

Pantheon Report

Generated at 2018-02-12 21:42:19 (UTC).

Data path: AWS California 1 Ethernet (*local*) → Stanford 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).

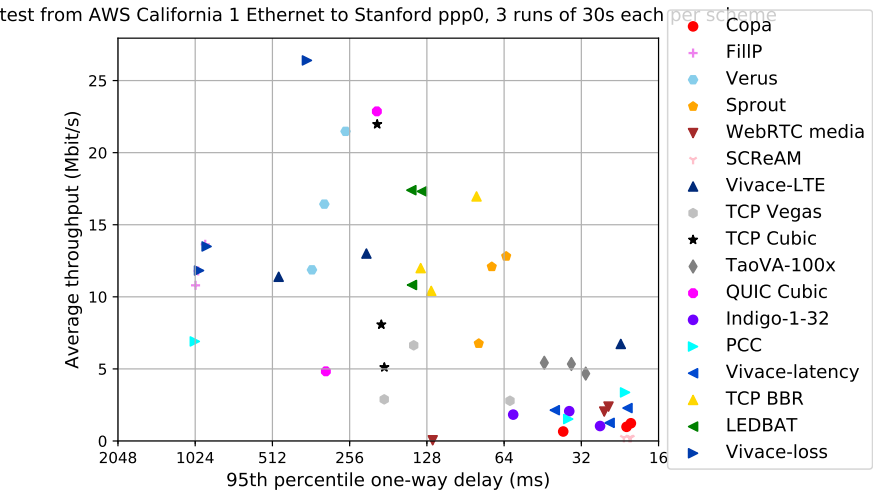
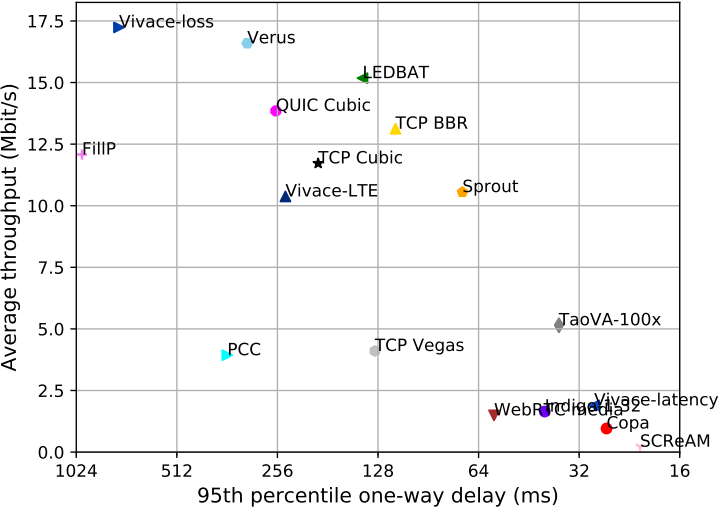
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

Git summary:

```
branch: master @ 2efdad57c2c56a9458b0d01ff33345e11732665
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ 828bbf95fd4941149b5cec90f281d1c69ae1a5c6
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 @ f1a14bffe749737437f61b1eae30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/vivace @ 7a4ba531e75b4a6f66f5c4580192120401784ce3
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from AWS California 1 Ethernet to Stanford ppp0, 3 runs of 30s each per scheme
(mean of all runs by 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	13.12	113.46	0.09
TCP Cubic	3	11.72	193.36	0.27
LEDBAT	3	15.18	142.47	0.25
PCC	3	3.93	361.62	10.18
QUIC Cubic	2	13.84	258.75	0.57
SCReAM	3	0.22	21.05	0.00
WebRTC media	3	1.49	57.55	0.00
Sprout	3	10.55	71.55	0.05
TaoVA-100x	3	5.15	36.79	0.01
TCP Vegas	3	4.11	130.83	0.02
Verus	3	16.59	315.32	2.26
Copa	3	0.96	26.50	6.06
FillP	3	12.08	984.50	67.37
Indigo-1-32	3	1.65	40.56	0.01
Vivace-latency	3	1.89	28.87	5.83
Vivace-loss	3	17.24	762.80	28.71
Vivace-LTE	3	10.37	242.26	1.53

Run 1: Statistics of TCP BBR

Start at: 2018-02-12 20:36:27

End at: 2018-02-12 20:36:57

Local clock offset: 0.154 ms

Remote clock offset: -3.953 ms

Below is generated by plot.py at 2018-02-12 21:41:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.41 Mbit/s

95th percentile per-packet one-way delay: 123.090 ms

Loss rate: 0.00%

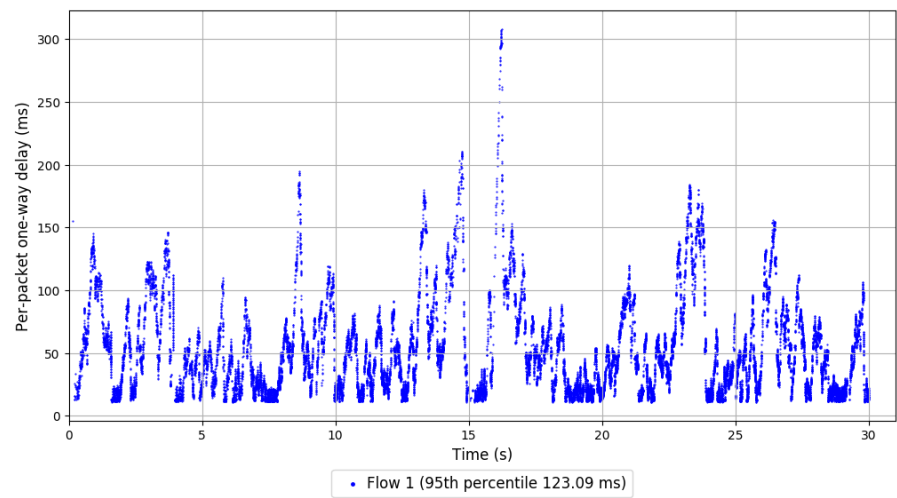
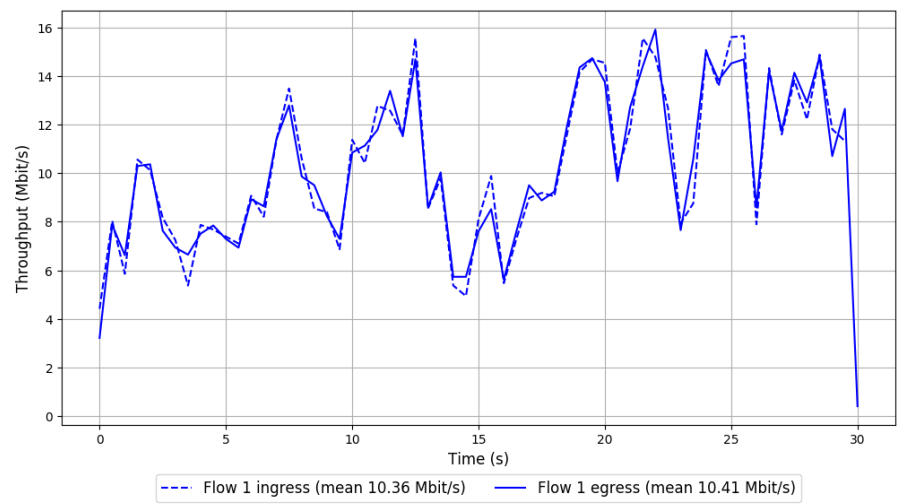
-- Flow 1:

Average throughput: 10.41 Mbit/s

95th percentile per-packet one-way delay: 123.090 ms

Loss rate: 0.00%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-02-12 21:00:03

End at: 2018-02-12 21:00:33

Local clock offset: 0.039 ms

Remote clock offset: -5.391 ms

Below is generated by plot.py at 2018-02-12 21:41:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 16.97 Mbit/s

95th percentile per-packet one-way delay: 81.969 ms

Loss rate: 0.15%

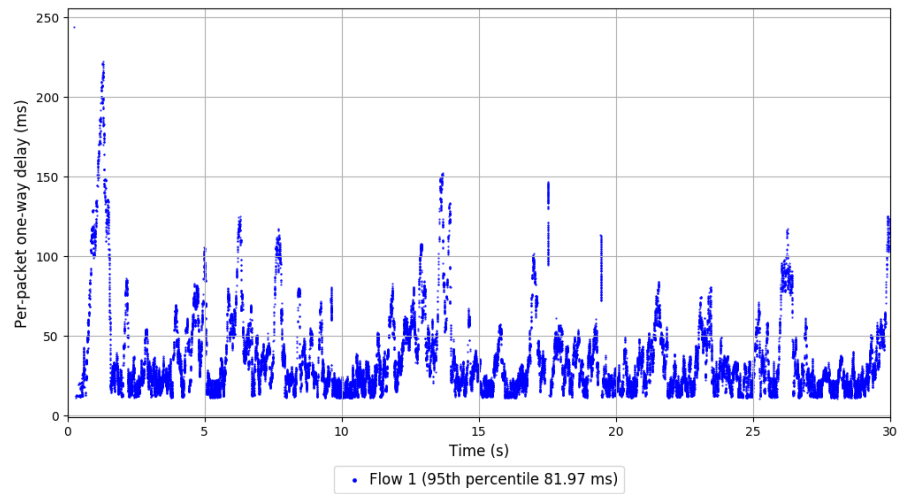
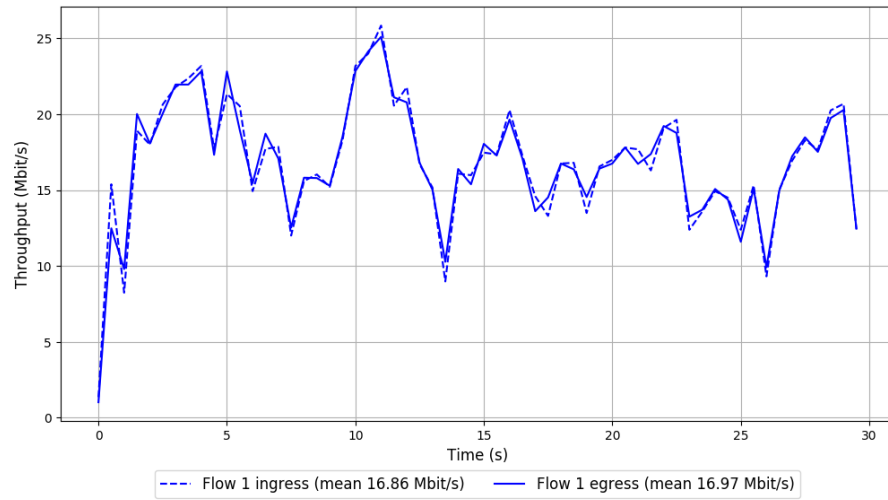
-- Flow 1:

Average throughput: 16.97 Mbit/s

95th percentile per-packet one-way delay: 81.969 ms

Loss rate: 0.15%

Run 2: Report of TCP BBR — Data Link

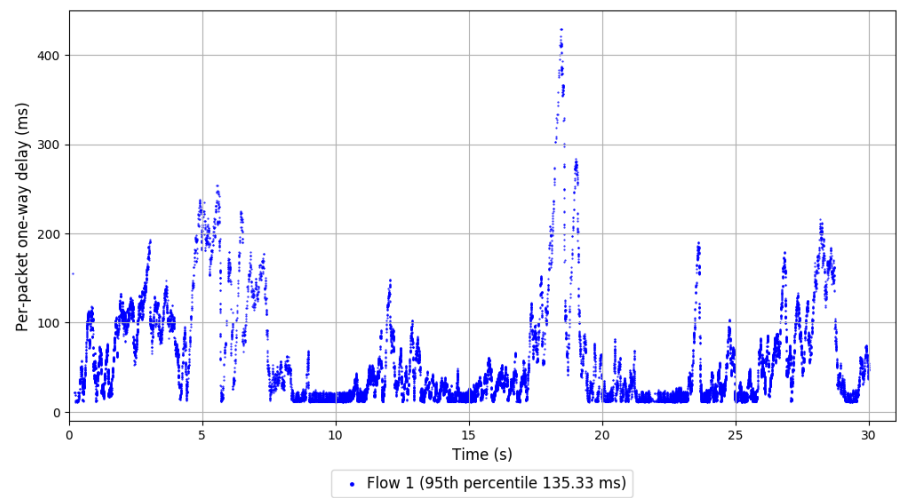
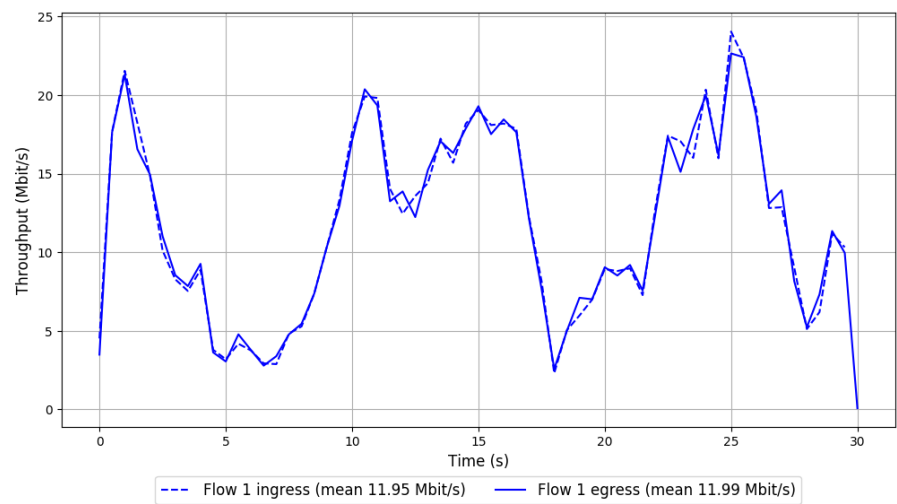


Run 3: Statistics of TCP BBR

Start at: 2018-02-12 21:23:39
End at: 2018-02-12 21:24:09
Local clock offset: 0.121 ms
Remote clock offset: -5.297 ms

Below is generated by plot.py at 2018-02-12 21:41:20
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 135.331 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 11.99 Mbit/s
95th percentile per-packet one-way delay: 135.331 ms
Loss rate: 0.13%

Run 3: Report of TCP BBR — Data Link

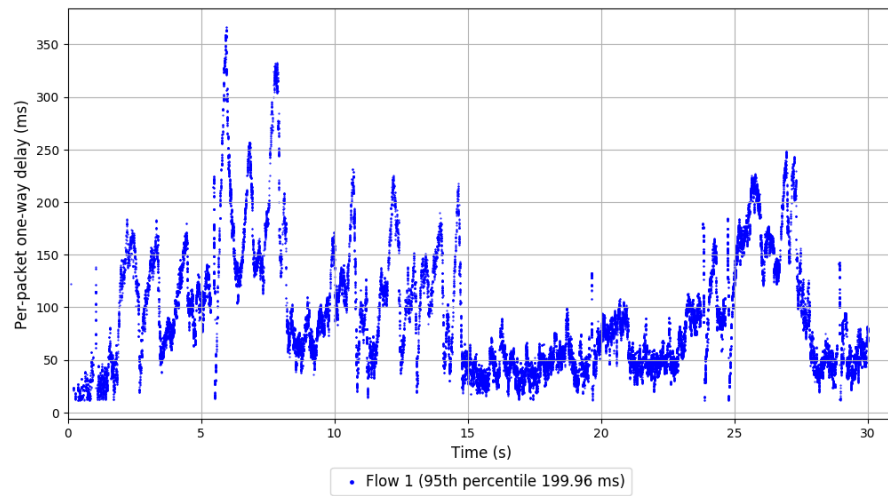
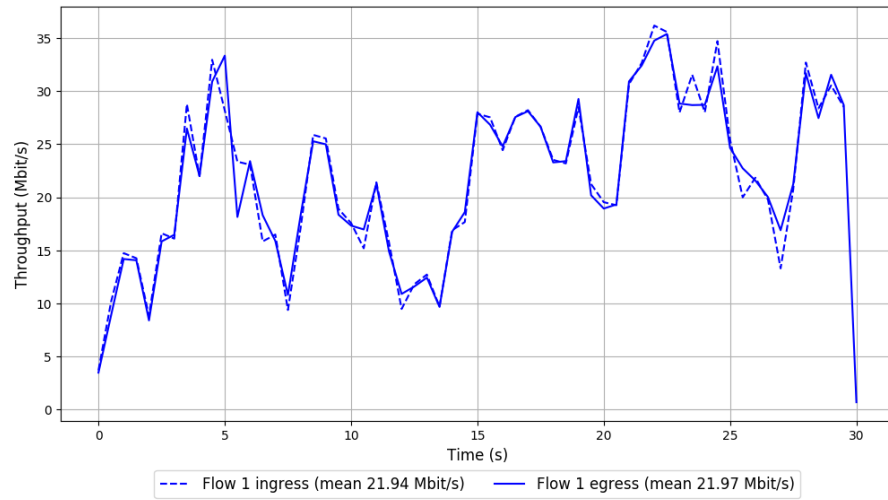


Run 1: Statistics of TCP Cubic

Start at: 2018-02-12 20:40:23
End at: 2018-02-12 20:40:53
Local clock offset: 0.08 ms
Remote clock offset: -4.168 ms

Below is generated by plot.py at 2018-02-12 21:41:28
Datalink statistics
-- Total of 1 flow:
Average throughput: 21.97 Mbit/s
95th percentile per-packet one-way delay: 199.956 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 21.97 Mbit/s
95th percentile per-packet one-way delay: 199.956 ms
