

Pantheon Report

Generated at 2018-09-10 22:32:02 (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:

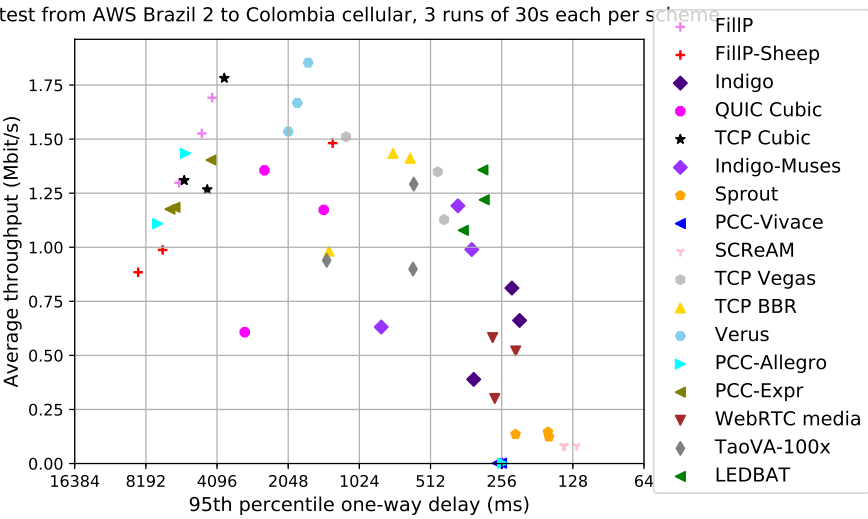
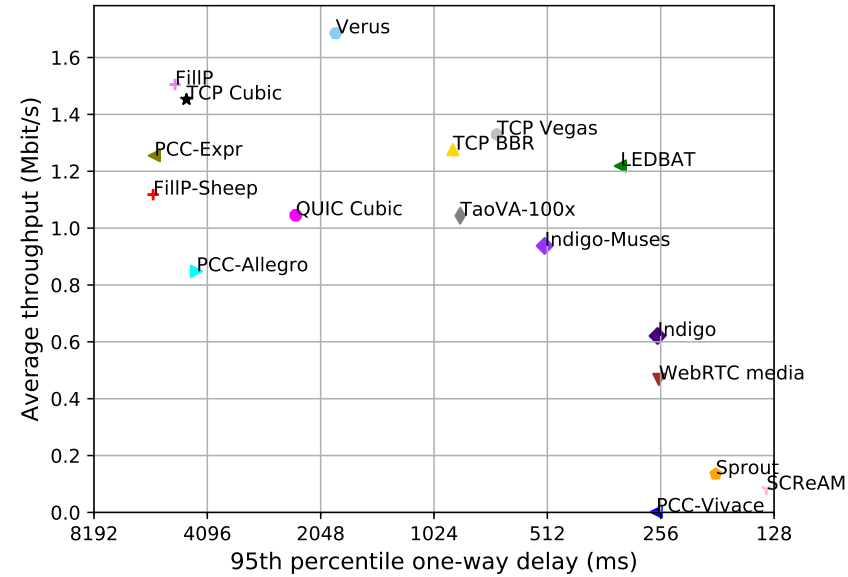
```
Linux 4.15.0-1020-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
net.ipv4.tcp_mem = 184101 245469 368202
```

