

Pantheon Report

Generated at 2019-02-05 02:05:26 (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:

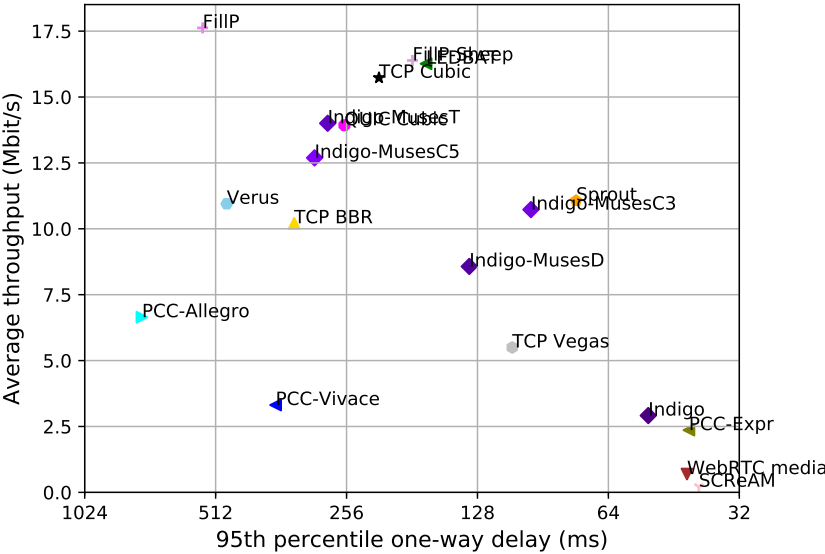
```
Linux 4.15.0-1031-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

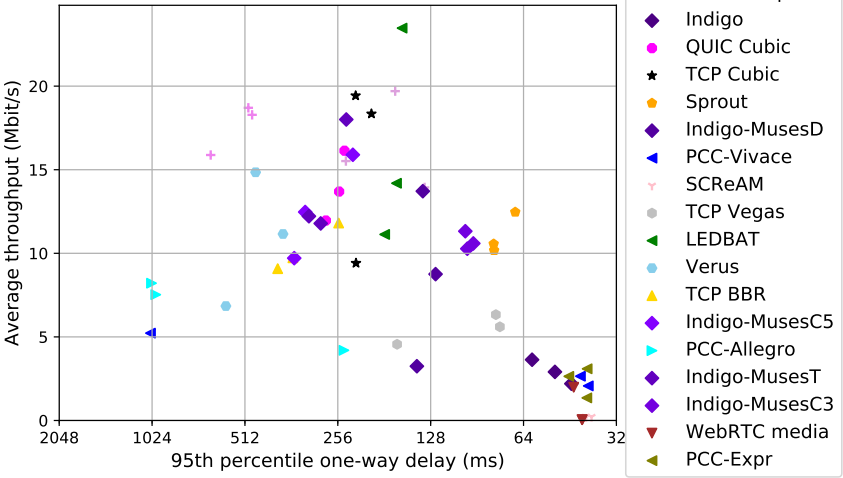
```
branch: muses @ 7a686f7c2ed0a333082c0bab1fa5c921ab47e6ee
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
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	10.21	337.80	0.39
Copa	0	N/A	N/A	N/A
TCP Cubic	3	15.73	215.59	0.51
FillP	3	17.62	548.52	1.08
FillP-Sheep	3	16.39	180.58	0.24
Indigo	3	2.92	51.82	0.12
Indigo-MusesC3	3	10.73	96.44	0.16
Indigo-MusesC5	3	12.69	303.24	0.51
Indigo-MusesD	3	8.57	133.67	0.16
Indigo-MusesT	3	14.00	282.93	0.68
LEDBAT	3	16.26	168.07	0.34
PCC-Allegro	3	6.65	756.20	2.18
PCC-Expr	3	2.36	41.80	66.07
QUIC Cubic	3	13.93	258.93	0.57
SCReAM	3	0.21	39.64	0.13
Sprout	3	11.07	75.93	0.14
TaoVA-100x	0	N/A	N/A	N/A
TCP Vegas	3	5.50	106.49	0.05
Verus	3	10.95	482.77	0.60
PCC-Vivace	3	3.31	372.72	1.95
WebRTC media	3	0.70	42.22	0.04

Run 1: Statistics of TCP BBR

Start at: 2019-02-05 00:52:09

End at: 2019-02-05 00:52:39

Local clock offset: 3.552 ms

Remote clock offset: -0.474 ms

Below is generated by plot.py at 2019-02-05 02:04:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 9.73 Mbit/s

95th percentile per-packet one-way delay: 358.008 ms

Loss rate: 0.47%

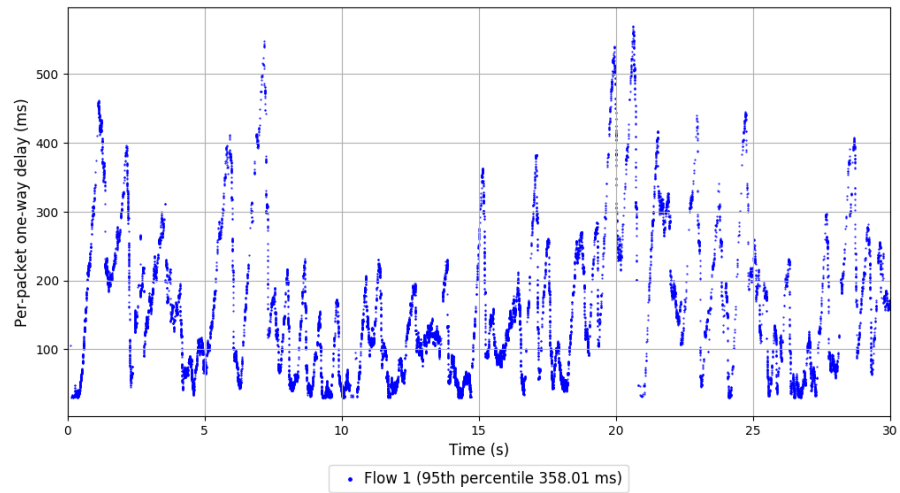
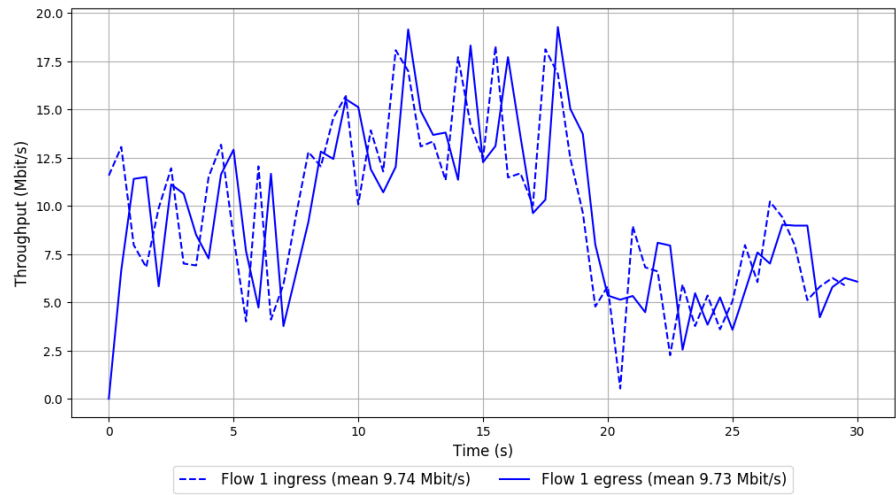
-- Flow 1:

Average throughput: 9.73 Mbit/s

95th percentile per-packet one-way delay: 358.008 ms

Loss rate: 0.47%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-02-05 01:18:00

End at: 2019-02-05 01:18:30

Local clock offset: 1.482 ms

Remote clock offset: 1.719 ms

Below is generated by plot.py at 2019-02-05 02:04:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 9.08 Mbit/s

95th percentile per-packet one-way delay: 401.002 ms

Loss rate: 0.32%

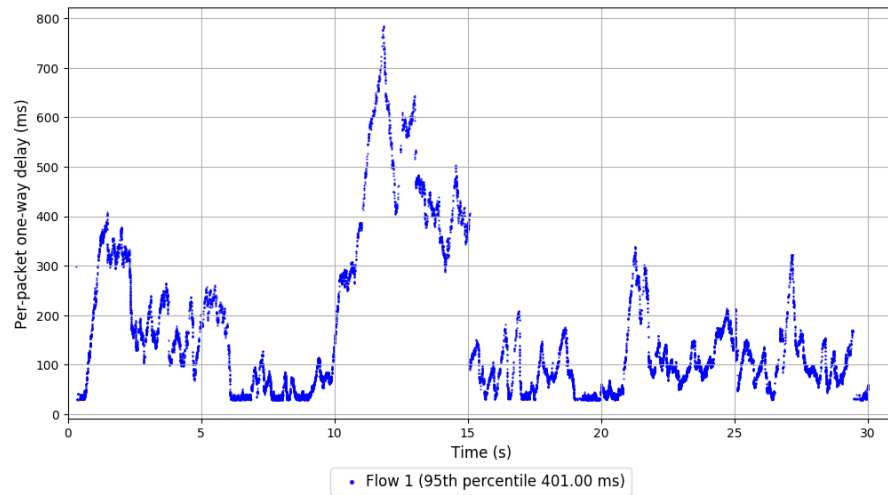
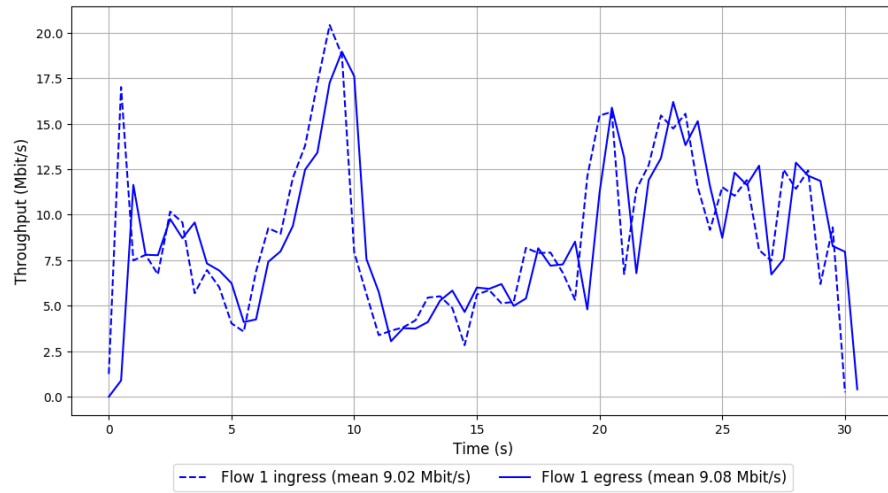
-- Flow 1:

Average throughput: 9.08 Mbit/s

95th percentile per-packet one-way delay: 401.002 ms

Loss rate: 0.32%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-02-05 01:43:46

End at: 2019-02-05 01:44:16

Local clock offset: 4.045 ms

Remote clock offset: 0.766 ms

Below is generated by plot.py at 2019-02-05 02:04:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.81 Mbit/s

95th percentile per-packet one-way delay: 254.384 ms

Loss rate: 0.39%

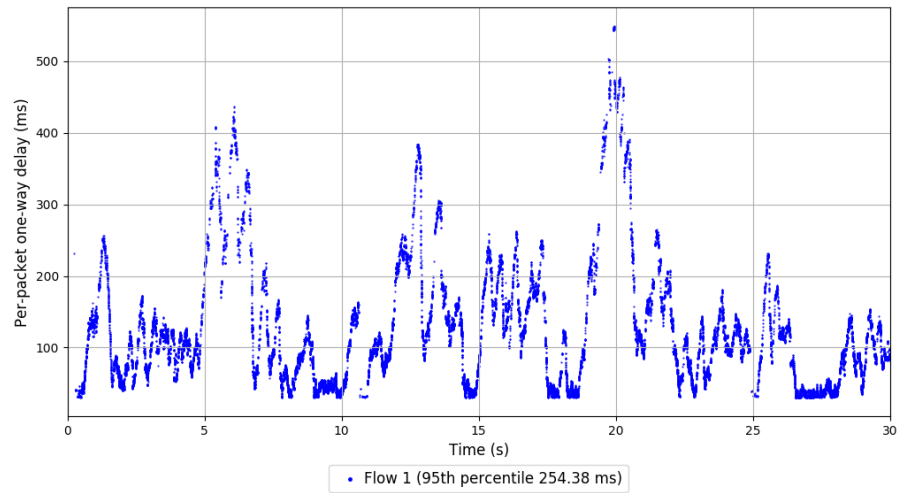
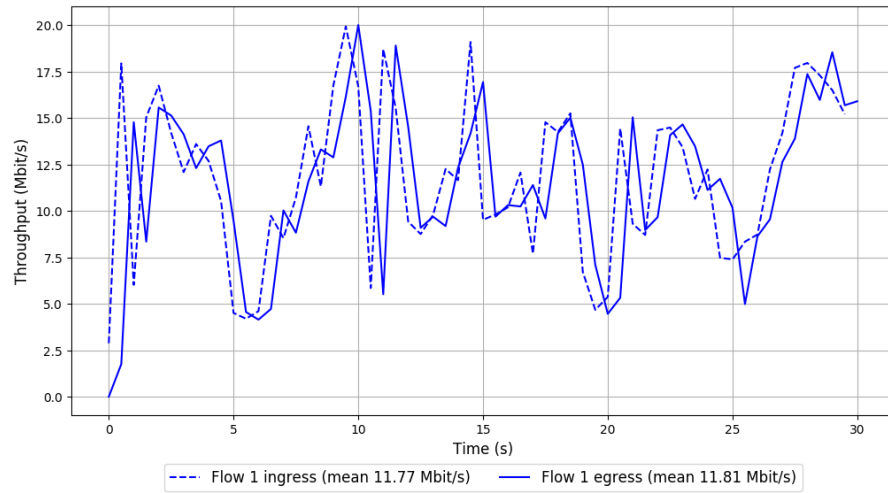
-- Flow 1:

Average throughput: 11.81 Mbit/s

95th percentile per-packet one-way delay: 254.384 ms

Loss rate: 0.39%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

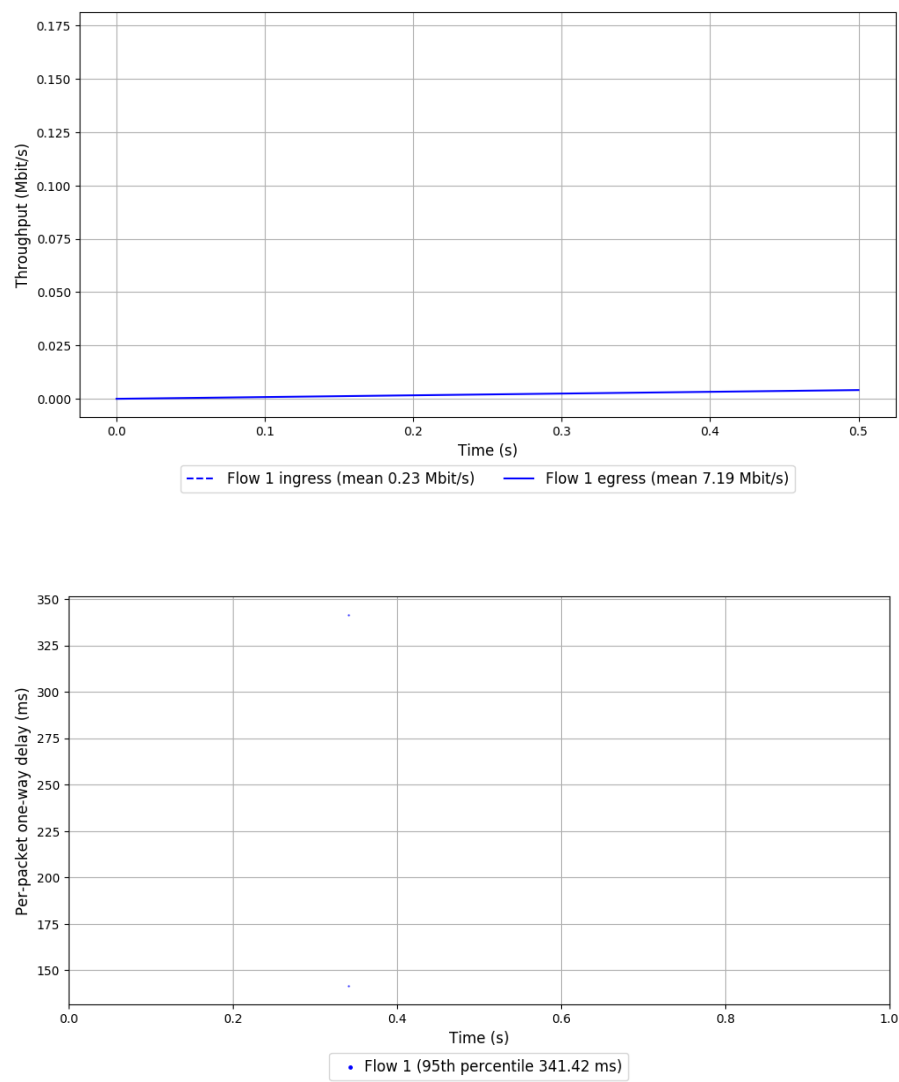
Start at: 2019-02-05 01:00:45

End at: 2019-02-05 01:01:15

Local clock offset: 5.04 ms

Remote clock offset: 0.669 ms

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

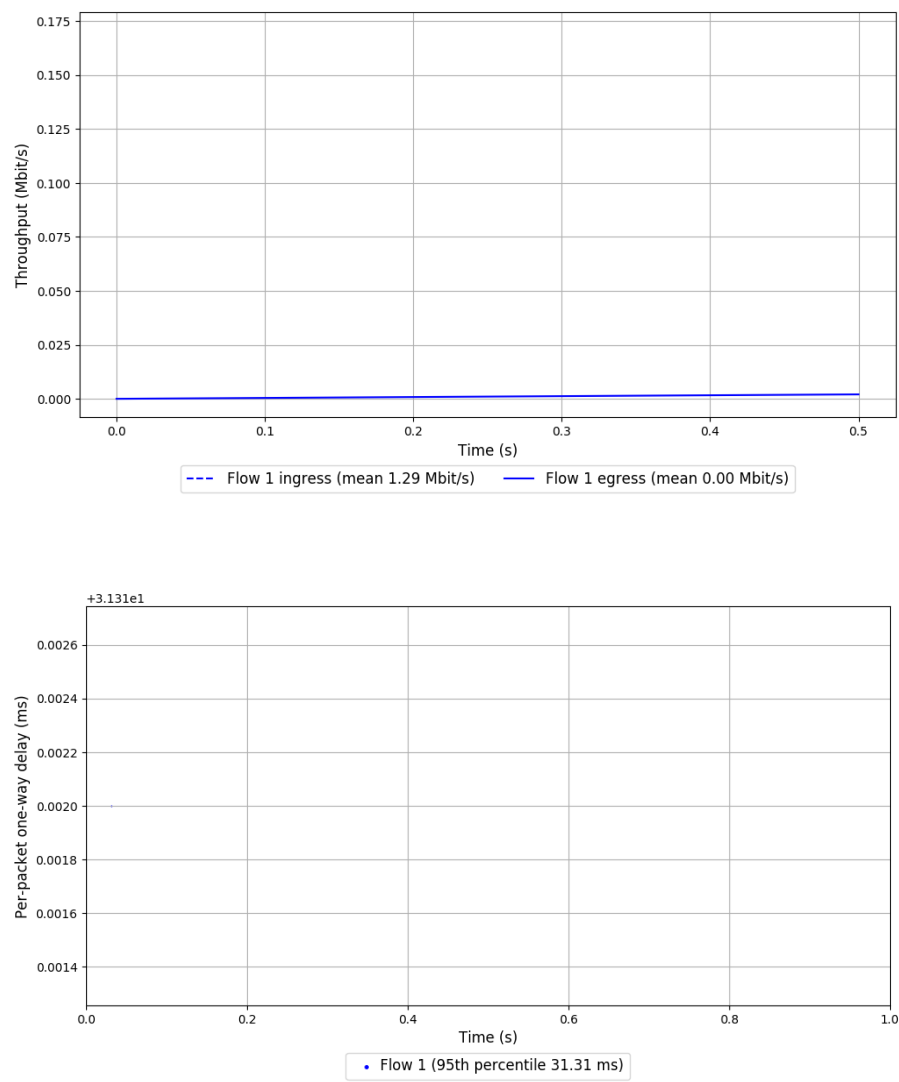
Start at: 2019-02-05 01:26:36

End at: 2019-02-05 01:27:06

Local clock offset: 2.741 ms

Remote clock offset: 0.82 ms

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

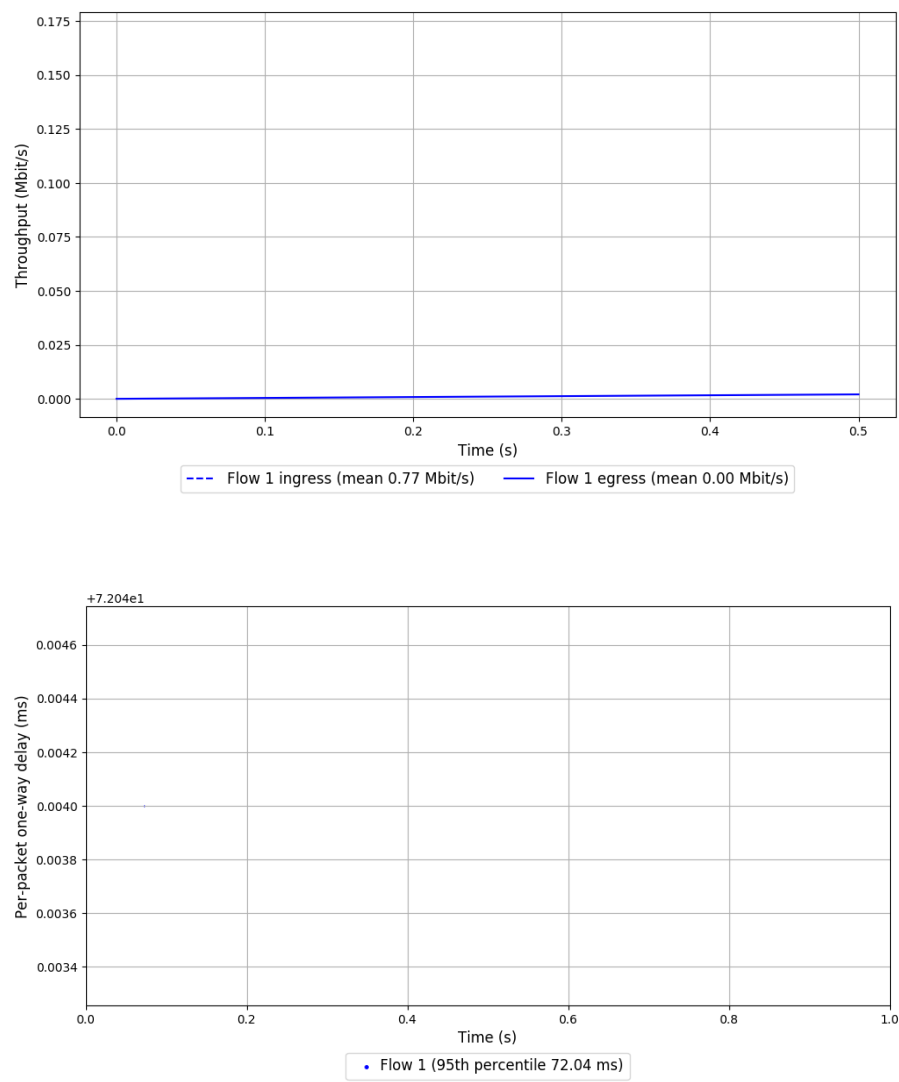
Start at: 2019-02-05 01:52:22

End at: 2019-02-05 01:52:52

Local clock offset: 2.172 ms

Remote clock offset: 0.871 ms

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-02-05 01:04:25

End at: 2019-02-05 01:04:55

Local clock offset: 4.635 ms

Remote clock offset: 1.013 ms

Below is generated by plot.py at 2019-02-05 02:04:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 18.34 Mbit/s

95th percentile per-packet one-way delay: 199.168 ms

Loss rate: 0.38%

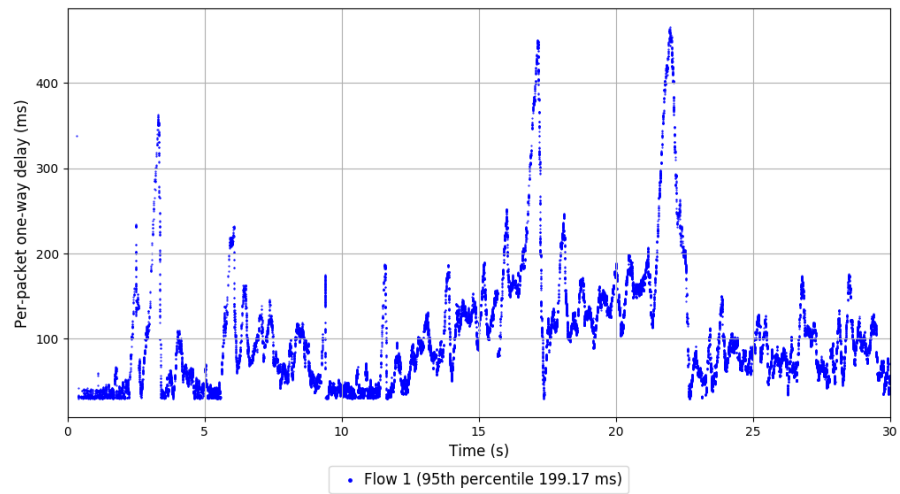
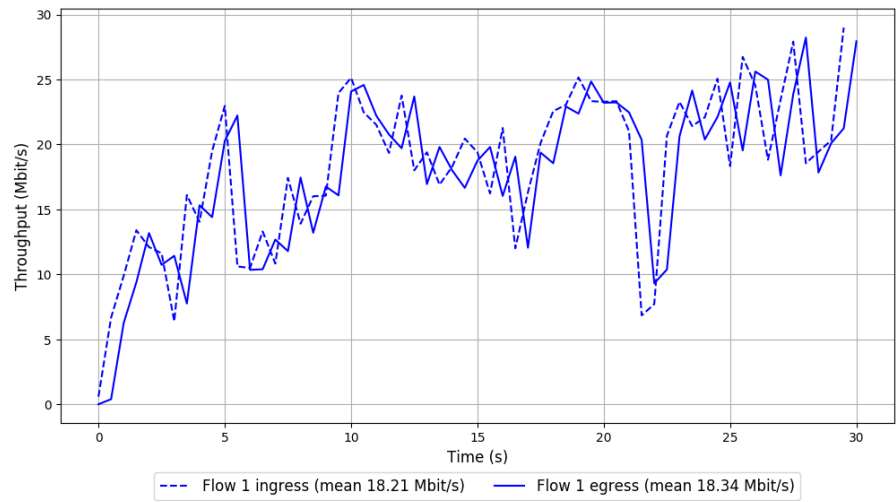
-- Flow 1:

Average throughput: 18.34 Mbit/s

95th percentile per-packet one-way delay: 199.168 ms

Loss rate: 0.38%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-02-05 01:30:17

End at: 2019-02-05 01:30:47

Local clock offset: 3.107 ms

Remote clock offset: 0.746 ms

Below is generated by plot.py at 2019-02-05 02:04:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 9.41 Mbit/s

95th percentile per-packet one-way delay: 223.499 ms

Loss rate: 0.94%

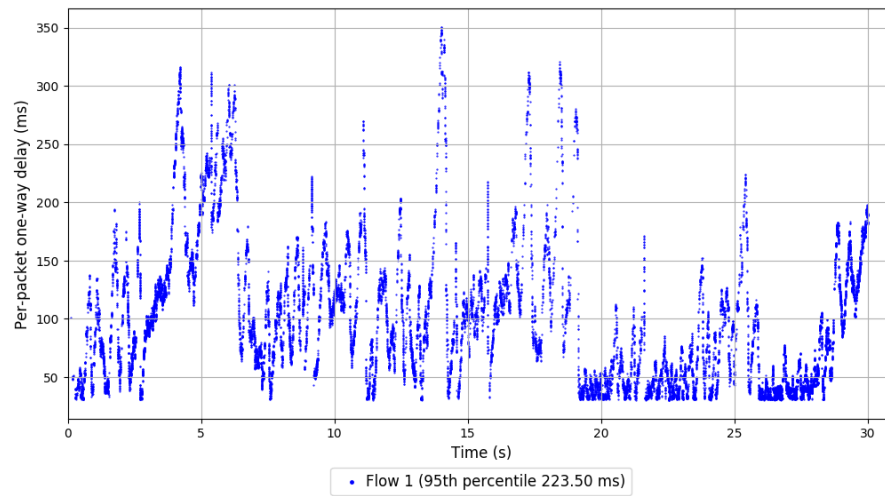
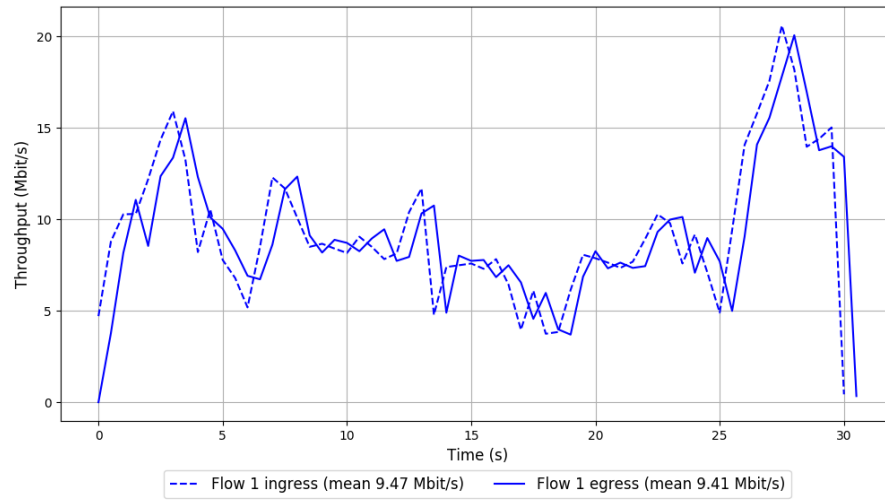
-- Flow 1:

Average throughput: 9.41 Mbit/s

95th percentile per-packet one-way delay: 223.499 ms

Loss rate: 0.94%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2019-02-05 01:56:02

End at: 2019-02-05 01:56:32

Local clock offset: 1.485 ms

Remote clock offset: 0.614 ms

Below is generated by plot.py at 2019-02-05 02:04:21

Datalink statistics

-- Total of 1 flow:

Average throughput: 19.43 Mbit/s

95th percentile per-packet one-way delay: 224.101 ms

Loss rate: 0.22%

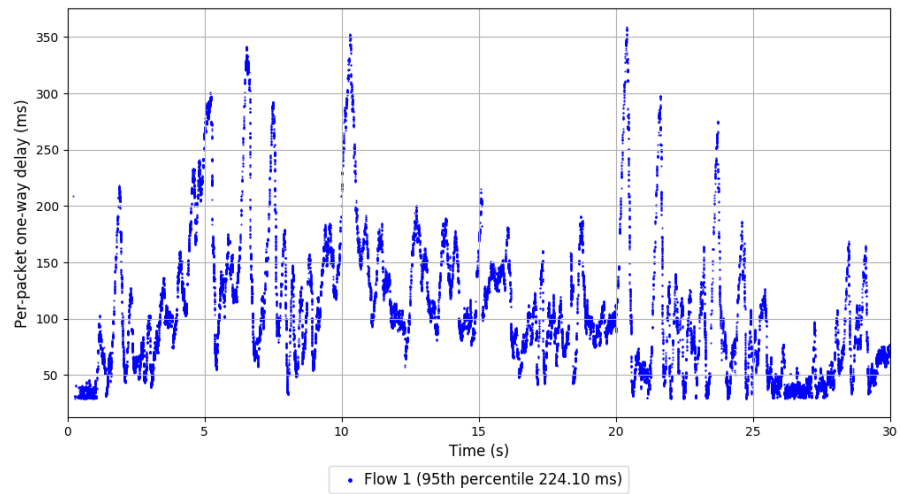
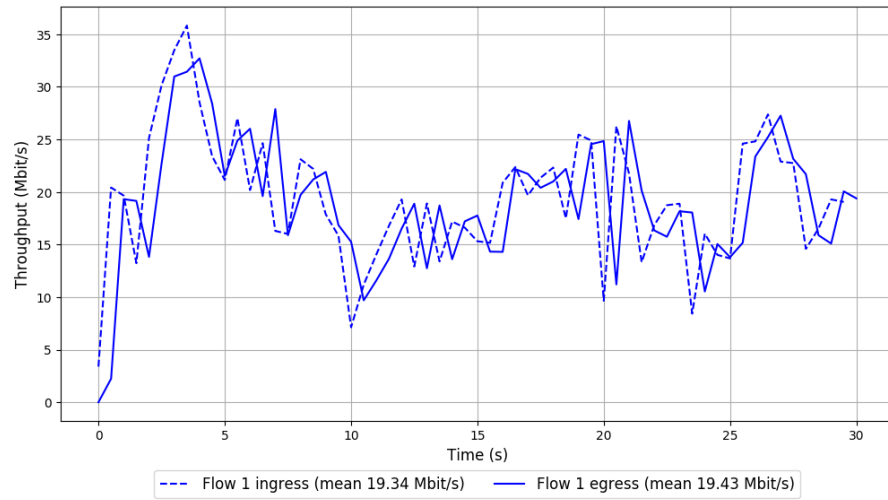
-- Flow 1:

Average throughput: 19.43 Mbit/s

95th percentile per-packet one-way delay: 224.101 ms

Loss rate: 0.22%

Run 3: Report of TCP Cubic — Data Link

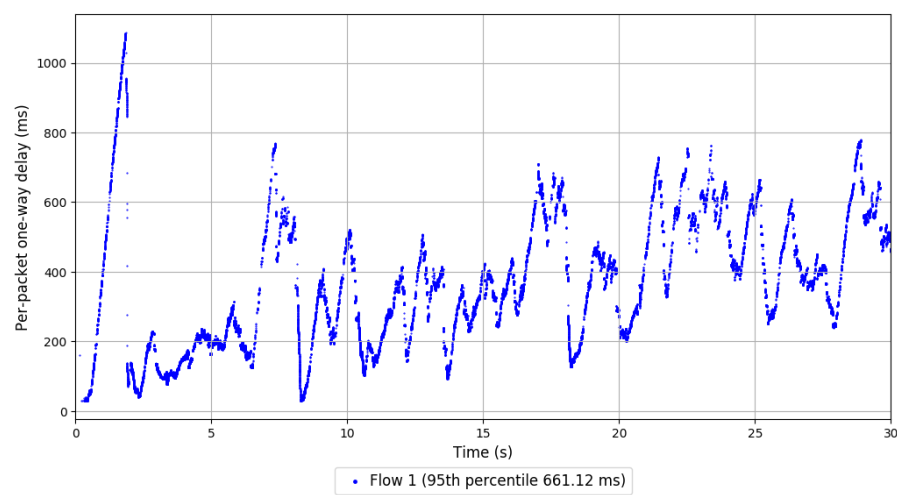
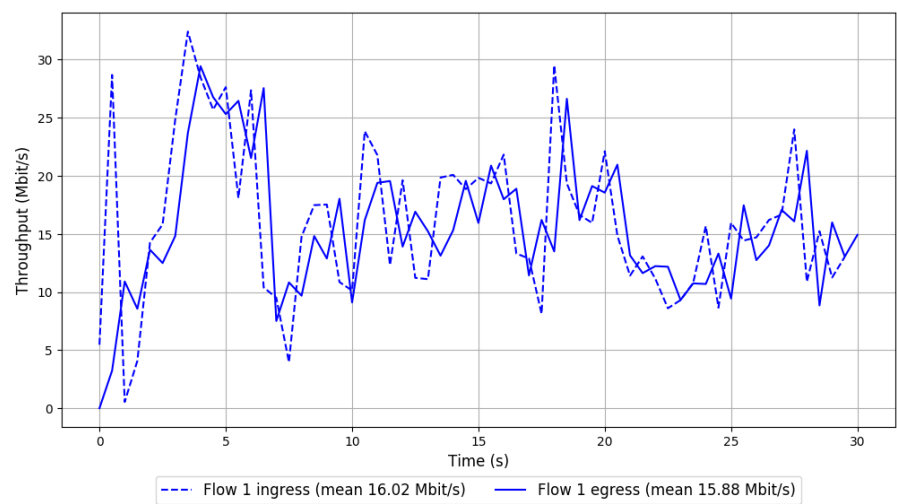


Run 1: Statistics of FillP

Start at: 2019-02-05 00:54:36
End at: 2019-02-05 00:55:06
Local clock offset: 3.886 ms
Remote clock offset: -0.168 ms

Below is generated by plot.py at 2019-02-05 02:04:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 15.88 Mbit/s
95th percentile per-packet one-way delay: 661.119 ms
Loss rate: 1.42%
-- Flow 1:
Average throughput: 15.88 Mbit/s
95th percentile per-packet one-way delay: 661.119 ms
Loss rate: 1.42%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-02-05 01:20:27

End at: 2019-02-05 01:20:57

Local clock offset: 1.916 ms

Remote clock offset: 1.388 ms

Below is generated by plot.py at 2019-02-05 02:04:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 18.70 Mbit/s

95th percentile per-packet one-way delay: 499.198 ms

Loss rate: 0.51%

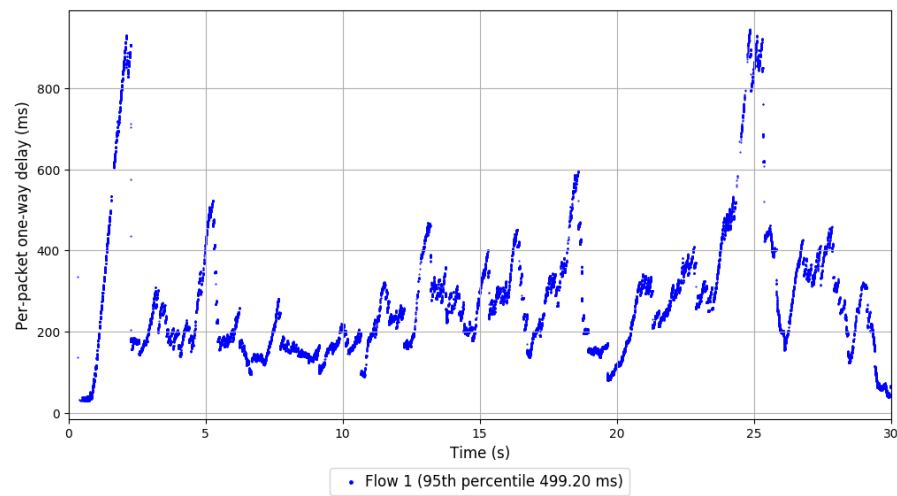
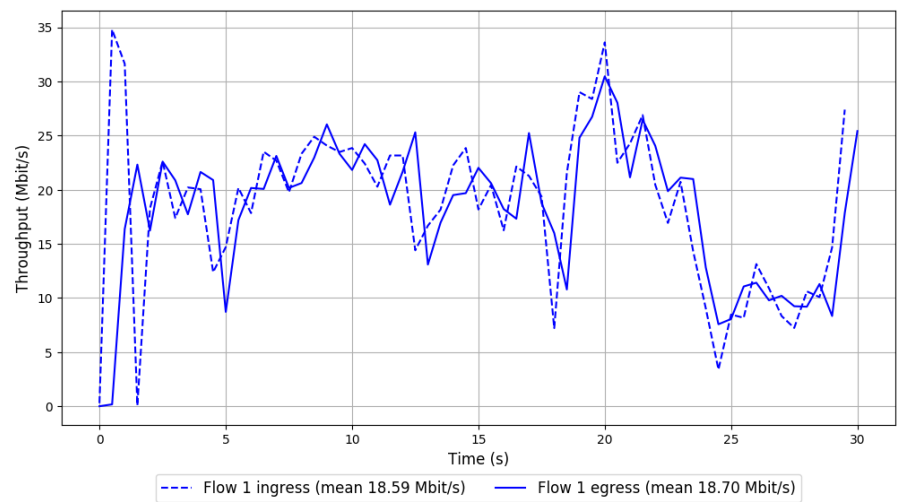
-- Flow 1:

Average throughput: 18.70 Mbit/s

95th percentile per-packet one-way delay: 499.198 ms

Loss rate: 0.51%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2019-02-05 01:46:13

End at: 2019-02-05 01:46:43

Local clock offset: 4.202 ms

Remote clock offset: 0.809 ms

Below is generated by plot.py at 2019-02-05 02:04:34

Datalink statistics

-- Total of 1 flow:

Average throughput: 18.28 Mbit/s

95th percentile per-packet one-way delay: 485.256 ms

Loss rate: 1.32%

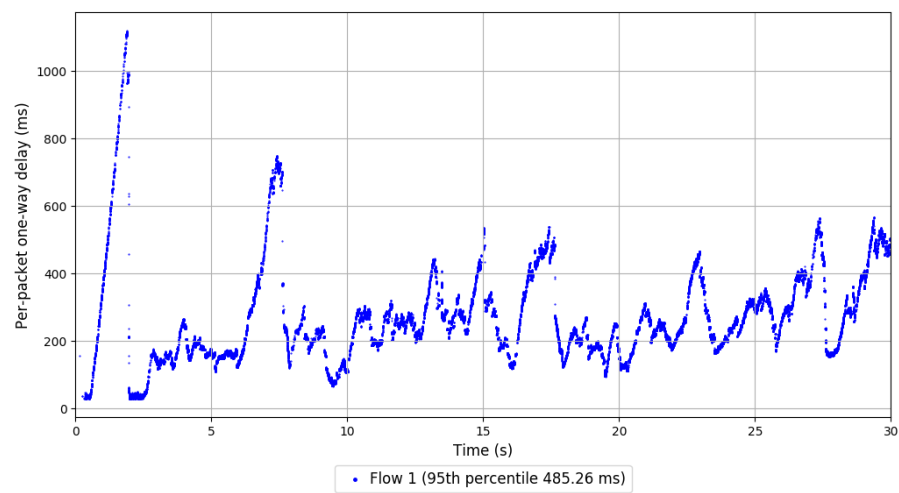
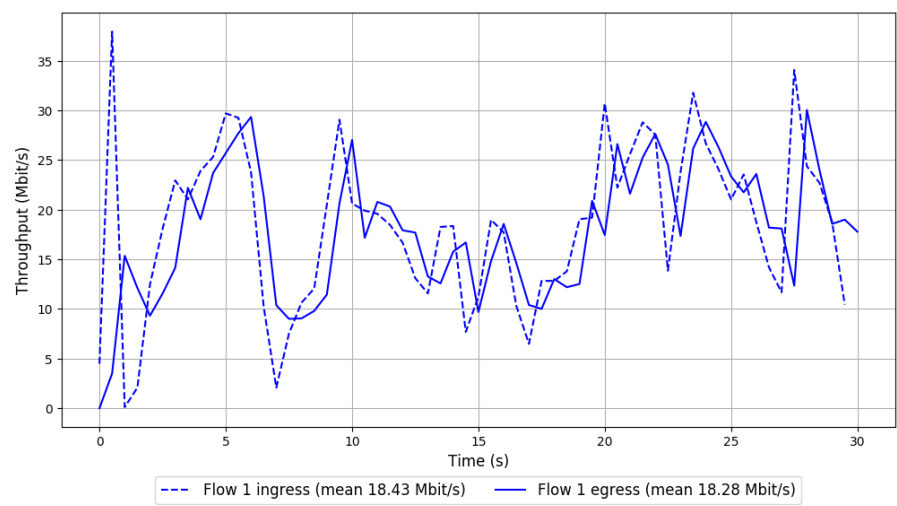
-- Flow 1:

Average throughput: 18.28 Mbit/s

95th percentile per-packet one-way delay: 485.256 ms

Loss rate: 1.32%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-02-05 01:08:06

End at: 2019-02-05 01:08:36

Local clock offset: 2.236 ms

Remote clock offset: 1.272 ms

Below is generated by plot.py at 2019-02-05 02:04:34

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.94 Mbit/s

95th percentile per-packet one-way delay: 133.936 ms

Loss rate: 0.22%

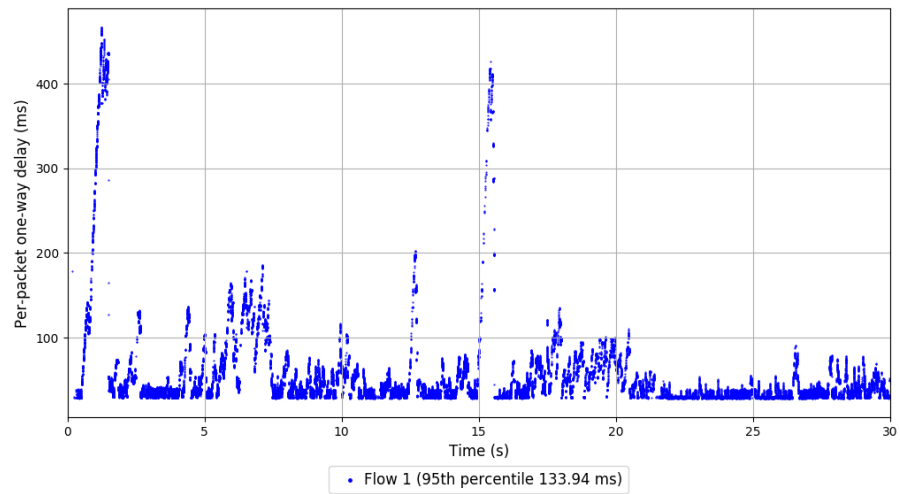
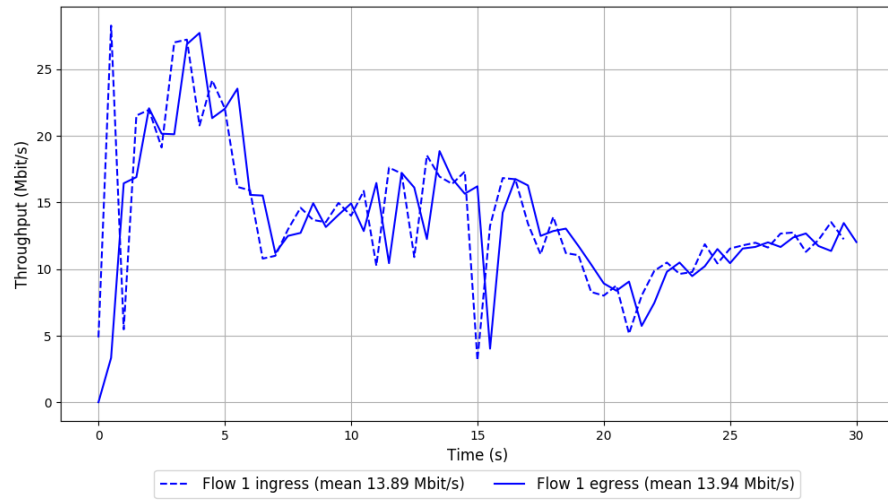
-- Flow 1:

Average throughput: 13.94 Mbit/s

95th percentile per-packet one-way delay: 133.936 ms

Loss rate: 0.22%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-02-05 01:33:58

End at: 2019-02-05 01:34:28

Local clock offset: 3.412 ms

Remote clock offset: 0.645 ms

Below is generated by plot.py at 2019-02-05 02:04:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 19.70 Mbit/s

95th percentile per-packet one-way delay: 166.814 ms

Loss rate: 0.07%

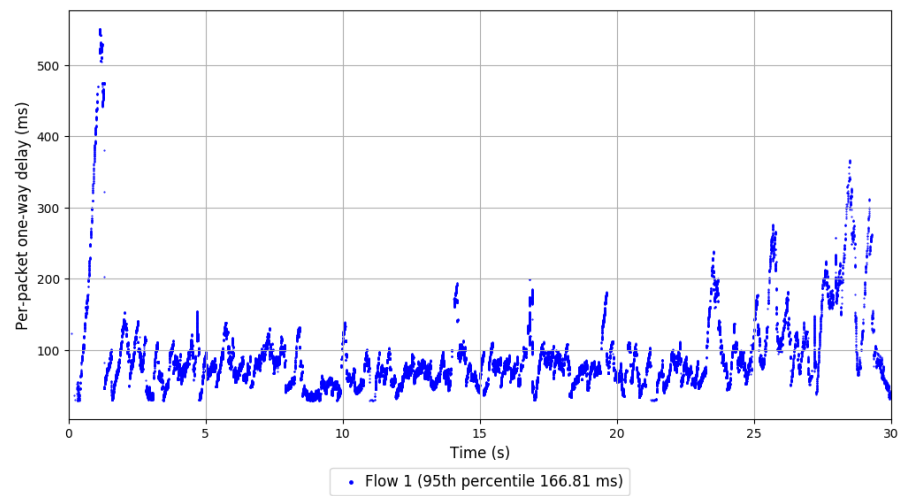
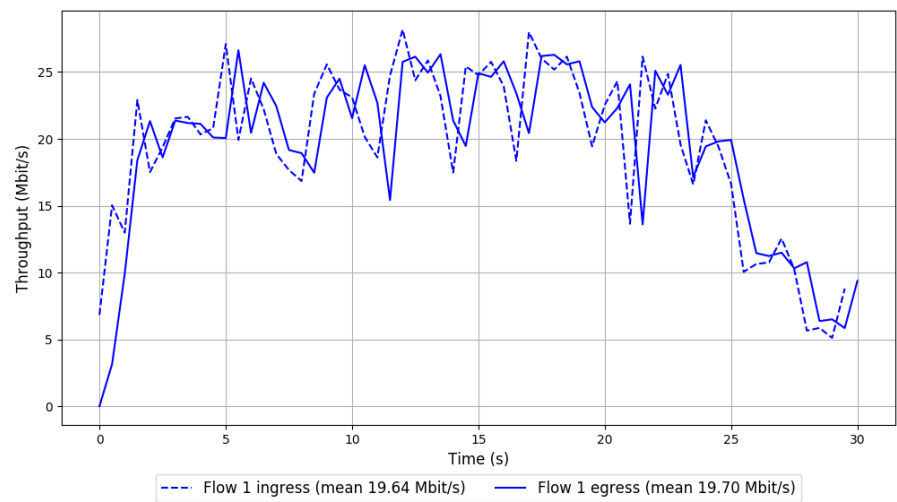
-- Flow 1:

Average throughput: 19.70 Mbit/s

95th percentile per-packet one-way delay: 166.814 ms

Loss rate: 0.07%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-02-05 01:59:43

End at: 2019-02-05 02:00:13

Local clock offset: 1.021 ms

Remote clock offset: 0.388 ms

Below is generated by plot.py at 2019-02-05 02:04:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 15.52 Mbit/s

95th percentile per-packet one-way delay: 240.994 ms

Loss rate: 0.42%

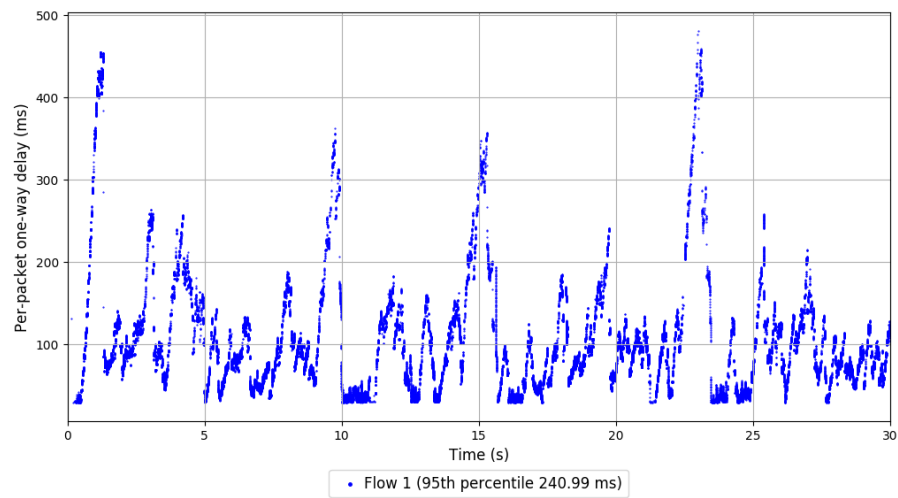
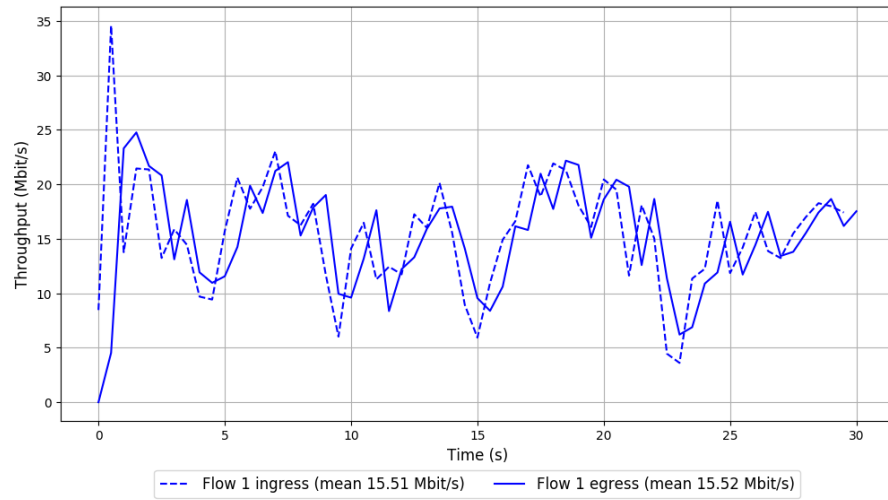
-- Flow 1:

Average throughput: 15.52 Mbit/s

95th percentile per-packet one-way delay: 240.994 ms

Loss rate: 0.42%

Run 3: Report of FillP-Sheep — Data Link

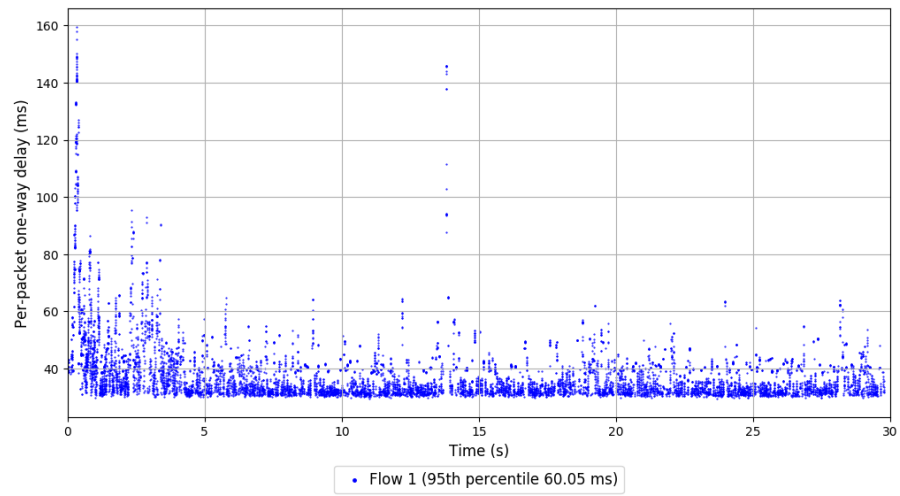
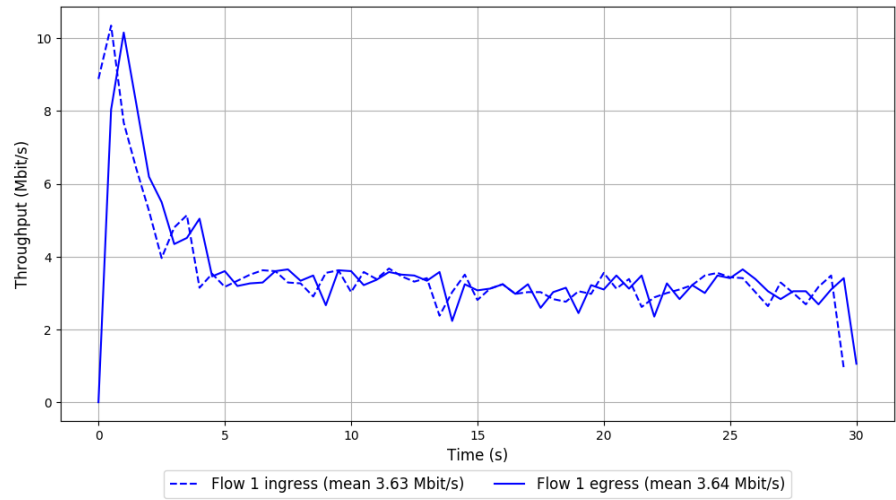


```
Run 1: Statistics of Indigo

Start at: 2019-02-05 01:09:20
End at: 2019-02-05 01:09:50
Local clock offset: 1.894 ms
Remote clock offset: 1.42 ms

# Below is generated by plot.py at 2019-02-05 02:04:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.64 Mbit/s
95th percentile per-packet one-way delay: 60.045 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 3.64 Mbit/s
95th percentile per-packet one-way delay: 60.045 ms
Loss rate: 0.10%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-02-05 01:35:12

End at: 2019-02-05 01:35:42

Local clock offset: 3.49 ms

Remote clock offset: 0.685 ms

Below is generated by plot.py at 2019-02-05 02:04:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.20 Mbit/s

95th percentile per-packet one-way delay: 44.789 ms

Loss rate: 0.18%

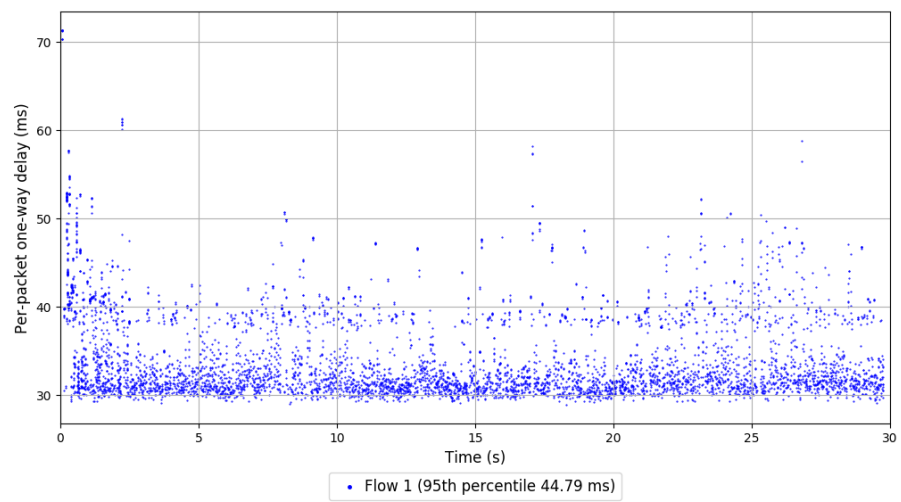
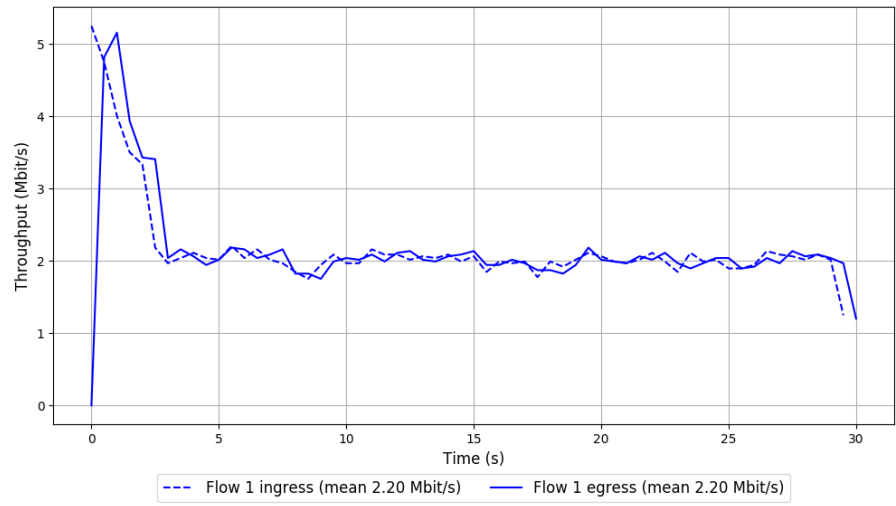
-- Flow 1:

Average throughput: 2.20 Mbit/s

95th percentile per-packet one-way delay: 44.789 ms

Loss rate: 0.18%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-02-05 02:00:57

End at: 2019-02-05 02:01:27

Local clock offset: 0.908 ms

Remote clock offset: 0.488 ms

Below is generated by plot.py at 2019-02-05 02:04:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.91 Mbit/s

95th percentile per-packet one-way delay: 50.629 ms

Loss rate: 0.07%

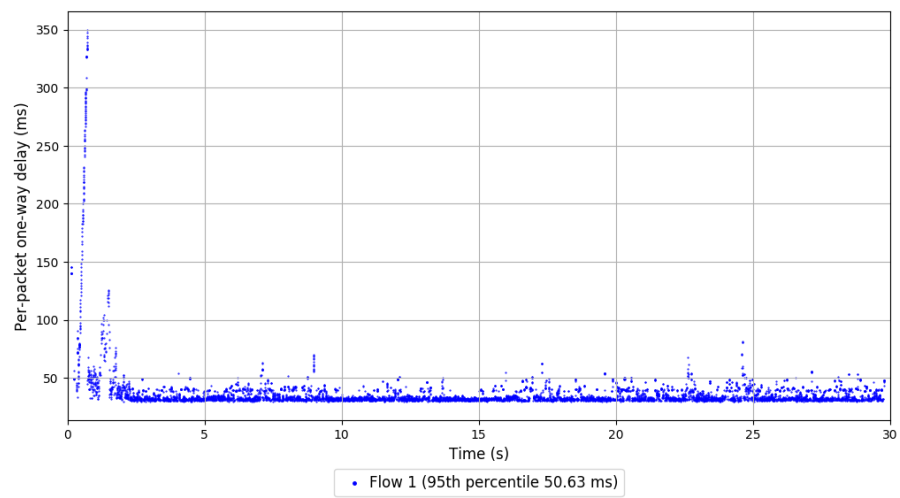
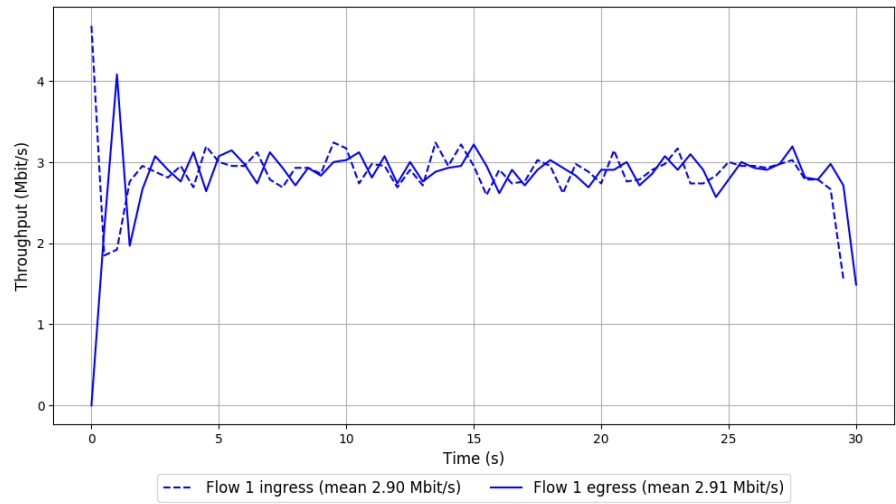
-- Flow 1:

Average throughput: 2.91 Mbit/s

95th percentile per-packet one-way delay: 50.629 ms

Loss rate: 0.07%

Run 3: Report of Indigo — Data Link

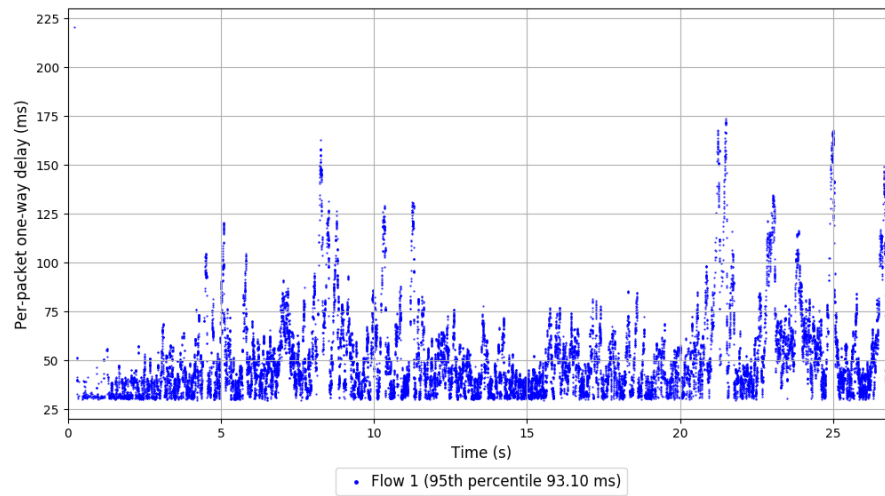
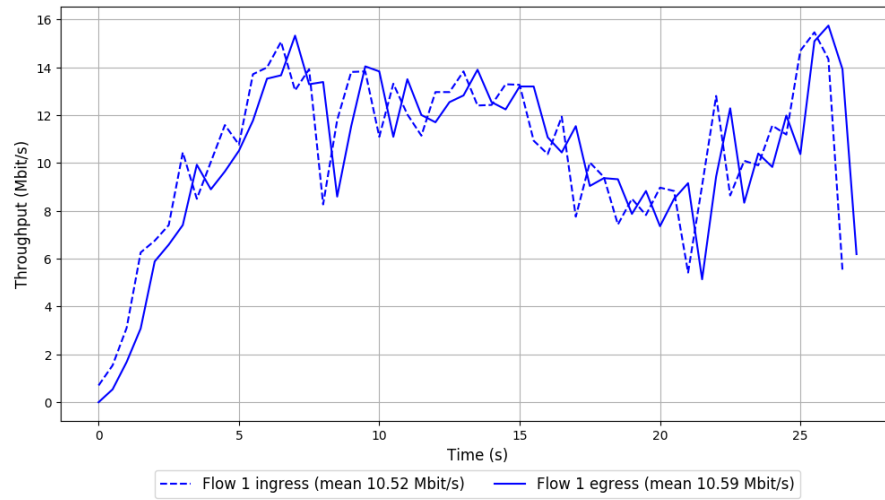



```
Run 1: Statistics of Indigo-MusesC3

Start at: 2019-02-05 00:53:23
End at: 2019-02-05 00:53:53
Local clock offset: 3.681 ms
Remote clock offset: -0.318 ms

# Below is generated by plot.py at 2019-02-05 02:04:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.59 Mbit/s
95th percentile per-packet one-way delay: 93.096 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 10.59 Mbit/s
95th percentile per-packet one-way delay: 93.096 ms
Loss rate: 0.14%
```

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-02-05 01:19:14

End at: 2019-02-05 01:19:44

Local clock offset: 1.702 ms

Remote clock offset: 1.524 ms

Below is generated by plot.py at 2019-02-05 02:04:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.32 Mbit/s

95th percentile per-packet one-way delay: 98.828 ms

Loss rate: 0.10%

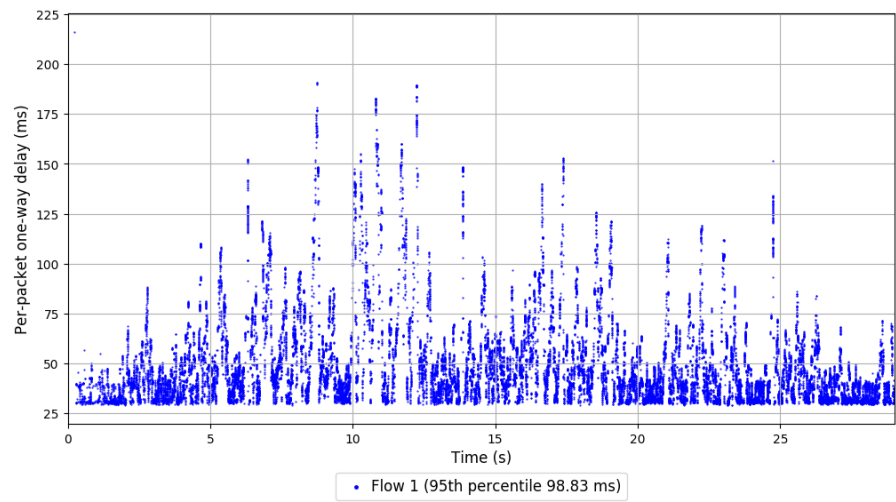
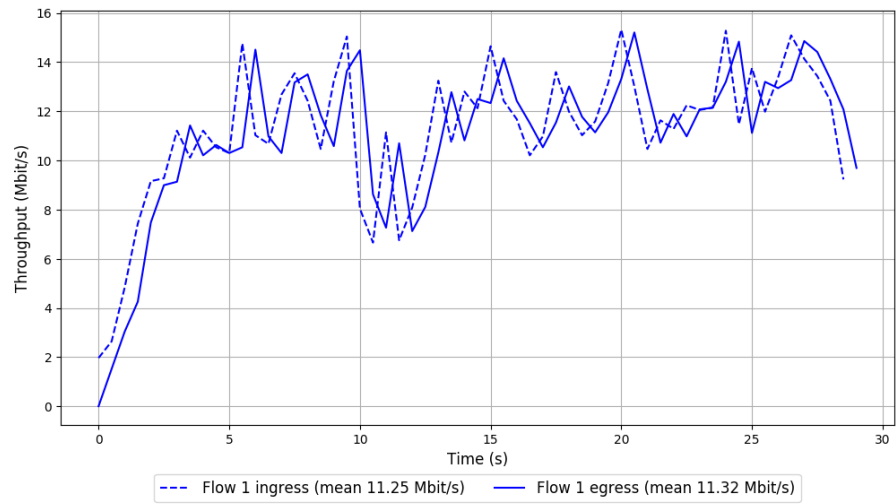
-- Flow 1:

Average throughput: 11.32 Mbit/s

95th percentile per-packet one-way delay: 98.828 ms

Loss rate: 0.10%

Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-02-05 01:45:00

End at: 2019-02-05 01:45:30

Local clock offset: 4.125 ms

Remote clock offset: 0.756 ms

Below is generated by plot.py at 2019-02-05 02:04:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.27 Mbit/s

95th percentile per-packet one-way delay: 97.396 ms

Loss rate: 0.25%

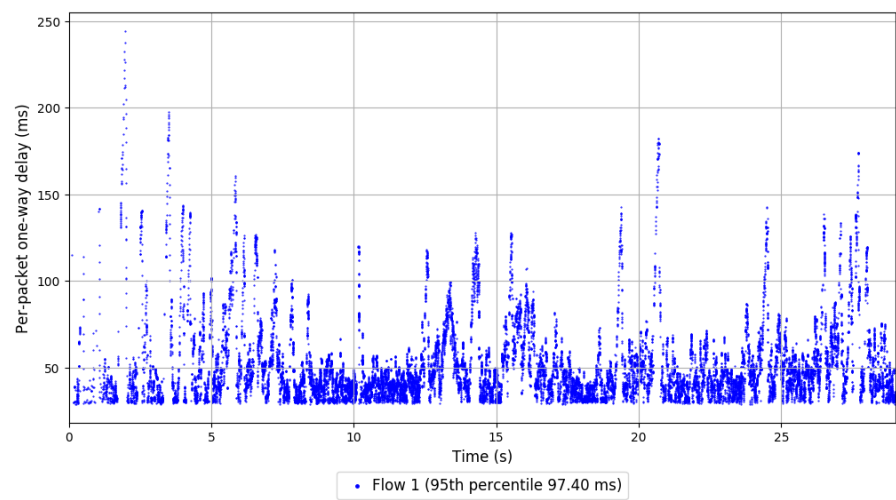
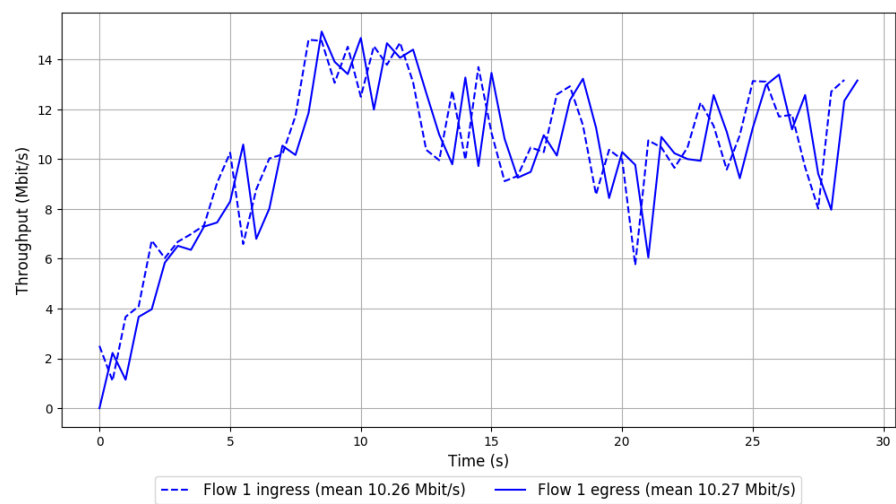
-- Flow 1:

Average throughput: 10.27 Mbit/s

95th percentile per-packet one-way delay: 97.396 ms

Loss rate: 0.25%

Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-02-05 00:58:18

End at: 2019-02-05 00:58:48

Local clock offset: 4.588 ms

Remote clock offset: 0.268 ms

Below is generated by plot.py at 2019-02-05 02:04:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 9.71 Mbit/s

95th percentile per-packet one-way delay: 354.396 ms

Loss rate: 1.35%

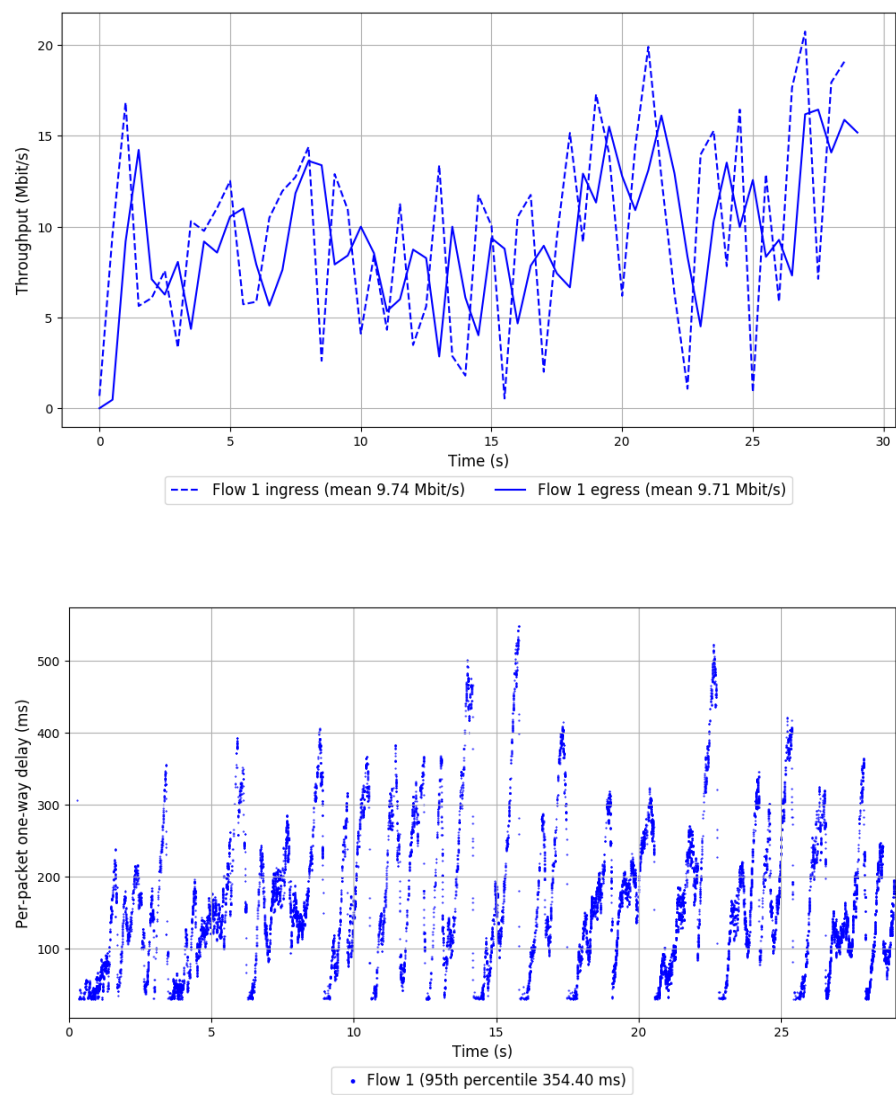
-- Flow 1:

Average throughput: 9.71 Mbit/s

95th percentile per-packet one-way delay: 354.396 ms

Loss rate: 1.35%

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-02-05 01:24:09

End at: 2019-02-05 01:24:39

Local clock offset: 2.444 ms

Remote clock offset: 0.904 ms

Below is generated by plot.py at 2019-02-05 02:04:45

Datalink statistics

-- Total of 1 flow:

Average throughput: 15.89 Mbit/s

95th percentile per-packet one-way delay: 228.798 ms

Loss rate: 0.04%

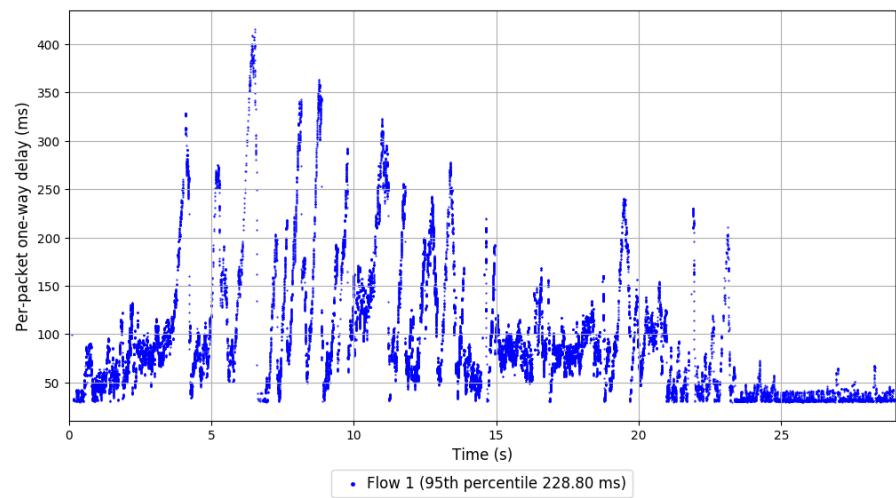
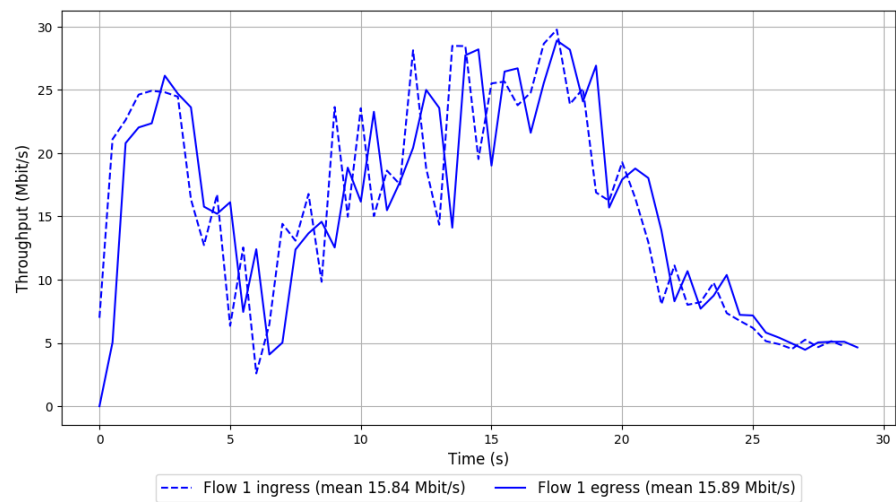
-- Flow 1:

Average throughput: 15.89 Mbit/s

95th percentile per-packet one-way delay: 228.798 ms

Loss rate: 0.04%

Run 2: Report of Indigo-MusesC5 — Data Link



Run 3: Statistics of Indigo-MusesC5

Start at: 2019-02-05 01:49:55

End at: 2019-02-05 01:50:25

Local clock offset: 2.818 ms

Remote clock offset: 0.951 ms

Below is generated by plot.py at 2019-02-05 02:04:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.47 Mbit/s

95th percentile per-packet one-way delay: 326.535 ms

Loss rate: 0.13%

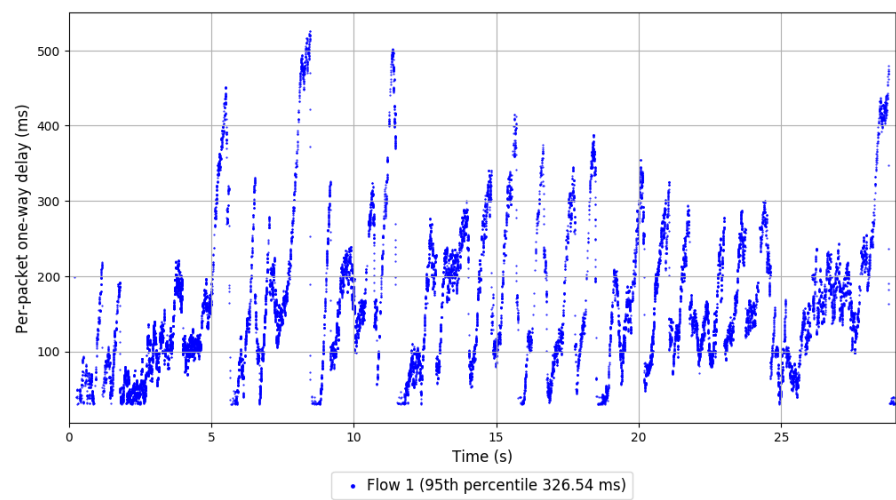
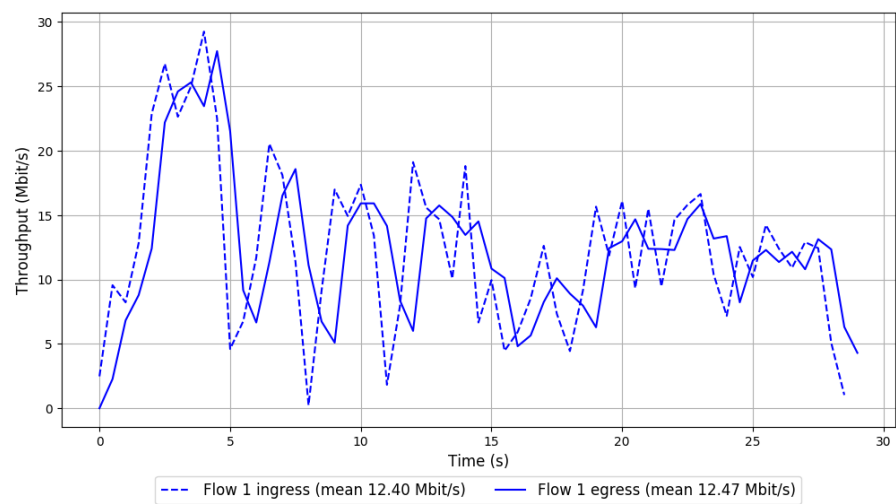
-- Flow 1:

Average throughput: 12.47 Mbit/s

95th percentile per-packet one-way delay: 326.535 ms

Loss rate: 0.13%

Run 3: Report of Indigo-MusesC5 — Data Link

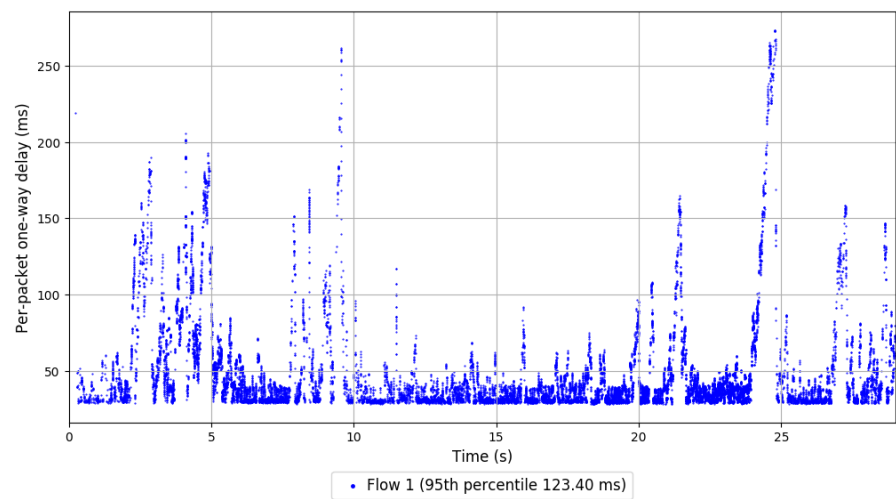
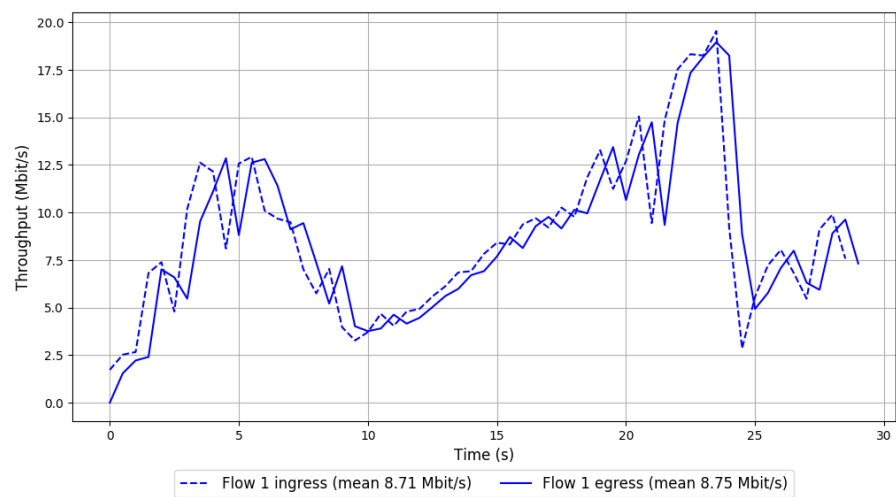


```
Run 1: Statistics of Indigo-MusesD

Start at: 2019-02-05 01:03:12
End at: 2019-02-05 01:03:42
Local clock offset: 5.494 ms
Remote clock offset: 0.862 ms

# Below is generated by plot.py at 2019-02-05 02:04:46
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.75 Mbit/s
95th percentile per-packet one-way delay: 123.401 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 8.75 Mbit/s
95th percentile per-packet one-way delay: 123.401 ms
Loss rate: 0.25%
```

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-02-05 01:29:03

End at: 2019-02-05 01:29:33

Local clock offset: 2.986 ms

Remote clock offset: 0.728 ms

Below is generated by plot.py at 2019-02-05 02:04:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.72 Mbit/s

95th percentile per-packet one-way delay: 135.736 ms

Loss rate: 0.21%

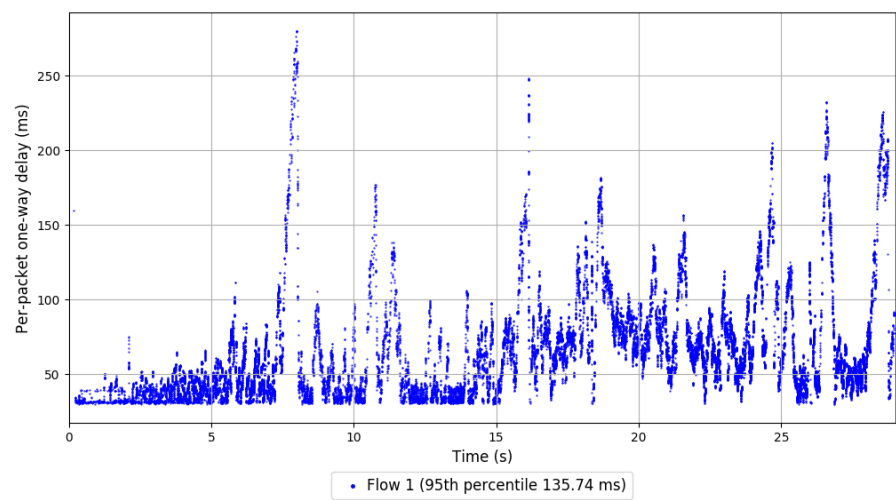
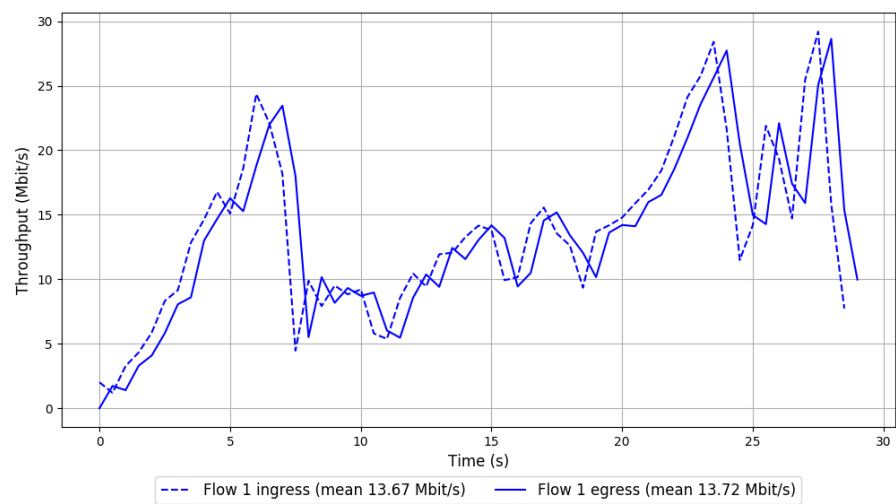
-- Flow 1:

Average throughput: 13.72 Mbit/s

95th percentile per-packet one-way delay: 135.736 ms

Loss rate: 0.21%

Run 2: Report of Indigo-MusesD — Data Link



Run 3: Statistics of Indigo-MusesD

Start at: 2019-02-05 01:54:49

End at: 2019-02-05 01:55:19

Local clock offset: 1.652 ms

Remote clock offset: 0.644 ms

Below is generated by plot.py at 2019-02-05 02:04:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.25 Mbit/s

95th percentile per-packet one-way delay: 141.872 ms

Loss rate: 0.03%

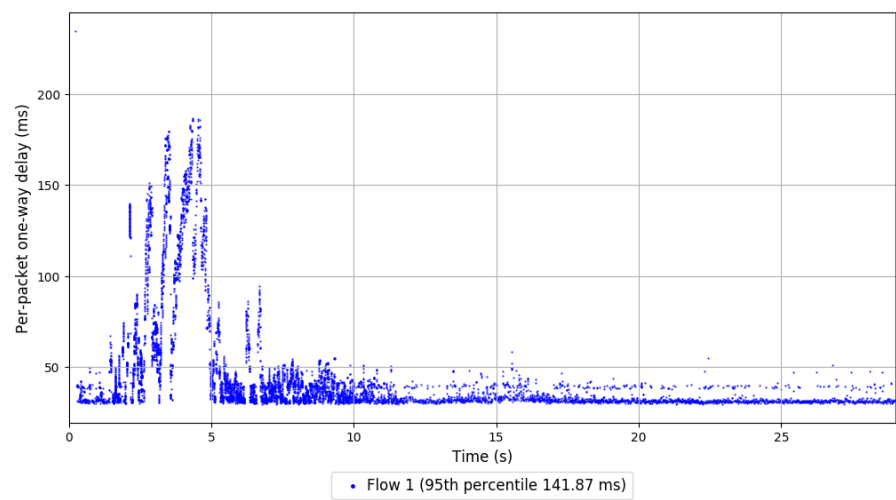
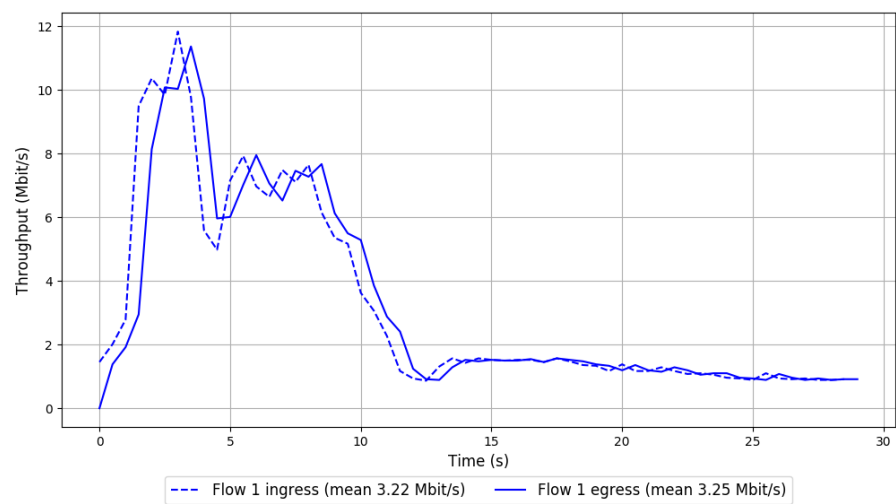
-- Flow 1:

Average throughput: 3.25 Mbit/s

95th percentile per-packet one-way delay: 141.872 ms

Loss rate: 0.03%

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MusesT

Start at: 2019-02-05 00:57:04

End at: 2019-02-05 00:57:34

Local clock offset: 4.342 ms

Remote clock offset: 0.121 ms

Below is generated by plot.py at 2019-02-05 02:04:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.79 Mbit/s

95th percentile per-packet one-way delay: 290.853 ms

Loss rate: 0.57%

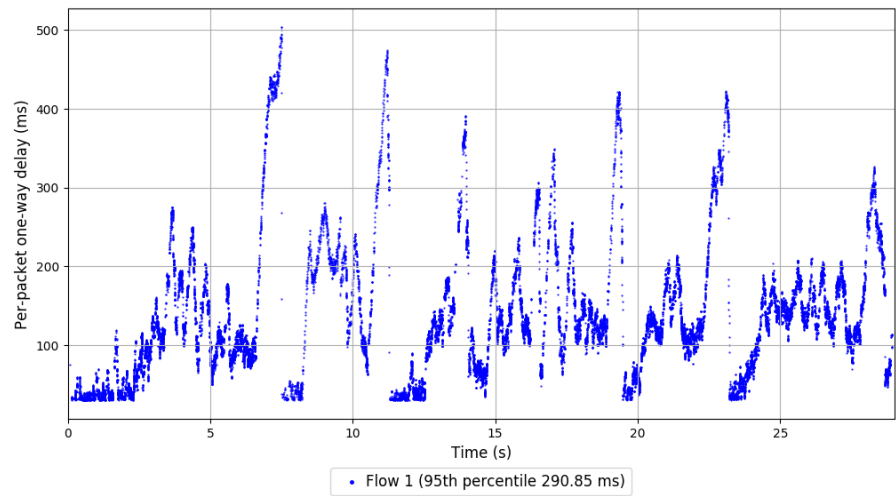
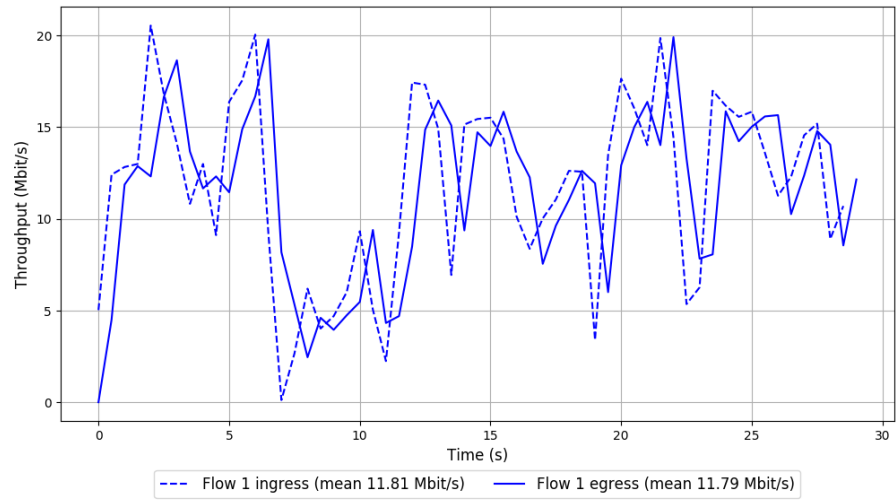
-- Flow 1:

Average throughput: 11.79 Mbit/s

95th percentile per-packet one-way delay: 290.853 ms

Loss rate: 0.57%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MusesT

Start at: 2019-02-05 01:22:55

End at: 2019-02-05 01:23:25

Local clock offset: 2.284 ms

Remote clock offset: 1.088 ms

Below is generated by plot.py at 2019-02-05 02:04:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 18.00 Mbit/s

95th percentile per-packet one-way delay: 240.306 ms

Loss rate: 0.71%

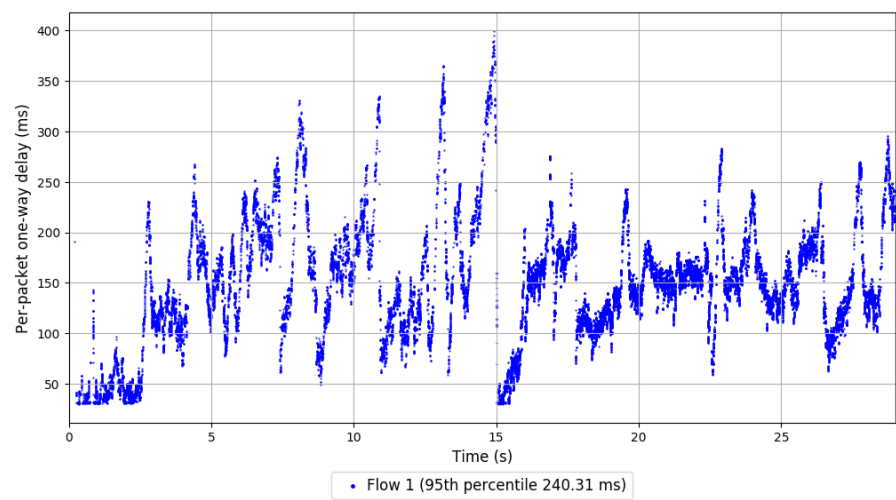
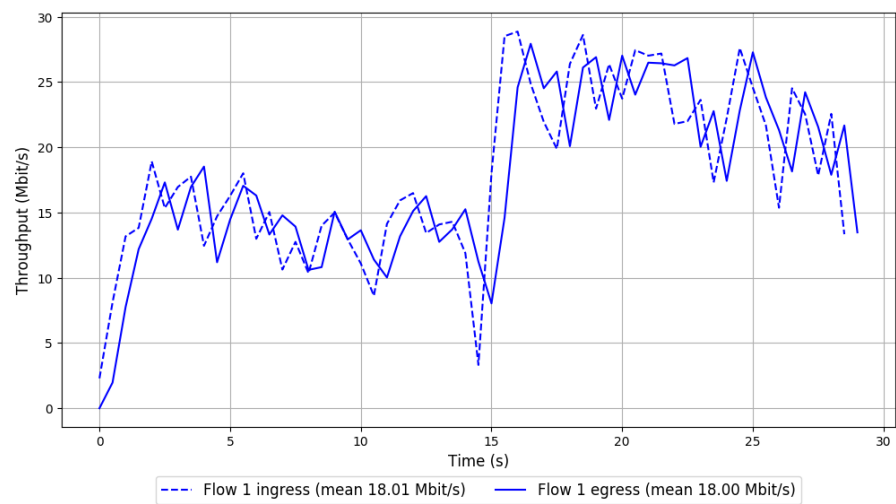
-- Flow 1:

Average throughput: 18.00 Mbit/s

95th percentile per-packet one-way delay: 240.306 ms

Loss rate: 0.71%

Run 2: Report of Indigo-MusesT — Data Link



Run 3: Statistics of Indigo-MusesT

Start at: 2019-02-05 01:48:41

End at: 2019-02-05 01:49:11

Local clock offset: 3.289 ms

Remote clock offset: 0.876 ms

Below is generated by plot.py at 2019-02-05 02:04:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.22 Mbit/s

95th percentile per-packet one-way delay: 317.616 ms

Loss rate: 0.75%

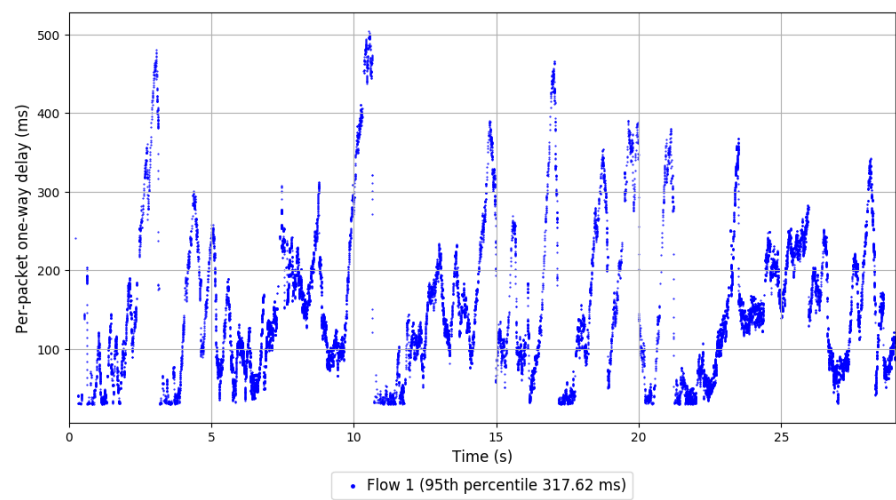
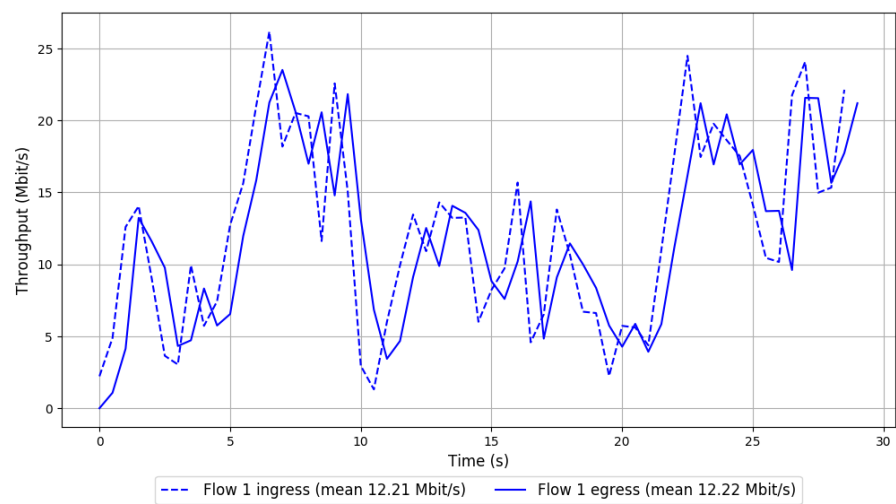
-- Flow 1:

Average throughput: 12.22 Mbit/s

95th percentile per-packet one-way delay: 317.616 ms

Loss rate: 0.75%

Run 3: Report of Indigo-MusesT — Data Link

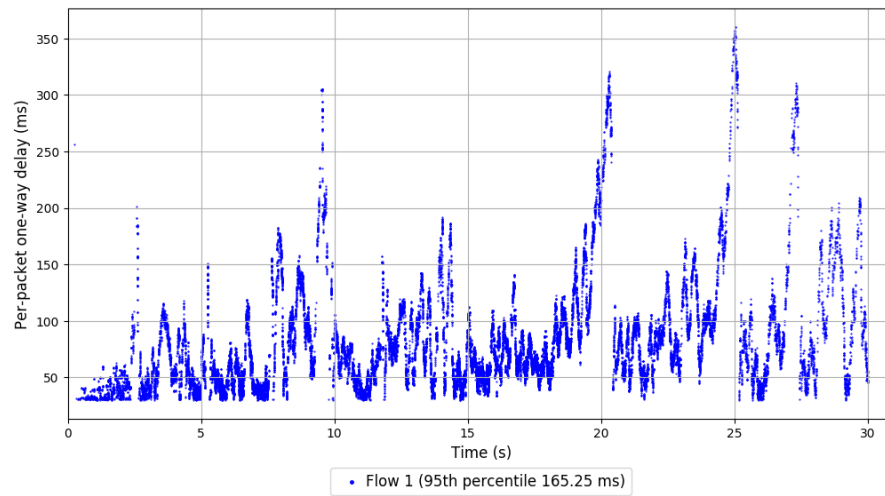
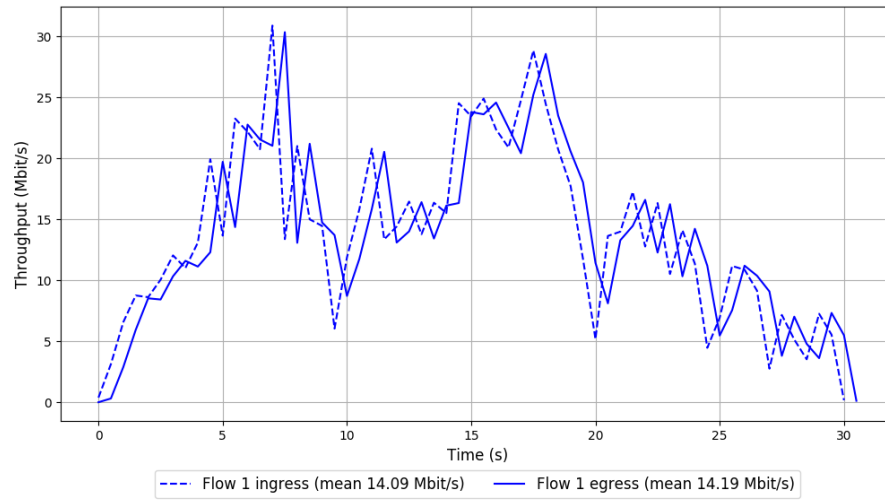


Run 1: Statistics of LEDBAT

Start at: 2019-02-05 00:47:15
End at: 2019-02-05 00:47:45
Local clock offset: 3.155 ms
Remote clock offset: -1.573 ms

Below is generated by plot.py at 2019-02-05 02:04:55
Datalink statistics
-- Total of 1 flow:
Average throughput: 14.19 Mbit/s
95th percentile per-packet one-way delay: 165.252 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 14.19 Mbit/s
95th percentile per-packet one-way delay: 165.252 ms
Loss rate: 0.15%

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-02-05 01:13:00

End at: 2019-02-05 01:13:30

Local clock offset: 1.282 ms

Remote clock offset: 1.71 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 23.47 Mbit/s

95th percentile per-packet one-way delay: 158.476 ms

Loss rate: 0.40%

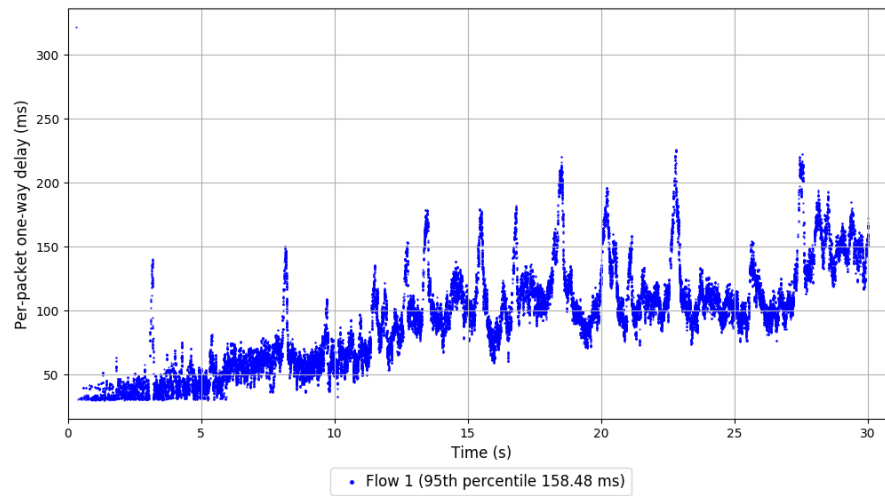
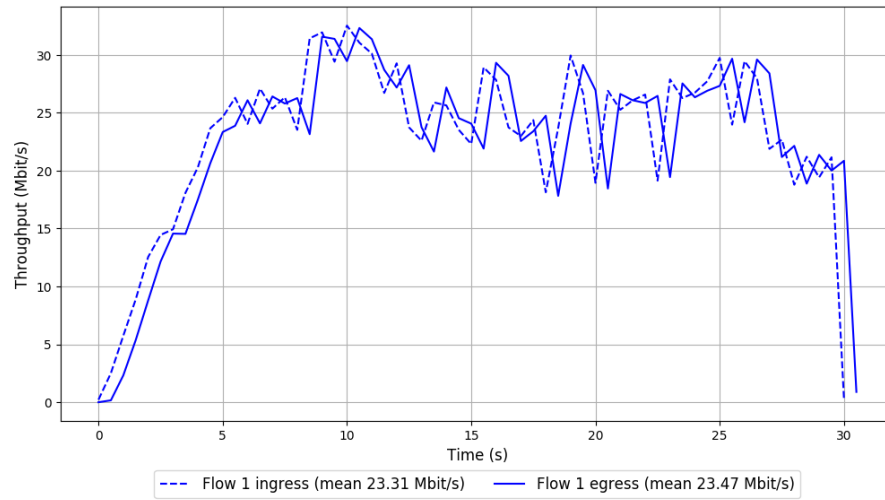
-- Flow 1:

Average throughput: 23.47 Mbit/s

95th percentile per-packet one-way delay: 158.476 ms

Loss rate: 0.40%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-02-05 01:38:52

End at: 2019-02-05 01:39:22

Local clock offset: 3.744 ms

Remote clock offset: 0.658 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.13 Mbit/s

95th percentile per-packet one-way delay: 180.476 ms

Loss rate: 0.47%

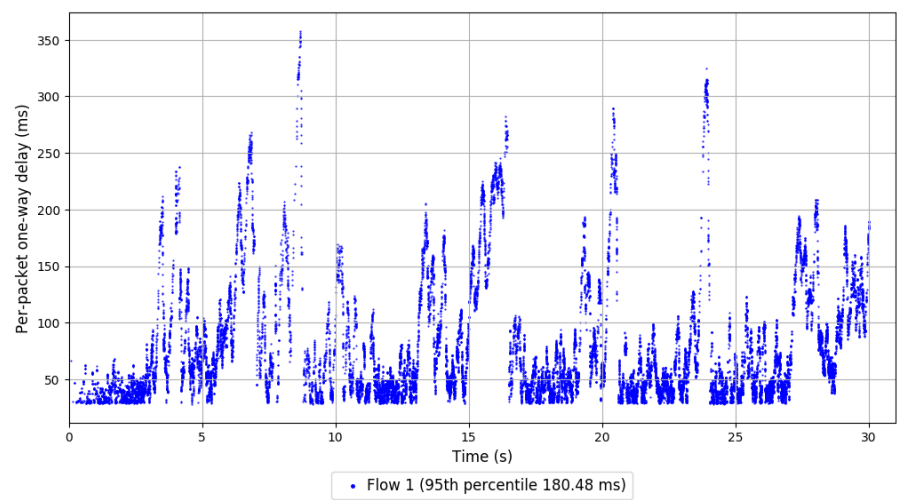
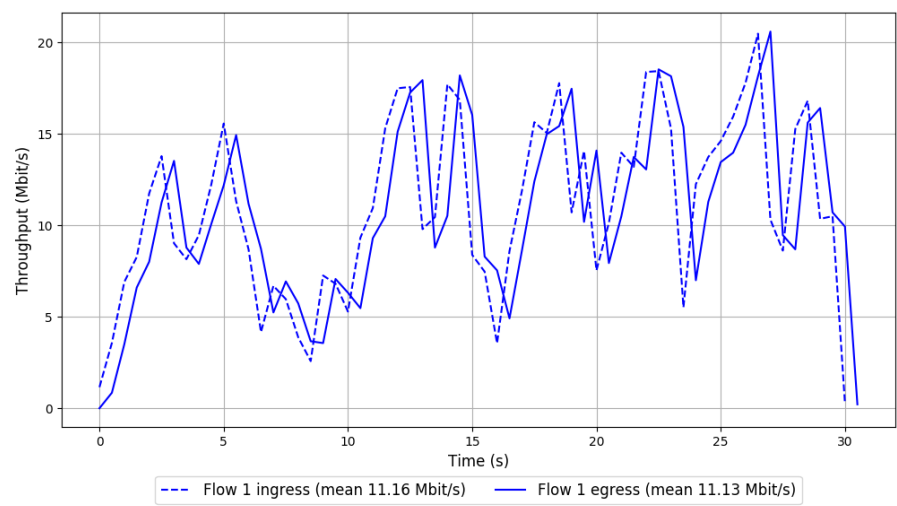
-- Flow 1:

Average throughput: 11.13 Mbit/s

95th percentile per-packet one-way delay: 180.476 ms

Loss rate: 0.47%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2019-02-05 00:59:31

End at: 2019-02-05 01:00:01

Local clock offset: 4.815 ms

Remote clock offset: 0.445 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.20 Mbit/s

95th percentile per-packet one-way delay: 244.571 ms

Loss rate: 0.14%

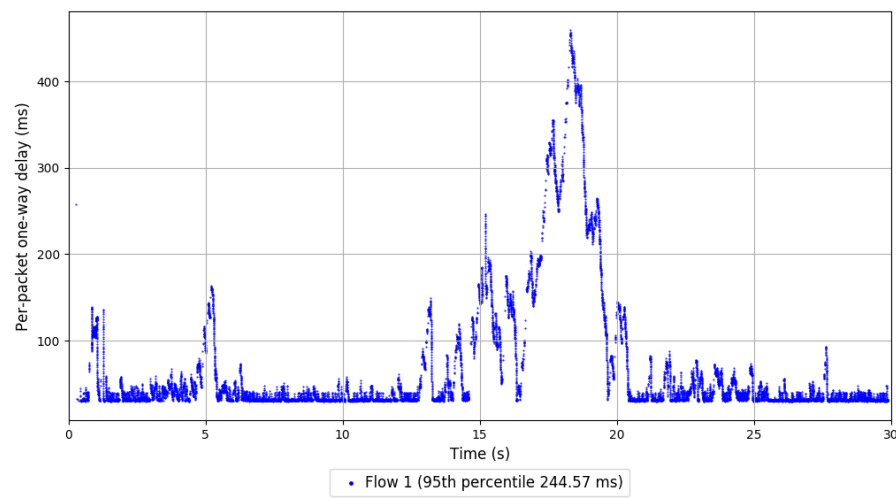
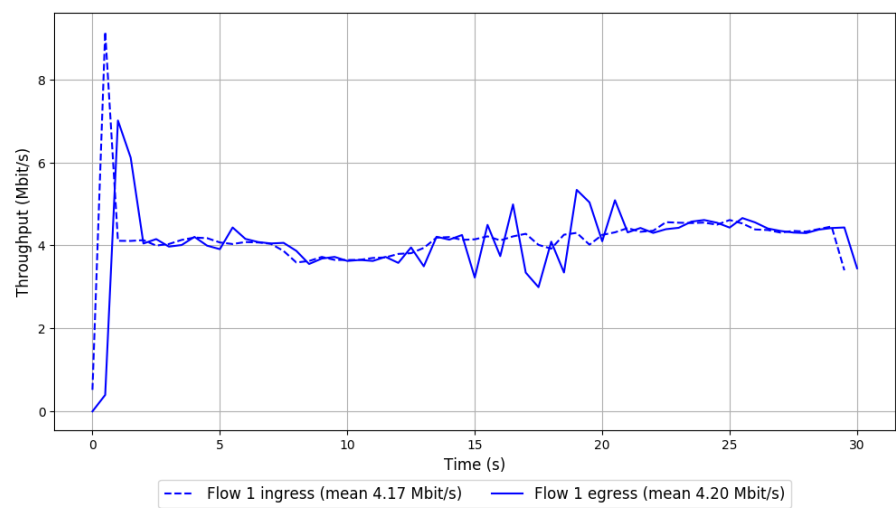
-- Flow 1:

Average throughput: 4.20 Mbit/s

95th percentile per-packet one-way delay: 244.571 ms

Loss rate: 0.14%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-02-05 01:25:23

End at: 2019-02-05 01:25:53

Local clock offset: 2.588 ms

Remote clock offset: 0.855 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 8.21 Mbit/s

95th percentile per-packet one-way delay: 1028.025 ms

Loss rate: 5.27%

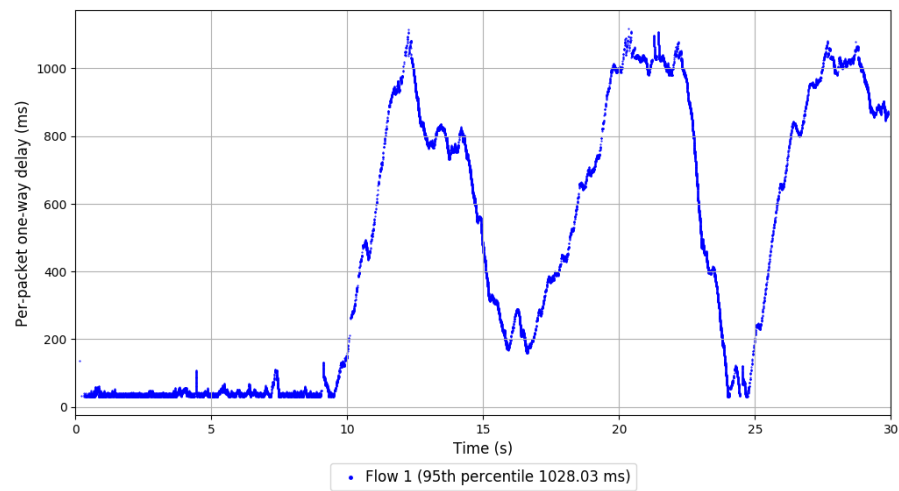
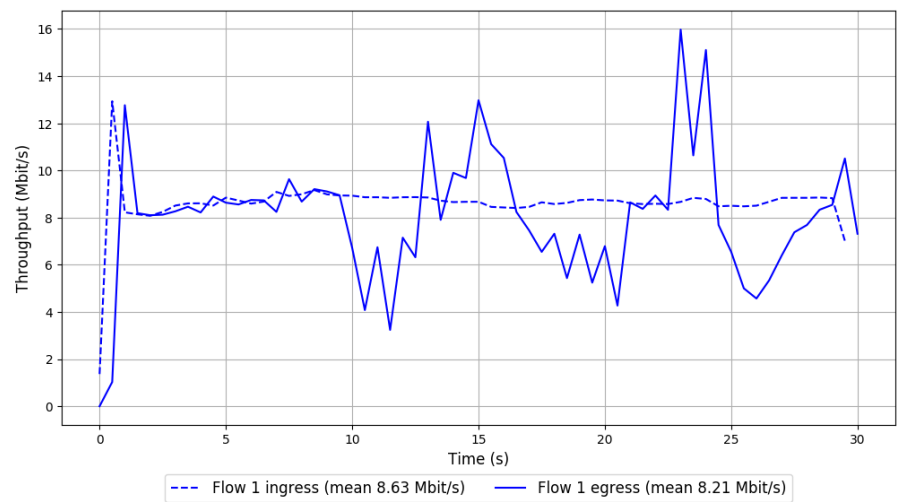
-- Flow 1:

Average throughput: 8.21 Mbit/s

95th percentile per-packet one-way delay: 1028.025 ms

Loss rate: 5.27%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-02-05 01:51:08

End at: 2019-02-05 01:51:38

Local clock offset: 2.5 ms

Remote clock offset: 0.976 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.53 Mbit/s

95th percentile per-packet one-way delay: 995.996 ms

Loss rate: 1.13%

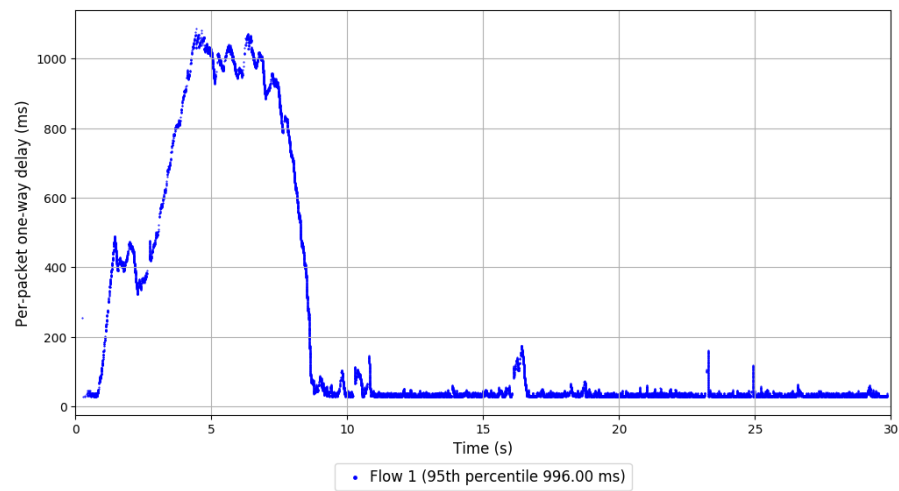
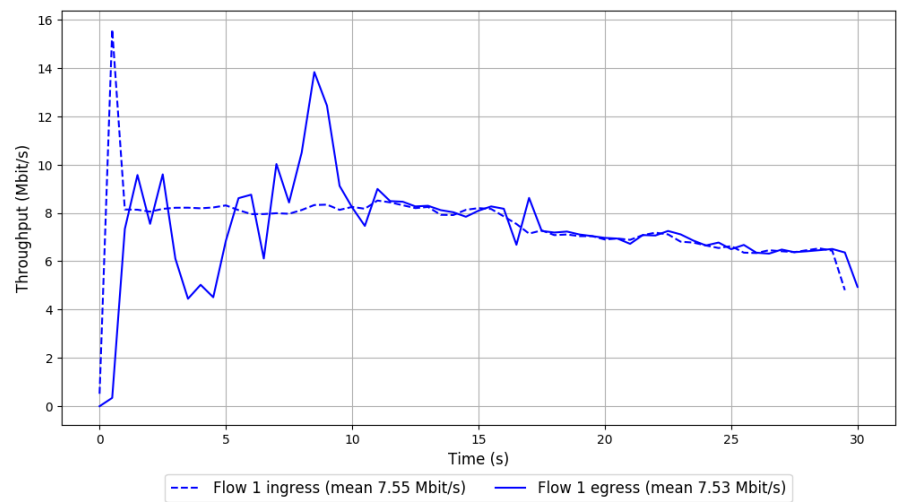
-- Flow 1:

Average throughput: 7.53 Mbit/s

95th percentile per-packet one-way delay: 995.996 ms

Loss rate: 1.13%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2019-02-05 01:11:47

End at: 2019-02-05 01:12:17

Local clock offset: 1.428 ms

Remote clock offset: 1.623 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.64 Mbit/s

95th percentile per-packet one-way delay: 45.652 ms

Loss rate: 65.55%

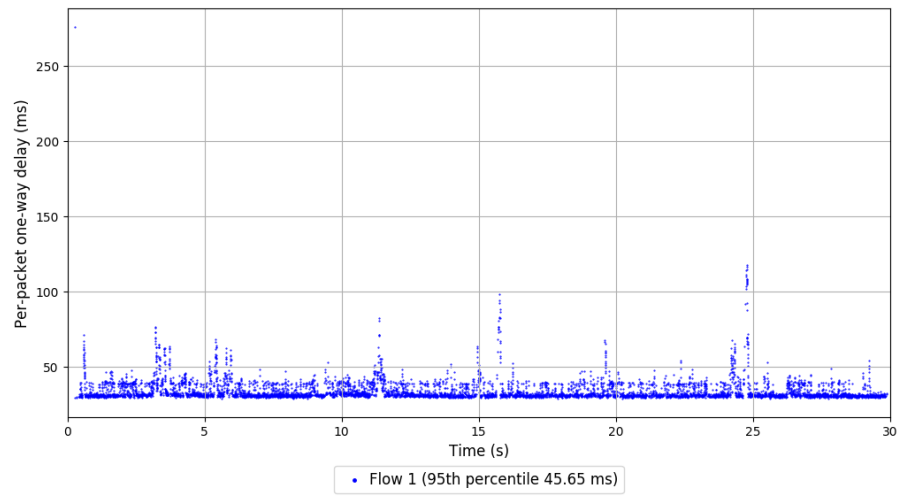
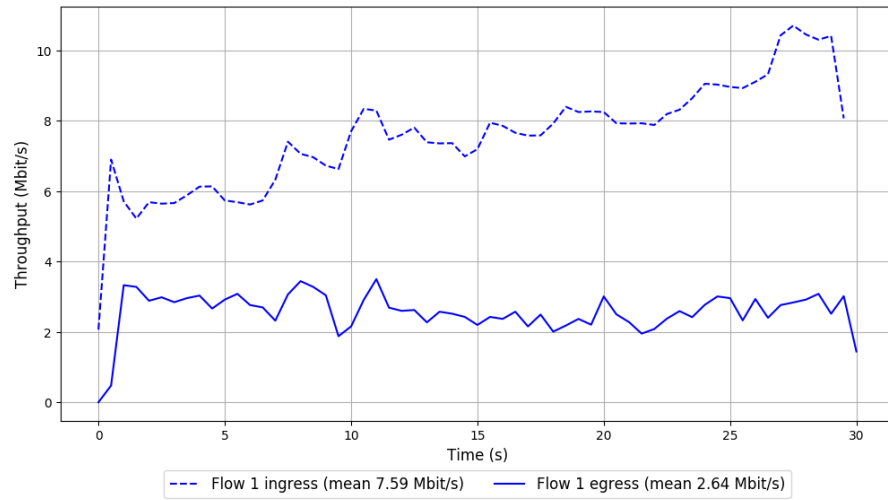
-- Flow 1:

Average throughput: 2.64 Mbit/s

95th percentile per-packet one-way delay: 45.652 ms

Loss rate: 65.55%

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2019-02-05 01:37:38

End at: 2019-02-05 01:38:08

Local clock offset: 3.676 ms

Remote clock offset: 0.689 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.09 Mbit/s

95th percentile per-packet one-way delay: 39.821 ms

Loss rate: 53.83%

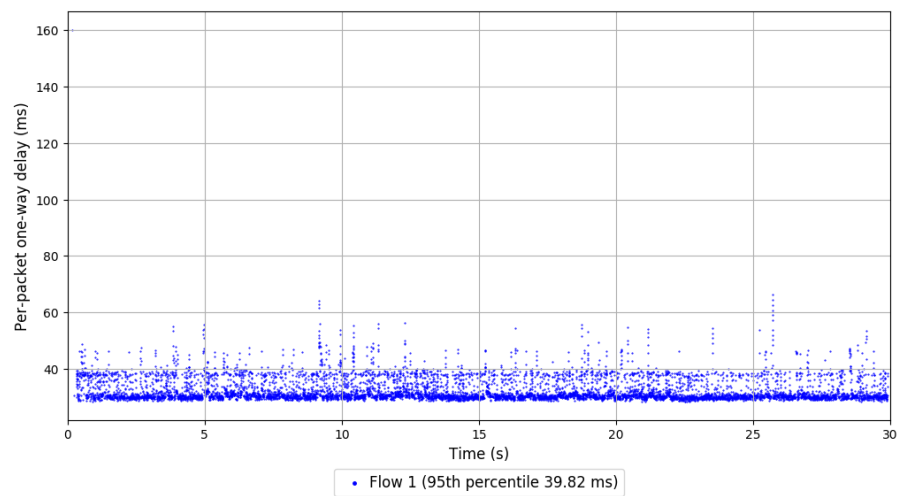
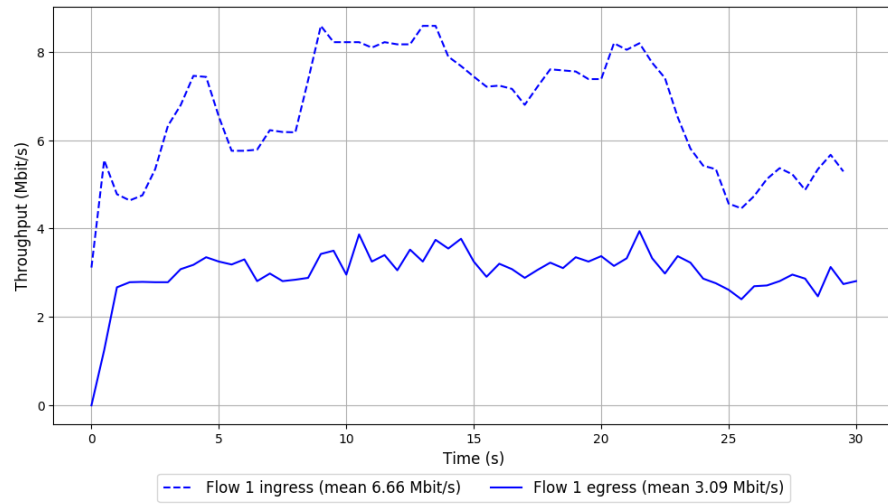
-- Flow 1:

Average throughput: 3.09 Mbit/s

95th percentile per-packet one-way delay: 39.821 ms

Loss rate: 53.83%

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2019-02-05 02:03:24

End at: 2019-02-05 02:03:54

Local clock offset: 0.714 ms

Remote clock offset: 0.391 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 39.914 ms

Loss rate: 78.83%

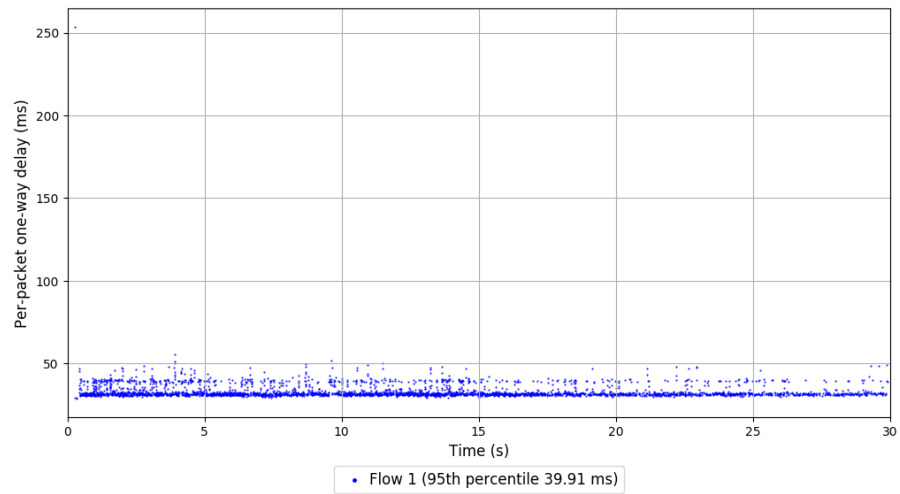
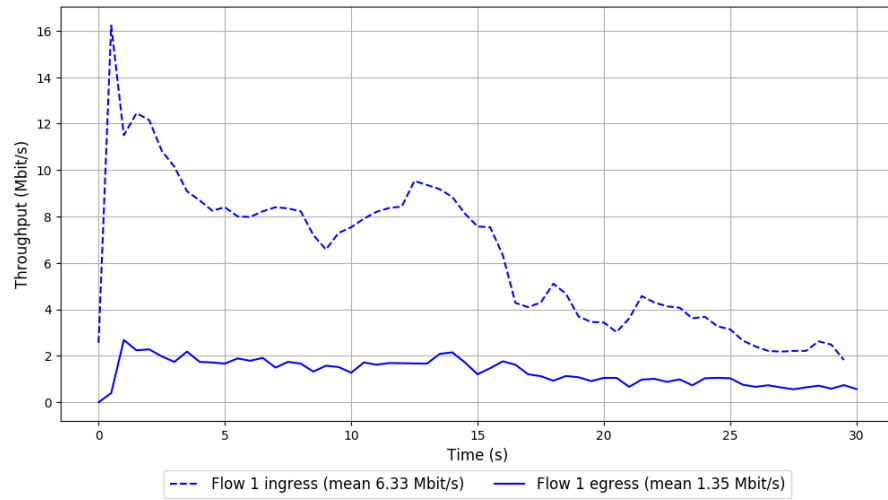
-- Flow 1:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 39.914 ms

Loss rate: 78.83%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-02-05 01:01:58

End at: 2019-02-05 01:02:28

Local clock offset: 5.26 ms

Remote clock offset: 0.717 ms

Below is generated by plot.py at 2019-02-05 02:05:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.96 Mbit/s

95th percentile per-packet one-way delay: 279.797 ms

Loss rate: 0.45%

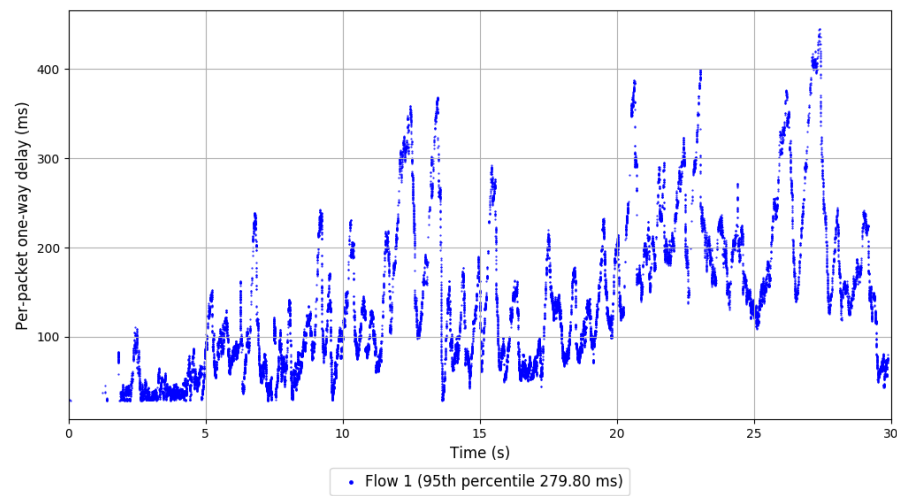
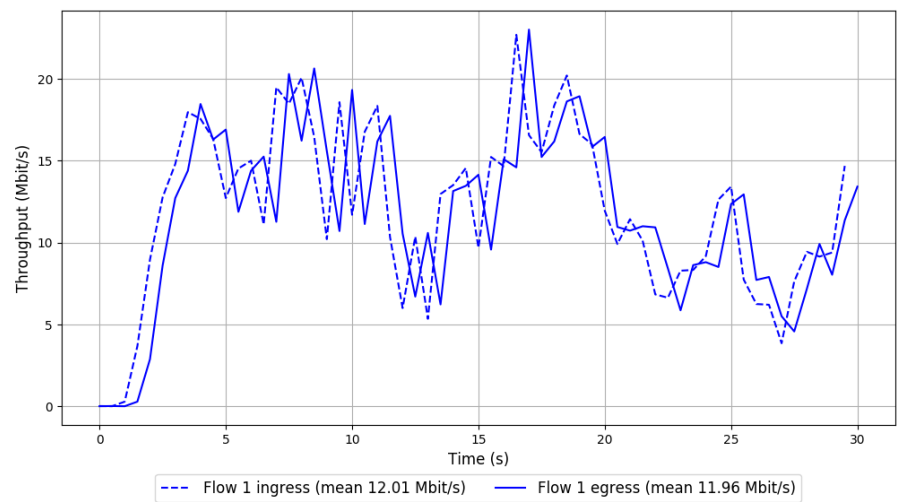
-- Flow 1:

Average throughput: 11.96 Mbit/s

95th percentile per-packet one-way delay: 279.797 ms

Loss rate: 0.45%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-02-05 01:27:49

End at: 2019-02-05 01:28:19

Local clock offset: 2.867 ms

Remote clock offset: 0.859 ms

Below is generated by plot.py at 2019-02-05 02:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 16.14 Mbit/s

95th percentile per-packet one-way delay: 243.531 ms

Loss rate: 0.64%

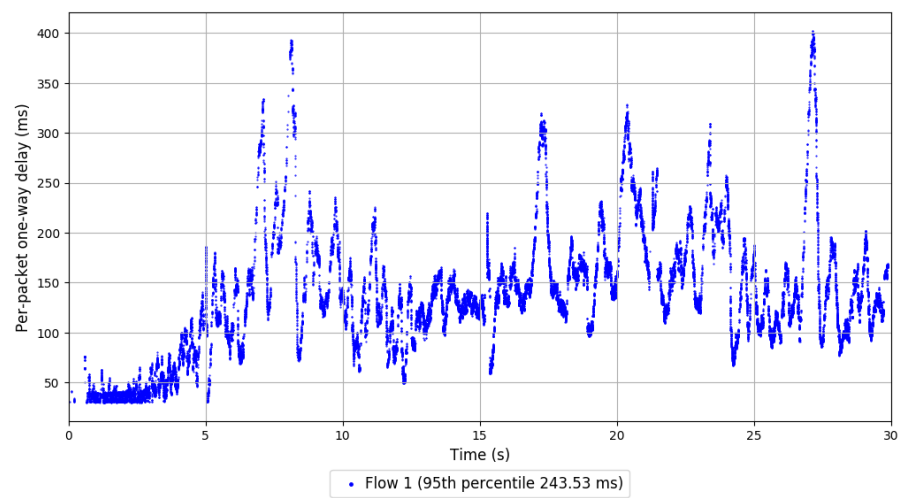
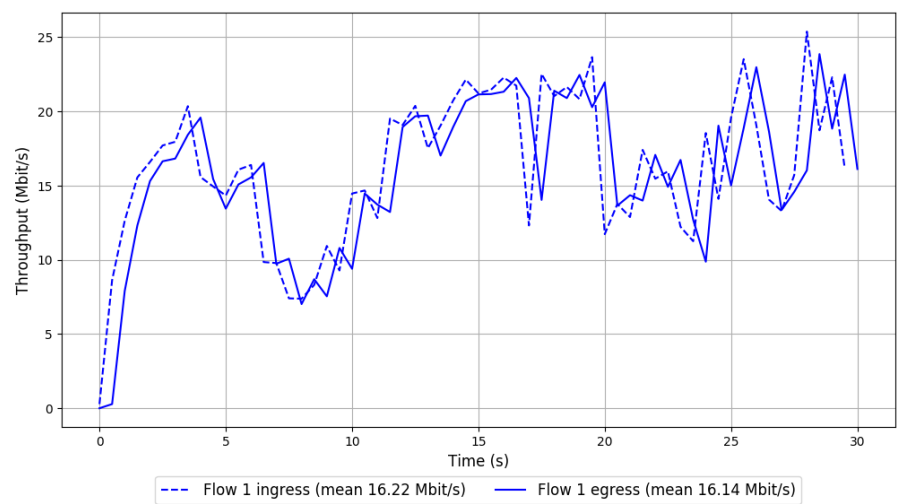
-- Flow 1:

Average throughput: 16.14 Mbit/s

95th percentile per-packet one-way delay: 243.531 ms

Loss rate: 0.64%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2019-02-05 01:53:35

End at: 2019-02-05 01:54:05

Local clock offset: 1.896 ms

Remote clock offset: 0.772 ms

Below is generated by plot.py at 2019-02-05 02:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.69 Mbit/s

95th percentile per-packet one-way delay: 253.459 ms

Loss rate: 0.62%

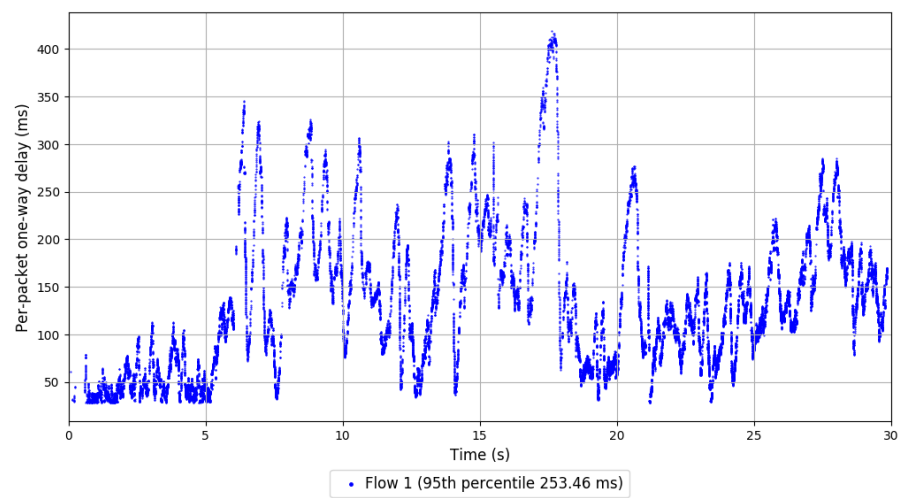
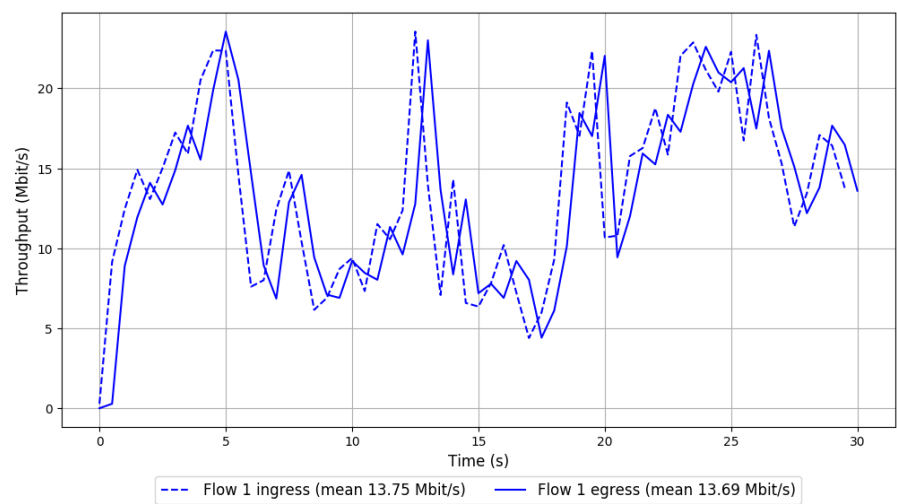
-- Flow 1:

Average throughput: 13.69 Mbit/s

95th percentile per-packet one-way delay: 253.459 ms

Loss rate: 0.62%

Run 3: Report of QUIC Cubic — Data Link

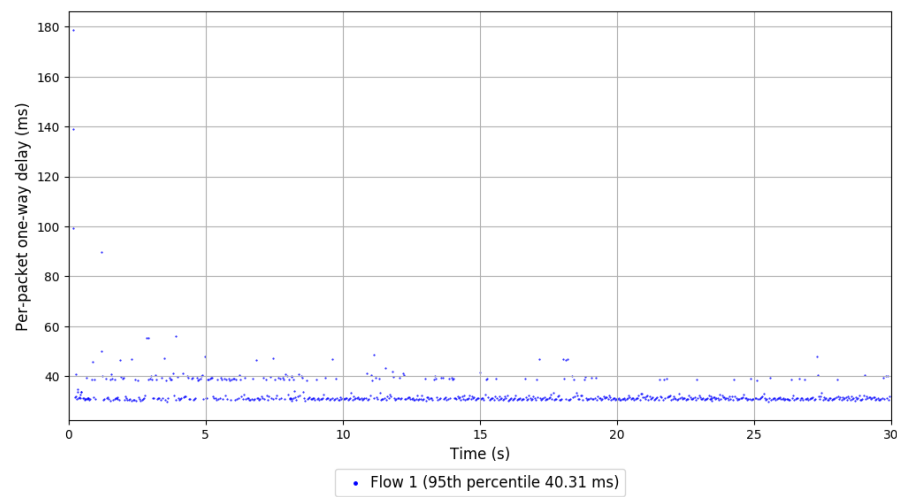
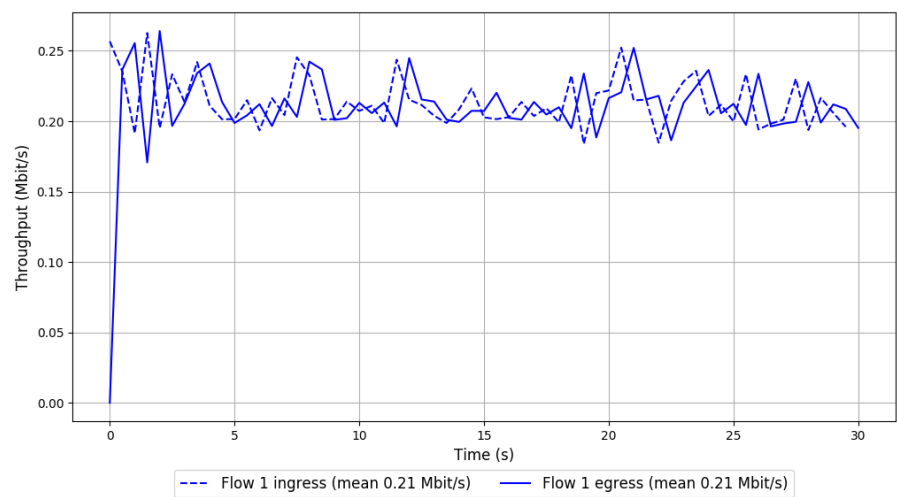


Run 1: Statistics of SCReAM

Start at: 2019-02-05 00:48:29
End at: 2019-02-05 00:48:59
Local clock offset: 3.232 ms
Remote clock offset: -1.316 ms

Below is generated by plot.py at 2019-02-05 02:05:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 40.307 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 40.307 ms
Loss rate: 0.13%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-02-05 01:14:14

End at: 2019-02-05 01:14:45

Local clock offset: 1.178 ms

Remote clock offset: 1.755 ms

Below is generated by plot.py at 2019-02-05 02:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 38.517 ms

Loss rate: 0.13%

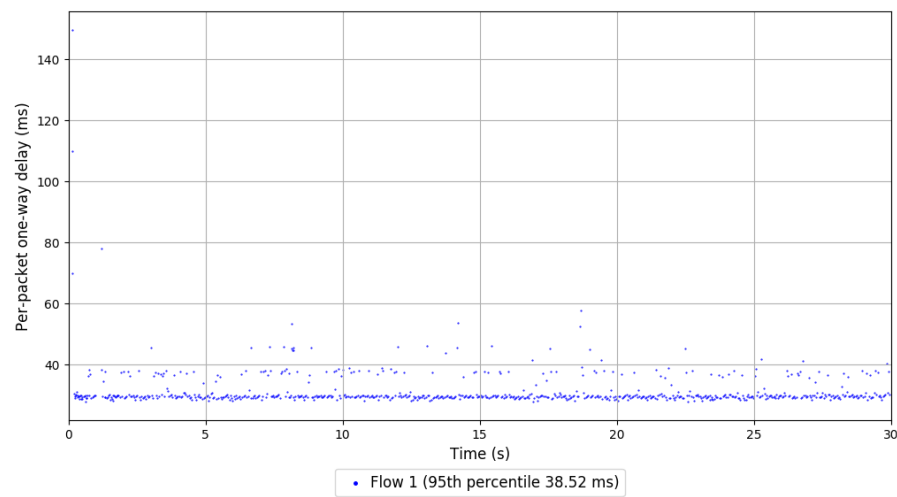
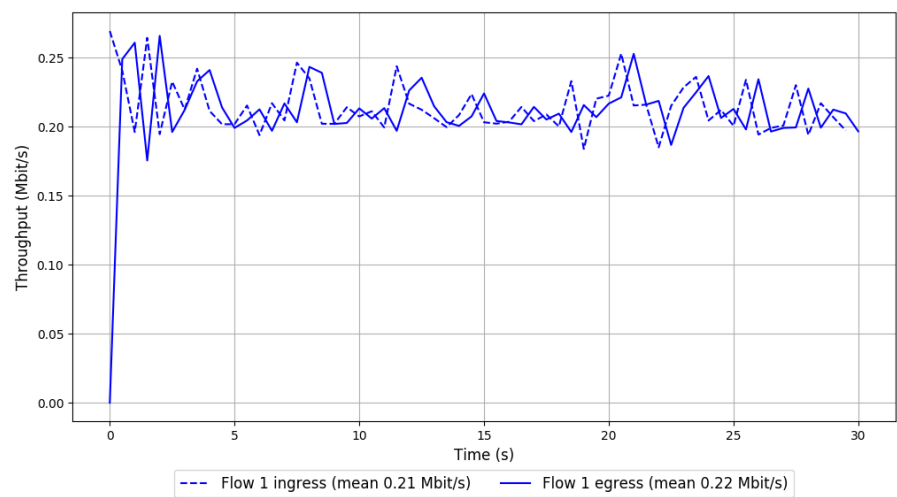
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 38.517 ms

Loss rate: 0.13%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2019-02-05 01:40:06

End at: 2019-02-05 01:40:36

Local clock offset: 3.833 ms

Remote clock offset: 0.683 ms

Below is generated by plot.py at 2019-02-05 02:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 40.109 ms

Loss rate: 0.13%

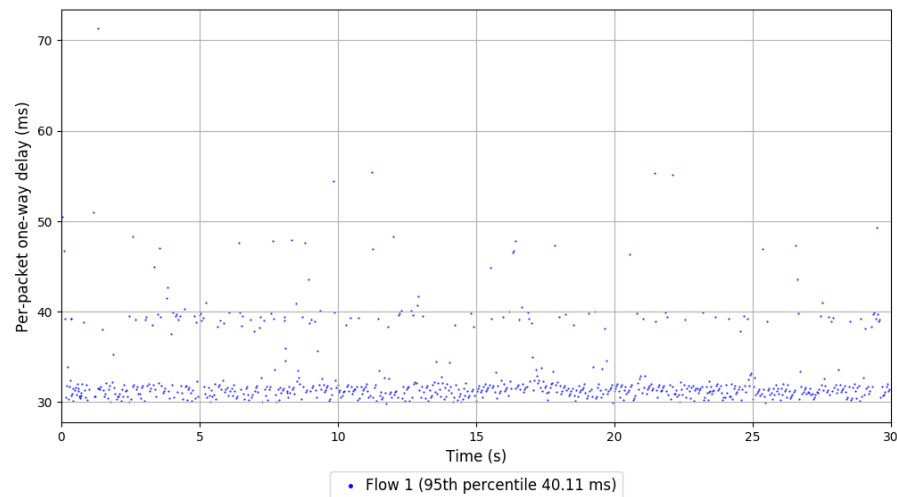
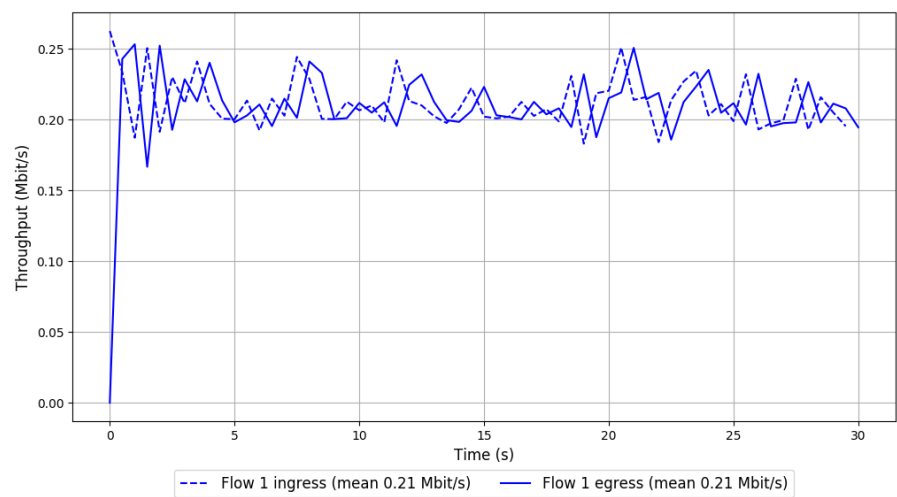
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 40.109 ms

Loss rate: 0.13%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2019-02-05 00:55:50

End at: 2019-02-05 00:56:20

Local clock offset: 4.133 ms

Remote clock offset: 0.055 ms

Below is generated by plot.py at 2019-02-05 02:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.47 Mbit/s

95th percentile per-packet one-way delay: 68.087 ms

Loss rate: 0.13%

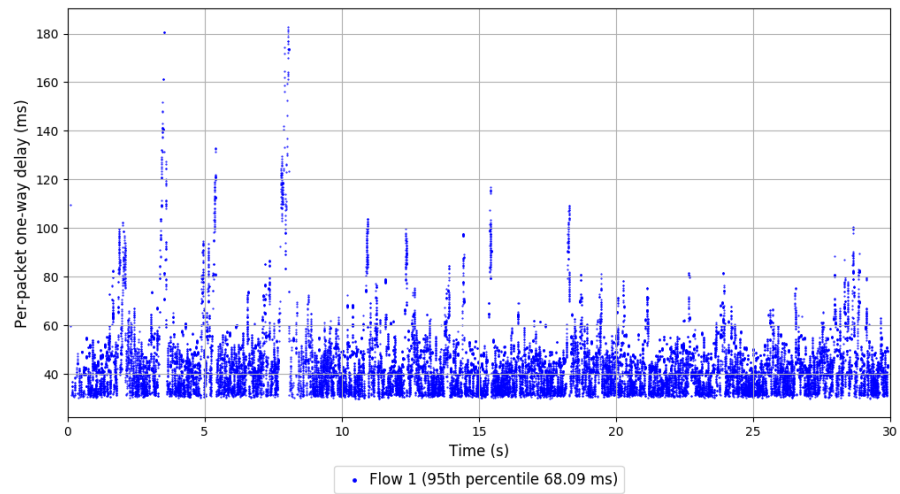
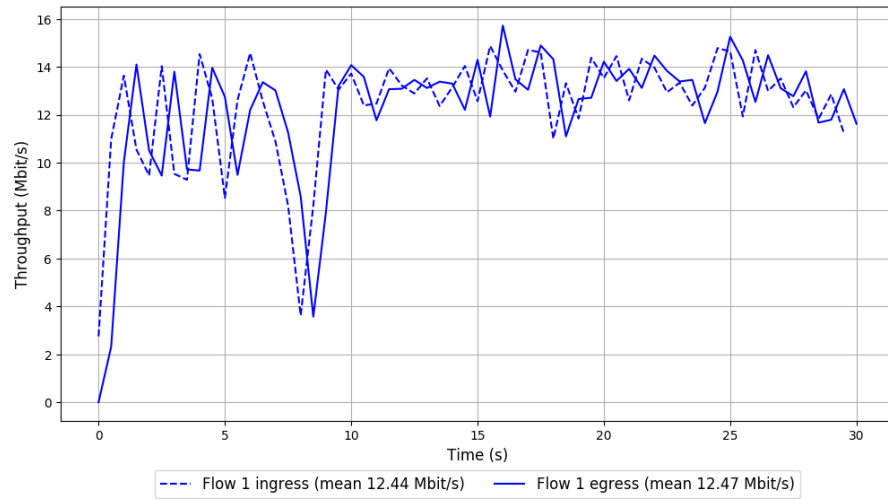
-- Flow 1:

Average throughput: 12.47 Mbit/s

95th percentile per-packet one-way delay: 68.087 ms

Loss rate: 0.13%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2019-02-05 01:21:41

End at: 2019-02-05 01:22:11

Local clock offset: 2.102 ms

Remote clock offset: 1.129 ms

Below is generated by plot.py at 2019-02-05 02:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.56 Mbit/s

95th percentile per-packet one-way delay: 79.981 ms

Loss rate: 0.08%

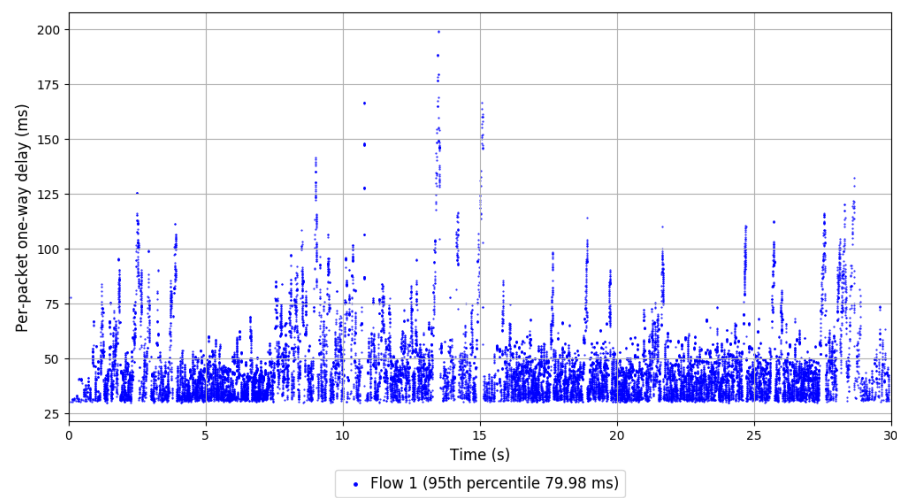
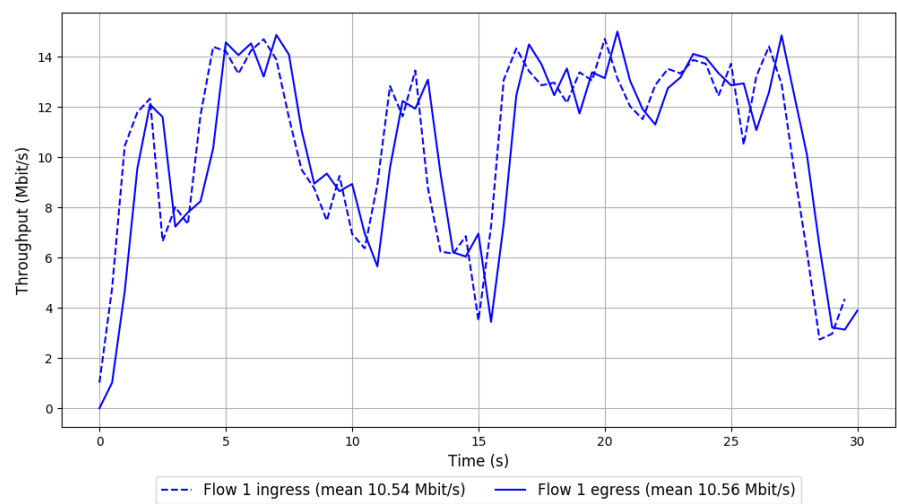
-- Flow 1:

Average throughput: 10.56 Mbit/s

95th percentile per-packet one-way delay: 79.981 ms

Loss rate: 0.08%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2019-02-05 01:47:27

End at: 2019-02-05 01:47:57

Local clock offset: 3.692 ms

Remote clock offset: 0.88 ms

Below is generated by plot.py at 2019-02-05 02:05:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.17 Mbit/s

95th percentile per-packet one-way delay: 79.718 ms

Loss rate: 0.20%

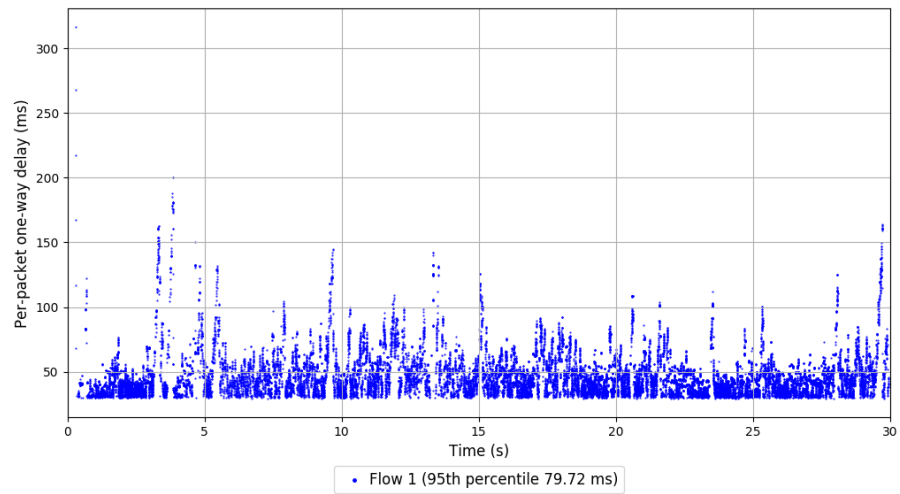
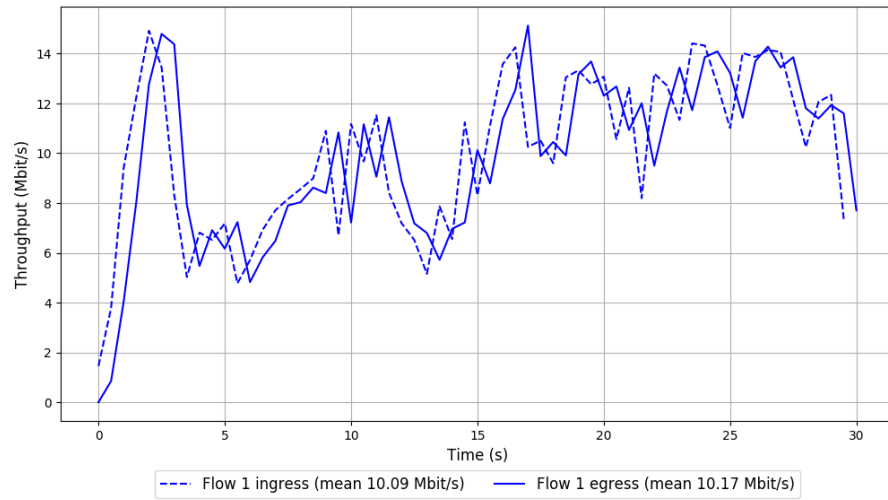
-- Flow 1:

Average throughput: 10.17 Mbit/s

95th percentile per-packet one-way delay: 79.718 ms

Loss rate: 0.20%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

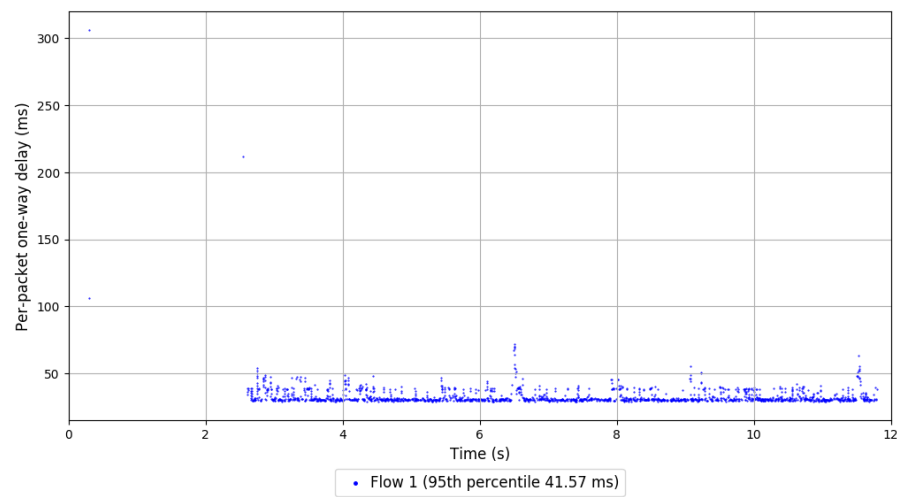
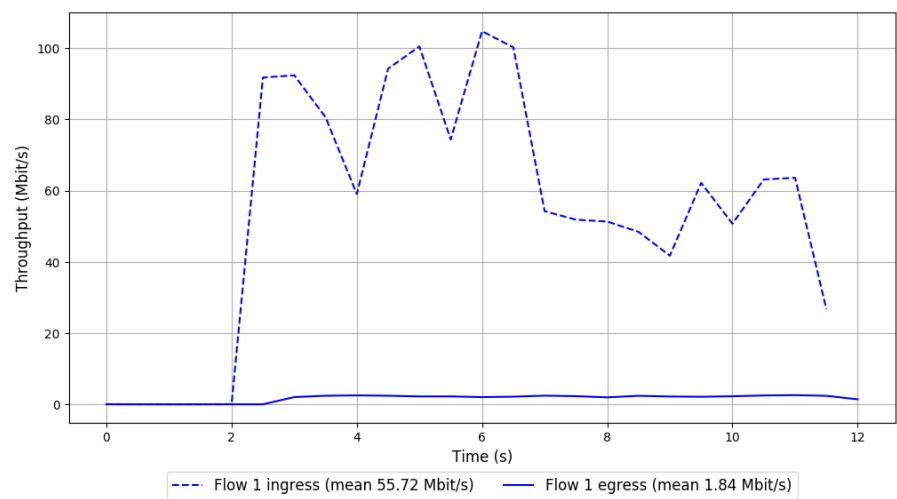
Start at: 2019-02-05 01:10:33

End at: 2019-02-05 01:11:03

Local clock offset: 1.622 ms

Remote clock offset: 1.473 ms

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



Run 2: Statistics of TaoVA-100x

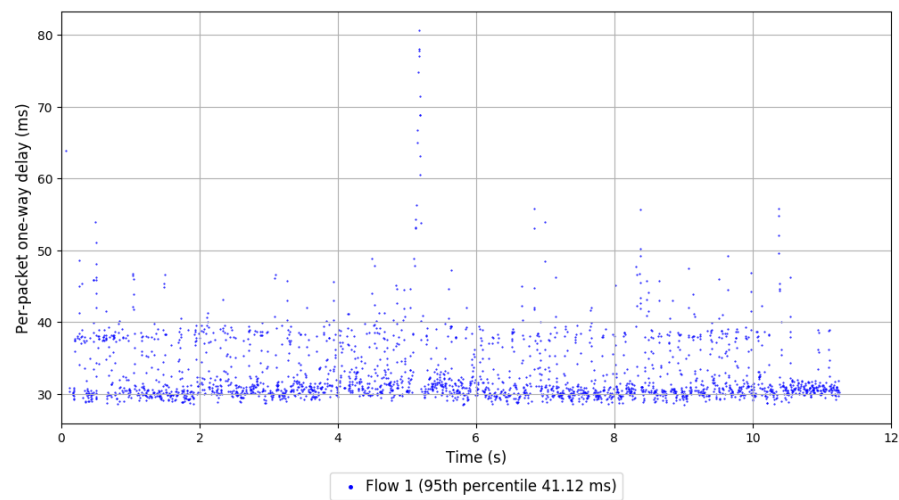
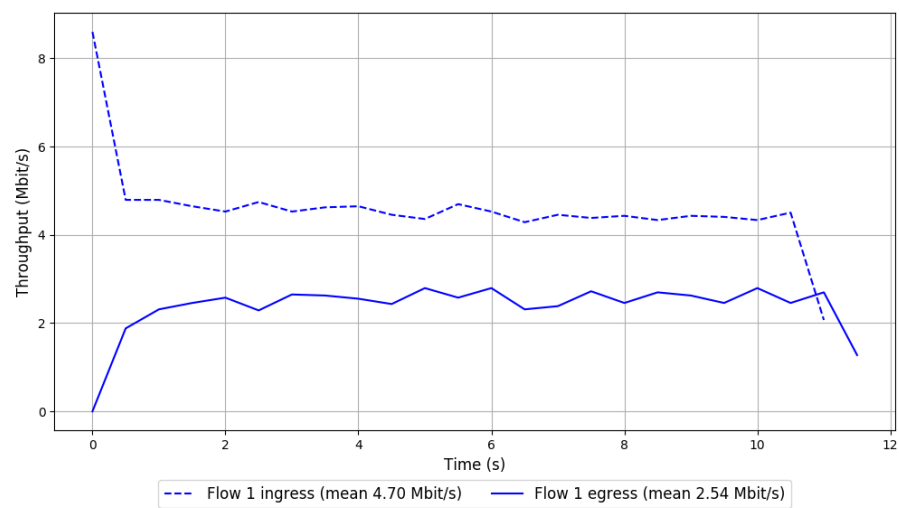
Start at: 2019-02-05 01:36:25

End at: 2019-02-05 01:36:55

Local clock offset: 3.589 ms

Remote clock offset: 0.674 ms

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



Run 3: Statistics of TaoVA-100x

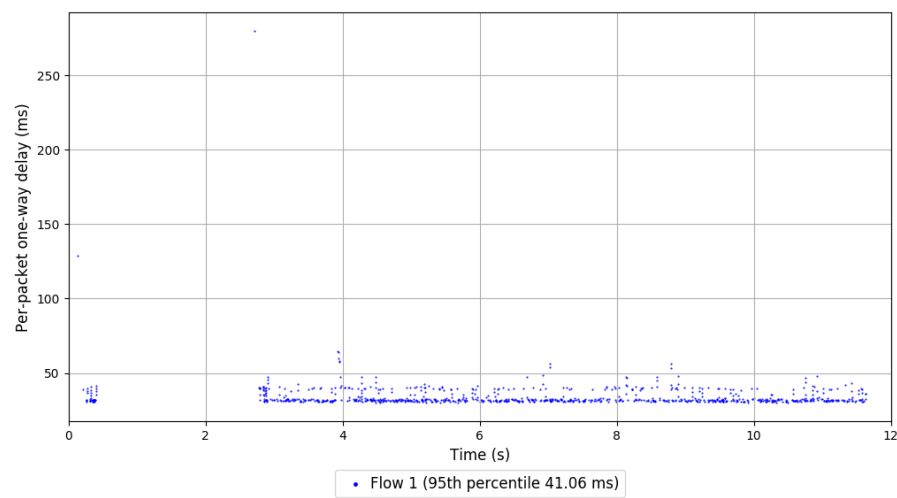
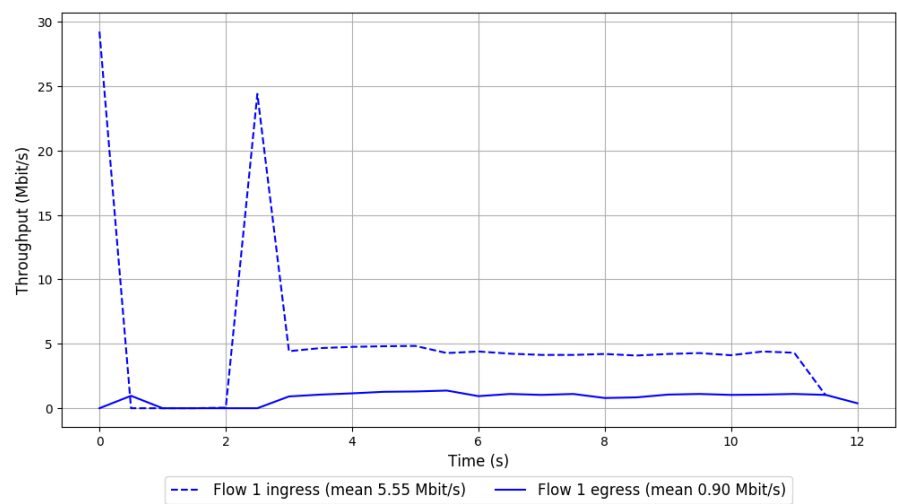
Start at: 2019-02-05 02:02:10

End at: 2019-02-05 02:02:40

Local clock offset: 0.802 ms

Remote clock offset: 0.524 ms

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



Run 1: Statistics of TCP Vegas

Start at: 2019-02-05 01:06:53

End at: 2019-02-05 01:07:23

Local clock offset: 2.751 ms

Remote clock offset: 1.129 ms

Below is generated by plot.py at 2019-02-05 02:05:16

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.60 Mbit/s

95th percentile per-packet one-way delay: 76.357 ms

Loss rate: 0.05%

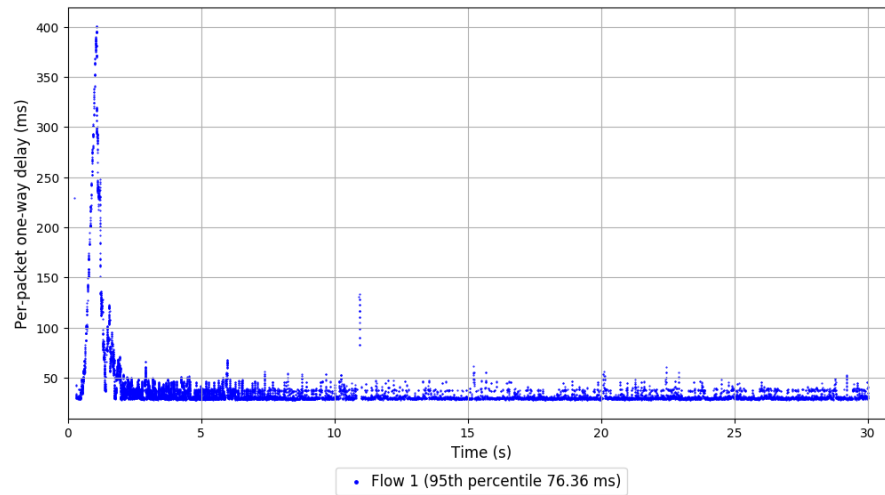
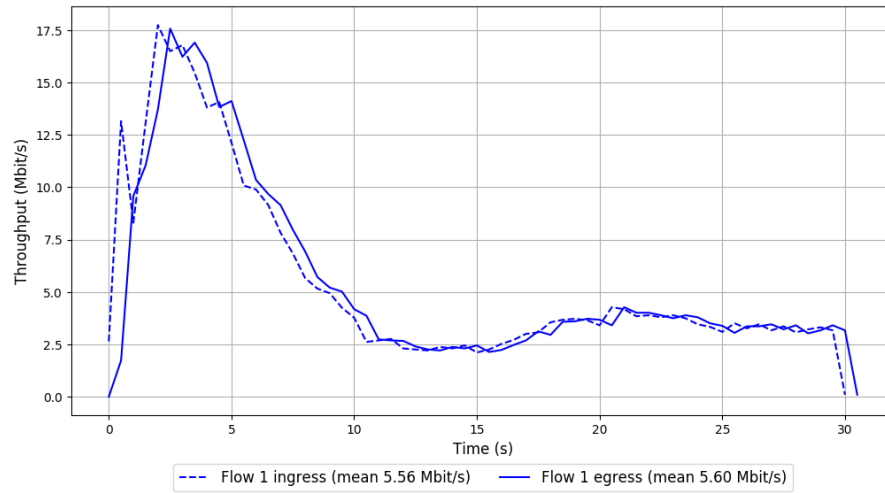
-- Flow 1:

Average throughput: 5.60 Mbit/s

95th percentile per-packet one-way delay: 76.357 ms

Loss rate: 0.05%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2019-02-05 01:32:44

End at: 2019-02-05 01:33:14

Local clock offset: 3.293 ms

Remote clock offset: 0.769 ms

Below is generated by plot.py at 2019-02-05 02:05:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.33 Mbit/s

95th percentile per-packet one-way delay: 78.675 ms

Loss rate: 0.04%

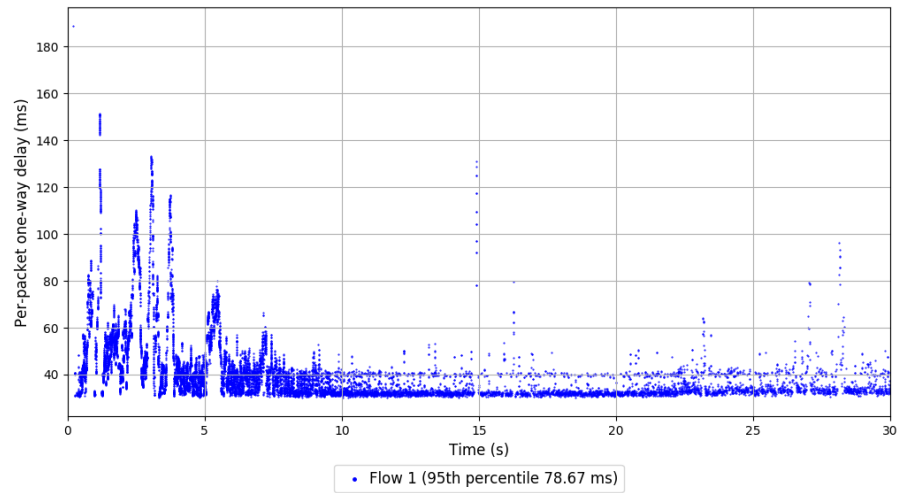
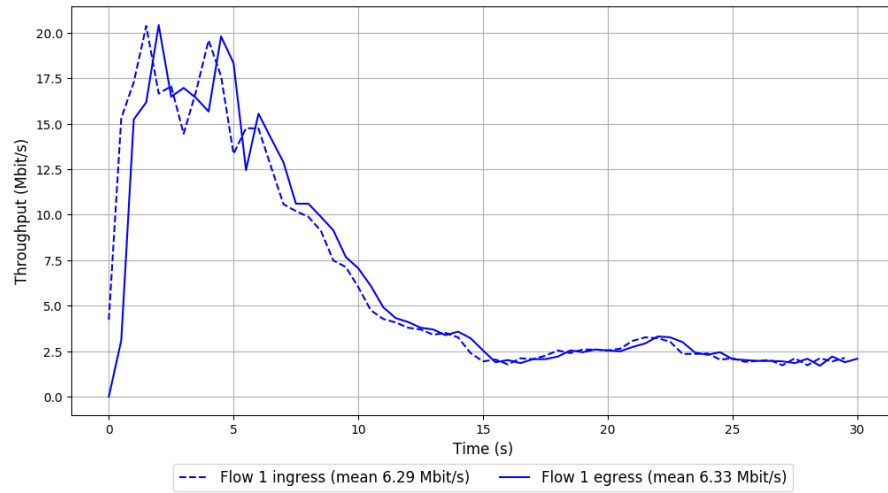
-- Flow 1:

Average throughput: 6.33 Mbit/s

95th percentile per-packet one-way delay: 78.675 ms

Loss rate: 0.04%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2019-02-05 01:58:30

End at: 2019-02-05 01:59:00

Local clock offset: 1.152 ms

Remote clock offset: 0.539 ms

Below is generated by plot.py at 2019-02-05 02:05:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.56 Mbit/s

95th percentile per-packet one-way delay: 164.443 ms

Loss rate: 0.05%

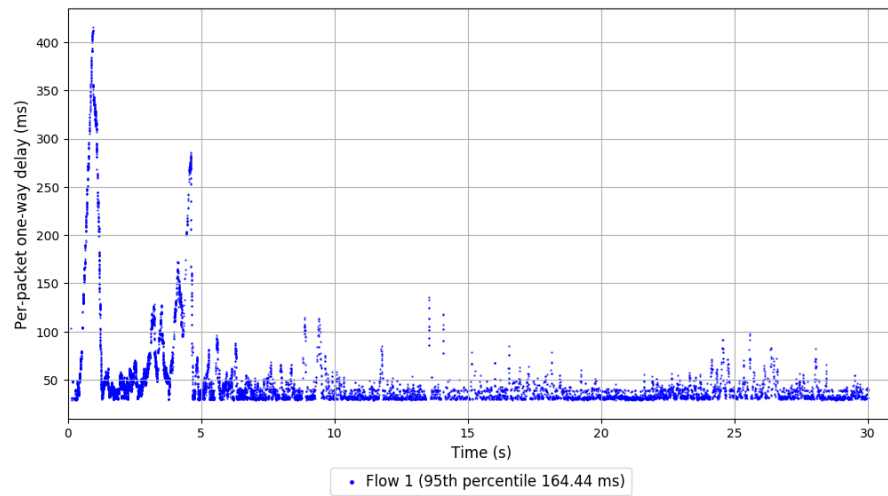
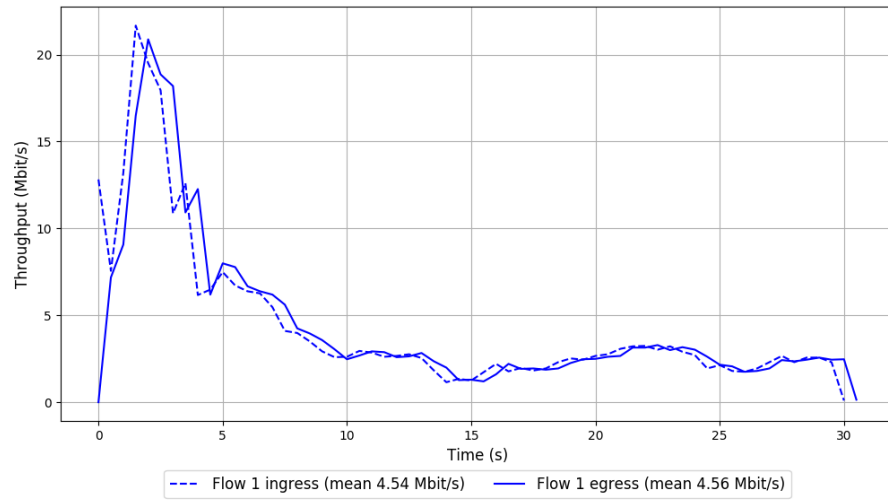
-- Flow 1:

Average throughput: 4.56 Mbit/s

95th percentile per-packet one-way delay: 164.443 ms

Loss rate: 0.05%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2019-02-05 00:50:56

End at: 2019-02-05 00:51:26

Local clock offset: 3.582 ms

Remote clock offset: -0.8 ms

Below is generated by plot.py at 2019-02-05 02:05:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 6.84 Mbit/s

95th percentile per-packet one-way delay: 590.214 ms

Loss rate: 0.32%

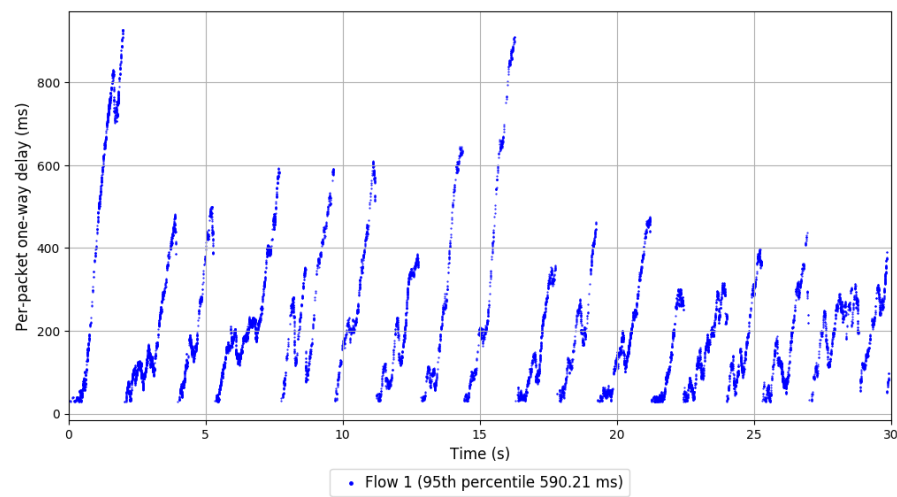
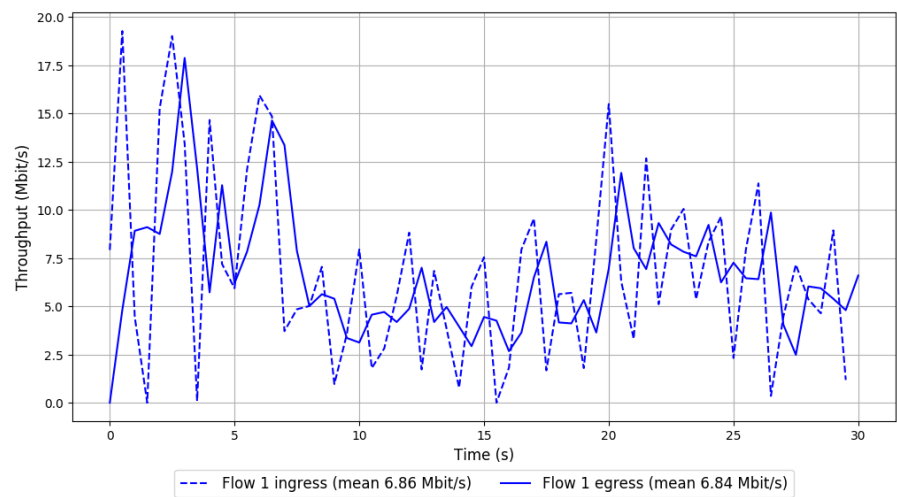
-- Flow 1:

Average throughput: 6.84 Mbit/s

95th percentile per-packet one-way delay: 590.214 ms

Loss rate: 0.32%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-02-05 01:16:41

End at: 2019-02-05 01:17:11

Local clock offset: 1.183 ms

Remote clock offset: 1.882 ms

Below is generated by plot.py at 2019-02-05 02:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 14.85 Mbit/s

95th percentile per-packet one-way delay: 472.772 ms

Loss rate: 1.08%

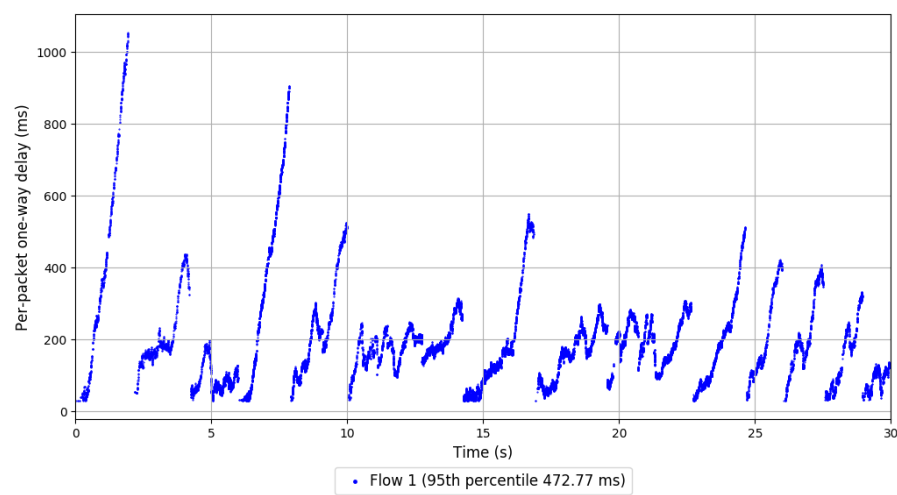
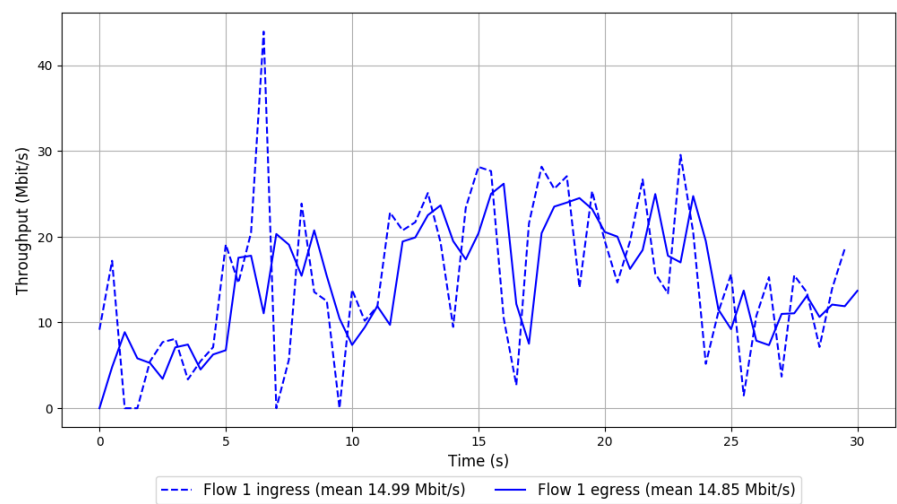
-- Flow 1:

Average throughput: 14.85 Mbit/s

95th percentile per-packet one-way delay: 472.772 ms

Loss rate: 1.08%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2019-02-05 01:42:32

End at: 2019-02-05 01:43:02

Local clock offset: 3.986 ms

Remote clock offset: 0.742 ms

Below is generated by plot.py at 2019-02-05 02:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.16 Mbit/s

95th percentile per-packet one-way delay: 385.321 ms

Loss rate: 0.40%

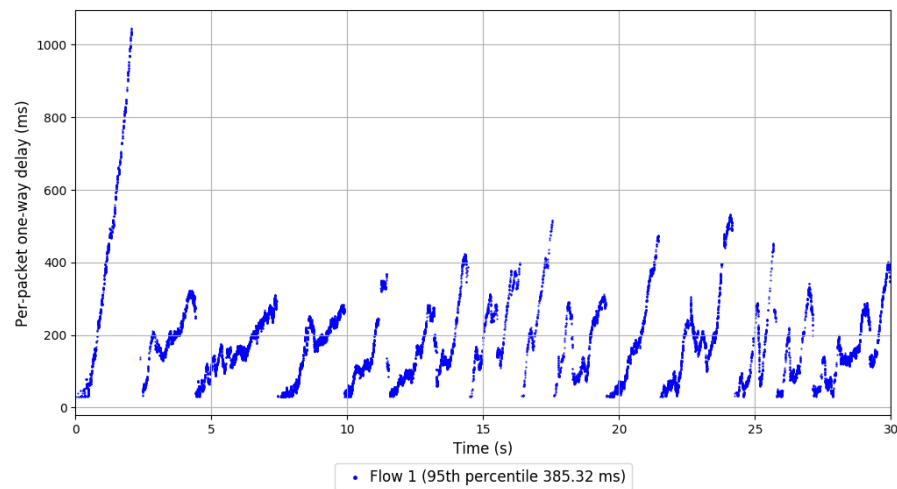
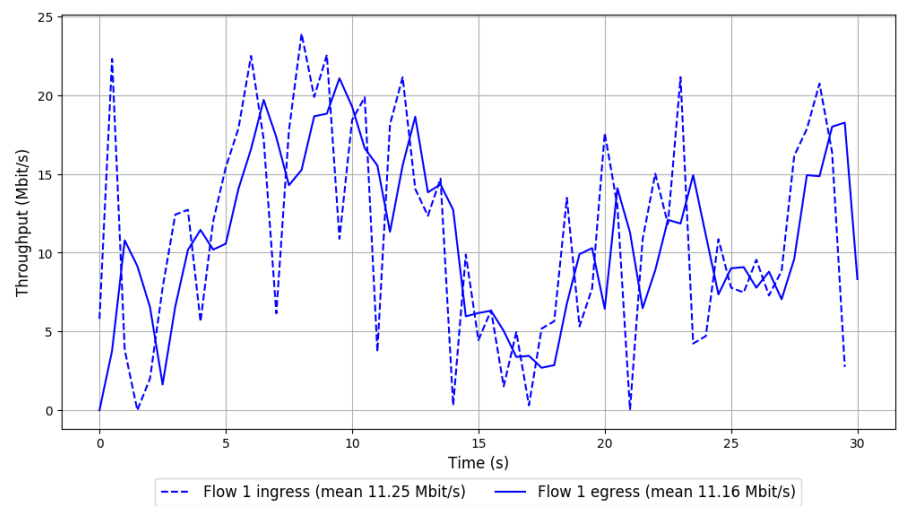
-- Flow 1:

Average throughput: 11.16 Mbit/s

95th percentile per-packet one-way delay: 385.321 ms

Loss rate: 0.40%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-02-05 01:05:39

End at: 2019-02-05 01:06:09

Local clock offset: 3.508 ms

Remote clock offset: 1.068 ms

Below is generated by plot.py at 2019-02-05 02:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.07 Mbit/s

95th percentile per-packet one-way delay: 39.481 ms

Loss rate: 0.10%

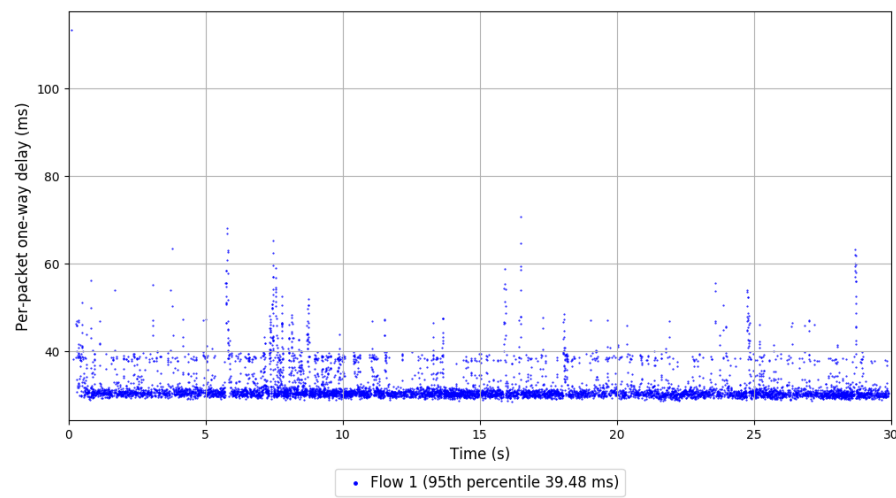
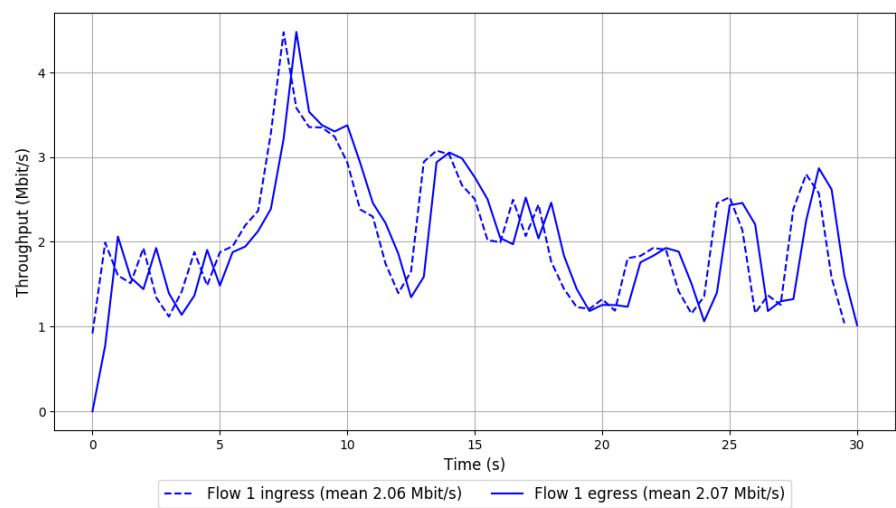
-- Flow 1:

Average throughput: 2.07 Mbit/s

95th percentile per-packet one-way delay: 39.481 ms

Loss rate: 0.10%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-02-05 01:31:31

End at: 2019-02-05 01:32:01

Local clock offset: 3.208 ms

Remote clock offset: 0.715 ms

Below is generated by plot.py at 2019-02-05 02:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.22 Mbit/s

95th percentile per-packet one-way delay: 1036.804 ms

Loss rate: 5.57%

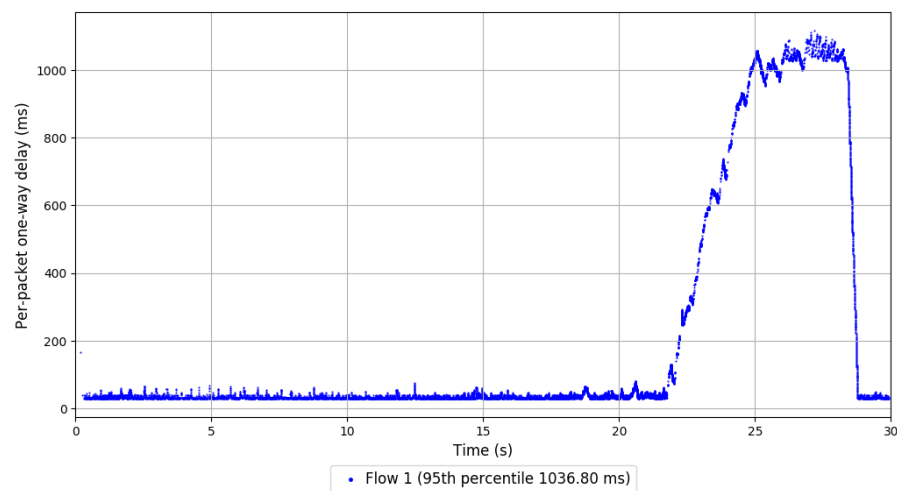
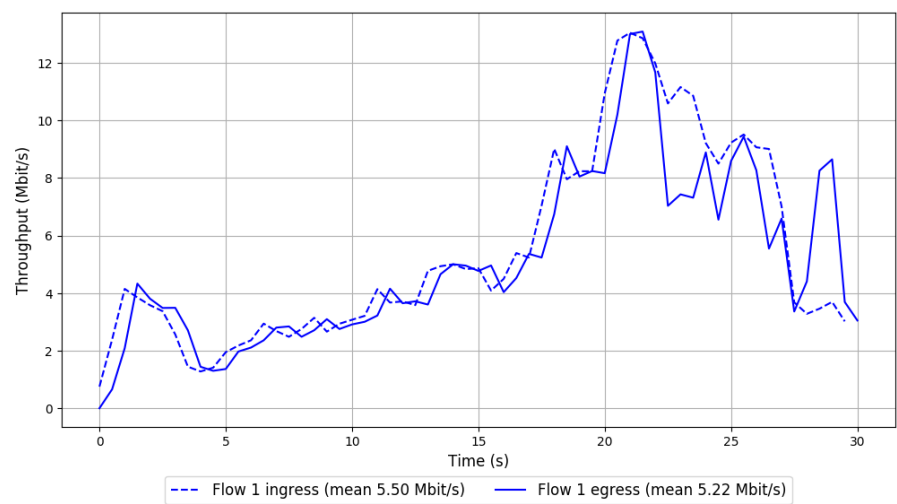
-- Flow 1:

Average throughput: 5.22 Mbit/s

95th percentile per-packet one-way delay: 1036.804 ms

Loss rate: 5.57%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-02-05 01:57:16

End at: 2019-02-05 01:57:46

Local clock offset: 1.294 ms

Remote clock offset: 0.56 ms

Below is generated by plot.py at 2019-02-05 02:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.65 Mbit/s

95th percentile per-packet one-way delay: 41.875 ms

Loss rate: 0.19%

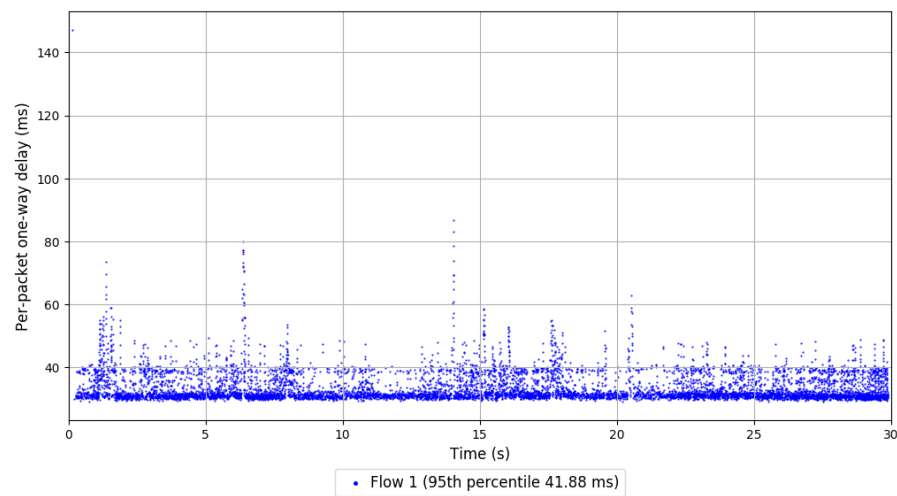
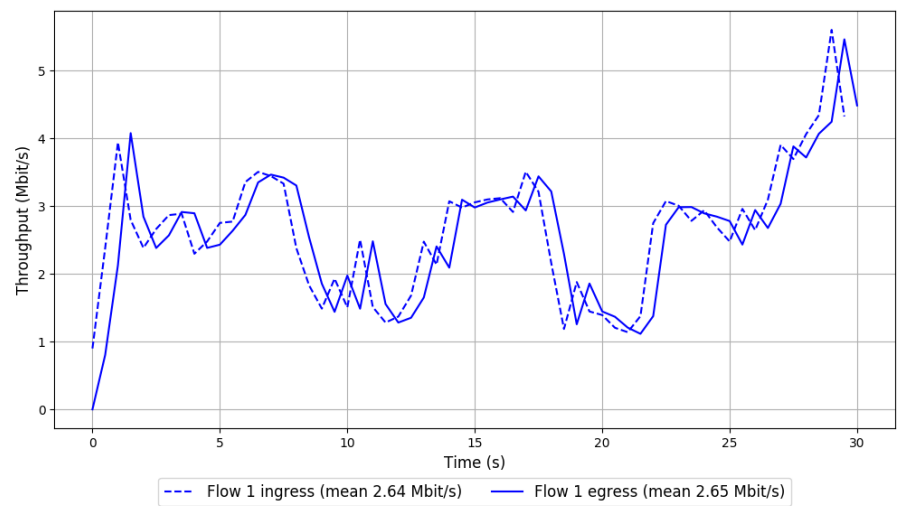
-- Flow 1:

Average throughput: 2.65 Mbit/s

95th percentile per-packet one-way delay: 41.875 ms

Loss rate: 0.19%

Run 3: Report of PCC-Vivace — Data Link

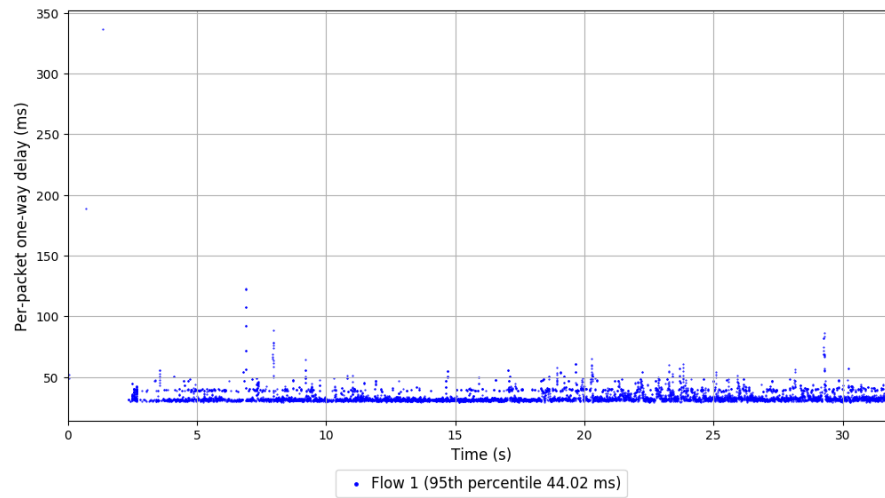
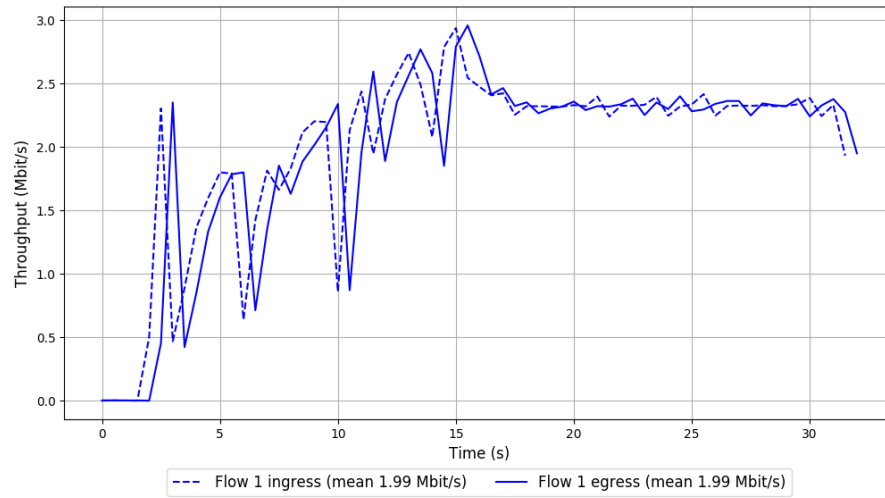


Run 1: Statistics of WebRTC media

Start at: 2019-02-05 00:49:42
End at: 2019-02-05 00:50:12
Local clock offset: 3.447 ms
Remote clock offset: -1.056 ms

Below is generated by plot.py at 2019-02-05 02:05:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 44.018 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 44.018 ms
Loss rate: 0.11%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-02-05 01:15:28

End at: 2019-02-05 01:15:58

Local clock offset: 1.11 ms

Remote clock offset: 1.771 ms

Below is generated by plot.py at 2019-02-05 02:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 41.304 ms

Loss rate: 0.00%

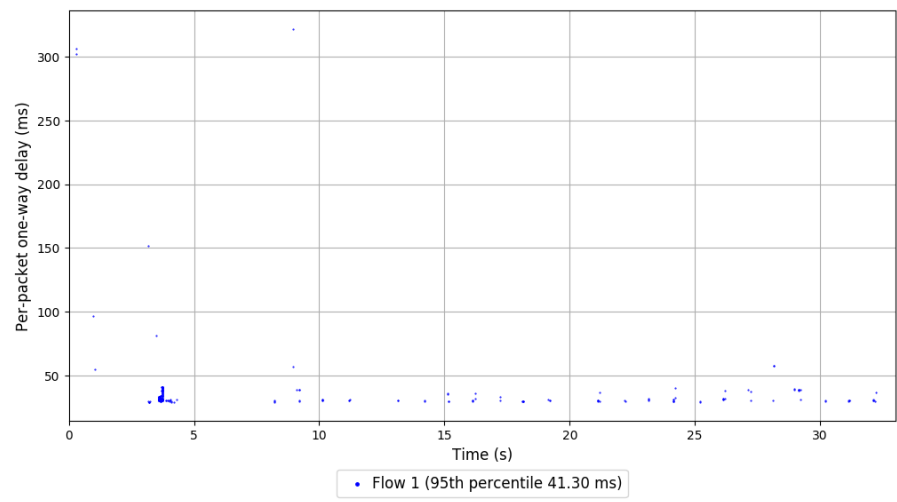
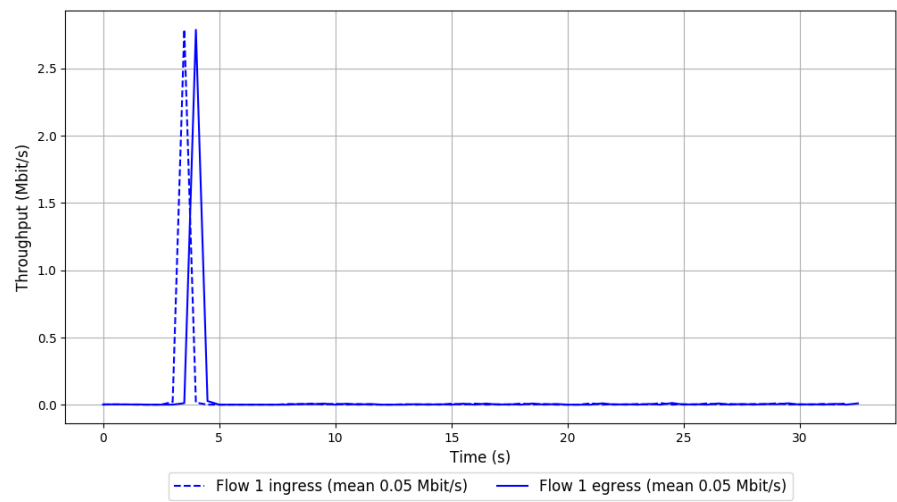
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 41.304 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-02-05 01:41:19

End at: 2019-02-05 01:41:49

Local clock offset: 3.909 ms

Remote clock offset: 0.733 ms

Below is generated by plot.py at 2019-02-05 02:05:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 41.347 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 41.347 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

