

Pantheon Report

Generated at 2018-06-05 04:17:04 (UTC).

Data path: AWS California 1 Ethernet (*local*) →Stanford ppp0 ppp0 (*remote*).

Repeated the test of 16 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

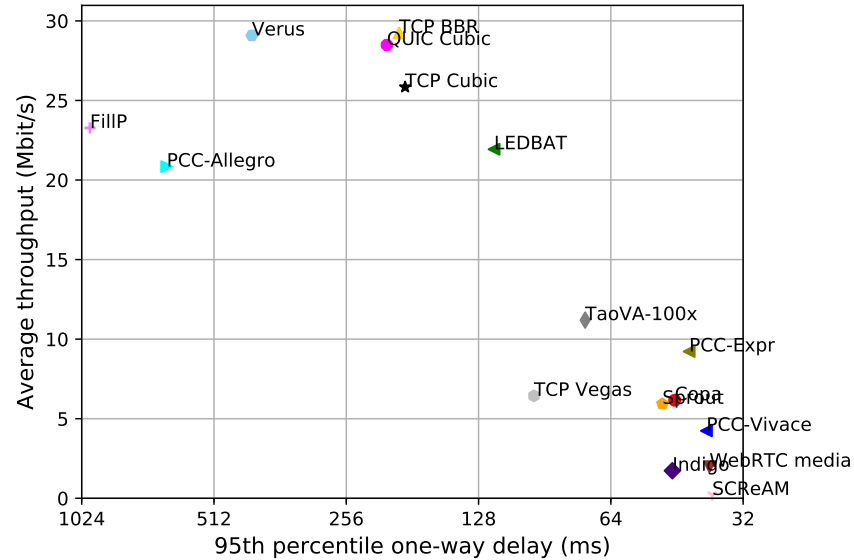
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

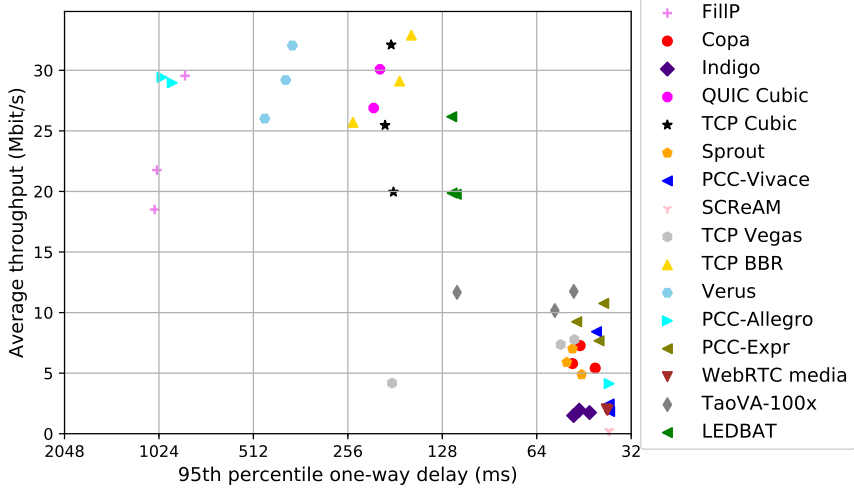
Git summary:

```
branch: master @ 227fdf9a3757f17b88537cceed5743a33037a3d2
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/genericCC @ c7966e494a929986eaa5a9c169a7f381fe1bbbe5
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ 6f038ed31259d366f9840f65b82cbe8f464b1b39
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-quirk @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ c838669682f0c19f6baf92afc9a596a406d48c1f
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 ppp0, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from AWS California 1 to Stanford ppp0, 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	29.24	194.12	0.28
Copa	3	6.16	45.81	0.03
TCP Cubic	3	25.84	188.07	0.28
FillP	3	23.27	980.60	42.10
Indigo	3	1.73	46.37	0.01
LEDBAT	3	21.93	118.04	0.12
PCC-Allegro	3	20.84	655.89	7.50
PCC-Expr	3	9.23	42.47	0.03
QUIC Cubic	2	28.48	207.02	0.44
SCReAM	3	0.21	37.63	0.03
Sprout	3	5.93	48.86	0.00
TaoVA-100x	3	11.20	73.22	0.09
TCP Vegas	3	6.43	95.75	0.01
Verus	3	29.09	419.83	1.57
PCC-Vivace	3	4.24	38.80	0.07
WebRTC media	3	1.98	38.19	0.05

Run 1: Statistics of TCP BBR

Start at: 2018-06-05 03:26:24

End at: 2018-06-05 03:26:54

Local clock offset: 0.165 ms

Remote clock offset: 0.191 ms

Below is generated by plot.py at 2018-06-05 04:15:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 29.11 Mbit/s

95th percentile per-packet one-way delay: 175.071 ms

Loss rate: 0.35%

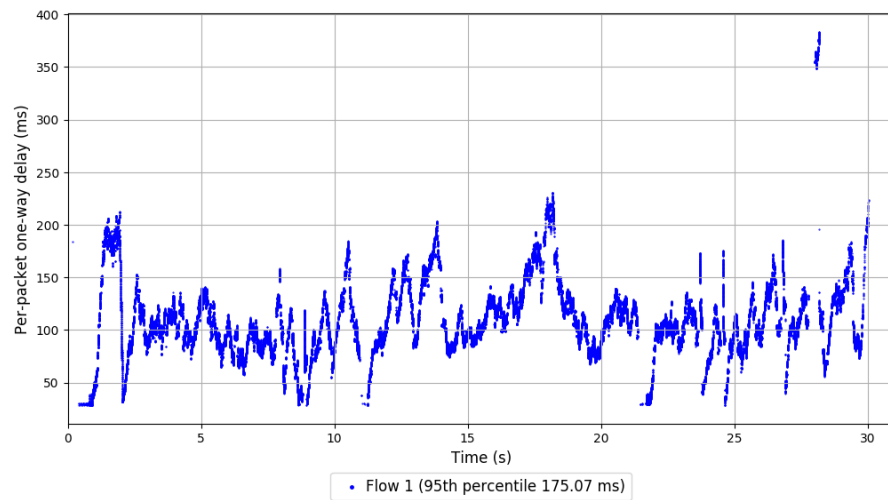
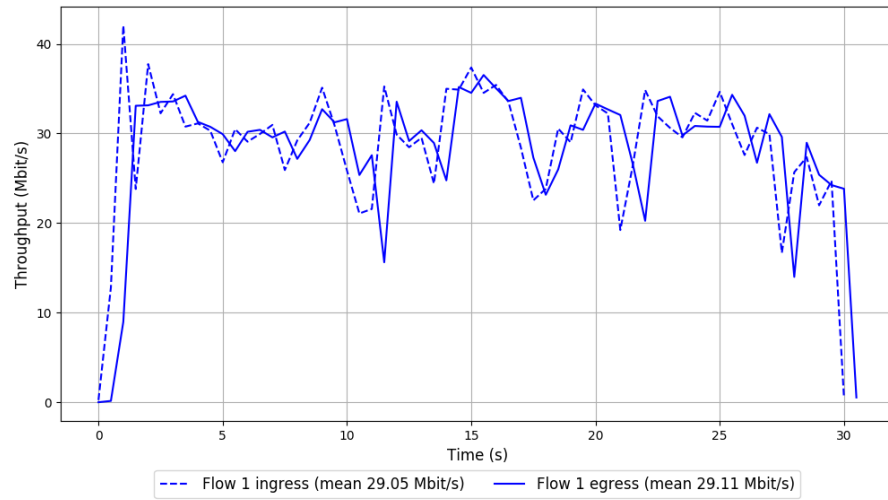
-- Flow 1:

Average throughput: 29.11 Mbit/s

95th percentile per-packet one-way delay: 175.071 ms

Loss rate: 0.35%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-06-05 03:47:16

End at: 2018-06-05 03:47:46

Local clock offset: 0.4 ms

Remote clock offset: 0.437 ms

Below is generated by plot.py at 2018-06-05 04:15:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 25.71 Mbit/s

95th percentile per-packet one-way delay: 246.650 ms

Loss rate: 0.32%

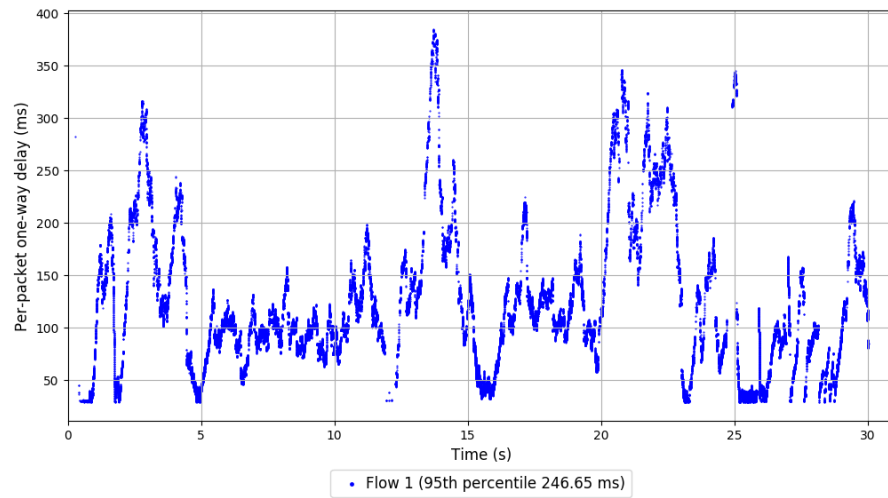
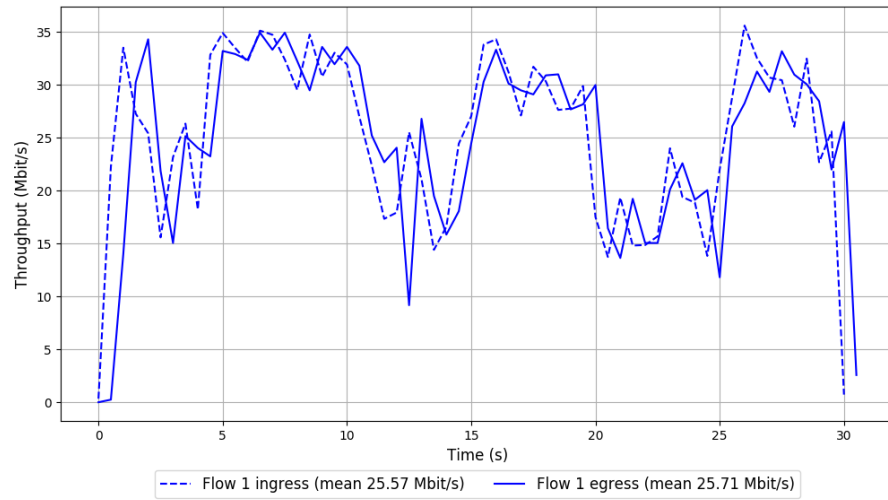
-- Flow 1:

Average throughput: 25.71 Mbit/s

95th percentile per-packet one-way delay: 246.650 ms

Loss rate: 0.32%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-06-05 04:08:13

End at: 2018-06-05 04:08:43

Local clock offset: 0.387 ms

Remote clock offset: 0.341 ms

Below is generated by plot.py at 2018-06-05 04:15:57

Datalink statistics

-- Total of 1 flow:

Average throughput: 32.90 Mbit/s

95th percentile per-packet one-way delay: 160.650 ms

Loss rate: 0.17%

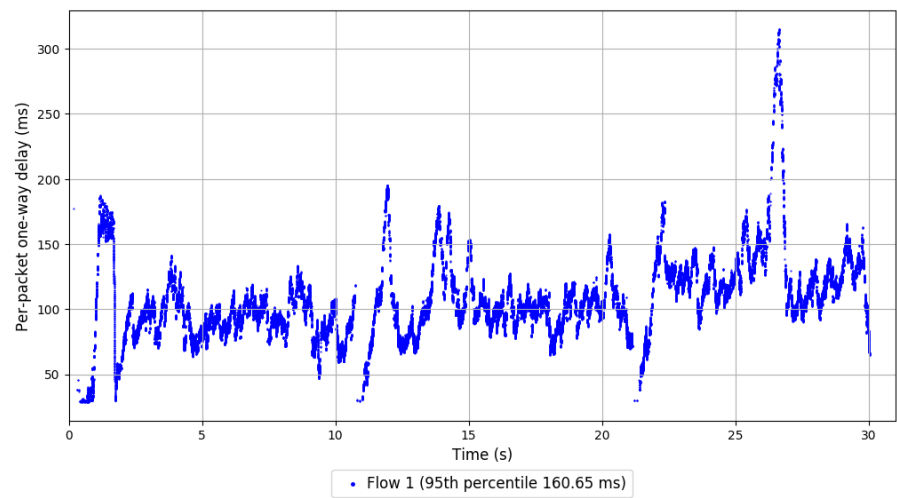
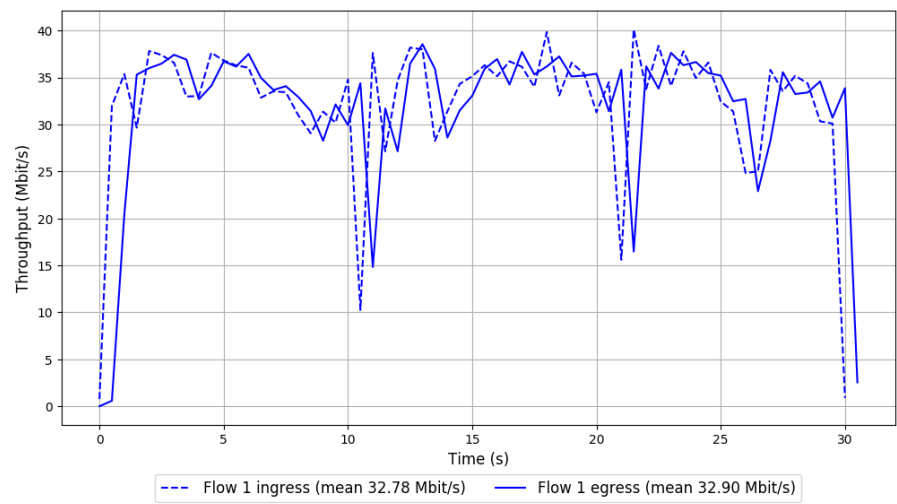
-- Flow 1:

Average throughput: 32.90 Mbit/s

95th percentile per-packet one-way delay: 160.650 ms

Loss rate: 0.17%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

Start at: 2018-06-05 03:17:17

End at: 2018-06-05 03:17:47

Local clock offset: 0.075 ms

Remote clock offset: 0.076 ms

