

Pantheon Report

Generated at 2019-03-26 20:05:31 (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:

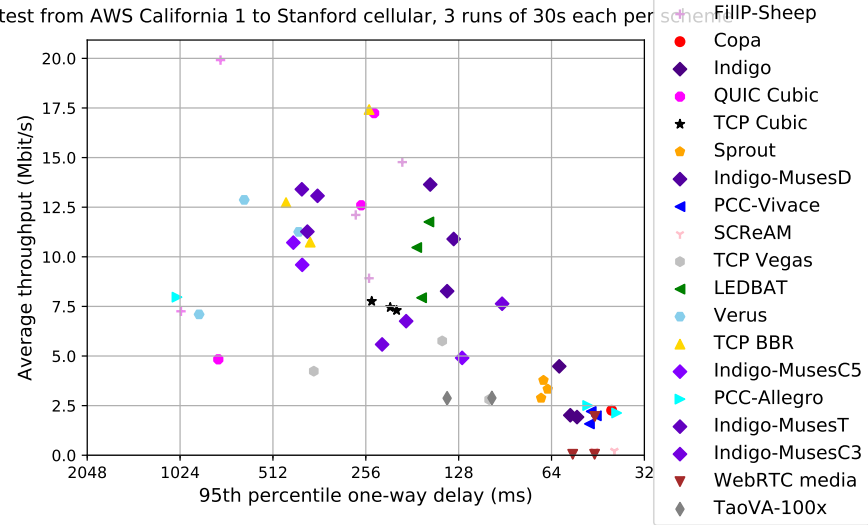
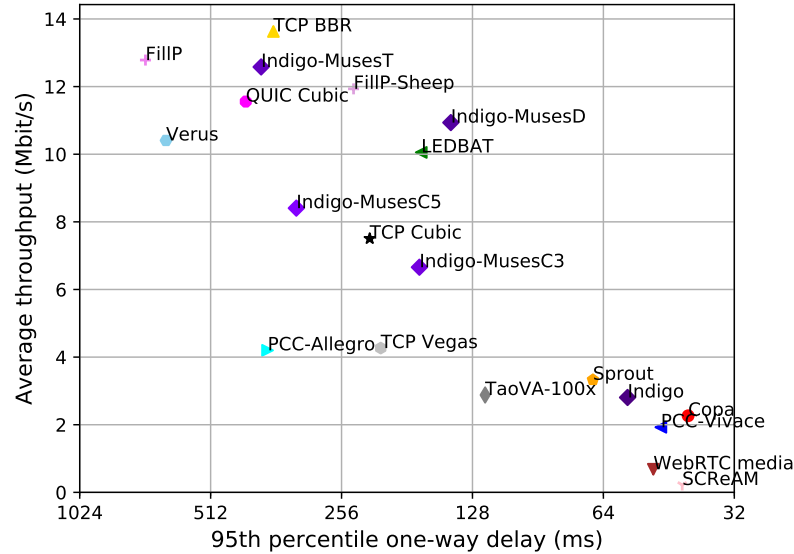
```
Linux 4.15.0-1034-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

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)



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	13.63	367.25	0.70
Copa	1	2.26	40.86	23.75
TCP Cubic	3	7.50	220.56	0.16
FillP	3	12.78	722.97	3.96
FillP-Sheep	3	11.93	240.24	0.30
Indigo	3	2.81	56.32	0.10
Indigo-MusesC3	3	6.66	169.54	0.42
Indigo-MusesC5	3	8.41	325.27	0.70
Indigo-MusesD	3	10.94	143.55	0.27
Indigo-MusesT	3	12.58	391.89	0.71
LEDBAT	3	10.06	167.92	0.23
PCC-Allegro	3	4.20	378.65	2.96
PCC-Expr	0	N/A	N/A	N/A
QUIC Cubic	3	11.56	425.08	0.62
SCReAM	3	0.22	42.17	0.13
Sprout	3	3.33	67.66	0.23
TaoVA-100x	2	2.88	119.70	65.92
TCP Vegas	3	4.27	208.05	0.13
Verus	3	10.41	648.40	1.85
PCC-Vivace	3	1.93	47.22	0.11
WebRTC media	3	0.68	49.13	0.04

Run 1: Statistics of TCP BBR

Start at: 2019-03-26 19:03:23

End at: 2019-03-26 19:03:53

Local clock offset: 1.119 ms

Remote clock offset: 0.765 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 17.42 Mbit/s

95th percentile per-packet one-way delay: 249.778 ms

Loss rate: 0.51%

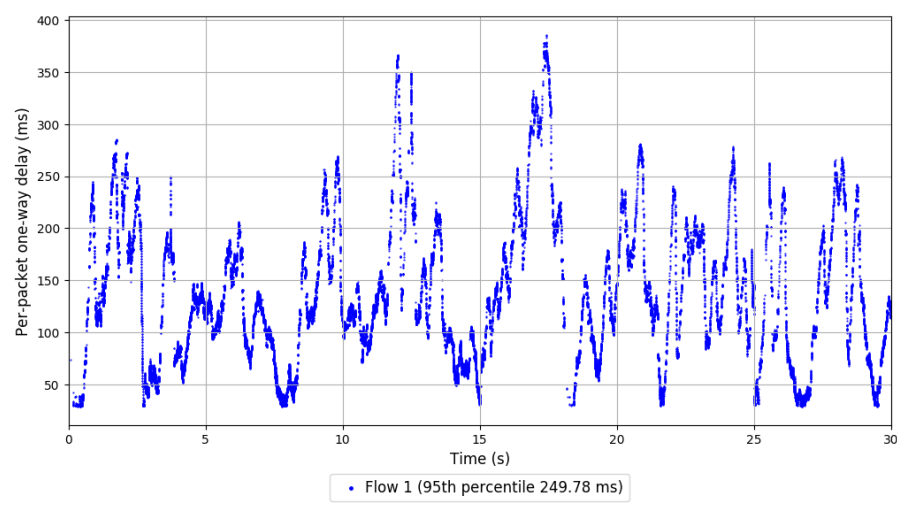
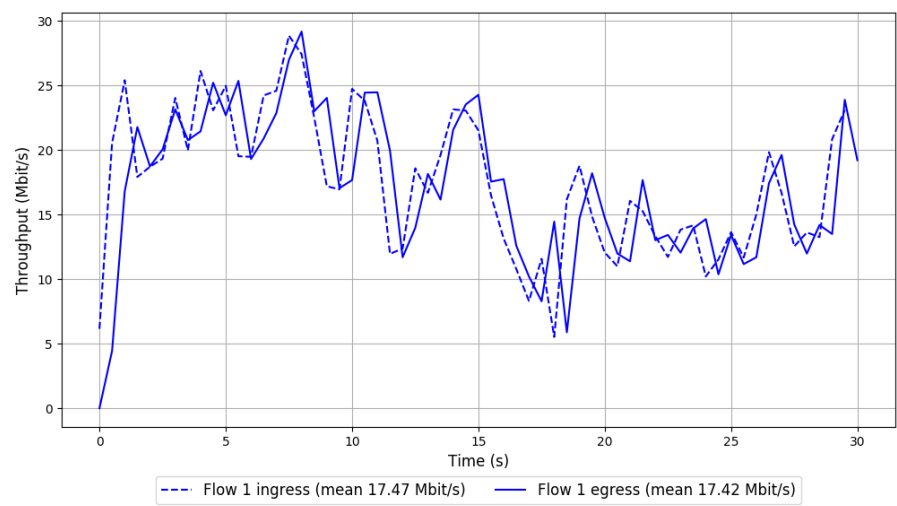
-- Flow 1:

Average throughput: 17.42 Mbit/s

95th percentile per-packet one-way delay: 249.778 ms

Loss rate: 0.51%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-03-26 19:29:14

End at: 2019-03-26 19:29:44

Local clock offset: 1.467 ms

Remote clock offset: 0.392 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.74 Mbit/s

95th percentile per-packet one-way delay: 387.650 ms

Loss rate: 0.79%

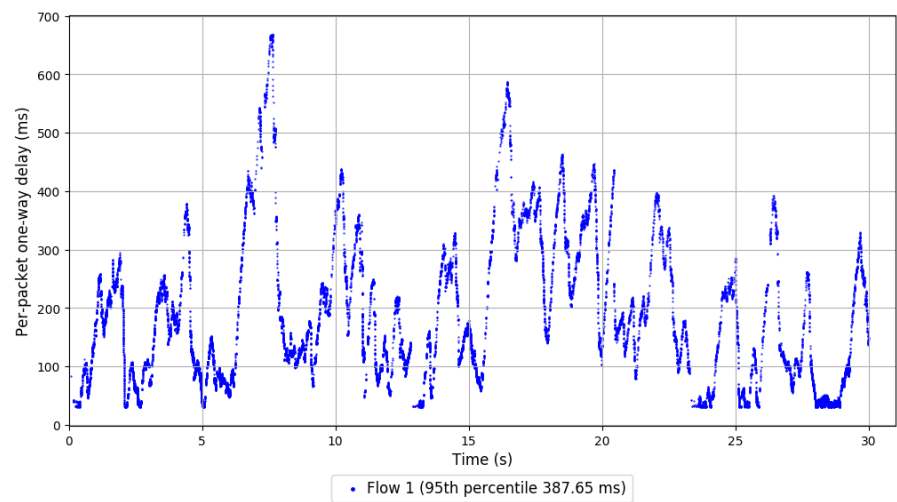
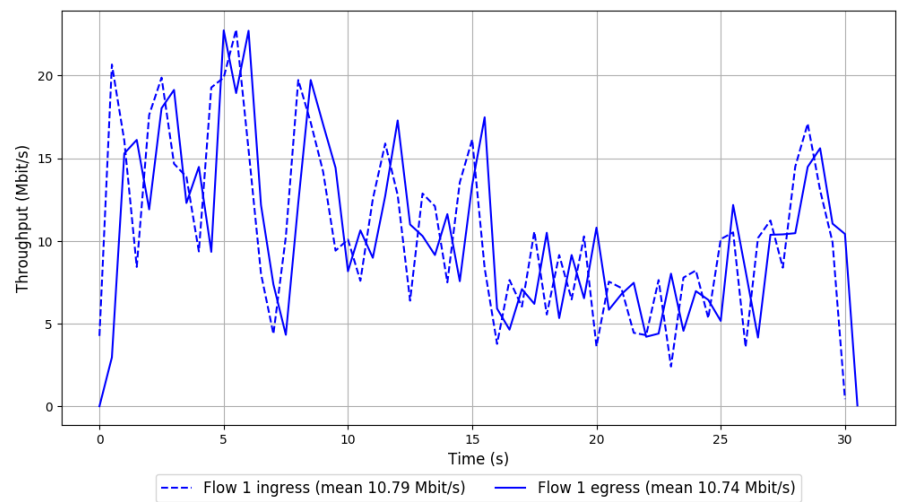
-- Flow 1:

Average throughput: 10.74 Mbit/s

95th percentile per-packet one-way delay: 387.650 ms

Loss rate: 0.79%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-03-26 19:55:00

End at: 2019-03-26 19:55:30

Local clock offset: 1.467 ms

Remote clock offset: -0.063 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.73 Mbit/s

95th percentile per-packet one-way delay: 464.318 ms

Loss rate: 0.81%

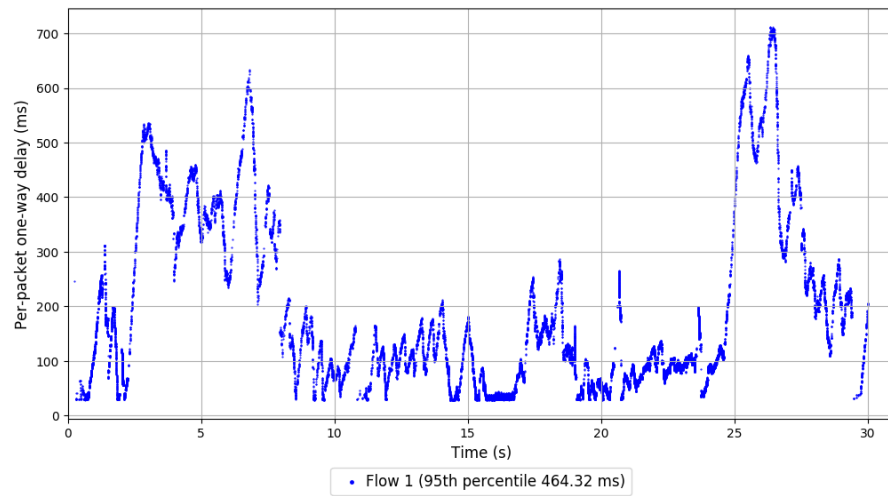
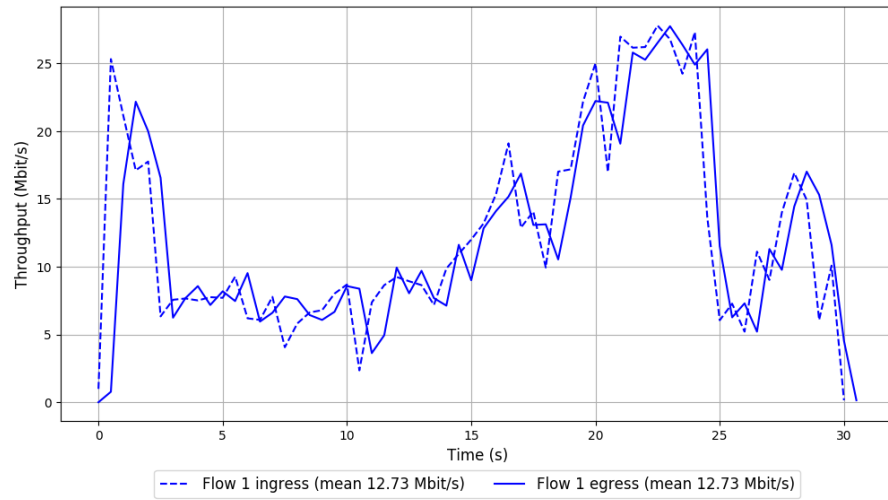
-- Flow 1:

Average throughput: 12.73 Mbit/s

95th percentile per-packet one-way delay: 464.318 ms

Loss rate: 0.81%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

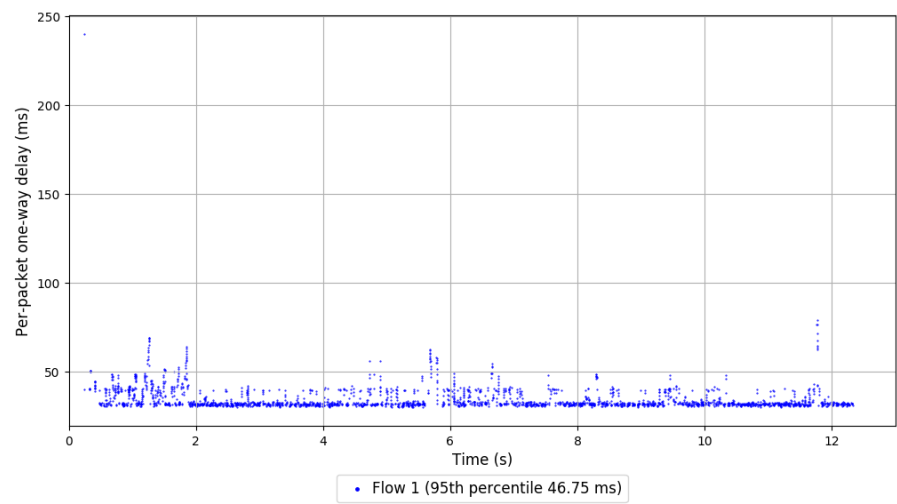
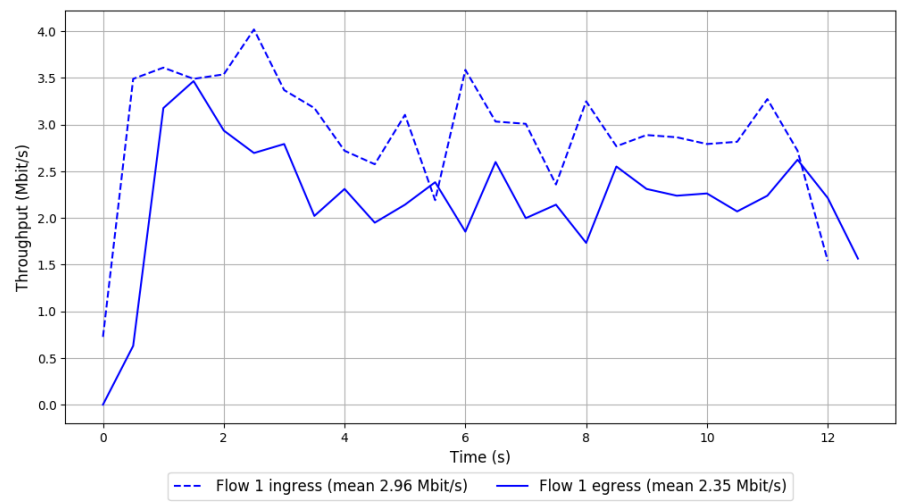
Start at: 2019-03-26 19:00:56

End at: 2019-03-26 19:01:26

Local clock offset: 0.892 ms

Remote clock offset: 0.708 ms

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

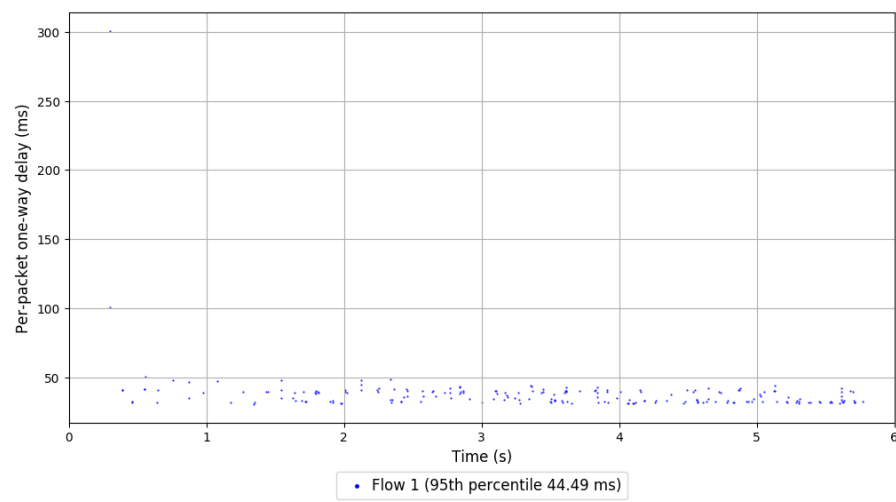
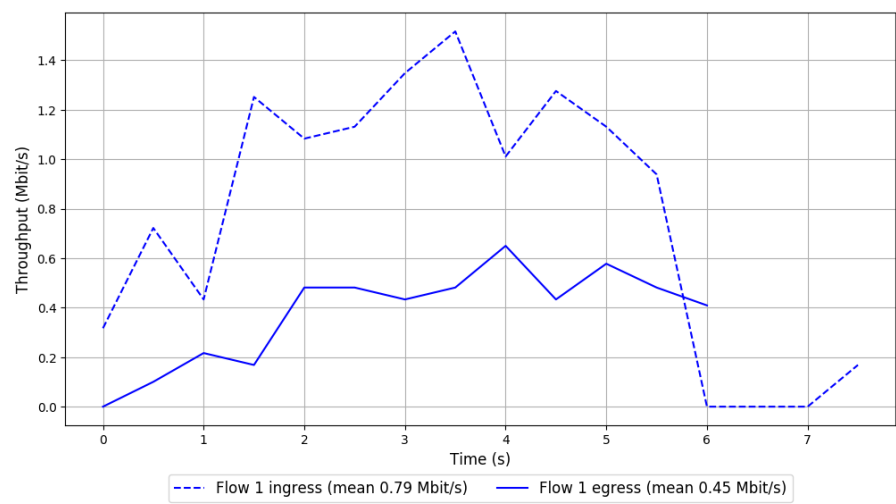
Start at: 2019-03-26 19:26:47

End at: 2019-03-26 19:27:17

Local clock offset: 1.42 ms

Remote clock offset: 0.385 ms

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2019-03-26 19:52:32

End at: 2019-03-26 19:53:02

Local clock offset: 1.598 ms

Remote clock offset: 0.04 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.26 Mbit/s

95th percentile per-packet one-way delay: 40.862 ms

Loss rate: 23.75%

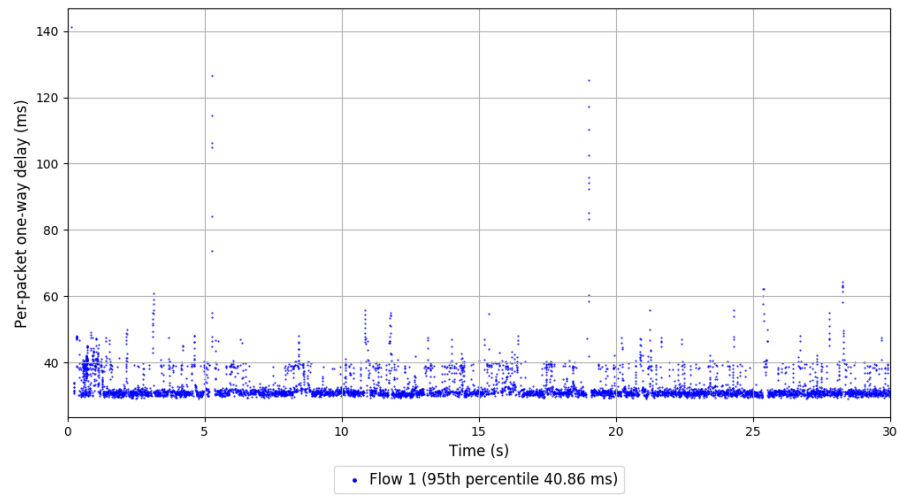
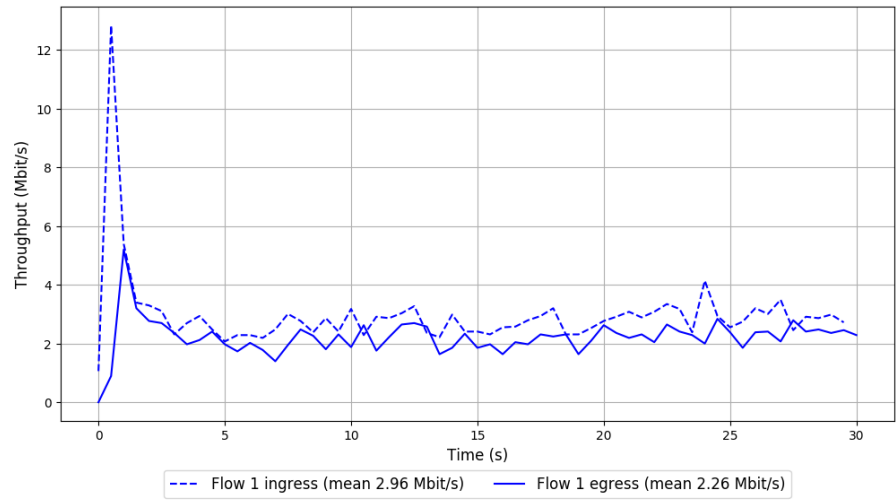
-- Flow 1:

Average throughput: 2.26 Mbit/s

95th percentile per-packet one-way delay: 40.862 ms

Loss rate: 23.75%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-03-26 18:53:35

End at: 2019-03-26 18:54:05

Local clock offset: 1.036 ms

Remote clock offset: 0.658 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.76 Mbit/s

95th percentile per-packet one-way delay: 244.985 ms

Loss rate: 0.22%

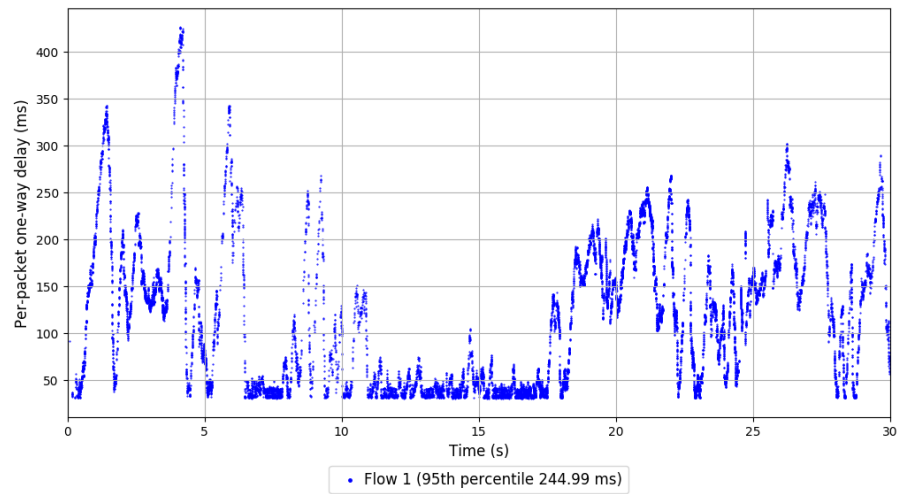
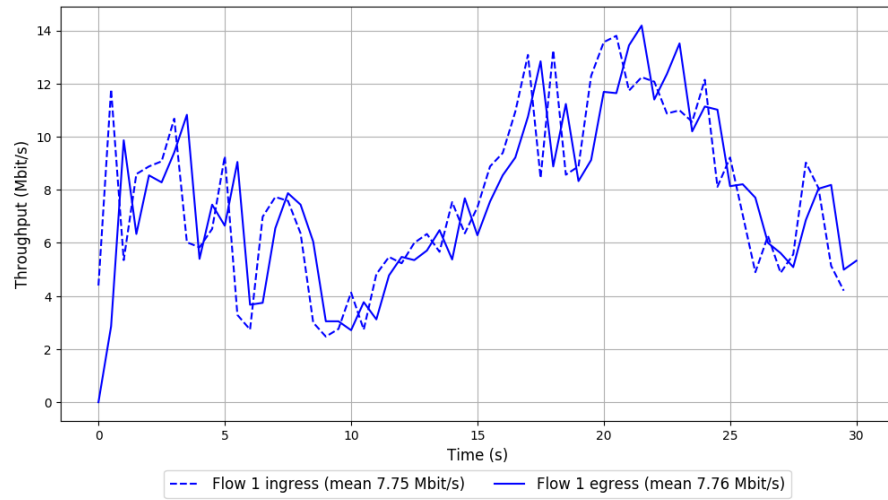
-- Flow 1:

Average throughput: 7.76 Mbit/s

95th percentile per-packet one-way delay: 244.985 ms

Loss rate: 0.22%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-03-26 19:19:25

End at: 2019-03-26 19:19:55

Local clock offset: 1.584 ms

