

Pantheon Report

Generated at 2018-04-03 01:46:39 (UTC).

Data path: AWS Brazil 2 Ethernet (*local*) → Colombia 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).

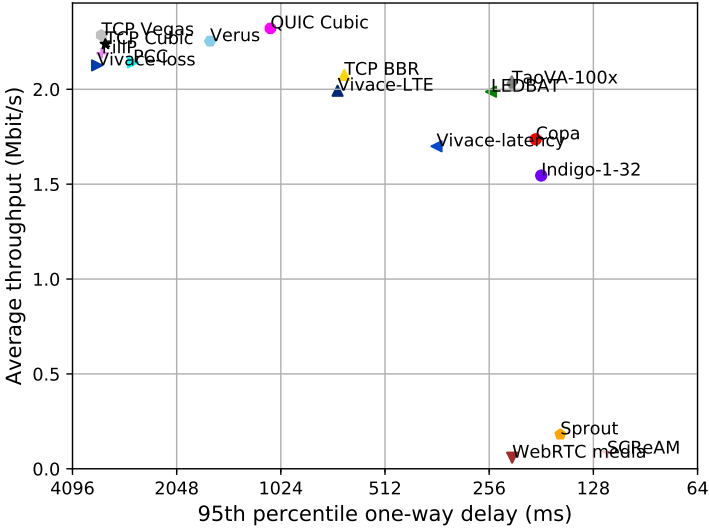
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

NTP offsets were measured against **gps.ntp.br** and have been applied to correct the timestamps in logs.

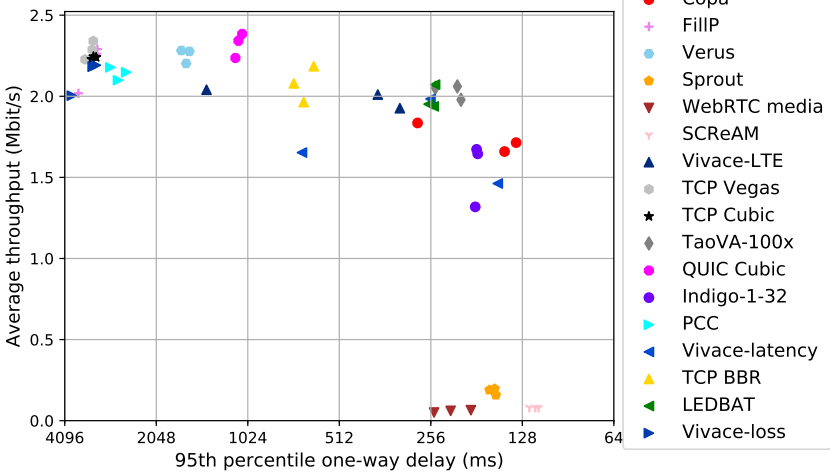
Git summary:

```
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-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeab30b267cde681
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 Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from AWS Brazil 2 Ethernet to Colombia 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	2.08	671.46	1.18
TCP Cubic	3	2.24	3289.53	12.66
LEDBAT	3	1.99	252.99	0.50
PCC	3	2.14	2736.63	41.78
QUIC Cubic	3	2.32	1097.59	3.41
SCReAM	3	0.08	116.91	0.00
WebRTC media	3	0.06	219.73	0.00
Sprout	3	0.18	159.51	0.13
TaoVA-100x	3	2.03	220.23	0.96
TCP Vegas	3	2.29	3380.22	17.06
Verus	3	2.25	1640.23	3.85
Copa	3	1.74	187.88	0.09
FillP	3	2.19	3373.82	14.15
Indigo-1-32	3	1.55	181.12	0.08
Vivace-latency	3	1.70	363.49	0.86
Vivace-loss	3	2.12	3477.54	36.65
Vivace-LTE	3	1.99	702.00	2.61

Run 1: Statistics of TCP BBR

Start at: 2018-04-03 00:53:38

End at: 2018-04-03 00:54:08

Local clock offset: 16.736 ms

Remote clock offset: 11.944 ms

Below is generated by plot.py at 2018-04-03 01:46:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 621.080 ms

Loss rate: 1.16%

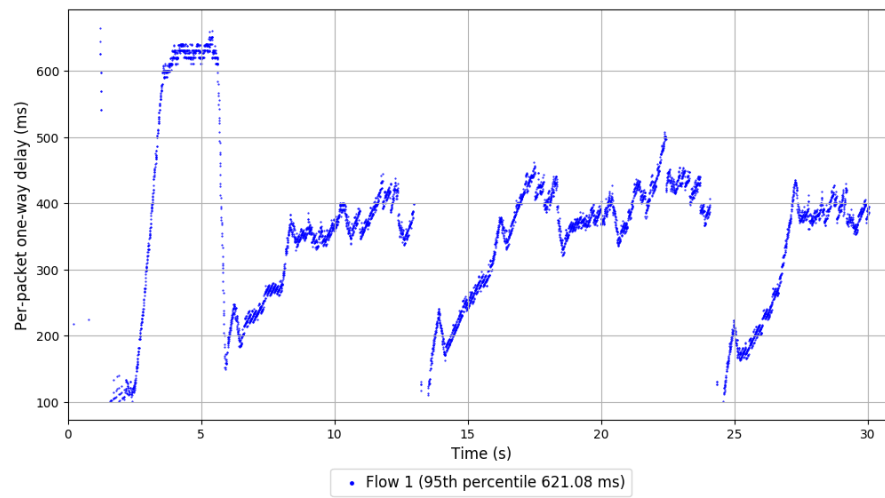
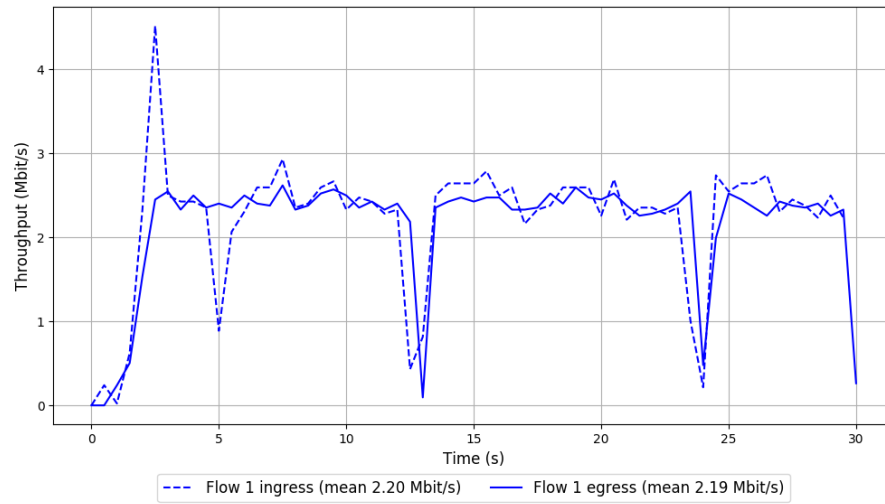
-- Flow 1:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 621.080 ms

Loss rate: 1.16%

Run 1: Report of TCP BBR — Data Link

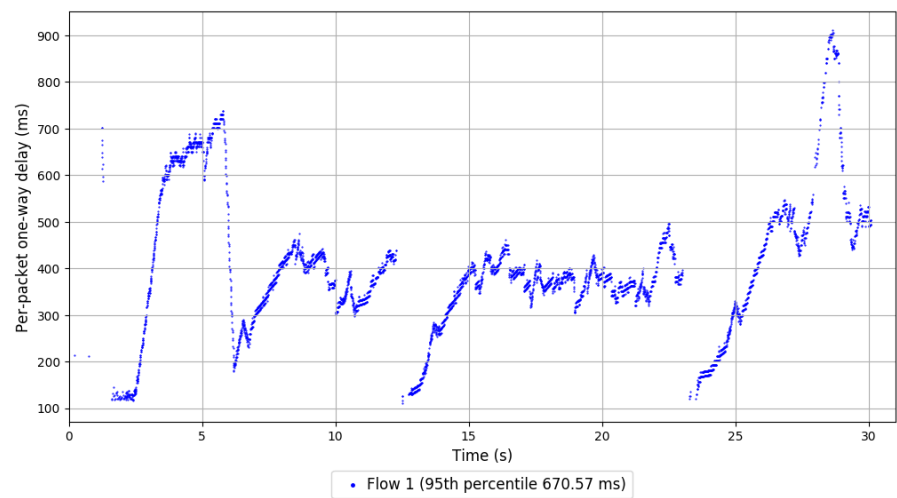
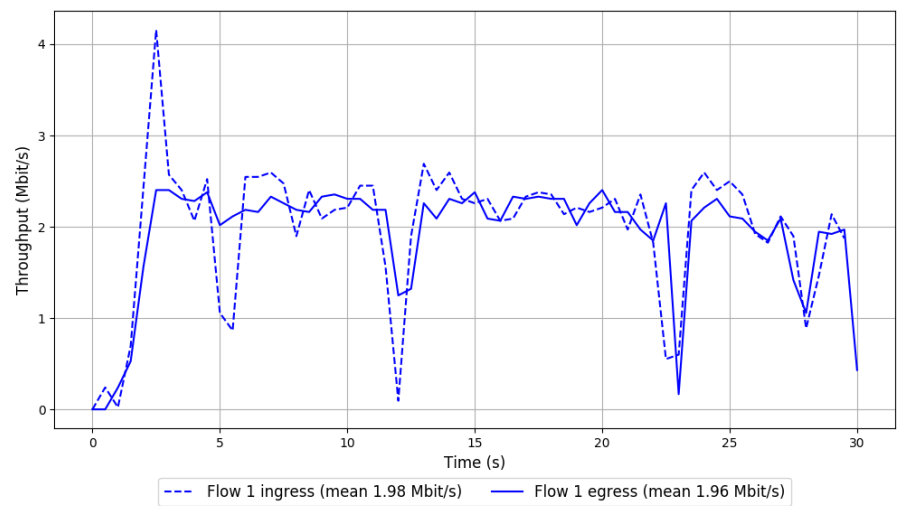


Run 2: Statistics of TCP BBR

Start at: 2018-04-03 01:14:55
End at: 2018-04-03 01:15:25
Local clock offset: -0.987 ms
Remote clock offset: 11.956 ms

Below is generated by plot.py at 2018-04-03 01:46:02
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 670.566 ms
Loss rate: 1.23%
-- Flow 1:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 670.566 ms
Loss rate: 1.23%

Run 2: Report of TCP BBR — Data Link

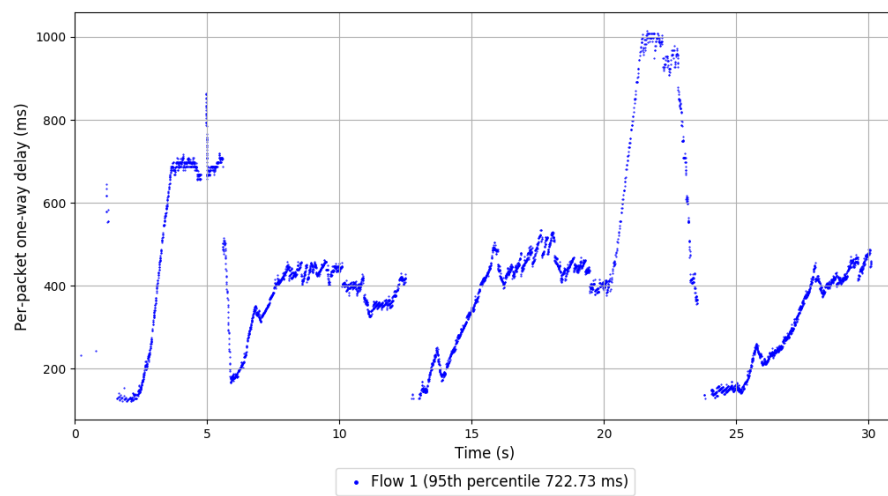
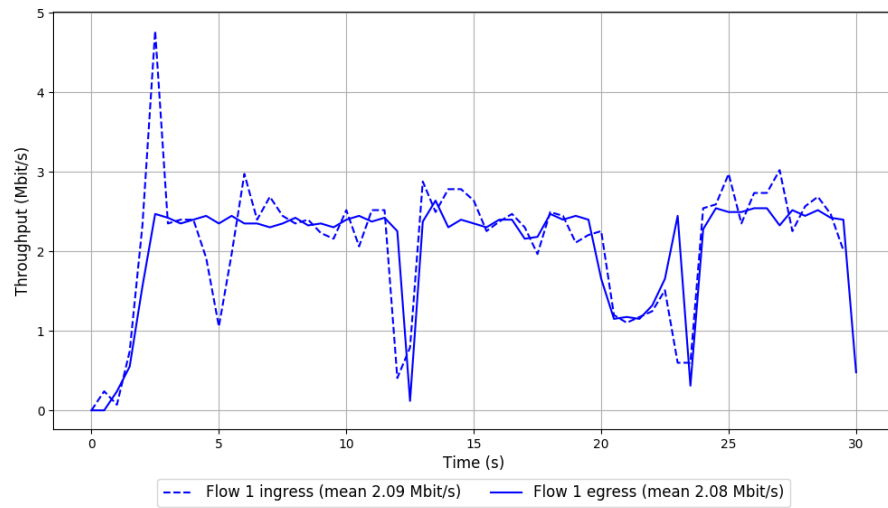


Run 3: Statistics of TCP BBR

Start at: 2018-04-03 01:36:13
End at: 2018-04-03 01:36:43
Local clock offset: -4.839 ms
Remote clock offset: 12.966 ms

Below is generated by plot.py at 2018-04-03 01:46:02
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 722.725 ms
Loss rate: 1.15%
-- Flow 1:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 722.725 ms
Loss rate: 1.15%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-04-03 00:51:16

End at: 2018-04-03 00:51:46

Local clock offset: 18.4 ms

Remote clock offset: 12.09 ms

Below is generated by plot.py at 2018-04-03 01:46:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.24 Mbit/s

95th percentile per-packet one-way delay: 3296.043 ms

Loss rate: 12.76%

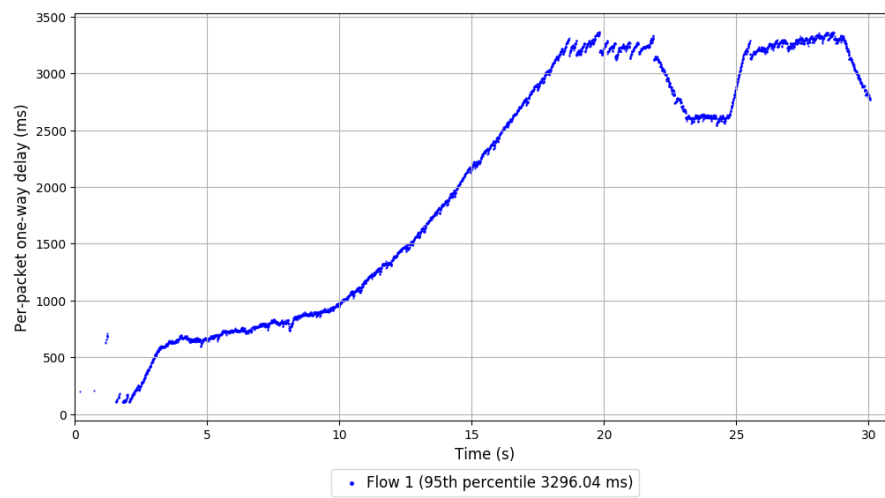
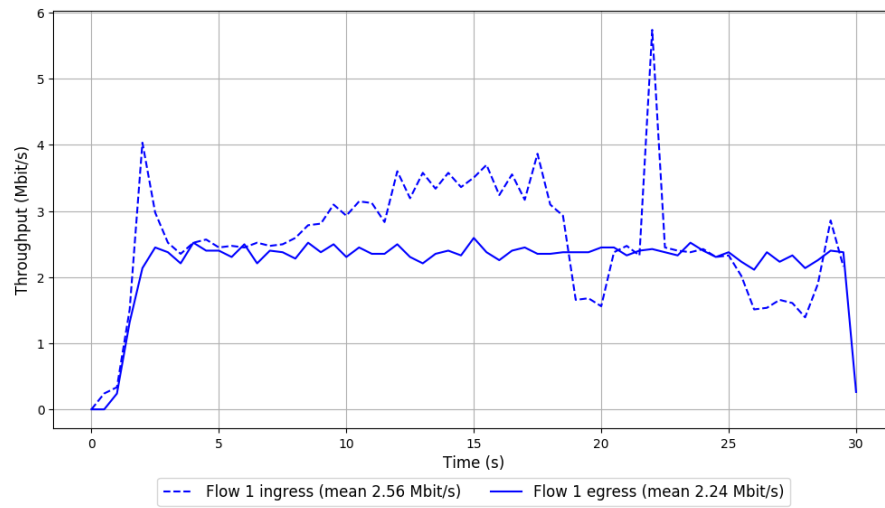
-- Flow 1:

Average throughput: 2.24 Mbit/s

95th percentile per-packet one-way delay: 3296.043 ms

Loss rate: 12.76%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-04-03 01:12:33

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

Local clock offset: -6.452 ms

Remote clock offset: 6.652 ms

Below is generated by plot.py at 2018-04-03 01:46:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 3342.127 ms

Loss rate: 12.99%

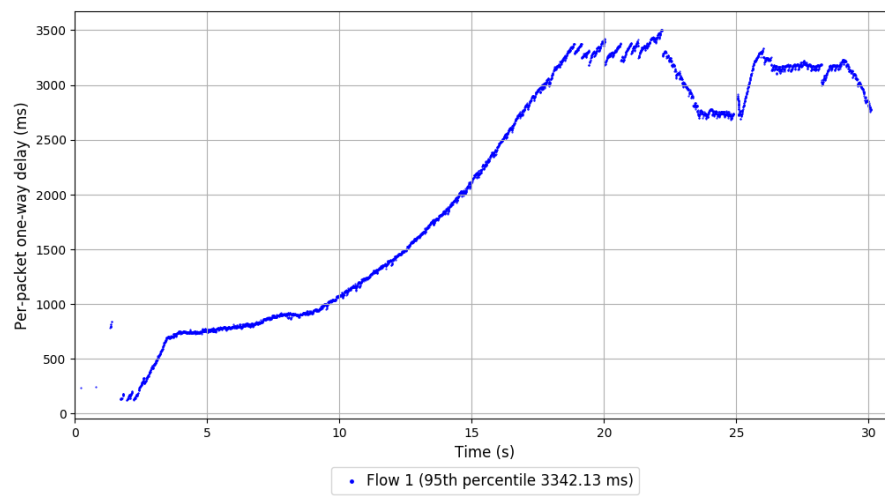
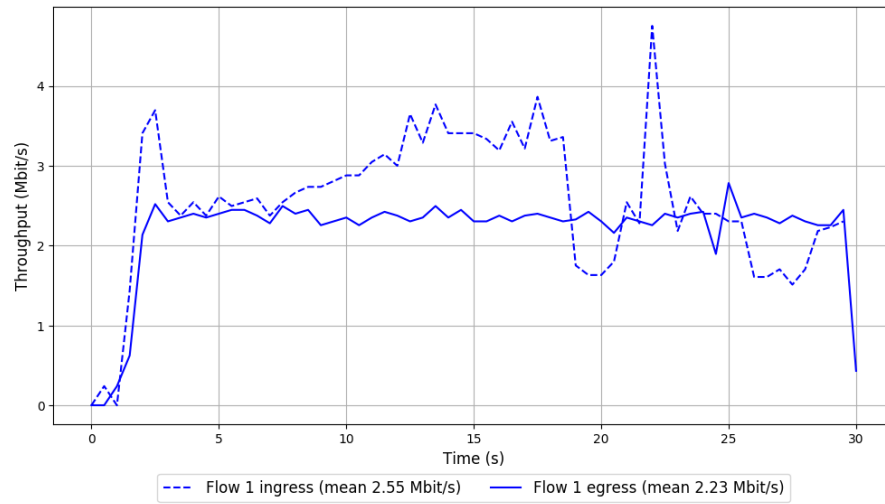
-- Flow 1:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 3342.127 ms

Loss rate: 12.99%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-04-03 01:33:51

End at: 2018-04-03 01:34:21

Local clock offset: -4.895 ms

Remote clock offset: 6.624 ms

Below is generated by plot.py at 2018-04-03 01:46:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.24 Mbit/s

95th percentile per-packet one-way delay: 3230.414 ms

Loss rate: 12.22%

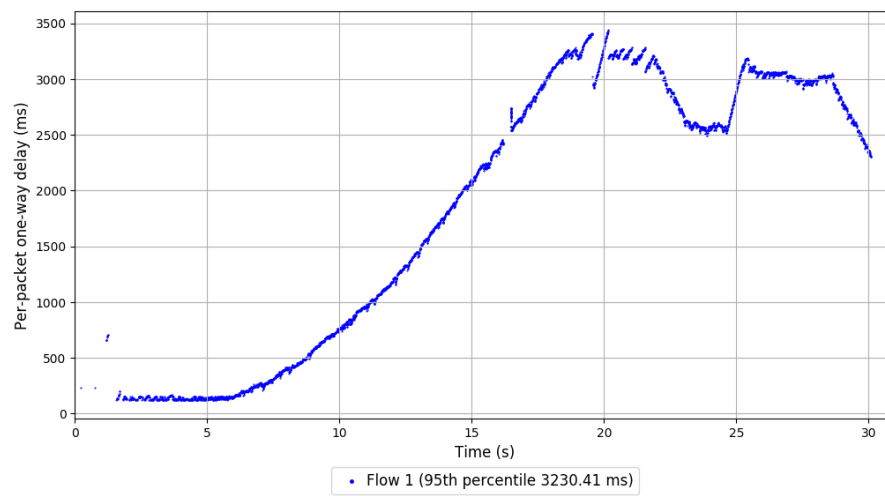
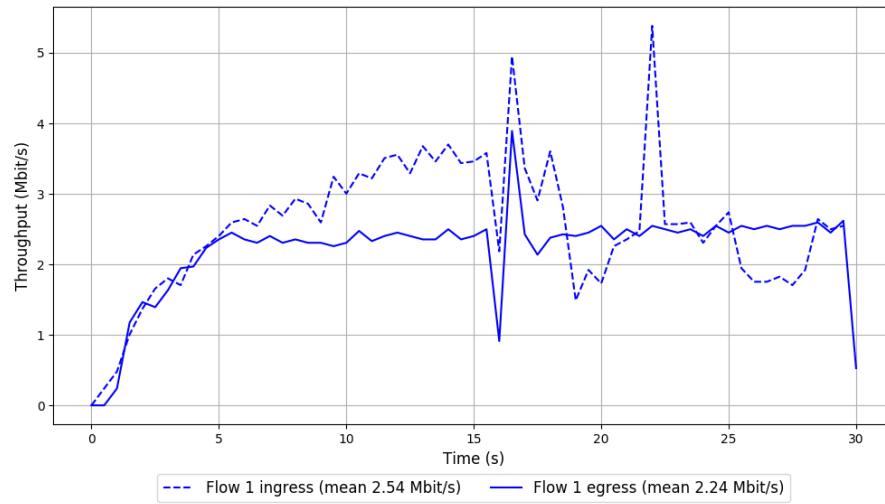
-- Flow 1:

Average throughput: 2.24 Mbit/s

95th percentile per-packet one-way delay: 3230.414 ms

Loss rate: 12.22%

Run 3: Report of TCP Cubic — Data Link

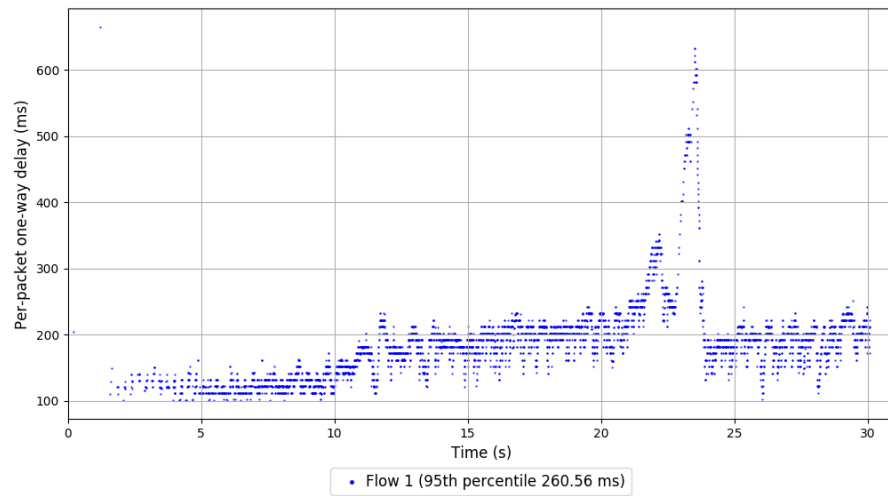
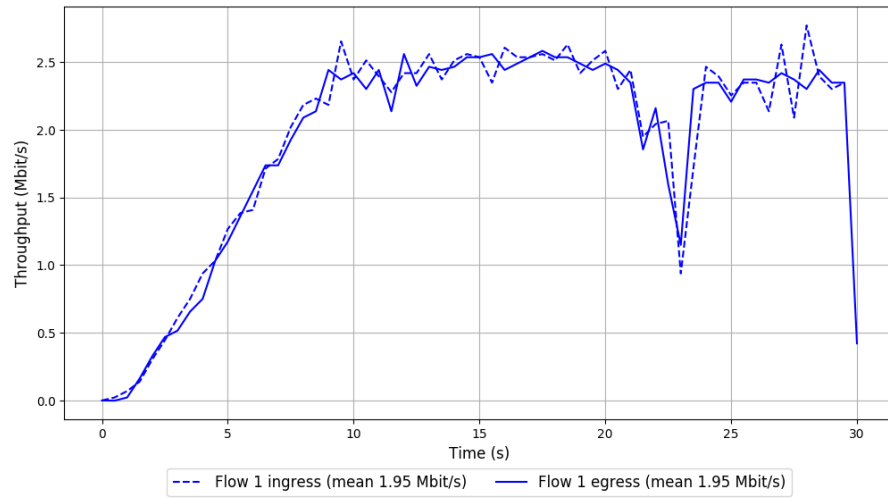


