

Pantheon Report

Generated at 2019-03-19 08:05:46 (UTC).

Data path: Colombia cellular on ppp0 (*remote*) → AWS Brazil 2 on ens5 (*local*).

Repeated the test of 21 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

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

System info:

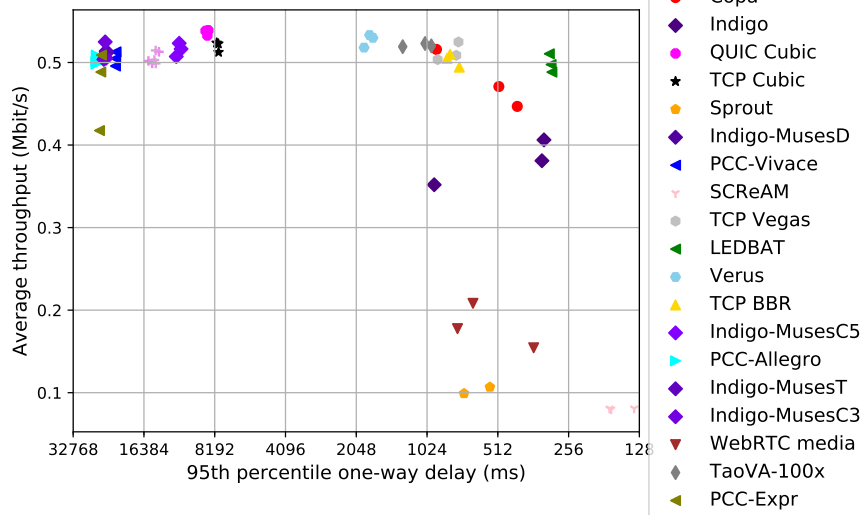
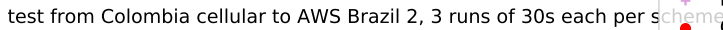
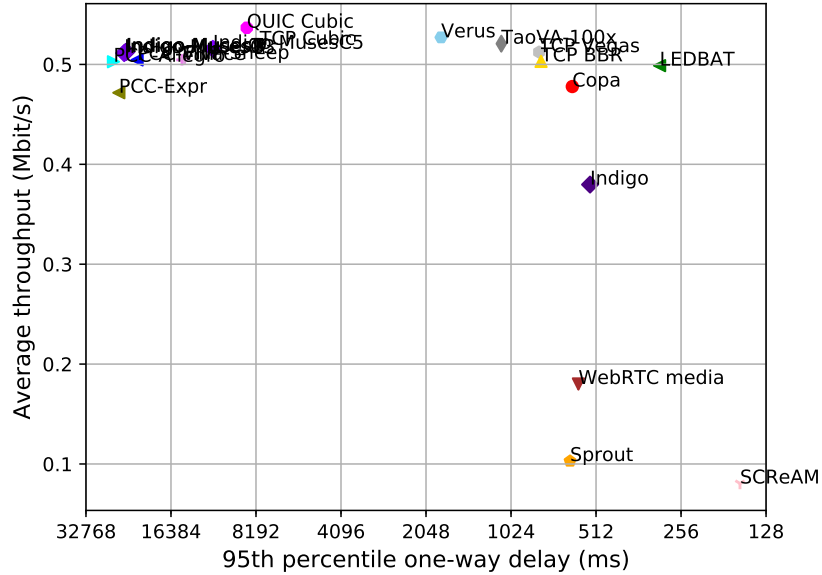
```
Linux 4.15.0-1033-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

```
branch: muses @ 7a686f7c2ed0a333082c0bab1fa5c921ab47e6ee
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf5e58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 5ce721187ad823da20955337730c746486ca4966
third_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd
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/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
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 @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851

test from Colombia cellular to AWS Brazil 2, 3 runs of 30s each per scheme
(mean of all runs by scheme)



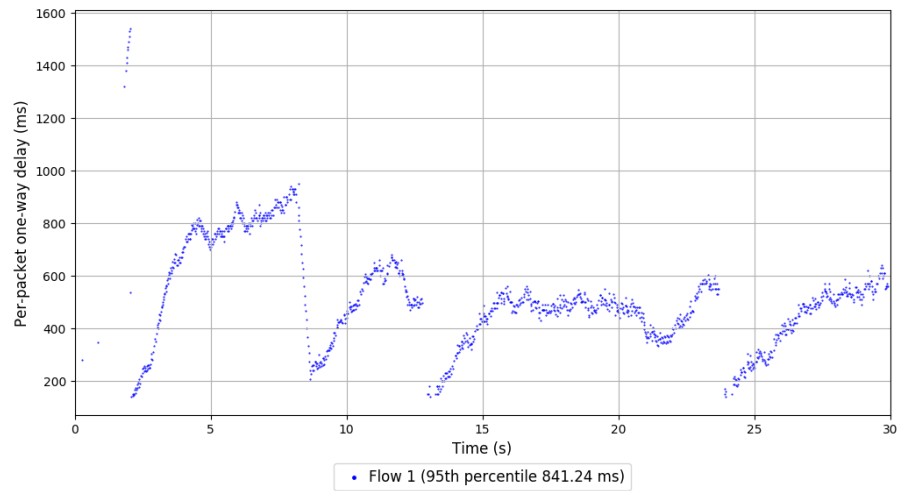
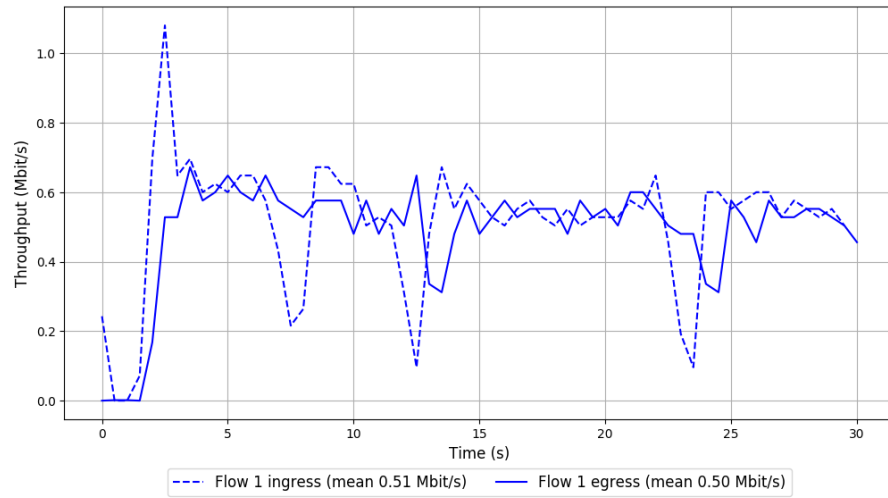
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	0.50	801.61	2.28
Copa	3	0.48	621.34	1.90
TCP Cubic	3	0.52	7947.29	30.92
FillP	3	0.50	14978.04	25.46
FillP-Sheep	3	0.50	14661.37	16.76
Indigo	3	0.38	537.64	0.83
Indigo-MusesC3	3	0.51	23993.35	93.19
Indigo-MusesC5	3	0.52	11640.94	43.46
Indigo-MusesD	1	0.51	23539.09	92.55
Indigo-MusesT	3	0.51	23698.69	86.33
LEDBAT	3	0.50	304.97	1.13
PCC-Allegro	3	0.50	26186.38	98.64
PCC-Expr	3	0.47	25065.63	92.34
QUIC Cubic	3	0.54	8829.27	31.71
SCReAM	3	0.08	158.32	0.79
Sprout	2	0.11	632.96	0.61
TaoVA-100x	3	0.52	1108.51	2.60
TCP Vegas	3	0.51	814.89	1.05
Verus	3	0.53	1811.69	3.50
PCC-Vivace	3	0.50	21605.05	75.07
WebRTC media	3	0.18	591.14	0.22

Run 1: Statistics of TCP BBR

Start at: 2019-03-19 06:51:57
End at: 2019-03-19 06:52:27
Local clock offset: -2.472 ms
Remote clock offset: 13.378 ms

Below is generated by plot.py at 2019-03-19 08:05:08
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 841.244 ms
Loss rate: 2.20%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 841.244 ms
Loss rate: 2.20%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-03-19 07:16:31

End at: 2019-03-19 07:17:01

Local clock offset: -2.828 ms

Remote clock offset: 5.913 ms

Below is generated by plot.py at 2019-03-19 08:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 746.411 ms

Loss rate: 2.16%

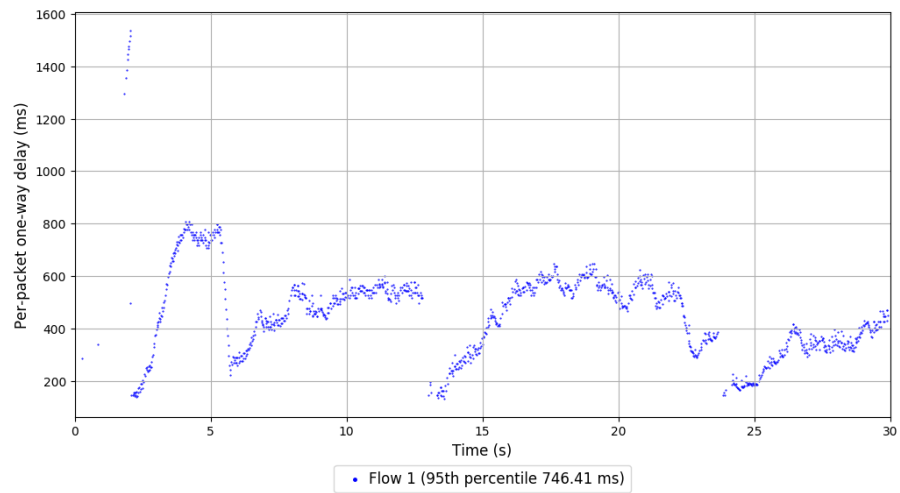
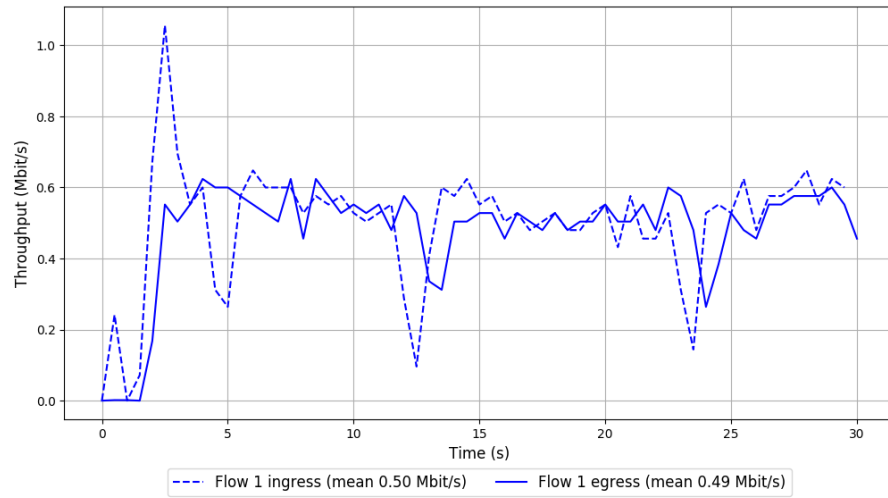
-- Flow 1:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 746.411 ms

Loss rate: 2.16%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-03-19 07:41:20

End at: 2019-03-19 07:41:50

Local clock offset: -2.569 ms

Remote clock offset: 2.413 ms

Below is generated by plot.py at 2019-03-19 08:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 817.167 ms

Loss rate: 2.48%

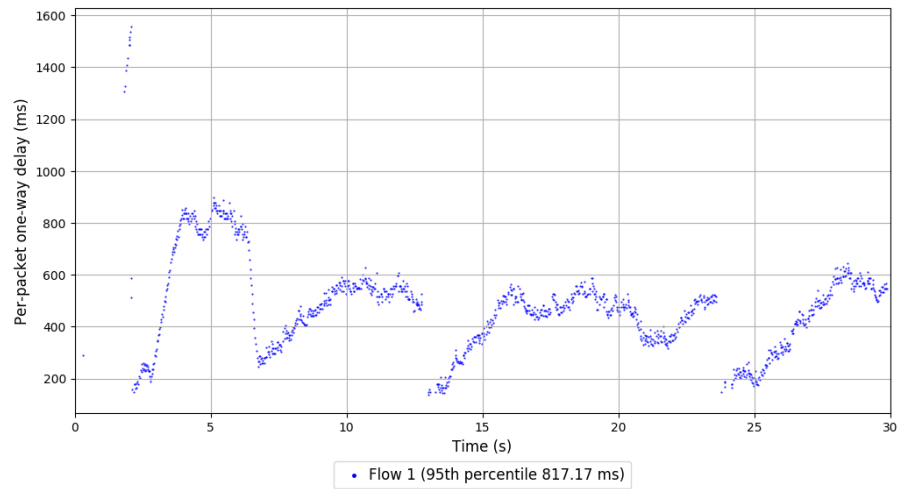
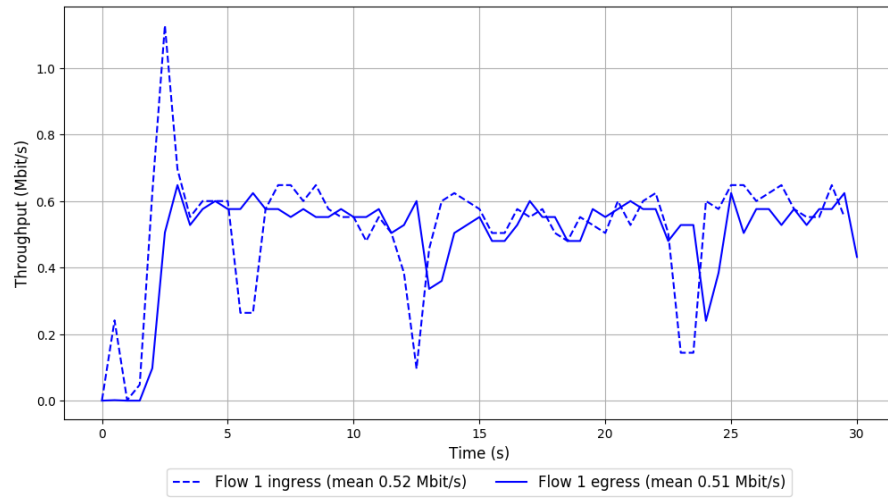
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 817.167 ms

Loss rate: 2.48%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

Start at: 2019-03-19 07:09:42

End at: 2019-03-19 07:10:12

Local clock offset: -3.606 ms

Remote clock offset: 7.692 ms

Below is generated by plot.py at 2019-03-19 08:05:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 933.964 ms

Loss rate: 3.78%

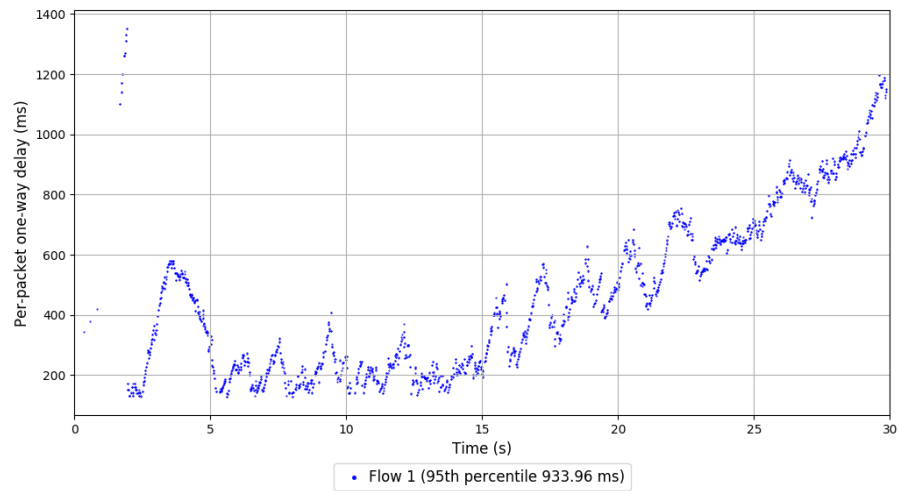
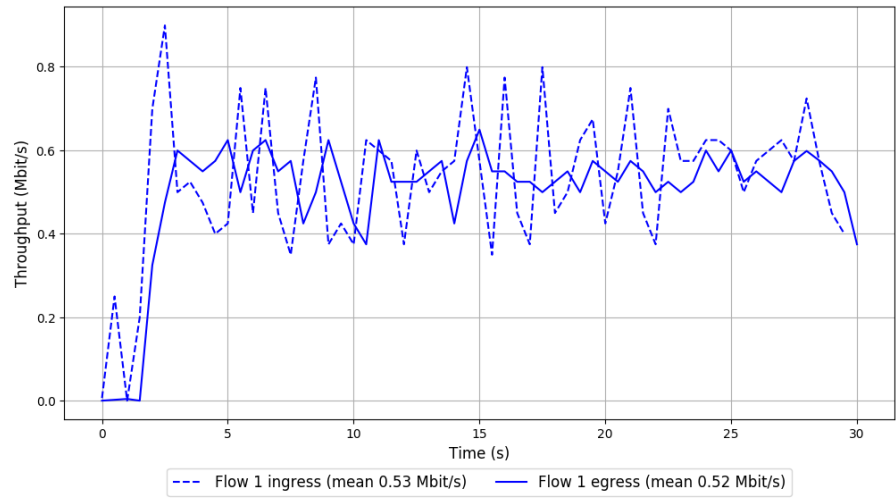
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 933.964 ms

Loss rate: 3.78%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2019-03-19 07:34:30

End at: 2019-03-19 07:35:01

Local clock offset: -1.892 ms

Remote clock offset: 4.861 ms

Below is generated by plot.py at 2019-03-19 08:05:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.47 Mbit/s

95th percentile per-packet one-way delay: 506.865 ms

Loss rate: 0.89%

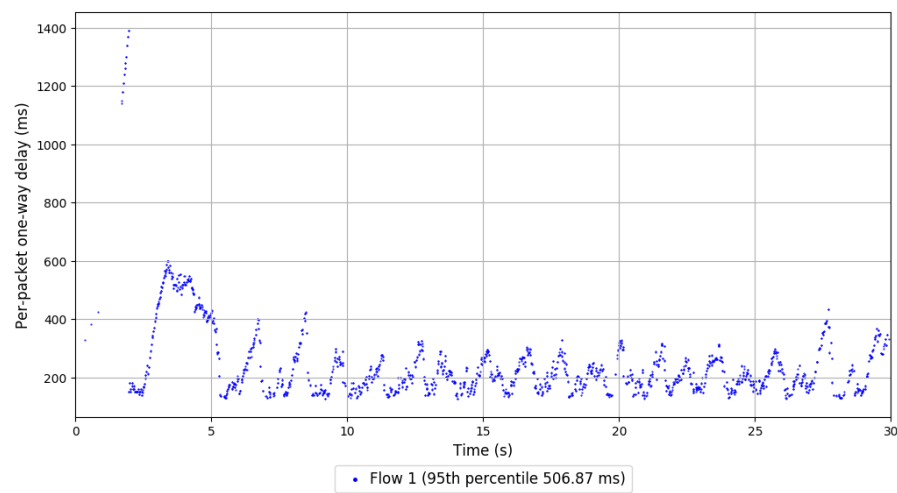
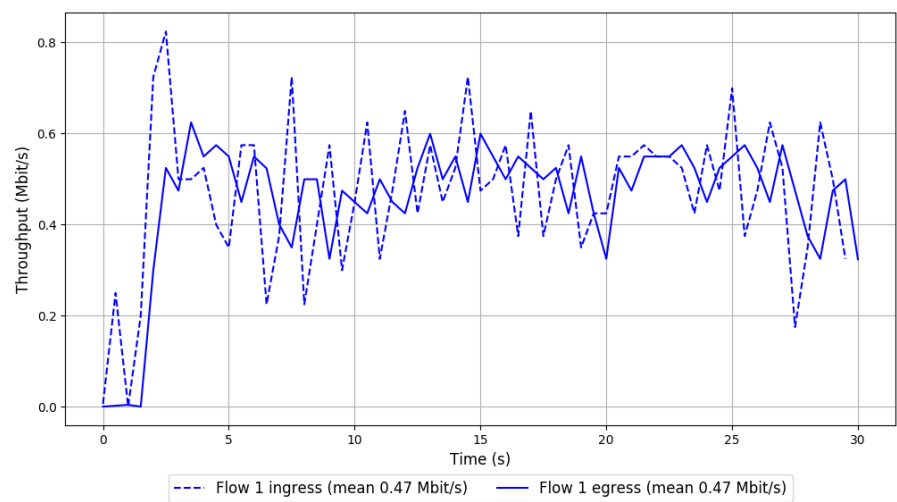
-- Flow 1:

Average throughput: 0.47 Mbit/s

95th percentile per-packet one-way delay: 506.865 ms

Loss rate: 0.89%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2019-03-19 07:58:48

End at: 2019-03-19 07:59:18

Local clock offset: -3.239 ms

Remote clock offset: 5.88 ms

Below is generated by plot.py at 2019-03-19 08:05:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.45 Mbit/s

95th percentile per-packet one-way delay: 423.199 ms

Loss rate: 1.03%

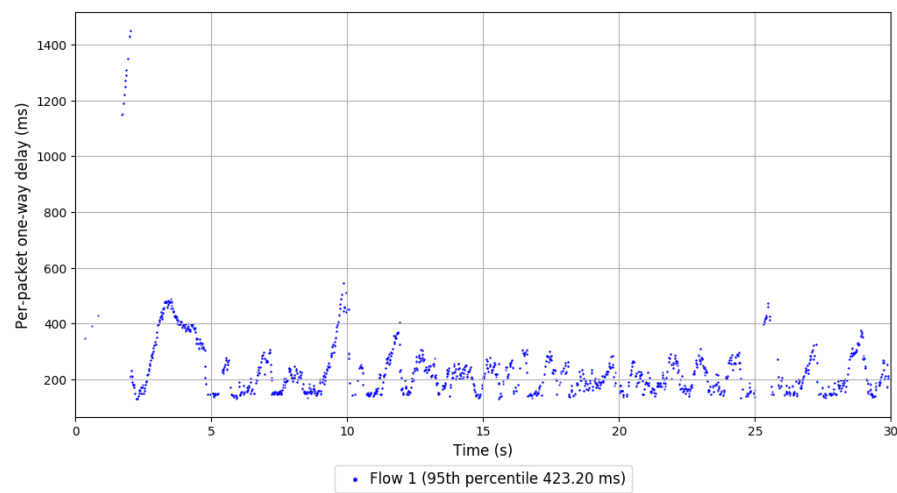
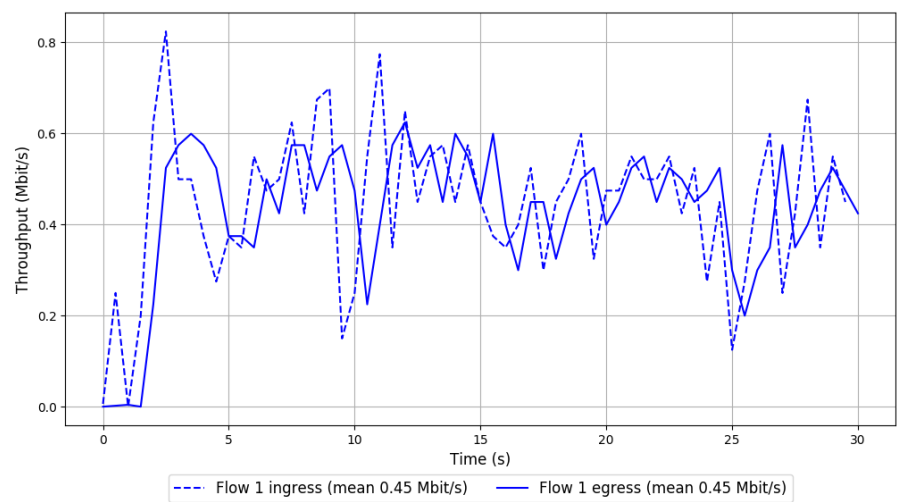
-- Flow 1:

Average throughput: 0.45 Mbit/s

95th percentile per-packet one-way delay: 423.199 ms

Loss rate: 1.03%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-03-19 06:58:56