Loss rate: 0.20%

Run 1: Report of TCP Cubic — Data Link

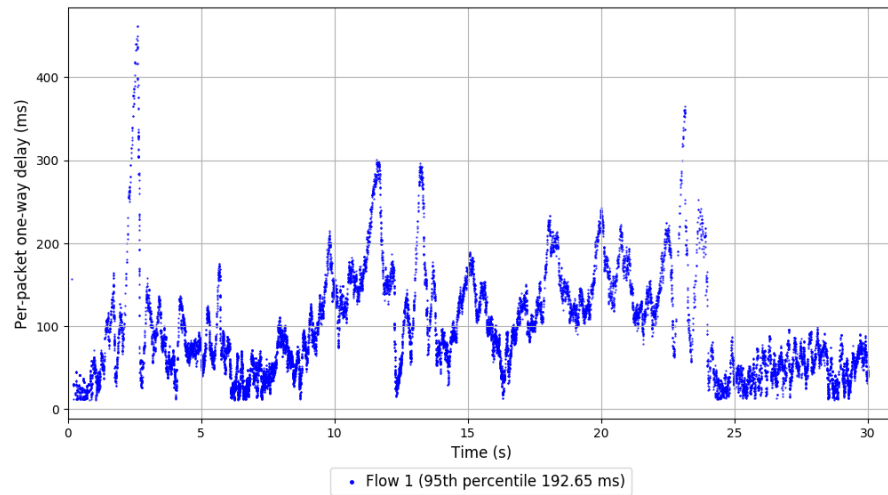
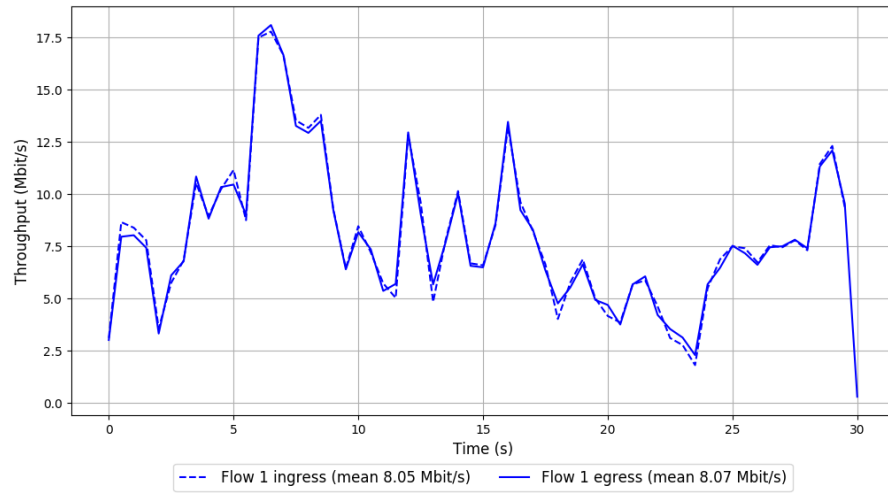


Run 2: Statistics of TCP Cubic

Start at: 2018-02-12 21:03:59
End at: 2018-02-12 21:04:29
Local clock offset: 0.148 ms
Remote clock offset: -5.515 ms

Below is generated by plot.py at 2018-02-12 21:41:28
Datalink statistics
-- Total of 1 flow:
Average throughput: 8.07 Mbit/s
95th percentile per-packet one-way delay: 192.648 ms
Loss rate: 0.18%
-- Flow 1:
Average throughput: 8.07 Mbit/s
95th percentile per-packet one-way delay: 192.648 ms
Loss rate: 0.18%

Run 2: Report of TCP Cubic — Data Link

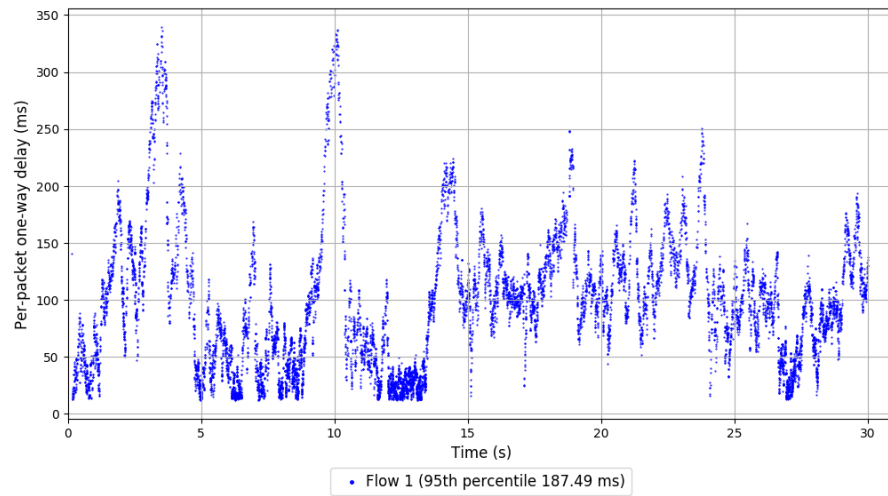
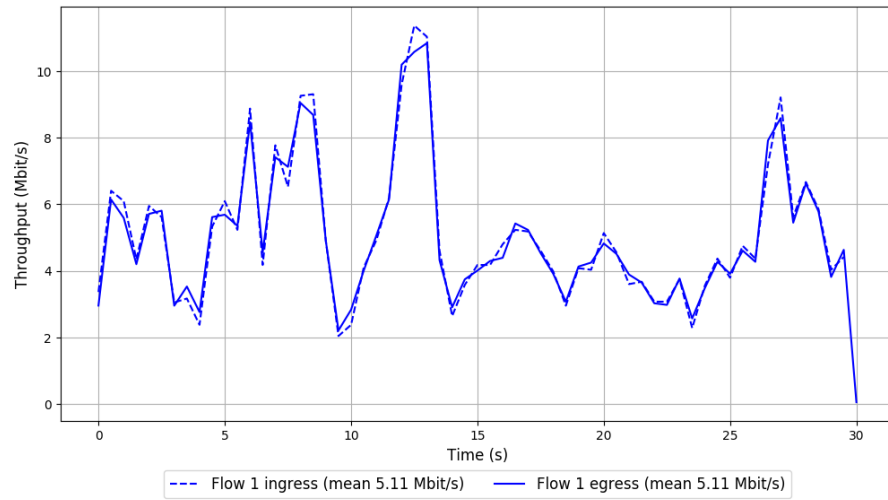


Run 3: Statistics of TCP Cubic

Start at: 2018-02-12 21:27:34
End at: 2018-02-12 21:28:04
Local clock offset: -0.008 ms
Remote clock offset: -5.261 ms

Below is generated by plot.py at 2018-02-12 21:41:28
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.11 Mbit/s
95th percentile per-packet one-way delay: 187.487 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 5.11 Mbit/s
95th percentile per-packet one-way delay: 187.487 ms
Loss rate: 0.42%

Run 3: Report of TCP Cubic — Data Link

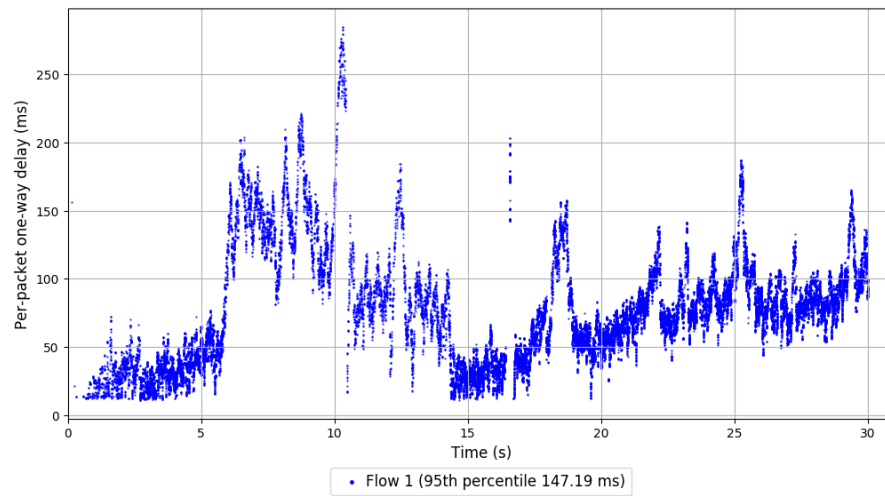
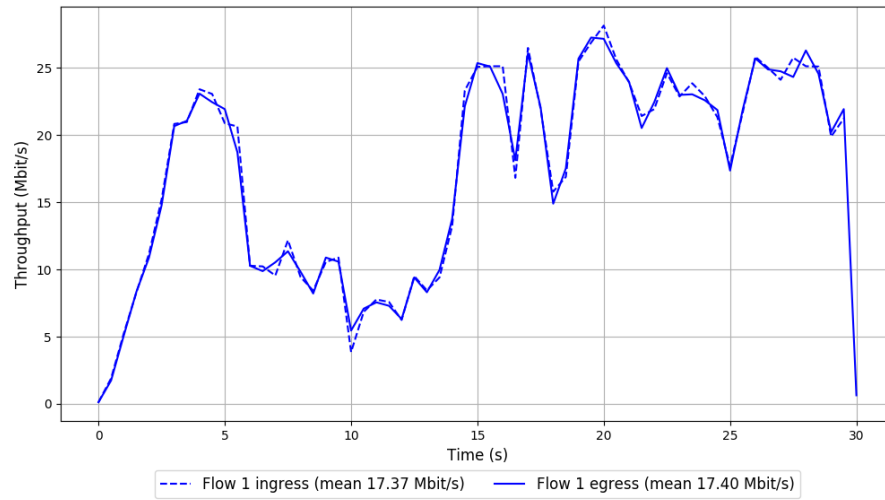


Run 1: Statistics of LEDBAT

Start at: 2018-02-12 20:49:34
End at: 2018-02-12 20:50:04
Local clock offset: 0.179 ms
Remote clock offset: -5.025 ms

Below is generated by plot.py at 2018-02-12 21:41:28
Datalink statistics
-- Total of 1 flow:
Average throughput: 17.40 Mbit/s
95th percentile per-packet one-way delay: 147.186 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 17.40 Mbit/s
95th percentile per-packet one-way delay: 147.186 ms
Loss rate: 0.27%

Run 1: Report of LEDBAT — Data Link

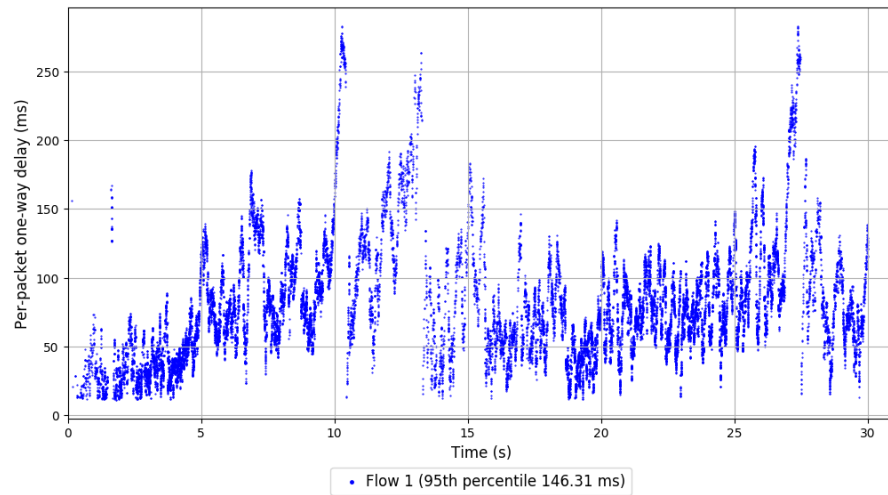
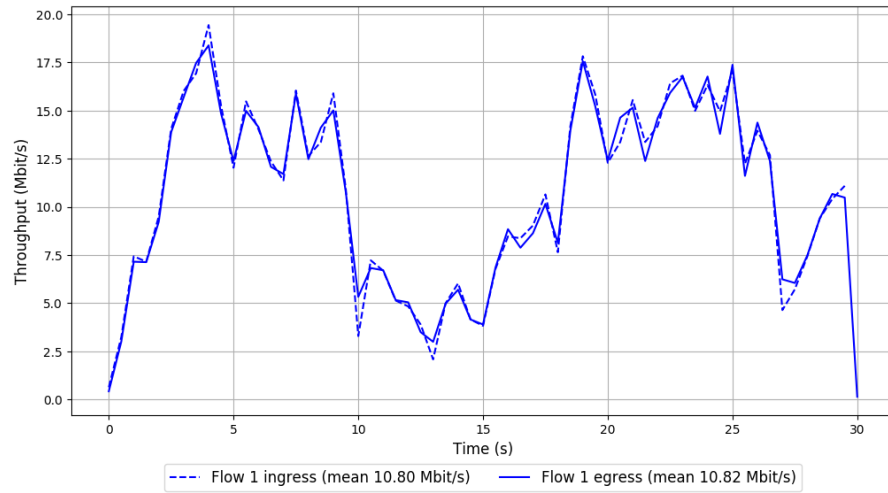


Run 2: Statistics of LEDBAT

Start at: 2018-02-12 21:13:10
End at: 2018-02-12 21:13:40
Local clock offset: 0.081 ms
Remote clock offset: -5.575 ms

Below is generated by plot.py at 2018-02-12 21:41:28
Datalink statistics
-- Total of 1 flow:
Average throughput: 10.82 Mbit/s
95th percentile per-packet one-way delay: 146.311 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 10.82 Mbit/s
95th percentile per-packet one-way delay: 146.311 ms
Loss rate: 0.25%

Run 2: Report of LEDBAT — Data Link

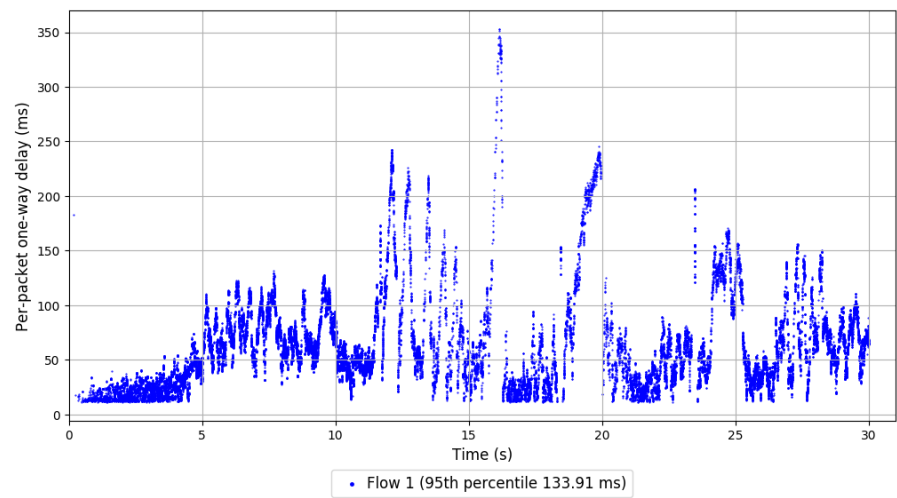
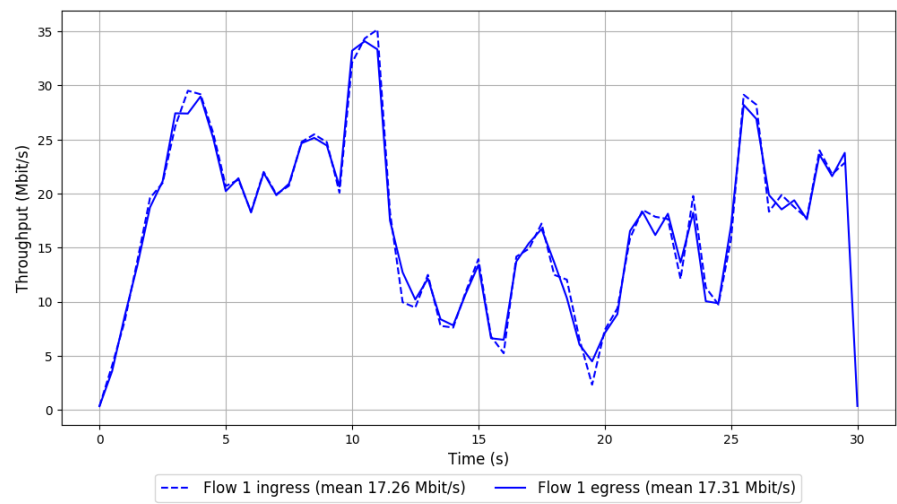


Run 3: Statistics of LEDBAT

Start at: 2018-02-12 21:36:45
End at: 2018-02-12 21:37:15
Local clock offset: 0.131 ms
Remote clock offset: -5.258 ms

Below is generated by plot.py at 2018-02-12 21:41:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 17.31 Mbit/s
95th percentile per-packet one-way delay: 133.907 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 17.31 Mbit/s
95th percentile per-packet one-way delay: 133.907 ms
Loss rate: 0.23%

Run 3: Report of LEDBAT — Data Link

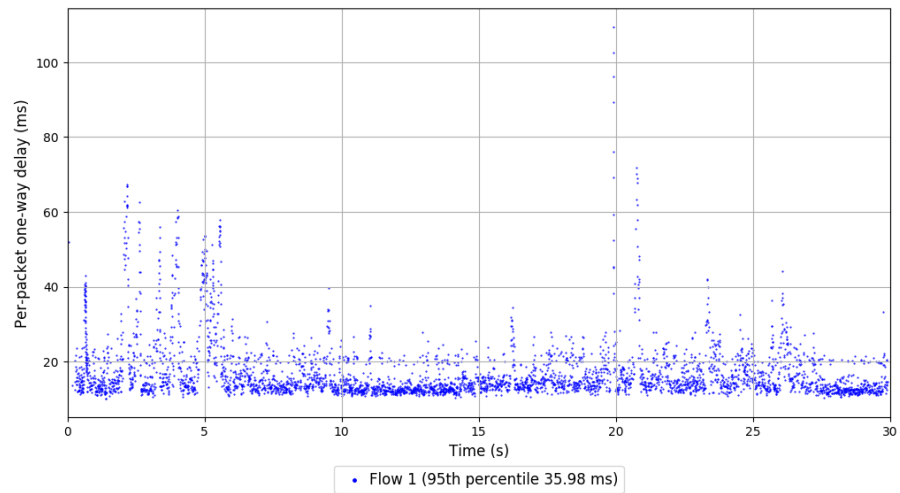
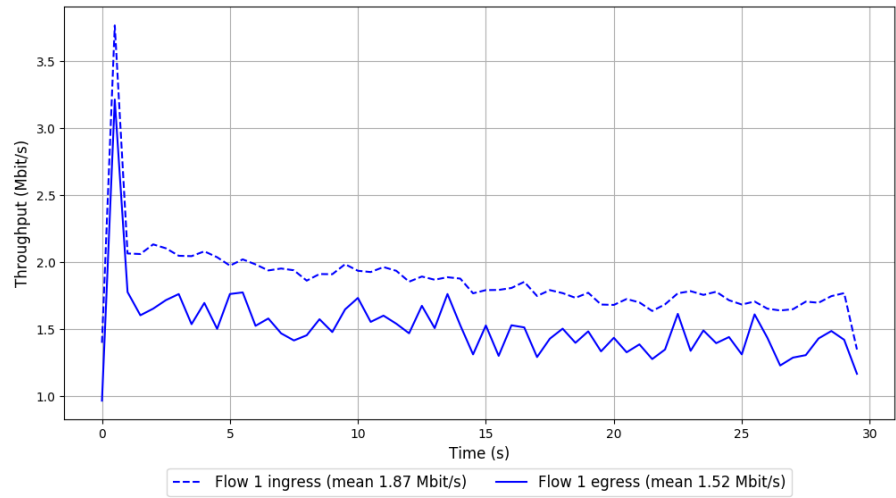


Run 1: Statistics of PCC

Start at: 2018-02-12 20:31:13
End at: 2018-02-12 20:31:43
Local clock offset: 0.16 ms
Remote clock offset: -4.127 ms

Below is generated by plot.py at 2018-02-12 21:41:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 35.985 ms
Loss rate: 18.67%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 35.985 ms
Loss rate: 18.67%

Run 1: Report of PCC — Data Link

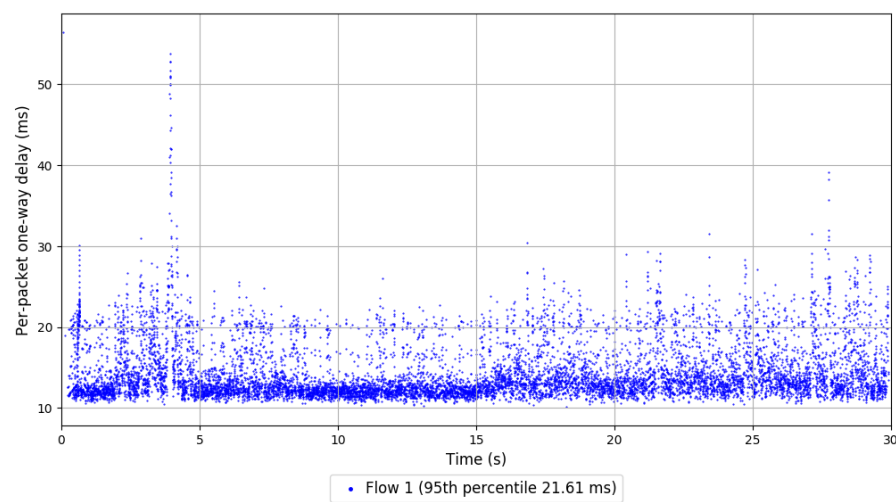
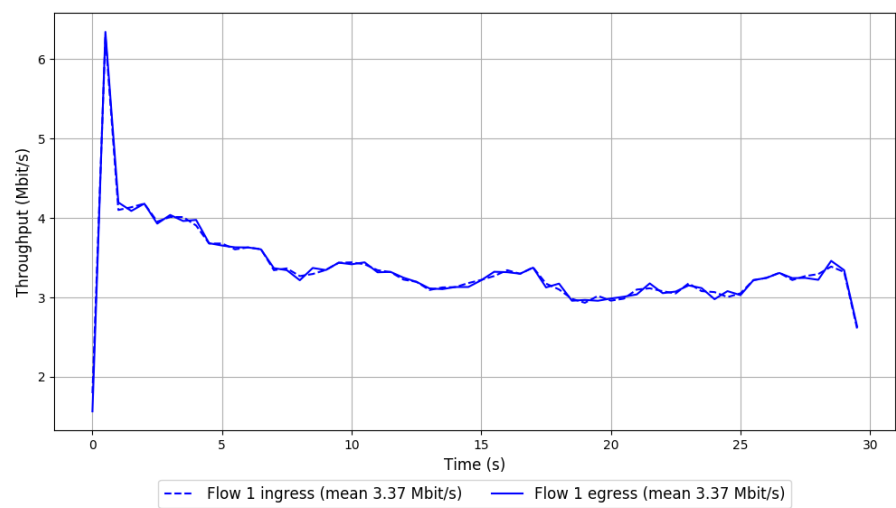


Run 2: Statistics of PCC

