

Pantheon Report

Generated at 2019-01-17 04:17:50 (UTC).

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

Repeated the test of 19 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:

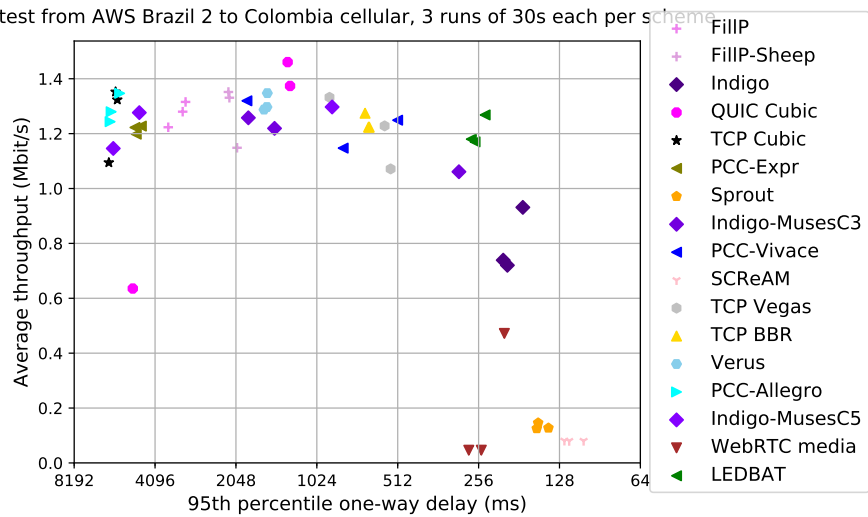
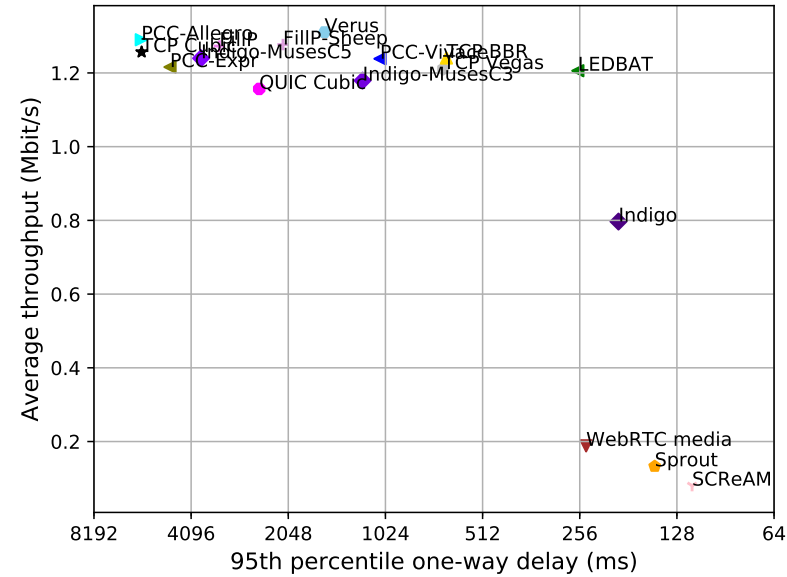
```
Linux 4.15.0-1031-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

