

Pantheon Report

Generated at 2018-09-07 09:46:37 (UTC).

Data path: AWS Brazil 2 on `ens5` (*local*) → Colombia cellular on `ppp0` (*remote*).

Repeated the test of 18 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

NTP offsets were measured against `gps.ntp.br` and have been applied to correct the timestamps in logs.

System info:

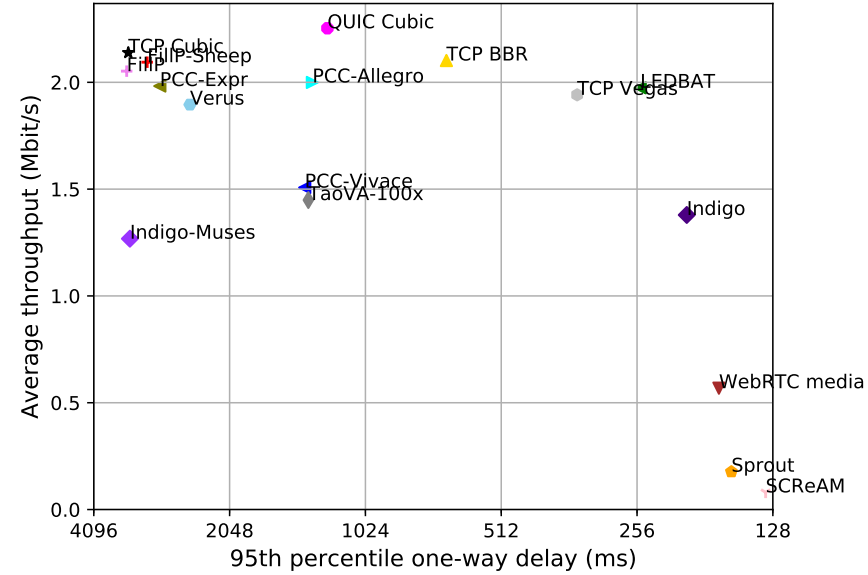
```
Linux 4.15.0-1020-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
net.ipv4.tcp_mem = 536870912 536870912 536870912
```

Git summary:

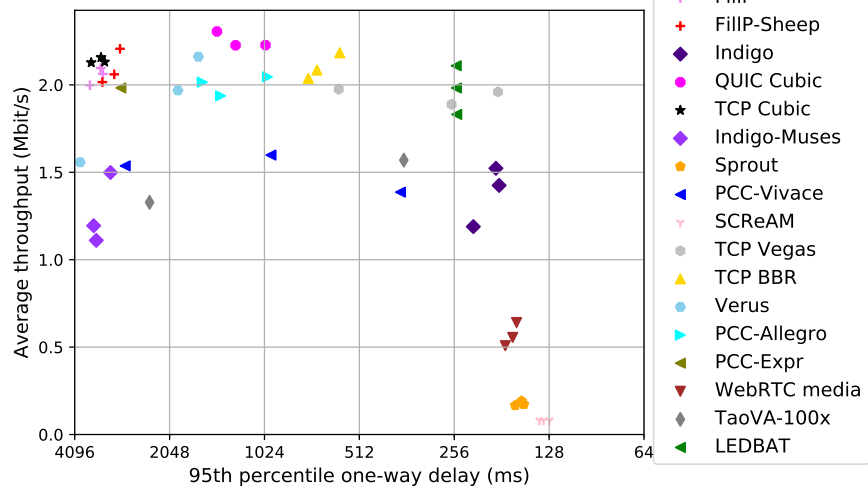
```
branch: muses @ e0a9b05ad97d268013b7cc9a9c95637b593a1b4c
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 7631aea3923a3598767c87765ae5103aca0678d3
third_party/pantheon-tunnel @ cbfce6db5ff5740dafa1771f813cd646339e1952
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 Brazil 2 to Colombia cellular, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from AWS Brazil 2 to Colombia 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	2.10	677.27	1.19
Copa	0	N/A	N/A	N/A
TCP Cubic	3	2.14	3434.41	13.54
FillP	3	2.05	3462.99	81.51
FillP-Sheep	3	2.10	3118.85	6.25
Indigo	3	1.38	198.64	0.24
LEDBAT	3	1.97	251.97	0.38
Indigo-Muses	3	1.27	3406.79	87.90
PCC-Allegro	3	2.00	1342.24	0.15
PCC-Expr	1	1.98	2924.45	63.96
QUIC Cubic	3	2.26	1243.30	3.88
SCReAM	3	0.08	132.81	0.17
Sprout	3	0.18	158.18	0.02
TaoVA-100x	2	1.45	1370.28	1.78
TCP Vegas	3	1.94	347.50	0.42
Verus	3	1.90	2507.52	9.26
PCC-Vivace	3	1.51	1396.10	0.19
WebRTC media	3	0.57	168.58	0.30

Run 1: Statistics of TCP BBR

Start at: 2018-09-07 08:58:28

End at: 2018-09-07 08:58:58

Local clock offset: 2.374 ms

Remote clock offset: 7.431 ms

Below is generated by plot.py at 2018-09-07 09:46:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.08 Mbit/s

95th percentile per-packet one-way delay: 697.669 ms

Loss rate: 1.65%

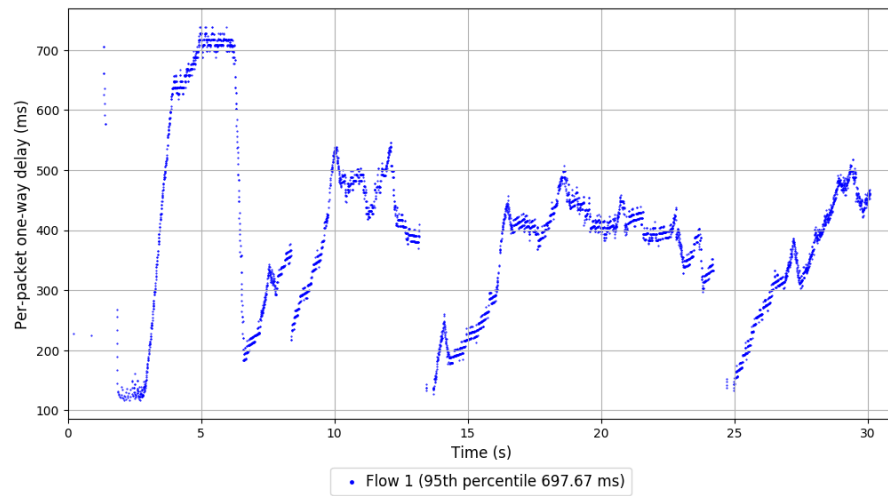
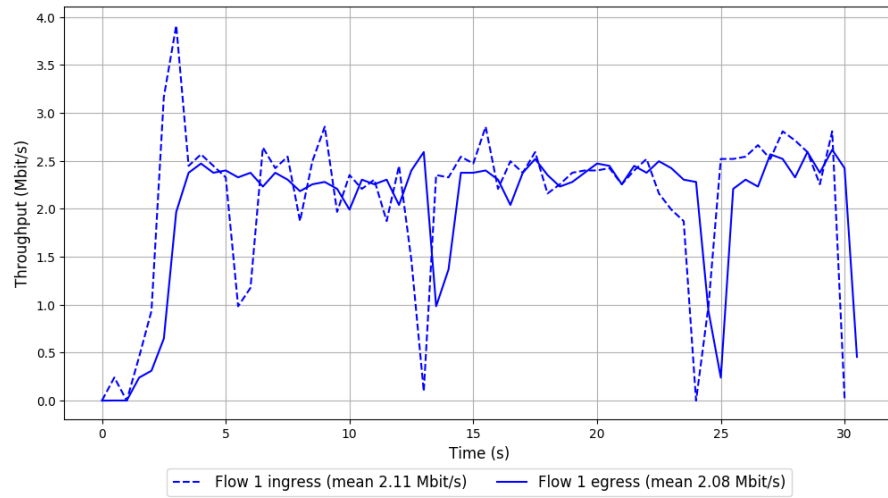
-- Flow 1:

Average throughput: 2.08 Mbit/s

95th percentile per-packet one-way delay: 697.669 ms

Loss rate: 1.65%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-07 09:19:06

End at: 2018-09-07 09:19:36

Local clock offset: 3.206 ms

Remote clock offset: 2.813 ms

Below is generated by plot.py at 2018-09-07 09:46:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 590.865 ms

Loss rate: 1.02%

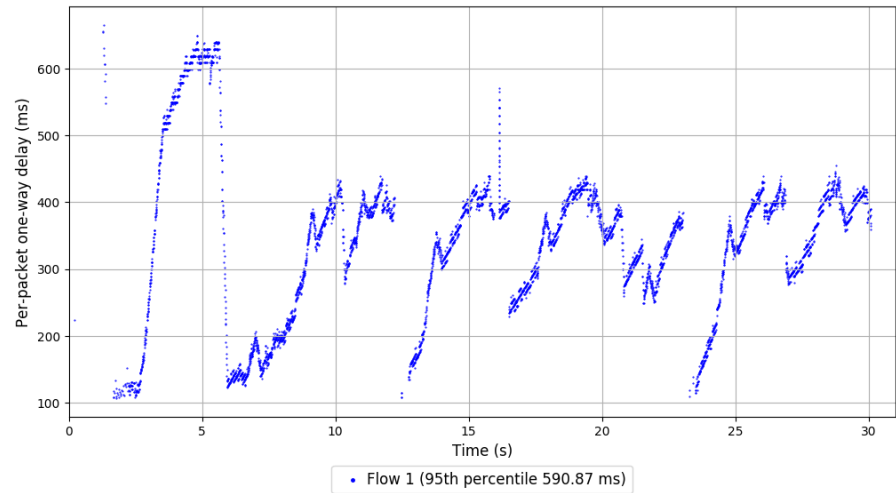
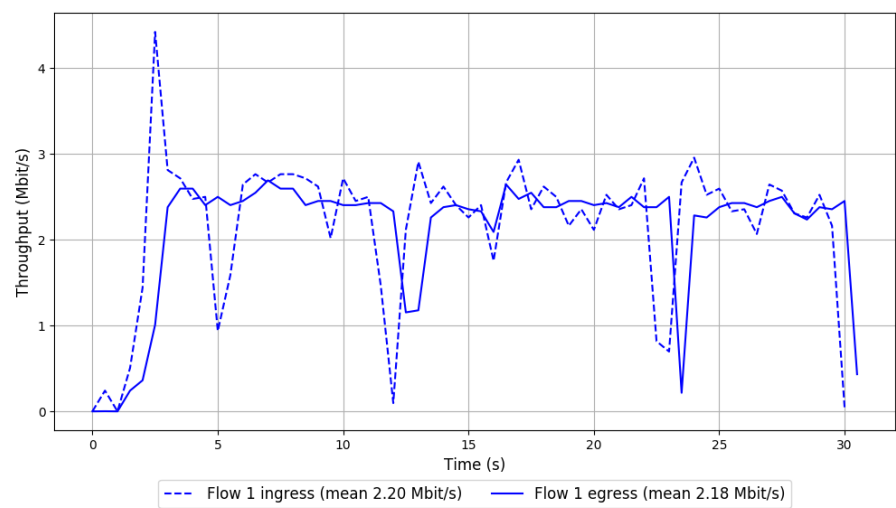
-- Flow 1:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 590.865 ms

Loss rate: 1.02%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-07 09:39:39

End at: 2018-09-07 09:40:09

Local clock offset: 4.984 ms

Remote clock offset: 5.987 ms

Below is generated by plot.py at 2018-09-07 09:46:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.04 Mbit/s

95th percentile per-packet one-way delay: 743.283 ms

Loss rate: 0.90%

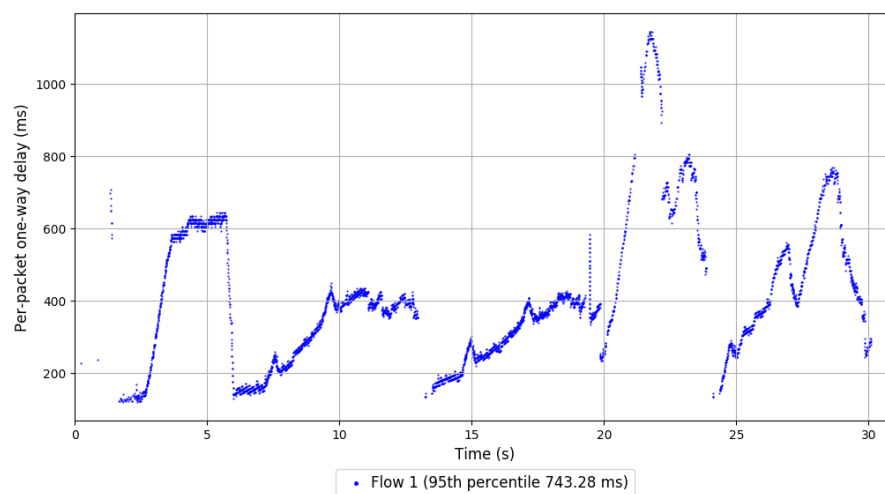
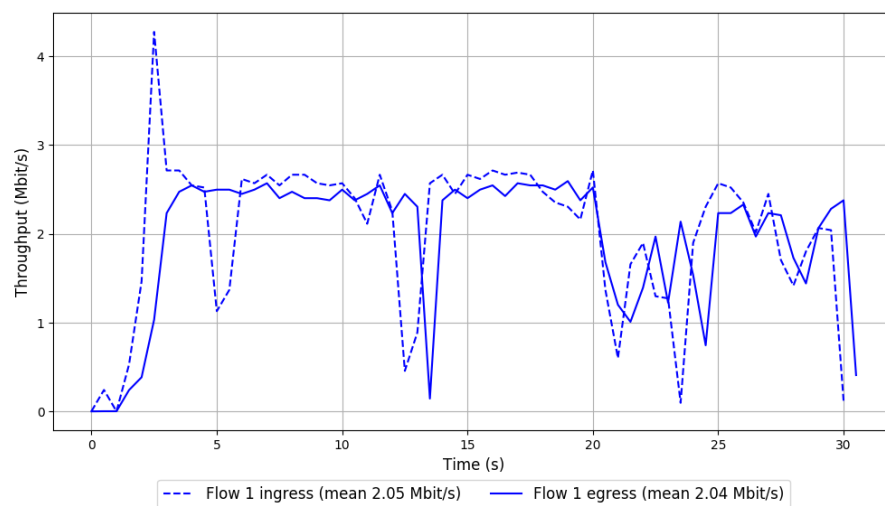
-- Flow 1:

Average throughput: 2.04 Mbit/s

95th percentile per-packet one-way delay: 743.283 ms

Loss rate: 0.90%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

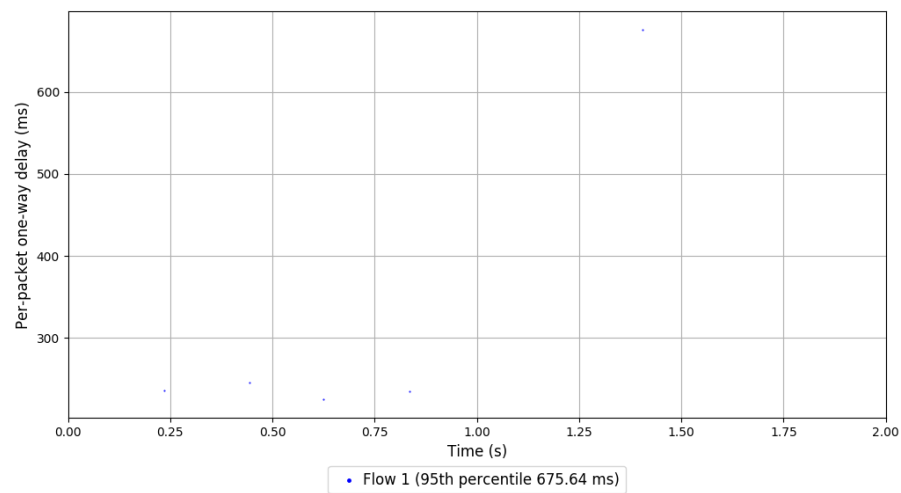
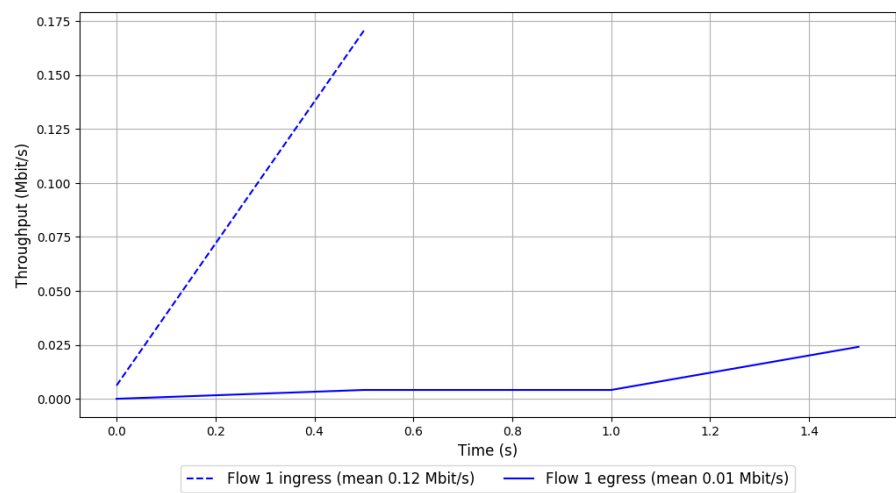
Start at: 2018-09-07 09:03:02

End at: 2018-09-07 09:03:32

Local clock offset: 2.115 ms

Remote clock offset: 7.04 ms

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

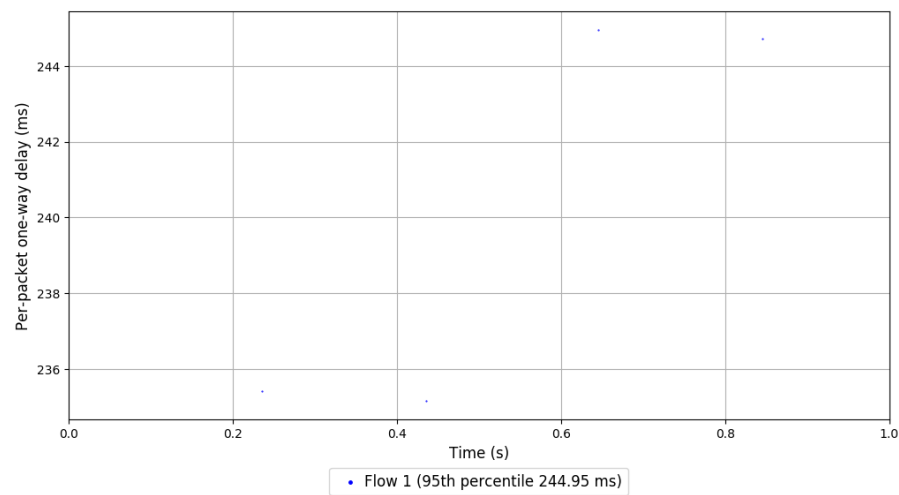
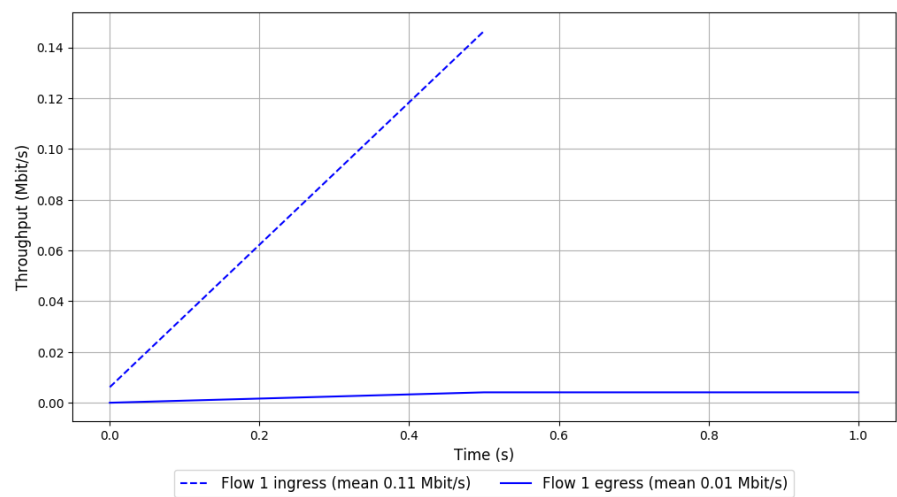
Start at: 2018-09-07 09:23:39

End at: 2018-09-07 09:24:09

Local clock offset: 4.233 ms

Remote clock offset: 6.509 ms

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

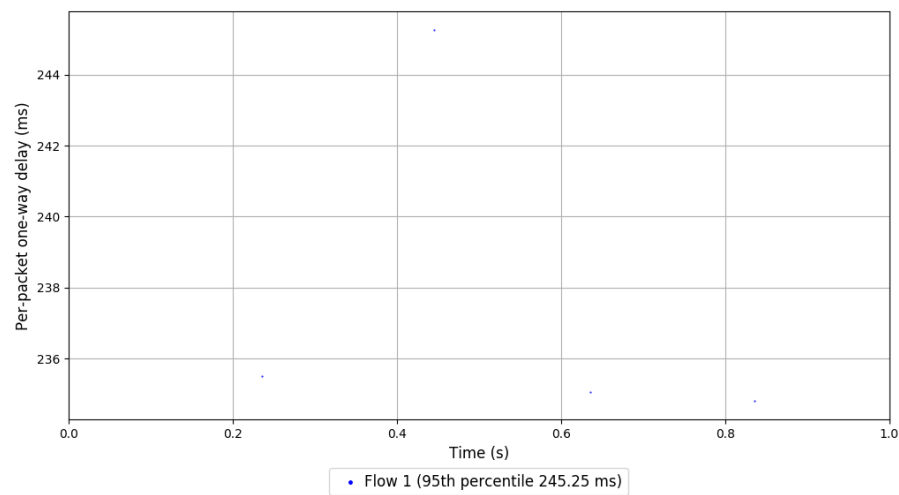
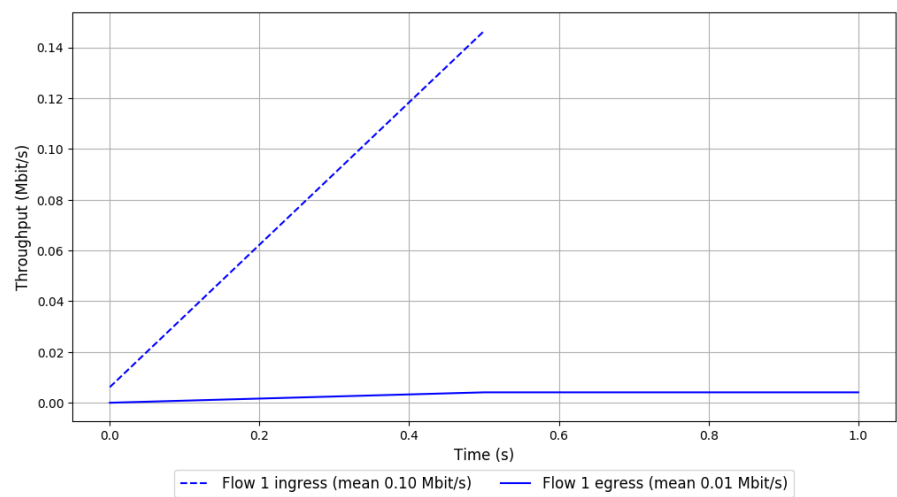
Start at: 2018-09-07 09:44:13

End at: 2018-09-07 09:44:43

Local clock offset: 5.952 ms

Remote clock offset: 5.83 ms

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-07 08:59:36

End at: 2018-09-07 09:00:06

Local clock offset: 1.609 ms

Remote clock offset: 3.469 ms

Below is generated by plot.py at 2018-09-07 09:46:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 3630.942 ms

Loss rate: 15.04%

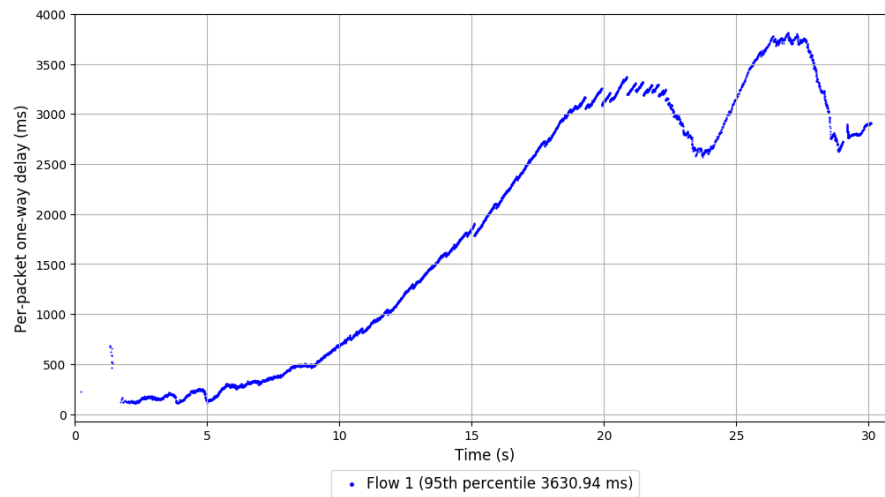
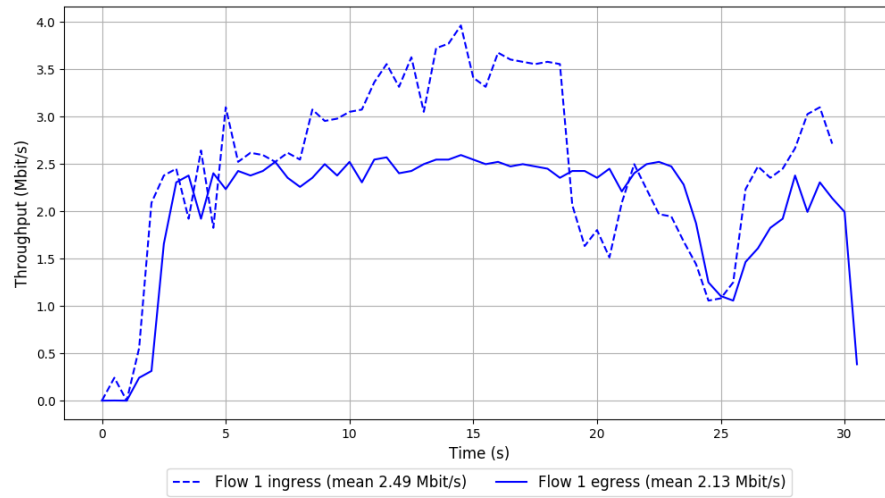
-- Flow 1:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 3630.942 ms

Loss rate: 15.04%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-07 09:20:14

End at: 2018-09-07 09:20:44

Local clock offset: 3.489 ms

Remote clock offset: 6.239 ms

Below is generated by plot.py at 2018-09-07 09:46:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 3292.300 ms

