

Pantheon Report

Generated at 2018-03-12 22:02:55 (UTC).

Data path: Colombia ppp0 (*remote*) → AWS Brazil 2 Ethernet (*local*).

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).

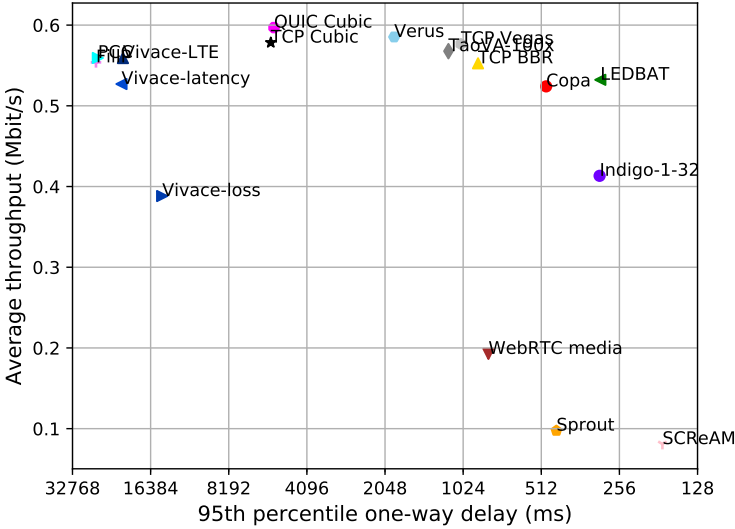
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

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

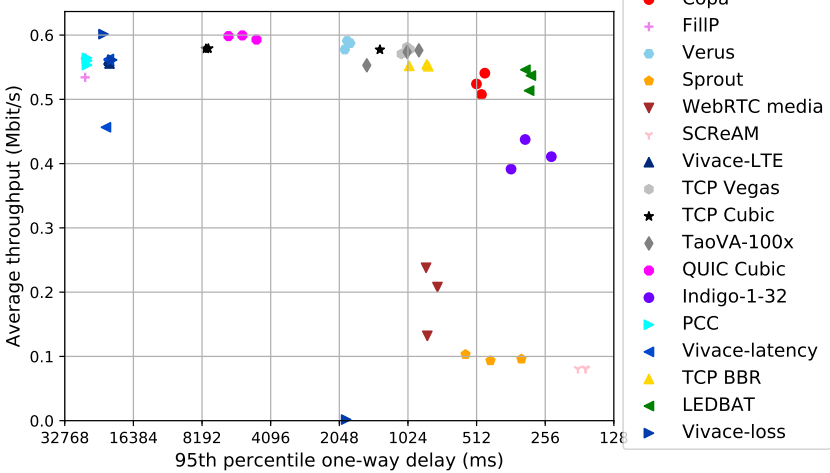
Git summary:

```
branch: master @ f12c42a2c63fdd9a862eefa0468859bf379b6623
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fixp @ 828bbf95fd4941149b5cec90f281d1c69ae1a5c6
third_party/genericCC @ 9249eea3238475c4d8cca1443d28df70bff6c4a2
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ 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 Colombia ppp0 to AWS Brazil 2 Ethernet, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from Colombia ppp0 to AWS Brazil 2 Ethernet, 3 runs of 30s each per scheme



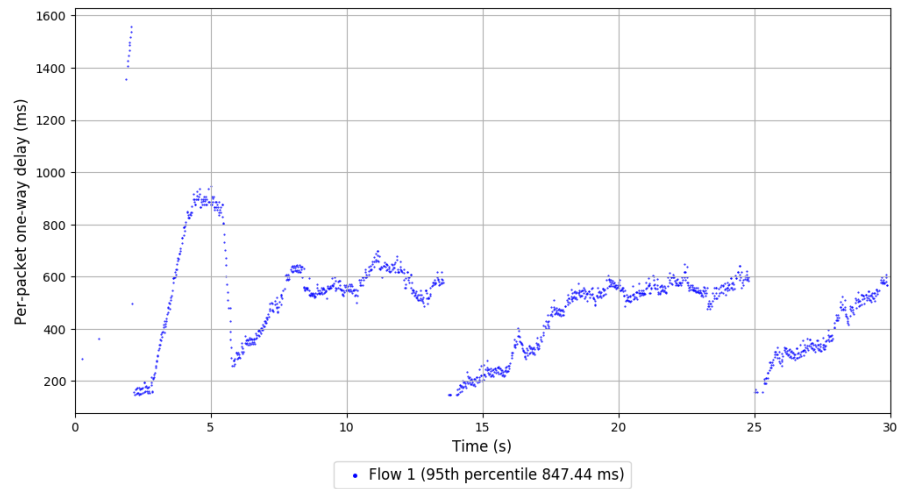
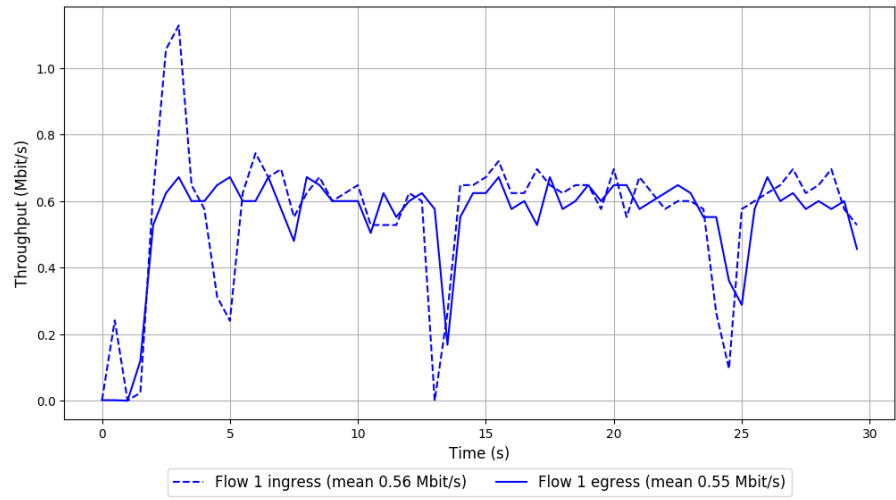
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	0.55	897.44	2.34
TCP Cubic	3	0.58	5641.90	21.23
LEDBAT	3	0.53	303.34	1.52
PCC	3	0.56	26162.19	98.25
QUIC Cubic	3	0.60	5483.30	21.39
SCReAM	3	0.08	174.81	0.79
WebRTC media	3	0.19	818.28	1.78
Sprout	3	0.10	447.73	0.87
TaoVA-100x	3	0.57	1166.97	2.67
TCP Vegas	3	0.58	1044.31	1.89
Verus	3	0.59	1888.61	4.61
Copa	3	0.52	490.37	3.22
FillP	3	0.55	26601.68	98.78
Indigo-1-32	3	0.41	305.21	1.80
Vivace-latency	3	0.53	21223.38	73.28
Vivace-loss	3	0.39	14786.38	59.50
Vivace-LTE	3	0.56	20941.75	71.77

Run 1: Statistics of TCP BBR

Start at: 2018-03-12 20:10:28
End at: 2018-03-12 20:10:58
Local clock offset: -6.809 ms
Remote clock offset: -5.257 ms

Below is generated by plot.py at 2018-03-12 22:02:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 847.442 ms
Loss rate: 2.36%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 847.442 ms
Loss rate: 2.36%

Run 1: Report of TCP BBR — Data Link

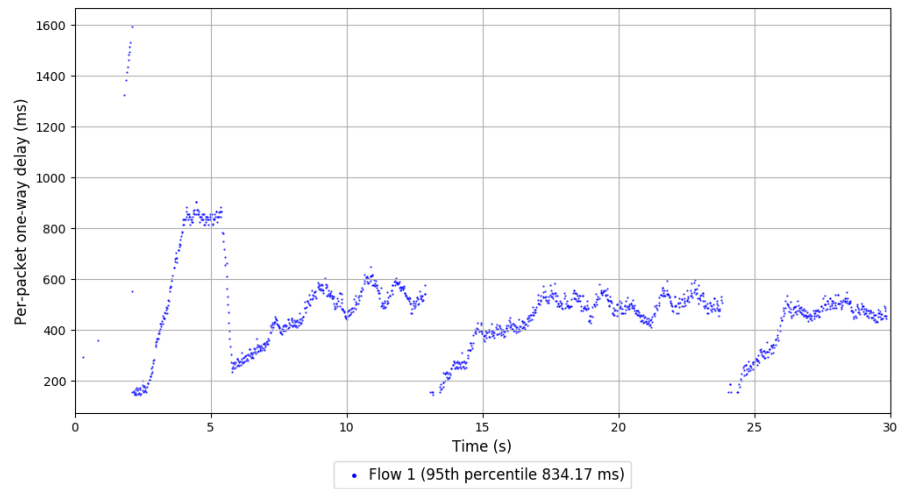
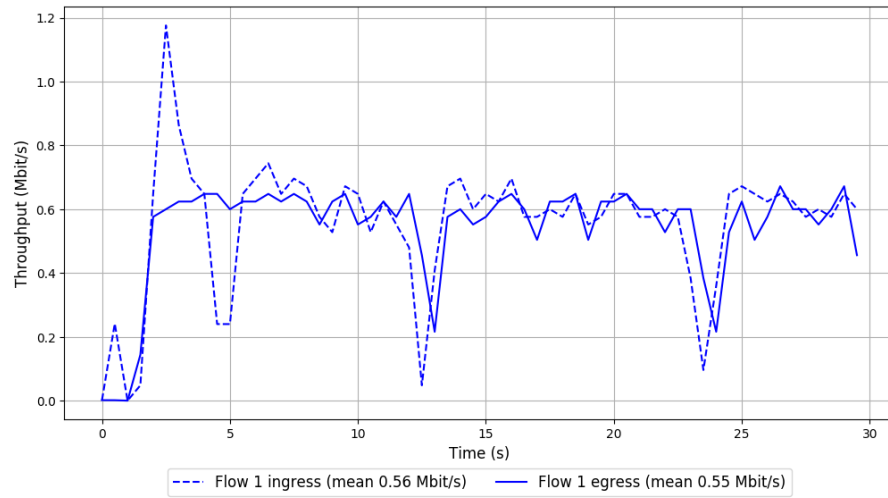


Run 2: Statistics of TCP BBR

Start at: 2018-03-12 20:31:34
End at: 2018-03-12 20:32:04
Local clock offset: -10.368 ms
Remote clock offset: -1.242 ms

Below is generated by plot.py at 2018-03-12 22:02:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 834.166 ms
Loss rate: 2.16%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 834.166 ms
Loss rate: 2.16%

Run 2: Report of TCP BBR — Data Link

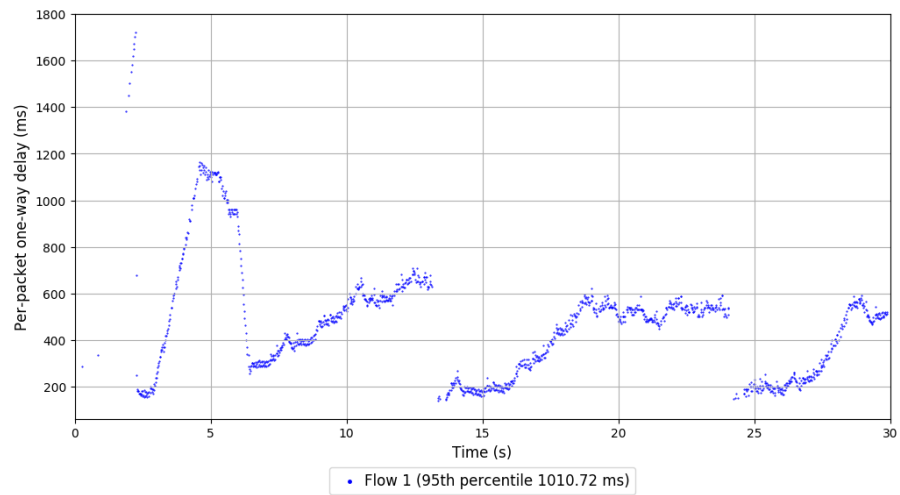
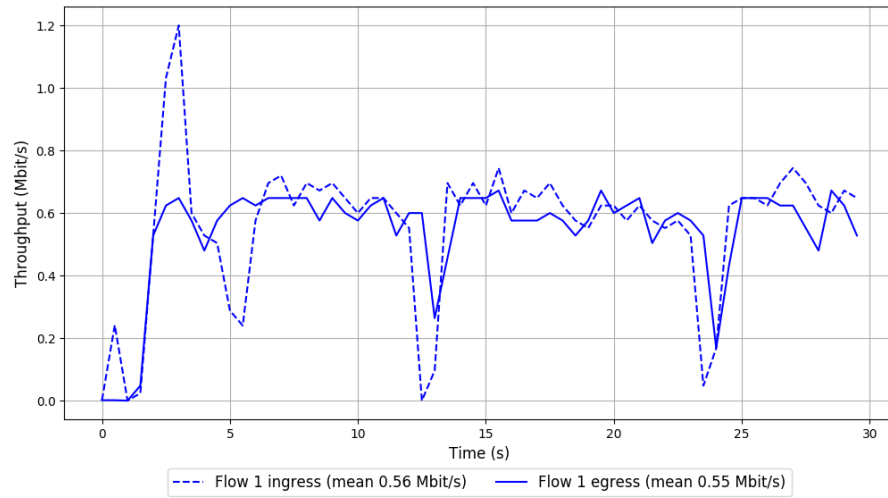


Run 3: Statistics of TCP BBR

Start at: 2018-03-12 20:52:40
End at: 2018-03-12 20:53:10
Local clock offset: -13.496 ms
Remote clock offset: -0.398 ms

Below is generated by plot.py at 2018-03-12 22:02:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 1010.721 ms
Loss rate: 2.51%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 1010.721 ms
Loss rate: 2.51%

Run 3: Report of TCP BBR — Data Link

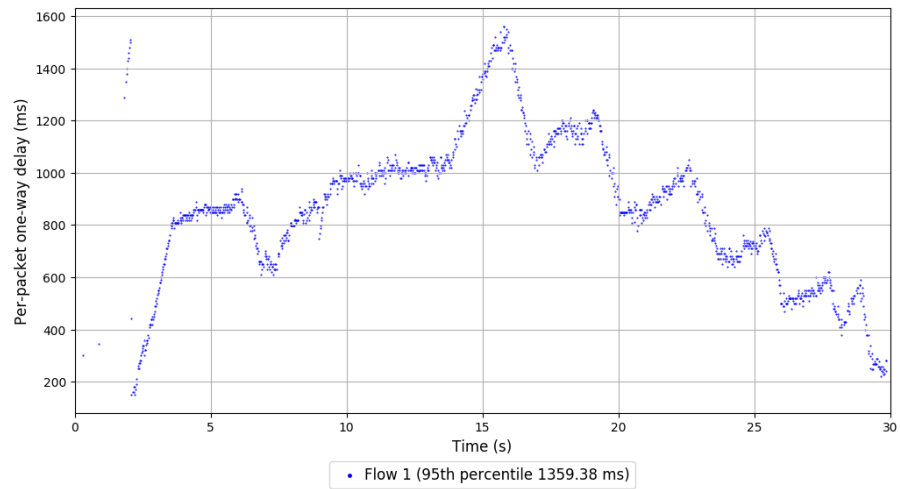
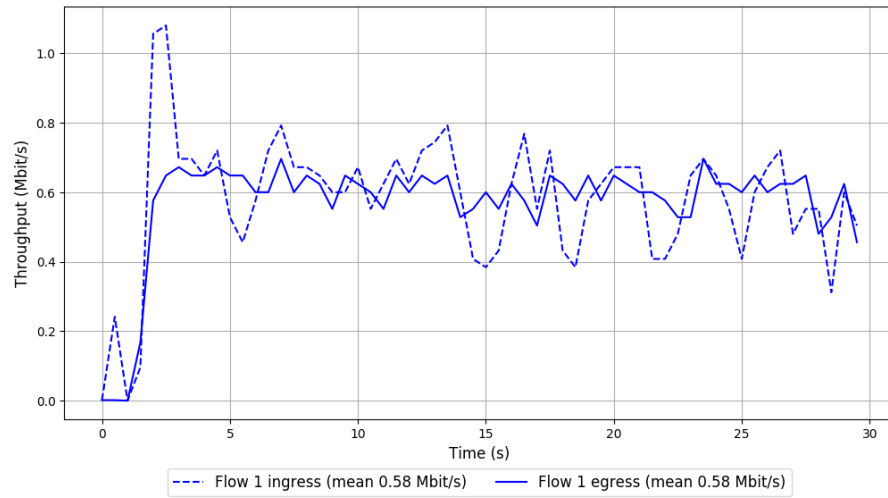


Run 1: Statistics of TCP Cubic

Start at: 2018-03-12 20:12:48
End at: 2018-03-12 20:13:18
Local clock offset: -7.09 ms