Below is generated by plot.py at 2018-06-05 04:15:57

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.79 Mbit/s

95th percentile per-packet one-way delay: 49.217 ms

Loss rate: 0.01%

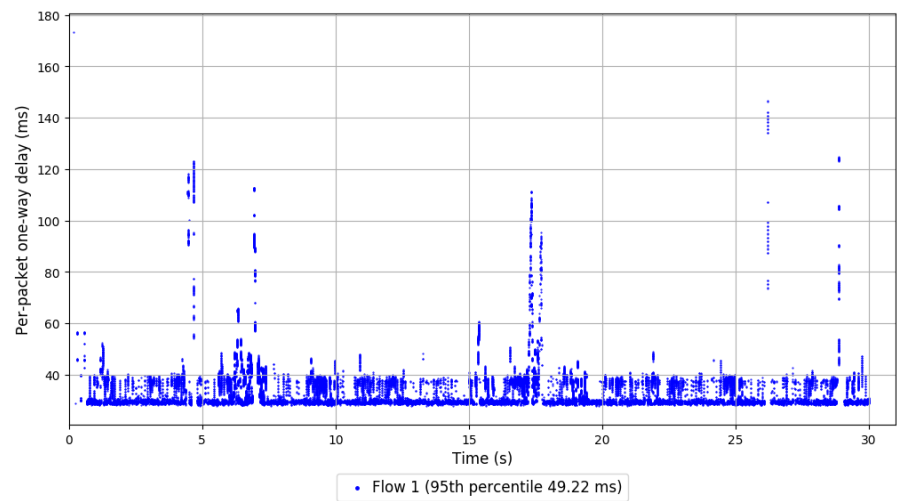
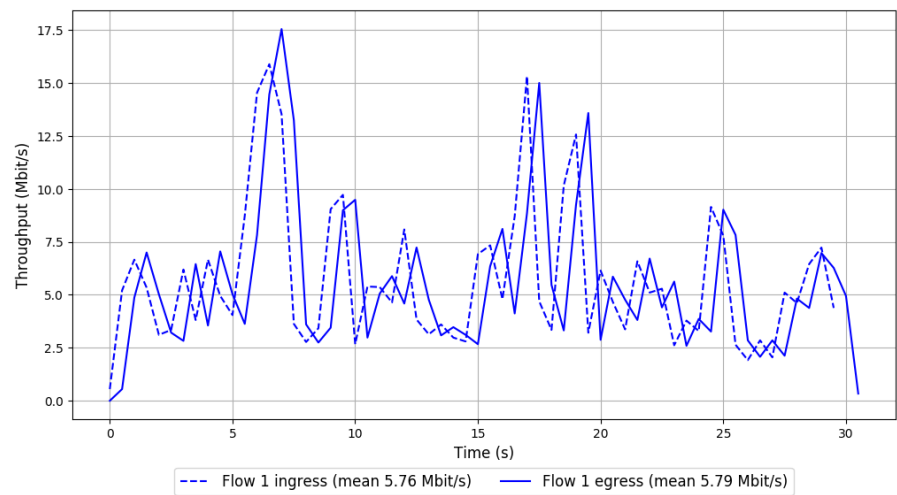
-- Flow 1:

Average throughput: 5.79 Mbit/s

95th percentile per-packet one-way delay: 49.217 ms

Loss rate: 0.01%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-06-05 03:38:07

End at: 2018-06-05 03:38:37

Local clock offset: 0.391 ms

Remote clock offset: 0.396 ms

Below is generated by plot.py at 2018-06-05 04:15:58

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.42 Mbit/s

95th percentile per-packet one-way delay: 41.663 ms

Loss rate: 0.08%

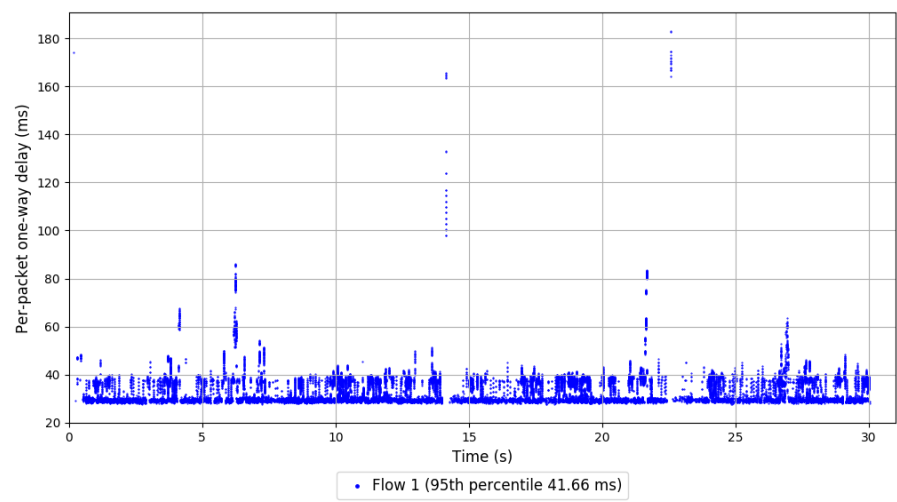
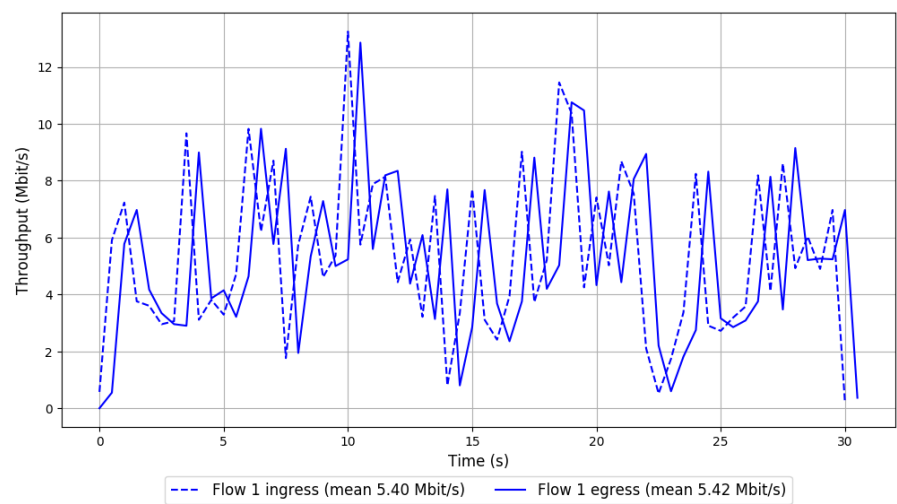
-- Flow 1:

Average throughput: 5.42 Mbit/s

95th percentile per-packet one-way delay: 41.663 ms

Loss rate: 0.08%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-06-05 03:59:01

End at: 2018-06-05 03:59:31

Local clock offset: 0.41 ms

Remote clock offset: 0.343 ms

Below is generated by plot.py at 2018-06-05 04:15:58

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.27 Mbit/s

95th percentile per-packet one-way delay: 46.538 ms

Loss rate: 0.00%

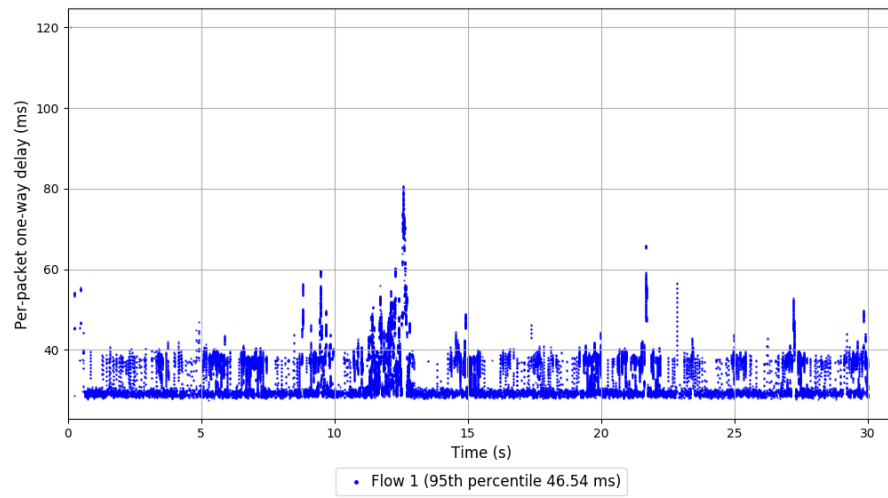
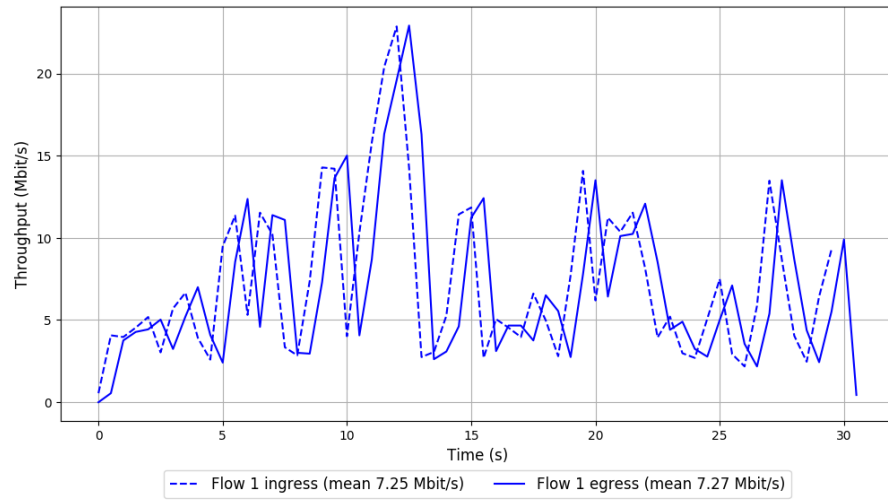
-- Flow 1:

Average throughput: 7.27 Mbit/s

95th percentile per-packet one-way delay: 46.538 ms

Loss rate: 0.00%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-06-05 03:25:06

End at: 2018-06-05 03:25:36

Local clock offset: 0.215 ms

Remote clock offset: 0.174 ms

Below is generated by plot.py at 2018-06-05 04:15:58

Datalink statistics

-- Total of 1 flow:

Average throughput: 19.96 Mbit/s

95th percentile per-packet one-way delay: 183.171 ms

Loss rate: 0.47%

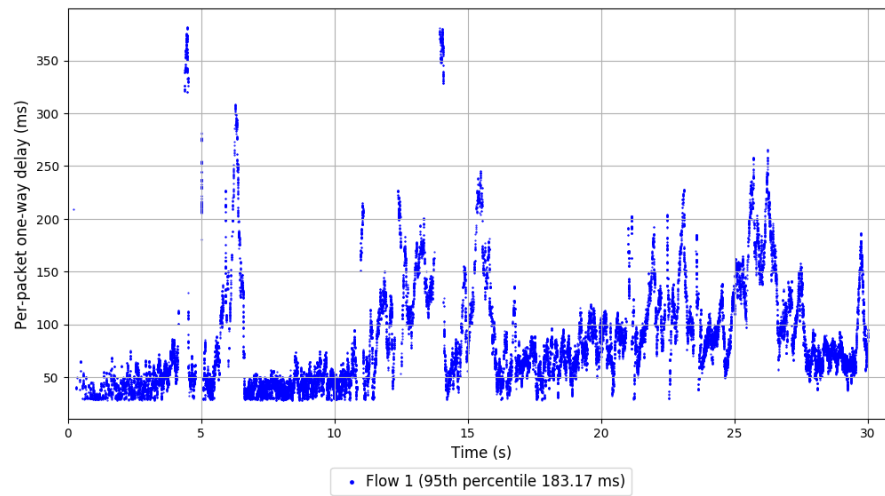
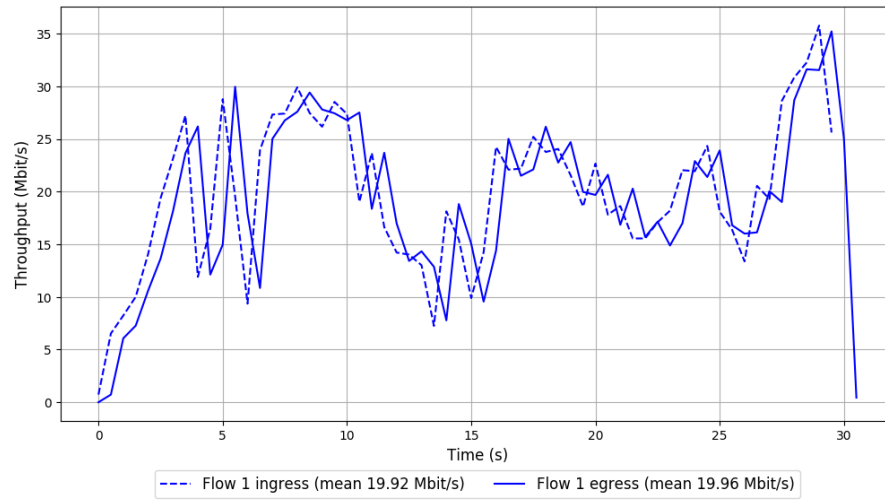
-- Flow 1:

Average throughput: 19.96 Mbit/s

95th percentile per-packet one-way delay: 183.171 ms

Loss rate: 0.47%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-06-05 03:45:57

End at: 2018-06-05 03:46:27

Local clock offset: 0.467 ms

Remote clock offset: 0.541 ms

Below is generated by plot.py at 2018-06-05 04:15:58

Datalink statistics

-- Total of 1 flow:

Average throughput: 25.47 Mbit/s

95th percentile per-packet one-way delay: 194.787 ms

Loss rate: 0.11%

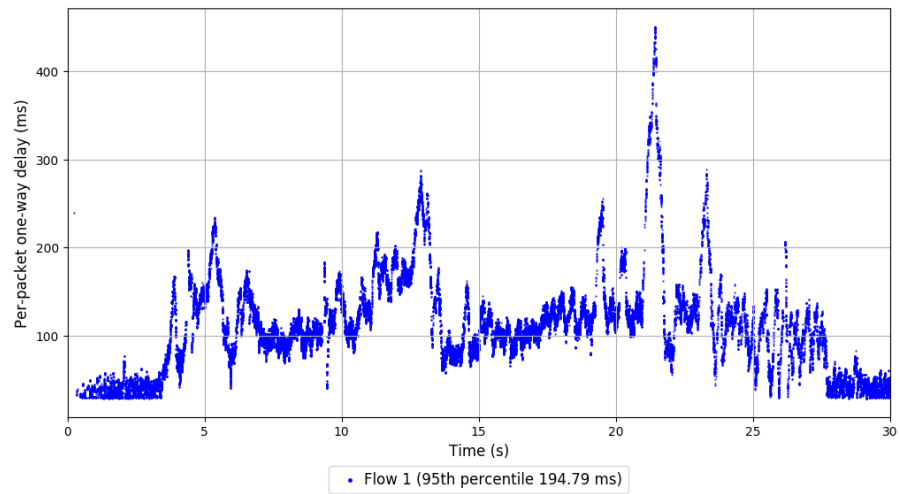
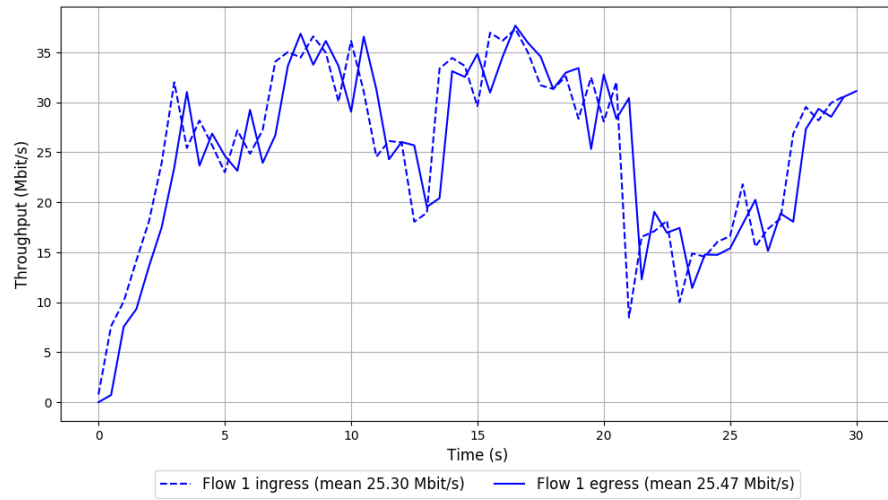
-- Flow 1:

Average throughput: 25.47 Mbit/s

95th percentile per-packet one-way delay: 194.787 ms

Loss rate: 0.11%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-06-05 04:06:54

End at: 2018-06-05 04:07:24

Local clock offset: 0.305 ms

Remote clock offset: 0.36 ms

Below is generated by plot.py at 2018-06-05 04:16:05

Datalink statistics

-- Total of 1 flow:

Average throughput: 32.10 Mbit/s

95th percentile per-packet one-way delay: 186.257 ms

Loss rate: 0.27%

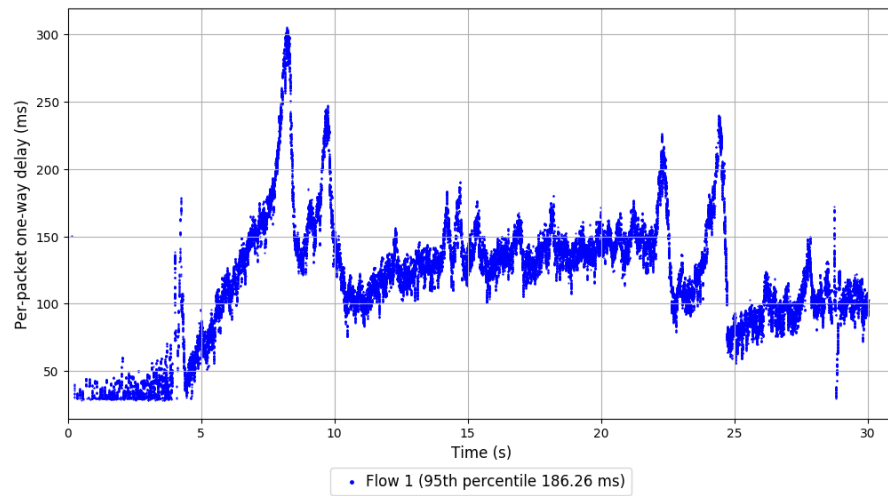
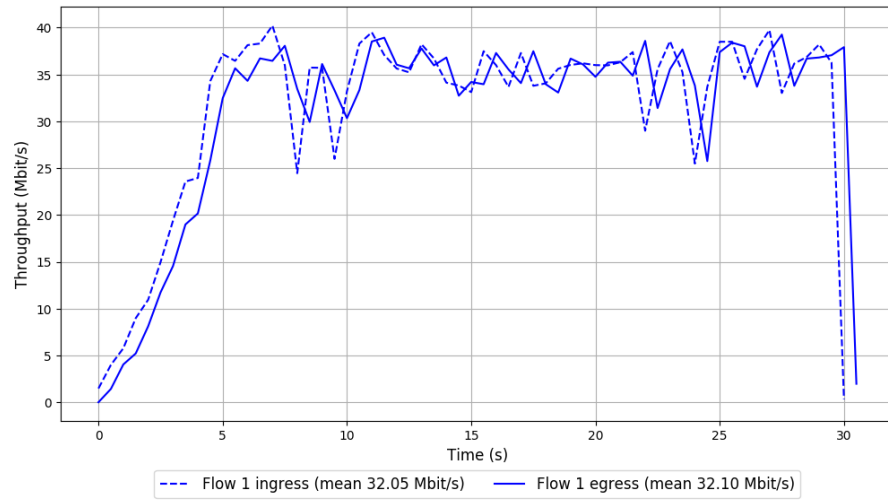
-- Flow 1:

Average throughput: 32.10 Mbit/s

95th percentile per-packet one-way delay: 186.257 ms

Loss rate: 0.27%

Run 3: Report of TCP Cubic — Data Link

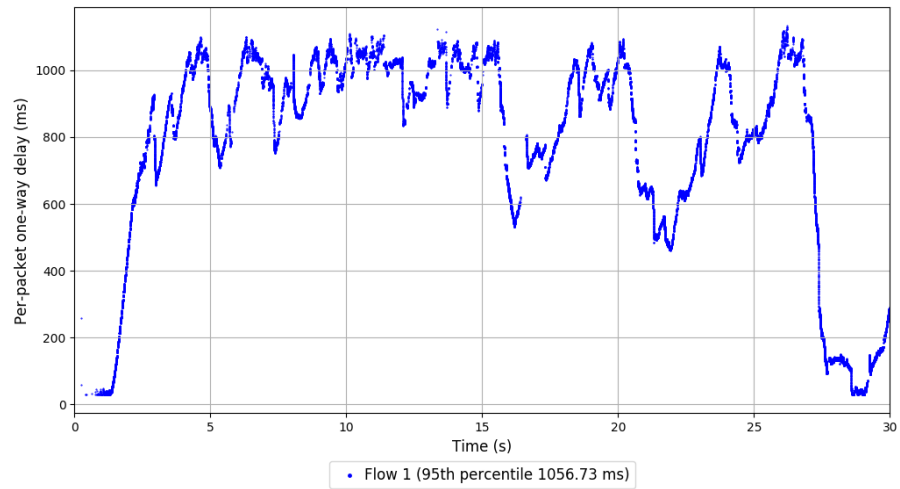
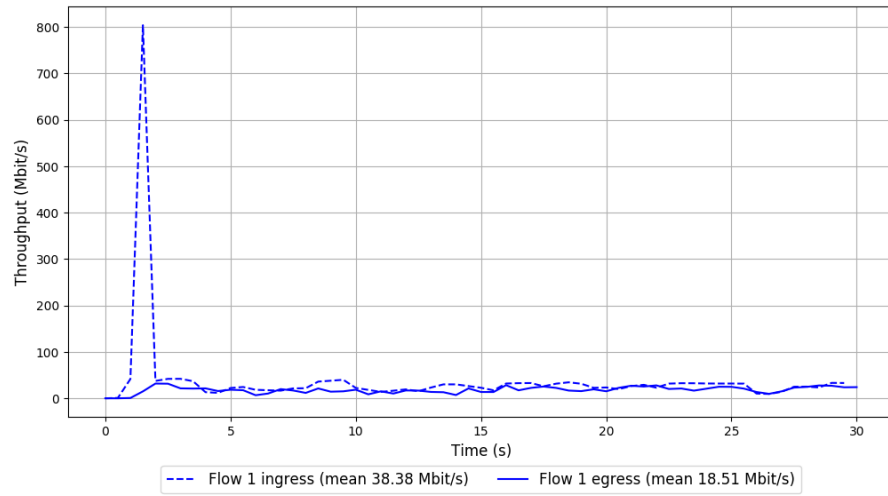