End at: 2019-03-19 06:59:26

Local clock offset: -2.735 ms

Remote clock offset: 6.818 ms

Below is generated by plot.py at 2019-03-19 08:05:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 7893.253 ms

Loss rate: 30.87%

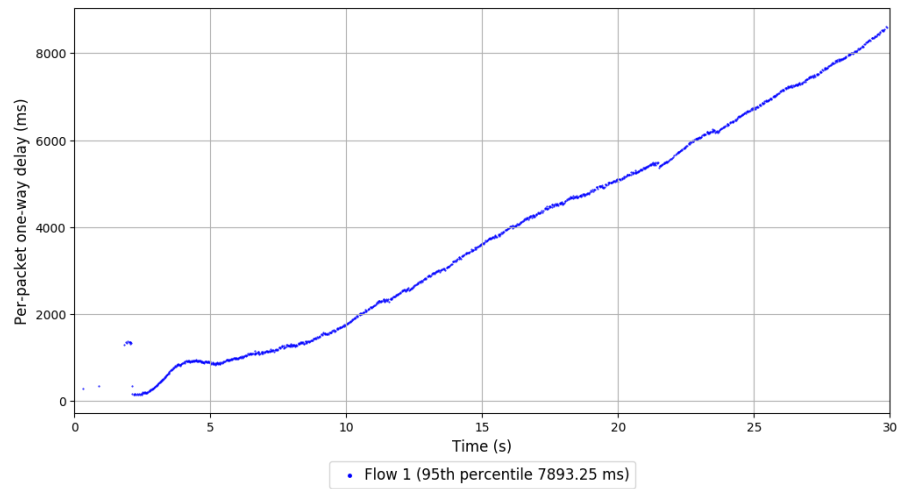
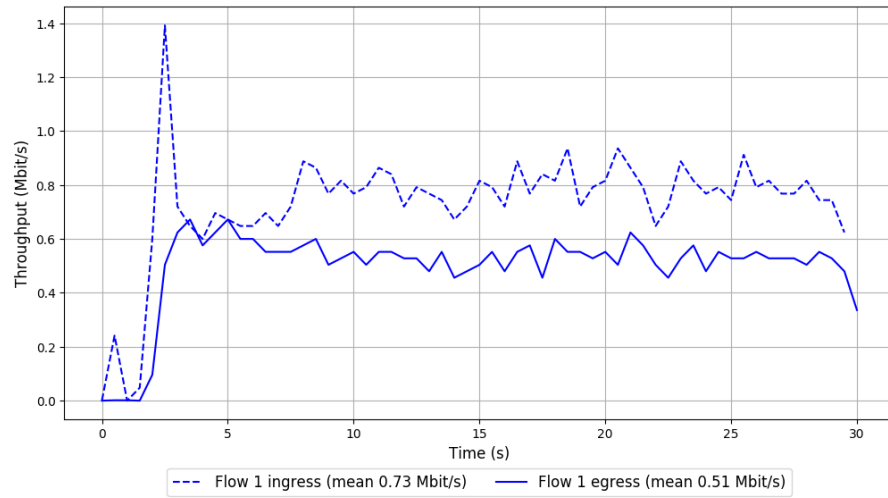
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 7893.253 ms

Loss rate: 30.87%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-03-19 07:23:45

End at: 2019-03-19 07:24:15

Local clock offset: -2.285 ms

Remote clock offset: 5.799 ms

Below is generated by plot.py at 2019-03-19 08:05:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 8036.647 ms

Loss rate: 30.91%

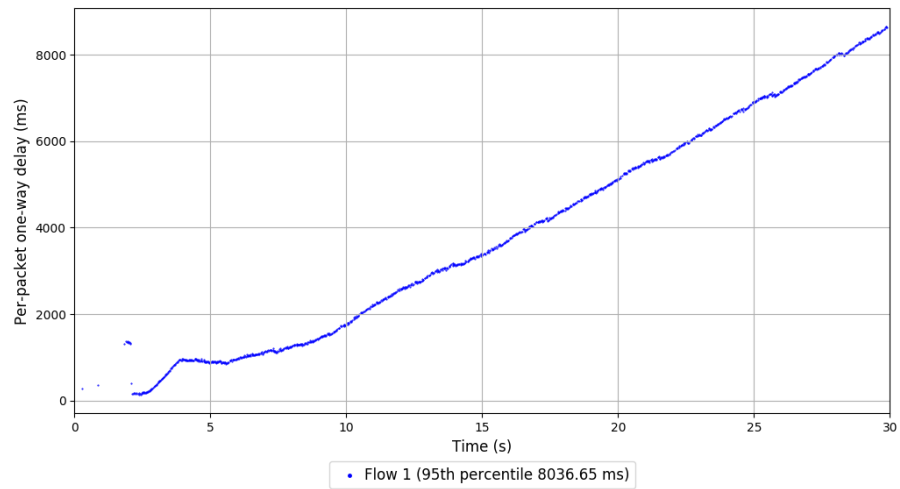
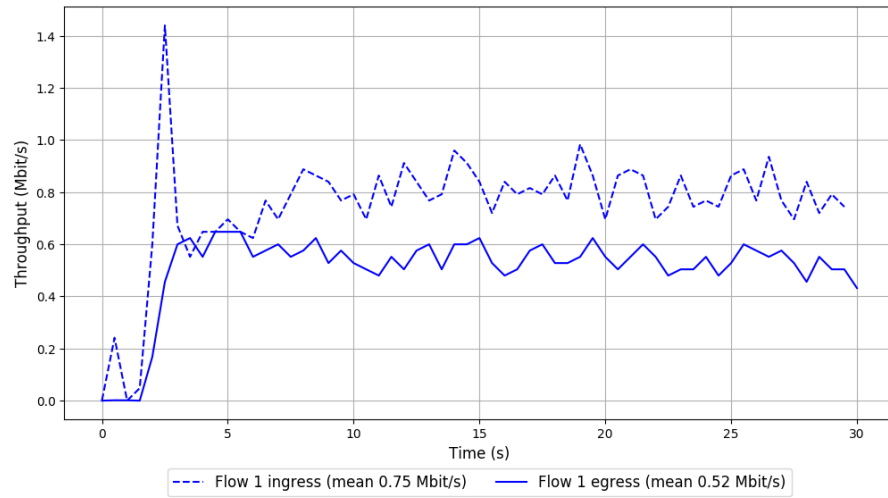
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 8036.647 ms

Loss rate: 30.91%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2019-03-19 07:48:16

End at: 2019-03-19 07:48:46

Local clock offset: -2.636 ms

Remote clock offset: 1.589 ms

Below is generated by plot.py at 2019-03-19 08:05:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 7911.975 ms

Loss rate: 30.99%

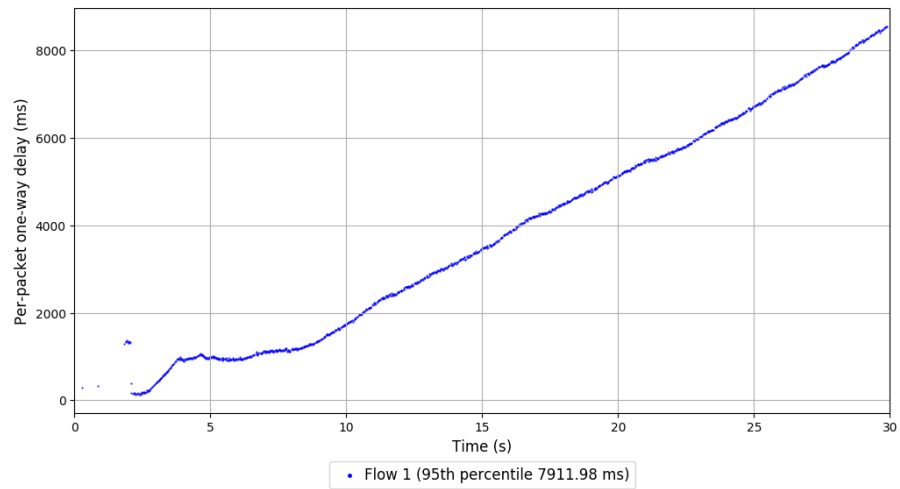
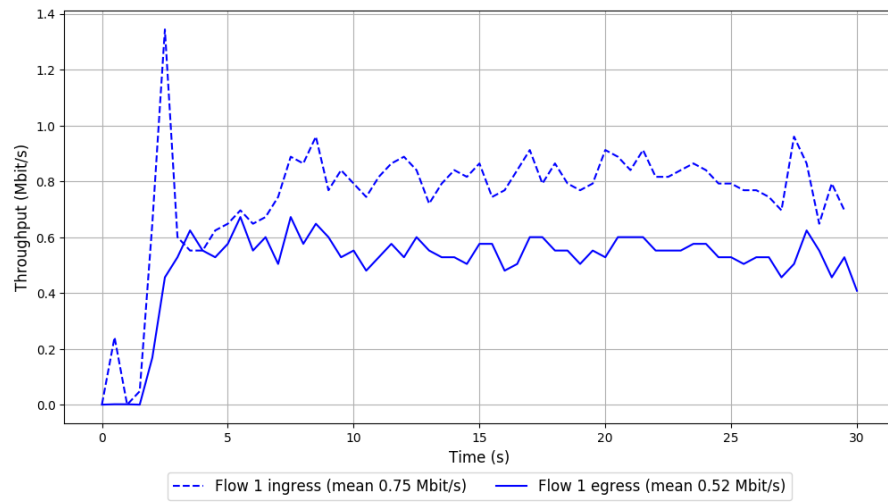
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 7911.975 ms

Loss rate: 30.99%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2019-03-19 07:08:34

End at: 2019-03-19 07:09:04

Local clock offset: -3.614 ms

Remote clock offset: 5.599 ms

Below is generated by plot.py at 2019-03-19 08:05:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 14141.714 ms

Loss rate: 27.20%

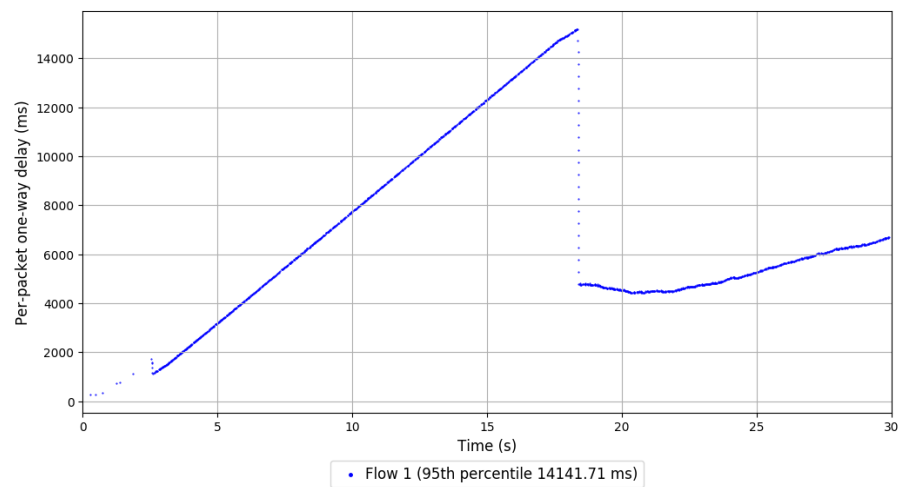
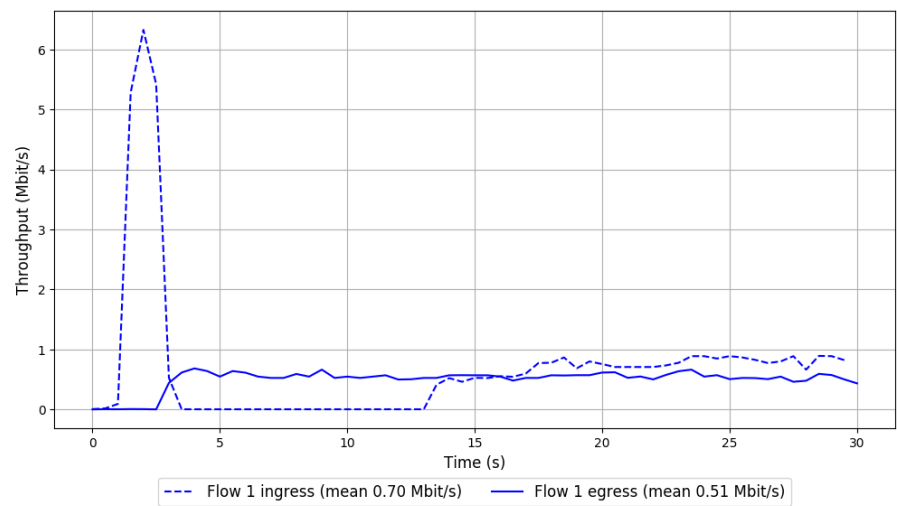
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 14141.714 ms

Loss rate: 27.20%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-03-19 07:33:22

End at: 2019-03-19 07:33:52

Local clock offset: -2.678 ms

Remote clock offset: 4.726 ms

Below is generated by plot.py at 2019-03-19 08:05:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 15676.249 ms

Loss rate: 24.21%

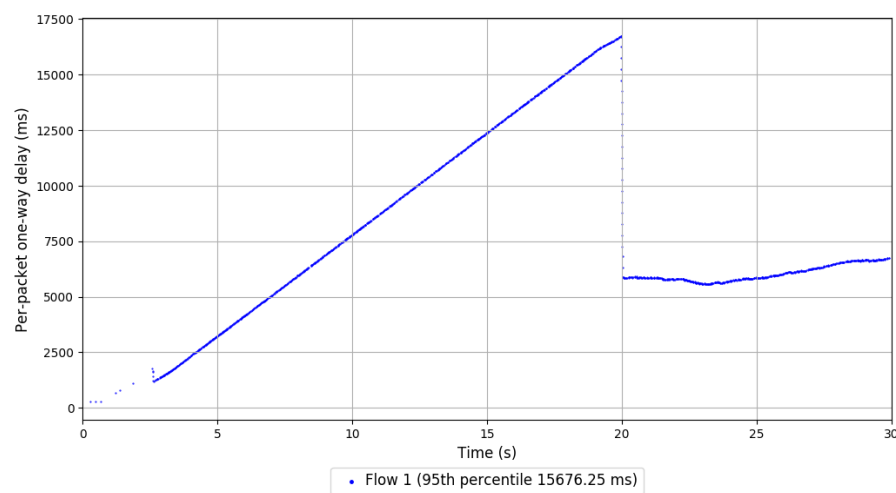
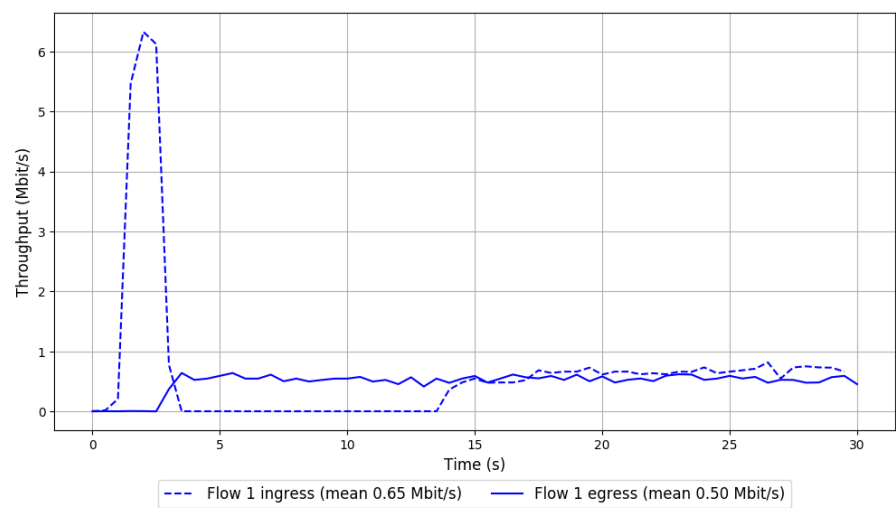
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 15676.249 ms

Loss rate: 24.21%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2019-03-19 07:57:40

End at: 2019-03-19 07:58:10

Local clock offset: -3.243 ms

Remote clock offset: 1.848 ms

Below is generated by plot.py at 2019-03-19 08:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 15116.160 ms

Loss rate: 24.96%

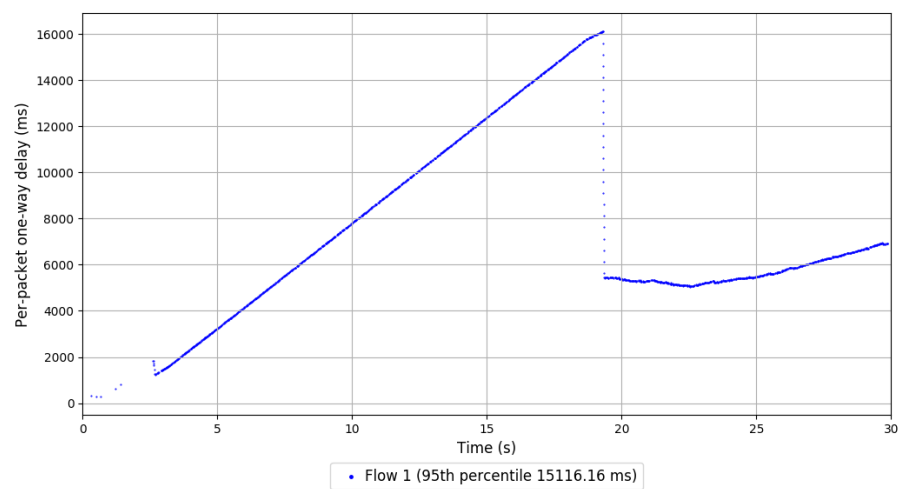
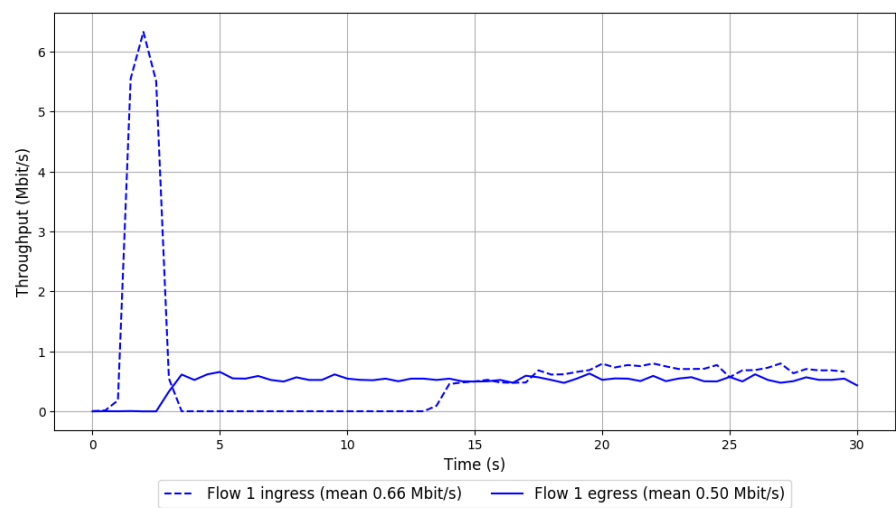
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 15116.160 ms

Loss rate: 24.96%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-03-19 07:11:58

End at: 2019-03-19 07:12:28

Local clock offset: -2.852 ms

Remote clock offset: 6.272 ms

Below is generated by plot.py at 2019-03-19 08:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 14602.988 ms

Loss rate: 16.46%

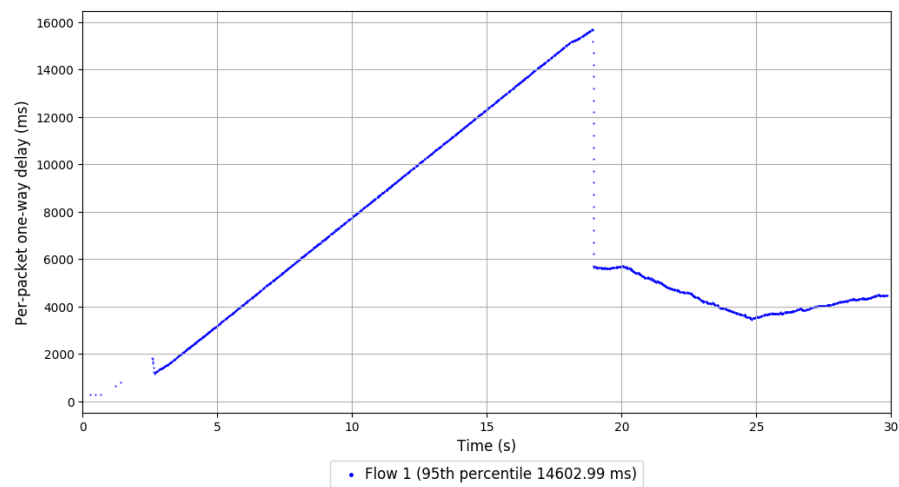
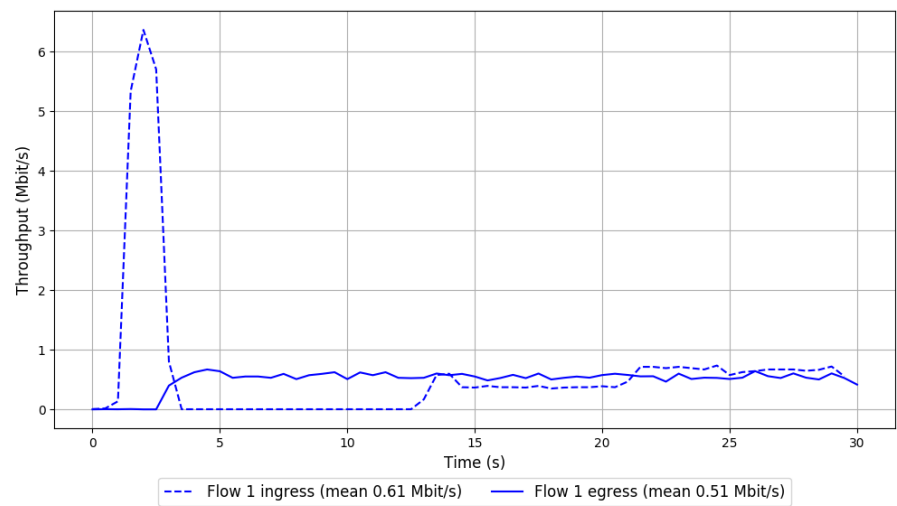
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 14602.988 ms

Loss rate: 16.46%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-03-19 07:36:48

End at: 2019-03-19 07:37:18

Local clock offset: -2.666 ms

Remote clock offset: 5.97 ms

Below is generated by plot.py at 2019-03-19 08:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 14785.701 ms

Loss rate: 17.83%

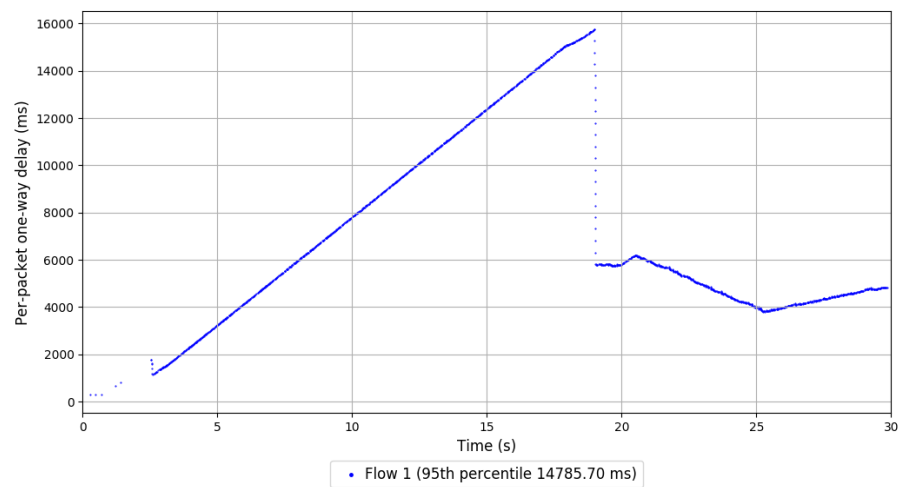
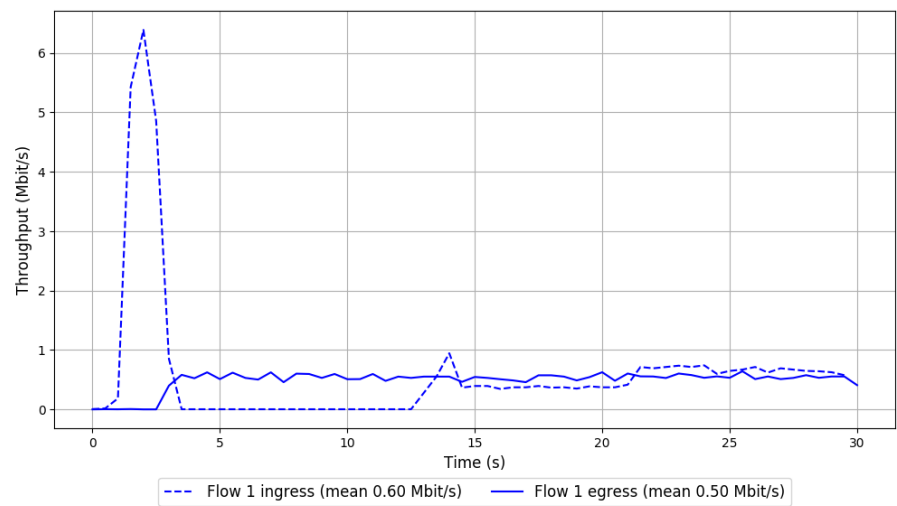
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 14785.701 ms