Remote clock offset: -6.226 ms

Below is generated by plot.py at 2018-03-12 22:02:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1359.379 ms
Loss rate: 1.59%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1359.379 ms
Loss rate: 1.59%

Run 1: Report of TCP Cubic — Data Link

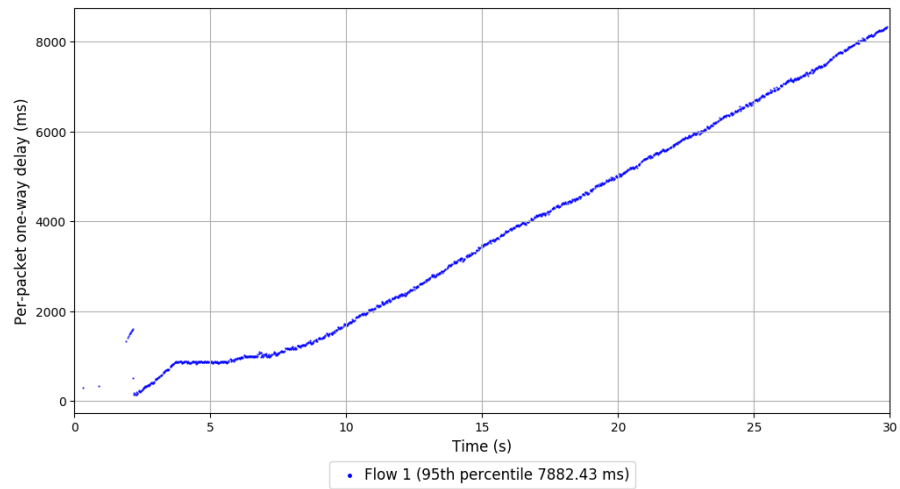
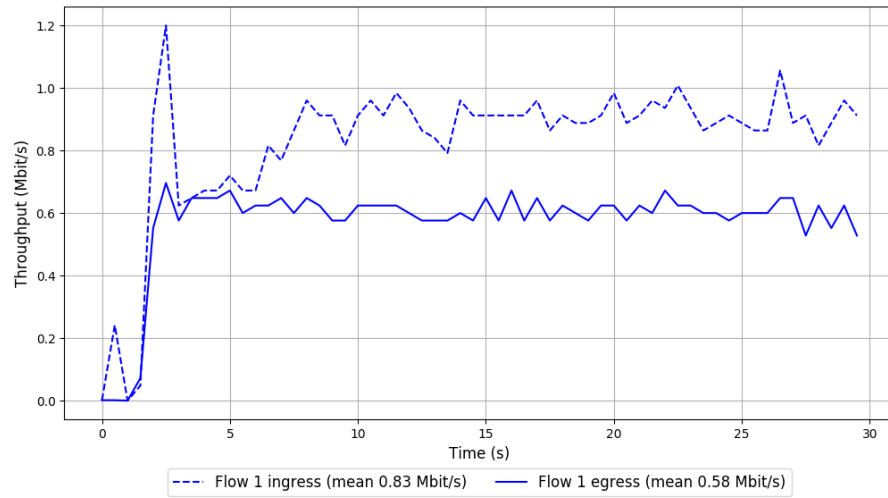


Run 2: Statistics of TCP Cubic

Start at: 2018-03-12 20:33:54
End at: 2018-03-12 20:34:24
Local clock offset: -10.429 ms
Remote clock offset: -2.309 ms

Below is generated by plot.py at 2018-03-12 22:02:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 7882.429 ms
Loss rate: 31.01%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 7882.429 ms
Loss rate: 31.01%

Run 2: Report of TCP Cubic — Data Link

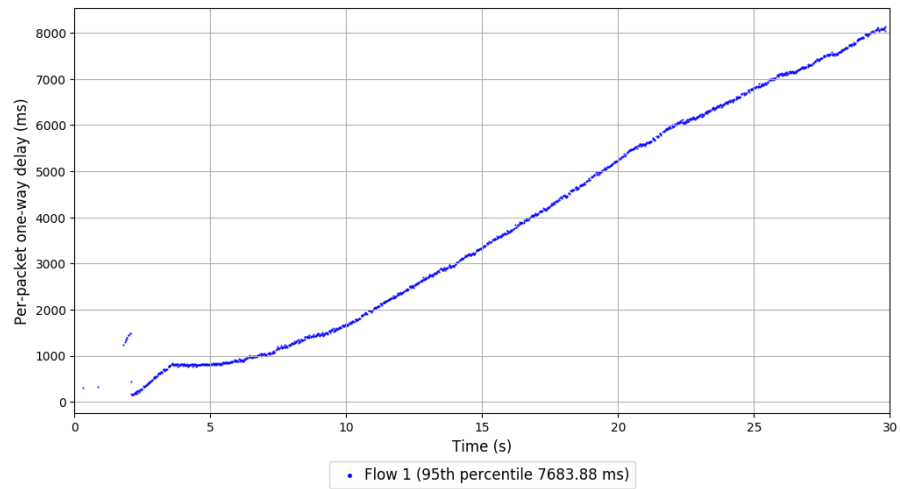
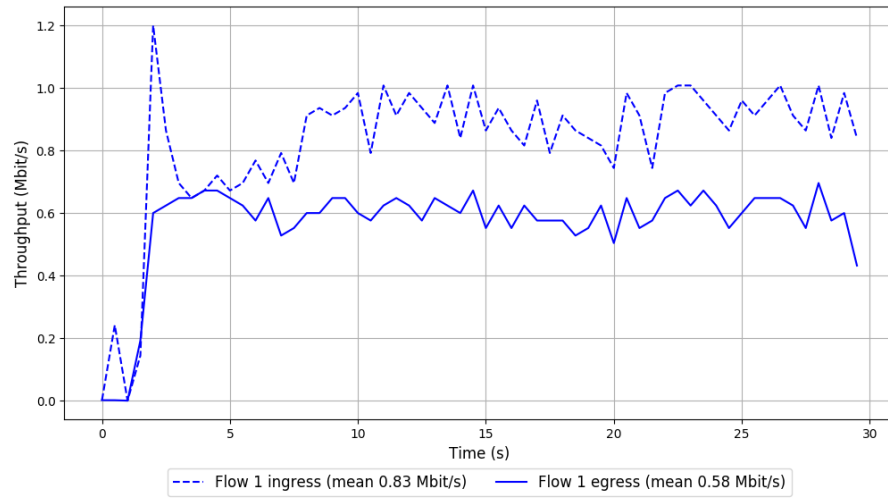


Run 3: Statistics of TCP Cubic

Start at: 2018-03-12 20:55:02
End at: 2018-03-12 20:55:32
Local clock offset: -14.011 ms
Remote clock offset: -2.175 ms

Below is generated by plot.py at 2018-03-12 22:02:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 7683.882 ms
Loss rate: 31.09%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 7683.882 ms
Loss rate: 31.09%

Run 3: Report of TCP Cubic — Data Link

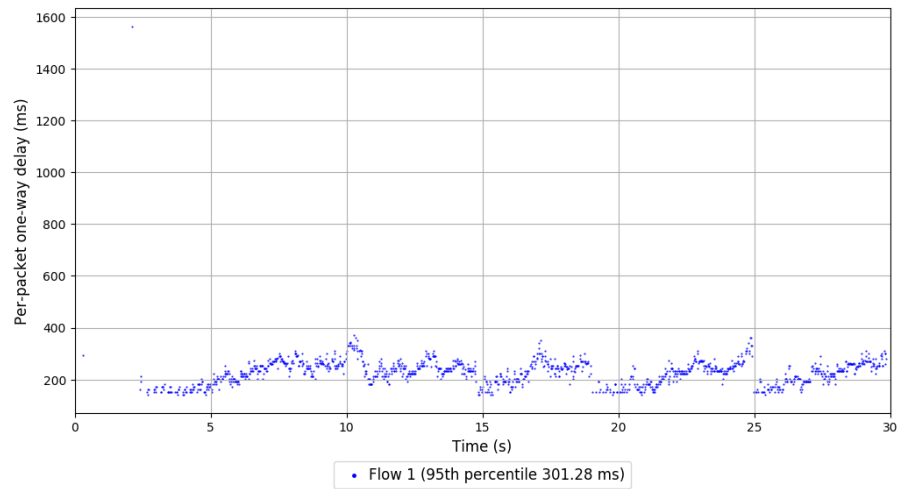
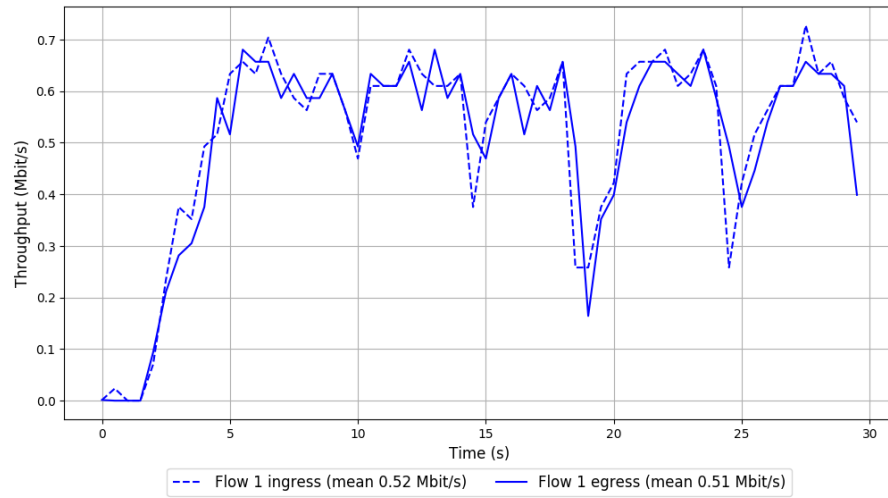


```
Run 1: Statistics of LEDBAT

Start at: 2018-03-12 20:11:38
End at: 2018-03-12 20:12:08
Local clock offset: -6.948 ms
Remote clock offset: -5.25 ms

# Below is generated by plot.py at 2018-03-12 22:02:19
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 301.282 ms
Loss rate: 1.82%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 301.282 ms
Loss rate: 1.82%
```

Run 1: Report of LEDBAT — Data Link

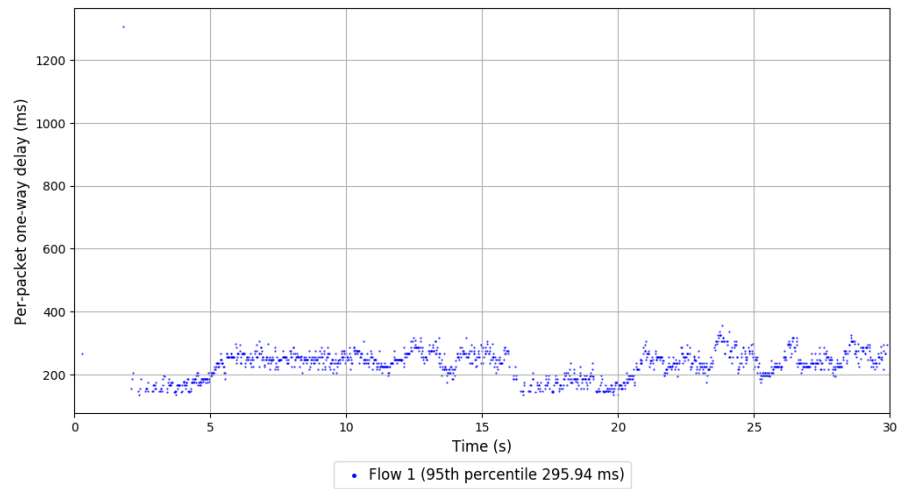
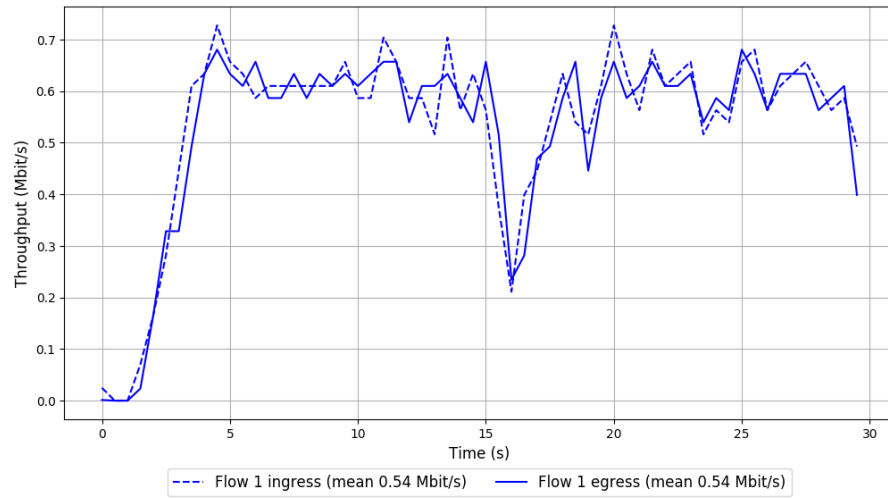


Run 2: Statistics of LEDBAT

Start at: 2018-03-12 20:32:44
End at: 2018-03-12 20:33:14
Local clock offset: -10.439 ms
Remote clock offset: -1.39 ms

Below is generated by plot.py at 2018-03-12 22:02:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 295.941 ms
Loss rate: 1.45%
-- Flow 1:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 295.941 ms
Loss rate: 1.45%

Run 2: Report of LEDBAT — Data Link

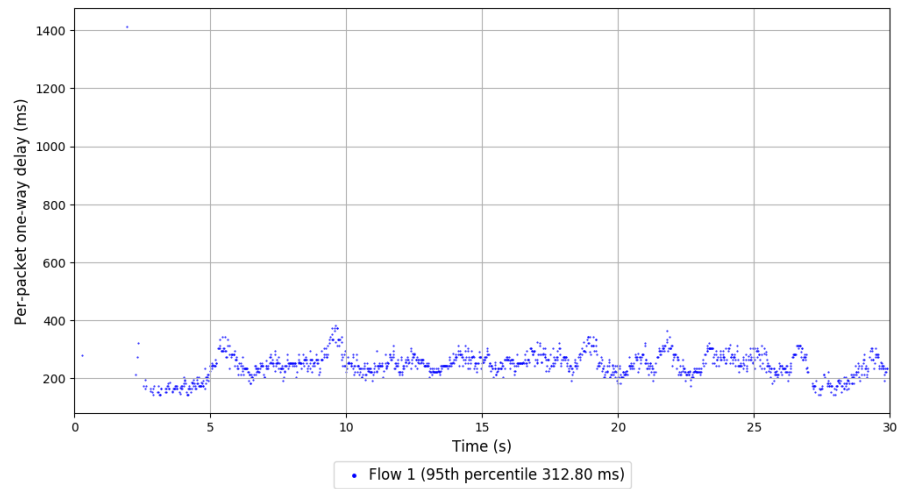
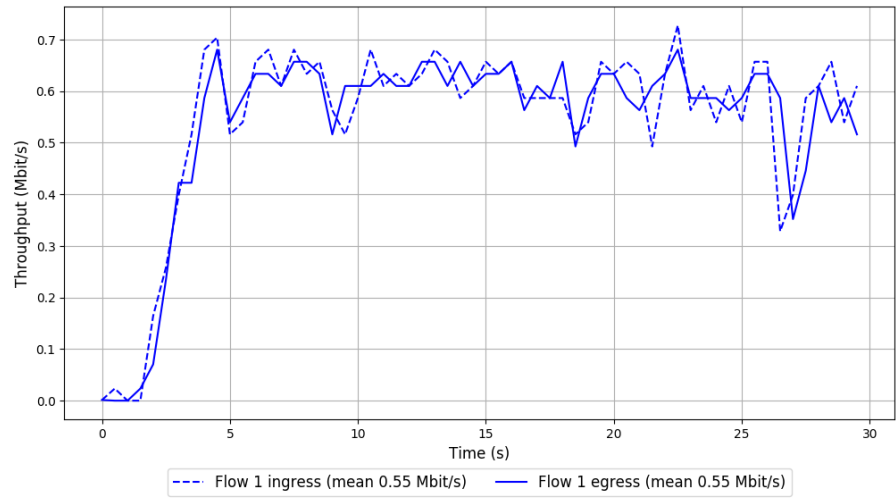


Run 3: Statistics of LEDBAT

Start at: 2018-03-12 20:53:52
End at: 2018-03-12 20:54:22
Local clock offset: -13.762 ms
Remote clock offset: -6.959 ms

Below is generated by plot.py at 2018-03-12 22:02:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 312.802 ms
Loss rate: 1.29%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 312.802 ms
Loss rate: 1.29%

Run 3: Report of LEDBAT — Data Link

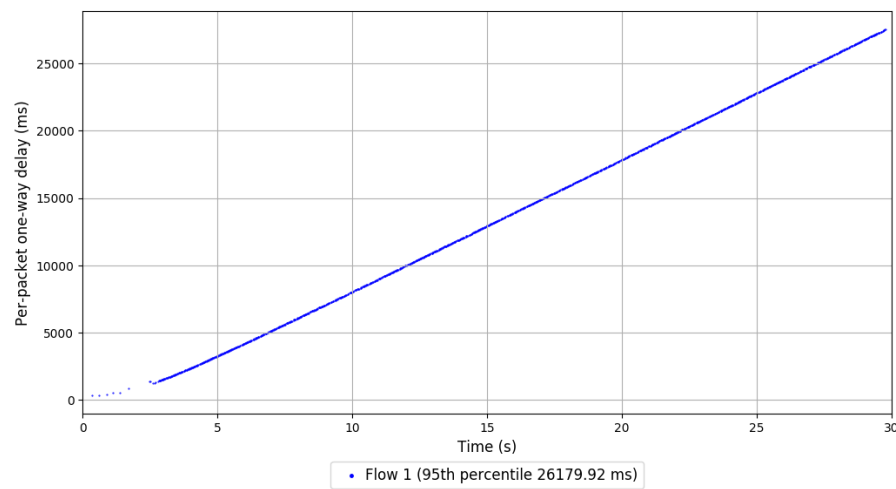
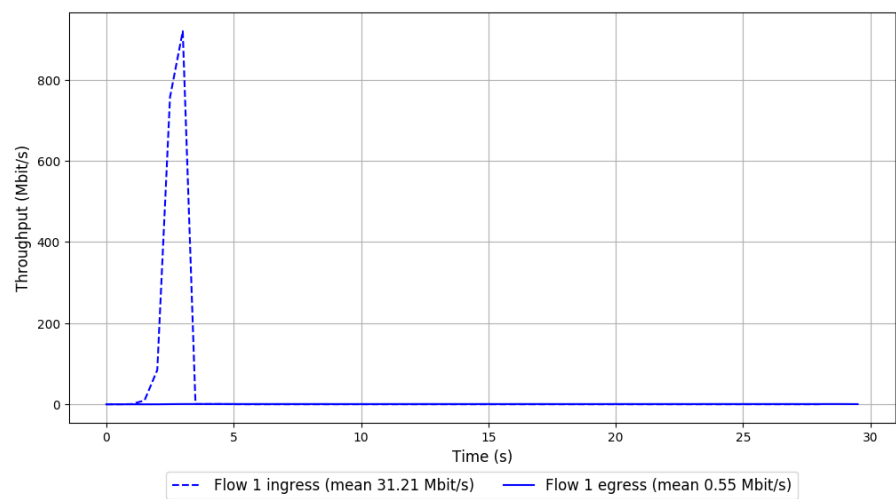


Run 1: Statistics of PCC

Start at: 2018-03-12 20:08:06
End at: 2018-03-12 20:08:36
Local clock offset: -6.14 ms
Remote clock offset: -5.796 ms

Below is generated by plot.py at 2018-03-12 22:02:40
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 26179.925 ms