Git summary:

```
branch: muses @ f30bceca2aec2ef14a3cf71e25642f4a30905a03
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 65ac1b19bbefed0c6349ae986009b4fa8643c40a
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)



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	1.27	912.45	1.93
Copa	0	N/A	N/A	N/A
TCP Cubic	3	1.45	4653.02	18.51
FillP	3	1.51	4988.77	92.62
FillP-Sheep	3	1.12	5704.93	23.18
Indigo	3	0.62	261.02	0.15
LEDBAT	3	1.22	327.67	0.46
Indigo-Muses	3	0.94	520.65	0.24
PCC-Allegro	3	0.85	4376.55	26.34
PCC-Expr	3	1.25	5663.51	77.63
QUIC Cubic	3	1.05	2385.36	8.11
SCReAM	3	0.08	134.11	0.13
Sprout	3	0.14	182.83	0.01
TaoVA-100x	3	1.04	872.64	0.77
TCP Vegas	3	1.33	697.05	0.83
Verus	3	1.69	1868.86	4.17
PCC-Vivace	3	0.00	263.29	0.00
WebRTC media	3	0.47	258.94	0.21

Run 1: Statistics of TCP BBR

Start at: 2018-09-10 21:39:23

End at: 2018-09-10 21:39:53

Local clock offset: -7.903 ms

Remote clock offset: 6.251 ms

Below is generated by plot.py at 2018-09-10 22:31:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.41 Mbit/s

95th percentile per-packet one-way delay: 624.160 ms

Loss rate: 1.96%

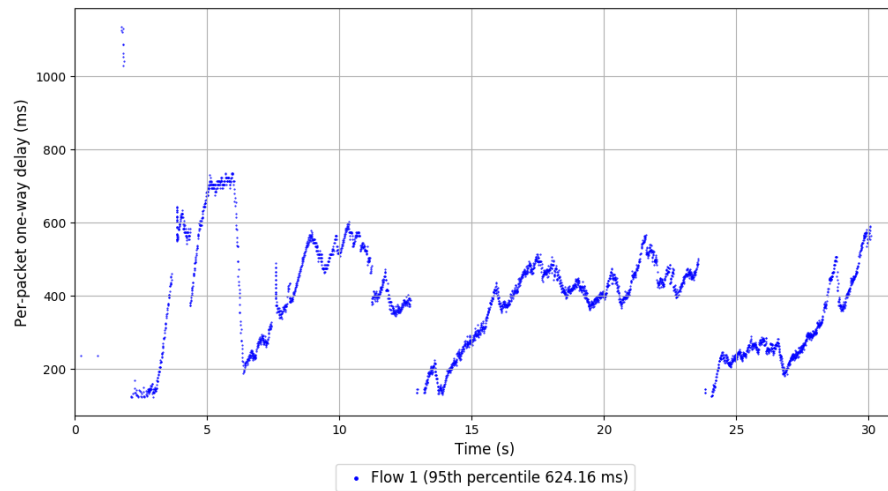
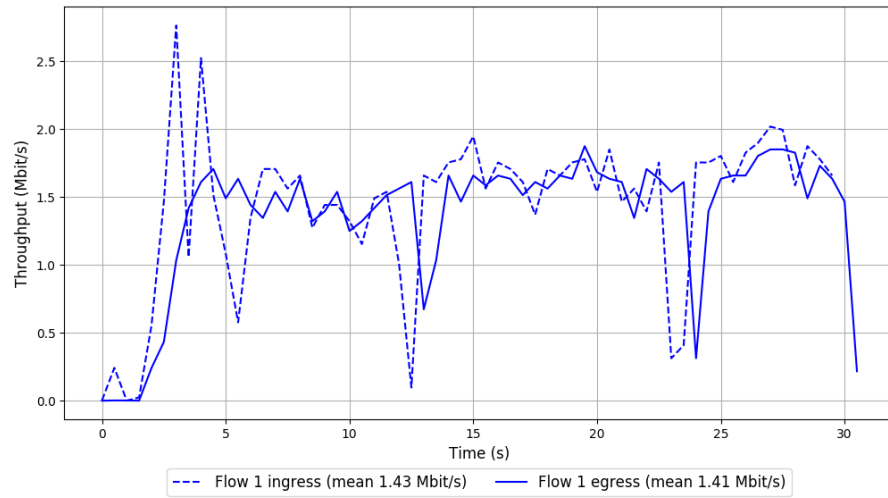
-- Flow 1:

Average throughput: 1.41 Mbit/s

95th percentile per-packet one-way delay: 624.160 ms

Loss rate: 1.96%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-10 21:59:55

End at: 2018-09-10 22:00:25

Local clock offset: -8.19 ms

Remote clock offset: 6.263 ms

Below is generated by plot.py at 2018-09-10 22:31:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.98 Mbit/s

95th percentile per-packet one-way delay: 1375.578 ms

Loss rate: 2.08%

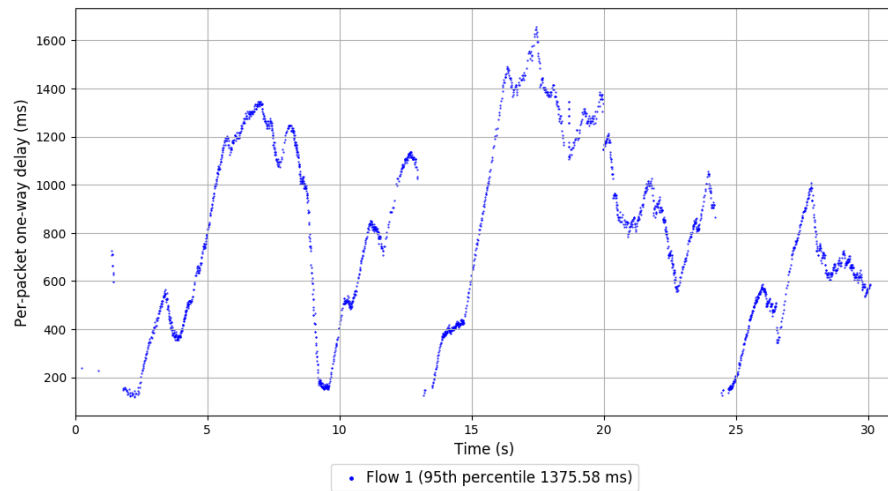
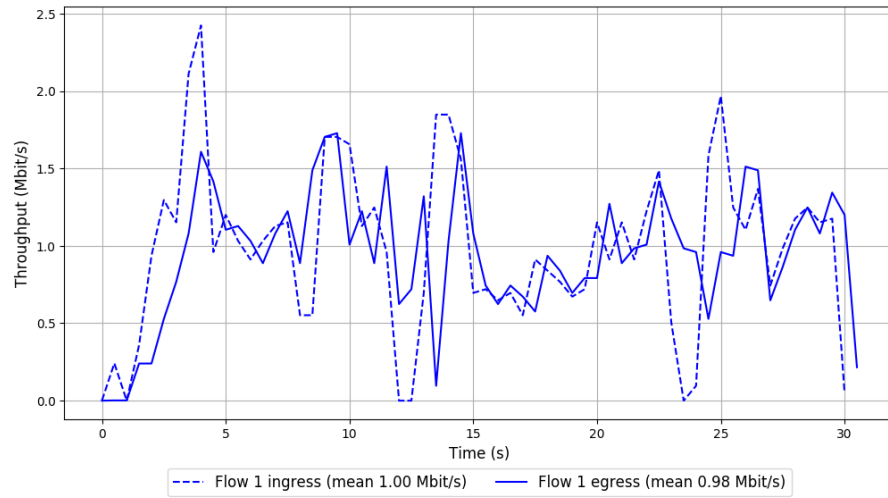
-- Flow 1:

Average throughput: 0.98 Mbit/s

95th percentile per-packet one-way delay: 1375.578 ms

Loss rate: 2.08%

Run 2: Report of TCP BBR — Data Link

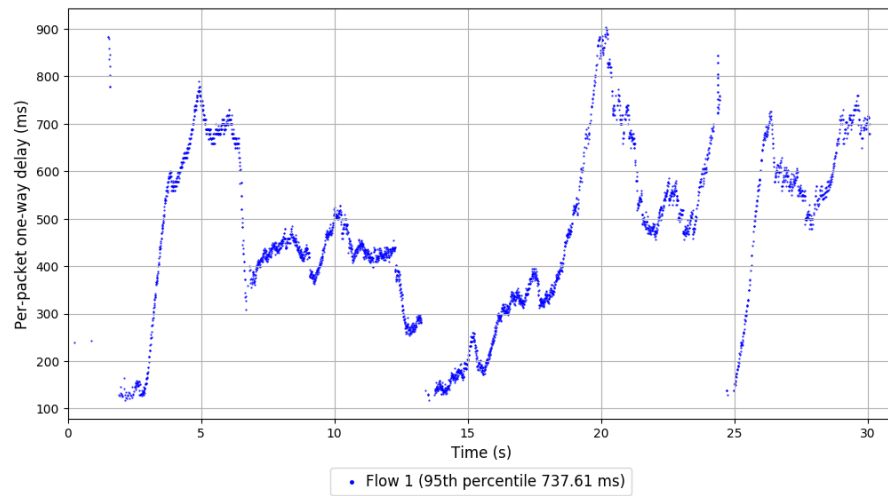
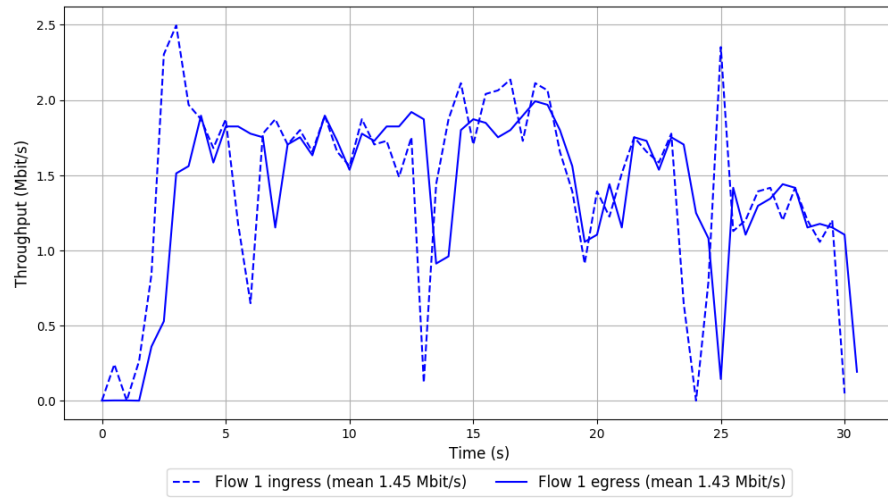


Run 3: Statistics of TCP BBR

Start at: 2018-09-10 22:20:29
End at: 2018-09-10 22:20:59
Local clock offset: -10.705 ms
Remote clock offset: 6.747 ms

Below is generated by plot.py at 2018-09-10 22:31:28
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 737.612 ms
Loss rate: 1.74%
-- Flow 1:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 737.612 ms
Loss rate: 1.74%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

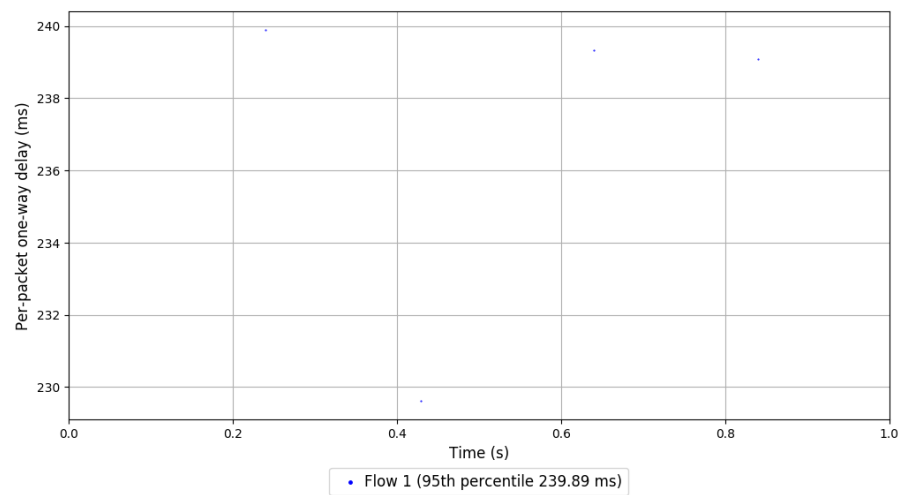
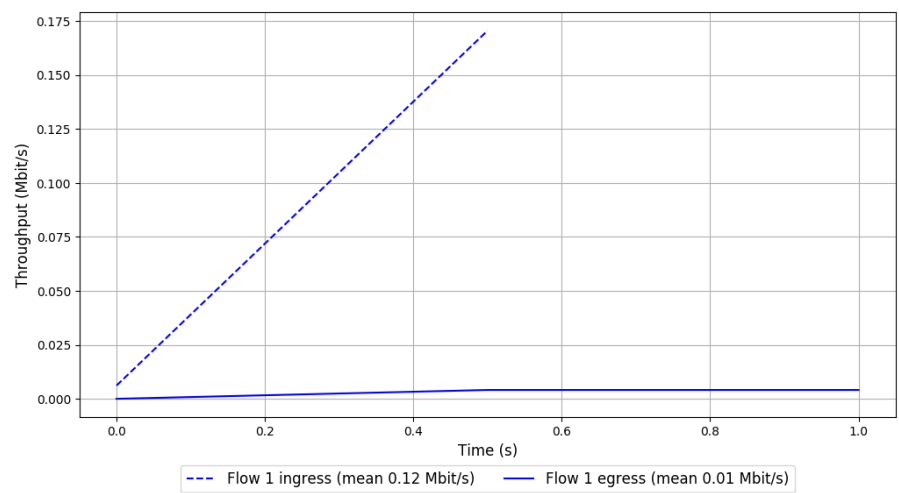
Start at: 2018-09-10 21:34:48

End at: 2018-09-10 21:35:18

Local clock offset: -7.456 ms

Remote clock offset: 6.284 ms

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

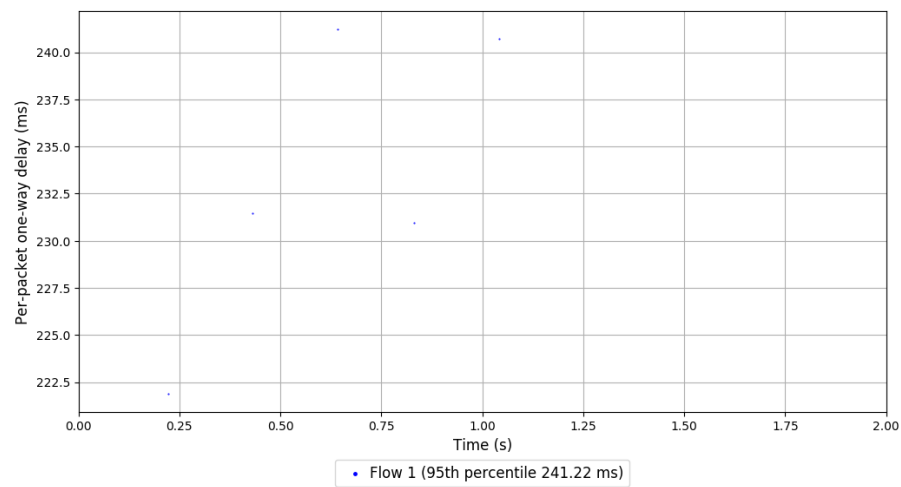
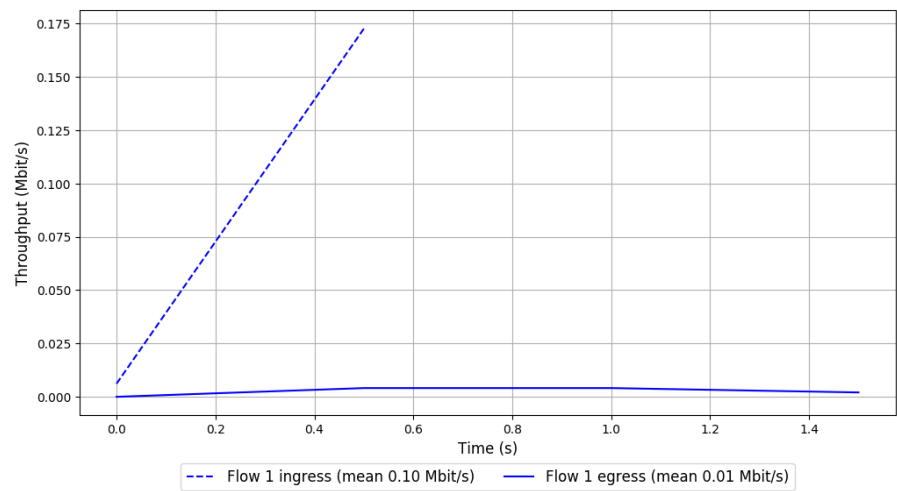
Start at: 2018-09-10 21:55:22

End at: 2018-09-10 21:55:52

Local clock offset: -7.762 ms

Remote clock offset: 2.074 ms

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

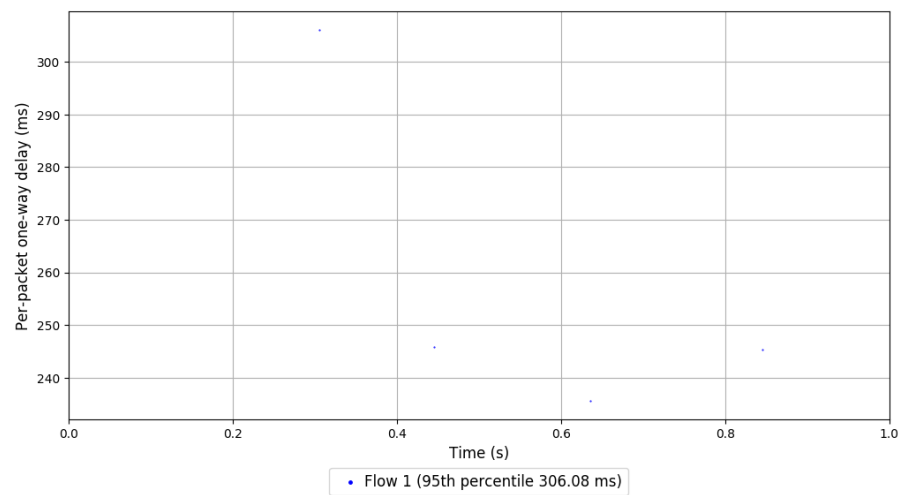
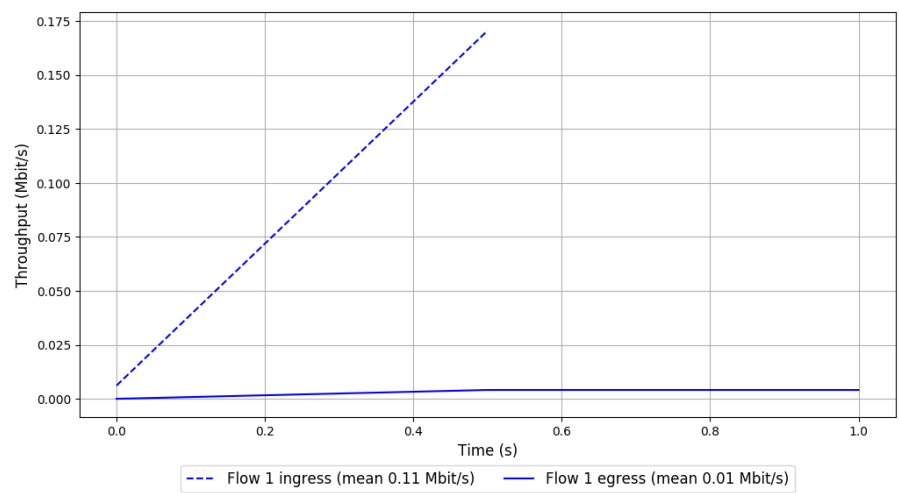
Start at: 2018-09-10 22:15:51

End at: 2018-09-10 22:16:21

Local clock offset: -9.178 ms

Remote clock offset: 6.537 ms

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-10 21:43:57

End at: 2018-09-10 21:44:27

Local clock offset: -7.769 ms

Remote clock offset: 6.375 ms

Below is generated by plot.py at 2018-09-10 22:31:28

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.31 Mbit/s

95th percentile per-packet one-way delay: 5638.198 ms

Loss rate: 19.13%

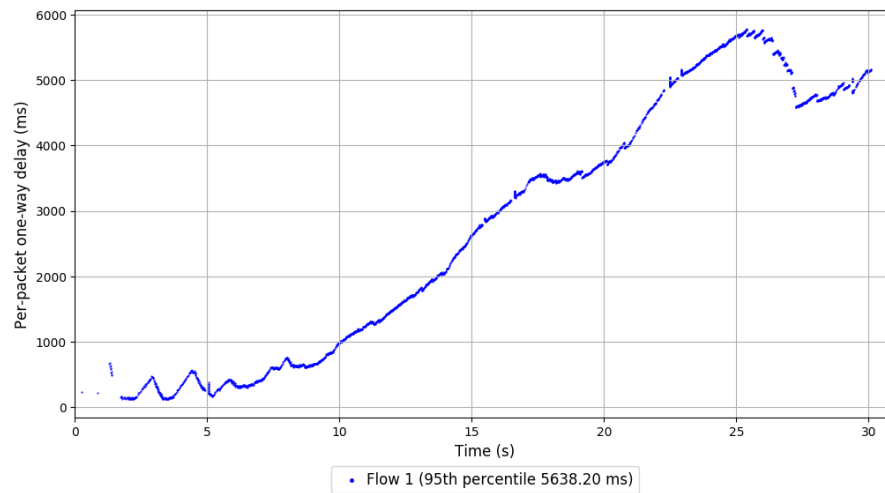
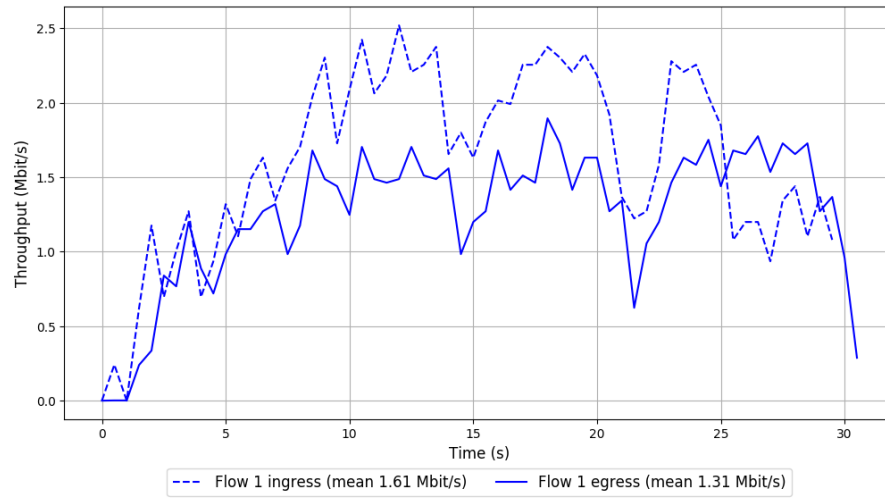
-- Flow 1:

Average throughput: 1.31 Mbit/s

95th percentile per-packet one-way delay: 5638.198 ms

Loss rate: 19.13%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-10 22:04:28

End at: 2018-09-10 22:04:58

Local clock offset: -8.675 ms

Remote clock offset: 1.878 ms

Below is generated by plot.py at 2018-09-10 22:31:28

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 4504.253 ms

Loss rate: 19.42%