Start at: 2018-02-12 20:54:48
End at: 2018-02-12 20:55:18
Local clock offset: 0.171 ms
Remote clock offset: -5.275 ms

Below is generated by plot.py at 2018-02-12 21:41:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.37 Mbit/s
95th percentile per-packet one-way delay: 21.607 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 3.37 Mbit/s
95th percentile per-packet one-way delay: 21.607 ms
Loss rate: 0.02%

Run 2: Report of PCC — Data Link

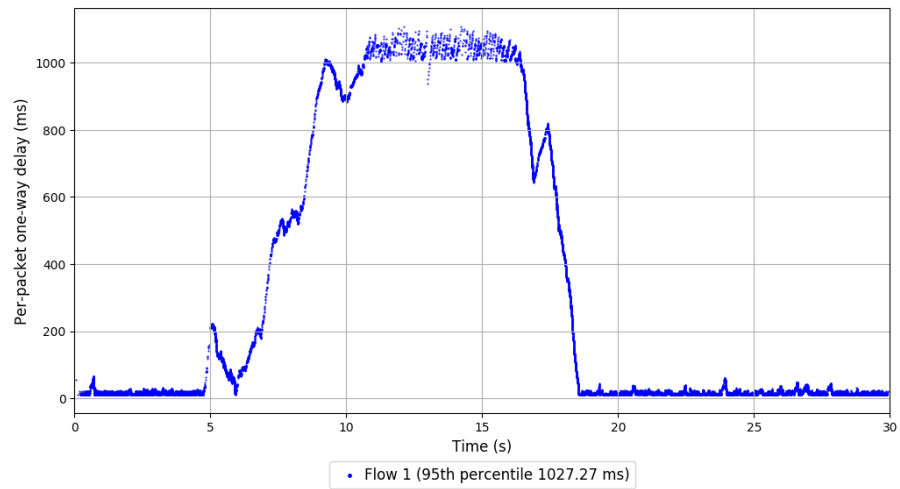
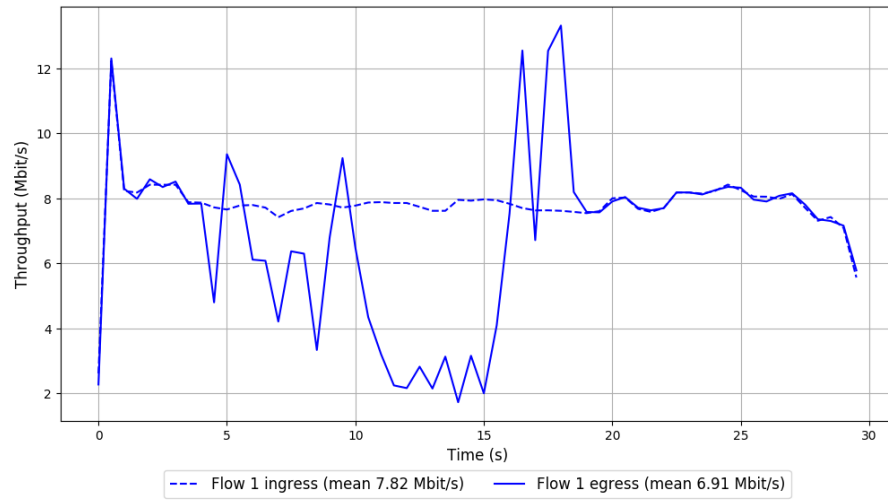


Run 3: Statistics of PCC

Start at: 2018-02-12 21:18:24
End at: 2018-02-12 21:18:55
Local clock offset: 0.088 ms
Remote clock offset: -5.371 ms

Below is generated by plot.py at 2018-02-12 21:41:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.91 Mbit/s
95th percentile per-packet one-way delay: 1027.267 ms
Loss rate: 11.86%
-- Flow 1:
Average throughput: 6.91 Mbit/s
95th percentile per-packet one-way delay: 1027.267 ms
Loss rate: 11.86%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

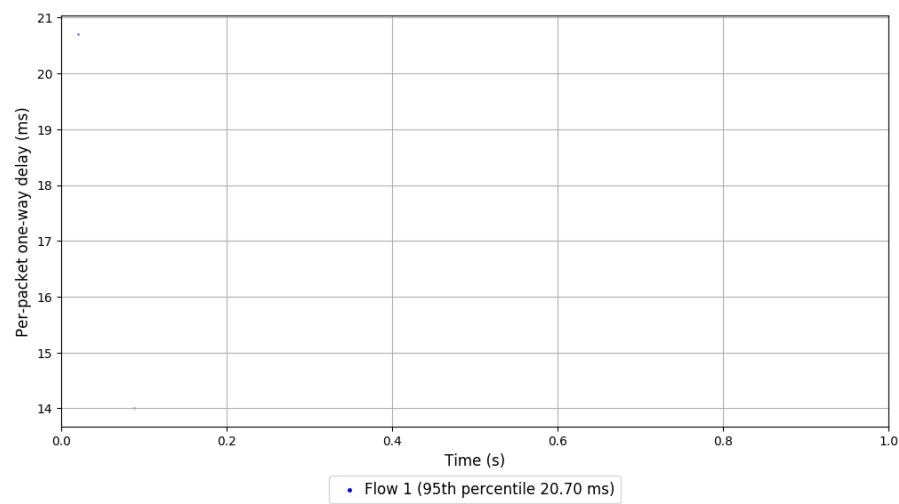
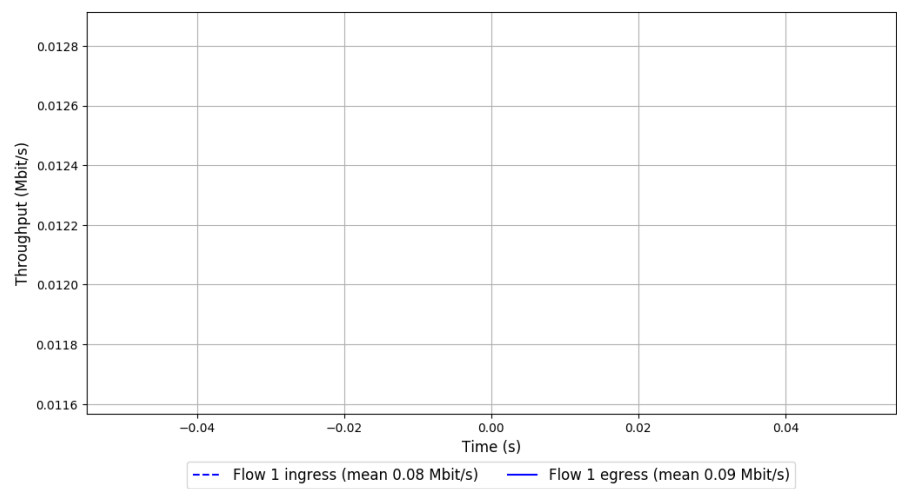
Start at: 2018-02-12 20:39:04

End at: 2018-02-12 20:39:34

Local clock offset: 0.179 ms

Remote clock offset: -3.938 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-02-12 21:02:40

End at: 2018-02-12 21:03:10

Local clock offset: 0.143 ms

Remote clock offset: -5.415 ms

Below is generated by plot.py at 2018-02-12 21:41:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 22.86 Mbit/s

95th percentile per-packet one-way delay: 200.542 ms

Loss rate: 0.54%

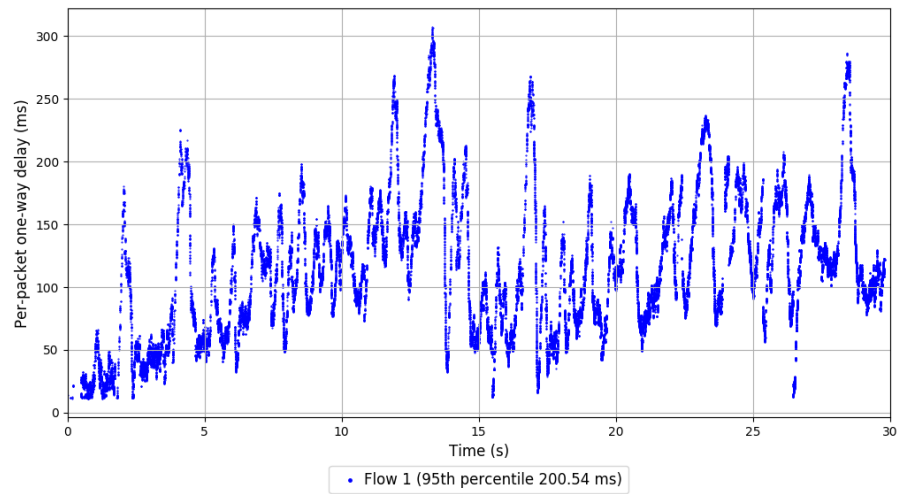
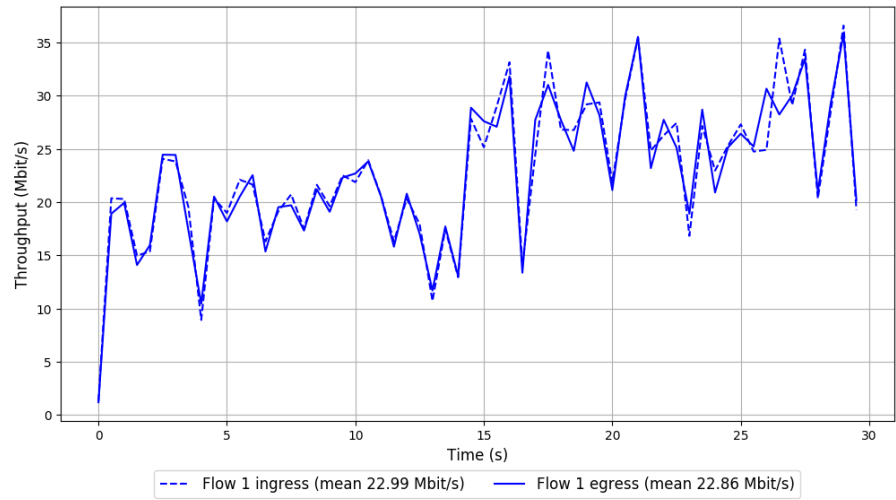
-- Flow 1:

Average throughput: 22.86 Mbit/s

95th percentile per-packet one-way delay: 200.542 ms

Loss rate: 0.54%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-02-12 21:26:16

End at: 2018-02-12 21:26:46

Local clock offset: 0.074 ms

Remote clock offset: -5.355 ms

Below is generated by plot.py at 2018-02-12 21:41:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.83 Mbit/s

95th percentile per-packet one-way delay: 316.968 ms

Loss rate: 0.61%

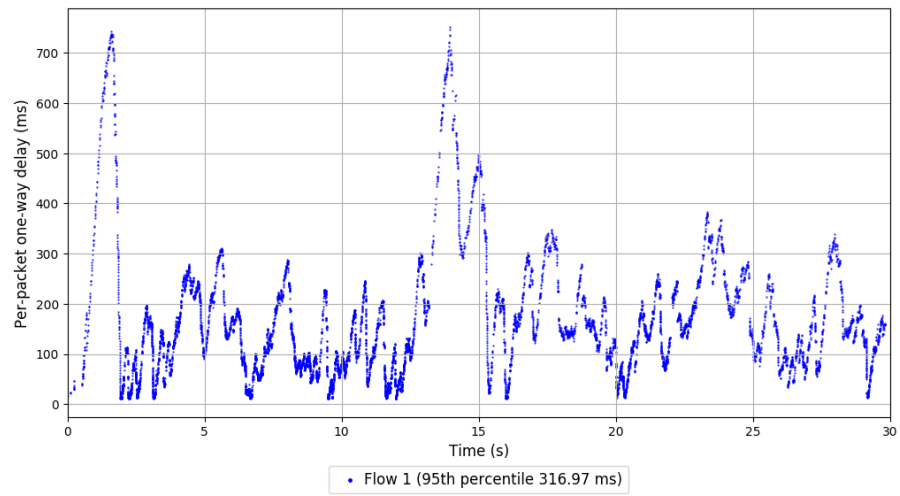
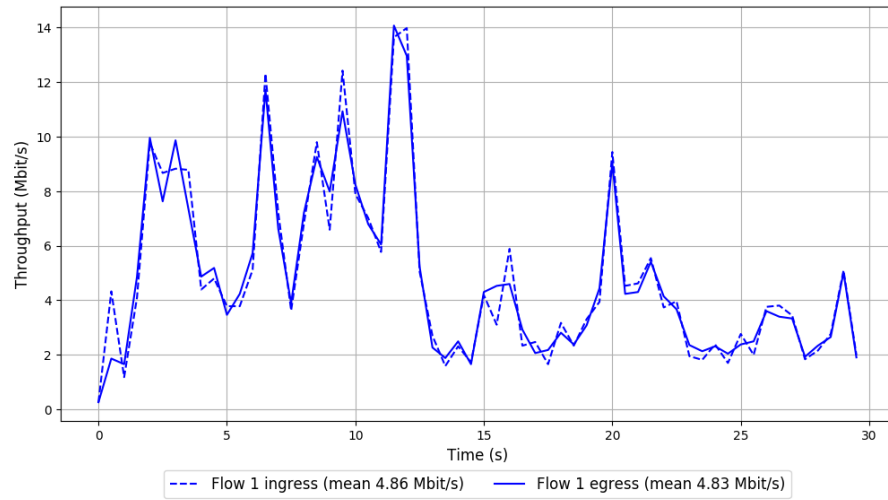
-- Flow 1:

Average throughput: 4.83 Mbit/s

95th percentile per-packet one-way delay: 316.968 ms

Loss rate: 0.61%

Run 3: Report of QUIC Cubic — Data Link

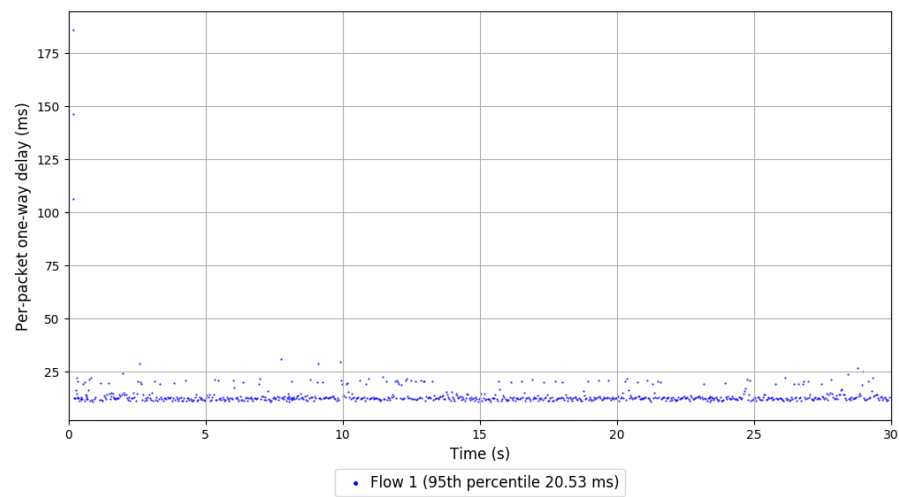
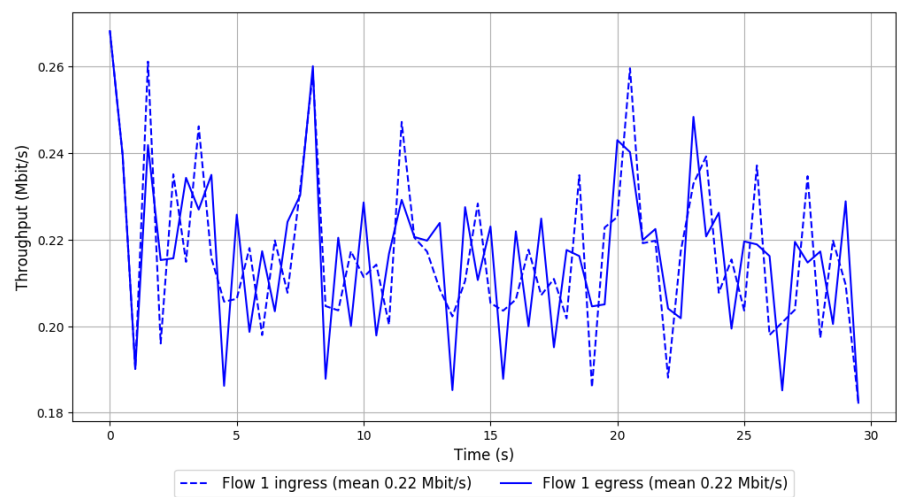


Run 1: Statistics of SCReAM

Start at: 2018-02-12 20:35:09
End at: 2018-02-12 20:35:39
Local clock offset: 0.074 ms
Remote clock offset: -4.052 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.526 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.526 ms
Loss rate: 0.00%

Run 1: Report of SReAM — Data Link

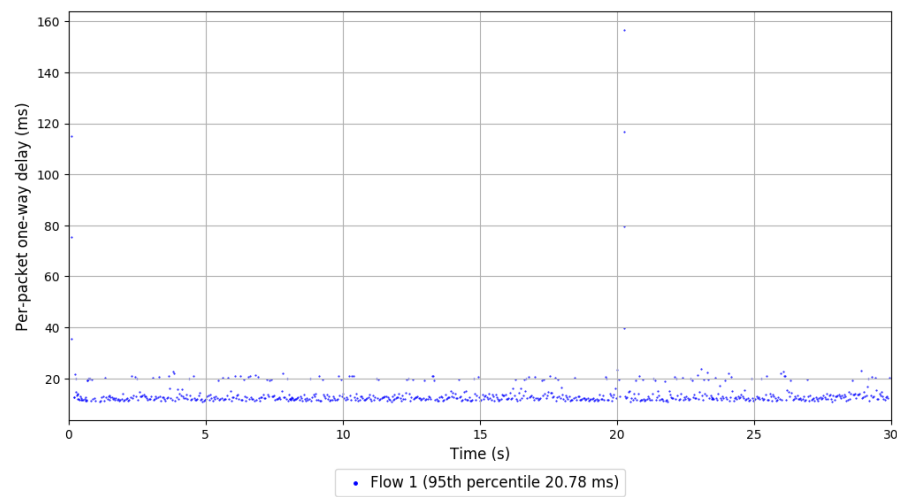
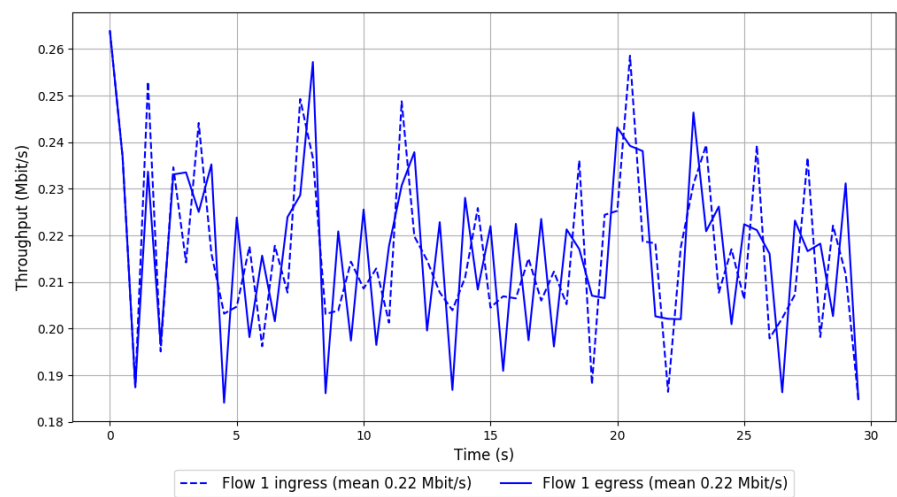


Run 2: Statistics of SCReAM

Start at: 2018-02-12 20:58:44
End at: 2018-02-12 20:59:14
Local clock offset: 0.132 ms
Remote clock offset: -5.429 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.781 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.781 ms
Loss rate: 0.00%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-02-12 21:22:21

End at: 2018-02-12 21:22:51

Local clock offset: -0.0 ms

Remote clock offset: -5.42 ms

Below is generated by plot.py at 2018-02-12 21:41:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 21.835 ms

Loss rate: 0.00%

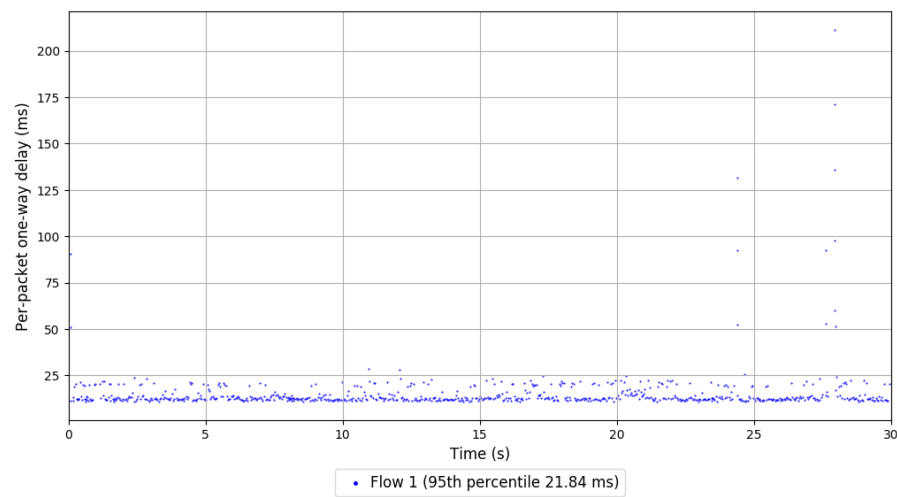
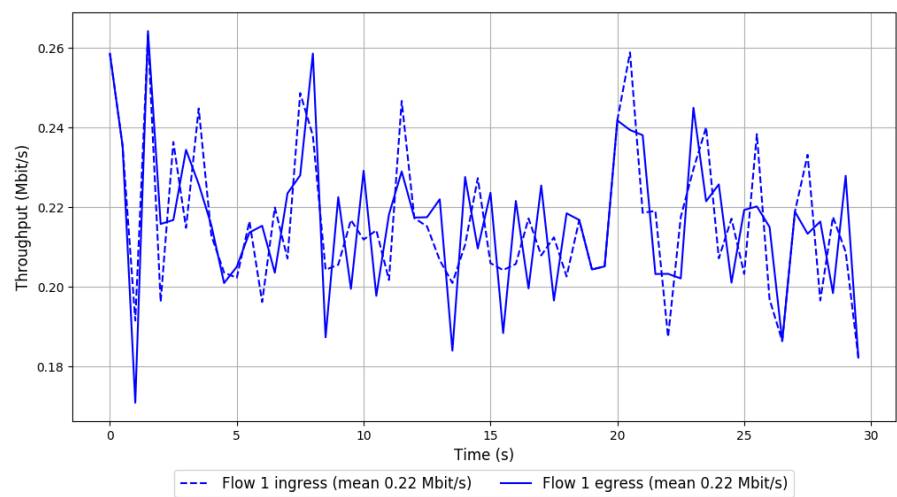
