

Pantheon Report

Generated at 2018-09-06 04:28:05 (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.

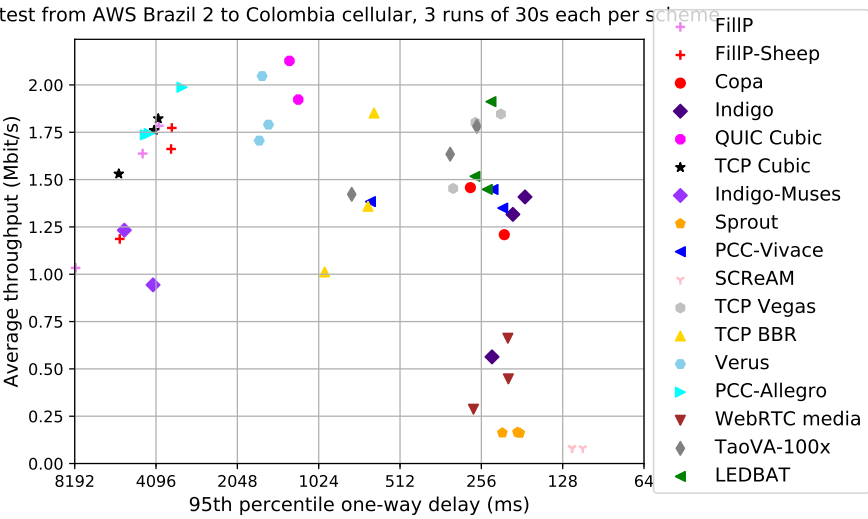
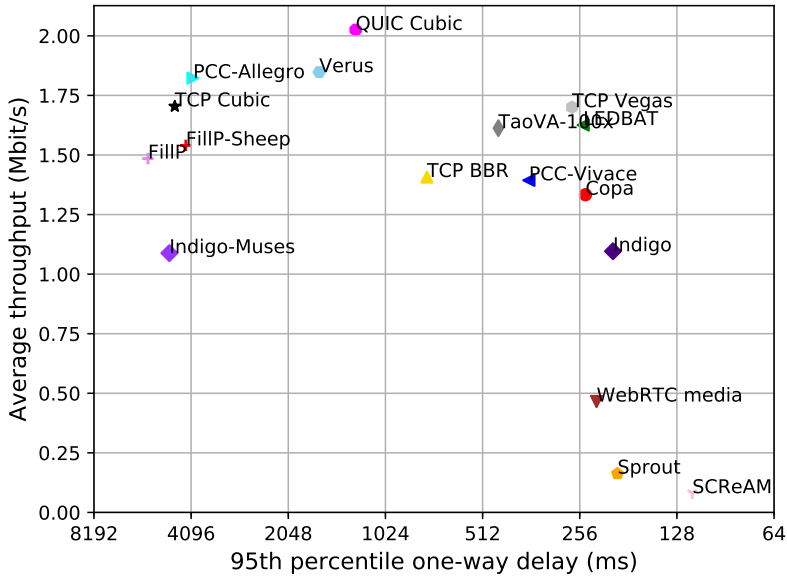
System info:

```
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 @ f392ce15d580343f4432c3d7e068b3290f03eb4a
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ a28d20fb82a95a965a3da65fd1eb71b8994e9b84
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
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)



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	1.41	761.55	0.81
Copa	2	1.33	245.79	0.16
TCP Cubic	3	1.70	4602.97	16.81
FillP	3	1.48	5573.70	91.71
FillP-Sheep	3	1.54	4254.39	6.17
Indigo	3	1.10	201.96	0.12
LEDBAT	3	1.63	249.85	0.71
Indigo-Muses	2	1.08	4784.10	80.88
PCC-Allegro	3	1.82	4039.17	54.50
PCC-Expr	0	N/A	N/A	N/A
QUIC Cubic	2	2.02	1266.34	4.70
SCReAM	3	0.08	114.69	0.13
Sprout	3	0.16	195.58	0.00
TaoVA-100x	3	1.61	457.55	0.35
TCP Vegas	3	1.70	270.47	0.35
Verus	3	1.85	1643.10	4.40
PCC-Vivace	3	1.39	368.00	0.98
WebRTC media	3	0.47	227.09	0.04

Run 1: Statistics of TCP BBR

Start at: 2018-09-06 03:40:11

End at: 2018-09-06 03:40:41

Local clock offset: 0.536 ms

Remote clock offset: 1.225 ms

Below is generated by plot.py at 2018-09-06 04:27:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.36 Mbit/s

95th percentile per-packet one-way delay: 672.699 ms

Loss rate: 1.55%

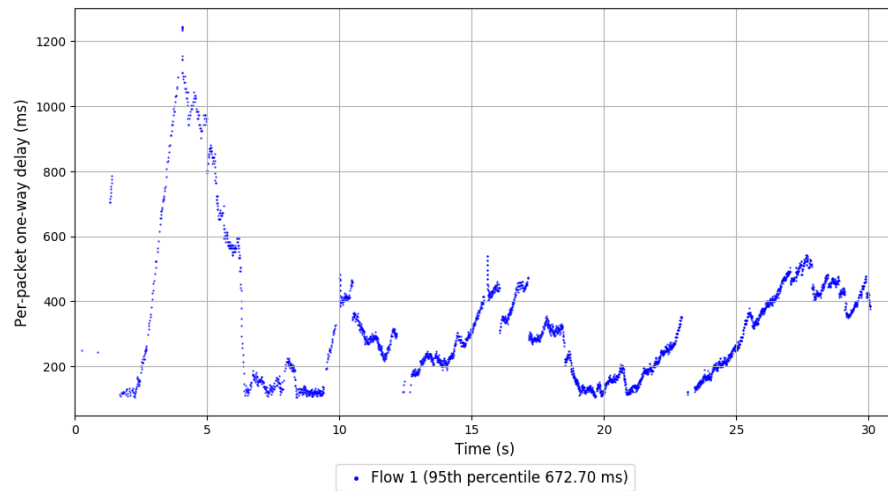
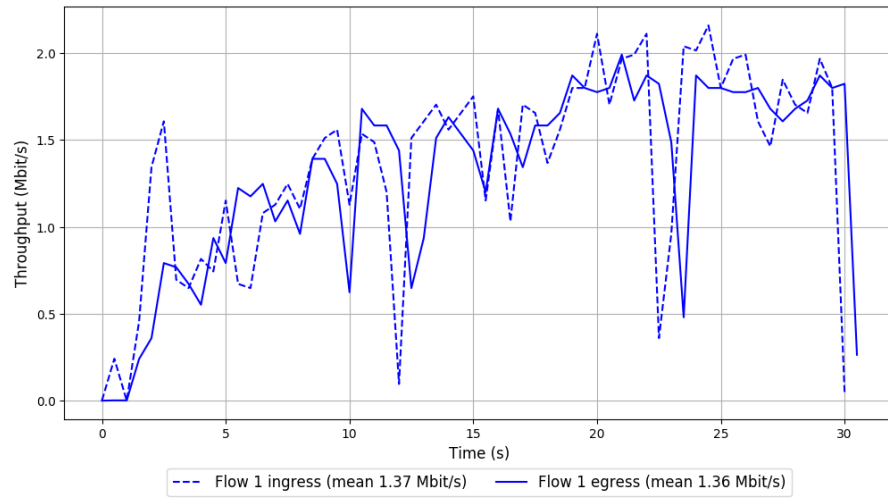
-- Flow 1:

Average throughput: 1.36 Mbit/s

95th percentile per-packet one-way delay: 672.699 ms

Loss rate: 1.55%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-06 04:00:41

End at: 2018-09-06 04:01:11

Local clock offset: -2.155 ms

Remote clock offset: 1.865 ms

Below is generated by plot.py at 2018-09-06 04:27:31

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.01 Mbit/s

95th percentile per-packet one-way delay: 973.087 ms

Loss rate: 0.44%

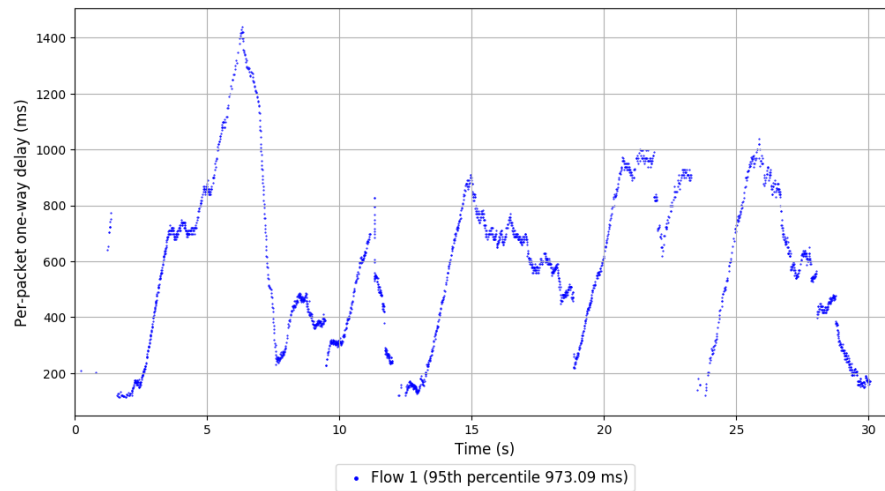
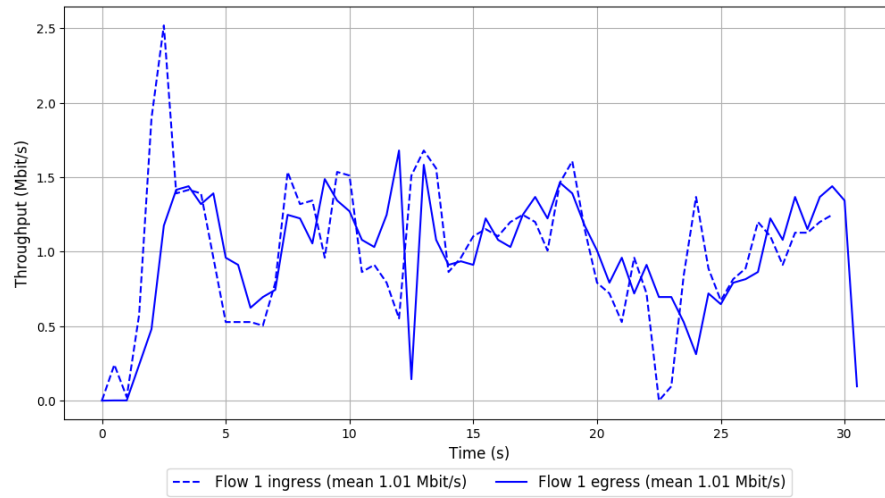
-- Flow 1:

Average throughput: 1.01 Mbit/s

95th percentile per-packet one-way delay: 973.087 ms

Loss rate: 0.44%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-09-06 04:21:10

End at: 2018-09-06 04:21:40

Local clock offset: -1.947 ms

Remote clock offset: 1.447 ms

Below is generated by plot.py at 2018-09-06 04:27:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.85 Mbit/s

95th percentile per-packet one-way delay: 638.849 ms

Loss rate: 0.43%

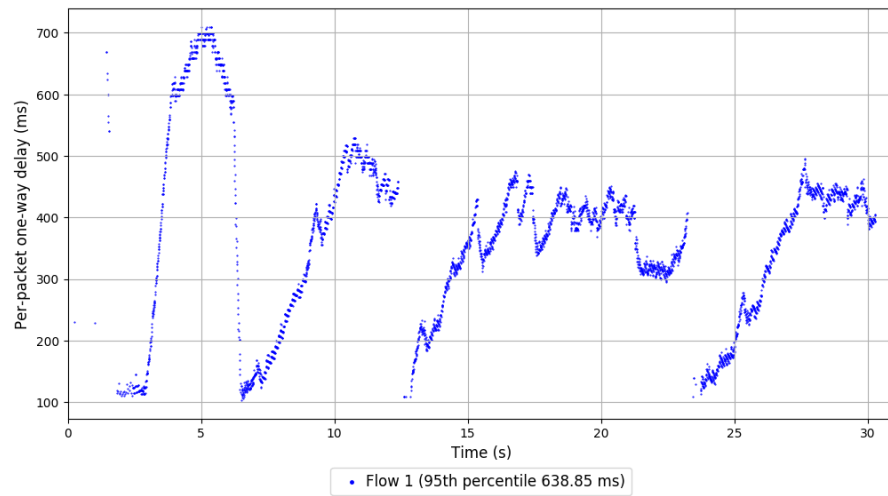
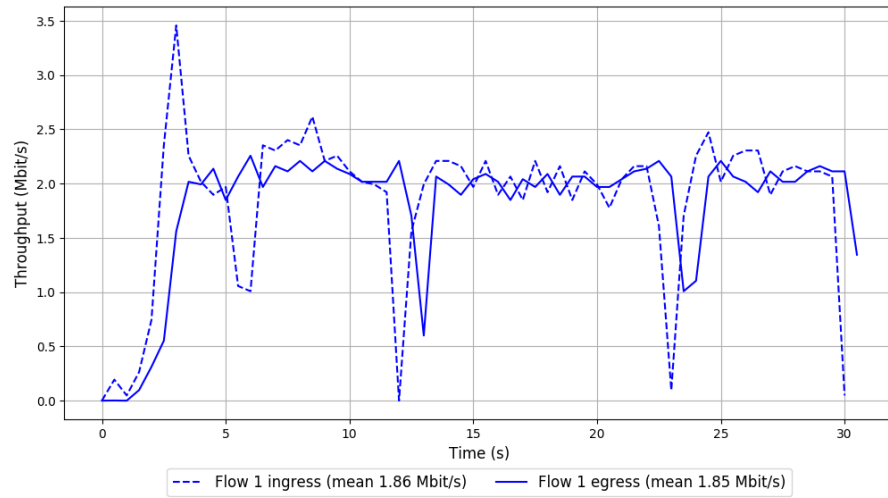
-- Flow 1:

Average throughput: 1.85 Mbit/s

95th percentile per-packet one-way delay: 638.849 ms

Loss rate: 0.43%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

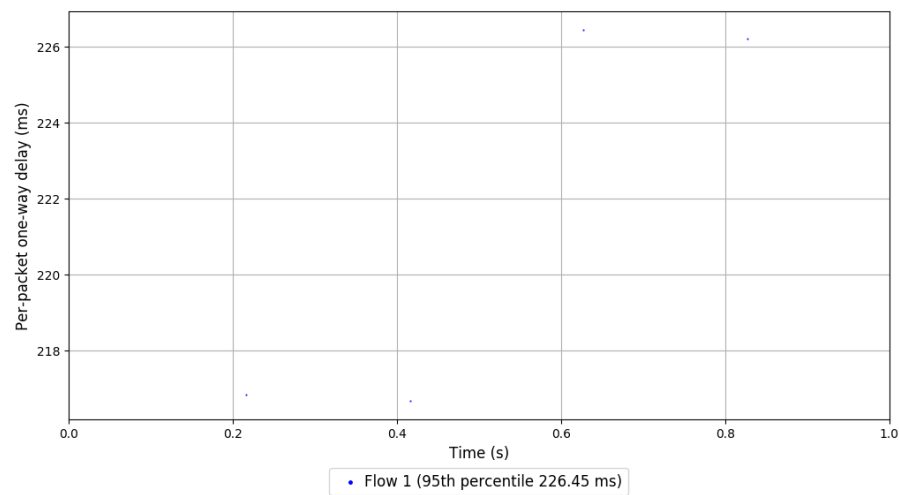
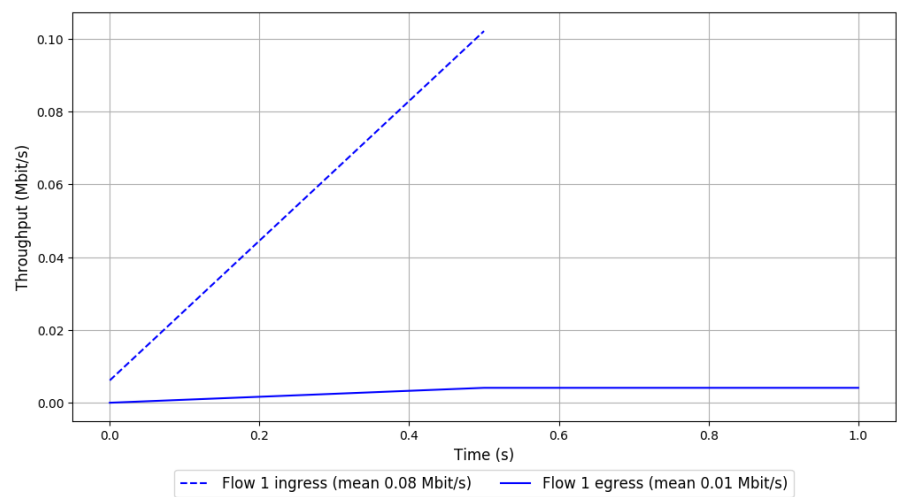
Start at: 2018-09-06 03:26:32

End at: 2018-09-06 03:27:02

Local clock offset: 3.133 ms

Remote clock offset: 1.619 ms

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-09-06 03:46:58

End at: 2018-09-06 03:47:29

Local clock offset: -0.677 ms

Remote clock offset: 0.011 ms

Below is generated by plot.py at 2018-09-06 04:27:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.21 Mbit/s

95th percentile per-packet one-way delay: 210.528 ms

Loss rate: 0.14%

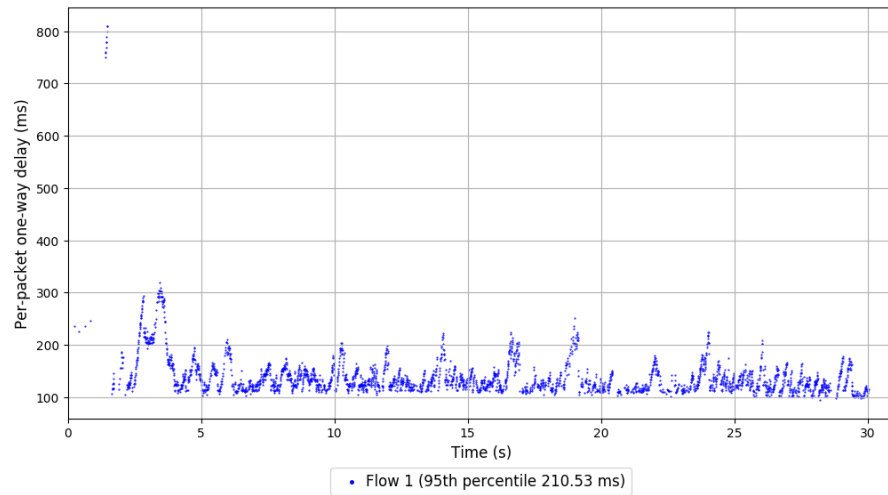
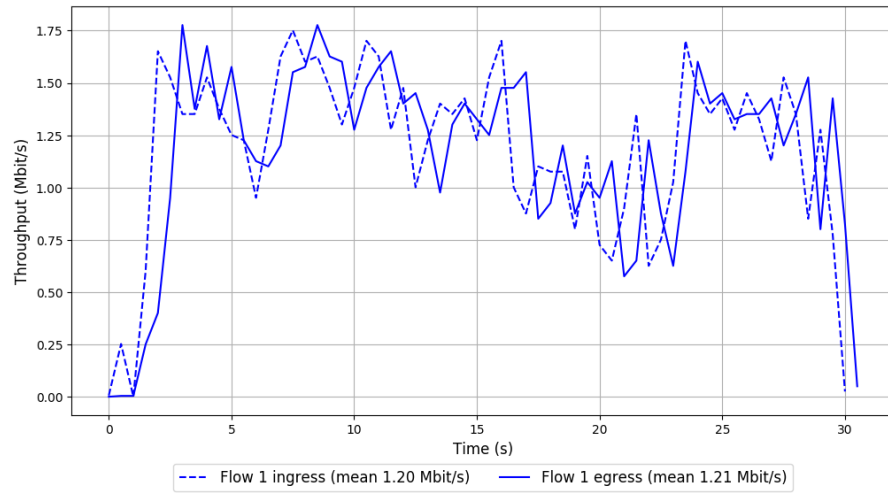
-- Flow 1:

Average throughput: 1.21 Mbit/s

95th percentile per-packet one-way delay: 210.528 ms

Loss rate: 0.14%

Run 2: Report of Copa — Data Link

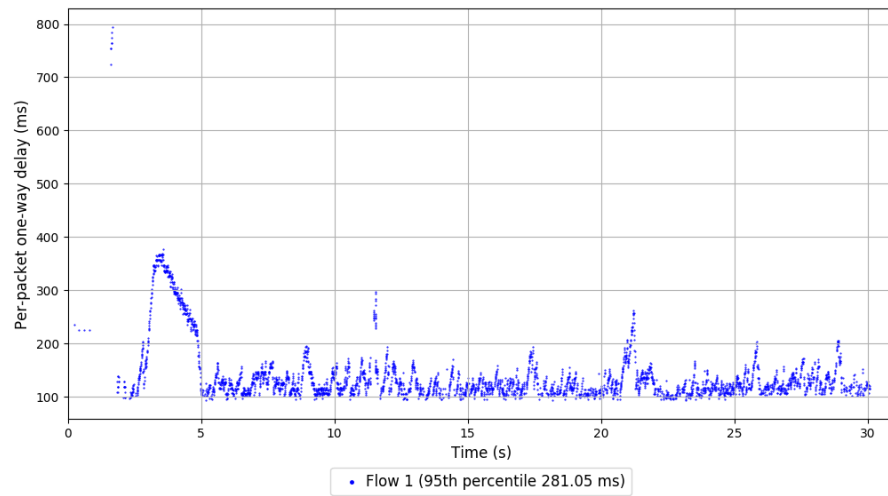
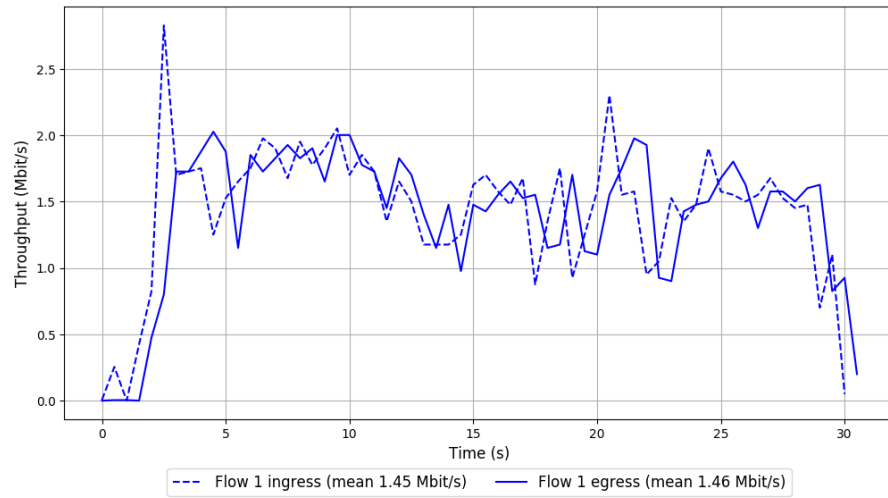


Run 3: Statistics of Copa

Start at: 2018-09-06 04:07:32
End at: 2018-09-06 04:08:02
Local clock offset: -3.188 ms
Remote clock offset: -0.513 ms

Below is generated by plot.py at 2018-09-06 04:27:32
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 281.052 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 281.052 ms
Loss rate: 0.17%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-06 03:28:48

End at: 2018-09-06 03:29:18

Local clock offset: 3.693 ms

Remote clock offset: 2.735 ms

Below is generated by plot.py at 2018-09-06 04:27:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.82 Mbit/s

95th percentile per-packet one-way delay: 4019.070 ms