```
Run 1: Statistics of LEDBAT

Start at: 2018-04-03 00:46:32
End at: 2018-04-03 00:47:02
Local clock offset: 11.498 ms
Remote clock offset: 12.174 ms

# Below is generated by plot.py at 2018-04-03 01:46:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 260.558 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 260.558 ms
Loss rate: 0.48%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-04-03 01:07:49

End at: 2018-04-03 01:08:19

Local clock offset: -2.491 ms

Remote clock offset: 5.684 ms

Below is generated by plot.py at 2018-04-03 01:46:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 250.476 ms

Loss rate: 0.46%

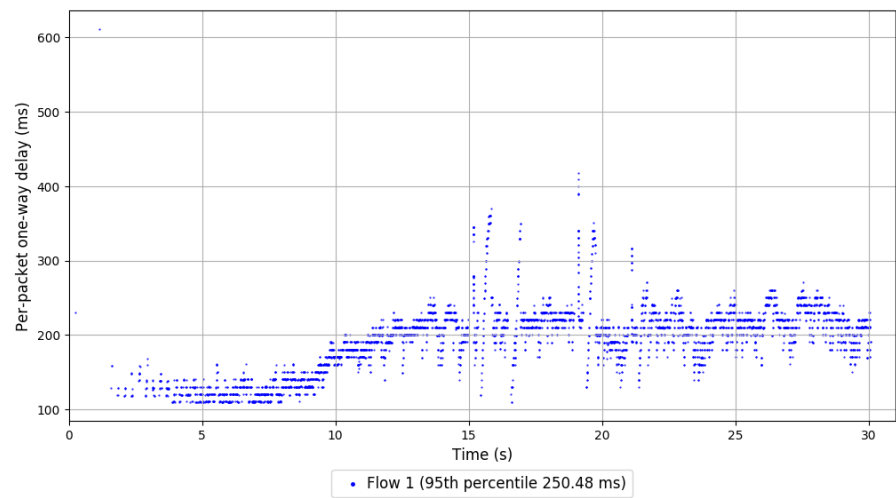
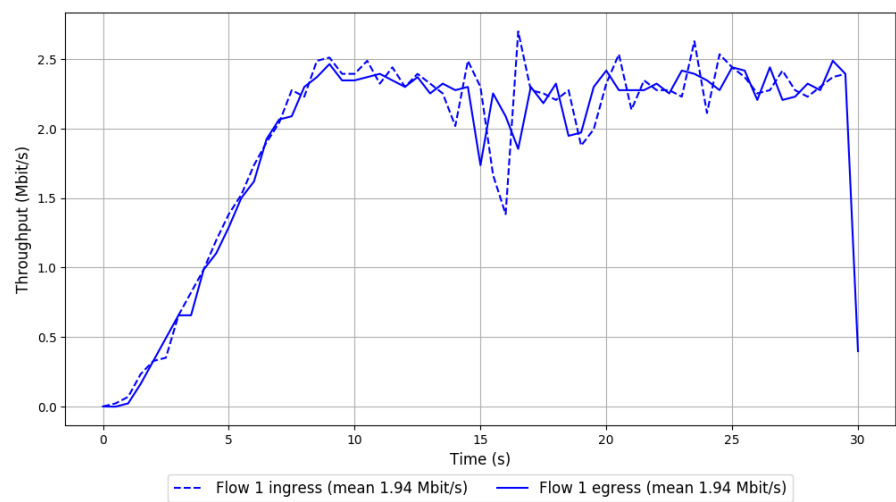
-- Flow 1:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 250.476 ms

Loss rate: 0.46%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-04-03 01:29:06

End at: 2018-04-03 01:29:36

Local clock offset: -5.09 ms

Remote clock offset: 6.667 ms

Below is generated by plot.py at 2018-04-03 01:46:05

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.07 Mbit/s

95th percentile per-packet one-way delay: 247.928 ms

Loss rate: 0.57%

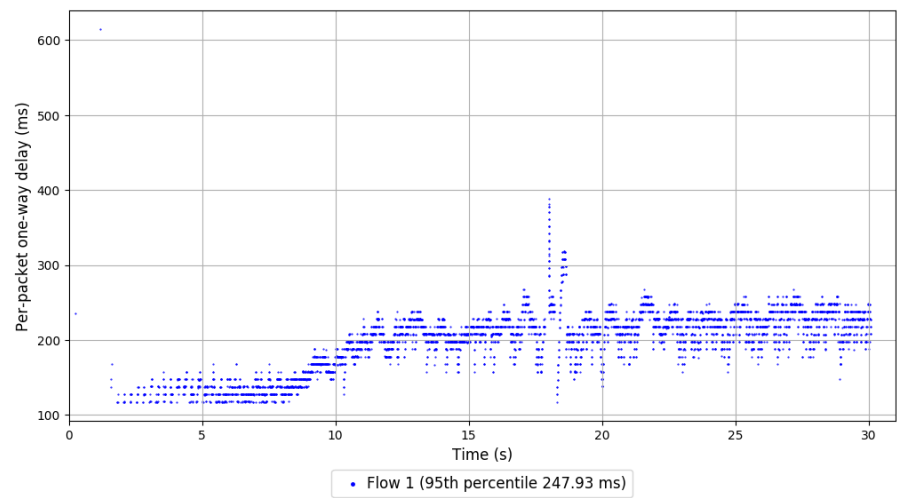
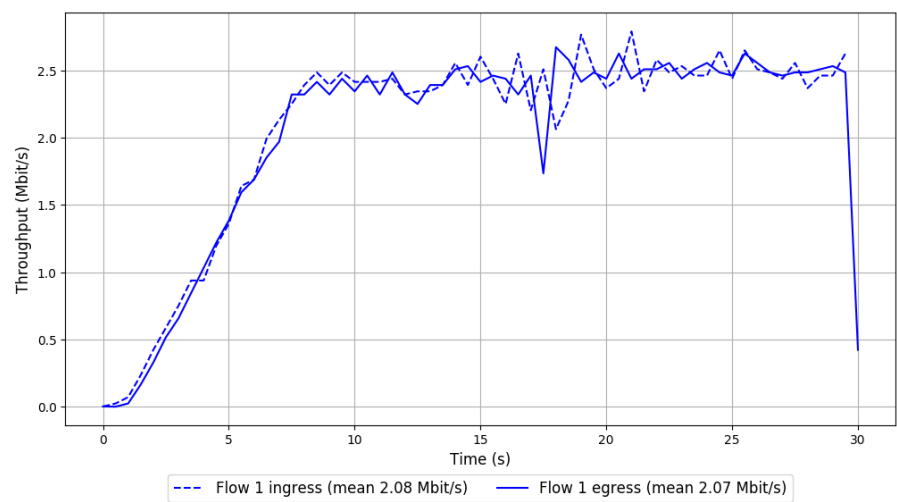
-- Flow 1:

Average throughput: 2.07 Mbit/s

95th percentile per-packet one-way delay: 247.928 ms

Loss rate: 0.57%

Run 3: Report of LEDBAT — Data Link

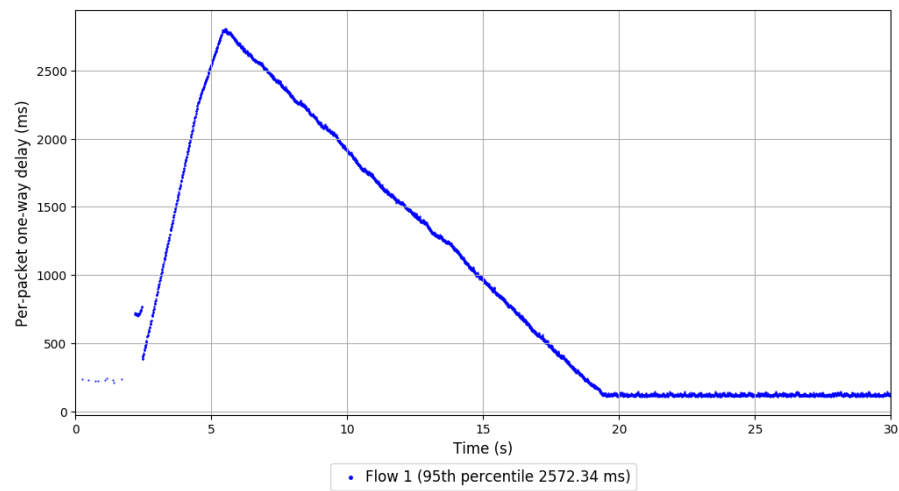
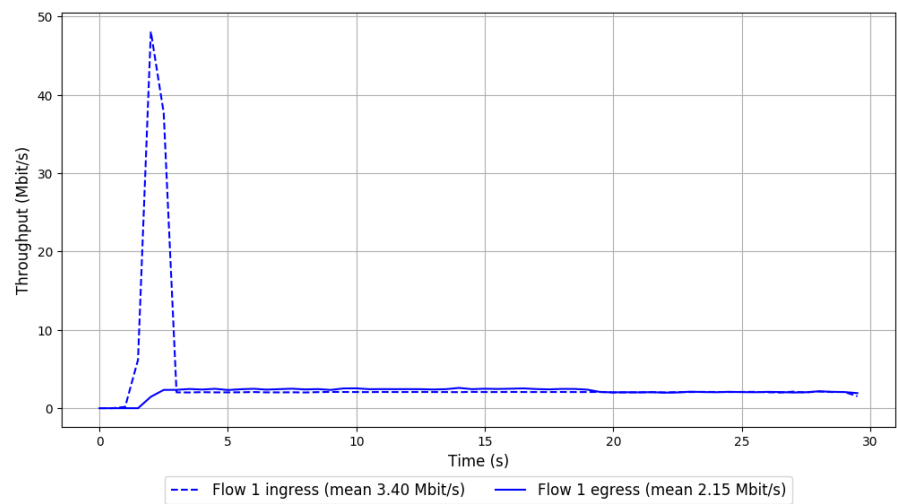


```
Run 1: Statistics of PCC

Start at: 2018-04-03 00:56:00
End at: 2018-04-03 00:56:30
Local clock offset: 4.762 ms
Remote clock offset: 12.019 ms

# Below is generated by plot.py at 2018-04-03 01:46:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 2572.337 ms
Loss rate: 37.08%
-- Flow 1:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 2572.337 ms
Loss rate: 37.08%
```

Run 1: Report of PCC — Data Link

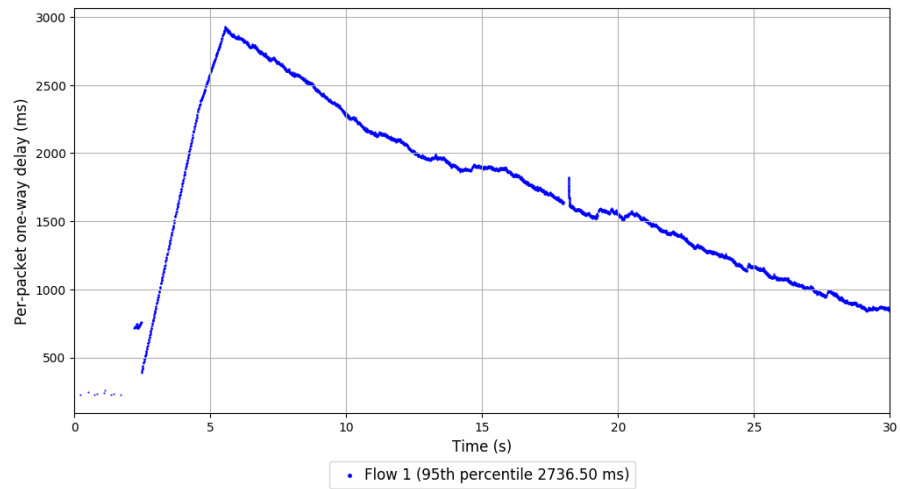
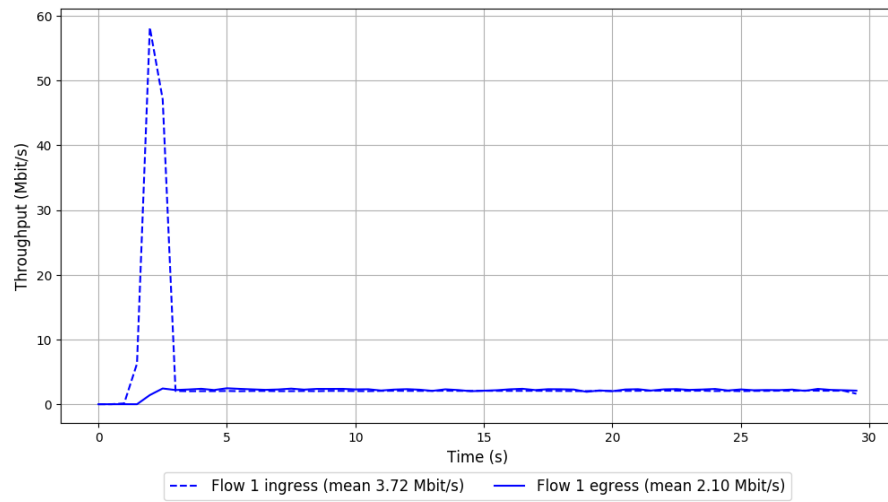


Run 2: Statistics of PCC

Start at: 2018-04-03 01:17:17
End at: 2018-04-03 01:17:47
Local clock offset: -3.319 ms
Remote clock offset: 13.019 ms

Below is generated by plot.py at 2018-04-03 01:46:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 2736.500 ms
Loss rate: 43.88%
-- Flow 1:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 2736.500 ms
Loss rate: 43.88%

Run 2: Report of PCC — Data Link



Run 3: Statistics of PCC

Start at: 2018-04-03 01:38:35

End at: 2018-04-03 01:39:05

Local clock offset: -4.745 ms

Remote clock offset: 5.56 ms

Below is generated by plot.py at 2018-04-03 01:46:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 2901.062 ms

Loss rate: 44.38%

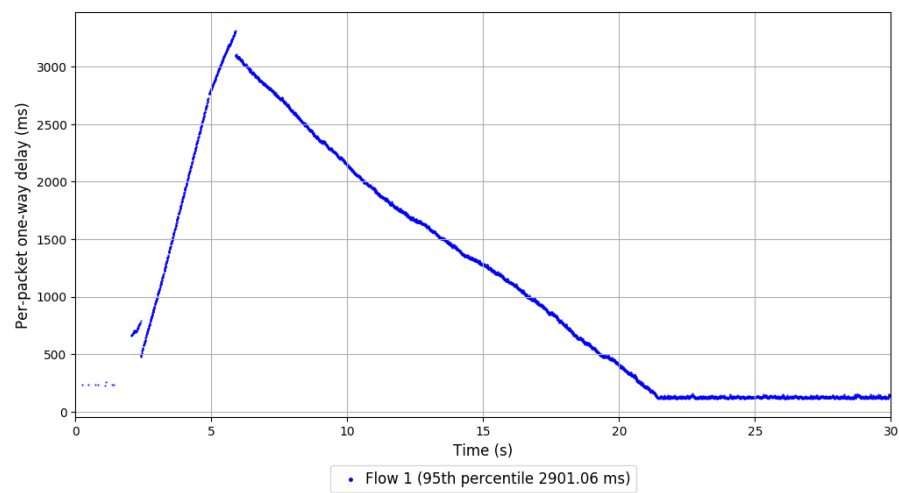
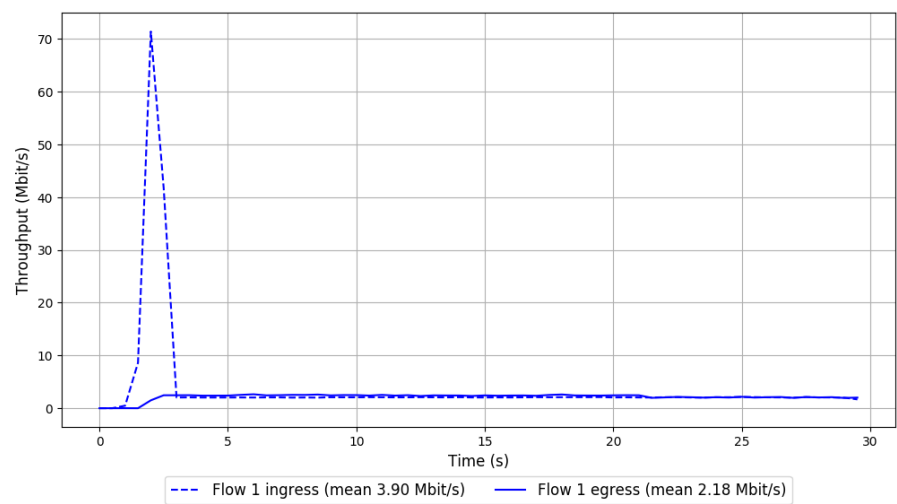
-- Flow 1:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 2901.062 ms

