

Pantheon Report

Generated at 2018-02-02 14:19:54 (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).

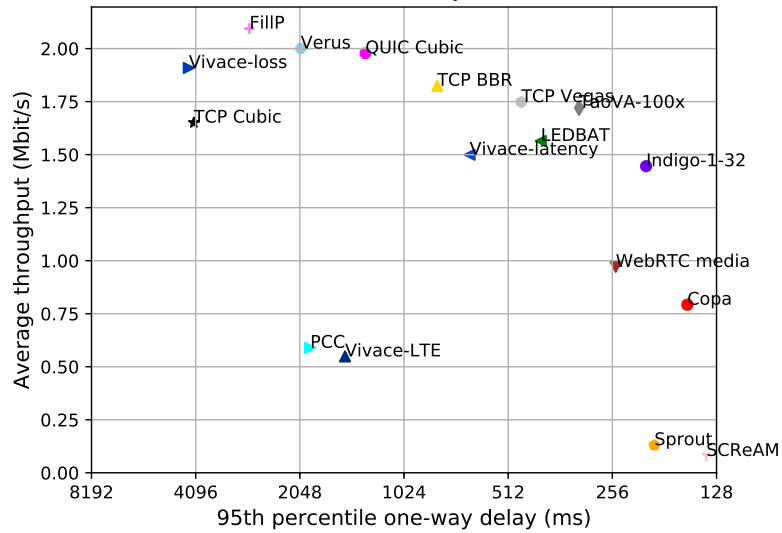
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

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

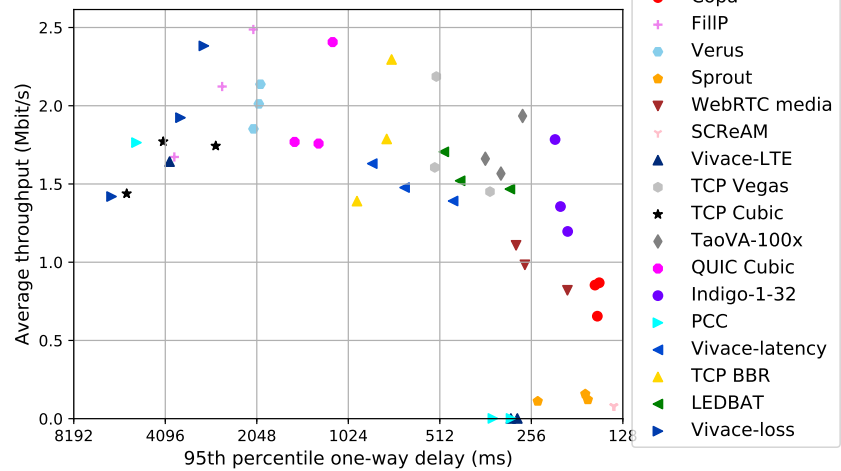
Git summary:

```
branch: master @ 70217998b3c9a7166a95460a70c0854d1326e100
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ fb9c9ab842e5614ad52911a76fb9bd1c1b0dca86
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
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 @ a488197ddd041ace68a42849b2540ad834825f42
```

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	1.83	820.82	1.59
TCP Cubic	3	1.65	4147.52	17.23
LEDBAT	3	1.57	412.27	0.46
PCC	3	0.59	1911.62	26.61
QUIC Cubic	3	1.98	1324.57	4.22
SCReAM	3	0.08	137.07	0.00
WebRTC media	3	0.97	250.31	0.26
Sprout	3	0.13	193.63	0.17
TaoVA-100x	3	1.72	319.49	0.46
TCP Vegas	3	1.75	469.33	0.32
Verus	3	2.00	2036.52	4.89
Copa	3	0.79	155.47	0.18
FillP	3	2.09	2863.26	19.35
Indigo-1-32	3	1.45	204.53	0.26
Vivace-latency	3	1.50	661.97	2.23
Vivace-loss	3	1.91	4287.09	44.03
Vivace-LTE	3	0.55	1516.30	1.89

Run 1: Statistics of TCP BBR

Start at: 2018-02-02 13:19:52

End at: 2018-02-02 13:20:22

Local clock offset: 0.471 ms

Remote clock offset: -4.251 ms

Below is generated by plot.py at 2018-02-02 14:19:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.79 Mbit/s

95th percentile per-packet one-way delay: 765.735 ms

Loss rate: 2.05%

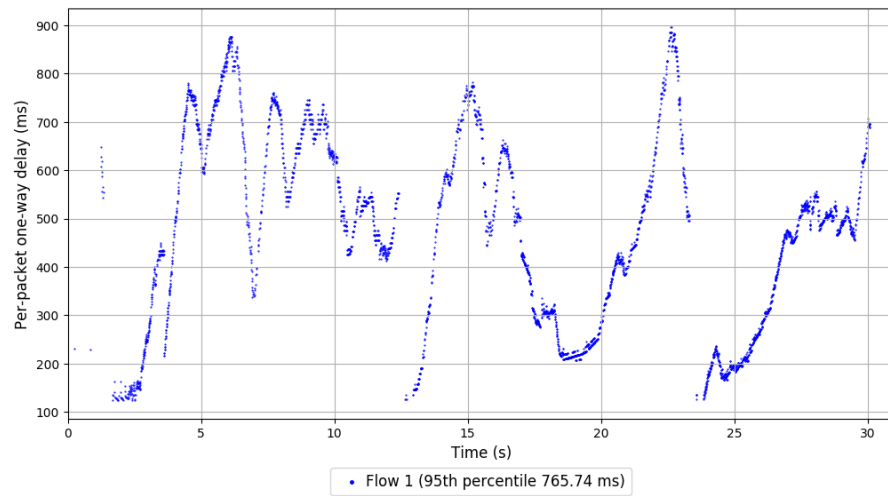
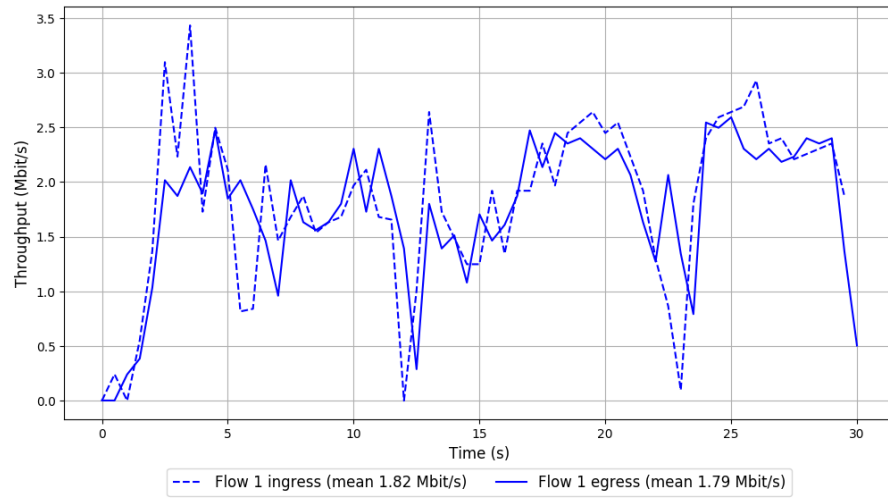
-- Flow 1:

Average throughput: 1.79 Mbit/s

95th percentile per-packet one-way delay: 765.735 ms

Loss rate: 2.05%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-02-02 13:39:58

End at: 2018-02-02 13:40:28

Local clock offset: 0.377 ms

Remote clock offset: -3.825 ms

Below is generated by plot.py at 2018-02-02 14:19:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.30 Mbit/s

95th percentile per-packet one-way delay: 737.852 ms

Loss rate: 1.09%

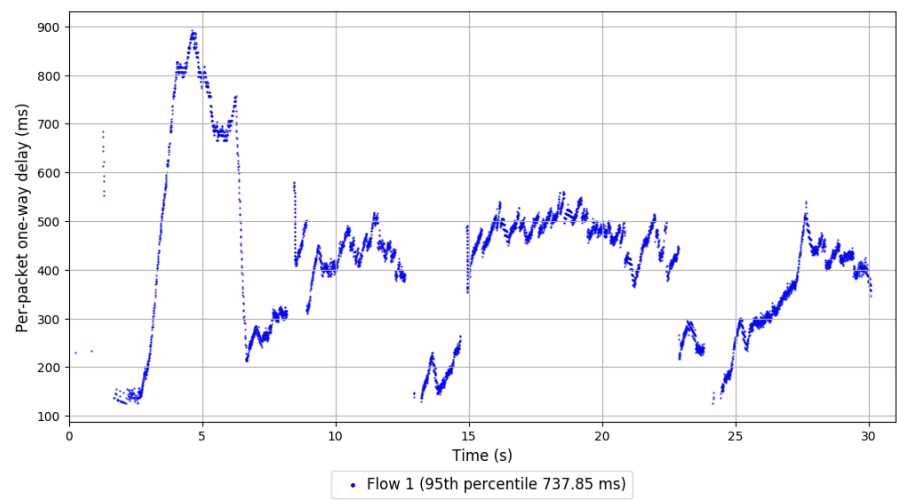
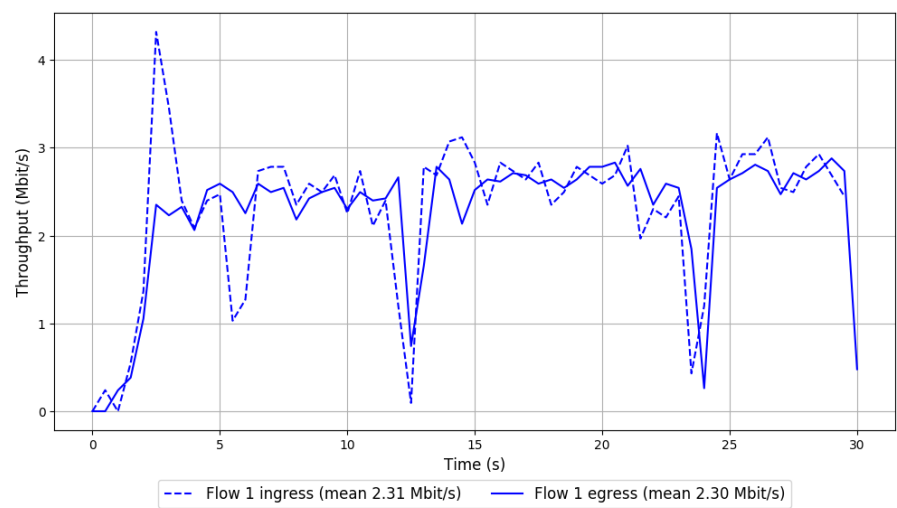
-- Flow 1:

Average throughput: 2.30 Mbit/s

95th percentile per-packet one-way delay: 737.852 ms

Loss rate: 1.09%

Run 2: Report of TCP BBR — Data Link

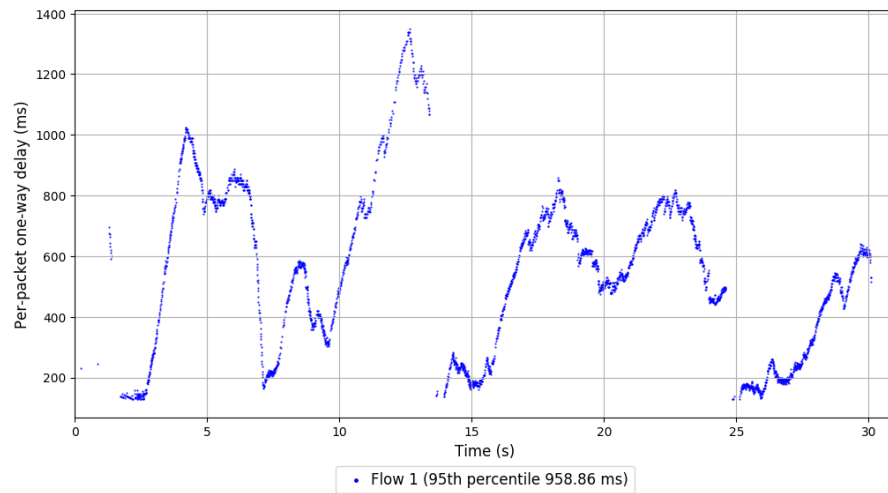
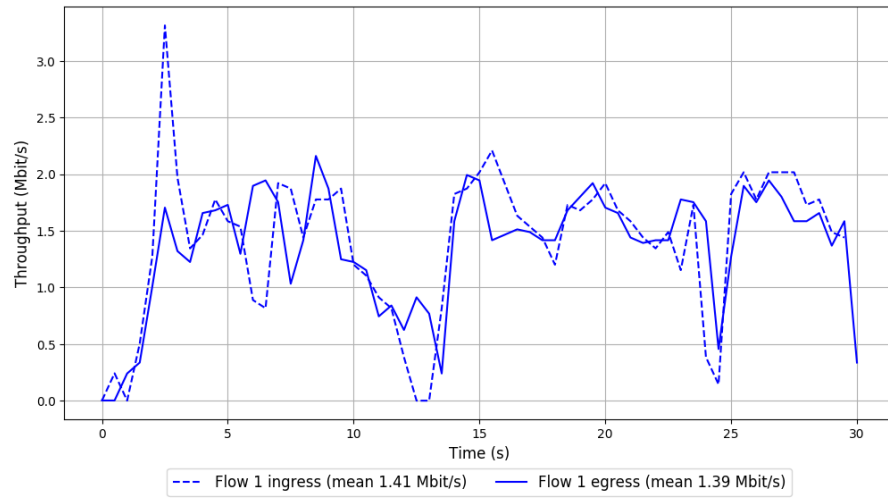


Run 3: Statistics of TCP BBR

Start at: 2018-02-02 14:00:04
End at: 2018-02-02 14:00:34
Local clock offset: 0.28 ms
Remote clock offset: -4.654 ms

Below is generated by plot.py at 2018-02-02 14:19:20
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 958.860 ms
Loss rate: 1.62%
-- Flow 1:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 958.860 ms
Loss rate: 1.62%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-02-02 13:36:24

End at: 2018-02-02 13:36:54

Local clock offset: 0.361 ms

Remote clock offset: 1.739 ms

Below is generated by plot.py at 2018-02-02 14:19:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.44 Mbit/s

95th percentile per-packet one-way delay: 5487.500 ms

Loss rate: 22.69%

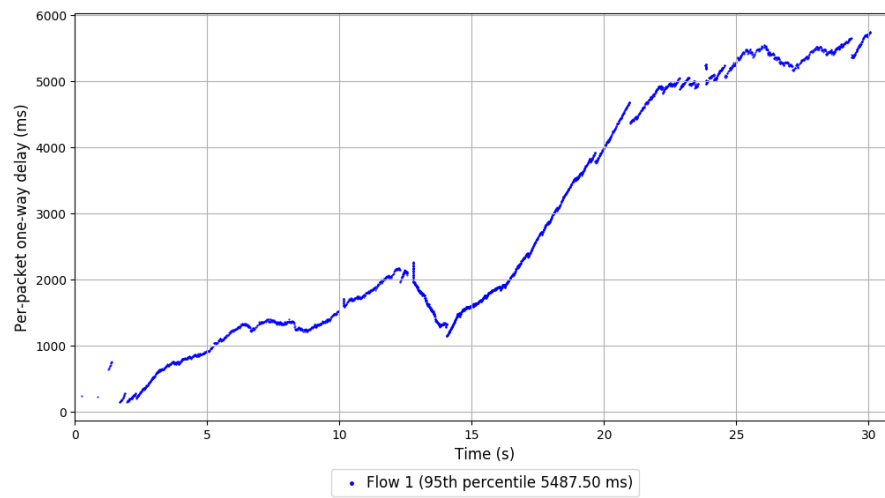
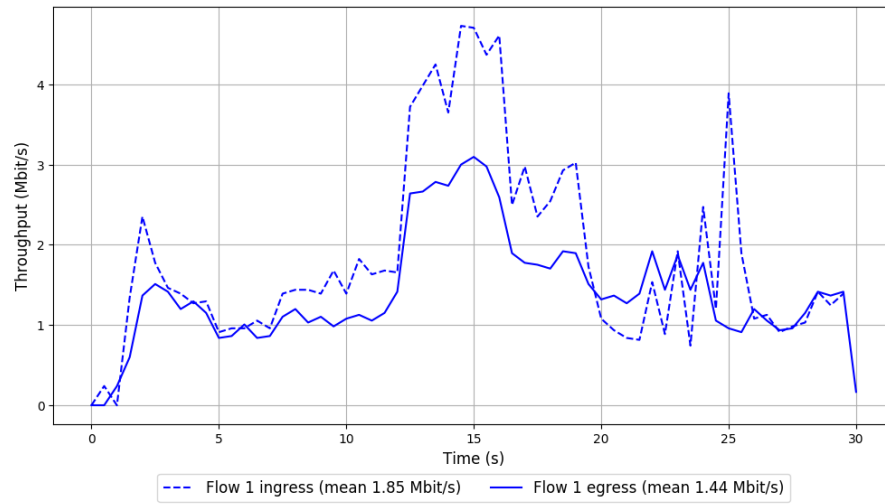
-- Flow 1:

Average throughput: 1.44 Mbit/s

95th percentile per-packet one-way delay: 5487.500 ms

Loss rate: 22.69%

Run 1: Report of TCP Cubic — Data Link

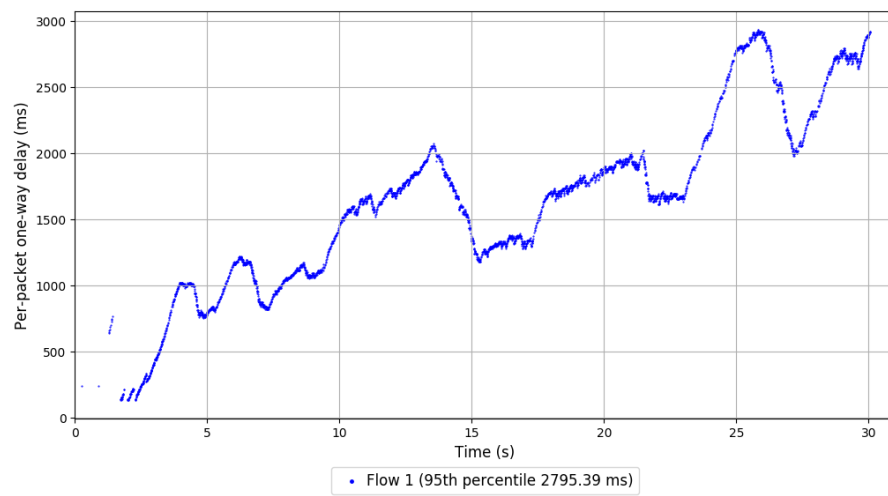
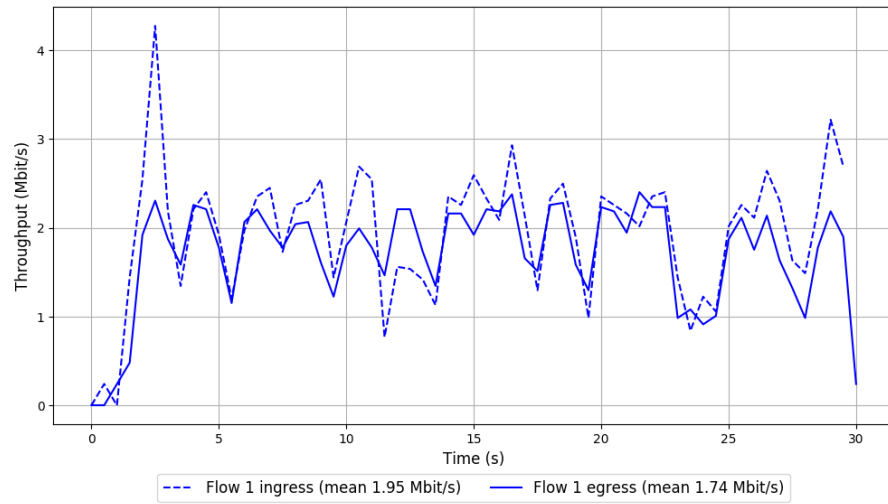


Run 2: Statistics of TCP Cubic

Start at: 2018-02-02 13:56:31
End at: 2018-02-02 13:57:01
Local clock offset: 0.28 ms
Remote clock offset: -4.413 ms

Below is generated by plot.py at 2018-02-02 14:19:20
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 2795.387 ms
Loss rate: 11.01%
-- Flow 1:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 2795.387 ms
Loss rate: 11.01%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-02-02 14:16:39

End at: 2018-02-02 14:17:09

Local clock offset: 0.313 ms

Remote clock offset: 1.26 ms

Below is generated by plot.py at 2018-02-02 14:19:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.77 Mbit/s

