

Pantheon Report

Generated at 2018-03-05 20:03:33 (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).

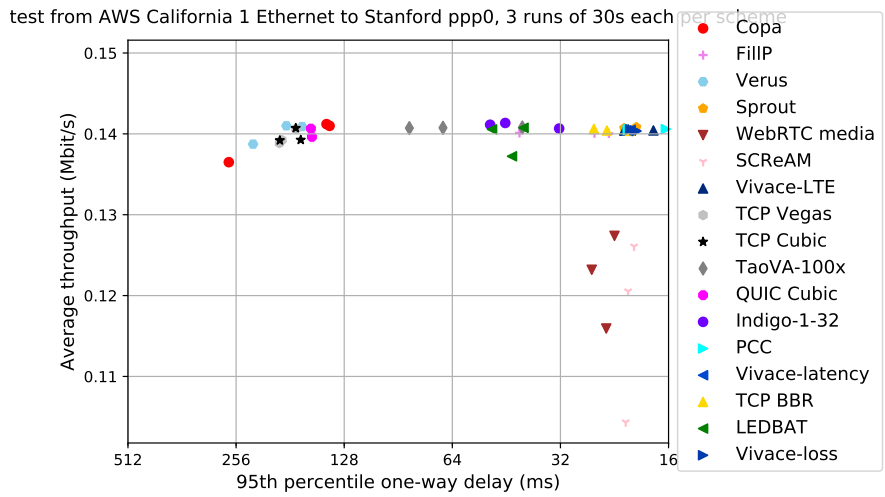
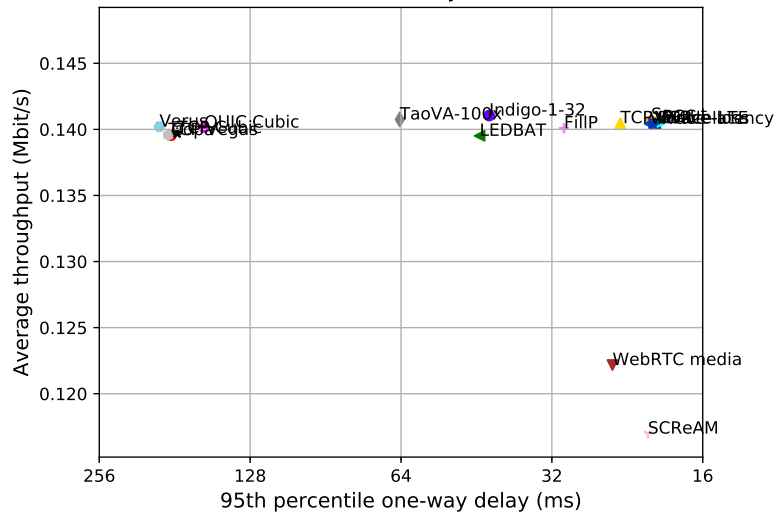
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

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

Git summary:

```
branch: master @ f12c42a2c63fdd9a862eefa0468859bf379b6623
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ 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-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)



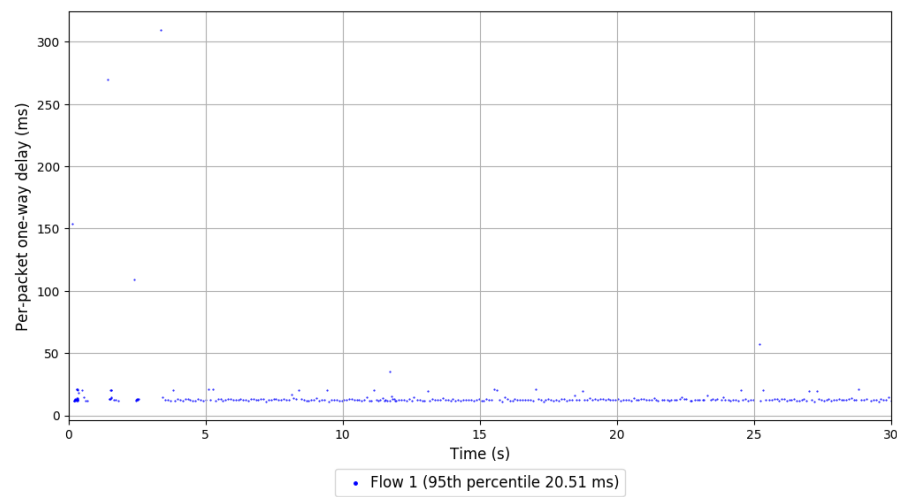
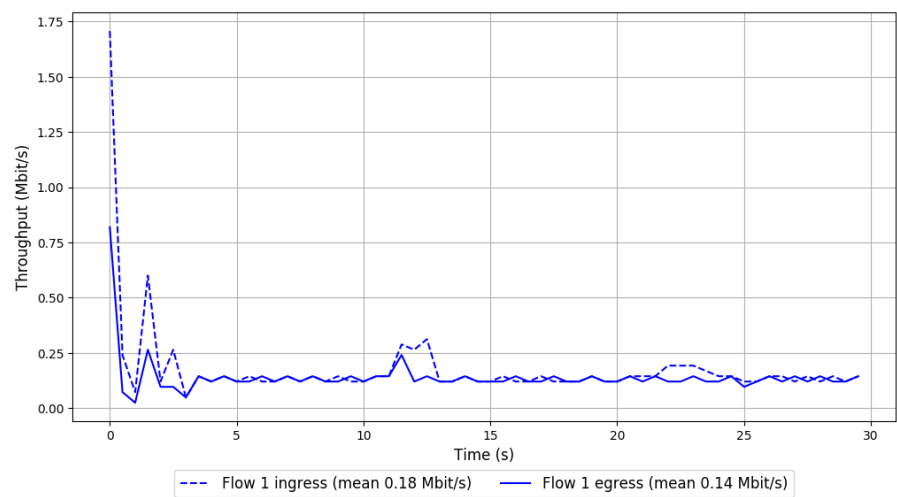
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	0.14	23.36	21.55
TCP Cubic	3	0.14	179.04	31.86
LEDBAT	3	0.14	44.61	33.54
PCC	3	0.14	19.25	94.40
QUIC Cubic	2	0.14	157.93	60.34
SCReAM	3	0.12	20.59	1.03
WebRTC media	3	0.12	24.22	60.24
Sprout	3	0.14	20.28	52.46
TaoVA-100x	3	0.14	64.36	93.23
TCP Vegas	3	0.14	186.37	31.86
Verus	3	0.14	194.21	75.24
Copa	3	0.14	184.07	52.14
FillP	3	0.14	30.27	98.79
Indigo-1-32	3	0.14	42.69	63.23
Vivace-latency	3	0.14	20.42	88.35
Vivace-loss	3	0.14	20.00	88.19
Vivace-LTE	3	0.14	19.87	88.03

Run 1: Statistics of TCP BBR

Start at: 2018-03-05 19:05:35
End at: 2018-03-05 19:06:05
Local clock offset: -10.128 ms
Remote clock offset: 1.068 ms

Below is generated by plot.py at 2018-03-05 20:03:02
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.510 ms
Loss rate: 21.74%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.510 ms
Loss rate: 21.74%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-03-05 19:29:03

End at: 2018-03-05 19:29:33

Local clock offset: -7.786 ms

Remote clock offset: 0.724 ms

Below is generated by plot.py at 2018-03-05 20:03:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 25.823 ms

Loss rate: 24.62%

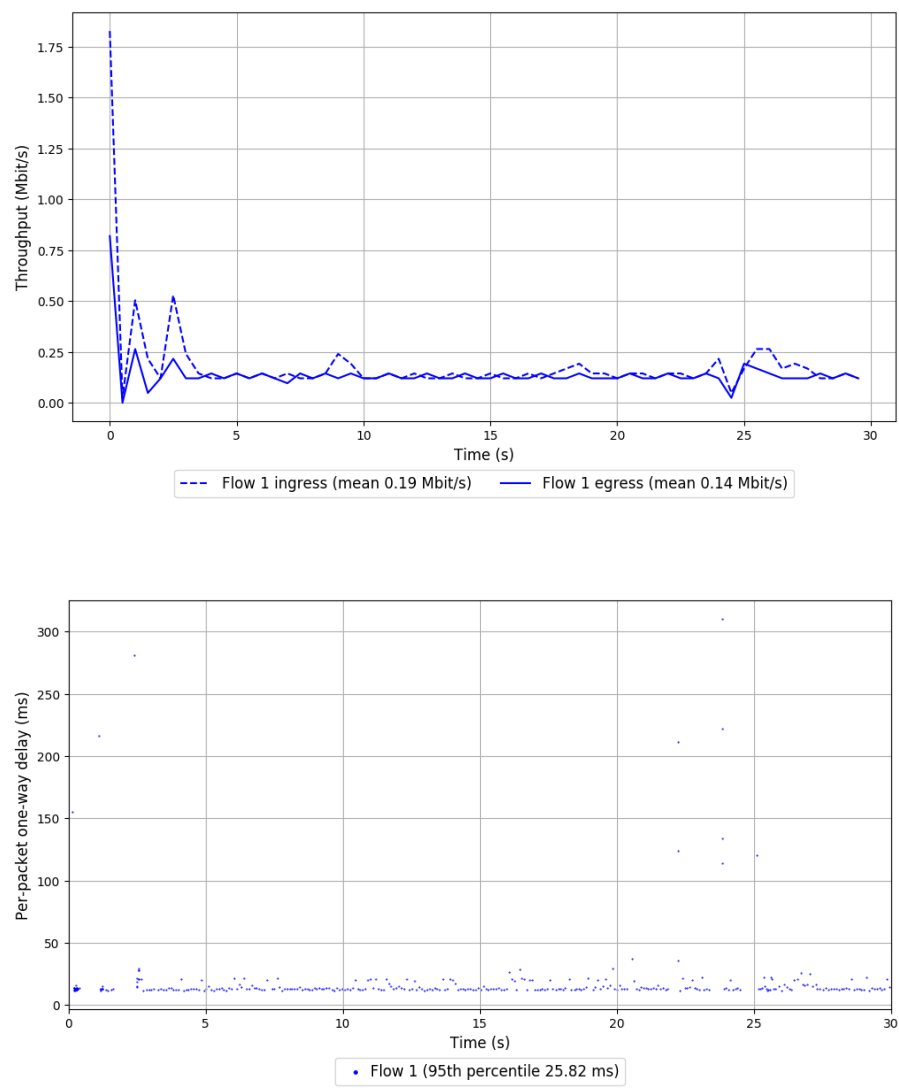
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 25.823 ms

Loss rate: 24.62%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-03-05 19:52:37

End at: 2018-03-05 19:53:07

Local clock offset: -5.415 ms

Remote clock offset: 0.686 ms

Below is generated by plot.py at 2018-03-05 20:03:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 23.751 ms

Loss rate: 18.30%

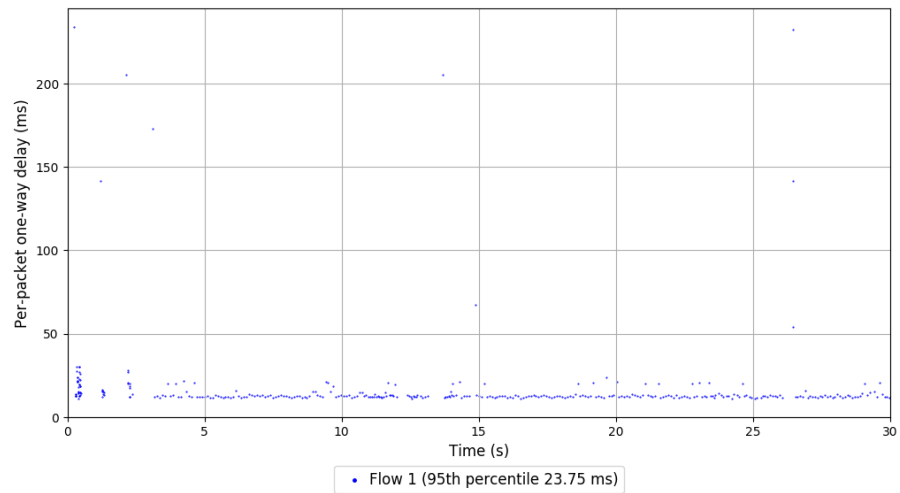
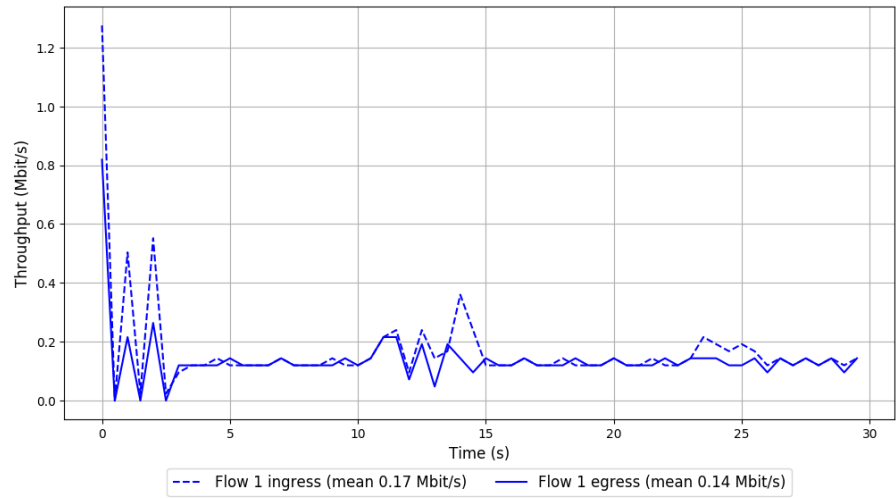
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 23.751 ms

Loss rate: 18.30%

Run 3: Report of TCP BBR — Data Link

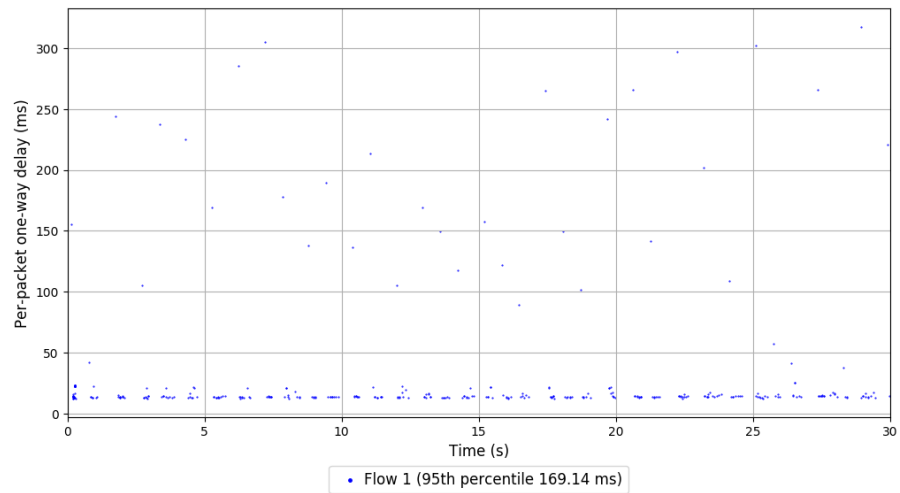
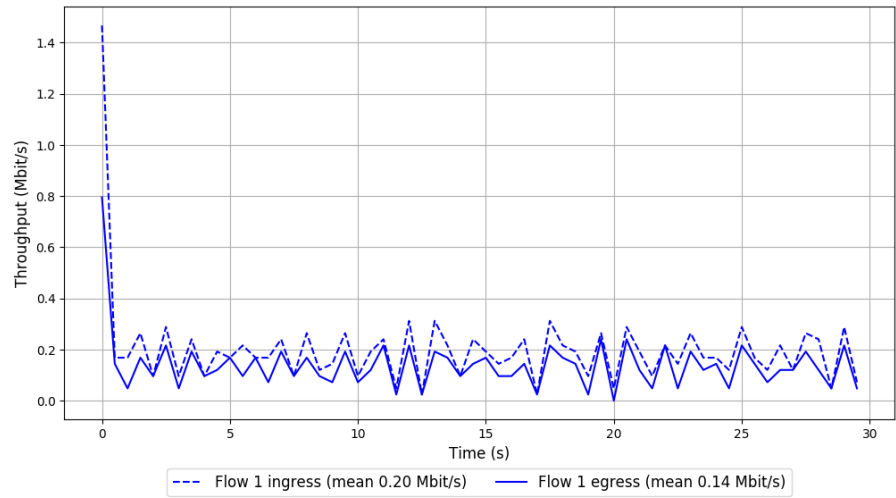


Run 1: Statistics of TCP Cubic

Start at: 2018-03-05 18:52:32
End at: 2018-03-05 18:53:02
Local clock offset: -17.263 ms
Remote clock offset: 1.311 ms

Below is generated by plot.py at 2018-03-05 20:03:02
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 169.140 ms
Loss rate: 31.21%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 169.140 ms
Loss rate: 31.21%

Run 1: Report of TCP Cubic — Data Link

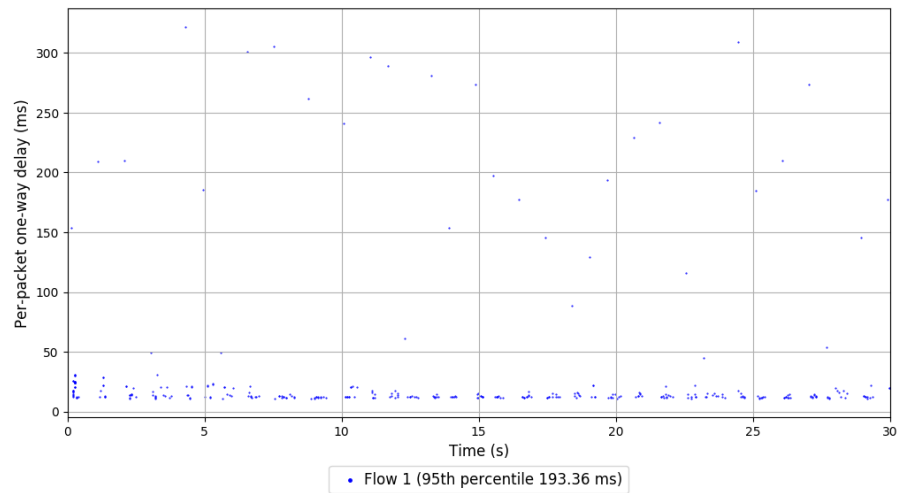
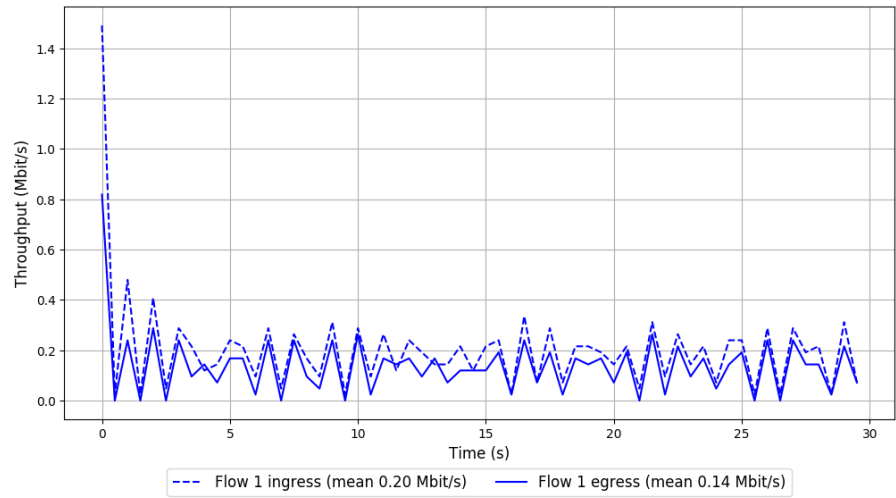


Run 2: Statistics of TCP Cubic

Start at: 2018-03-05 19:16:01
End at: 2018-03-05 19:16:31
Local clock offset: -11.251 ms
Remote clock offset: 0.857 ms

Below is generated by plot.py at 2018-03-05 20:03:02
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 193.360 ms
Loss rate: 31.48%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 193.360 ms
Loss rate: 31.48%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-03-05 19:39:33

End at: 2018-03-05 19:40:03

Local clock offset: -4.826 ms

Remote clock offset: 0.728 ms

Below is generated by plot.py at 2018-03-05 20:03:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 174.622 ms

Loss rate: 32.88%

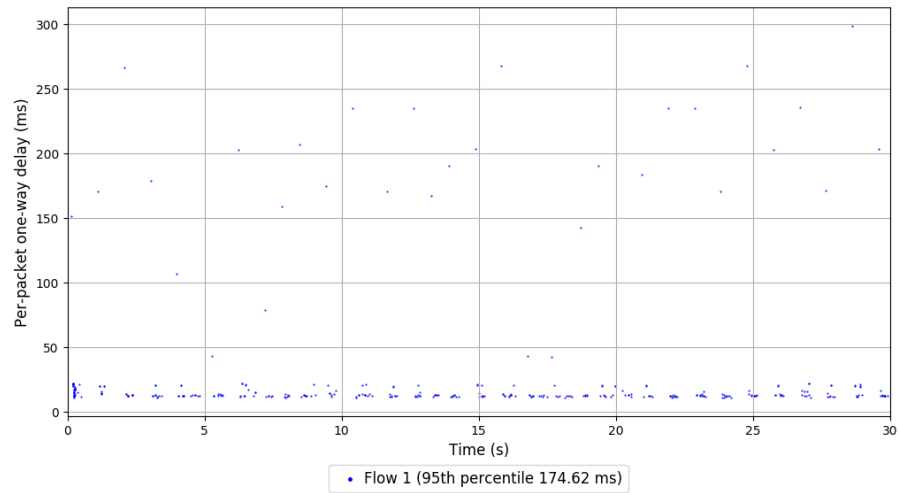
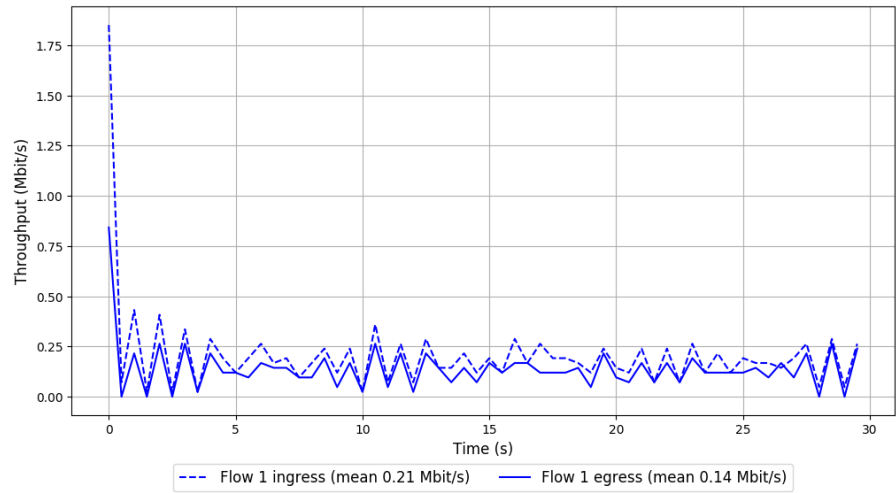
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 174.622 ms

Loss rate: 32.88%

Run 3: Report of TCP Cubic — Data Link

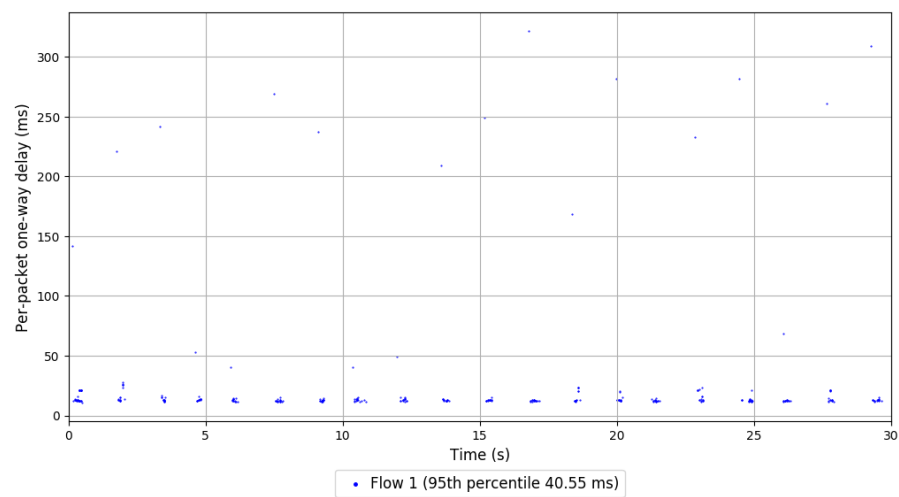
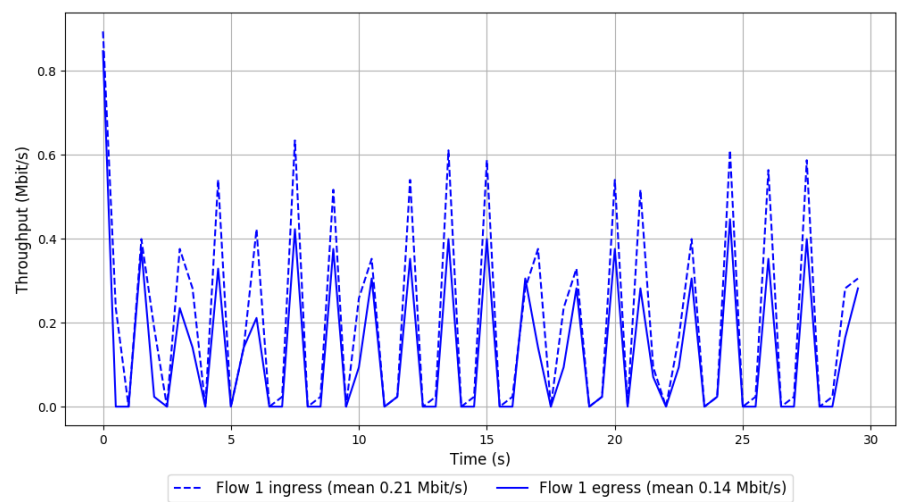