Loss rate: 98.16%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 26179.925 ms
Loss rate: 98.16%

Run 1: Report of PCC — Data Link

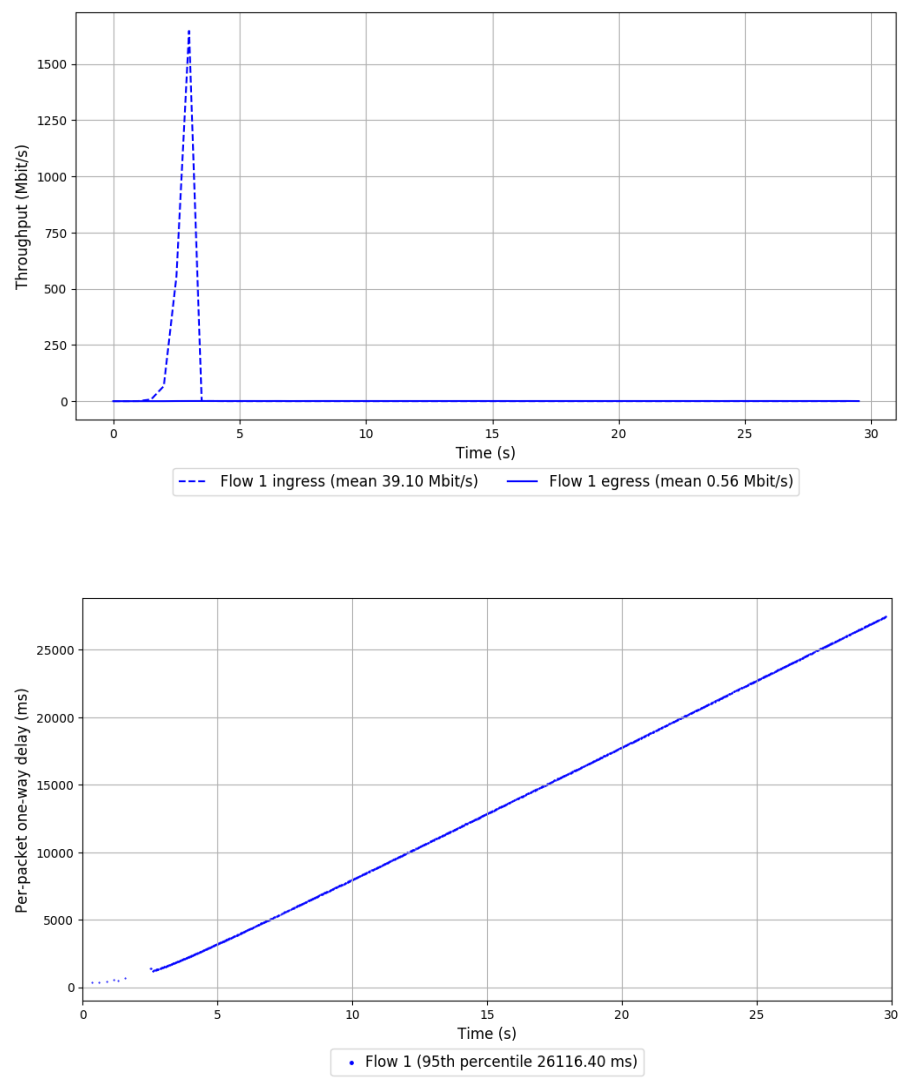


Run 2: Statistics of PCC

Start at: 2018-03-12 20:29:12
End at: 2018-03-12 20:29:42
Local clock offset: -10.489 ms
Remote clock offset: -2.126 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26116.404 ms
Loss rate: 98.55%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26116.404 ms
Loss rate: 98.55%

Run 2: Report of PCC — Data Link

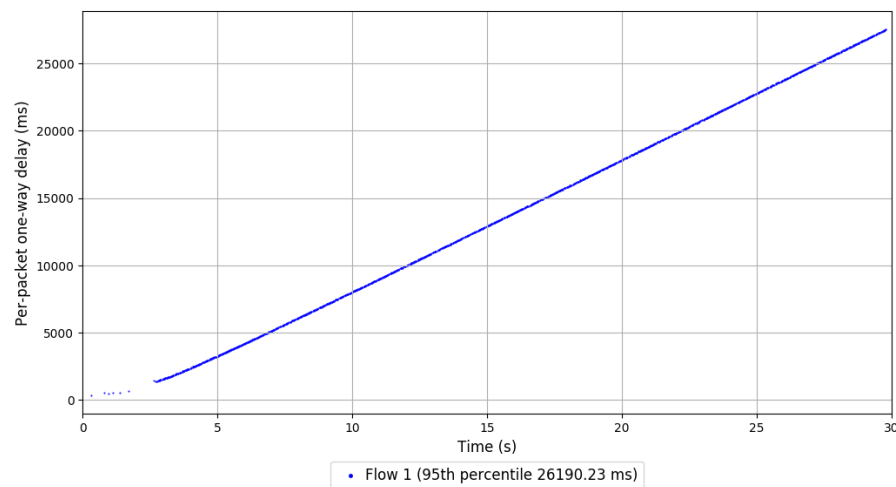
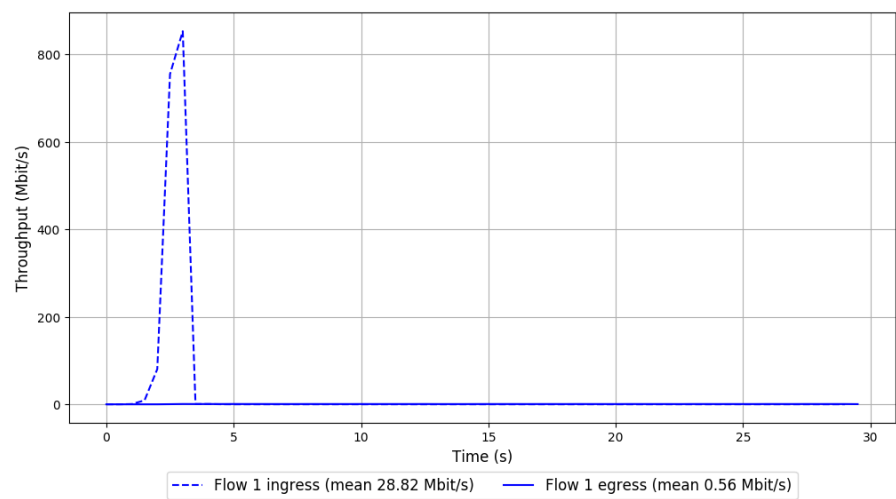


Run 3: Statistics of PCC

Start at: 2018-03-12 20:50:18
End at: 2018-03-12 20:50:48
Local clock offset: -12.979 ms
Remote clock offset: -0.298 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26190.234 ms
Loss rate: 98.04%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26190.234 ms
Loss rate: 98.04%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-03-12 20:13:58

End at: 2018-03-12 20:14:28

Local clock offset: -7.184 ms

Remote clock offset: -5.457 ms

Below is generated by plot.py at 2018-03-12 22:02:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.60 Mbit/s

95th percentile per-packet one-way delay: 5452.829 ms

Loss rate: 23.13%

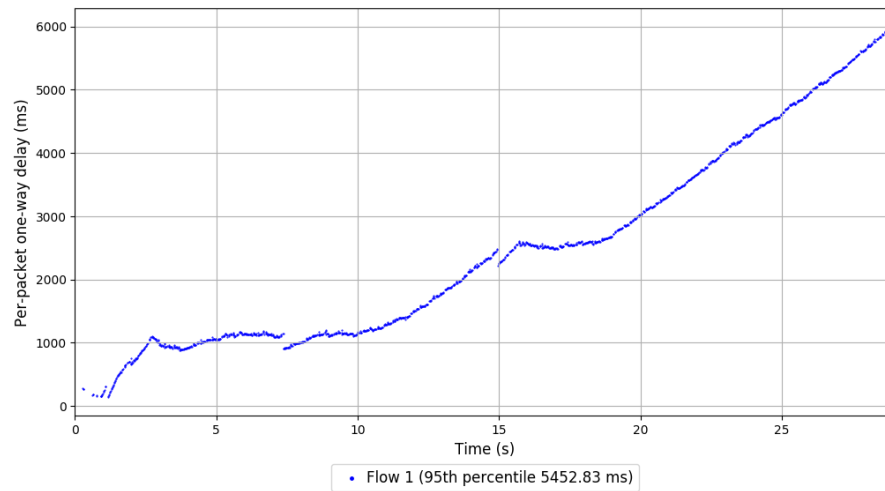
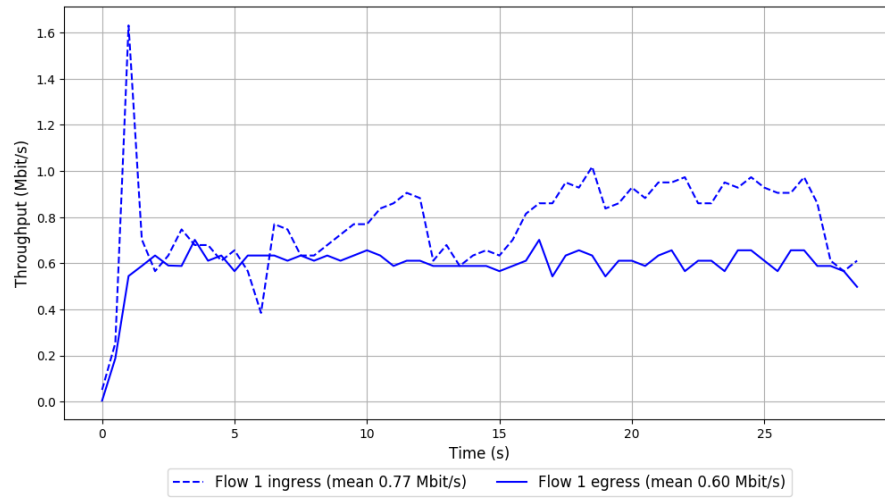
-- Flow 1:

Average throughput: 0.60 Mbit/s

95th percentile per-packet one-way delay: 5452.829 ms

Loss rate: 23.13%

Run 1: Report of QUIC Cubic — Data Link

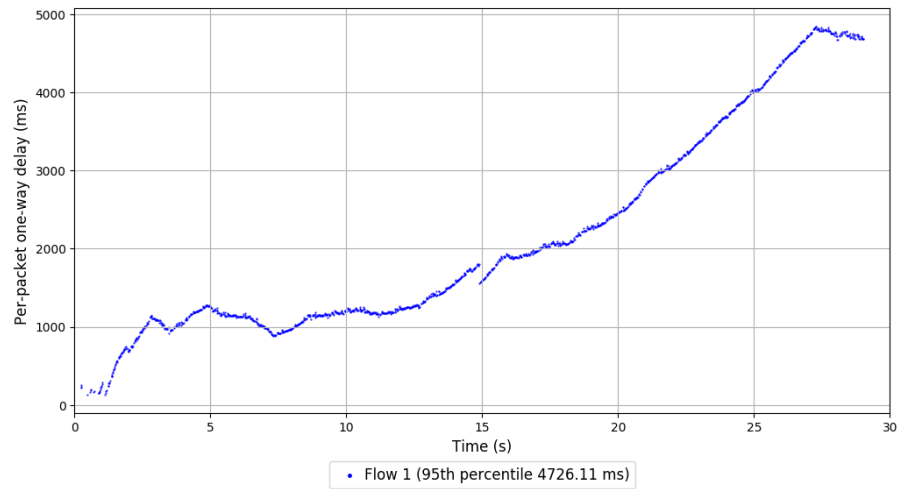
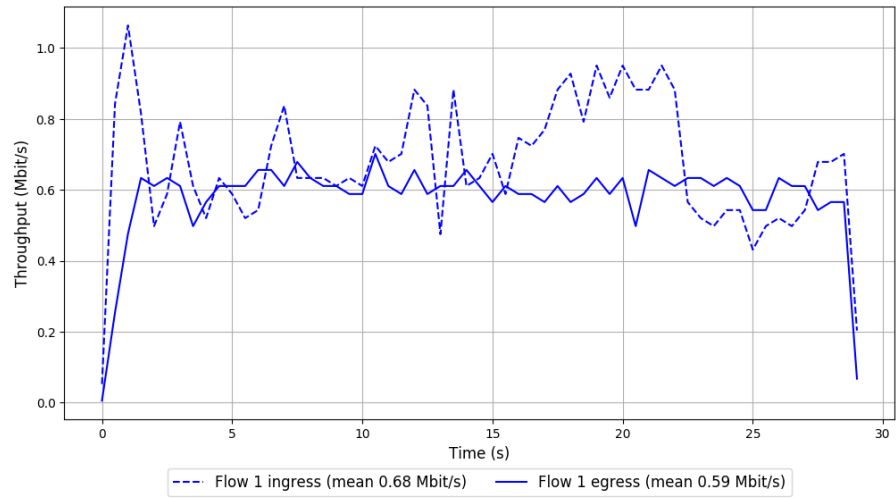


Run 2: Statistics of QUIC Cubic

Start at: 2018-03-12 20:35:04
End at: 2018-03-12 20:35:34
Local clock offset: -10.498 ms
Remote clock offset: -2.326 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 4726.107 ms
Loss rate: 14.07%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 4726.107 ms
Loss rate: 14.07%

Run 2: Report of QUIC Cubic — Data Link

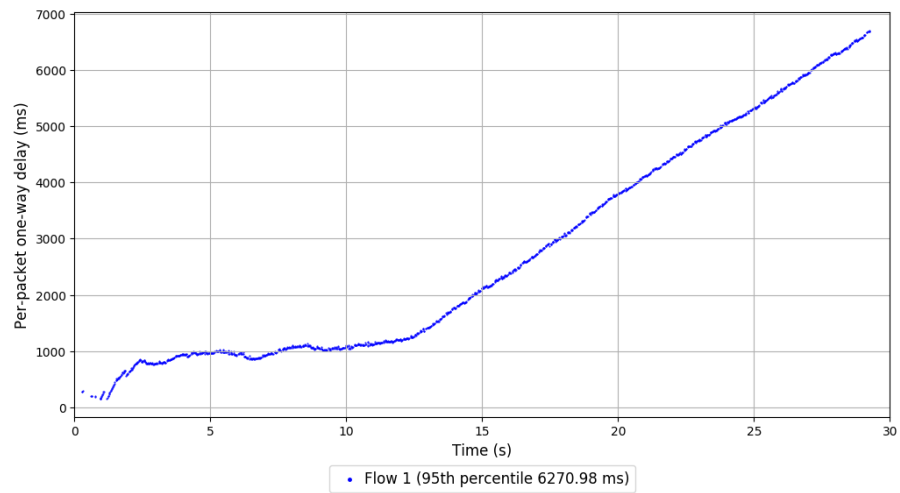
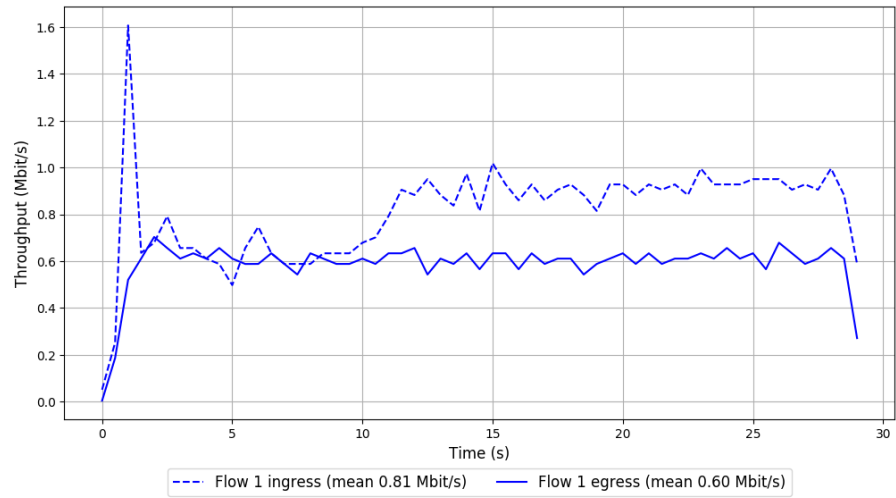


Run 3: Statistics of QUIC Cubic

Start at: 2018-03-12 20:56:12
End at: 2018-03-12 20:56:42
Local clock offset: -14.275 ms
Remote clock offset: -6.167 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 6270.977 ms
Loss rate: 26.97%
-- Flow 1:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 6270.977 ms
Loss rate: 26.97%

Run 3: Report of QUIC Cubic — Data Link

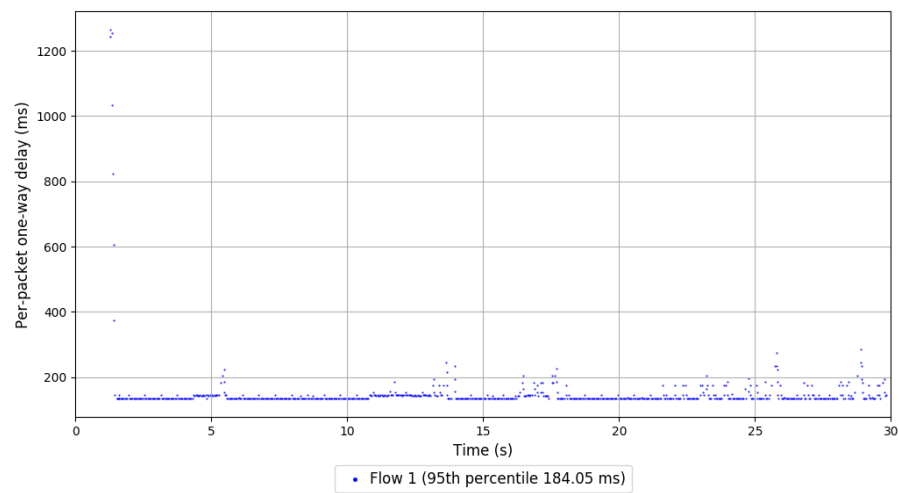
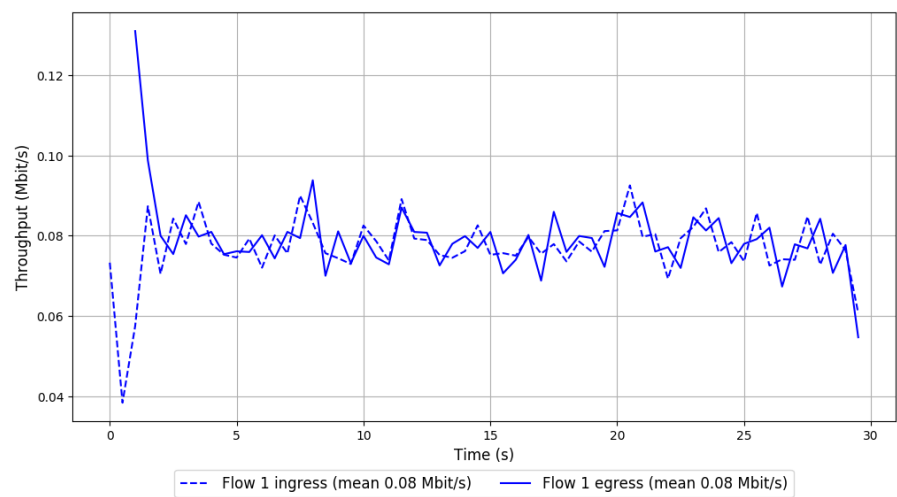


Run 1: Statistics of SCReAM

Start at: 2018-03-12 20:03:26
End at: 2018-03-12 20:03:56
Local clock offset: -6.021 ms
Remote clock offset: -5.157 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 184.050 ms
Loss rate: 0.66%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 184.050 ms
Loss rate: 0.66%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-03-12 20:24:32

End at: 2018-03-12 20:25:02

Local clock offset: -9.792 ms

Remote clock offset: -0.15 ms

Below is generated by plot.py at 2018-03-12 22:02:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 170.544 ms

Loss rate: 0.93%

