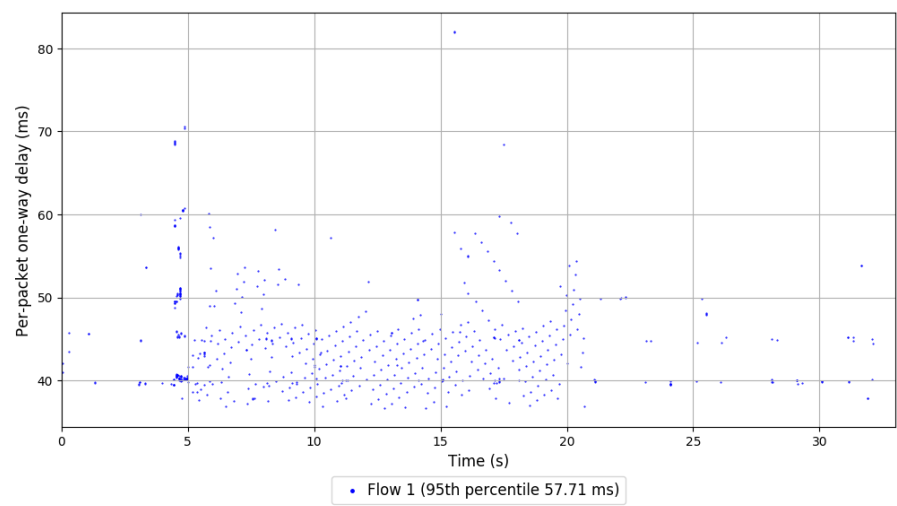
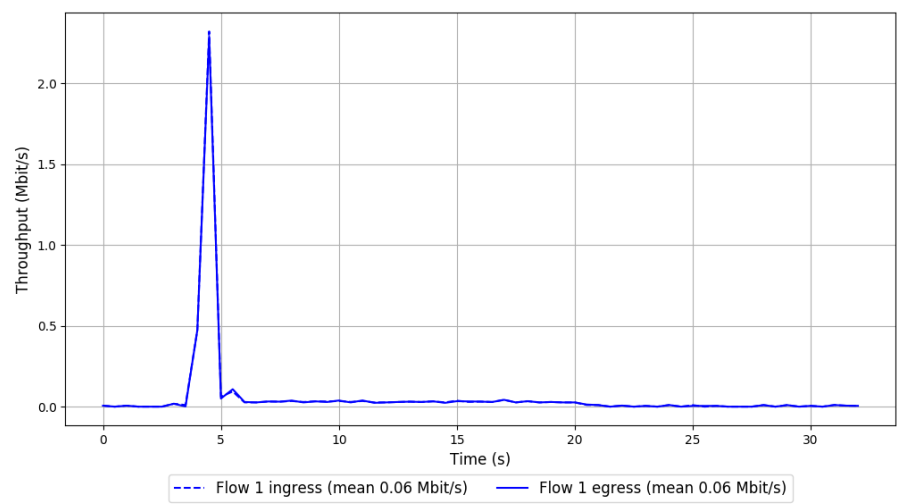


Run 2: Statistics of WebRTC media

Start at: 2018-04-16 22:04:27  
End at: 2018-04-16 22:04:57  
Local clock offset: -0.131 ms  
Remote clock offset: -8.431 ms

# Below is generated by plot.py at 2018-04-16 22:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 57.708 ms  
Loss rate: 0.95%  
-- Flow 1:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 57.708 ms  
Loss rate: 0.95%

Run 2: Report of WebRTC media — Data Link

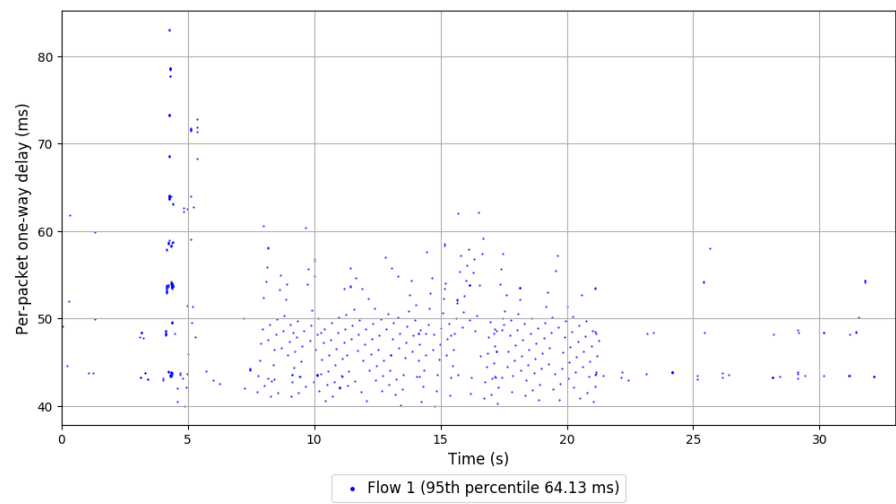
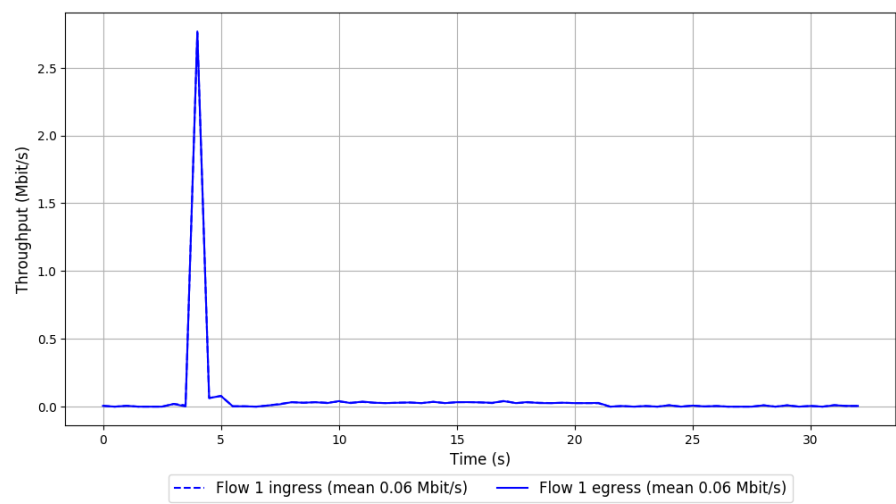


Run 3: Statistics of WebRTC media

Start at: 2018-04-16 22:23:03  
End at: 2018-04-16 22:23:33  
Local clock offset: -5.433 ms  
Remote clock offset: -7.223 ms

# Below is generated by plot.py at 2018-04-16 22:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 64.132 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 64.132 ms  
Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

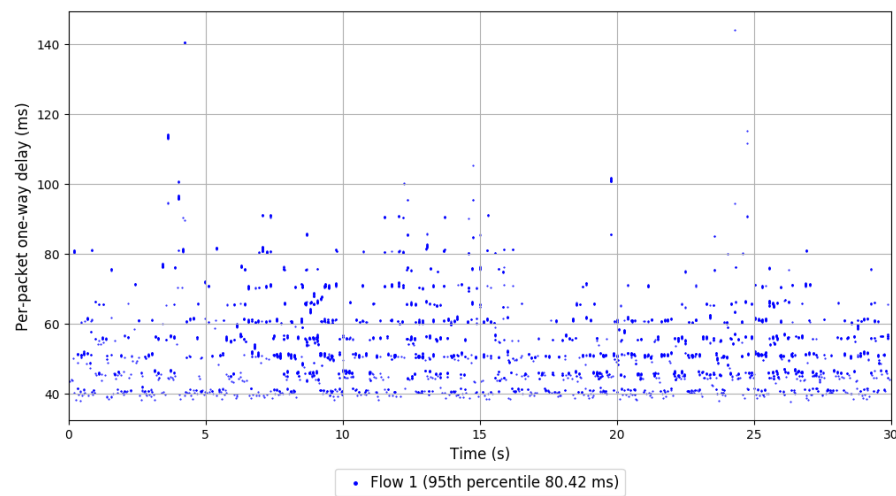
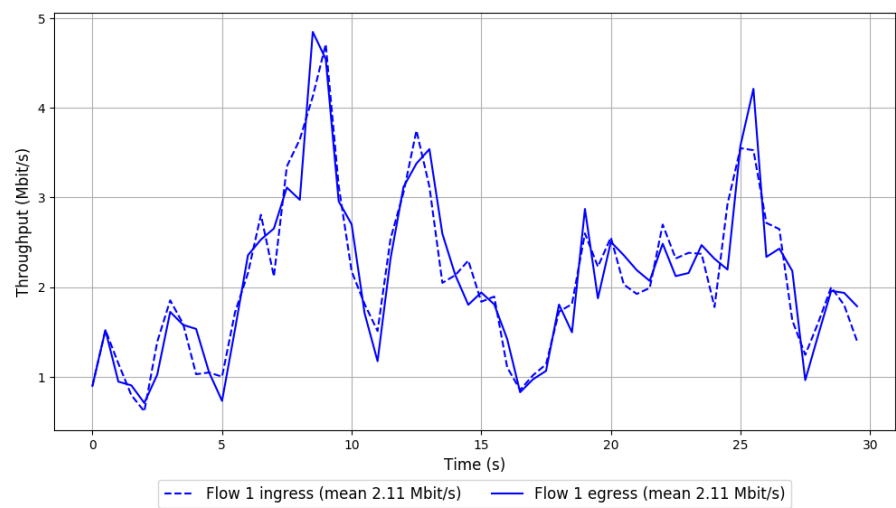


Run 1: Statistics of Sprout

Start at: 2018-04-16 21:50:11  
End at: 2018-04-16 21:50:41  
Local clock offset: 1.467 ms  
Remote clock offset: -9.085 ms

# Below is generated by plot.py at 2018-04-16 22:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.11 Mbit/s  
95th percentile per-packet one-way delay: 80.424 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 2.11 Mbit/s  
95th percentile per-packet one-way delay: 80.424 ms  
Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