Loss rate: 17.68%

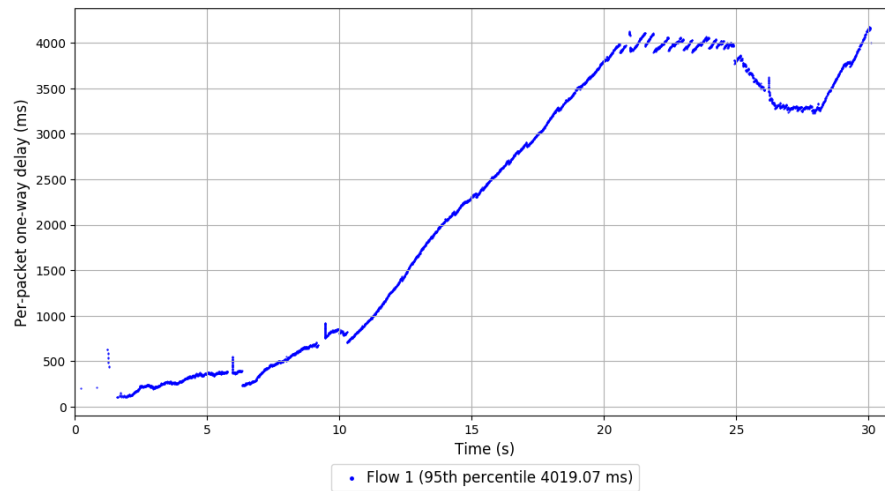
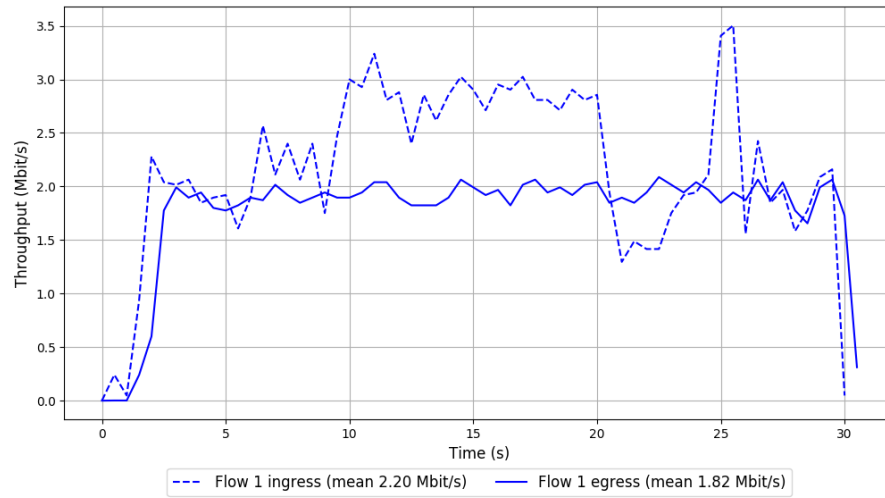
-- Flow 1:

Average throughput: 1.82 Mbit/s

95th percentile per-packet one-way delay: 4019.070 ms

Loss rate: 17.68%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-06 03:49:14

End at: 2018-09-06 03:49:44

Local clock offset: -0.324 ms

Remote clock offset: 2.241 ms

Below is generated by plot.py at 2018-09-06 04:27:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.76 Mbit/s

95th percentile per-packet one-way delay: 4163.473 ms

Loss rate: 15.71%

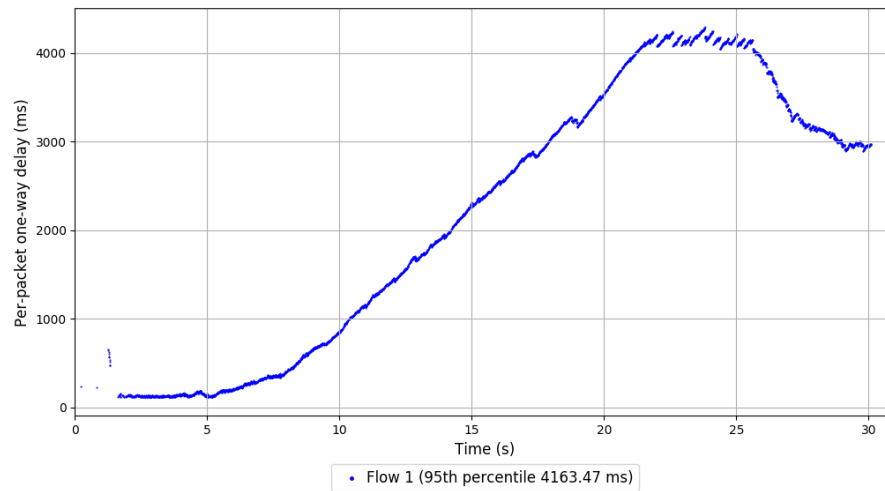
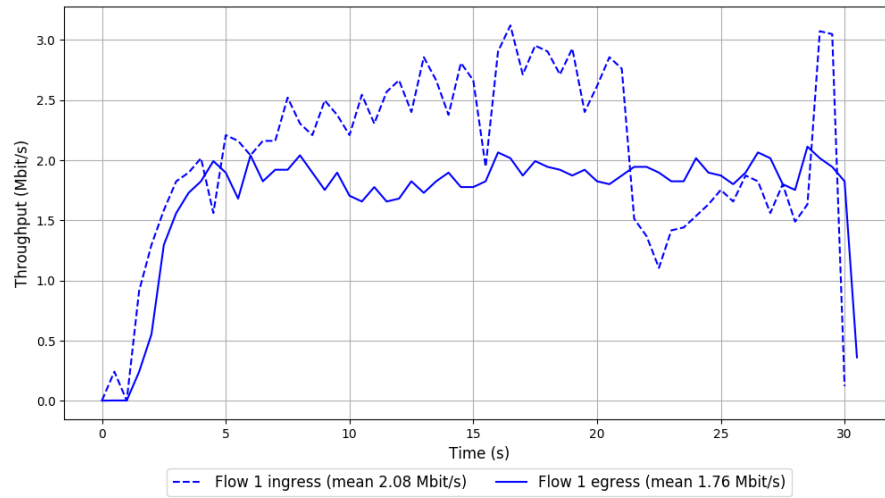
-- Flow 1:

Average throughput: 1.76 Mbit/s

95th percentile per-packet one-way delay: 4163.473 ms

Loss rate: 15.71%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-09-06 04:09:49

End at: 2018-09-06 04:10:19

Local clock offset: -3.561 ms

Remote clock offset: 0.524 ms

Below is generated by plot.py at 2018-09-06 04:27:33

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.53 Mbit/s

95th percentile per-packet one-way delay: 5626.378 ms

Loss rate: 17.05%

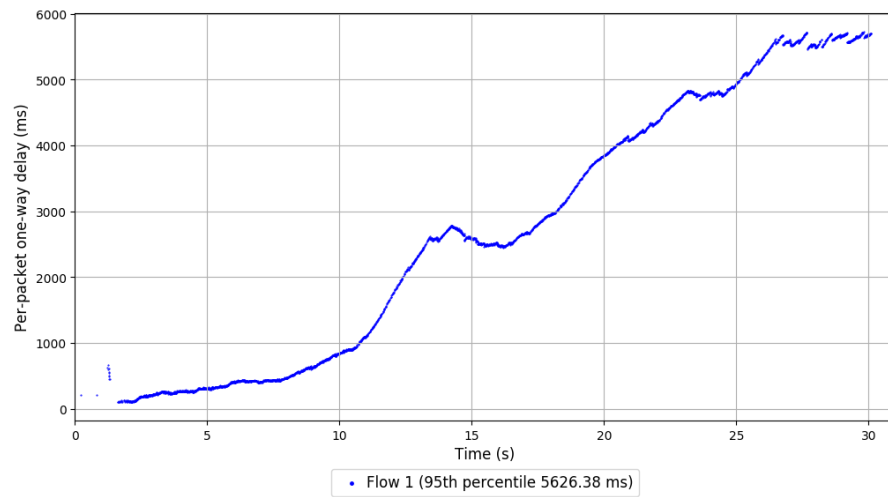
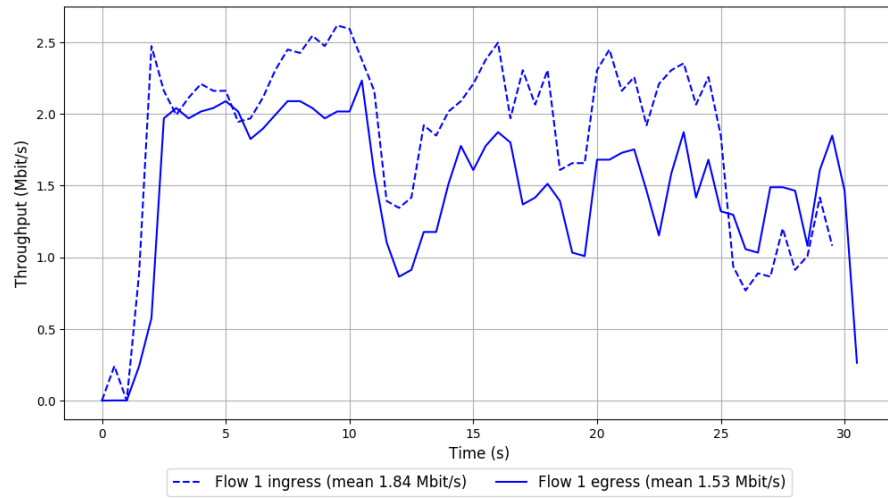
-- Flow 1:

Average throughput: 1.53 Mbit/s

95th percentile per-packet one-way delay: 5626.378 ms

Loss rate: 17.05%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2018-09-06 03:31:04

End at: 2018-09-06 03:31:34

Local clock offset: 3.569 ms

Remote clock offset: 0.335 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 8130.639 ms

Loss rate: 95.82%

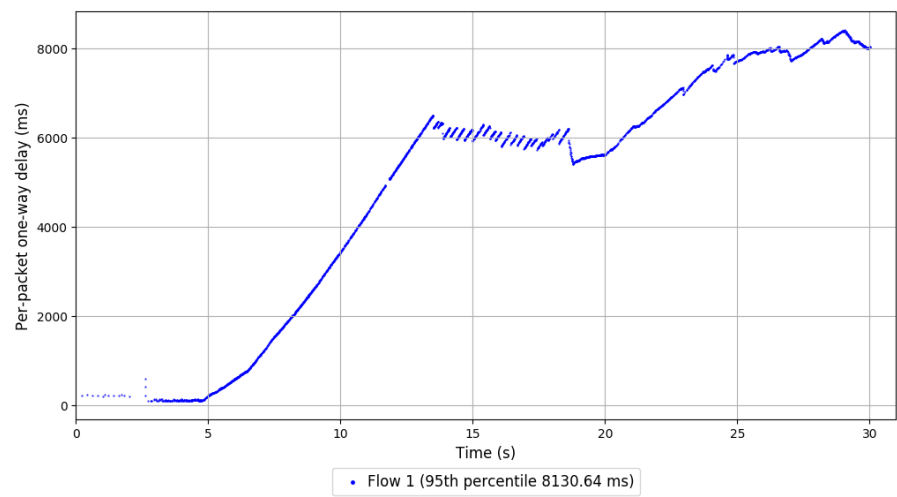
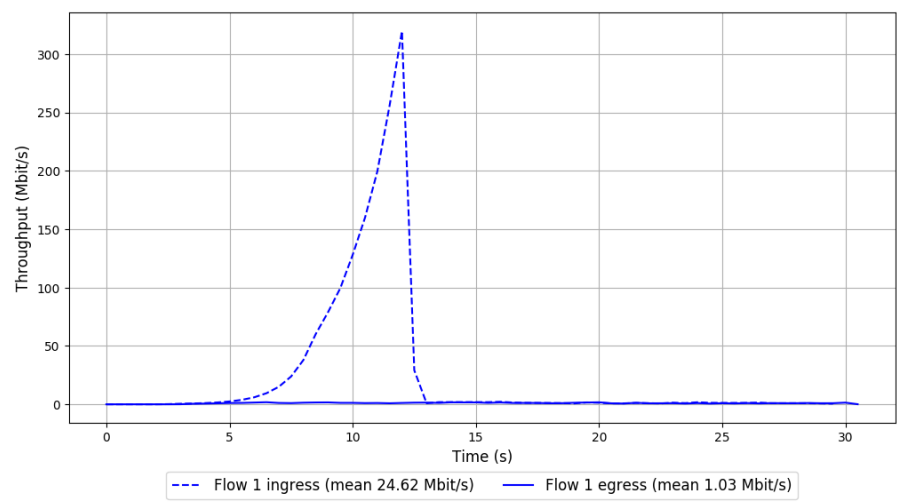
-- Flow 1:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 8130.639 ms

Loss rate: 95.82%

Run 1: Report of FillP — Data Link

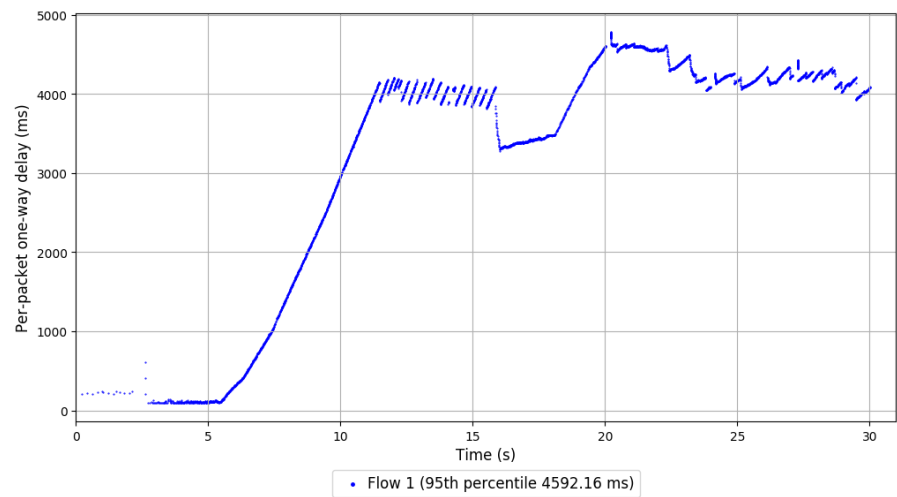
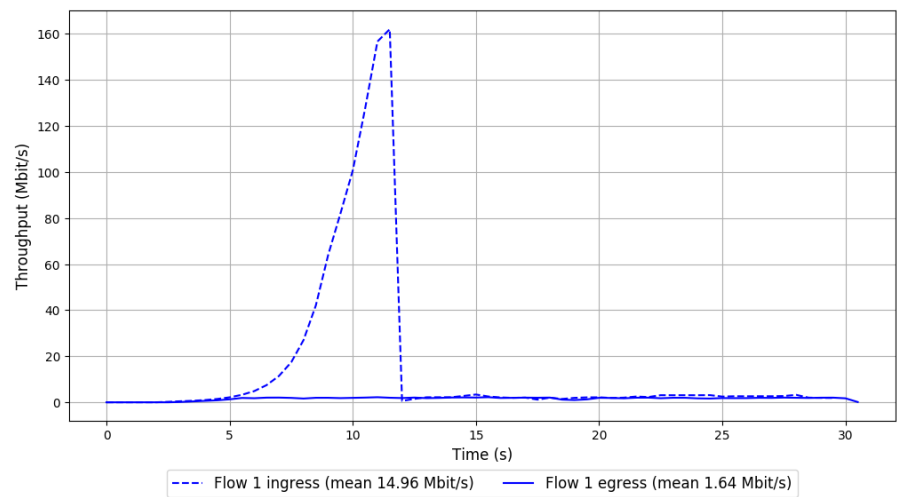


Run 2: Statistics of FillP

Start at: 2018-09-06 03:51:30
End at: 2018-09-06 03:52:00
Local clock offset: -1.453 ms
Remote clock offset: -0.166 ms

Below is generated by plot.py at 2018-09-06 04:27:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 4592.158 ms
Loss rate: 89.10%
-- Flow 1:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 4592.158 ms
Loss rate: 89.10%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-09-06 04:12:05

End at: 2018-09-06 04:12:35

Local clock offset: -4.714 ms

Remote clock offset: 1.503 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.78 Mbit/s

95th percentile per-packet one-way delay: 3998.312 ms

Loss rate: 90.20%

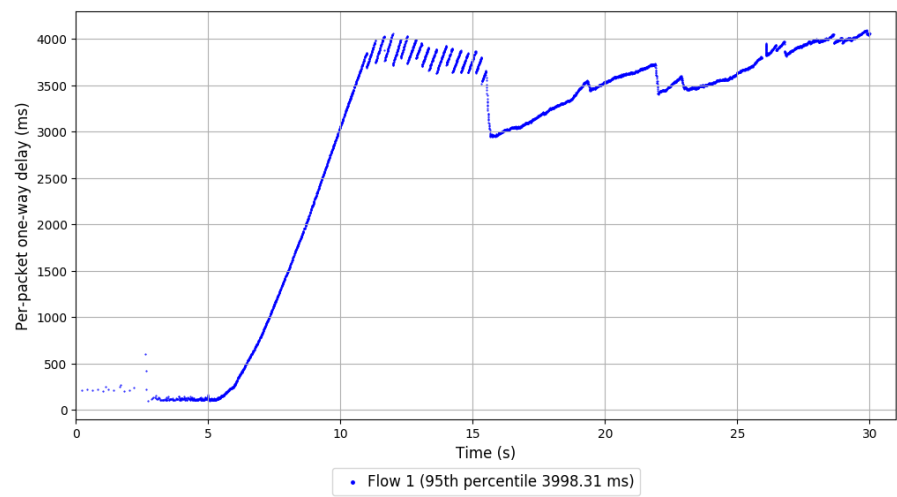
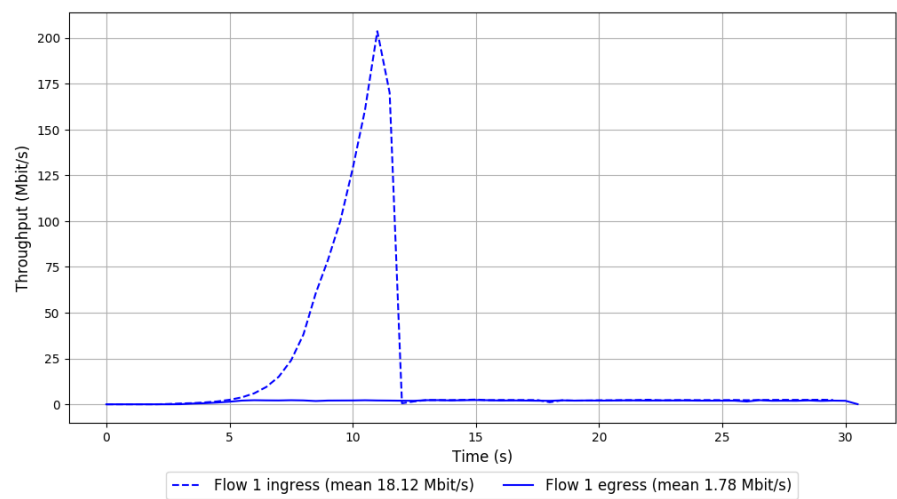
-- Flow 1:

Average throughput: 1.78 Mbit/s

95th percentile per-packet one-way delay: 3998.312 ms

Loss rate: 90.20%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2018-09-06 03:29:56

End at: 2018-09-06 03:30:26

Local clock offset: 2.938 ms

Remote clock offset: 2.75 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 5580.012 ms

Loss rate: 13.10%

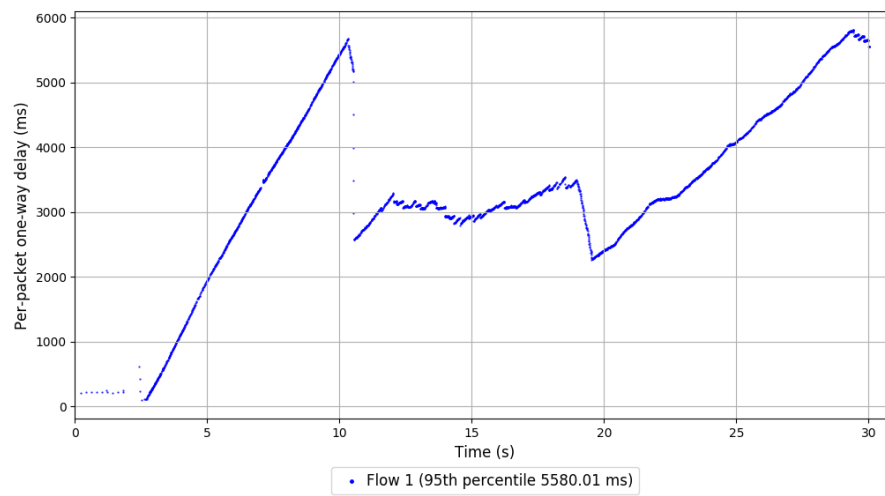
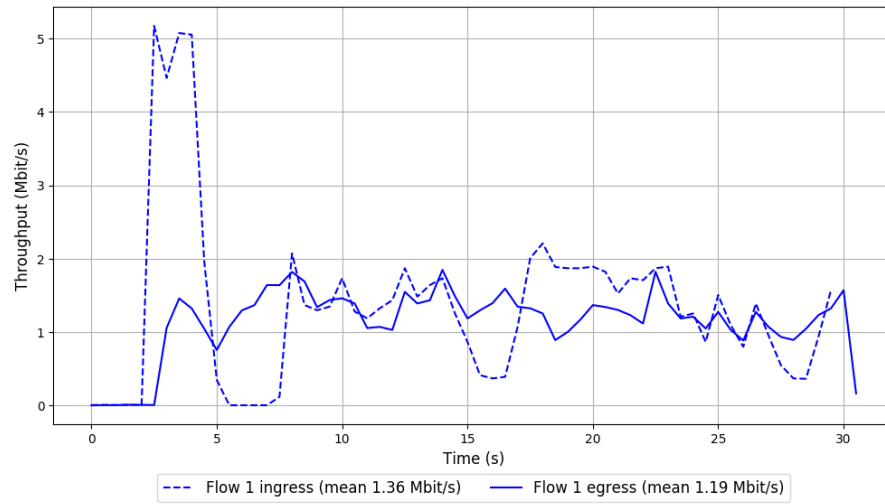
-- Flow 1:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 5580.012 ms

Loss rate: 13.10%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2018-09-06 03:50:22

End at: 2018-09-06 03:50:52

Local clock offset: -0.533 ms

Remote clock offset: -0.124 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.66 Mbit/s

95th percentile per-packet one-way delay: 3603.249 ms

Loss rate: 3.29%

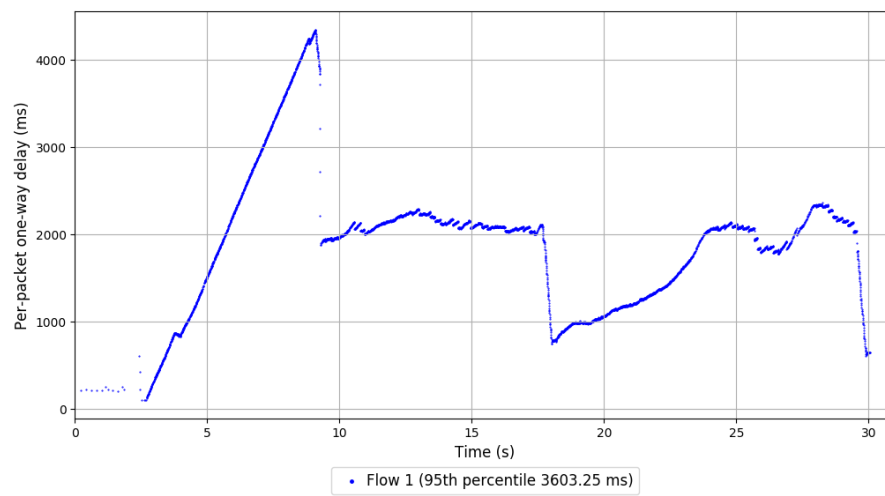
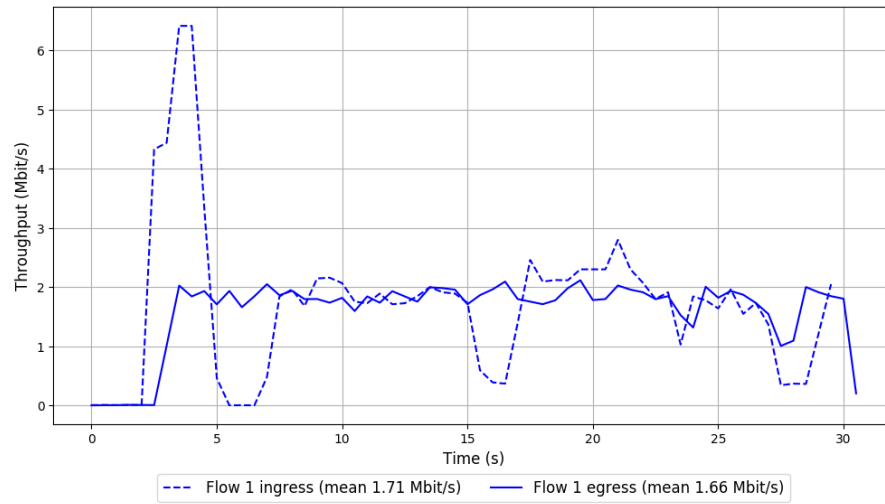
-- Flow 1:

Average throughput: 1.66 Mbit/s

95th percentile per-packet one-way delay: 3603.249 ms

Loss rate: 3.29%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2018-09-06 04:10:57

End at: 2018-09-06 04:11:27

Local clock offset: -4.541 ms

Remote clock offset: 0.471 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.77 Mbit/s

95th percentile per-packet one-way delay: 3579.922 ms

Loss rate: 2.13%

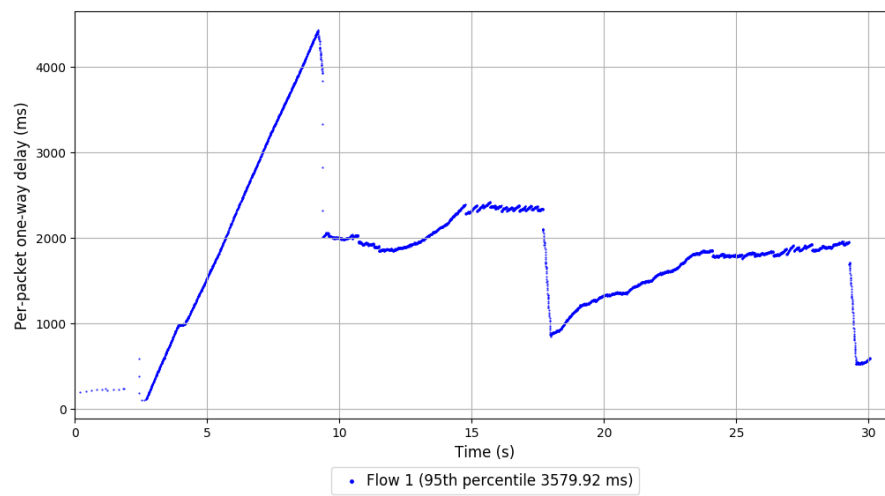
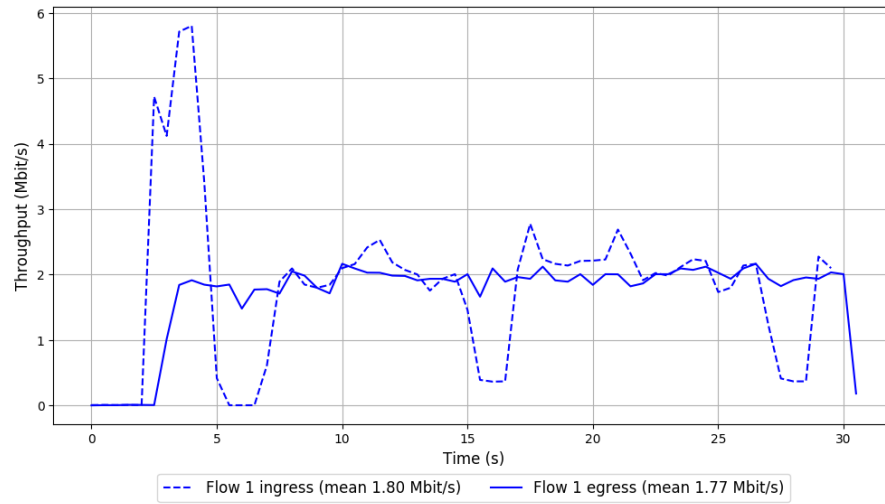
-- Flow 1:

Average throughput: 1.77 Mbit/s

95th percentile per-packet one-way delay: 3579.922 ms

Loss rate: 2.13%

Run 3: Report of FillP-Sheep — Data Link

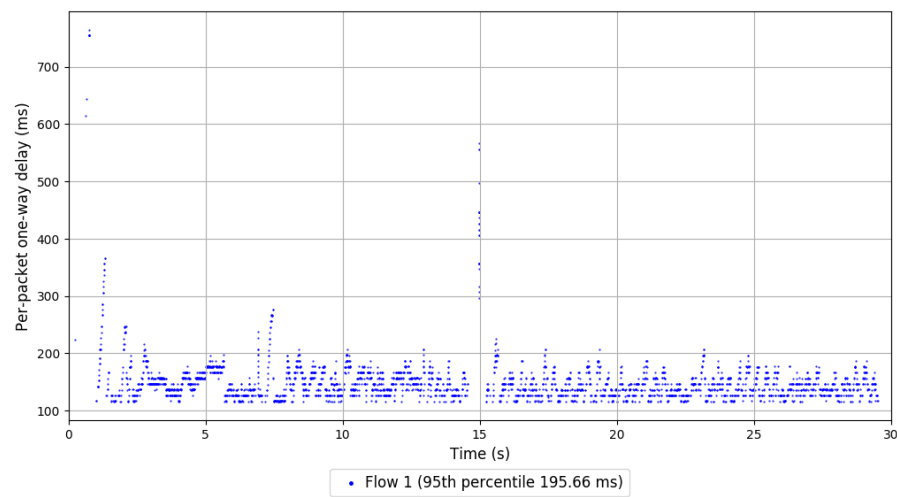
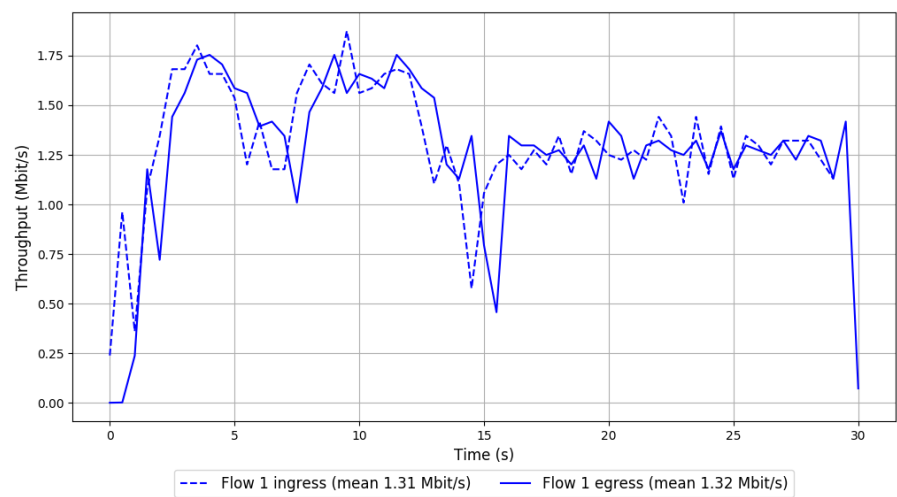