```
branch: muses @ 308b29cefdb093313dc8409e68bf4b4cecd405d1
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf5e58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ c3eee875824760ec5b2fd207fefe166e1afe2170
third_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
M src/examples/cellsim.cc
M src/examples/sproutbt2.cc
M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
M tools/plot.py
```

third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851

test from AWS 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	1.24	662.64	0.97
Copa	0	N/A	N/A	N/A
TCP Cubic	3	1.25	5831.68	21.08
FillP	3	1.27	3347.92	9.83
FillP-Sheep	3	1.28	2126.23	1.16
Indigo	3	0.80	194.20	0.39
Indigo-MusesC3	3	1.18	1205.22	0.45
Indigo-MusesC5	3	1.24	3815.09	4.42
LEDBAT	3	1.21	259.55	0.51
PCC-Allegro	3	1.29	5844.43	65.58
PCC-Expr	3	1.22	4763.02	78.56
QUIC Cubic	3	1.16	2520.09	7.49
SCReAM	3	0.08	114.87	0.13
Sprout	3	0.14	149.97	0.61
TaoVA-100x	0	N/A	N/A	N/A
TCP Vegas	3	1.21	678.52	0.80
Verus	3	1.31	1581.84	3.09
PCC-Vivace	3	1.24	1064.71	2.79
WebRTC media	3	0.19	244.62	0.03

Run 1: Statistics of TCP BBR

Start at: 2019-01-17 03:13:58

End at: 2019-01-17 03:14:28

Local clock offset: 3.232 ms

Remote clock offset: 50.054 ms

Below is generated by plot.py at 2019-01-17 04:17:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.22 Mbit/s

95th percentile per-packet one-way delay: 657.185 ms

Loss rate: 1.30%

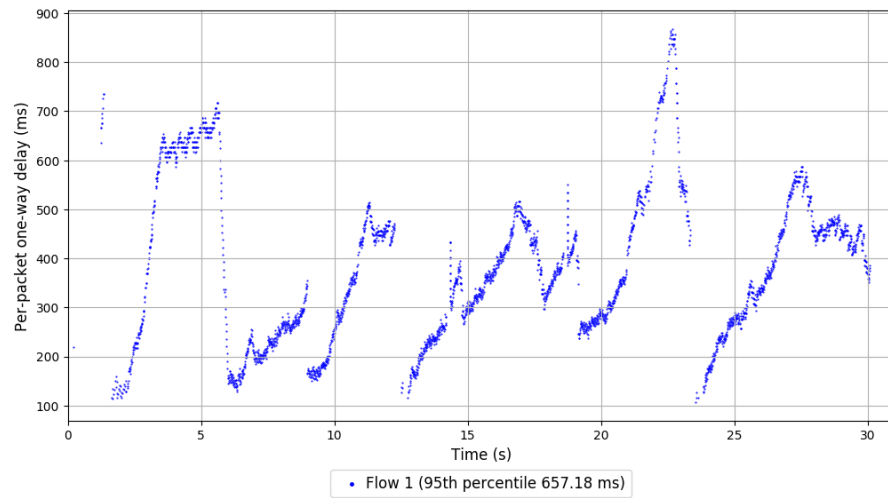
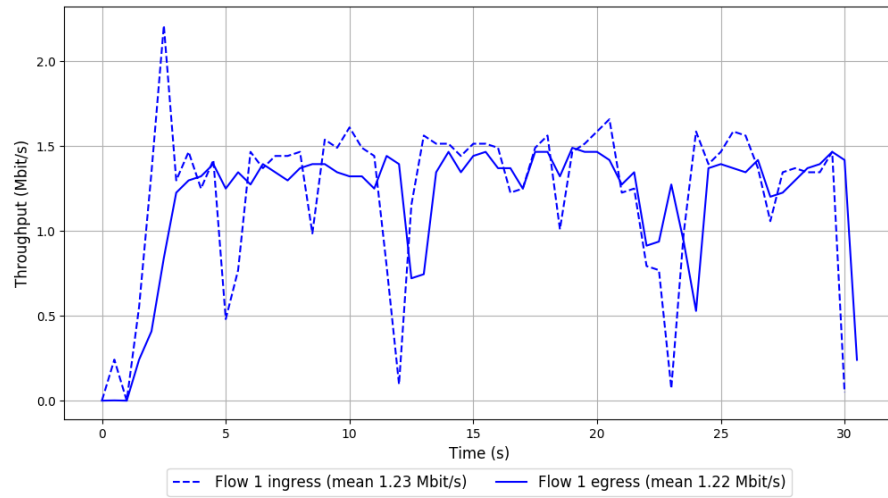
-- Flow 1:

Average throughput: 1.22 Mbit/s

95th percentile per-packet one-way delay: 657.185 ms

Loss rate: 1.30%

Run 1: Report of TCP BBR — Data Link

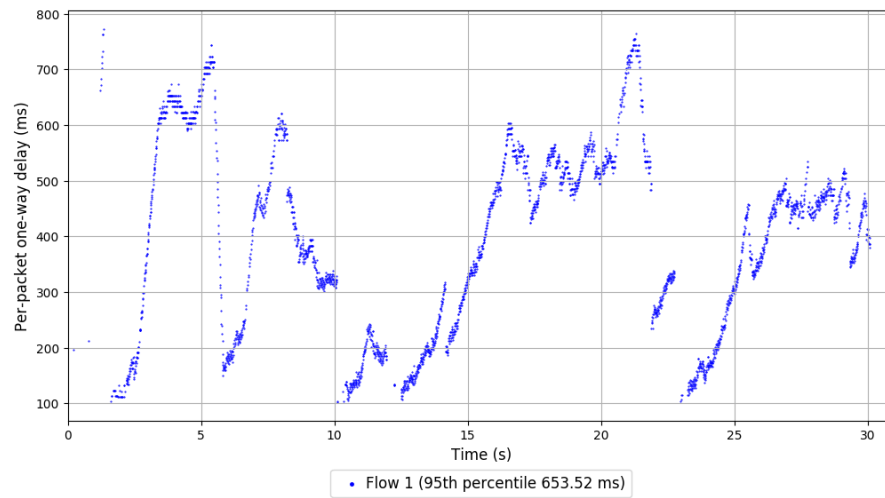
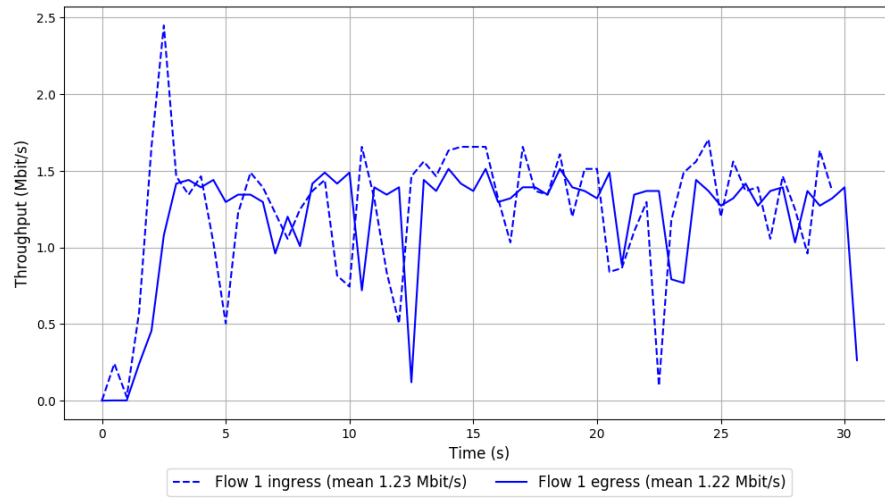


Run 2: Statistics of TCP BBR

Start at: 2019-01-17 03:35:37
End at: 2019-01-17 03:36:07
Local clock offset: -0.524 ms
Remote clock offset: 16.589 ms

Below is generated by plot.py at 2019-01-17 04:17:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 653.516 ms
Loss rate: 1.26%
-- Flow 1:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 653.516 ms
Loss rate: 1.26%

Run 2: Report of TCP BBR — Data Link

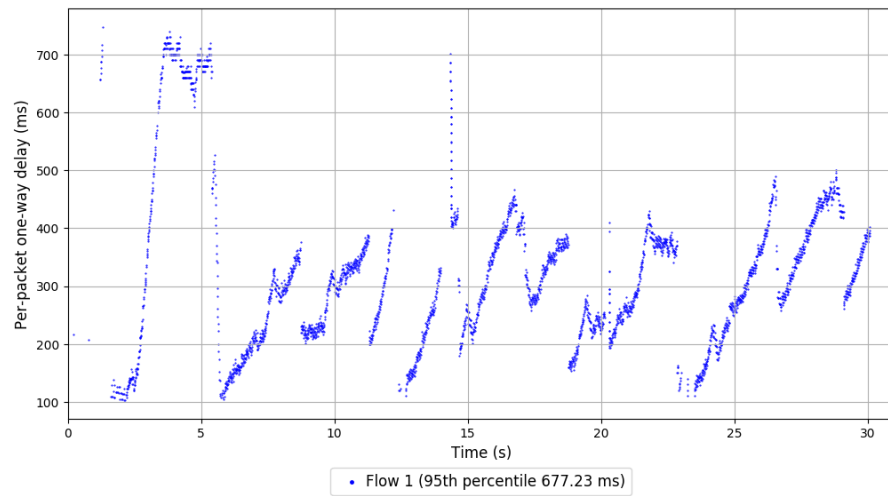
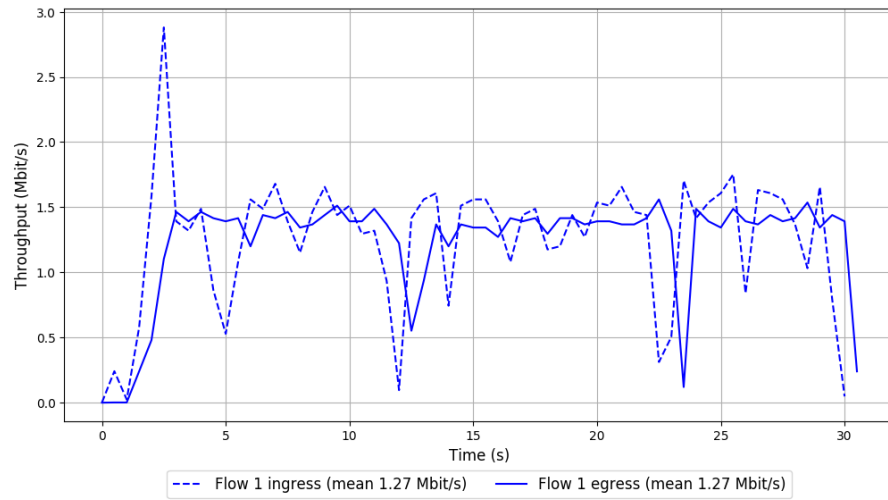


Run 3: Statistics of TCP BBR

Start at: 2019-01-17 03:57:12
End at: 2019-01-17 03:57:42
Local clock offset: -1.157 ms
Remote clock offset: -15.198 ms

Below is generated by plot.py at 2019-01-17 04:17:19
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 677.228 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 677.228 ms
Loss rate: 0.35%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

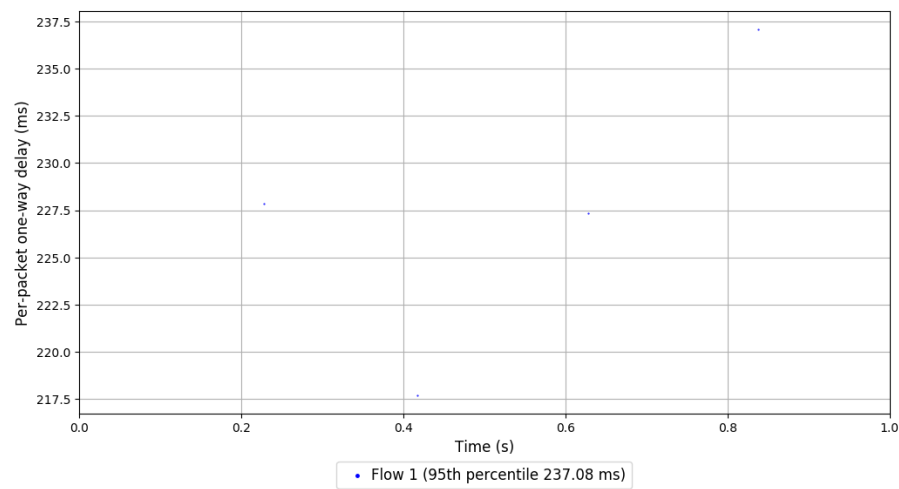
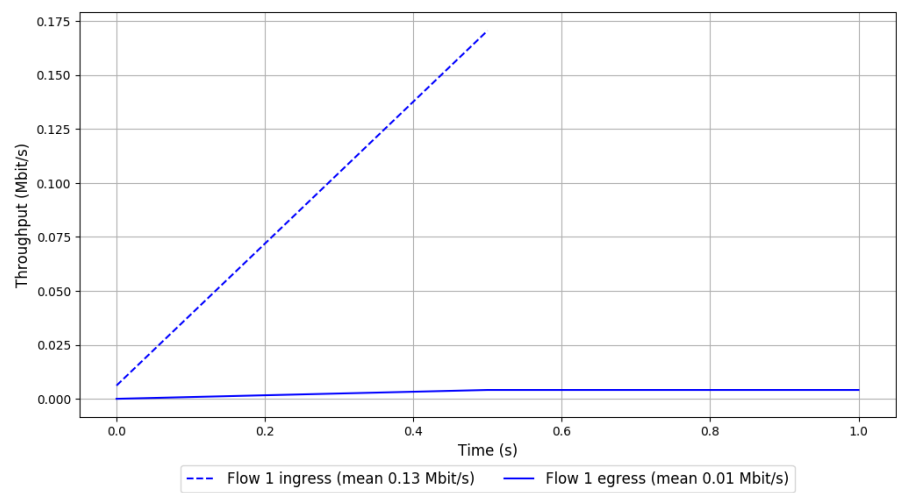
Start at: 2019-01-17 03:12:50

End at: 2019-01-17 03:13:20

Local clock offset: 2.245 ms

Remote clock offset: 49.86 ms

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

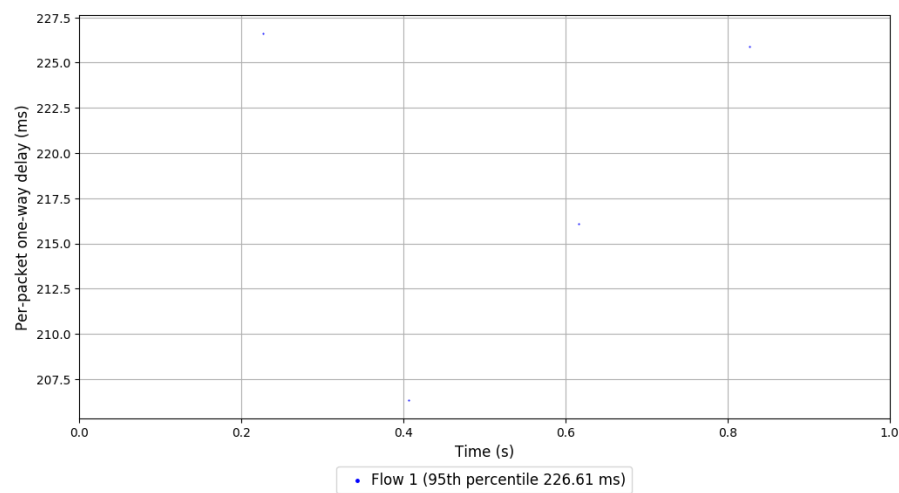
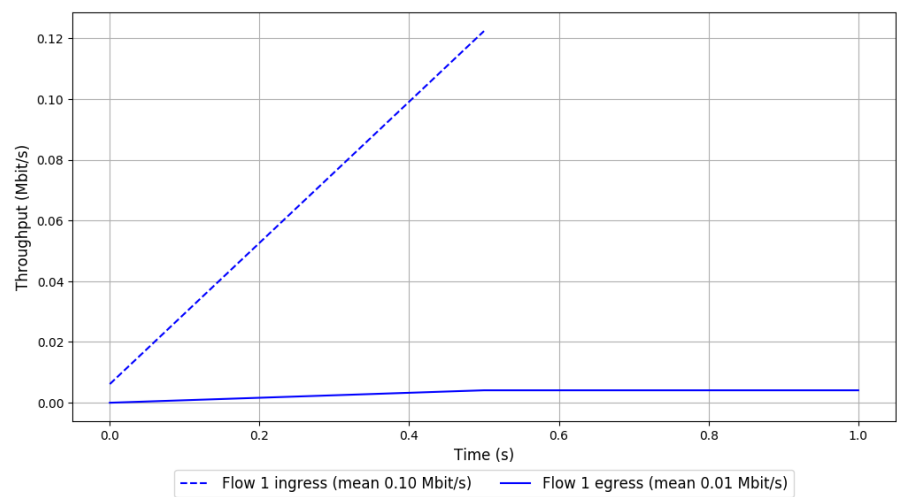
Start at: 2019-01-17 03:34:29

End at: 2019-01-17 03:34:59

Local clock offset: -1.302 ms

Remote clock offset: 21.432 ms

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

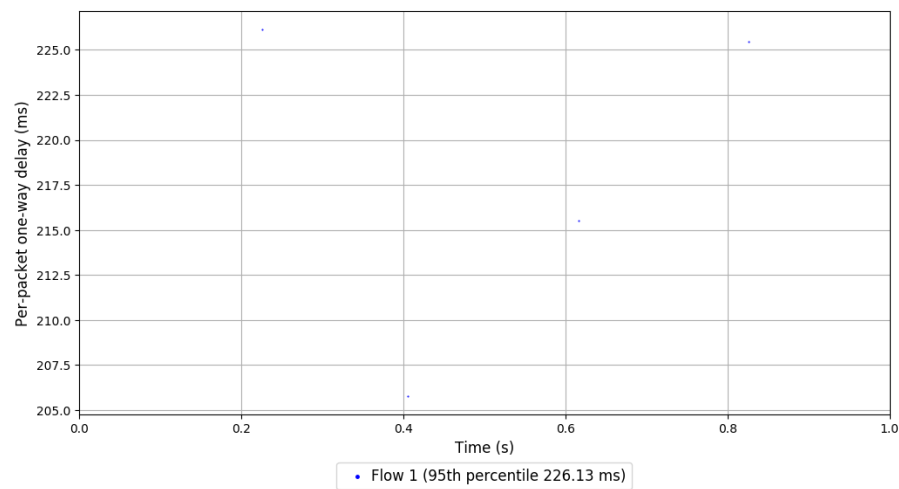
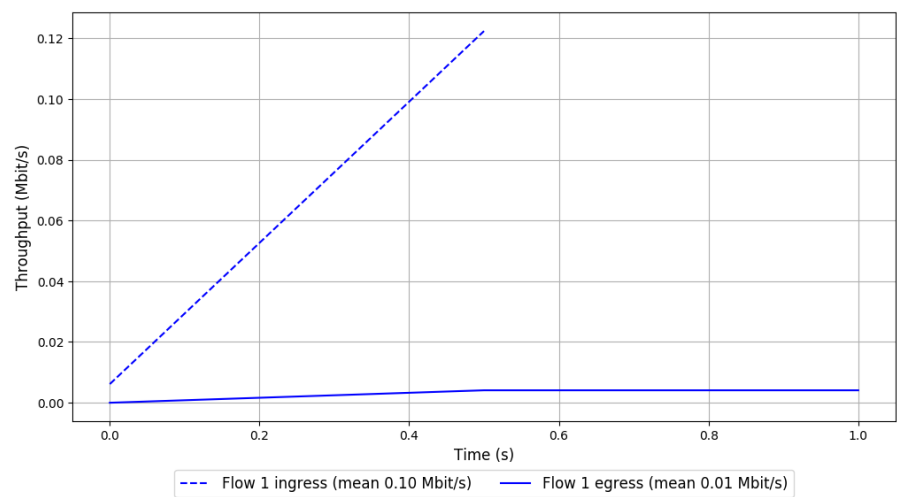
Start at: 2019-01-17 03:56:04

End at: 2019-01-17 03:56:34

Local clock offset: -1.866 ms

Remote clock offset: -13.159 ms

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-01-17 03:17:23

End at: 2019-01-17 03:17:53

Local clock offset: 3.954 ms

Remote clock offset: 49.977 ms

Below is generated by plot.py at 2019-01-17 04:17:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 5745.720 ms

Loss rate: 19.53%

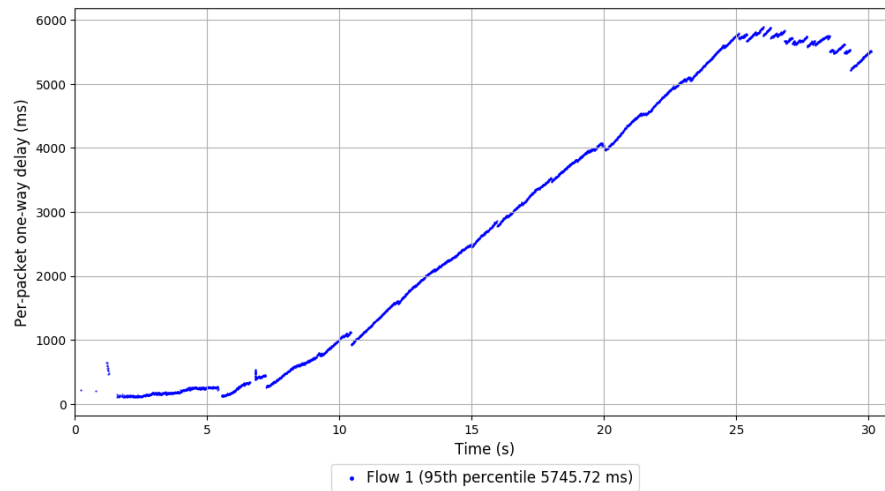
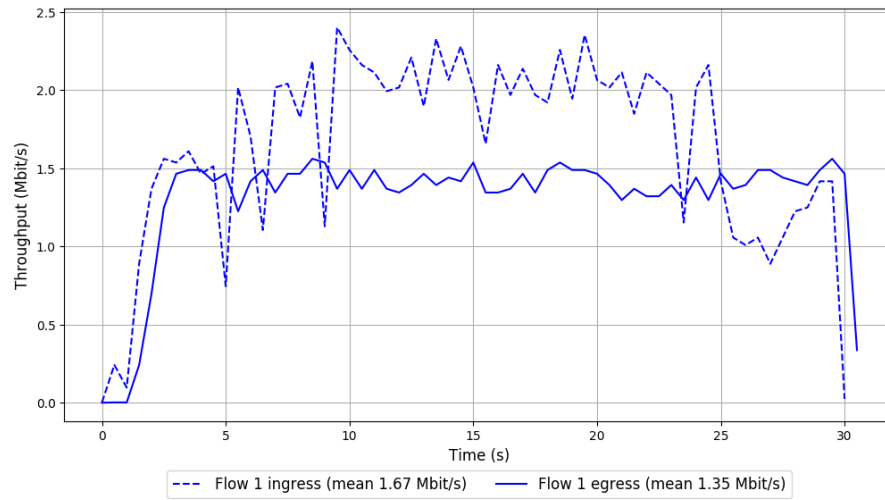
-- Flow 1:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 5745.720 ms

Loss rate: 19.53%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-01-17 03:39:02

End at: 2019-01-17 03:39:32

Local clock offset: -0.474 ms

Remote clock offset: 8.66 ms

Below is generated by plot.py at 2019-01-17 04:17:19

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 5662.417 ms

Loss rate: 19.82%

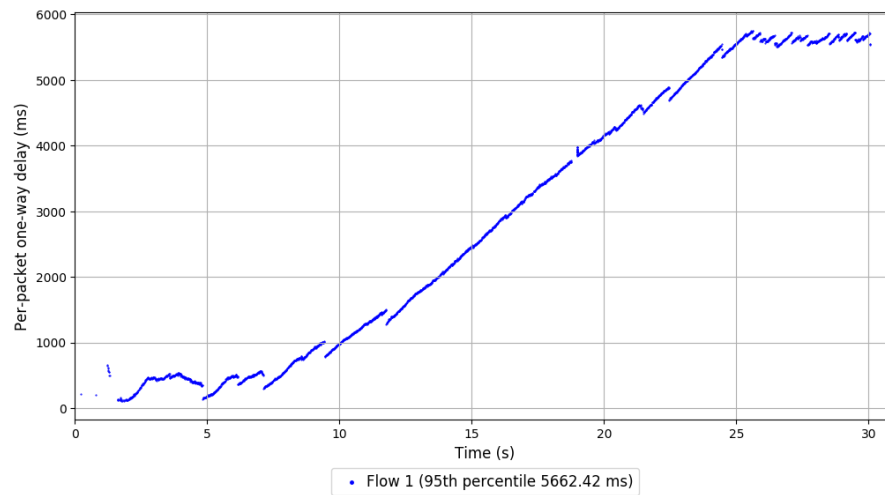
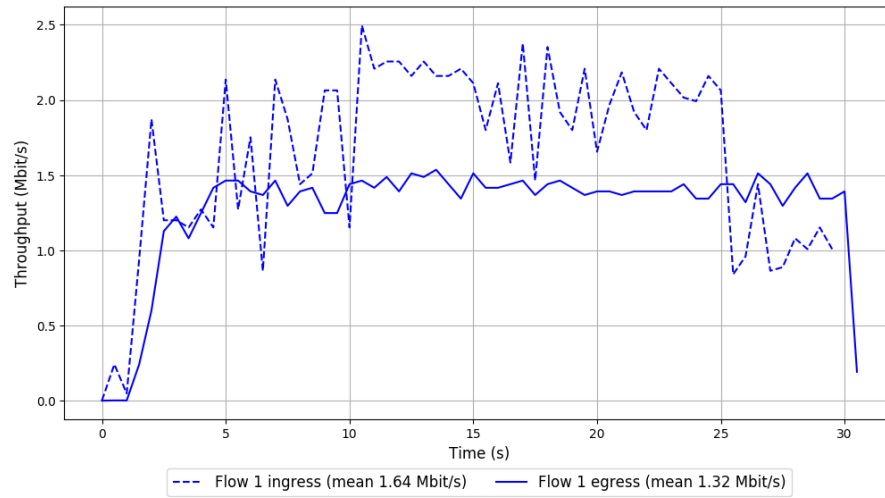
-- Flow 1:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 5662.417 ms

Loss rate: 19.82%

Run 2: Report of TCP Cubic — Data Link

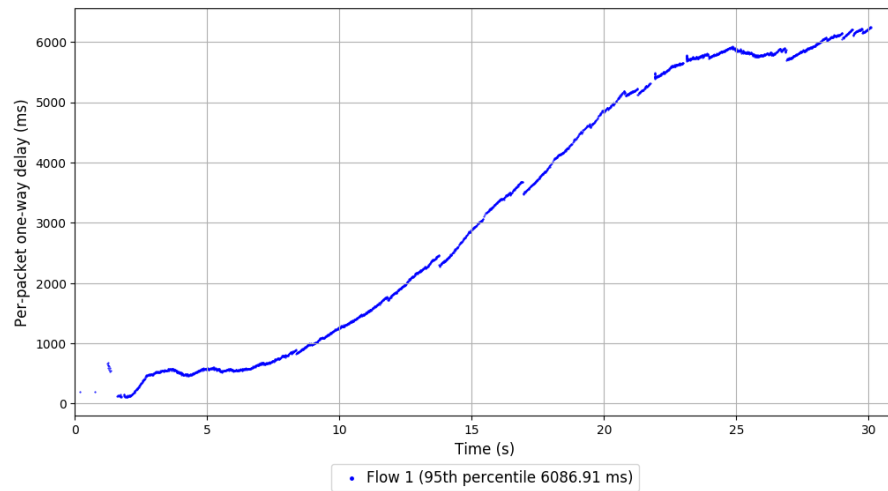
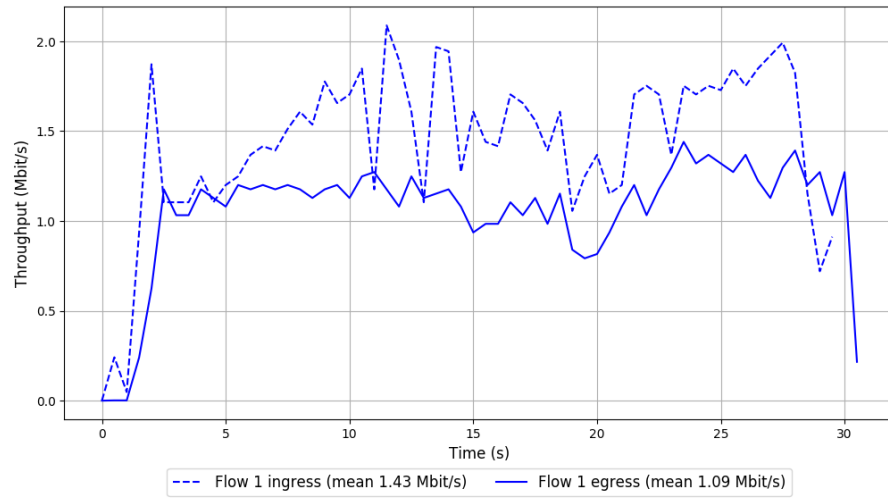


Run 3: Statistics of TCP Cubic

Start at: 2019-01-17 04:00:37
End at: 2019-01-17 04:01:07
Local clock offset: -2.075 ms
Remote clock offset: -16.729 ms

Below is generated by plot.py at 2019-01-17 04:17:20
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 6086.913 ms
Loss rate: 23.88%
-- Flow 1:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 6086.913 ms
Loss rate: 23.88%

Run 3: Report of TCP Cubic — Data Link

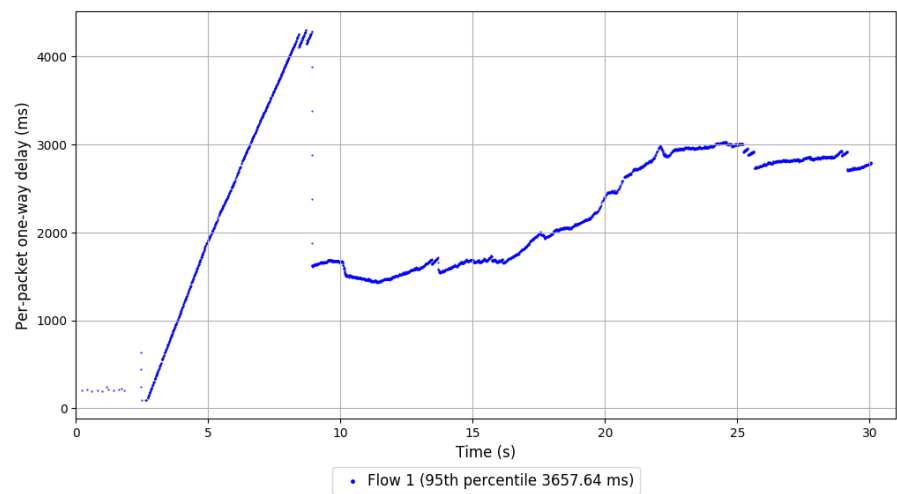
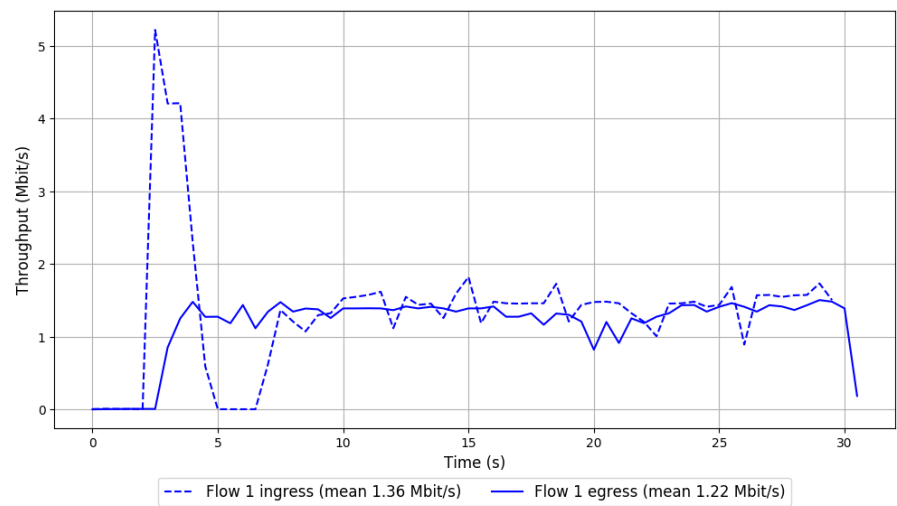


Run 1: Statistics of FillP

Start at: 2019-01-17 03:25:22
End at: 2019-01-17 03:25:52
Local clock offset: 0.409 ms
Remote clock offset: 47.181 ms

Below is generated by plot.py at 2019-01-17 04:17:20
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 3657.640 ms
Loss rate: 10.57%
-- Flow 1:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 3657.640 ms
Loss rate: 10.57%

Run 1: Report of FillP — Data Link

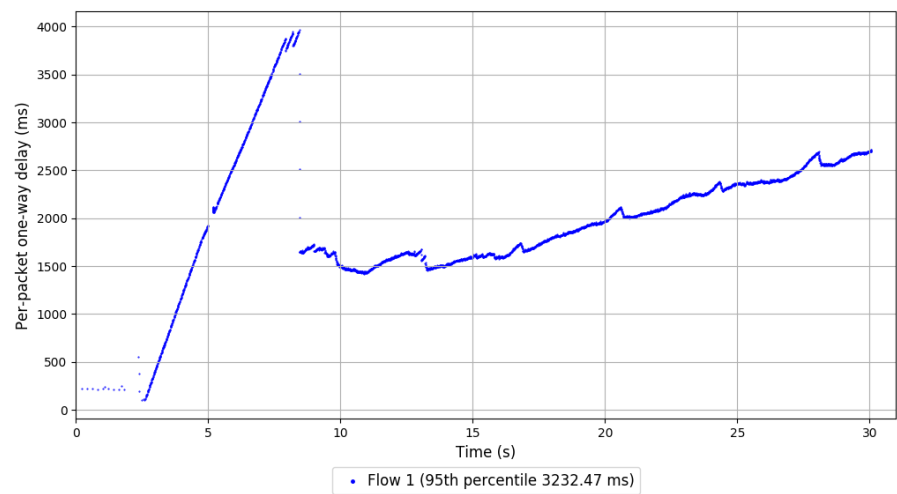
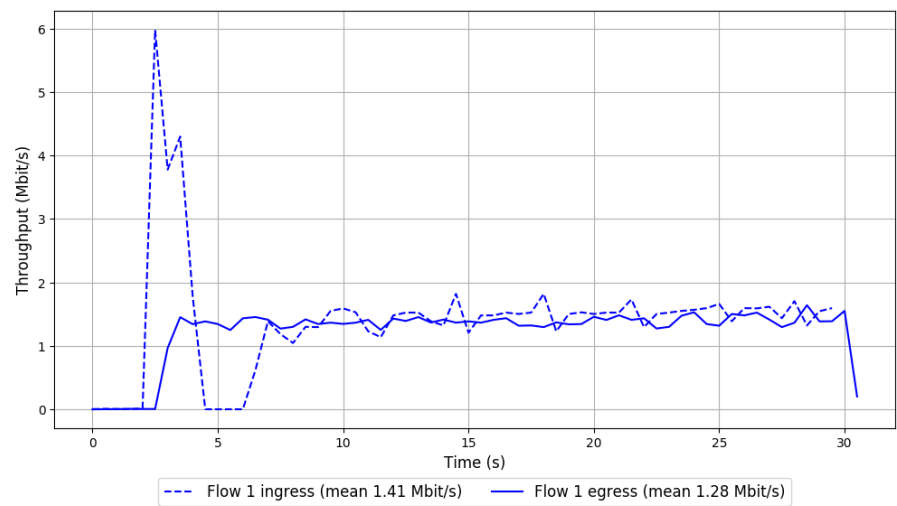


Run 2: Statistics of FillP

Start at: 2019-01-17 03:46:59
End at: 2019-01-17 03:47:29
Local clock offset: -0.599 ms
Remote clock offset: -5.337 ms

Below is generated by plot.py at 2019-01-17 04:17:21
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 3232.467 ms
Loss rate: 9.53%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 3232.467 ms
Loss rate: 9.53%

Run 2: Report of FillP — Data Link

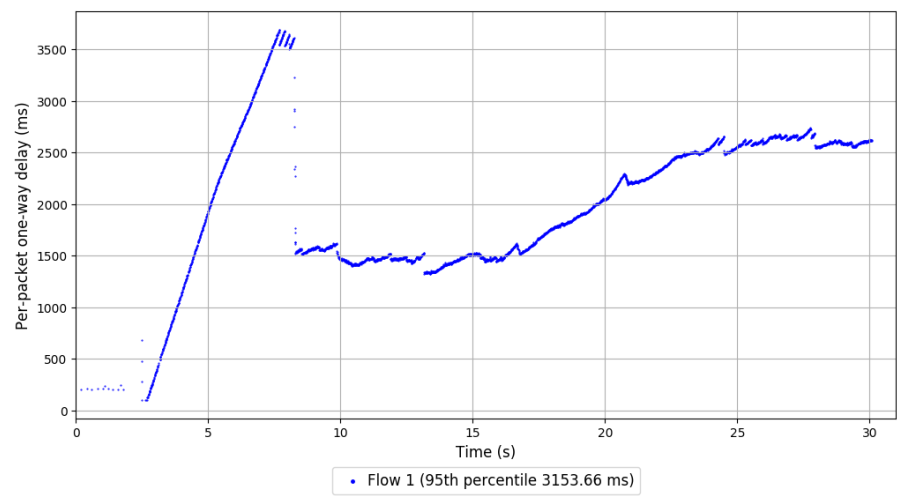
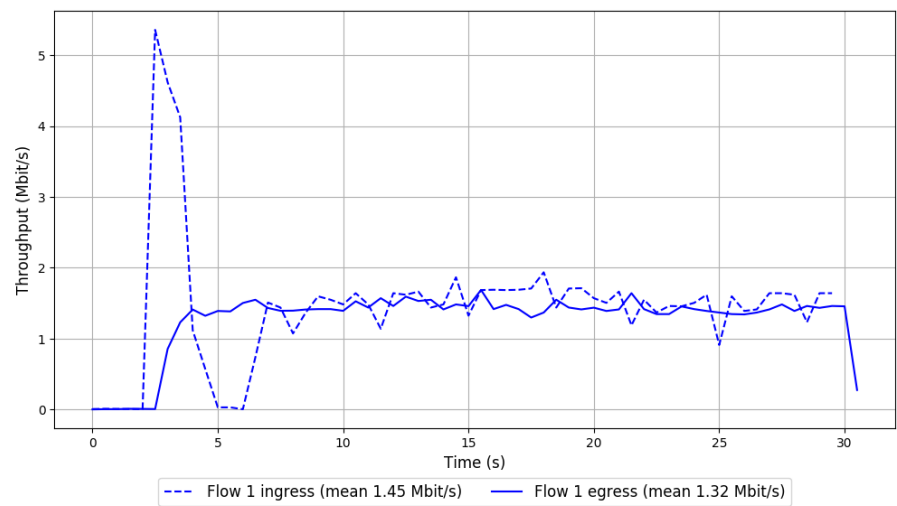


Run 3: Statistics of FillP

Start at: 2019-01-17 04:08:35
End at: 2019-01-17 04:09:05
Local clock offset: -1.812 ms
Remote clock offset: -14.982 ms

Below is generated by plot.py at 2019-01-17 04:17:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 3153.659 ms
Loss rate: 9.38%
-- Flow 1:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 3153.659 ms
Loss rate: 9.38%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-01-17 03:31:04

End at: 2019-01-17 03:31:34

Local clock offset: -1.167 ms

Remote clock offset: 33.434 ms

Below is generated by plot.py at 2019-01-17 04:17:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.15 Mbit/s

95th percentile per-packet one-way delay: 2028.181 ms

Loss rate: 2.07%

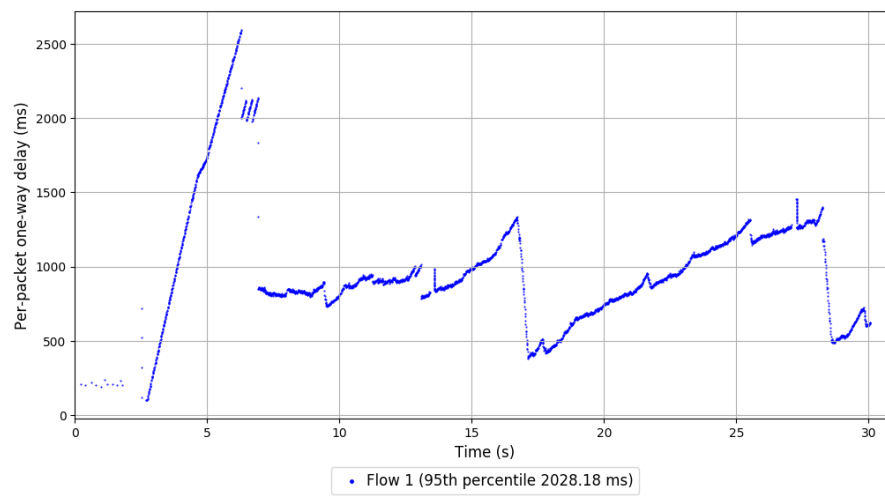
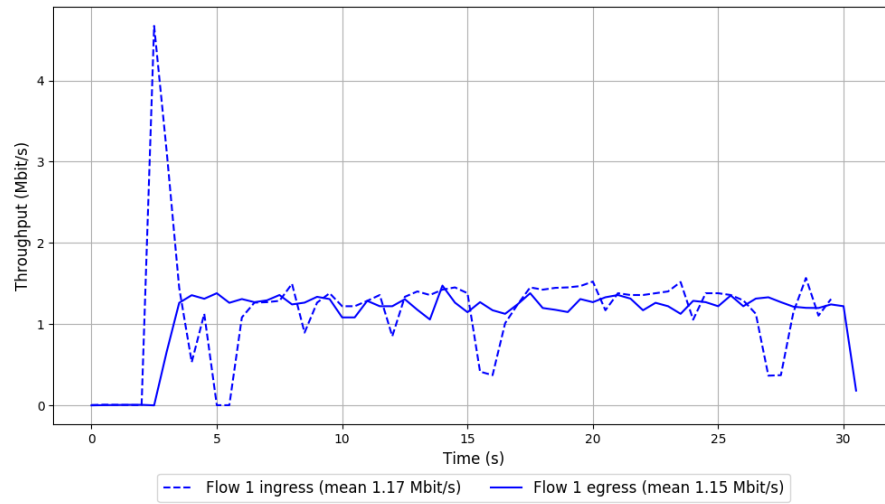
-- Flow 1:

Average throughput: 1.15 Mbit/s

95th percentile per-packet one-way delay: 2028.181 ms

Loss rate: 2.07%

Run 1: Report of FillP-Sheep — Data Link

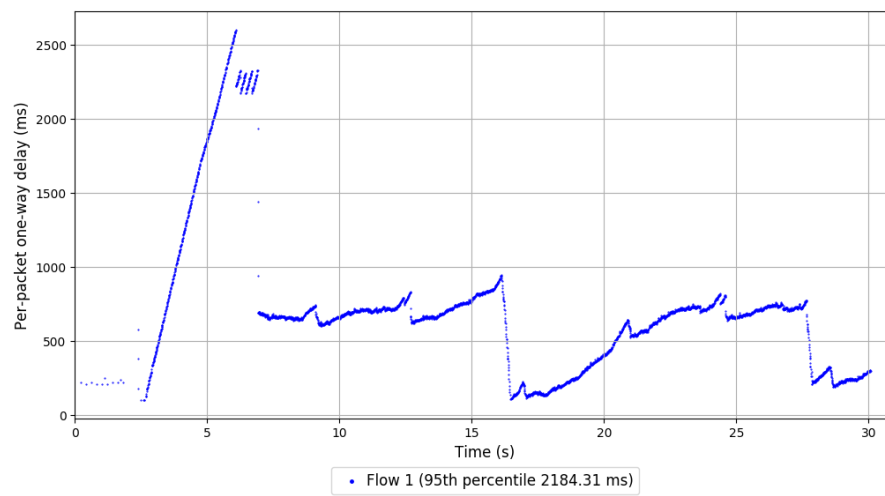
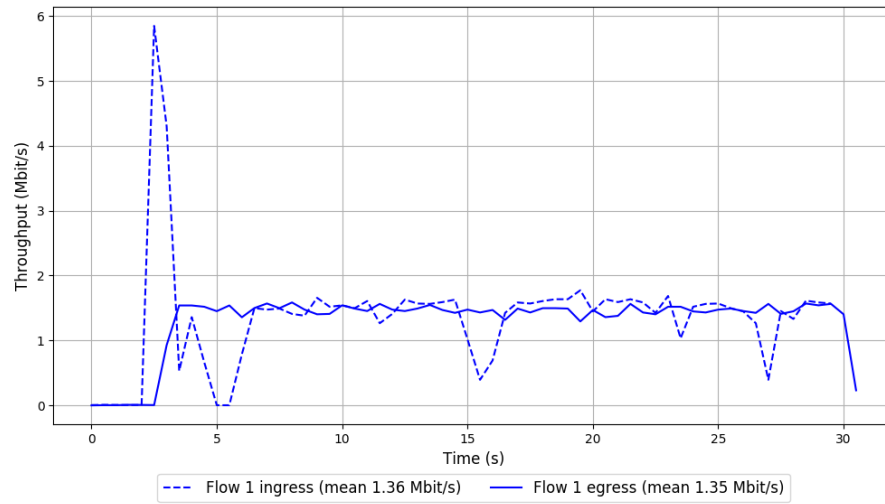


Run 2: Statistics of FillP-Sheep

Start at: 2019-01-17 03:52:40
End at: 2019-01-17 03:53:10
Local clock offset: -1.509 ms
Remote clock offset: -11.24 ms

Below is generated by plot.py at 2019-01-17 04:17:25
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 2184.306 ms
Loss rate: 0.85%
-- Flow 1:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 2184.306 ms
Loss rate: 0.85%

Run 2: Report of FillP-Sheep — Data Link

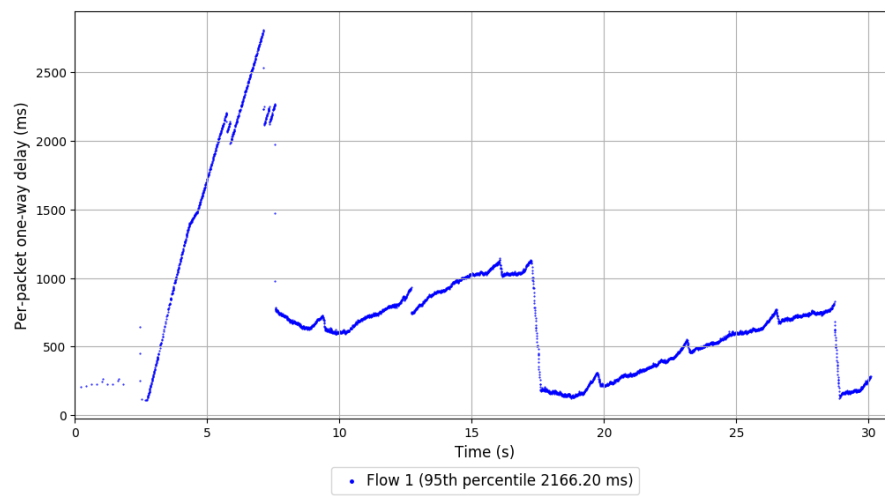
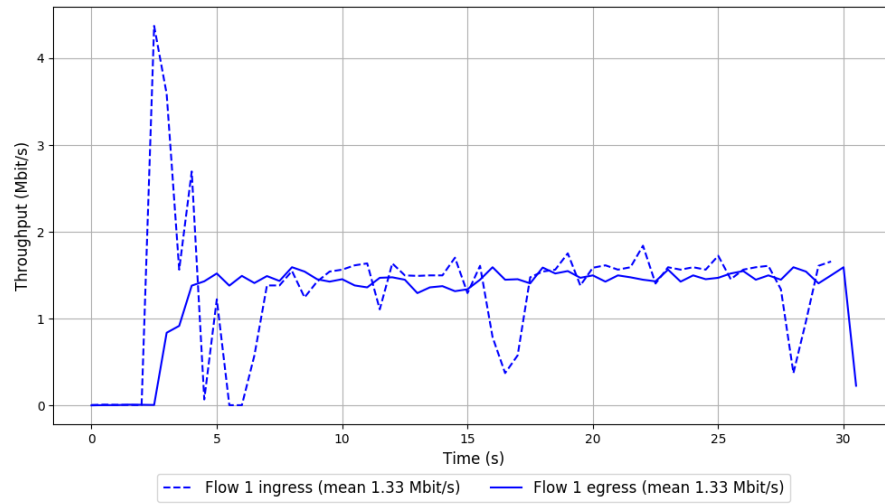


Run 3: Statistics of FillP-Sheep

Start at: 2019-01-17 04:14:21
End at: 2019-01-17 04:14:51
Local clock offset: -0.802 ms
Remote clock offset: -7.316 ms

Below is generated by plot.py at 2019-01-17 04:17:25
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 2166.204 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 2166.204 ms
Loss rate: 0.57%

Run 3: Report of FillP-Sheep — Data Link

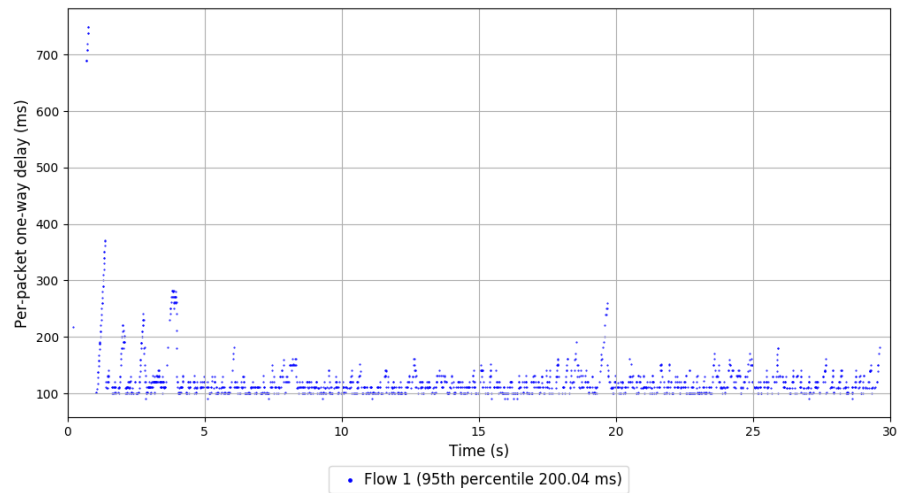
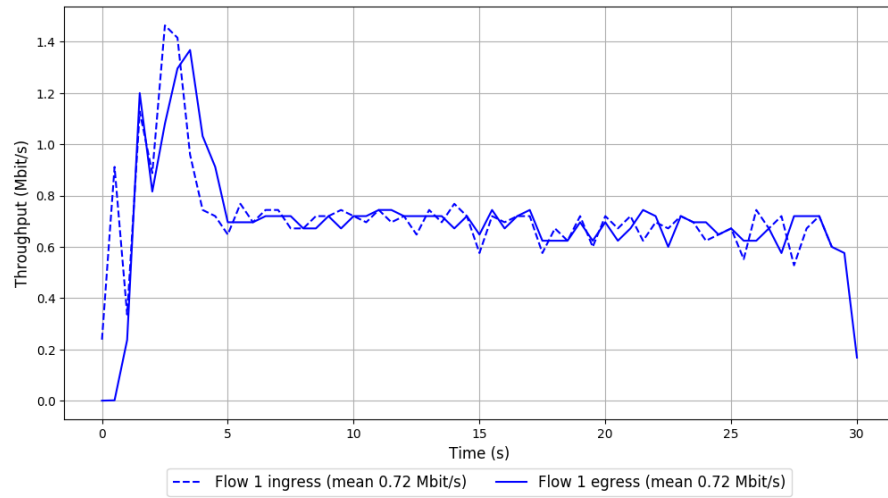