Loss rate: 13.42%

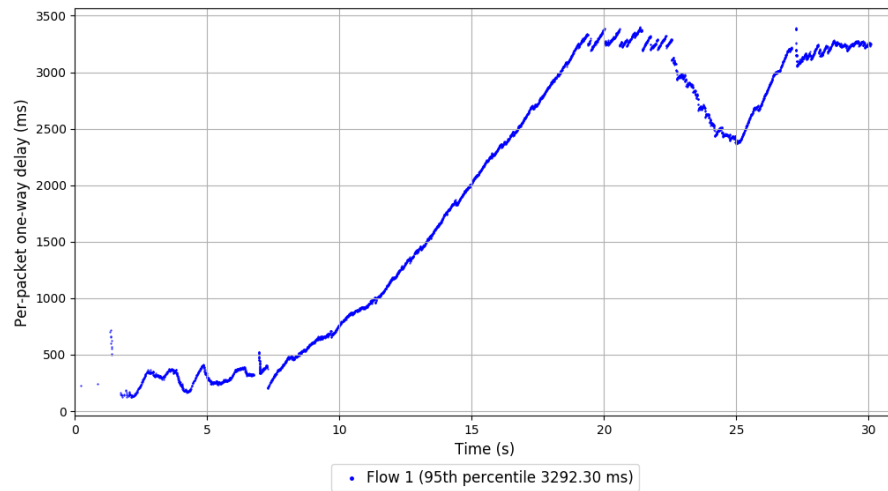
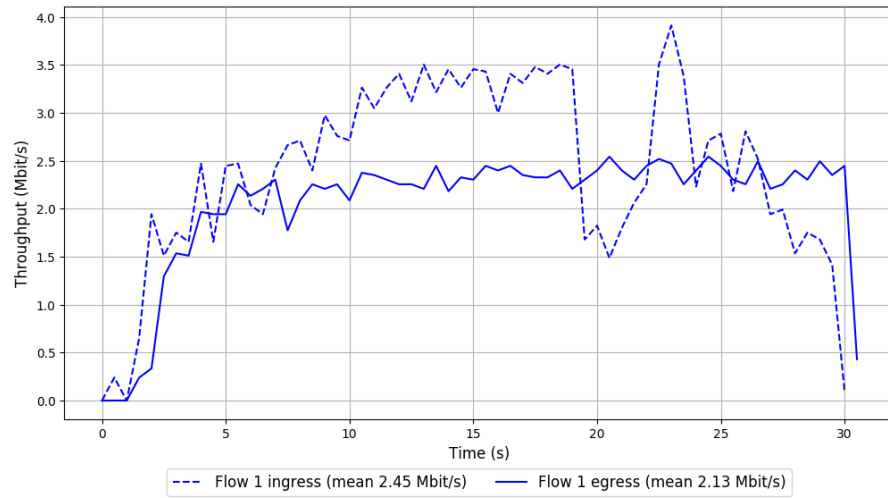
-- Flow 1:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 3292.300 ms

Loss rate: 13.42%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-09-07 09:40:48

End at: 2018-09-07 09:41:18

Local clock offset: 5.815 ms

Remote clock offset: 5.932 ms

Below is generated by plot.py at 2018-09-07 09:46:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.16 Mbit/s

95th percentile per-packet one-way delay: 3379.973 ms

Loss rate: 12.17%

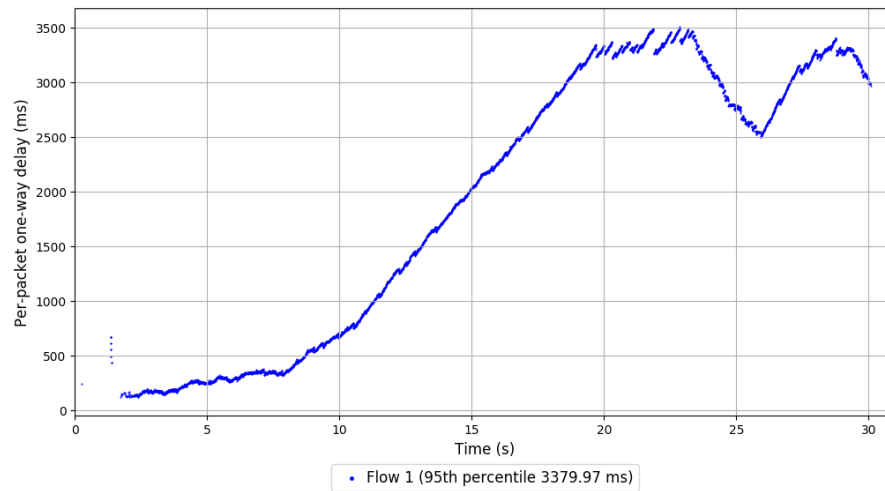
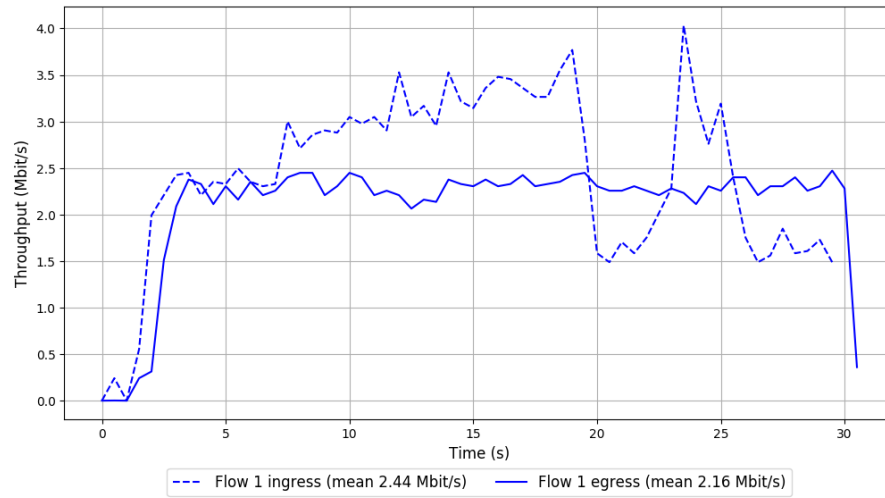
-- Flow 1:

Average throughput: 2.16 Mbit/s

95th percentile per-packet one-way delay: 3379.973 ms

Loss rate: 12.17%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2018-09-07 08:57:19

End at: 2018-09-07 08:57:49

Local clock offset: 2.532 ms

Remote clock offset: 7.45 ms

Below is generated by plot.py at 2018-09-07 09:46:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.10 Mbit/s

95th percentile per-packet one-way delay: 3389.978 ms

Loss rate: 77.32%

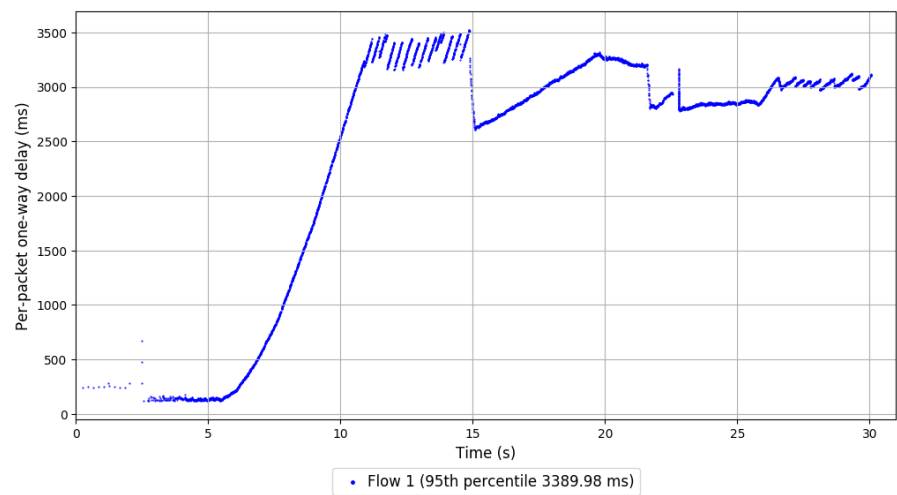
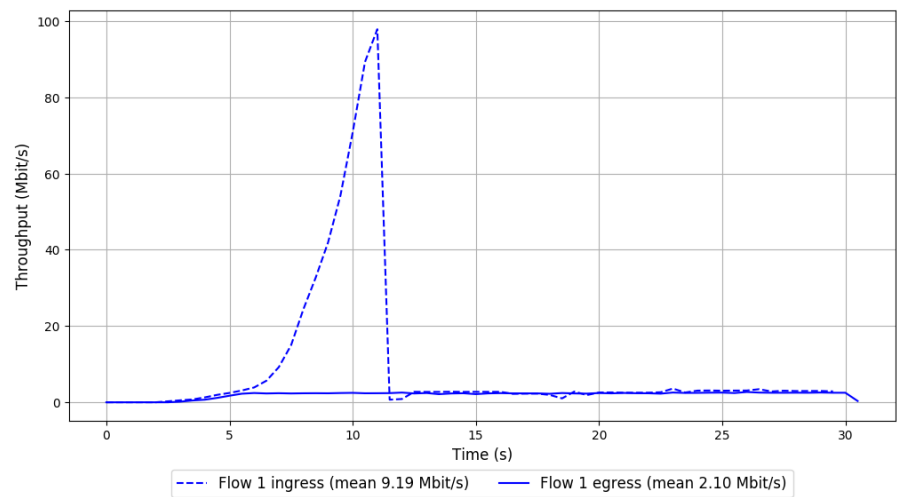
-- Flow 1:

Average throughput: 2.10 Mbit/s

95th percentile per-packet one-way delay: 3389.978 ms

Loss rate: 77.32%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-09-07 09:17:57

End at: 2018-09-07 09:18:27

Local clock offset: 1.923 ms

Remote clock offset: 2.352 ms

Below is generated by plot.py at 2018-09-07 09:46:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.00 Mbit/s

95th percentile per-packet one-way delay: 3665.829 ms

Loss rate: 85.60%

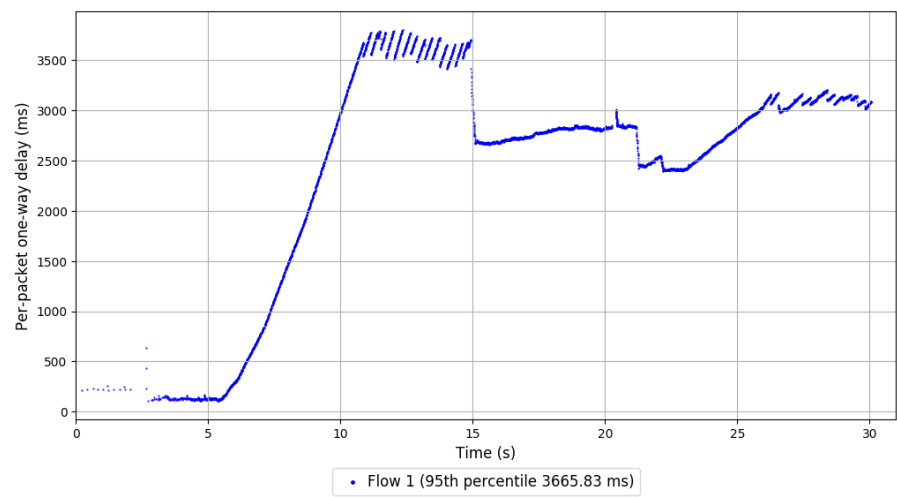
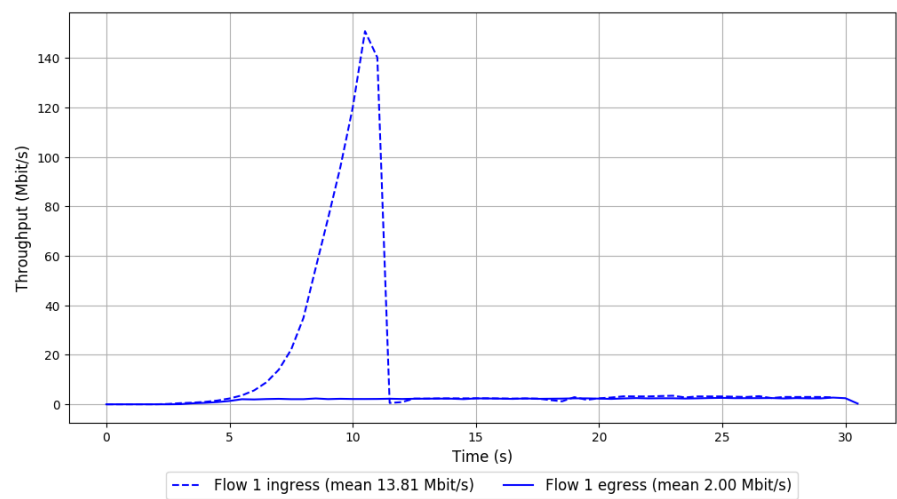
-- Flow 1:

Average throughput: 2.00 Mbit/s

95th percentile per-packet one-way delay: 3665.829 ms

Loss rate: 85.60%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-09-07 09:38:30

End at: 2018-09-07 09:39:00

Local clock offset: 5.699 ms

Remote clock offset: 2.14 ms

Below is generated by plot.py at 2018-09-07 09:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 3333.169 ms

Loss rate: 81.62%

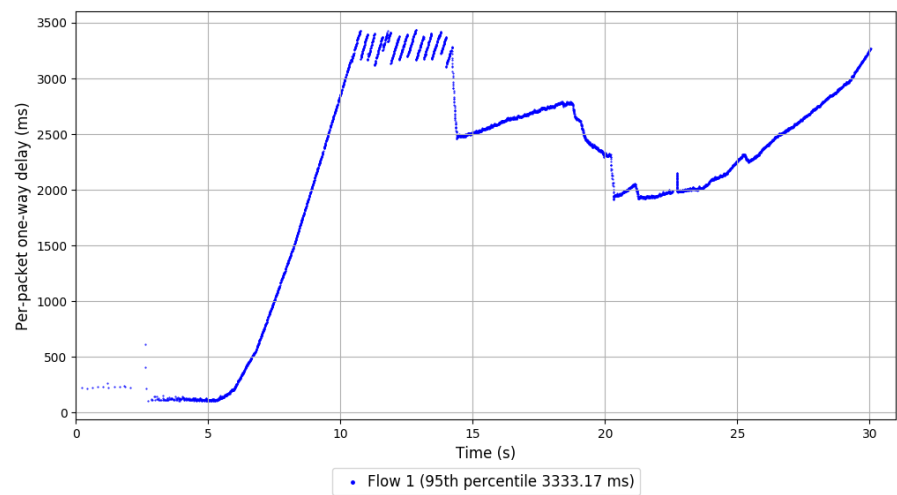
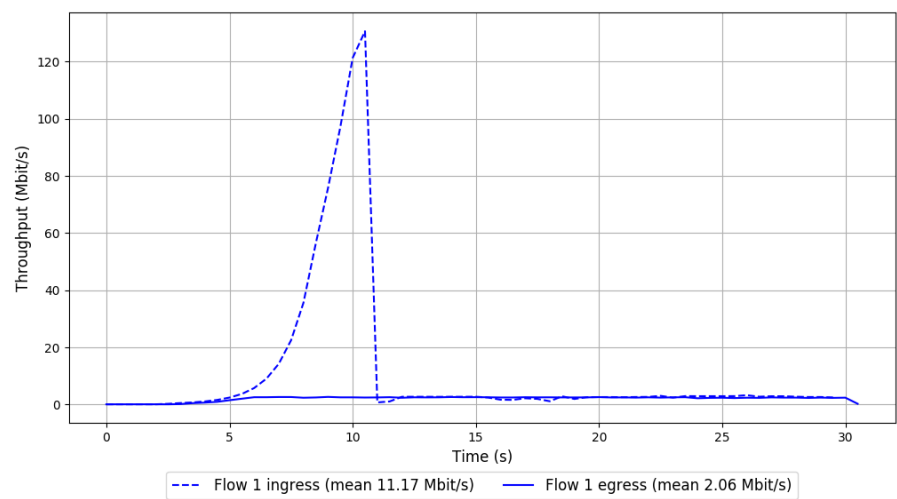
-- Flow 1:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 3333.169 ms

Loss rate: 81.62%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2018-09-07 09:01:53

End at: 2018-09-07 09:02:23

Local clock offset: 1.461 ms

Remote clock offset: 7.358 ms

Below is generated by plot.py at 2018-09-07 09:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.02 Mbit/s

95th percentile per-packet one-way delay: 3346.258 ms

Loss rate: 6.95%

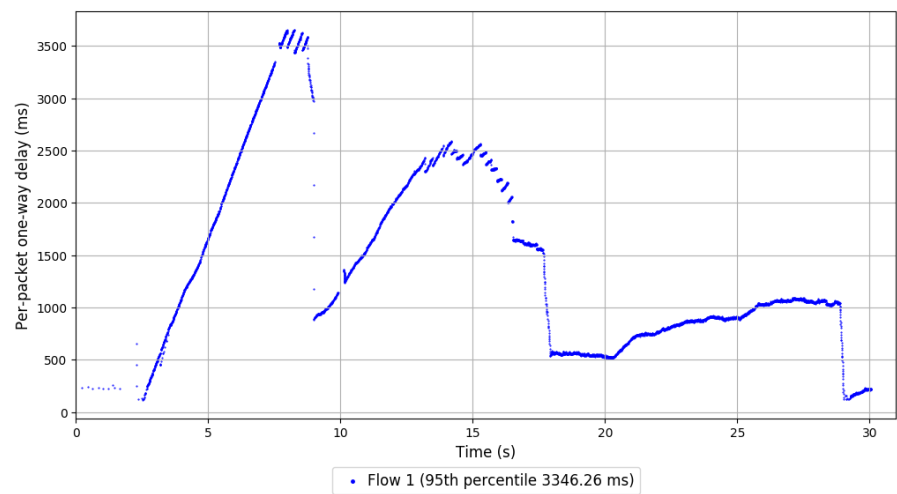
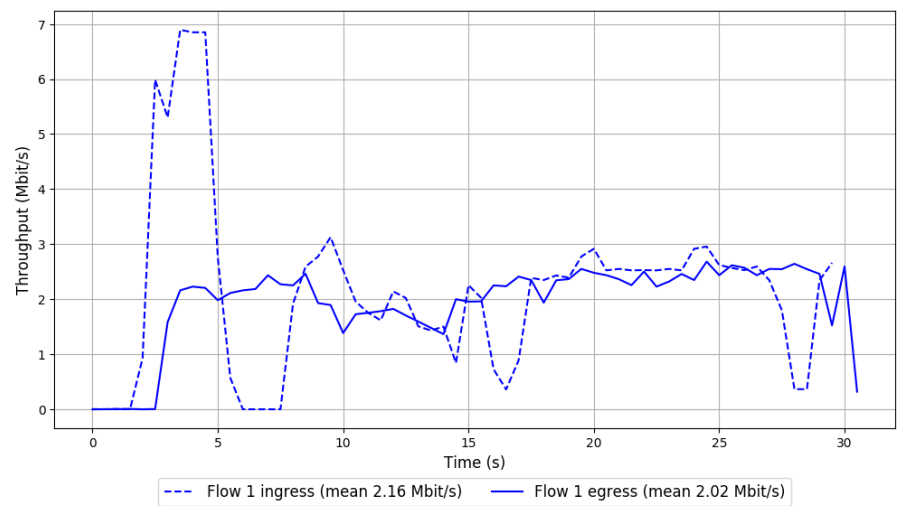
-- Flow 1:

Average throughput: 2.02 Mbit/s

95th percentile per-packet one-way delay: 3346.258 ms

Loss rate: 6.95%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2018-09-07 09:22:30

End at: 2018-09-07 09:23:00

Local clock offset: 3.179 ms

Remote clock offset: 2.603 ms

Below is generated by plot.py at 2018-09-07 09:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 3068.439 ms

Loss rate: 4.92%

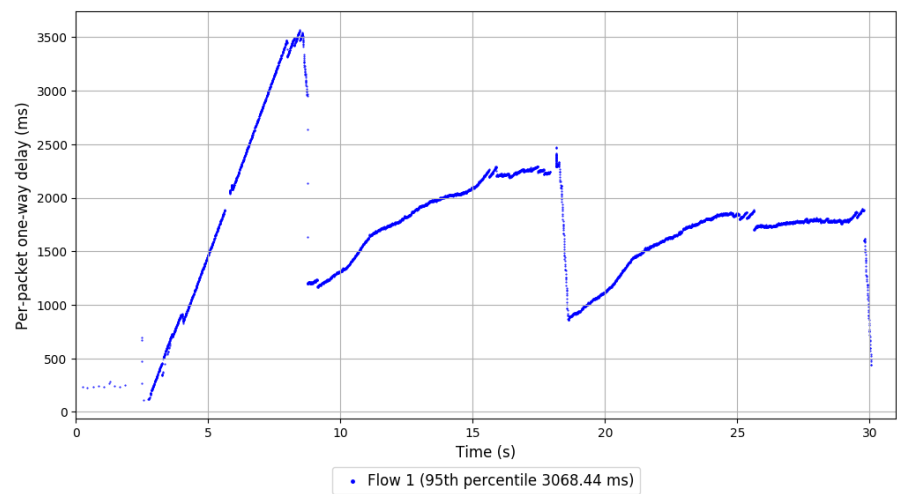
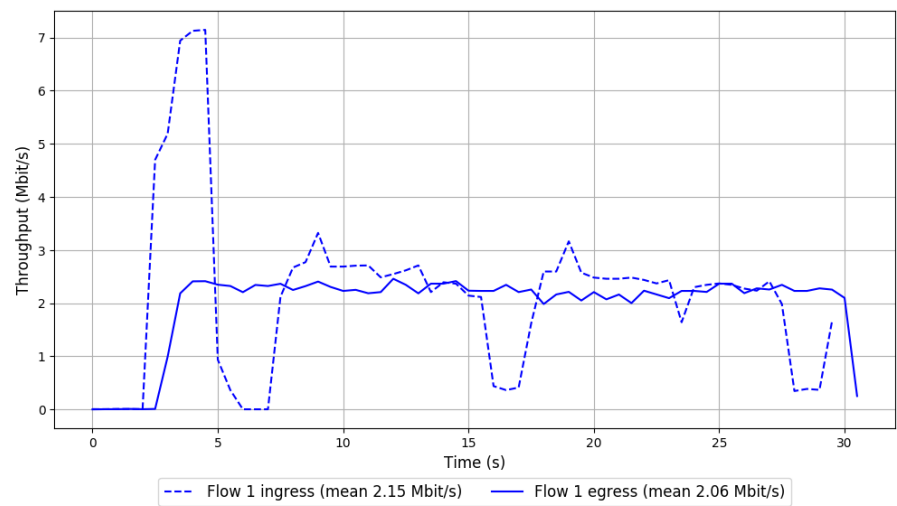
-- Flow 1:

Average throughput: 2.06 Mbit/s

95th percentile per-packet one-way delay: 3068.439 ms

Loss rate: 4.92%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2018-09-07 09:43:05

End at: 2018-09-07 09:43:35

Local clock offset: 5.907 ms

Remote clock offset: 1.551 ms

Below is generated by plot.py at 2018-09-07 09:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.21 Mbit/s

95th percentile per-packet one-way delay: 2941.867 ms

Loss rate: 6.88%

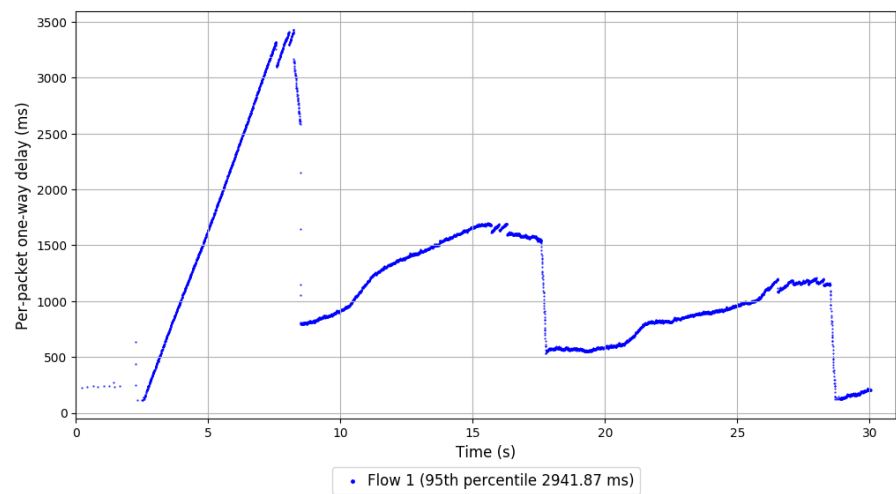
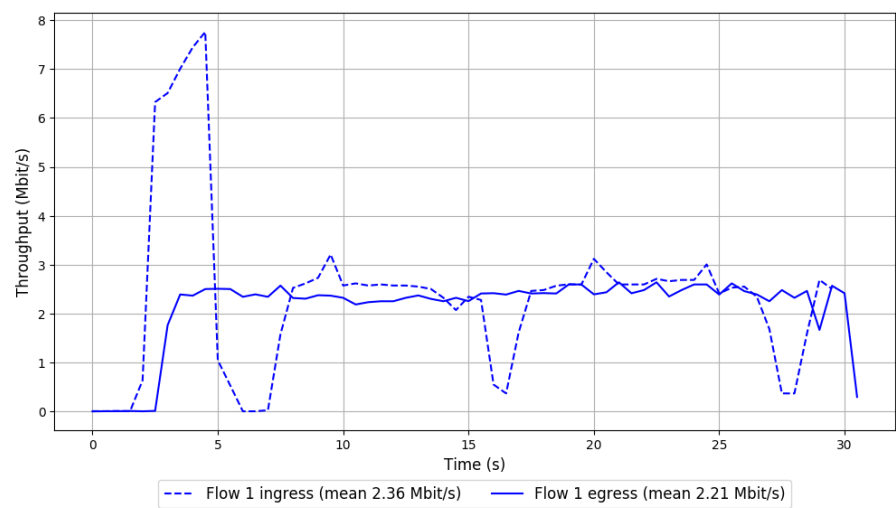
-- Flow 1:

Average throughput: 2.21 Mbit/s

95th percentile per-packet one-way delay: 2941.867 ms

Loss rate: 6.88%

Run 3: Report of FillP-Sheep — Data Link

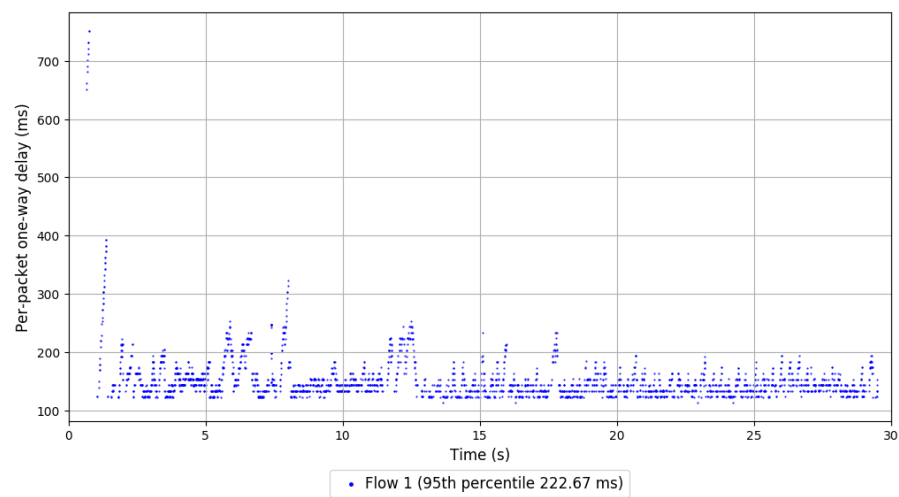
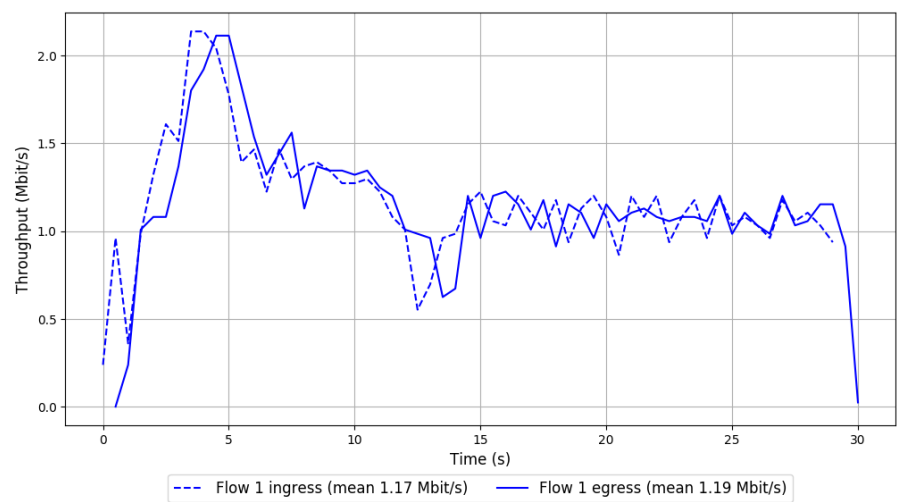