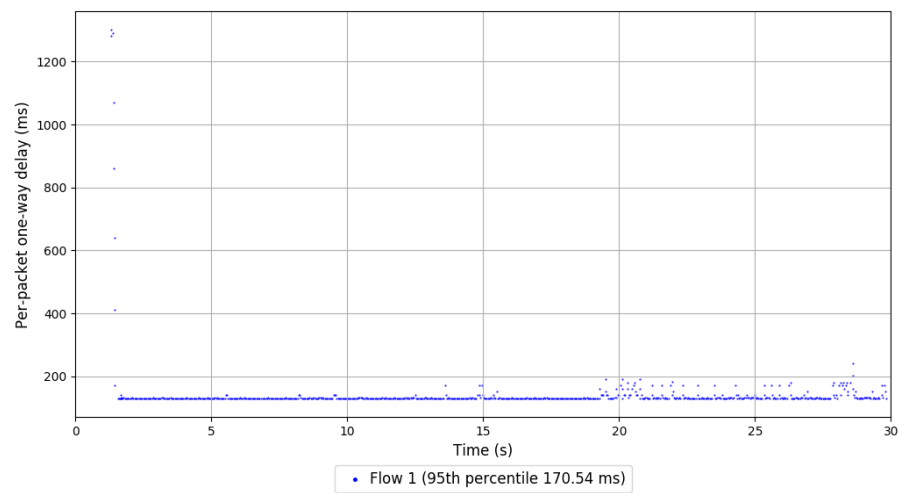
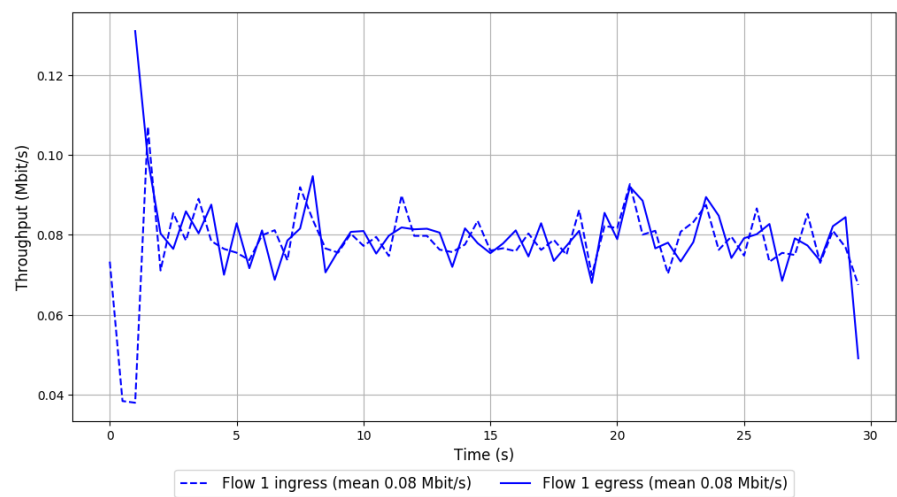
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 170.544 ms

Loss rate: 0.93%

Run 2: Report of SReAM — Data Link

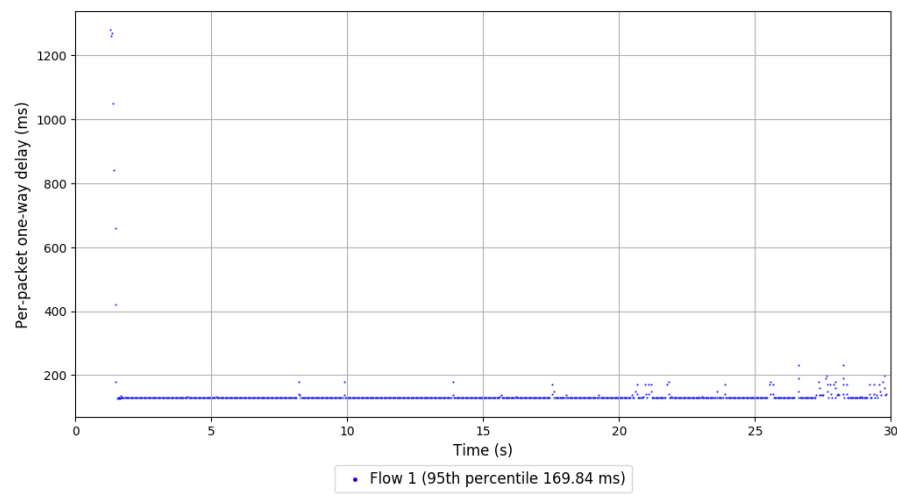
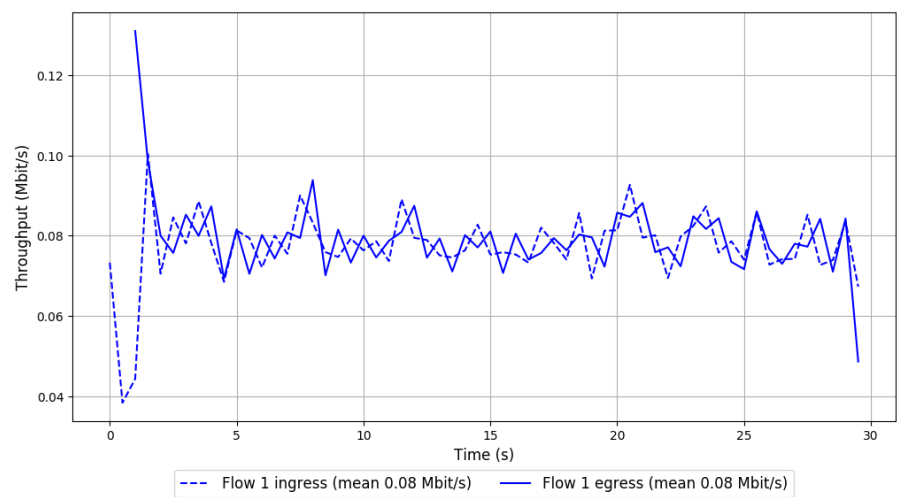


Run 3: Statistics of SCReAM

Start at: 2018-03-12 20:45:38
End at: 2018-03-12 20:46:08
Local clock offset: -12.059 ms
Remote clock offset: -2.229 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 169.842 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 169.842 ms
Loss rate: 0.79%

Run 3: Report of SReAM — Data Link

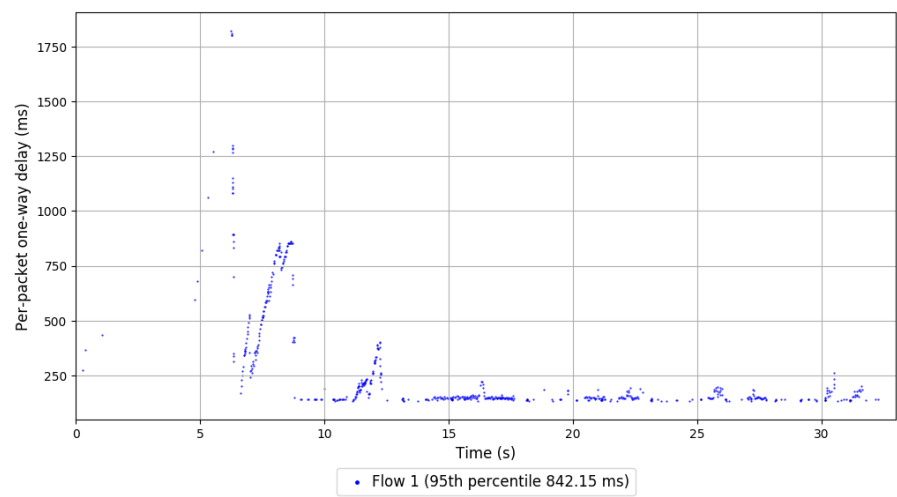
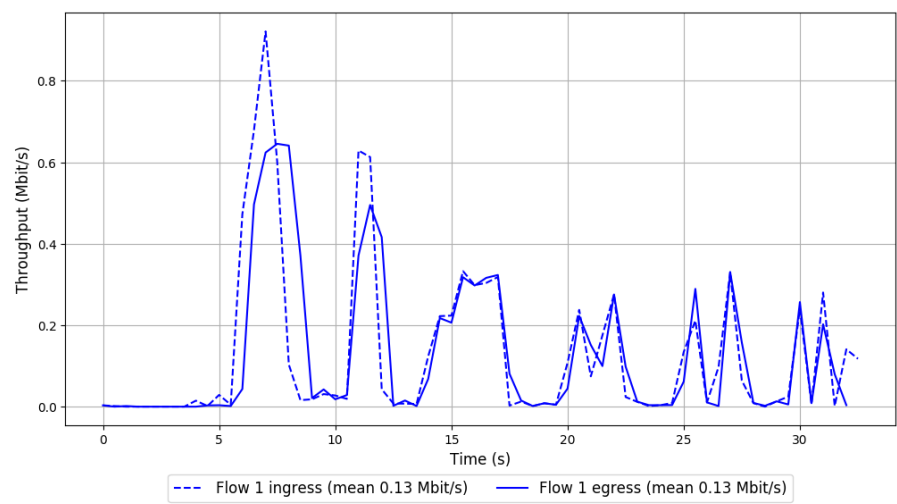


Run 1: Statistics of WebRTC media

Start at: 2018-03-12 20:15:09
End at: 2018-03-12 20:15:39
Local clock offset: -7.455 ms
Remote clock offset: -5.543 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 842.155 ms
Loss rate: 2.93%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 842.155 ms
Loss rate: 2.93%

Run 1: Report of WebRTC media — Data Link

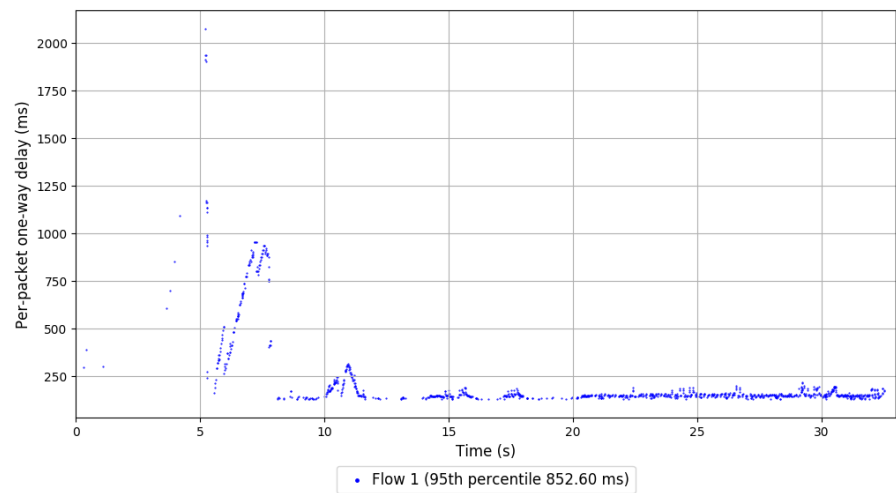
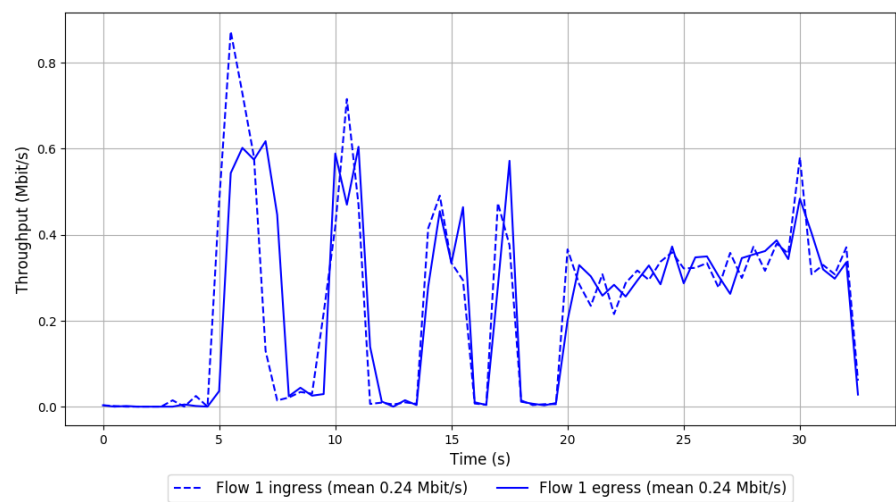


Run 2: Statistics of WebRTC media

Start at: 2018-03-12 20:36:14
End at: 2018-03-12 20:36:45
Local clock offset: -10.592 ms
Remote clock offset: -7.166 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 852.600 ms
Loss rate: 1.13%
-- Flow 1:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 852.600 ms
Loss rate: 1.13%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-03-12 20:57:22

End at: 2018-03-12 20:57:52

Local clock offset: -14.64 ms

Remote clock offset: -6.99 ms

Below is generated by plot.py at 2018-03-12 22:02:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 760.087 ms

Loss rate: 1.29%

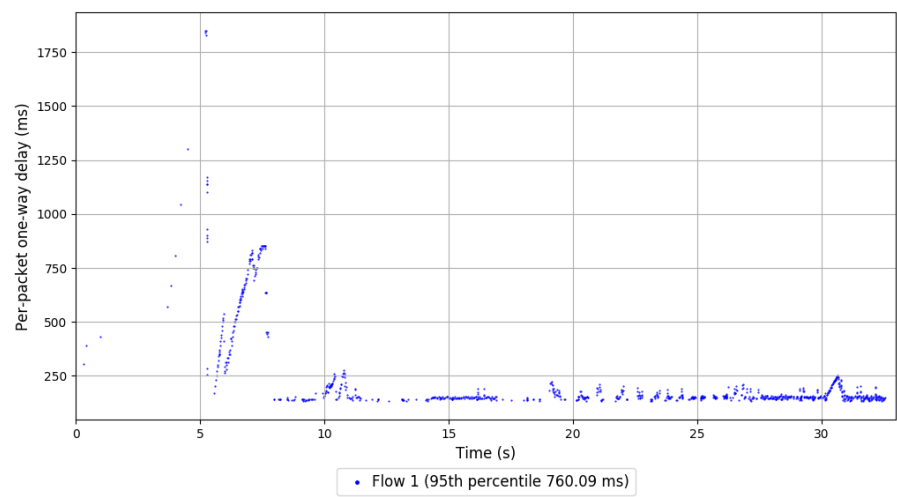
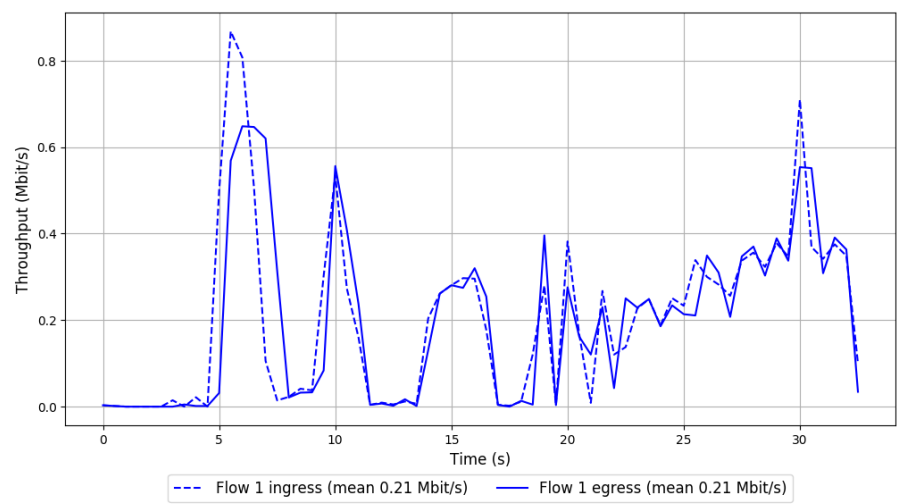
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 760.087 ms

Loss rate: 1.29%

Run 3: Report of WebRTC media — Data Link

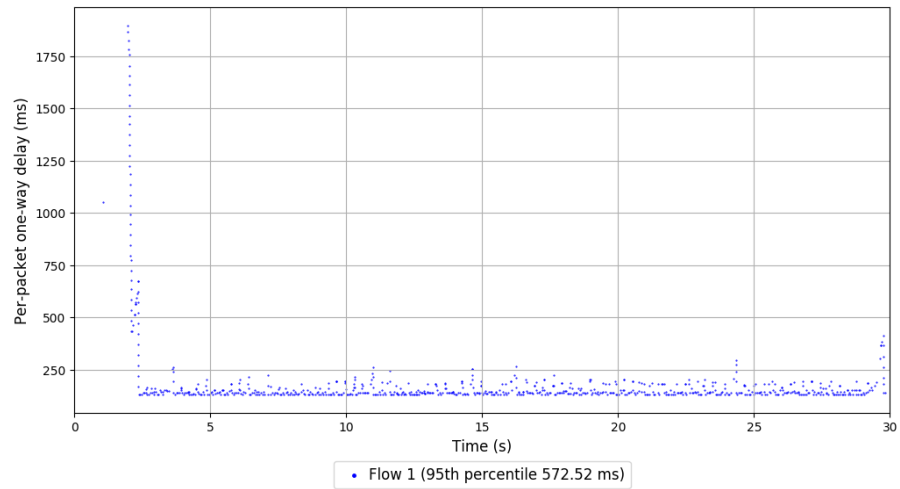
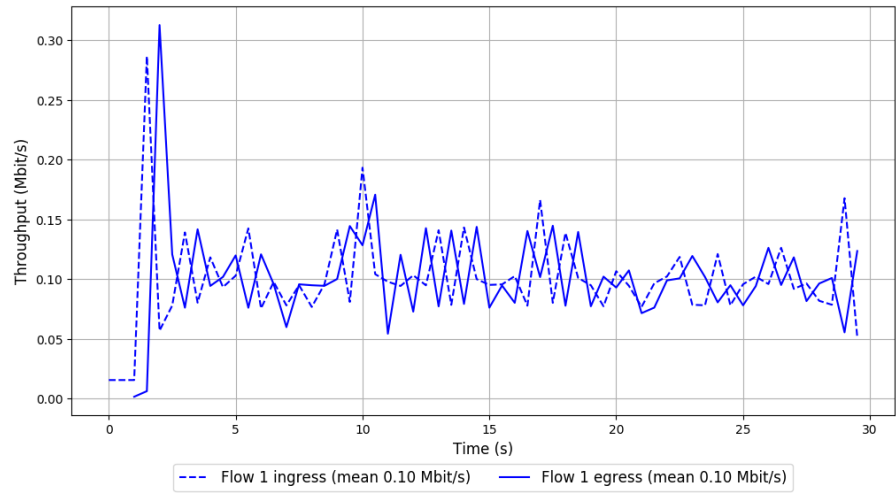


Run 1: Statistics of Sprout

Start at: 2018-03-12 19:57:33
End at: 2018-03-12 19:58:03
Local clock offset: -5.265 ms
Remote clock offset: -5.117 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 572.524 ms
Loss rate: 1.15%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 572.524 ms
Loss rate: 1.15%

Run 1: Report of Sprout — Data Link

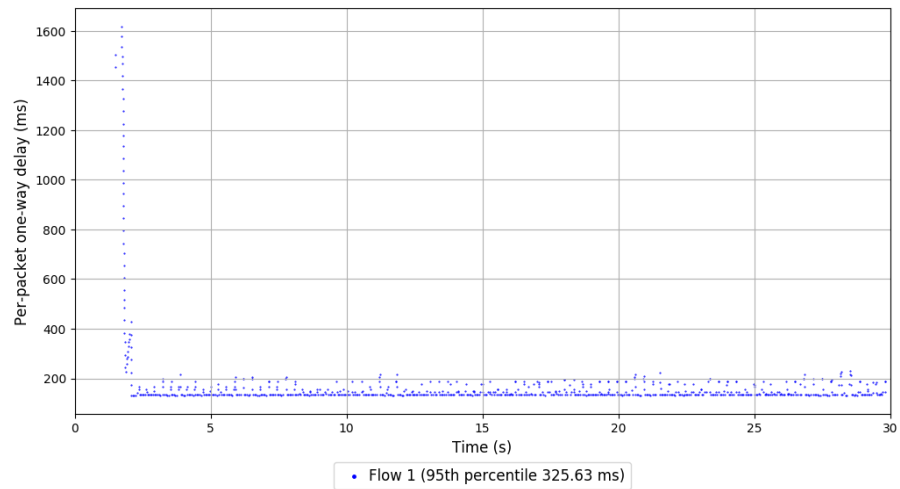
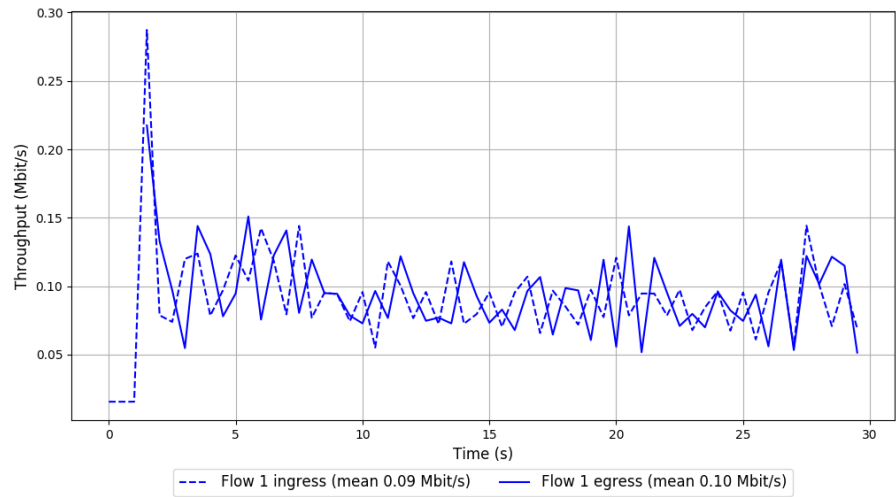


Run 2: Statistics of Sprout

Start at: 2018-03-12 20:18:39
End at: 2018-03-12 20:19:10
Local clock offset: -8.228 ms
Remote clock offset: -6.554 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 325.634 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 325.634 ms
Loss rate: 1.03%

Run 2: Report of Sprout — Data Link

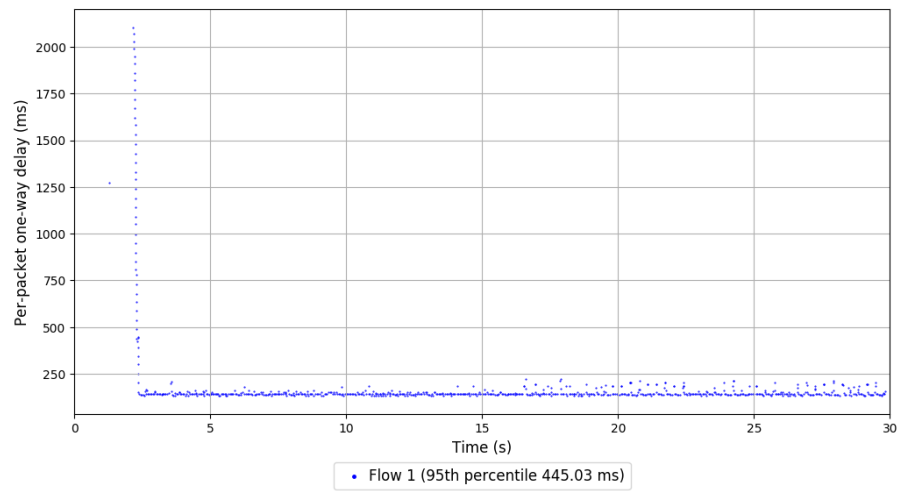
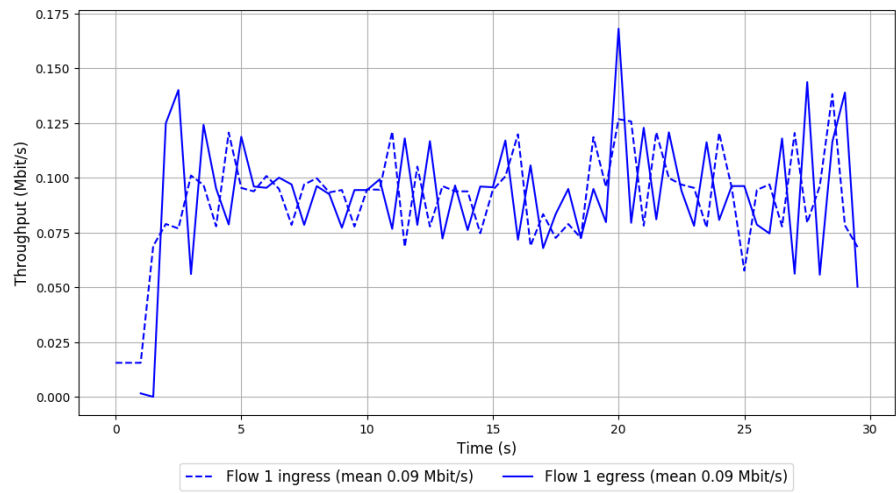


Run 3: Statistics of Sprout

Start at: 2018-03-12 20:39:45
End at: 2018-03-12 20:40:15
Local clock offset: -11.114 ms
Remote clock offset: -7.096 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 445.031 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 445.031 ms