```
Run 1: Statistics of Indigo

Start at: 2019-01-17 03:24:14
End at: 2019-01-17 03:24:44
Local clock offset: -0.08 ms
Remote clock offset: 45.939 ms

# Below is generated by plot.py at 2019-01-17 04:17:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 200.042 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 200.042 ms
Loss rate: 0.11%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-01-17 03:45:51

End at: 2019-01-17 03:46:21

Local clock offset: -0.631 ms

Remote clock offset: 0.069 ms

Below is generated by plot.py at 2019-01-17 04:17:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.74 Mbit/s

95th percentile per-packet one-way delay: 207.310 ms

Loss rate: 0.22%

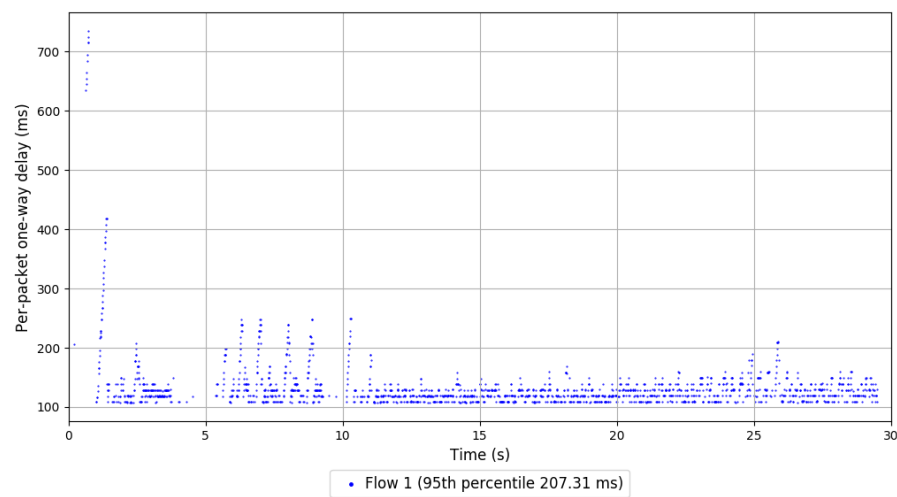
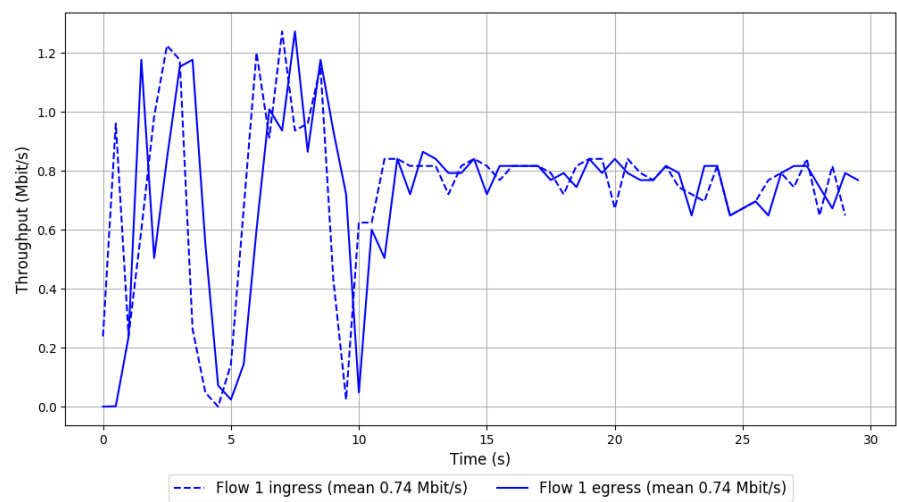
-- Flow 1:

Average throughput: 0.74 Mbit/s

95th percentile per-packet one-way delay: 207.310 ms

Loss rate: 0.22%

Run 2: Report of Indigo — Data Link

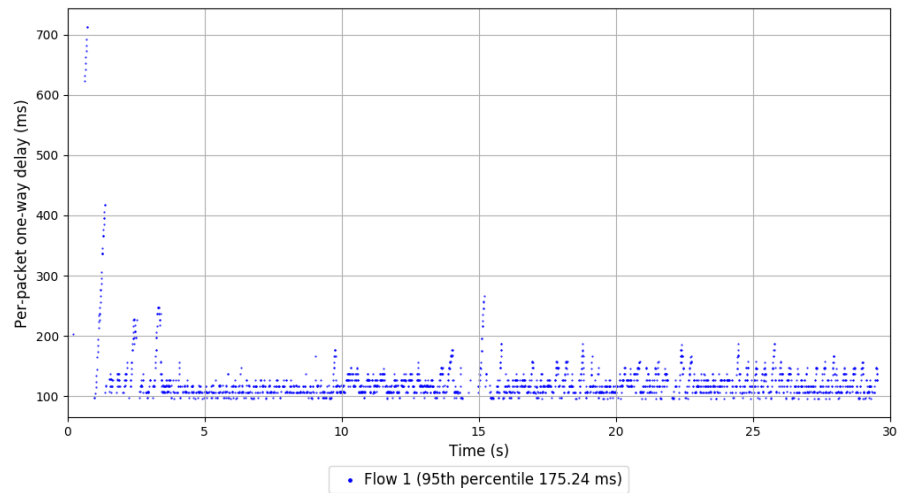
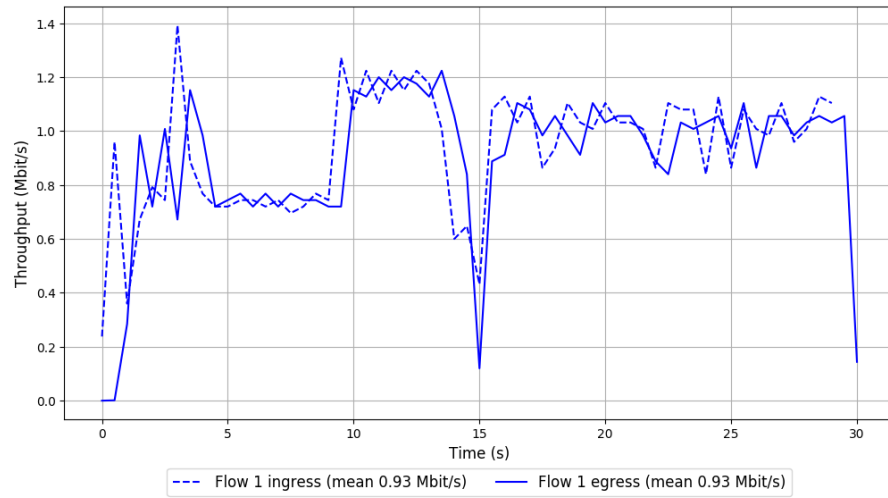


Run 3: Statistics of Indigo

Start at: 2019-01-17 04:07:27
End at: 2019-01-17 04:07:57
Local clock offset: -1.866 ms
Remote clock offset: -17.387 ms

Below is generated by plot.py at 2019-01-17 04:17:25
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 175.244 ms
Loss rate: 0.83%
-- Flow 1:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 175.244 ms
Loss rate: 0.83%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

Start at: 2019-01-17 03:19:39

End at: 2019-01-17 03:20:09

Local clock offset: 1.955 ms

Remote clock offset: 51.45 ms

Below is generated by plot.py at 2019-01-17 04:17:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.22 Mbit/s

95th percentile per-packet one-way delay: 1471.335 ms

Loss rate: 0.34%

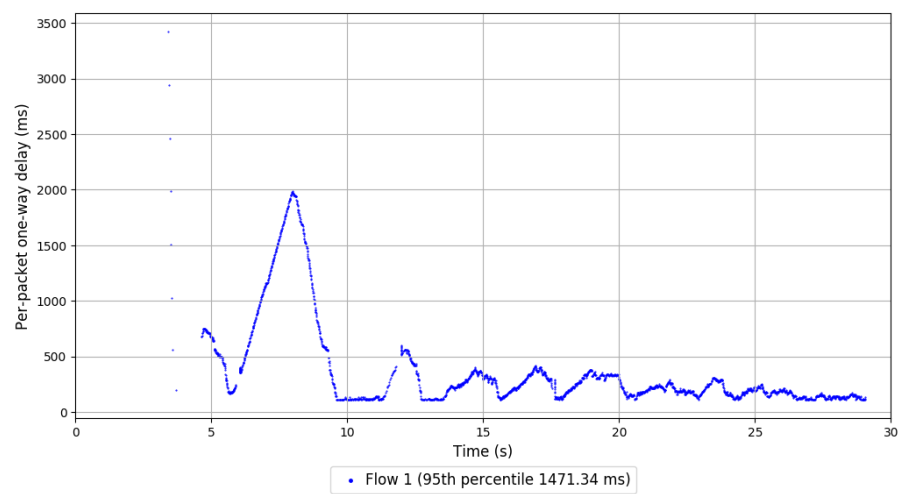
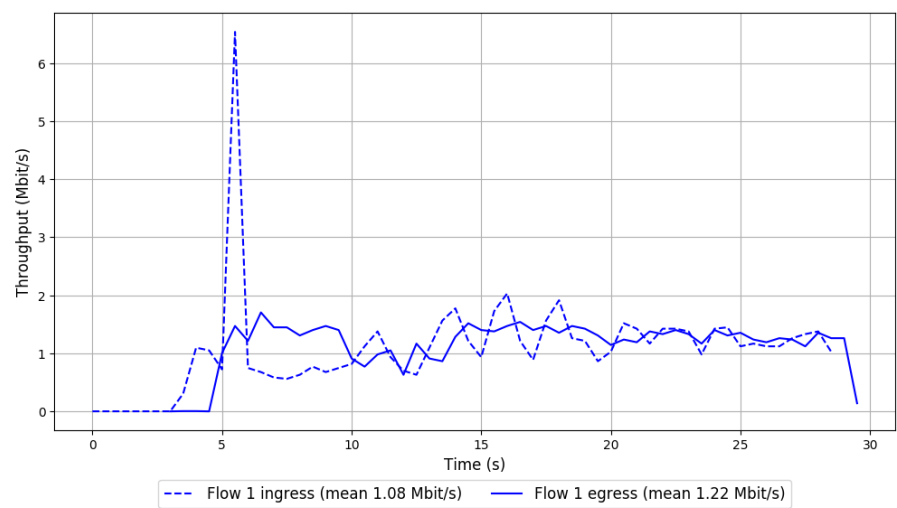
-- Flow 1:

Average throughput: 1.22 Mbit/s

95th percentile per-packet one-way delay: 1471.335 ms

Loss rate: 0.34%

Run 1: Report of Indigo-MusesC3 — Data Link



Run 2: Statistics of Indigo-MusesC3

Start at: 2019-01-17 03:41:18

End at: 2019-01-17 03:41:48

Local clock offset: -1.031 ms

Remote clock offset: 7.066 ms

Below is generated by plot.py at 2019-01-17 04:17:29

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.26 Mbit/s

95th percentile per-packet one-way delay: 1841.318 ms

Loss rate: 0.54%

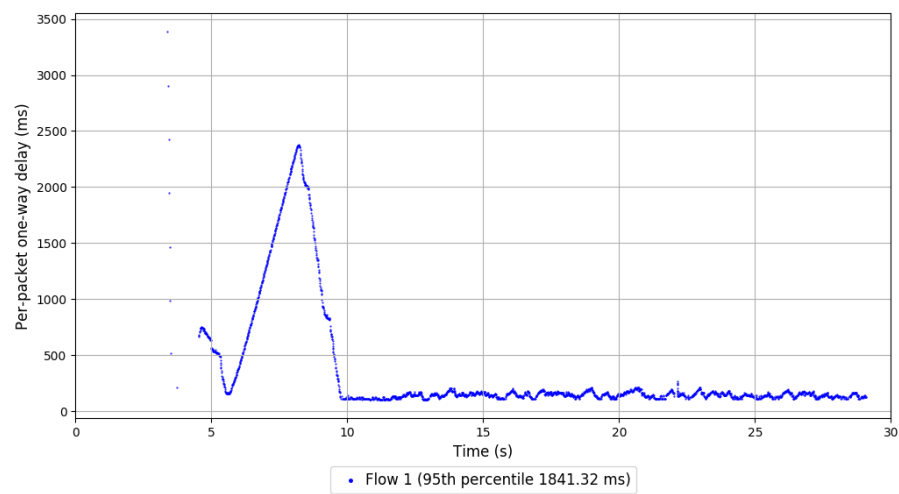
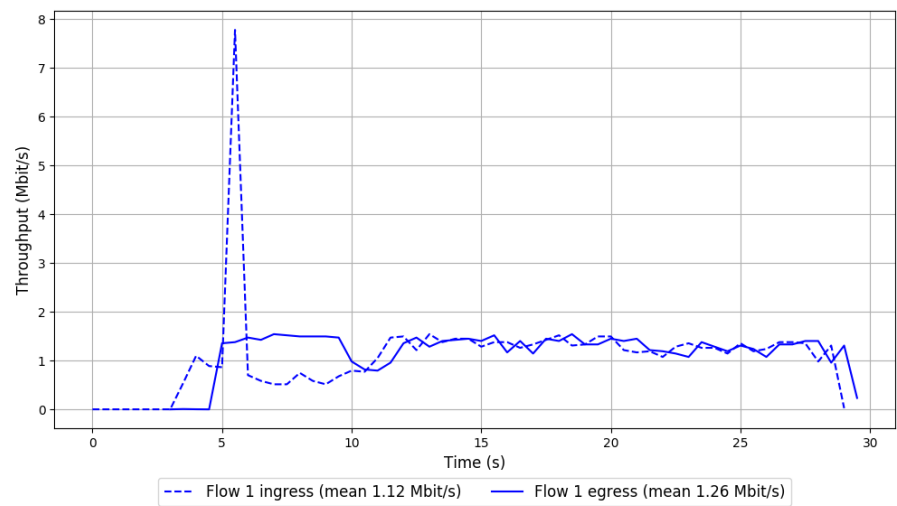
-- Flow 1:

Average throughput: 1.26 Mbit/s

95th percentile per-packet one-way delay: 1841.318 ms

Loss rate: 0.54%

Run 2: Report of Indigo-MusesC3 — Data Link

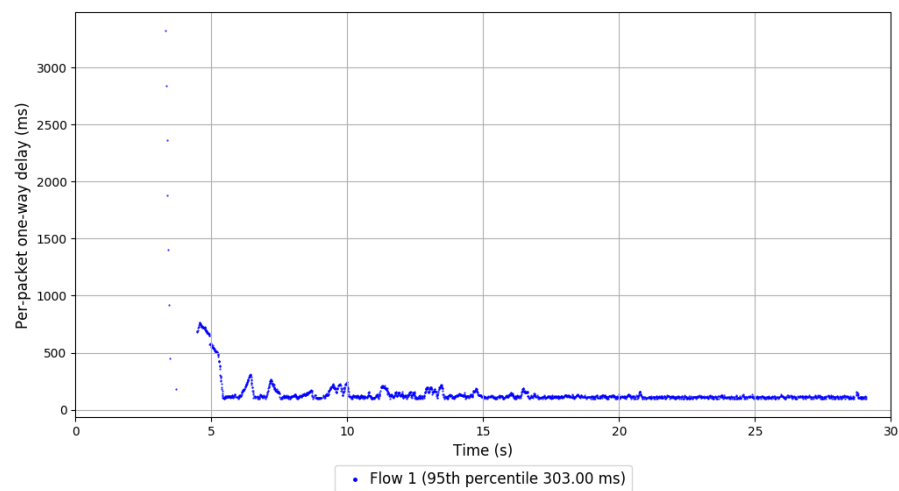
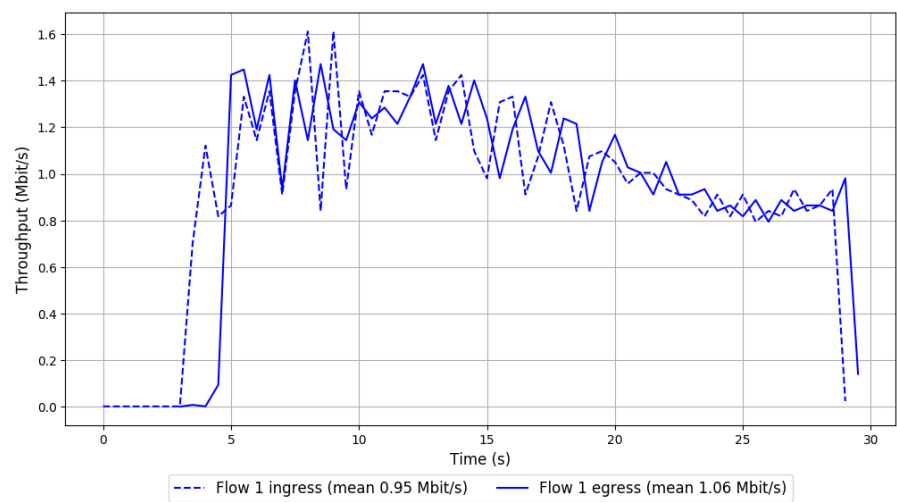


Run 3: Statistics of Indigo-MusesC3

Start at: 2019-01-17 04:02:54
End at: 2019-01-17 04:03:24
Local clock offset: -2.019 ms
Remote clock offset: -19.272 ms

Below is generated by plot.py at 2019-01-17 04:17:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 303.005 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 303.005 ms
Loss rate: 0.47%

Run 3: Report of Indigo-MusesC3 — Data Link

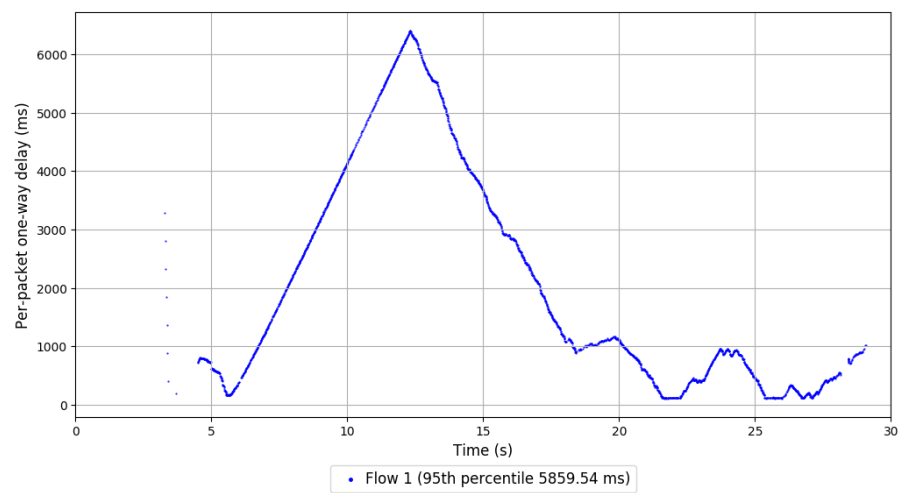
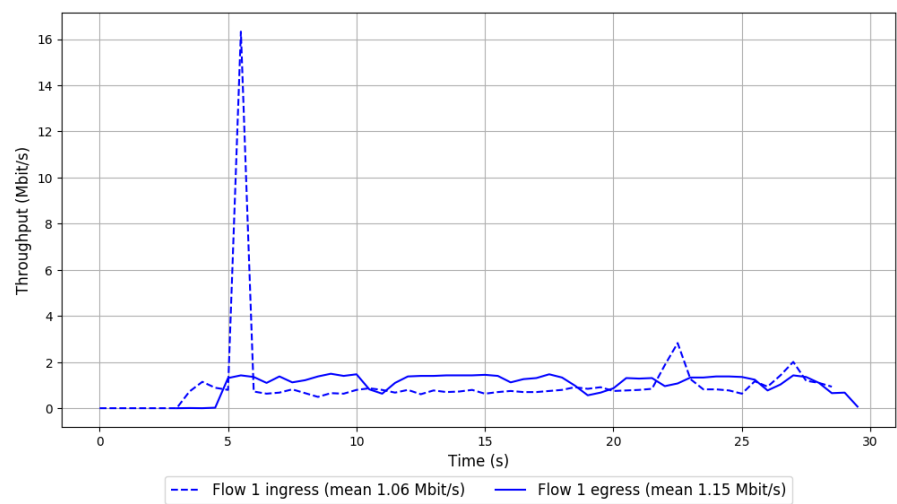


Run 1: Statistics of Indigo-MusesC5

Start at: 2019-01-17 03:26:31
End at: 2019-01-17 03:27:01
Local clock offset: 0.137 ms
Remote clock offset: 47.394 ms

Below is generated by plot.py at 2019-01-17 04:17:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 5859.540 ms
Loss rate: 3.51%
-- Flow 1:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 5859.540 ms
Loss rate: 3.51%

Run 1: Report of Indigo-MusesC5 — Data Link

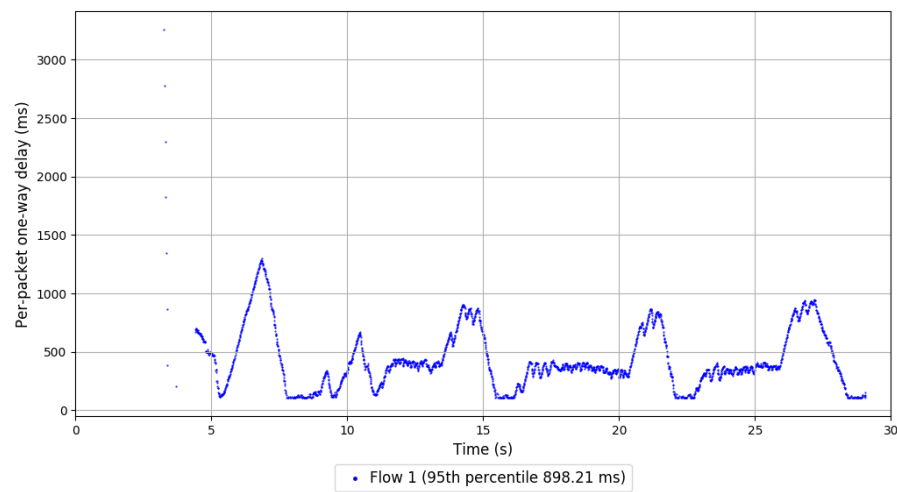
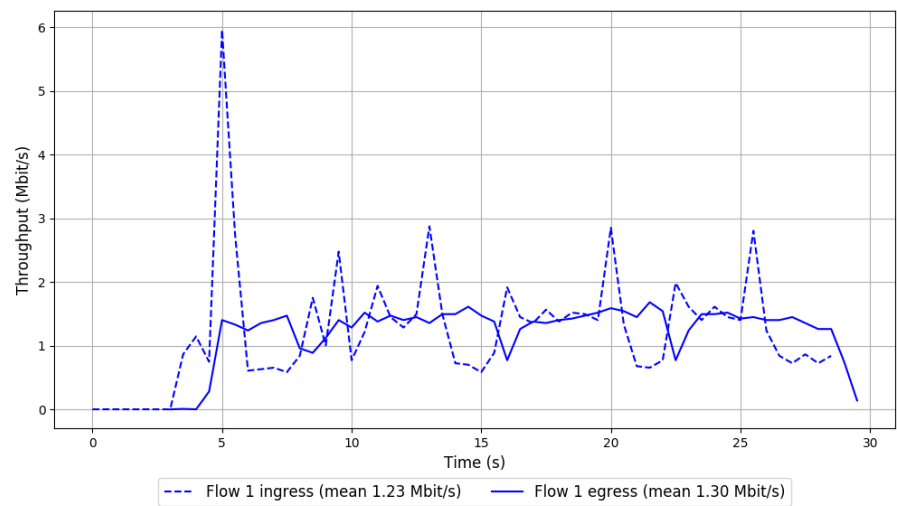


Run 2: Statistics of Indigo-MusesC5

Start at: 2019-01-17 03:48:07
End at: 2019-01-17 03:48:37
Local clock offset: 0.116 ms
Remote clock offset: -2.521 ms

Below is generated by plot.py at 2019-01-17 04:17:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 898.206 ms
Loss rate: 6.09%
-- Flow 1:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 898.206 ms
Loss rate: 6.09%

Run 2: Report of Indigo-MusesC5 — Data Link

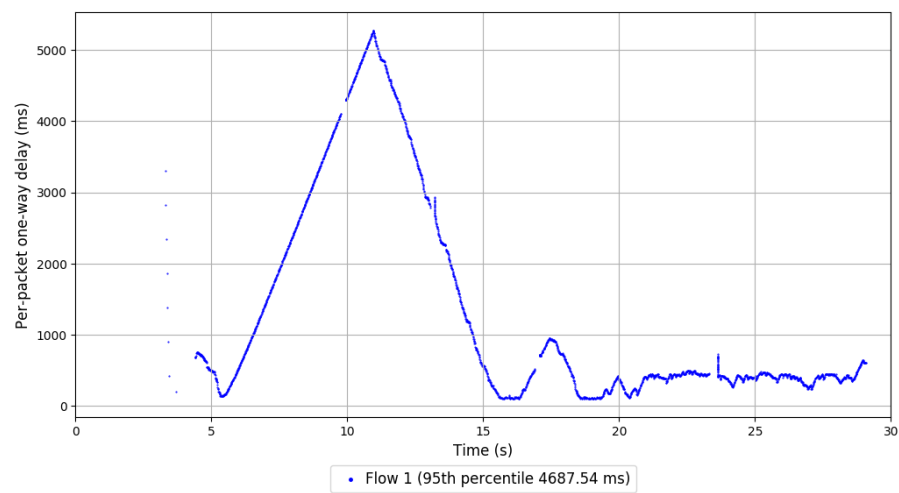
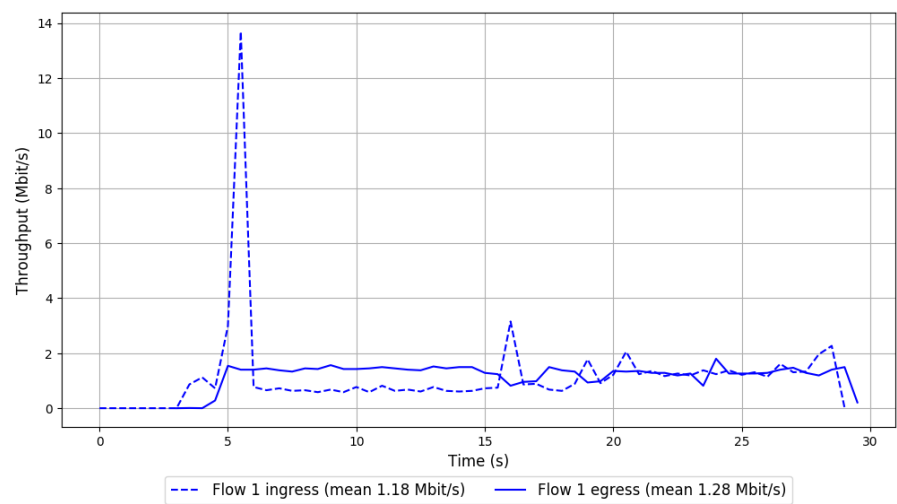


Run 3: Statistics of Indigo-MusesC5

Start at: 2019-01-17 04:09:44
End at: 2019-01-17 04:10:14
Local clock offset: -0.997 ms
Remote clock offset: -14.975 ms

Below is generated by plot.py at 2019-01-17 04:17:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 4687.536 ms
Loss rate: 3.66%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 4687.536 ms
Loss rate: 3.66%