95th percentile per-packet one-way delay: 4159.660 ms

Loss rate: 17.99%

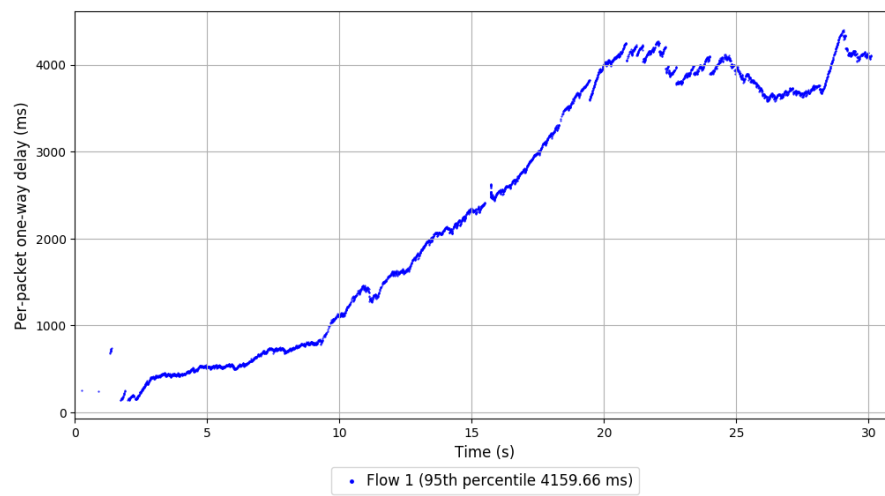
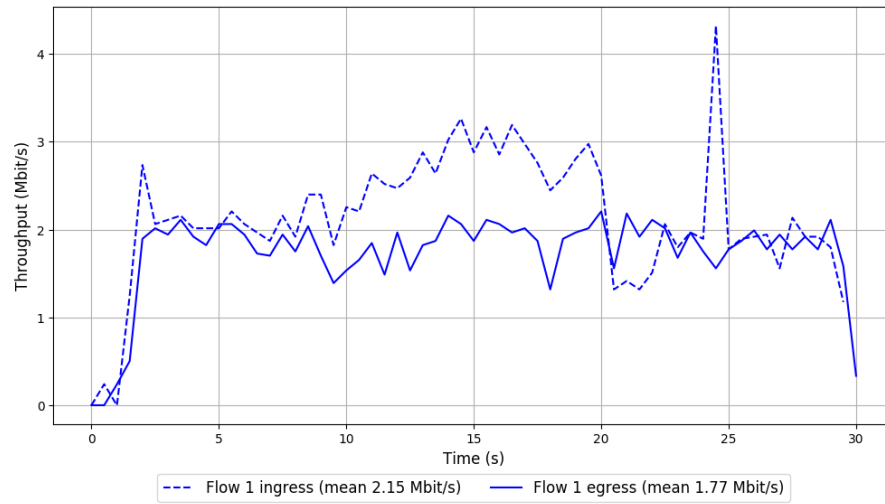
-- Flow 1:

Average throughput: 1.77 Mbit/s

95th percentile per-packet one-way delay: 4159.660 ms

Loss rate: 17.99%

Run 3: Report of TCP Cubic — Data Link

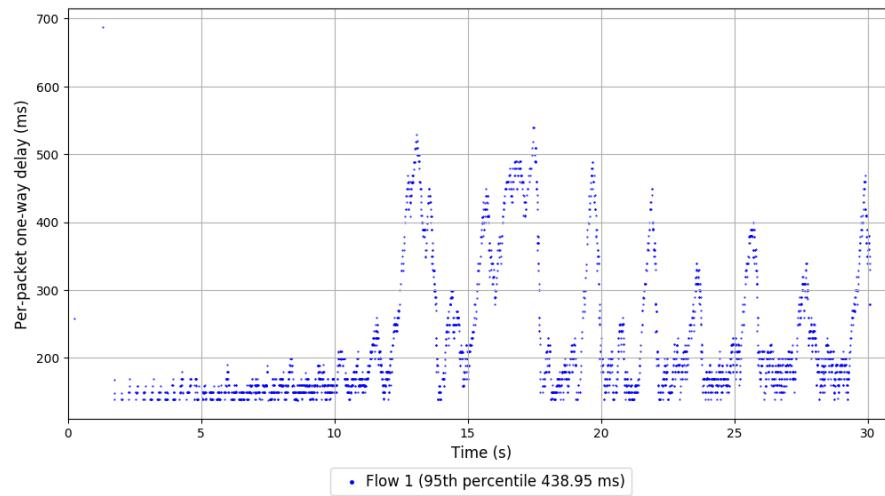
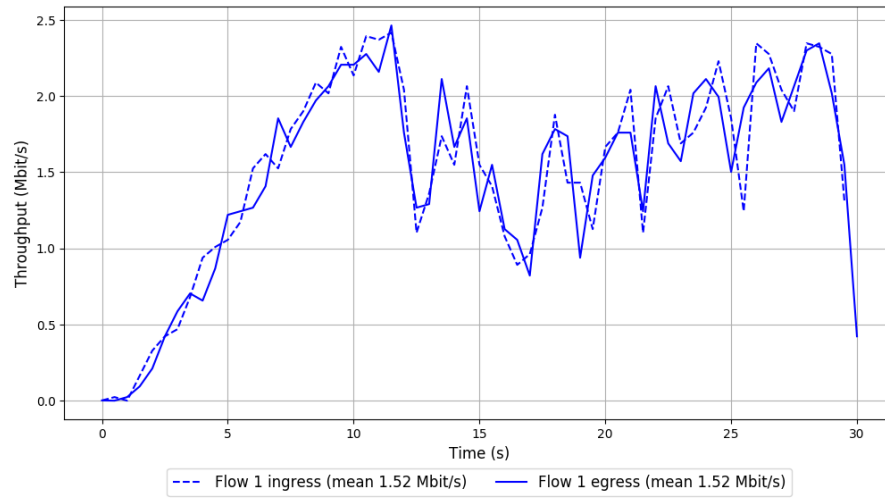


```
Run 1: Statistics of LEDBAT

Start at: 2018-02-02 13:30:30
End at: 2018-02-02 13:31:00
Local clock offset: 0.415 ms
Remote clock offset: 1.539 ms

# Below is generated by plot.py at 2018-02-02 14:19:20
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 438.953 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 438.953 ms
Loss rate: 0.57%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-02-02 13:50:36

End at: 2018-02-02 13:51:06

Local clock offset: 0.365 ms

Remote clock offset: 1.392 ms

Below is generated by plot.py at 2018-02-02 14:19:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.71 Mbit/s

95th percentile per-packet one-way delay: 496.678 ms

Loss rate: 0.23%

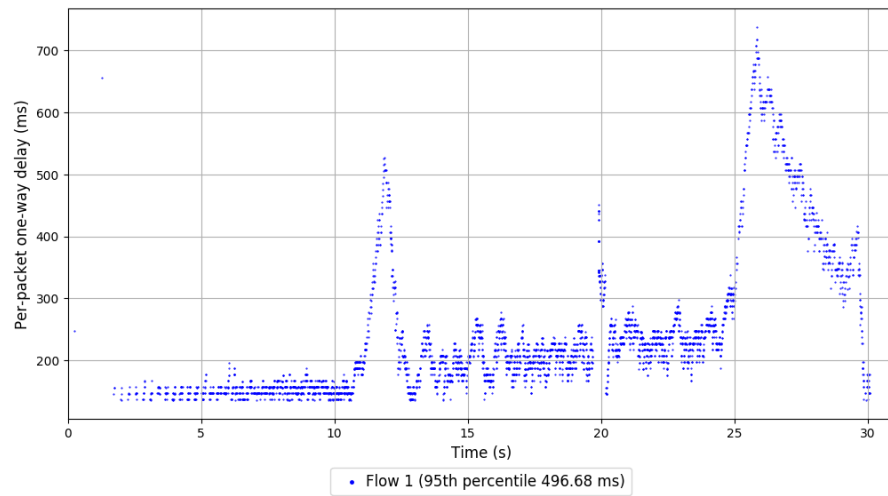
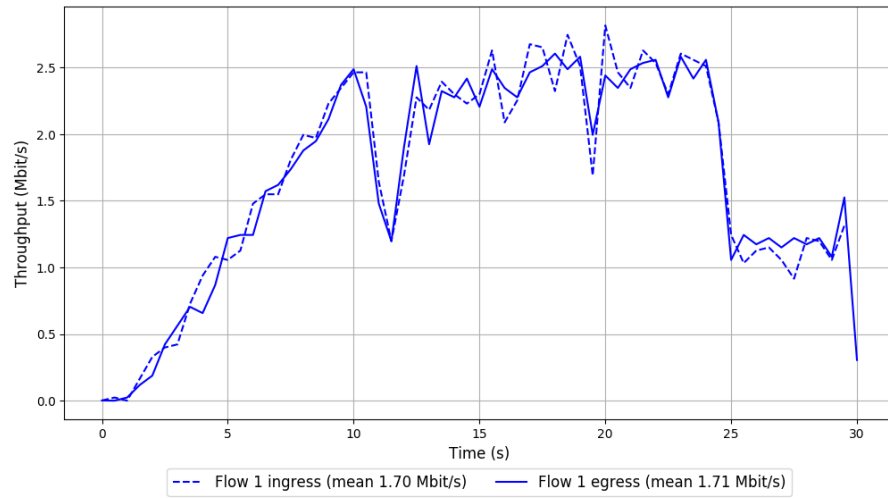
-- Flow 1:

Average throughput: 1.71 Mbit/s

95th percentile per-packet one-way delay: 496.678 ms

Loss rate: 0.23%

Run 2: Report of LEDBAT — Data Link

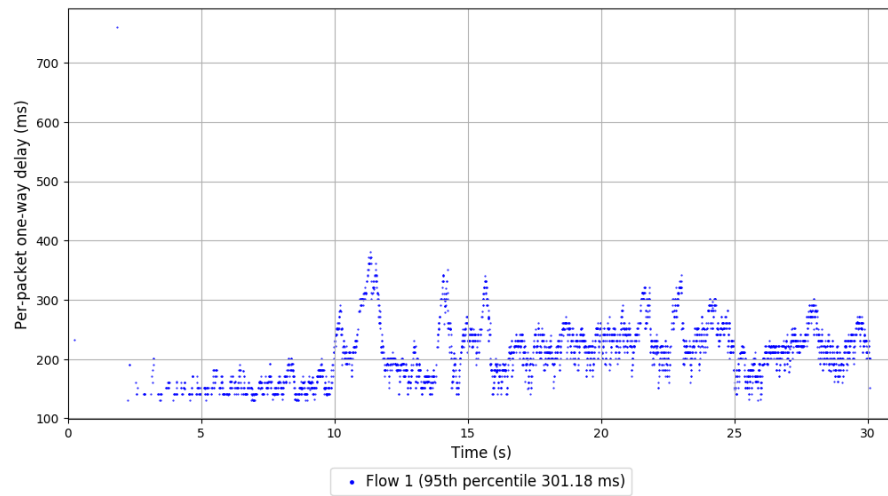
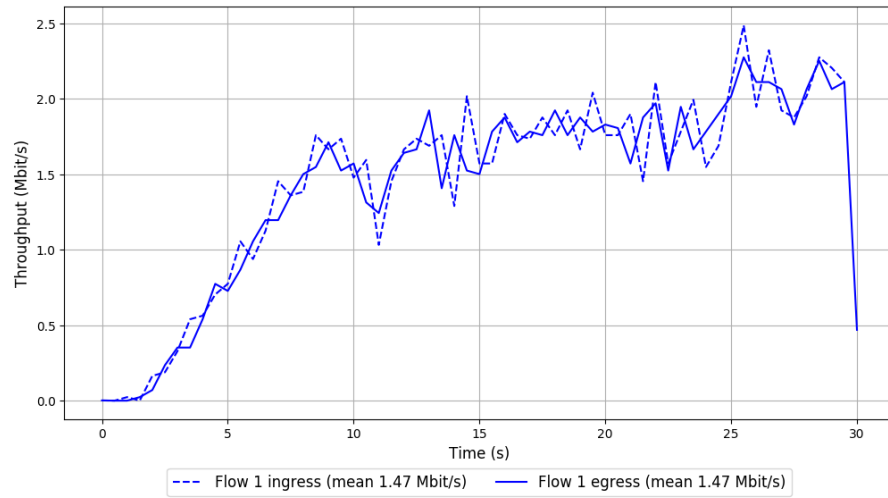


Run 3: Statistics of LEDBAT

Start at: 2018-02-02 14:10:45
End at: 2018-02-02 14:11:15
Local clock offset: 0.347 ms
Remote clock offset: -5.034 ms

Below is generated by plot.py at 2018-02-02 14:19:23
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 301.184 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 301.184 ms
Loss rate: 0.59%

Run 3: Report of LEDBAT — Data Link

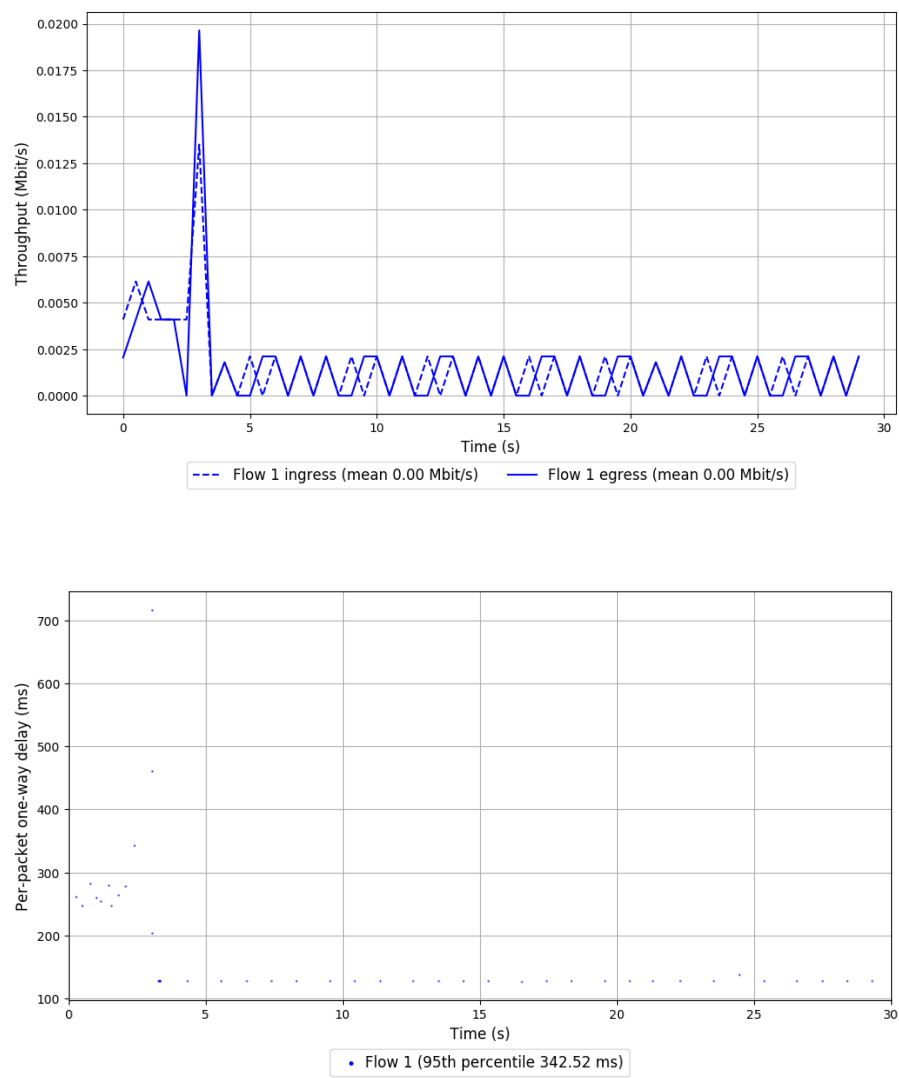


Run 1: Statistics of PCC

Start at: 2018-02-02 13:28:08
End at: 2018-02-02 13:28:39
Local clock offset: 0.431 ms
Remote clock offset: -4.266 ms

Below is generated by plot.py at 2018-02-02 14:19:23
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 342.521 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 342.521 ms
Loss rate: 0.00%

Run 1: Report of PCC — Data Link



Run 2: Statistics of PCC

Start at: 2018-02-02 13:48:14

End at: 2018-02-02 13:48:44

Local clock offset: 0.374 ms

Remote clock offset: 1.603 ms

Below is generated by plot.py at 2018-02-02 14:19:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 298.543 ms

Loss rate: 0.00%

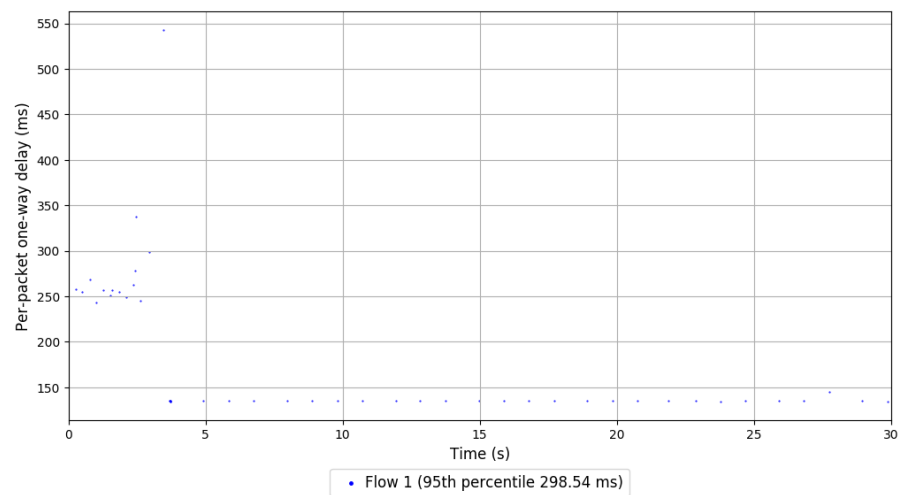
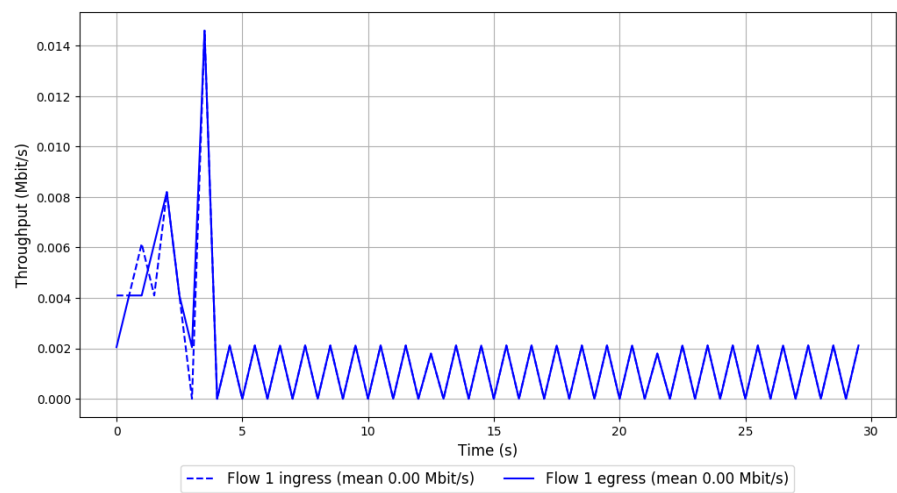
-- Flow 1:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 298.543 ms

Loss rate: 0.00%

Run 2: Report of PCC — Data Link

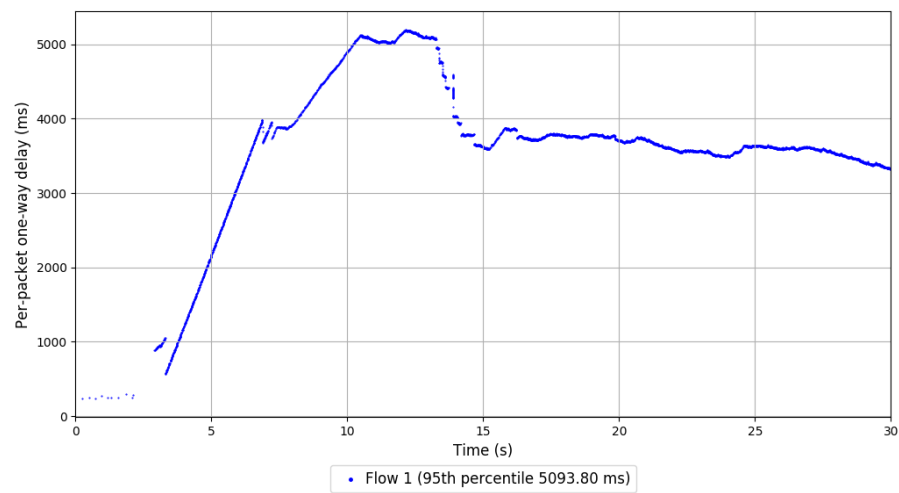
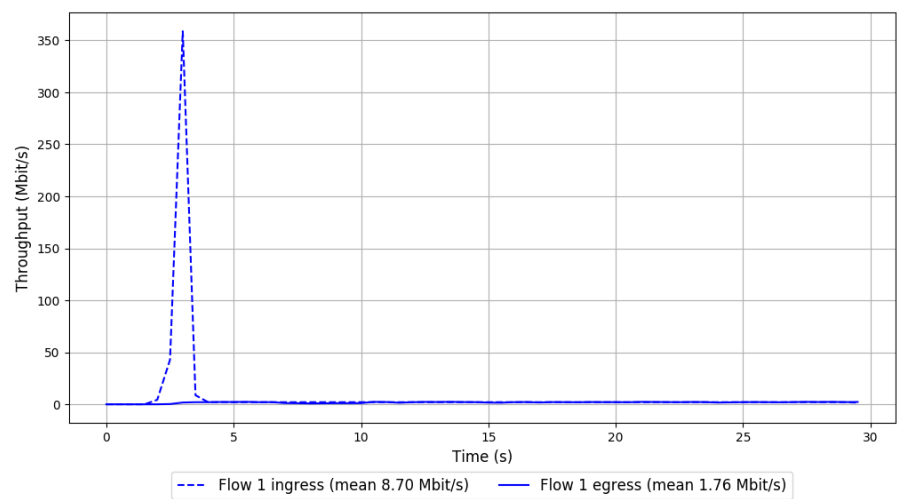


Run 3: Statistics of PCC

Start at: 2018-02-02 14:08:20
End at: 2018-02-02 14:08:50
Local clock offset: 0.337 ms
Remote clock offset: -4.118 ms

Below is generated by plot.py at 2018-02-02 14:19:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 5093.802 ms
Loss rate: 79.82%
-- Flow 1:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 5093.802 ms
Loss rate: 79.82%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-02-02 13:34:02

End at: 2018-02-02 13:34:32

Local clock offset: 0.394 ms

Remote clock offset: -3.259 ms

Below is generated by plot.py at 2018-02-02 14:19:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.41 Mbit/s

95th percentile per-packet one-way delay: 1152.933 ms

Loss rate: 4.08%

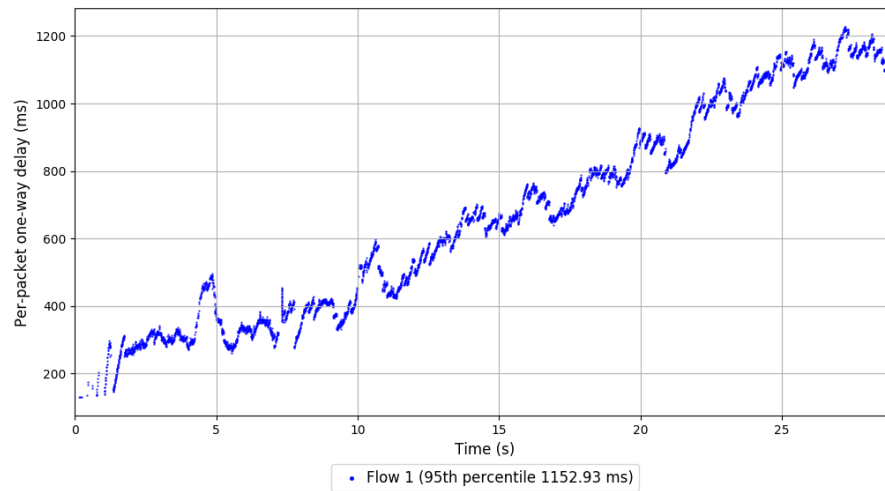
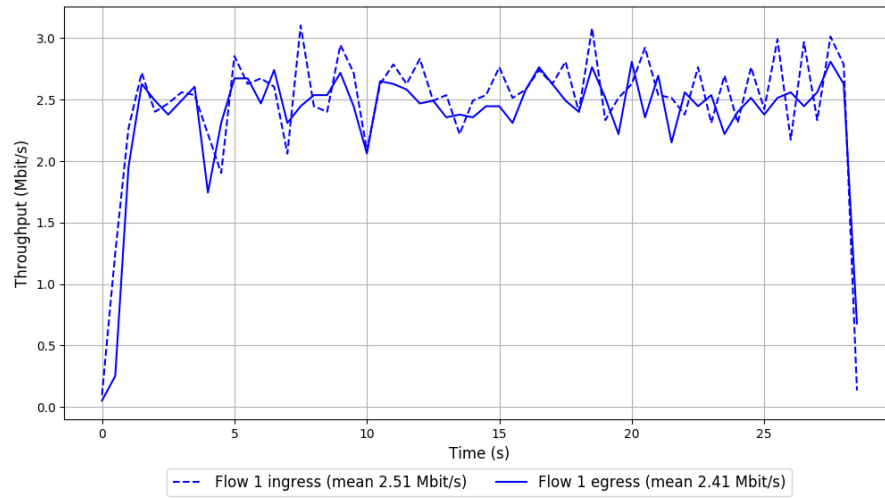
-- Flow 1:

Average throughput: 2.41 Mbit/s

95th percentile per-packet one-way delay: 1152.933 ms

Loss rate: 4.08%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-02-02 13:54:09

End at: 2018-02-02 13:54:39

Local clock offset: 0.344 ms

Remote clock offset: -3.633 ms

Below is generated by plot.py at 2018-02-02 14:19:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.76 Mbit/s

95th percentile per-packet one-way delay: 1282.729 ms

Loss rate: 4.23%

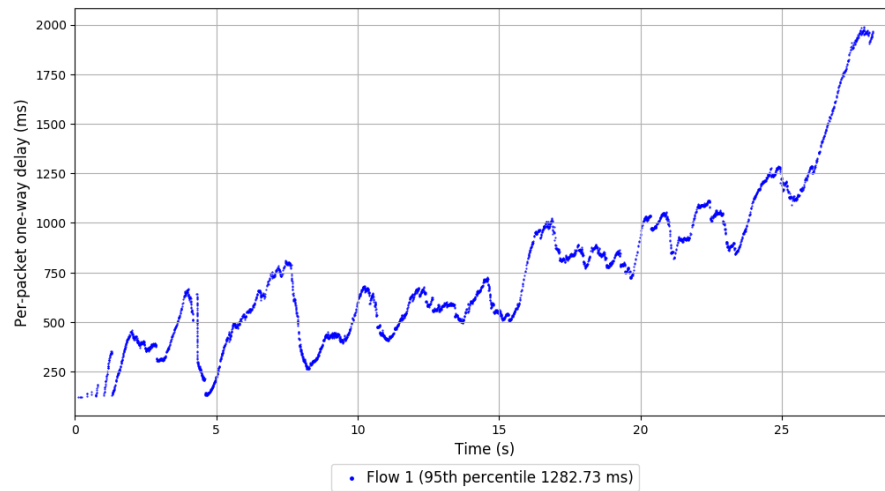
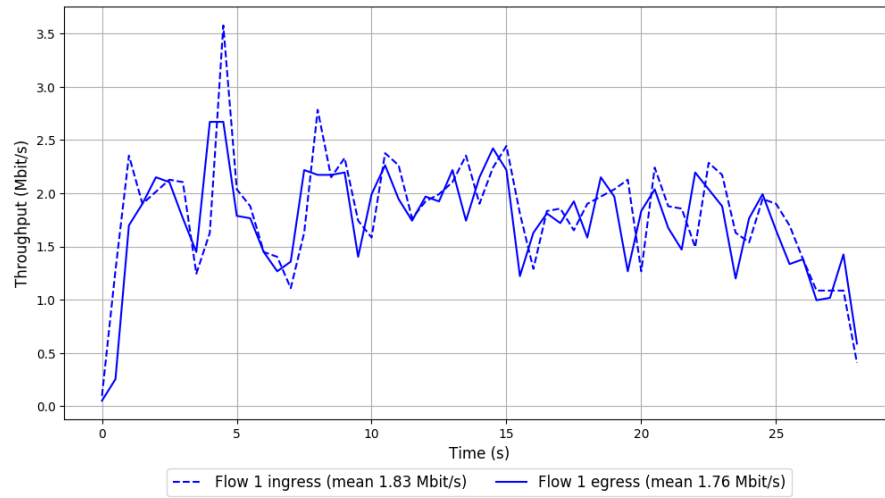
-- Flow 1:

Average throughput: 1.76 Mbit/s

95th percentile per-packet one-way delay: 1282.729 ms

Loss rate: 4.23%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-02-02 14:14:17

End at: 2018-02-02 14:14:47

Local clock offset: 0.331 ms

Remote clock offset: 1.284 ms

Below is generated by plot.py at 2018-02-02 14:19:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.77 Mbit/s

95th percentile per-packet one-way delay: 1538.058 ms

Loss rate: 4.36%

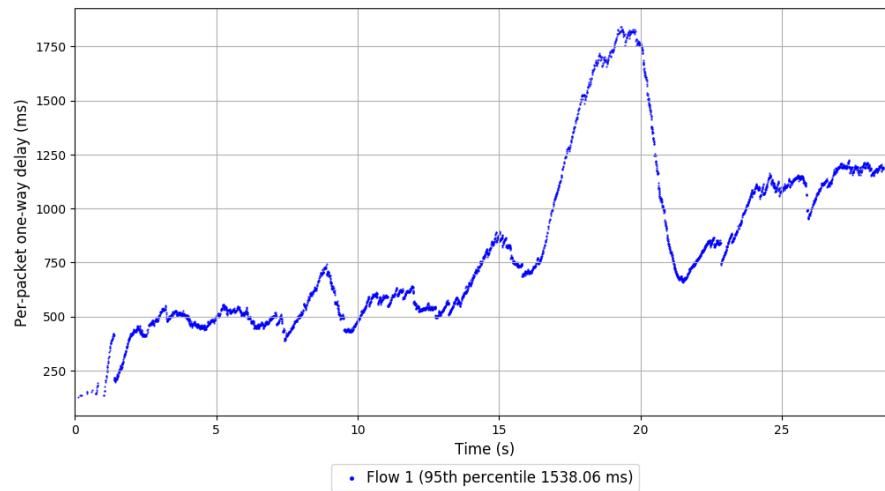
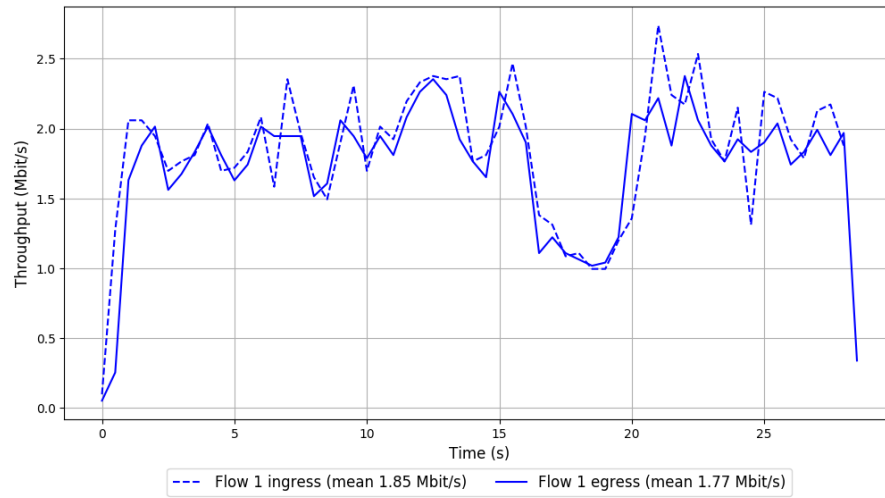
-- Flow 1:

Average throughput: 1.77 Mbit/s

95th percentile per-packet one-way delay: 1538.058 ms

Loss rate: 4.36%

Run 3: Report of QUIC Cubic — Data Link

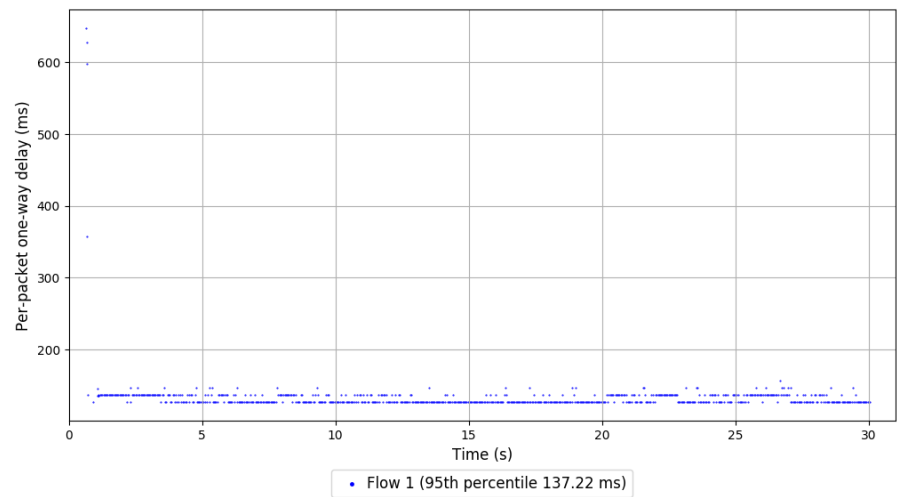
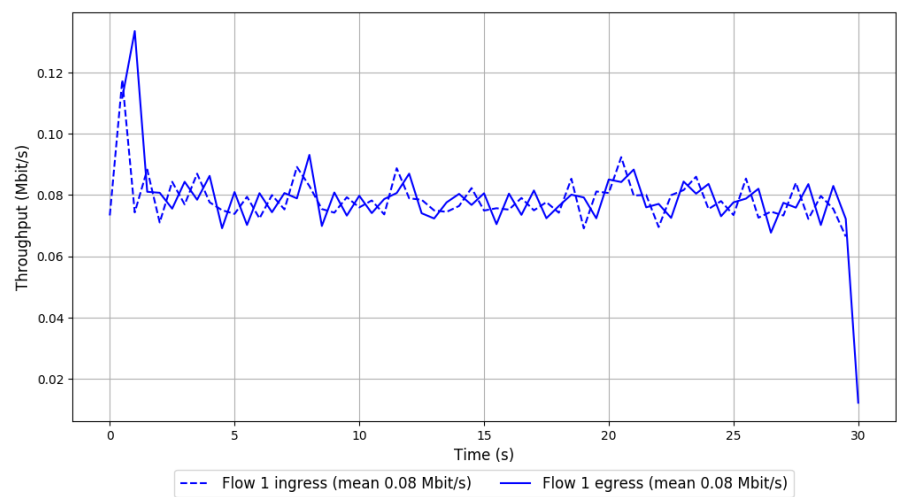