Loss rate: 0.43%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2018-03-12 20:16:19

End at: 2018-03-12 20:16:49

Local clock offset: -7.709 ms

Remote clock offset: -6.46 ms

Below is generated by plot.py at 2018-03-12 22:02:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.55 Mbit/s

95th percentile per-packet one-way delay: 1551.521 ms

Loss rate: 2.80%

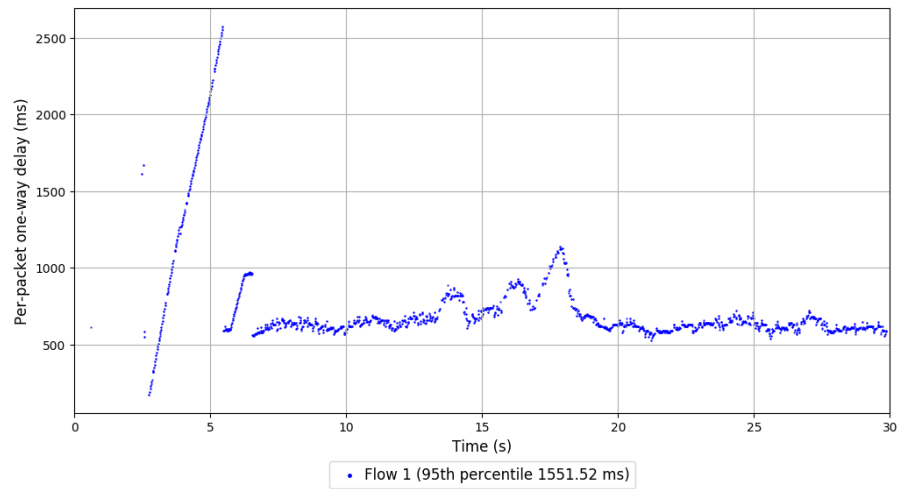
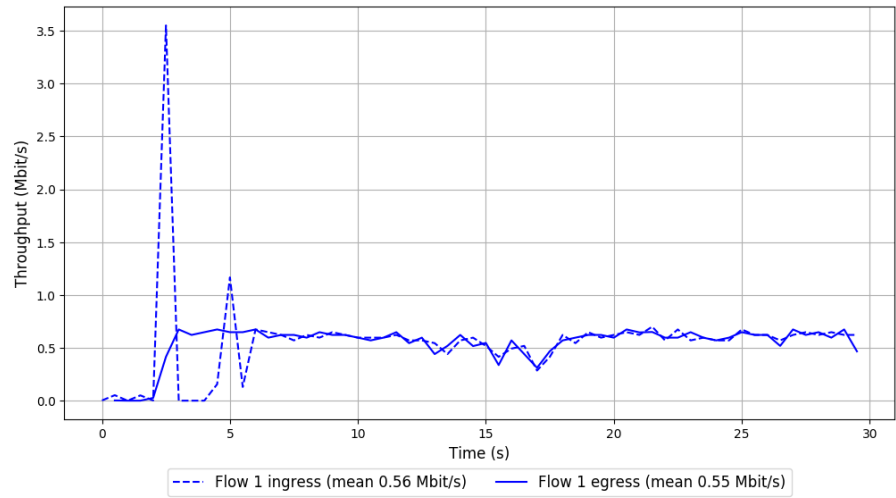
-- Flow 1:

Average throughput: 0.55 Mbit/s

95th percentile per-packet one-way delay: 1551.521 ms

Loss rate: 2.80%

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

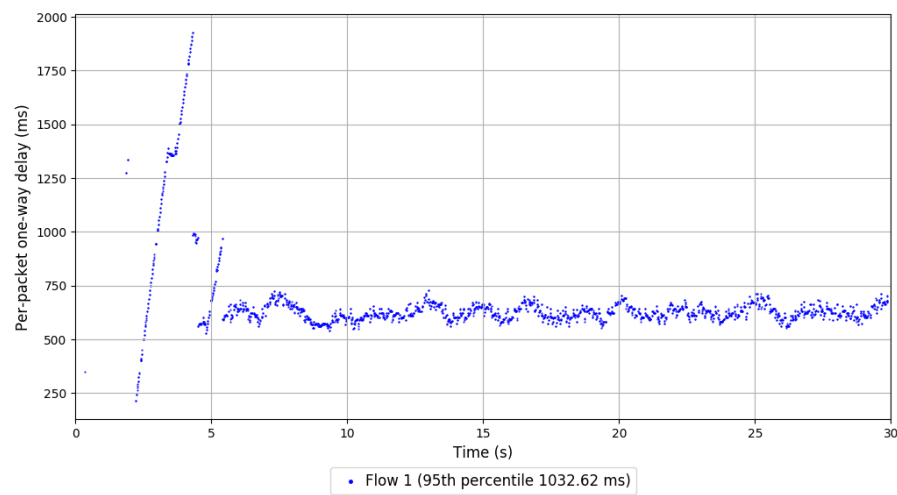
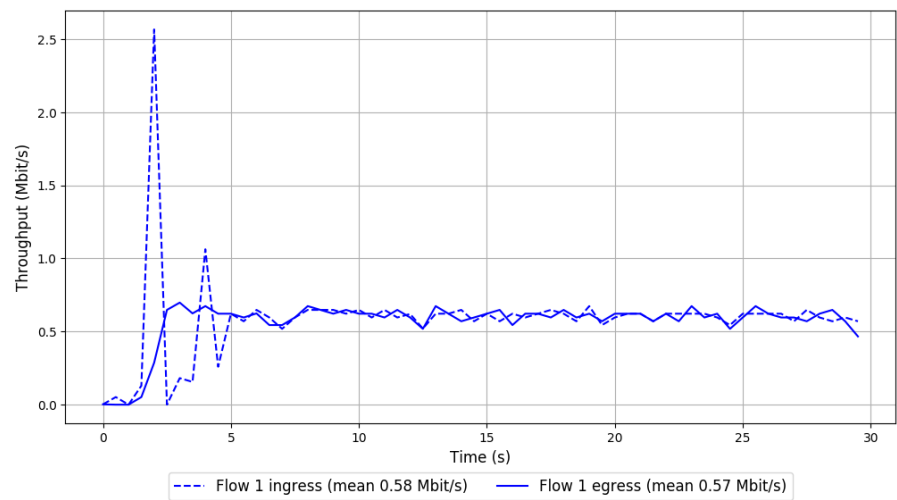


Run 2: Statistics of TaoVA-100x

Start at: 2018-03-12 20:37:25
End at: 2018-03-12 20:37:55
Local clock offset: -10.747 ms
Remote clock offset: -1.518 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 1032.621 ms
Loss rate: 2.60%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 1032.621 ms
Loss rate: 2.60%

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

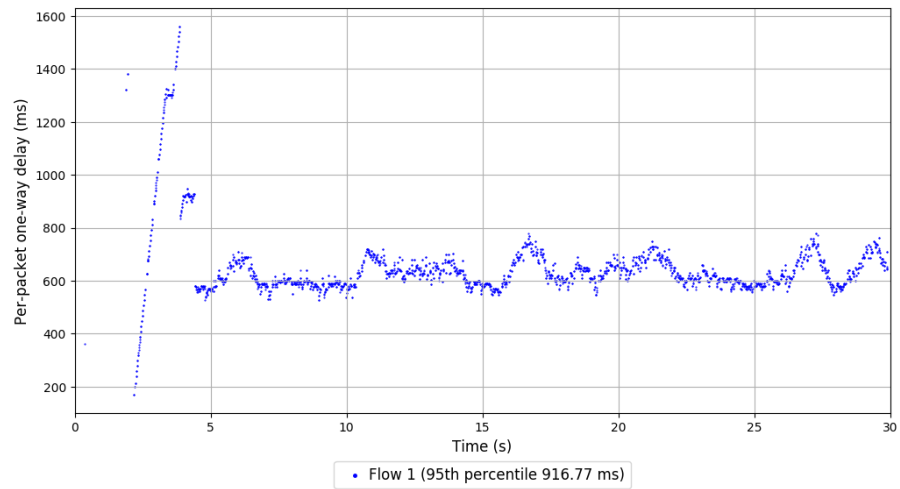
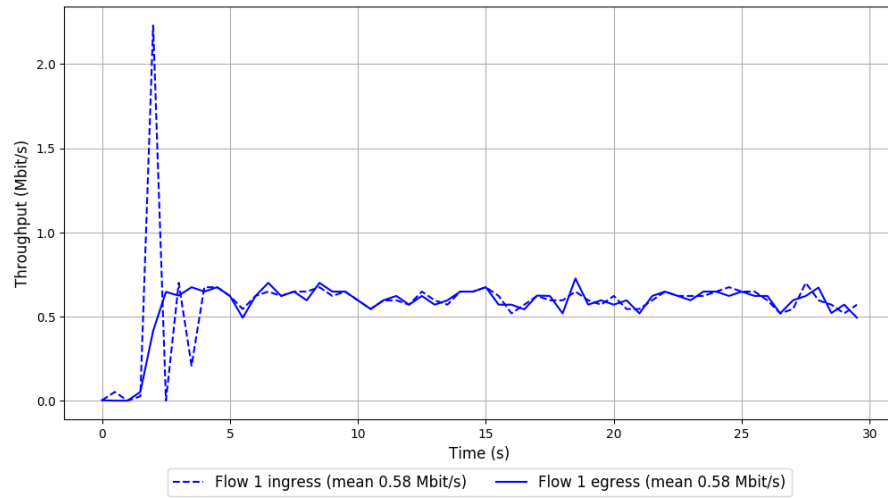


Run 3: Statistics of TaoVA-100x

Start at: 2018-03-12 20:58:32
End at: 2018-03-12 20:59:02
Local clock offset: -14.851 ms
Remote clock offset: -1.224 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 916.769 ms
Loss rate: 2.60%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 916.769 ms
Loss rate: 2.60%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-03-12 20:09:17

End at: 2018-03-12 20:09:47

Local clock offset: -6.491 ms

Remote clock offset: -5.93 ms

Below is generated by plot.py at 2018-03-12 22:02:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 1034.879 ms

Loss rate: 1.24%

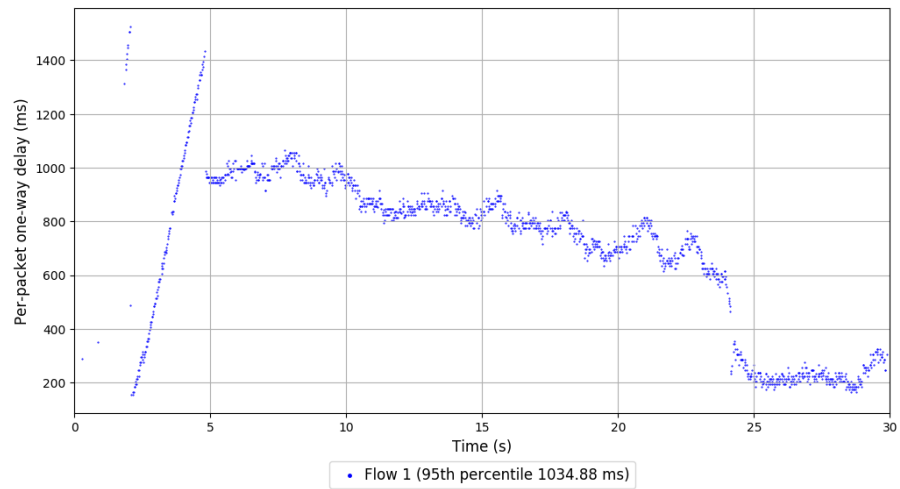
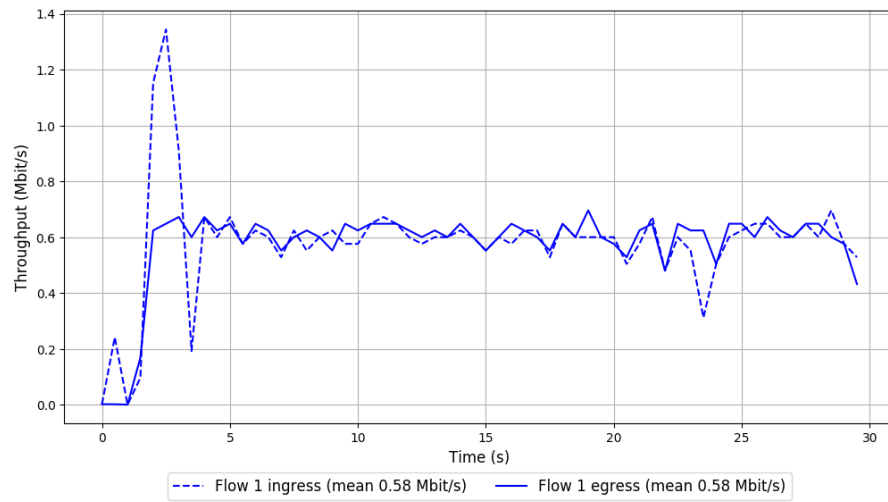
-- Flow 1:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 1034.879 ms

Loss rate: 1.24%

Run 1: Report of TCP Vegas — Data Link

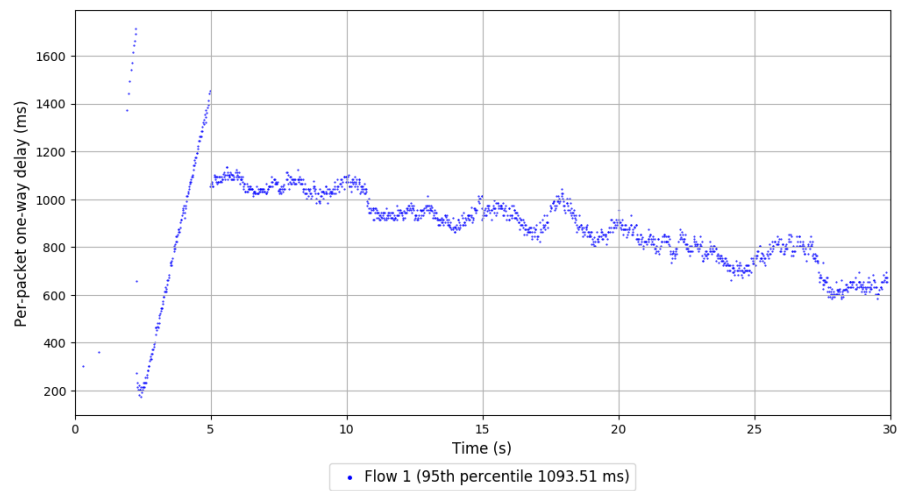
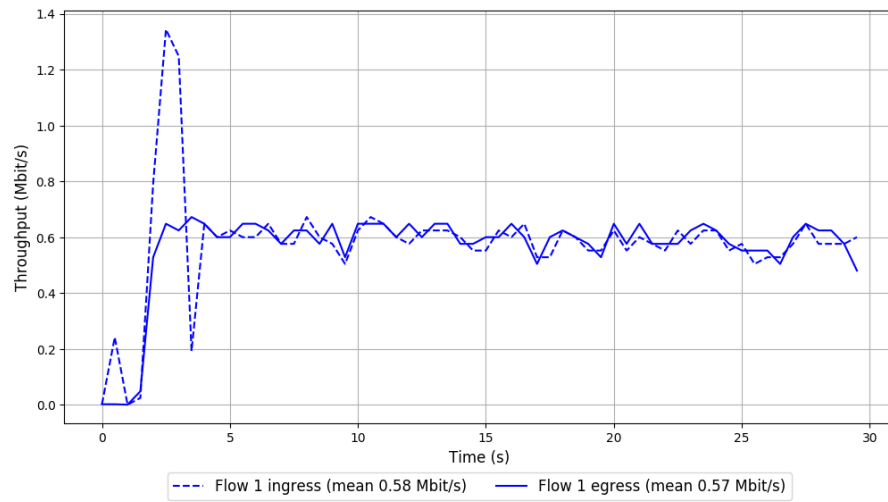


Run 2: Statistics of TCP Vegas

Start at: 2018-03-12 20:30:24
End at: 2018-03-12 20:30:54
Local clock offset: -10.384 ms
Remote clock offset: -6.22 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 1093.506 ms
Loss rate: 2.43%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 1093.506 ms
Loss rate: 2.43%

Run 2: Report of TCP Vegas — Data Link

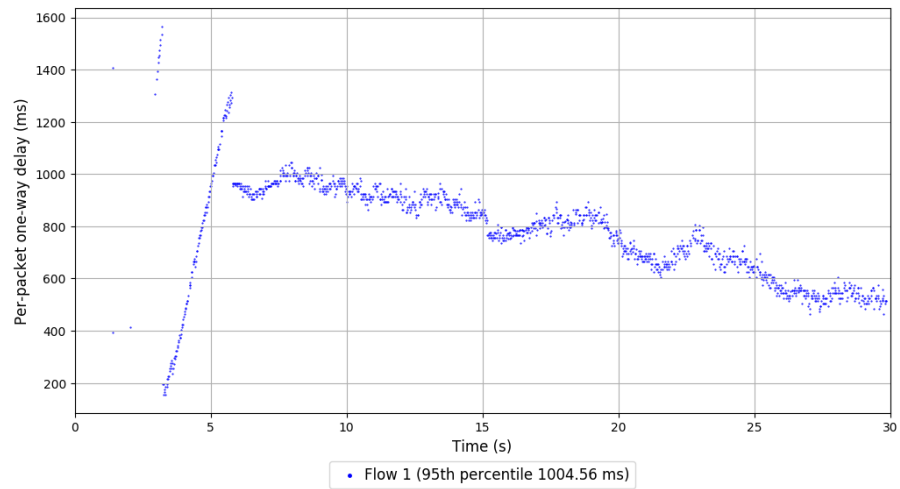
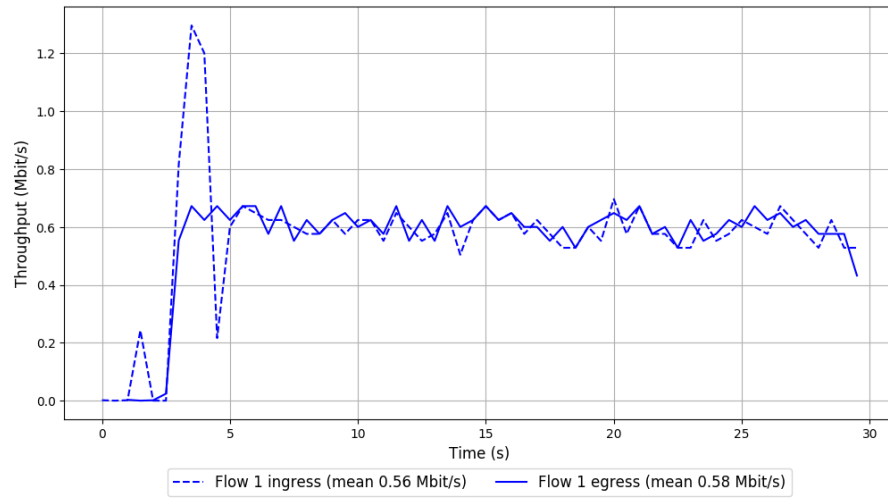


Run 3: Statistics of TCP Vegas

Start at: 2018-03-12 20:51:29
End at: 2018-03-12 20:51:59
Local clock offset: -13.265 ms
Remote clock offset: -6.227 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1004.558 ms
Loss rate: 2.00%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1004.558 ms
Loss rate: 2.00%

Run 3: Report of TCP Vegas — Data Link

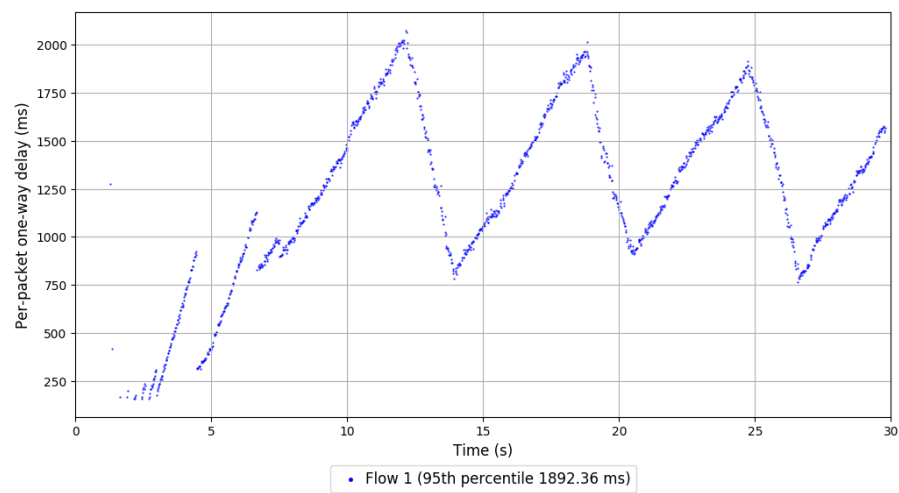
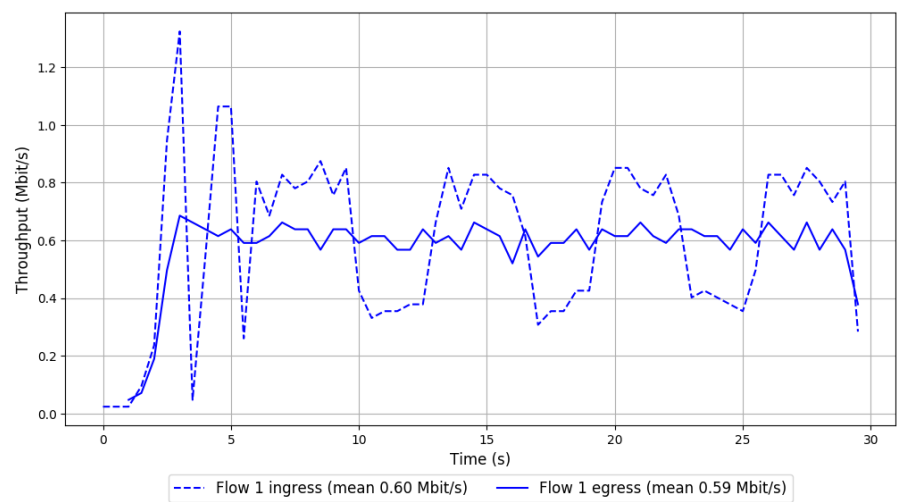


Run 1: Statistics of Verus

Start at: 2018-03-12 19:58:43
End at: 2018-03-12 19:59:13
Local clock offset: -5.66 ms
