

Pantheon Report

Generated at 2018-04-03 01:37:13 (UTC).

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

Repeated the test of 17 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

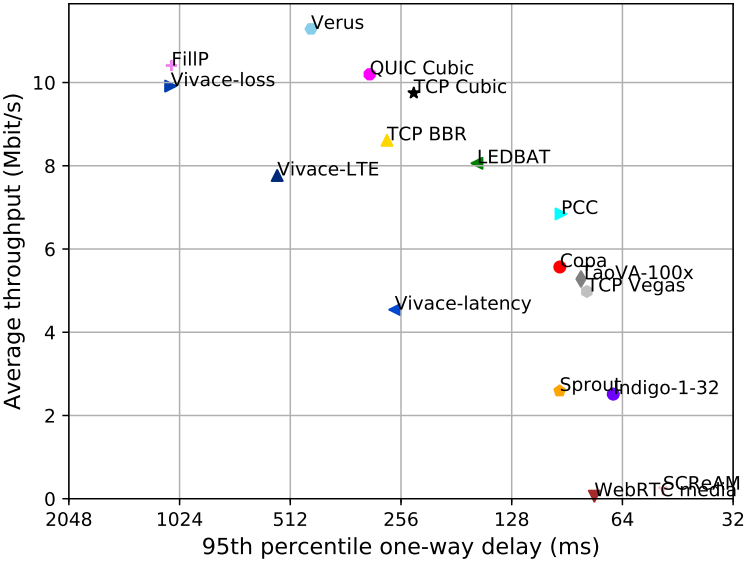
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

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

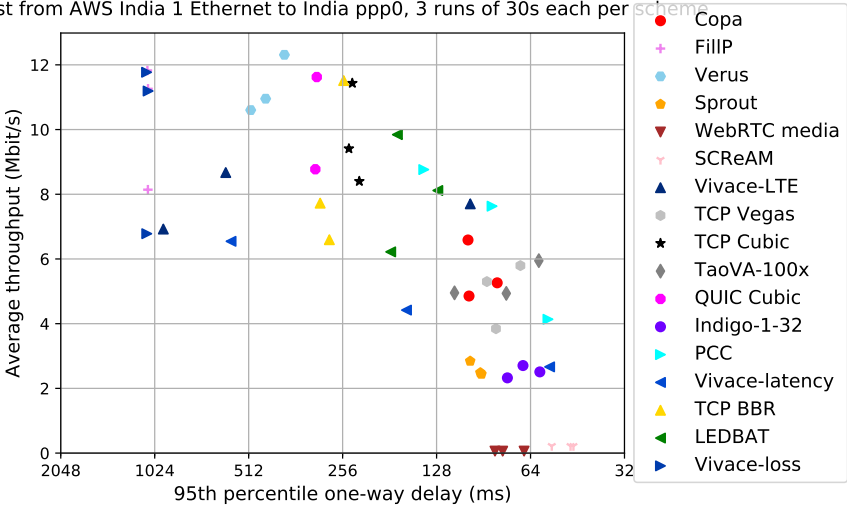
Git summary:

```
branch: master @ eb420b5be9bafccd22cf68b99ff5a2000462fc59
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ 11f8c46a2bf1dc797253db7e8ca04076272b2a44
third_party/genericCC @ 9249eea3238475c4d8cca1443d28df70bff6c4a2
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quick @ 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	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	8.62	279.51	1.07
TCP Cubic	3	9.75	236.37	0.68
LEDBAT	3	8.06	159.15	0.50
PCC	3	6.84	93.97	0.62
QUIC Cubic	2	10.20	311.45	0.92
SCReAM	3	0.22	49.66	0.13
WebRTC media	3	0.06	76.30	0.00
Sprout	3	2.59	94.83	0.23
TaoVA-100x	3	5.28	82.95	0.16
TCP Vegas	3	4.98	79.96	0.16
Verus	3	11.29	449.80	1.78
Copa	3	5.57	94.70	0.11
FillP	3	10.41	1077.78	19.68
Indigo-1-32	3	2.52	67.78	0.15
Vivace-latency	3	4.54	266.25	0.24
Vivace-loss	3	9.91	1082.60	27.31
Vivace-LTE	3	7.77	555.73	0.80

Run 1: Statistics of TCP BBR

Start at: 2018-04-03 00:44:14

End at: 2018-04-03 00:44:44

Local clock offset: -3.471 ms

Remote clock offset: -1.237 ms

Below is generated by plot.py at 2018-04-03 01:36:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.73 Mbit/s

95th percentile per-packet one-way delay: 302.144 ms

Loss rate: 0.80%

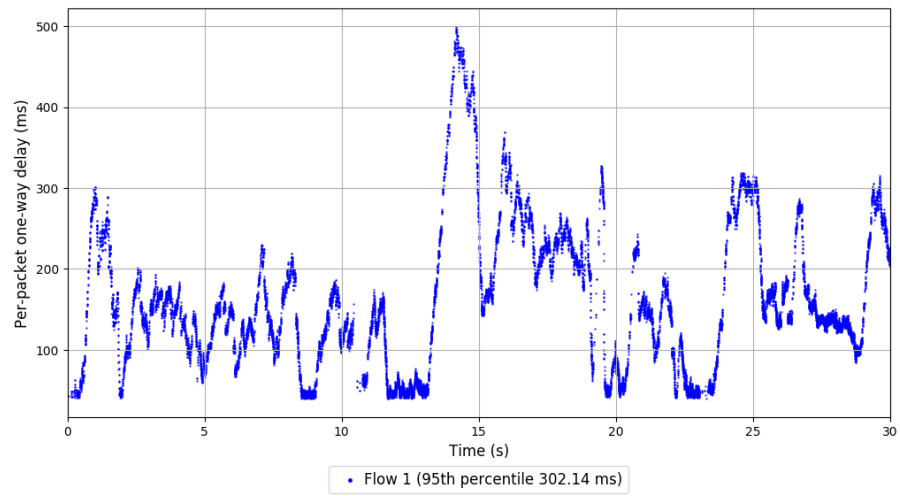
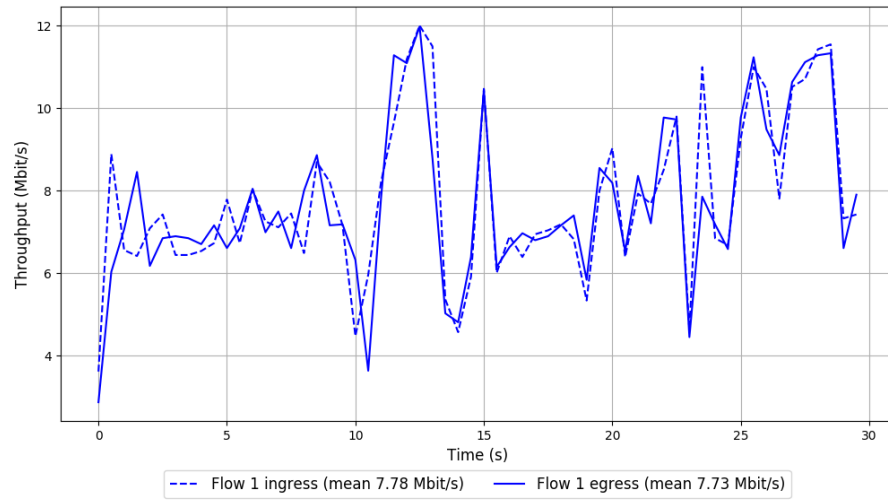
-- Flow 1:

Average throughput: 7.73 Mbit/s

95th percentile per-packet one-way delay: 302.144 ms

Loss rate: 0.80%

Run 1: Report of TCP BBR — Data Link

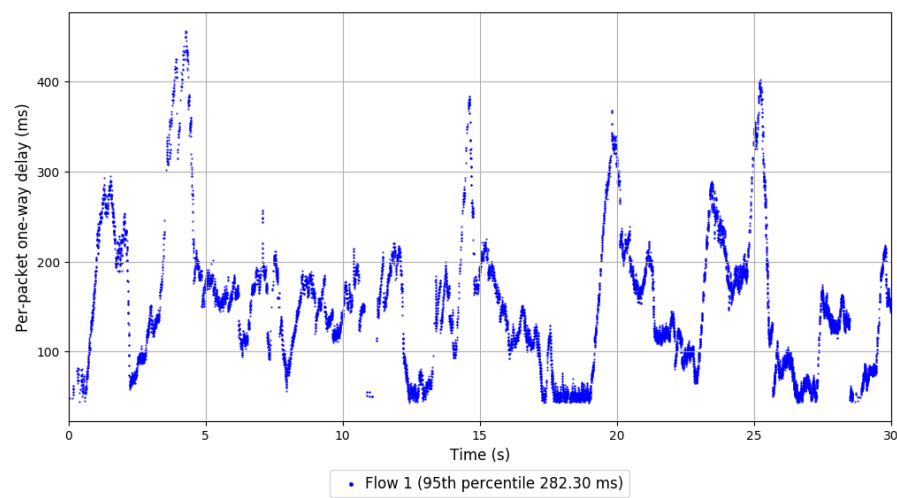
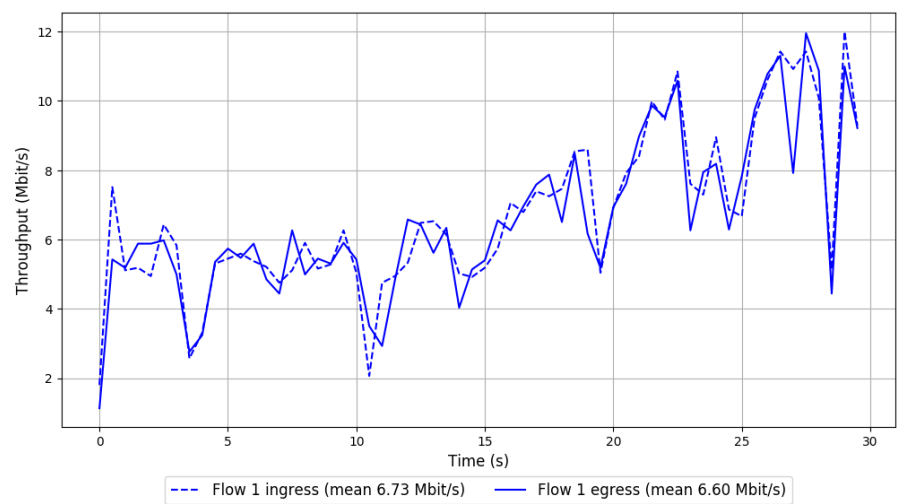


Run 2: Statistics of TCP BBR

Start at: 2018-04-03 01:03:49
End at: 2018-04-03 01:04:19
Local clock offset: 1.744 ms
Remote clock offset: -1.355 ms

Below is generated by plot.py at 2018-04-03 01:36:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.60 Mbit/s
95th percentile per-packet one-way delay: 282.298 ms
Loss rate: 2.12%
-- Flow 1:
Average throughput: 6.60 Mbit/s
95th percentile per-packet one-way delay: 282.298 ms
Loss rate: 2.12%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-04-03 01:23:32

End at: 2018-04-03 01:24:02

Local clock offset: 1.408 ms

Remote clock offset: 3.207 ms

Below is generated by plot.py at 2018-04-03 01:36:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.52 Mbit/s

95th percentile per-packet one-way delay: 254.084 ms

Loss rate: 0.29%

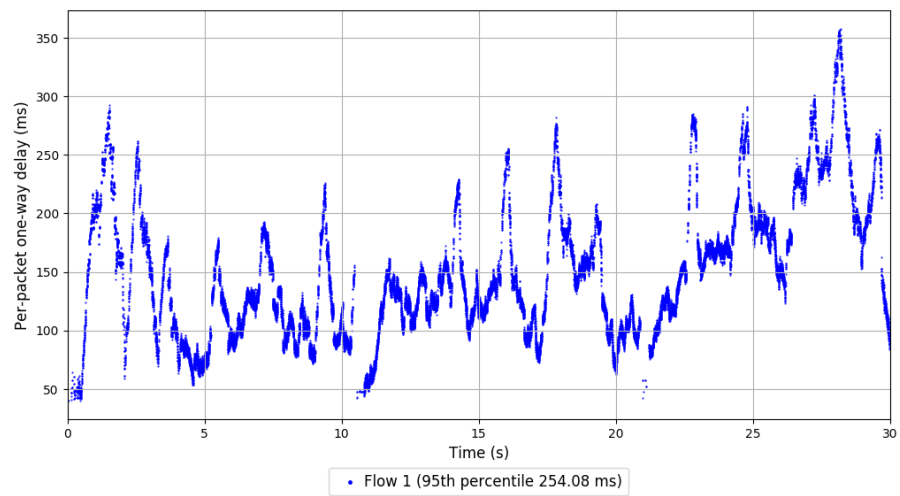
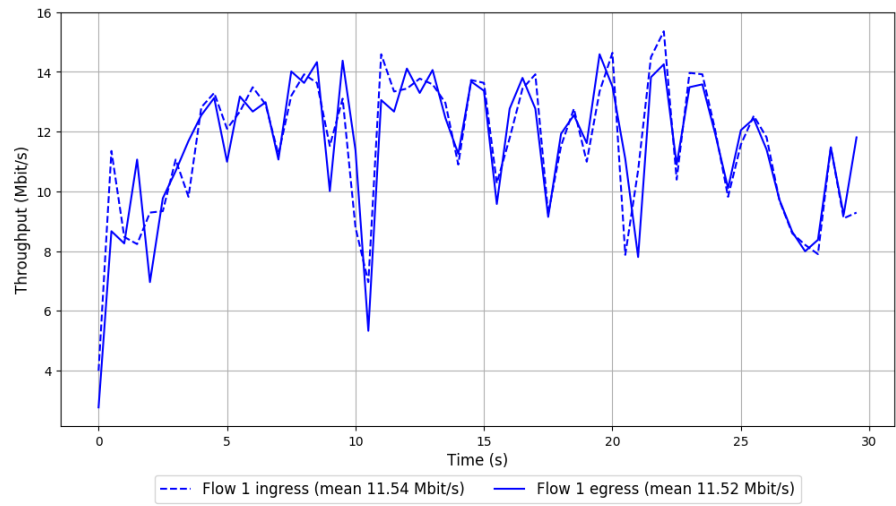
-- Flow 1:

Average throughput: 11.52 Mbit/s

95th percentile per-packet one-way delay: 254.084 ms

Loss rate: 0.29%

Run 3: Report of TCP BBR — Data Link

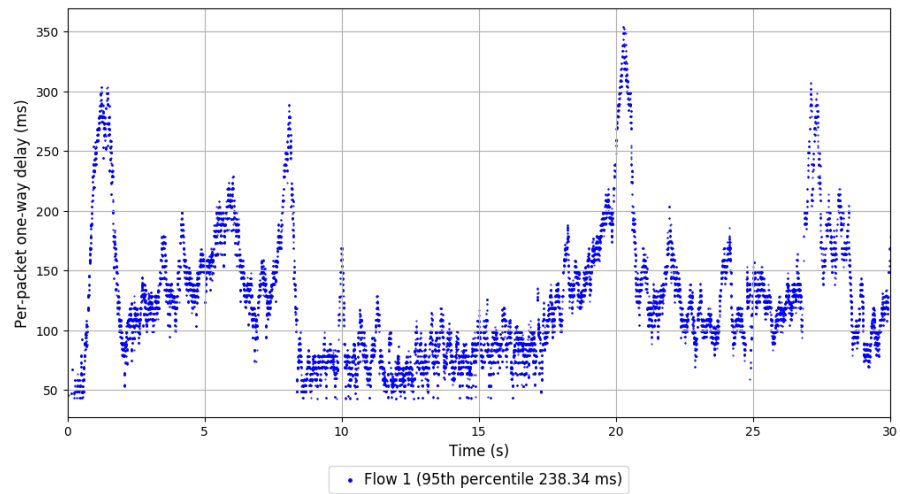
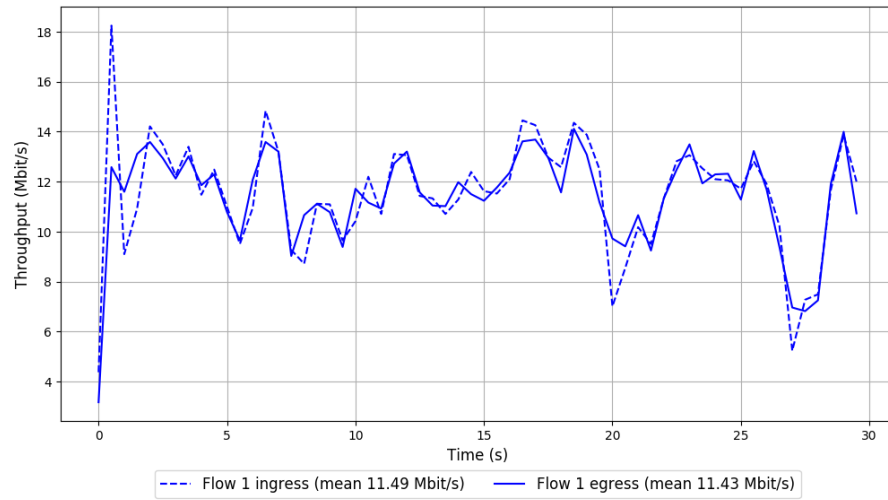


Run 1: Statistics of TCP Cubic

Start at: 2018-04-03 00:36:36
End at: 2018-04-03 00:37:07
Local clock offset: -5.568 ms
Remote clock offset: -1.367 ms

Below is generated by plot.py at 2018-04-03 01:36:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.43 Mbit/s
95th percentile per-packet one-way delay: 238.340 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 11.43 Mbit/s
95th percentile per-packet one-way delay: 238.340 ms
Loss rate: 0.64%

Run 1: Report of TCP Cubic — Data Link

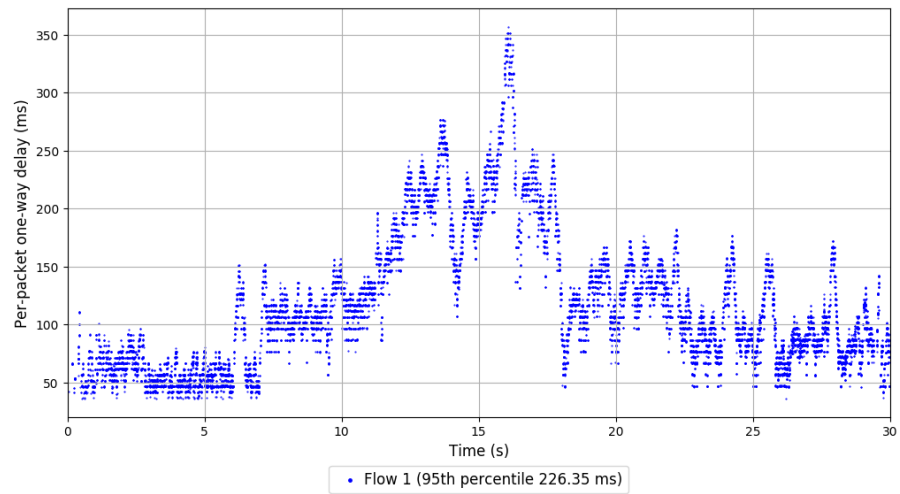
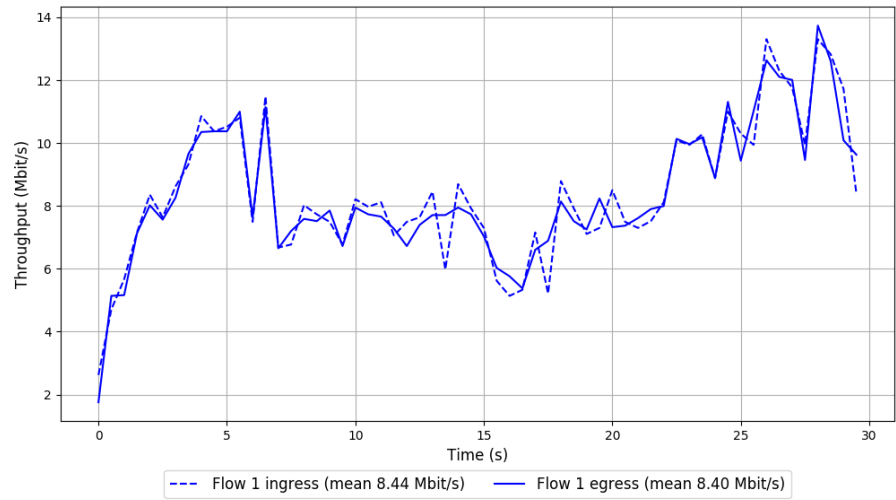