```
Run 1: Statistics of SCReAM

Start at: 2018-02-02 13:23:25
End at: 2018-02-02 13:23:55
Local clock offset: 0.472 ms
Remote clock offset: 1.422 ms

# Below is generated by plot.py at 2018-02-02 14:19:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 137.218 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 137.218 ms
Loss rate: 0.00%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-02-02 13:43:31

End at: 2018-02-02 13:44:01

Local clock offset: 0.373 ms

Remote clock offset: 2.547 ms

Below is generated by plot.py at 2018-02-02 14:19:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 137.580 ms

Loss rate: 0.00%

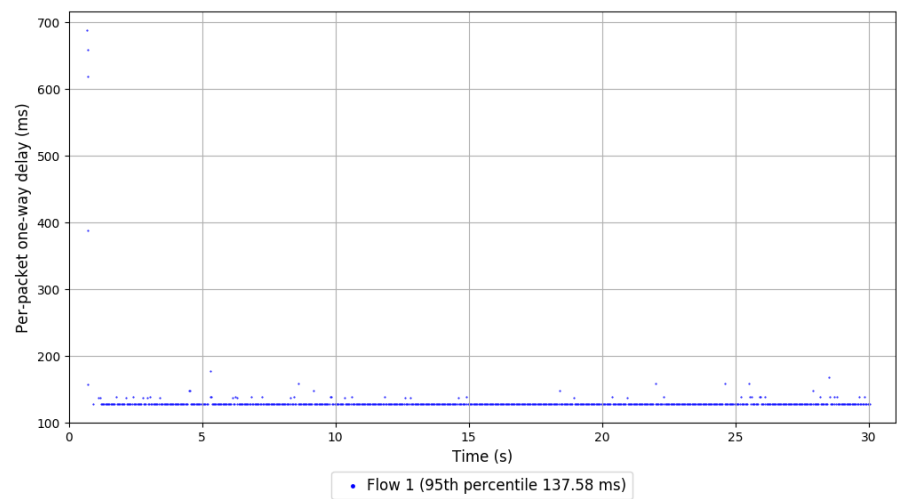
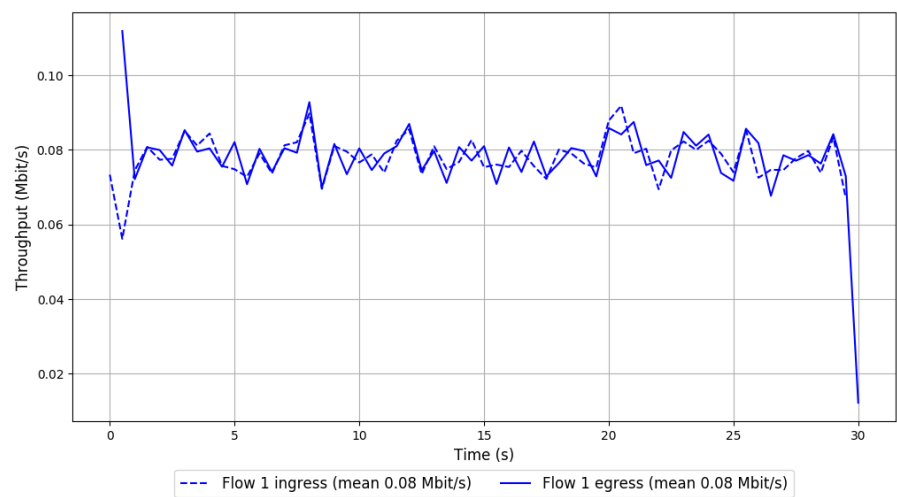
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 137.580 ms

Loss rate: 0.00%

Run 2: Report of SCRaM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-02-02 14:03:37

End at: 2018-02-02 14:04:07

Local clock offset: 0.287 ms

Remote clock offset: 0.023 ms

Below is generated by plot.py at 2018-02-02 14:19:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 136.407 ms

Loss rate: 0.00%

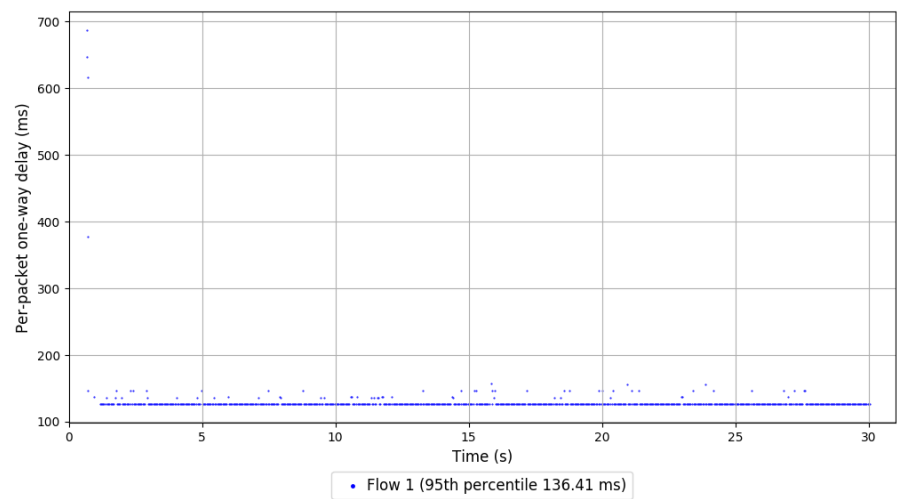
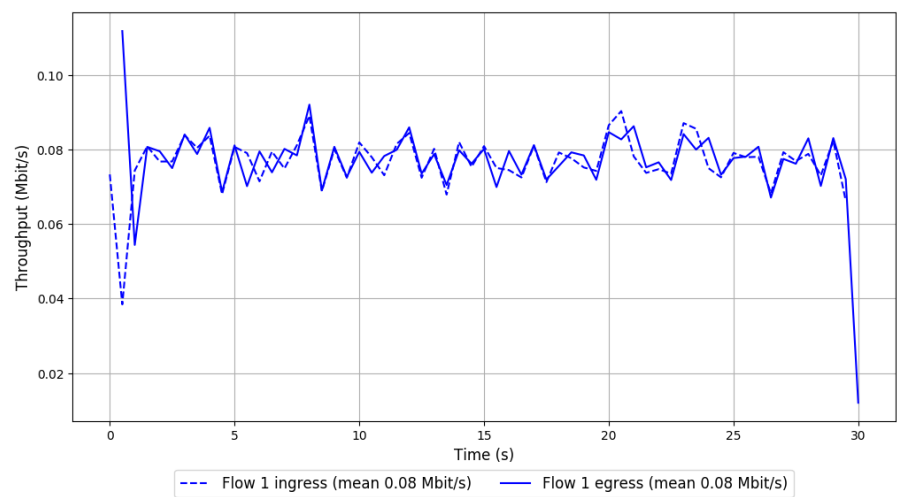
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 136.407 ms

