

Pantheon Report

Generated at 2019-02-11 11:58:46 (UTC).

Data path: AWS California 1 on *ens5 (local)* → Stanford cellular on *ppp0 (remote)*.

Repeated the test of 21 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

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

System info:

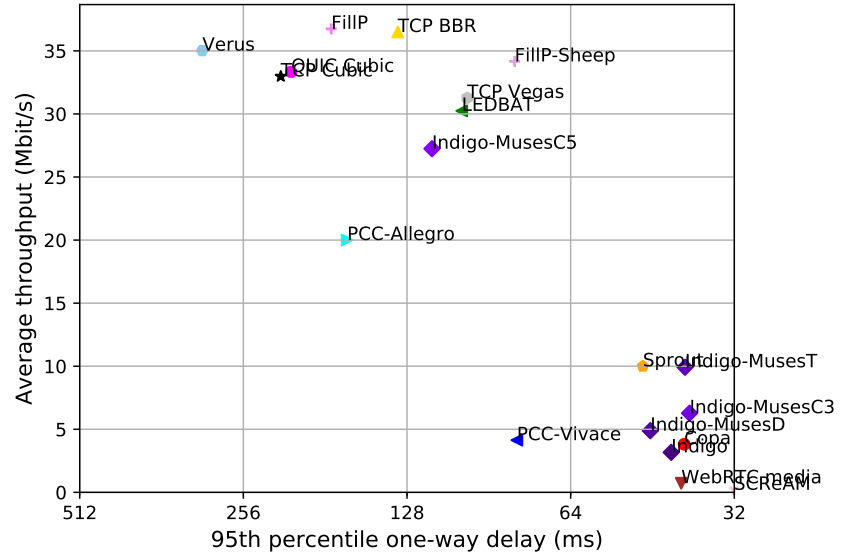
```
Linux 4.15.0-1031-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

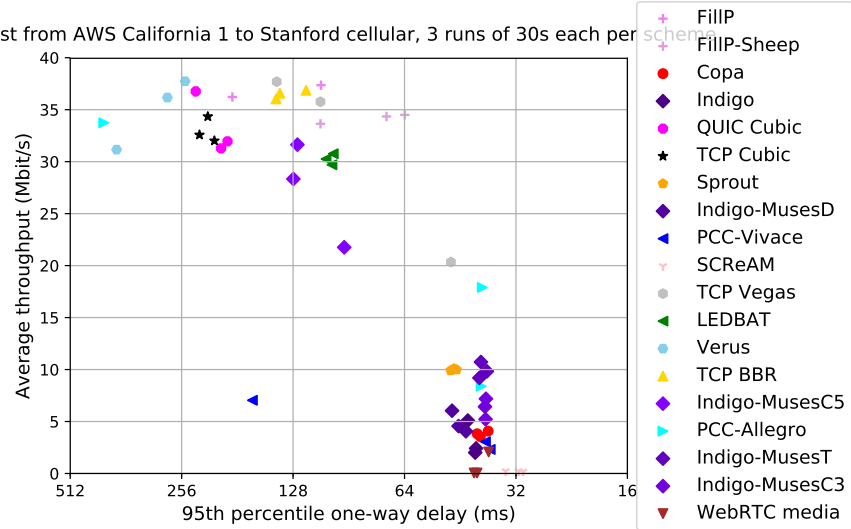
```
branch: muses @ 7a686f7c2ed0a333082c0bab1fa5c921ab47e6ee
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
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 AWS California 1 to Stanford cellular, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from AWS California 1 to Stanford cellular, 3 runs of 30s each per



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	36.50	133.11	0.36
Copa	3	3.81	39.57	13.88
TCP Cubic	3	32.98	218.50	0.41
FillP	3	36.74	176.47	0.51
FillP-Sheep	3	34.16	81.14	0.22
Indigo	3	3.17	41.81	0.07
Indigo-MusesC3	3	6.28	38.68	0.11
Indigo-MusesC5	3	27.24	115.17	0.05
Indigo-MusesD	3	4.89	45.68	0.02
Indigo-MusesT	3	9.92	39.43	0.08
LEDBAT	3	30.24	101.53	0.40
PCC-Allegro	3	20.01	164.94	0.16
PCC-Expr	0	N/A	N/A	N/A
QUIC Cubic	3	33.33	209.10	0.78
SCReAM	3	0.20	32.06	0.13
Sprout	3	10.00	47.13	0.12
TaoVA-100x	0	N/A	N/A	N/A
TCP Vegas	3	31.26	99.21	0.13
Verus	3	35.02	304.63	1.64
PCC-Vivace	3	4.13	80.38	0.20
WebRTC media	3	0.72	40.07	0.03

Run 1: Statistics of TCP BBR

Start at: 2019-02-11 10:56:29

End at: 2019-02-11 10:56:59

Local clock offset: 3.899 ms

Remote clock offset: 0.331 ms

Below is generated by plot.py at 2019-02-11 11:57:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 36.58 Mbit/s

95th percentile per-packet one-way delay: 138.963 ms

Loss rate: 0.37%

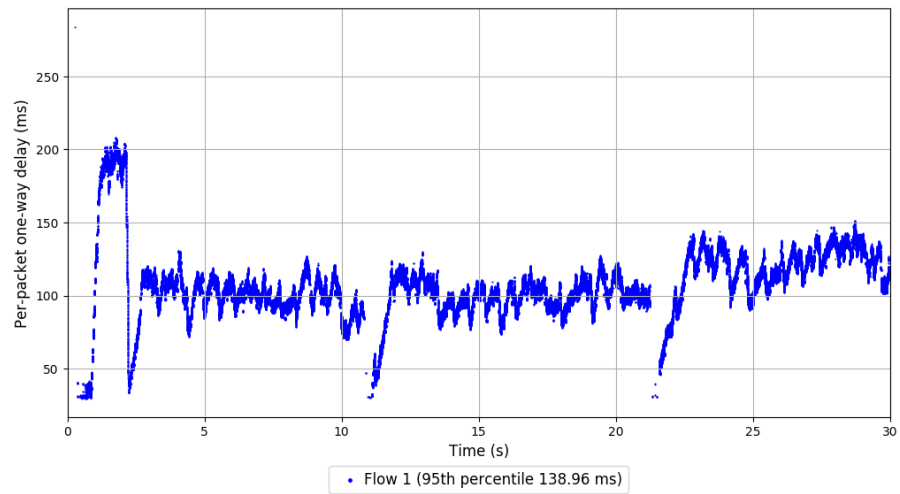
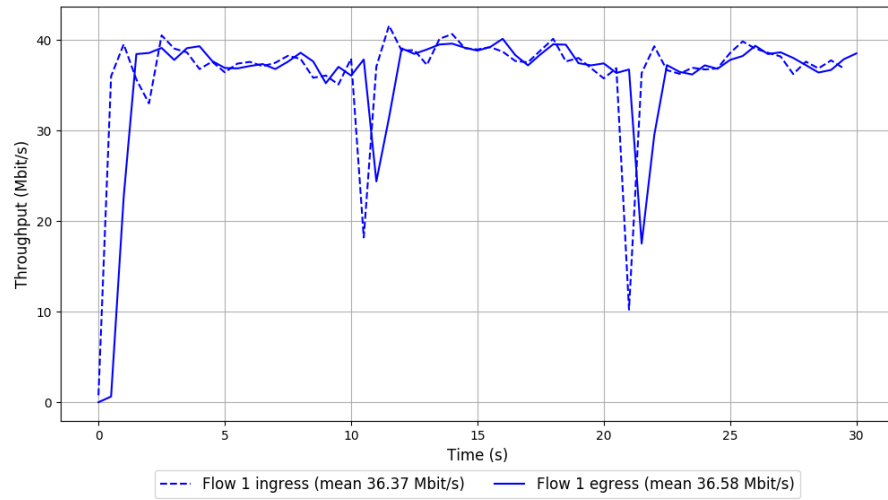
-- Flow 1:

Average throughput: 36.58 Mbit/s

95th percentile per-packet one-way delay: 138.963 ms

Loss rate: 0.37%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-02-11 11:22:27

End at: 2019-02-11 11:22:57

Local clock offset: 3.43 ms

Remote clock offset: 0.305 ms

Below is generated by plot.py at 2019-02-11 11:57:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 36.87 Mbit/s

95th percentile per-packet one-way delay: 118.070 ms

Loss rate: 0.34%

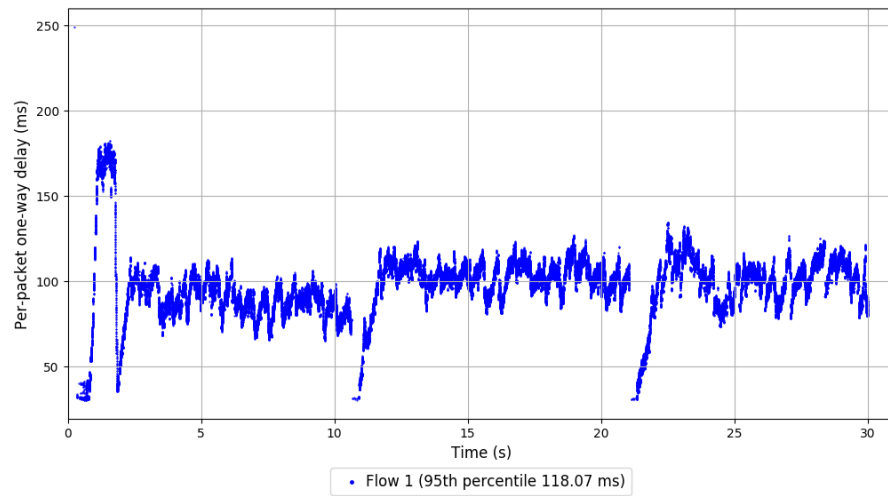
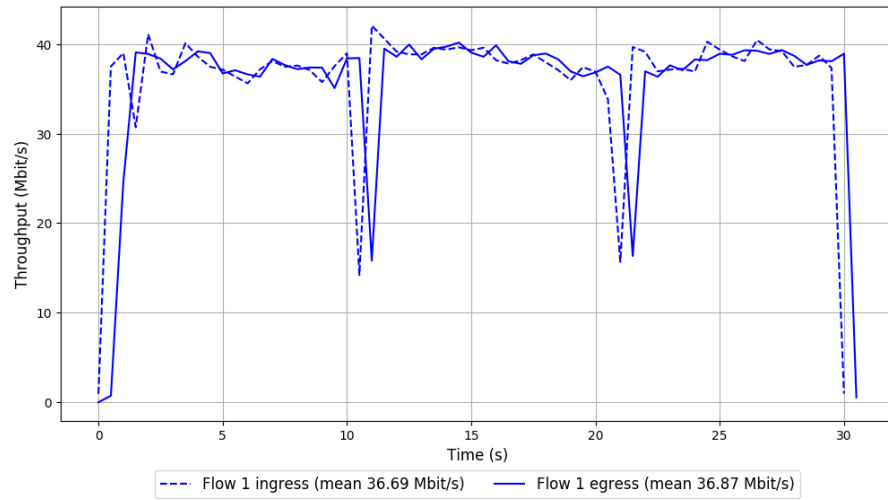
-- Flow 1:

Average throughput: 36.87 Mbit/s

95th percentile per-packet one-way delay: 118.070 ms

Loss rate: 0.34%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-02-11 11:48:24

End at: 2019-02-11 11:48:54

Local clock offset: 6.674 ms

Remote clock offset: -3.06 ms

Below is generated by plot.py at 2019-02-11 11:57:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 36.04 Mbit/s

95th percentile per-packet one-way delay: 142.308 ms

Loss rate: 0.36%

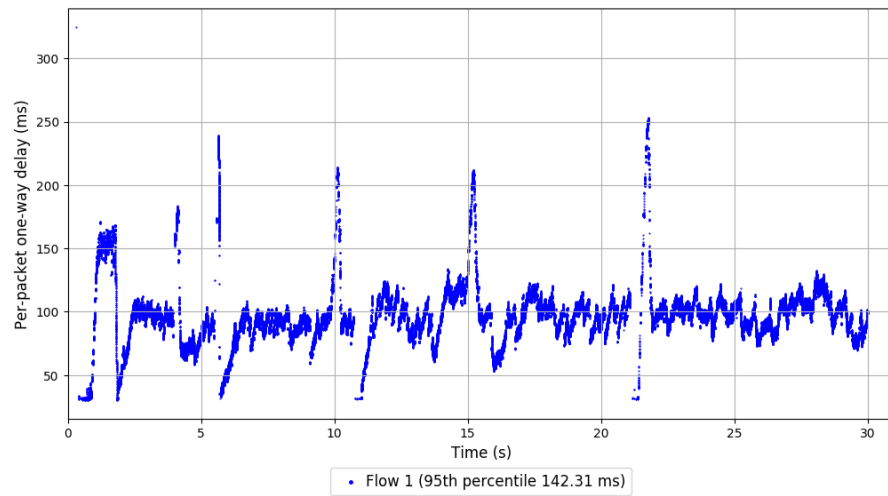
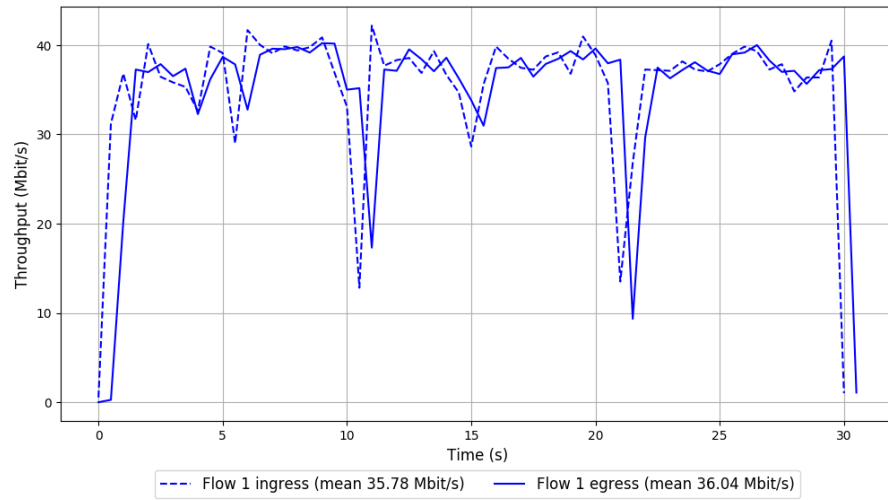
-- Flow 1:

Average throughput: 36.04 Mbit/s

95th percentile per-packet one-way delay: 142.308 ms

Loss rate: 0.36%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

Start at: 2019-02-11 10:51:32

End at: 2019-02-11 10:52:02

Local clock offset: -0.006 ms

Remote clock offset: 0.262 ms

Below is generated by plot.py at 2019-02-11 11:57:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.82 Mbit/s

95th percentile per-packet one-way delay: 40.724 ms

Loss rate: 12.86%

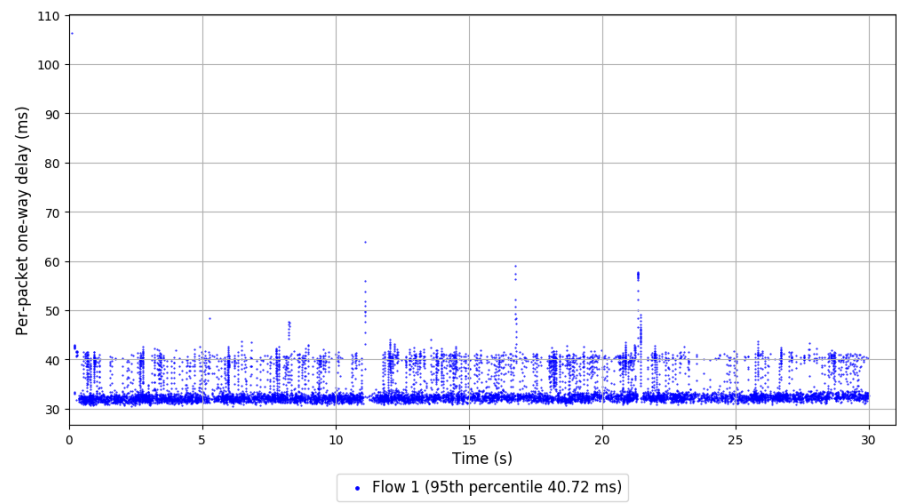
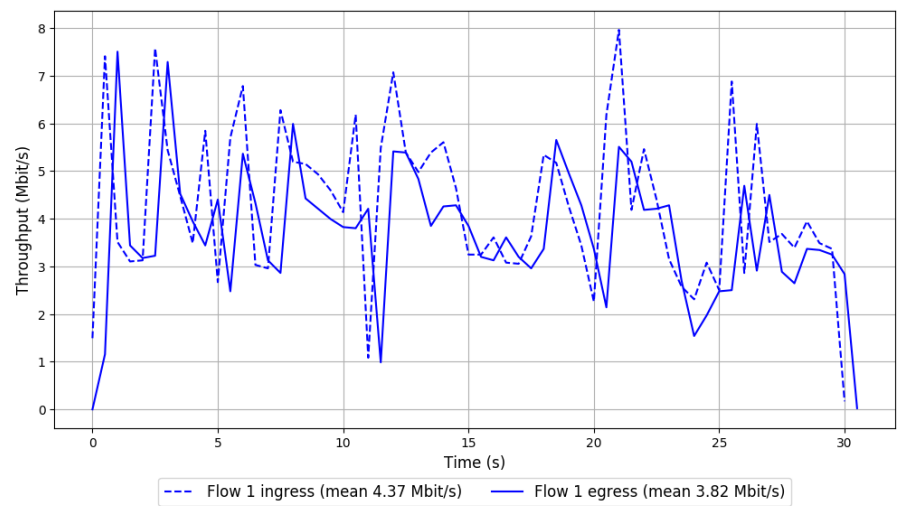
-- Flow 1:

Average throughput: 3.82 Mbit/s

95th percentile per-packet one-way delay: 40.724 ms

Loss rate: 12.86%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2019-02-11 11:17:31

End at: 2019-02-11 11:18:01

Local clock offset: 3.13 ms

Remote clock offset: 0.29 ms

Below is generated by plot.py at 2019-02-11 11:57:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.08 Mbit/s

95th percentile per-packet one-way delay: 38.042 ms

Loss rate: 15.93%

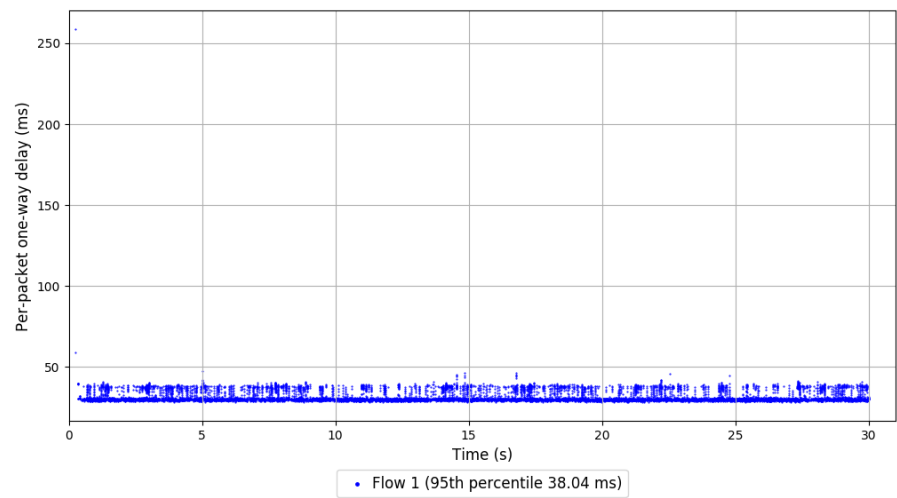
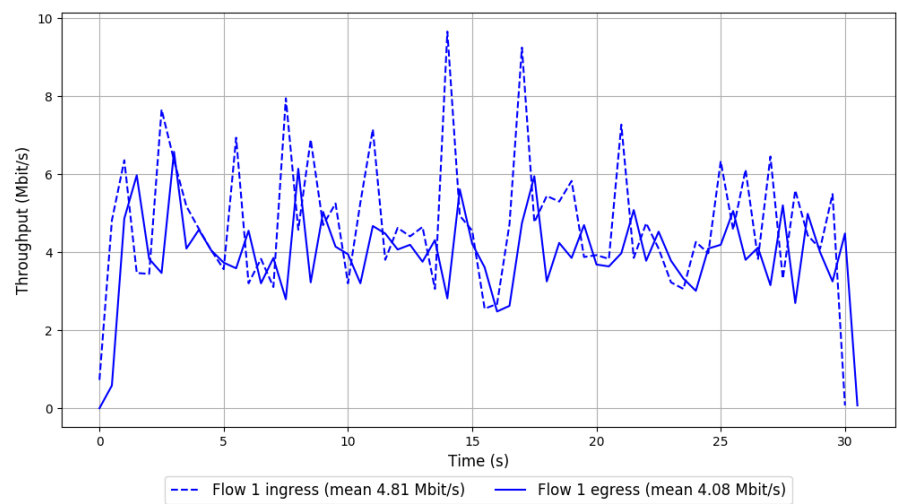
-- Flow 1:

Average throughput: 4.08 Mbit/s

95th percentile per-packet one-way delay: 38.042 ms

Loss rate: 15.93%

Run 2: Report of Copa — Data Link

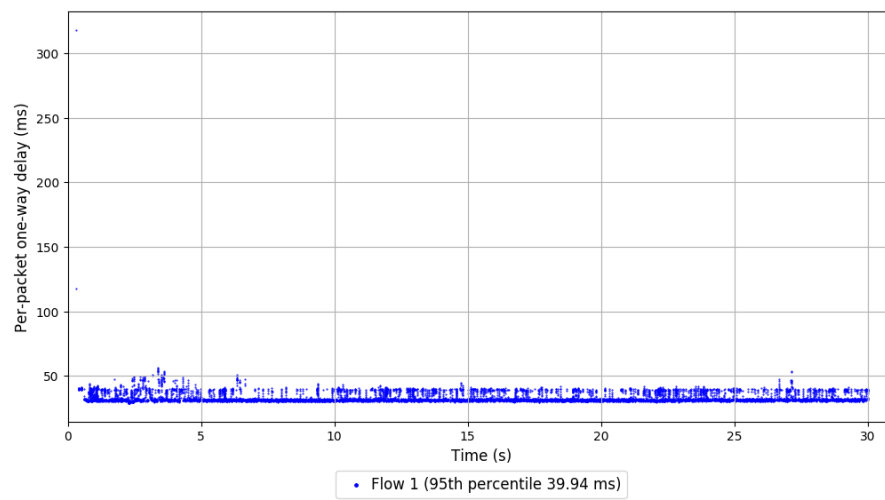
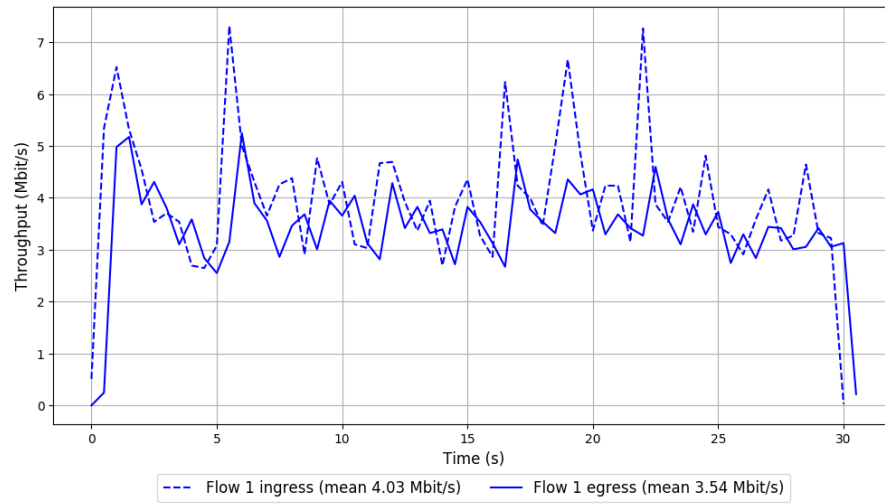


Run 3: Statistics of Copa

Start at: 2019-02-11 11:43:29
End at: 2019-02-11 11:43:59
Local clock offset: 5.978 ms
Remote clock offset: -2.372 ms

Below is generated by plot.py at 2019-02-11 11:57:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.54 Mbit/s
95th percentile per-packet one-way delay: 39.941 ms
Loss rate: 12.85%
-- Flow 1:
Average throughput: 3.54 Mbit/s
95th percentile per-packet one-way delay: 39.941 ms
Loss rate: 12.85%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-02-11 10:39:13

End at: 2019-02-11 10:39:43

Local clock offset: 4.071 ms

Remote clock offset: 0.174 ms

Below is generated by plot.py at 2019-02-11 11:57:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 34.34 Mbit/s

95th percentile per-packet one-way delay: 217.560 ms

Loss rate: 0.54%

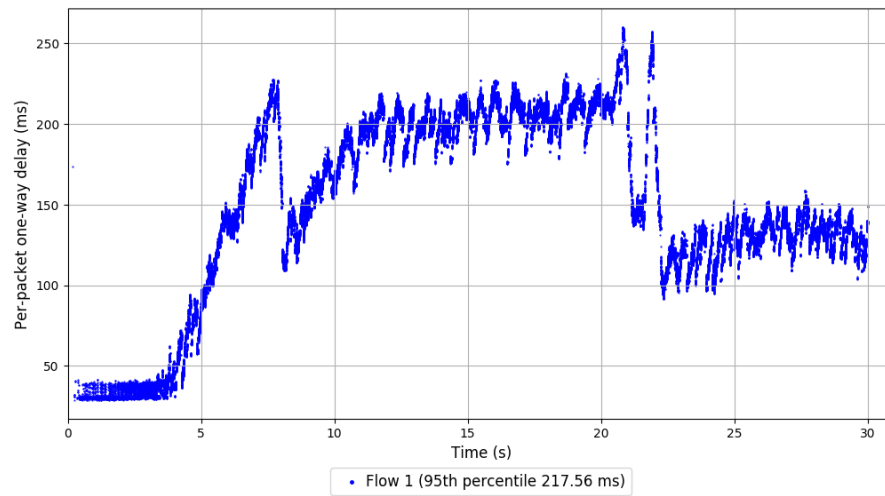
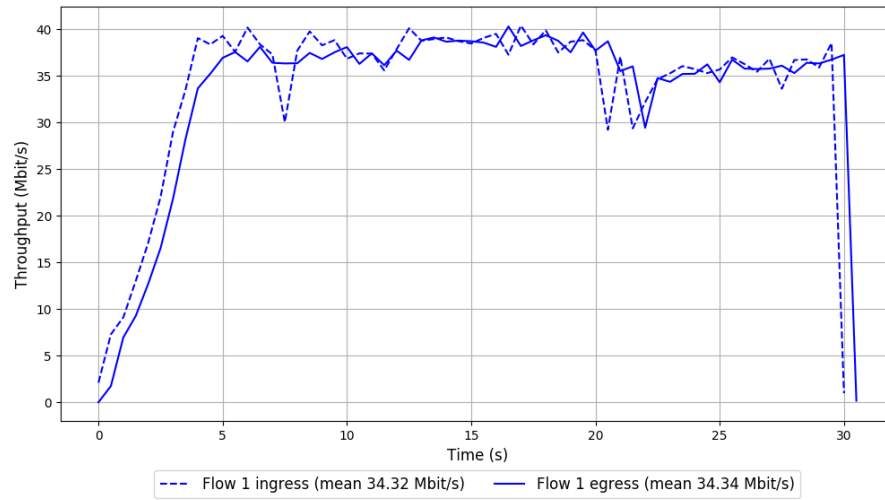
-- Flow 1:

Average throughput: 34.34 Mbit/s

95th percentile per-packet one-way delay: 217.560 ms

Loss rate: 0.54%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-02-11 11:05:07

End at: 2019-02-11 11:05:37

Local clock offset: 7.302 ms

Remote clock offset: 0.256 ms

Below is generated by plot.py at 2019-02-11 11:57:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 32.01 Mbit/s

95th percentile per-packet one-way delay: 208.803 ms

Loss rate: 0.49%

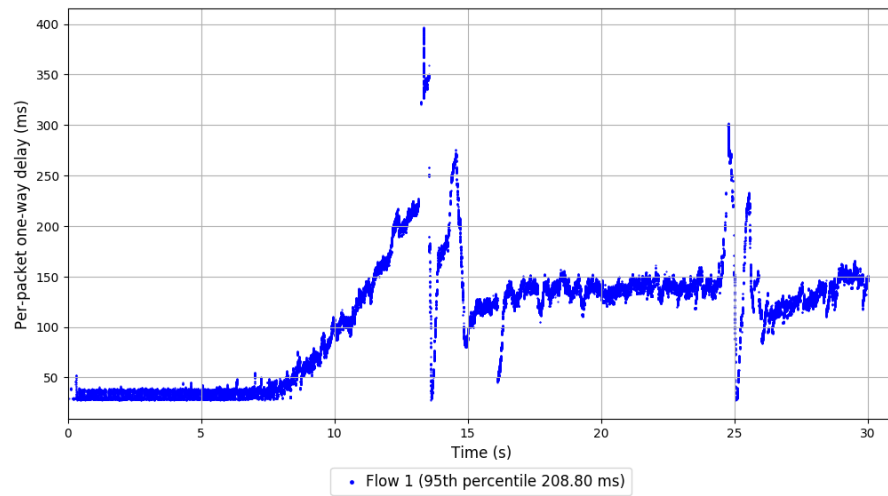
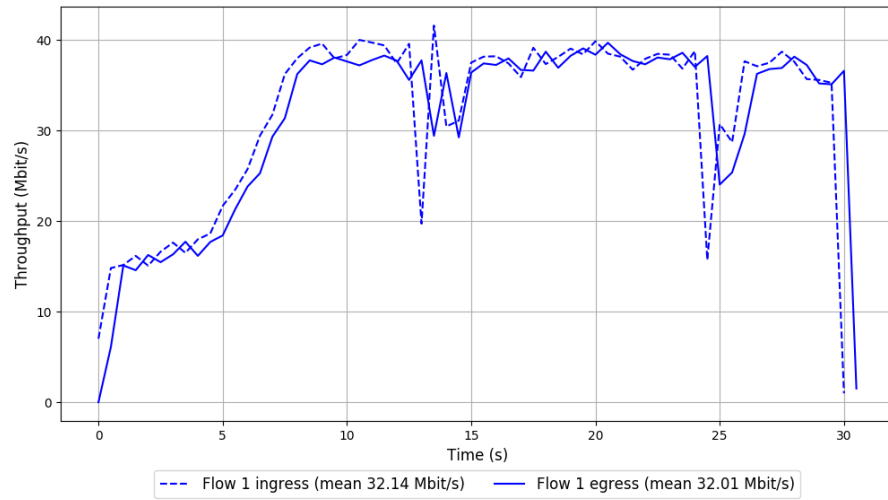
-- Flow 1:

Average throughput: 32.01 Mbit/s

95th percentile per-packet one-way delay: 208.803 ms

Loss rate: 0.49%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2019-02-11 11:31:05

End at: 2019-02-11 11:31:35

Local clock offset: 4.921 ms

Remote clock offset: 0.395 ms

Below is generated by plot.py at 2019-02-11 11:57:05

Datalink statistics

-- Total of 1 flow:

Average throughput: 32.58 Mbit/s

95th percentile per-packet one-way delay: 229.130 ms

Loss rate: 0.21%

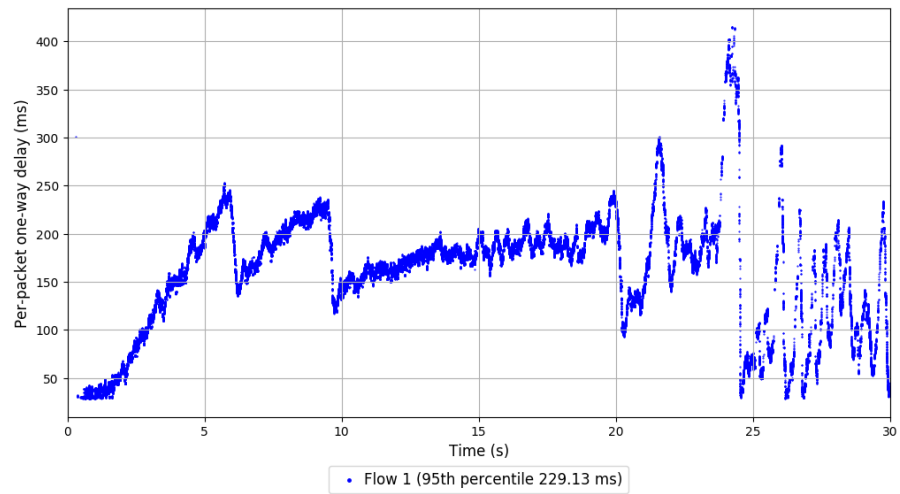
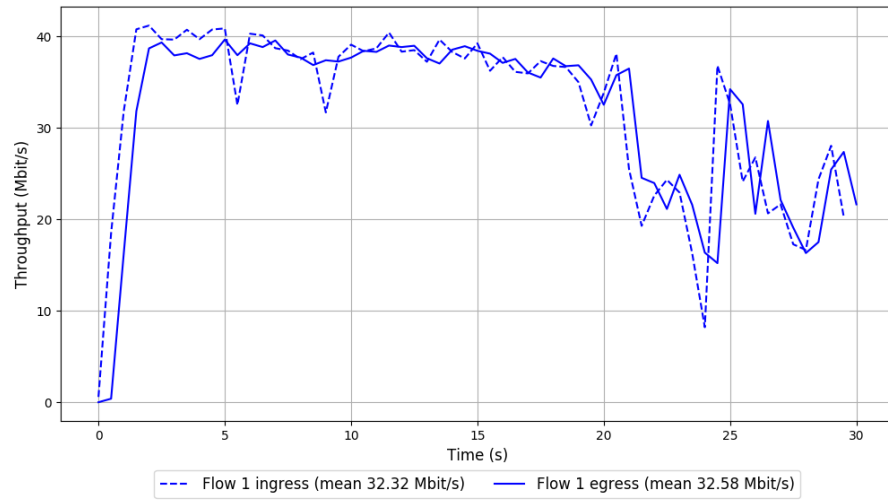
-- Flow 1:

Average throughput: 32.58 Mbit/s

95th percentile per-packet one-way delay: 229.130 ms

Loss rate: 0.21%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2019-02-11 11:03:53

End at: 2019-02-11 11:04:23

Local clock offset: 7.609 ms

Remote clock offset: 0.258 ms

Below is generated by plot.py at 2019-02-11 11:57:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 37.36 Mbit/s

95th percentile per-packet one-way delay: 107.602 ms

Loss rate: 0.33%

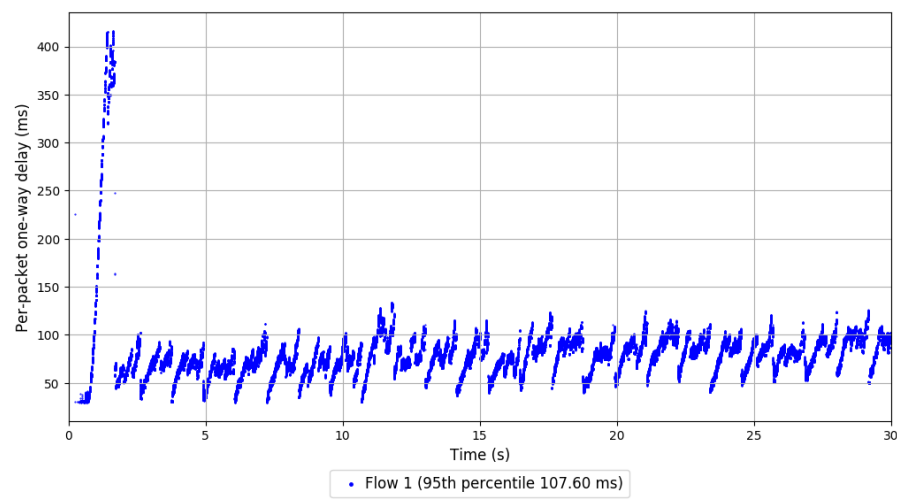
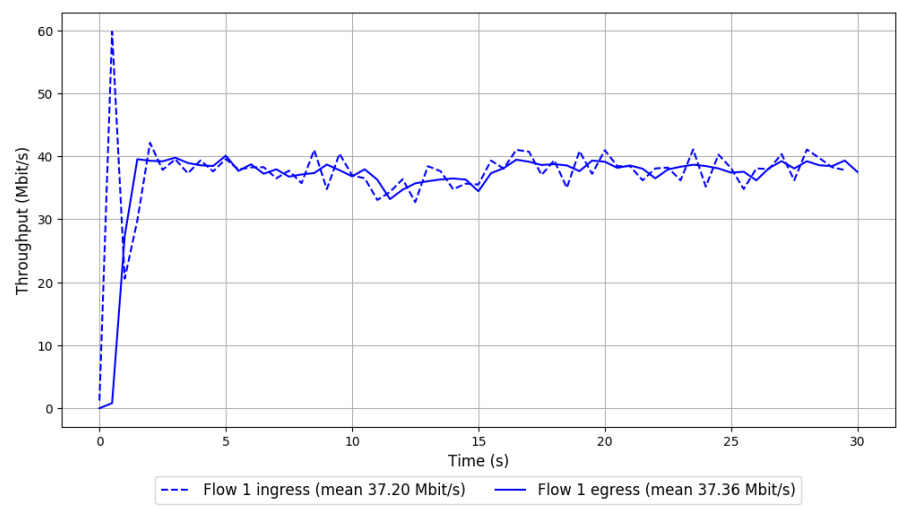
-- Flow 1:

Average throughput: 37.36 Mbit/s

95th percentile per-packet one-way delay: 107.602 ms

Loss rate: 0.33%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-02-11 11:29:51

End at: 2019-02-11 11:30:21

Local clock offset: 4.626 ms

Remote clock offset: 0.367 ms

Below is generated by plot.py at 2019-02-11 11:57:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 36.22 Mbit/s

95th percentile per-packet one-way delay: 186.730 ms

Loss rate: 0.58%

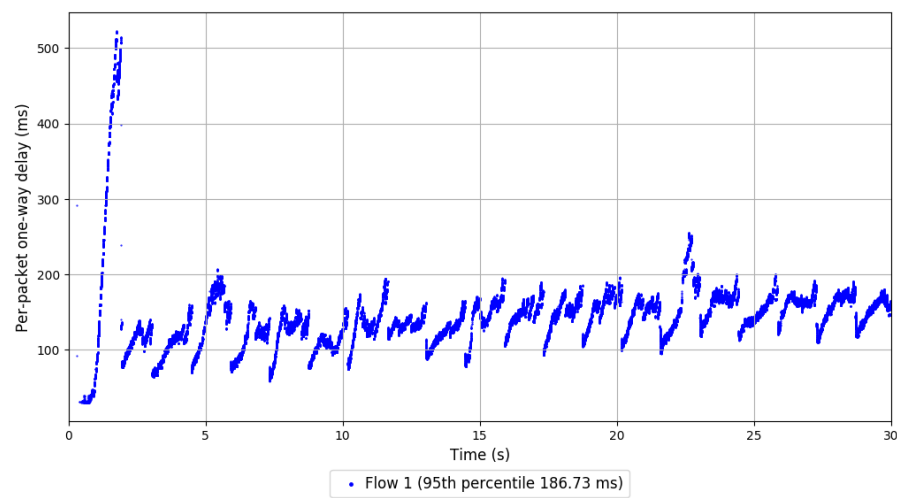
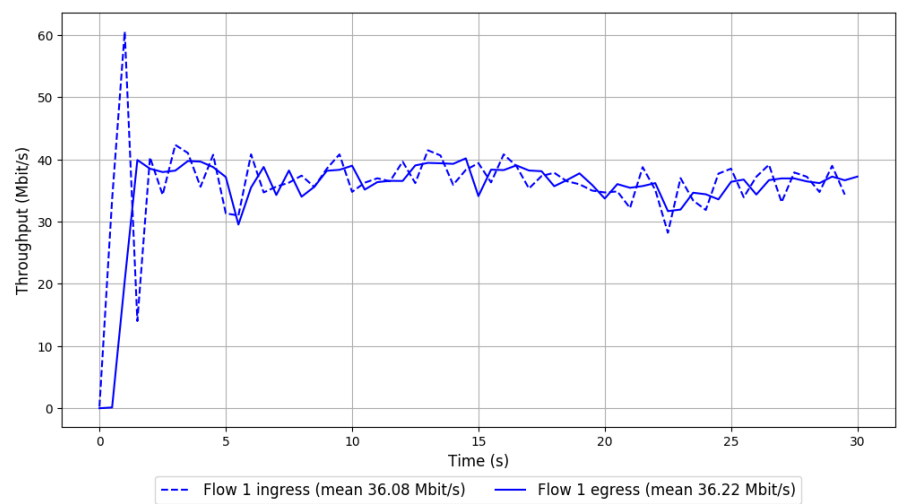
-- Flow 1:

Average throughput: 36.22 Mbit/s

95th percentile per-packet one-way delay: 186.730 ms

Loss rate: 0.58%

Run 2: Report of FillP — Data Link

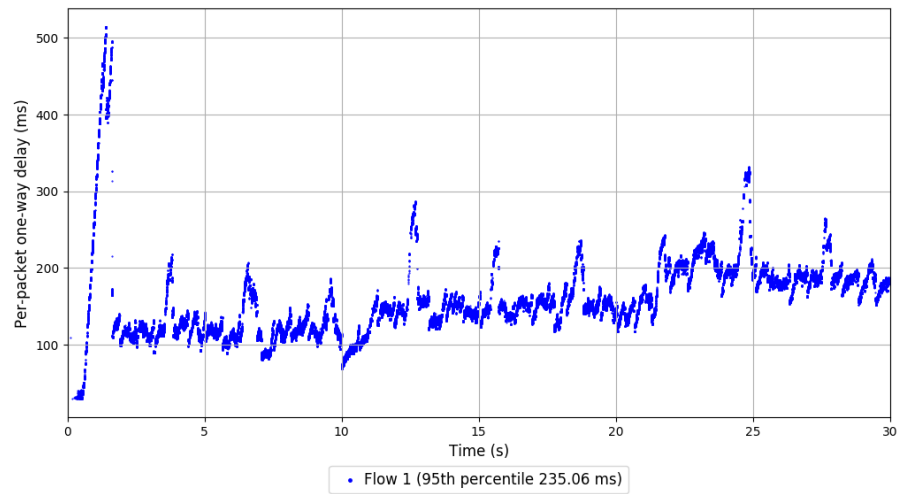
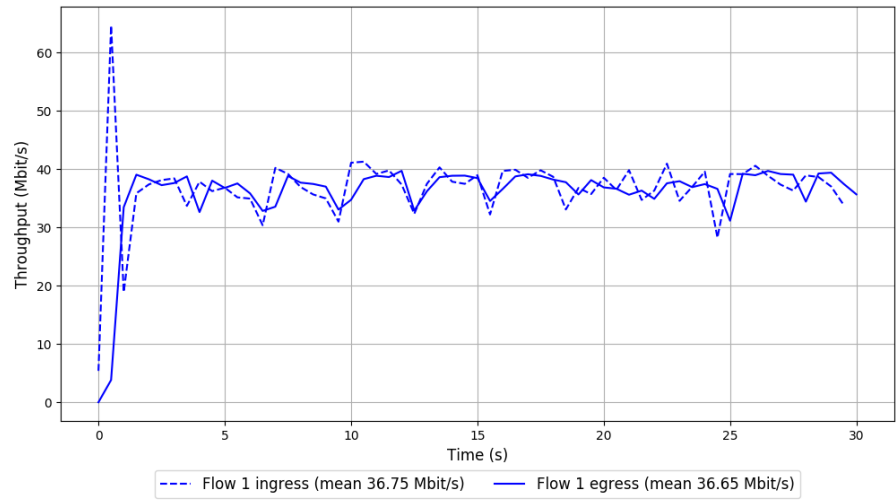


Run 3: Statistics of FillP

Start at: 2019-02-11 11:55:48
End at: 2019-02-11 11:56:18
Local clock offset: 8.054 ms
Remote clock offset: -3.736 ms

Below is generated by plot.py at 2019-02-11 11:57:39
Datalink statistics
-- Total of 1 flow:
Average throughput: 36.65 Mbit/s
95th percentile per-packet one-way delay: 235.063 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 36.65 Mbit/s
95th percentile per-packet one-way delay: 235.063 ms
Loss rate: 0.62%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-02-11 10:40:28

End at: 2019-02-11 10:40:58

Local clock offset: 2.434 ms

Remote clock offset: 0.152 ms

Below is generated by plot.py at 2019-02-11 11:57:39

Datalink statistics

-- Total of 1 flow:

Average throughput: 34.35 Mbit/s

95th percentile per-packet one-way delay: 71.584 ms

Loss rate: 0.24%

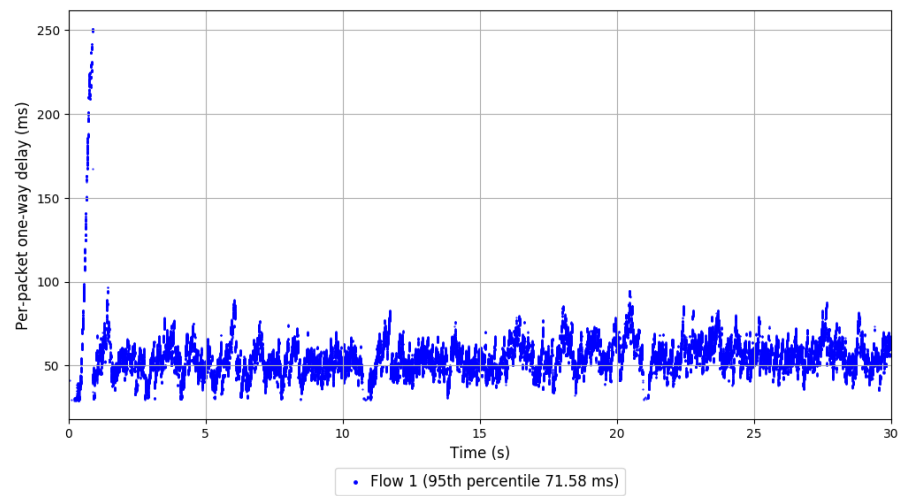
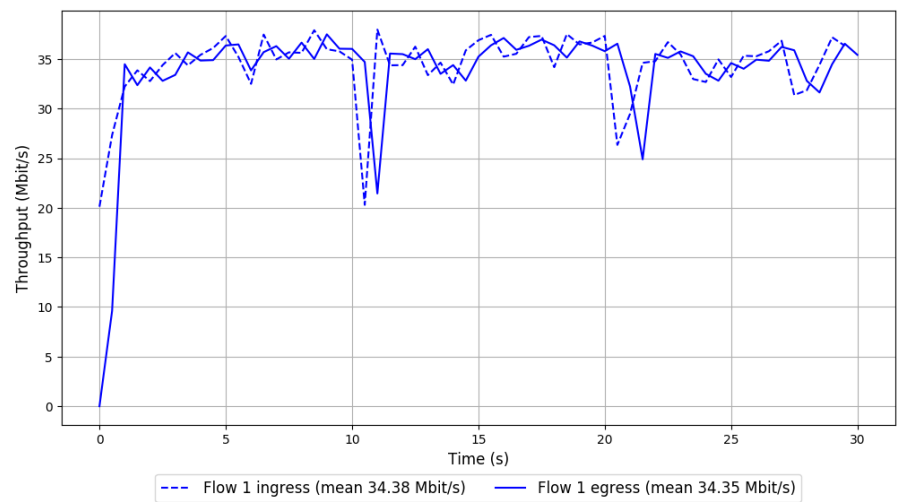
-- Flow 1:

Average throughput: 34.35 Mbit/s

95th percentile per-packet one-way delay: 71.584 ms

Loss rate: 0.24%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-02-11 11:06:22

End at: 2019-02-11 11:06:52

Local clock offset: 6.313 ms

Remote clock offset: 0.19 ms

Below is generated by plot.py at 2019-02-11 11:57:40

Datalink statistics

-- Total of 1 flow:

Average throughput: 34.50 Mbit/s

95th percentile per-packet one-way delay: 63.886 ms

Loss rate: 0.14%

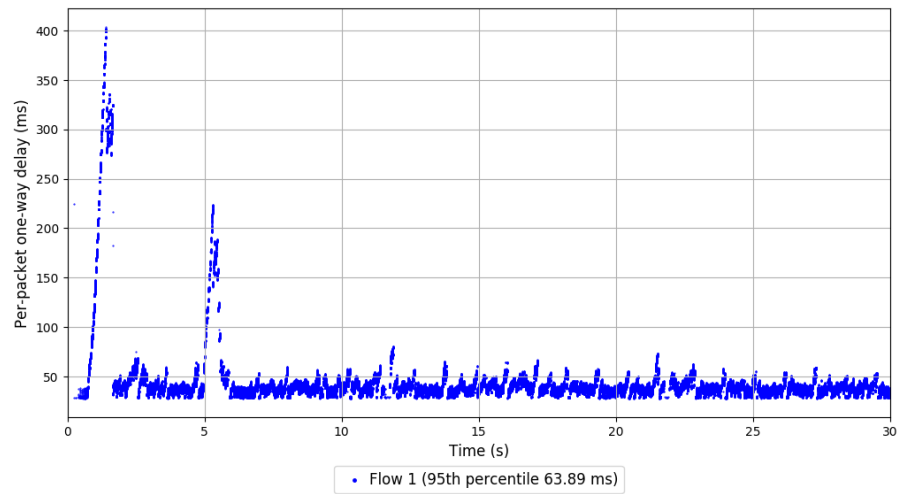
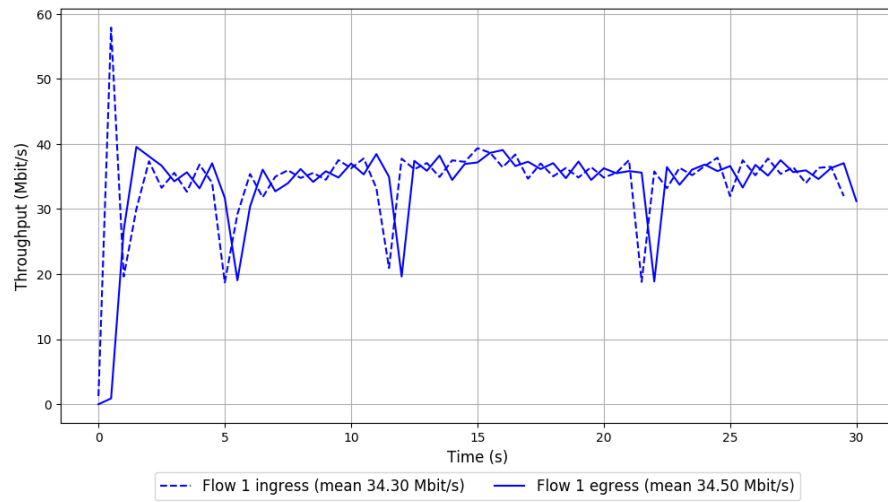
-- Flow 1:

Average throughput: 34.50 Mbit/s

95th percentile per-packet one-way delay: 63.886 ms

Loss rate: 0.14%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-02-11 11:32:20

End at: 2019-02-11 11:32:50

Local clock offset: 5.163 ms

Remote clock offset: 0.374 ms

Below is generated by plot.py at 2019-02-11 11:57:40

Datalink statistics

-- Total of 1 flow:

Average throughput: 33.64 Mbit/s

95th percentile per-packet one-way delay: 107.945 ms

Loss rate: 0.27%

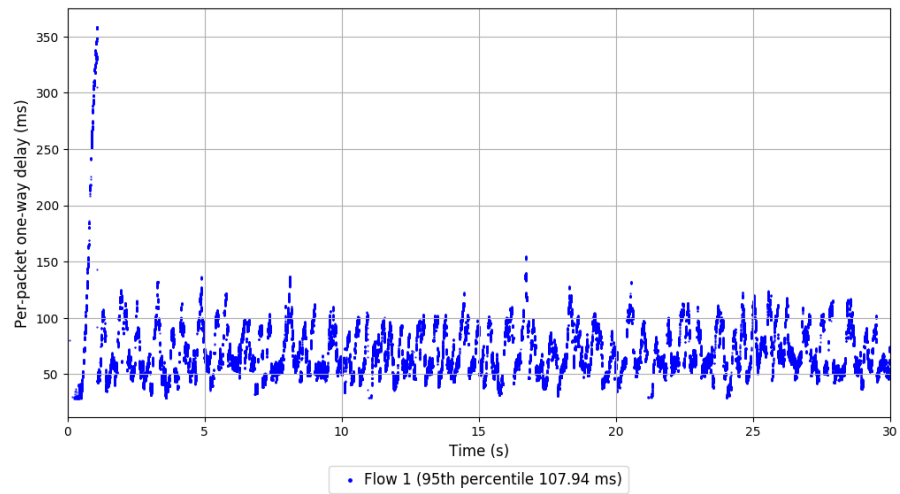
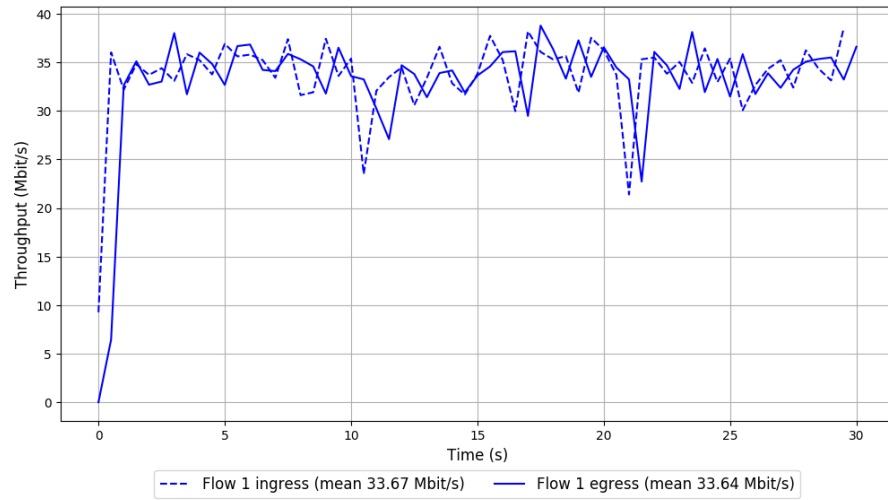
-- Flow 1:

Average throughput: 33.64 Mbit/s

95th percentile per-packet one-way delay: 107.945 ms

Loss rate: 0.27%

Run 3: Report of FillP-Sheep — Data Link

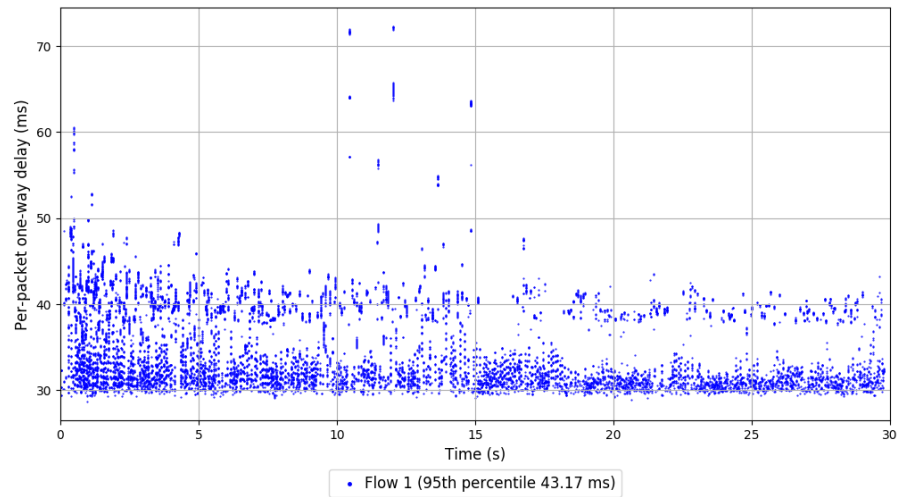
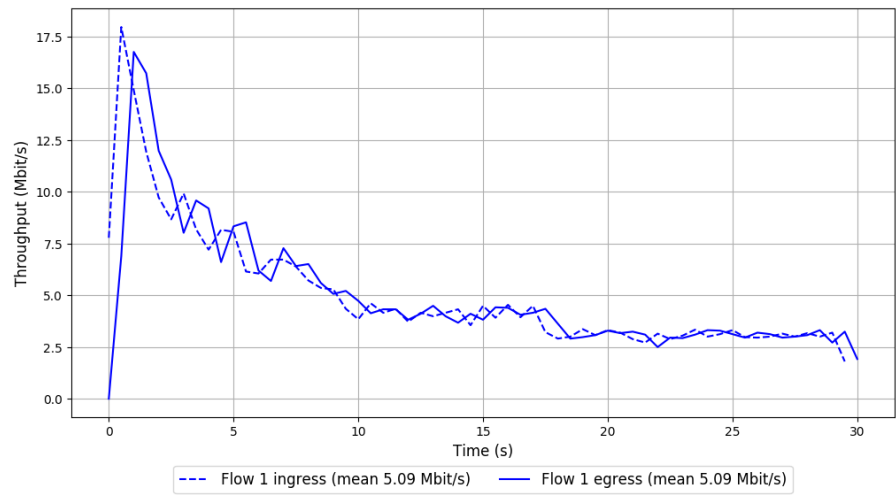


```
Run 1: Statistics of Indigo

Start at: 2019-02-11 10:49:05
End at: 2019-02-11 10:49:35
Local clock offset: -0.501 ms
Remote clock offset: 0.205 ms

# Below is generated by plot.py at 2019-02-11 11:57:40
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.09 Mbit/s
95th percentile per-packet one-way delay: 43.168 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 5.09 Mbit/s
95th percentile per-packet one-way delay: 43.168 ms
Loss rate: 0.04%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-02-11 11:15:04

End at: 2019-02-11 11:15:34

Local clock offset: 3.234 ms

Remote clock offset: 0.359 ms

Below is generated by plot.py at 2019-02-11 11:57:40

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.01 Mbit/s

95th percentile per-packet one-way delay: 41.233 ms

Loss rate: 0.10%

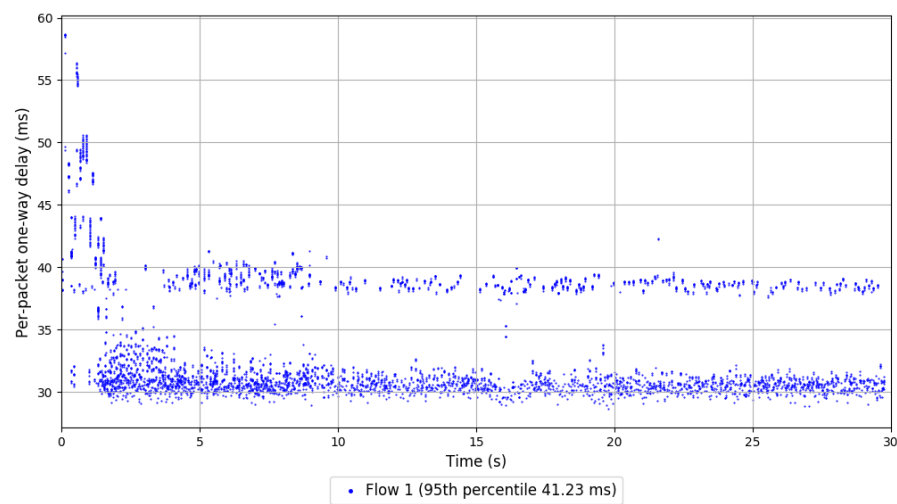
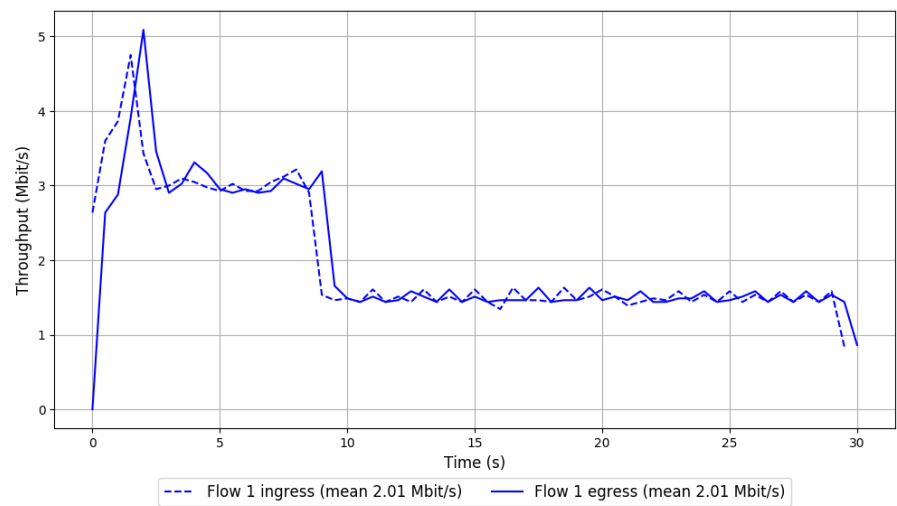
-- Flow 1:

Average throughput: 2.01 Mbit/s

95th percentile per-packet one-way delay: 41.233 ms

Loss rate: 0.10%

Run 2: Report of Indigo — Data Link

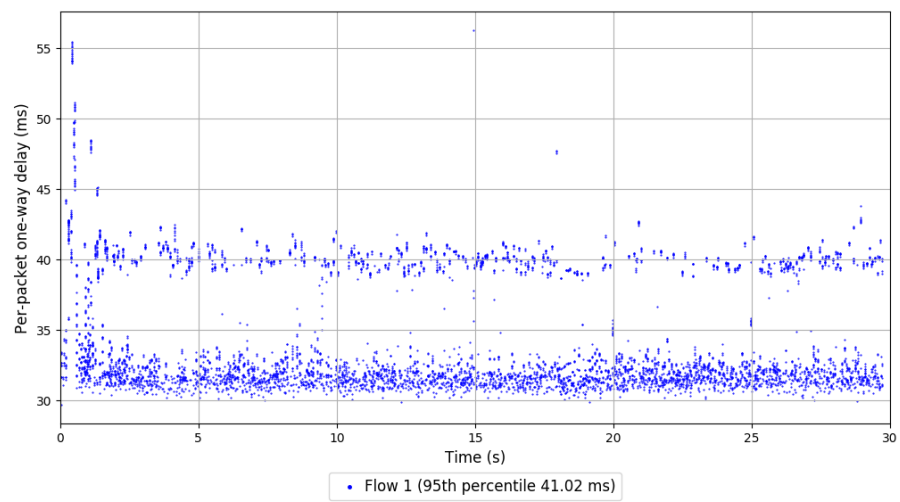
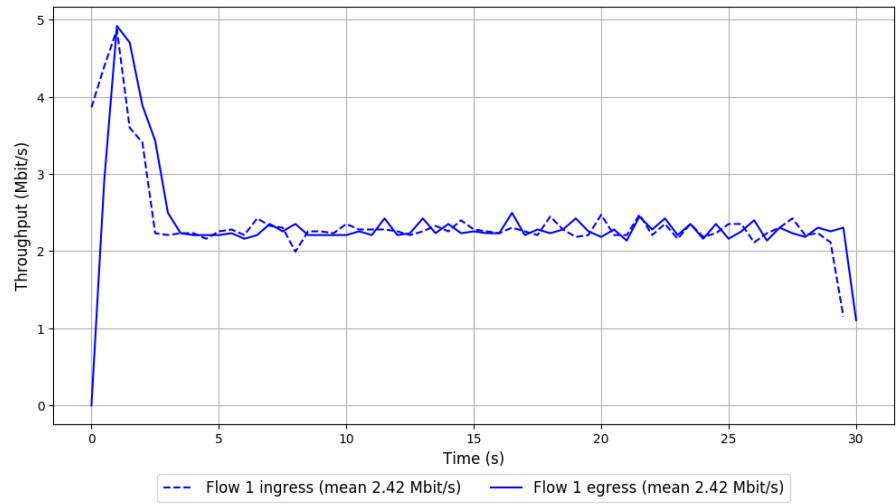


Run 3: Statistics of Indigo

Start at: 2019-02-11 11:41:02
End at: 2019-02-11 11:41:32
Local clock offset: 5.74 ms
Remote clock offset: -2.007 ms

Below is generated by plot.py at 2019-02-11 11:57:40
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 41.015 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 41.015 ms
Loss rate: 0.07%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-02-11 10:42:57

End at: 2019-02-11 10:43:27

Local clock offset: 2.879 ms

Remote clock offset: 0.195 ms

Below is generated by plot.py at 2019-02-11 11:57:40

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.22 Mbit/s

95th percentile per-packet one-way delay: 38.664 ms

Loss rate: 0.07%

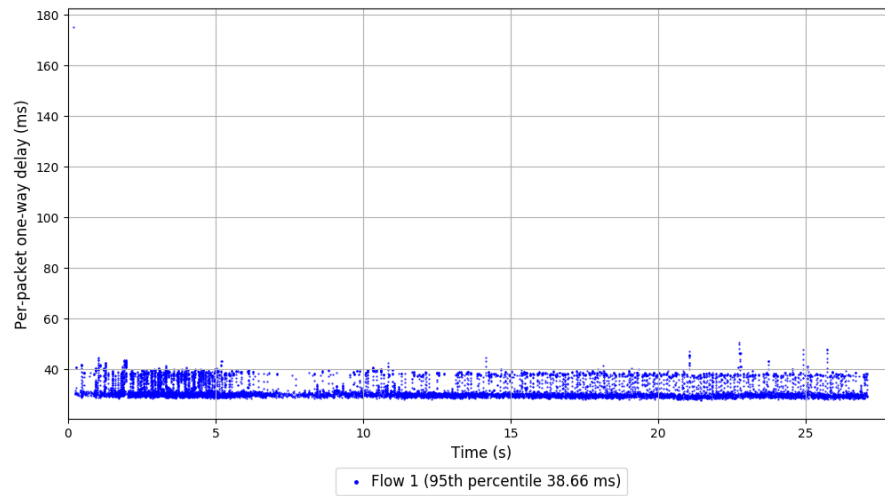
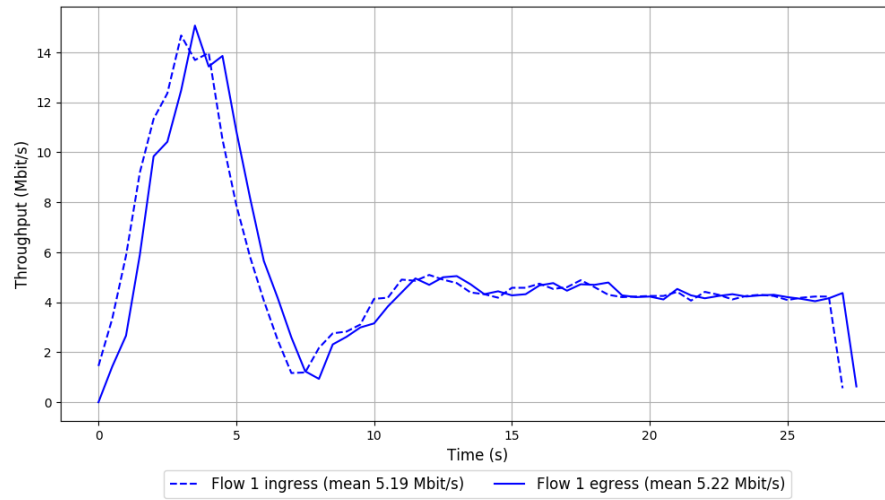
-- Flow 1:

Average throughput: 5.22 Mbit/s

95th percentile per-packet one-way delay: 38.664 ms

Loss rate: 0.07%

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-02-11 11:08:51

End at: 2019-02-11 11:09:21

Local clock offset: 4.837 ms

Remote clock offset: 0.297 ms

Below is generated by plot.py at 2019-02-11 11:57:40

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.42 Mbit/s

95th percentile per-packet one-way delay: 38.804 ms

Loss rate: 0.11%

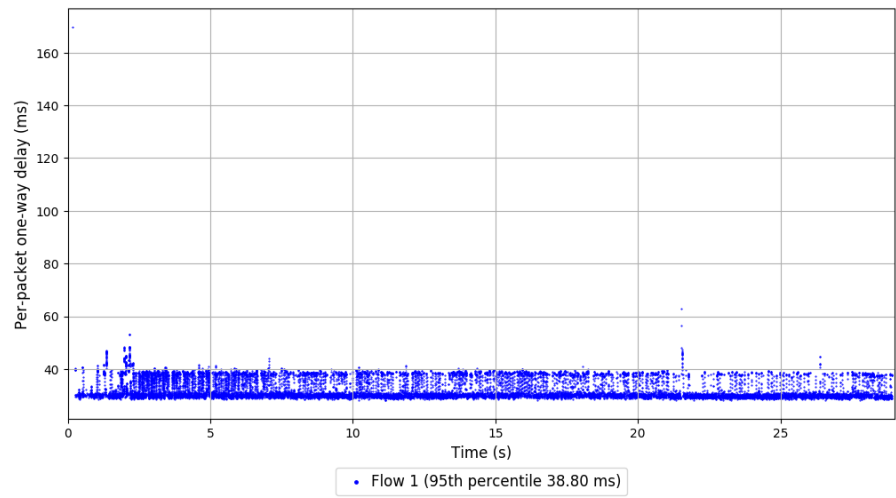
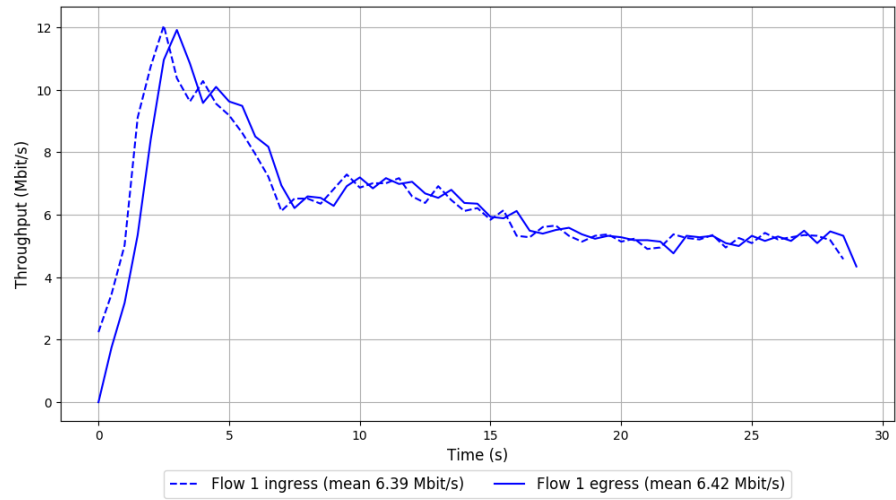
-- Flow 1:

Average throughput: 6.42 Mbit/s

95th percentile per-packet one-way delay: 38.804 ms

Loss rate: 0.11%

Run 2: Report of Indigo-MusesC3 — Data Link

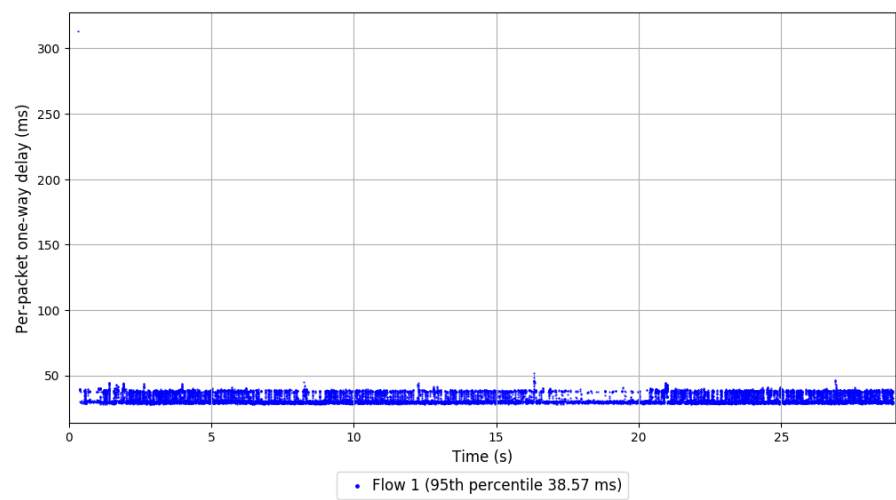
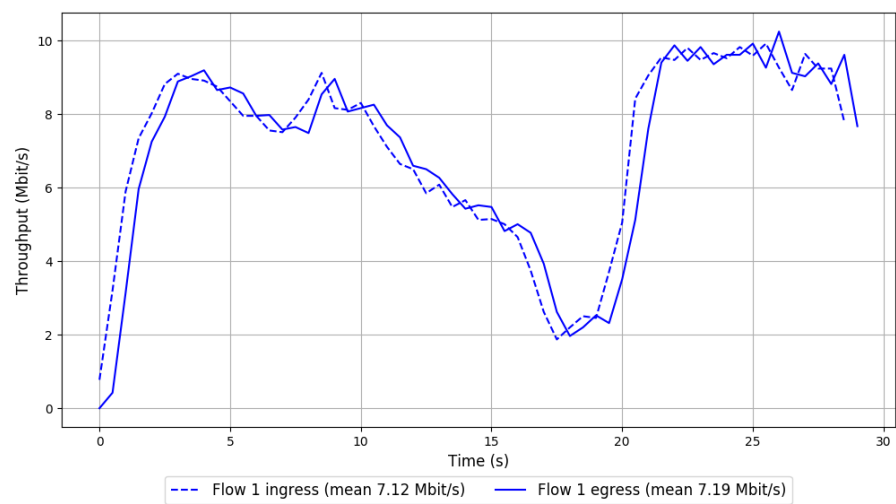


Run 3: Statistics of Indigo-MusesC3

Start at: 2019-02-11 11:34:49
End at: 2019-02-11 11:35:19
Local clock offset: 5.666 ms
Remote clock offset: -0.648 ms

Below is generated by plot.py at 2019-02-11 11:57:40
Datalink statistics
-- Total of 1 flow:
Average throughput: 7.19 Mbit/s
95th percentile per-packet one-way delay: 38.570 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 7.19 Mbit/s
95th percentile per-packet one-way delay: 38.570 ms
Loss rate: 0.16%

Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-02-11 10:44:10

End at: 2019-02-11 10:44:40

Local clock offset: 1.147 ms

Remote clock offset: 0.13 ms

Below is generated by plot.py at 2019-02-11 11:57:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 31.64 Mbit/s

95th percentile per-packet one-way delay: 124.592 ms

Loss rate: 0.05%

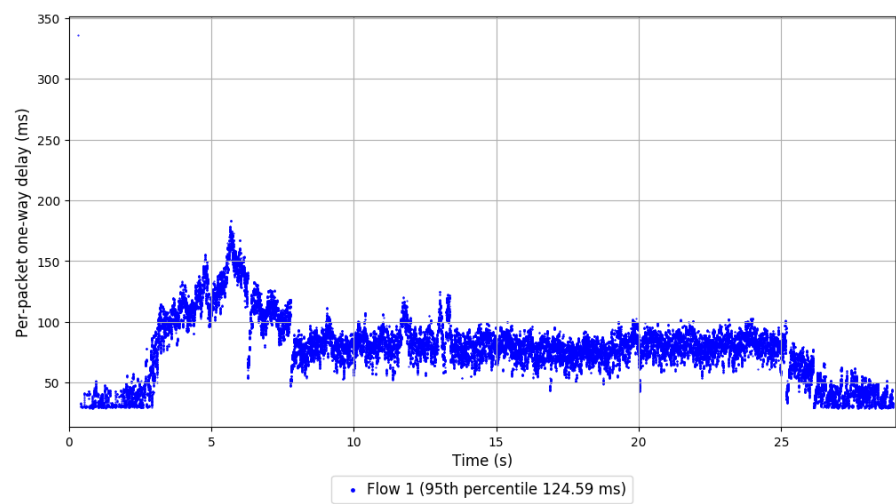
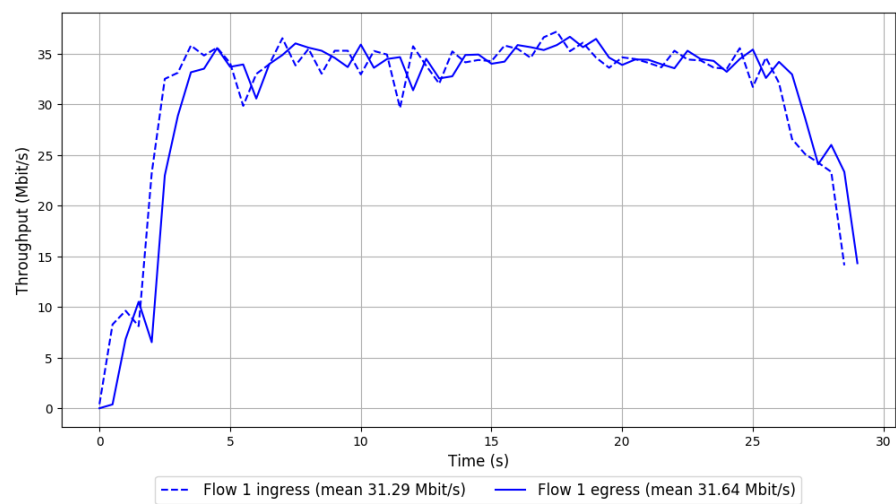
-- Flow 1:

Average throughput: 31.64 Mbit/s

95th percentile per-packet one-way delay: 124.592 ms

Loss rate: 0.05%

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-02-11 11:10:10

End at: 2019-02-11 11:10:40

Local clock offset: 4.357 ms

Remote clock offset: 0.39 ms

Below is generated by plot.py at 2019-02-11 11:57:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 21.76 Mbit/s

95th percentile per-packet one-way delay: 93.126 ms

Loss rate: 0.11%

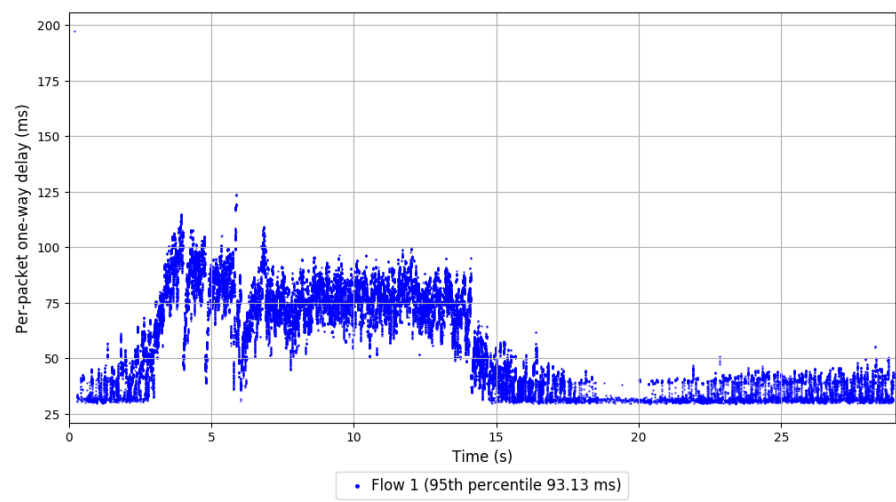
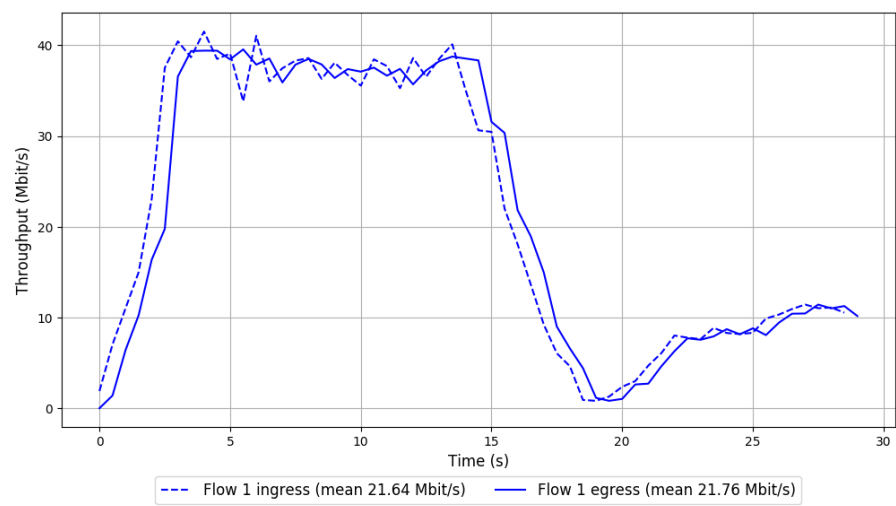
-- Flow 1:

Average throughput: 21.76 Mbit/s

95th percentile per-packet one-way delay: 93.126 ms

Loss rate: 0.11%

Run 2: Report of Indigo-MusesC5 — Data Link

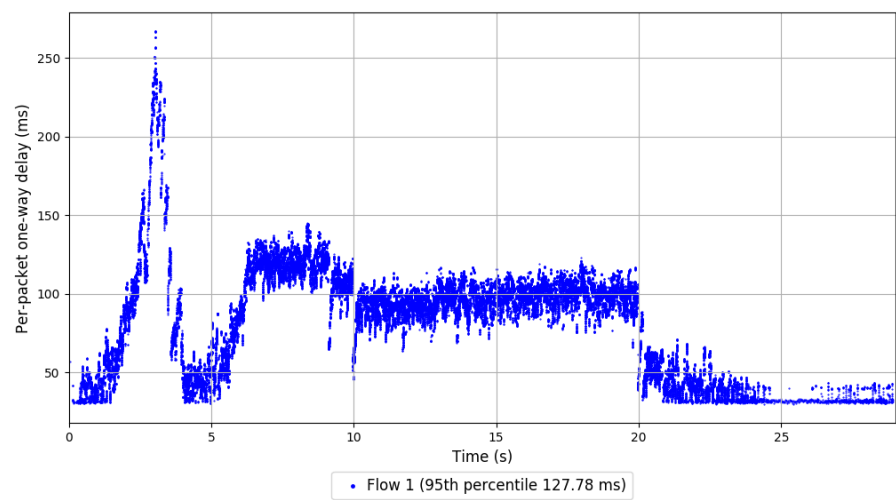
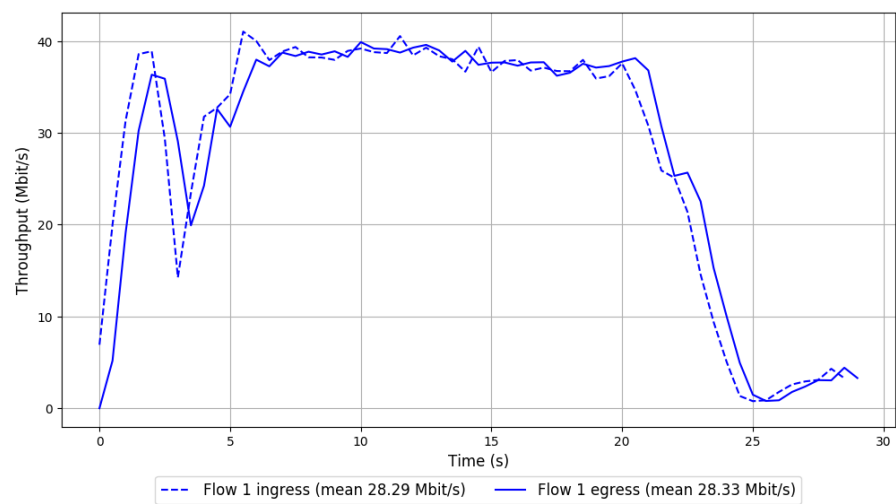


Run 3: Statistics of Indigo-MusesC5

Start at: 2019-02-11 11:36:02
End at: 2019-02-11 11:36:32
Local clock offset: 5.605 ms
Remote clock offset: -0.905 ms

Below is generated by plot.py at 2019-02-11 11:57:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 28.33 Mbit/s
95th percentile per-packet one-way delay: 127.778 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 28.33 Mbit/s
95th percentile per-packet one-way delay: 127.778 ms
Loss rate: 0.00%

Run 3: Report of Indigo-MusesC5 — Data Link



Run 1: Statistics of Indigo-MusesD

Start at: 2019-02-11 10:47:52

End at: 2019-02-11 10:48:22

Local clock offset: -0.592 ms

Remote clock offset: 0.282 ms

Below is generated by plot.py at 2019-02-11 11:57:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.04 Mbit/s

95th percentile per-packet one-way delay: 47.624 ms

Loss rate: 0.02%

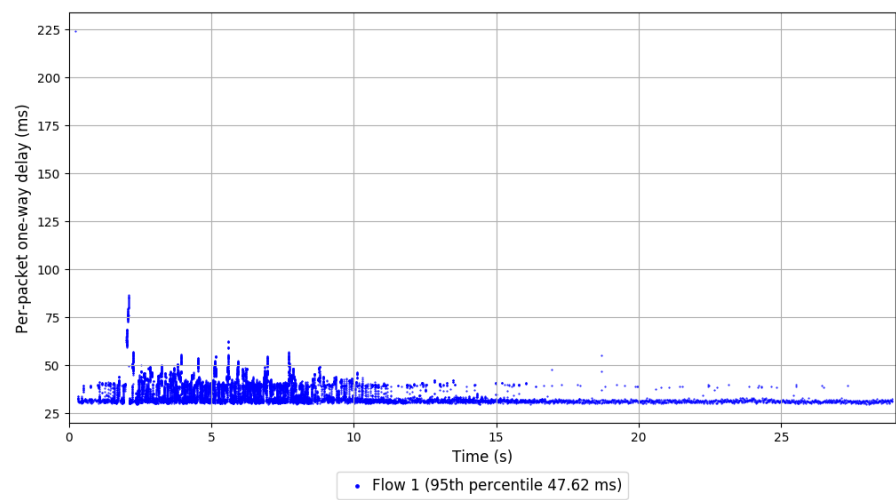
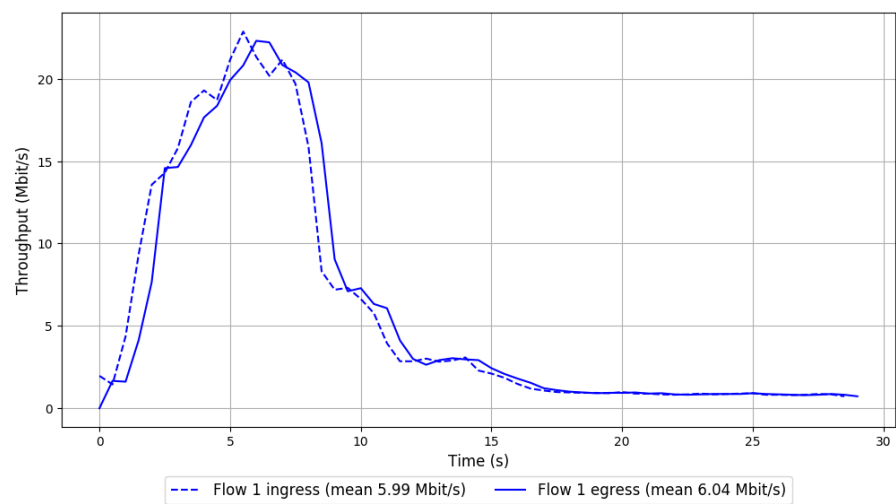
-- Flow 1:

Average throughput: 6.04 Mbit/s

95th percentile per-packet one-way delay: 47.624 ms

Loss rate: 0.02%

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-02-11 11:13:51

End at: 2019-02-11 11:14:21

Local clock offset: 3.381 ms

Remote clock offset: 0.37 ms

Below is generated by plot.py at 2019-02-11 11:57:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.06 Mbit/s

95th percentile per-packet one-way delay: 43.682 ms

Loss rate: 0.01%

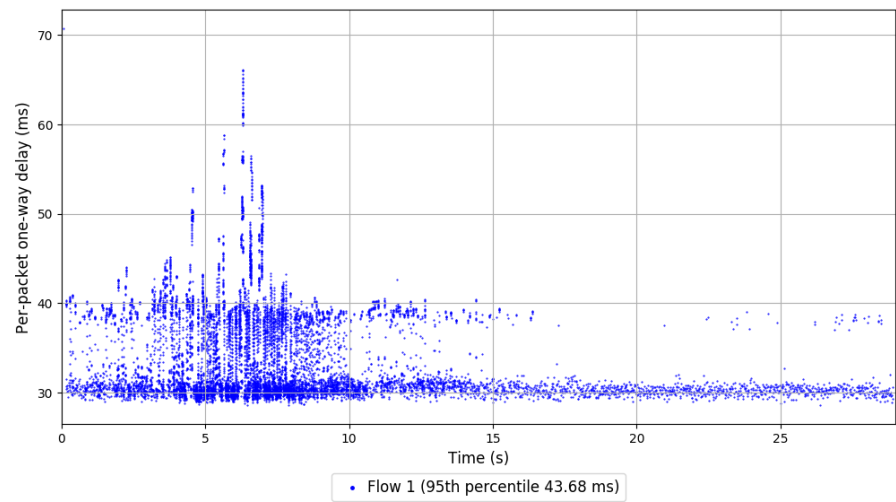
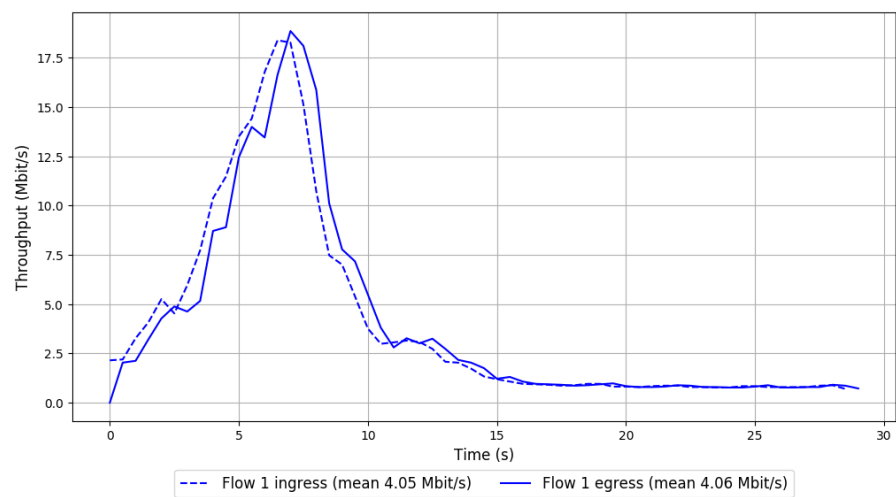
-- Flow 1:

Average throughput: 4.06 Mbit/s

95th percentile per-packet one-way delay: 43.682 ms

Loss rate: 0.01%

Run 2: Report of Indigo-MusesD — Data Link



Run 3: Statistics of Indigo-MusesD

Start at: 2019-02-11 11:39:44

End at: 2019-02-11 11:40:14

Local clock offset: 5.652 ms

Remote clock offset: -1.77 ms

Below is generated by plot.py at 2019-02-11 11:57:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.56 Mbit/s

95th percentile per-packet one-way delay: 45.734 ms

Loss rate: 0.03%

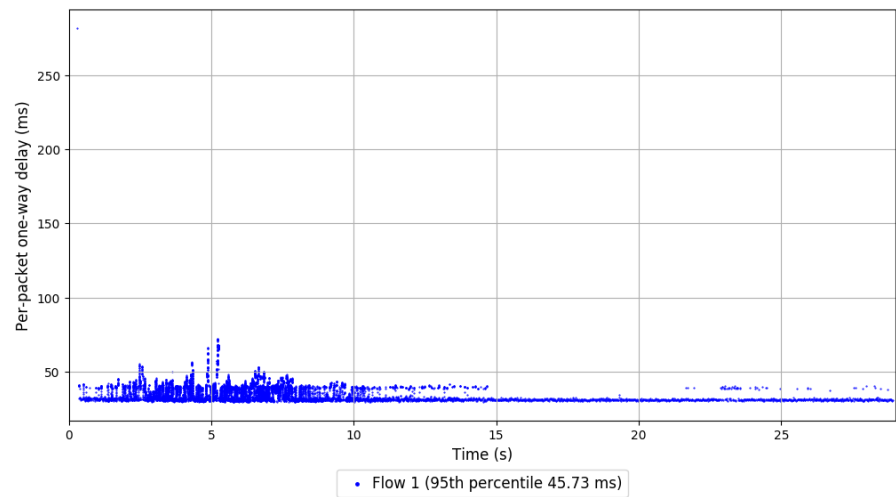
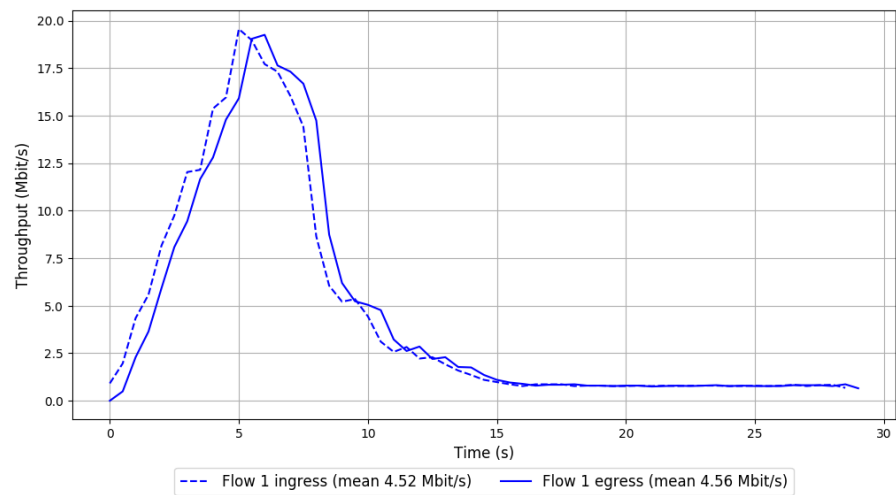
-- Flow 1:

Average throughput: 4.56 Mbit/s

95th percentile per-packet one-way delay: 45.734 ms

Loss rate: 0.03%

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MusesT

Start at: 2019-02-11 10:46:38

End at: 2019-02-11 10:47:08

Local clock offset: -0.472 ms

Remote clock offset: 0.088 ms

Below is generated by plot.py at 2019-02-11 11:57:43

Datalink statistics

-- Total of 1 flow:

Average throughput: 9.83 Mbit/s

95th percentile per-packet one-way delay: 38.341 ms

Loss rate: 0.11%

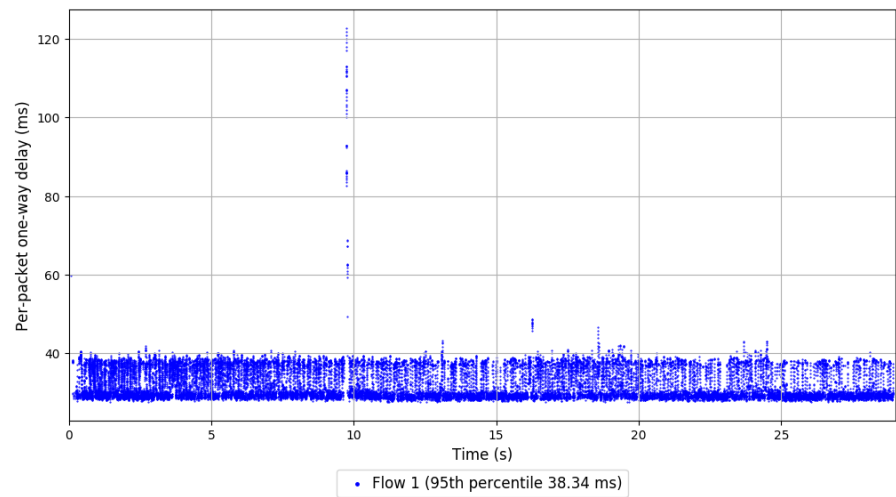
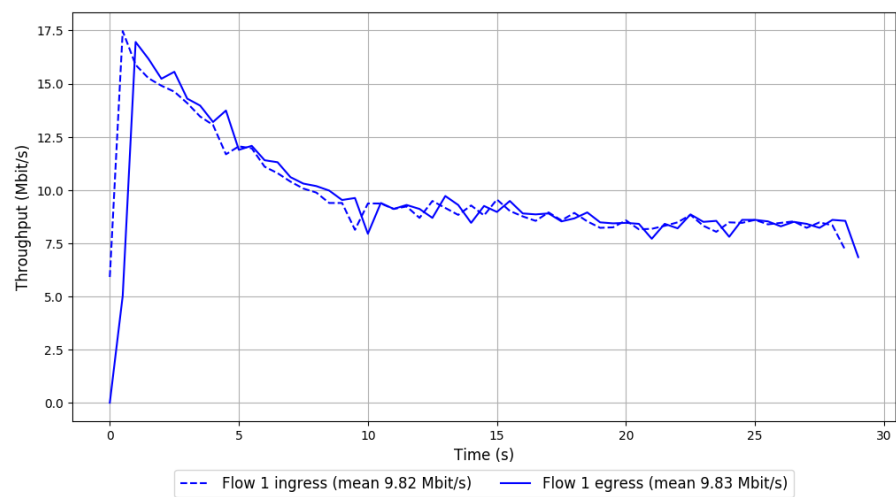
-- Flow 1:

Average throughput: 9.83 Mbit/s

95th percentile per-packet one-way delay: 38.341 ms

Loss rate: 0.11%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MusesT

Start at: 2019-02-11 11:12:37

End at: 2019-02-11 11:13:07

Local clock offset: 3.591 ms

Remote clock offset: 0.273 ms

Below is generated by plot.py at 2019-02-11 11:57:45

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.72 Mbit/s

95th percentile per-packet one-way delay: 39.788 ms

Loss rate: 0.07%

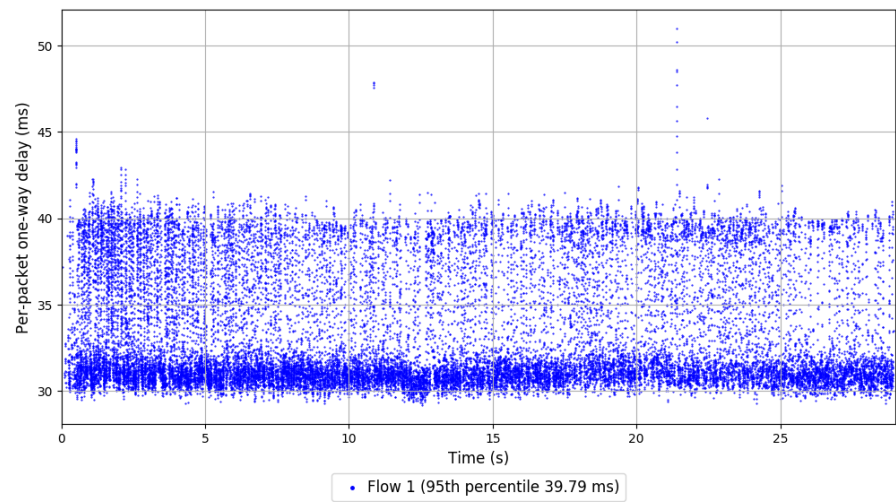
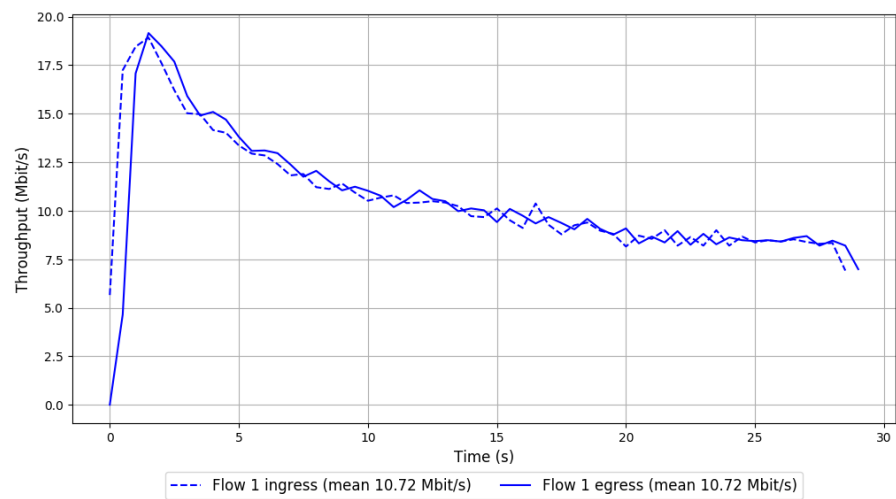
-- Flow 1:

Average throughput: 10.72 Mbit/s

95th percentile per-packet one-way delay: 39.788 ms

Loss rate: 0.07%

Run 2: Report of Indigo-MusesT — Data Link

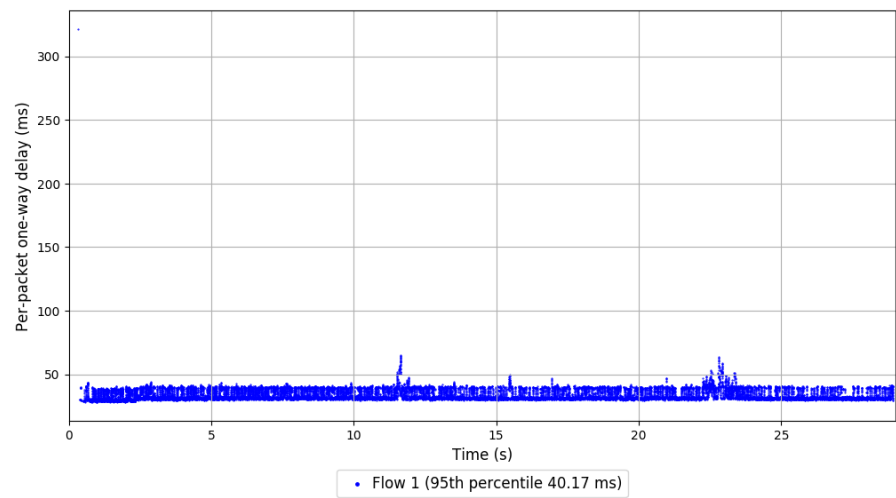
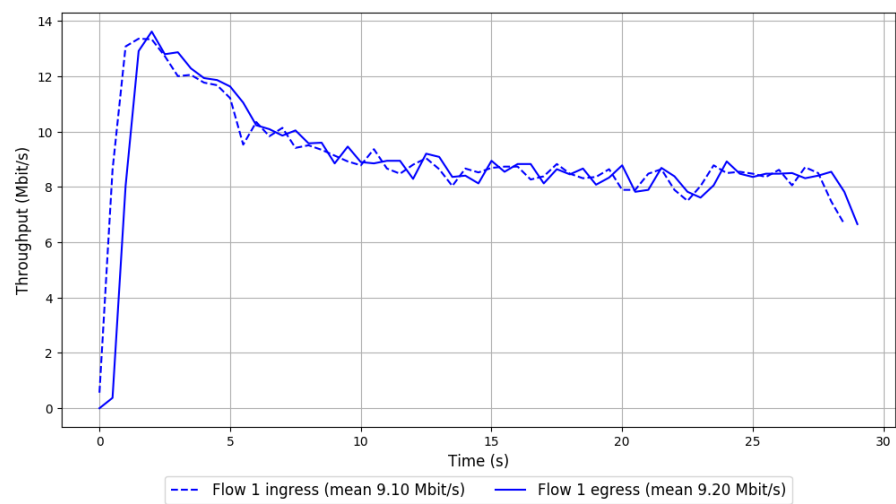


Run 3: Statistics of Indigo-MusesT

Start at: 2019-02-11 11:38:30
End at: 2019-02-11 11:39:00
Local clock offset: 5.591 ms
Remote clock offset: -1.522 ms

Below is generated by plot.py at 2019-02-11 11:57:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.20 Mbit/s
95th percentile per-packet one-way delay: 40.171 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 9.20 Mbit/s
95th percentile per-packet one-way delay: 40.171 ms
Loss rate: 0.06%

Run 3: Report of Indigo-MusesT — Data Link

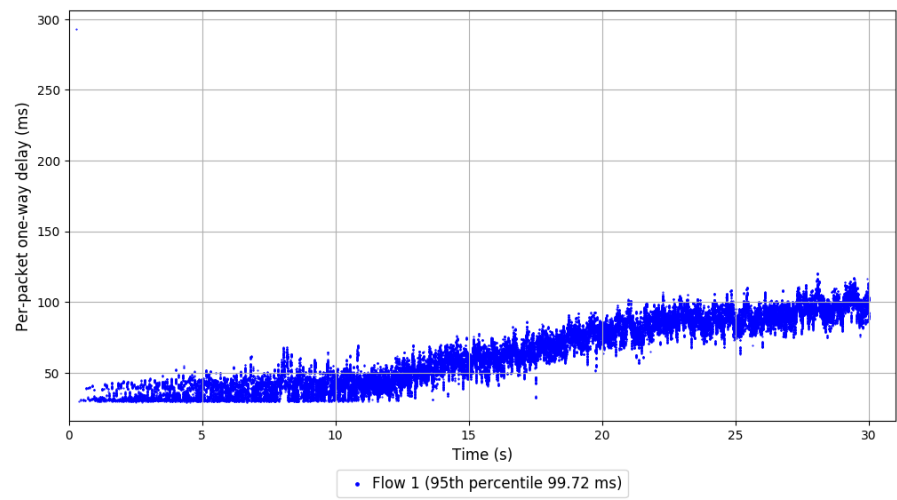
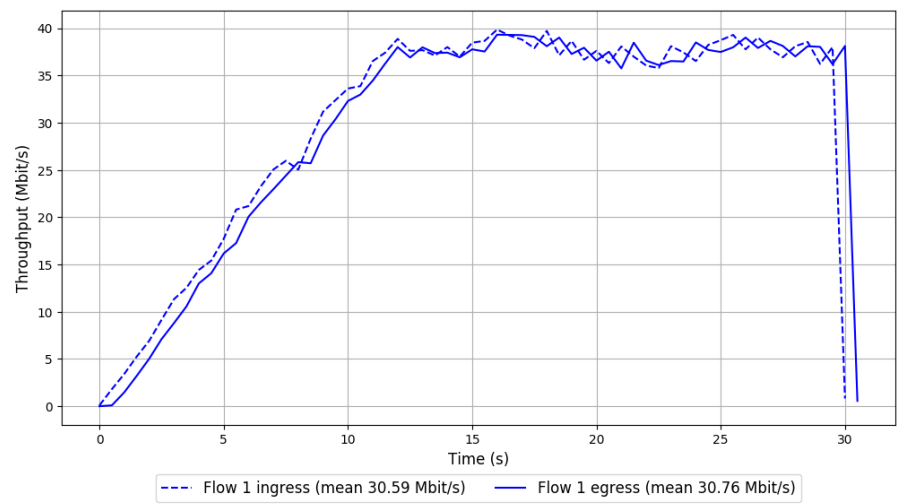