Run 2: Statistics of TCP Cubic

Start at: 2018-04-03 00:56:11
End at: 2018-04-03 00:56:41
Local clock offset: 1.427 ms
Remote clock offset: -1.816 ms

Below is generated by plot.py at 2018-04-03 01:36:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 8.40 Mbit/s
95th percentile per-packet one-way delay: 226.346 ms
Loss rate: 0.63%
-- Flow 1:
Average throughput: 8.40 Mbit/s
95th percentile per-packet one-way delay: 226.346 ms
Loss rate: 0.63%

Run 2: Report of TCP Cubic — Data Link

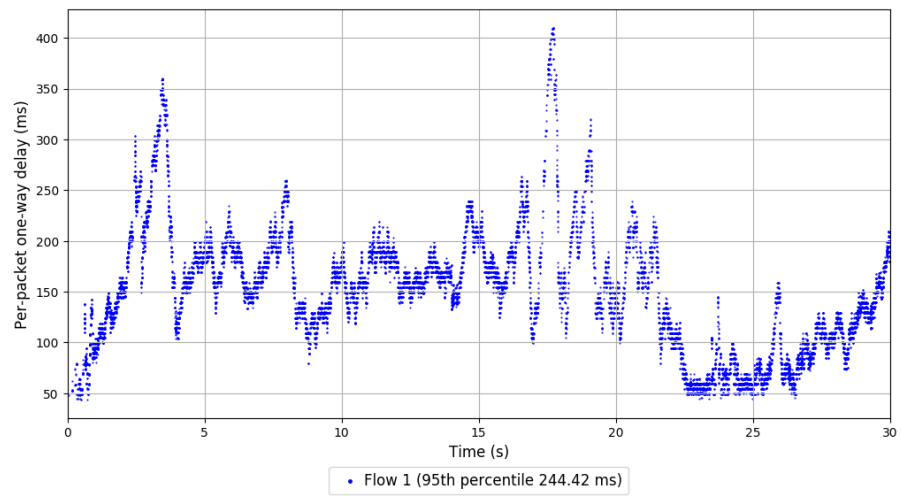
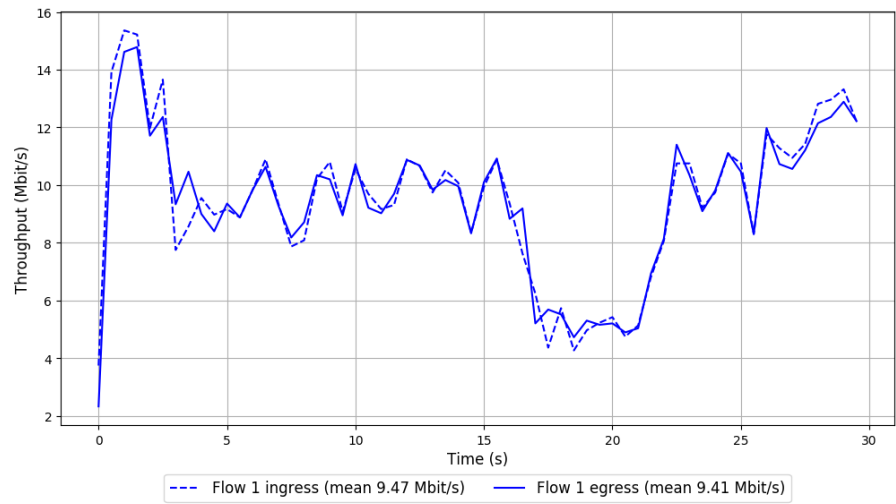


Run 3: Statistics of TCP Cubic

Start at: 2018-04-03 01:15:52
End at: 2018-04-03 01:16:22
Local clock offset: 0.931 ms
Remote clock offset: -1.547 ms

Below is generated by plot.py at 2018-04-03 01:36:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.41 Mbit/s
95th percentile per-packet one-way delay: 244.420 ms
Loss rate: 0.77%
-- Flow 1:
Average throughput: 9.41 Mbit/s
95th percentile per-packet one-way delay: 244.420 ms
Loss rate: 0.77%

Run 3: Report of TCP Cubic — Data Link

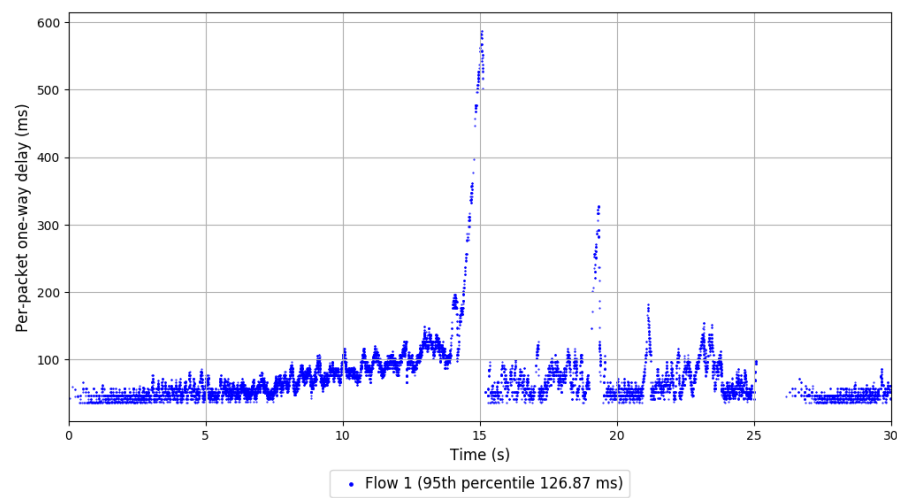
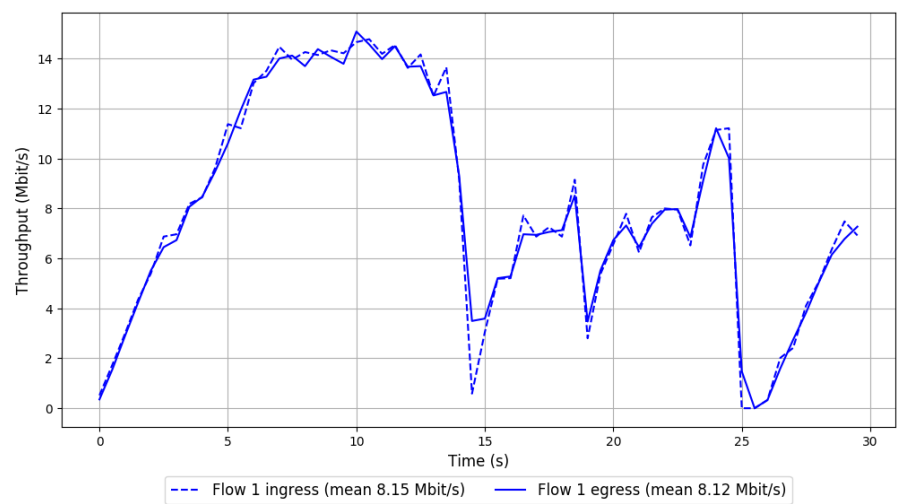


```
Run 1: Statistics of LEDBAT

Start at: 2018-04-03 00:40:58
End at: 2018-04-03 00:41:28
Local clock offset: -4.544 ms
Remote clock offset: -2.498 ms

# Below is generated by plot.py at 2018-04-03 01:36:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.12 Mbit/s
95th percentile per-packet one-way delay: 126.866 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 8.12 Mbit/s
95th percentile per-packet one-way delay: 126.866 ms
Loss rate: 0.46%
```


Run 1: Report of LEDBAT — Data Link

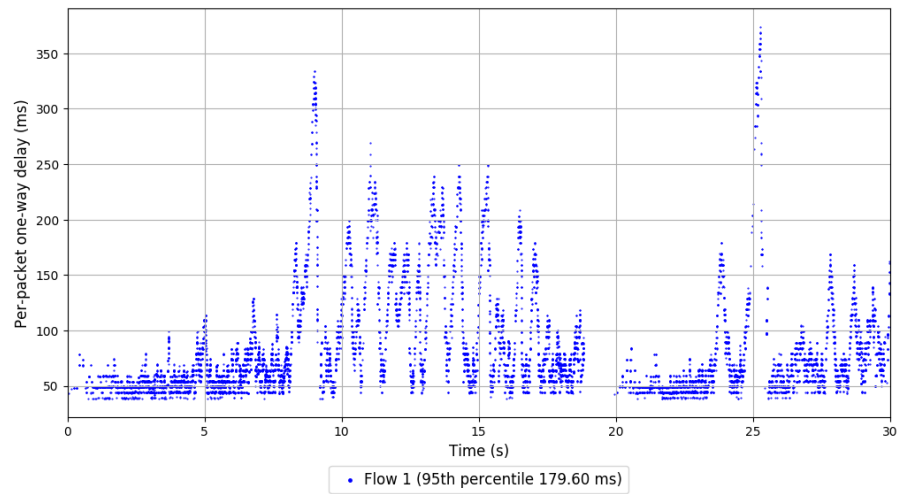
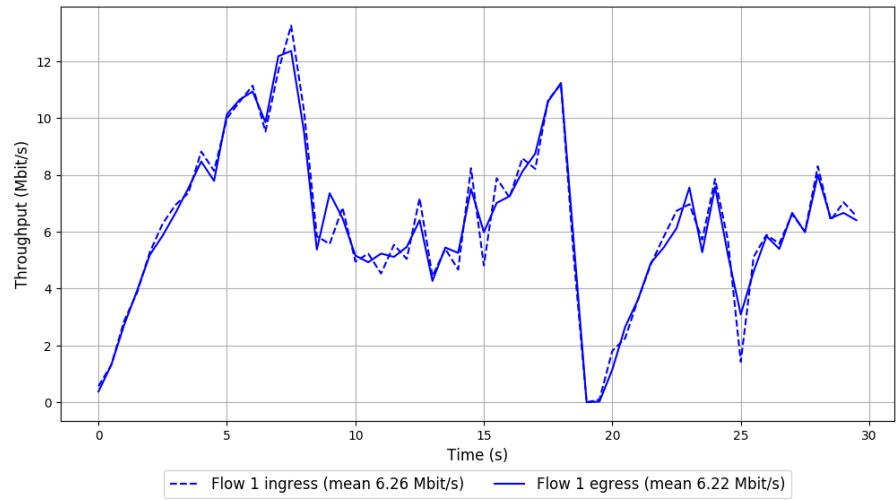


Run 2: Statistics of LEDBAT

Start at: 2018-04-03 01:00:31
End at: 2018-04-03 01:01:01
Local clock offset: 0.724 ms
Remote clock offset: -2.237 ms

Below is generated by plot.py at 2018-04-03 01:36:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.22 Mbit/s
95th percentile per-packet one-way delay: 179.598 ms
Loss rate: 0.70%
-- Flow 1:
Average throughput: 6.22 Mbit/s
95th percentile per-packet one-way delay: 179.598 ms
Loss rate: 0.70%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-04-03 01:20:14

End at: 2018-04-03 01:20:44

Local clock offset: 1.735 ms

Remote clock offset: 1.012 ms

Below is generated by plot.py at 2018-04-03 01:36:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 9.84 Mbit/s

95th percentile per-packet one-way delay: 170.974 ms

Loss rate: 0.34%

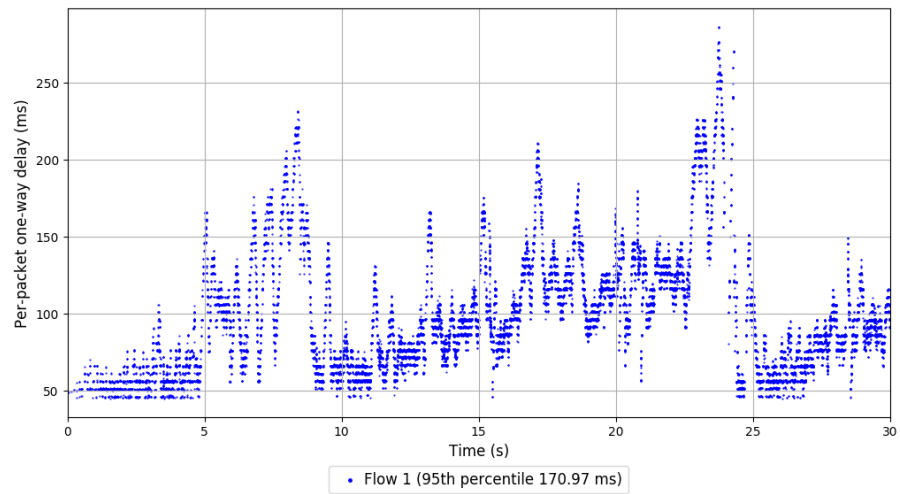
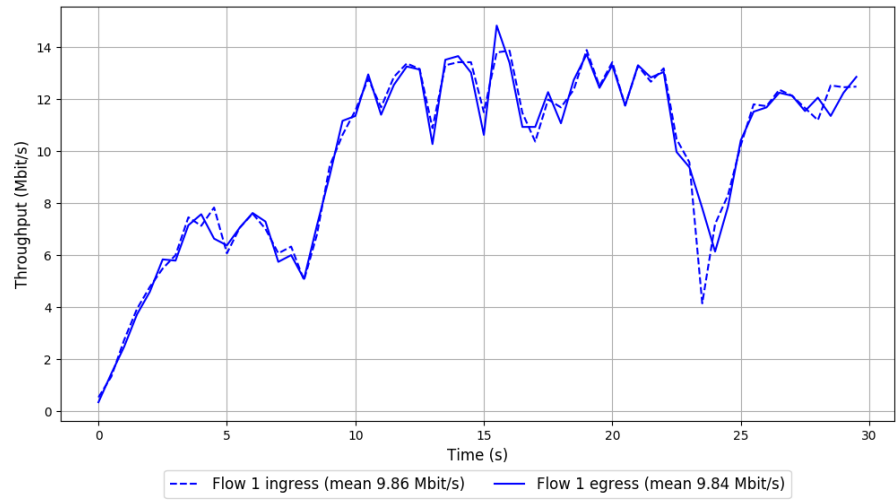
-- Flow 1:

Average throughput: 9.84 Mbit/s

95th percentile per-packet one-way delay: 170.974 ms

Loss rate: 0.34%

Run 3: Report of LEDBAT — Data Link

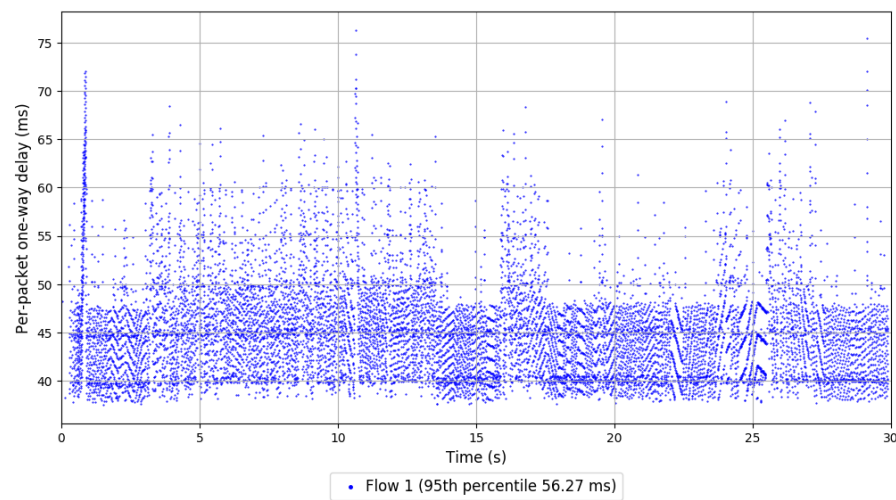
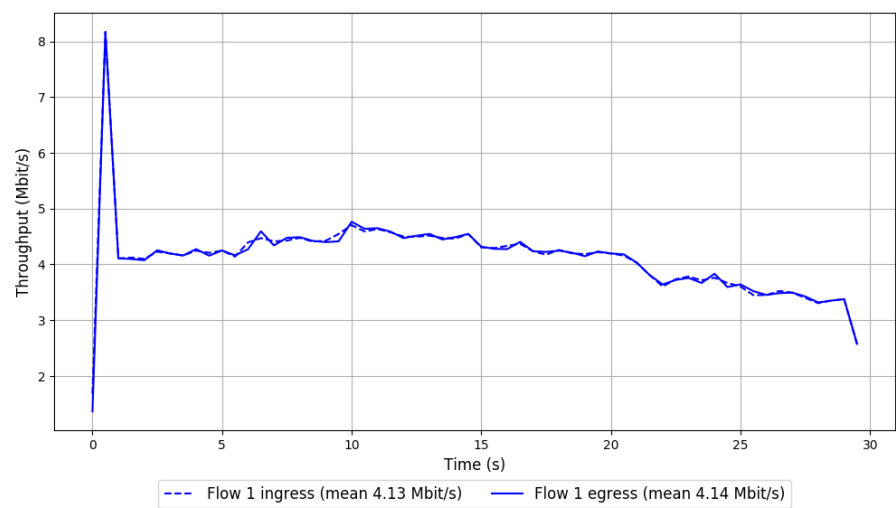


Run 1: Statistics of PCC

Start at: 2018-04-03 00:47:30
End at: 2018-04-03 00:48:00
Local clock offset: -0.755 ms
Remote clock offset: -0.807 ms

Below is generated by plot.py at 2018-04-03 01:36:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.14 Mbit/s
95th percentile per-packet one-way delay: 56.266 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 4.14 Mbit/s
95th percentile per-packet one-way delay: 56.266 ms
Loss rate: 0.10%

Run 1: Report of PCC — Data Link

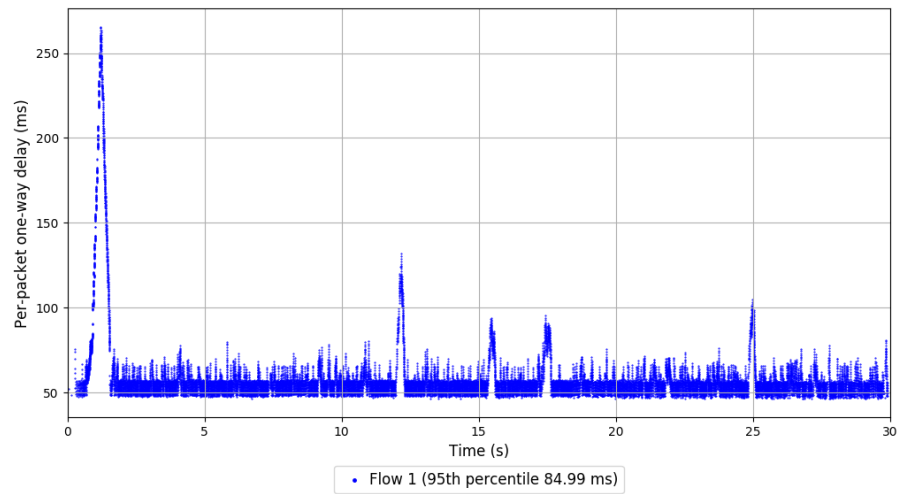
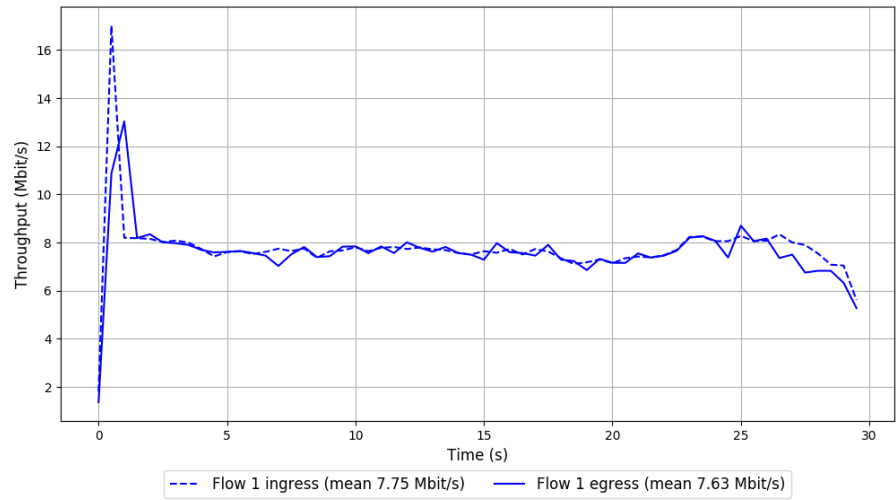


Run 2: Statistics of PCC

Start at: 2018-04-03 01:07:06
End at: 2018-04-03 01:07:36
Local clock offset: -0.956 ms
Remote clock offset: -0.266 ms

Below is generated by plot.py at 2018-04-03 01:36:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 7.63 Mbit/s