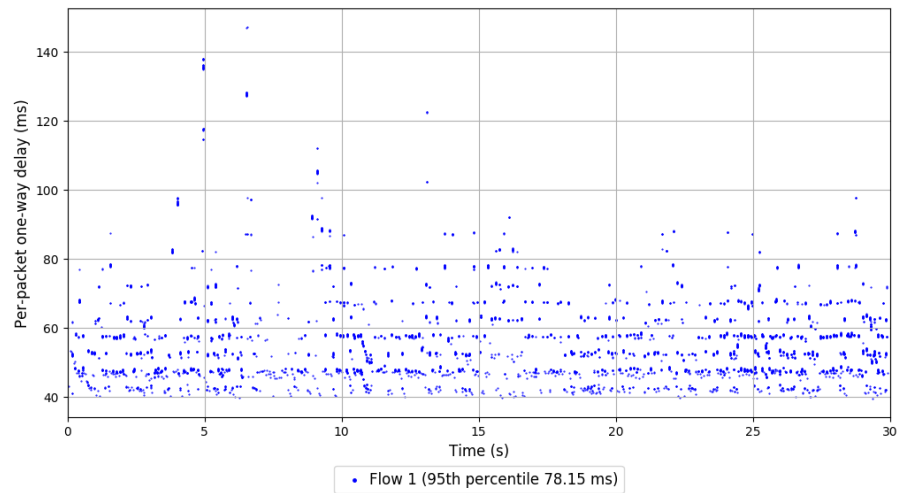
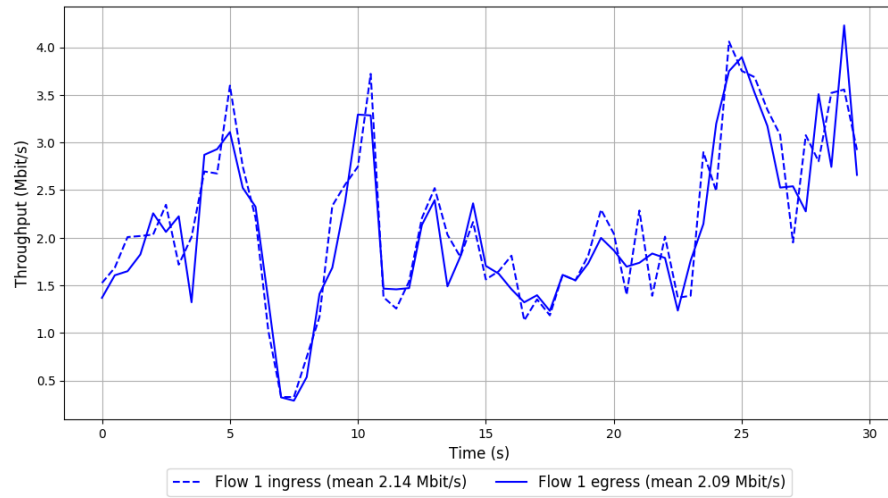


Run 2: Statistics of Sprout

Start at: 2018-04-16 22:08:50  
End at: 2018-04-16 22:09:20  
Local clock offset: -1.718 ms  
Remote clock offset: -6.877 ms

# Below is generated by plot.py at 2018-04-16 22:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.09 Mbit/s  
95th percentile per-packet one-way delay: 78.152 ms  
Loss rate: 2.50%  
-- Flow 1:  
Average throughput: 2.09 Mbit/s  
95th percentile per-packet one-way delay: 78.152 ms  
Loss rate: 2.50%

## Run 2: Report of Sprout — Data Link

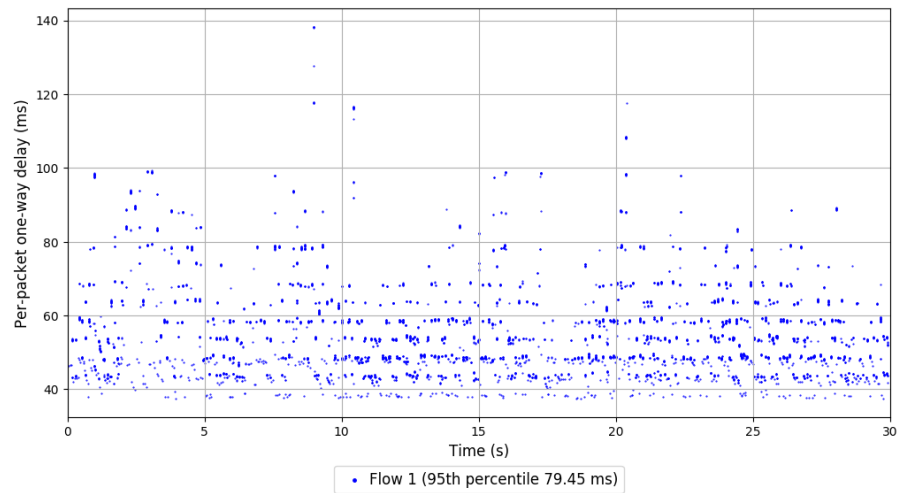
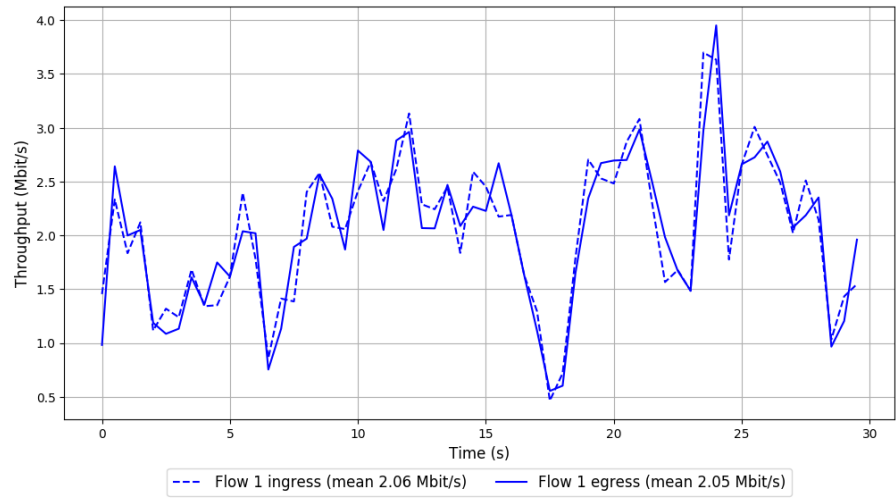


Run 3: Statistics of Sprout

Start at: 2018-04-16 22:27:25  
End at: 2018-04-16 22:27:55  
Local clock offset: -4.695 ms  
Remote clock offset: -7.483 ms

# Below is generated by plot.py at 2018-04-16 22:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.05 Mbit/s  
95th percentile per-packet one-way delay: 79.446 ms  
Loss rate: 0.29%  
-- Flow 1:  
Average throughput: 2.05 Mbit/s  
95th percentile per-packet one-way delay: 79.446 ms  
Loss rate: 0.29%

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



Run 1: Statistics of TaoVA-100x

Start at: 2018-04-16 21:51:16

End at: 2018-04-16 21:51:46

Local clock offset: 1.666 ms

Remote clock offset: -9.789 ms

# Below is generated by plot.py at 2018-04-16 22:39:17

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.64 Mbit/s

95th percentile per-packet one-way delay: 77.088 ms

Loss rate: 0.09%

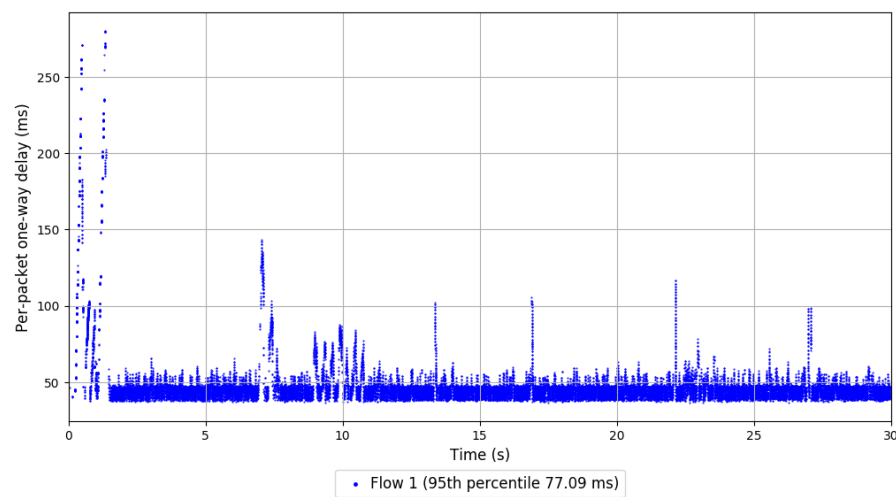
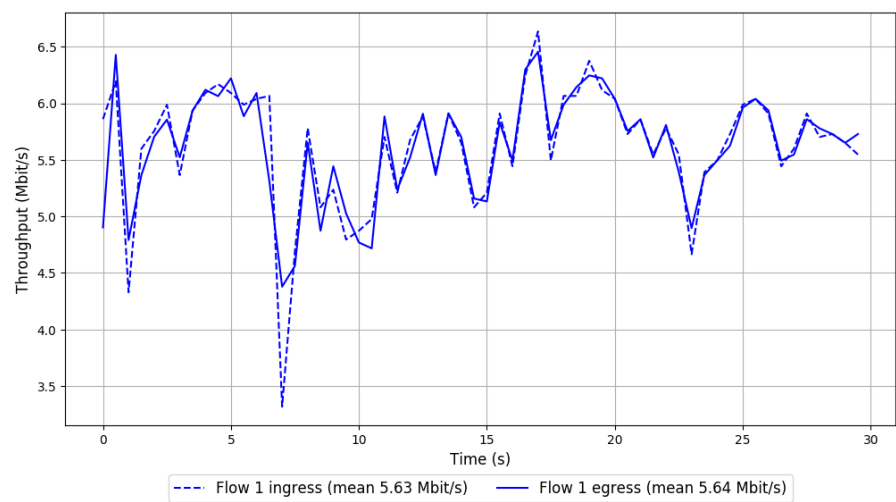
-- Flow 1:

Average throughput: 5.64 Mbit/s

95th percentile per-packet one-way delay: 77.088 ms

Loss rate: 0.09%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-04-16 22:09:55

End at: 2018-04-16 22:10:25

Local clock offset: -3.496 ms

Remote clock offset: -8.024 ms

# Below is generated by plot.py at 2018-04-16 22:39:20

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.86 Mbit/s

95th percentile per-packet one-way delay: 57.993 ms

Loss rate: 0.13%

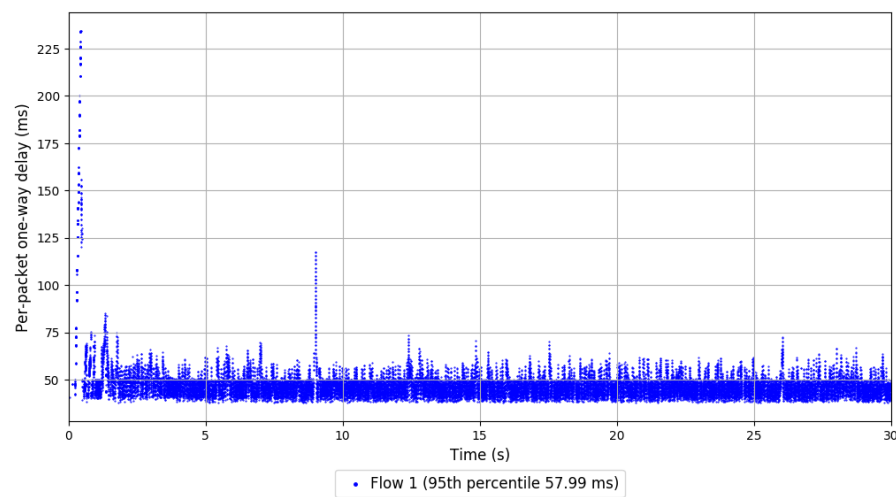
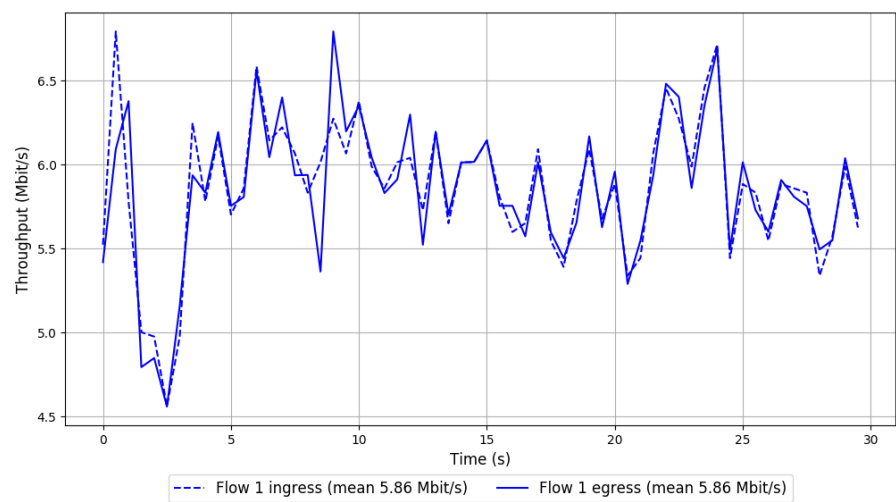
-- Flow 1:

Average throughput: 5.86 Mbit/s

95th percentile per-packet one-way delay: 57.993 ms

Loss rate: 0.13%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-04-16 22:28:30

End at: 2018-04-16 22:29:00

Local clock offset: -4.014 ms

Remote clock offset: -7.74 ms

# Below is generated by plot.py at 2018-04-16 22:39:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.59 Mbit/s

95th percentile per-packet one-way delay: 55.676 ms

Loss rate: 0.11%

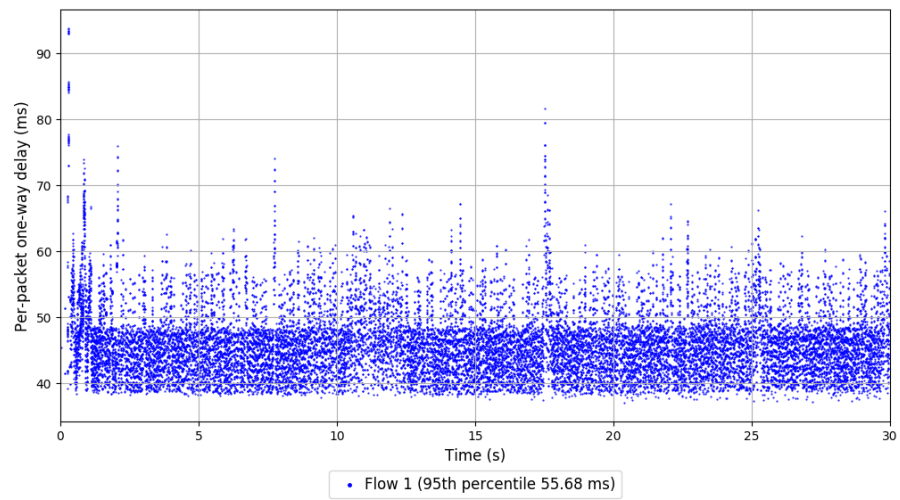
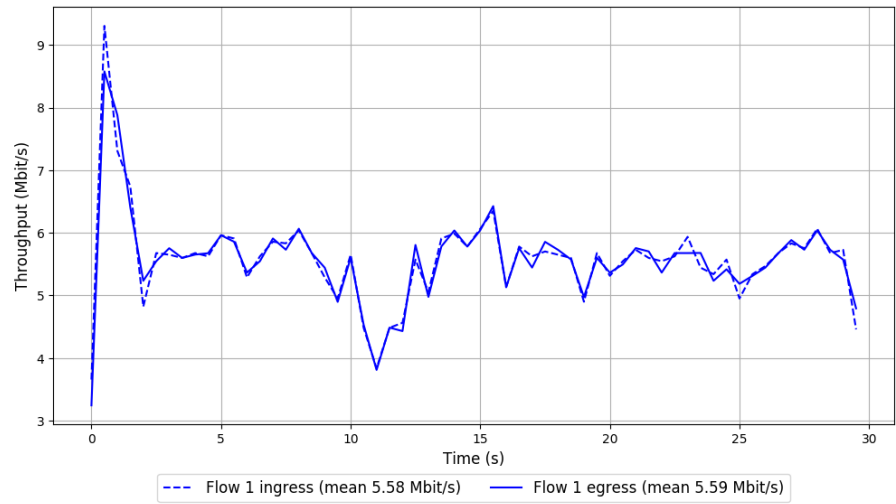
-- Flow 1:

Average throughput: 5.59 Mbit/s

95th percentile per-packet one-way delay: 55.676 ms

Loss rate: 0.11%

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

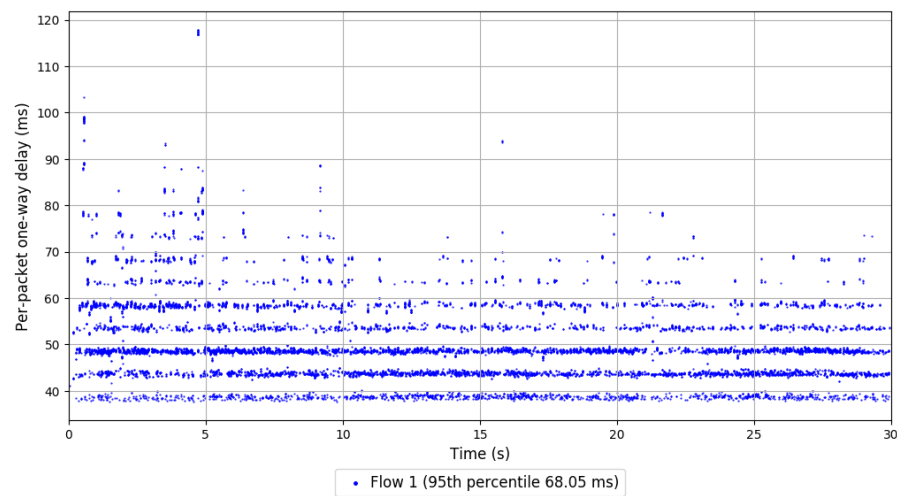
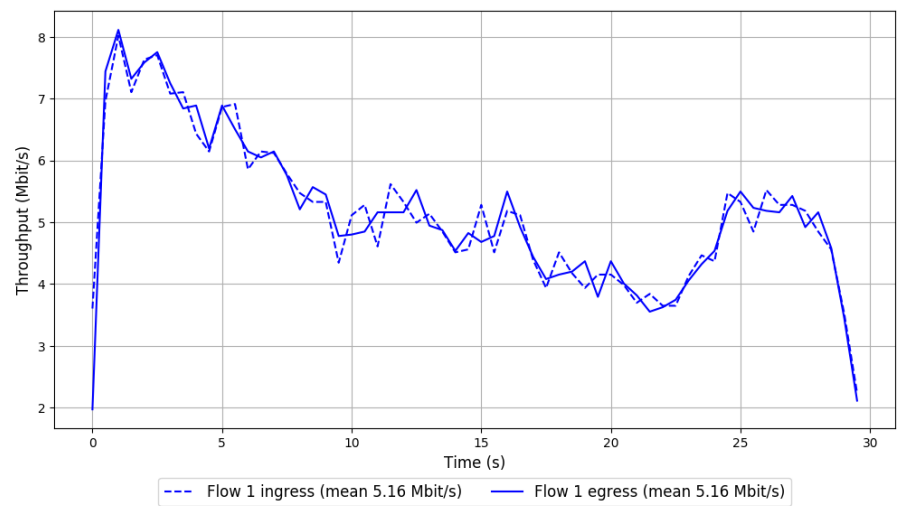


Run 1: Statistics of TCP Vegas

Start at: 2018-04-16 21:57:50  
End at: 2018-04-16 21:58:20  
Local clock offset: 2.136 ms  
Remote clock offset: -9.251 ms

# Below is generated by plot.py at 2018-04-16 22:39:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 5.16 Mbit/s  
95th percentile per-packet one-way delay: 68.053 ms  
Loss rate: 0.20%  
-- Flow 1:  
Average throughput: 5.16 Mbit/s  
95th percentile per-packet one-way delay: 68.053 ms  
Loss rate: 0.20%

Run 1: Report of TCP Vegas — Data Link

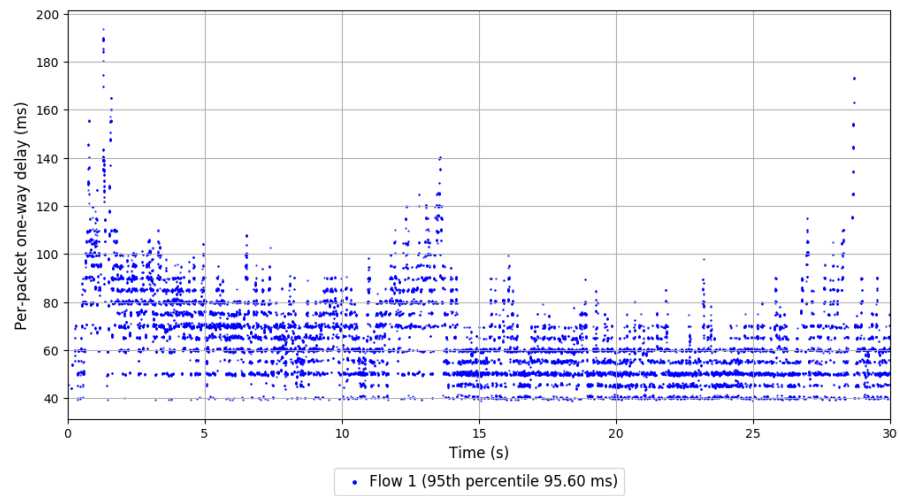
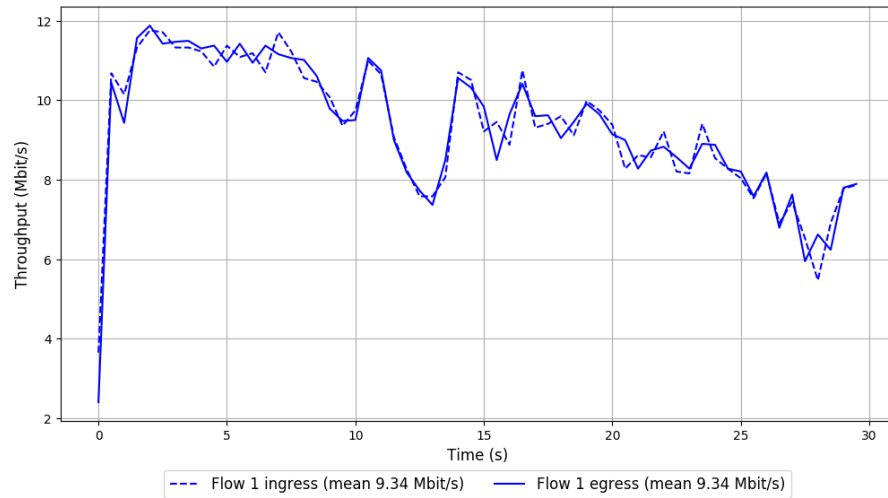


Run 2: Statistics of TCP Vegas

Start at: 2018-04-16 22:16:30  
End at: 2018-04-16 22:17:00  
Local clock offset: -3.923 ms  
Remote clock offset: -7.729 ms

# Below is generated by plot.py at 2018-04-16 22:39:23  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 9.34 Mbit/s  
95th percentile per-packet one-way delay: 95.601 ms  
Loss rate: 0.11%  
-- Flow 1:  
Average throughput: 9.34 Mbit/s  
95th percentile per-packet one-way delay: 95.601 ms  
Loss rate: 0.11%