```
Run 1: Statistics of LEDBAT

Start at: 2018-03-05 19:13:24
End at: 2018-03-05 19:13:54
Local clock offset: -10.736 ms
Remote clock offset: 0.993 ms

# Below is generated by plot.py at 2018-03-05 20:03:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 40.545 ms
Loss rate: 33.58%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 40.545 ms
Loss rate: 33.58%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-03-05 19:36:57

End at: 2018-03-05 19:37:27

Local clock offset: -5.065 ms

Remote clock offset: 0.75 ms

Below is generated by plot.py at 2018-03-05 20:03:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 43.660 ms

Loss rate: 33.14%

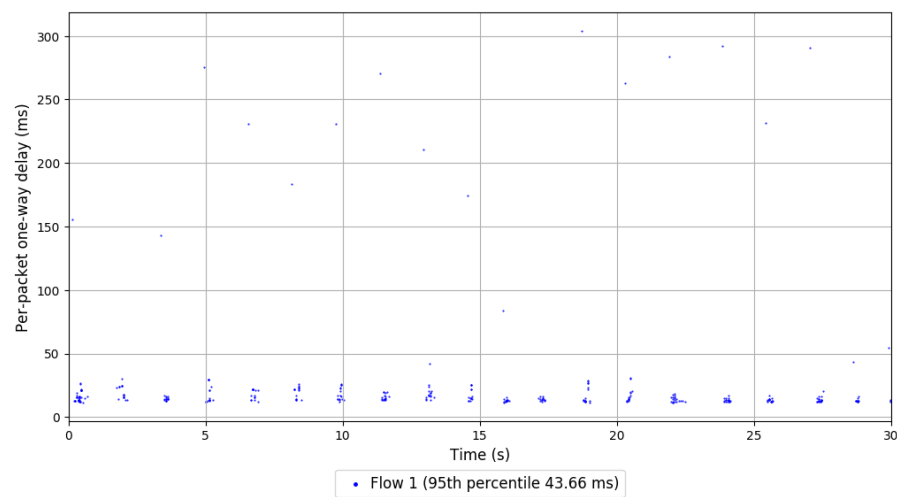
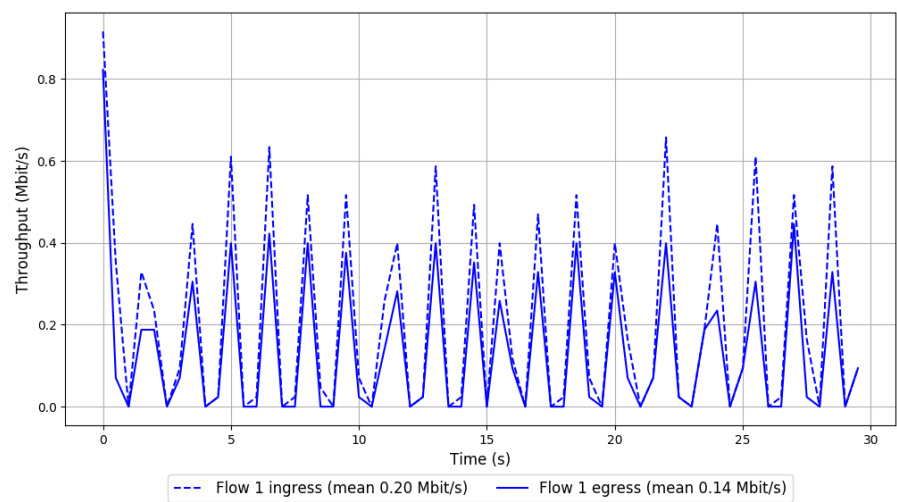
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 43.660 ms

Loss rate: 33.14%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-03-05 20:00:26

End at: 2018-03-05 20:00:56

Local clock offset: -4.558 ms

Remote clock offset: 0.743 ms

Below is generated by plot.py at 2018-03-05 20:03:06

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 49.613 ms

Loss rate: 33.89%

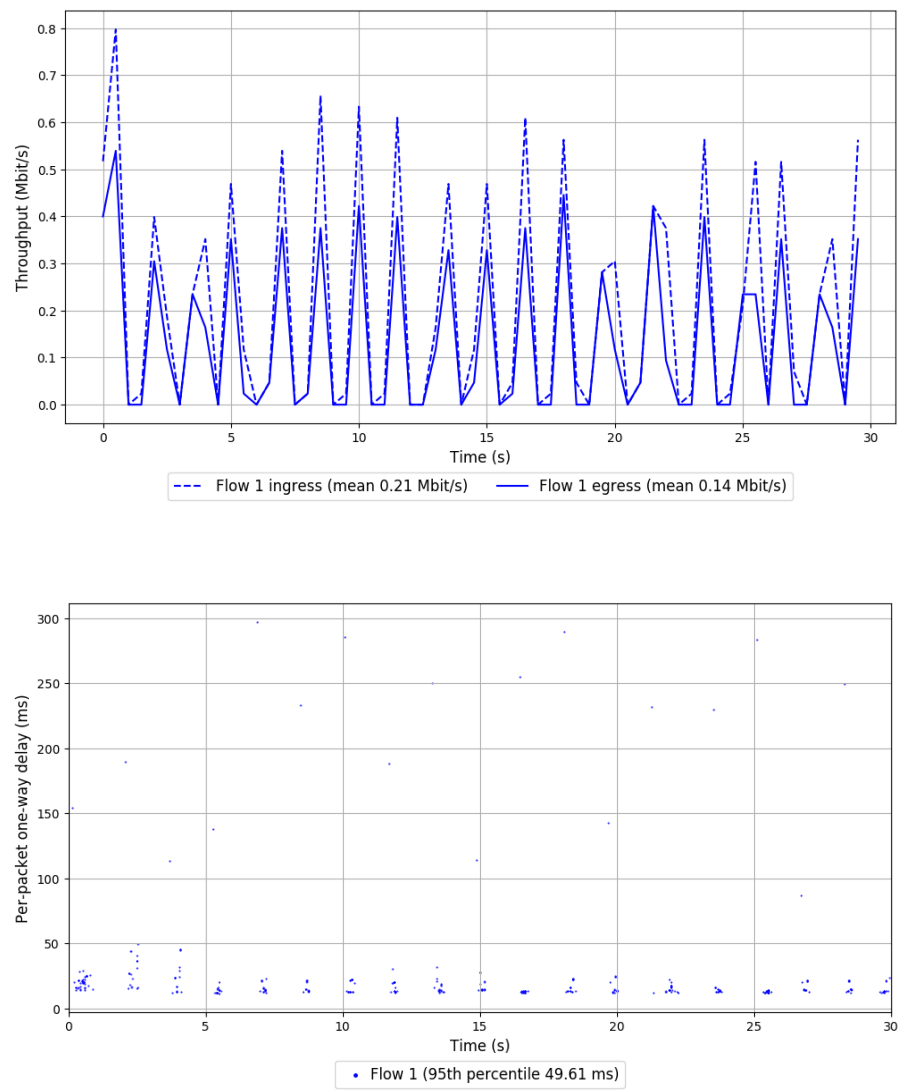
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 49.613 ms

Loss rate: 33.89%

Run 3: Report of LEDBAT — Data Link

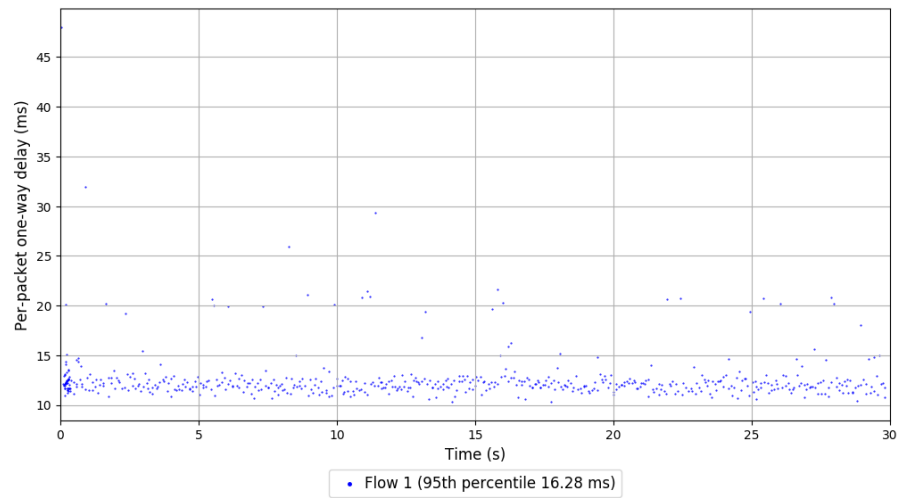
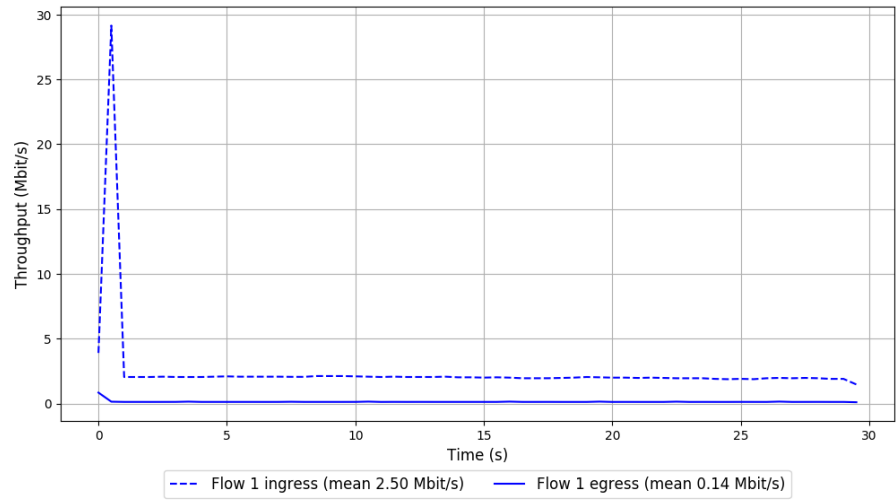


Run 1: Statistics of PCC

Start at: 2018-03-05 19:10:48
End at: 2018-03-05 19:11:18
Local clock offset: -10.408 ms
Remote clock offset: 0.935 ms

Below is generated by plot.py at 2018-03-05 20:03:08
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 16.276 ms
Loss rate: 94.39%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 16.276 ms
Loss rate: 94.39%

Run 1: Report of PCC — Data Link



Run 2: Statistics of PCC

Start at: 2018-03-05 19:34:21

End at: 2018-03-05 19:34:51

Local clock offset: -5.599 ms

Remote clock offset: 0.744 ms

Below is generated by plot.py at 2018-03-05 20:03:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.696 ms

Loss rate: 94.70%

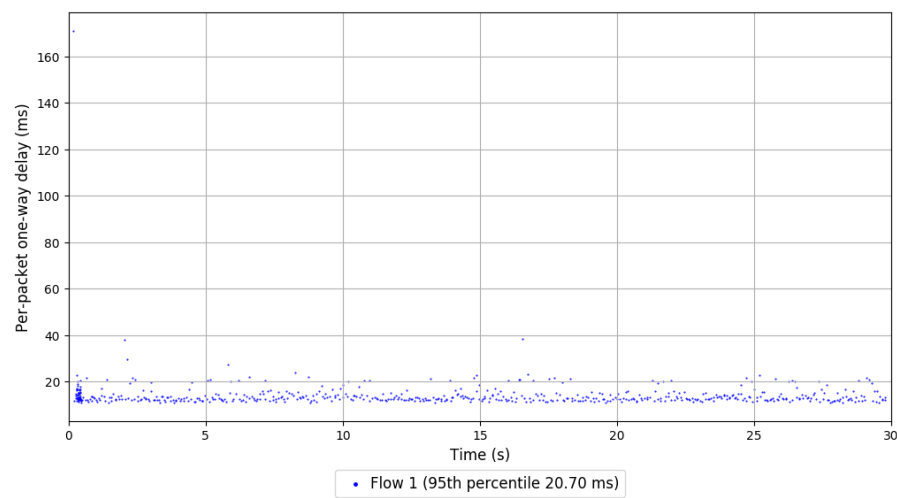
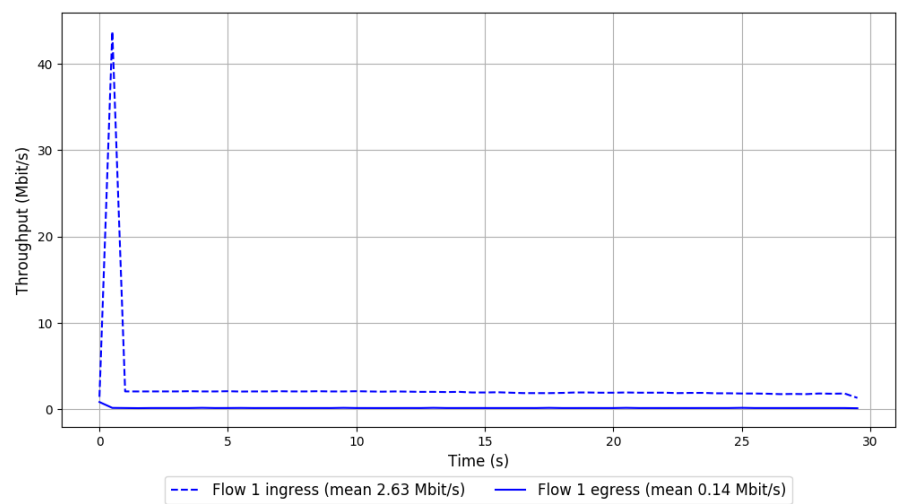
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.696 ms

Loss rate: 94.70%

Run 2: Report of PCC — Data Link



Run 3: Statistics of PCC

Start at: 2018-03-05 19:57:49

End at: 2018-03-05 19:58:19

Local clock offset: -5.582 ms

Remote clock offset: 0.667 ms

Below is generated by plot.py at 2018-03-05 20:03:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.789 ms

Loss rate: 94.12%

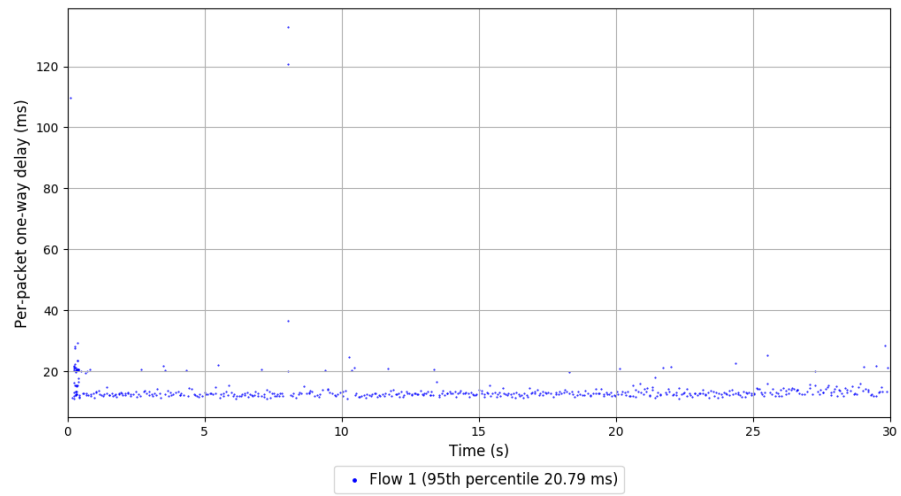
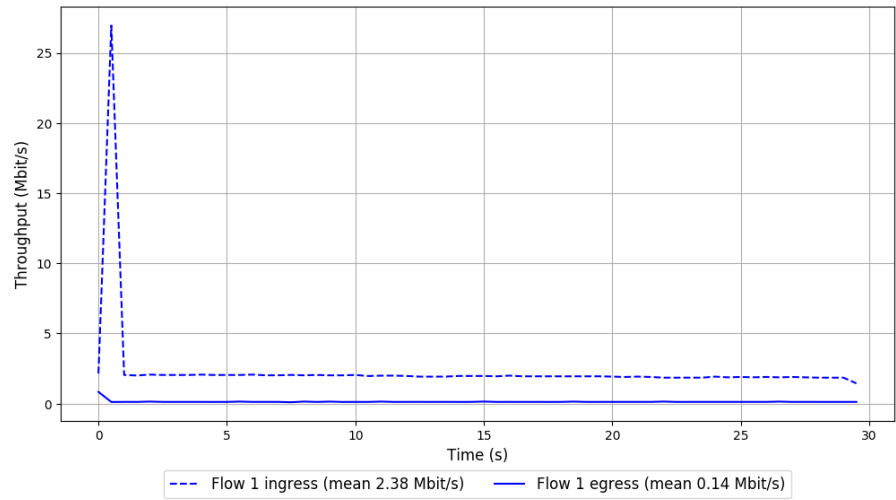
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.789 ms