```
Run 1: Statistics of FillP

Start at: 2018-06-05 03:32:55
End at: 2018-06-05 03:33:25
Local clock offset: 0.336 ms
Remote clock offset: 0.25 ms

# Below is generated by plot.py at 2018-06-05 04:16:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 18.51 Mbit/s
95th percentile per-packet one-way delay: 1056.734 ms
Loss rate: 52.17%
-- Flow 1:
Average throughput: 18.51 Mbit/s
95th percentile per-packet one-way delay: 1056.734 ms
Loss rate: 52.17%
```

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-06-05 03:53:48

End at: 2018-06-05 03:54:18

Local clock offset: 0.474 ms

Remote clock offset: 0.283 ms

Below is generated by plot.py at 2018-06-05 04:16:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 21.76 Mbit/s

95th percentile per-packet one-way delay: 1039.586 ms

Loss rate: 41.66%

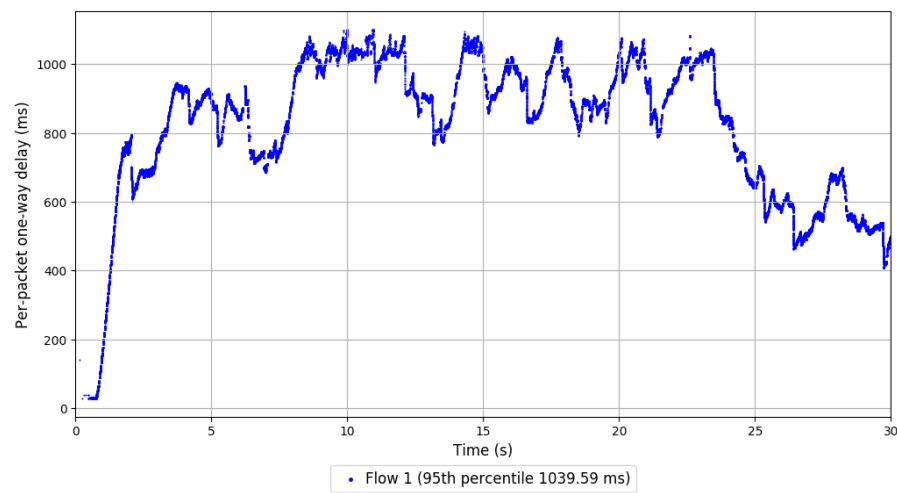
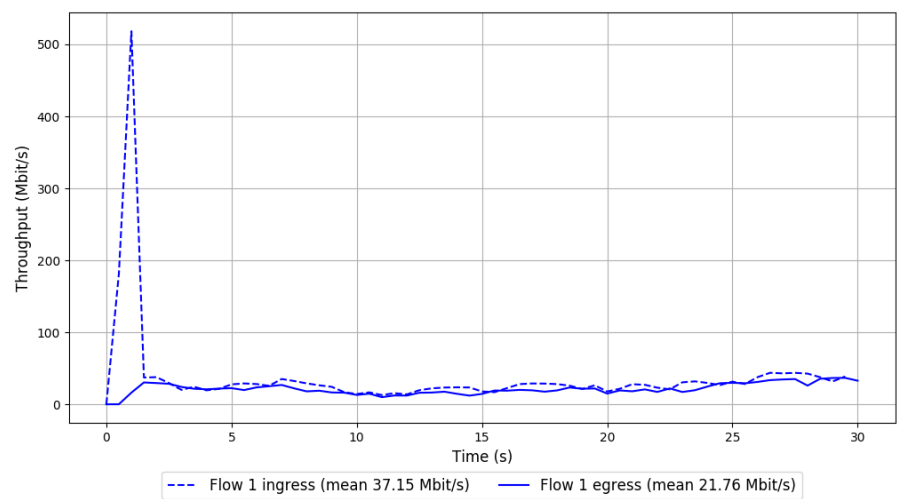
-- Flow 1:

Average throughput: 21.76 Mbit/s

95th percentile per-packet one-way delay: 1039.586 ms

Loss rate: 41.66%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-06-05 04:14:45

End at: 2018-06-05 04:15:15

Local clock offset: 0.33 ms

Remote clock offset: 0.406 ms

Below is generated by plot.py at 2018-06-05 04:16:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 29.55 Mbit/s

95th percentile per-packet one-way delay: 845.474 ms

Loss rate: 32.46%

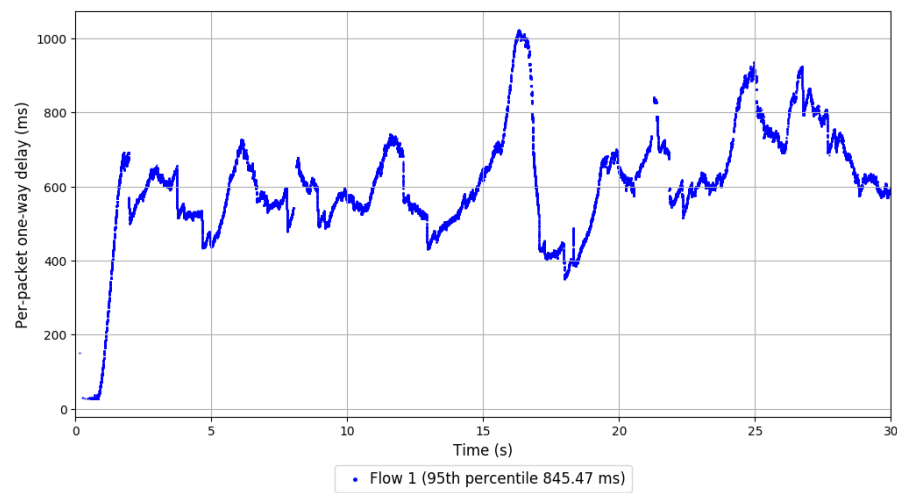
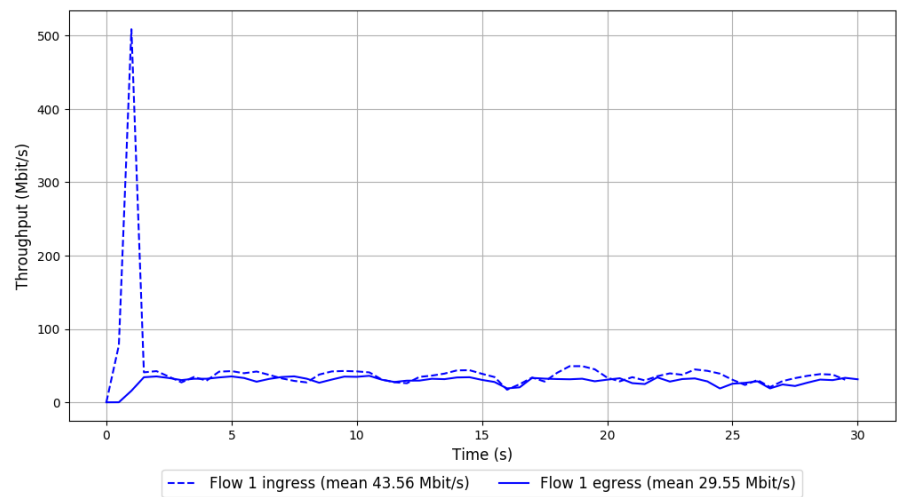
-- Flow 1:

Average throughput: 29.55 Mbit/s

95th percentile per-packet one-way delay: 845.474 ms

Loss rate: 32.46%

Run 3: Report of FillP — Data Link

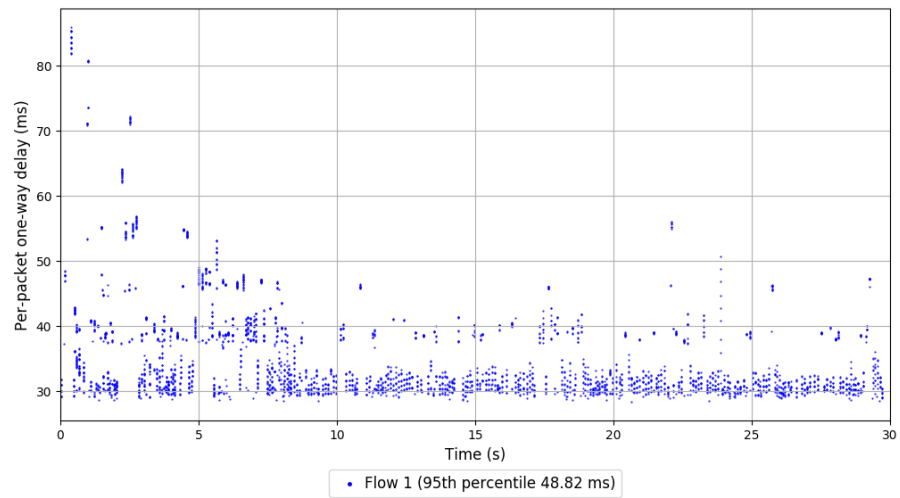
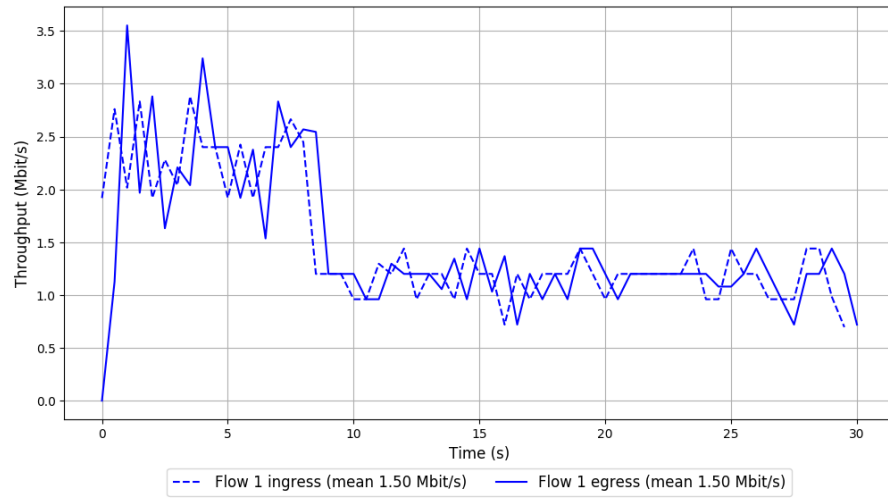


```
Run 1: Statistics of Indigo

Start at: 2018-06-05 03:31:37
End at: 2018-06-05 03:32:07
Local clock offset: 0.31 ms
Remote clock offset: 0.223 ms

# Below is generated by plot.py at 2018-06-05 04:16:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 48.818 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 48.818 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-06-05 03:52:30

End at: 2018-06-05 03:53:00

Local clock offset: 0.397 ms

Remote clock offset: 0.385 ms

Below is generated by plot.py at 2018-06-05 04:16:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 46.855 ms

Loss rate: 0.00%

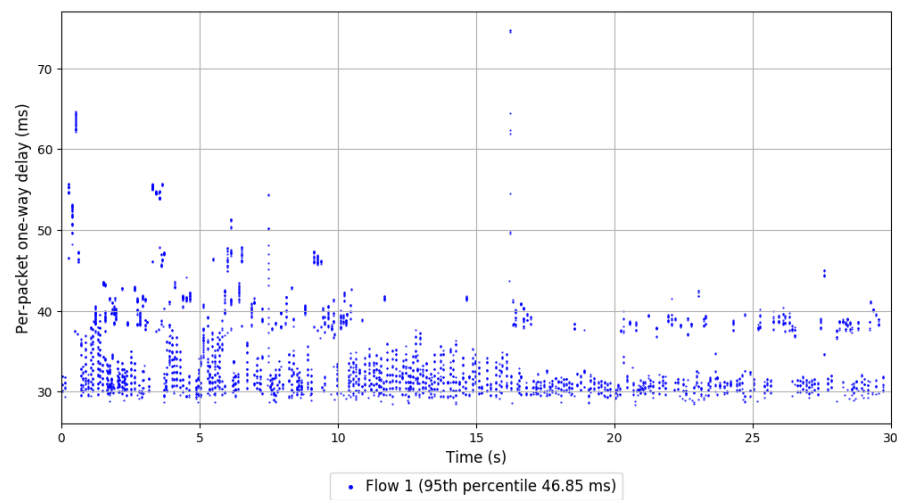
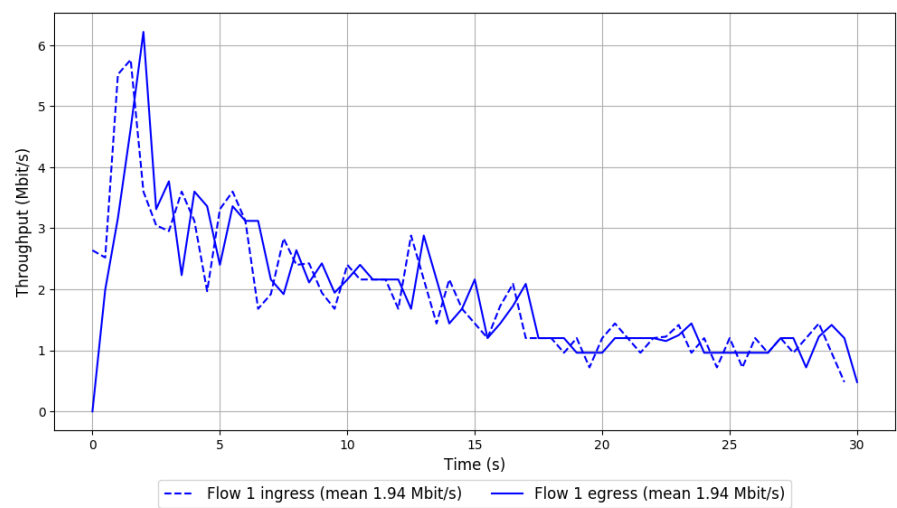
-- Flow 1:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 46.855 ms

Loss rate: 0.00%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-06-05 04:13:27

End at: 2018-06-05 04:13:57

Local clock offset: 0.307 ms

Remote clock offset: 0.449 ms

Below is generated by plot.py at 2018-06-05 04:16:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.75 Mbit/s

95th percentile per-packet one-way delay: 43.435 ms

Loss rate: 0.02%

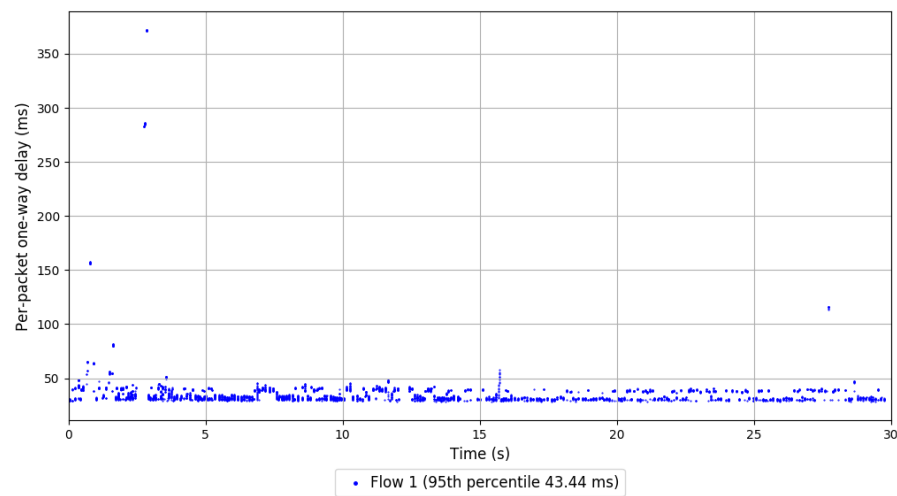
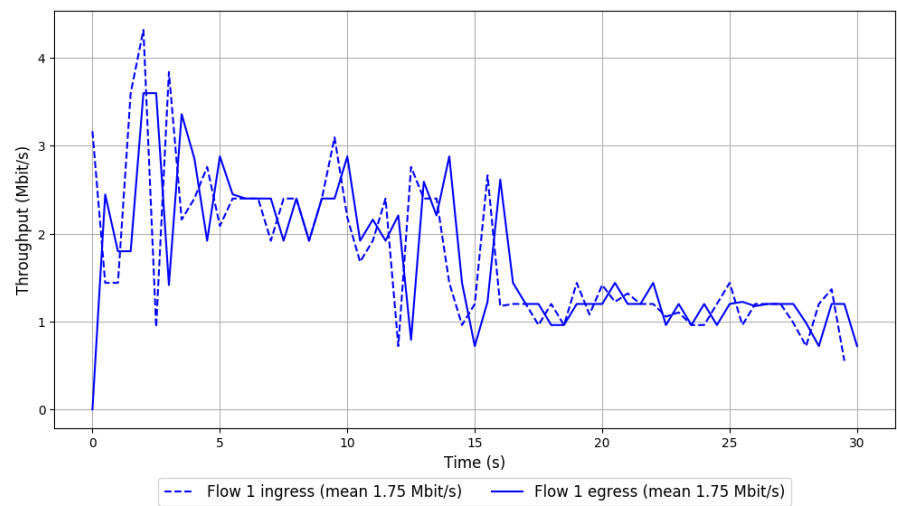
-- Flow 1:

Average throughput: 1.75 Mbit/s

95th percentile per-packet one-way delay: 43.435 ms

Loss rate: 0.02%

Run 3: Report of Indigo — Data Link

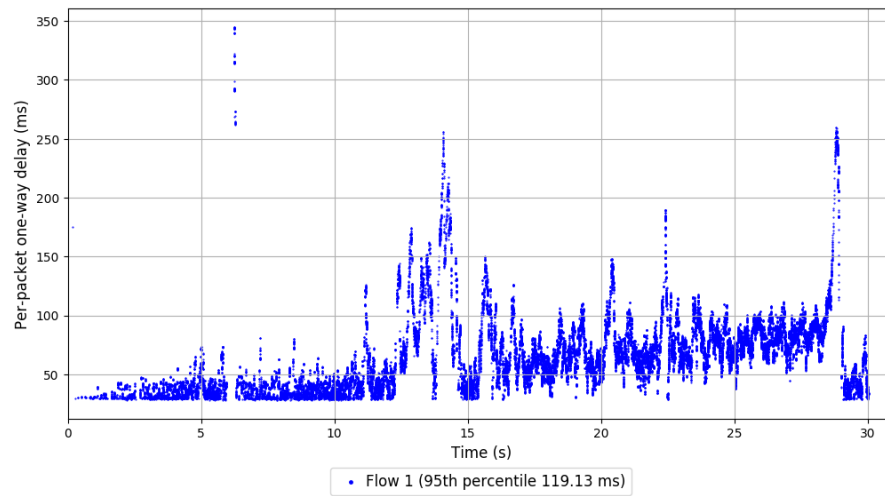
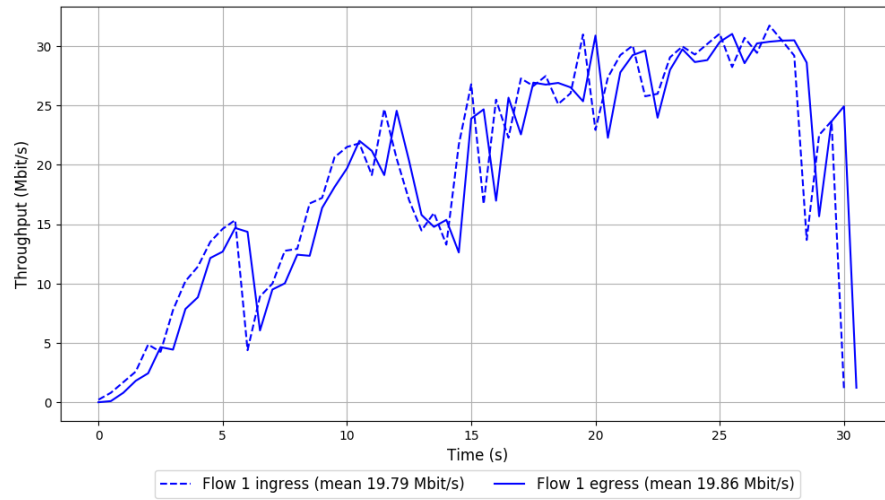


```
Run 1: Statistics of LEDBAT

Start at: 2018-06-05 03:21:12
End at: 2018-06-05 03:21:42
Local clock offset: 0.194 ms
Remote clock offset: 0.103 ms

# Below is generated by plot.py at 2018-06-05 04:16:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 19.86 Mbit/s
95th percentile per-packet one-way delay: 119.134 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 19.86 Mbit/s
95th percentile per-packet one-way delay: 119.134 ms
Loss rate: 0.12%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-06-05 03:42:01

End at: 2018-06-05 03:42:31

Local clock offset: 0.437 ms

Remote clock offset: 0.493 ms

Below is generated by plot.py at 2018-06-05 04:16:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 19.76 Mbit/s

95th percentile per-packet one-way delay: 115.557 ms

Loss rate: 0.10%

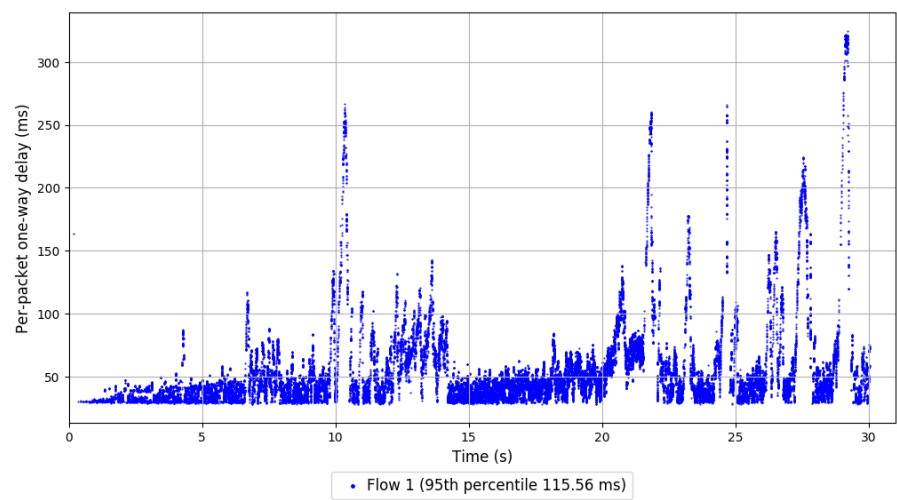
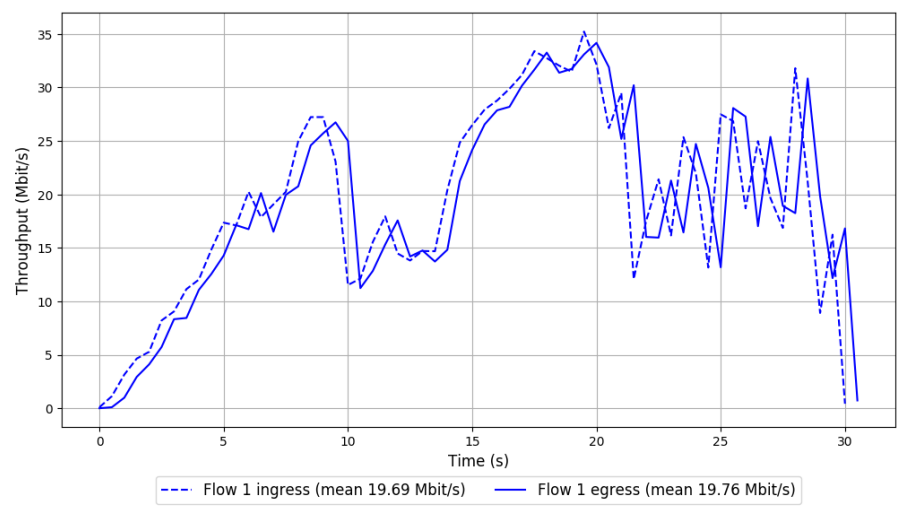
-- Flow 1:

Average throughput: 19.76 Mbit/s

95th percentile per-packet one-way delay: 115.557 ms

Loss rate: 0.10%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-06-05 04:02:57

End at: 2018-06-05 04:03:27

Local clock offset: 0.377 ms

Remote clock offset: 0.366 ms

Below is generated by plot.py at 2018-06-05 04:16:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 26.17 Mbit/s

95th percentile per-packet one-way delay: 119.430 ms

Loss rate: 0.13%

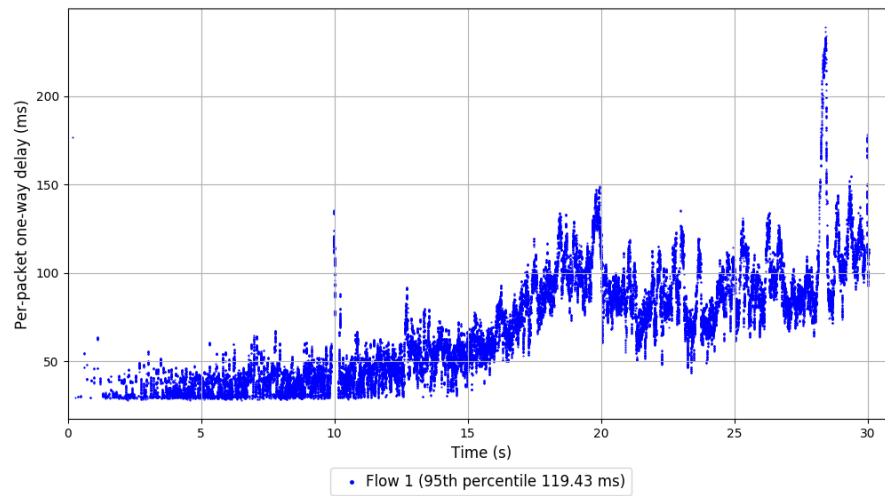
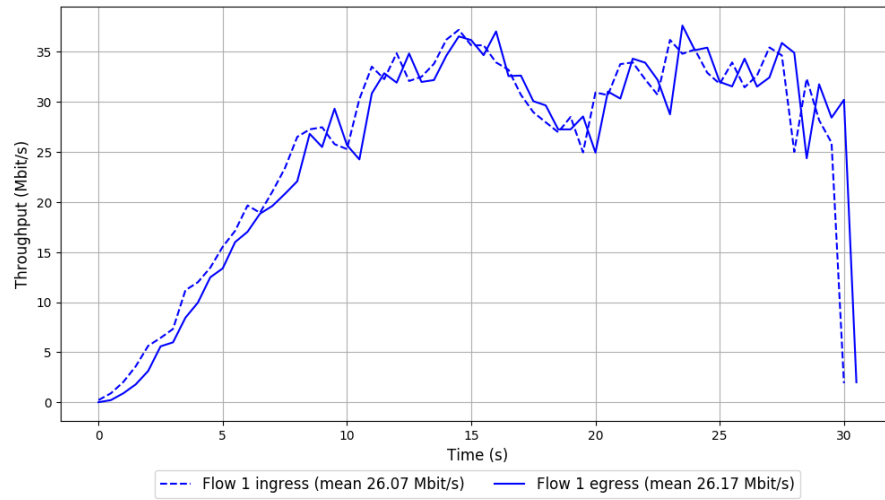
-- Flow 1:

Average throughput: 26.17 Mbit/s

95th percentile per-packet one-way delay: 119.430 ms

Loss rate: 0.13%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2018-06-05 03:19:54

End at: 2018-06-05 03:20:24

Local clock offset: 0.171 ms

Remote clock offset: 0.087 ms

Below is generated by plot.py at 2018-06-05 04:16:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 29.42 Mbit/s

95th percentile per-packet one-way delay: 1001.219 ms

Loss rate: 9.67%

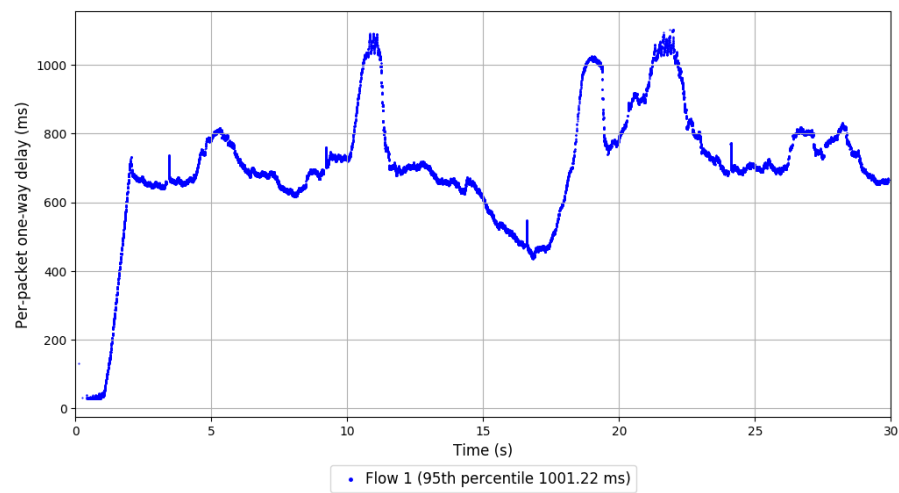
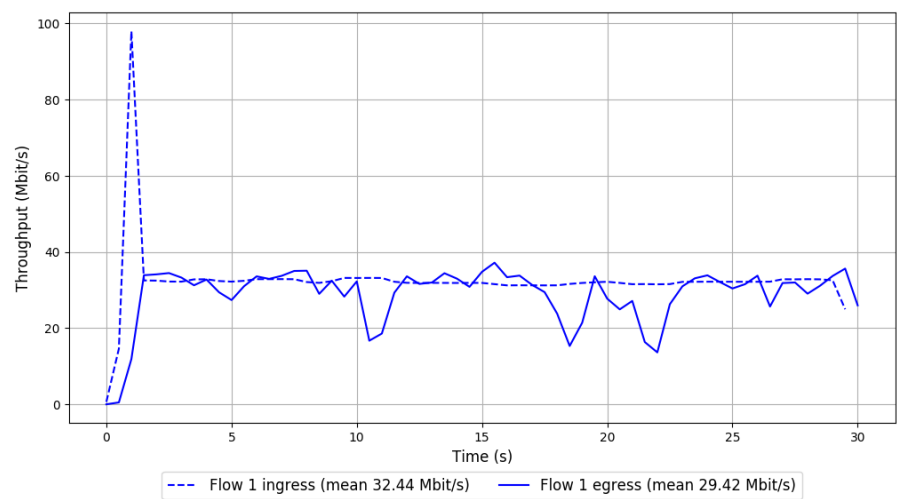
-- Flow 1:

Average throughput: 29.42 Mbit/s

95th percentile per-packet one-way delay: 1001.219 ms

Loss rate: 9.67%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-06-05 03:40:44

End at: 2018-06-05 03:41:14

Local clock offset: 0.415 ms

Remote clock offset: 0.421 ms

Below is generated by plot.py at 2018-06-05 04:16:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.13 Mbit/s

95th percentile per-packet one-way delay: 37.605 ms

Loss rate: 0.07%

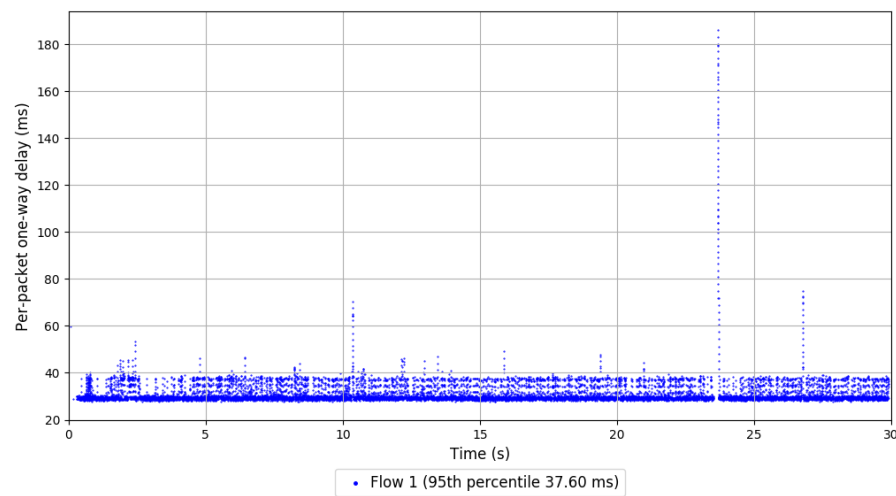
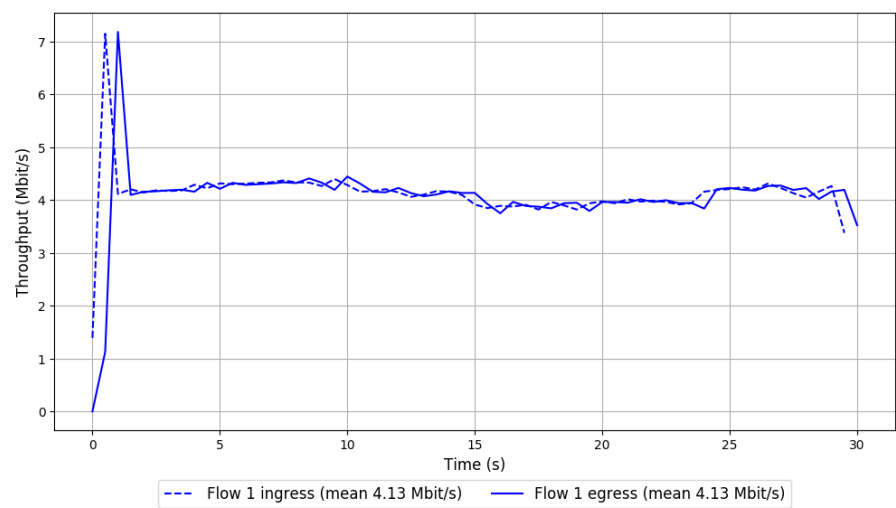
-- Flow 1:

Average throughput: 4.13 Mbit/s

95th percentile per-packet one-way delay: 37.605 ms

Loss rate: 0.07%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-06-05 04:01:39

End at: 2018-06-05 04:02:09

Local clock offset: 0.287 ms

Remote clock offset: 0.305 ms

Below is generated by plot.py at 2018-06-05 04:16:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 28.97 Mbit/s

95th percentile per-packet one-way delay: 928.848 ms

Loss rate: 12.75%

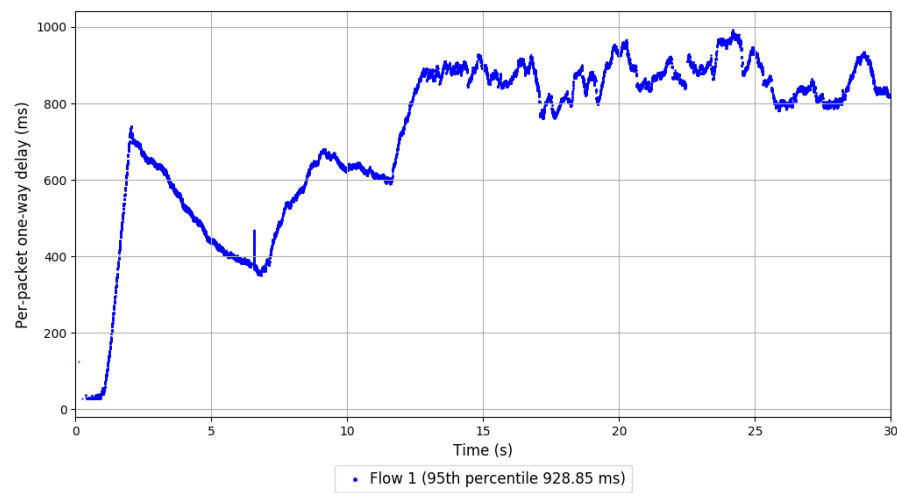
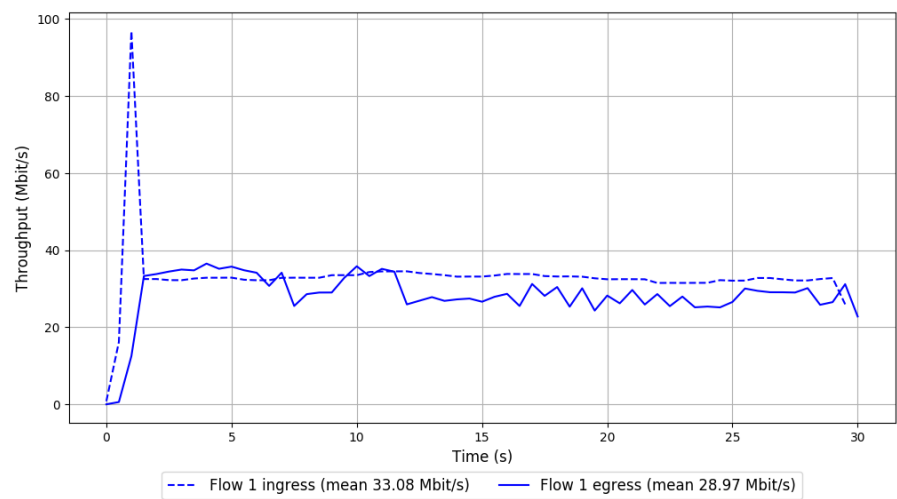
-- Flow 1:

Average throughput: 28.97 Mbit/s

95th percentile per-packet one-way delay: 928.848 ms

Loss rate: 12.75%

Run 3: Report of PCC-Allegro — Data Link

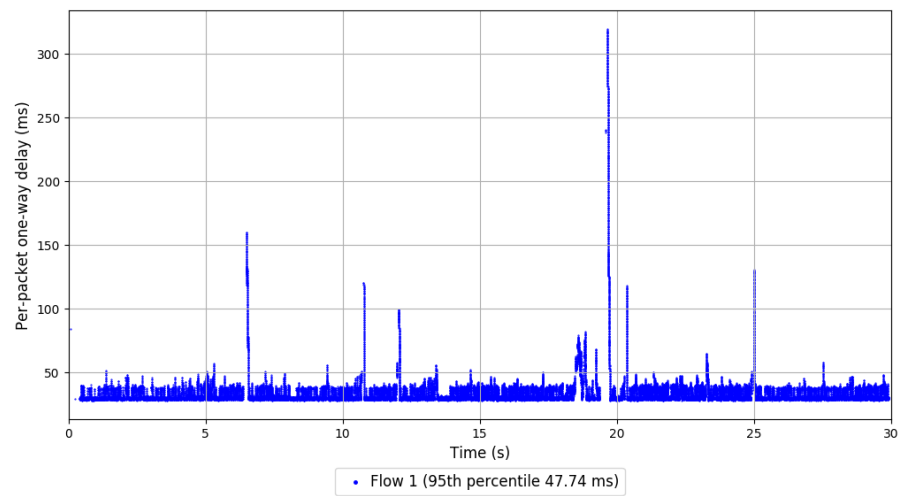
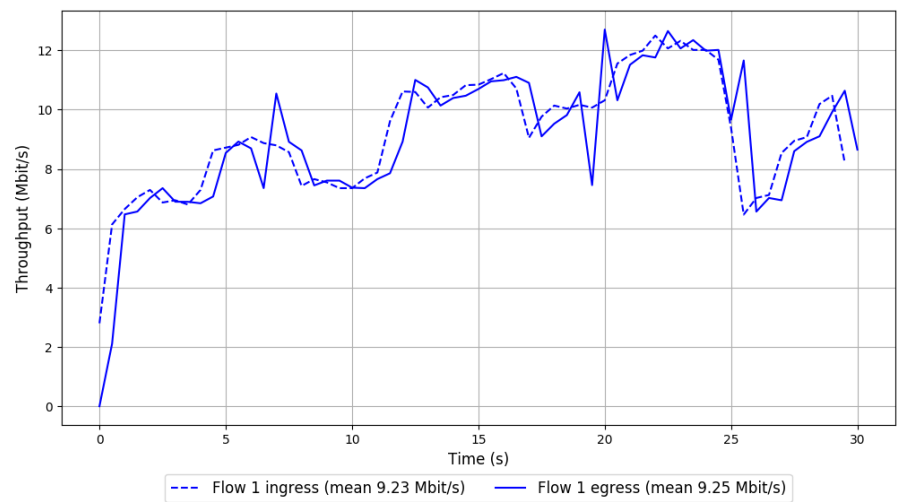


```
Run 1: Statistics of PCC-Expr

Start at: 2018-06-05 03:30:19
End at: 2018-06-05 03:30:49
Local clock offset: 0.283 ms
Remote clock offset: 0.212 ms