```
Run 1: Statistics of LEDBAT

Start at: 2019-02-11 11:02:38
End at: 2019-02-11 11:03:08
Local clock offset: 7.063 ms
Remote clock offset: 0.286 ms

# Below is generated by plot.py at 2019-02-11 11:58:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 30.76 Mbit/s
95th percentile per-packet one-way delay: 99.725 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 30.76 Mbit/s
95th percentile per-packet one-way delay: 99.725 ms
Loss rate: 0.41%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-02-11 11:28:36

End at: 2019-02-11 11:29:06

Local clock offset: 4.403 ms

Remote clock offset: 0.448 ms

Below is generated by plot.py at 2019-02-11 11:58:08

Datalink statistics

-- Total of 1 flow:

Average throughput: 29.70 Mbit/s

95th percentile per-packet one-way delay: 100.534 ms

Loss rate: 0.40%

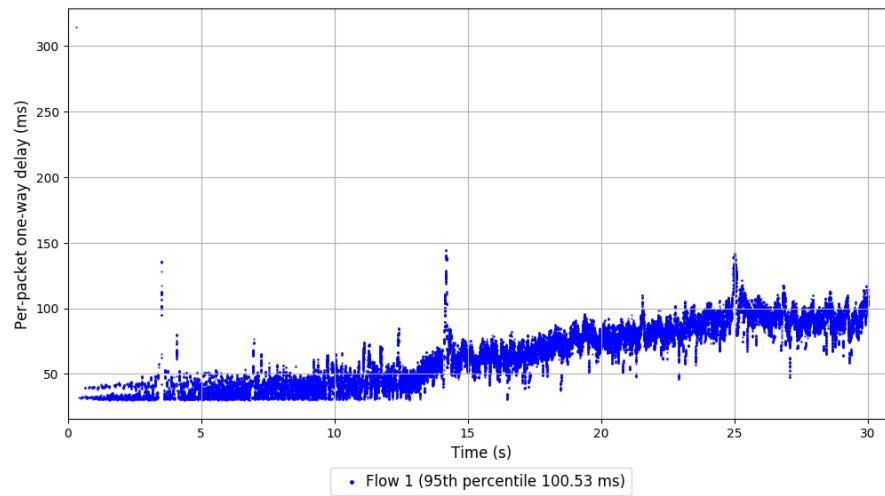
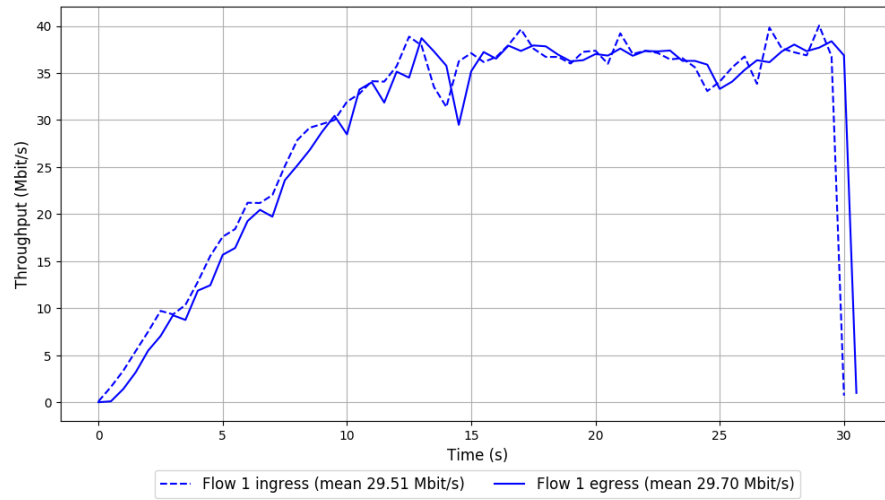
-- Flow 1:

Average throughput: 29.70 Mbit/s

95th percentile per-packet one-way delay: 100.534 ms

Loss rate: 0.40%

Run 2: Report of LEDBAT — Data Link

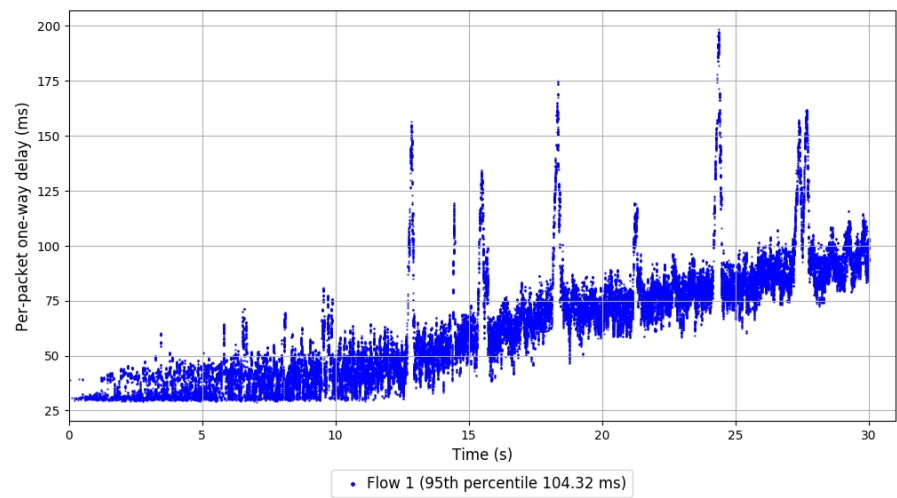
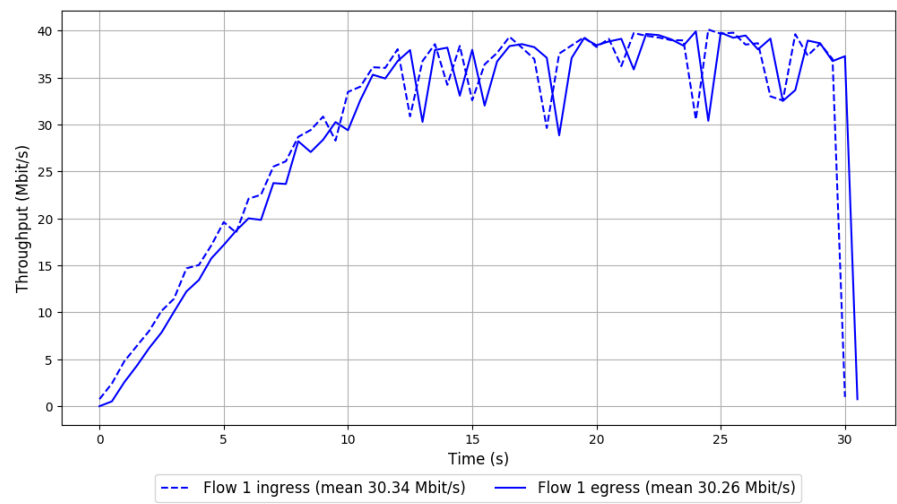


Run 3: Statistics of LEDBAT

Start at: 2019-02-11 11:54:33
End at: 2019-02-11 11:55:03
Local clock offset: 7.776 ms
Remote clock offset: -3.721 ms

Below is generated by plot.py at 2019-02-11 11:58:09
Datalink statistics
-- Total of 1 flow:
Average throughput: 30.26 Mbit/s
95th percentile per-packet one-way delay: 104.319 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 30.26 Mbit/s
95th percentile per-packet one-way delay: 104.319 ms
Loss rate: 0.40%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2019-02-11 10:52:47

End at: 2019-02-11 10:53:17

Local clock offset: 1.101 ms

Remote clock offset: 0.286 ms

Below is generated by plot.py at 2019-02-11 11:58:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 17.89 Mbit/s

95th percentile per-packet one-way delay: 39.463 ms

Loss rate: 0.12%

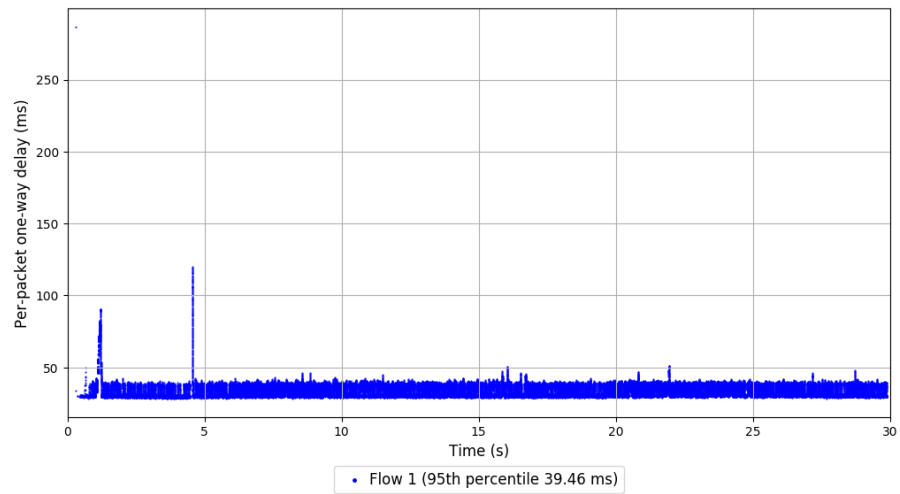
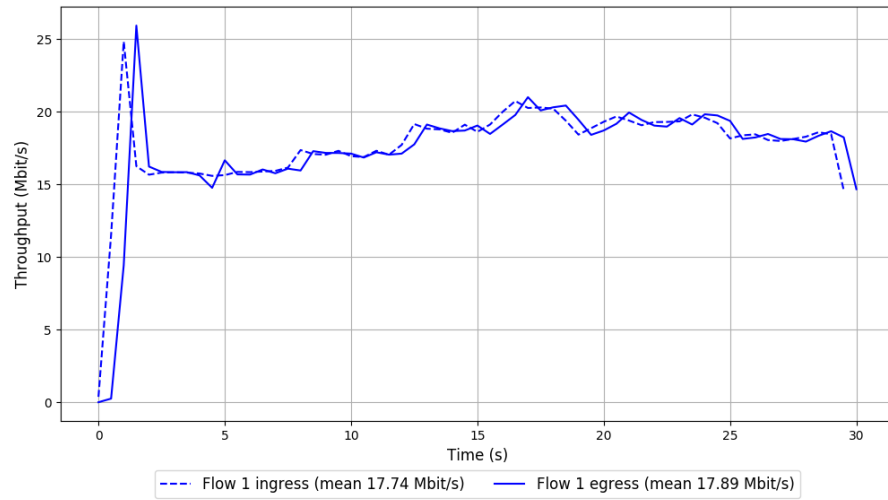
-- Flow 1:

Average throughput: 17.89 Mbit/s

95th percentile per-packet one-way delay: 39.463 ms

Loss rate: 0.12%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-02-11 11:18:45

End at: 2019-02-11 11:19:15

Local clock offset: 3.145 ms

Remote clock offset: 0.331 ms

Below is generated by plot.py at 2019-02-11 11:58:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 33.74 Mbit/s

95th percentile per-packet one-way delay: 415.601 ms

Loss rate: 0.25%

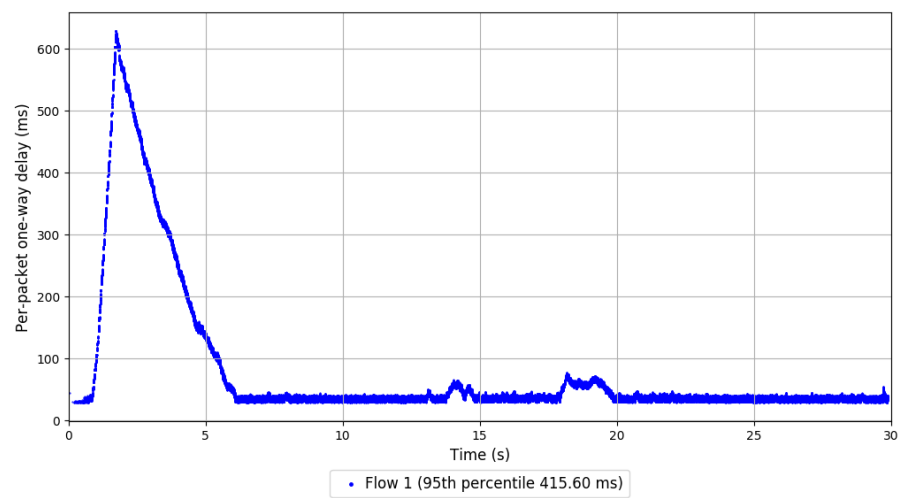
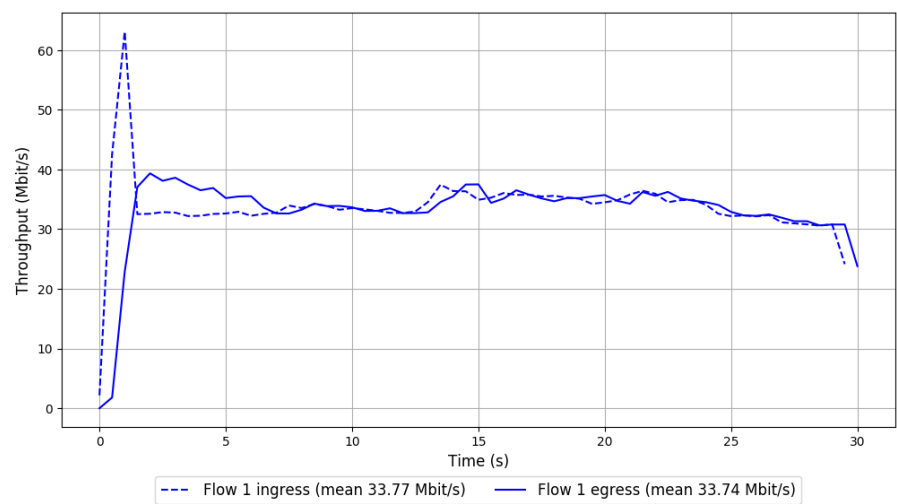
-- Flow 1:

Average throughput: 33.74 Mbit/s

95th percentile per-packet one-way delay: 415.601 ms

Loss rate: 0.25%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-02-11 11:44:42

End at: 2019-02-11 11:45:12

Local clock offset: 6.13 ms

Remote clock offset: -2.601 ms

Below is generated by plot.py at 2019-02-11 11:58:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 8.39 Mbit/s

95th percentile per-packet one-way delay: 39.751 ms

Loss rate: 0.12%

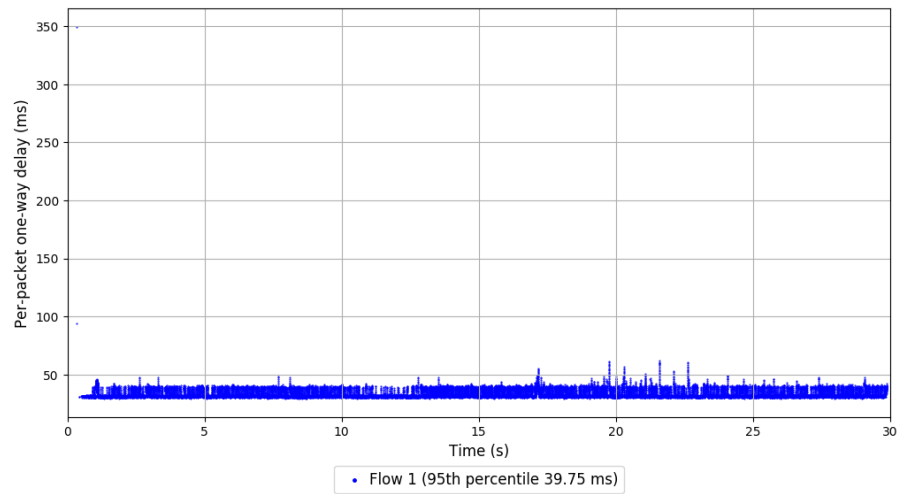
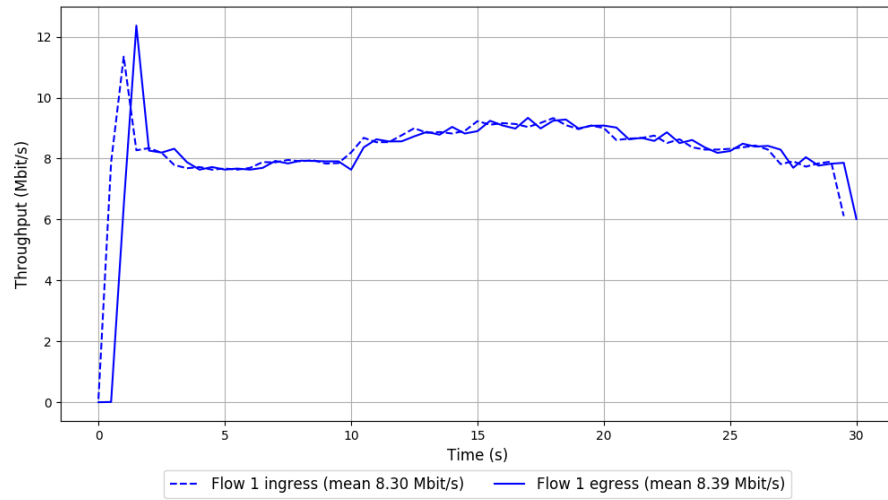
-- Flow 1:

Average throughput: 8.39 Mbit/s

95th percentile per-packet one-way delay: 39.751 ms

Loss rate: 0.12%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

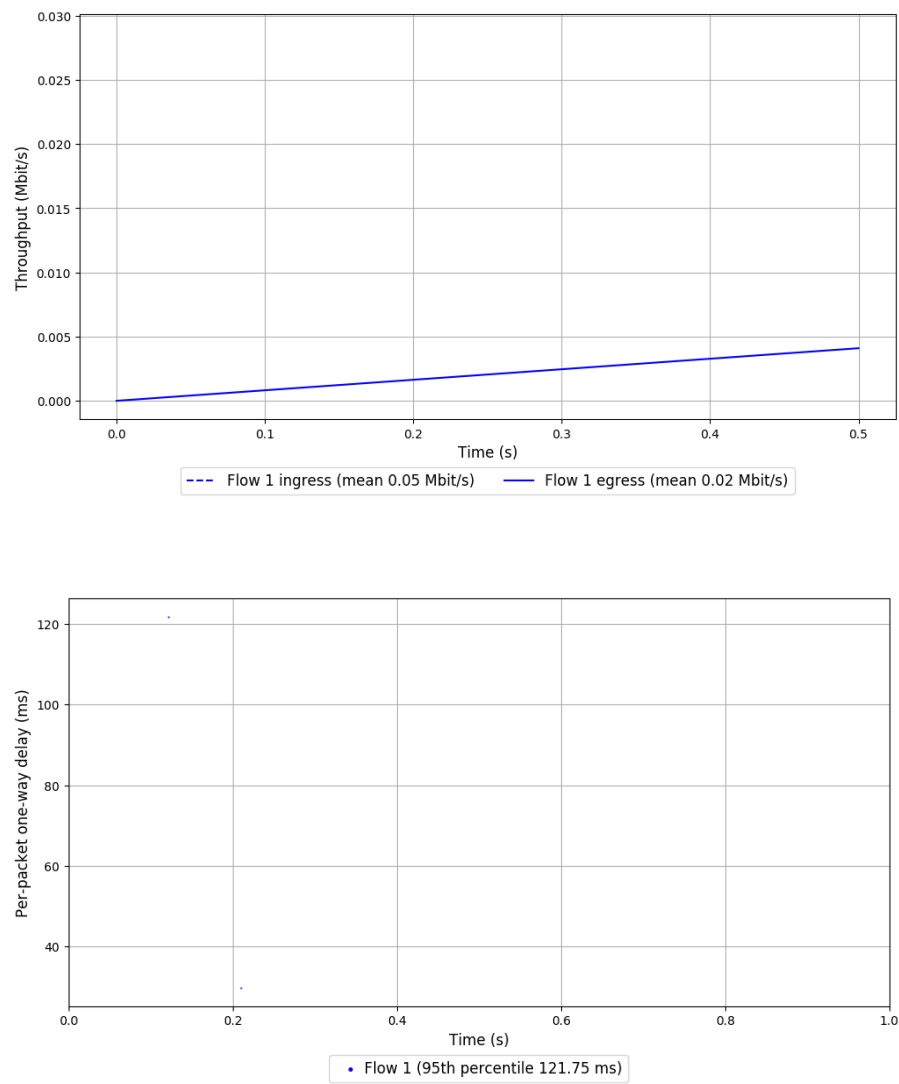
Start at: 2019-02-11 11:01:25

End at: 2019-02-11 11:01:55

Local clock offset: 6.424 ms

Remote clock offset: 0.247 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

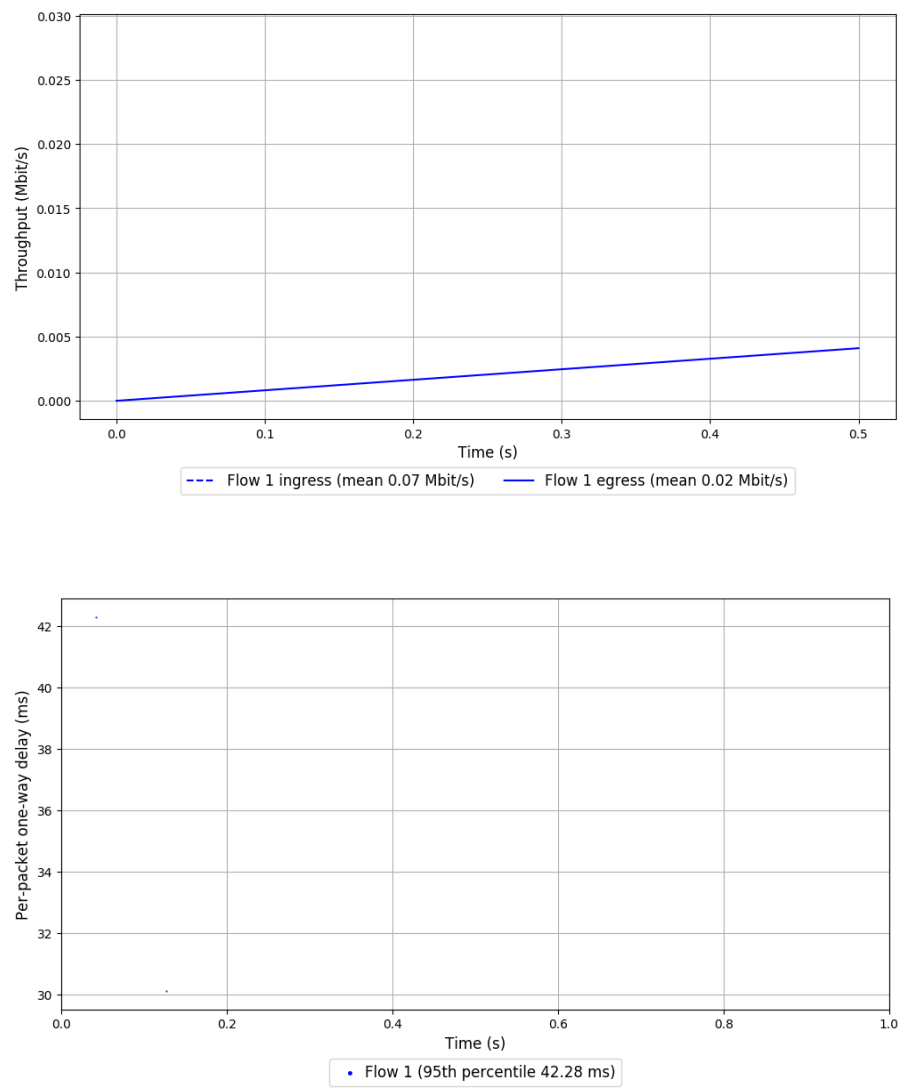
Start at: 2019-02-11 11:27:23

End at: 2019-02-11 11:27:53

Local clock offset: 4.208 ms

Remote clock offset: 0.406 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

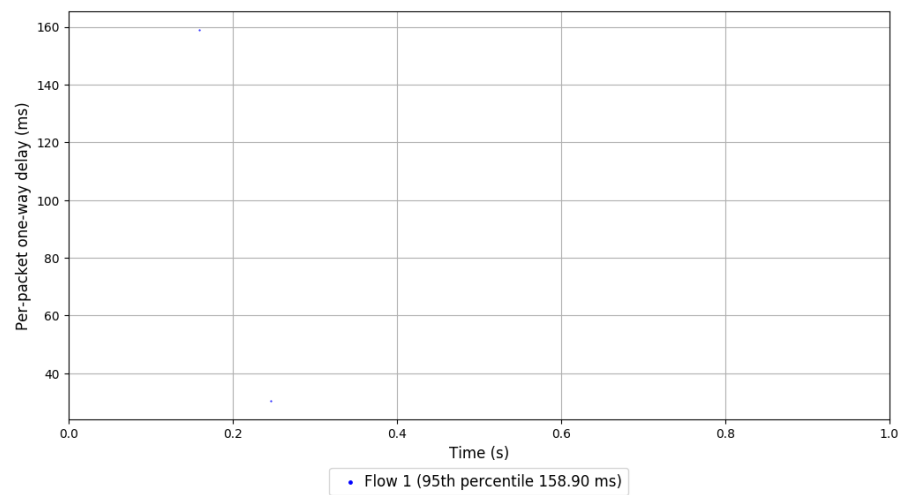
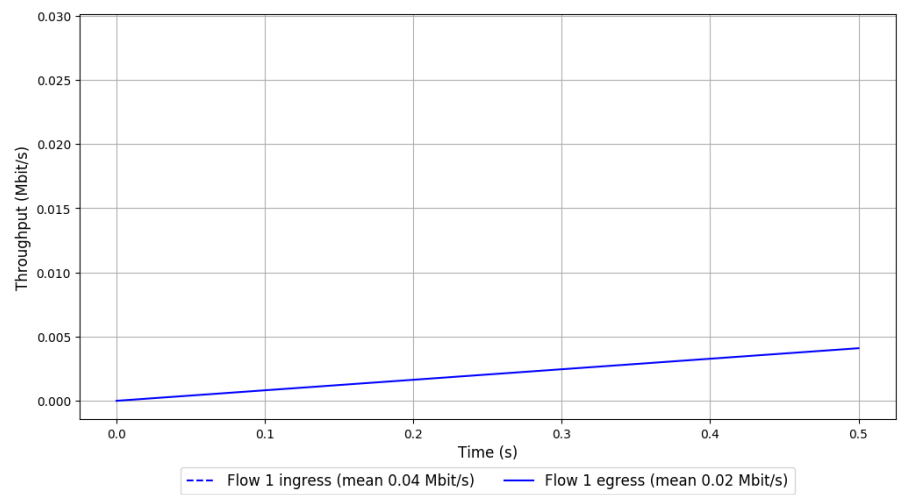
Start at: 2019-02-11 11:53:20