Loss rate: 94.12%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

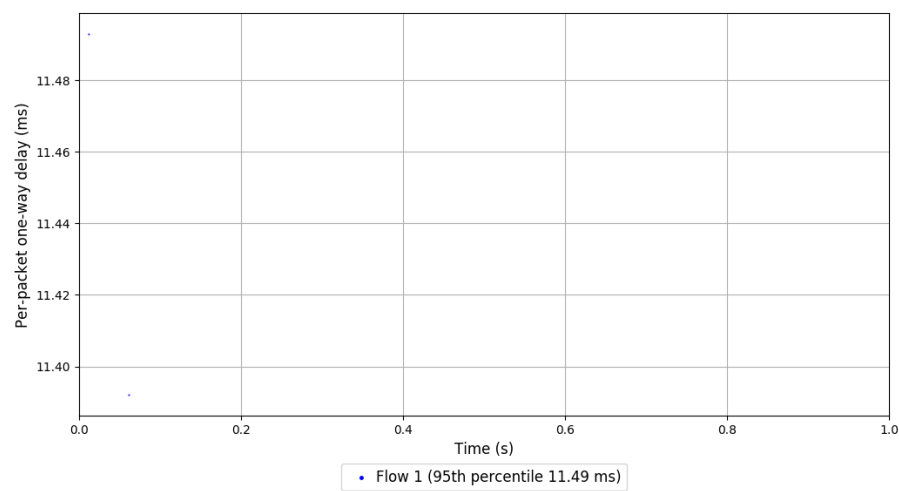
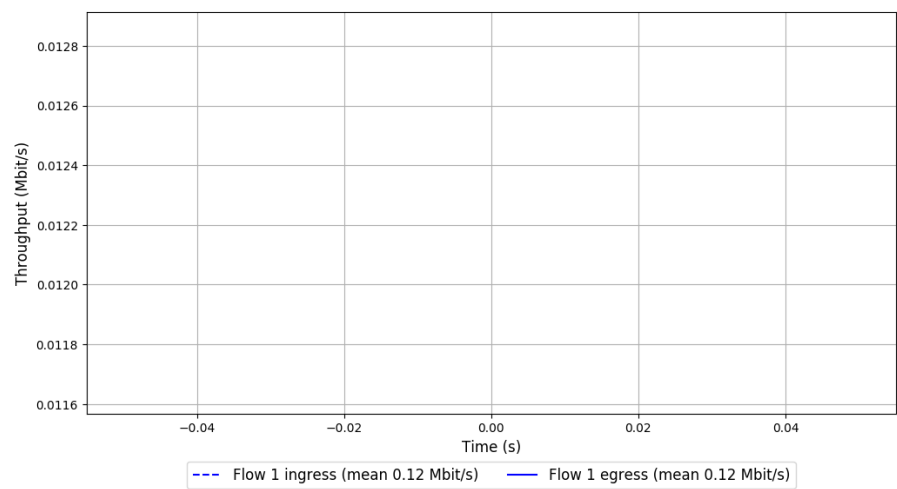
Start at: 2018-03-05 19:02:59

End at: 2018-03-05 19:03:29

Local clock offset: -10.382 ms

Remote clock offset: 1.159 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-03-05 19:26:27

End at: 2018-03-05 19:26:57

Local clock offset: -9.688 ms

Remote clock offset: 0.711 ms

Below is generated by plot.py at 2018-03-05 20:03:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 157.399 ms

Loss rate: 58.36%

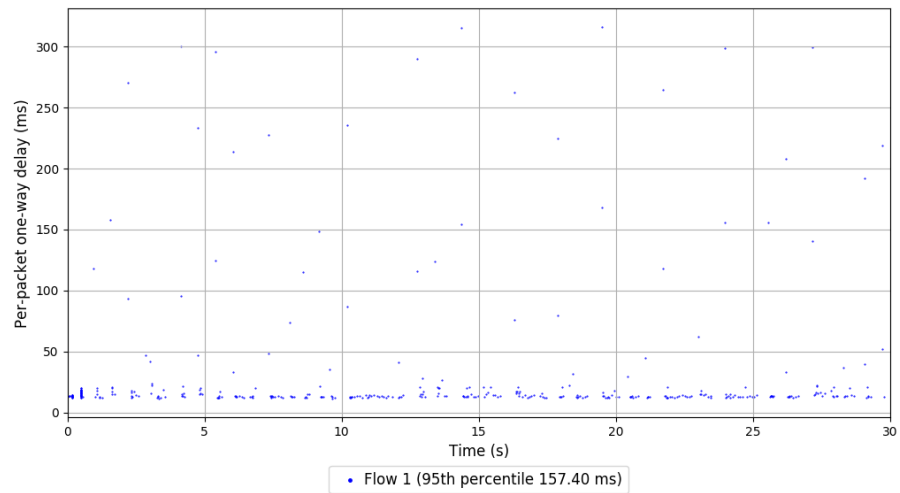
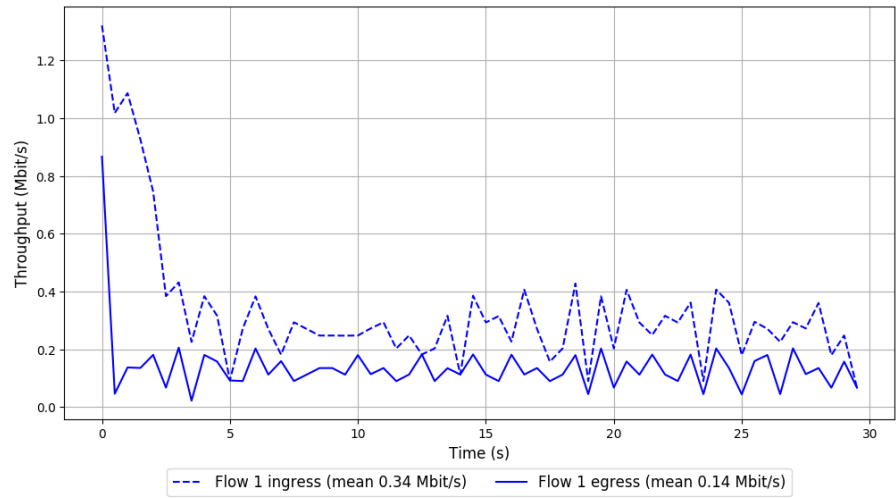
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 157.399 ms

Loss rate: 58.36%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-03-05 19:50:00

End at: 2018-03-05 19:50:30

Local clock offset: -5.1 ms

Remote clock offset: 0.754 ms

Below is generated by plot.py at 2018-03-05 20:03:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 158.454 ms

Loss rate: 62.32%

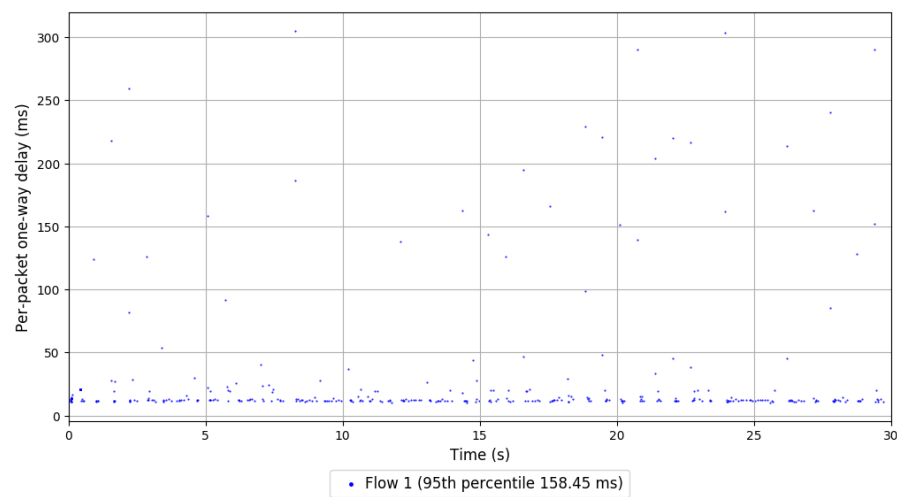
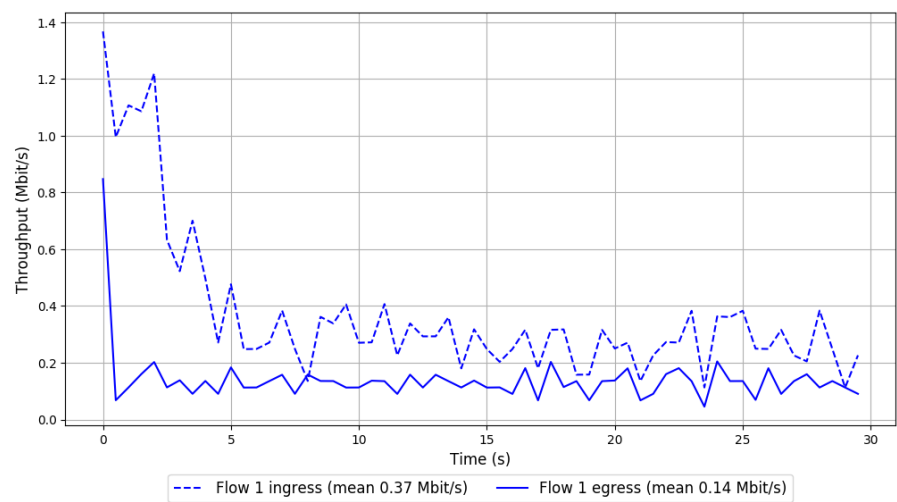
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 158.454 ms

Loss rate: 62.32%

Run 3: Report of QUIC Cubic — Data Link

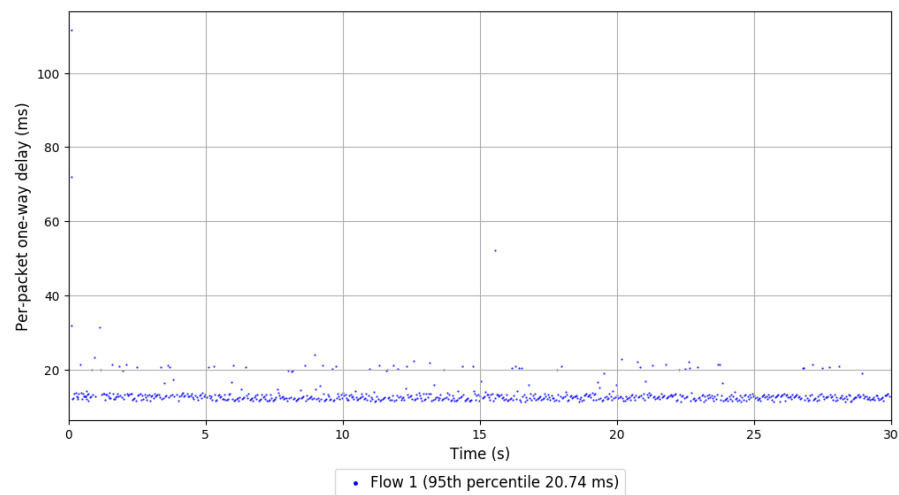
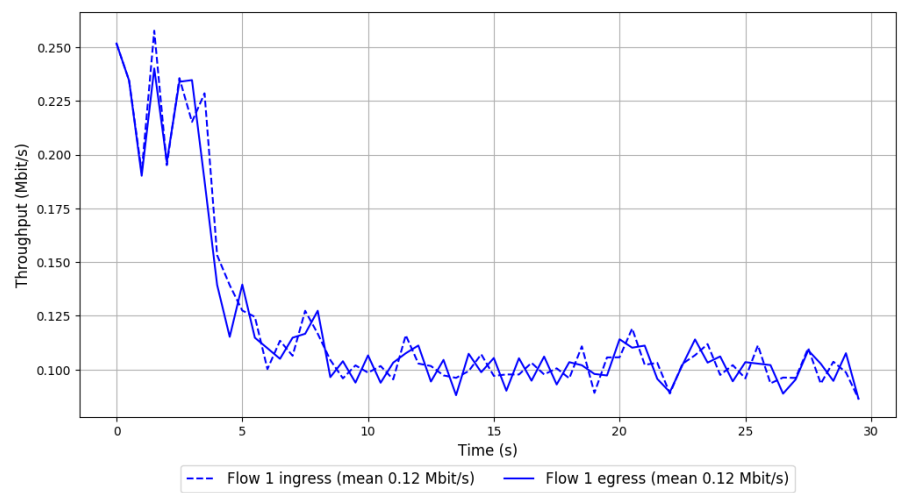


Run 1: Statistics of SCReAM

Start at: 2018-03-05 18:59:04
End at: 2018-03-05 18:59:34
Local clock offset: -11.583 ms
Remote clock offset: 1.271 ms

Below is generated by plot.py at 2018-03-05 20:03:09
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 20.741 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 20.741 ms
Loss rate: 0.92%

Run 1: Report of SReAM — Data Link

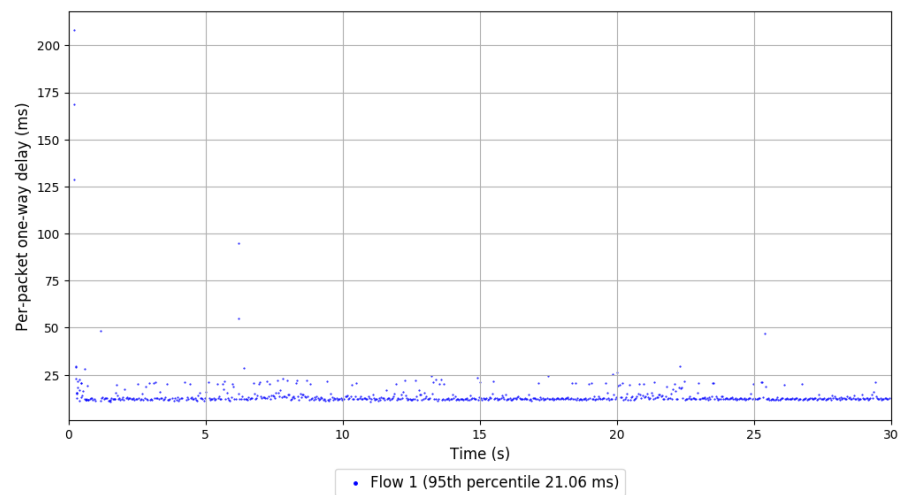
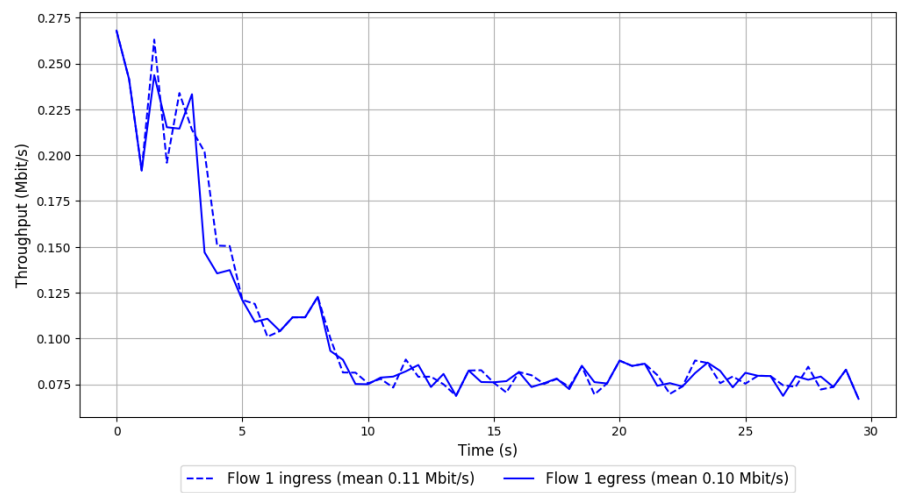


Run 2: Statistics of SCReAM

Start at: 2018-03-05 19:22:31
End at: 2018-03-05 19:23:02
Local clock offset: -12.998 ms
Remote clock offset: 0.769 ms

Below is generated by plot.py at 2018-03-05 20:03:10
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 21.058 ms
Loss rate: 1.32%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 21.058 ms
Loss rate: 1.32%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-03-05 19:46:05

End at: 2018-03-05 19:46:35

Local clock offset: -4.895 ms

Remote clock offset: 0.818 ms

Below is generated by plot.py at 2018-03-05 20:03:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 19.960 ms

Loss rate: 0.86%

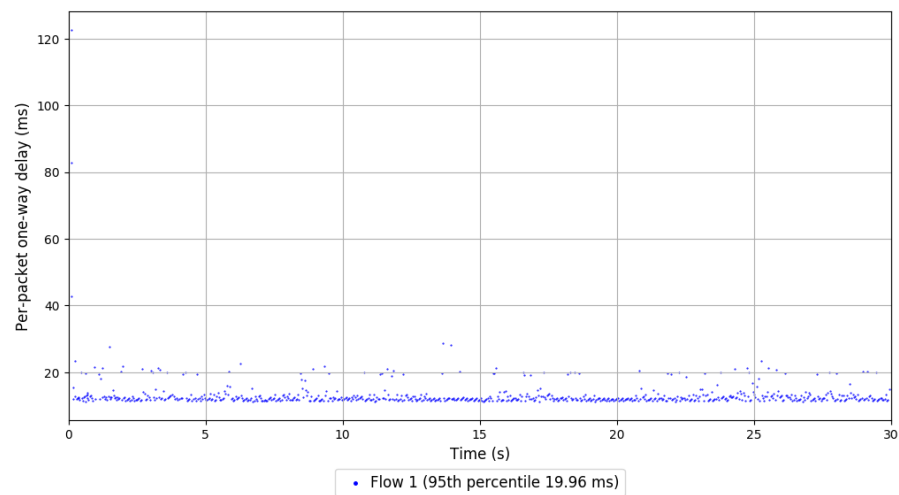
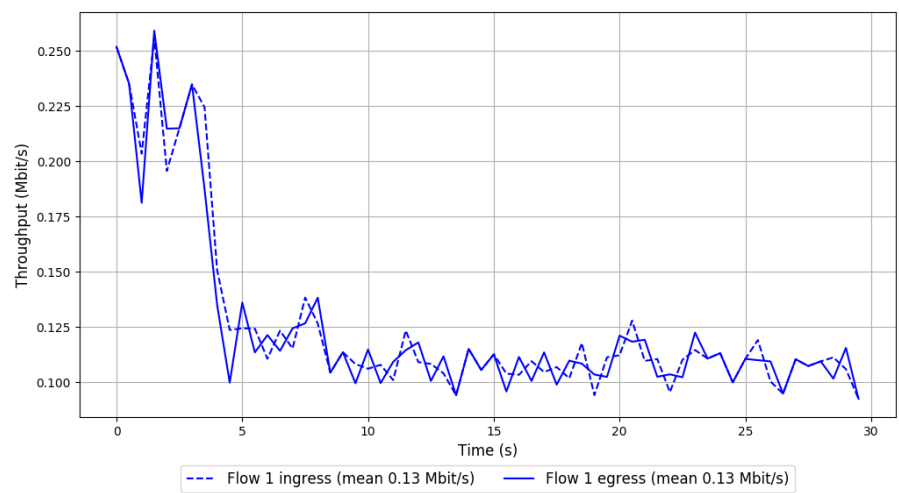
-- Flow 1:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 19.960 ms