Loss rate: 44.38%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-04-03 00:59:33

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

Local clock offset: 13.515 ms

Remote clock offset: 10.998 ms

Below is generated by plot.py at 2018-04-03 01:46:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.24 Mbit/s

95th percentile per-packet one-way delay: 1124.802 ms

Loss rate: 3.29%

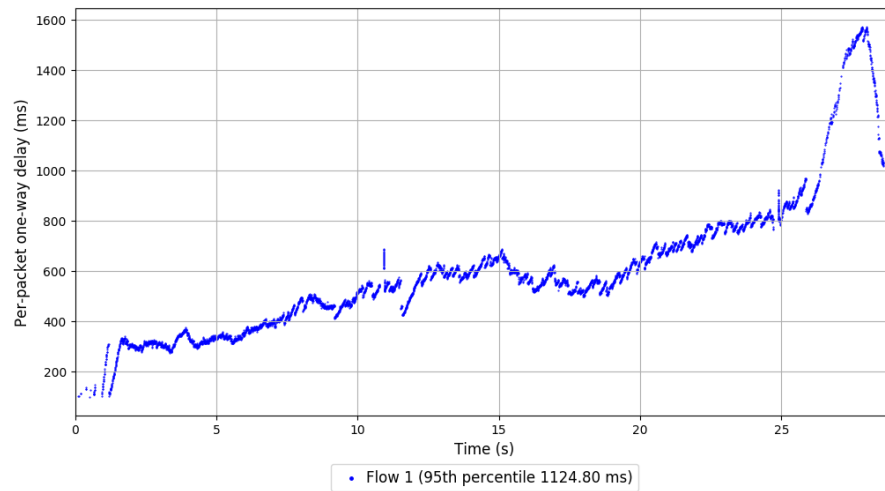
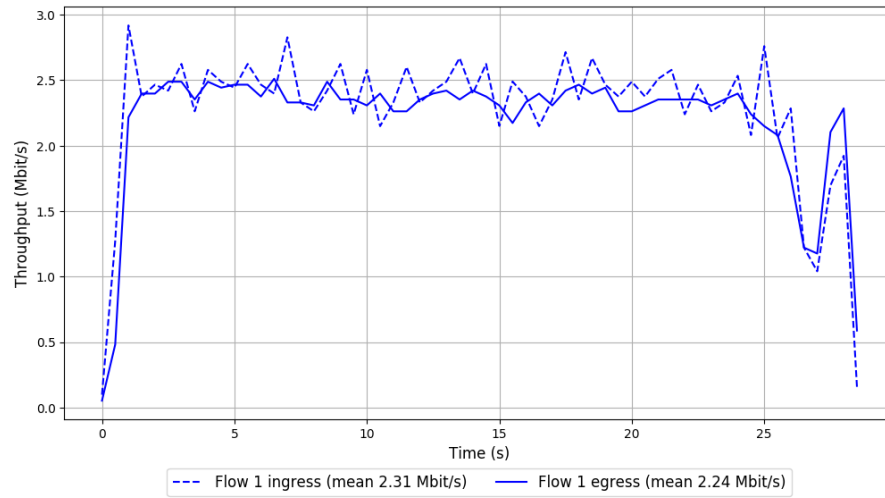
-- Flow 1:

Average throughput: 2.24 Mbit/s

95th percentile per-packet one-way delay: 1124.802 ms

Loss rate: 3.29%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-04-03 01:20:50

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

Local clock offset: -5.884 ms

Remote clock offset: 5.632 ms

Below is generated by plot.py at 2018-04-03 01:46:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.38 Mbit/s

95th percentile per-packet one-way delay: 1068.633 ms

Loss rate: 3.69%

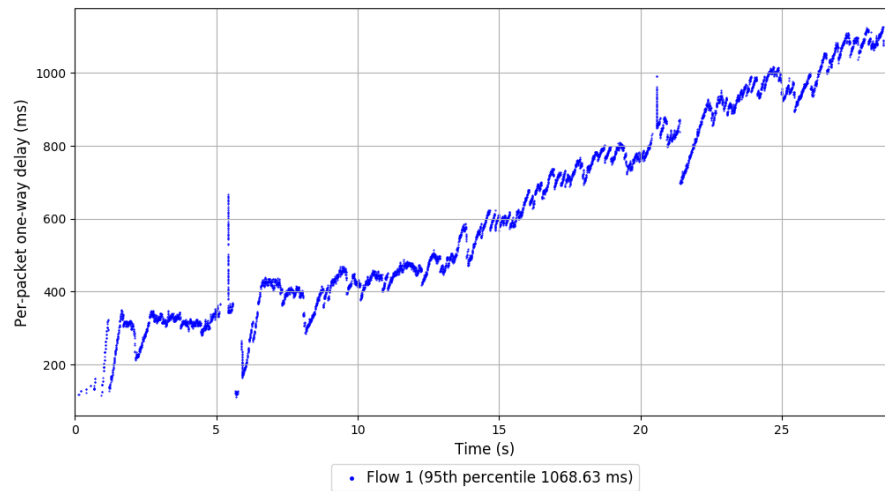
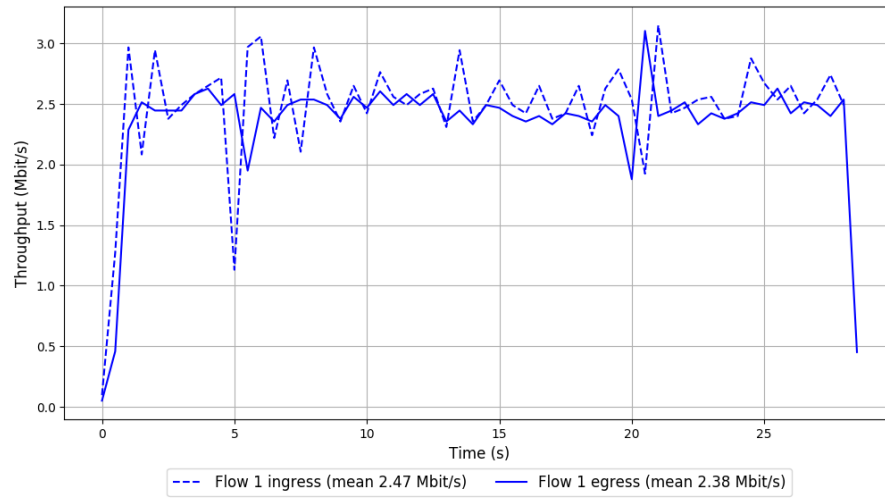
-- Flow 1:

Average throughput: 2.38 Mbit/s

95th percentile per-packet one-way delay: 1068.633 ms

Loss rate: 3.69%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-04-03 01:42:08

End at: 2018-04-03 01:42:38

Local clock offset: -4.699 ms

Remote clock offset: 5.567 ms

Below is generated by plot.py at 2018-04-03 01:46:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.34 Mbit/s

95th percentile per-packet one-way delay: 1099.348 ms

Loss rate: 3.25%

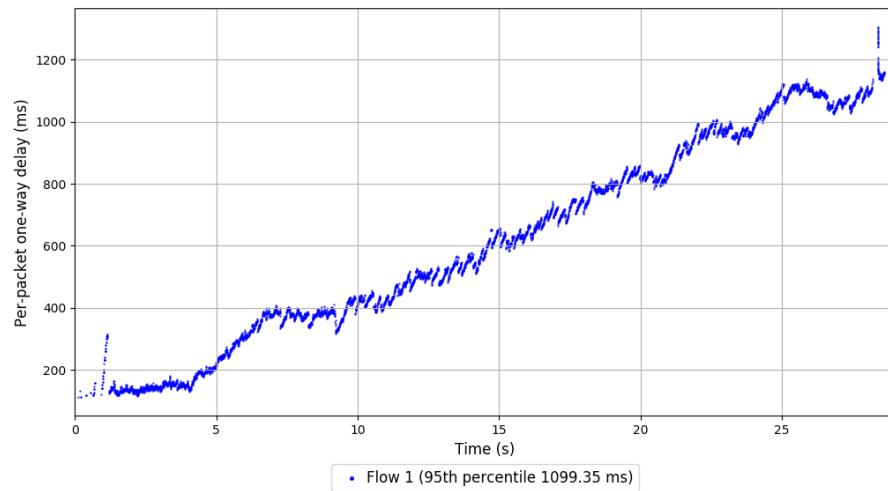
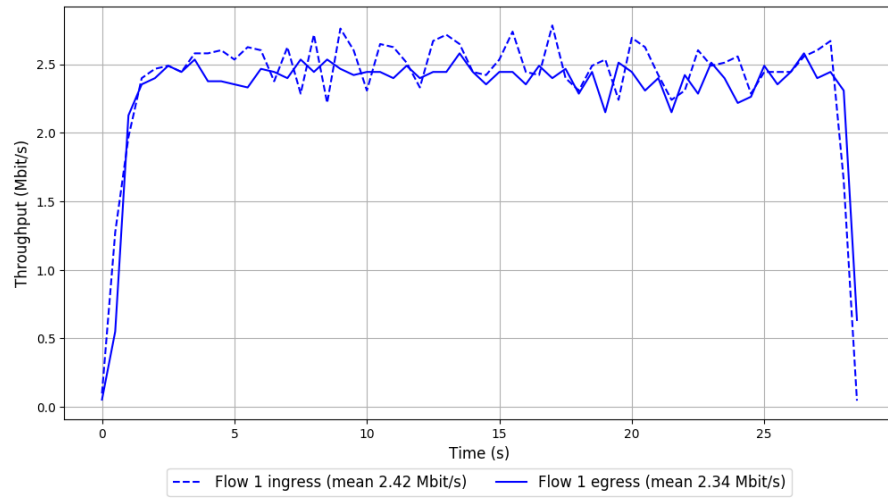
-- Flow 1:

Average throughput: 2.34 Mbit/s

95th percentile per-packet one-way delay: 1099.348 ms

Loss rate: 3.25%

Run 3: Report of QUIC Cubic — Data Link

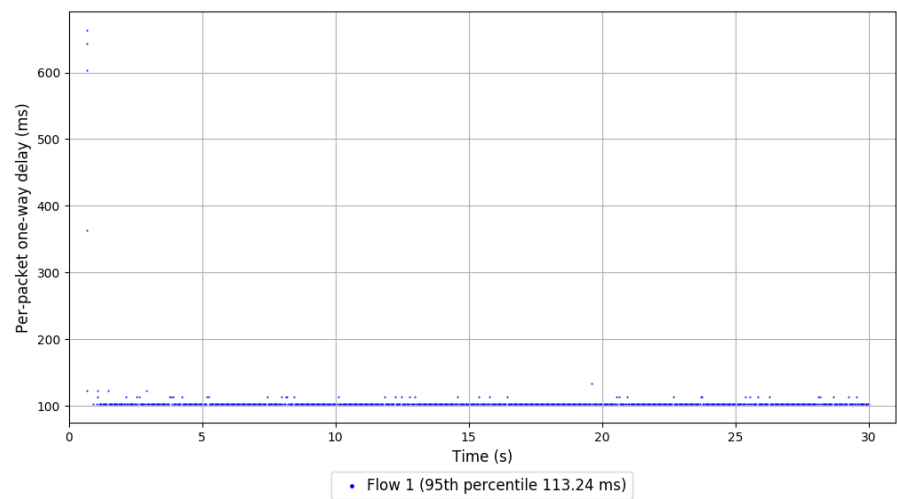
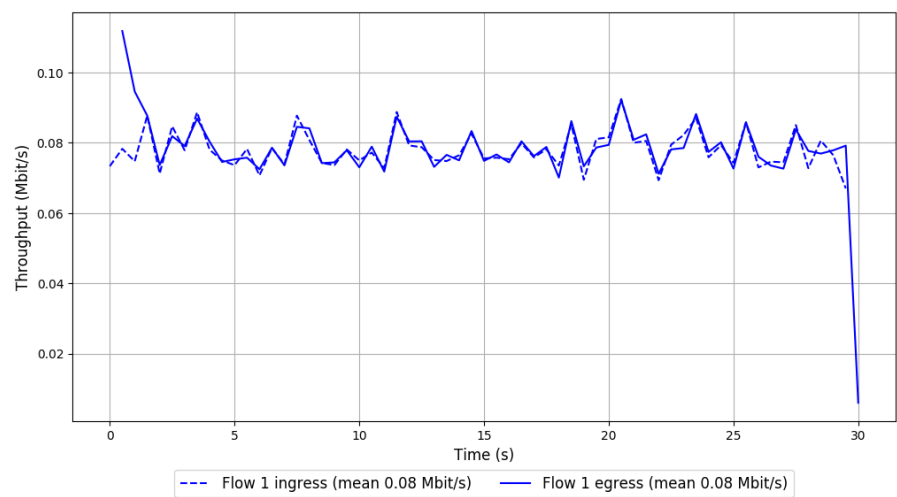


```
Run 1: Statistics of SCReAM

Start at: 2018-04-03 00:44:10
End at: 2018-04-03 00:44:40
Local clock offset: 10.984 ms
Remote clock offset: 13.248 ms

# Below is generated by plot.py at 2018-04-03 01:46:11
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 113.244 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 113.244 ms
Loss rate: 0.00%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-04-03 01:05:27

End at: 2018-04-03 01:05:57

Local clock offset: 0.714 ms

Remote clock offset: 5.629 ms

Below is generated by plot.py at 2018-04-03 01:46:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 116.076 ms

Loss rate: 0.00%

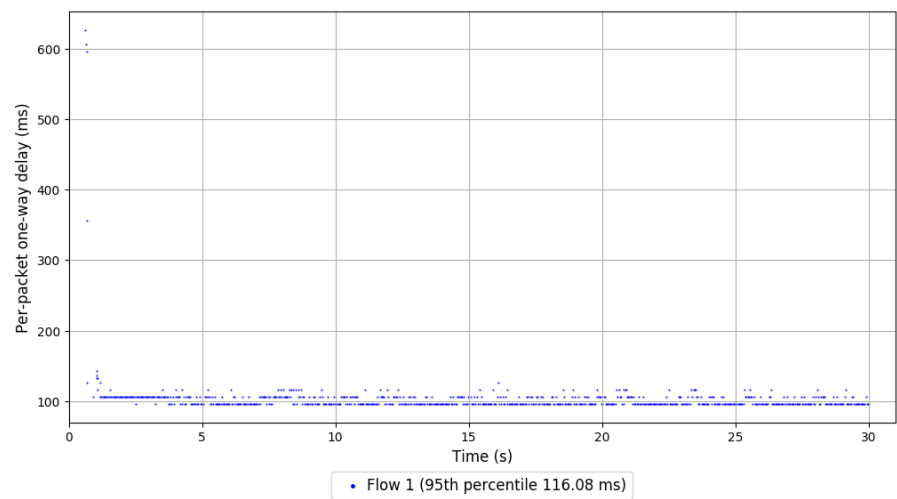
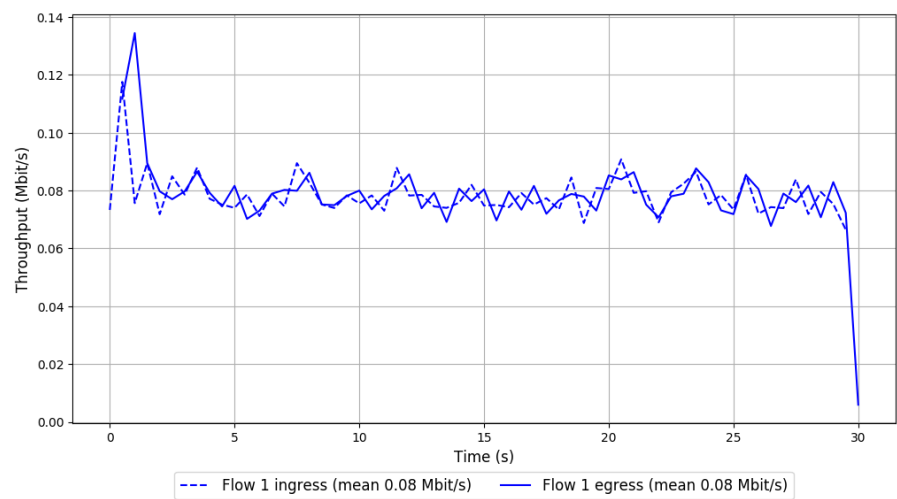
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 116.076 ms

Loss rate: 0.00%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-04-03 01:26:45

End at: 2018-04-03 01:27:15

Local clock offset: -2.747 ms

Remote clock offset: 6.509 ms

Below is generated by plot.py at 2018-04-03 01:46:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 121.401 ms

Loss rate: 0.00%

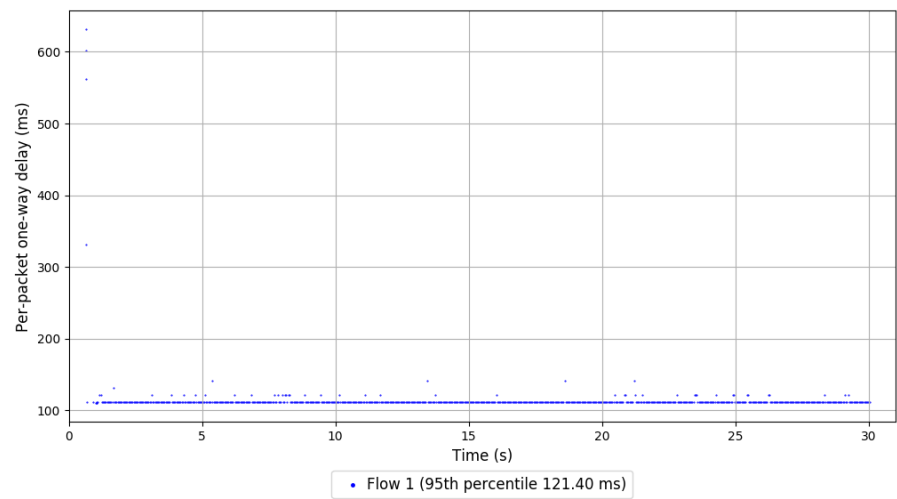
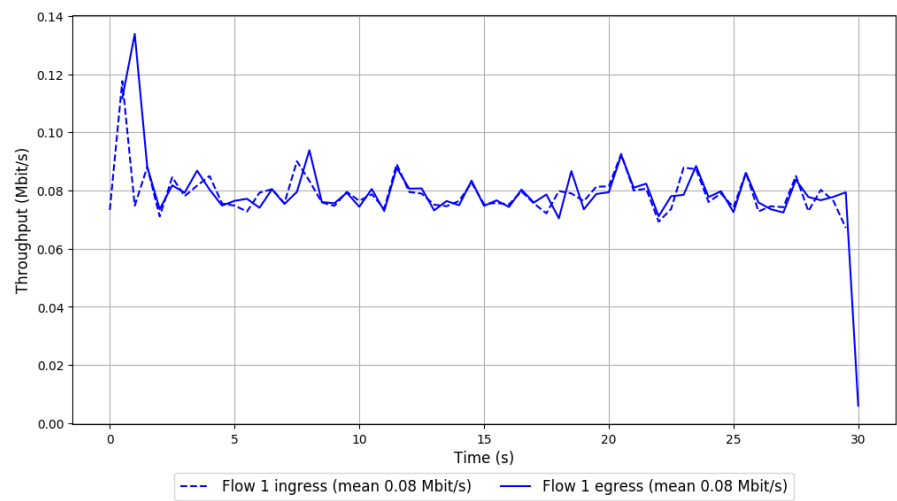
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 121.401 ms

Loss rate: 0.00%

Run 3: Report of SReAM — Data Link

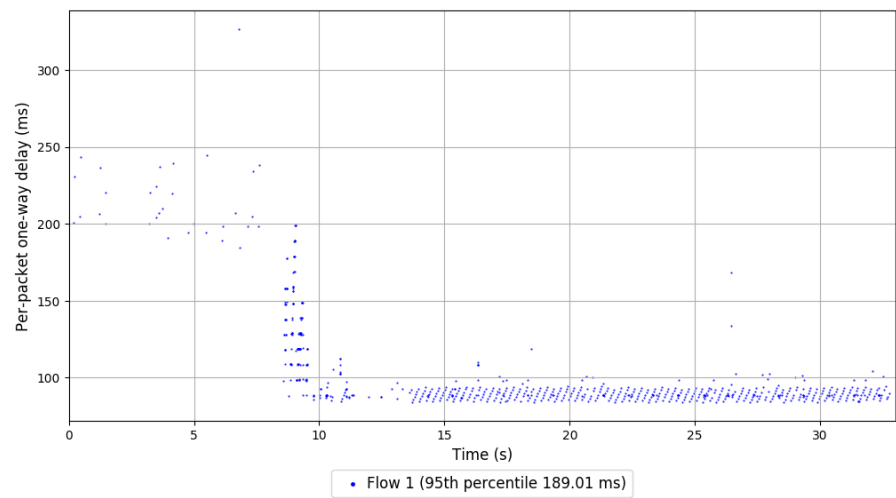
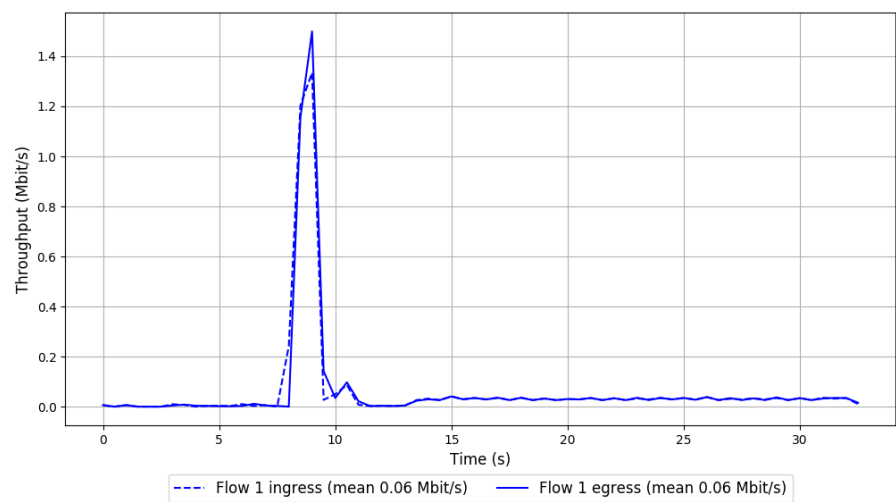