Loss rate: 17.83%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-03-19 08:01:05

End at: 2019-03-19 08:01:35

Local clock offset: -2.529 ms

Remote clock offset: 3.131 ms

Below is generated by plot.py at 2019-03-19 08:05:15

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 14595.416 ms

Loss rate: 15.98%

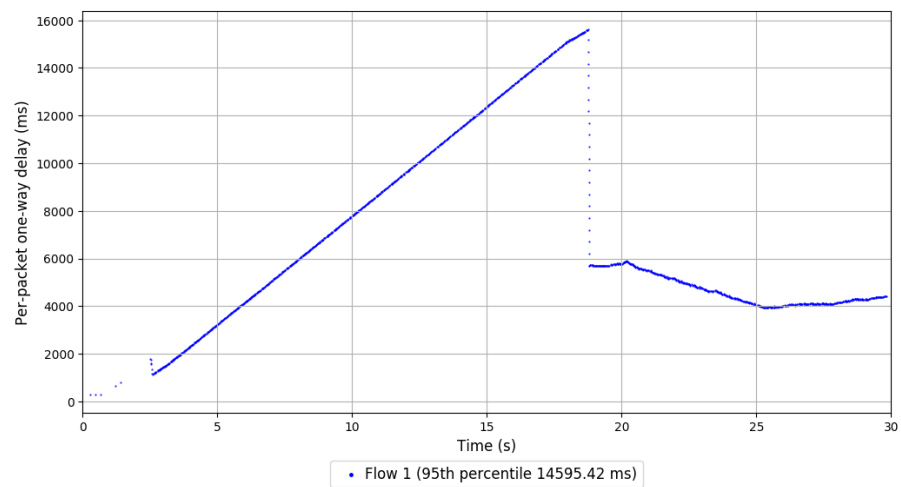
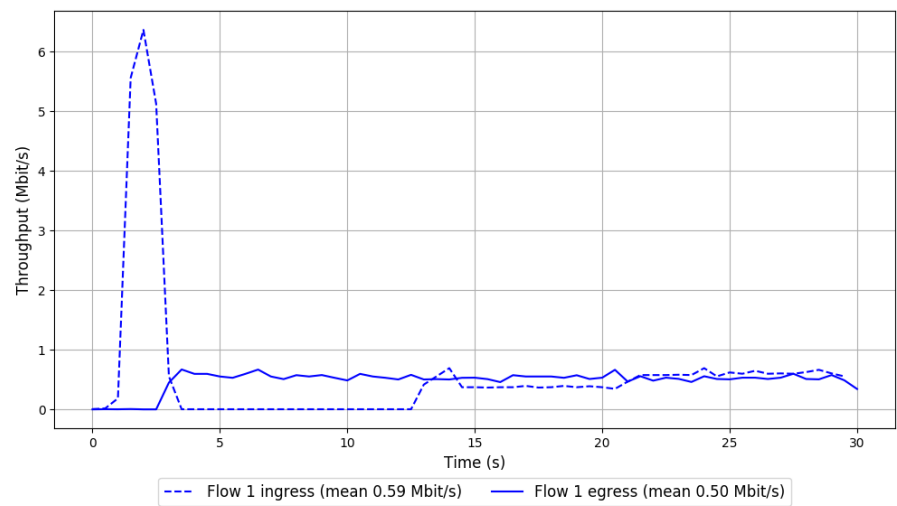
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 14595.416 ms