95th percentile per-packet one-way delay: 84.989 ms
Loss rate: 1.66%
-- Flow 1:
Average throughput: 7.63 Mbit/s
95th percentile per-packet one-way delay: 84.989 ms
Loss rate: 1.66%

Run 2: Report of PCC — Data Link



Run 3: Statistics of PCC

Start at: 2018-04-03 01:26:50

End at: 2018-04-03 01:27:20

Local clock offset: 4.269 ms

Remote clock offset: 4.31 ms

Below is generated by plot.py at 2018-04-03 01:36:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 8.76 Mbit/s

95th percentile per-packet one-way delay: 140.650 ms

Loss rate: 0.11%

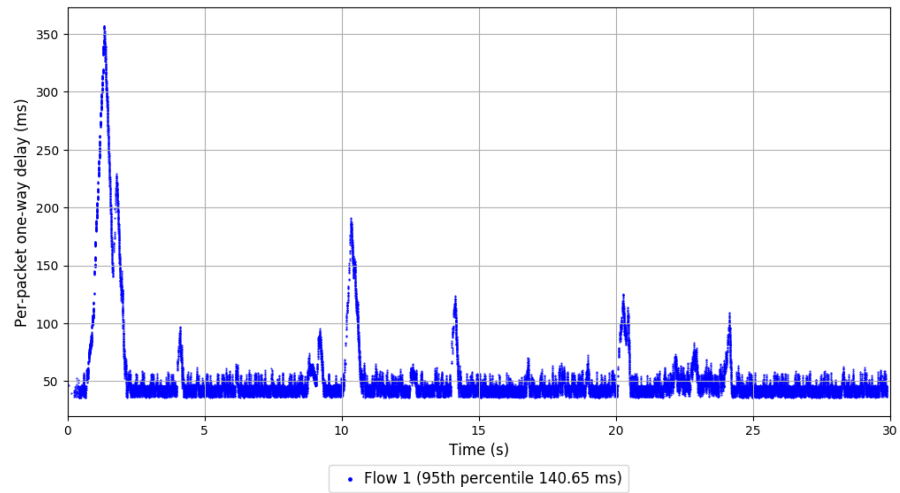
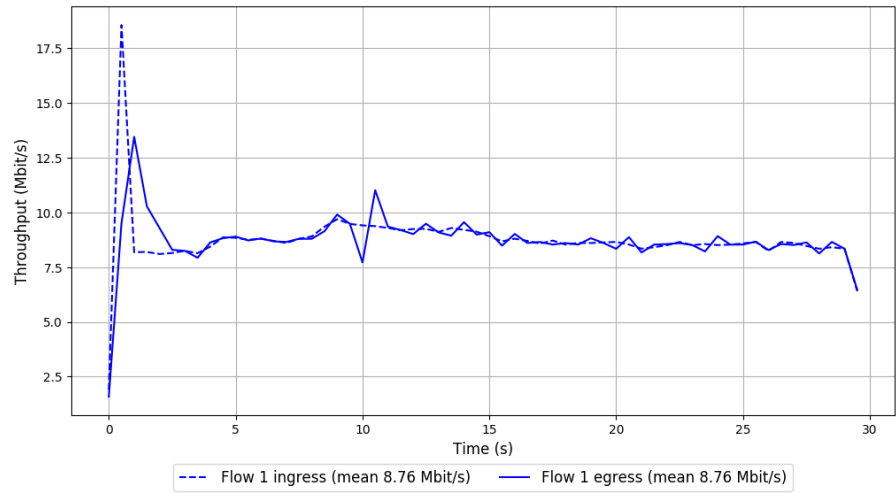
-- Flow 1:

Average throughput: 8.76 Mbit/s

95th percentile per-packet one-way delay: 140.650 ms

Loss rate: 0.11%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

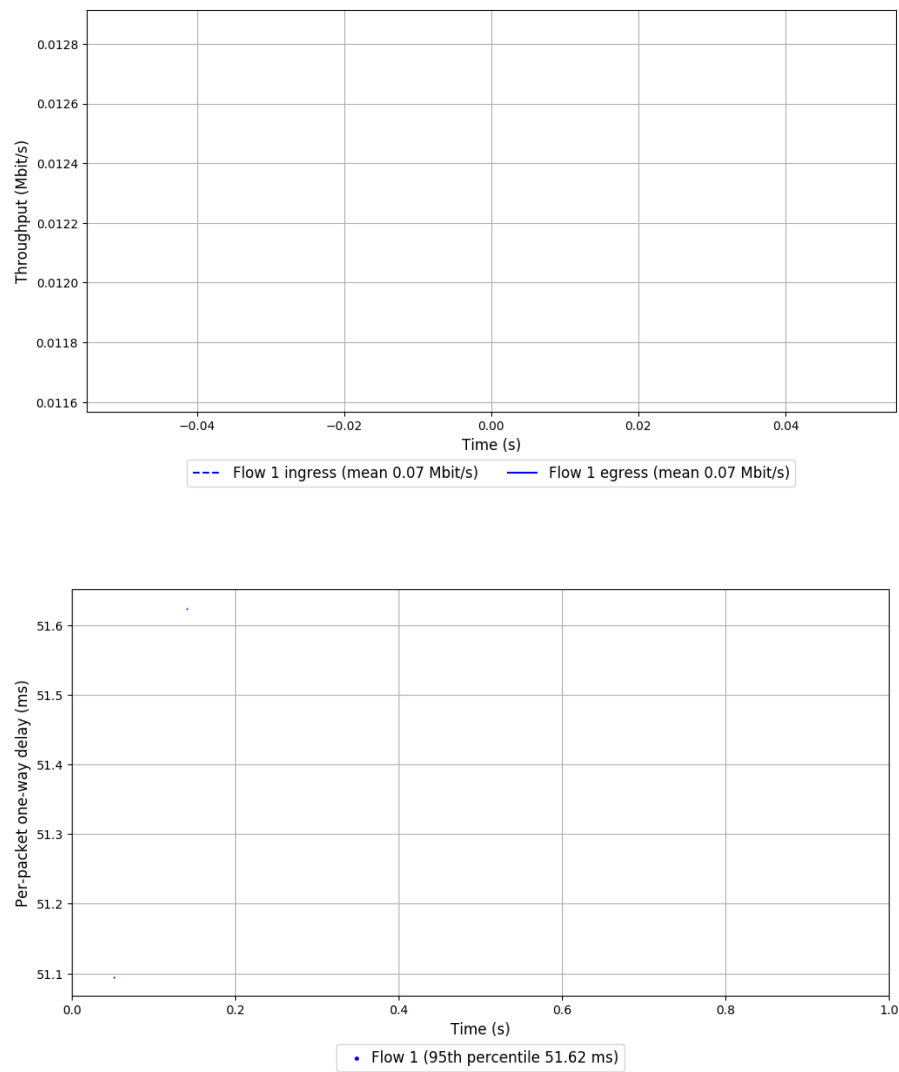
Start at: 2018-04-03 00:50:45

End at: 2018-04-03 00:51:15

Local clock offset: -2.622 ms

Remote clock offset: -1.622 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-04-03 01:10:23

End at: 2018-04-03 01:10:53

Local clock offset: 0.569 ms

Remote clock offset: -1.846 ms

Below is generated by plot.py at 2018-04-03 01:36:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 8.77 Mbit/s

95th percentile per-packet one-way delay: 313.109 ms

Loss rate: 1.10%

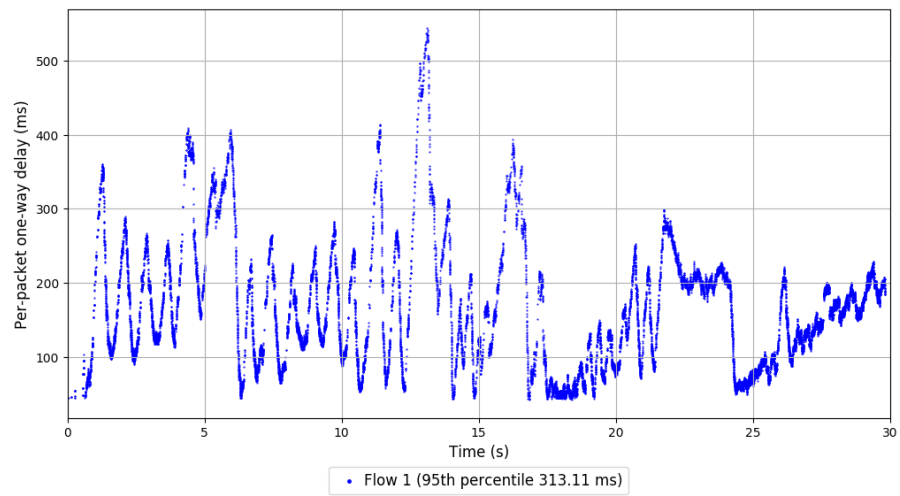
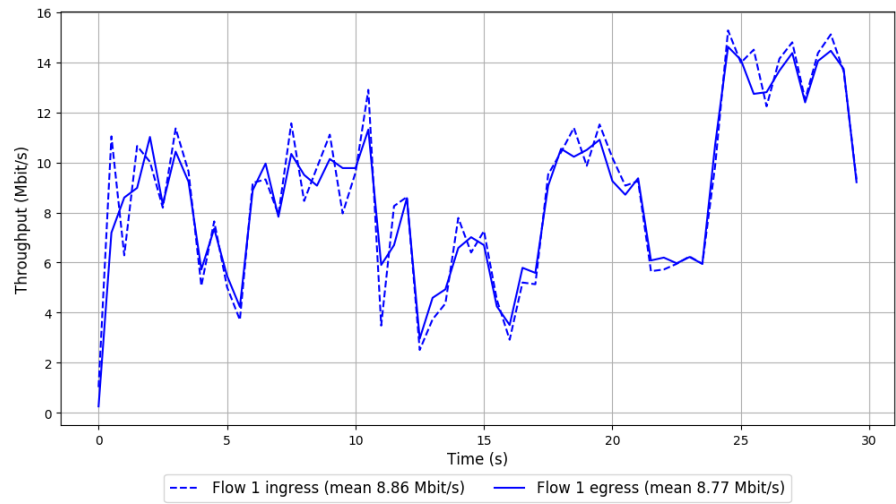
-- Flow 1:

Average throughput: 8.77 Mbit/s

95th percentile per-packet one-way delay: 313.109 ms

Loss rate: 1.10%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-04-03 01:30:07

End at: 2018-04-03 01:30:37

Local clock offset: 2.598 ms

Remote clock offset: 6.047 ms

Below is generated by plot.py at 2018-04-03 01:36:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.62 Mbit/s

95th percentile per-packet one-way delay: 309.801 ms

Loss rate: 0.74%

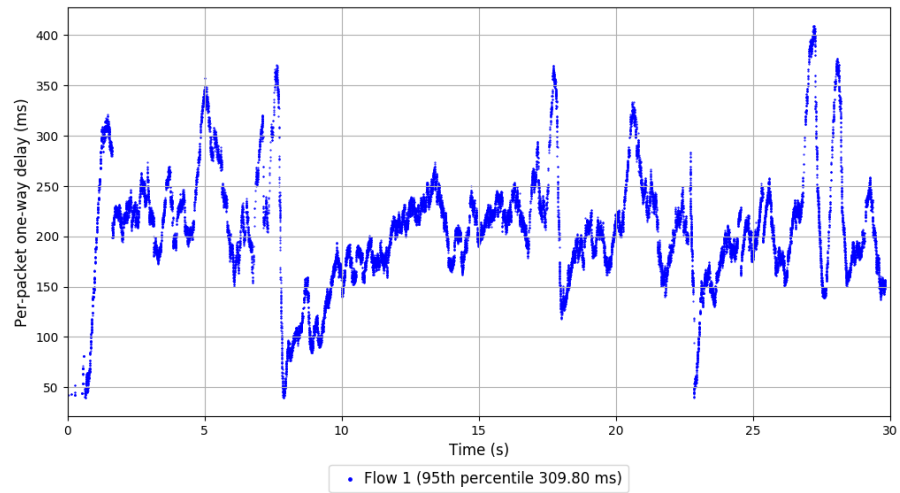
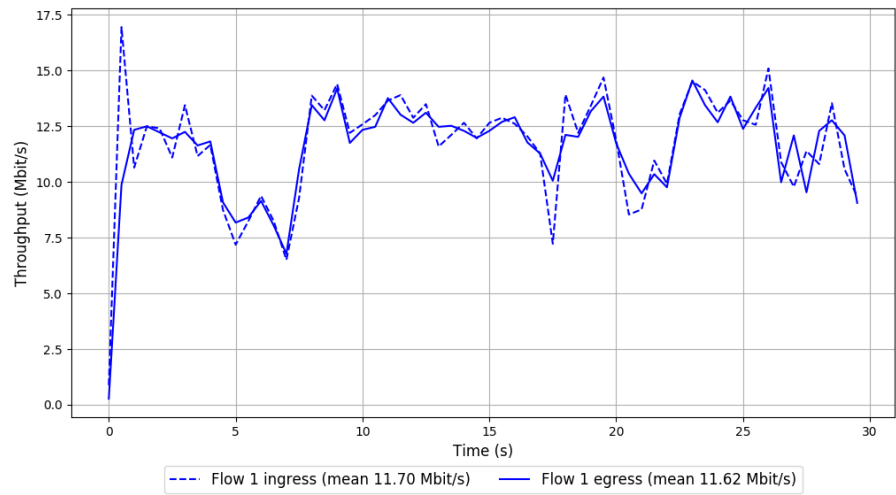
-- Flow 1:

Average throughput: 11.62 Mbit/s

95th percentile per-packet one-way delay: 309.801 ms

Loss rate: 0.74%

Run 3: Report of QUIC Cubic — Data Link

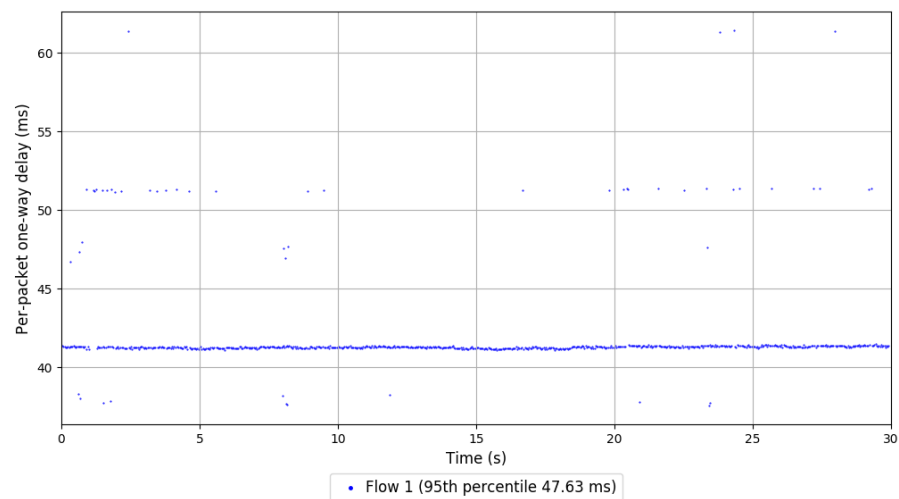
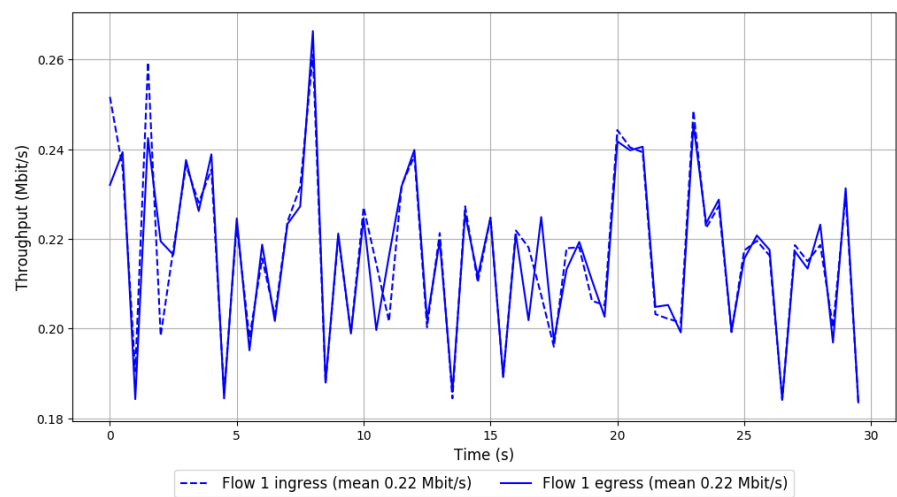


```
Run 1: Statistics of SCReAM

Start at: 2018-04-03 00:39:53
End at: 2018-04-03 00:40:23
Local clock offset: -5.255 ms
Remote clock offset: -1.908 ms

# Below is generated by plot.py at 2018-04-03 01:36:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.631 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.631 ms
Loss rate: 0.13%
```

Run 1: Report of SReAM — Data Link

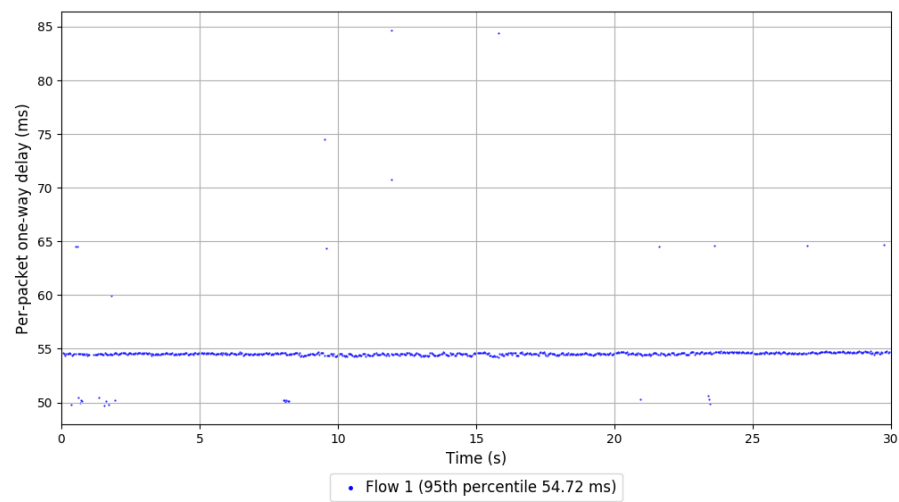
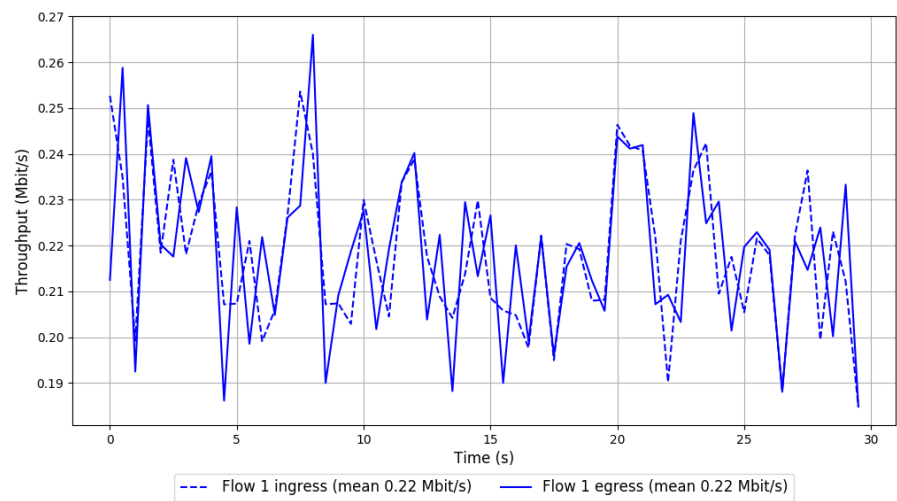


Run 2: Statistics of SCReAM

Start at: 2018-04-03 00:59:27
End at: 2018-04-03 00:59:57
Local clock offset: -0.709 ms
Remote clock offset: -1.502 ms

Below is generated by plot.py at 2018-04-03 01:36:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 54.716 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 54.716 ms
Loss rate: 0.13%

Run 2: Report of SReAM — Data Link

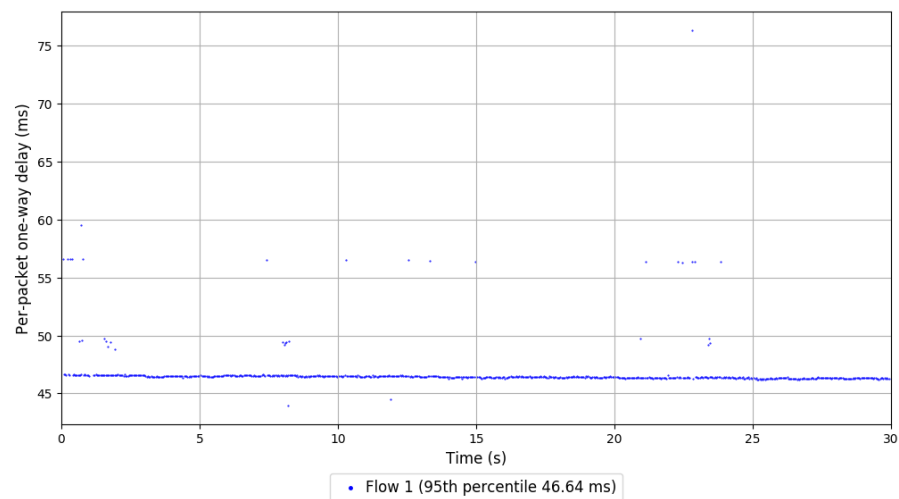
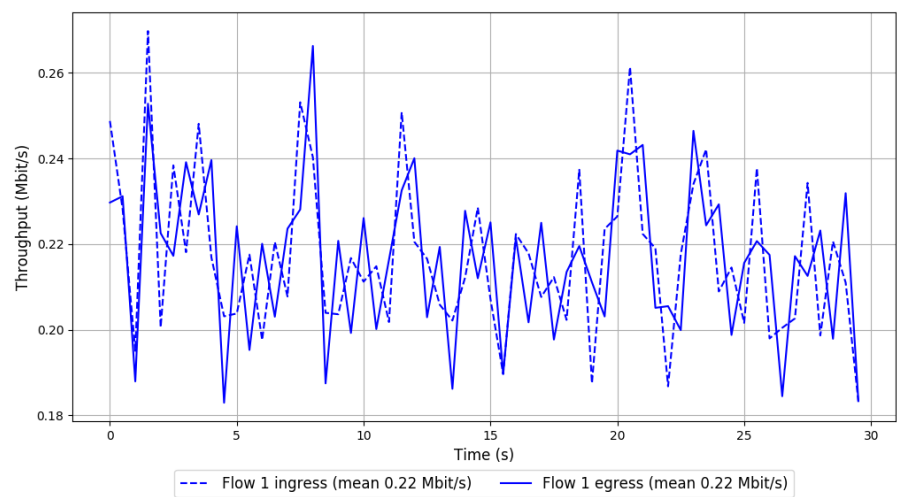


Run 3: Statistics of SCReAM

Start at: 2018-04-03 01:19:09
End at: 2018-04-03 01:19:39
Local clock offset: 1.175 ms
Remote clock offset: -0.737 ms

Below is generated by plot.py at 2018-04-03 01:36:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.637 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.637 ms
Loss rate: 0.13%

Run 3: Report of SReAM — Data Link

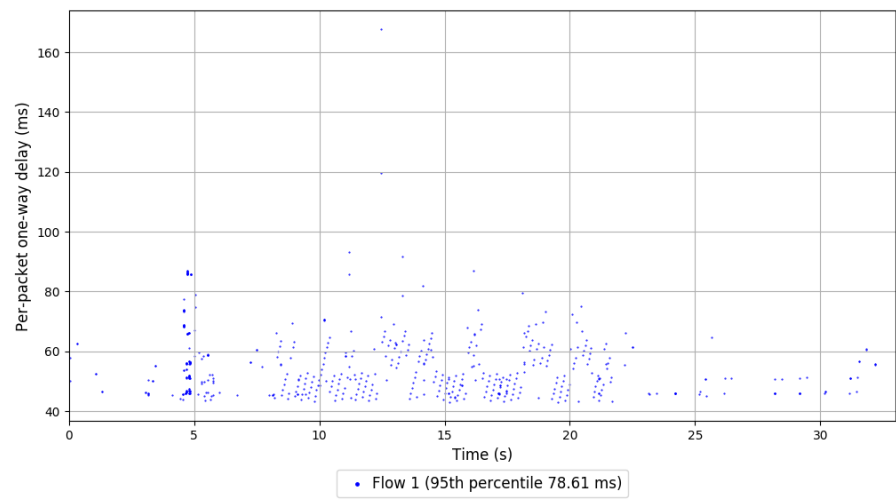
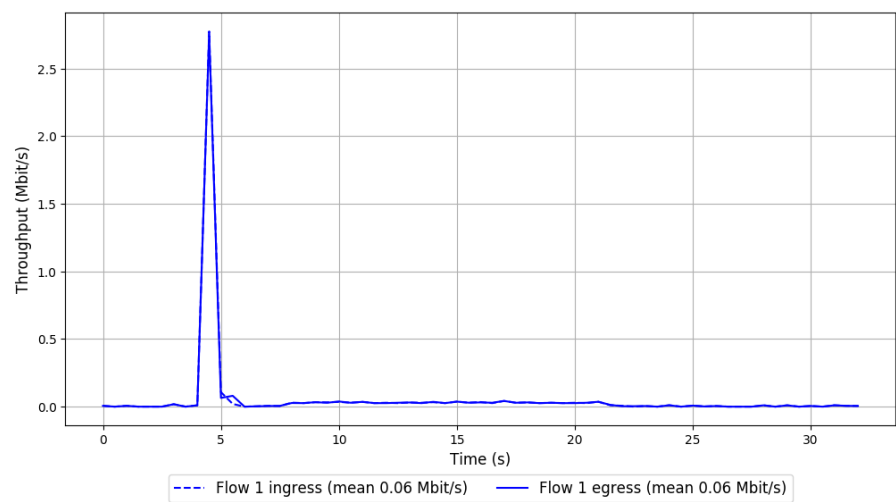