```
Run 1: Statistics of WebRTC media

Start at: 2018-04-03 00:42:59
End at: 2018-04-03 00:43:29
Local clock offset: 18.16 ms
Remote clock offset: 5.916 ms

# Below is generated by plot.py at 2018-04-03 01:46:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 189.008 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 189.008 ms
Loss rate: 0.00%
```

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-04-03 01:04:17

End at: 2018-04-03 01:04:47

Local clock offset: -5.505 ms

Remote clock offset: 5.585 ms

Below is generated by plot.py at 2018-04-03 01:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 249.835 ms

Loss rate: 0.00%

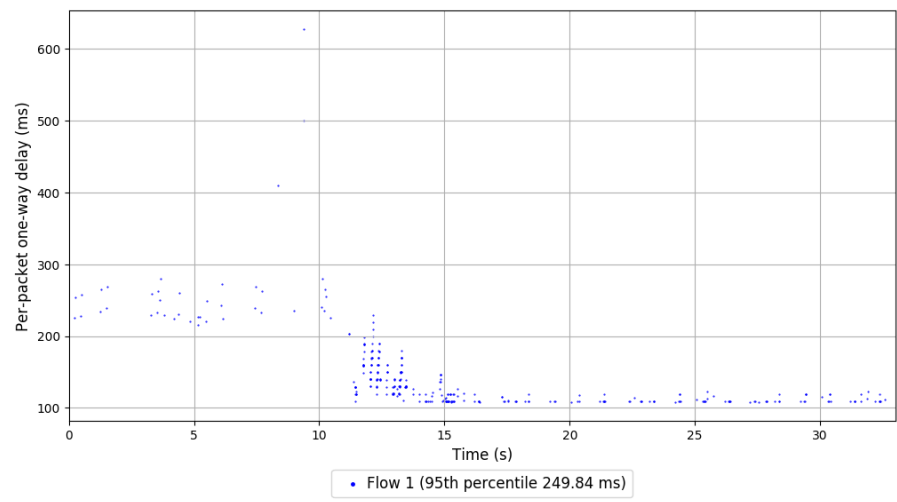
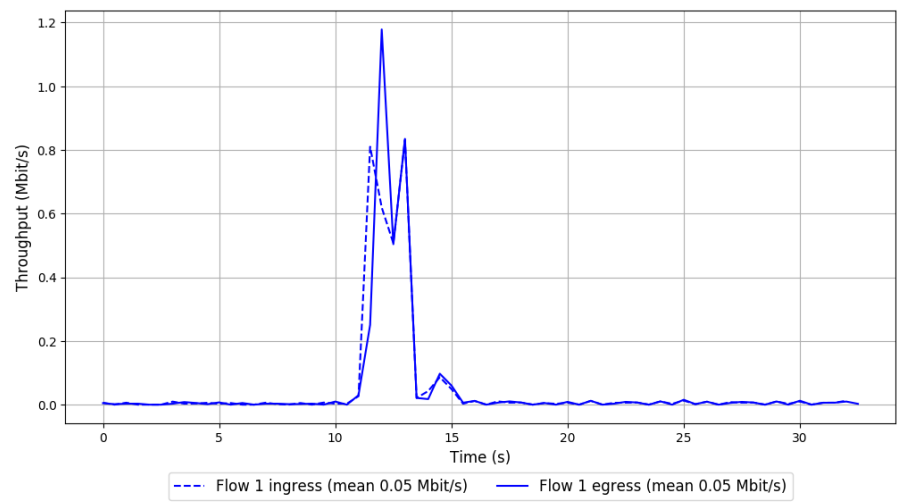
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 249.835 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-04-03 01:25:35

End at: 2018-04-03 01:26:05

Local clock offset: -5.274 ms

Remote clock offset: 6.618 ms

Below is generated by plot.py at 2018-04-03 01:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 220.354 ms

Loss rate: 0.00%

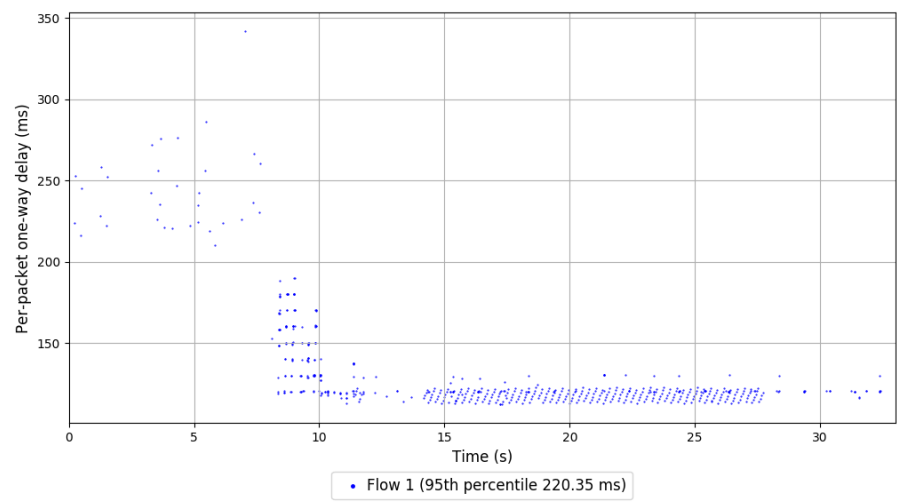
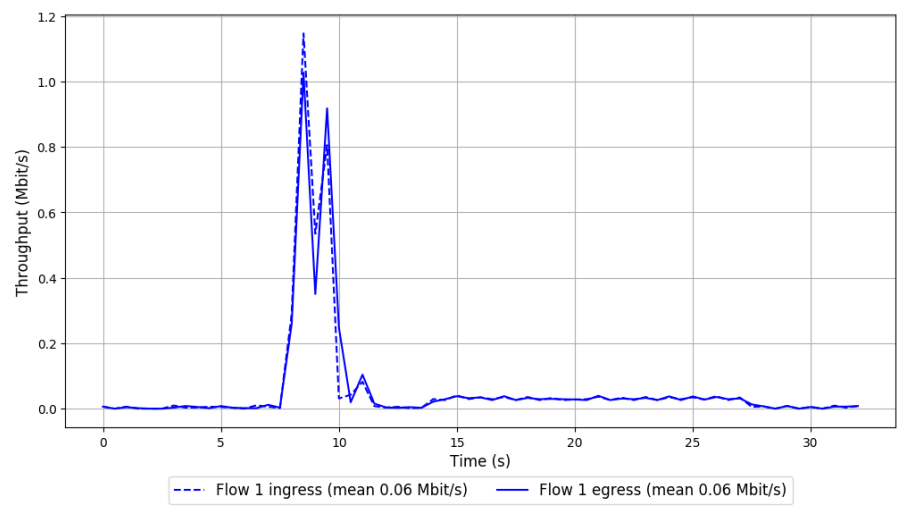
-- Flow 1:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 220.354 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link



Run 1: Statistics of Sprout

Start at: 2018-04-03 01:00:44

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

Local clock offset: -4.103 ms

Remote clock offset: 6.655 ms

Below is generated by plot.py at 2018-04-03 01:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 156.423 ms

Loss rate: 0.00%

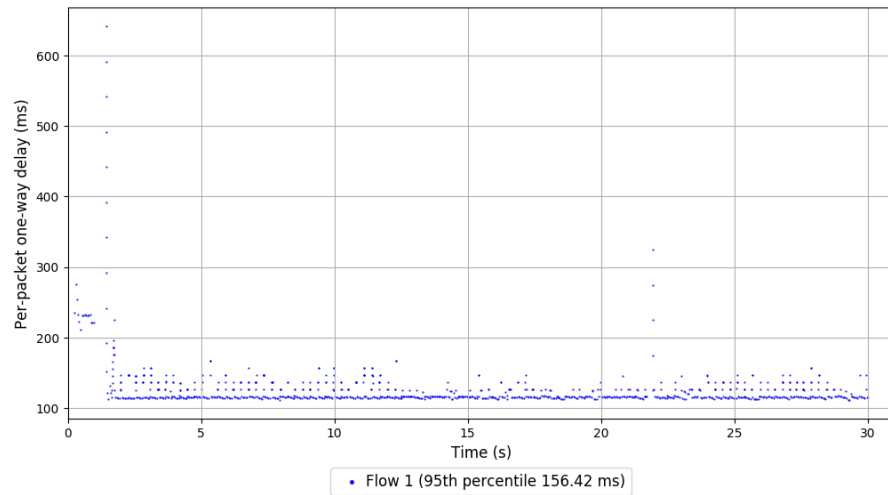
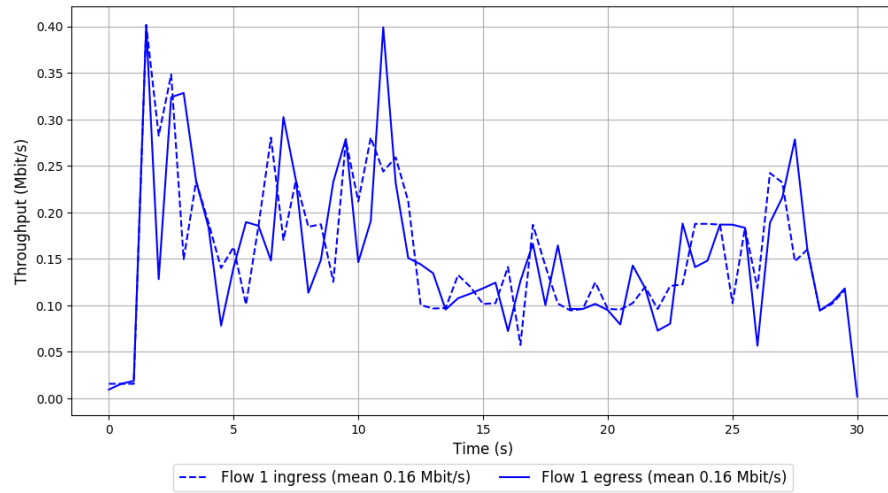
-- Flow 1:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 156.423 ms

Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

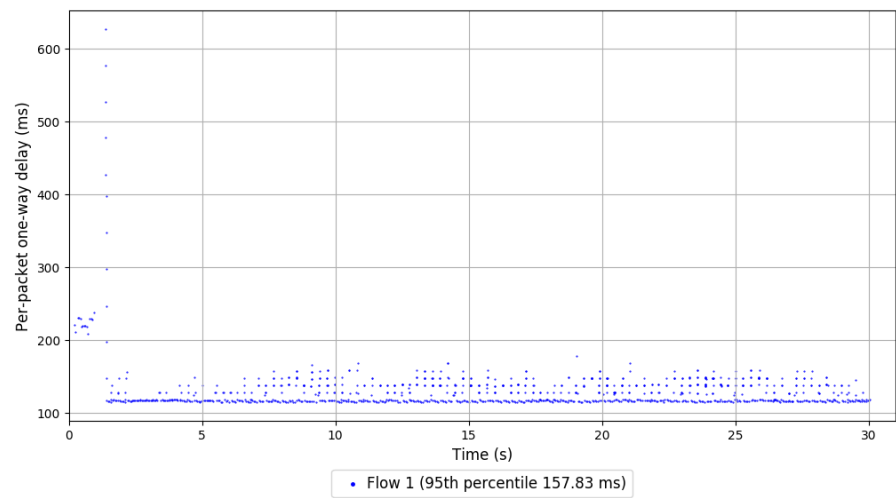
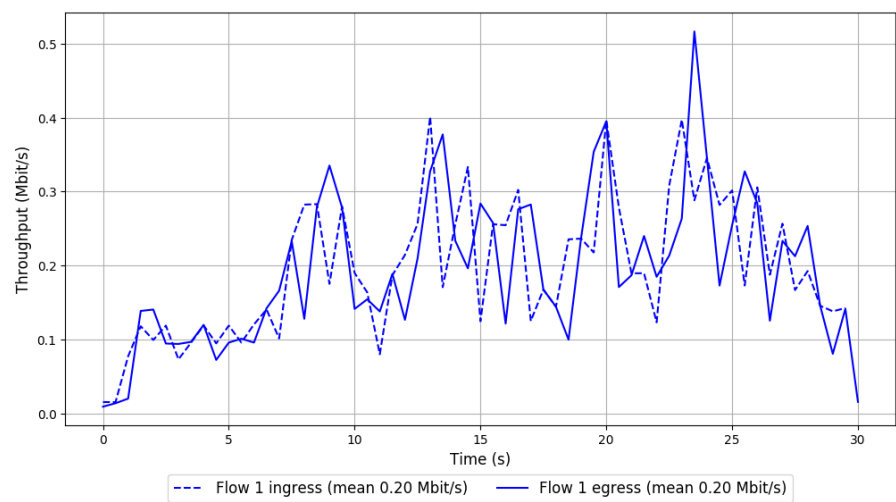


Run 2: Statistics of Sprout

Start at: 2018-04-03 01:22:01
End at: 2018-04-03 01:22:31
Local clock offset: -5.71 ms
Remote clock offset: 11.984 ms

Below is generated by plot.py at 2018-04-03 01:46:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 157.828 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 157.828 ms
Loss rate: 0.40%

Run 2: Report of Sprout — Data Link

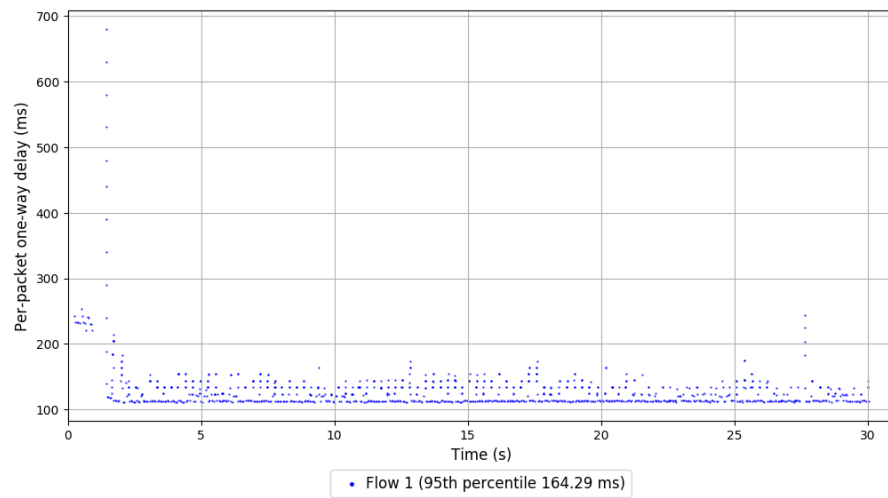
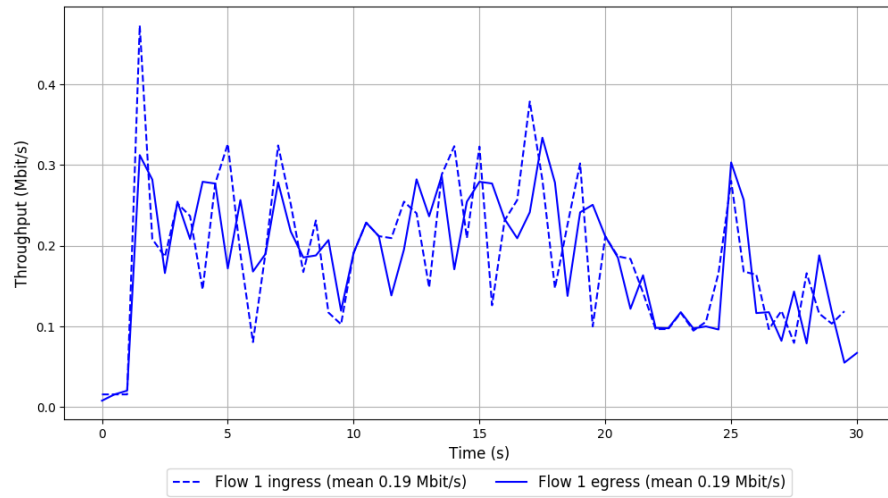


Run 3: Statistics of Sprout

Start at: 2018-04-03 01:43:19
End at: 2018-04-03 01:43:49
Local clock offset: -4.657 ms
Remote clock offset: 12.996 ms

Below is generated by plot.py at 2018-04-03 01:46:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 164.286 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 164.286 ms
Loss rate: 0.00%

Run 3: Report of Sprout — Data Link

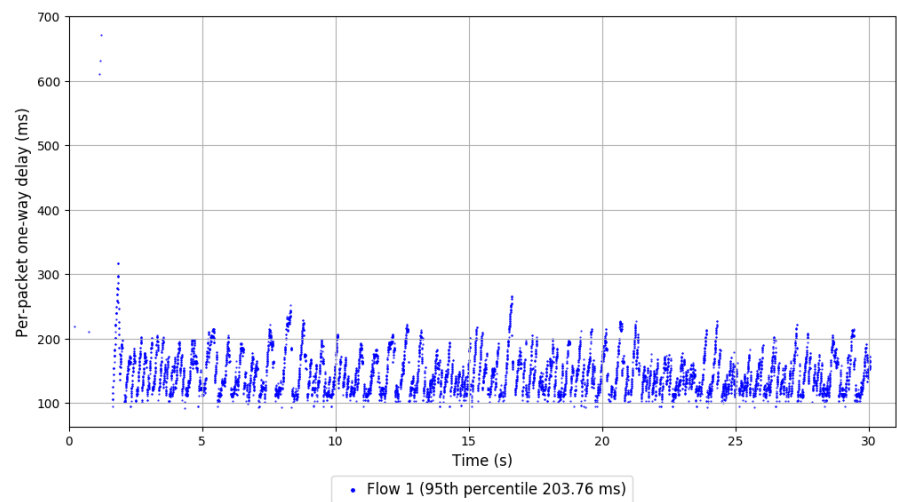
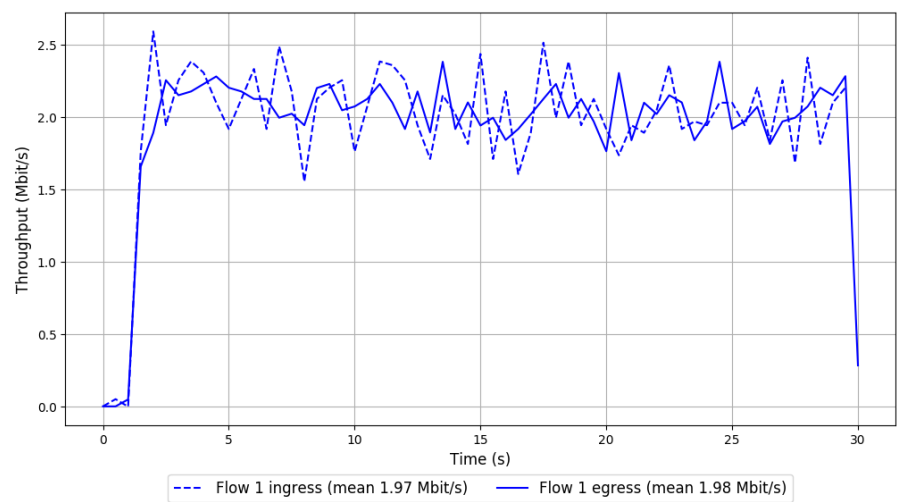