Run 3: Report of Indigo-MusesC5 — Data Link

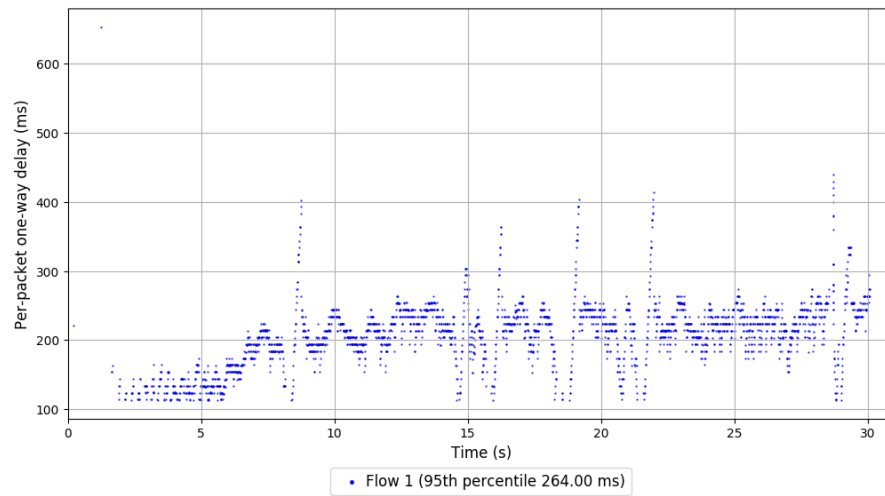
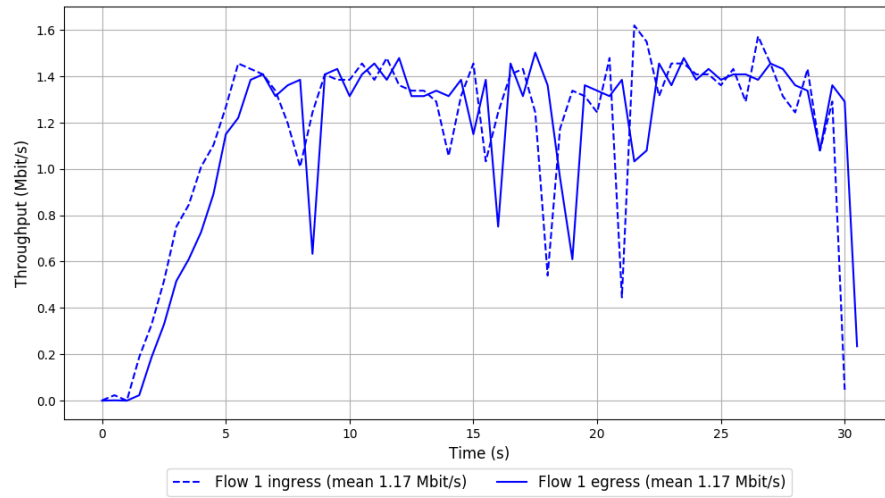


```
Run 1: Statistics of LEDBAT

Start at: 2019-01-17 03:20:48
End at: 2019-01-17 03:21:18
Local clock offset: 1.292 ms
Remote clock offset: 51.778 ms

# Below is generated by plot.py at 2019-01-17 04:17:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 263.995 ms
Loss rate: 0.63%
-- Flow 1:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 263.995 ms
Loss rate: 0.63%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-01-17 03:42:26

End at: 2019-01-17 03:42:56

Local clock offset: -0.948 ms

Remote clock offset: 1.233 ms

Below is generated by plot.py at 2019-01-17 04:17:30

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 242.071 ms

Loss rate: 0.46%

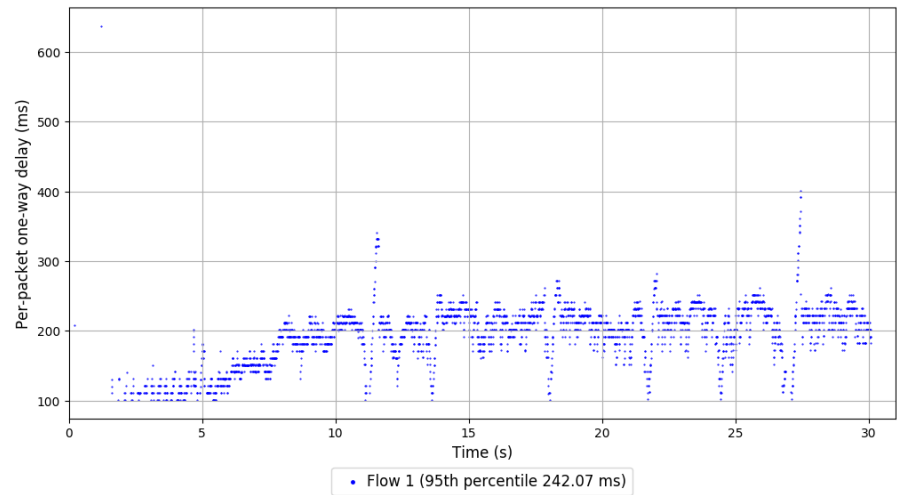
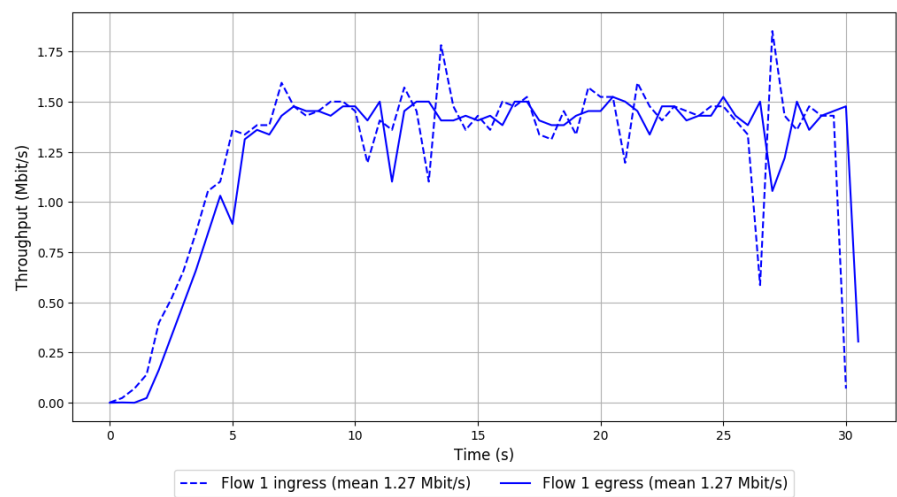
-- Flow 1:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 242.071 ms

Loss rate: 0.46%

Run 2: Report of LEDBAT — Data Link

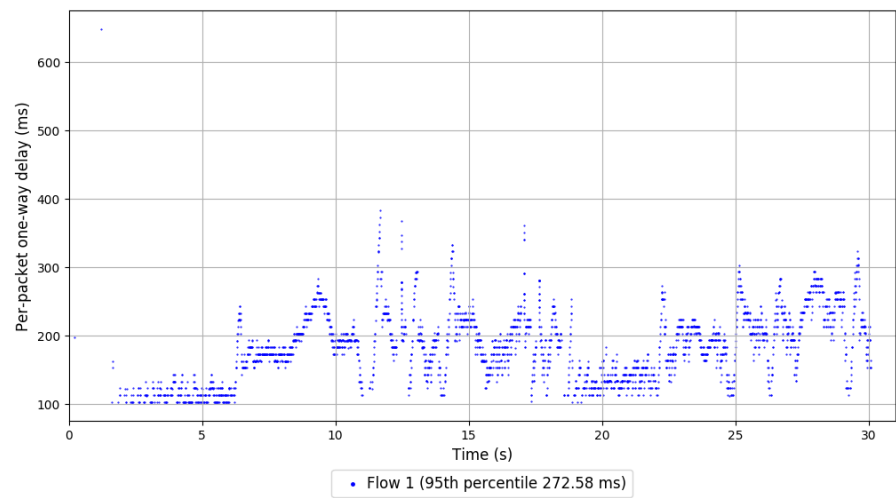
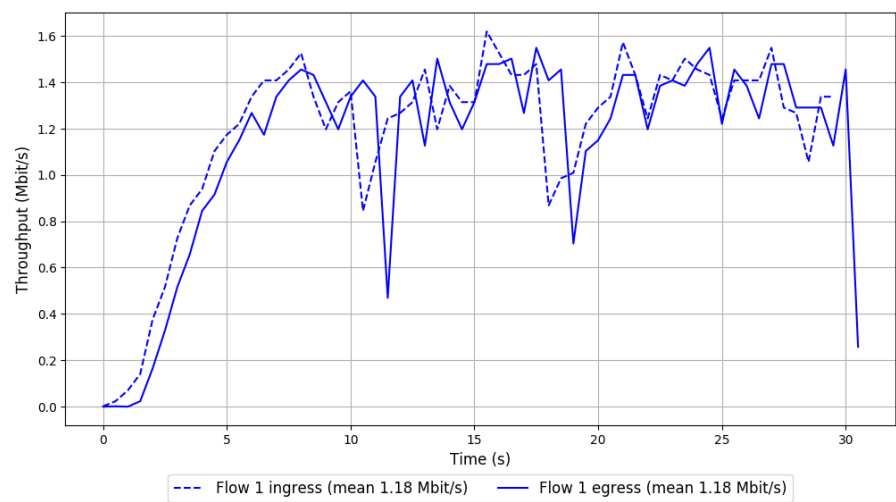


Run 3: Statistics of LEDBAT

Start at: 2019-01-17 04:04:02
End at: 2019-01-17 04:04:32
Local clock offset: -1.205 ms
Remote clock offset: -19.118 ms

Below is generated by plot.py at 2019-01-17 04:17:31
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 272.577 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 272.577 ms
Loss rate: 0.43%

Run 3: Report of LEDBAT — Data Link

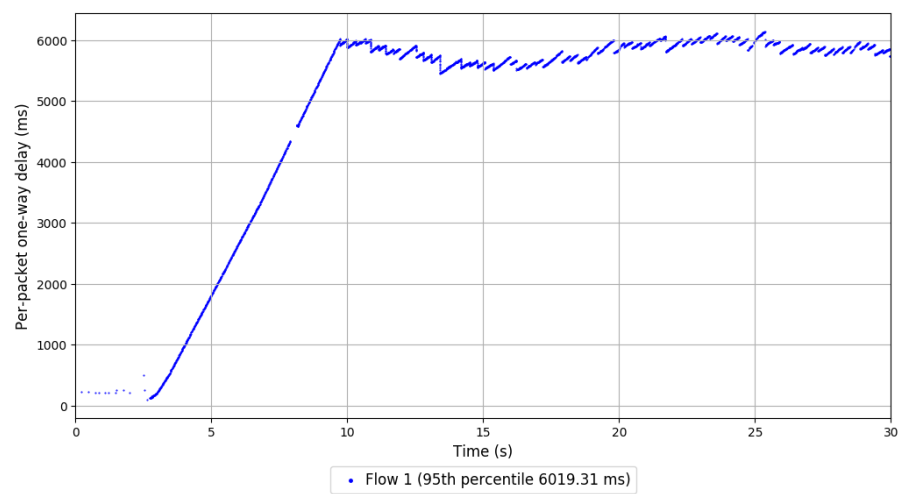
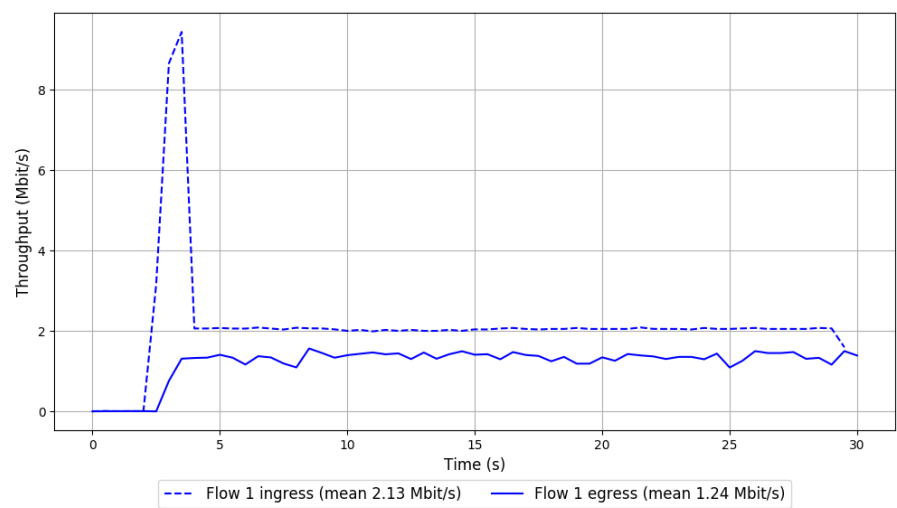


Run 1: Statistics of PCC-Allegro

Start at: 2019-01-17 03:33:21
End at: 2019-01-17 03:33:51
Local clock offset: -0.515 ms
Remote clock offset: 25.217 ms

Below is generated by plot.py at 2019-01-17 04:17:31
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 6019.314 ms
Loss rate: 41.92%
-- Flow 1:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 6019.314 ms
Loss rate: 41.92%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-01-17 03:54:56

End at: 2019-01-17 03:55:26

Local clock offset: -0.996 ms

Remote clock offset: -12.602 ms

Below is generated by plot.py at 2019-01-17 04:17:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.28 Mbit/s

95th percentile per-packet one-way delay: 5966.735 ms

Loss rate: 76.56%

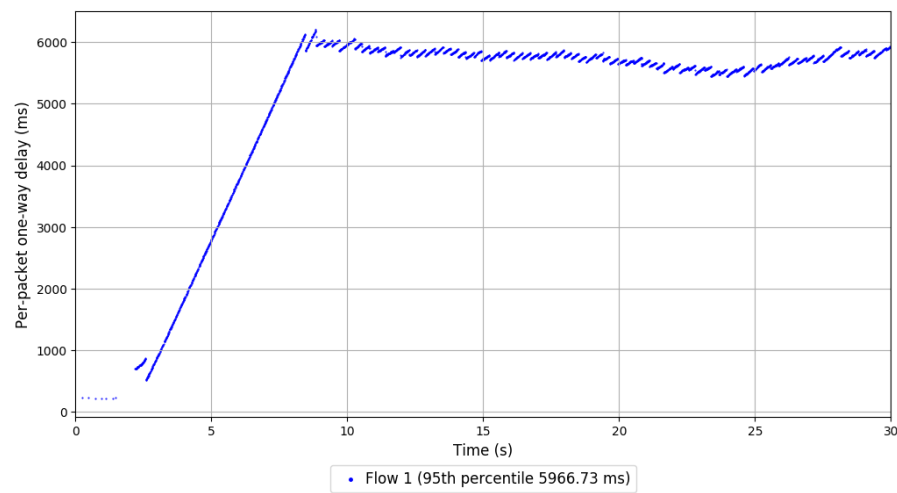
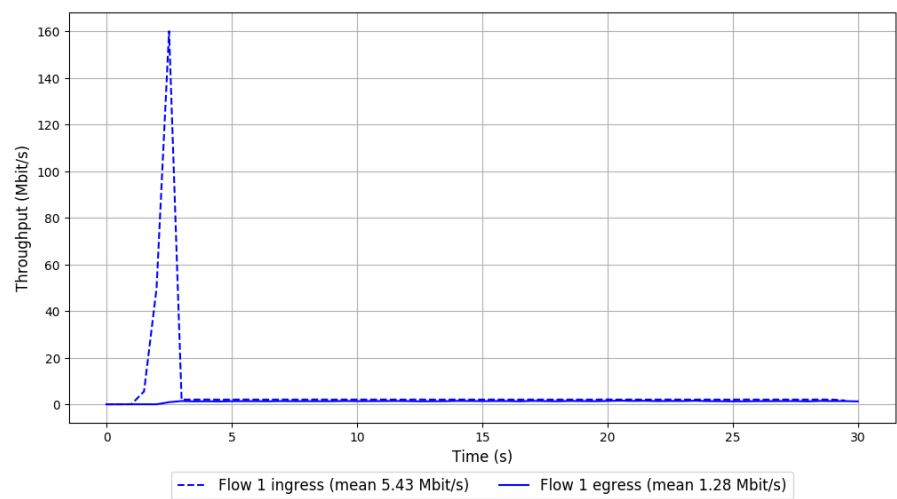
-- Flow 1:

Average throughput: 1.28 Mbit/s

95th percentile per-packet one-way delay: 5966.735 ms

Loss rate: 76.56%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-01-17 04:16:38

End at: 2019-01-17 04:17:08

Local clock offset: -0.575 ms

Remote clock offset: -11.944 ms

Below is generated by plot.py at 2019-01-17 04:17:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 5547.243 ms

Loss rate: 78.26%

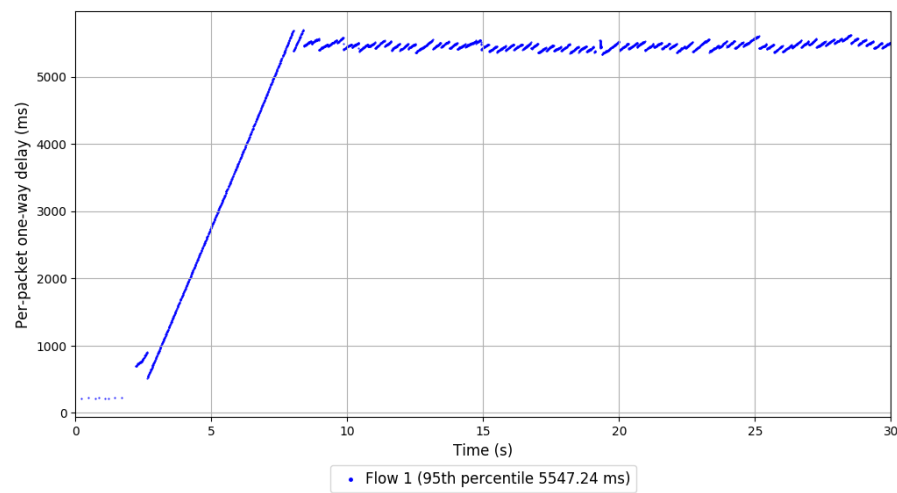
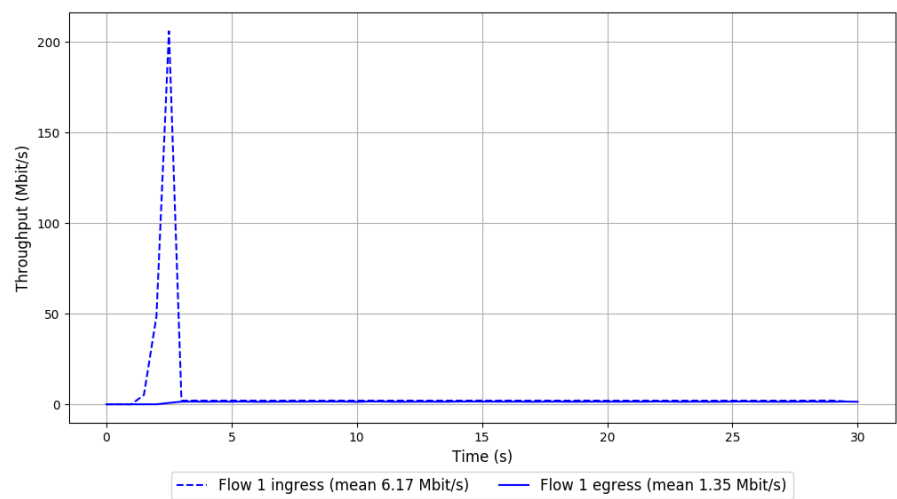
-- Flow 1:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 5547.243 ms

Loss rate: 78.26%

Run 3: Report of PCC-Allegro — Data Link

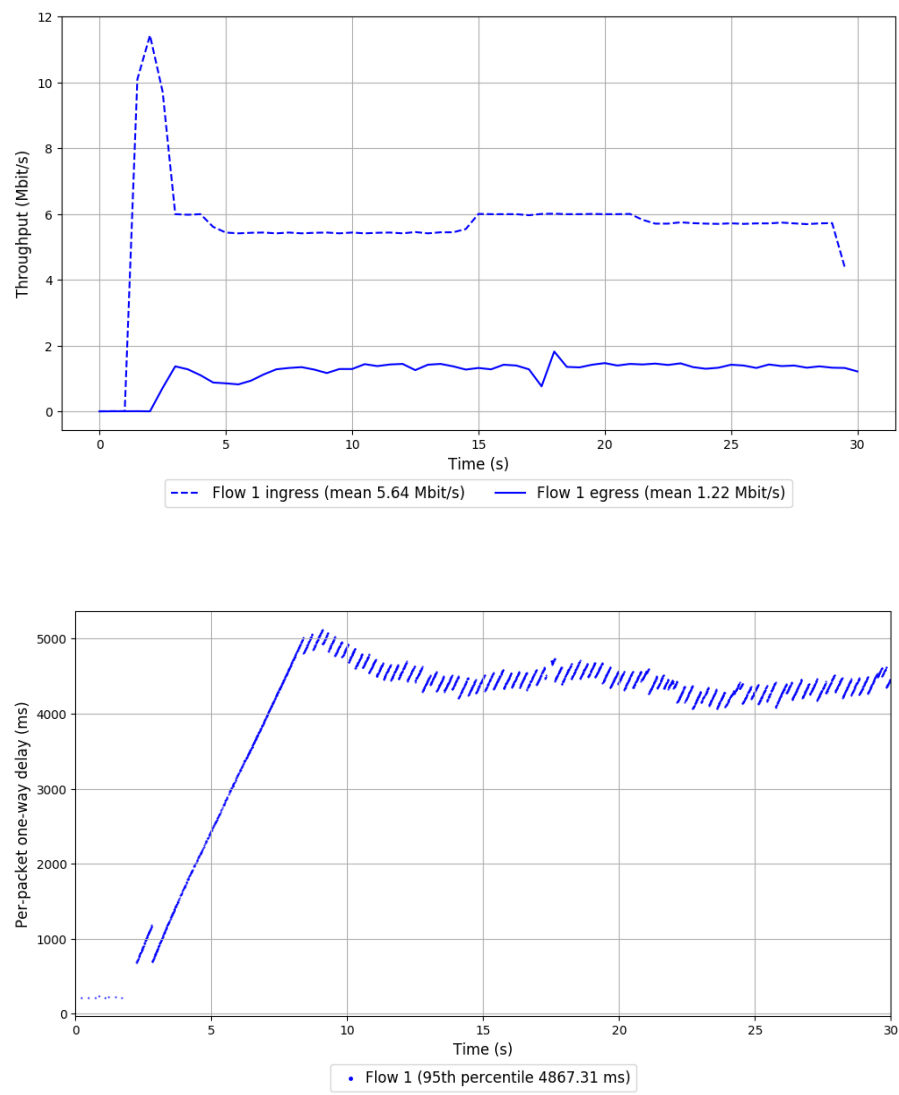



```
Run 1: Statistics of PCC-Expr

Start at: 2019-01-17 03:28:47
End at: 2019-01-17 03:29:17
Local clock offset: -0.989 ms
Remote clock offset: 51.976 ms