Loss rate: 15.98%

Run 3: Report of FillP-Sheep — Data Link

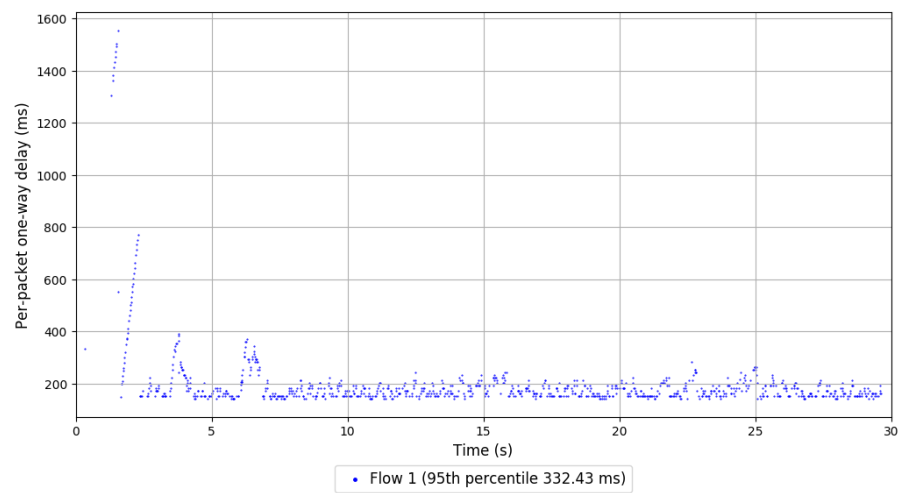
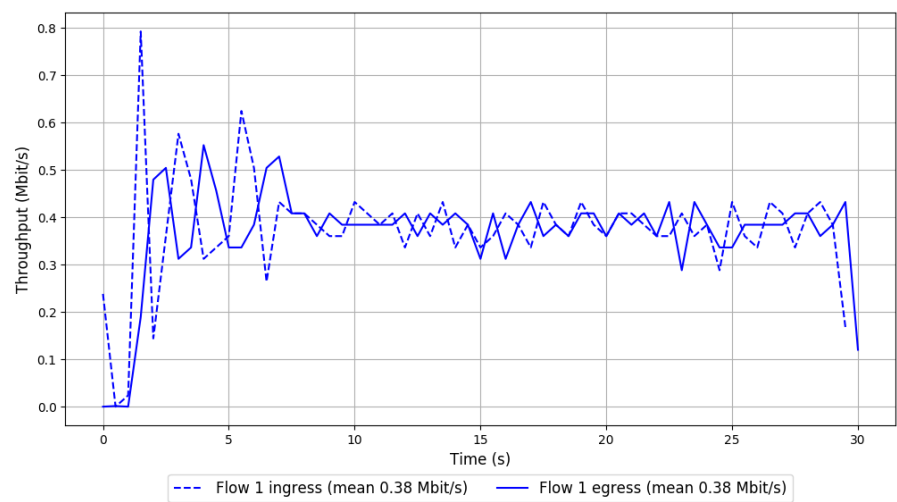


```
Run 1: Statistics of Indigo

Start at: 2019-03-19 07:02:44
End at: 2019-03-19 07:03:14
Local clock offset: -2.861 ms
Remote clock offset: 3.485 ms

# Below is generated by plot.py at 2019-03-19 08:05:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 332.426 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 332.426 ms
Loss rate: 0.75%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-03-19 07:27:33

End at: 2019-03-19 07:28:03

Local clock offset: -2.12 ms

Remote clock offset: 5.827 ms

Below is generated by plot.py at 2019-03-19 08:05:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.41 Mbit/s

95th percentile per-packet one-way delay: 325.847 ms

Loss rate: 0.90%

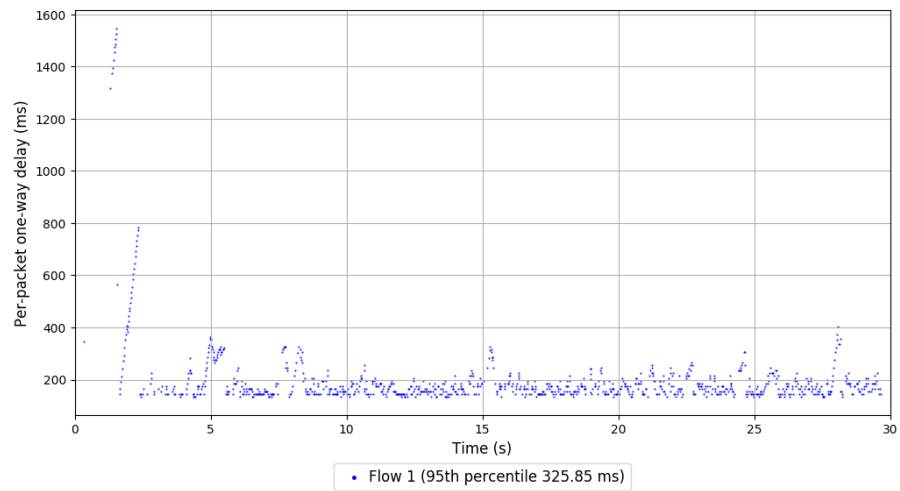
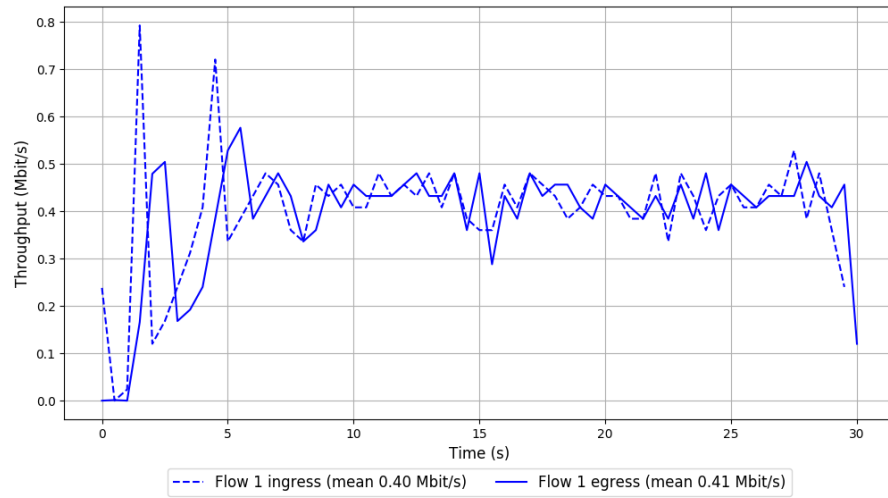
-- Flow 1:

Average throughput: 0.41 Mbit/s

95th percentile per-packet one-way delay: 325.847 ms

Loss rate: 0.90%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-03-19 07:51:50

End at: 2019-03-19 07:52:20

Local clock offset: -2.935 ms

Remote clock offset: 6.879 ms

Below is generated by plot.py at 2019-03-19 08:05:17

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.35 Mbit/s

95th percentile per-packet one-way delay: 954.659 ms

Loss rate: 0.83%

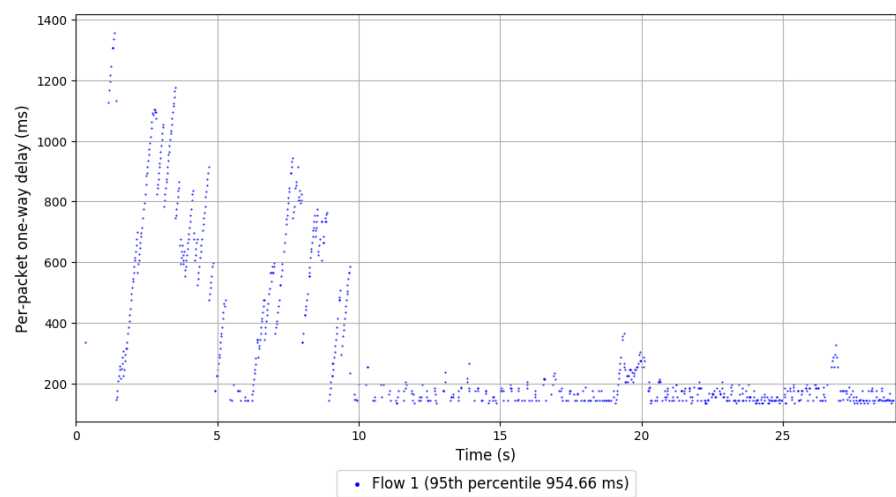
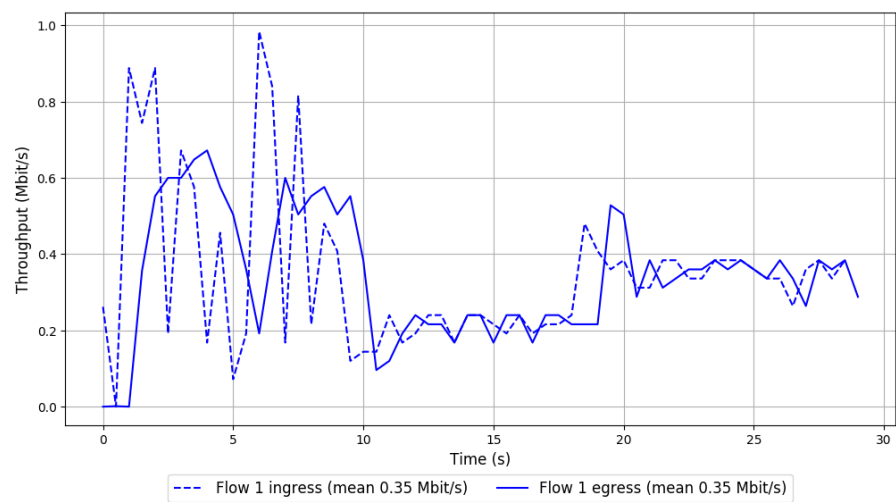
-- Flow 1:

Average throughput: 0.35 Mbit/s

95th percentile per-packet one-way delay: 954.659 ms

Loss rate: 0.83%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-03-19 07:05:01

End at: 2019-03-19 07:05:31

Local clock offset: -3.639 ms

Remote clock offset: 7.689 ms

Below is generated by plot.py at 2019-03-19 08:05:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 24281.286 ms

Loss rate: 91.93%

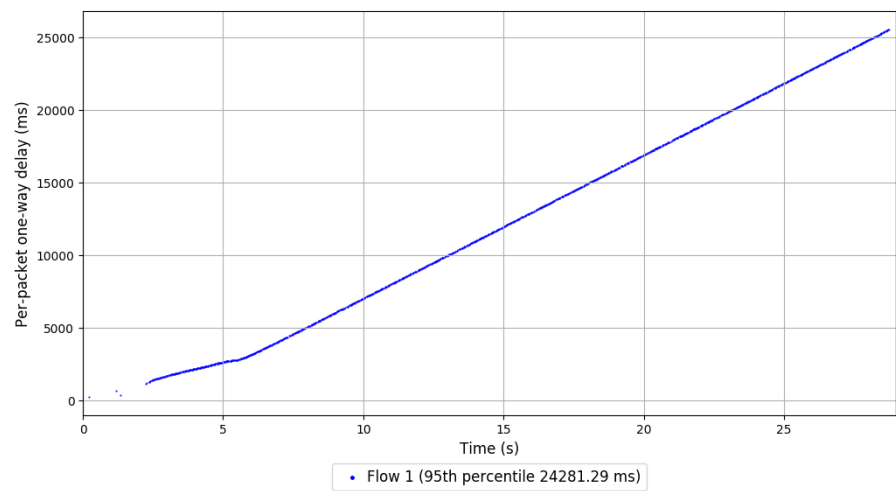
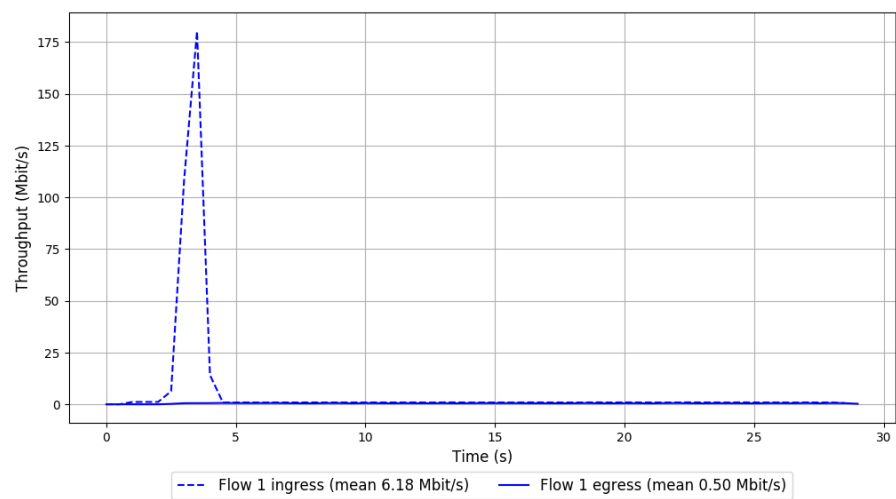
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 24281.286 ms

Loss rate: 91.93%

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-03-19 07:29:49

End at: 2019-03-19 07:30:19

Local clock offset: -2.026 ms

Remote clock offset: 2.008 ms

Below is generated by plot.py at 2019-03-19 08:05:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 23942.397 ms

Loss rate: 93.73%

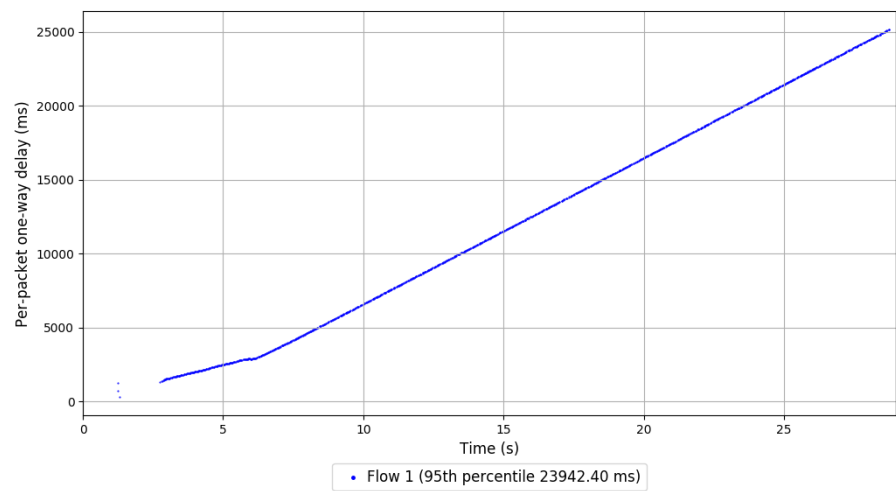
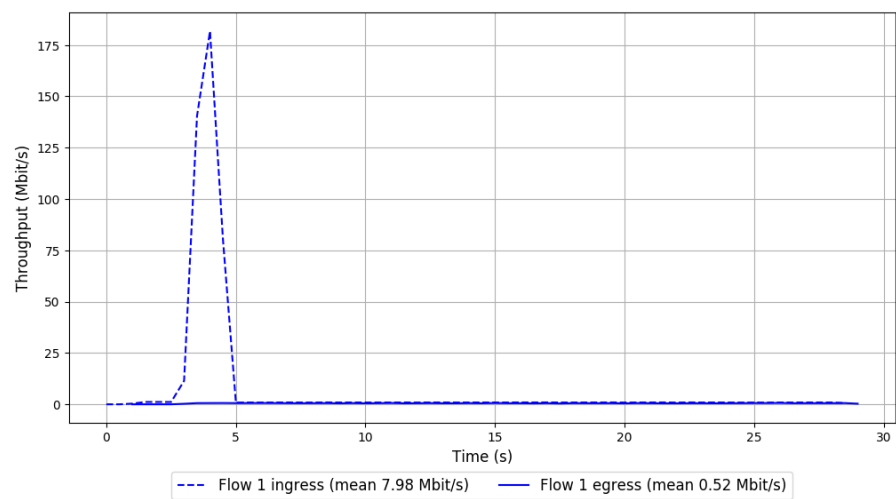
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 23942.397 ms

Loss rate: 93.73%

Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-03-19 07:54:07

End at: 2019-03-19 07:54:37

Local clock offset: -3.043 ms

Remote clock offset: 1.924 ms

Below is generated by plot.py at 2019-03-19 08:05:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 23756.378 ms

Loss rate: 93.90%

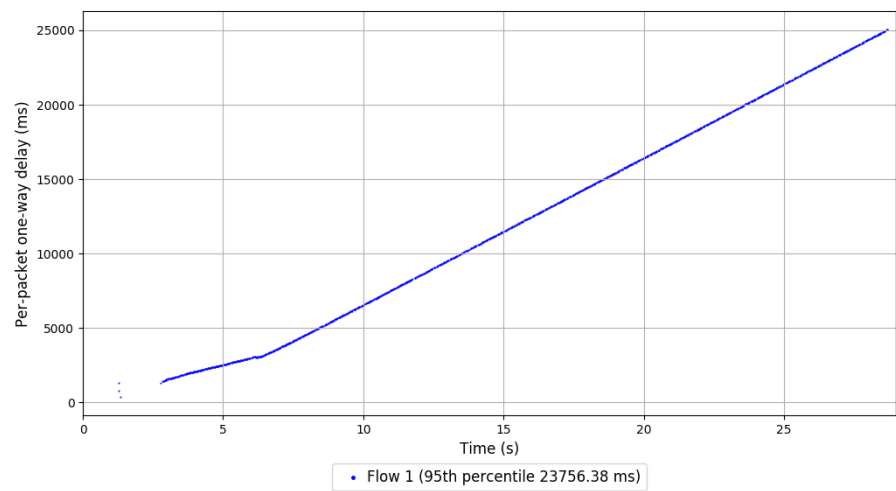
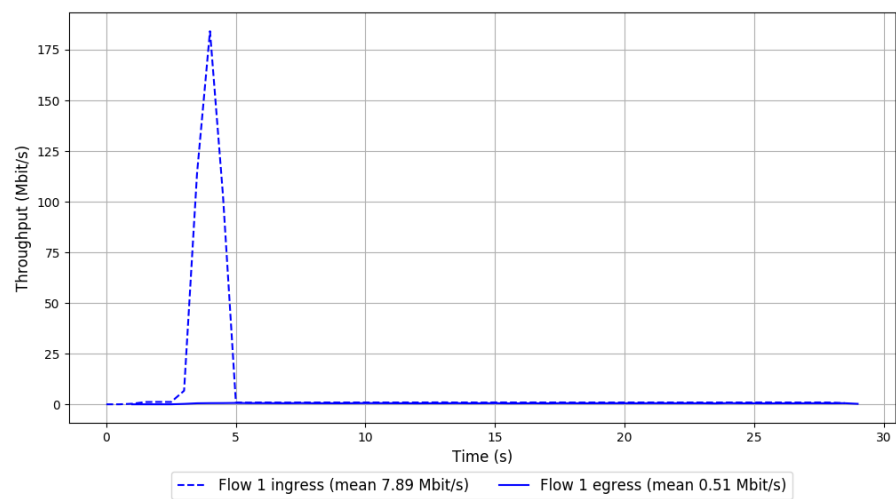
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 23756.378 ms

Loss rate: 93.90%

Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-03-19 07:07:25

End at: 2019-03-19 07:07:55

Local clock offset: -3.586 ms

Remote clock offset: 2.02 ms

Below is generated by plot.py at 2019-03-19 08:05:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 11597.106 ms

Loss rate: 42.58%

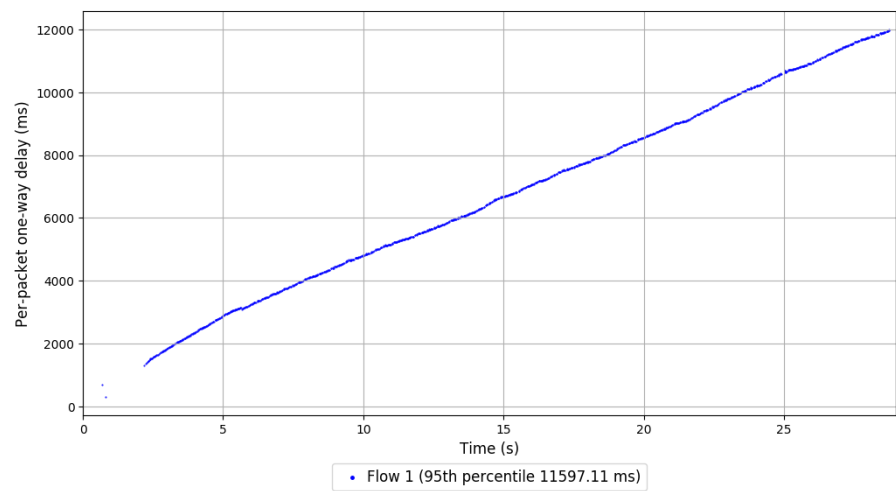
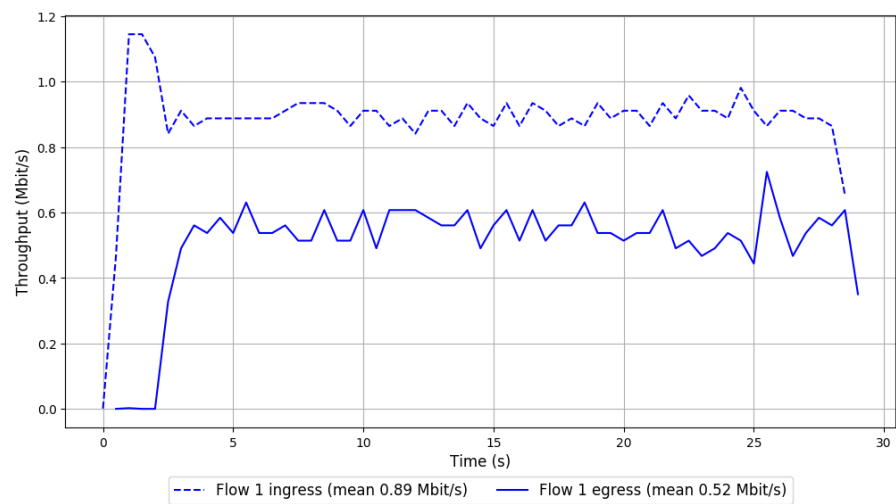
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 11597.106 ms

Loss rate: 42.58%

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-03-19 07:32:14

End at: 2019-03-19 07:32:44

Local clock offset: -2.726 ms

Remote clock offset: 5.792 ms

Below is generated by plot.py at 2019-03-19 08:05:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 11936.695 ms

Loss rate: 44.47%

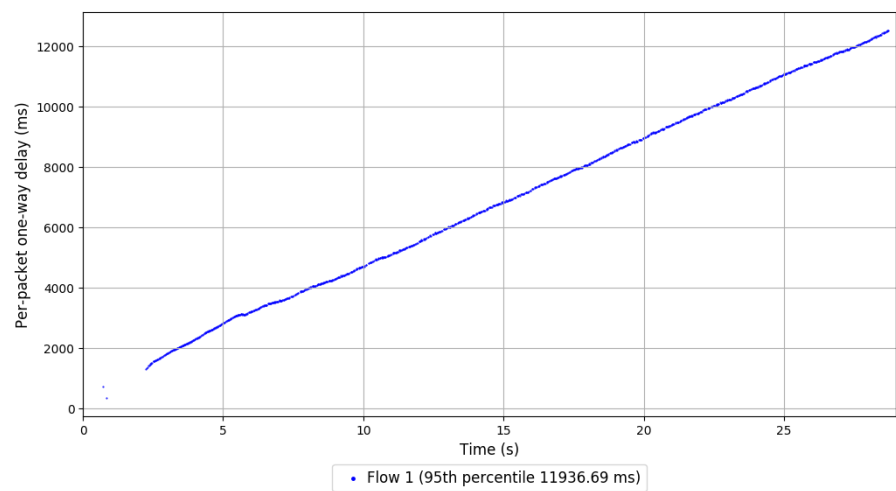
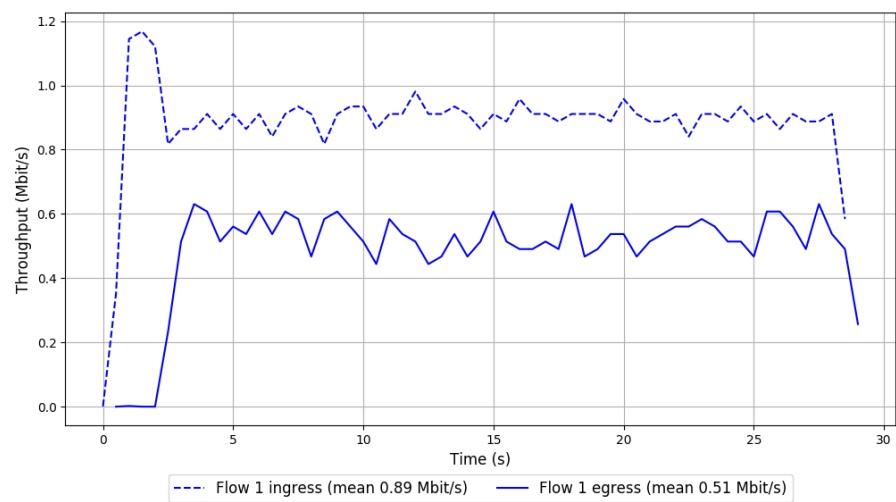
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 11936.695 ms

Loss rate: 44.47%

Run 2: Report of Indigo-MusesC5 — Data Link



Run 3: Statistics of Indigo-MusesC5

Start at: 2019-03-19 07:56:32

End at: 2019-03-19 07:57:02

Local clock offset: -2.398 ms

Remote clock offset: 8.044 ms

Below is generated by plot.py at 2019-03-19 08:05:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 11389.006 ms

Loss rate: 43.33%

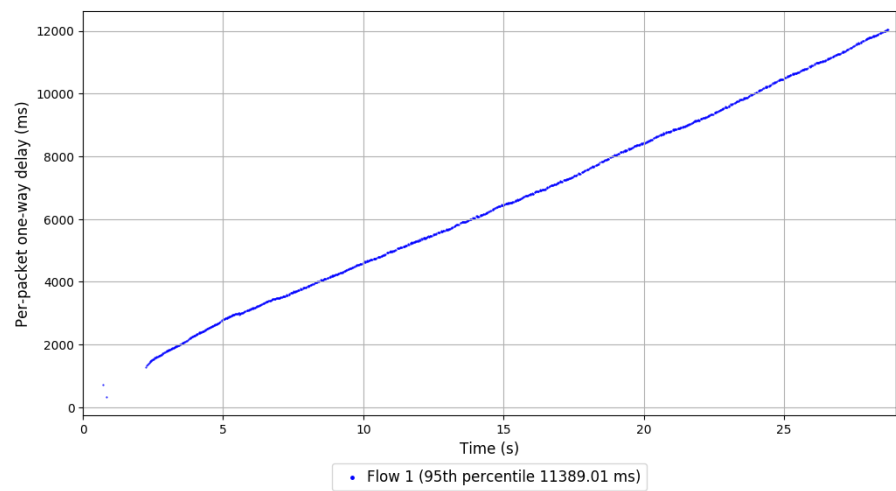
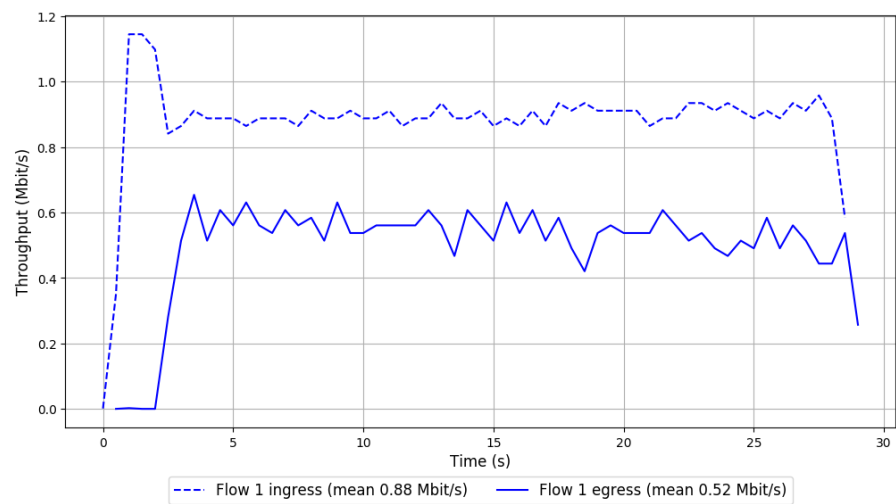
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 11389.006 ms

Loss rate: 43.33%

Run 3: Report of Indigo-MusesC5 — Data Link



Run 1: Statistics of Indigo-MusesD

/home/ubuntu/pantheon/data/2019-03-19T06-51-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo.

Run 1: Report of Indigo-MusesD — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of Indigo-MusesD

/home/ubuntu/pantheon/data/2019-03-19T06-51-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo.

Run 2: Report of Indigo-MusesD — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Indigo-MusesD

Start at: 2019-03-19 07:50:38

End at: 2019-03-19 07:51:08

Local clock offset: -2.072 ms

Remote clock offset: 2.89 ms

Below is generated by plot.py at 2019-03-19 08:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 23539.090 ms

Loss rate: 92.55%

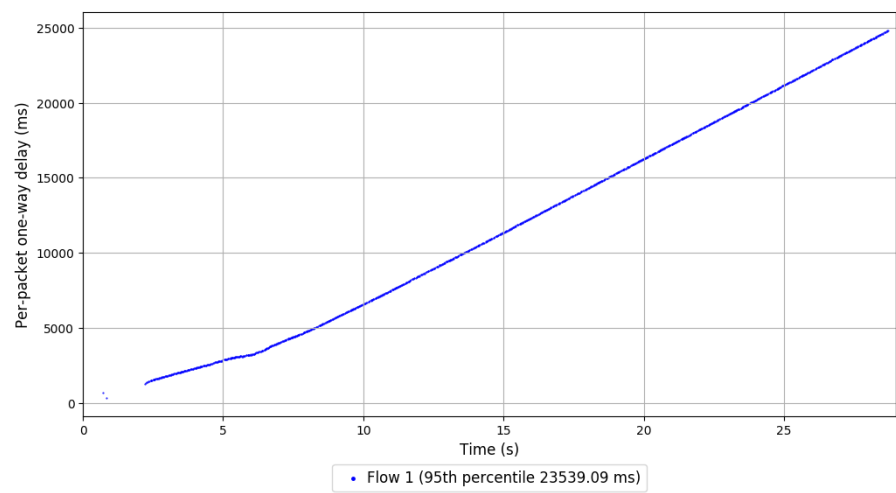
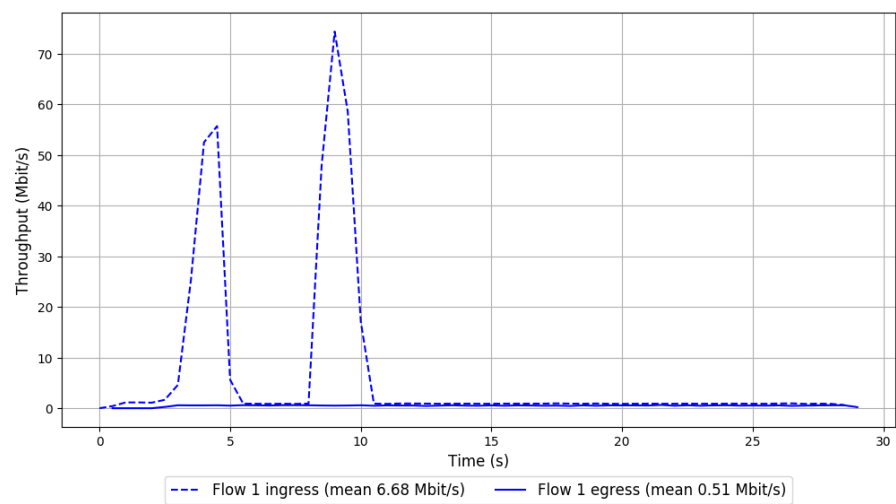
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 23539.090 ms

Loss rate: 92.55%

Run 3: Report of Indigo-MusesD — Data Link

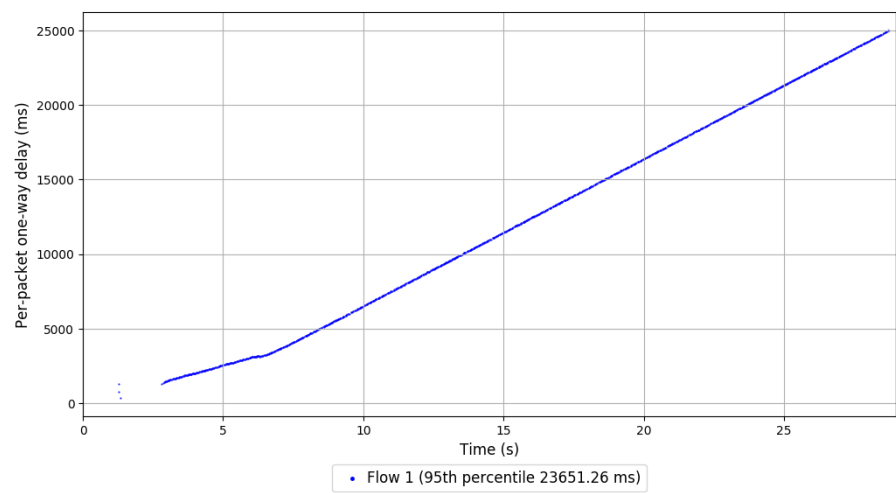
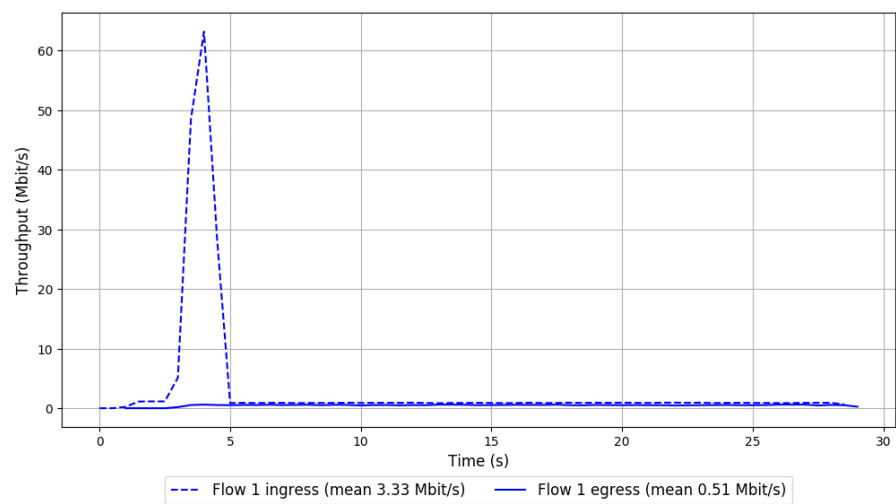


Run 1: Statistics of Indigo-MusesT

Start at: 2019-03-19 06:53:05
End at: 2019-03-19 06:53:35
Local clock offset: -2.534 ms
Remote clock offset: 11.812 ms

Below is generated by plot.py at 2019-03-19 08:05:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 23651.261 ms
Loss rate: 85.32%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 23651.261 ms
Loss rate: 85.32%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MusesT

Start at: 2019-03-19 07:17:40

End at: 2019-03-19 07:18:10

Local clock offset: -2.721 ms

Remote clock offset: 1.775 ms

Below is generated by plot.py at 2019-03-19 08:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 23726.461 ms

Loss rate: 86.45%

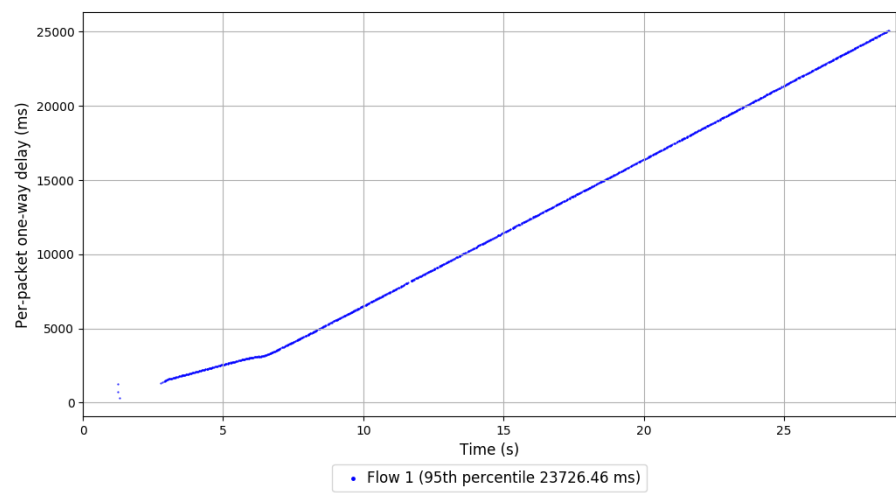
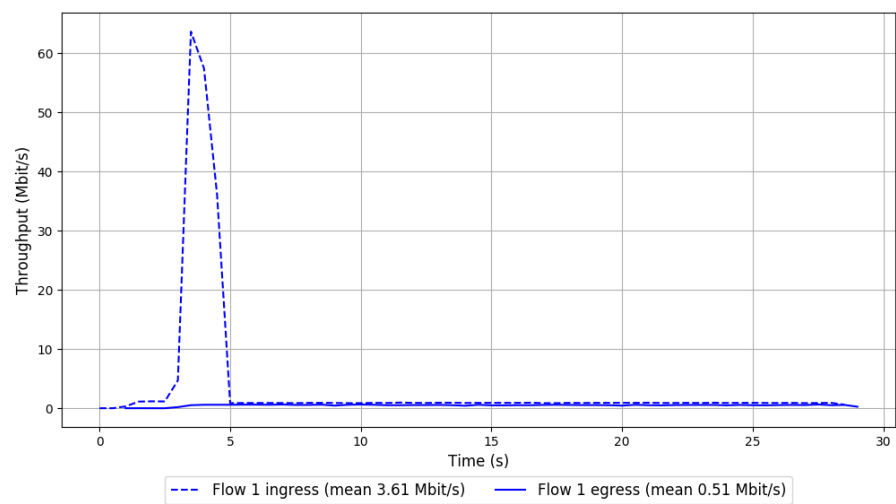
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 23726.461 ms

Loss rate: 86.45%

Run 2: Report of Indigo-MusesT — Data Link



Run 3: Statistics of Indigo-MusesT

Start at: 2019-03-19 07:42:29

End at: 2019-03-19 07:42:59

Local clock offset: -1.743 ms

Remote clock offset: 2.46 ms

Below is generated by plot.py at 2019-03-19 08:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 23718.353 ms

Loss rate: 87.22%

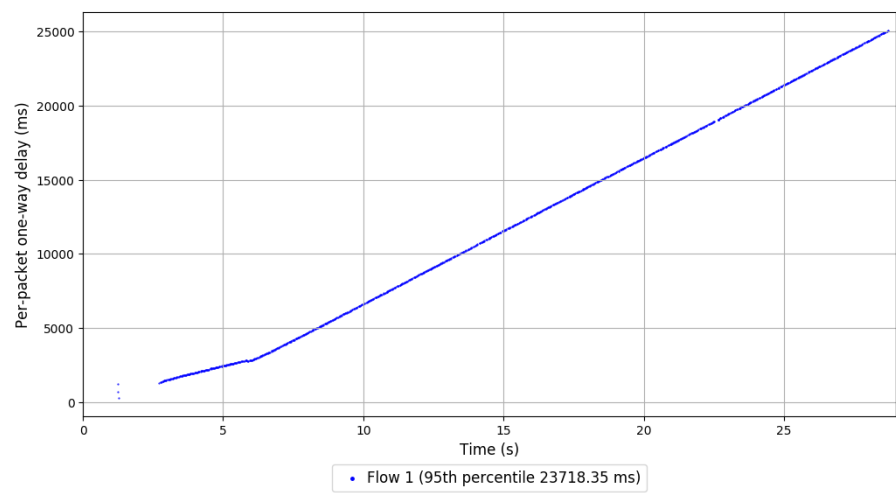
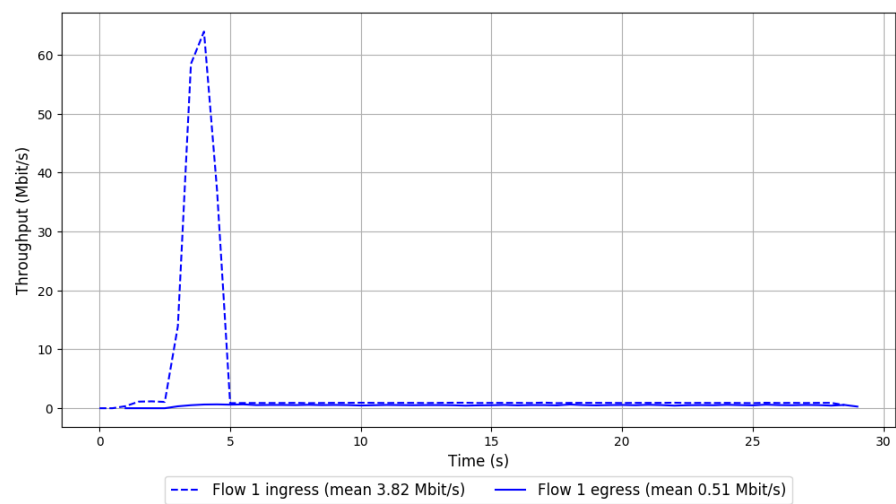
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 23718.353 ms

Loss rate: 87.22%

Run 3: Report of Indigo-MusesT — Data Link

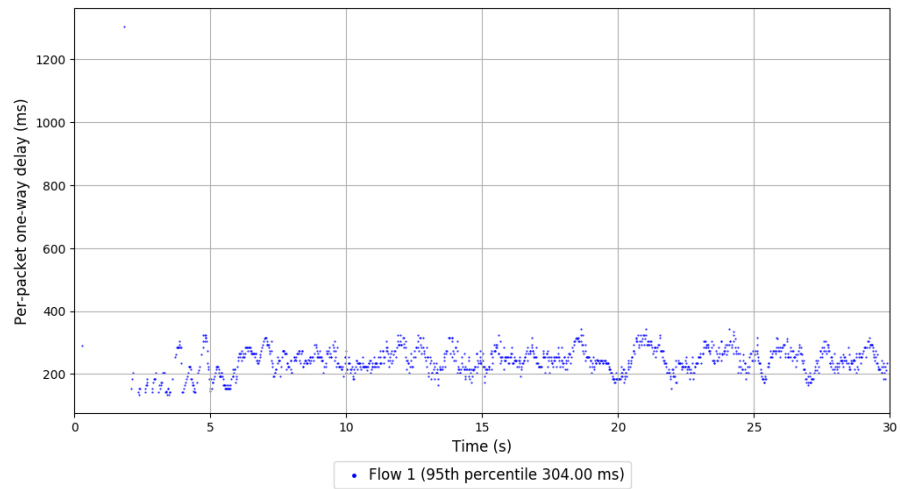
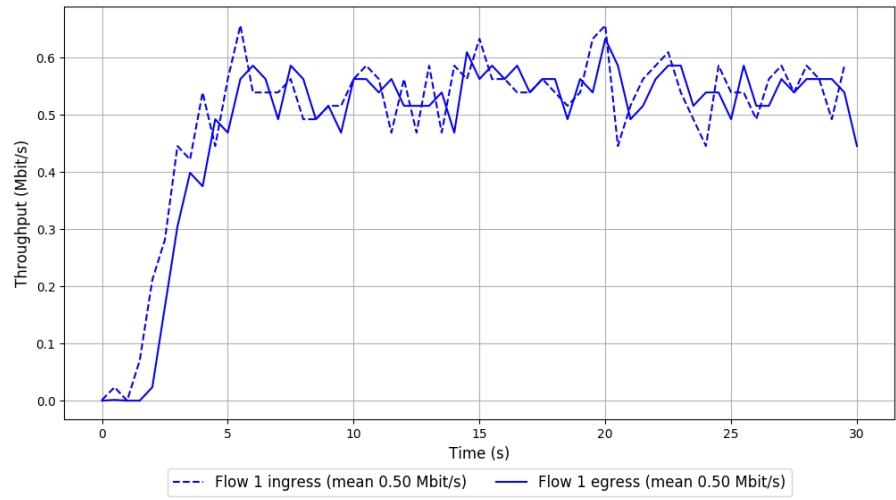