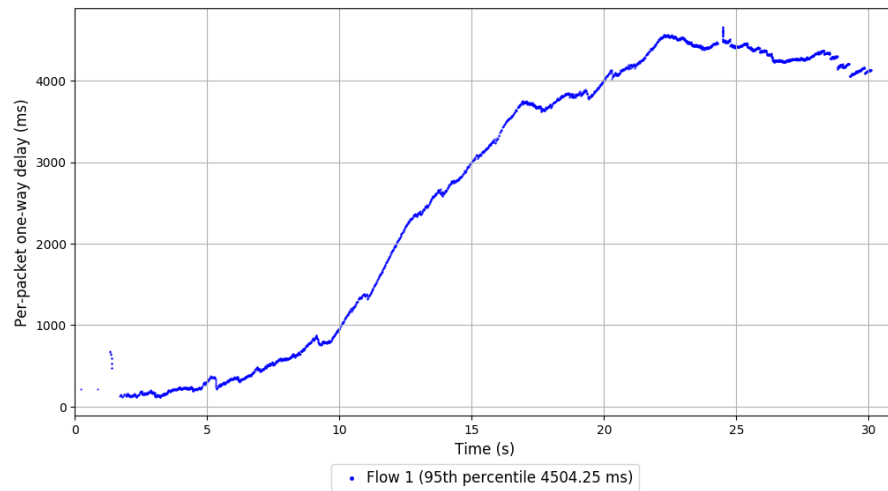
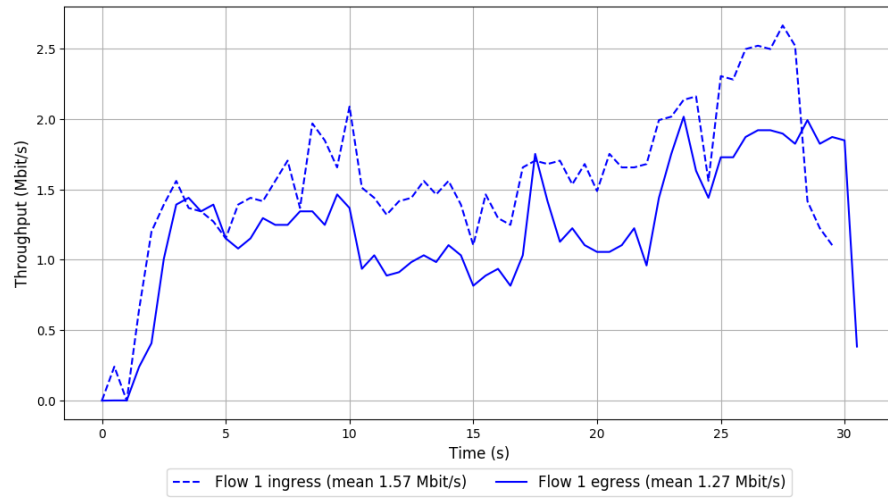
-- Flow 1:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 4504.253 ms

Loss rate: 19.42%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-09-10 22:25:02

End at: 2018-09-10 22:25:32

Local clock offset: -10.82 ms

Remote clock offset: 6.813 ms

Below is generated by plot.py at 2018-09-10 22:31:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.78 Mbit/s

95th percentile per-packet one-way delay: 3816.617 ms

Loss rate: 16.98%

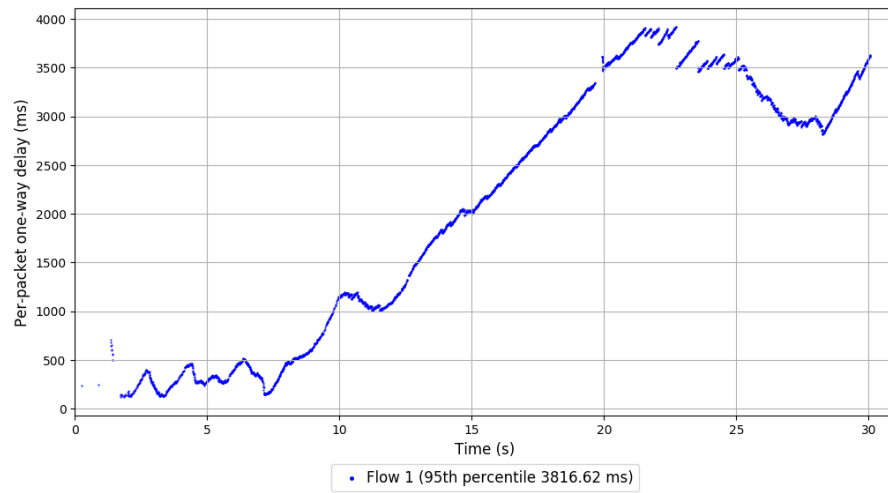
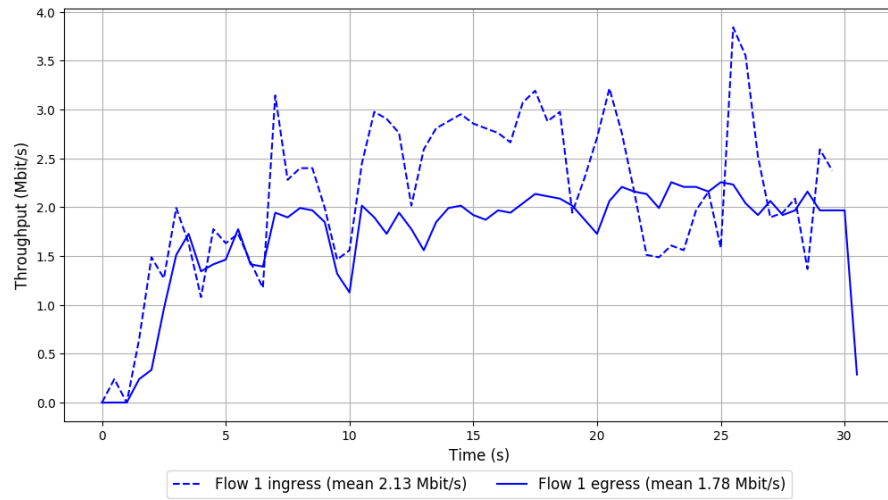
-- Flow 1:

Average throughput: 1.78 Mbit/s

95th percentile per-packet one-way delay: 3816.617 ms

Loss rate: 16.98%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2018-09-10 21:46:13

End at: 2018-09-10 21:46:43

Local clock offset: -7.907 ms

Remote clock offset: 6.331 ms

Below is generated by plot.py at 2018-09-10 22:31:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.30 Mbit/s

95th percentile per-packet one-way delay: 5921.269 ms

Loss rate: 94.34%

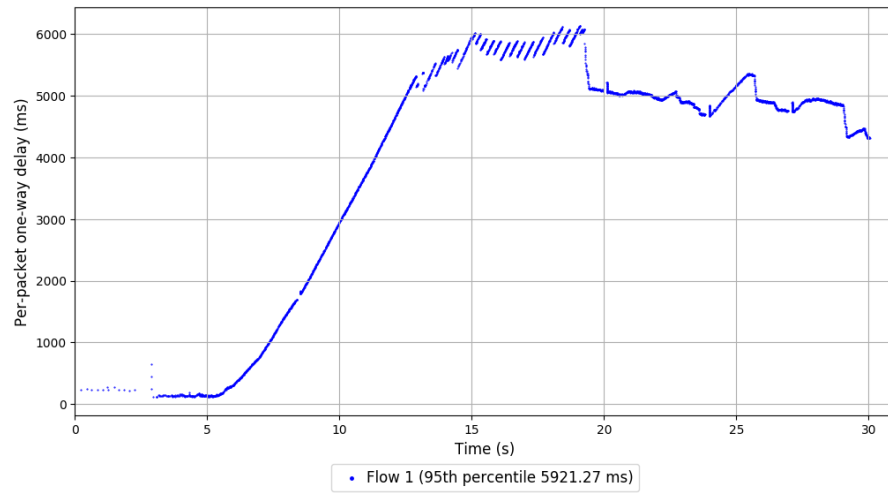
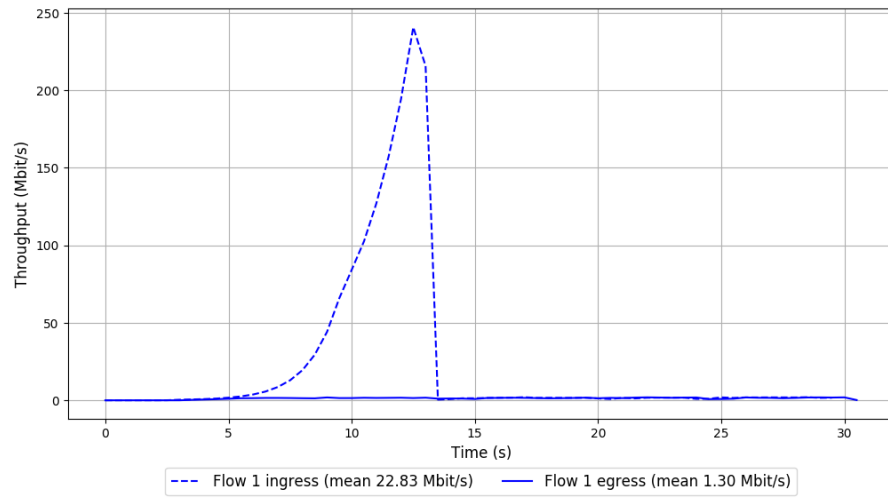
-- Flow 1:

Average throughput: 1.30 Mbit/s

95th percentile per-packet one-way delay: 5921.269 ms

Loss rate: 94.34%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-09-10 22:06:44

End at: 2018-09-10 22:07:14

Local clock offset: -7.99 ms

Remote clock offset: 2.084 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.53 Mbit/s

95th percentile per-packet one-way delay: 4750.314 ms

Loss rate: 93.68%

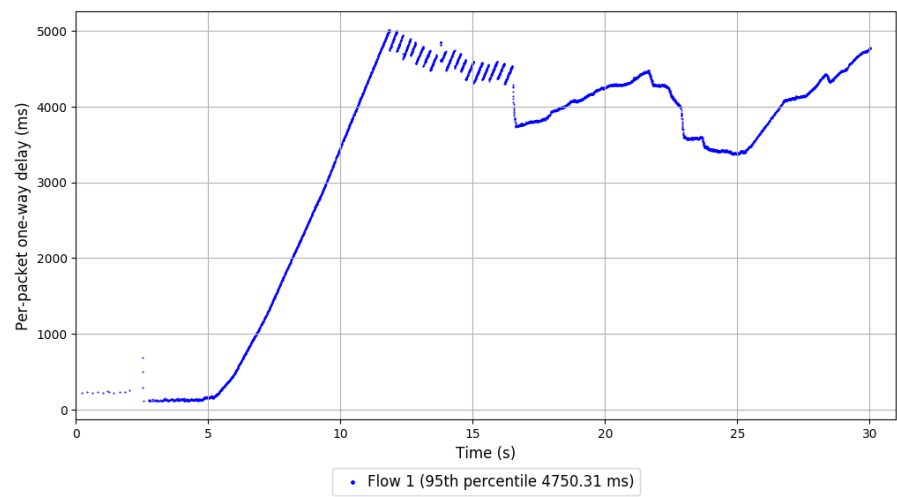
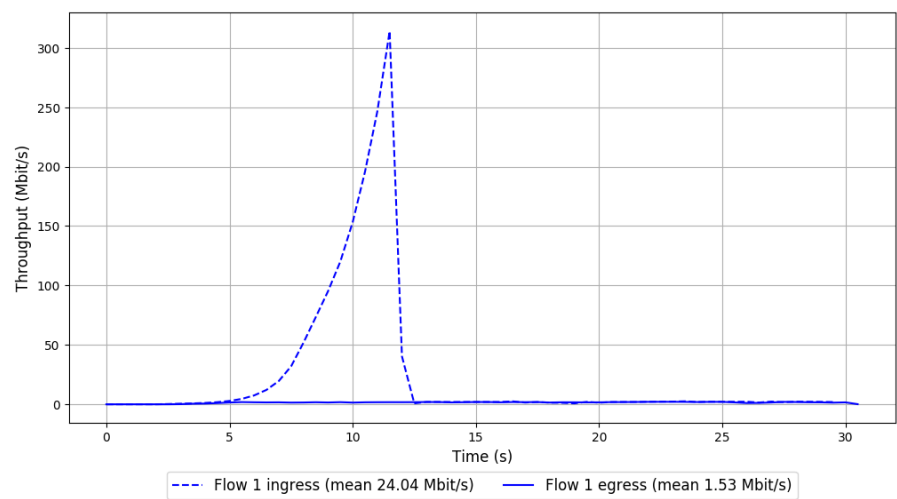
-- Flow 1:

Average throughput: 1.53 Mbit/s

95th percentile per-packet one-way delay: 4750.314 ms

Loss rate: 93.68%

Run 2: Report of FillP — Data Link

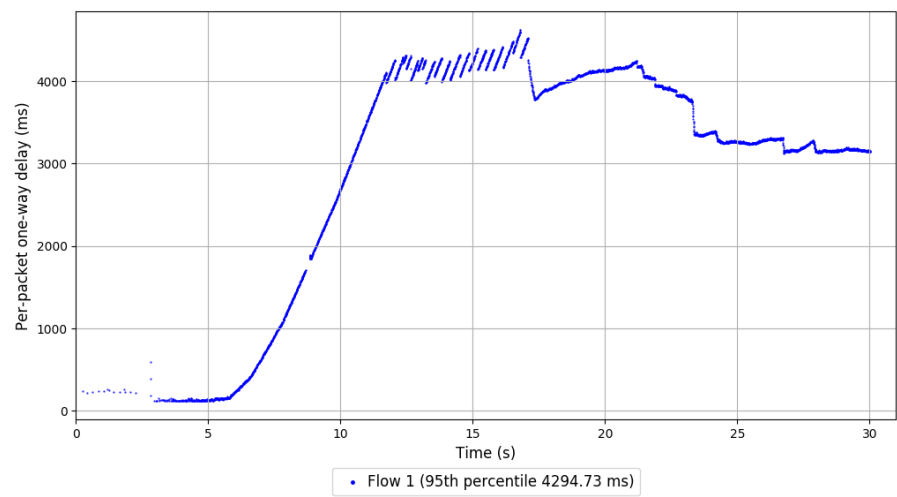
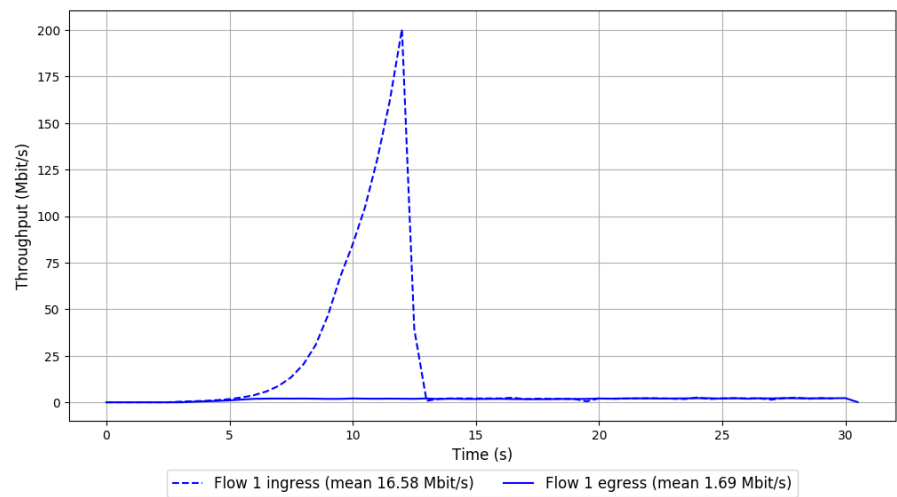


Run 3: Statistics of FillP

Start at: 2018-09-10 22:27:20
End at: 2018-09-10 22:27:50
Local clock offset: -12.112 ms
Remote clock offset: 7.319 ms

Below is generated by plot.py at 2018-09-10 22:31:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.69 Mbit/s
95th percentile per-packet one-way delay: 4294.733 ms
Loss rate: 89.85%
-- Flow 1:
Average throughput: 1.69 Mbit/s
95th percentile per-packet one-way delay: 4294.733 ms
Loss rate: 89.85%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2018-09-10 21:49:38

End at: 2018-09-10 21:50:08

Local clock offset: -7.985 ms

Remote clock offset: 2.16 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.88 Mbit/s

95th percentile per-packet one-way delay: 8829.561 ms

Loss rate: 51.65%

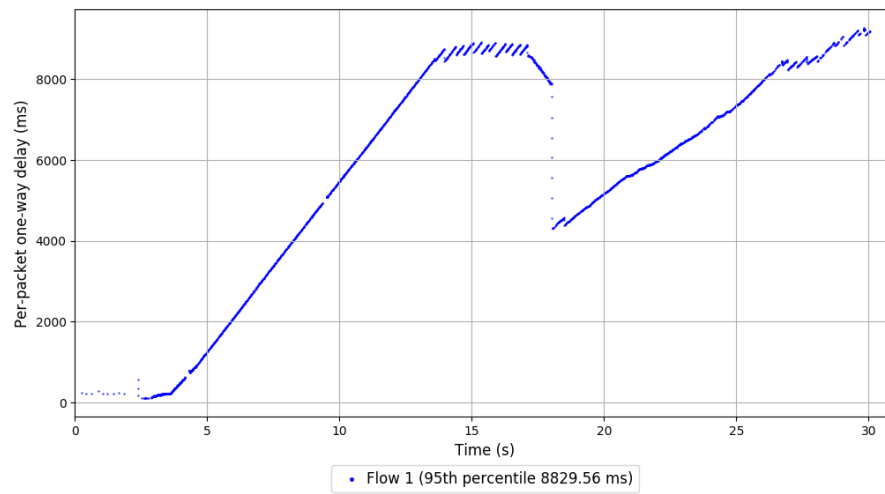
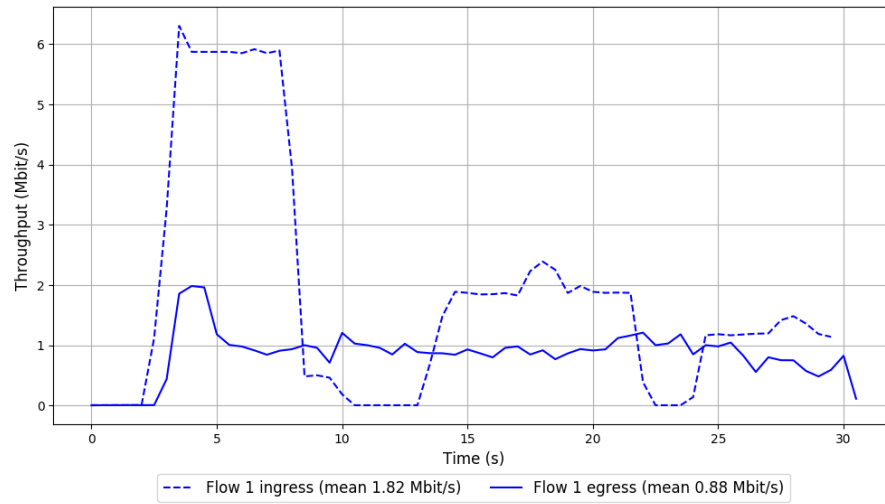
-- Flow 1:

Average throughput: 0.88 Mbit/s

95th percentile per-packet one-way delay: 8829.561 ms

Loss rate: 51.65%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2018-09-10 22:10:10

End at: 2018-09-10 22:10:40

Local clock offset: -8.293 ms

Remote clock offset: 2.068 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.99 Mbit/s

95th percentile per-packet one-way delay: 6957.438 ms

Loss rate: 16.40%

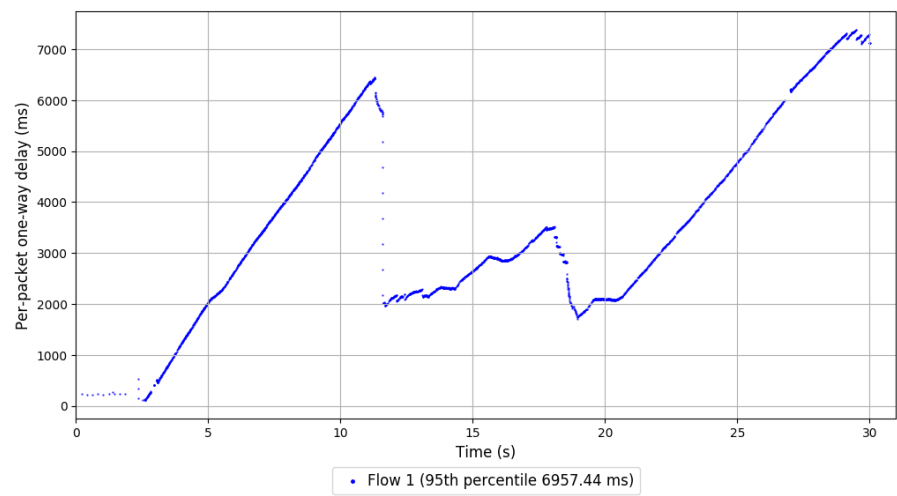
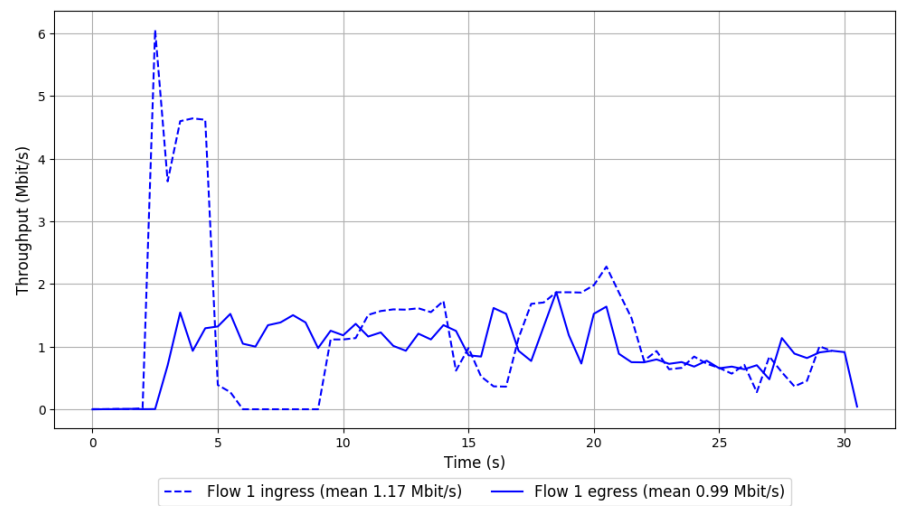
-- Flow 1:

Average throughput: 0.99 Mbit/s

95th percentile per-packet one-way delay: 6957.438 ms

Loss rate: 16.40%

Run 2: Report of FillP-Sheep — Data Link

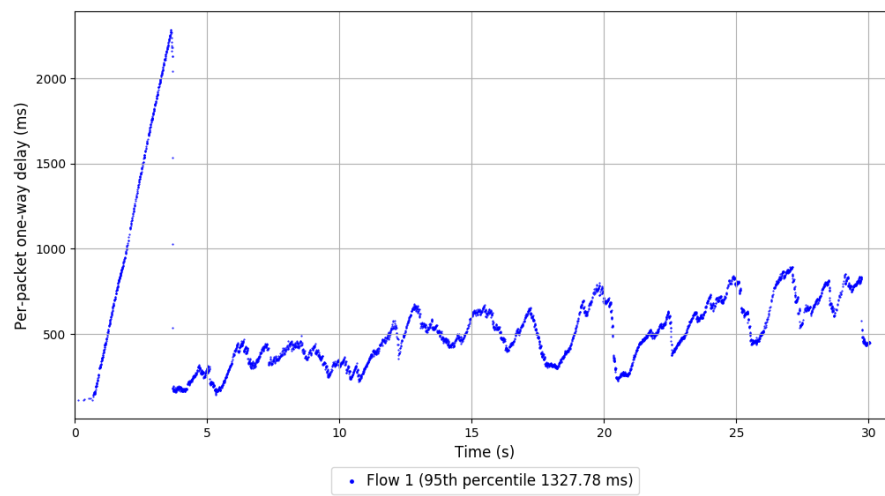
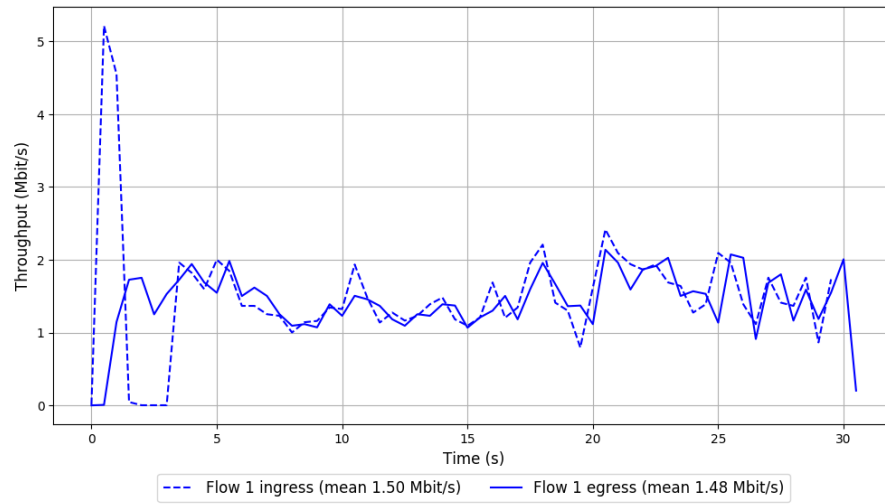


Run 3: Statistics of FillP-Sheep

Start at: 2018-09-10 22:30:46
End at: 2018-09-10 22:31:16
Local clock offset: -10.488 ms
Remote clock offset: 2.781 ms

Below is generated by plot.py at 2018-09-10 22:31:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 1327.779 ms
Loss rate: 1.49%
-- Flow 1:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 1327.779 ms
Loss rate: 1.49%

Run 3: Report of FillP-Sheep — Data Link

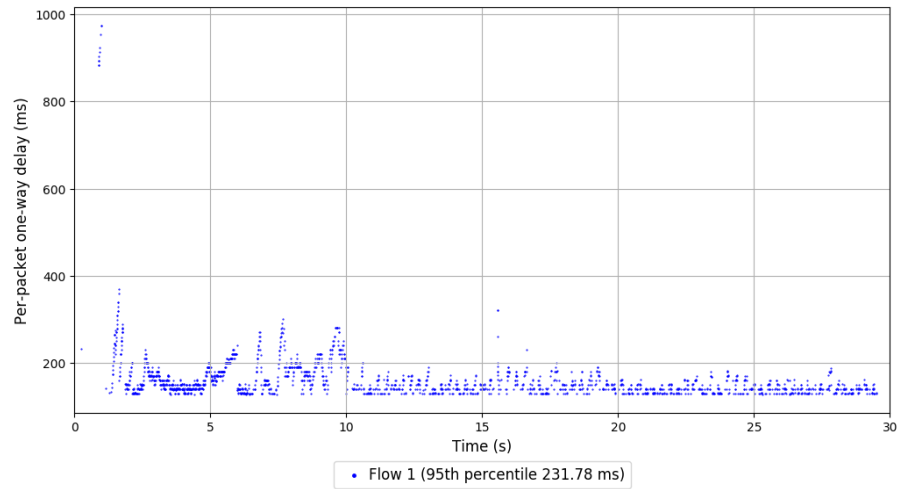
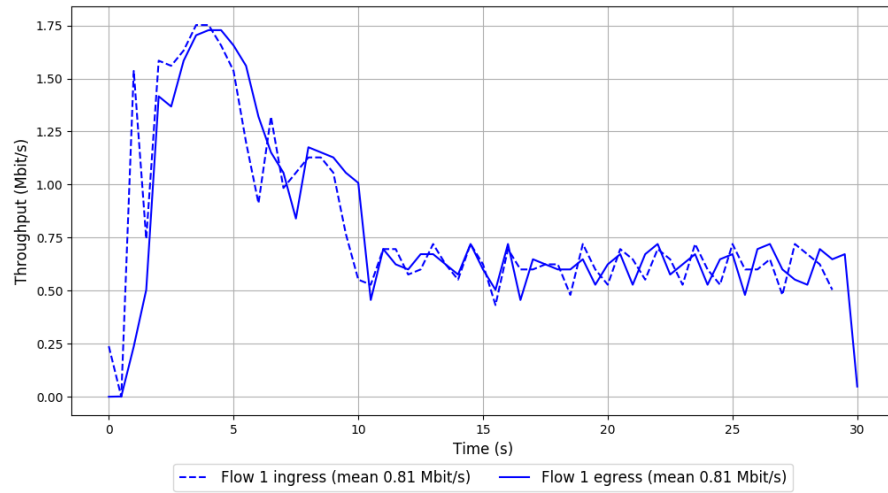