# Below is generated by plot.py at 2019-01-17 04:17:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 4867.311 ms
Loss rate: 78.43%
-- Flow 1:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 4867.311 ms
Loss rate: 78.43%
```

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2019-01-17 03:50:24

End at: 2019-01-17 03:50:54

Local clock offset: -1.175 ms

Remote clock offset: -5.31 ms

Below is generated by plot.py at 2019-01-17 04:17:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.20 Mbit/s

95th percentile per-packet one-way delay: 4813.580 ms

Loss rate: 78.90%

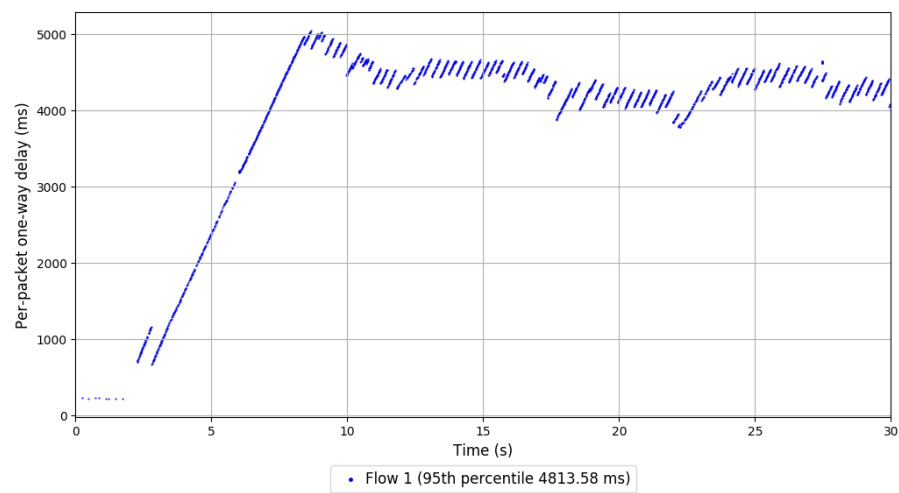
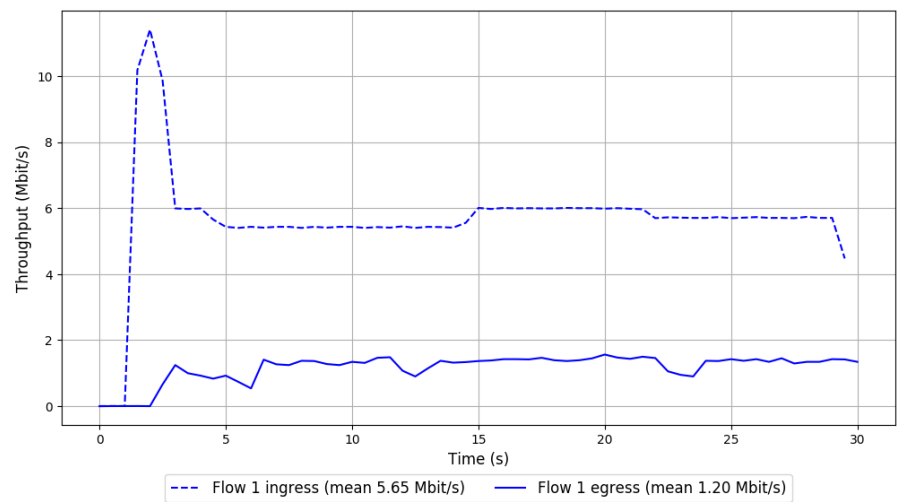
-- Flow 1:

Average throughput: 1.20 Mbit/s

95th percentile per-packet one-way delay: 4813.580 ms

Loss rate: 78.90%

Run 2: Report of PCC-Expr — Data Link

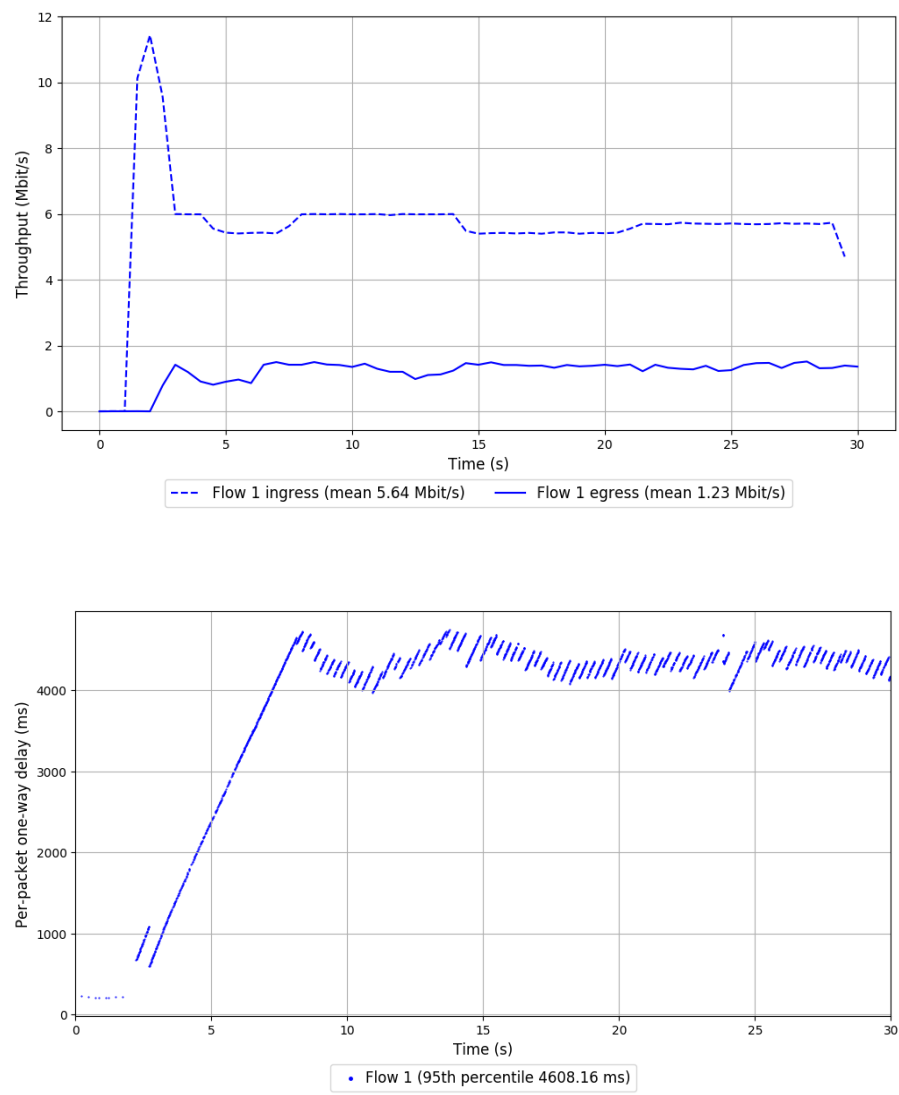


Run 3: Statistics of PCC-Expr

Start at: 2019-01-17 04:12:05
End at: 2019-01-17 04:12:35
Local clock offset: -0.862 ms
Remote clock offset: -12.152 ms

Below is generated by plot.py at 2019-01-17 04:17:38
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 4608.162 ms
Loss rate: 78.35%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 4608.162 ms
Loss rate: 78.35%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-01-17 03:29:56

End at: 2019-01-17 03:30:26

Local clock offset: -0.34 ms

Remote clock offset: 44.355 ms

Below is generated by plot.py at 2019-01-17 04:17:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 4957.292 ms

Loss rate: 12.04%

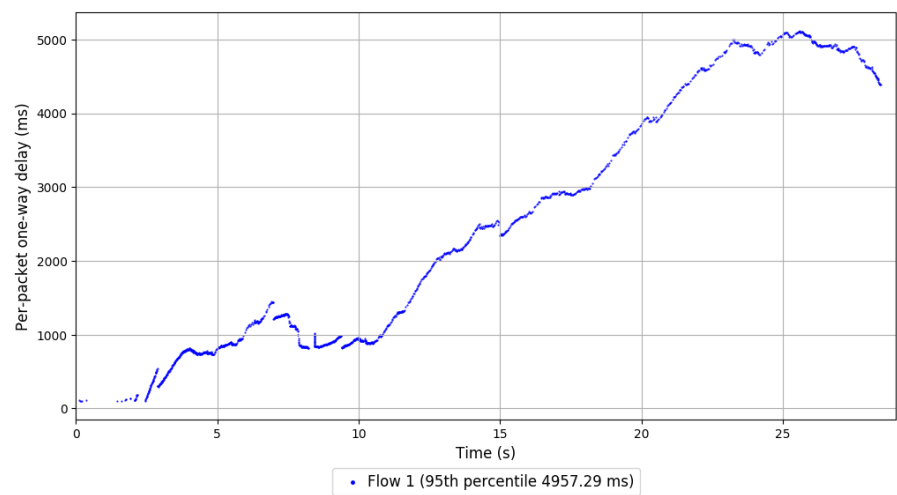
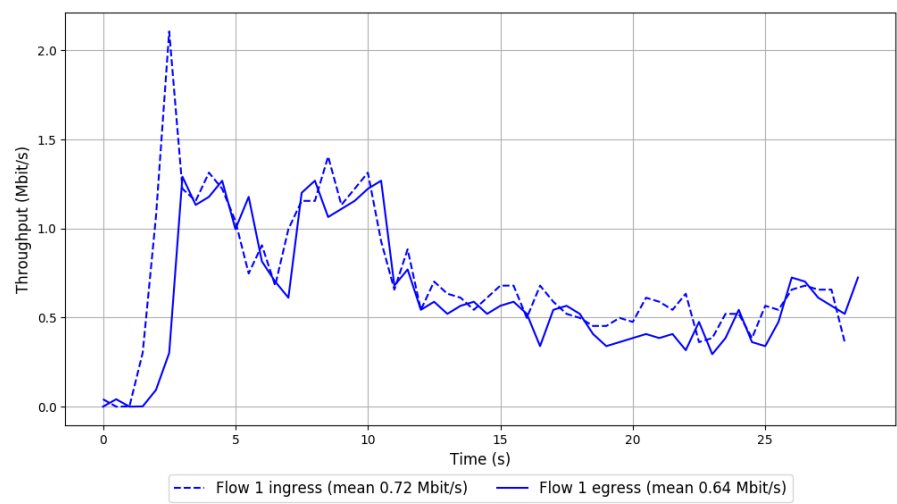
-- Flow 1:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 4957.292 ms

Loss rate: 12.04%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-01-17 03:51:32

End at: 2019-01-17 03:52:02

Local clock offset: -0.573 ms

Remote clock offset: -9.29 ms

Below is generated by plot.py at 2019-01-17 04:17:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.46 Mbit/s

95th percentile per-packet one-way delay: 1314.935 ms

Loss rate: 5.95%

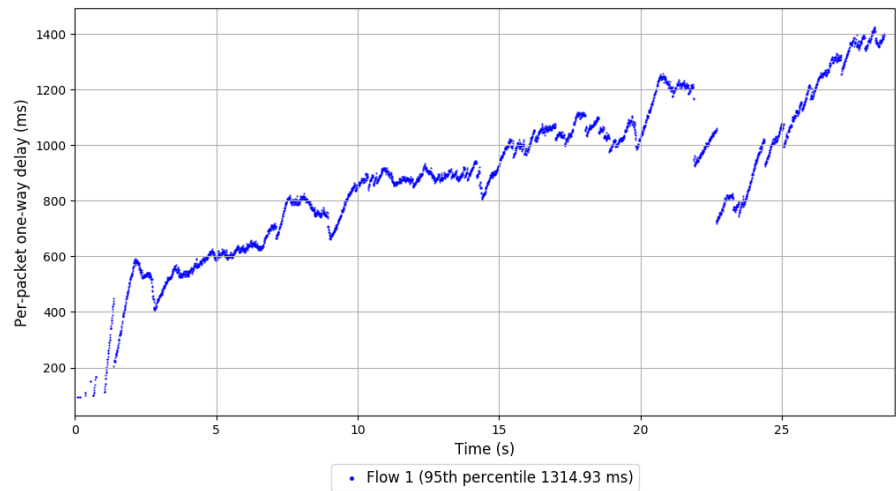
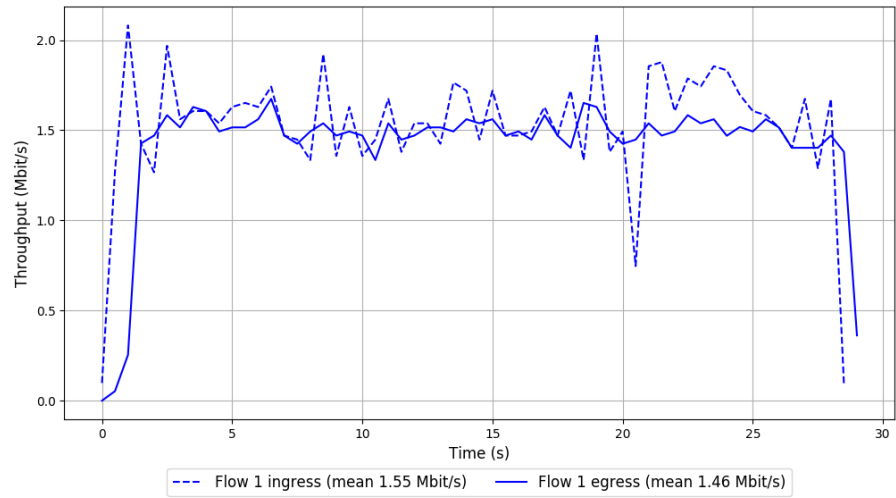
-- Flow 1:

Average throughput: 1.46 Mbit/s

95th percentile per-packet one-way delay: 1314.935 ms

Loss rate: 5.95%

Run 2: Report of QUIC Cubic — Data Link

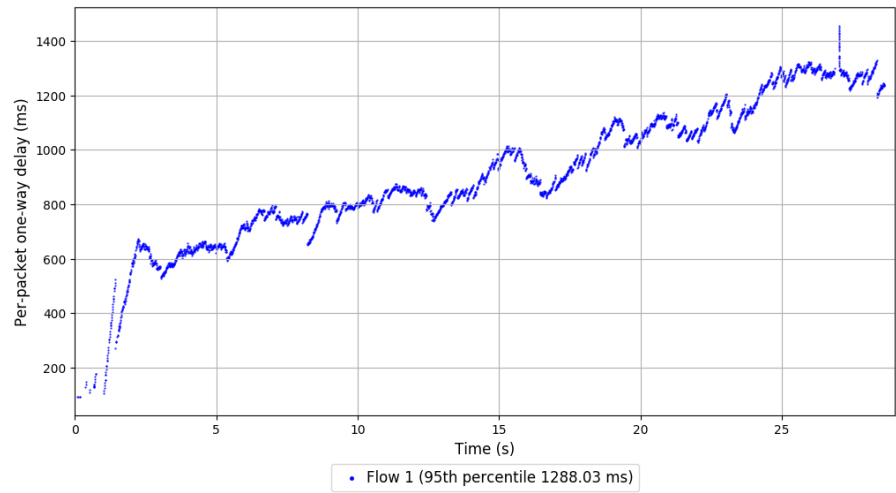
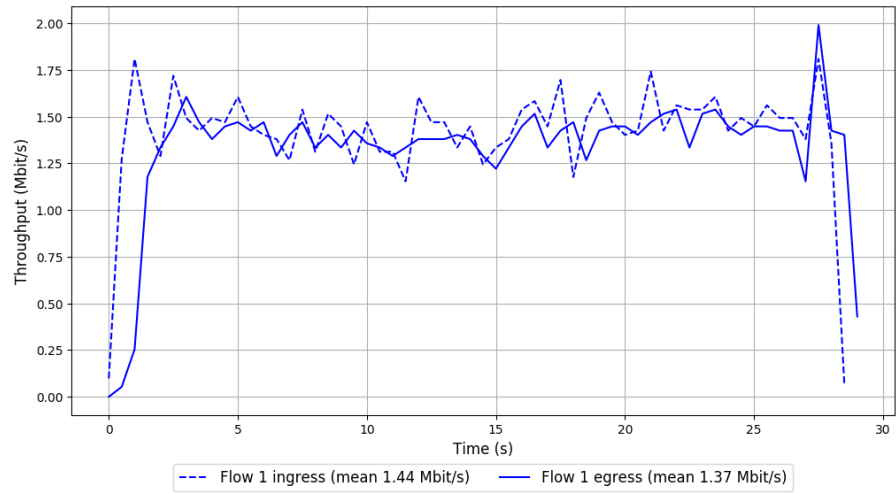


Run 3: Statistics of QUIC Cubic

Start at: 2019-01-17 04:13:13
End at: 2019-01-17 04:13:43
Local clock offset: -0.803 ms
Remote clock offset: -8.774 ms

Below is generated by plot.py at 2019-01-17 04:17:38
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 1288.031 ms
Loss rate: 4.47%
-- Flow 1:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 1288.031 ms
Loss rate: 4.47%

Run 3: Report of QUIC Cubic — Data Link

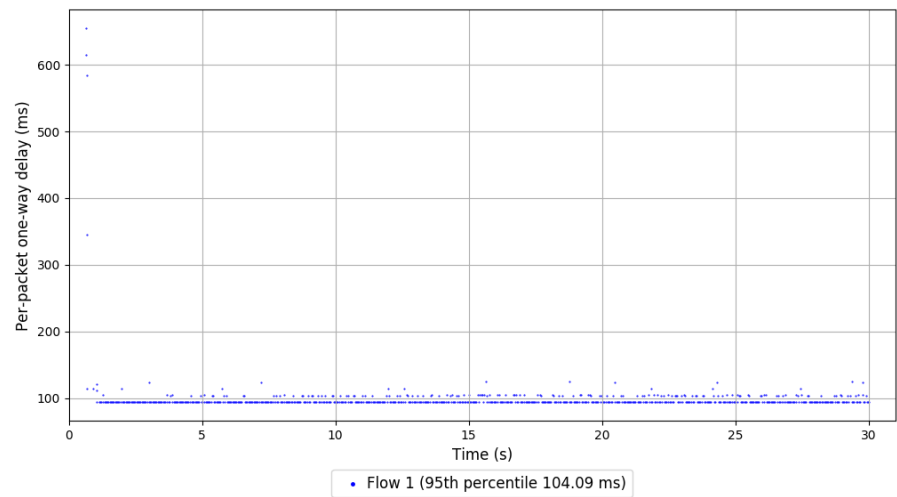
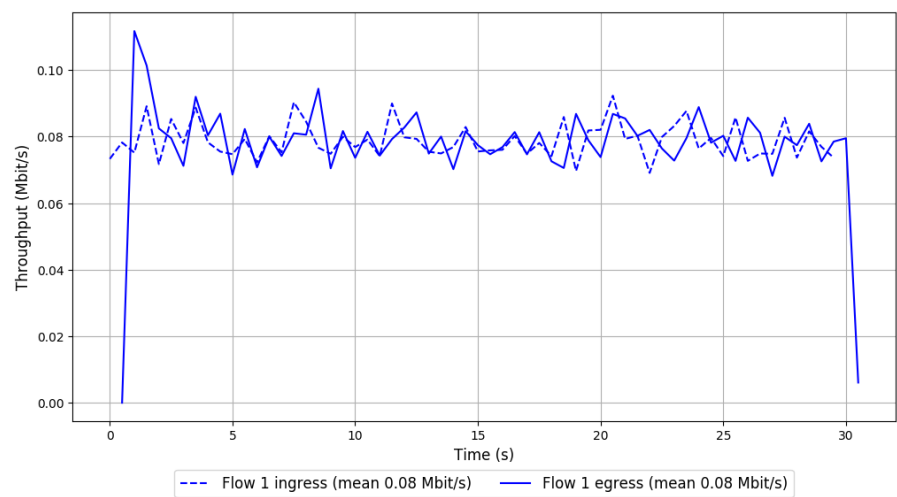


Run 1: Statistics of SCReAM

Start at: 2019-01-17 03:27:39
End at: 2019-01-17 03:28:09
Local clock offset: -0.15 ms
Remote clock offset: 46.394 ms

Below is generated by plot.py at 2019-01-17 04:17:38
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 104.093 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 104.093 ms
Loss rate: 0.13%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2019-01-17 03:49:16

End at: 2019-01-17 03:49:46

Local clock offset: -0.126 ms

Remote clock offset: -1.66 ms

Below is generated by plot.py at 2019-01-17 04:17:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 122.717 ms

Loss rate: 0.13%

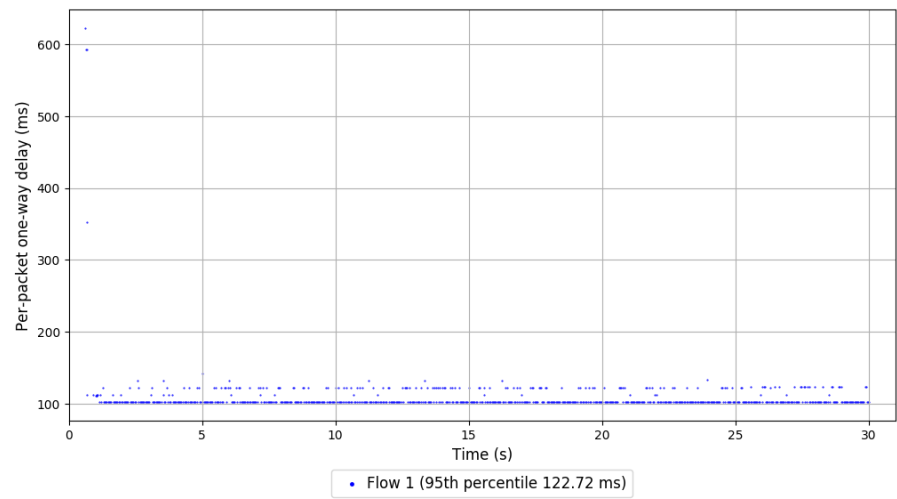
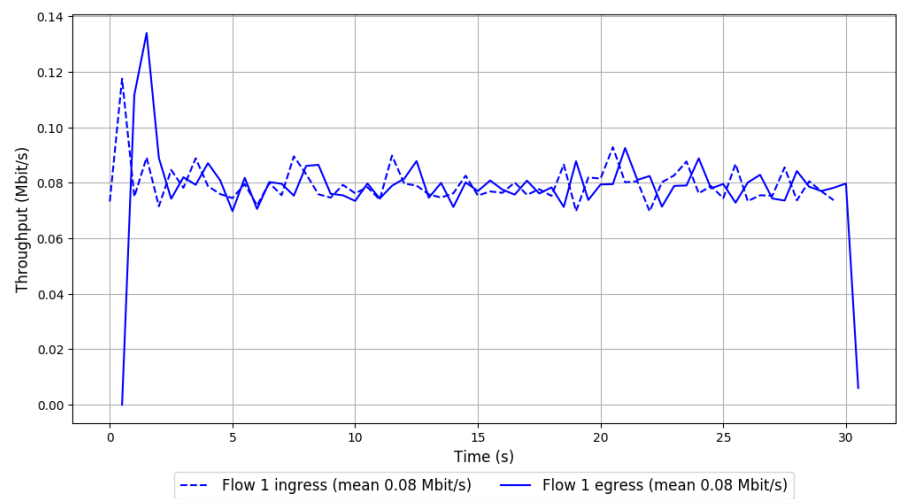
-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 122.717 ms

Loss rate: 0.13%

Run 2: Report of SReAM — Data Link

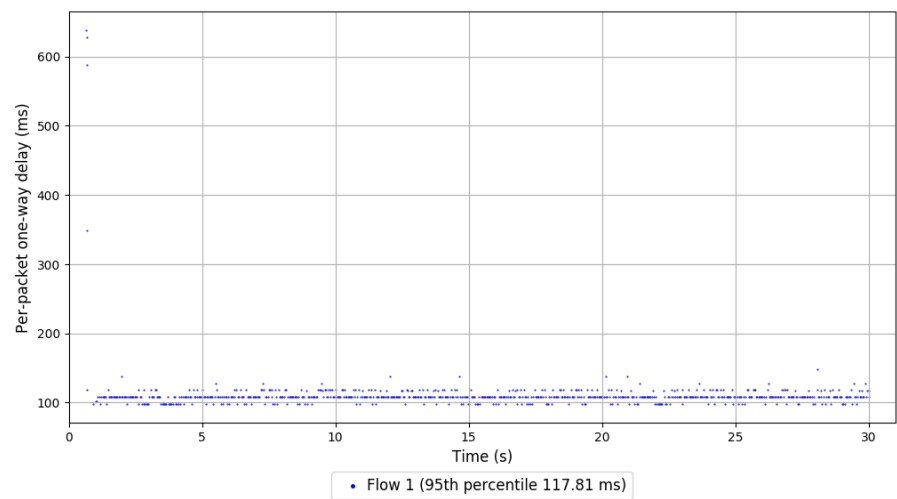
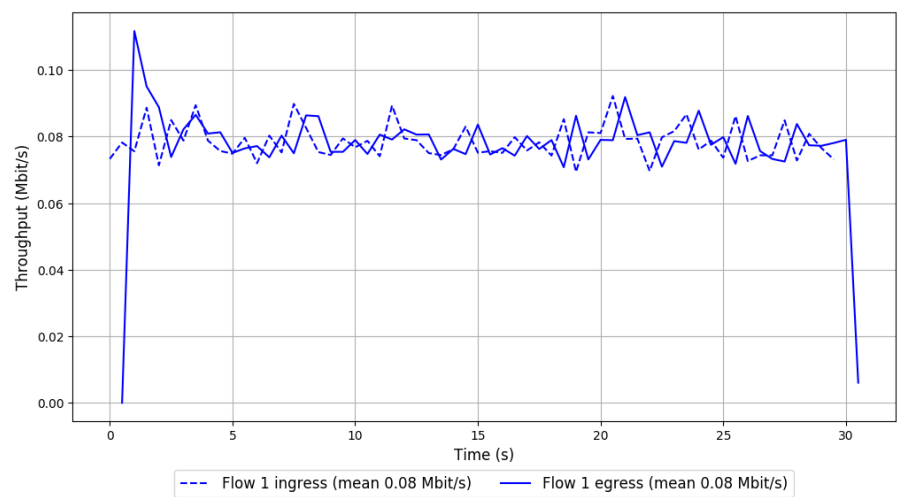


Run 3: Statistics of SCReAM

Start at: 2019-01-17 04:10:52
End at: 2019-01-17 04:11:22
Local clock offset: -1.751 ms
Remote clock offset: -12.902 ms

Below is generated by plot.py at 2019-01-17 04:17:40
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 117.806 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 117.806 ms
Loss rate: 0.13%

Run 3: Report of SReAM — Data Link

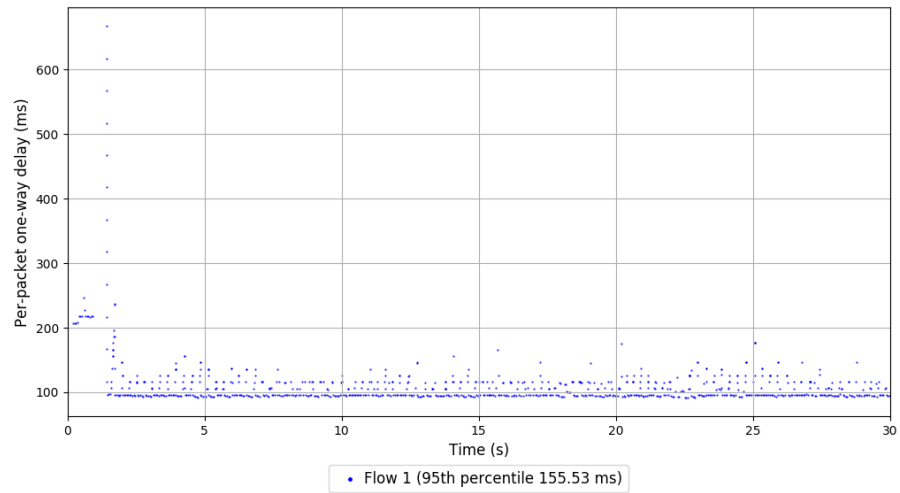
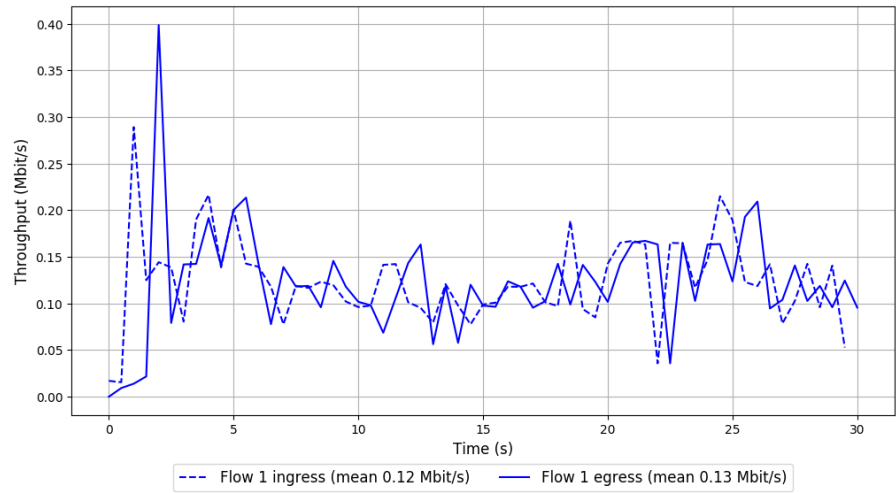


Run 1: Statistics of Sprout

Start at: 2019-01-17 03:16:15
End at: 2019-01-17 03:16:45
Local clock offset: 2.991 ms
Remote clock offset: 46.116 ms

Below is generated by plot.py at 2019-01-17 04:17:40
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 155.533 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 155.533 ms
Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

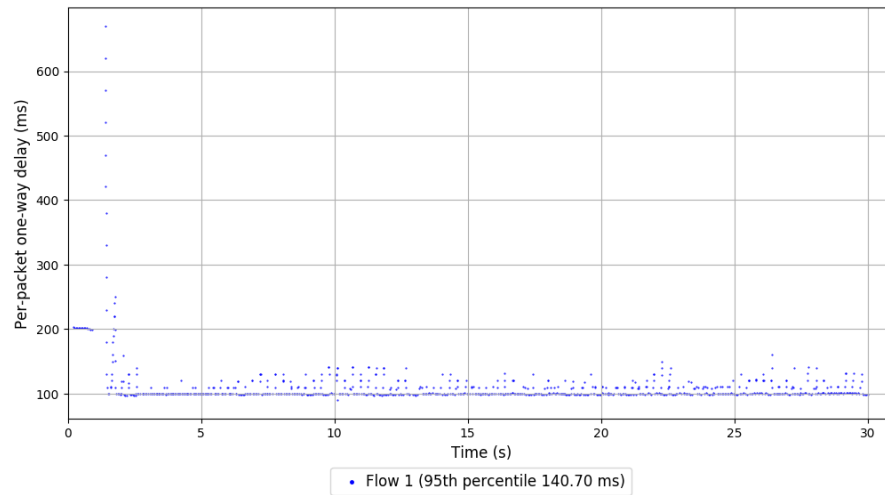
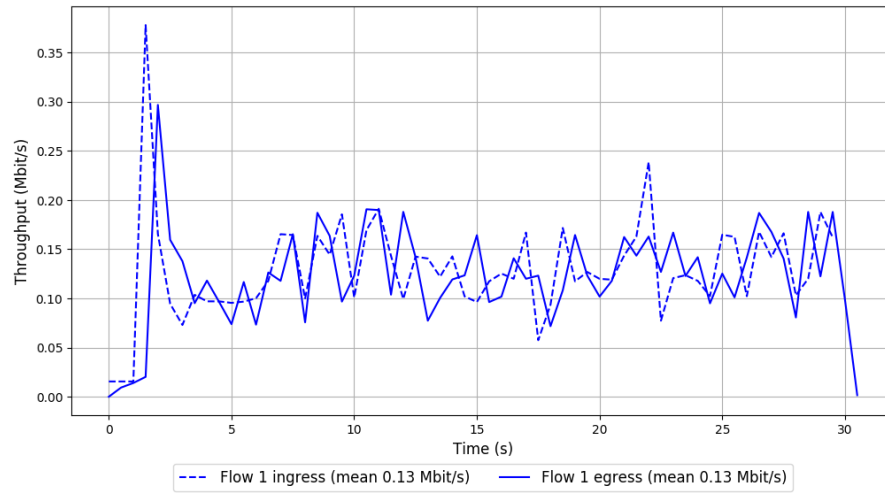


Run 2: Statistics of Sprout

Start at: 2019-01-17 03:37:53
End at: 2019-01-17 03:38:23
Local clock offset: -1.302 ms
Remote clock offset: 10.011 ms

Below is generated by plot.py at 2019-01-17 04:17:40
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 140.699 ms
Loss rate: 1.82%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 140.699 ms
Loss rate: 1.82%

Run 2: Report of Sprout — Data Link

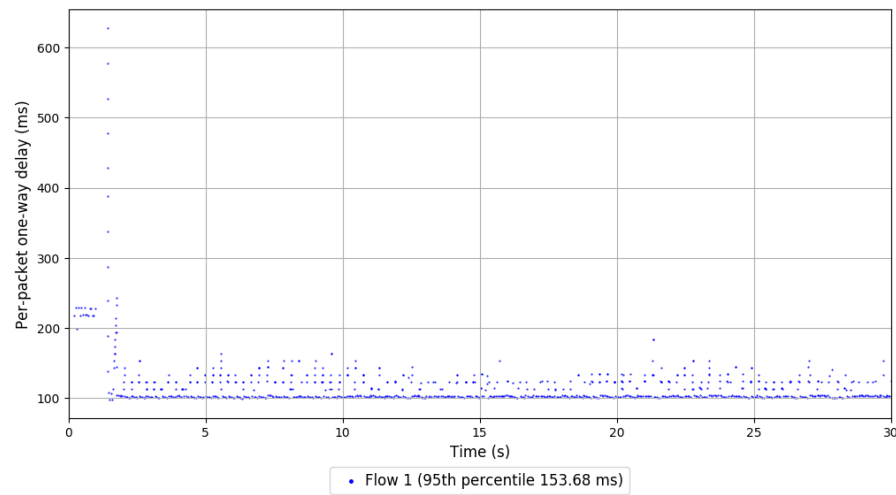
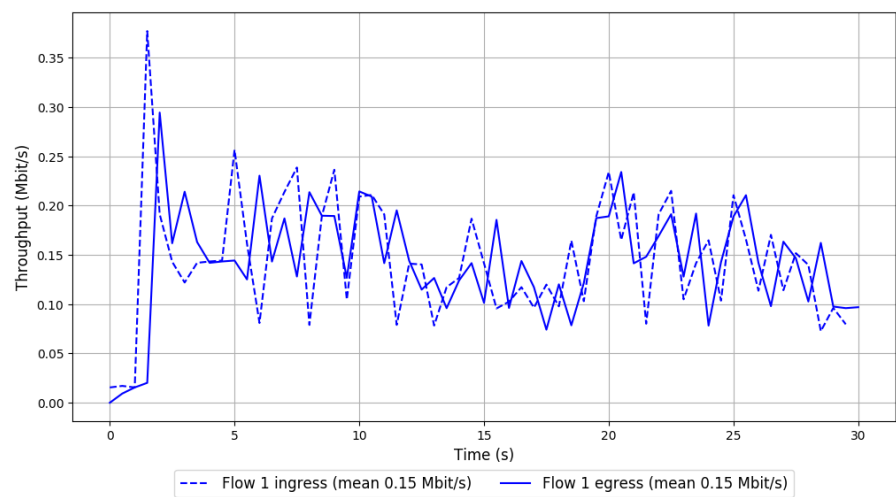


Run 3: Statistics of Sprout

Start at: 2019-01-17 03:59:29
End at: 2019-01-17 03:59:59
Local clock offset: -1.997 ms
Remote clock offset: -11.804 ms

Below is generated by plot.py at 2019-01-17 04:17:41
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 153.683 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 153.683 ms