```
Run 1: Statistics of LEDBAT

Start at: 2019-03-19 07:14:15
End at: 2019-03-19 07:14:45
Local clock offset: -2.871 ms
Remote clock offset: 7.215 ms

# Below is generated by plot.py at 2019-03-19 08:05:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 303.995 ms
Loss rate: 1.26%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 303.995 ms
Loss rate: 1.26%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-03-19 07:39:04

End at: 2019-03-19 07:39:34

Local clock offset: -1.78 ms

Remote clock offset: 2.268 ms

Below is generated by plot.py at 2019-03-19 08:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 301.595 ms

Loss rate: 1.12%

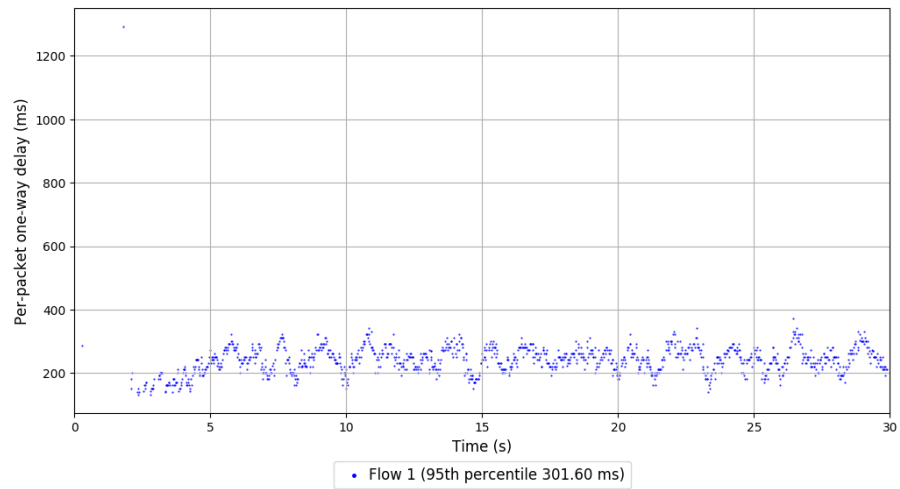
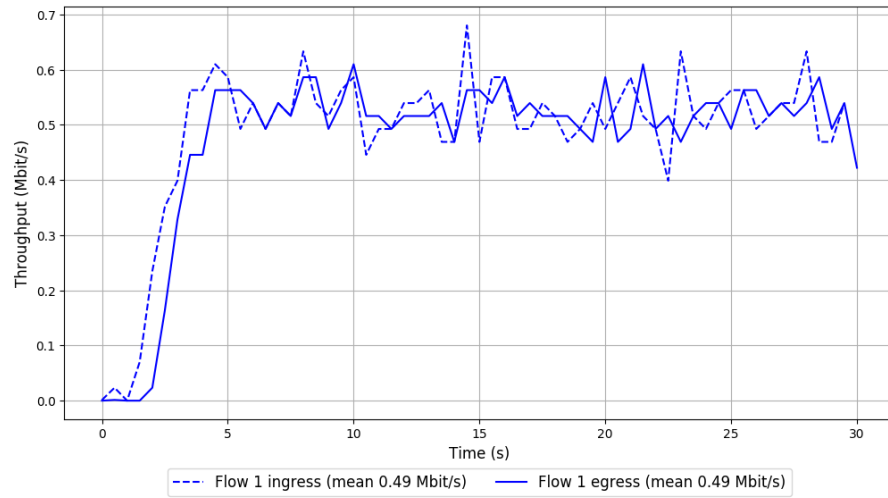
-- Flow 1:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 301.595 ms

Loss rate: 1.12%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-03-19 08:03:21

End at: 2019-03-19 08:03:51

Local clock offset: -3.34 ms

Remote clock offset: 3.514 ms

Below is generated by plot.py at 2019-03-19 08:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 309.314 ms

Loss rate: 1.00%

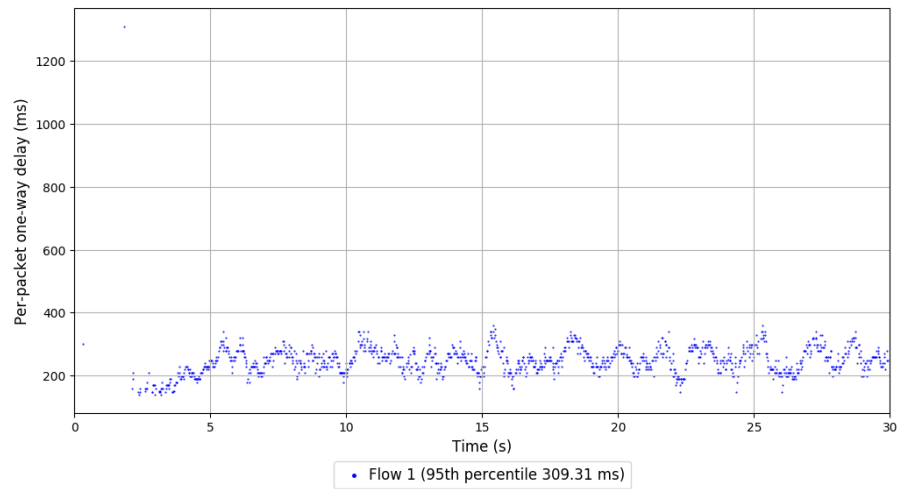
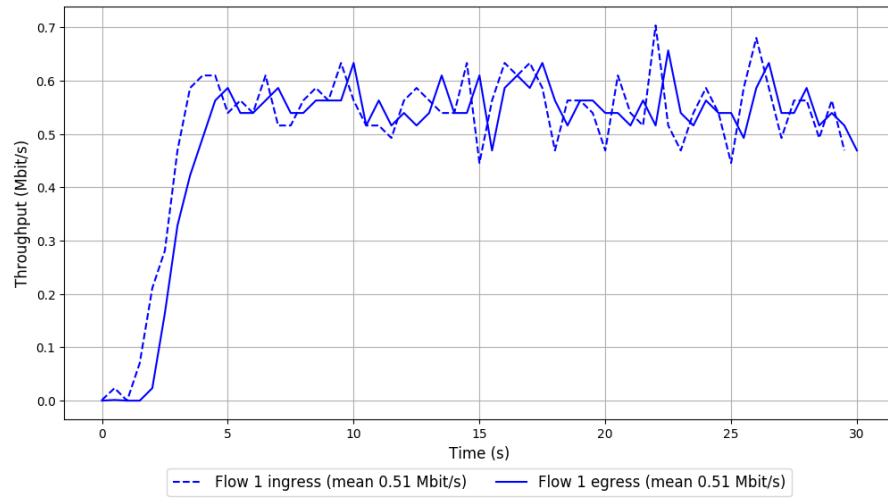
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 309.314 ms

Loss rate: 1.00%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2019-03-19 06:55:26

End at: 2019-03-19 06:55:56

Local clock offset: -3.448 ms

Remote clock offset: 8.715 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 26221.138 ms

Loss rate: 98.68%

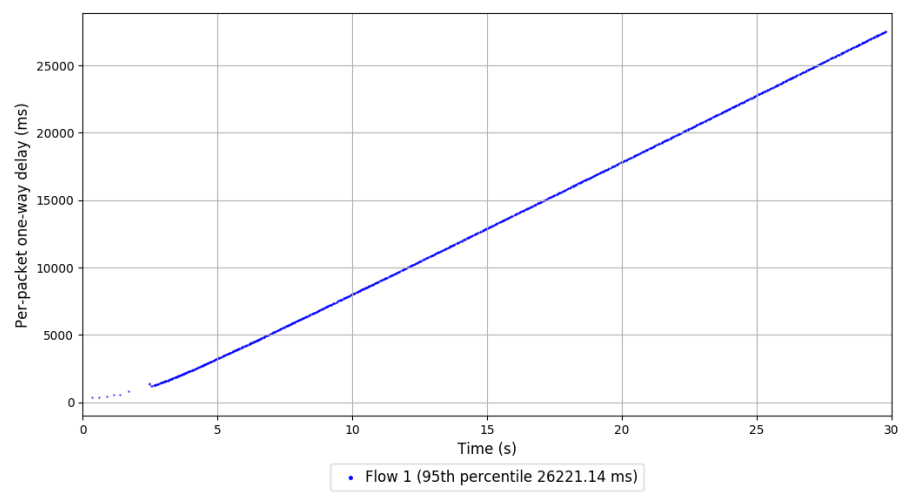
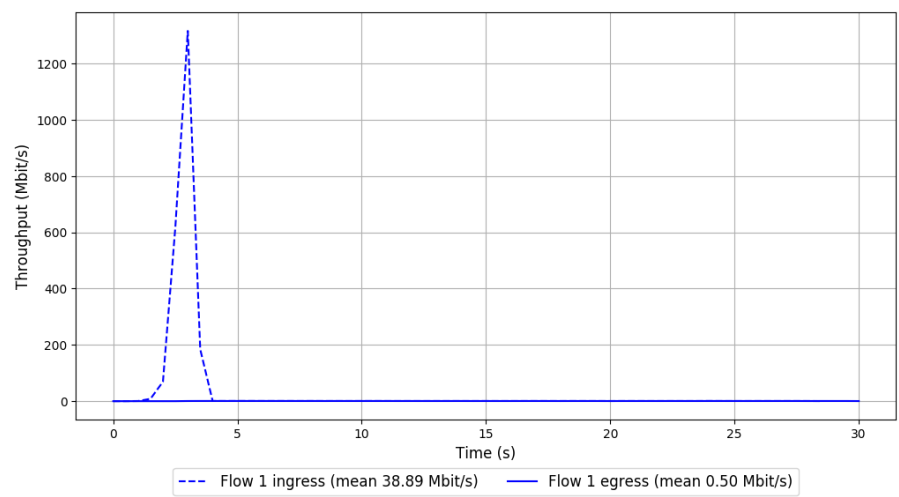
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 26221.138 ms

Loss rate: 98.68%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-03-19 07:20:19

End at: 2019-03-19 07:20:49

Local clock offset: -2.491 ms

Remote clock offset: 0.857 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 26134.964 ms

Loss rate: 98.60%

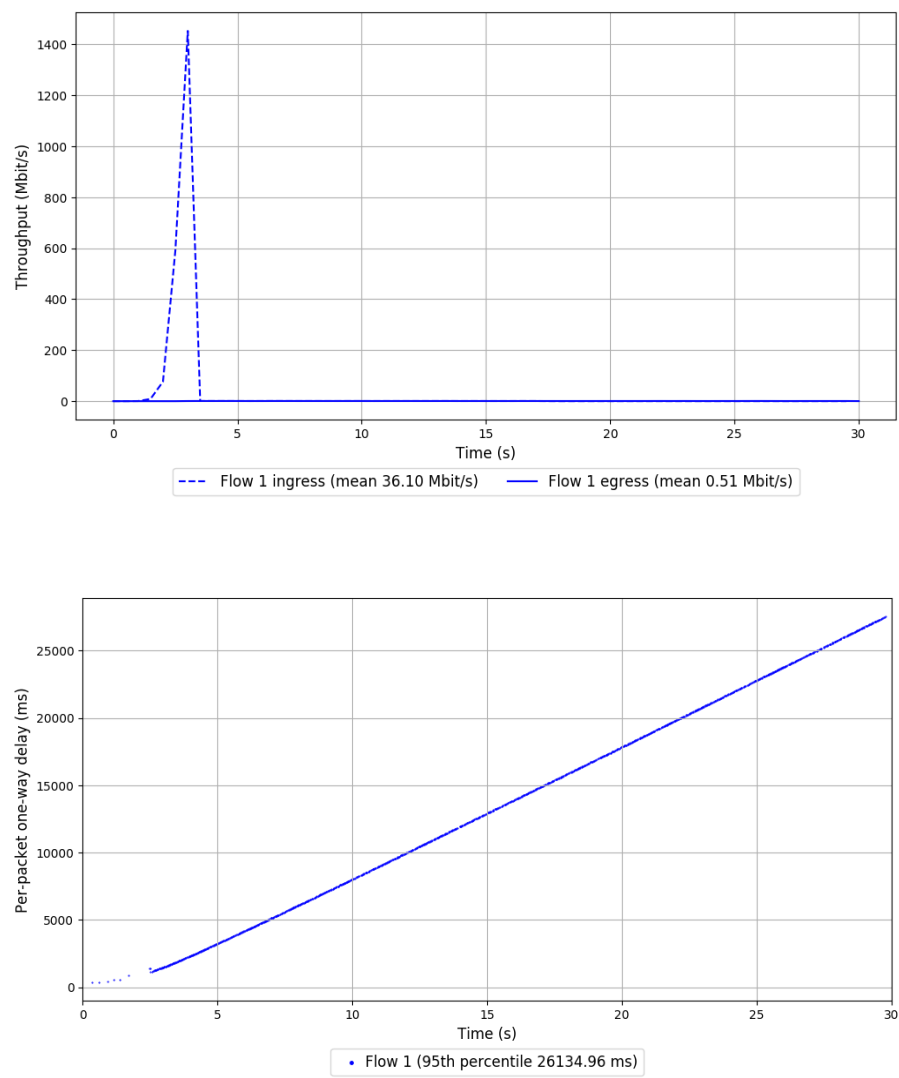
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 26134.964 ms

Loss rate: 98.60%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-03-19 07:44:50

End at: 2019-03-19 07:45:20

Local clock offset: -2.504 ms

Remote clock offset: 5.302 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 26203.032 ms

Loss rate: 98.63%

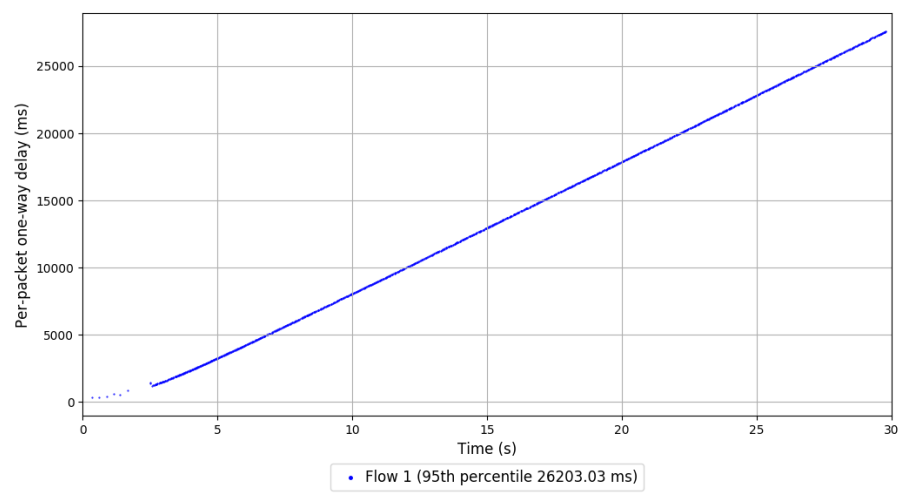
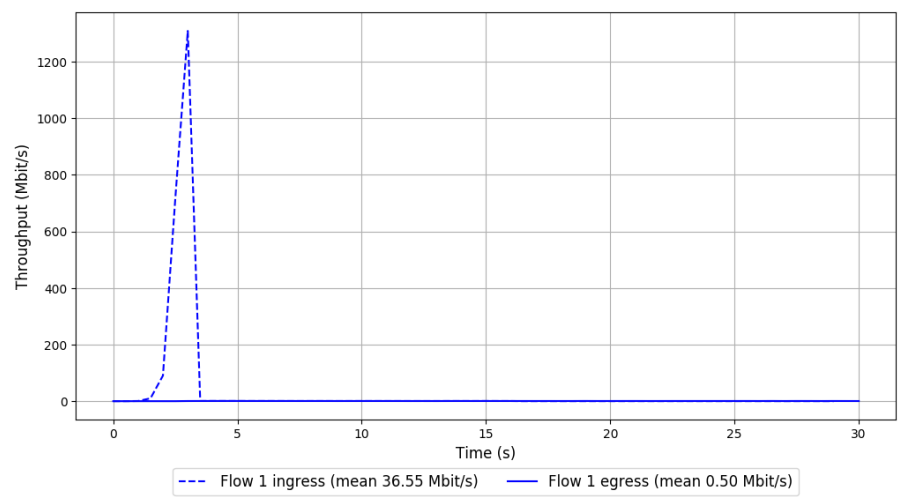
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 26203.032 ms

Loss rate: 98.63%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2019-03-19 07:06:14

End at: 2019-03-19 07:06:44

Local clock offset: -3.59 ms

Remote clock offset: 2.334 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 24856.937 ms

Loss rate: 91.37%

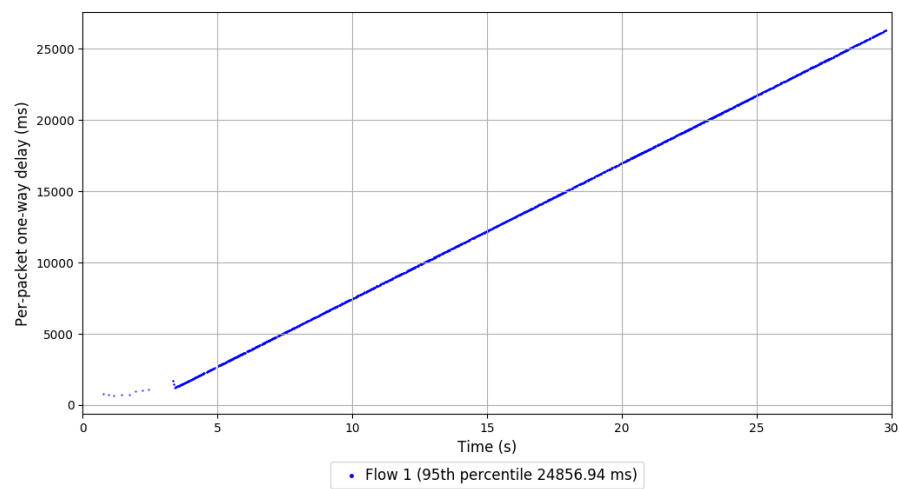
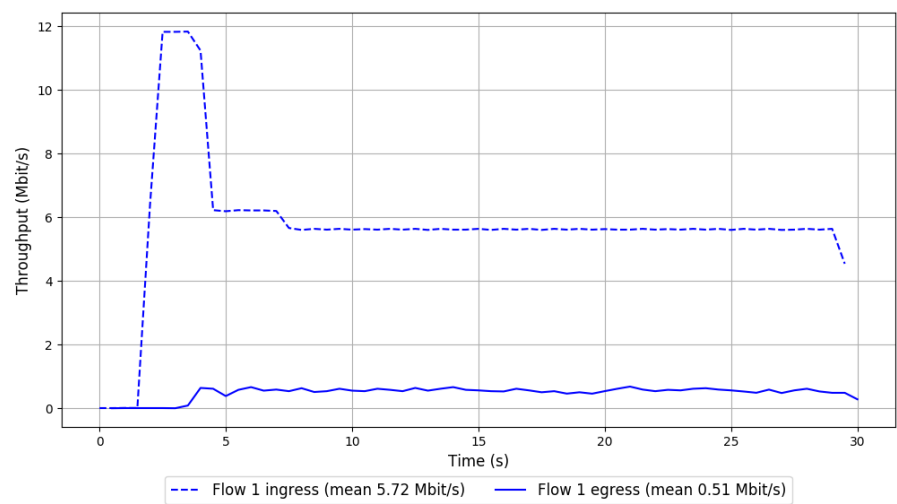
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 24856.937 ms

Loss rate: 91.37%

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2019-03-19 07:31:02

End at: 2019-03-19 07:31:32

Local clock offset: -2.762 ms

Remote clock offset: 2.072 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 25004.210 ms

Loss rate: 92.13%

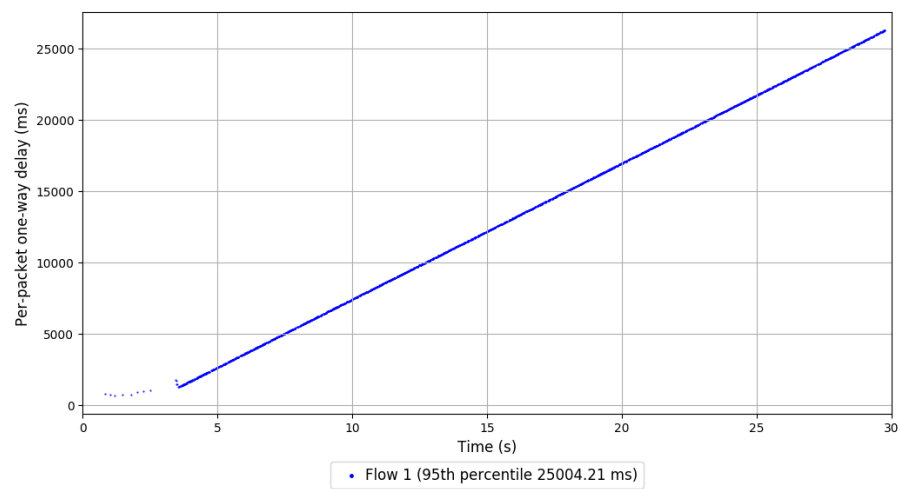
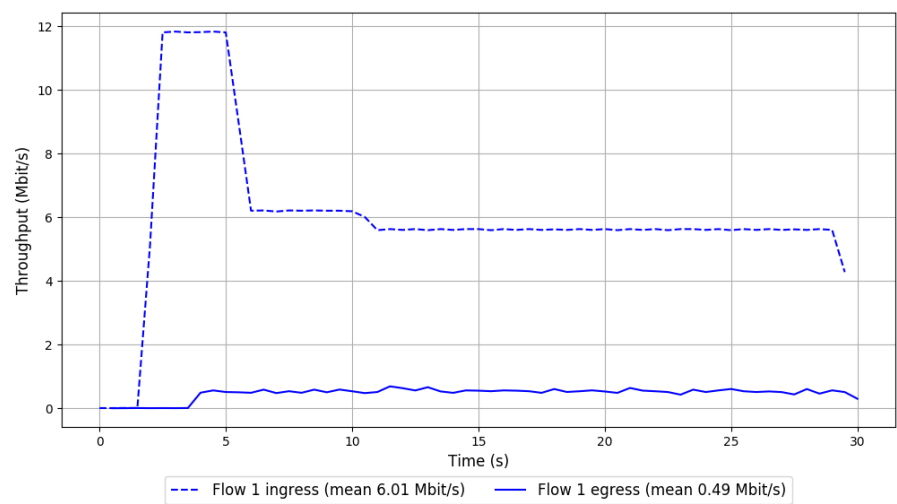
-- Flow 1:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 25004.210 ms

Loss rate: 92.13%

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2019-03-19 07:55:20

End at: 2019-03-19 07:55:50

Local clock offset: -3.086 ms

Remote clock offset: 6.923 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.42 Mbit/s