```
Run 1: Statistics of Indigo

Start at: 2018-09-10 21:38:15
End at: 2018-09-10 21:38:45
Local clock offset: -7.555 ms
Remote clock offset: 6.258 ms

# Below is generated by plot.py at 2018-09-10 22:31:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 231.783 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 231.783 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-10 21:58:47

End at: 2018-09-10 21:59:17

Local clock offset: -9.134 ms

Remote clock offset: 6.267 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.39 Mbit/s

95th percentile per-packet one-way delay: 336.235 ms

Loss rate: 0.21%

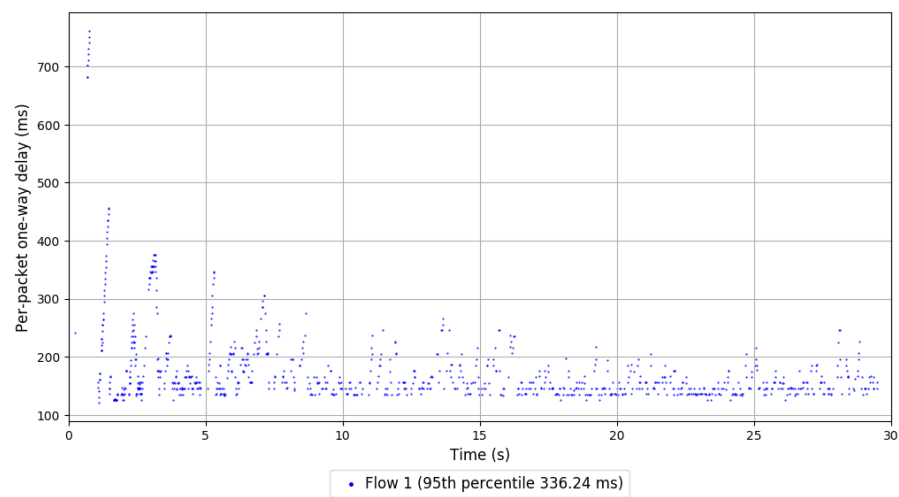
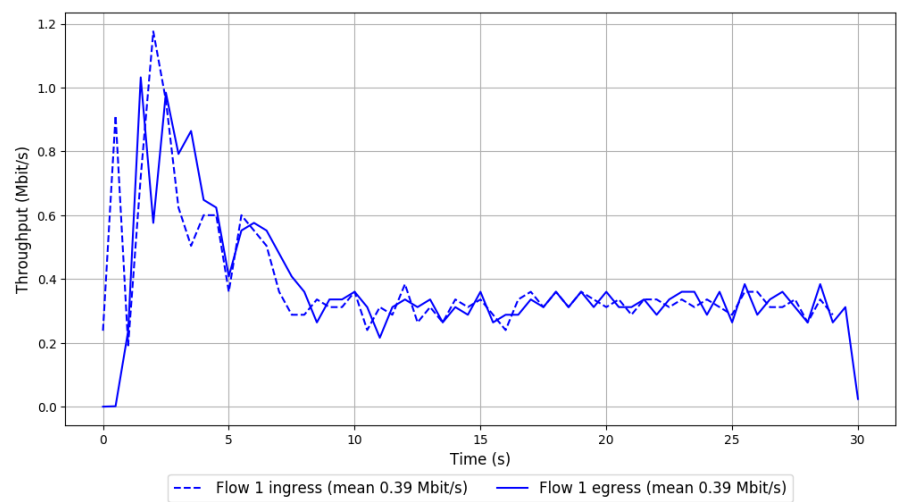
-- Flow 1:

Average throughput: 0.39 Mbit/s

95th percentile per-packet one-way delay: 336.235 ms

Loss rate: 0.21%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-09-10 22:19:21

End at: 2018-09-10 22:19:51

Local clock offset: -9.734 ms

Remote clock offset: 6.892 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.66 Mbit/s

95th percentile per-packet one-way delay: 215.028 ms

Loss rate: 0.25%

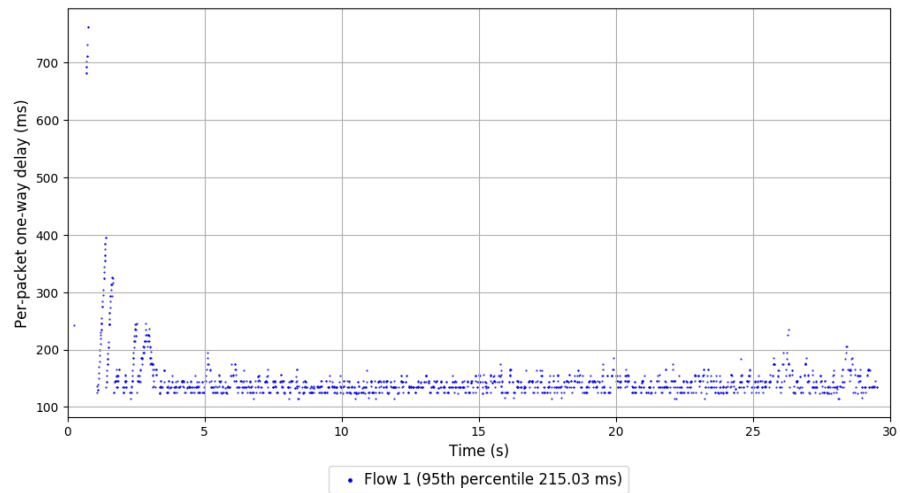
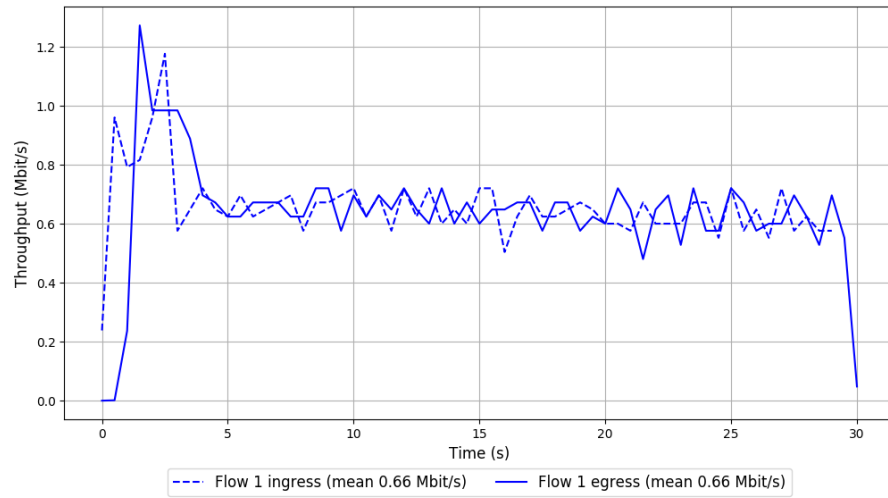
-- Flow 1:

Average throughput: 0.66 Mbit/s

95th percentile per-packet one-way delay: 215.028 ms

Loss rate: 0.25%

Run 3: Report of Indigo — Data Link

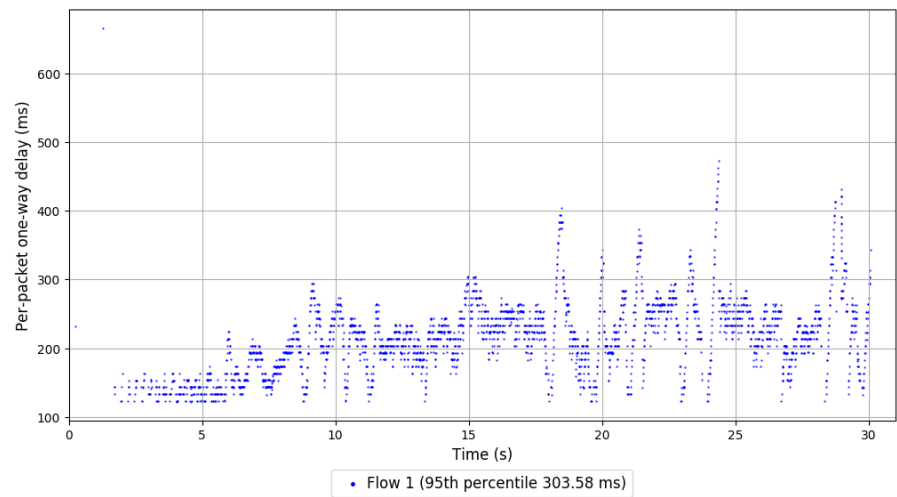
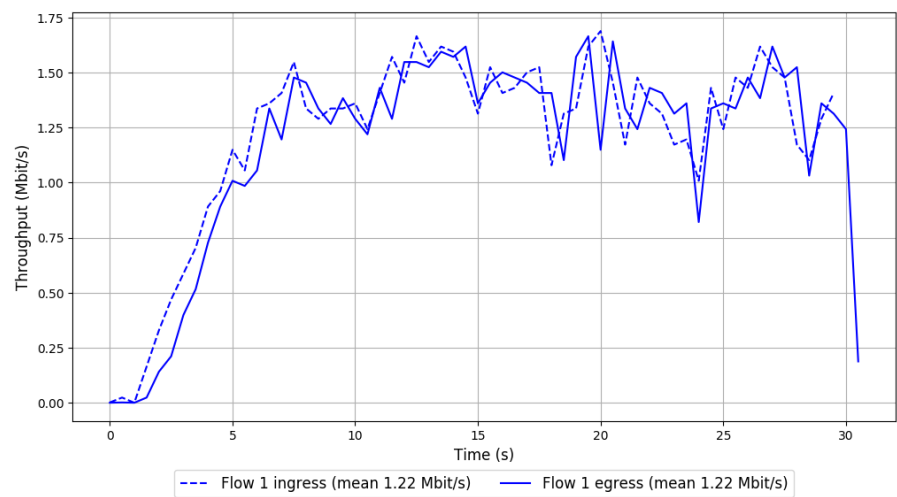


```
Run 1: Statistics of LEDBAT

Start at: 2018-09-10 21:33:38
End at: 2018-09-10 21:34:08
Local clock offset: -7.509 ms
Remote clock offset: 6.14 ms

# Below is generated by plot.py at 2018-09-10 22:31:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 303.579 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 303.579 ms
Loss rate: 0.67%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-09-10 21:54:14

End at: 2018-09-10 21:54:44

Local clock offset: -8.374 ms

Remote clock offset: 2.223 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.36 Mbit/s

95th percentile per-packet one-way delay: 307.421 ms

Loss rate: 0.46%

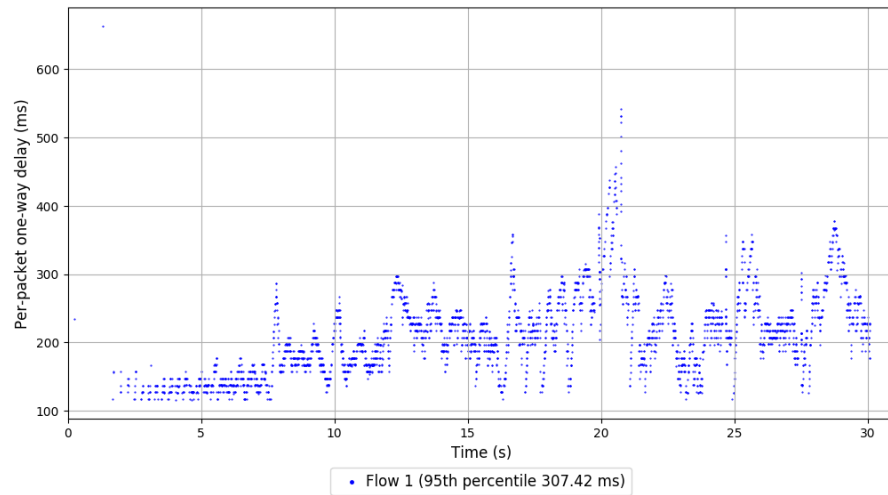
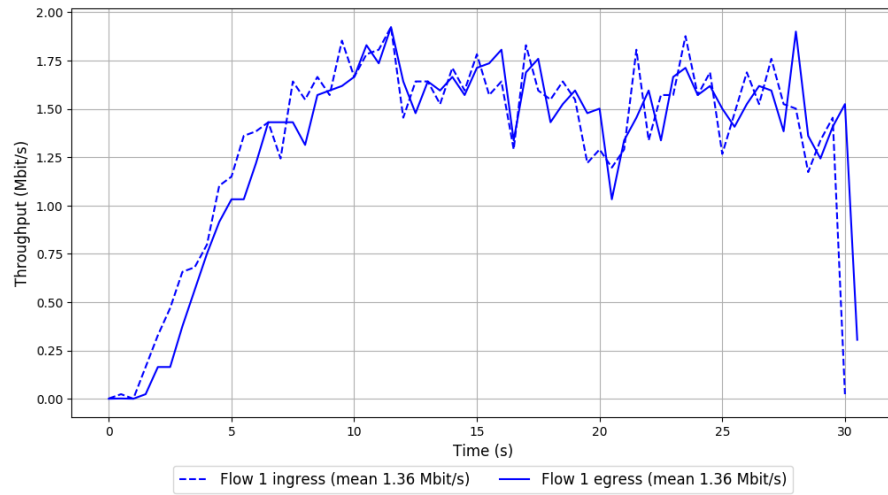
-- Flow 1:

Average throughput: 1.36 Mbit/s

95th percentile per-packet one-way delay: 307.421 ms

Loss rate: 0.46%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-09-10 22:14:42

End at: 2018-09-10 22:15:12

Local clock offset: -8.963 ms

Remote clock offset: 2.248 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.08 Mbit/s

95th percentile per-packet one-way delay: 372.016 ms

Loss rate: 0.25%

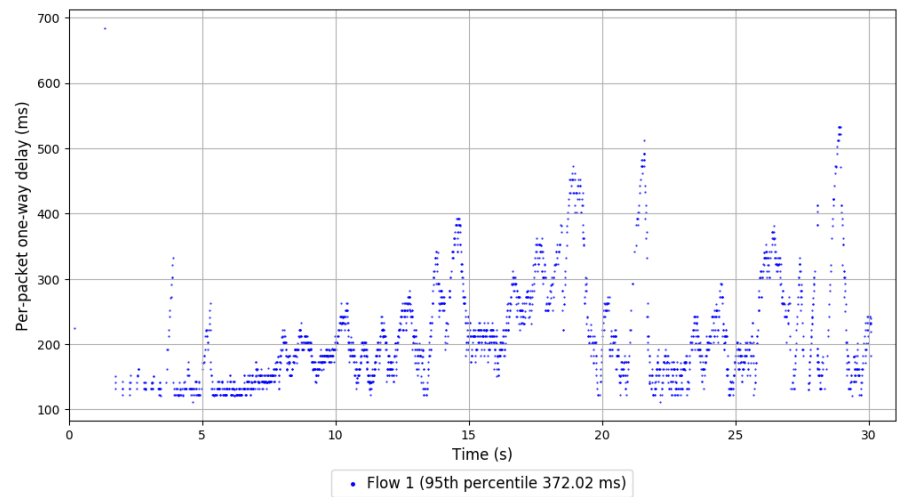
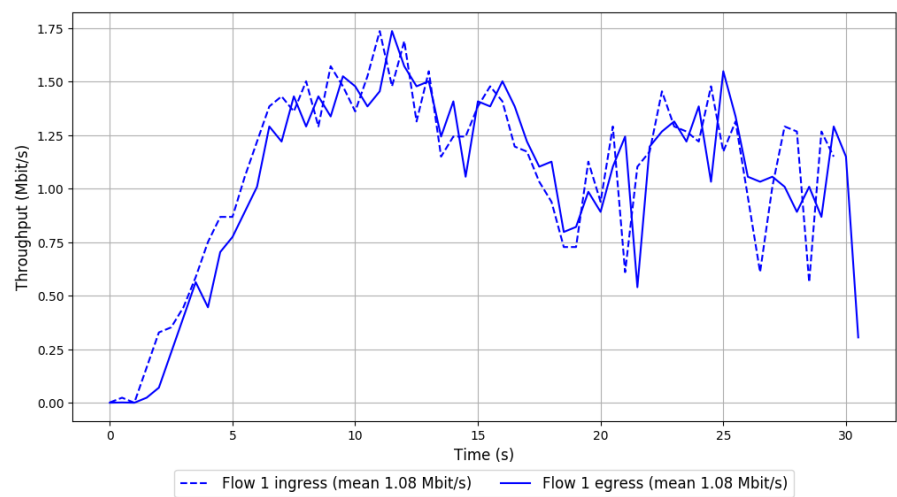
-- Flow 1:

Average throughput: 1.08 Mbit/s

95th percentile per-packet one-way delay: 372.016 ms

Loss rate: 0.25%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of Indigo-Muses

Start at: 2018-09-10 21:45:05

End at: 2018-09-10 21:45:35

Local clock offset: -8.059 ms

Remote clock offset: 6.268 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.63 Mbit/s

95th percentile per-packet one-way delay: 827.317 ms

Loss rate: 0.50%

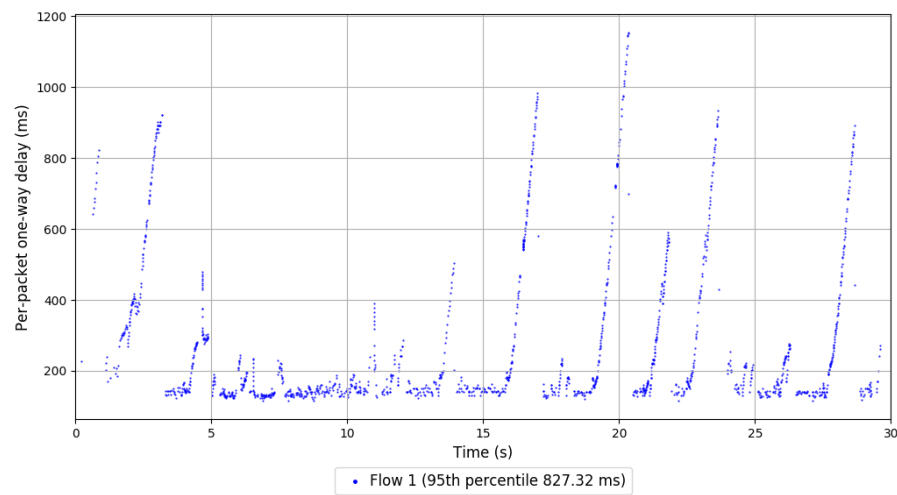
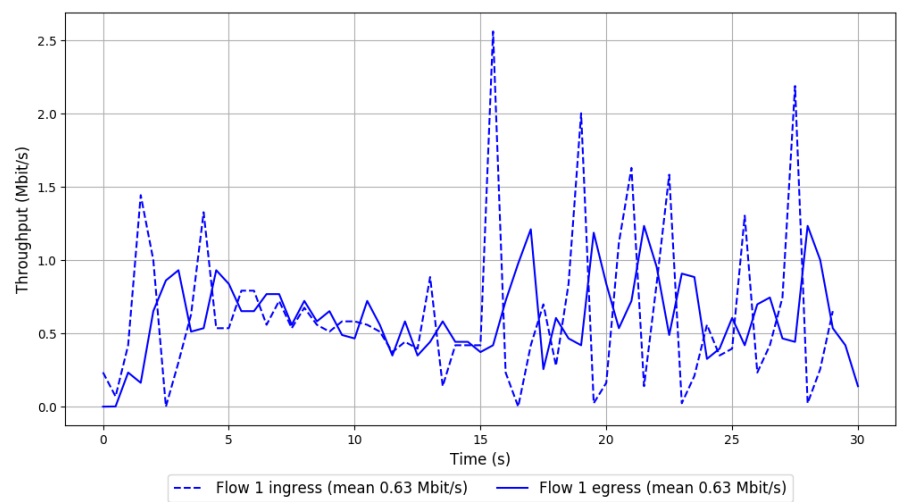
-- Flow 1:

Average throughput: 0.63 Mbit/s

95th percentile per-packet one-way delay: 827.317 ms

Loss rate: 0.50%

Run 1: Report of Indigo-Muses — Data Link



Run 2: Statistics of Indigo-Muses

Start at: 2018-09-10 22:05:36

End at: 2018-09-10 22:06:06

Local clock offset: -8.723 ms

Remote clock offset: 2.028 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 392.106 ms

Loss rate: 0.13%

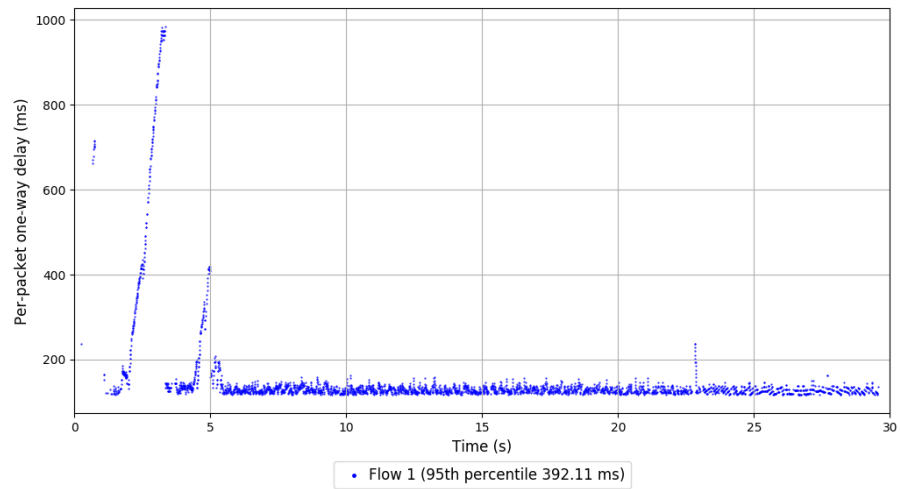
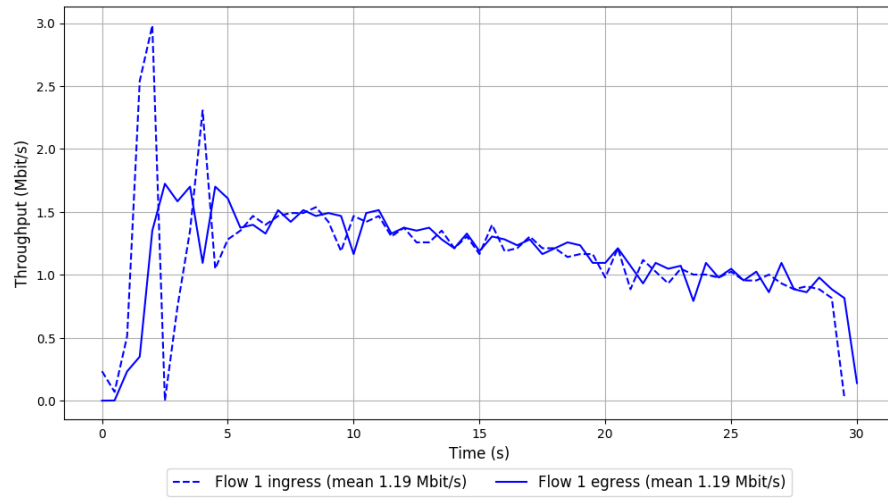
-- Flow 1:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 392.106 ms

Loss rate: 0.13%

Run 2: Report of Indigo-Muses — Data Link

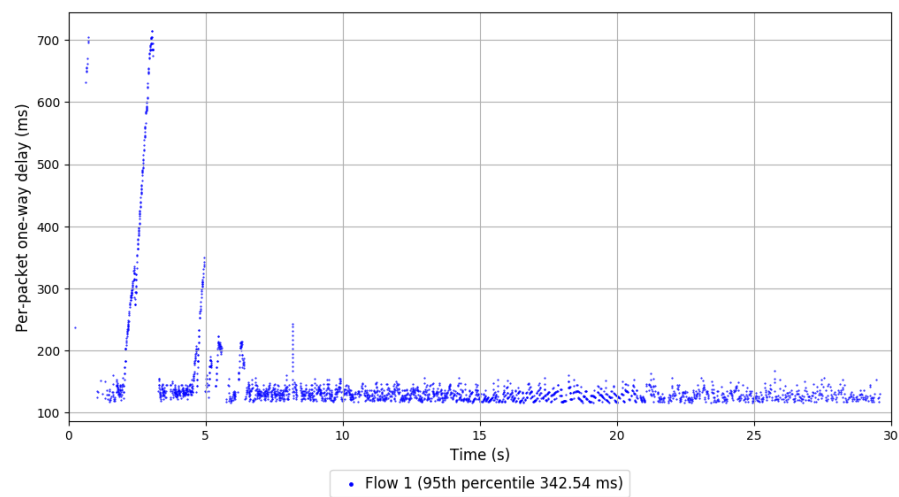
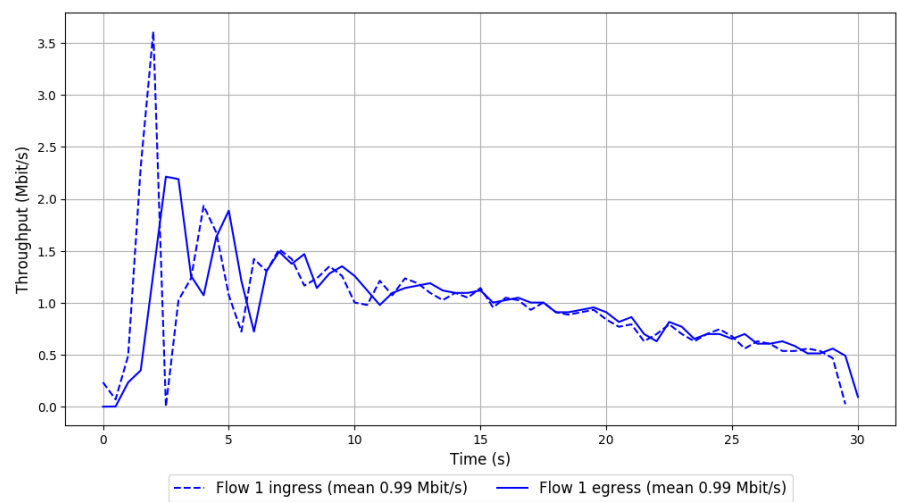


Run 3: Statistics of Indigo-Muses

Start at: 2018-09-10 22:26:12
End at: 2018-09-10 22:26:42
Local clock offset: -11.035 ms
Remote clock offset: 7.106 ms

Below is generated by plot.py at 2018-09-10 22:31:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 342.537 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 342.537 ms
Loss rate: 0.08%

Run 3: Report of Indigo-Muses — Data Link

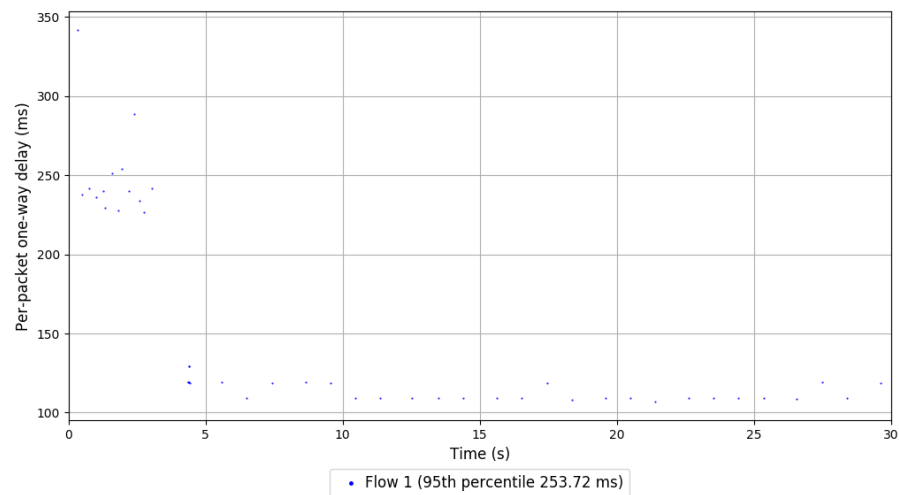
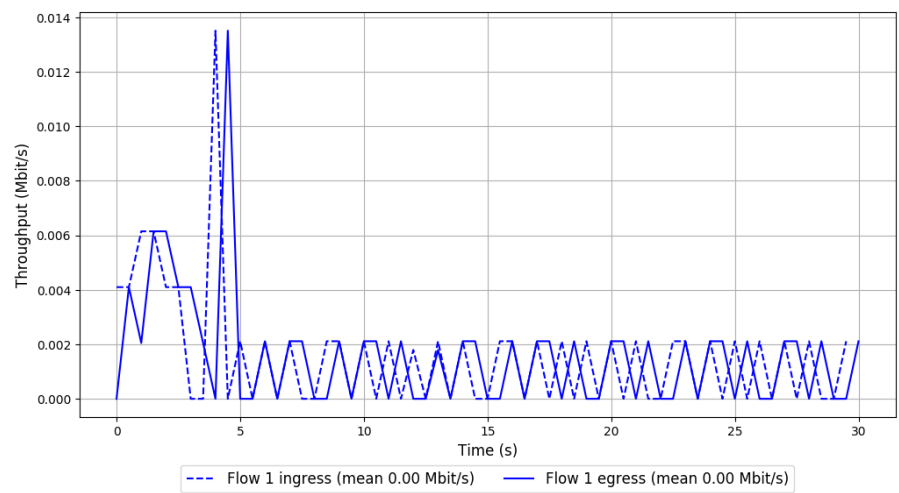


```
Run 1: Statistics of PCC-Allegro

Start at: 2018-09-10 21:32:30
End at: 2018-09-10 21:33:00
Local clock offset: -6.082 ms
Remote clock offset: 1.963 ms