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 21.835 ms

Loss rate: 0.00%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-02-12 20:52:12

End at: 2018-02-12 20:52:42

Local clock offset: 0.072 ms

Remote clock offset: -5.11 ms

Below is generated by plot.py at 2018-02-12 21:41:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 121.509 ms

Loss rate: 0.00%

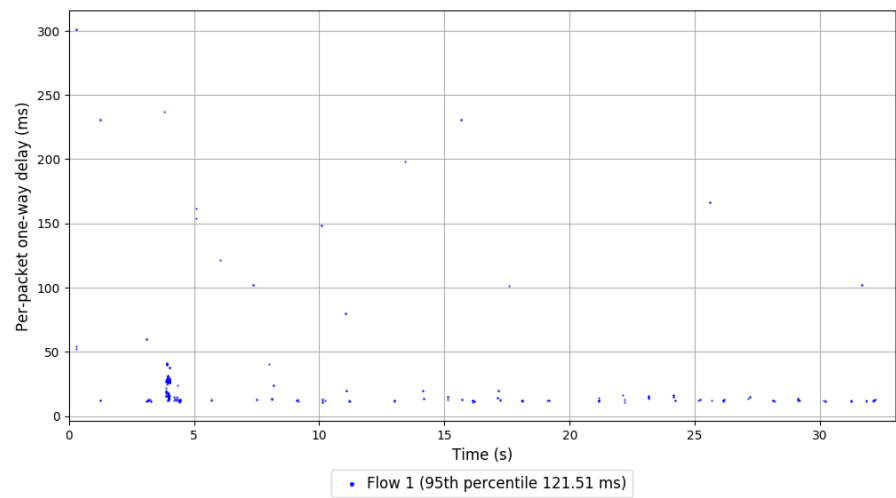
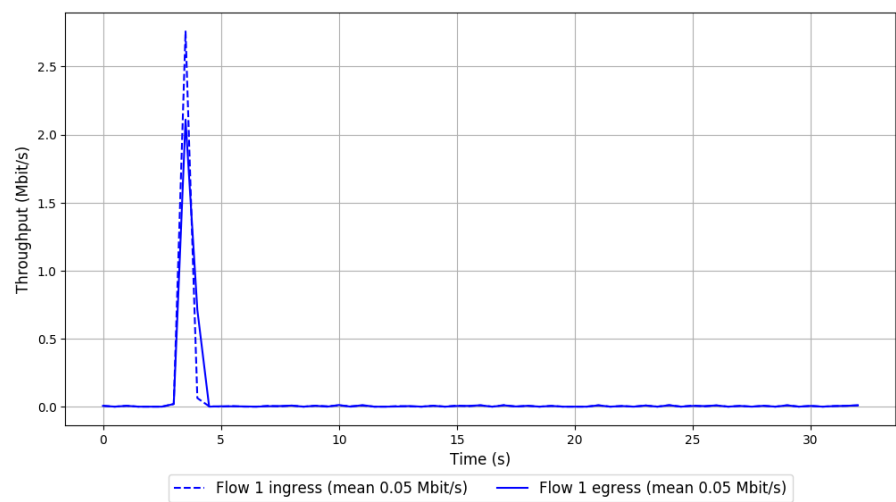
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 121.509 ms

Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link

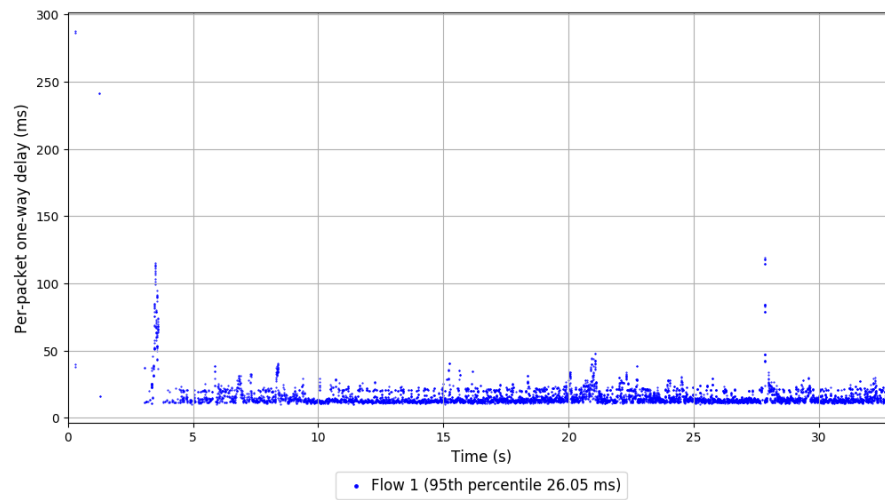
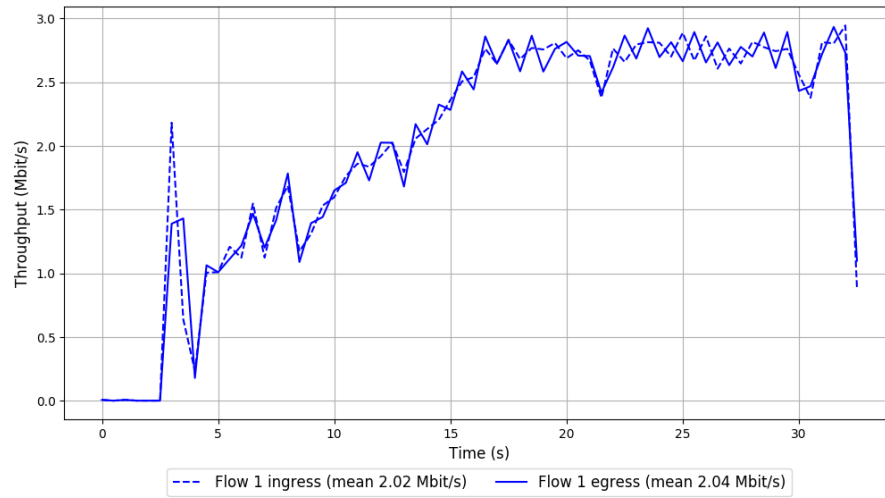


Run 2: Statistics of WebRTC media

Start at: 2018-02-12 21:15:48
End at: 2018-02-12 21:16:18
Local clock offset: 0.099 ms
Remote clock offset: -5.542 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 26.053 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 26.053 ms
Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link

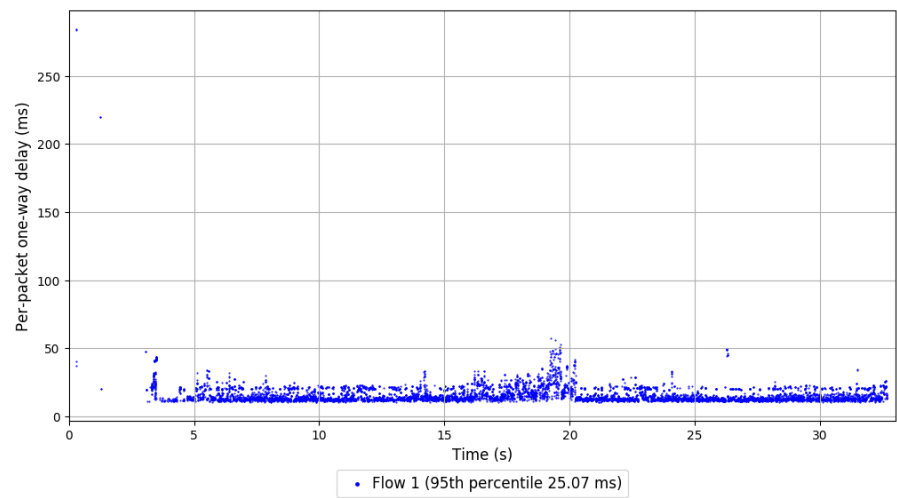
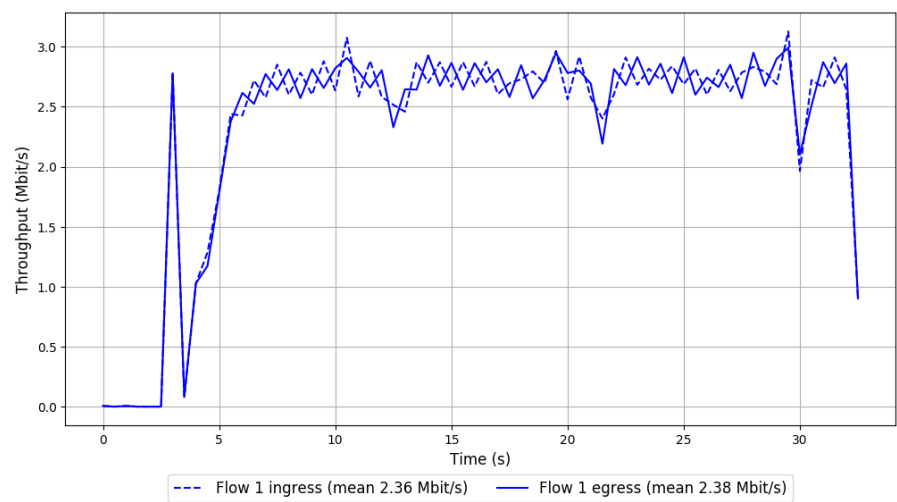


Run 3: Statistics of WebRTC media

Start at: 2018-02-12 21:39:24
End at: 2018-02-12 21:39:54
Local clock offset: 0.104 ms
Remote clock offset: -5.225 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 25.075 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 25.075 ms
Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

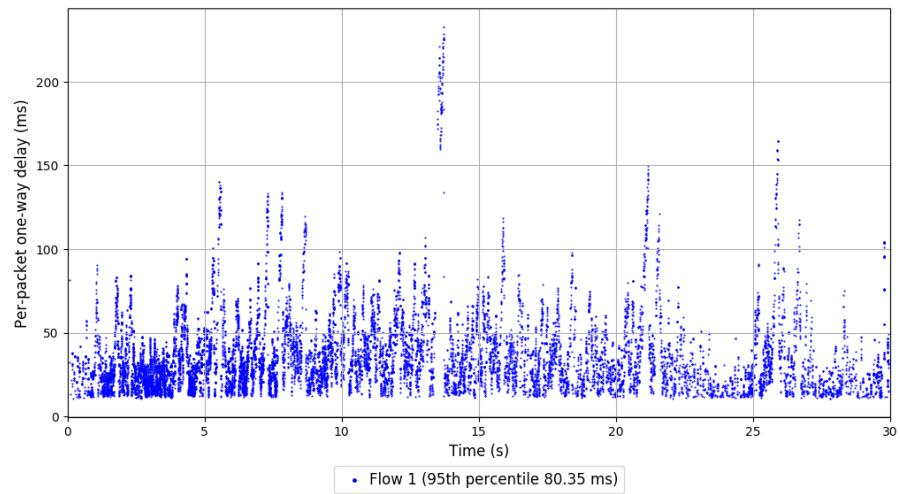
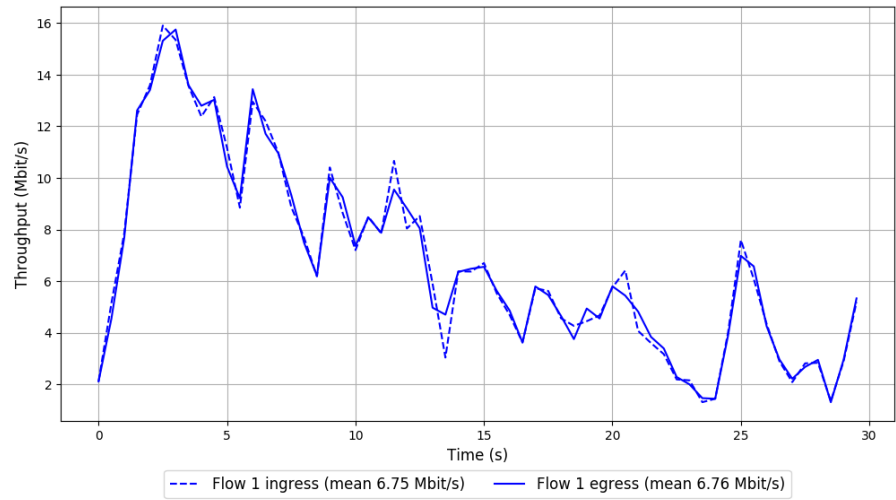


Run 1: Statistics of Sprout

Start at: 2018-02-12 20:46:56
End at: 2018-02-12 20:47:26
Local clock offset: 0.186 ms
Remote clock offset: -4.878 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.76 Mbit/s
95th percentile per-packet one-way delay: 80.350 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 6.76 Mbit/s
95th percentile per-packet one-way delay: 80.350 ms
Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

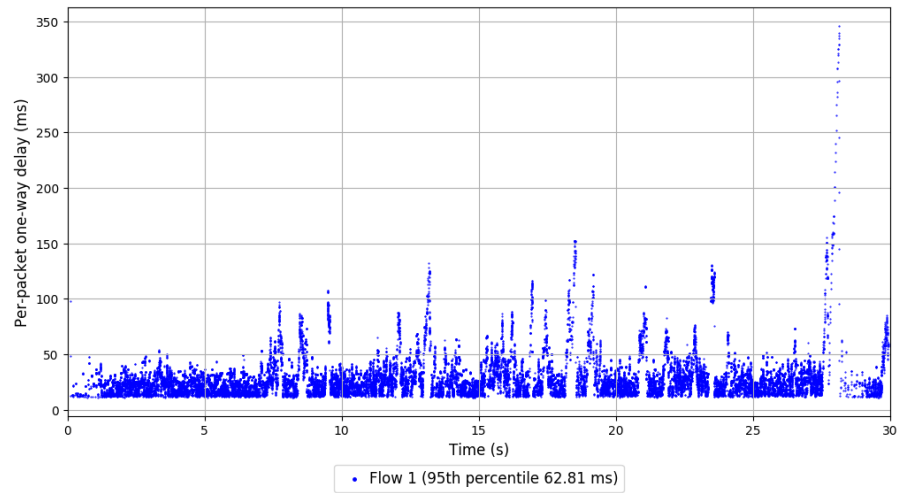
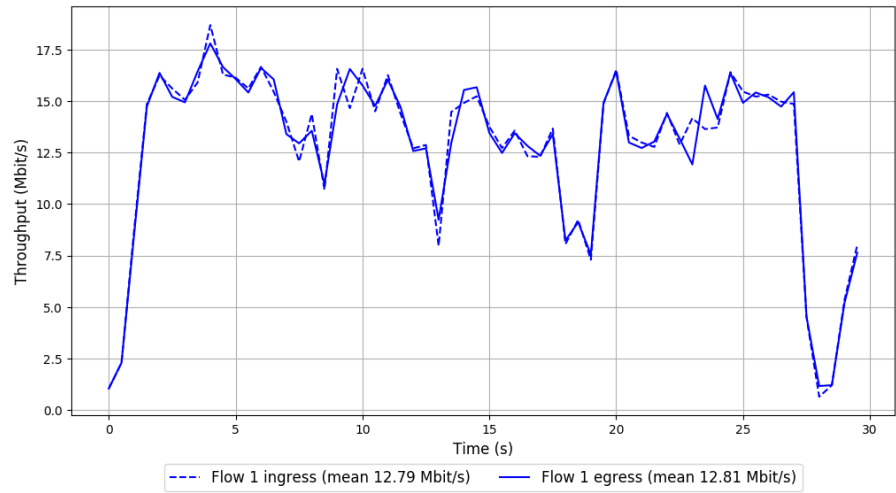


Run 2: Statistics of Sprout

Start at: 2018-02-12 21:10:32
End at: 2018-02-12 21:11:02
Local clock offset: 0.117 ms
Remote clock offset: -5.513 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 12.81 Mbit/s
95th percentile per-packet one-way delay: 62.808 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 12.81 Mbit/s
95th percentile per-packet one-way delay: 62.808 ms
Loss rate: 0.07%

Run 2: Report of Sprout — Data Link

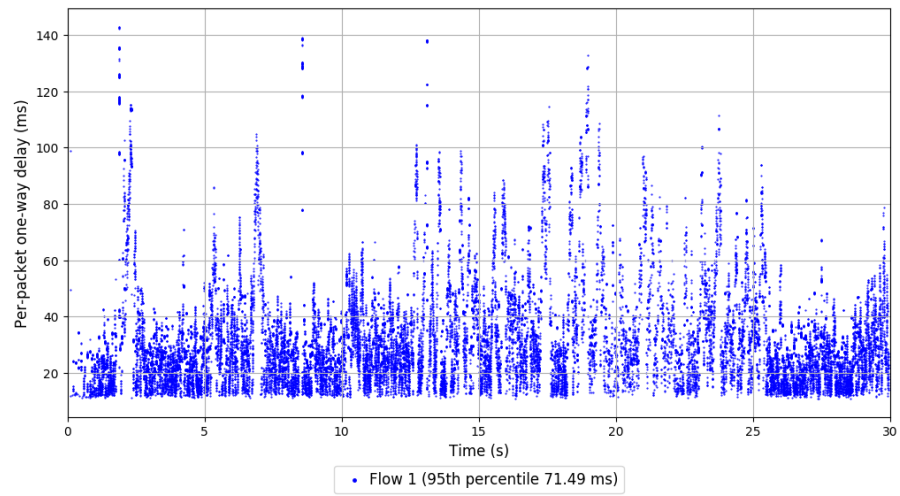
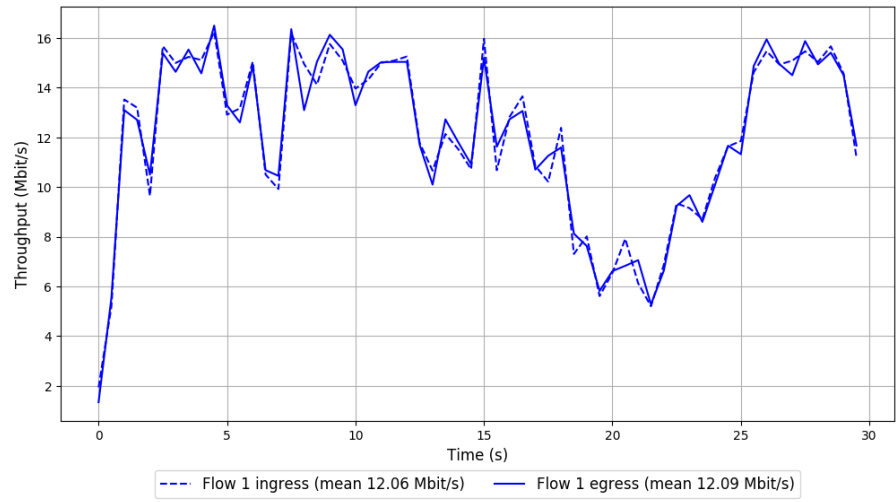


Run 3: Statistics of Sprout

Start at: 2018-02-12 21:34:07
End at: 2018-02-12 21:34:37
Local clock offset: 0.108 ms
Remote clock offset: -5.339 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 12.09 Mbit/s
95th percentile per-packet one-way delay: 71.491 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 12.09 Mbit/s
95th percentile per-packet one-way delay: 71.491 ms
Loss rate: 0.07%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2018-02-12 20:41:42

End at: 2018-02-12 20:42:12

Local clock offset: 0.189 ms

Remote clock offset: -4.296 ms

Below is generated by plot.py at 2018-02-12 21:41:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.67 Mbit/s

95th percentile per-packet one-way delay: 30.770 ms

Loss rate: 0.02%

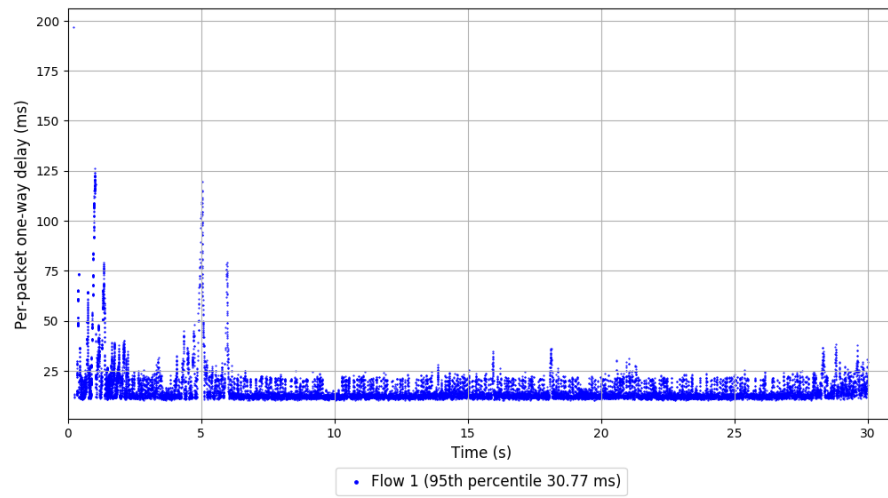
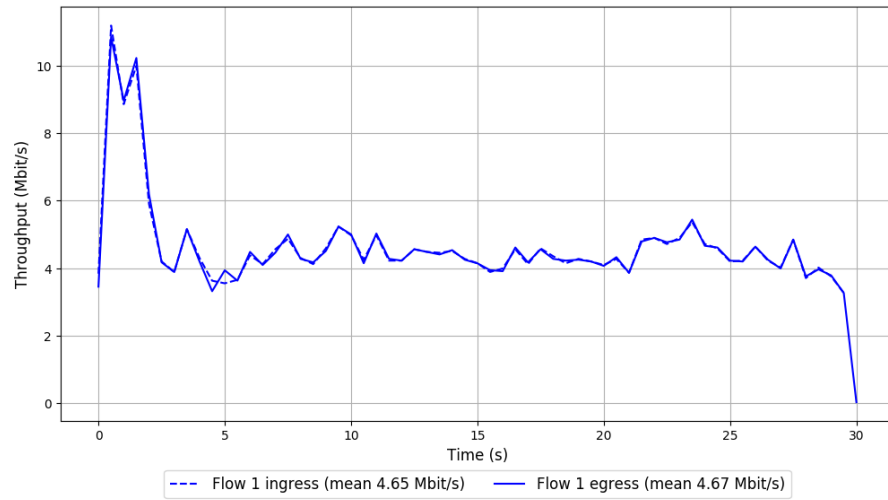
-- Flow 1:

Average throughput: 4.67 Mbit/s

95th percentile per-packet one-way delay: 30.770 ms

Loss rate: 0.02%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-02-12 21:05:18