95th percentile per-packet one-way delay: 25335.735 ms

Loss rate: 93.51%

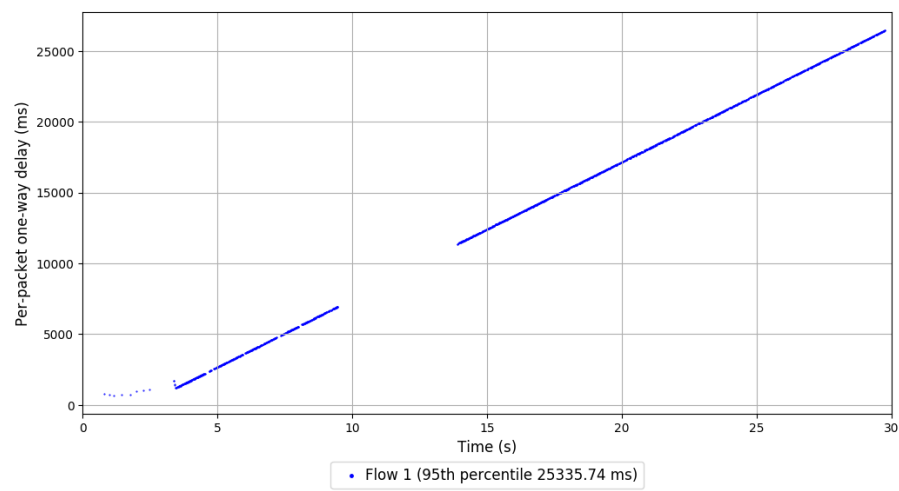
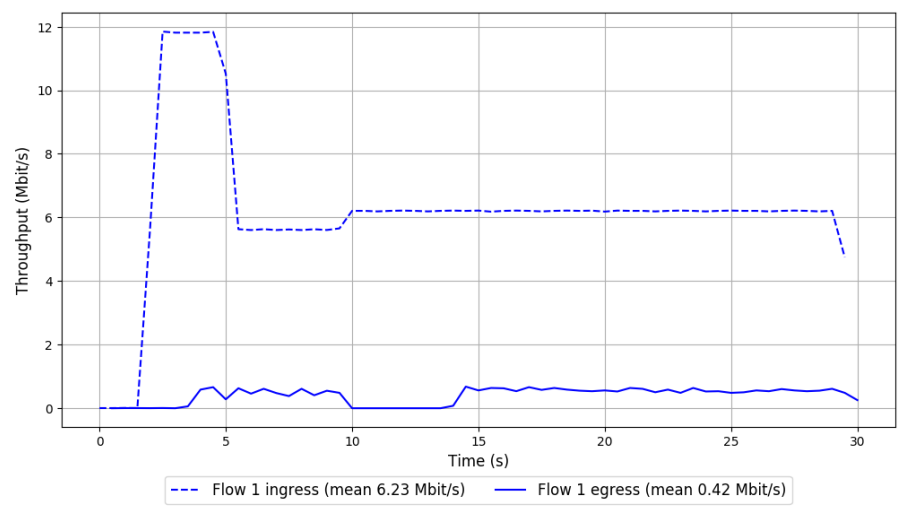
-- Flow 1:

Average throughput: 0.42 Mbit/s

95th percentile per-packet one-way delay: 25335.735 ms

Loss rate: 93.51%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-03-19 07:15:23

End at: 2019-03-19 07:15:53

Local clock offset: -2.934 ms

Remote clock offset: 4.92 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 8959.397 ms

Loss rate: 31.15%

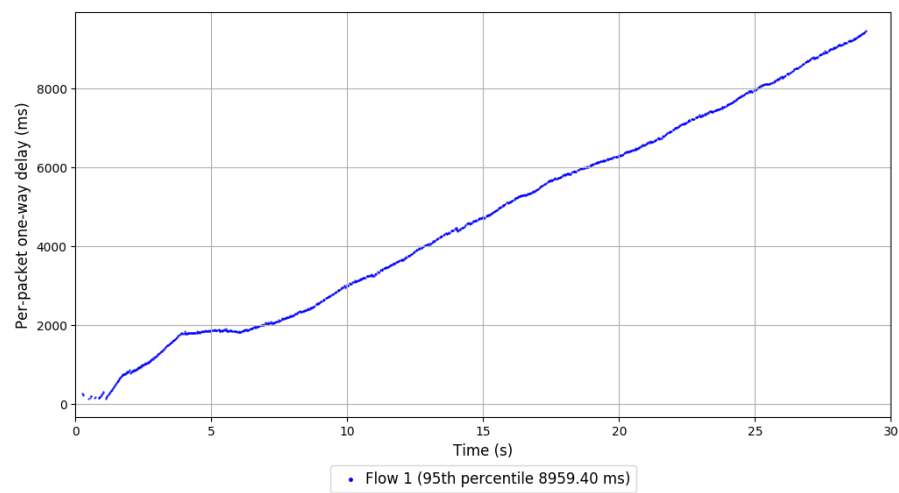
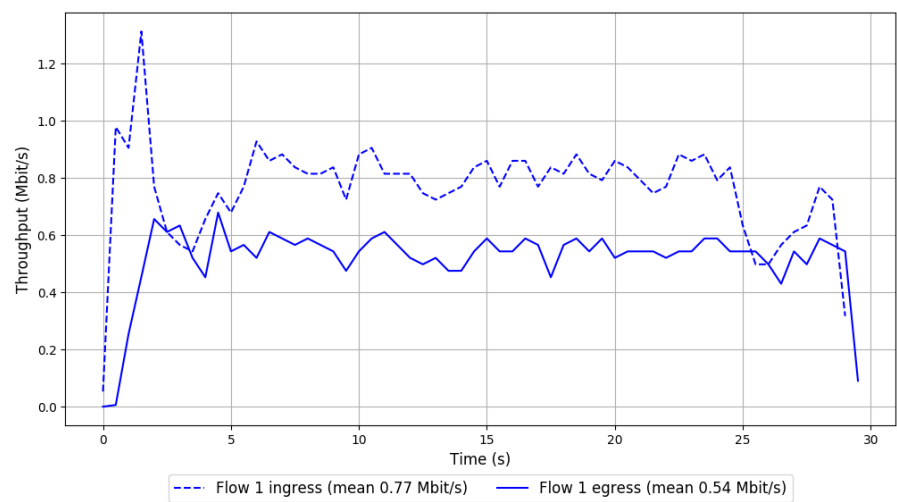
-- Flow 1:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 8959.397 ms

Loss rate: 31.15%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-03-19 07:40:12

End at: 2019-03-19 07:40:42

Local clock offset: -2.514 ms

Remote clock offset: 6.391 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 8805.655 ms

Loss rate: 33.15%

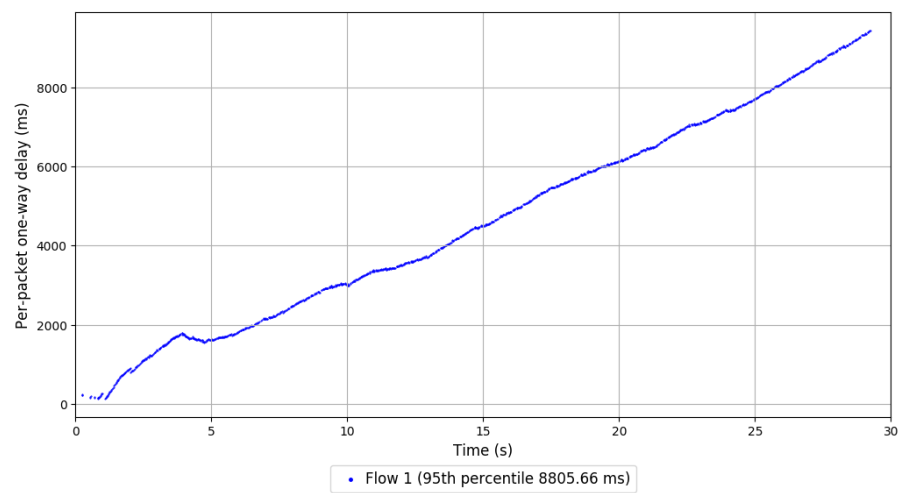
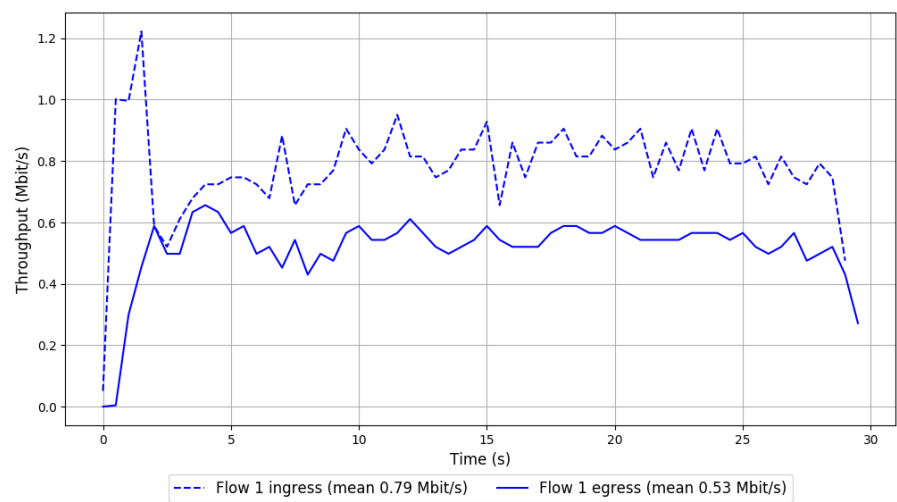
-- Flow 1:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 8805.655 ms

Loss rate: 33.15%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2019-03-19 08:04:29

End at: 2019-03-19 08:04:59

Local clock offset: -3.337 ms

Remote clock offset: 2.344 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 8722.756 ms

Loss rate: 30.82%

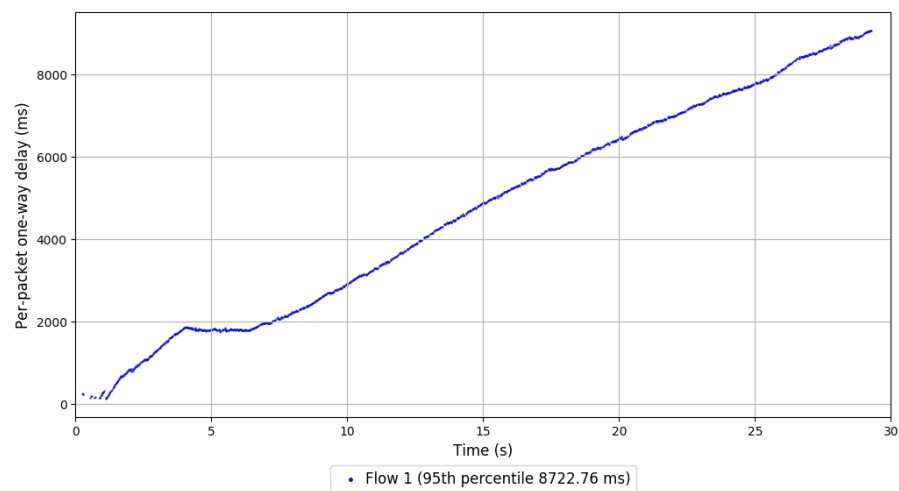
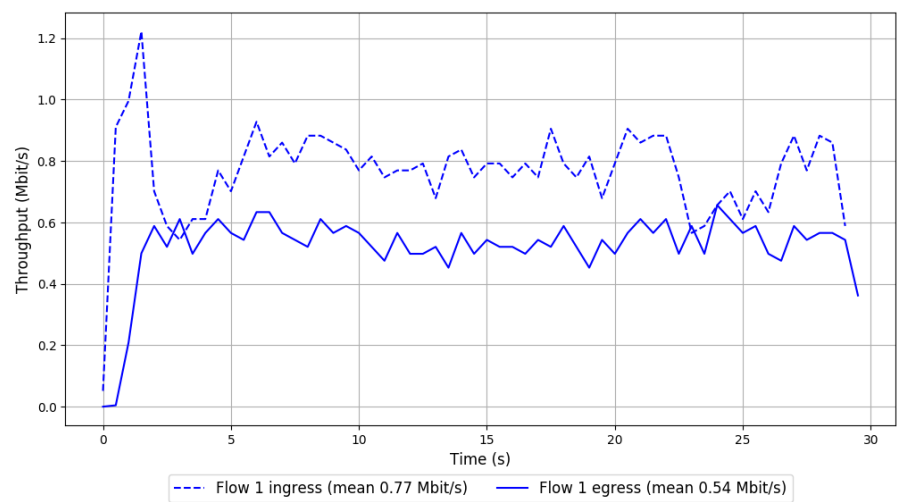
-- Flow 1:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 8722.756 ms

Loss rate: 30.82%

Run 3: Report of QUIC Cubic — Data Link

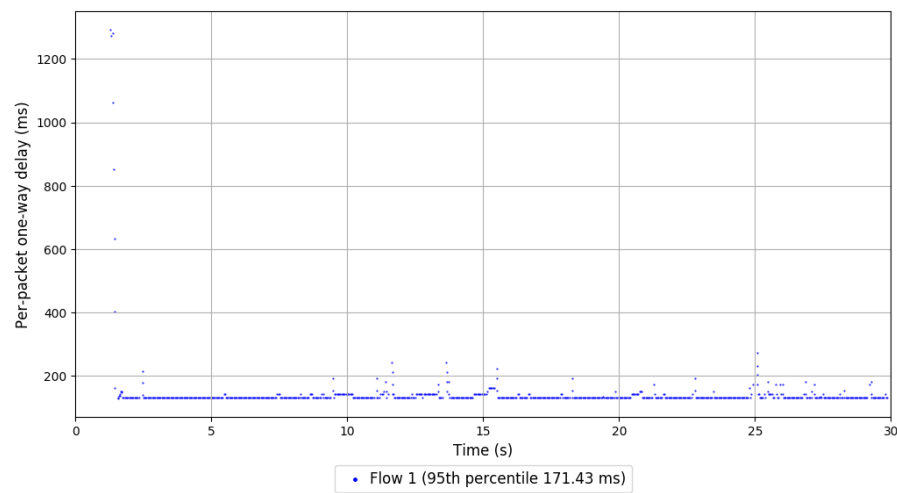
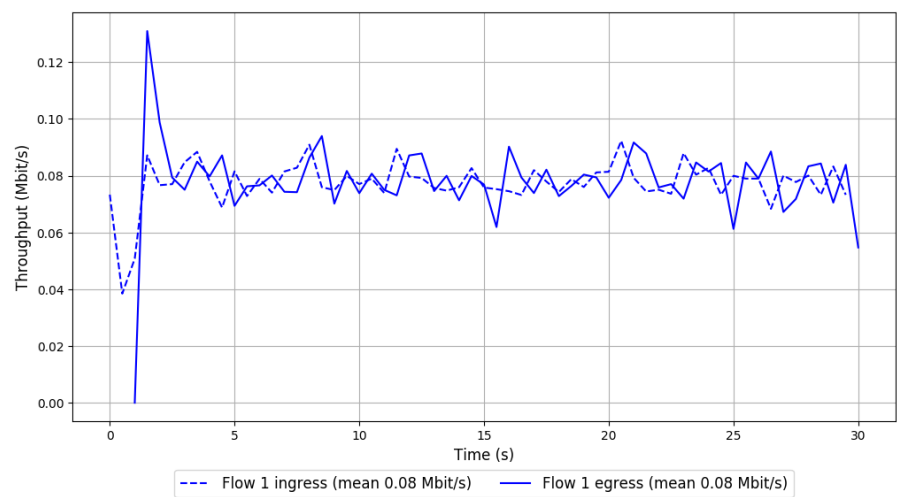


Run 1: Statistics of SCReAM

Start at: 2019-03-19 06:57:48
End at: 2019-03-19 06:58:18
Local clock offset: -2.748 ms
Remote clock offset: 11.256 ms

Below is generated by plot.py at 2019-03-19 08:05:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 171.430 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 171.430 ms
Loss rate: 0.79%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-03-19 07:22:37

End at: 2019-03-19 07:23:07

Local clock offset: -3.114 ms

Remote clock offset: 5.738 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 134.694 ms

Loss rate: 0.65%

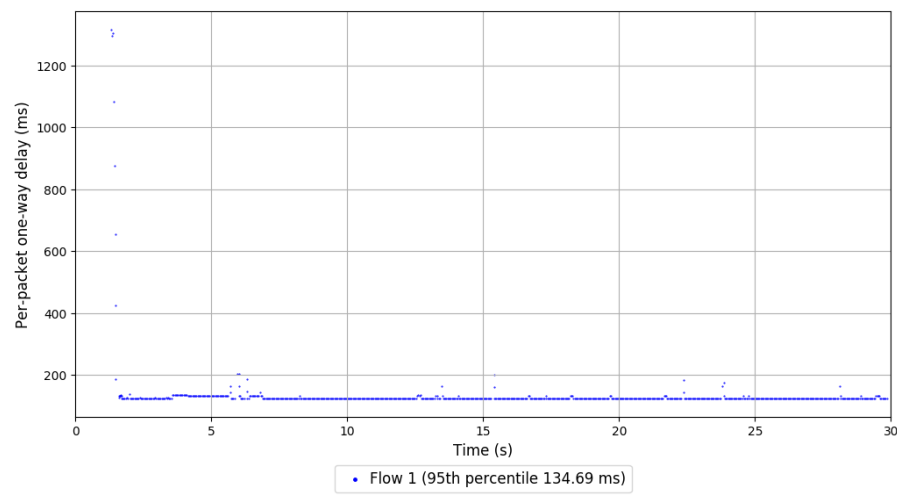
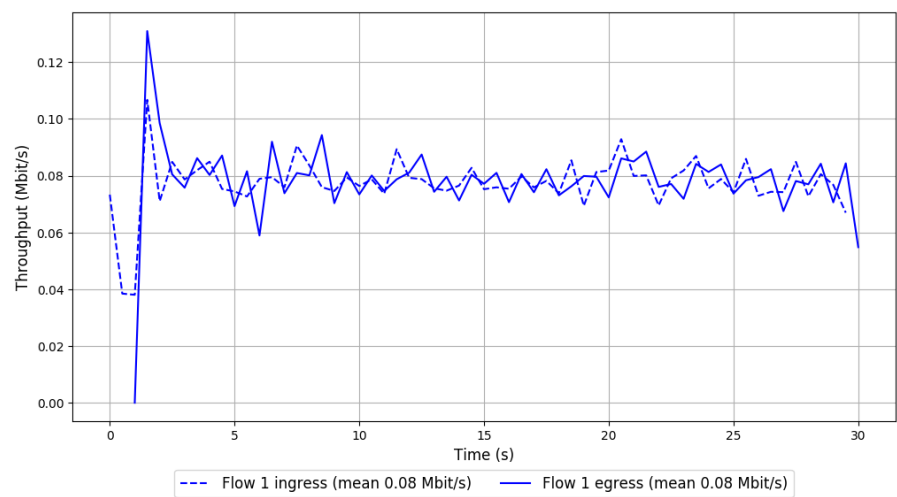
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 134.694 ms

Loss rate: 0.65%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2019-03-19 07:47:08

End at: 2019-03-19 07:47:38

Local clock offset: -2.528 ms

Remote clock offset: 5.447 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 168.844 ms

Loss rate: 0.92%

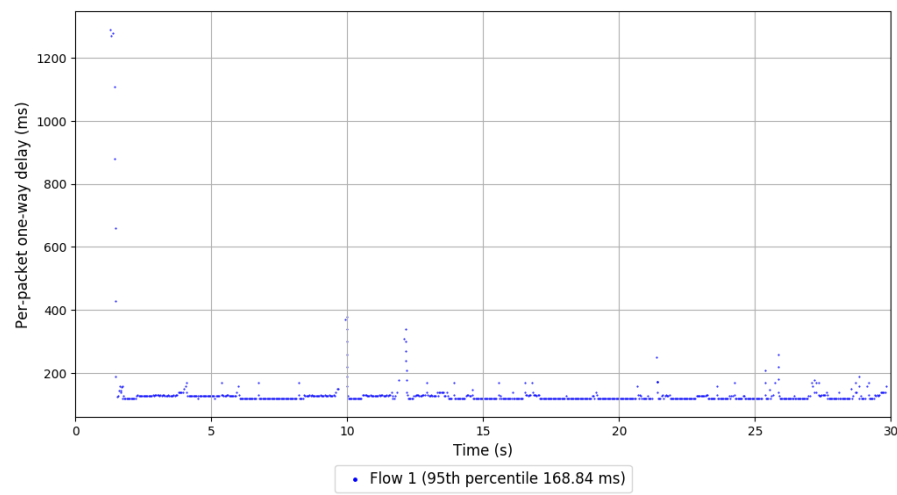
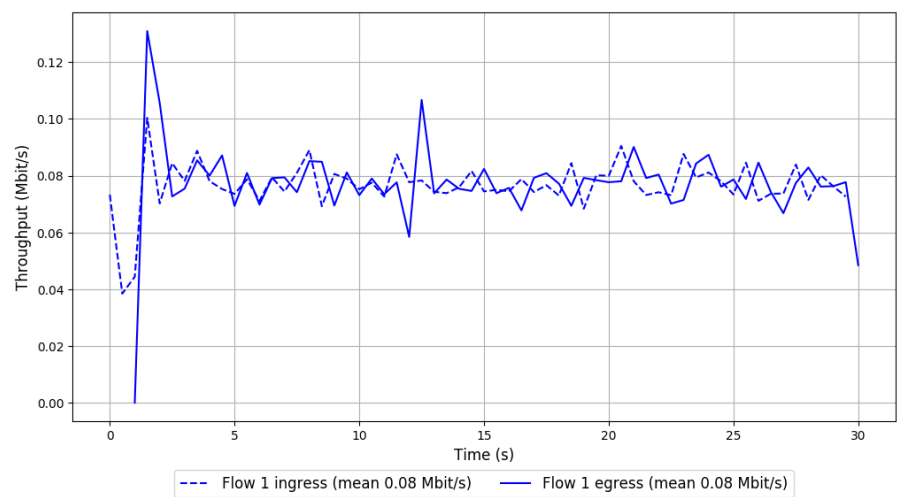
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 168.844 ms

Loss rate: 0.92%

Run 3: Report of SReAM — Data Link

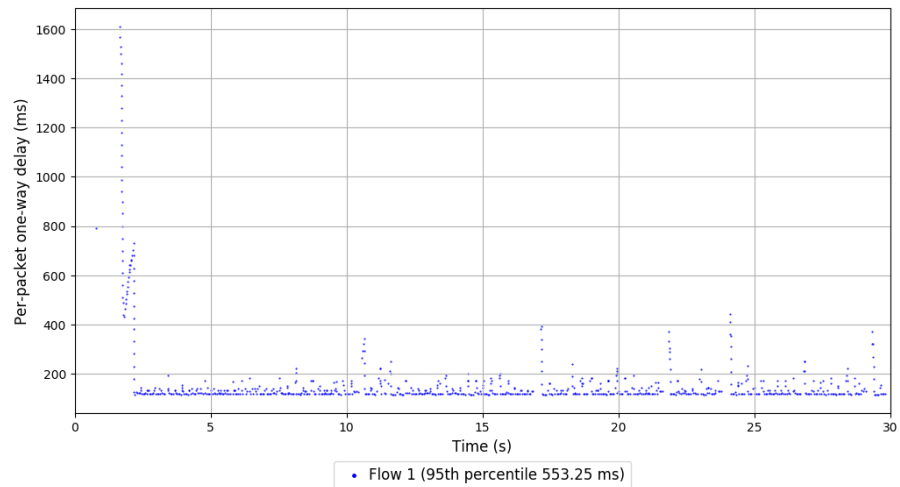
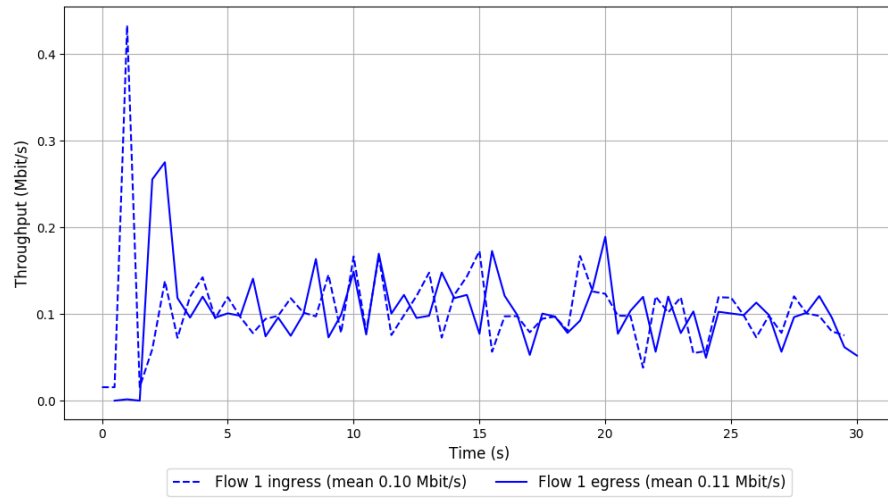


Run 1: Statistics of Sprout

Start at: 2019-03-19 06:54:18
End at: 2019-03-19 06:54:48
Local clock offset: -2.605 ms
Remote clock offset: 10.947 ms

Below is generated by plot.py at 2019-03-19 08:05:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 553.245 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 553.245 ms
Loss rate: 1.10%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

/home/ubuntu/pantheon/data/2019-03-19T06-51-Colombia-cellular-to-AWS-Brazil-2-3-runs/sprout.