```
Run 1: Statistics of Indigo

Start at: 2018-09-06 03:41:19
End at: 2018-09-06 03:41:49
Local clock offset: 1.002 ms
Remote clock offset: 0.208 ms

# Below is generated by plot.py at 2018-09-06 04:27:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 195.659 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 195.659 ms
Loss rate: 0.16%
```

Run 1: Report of Indigo — Data Link

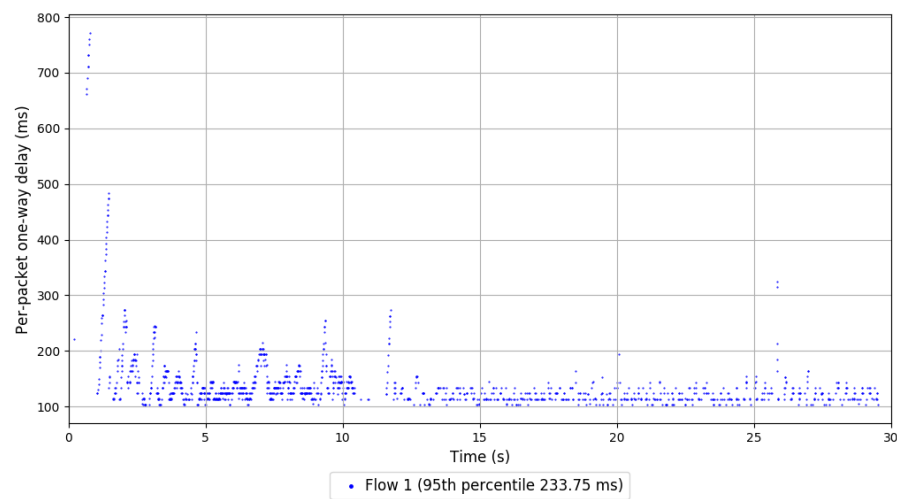
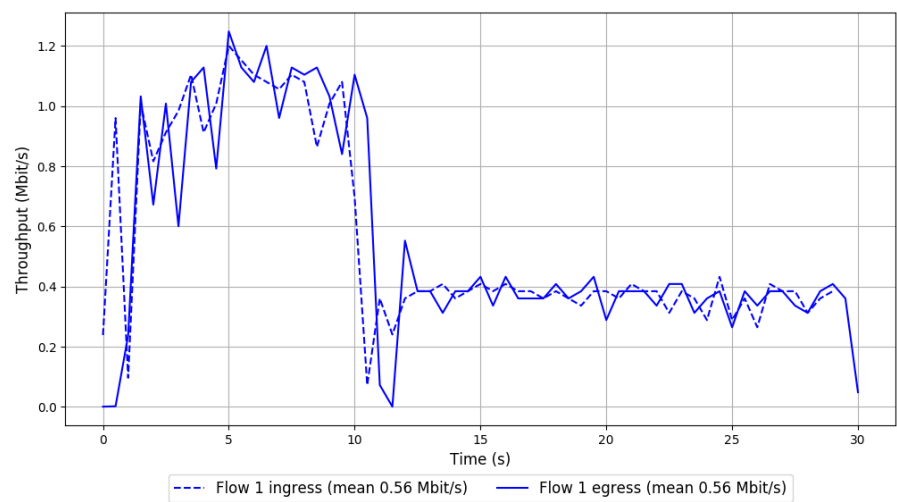


Run 2: Statistics of Indigo

Start at: 2018-09-06 04:01:48
End at: 2018-09-06 04:02:19
Local clock offset: -3.059 ms
Remote clock offset: -0.266 ms

Below is generated by plot.py at 2018-09-06 04:27:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 233.754 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 233.754 ms
Loss rate: 0.00%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-06 04:22:19

End at: 2018-09-06 04:22:49

Local clock offset: -0.76 ms

Remote clock offset: 0.264 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.41 Mbit/s

95th percentile per-packet one-way delay: 176.475 ms

Loss rate: 0.20%

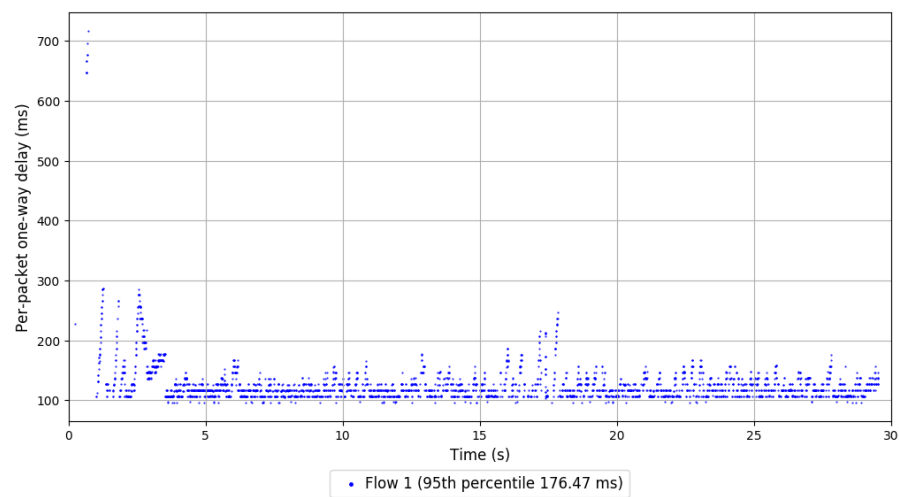
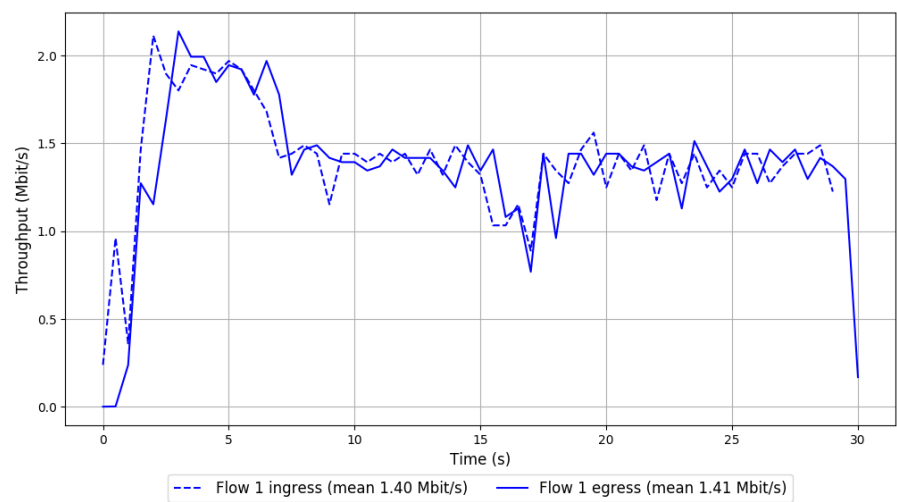
-- Flow 1:

Average throughput: 1.41 Mbit/s

95th percentile per-packet one-way delay: 176.475 ms

Loss rate: 0.20%

Run 3: Report of Indigo — Data Link

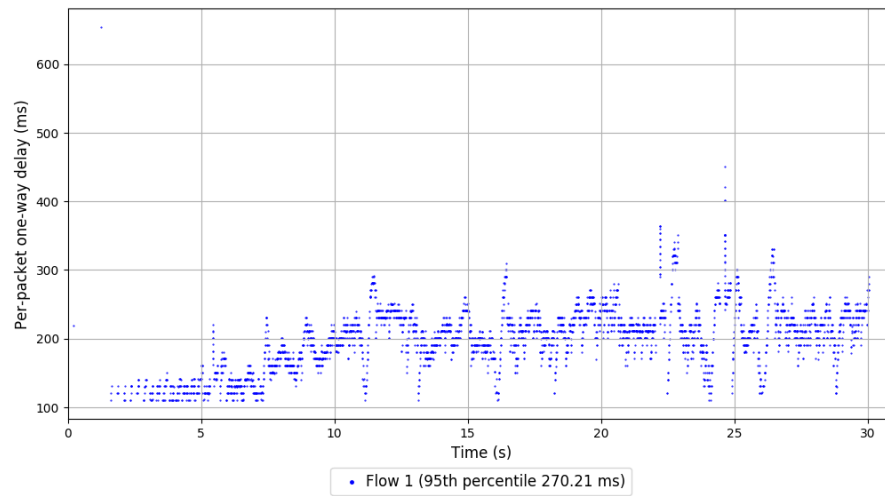
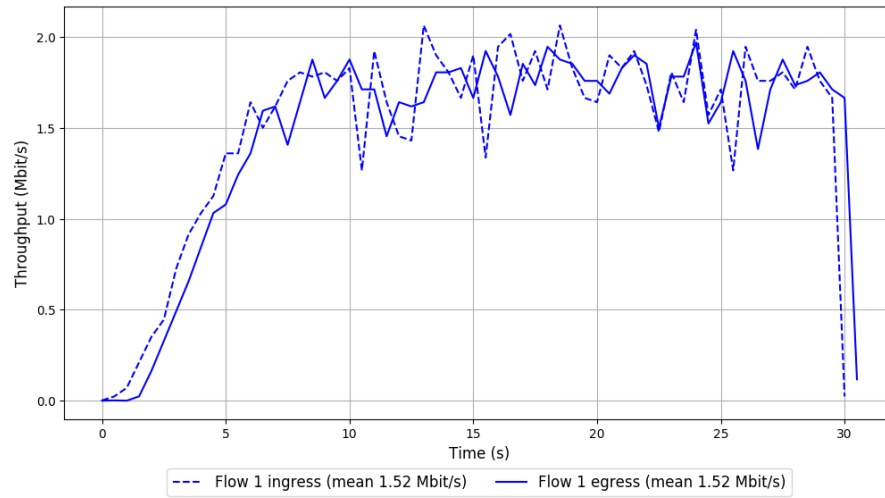


```
Run 1: Statistics of LEDBAT

Start at: 2018-09-06 03:35:38
End at: 2018-09-06 03:36:08
Local clock offset: 1.547 ms
Remote clock offset: 2.517 ms