End at: 2019-02-11 11:53:50

Local clock offset: 7.576 ms

Remote clock offset: -3.619 ms

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-02-11 10:55:14

End at: 2019-02-11 10:55:44

Local clock offset: 3.022 ms

Remote clock offset: 0.267 ms

Below is generated by plot.py at 2019-02-11 11:58:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 31.28 Mbit/s

95th percentile per-packet one-way delay: 200.280 ms

Loss rate: 0.83%

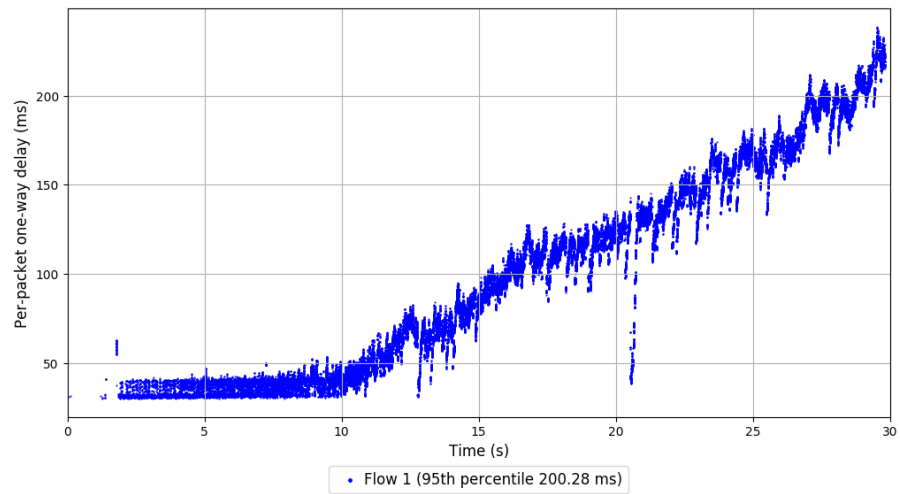
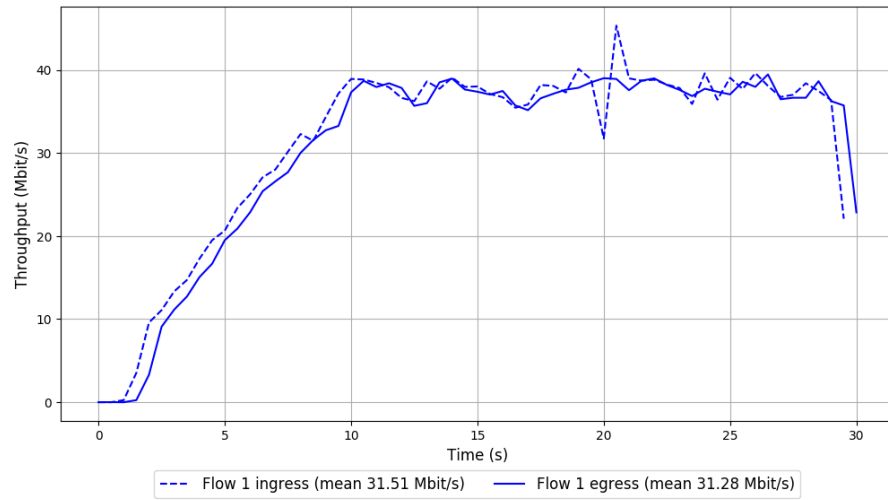
-- Flow 1:

Average throughput: 31.28 Mbit/s

95th percentile per-packet one-way delay: 200.280 ms

Loss rate: 0.83%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-02-11 11:21:13

End at: 2019-02-11 11:21:43

Local clock offset: 3.28 ms

Remote clock offset: 0.388 ms

Below is generated by plot.py at 2019-02-11 11:58:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 36.77 Mbit/s

95th percentile per-packet one-way delay: 234.537 ms

Loss rate: 0.70%

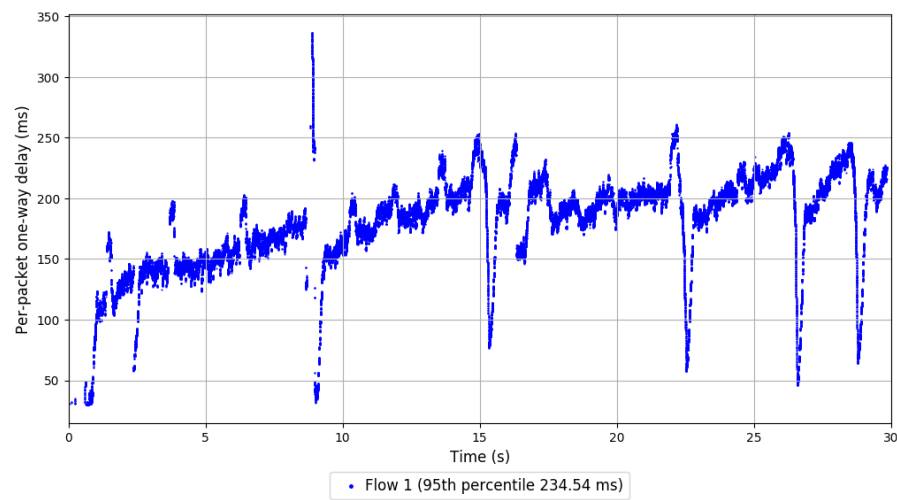
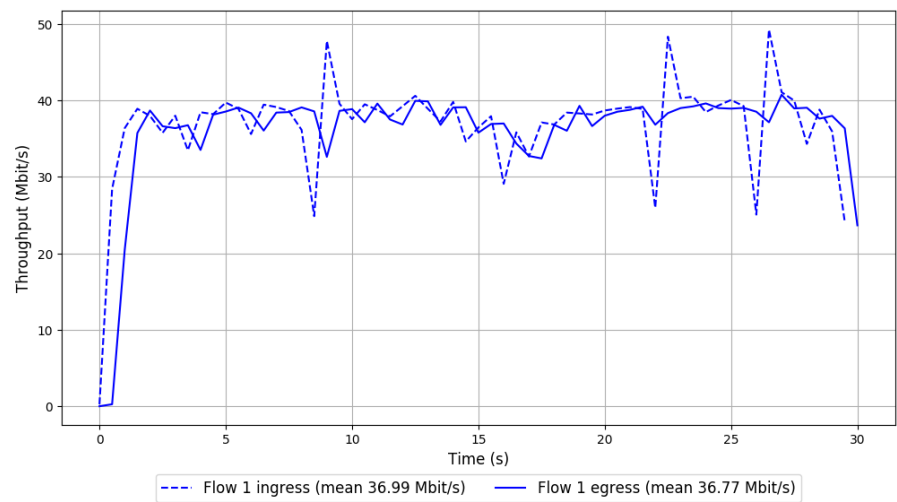
-- Flow 1:

Average throughput: 36.77 Mbit/s

95th percentile per-packet one-way delay: 234.537 ms

Loss rate: 0.70%

Run 2: Report of QUIC Cubic — Data Link

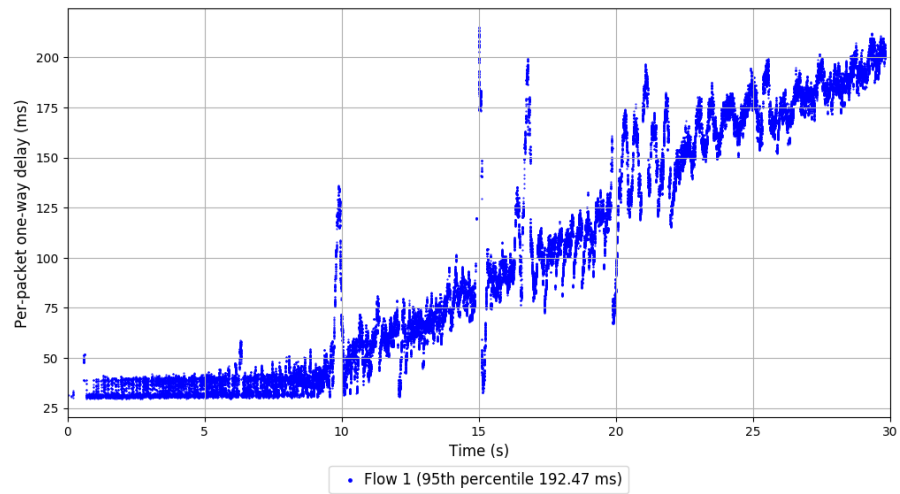
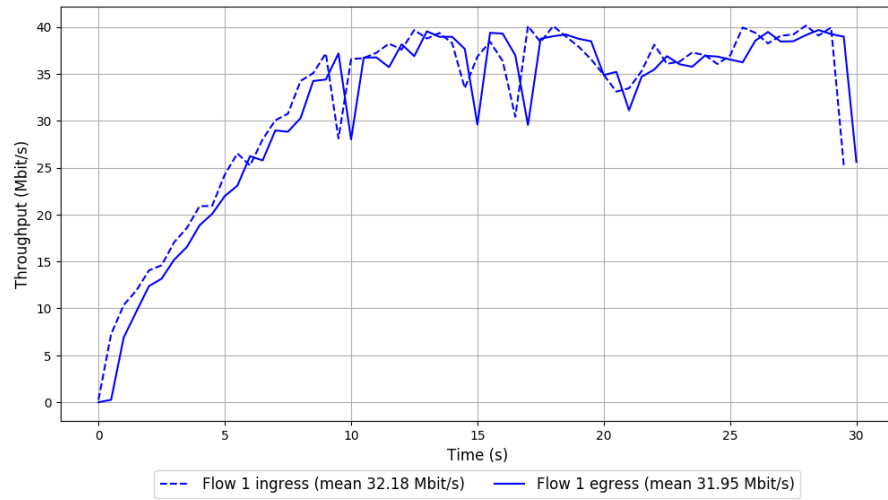


Run 3: Statistics of QUIC Cubic

Start at: 2019-02-11 11:47:10
End at: 2019-02-11 11:47:40
Local clock offset: 6.495 ms
Remote clock offset: -2.902 ms

Below is generated by plot.py at 2019-02-11 11:58:23
Datalink statistics
-- Total of 1 flow:
Average throughput: 31.95 Mbit/s
95th percentile per-packet one-way delay: 192.473 ms
Loss rate: 0.81%
-- Flow 1:
Average throughput: 31.95 Mbit/s
95th percentile per-packet one-way delay: 192.473 ms
Loss rate: 0.81%

Run 3: Report of QUIC Cubic — Data Link



Run 1: Statistics of SCReAM

Start at: 2019-02-11 11:00:12

End at: 2019-02-11 11:00:42

Local clock offset: 5.851 ms

Remote clock offset: 0.317 ms

Below is generated by plot.py at 2019-02-11 11:58:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 30.594 ms

Loss rate: 0.13%

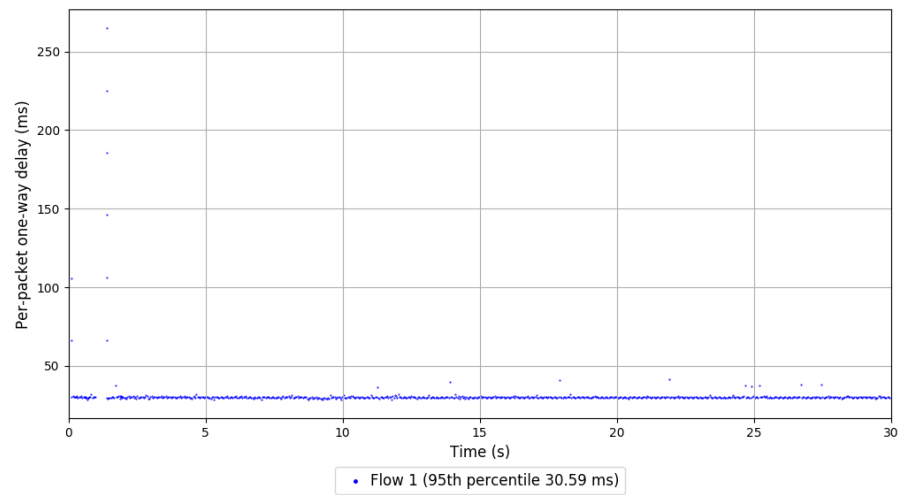
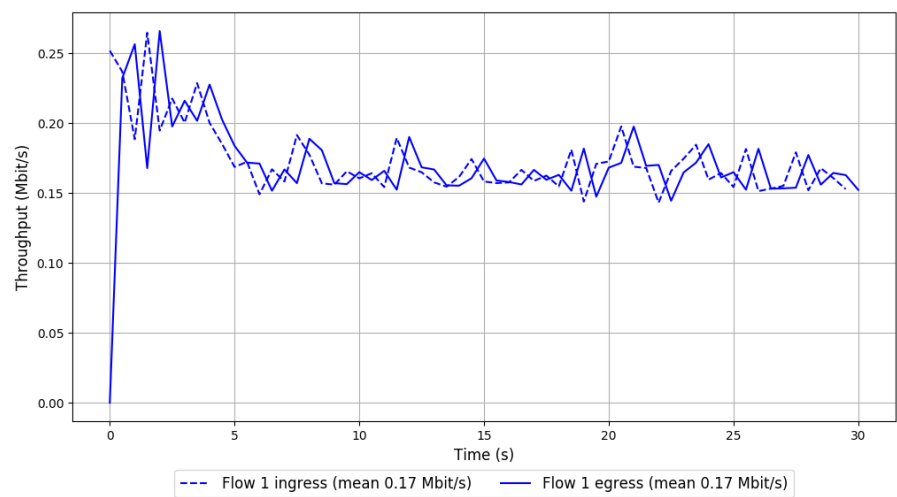
-- Flow 1:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 30.594 ms

Loss rate: 0.13%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-02-11 11:26:09

End at: 2019-02-11 11:26:40

Local clock offset: 3.992 ms

Remote clock offset: 0.455 ms

Below is generated by plot.py at 2019-02-11 11:58:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 34.091 ms

Loss rate: 0.13%

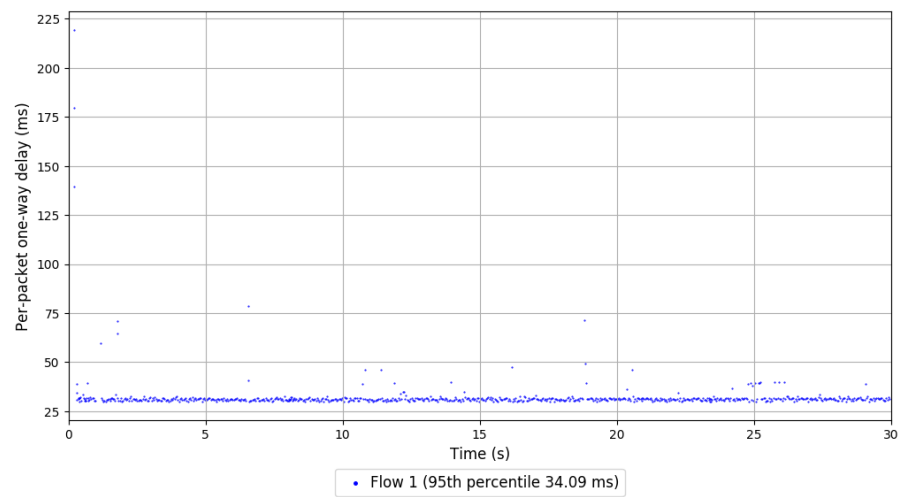
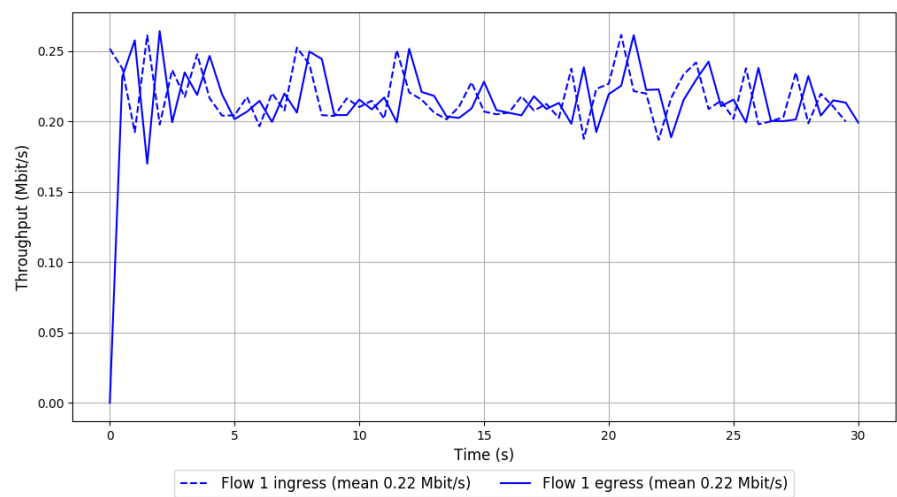
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 34.091 ms

Loss rate: 0.13%

Run 2: Report of SReAM — Data Link

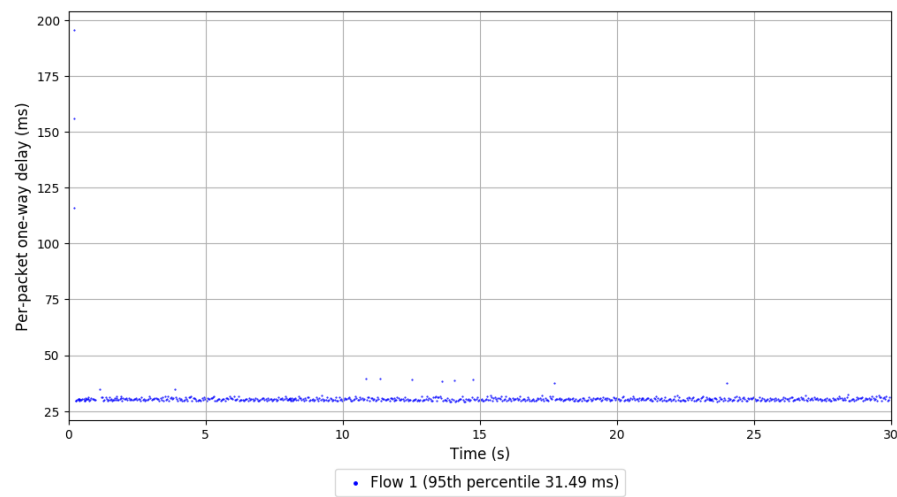
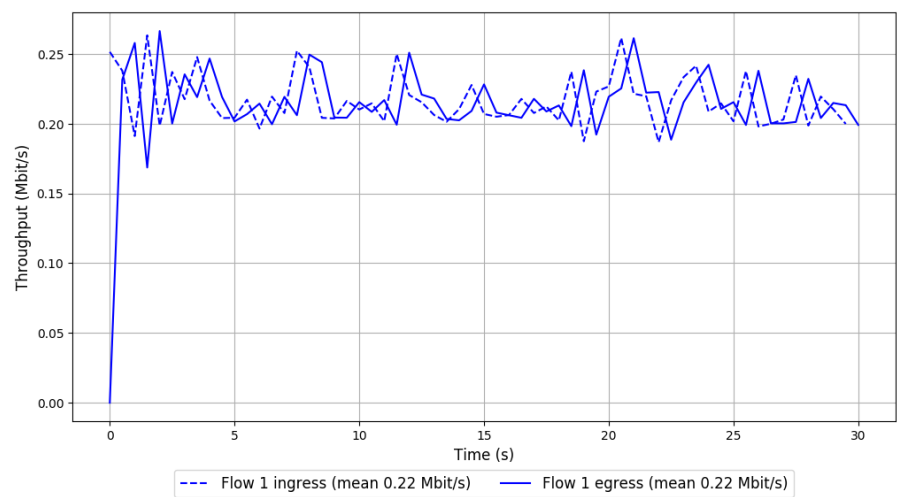


Run 3: Statistics of SCReAM

Start at: 2019-02-11 11:52:07
End at: 2019-02-11 11:52:37
Local clock offset: 7.337 ms
Remote clock offset: -3.391 ms

Below is generated by plot.py at 2019-02-11 11:58:23
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 31.487 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 31.487 ms
Loss rate: 0.13%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2019-02-11 10:58:58

End at: 2019-02-11 10:59:28

Local clock offset: 5.379 ms

Remote clock offset: 0.306 ms

Below is generated by plot.py at 2019-02-11 11:58:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.09 Mbit/s

95th percentile per-packet one-way delay: 47.075 ms

Loss rate: 0.17%

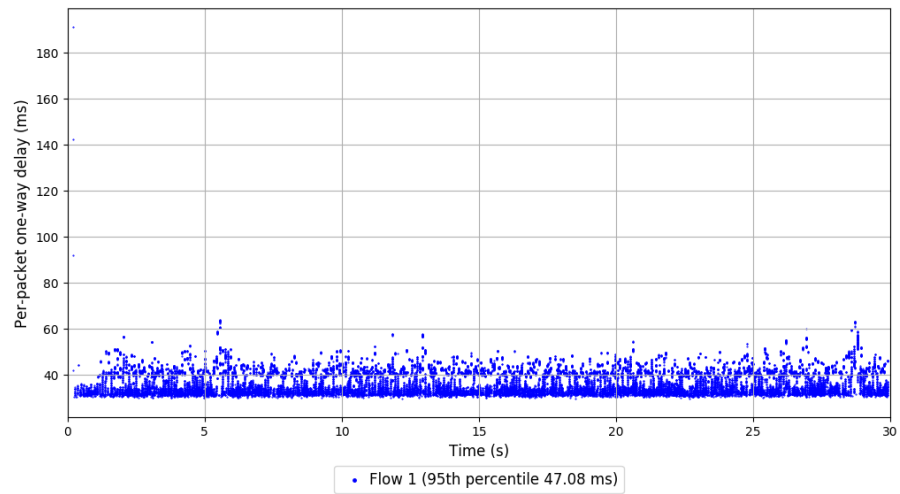
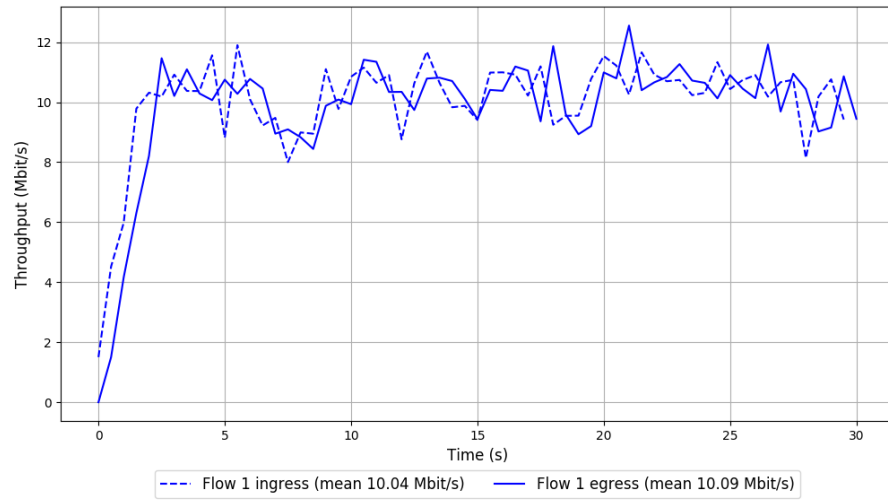
-- Flow 1:

Average throughput: 10.09 Mbit/s

95th percentile per-packet one-way delay: 47.075 ms

Loss rate: 0.17%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2019-02-11 11:24:56

End at: 2019-02-11 11:25:26

Local clock offset: 3.75 ms

Remote clock offset: 0.405 ms

Below is generated by plot.py at 2019-02-11 11:58:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 9.99 Mbit/s