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

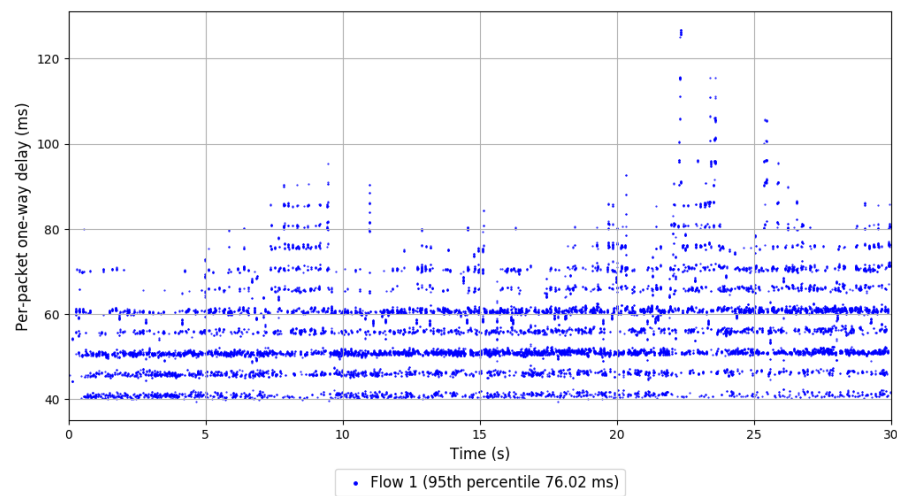
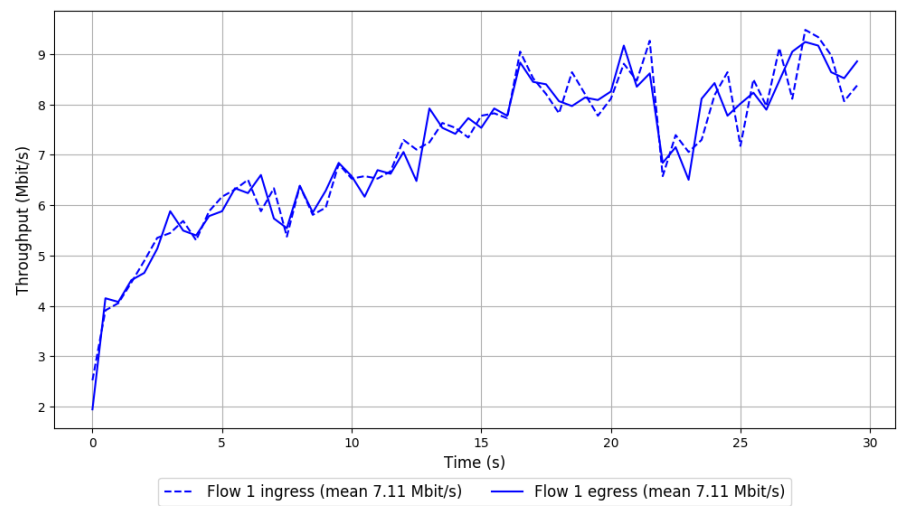


Run 3: Statistics of TCP Vegas

Start at: 2018-04-16 22:35:04  
End at: 2018-04-16 22:35:34  
Local clock offset: -10.762 ms  
Remote clock offset: -14.351 ms

# Below is generated by plot.py at 2018-04-16 22:39:23  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 7.11 Mbit/s  
95th percentile per-packet one-way delay: 76.022 ms  
Loss rate: 0.14%  
-- Flow 1:  
Average throughput: 7.11 Mbit/s  
95th percentile per-packet one-way delay: 76.022 ms  
Loss rate: 0.14%

Run 3: Report of TCP Vegas — Data Link

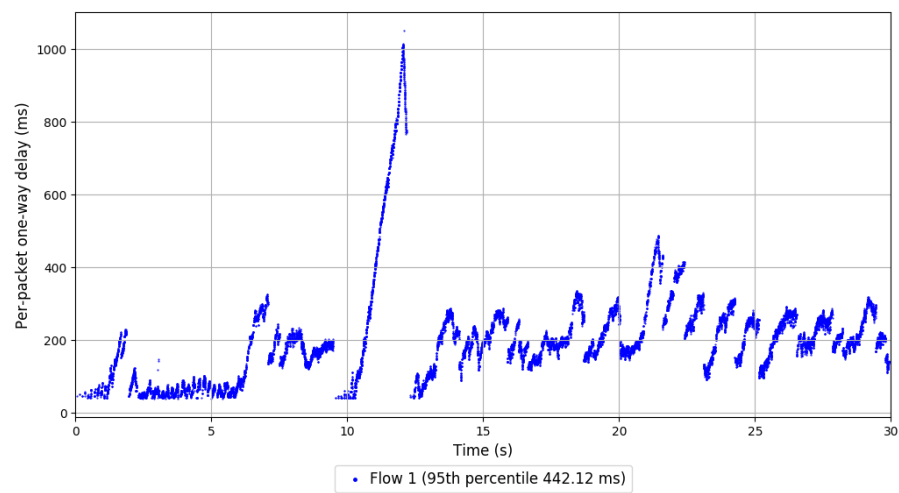
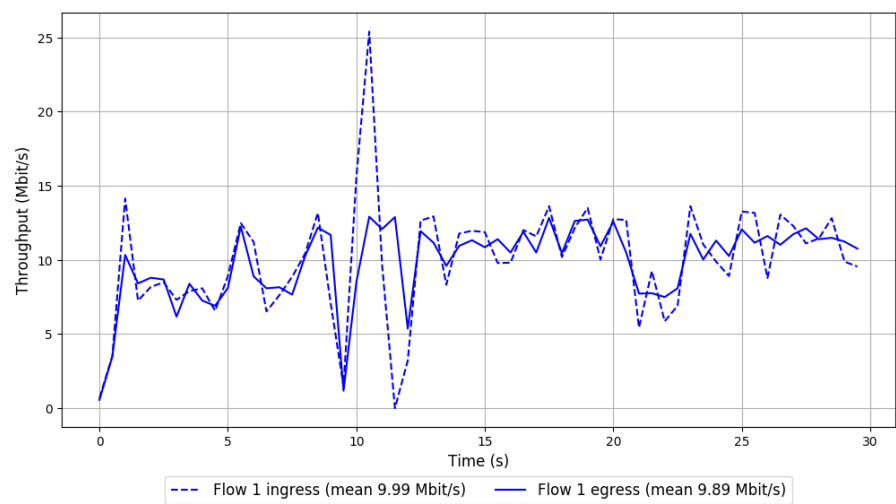


Run 1: Statistics of Verus

Start at: 2018-04-16 21:49:05  
End at: 2018-04-16 21:49:35  
Local clock offset: 0.081 ms  
Remote clock offset: -9.755 ms

# Below is generated by plot.py at 2018-04-16 22:39:27  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 9.89 Mbit/s  
95th percentile per-packet one-way delay: 442.125 ms  
Loss rate: 1.12%  
-- Flow 1:  
Average throughput: 9.89 Mbit/s  
95th percentile per-packet one-way delay: 442.125 ms  
Loss rate: 1.12%

Run 1: Report of Verus — Data Link

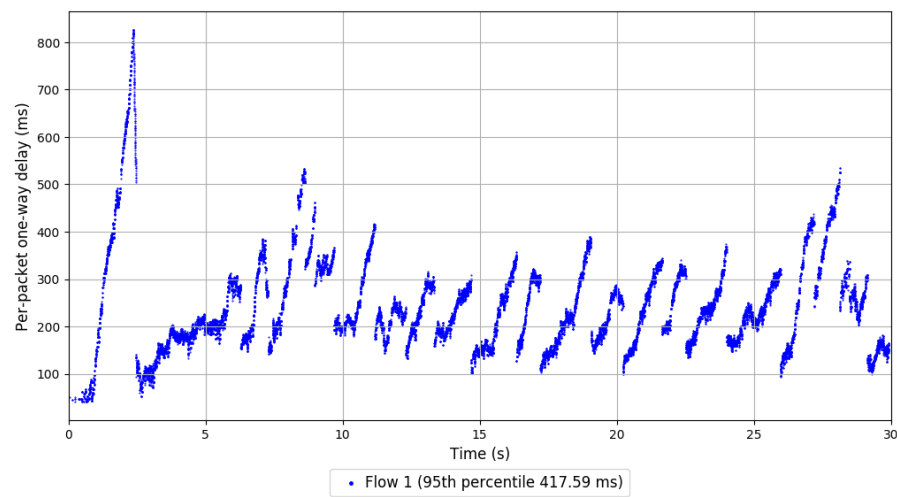
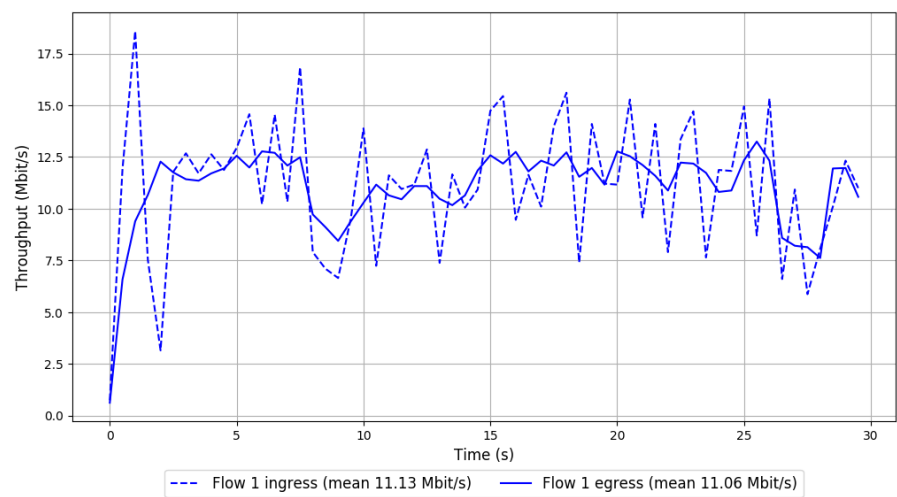


Run 2: Statistics of Verus

Start at: 2018-04-16 22:07:44  
End at: 2018-04-16 22:08:14  
Local clock offset: -2.497 ms  
Remote clock offset: -8.324 ms

# Below is generated by plot.py at 2018-04-16 22:39:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 11.06 Mbit/s  
95th percentile per-packet one-way delay: 417.589 ms  
Loss rate: 0.79%  
-- Flow 1:  
Average throughput: 11.06 Mbit/s  
95th percentile per-packet one-way delay: 417.589 ms  
Loss rate: 0.79%