```
Run 1: Statistics of TaoVA-100x

Start at: 2018-04-03 00:48:54
End at: 2018-04-03 00:49:24
Local clock offset: 16.171 ms
Remote clock offset: 12.149 ms

# Below is generated by plot.py at 2018-04-03 01:46:19
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 203.760 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 203.760 ms
Loss rate: 0.06%
```

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-04-03 01:10:11

End at: 2018-04-03 01:10:41

Local clock offset: -3.934 ms

Remote clock offset: 6.608 ms

Below is generated by plot.py at 2018-04-03 01:46:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 209.367 ms

Loss rate: 0.08%

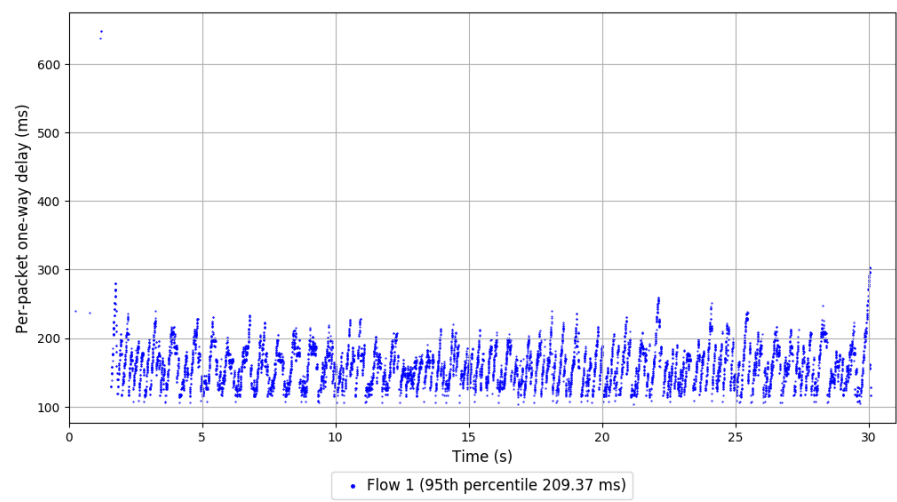
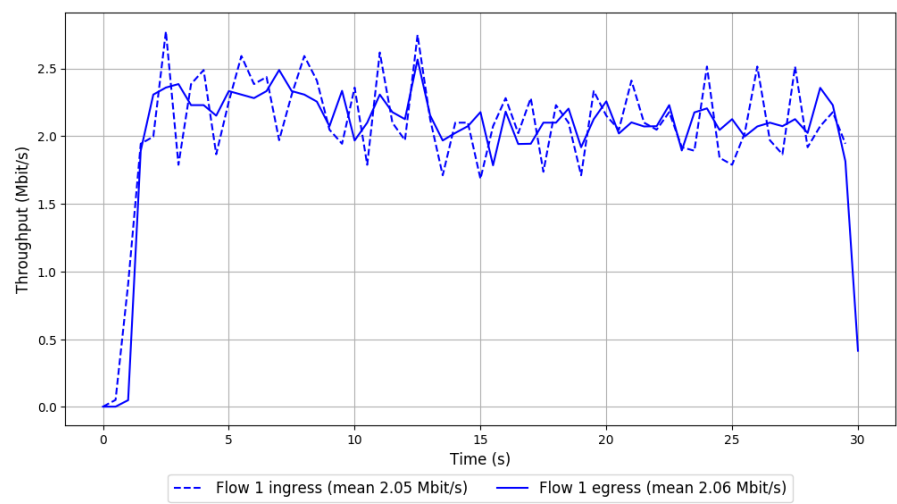
-- Flow 1:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 209.367 ms

Loss rate: 0.08%

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

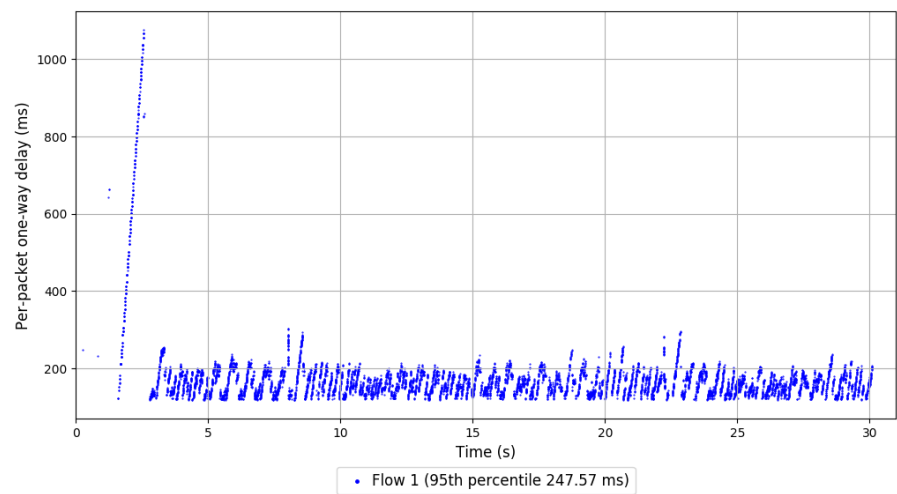
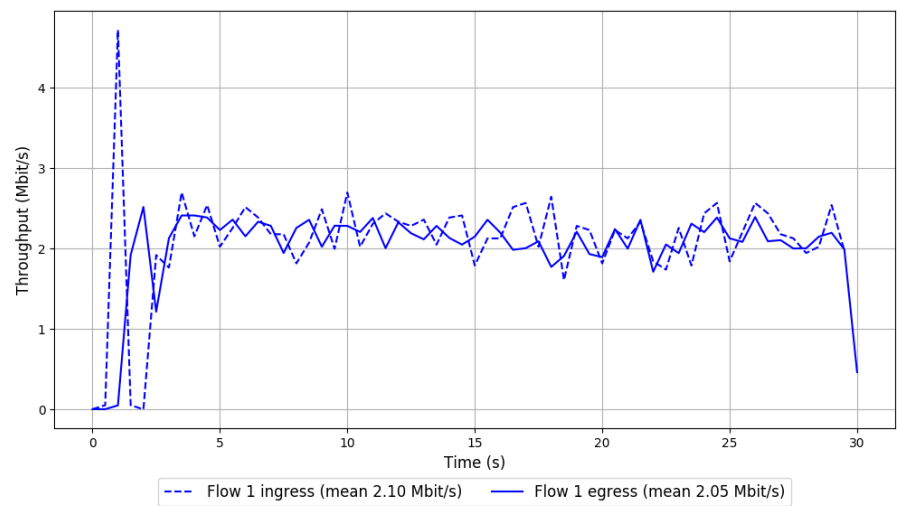


Run 3: Statistics of TaoVA-100x

Start at: 2018-04-03 01:31:29
End at: 2018-04-03 01:31:59
Local clock offset: -5.005 ms
Remote clock offset: 11.897 ms

Below is generated by plot.py at 2018-04-03 01:46:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 247.567 ms
Loss rate: 2.74%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 247.567 ms
Loss rate: 2.74%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-04-03 00:45:21

End at: 2018-04-03 00:45:51

Local clock offset: 14.198 ms

Remote clock offset: 6.88 ms

Below is generated by plot.py at 2018-04-03 01:46:21

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 3513.647 ms

Loss rate: 17.36%

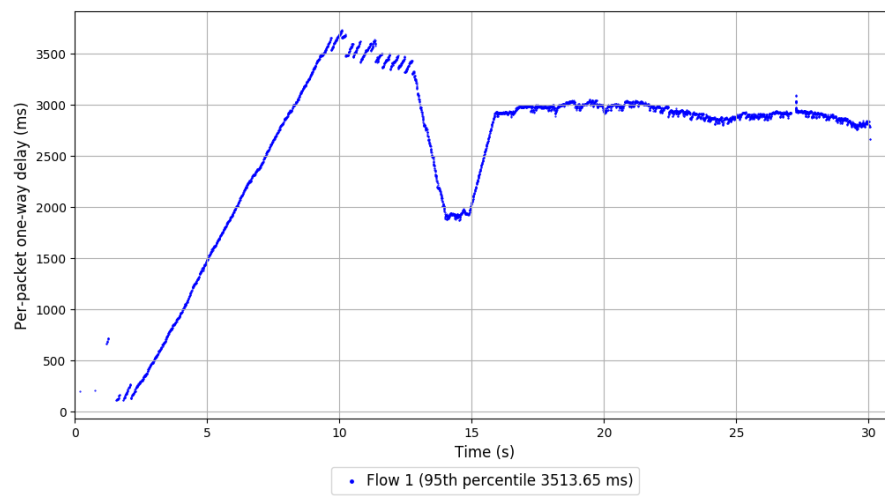
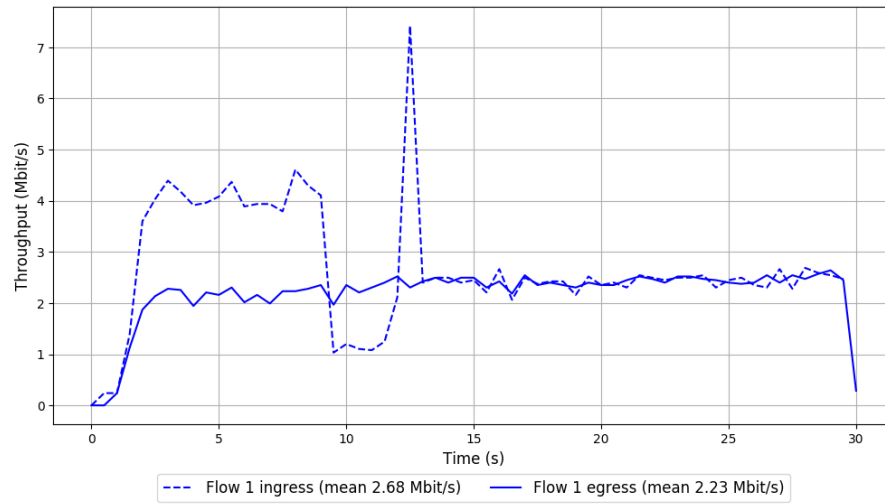
-- Flow 1:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 3513.647 ms

Loss rate: 17.36%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-04-03 01:06:38

End at: 2018-04-03 01:07:08

Local clock offset: 3.713 ms

Remote clock offset: 6.634 ms

Below is generated by plot.py at 2018-04-03 01:46:21

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.29 Mbit/s

95th percentile per-packet one-way delay: 3326.353 ms

Loss rate: 16.98%

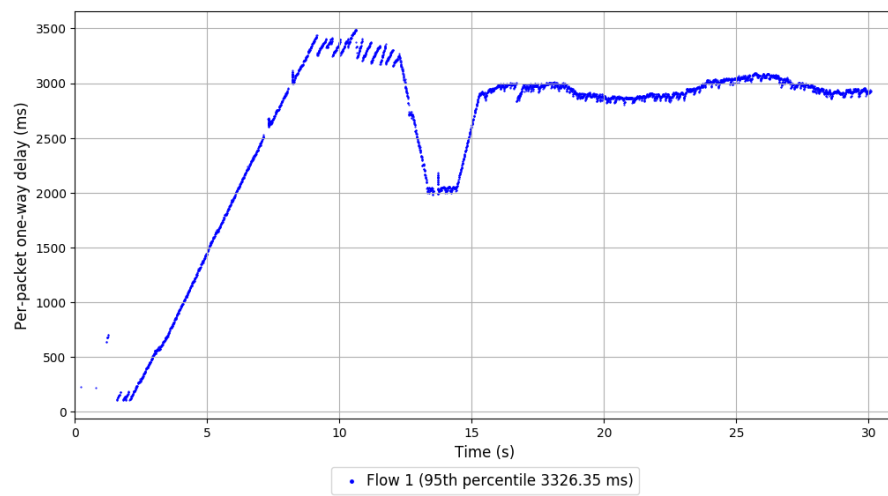
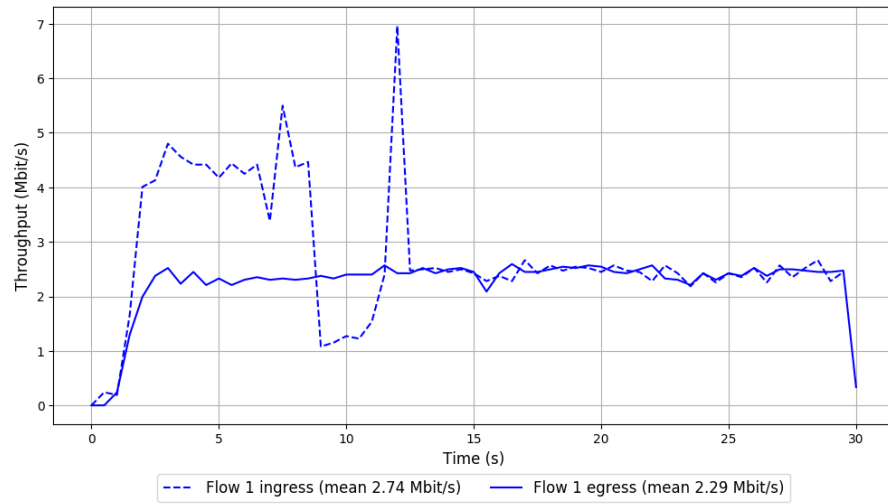
-- Flow 1:

Average throughput: 2.29 Mbit/s

95th percentile per-packet one-way delay: 3326.353 ms

Loss rate: 16.98%

Run 2: Report of TCP Vegas — Data Link

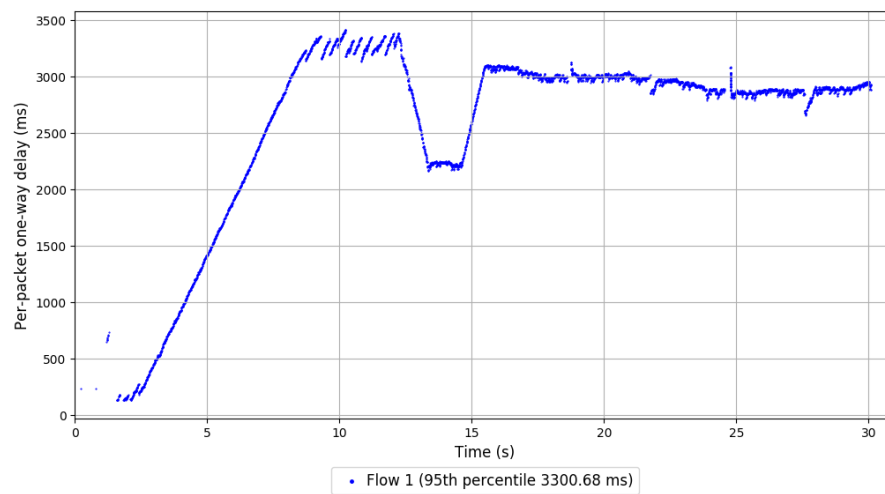
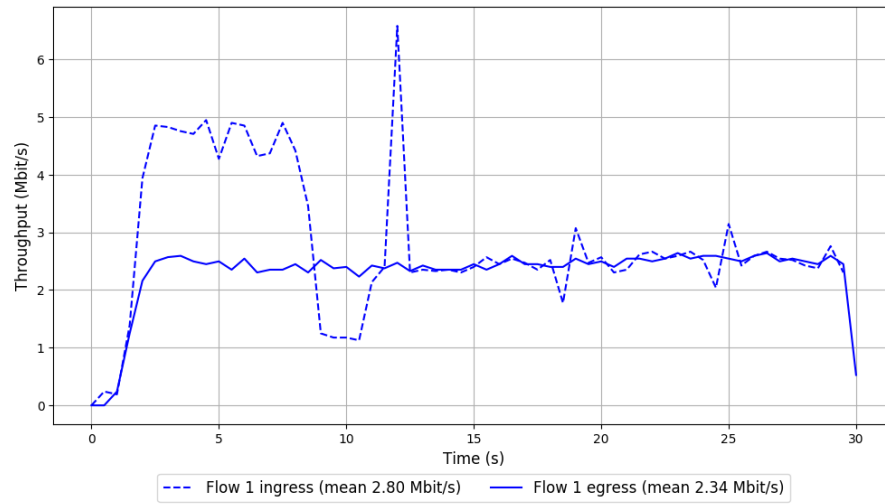


Run 3: Statistics of TCP Vegas

Start at: 2018-04-03 01:27:55
End at: 2018-04-03 01:28:25
Local clock offset: -5.197 ms
Remote clock offset: 6.568 ms

Below is generated by plot.py at 2018-04-03 01:46:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 3300.675 ms
Loss rate: 16.83%
-- Flow 1:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 3300.675 ms
Loss rate: 16.83%

Run 3: Report of TCP Vegas — Data Link

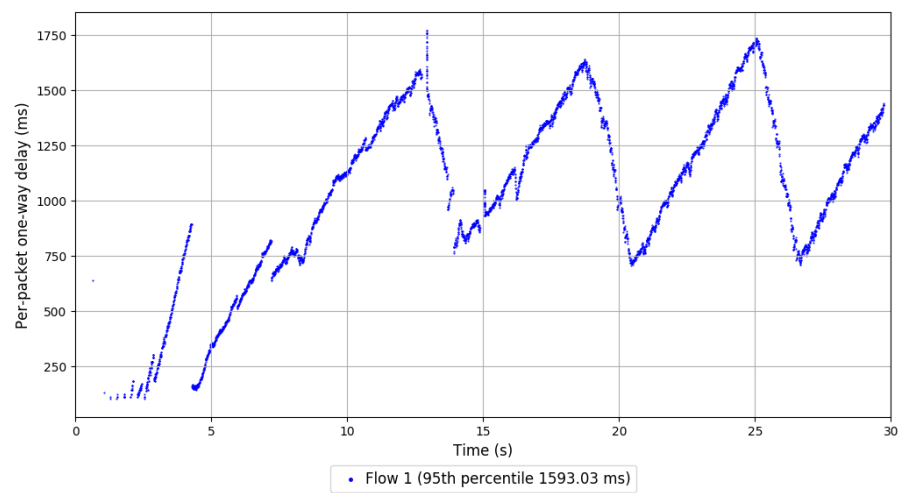
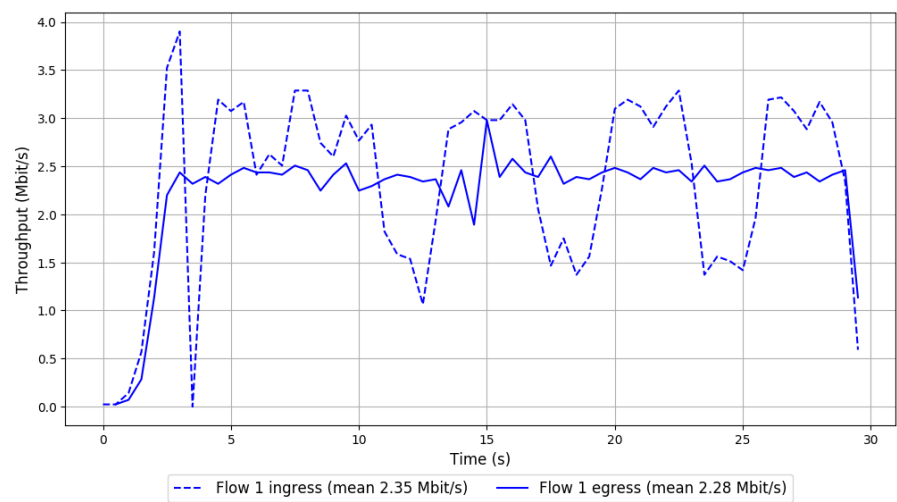


Run 1: Statistics of Verus

Start at: 2018-04-03 00:54:49
End at: 2018-04-03 00:55:19
Local clock offset: 14.982 ms
Remote clock offset: 12.093 ms

Below is generated by plot.py at 2018-04-03 01:46:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 1593.025 ms
Loss rate: 5.07%
-- Flow 1:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 1593.025 ms
Loss rate: 5.07%

Run 1: Report of Verus — Data Link

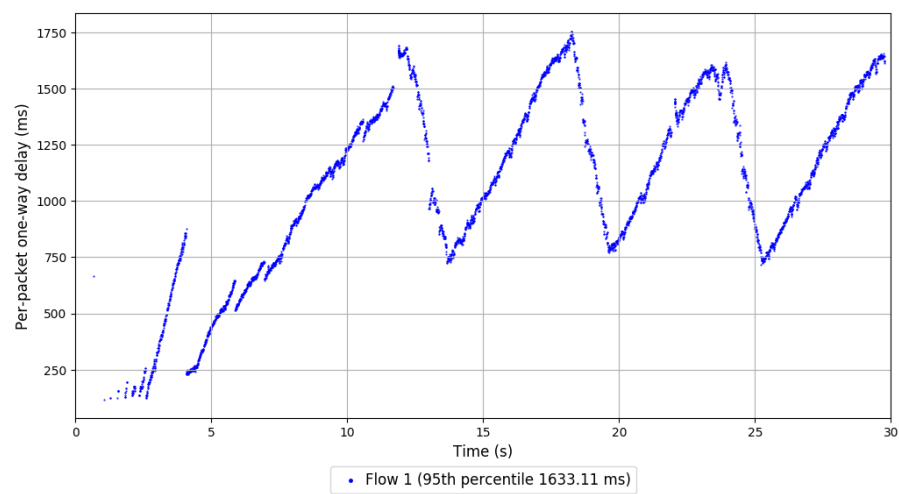
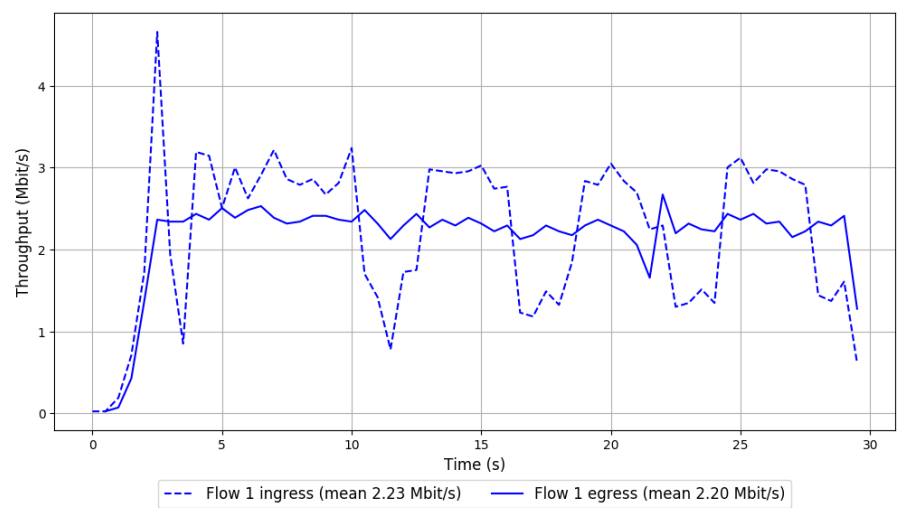


Run 2: Statistics of Verus

Start at: 2018-04-03 01:16:06
End at: 2018-04-03 01:16:36
Local clock offset: -3.57 ms
Remote clock offset: 10.907 ms

Below is generated by plot.py at 2018-04-03 01:46:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 1633.110 ms
Loss rate: 3.34%