```
Run 1: Statistics of Indigo

Start at: 2018-09-07 08:45:53
End at: 2018-09-07 08:46:23
Local clock offset: 3.875 ms
Remote clock offset: 7.733 ms

# Below is generated by plot.py at 2018-09-07 09:46:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 222.666 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 222.666 ms
Loss rate: 0.21%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-07 09:06:27

End at: 2018-09-07 09:06:57

Local clock offset: 1.236 ms

Remote clock offset: 3.061 ms

Below is generated by plot.py at 2018-09-07 09:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.52 Mbit/s

95th percentile per-packet one-way delay: 188.809 ms

Loss rate: 0.22%

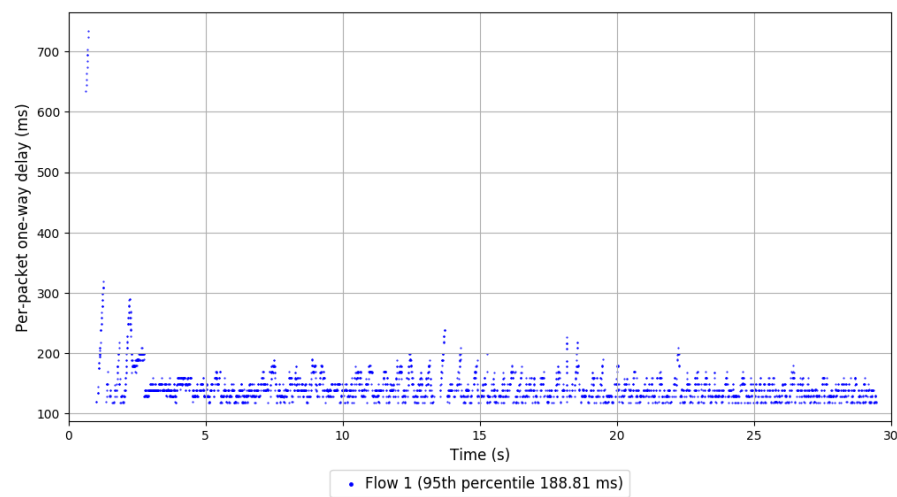
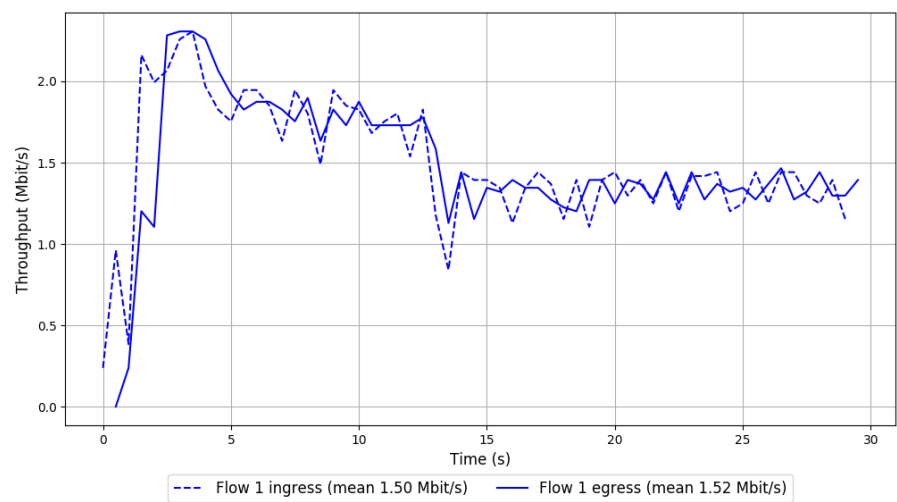
-- Flow 1:

Average throughput: 1.52 Mbit/s

95th percentile per-packet one-way delay: 188.809 ms

Loss rate: 0.22%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-07 09:27:03

End at: 2018-09-07 09:27:33

Local clock offset: 4.774 ms

Remote clock offset: 6.379 ms

Below is generated by plot.py at 2018-09-07 09:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.42 Mbit/s

95th percentile per-packet one-way delay: 184.456 ms

Loss rate: 0.29%

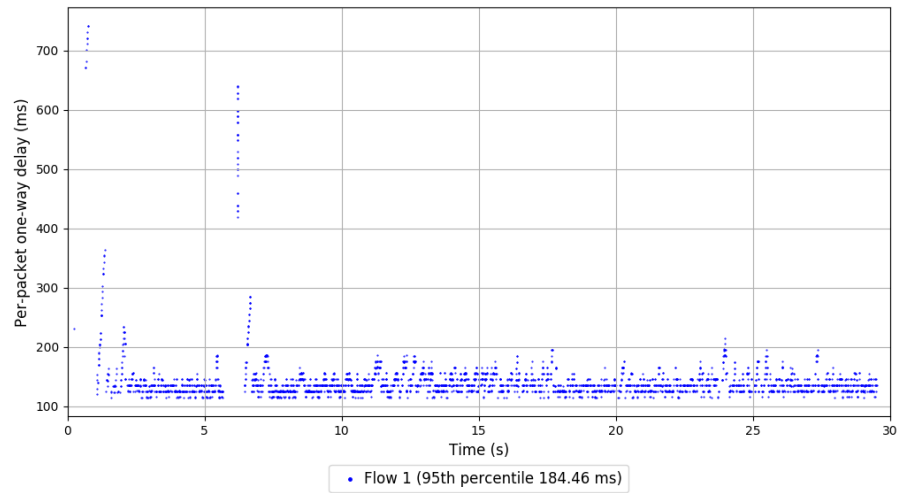
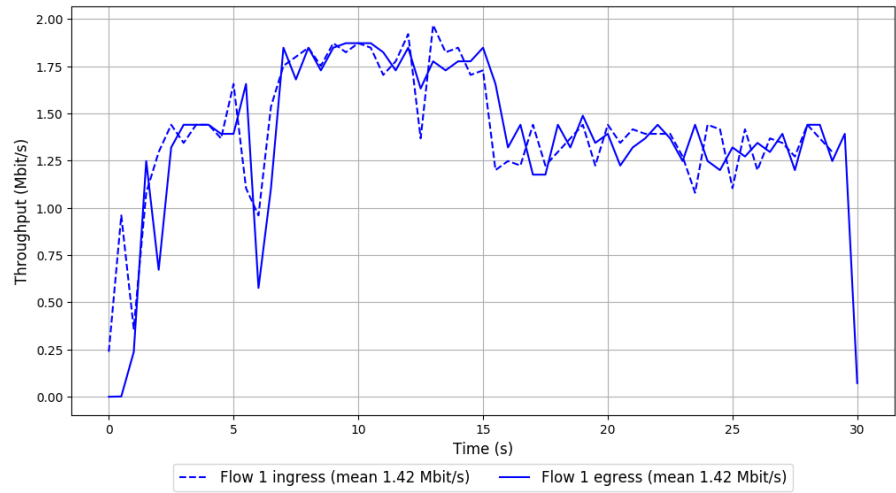
-- Flow 1:

Average throughput: 1.42 Mbit/s

95th percentile per-packet one-way delay: 184.456 ms

Loss rate: 0.29%

Run 3: Report of Indigo — Data Link

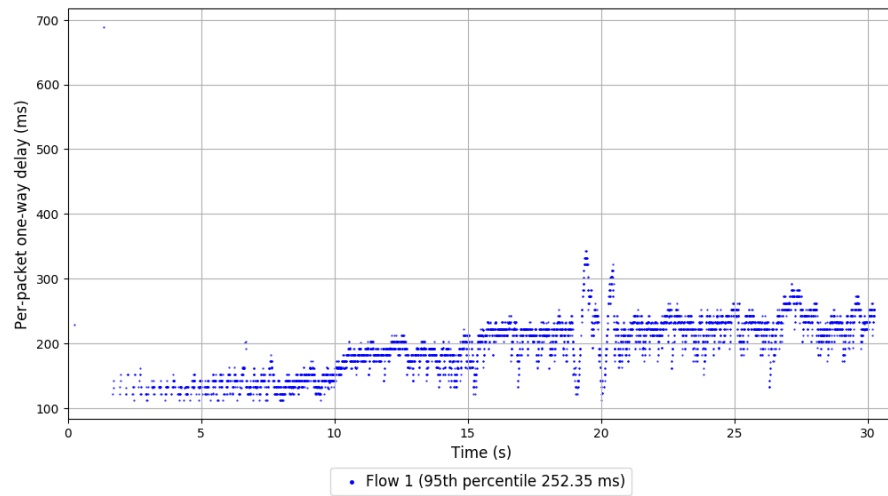
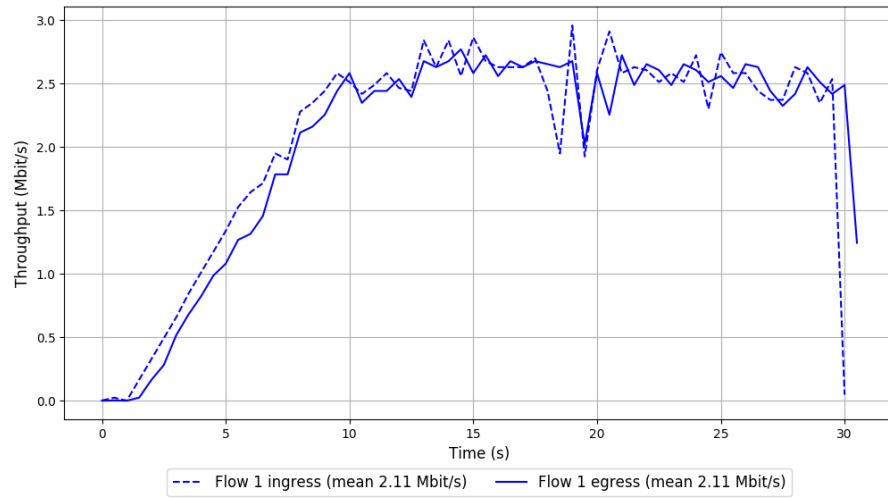



```
Run 1: Statistics of LEDBAT

Start at: 2018-09-07 08:48:10
End at: 2018-09-07 08:48:40
Local clock offset: 2.748 ms
Remote clock offset: 7.642 ms

# Below is generated by plot.py at 2018-09-07 09:46:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 252.354 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 252.354 ms
Loss rate: 0.00%
```