End at: 2018-02-12 21:05:48

Local clock offset: 0.125 ms

Remote clock offset: -5.495 ms

Below is generated by plot.py at 2018-02-12 21:41:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.43 Mbit/s

95th percentile per-packet one-way delay: 44.611 ms

Loss rate: 0.00%

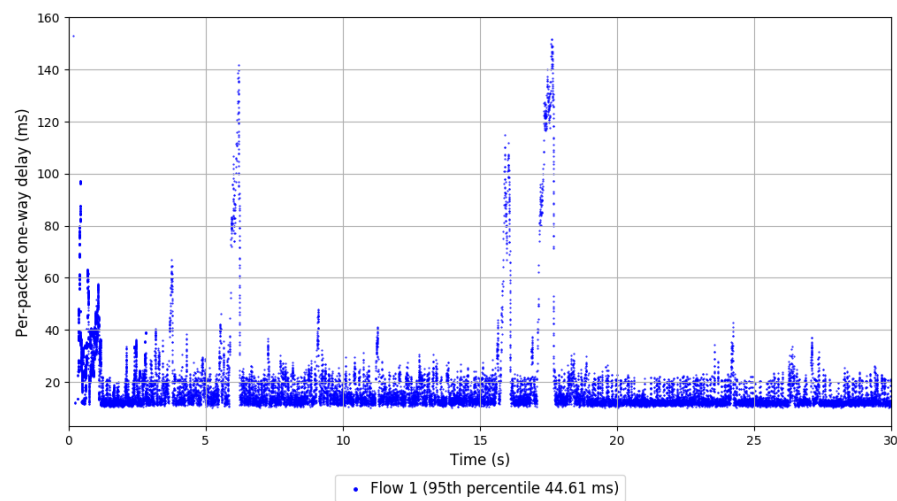
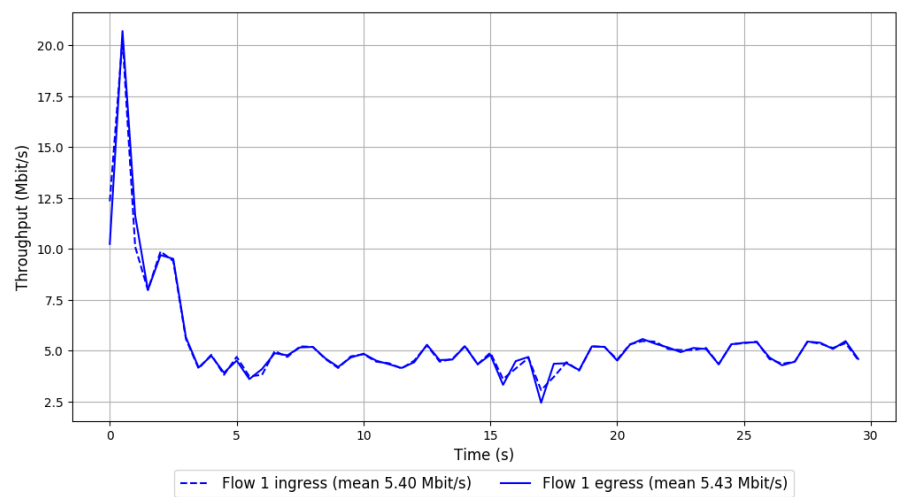
-- Flow 1:

Average throughput: 5.43 Mbit/s

95th percentile per-packet one-way delay: 44.611 ms

Loss rate: 0.00%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-02-12 21:28:53

End at: 2018-02-12 21:29:23

Local clock offset: 0.086 ms

Remote clock offset: -5.368 ms

Below is generated by plot.py at 2018-02-12 21:41:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.34 Mbit/s

95th percentile per-packet one-way delay: 34.989 ms

Loss rate: 0.00%

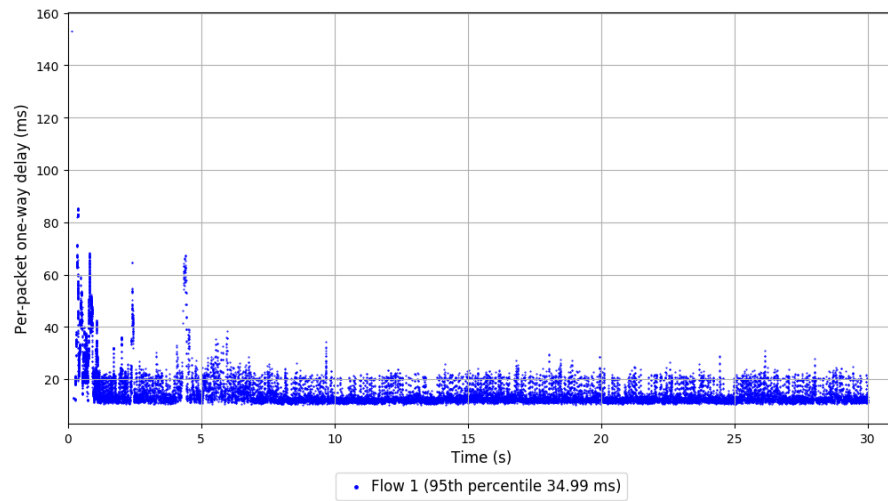
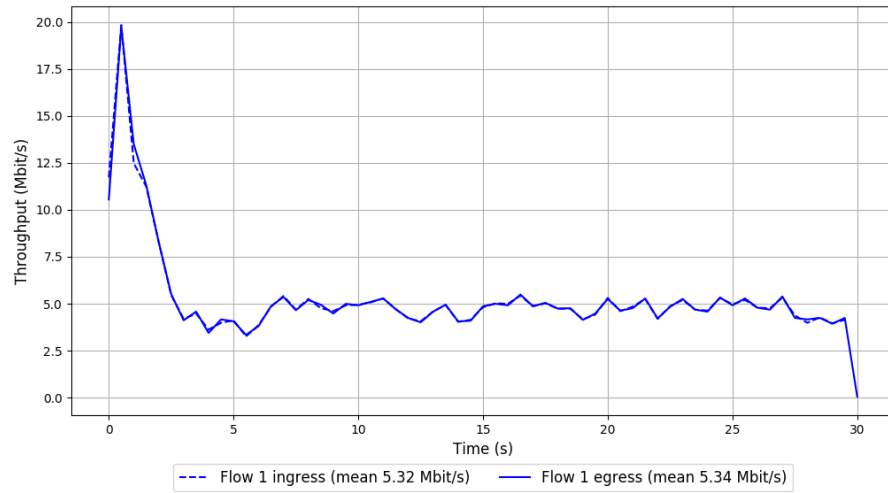
-- Flow 1:

Average throughput: 5.34 Mbit/s

95th percentile per-packet one-way delay: 34.989 ms

Loss rate: 0.00%

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

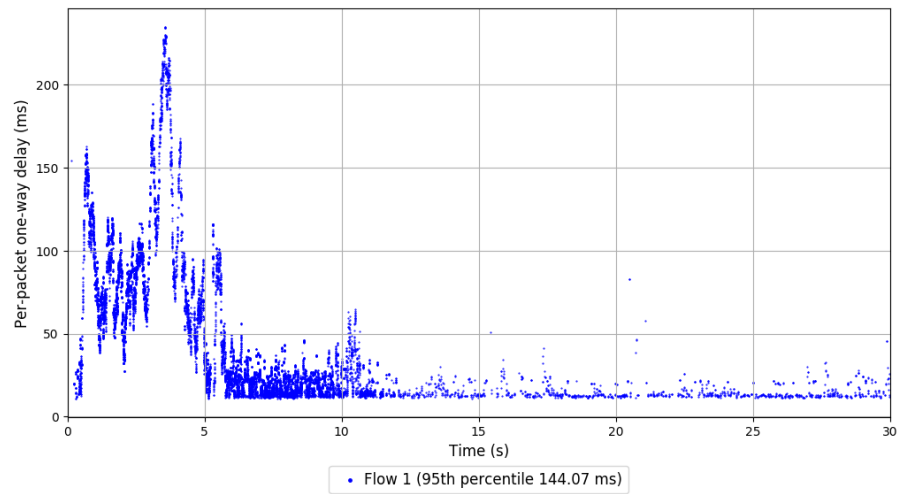
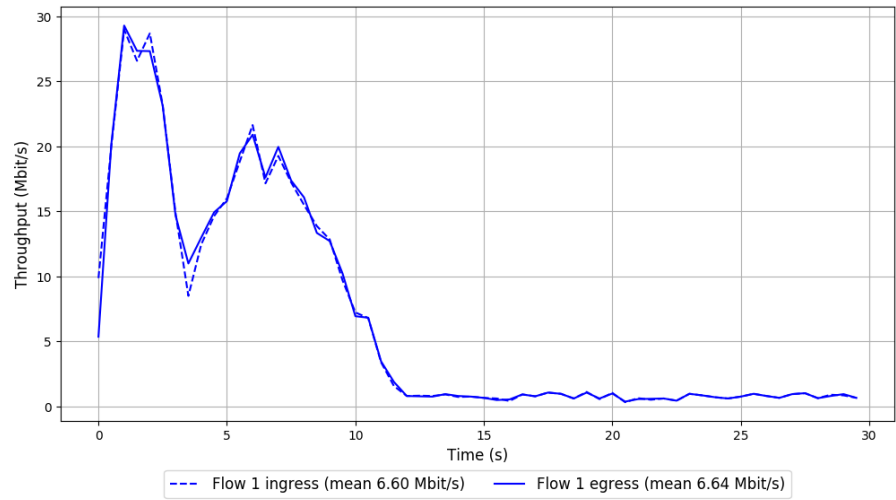


Run 1: Statistics of TCP Vegas

Start at: 2018-02-12 20:37:46
End at: 2018-02-12 20:38:16
Local clock offset: 0.091 ms
Remote clock offset: -4.027 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.64 Mbit/s
95th percentile per-packet one-way delay: 144.075 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 6.64 Mbit/s
95th percentile per-packet one-way delay: 144.075 ms
Loss rate: 0.01%

Run 1: Report of TCP Vegas — Data Link

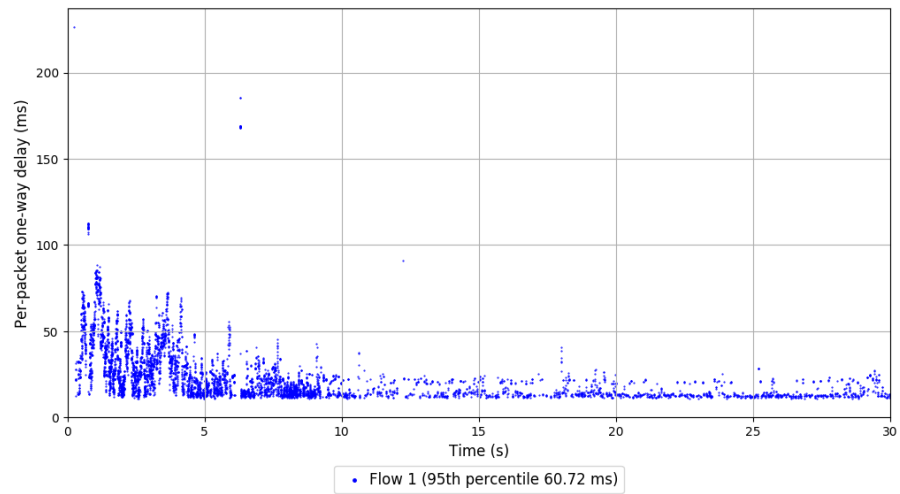
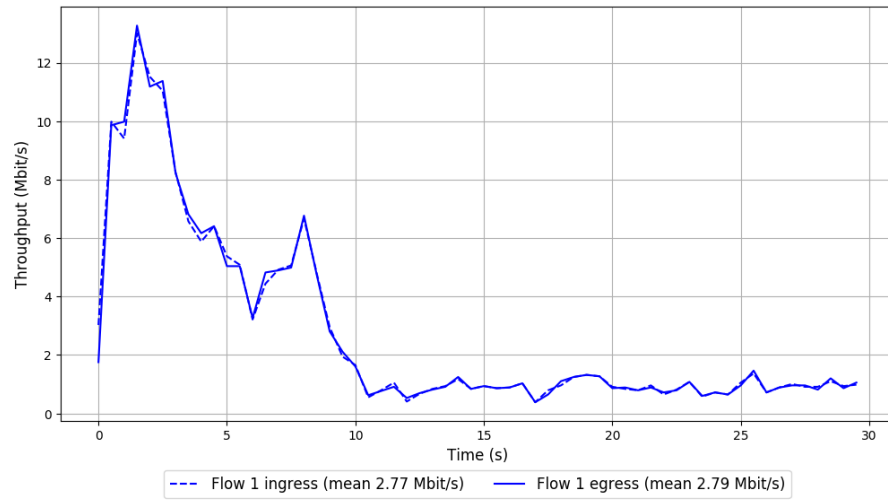


Run 2: Statistics of TCP Vegas

Start at: 2018-02-12 21:01:21
End at: 2018-02-12 21:01:51
Local clock offset: 0.133 ms
Remote clock offset: -5.483 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.79 Mbit/s
95th percentile per-packet one-way delay: 60.718 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.79 Mbit/s
95th percentile per-packet one-way delay: 60.718 ms
Loss rate: 0.00%

Run 2: Report of TCP Vegas — Data Link

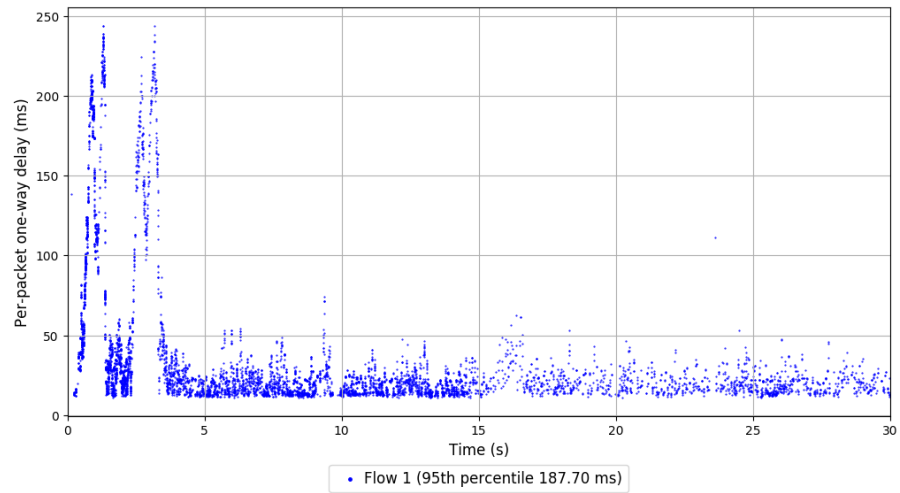
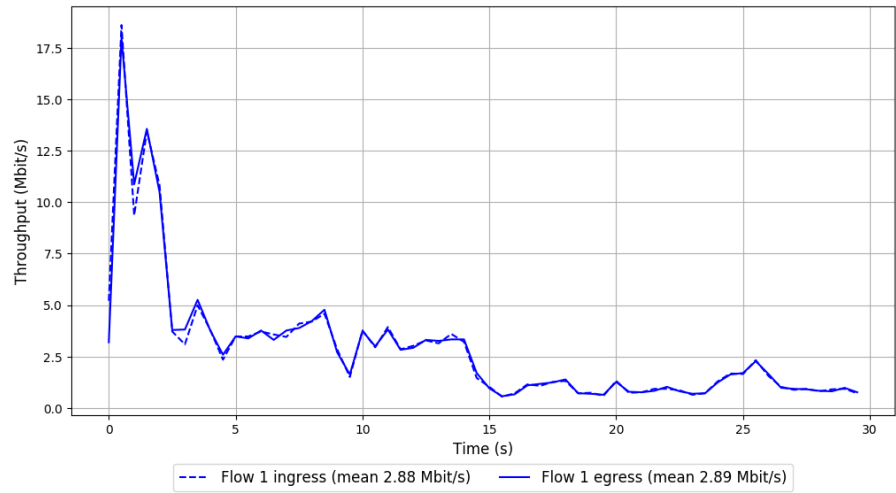


Run 3: Statistics of TCP Vegas

Start at: 2018-02-12 21:24:58
End at: 2018-02-12 21:25:28
Local clock offset: 0.086 ms
Remote clock offset: -5.401 ms

Below is generated by plot.py at 2018-02-12 21:41:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.89 Mbit/s
95th percentile per-packet one-way delay: 187.699 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 2.89 Mbit/s
95th percentile per-packet one-way delay: 187.699 ms
Loss rate: 0.04%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-02-12 20:43:00

End at: 2018-02-12 20:43:30

Local clock offset: 0.143 ms

Remote clock offset: -4.53 ms

Below is generated by plot.py at 2018-02-12 21:42:00

Datalink statistics

-- Total of 1 flow:

Average throughput: 16.43 Mbit/s

95th percentile per-packet one-way delay: 321.274 ms

Loss rate: 3.62%

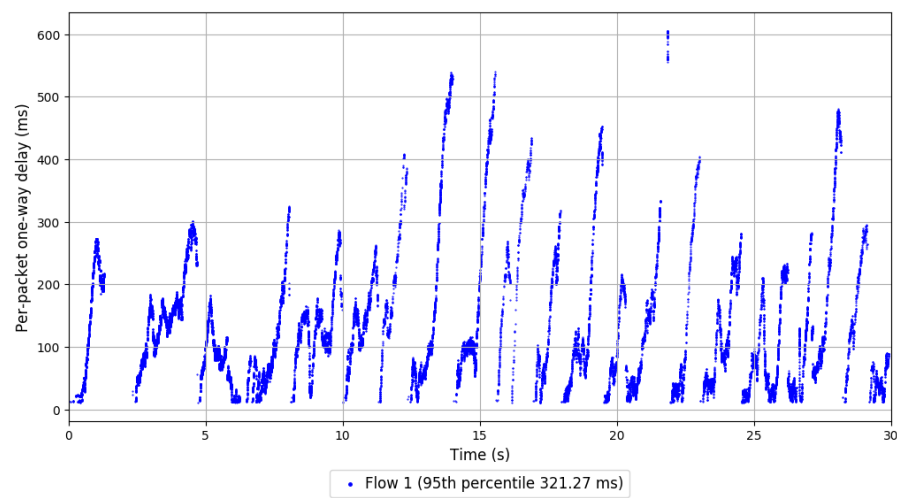
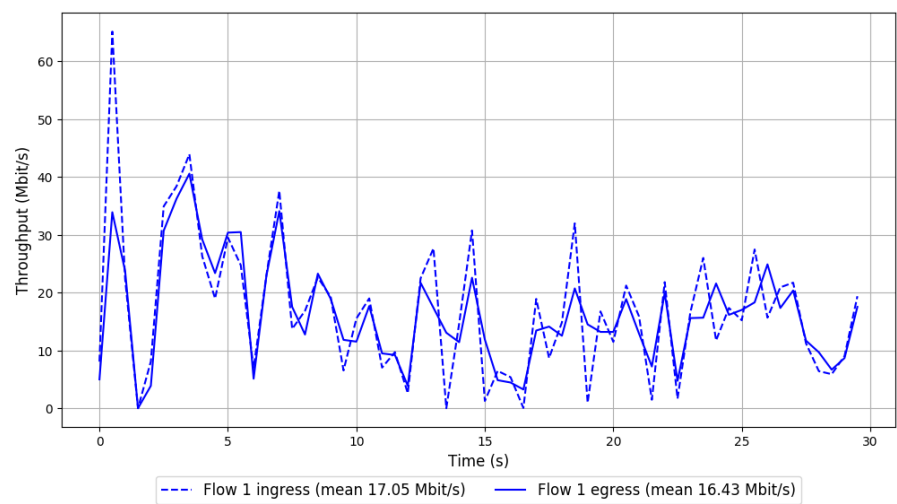
-- Flow 1:

Average throughput: 16.43 Mbit/s

95th percentile per-packet one-way delay: 321.274 ms

Loss rate: 3.62%

Run 1: Report of Verus — Data Link

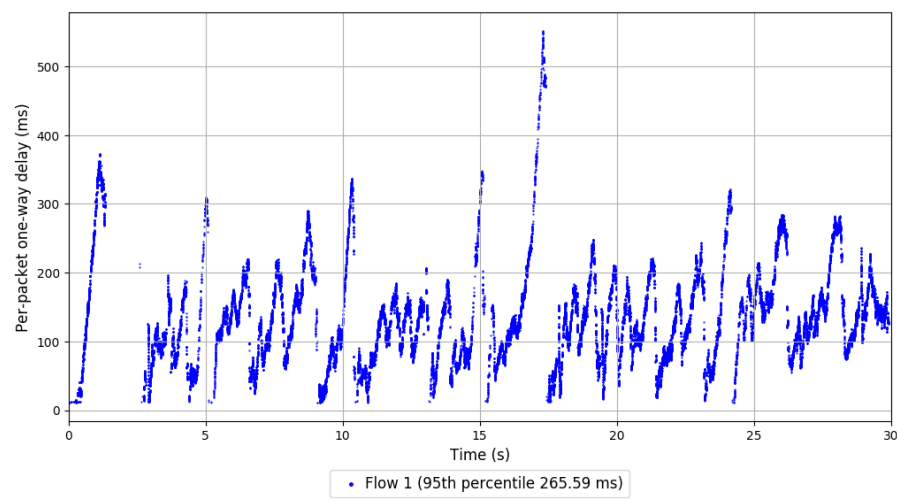
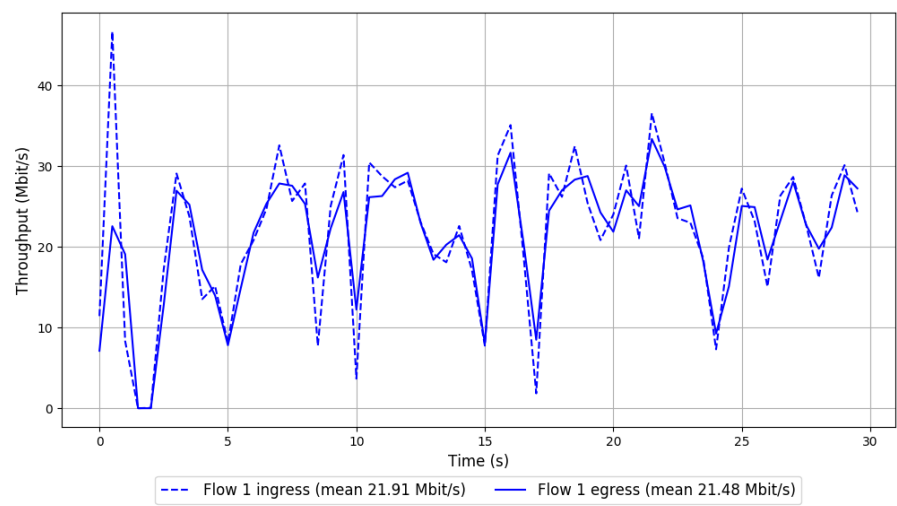


Run 2: Statistics of Verus

Start at: 2018-02-12 21:06:36
End at: 2018-02-12 21:07:06
Local clock offset: 0.037 ms
Remote clock offset: -5.547 ms

Below is generated by plot.py at 2018-02-12 21:42:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 21.48 Mbit/s