-- Flow 1:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 1633.110 ms
Loss rate: 3.34%

Run 2: Report of Verus — Data Link

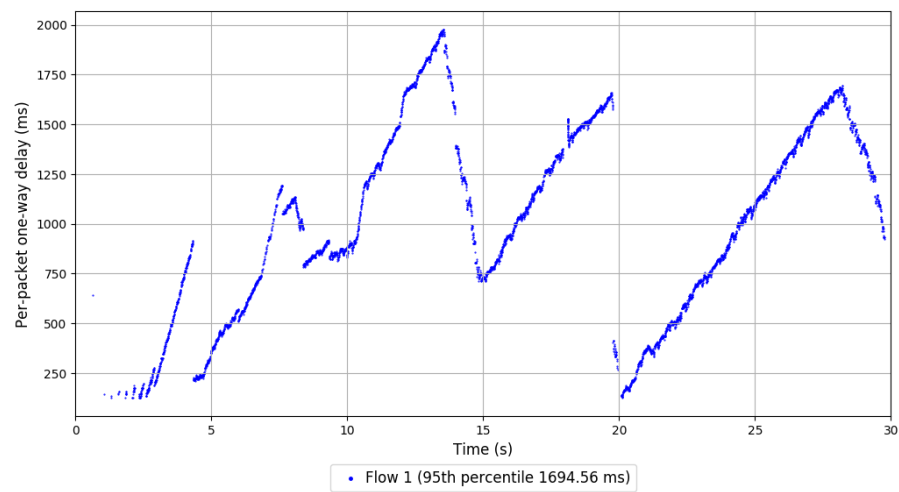
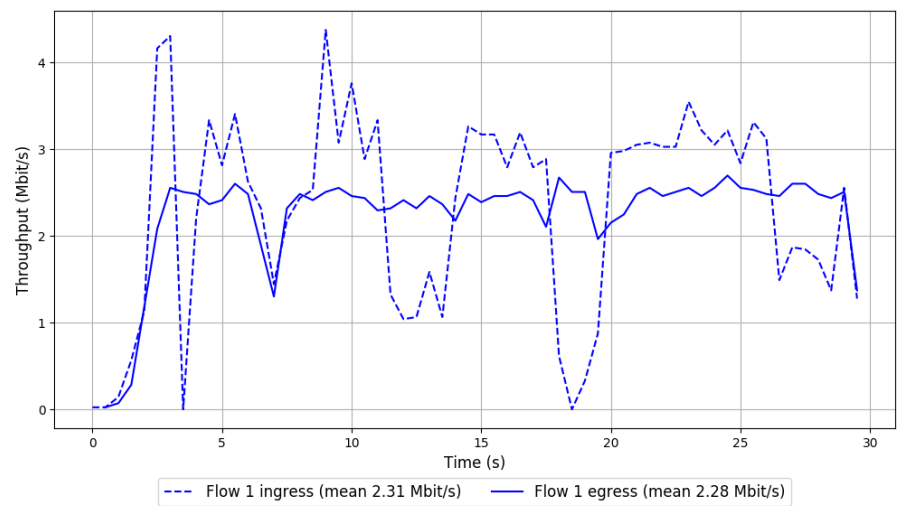


Run 3: Statistics of Verus

Start at: 2018-04-03 01:37:24
End at: 2018-04-03 01:37:54
Local clock offset: -4.764 ms
Remote clock offset: 10.937 ms

Below is generated by plot.py at 2018-04-03 01:46:25
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 1694.555 ms
Loss rate: 3.14%
-- Flow 1:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 1694.555 ms
Loss rate: 3.14%

Run 3: Report of Verus — Data Link

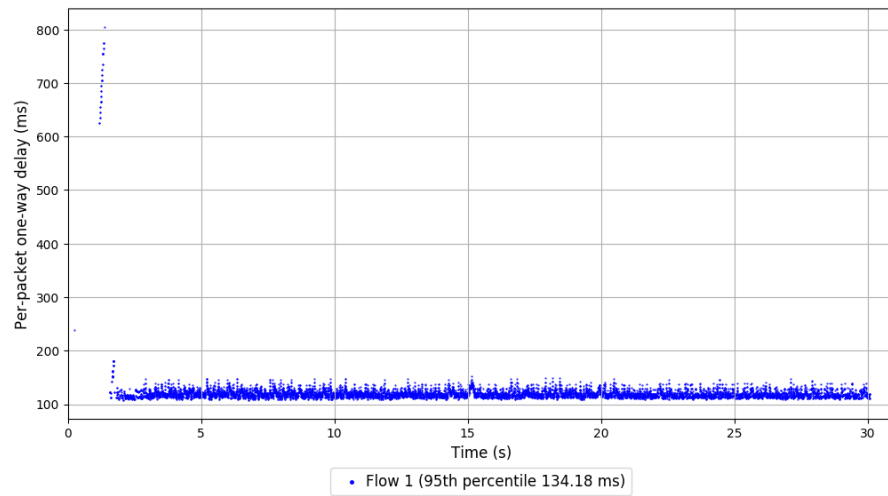
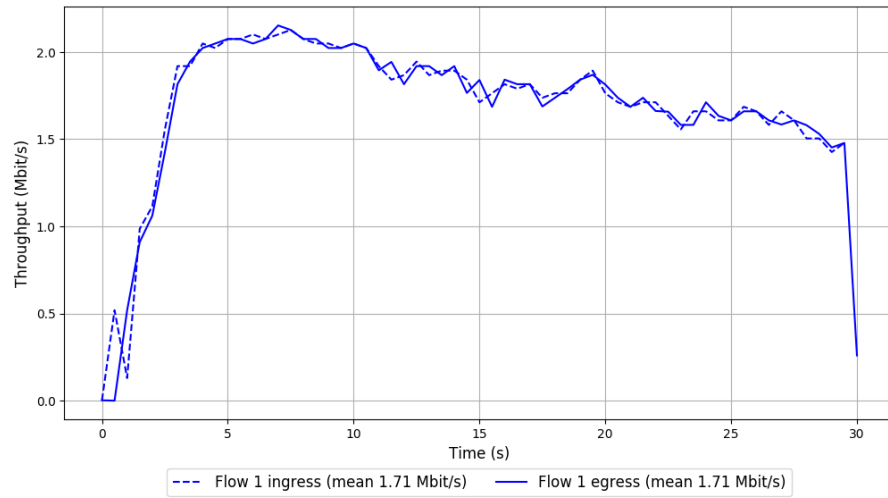


Run 1: Statistics of Copa

Start at: 2018-04-03 00:57:11
End at: 2018-04-03 00:57:41
Local clock offset: 4.042 ms
Remote clock offset: 12.128 ms

Below is generated by plot.py at 2018-04-03 01:46:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 134.180 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 134.180 ms
Loss rate: 0.05%

Run 1: Report of Copa — Data Link

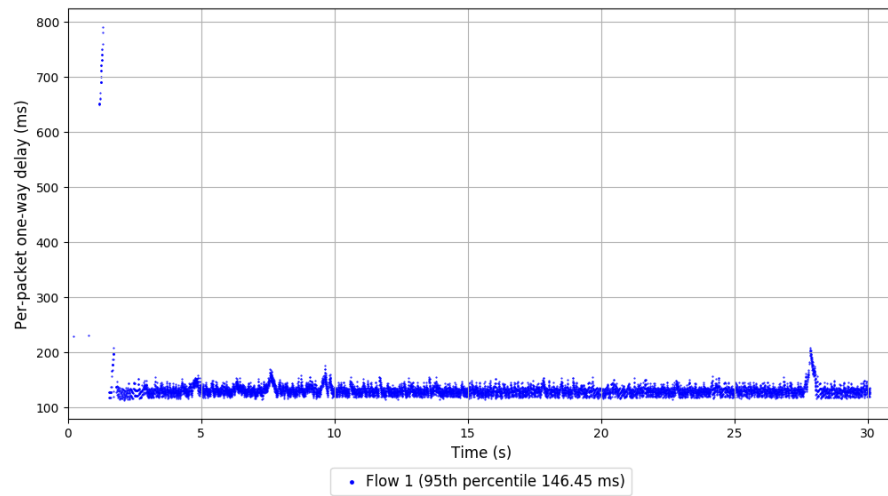
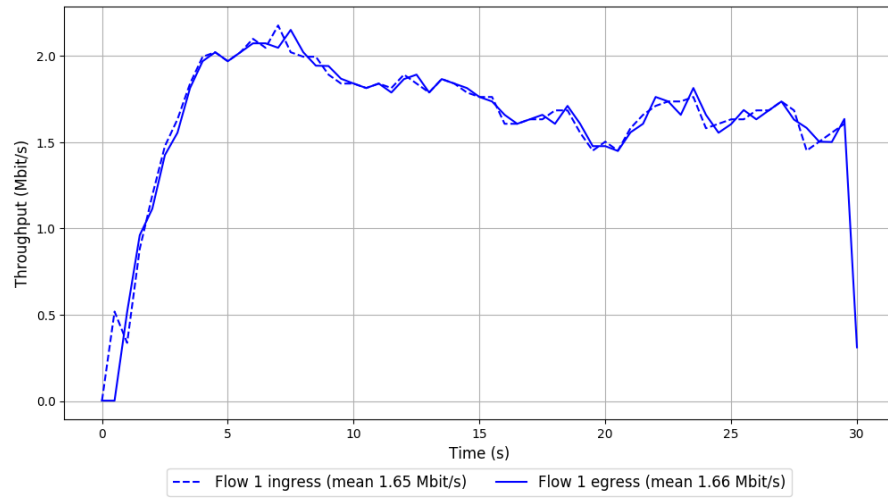


Run 2: Statistics of Copa

Start at: 2018-04-03 01:18:28
End at: 2018-04-03 01:18:58
Local clock offset: -6.247 ms
Remote clock offset: 11.917 ms

Below is generated by plot.py at 2018-04-03 01:46:27
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 146.449 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 146.449 ms
Loss rate: 0.08%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-04-03 01:39:46

End at: 2018-04-03 01:40:16

Local clock offset: -4.679 ms

Remote clock offset: 5.581 ms

Below is generated by plot.py at 2018-04-03 01:46:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.84 Mbit/s

95th percentile per-packet one-way delay: 283.014 ms

Loss rate: 0.14%

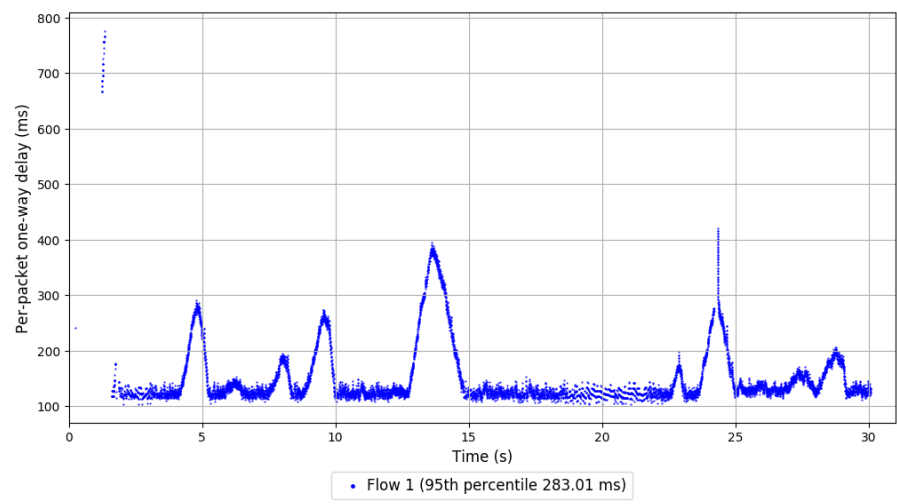
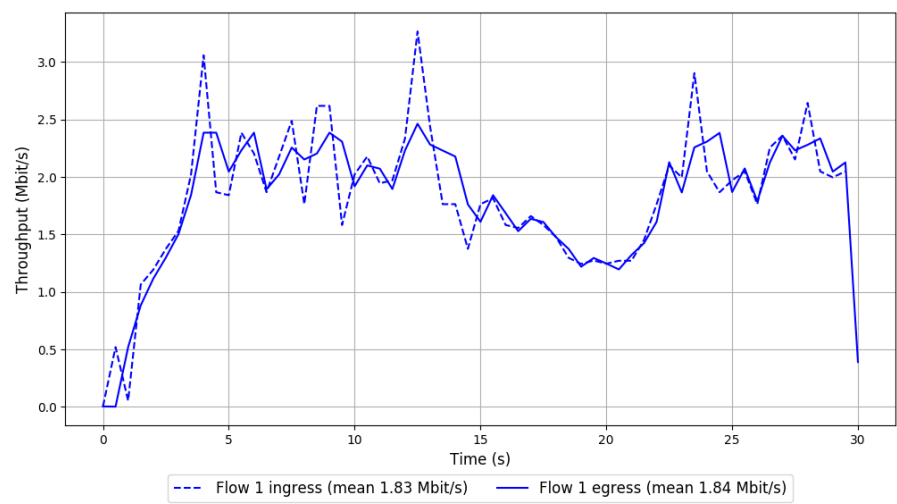
-- Flow 1:

Average throughput: 1.84 Mbit/s

95th percentile per-packet one-way delay: 283.014 ms

Loss rate: 0.14%

Run 3: Report of Copa — Data Link



Run 1: Statistics of FillP

Start at: 2018-04-03 00:41:48

End at: 2018-04-03 00:42:18

Local clock offset: 18.911 ms

Remote clock offset: 5.992 ms

Below is generated by plot.py at 2018-04-03 01:46:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.26 Mbit/s

95th percentile per-packet one-way delay: 3228.060 ms

Loss rate: 13.37%

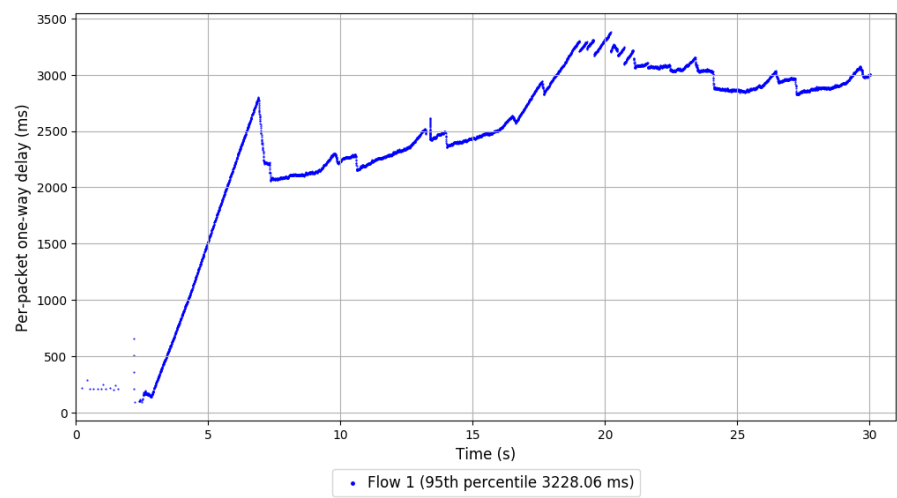
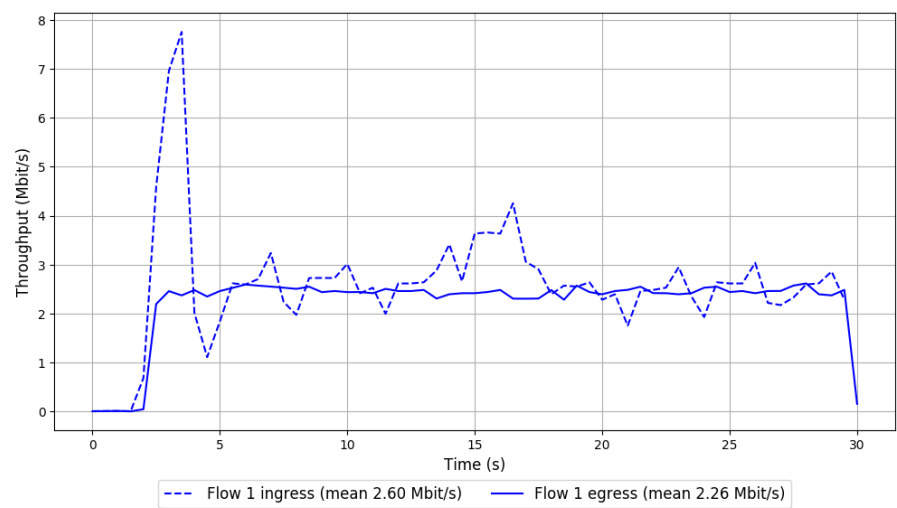
-- Flow 1:

Average throughput: 2.26 Mbit/s

95th percentile per-packet one-way delay: 3228.060 ms

Loss rate: 13.37%

Run 1: Report of FillP — Data Link

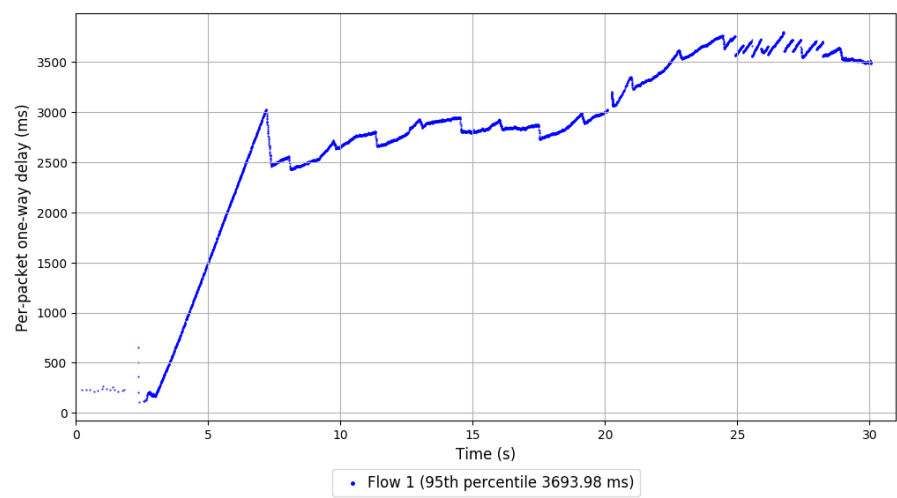
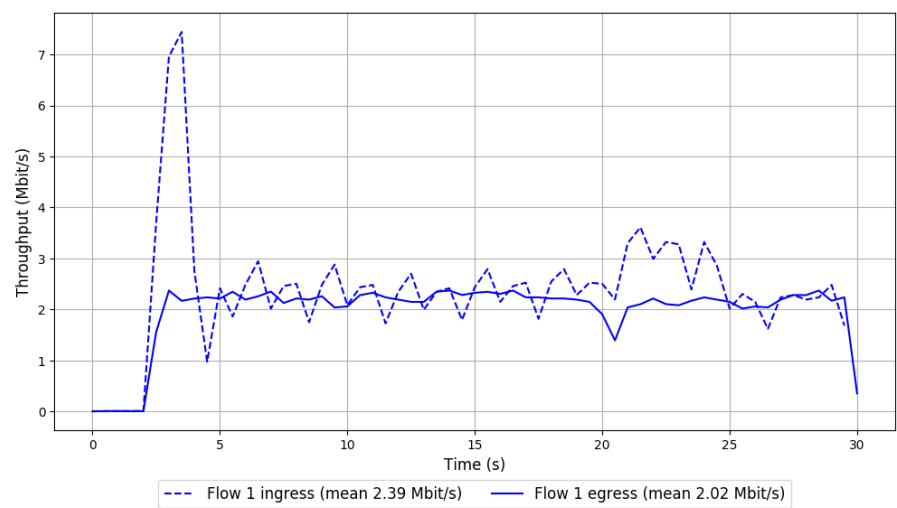


Run 2: Statistics of FillP

Start at: 2018-04-03 01:03:06
End at: 2018-04-03 01:03:36
Local clock offset: -4.636 ms
Remote clock offset: 11.998 ms

Below is generated by plot.py at 2018-04-03 01:46:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 3693.982 ms
Loss rate: 15.98%
-- Flow 1:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 3693.982 ms
Loss rate: 15.98%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

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

End at: 2018-04-03 01:24:54

Local clock offset: -5.503 ms

Remote clock offset: 6.551 ms

Below is generated by plot.py at 2018-04-03 01:46:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.29 Mbit/s

95th percentile per-packet one-way delay: 3199.426 ms

Loss rate: 13.11%

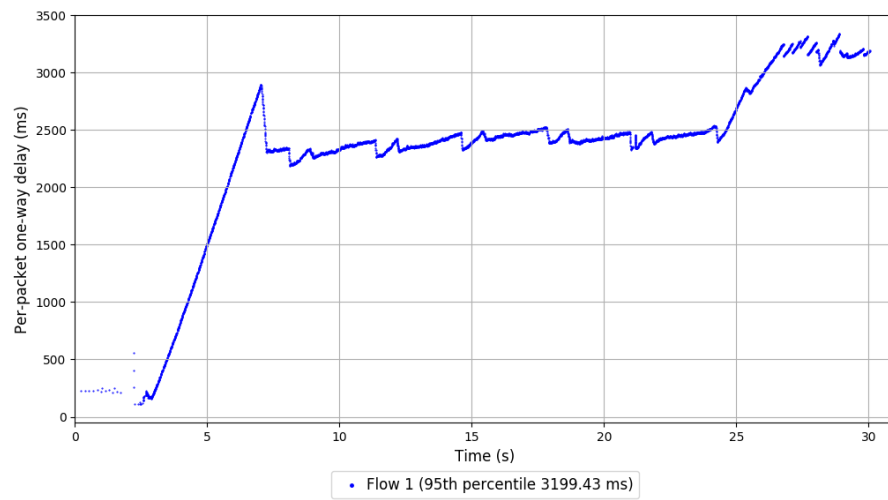
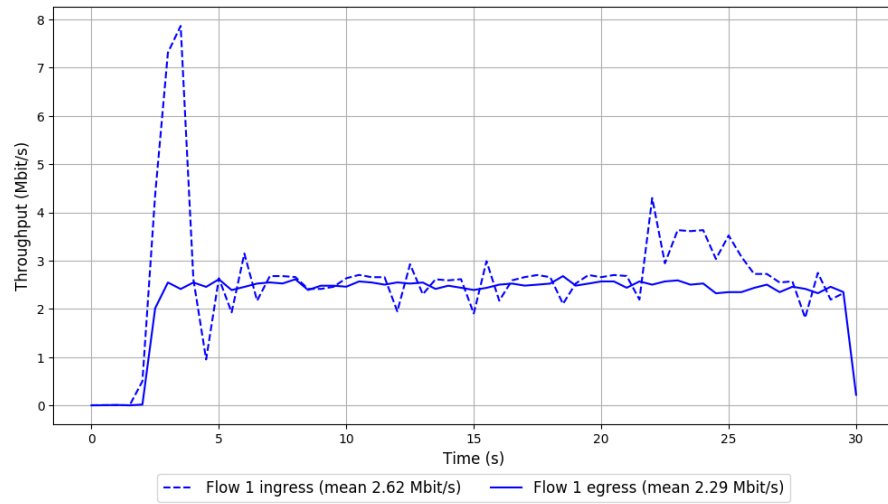
-- Flow 1:

Average throughput: 2.29 Mbit/s

95th percentile per-packet one-way delay: 3199.426 ms

Loss rate: 13.11%

Run 3: Report of FillP — Data Link

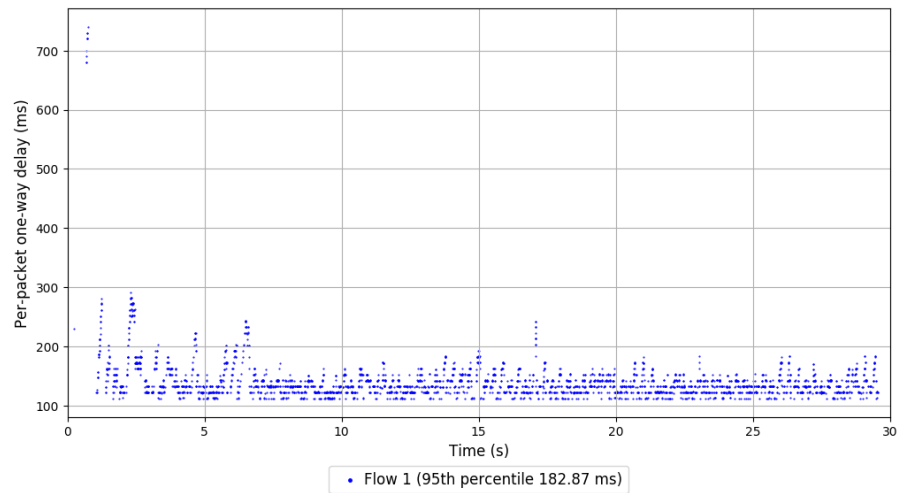
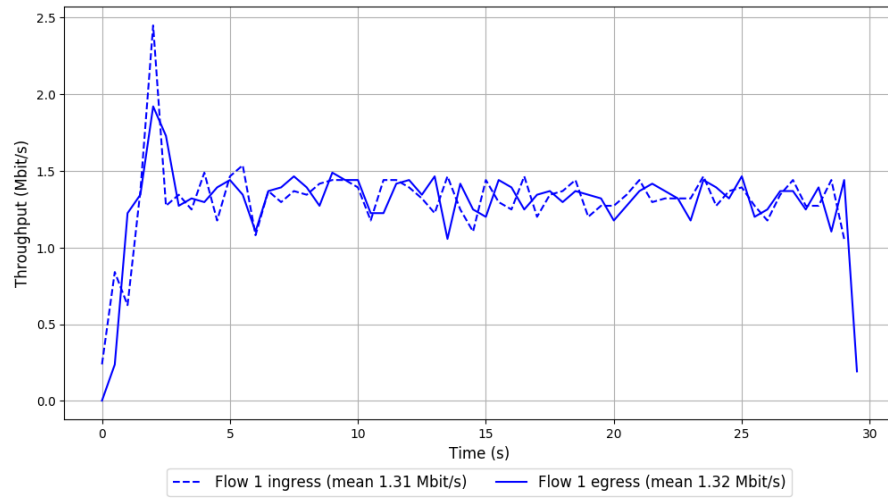