Remote clock offset: 0.456 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.45 Mbit/s

95th percentile per-packet one-way delay: 213.301 ms

Loss rate: 0.13%

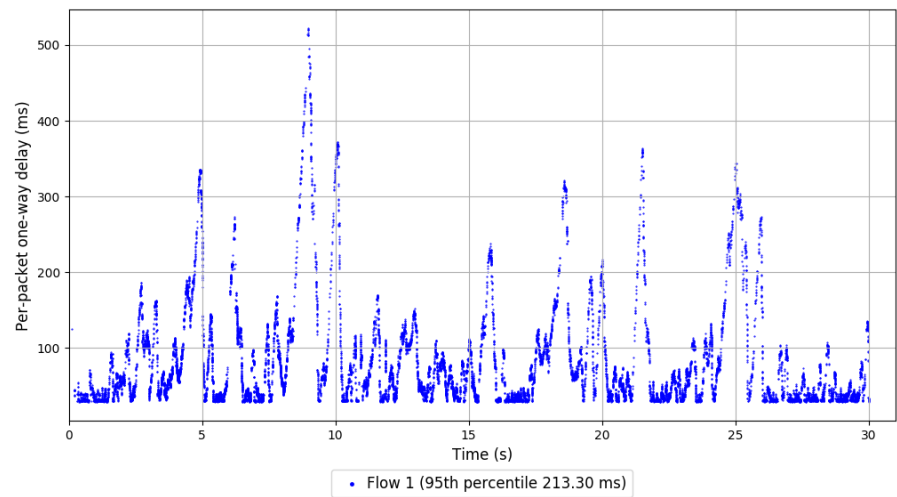
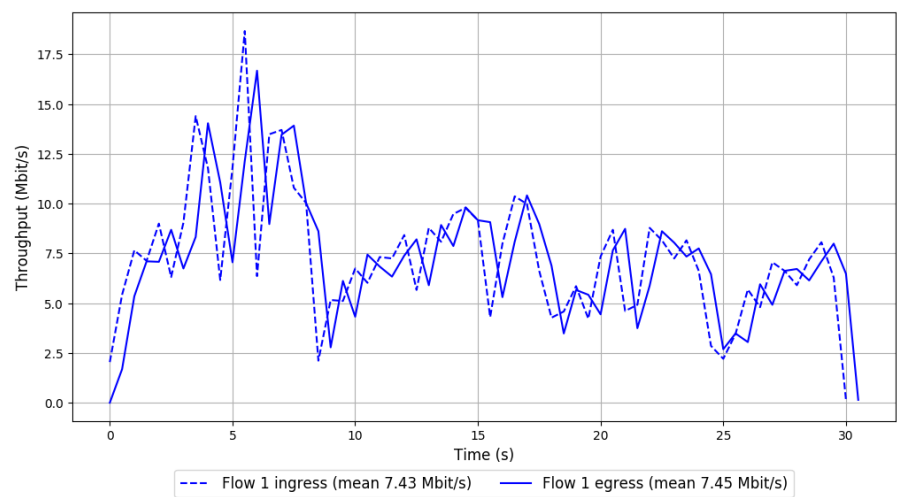
-- Flow 1:

Average throughput: 7.45 Mbit/s

95th percentile per-packet one-way delay: 213.301 ms

Loss rate: 0.13%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2019-03-26 19:45:11

End at: 2019-03-26 19:45:41

Local clock offset: 2.293 ms

Remote clock offset: 0.111 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.30 Mbit/s

95th percentile per-packet one-way delay: 203.395 ms

Loss rate: 0.14%

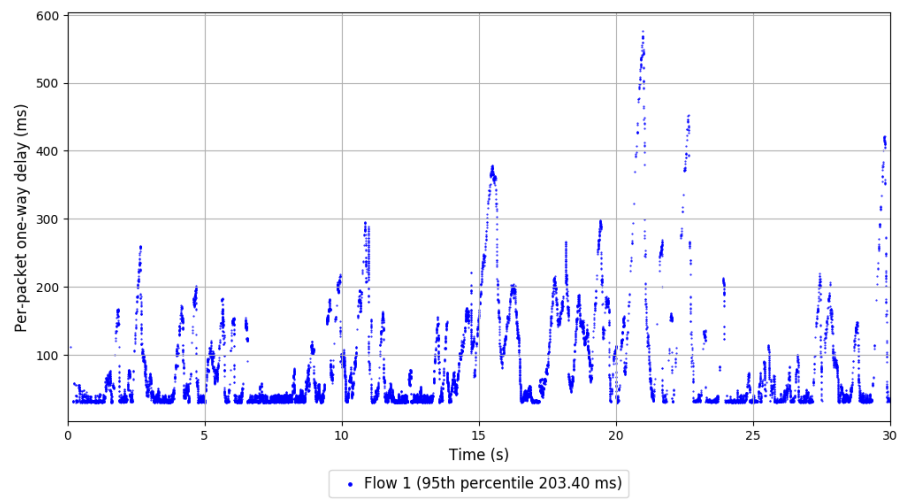
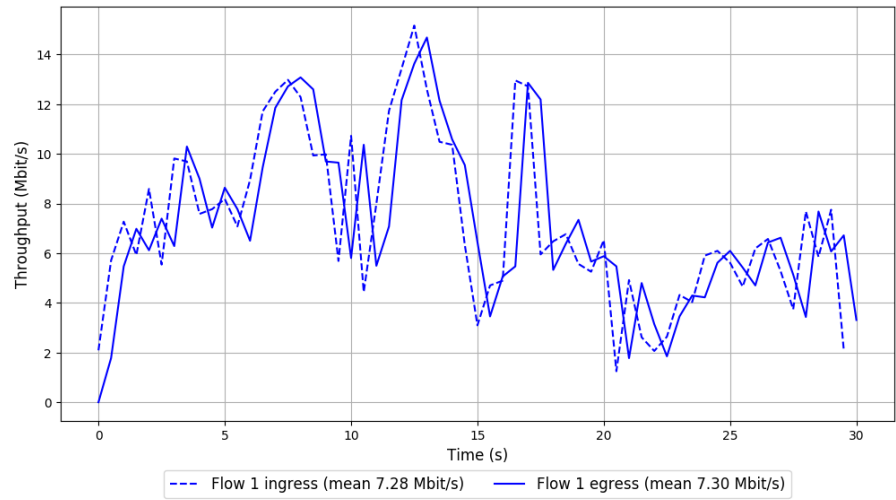
-- Flow 1:

Average throughput: 7.30 Mbit/s

95th percentile per-packet one-way delay: 203.395 ms

Loss rate: 0.14%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2019-03-26 19:02:10

End at: 2019-03-26 19:02:40

Local clock offset: 0.986 ms

Remote clock offset: 0.747 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.19 Mbit/s

95th percentile per-packet one-way delay: 394.690 ms

Loss rate: 1.02%

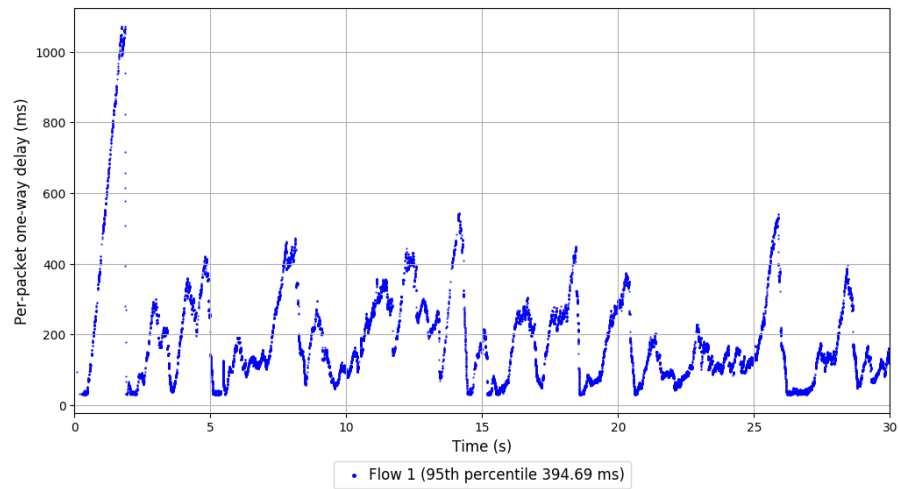
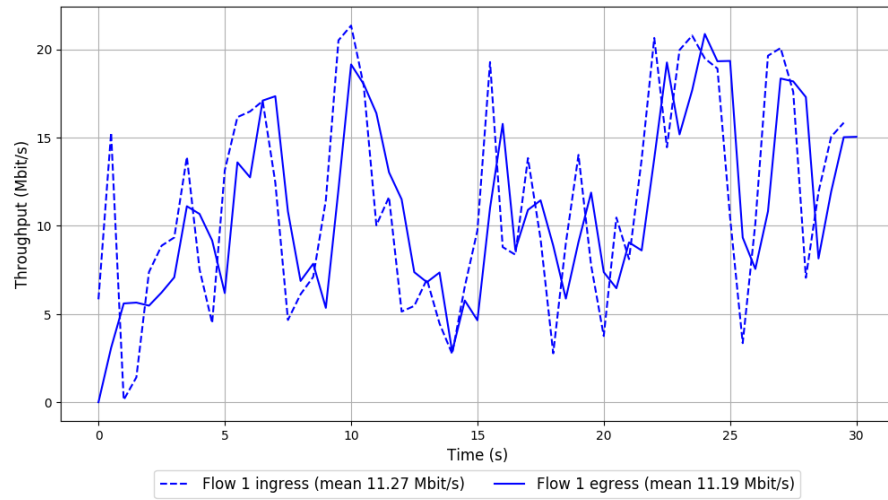
-- Flow 1:

Average throughput: 11.19 Mbit/s

95th percentile per-packet one-way delay: 394.690 ms

Loss rate: 1.02%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-03-26 19:28:00

End at: 2019-03-26 19:28:30

Local clock offset: 1.44 ms

Remote clock offset: 0.316 ms

Below is generated by plot.py at 2019-03-26 20:04:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.25 Mbit/s

95th percentile per-packet one-way delay: 1017.069 ms

Loss rate: 8.05%

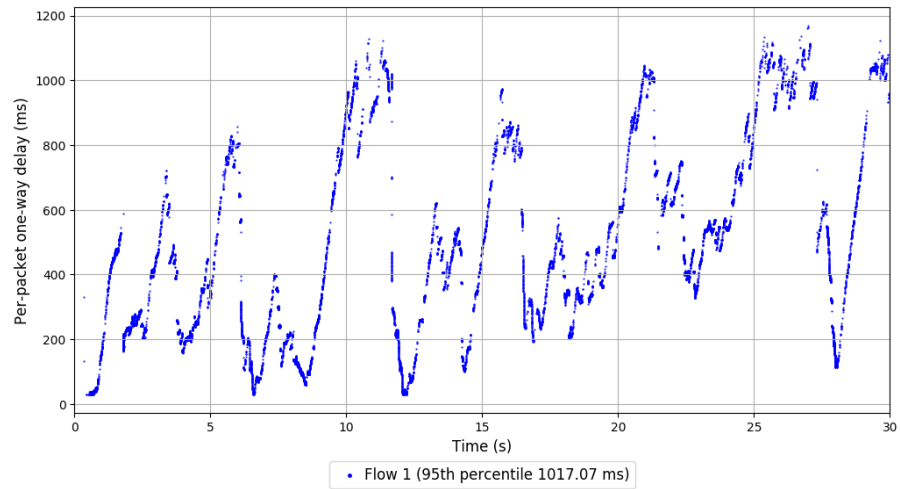
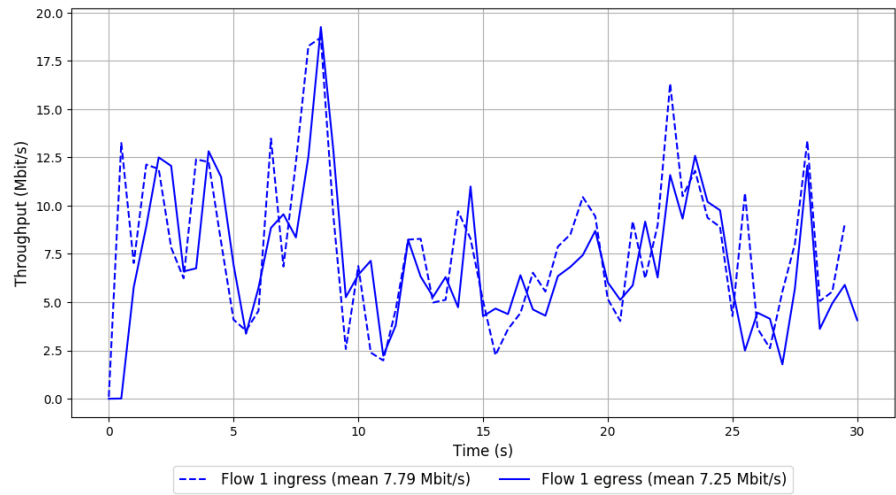
-- Flow 1:

Average throughput: 7.25 Mbit/s

95th percentile per-packet one-way delay: 1017.069 ms

Loss rate: 8.05%

Run 2: Report of FillP — Data Link

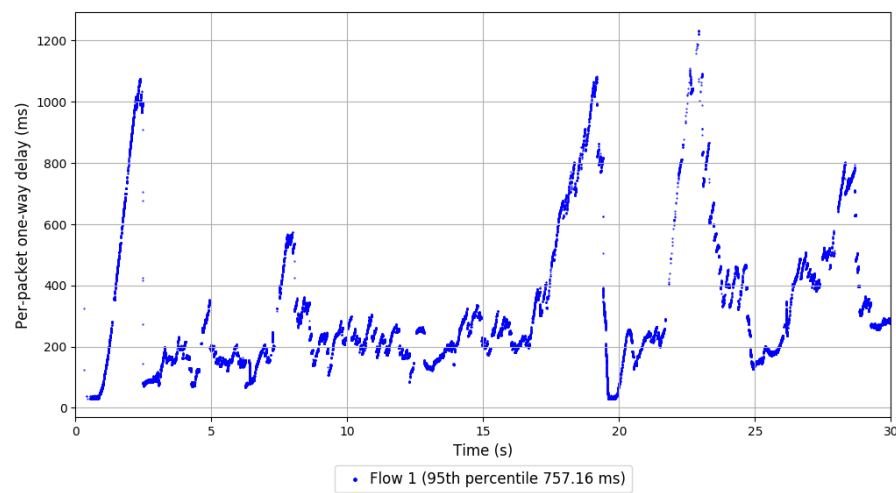
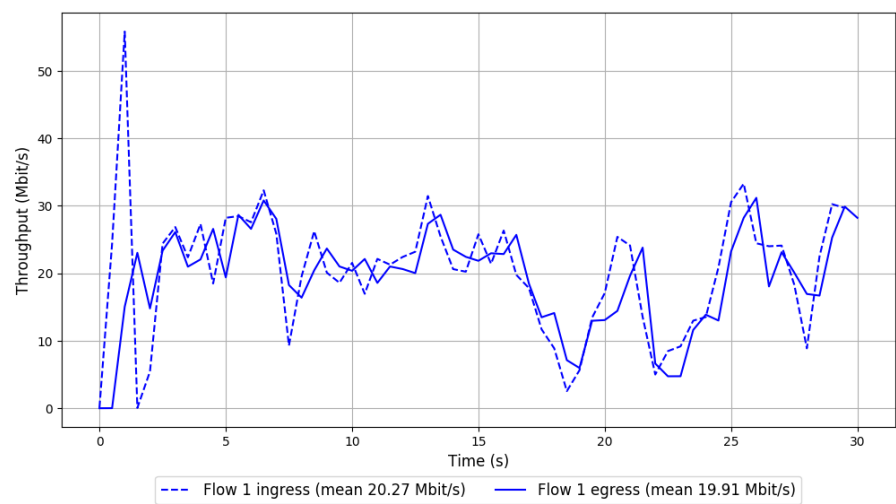


Run 3: Statistics of FillP

Start at: 2019-03-26 19:53:46
End at: 2019-03-26 19:54:16
Local clock offset: 1.496 ms
Remote clock offset: -0.079 ms

Below is generated by plot.py at 2019-03-26 20:04:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 19.91 Mbit/s
95th percentile per-packet one-way delay: 757.162 ms
Loss rate: 2.82%
-- Flow 1:
Average throughput: 19.91 Mbit/s
95th percentile per-packet one-way delay: 757.162 ms
Loss rate: 2.82%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-03-26 18:47:27

End at: 2019-03-26 18:47:57

Local clock offset: 0.404 ms

Remote clock offset: 0.537 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 8.92 Mbit/s

95th percentile per-packet one-way delay: 249.851 ms

Loss rate: 0.28%

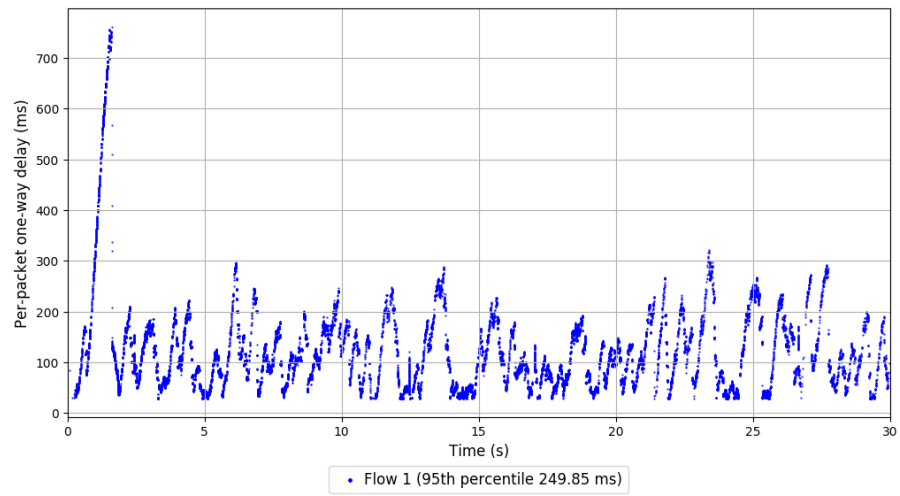
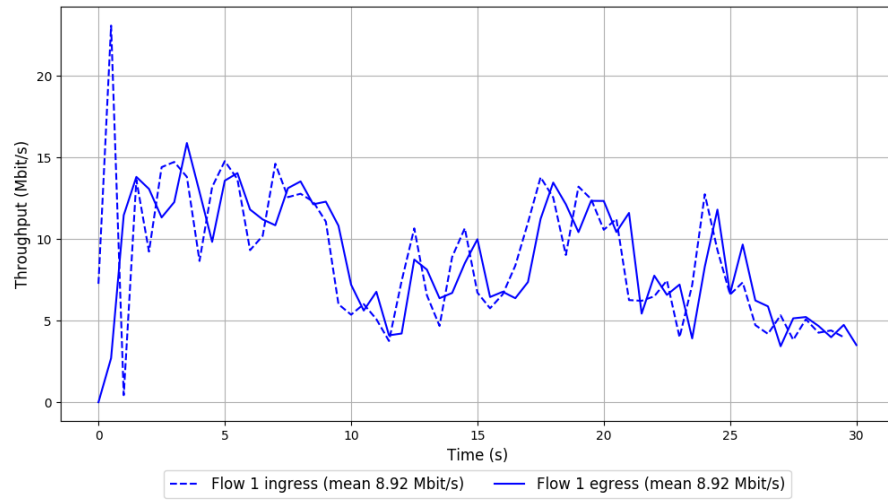
-- Flow 1:

Average throughput: 8.92 Mbit/s

95th percentile per-packet one-way delay: 249.851 ms

Loss rate: 0.28%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-03-26 19:13:12

End at: 2019-03-26 19:13:42

Local clock offset: 1.631 ms

Remote clock offset: 0.443 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 14.77 Mbit/s

95th percentile per-packet one-way delay: 194.929 ms

Loss rate: 0.34%

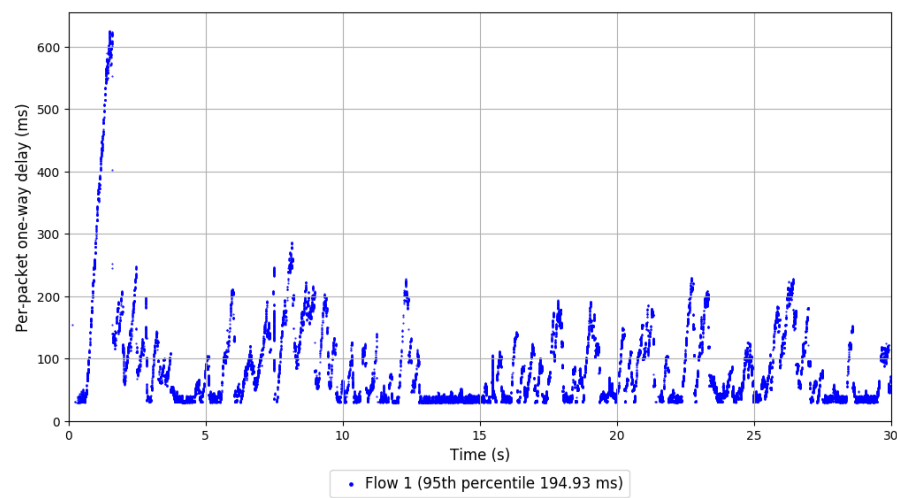
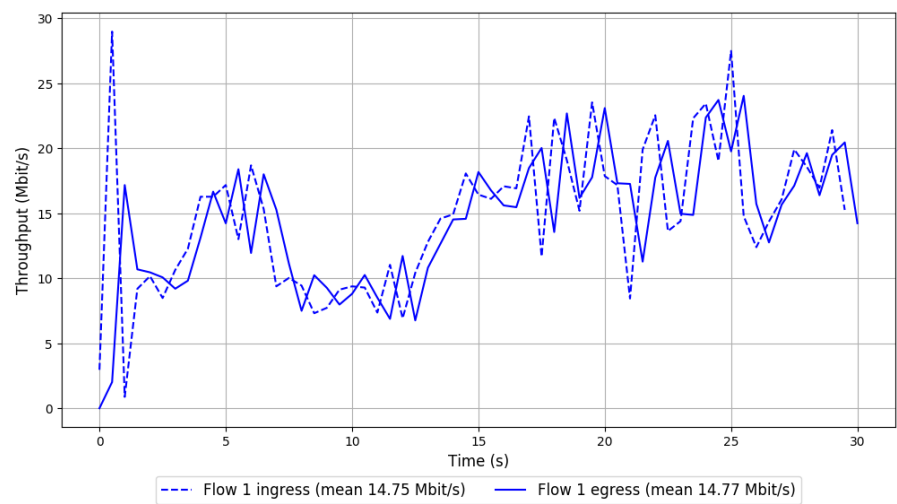
-- Flow 1:

Average throughput: 14.77 Mbit/s

95th percentile per-packet one-way delay: 194.929 ms

Loss rate: 0.34%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-03-26 19:39:03

End at: 2019-03-26 19:39:33

Local clock offset: 1.916 ms

Remote clock offset: 0.336 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.11 Mbit/s

95th percentile per-packet one-way delay: 275.939 ms

Loss rate: 0.29%

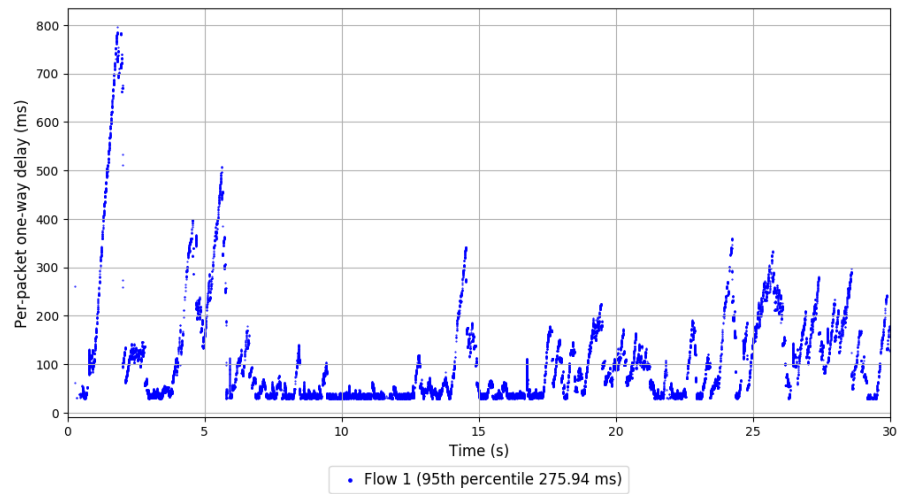
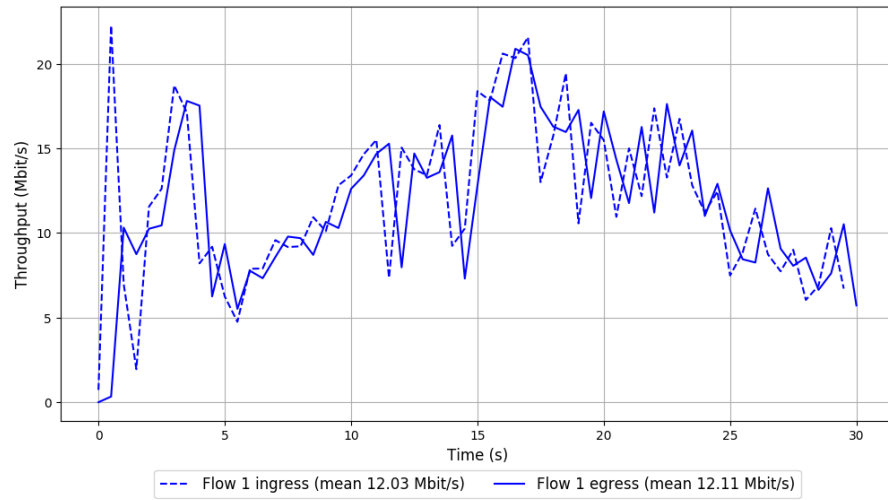
-- Flow 1:

Average throughput: 12.11 Mbit/s

95th percentile per-packet one-way delay: 275.939 ms

Loss rate: 0.29%

Run 3: Report of FillP-Sheep — Data Link

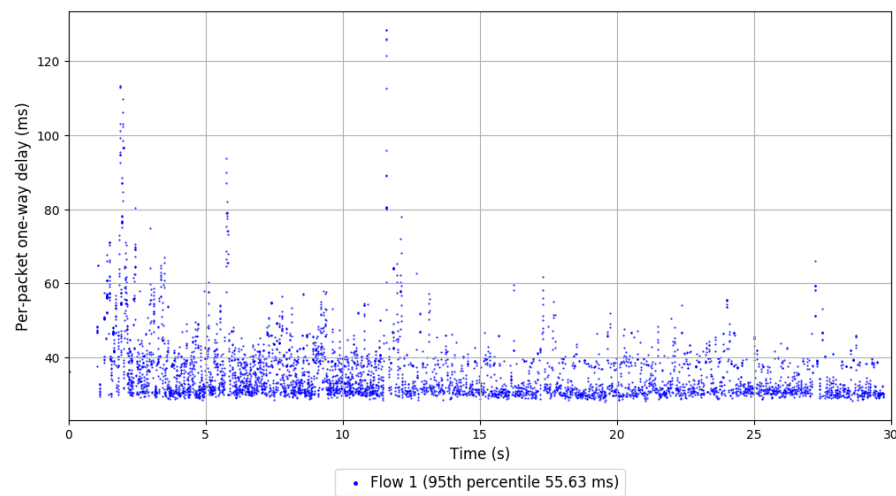
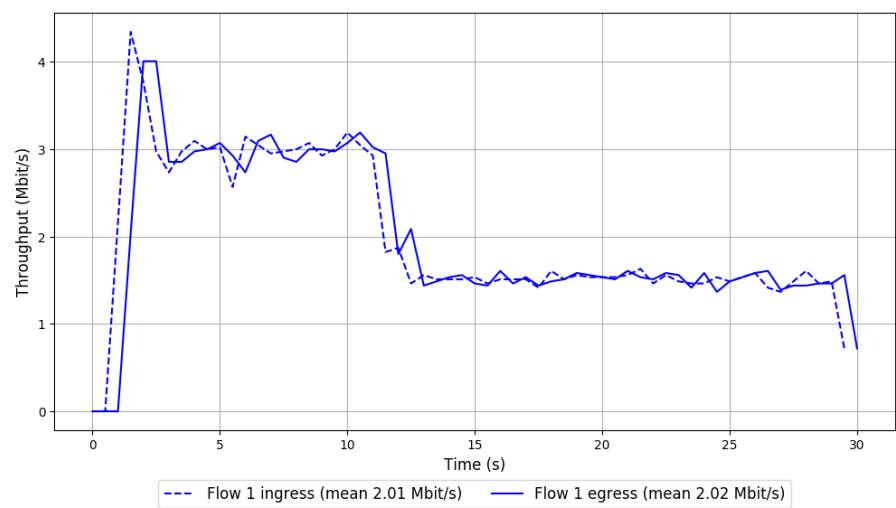