Loss rate: 0.86%

Run 3: Report of SReAM — Data Link

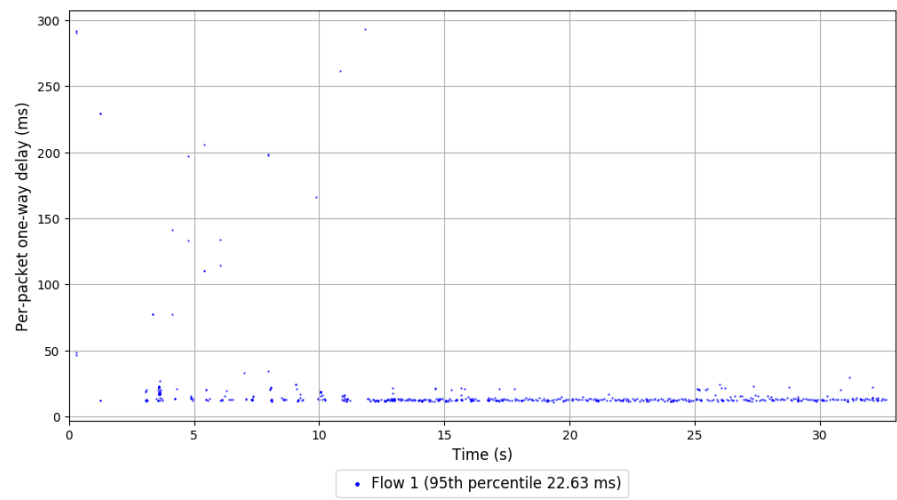
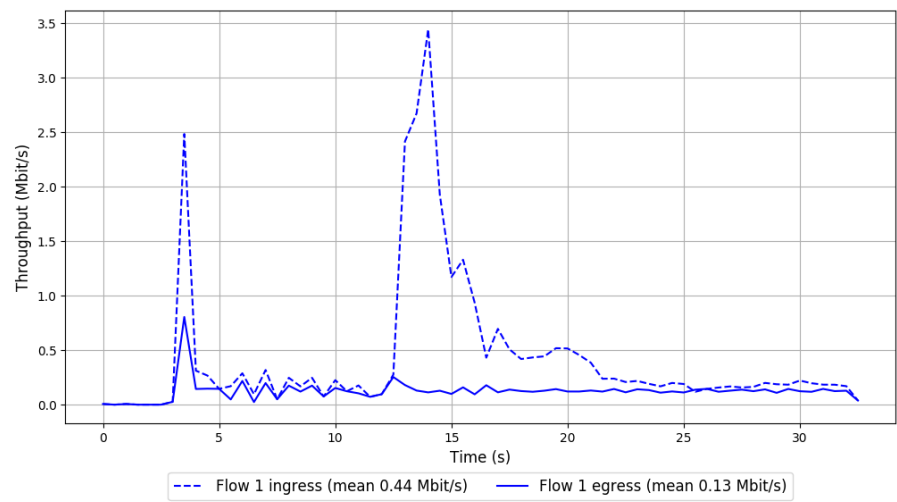


Run 1: Statistics of WebRTC media

Start at: 2018-03-05 18:57:45
End at: 2018-03-05 18:58:15
Local clock offset: -12.245 ms
Remote clock offset: 1.241 ms

Below is generated by plot.py at 2018-03-05 20:03:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 22.628 ms
Loss rate: 71.31%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 22.628 ms
Loss rate: 71.31%

Run 1: Report of WebRTC media — Data Link

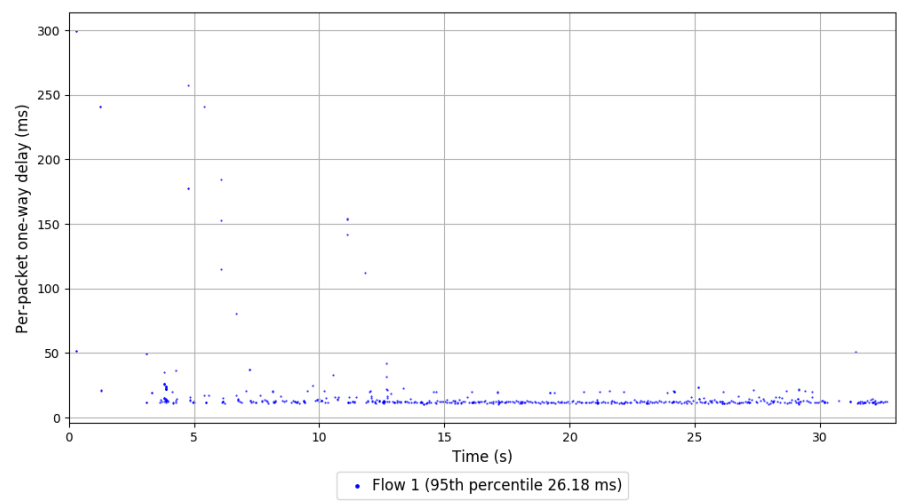
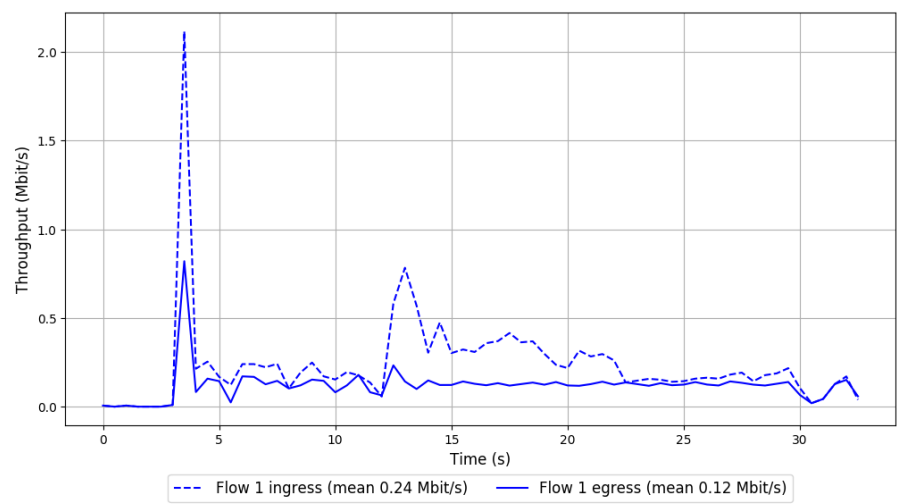


Run 2: Statistics of WebRTC media

Start at: 2018-03-05 19:21:13
End at: 2018-03-05 19:21:43
Local clock offset: -12.577 ms
Remote clock offset: 0.769 ms

Below is generated by plot.py at 2018-03-05 20:03:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 26.184 ms
Loss rate: 49.11%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 26.184 ms
Loss rate: 49.11%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-03-05 19:44:47

End at: 2018-03-05 19:45:17

Local clock offset: -4.905 ms

Remote clock offset: 0.781 ms

Below is generated by plot.py at 2018-03-05 20:03:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 23.854 ms

Loss rate: 60.31%

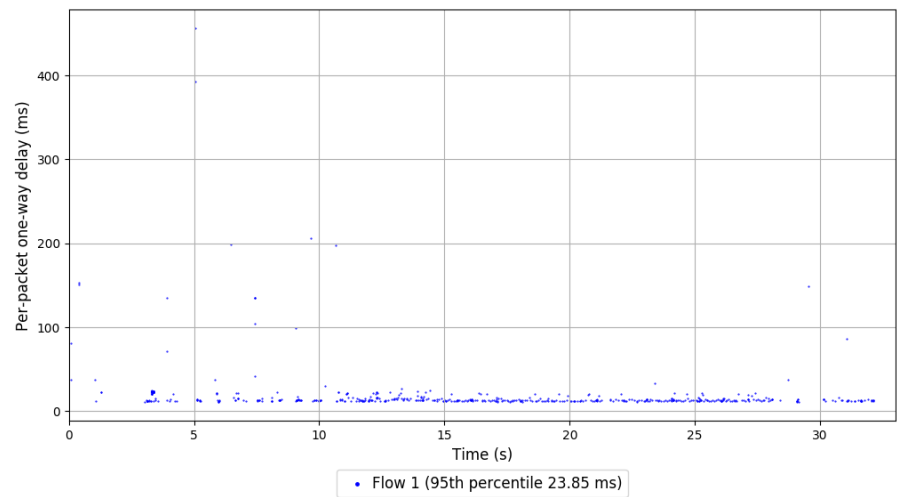
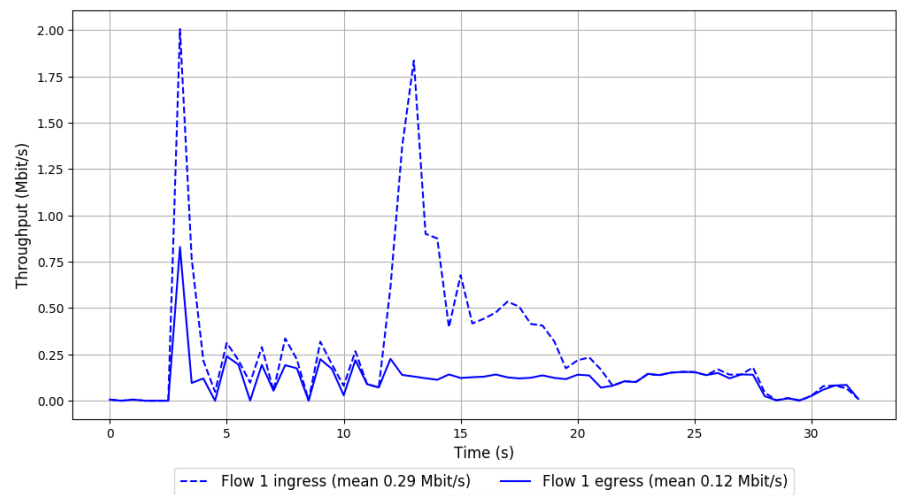
-- Flow 1:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 23.854 ms

Loss rate: 60.31%

Run 3: Report of WebRTC media — Data Link

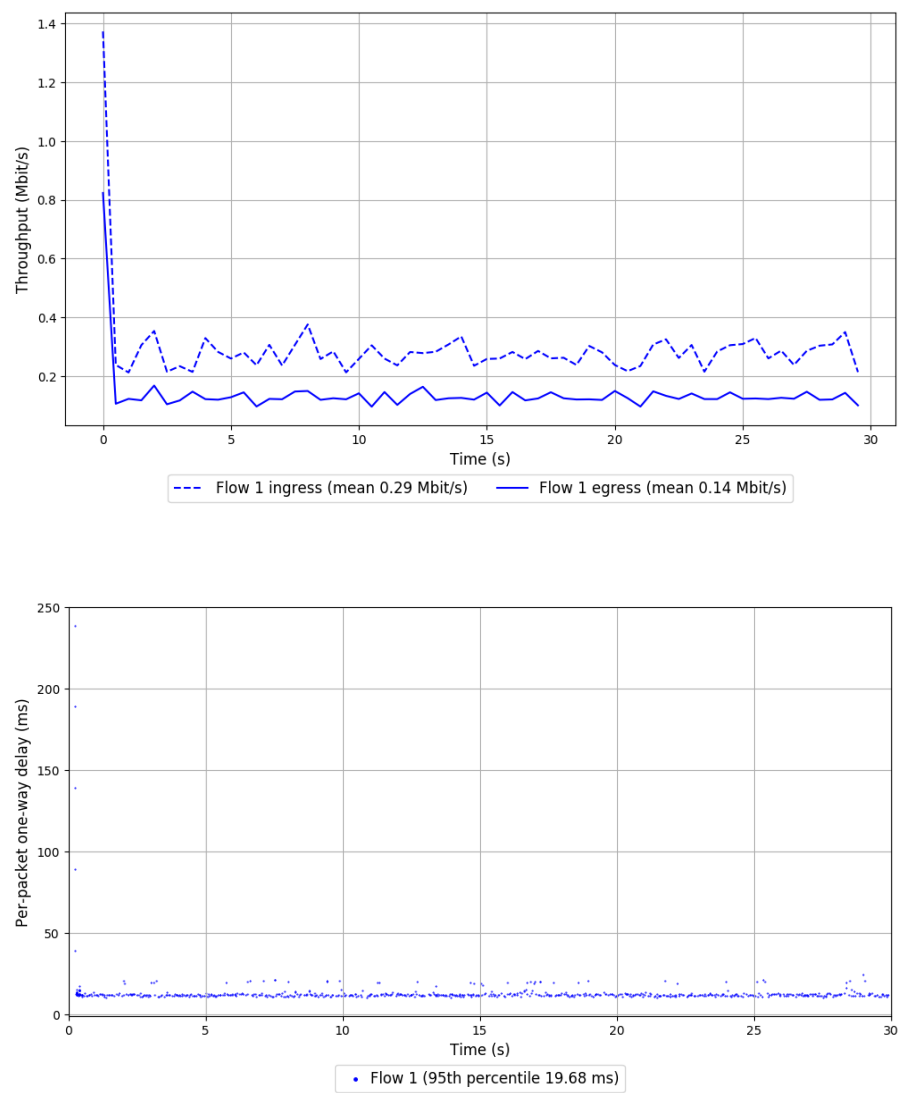


Run 1: Statistics of Sprout

Start at: 2018-03-05 19:04:17
End at: 2018-03-05 19:04:47
Local clock offset: -10.105 ms
Remote clock offset: 1.054 ms

Below is generated by plot.py at 2018-03-05 20:03:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.679 ms
Loss rate: 52.53%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.679 ms
Loss rate: 52.53%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2018-03-05 19:27:45

End at: 2018-03-05 19:28:15

Local clock offset: -8.483 ms

Remote clock offset: 0.699 ms

Below is generated by plot.py at 2018-03-05 20:03:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 21.264 ms

Loss rate: 51.91%

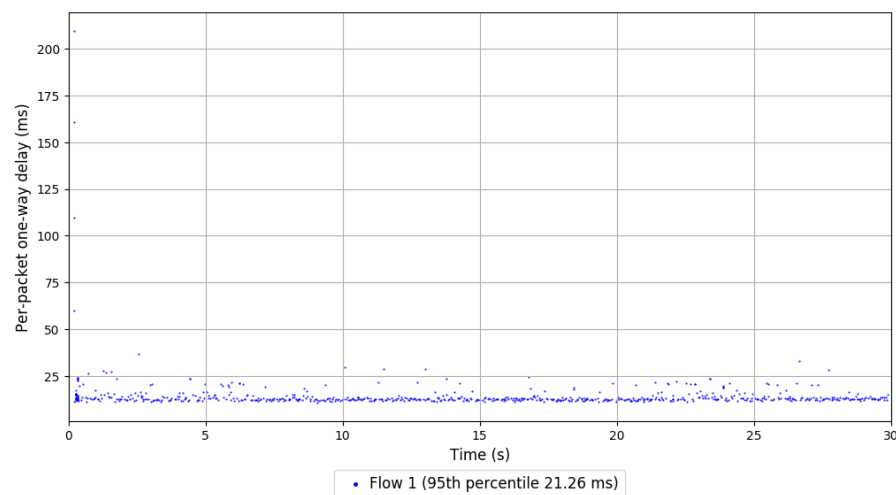
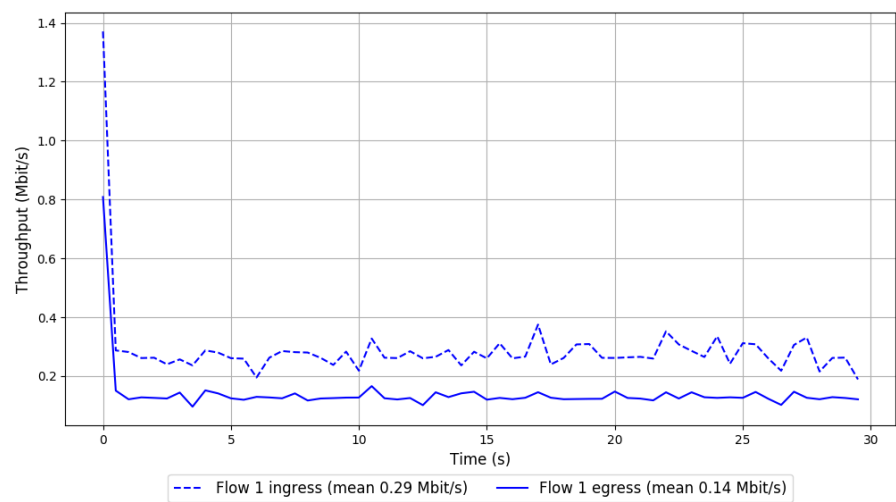
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 21.264 ms

Loss rate: 51.91%

Run 2: Report of Sprout — Data Link

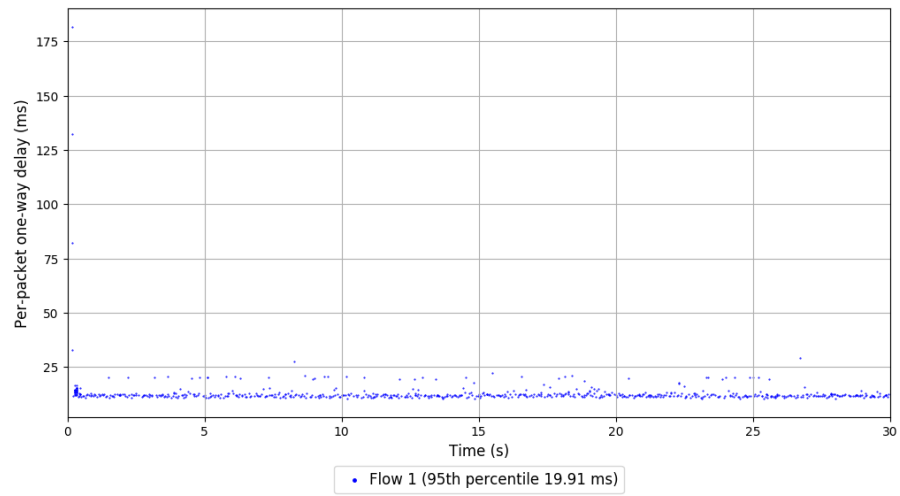
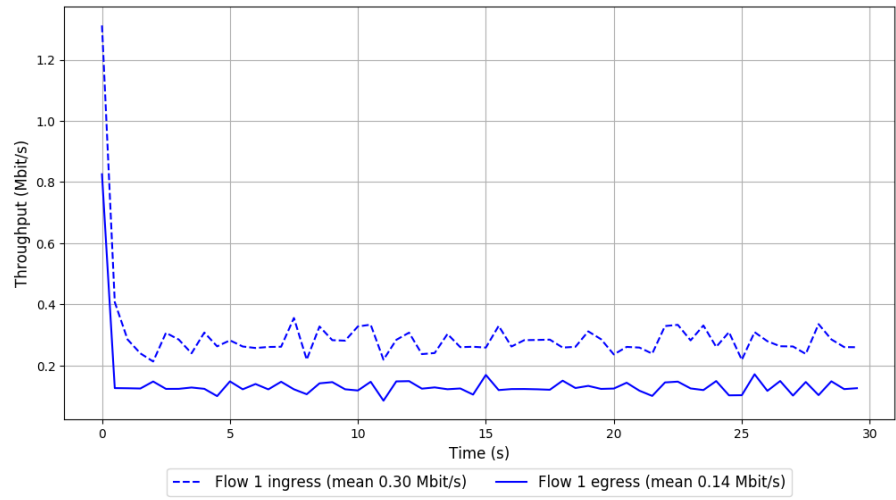


Run 3: Statistics of Sprout

Start at: 2018-03-05 19:51:18
End at: 2018-03-05 19:51:48
Local clock offset: -5.183 ms
Remote clock offset: 0.693 ms

Below is generated by plot.py at 2018-03-05 20:03:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.908 ms
Loss rate: 52.93%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.908 ms
Loss rate: 52.93%

Run 3: Report of Sprout — Data Link

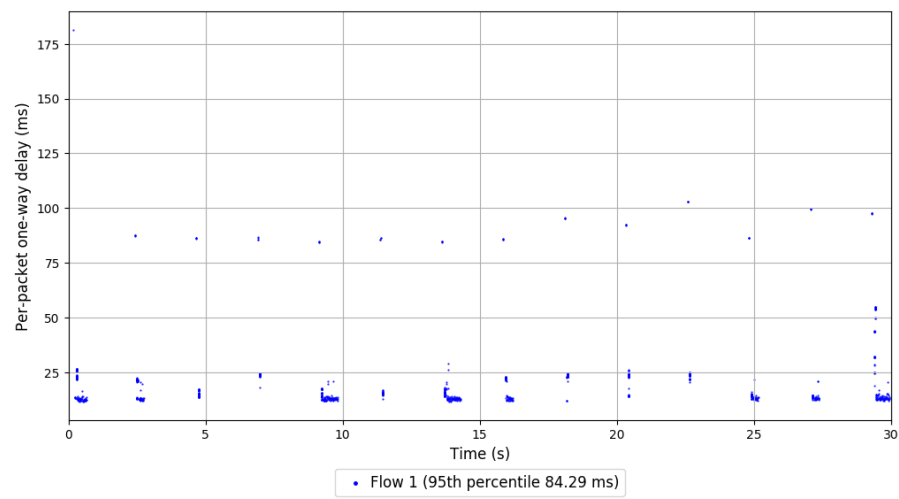
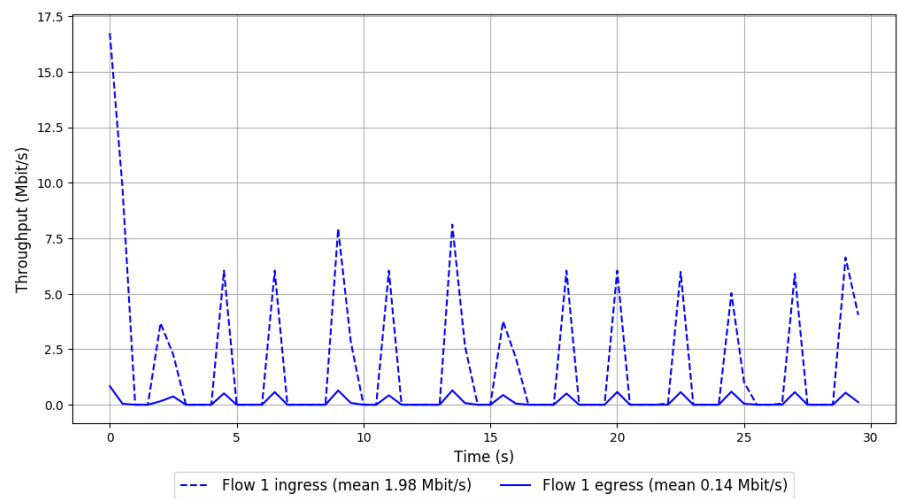


```
Run 1: Statistics of TaoVA-100x

Start at: 2018-03-05 18:53:50
End at: 2018-03-05 18:54:21
Local clock offset: -15.623 ms
Remote clock offset: 1.22 ms

# Below is generated by plot.py at 2018-03-05 20:03:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 84.288 ms
Loss rate: 92.95%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 84.288 ms
Loss rate: 92.95%
```