Loss rate: 0.00%

Run 3: Report of SReAM — Data Link

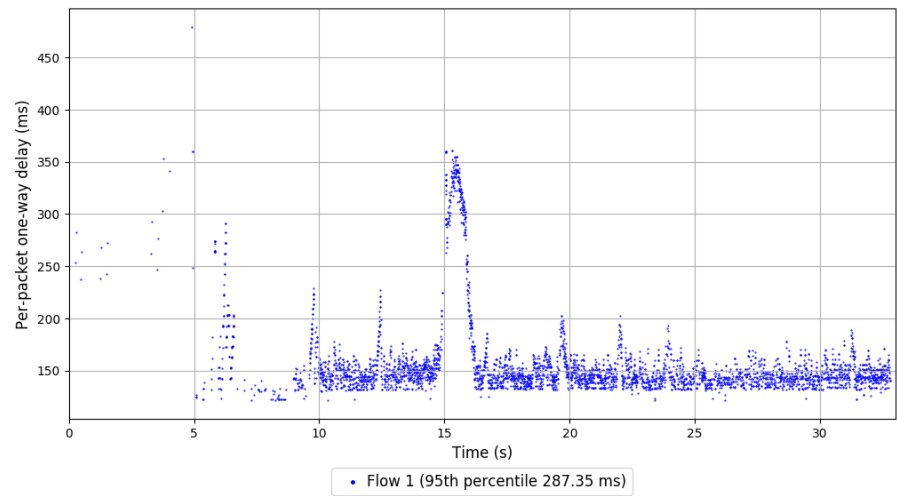
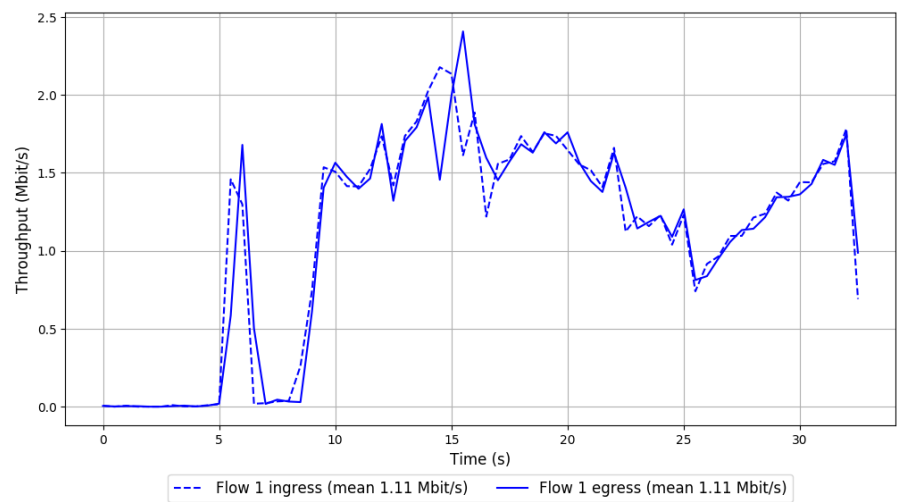


```
Run 1: Statistics of WebRTC media

Start at: 2018-02-02 13:22:14
End at: 2018-02-02 13:22:44
Local clock offset: 0.399 ms
Remote clock offset: 1.305 ms

# Below is generated by plot.py at 2018-02-02 14:19:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 287.354 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 287.354 ms
Loss rate: 0.30%
```

Run 1: Report of WebRTC media — Data Link

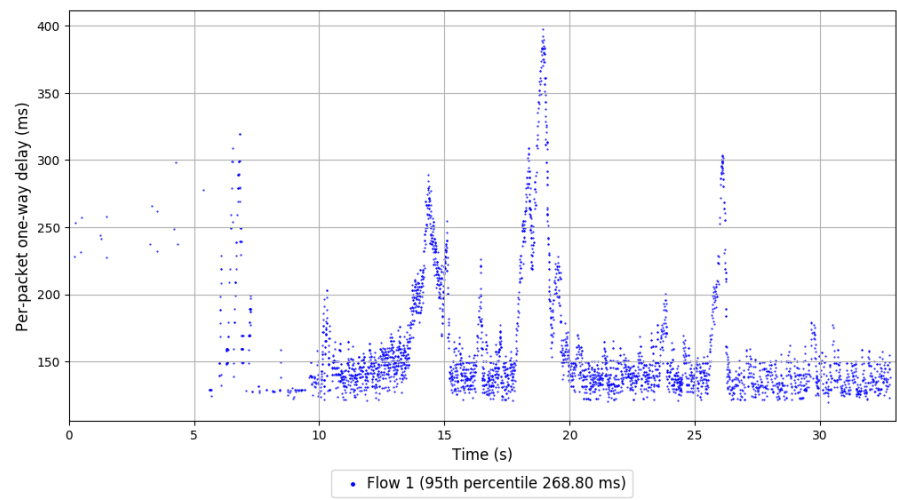
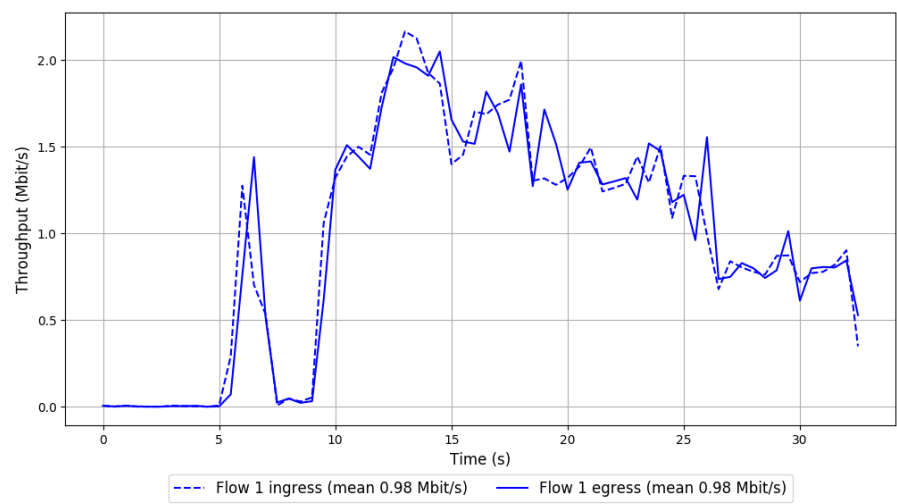


Run 2: Statistics of WebRTC media

Start at: 2018-02-02 13:42:20
End at: 2018-02-02 13:42:50
Local clock offset: 0.378 ms
Remote clock offset: -3.005 ms

Below is generated by plot.py at 2018-02-02 14:19:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 268.800 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 268.800 ms
Loss rate: 0.14%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-02-02 14:02:26

End at: 2018-02-02 14:02:56

Local clock offset: 0.362 ms

Remote clock offset: 1.031 ms

Below is generated by plot.py at 2018-02-02 14:19:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.82 Mbit/s

95th percentile per-packet one-way delay: 194.766 ms

Loss rate: 0.33%

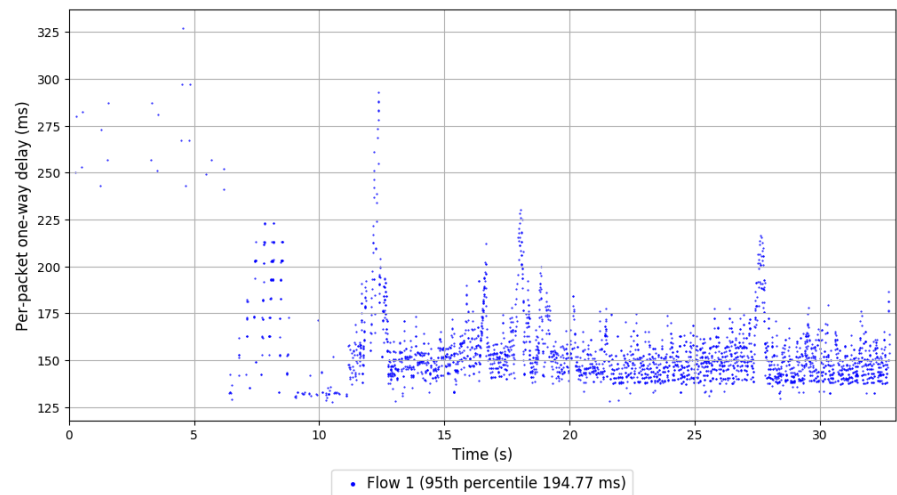
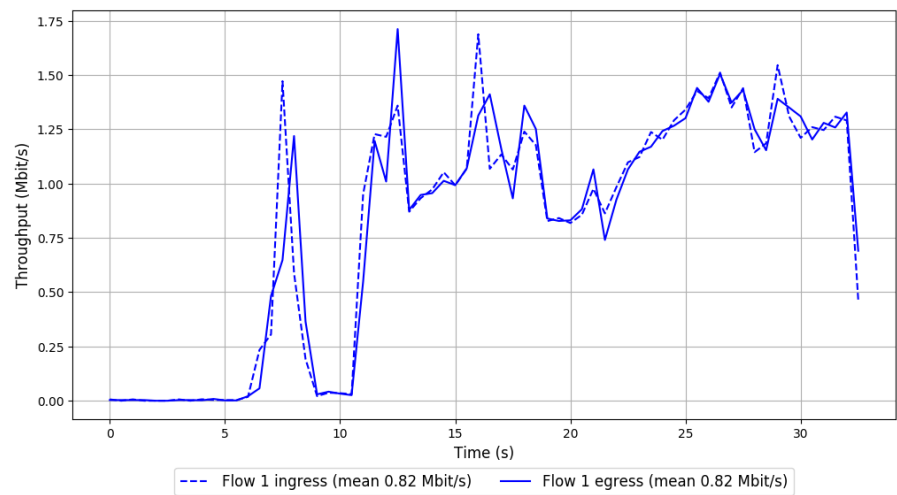
-- Flow 1:

Average throughput: 0.82 Mbit/s

95th percentile per-packet one-way delay: 194.766 ms

Loss rate: 0.33%

Run 3: Report of WebRTC media — Data Link

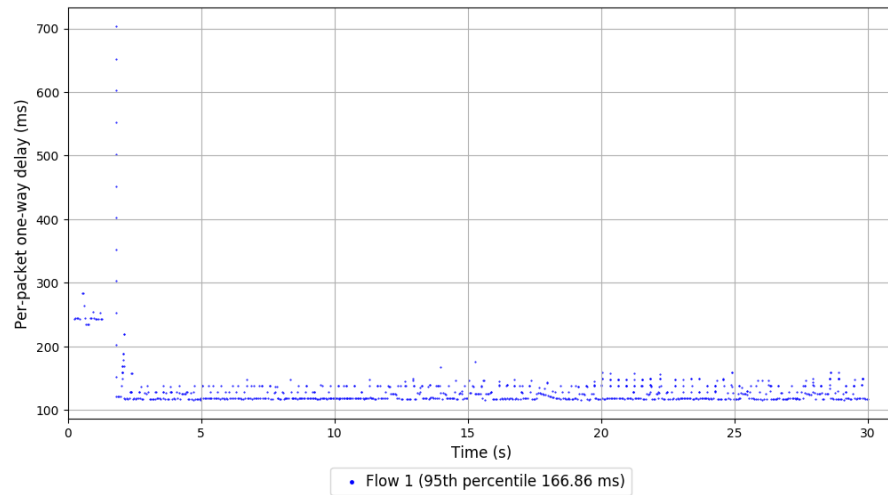
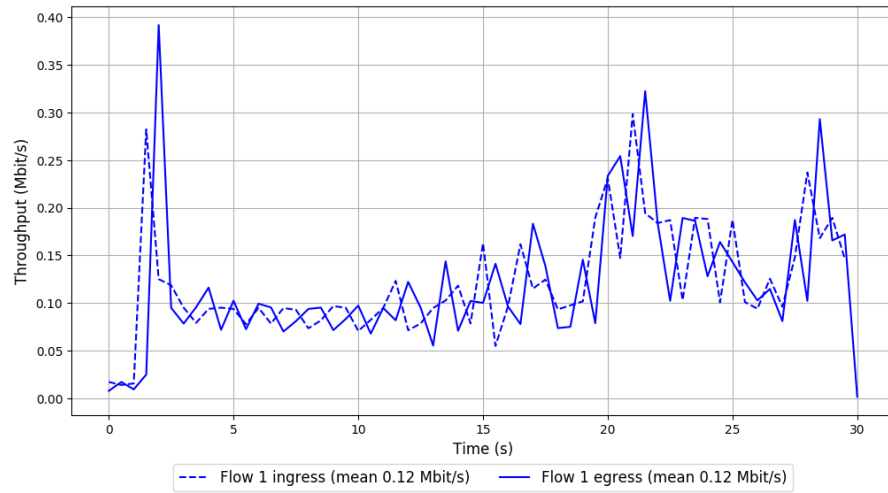


Run 1: Statistics of Sprout

Start at: 2018-02-02 13:25:46
End at: 2018-02-02 13:26:16
Local clock offset: 0.463 ms
Remote clock offset: -4.287 ms

Below is generated by plot.py at 2018-02-02 14:19:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 166.857 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 166.857 ms
Loss rate: 0.16%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2018-02-02 13:45:52

End at: 2018-02-02 13:46:22

Local clock offset: 0.305 ms

Remote clock offset: 1.666 ms

Below is generated by plot.py at 2018-02-02 14:19:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 243.898 ms

Loss rate: 0.34%

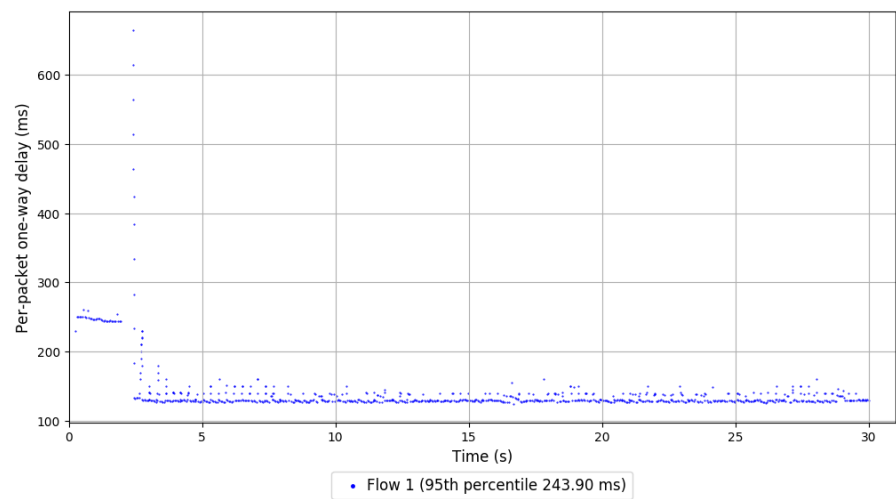
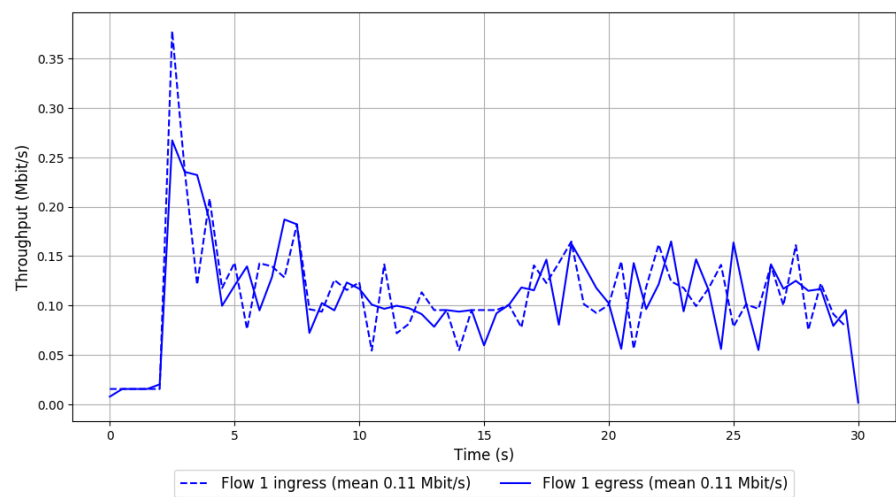
-- Flow 1:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 243.898 ms

Loss rate: 0.34%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2018-02-02 14:05:58

End at: 2018-02-02 14:06:28

Local clock offset: 0.354 ms

Remote clock offset: 0.849 ms

Below is generated by plot.py at 2018-02-02 14:19:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 170.125 ms

Loss rate: 0.02%

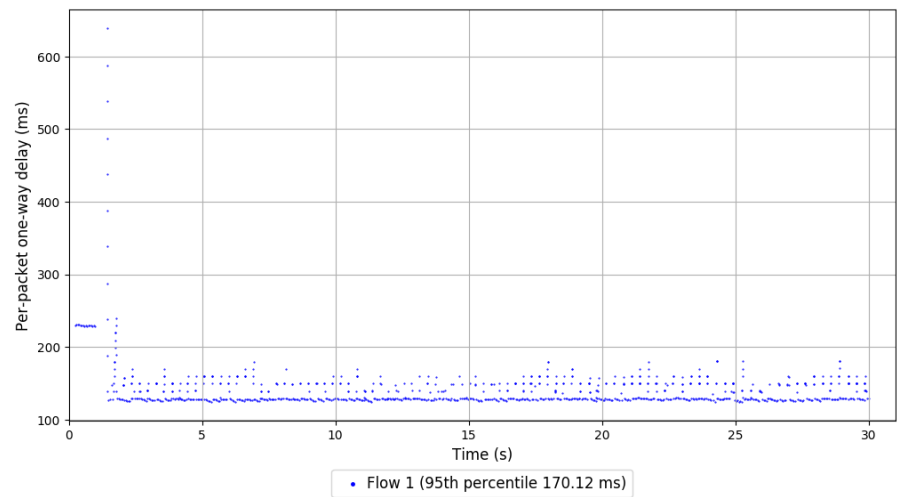
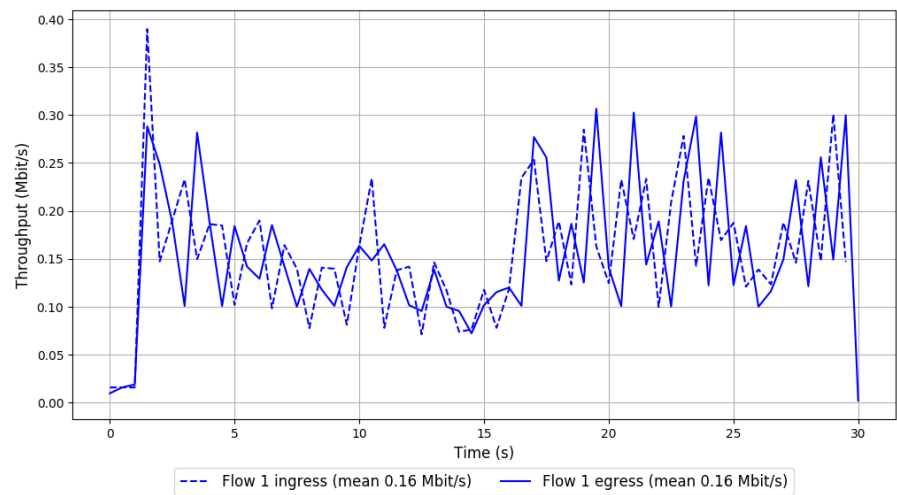
-- Flow 1:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 170.125 ms

Loss rate: 0.02%

Run 3: Report of Sprout — Data Link

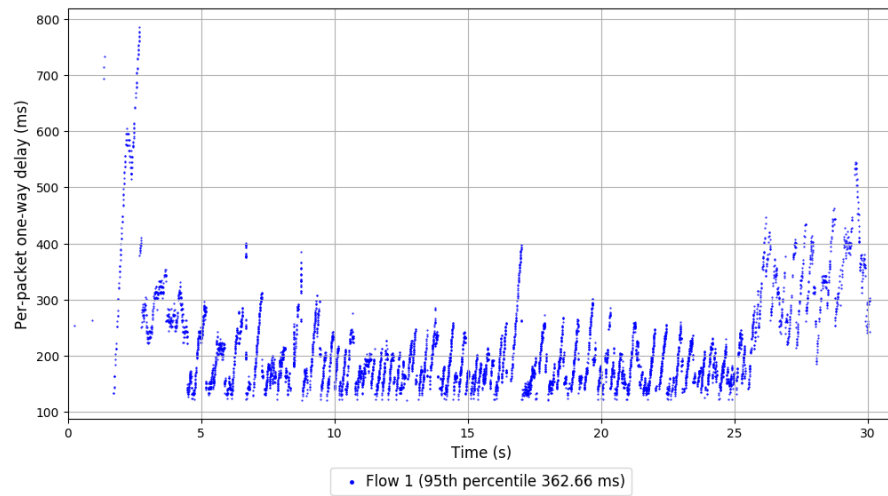
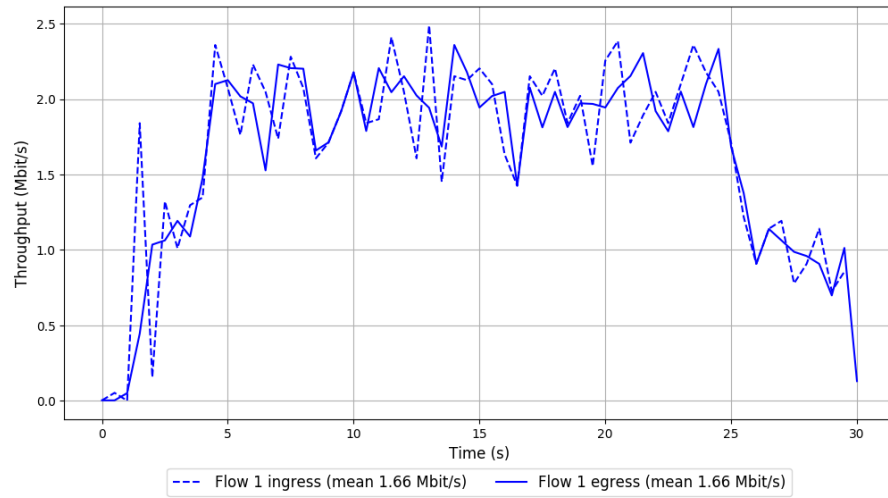


```
Run 1: Statistics of TaoVA-100x

Start at: 2018-02-02 13:29:19
End at: 2018-02-02 13:29:49
Local clock offset: 0.42 ms
Remote clock offset: 0.733 ms

# Below is generated by plot.py at 2018-02-02 14:19:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 362.661 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 362.661 ms
Loss rate: 0.49%
```