Run 1: Statistics of WebRTC media

Start at: 2018-04-03 00:49:40
End at: 2018-04-03 00:50:10
Local clock offset: -1.079 ms
Remote clock offset: -1.248 ms

Below is generated by plot.py at 2018-04-03 01:36:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 78.607 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 78.607 ms
Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link

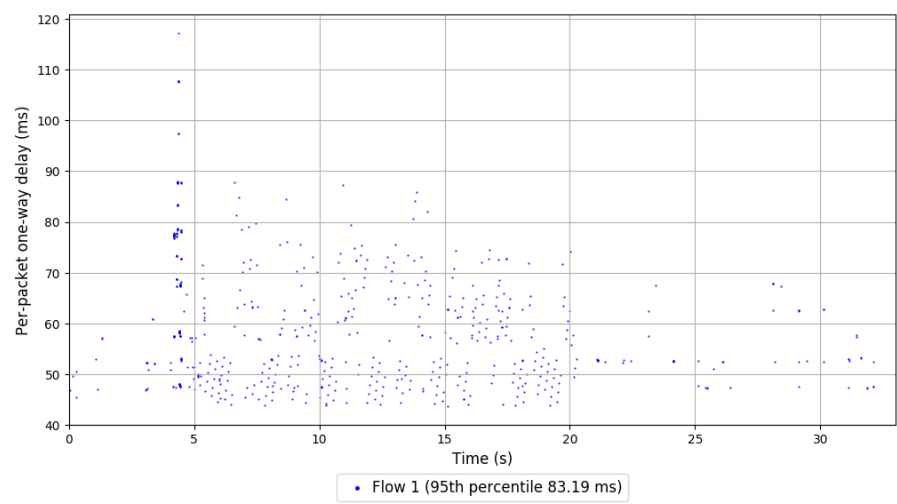
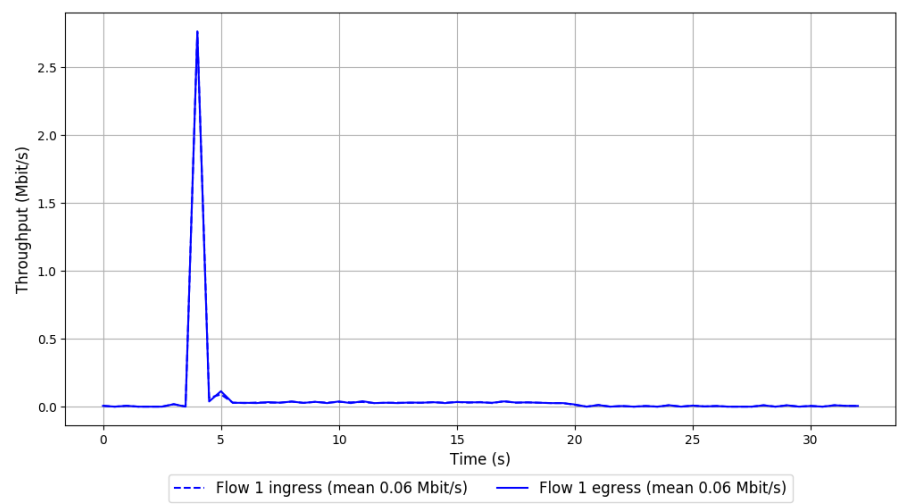


Run 2: Statistics of WebRTC media

Start at: 2018-04-03 01:09:17
End at: 2018-04-03 01:09:47
Local clock offset: -0.136 ms
Remote clock offset: -1.782 ms

Below is generated by plot.py at 2018-04-03 01:36:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 83.187 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 83.187 ms
Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-04-03 01:29:01

End at: 2018-04-03 01:29:31

Local clock offset: 4.357 ms

Remote clock offset: 5.409 ms

Below is generated by plot.py at 2018-04-03 01:36:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 67.106 ms

Loss rate: 0.00%

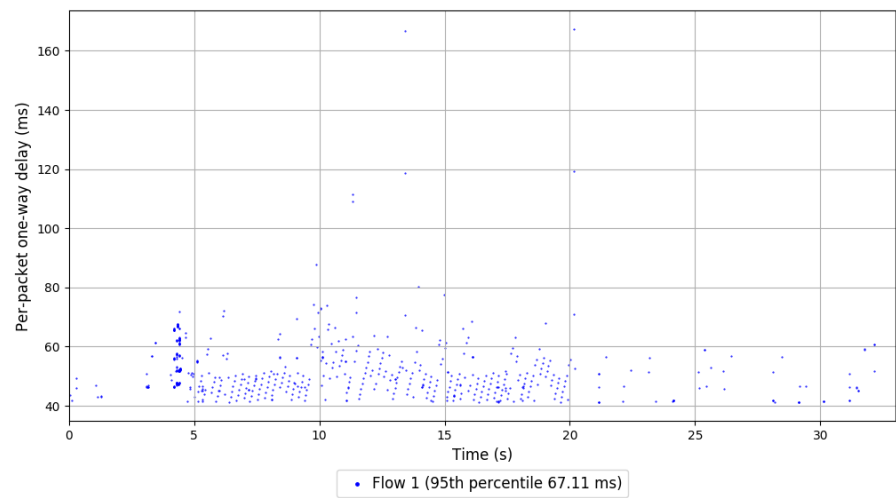
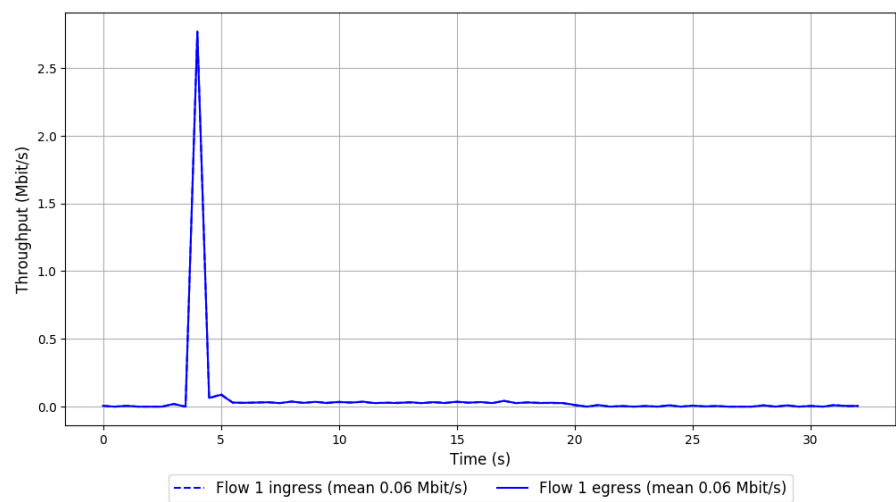
-- Flow 1:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 67.106 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

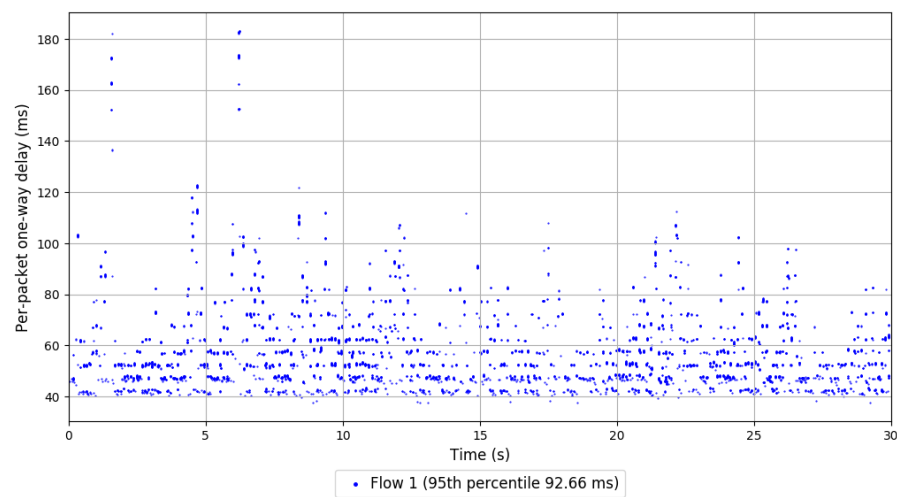
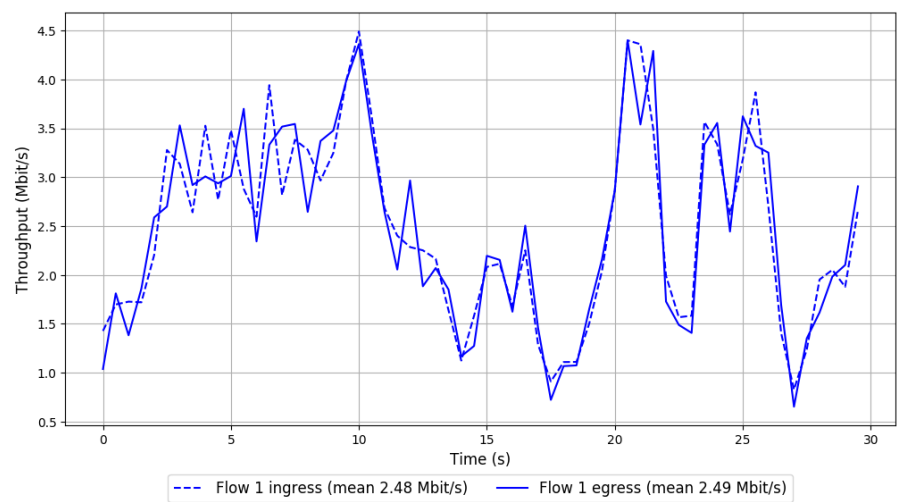


Run 1: Statistics of Sprout

Start at: 2018-04-03 00:51:50
End at: 2018-04-03 00:52:20
Local clock offset: -2.147 ms
Remote clock offset: -2.015 ms

Below is generated by plot.py at 2018-04-03 01:36:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 92.664 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 92.664 ms
Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

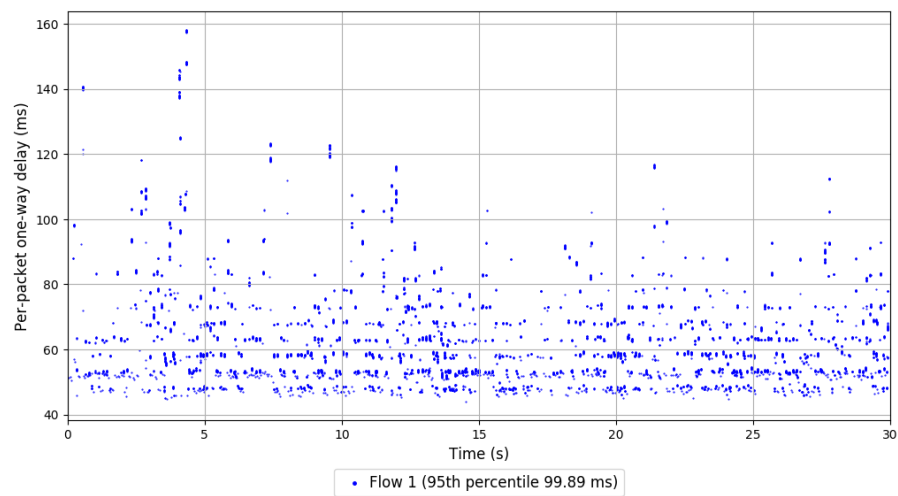
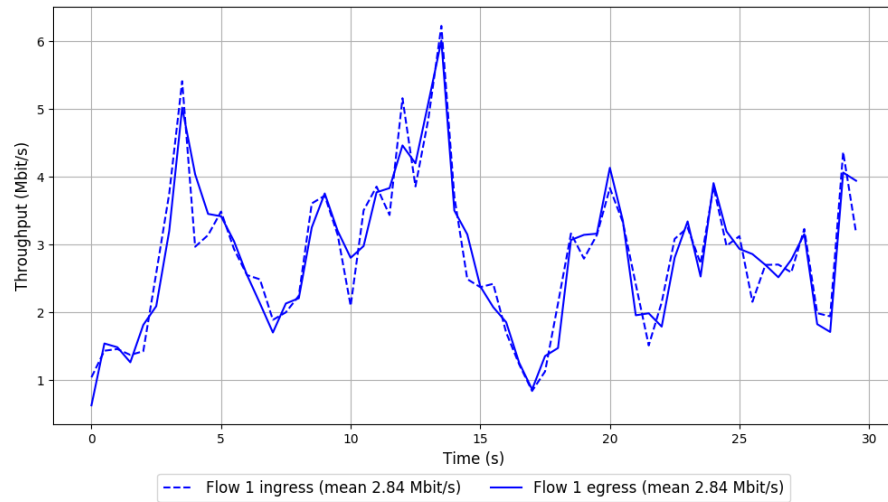


Run 2: Statistics of Sprout

Start at: 2018-04-03 01:11:28
End at: 2018-04-03 01:11:58
Local clock offset: 0.756 ms
Remote clock offset: -0.851 ms

Below is generated by plot.py at 2018-04-03 01:36:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.84 Mbit/s
95th percentile per-packet one-way delay: 99.885 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.84 Mbit/s
95th percentile per-packet one-way delay: 99.885 ms
Loss rate: 0.00%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2018-04-03 01:31:13

End at: 2018-04-03 01:31:43

Local clock offset: 4.299 ms

Remote clock offset: 6.425 ms

Below is generated by plot.py at 2018-04-03 01:36:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.44 Mbit/s

95th percentile per-packet one-way delay: 91.948 ms

Loss rate: 0.69%

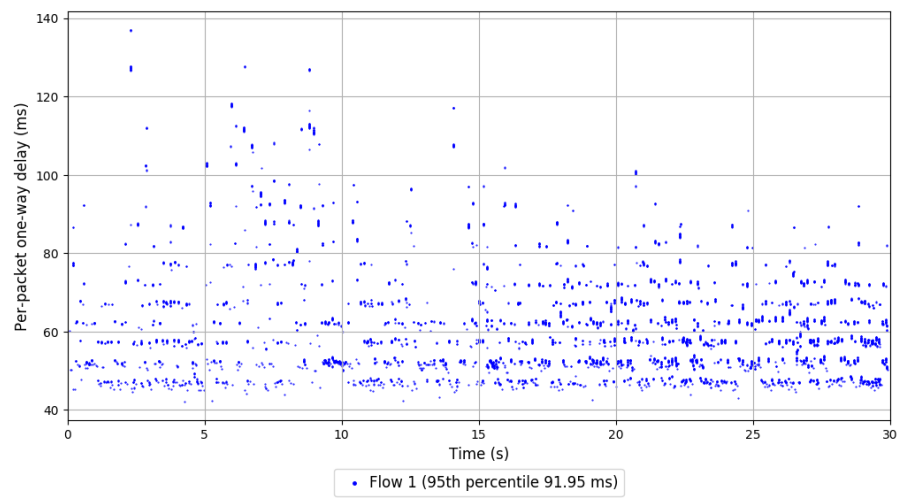
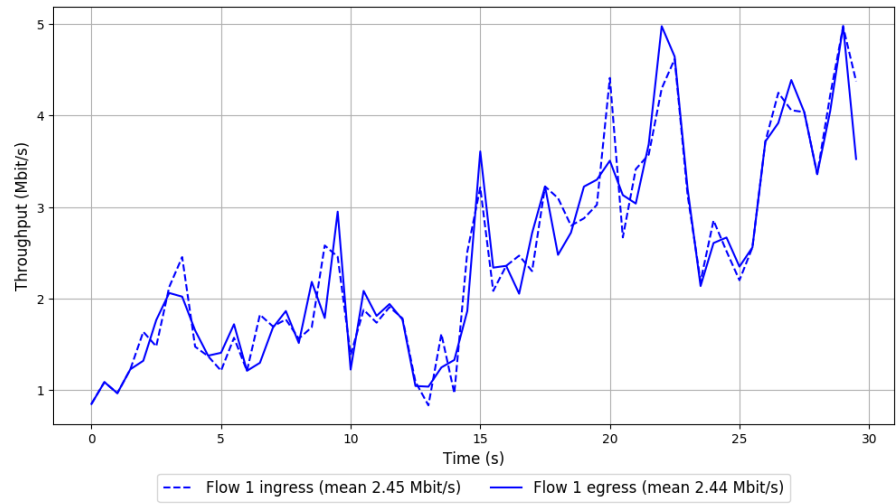
-- Flow 1:

Average throughput: 2.44 Mbit/s

95th percentile per-packet one-way delay: 91.948 ms

Loss rate: 0.69%

Run 3: Report of Sprout — Data Link

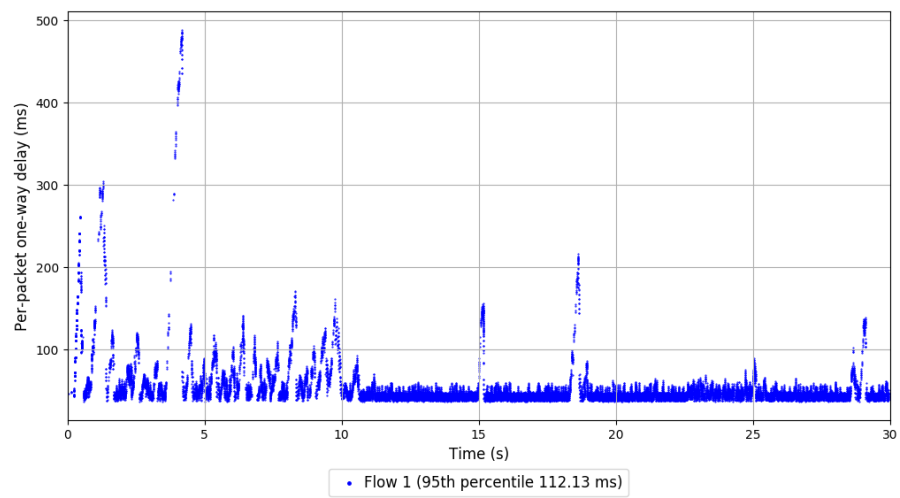
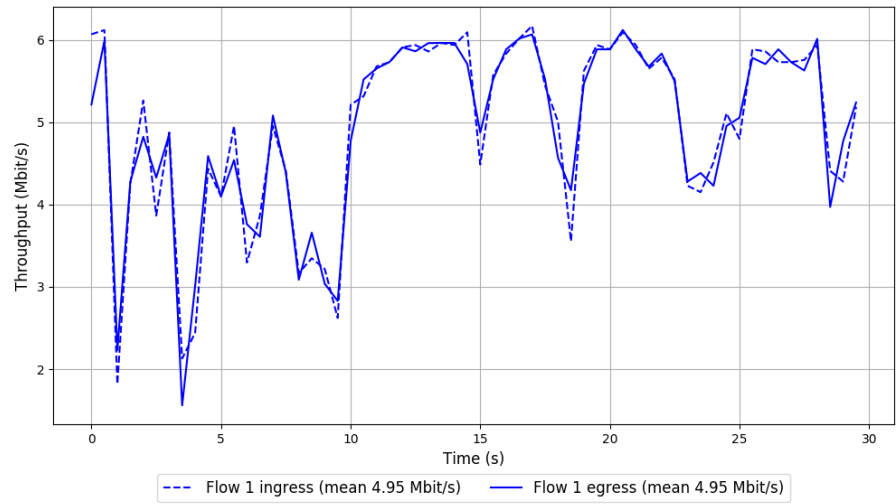


Run 1: Statistics of TaoVA-100x

Start at: 2018-04-03 00:45:19
End at: 2018-04-03 00:45:49
Local clock offset: -2.979 ms
Remote clock offset: -2.255 ms

Below is generated by plot.py at 2018-04-03 01:36:41
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.95 Mbit/s
95th percentile per-packet one-way delay: 112.133 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 4.95 Mbit/s
95th percentile per-packet one-way delay: 112.133 ms
Loss rate: 0.14%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-04-03 01:04:55

End at: 2018-04-03 01:05:25

Local clock offset: -0.852 ms

Remote clock offset: -2.08 ms

Below is generated by plot.py at 2018-04-03 01:36:41