Run 2: Report of Verus — Data Link

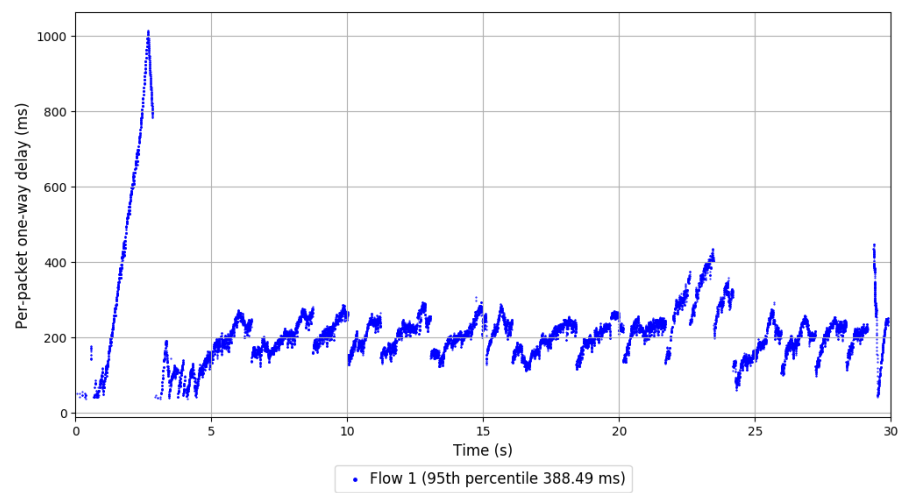
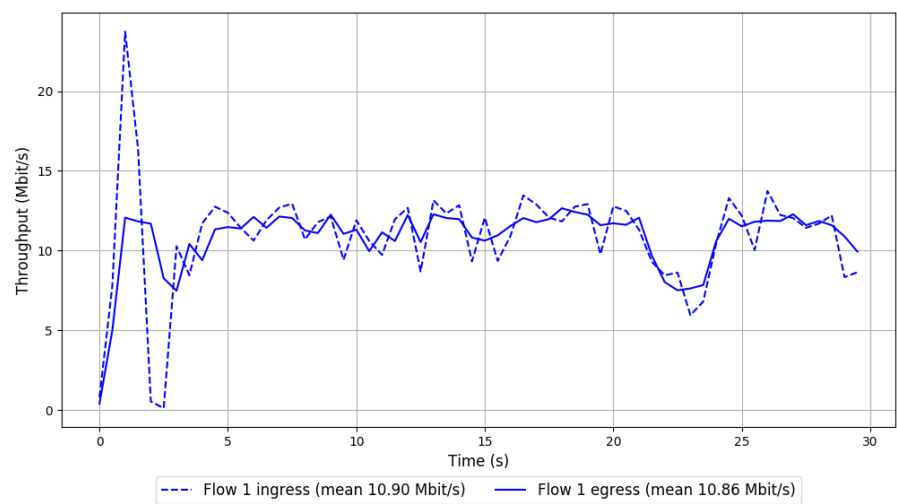


Run 3: Statistics of Verus

Start at: 2018-04-16 22:26:19  
End at: 2018-04-16 22:26:49  
Local clock offset: -4.728 ms  
Remote clock offset: -8.062 ms

# Below is generated by plot.py at 2018-04-16 22:39:30  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 10.86 Mbit/s  
95th percentile per-packet one-way delay: 388.491 ms  
Loss rate: 0.48%  
-- Flow 1:  
Average throughput: 10.86 Mbit/s  
95th percentile per-packet one-way delay: 388.491 ms  
Loss rate: 0.48%

Run 3: Report of Verus — Data Link

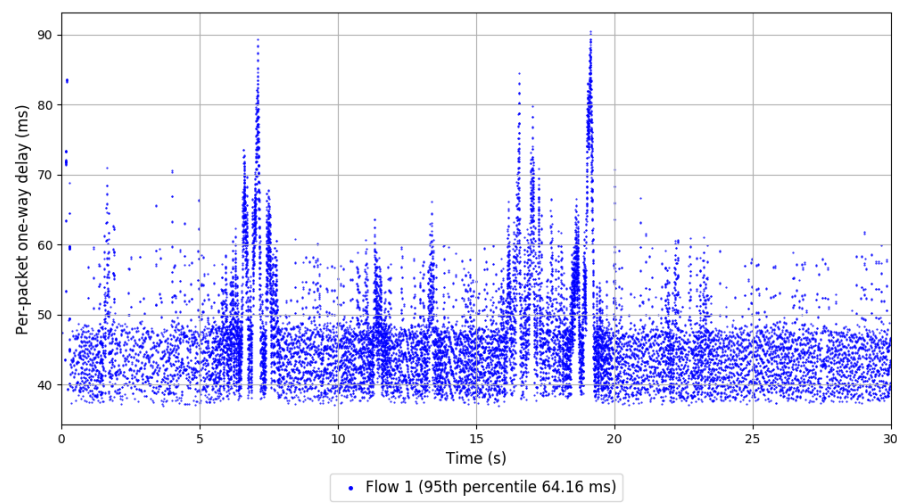
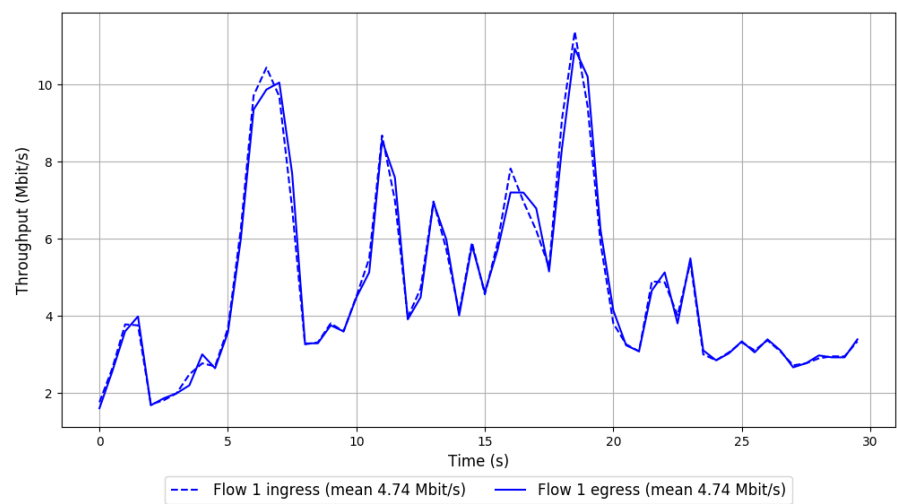


Run 1: Statistics of Copa

Start at: 2018-04-16 21:44:40  
End at: 2018-04-16 21:45:10  
Local clock offset: -0.062 ms  
Remote clock offset: -10.298 ms

# Below is generated by plot.py at 2018-04-16 22:39:30  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.74 Mbit/s  
95th percentile per-packet one-way delay: 64.160 ms  
Loss rate: 0.08%  
-- Flow 1:  
Average throughput: 4.74 Mbit/s  
95th percentile per-packet one-way delay: 64.160 ms  
Loss rate: 0.08%

Run 1: Report of Copa — Data Link

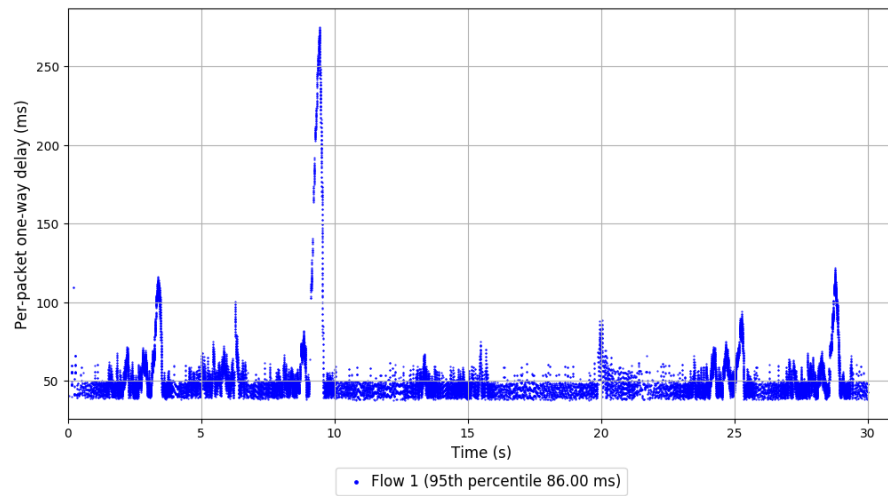
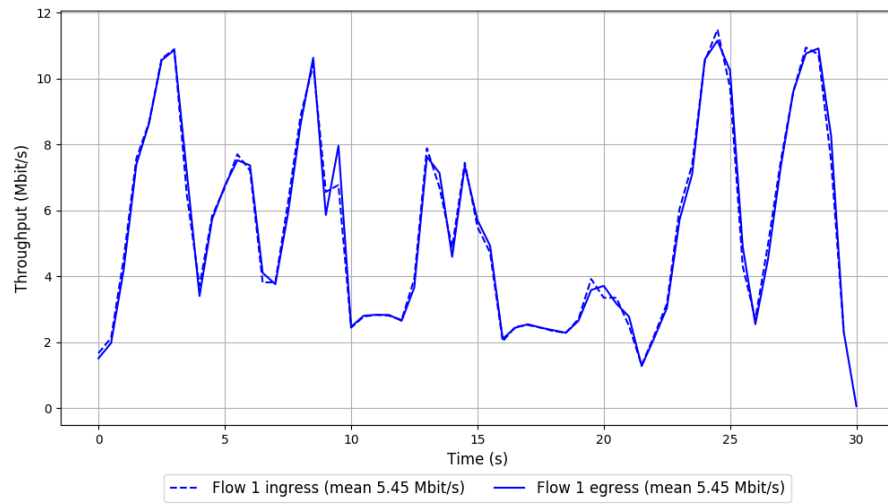


Run 2: Statistics of Copa

Start at: 2018-04-16 22:03:21  
End at: 2018-04-16 22:03:51  
Local clock offset: -0.336 ms  
Remote clock offset: -7.827 ms

# Below is generated by plot.py at 2018-04-16 22:39:35  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 5.45 Mbit/s  
95th percentile per-packet one-way delay: 85.996 ms  
Loss rate: 0.04%  
-- Flow 1:  
Average throughput: 5.45 Mbit/s  
95th percentile per-packet one-way delay: 85.996 ms  
Loss rate: 0.04%

## Run 2: Report of Copa — Data Link

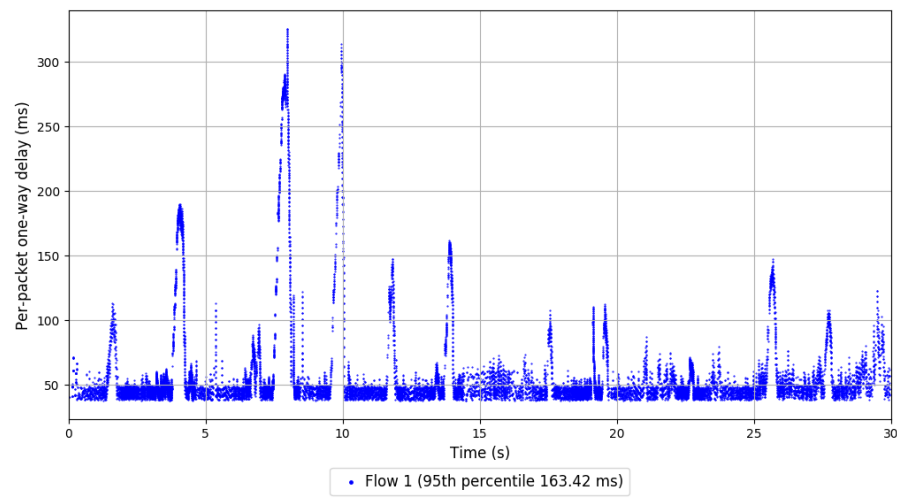
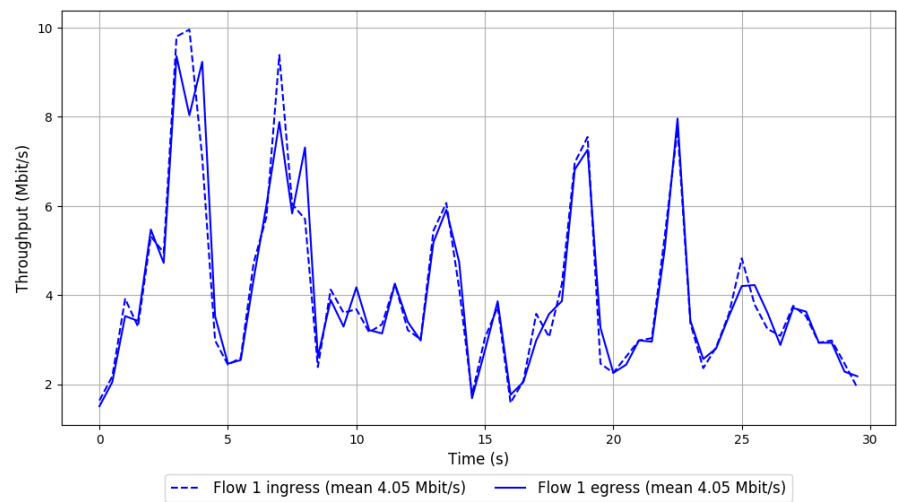