Loss rate: 0.02%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

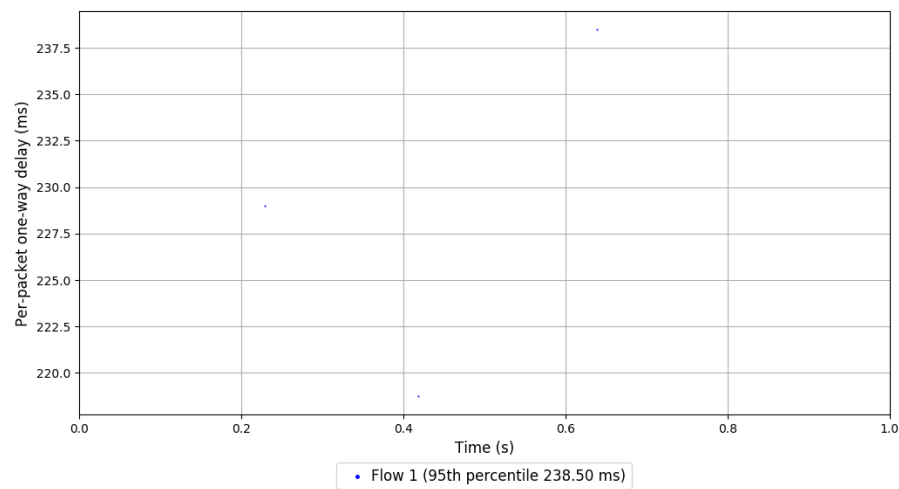
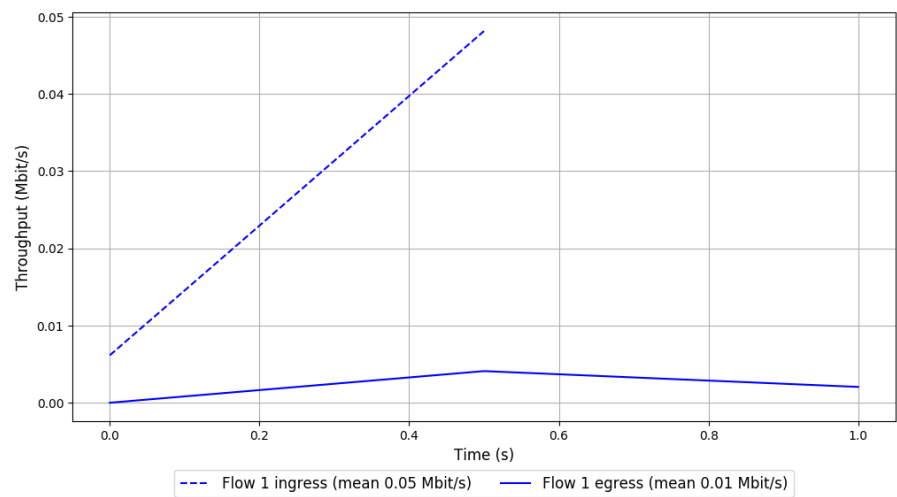
Start at: 2019-01-17 03:23:05

End at: 2019-01-17 03:23:35

Local clock offset: 1.118 ms

Remote clock offset: 51.989 ms

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



Run 2: Statistics of TaoVA-100x

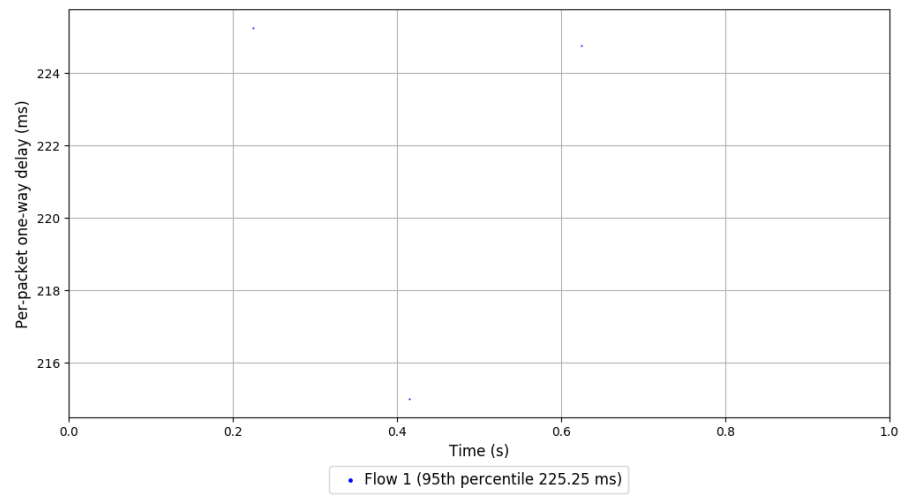
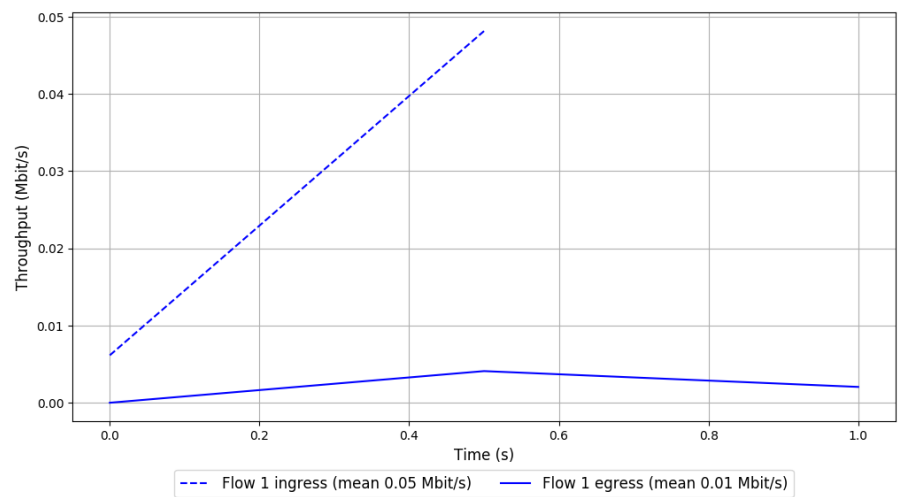
Start at: 2019-01-17 03:44:43

End at: 2019-01-17 03:45:13

Local clock offset: 0.016 ms

Remote clock offset: -1.116 ms

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



Run 3: Statistics of TaoVA-100x

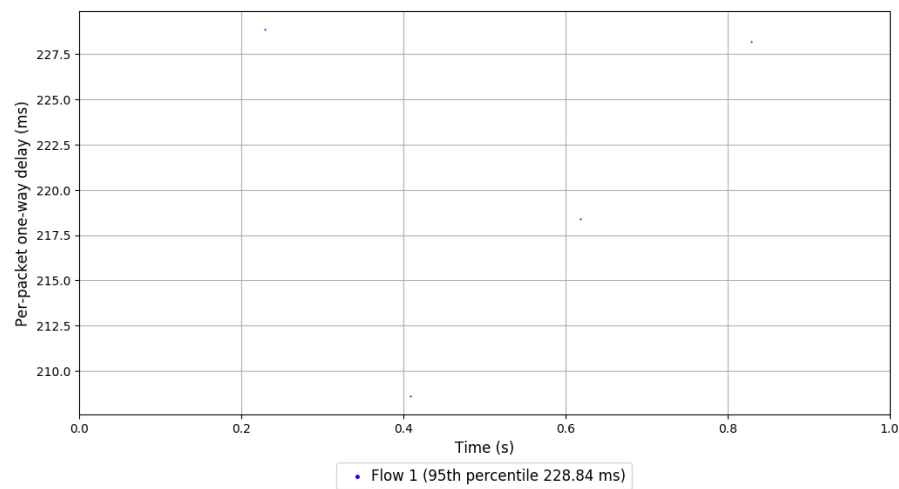
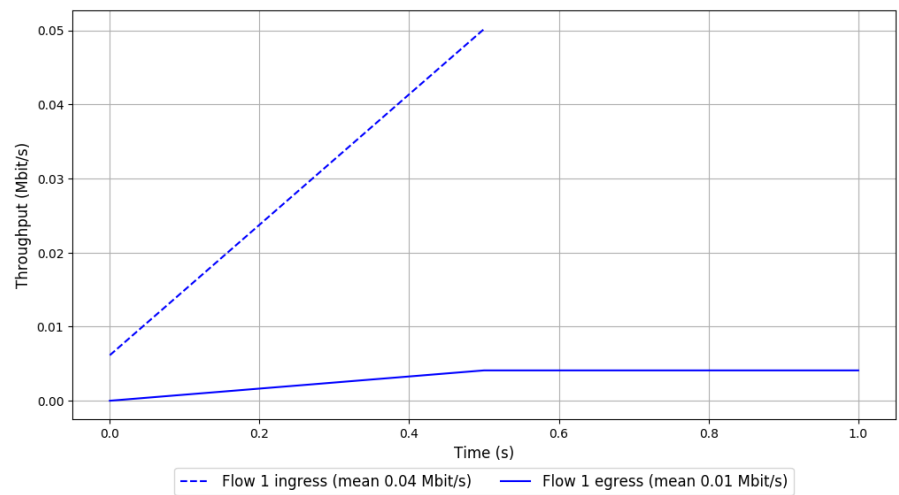
Start at: 2019-01-17 04:06:19

End at: 2019-01-17 04:06:49

Local clock offset: -1.121 ms

Remote clock offset: -13.528 ms

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

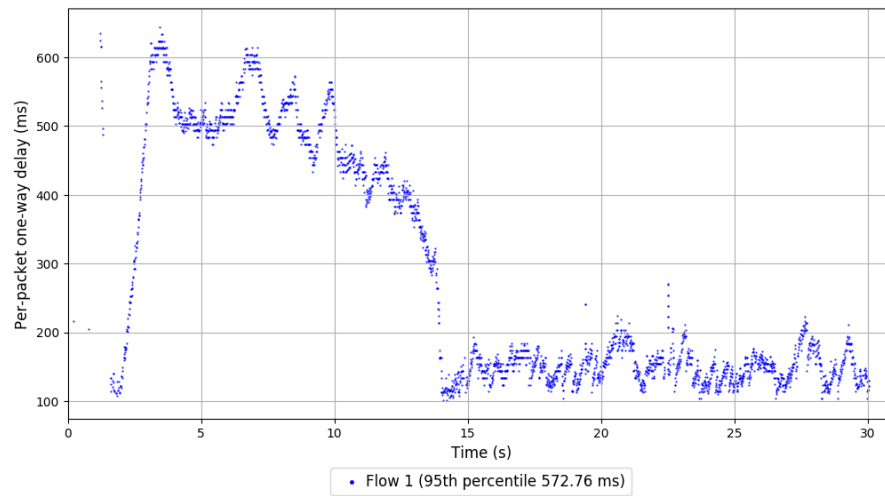
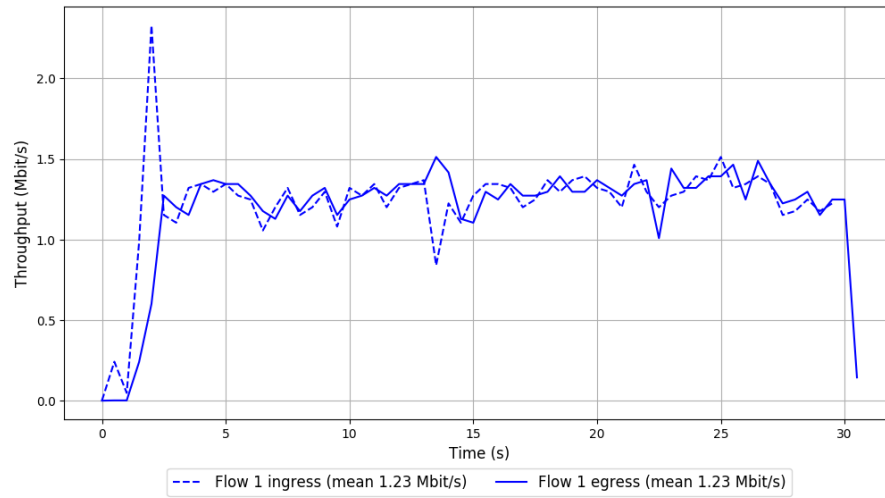


Run 1: Statistics of TCP Vegas

Start at: 2019-01-17 03:15:06
End at: 2019-01-17 03:15:36
Local clock offset: 3.484 ms
Remote clock offset: 44.874 ms

Below is generated by plot.py at 2019-01-17 04:17:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 572.761 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 572.761 ms
Loss rate: 0.23%

Run 1: Report of TCP Vegas — Data Link

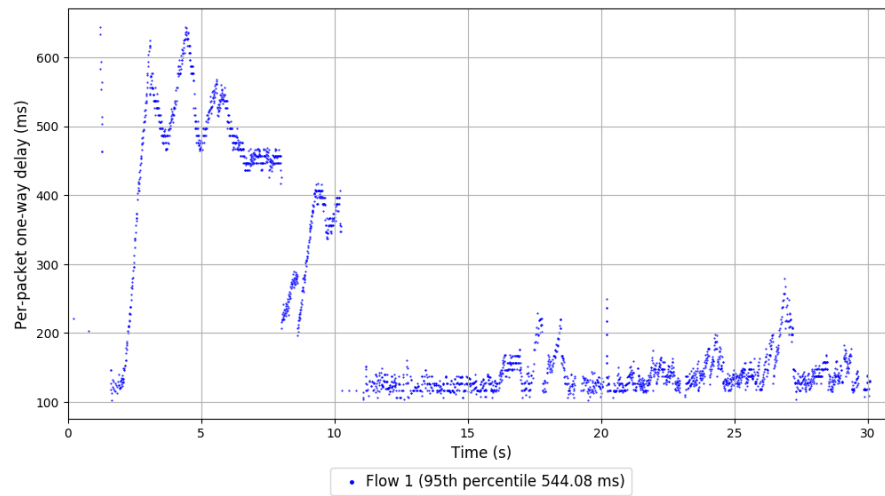
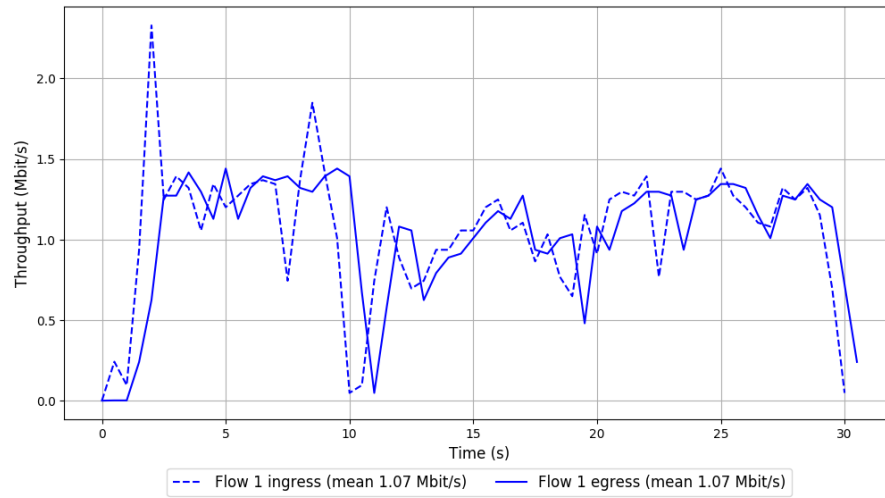


Run 2: Statistics of TCP Vegas

Start at: 2019-01-17 03:36:45
End at: 2019-01-17 03:37:15
Local clock offset: -1.259 ms
Remote clock offset: 18.218 ms

Below is generated by plot.py at 2019-01-17 04:17:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 544.084 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 544.084 ms
Loss rate: 0.34%

Run 2: Report of TCP Vegas — Data Link

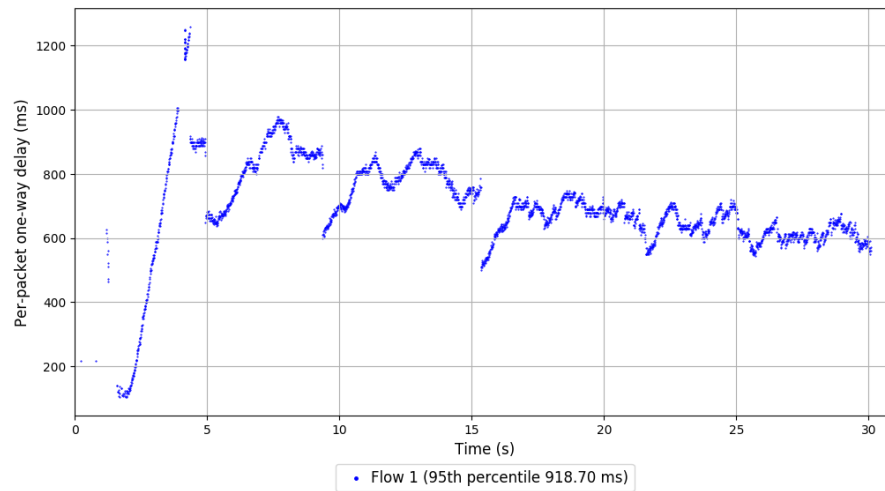
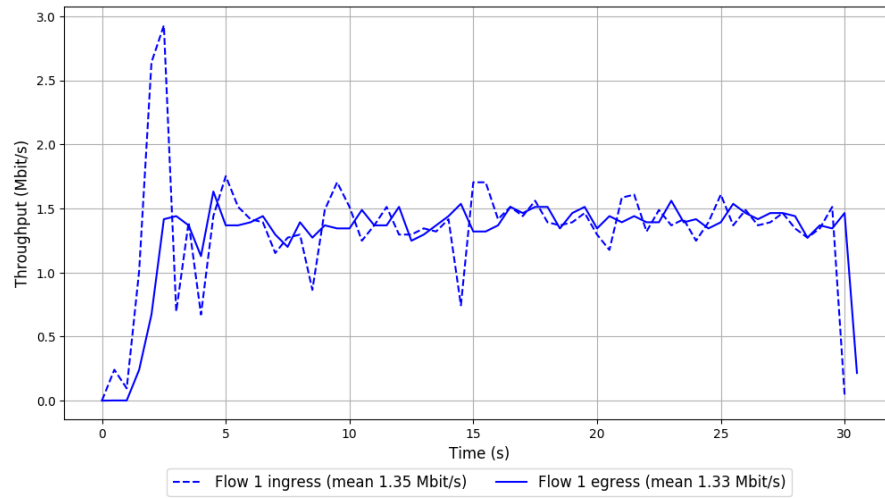


Run 3: Statistics of TCP Vegas

Start at: 2019-01-17 03:58:20
End at: 2019-01-17 03:58:51
Local clock offset: -1.203 ms
Remote clock offset: -15.085 ms

Below is generated by plot.py at 2019-01-17 04:17:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 918.703 ms
Loss rate: 1.84%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 918.703 ms
Loss rate: 1.84%

Run 3: Report of TCP Vegas — Data Link

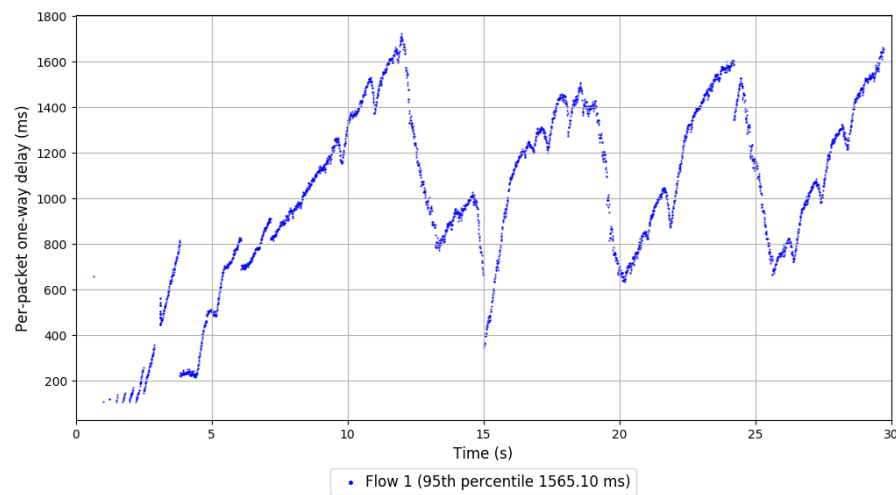
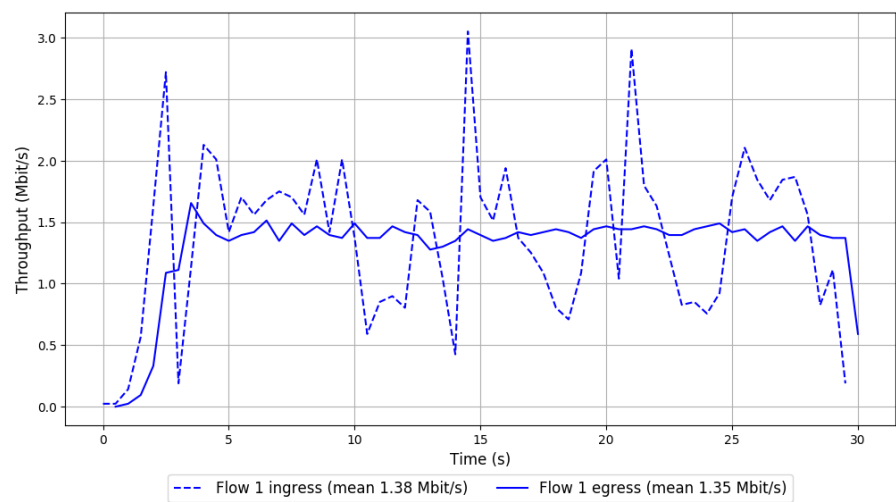


Run 1: Statistics of Verus

Start at: 2019-01-17 03:18:31
End at: 2019-01-17 03:19:01
Local clock offset: 3.348 ms
Remote clock offset: 50.077 ms

Below is generated by plot.py at 2019-01-17 04:17:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 1565.095 ms
Loss rate: 4.22%
-- Flow 1:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 1565.095 ms
Loss rate: 4.22%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-01-17 03:40:10

End at: 2019-01-17 03:40:40

Local clock offset: -0.341 ms

Remote clock offset: 6.73 ms

Below is generated by plot.py at 2019-01-17 04:17:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.29 Mbit/s

95th percentile per-packet one-way delay: 1609.966 ms

Loss rate: 2.52%

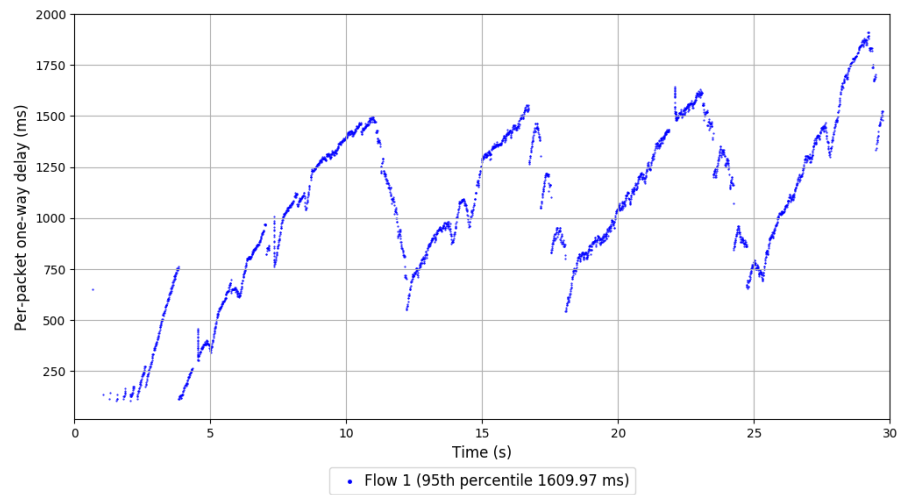
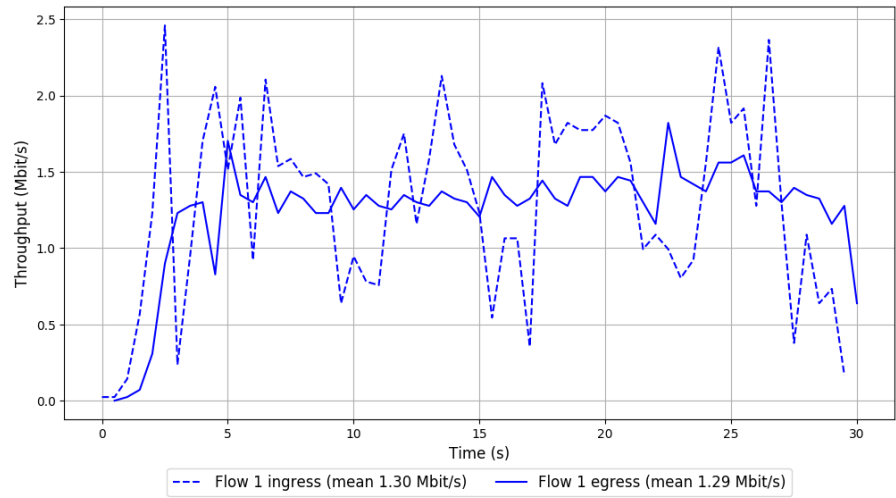
-- Flow 1:

Average throughput: 1.29 Mbit/s

95th percentile per-packet one-way delay: 1609.966 ms

Loss rate: 2.52%

Run 2: Report of Verus — Data Link

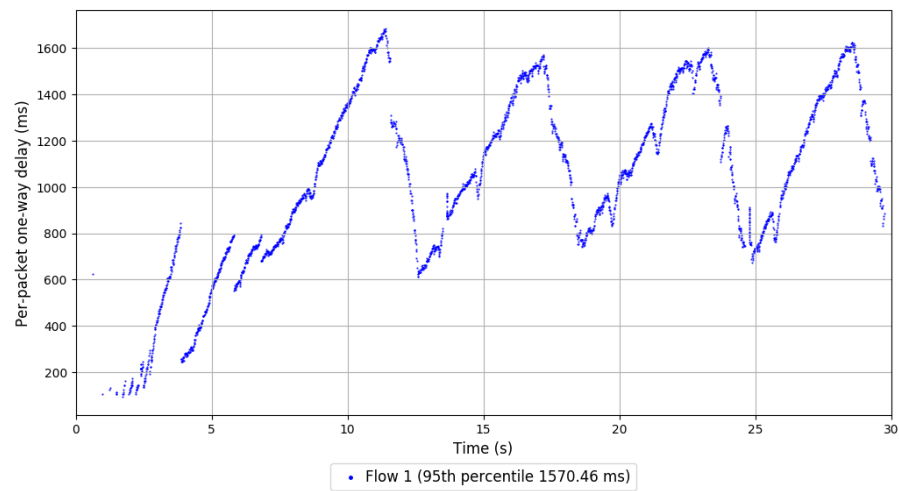
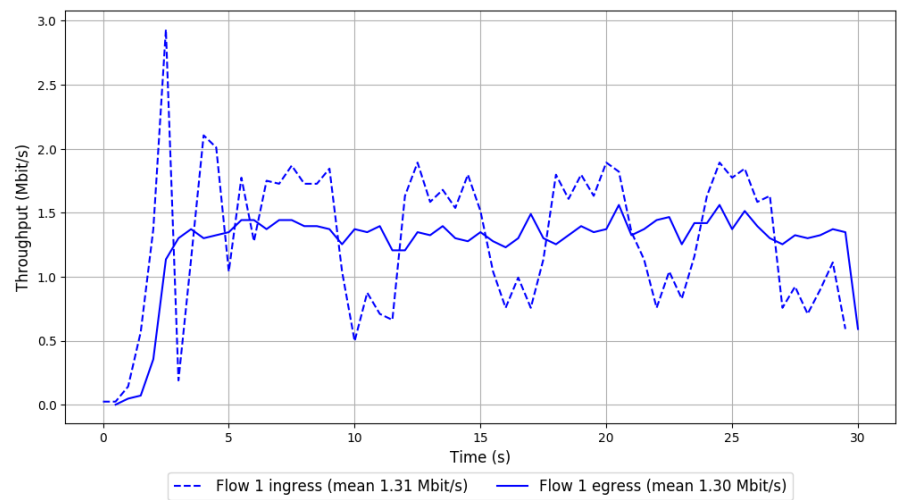


Run 3: Statistics of Verus

Start at: 2019-01-17 04:01:46
End at: 2019-01-17 04:02:16
Local clock offset: -1.243 ms
Remote clock offset: -18.755 ms

Below is generated by plot.py at 2019-01-17 04:17:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 1570.456 ms
Loss rate: 2.53%
-- Flow 1:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 1570.456 ms
Loss rate: 2.53%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-01-17 03:21:56

End at: 2019-01-17 03:22:27

Local clock offset: 0.748 ms

Remote clock offset: 51.881 ms

Below is generated by plot.py at 2019-01-17 04:17:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 1864.421 ms

Loss rate: 1.82%

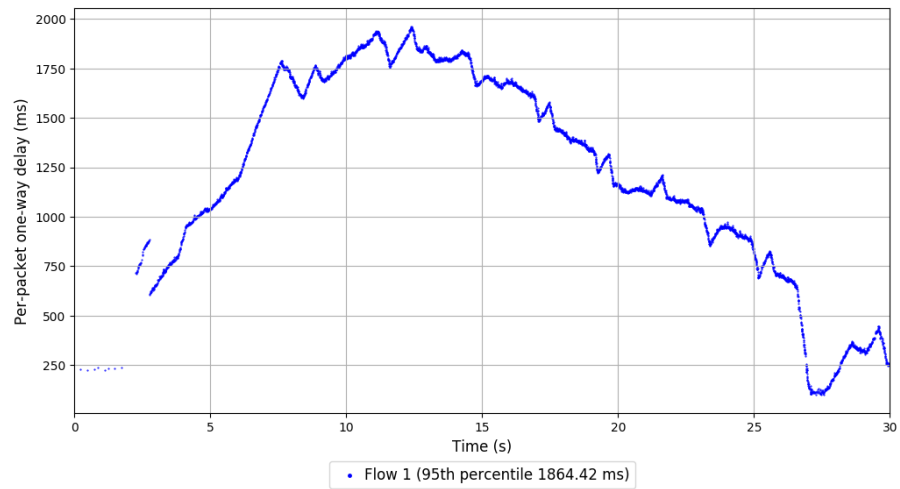
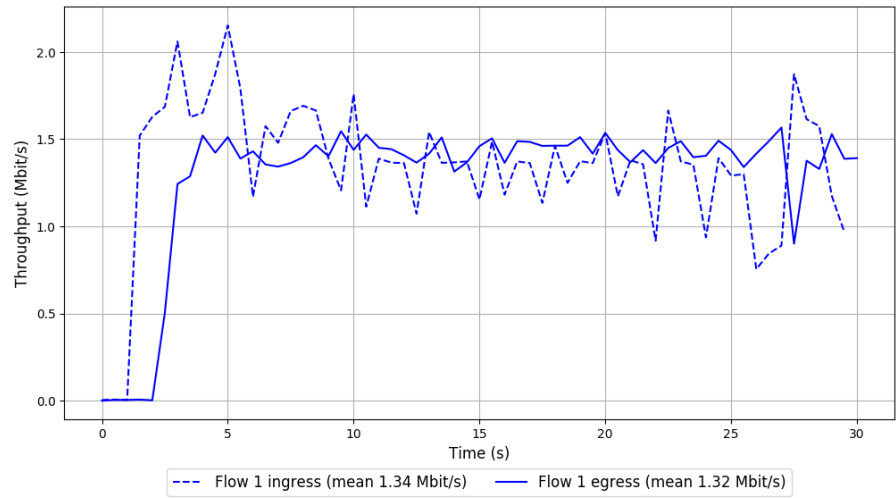
-- Flow 1:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 1864.421 ms

Loss rate: 1.82%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-01-17 03:43:35

End at: 2019-01-17 03:44:05

Local clock offset: -0.85 ms

Remote clock offset: -0.457 ms

Below is generated by plot.py at 2019-01-17 04:17:47

Datalink statistics

-- Total of 1 flow:

Average throughput: 1.25 Mbit/s

95th percentile per-packet one-way delay: 512.450 ms

Loss rate: 2.47%

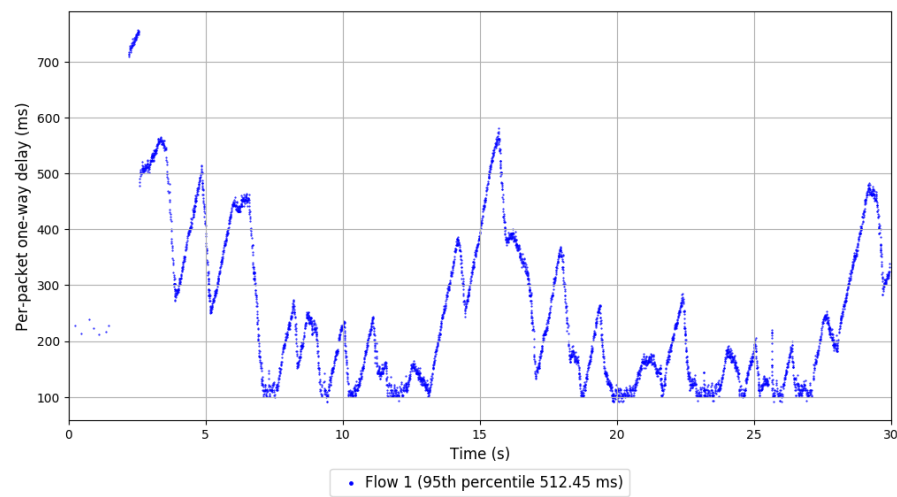
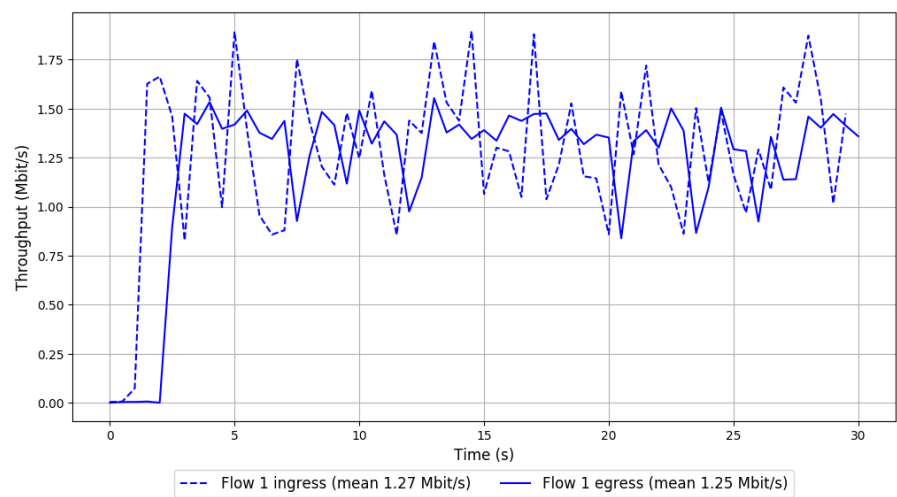
-- Flow 1:

Average throughput: 1.25 Mbit/s

95th percentile per-packet one-way delay: 512.450 ms

Loss rate: 2.47%

Run 2: Report of PCC-Vivace — Data Link

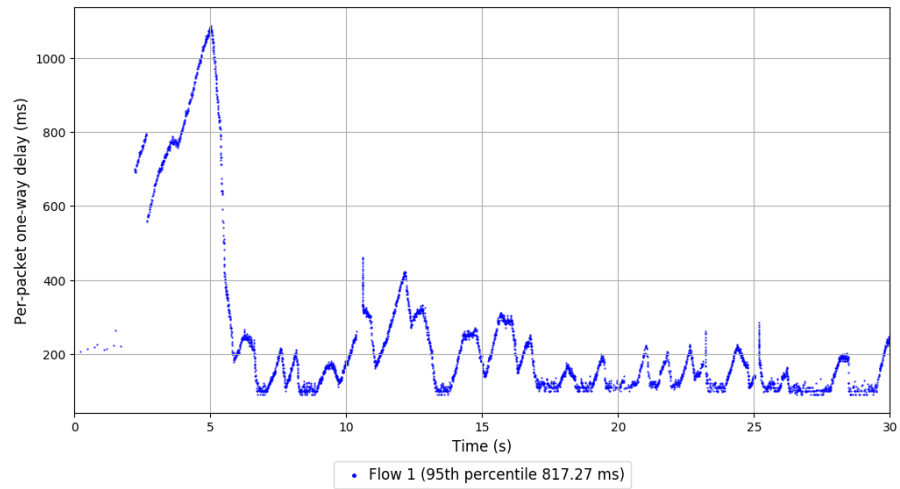
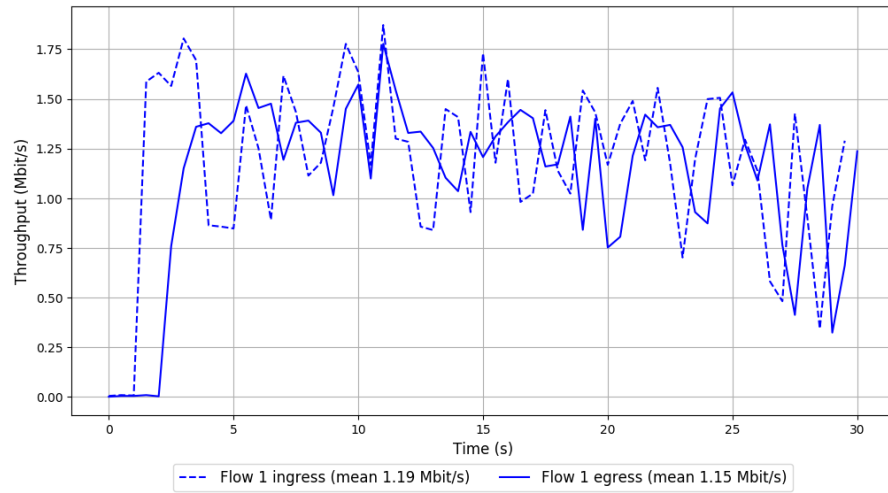


Run 3: Statistics of PCC-Vivace

Start at: 2019-01-17 04:05:11
End at: 2019-01-17 04:05:41
Local clock offset: -1.937 ms
Remote clock offset: -18.806 ms

Below is generated by plot.py at 2019-01-17 04:17:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 817.269 ms
Loss rate: 4.09%
-- Flow 1:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 817.269 ms
Loss rate: 4.09%

Run 3: Report of PCC-Vivace — Data Link

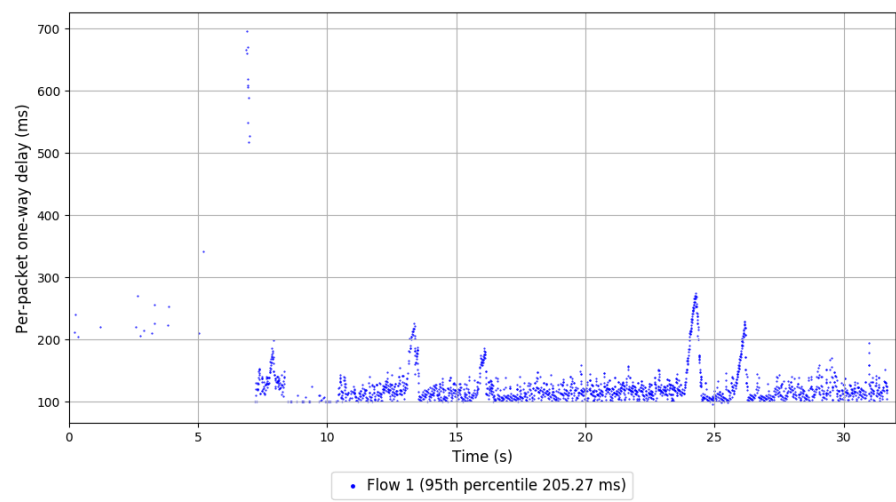
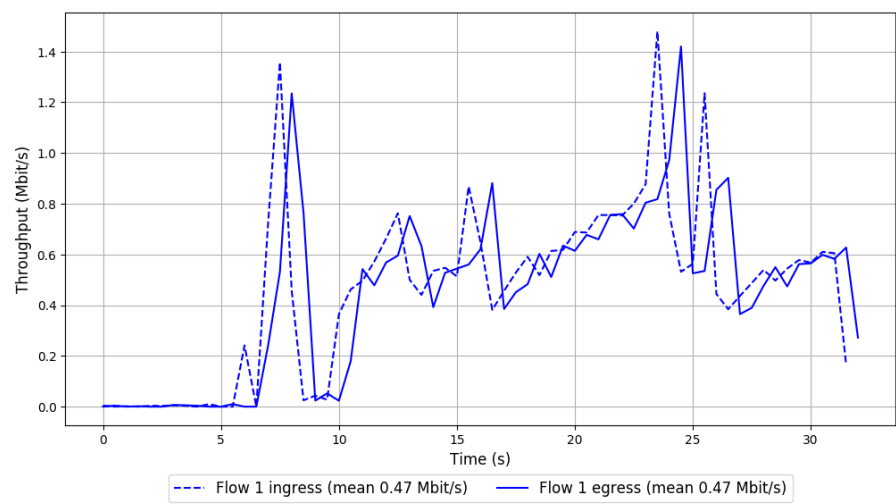