Remote clock offset: -5.118 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1892.362 ms
Loss rate: 6.37%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1892.362 ms
Loss rate: 6.37%

Run 1: Report of Verus — Data Link

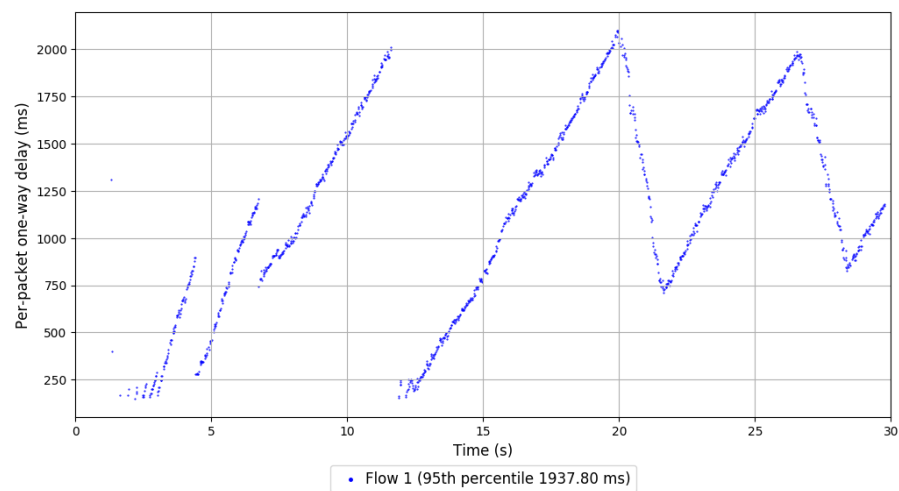
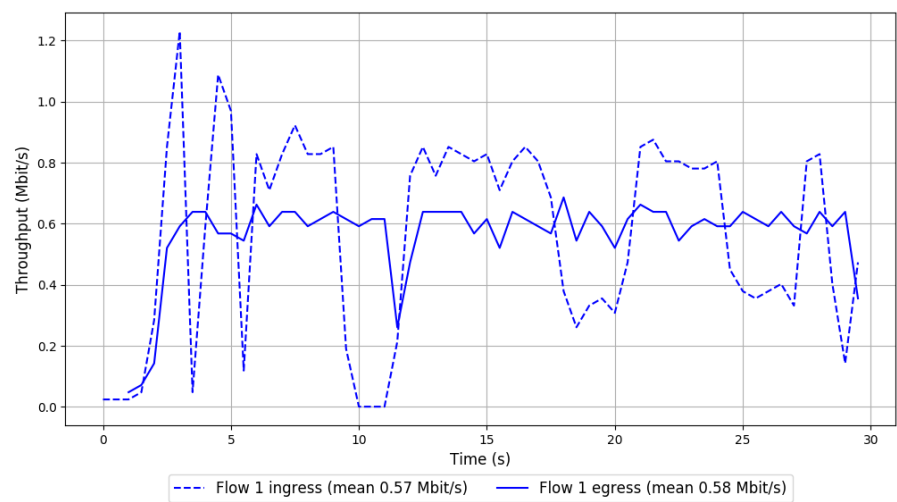


Run 2: Statistics of Verus

Start at: 2018-03-12 20:19:50
End at: 2018-03-12 20:20:20
Local clock offset: -8.525 ms
Remote clock offset: -5.863 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1937.802 ms
Loss rate: 2.66%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1937.802 ms
Loss rate: 2.66%

Run 2: Report of Verus — Data Link

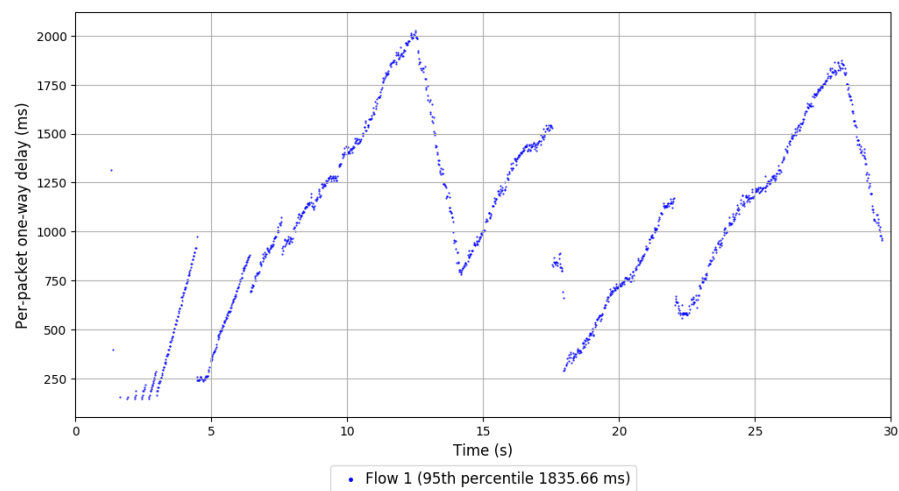
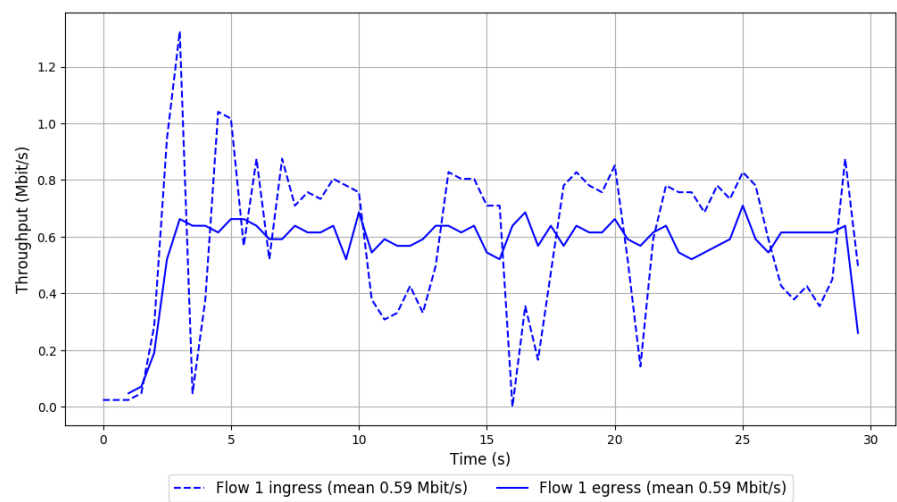


Run 3: Statistics of Verus

Start at: 2018-03-12 20:40:56
End at: 2018-03-12 20:41:26
Local clock offset: -11.293 ms
Remote clock offset: -0.43 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1835.665 ms
Loss rate: 4.80%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1835.665 ms
Loss rate: 4.80%

Run 3: Report of Verus — Data Link



Run 1: Statistics of Copa

Start at: 2018-03-12 20:01:06

End at: 2018-03-12 20:01:36

Local clock offset: -6.759 ms

Remote clock offset: 0.707 ms

Below is generated by plot.py at 2018-03-12 22:02:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 487.496 ms

Loss rate: 2.93%

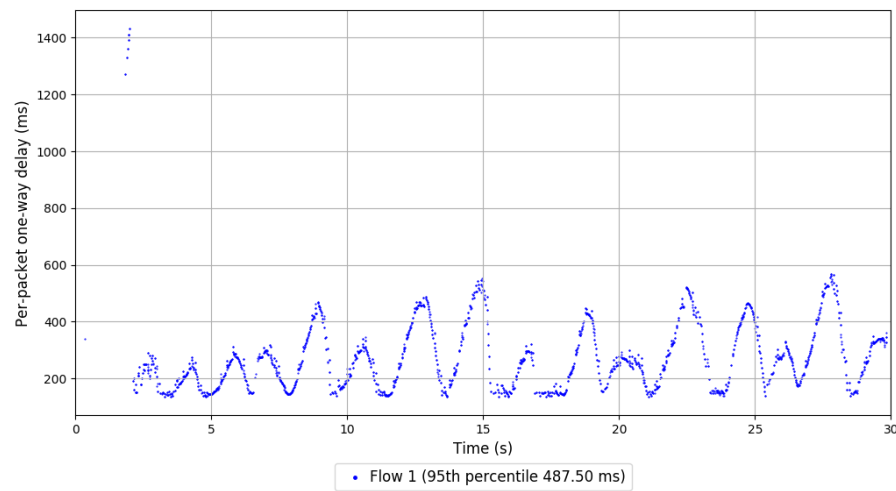
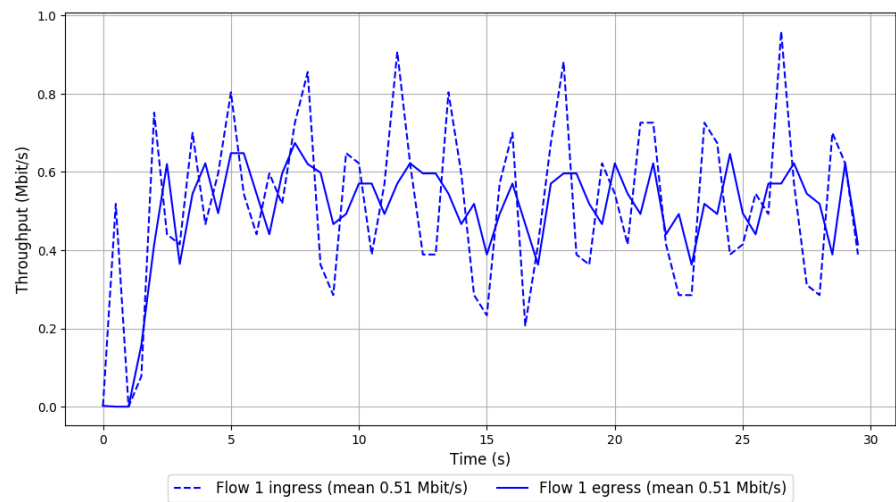
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 487.496 ms

Loss rate: 2.93%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-03-12 20:22:12

End at: 2018-03-12 20:22:42

Local clock offset: -9.195 ms

Remote clock offset: -6.68 ms

Below is generated by plot.py at 2018-03-12 22:02:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 512.591 ms

Loss rate: 4.00%

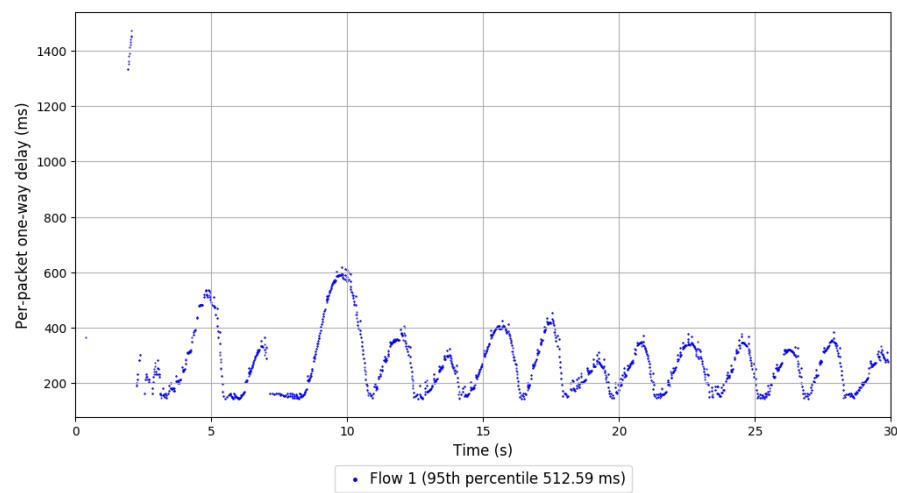
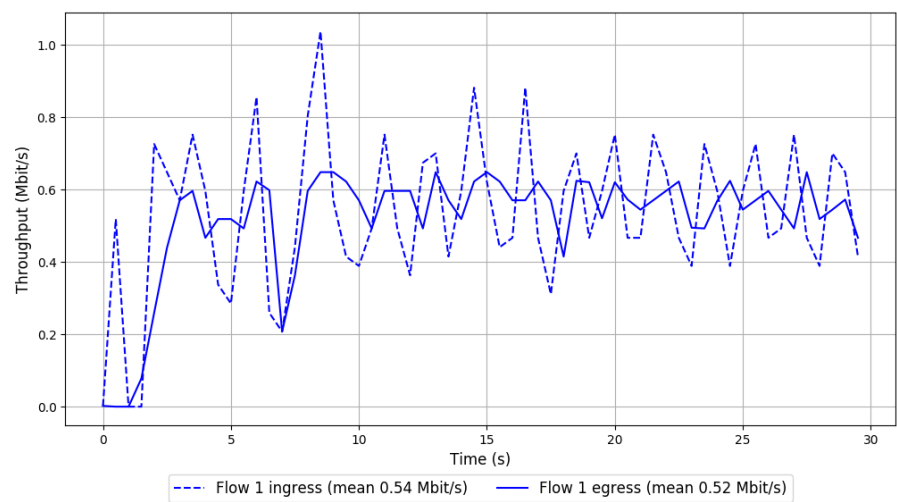
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 512.591 ms

Loss rate: 4.00%

Run 2: Report of Copa — Data Link

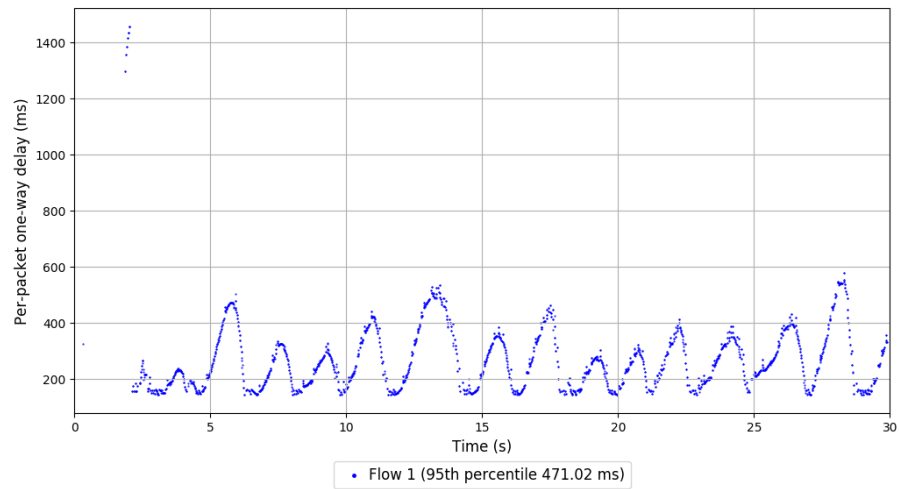
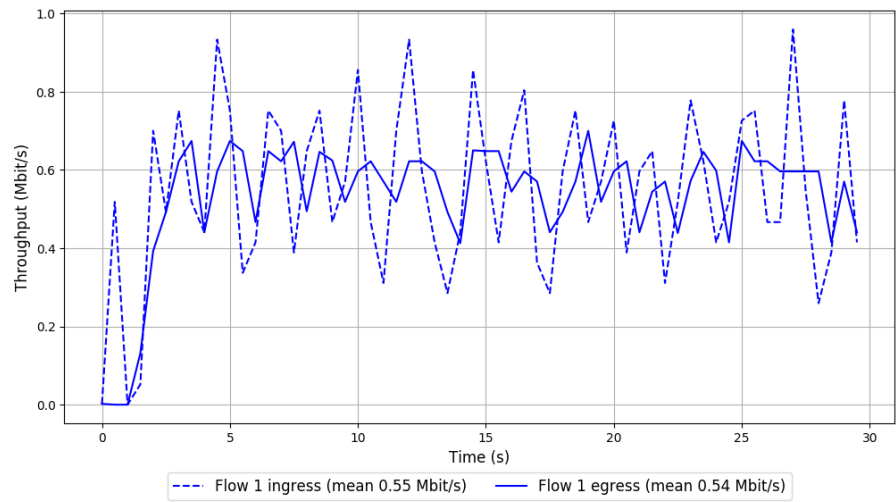


Run 3: Statistics of Copa

Start at: 2018-03-12 20:43:18
End at: 2018-03-12 20:43:48
Local clock offset: -11.643 ms
Remote clock offset: -6.27 ms

Below is generated by plot.py at 2018-03-12 22:02:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 471.022 ms
Loss rate: 2.74%
-- Flow 1:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 471.022 ms
Loss rate: 2.74%

Run 3: Report of Copa — Data Link

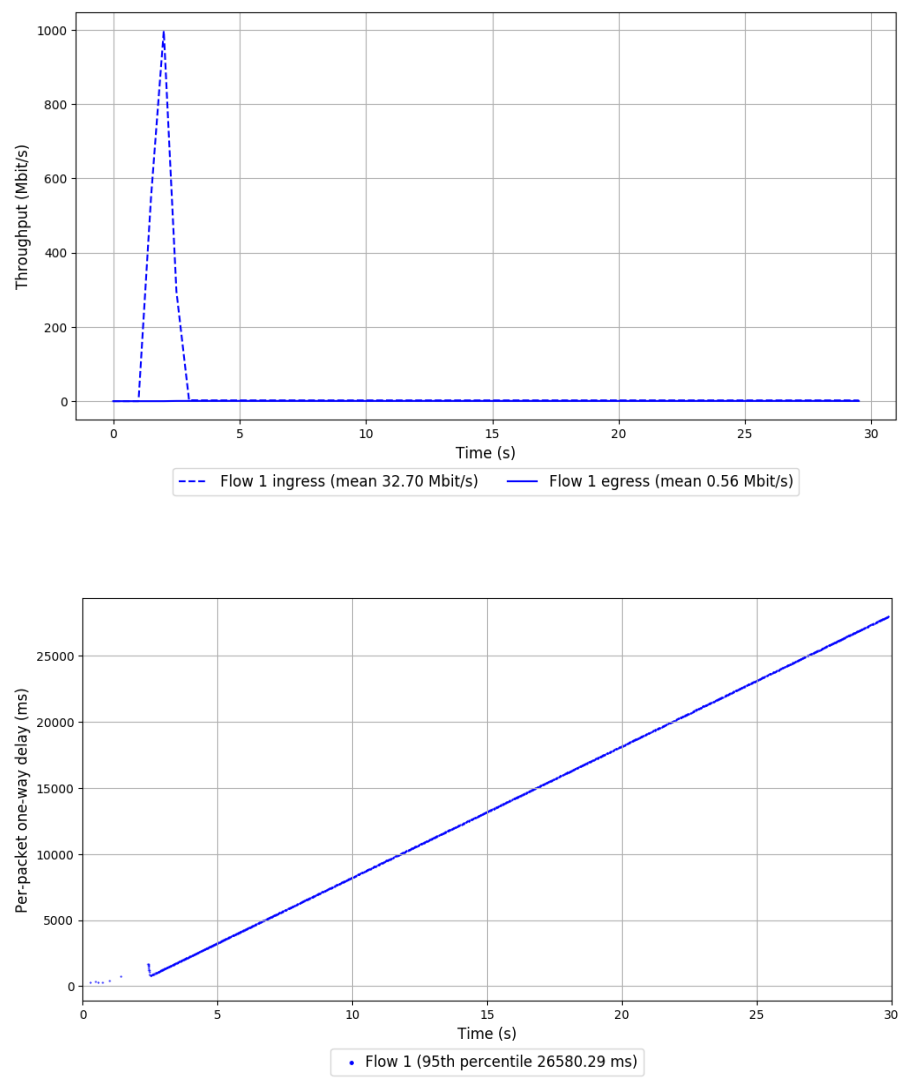


Run 1: Statistics of FillP

Start at: 2018-03-12 19:59:53
End at: 2018-03-12 20:00:23
Local clock offset: -6.144 ms
Remote clock offset: -5.066 ms

Below is generated by plot.py at 2018-03-12 22:02:52
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26580.295 ms
Loss rate: 98.30%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26580.295 ms
Loss rate: 98.30%

Run 1: Report of FillP — Data Link

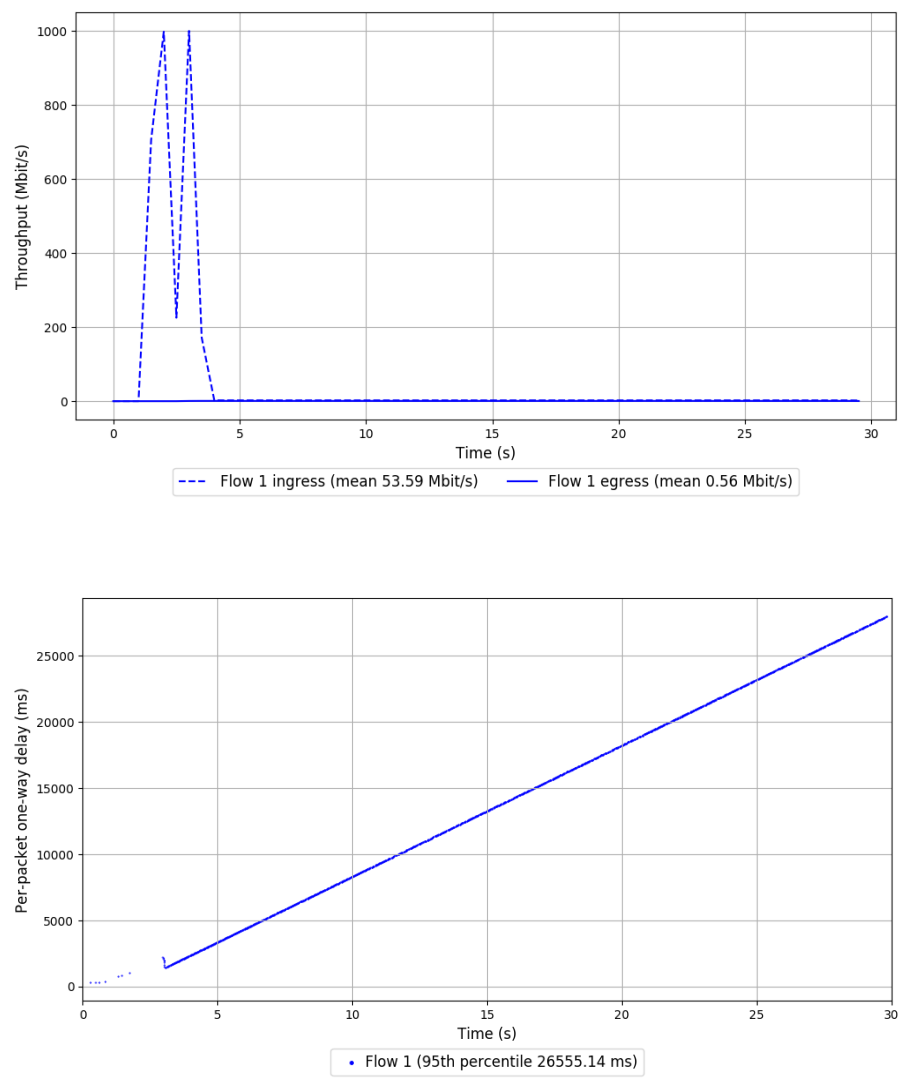


Run 2: Statistics of FillP

Start at: 2018-03-12 20:21:00
End at: 2018-03-12 20:21:30