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

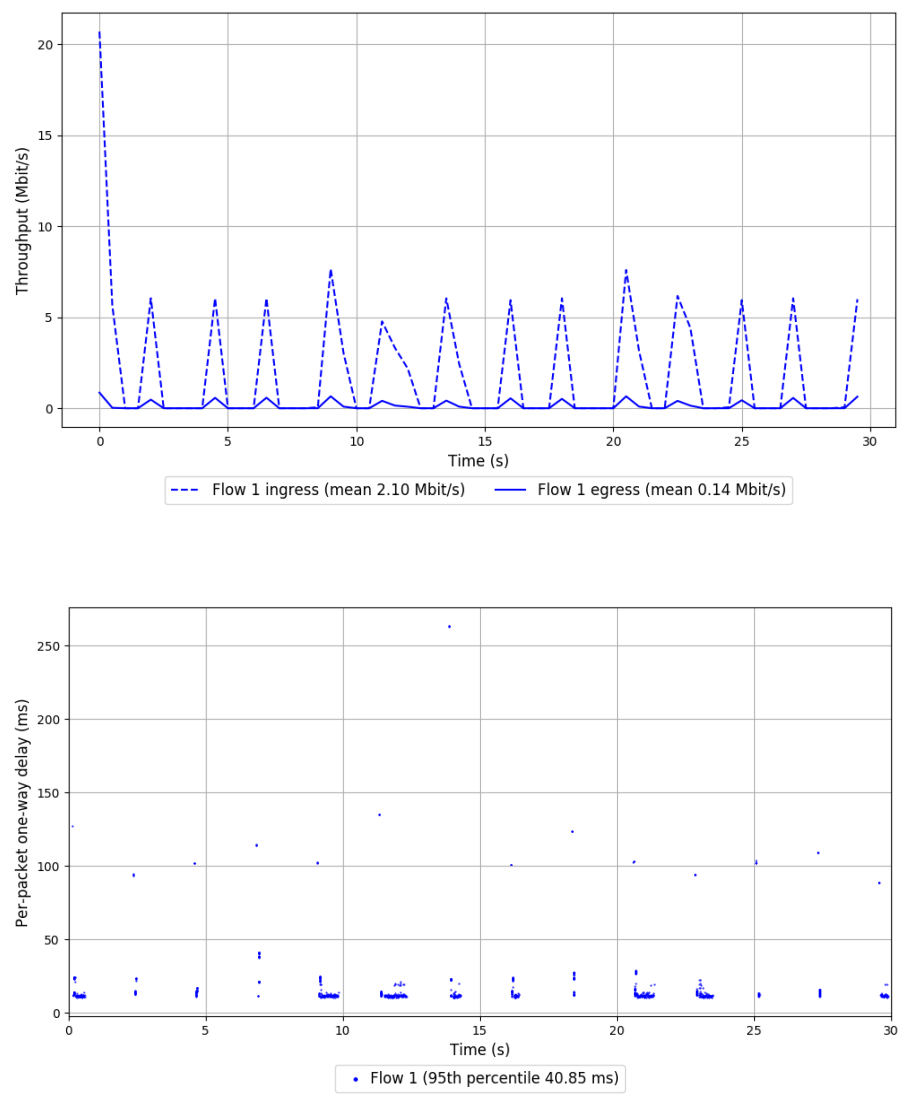


Run 2: Statistics of TaoVA-100x

Start at: 2018-03-05 19:17:19
End at: 2018-03-05 19:17:49
Local clock offset: -11.578 ms
Remote clock offset: 0.821 ms

Below is generated by plot.py at 2018-03-05 20:03:17
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 40.853 ms
Loss rate: 93.31%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 40.853 ms
Loss rate: 93.31%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-03-05 19:40:52

End at: 2018-03-05 19:41:22

Local clock offset: -4.851 ms

Remote clock offset: 0.721 ms

Below is generated by plot.py at 2018-03-05 20:03:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 67.945 ms

Loss rate: 93.43%

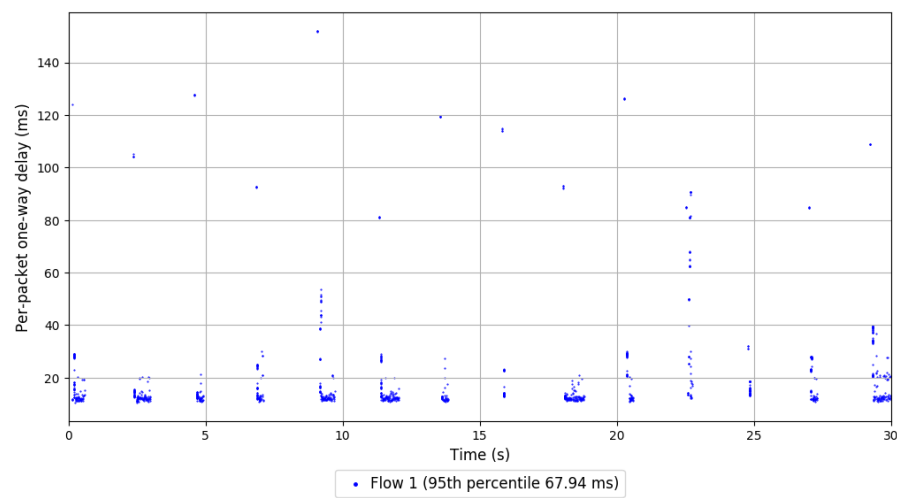
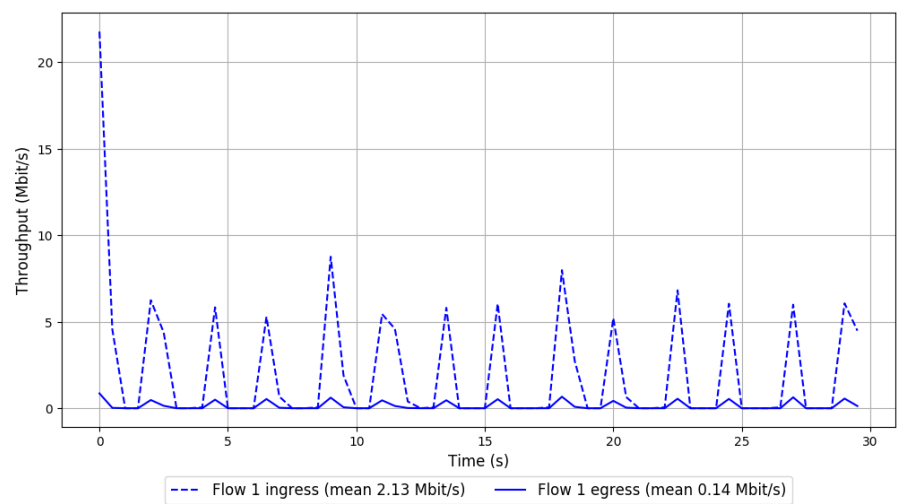
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 67.945 ms

Loss rate: 93.43%

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

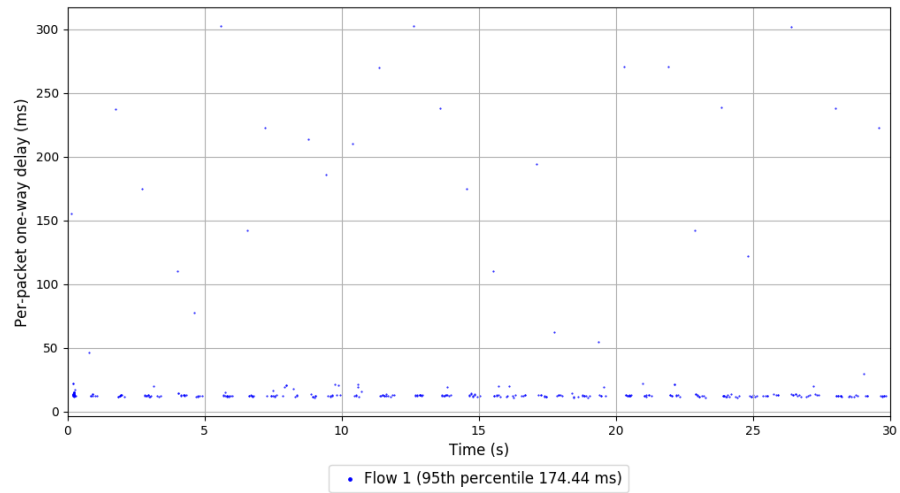
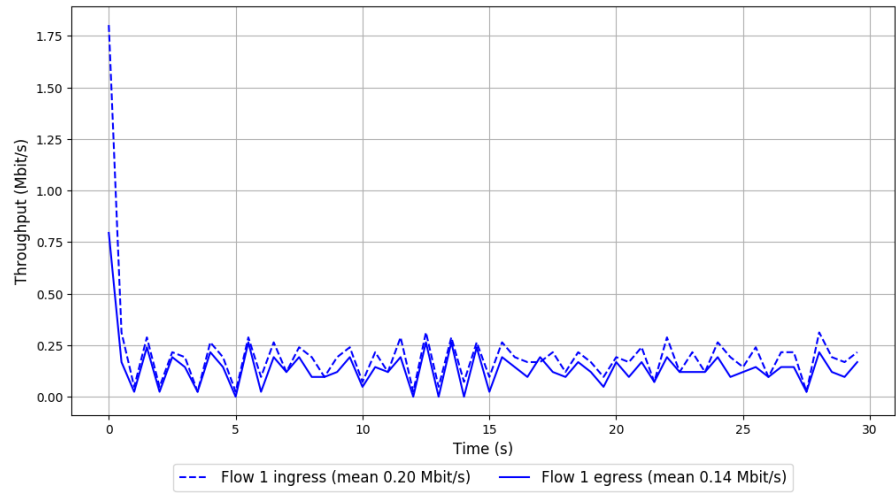


Run 1: Statistics of TCP Vegas

Start at: 2018-03-05 19:06:53
End at: 2018-03-05 19:07:23
Local clock offset: -10.011 ms
Remote clock offset: 0.988 ms

Below is generated by plot.py at 2018-03-05 20:03:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 174.443 ms
Loss rate: 31.76%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 174.443 ms
Loss rate: 31.76%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-03-05 19:30:22

End at: 2018-03-05 19:30:52

Local clock offset: -6.962 ms

Remote clock offset: 0.674 ms

Below is generated by plot.py at 2018-03-05 20:03:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 190.845 ms

Loss rate: 32.28%

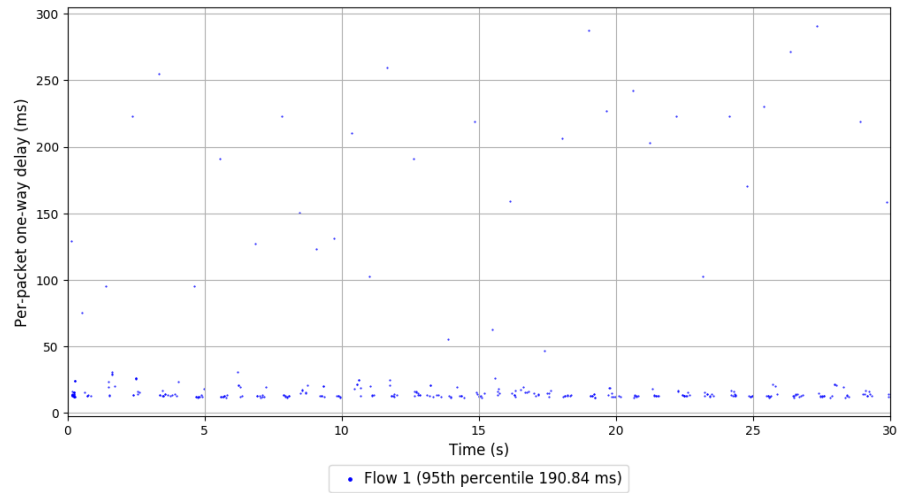
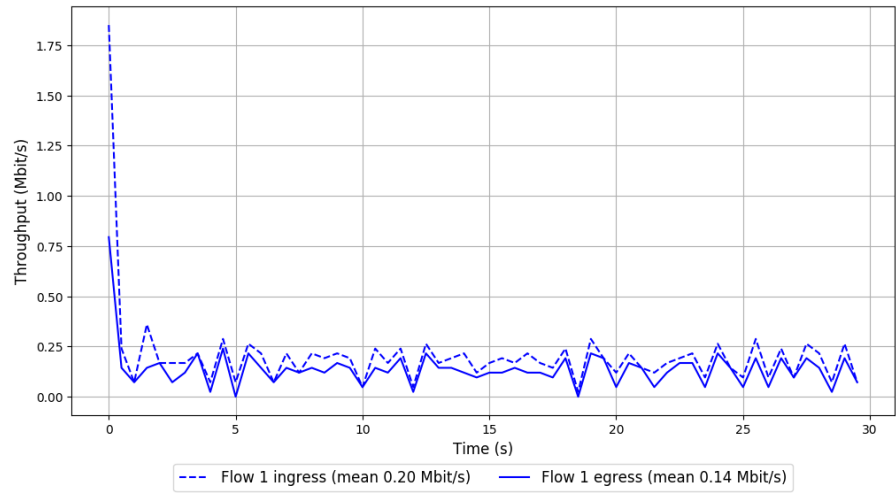
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 190.845 ms

Loss rate: 32.28%

Run 2: Report of TCP Vegas — Data Link

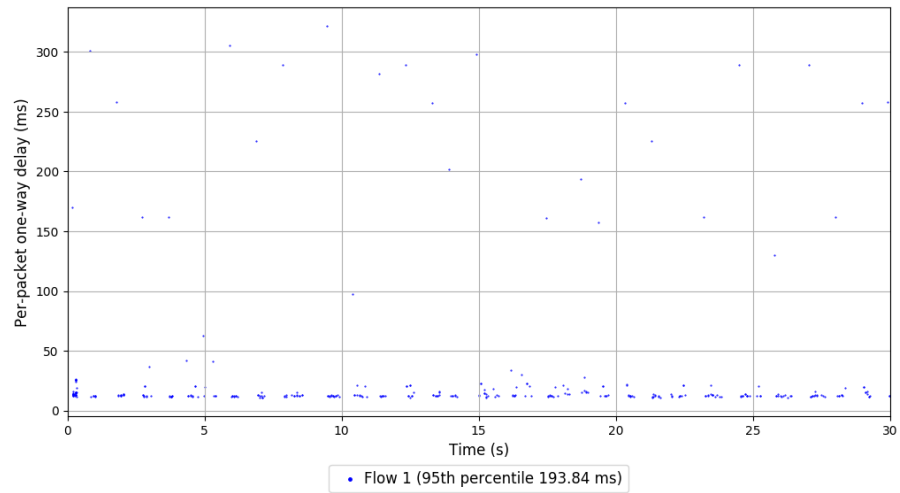
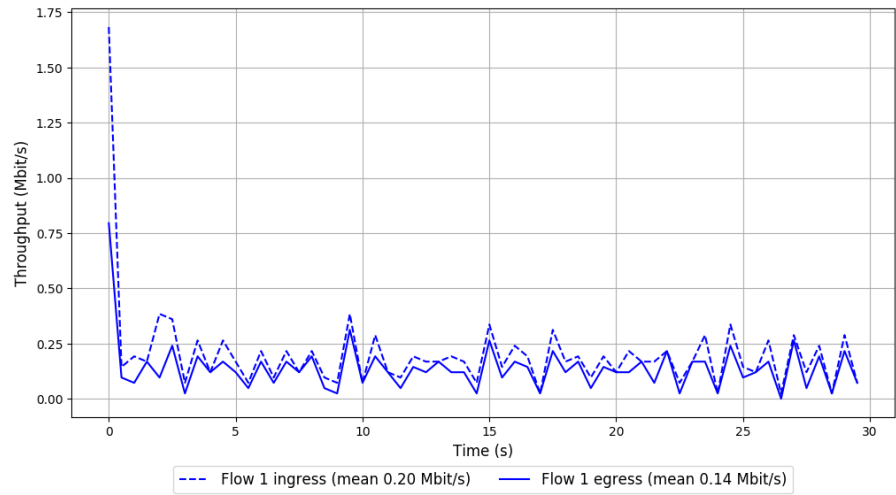


Run 3: Statistics of TCP Vegas

Start at: 2018-03-05 19:53:55
End at: 2018-03-05 19:54:25
Local clock offset: -5.469 ms
Remote clock offset: 0.737 ms

Below is generated by plot.py at 2018-03-05 20:03:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 193.835 ms
Loss rate: 31.54%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 193.835 ms
Loss rate: 31.54%

Run 3: Report of TCP Vegas — Data Link

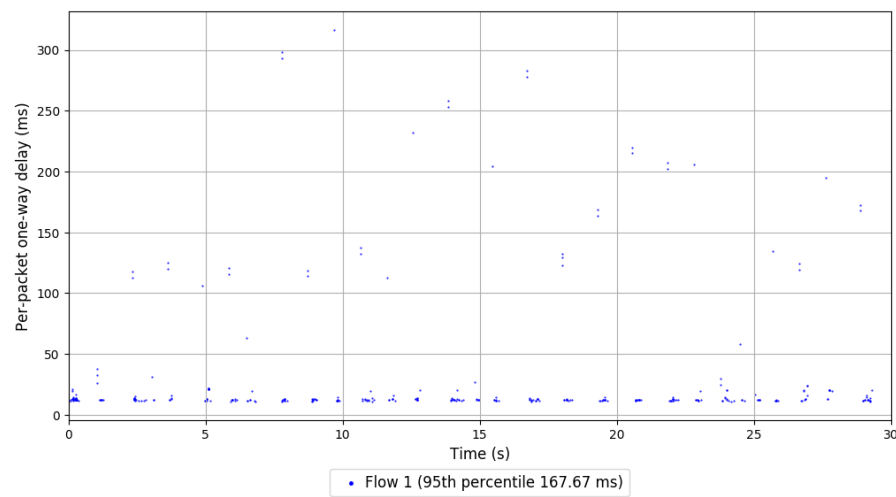
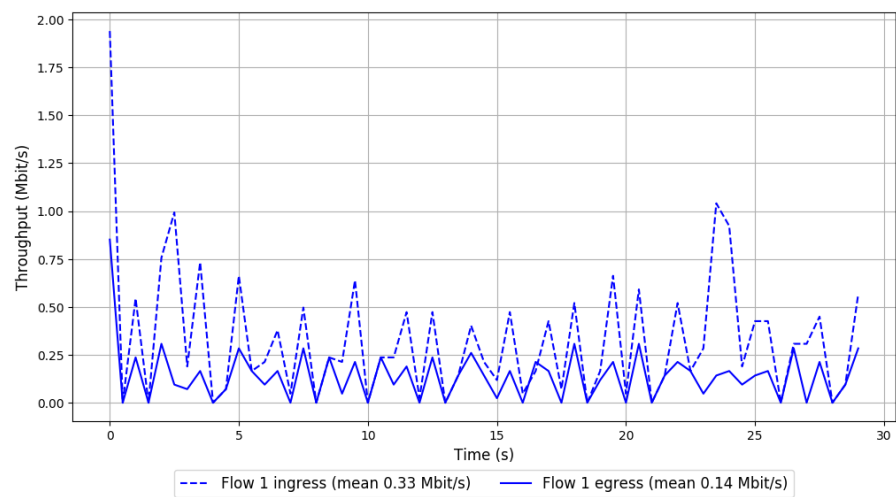


Run 1: Statistics of Verus

Start at: 2018-03-05 19:08:12
End at: 2018-03-05 19:08:42
Local clock offset: -10.164 ms
Remote clock offset: 0.971 ms