```
Run 1: Statistics of WebRTC media

Start at: 2019-01-17 03:32:12
End at: 2019-01-17 03:32:42
Local clock offset: -1.298 ms
Remote clock offset: 32.888 ms

# Below is generated by plot.py at 2019-01-17 04:17:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 205.268 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 205.268 ms
Loss rate: 0.10%
```

Run 1: Report of WebRTC media — Data Link

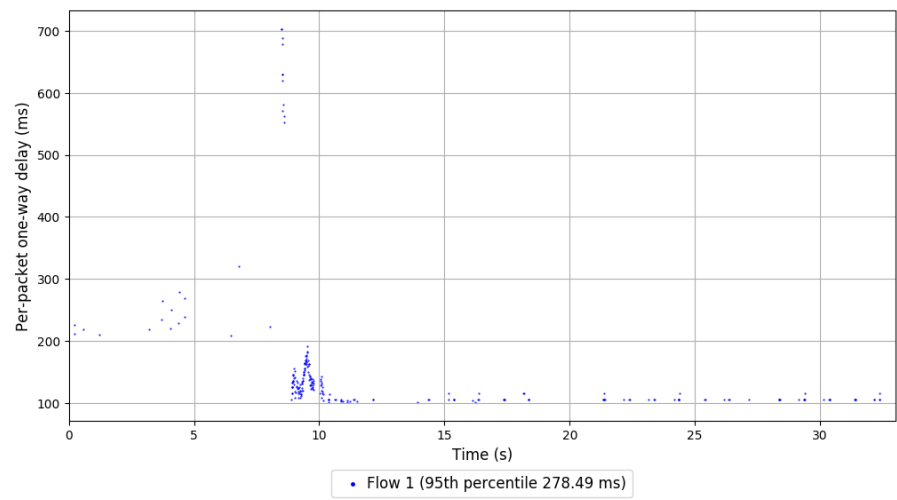
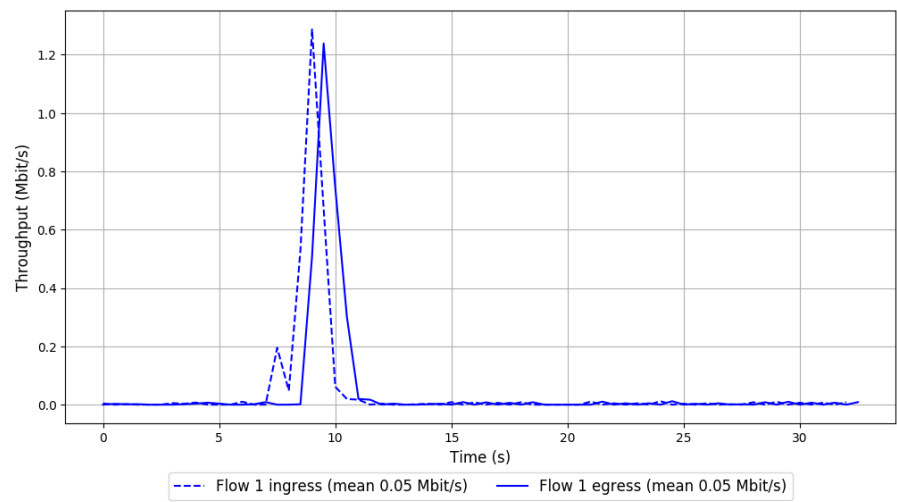


Run 2: Statistics of WebRTC media

Start at: 2019-01-17 03:53:48
End at: 2019-01-17 03:54:18
Local clock offset: -1.665 ms
Remote clock offset: -6.194 ms

Below is generated by plot.py at 2019-01-17 04:17:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 278.493 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 278.493 ms
Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-01-17 04:15:30
End at: 2019-01-17 04:16:00
Local clock offset: -1.417 ms
Remote clock offset: -10.96 ms

Below is generated by plot.py at 2019-01-17 04:17:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 250.105 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 250.105 ms
Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