95th percentile per-packet one-way delay: 265.591 ms
Loss rate: 1.91%
-- Flow 1:
Average throughput: 21.48 Mbit/s
95th percentile per-packet one-way delay: 265.591 ms
Loss rate: 1.91%

Run 2: Report of Verus — Data Link

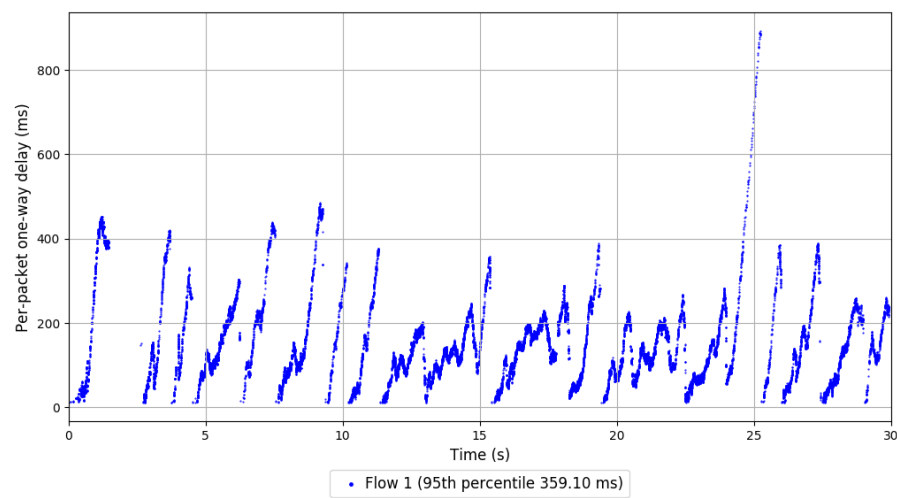
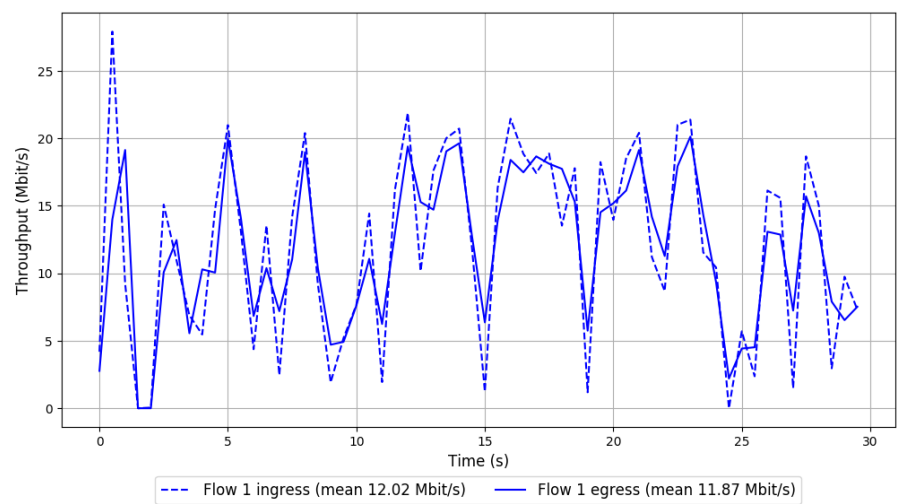


Run 3: Statistics of Verus

Start at: 2018-02-12 21:30:11
End at: 2018-02-12 21:30:41
Local clock offset: 0.086 ms
Remote clock offset: -5.223 ms

Below is generated by plot.py at 2018-02-12 21:42:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.87 Mbit/s
95th percentile per-packet one-way delay: 359.100 ms
Loss rate: 1.25%
-- Flow 1:
Average throughput: 11.87 Mbit/s
95th percentile per-packet one-way delay: 359.100 ms
Loss rate: 1.25%

Run 3: Report of Verus — Data Link

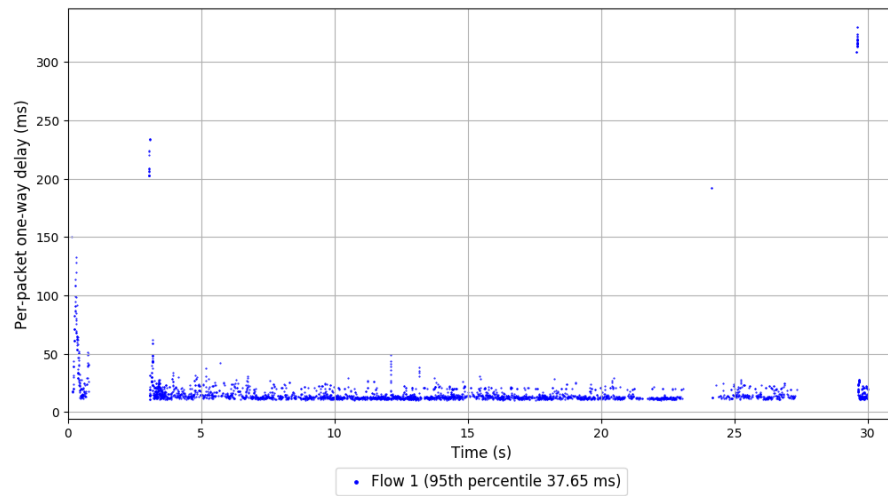
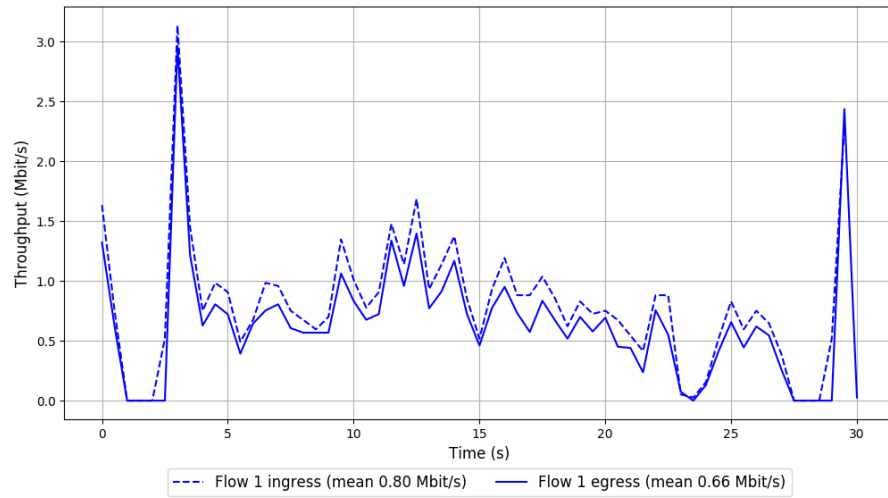


Run 1: Statistics of Copa

Start at: 2018-02-12 20:29:55
End at: 2018-02-12 20:30:25
Local clock offset: 0.177 ms
Remote clock offset: -4.138 ms

Below is generated by plot.py at 2018-02-12 21:42:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 37.652 ms
Loss rate: 18.19%
-- Flow 1:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 37.652 ms
Loss rate: 18.19%

Run 1: Report of Copa — Data Link

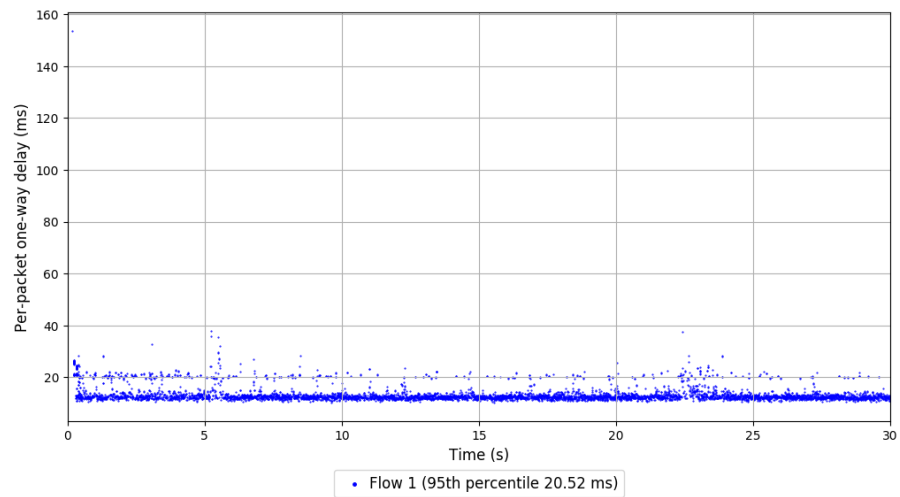
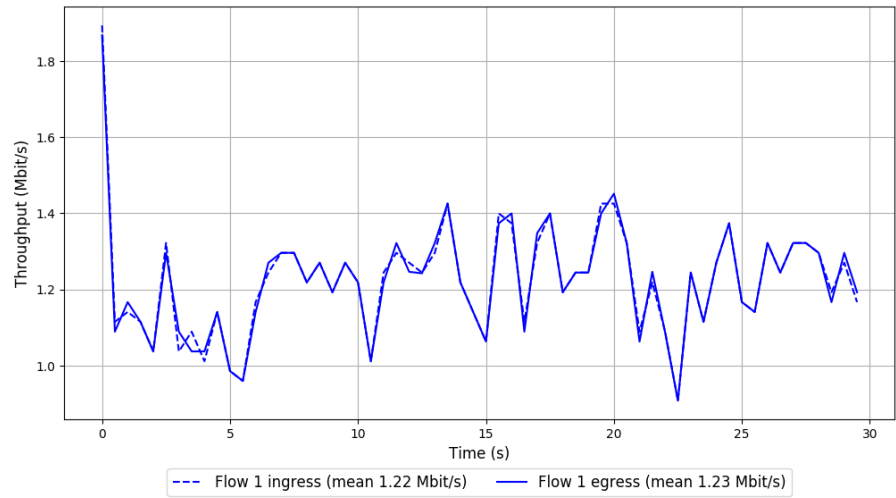


Run 2: Statistics of Copa

Start at: 2018-02-12 20:53:30
End at: 2018-02-12 20:54:00
Local clock offset: 0.078 ms
Remote clock offset: -5.144 ms

Below is generated by plot.py at 2018-02-12 21:42:04
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 20.515 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 20.515 ms
Loss rate: 0.00%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-02-12 21:17:06

End at: 2018-02-12 21:17:36

Local clock offset: 0.098 ms

Remote clock offset: -5.48 ms

Below is generated by plot.py at 2018-02-12 21:42:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.98 Mbit/s

95th percentile per-packet one-way delay: 21.329 ms

Loss rate: 0.00%

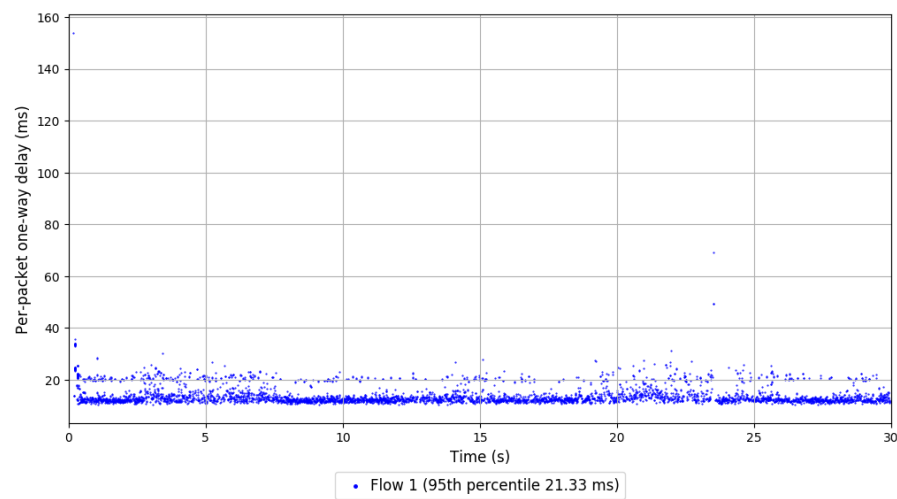
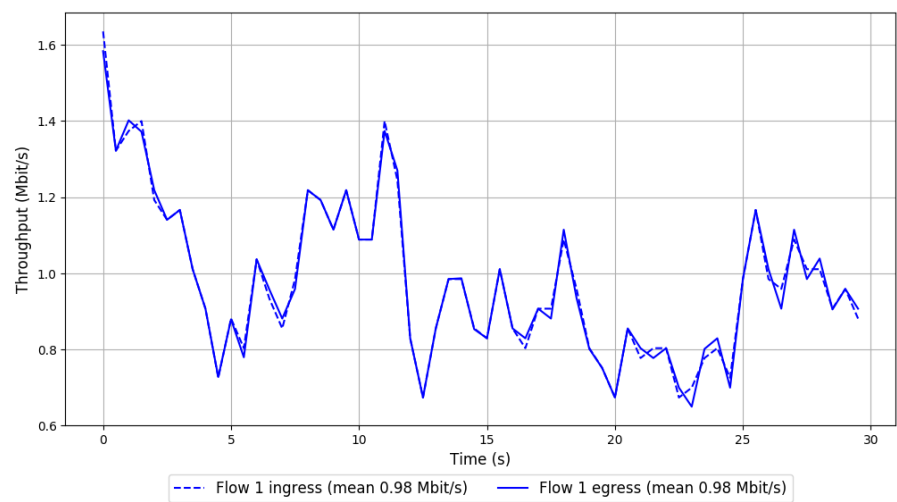
-- Flow 1:

Average throughput: 0.98 Mbit/s

95th percentile per-packet one-way delay: 21.329 ms

Loss rate: 0.00%

Run 3: Report of Copa — Data Link

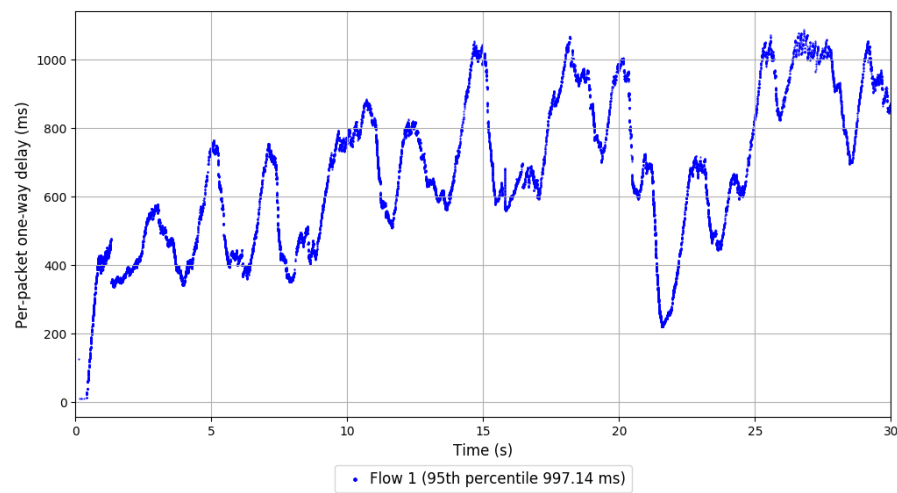
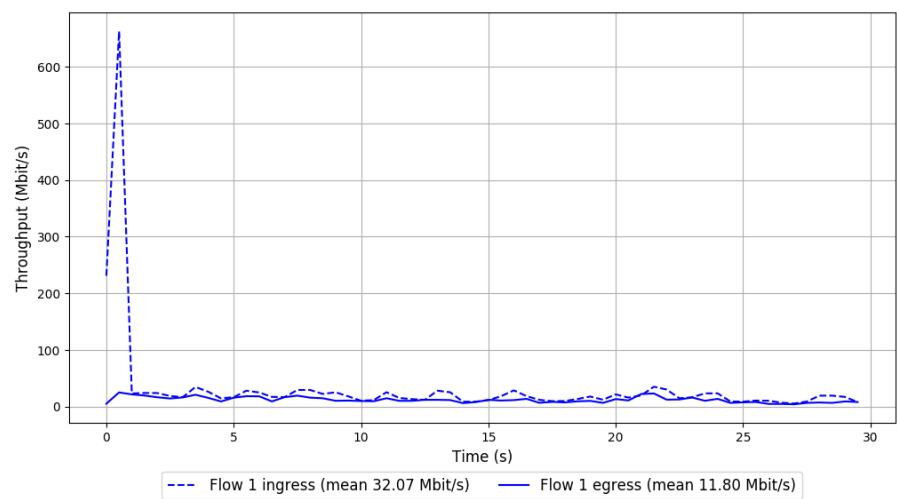


Run 1: Statistics of FillP

Start at: 2018-02-12 20:48:15
End at: 2018-02-12 20:48:45
Local clock offset: 0.182 ms
Remote clock offset: -4.859 ms

Below is generated by plot.py at 2018-02-12 21:42:06
Datalink statistics
-- Total of 1 flow:
Average throughput: 11.80 Mbit/s
95th percentile per-packet one-way delay: 997.139 ms
Loss rate: 63.35%
-- Flow 1:
Average throughput: 11.80 Mbit/s
95th percentile per-packet one-way delay: 997.139 ms
Loss rate: 63.35%

Run 1: Report of FillP — Data Link

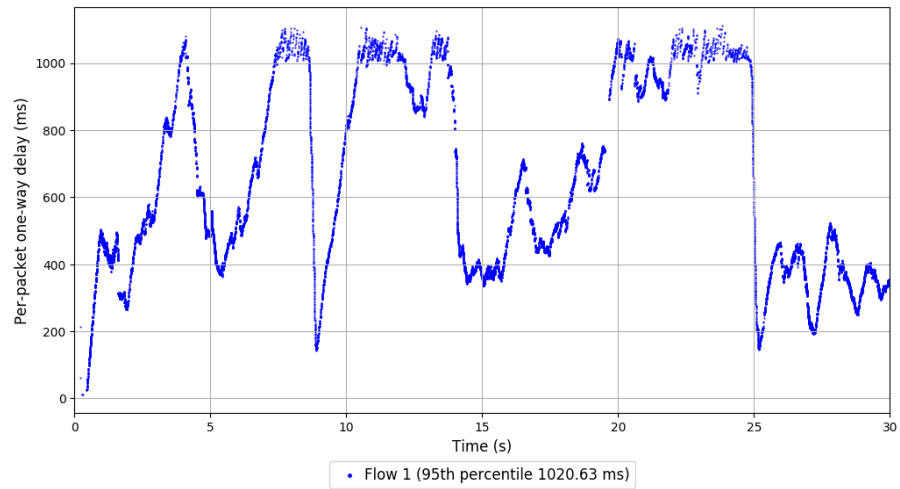
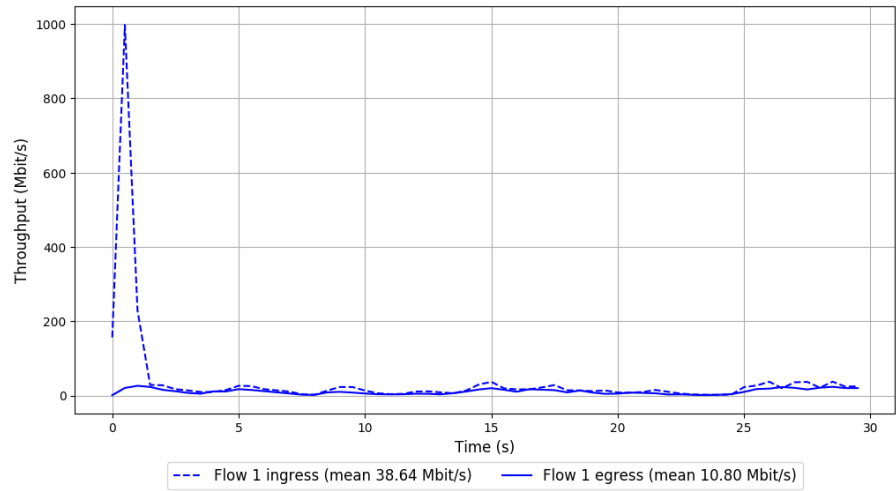


Run 2: Statistics of FillP

Start at: 2018-02-12 21:11:51
End at: 2018-02-12 21:12:21
Local clock offset: 0.099 ms
Remote clock offset: -5.612 ms

Below is generated by plot.py at 2018-02-12 21:42:09
Datalink statistics
-- Total of 1 flow:
Average throughput: 10.80 Mbit/s
95th percentile per-packet one-way delay: 1020.634 ms
Loss rate: 72.24%
-- Flow 1:
Average throughput: 10.80 Mbit/s
95th percentile per-packet one-way delay: 1020.634 ms
Loss rate: 72.24%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-02-12 21:35:26