Run 2: Report of Sprout — Data Link

Figure is missing

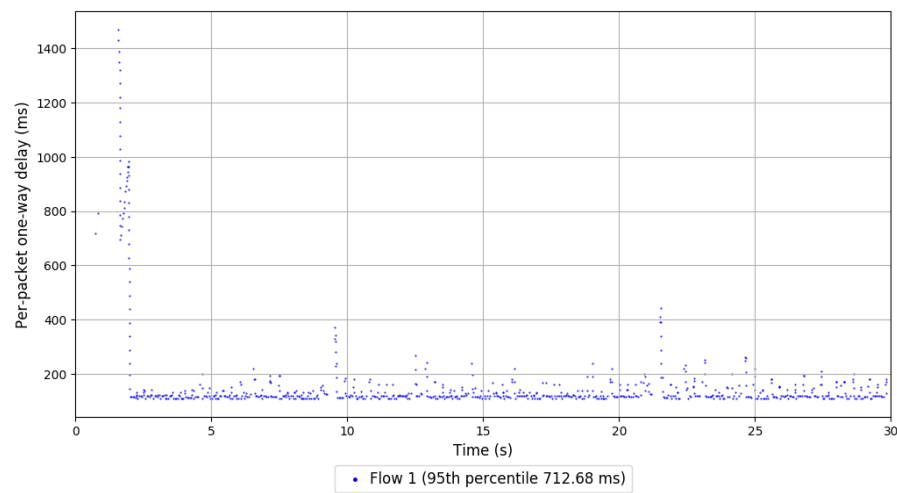
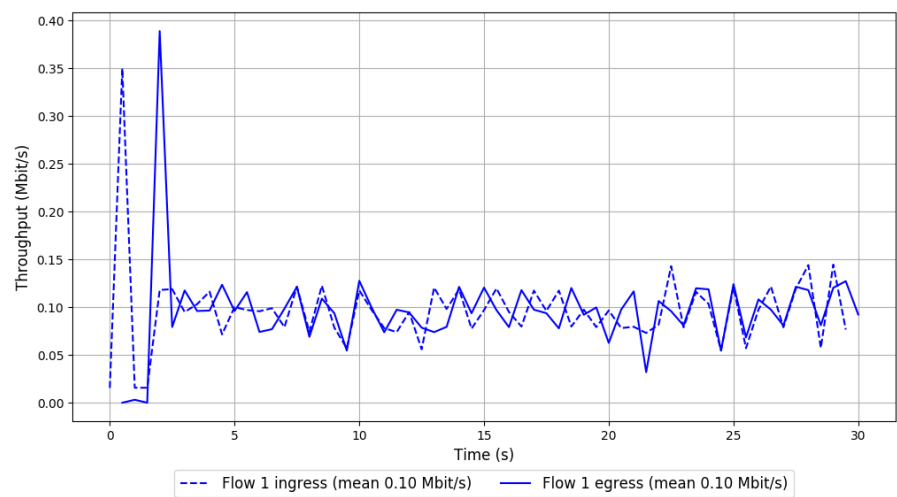
Figure is missing

Run 3: Statistics of Sprout

Start at: 2019-03-19 07:43:42
End at: 2019-03-19 07:44:12
Local clock offset: -2.516 ms
Remote clock offset: 6.215 ms

Below is generated by plot.py at 2019-03-19 08:05:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 712.681 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 712.681 ms
Loss rate: 0.11%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2019-03-19 07:13:07

End at: 2019-03-19 07:13:37

Local clock offset: -3.622 ms

Remote clock offset: 1.195 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 981.642 ms

Loss rate: 2.53%

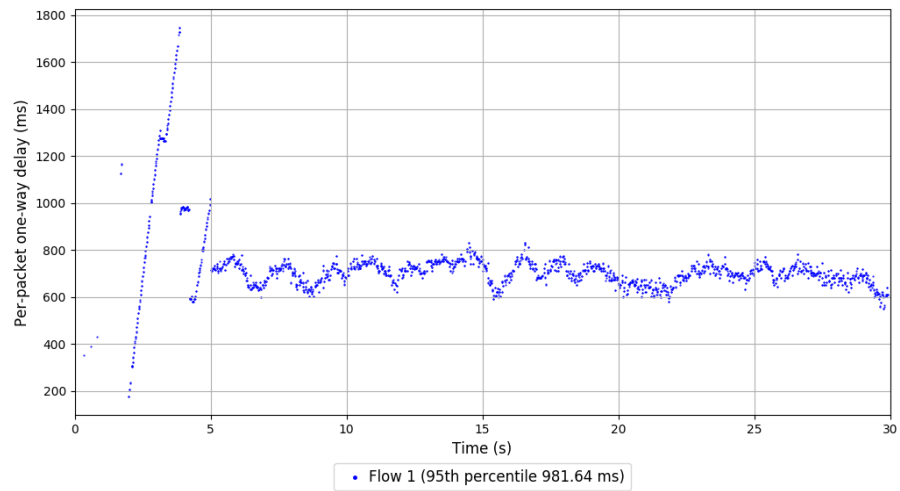
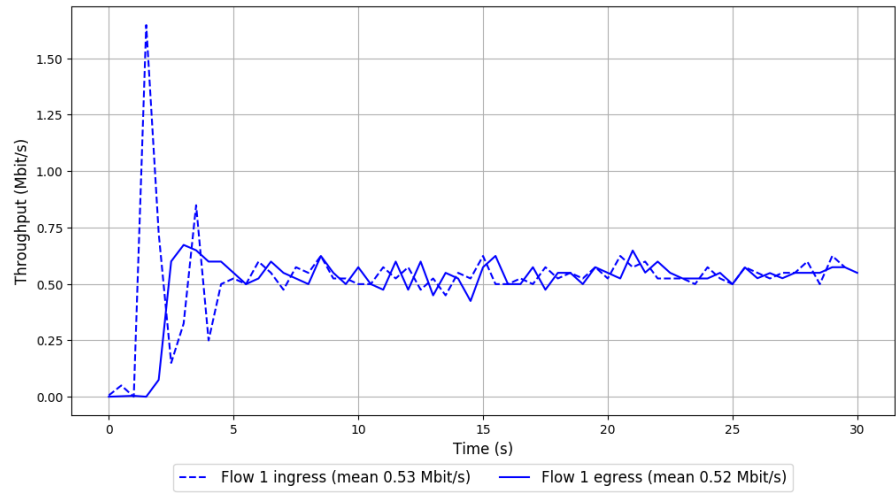
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 981.642 ms

Loss rate: 2.53%

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



Run 2: Statistics of TaoVA-100x

Start at: 2019-03-19 07:37:56

End at: 2019-03-19 07:38:26

Local clock offset: -2.561 ms

Remote clock offset: 6.2 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 1044.186 ms

Loss rate: 2.59%

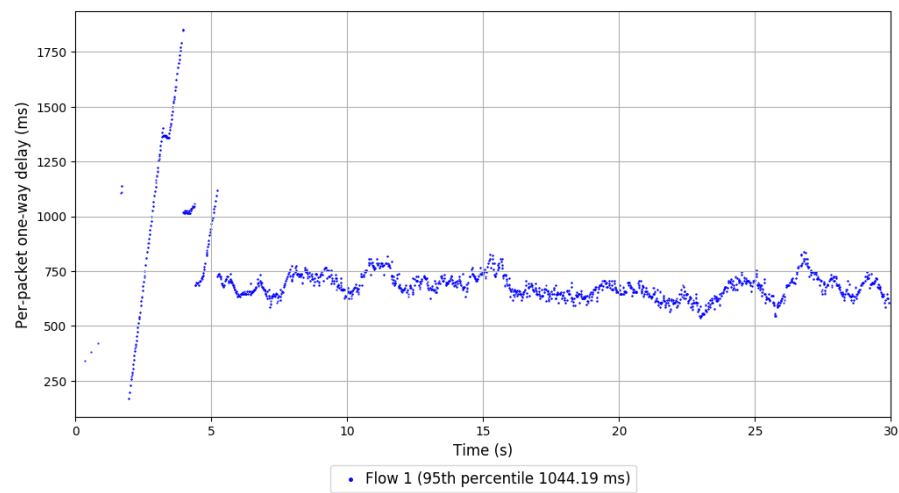
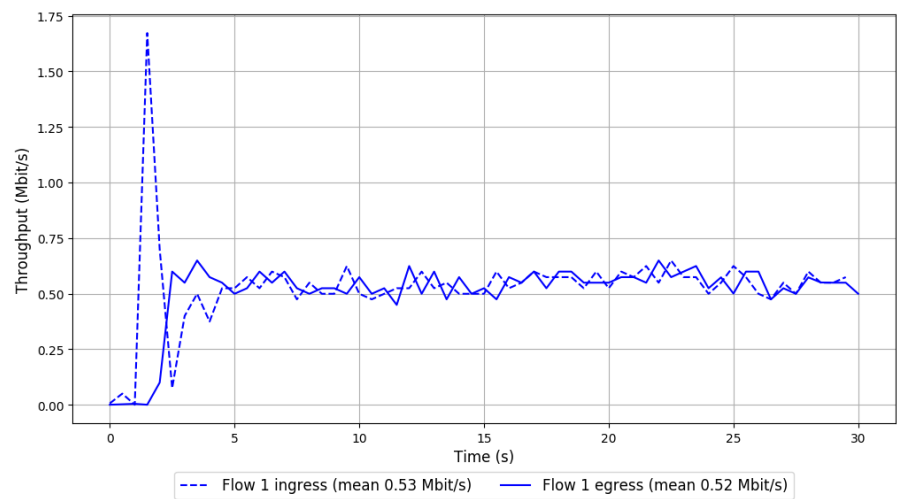
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 1044.186 ms

Loss rate: 2.59%

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



Run 3: Statistics of TaoVA-100x

Start at: 2019-03-19 08:02:13

End at: 2019-03-19 08:02:43

Local clock offset: -3.322 ms

Remote clock offset: 3.367 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 1299.696 ms

Loss rate: 2.69%

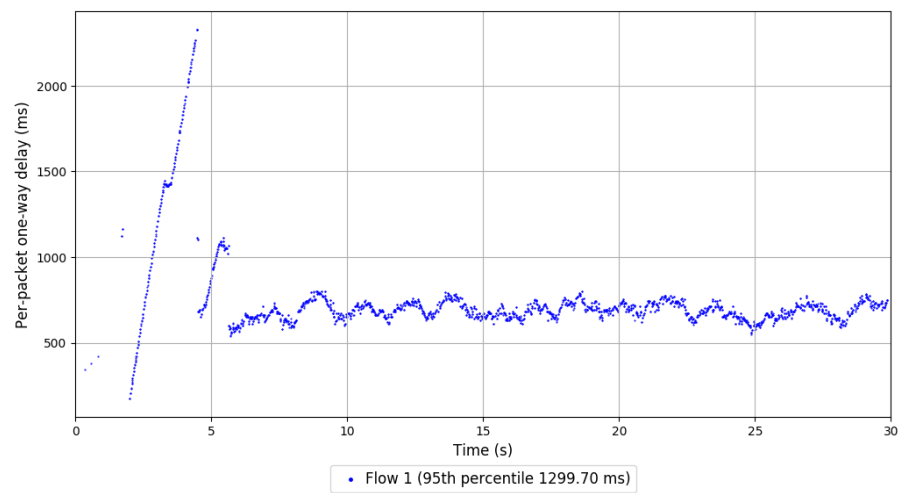
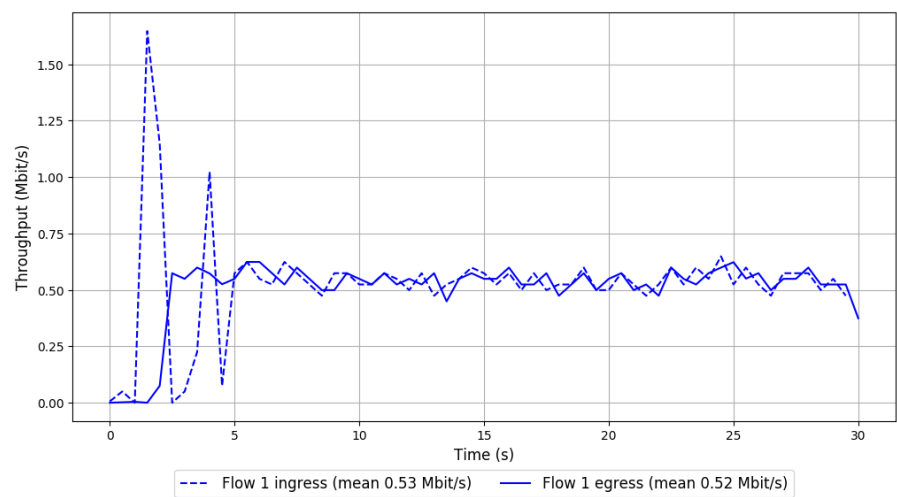
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 1299.696 ms

Loss rate: 2.69%

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



Run 1: Statistics of TCP Vegas

Start at: 2019-03-19 07:03:52

End at: 2019-03-19 07:04:22

Local clock offset: -3.573 ms

Remote clock offset: 9.146 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 752.745 ms

Loss rate: 0.92%

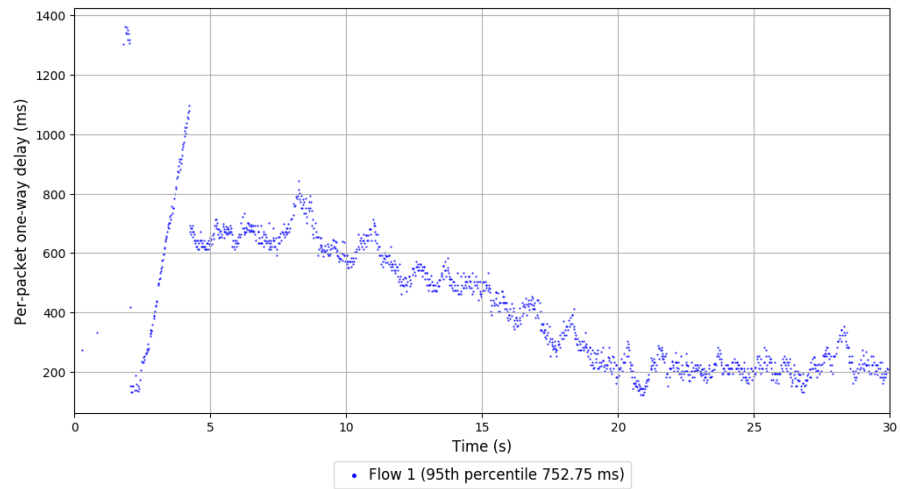
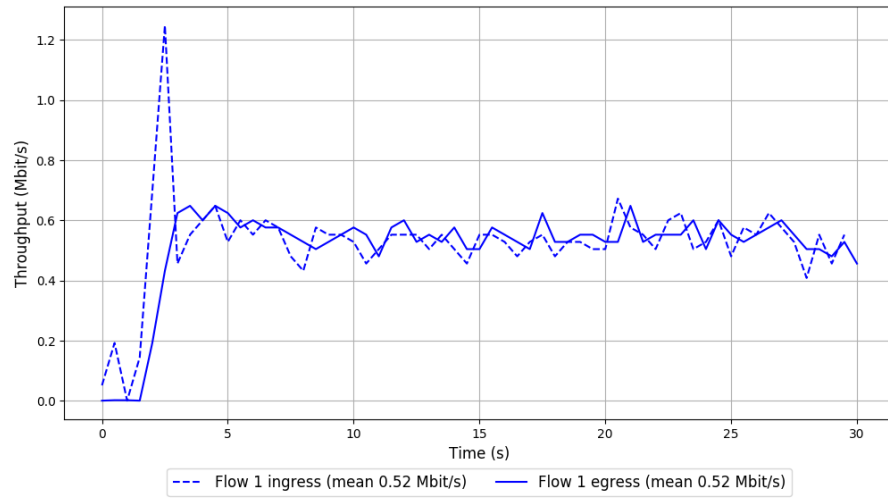
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 752.745 ms

Loss rate: 0.92%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2019-03-19 07:28:41

End at: 2019-03-19 07:29:11

Local clock offset: -2.089 ms

Remote clock offset: 1.938 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 922.862 ms

Loss rate: 1.19%

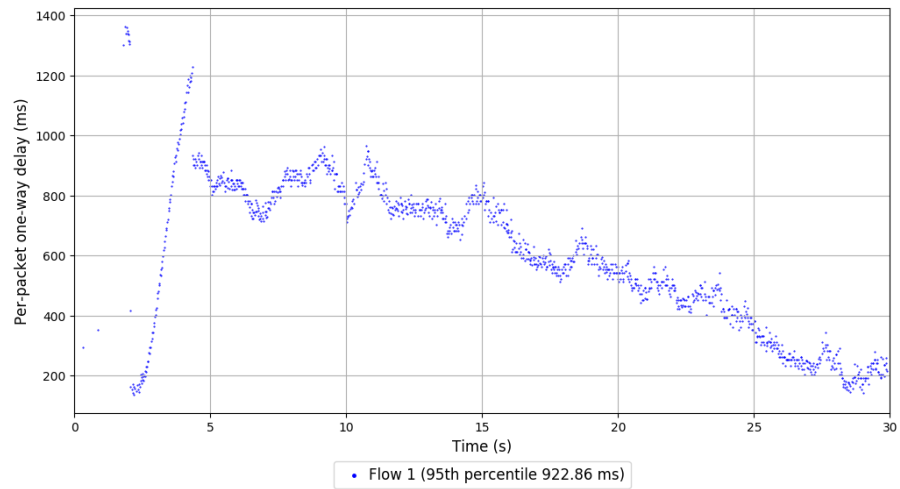
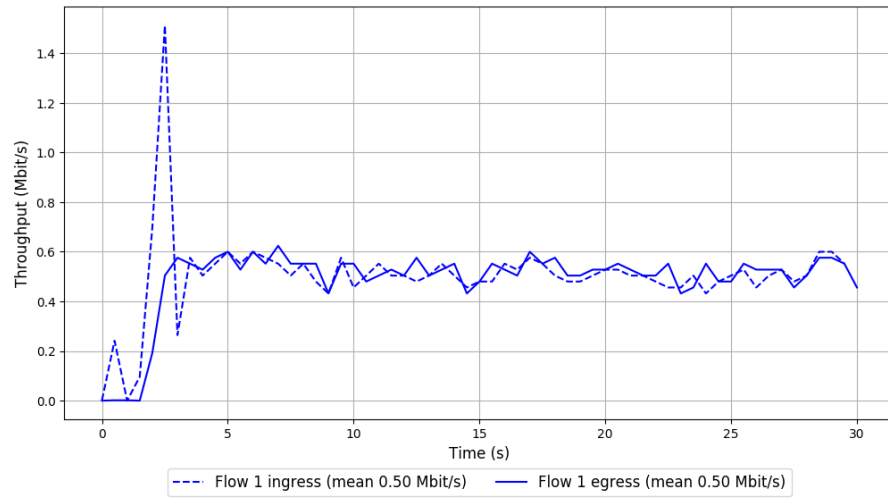
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 922.862 ms

Loss rate: 1.19%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2019-03-19 07:52:58

End at: 2019-03-19 07:53:28

Local clock offset: -2.316 ms

Remote clock offset: 6.799 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 769.071 ms

Loss rate: 1.03%

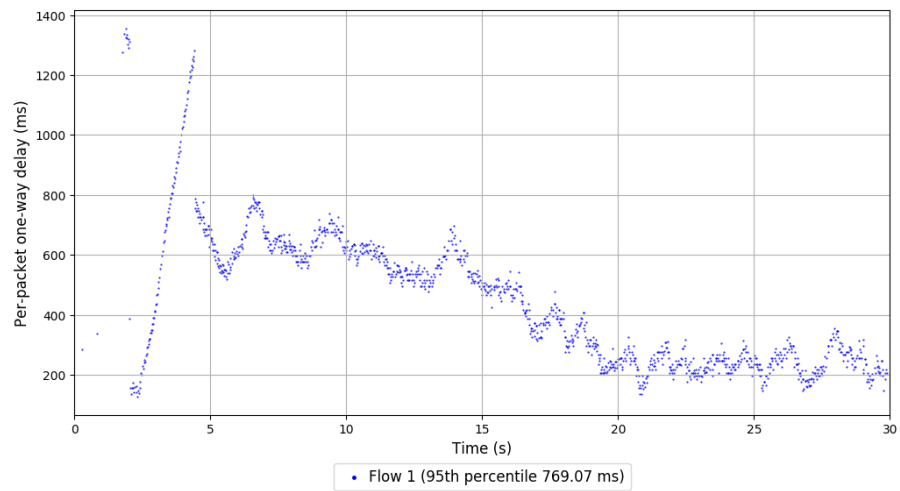
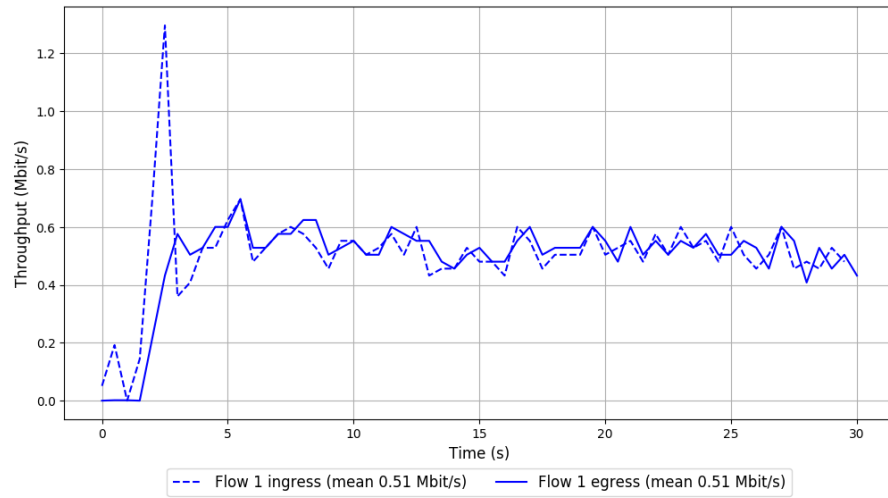
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 769.071 ms

Loss rate: 1.03%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2019-03-19 07:10:50

End at: 2019-03-19 07:11:20

Local clock offset: -3.604 ms

Remote clock offset: 5.289 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 1797.635 ms