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.94 Mbit/s

95th percentile per-packet one-way delay: 76.523 ms

Loss rate: 0.17%

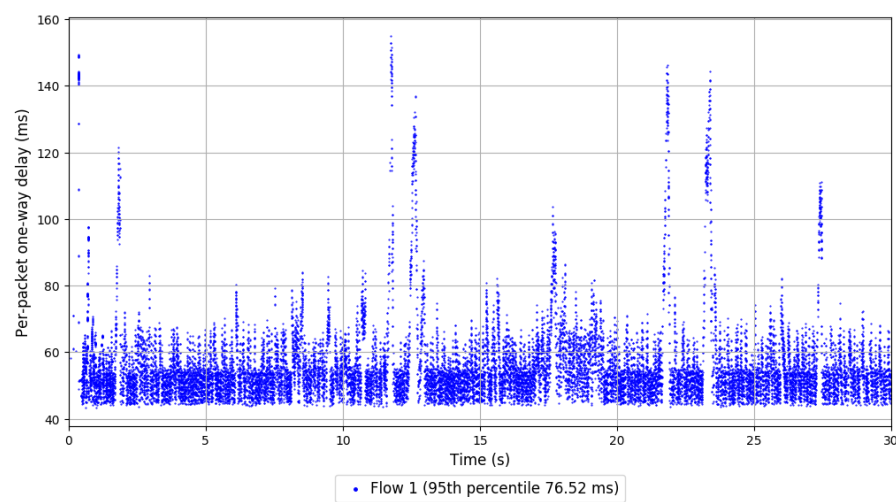
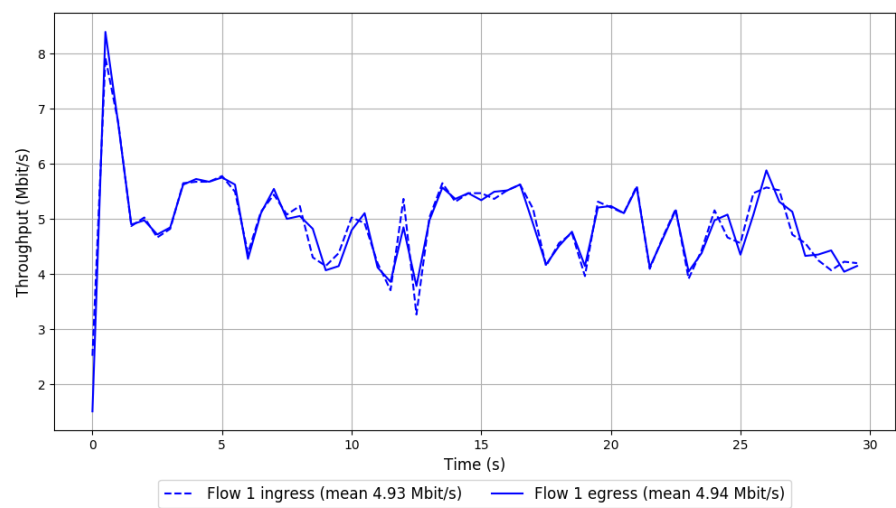
-- Flow 1:

Average throughput: 4.94 Mbit/s

95th percentile per-packet one-way delay: 76.523 ms

Loss rate: 0.17%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-04-03 01:24:38

End at: 2018-04-03 01:25:08

Local clock offset: 4.156 ms

Remote clock offset: 2.845 ms

Below is generated by plot.py at 2018-04-03 01:36:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.95 Mbit/s

95th percentile per-packet one-way delay: 60.202 ms

Loss rate: 0.17%

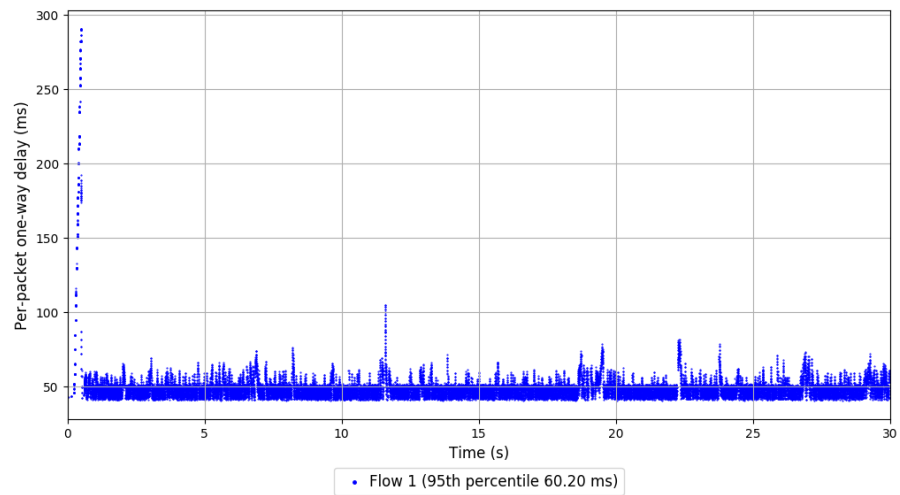
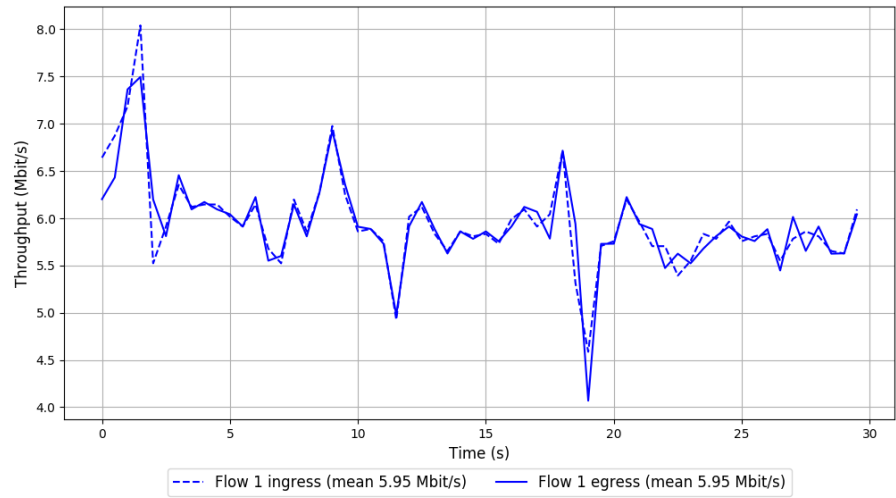
-- Flow 1:

Average throughput: 5.95 Mbit/s

95th percentile per-packet one-way delay: 60.202 ms

Loss rate: 0.17%

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

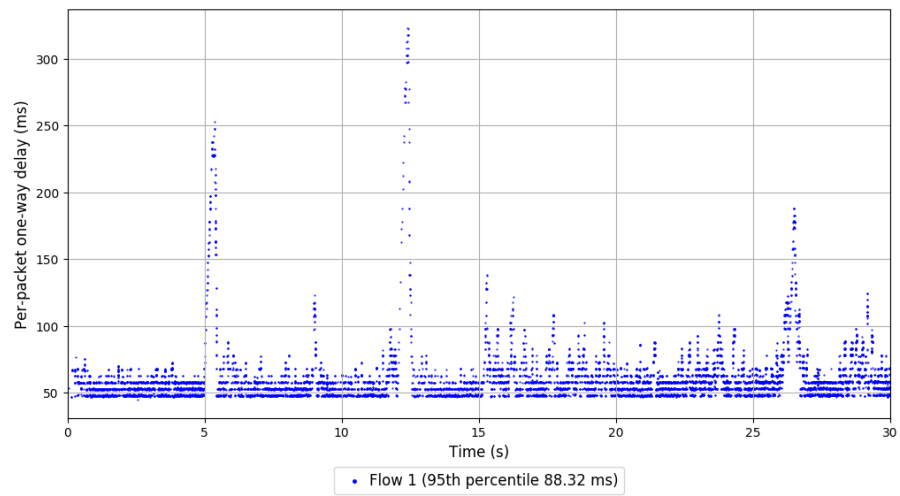
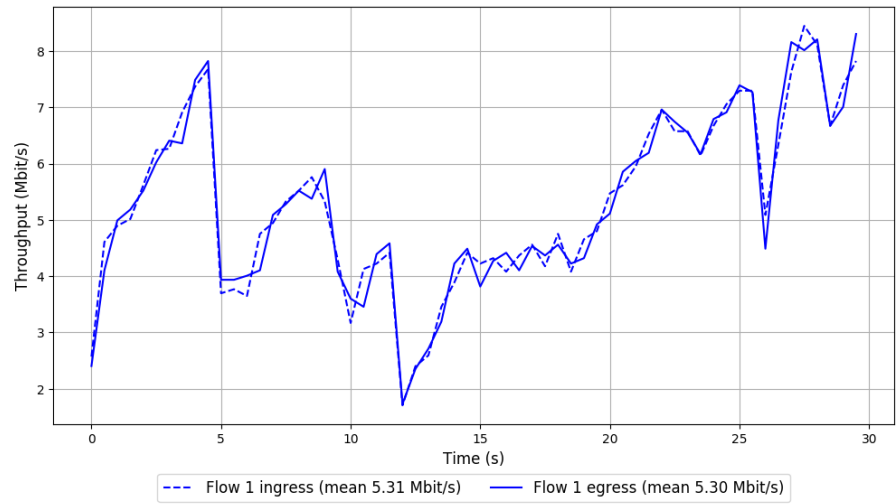


Run 1: Statistics of TCP Vegas

Start at: 2018-04-03 00:54:00
End at: 2018-04-03 00:54:30
Local clock offset: -0.159 ms
Remote clock offset: -1.314 ms

Below is generated by plot.py at 2018-04-03 01:36:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.30 Mbit/s
95th percentile per-packet one-way delay: 88.317 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 5.30 Mbit/s
95th percentile per-packet one-way delay: 88.317 ms
Loss rate: 0.26%

Run 1: Report of TCP Vegas — Data Link

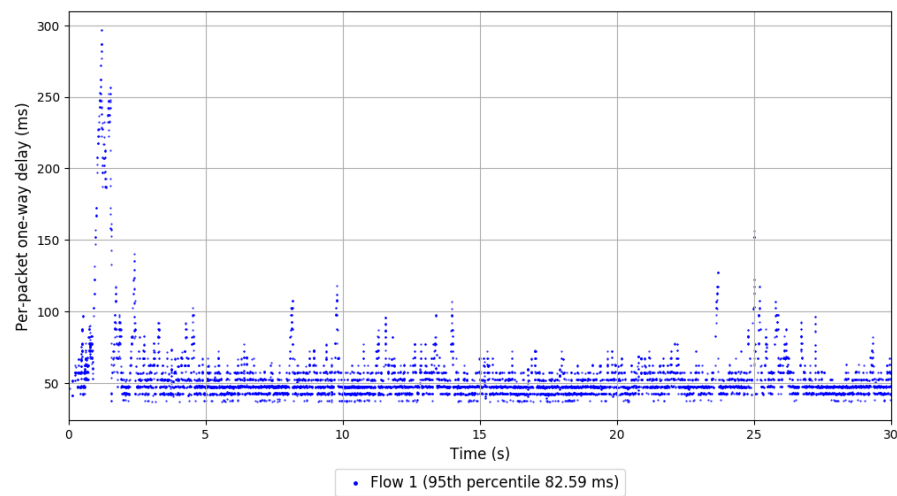
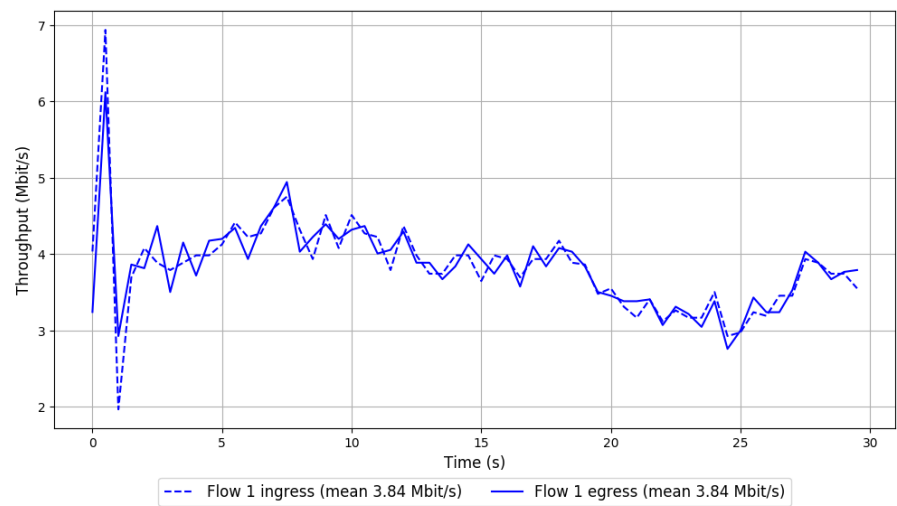


Run 2: Statistics of TCP Vegas

Start at: 2018-04-03 01:13:40
End at: 2018-04-03 01:14:10
Local clock offset: 2.105 ms
Remote clock offset: -1.451 ms

Below is generated by plot.py at 2018-04-03 01:36:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.84 Mbit/s
95th percentile per-packet one-way delay: 82.592 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 3.84 Mbit/s
95th percentile per-packet one-way delay: 82.592 ms
Loss rate: 0.07%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2018-04-03 01:33:24

End at: 2018-04-03 01:33:54

Local clock offset: 2.8 ms

Remote clock offset: 6.48 ms

Below is generated by plot.py at 2018-04-03 01:36:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.79 Mbit/s

95th percentile per-packet one-way delay: 68.975 ms

Loss rate: 0.15%

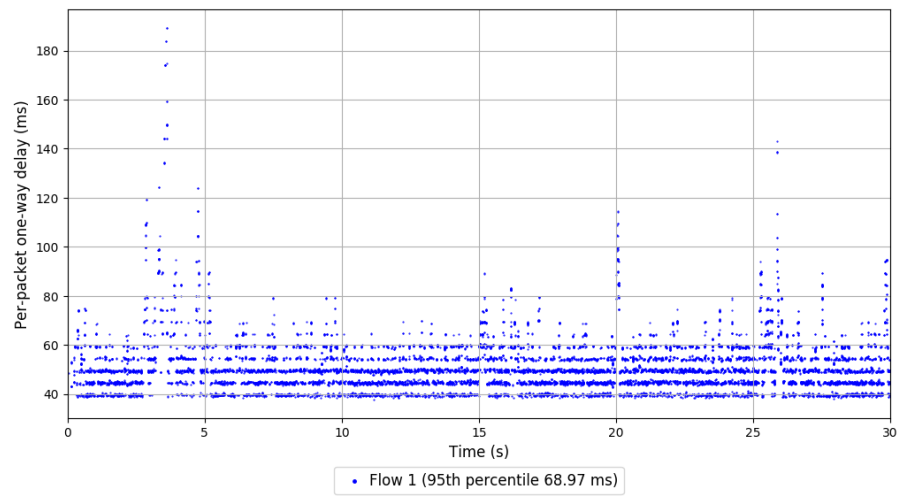
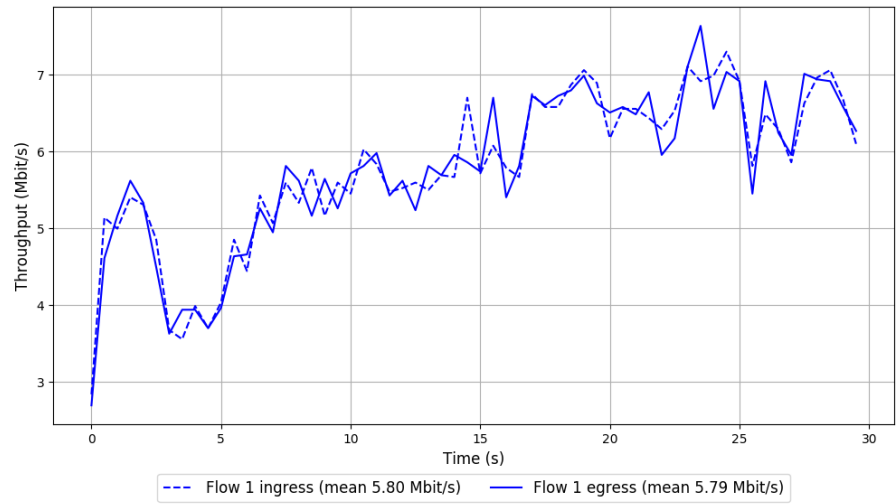
-- Flow 1:

Average throughput: 5.79 Mbit/s

95th percentile per-packet one-way delay: 68.975 ms

Loss rate: 0.15%

Run 3: Report of TCP Vegas — Data Link

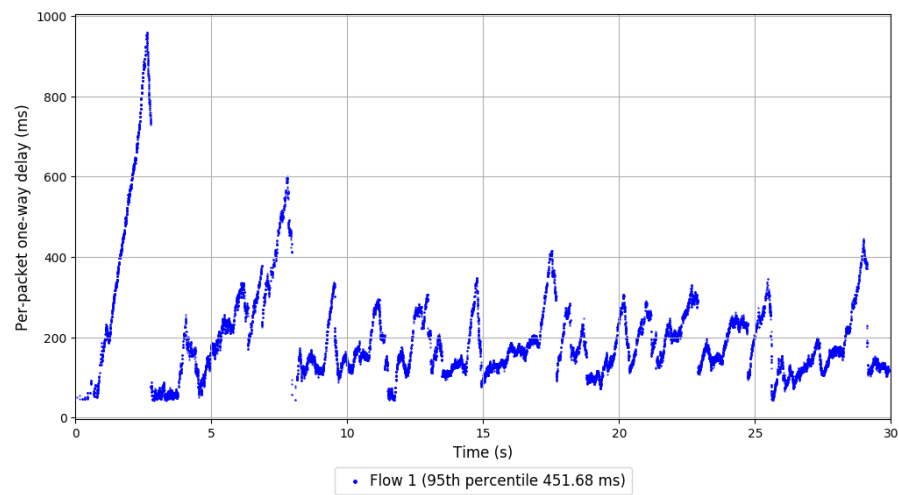
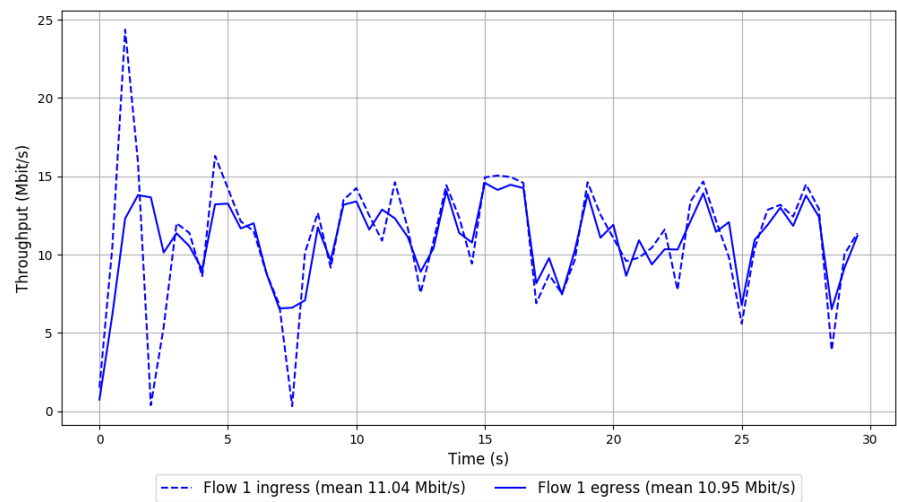


Run 1: Statistics of Verus

Start at: 2018-04-03 00:55:05
End at: 2018-04-03 00:55:35
Local clock offset: 1.762 ms
Remote clock offset: -0.304 ms

Below is generated by plot.py at 2018-04-03 01:36:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 10.95 Mbit/s
95th percentile per-packet one-way delay: 451.679 ms
Loss rate: 0.93%
-- Flow 1:
Average throughput: 10.95 Mbit/s
95th percentile per-packet one-way delay: 451.679 ms
Loss rate: 0.93%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-04-03 01:14:45

End at: 2018-04-03 01:15:15

Local clock offset: 1.725 ms

Remote clock offset: -1.54 ms

Below is generated by plot.py at 2018-04-03 01:36:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.60 Mbit/s

95th percentile per-packet one-way delay: 504.404 ms

Loss rate: 3.42%

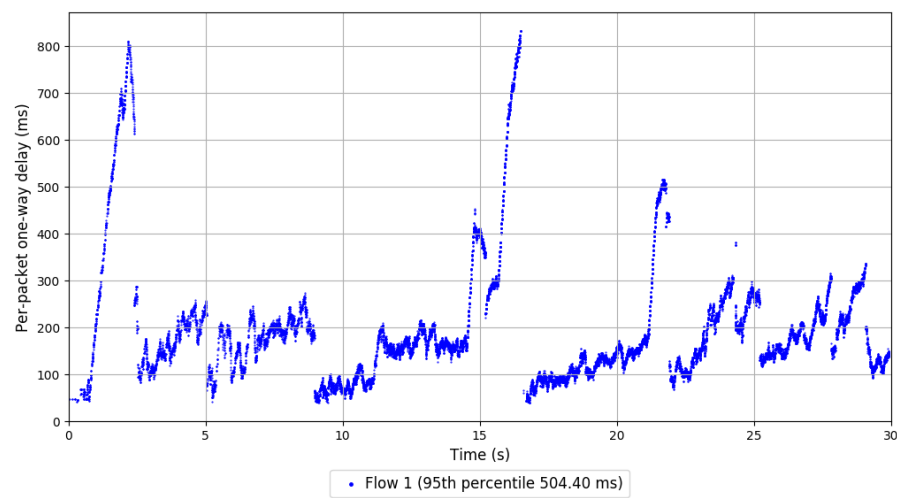
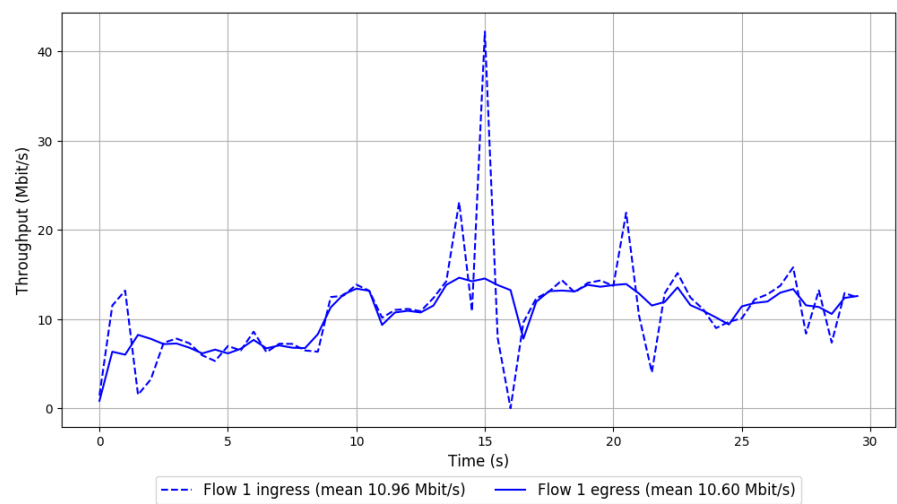
-- Flow 1:

Average throughput: 10.60 Mbit/s

95th percentile per-packet one-way delay: 504.404 ms

Loss rate: 3.42%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-04-03 01:34:30

End at: 2018-04-03 01:35:00

Local clock offset: 3.416 ms

Remote clock offset: 7.379 ms

Below is generated by plot.py at 2018-04-03 01:36:52

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.31 Mbit/s

95th percentile per-packet one-way delay: 393.325 ms

Loss rate: 0.98%

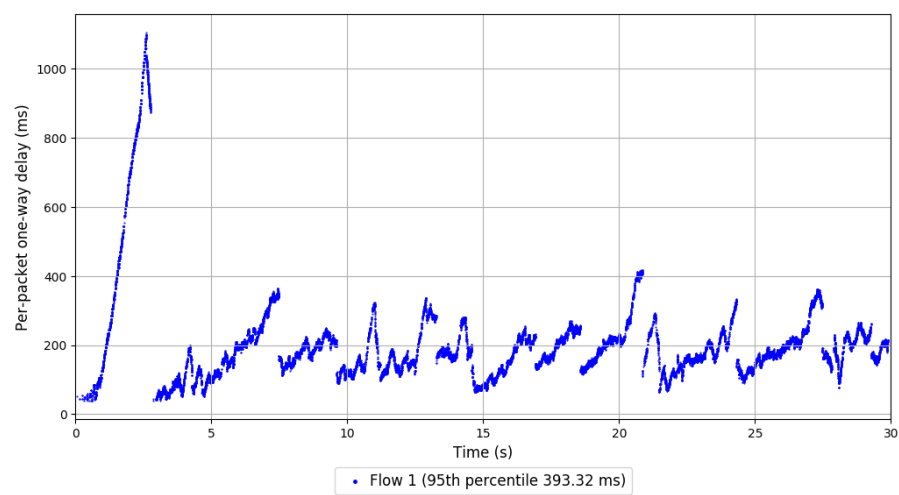
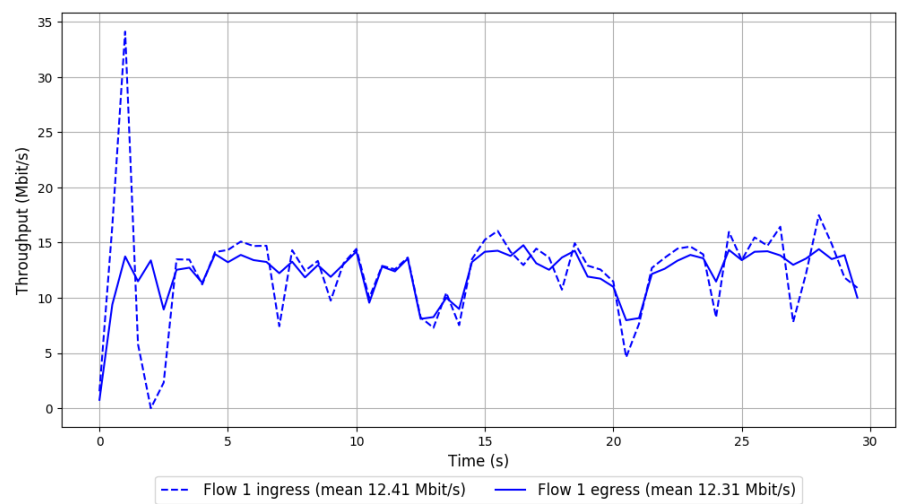
-- Flow 1:

Average throughput: 12.31 Mbit/s

95th percentile per-packet one-way delay: 393.325 ms

Loss rate: 0.98%

Run 3: Report of Verus — Data Link

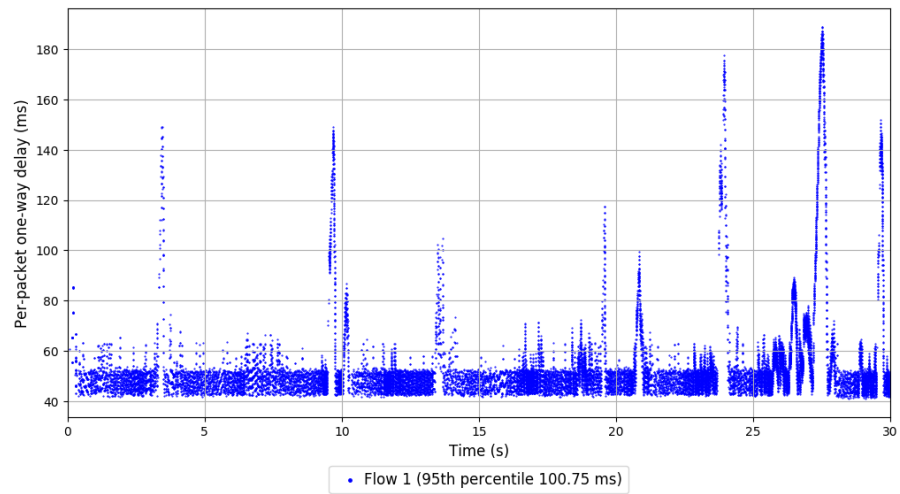
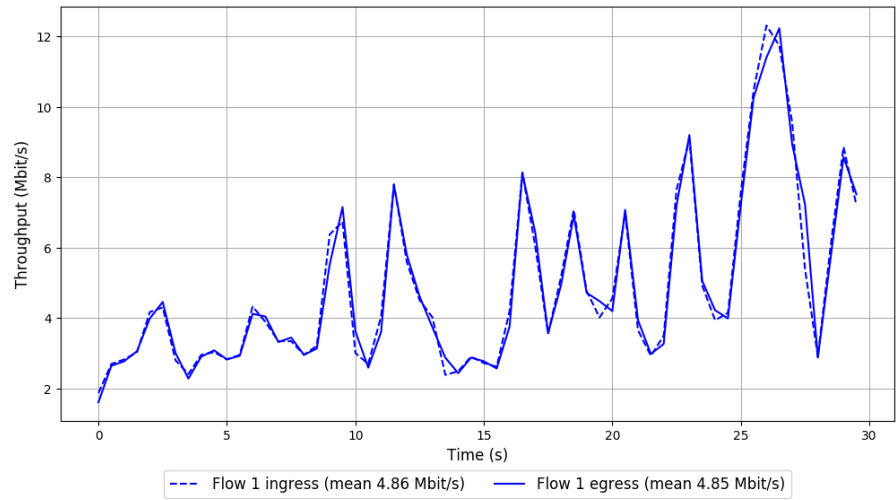


Run 1: Statistics of Copa

Start at: 2018-04-03 00:52:55
End at: 2018-04-03 00:53:25
Local clock offset: 0.802 ms
Remote clock offset: -1.102 ms

Below is generated by plot.py at 2018-04-03 01:36:52
Datalink statistics
-- Total of 1 flow:
Average throughput: 4.85 Mbit/s
95th percentile per-packet one-way delay: 100.754 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 4.85 Mbit/s
95th percentile per-packet one-way delay: 100.754 ms
Loss rate: 0.22%

Run 1: Report of Copa — Data Link

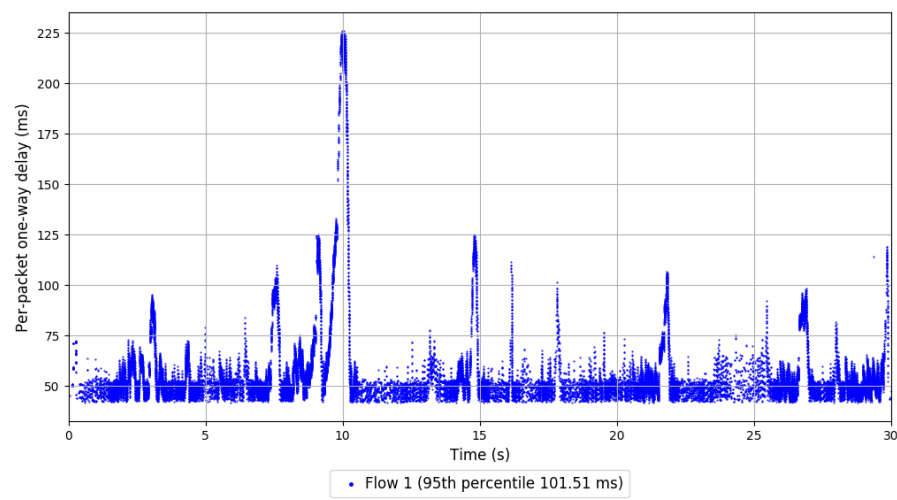
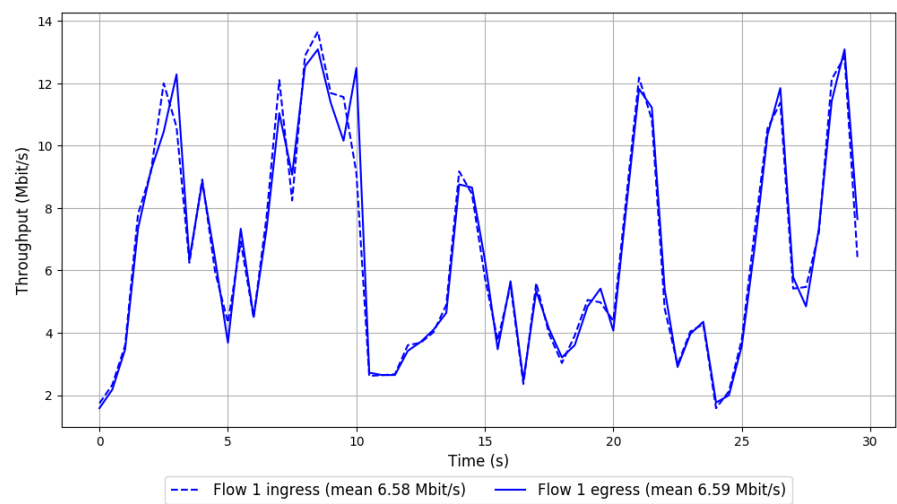


Run 2: Statistics of Copa

Start at: 2018-04-03 01:12:34
End at: 2018-04-03 01:13:04
Local clock offset: 1.933 ms
Remote clock offset: -1.762 ms

Below is generated by plot.py at 2018-04-03 01:36:56
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.59 Mbit/s
95th percentile per-packet one-way delay: 101.513 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 6.59 Mbit/s
95th percentile per-packet one-way delay: 101.513 ms
Loss rate: 0.04%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-04-03 01:32:18

End at: 2018-04-03 01:32:48

Local clock offset: 3.805 ms

Remote clock offset: 6.125 ms

Below is generated by plot.py at 2018-04-03 01:36:56

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.26 Mbit/s

95th percentile per-packet one-way delay: 81.843 ms

Loss rate: 0.06%

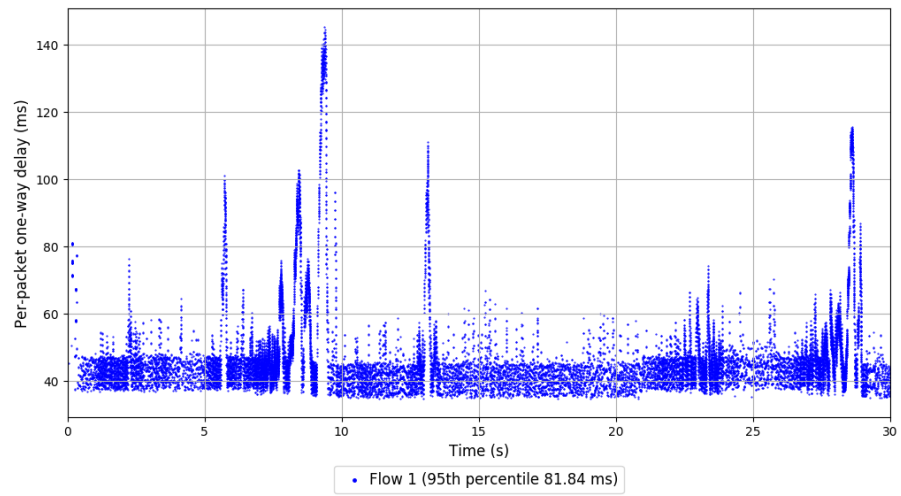
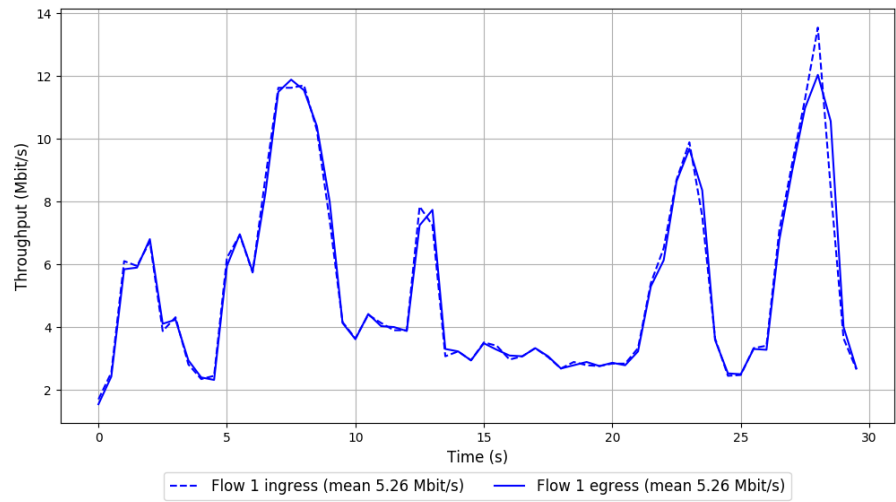
-- Flow 1:

Average throughput: 5.26 Mbit/s

95th percentile per-packet one-way delay: 81.843 ms

Loss rate: 0.06%

Run 3: Report of Copa — Data Link



Run 1: Statistics of FillP

Start at: 2018-04-03 00:42:03

End at: 2018-04-03 00:42:33

Local clock offset: -3.589 ms

Remote clock offset: -1.17 ms

Below is generated by plot.py at 2018-04-03 01:36:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.26 Mbit/s

95th percentile per-packet one-way delay: 1075.816 ms

Loss rate: 17.57%

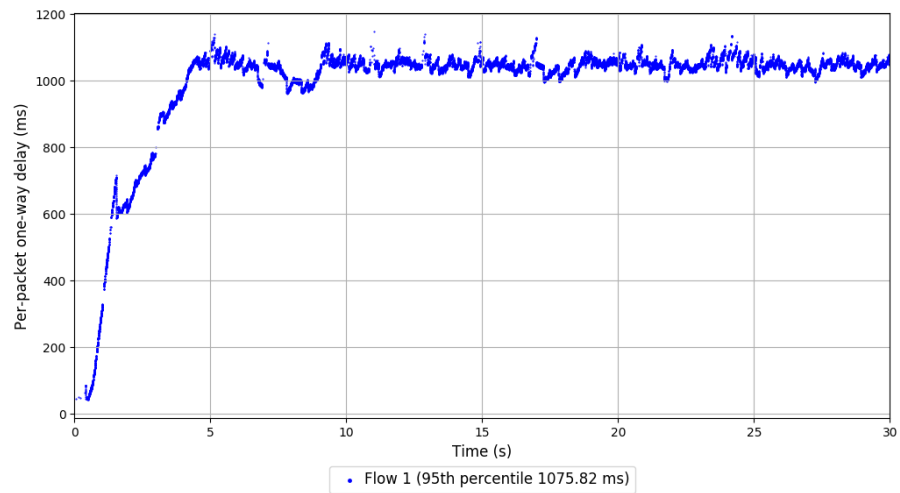
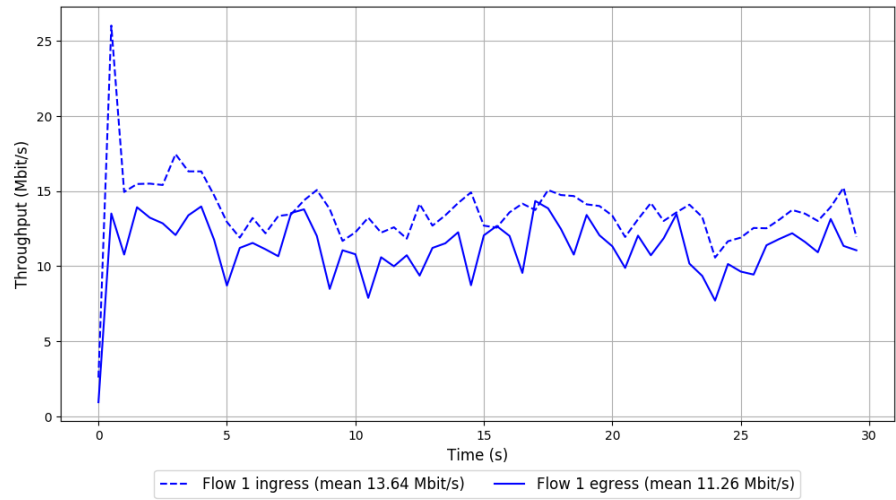
-- Flow 1:

Average throughput: 11.26 Mbit/s

95th percentile per-packet one-way delay: 1075.816 ms

Loss rate: 17.57%

Run 1: Report of FillP — Data Link

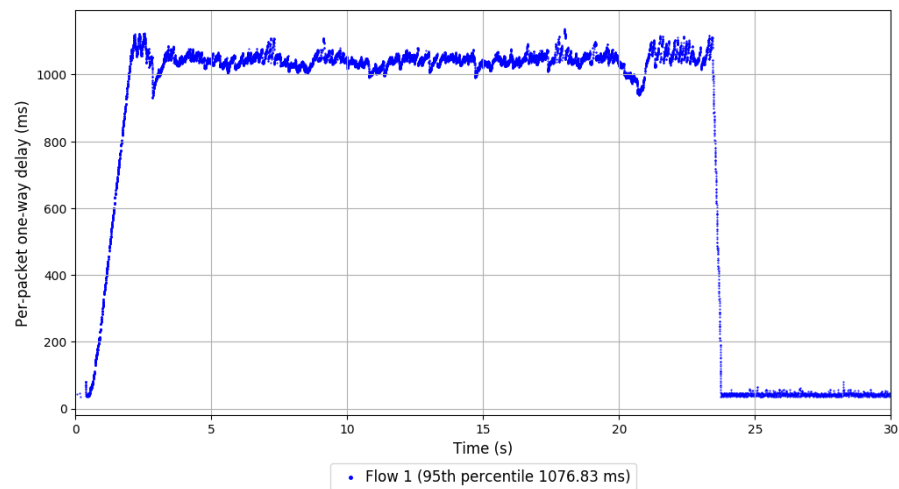
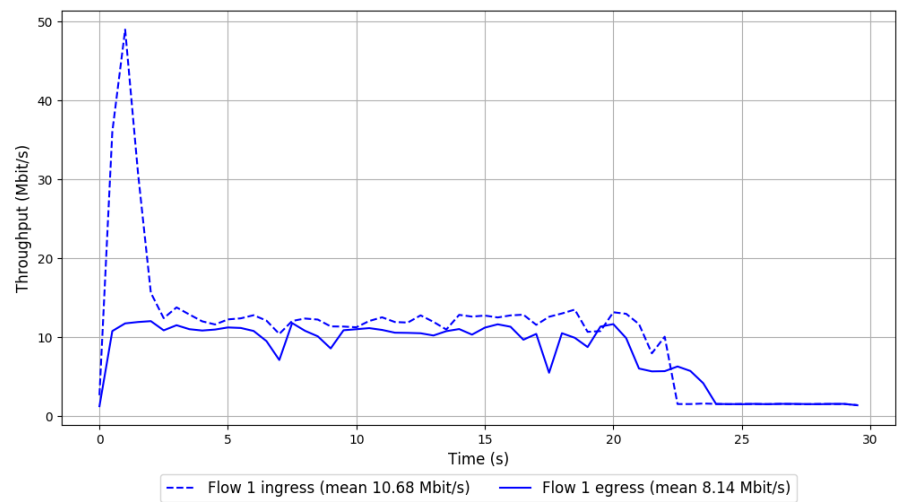


Run 2: Statistics of FillP

Start at: 2018-04-03 01:01:37
End at: 2018-04-03 01:02:07
Local clock offset: 2.052 ms
Remote clock offset: -2.131 ms

Below is generated by plot.py at 2018-04-03 01:36:59
Datalink statistics
-- Total of 1 flow:
Average throughput: 8.14 Mbit/s
95th percentile per-packet one-way delay: 1076.833 ms
Loss rate: 23.88%
-- Flow 1:
Average throughput: 8.14 Mbit/s
95th percentile per-packet one-way delay: 1076.833 ms
Loss rate: 23.88%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-04-03 01:21:20

End at: 2018-04-03 01:21:50