```
Run 1: Statistics of Indigo-1-32

Start at: 2018-04-03 00:52:27
End at: 2018-04-03 00:52:57
Local clock offset: -0.365 ms
Remote clock offset: 12.059 ms

# Below is generated by plot.py at 2018-04-03 01:46:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 182.873 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 182.873 ms
Loss rate: 0.06%
```

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



Run 2: Statistics of Indigo-1-32

Start at: 2018-04-03 01:13:44

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

Local clock offset: -1.049 ms

Remote clock offset: 6.621 ms

Below is generated by plot.py at 2018-04-03 01:46:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.67 Mbit/s

95th percentile per-packet one-way delay: 181.043 ms

Loss rate: 0.07%

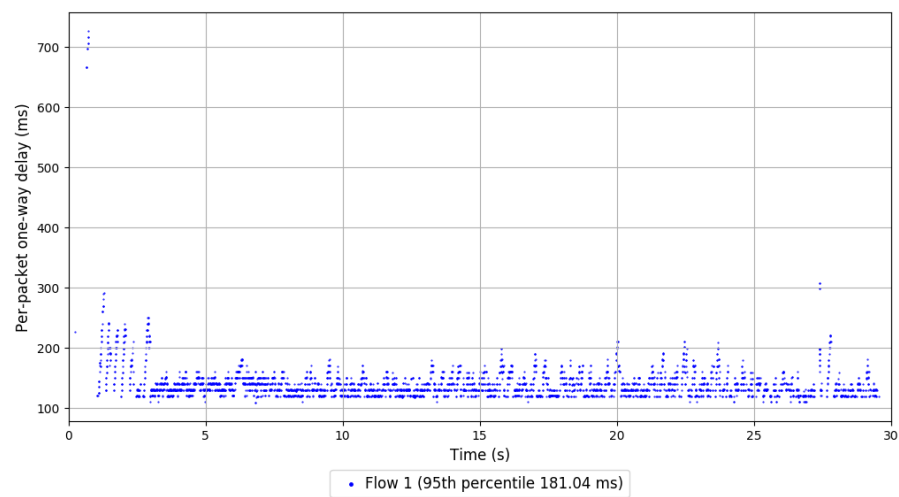
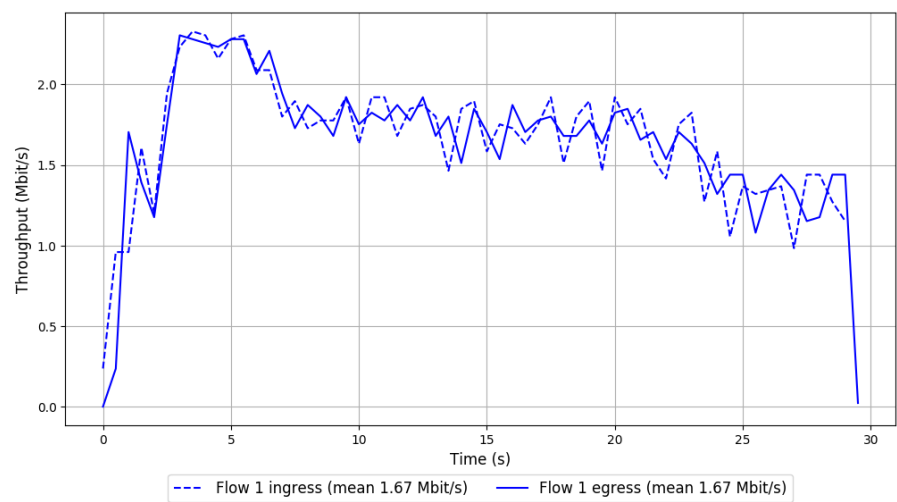
-- Flow 1:

Average throughput: 1.67 Mbit/s

95th percentile per-packet one-way delay: 181.043 ms

Loss rate: 0.07%

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

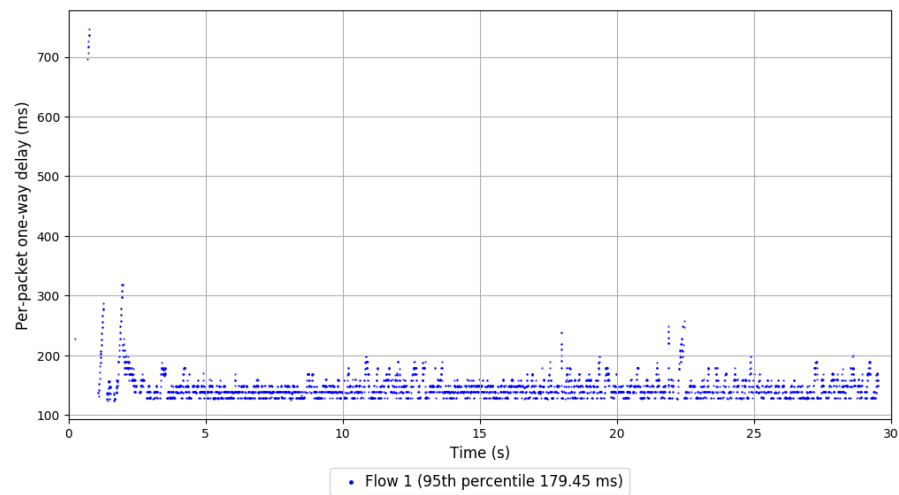
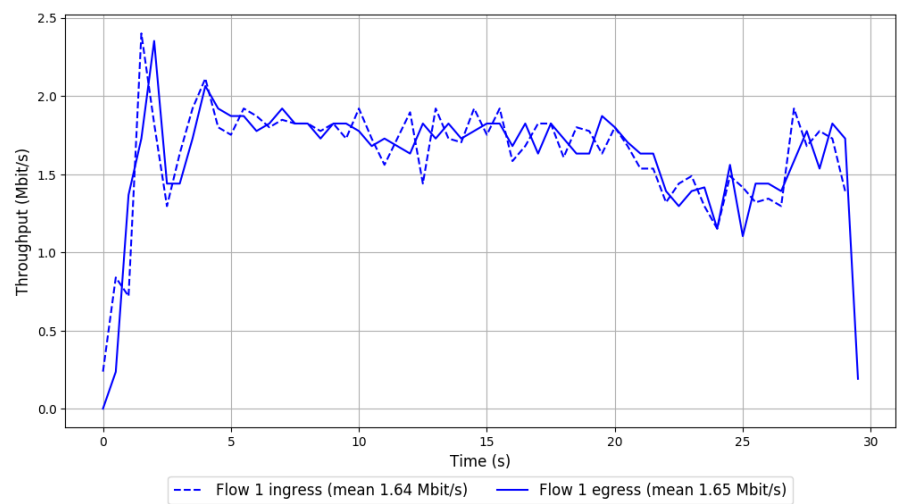


Run 3: Statistics of Indigo-1-32

Start at: 2018-04-03 01:35:02
End at: 2018-04-03 01:35:32
Local clock offset: -4.927 ms
Remote clock offset: 12.978 ms

Below is generated by plot.py at 2018-04-03 01:46:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.65 Mbit/s
95th percentile per-packet one-way delay: 179.449 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 1.65 Mbit/s
95th percentile per-packet one-way delay: 179.449 ms
Loss rate: 0.10%

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

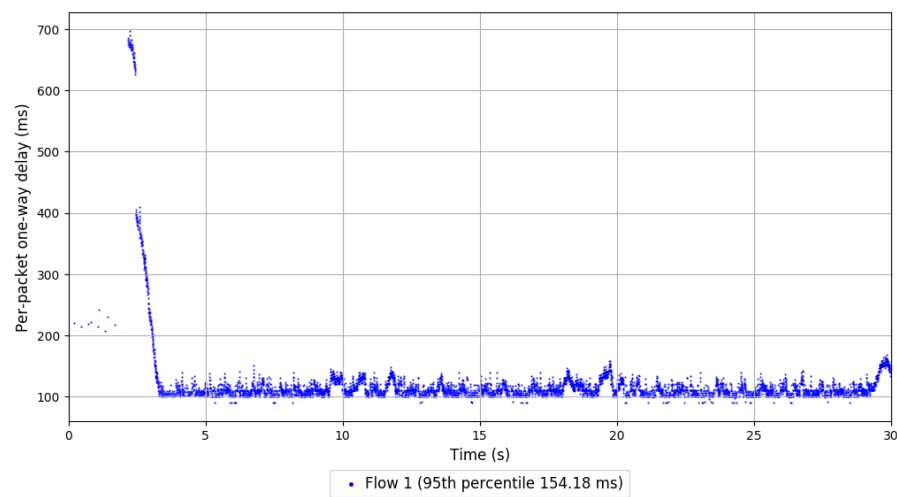
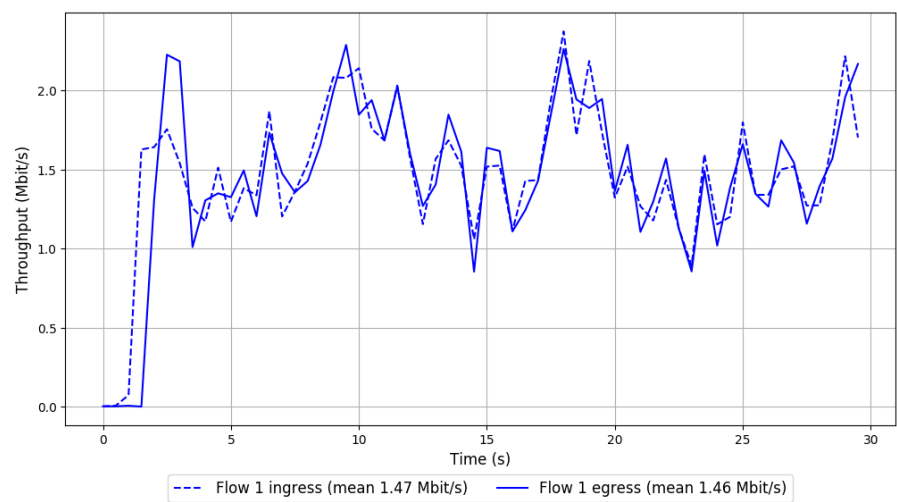


Run 1: Statistics of Vivace-latency

Start at: 2018-04-03 01:01:55
End at: 2018-04-03 01:02:25
Local clock offset: 13.519 ms
Remote clock offset: 12.054 ms

Below is generated by plot.py at 2018-04-03 01:46:32
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 154.180 ms
Loss rate: 1.04%
-- Flow 1:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 154.180 ms
Loss rate: 1.04%

Run 1: Report of Vivace-latency — Data Link

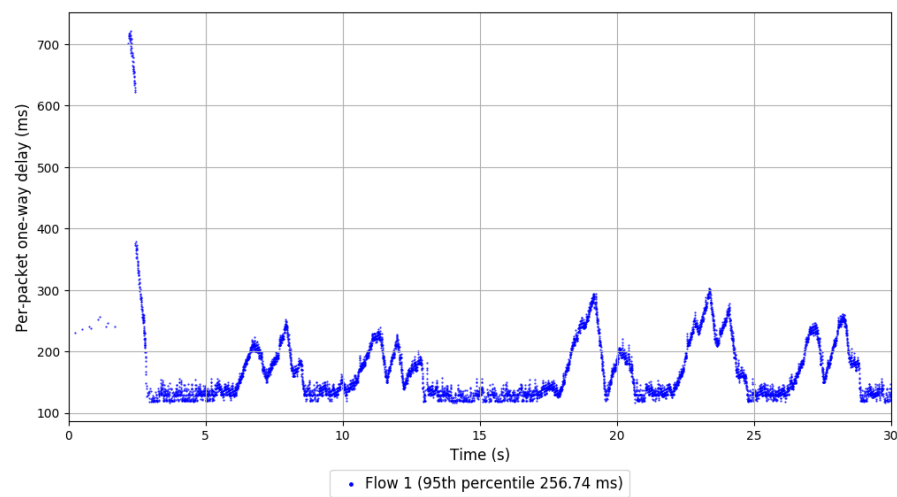
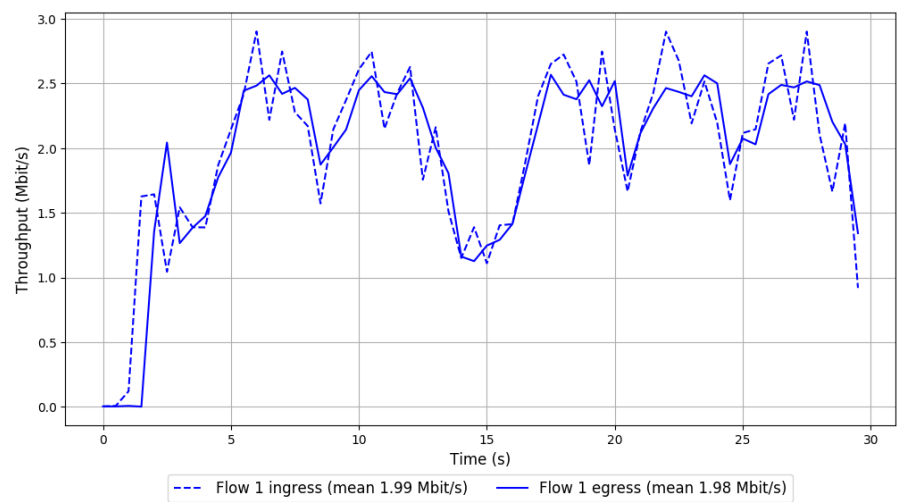


Run 2: Statistics of Vivace-latency

Start at: 2018-04-03 01:23:12
End at: 2018-04-03 01:23:42
Local clock offset: -5.524 ms
Remote clock offset: 12.923 ms

Below is generated by plot.py at 2018-04-03 01:46:33
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 256.737 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 256.737 ms
Loss rate: 0.75%

Run 2: Report of Vivace-latency — Data Link

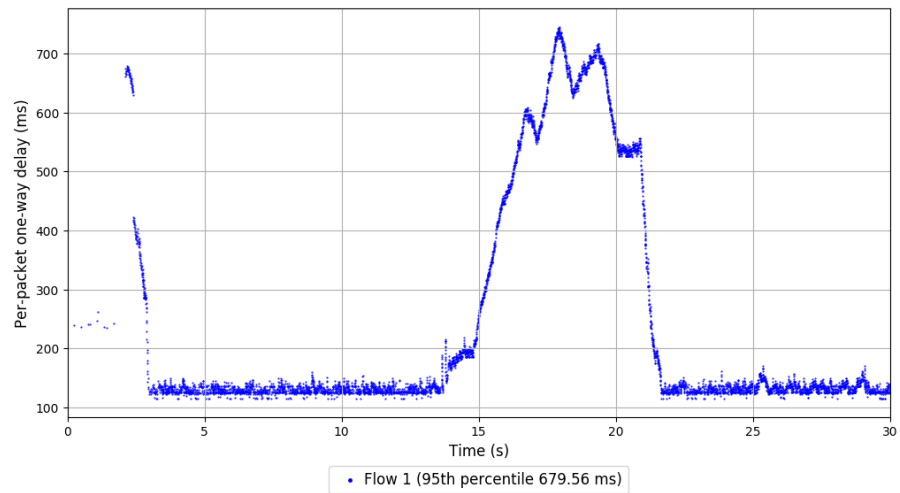
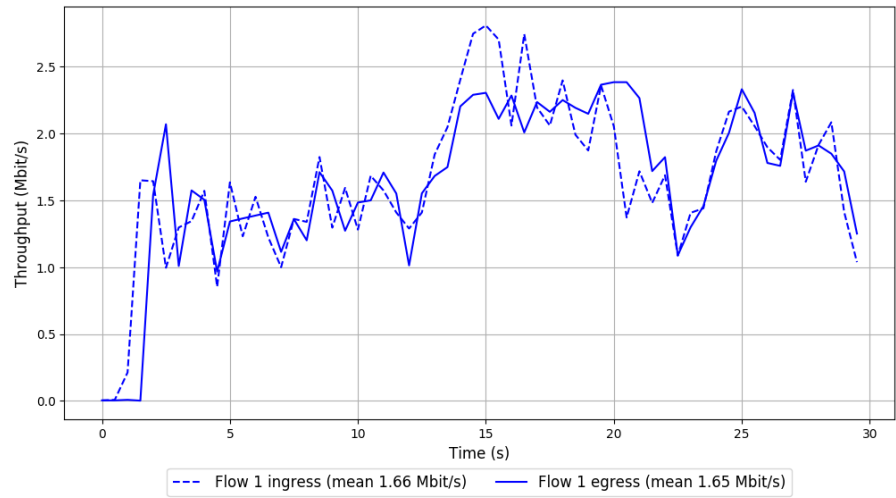


Run 3: Statistics of Vivace-latency

Start at: 2018-04-03 01:44:30
End at: 2018-04-03 01:45:00
Local clock offset: -4.632 ms
Remote clock offset: 11.944 ms

Below is generated by plot.py at 2018-04-03 01:46:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.65 Mbit/s
95th percentile per-packet one-way delay: 679.564 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 1.65 Mbit/s
95th percentile per-packet one-way delay: 679.564 ms