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-02-02 13:49:25

End at: 2018-02-02 13:49:55

Local clock offset: 0.372 ms

Remote clock offset: -4.215 ms

Below is generated by plot.py at 2018-02-02 14:19:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.93 Mbit/s

95th percentile per-packet one-way delay: 273.535 ms

Loss rate: 0.34%

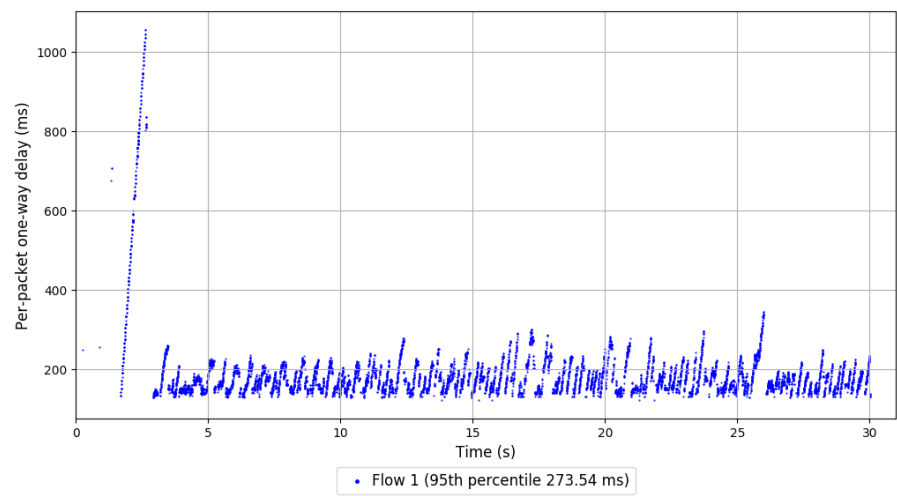
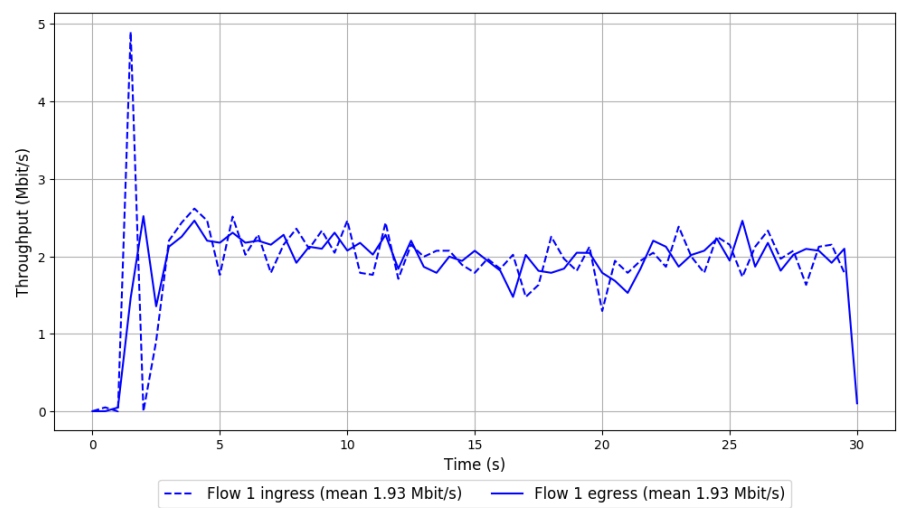
-- Flow 1:

Average throughput: 1.93 Mbit/s

95th percentile per-packet one-way delay: 273.535 ms

Loss rate: 0.34%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-02-02 14:09:31

End at: 2018-02-02 14:10:01

Local clock offset: 0.335 ms

Remote clock offset: -0.086 ms

Below is generated by plot.py at 2018-02-02 14:19:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 322.268 ms

Loss rate: 0.55%

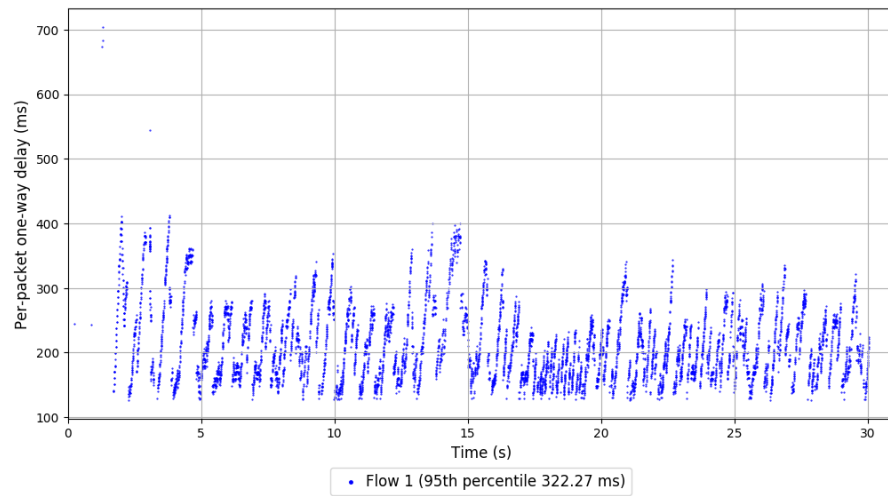
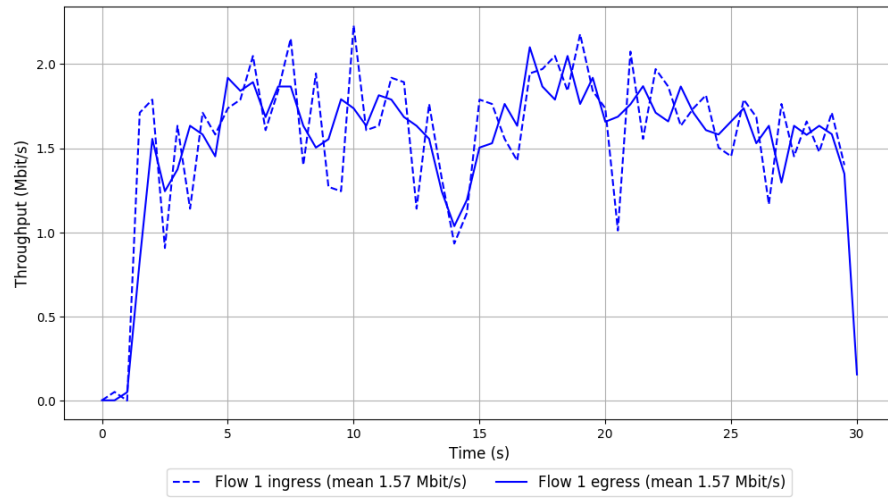
-- Flow 1:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 322.268 ms

Loss rate: 0.55%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-02-02 13:37:35

End at: 2018-02-02 13:38:05

Local clock offset: 0.396 ms

Remote clock offset: 1.911 ms

Below is generated by plot.py at 2018-02-02 14:19:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 525.751 ms

Loss rate: 0.24%

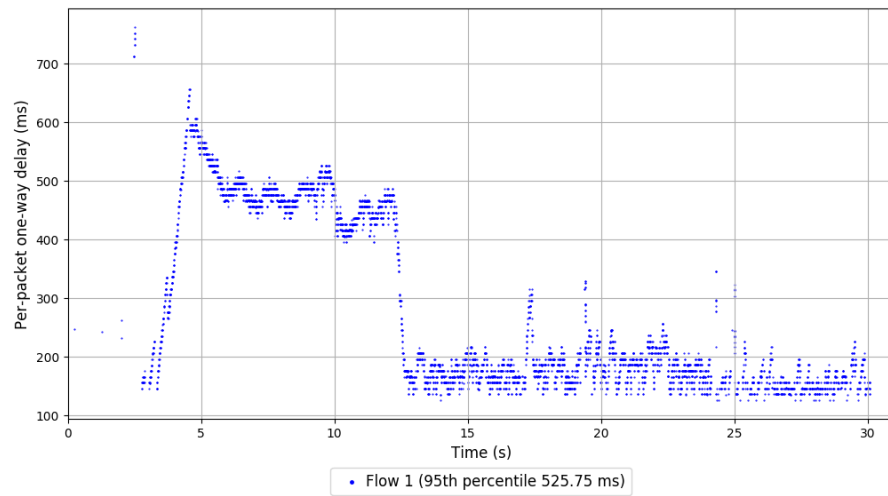
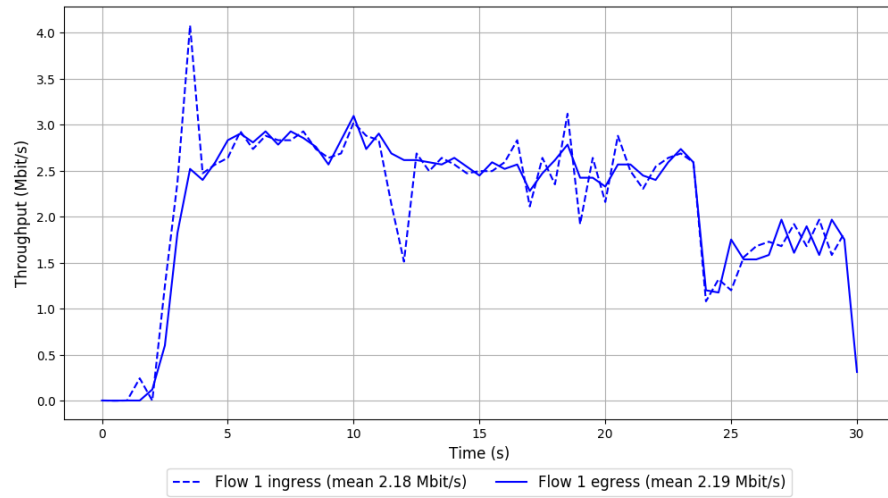
-- Flow 1:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 525.751 ms

Loss rate: 0.24%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-02-02 13:57:41

End at: 2018-02-02 13:58:11

Local clock offset: 0.378 ms

Remote clock offset: 2.01 ms

Below is generated by plot.py at 2018-02-02 14:19:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.61 Mbit/s

95th percentile per-packet one-way delay: 532.093 ms

Loss rate: 0.52%

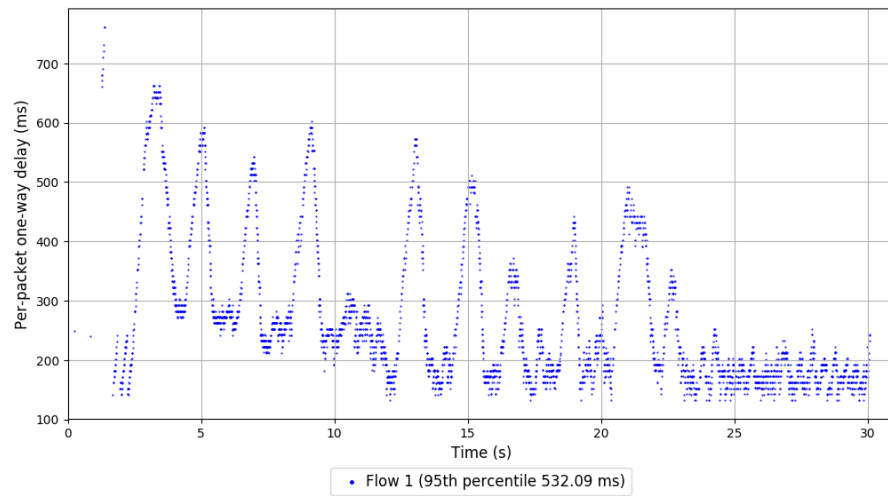
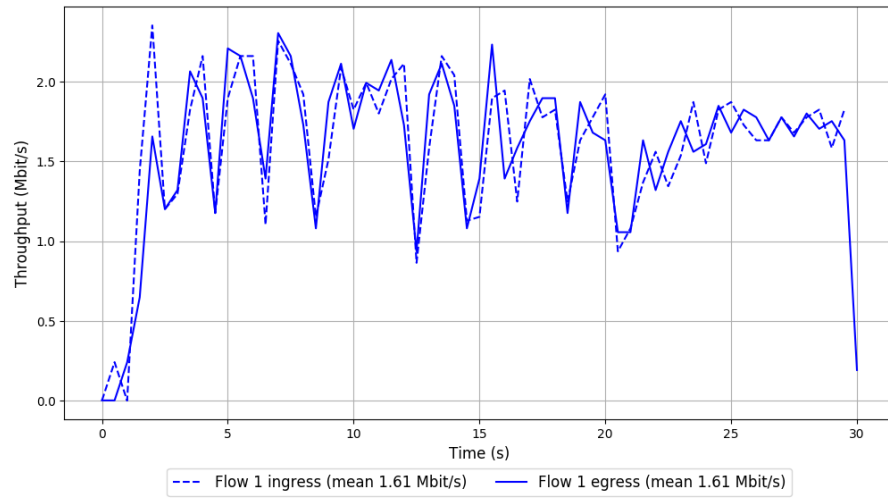
-- Flow 1:

Average throughput: 1.61 Mbit/s

95th percentile per-packet one-way delay: 532.093 ms

Loss rate: 0.52%

Run 2: Report of TCP Vegas — Data Link

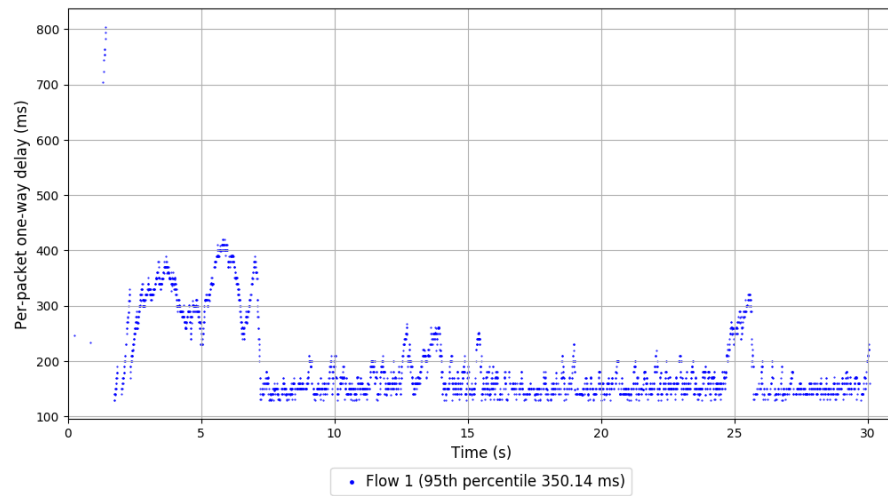
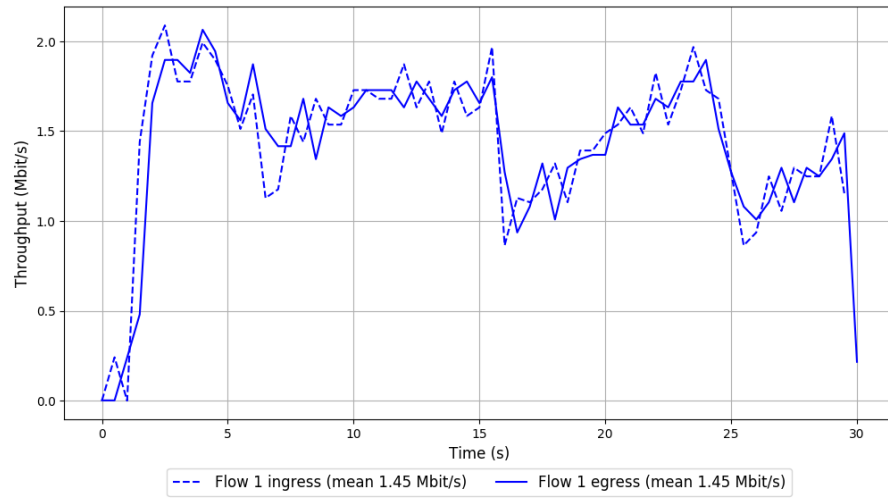


Run 3: Statistics of TCP Vegas

Start at: 2018-02-02 14:17:50
End at: 2018-02-02 14:18:20
Local clock offset: 0.313 ms
Remote clock offset: -0.457 ms

Below is generated by plot.py at 2018-02-02 14:19:38
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 350.141 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 350.141 ms
Loss rate: 0.19%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-02-02 13:26:57

End at: 2018-02-02 13:27:27

Local clock offset: 0.447 ms

Remote clock offset: 0.59 ms

Below is generated by plot.py at 2018-02-02 14:19:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.01 Mbit/s

95th percentile per-packet one-way delay: 2016.955 ms

Loss rate: 5.27%

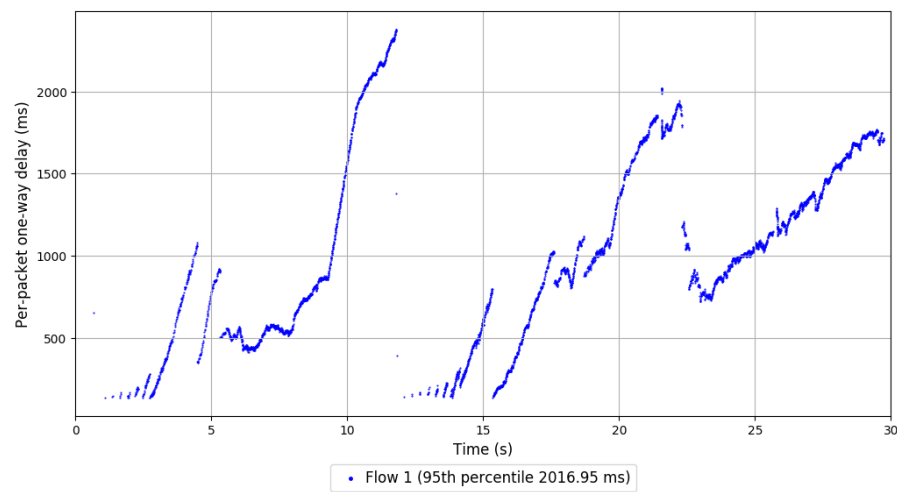
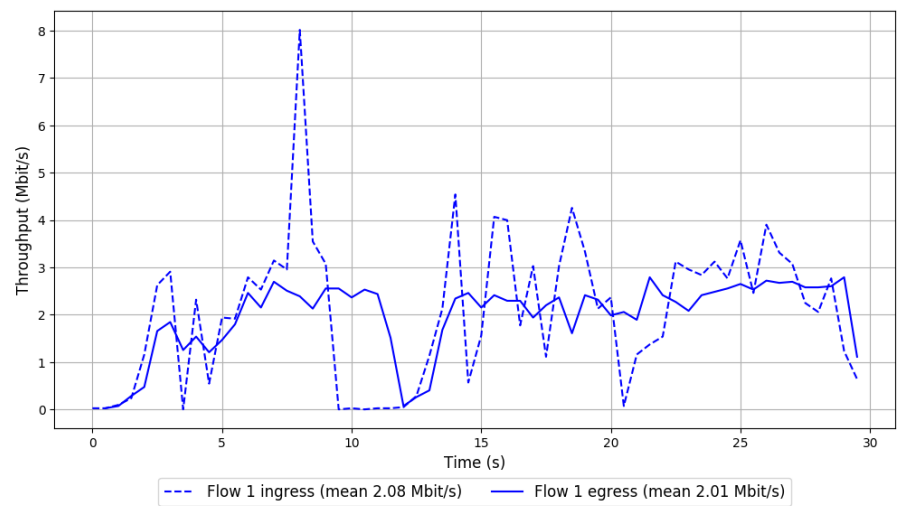
-- Flow 1:

Average throughput: 2.01 Mbit/s

95th percentile per-packet one-way delay: 2016.955 ms

Loss rate: 5.27%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-02-02 13:47:03

End at: 2018-02-02 13:47:33

Local clock offset: 0.365 ms

Remote clock offset: -3.21 ms

Below is generated by plot.py at 2018-02-02 14:19:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.14 Mbit/s