```
Run 1: Statistics of Indigo

Start at: 2019-03-26 18:49:55
End at: 2019-03-26 18:50:25
Local clock offset: 0.724 ms
Remote clock offset: 0.498 ms

# Below is generated by plot.py at 2019-03-26 20:04:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 55.631 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 55.631 ms
Loss rate: 0.10%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-03-26 19:15:40

End at: 2019-03-26 19:16:10

Local clock offset: 1.823 ms

Remote clock offset: 0.445 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.92 Mbit/s

95th percentile per-packet one-way delay: 52.912 ms

Loss rate: 0.13%

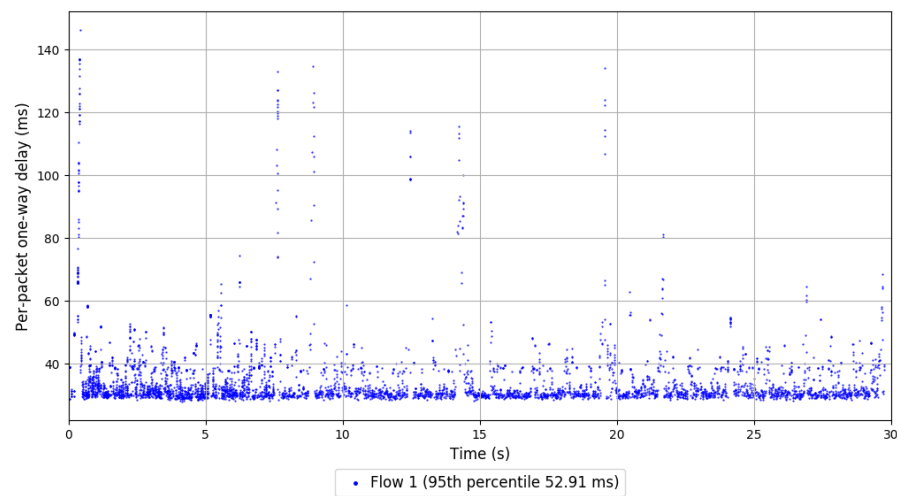
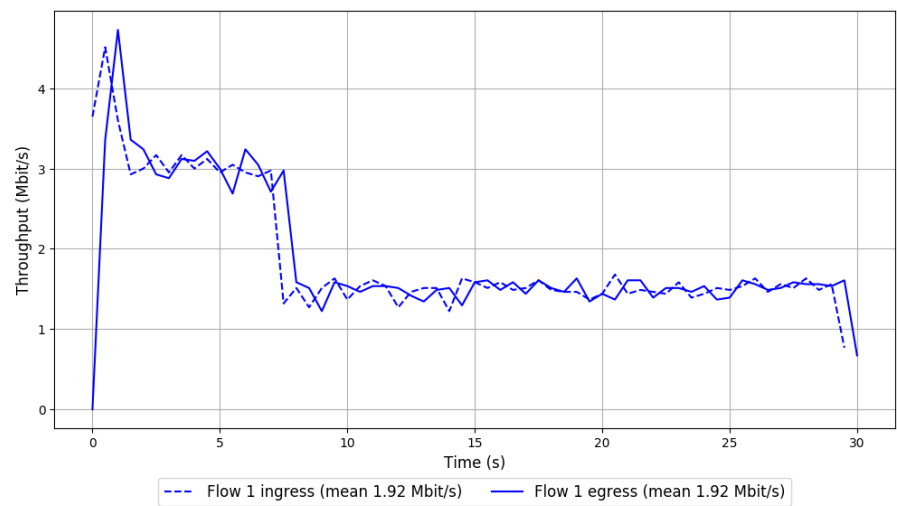
-- Flow 1:

Average throughput: 1.92 Mbit/s

95th percentile per-packet one-way delay: 52.912 ms

Loss rate: 0.13%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-03-26 19:41:31

End at: 2019-03-26 19:42:01

Local clock offset: 2.075 ms

Remote clock offset: 0.154 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.48 Mbit/s

95th percentile per-packet one-way delay: 60.417 ms

Loss rate: 0.06%

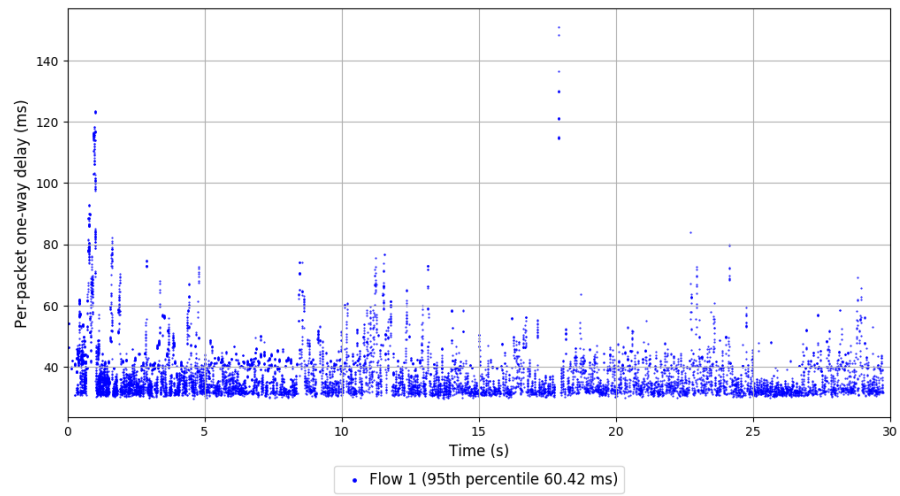
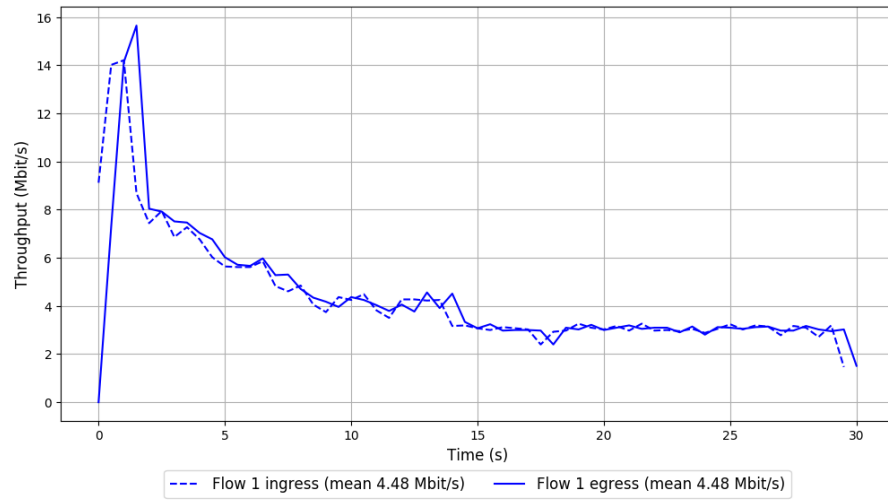
-- Flow 1:

Average throughput: 4.48 Mbit/s

95th percentile per-packet one-way delay: 60.417 ms

Loss rate: 0.06%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-03-26 18:54:48

End at: 2019-03-26 18:55:18

Local clock offset: 1.203 ms

Remote clock offset: 0.692 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.63 Mbit/s

95th percentile per-packet one-way delay: 92.553 ms

Loss rate: 0.07%

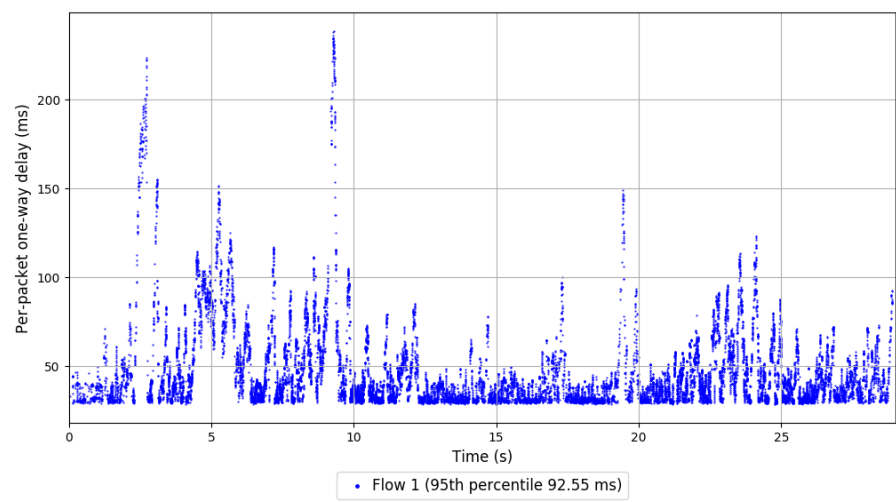
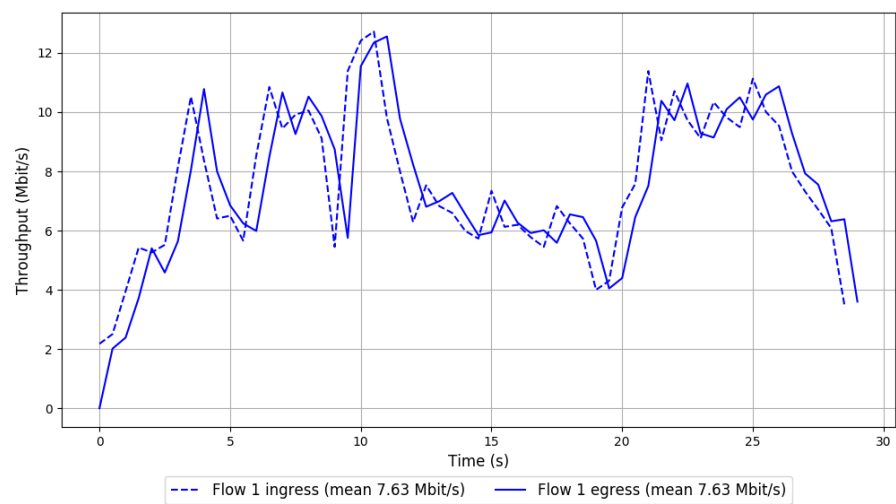
-- Flow 1:

Average throughput: 7.63 Mbit/s

95th percentile per-packet one-way delay: 92.553 ms

Loss rate: 0.07%

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-03-26 19:20:38

End at: 2019-03-26 19:21:08

Local clock offset: 1.518 ms

Remote clock offset: 0.478 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.58 Mbit/s

95th percentile per-packet one-way delay: 226.627 ms

Loss rate: 0.74%

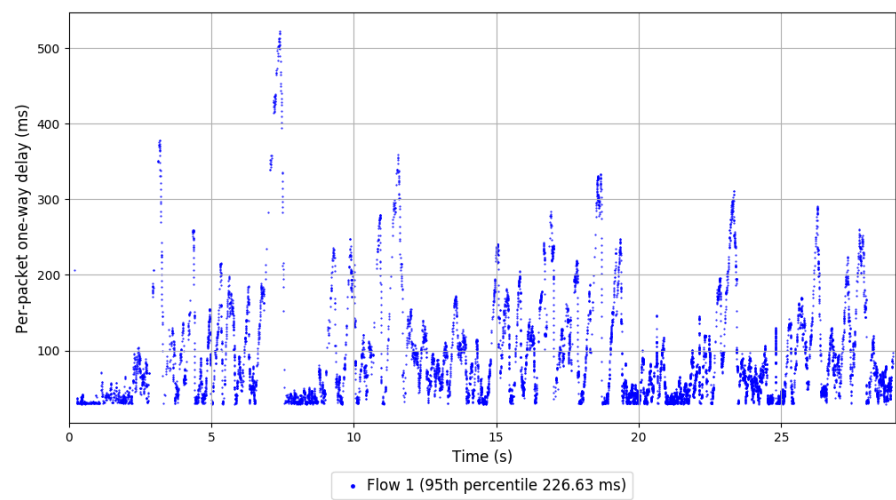
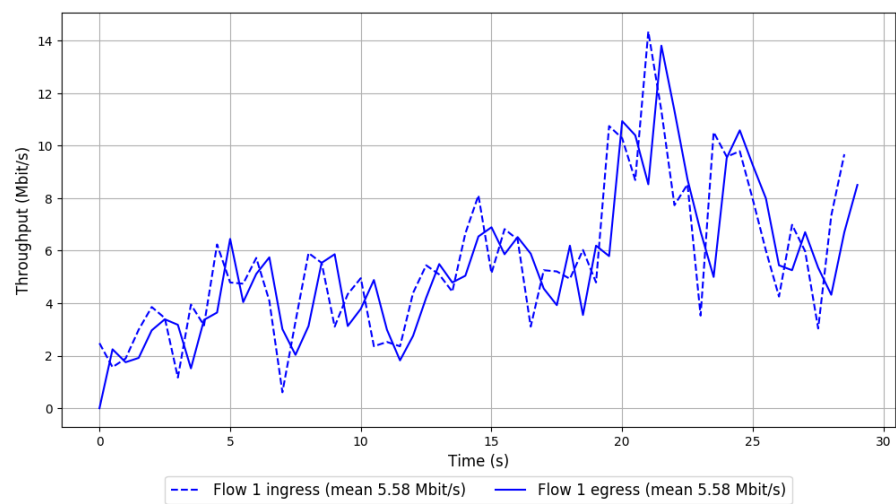
-- Flow 1:

Average throughput: 5.58 Mbit/s

95th percentile per-packet one-way delay: 226.627 ms

Loss rate: 0.74%

Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-03-26 19:46:25

End at: 2019-03-26 19:46:55

Local clock offset: 2.363 ms

Remote clock offset: 0.171 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.76 Mbit/s

95th percentile per-packet one-way delay: 189.427 ms

Loss rate: 0.46%

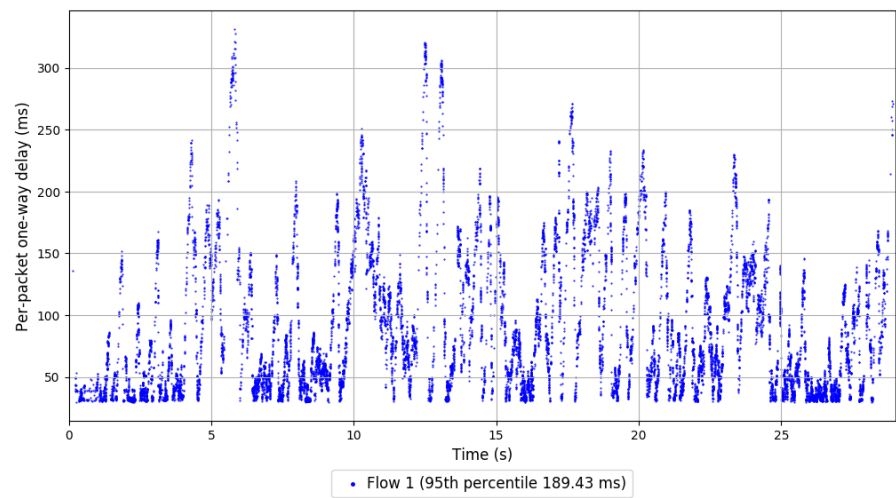
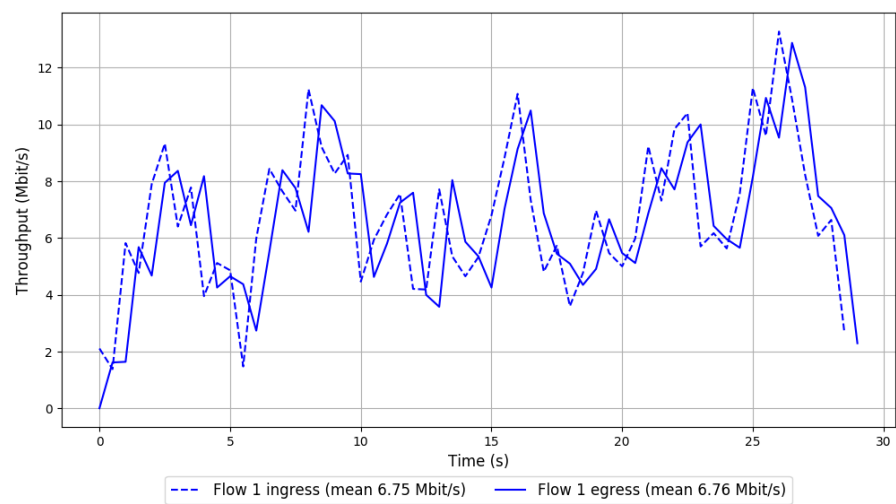
-- Flow 1:

Average throughput: 6.76 Mbit/s

95th percentile per-packet one-way delay: 189.427 ms

Loss rate: 0.46%

Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-03-26 19:09:31

End at: 2019-03-26 19:10:01

Local clock offset: 1.343 ms

Remote clock offset: 0.488 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.91 Mbit/s

95th percentile per-packet one-way delay: 124.706 ms

Loss rate: 0.23%

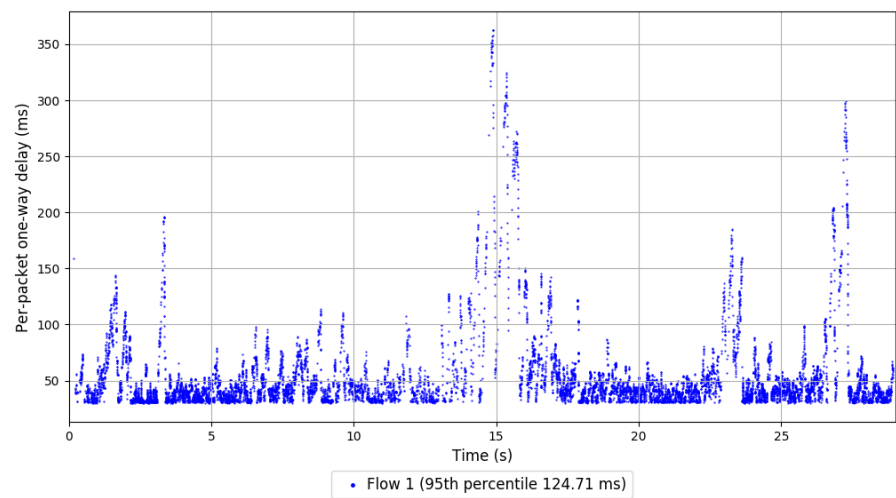
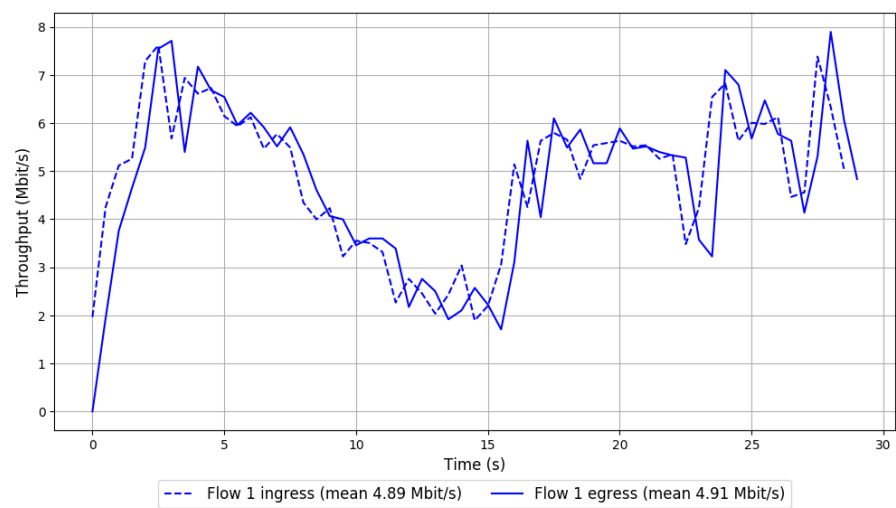
-- Flow 1:

Average throughput: 4.91 Mbit/s

95th percentile per-packet one-way delay: 124.706 ms

Loss rate: 0.23%

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-03-26 19:35:22

End at: 2019-03-26 19:35:52

Local clock offset: 1.727 ms

Remote clock offset: 0.342 ms

Below is generated by plot.py at 2019-03-26 20:04:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 9.60 Mbit/s

95th percentile per-packet one-way delay: 411.482 ms

Loss rate: 1.06%

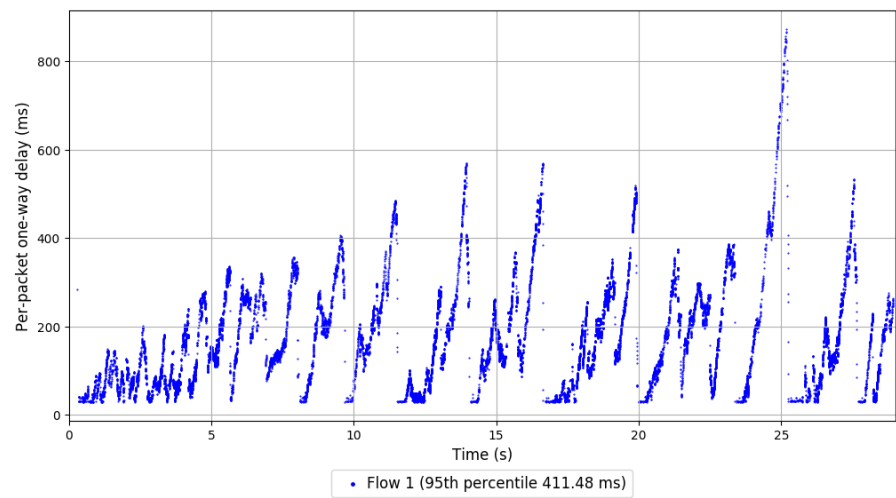
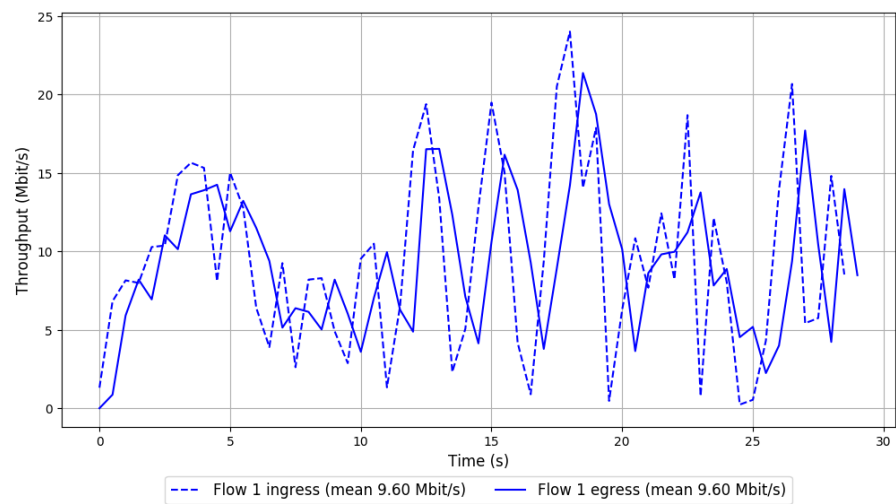
-- Flow 1:

Average throughput: 9.60 Mbit/s

95th percentile per-packet one-way delay: 411.482 ms

Loss rate: 1.06%

Run 2: Report of Indigo-MusesC5 — Data Link

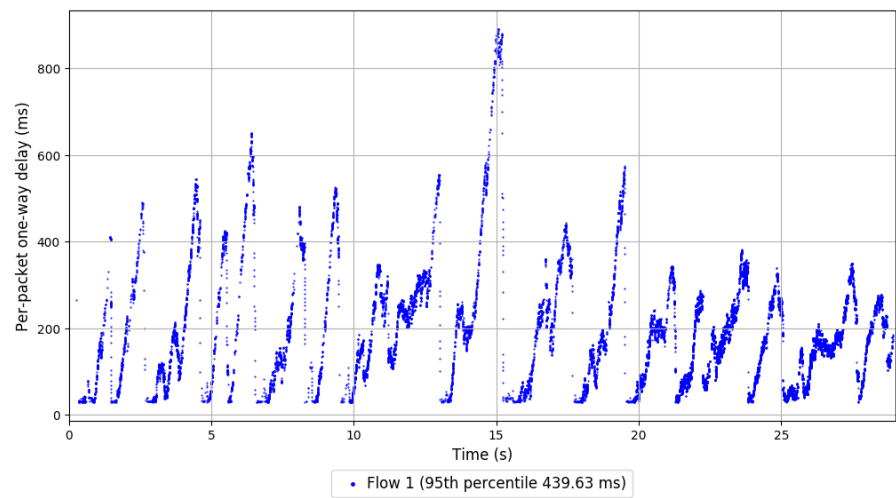
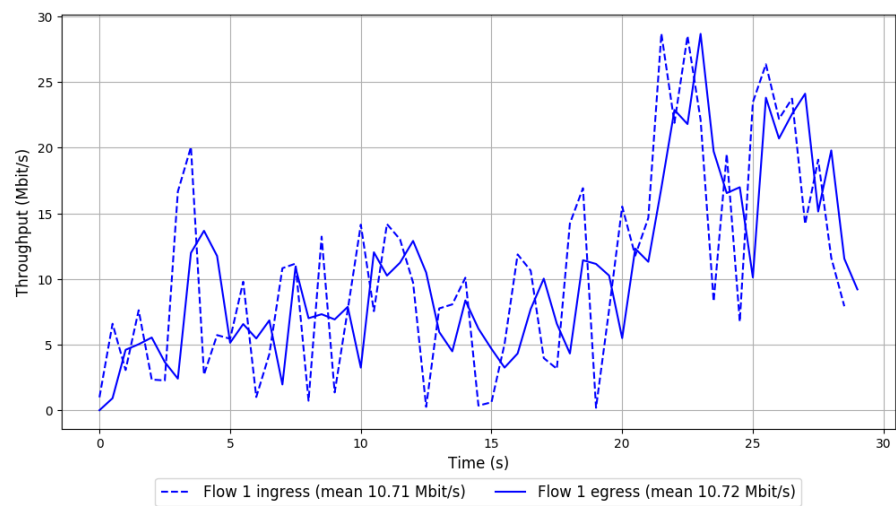


Run 3: Statistics of Indigo-MusesC5

Start at: 2019-03-26 20:01:08
End at: 2019-03-26 20:01:38
Local clock offset: 1.316 ms
Remote clock offset: -0.087 ms

Below is generated by plot.py at 2019-03-26 20:04:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 10.72 Mbit/s
95th percentile per-packet one-way delay: 439.633 ms
Loss rate: 0.82%
-- Flow 1:
Average throughput: 10.72 Mbit/s
95th percentile per-packet one-way delay: 439.633 ms
Loss rate: 0.82%

Run 3: Report of Indigo-MusesC5 — Data Link



Run 1: Statistics of Indigo-MusesD

Start at: 2019-03-26 19:10:45

End at: 2019-03-26 19:11:15

Local clock offset: 1.42 ms

Remote clock offset: 0.503 ms

Below is generated by plot.py at 2019-03-26 20:04:51

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.90 Mbit/s

95th percentile per-packet one-way delay: 132.863 ms

Loss rate: 0.34%

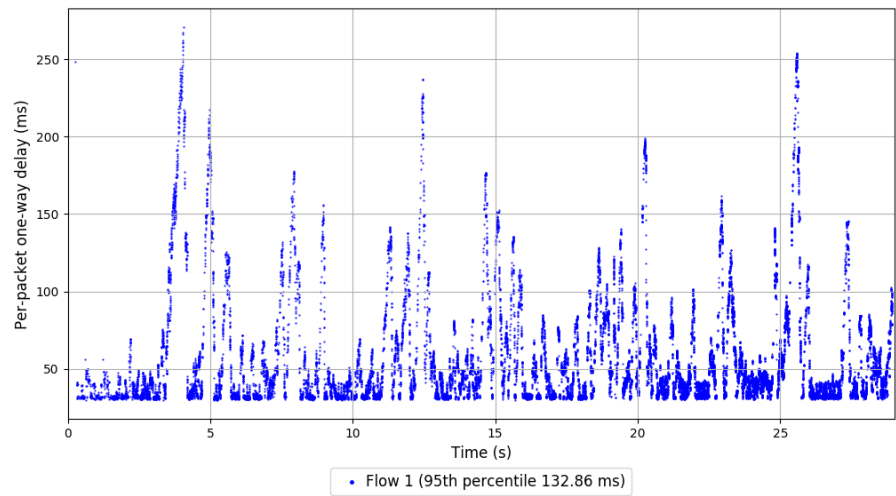
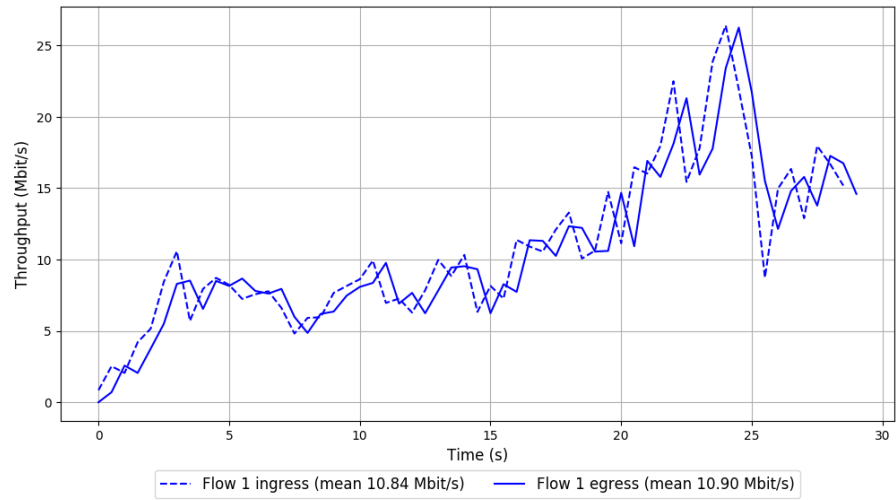
-- Flow 1:

Average throughput: 10.90 Mbit/s

95th percentile per-packet one-way delay: 132.863 ms

Loss rate: 0.34%

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-03-26 19:36:36

End at: 2019-03-26 19:37:06

Local clock offset: 1.78 ms

Remote clock offset: 0.348 ms

Below is generated by plot.py at 2019-03-26 20:04:51

Datalink statistics

-- Total of 1 flow:

Average throughput: 8.27 Mbit/s

95th percentile per-packet one-way delay: 139.518 ms

Loss rate: 0.06%

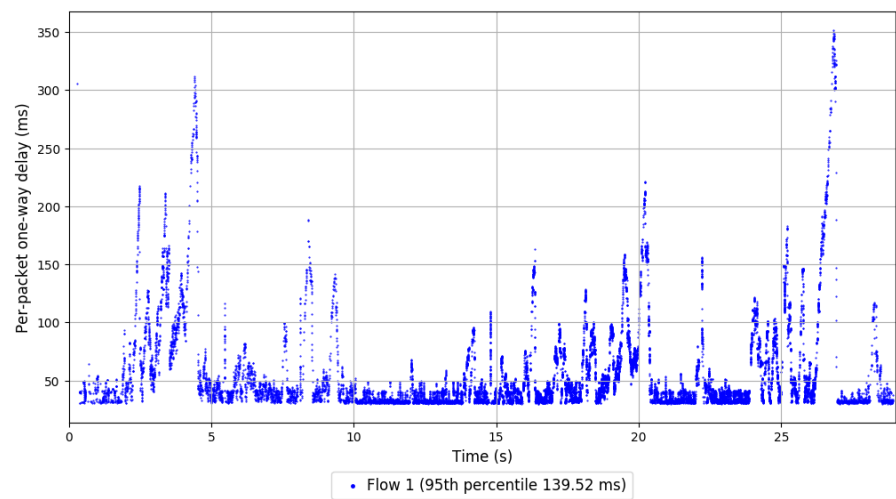
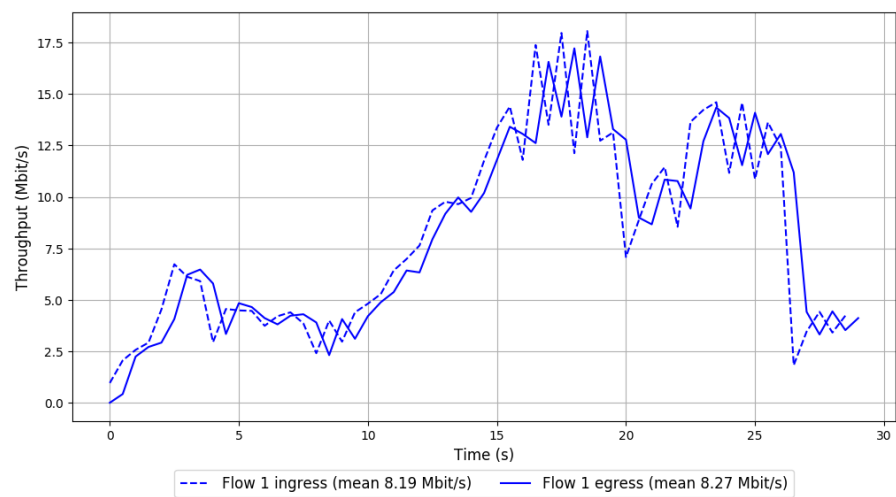
-- Flow 1:

Average throughput: 8.27 Mbit/s

95th percentile per-packet one-way delay: 139.518 ms

Loss rate: 0.06%

Run 2: Report of Indigo-MusesD — Data Link



Run 3: Statistics of Indigo-MusesD

Start at: 2019-03-26 20:02:21

End at: 2019-03-26 20:02:51

Local clock offset: 1.303 ms

Remote clock offset: -0.116 ms

Below is generated by plot.py at 2019-03-26 20:04:56

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.64 Mbit/s

95th percentile per-packet one-way delay: 158.264 ms

Loss rate: 0.40%

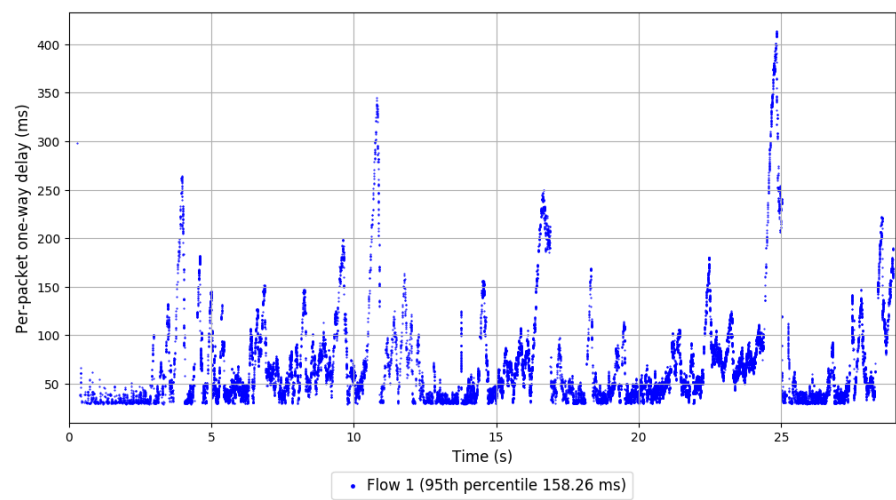
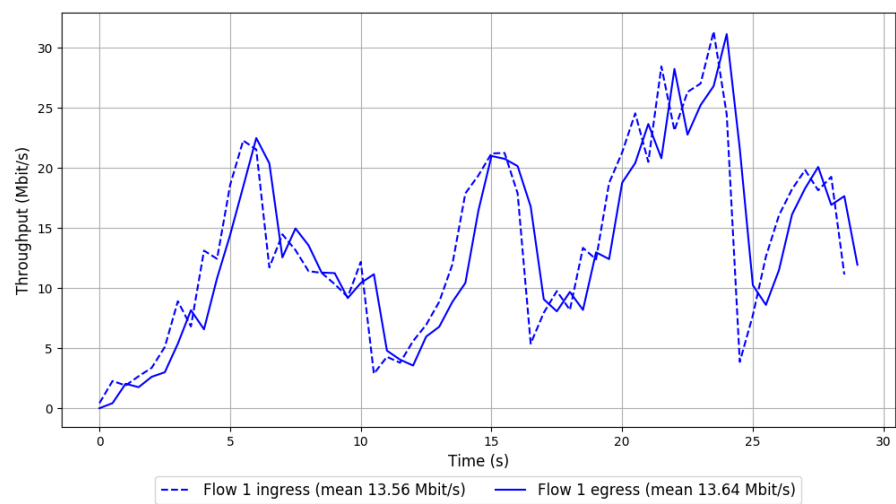
-- Flow 1:

Average throughput: 13.64 Mbit/s

95th percentile per-packet one-way delay: 158.264 ms

Loss rate: 0.40%

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MusesT

Start at: 2019-03-26 19:11:58

End at: 2019-03-26 19:12:28

Local clock offset: 1.524 ms

Remote clock offset: 0.525 ms

Below is generated by plot.py at 2019-03-26 20:04:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.40 Mbit/s

95th percentile per-packet one-way delay: 412.630 ms

Loss rate: 0.90%

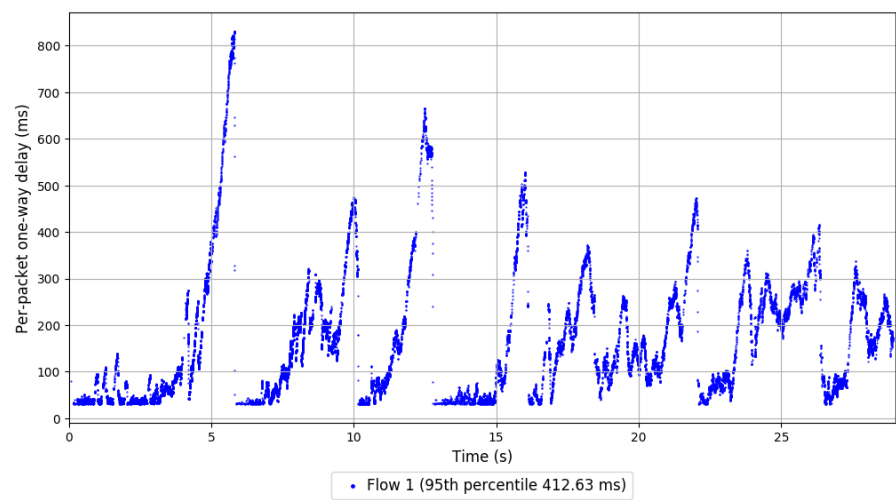
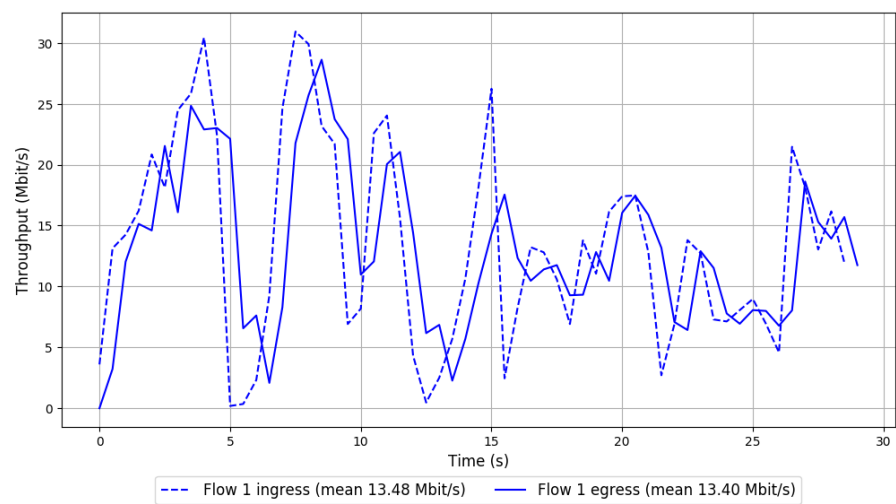
-- Flow 1:

Average throughput: 13.40 Mbit/s

95th percentile per-packet one-way delay: 412.630 ms

Loss rate: 0.90%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MusesT

Start at: 2019-03-26 19:37:49

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

Local clock offset: 1.847 ms

Remote clock offset: 0.281 ms

Below is generated by plot.py at 2019-03-26 20:04:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.27 Mbit/s

95th percentile per-packet one-way delay: 395.977 ms

Loss rate: 0.87%

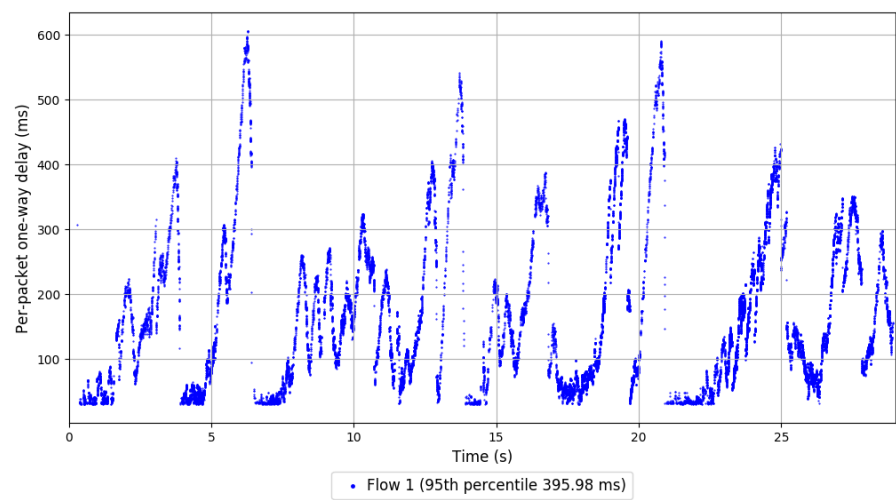
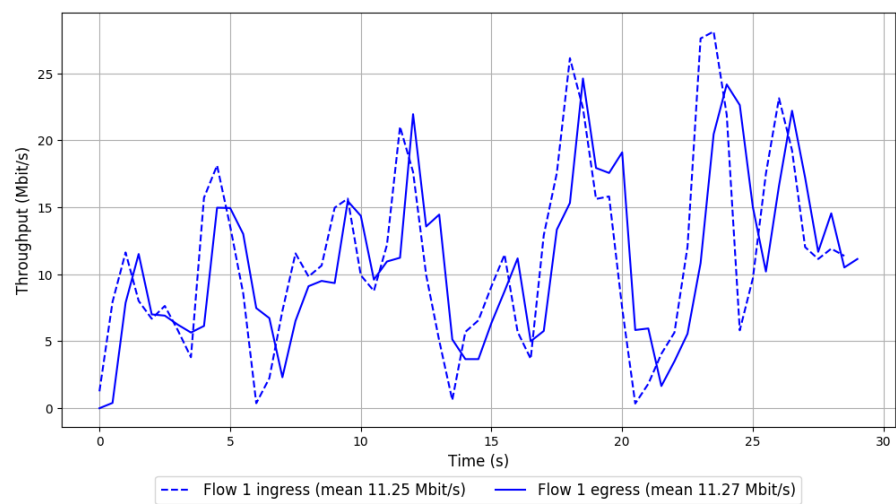
-- Flow 1:

Average throughput: 11.27 Mbit/s

95th percentile per-packet one-way delay: 395.977 ms

Loss rate: 0.87%

Run 2: Report of Indigo-MusesT — Data Link



Run 3: Statistics of Indigo-MusesT

Start at: 2019-03-26 20:03:35

End at: 2019-03-26 20:04:05

Local clock offset: 1.319 ms

Remote clock offset: -0.222 ms

Below is generated by plot.py at 2019-03-26 20:05:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.07 Mbit/s

95th percentile per-packet one-way delay: 367.054 ms

Loss rate: 0.35%

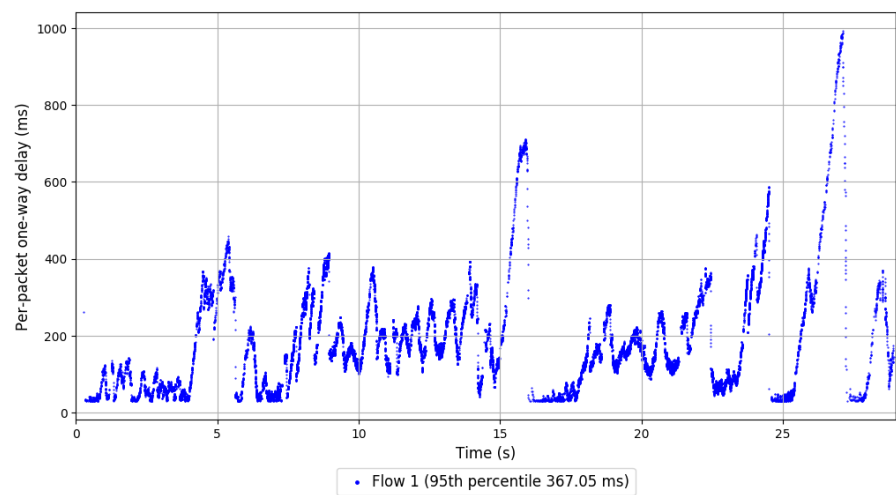
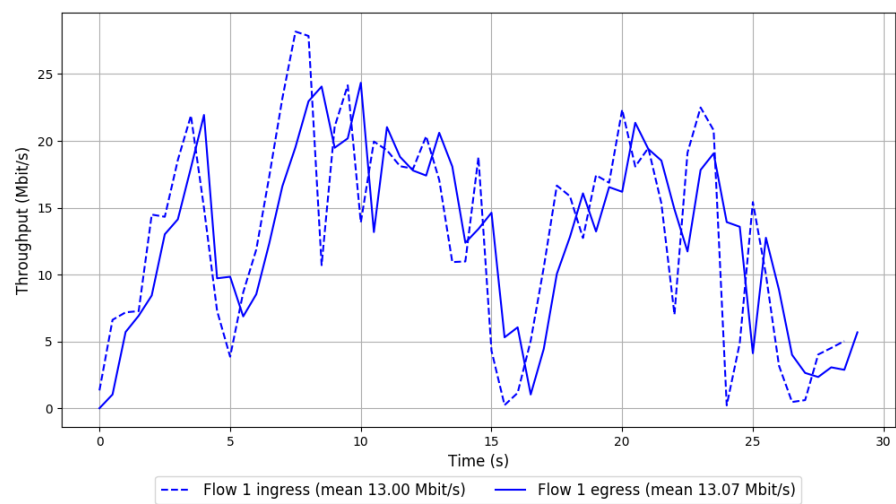
-- Flow 1:

Average throughput: 13.07 Mbit/s

95th percentile per-packet one-way delay: 367.054 ms

Loss rate: 0.35%

Run 3: Report of Indigo-MusesT — Data Link

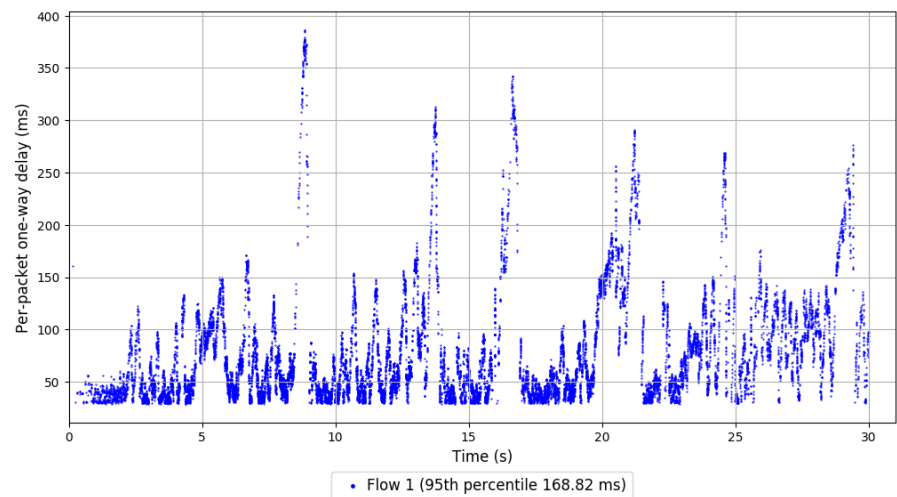
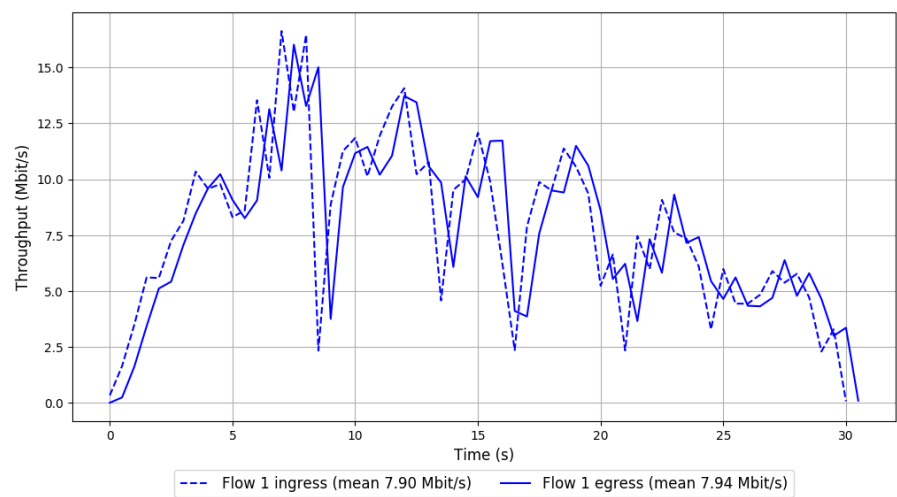


```
Run 1: Statistics of LEDBAT

Start at: 2019-03-26 18:48:41
End at: 2019-03-26 18:49:11
Local clock offset: 0.821 ms
Remote clock offset: 0.492 ms

# Below is generated by plot.py at 2019-03-26 20:05:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.94 Mbit/s
95th percentile per-packet one-way delay: 168.818 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 7.94 Mbit/s
95th percentile per-packet one-way delay: 168.818 ms
Loss rate: 0.14%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-03-26 19:14:26

End at: 2019-03-26 19:14:56

Local clock offset: 1.722 ms

Remote clock offset: 0.439 ms

Below is generated by plot.py at 2019-03-26 20:05:06

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.47 Mbit/s

95th percentile per-packet one-way delay: 175.078 ms

Loss rate: 0.42%

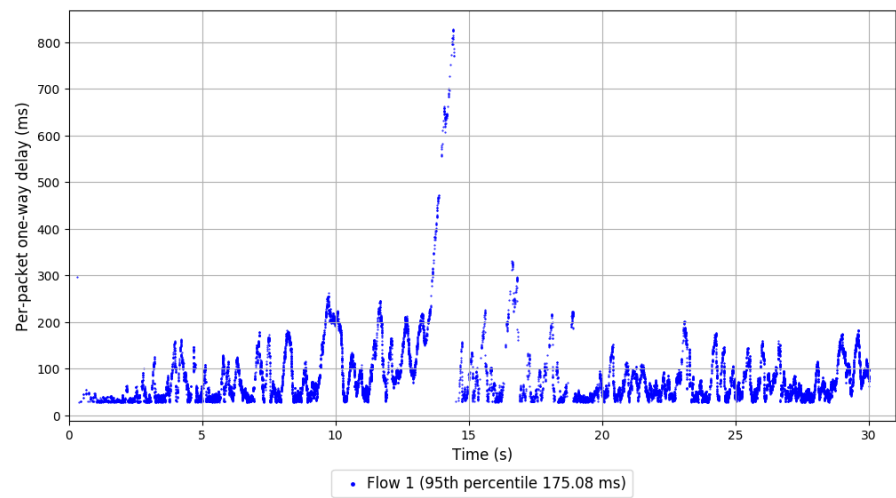
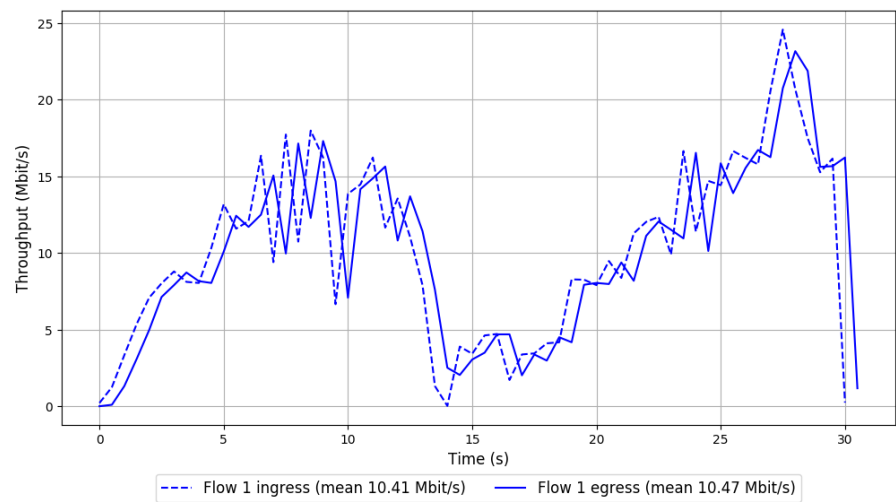
-- Flow 1:

Average throughput: 10.47 Mbit/s

95th percentile per-packet one-way delay: 175.078 ms

Loss rate: 0.42%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-03-26 19:40:17

End at: 2019-03-26 19:40:47

Local clock offset: 2.0 ms

Remote clock offset: 0.202 ms

Below is generated by plot.py at 2019-03-26 20:05:08

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.76 Mbit/s

95th percentile per-packet one-way delay: 159.860 ms

Loss rate: 0.13%

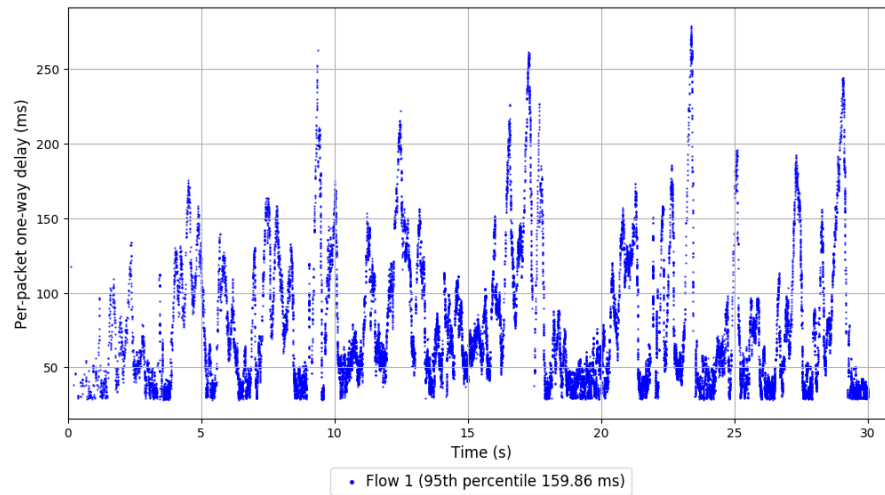
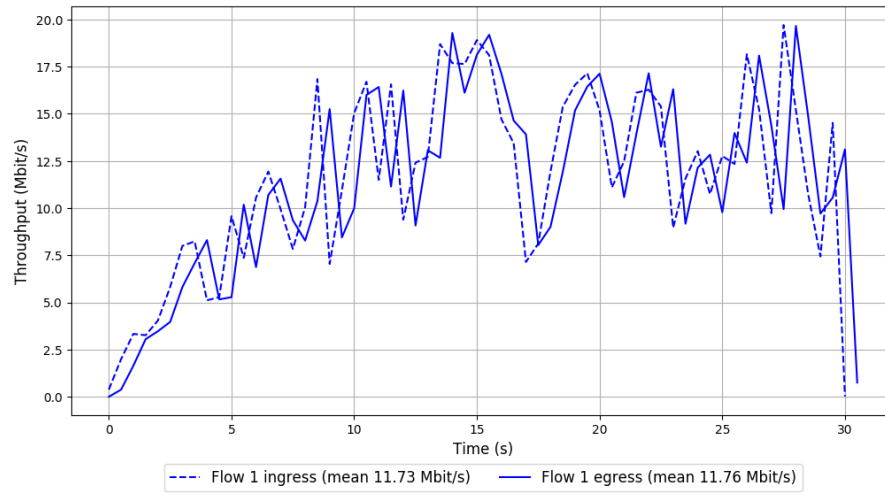
-- Flow 1:

Average throughput: 11.76 Mbit/s

95th percentile per-packet one-way delay: 159.860 ms

Loss rate: 0.13%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2019-03-26 19:04:37

End at: 2019-03-26 19:05:07

Local clock offset: 1.126 ms

Remote clock offset: 0.691 ms

Below is generated by plot.py at 2019-03-26 20:05:08

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 39.361 ms

Loss rate: 0.10%

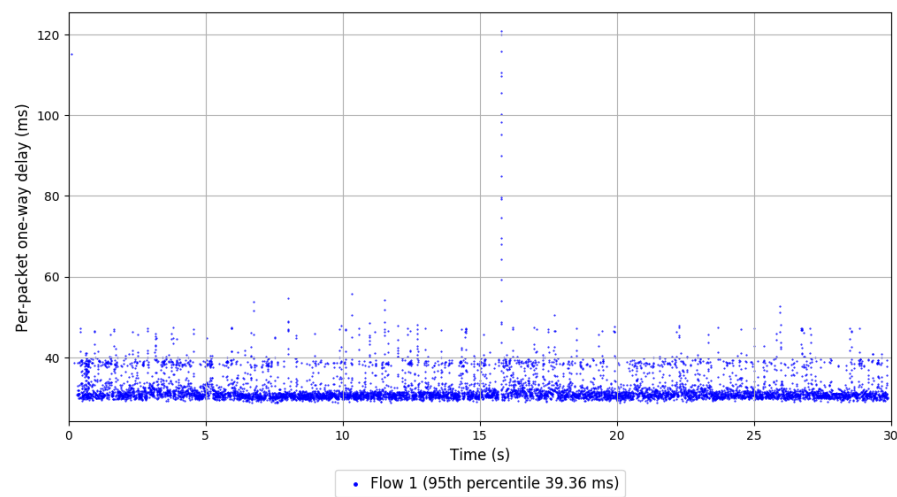
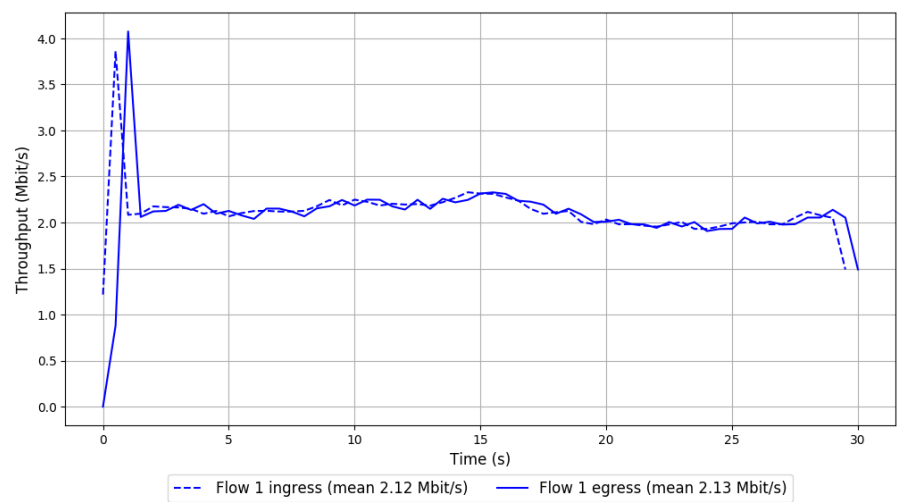
-- Flow 1:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 39.361 ms

Loss rate: 0.10%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-03-26 19:30:28

End at: 2019-03-26 19:30:58

Local clock offset: 1.509 ms

Remote clock offset: 0.387 ms

Below is generated by plot.py at 2019-03-26 20:05:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.97 Mbit/s

95th percentile per-packet one-way delay: 1047.745 ms

Loss rate: 8.65%

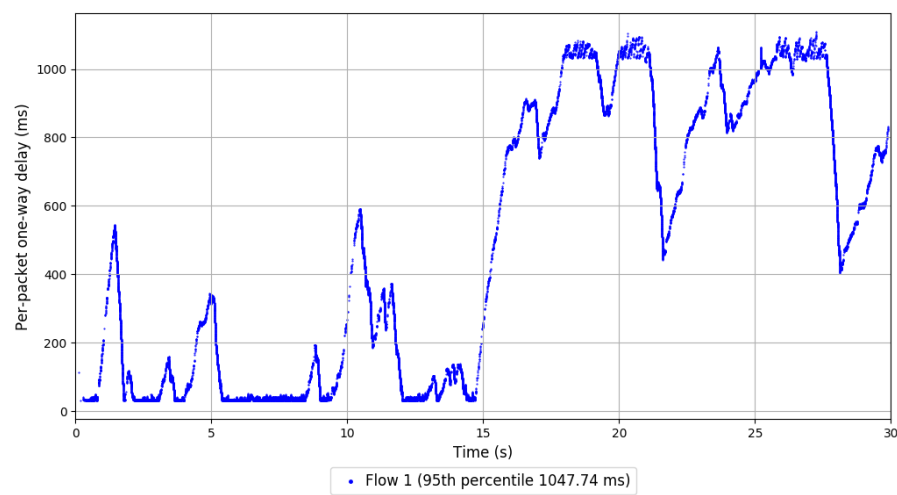
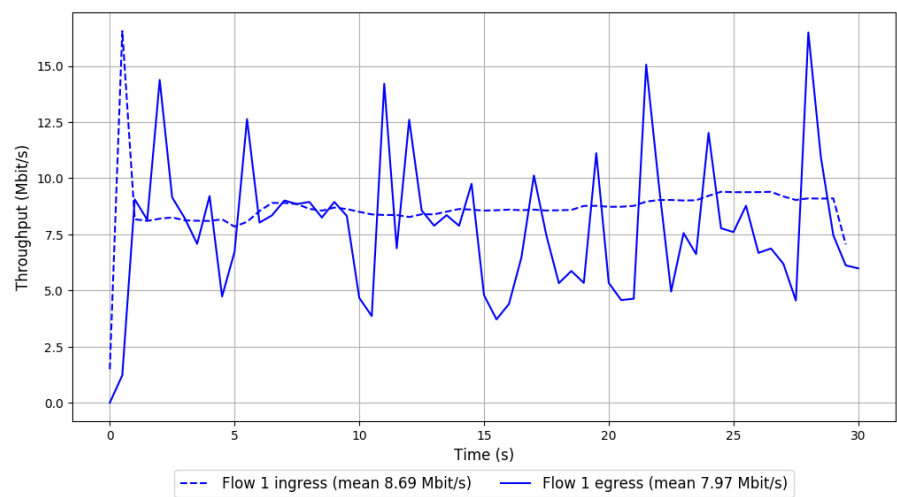
-- Flow 1:

Average throughput: 7.97 Mbit/s

95th percentile per-packet one-way delay: 1047.745 ms

Loss rate: 8.65%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-03-26 19:56:14

End at: 2019-03-26 19:56:44

Local clock offset: 1.393 ms

Remote clock offset: -0.031 ms

Below is generated by plot.py at 2019-03-26 20:05:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 48.852 ms

Loss rate: 0.13%

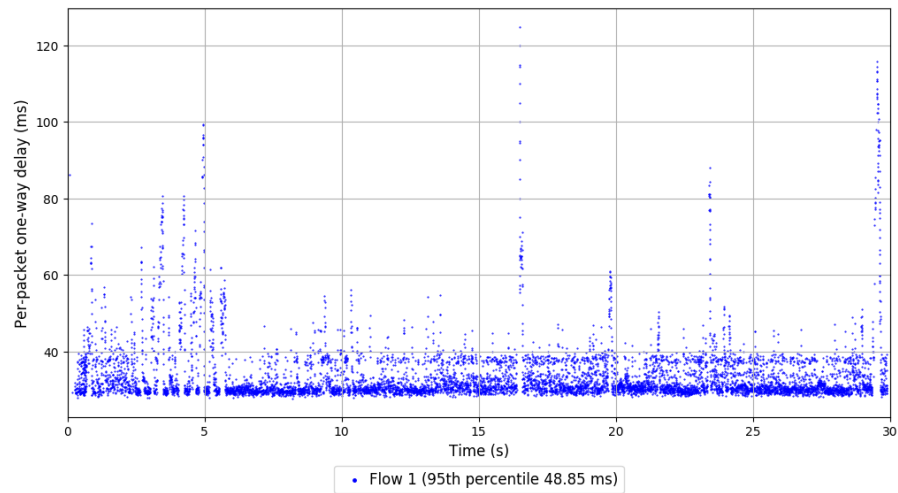
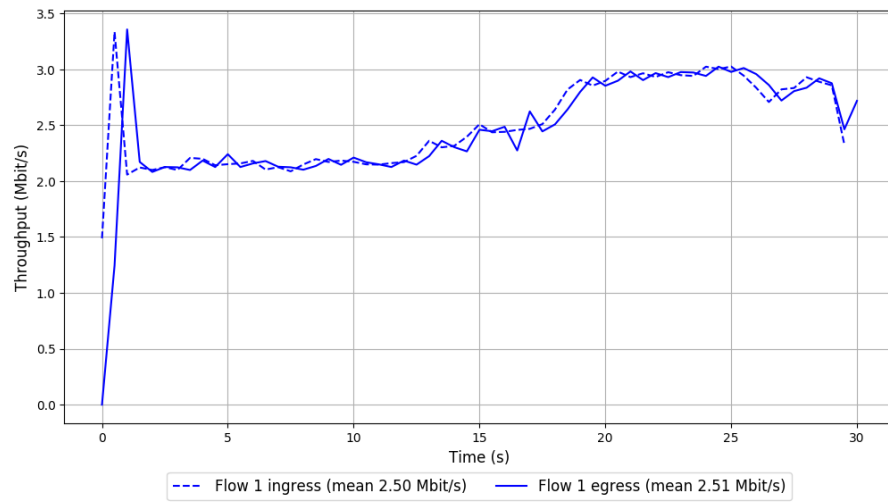
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 48.852 ms

Loss rate: 0.13%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

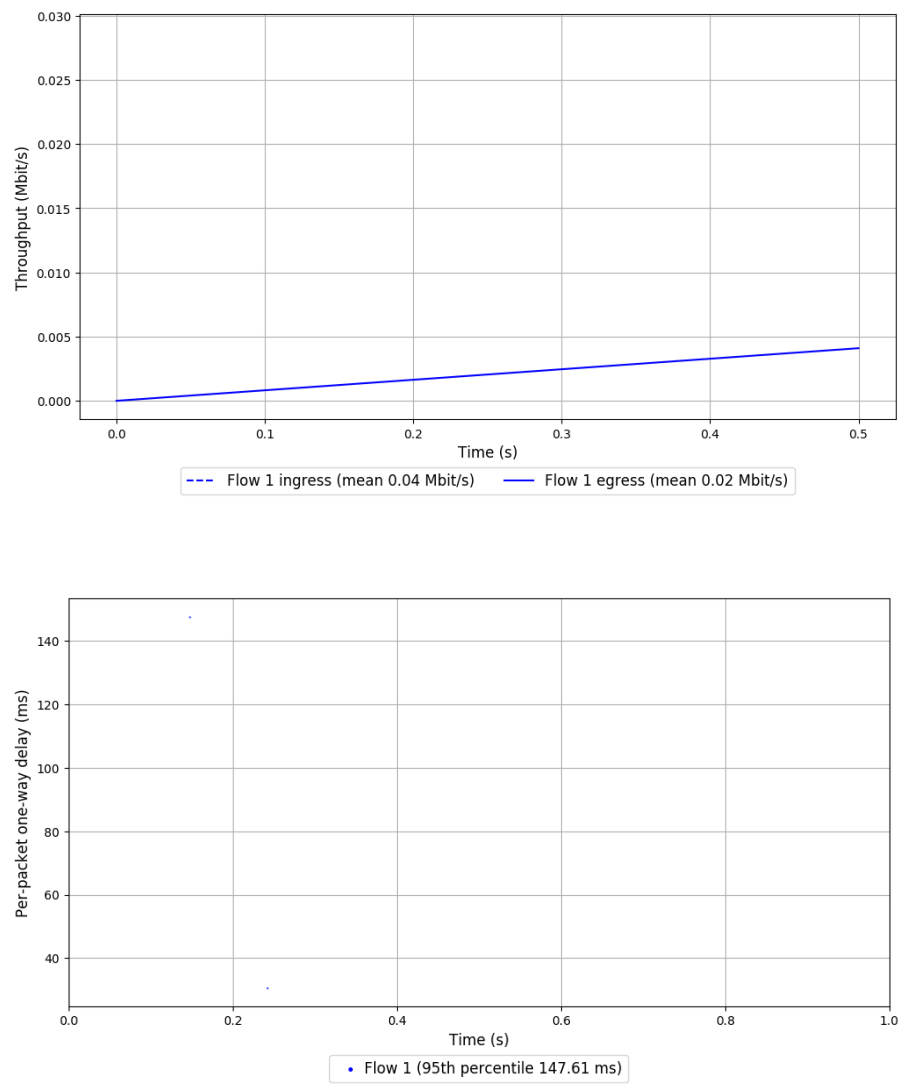
Start at: 2019-03-26 18:51:08

End at: 2019-03-26 18:51:38

Local clock offset: 0.826 ms

Remote clock offset: 0.58 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

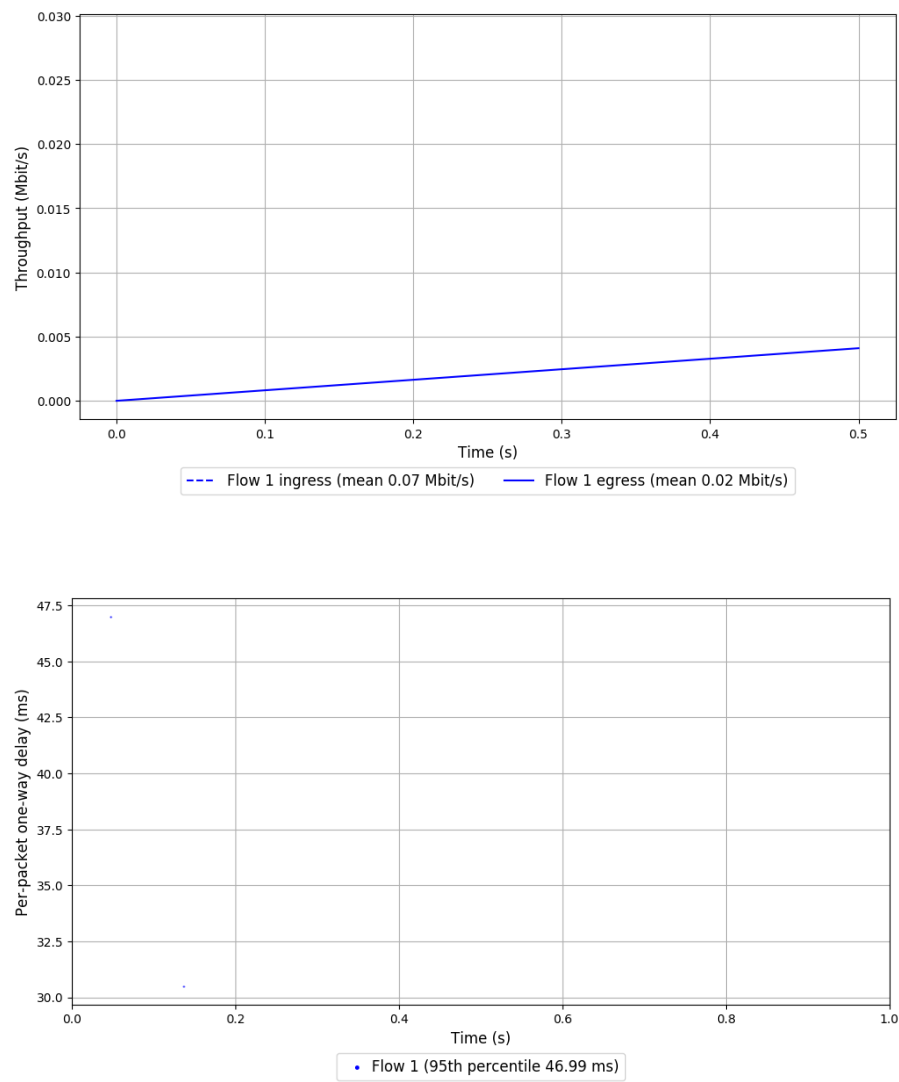
Start at: 2019-03-26 19:16:53

End at: 2019-03-26 19:17:23

Local clock offset: 1.824 ms

Remote clock offset: 0.548 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

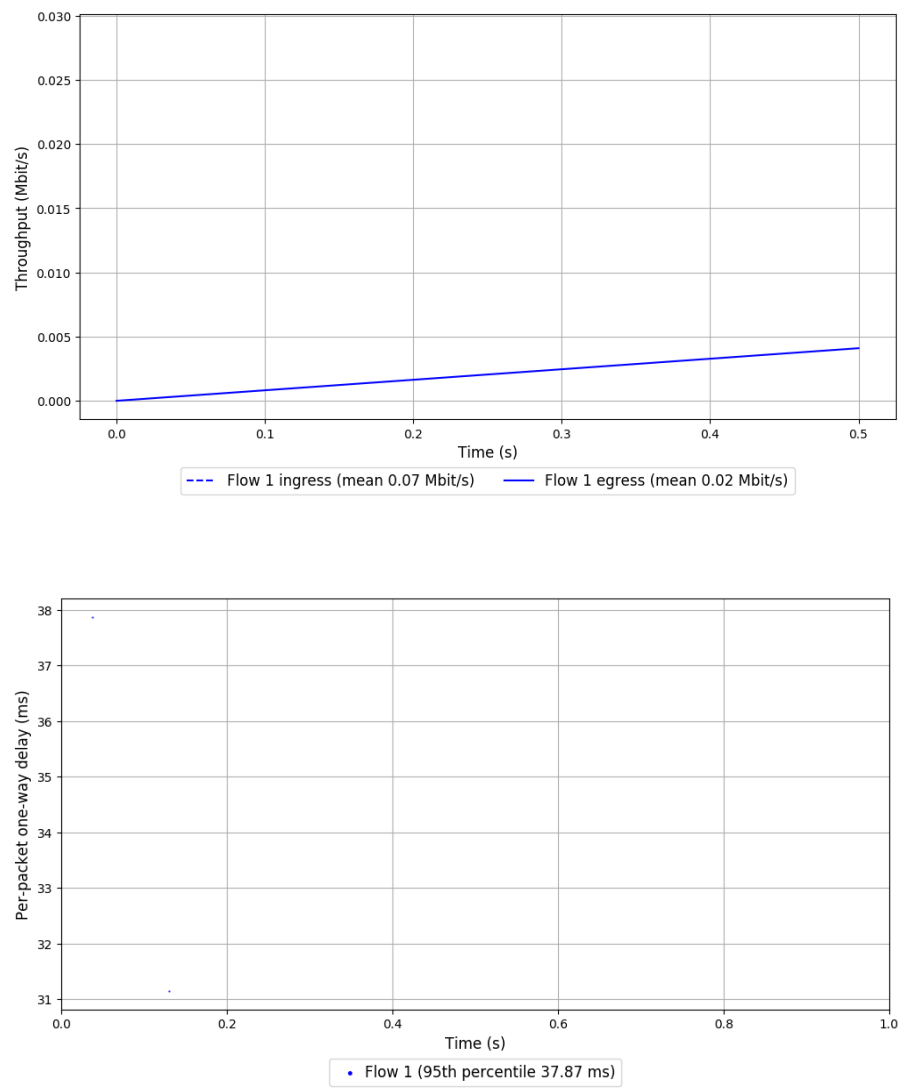
Start at: 2019-03-26 19:42:44

End at: 2019-03-26 19:43:14

Local clock offset: 2.156 ms

Remote clock offset: 0.217 ms

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-03-26 19:05:51

End at: 2019-03-26 19:06:21

Local clock offset: 1.143 ms

Remote clock offset: 0.58 ms

Below is generated by plot.py at 2019-03-26 20:05:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.60 Mbit/s

95th percentile per-packet one-way delay: 264.810 ms

Loss rate: 0.63%

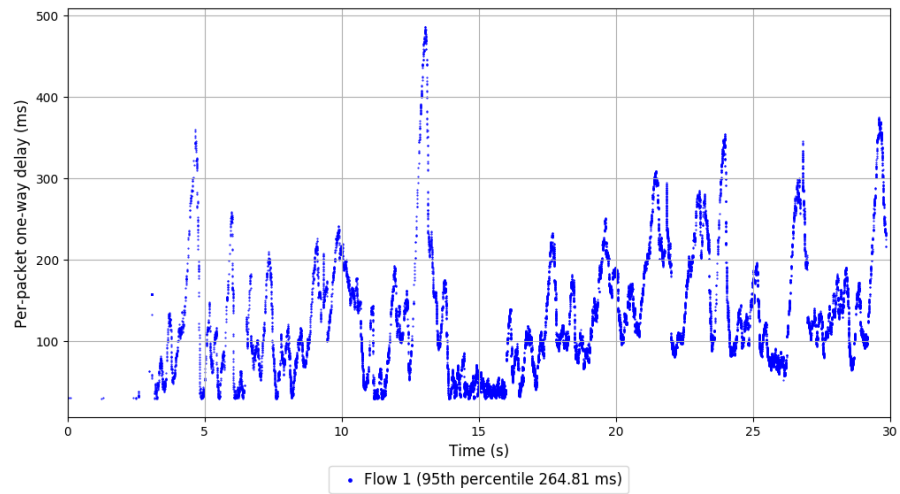
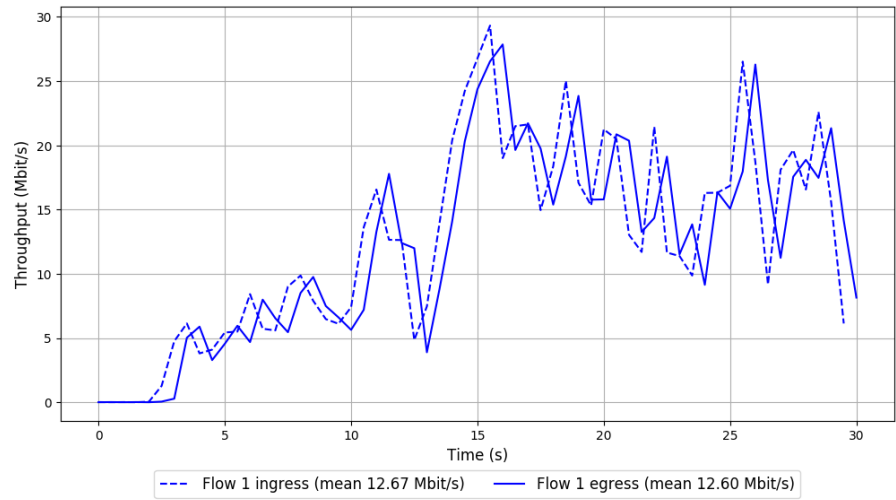
-- Flow 1:

Average throughput: 12.60 Mbit/s

95th percentile per-packet one-way delay: 264.810 ms

Loss rate: 0.63%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-03-26 19:31:41

End at: 2019-03-26 19:32:11

Local clock offset: 1.562 ms

Remote clock offset: 0.345 ms

Below is generated by plot.py at 2019-03-26 20:05:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 17.24 Mbit/s

95th percentile per-packet one-way delay: 240.620 ms

Loss rate: 0.71%

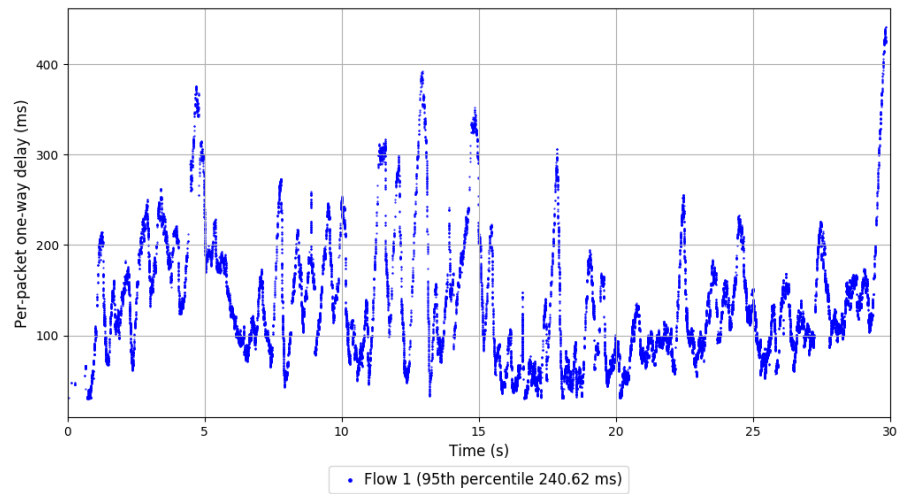
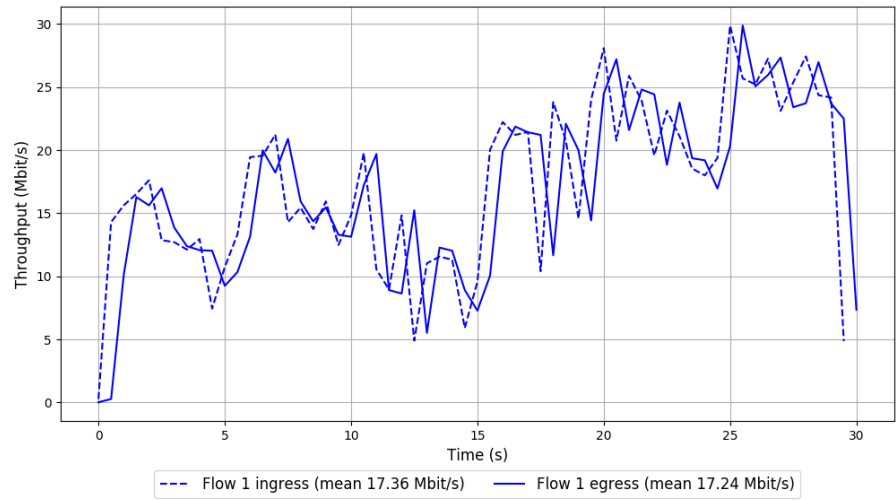
-- Flow 1:

Average throughput: 17.24 Mbit/s

95th percentile per-packet one-way delay: 240.620 ms

Loss rate: 0.71%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2019-03-26 19:57:27

End at: 2019-03-26 19:57:57

Local clock offset: 1.37 ms

Remote clock offset: -0.055 ms

Below is generated by plot.py at 2019-03-26 20:05:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.83 Mbit/s

95th percentile per-packet one-way delay: 769.821 ms

Loss rate: 0.51%

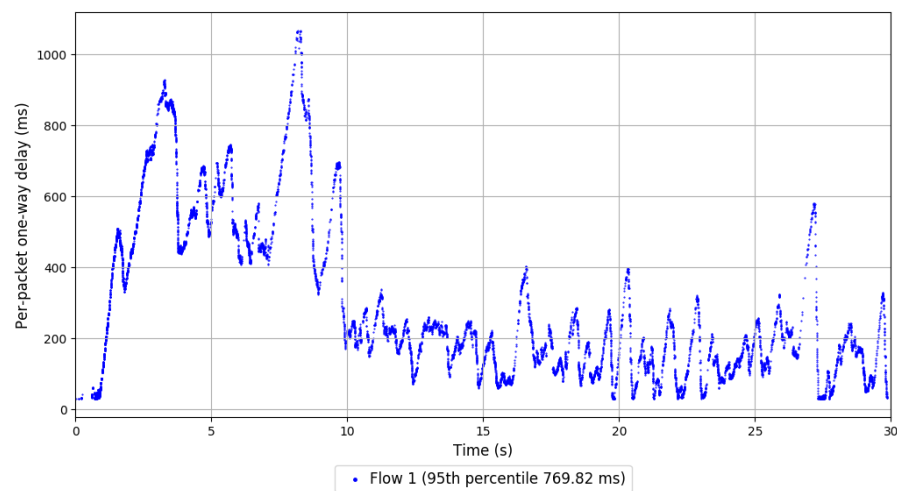
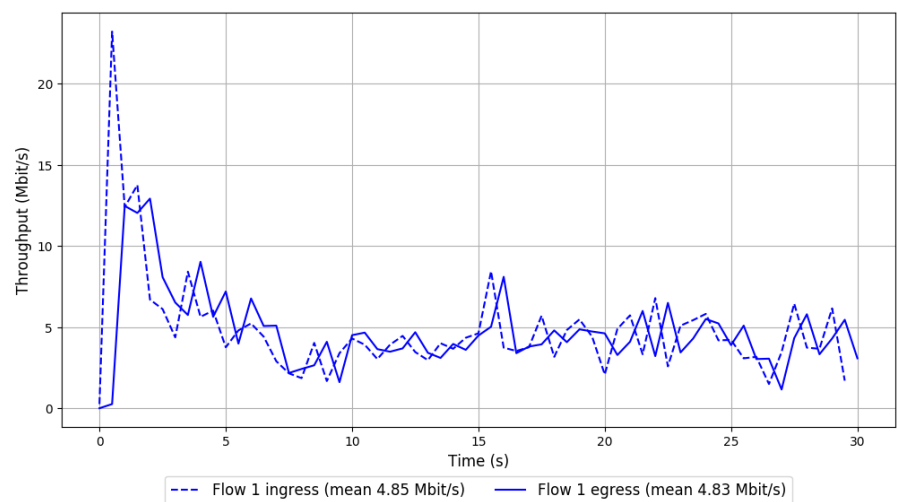
-- Flow 1:

Average throughput: 4.83 Mbit/s

95th percentile per-packet one-way delay: 769.821 ms

Loss rate: 0.51%

Run 3: Report of QUIC Cubic — Data Link

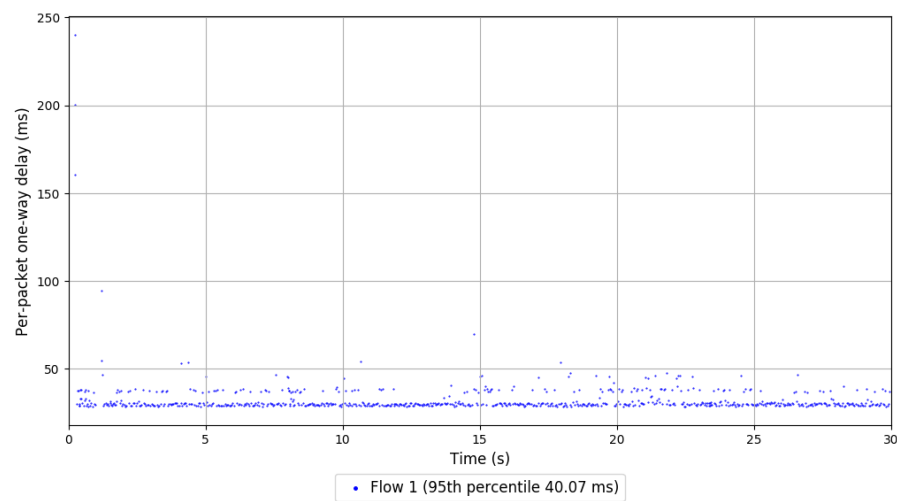
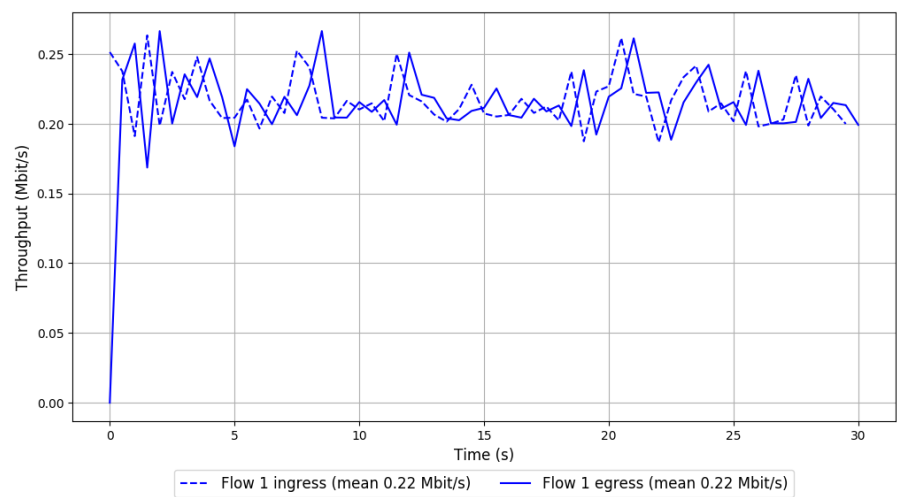