95th percentile per-packet one-way delay: 46.259 ms

Loss rate: 0.00%

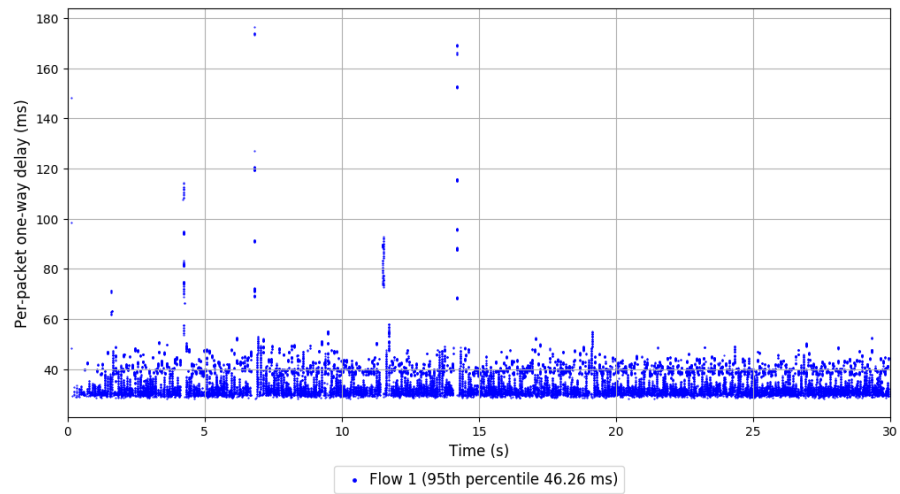
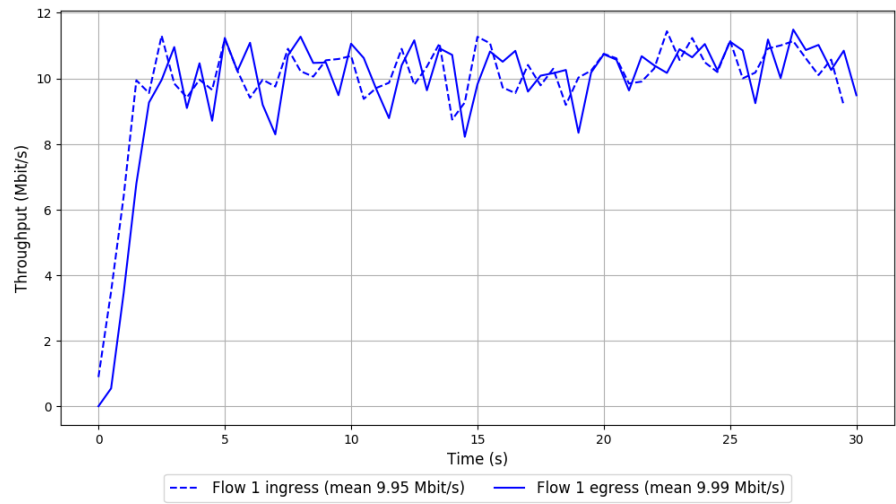
-- Flow 1:

Average throughput: 9.99 Mbit/s

95th percentile per-packet one-way delay: 46.259 ms

Loss rate: 0.00%

Run 2: Report of Sprout — Data Link

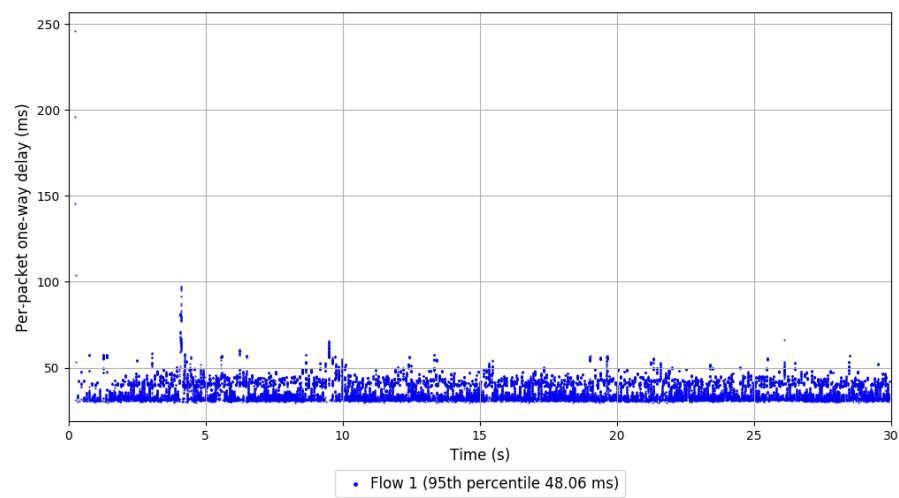
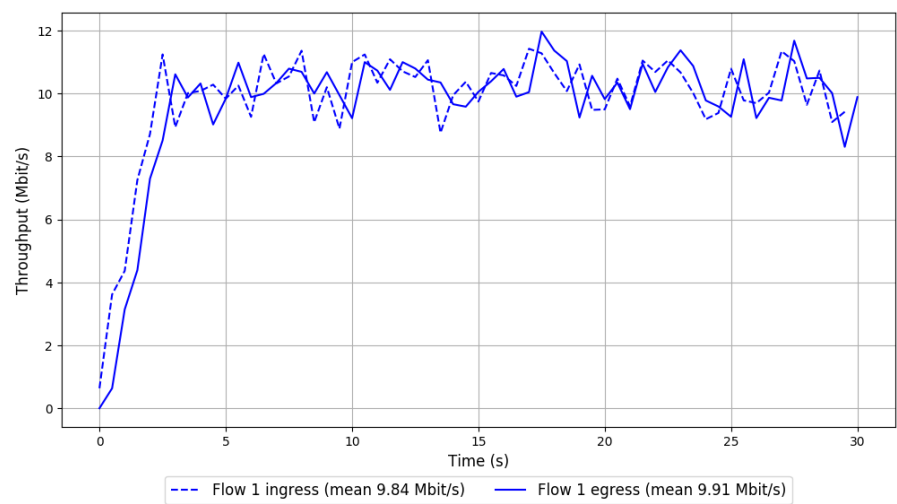


Run 3: Statistics of Sprout

Start at: 2019-02-11 11:50:53
End at: 2019-02-11 11:51:23
Local clock offset: 7.099 ms
Remote clock offset: -3.325 ms

Below is generated by plot.py at 2019-02-11 11:58:23
Datalink statistics
-- Total of 1 flow:
Average throughput: 9.91 Mbit/s
95th percentile per-packet one-way delay: 48.062 ms
Loss rate: 0.18%
-- Flow 1:
Average throughput: 9.91 Mbit/s
95th percentile per-packet one-way delay: 48.062 ms
Loss rate: 0.18%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

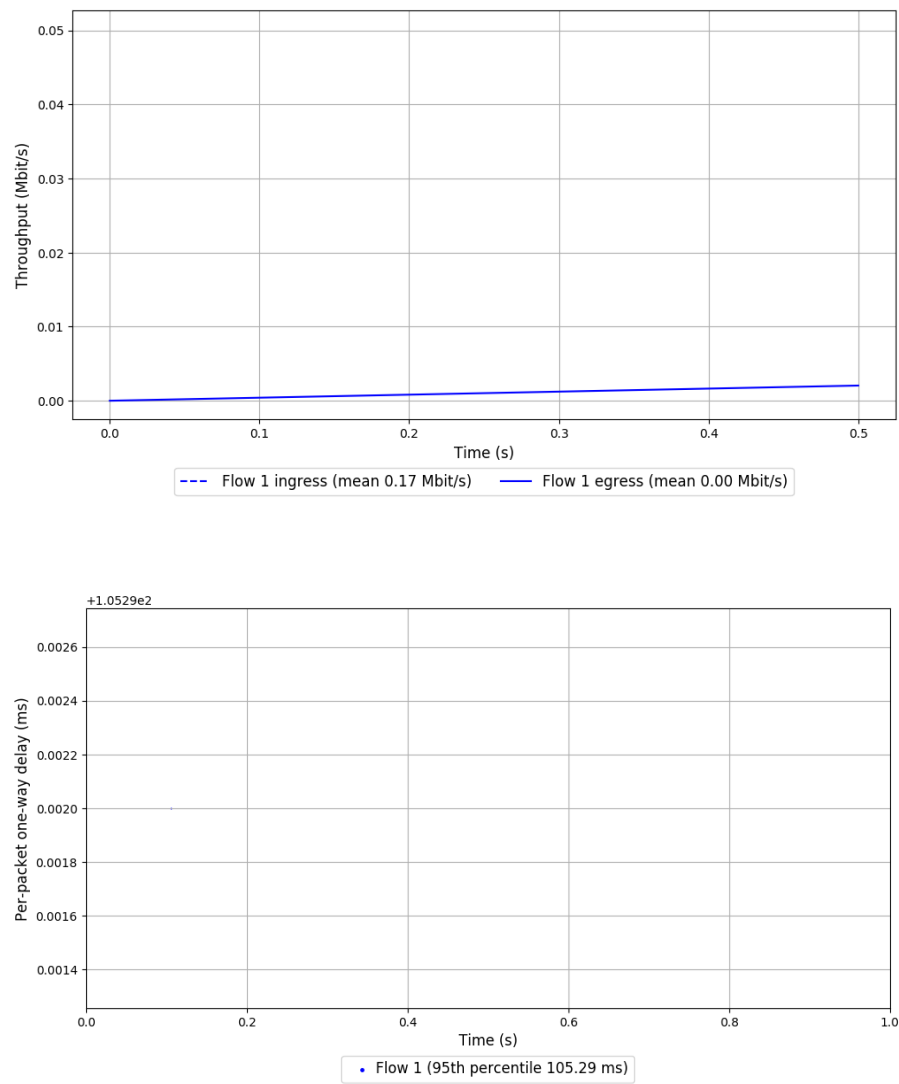
Start at: 2019-02-11 10:45:25

End at: 2019-02-11 10:45:55

Local clock offset: 0.063 ms

Remote clock offset: 0.257 ms

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



Run 2: Statistics of TaoVA-100x

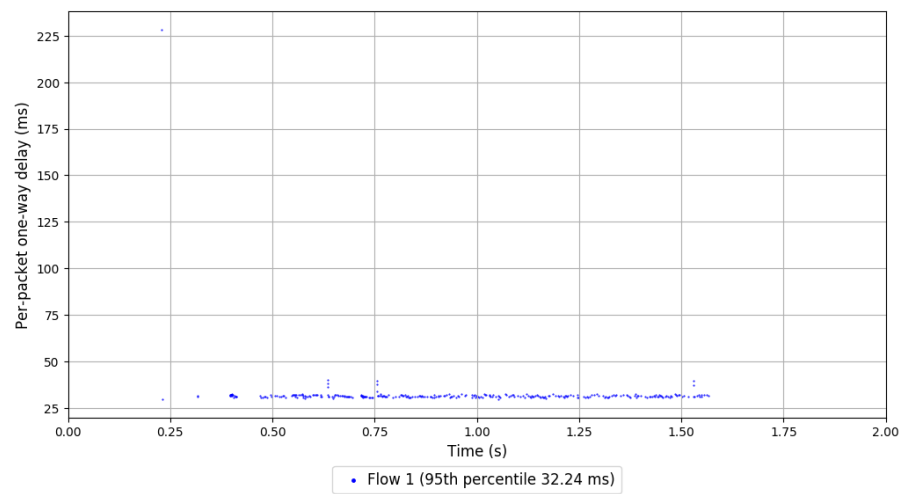
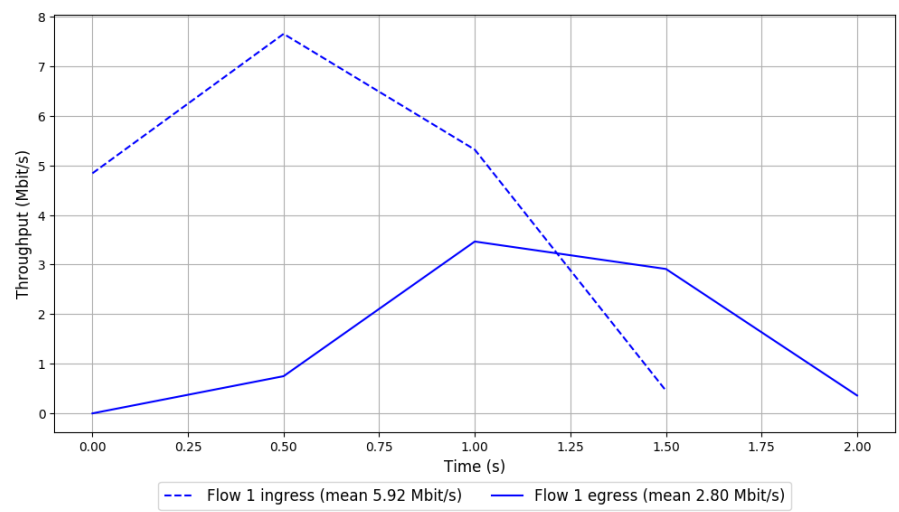
Start at: 2019-02-11 11:11:24

End at: 2019-02-11 11:11:54

Local clock offset: 3.909 ms

Remote clock offset: 0.373 ms

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



Run 3: Statistics of TaoVA-100x

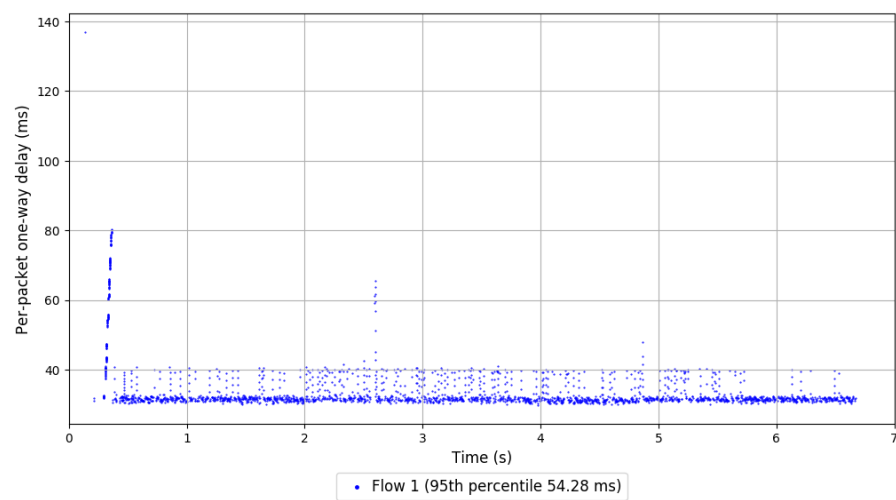
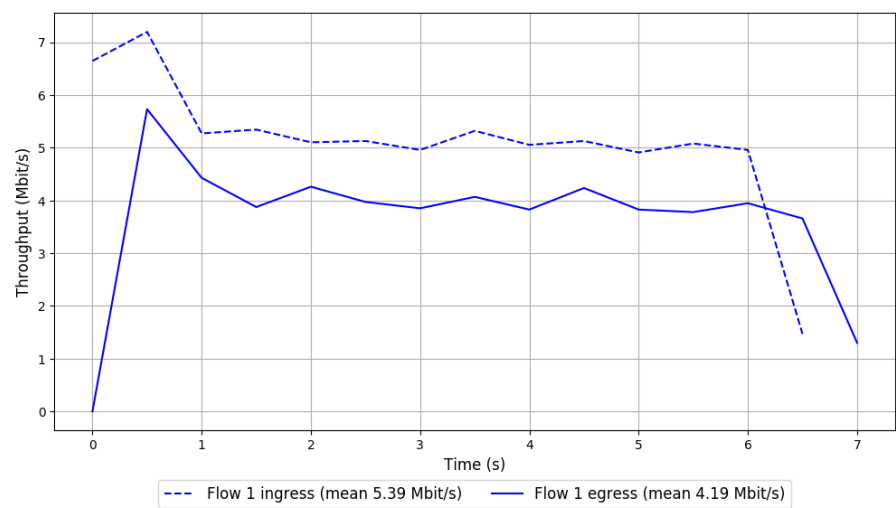
Start at: 2019-02-11 11:37:16

End at: 2019-02-11 11:37:47

Local clock offset: 5.58 ms

Remote clock offset: -1.139 ms

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



Run 1: Statistics of TCP Vegas

Start at: 2019-02-11 10:57:43

End at: 2019-02-11 10:58:13

Local clock offset: 4.586 ms

Remote clock offset: 0.362 ms

Below is generated by plot.py at 2019-02-11 11:58:42

Datalink statistics

-- Total of 1 flow:

Average throughput: 37.69 Mbit/s

95th percentile per-packet one-way delay: 141.717 ms

Loss rate: 0.27%

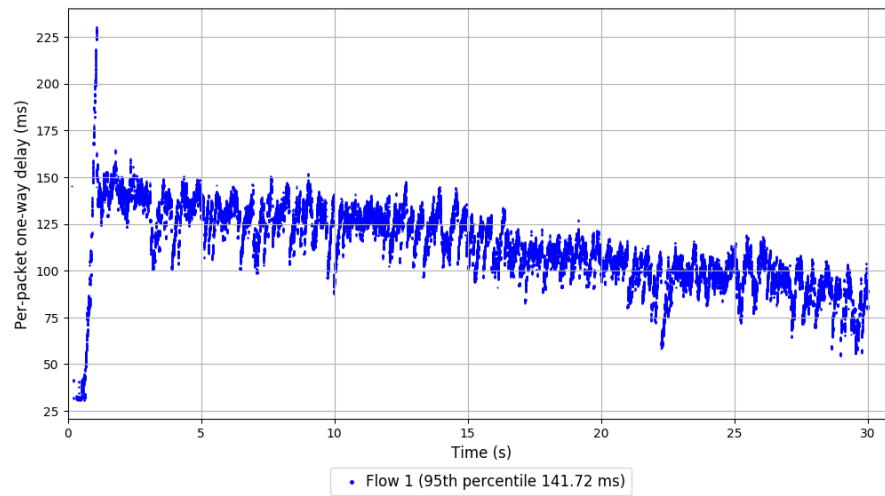
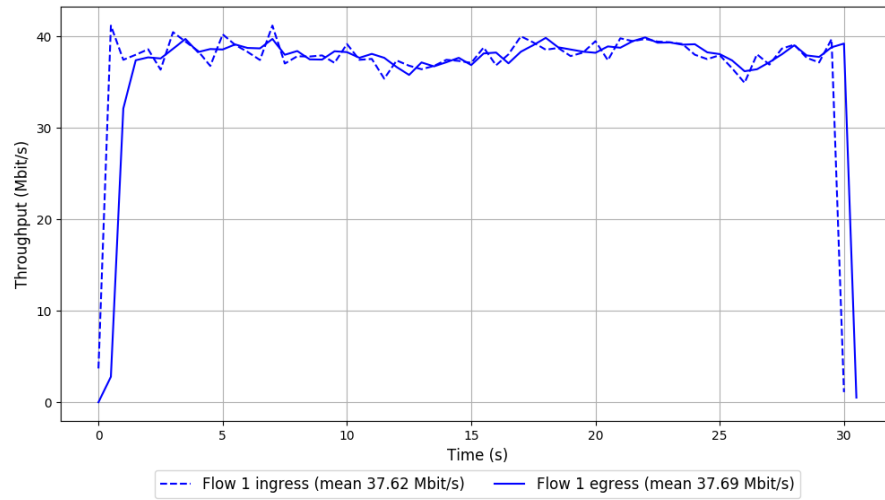
-- Flow 1:

Average throughput: 37.69 Mbit/s

95th percentile per-packet one-way delay: 141.717 ms

Loss rate: 0.27%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2019-02-11 11:23:42

End at: 2019-02-11 11:24:12

Local clock offset: 3.604 ms

Remote clock offset: 0.37 ms

Below is generated by plot.py at 2019-02-11 11:58:42

Datalink statistics

-- Total of 1 flow:

Average throughput: 20.34 Mbit/s

95th percentile per-packet one-way delay: 47.941 ms

Loss rate: 0.02%

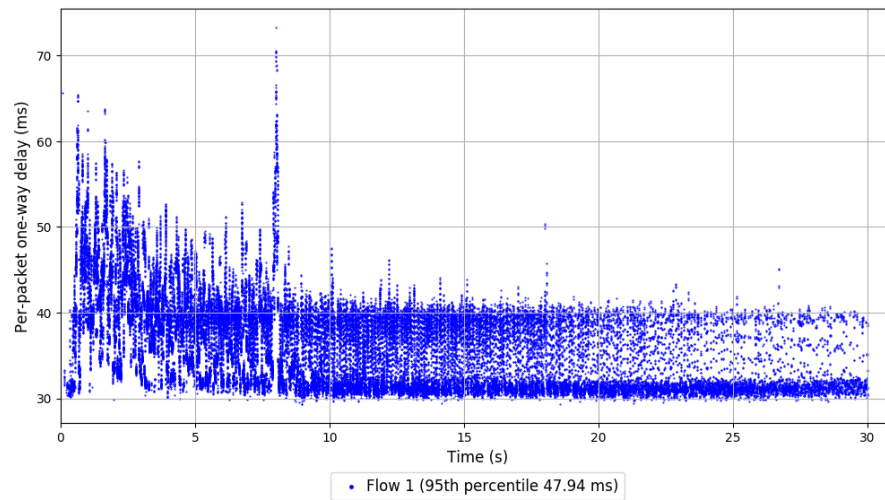
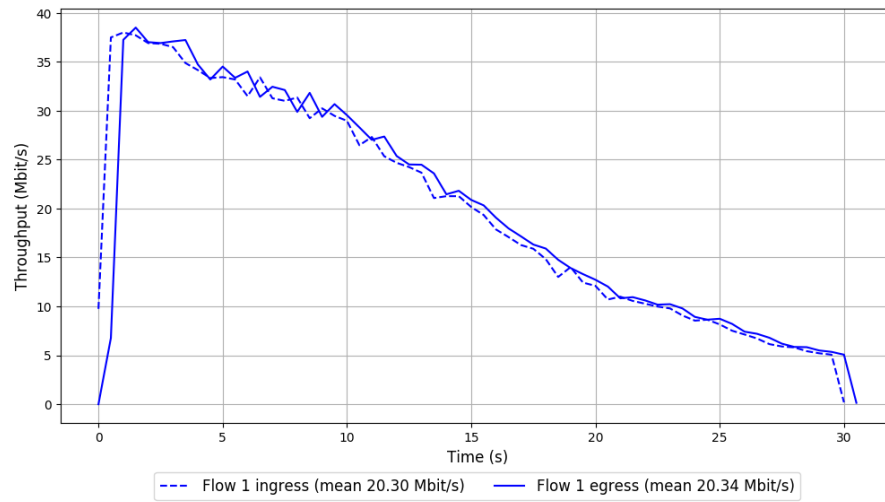
-- Flow 1:

Average throughput: 20.34 Mbit/s

95th percentile per-packet one-way delay: 47.941 ms

Loss rate: 0.02%

Run 2: Report of TCP Vegas — Data Link

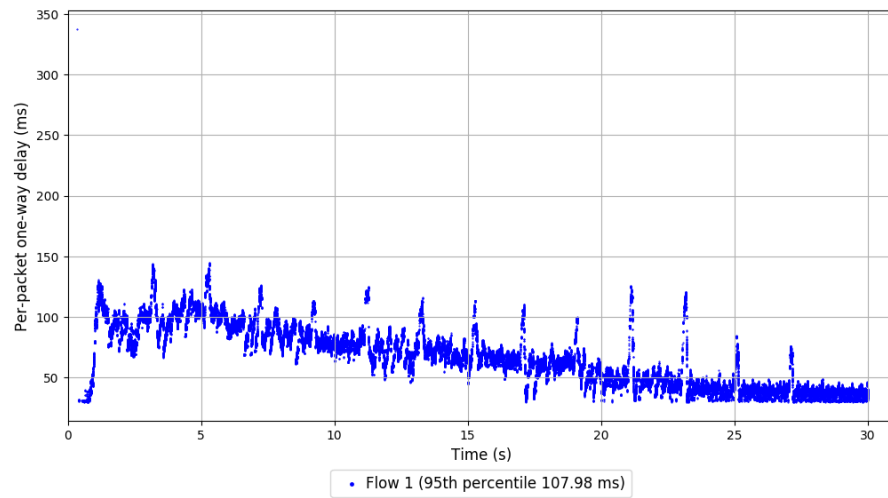
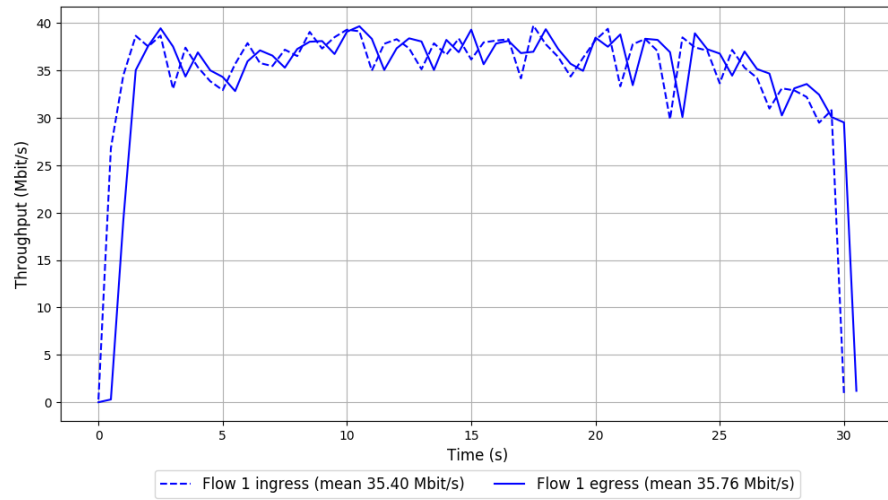


Run 3: Statistics of TCP Vegas

Start at: 2019-02-11 11:49:39
End at: 2019-02-11 11:50:09
Local clock offset: 6.904 ms
Remote clock offset: -3.241 ms

Below is generated by plot.py at 2019-02-11 11:58:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 35.76 Mbit/s
95th percentile per-packet one-way delay: 107.978 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 35.76 Mbit/s
95th percentile per-packet one-way delay: 107.978 ms
Loss rate: 0.11%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2019-02-11 10:41:42

End at: 2019-02-11 10:42:12

Local clock offset: 2.293 ms

Remote clock offset: 0.111 ms

Below is generated by plot.py at 2019-02-11 11:58:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 36.17 Mbit/s