Loss rate: 3.82%

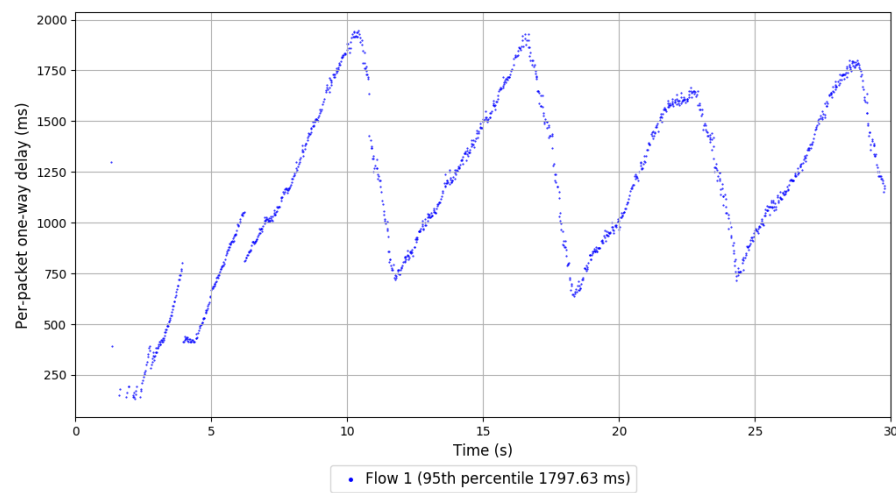
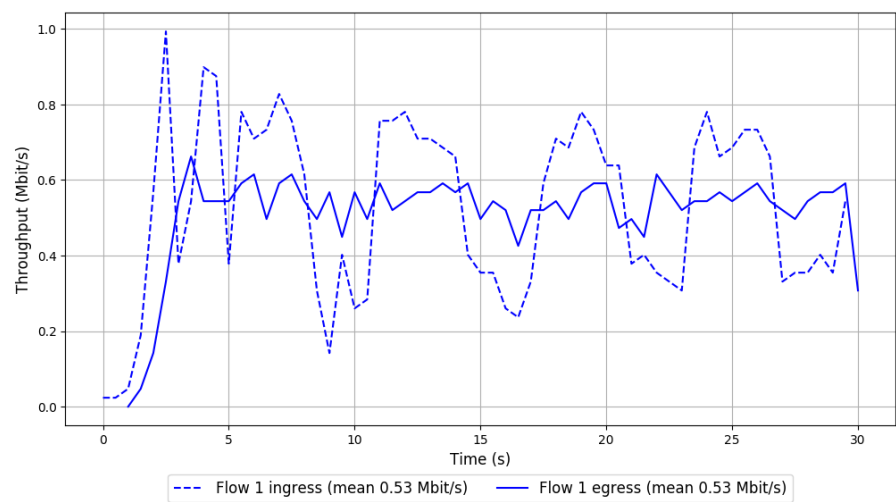
-- Flow 1:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 1797.635 ms

Loss rate: 3.82%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-03-19 07:35:39

End at: 2019-03-19 07:36:09

Local clock offset: -1.938 ms

Remote clock offset: 1.114 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 1739.904 ms

Loss rate: 2.89%

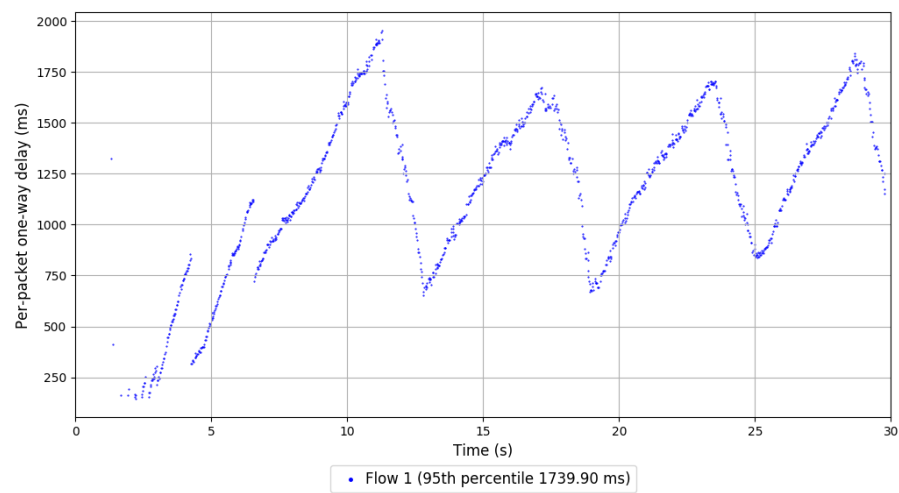
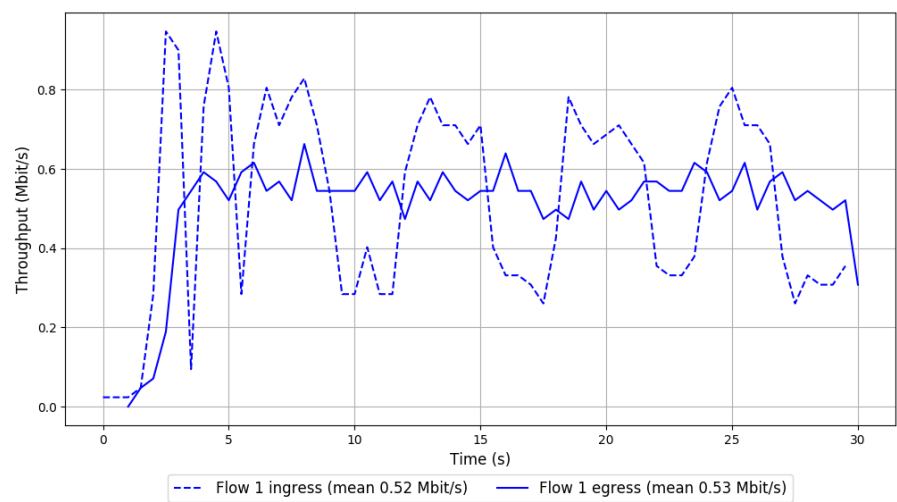
-- Flow 1:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 1739.904 ms

Loss rate: 2.89%

Run 2: Report of Verus — Data Link

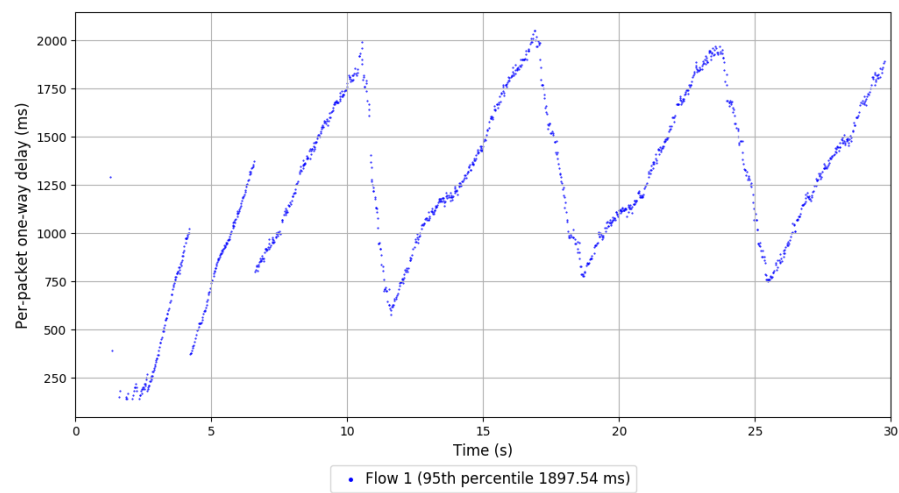
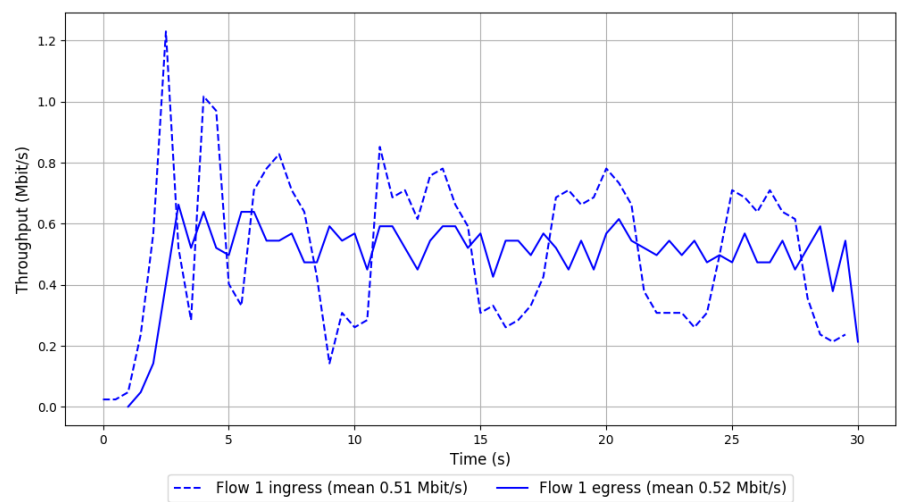


Run 3: Statistics of Verus

Start at: 2019-03-19 07:59:57
End at: 2019-03-19 08:00:27
Local clock offset: -2.508 ms
Remote clock offset: 7.147 ms

Below is generated by plot.py at 2019-03-19 08:05:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 1897.536 ms
Loss rate: 3.78%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 1897.536 ms
Loss rate: 3.78%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-03-19 07:00:04

End at: 2019-03-19 07:00:34

Local clock offset: -3.517 ms

Remote clock offset: 8.699 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 21662.520 ms

Loss rate: 75.83%

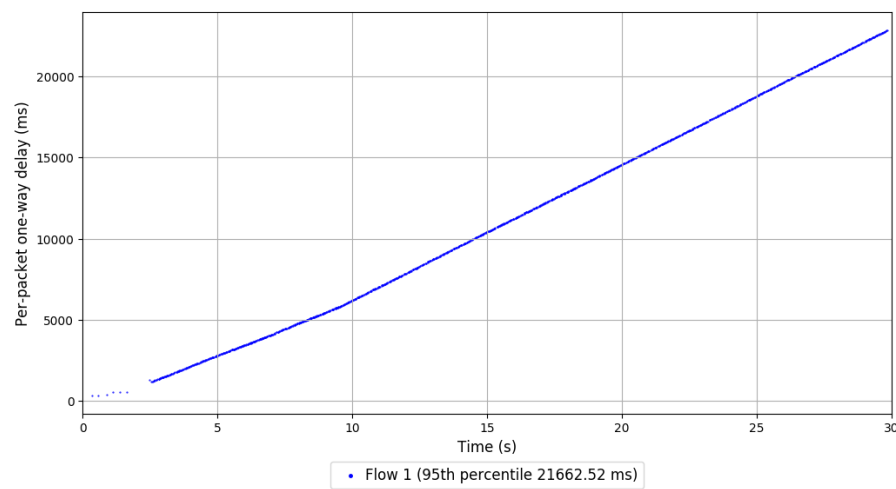
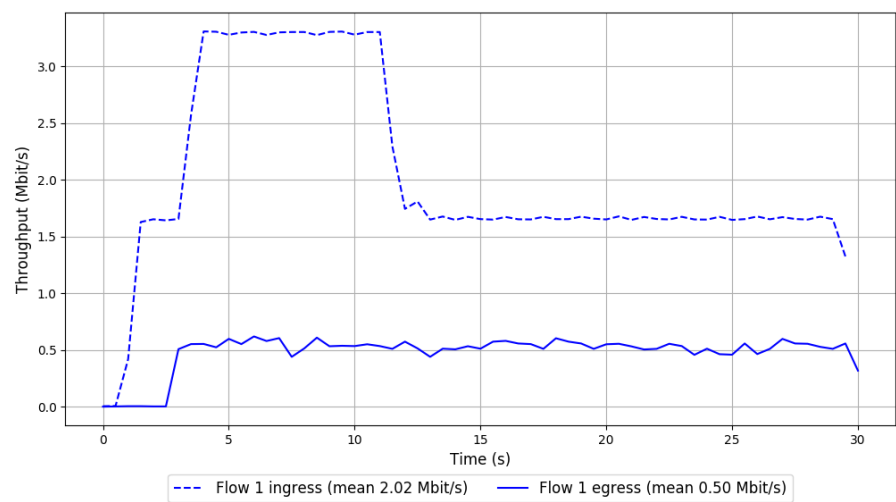
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 21662.520 ms

Loss rate: 75.83%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-03-19 07:24:54

End at: 2019-03-19 07:25:24

Local clock offset: -3.07 ms

Remote clock offset: 1.963 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 21618.198 ms

Loss rate: 74.77%

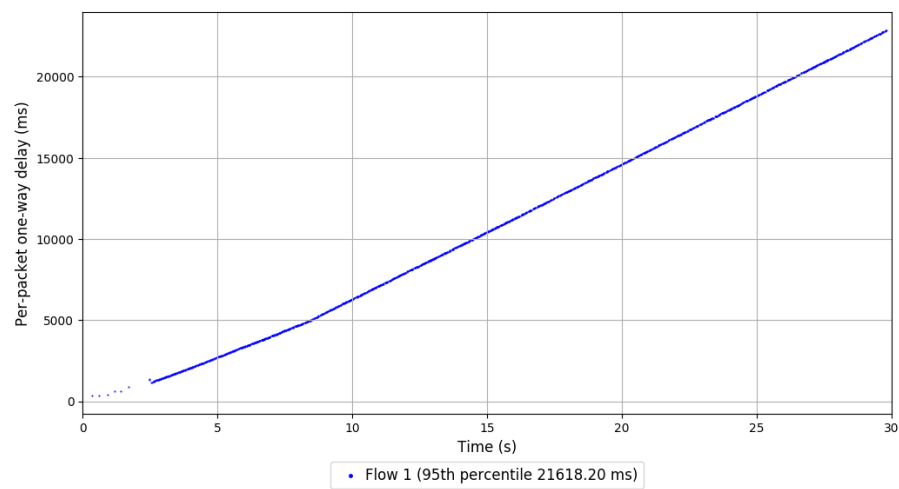
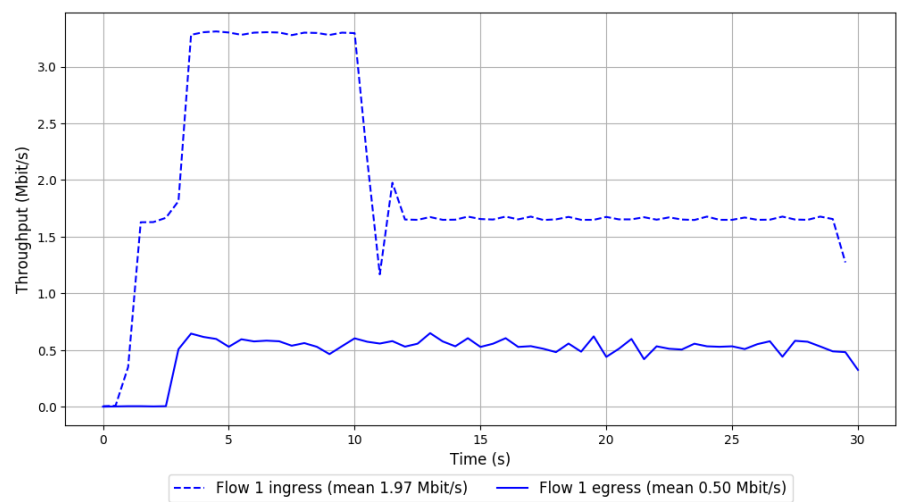
-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 21618.198 ms

Loss rate: 74.77%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-03-19 07:49:24

End at: 2019-03-19 07:49:54

Local clock offset: -2.045 ms

Remote clock offset: 6.616 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 21534.418 ms

Loss rate: 74.60%

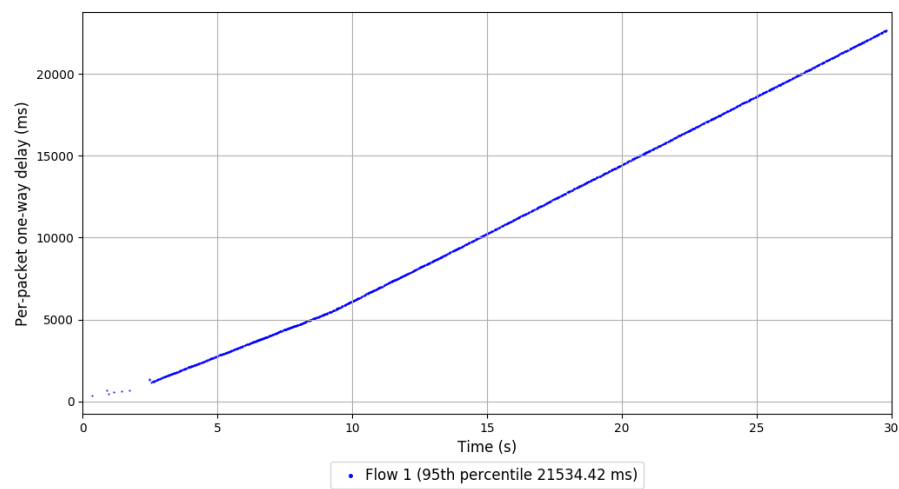
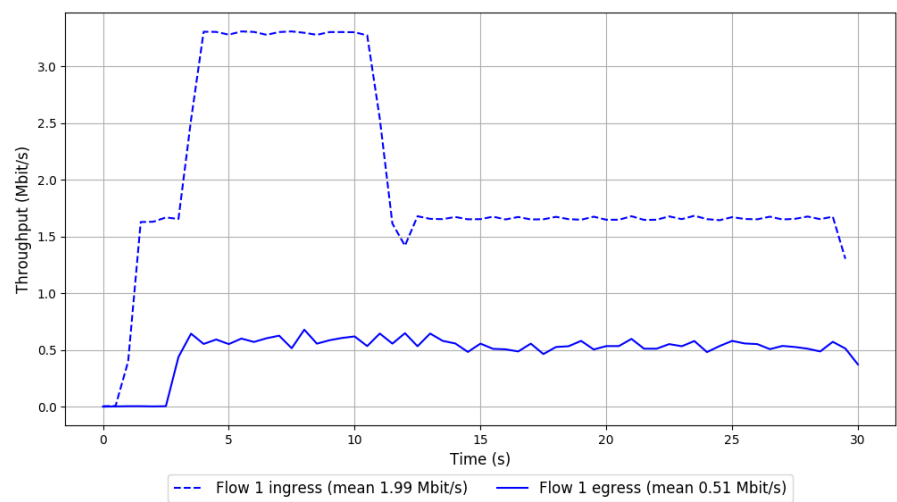
-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 21534.418 ms

Loss rate: 74.60%

Run 3: Report of PCC-Vivace — Data Link

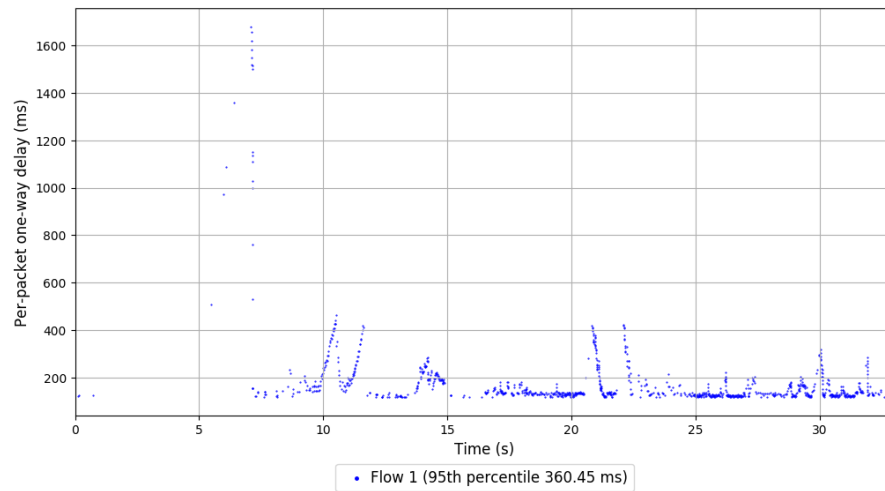
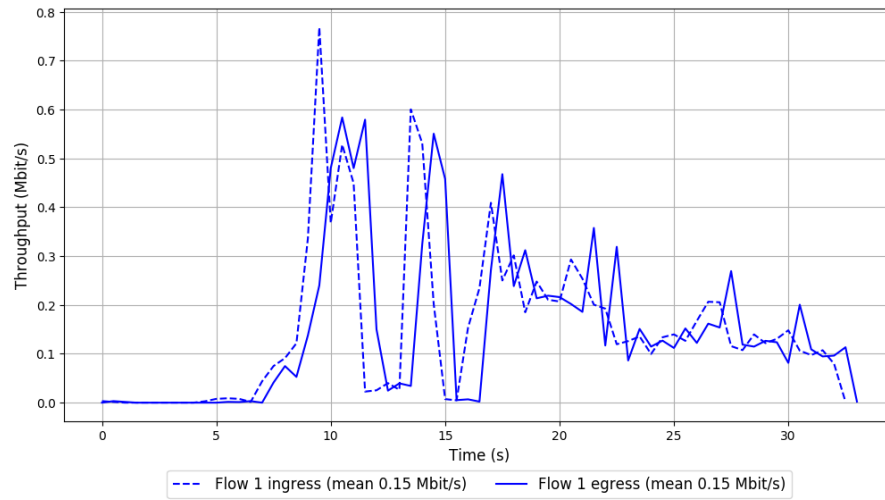


Run 1: Statistics of WebRTC media

Start at: 2019-03-19 06:56:40
End at: 2019-03-19 06:57:10
Local clock offset: -3.433 ms
Remote clock offset: 11.262 ms

Below is generated by plot.py at 2019-03-19 08:05:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 360.453 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 360.453 ms
Loss rate: 0.02%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-03-19 07:21:29

End at: 2019-03-19 07:21:59

Local clock offset: -3.169 ms

Remote clock offset: 5.769 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 653.057 ms

Loss rate: 0.26%

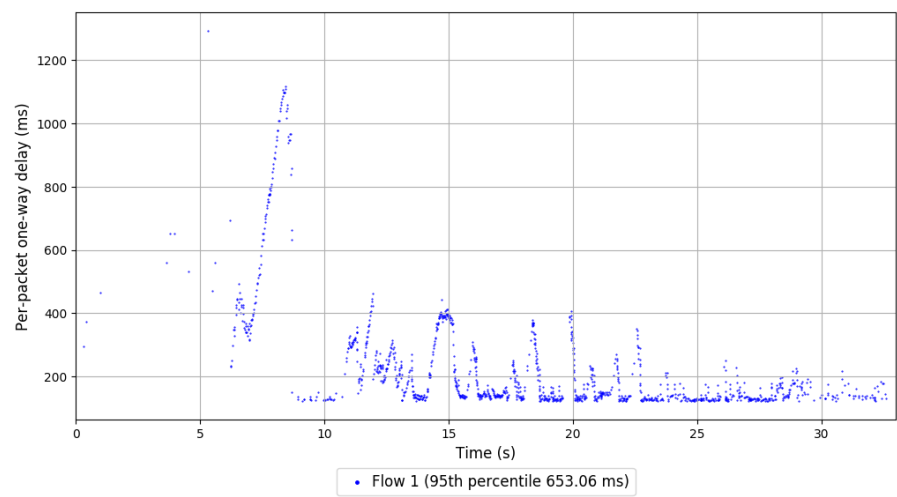
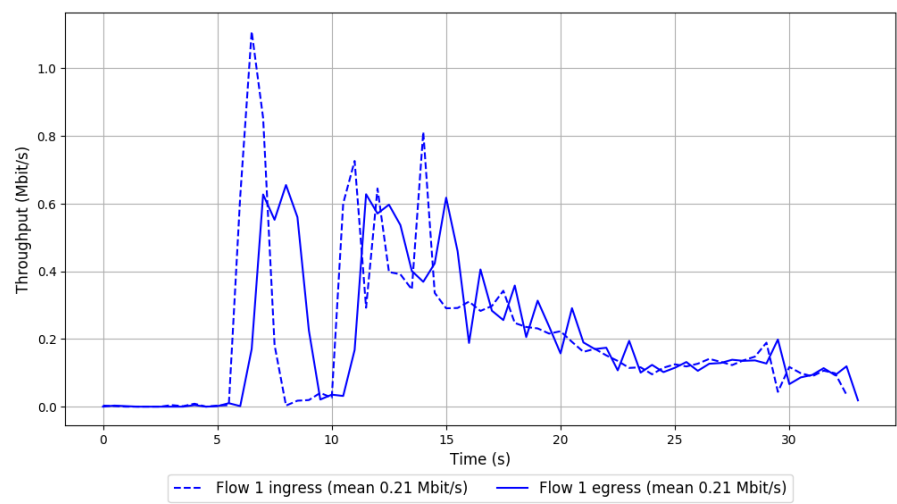
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 653.057 ms

Loss rate: 0.26%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-03-19 07:46:00

End at: 2019-03-19 07:46:30

Local clock offset: -2.412 ms

Remote clock offset: 5.334 ms

Below is generated by plot.py at 2019-03-19 08:05:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.18 Mbit/s

95th percentile per-packet one-way delay: 759.900 ms

Loss rate: 0.39%

-- Flow 1:

Average throughput: 0.18 Mbit/s

95th percentile per-packet one-way delay: 759.900 ms

Loss rate: 0.39%

Run 3: Report of WebRTC media — Data Link