Loss rate: 0.78%

Run 3: Report of Vivace-latency — Data Link



Run 1: Statistics of Vivace-loss

Start at: 2018-04-03 00:47:43

End at: 2018-04-03 00:48:13

Local clock offset: 9.055 ms

Remote clock offset: 5.874 ms

Below is generated by plot.py at 2018-04-03 01:46:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 3235.946 ms

Loss rate: 33.33%

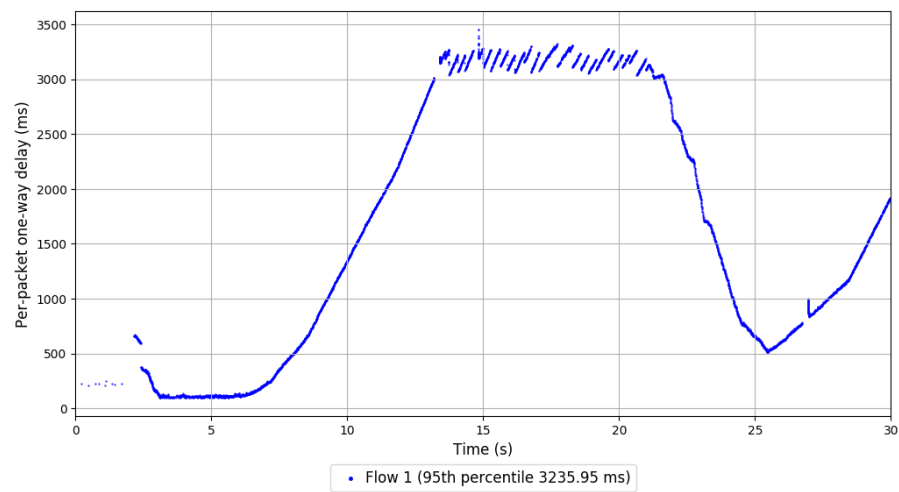
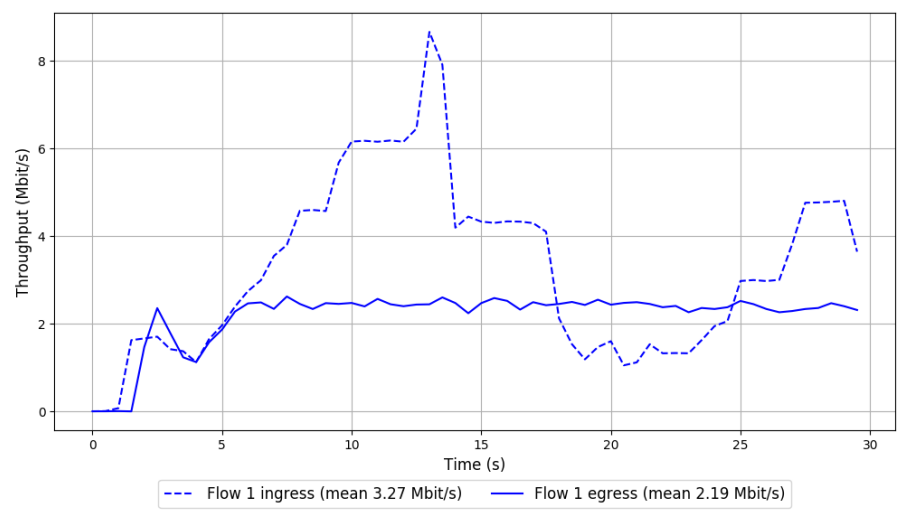
-- Flow 1:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 3235.946 ms

Loss rate: 33.33%

Run 1: Report of Vivace-loss — Data Link



Run 2: Statistics of Vivace-loss

Start at: 2018-04-03 01:09:00

End at: 2018-04-03 01:09:30

Local clock offset: -5.872 ms

Remote clock offset: 5.578 ms

Below is generated by plot.py at 2018-04-03 01:46:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 3315.113 ms

Loss rate: 42.28%

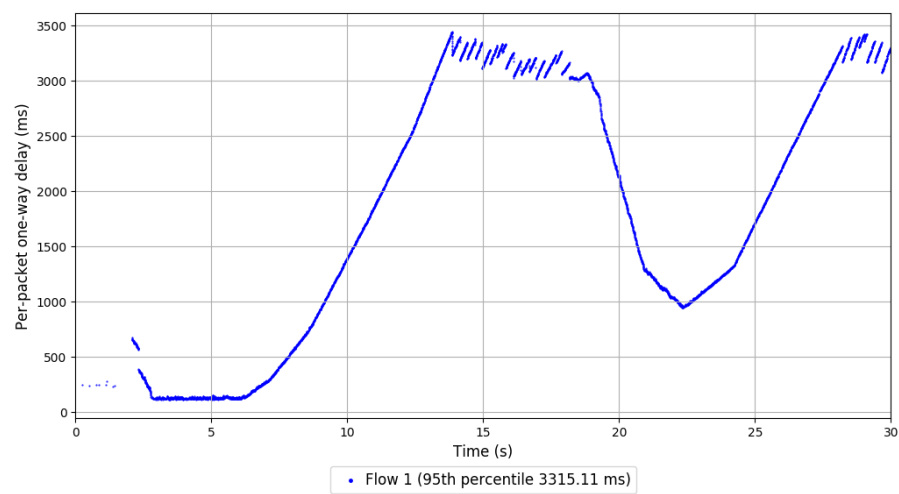
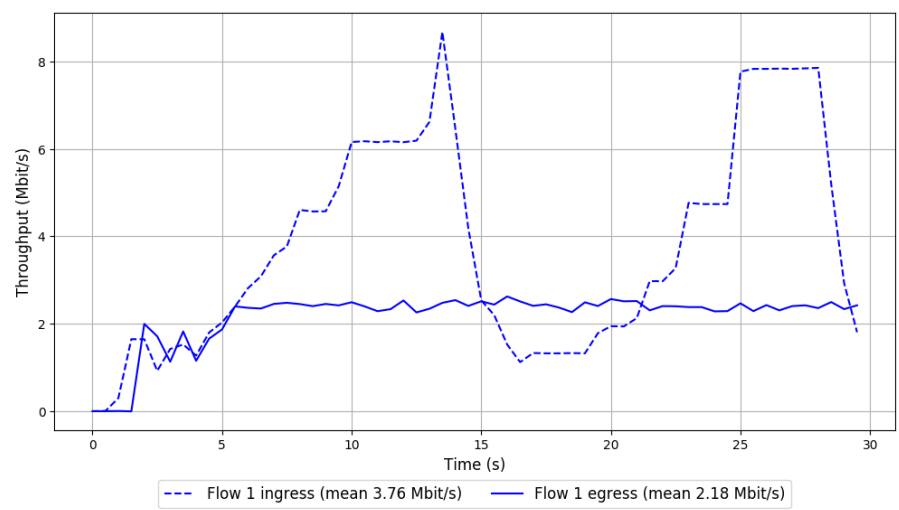
-- Flow 1:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 3315.113 ms

Loss rate: 42.28%

Run 2: Report of Vivace-loss — Data Link

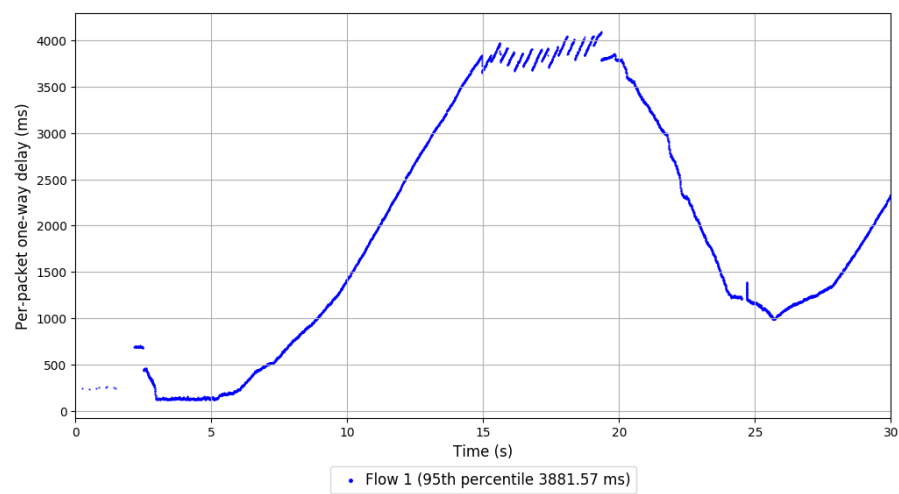
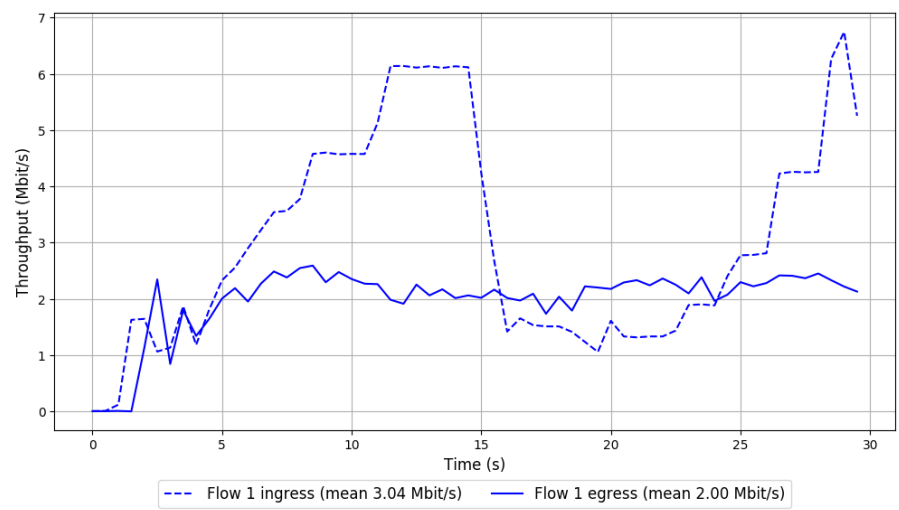


Run 3: Statistics of Vivace-loss

Start at: 2018-04-03 01:30:17
End at: 2018-04-03 01:30:47
Local clock offset: -4.994 ms
Remote clock offset: 12.011 ms

Below is generated by plot.py at 2018-04-03 01:46:37
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 3881.572 ms
Loss rate: 34.35%
-- Flow 1:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 3881.572 ms
Loss rate: 34.35%

Run 3: Report of Vivace-loss — Data Link



Run 1: Statistics of Vivace-LTE

Start at: 2018-04-03 00:58:22

End at: 2018-04-03 00:58:52

Local clock offset: 14.885 ms

Remote clock offset: 6.605 ms

Below is generated by plot.py at 2018-04-03 01:46:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.93 Mbit/s

95th percentile per-packet one-way delay: 323.644 ms

Loss rate: 0.78%

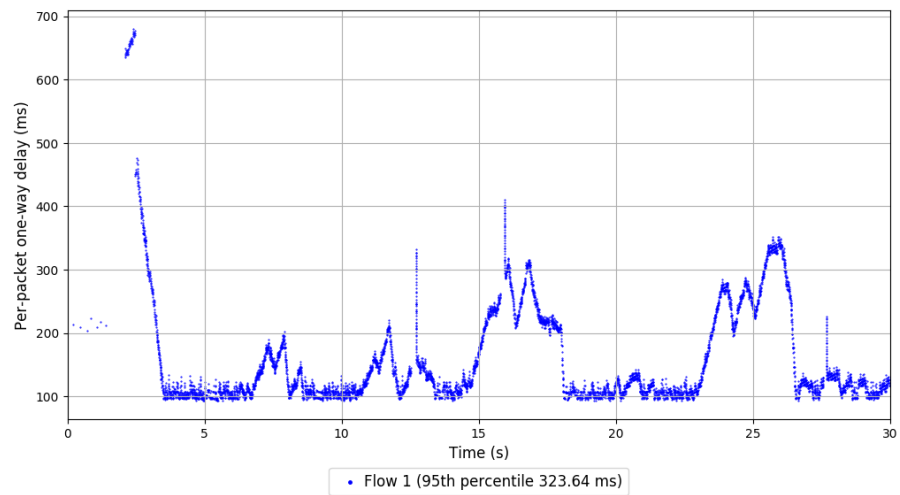
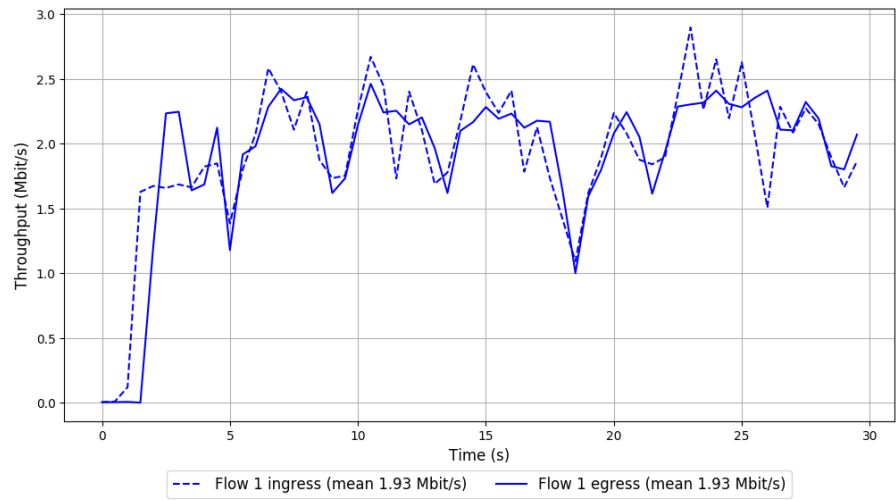
-- Flow 1:

Average throughput: 1.93 Mbit/s

95th percentile per-packet one-way delay: 323.644 ms

Loss rate: 0.78%

Run 1: Report of Vivace-LTE — Data Link



Run 2: Statistics of Vivace-LTE

Start at: 2018-04-03 01:19:39

End at: 2018-04-03 01:20:09

Local clock offset: -6.046 ms

Remote clock offset: 5.601 ms

Below is generated by plot.py at 2018-04-03 01:46:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.01 Mbit/s

95th percentile per-packet one-way delay: 382.515 ms

Loss rate: 1.86%

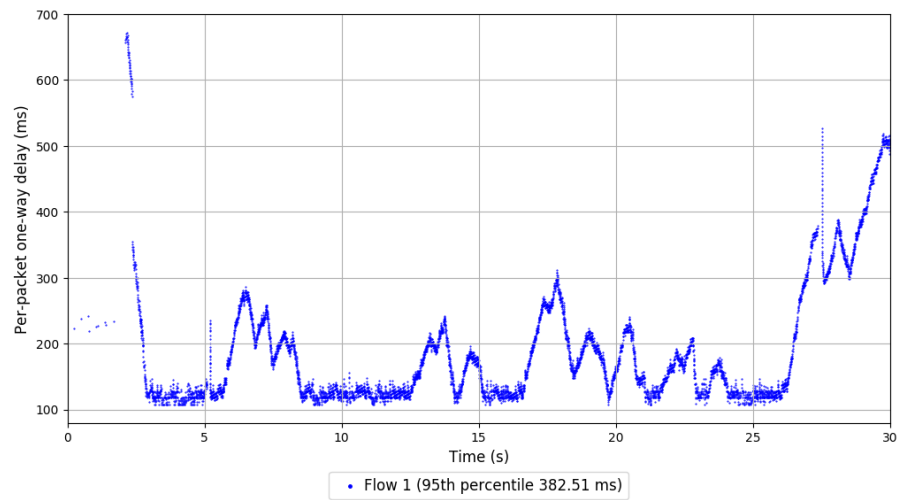
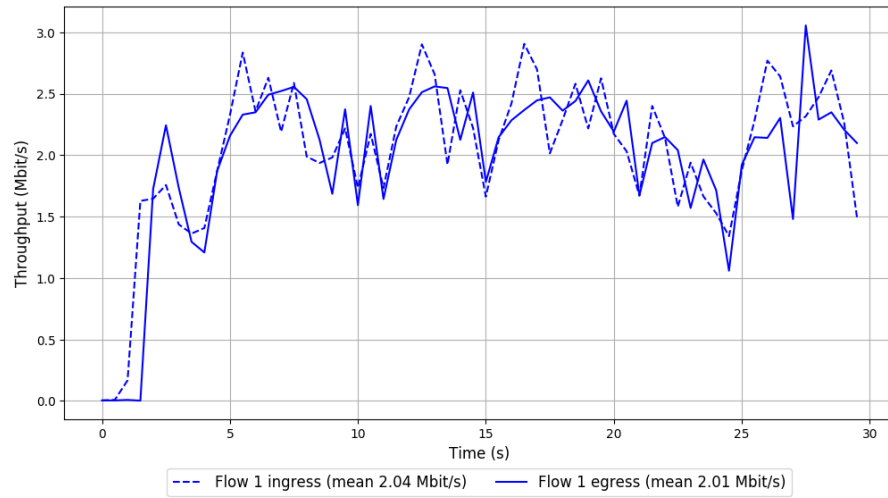
-- Flow 1:

Average throughput: 2.01 Mbit/s

95th percentile per-packet one-way delay: 382.515 ms

Loss rate: 1.86%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-04-03 01:40:57
End at: 2018-04-03 01:41:27
Local clock offset: -4.714 ms
Remote clock offset: 12.995 ms

Below is generated by plot.py at 2018-04-03 01:46:37
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 1399.841 ms
Loss rate: 5.18%
-- Flow 1:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 1399.841 ms
Loss rate: 5.18%

Run 3: Report of Vivace-LTE — Data Link