# Below is generated by plot.py at 2018-06-05 04:16:37
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.25 Mbit/s
95th percentile per-packet one-way delay: 47.737 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 9.25 Mbit/s
95th percentile per-packet one-way delay: 47.737 ms
Loss rate: 0.04%
```

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2018-06-05 03:51:11

End at: 2018-06-05 03:51:41

Local clock offset: 0.424 ms

Remote clock offset: 0.39 ms

Below is generated by plot.py at 2018-06-05 04:16:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.67 Mbit/s

95th percentile per-packet one-way delay: 40.518 ms

Loss rate: 0.02%

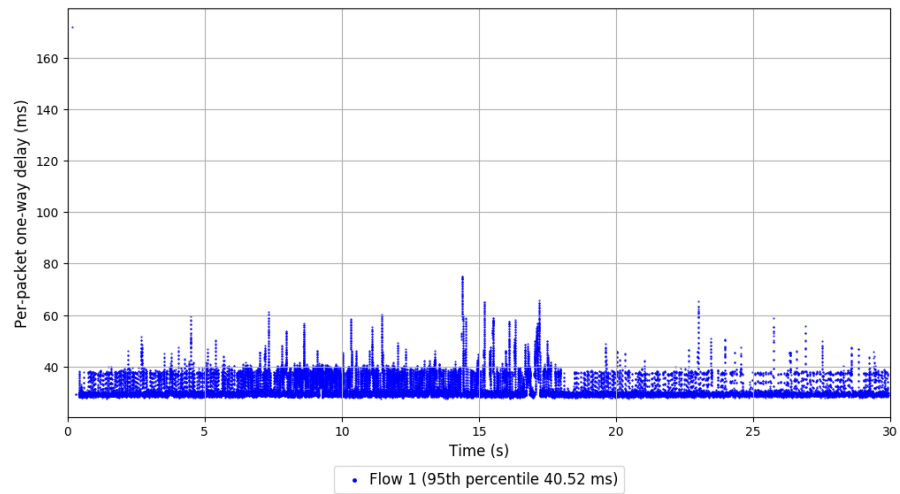
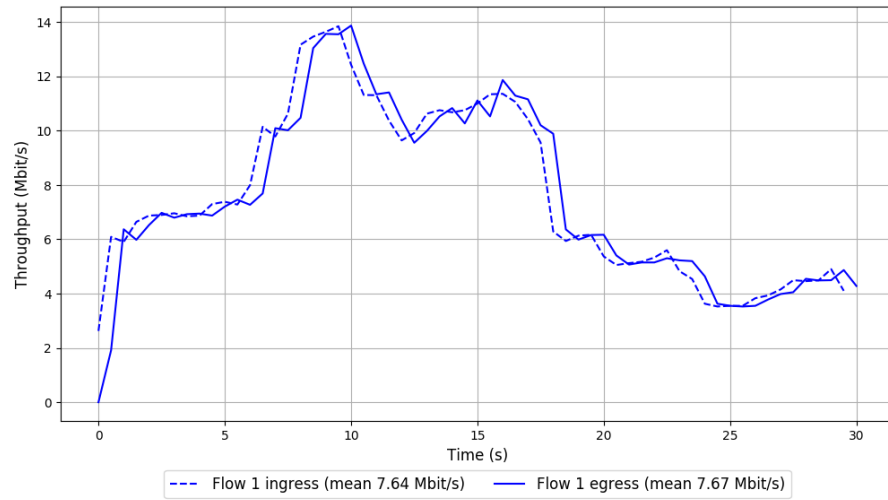
-- Flow 1:

Average throughput: 7.67 Mbit/s

95th percentile per-packet one-way delay: 40.518 ms

Loss rate: 0.02%

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2018-06-05 04:12:08

End at: 2018-06-05 04:12:38

Local clock offset: 0.407 ms

Remote clock offset: 0.39 ms

Below is generated by plot.py at 2018-06-05 04:16:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.76 Mbit/s

95th percentile per-packet one-way delay: 39.152 ms

Loss rate: 0.04%

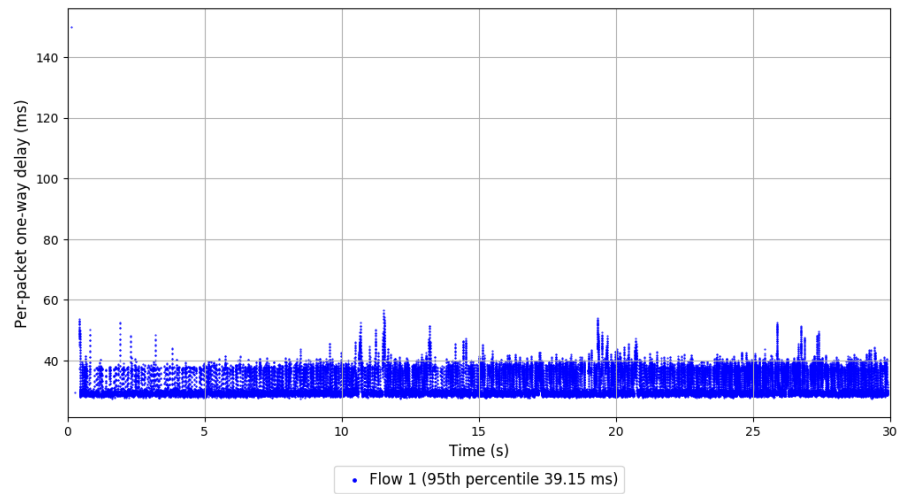
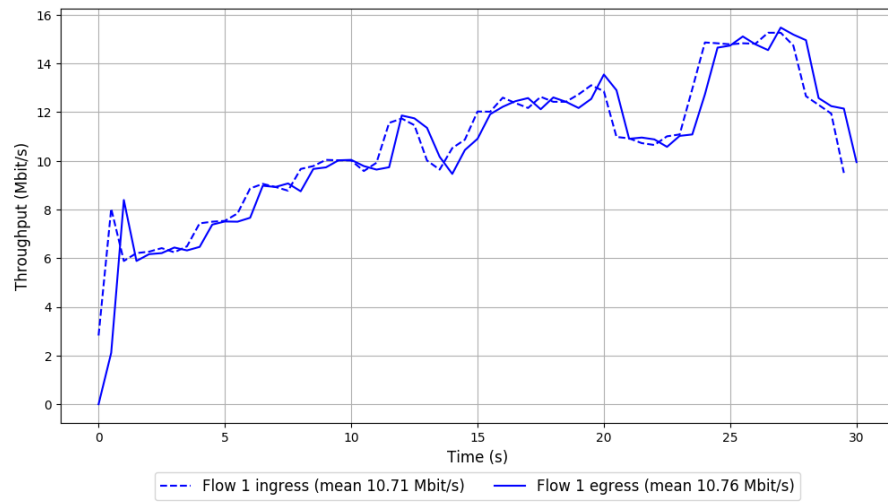
-- Flow 1:

Average throughput: 10.76 Mbit/s

95th percentile per-packet one-way delay: 39.152 ms

Loss rate: 0.04%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

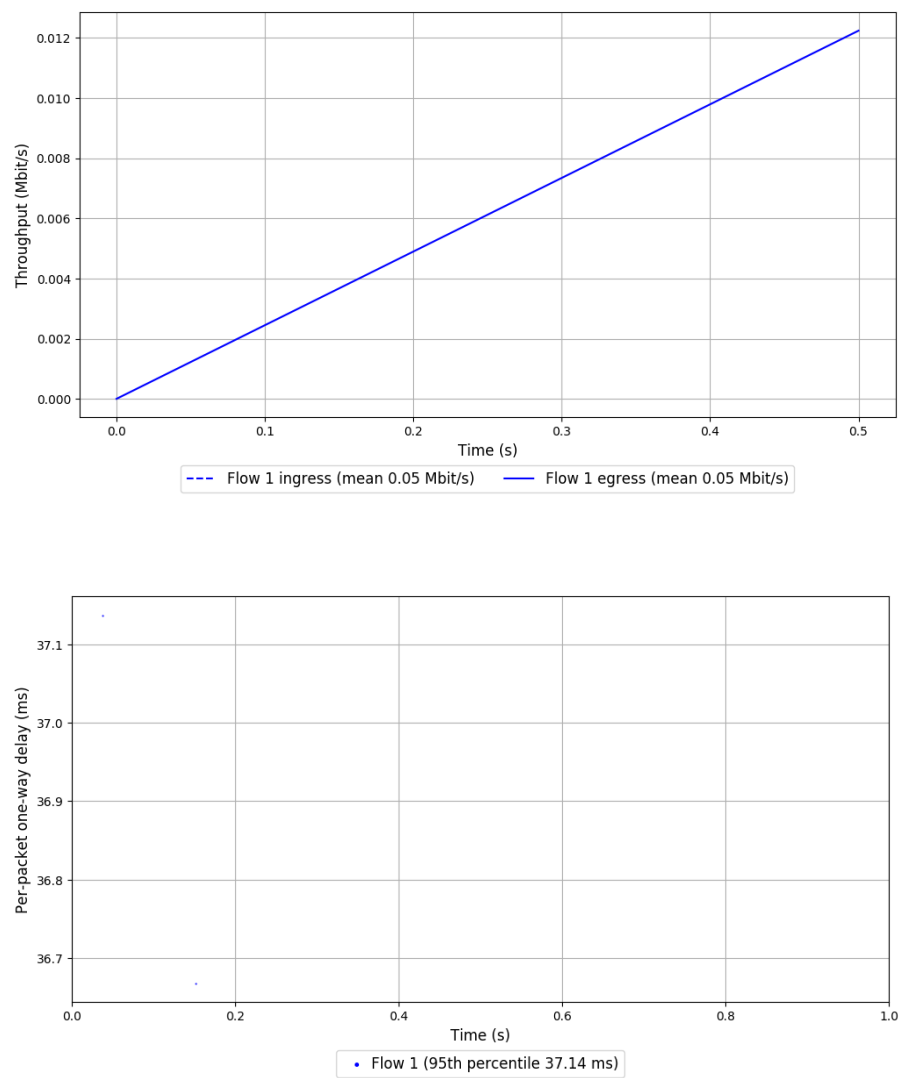
Start at: 2018-06-05 03:22:31

End at: 2018-06-05 03:23:01

Local clock offset: 0.212 ms

Remote clock offset: 0.11 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-06-05 03:43:20

End at: 2018-06-05 03:43:50

Local clock offset: 0.41 ms

Remote clock offset: 0.474 ms

Below is generated by plot.py at 2018-06-05 04:16:45

Datalink statistics

-- Total of 1 flow:

Average throughput: 30.08 Mbit/s

95th percentile per-packet one-way delay: 202.219 ms

Loss rate: 0.61%

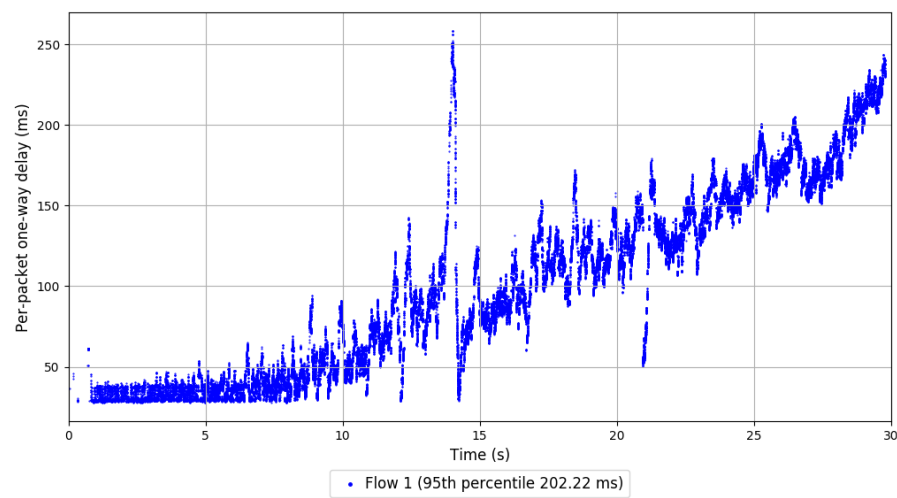
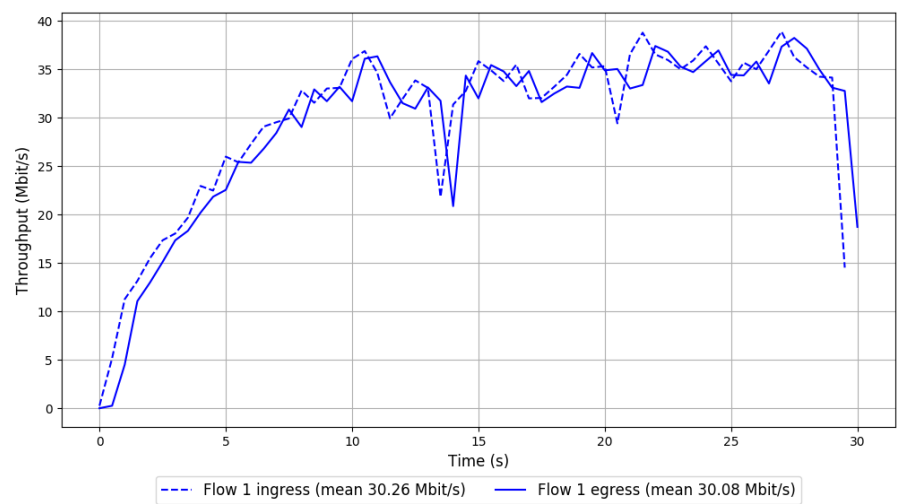
-- Flow 1:

Average throughput: 30.08 Mbit/s

95th percentile per-packet one-way delay: 202.219 ms

Loss rate: 0.61%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-06-05 04:04:16

End at: 2018-06-05 04:04:46

Local clock offset: 0.38 ms

Remote clock offset: 0.377 ms

Below is generated by plot.py at 2018-06-05 04:16:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 26.89 Mbit/s

95th percentile per-packet one-way delay: 211.813 ms

Loss rate: 0.27%

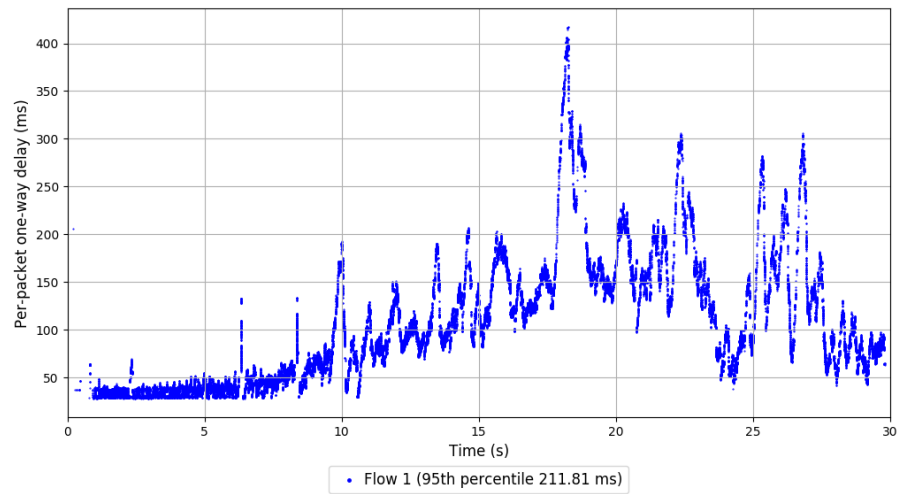
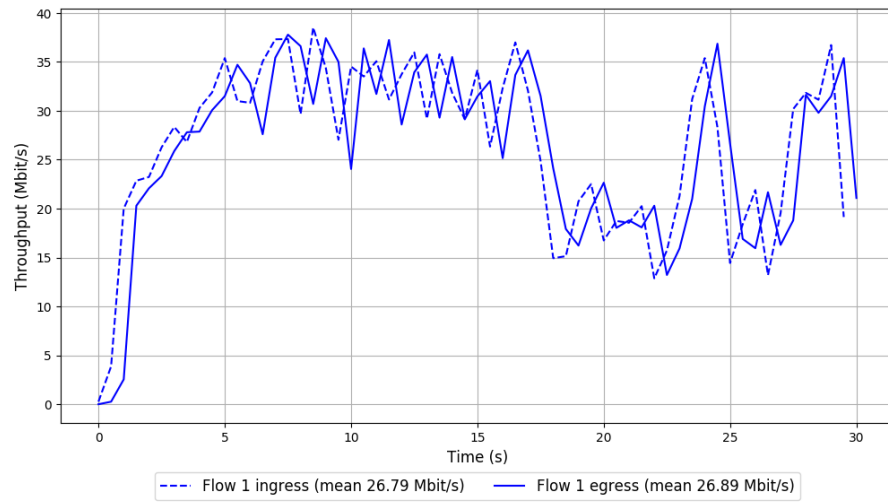
-- Flow 1:

Average throughput: 26.89 Mbit/s

95th percentile per-packet one-way delay: 211.813 ms

Loss rate: 0.27%

Run 3: Report of QUIC Cubic — Data Link

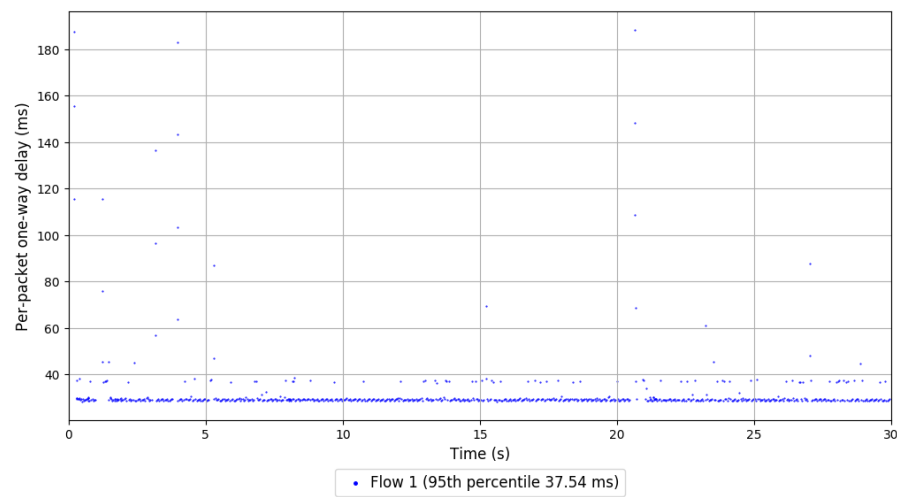
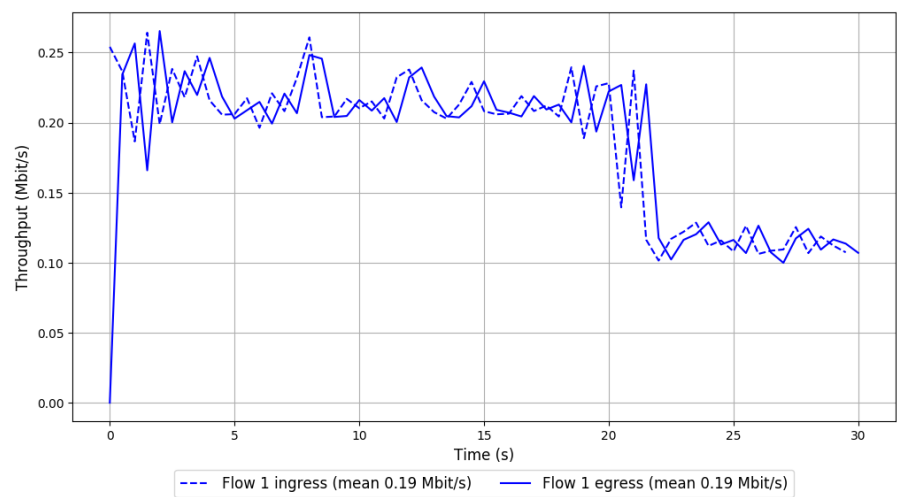


```
Run 1: Statistics of SCReAM

Start at: 2018-06-05 03:27:43
End at: 2018-06-05 03:28:13
Local clock offset: 0.259 ms
Remote clock offset: 0.25 ms

# Below is generated by plot.py at 2018-06-05 04:16:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 37.539 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 37.539 ms
Loss rate: 0.08%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-06-05 03:48:34

End at: 2018-06-05 03:49:05

Local clock offset: 0.491 ms

Remote clock offset: 0.434 ms

Below is generated by plot.py at 2018-06-05 04:16:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 37.596 ms

Loss rate: 0.00%

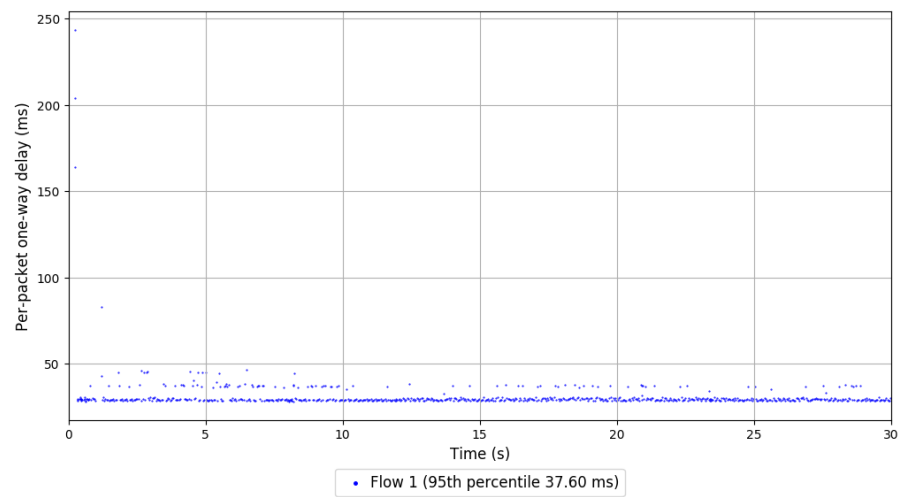
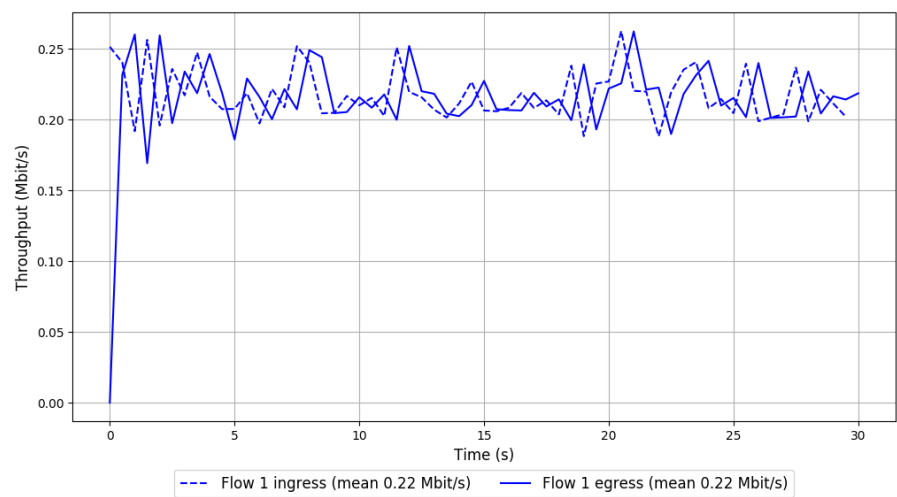
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 37.596 ms