# Below is generated by plot.py at 2018-09-06 04:27:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 270.208 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 270.208 ms
Loss rate: 0.90%
```


Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-09-06 03:56:08

End at: 2018-09-06 03:56:38

Local clock offset: -1.429 ms

Remote clock offset: 1.208 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.45 Mbit/s

95th percentile per-packet one-way delay: 243.419 ms

Loss rate: 0.83%

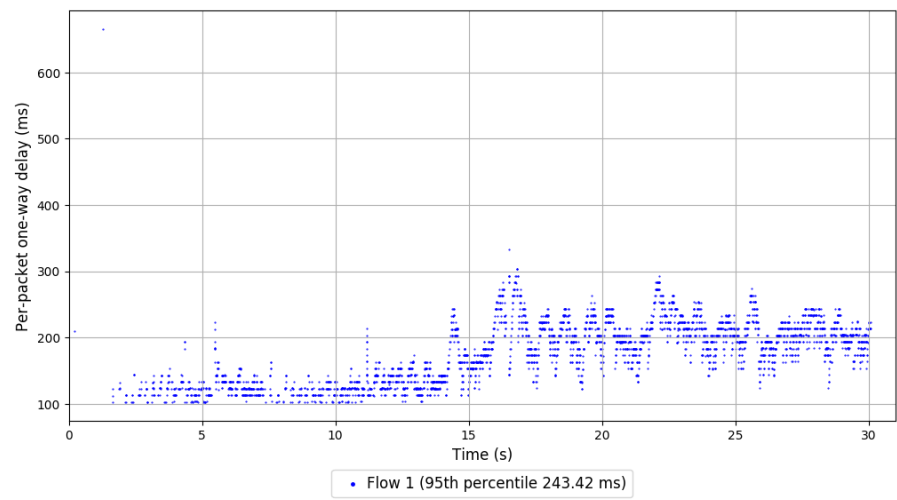
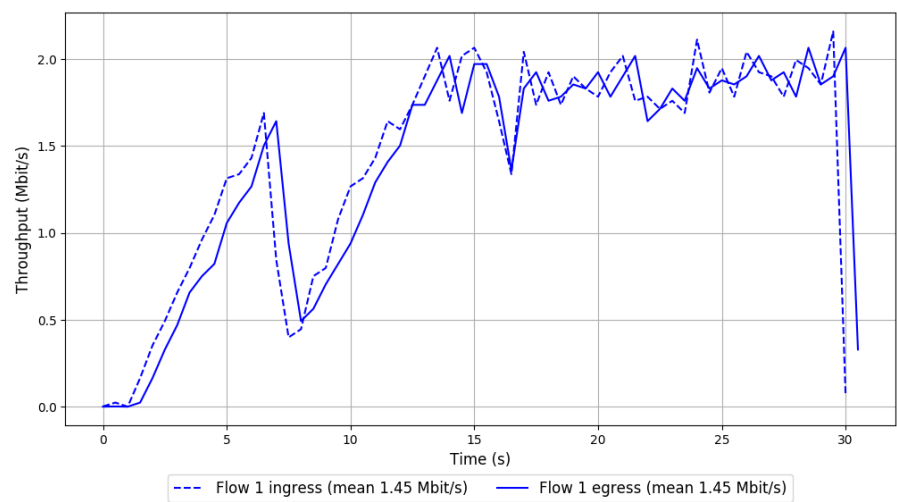
-- Flow 1:

Average throughput: 1.45 Mbit/s

95th percentile per-packet one-way delay: 243.419 ms

Loss rate: 0.83%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-09-06 04:16:38

End at: 2018-09-06 04:17:08

Local clock offset: -3.739 ms

Remote clock offset: 0.319 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.91 Mbit/s

95th percentile per-packet one-way delay: 235.913 ms

Loss rate: 0.39%

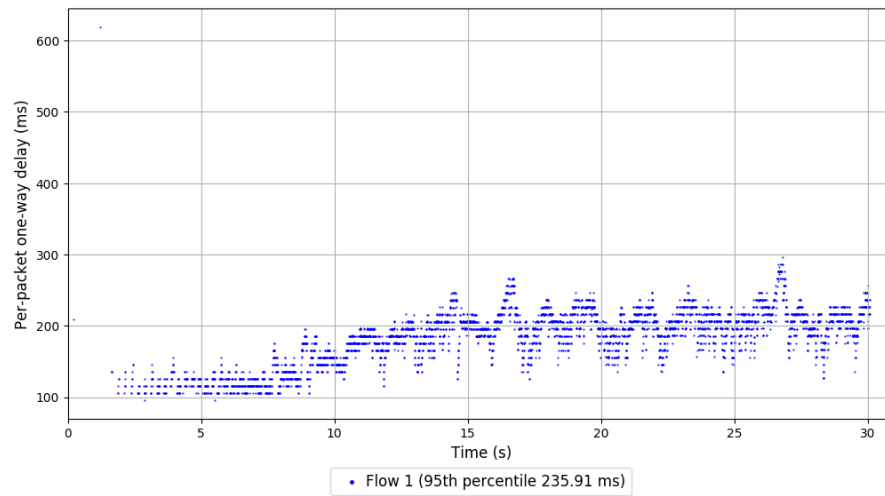
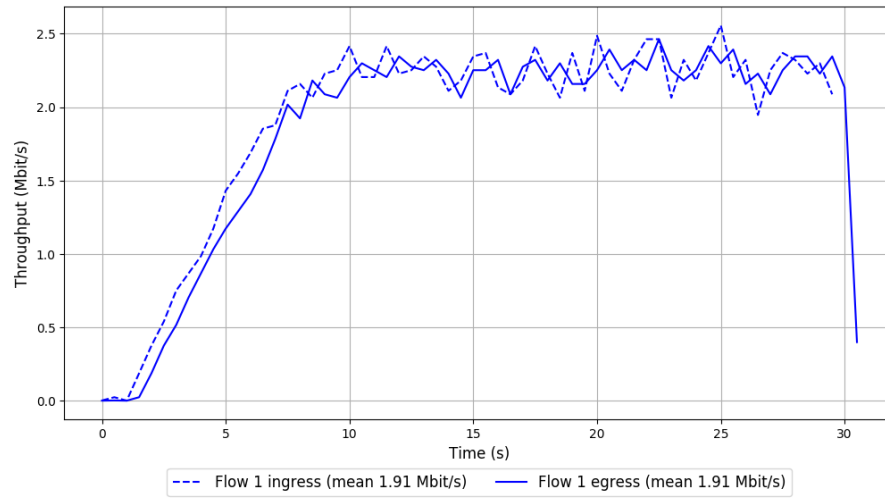
-- Flow 1:

Average throughput: 1.91 Mbit/s

95th percentile per-packet one-way delay: 235.913 ms

Loss rate: 0.39%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of Indigo-Muses

Start at: 2018-09-06 03:34:29

End at: 2018-09-06 03:34:59

Local clock offset: 1.944 ms

Remote clock offset: 1.464 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.94 Mbit/s

95th percentile per-packet one-way delay: 4201.640 ms

Loss rate: 83.70%

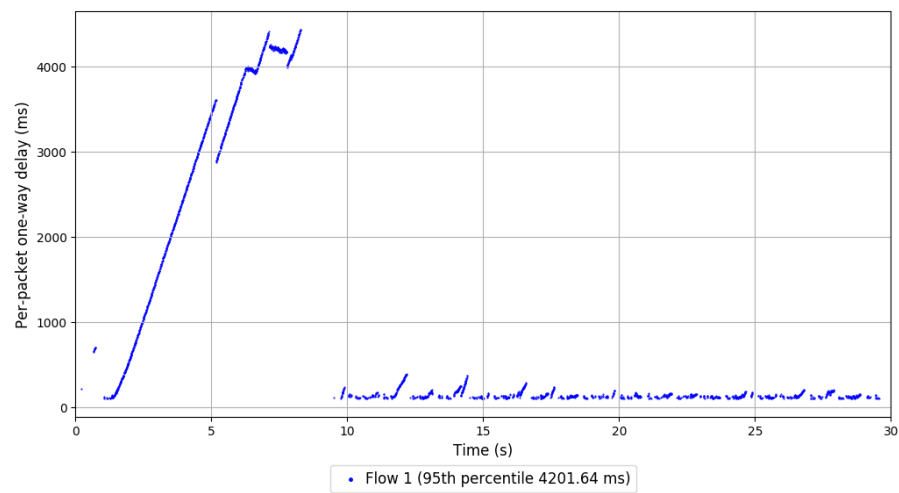
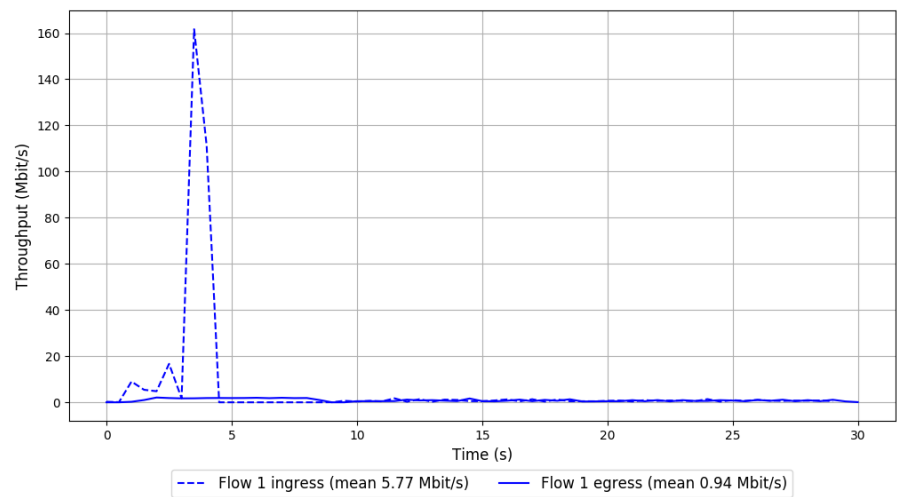
-- Flow 1:

Average throughput: 0.94 Mbit/s

95th percentile per-packet one-way delay: 4201.640 ms

Loss rate: 83.70%

Run 1: Report of Indigo-Muses — Data Link

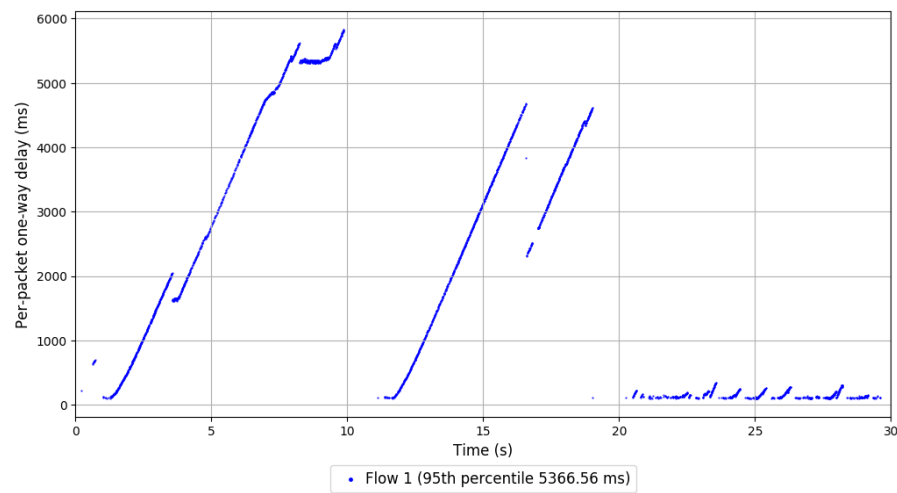
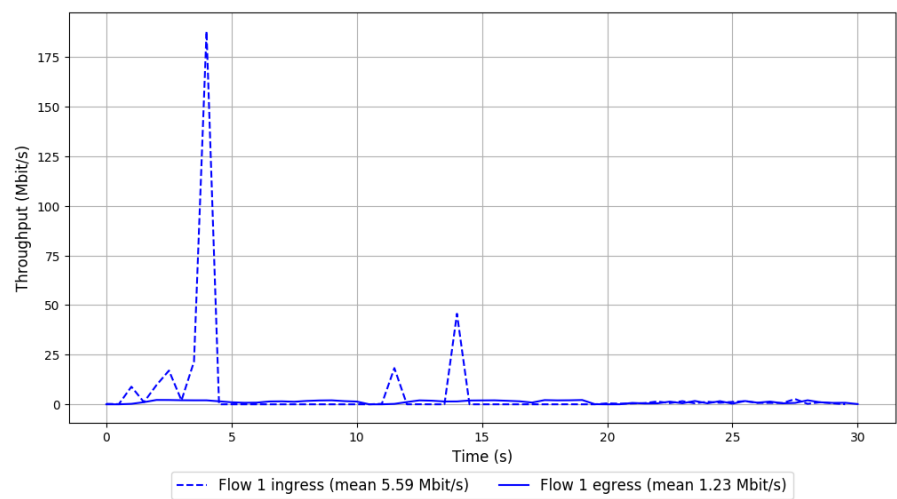


Run 2: Statistics of Indigo-Muses

Start at: 2018-09-06 03:54:55
End at: 2018-09-06 03:55:25
Local clock offset: -1.967 ms
Remote clock offset: -0.138 ms

Below is generated by plot.py at 2018-09-06 04:27:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 5366.559 ms
Loss rate: 78.05%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 5366.559 ms
Loss rate: 78.05%

Run 2: Report of Indigo-Muses — Data Link



Run 3: Statistics of Indigo-Muses

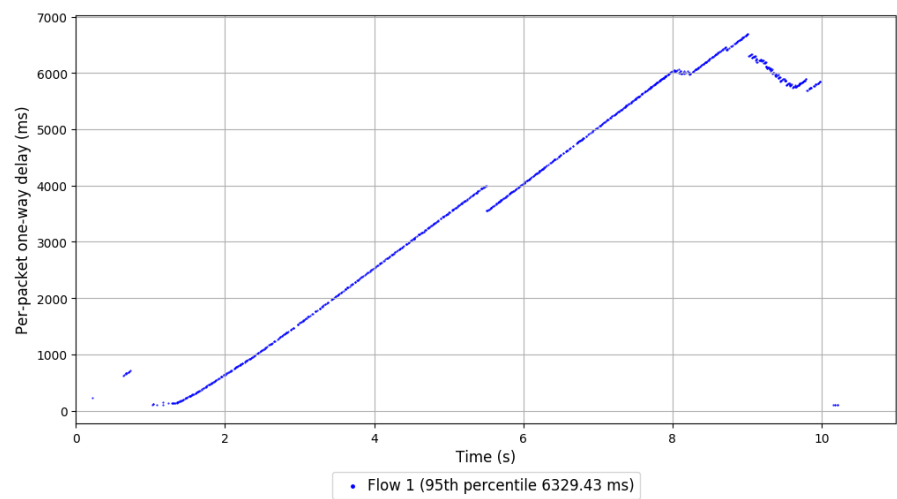
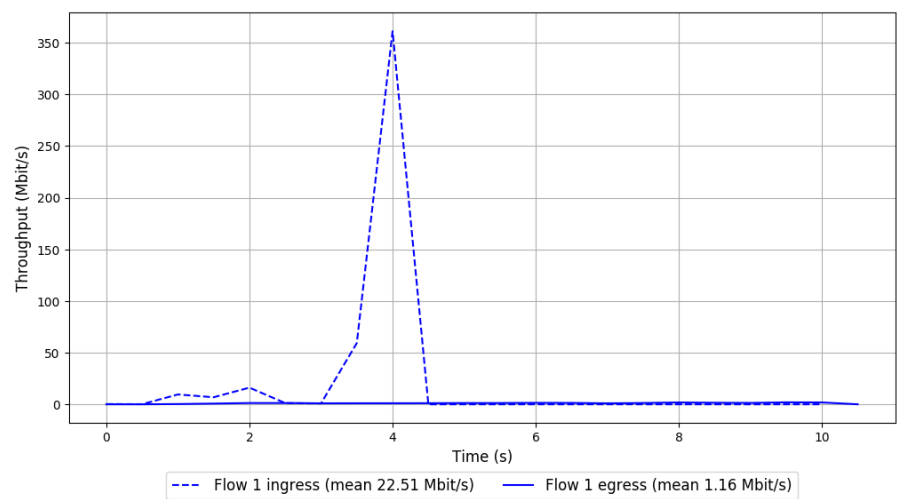
Start at: 2018-09-06 04:15:30

End at: 2018-09-06 04:16:00

Local clock offset: -4.546 ms

Remote clock offset: 1.626 ms

Run 3: Report of Indigo-Muses — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2018-09-06 03:37:54

End at: 2018-09-06 03:38:24

Local clock offset: 1.03 ms

Remote clock offset: 0.257 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 4488.508 ms

Loss rate: 57.51%

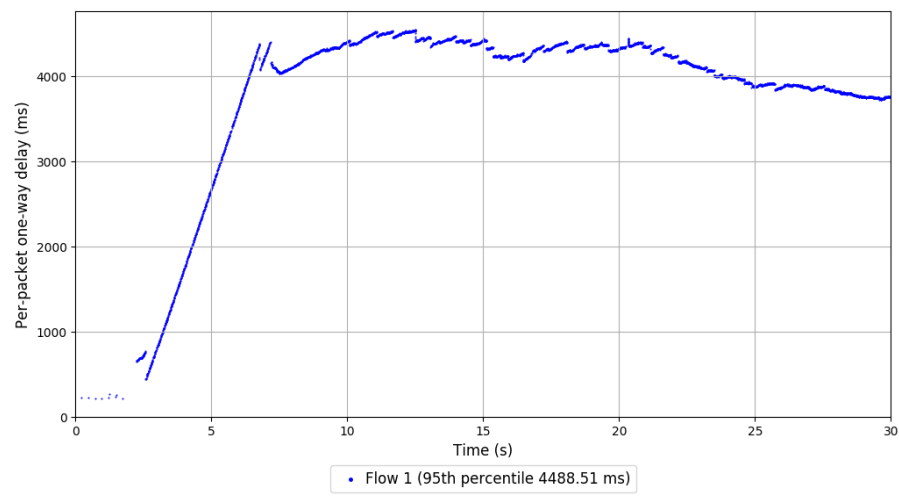
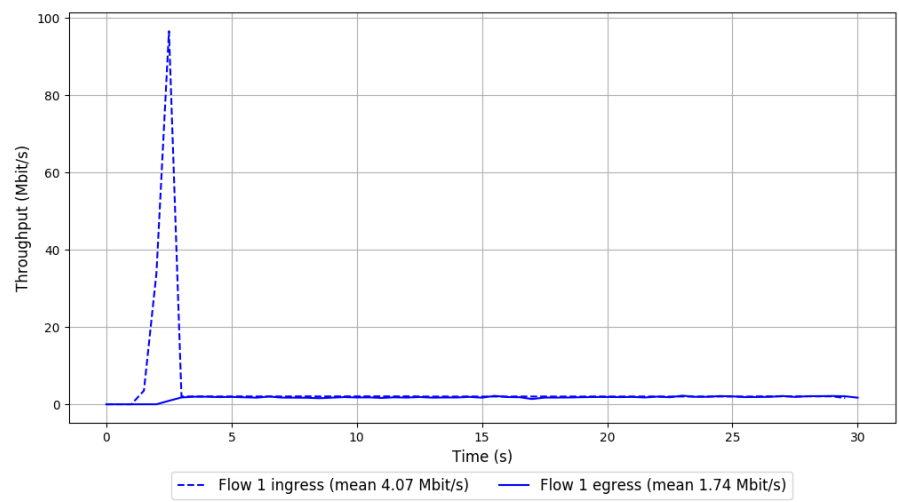
-- Flow 1:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 4488.508 ms

Loss rate: 57.51%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-09-06 03:58:24

End at: 2018-09-06 03:58:54