# Below is generated by plot.py at 2018-09-10 22:31:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 253.719 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 253.719 ms
Loss rate: 0.00%
```

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-09-10 21:53:05

End at: 2018-09-10 21:53:35

Local clock offset: -7.41 ms

Remote clock offset: 6.3 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 7305.510 ms

Loss rate: 47.33%

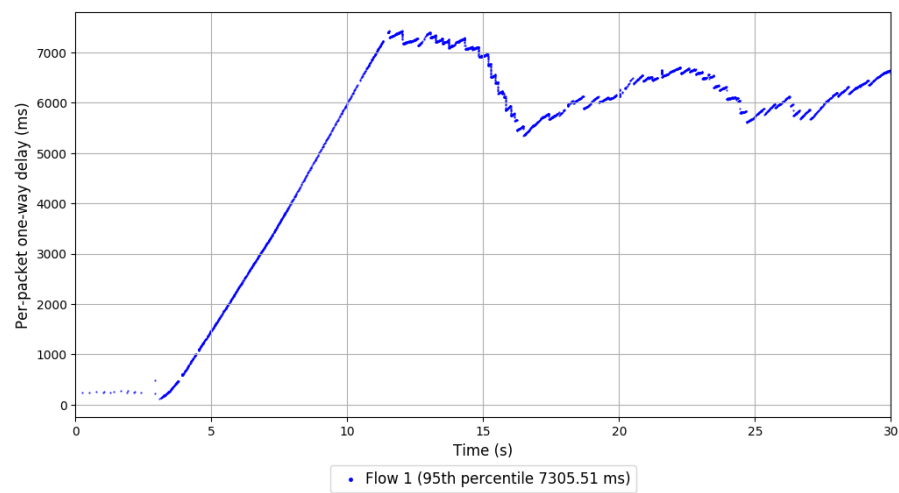
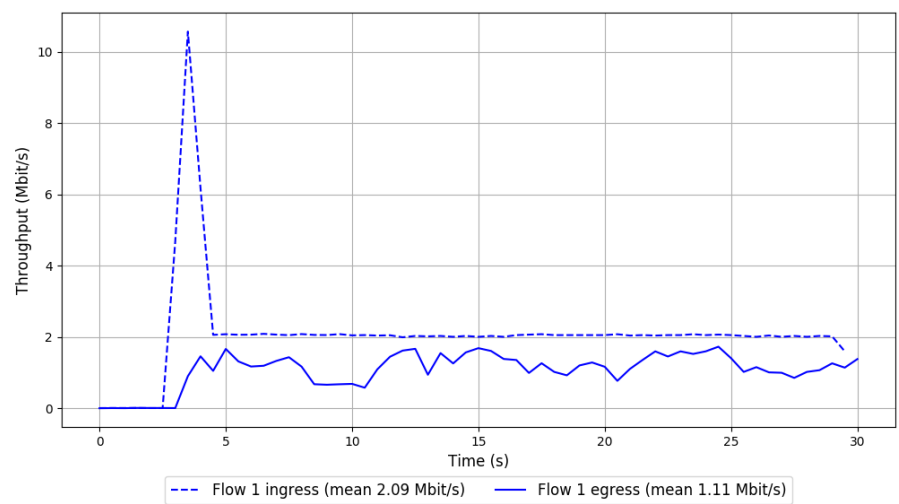
-- Flow 1:

Average throughput: 1.11 Mbit/s

95th percentile per-packet one-way delay: 7305.510 ms

Loss rate: 47.33%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-09-10 22:13:34

End at: 2018-09-10 22:14:04

Local clock offset: -8.722 ms

Remote clock offset: 6.6 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.43 Mbit/s

95th percentile per-packet one-way delay: 5570.422 ms

Loss rate: 31.68%

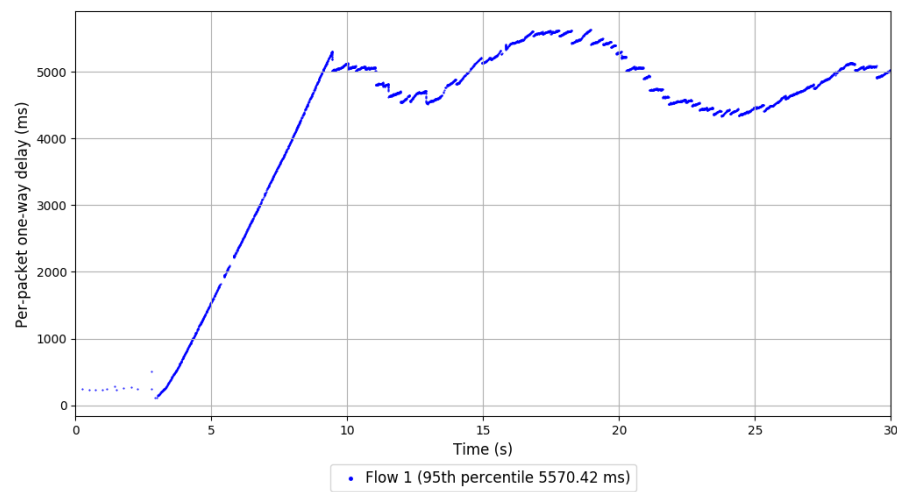
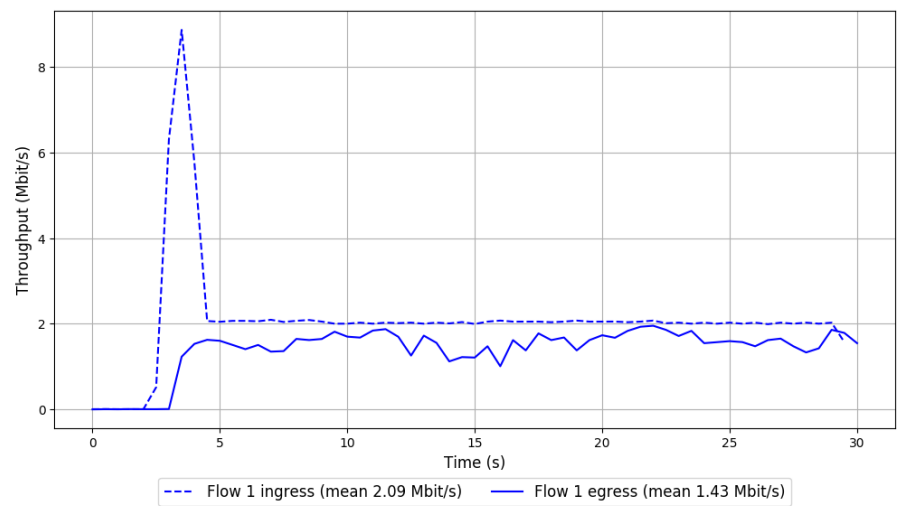
-- Flow 1:

Average throughput: 1.43 Mbit/s

95th percentile per-packet one-way delay: 5570.422 ms

Loss rate: 31.68%

Run 3: Report of PCC-Allegro — Data Link

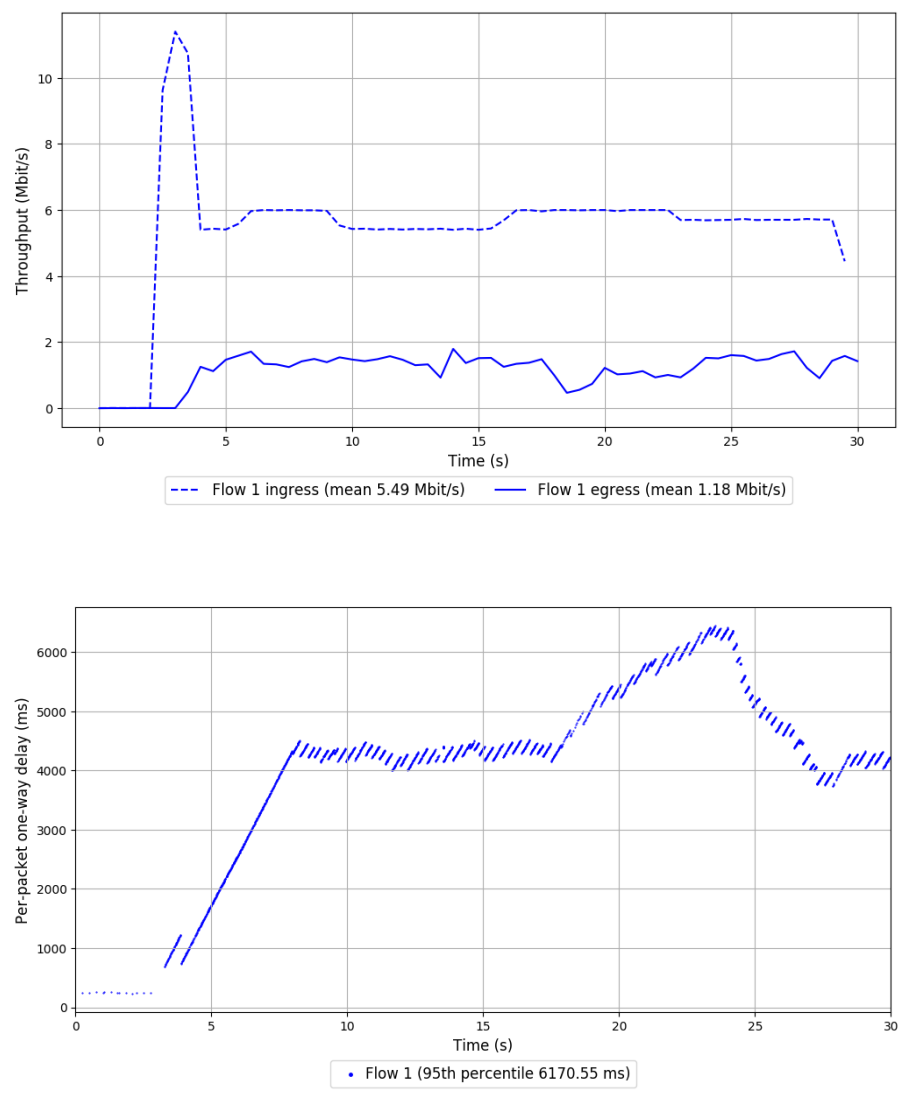


```
Run 1: Statistics of PCC-Expr

Start at: 2018-09-10 21:37:05
End at: 2018-09-10 21:37:35
Local clock offset: -8.544 ms
Remote clock offset: 6.25 ms

# Below is generated by plot.py at 2018-09-10 22:31:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 6170.553 ms
Loss rate: 78.55%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 6170.553 ms
Loss rate: 78.55%
```

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2018-09-10 21:57:38

End at: 2018-09-10 21:58:08

Local clock offset: -9.019 ms

Remote clock offset: 6.388 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.18 Mbit/s

95th percentile per-packet one-way delay: 6478.081 ms

Loss rate: 79.29%

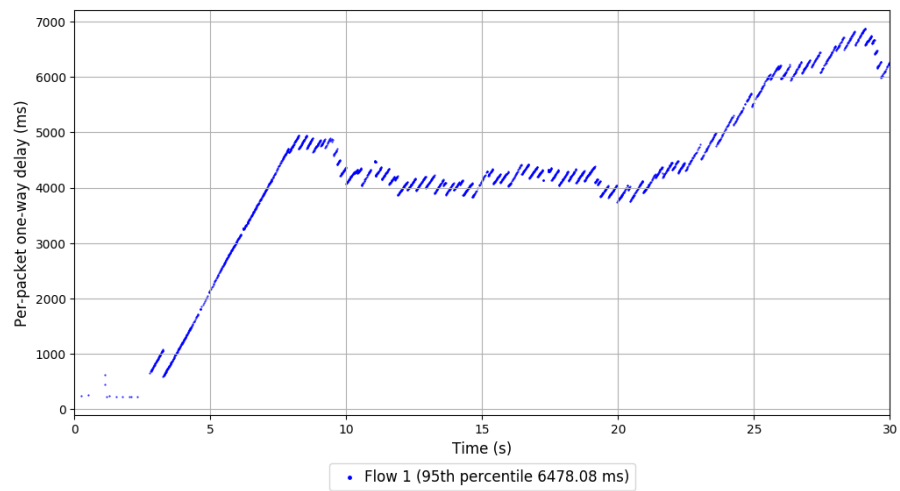
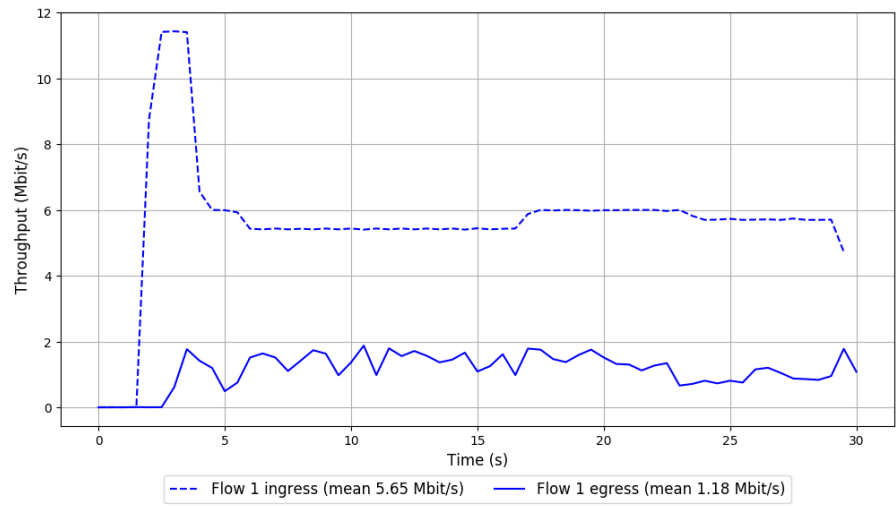
-- Flow 1:

Average throughput: 1.18 Mbit/s

95th percentile per-packet one-way delay: 6478.081 ms

Loss rate: 79.29%

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2018-09-10 22:18:07

End at: 2018-09-10 22:18:37

Local clock offset: -9.505 ms

Remote clock offset: 2.335 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 4341.898 ms

Loss rate: 75.04%

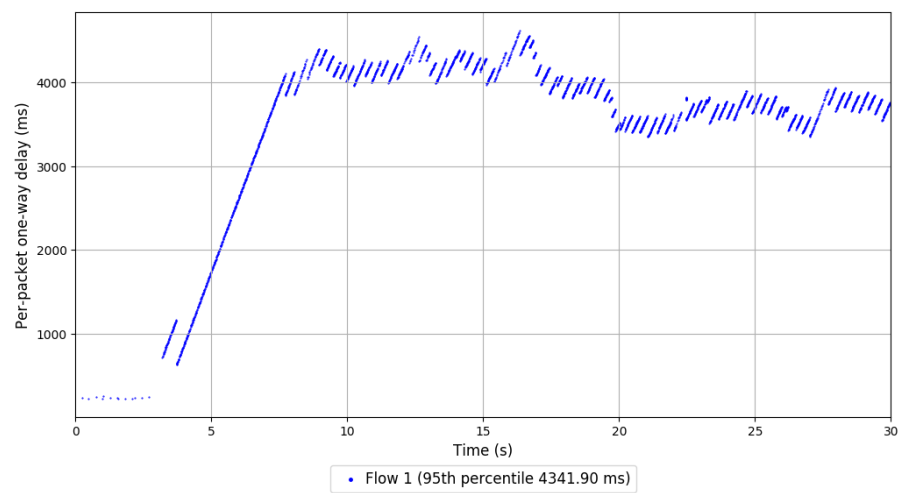
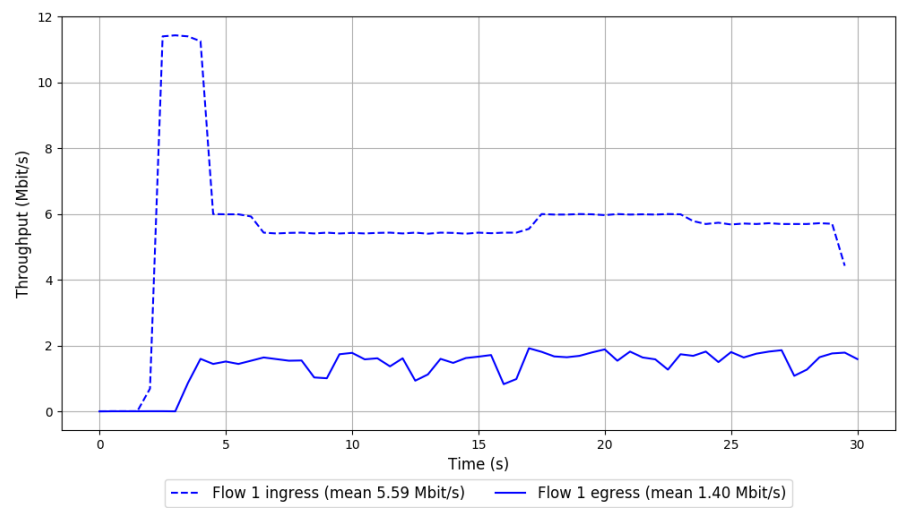
-- Flow 1:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 4341.898 ms

Loss rate: 75.04%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-09-10 21:41:40

End at: 2018-09-10 21:42:10

Local clock offset: -7.18 ms

Remote clock offset: 1.953 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.61 Mbit/s

95th percentile per-packet one-way delay: 3127.285 ms

Loss rate: 12.07%

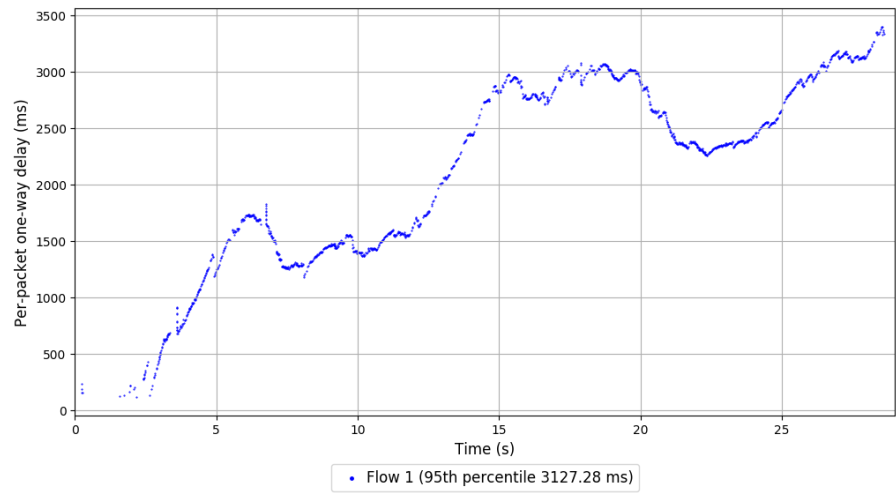
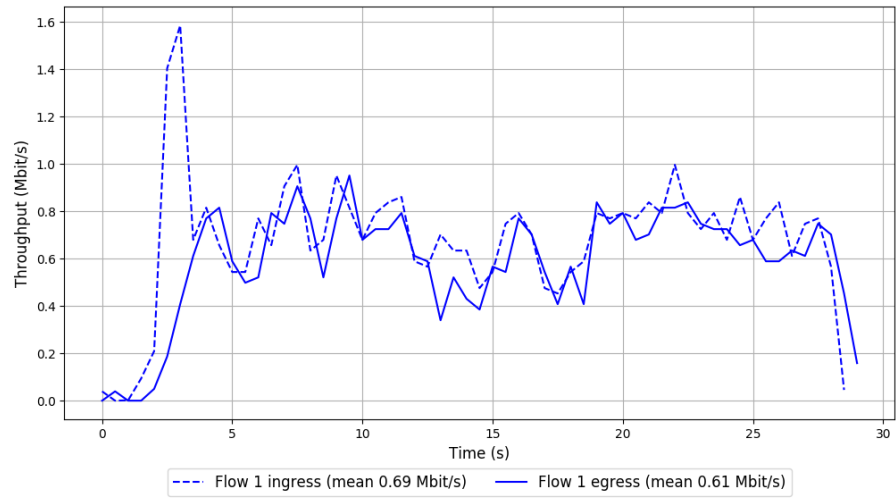
-- Flow 1:

Average throughput: 0.61 Mbit/s

95th percentile per-packet one-way delay: 3127.285 ms

Loss rate: 12.07%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-09-10 22:02:11

End at: 2018-09-10 22:02:41

Local clock offset: -8.779 ms

Remote clock offset: 1.783 ms

Below is generated by plot.py at 2018-09-10 22:31:48

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.17 Mbit/s

95th percentile per-packet one-way delay: 1448.834 ms

Loss rate: 3.86%

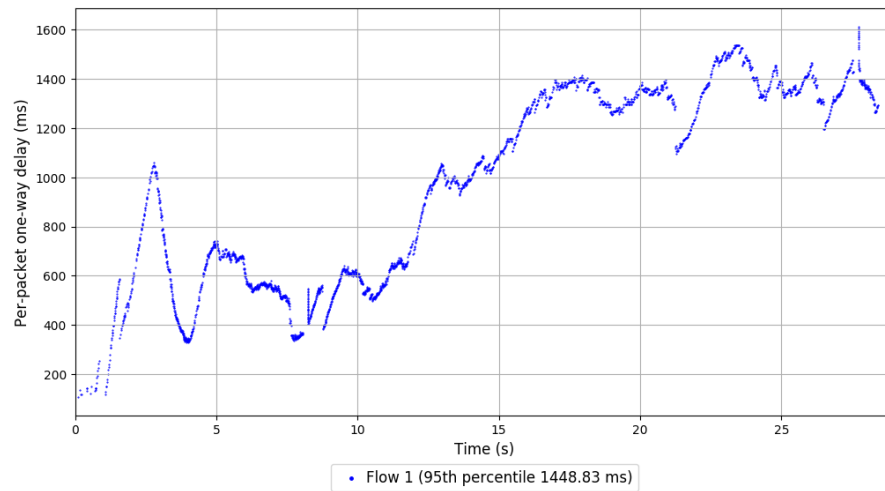
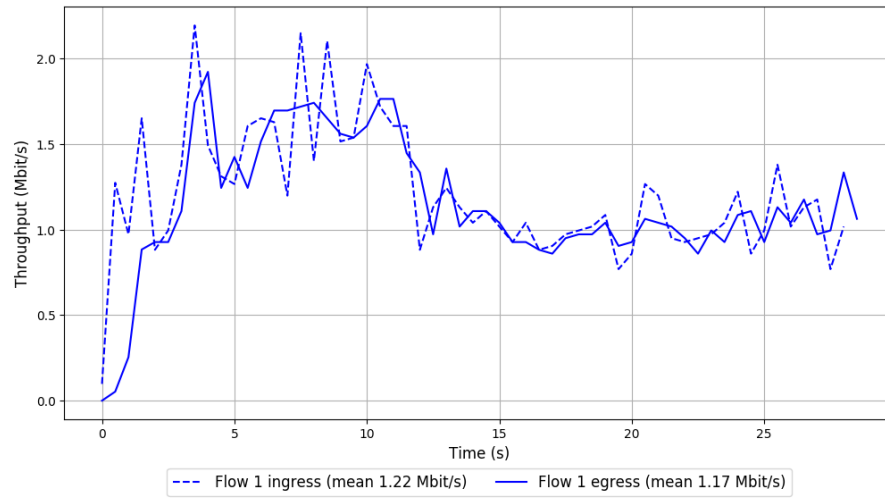
-- Flow 1:

Average throughput: 1.17 Mbit/s

95th percentile per-packet one-way delay: 1448.834 ms

Loss rate: 3.86%

Run 2: Report of QUIC Cubic — Data Link

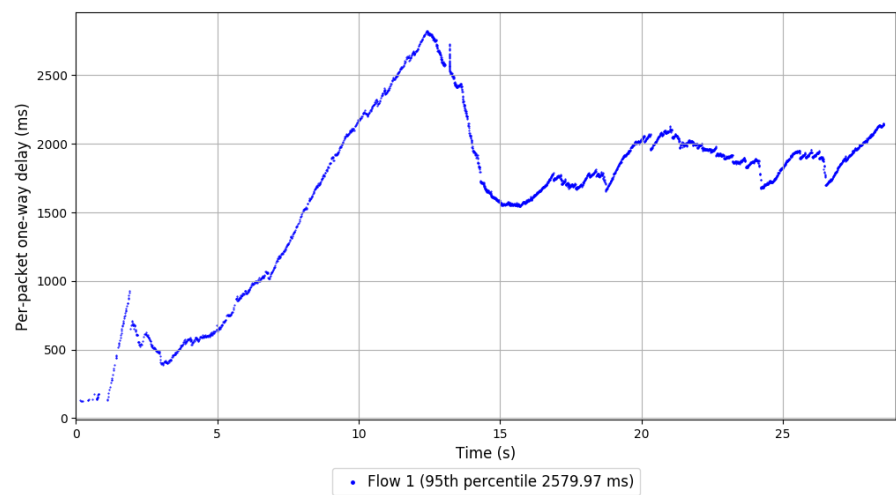
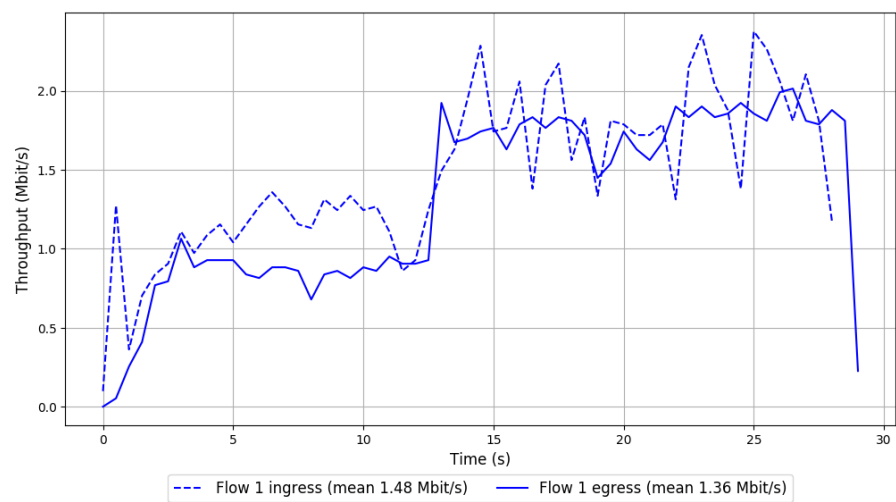


Run 3: Statistics of QUIC Cubic

Start at: 2018-09-10 22:22:46
End at: 2018-09-10 22:23:16
Local clock offset: -10.342 ms
Remote clock offset: 2.513 ms

Below is generated by plot.py at 2018-09-10 22:31:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 2579.970 ms
Loss rate: 8.41%
-- Flow 1:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 2579.970 ms
Loss rate: 8.41%

Run 3: Report of QUIC Cubic — Data Link

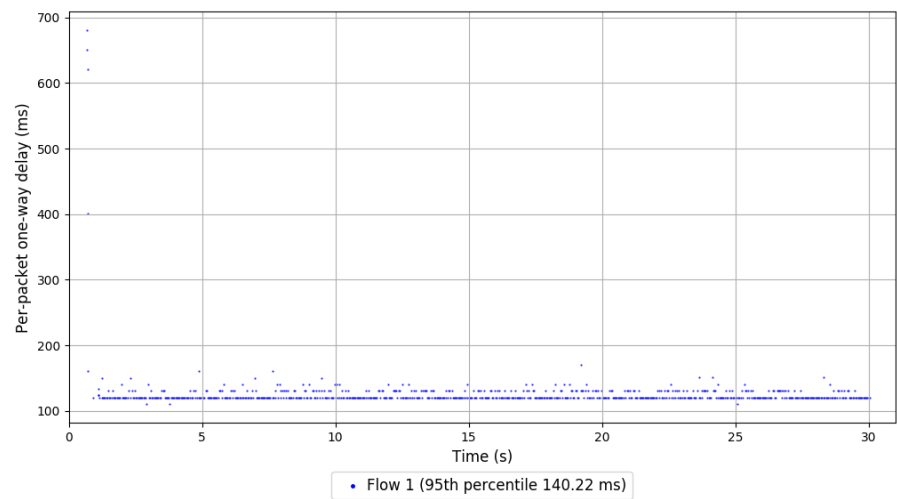
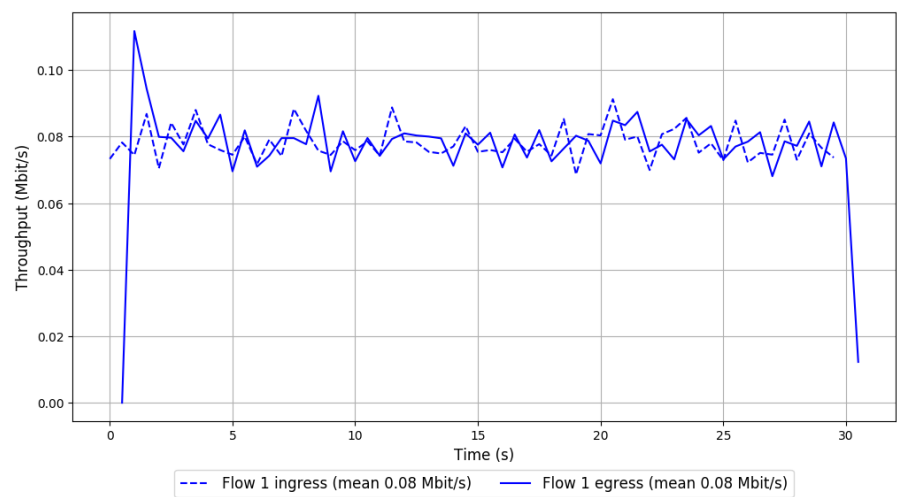