Loss rate: 0.00%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-06-05 04:09:32

End at: 2018-06-05 04:10:02

Local clock offset: 0.405 ms

Remote clock offset: 0.439 ms

Below is generated by plot.py at 2018-06-05 04:16:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 37.759 ms

Loss rate: 0.00%

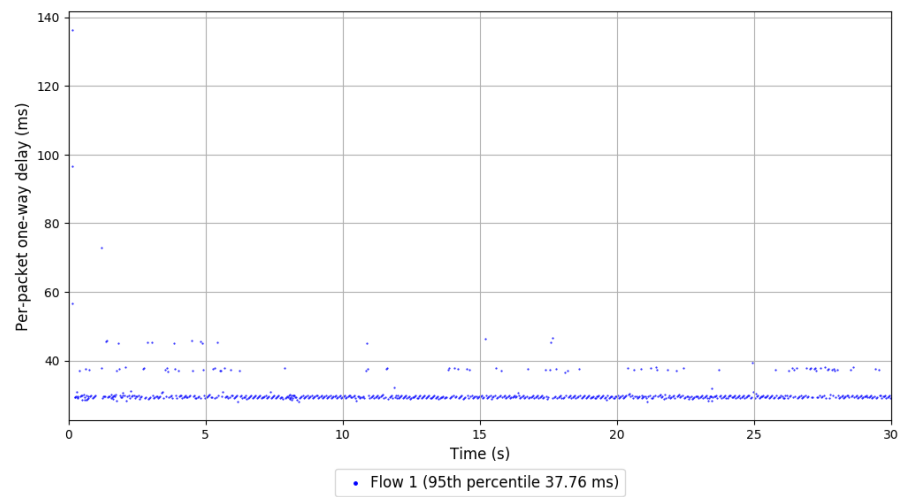
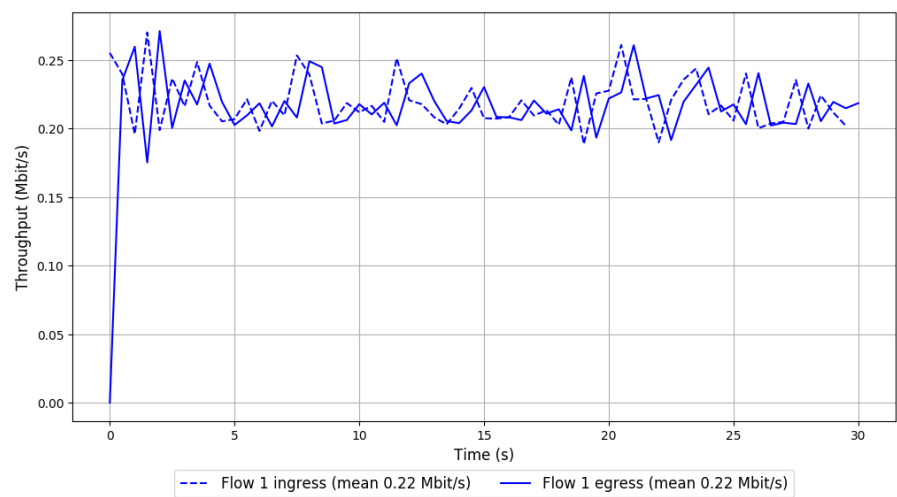
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 37.759 ms

Loss rate: 0.00%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2018-06-05 03:13:24

End at: 2018-06-05 03:13:54

Local clock offset: 0.155 ms

Remote clock offset: 0.051 ms

Below is generated by plot.py at 2018-06-05 04:16:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.02 Mbit/s

95th percentile per-packet one-way delay: 49.227 ms

Loss rate: 0.01%

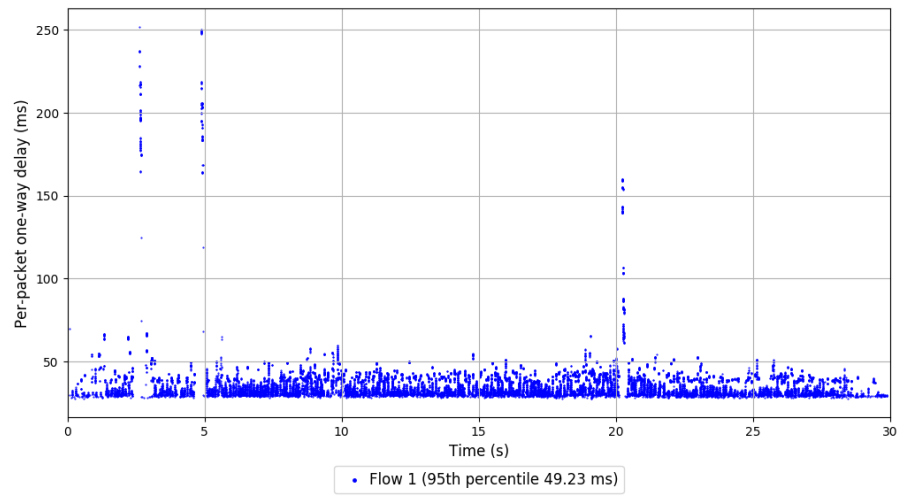
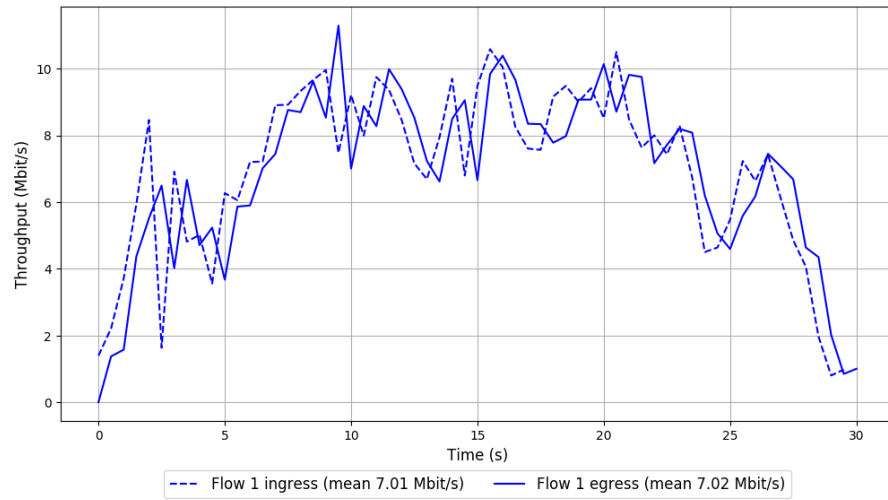
-- Flow 1:

Average throughput: 7.02 Mbit/s

95th percentile per-packet one-way delay: 49.227 ms

Loss rate: 0.01%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2018-06-05 03:34:13

End at: 2018-06-05 03:34:43

Local clock offset: 0.35 ms

Remote clock offset: 0.343 ms

Below is generated by plot.py at 2018-06-05 04:16:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 5.89 Mbit/s

95th percentile per-packet one-way delay: 51.326 ms

Loss rate: 0.00%

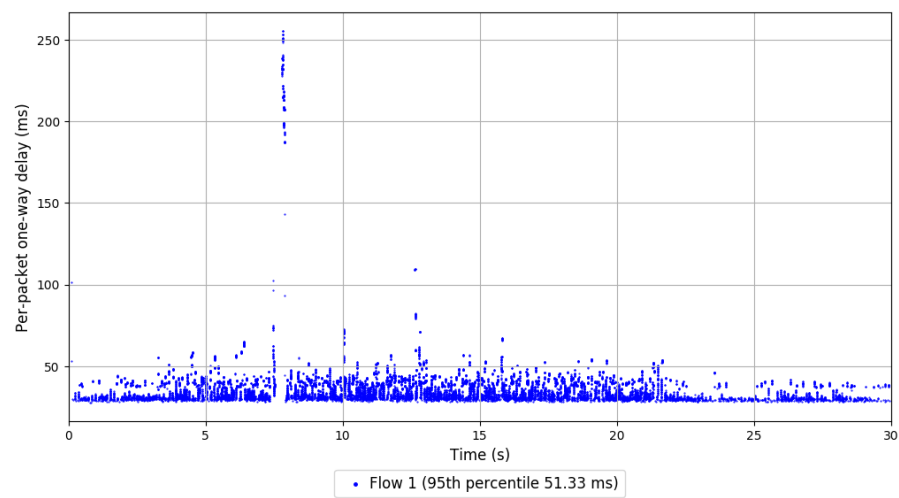
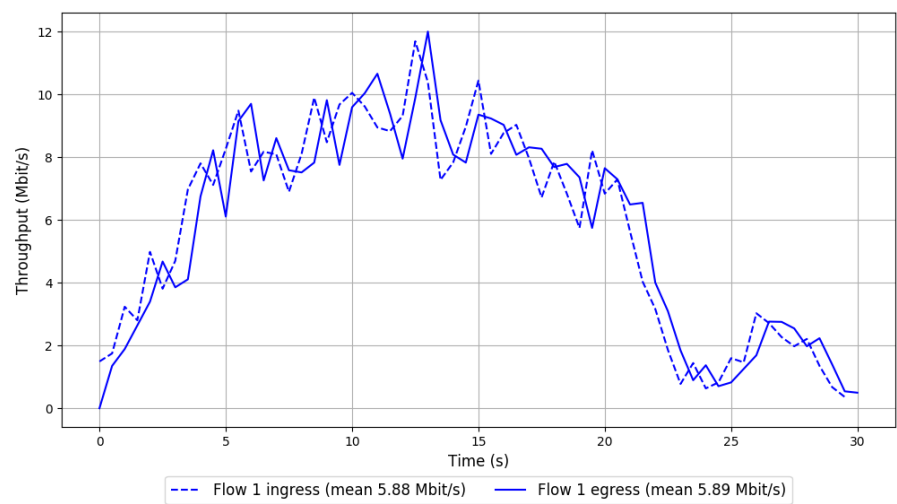
-- Flow 1:

Average throughput: 5.89 Mbit/s

95th percentile per-packet one-way delay: 51.326 ms

Loss rate: 0.00%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2018-06-05 03:55:07

End at: 2018-06-05 03:55:37

Local clock offset: 0.435 ms

Remote clock offset: 0.347 ms

Below is generated by plot.py at 2018-06-05 04:16:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.89 Mbit/s

95th percentile per-packet one-way delay: 46.039 ms

Loss rate: 0.00%

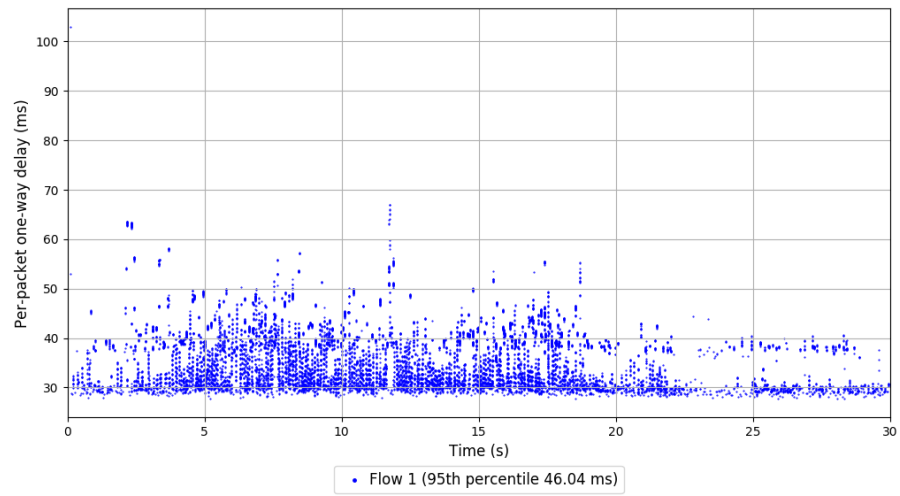
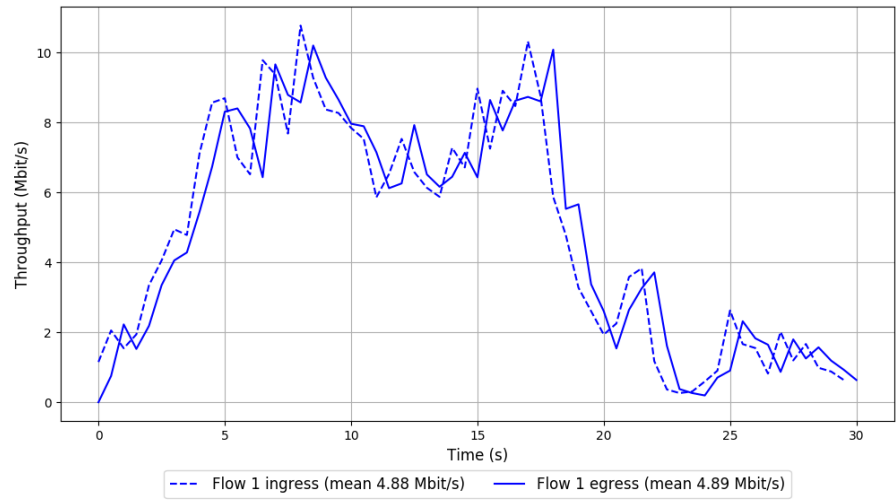
-- Flow 1:

Average throughput: 4.89 Mbit/s

95th percentile per-packet one-way delay: 46.039 ms

Loss rate: 0.00%

Run 3: Report of Sprout — Data Link

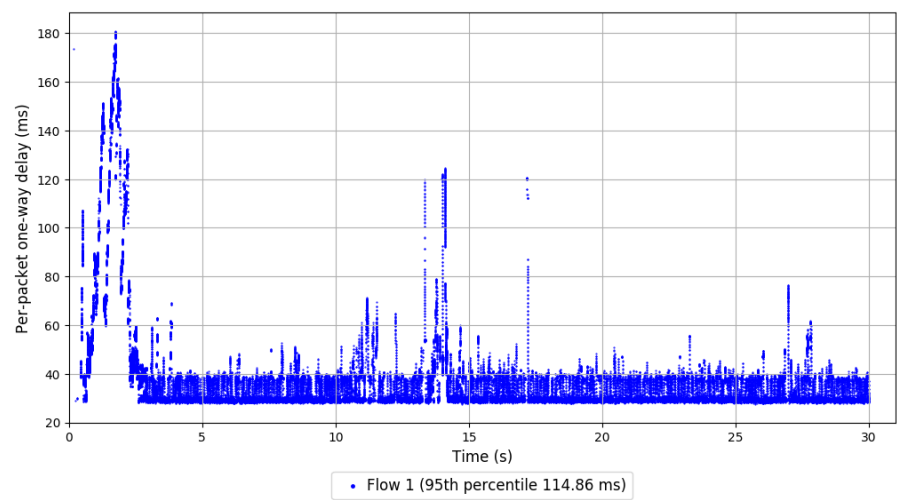
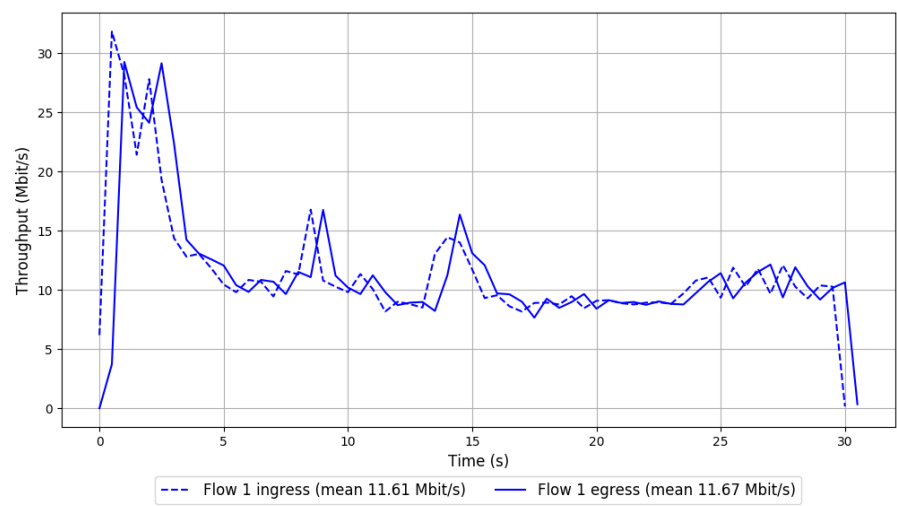


```
Run 1: Statistics of TaoVA-100x

Start at: 2018-06-05 03:29:00
End at: 2018-06-05 03:29:30
Local clock offset: 0.265 ms
Remote clock offset: 0.252 ms

# Below is generated by plot.py at 2018-06-05 04:16:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.67 Mbit/s
95th percentile per-packet one-way delay: 114.856 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 11.67 Mbit/s
95th percentile per-packet one-way delay: 114.856 ms
Loss rate: 0.06%
```

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-06-05 03:49:52

End at: 2018-06-05 03:50:22

Local clock offset: 0.421 ms

Remote clock offset: 0.399 ms

Below is generated by plot.py at 2018-06-05 04:16:52

Datalink statistics

-- Total of 1 flow:

Average throughput: 10.17 Mbit/s

95th percentile per-packet one-way delay: 56.032 ms

Loss rate: 0.04%

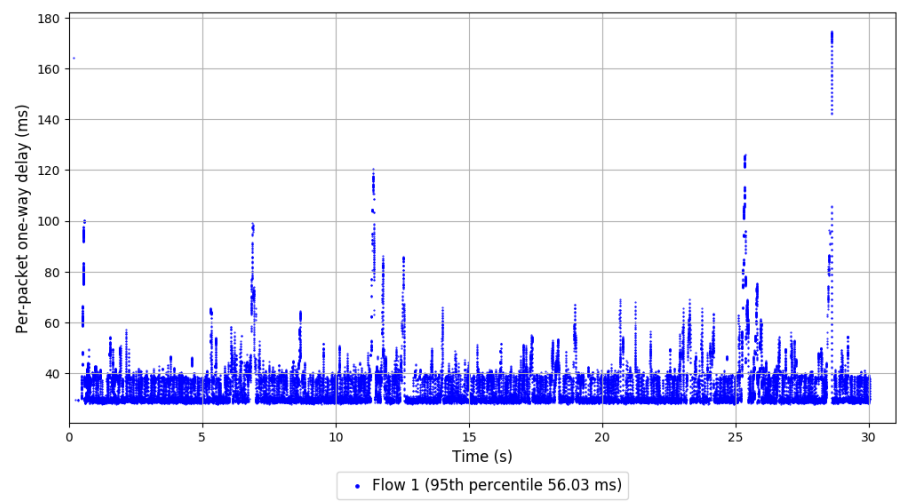
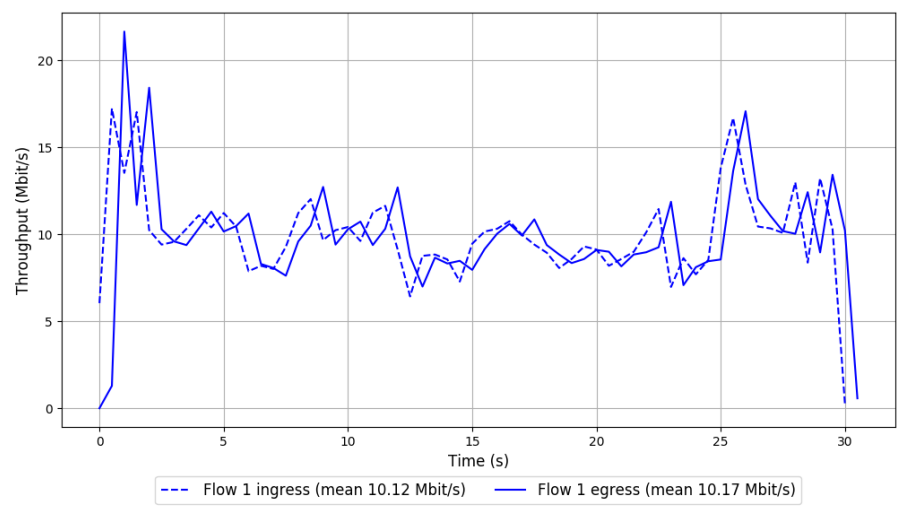
-- Flow 1:

Average throughput: 10.17 Mbit/s

95th percentile per-packet one-way delay: 56.032 ms

Loss rate: 0.04%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-06-05 04:10:50

End at: 2018-06-05 04:11:20

Local clock offset: 0.393 ms

Remote clock offset: 0.396 ms

Below is generated by plot.py at 2018-06-05 04:16:56

Datalink statistics

-- Total of 1 flow:

Average throughput: 11.75 Mbit/s

95th percentile per-packet one-way delay: 48.763 ms

Loss rate: 0.18%

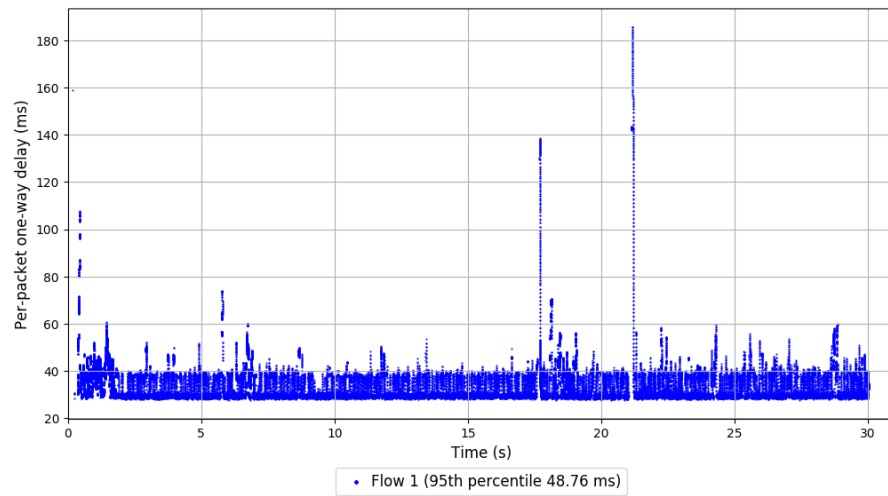
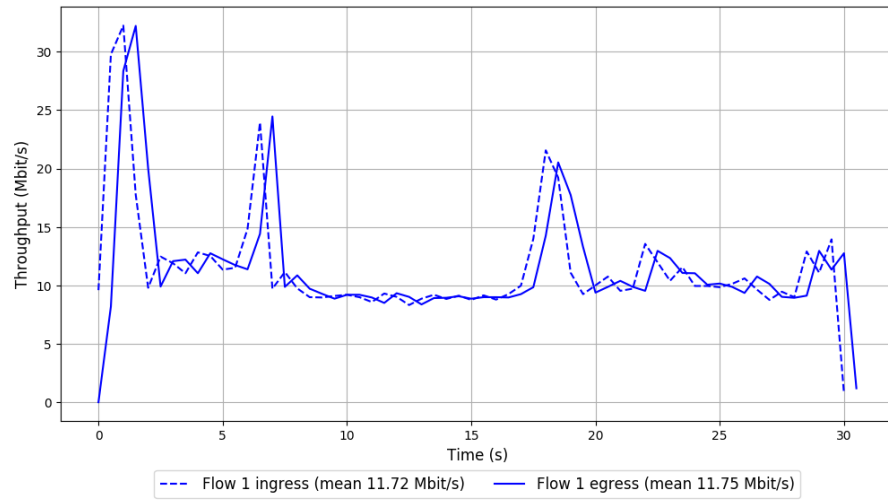
-- Flow 1:

Average throughput: 11.75 Mbit/s

95th percentile per-packet one-way delay: 48.763 ms

Loss rate: 0.18%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-06-05 03:23:48

End at: 2018-06-05 03:24:18

Local clock offset: 0.219 ms

Remote clock offset: 0.122 ms

Below is generated by plot.py at 2018-06-05 04:16:56

Datalink statistics

-- Total of 1 flow:

Average throughput: 4.17 Mbit/s

95th percentile per-packet one-way delay: 185.041 ms

Loss rate: 0.03%

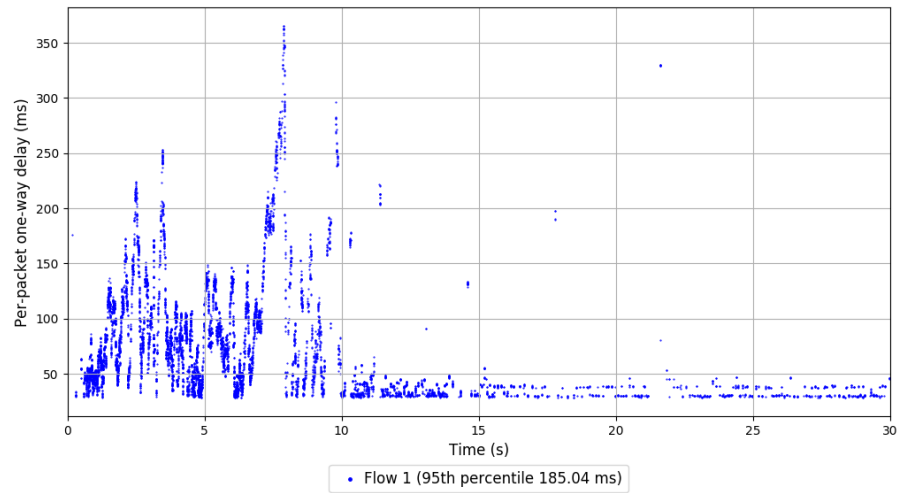
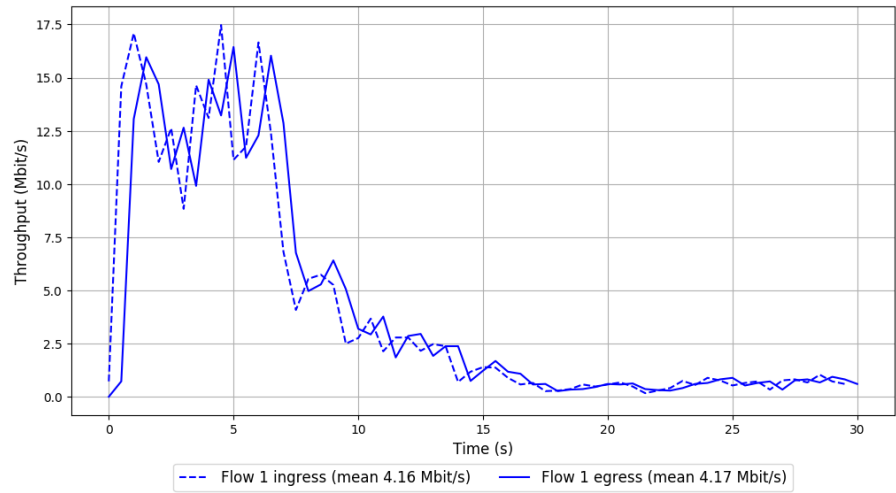
-- Flow 1:

Average throughput: 4.17 Mbit/s

95th percentile per-packet one-way delay: 185.041 ms

Loss rate: 0.03%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-06-05 03:44:38

End at: 2018-06-05 03:45:08

Local clock offset: 0.444 ms

Remote clock offset: 0.46 ms

Below is generated by plot.py at 2018-06-05 04:16:56

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.77 Mbit/s

95th percentile per-packet one-way delay: 48.555 ms

Loss rate: 0.00%

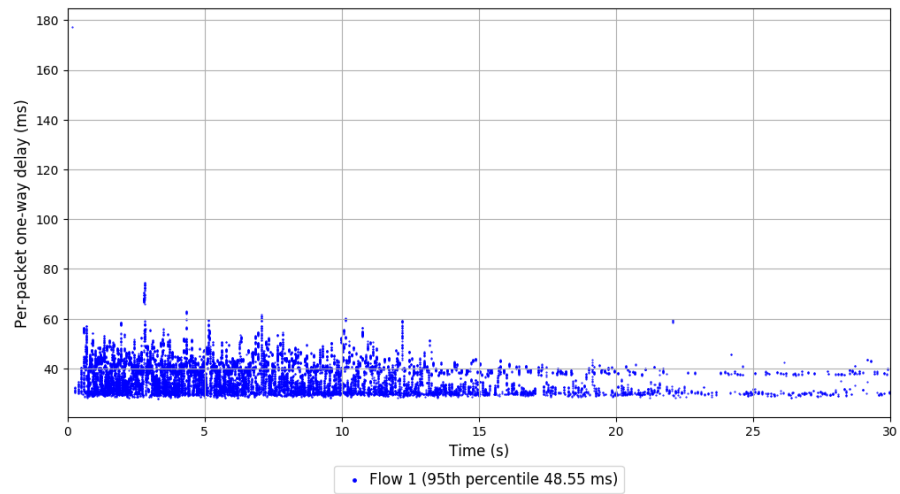
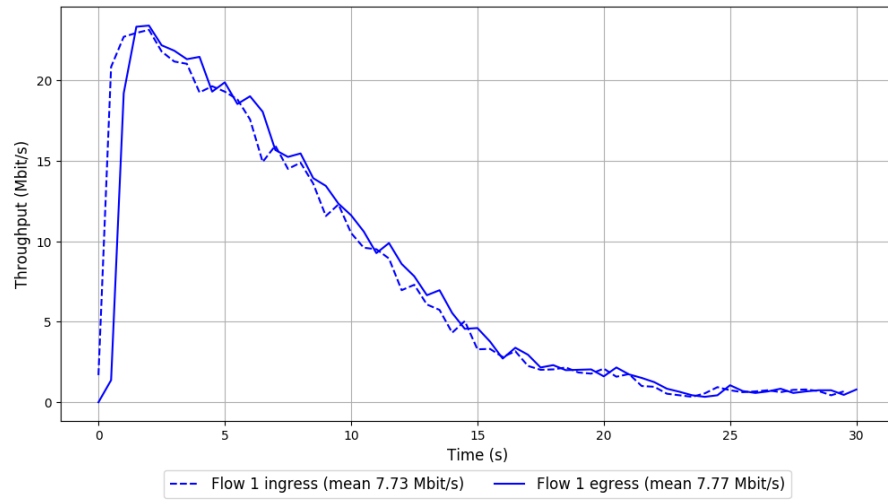
-- Flow 1:

Average throughput: 7.77 Mbit/s

95th percentile per-packet one-way delay: 48.555 ms

Loss rate: 0.00%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2018-06-05 04:05:35

End at: 2018-06-05 04:06:05

Local clock offset: 0.392 ms

Remote clock offset: 0.34 ms

Below is generated by plot.py at 2018-06-05 04:16:56

Datalink statistics

-- Total of 1 flow:

Average throughput: 7.36 Mbit/s

95th percentile per-packet one-way delay: 53.669 ms

Loss rate: 0.00%

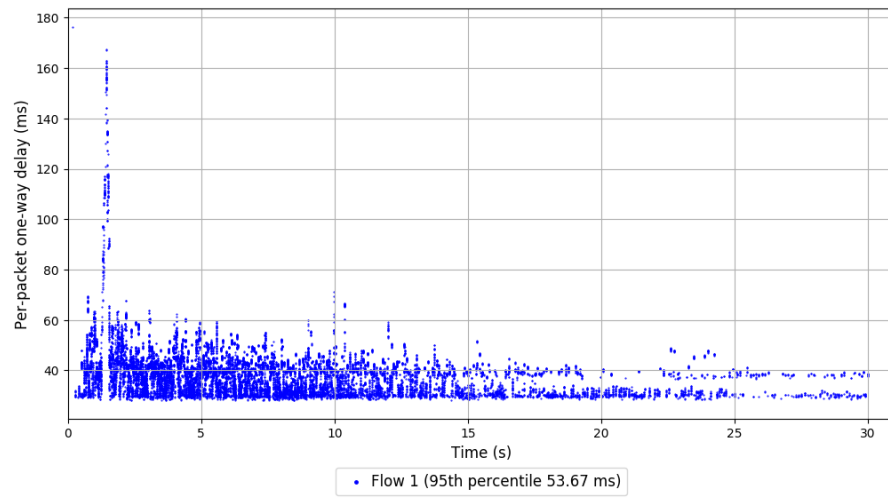
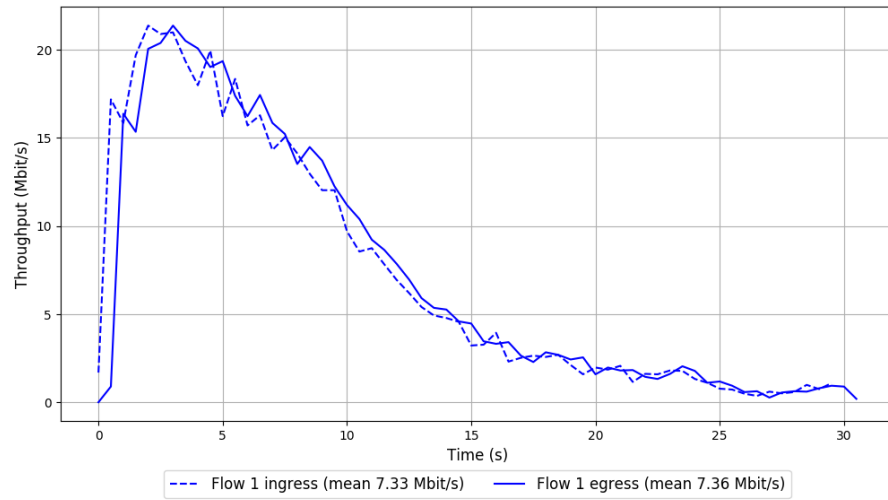
-- Flow 1:

Average throughput: 7.36 Mbit/s

95th percentile per-packet one-way delay: 53.669 ms

Loss rate: 0.00%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-06-05 03:18:35

End at: 2018-06-05 03:19:05

Local clock offset: 0.168 ms

Remote clock offset: 0.085 ms

Below is generated by plot.py at 2018-06-05 04:16:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 26.01 Mbit/s

95th percentile per-packet one-way delay: 471.031 ms

Loss rate: 2.53%

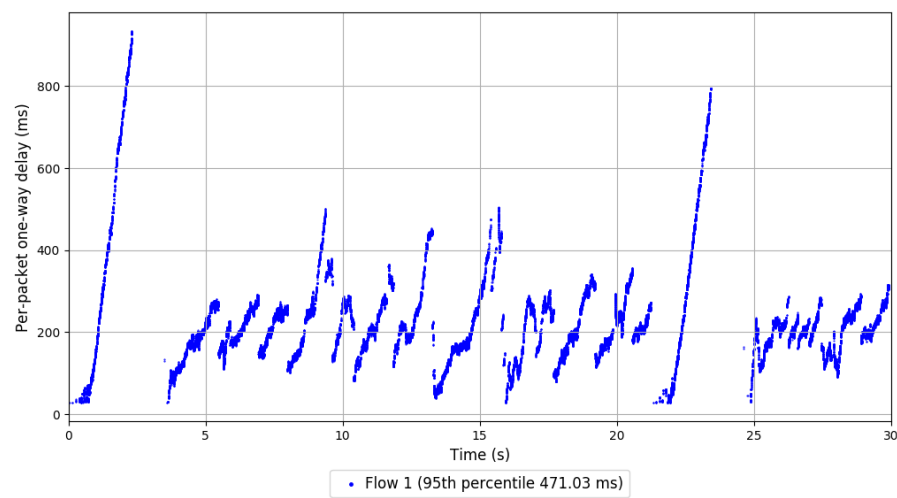
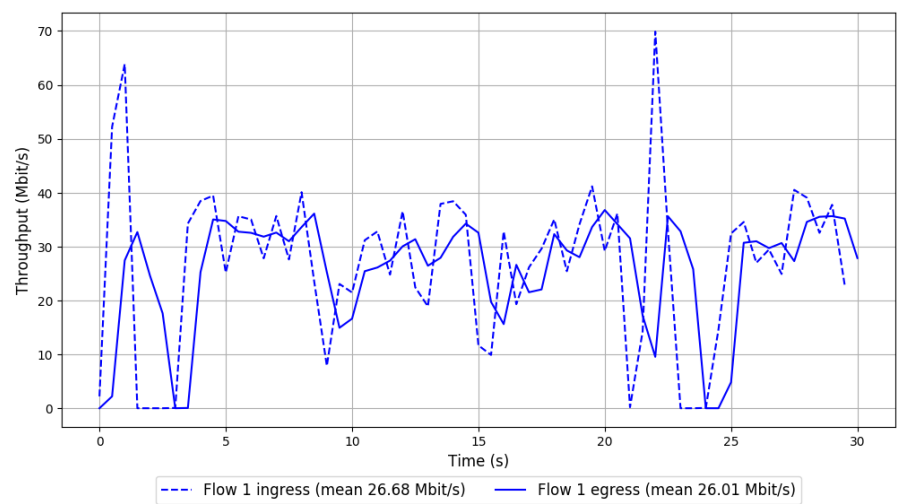
-- Flow 1:

Average throughput: 26.01 Mbit/s

95th percentile per-packet one-way delay: 471.031 ms

Loss rate: 2.53%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-06-05 03:39:25

End at: 2018-06-05 03:39:55

Local clock offset: 0.409 ms

Remote clock offset: 0.369 ms

Below is generated by plot.py at 2018-06-05 04:17:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 32.05 Mbit/s

95th percentile per-packet one-way delay: 384.620 ms

Loss rate: 1.47%

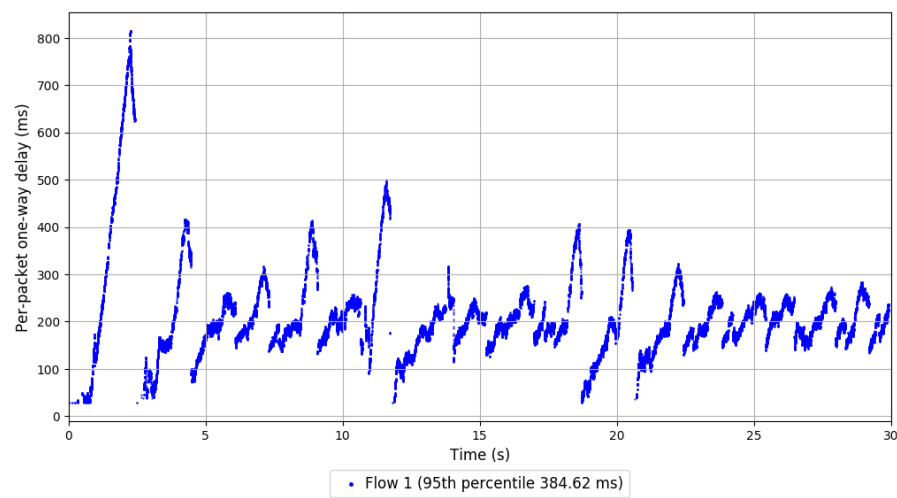
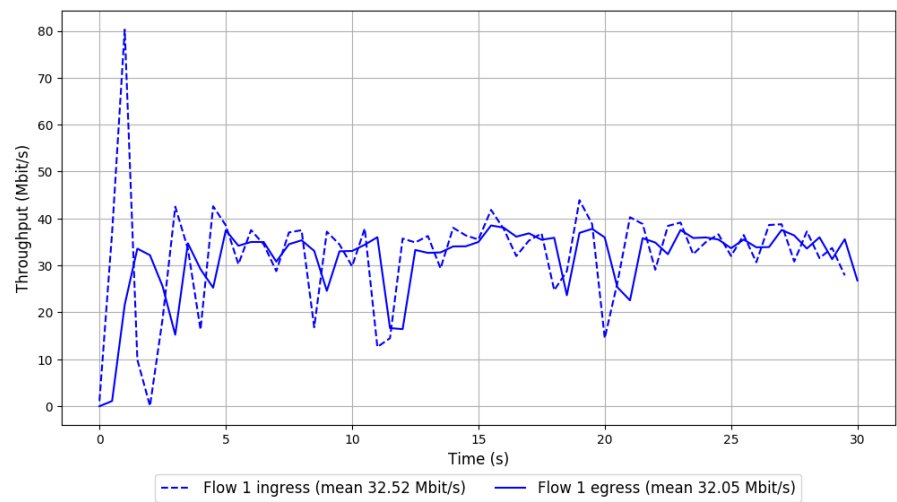
-- Flow 1:

Average throughput: 32.05 Mbit/s

95th percentile per-packet one-way delay: 384.620 ms

Loss rate: 1.47%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-06-05 04:00:19

End at: 2018-06-05 04:00:49

Local clock offset: 0.402 ms

Remote clock offset: 0.289 ms

Below is generated by plot.py at 2018-06-05 04:17:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 29.20 Mbit/s

95th percentile per-packet one-way delay: 403.832 ms

Loss rate: 0.71%

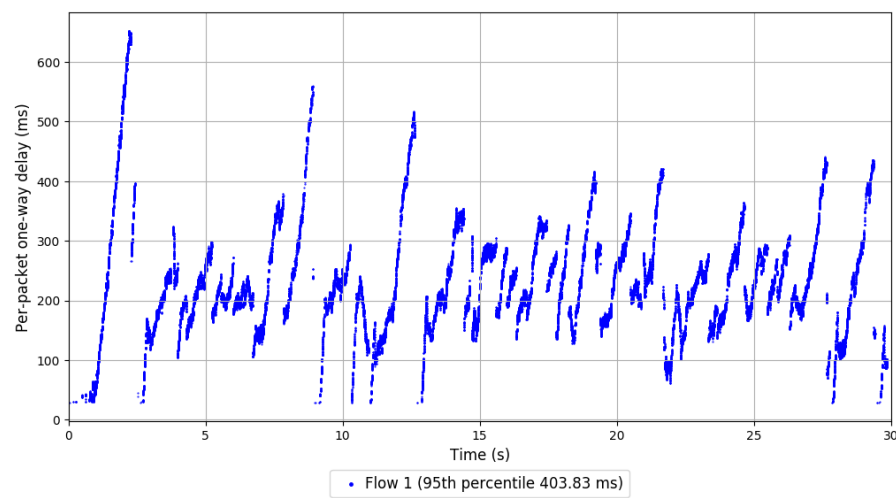
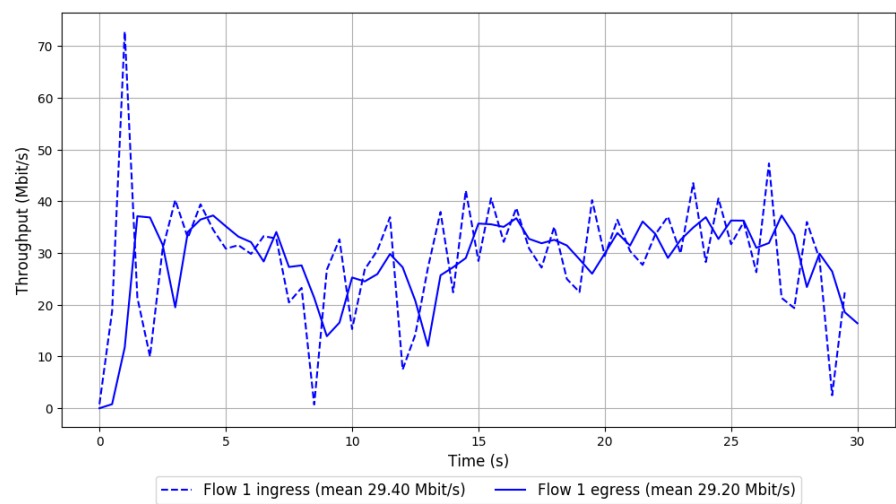
-- Flow 1:

Average throughput: 29.20 Mbit/s

95th percentile per-packet one-way delay: 403.832 ms

Loss rate: 0.71%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2018-06-05 03:15:59

End at: 2018-06-05 03:16:29

Local clock offset: 0.075 ms

Remote clock offset: 0.129 ms

Below is generated by plot.py at 2018-06-05 04:17:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.84 Mbit/s

95th percentile per-packet one-way delay: 37.488 ms

Loss rate: 0.02%

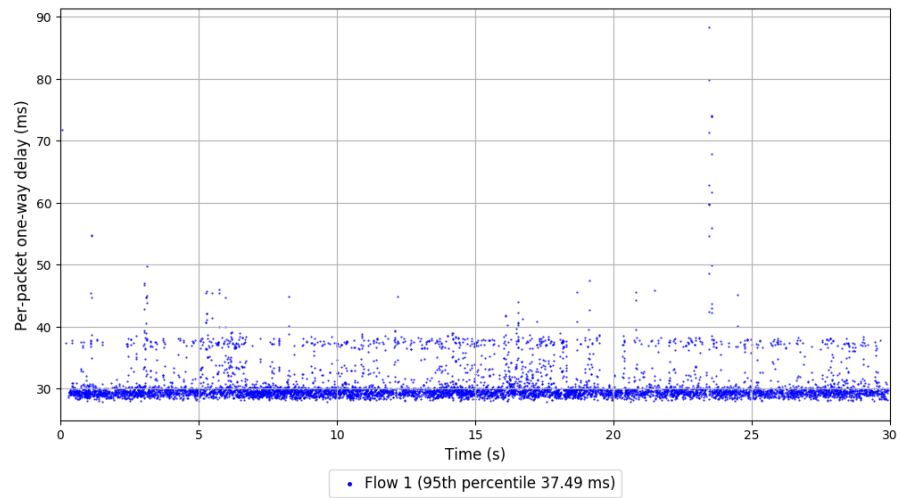
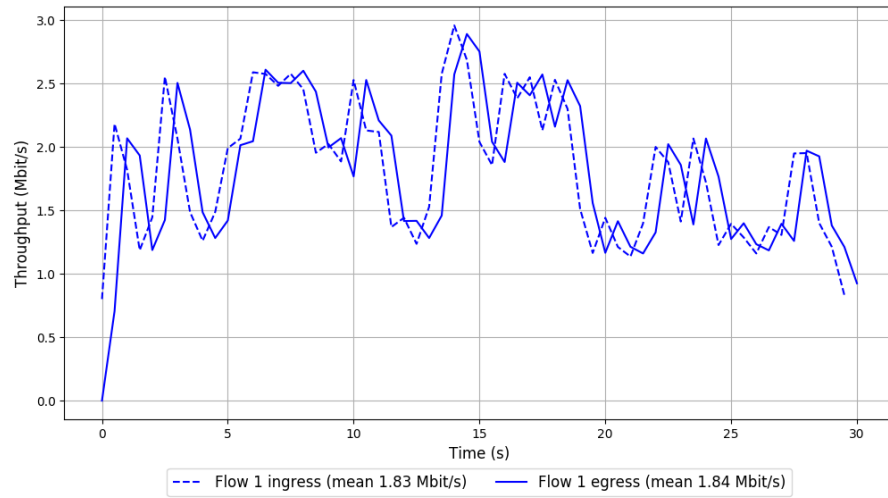
-- Flow 1:

Average throughput: 1.84 Mbit/s

95th percentile per-packet one-way delay: 37.488 ms

Loss rate: 0.02%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-06-05 03:36:49

End at: 2018-06-05 03:37:19

Local clock offset: 0.374 ms

Remote clock offset: 0.317 ms

Below is generated by plot.py at 2018-06-05 04:17:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 8.42 Mbit/s

95th percentile per-packet one-way delay: 41.288 ms

Loss rate: 0.09%

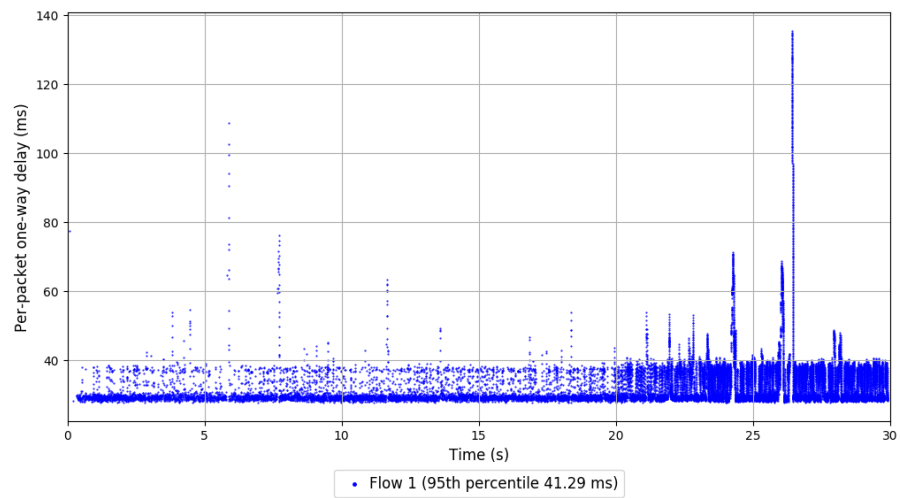
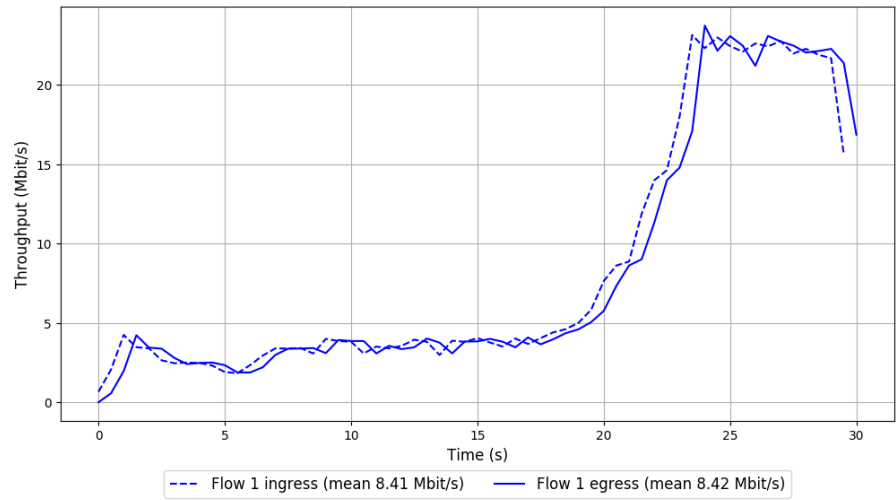
-- Flow 1:

Average throughput: 8.42 Mbit/s

95th percentile per-packet one-way delay: 41.288 ms

Loss rate: 0.09%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2018-06-05 03:57:43

End at: 2018-06-05 03:58:13

Local clock offset: 0.416 ms

Remote clock offset: 0.297 ms

Below is generated by plot.py at 2018-06-05 04:17:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.45 Mbit/s

95th percentile per-packet one-way delay: 37.612 ms

Loss rate: 0.11%

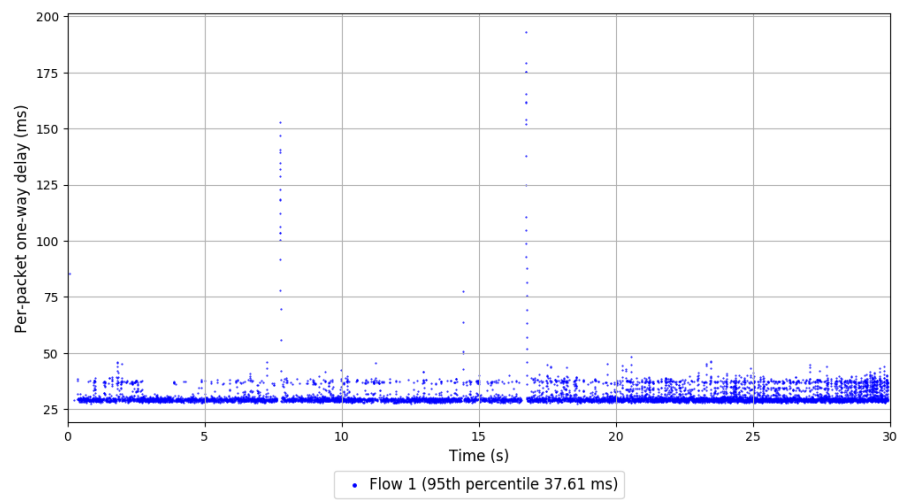
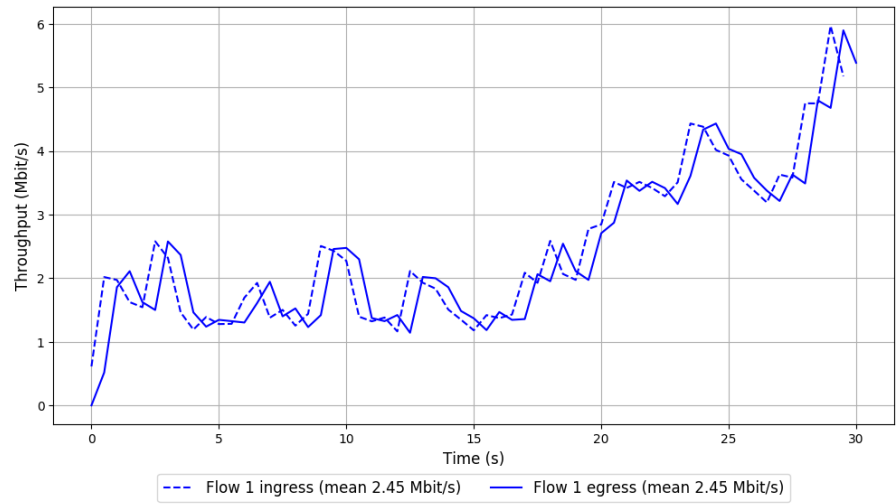
-- Flow 1:

Average throughput: 2.45 Mbit/s

95th percentile per-packet one-way delay: 37.612 ms

Loss rate: 0.11%

Run 3: Report of PCC-Vivace — Data Link

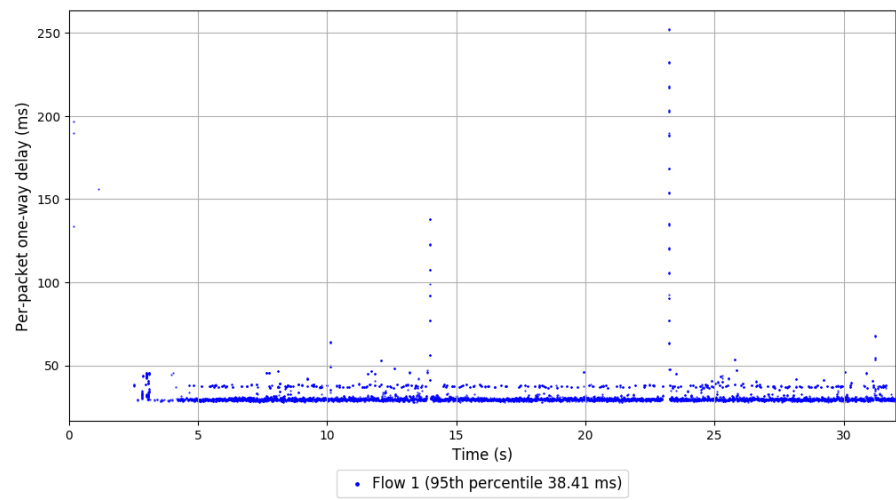
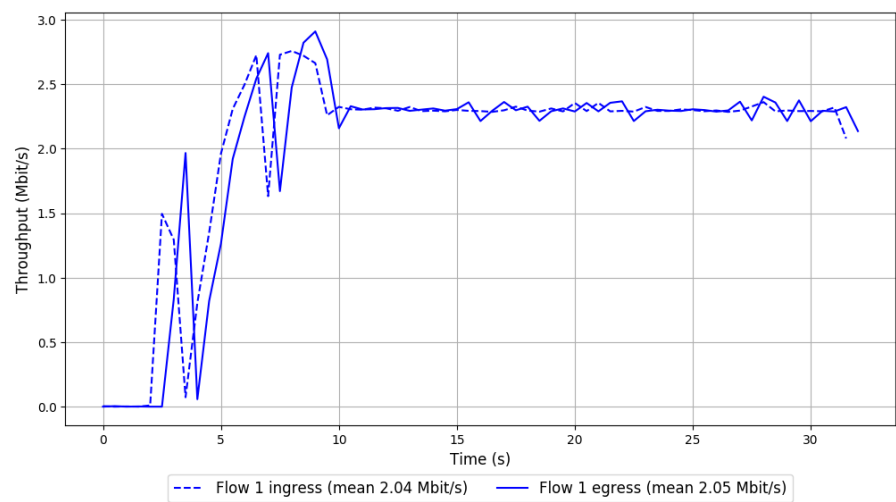


```
Run 1: Statistics of WebRTC media

Start at: 2018-06-05 03:14:41
End at: 2018-06-05 03:15:12
Local clock offset: 0.074 ms
Remote clock offset: 0.116 ms

# Below is generated by plot.py at 2018-06-05 04:17:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 38.409 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 38.409 ms
Loss rate: 0.09%
```

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-06-05 03:35:31

End at: 2018-06-05 03:36:01

Local clock offset: 0.377 ms

Remote clock offset: 0.324 ms

Below is generated by plot.py at 2018-06-05 04:17:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.96 Mbit/s

95th percentile per-packet one-way delay: 37.962 ms

Loss rate: 0.06%

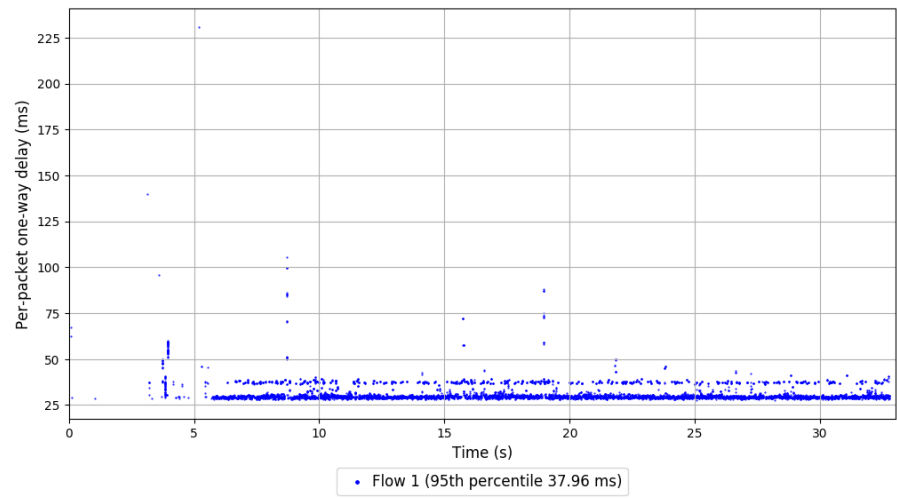
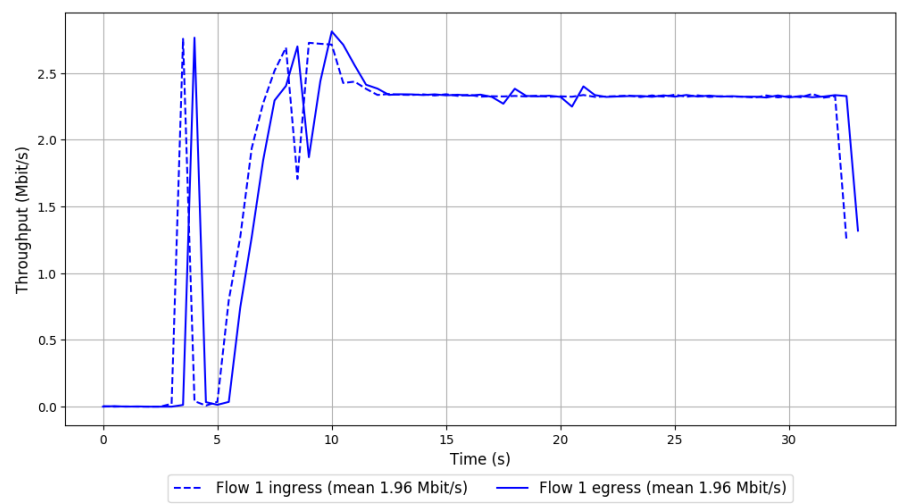
-- Flow 1:

Average throughput: 1.96 Mbit/s

95th percentile per-packet one-way delay: 37.962 ms

Loss rate: 0.06%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-06-05 03:56:25

End at: 2018-06-05 03:56:55

Local clock offset: 0.426 ms

Remote clock offset: 0.38 ms

Below is generated by plot.py at 2018-06-05 04:17:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 38.186 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 38.186 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