95th percentile per-packet one-way delay: 279.765 ms

Loss rate: 1.96%

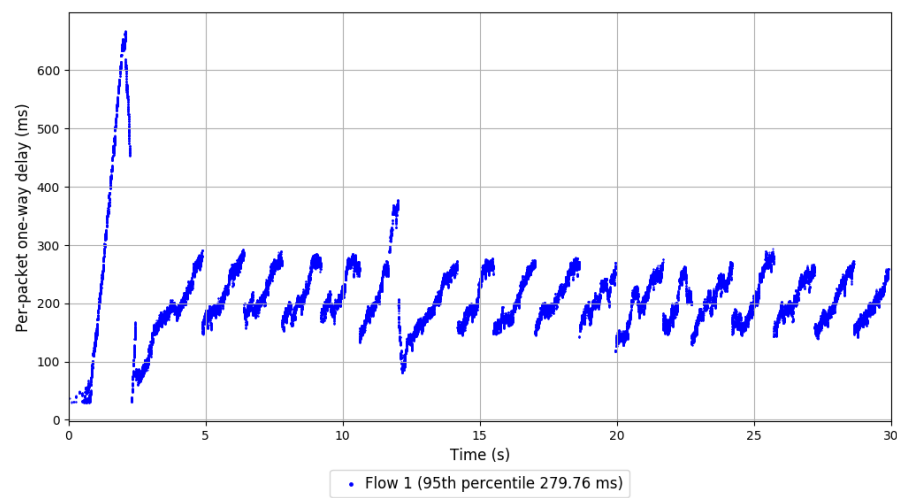
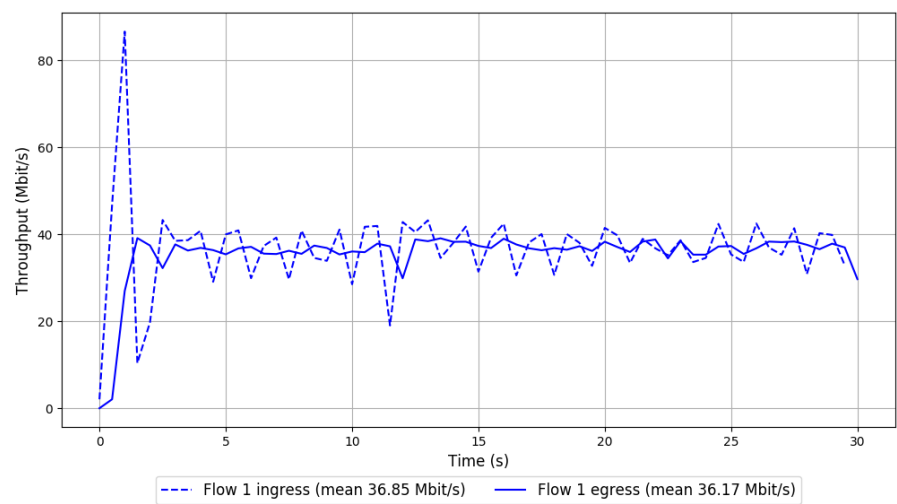
-- Flow 1:

Average throughput: 36.17 Mbit/s

95th percentile per-packet one-way delay: 279.765 ms

Loss rate: 1.96%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-02-11 11:07:36

End at: 2019-02-11 11:08:06

Local clock offset: 5.46 ms

Remote clock offset: 0.307 ms

Below is generated by plot.py at 2019-02-11 11:58:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 37.73 Mbit/s

95th percentile per-packet one-way delay: 250.456 ms

Loss rate: 1.46%

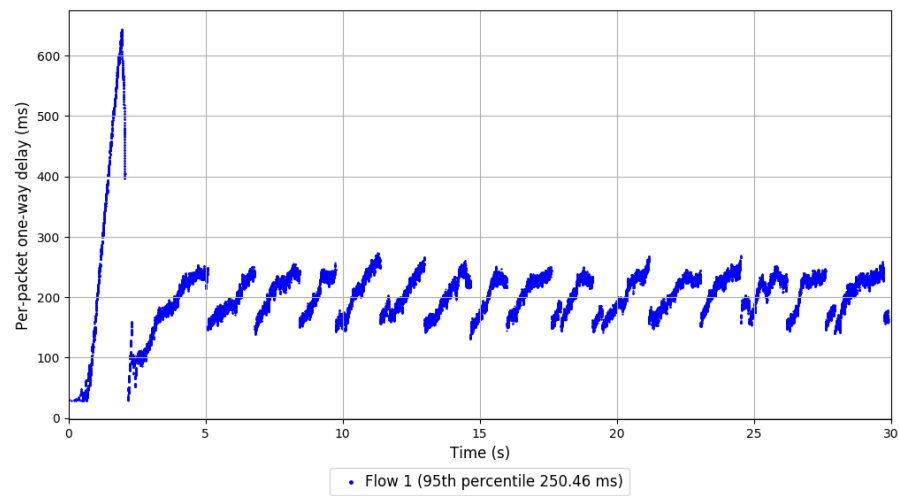
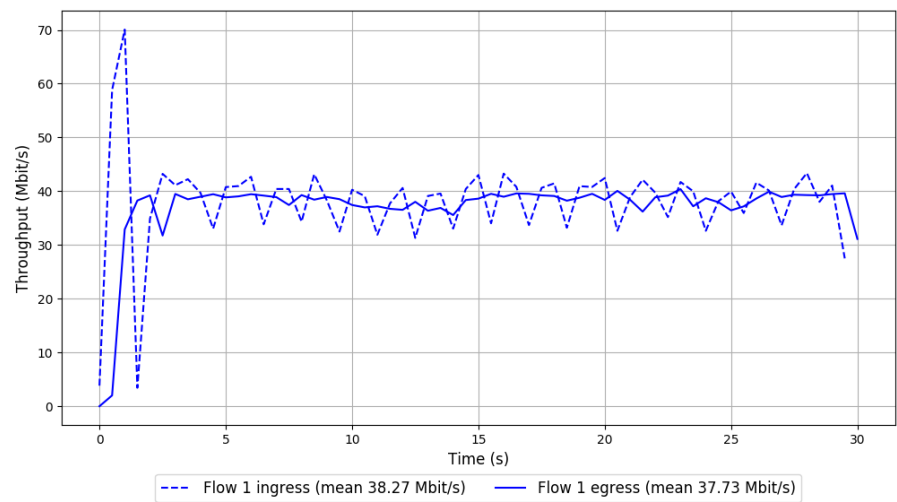
-- Flow 1:

Average throughput: 37.73 Mbit/s

95th percentile per-packet one-way delay: 250.456 ms

Loss rate: 1.46%

Run 2: Report of Verus — Data Link

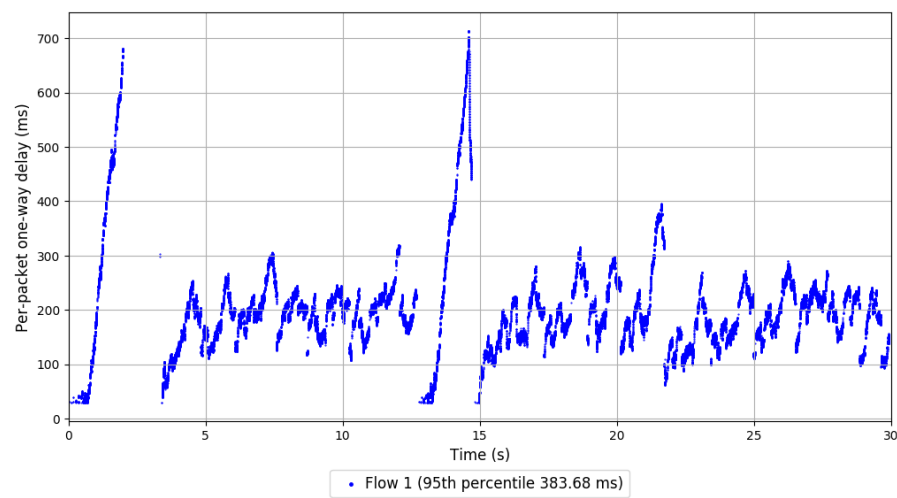
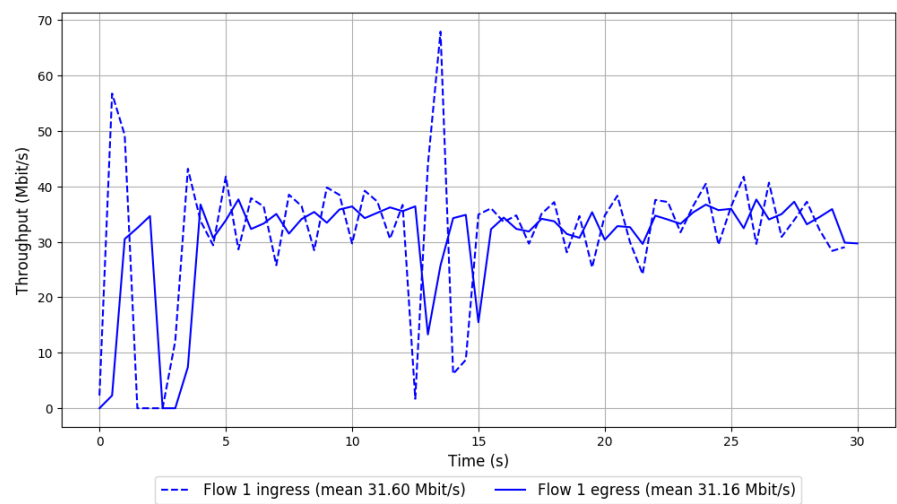


Run 3: Statistics of Verus

Start at: 2019-02-11 11:33:34
End at: 2019-02-11 11:34:04
Local clock offset: 5.455 ms
Remote clock offset: -0.082 ms

Below is generated by plot.py at 2019-02-11 11:58:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 31.16 Mbit/s
95th percentile per-packet one-way delay: 383.681 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 31.16 Mbit/s
95th percentile per-packet one-way delay: 383.681 ms
Loss rate: 1.50%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-02-11 10:54:01

End at: 2019-02-11 10:54:31

Local clock offset: 2.241 ms

Remote clock offset: 0.263 ms

Below is generated by plot.py at 2019-02-11 11:58:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.04 Mbit/s

95th percentile per-packet one-way delay: 164.890 ms

Loss rate: 0.20%

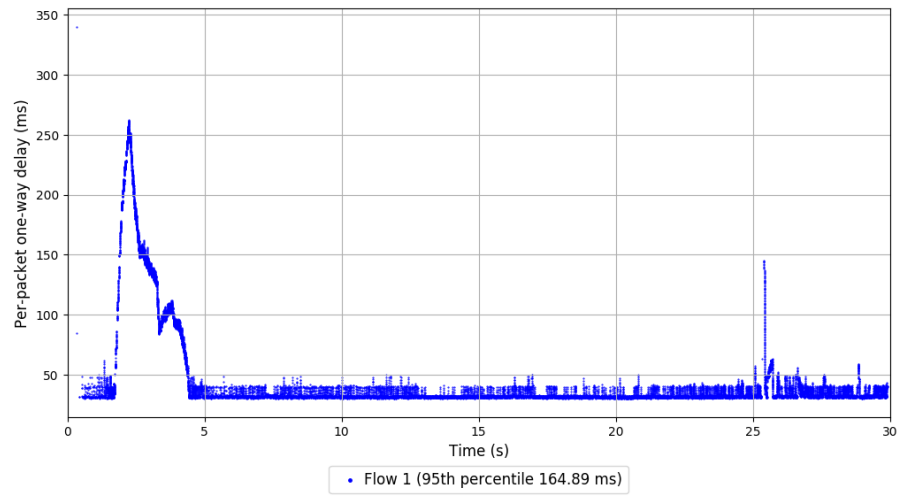
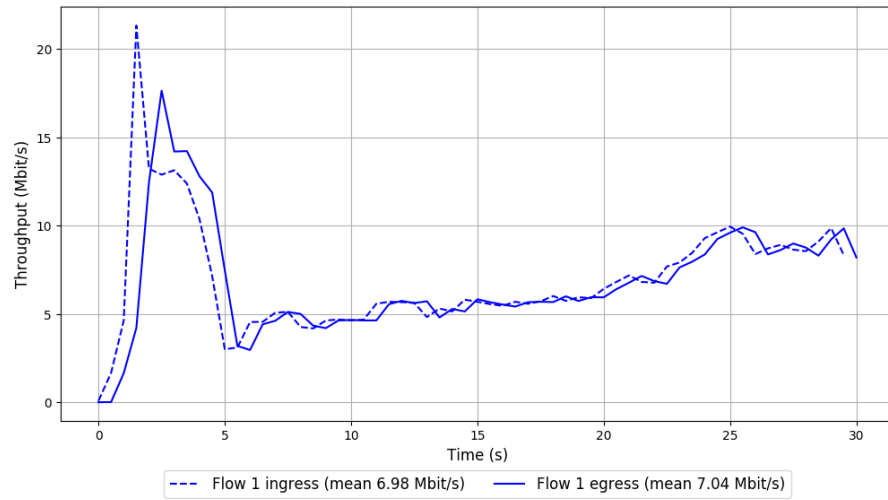
-- Flow 1:

Average throughput: 7.04 Mbit/s

95th percentile per-packet one-way delay: 164.890 ms

Loss rate: 0.20%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-02-11 11:19:59

End at: 2019-02-11 11:20:29

Local clock offset: 3.207 ms

Remote clock offset: 0.407 ms

Below is generated by plot.py at 2019-02-11 11:58:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.05 Mbit/s

95th percentile per-packet one-way delay: 38.698 ms

Loss rate: 0.29%

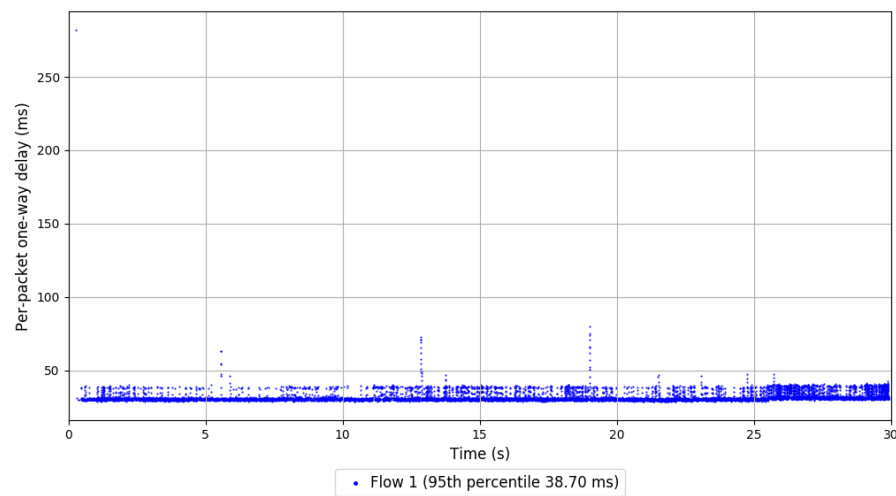
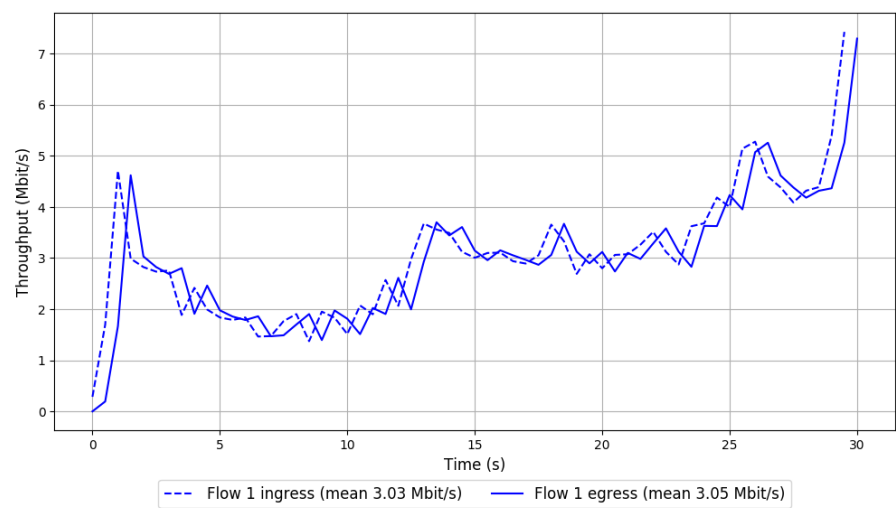
-- Flow 1:

Average throughput: 3.05 Mbit/s

95th percentile per-packet one-way delay: 38.698 ms

Loss rate: 0.29%

Run 2: Report of PCC-Vivace — Data Link

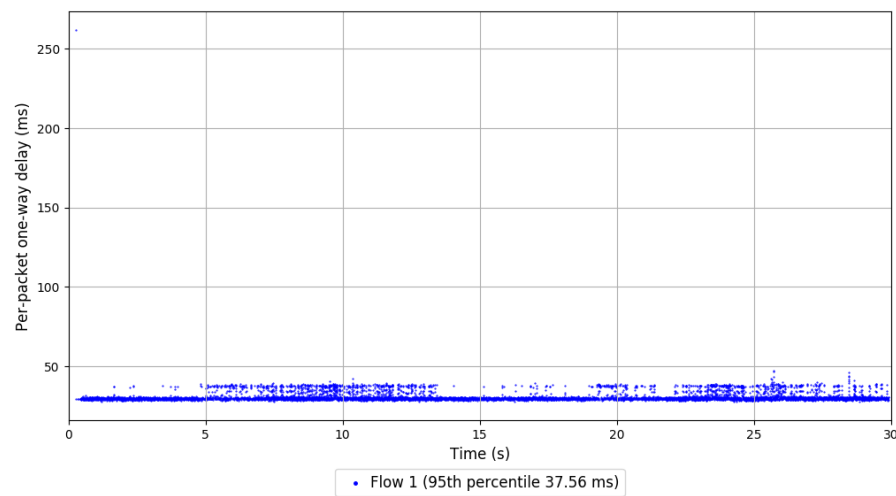
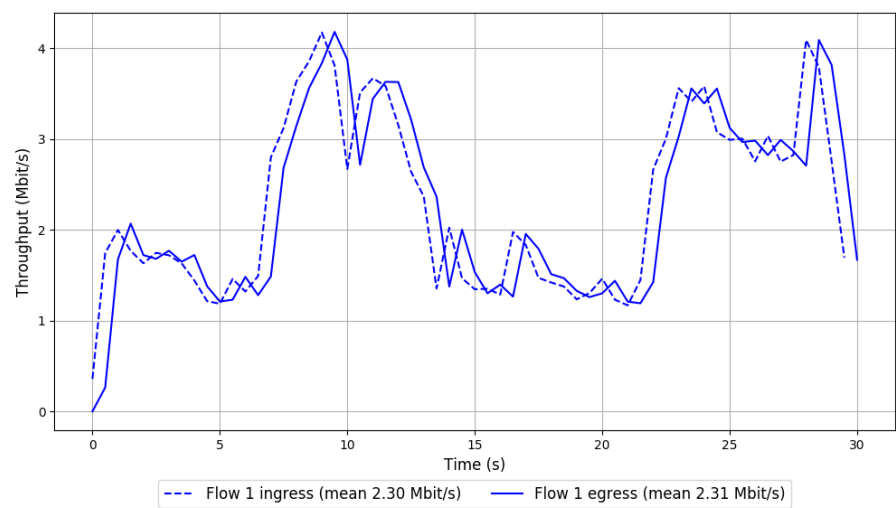


Run 3: Statistics of PCC-Vivace

Start at: 2019-02-11 11:45:56
End at: 2019-02-11 11:46:26
Local clock offset: 6.298 ms
Remote clock offset: -2.718 ms

Below is generated by plot.py at 2019-02-11 11:58:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 37.559 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 37.559 ms
Loss rate: 0.10%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2019-02-11 10:50:19

End at: 2019-02-11 10:50:49

Local clock offset: -0.292 ms

Remote clock offset: 0.256 ms

Below is generated by plot.py at 2019-02-11 11:58:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.07 Mbit/s

95th percentile per-packet one-way delay: 37.930 ms

Loss rate: 0.10%

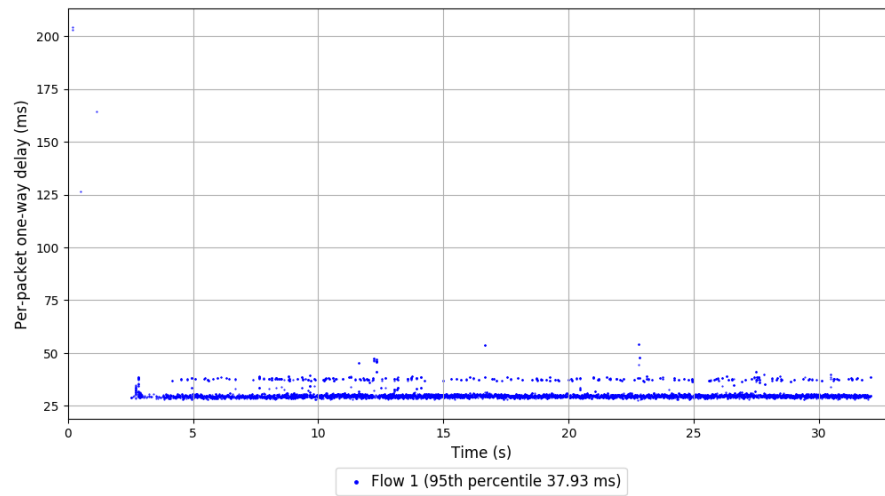
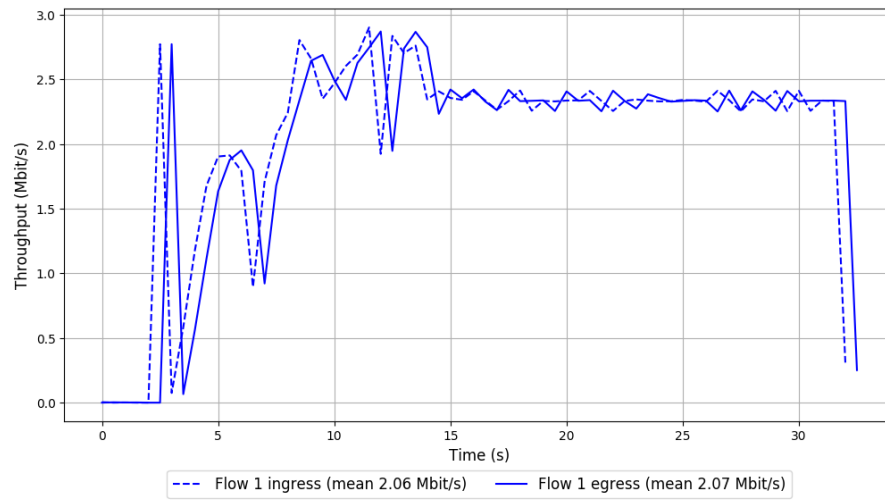
-- Flow 1:

Average throughput: 2.07 Mbit/s

95th percentile per-packet one-way delay: 37.930 ms

Loss rate: 0.10%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-02-11 11:16:18

End at: 2019-02-11 11:16:48

Local clock offset: 3.148 ms

Remote clock offset: 0.271 ms

Below is generated by plot.py at 2019-02-11 11:58:44

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 40.760 ms

Loss rate: 0.00%

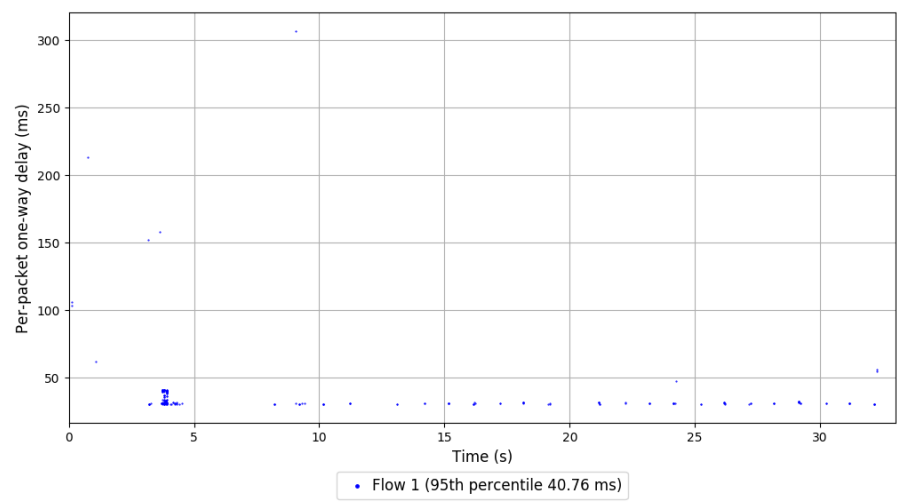
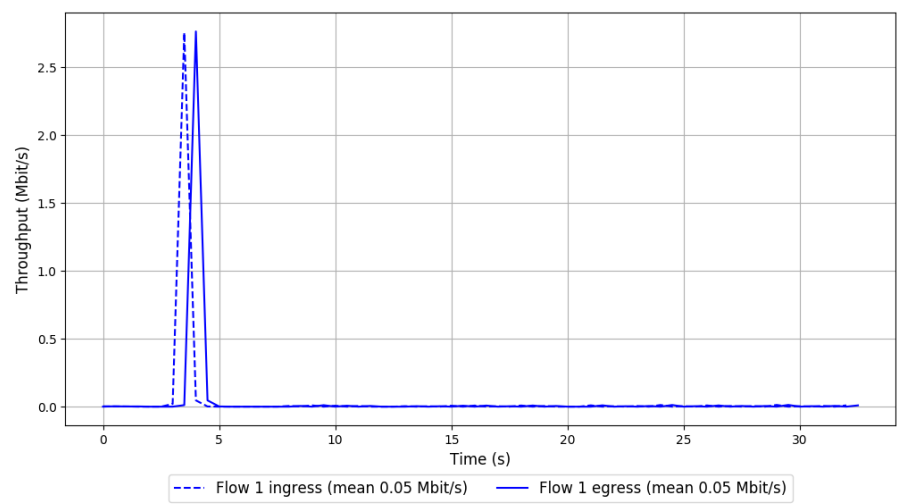
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 40.760 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-02-11 11:42:16
End at: 2019-02-11 11:42:46
Local clock offset: 5.866 ms
Remote clock offset: -2.299 ms

Below is generated by plot.py at 2019-02-11 11:58:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 41.516 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 41.516 ms
Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