Local clock offset: -8.808 ms
Remote clock offset: -1.915 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26555.144 ms
Loss rate: 98.96%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26555.144 ms
Loss rate: 98.96%

Run 2: Report of FillP — Data Link

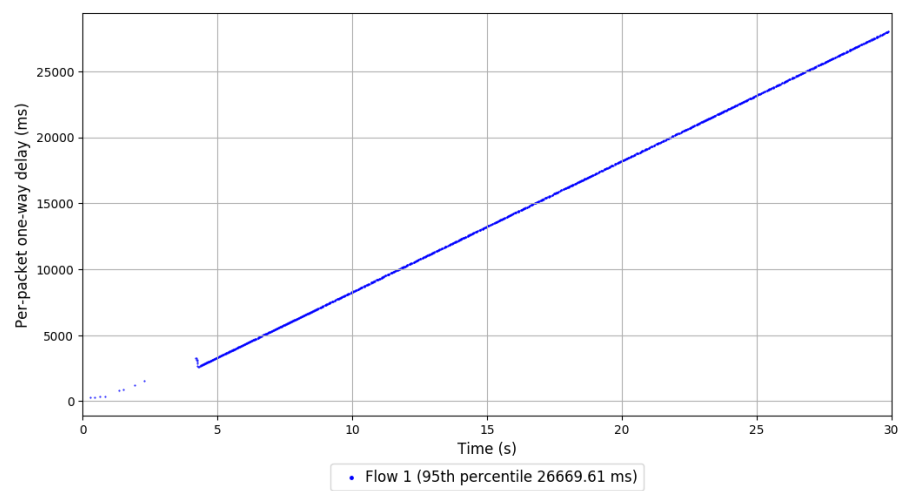
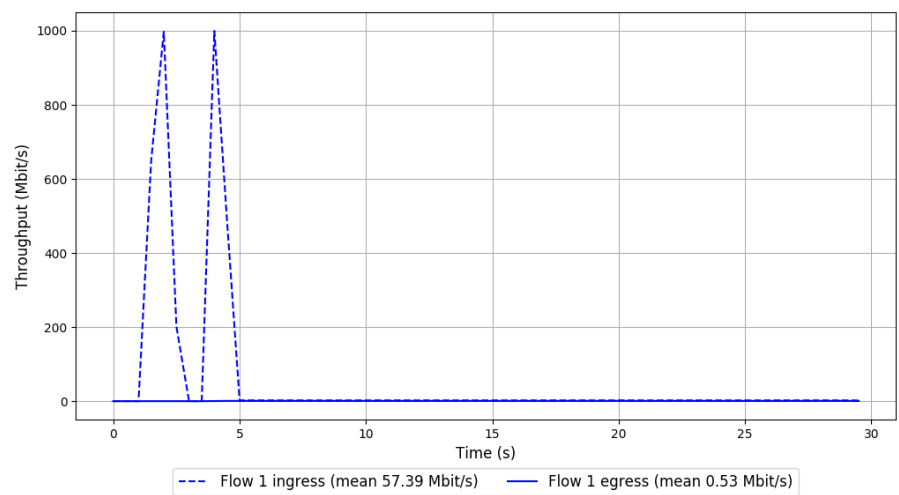


Run 3: Statistics of FillP

Start at: 2018-03-12 20:42:06
End at: 2018-03-12 20:42:36
Local clock offset: -11.447 ms
Remote clock offset: -6.283 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 26669.606 ms
Loss rate: 99.08%
-- Flow 1:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 26669.606 ms
Loss rate: 99.08%

Run 3: Report of FillP — Data Link

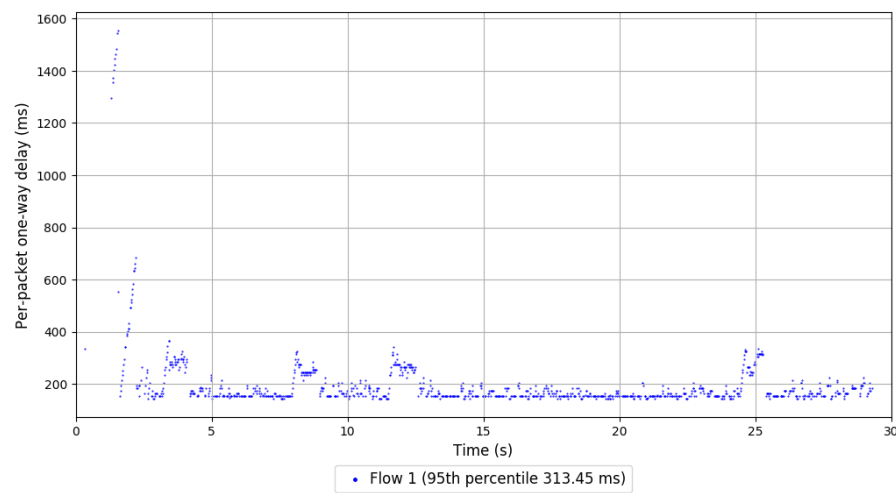
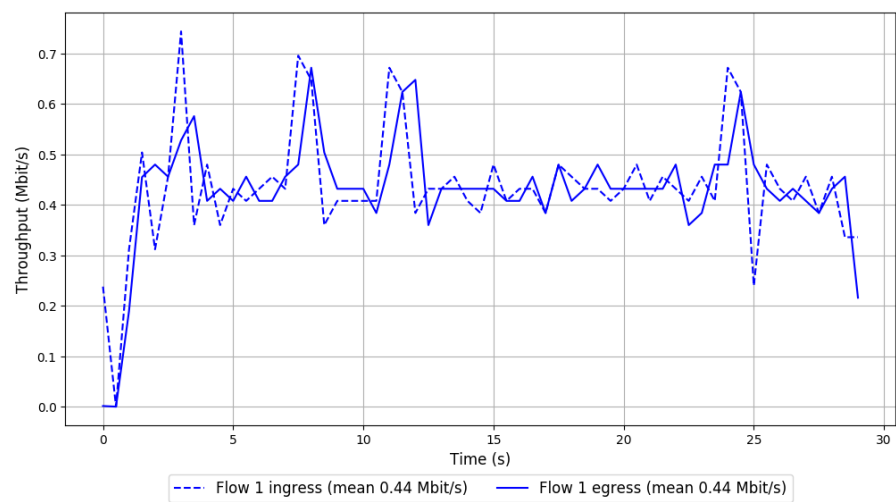


```
Run 1: Statistics of Indigo-1-32

Start at: 2018-03-12 20:02:16
End at: 2018-03-12 20:02:46
Local clock offset: -6.633 ms
Remote clock offset: 0.778 ms

# Below is generated by plot.py at 2018-03-12 22:02:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 313.449 ms
Loss rate: 1.40%
-- Flow 1:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 313.449 ms
Loss rate: 1.40%
```

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

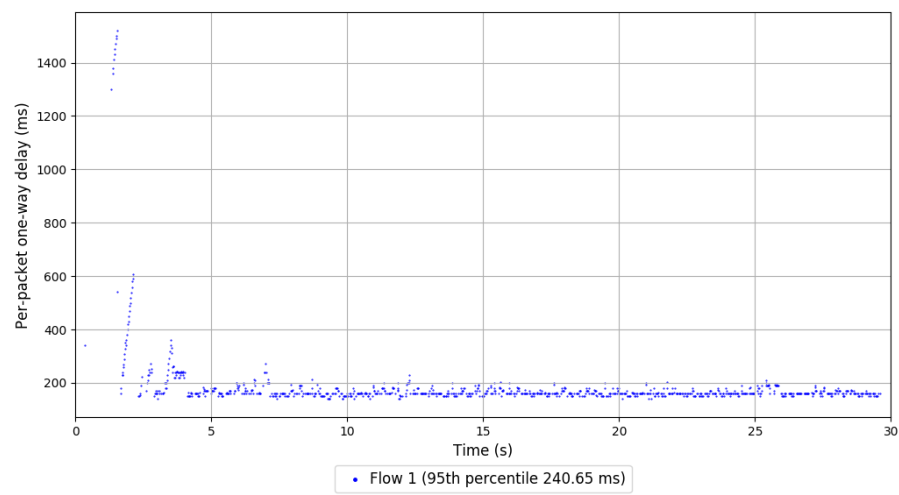
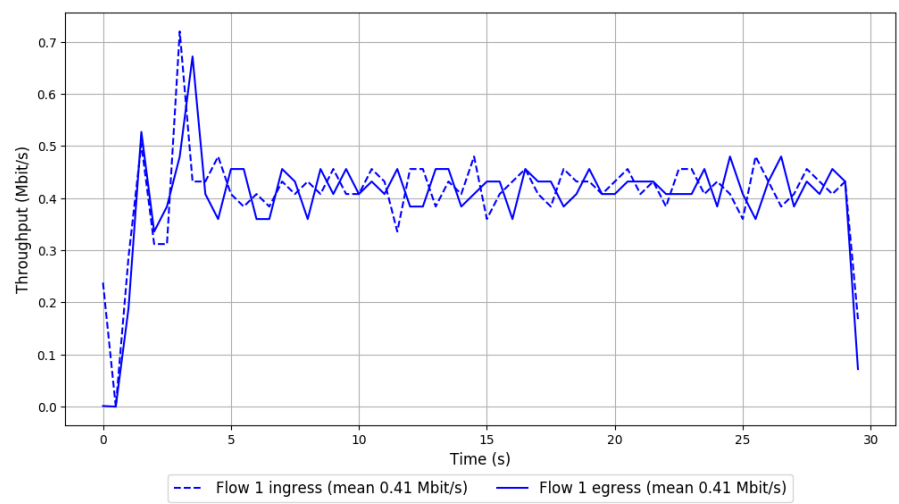


Run 2: Statistics of Indigo-1-32

Start at: 2018-03-12 20:23:22
End at: 2018-03-12 20:23:52
Local clock offset: -9.533 ms
Remote clock offset: -1.125 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 240.649 ms
Loss rate: 1.86%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 240.649 ms
Loss rate: 1.86%

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

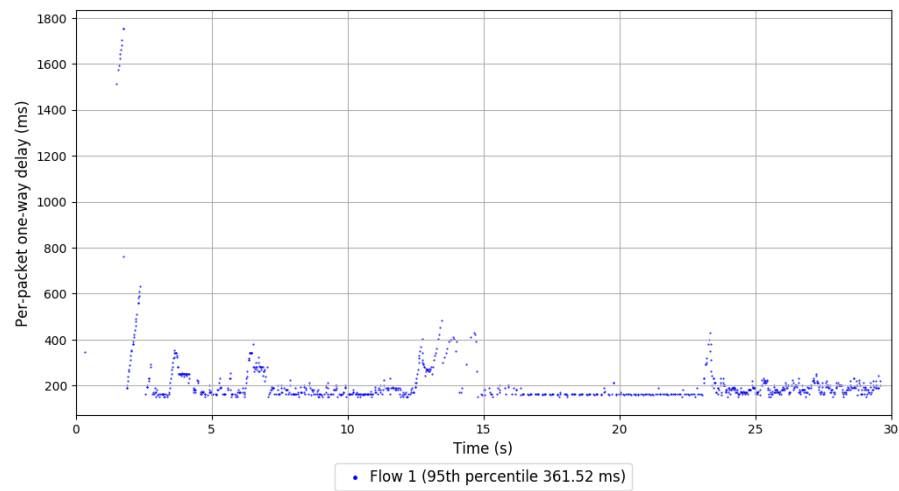
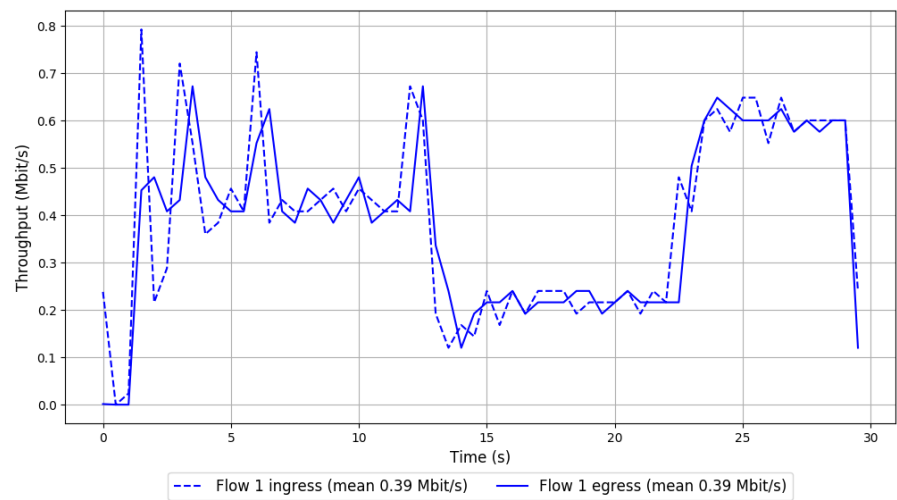


Run 3: Statistics of Indigo-1-32

Start at: 2018-03-12 20:44:28
End at: 2018-03-12 20:44:58
Local clock offset: -11.837 ms
Remote clock offset: -6.184 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 361.522 ms
Loss rate: 2.15%
-- Flow 1:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 361.522 ms
Loss rate: 2.15%

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

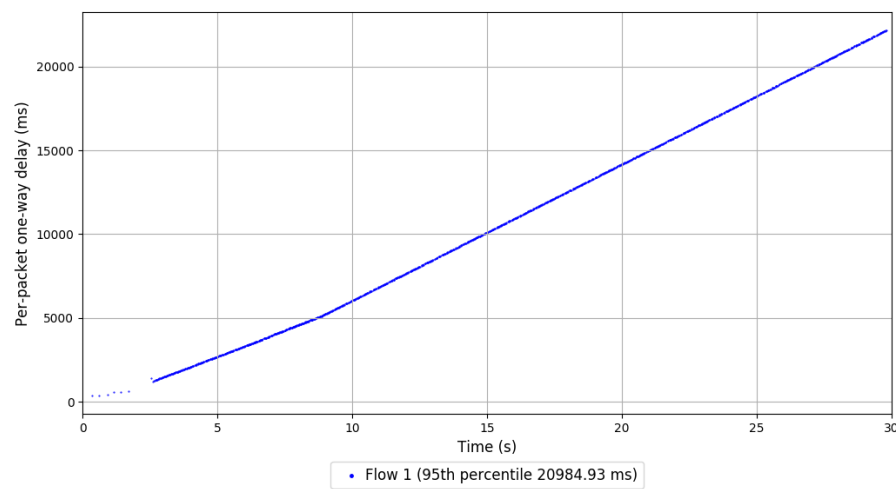
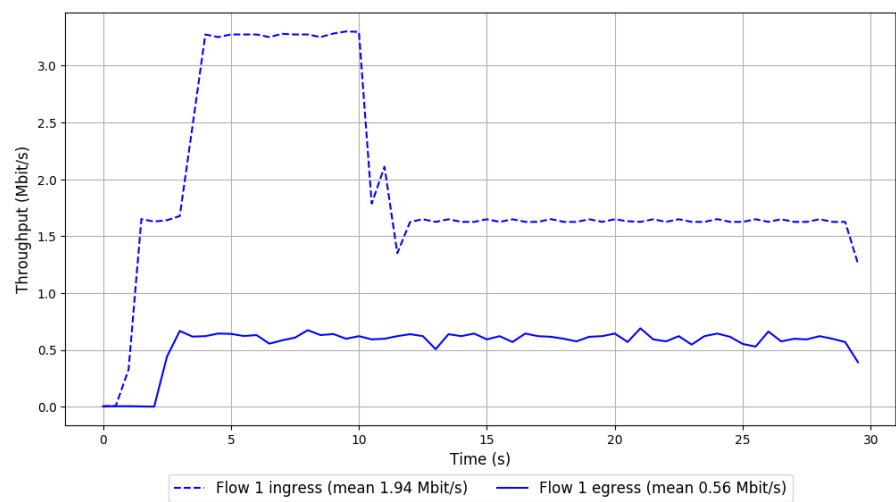


Run 1: Statistics of Vivace-latency

Start at: 2018-03-12 19:56:23
End at: 2018-03-12 19:56:53
Local clock offset: -5.511 ms
Remote clock offset: -0.251 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 20984.933 ms
Loss rate: 71.36%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 20984.933 ms
Loss rate: 71.36%

Run 1: Report of Vivace-latency — Data Link

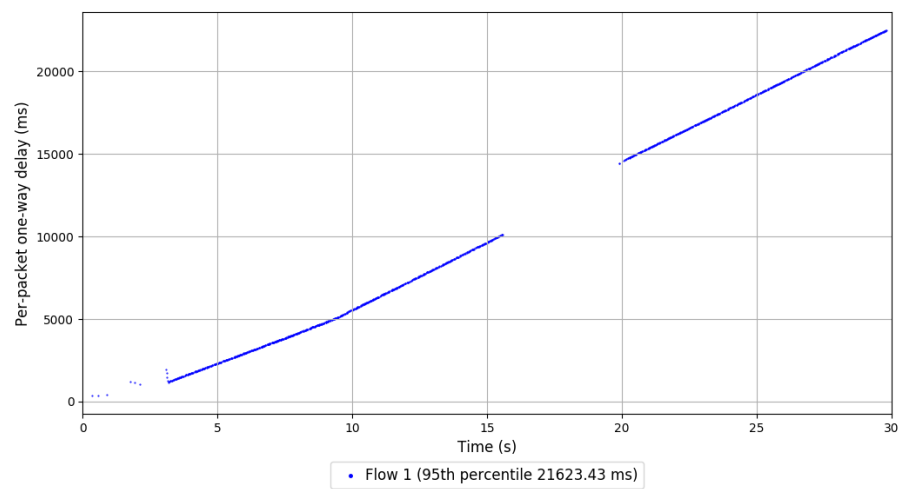
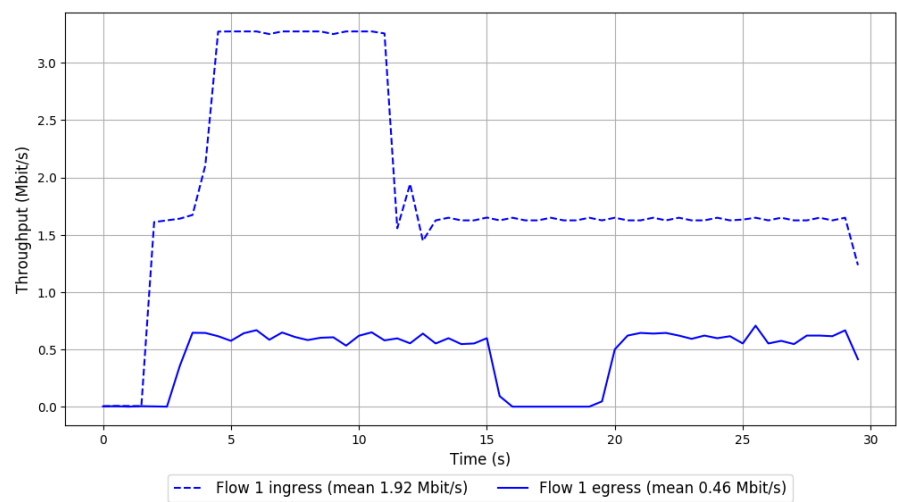


Run 2: Statistics of Vivace-latency

Start at: 2018-03-12 20:17:30
End at: 2018-03-12 20:18:00
Local clock offset: -7.978 ms
Remote clock offset: -0.926 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 21623.428 ms
Loss rate: 76.54%
-- Flow 1:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 21623.428 ms
Loss rate: 76.54%

Run 2: Report of Vivace-latency — Data Link

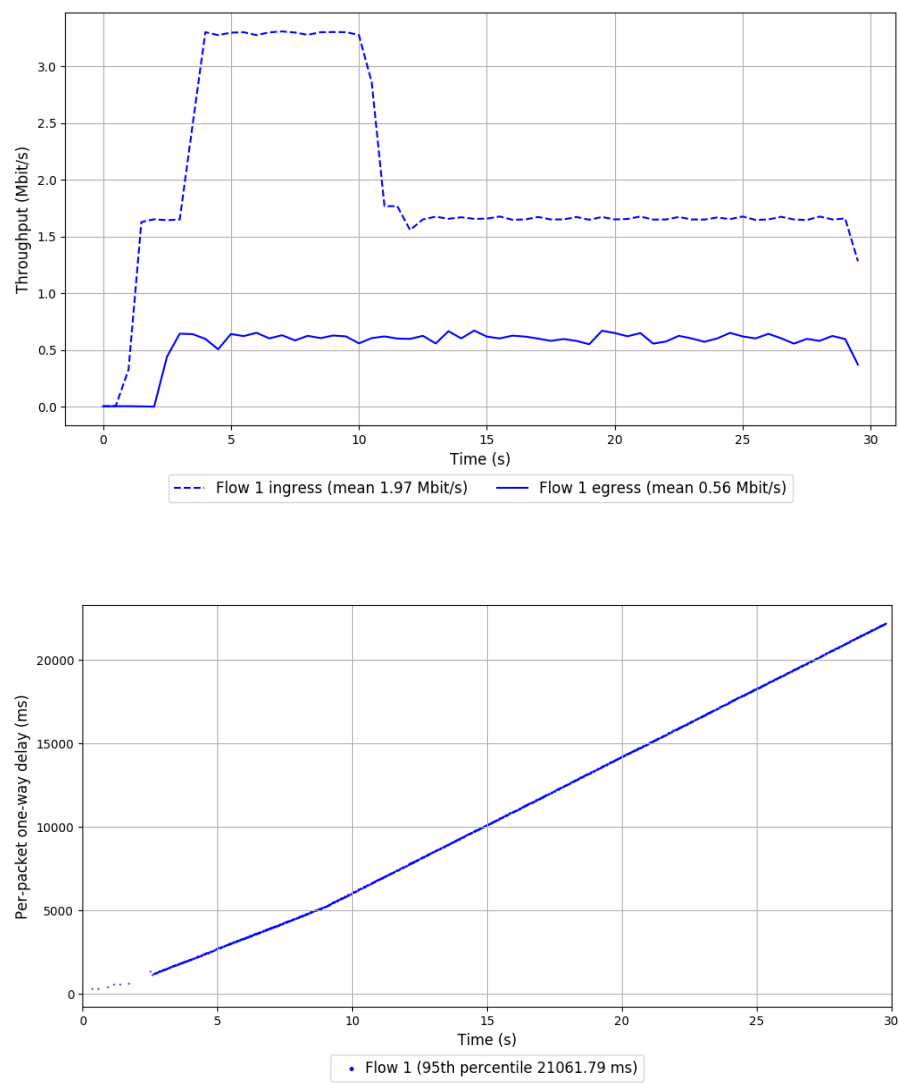