```
Run 1: Statistics of SCReAM

Start at: 2018-09-10 21:30:14
End at: 2018-09-10 21:30:44
Local clock offset: -8.411 ms
Remote clock offset: 1.951 ms

# Below is generated by plot.py at 2018-09-10 22:31:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 140.218 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 140.218 ms
Loss rate: 0.13%
```

Run 1: Report of SReAM — Data Link

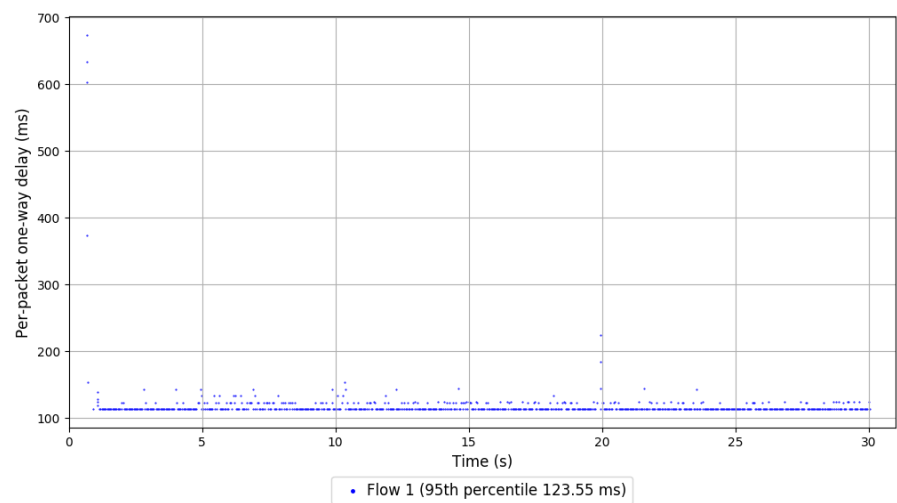
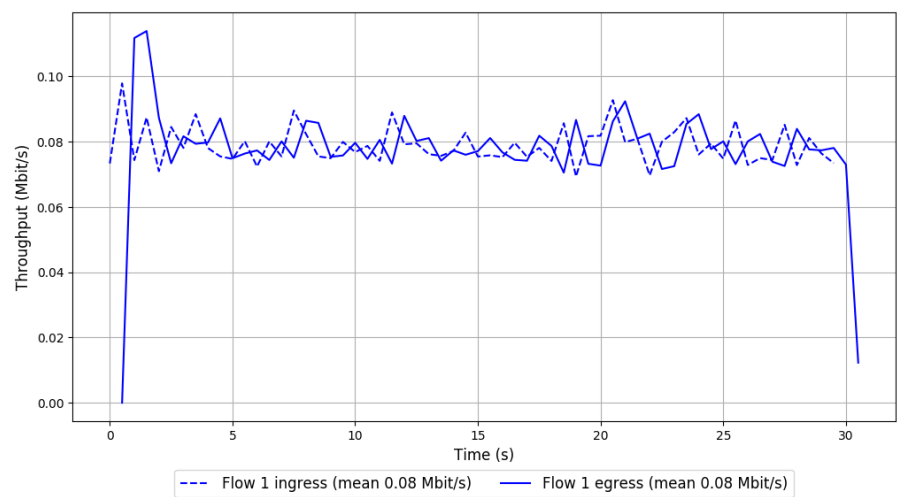


Run 2: Statistics of SCReAM

Start at: 2018-09-10 21:50:47
End at: 2018-09-10 21:51:17
Local clock offset: -7.238 ms
Remote clock offset: 2.078 ms

Below is generated by plot.py at 2018-09-10 22:31:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 123.550 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 123.550 ms
Loss rate: 0.13%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-09-10 22:11:18

End at: 2018-09-10 22:11:48

Local clock offset: -9.199 ms

Remote clock offset: 6.47 ms

Below is generated by plot.py at 2018-09-10 22:31:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 138.577 ms

Loss rate: 0.13%

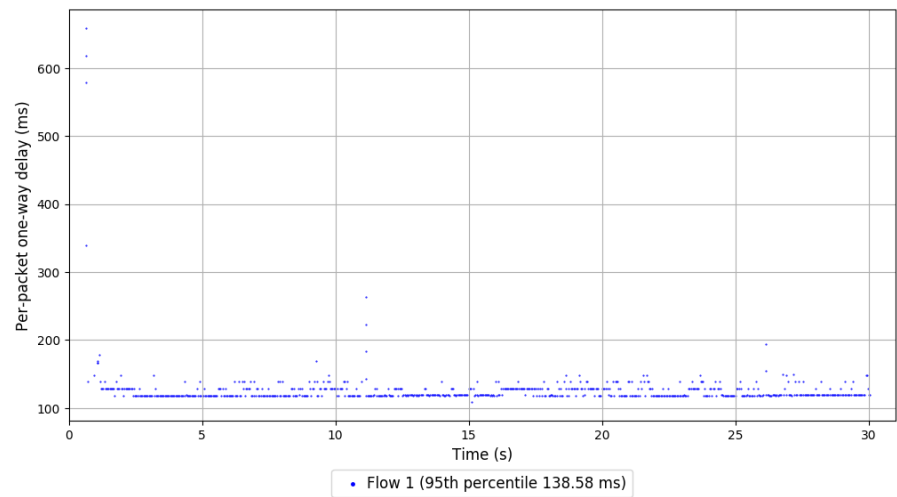
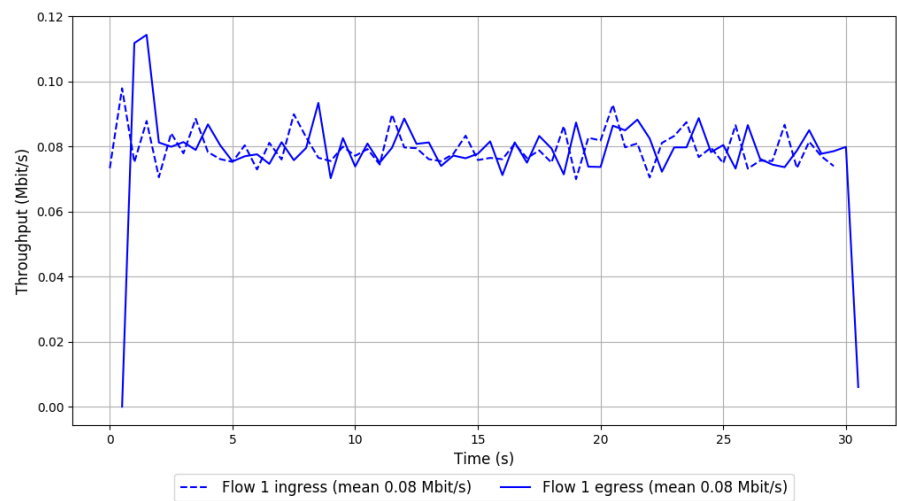
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 138.577 ms

Loss rate: 0.13%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2018-09-10 21:42:48

End at: 2018-09-10 21:43:18

Local clock offset: -8.186 ms

Remote clock offset: 6.288 ms

Below is generated by plot.py at 2018-09-10 22:31:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 223.673 ms

Loss rate: 0.00%

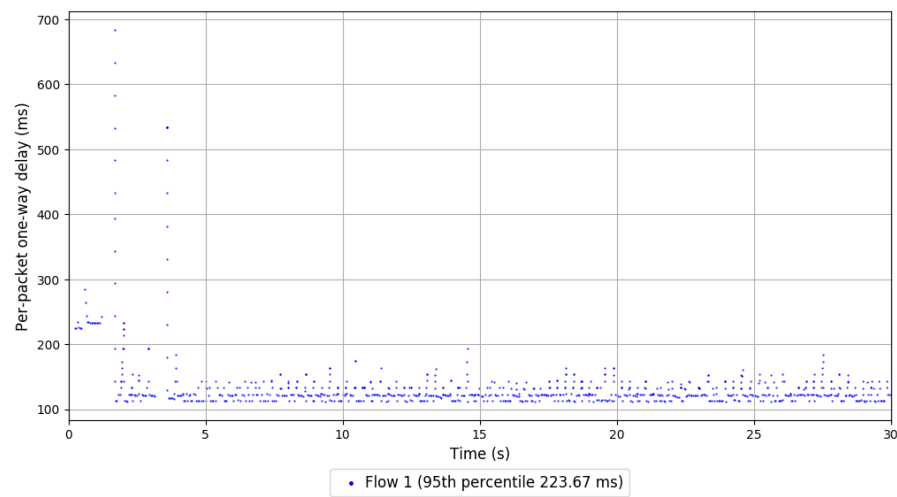
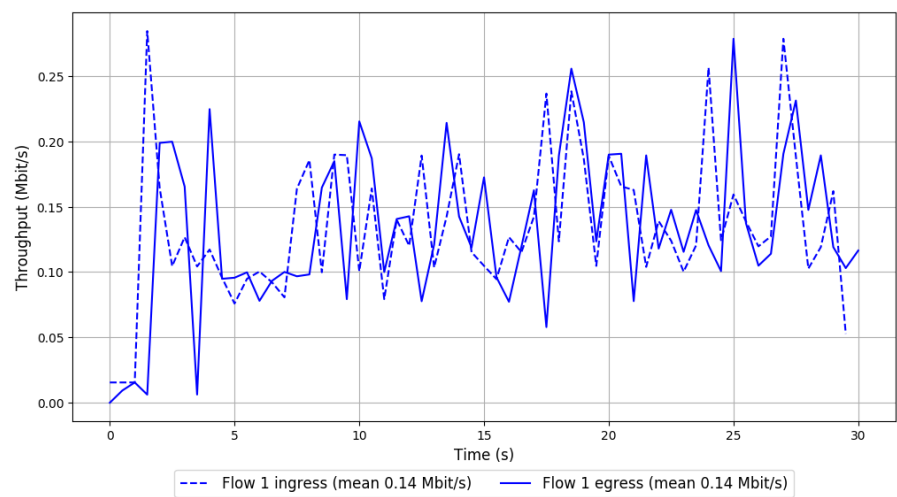
-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 223.673 ms

Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

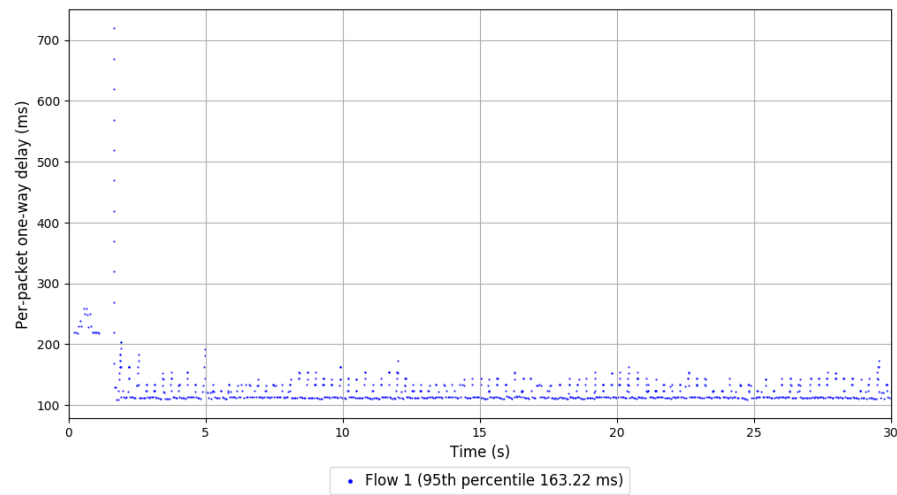
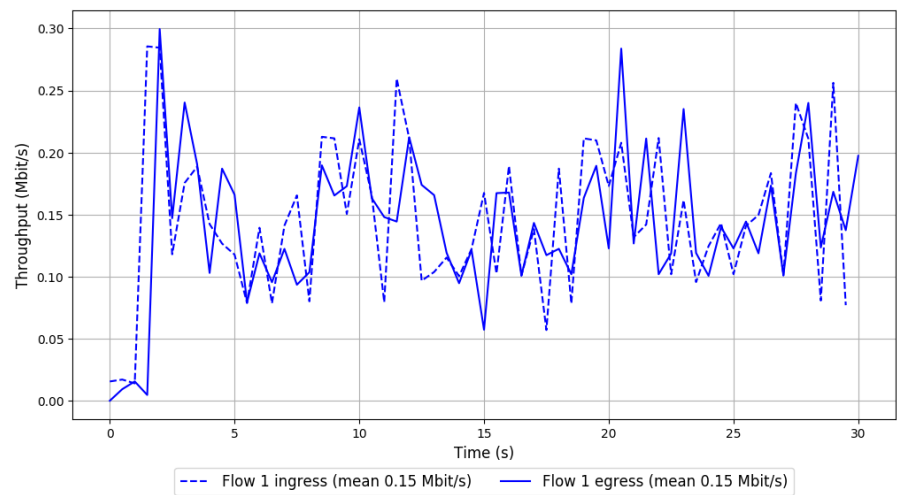


Run 2: Statistics of Sprout

Start at: 2018-09-10 22:03:20
End at: 2018-09-10 22:03:50
Local clock offset: -7.928 ms
Remote clock offset: 1.859 ms

Below is generated by plot.py at 2018-09-10 22:31:51
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 163.222 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 163.222 ms
Loss rate: 0.02%

Run 2: Report of Sprout — Data Link

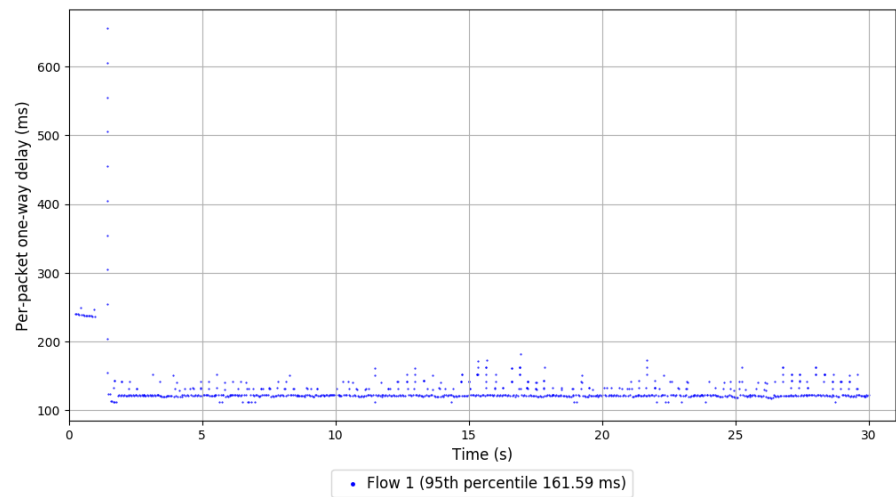
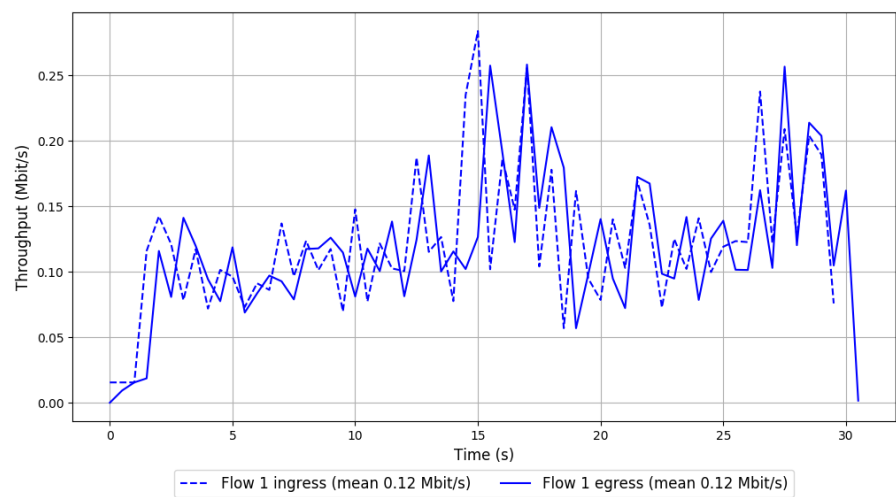


Run 3: Statistics of Sprout

Start at: 2018-09-10 22:23:54
End at: 2018-09-10 22:24:24
Local clock offset: -11.322 ms
Remote clock offset: 2.474 ms

Below is generated by plot.py at 2018-09-10 22:31:51
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 161.585 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 161.585 ms
Loss rate: 0.02%

Run 3: Report of Sprout — Data Link

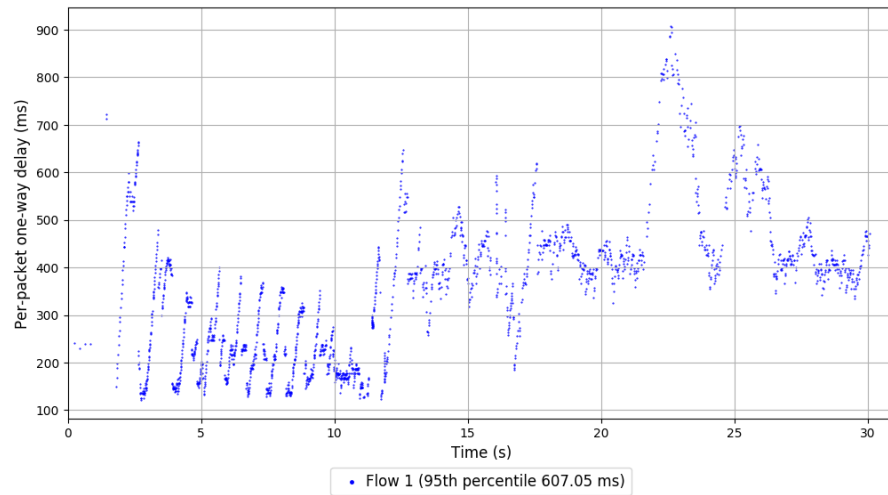
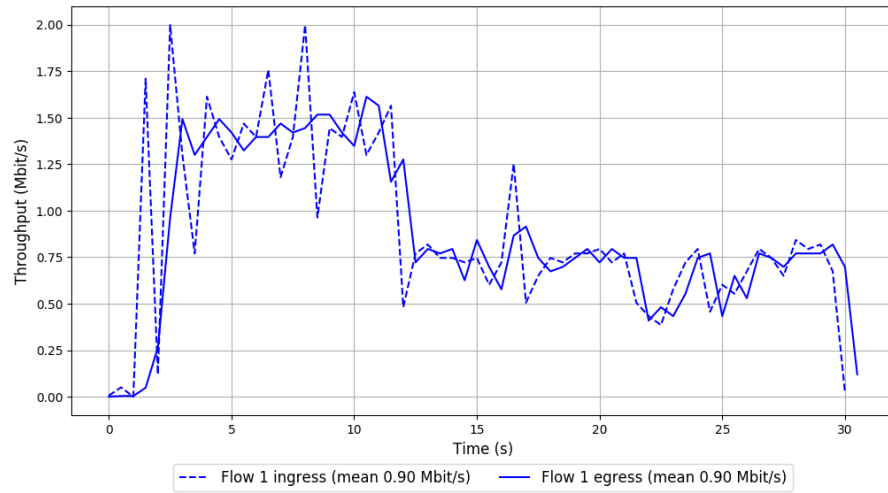