```
Run 1: Statistics of SCReAM

Start at: 2019-03-26 18:52:21
End at: 2019-03-26 18:52:51
Local clock offset: 0.87 ms
Remote clock offset: 0.565 ms

# Below is generated by plot.py at 2019-03-26 20:05:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 40.069 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 40.069 ms
Loss rate: 0.13%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-03-26 19:18:11

End at: 2019-03-26 19:18:41

Local clock offset: 1.68 ms

Remote clock offset: 0.468 ms

Below is generated by plot.py at 2019-03-26 20:05:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 46.431 ms

Loss rate: 0.13%

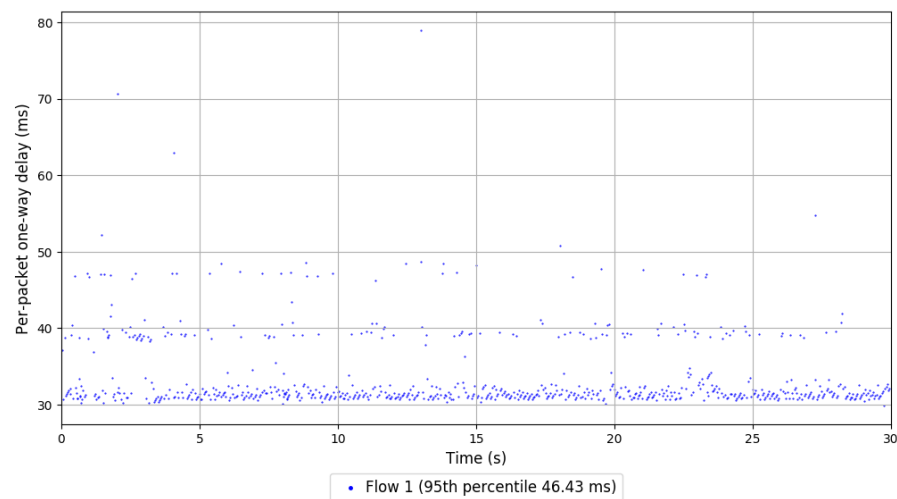
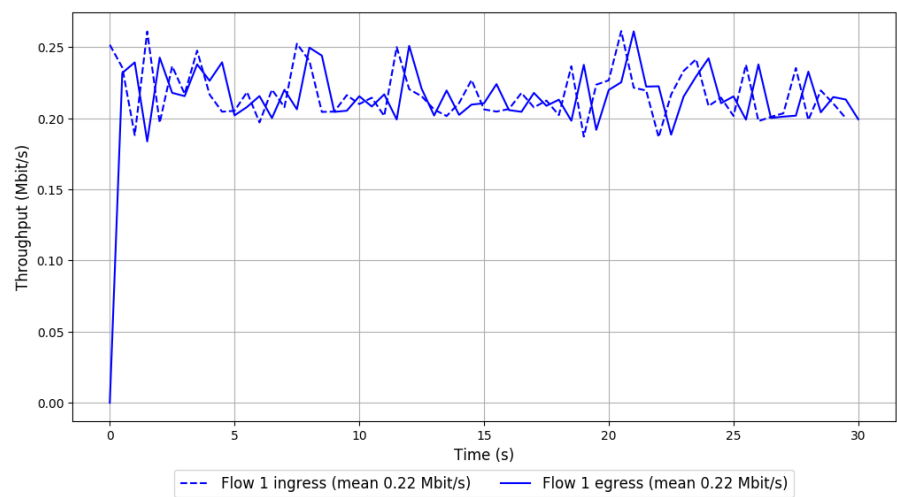
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 46.431 ms

Loss rate: 0.13%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2019-03-26 19:43:58

End at: 2019-03-26 19:44:28

Local clock offset: 2.213 ms

Remote clock offset: 0.233 ms

Below is generated by plot.py at 2019-03-26 20:05:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 39.999 ms

Loss rate: 0.13%

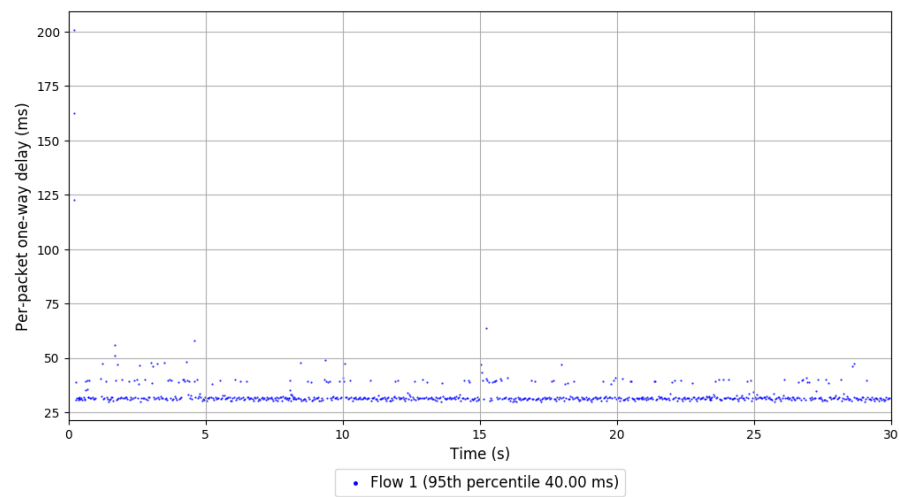
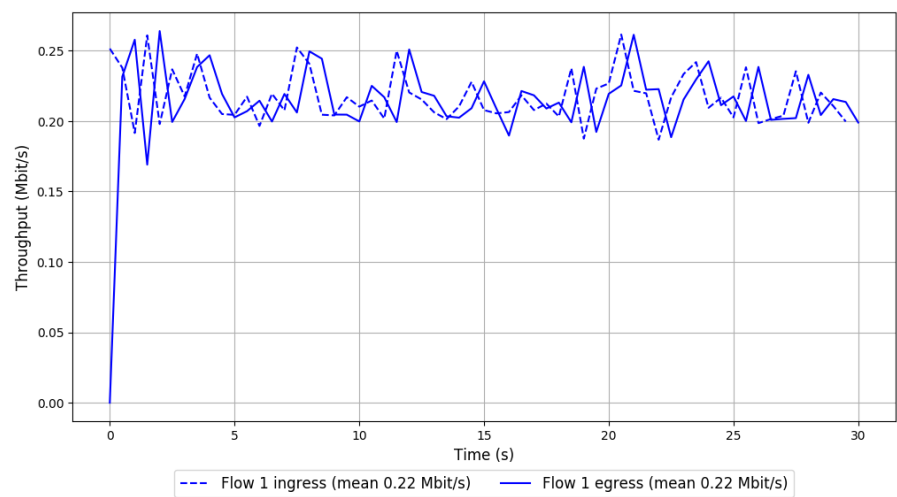
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 39.999 ms

Loss rate: 0.13%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2019-03-26 19:07:04

End at: 2019-03-26 19:07:34

Local clock offset: 1.189 ms

Remote clock offset: 0.658 ms

Below is generated by plot.py at 2019-03-26 20:05:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.78 Mbit/s

95th percentile per-packet one-way delay: 67.964 ms

Loss rate: 0.02%

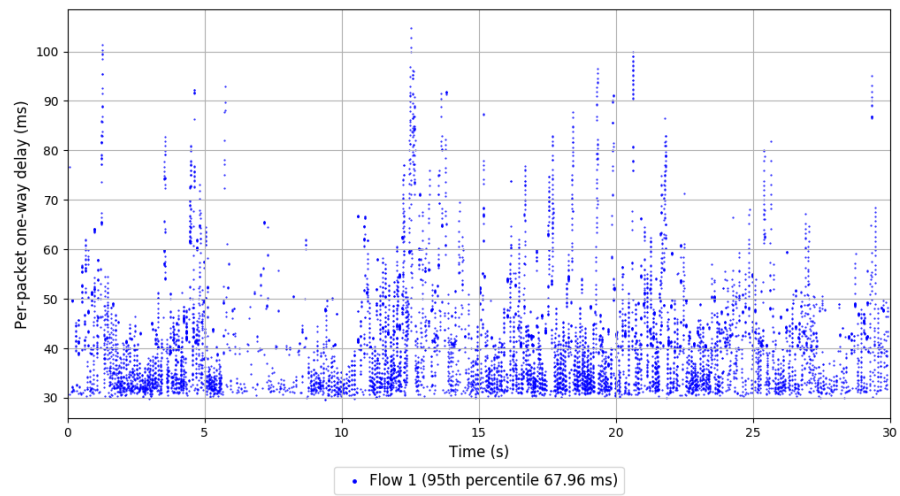
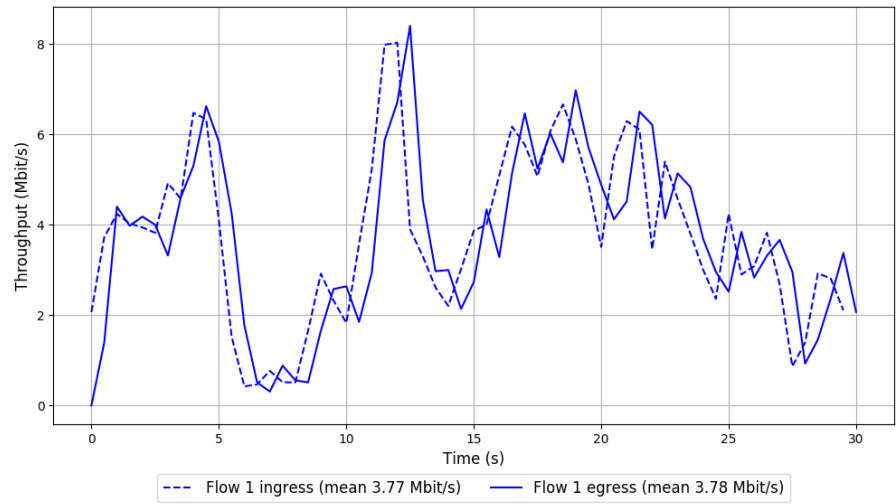
-- Flow 1:

Average throughput: 3.78 Mbit/s

95th percentile per-packet one-way delay: 67.964 ms

Loss rate: 0.02%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2019-03-26 19:32:55

End at: 2019-03-26 19:33:25

Local clock offset: 1.614 ms

Remote clock offset: 0.324 ms

Below is generated by plot.py at 2019-03-26 20:05:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.33 Mbit/s