Below is generated by plot.py at 2018-03-05 20:03:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 167.669 ms
Loss rate: 57.90%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 167.669 ms
Loss rate: 57.90%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-03-05 19:31:40

End at: 2018-03-05 19:32:10

Local clock offset: -6.436 ms

Remote clock offset: 0.66 ms

Below is generated by plot.py at 2018-03-05 20:03:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 229.553 ms

Loss rate: 99.14%

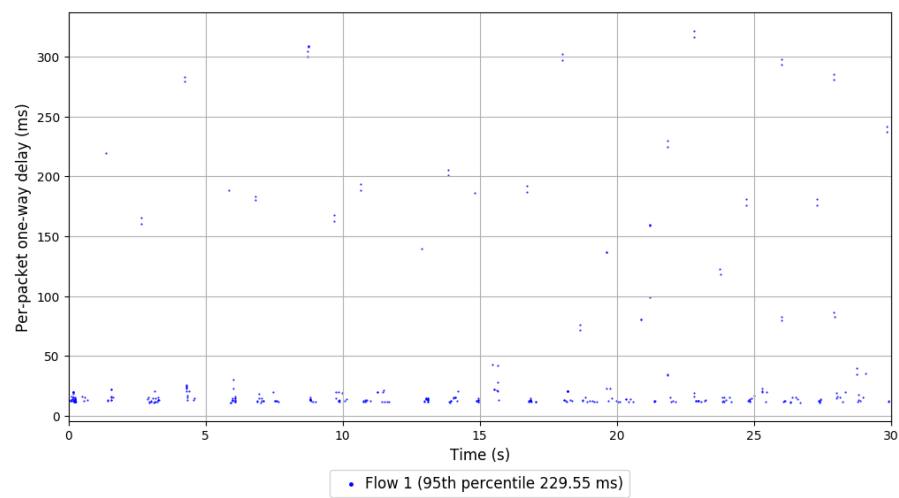
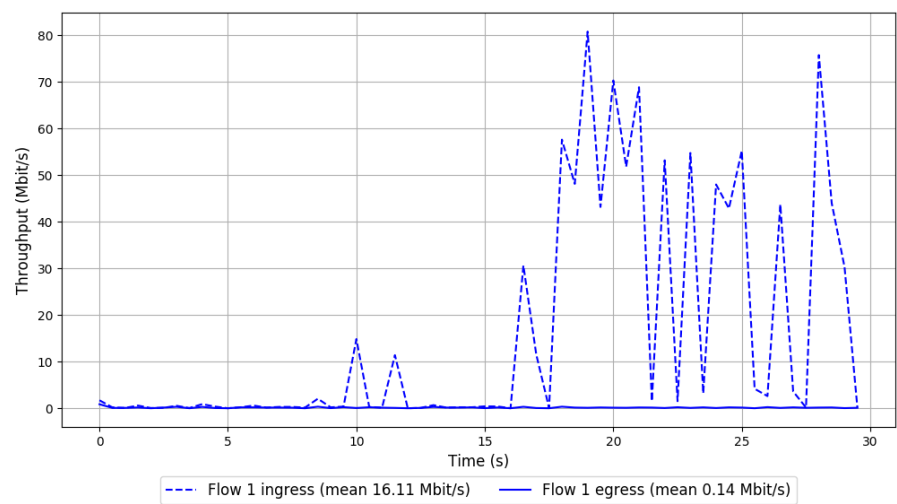
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 229.553 ms

Loss rate: 99.14%

Run 2: Report of Verus — Data Link

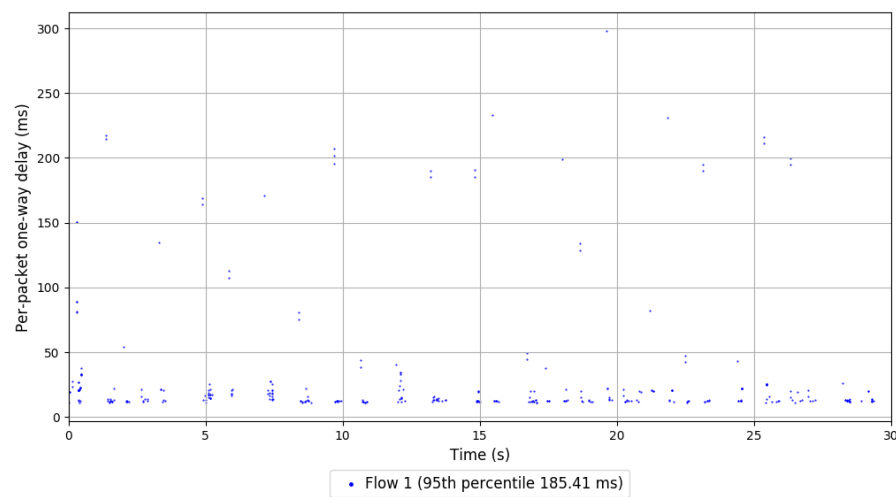
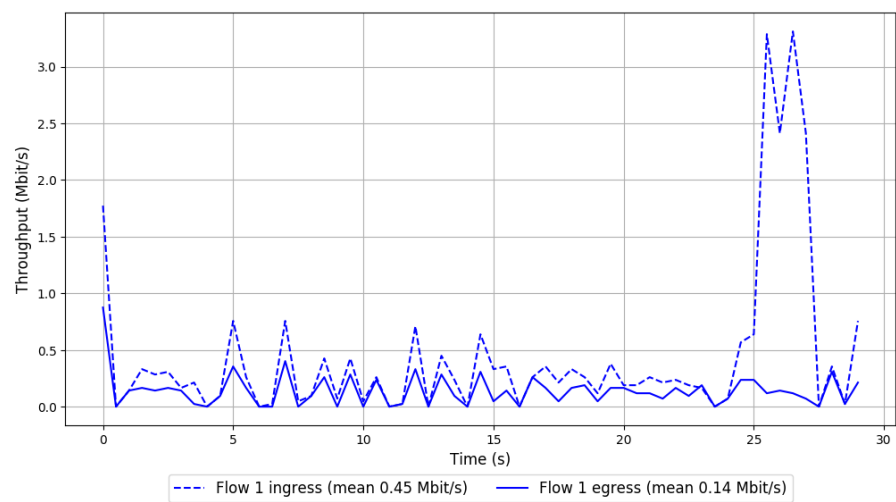


Run 3: Statistics of Verus

Start at: 2018-03-05 19:55:13
End at: 2018-03-05 19:55:43
Local clock offset: -5.612 ms
Remote clock offset: 0.68 ms

Below is generated by plot.py at 2018-03-05 20:03:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 185.406 ms
Loss rate: 68.67%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 185.406 ms
Loss rate: 68.67%

Run 3: Report of Verus — Data Link

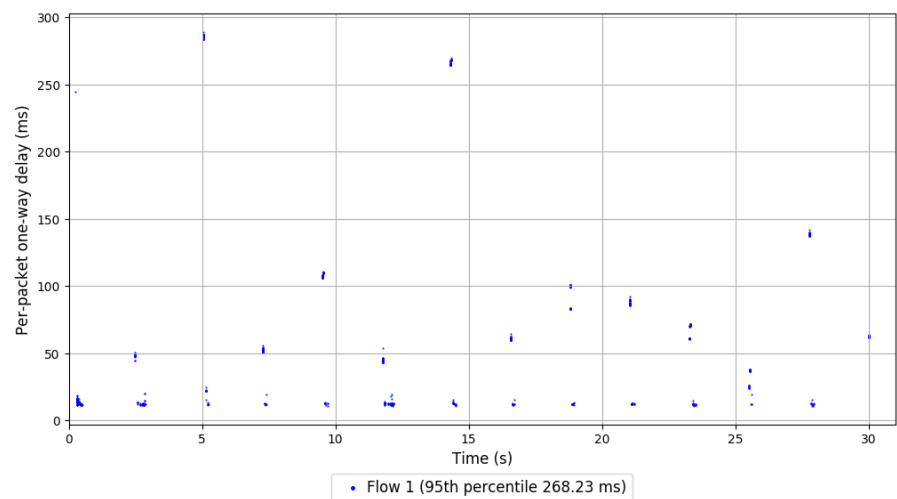
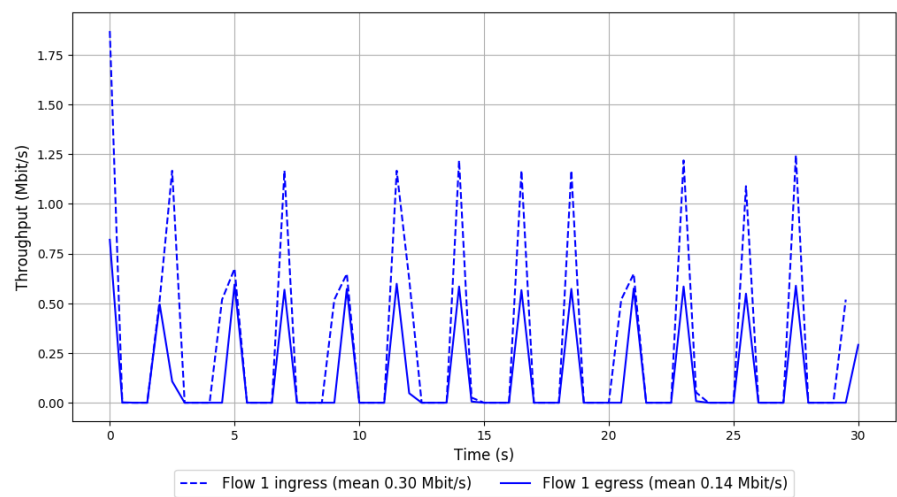


Run 1: Statistics of Copa

Start at: 2018-03-05 19:00:22
End at: 2018-03-05 19:00:52
Local clock offset: -11.029 ms
Remote clock offset: 1.159 ms

Below is generated by plot.py at 2018-03-05 20:03:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 268.227 ms
Loss rate: 54.18%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 268.227 ms
Loss rate: 54.18%

Run 1: Report of Copa — Data Link

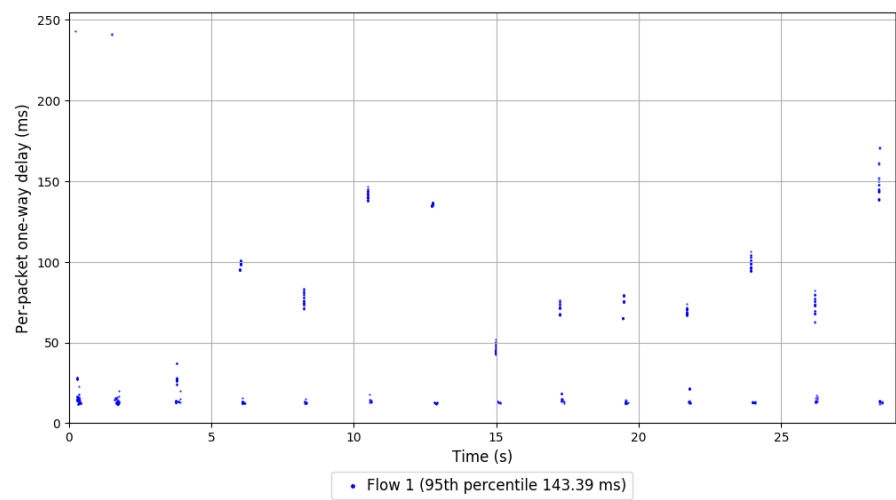
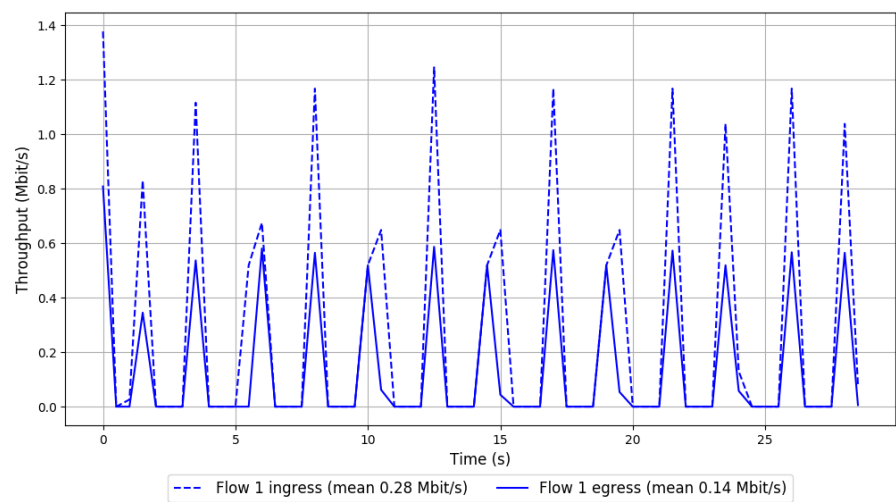


Run 2: Statistics of Copa

Start at: 2018-03-05 19:23:50
End at: 2018-03-05 19:24:20
Local clock offset: -12.107 ms
Remote clock offset: 0.781 ms

Below is generated by plot.py at 2018-03-05 20:03:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 143.389 ms
Loss rate: 50.75%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 143.389 ms
Loss rate: 50.75%

Run 2: Report of Copa — Data Link

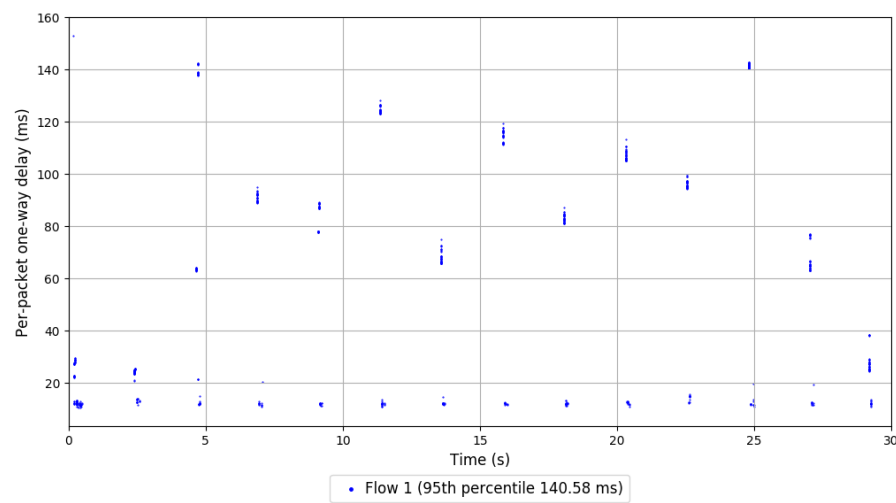
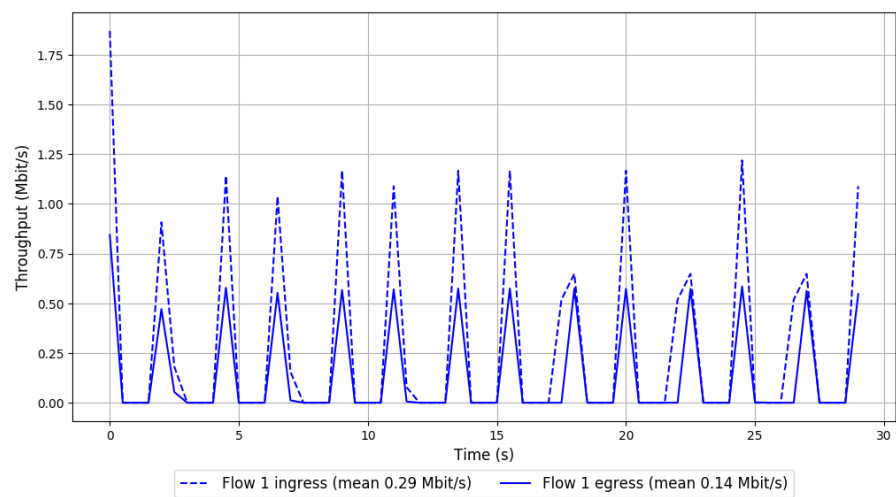


Run 3: Statistics of Copa

Start at: 2018-03-05 19:47:23
End at: 2018-03-05 19:47:53
Local clock offset: -4.894 ms
Remote clock offset: 0.725 ms

Below is generated by plot.py at 2018-03-05 20:03:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 140.583 ms
Loss rate: 51.48%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 140.583 ms
Loss rate: 51.48%

Run 3: Report of Copa — Data Link

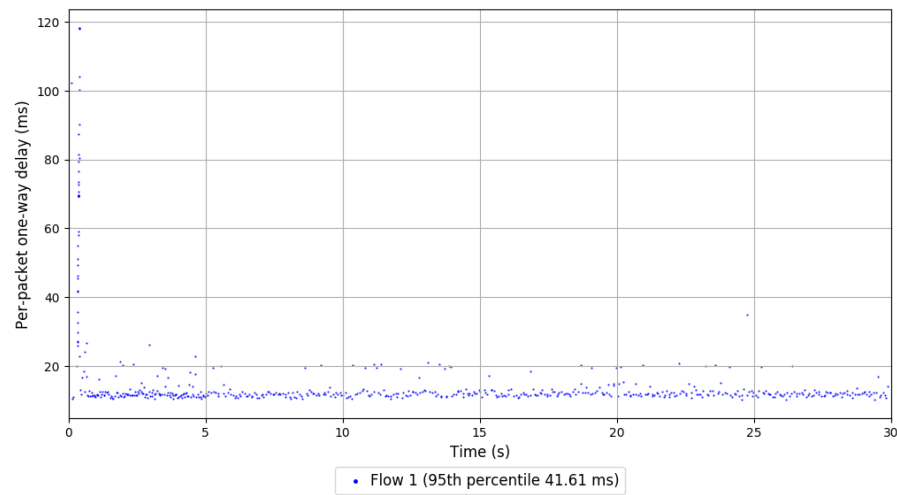
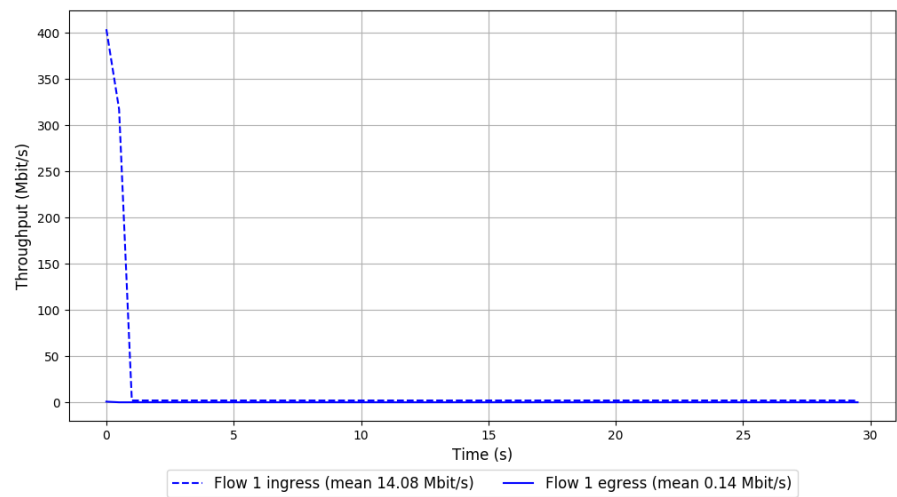


Run 1: Statistics of FillP

Start at: 2018-03-05 19:14:42
End at: 2018-03-05 19:15:12
Local clock offset: -10.941 ms
Remote clock offset: 0.872 ms

Below is generated by plot.py at 2018-03-05 20:03:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 41.612 ms
Loss rate: 99.01%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 41.612 ms
Loss rate: 99.01%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-03-05 19:38:15

End at: 2018-03-05 19:38:45

Local clock offset: -5.015 ms

Remote clock offset: 0.692 ms

Below is generated by plot.py at 2018-03-05 20:03:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 23.464 ms