```
Run 1: Statistics of TaoVA-100x

Start at: 2018-09-10 21:40:32
End at: 2018-09-10 21:41:02
Local clock offset: -7.045 ms
Remote clock offset: 1.987 ms

# Below is generated by plot.py at 2018-09-10 22:31:52
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 607.051 ms
Loss rate: 1.06%
-- Flow 1:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 607.051 ms
Loss rate: 1.06%
```

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-09-10 22:01:03

End at: 2018-09-10 22:01:33

Local clock offset: -8.806 ms

Remote clock offset: 6.134 ms

Below is generated by plot.py at 2018-09-10 22:31:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.94 Mbit/s

95th percentile per-packet one-way delay: 1407.750 ms

Loss rate: 0.77%

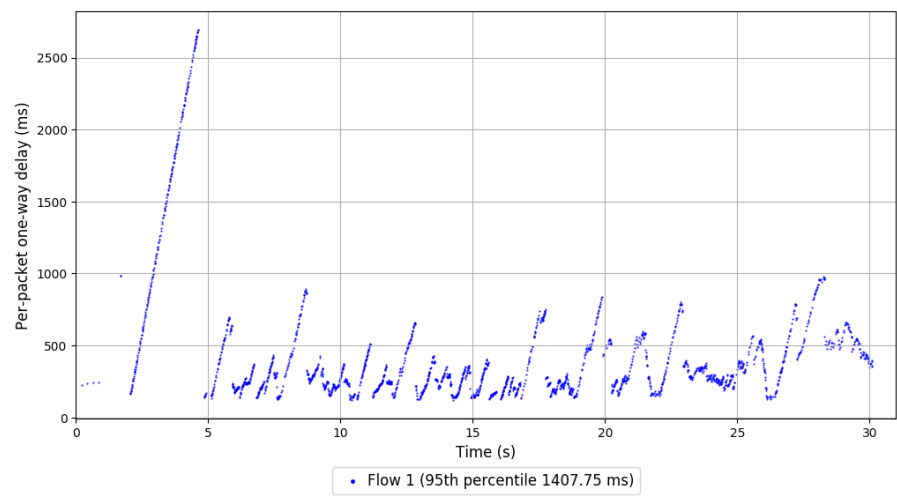
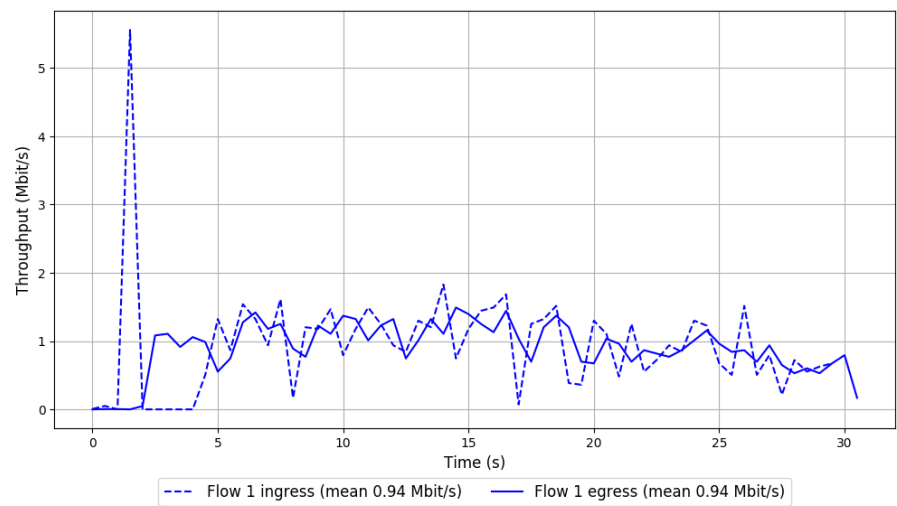
-- Flow 1:

Average throughput: 0.94 Mbit/s

95th percentile per-packet one-way delay: 1407.750 ms

Loss rate: 0.77%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-09-10 22:21:37

End at: 2018-09-10 22:22:07

Local clock offset: -10.89 ms

Remote clock offset: 6.808 ms

Below is generated by plot.py at 2018-09-10 22:31:53

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.29 Mbit/s

95th percentile per-packet one-way delay: 603.118 ms

Loss rate: 0.47%

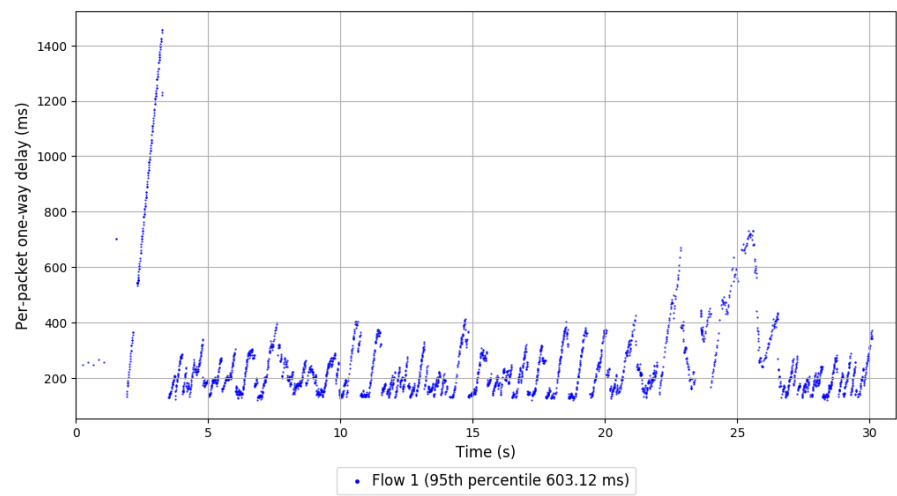
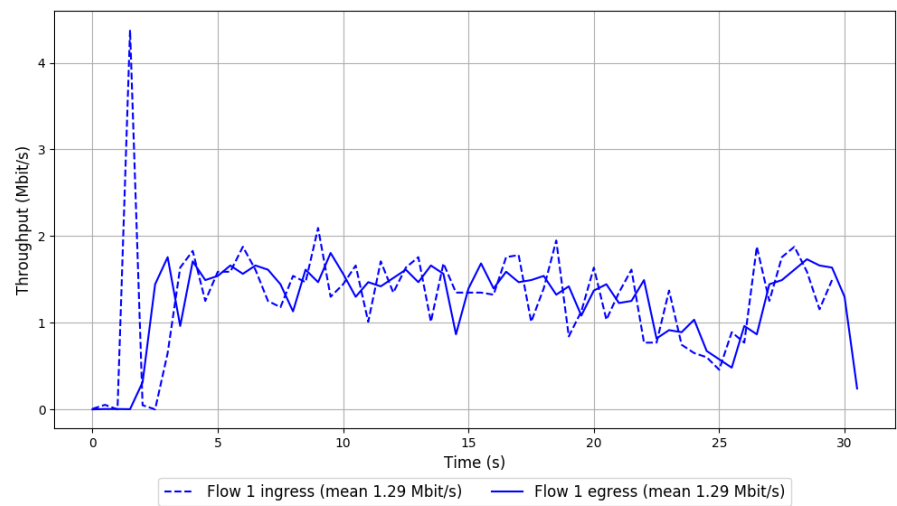
-- Flow 1:

Average throughput: 1.29 Mbit/s

95th percentile per-packet one-way delay: 603.118 ms

Loss rate: 0.47%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-09-10 21:48:30

End at: 2018-09-10 21:49:00

Local clock offset: -7.373 ms

Remote clock offset: 6.365 ms

Below is generated by plot.py at 2018-09-10 22:31:55

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.51 Mbit/s

95th percentile per-packet one-way delay: 1165.544 ms

Loss rate: 1.67%

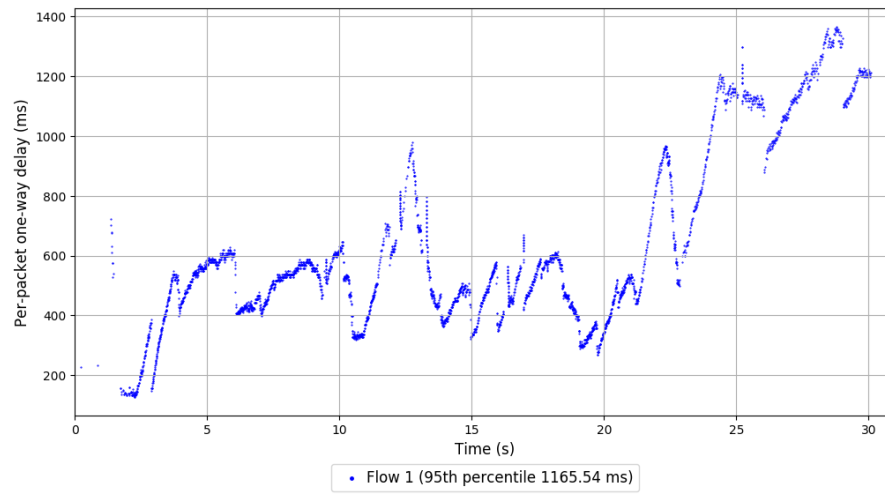
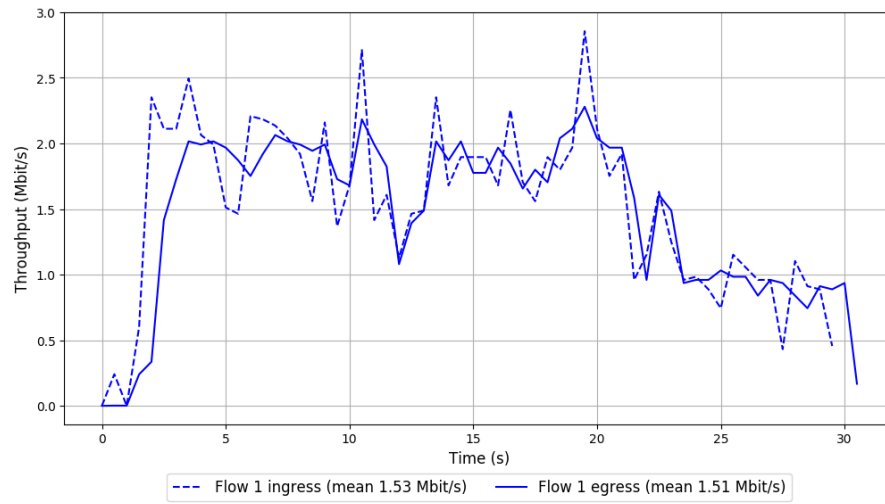
-- Flow 1:

Average throughput: 1.51 Mbit/s

95th percentile per-packet one-way delay: 1165.544 ms

Loss rate: 1.67%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-09-10 22:09:02

End at: 2018-09-10 22:09:32

Local clock offset: -8.216 ms

Remote clock offset: 2.066 ms

Below is generated by plot.py at 2018-09-10 22:31:55

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.13 Mbit/s

95th percentile per-packet one-way delay: 448.408 ms

Loss rate: 0.39%

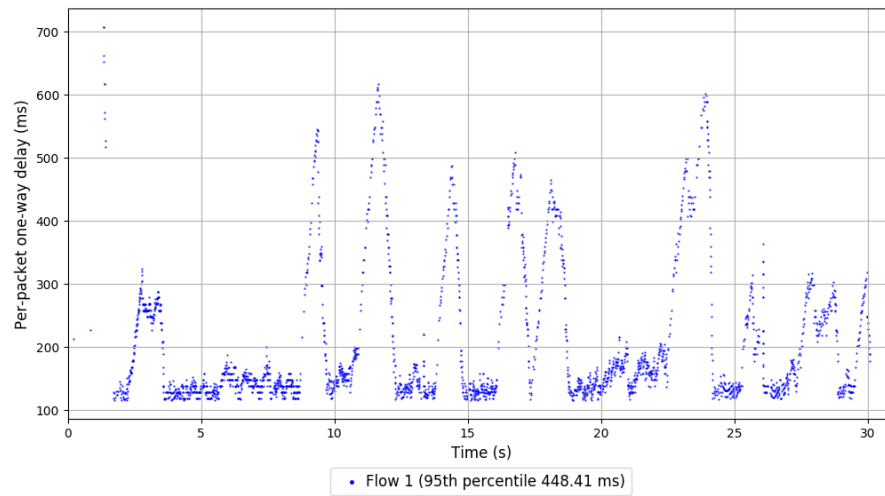
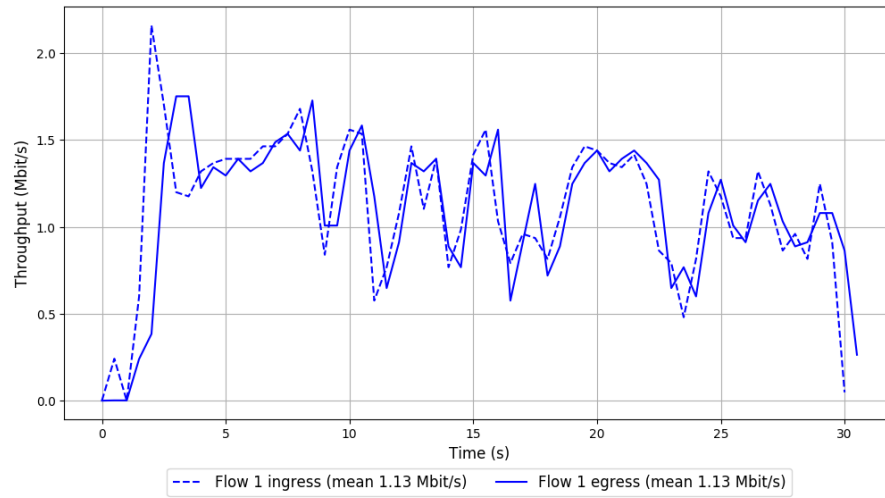
-- Flow 1:

Average throughput: 1.13 Mbit/s

95th percentile per-packet one-way delay: 448.408 ms

Loss rate: 0.39%

Run 2: Report of TCP Vegas — Data Link

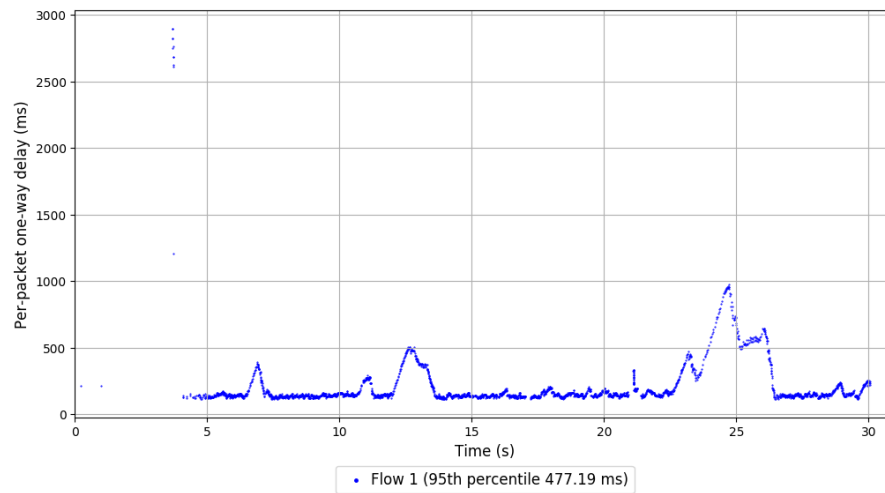
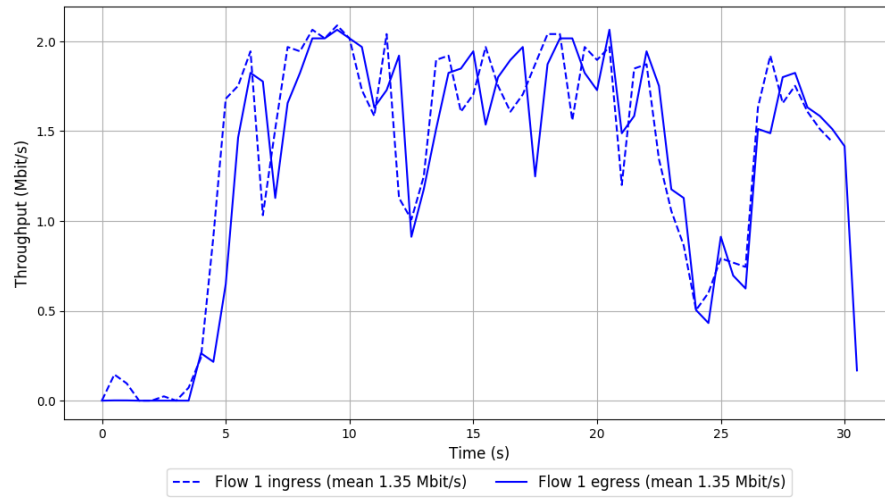


Run 3: Statistics of TCP Vegas

Start at: 2018-09-10 22:29:37
End at: 2018-09-10 22:30:07
Local clock offset: -11.678 ms
Remote clock offset: 3.019 ms

Below is generated by plot.py at 2018-09-10 22:31:56
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 477.195 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 477.195 ms
Loss rate: 0.42%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-09-10 21:47:22

End at: 2018-09-10 21:47:52

Local clock offset: -8.329 ms

Remote clock offset: 1.952 ms

Below is generated by plot.py at 2018-09-10 22:31:57

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.54 Mbit/s

95th percentile per-packet one-way delay: 2045.937 ms

Loss rate: 5.34%

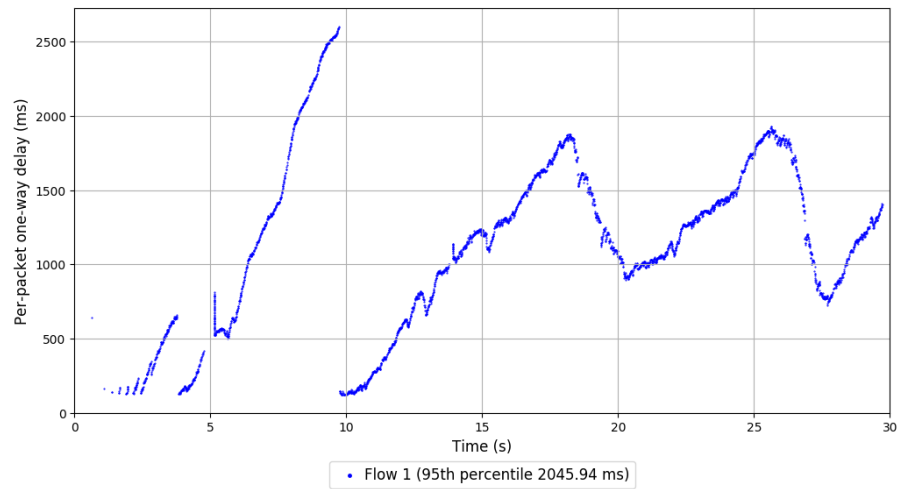
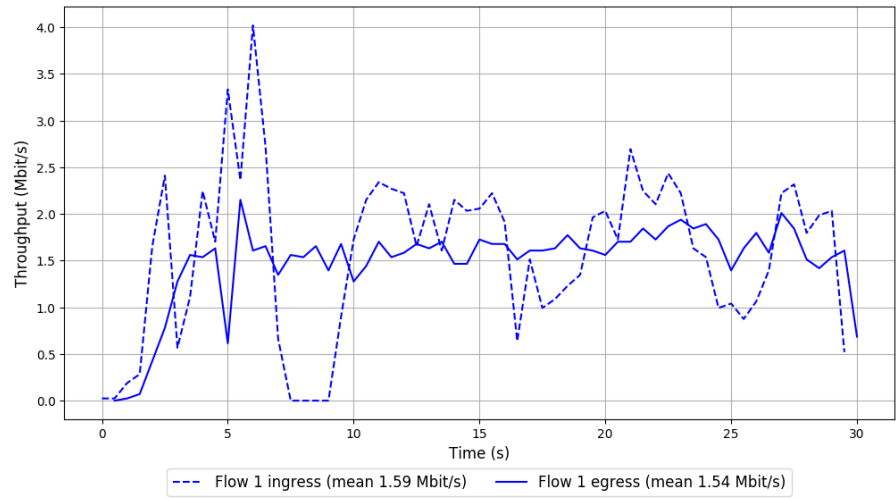
-- Flow 1:

Average throughput: 1.54 Mbit/s

95th percentile per-packet one-way delay: 2045.937 ms

Loss rate: 5.34%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-09-10 22:07:53

End at: 2018-09-10 22:08:23

Local clock offset: -8.828 ms

Remote clock offset: 6.362 ms

Below is generated by plot.py at 2018-09-10 22:31:58

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.67 Mbit/s

95th percentile per-packet one-way delay: 1874.937 ms

Loss rate: 4.28%

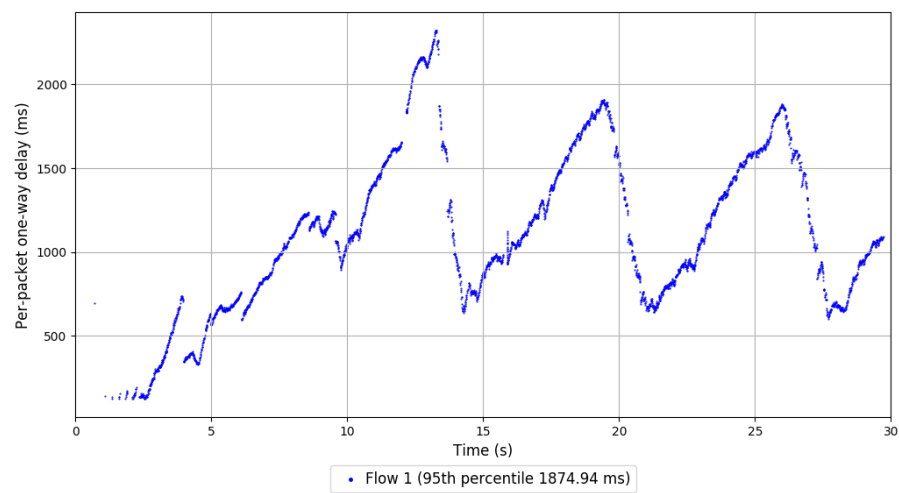
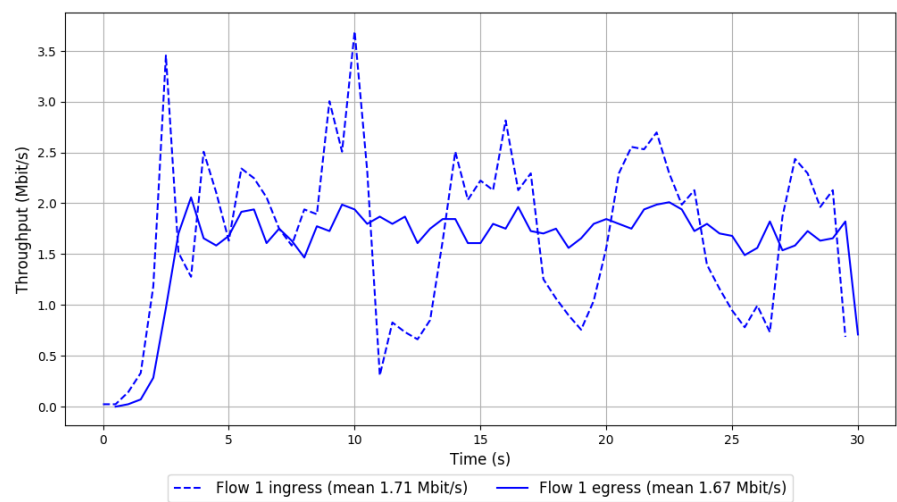
-- Flow 1:

Average throughput: 1.67 Mbit/s

95th percentile per-packet one-way delay: 1874.937 ms

Loss rate: 4.28%

Run 2: Report of Verus — Data Link

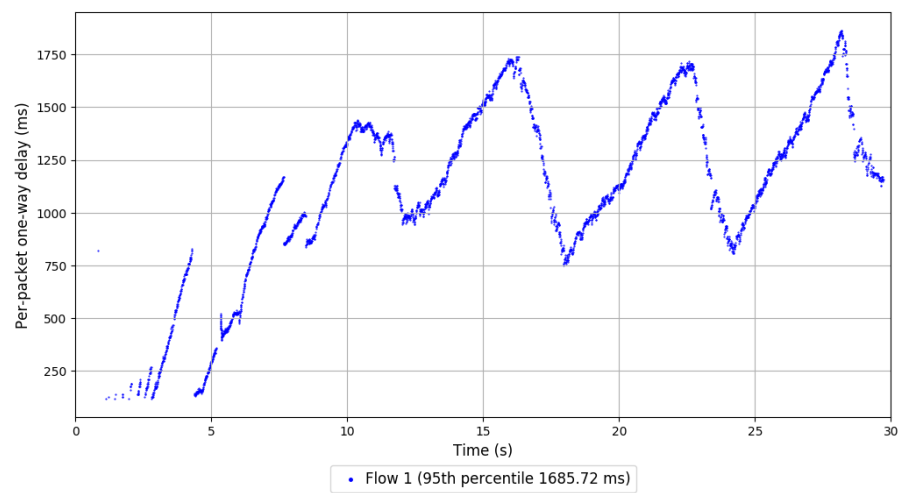
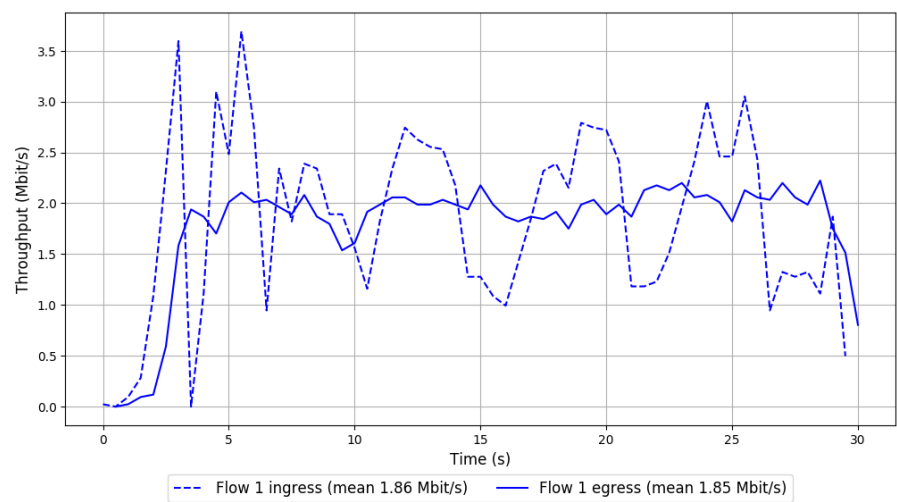


Run 3: Statistics of Verus

Start at: 2018-09-10 22:28:28
End at: 2018-09-10 22:28:58
Local clock offset: -12.212 ms
Remote clock offset: 6.833 ms

Below is generated by plot.py at 2018-09-10 22:31:59
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 1685.719 ms
Loss rate: 2.89%
-- Flow 1:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 1685.719 ms
Loss rate: 2.89%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2018-09-10 21:31:22

End at: 2018-09-10 21:31:52

Local clock offset: -7.346 ms

Remote clock offset: 1.882 ms

Below is generated by plot.py at 2018-09-10 22:31:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 267.475 ms

Loss rate: 0.00%

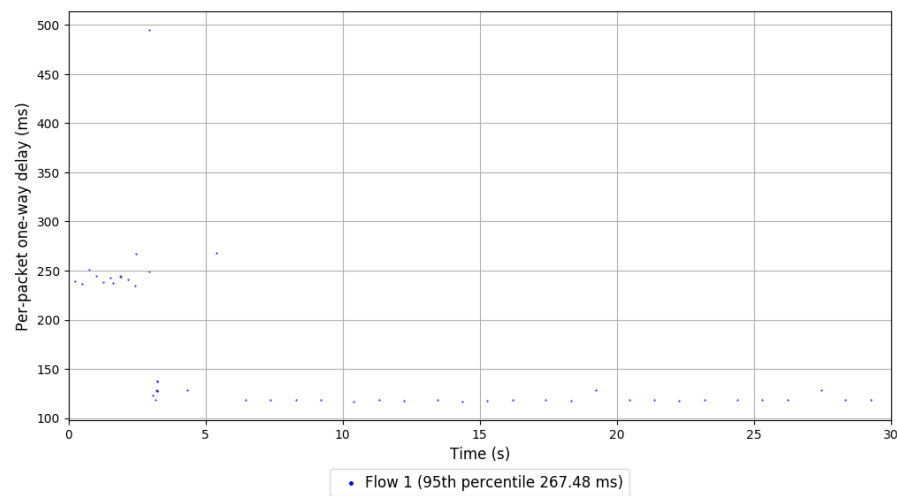
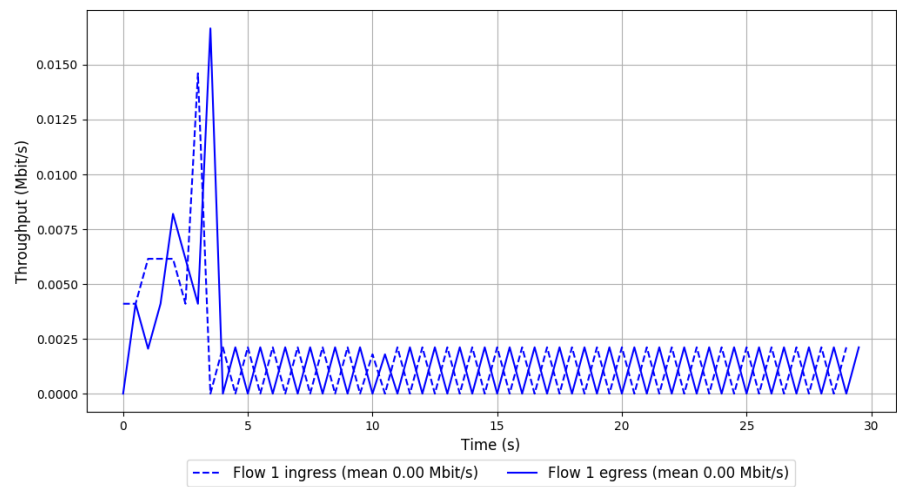
-- Flow 1:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 267.475 ms

Loss rate: 0.00%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-09-10 21:51:55

End at: 2018-09-10 21:52:25

Local clock offset: -8.091 ms

Remote clock offset: 6.255 ms

Below is generated by plot.py at 2018-09-10 22:31:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 266.137 ms

Loss rate: 0.00%

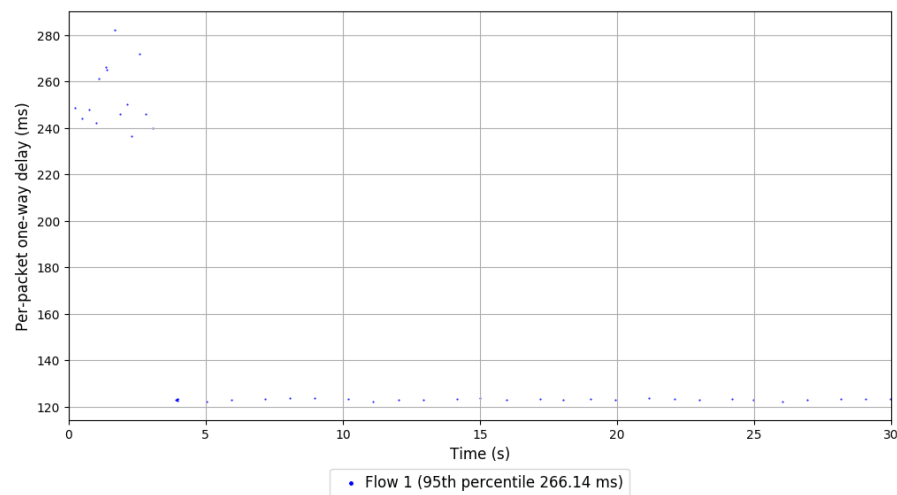
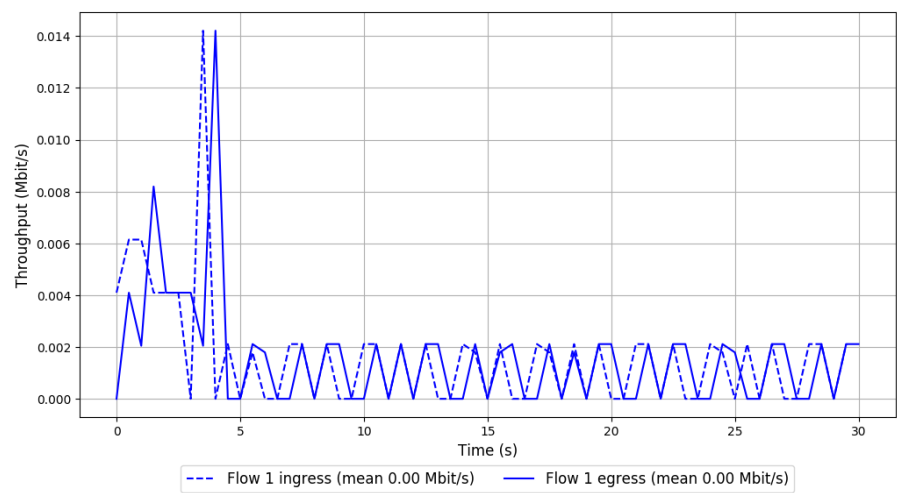
-- Flow 1:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 266.137 ms

Loss rate: 0.00%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2018-09-10 22:12:26

End at: 2018-09-10 22:12:56

Local clock offset: -8.57 ms

Remote clock offset: 6.445 ms

Below is generated by plot.py at 2018-09-10 22:31:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 256.264 ms

Loss rate: 0.00%

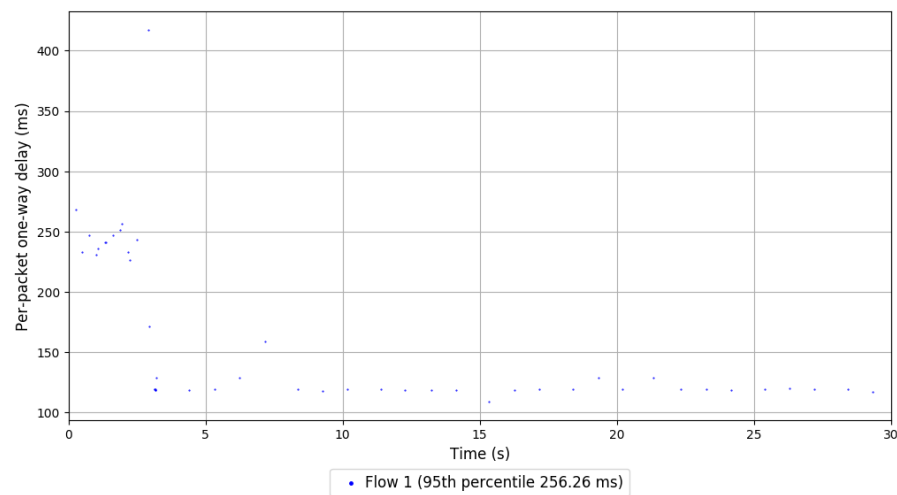
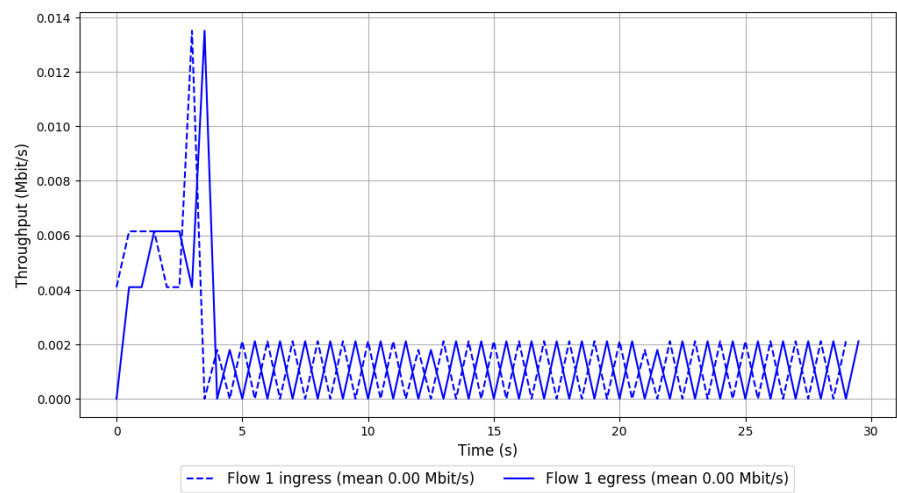
-- Flow 1:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 256.264 ms

Loss rate: 0.00%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-09-10 21:35:56

End at: 2018-09-10 21:36:26

Local clock offset: -8.871 ms

Remote clock offset: 6.289 ms

Below is generated by plot.py at 2018-09-10 22:31:59

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 279.698 ms

Loss rate: 0.08%

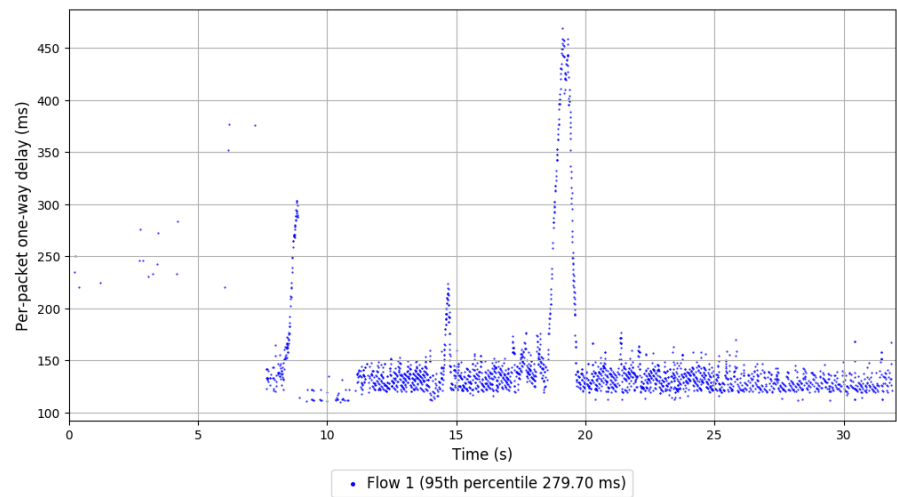
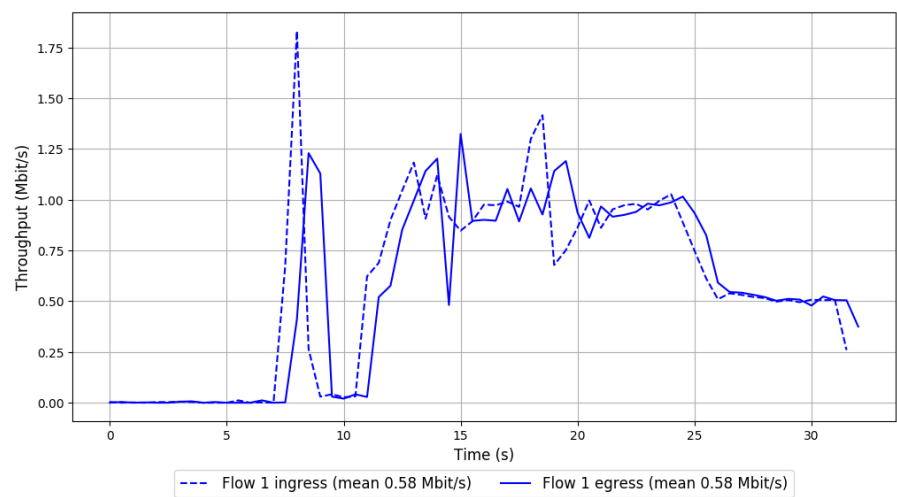
-- Flow 1:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 279.698 ms

Loss rate: 0.08%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-09-10 21:56:30

End at: 2018-09-10 21:57:00

Local clock offset: -8.749 ms

Remote clock offset: 2.13 ms

Below is generated by plot.py at 2018-09-10 22:32:00

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 223.316 ms

Loss rate: 0.52%

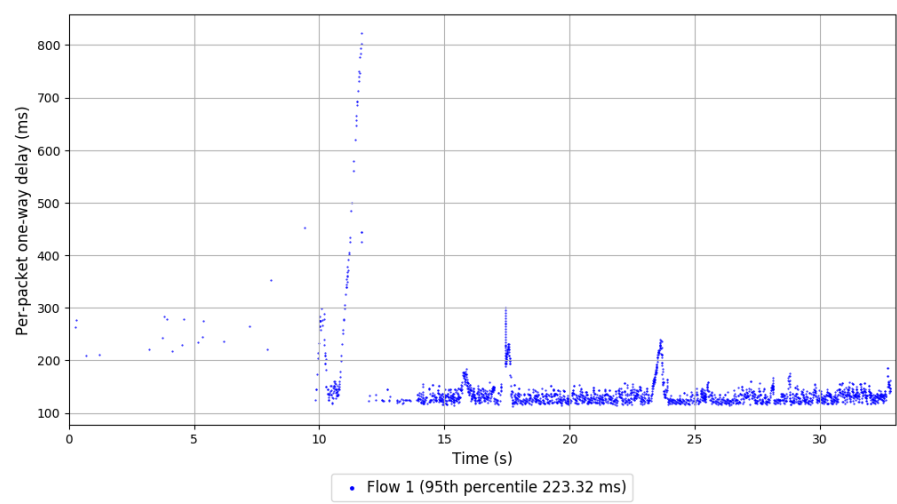
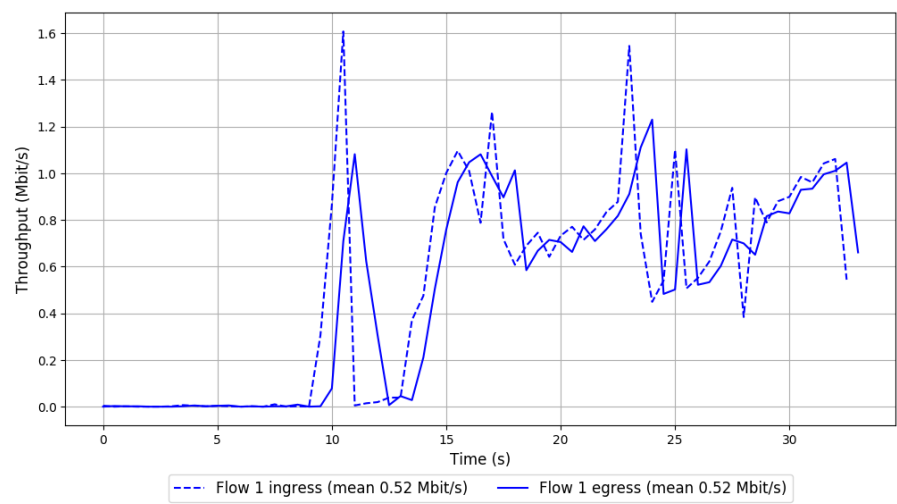
-- Flow 1:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 223.316 ms

Loss rate: 0.52%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-09-10 22:16:59

End at: 2018-09-10 22:17:29

Local clock offset: -10.07 ms

Remote clock offset: 2.264 ms

Below is generated by plot.py at 2018-09-10 22:32:00

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 273.802 ms

Loss rate: 0.04%

-- Flow 1:

Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 273.802 ms

Loss rate: 0.04%

Run 3: Report of WebRTC media — Data Link