End at: 2018-02-12 21:35:56

Local clock offset: 0.1 ms

Remote clock offset: -5.326 ms

Below is generated by plot.py at 2018-02-12 21:42:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.64 Mbit/s

95th percentile per-packet one-way delay: 935.736 ms

Loss rate: 66.51%

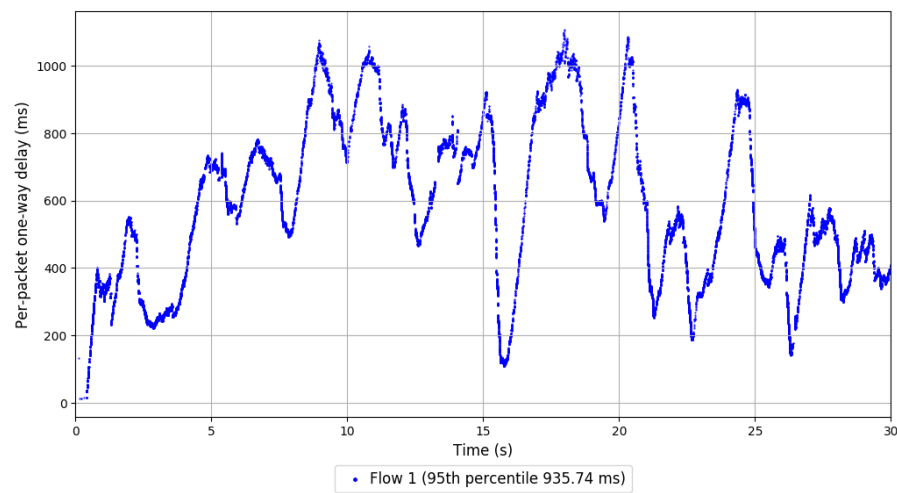
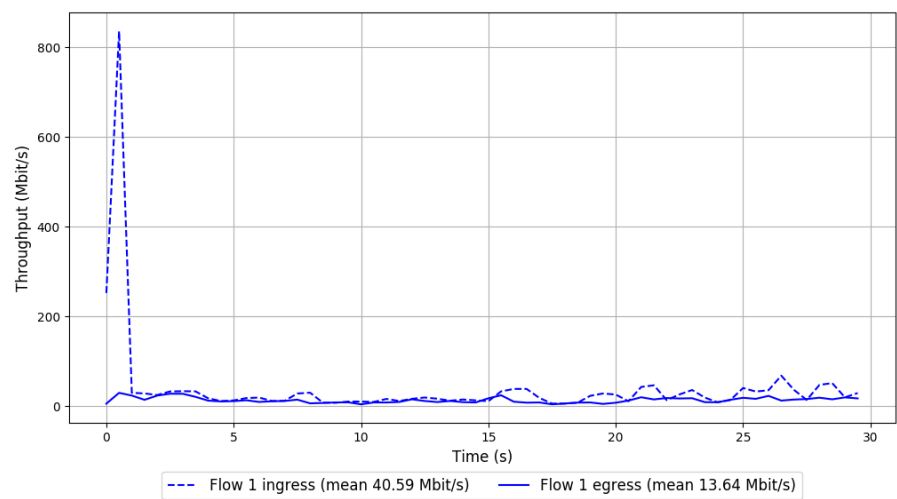
-- Flow 1:

Average throughput: 13.64 Mbit/s

95th percentile per-packet one-way delay: 935.736 ms

Loss rate: 66.51%

Run 3: Report of FillP — Data Link

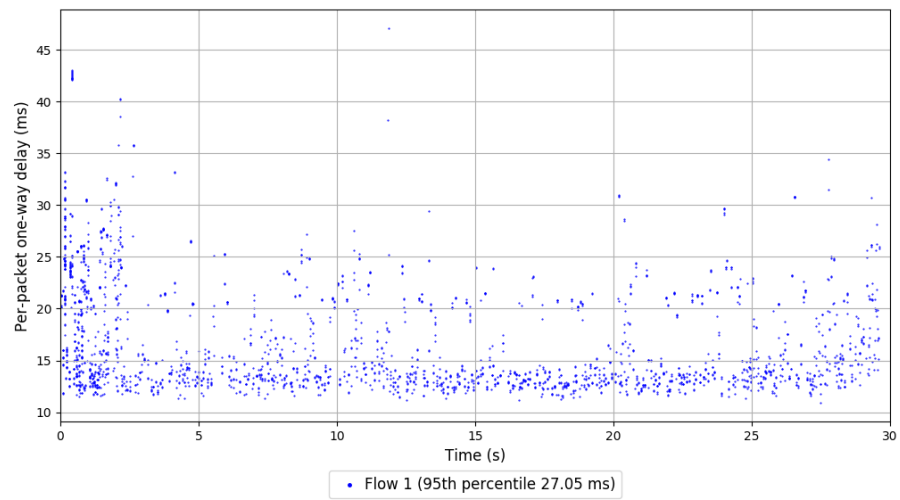
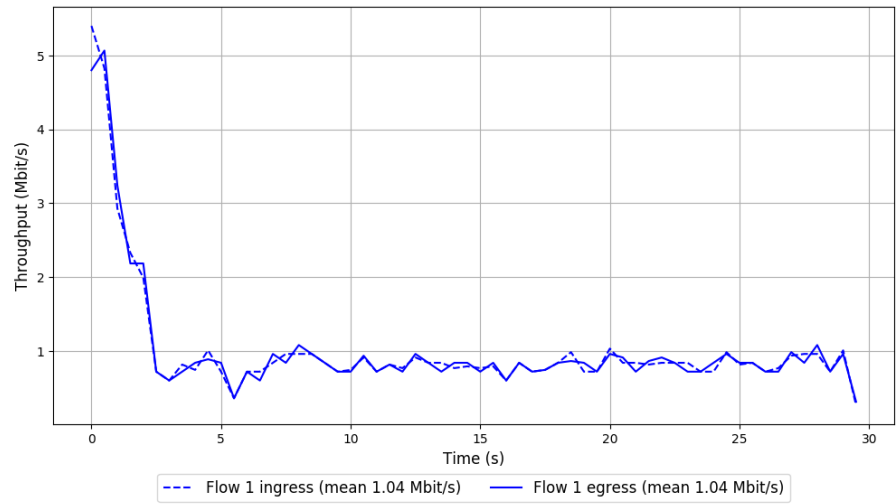


```
Run 1: Statistics of Indigo-1-32

Start at: 2018-02-12 20:45:38
End at: 2018-02-12 20:46:08
Local clock offset: 0.092 ms
Remote clock offset: -4.707 ms

# Below is generated by plot.py at 2018-02-12 21:42:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 27.046 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 27.046 ms
Loss rate: 0.00%
```

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



Run 2: Statistics of Indigo-1-32

Start at: 2018-02-12 21:09:14

End at: 2018-02-12 21:09:44

Local clock offset: 0.103 ms

Remote clock offset: -5.52 ms

Below is generated by plot.py at 2018-02-12 21:42:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.83 Mbit/s

95th percentile per-packet one-way delay: 58.982 ms

Loss rate: 0.02%

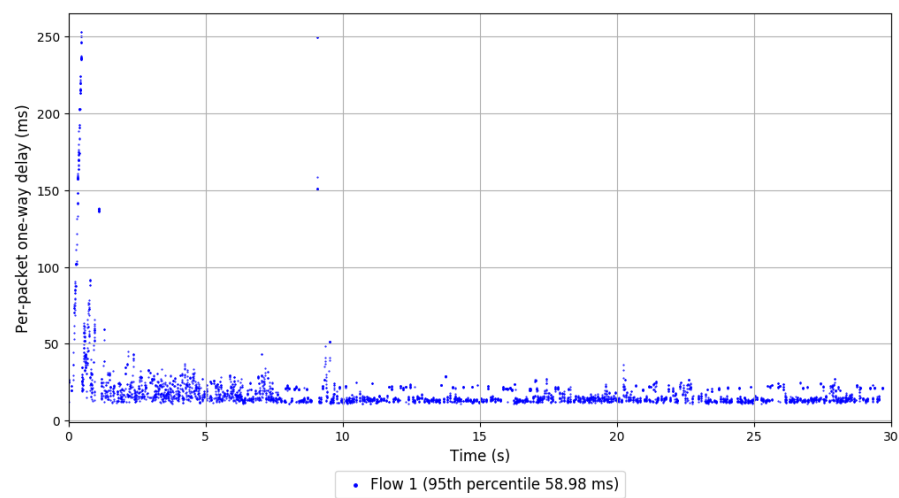
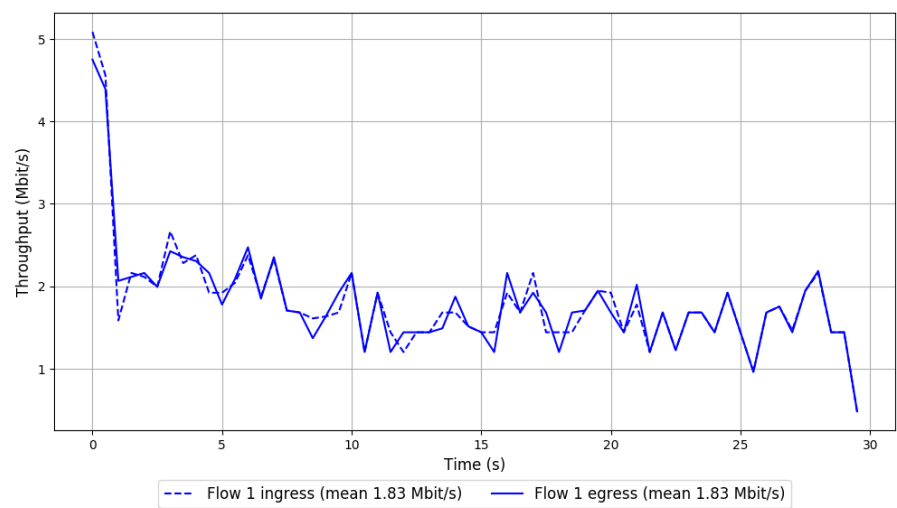
-- Flow 1:

Average throughput: 1.83 Mbit/s

95th percentile per-packet one-way delay: 58.982 ms

Loss rate: 0.02%

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

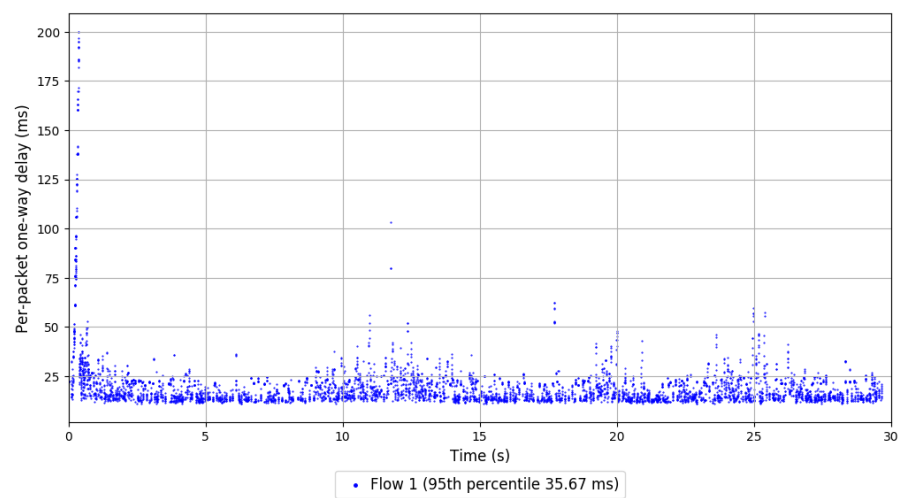
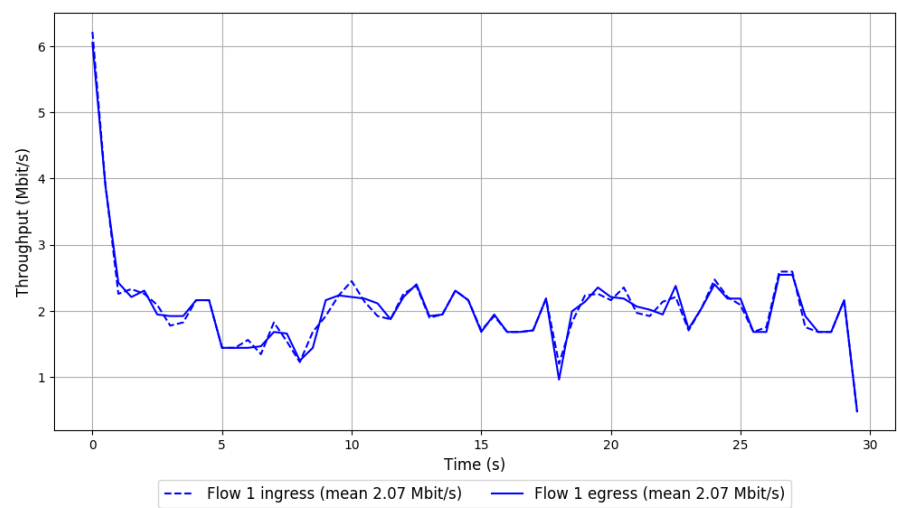


Run 3: Statistics of Indigo-1-32

Start at: 2018-02-12 21:32:49
End at: 2018-02-12 21:33:19
Local clock offset: 0.103 ms
Remote clock offset: -5.272 ms

Below is generated by plot.py at 2018-02-12 21:42:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 35.667 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 35.667 ms
Loss rate: 0.00%

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

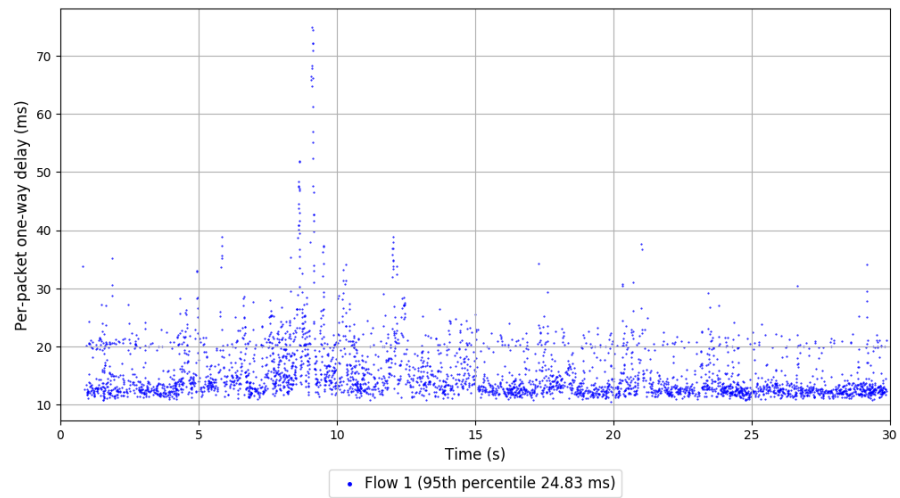
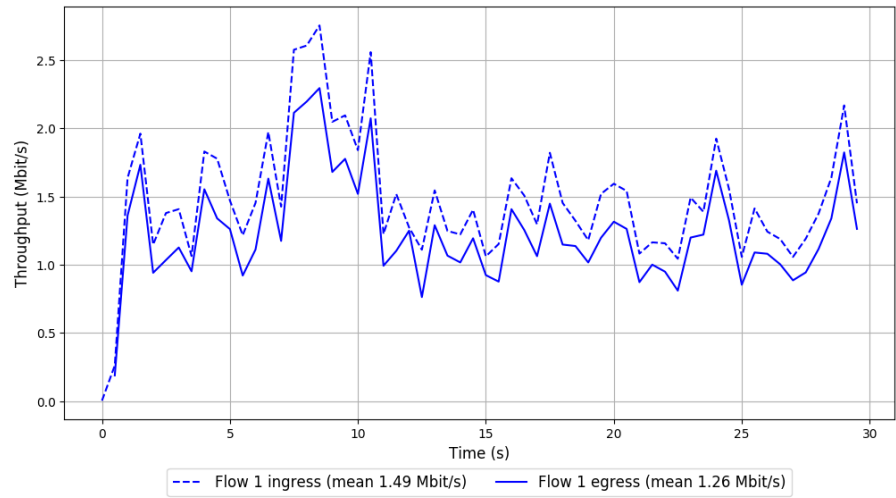


Run 1: Statistics of Vivace-latency

Start at: 2018-02-12 20:32:31
End at: 2018-02-12 20:33:01
Local clock offset: 0.152 ms
Remote clock offset: -3.995 ms

Below is generated by plot.py at 2018-02-12 21:42:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 24.834 ms
Loss rate: 17.50%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 24.834 ms
Loss rate: 17.50%

Run 1: Report of Vivace-latency — Data Link



Run 2: Statistics of Vivace-latency

Start at: 2018-02-12 20:56:07

End at: 2018-02-12 20:56:37

Local clock offset: 0.145 ms

Remote clock offset: -5.34 ms

Below is generated by plot.py at 2018-02-12 21:42:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.14 Mbit/s

95th percentile per-packet one-way delay: 40.610 ms

Loss rate: 0.00%

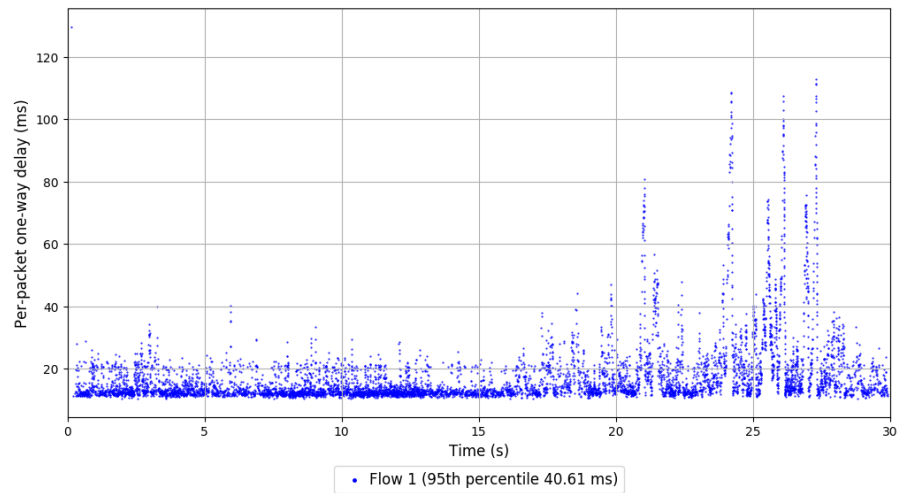
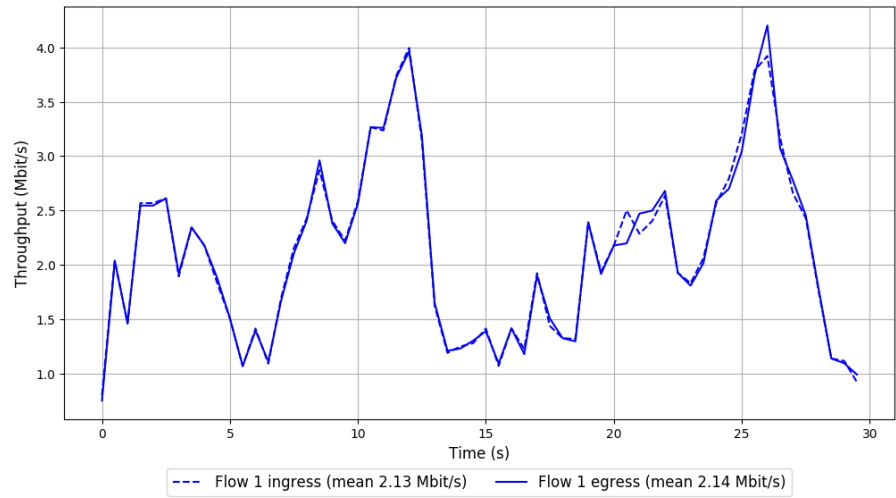
-- Flow 1:

Average throughput: 2.14 Mbit/s

95th percentile per-packet one-way delay: 40.610 ms

Loss rate: 0.00%

Run 2: Report of Vivace-latency — Data Link

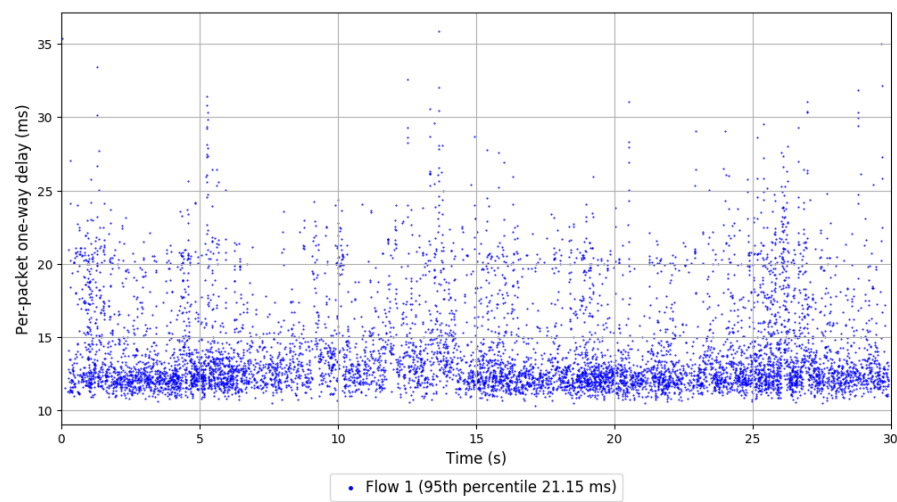
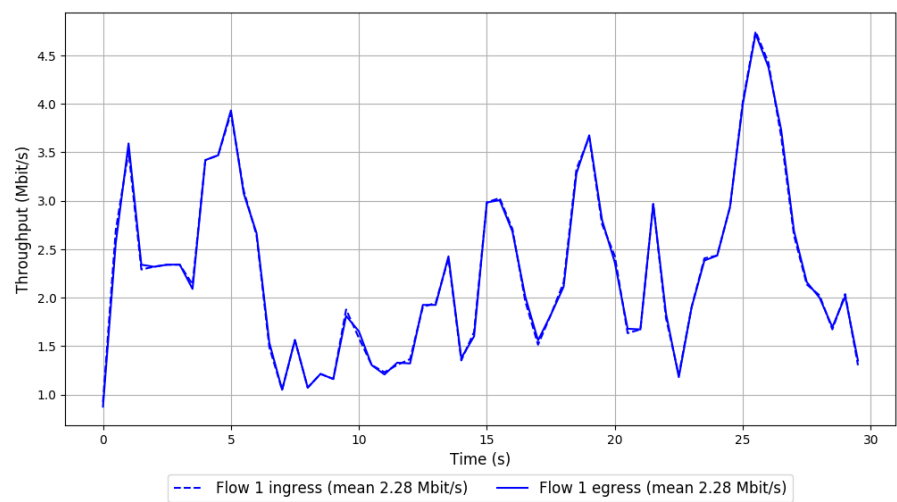


Run 3: Statistics of Vivace-latency

Start at: 2018-02-12 21:19:43
End at: 2018-02-12 21:20:13
Local clock offset: 0.007 ms
Remote clock offset: -5.419 ms

Below is generated by plot.py at 2018-02-12 21:42:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 21.152 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 21.152 ms