Loss rate: 98.74%

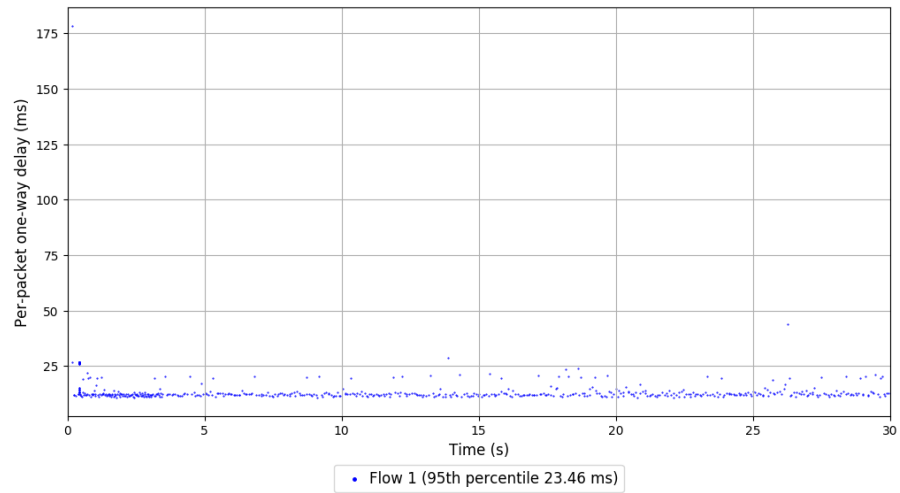
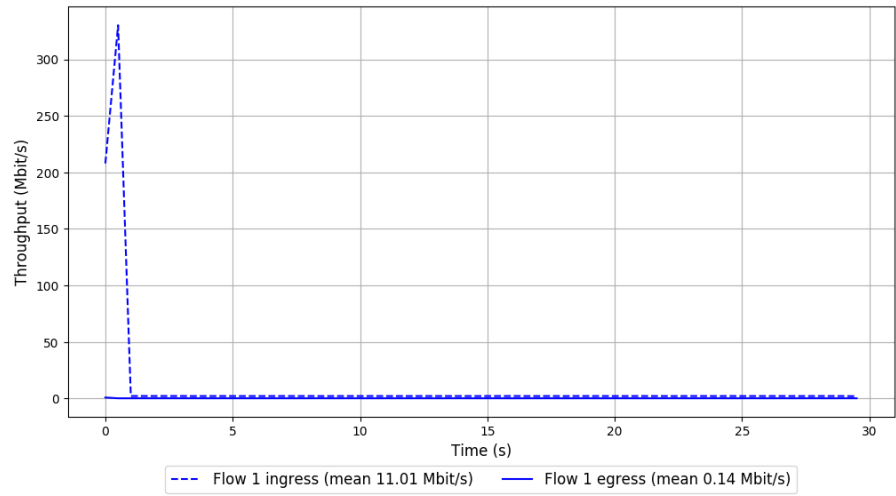
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 23.464 ms

Loss rate: 98.74%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-03-05 20:01:44

End at: 2018-03-05 20:02:14

Local clock offset: -4.258 ms

Remote clock offset: 0.636 ms

Below is generated by plot.py at 2018-03-05 20:03:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 25.725 ms

Loss rate: 98.63%

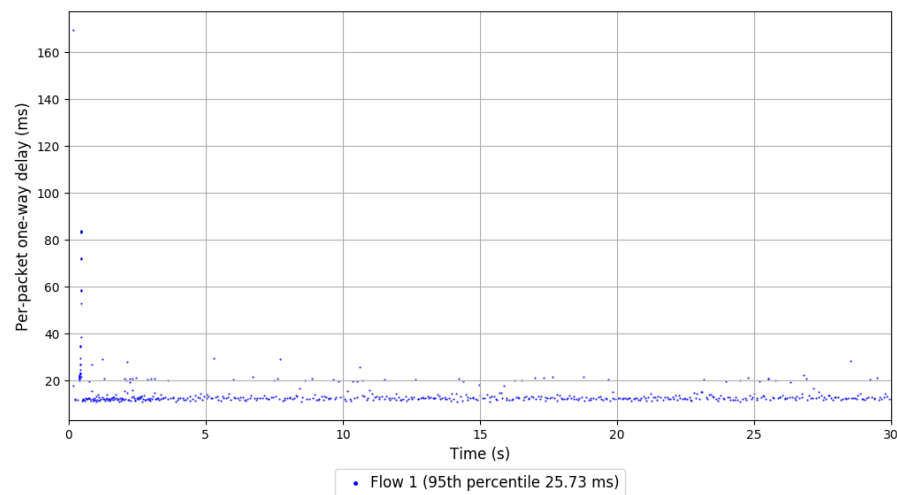
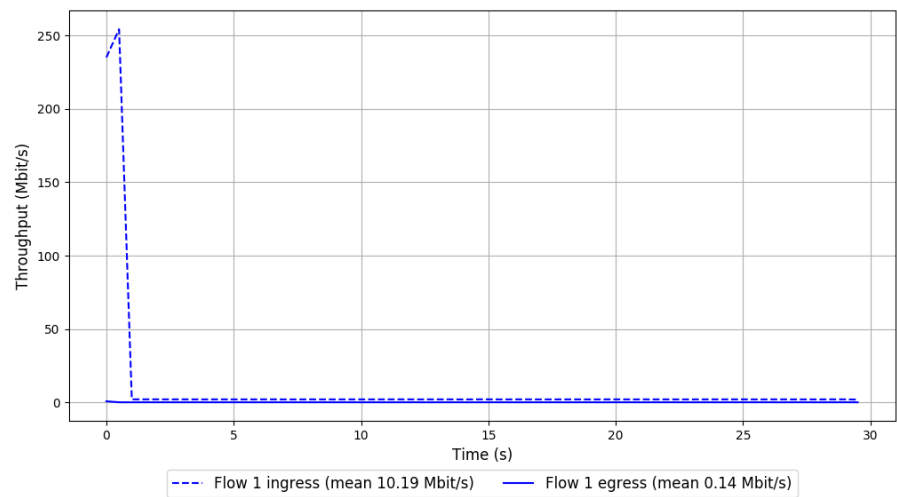
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 25.725 ms

Loss rate: 98.63%

Run 3: Report of FillP — Data Link

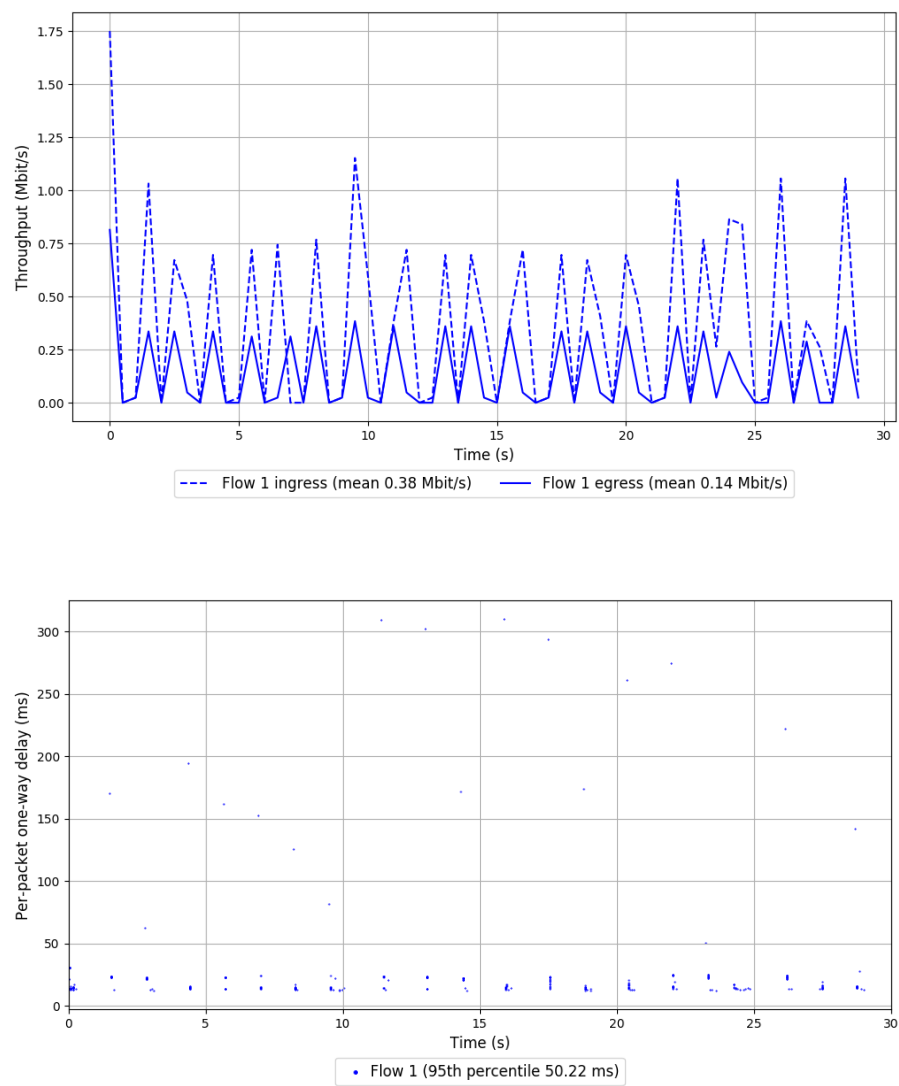


```
Run 1: Statistics of Indigo-1-32

Start at: 2018-03-05 18:55:09
End at: 2018-03-05 18:55:39
Local clock offset: -14.259 ms
Remote clock offset: 1.315 ms

# Below is generated by plot.py at 2018-03-05 20:03:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 50.223 ms
Loss rate: 63.38%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 50.223 ms
Loss rate: 63.38%
```

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

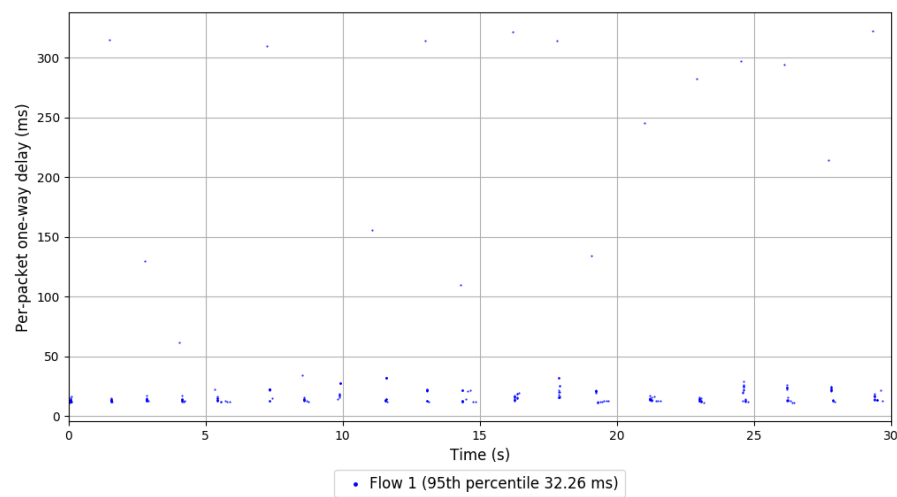
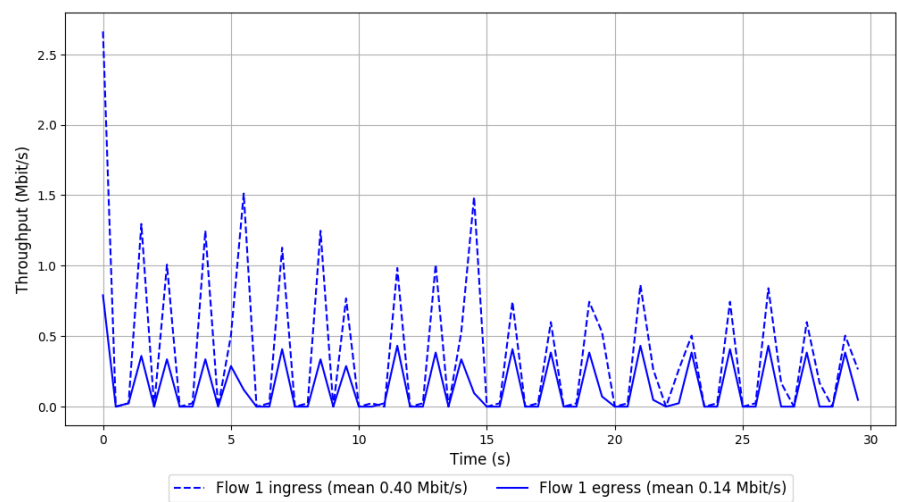


Run 2: Statistics of Indigo-1-32

Start at: 2018-03-05 19:18:37
End at: 2018-03-05 19:19:07
Local clock offset: -11.915 ms
Remote clock offset: 0.879 ms

Below is generated by plot.py at 2018-03-05 20:03:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 32.263 ms
Loss rate: 64.42%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 32.263 ms
Loss rate: 64.42%

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



Run 3: Statistics of Indigo-1-32

Start at: 2018-03-05 19:42:10

End at: 2018-03-05 19:42:40

Local clock offset: -4.719 ms

Remote clock offset: 0.725 ms

Below is generated by plot.py at 2018-03-05 20:03:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 45.584 ms

Loss rate: 61.90%

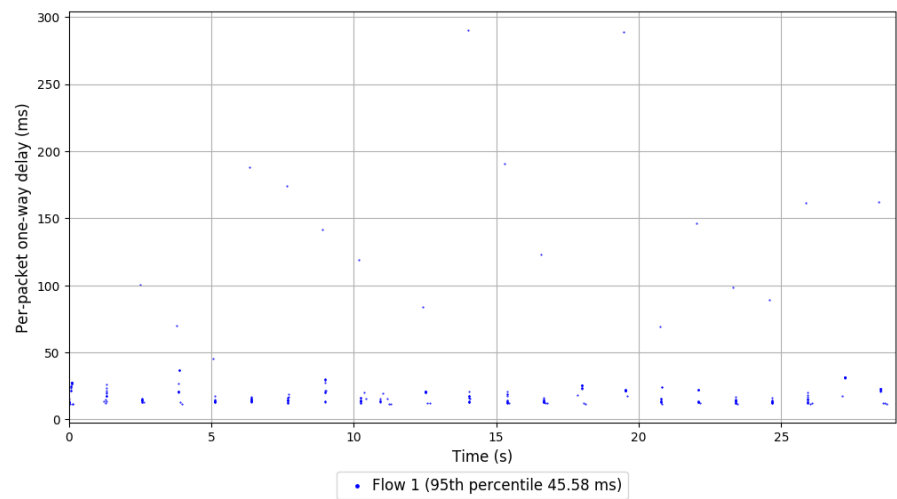
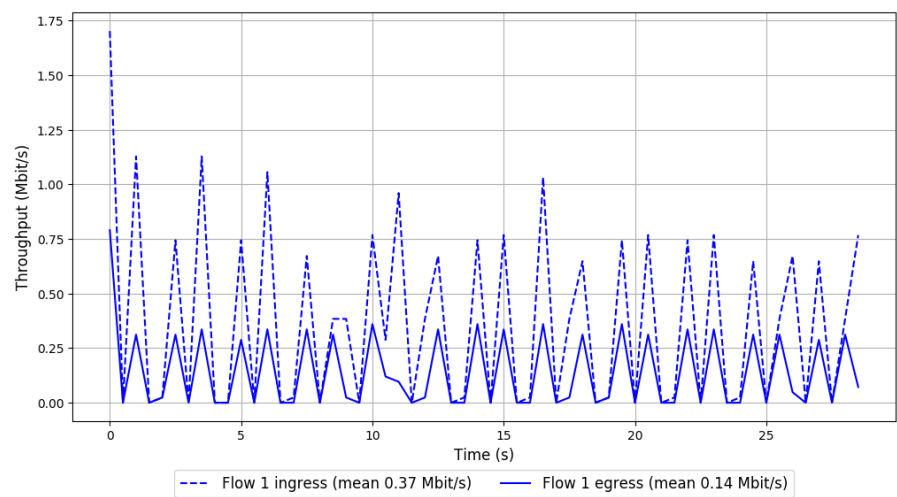
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 45.584 ms

Loss rate: 61.90%

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

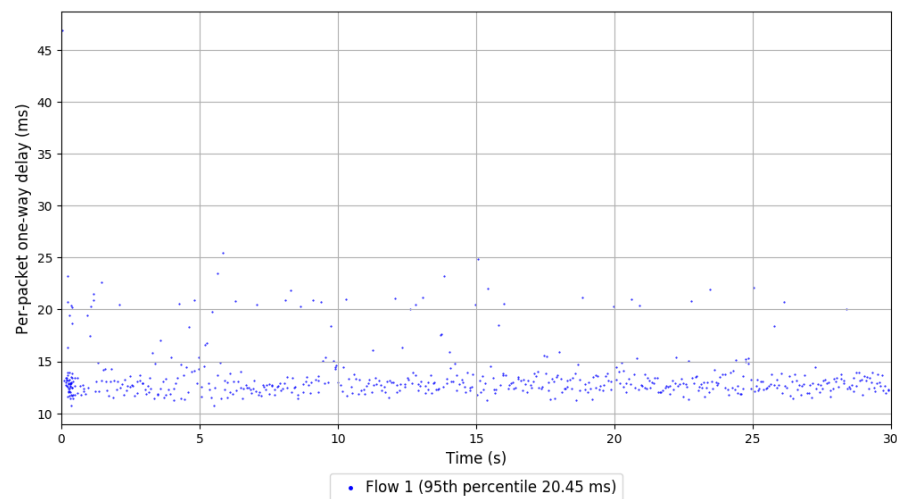
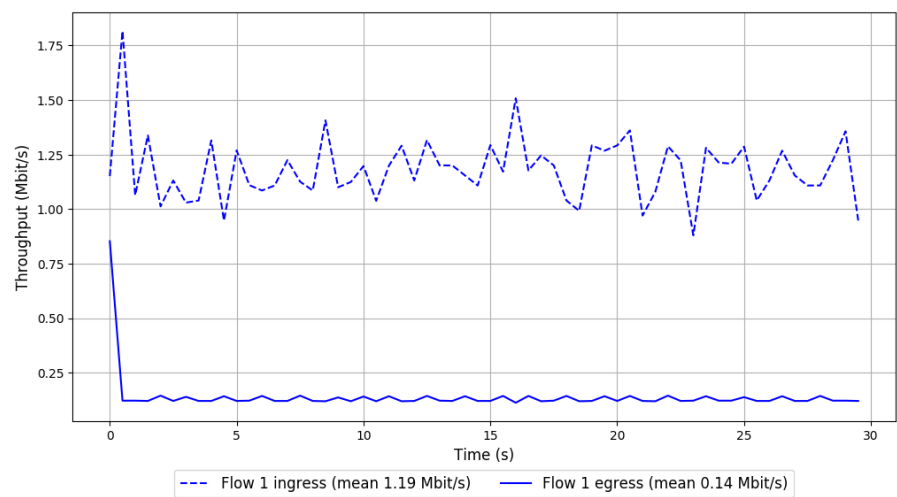


Run 1: Statistics of Vivace-latency

Start at: 2018-03-05 18:56:27
End at: 2018-03-05 18:56:57
Local clock offset: -13.093 ms
Remote clock offset: 1.255 ms

Below is generated by plot.py at 2018-03-05 20:03:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.454 ms
Loss rate: 88.18%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.454 ms
Loss rate: 88.18%

Run 1: Report of Vivace-latency — Data Link



Run 2: Statistics of Vivace-latency

Start at: 2018-03-05 19:19:55

End at: 2018-03-05 19:20:25

Local clock offset: -12.19 ms

Remote clock offset: 0.874 ms

Below is generated by plot.py at 2018-03-05 20:03:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.407 ms

Loss rate: 88.43%

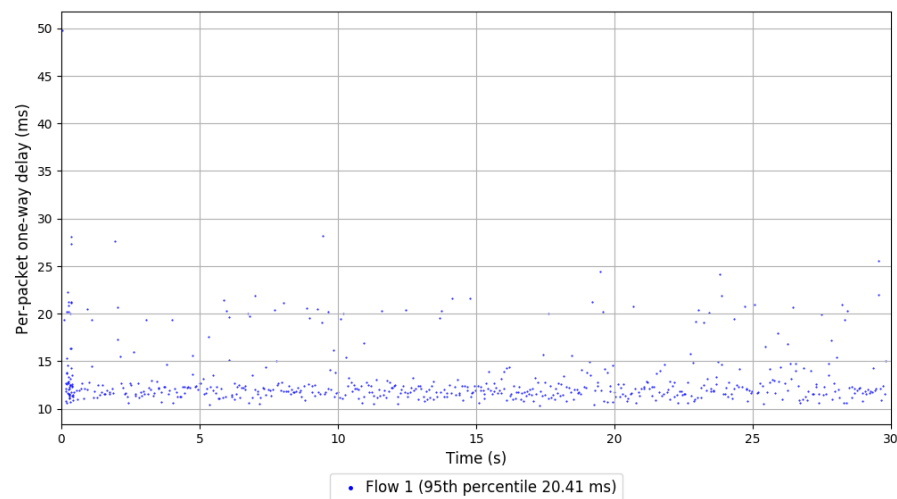
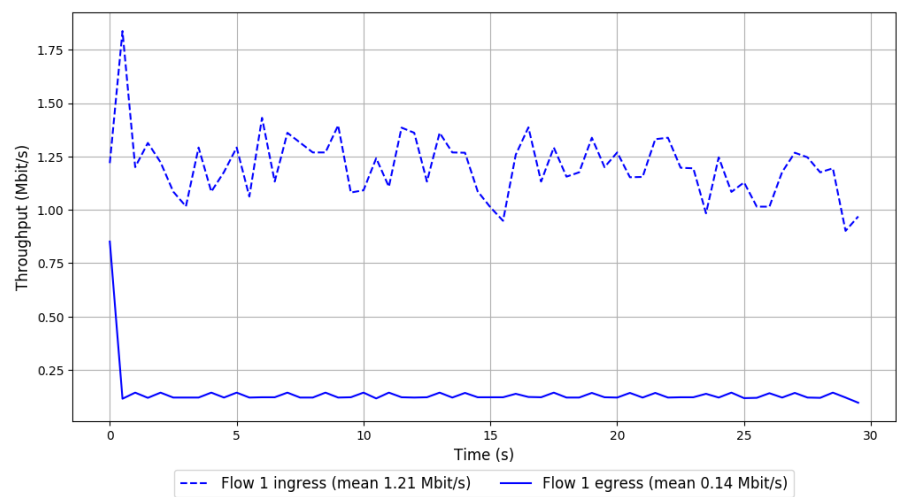
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.407 ms