Run 3: Statistics of Copa

Start at: 2018-04-16 22:21:57  
End at: 2018-04-16 22:22:27  
Local clock offset: -4.723 ms  
Remote clock offset: -8.222 ms

# Below is generated by plot.py at 2018-04-16 22:39:35  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.05 Mbit/s  
95th percentile per-packet one-way delay: 163.424 ms  
Loss rate: 0.16%  
-- Flow 1:  
Average throughput: 4.05 Mbit/s  
95th percentile per-packet one-way delay: 163.424 ms  
Loss rate: 0.16%

Run 3: Report of Copa — Data Link

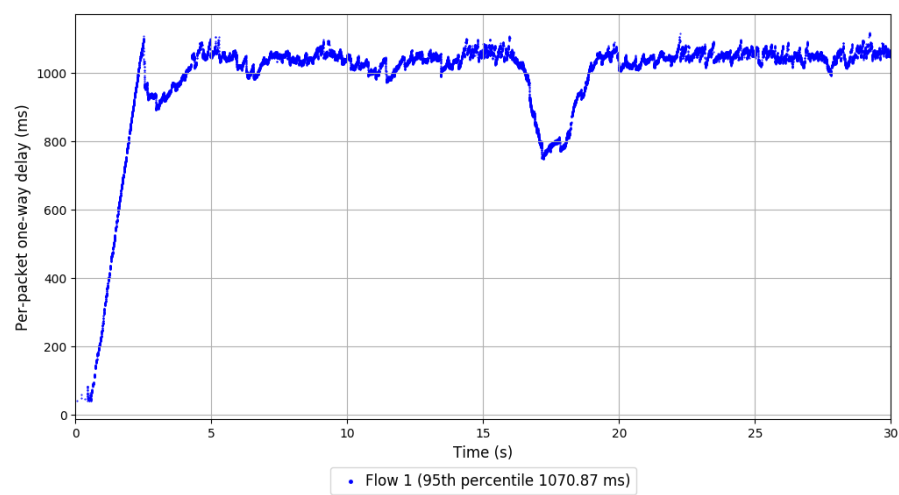
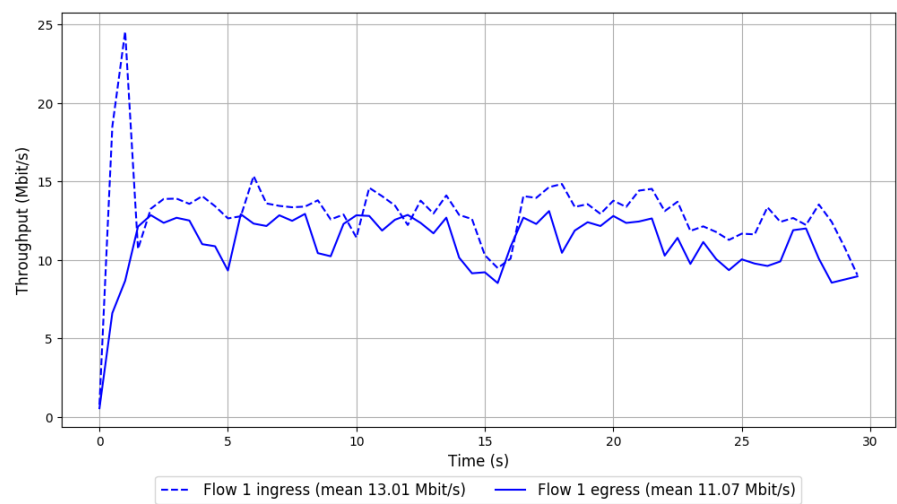


Run 1: Statistics of FillP

Start at: 2018-04-16 21:53:27  
End at: 2018-04-16 21:53:57  
Local clock offset: 1.397 ms  
Remote clock offset: -8.946 ms

# Below is generated by plot.py at 2018-04-16 22:39:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 11.07 Mbit/s  
95th percentile per-packet one-way delay: 1070.866 ms  
Loss rate: 15.02%  
-- Flow 1:  
Average throughput: 11.07 Mbit/s  
95th percentile per-packet one-way delay: 1070.866 ms  
Loss rate: 15.02%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-04-16 22:12:07

End at: 2018-04-16 22:12:37

Local clock offset: -3.92 ms

Remote clock offset: -7.42 ms

# Below is generated by plot.py at 2018-04-16 22:39:40

# Datalink statistics

-- Total of 1 flow:

Average throughput: 10.94 Mbit/s

95th percentile per-packet one-way delay: 1073.749 ms

Loss rate: 17.19%

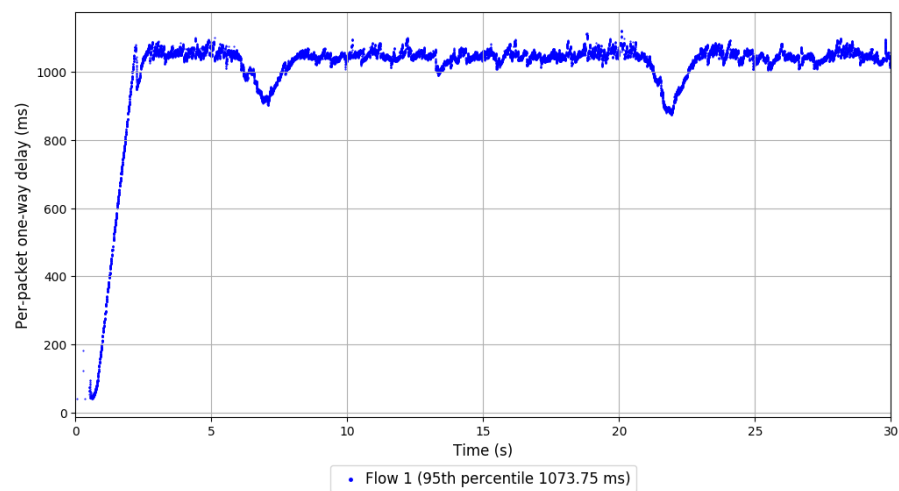
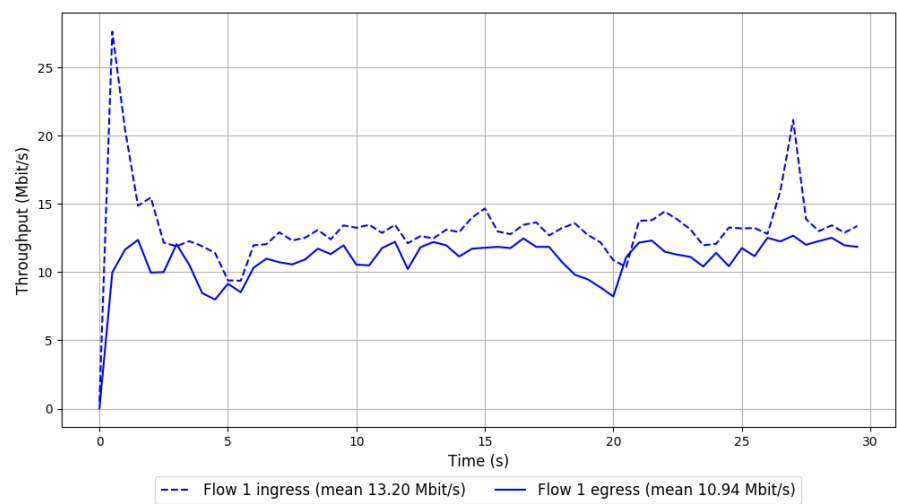
-- Flow 1:

Average throughput: 10.94 Mbit/s

95th percentile per-packet one-way delay: 1073.749 ms

Loss rate: 17.19%

Run 2: Report of FillP — Data Link

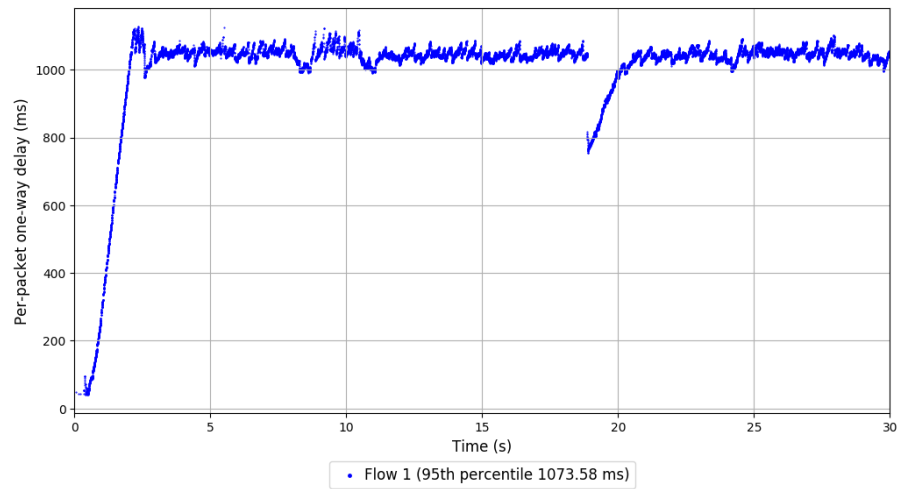
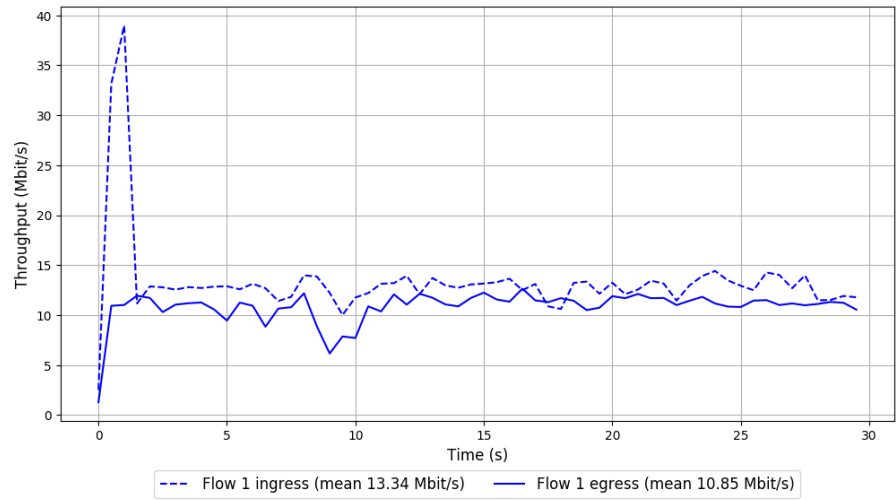