Run 3: Statistics of Vivace-latency

Start at: 2018-03-12 20:38:35
End at: 2018-03-12 20:39:05
Local clock offset: -10.862 ms
Remote clock offset: -1.318 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 21061.790 ms
Loss rate: 71.94%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 21061.790 ms
Loss rate: 71.94%

Run 3: Report of Vivace-latency — Data Link



Run 1: Statistics of Vivace-loss

Start at: 2018-03-12 20:05:46

End at: 2018-03-12 20:06:16

Local clock offset: -5.763 ms

Remote clock offset: -5.368 ms

Below is generated by plot.py at 2018-03-12 22:02:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.60 Mbit/s

95th percentile per-packet one-way delay: 22149.262 ms

Loss rate: 89.58%

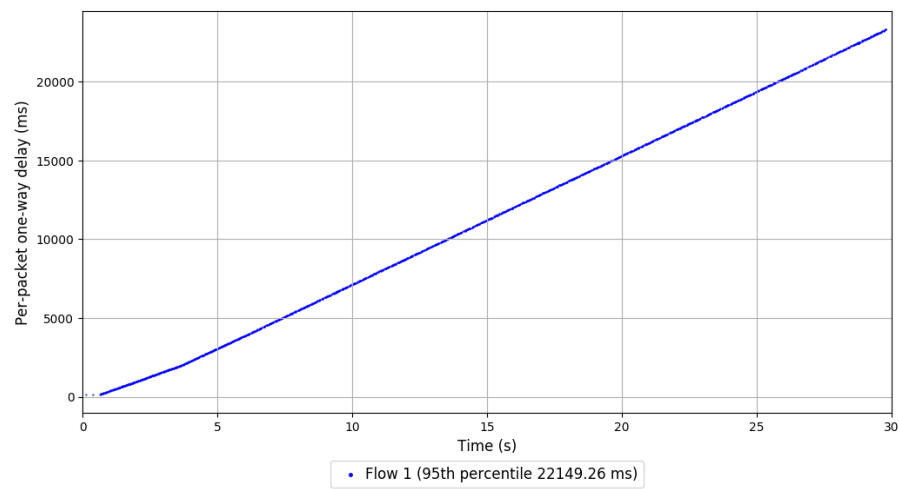
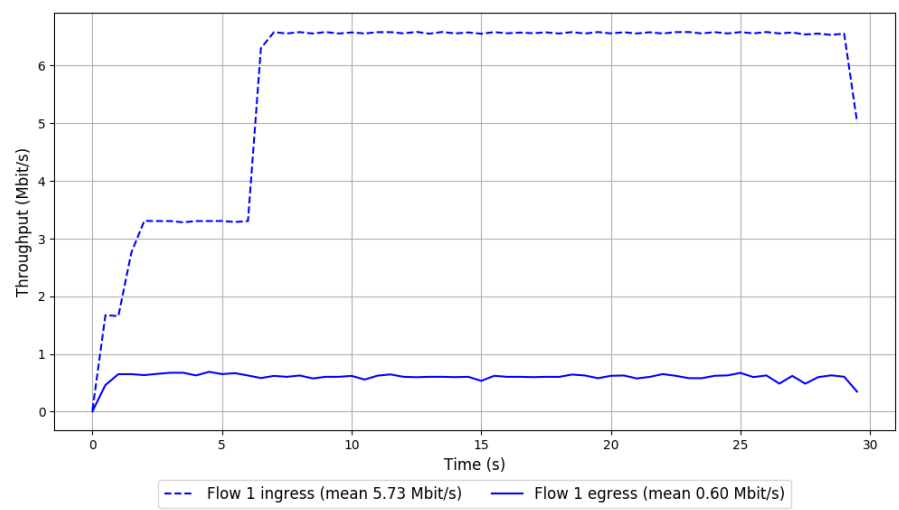
-- Flow 1:

Average throughput: 0.60 Mbit/s

95th percentile per-packet one-way delay: 22149.262 ms

Loss rate: 89.58%

Run 1: Report of Vivace-loss — Data Link

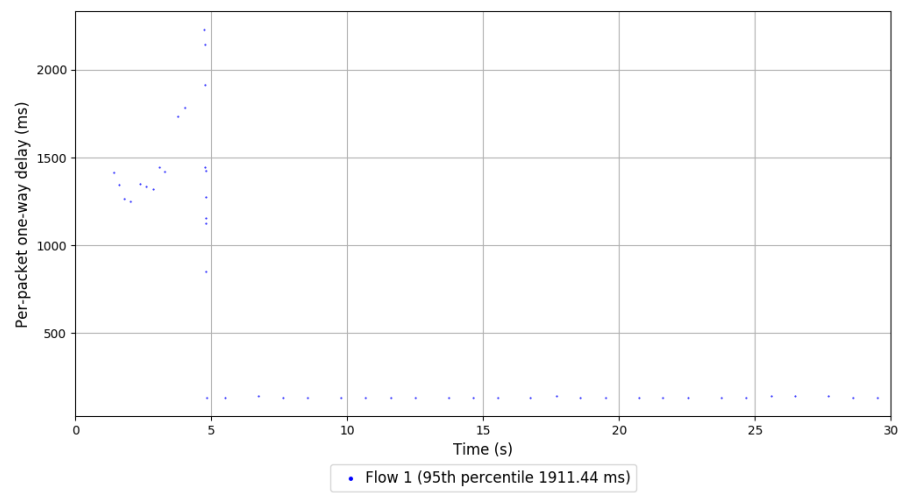
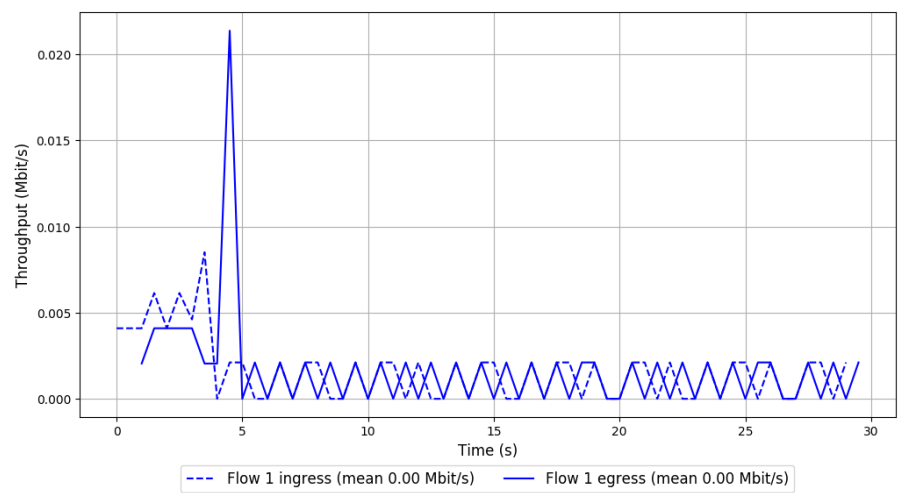


Run 2: Statistics of Vivace-loss

Start at: 2018-03-12 20:26:52
End at: 2018-03-12 20:27:22
Local clock offset: -10.481 ms
Remote clock offset: -6.09 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1911.442 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1911.442 ms
Loss rate: 0.00%

Run 2: Report of Vivace-loss — Data Link

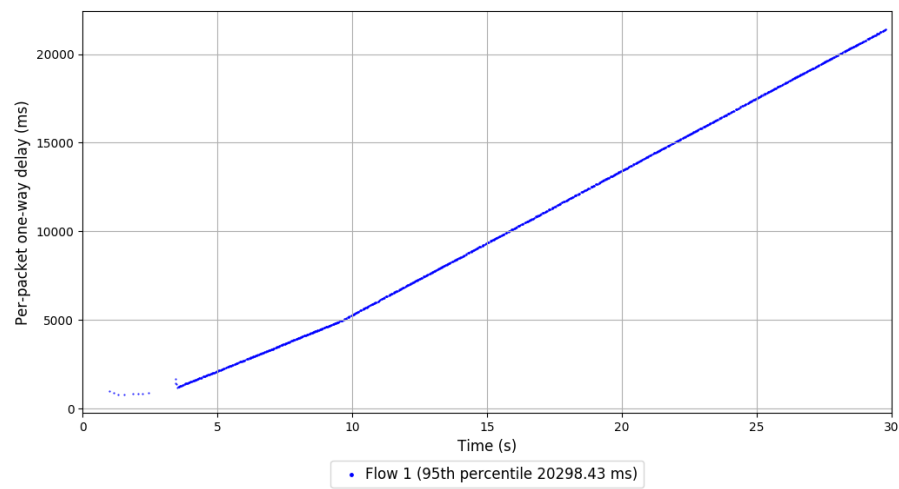
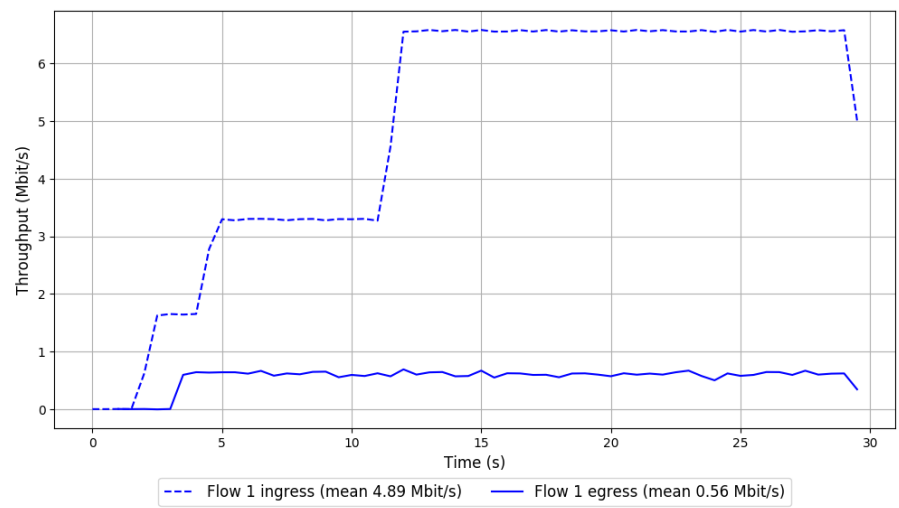


Run 3: Statistics of Vivace-loss

Start at: 2018-03-12 20:47:58
End at: 2018-03-12 20:48:28
Local clock offset: -12.549 ms
Remote clock offset: -1.14 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 20298.431 ms
Loss rate: 88.93%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 20298.431 ms
Loss rate: 88.93%

Run 3: Report of Vivace-loss — Data Link

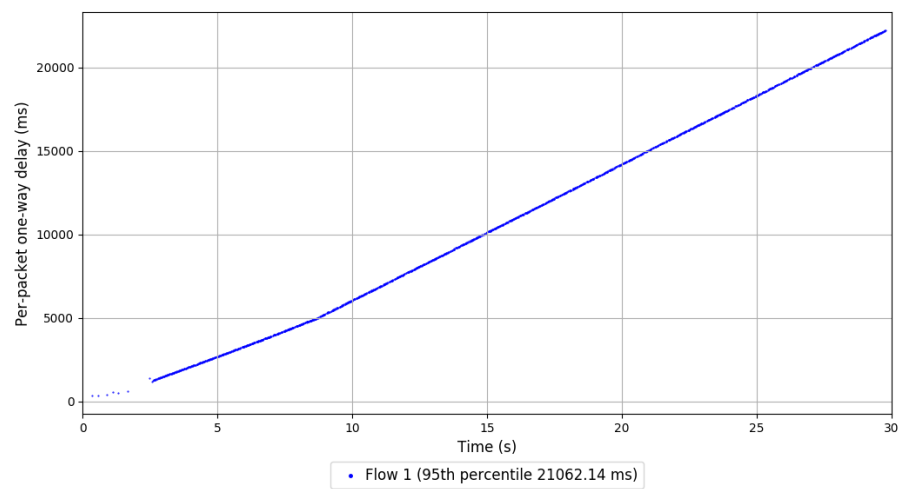
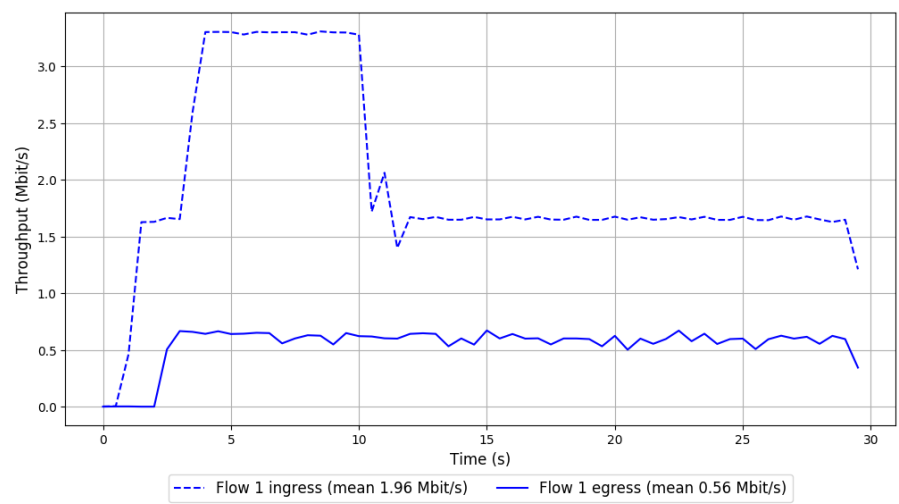


Run 1: Statistics of Vivace-LTE

Start at: 2018-03-12 20:04:36
End at: 2018-03-12 20:05:06
Local clock offset: -5.812 ms
Remote clock offset: -4.489 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 21062.143 ms
Loss rate: 71.73%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 21062.143 ms
Loss rate: 71.73%

Run 1: Report of Vivace-LTE — Data Link

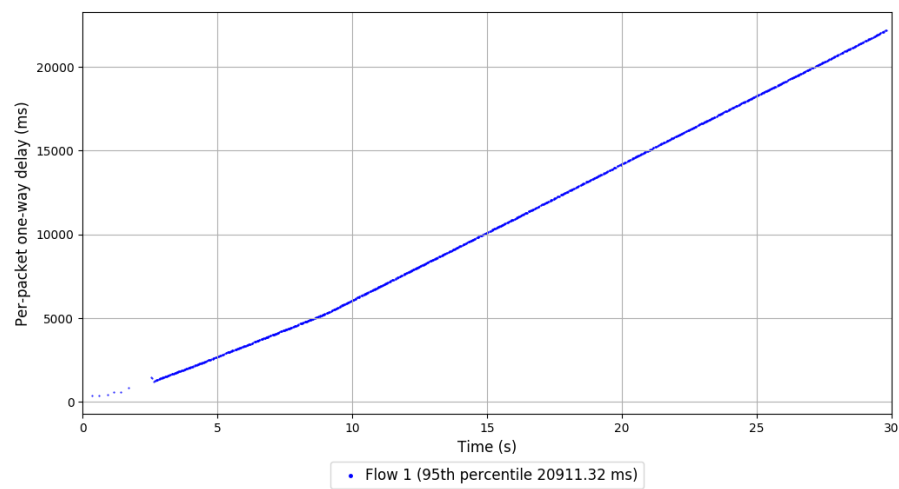
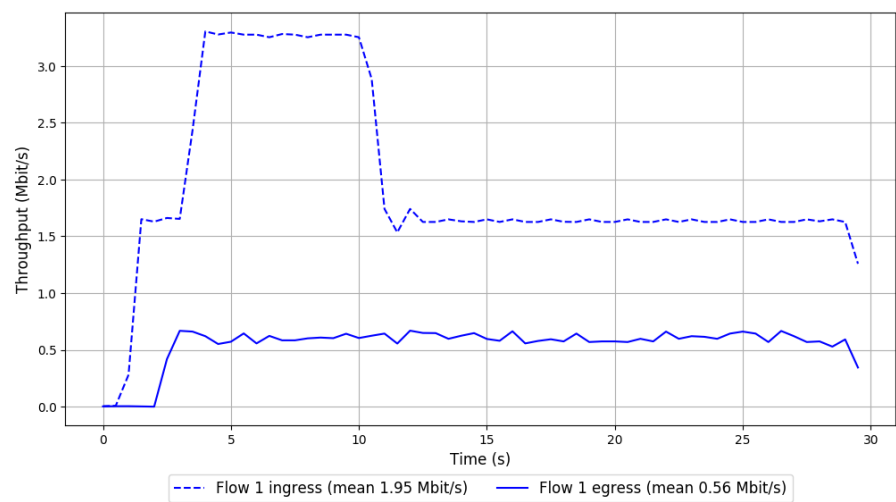


Run 2: Statistics of Vivace-LTE

Start at: 2018-03-12 20:25:42
End at: 2018-03-12 20:26:12
Local clock offset: -10.159 ms
Remote clock offset: -6.096 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 20911.320 ms
Loss rate: 71.73%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 20911.320 ms
Loss rate: 71.73%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-03-12 20:46:48
End at: 2018-03-12 20:47:18
Local clock offset: -12.277 ms
Remote clock offset: -2.228 ms

Below is generated by plot.py at 2018-03-12 22:02:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 20851.777 ms
Loss rate: 71.86%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 20851.777 ms
Loss rate: 71.86%

Run 3: Report of Vivace-LTE — Data Link