Local clock offset: -1.826 ms

Remote clock offset: 0.864 ms

Below is generated by plot.py at 2018-09-06 04:27:49

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 4345.613 ms

Loss rate: 50.03%

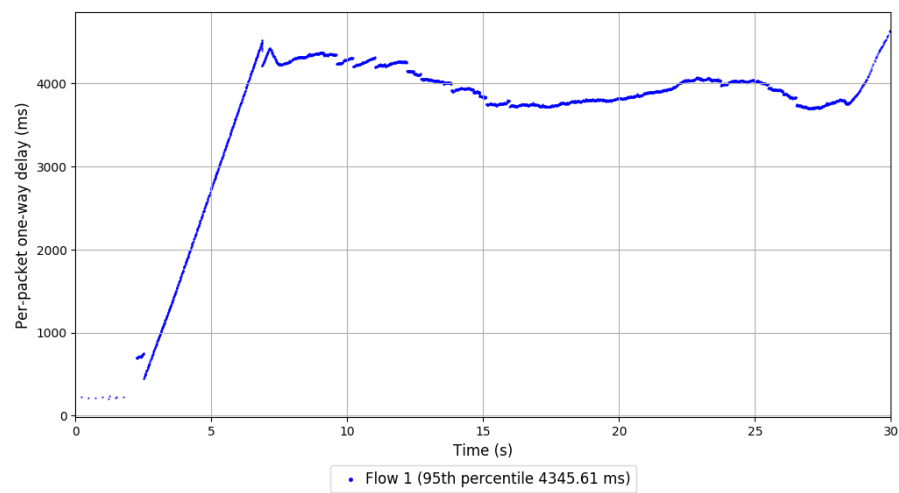
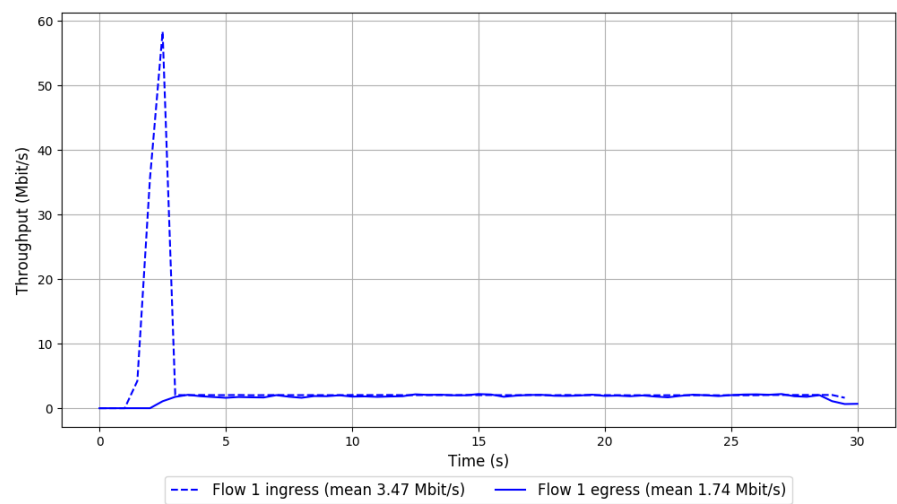
-- Flow 1:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 4345.613 ms

Loss rate: 50.03%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-09-06 04:18:54

End at: 2018-09-06 04:19:24

Local clock offset: -3.105 ms

Remote clock offset: 0.289 ms

Below is generated by plot.py at 2018-09-06 04:27:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.99 Mbit/s

95th percentile per-packet one-way delay: 3283.386 ms

Loss rate: 55.95%

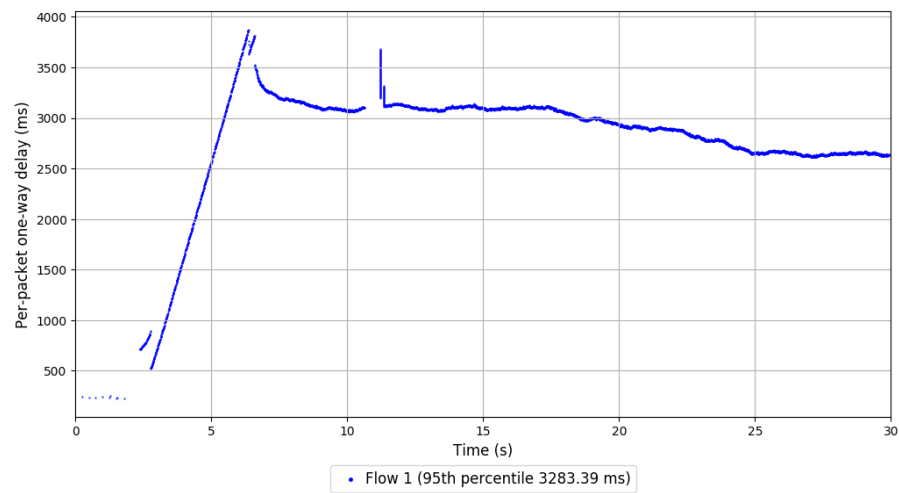
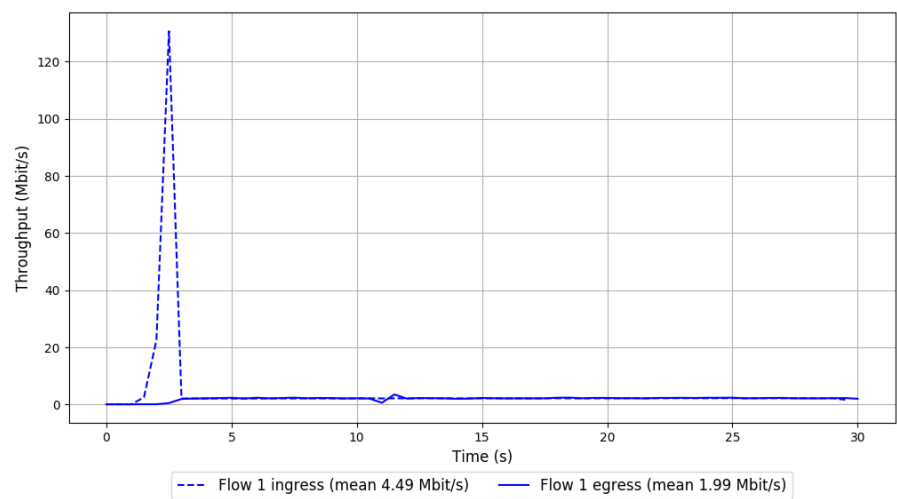
-- Flow 1:

Average throughput: 1.99 Mbit/s

95th percentile per-packet one-way delay: 3283.386 ms

Loss rate: 55.95%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

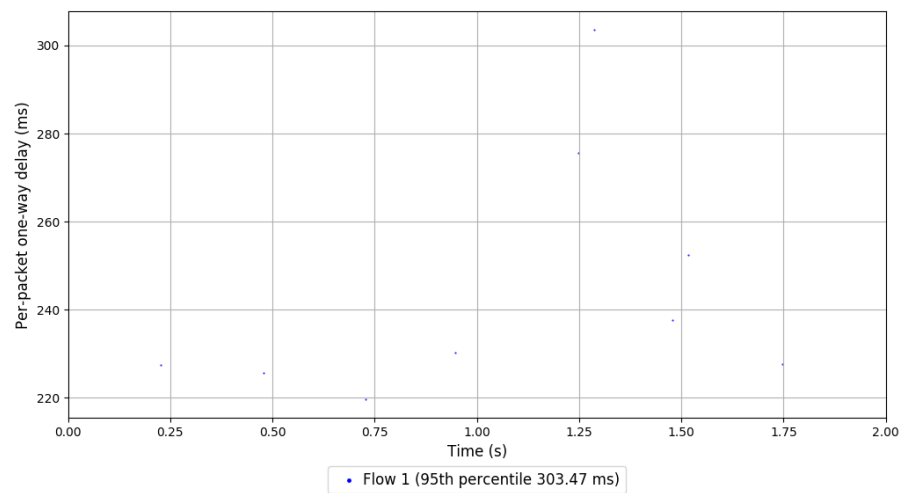
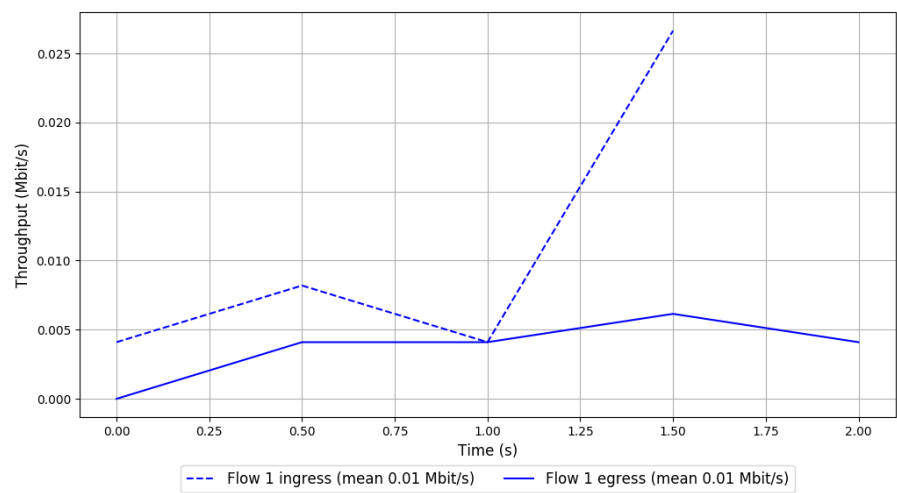
Start at: 2018-09-06 03:43:35

End at: 2018-09-06 03:44:05

Local clock offset: -0.201 ms

Remote clock offset: 2.368 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

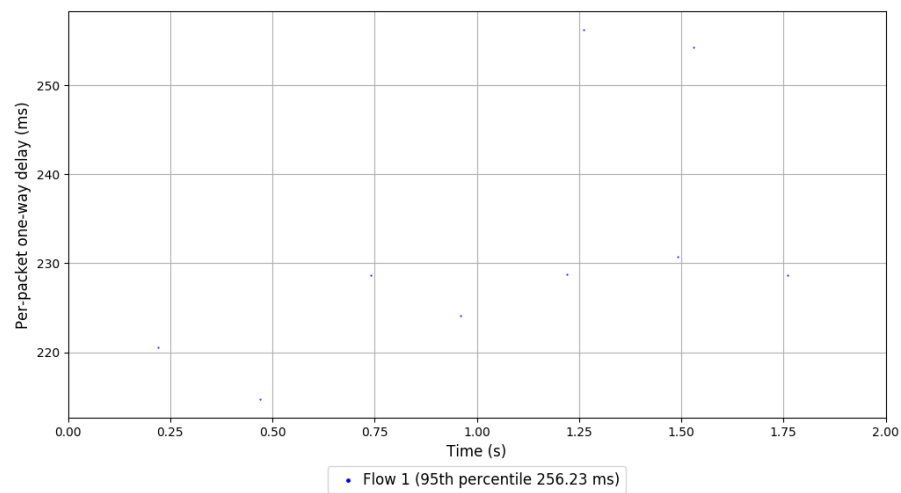
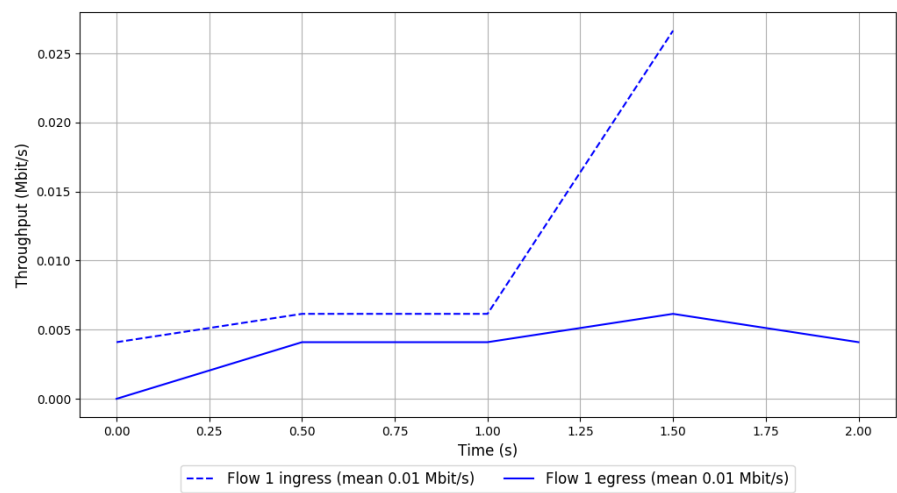
Start at: 2018-09-06 04:04:05

End at: 2018-09-06 04:04:35

Local clock offset: -2.729 ms

Remote clock offset: 1.935 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

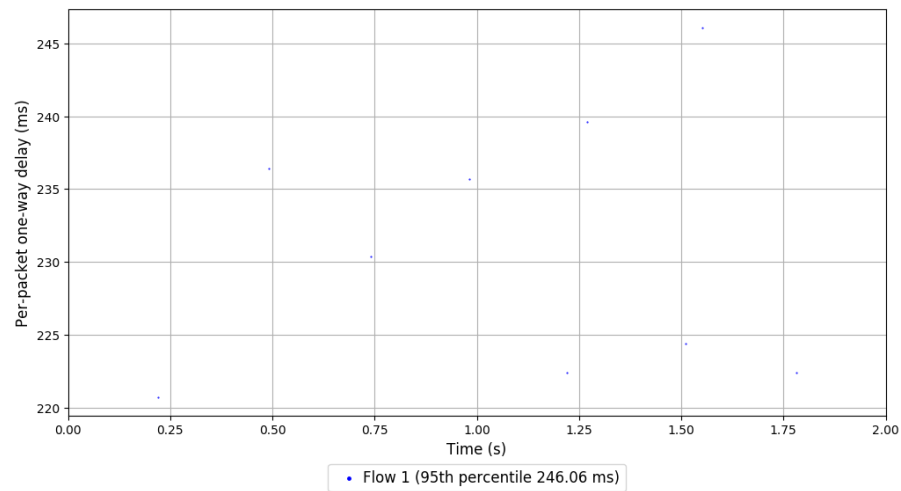
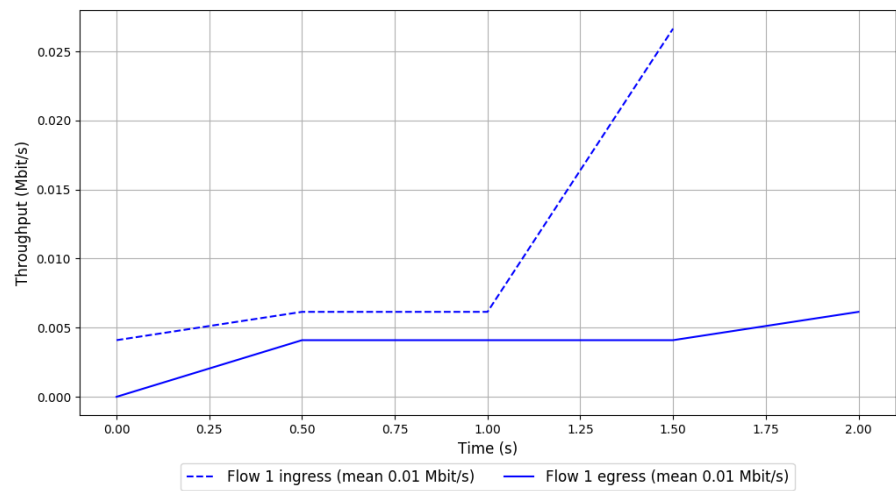
Start at: 2018-09-06 04:24:34

End at: 2018-09-06 04:25:04

Local clock offset: -0.111 ms

Remote clock offset: 1.311 ms

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

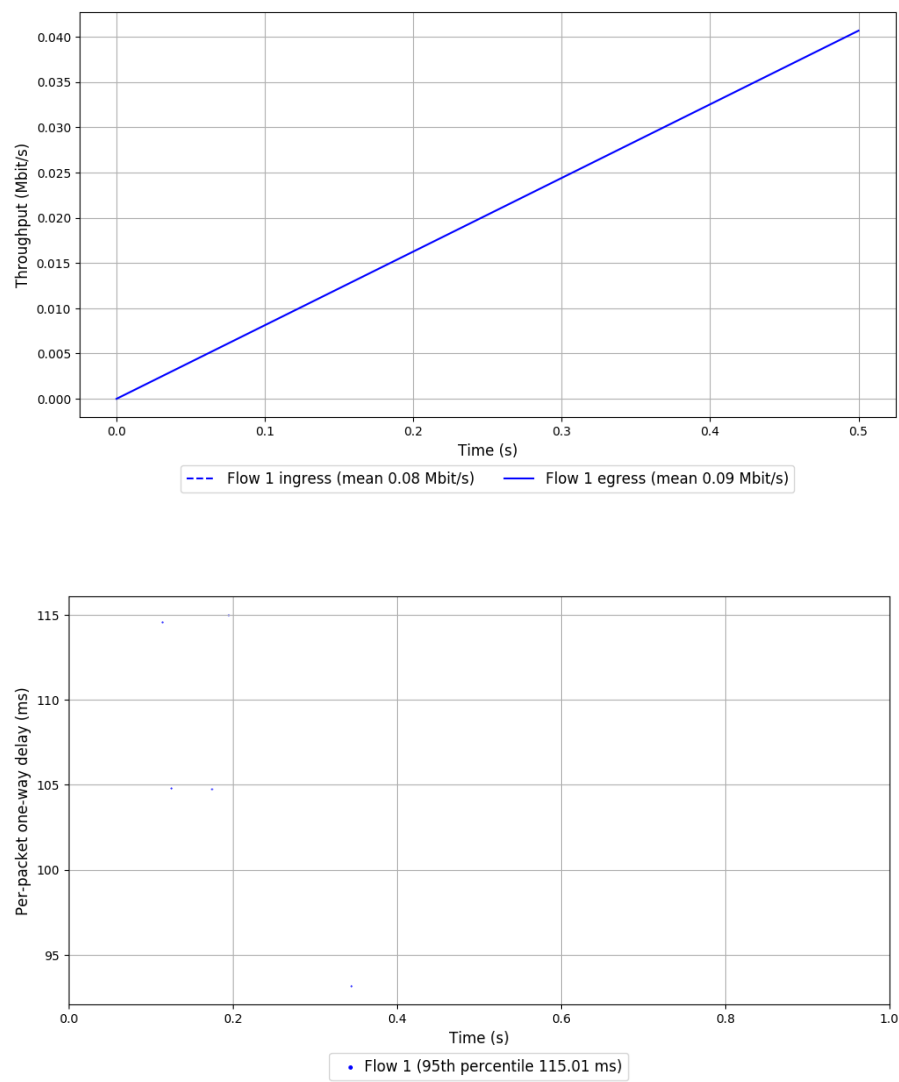
Start at: 2018-09-06 03:33:22

End at: 2018-09-06 03:33:52

Local clock offset: 3.123 ms

Remote clock offset: 2.576 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-09-06 03:53:47

End at: 2018-09-06 03:54:17

Local clock offset: -1.068 ms

Remote clock offset: 2.033 ms

Below is generated by plot.py at 2018-09-06 04:27:51

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.92 Mbit/s

95th percentile per-packet one-way delay: 1218.756 ms

Loss rate: 4.59%

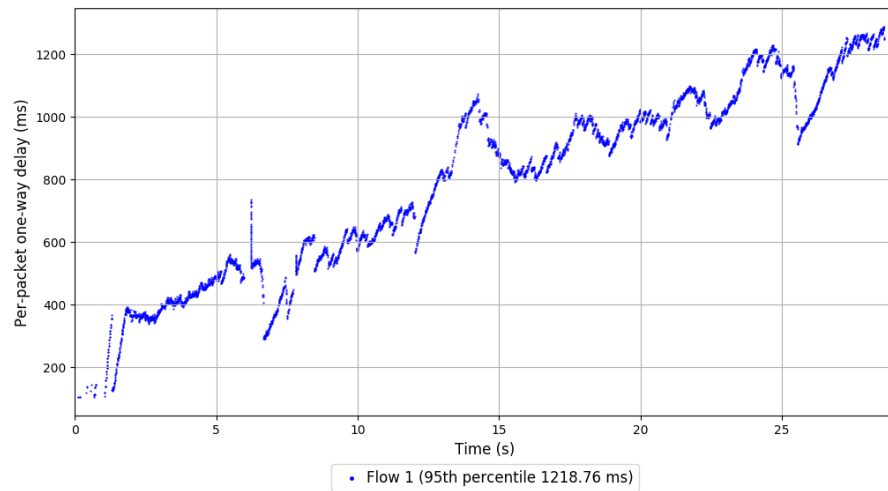
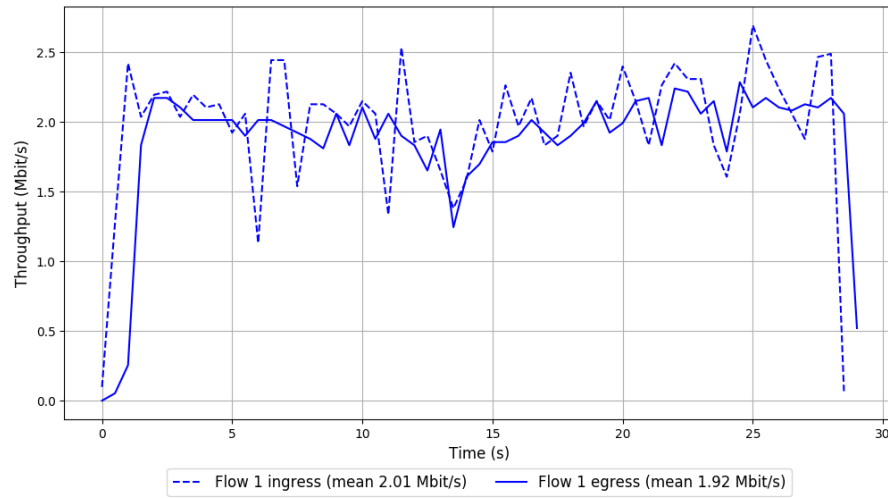
-- Flow 1:

Average throughput: 1.92 Mbit/s

95th percentile per-packet one-way delay: 1218.756 ms

Loss rate: 4.59%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-09-06 04:14:22

End at: 2018-09-06 04:14:52

Local clock offset: -4.266 ms

Remote clock offset: 0.489 ms

Below is generated by plot.py at 2018-09-06 04:27:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 1313.916 ms

Loss rate: 4.81%

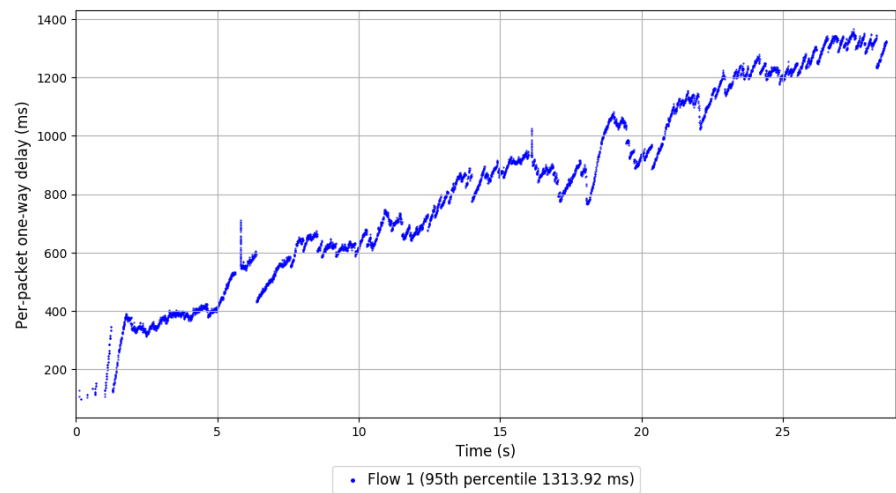
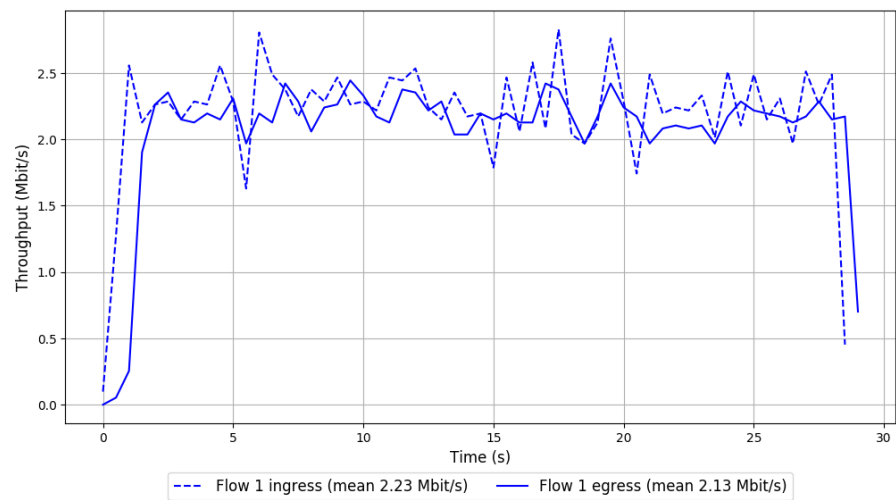
-- Flow 1:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 1313.916 ms

Loss rate: 4.81%

Run 3: Report of QUIC Cubic — Data Link

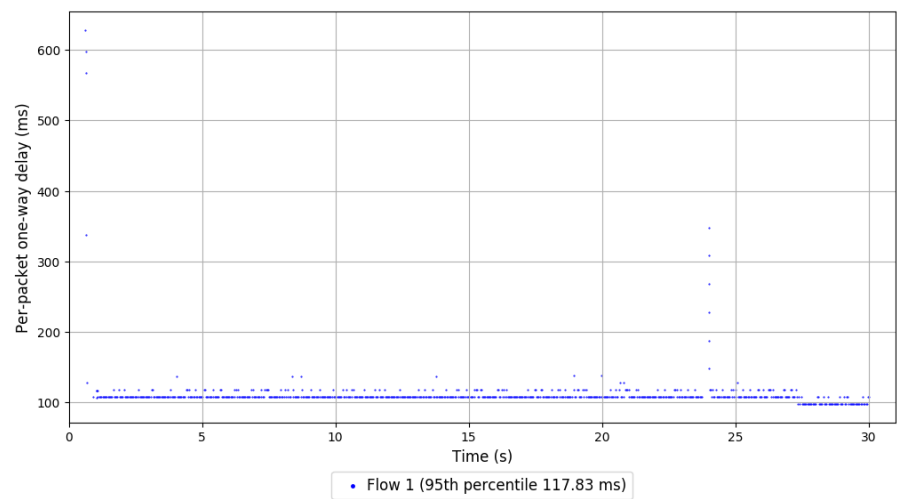
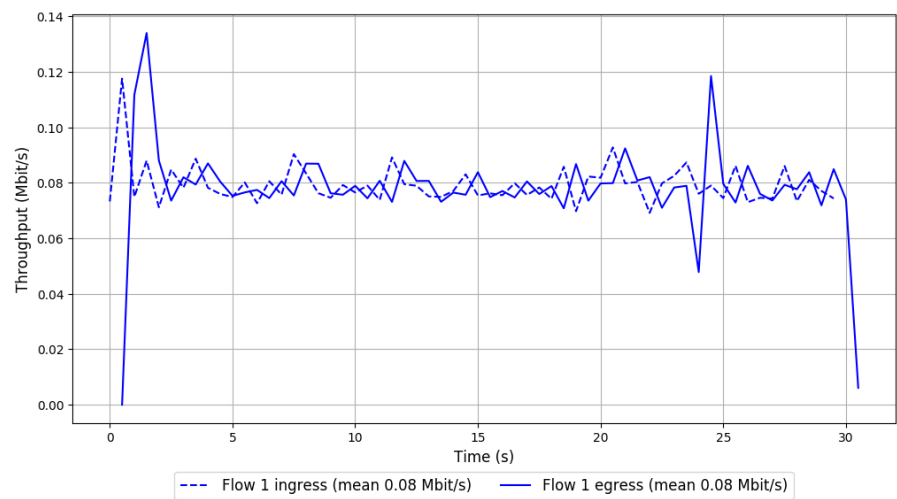