Local clock offset: 0.702 ms

Remote clock offset: 1.624 ms

Below is generated by plot.py at 2018-04-03 01:37:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.83 Mbit/s

95th percentile per-packet one-way delay: 1080.690 ms

Loss rate: 17.58%

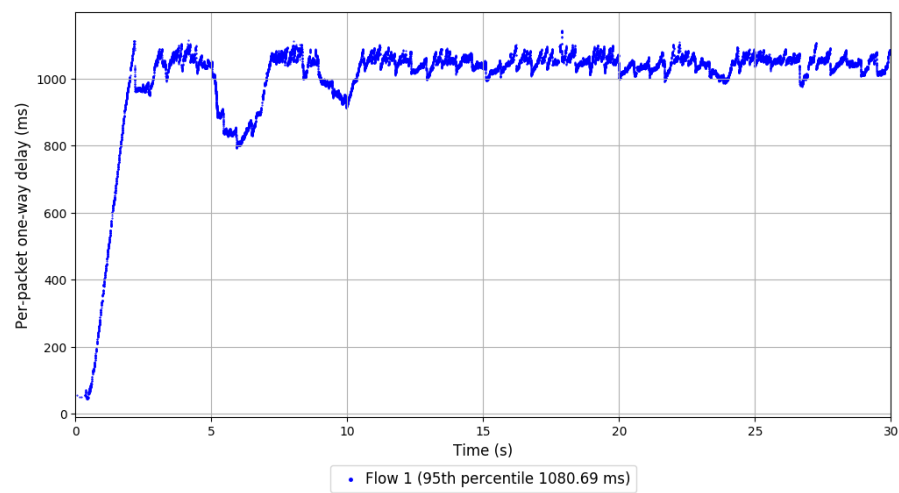
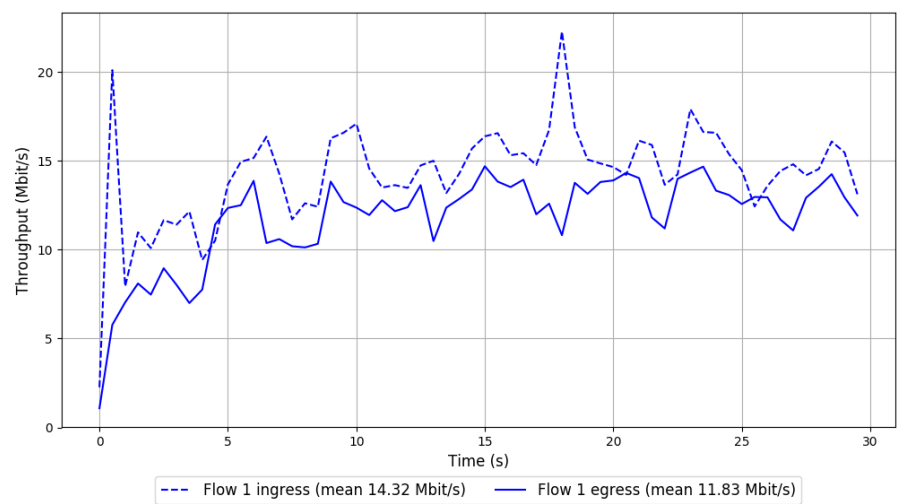
-- Flow 1:

Average throughput: 11.83 Mbit/s

95th percentile per-packet one-way delay: 1080.690 ms

Loss rate: 17.58%

Run 3: Report of FillP — Data Link



Run 1: Statistics of Indigo-1-32

Start at: 2018-04-03 00:46:25

End at: 2018-04-03 00:46:55

Local clock offset: -2.648 ms

Remote clock offset: -2.15 ms

Below is generated by plot.py at 2018-04-03 01:37:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 59.760 ms

Loss rate: 0.08%

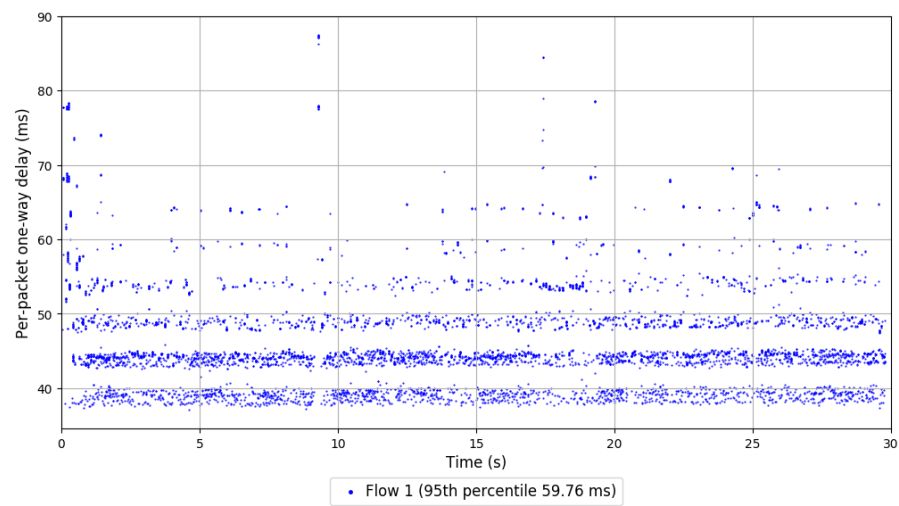
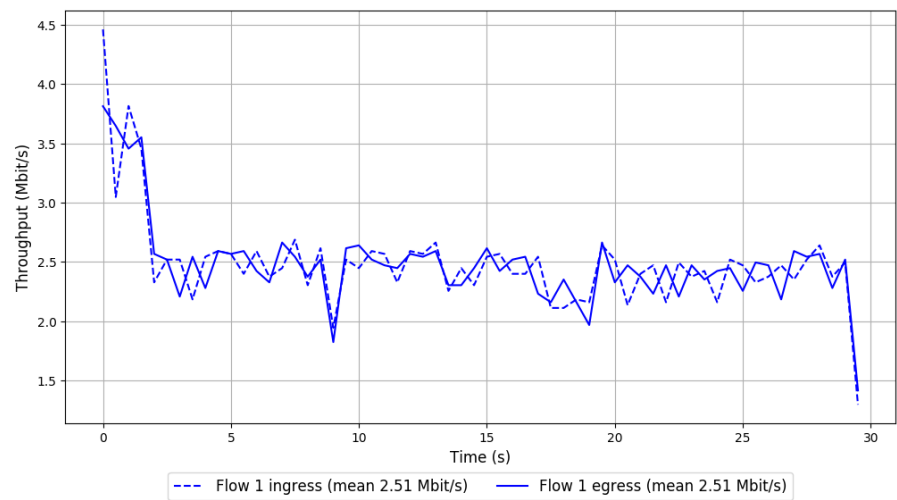
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 59.760 ms

Loss rate: 0.08%

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

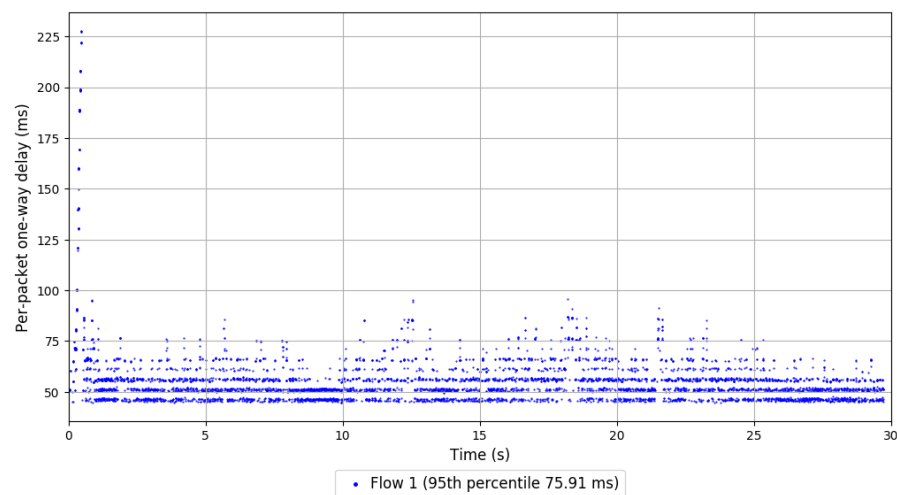
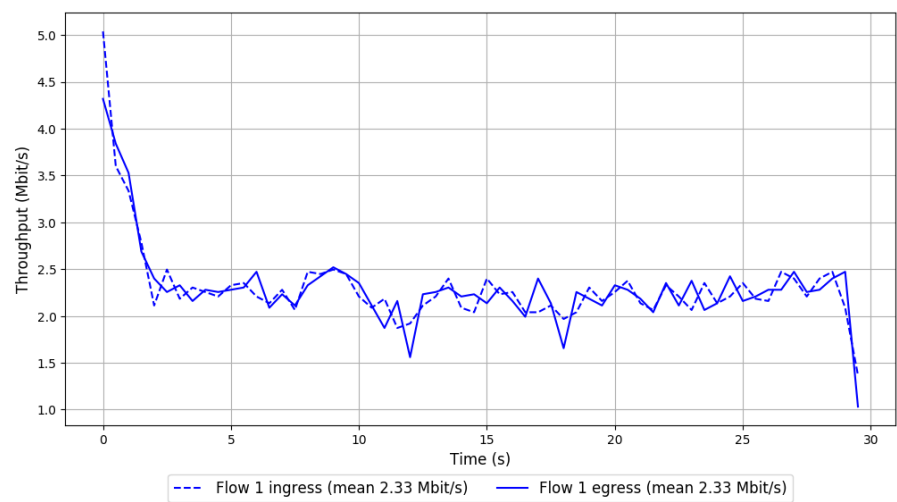


Run 2: Statistics of Indigo-1-32

Start at: 2018-04-03 01:06:01
End at: 2018-04-03 01:06:31
Local clock offset: -0.619 ms
Remote clock offset: -2.796 ms

Below is generated by plot.py at 2018-04-03 01:37:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 75.911 ms
Loss rate: 0.31%
-- Flow 1:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 75.911 ms
Loss rate: 0.31%

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



Run 3: Statistics of Indigo-1-32

Start at: 2018-04-03 01:25:44

End at: 2018-04-03 01:26:14

Local clock offset: 0.796 ms

Remote clock offset: 2.81 ms

Below is generated by plot.py at 2018-04-03 01:37:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.71 Mbit/s

95th percentile per-packet one-way delay: 67.665 ms

Loss rate: 0.07%

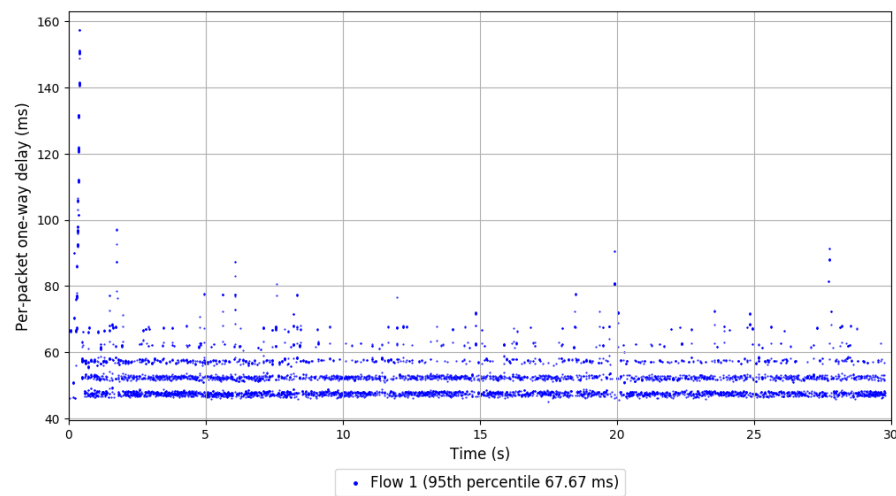
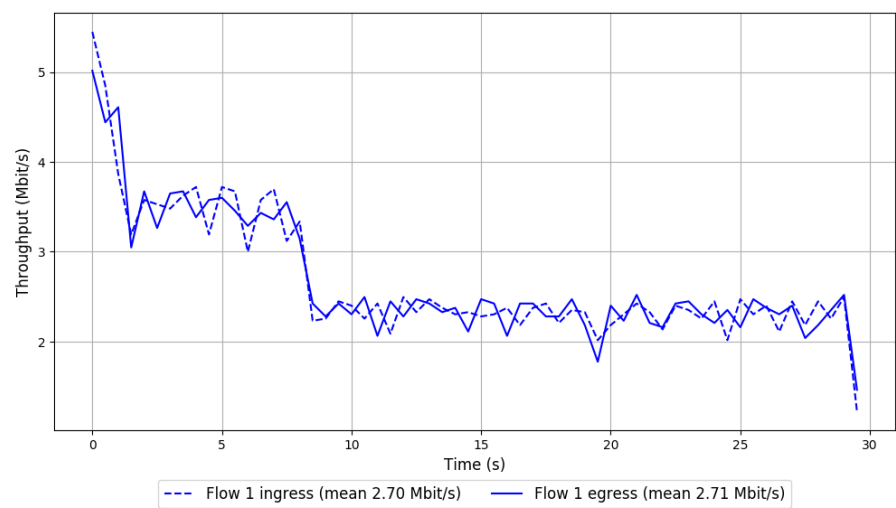
-- Flow 1:

Average throughput: 2.71 Mbit/s

95th percentile per-packet one-way delay: 67.665 ms

Loss rate: 0.07%

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



Run 1: Statistics of Vivace-latency

Start at: 2018-04-03 00:48:35

End at: 2018-04-03 00:49:05

Local clock offset: -1.571 ms

Remote clock offset: -1.96 ms

Below is generated by plot.py at 2018-04-03 01:37:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.55 Mbit/s

95th percentile per-packet one-way delay: 583.262 ms

Loss rate: 0.49%

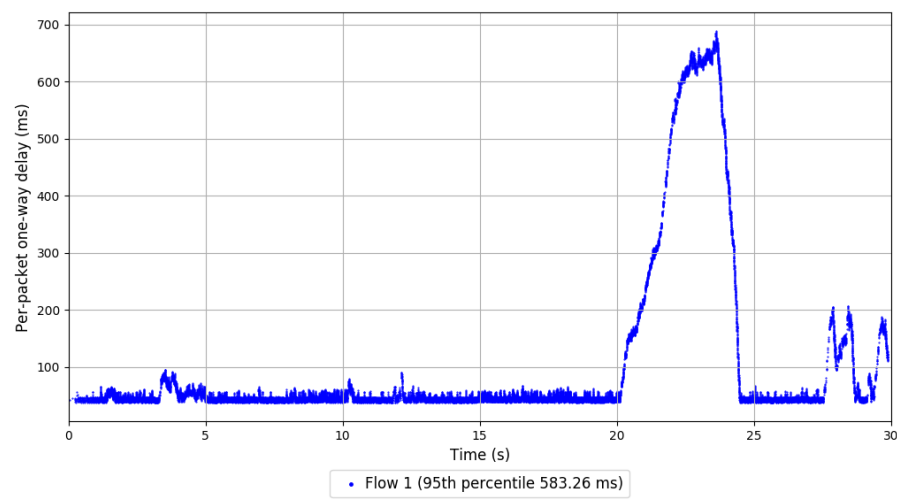
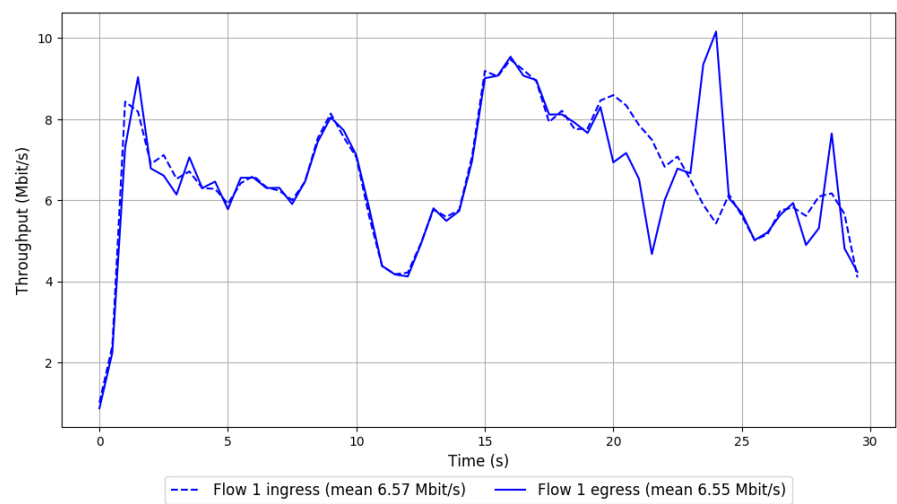
-- Flow 1:

Average throughput: 6.55 Mbit/s

95th percentile per-packet one-way delay: 583.262 ms

Loss rate: 0.49%

Run 1: Report of Vivace-latency — Data Link

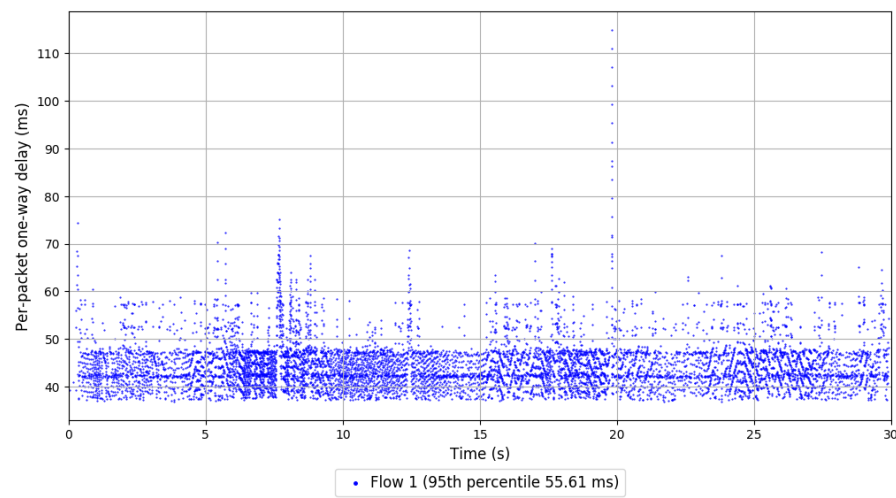
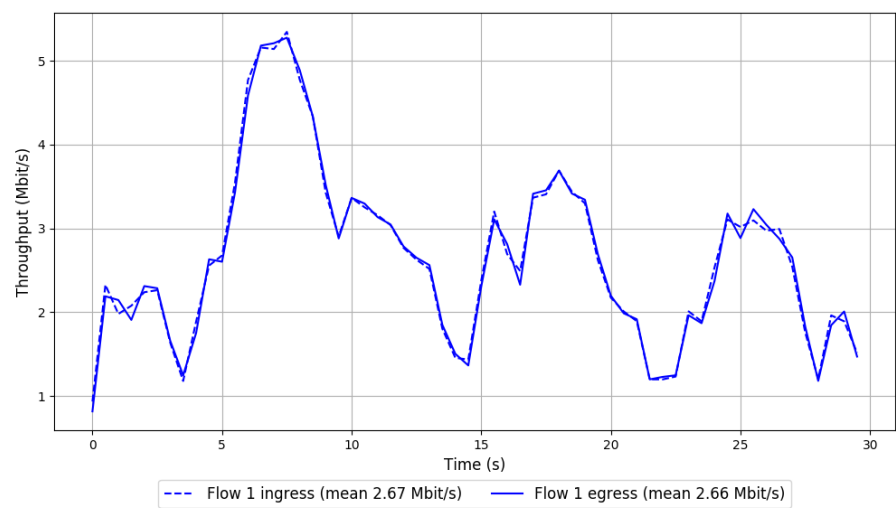


Run 2: Statistics of Vivace-latency

Start at: 2018-04-03 01:08:12
End at: 2018-04-03 01:08:42
Local clock offset: 0.812 ms
Remote clock offset: -1.153 ms

Below is generated by plot.py at 2018-04-03 01:37:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.66 Mbit/s
95th percentile per-packet one-way delay: 55.611 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 2.66 Mbit/s
95th percentile per-packet one-way delay: 55.611 ms
Loss rate: 0.13%

Run 2: Report of Vivace-latency — Data Link



Run 3: Statistics of Vivace-latency

Start at: 2018-04-03 01:27:56

End at: 2018-04-03 01:28:26

Local clock offset: 3.102 ms

Remote clock offset: 4.415 ms

Below is generated by plot.py at 2018-04-03 01:37:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.42 Mbit/s

95th percentile per-packet one-way delay: 159.874 ms

Loss rate: 0.10%