Loss rate: 88.43%

Run 2: Report of Vivace-latency — Data Link



Run 3: Statistics of Vivace-latency

Start at: 2018-03-05 19:43:29

End at: 2018-03-05 19:43:59

Local clock offset: -4.818 ms

Remote clock offset: 0.775 ms

Below is generated by plot.py at 2018-03-05 20:03:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.400 ms

Loss rate: 88.45%

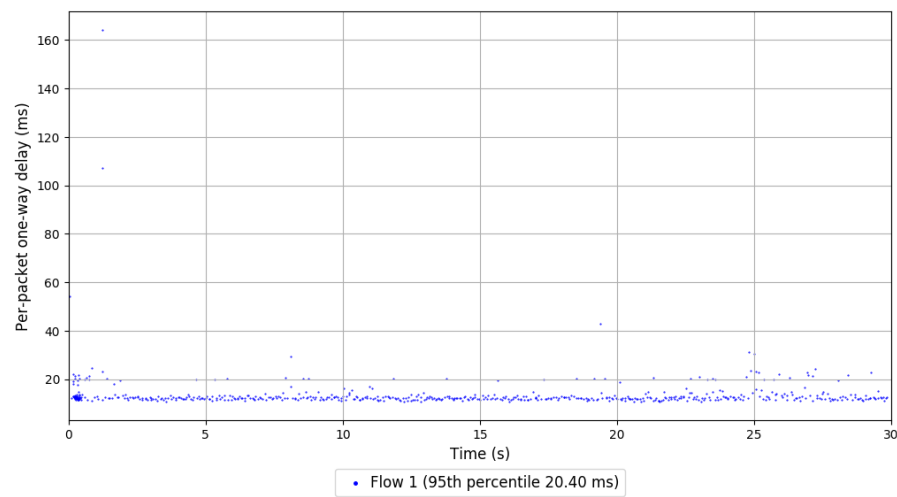
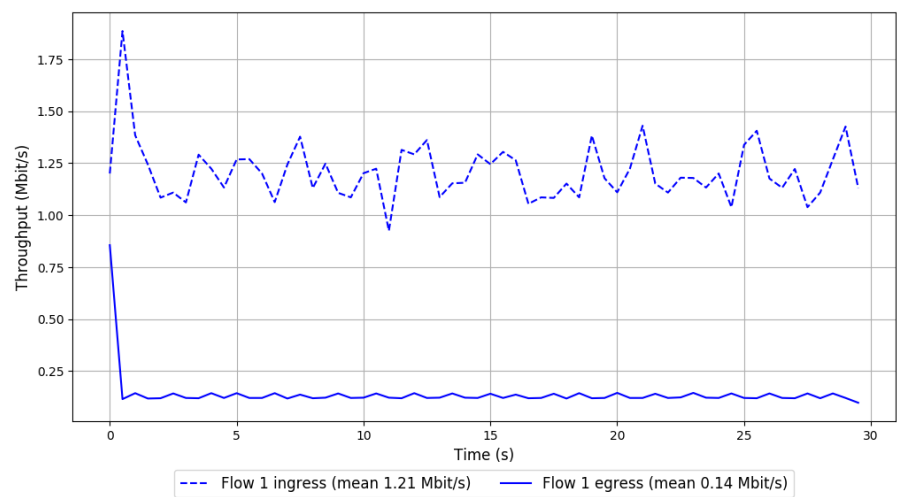
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.400 ms

Loss rate: 88.45%

Run 3: Report of Vivace-latency — Data Link

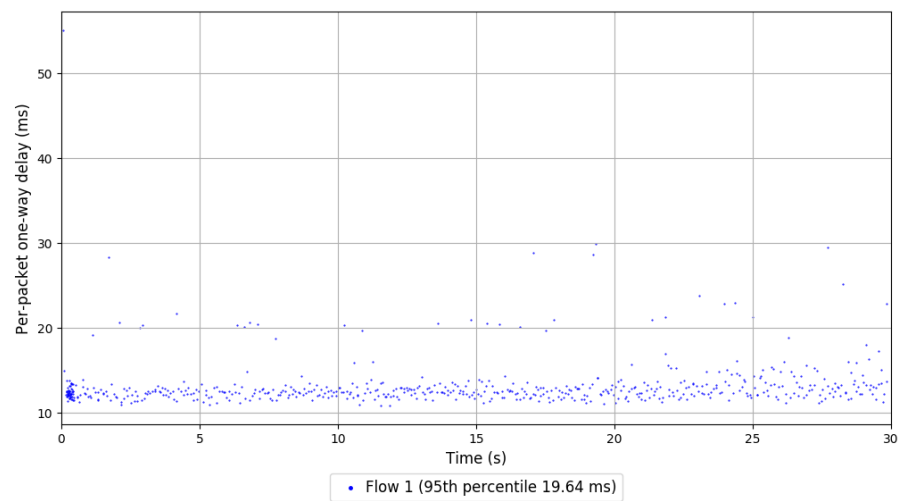
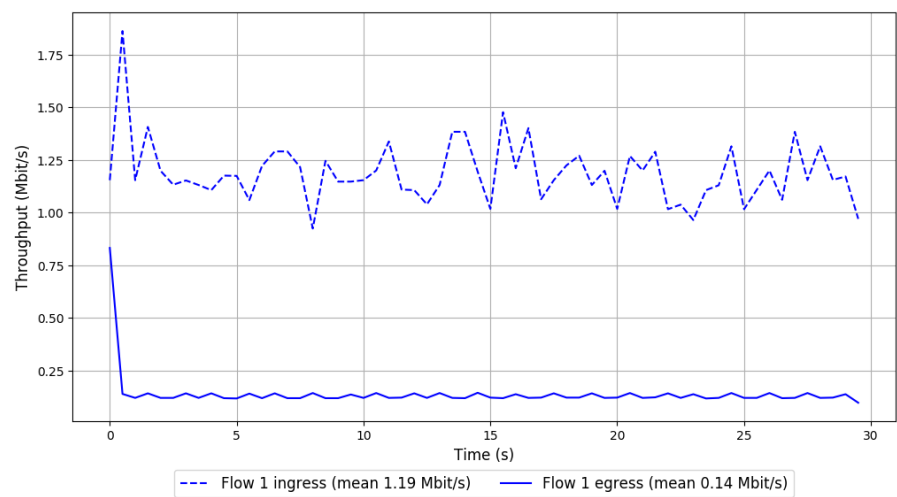


Run 1: Statistics of Vivace-loss

Start at: 2018-03-05 19:01:40
End at: 2018-03-05 19:02:10
Local clock offset: -10.691 ms
Remote clock offset: 1.128 ms

Below is generated by plot.py at 2018-03-05 20:03:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.637 ms
Loss rate: 88.26%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.637 ms
Loss rate: 88.26%

Run 1: Report of Vivace-loss — Data Link

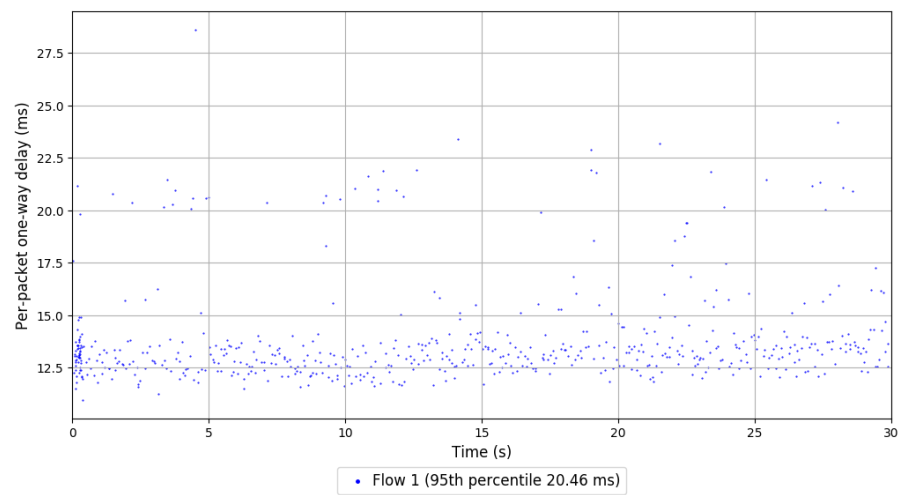
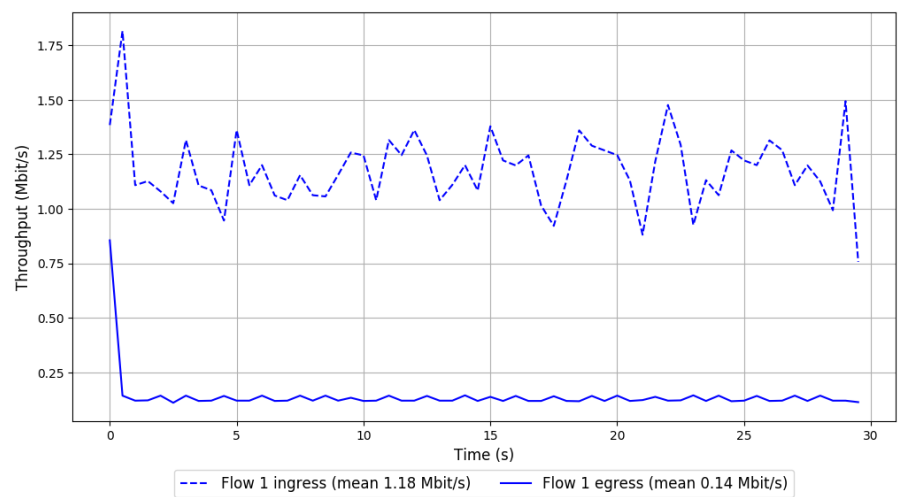


Run 2: Statistics of Vivace-loss

Start at: 2018-03-05 19:25:08
End at: 2018-03-05 19:25:38
Local clock offset: -10.811 ms
Remote clock offset: 0.712 ms

Below is generated by plot.py at 2018-03-05 20:03:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.465 ms
Loss rate: 88.12%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.465 ms
Loss rate: 88.12%

Run 2: Report of Vivace-loss — Data Link



Run 3: Statistics of Vivace-loss

Start at: 2018-03-05 19:48:42

End at: 2018-03-05 19:49:12

Local clock offset: -4.977 ms

Remote clock offset: 0.736 ms

Below is generated by plot.py at 2018-03-05 20:03:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 19.892 ms

Loss rate: 88.19%

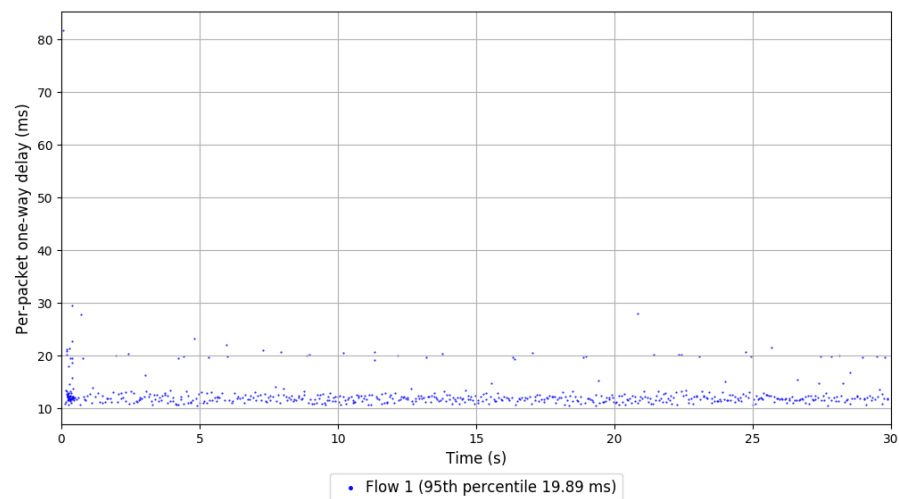
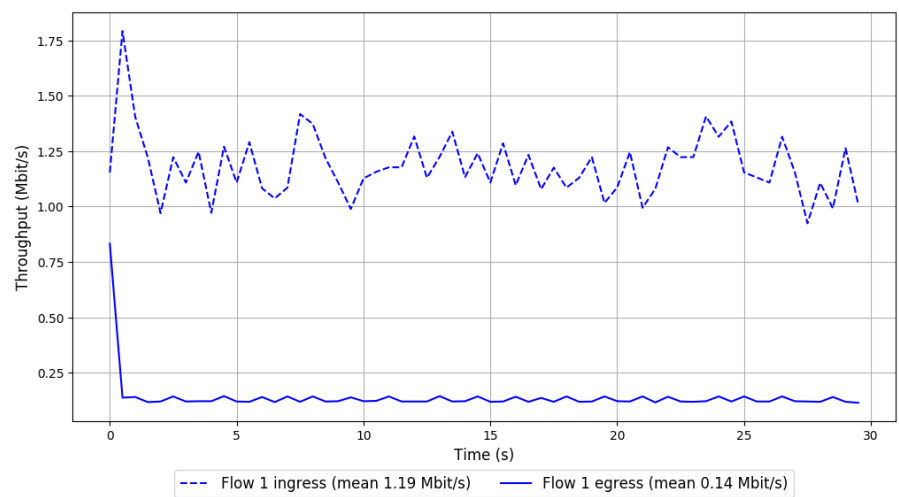
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 19.892 ms

Loss rate: 88.19%

Run 3: Report of Vivace-loss — Data Link



Run 1: Statistics of Vivace-LTE

Start at: 2018-03-05 19:09:29

End at: 2018-03-05 19:09:59

Local clock offset: -10.15 ms

Remote clock offset: 0.984 ms

Below is generated by plot.py at 2018-03-05 20:03:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 17.630 ms

Loss rate: 88.15%

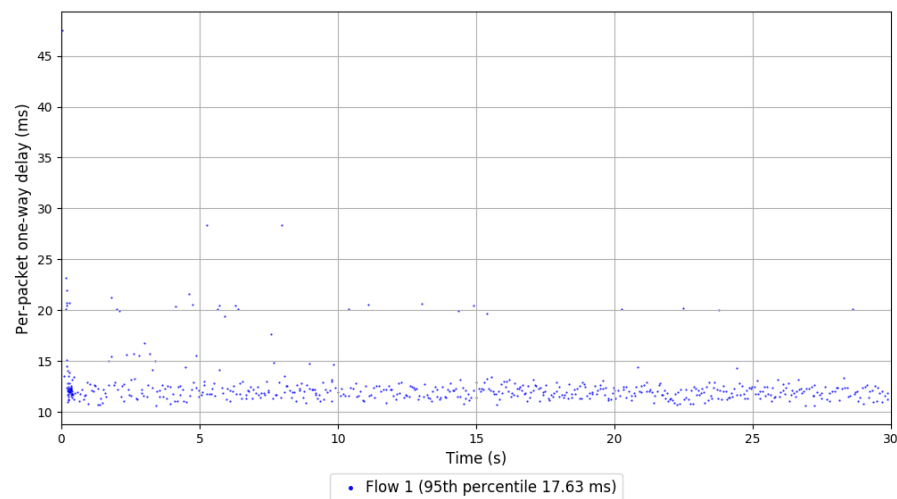
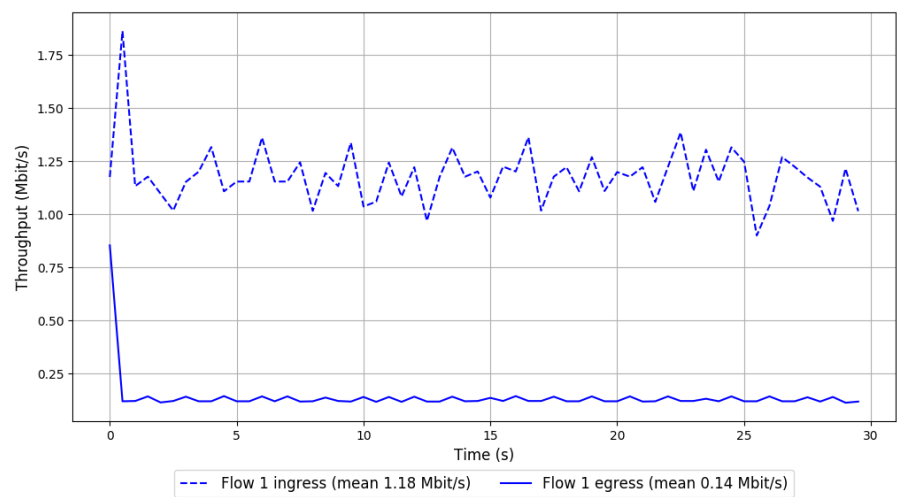
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 17.630 ms

Loss rate: 88.15%

Run 1: Report of Vivace-LTE — Data Link



Run 2: Statistics of Vivace-LTE

Start at: 2018-03-05 19:33:02

End at: 2018-03-05 19:33:32

Local clock offset: -6.049 ms

Remote clock offset: 0.65 ms

Below is generated by plot.py at 2018-03-05 20:03:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.726 ms

Loss rate: 87.86%

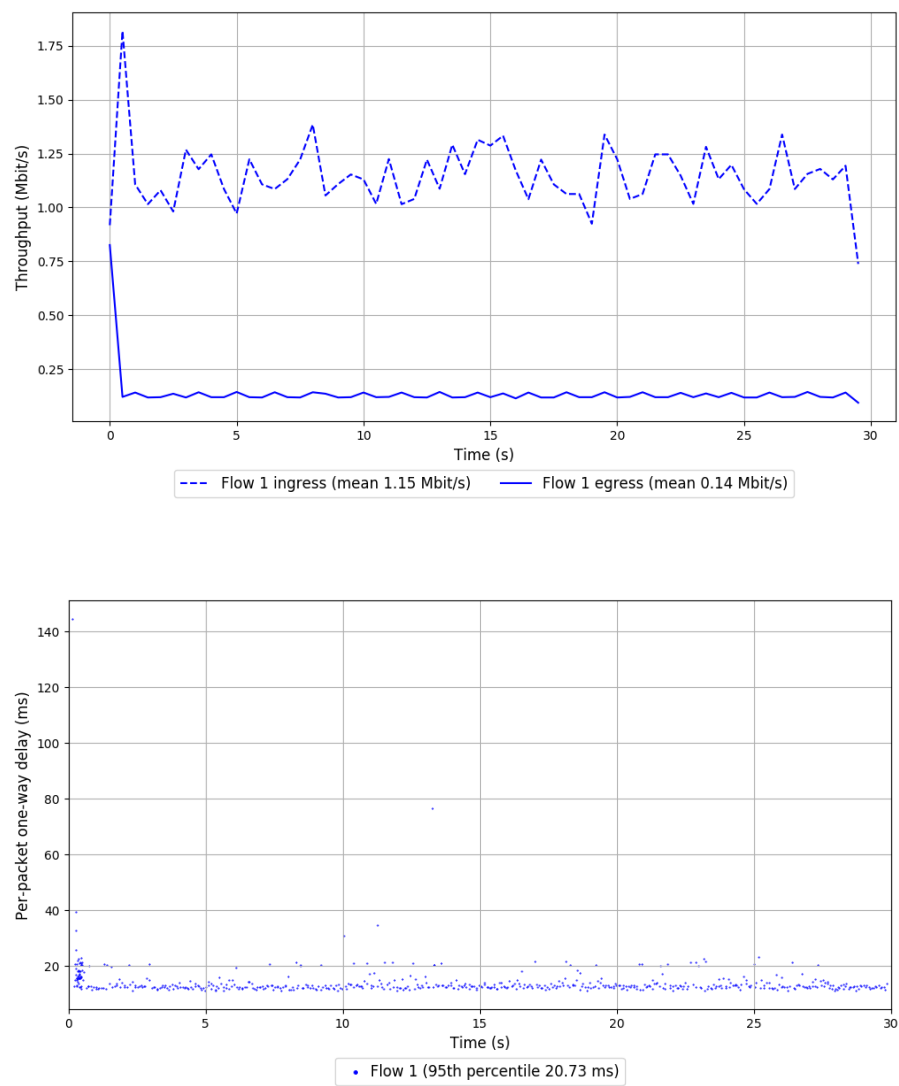
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 20.726 ms

Loss rate: 87.86%

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

Start at: 2018-03-05 19:56:31

End at: 2018-03-05 19:57:01

Local clock offset: -5.731 ms

Remote clock offset: 0.761 ms

Below is generated by plot.py at 2018-03-05 20:03:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 21.265 ms

Loss rate: 88.09%

-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 21.265 ms

Loss rate: 88.09%

Run 3: Report of Vivace-LTE — Data Link