```
Run 1: Statistics of SCReAM

Start at: 2018-09-06 03:27:40
End at: 2018-09-06 03:28:10
Local clock offset: 3.841 ms
Remote clock offset: 2.732 ms

# Below is generated by plot.py at 2018-09-06 04:27:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 117.829 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 117.829 ms
Loss rate: 0.13%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-09-06 03:48:06

End at: 2018-09-06 03:48:36

Local clock offset: -0.886 ms

Remote clock offset: 0.121 ms

Below is generated by plot.py at 2018-09-06 04:27:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 118.311 ms

Loss rate: 0.13%

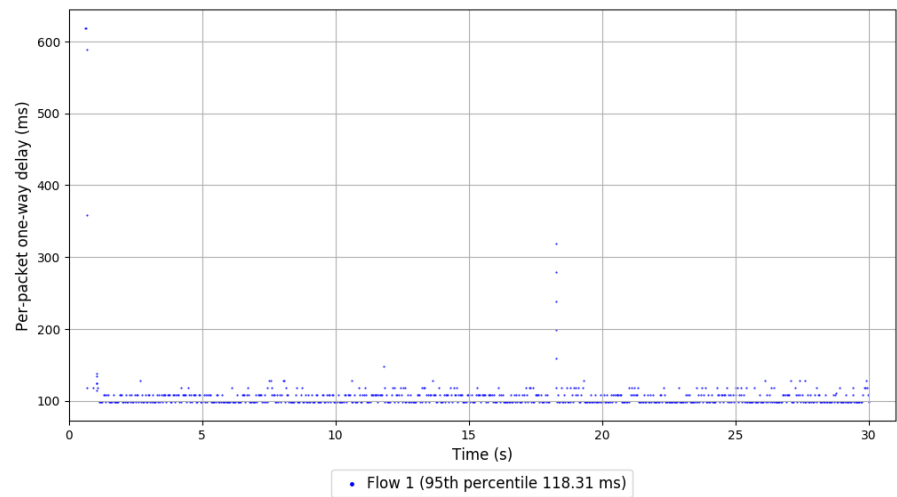
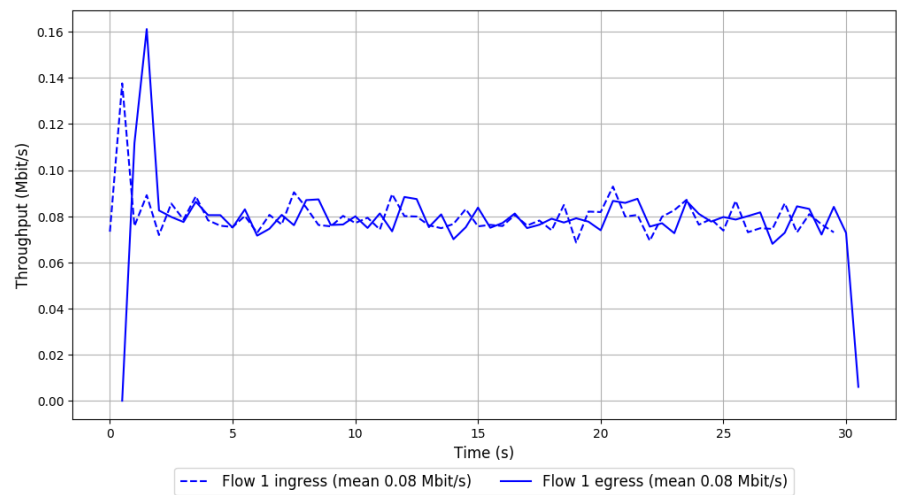
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 118.311 ms

Loss rate: 0.13%

Run 2: Report of SReAM — Data Link

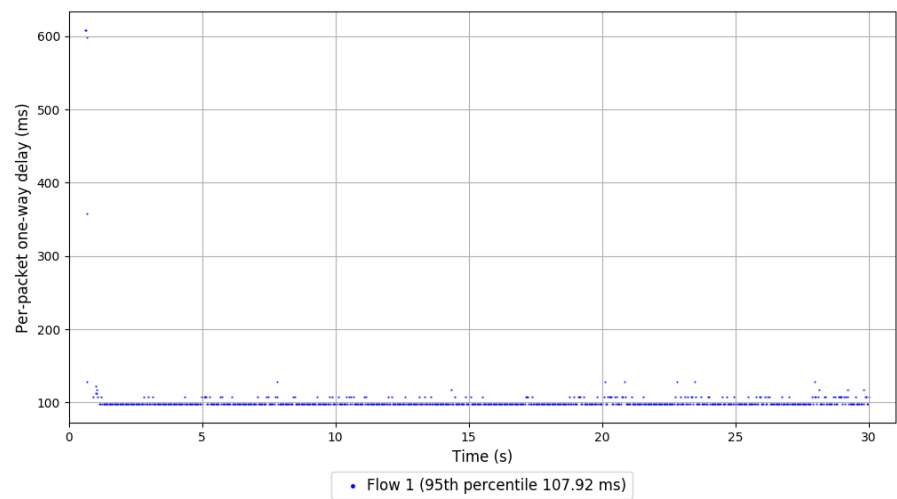
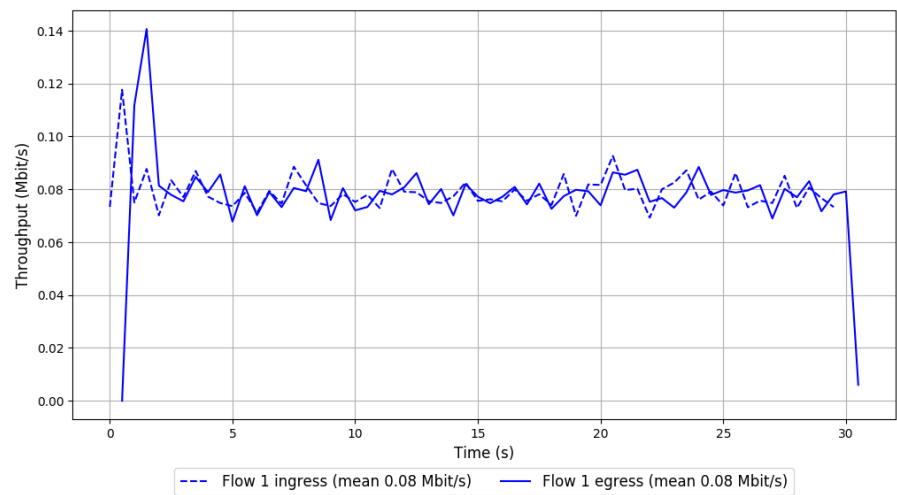


Run 3: Statistics of SCReAM

Start at: 2018-09-06 04:08:41
End at: 2018-09-06 04:09:11
Local clock offset: -4.119 ms
Remote clock offset: -0.591 ms

Below is generated by plot.py at 2018-09-06 04:27:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 107.920 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 107.920 ms
Loss rate: 0.13%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2018-09-06 03:42:27

End at: 2018-09-06 03:42:57

Local clock offset: 0.08 ms

Remote clock offset: 1.335 ms

Below is generated by plot.py at 2018-09-06 04:27:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 214.078 ms

Loss rate: 0.00%

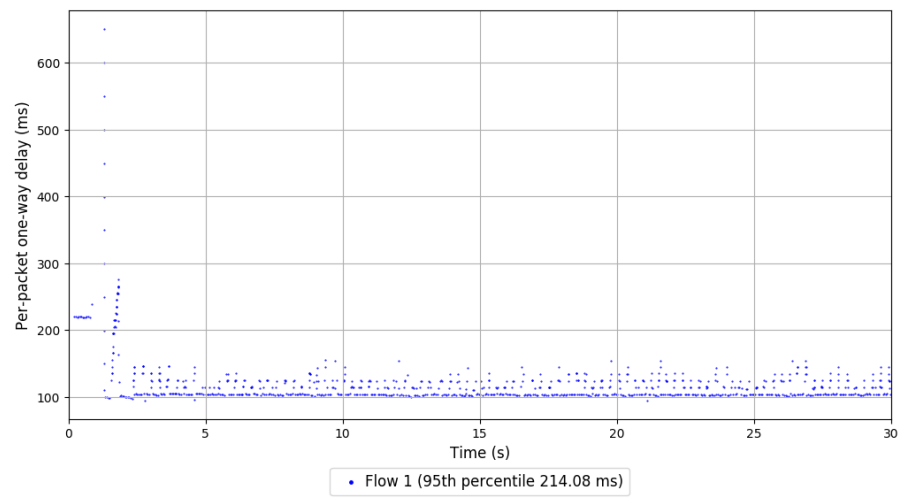
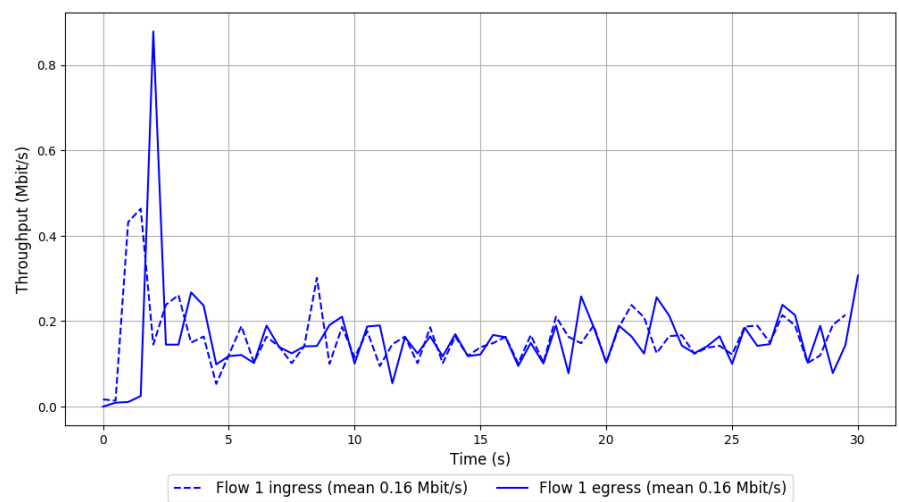
-- Flow 1:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 214.078 ms

Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

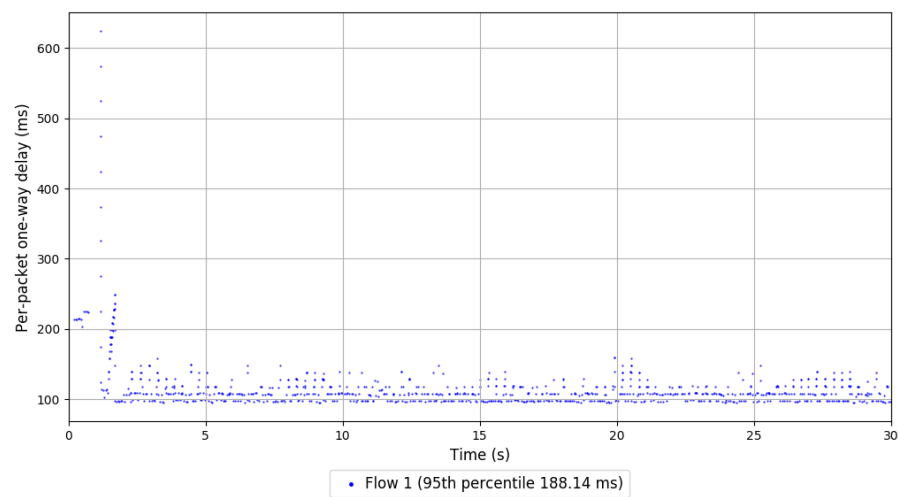
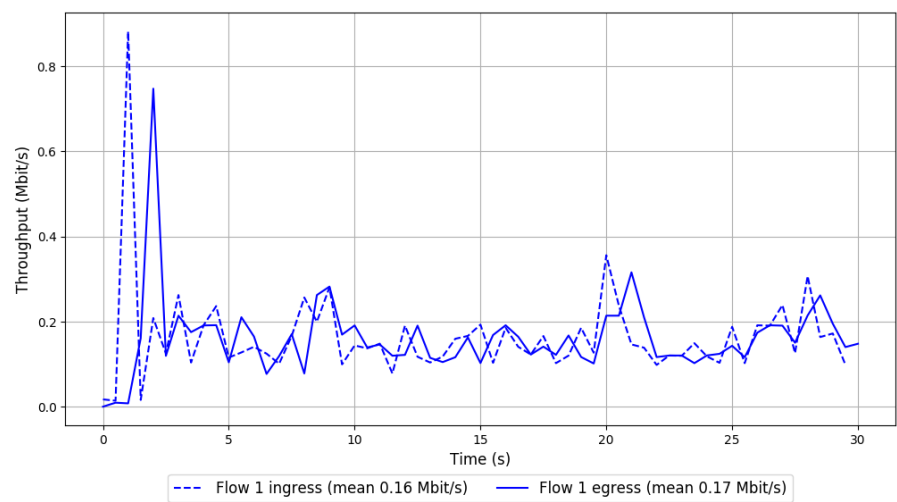


Run 2: Statistics of Sprout

Start at: 2018-09-06 04:02:57
End at: 2018-09-06 04:03:27
Local clock offset: -3.318 ms
Remote clock offset: -0.525 ms

Below is generated by plot.py at 2018-09-06 04:27:53
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 188.138 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 188.138 ms
Loss rate: 0.00%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2018-09-06 04:23:27

End at: 2018-09-06 04:23:57

Local clock offset: -0.375 ms

Remote clock offset: 1.391 ms

Below is generated by plot.py at 2018-09-06 04:27:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 184.509 ms

Loss rate: 0.00%

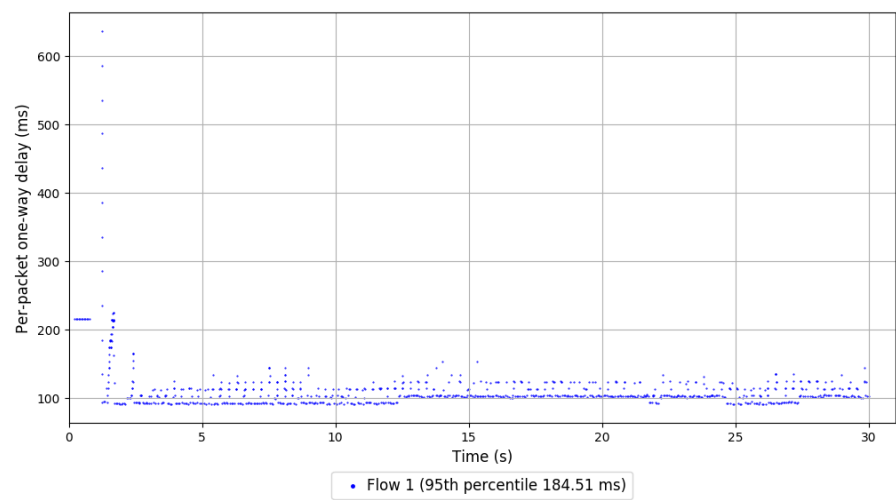
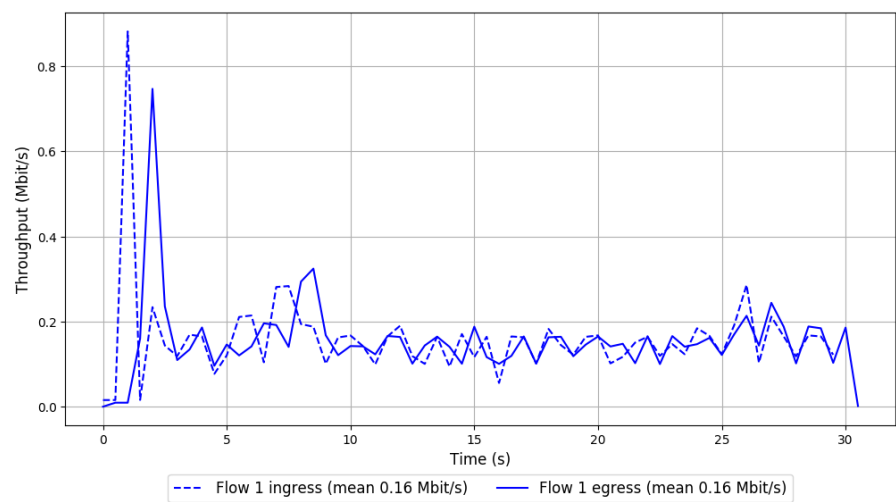
-- Flow 1:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 184.509 ms

Loss rate: 0.00%

Run 3: Report of Sprout — Data Link

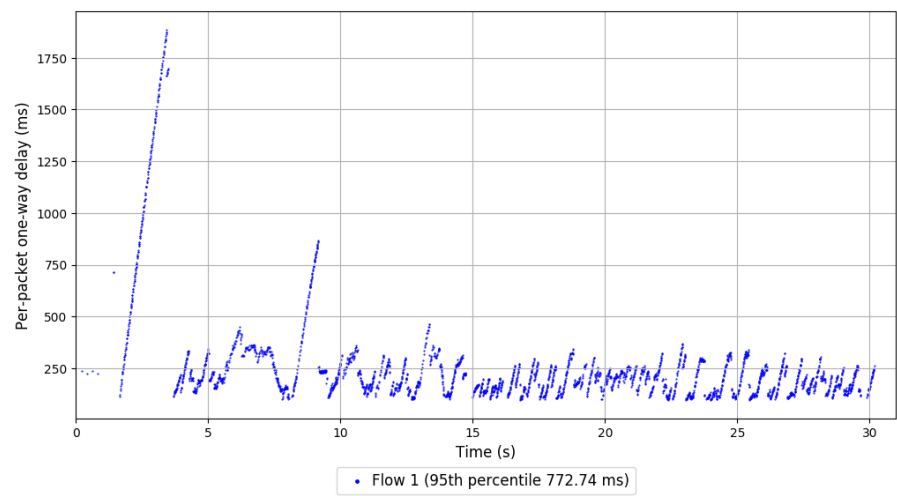
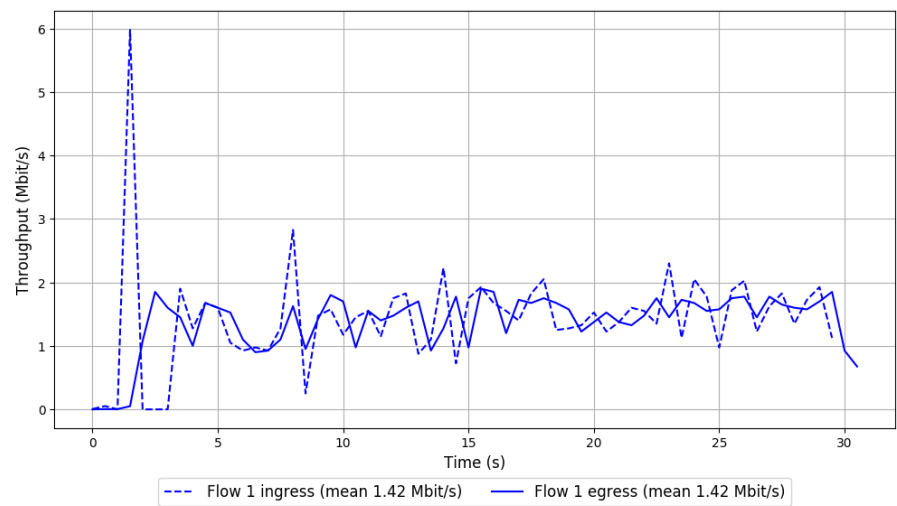


```
Run 1: Statistics of TaoVA-100x

Start at: 2018-09-06 03:32:12
End at: 2018-09-06 03:32:42
Local clock offset: 2.702 ms
Remote clock offset: 1.428 ms

# Below is generated by plot.py at 2018-09-06 04:27:55
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 772.737 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 772.737 ms
Loss rate: 0.06%
```