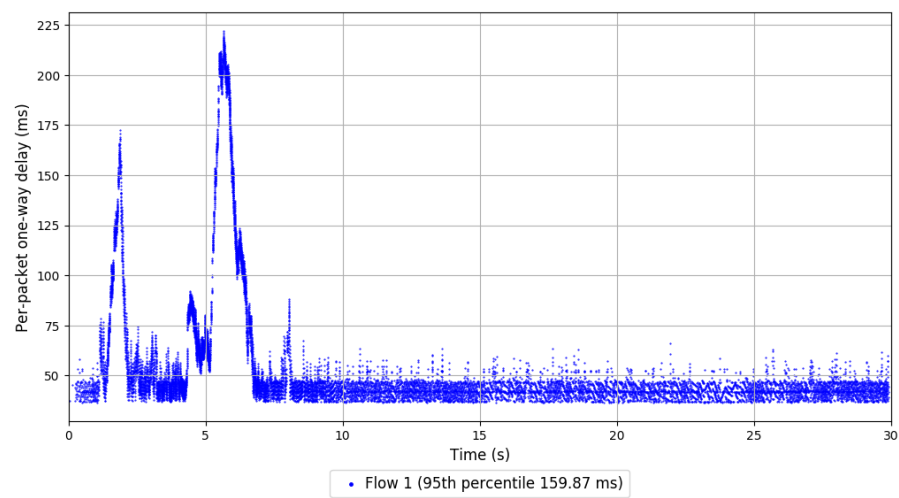
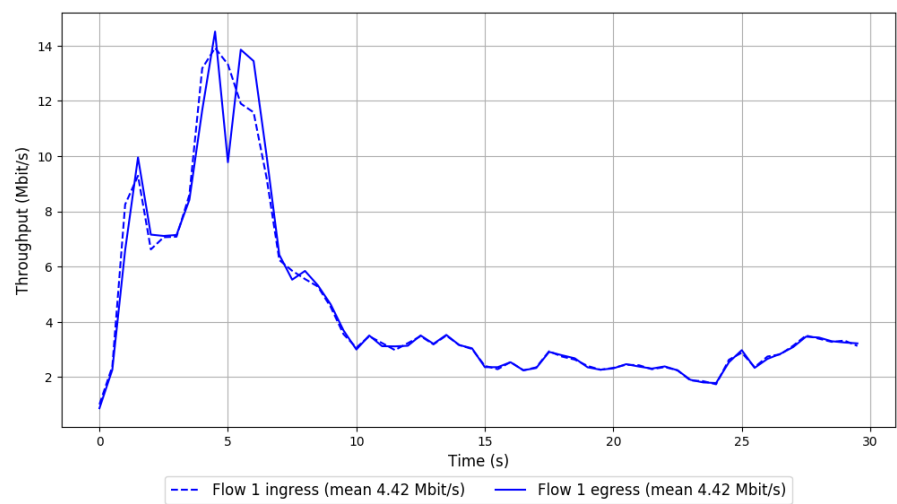
-- Flow 1:

Average throughput: 4.42 Mbit/s

95th percentile per-packet one-way delay: 159.874 ms

Loss rate: 0.10%

Run 3: Report of Vivace-latency — Data Link

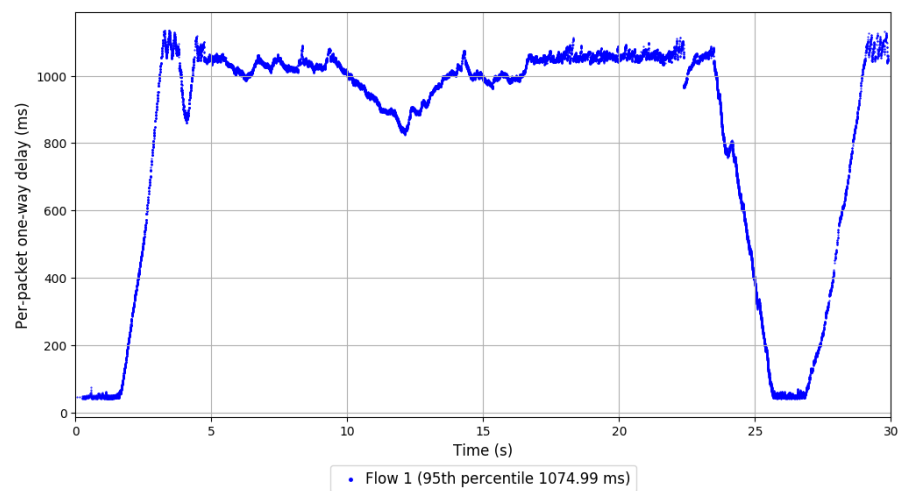
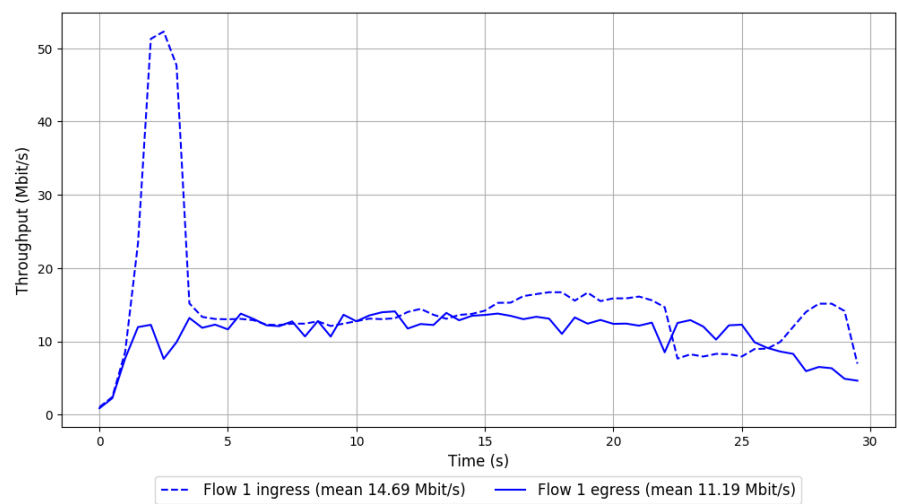


Run 1: Statistics of Vivace-loss

Start at: 2018-04-03 00:43:08
End at: 2018-04-03 00:43:38
Local clock offset: -7.187 ms
Remote clock offset: -1.616 ms

Below is generated by plot.py at 2018-04-03 01:37:11
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.19 Mbit/s
95th percentile per-packet one-way delay: 1074.990 ms
Loss rate: 23.93%
-- Flow 1:
Average throughput: 11.19 Mbit/s
95th percentile per-packet one-way delay: 1074.990 ms
Loss rate: 23.93%

Run 1: Report of Vivace-loss — Data Link



Run 2: Statistics of Vivace-loss

Start at: 2018-04-03 01:02:43

End at: 2018-04-03 01:03:13

Local clock offset: 2.104 ms

Remote clock offset: -1.479 ms

Below is generated by plot.py at 2018-04-03 01:37:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.78 Mbit/s

95th percentile per-packet one-way delay: 1085.647 ms

Loss rate: 26.75%

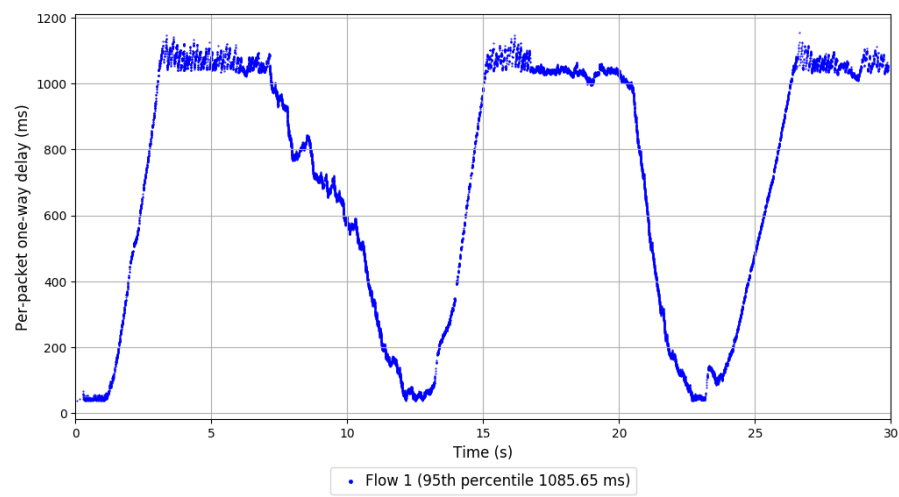
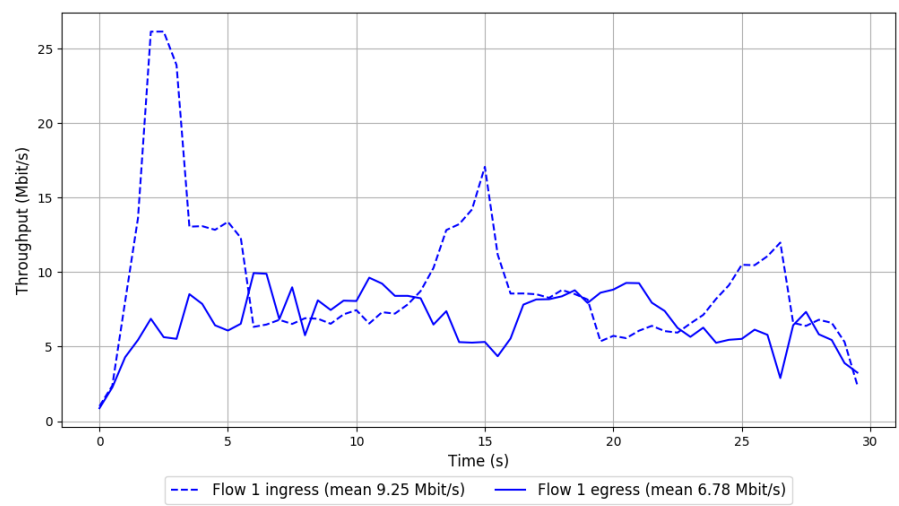
-- Flow 1:

Average throughput: 6.78 Mbit/s

95th percentile per-packet one-way delay: 1085.647 ms

Loss rate: 26.75%

Run 2: Report of Vivace-loss — Data Link



Run 3: Statistics of Vivace-loss

Start at: 2018-04-03 01:22:26

End at: 2018-04-03 01:22:56

Local clock offset: 3.434 ms

Remote clock offset: 2.028 ms

Below is generated by plot.py at 2018-04-03 01:37:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.77 Mbit/s

95th percentile per-packet one-way delay: 1087.171 ms

Loss rate: 31.24%

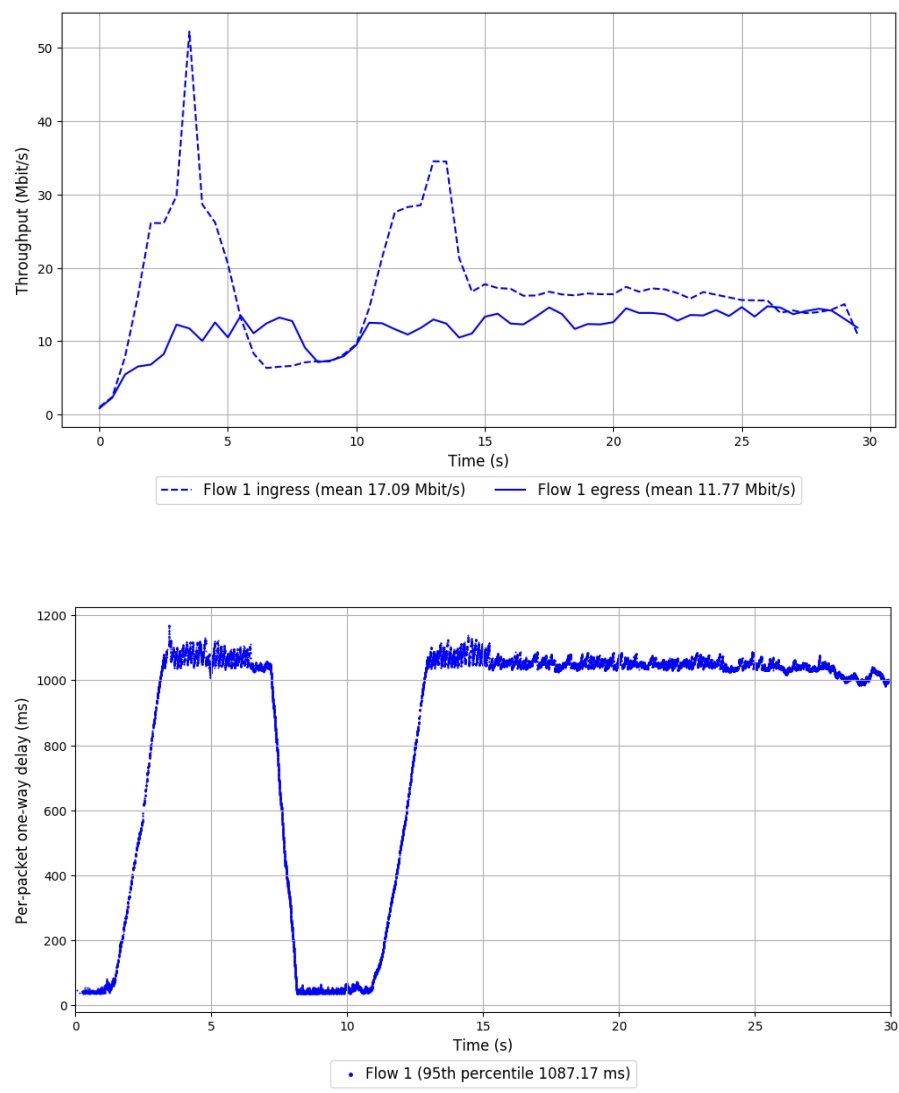
-- Flow 1:

Average throughput: 11.77 Mbit/s

95th percentile per-packet one-way delay: 1087.171 ms

Loss rate: 31.24%

Run 3: Report of Vivace-loss — Data Link

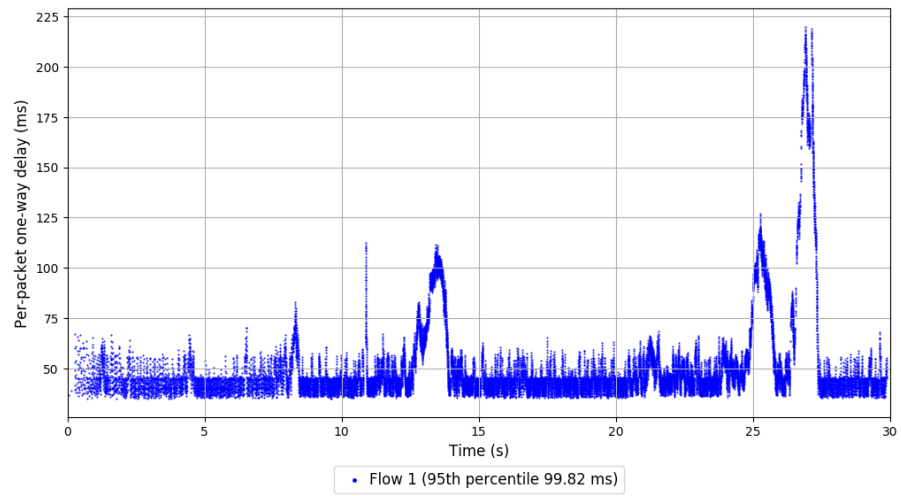
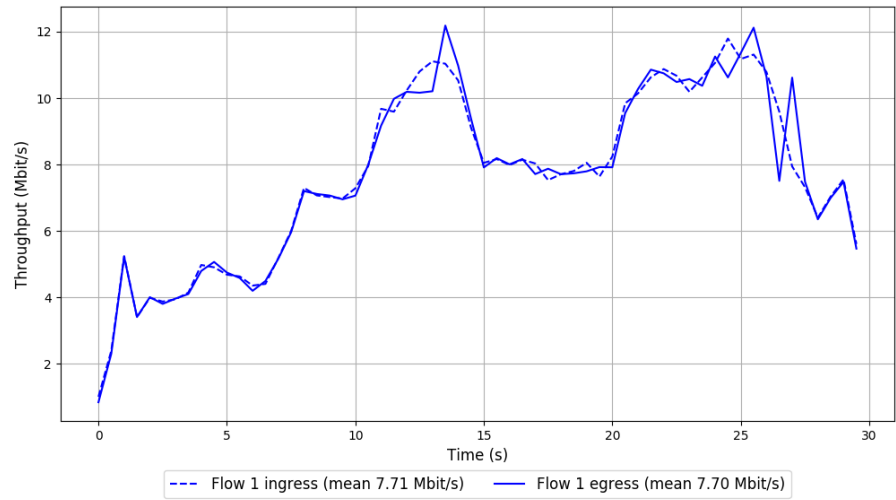


Run 1: Statistics of Vivace-LTE

Start at: 2018-04-03 00:37:42
End at: 2018-04-03 00:38:12
Local clock offset: -1.323 ms
Remote clock offset: -0.694 ms

Below is generated by plot.py at 2018-04-03 01:37:11
Datalink statistics
-- Total of 1 flow:
Average throughput: 7.70 Mbit/s
95th percentile per-packet one-way delay: 99.824 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 7.70 Mbit/s
95th percentile per-packet one-way delay: 99.824 ms
Loss rate: 0.16%

Run 1: Report of Vivace-LTE — Data Link

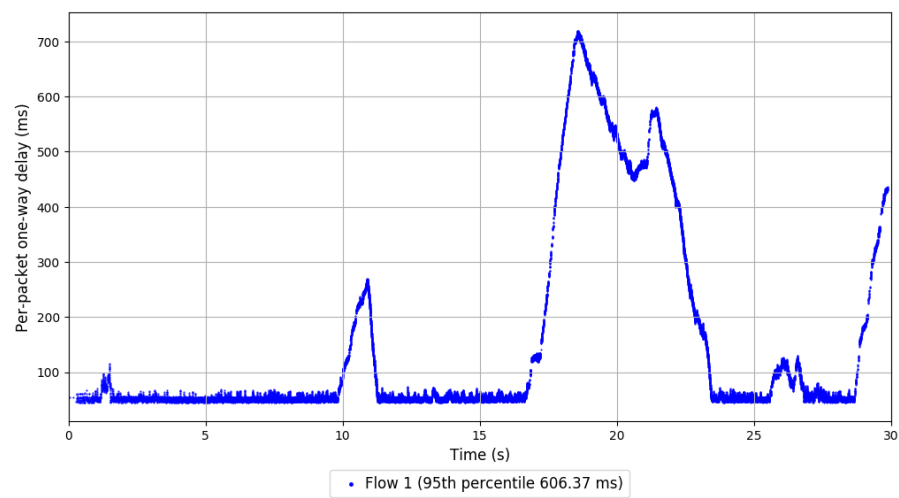
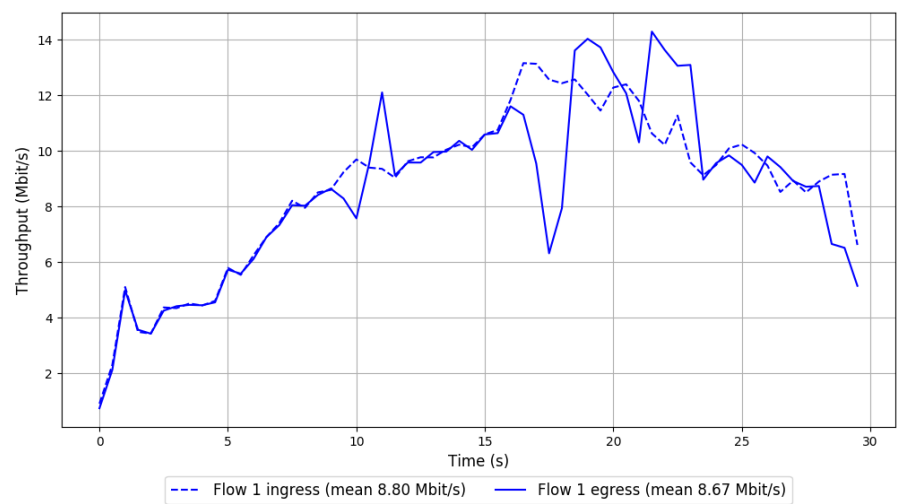


Run 2: Statistics of Vivace-LTE

Start at: 2018-04-03 00:57:16
End at: 2018-04-03 00:57:46
Local clock offset: -1.211 ms
Remote clock offset: -1.567 ms

Below is generated by plot.py at 2018-04-03 01:37:11
Datalink statistics
-- Total of 1 flow:
Average throughput: 8.67 Mbit/s
95th percentile per-packet one-way delay: 606.366 ms
Loss rate: 1.65%
-- Flow 1:
Average throughput: 8.67 Mbit/s
95th percentile per-packet one-way delay: 606.366 ms
Loss rate: 1.65%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-04-03 01:16:57

End at: 2018-04-03 01:17:27

Local clock offset: 0.136 ms

Remote clock offset: -2.164 ms

Below is generated by plot.py at 2018-04-03 01:37:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.93 Mbit/s

95th percentile per-packet one-way delay: 960.985 ms

Loss rate: 0.60%

-- Flow 1:

Average throughput: 6.93 Mbit/s

95th percentile per-packet one-way delay: 960.985 ms

Loss rate: 0.60%

Run 3: Report of Vivace-LTE — Data Link