95th percentile per-packet one-way delay: 1992.387 ms

Loss rate: 4.49%

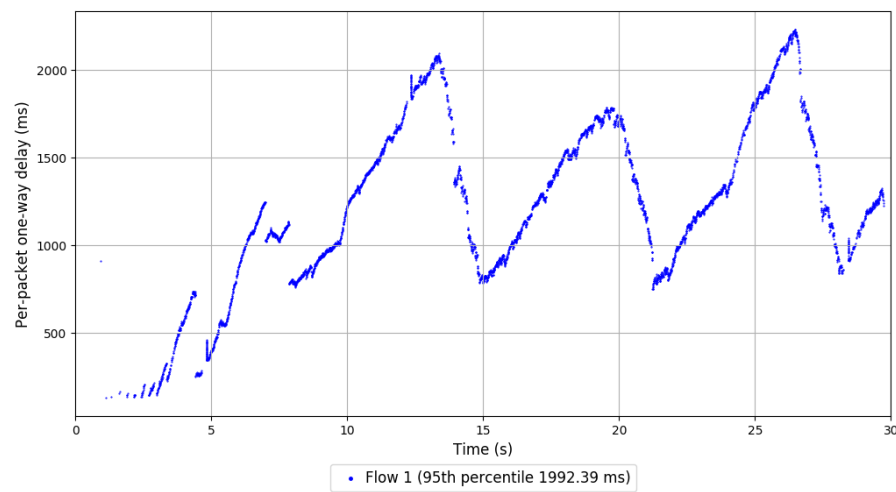
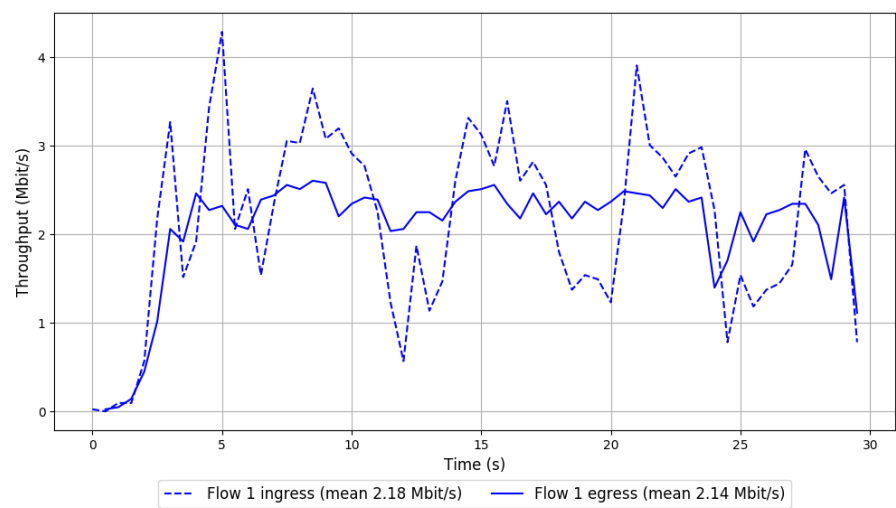
-- Flow 1:

Average throughput: 2.14 Mbit/s

95th percentile per-packet one-way delay: 1992.387 ms

Loss rate: 4.49%

Run 2: Report of Verus — Data Link

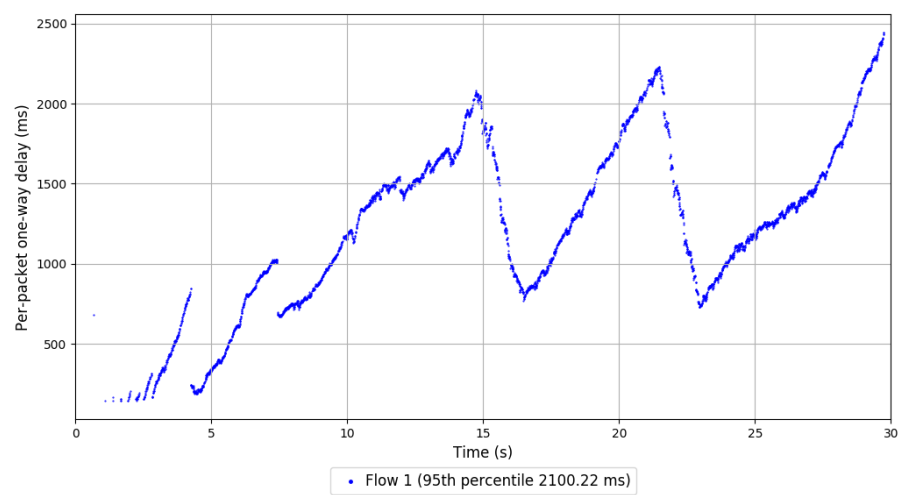
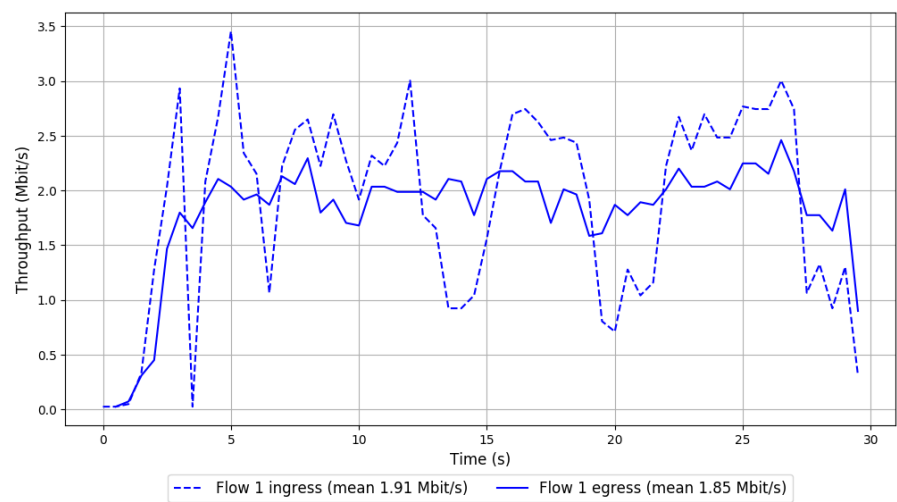


Run 3: Statistics of Verus

Start at: 2018-02-02 14:07:09
End at: 2018-02-02 14:07:39
Local clock offset: 0.367 ms
Remote clock offset: -0.031 ms

Below is generated by plot.py at 2018-02-02 14:19:39
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 2100.219 ms
Loss rate: 4.91%
-- Flow 1:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 2100.219 ms
Loss rate: 4.91%

Run 3: Report of Verus — Data Link

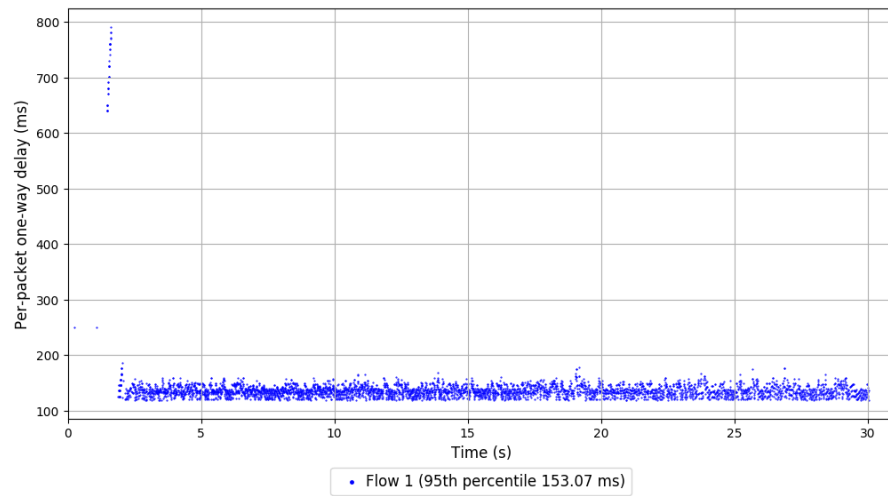
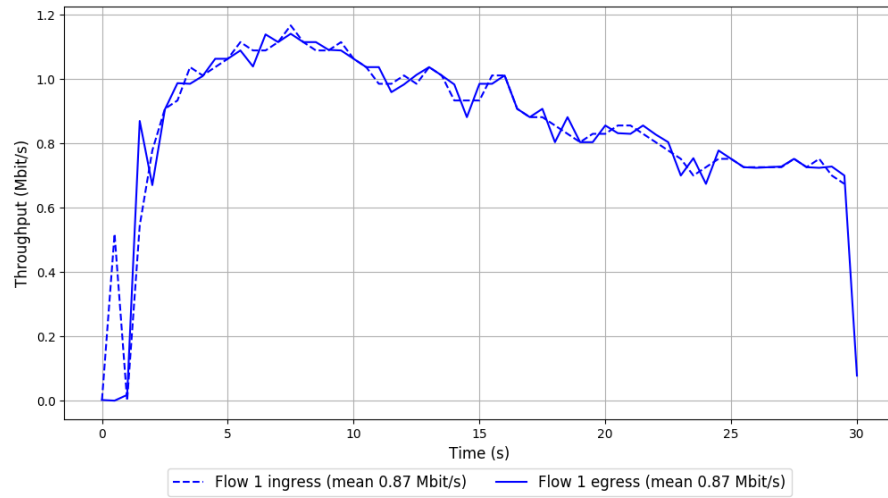


Run 1: Statistics of Copa

Start at: 2018-02-02 13:31:41
End at: 2018-02-02 13:32:11
Local clock offset: 0.396 ms
Remote clock offset: -4.136 ms

Below is generated by plot.py at 2018-02-02 14:19:40
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 153.075 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 153.075 ms
Loss rate: 0.25%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-02-02 13:51:47

End at: 2018-02-02 13:52:17

Local clock offset: 0.362 ms

Remote clock offset: 0.609 ms

Below is generated by plot.py at 2018-02-02 14:19:41

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.85 Mbit/s

95th percentile per-packet one-way delay: 158.056 ms

Loss rate: 0.10%

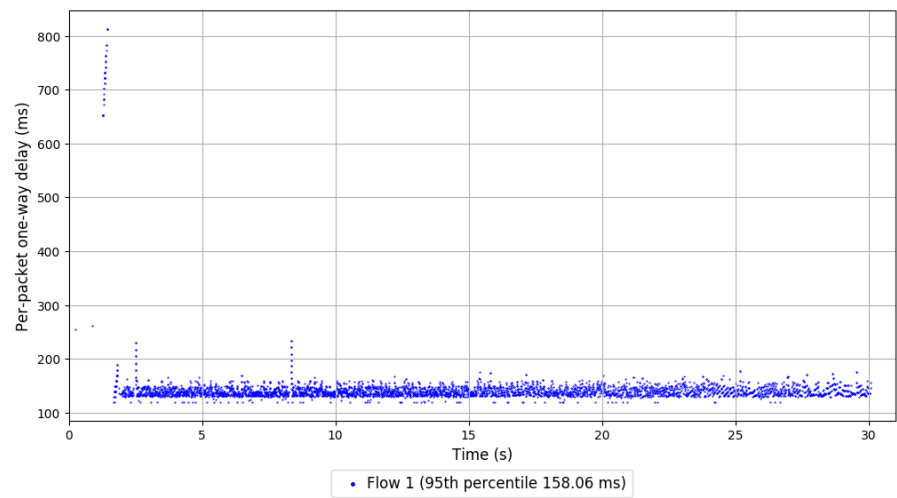
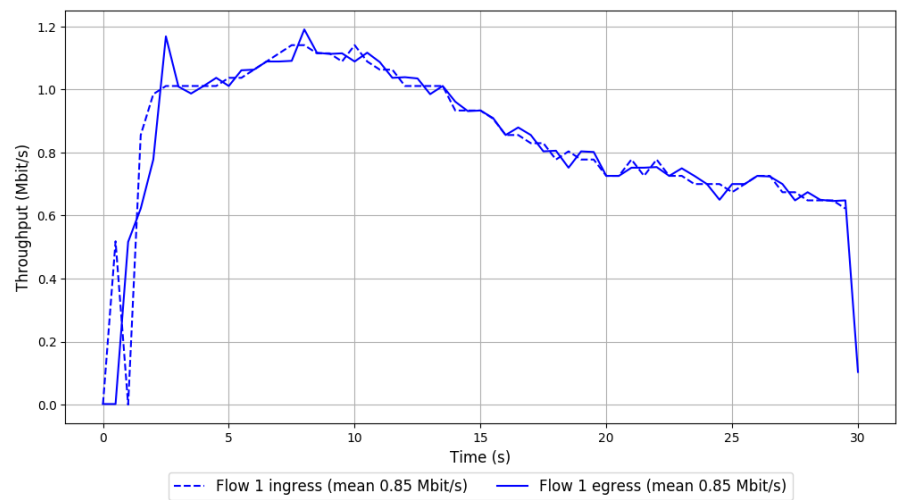
-- Flow 1:

Average throughput: 0.85 Mbit/s

95th percentile per-packet one-way delay: 158.056 ms

Loss rate: 0.10%

Run 2: Report of Copa — Data Link

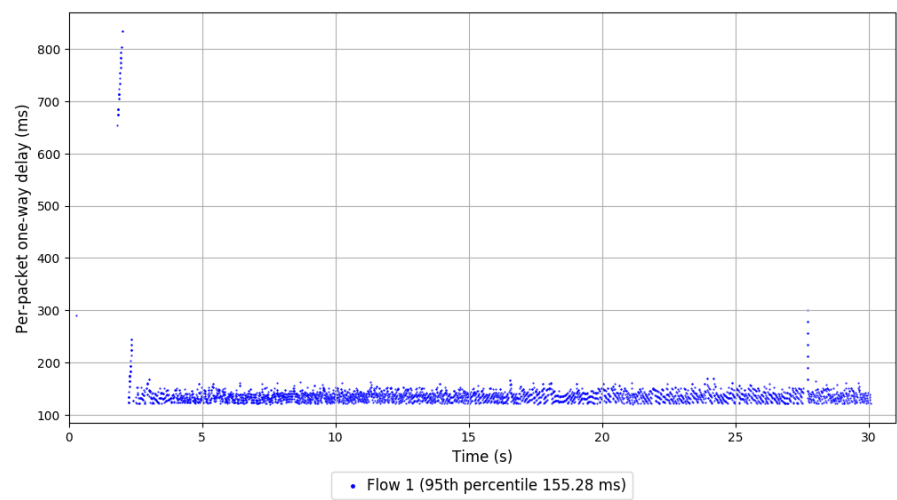
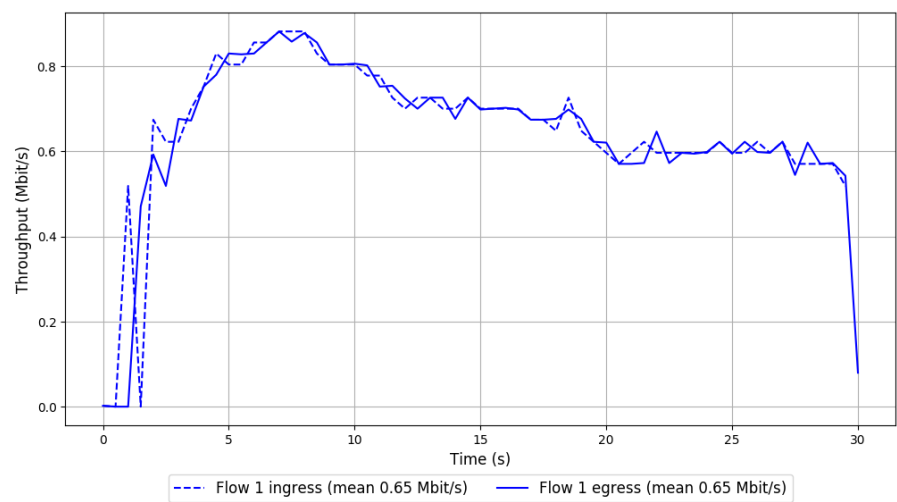


Run 3: Statistics of Copa

Start at: 2018-02-02 14:11:55
End at: 2018-02-02 14:12:26
Local clock offset: 0.322 ms
Remote clock offset: -4.281 ms

Below is generated by plot.py at 2018-02-02 14:19:41
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 155.285 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 155.285 ms
Loss rate: 0.20%

Run 3: Report of Copa — Data Link

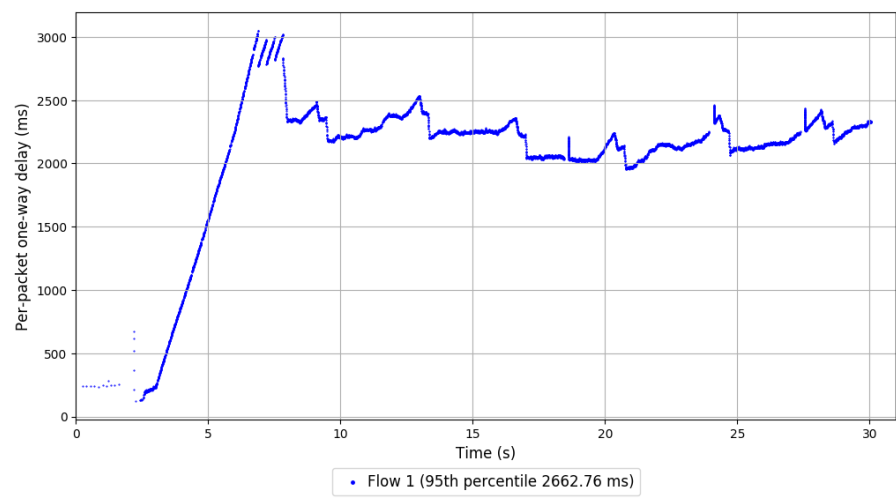
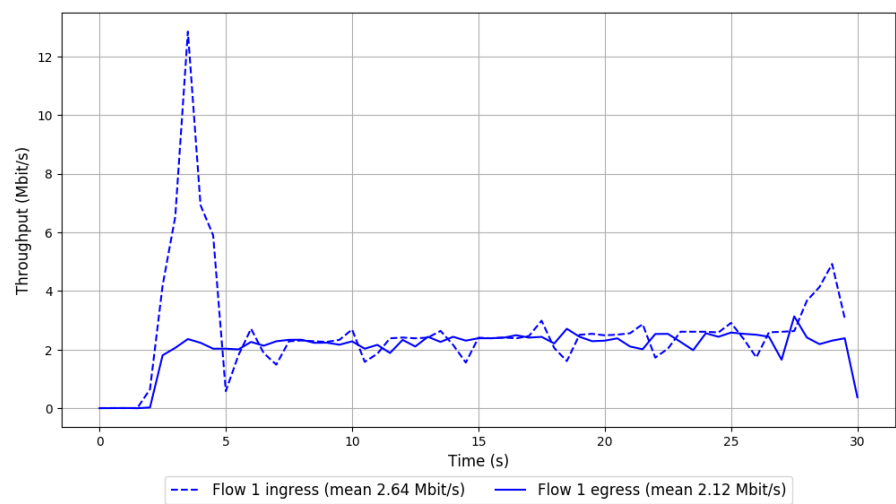


```
Run 1: Statistics of FillP

Start at: 2018-02-02 13:21:03
End at: 2018-02-02 13:21:33
Local clock offset: 0.399 ms
Remote clock offset: 1.436 ms

# Below is generated by plot.py at 2018-02-02 14:19:46
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 2662.764 ms
Loss rate: 19.90%
-- Flow 1:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 2662.764 ms
Loss rate: 19.90%
```

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-02-02 13:41:09

End at: 2018-02-02 13:41:39

Local clock offset: 0.391 ms

Remote clock offset: 1.105 ms

Below is generated by plot.py at 2018-02-02 14:19:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.49 Mbit/s

95th percentile per-packet one-way delay: 2102.331 ms

Loss rate: 14.35%

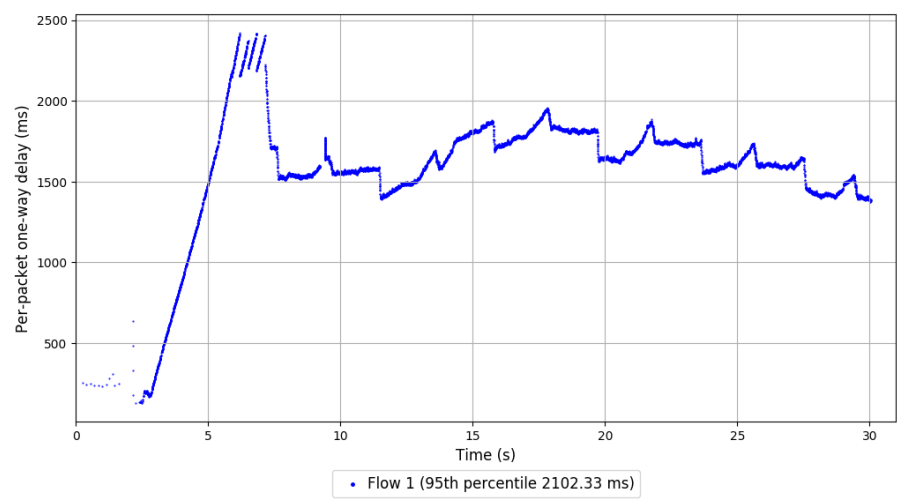
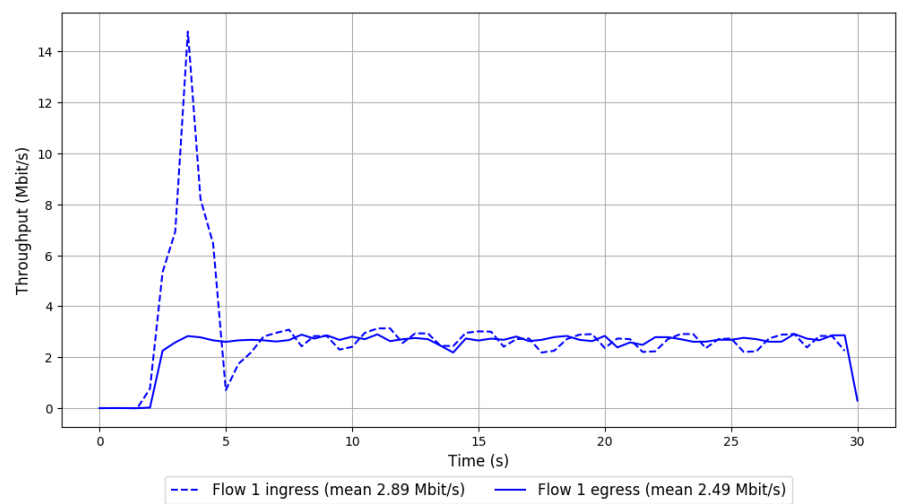
-- Flow 1:

Average throughput: 2.49 Mbit/s

95th percentile per-packet one-way delay: 2102.331 ms

Loss rate: 14.35%

Run 2: Report of FillP — Data Link

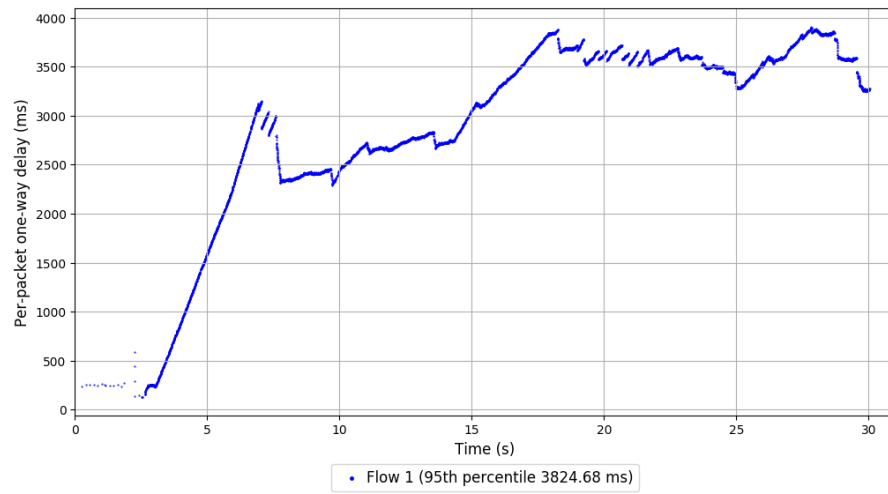
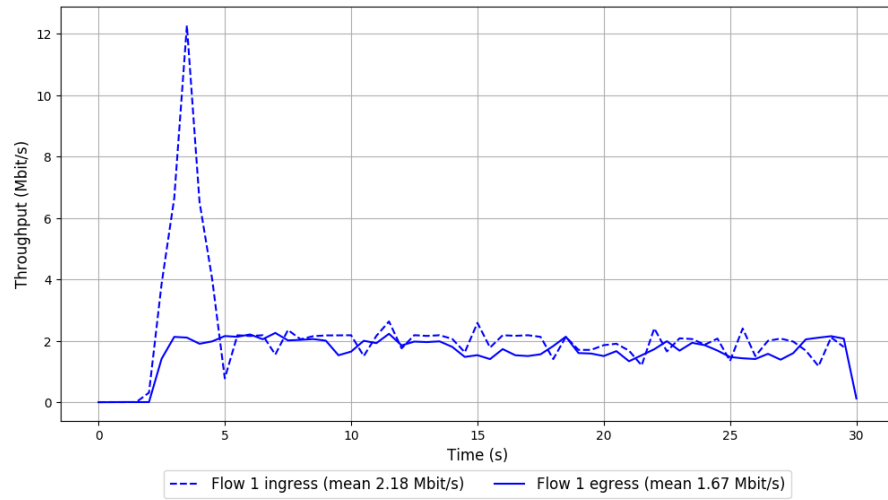


Run 3: Statistics of FillP

Start at: 2018-02-02 14:01:15
End at: 2018-02-02 14:01:45
Local clock offset: 0.359 ms
Remote clock offset: -3.941 ms

Below is generated by plot.py at 2018-02-02 14:19:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 3824.680 ms
Loss rate: 23.80%
-- Flow 1:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 3824.680 ms
Loss rate: 23.80%

Run 3: Report of FillP — Data Link

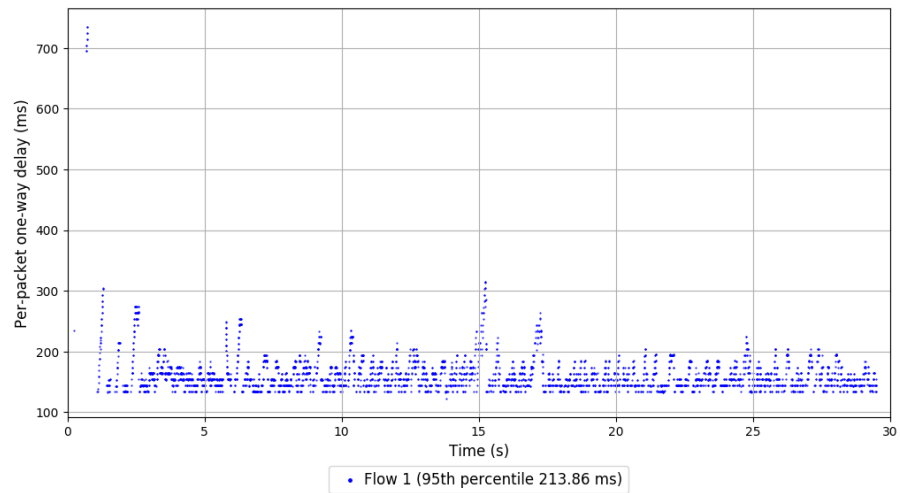
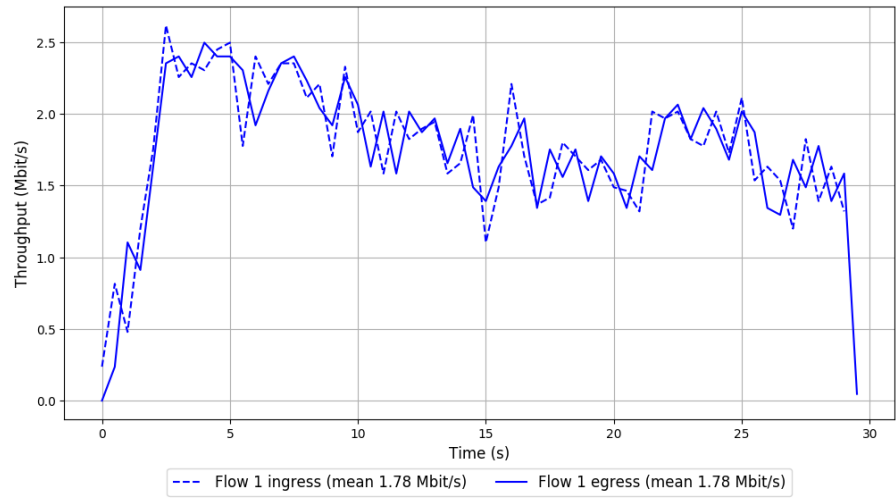


Run 1: Statistics of Indigo-1-32

Start at: 2018-02-02 13:32:51
End at: 2018-02-02 13:33:21
Local clock offset: 0.393 ms
Remote clock offset: -3.187 ms

Below is generated by plot.py at 2018-02-02 14:19:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.78 Mbit/s
95th percentile per-packet one-way delay: 213.863 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 1.78 Mbit/s
95th percentile per-packet one-way delay: 213.863 ms
Loss rate: 0.21%

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



Run 2: Statistics of Indigo-1-32

Start at: 2018-02-02 13:52:58

End at: 2018-02-02 13:53:28

Local clock offset: 0.364 ms

Remote clock offset: 0.455 ms

Below is generated by plot.py at 2018-02-02 14:19:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.36 Mbit/s

95th percentile per-packet one-way delay: 205.294 ms

Loss rate: 0.03%

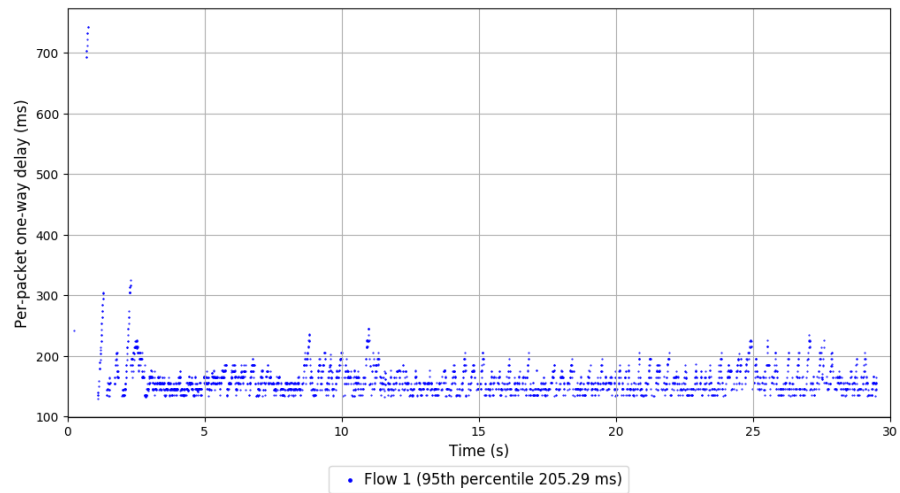
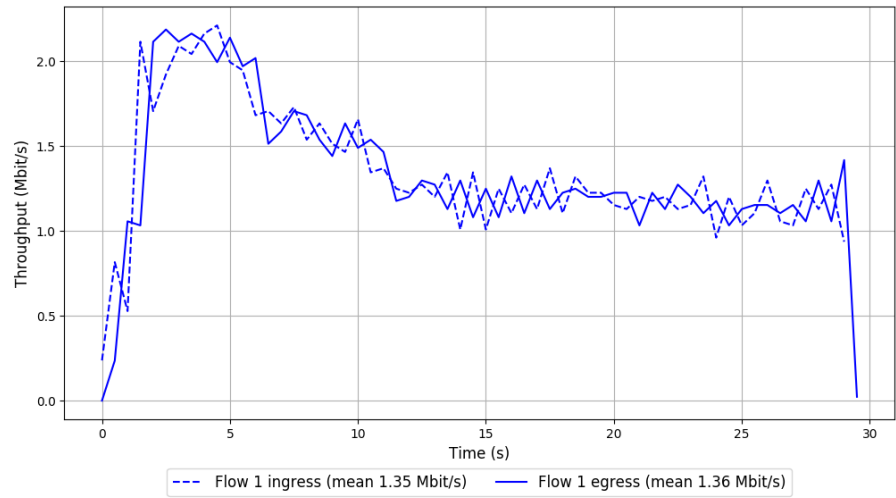
-- Flow 1:

Average throughput: 1.36 Mbit/s

95th percentile per-packet one-way delay: 205.294 ms

Loss rate: 0.03%

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

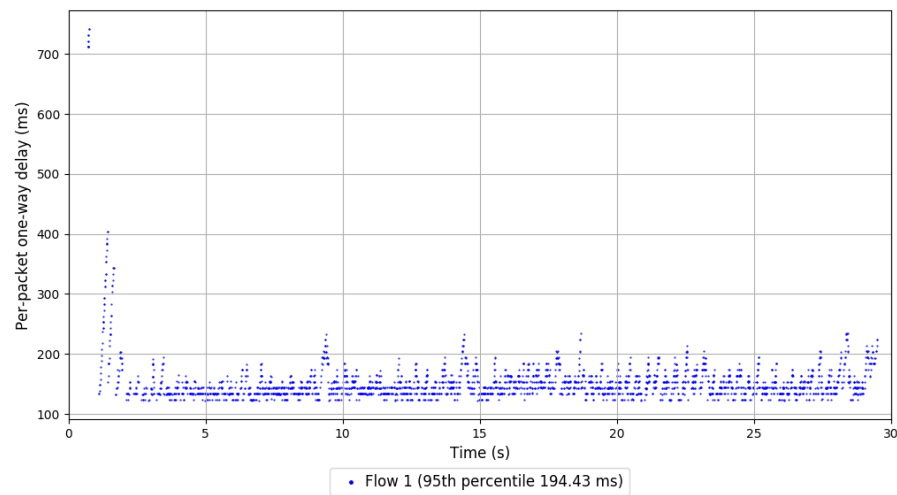
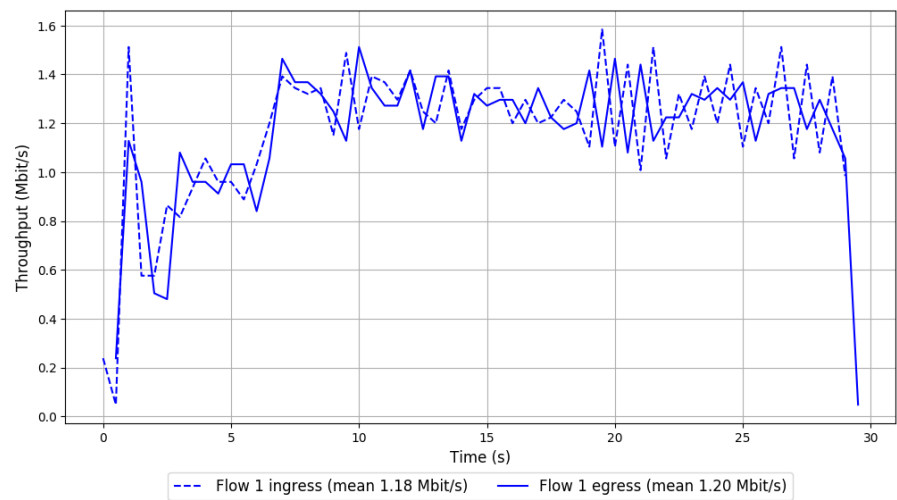


Run 3: Statistics of Indigo-1-32

Start at: 2018-02-02 14:13:06
End at: 2018-02-02 14:13:36
Local clock offset: 0.339 ms
Remote clock offset: -5.117 ms

Below is generated by plot.py at 2018-02-02 14:19:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 194.427 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 194.427 ms
Loss rate: 0.55%

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



Run 1: Statistics of Vivace-latency

Start at: 2018-02-02 13:35:13

End at: 2018-02-02 13:35:43

Local clock offset: 0.391 ms

Remote clock offset: -3.95 ms

Below is generated by plot.py at 2018-02-02 14:19:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.63 Mbit/s

95th percentile per-packet one-way delay: 854.183 ms

Loss rate: 0.78%

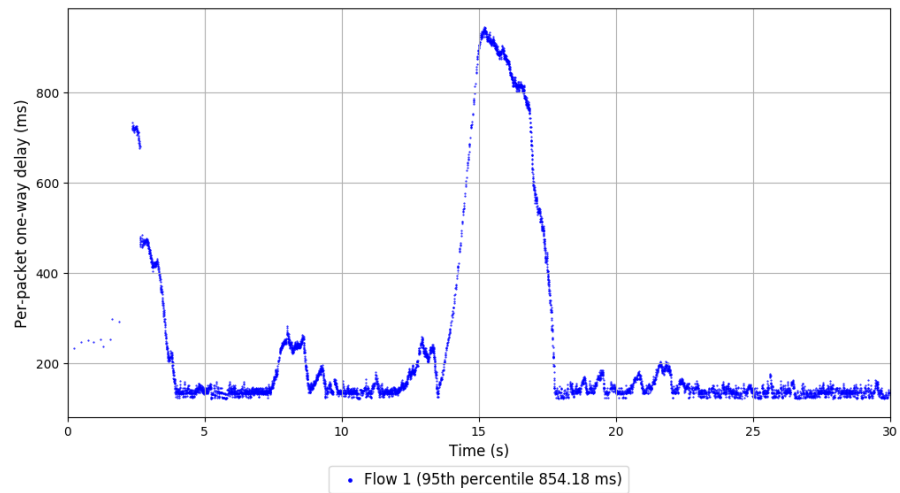
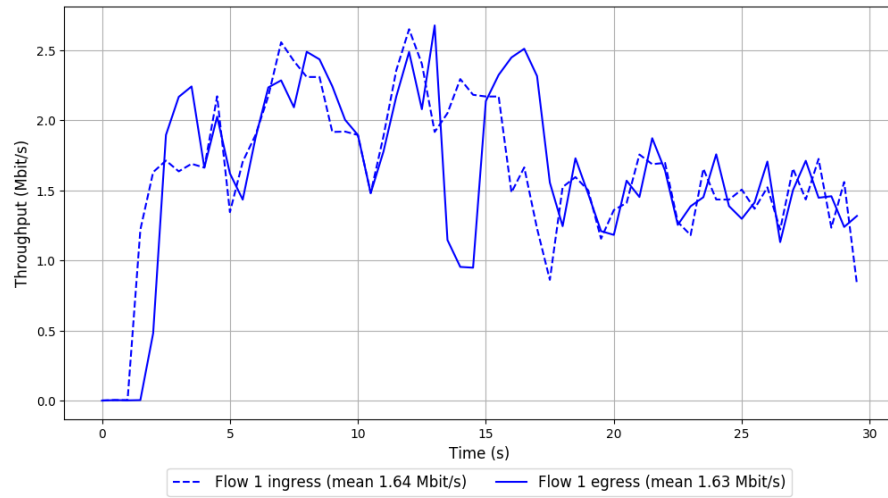
-- Flow 1:

Average throughput: 1.63 Mbit/s

95th percentile per-packet one-way delay: 854.183 ms

Loss rate: 0.78%

Run 1: Report of Vivace-latency — Data Link

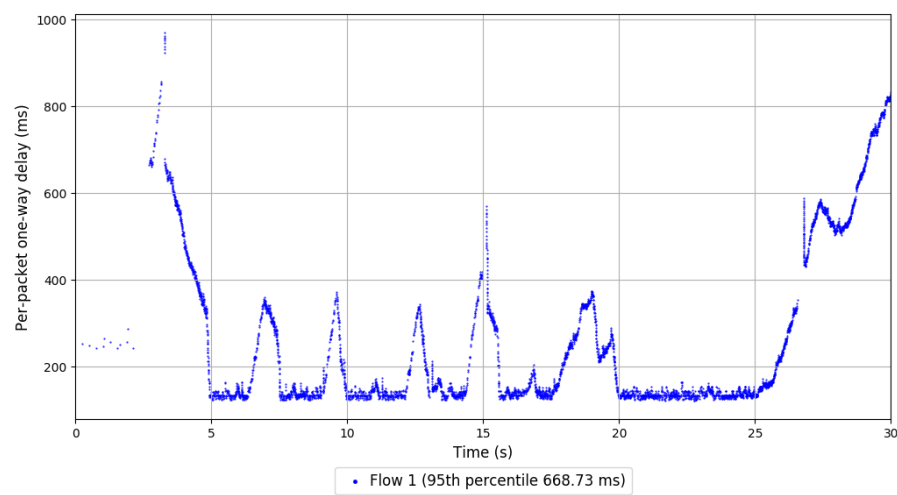
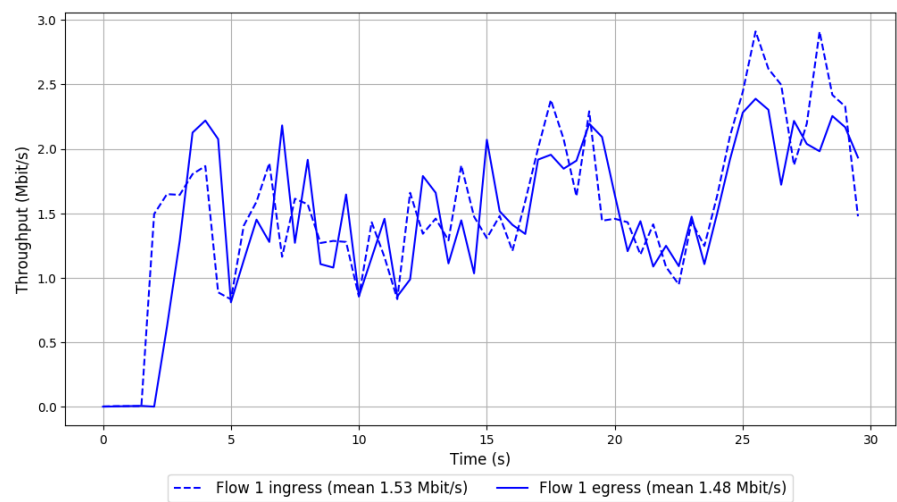


Run 2: Statistics of Vivace-latency

Start at: 2018-02-02 13:55:20
End at: 2018-02-02 13:55:50
Local clock offset: 0.359 ms
Remote clock offset: -4.381 ms