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-09-06 03:52:39

End at: 2018-09-06 03:53:09

Local clock offset: -1.615 ms

Remote clock offset: 1.012 ms

Below is generated by plot.py at 2018-09-06 04:27:56

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.63 Mbit/s

95th percentile per-packet one-way delay: 333.893 ms

Loss rate: 0.69%

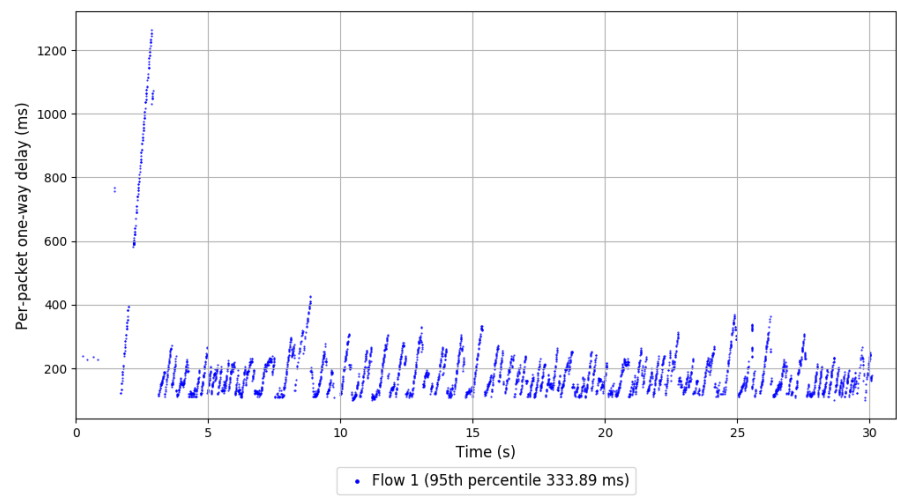
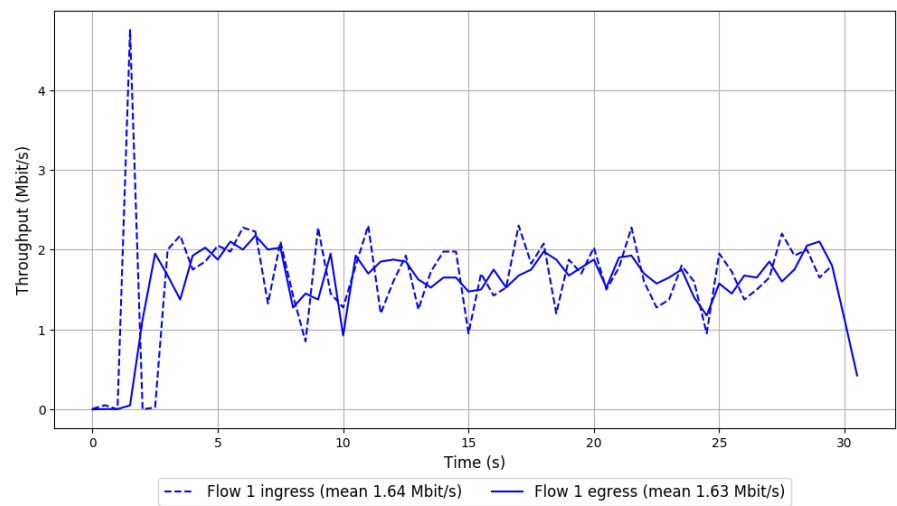
-- Flow 1:

Average throughput: 1.63 Mbit/s

95th percentile per-packet one-way delay: 333.893 ms

Loss rate: 0.69%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-09-06 04:13:14

End at: 2018-09-06 04:13:44

Local clock offset: -4.853 ms

Remote clock offset: -0.691 ms

Below is generated by plot.py at 2018-09-06 04:27:57

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.78 Mbit/s

95th percentile per-packet one-way delay: 266.009 ms

Loss rate: 0.31%

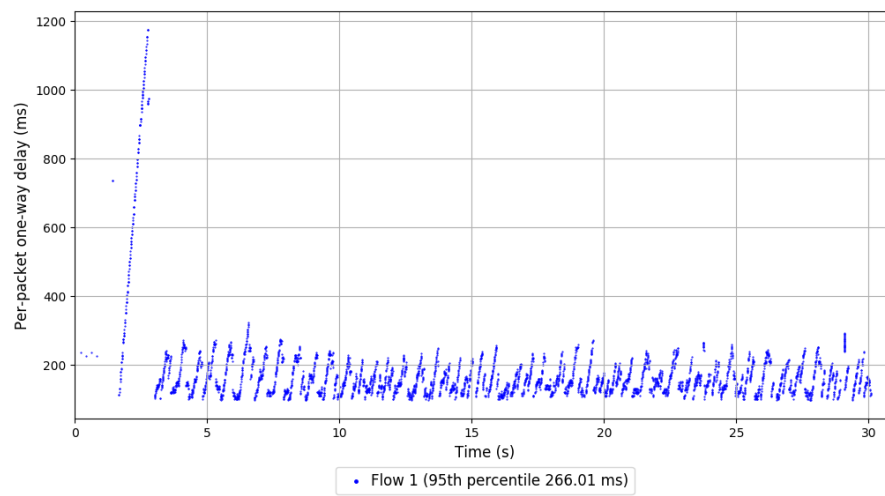
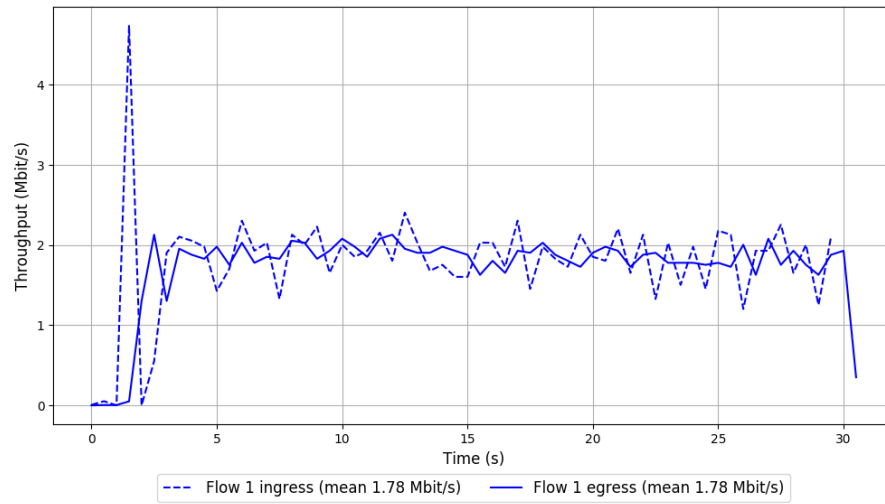
-- Flow 1:

Average throughput: 1.78 Mbit/s

95th percentile per-packet one-way delay: 266.009 ms

Loss rate: 0.31%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-09-06 03:44:42

End at: 2018-09-06 03:45:12

Local clock offset: 0.452 ms

Remote clock offset: 1.228 ms

Below is generated by plot.py at 2018-09-06 04:27:57

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.45 Mbit/s

95th percentile per-packet one-way delay: 325.530 ms

Loss rate: 0.44%

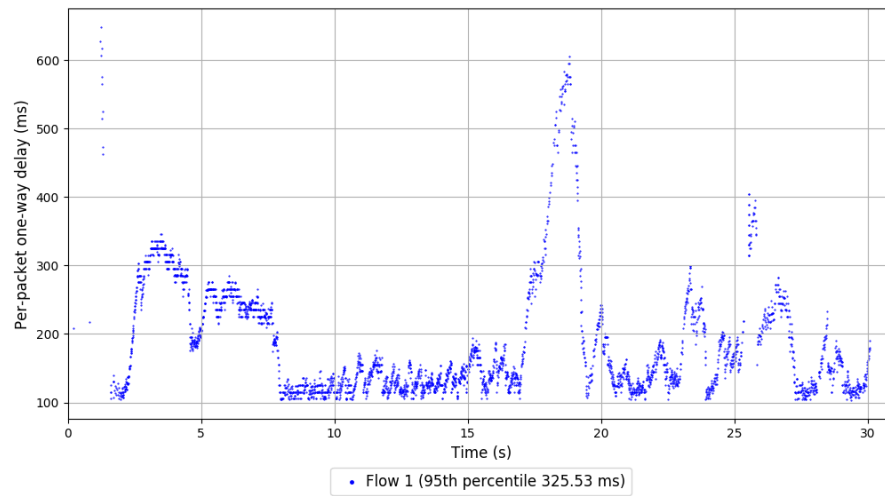
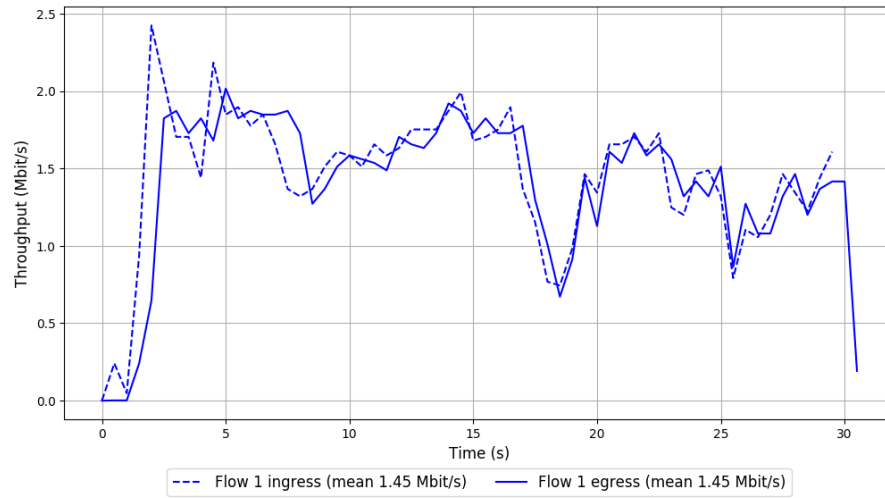
-- Flow 1:

Average throughput: 1.45 Mbit/s

95th percentile per-packet one-way delay: 325.530 ms

Loss rate: 0.44%

Run 1: Report of TCP Vegas — Data Link

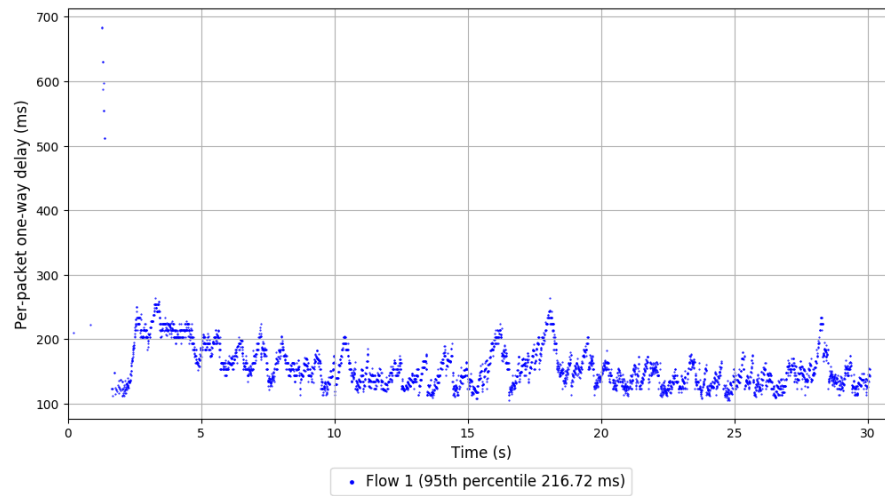
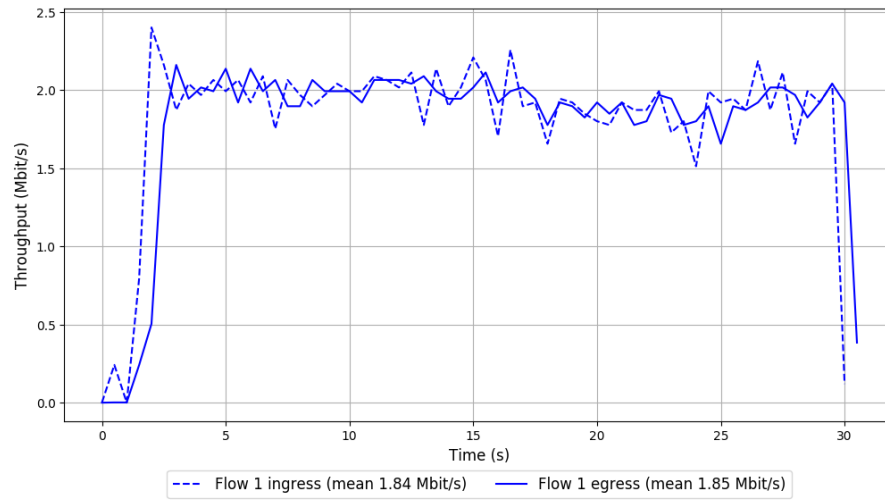


Run 2: Statistics of TCP Vegas

Start at: 2018-09-06 04:05:13
End at: 2018-09-06 04:05:43
Local clock offset: -3.578 ms
Remote clock offset: 1.847 ms

Below is generated by plot.py at 2018-09-06 04:27:58
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 216.721 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 216.721 ms
Loss rate: 0.33%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2018-09-06 04:25:42

End at: 2018-09-06 04:26:12

Local clock offset: -0.552 ms

Remote clock offset: 0.125 ms

Below is generated by plot.py at 2018-09-06 04:27:58

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.80 Mbit/s

95th percentile per-packet one-way delay: 269.149 ms

Loss rate: 0.29%

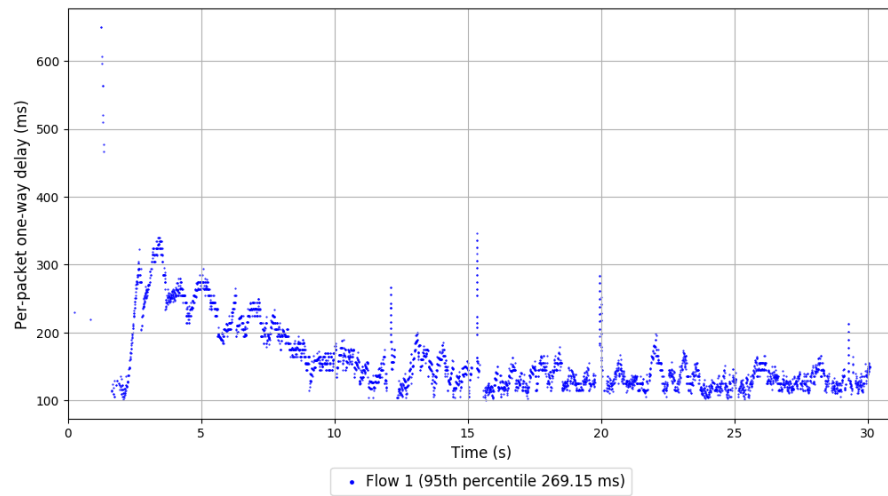
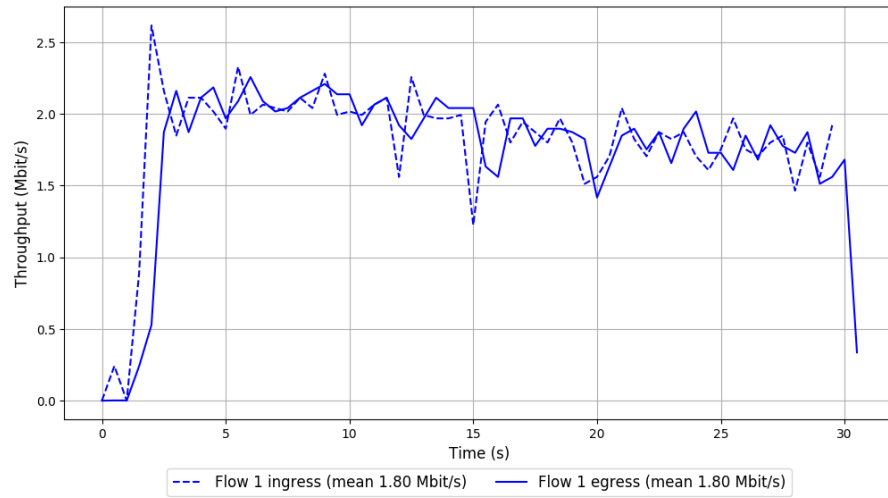
-- Flow 1:

Average throughput: 1.80 Mbit/s

95th percentile per-packet one-way delay: 269.149 ms

Loss rate: 0.29%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-09-06 03:36:46

End at: 2018-09-06 03:37:16

Local clock offset: 1.285 ms

Remote clock offset: 2.568 ms

Below is generated by plot.py at 2018-09-06 04:27:58

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.71 Mbit/s

95th percentile per-packet one-way delay: 1699.922 ms

Loss rate: 4.75%

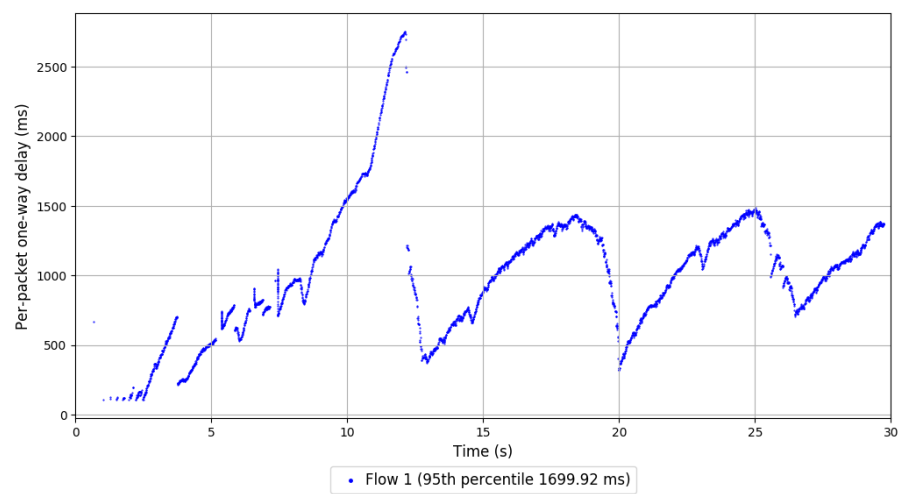
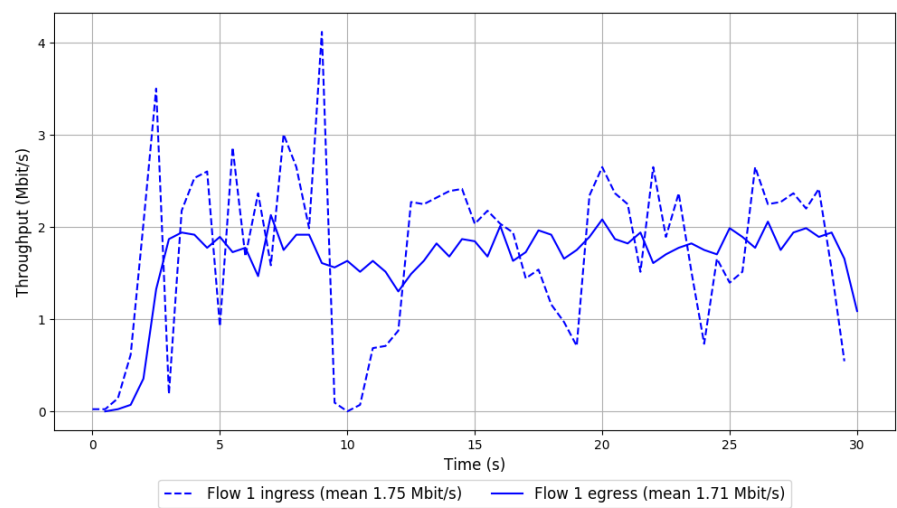
-- Flow 1:

Average throughput: 1.71 Mbit/s

95th percentile per-packet one-way delay: 1699.922 ms

Loss rate: 4.75%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-09-06 03:57:16

End at: 2018-09-06 03:57:46

Local clock offset: -2.339 ms

Remote clock offset: 0.875 ms

Below is generated by plot.py at 2018-09-06 04:27:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.79 Mbit/s