Loss rate: 0.00%

Run 3: Report of Vivace-latency — Data Link



Run 1: Statistics of Vivace-loss

Start at: 2018-02-12 20:50:53

End at: 2018-02-12 20:51:23

Local clock offset: 0.093 ms

Remote clock offset: -5.134 ms

Below is generated by plot.py at 2018-02-12 21:42:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.82 Mbit/s

95th percentile per-packet one-way delay: 989.007 ms

Loss rate: 34.69%

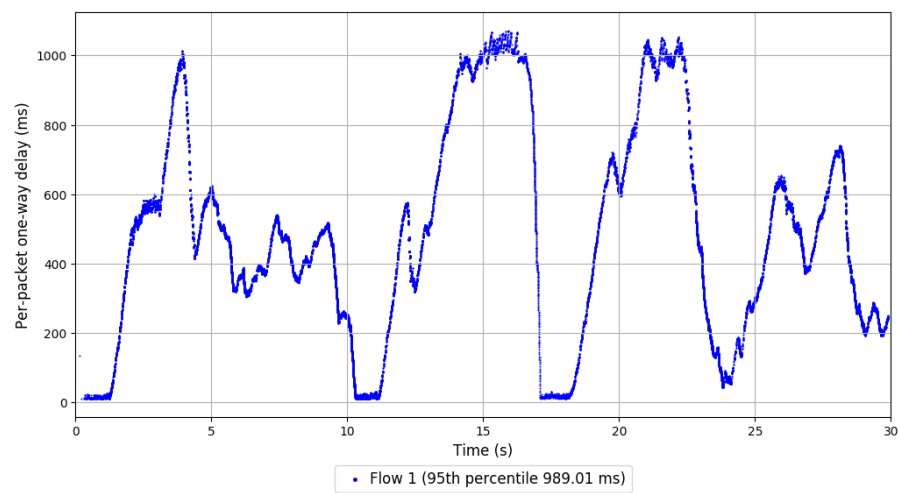
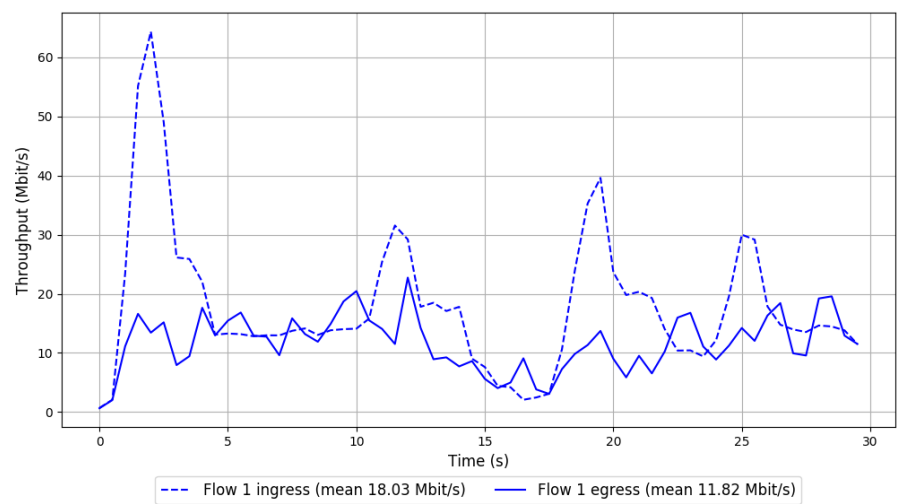
-- Flow 1:

Average throughput: 11.82 Mbit/s

95th percentile per-packet one-way delay: 989.007 ms

Loss rate: 34.69%

Run 1: Report of Vivace-loss — Data Link



Run 2: Statistics of Vivace-loss

Start at: 2018-02-12 21:14:29

End at: 2018-02-12 21:14:59

Local clock offset: 0.105 ms

Remote clock offset: -5.603 ms

Below is generated by plot.py at 2018-02-12 21:42:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.49 Mbit/s

95th percentile per-packet one-way delay: 923.858 ms

Loss rate: 31.56%

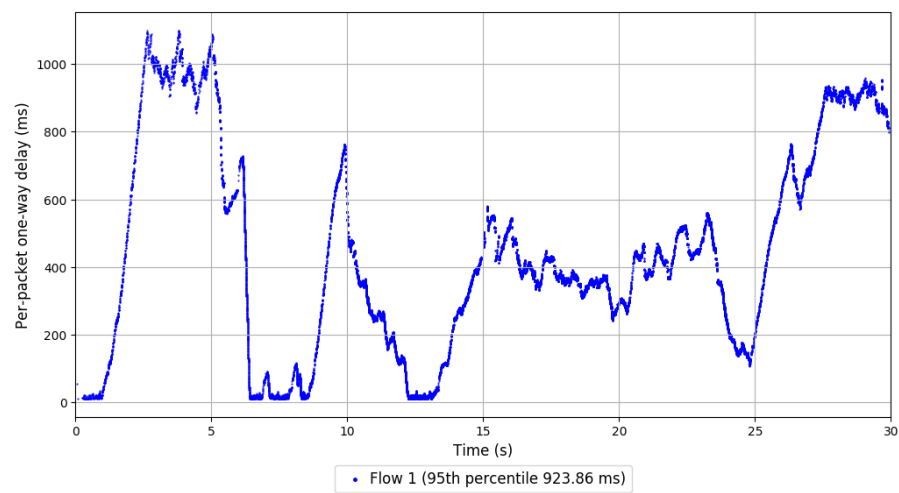
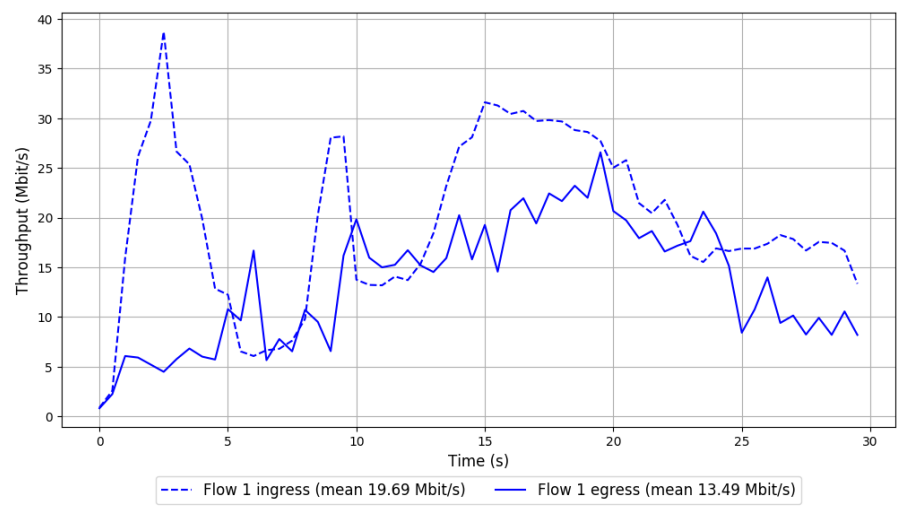
-- Flow 1:

Average throughput: 13.49 Mbit/s

95th percentile per-packet one-way delay: 923.858 ms

Loss rate: 31.56%

Run 2: Report of Vivace-loss — Data Link



Run 3: Statistics of Vivace-loss

Start at: 2018-02-12 21:38:04

End at: 2018-02-12 21:38:34

Local clock offset: 0.115 ms

Remote clock offset: -5.254 ms

Below is generated by plot.py at 2018-02-12 21:42:17

Datalink statistics

-- Total of 1 flow:

Average throughput: 26.40 Mbit/s

95th percentile per-packet one-way delay: 375.521 ms

Loss rate: 19.87%

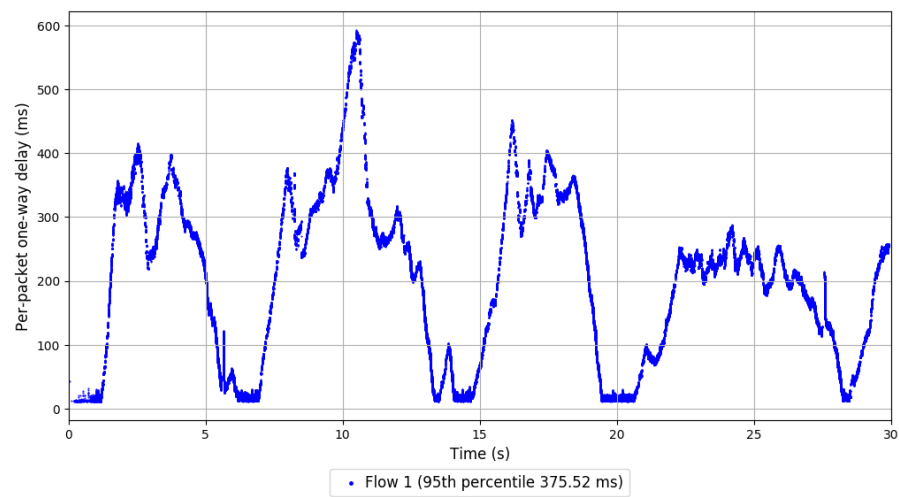
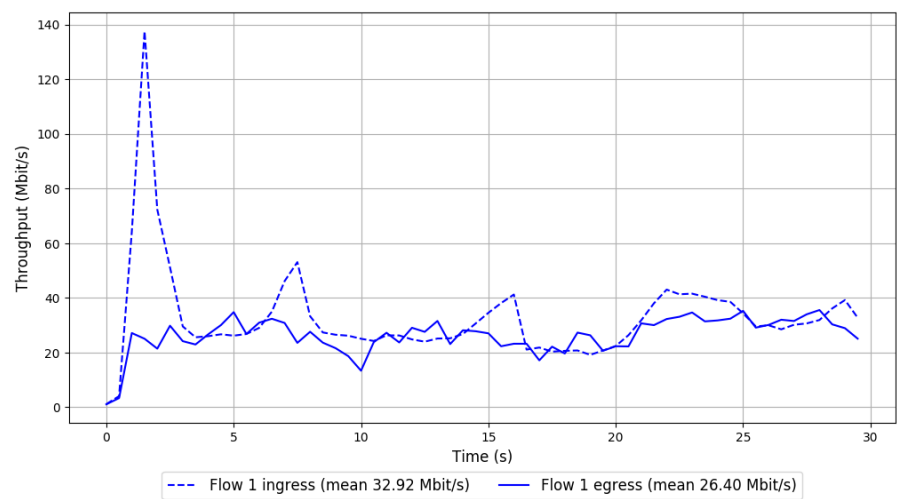
-- Flow 1:

Average throughput: 26.40 Mbit/s

95th percentile per-packet one-way delay: 375.521 ms

Loss rate: 19.87%

Run 3: Report of Vivace-loss — Data Link



Run 1: Statistics of Vivace-LTE

Start at: 2018-02-12 20:33:50

End at: 2018-02-12 20:34:20

Local clock offset: 0.161 ms

Remote clock offset: -4.09 ms

Below is generated by plot.py at 2018-02-12 21:42:17

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.39 Mbit/s

95th percentile per-packet one-way delay: 484.102 ms

Loss rate: 4.02%

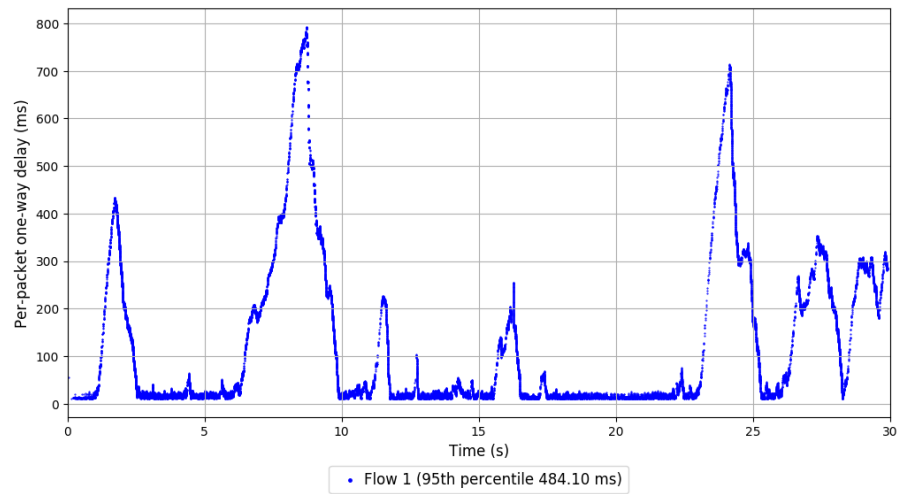
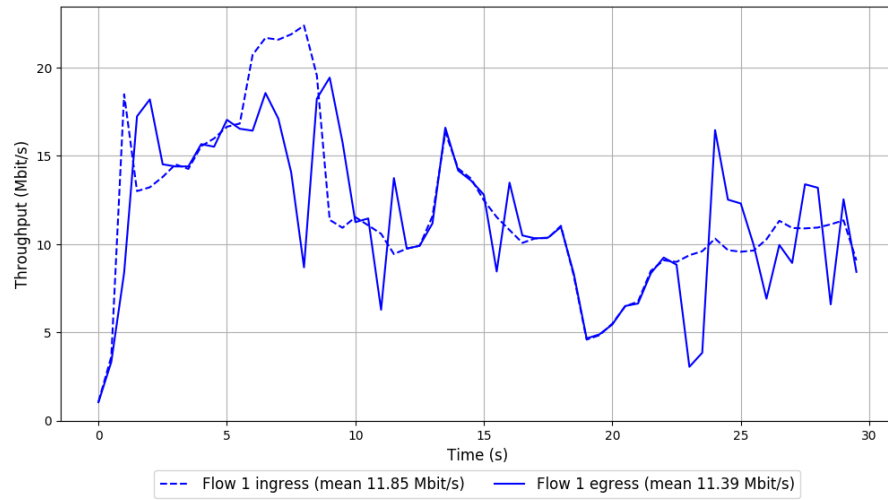
-- Flow 1:

Average throughput: 11.39 Mbit/s

95th percentile per-packet one-way delay: 484.102 ms

Loss rate: 4.02%

Run 1: Report of Vivace-LTE — Data Link

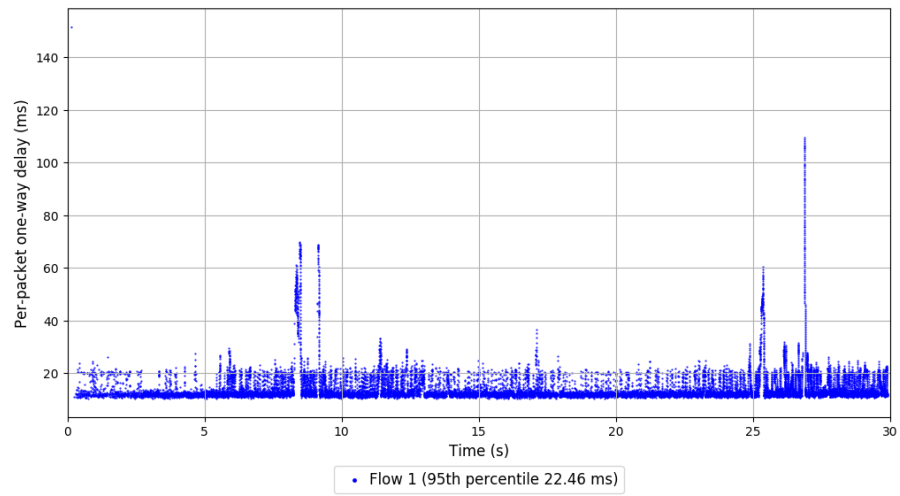
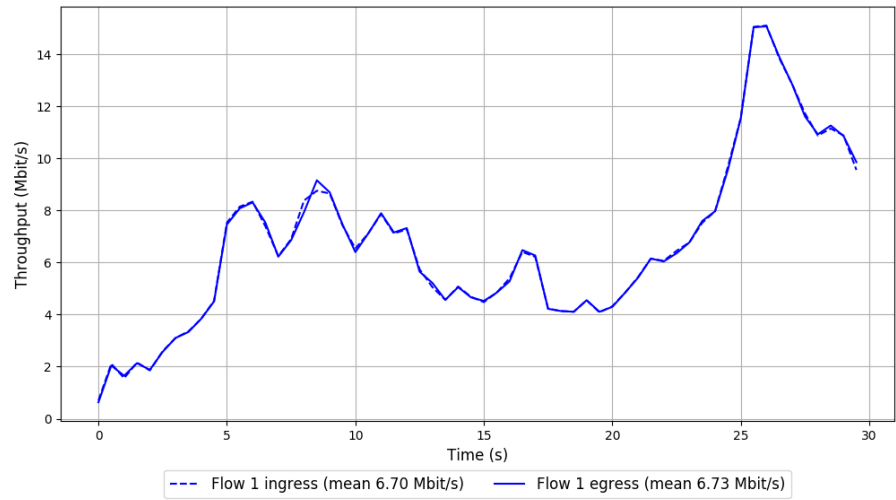


Run 2: Statistics of Vivace-LTE

Start at: 2018-02-12 20:57:25
End at: 2018-02-12 20:57:55
Local clock offset: 0.132 ms
Remote clock offset: -5.381 ms

Below is generated by plot.py at 2018-02-12 21:42:17
Datalink statistics
-- Total of 1 flow:
Average throughput: 6.73 Mbit/s
95th percentile per-packet one-way delay: 22.461 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 6.73 Mbit/s
95th percentile per-packet one-way delay: 22.461 ms
Loss rate: 0.00%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-02-12 21:21:02

End at: 2018-02-12 21:21:32

Local clock offset: 0.088 ms

Remote clock offset: -5.45 ms

Below is generated by plot.py at 2018-02-12 21:42:17

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.00 Mbit/s

95th percentile per-packet one-way delay: 220.229 ms

Loss rate: 0.56%

-- Flow 1:

Average throughput: 13.00 Mbit/s

95th percentile per-packet one-way delay: 220.229 ms

Loss rate: 0.56%

Run 3: Report of Vivace-LTE — Data Link