Below is generated by plot.py at 2018-02-02 14:19:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 668.732 ms
Loss rate: 4.18%
-- Flow 1:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 668.732 ms
Loss rate: 4.18%

Run 2: Report of Vivace-latency — Data Link



Run 3: Statistics of Vivace-latency

Start at: 2018-02-02 14:15:28

End at: 2018-02-02 14:15:58

Local clock offset: 0.322 ms

Remote clock offset: 1.309 ms

Below is generated by plot.py at 2018-02-02 14:19:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.39 Mbit/s

95th percentile per-packet one-way delay: 463.007 ms

Loss rate: 1.72%

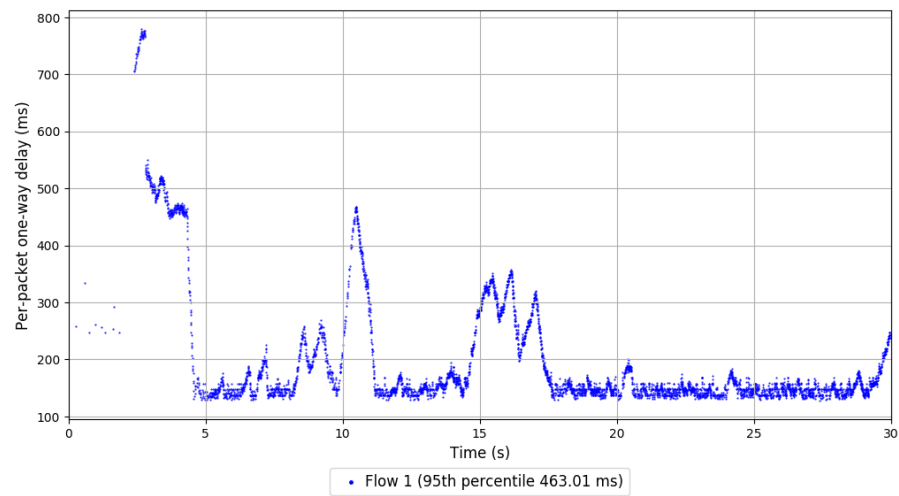
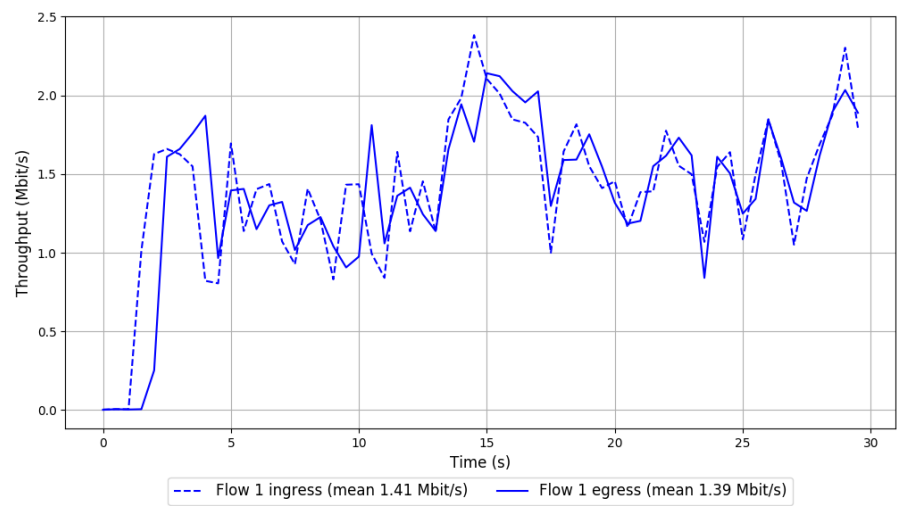
-- Flow 1:

Average throughput: 1.39 Mbit/s

95th percentile per-packet one-way delay: 463.007 ms

Loss rate: 1.72%

Run 3: Report of Vivace-latency — Data Link

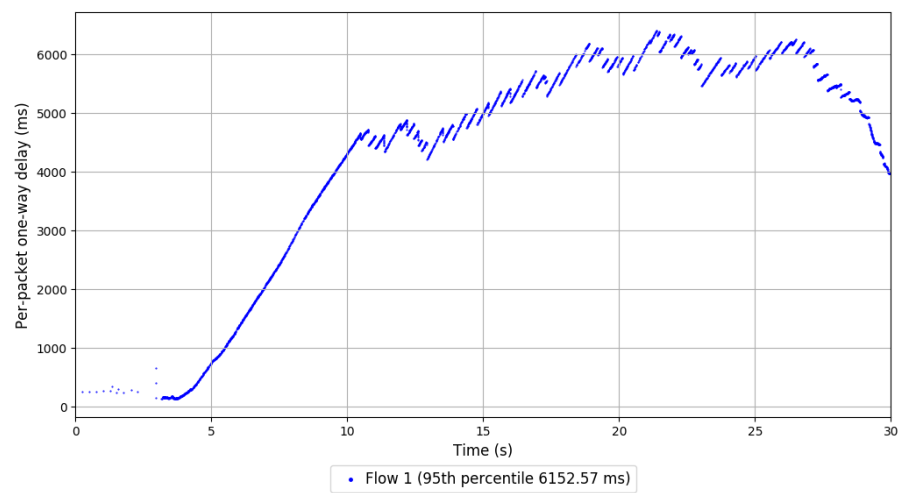
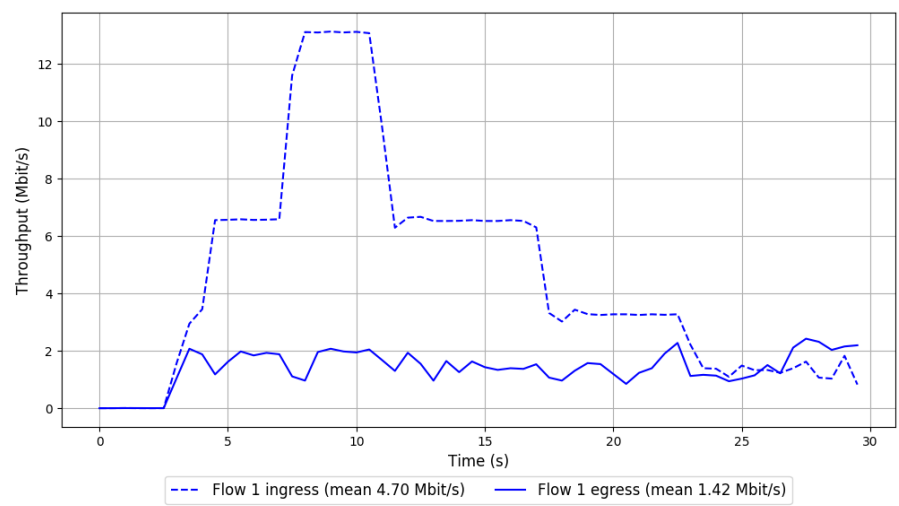


Run 1: Statistics of Vivace-loss

Start at: 2018-02-02 13:18:41
End at: 2018-02-02 13:19:11
Local clock offset: 0.505 ms
Remote clock offset: -3.425 ms

Below is generated by plot.py at 2018-02-02 14:19:51
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 6152.575 ms
Loss rate: 69.93%
-- Flow 1:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 6152.575 ms
Loss rate: 69.93%

Run 1: Report of Vivace-loss — Data Link



Run 2: Statistics of Vivace-loss

Start at: 2018-02-02 13:38:46

End at: 2018-02-02 13:39:16

Local clock offset: 0.364 ms

Remote clock offset: 1.887 ms

Below is generated by plot.py at 2018-02-02 14:19:52

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.38 Mbit/s

95th percentile per-packet one-way delay: 3058.282 ms

Loss rate: 30.23%

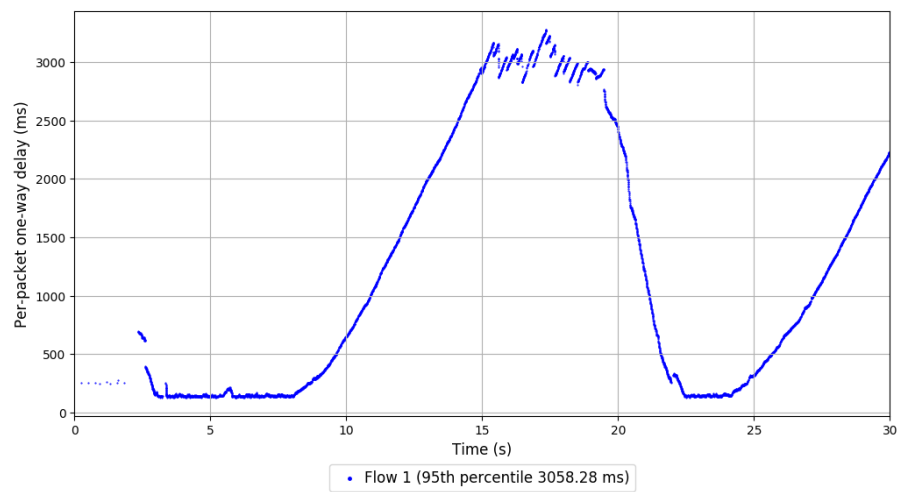
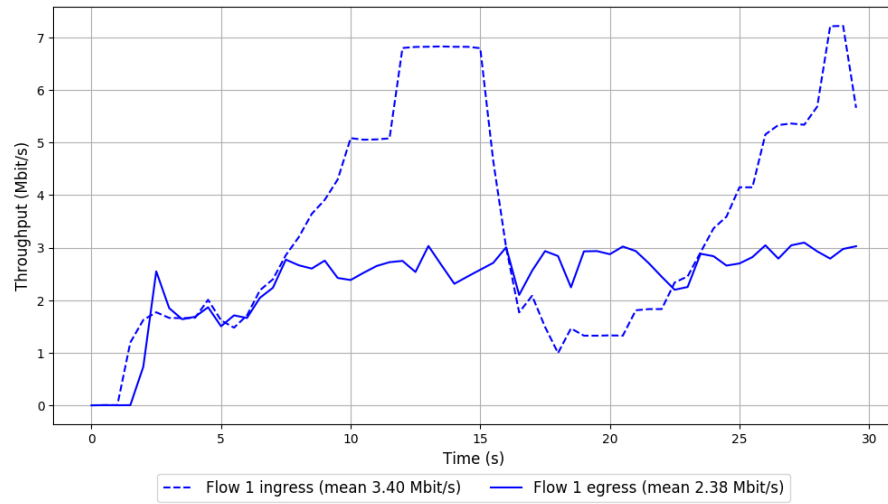
-- Flow 1:

Average throughput: 2.38 Mbit/s

95th percentile per-packet one-way delay: 3058.282 ms

Loss rate: 30.23%

Run 2: Report of Vivace-loss — Data Link



Run 3: Statistics of Vivace-loss

Start at: 2018-02-02 13:58:53

End at: 2018-02-02 13:59:23

Local clock offset: 0.348 ms

Remote clock offset: 0.277 ms

Below is generated by plot.py at 2018-02-02 14:19:52

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.92 Mbit/s

95th percentile per-packet one-way delay: 3650.421 ms

Loss rate: 31.94%

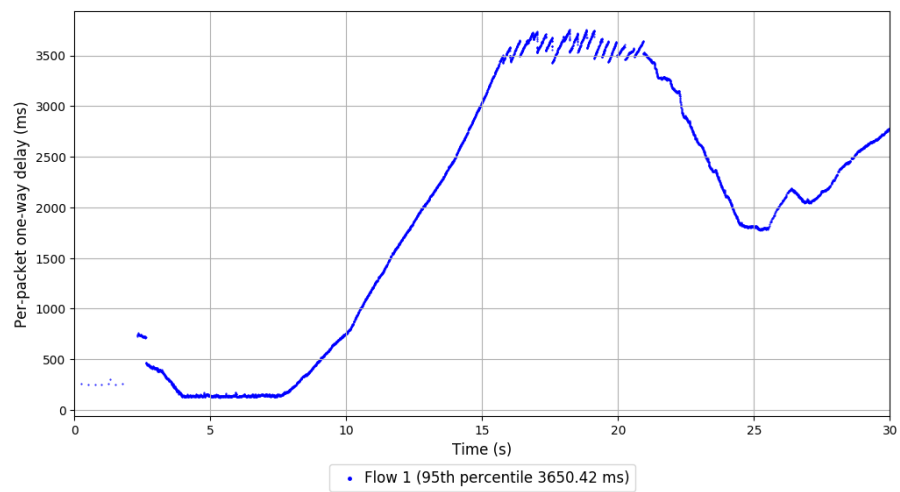
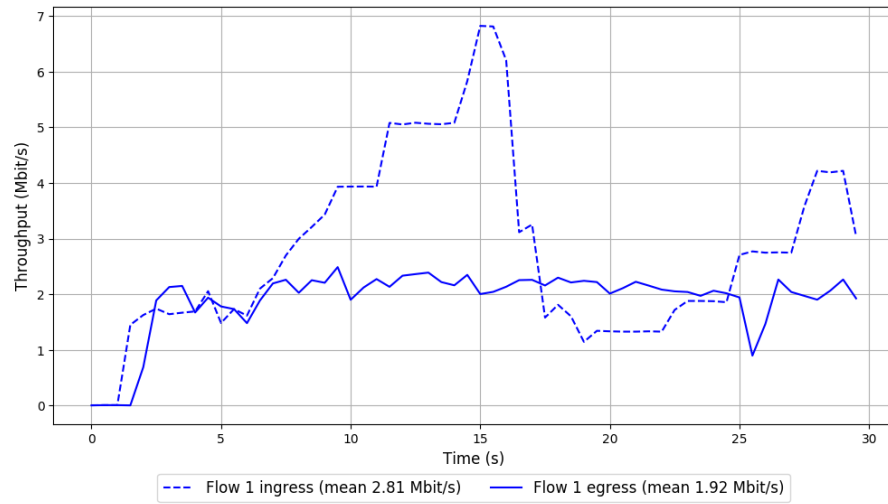
-- Flow 1:

Average throughput: 1.92 Mbit/s

95th percentile per-packet one-way delay: 3650.421 ms

Loss rate: 31.94%

Run 3: Report of Vivace-loss — Data Link



Run 1: Statistics of Vivace-LTE

Start at: 2018-02-02 13:24:36

End at: 2018-02-02 13:25:06

Local clock offset: 0.472 ms

Remote clock offset: 1.261 ms

Below is generated by plot.py at 2018-02-02 14:19:52

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 298.899 ms

Loss rate: 0.00%

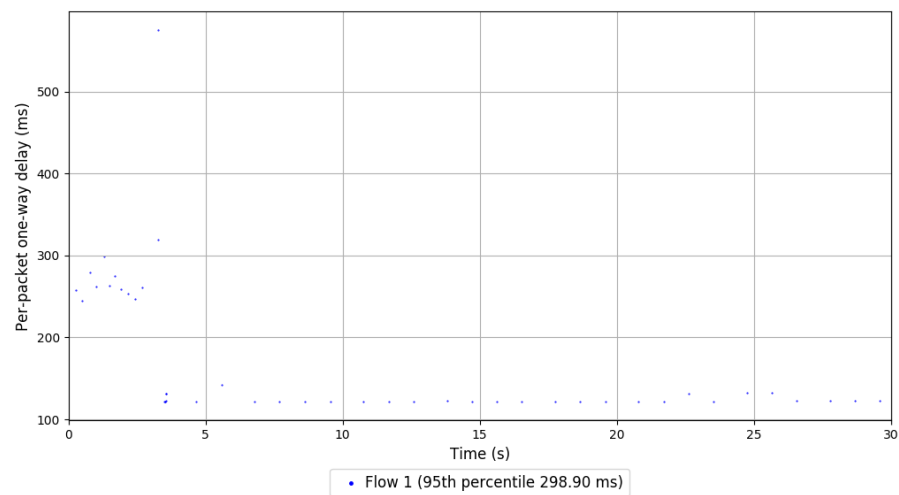
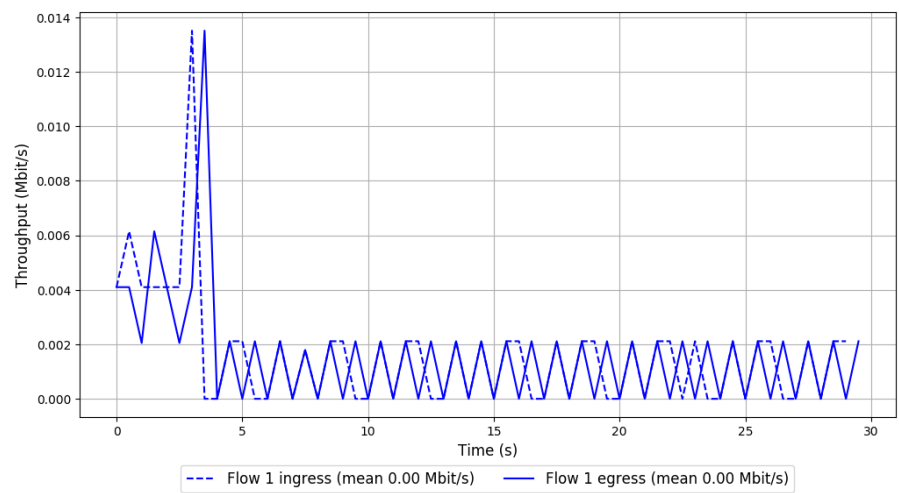
-- Flow 1:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 298.899 ms

Loss rate: 0.00%

Run 1: Report of Vivace-LTE — Data Link

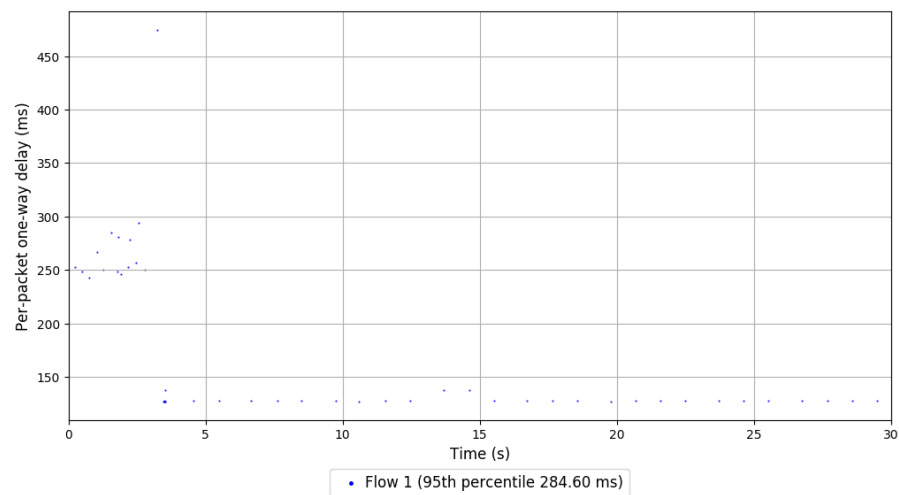
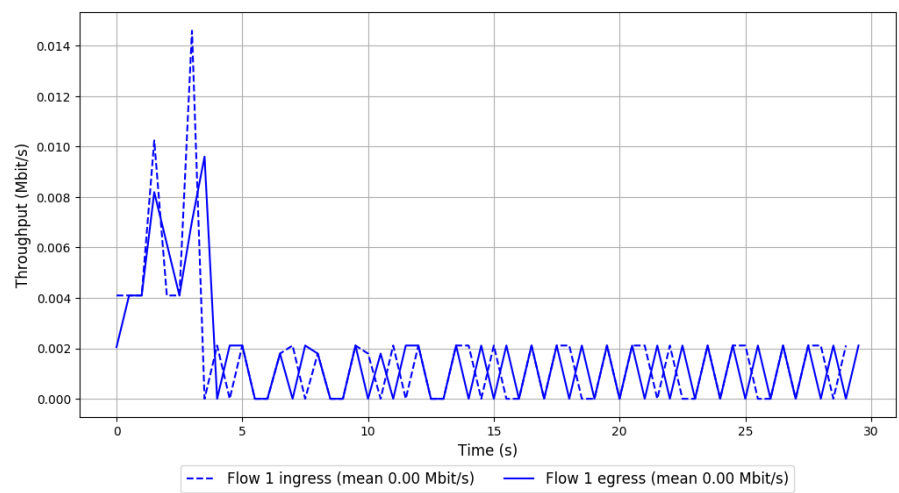


Run 2: Statistics of Vivace-LTE

Start at: 2018-02-02 13:44:42
End at: 2018-02-02 13:45:12
Local clock offset: 0.368 ms
Remote clock offset: -3.184 ms

Below is generated by plot.py at 2018-02-02 14:19:52
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 284.597 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 284.597 ms
Loss rate: 0.00%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-02-02 14:04:47

End at: 2018-02-02 14:05:17

Local clock offset: 0.358 ms

Remote clock offset: 1.637 ms

Below is generated by plot.py at 2018-02-02 14:19:52

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.64 Mbit/s

95th percentile per-packet one-way delay: 3965.416 ms

Loss rate: 5.68%

-- Flow 1:

Average throughput: 1.64 Mbit/s

95th percentile per-packet one-way delay: 3965.416 ms

Loss rate: 5.68%

Run 3: Report of Vivace-LTE — Data Link