95th percentile per-packet one-way delay: 1570.880 ms

Loss rate: 5.90%

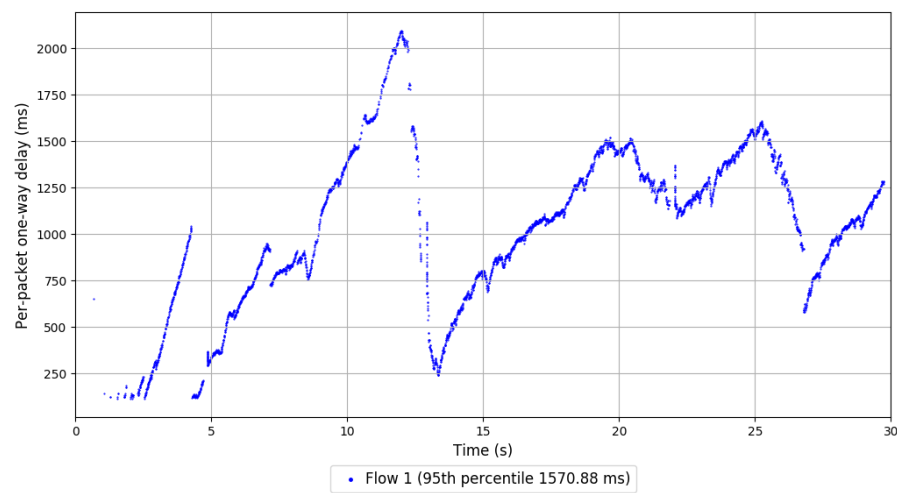
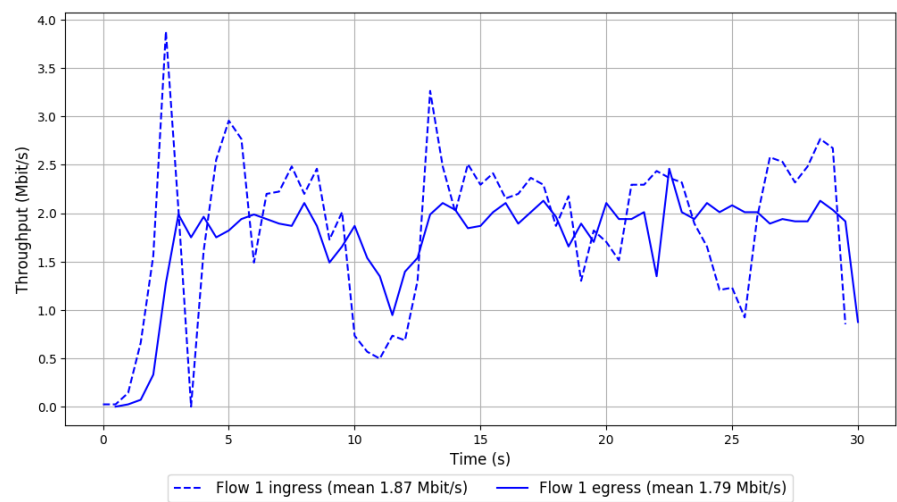
-- Flow 1:

Average throughput: 1.79 Mbit/s

95th percentile per-packet one-way delay: 1570.880 ms

Loss rate: 5.90%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-09-06 04:17:46

End at: 2018-09-06 04:18:16

Local clock offset: -2.941 ms

Remote clock offset: 0.26 ms

Below is generated by plot.py at 2018-09-06 04:28:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 2.05 Mbit/s

95th percentile per-packet one-way delay: 1658.490 ms

Loss rate: 2.55%

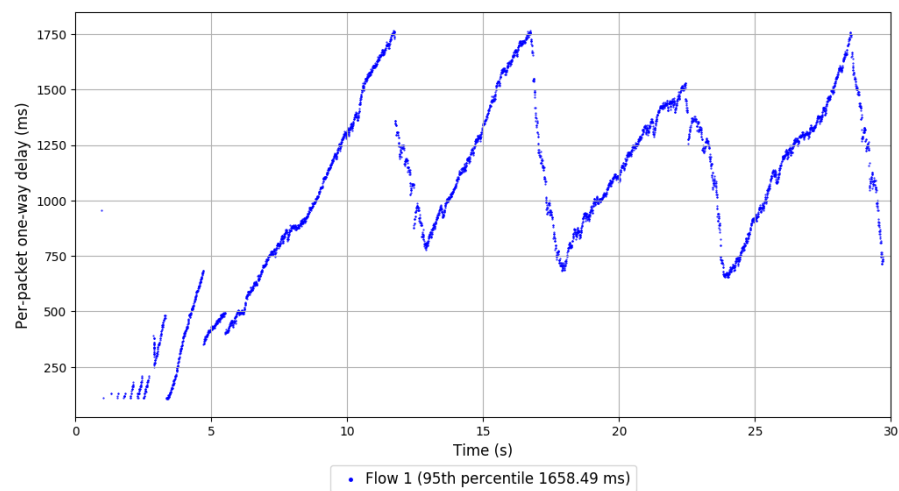
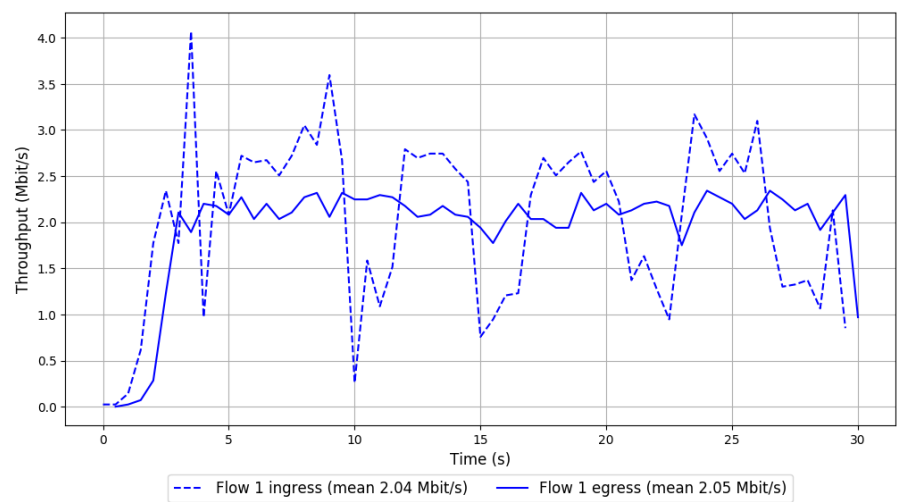
-- Flow 1:

Average throughput: 2.05 Mbit/s

95th percentile per-packet one-way delay: 1658.490 ms

Loss rate: 2.55%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2018-09-06 03:45:50

End at: 2018-09-06 03:46:20

Local clock offset: -0.505 ms

Remote clock offset: 2.134 ms

Below is generated by plot.py at 2018-09-06 04:28:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.38 Mbit/s

95th percentile per-packet one-way delay: 658.829 ms

Loss rate: 1.02%

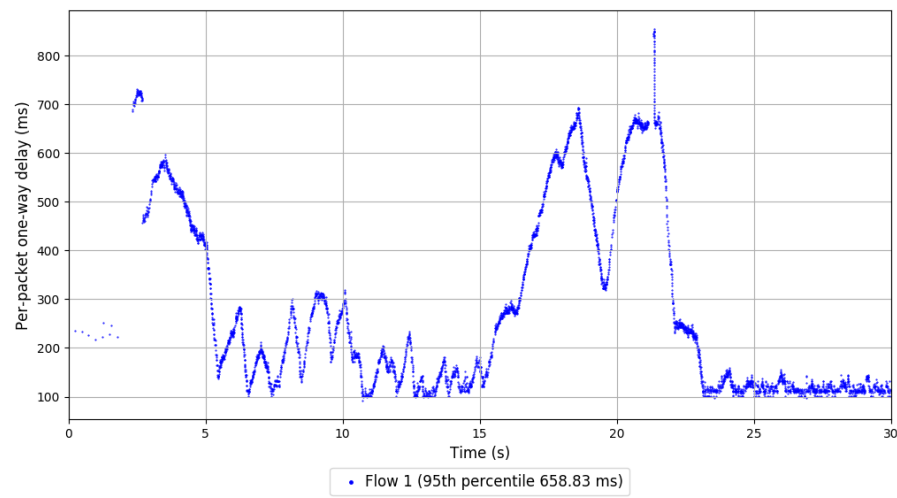
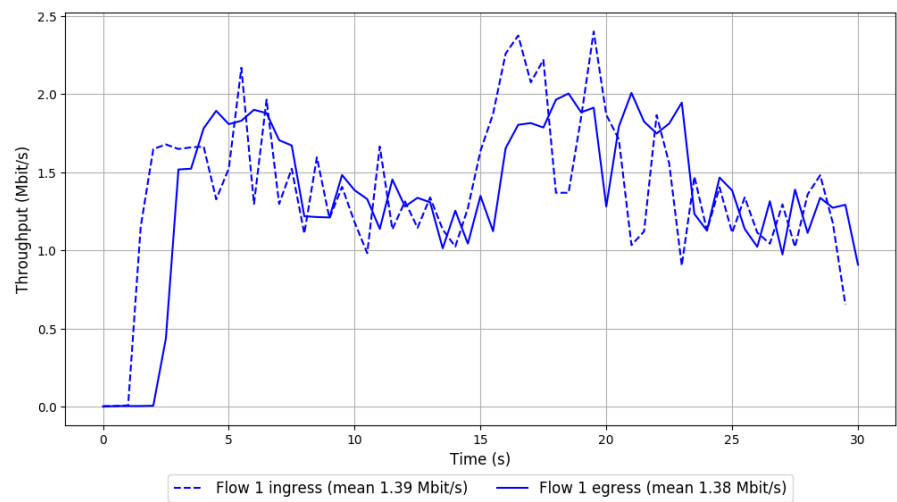
-- Flow 1:

Average throughput: 1.38 Mbit/s

95th percentile per-packet one-way delay: 658.829 ms

Loss rate: 1.02%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-09-06 04:06:23

End at: 2018-09-06 04:06:53

Local clock offset: -3.078 ms

Remote clock offset: 0.632 ms

Below is generated by plot.py at 2018-09-06 04:28:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 213.381 ms

Loss rate: 1.04%

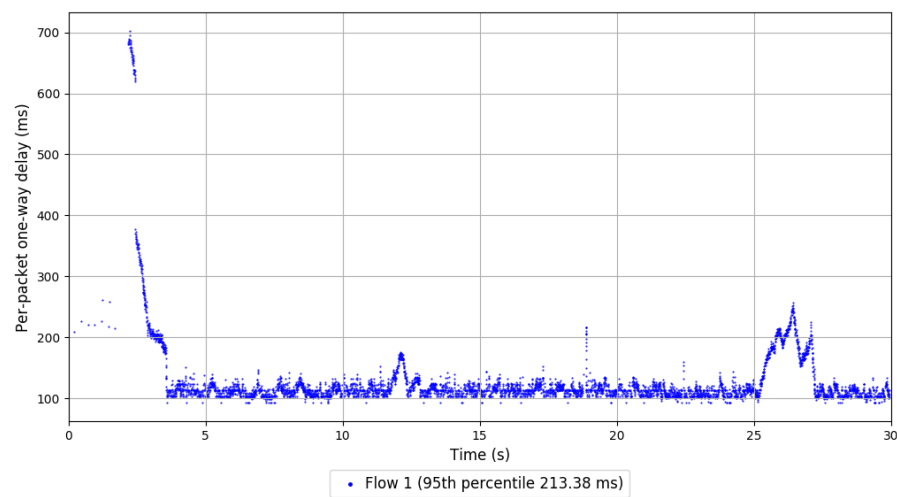
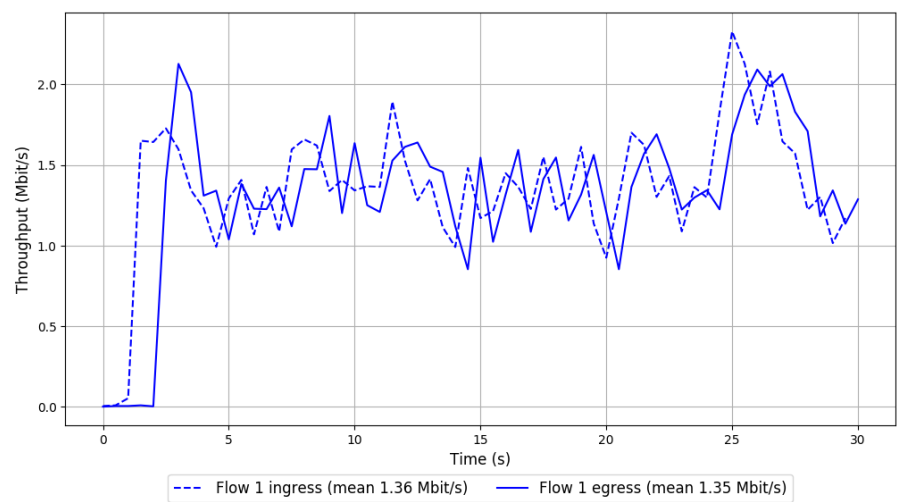
-- Flow 1:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 213.381 ms

Loss rate: 1.04%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2018-09-06 04:26:50

End at: 2018-09-06 04:27:20

Local clock offset: 0.475 ms

Remote clock offset: 0.116 ms

Below is generated by plot.py at 2018-09-06 04:28:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.45 Mbit/s

95th percentile per-packet one-way delay: 231.789 ms

Loss rate: 0.89%

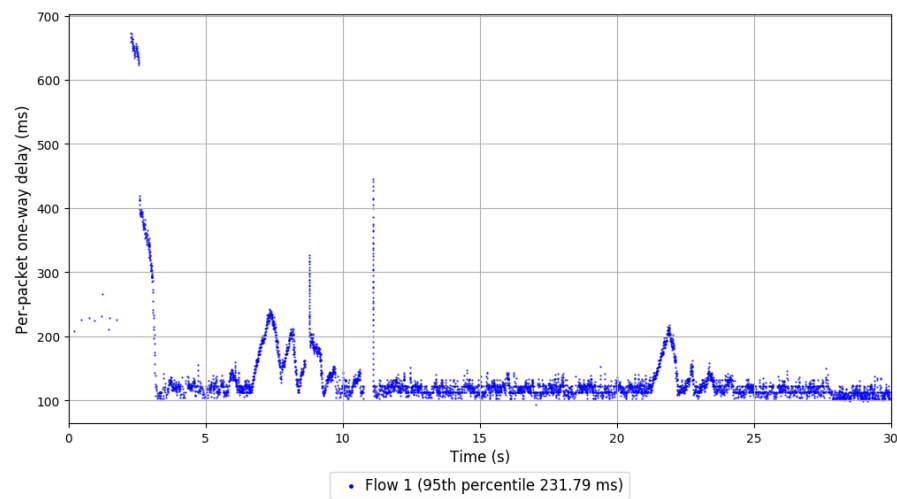
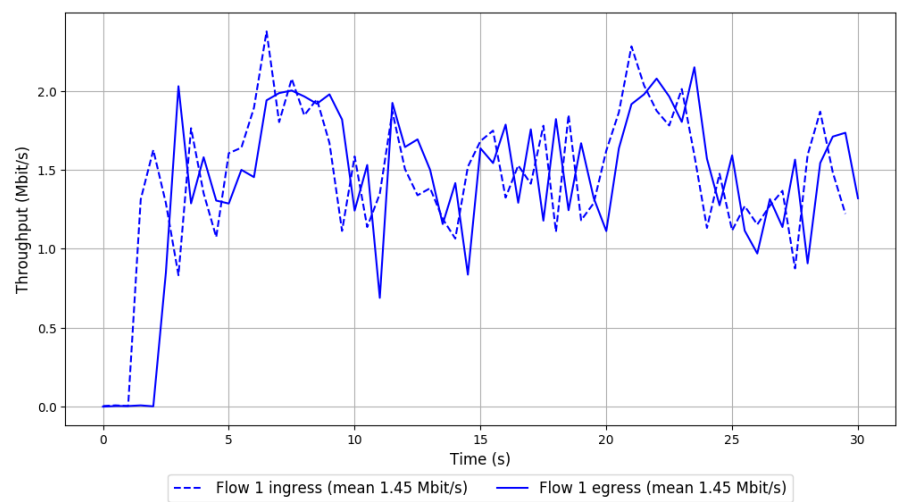
-- Flow 1:

Average throughput: 1.45 Mbit/s

95th percentile per-packet one-way delay: 231.789 ms

Loss rate: 0.89%

Run 3: Report of PCC-Vivace — Data Link

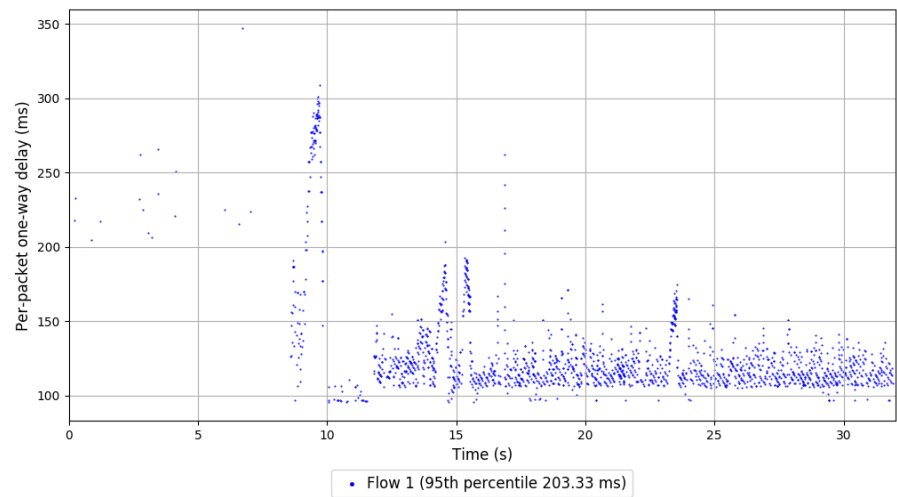
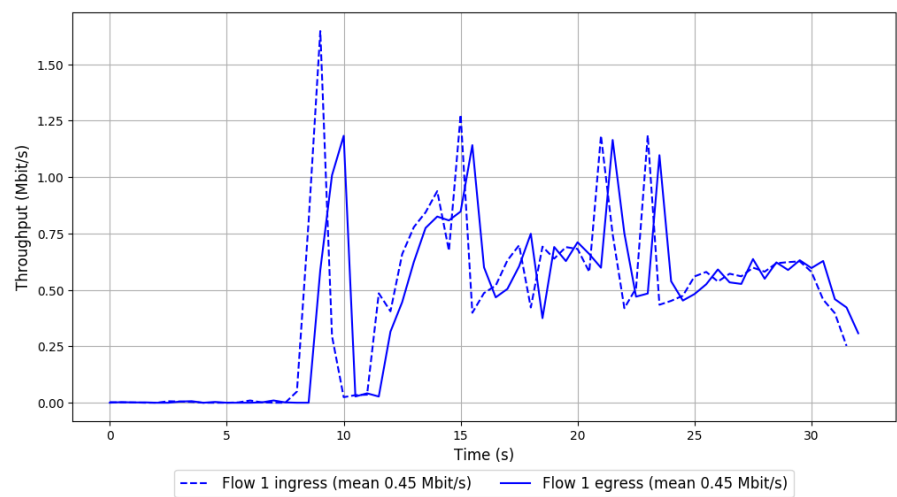


```
Run 1: Statistics of WebRTC media

Start at: 2018-09-06 03:39:03
End at: 2018-09-06 03:39:33
Local clock offset: 1.466 ms
Remote clock offset: 2.643 ms

# Below is generated by plot.py at 2018-09-06 04:28:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 203.326 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 203.326 ms
Loss rate: 0.09%
```

Run 1: Report of WebRTC media — Data Link

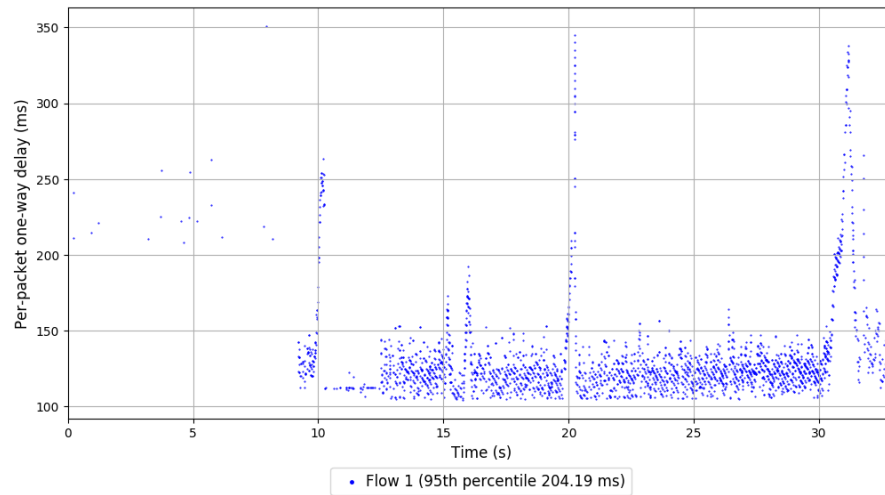
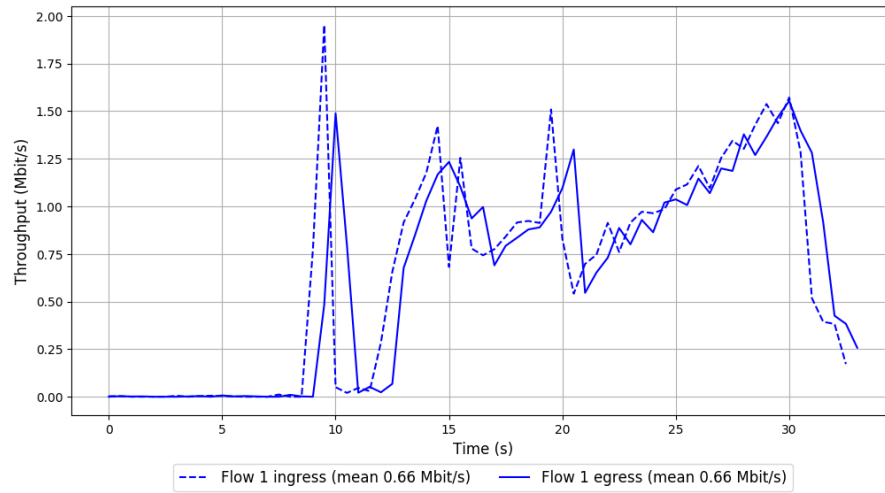


Run 2: Statistics of WebRTC media

Start at: 2018-09-06 03:59:32
End at: 2018-09-06 04:00:02
Local clock offset: -1.946 ms
Remote clock offset: -0.055 ms

Below is generated by plot.py at 2018-09-06 04:28:03
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 204.186 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 204.186 ms
Loss rate: 0.03%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-09-06 04:20:02

End at: 2018-09-06 04:20:33

Local clock offset: -2.524 ms

Remote clock offset: 1.405 ms

Below is generated by plot.py at 2018-09-06 04:28:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 273.759 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 273.759 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