Run 3: Statistics of FillP

Start at: 2018-04-16 22:30:41  
End at: 2018-04-16 22:31:11  
Local clock offset: -5.444 ms  
Remote clock offset: -7.873 ms

# Below is generated by plot.py at 2018-04-16 22:39:41  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 10.85 Mbit/s  
95th percentile per-packet one-way delay: 1073.576 ms  
Loss rate: 18.78%  
-- Flow 1:  
Average throughput: 10.85 Mbit/s  
95th percentile per-packet one-way delay: 1073.576 ms  
Loss rate: 18.78%

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



Run 1: Statistics of Indigo-1-32

Start at: 2018-04-16 21:52:22

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

Local clock offset: 1.787 ms

Remote clock offset: -9.006 ms

# Below is generated by plot.py at 2018-04-16 22:39:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 3.31 Mbit/s

95th percentile per-packet one-way delay: 61.721 ms

Loss rate: 2.50%

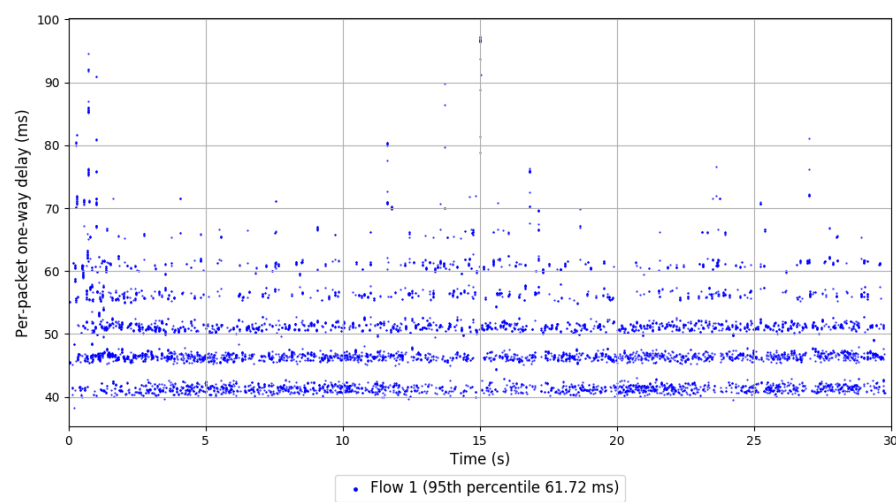
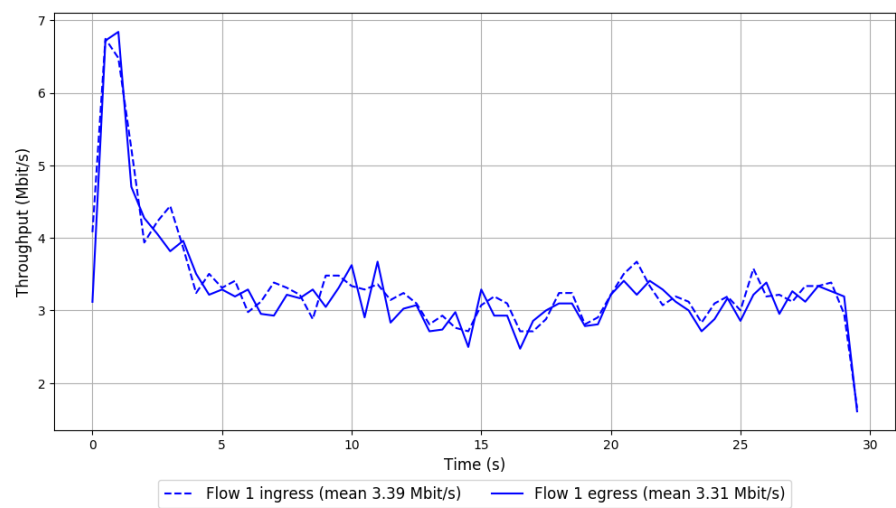
-- Flow 1:

Average throughput: 3.31 Mbit/s

95th percentile per-packet one-way delay: 61.721 ms

Loss rate: 2.50%

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

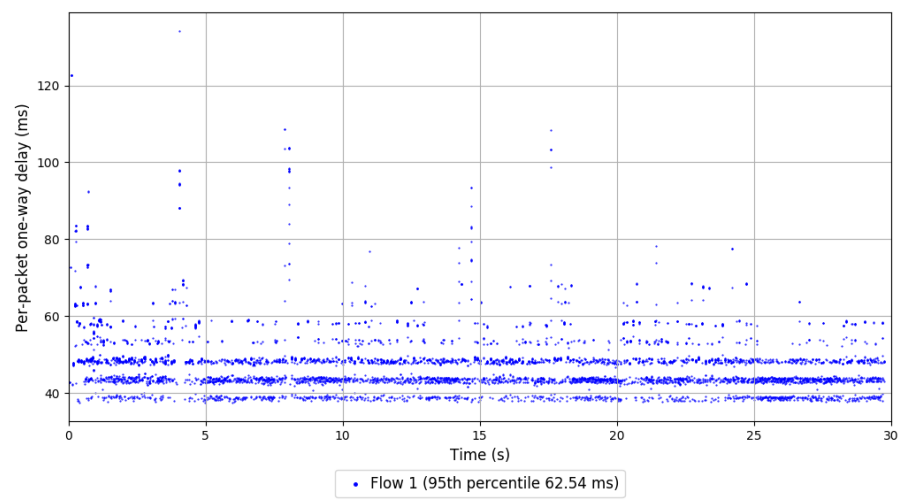
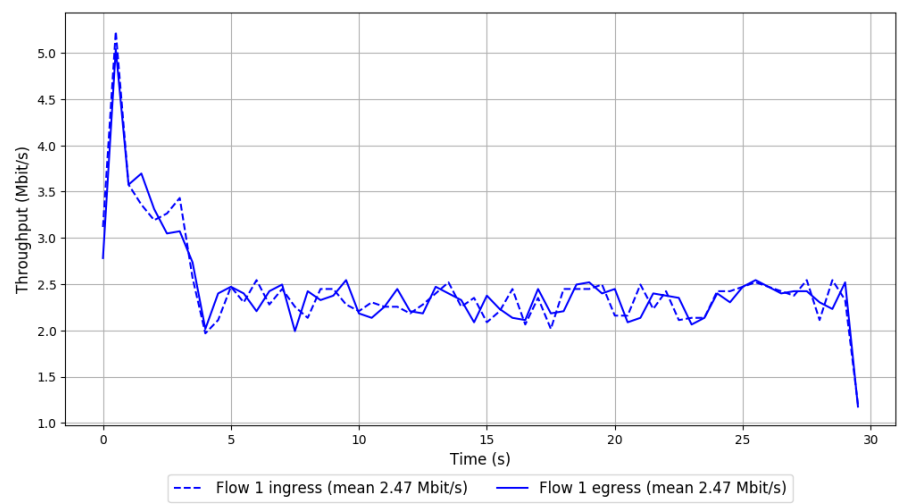


Run 2: Statistics of Indigo-1-32

Start at: 2018-04-16 22:11:01  
End at: 2018-04-16 22:11:31  
Local clock offset: -3.023 ms  
Remote clock offset: -7.389 ms

# Below is generated by plot.py at 2018-04-16 22:39:41  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.47 Mbit/s  
95th percentile per-packet one-way delay: 62.539 ms  
Loss rate: 0.23%  
-- Flow 1:  
Average throughput: 2.47 Mbit/s  
95th percentile per-packet one-way delay: 62.539 ms  
Loss rate: 0.23%

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

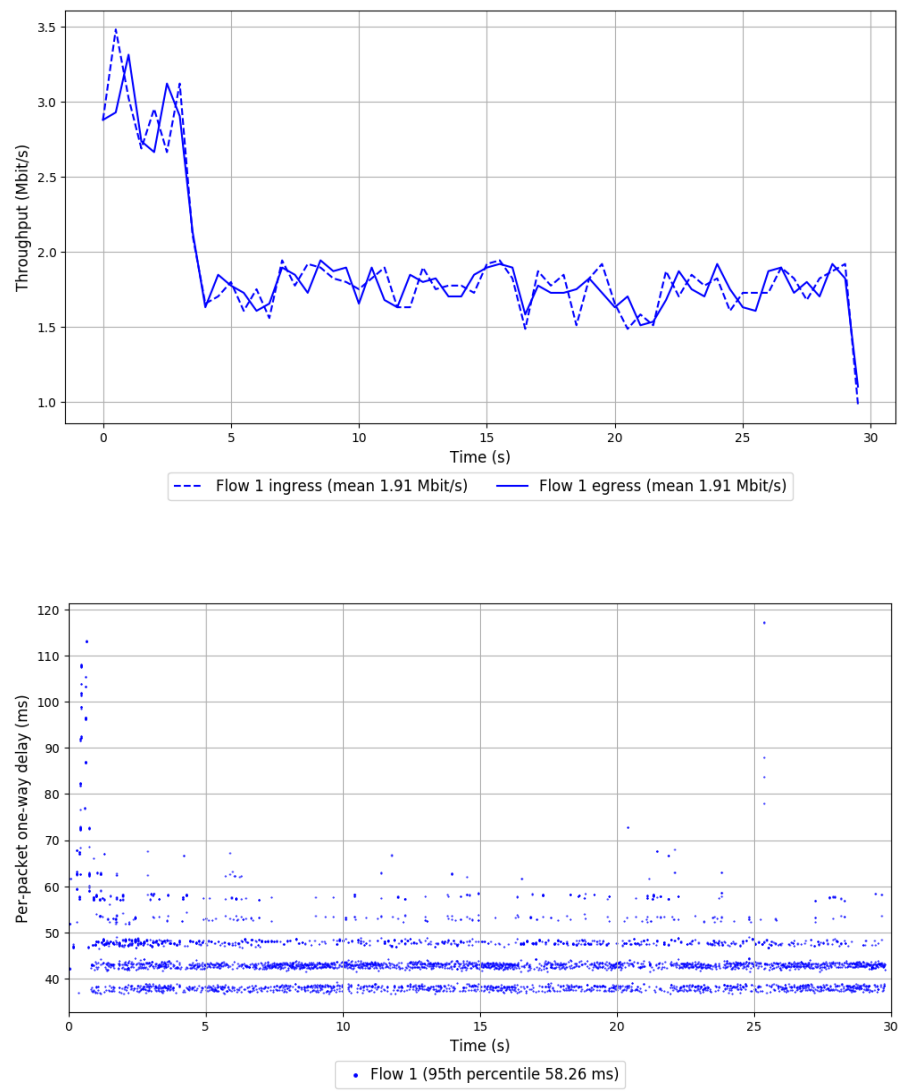


Run 3: Statistics of Indigo-1-32

Start at: 2018-04-16 22:29:36  
End at: 2018-04-16 22:30:06  
Local clock offset: -4.104 ms  
Remote clock offset: -7.991 ms