95th percentile per-packet one-way delay: 65.842 ms

Loss rate: 0.08%

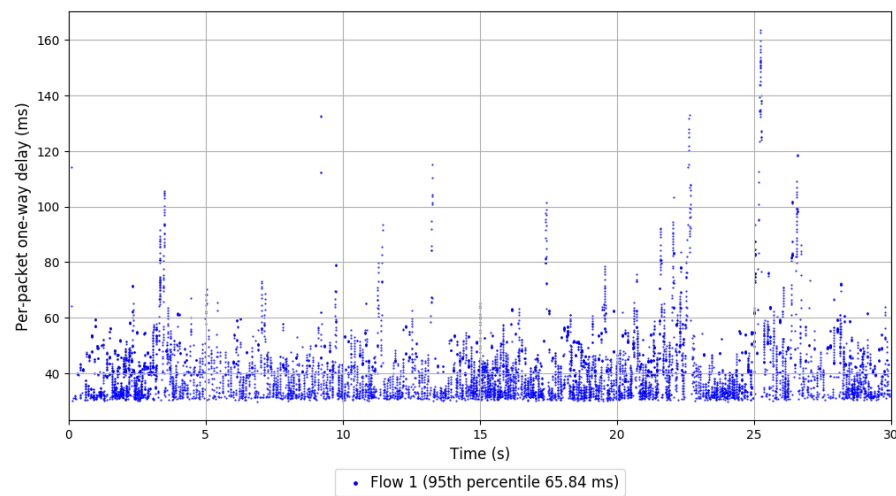
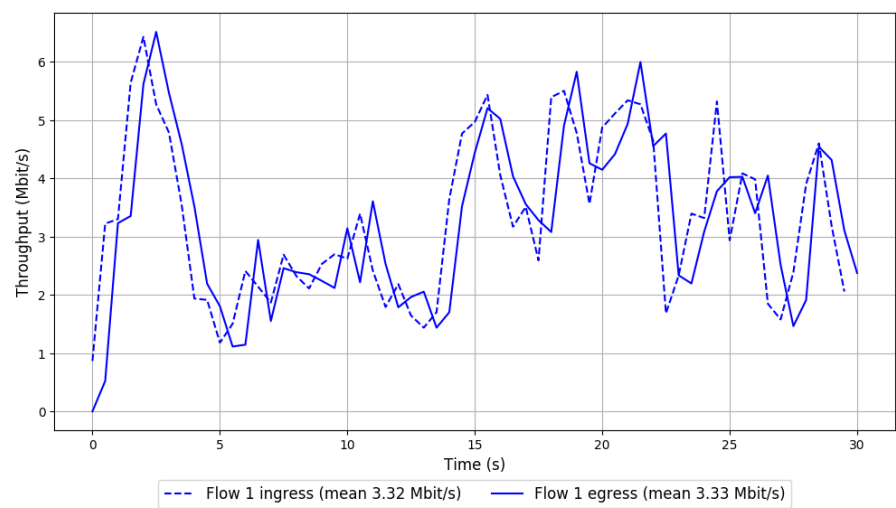
-- Flow 1:

Average throughput: 3.33 Mbit/s

95th percentile per-packet one-way delay: 65.842 ms

Loss rate: 0.08%

Run 2: Report of Sprout — Data Link

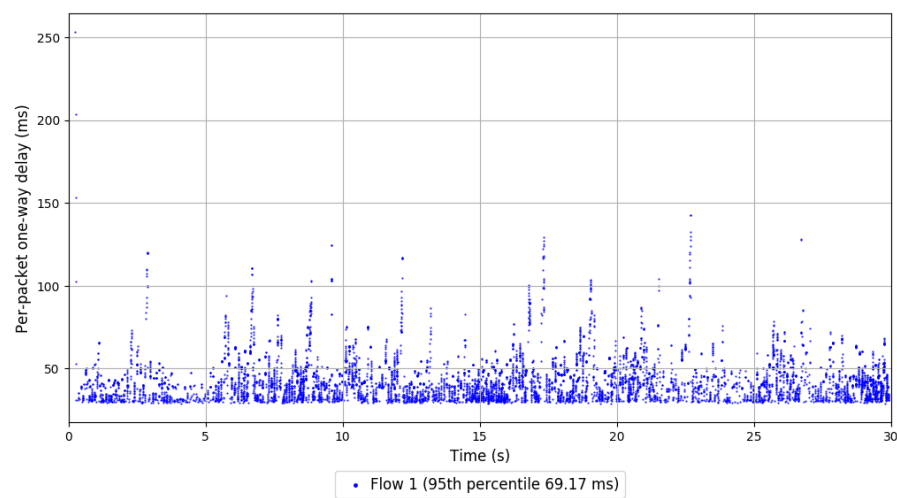
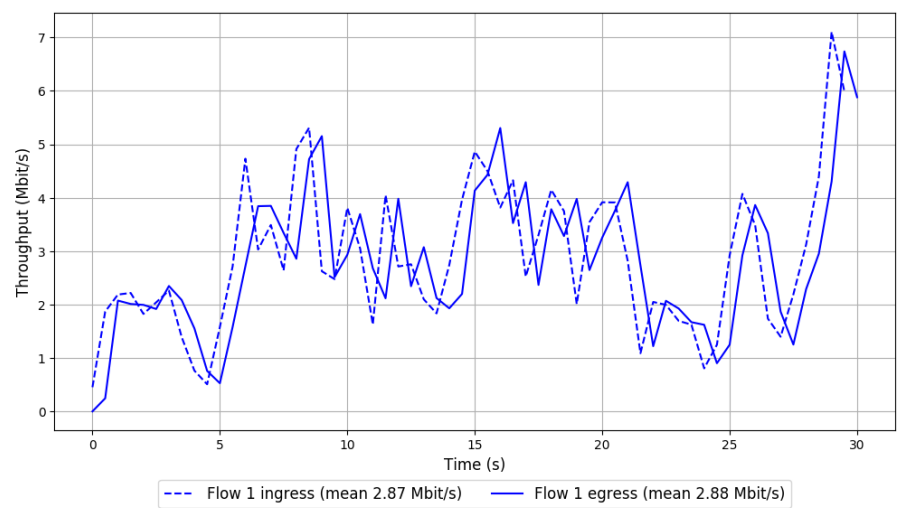


Run 3: Statistics of Sprout

Start at: 2019-03-26 19:58:41
End at: 2019-03-26 19:59:11
Local clock offset: 1.332 ms
Remote clock offset: -0.171 ms

Below is generated by plot.py at 2019-03-26 20:05:26
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 69.166 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 69.166 ms
Loss rate: 0.59%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2019-03-26 18:56:02

End at: 2019-03-26 18:56:32

Local clock offset: 0.931 ms

Remote clock offset: 0.609 ms

Below is generated by plot.py at 2019-03-26 20:05:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.89 Mbit/s

95th percentile per-packet one-way delay: 99.883 ms

Loss rate: 34.32%

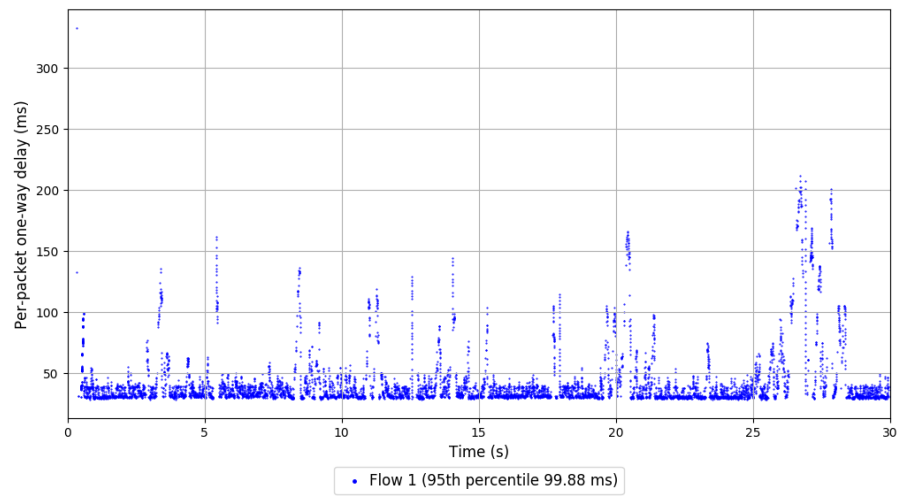
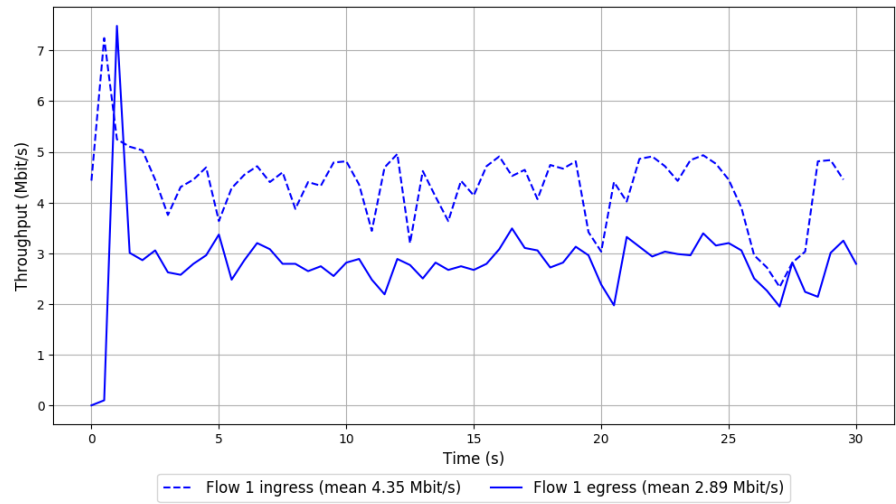
-- Flow 1:

Average throughput: 2.89 Mbit/s

95th percentile per-packet one-way delay: 99.883 ms

Loss rate: 34.32%

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



Run 2: Statistics of TaoVA-100x

Start at: 2019-03-26 19:21:52

End at: 2019-03-26 19:22:22

Local clock offset: 1.467 ms

Remote clock offset: 0.464 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.87 Mbit/s

95th percentile per-packet one-way delay: 139.510 ms

Loss rate: 97.53%

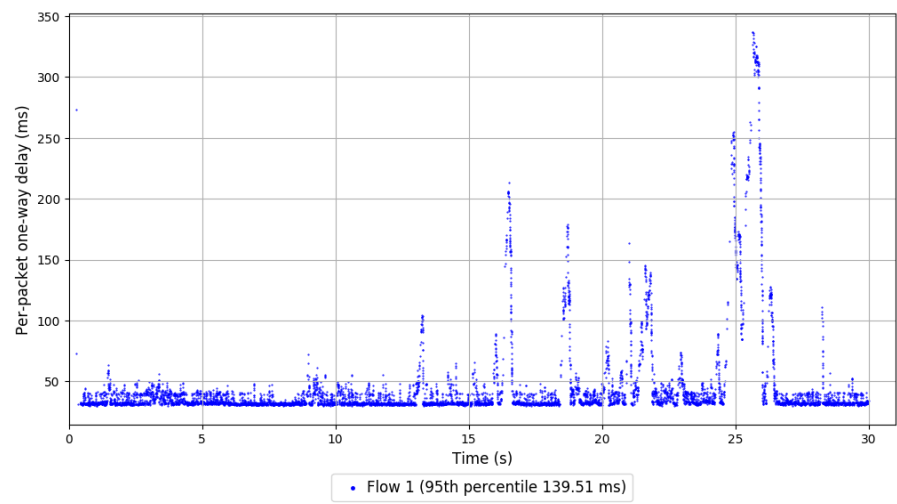
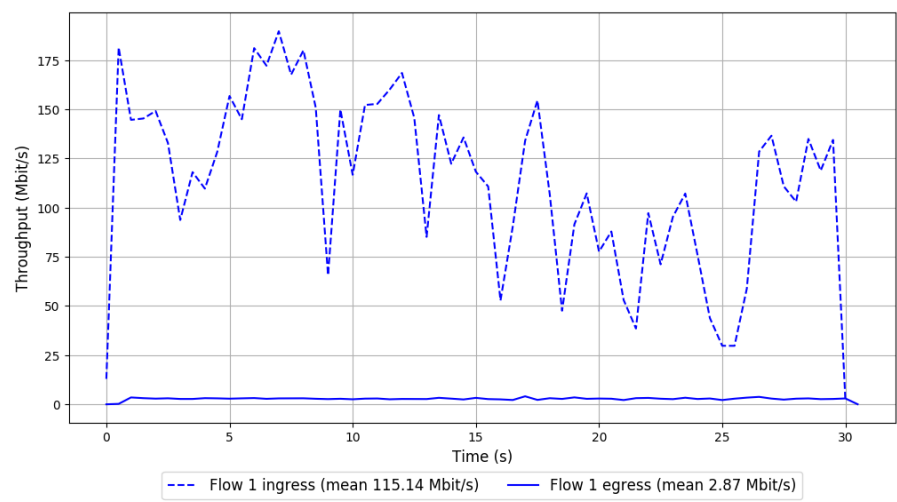
-- Flow 1:

Average throughput: 2.87 Mbit/s

95th percentile per-packet one-way delay: 139.510 ms

Loss rate: 97.53%

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



Run 3: Statistics of TaoVA-100x

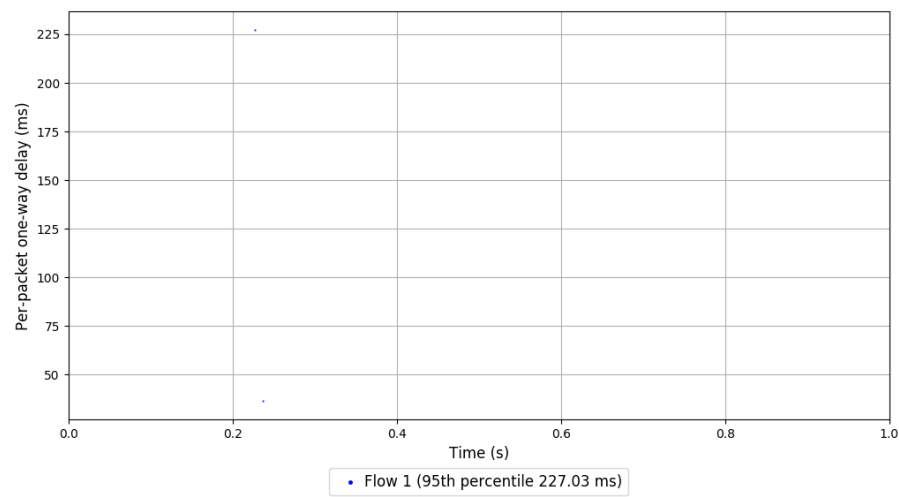
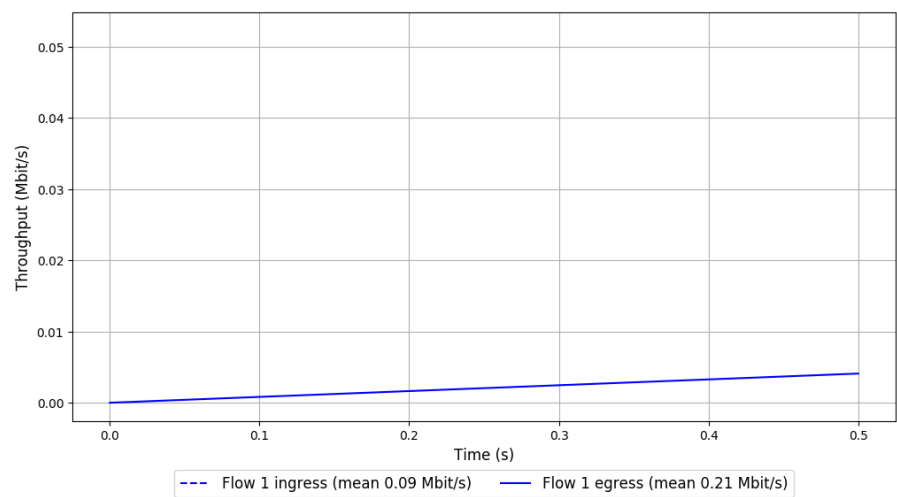
Start at: 2019-03-26 19:47:38

End at: 2019-03-26 19:48:08

Local clock offset: 2.163 ms

Remote clock offset: 0.053 ms

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



Run 1: Statistics of TCP Vegas

Start at: 2019-03-26 18:58:29

End at: 2019-03-26 18:58:59

Local clock offset: 0.759 ms

Remote clock offset: 0.711 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.76 Mbit/s

95th percentile per-packet one-way delay: 144.735 ms

Loss rate: 0.08%

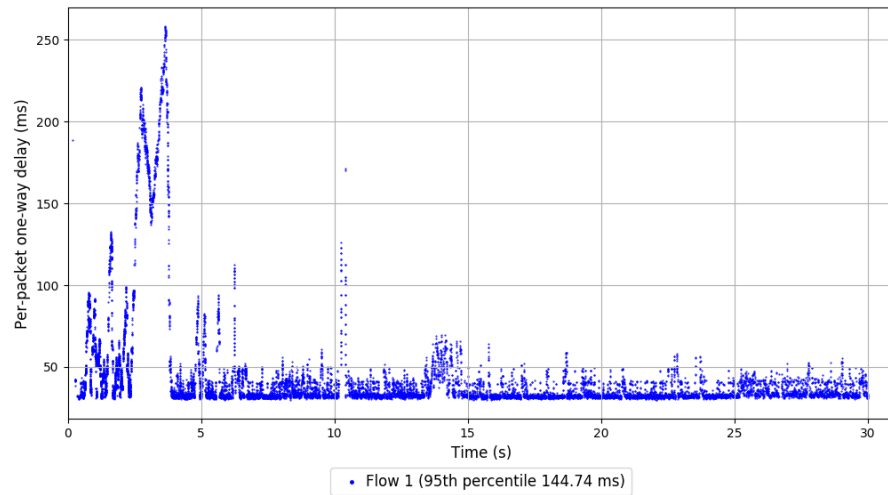
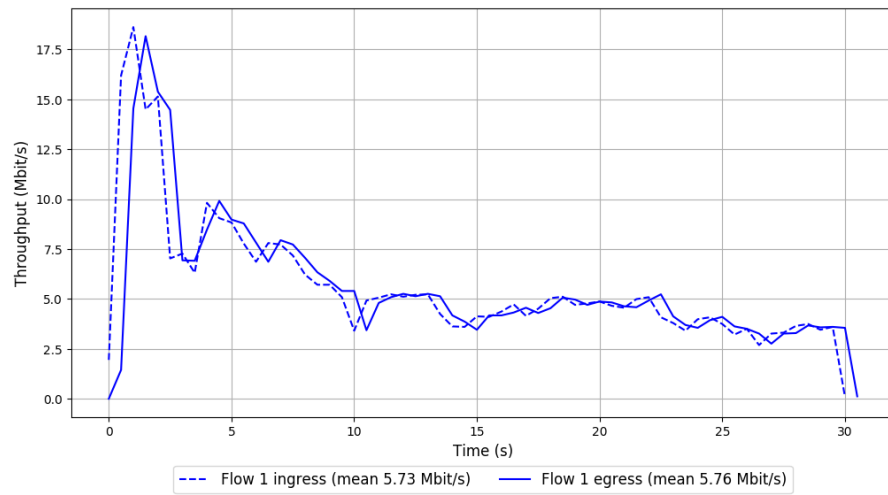
-- Flow 1:

Average throughput: 5.76 Mbit/s

95th percentile per-packet one-way delay: 144.735 ms

Loss rate: 0.08%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2019-03-26 19:24:20

End at: 2019-03-26 19:24:50

Local clock offset: 1.42 ms

Remote clock offset: 0.429 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.81 Mbit/s

95th percentile per-packet one-way delay: 101.949 ms

Loss rate: 0.11%

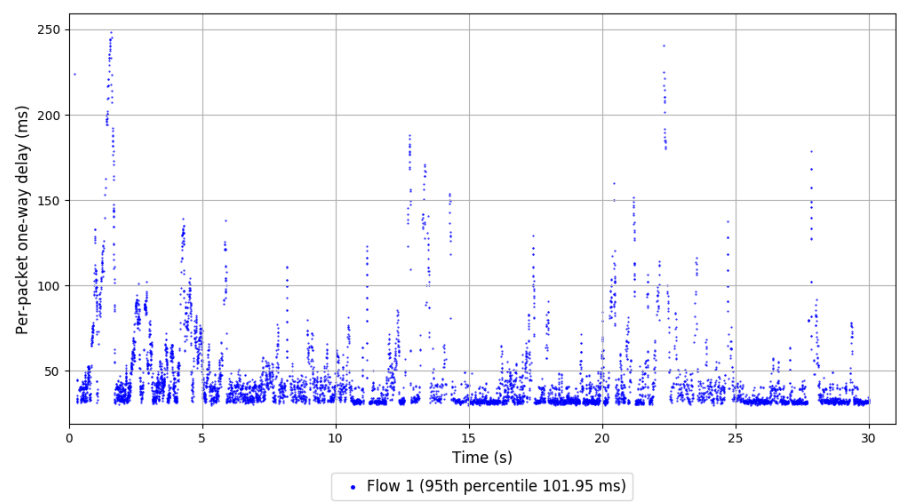
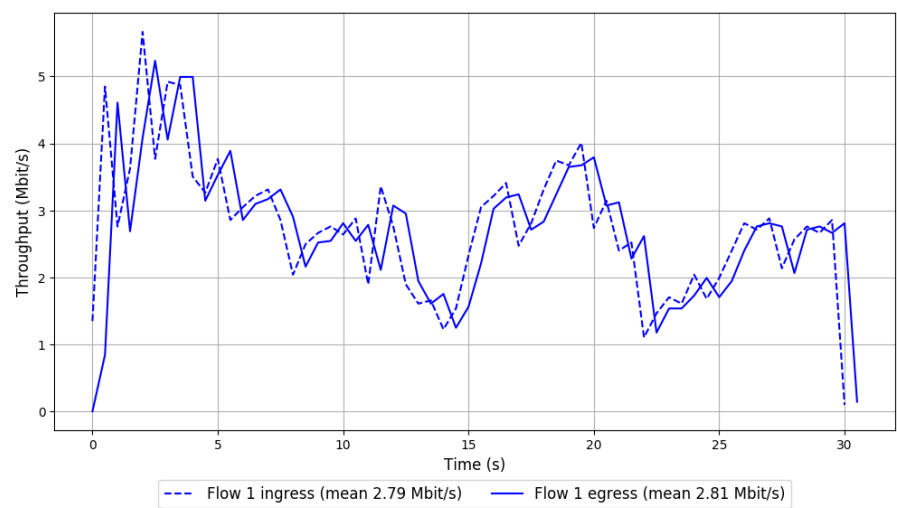
-- Flow 1:

Average throughput: 2.81 Mbit/s

95th percentile per-packet one-way delay: 101.949 ms

Loss rate: 0.11%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2019-03-26 19:50:05

End at: 2019-03-26 19:50:35

Local clock offset: 1.822 ms

Remote clock offset: 0.074 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.24 Mbit/s

95th percentile per-packet one-way delay: 377.467 ms

Loss rate: 0.19%

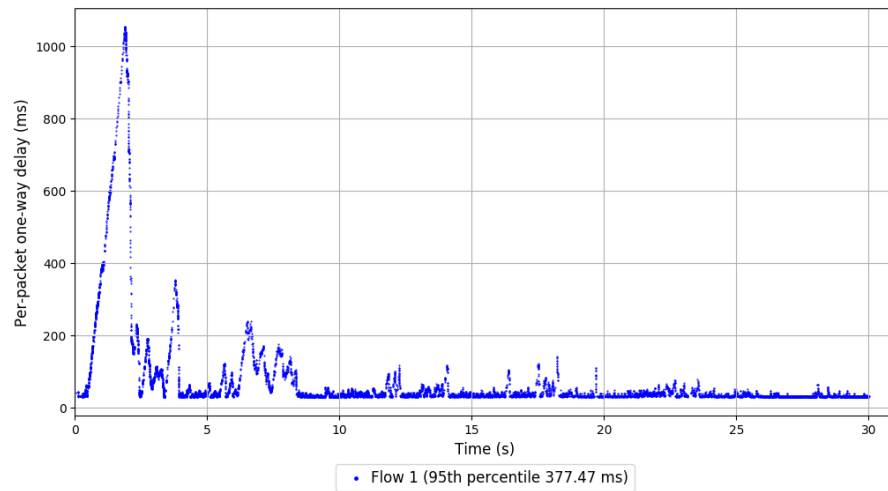
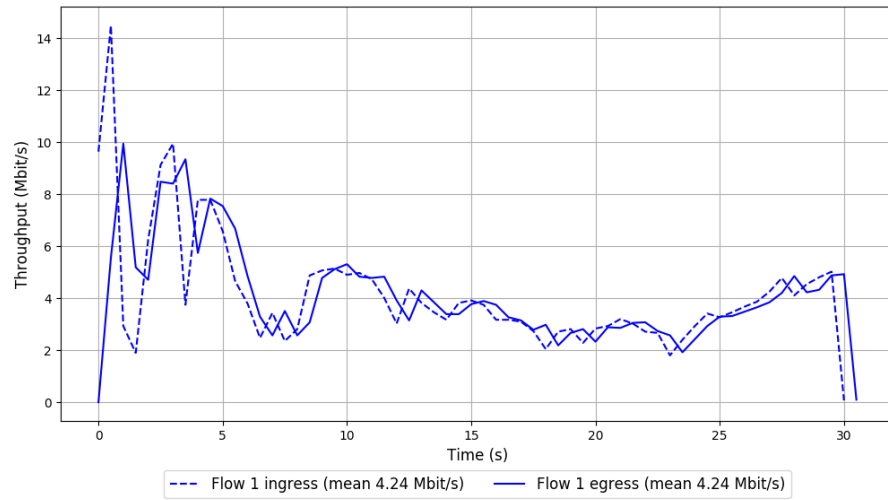
-- Flow 1:

Average throughput: 4.24 Mbit/s

95th percentile per-packet one-way delay: 377.467 ms

Loss rate: 0.19%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2019-03-26 18:59:42

End at: 2019-03-26 19:00:12

Local clock offset: 0.865 ms

Remote clock offset: 0.656 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.87 Mbit/s

95th percentile per-packet one-way delay: 634.376 ms

Loss rate: 1.47%

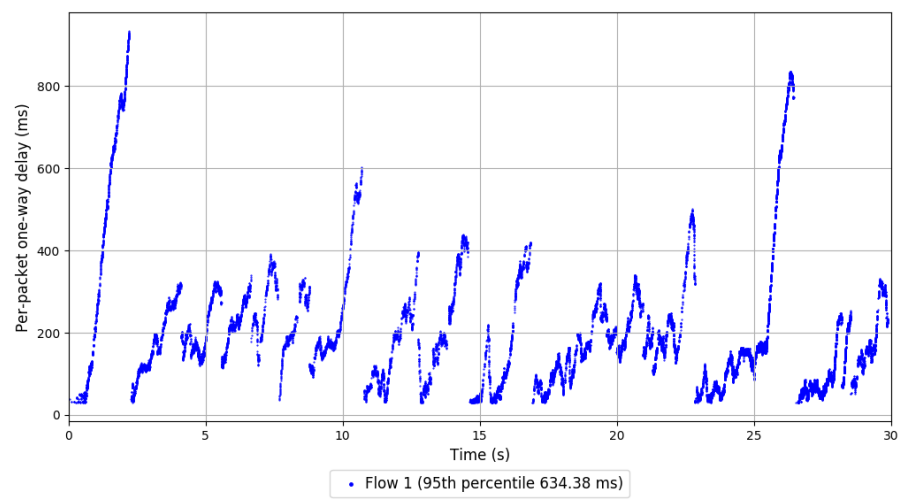
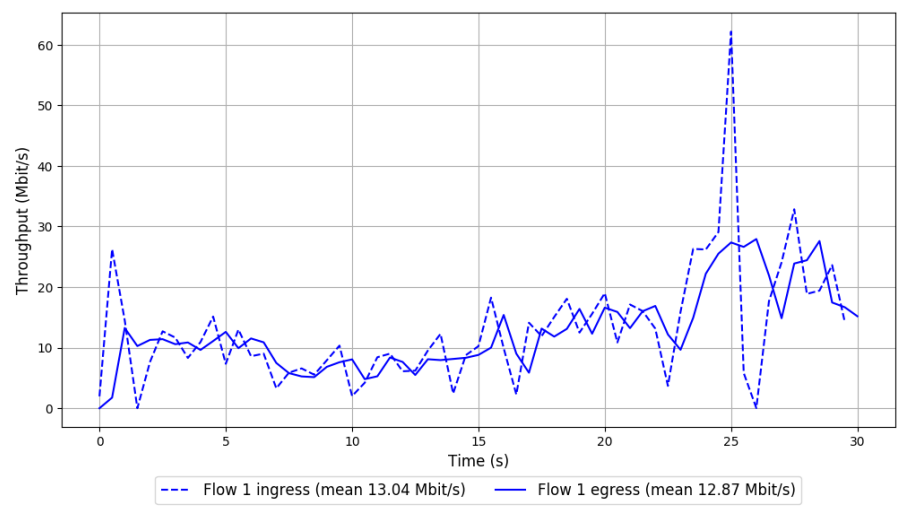
-- Flow 1:

Average throughput: 12.87 Mbit/s

95th percentile per-packet one-way delay: 634.376 ms

Loss rate: 1.47%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-03-26 19:25:33

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

Local clock offset: 1.433 ms

Remote clock offset: 0.45 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.10 Mbit/s

95th percentile per-packet one-way delay: 888.378 ms

Loss rate: 2.00%

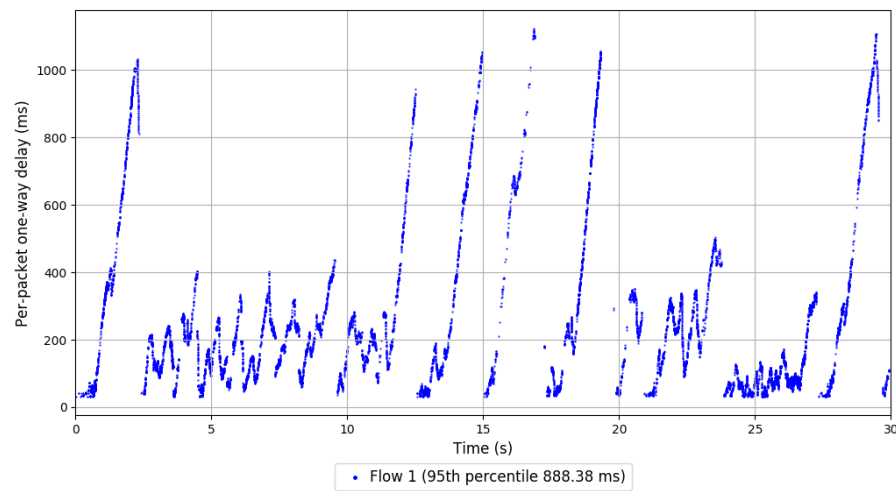
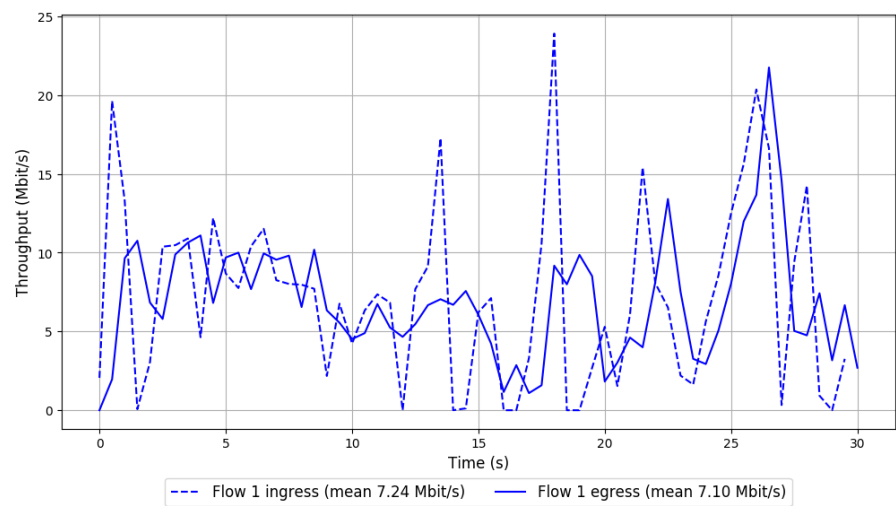
-- Flow 1:

Average throughput: 7.10 Mbit/s

95th percentile per-packet one-way delay: 888.378 ms

Loss rate: 2.00%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2019-03-26 19:51:19

End at: 2019-03-26 19:51:49

Local clock offset: 1.682 ms

Remote clock offset: 0.065 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.26 Mbit/s

95th percentile per-packet one-way delay: 422.443 ms

Loss rate: 2.09%

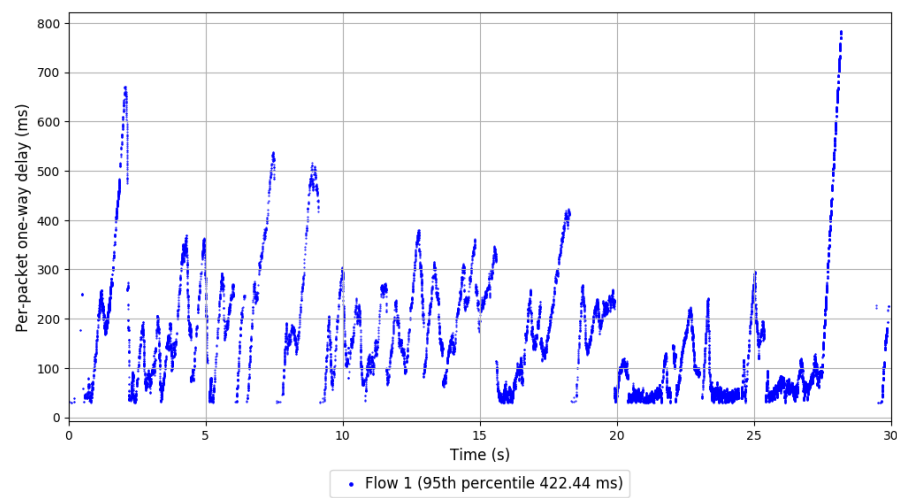
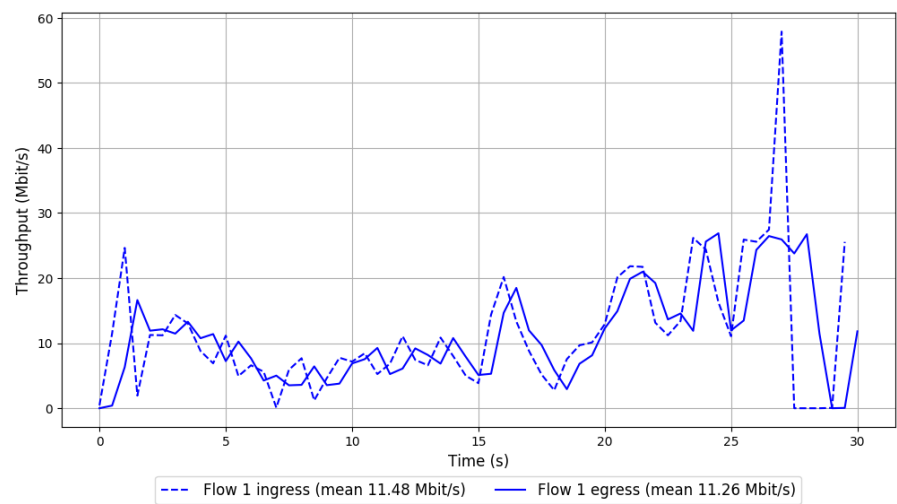
-- Flow 1:

Average throughput: 11.26 Mbit/s

95th percentile per-packet one-way delay: 422.443 ms

Loss rate: 2.09%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-03-26 18:57:15

End at: 2019-03-26 18:57:45

Local clock offset: 0.804 ms

Remote clock offset: 0.656 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.21 Mbit/s

95th percentile per-packet one-way delay: 47.606 ms

Loss rate: 0.14%

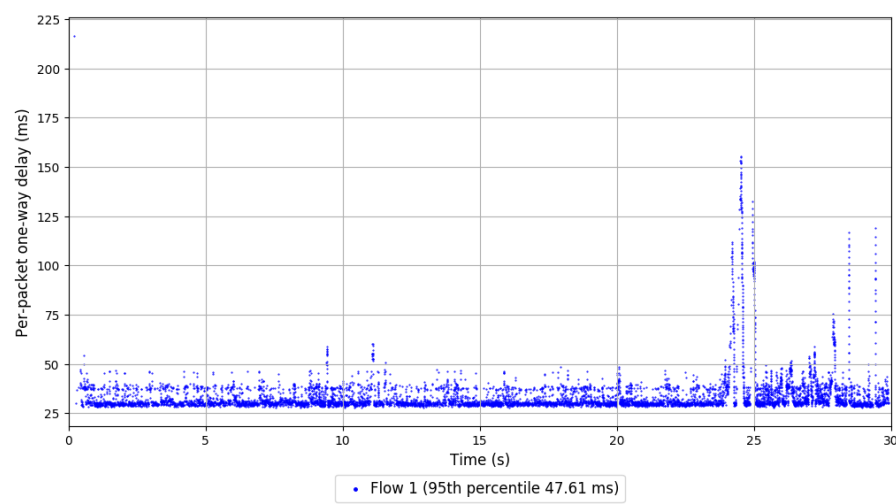
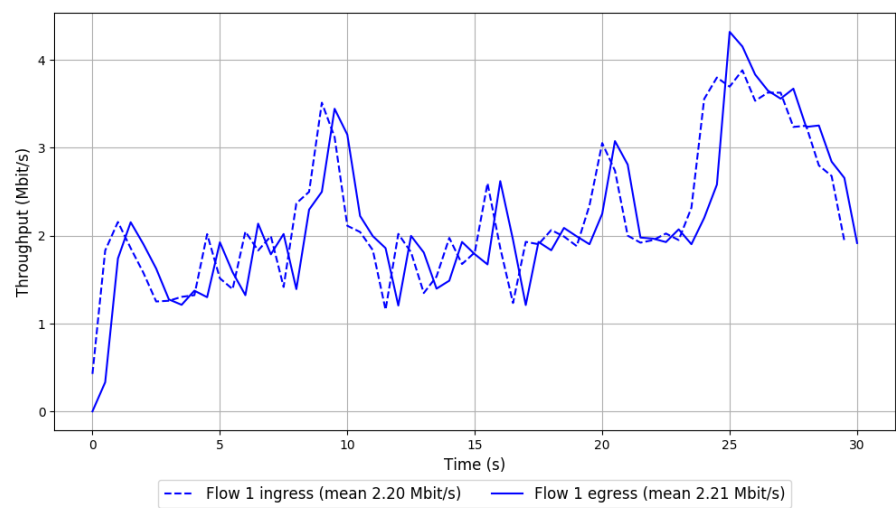
-- Flow 1:

Average throughput: 2.21 Mbit/s

95th percentile per-packet one-way delay: 47.606 ms

Loss rate: 0.14%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-03-26 19:23:07

End at: 2019-03-26 19:23:37

Local clock offset: 1.425 ms

Remote clock offset: 0.42 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.58 Mbit/s

95th percentile per-packet one-way delay: 48.244 ms

Loss rate: 0.14%

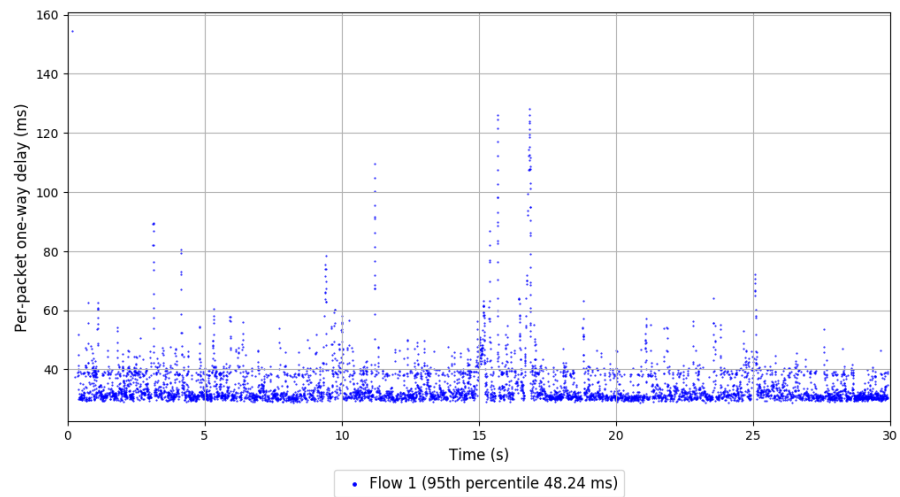
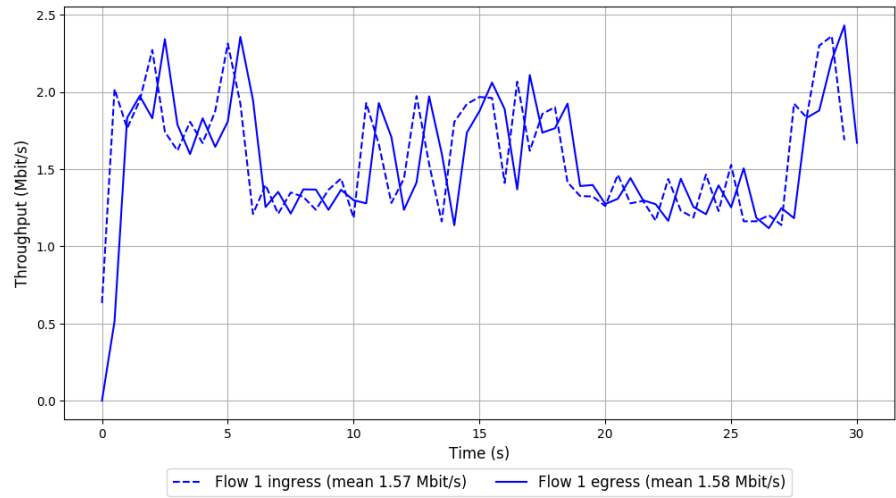
-- Flow 1:

Average throughput: 1.58 Mbit/s

95th percentile per-packet one-way delay: 48.244 ms

Loss rate: 0.14%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-03-26 19:48:52

End at: 2019-03-26 19:49:22

Local clock offset: 1.934 ms

Remote clock offset: 0.113 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.99 Mbit/s

95th percentile per-packet one-way delay: 45.815 ms

Loss rate: 0.06%

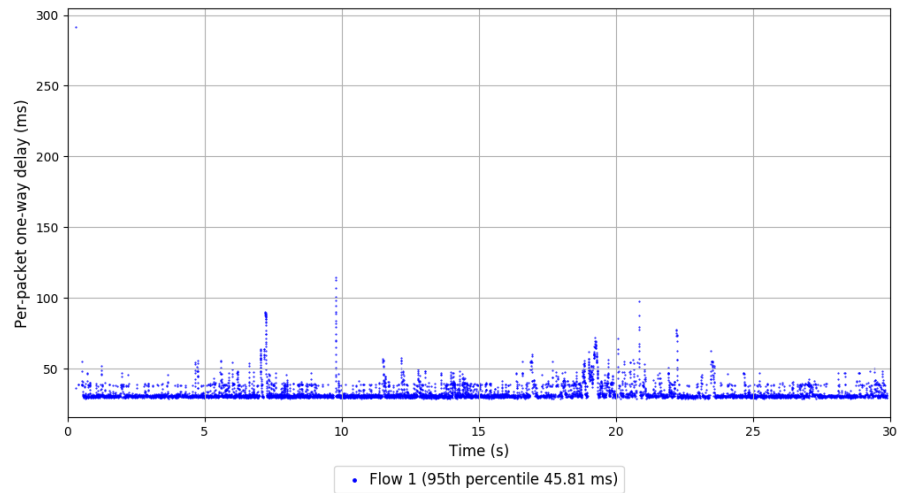
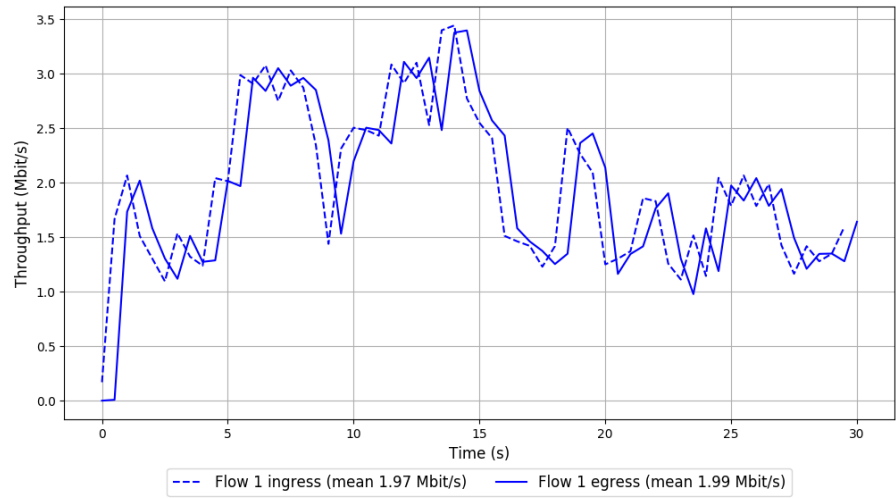
-- Flow 1:

Average throughput: 1.99 Mbit/s

95th percentile per-packet one-way delay: 45.815 ms

Loss rate: 0.06%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2019-03-26 19:08:18

End at: 2019-03-26 19:08:48

Local clock offset: 1.25 ms

Remote clock offset: 0.612 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.95 Mbit/s

95th percentile per-packet one-way delay: 46.331 ms

Loss rate: 0.12%

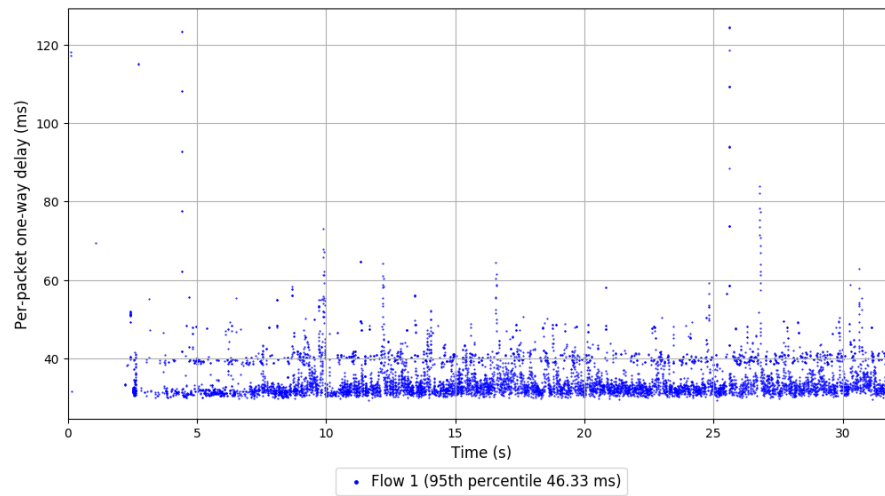
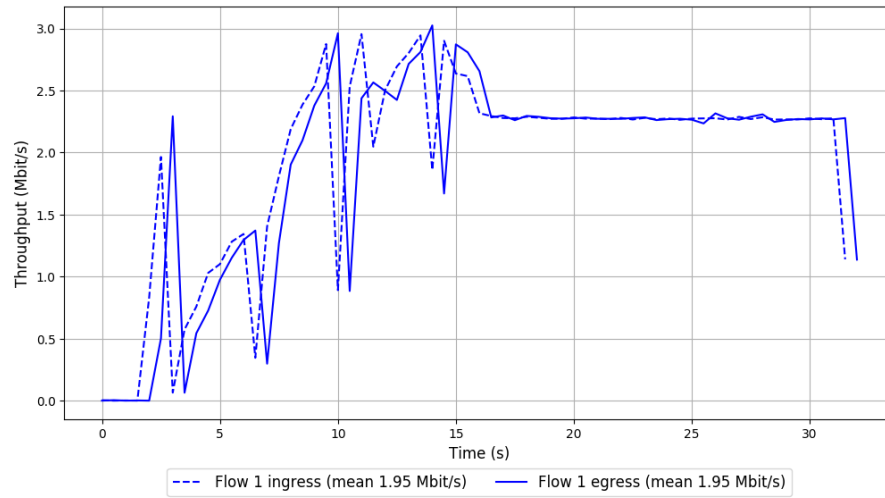
-- Flow 1:

Average throughput: 1.95 Mbit/s

95th percentile per-packet one-way delay: 46.331 ms

Loss rate: 0.12%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-03-26 19:34:09

End at: 2019-03-26 19:34:39

Local clock offset: 1.648 ms

Remote clock offset: 0.315 ms

Below is generated by plot.py at 2019-03-26 20:05:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 54.648 ms

Loss rate: 0.00%

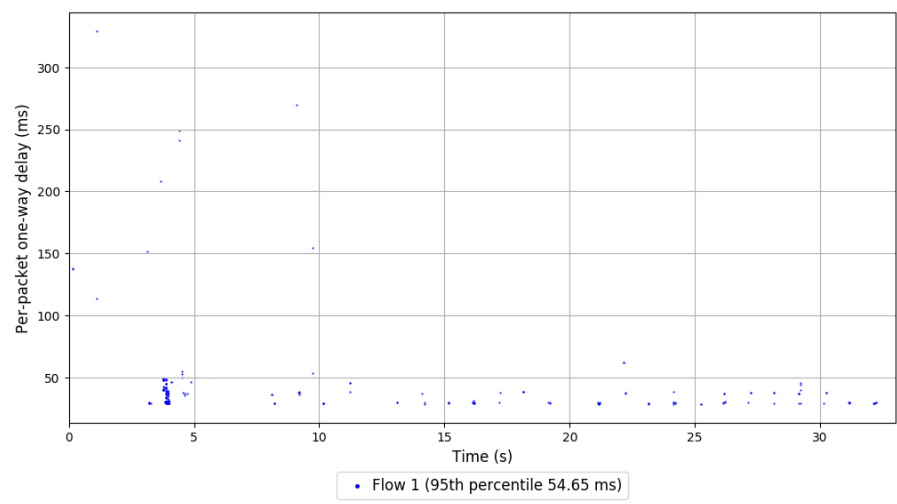
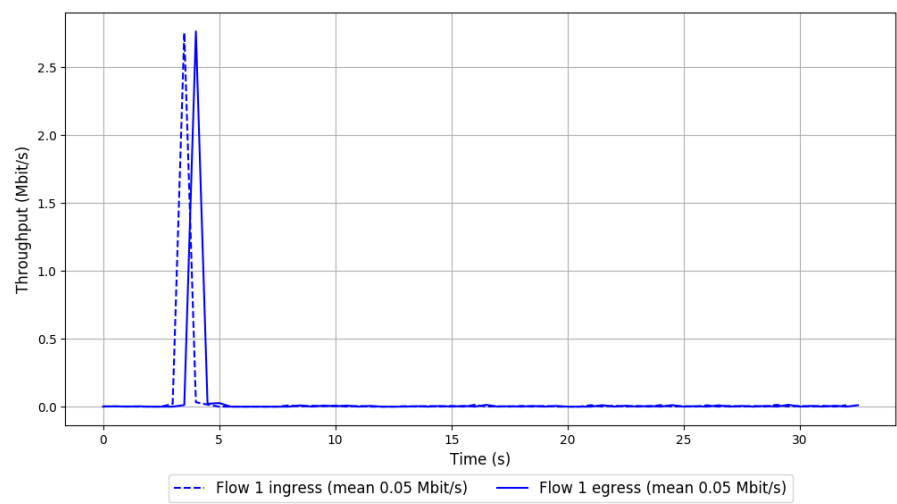
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 54.648 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-03-26 19:59:54
End at: 2019-03-26 20:00:24
Local clock offset: 1.326 ms
Remote clock offset: -0.167 ms

Below is generated by plot.py at 2019-03-26 20:05:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 46.406 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 46.406 ms
Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