Run 1: Report of LEDBAT — Data Link

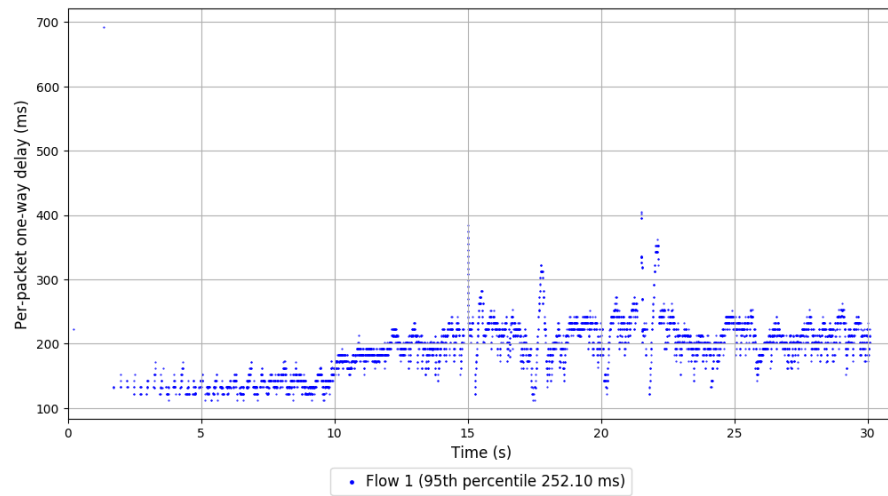
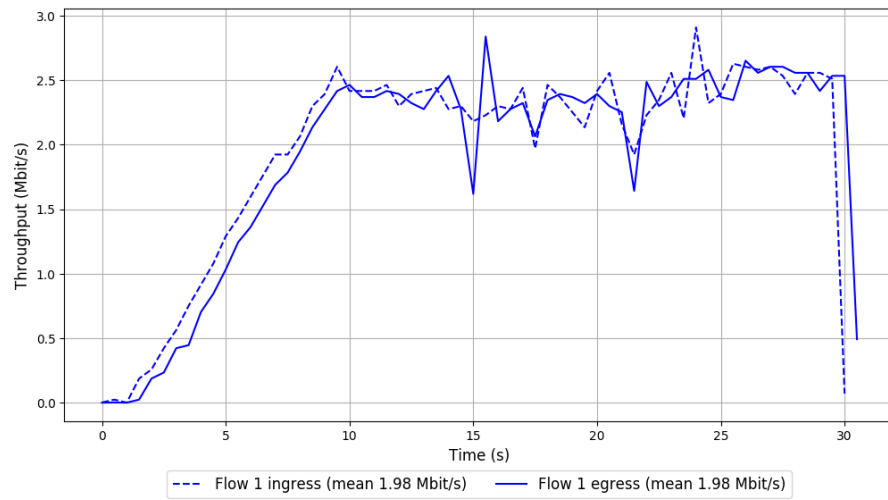


```
Run 2: Statistics of LEDBAT

Start at: 2018-09-07 09:08:44
End at: 2018-09-07 09:09:14
Local clock offset: 1.147 ms
Remote clock offset: 3.009 ms

# Below is generated by plot.py at 2018-09-07 09:46:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 252.098 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 252.098 ms
Loss rate: 0.49%
```

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-09-07 09:29:20

End at: 2018-09-07 09:29:50

Local clock offset: 5.012 ms

Remote clock offset: 2.01 ms

Below is generated by plot.py at 2018-09-07 09:46:13

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.83 Mbit/s

95th percentile per-packet one-way delay: 251.456 ms

Loss rate: 0.66%

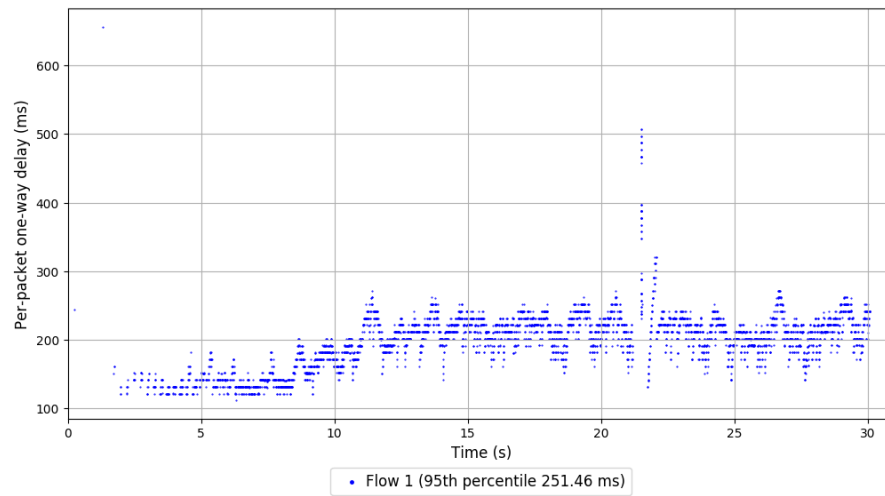
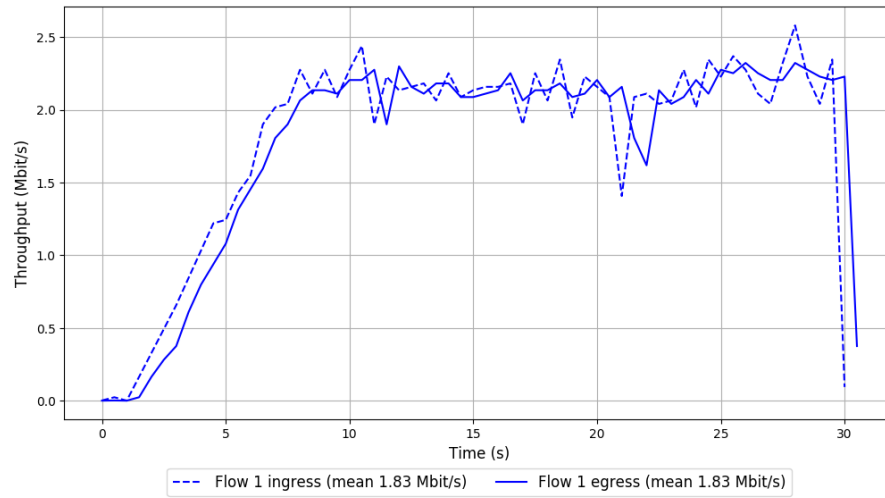
-- Flow 1:

Average throughput: 1.83 Mbit/s

95th percentile per-packet one-way delay: 251.456 ms

Loss rate: 0.66%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of Indigo-Muses

Start at: 2018-09-07 08:51:35

End at: 2018-09-07 08:52:05

Local clock offset: 2.975 ms

Remote clock offset: 3.812 ms

Below is generated by plot.py at 2018-09-07 09:46:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.50 Mbit/s

95th percentile per-packet one-way delay: 3154.471 ms

Loss rate: 86.83%

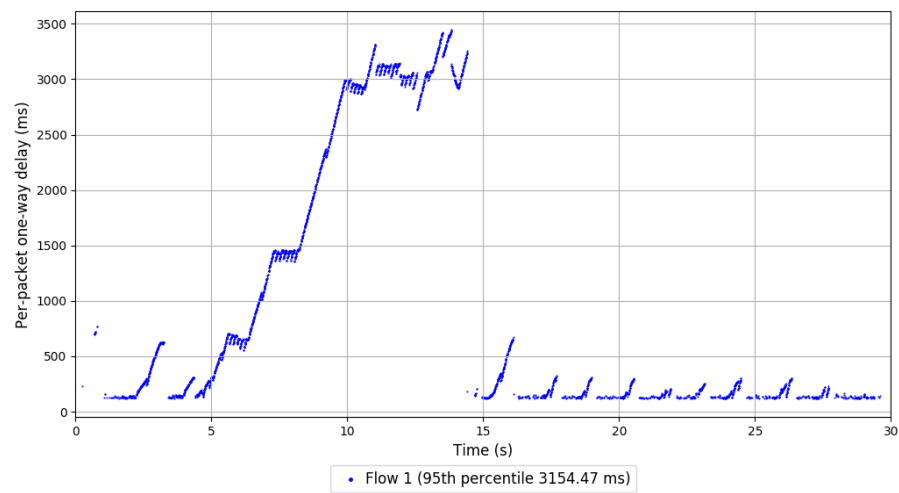
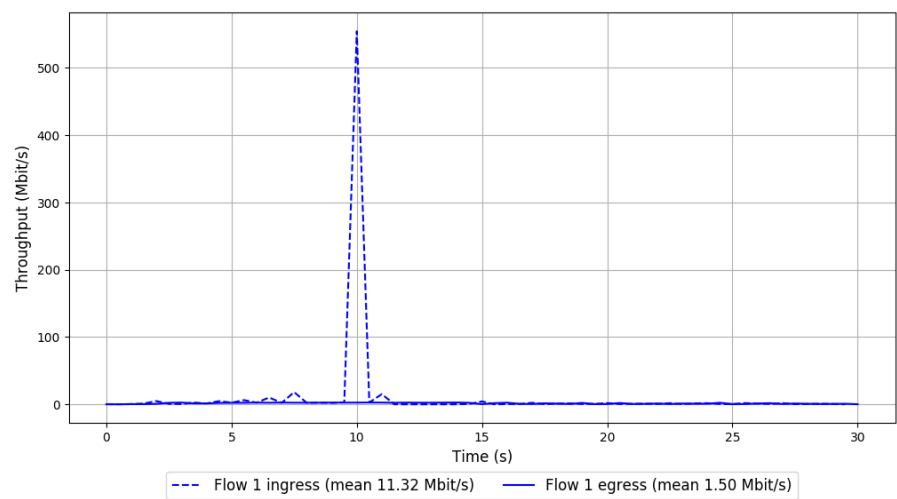
-- Flow 1:

Average throughput: 1.50 Mbit/s

95th percentile per-packet one-way delay: 3154.471 ms

Loss rate: 86.83%

Run 1: Report of Indigo-Muses — Data Link



Run 2: Statistics of Indigo-Muses

Start at: 2018-09-07 09:12:11

End at: 2018-09-07 09:12:41

Local clock offset: 1.003 ms

Remote clock offset: 3.122 ms

Below is generated by plot.py at 2018-09-07 09:46:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 3499.492 ms

Loss rate: 87.88%

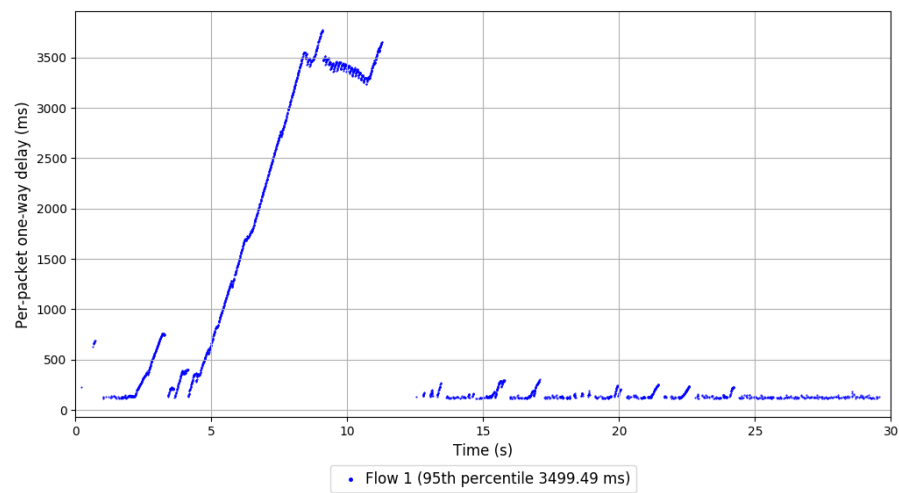
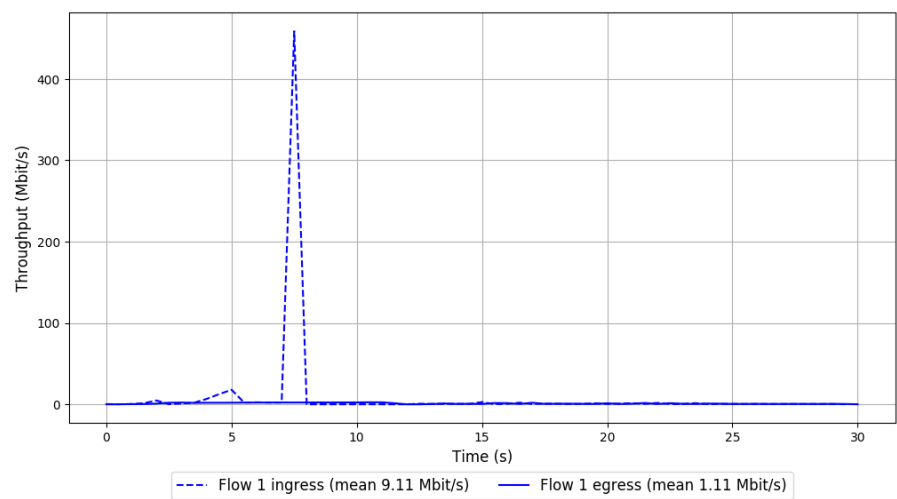
-- Flow 1:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 3499.492 ms

Loss rate: 87.88%

Run 2: Report of Indigo-Muses — Data Link



Run 3: Statistics of Indigo-Muses

Start at: 2018-09-07 09:32:45

End at: 2018-09-07 09:33:15

Local clock offset: 4.562 ms

Remote clock offset: 1.858 ms

Below is generated by plot.py at 2018-09-07 09:46:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 3566.407 ms

Loss rate: 88.99%

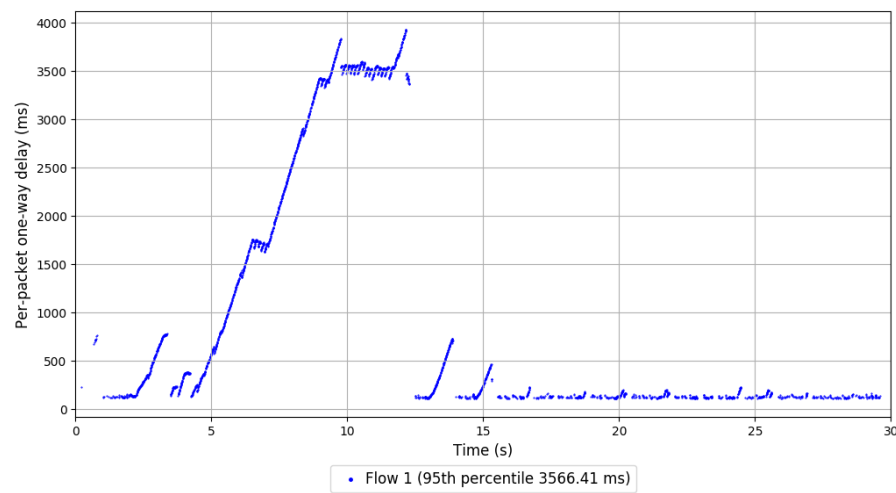
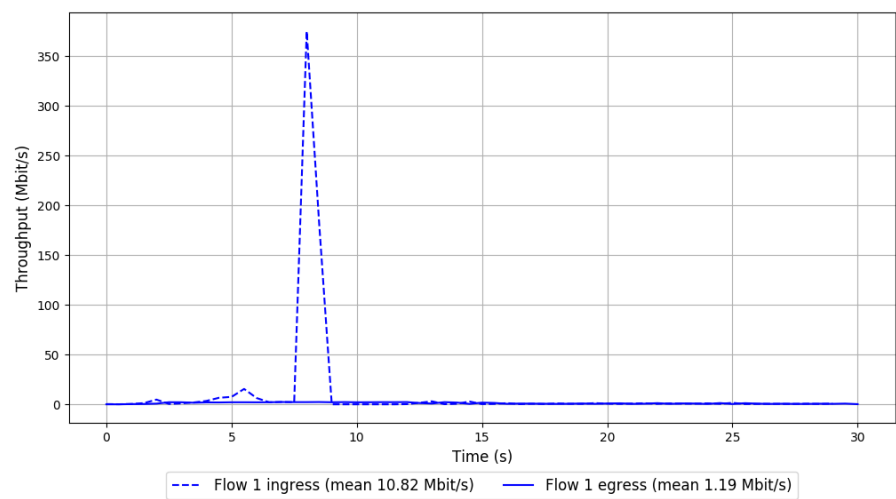
-- Flow 1:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 3566.407 ms

Loss rate: 88.99%

Run 3: Report of Indigo-Muses — Data Link

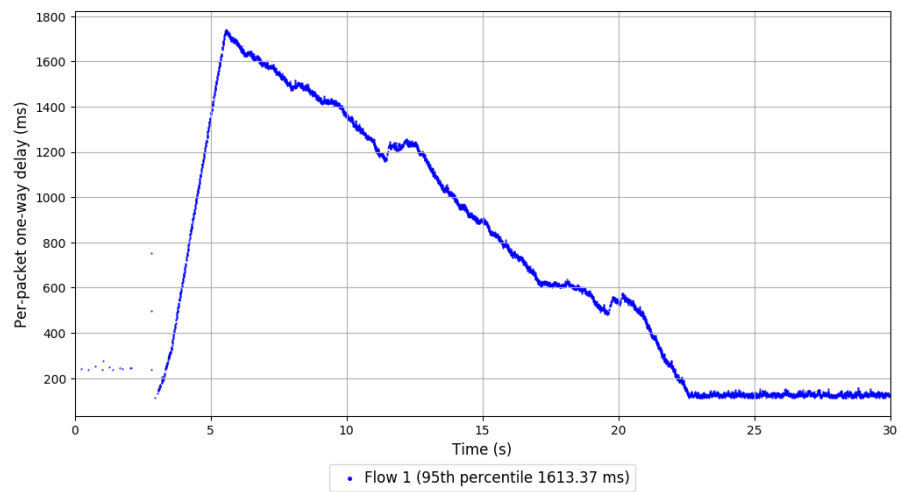
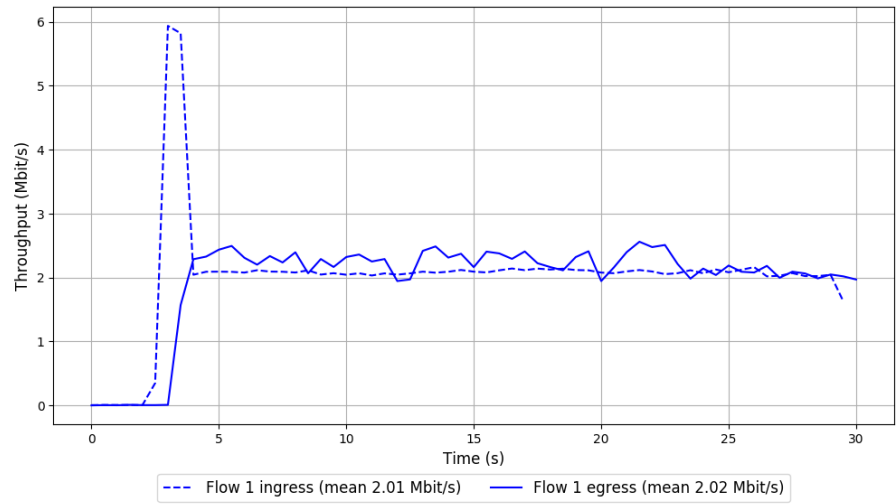


```
Run 1: Statistics of PCC-Allegro

Start at: 2018-09-07 08:47:01
End at: 2018-09-07 08:47:32
Local clock offset: 2.843 ms
Remote clock offset: 7.597 ms

# Below is generated by plot.py at 2018-09-07 09:46:20
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 1613.369 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 1613.369 ms
Loss rate: 0.16%
```

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-09-07 09:07:35

End at: 2018-09-07 09:08:05

Local clock offset: 1.202 ms

Remote clock offset: 3.061 ms

Below is generated by plot.py at 2018-09-07 09:46:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.05 Mbit/s

95th percentile per-packet one-way delay: 1001.914 ms

Loss rate: 0.16%

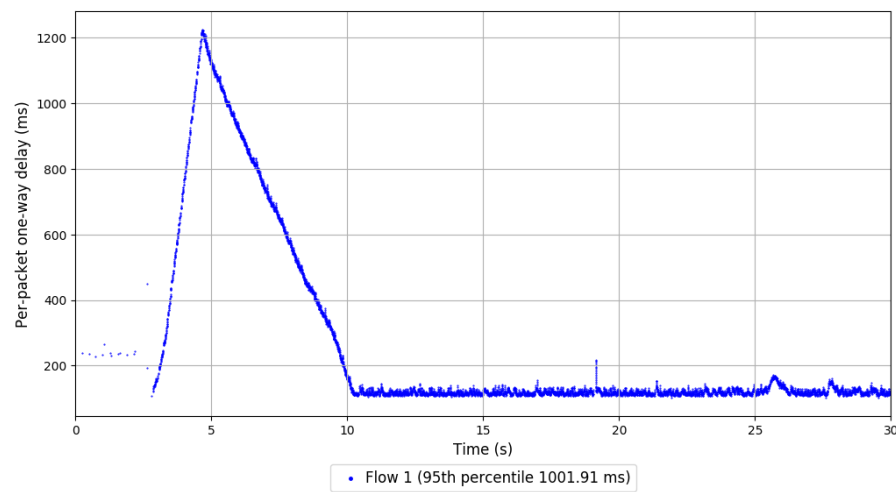
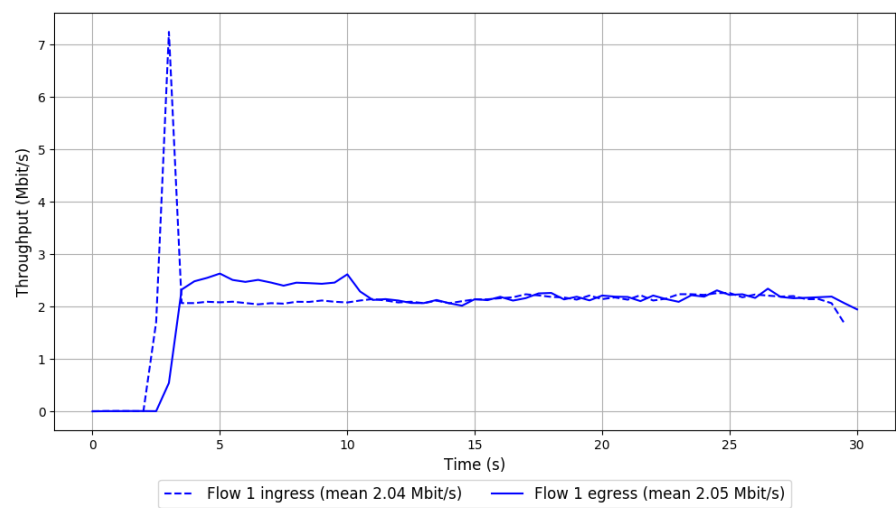
-- Flow 1:

Average throughput: 2.05 Mbit/s

95th percentile per-packet one-way delay: 1001.914 ms

Loss rate: 0.16%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-09-07 09:28:11

End at: 2018-09-07 09:28:41

Local clock offset: 4.043 ms

Remote clock offset: 6.706 ms

Below is generated by plot.py at 2018-09-07 09:46:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 1411.424 ms

Loss rate: 0.13%

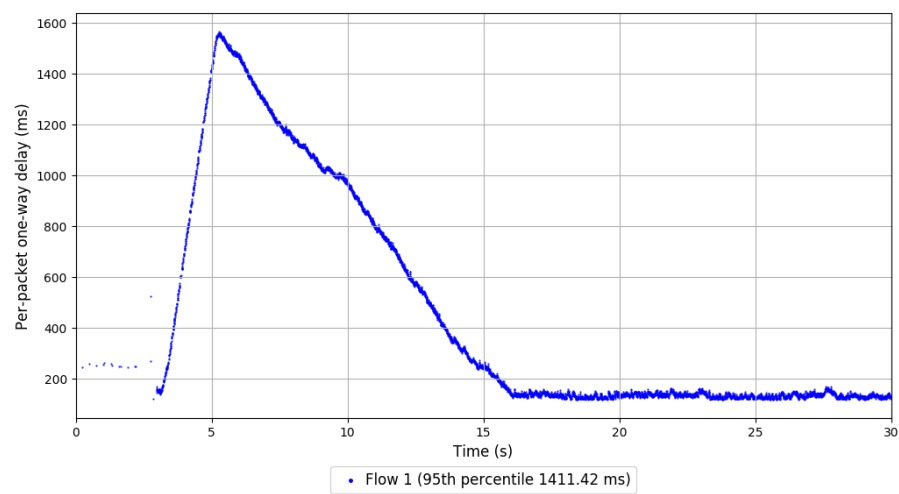
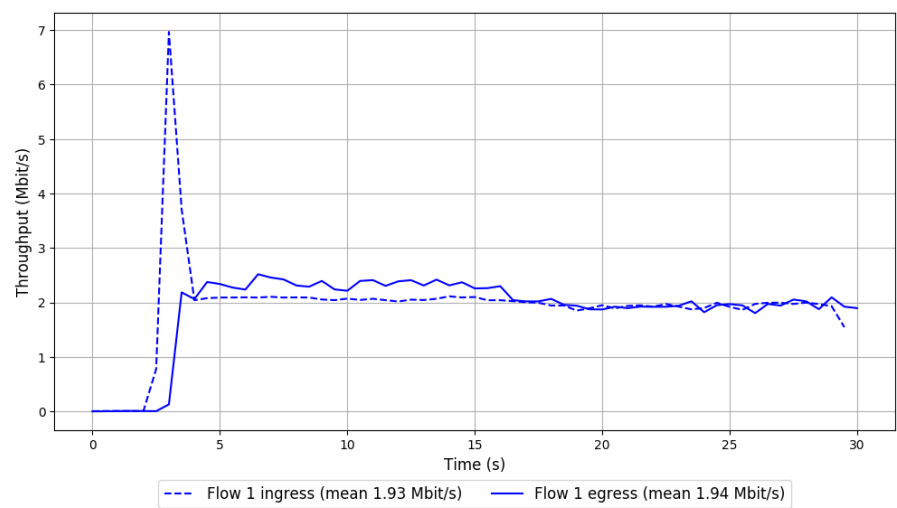
-- Flow 1:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 1411.424 ms

Loss rate: 0.13%

Run 3: Report of PCC-Allegro — Data Link

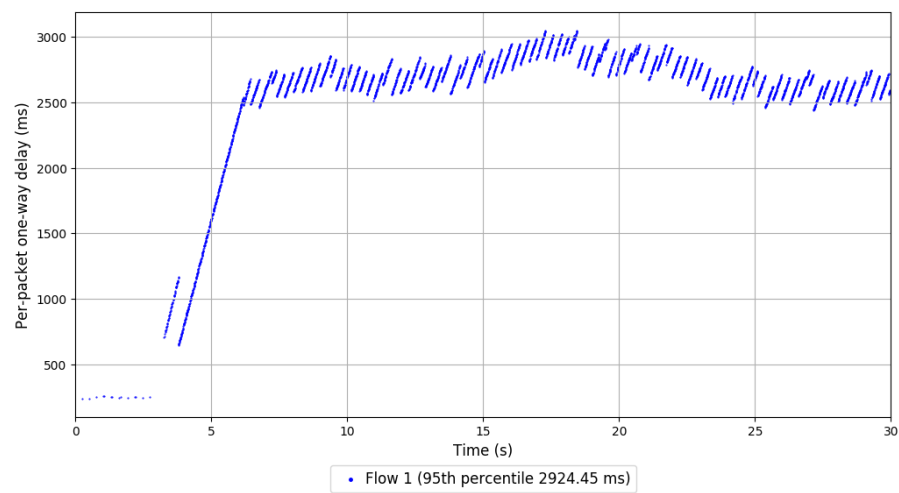
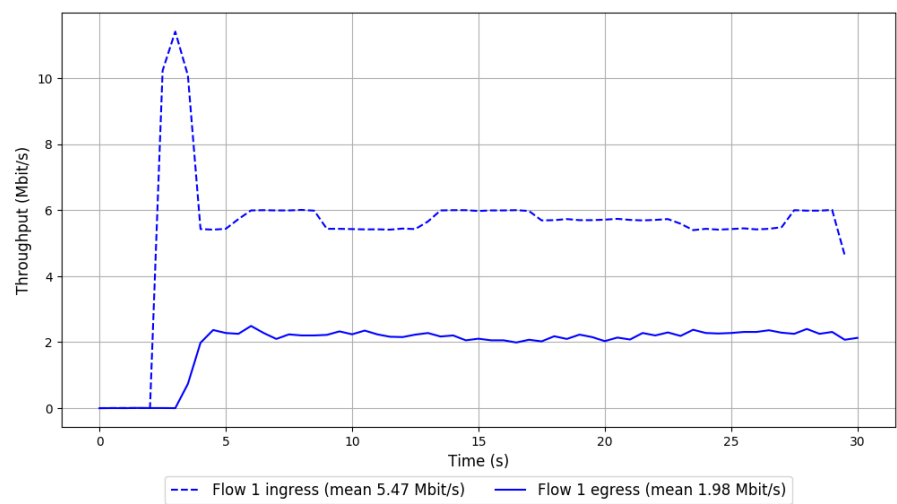


```
Run 1: Statistics of PCC-Expr

Start at: 2018-09-07 08:52:45
End at: 2018-09-07 08:53:15
Local clock offset: 2.165 ms
Remote clock offset: 7.574 ms

# Below is generated by plot.py at 2018-09-07 09:46:21
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 2924.446 ms
Loss rate: 63.96%
-- Flow 1:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 2924.446 ms
Loss rate: 63.96%
```

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

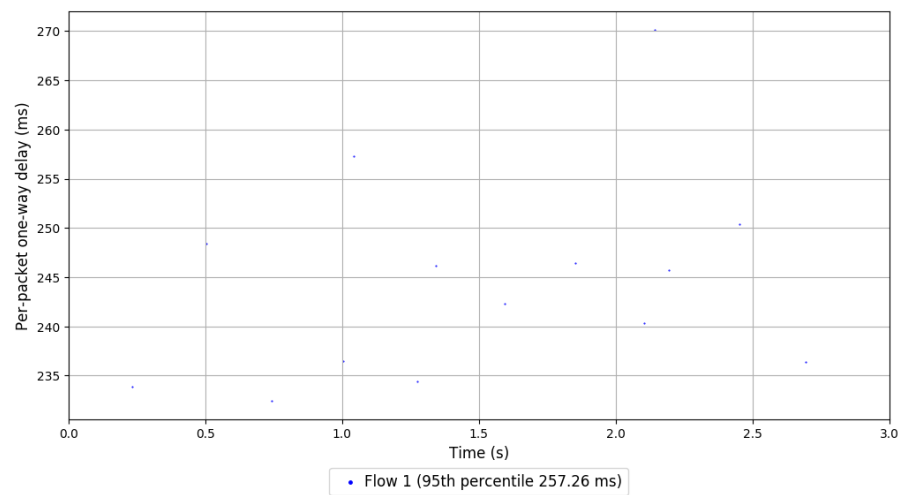
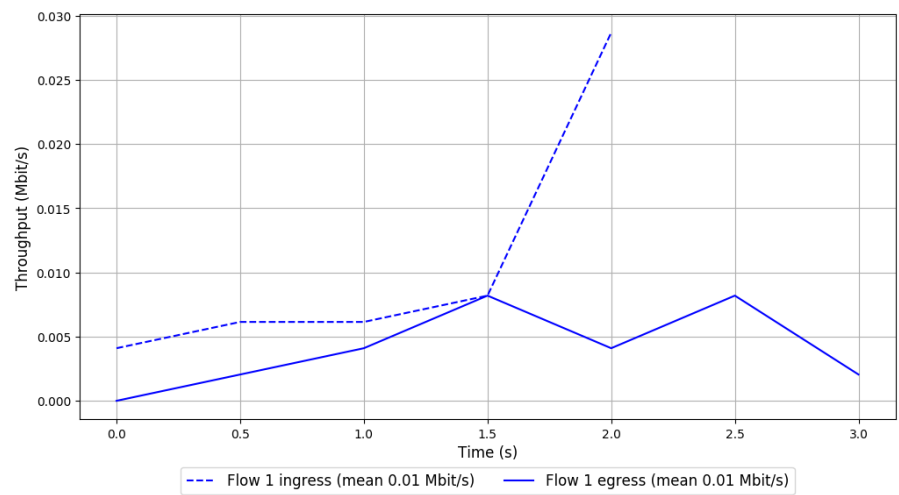
Start at: 2018-09-07 09:13:19

End at: 2018-09-07 09:13:49

Local clock offset: 1.74 ms

Remote clock offset: 2.693 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

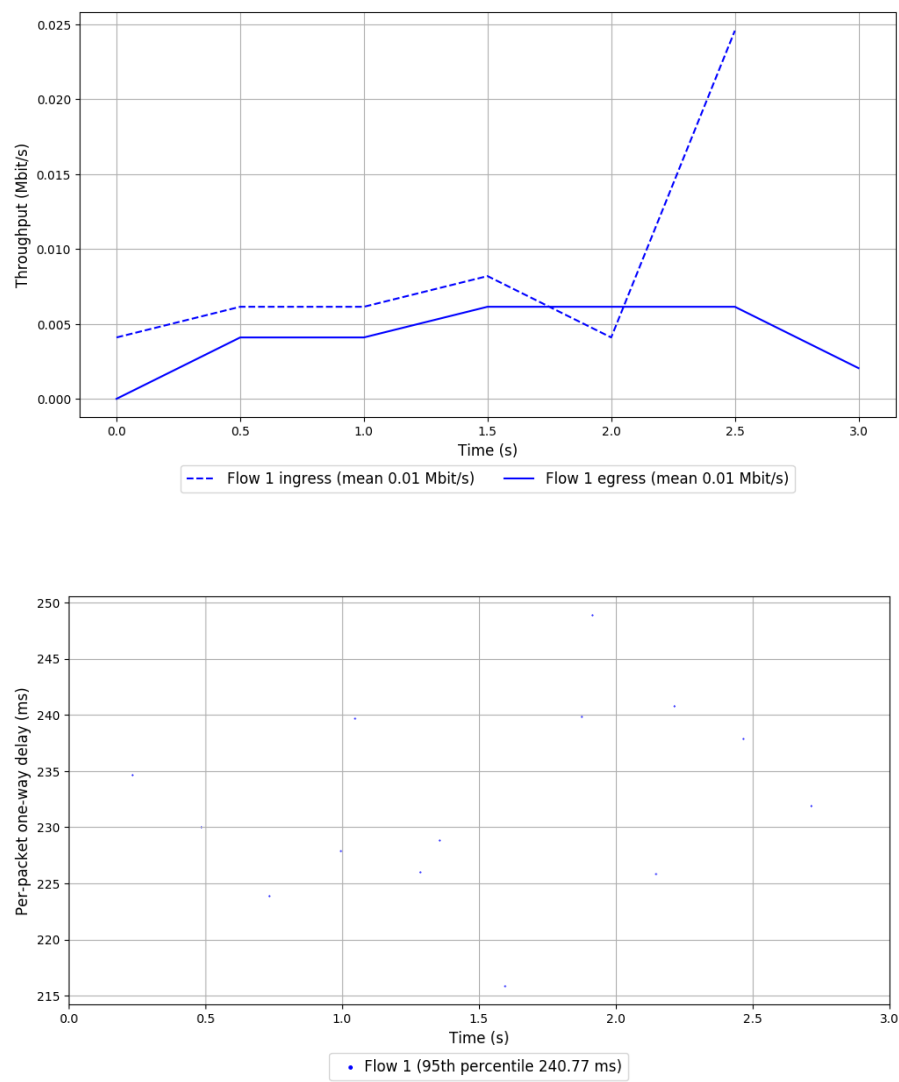
Start at: 2018-09-07 09:33:53

End at: 2018-09-07 09:34:23

Local clock offset: 4.655 ms

Remote clock offset: 1.793 ms

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-09-07 08:56:10

End at: 2018-09-07 08:56:40

Local clock offset: 2.623 ms

Remote clock offset: 3.643 ms

Below is generated by plot.py at 2018-09-07 09:46:23

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 1264.643 ms

Loss rate: 2.41%

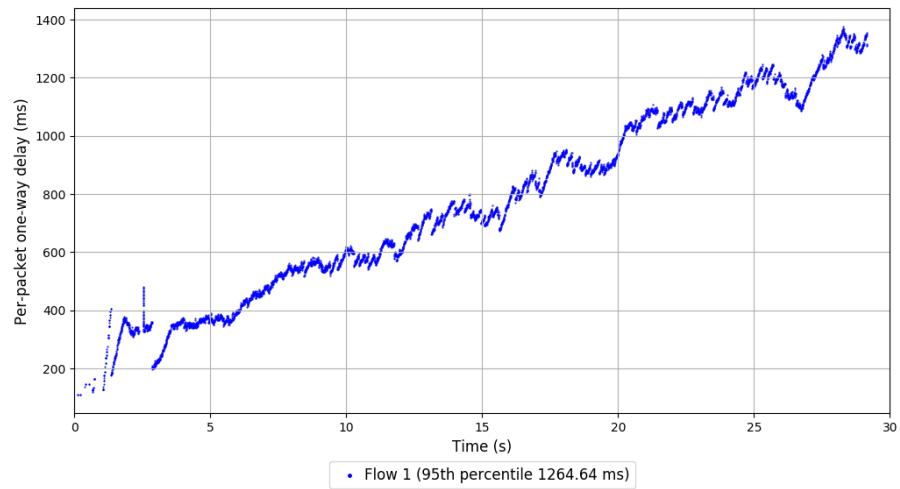
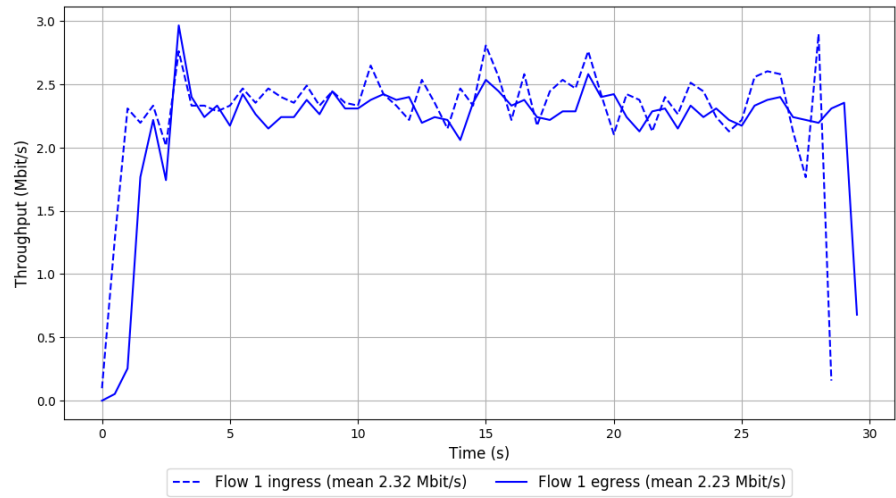
-- Flow 1:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 1264.643 ms

Loss rate: 2.41%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-09-07 09:16:49

End at: 2018-09-07 09:17:19

Local clock offset: 2.32 ms

Remote clock offset: 3.002 ms

Below is generated by plot.py at 2018-09-07 09:46:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.31 Mbit/s

95th percentile per-packet one-way delay: 1449.119 ms

Loss rate: 5.33%

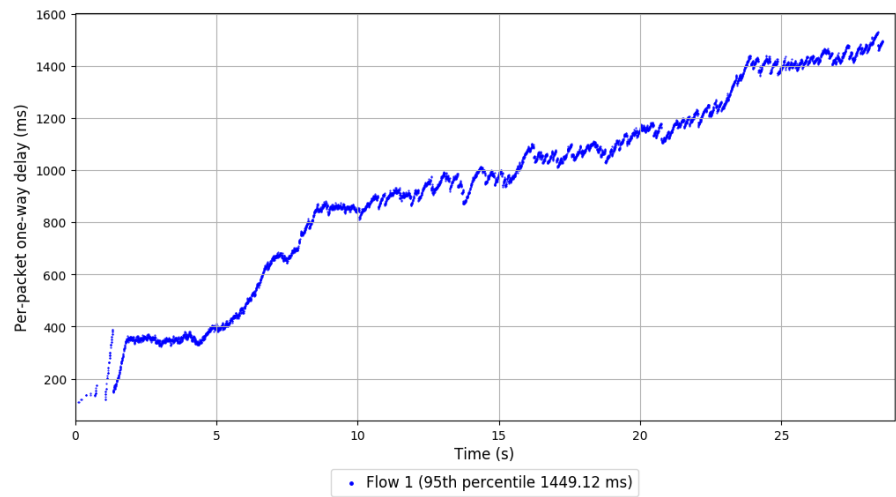
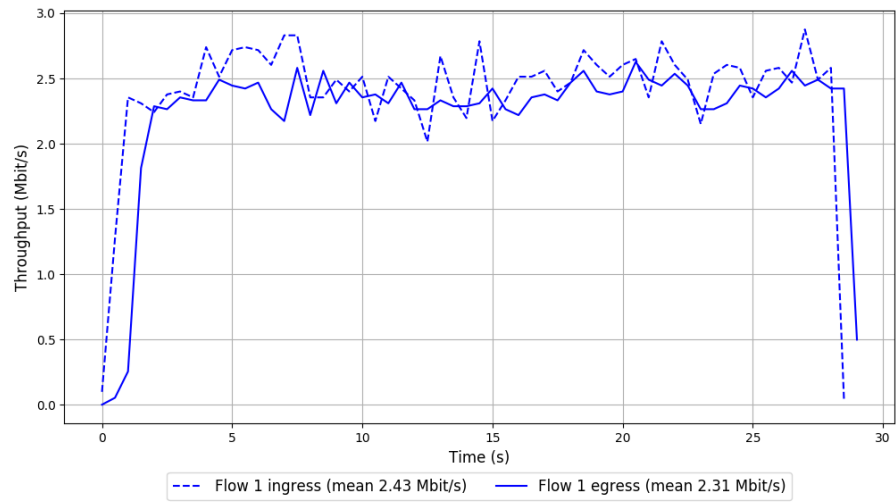
-- Flow 1:

Average throughput: 2.31 Mbit/s

95th percentile per-packet one-way delay: 1449.119 ms

Loss rate: 5.33%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-09-07 09:37:20

End at: 2018-09-07 09:37:50

Local clock offset: 4.788 ms

Remote clock offset: 1.736 ms

Below is generated by plot.py at 2018-09-07 09:46:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 1016.144 ms

Loss rate: 3.90%

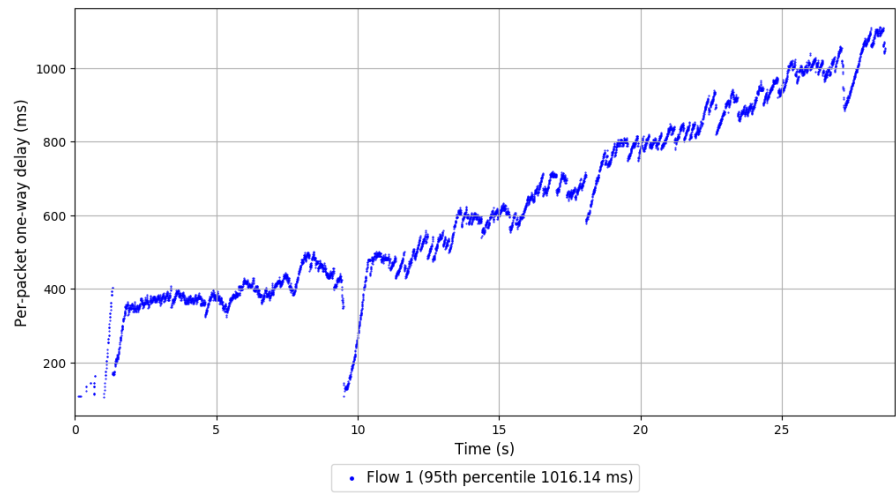
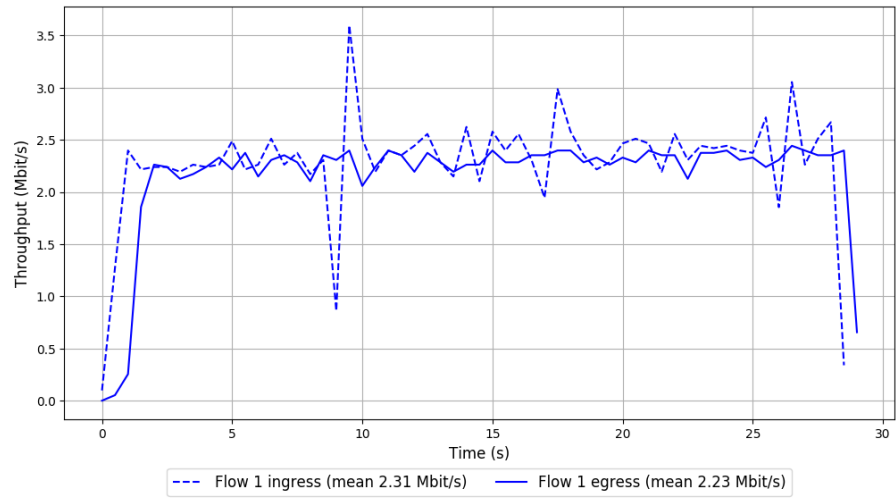
-- Flow 1:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 1016.144 ms

Loss rate: 3.90%

Run 3: Report of QUIC Cubic — Data Link

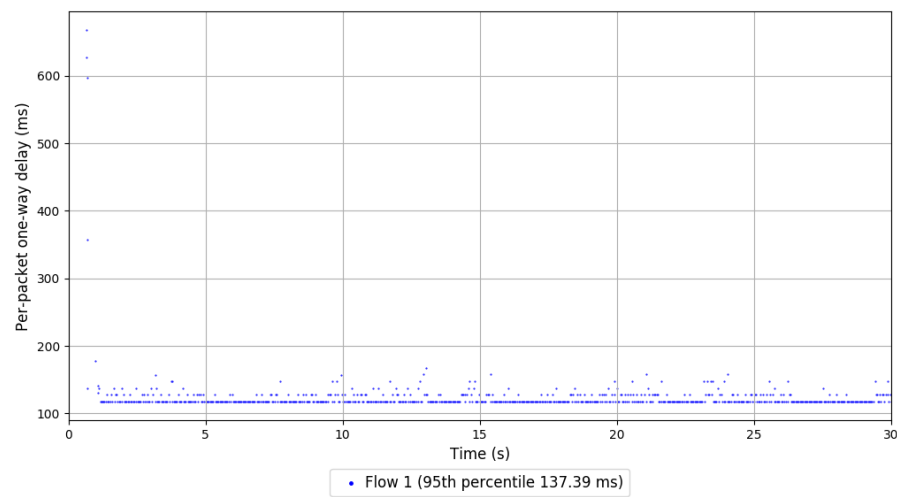
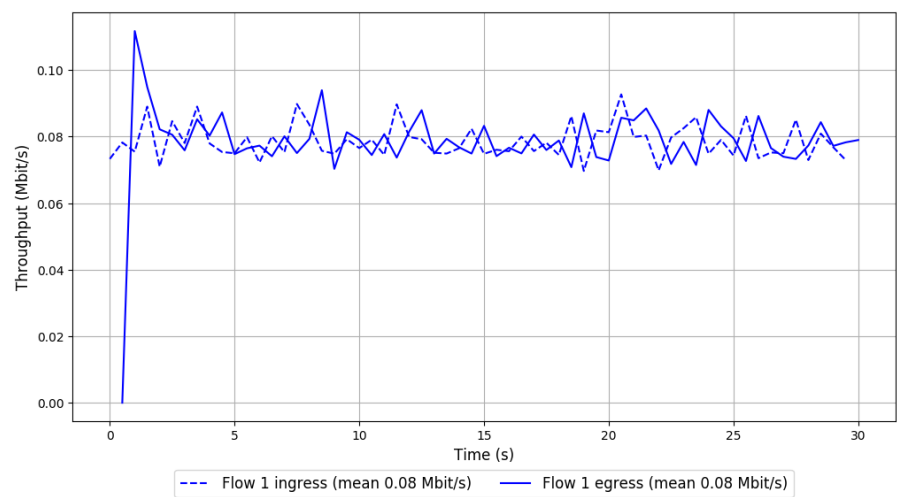


```
Run 1: Statistics of SCReAM

Start at: 2018-09-07 09:00:45
End at: 2018-09-07 09:01:15
Local clock offset: 2.237 ms
Remote clock offset: 7.748 ms

# Below is generated by plot.py at 2018-09-07 09:46:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 137.393 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 137.393 ms
Loss rate: 0.26%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-09-07 09:21:22

End at: 2018-09-07 09:21:52

Local clock offset: 2.963 ms

Remote clock offset: 6.313 ms

Below is generated by plot.py at 2018-09-07 09:46:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 127.673 ms

Loss rate: 0.13%

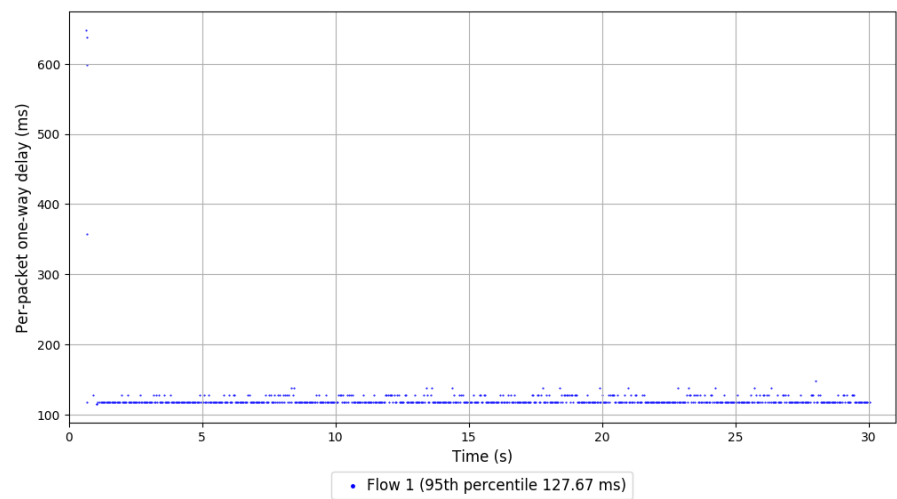
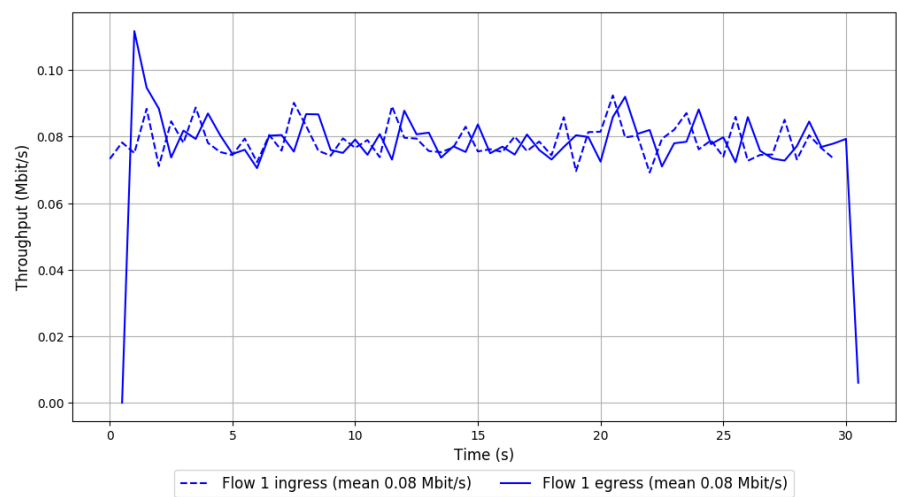
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 127.673 ms

Loss rate: 0.13%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-09-07 09:41:57

End at: 2018-09-07 09:42:27

Local clock offset: 5.852 ms

Remote clock offset: 2.053 ms

Below is generated by plot.py at 2018-09-07 09:46:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 133.372 ms

Loss rate: 0.13%

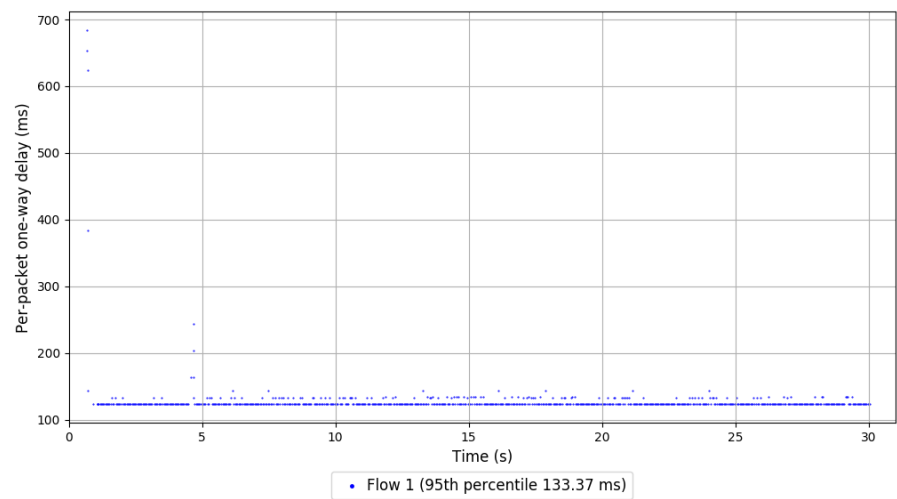
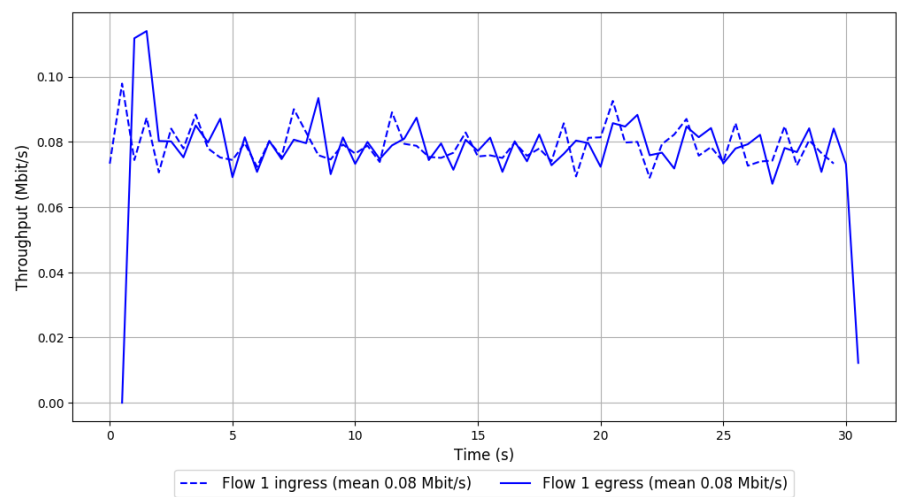
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 133.372 ms

Loss rate: 0.13%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2018-09-07 08:50:27

End at: 2018-09-07 08:50:57

Local clock offset: 2.335 ms

Remote clock offset: 3.71 ms

Below is generated by plot.py at 2018-09-07 09:46:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 154.019 ms

Loss rate: 0.03%

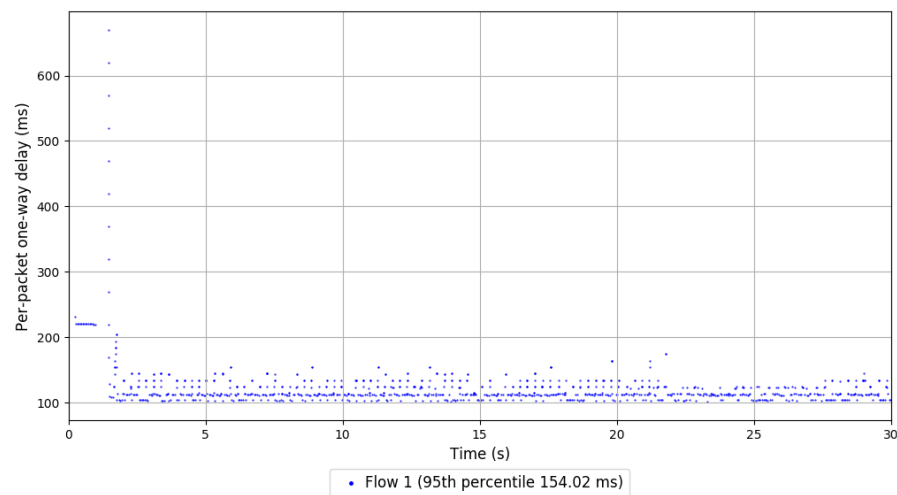
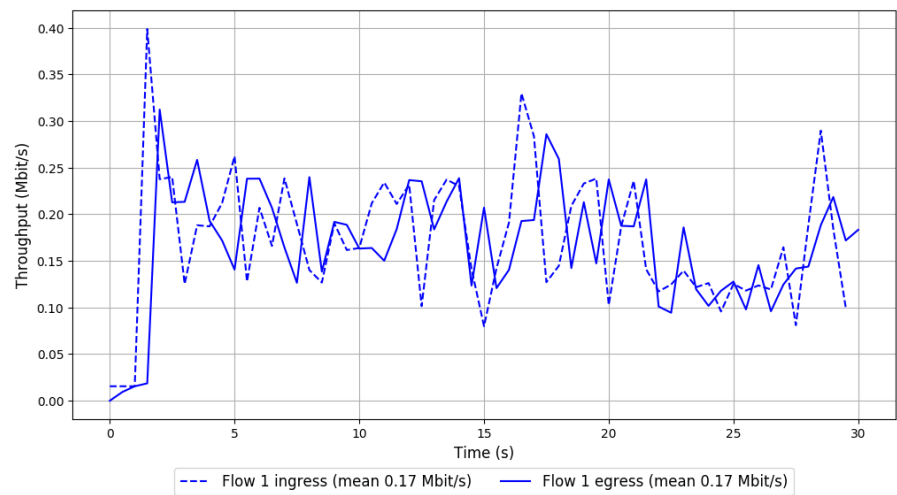
-- Flow 1:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 154.019 ms

Loss rate: 0.03%

Run 1: Report of Sprout — Data Link

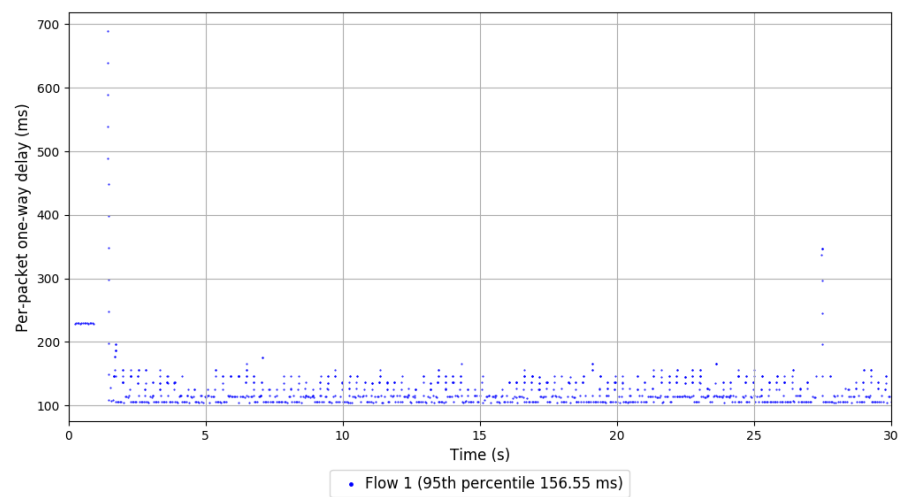
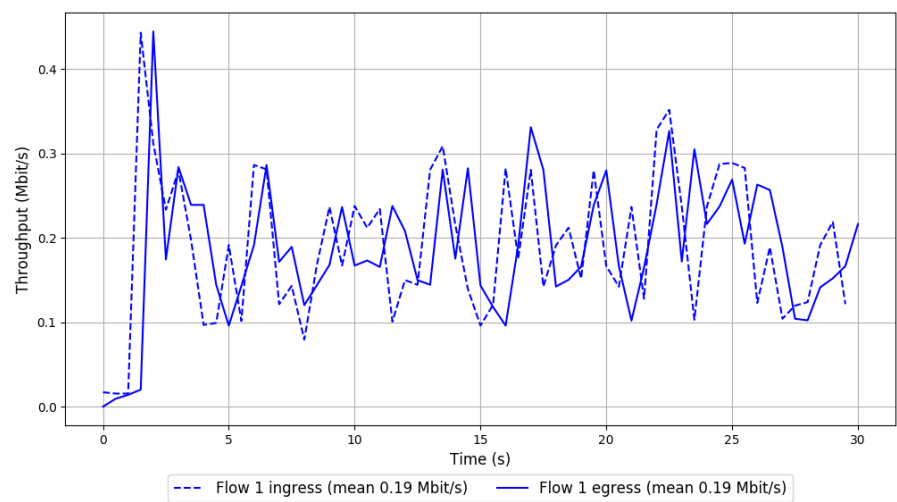


Run 2: Statistics of Sprout

Start at: 2018-09-07 09:11:03
End at: 2018-09-07 09:11:33
Local clock offset: 1.82 ms
Remote clock offset: 2.861 ms

Below is generated by plot.py at 2018-09-07 09:46:26
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 156.549 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 156.549 ms
Loss rate: 0.00%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2018-09-07 09:31:36

End at: 2018-09-07 09:32:06

Local clock offset: 5.169 ms

Remote clock offset: 1.903 ms

Below is generated by plot.py at 2018-09-07 09:46:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 163.965 ms

Loss rate: 0.02%

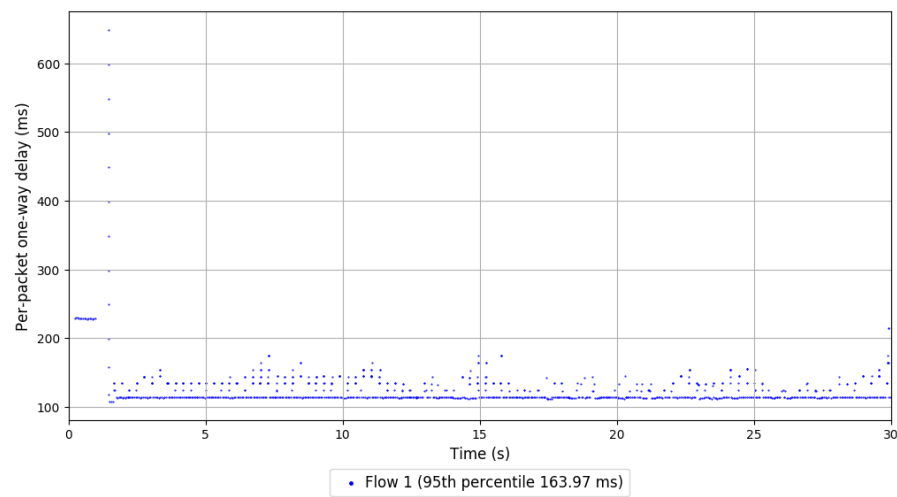
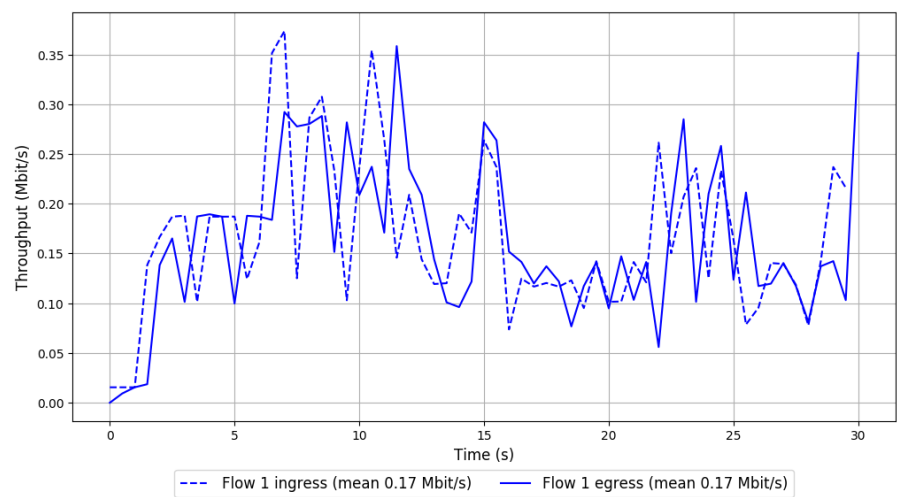
-- Flow 1:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 163.965 ms

Loss rate: 0.02%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

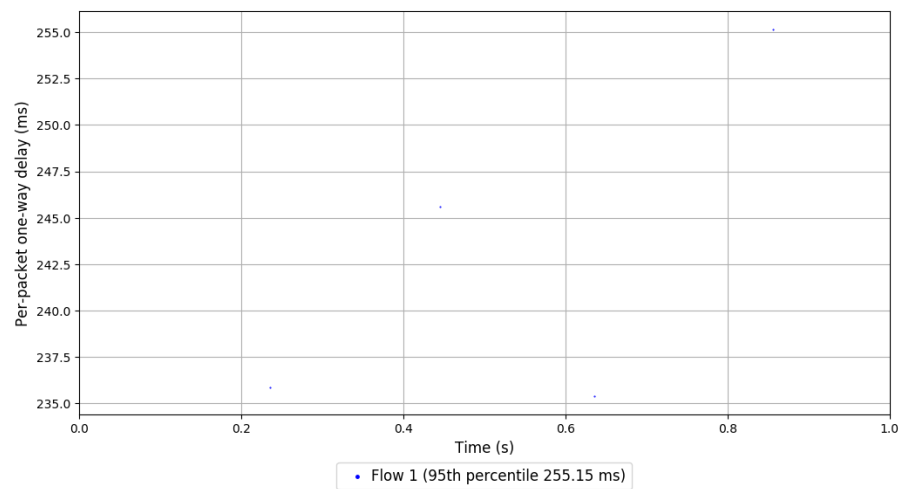
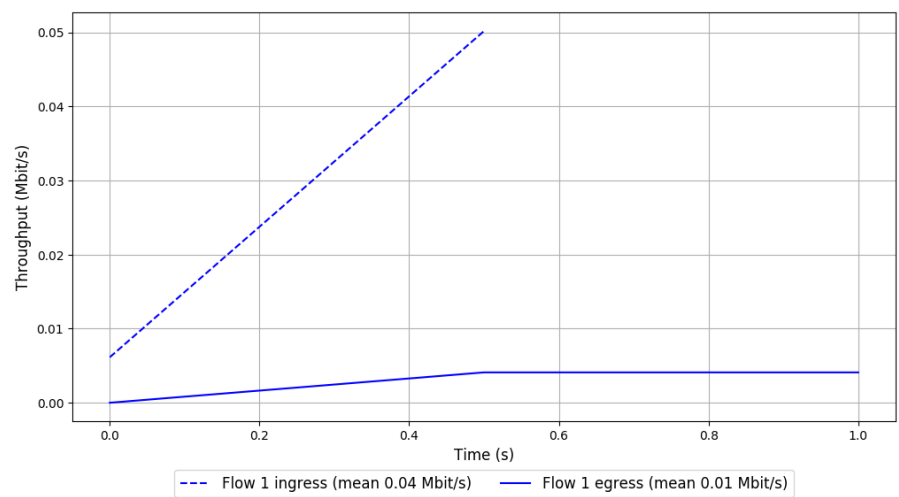
Start at: 2018-09-07 08:49:19

End at: 2018-09-07 08:49:49

Local clock offset: 2.537 ms

Remote clock offset: 7.536 ms

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-09-07 09:09:54

End at: 2018-09-07 09:10:24

Local clock offset: 1.037 ms

Remote clock offset: 7.514 ms

Below is generated by plot.py at 2018-09-07 09:46:28

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 370.069 ms

Loss rate: 0.56%

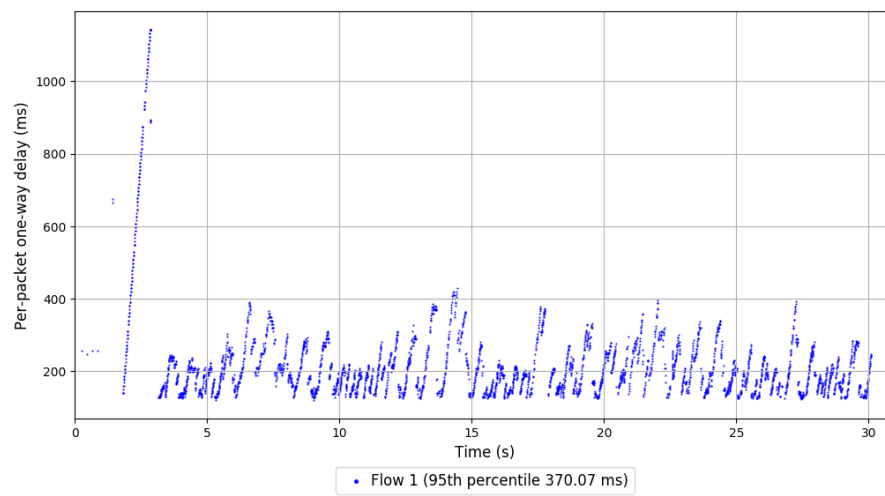
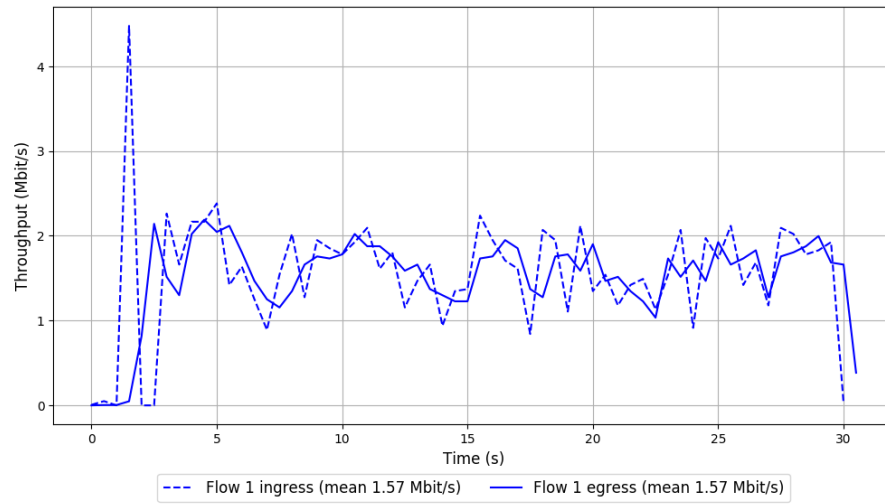
-- Flow 1:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 370.069 ms

Loss rate: 0.56%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-09-07 09:30:28

End at: 2018-09-07 09:30:58

Local clock offset: 5.126 ms

Remote clock offset: 6.195 ms

Below is generated by plot.py at 2018-09-07 09:46:28

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.33 Mbit/s

95th percentile per-packet one-way delay: 2370.496 ms

Loss rate: 3.00%

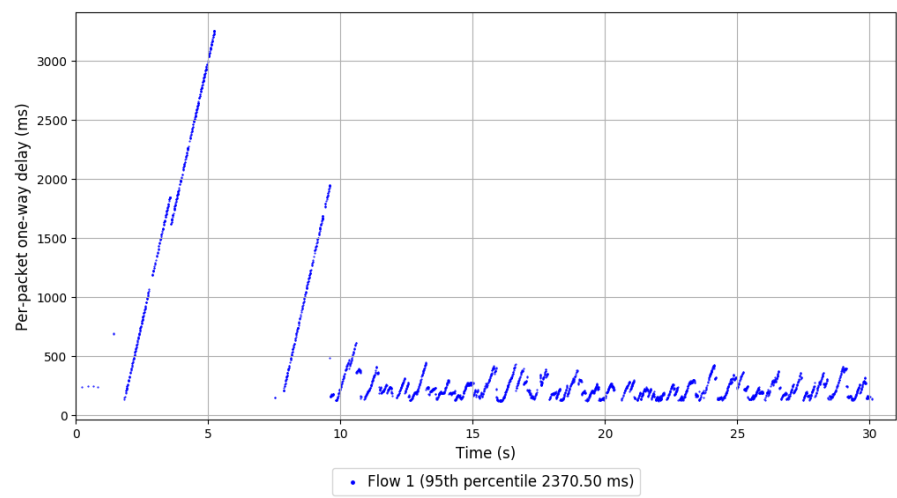
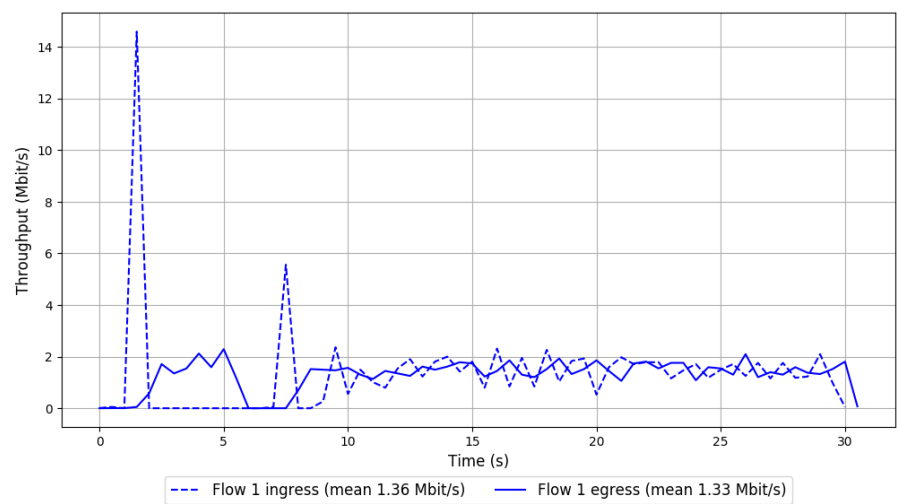
-- Flow 1:

Average throughput: 1.33 Mbit/s

95th percentile per-packet one-way delay: 2370.496 ms

Loss rate: 3.00%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-09-07 08:44:44

End at: 2018-09-07 08:45:14

Local clock offset: 3.989 ms

Remote clock offset: 3.931 ms

Below is generated by plot.py at 2018-09-07 09:46:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.89 Mbit/s

95th percentile per-packet one-way delay: 261.134 ms

Loss rate: 0.13%

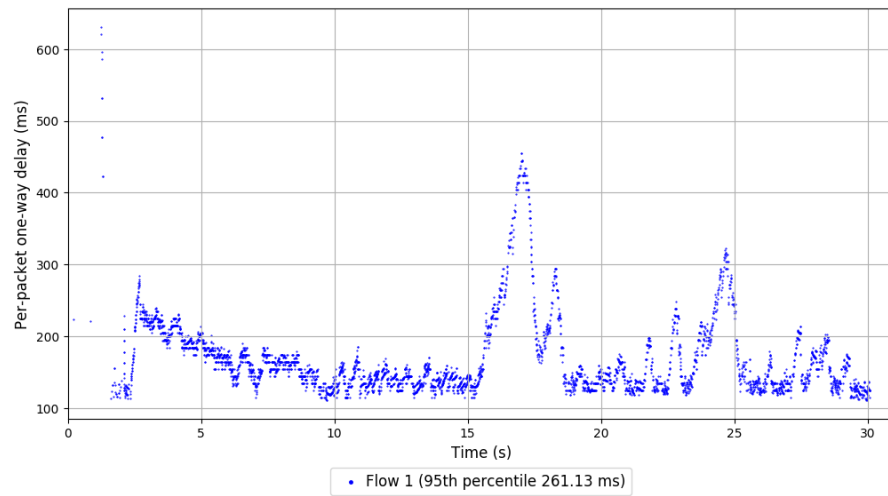
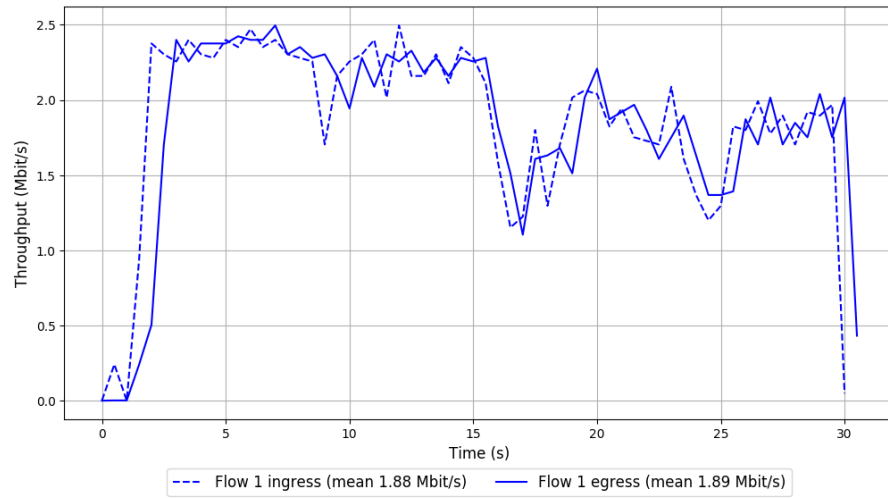
-- Flow 1:

Average throughput: 1.89 Mbit/s

95th percentile per-packet one-way delay: 261.134 ms

Loss rate: 0.13%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-09-07 09:05:18

End at: 2018-09-07 09:05:48

Local clock offset: 2.063 ms

Remote clock offset: 7.358 ms

Below is generated by plot.py at 2018-09-07 09:46:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.96 Mbit/s

95th percentile per-packet one-way delay: 186.027 ms

Loss rate: 0.27%

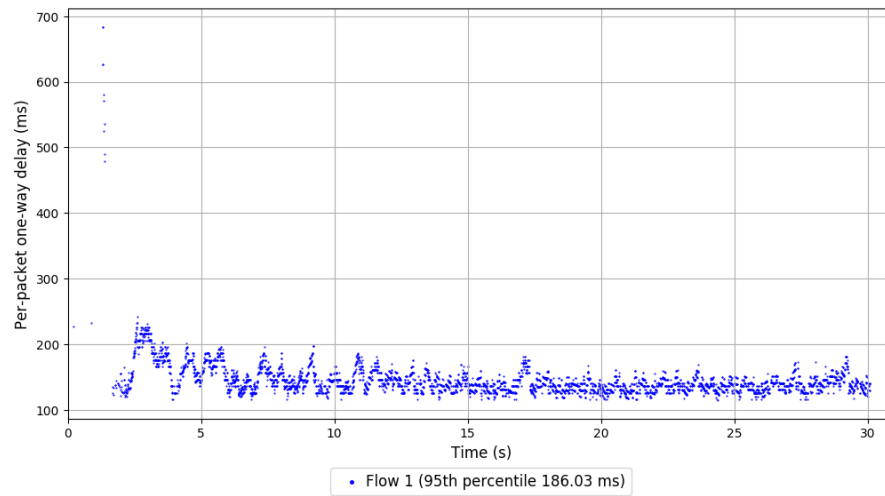
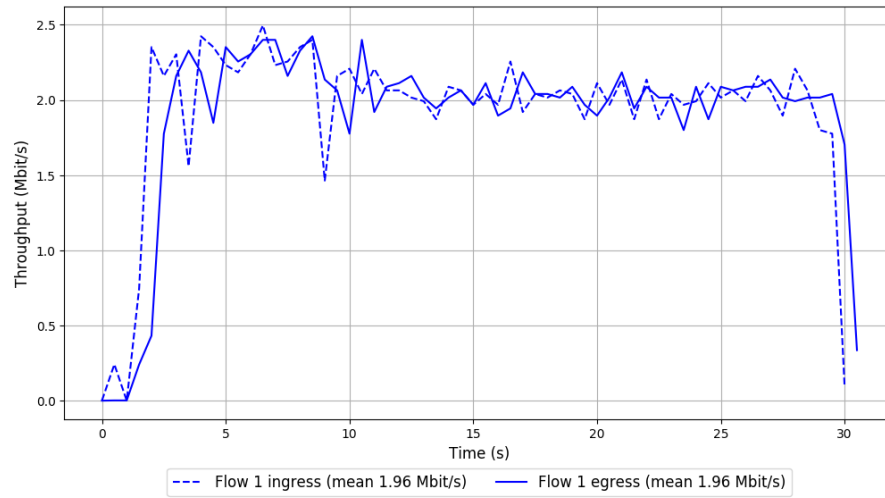
-- Flow 1:

Average throughput: 1.96 Mbit/s

95th percentile per-packet one-way delay: 186.027 ms