# Below is generated by plot.py at 2018-04-16 22:39:41  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.91 Mbit/s  
95th percentile per-packet one-way delay: 58.262 ms  
Loss rate: 0.11%  
-- Flow 1:  
Average throughput: 1.91 Mbit/s  
95th percentile per-packet one-way delay: 58.262 ms  
Loss rate: 0.11%

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



Run 1: Statistics of PCC-Vivace

Start at: 2018-04-16 21:54:33

End at: 2018-04-16 21:55:03

Local clock offset: 1.612 ms

Remote clock offset: -9.589 ms

# Below is generated by plot.py at 2018-04-16 22:39:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.04 Mbit/s

95th percentile per-packet one-way delay: 57.884 ms

Loss rate: 0.25%

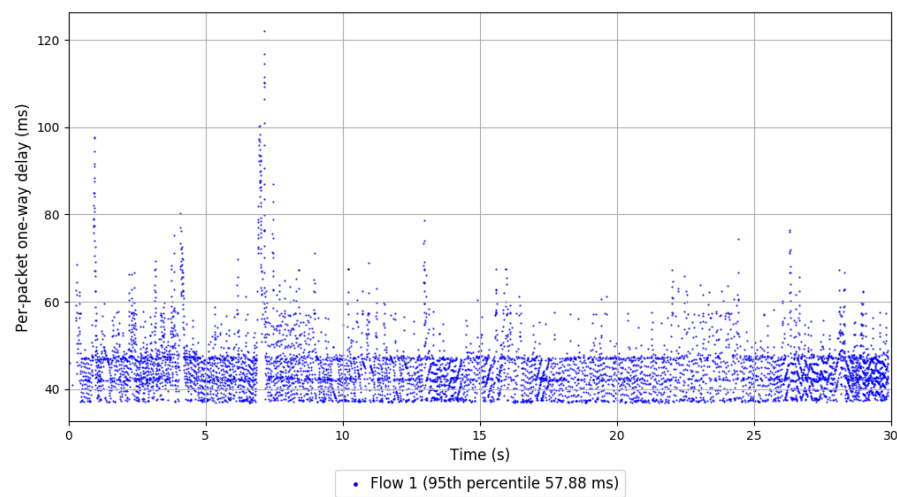
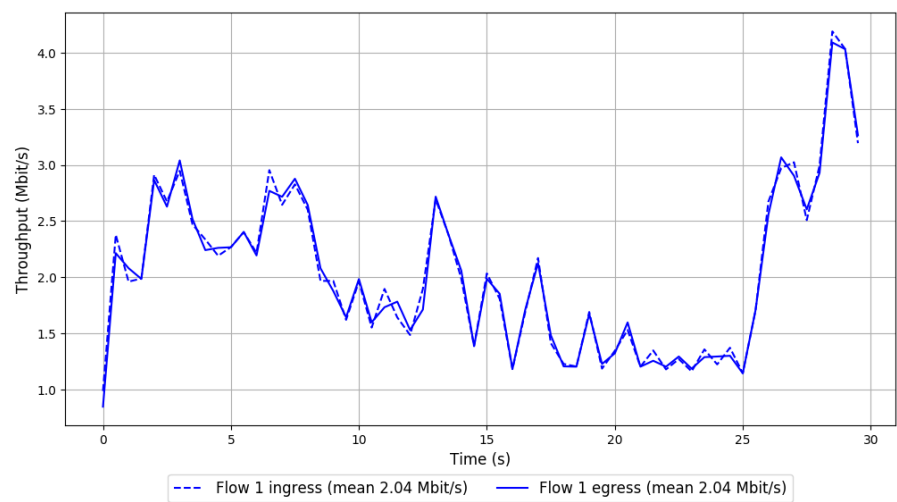
-- Flow 1:

Average throughput: 2.04 Mbit/s

95th percentile per-packet one-way delay: 57.884 ms

Loss rate: 0.25%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-04-16 22:13:13

End at: 2018-04-16 22:13:43

Local clock offset: -3.532 ms

Remote clock offset: -8.051 ms

# Below is generated by plot.py at 2018-04-16 22:39:41

# Datalink statistics

-- Total of 1 flow:

Average throughput: 6.83 Mbit/s

95th percentile per-packet one-way delay: 76.881 ms

Loss rate: 0.10%

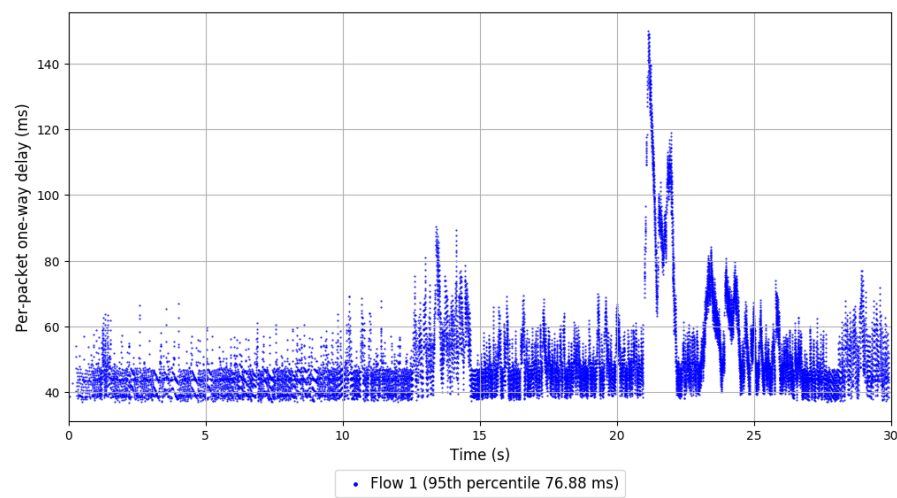
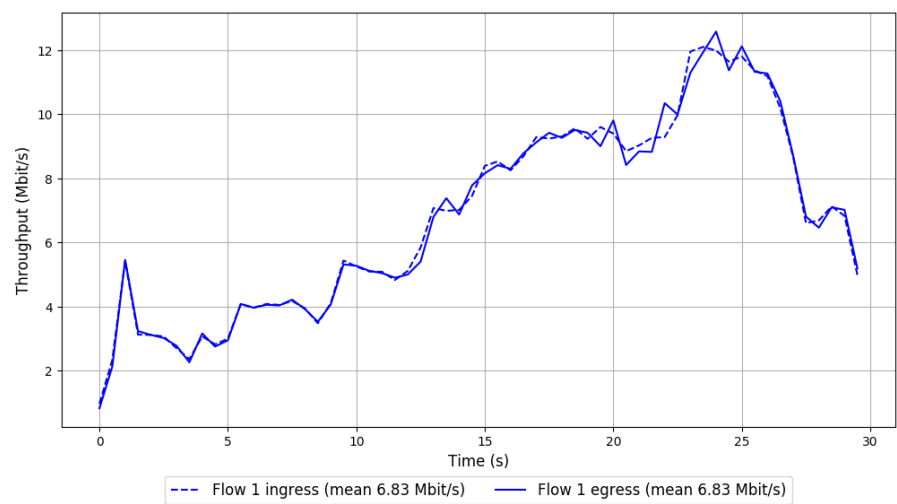
-- Flow 1:

Average throughput: 6.83 Mbit/s

95th percentile per-packet one-way delay: 76.881 ms

Loss rate: 0.10%

Run 2: Report of PCC-Vivace — Data Link

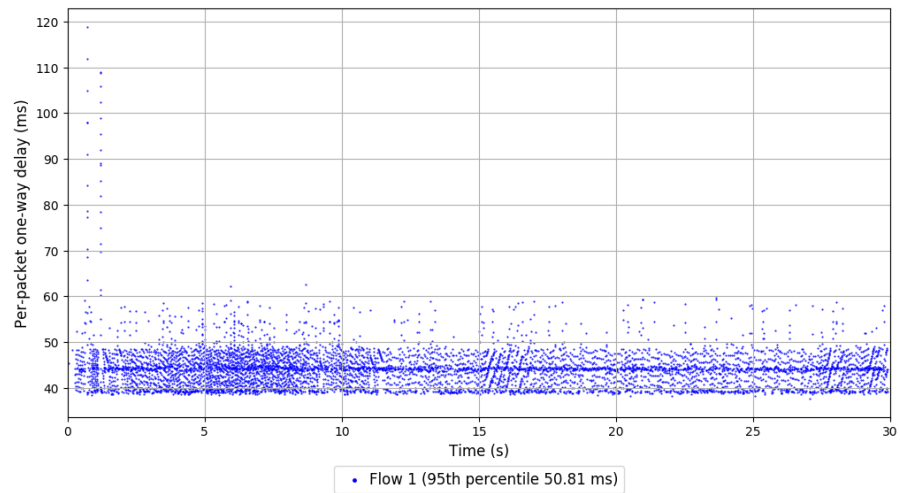
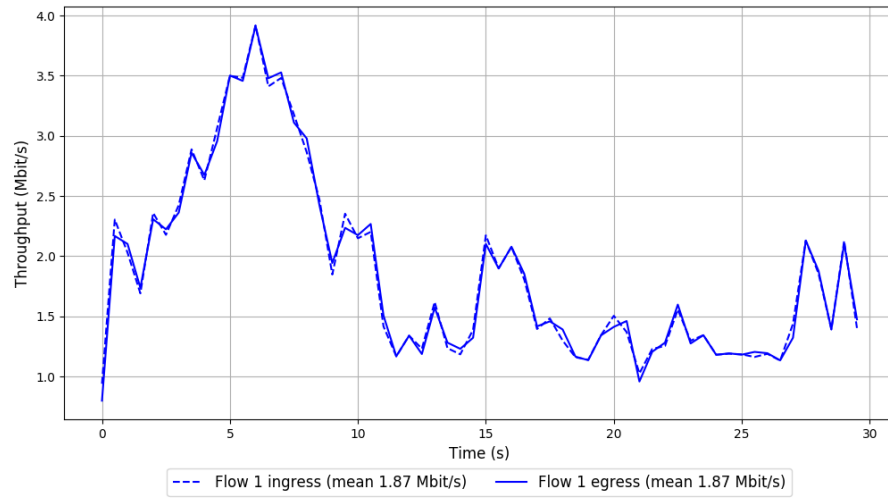


Run 3: Statistics of PCC-Vivace

Start at: 2018-04-16 22:31:48  
End at: 2018-04-16 22:32:18  
Local clock offset: -5.112 ms  
Remote clock offset: -8.416 ms

# Below is generated by plot.py at 2018-04-16 22:39:41  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.87 Mbit/s  
95th percentile per-packet one-way delay: 50.807 ms  
Loss rate: 0.10%  
-- Flow 1:  
Average throughput: 1.87 Mbit/s  
95th percentile per-packet one-way delay: 50.807 ms  
Loss rate: 0.10%

### Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2018-04-16 21:43:35

End at: 2018-04-16 21:44:05

Local clock offset: -0.5 ms

Remote clock offset: -9.823 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 22:02:16

End at: 2018-04-16 22:02:46

Local clock offset: 1.754 ms

Remote clock offset: -8.695 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 22:20:52

End at: 2018-04-16 22:21:22

Local clock offset: -4.044 ms

Remote clock offset: -8.206 ms

### Run 3: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing