

Pantheon Report

Generated at 2019-01-21 04:52:21 (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:

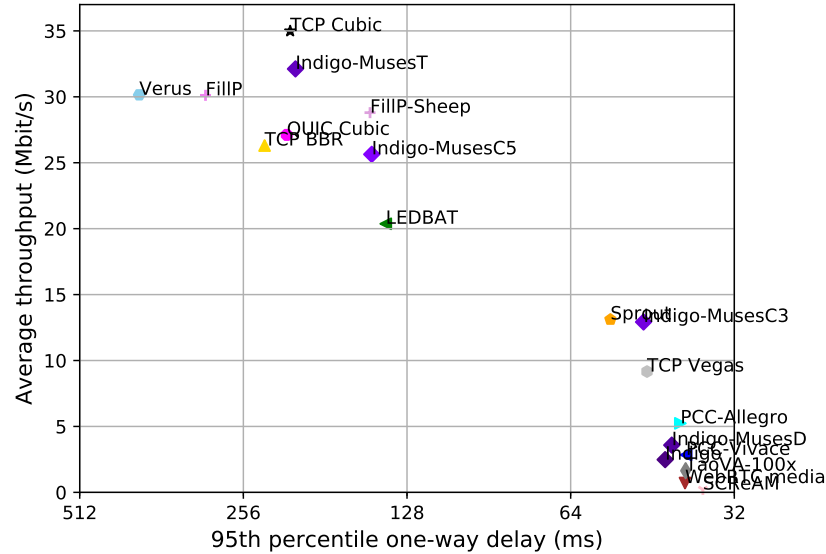
```
Linux 4.15.0-1031-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

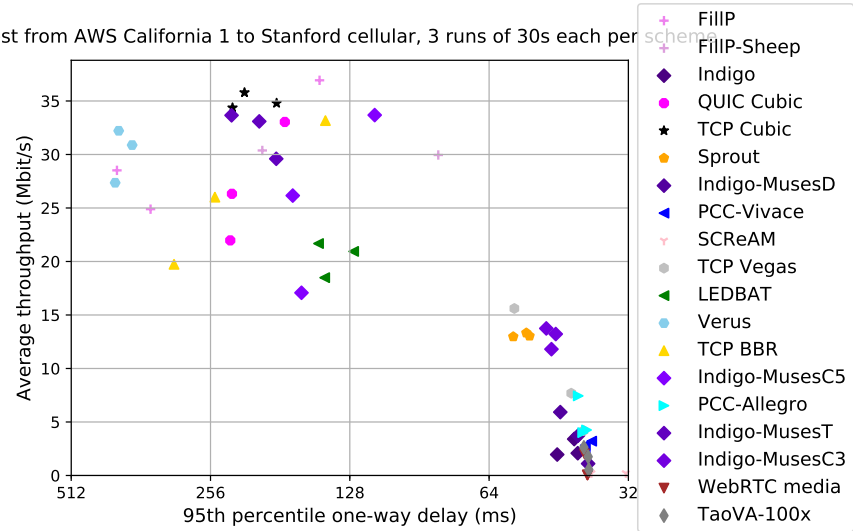
```
branch: muses @ 89d24e57783e7fbfec537a619071de937b639e38
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf5e58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 1ddcff131048c6962f123bcd22b4d166a422adde
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



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	26.31	233.98	0.45
Copa	0	N/A	N/A	N/A
TCP Cubic	3	34.99	209.96	0.42
FillP	3	30.11	300.52	0.46
FillP-Sheep	3	28.80	149.71	0.18
Indigo	3	2.48	42.89	0.04
Indigo-MusesC3	3	12.92	47.00	0.07
Indigo-MusesC5	3	25.64	148.63	0.19
Indigo-MusesD	3	3.58	41.71	0.15
Indigo-MusesT	3	32.12	205.32	0.51
LEDBAT	3	20.37	140.07	0.25
PCC-Allegro	3	5.23	40.21	0.11
PCC-Expr	0	N/A	N/A	N/A
QUIC Cubic	3	27.11	213.00	0.48
SCReAM	3	0.22	36.56	0.13
Sprout	3	13.11	54.08	0.13
TaoVA-100x	3	1.64	39.33	62.76
TCP Vegas	3	9.16	46.32	0.05
Verus	3	30.15	397.91	1.72
PCC-Vivace	3	2.84	39.27	0.07
WebRTC media	3	0.71	39.43	0.06

Run 1: Statistics of TCP BBR

Start at: 2019-01-21 03:48:33

End at: 2019-01-21 03:49:03

Local clock offset: -0.809 ms

Remote clock offset: 0.505 ms

Below is generated by plot.py at 2019-01-21 04:50:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 26.01 Mbit/s

95th percentile per-packet one-way delay: 250.489 ms

Loss rate: 0.37%

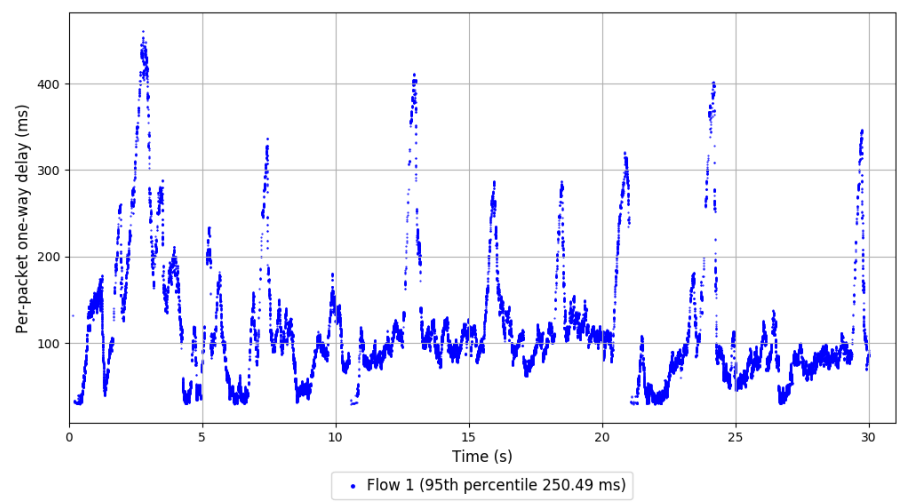
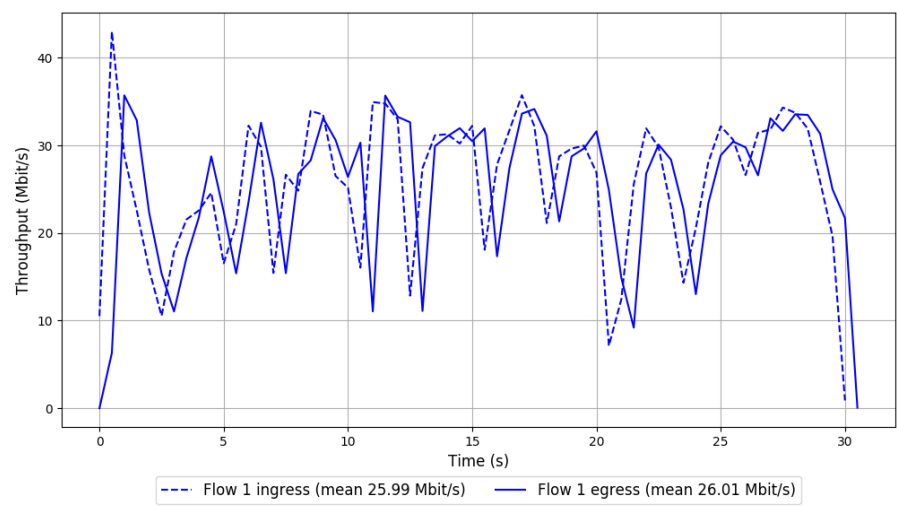
-- Flow 1:

Average throughput: 26.01 Mbit/s

95th percentile per-packet one-way delay: 250.489 ms

Loss rate: 0.37%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-01-21 04:14:13

End at: 2019-01-21 04:14:43

Local clock offset: -2.032 ms

Remote clock offset: 0.036 ms

Below is generated by plot.py at 2019-01-21 04:50:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 19.74 Mbit/s

95th percentile per-packet one-way delay: 306.951 ms

Loss rate: 0.63%

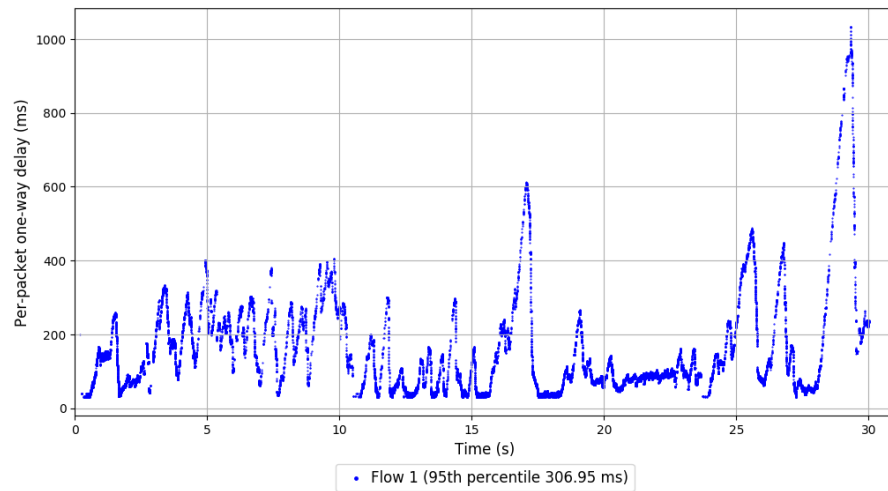
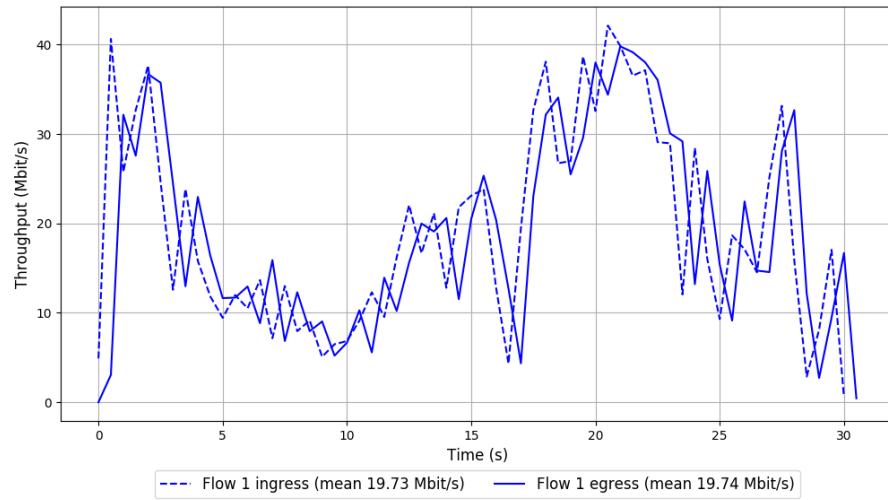
-- Flow 1:

Average throughput: 19.74 Mbit/s

95th percentile per-packet one-way delay: 306.951 ms

Loss rate: 0.63%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-01-21 04:39:55

End at: 2019-01-21 04:40:25

Local clock offset: 4.055 ms

Remote clock offset: -2.561 ms

Below is generated by plot.py at 2019-01-21 04:50:52

Datalink statistics

-- Total of 1 flow:

Average throughput: 33.17 Mbit/s

95th percentile per-packet one-way delay: 144.503 ms

Loss rate: 0.35%

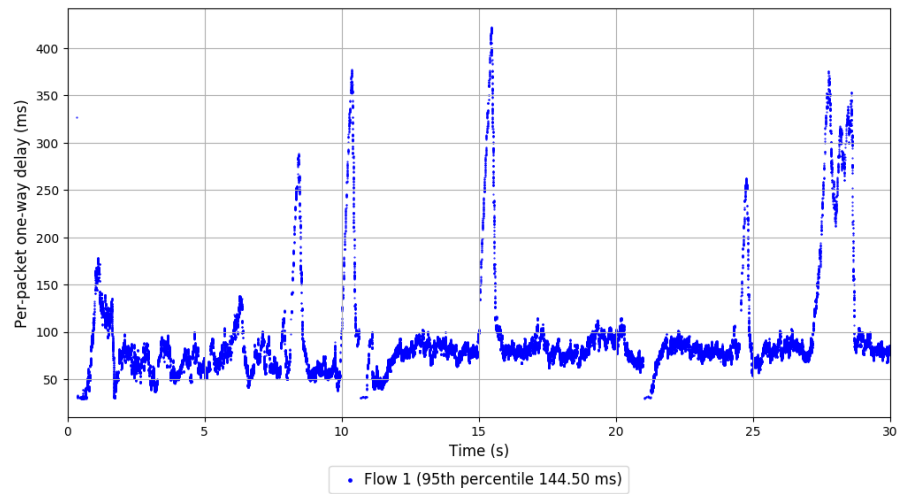
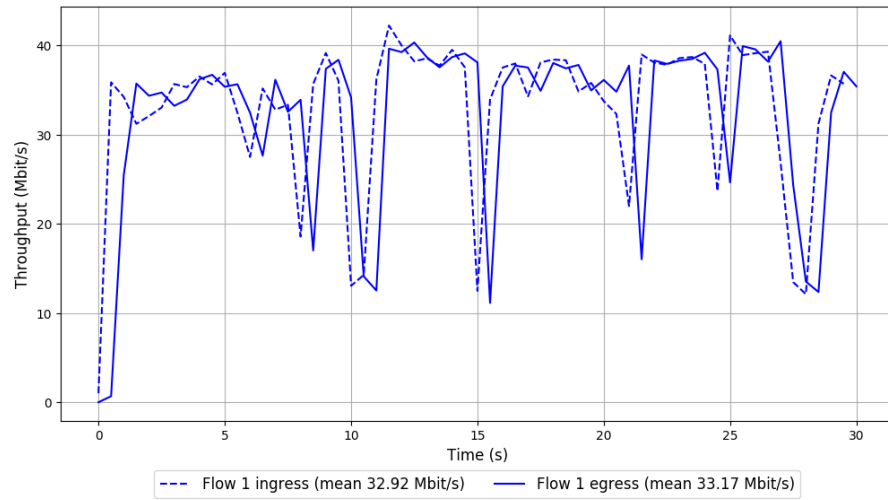
-- Flow 1:

Average throughput: 33.17 Mbit/s

95th percentile per-packet one-way delay: 144.503 ms

Loss rate: 0.35%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

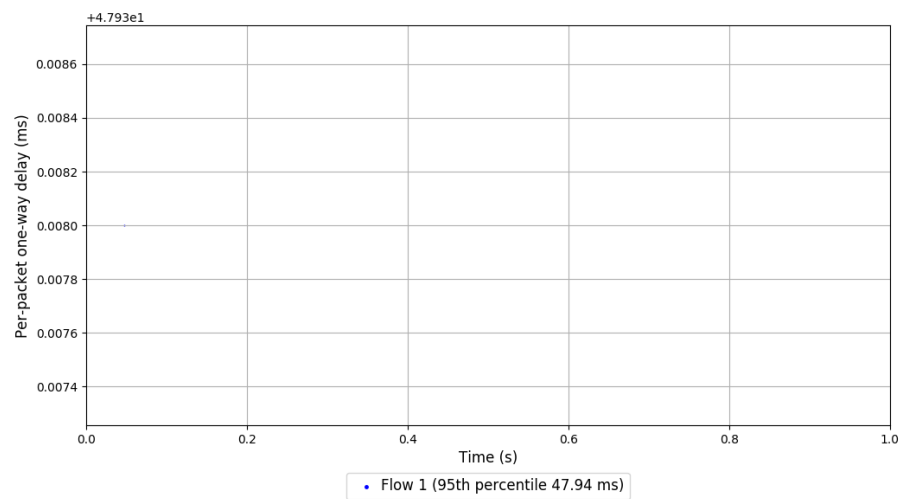
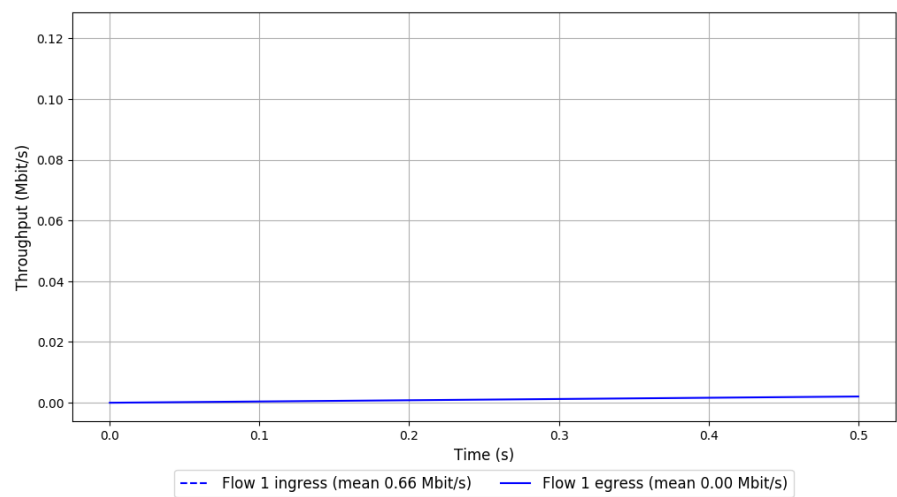
Start at: 2019-01-21 03:37:32

End at: 2019-01-21 03:38:02

Local clock offset: -0.106 ms

Remote clock offset: 0.285 ms

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

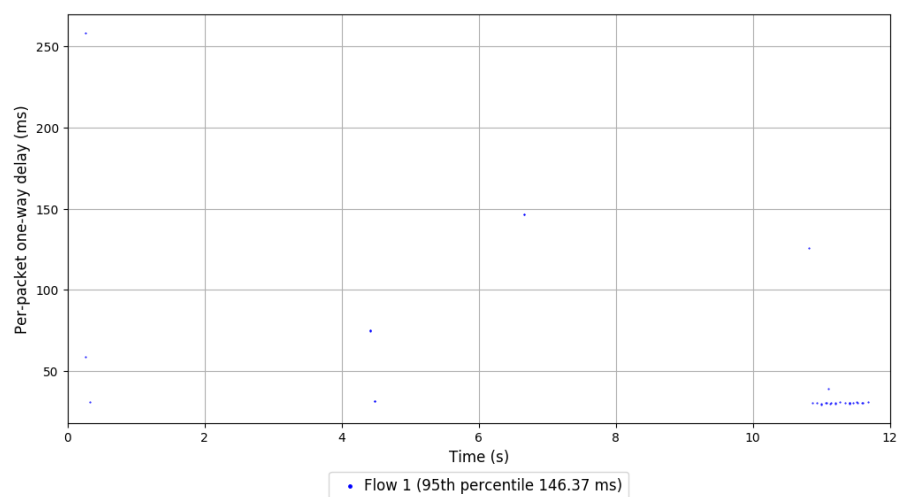
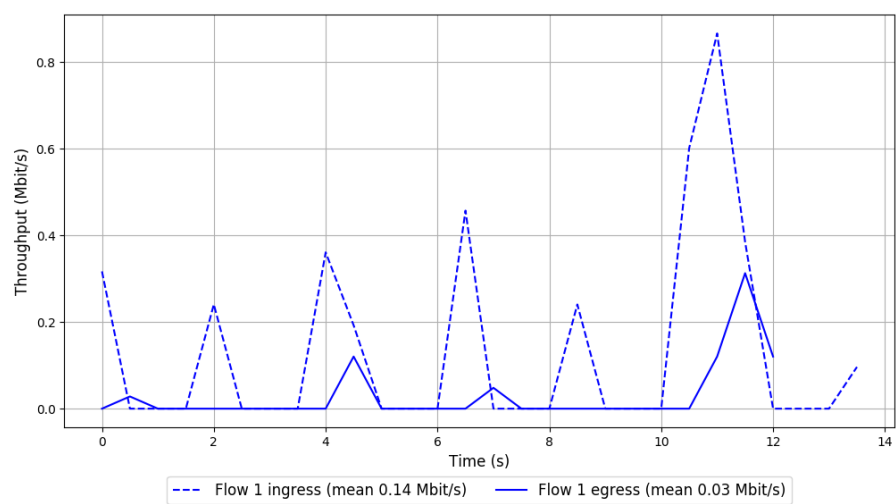
Start at: 2019-01-21 04:03:13

End at: 2019-01-21 04:03:43

Local clock offset: -1.519 ms

Remote clock offset: 0.249 ms

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

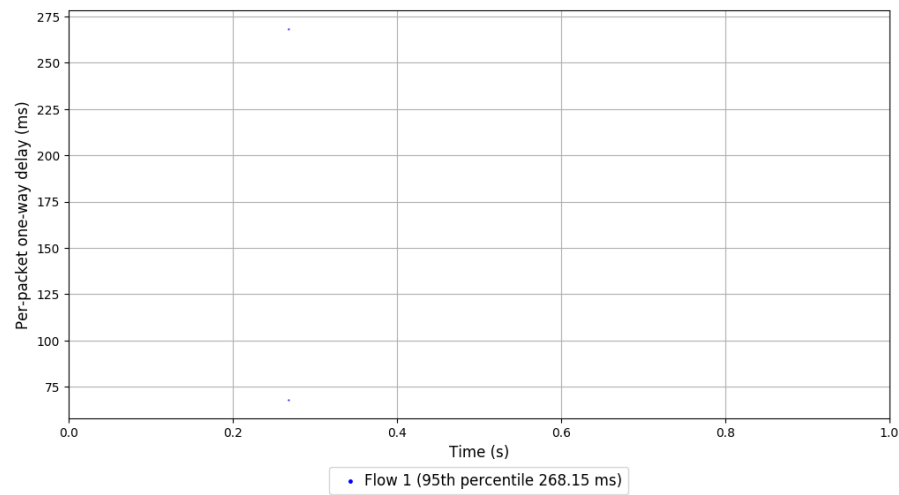
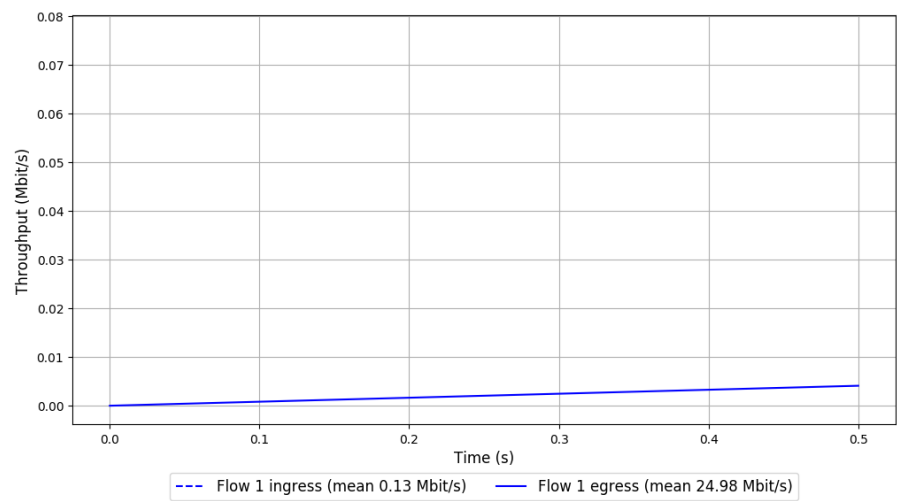
Start at: 2019-01-21 04:28:54

End at: 2019-01-21 04:29:24

Local clock offset: 2.149 ms

Remote clock offset: 0.123 ms

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-01-21 03:58:19

End at: 2019-01-21 03:58:49

Local clock offset: -1.288 ms

Remote clock offset: 0.297 ms

Below is generated by plot.py at 2019-01-21 04:50:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 35.79 Mbit/s

95th percentile per-packet one-way delay: 216.161 ms

Loss rate: 0.33%

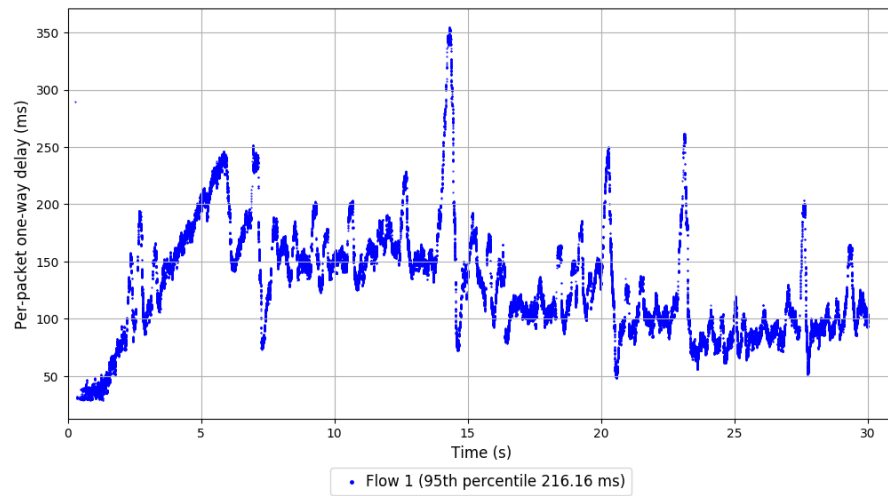
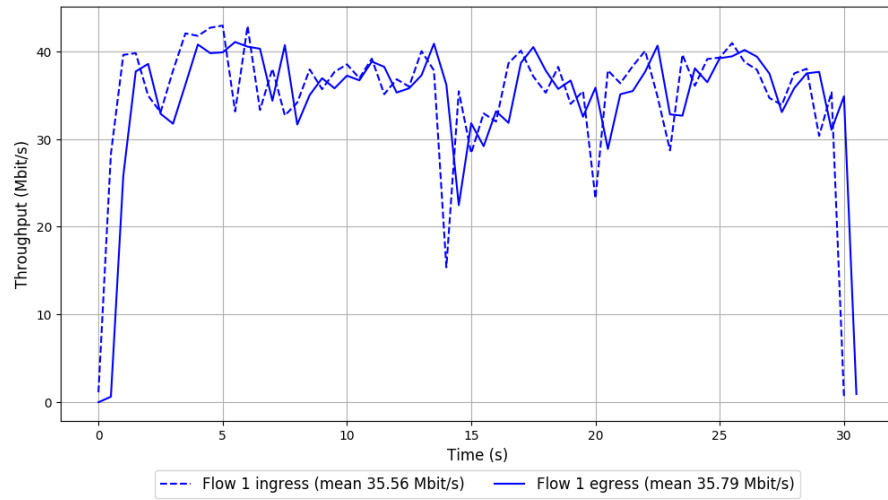
-- Flow 1:

Average throughput: 35.79 Mbit/s

95th percentile per-packet one-way delay: 216.161 ms

Loss rate: 0.33%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-01-21 04:23:59

End at: 2019-01-21 04:24:29

Local clock offset: 0.475 ms

Remote clock offset: 0.089 ms

Below is generated by plot.py at 2019-01-21 04:50:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 34.37 Mbit/s

95th percentile per-packet one-way delay: 229.455 ms

Loss rate: 0.51%

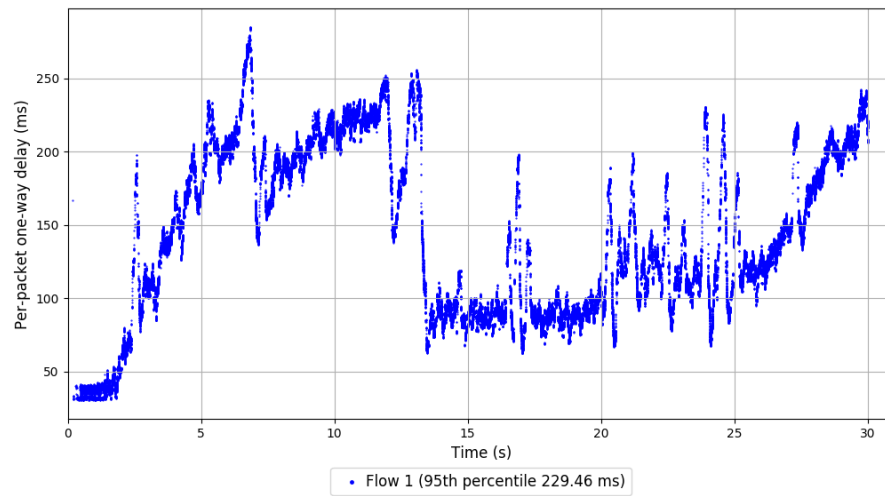
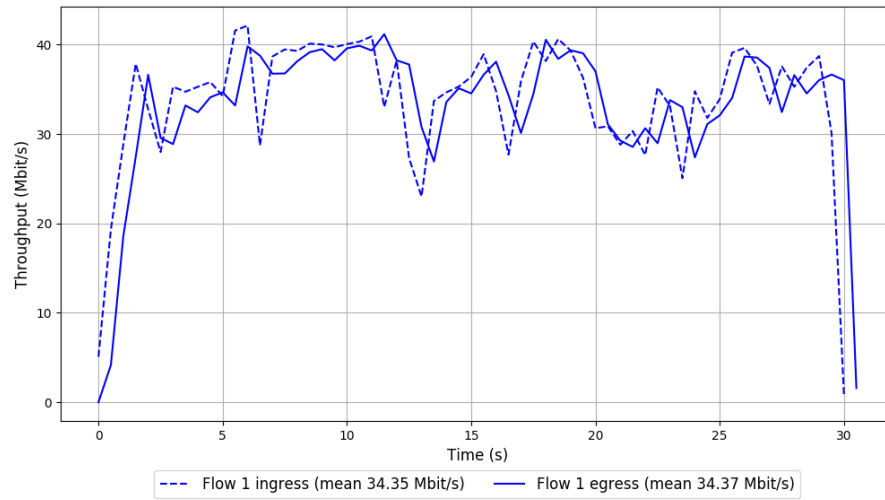
-- Flow 1:

Average throughput: 34.37 Mbit/s

95th percentile per-packet one-way delay: 229.455 ms

Loss rate: 0.51%

Run 2: Report of TCP Cubic — Data Link

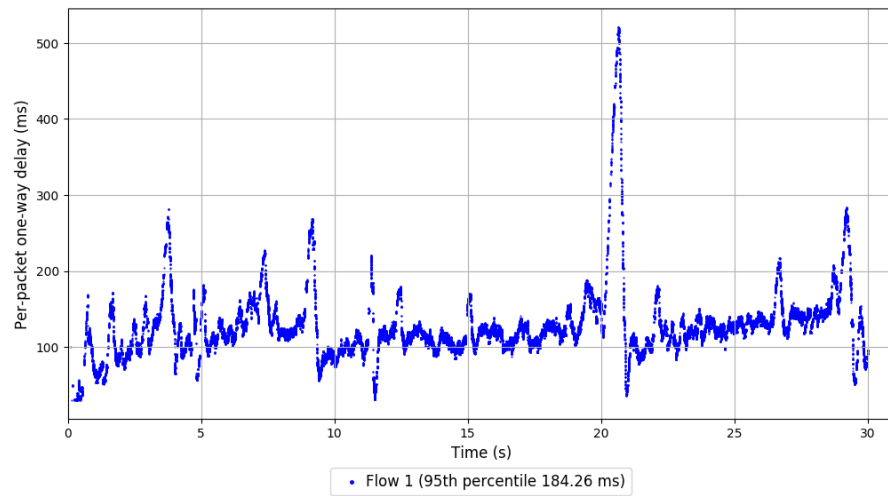
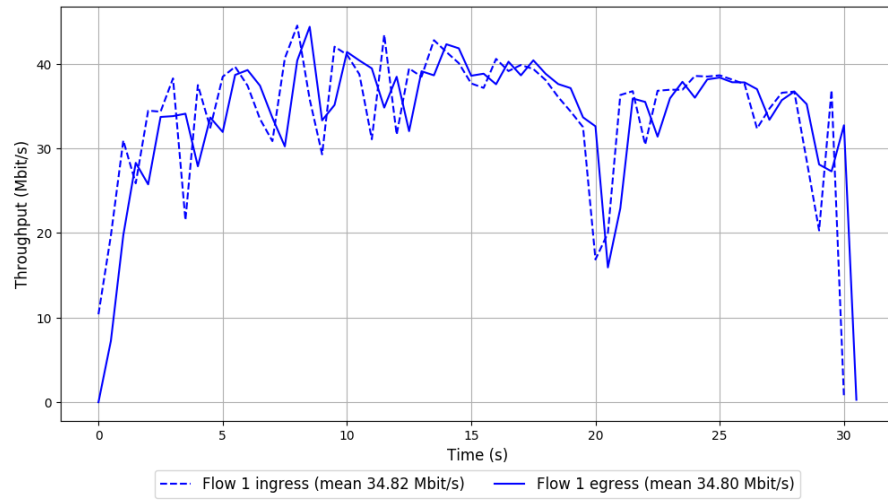


Run 3: Statistics of TCP Cubic

Start at: 2019-01-21 04:49:42
End at: 2019-01-21 04:50:12
Local clock offset: 4.74 ms
Remote clock offset: -3.732 ms

Below is generated by plot.py at 2019-01-21 04:50:55
Datalink statistics
-- Total of 1 flow:
Average throughput: 34.80 Mbit/s
95th percentile per-packet one-way delay: 184.263 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 34.80 Mbit/s
95th percentile per-packet one-way delay: 184.263 ms
Loss rate: 0.41%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2019-01-21 03:42:25

End at: 2019-01-21 03:42:55

Local clock offset: -0.454 ms

Remote clock offset: 0.364 ms

Below is generated by plot.py at 2019-01-21 04:50:55

Datalink statistics

-- Total of 1 flow:

Average throughput: 24.89 Mbit/s

95th percentile per-packet one-way delay: 344.977 ms

Loss rate: 0.37%

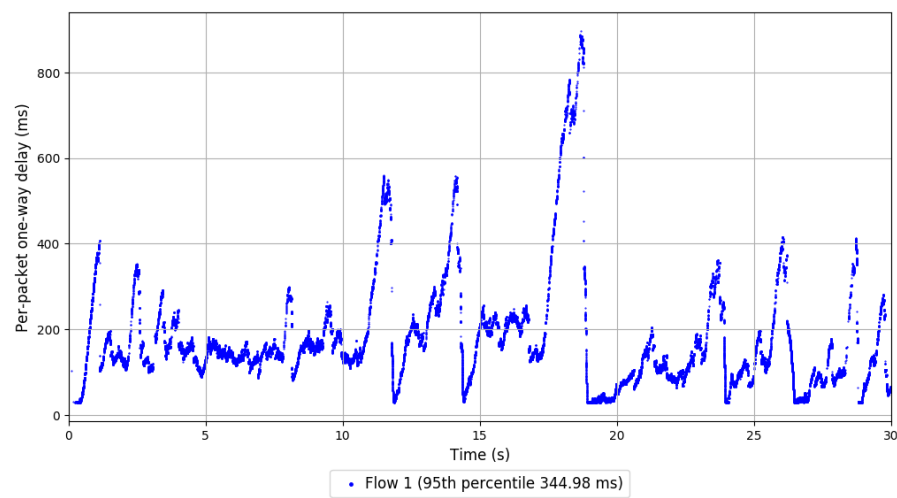
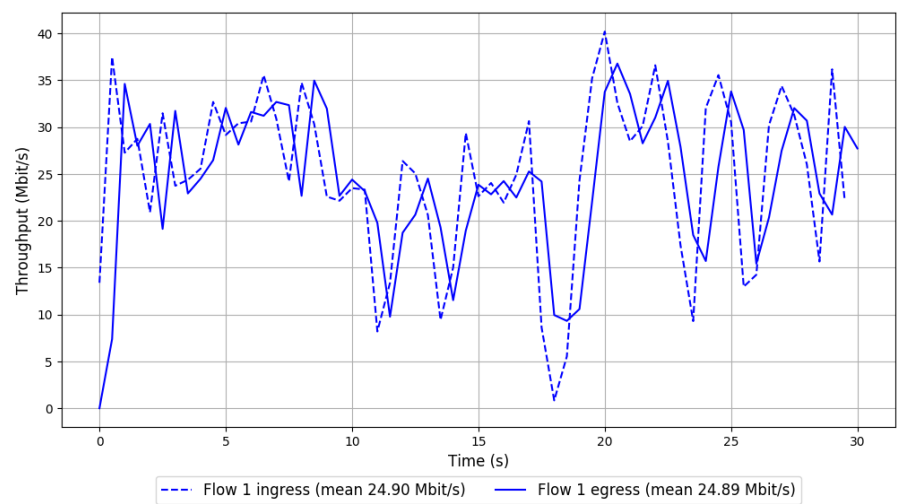
-- Flow 1:

Average throughput: 24.89 Mbit/s

95th percentile per-packet one-way delay: 344.977 ms

Loss rate: 0.37%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-01-21 04:08:06

End at: 2019-01-21 04:08:36

Local clock offset: -1.729 ms

Remote clock offset: 0.068 ms

Below is generated by plot.py at 2019-01-21 04:50:56

Datalink statistics

-- Total of 1 flow:

Average throughput: 28.52 Mbit/s

95th percentile per-packet one-way delay: 407.779 ms

Loss rate: 0.80%

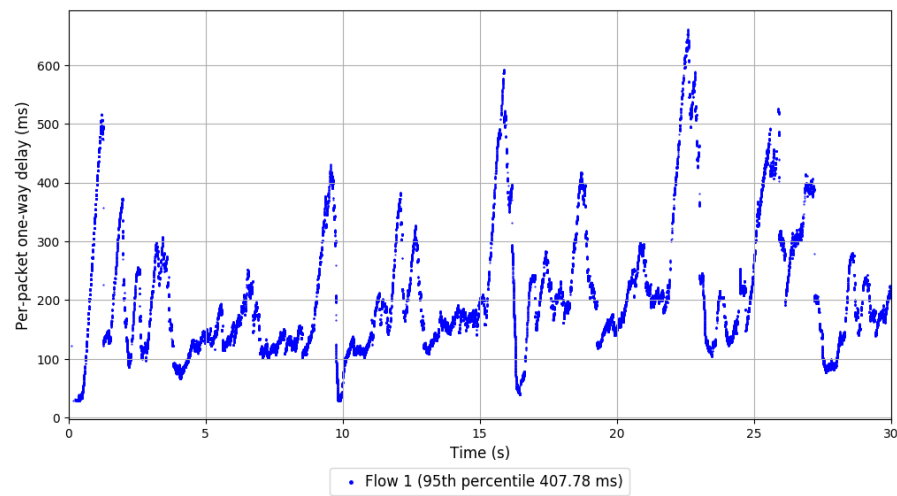
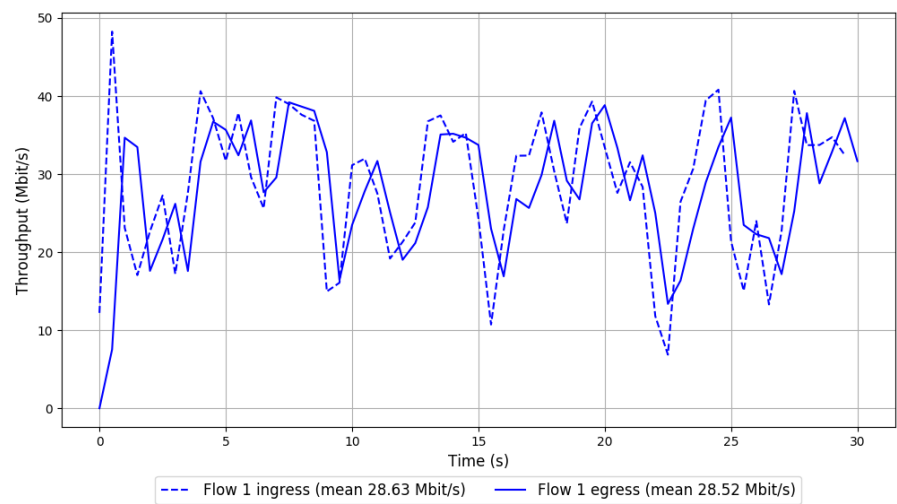
-- Flow 1:

Average throughput: 28.52 Mbit/s

95th percentile per-packet one-way delay: 407.779 ms

Loss rate: 0.80%

Run 2: Report of FillP — Data Link

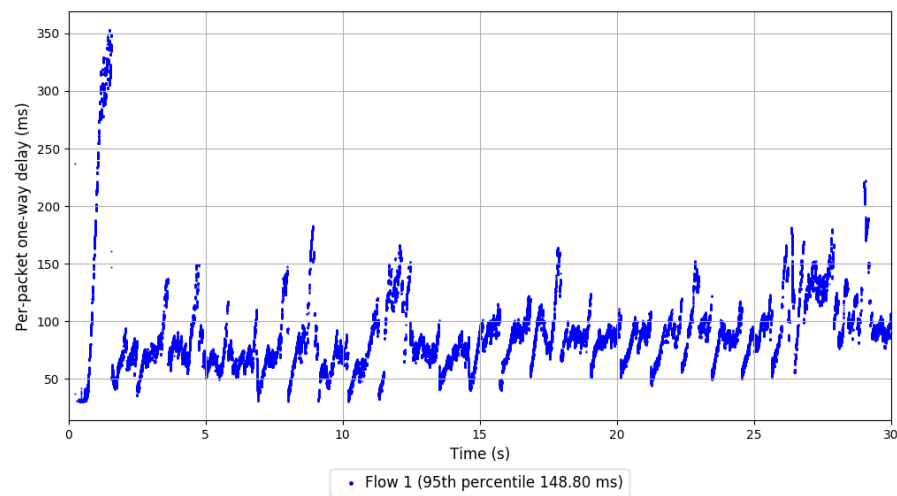
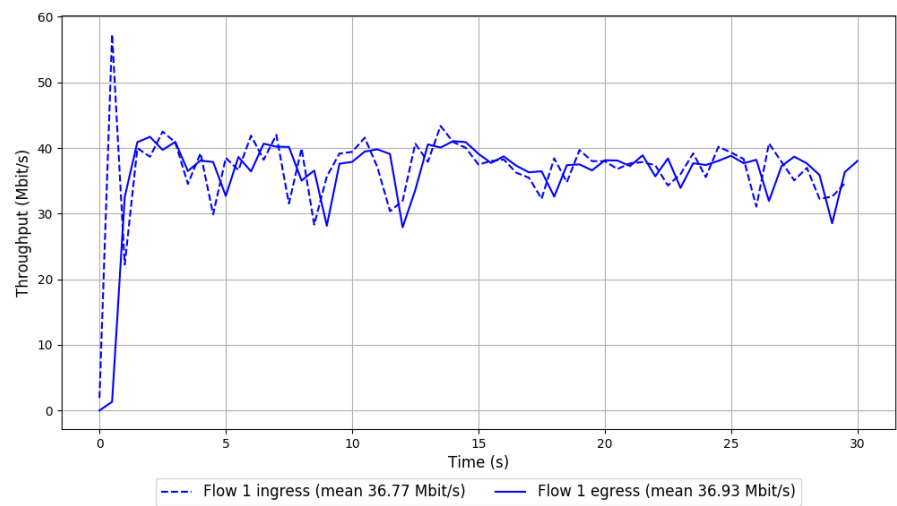


Run 3: Statistics of FillP

Start at: 2019-01-21 04:33:47
End at: 2019-01-21 04:34:17
Local clock offset: 3.236 ms
Remote clock offset: -1.374 ms

Below is generated by plot.py at 2019-01-21 04:51:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 36.93 Mbit/s
95th percentile per-packet one-way delay: 148.797 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 36.93 Mbit/s
95th percentile per-packet one-way delay: 148.797 ms
Loss rate: 0.20%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-01-21 03:35:05

End at: 2019-01-21 03:35:35

Local clock offset: 0.111 ms

Remote clock offset: 0.316 ms

Below is generated by plot.py at 2019-01-21 04:51:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 29.95 Mbit/s

95th percentile per-packet one-way delay: 82.415 ms

Loss rate: 0.12%

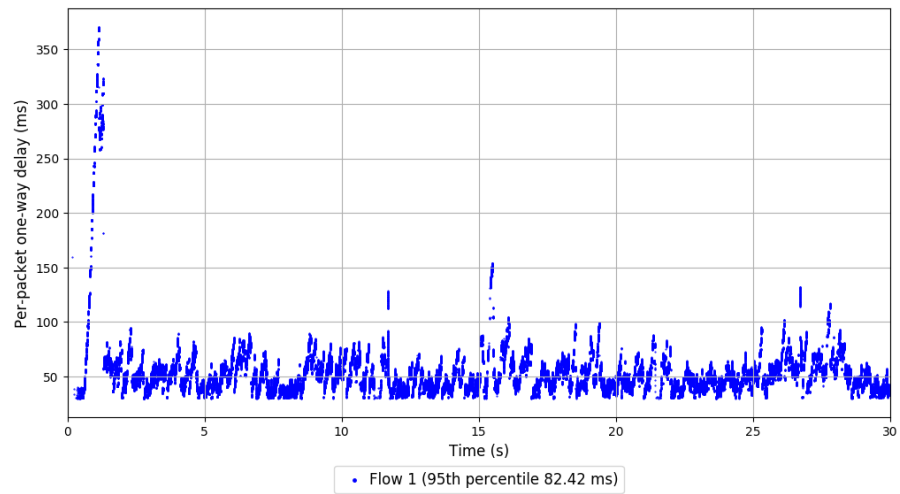
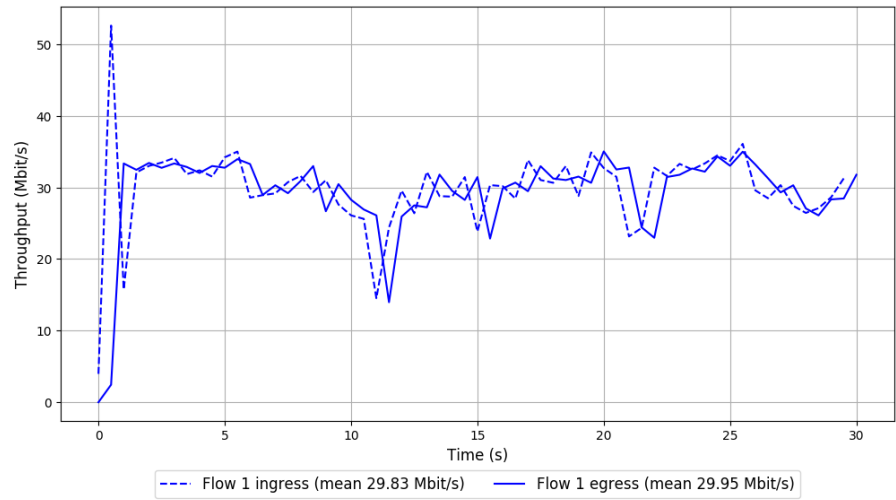
-- Flow 1:

Average throughput: 29.95 Mbit/s

95th percentile per-packet one-way delay: 82.415 ms

Loss rate: 0.12%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-01-21 04:00:46

End at: 2019-01-21 04:01:16

Local clock offset: -1.388 ms

Remote clock offset: 0.213 ms

Below is generated by plot.py at 2019-01-21 04:51:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 26.07 Mbit/s

95th percentile per-packet one-way delay: 168.879 ms

Loss rate: 0.05%

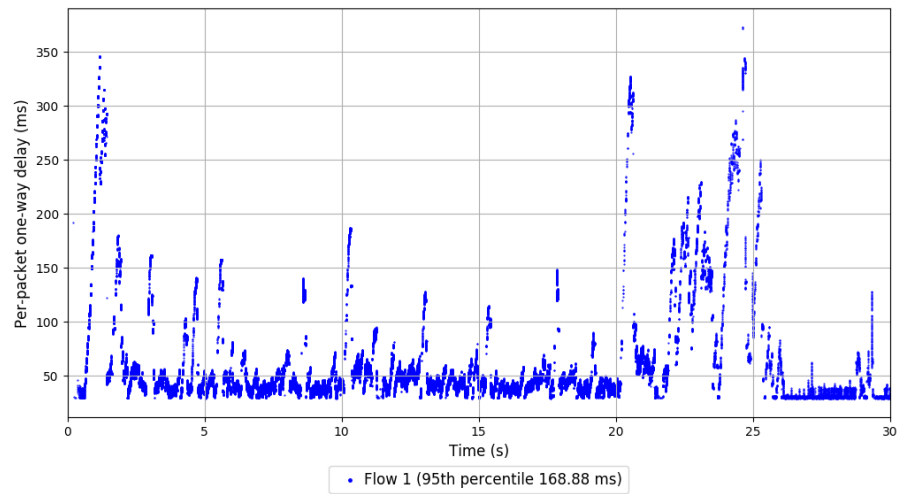
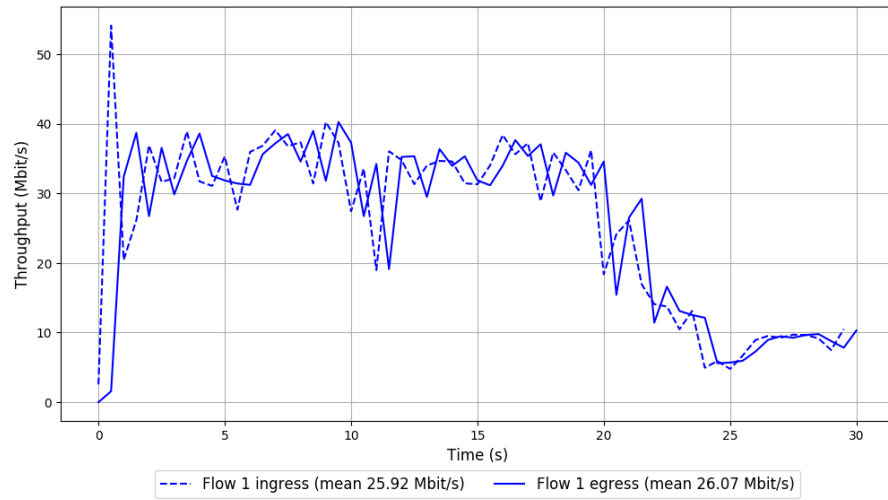
-- Flow 1:

Average throughput: 26.07 Mbit/s

95th percentile per-packet one-way delay: 168.879 ms

Loss rate: 0.05%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-01-21 04:26:27

End at: 2019-01-21 04:26:57

Local clock offset: 1.426 ms

Remote clock offset: 0.046 ms

Below is generated by plot.py at 2019-01-21 04:51:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 30.38 Mbit/s

95th percentile per-packet one-way delay: 197.827 ms

Loss rate: 0.38%

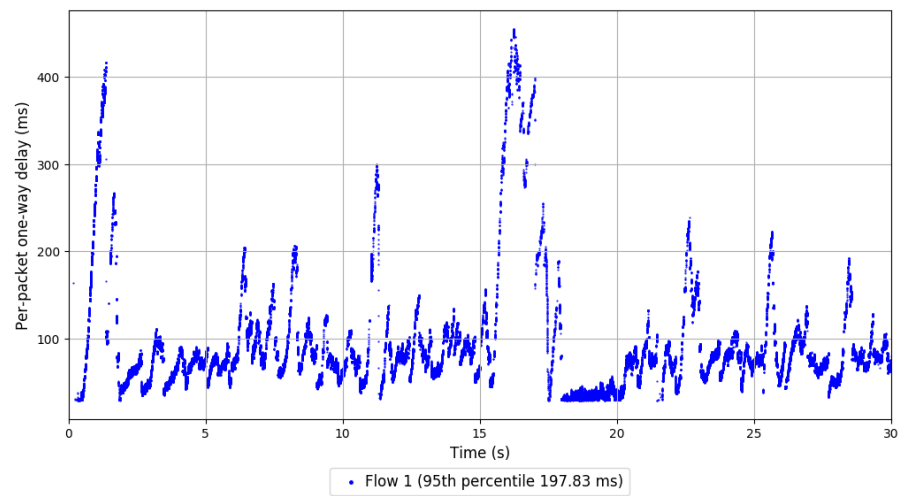
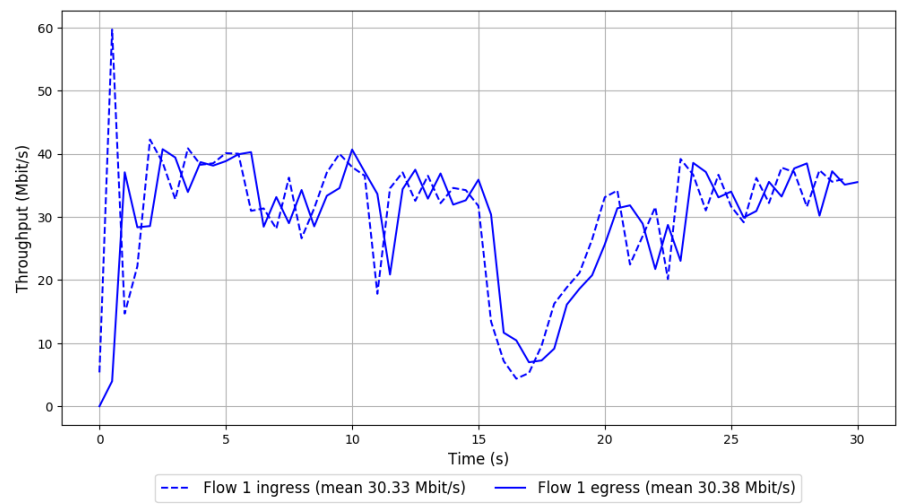
-- Flow 1:

Average throughput: 30.38 Mbit/s

95th percentile per-packet one-way delay: 197.827 ms

Loss rate: 0.38%

Run 3: Report of FillP-Sheep — Data Link

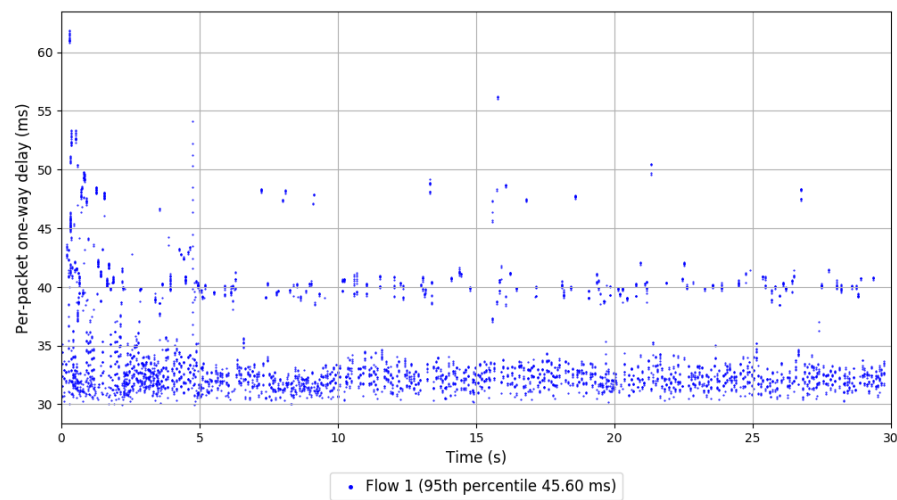
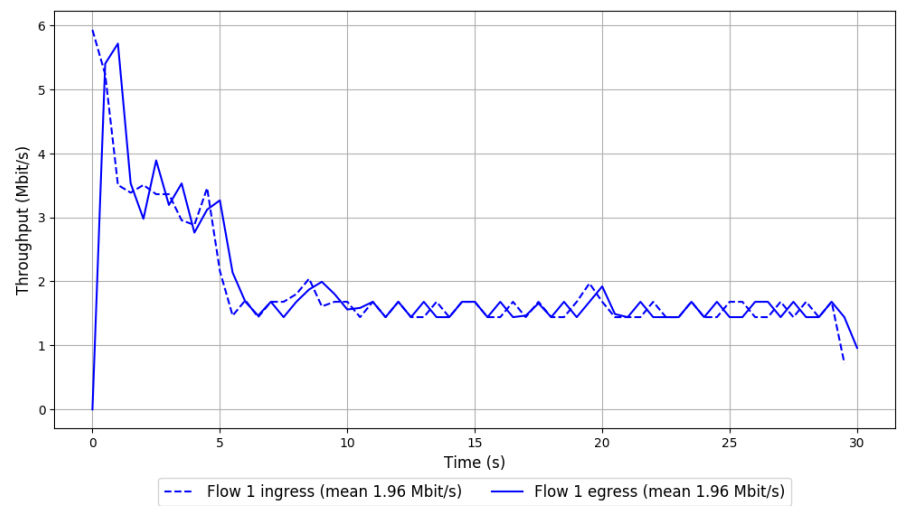


```
Run 1: Statistics of Indigo

Start at: 2019-01-21 03:55:52
End at: 2019-01-21 03:56:22
Local clock offset: -1.182 ms
Remote clock offset: 0.467 ms

# Below is generated by plot.py at 2019-01-21 04:51:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 45.602 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 45.602 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-01-21 04:21:33

End at: 2019-01-21 04:22:03

Local clock offset: -0.653 ms

Remote clock offset: 0.159 ms

Below is generated by plot.py at 2019-01-21 04:51:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.08 Mbit/s

95th percentile per-packet one-way delay: 41.174 ms

Loss rate: 0.04%

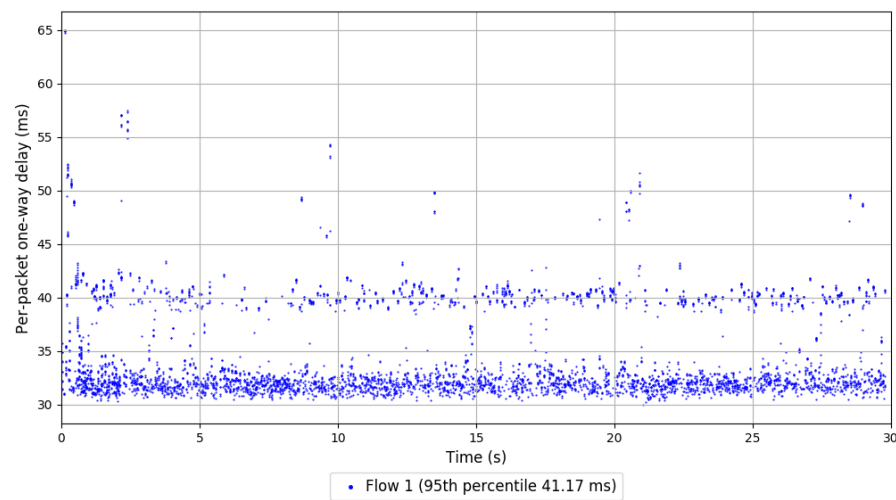
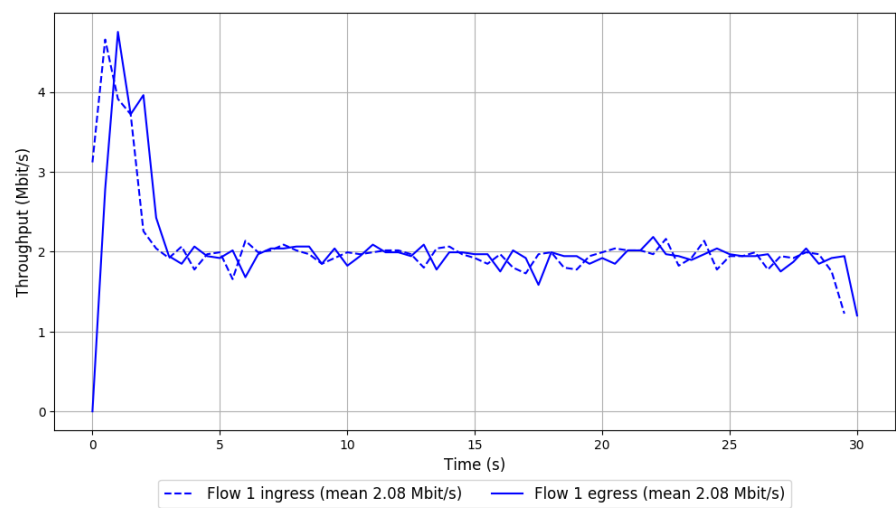
-- Flow 1:

Average throughput: 2.08 Mbit/s

95th percentile per-packet one-way delay: 41.174 ms

Loss rate: 0.04%

Run 2: Report of Indigo — Data Link

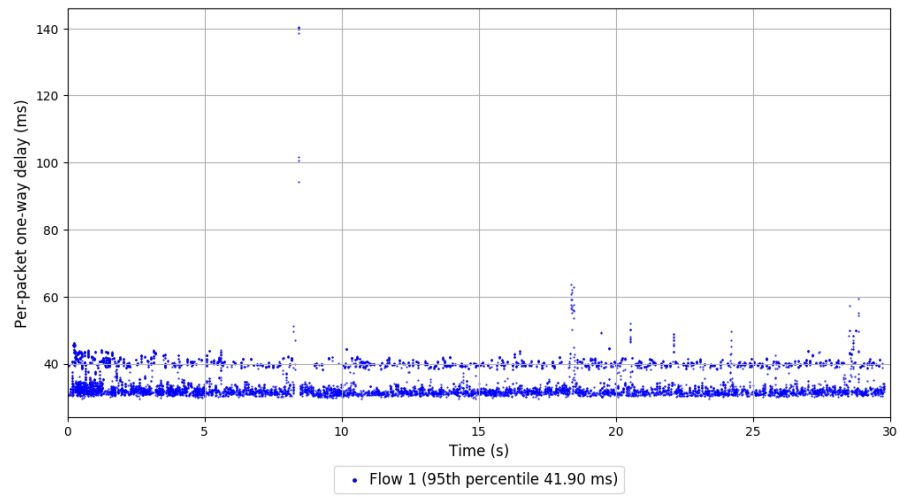
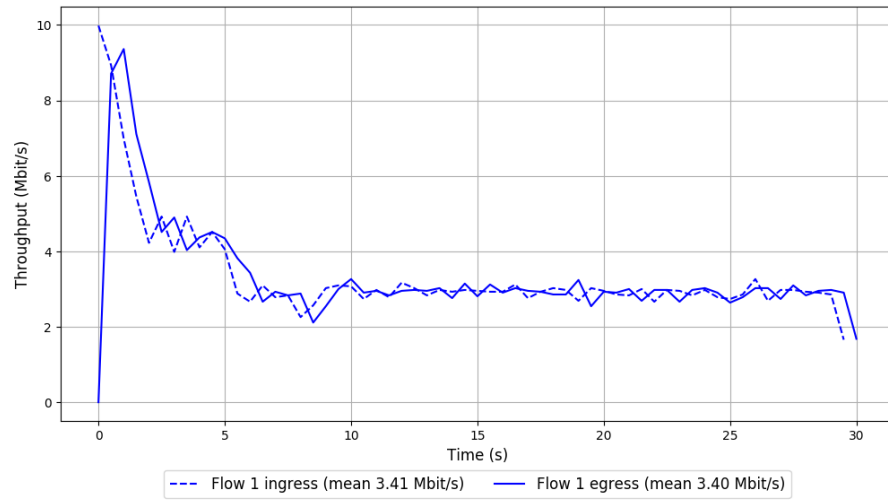


Run 3: Statistics of Indigo

Start at: 2019-01-21 04:47:15
End at: 2019-01-21 04:47:45
Local clock offset: 4.746 ms
Remote clock offset: -3.439 ms

Below is generated by plot.py at 2019-01-21 04:51:25
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.40 Mbit/s
95th percentile per-packet one-way delay: 41.903 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 3.40 Mbit/s
95th percentile per-packet one-way delay: 41.903 ms
Loss rate: 0.08%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-01-21 03:41:12

End at: 2019-01-21 03:41:42

Local clock offset: -0.382 ms

Remote clock offset: 0.302 ms

Below is generated by plot.py at 2019-01-21 04:51:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.80 Mbit/s

95th percentile per-packet one-way delay: 46.928 ms

Loss rate: 0.06%

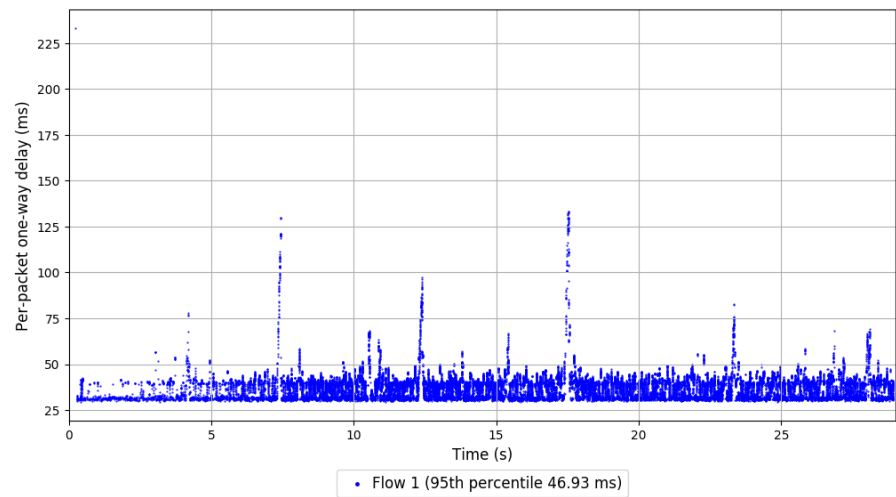
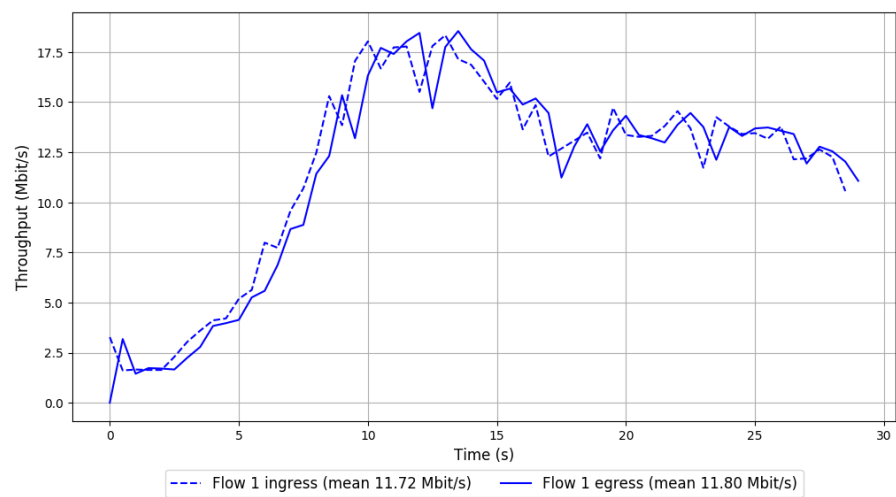
-- Flow 1:

Average throughput: 11.80 Mbit/s

95th percentile per-packet one-way delay: 46.928 ms

Loss rate: 0.06%

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-01-21 04:06:53

End at: 2019-01-21 04:07:23

Local clock offset: -1.679 ms

Remote clock offset: 0.116 ms

Below is generated by plot.py at 2019-01-21 04:51:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.74 Mbit/s

95th percentile per-packet one-way delay: 48.148 ms

Loss rate: 0.06%

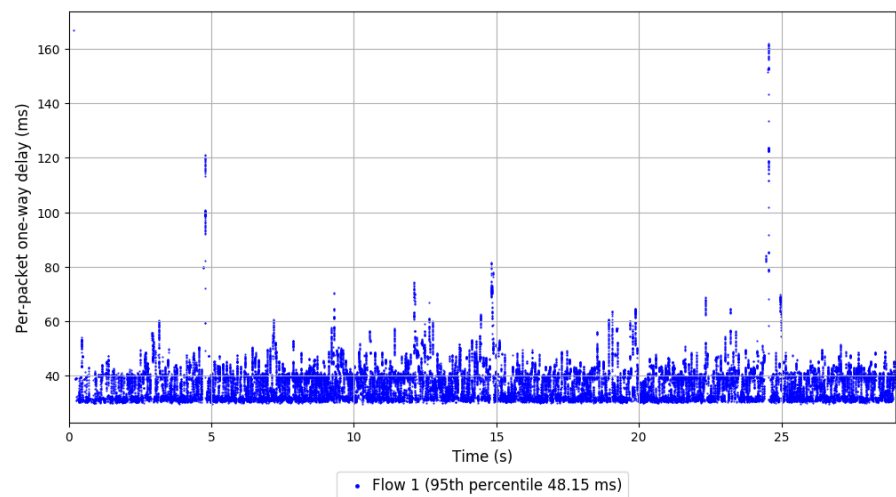
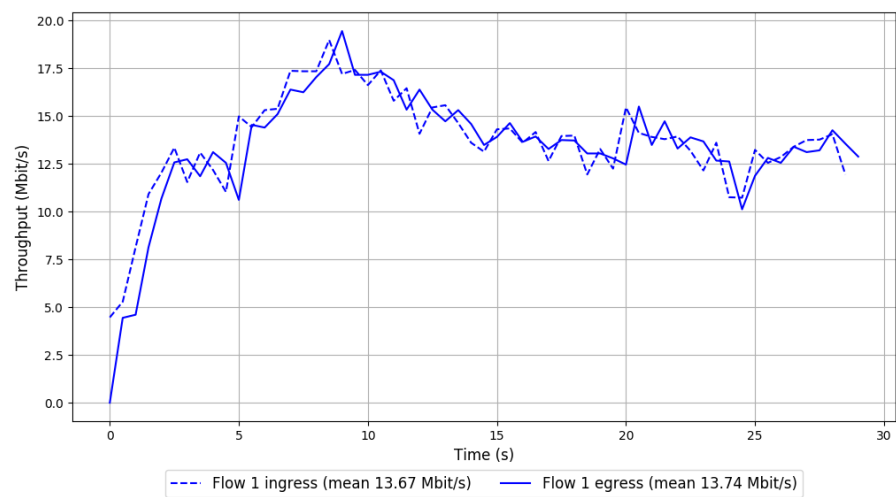
-- Flow 1:

Average throughput: 13.74 Mbit/s

95th percentile per-packet one-way delay: 48.148 ms

Loss rate: 0.06%

Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-01-21 04:32:33

End at: 2019-01-21 04:33:03

Local clock offset: 3.002 ms

Remote clock offset: -0.96 ms

Below is generated by plot.py at 2019-01-21 04:51:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.22 Mbit/s

95th percentile per-packet one-way delay: 45.935 ms

Loss rate: 0.10%

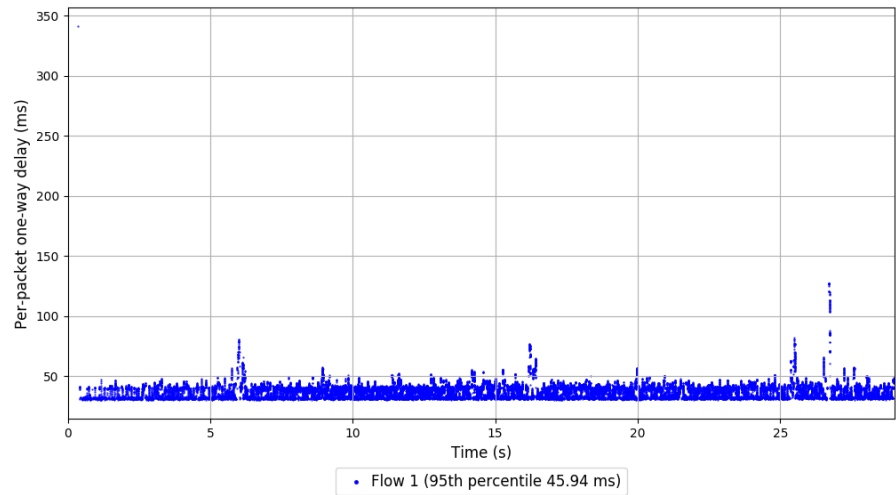
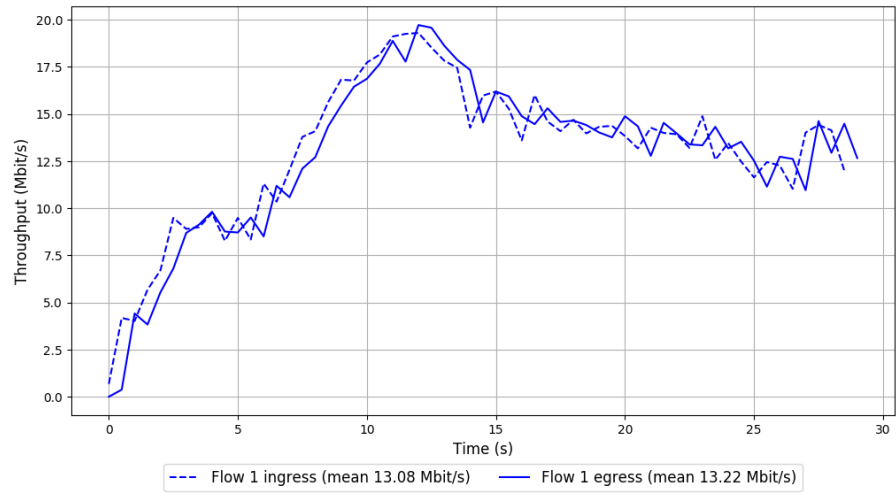
-- Flow 1:

Average throughput: 13.22 Mbit/s

95th percentile per-packet one-way delay: 45.935 ms

Loss rate: 0.10%

Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-01-21 03:46:05

End at: 2019-01-21 03:46:35

Local clock offset: -0.672 ms

Remote clock offset: 0.341 ms

Below is generated by plot.py at 2019-01-21 04:51:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 33.68 Mbit/s

95th percentile per-packet one-way delay: 113.090 ms

Loss rate: 0.13%

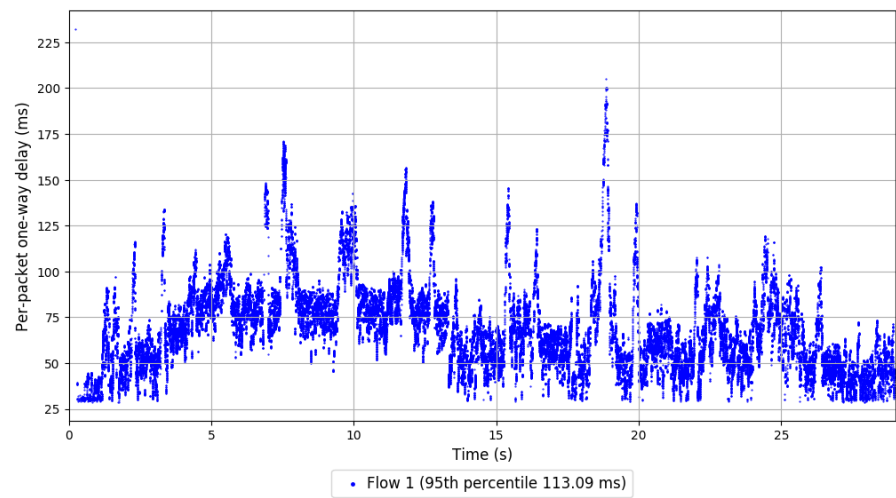
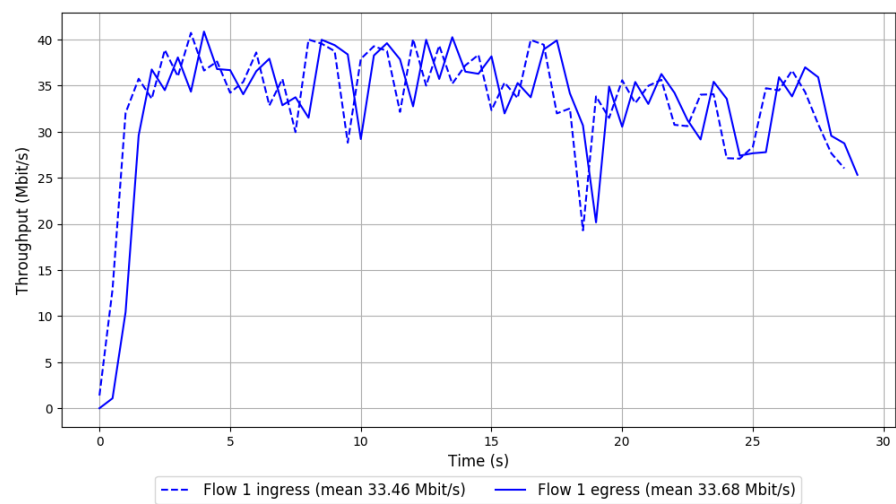
-- Flow 1:

Average throughput: 33.68 Mbit/s

95th percentile per-packet one-way delay: 113.090 ms

Loss rate: 0.13%

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

Start at: 2019-01-21 04:11:46

End at: 2019-01-21 04:12:16

Local clock offset: -1.903 ms

Remote clock offset: 0.037 ms

Below is generated by plot.py at 2019-01-21 04:51:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 17.08 Mbit/s

95th percentile per-packet one-way delay: 162.786 ms

Loss rate: 0.04%

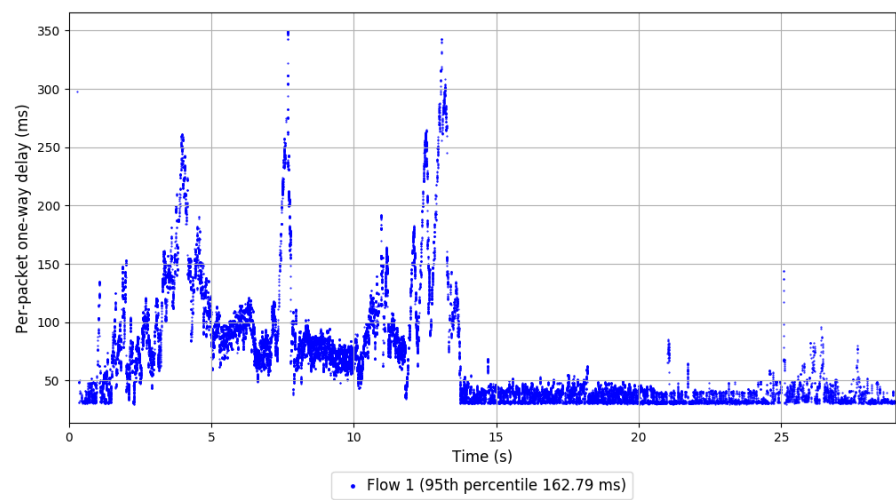
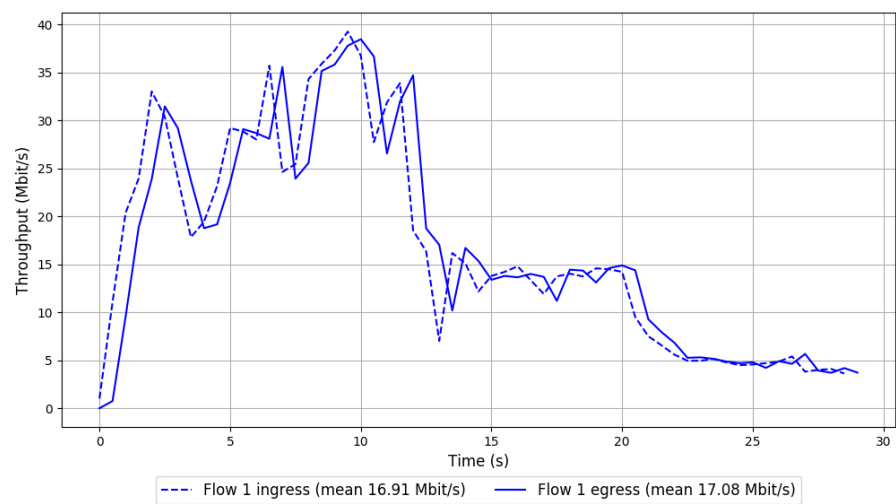
-- Flow 1:

Average throughput: 17.08 Mbit/s

95th percentile per-packet one-way delay: 162.786 ms

Loss rate: 0.04%

Run 2: Report of Indigo-MusesC5 — Data Link

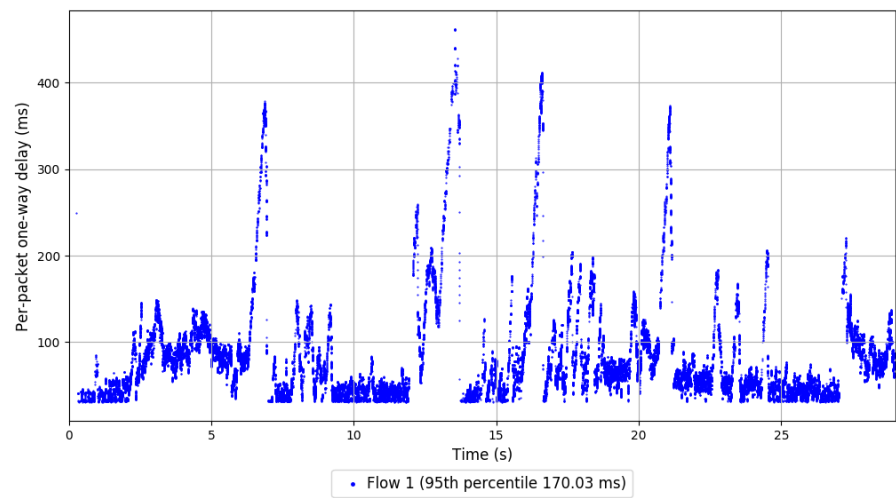
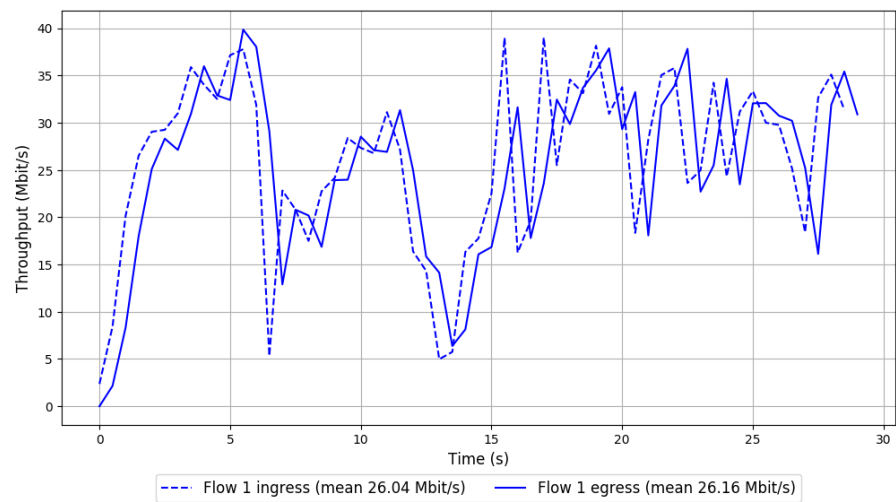


Run 3: Statistics of Indigo-MusesC5

Start at: 2019-01-21 04:37:27
End at: 2019-01-21 04:37:57
Local clock offset: 3.748 ms
Remote clock offset: -2.144 ms

Below is generated by plot.py at 2019-01-21 04:51:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 26.16 Mbit/s
95th percentile per-packet one-way delay: 170.025 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 26.16 Mbit/s
95th percentile per-packet one-way delay: 170.025 ms
Loss rate: 0.39%

Run 3: Report of Indigo-MusesC5 — Data Link



Run 1: Statistics of Indigo-MusesD

Start at: 2019-01-21 03:33:52

End at: 2019-01-21 03:34:22

Local clock offset: 0.21 ms

Remote clock offset: 0.316 ms

Below is generated by plot.py at 2019-01-21 04:51:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.72 Mbit/s

95th percentile per-packet one-way delay: 41.126 ms

Loss rate: 0.18%

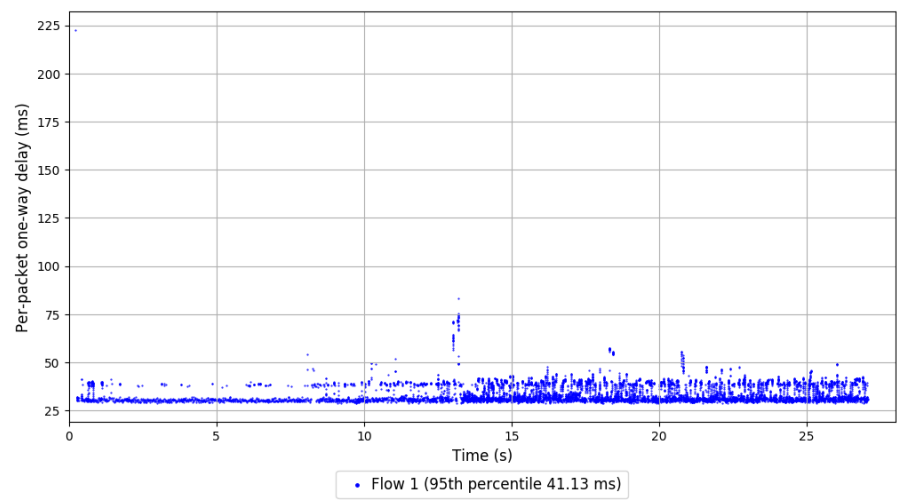
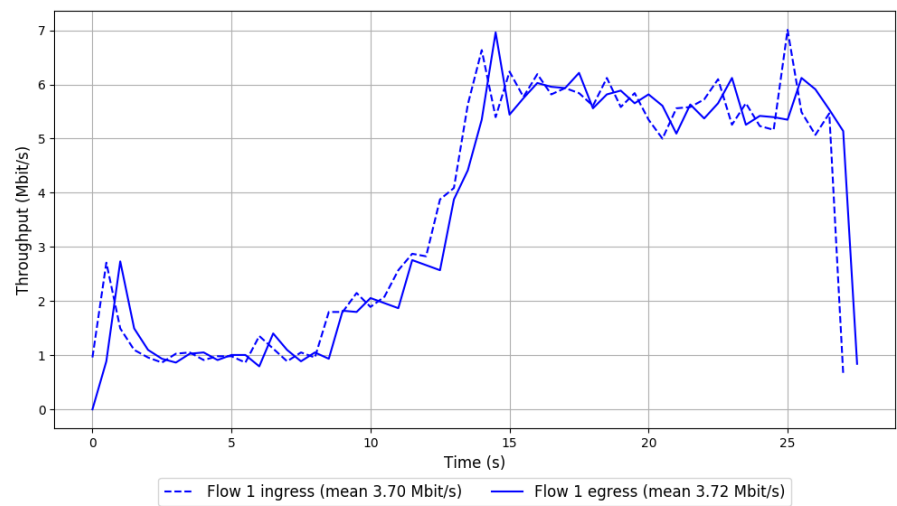
-- Flow 1:

Average throughput: 3.72 Mbit/s

95th percentile per-packet one-way delay: 41.126 ms

Loss rate: 0.18%

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-01-21 03:59:33

End at: 2019-01-21 04:00:03

Local clock offset: -1.356 ms

Remote clock offset: 0.379 ms

Below is generated by plot.py at 2019-01-21 04:51:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 39.101 ms

Loss rate: 0.07%

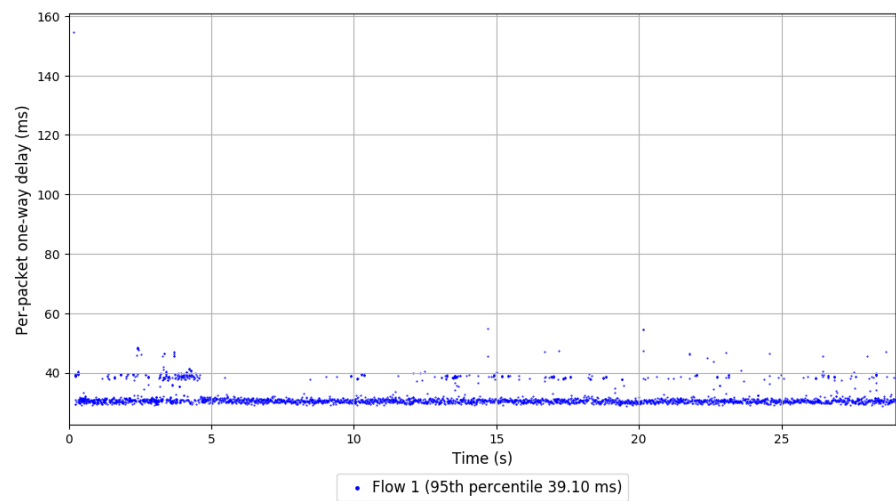
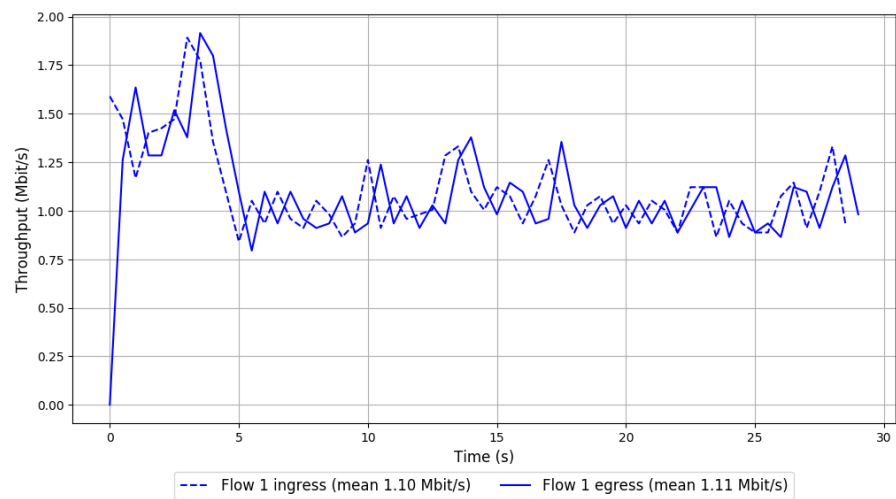
-- Flow 1:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 39.101 ms

Loss rate: 0.07%

Run 2: Report of Indigo-MusesD — Data Link



Run 3: Statistics of Indigo-MusesD

Start at: 2019-01-21 04:25:13

End at: 2019-01-21 04:25:44

Local clock offset: 0.99 ms

Remote clock offset: 0.106 ms

Below is generated by plot.py at 2019-01-21 04:51:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.92 Mbit/s

95th percentile per-packet one-way delay: 44.907 ms

Loss rate: 0.20%

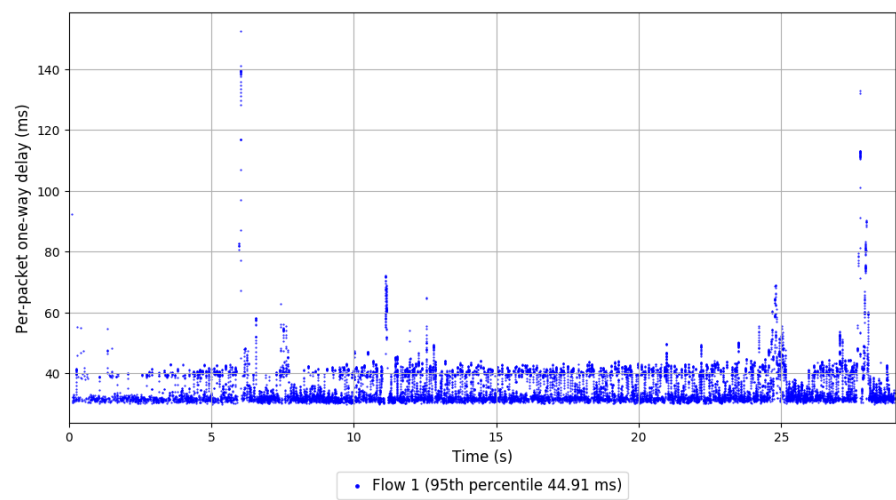
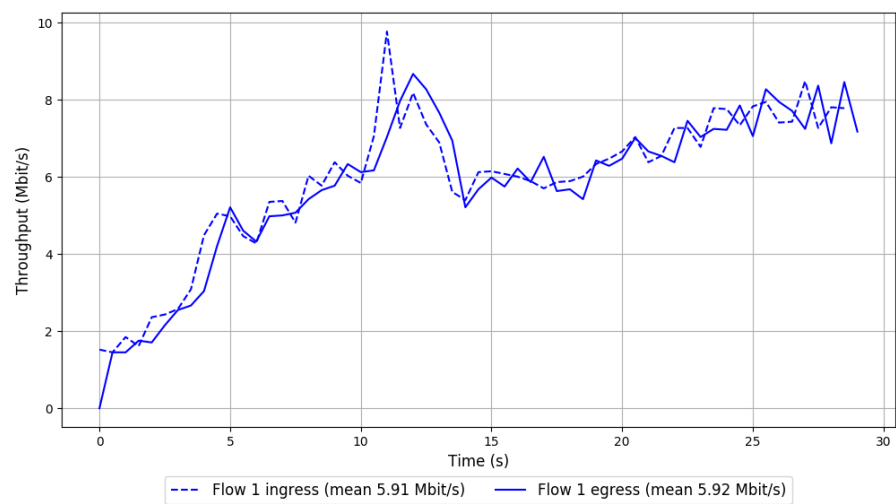
-- Flow 1:

Average throughput: 5.92 Mbit/s

95th percentile per-packet one-way delay: 44.907 ms

Loss rate: 0.20%

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MusesT

Start at: 2019-01-21 03:57:05

End at: 2019-01-21 03:57:35

Local clock offset: -1.237 ms

Remote clock offset: 0.369 ms

Below is generated by plot.py at 2019-01-21 04:51:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 33.09 Mbit/s

95th percentile per-packet one-way delay: 200.847 ms

Loss rate: 0.70%

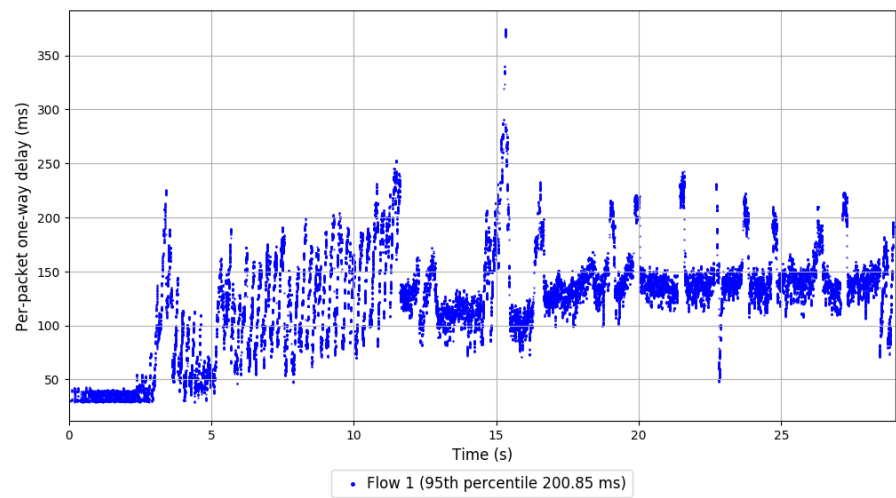
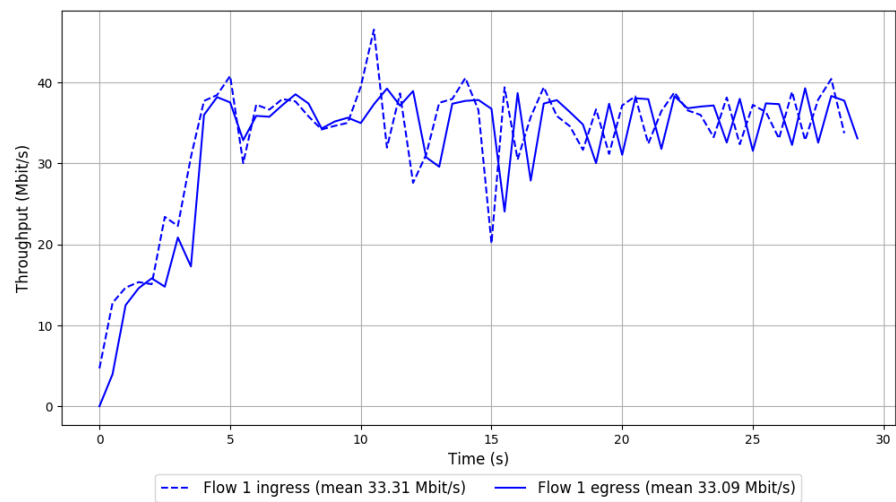
-- Flow 1:

Average throughput: 33.09 Mbit/s

95th percentile per-packet one-way delay: 200.847 ms

Loss rate: 0.70%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MusesT

Start at: 2019-01-21 04:22:46

End at: 2019-01-21 04:23:16

Local clock offset: -0.066 ms

Remote clock offset: 0.046 ms

Below is generated by plot.py at 2019-01-21 04:51:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 29.60 Mbit/s

95th percentile per-packet one-way delay: 184.567 ms

Loss rate: 0.29%

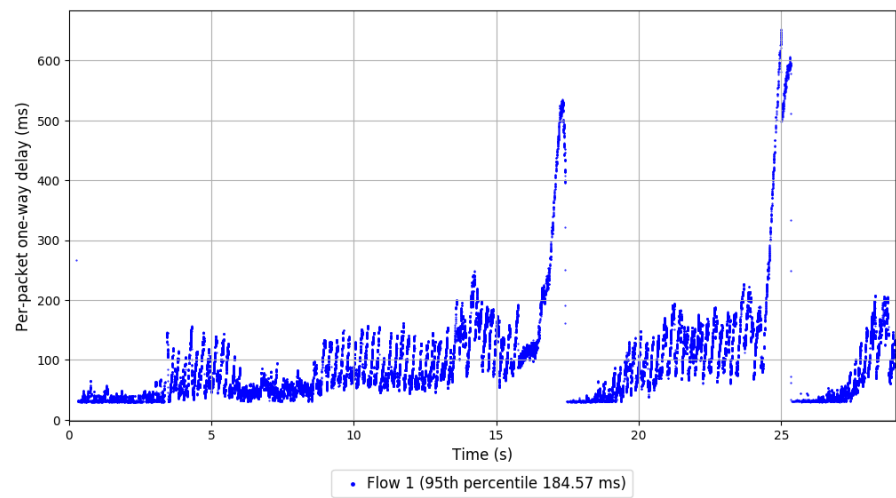
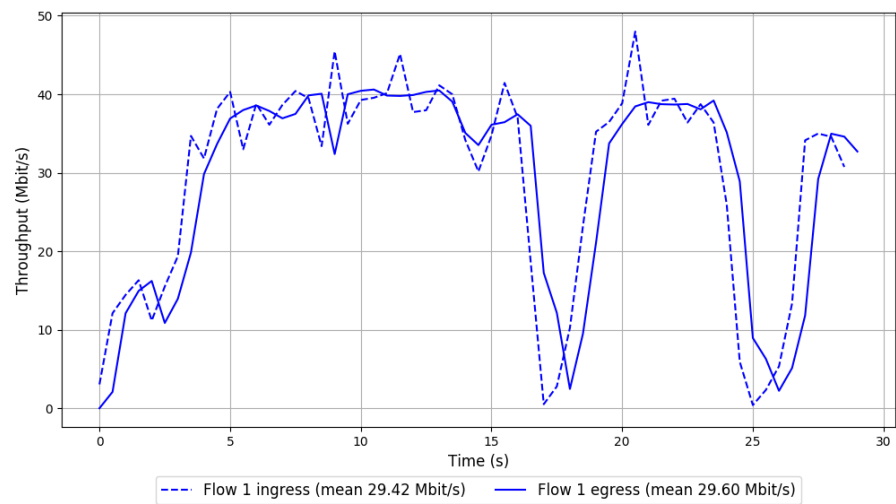
-- Flow 1:

Average throughput: 29.60 Mbit/s

95th percentile per-packet one-way delay: 184.567 ms

Loss rate: 0.29%

Run 2: Report of Indigo-MusesT — Data Link



Run 3: Statistics of Indigo-MusesT

Start at: 2019-01-21 04:48:28

End at: 2019-01-21 04:48:58

Local clock offset: 4.824 ms

Remote clock offset: -3.515 ms

Below is generated by plot.py at 2019-01-21 04:51:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 33.66 Mbit/s

95th percentile per-packet one-way delay: 230.536 ms

Loss rate: 0.53%

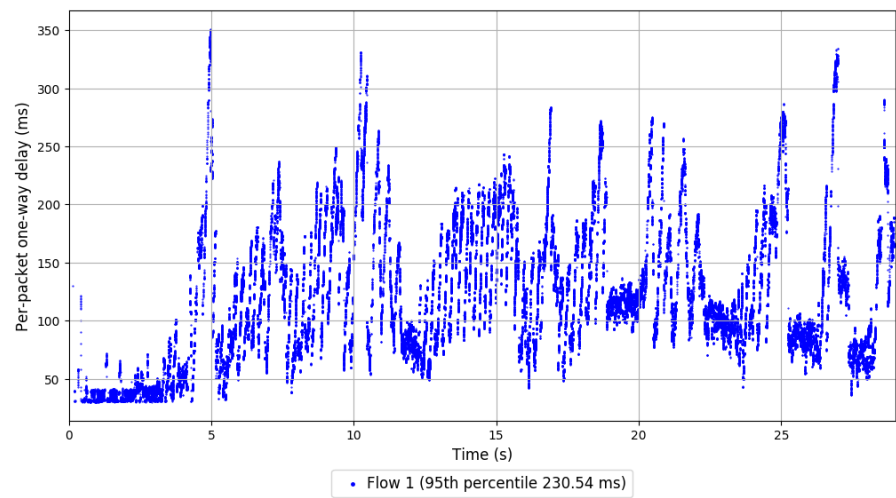
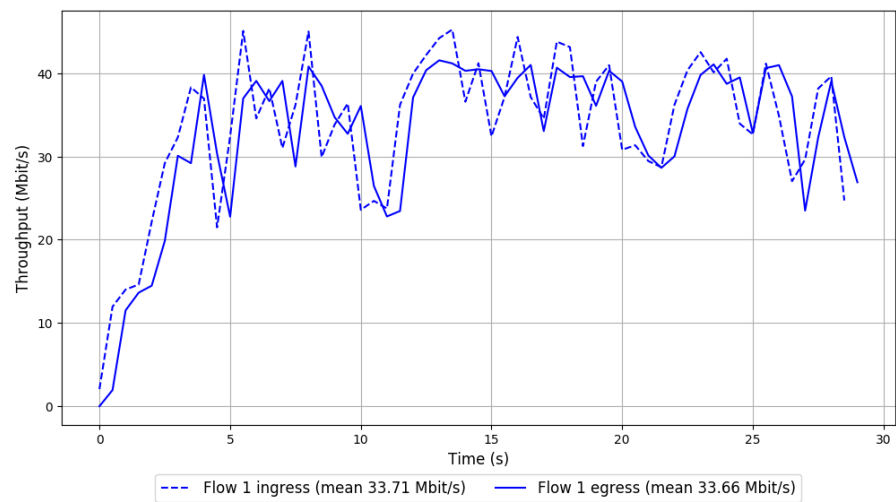
-- Flow 1:

Average throughput: 33.66 Mbit/s

95th percentile per-packet one-way delay: 230.536 ms

Loss rate: 0.53%

Run 3: Report of Indigo-MusesT — Data Link

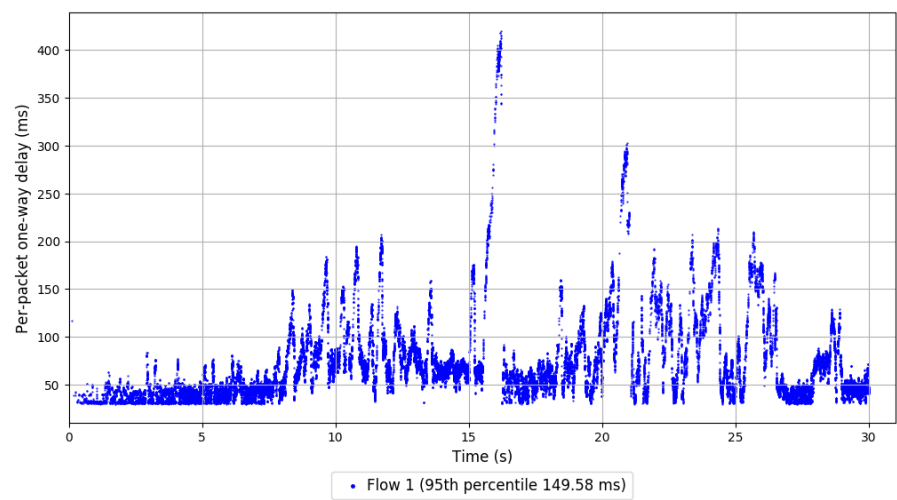
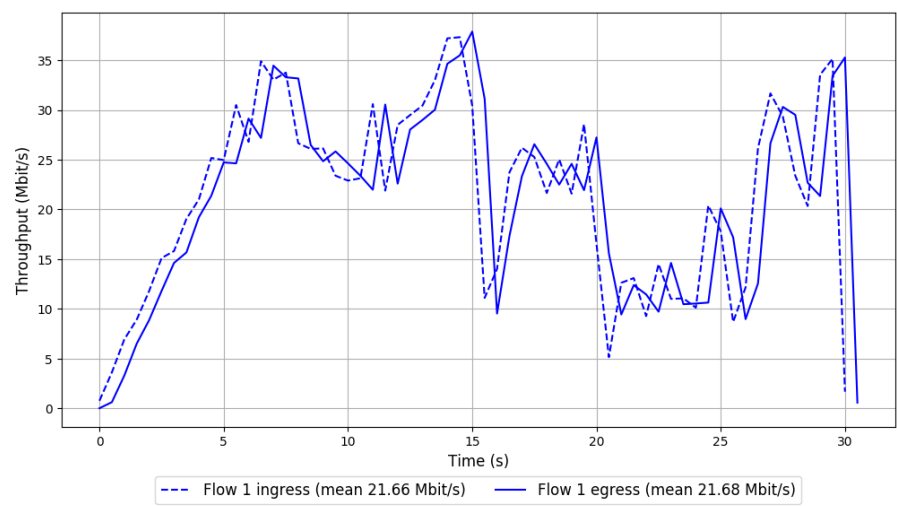


```
Run 1: Statistics of LEDBAT

Start at: 2019-01-21 03:39:58
End at: 2019-01-21 03:40:28
Local clock offset: -0.295 ms
Remote clock offset: 0.322 ms

# Below is generated by plot.py at 2019-01-21 04:51:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 21.68 Mbit/s
95th percentile per-packet one-way delay: 149.578 ms
Loss rate: 0.31%
-- Flow 1:
Average throughput: 21.68 Mbit/s
95th percentile per-packet one-way delay: 149.578 ms
Loss rate: 0.31%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-01-21 04:05:39

End at: 2019-01-21 04:06:09

Local clock offset: -1.63 ms

Remote clock offset: 0.145 ms

Below is generated by plot.py at 2019-01-21 04:51:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 18.49 Mbit/s

95th percentile per-packet one-way delay: 145.048 ms

Loss rate: 0.19%

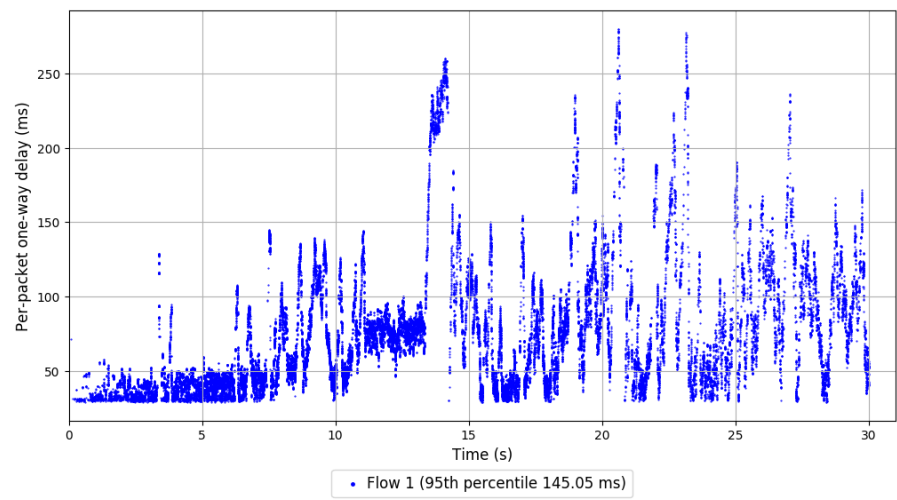
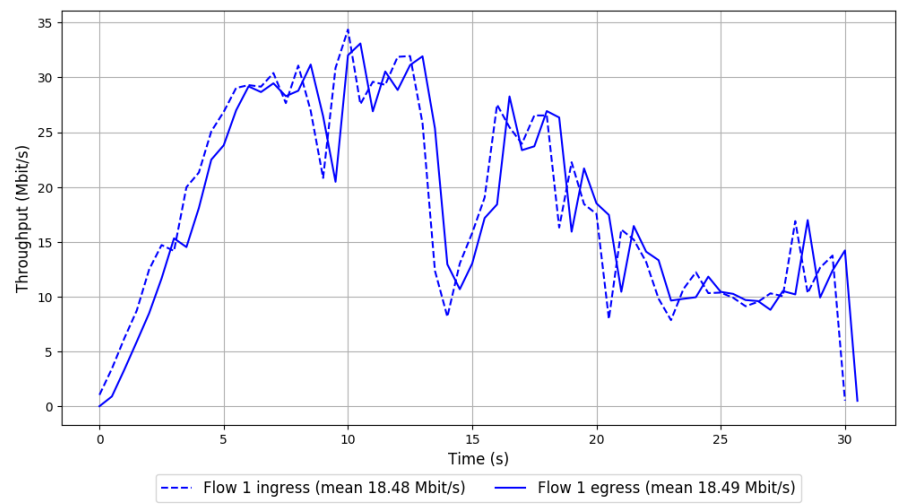
-- Flow 1:

Average throughput: 18.49 Mbit/s

95th percentile per-packet one-way delay: 145.048 ms

Loss rate: 0.19%

Run 2: Report of LEDBAT — Data Link

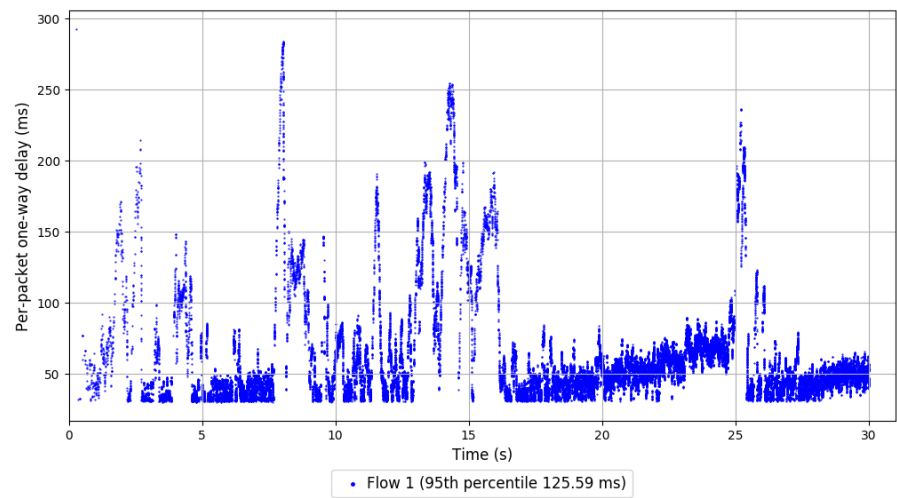
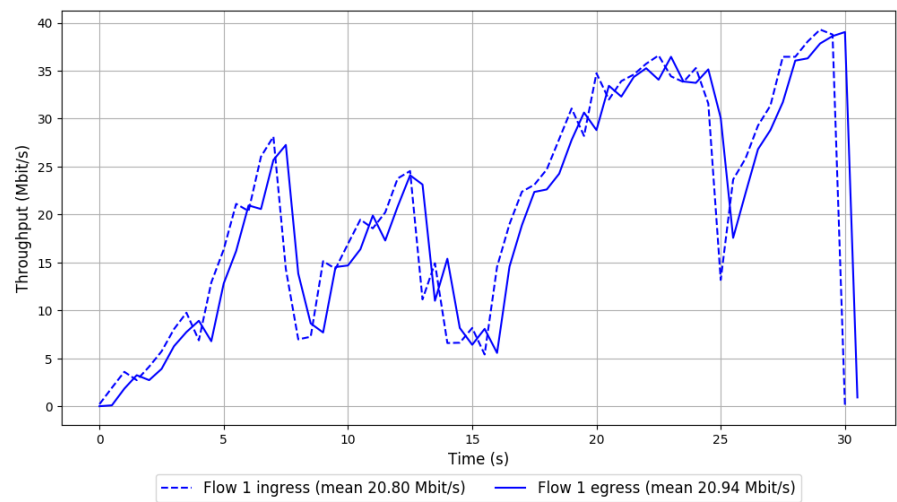


Run 3: Statistics of LEDBAT

Start at: 2019-01-21 04:31:20
End at: 2019-01-21 04:31:50
Local clock offset: 2.726 ms
Remote clock offset: -0.657 ms

Below is generated by plot.py at 2019-01-21 04:51:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 20.94 Mbit/s
95th percentile per-packet one-way delay: 125.588 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 20.94 Mbit/s
95th percentile per-packet one-way delay: 125.588 ms
Loss rate: 0.25%

Run 3: Report of LEDBAT — Data Link

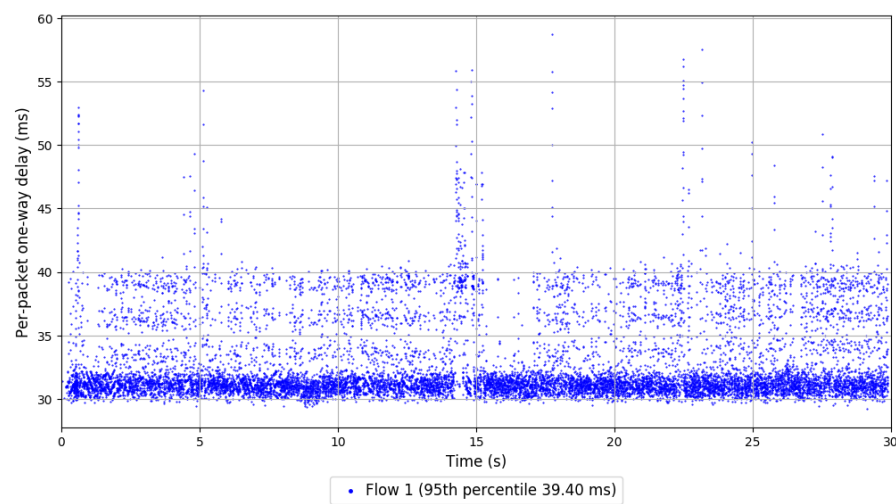
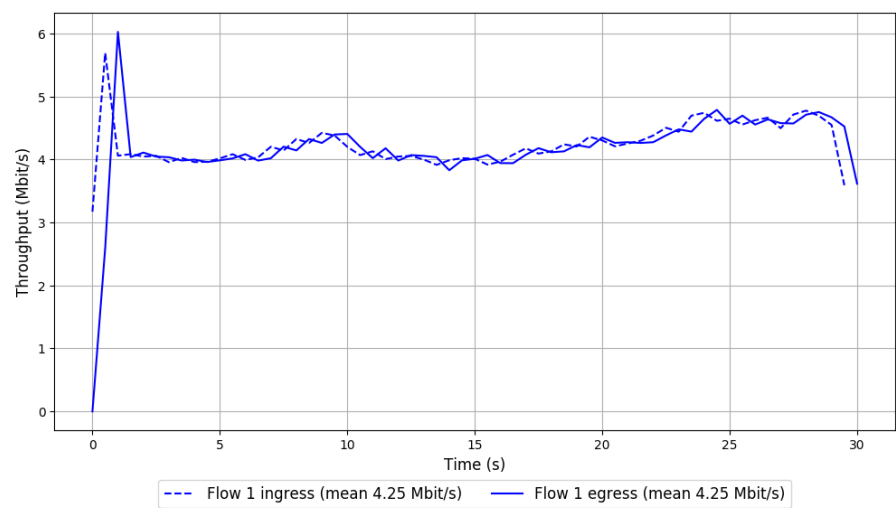


```
Run 1: Statistics of PCC-Allegro

Start at: 2019-01-21 03:38:45
End at: 2019-01-21 03:39:15
Local clock offset: -0.203 ms
Remote clock offset: 0.298 ms

# Below is generated by plot.py at 2019-01-21 04:51:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.25 Mbit/s
95th percentile per-packet one-way delay: 39.399 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 4.25 Mbit/s
95th percentile per-packet one-way delay: 39.399 ms
Loss rate: 0.13%
```

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-01-21 04:04:26

End at: 2019-01-21 04:04:56

Local clock offset: -1.573 ms

Remote clock offset: 0.19 ms

Below is generated by plot.py at 2019-01-21 04:51:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.01 Mbit/s

95th percentile per-packet one-way delay: 40.165 ms

Loss rate: 0.10%

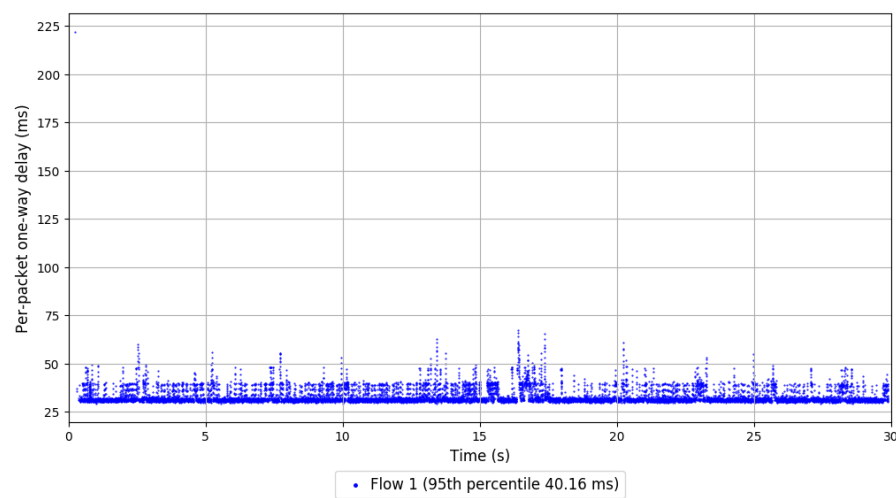
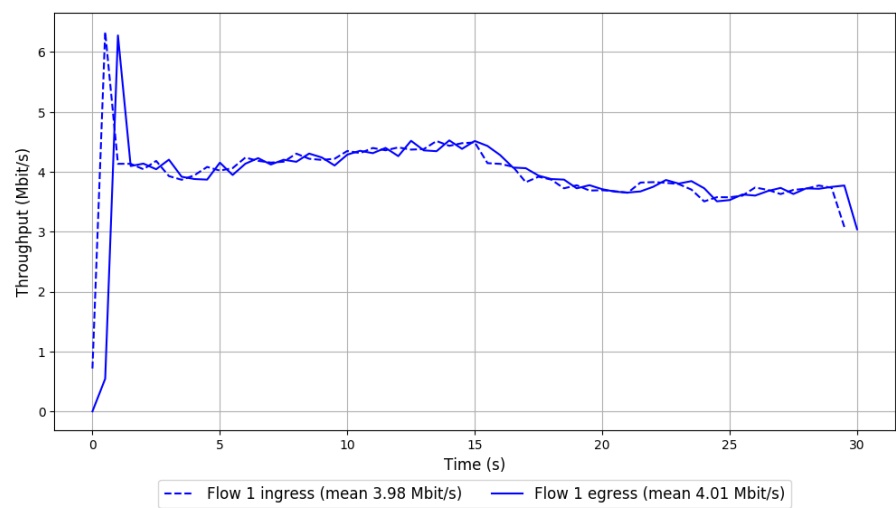
-- Flow 1:

Average throughput: 4.01 Mbit/s

95th percentile per-packet one-way delay: 40.165 ms

Loss rate: 0.10%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-01-21 04:30:06

End at: 2019-01-21 04:30:36

Local clock offset: 2.511 ms

Remote clock offset: -0.098 ms

Below is generated by plot.py at 2019-01-21 04:51:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.44 Mbit/s

95th percentile per-packet one-way delay: 41.070 ms

Loss rate: 0.09%

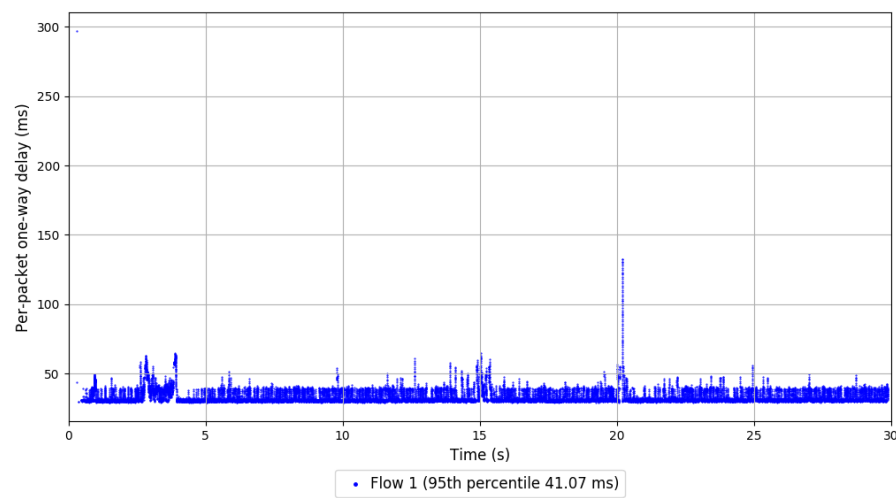
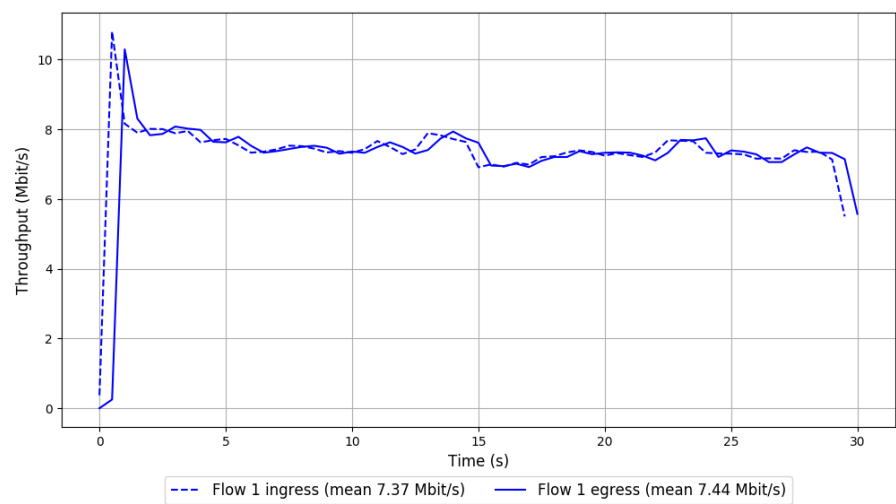
-- Flow 1:

Average throughput: 7.44 Mbit/s

95th percentile per-packet one-way delay: 41.070 ms

Loss rate: 0.09%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

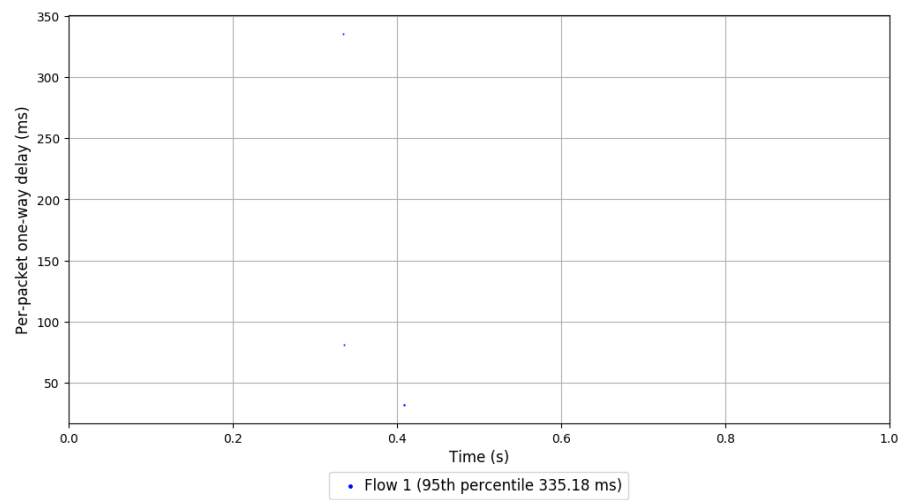
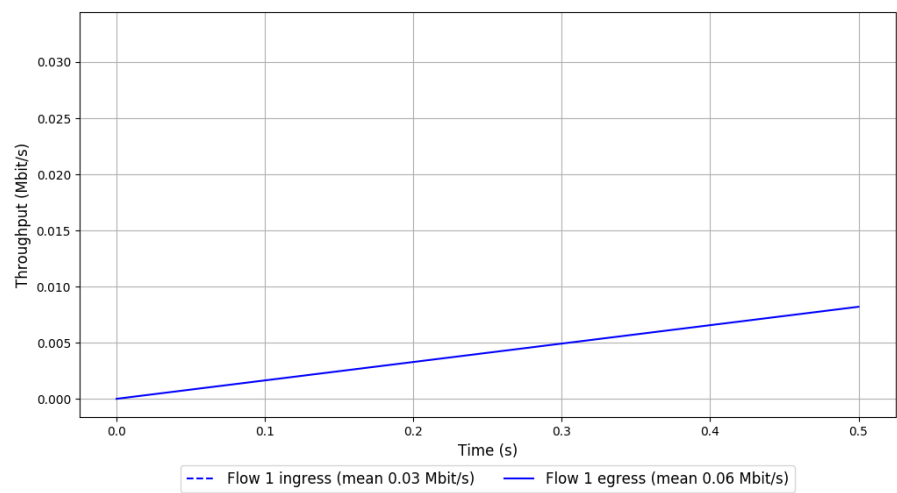
Start at: 2019-01-21 03:53:25

End at: 2019-01-21 03:53:55

Local clock offset: -1.062 ms

Remote clock offset: 0.448 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

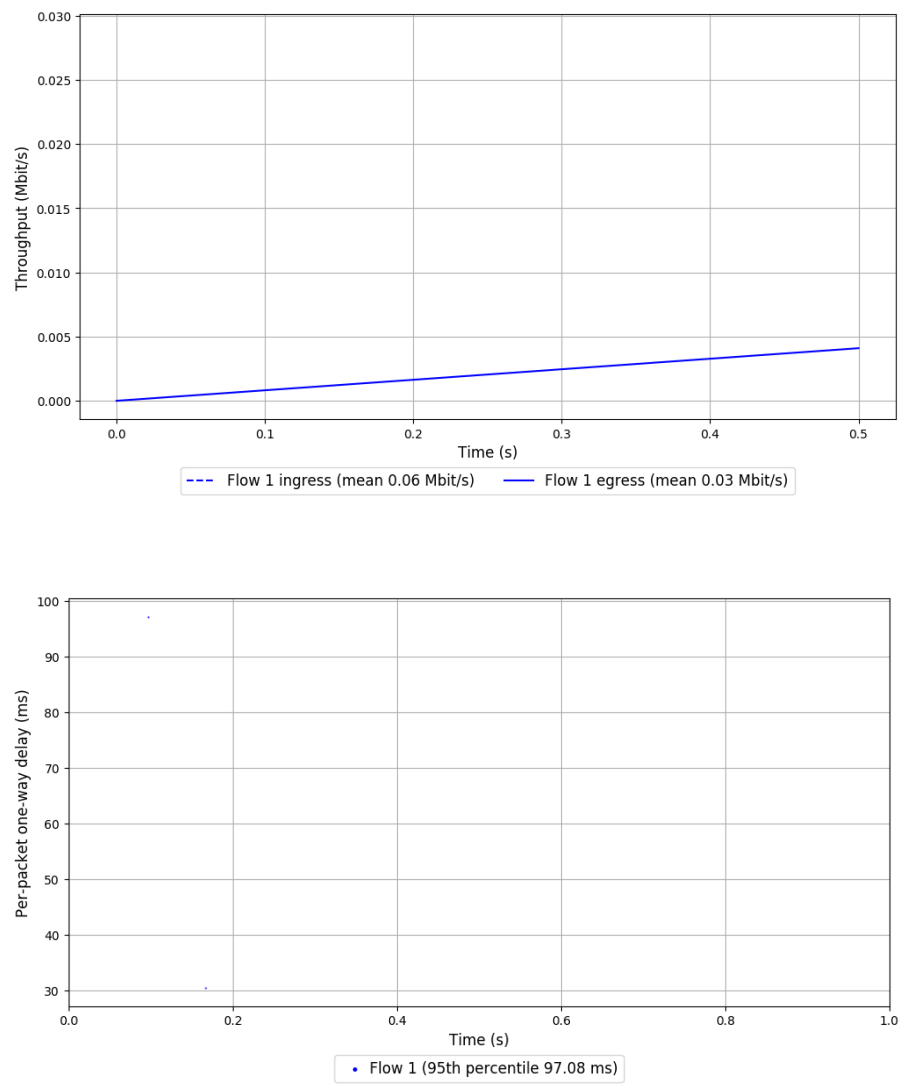
Start at: 2019-01-21 04:19:05

End at: 2019-01-21 04:19:35

Local clock offset: -2.223 ms

Remote clock offset: 0.109 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

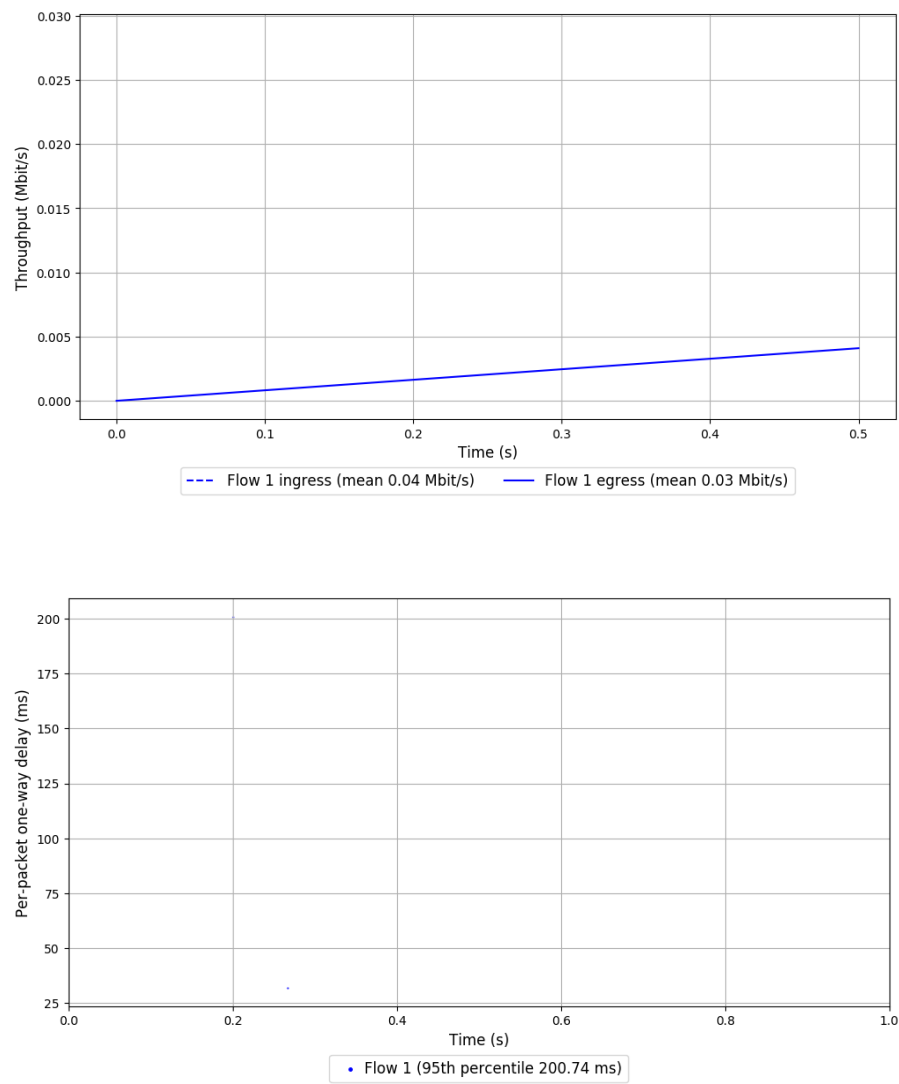
Start at: 2019-01-21 04:44:47

End at: 2019-01-21 04:45:17

Local clock offset: 4.528 ms

Remote clock offset: -3.225 ms

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-01-21 03:47:19

End at: 2019-01-21 03:47:49

Local clock offset: -0.758 ms

Remote clock offset: 0.412 ms

Below is generated by plot.py at 2019-01-21 04:52:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 21.97 Mbit/s

95th percentile per-packet one-way delay: 232.037 ms

Loss rate: 0.46%

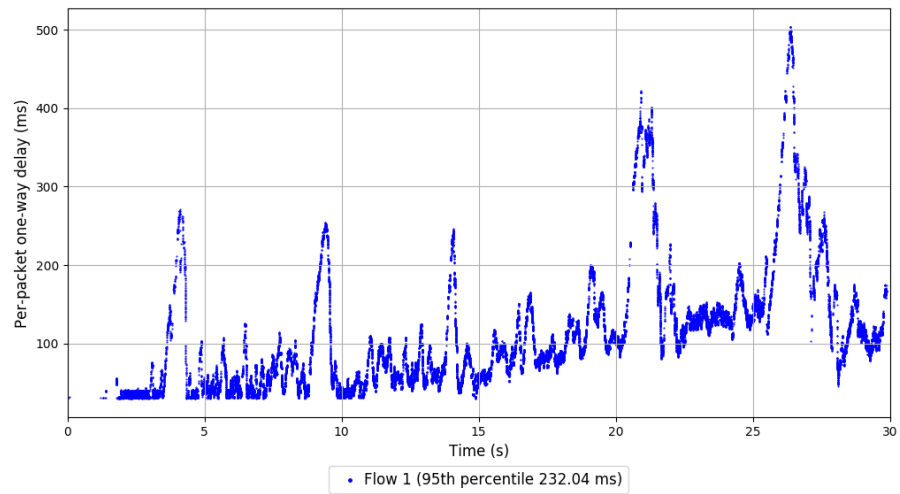
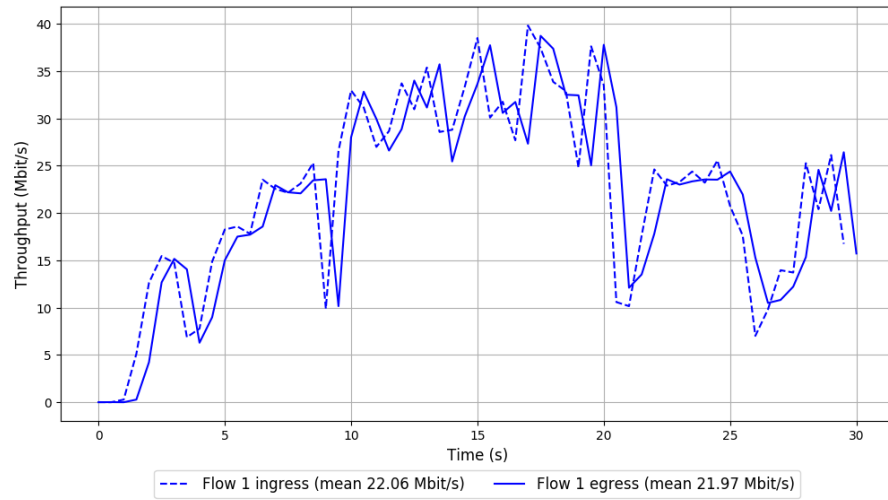
-- Flow 1:

Average throughput: 21.97 Mbit/s

95th percentile per-packet one-way delay: 232.037 ms

Loss rate: 0.46%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-01-21 04:12:59

End at: 2019-01-21 04:13:29

Local clock offset: -1.968 ms

Remote clock offset: 0.046 ms

Below is generated by plot.py at 2019-01-21 04:52:08

Datalink statistics

-- Total of 1 flow:

Average throughput: 26.33 Mbit/s

95th percentile per-packet one-way delay: 230.100 ms

Loss rate: 0.33%

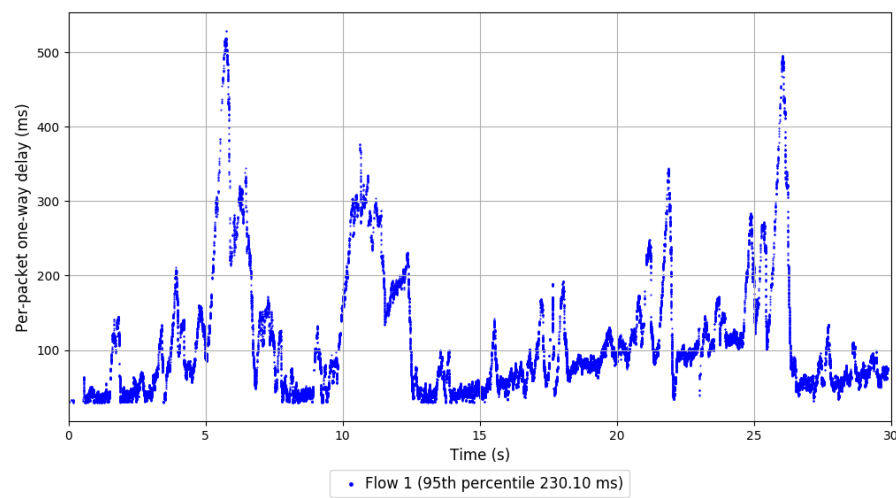
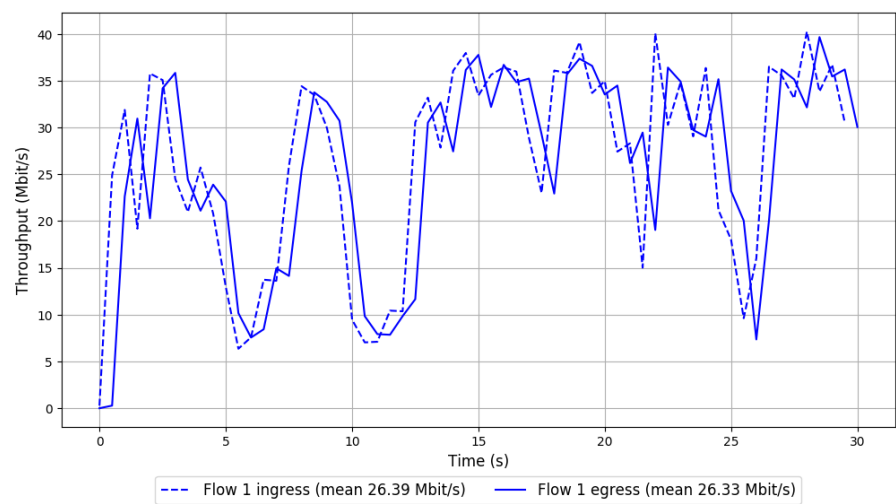
-- Flow 1:

Average throughput: 26.33 Mbit/s

95th percentile per-packet one-way delay: 230.100 ms

Loss rate: 0.33%

Run 2: Report of QUIC Cubic — Data Link

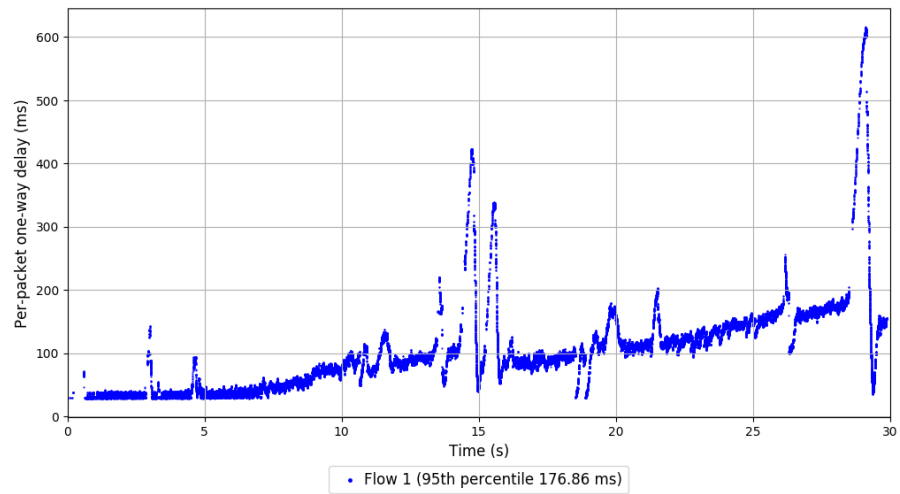
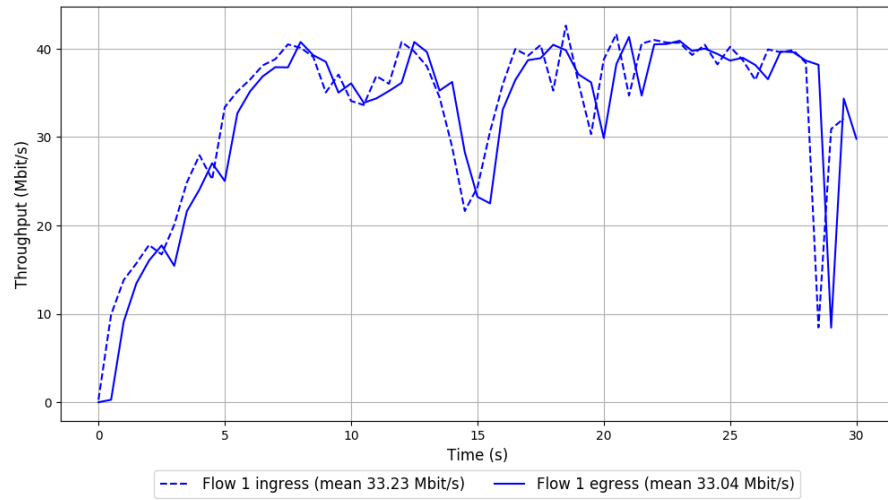


Run 3: Statistics of QUIC Cubic

Start at: 2019-01-21 04:38:41
End at: 2019-01-21 04:39:11
Local clock offset: 3.896 ms
Remote clock offset: -2.321 ms

Below is generated by plot.py at 2019-01-21 04:52:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 33.04 Mbit/s
95th percentile per-packet one-way delay: 176.858 ms
Loss rate: 0.66%
-- Flow 1:
Average throughput: 33.04 Mbit/s
95th percentile per-packet one-way delay: 176.858 ms
Loss rate: 0.66%

Run 3: Report of QUIC Cubic — Data Link



Run 1: Statistics of SCReAM

Start at: 2019-01-21 03:52:12

End at: 2019-01-21 03:52:42

Local clock offset: -0.989 ms

Remote clock offset: 0.514 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 32.408 ms

Loss rate: 0.13%

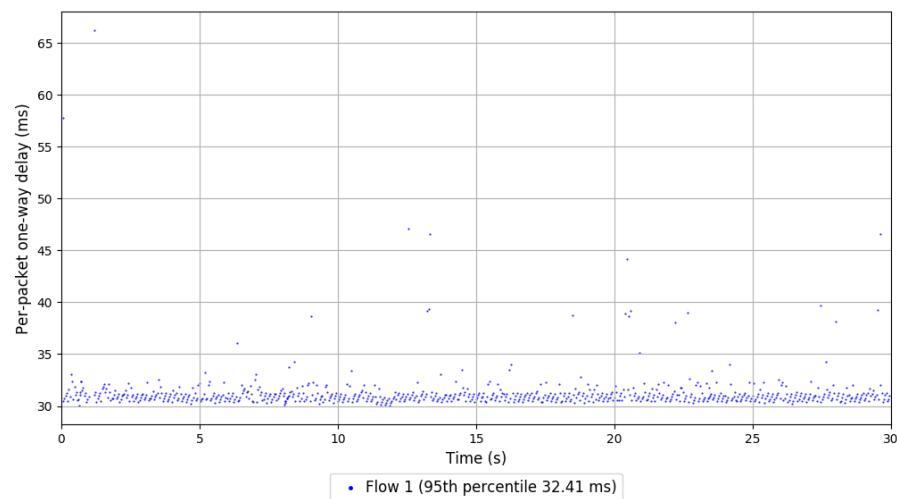
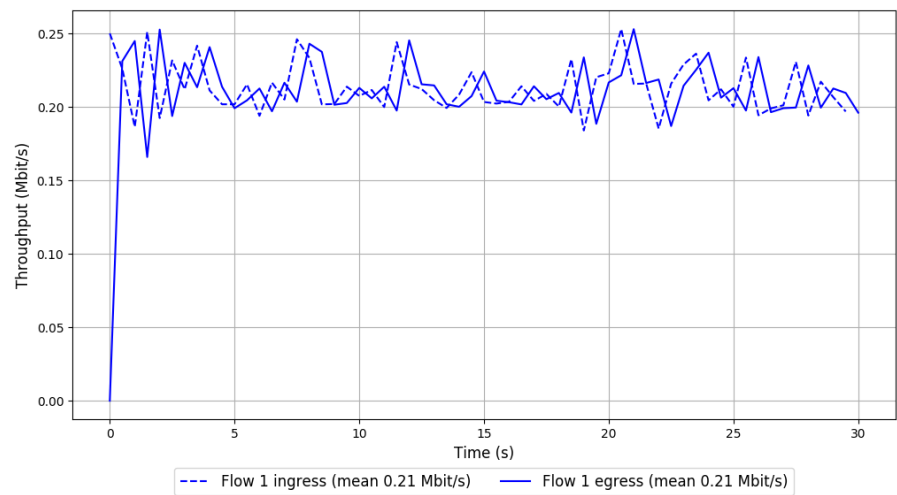
-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 32.408 ms

Loss rate: 0.13%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-01-21 04:17:53

End at: 2019-01-21 04:18:23

Local clock offset: -2.215 ms

Remote clock offset: 0.161 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 38.472 ms

Loss rate: 0.13%

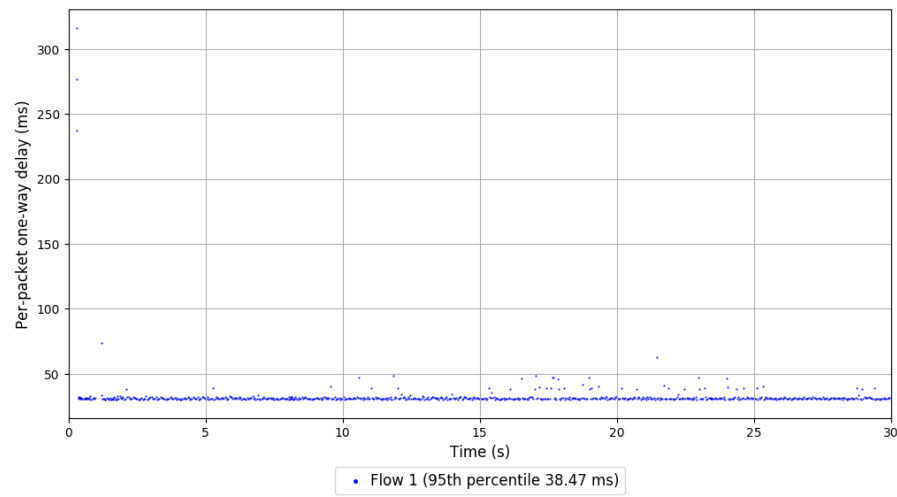
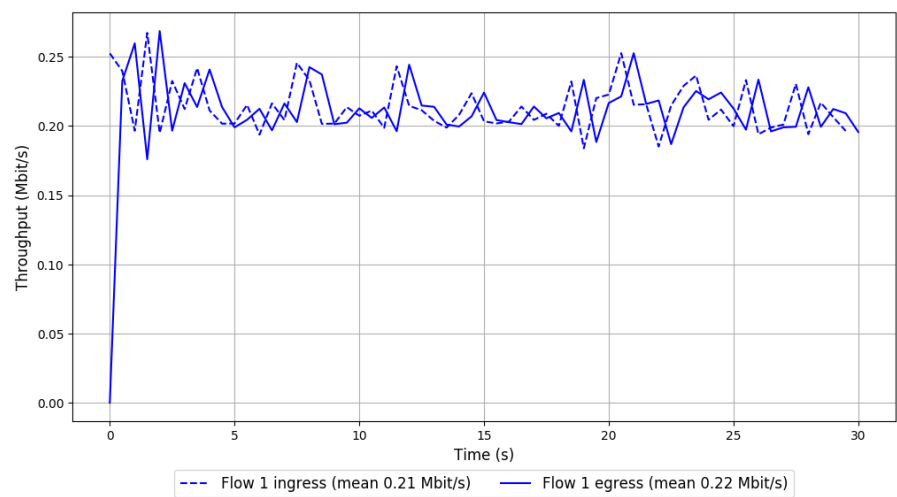
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 38.472 ms

Loss rate: 0.13%

Run 2: Report of SReAM — Data Link

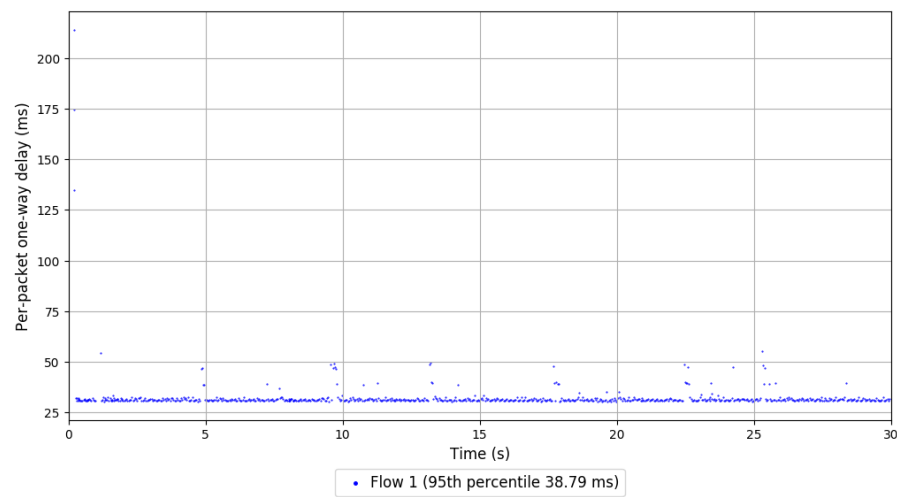
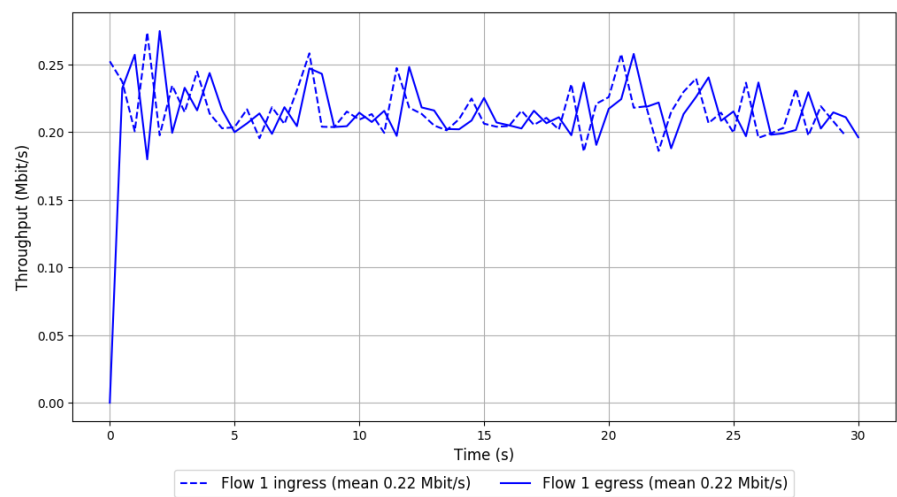


Run 3: Statistics of SCReAM

Start at: 2019-01-21 04:43:34
End at: 2019-01-21 04:44:05
Local clock offset: 4.432 ms
Remote clock offset: -2.992 ms

Below is generated by plot.py at 2019-01-21 04:52:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 38.792 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 38.792 ms
Loss rate: 0.13%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2019-01-21 03:43:39

End at: 2019-01-21 03:44:09

Local clock offset: -0.534 ms

Remote clock offset: 0.324 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 13.33 Mbit/s

95th percentile per-packet one-way delay: 53.173 ms

Loss rate: 0.06%

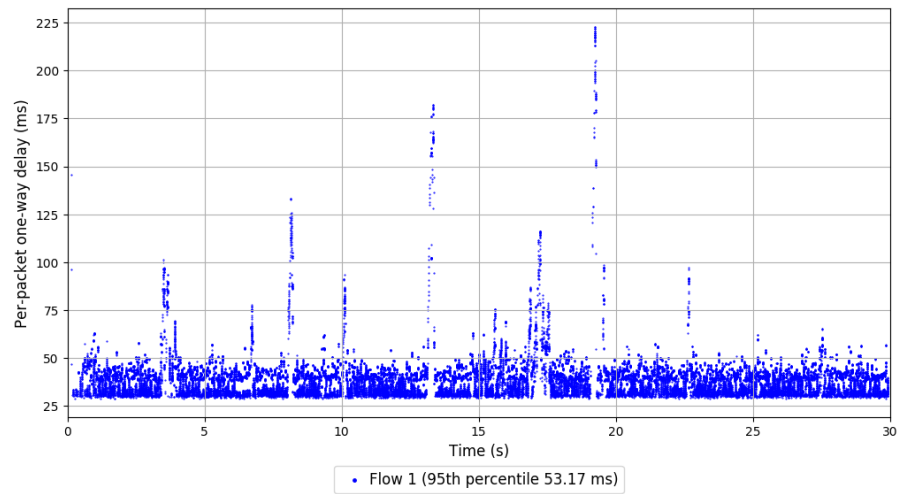
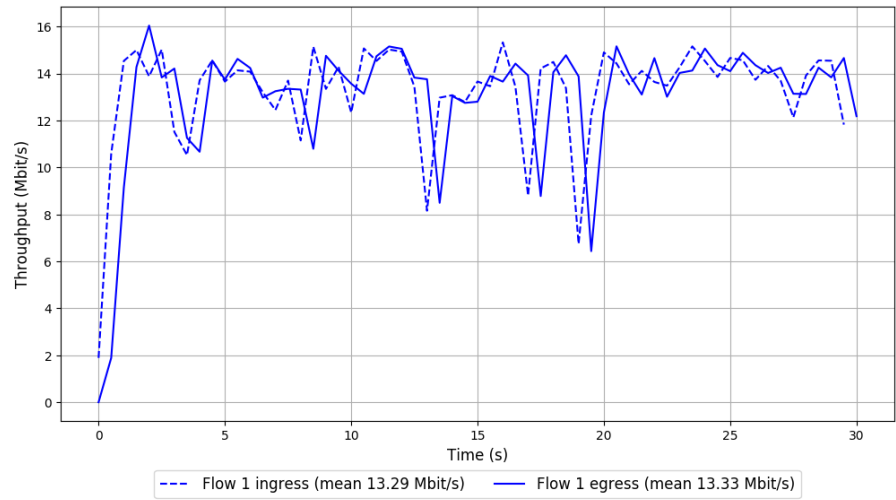
-- Flow 1:

Average throughput: 13.33 Mbit/s

95th percentile per-packet one-way delay: 53.173 ms

Loss rate: 0.06%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2019-01-21 04:09:20

End at: 2019-01-21 04:09:50

Local clock offset: -1.792 ms

Remote clock offset: 0.074 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 12.97 Mbit/s

95th percentile per-packet one-way delay: 56.746 ms

Loss rate: 0.16%

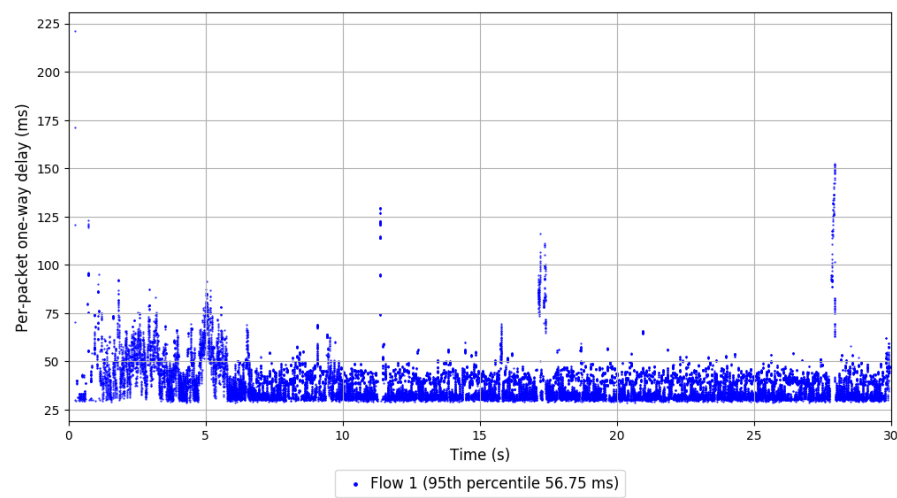
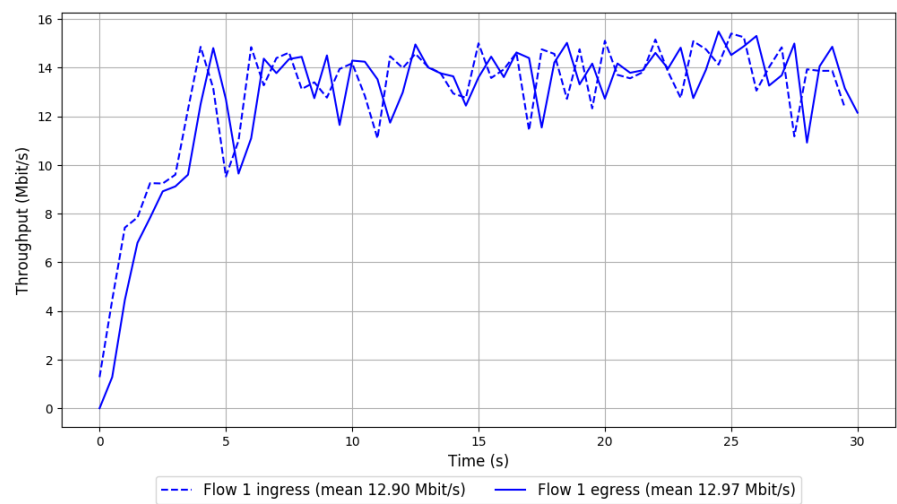
-- Flow 1:

Average throughput: 12.97 Mbit/s

95th percentile per-packet one-way delay: 56.746 ms

Loss rate: 0.16%

Run 2: Report of Sprout — Data Link

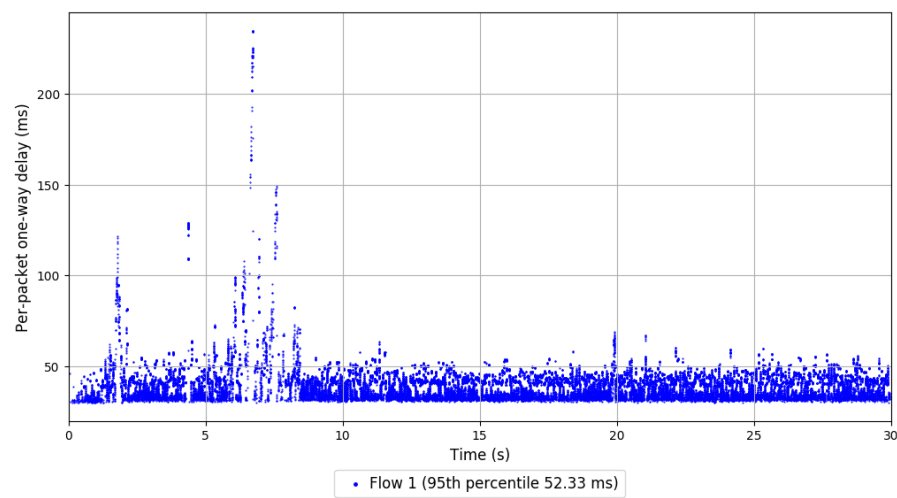
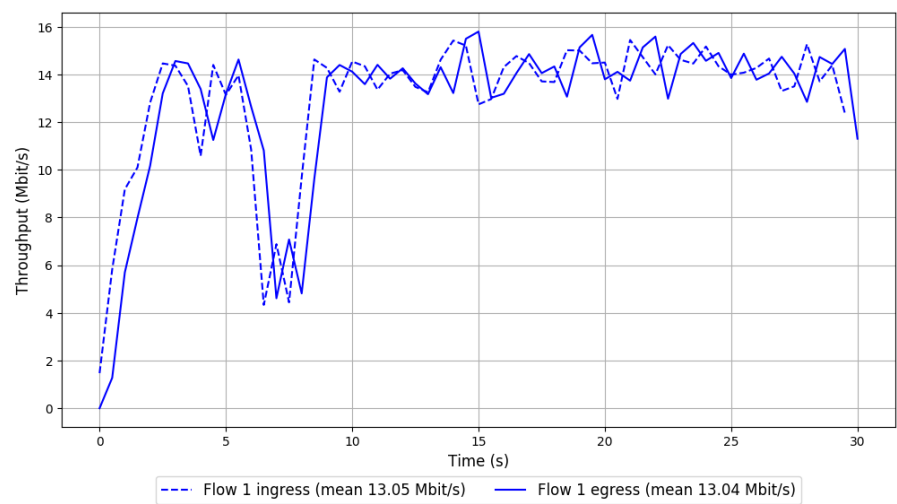


Run 3: Statistics of Sprout

Start at: 2019-01-21 04:35:01
End at: 2019-01-21 04:35:31
Local clock offset: 3.425 ms
Remote clock offset: -1.581 ms

Below is generated by plot.py at 2019-01-21 04:52:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 13.04 Mbit/s
95th percentile per-packet one-way delay: 52.334 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 13.04 Mbit/s
95th percentile per-packet one-way delay: 52.334 ms
Loss rate: 0.16%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2019-01-21 03:44:52

End at: 2019-01-21 03:45:22

Local clock offset: -0.613 ms

Remote clock offset: 0.371 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 38.960 ms

Loss rate: 85.16%

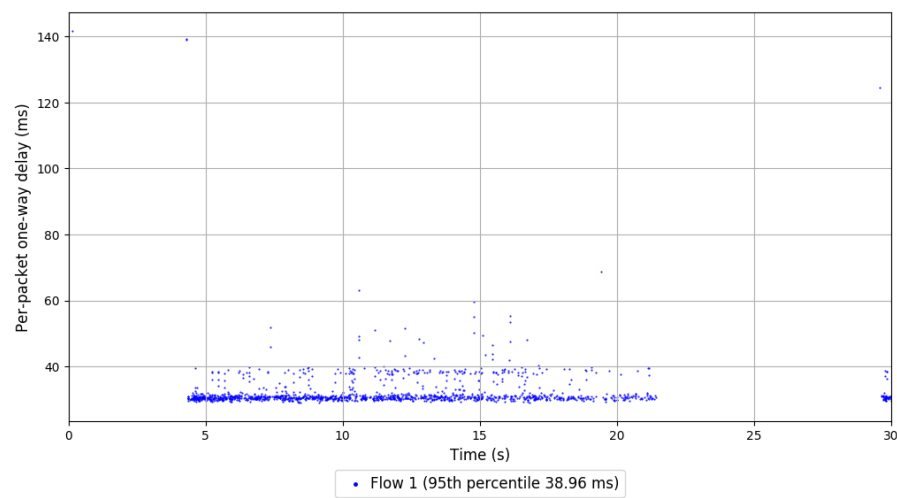
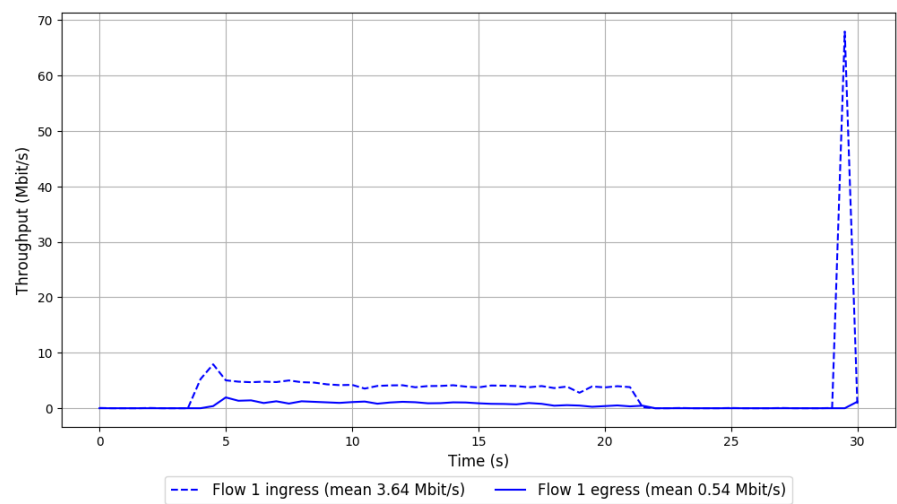
-- Flow 1:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 38.960 ms

Loss rate: 85.16%

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



Run 2: Statistics of TaoVA-100x

Start at: 2019-01-21 04:10:33

End at: 2019-01-21 04:11:03

Local clock offset: -1.855 ms

Remote clock offset: 0.151 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.76 Mbit/s

95th percentile per-packet one-way delay: 39.091 ms

Loss rate: 59.96%

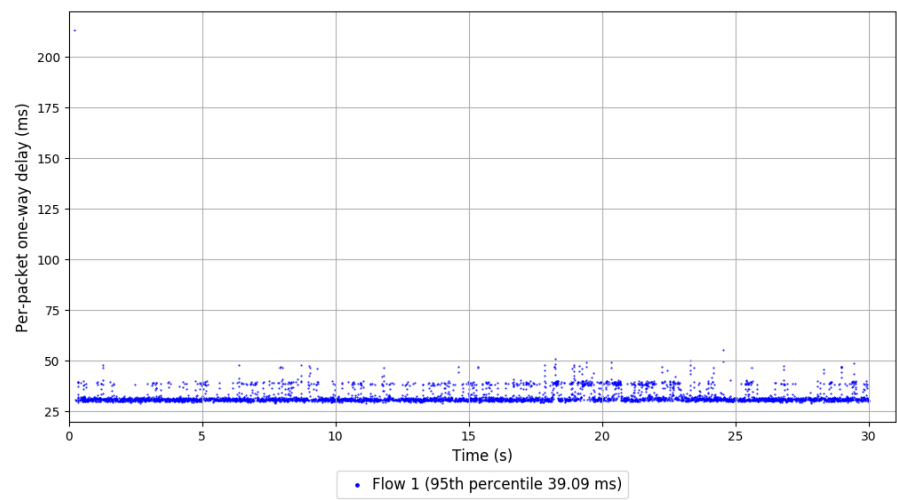
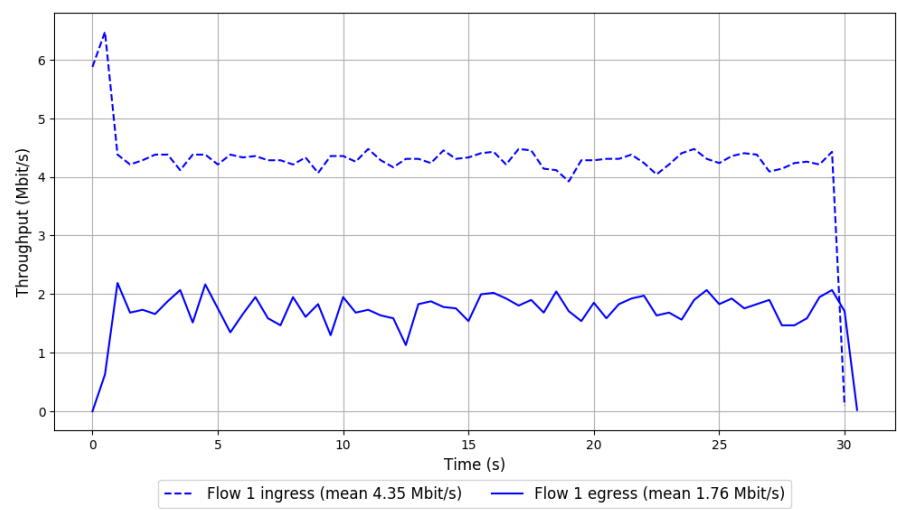
-- Flow 1:

Average throughput: 1.76 Mbit/s

95th percentile per-packet one-way delay: 39.091 ms

Loss rate: 59.96%

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



Run 3: Statistics of TaoVA-100x

Start at: 2019-01-21 04:36:14

End at: 2019-01-21 04:36:44

Local clock offset: 3.574 ms

Remote clock offset: -1.937 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.63 Mbit/s

95th percentile per-packet one-way delay: 39.935 ms

Loss rate: 43.16%

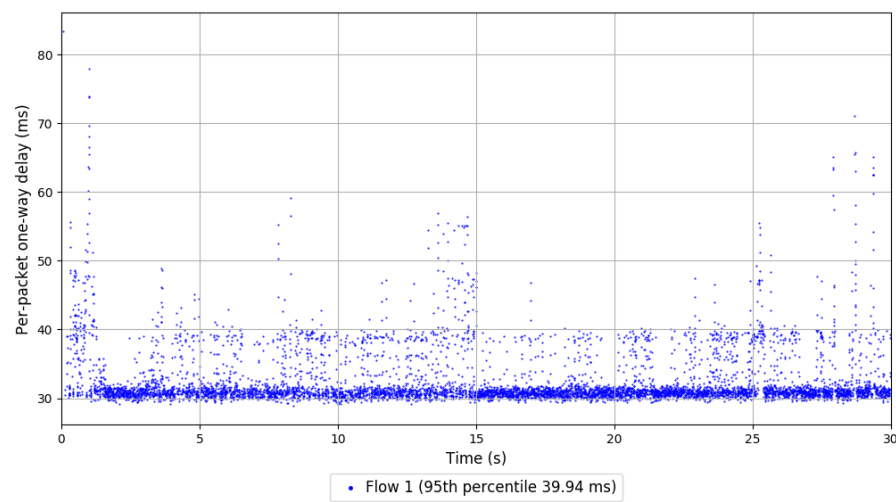
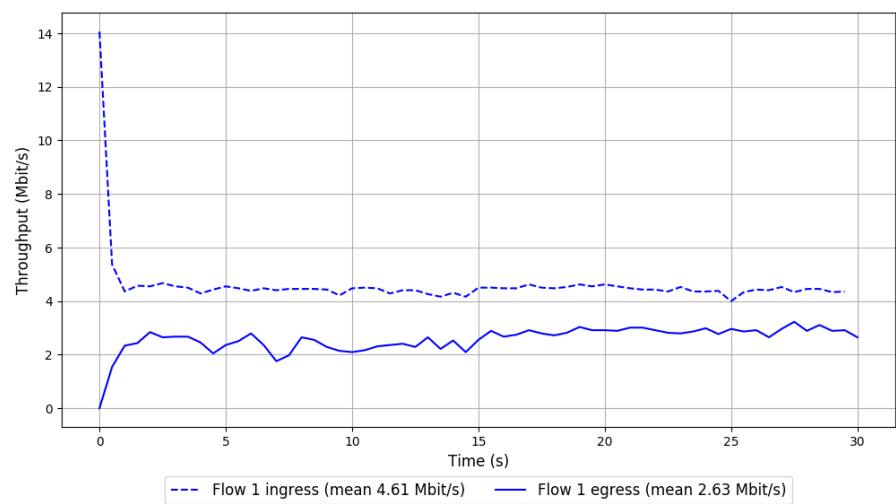
-- Flow 1:

Average throughput: 2.63 Mbit/s

95th percentile per-packet one-way delay: 39.935 ms

Loss rate: 43.16%

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



Run 1: Statistics of TCP Vegas

Start at: 2019-01-21 03:36:19

End at: 2019-01-21 03:36:49

Local clock offset: 0.009 ms

Remote clock offset: 0.265 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 15.61 Mbit/s

95th percentile per-packet one-way delay: 56.440 ms

Loss rate: 0.02%

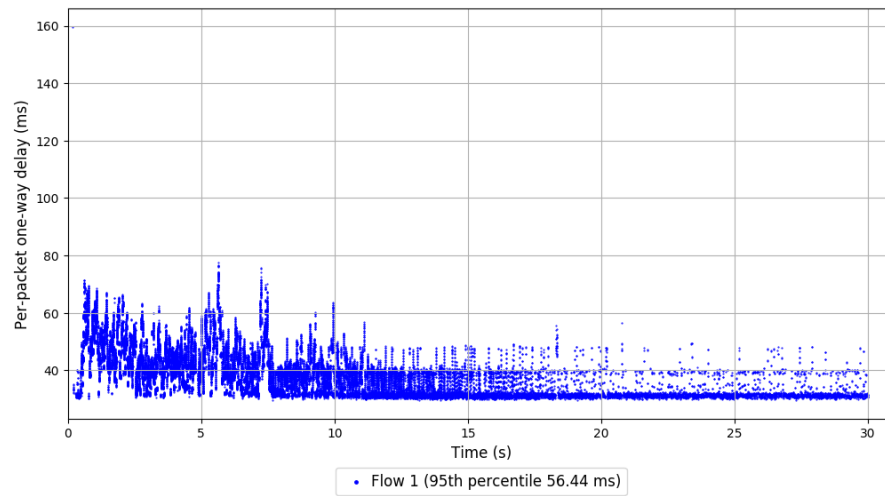
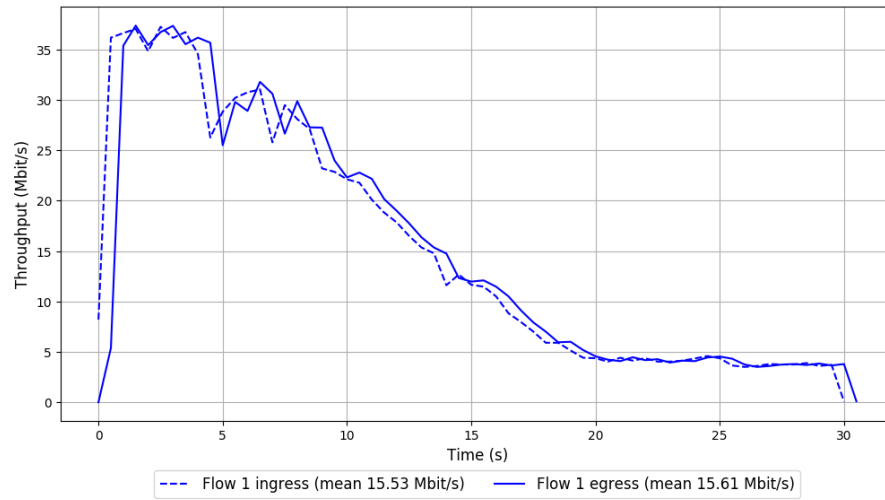
-- Flow 1:

Average throughput: 15.61 Mbit/s

95th percentile per-packet one-way delay: 56.440 ms

Loss rate: 0.02%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2019-01-21 04:02:00

End at: 2019-01-21 04:02:30

Local clock offset: -1.469 ms

Remote clock offset: 0.172 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.19 Mbit/s

95th percentile per-packet one-way delay: 39.984 ms

Loss rate: 0.08%

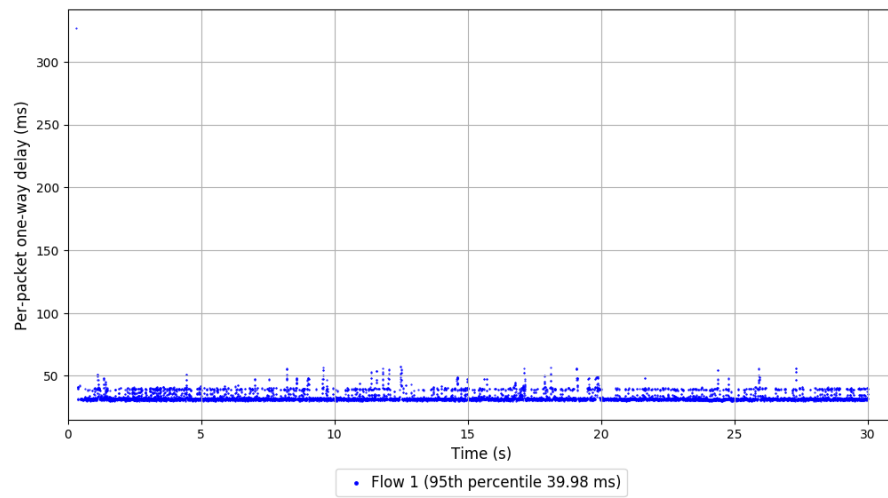
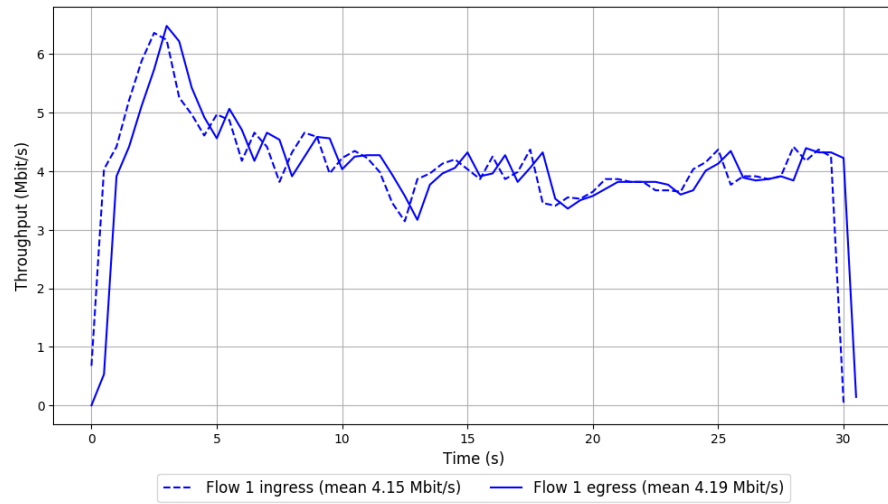
-- Flow 1:

Average throughput: 4.19 Mbit/s

95th percentile per-packet one-way delay: 39.984 ms

Loss rate: 0.08%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2019-01-21 04:27:40

End at: 2019-01-21 04:28:10

Local clock offset: 1.808 ms

Remote clock offset: 0.042 ms

Below is generated by plot.py at 2019-01-21 04:52:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.69 Mbit/s

95th percentile per-packet one-way delay: 42.526 ms

Loss rate: 0.05%

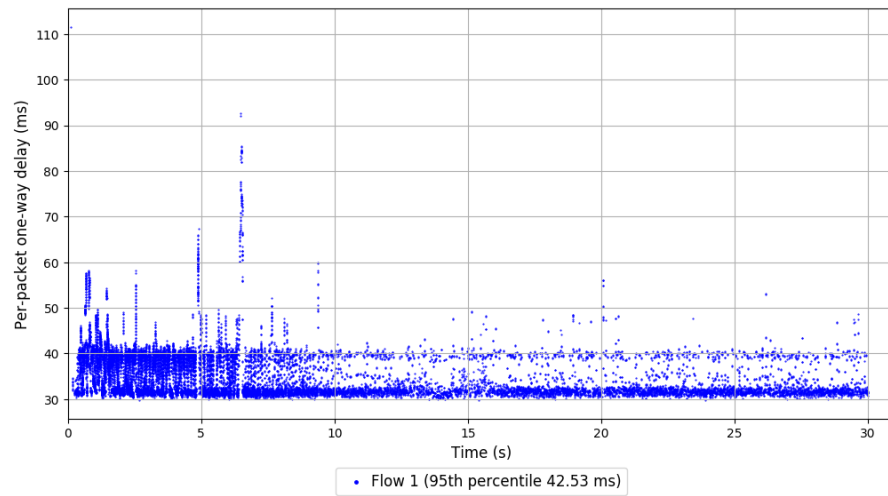
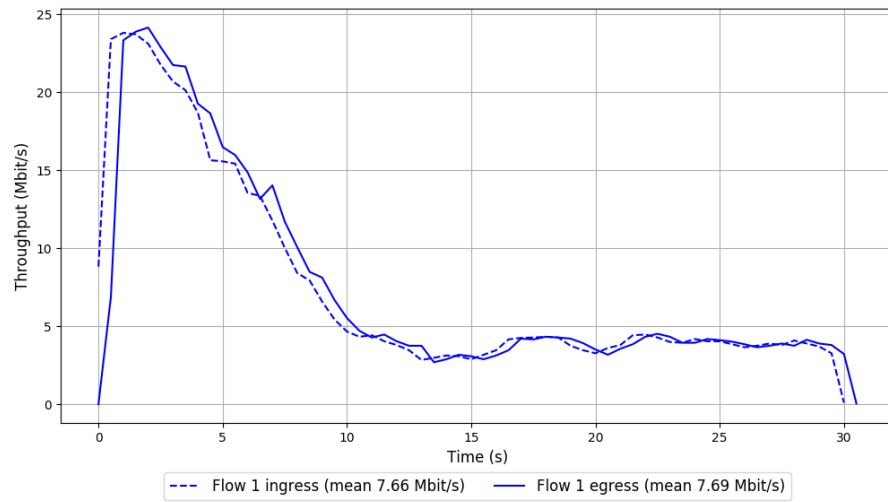
-- Flow 1:

Average throughput: 7.69 Mbit/s

95th percentile per-packet one-way delay: 42.526 ms

Loss rate: 0.05%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2019-01-21 03:54:38

End at: 2019-01-21 03:55:08

Local clock offset: -1.122 ms

Remote clock offset: 0.513 ms

Below is generated by plot.py at 2019-01-21 04:52:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 27.36 Mbit/s

95th percentile per-packet one-way delay: 411.435 ms

Loss rate: 2.14%

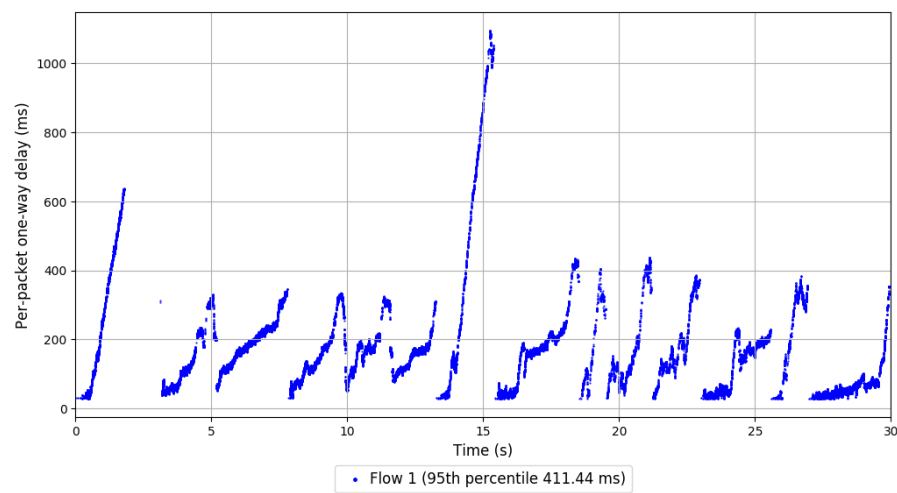
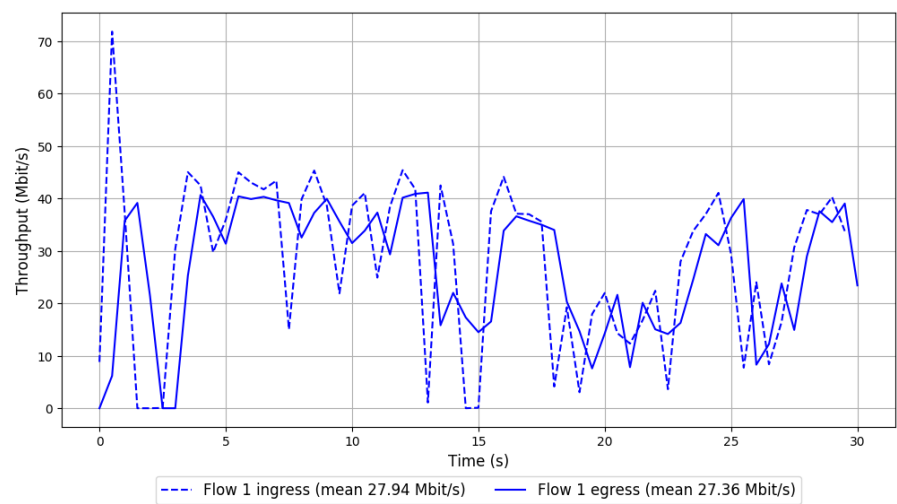
-- Flow 1:

Average throughput: 27.36 Mbit/s

95th percentile per-packet one-way delay: 411.435 ms

Loss rate: 2.14%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-01-21 04:20:18

End at: 2019-01-21 04:20:48

Local clock offset: -1.414 ms

Remote clock offset: 0.063 ms

Below is generated by plot.py at 2019-01-21 04:52:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 30.88 Mbit/s

95th percentile per-packet one-way delay: 378.073 ms

Loss rate: 1.44%

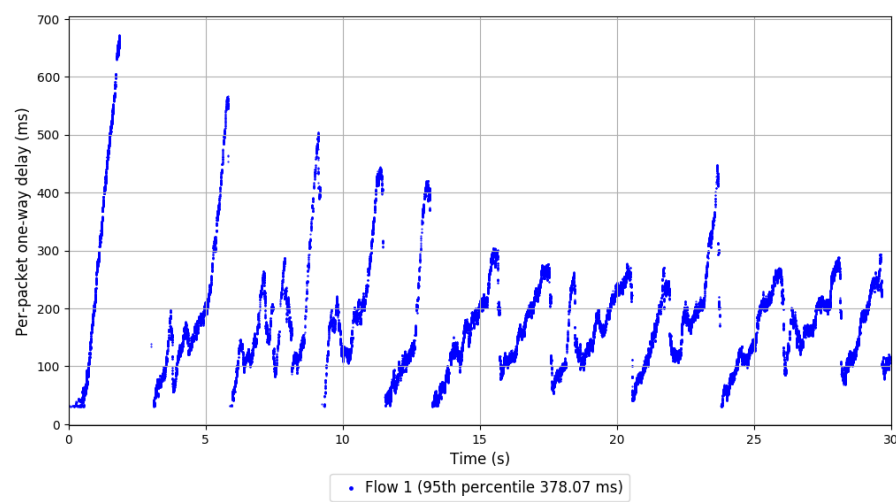
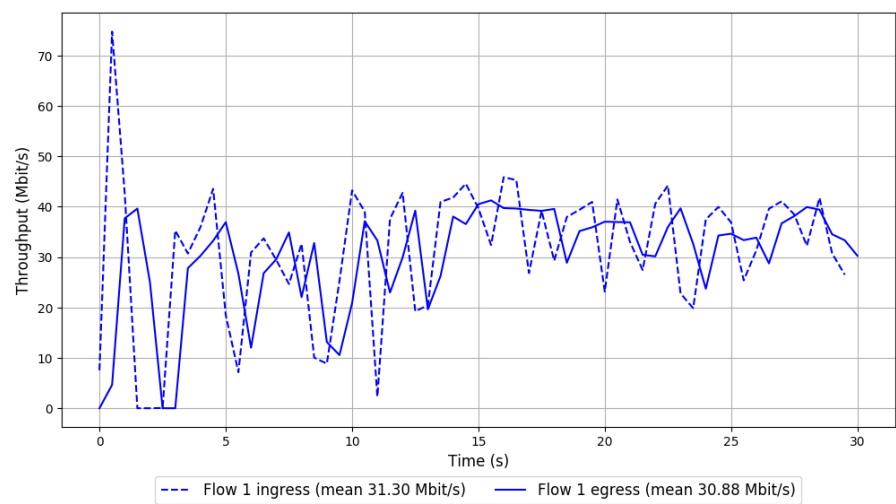
-- Flow 1:

Average throughput: 30.88 Mbit/s

95th percentile per-packet one-way delay: 378.073 ms

Loss rate: 1.44%

Run 2: Report of Verus — Data Link

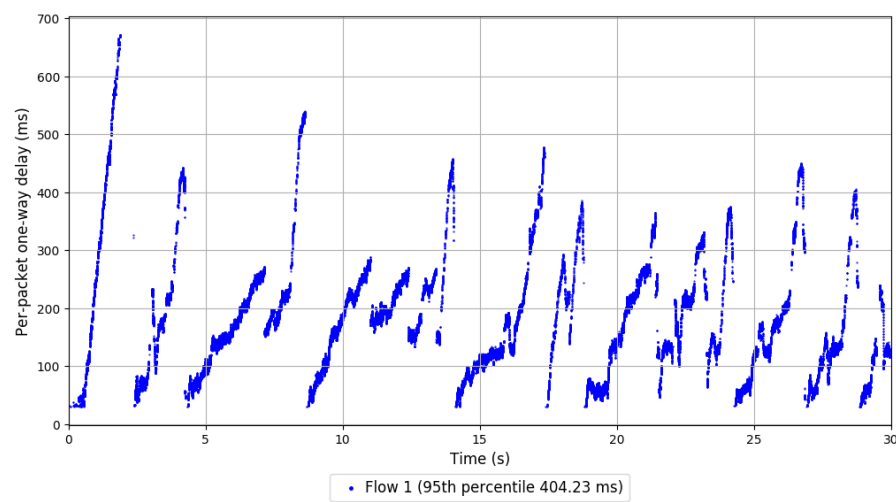
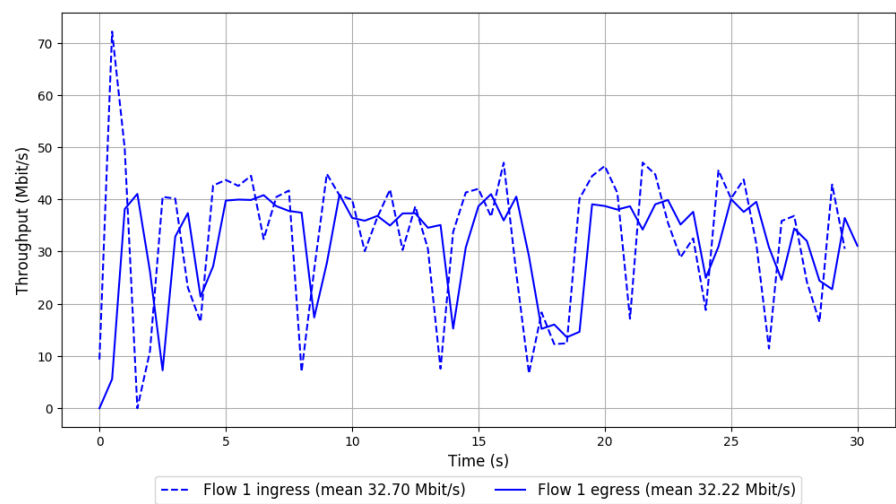


Run 3: Statistics of Verus

Start at: 2019-01-21 04:46:00
End at: 2019-01-21 04:46:30
Local clock offset: 4.637 ms
Remote clock offset: -3.287 ms

Below is generated by plot.py at 2019-01-21 04:52:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 32.22 Mbit/s
95th percentile per-packet one-way delay: 404.229 ms
Loss rate: 1.58%
-- Flow 1:
Average throughput: 32.22 Mbit/s
95th percentile per-packet one-way delay: 404.229 ms
Loss rate: 1.58%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-01-21 03:49:46

End at: 2019-01-21 03:50:16

Local clock offset: -0.865 ms

Remote clock offset: 0.408 ms

Below is generated by plot.py at 2019-01-21 04:52:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 3.21 Mbit/s

95th percentile per-packet one-way delay: 38.417 ms

Loss rate: 0.04%

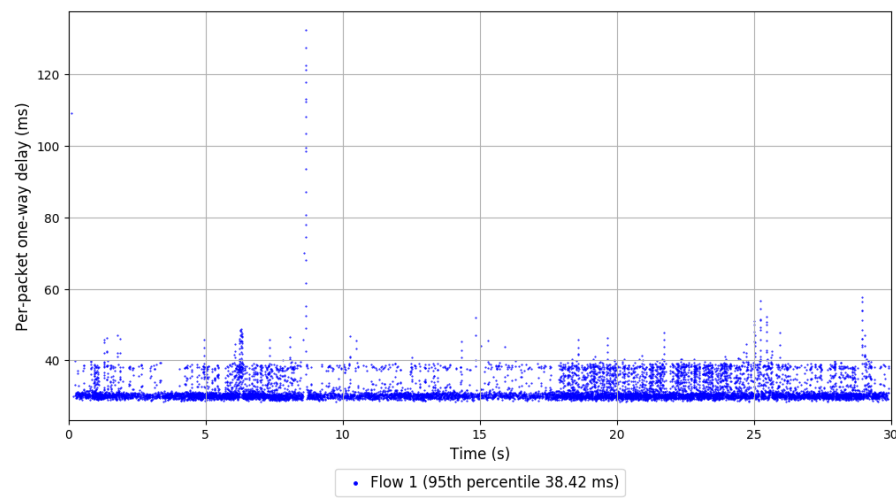
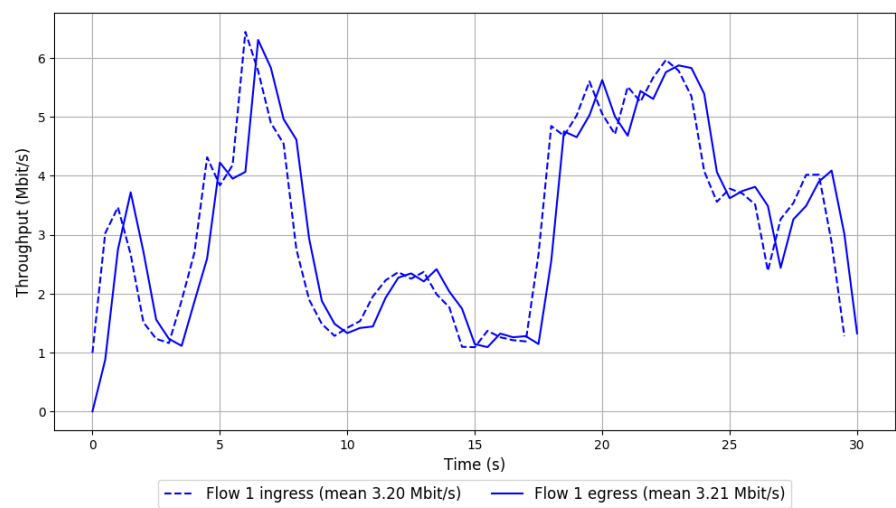
-- Flow 1:

Average throughput: 3.21 Mbit/s

95th percentile per-packet one-way delay: 38.417 ms

Loss rate: 0.04%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-01-21 04:15:27

End at: 2019-01-21 04:15:57

Local clock offset: -2.06 ms

Remote clock offset: 0.113 ms

Below is generated by plot.py at 2019-01-21 04:52:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 39.688 ms

Loss rate: 0.12%

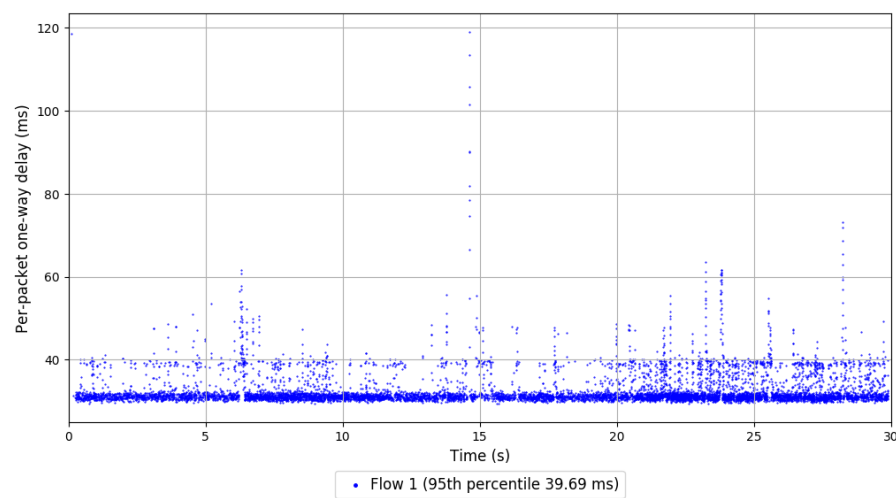
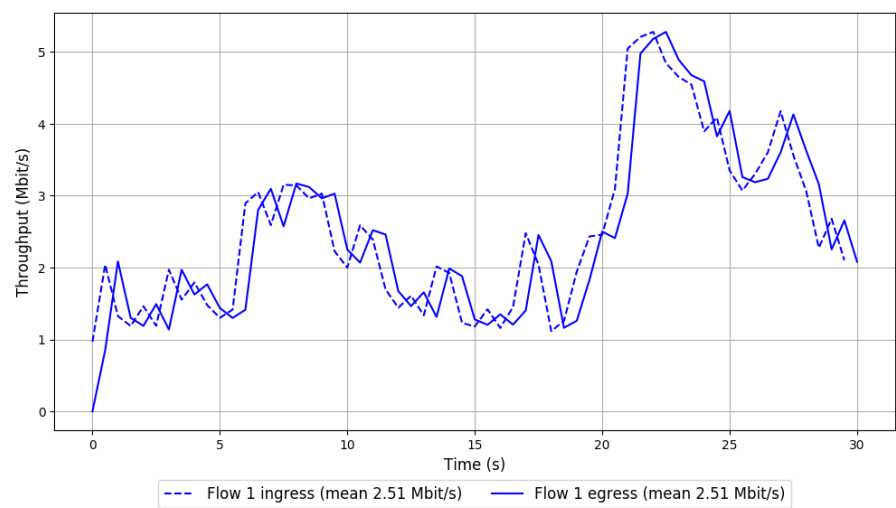
-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 39.688 ms

Loss rate: 0.12%

Run 2: Report of PCC-Vivace — Data Link

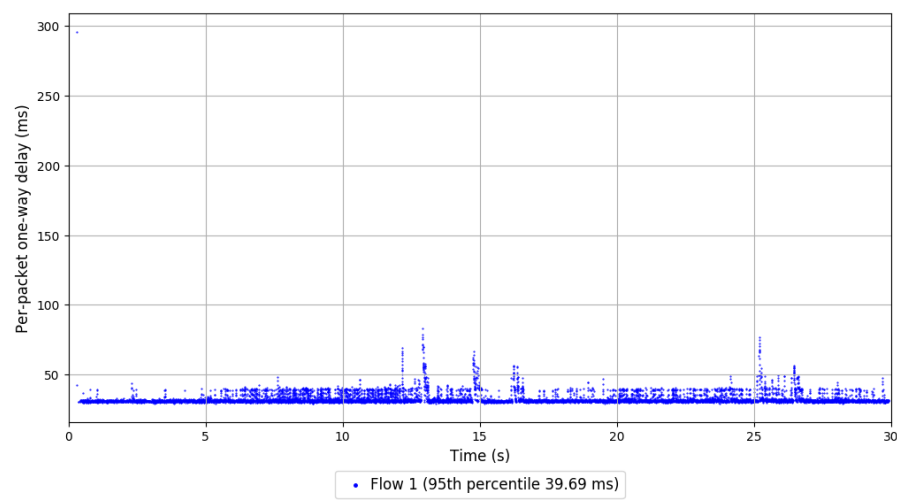
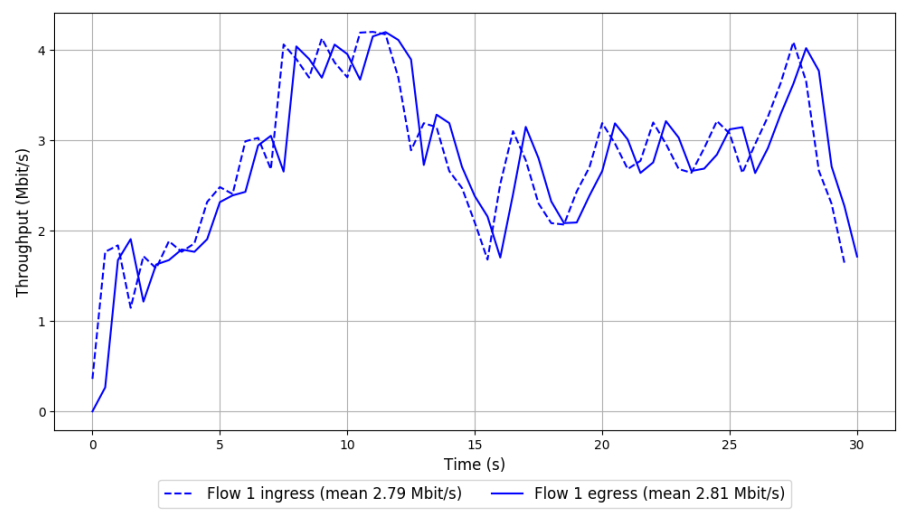


Run 3: Statistics of PCC-Vivace

Start at: 2019-01-21 04:41:09
End at: 2019-01-21 04:41:39
Local clock offset: 4.179 ms
Remote clock offset: -2.689 ms

Below is generated by plot.py at 2019-01-21 04:52:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.81 Mbit/s
95th percentile per-packet one-way delay: 39.690 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 2.81 Mbit/s
95th percentile per-packet one-way delay: 39.690 ms
Loss rate: 0.06%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2019-01-21 03:50:59

End at: 2019-01-21 03:51:29

Local clock offset: -0.933 ms

Remote clock offset: 0.42 ms

Below is generated by plot.py at 2019-01-21 04:52:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.02 Mbit/s

95th percentile per-packet one-way delay: 39.819 ms

Loss rate: 0.12%

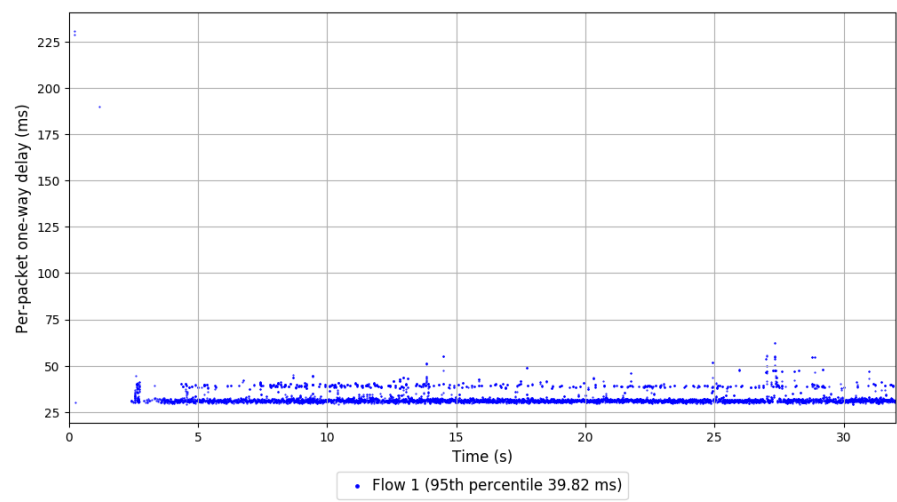
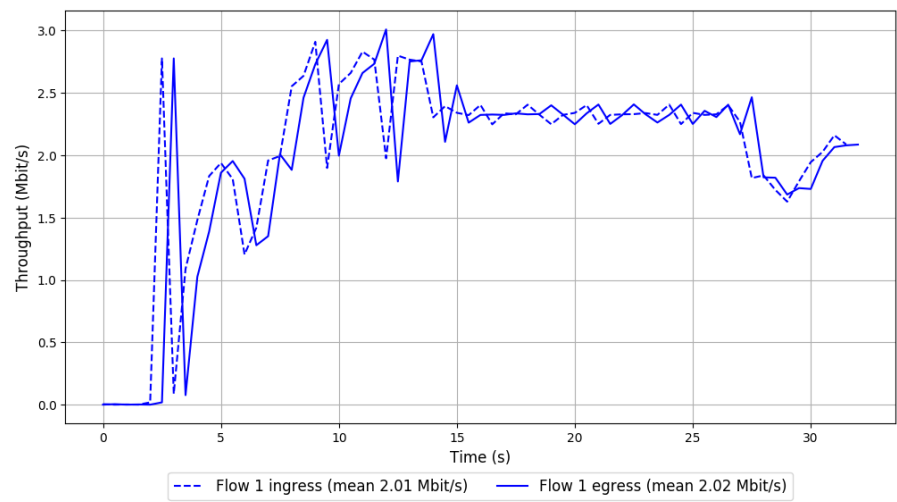
-- Flow 1:

Average throughput: 2.02 Mbit/s

95th percentile per-packet one-way delay: 39.819 ms

Loss rate: 0.12%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-01-21 04:16:40

End at: 2019-01-21 04:17:10

Local clock offset: -2.148 ms

Remote clock offset: 0.073 ms

Below is generated by plot.py at 2019-01-21 04:52:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 39.257 ms

Loss rate: 0.00%

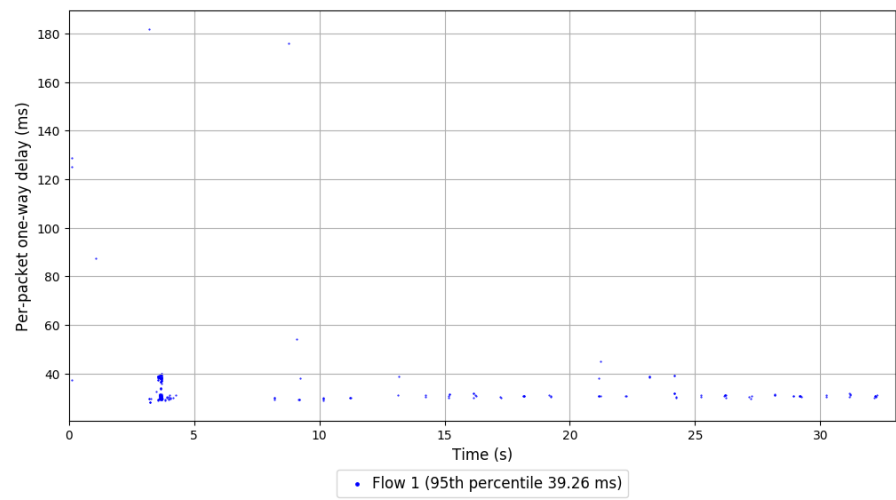
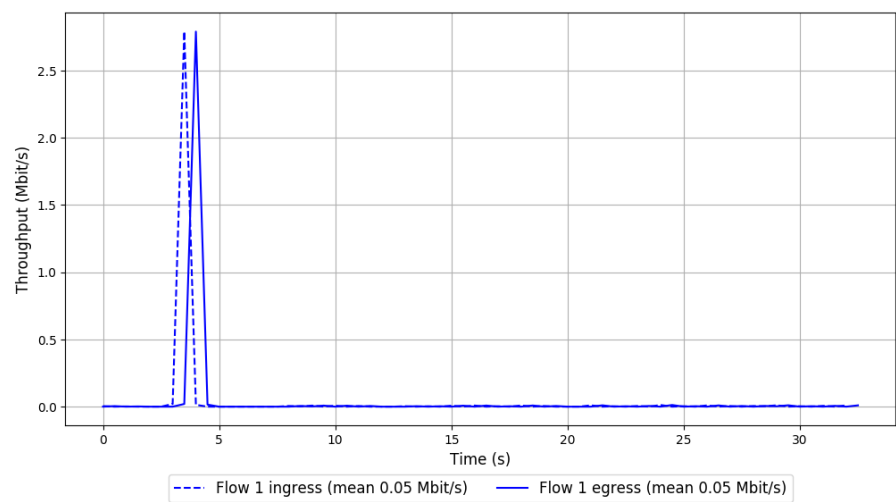
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 39.257 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-01-21 04:42:22
End at: 2019-01-21 04:42:52
Local clock offset: 4.327 ms
Remote clock offset: -2.973 ms

Below is generated by plot.py at 2019-01-21 04:52:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 39.205 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 39.205 ms
Loss rate: 0.05%

Run 3: Report of WebRTC media — Data Link