Loss rate: 0.27%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2018-09-07 09:25:55

End at: 2018-09-07 09:26:25

Local clock offset: 4.533 ms

Remote clock offset: 2.229 ms

Below is generated by plot.py at 2018-09-07 09:46:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.98 Mbit/s

95th percentile per-packet one-way delay: 595.341 ms

Loss rate: 0.87%

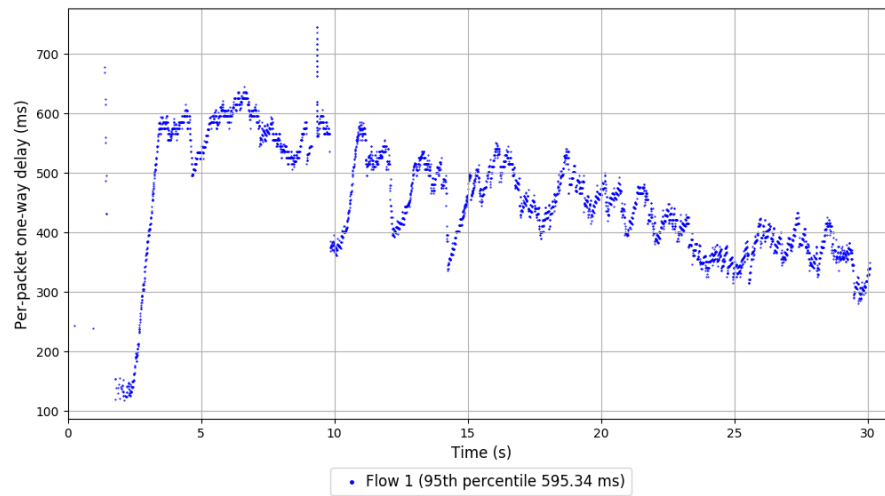
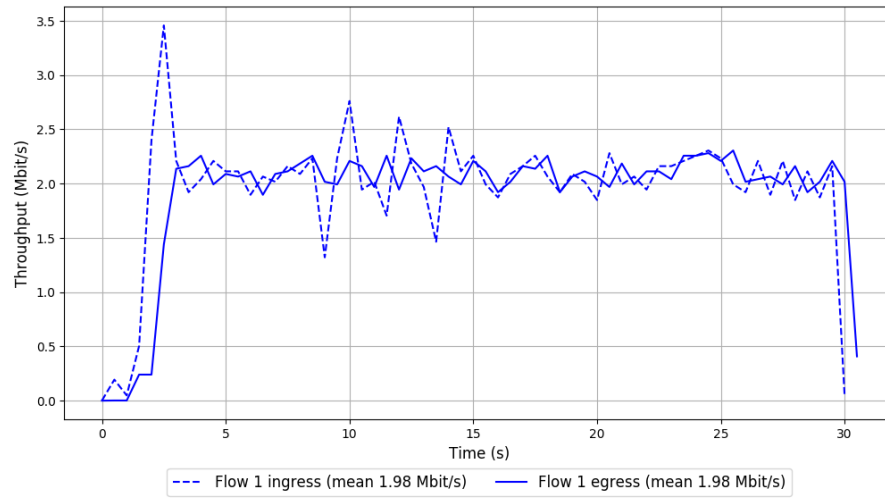
-- Flow 1:

Average throughput: 1.98 Mbit/s

95th percentile per-packet one-way delay: 595.341 ms

Loss rate: 0.87%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-09-07 09:04:09

End at: 2018-09-07 09:04:39

Local clock offset: 1.35 ms

Remote clock offset: 3.255 ms

Below is generated by plot.py at 2018-09-07 09:46:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.16 Mbit/s

95th percentile per-packet one-way delay: 1659.365 ms

Loss rate: 3.42%

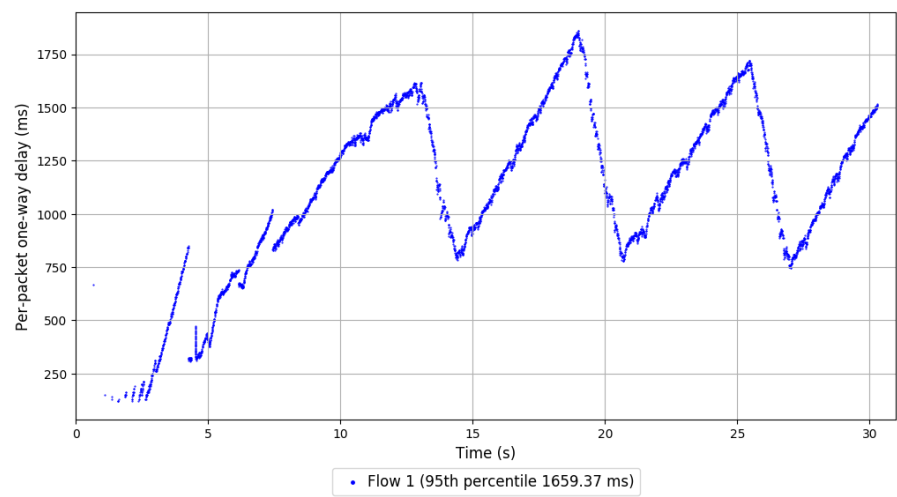
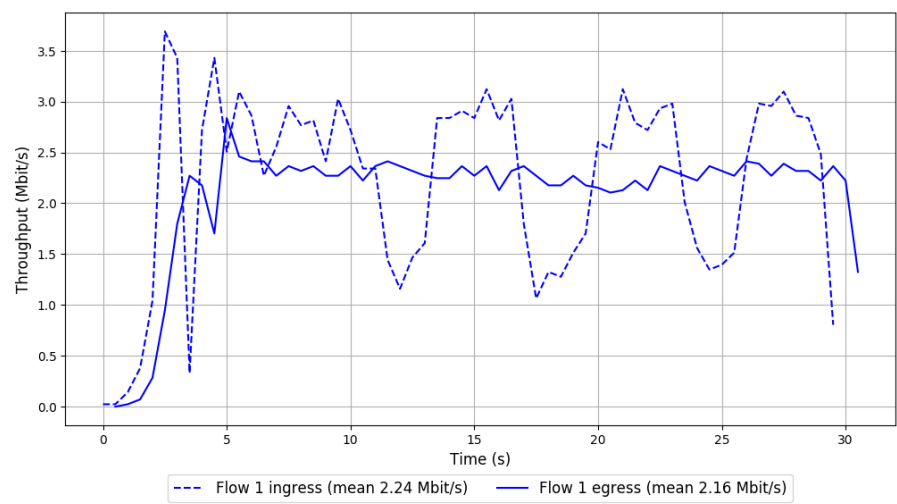
-- Flow 1:

Average throughput: 2.16 Mbit/s

95th percentile per-packet one-way delay: 1659.365 ms

Loss rate: 3.42%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-09-07 09:24:47

End at: 2018-09-07 09:25:17

Local clock offset: 4.449 ms

Remote clock offset: 2.231 ms

Below is generated by plot.py at 2018-09-07 09:46:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.97 Mbit/s

95th percentile per-packet one-way delay: 1927.451 ms

Loss rate: 2.91%

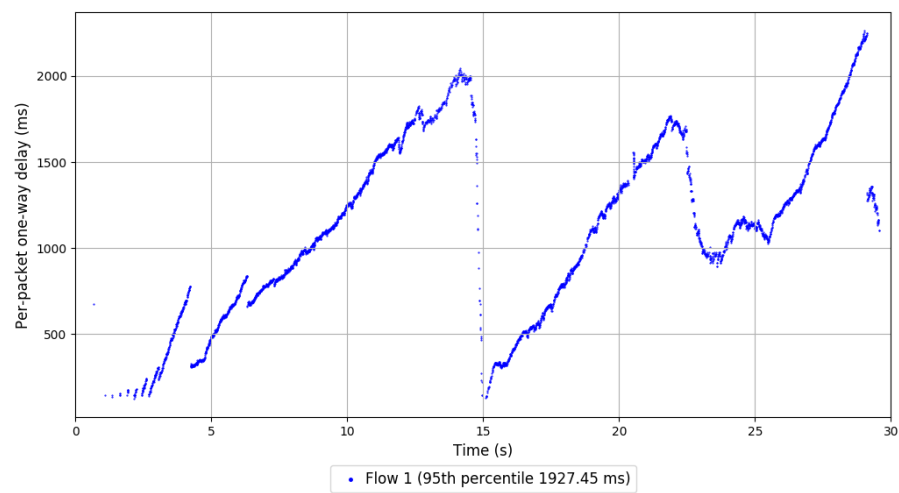
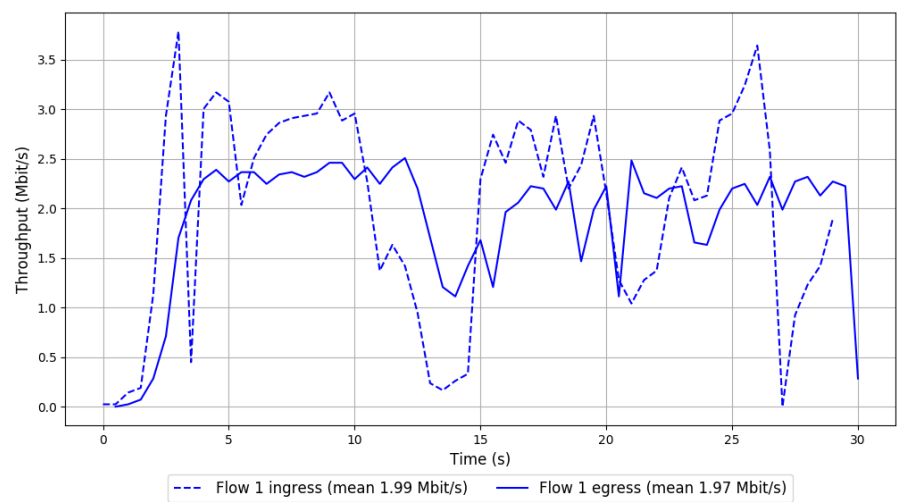
-- Flow 1:

Average throughput: 1.97 Mbit/s

95th percentile per-packet one-way delay: 1927.451 ms

Loss rate: 2.91%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-09-07 09:45:21

End at: 2018-09-07 09:45:51

Local clock offset: 5.156 ms

Remote clock offset: 5.425 ms

Below is generated by plot.py at 2018-09-07 09:46:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.56 Mbit/s

95th percentile per-packet one-way delay: 3935.747 ms

Loss rate: 21.45%

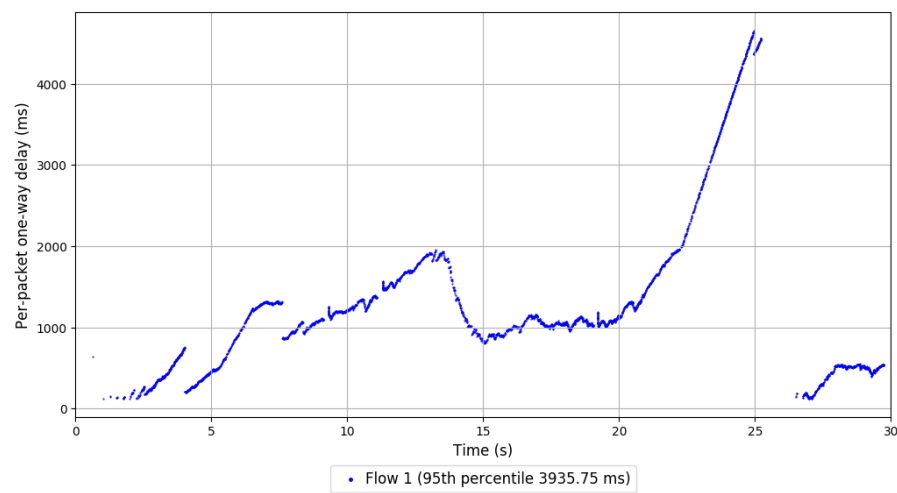
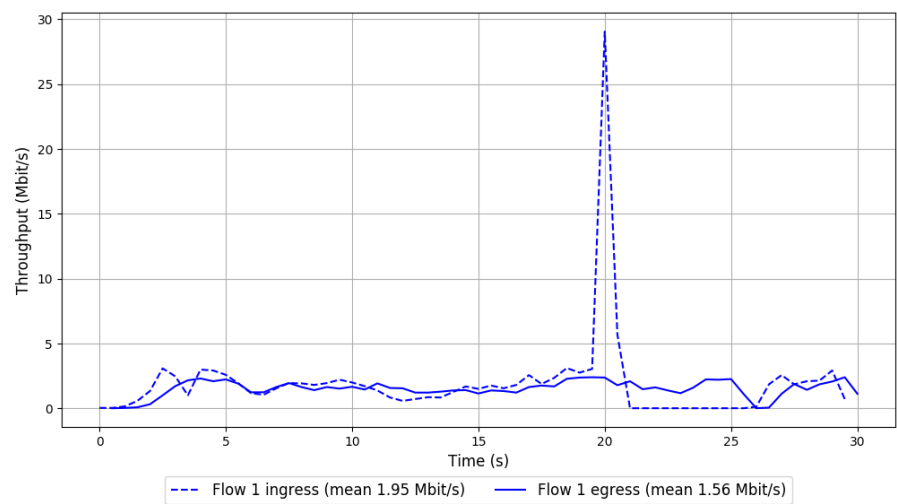
-- Flow 1:

Average throughput: 1.56 Mbit/s

95th percentile per-packet one-way delay: 3935.747 ms

Loss rate: 21.45%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2018-09-07 08:55:01

End at: 2018-09-07 08:55:31

Local clock offset: 1.953 ms

Remote clock offset: 3.224 ms

Below is generated by plot.py at 2018-09-07 09:46:34

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.39 Mbit/s

95th percentile per-packet one-way delay: 379.189 ms

Loss rate: 0.14%

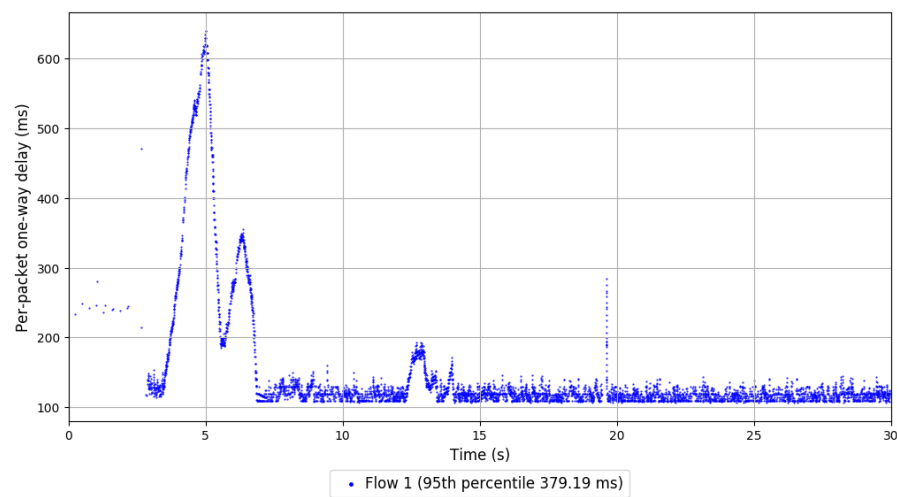
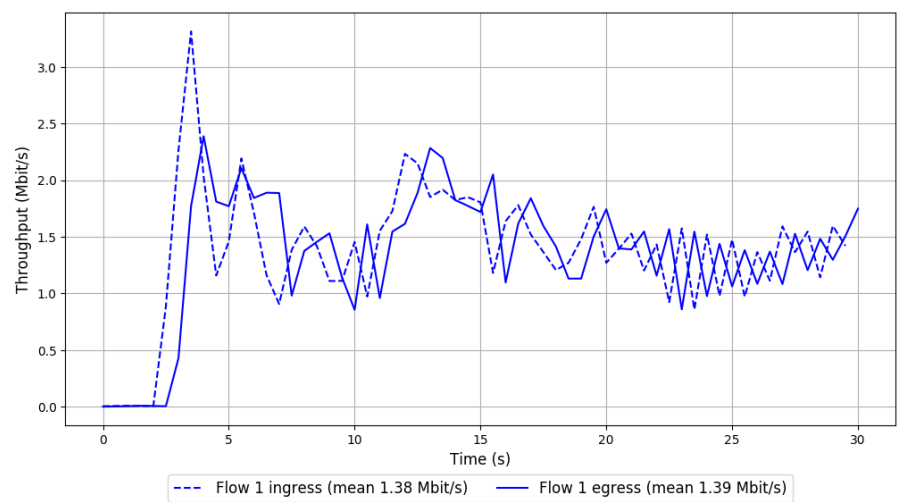
-- Flow 1:

Average throughput: 1.39 Mbit/s

95th percentile per-packet one-way delay: 379.189 ms

Loss rate: 0.14%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-09-07 09:15:35

End at: 2018-09-07 09:16:05

Local clock offset: 1.913 ms

Remote clock offset: 7.248 ms

Below is generated by plot.py at 2018-09-07 09:46:34

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.54 Mbit/s

95th percentile per-packet one-way delay: 2832.482 ms

Loss rate: 0.26%

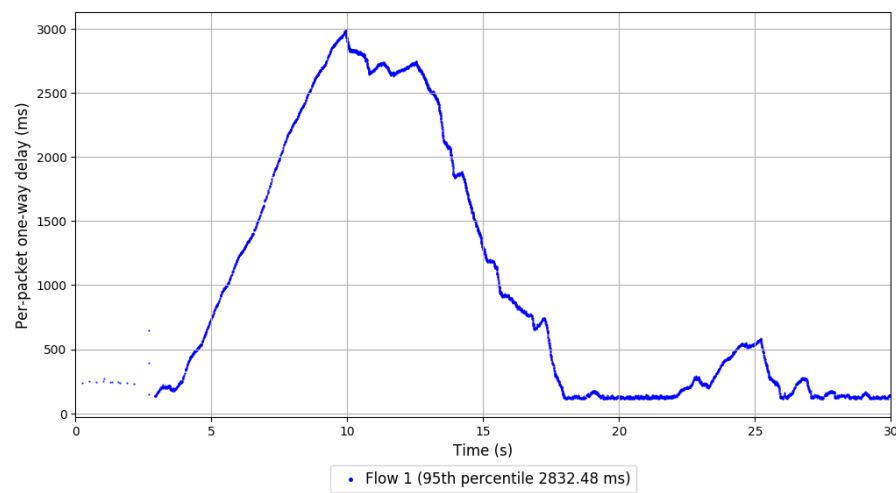
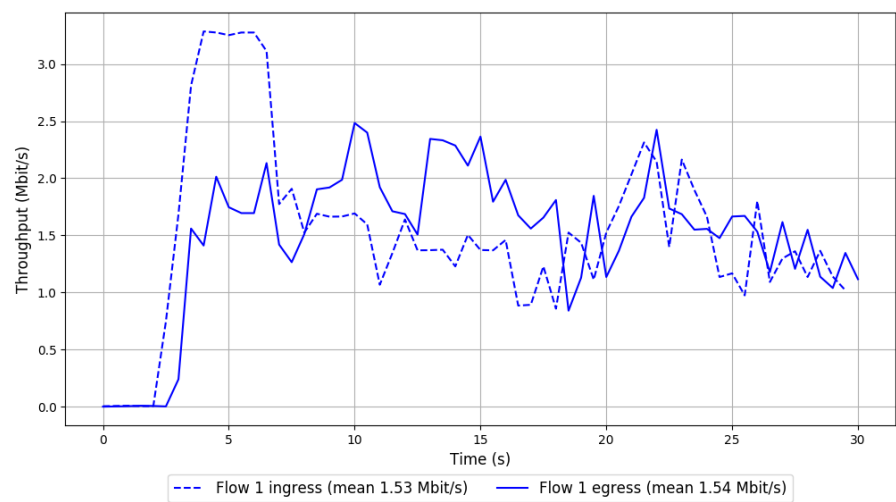
-- Flow 1:

Average throughput: 1.54 Mbit/s

95th percentile per-packet one-way delay: 2832.482 ms

Loss rate: 0.26%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2018-09-07 09:36:08

End at: 2018-09-07 09:36:39

Local clock offset: 4.791 ms

Remote clock offset: 6.272 ms

Below is generated by plot.py at 2018-09-07 09:46:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.60 Mbit/s

95th percentile per-packet one-way delay: 976.638 ms

Loss rate: 0.17%

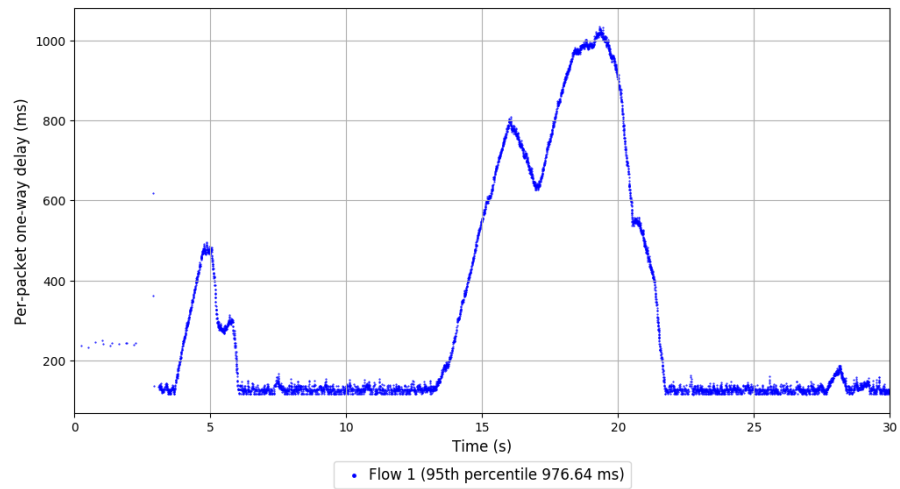
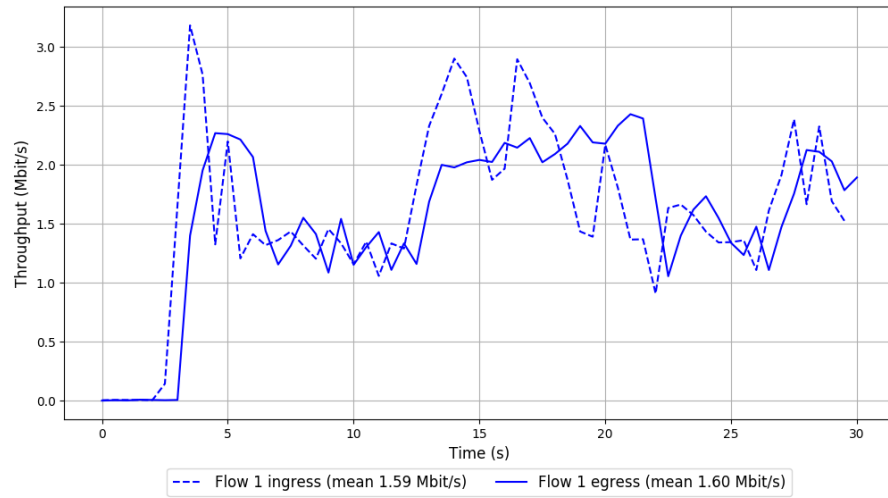
-- Flow 1:

Average throughput: 1.60 Mbit/s

95th percentile per-packet one-way delay: 976.638 ms

Loss rate: 0.17%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-09-07 08:53:53

End at: 2018-09-07 08:54:23

Local clock offset: 2.811 ms

Remote clock offset: 3.622 ms

Below is generated by plot.py at 2018-09-07 09:46:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 167.032 ms

Loss rate: 0.10%

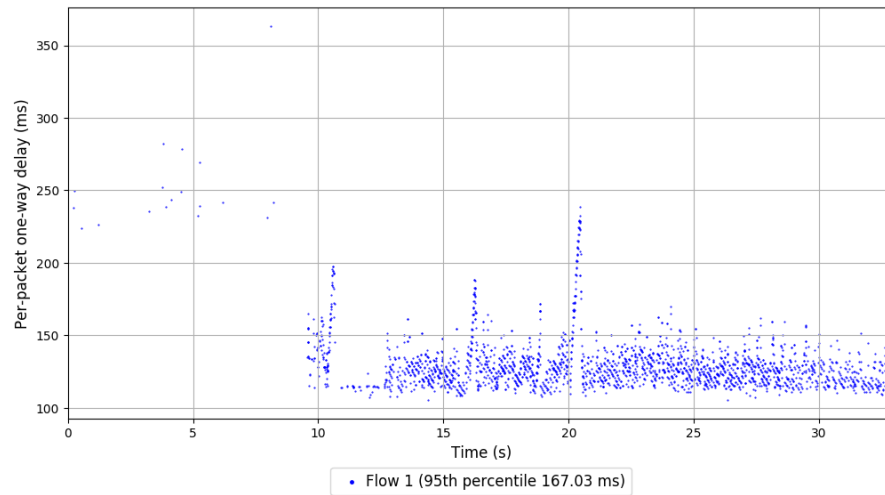
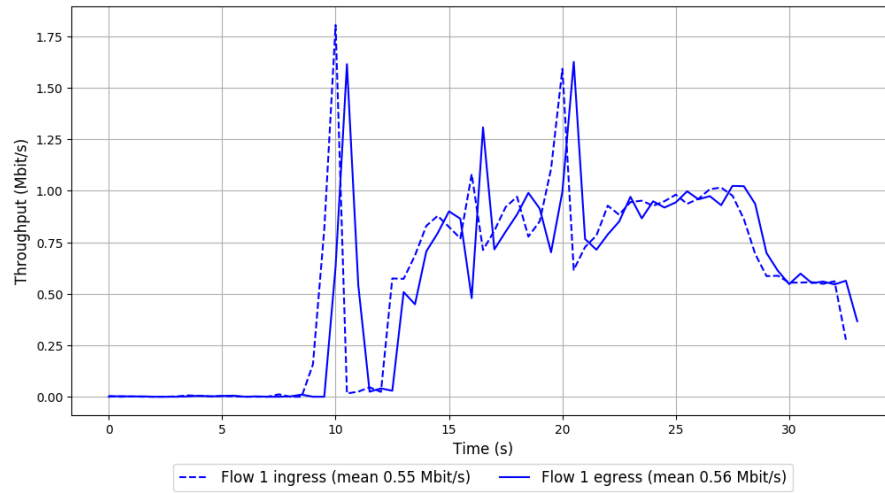
-- Flow 1:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 167.032 ms

Loss rate: 0.10%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-09-07 09:14:27

End at: 2018-09-07 09:14:57

Local clock offset: 1.69 ms

Remote clock offset: 3.011 ms

Below is generated by plot.py at 2018-09-07 09:46:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 162.391 ms

Loss rate: 0.51%

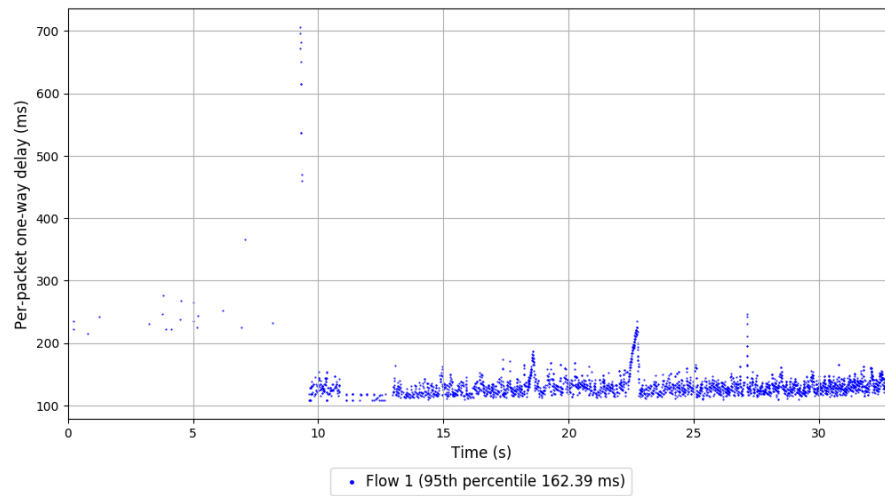
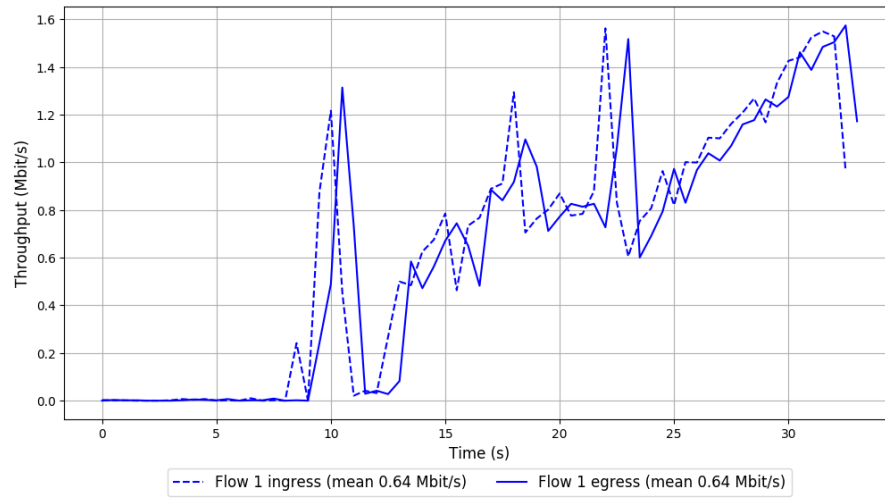
-- Flow 1:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 162.391 ms

Loss rate: 0.51%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-09-07 09:35:00

End at: 2018-09-07 09:35:30

Local clock offset: 4.717 ms

Remote clock offset: 2.078 ms

Below is generated by plot.py at 2018-09-07 09:46:35

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 176.309 ms

Loss rate: 0.30%

-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 176.309 ms

Loss rate: 0.30%

Run 3: Report of WebRTC media — Data Link

