

## Pantheon Report

Generated at 2018-12-02 09:00:25 (UTC).

Data path: India cellular on `ppp0` (*remote*) → AWS India 1 on `ens5` (*local*).

Repeated the test of 19 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

### System info:

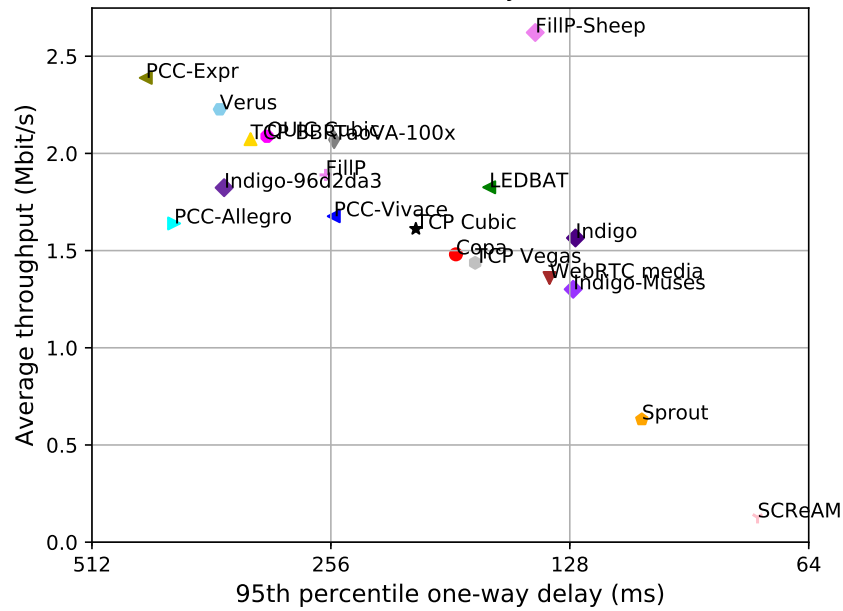
```
Linux 4.15.0-1027-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

### Git summary:

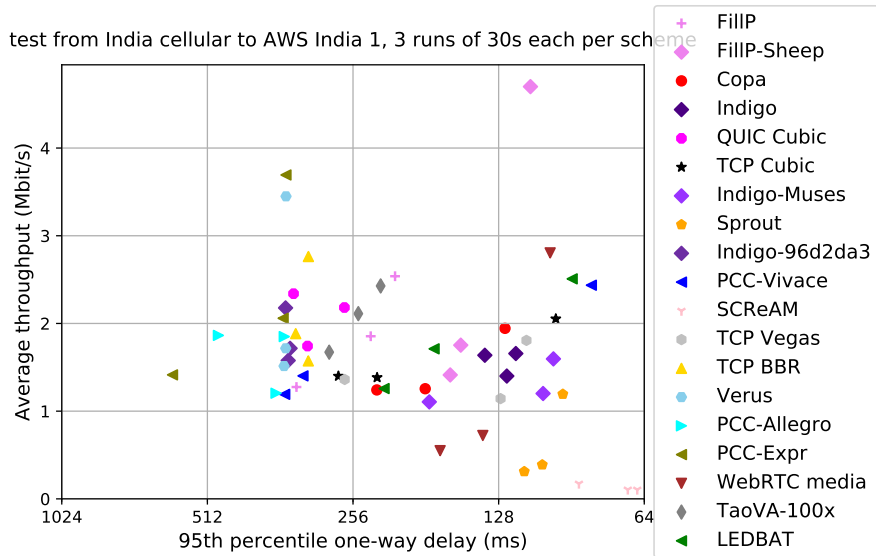
```
branch: muses @ 7b6dad87cde3ab65f7c4052140eb54098aa58e9d
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf5e58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/indigo-96d2da3 @ 8413272d46f8aa0bcb967ed7048b6a8f994abb95
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 65ac1b19bbefed0c6349ae986009b4fa8643c40a
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 India cellular to AWS India 1, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



test from India cellular to AWS India 1, 3 runs of 30s each per scheme



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	2.07	323.18	2.22
Copa	3	1.48	178.10	1.38
TCP Cubic	3	1.61	200.06	1.47
FillP	3	1.89	259.99	2.73
FillP-Sheep	3	2.62	141.49	1.29
Indigo	3	1.57	125.92	2.39
Indigo-96d2da3	3	1.83	348.94	13.87
LEDBAT	3	1.83	161.71	1.51
Indigo-Muses	3	1.30	126.75	2.54
PCC-Allegro	3	1.64	403.40	46.41
PCC-Expr	3	2.39	437.98	56.82
QUIC Cubic	3	2.09	308.12	2.19
SCReAM	3	0.13	74.24	1.37
Sprout	3	0.63	103.86	1.21
TaoVA-100x	3	2.07	253.60	3.30
TCP Vegas	3	1.44	168.43	1.81
Verus	3	2.23	353.42	15.88
PCC-Vivace	3	1.68	253.87	5.00
WebRTC media	3	1.36	135.75	1.31

Run 1: Statistics of TCP BBR

Start at: 2018-12-02 08:15:14

End at: 2018-12-02 08:15:44

Local clock offset: 3.034 ms

Remote clock offset: 0.447 ms

# Below is generated by plot.py at 2018-12-02 08:59:44

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 316.707 ms

Loss rate: 1.31%

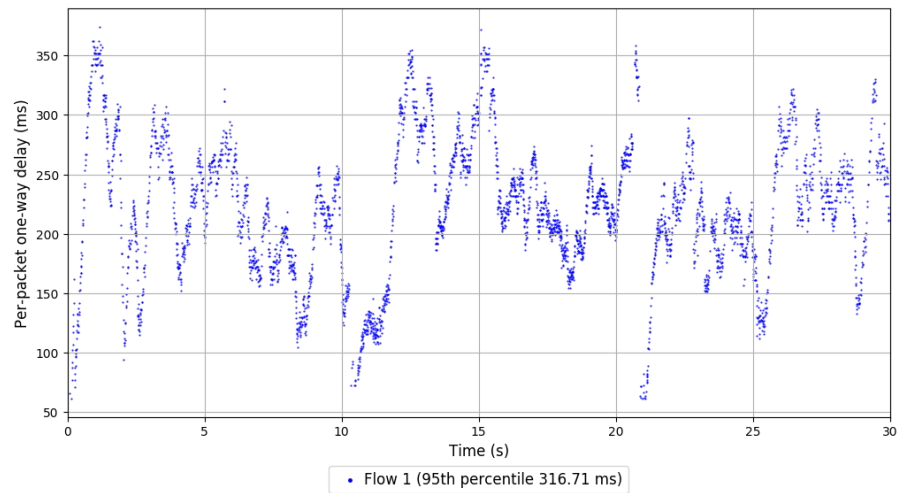
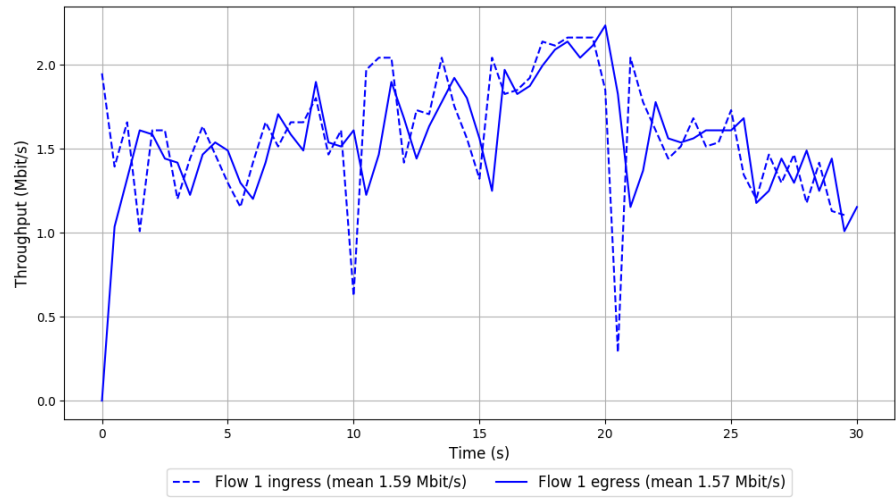
-- Flow 1:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 316.707 ms

Loss rate: 1.31%

### Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-12-02 08:36:07

End at: 2018-12-02 08:36:37

Local clock offset: 0.25 ms

Remote clock offset: -1.551 ms

# Below is generated by plot.py at 2018-12-02 08:59:45

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.88 Mbit/s

95th percentile per-packet one-way delay: 336.292 ms

Loss rate: 3.61%

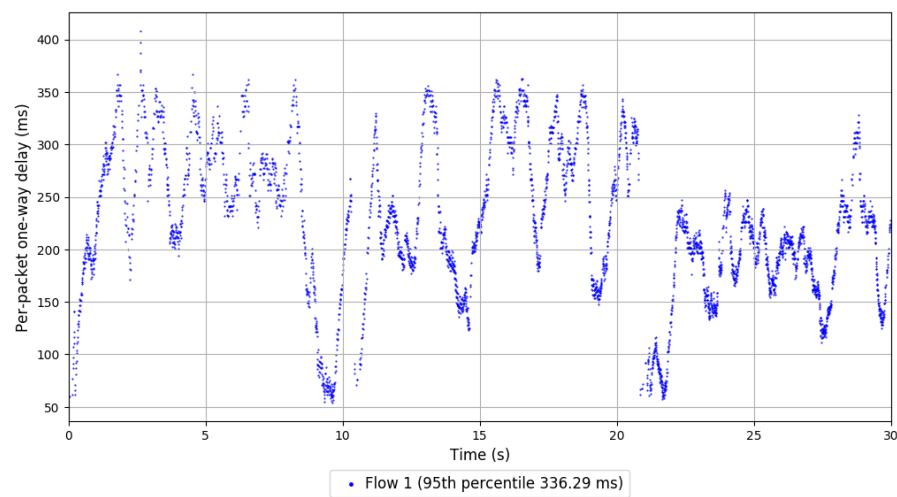
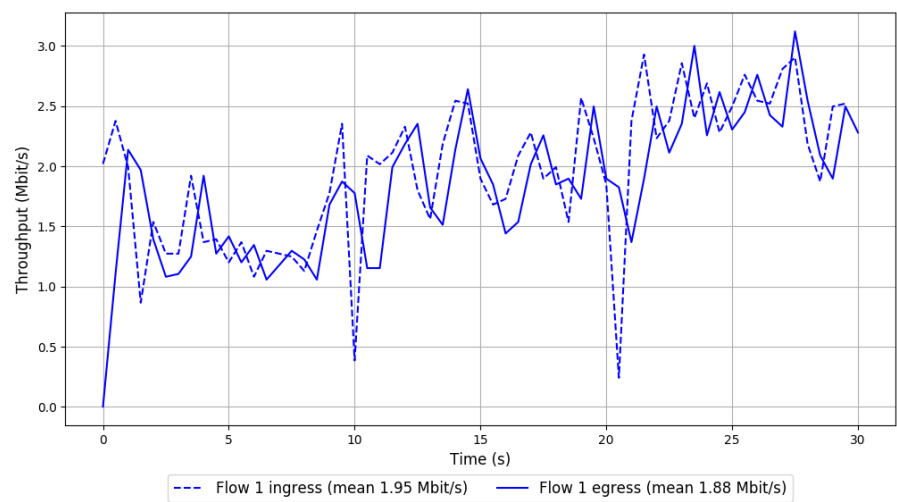
-- Flow 1:

Average throughput: 1.88 Mbit/s

95th percentile per-packet one-way delay: 336.292 ms

Loss rate: 3.61%

Run 2: Report of TCP BBR — Data Link





Run 3: Statistics of TCP BBR

Start at: 2018-12-02 08:56:53

End at: 2018-12-02 08:57:23

Local clock offset: 1.755 ms

Remote clock offset: -2.667 ms

# Below is generated by plot.py at 2018-12-02 08:59:47

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.76 Mbit/s

95th percentile per-packet one-way delay: 316.553 ms

Loss rate: 1.73%

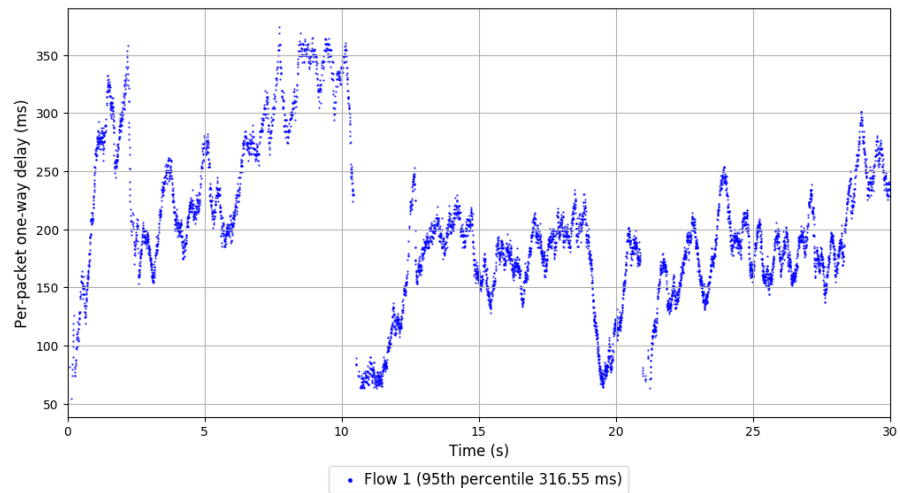
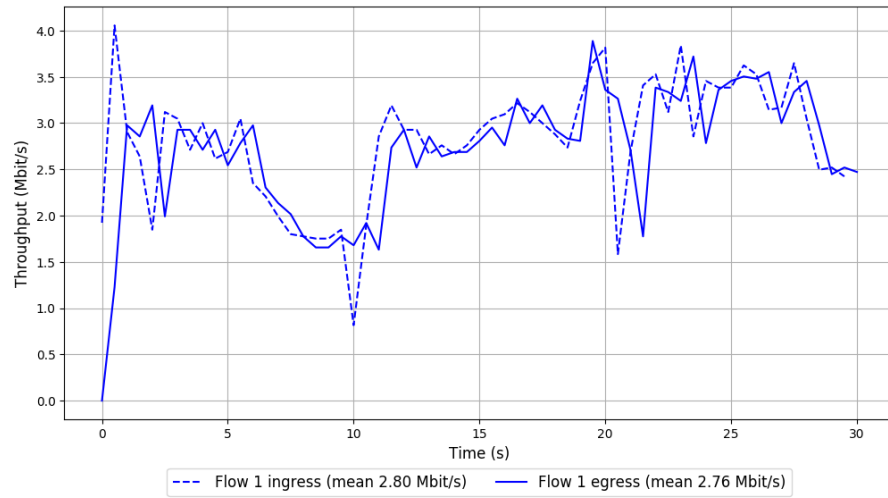
-- Flow 1:

Average throughput: 2.76 Mbit/s

95th percentile per-packet one-way delay: 316.553 ms

Loss rate: 1.73%

### Run 3: Report of TCP BBR — Data Link

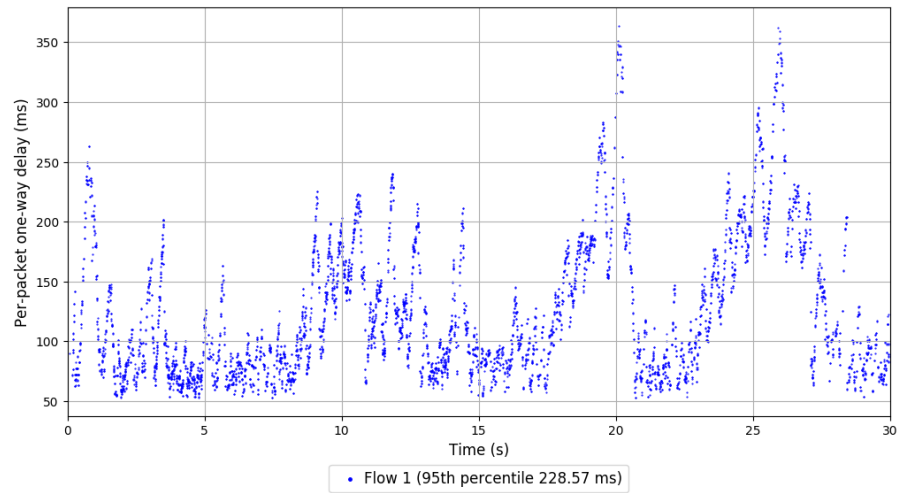
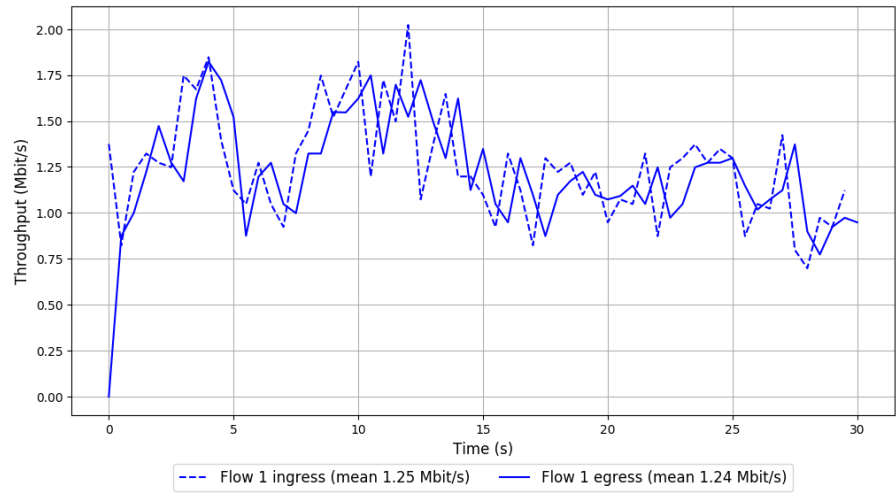


Run 1: Statistics of Copa

Start at: 2018-12-02 08:14:09  
End at: 2018-12-02 08:14:39  
Local clock offset: 3.163 ms  
Remote clock offset: -0.779 ms

# Below is generated by plot.py at 2018-12-02 08:59:47  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.24 Mbit/s  
95th percentile per-packet one-way delay: 228.572 ms  
Loss rate: 1.34%  
-- Flow 1:  
Average throughput: 1.24 Mbit/s  
95th percentile per-packet one-way delay: 228.572 ms  
Loss rate: 1.34%

## Run 1: Report of Copa — Data Link

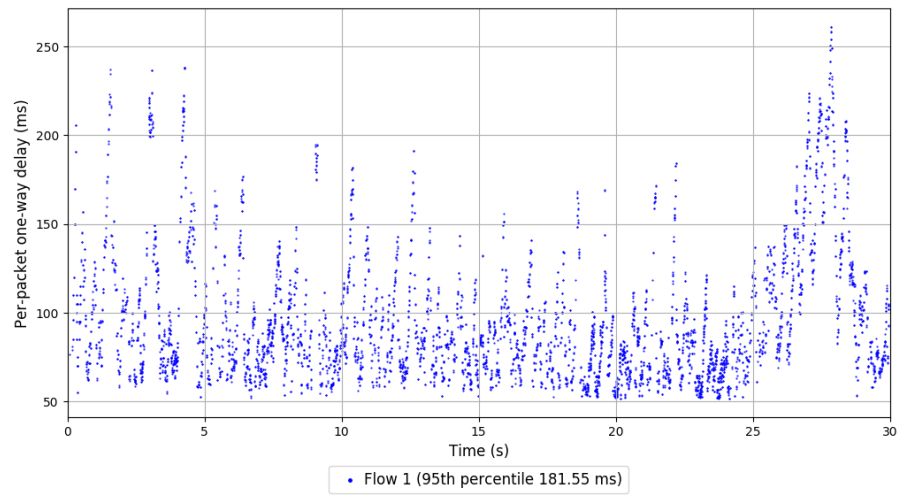
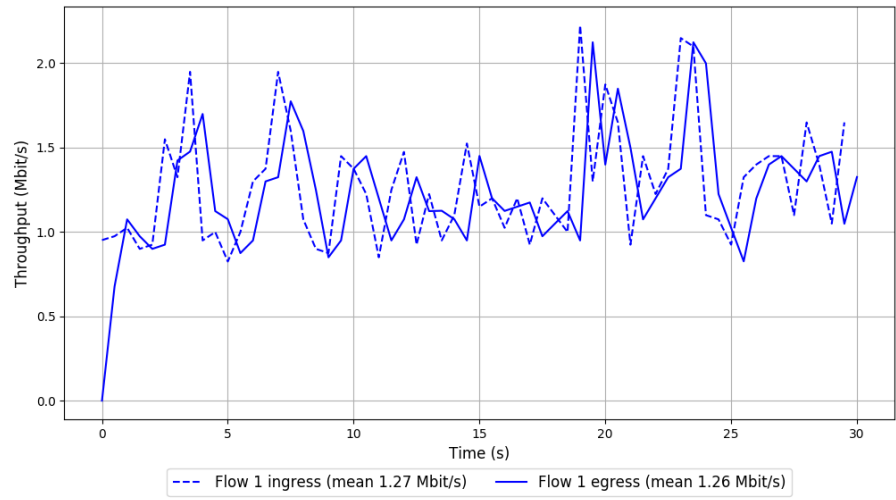


Run 2: Statistics of Copa

Start at: 2018-12-02 08:35:00  
End at: 2018-12-02 08:35:30  
Local clock offset: 0.473 ms  
Remote clock offset: -0.933 ms

# Below is generated by plot.py at 2018-12-02 08:59:47  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.26 Mbit/s  
95th percentile per-packet one-way delay: 181.553 ms  
Loss rate: 1.70%  
-- Flow 1:  
Average throughput: 1.26 Mbit/s  
95th percentile per-packet one-way delay: 181.553 ms  
Loss rate: 1.70%

## Run 2: Report of Copa — Data Link

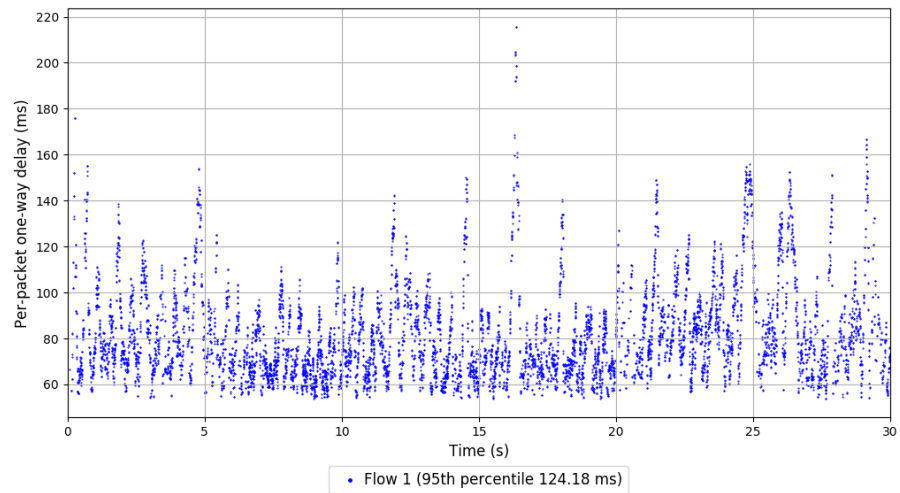
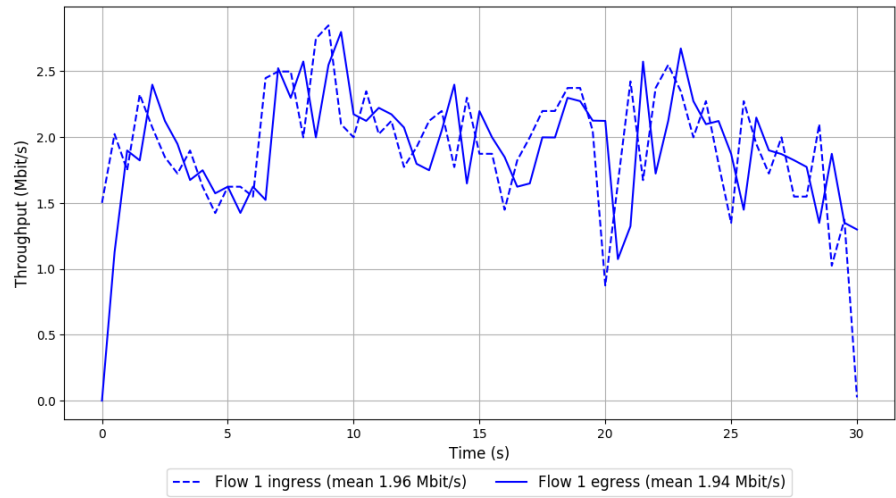


Run 3: Statistics of Copa

Start at: 2018-12-02 08:55:47  
End at: 2018-12-02 08:56:17  
Local clock offset: 1.645 ms  
Remote clock offset: -2.527 ms

# Below is generated by plot.py at 2018-12-02 08:59:48  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.94 Mbit/s  
95th percentile per-packet one-way delay: 124.180 ms  
Loss rate: 1.10%  
-- Flow 1:  
Average throughput: 1.94 Mbit/s  
95th percentile per-packet one-way delay: 124.180 ms  
Loss rate: 1.10%

### Run 3: Report of Copa — Data Link



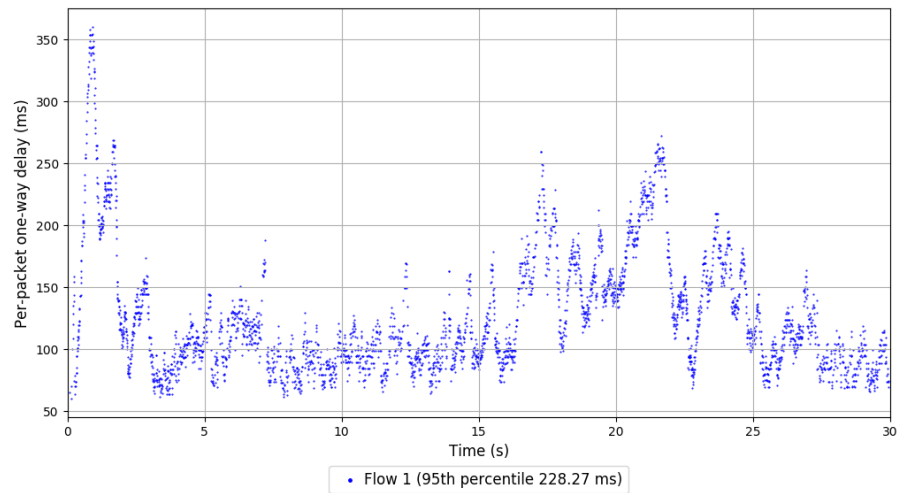
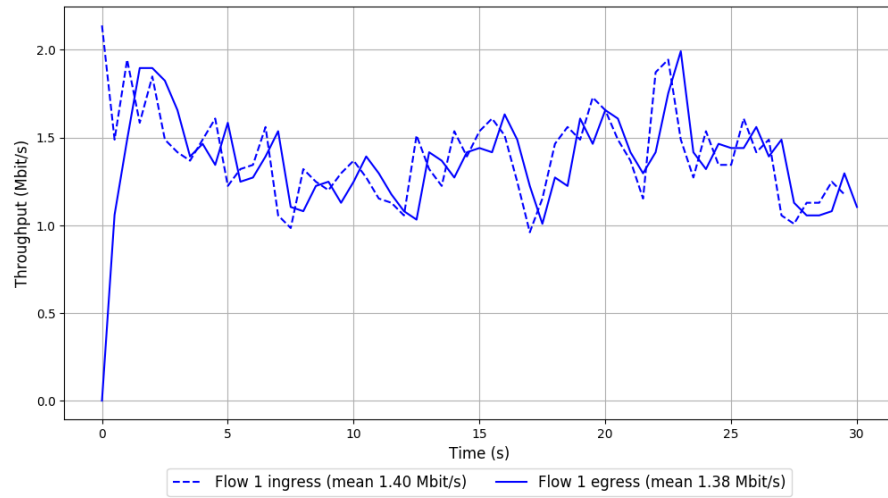


Run 1: Statistics of TCP Cubic

Start at: 2018-12-02 08:16:20  
End at: 2018-12-02 08:16:50  
Local clock offset: 4.084 ms  
Remote clock offset: -0.899 ms

# Below is generated by plot.py at 2018-12-02 08:59:48  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.38 Mbit/s  
95th percentile per-packet one-way delay: 228.269 ms  
Loss rate: 1.40%  
-- Flow 1:  
Average throughput: 1.38 Mbit/s  
95th percentile per-packet one-way delay: 228.269 ms  
Loss rate: 1.40%

### Run 1: Report of TCP Cubic — Data Link

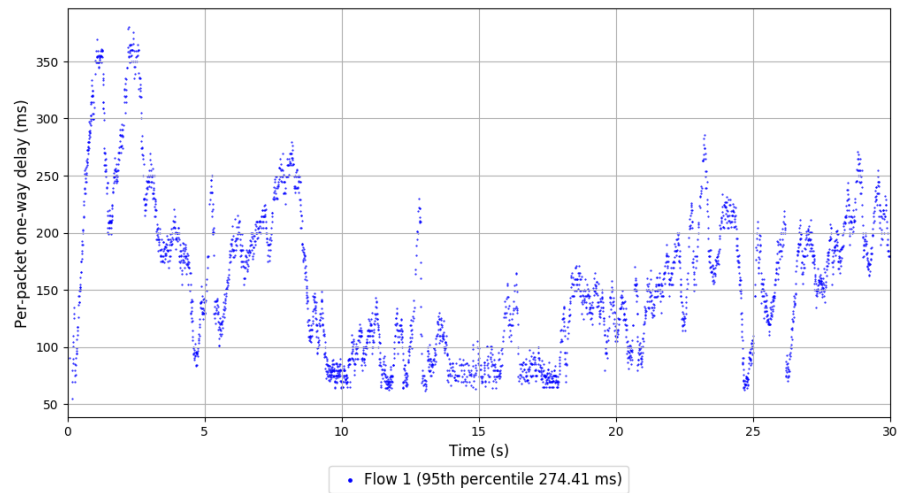
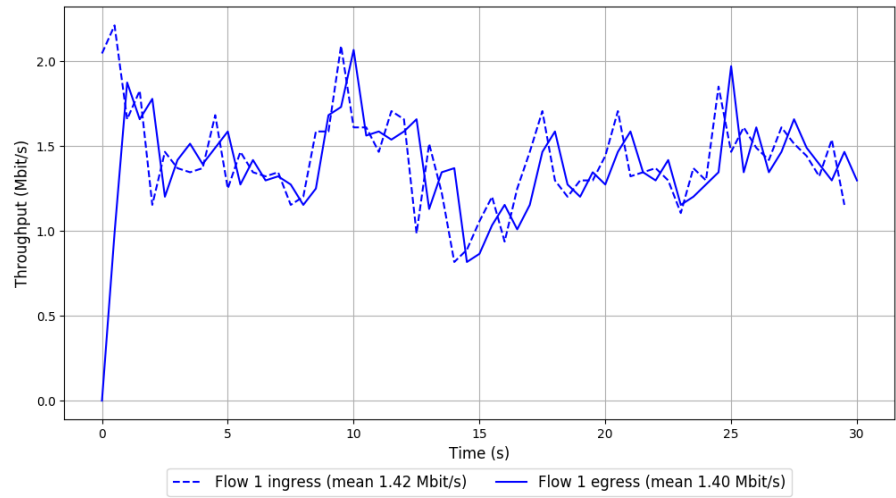


Run 2: Statistics of TCP Cubic

Start at: 2018-12-02 08:37:13  
End at: 2018-12-02 08:37:43  
Local clock offset: 2.46 ms  
Remote clock offset: -0.857 ms

# Below is generated by plot.py at 2018-12-02 08:59:48  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.40 Mbit/s  
95th percentile per-packet one-way delay: 274.409 ms  
Loss rate: 1.86%  
-- Flow 1:  
Average throughput: 1.40 Mbit/s  
95th percentile per-packet one-way delay: 274.409 ms  
Loss rate: 1.86%

## Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-12-02 08:57:59

End at: 2018-12-02 08:58:29

Local clock offset: 2.37 ms

Remote clock offset: -2.6 ms

# Below is generated by plot.py at 2018-12-02 08:59:50

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.05 Mbit/s

95th percentile per-packet one-way delay: 97.515 ms

Loss rate: 1.16%

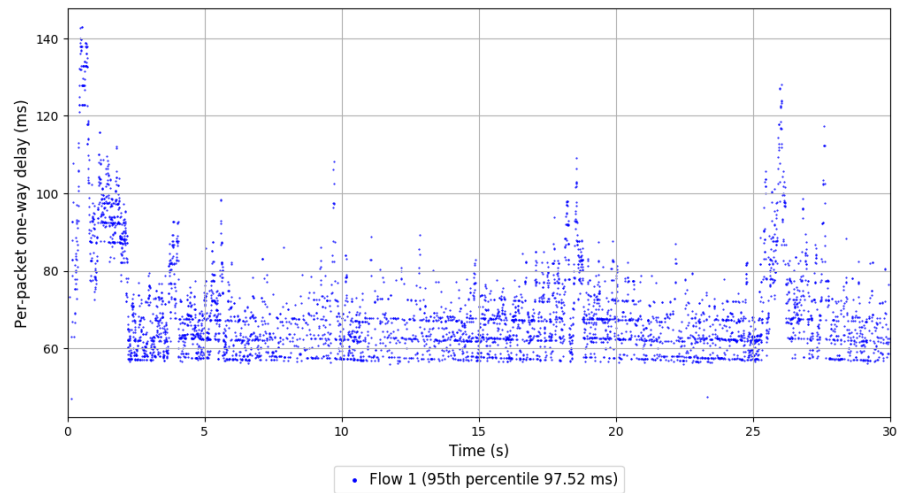
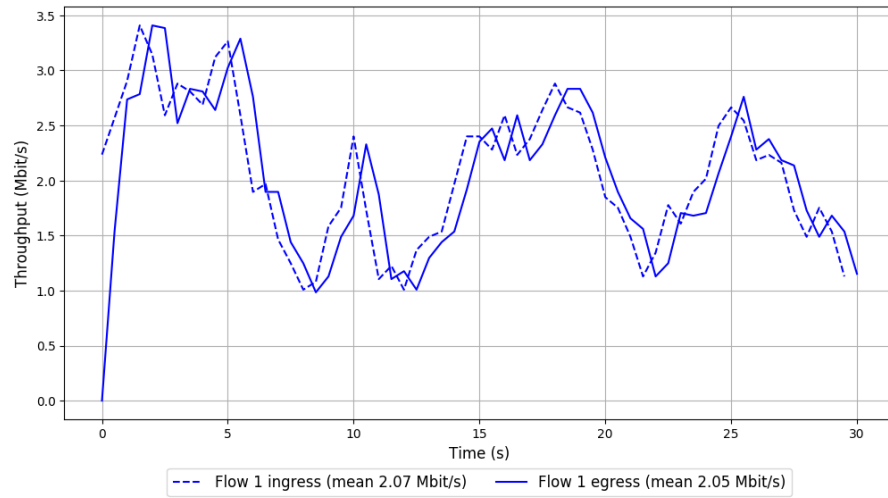
-- Flow 1:

Average throughput: 2.05 Mbit/s

95th percentile per-packet one-way delay: 97.515 ms

Loss rate: 1.16%

### Run 3: Report of TCP Cubic — Data Link

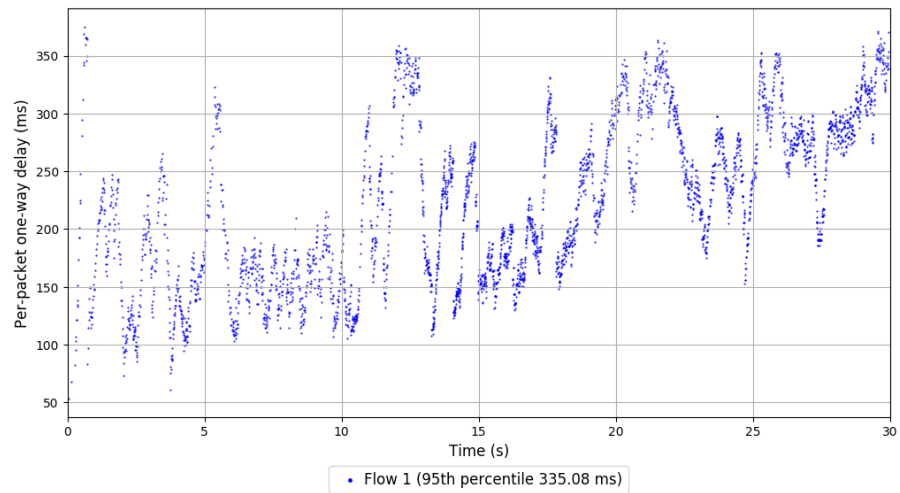
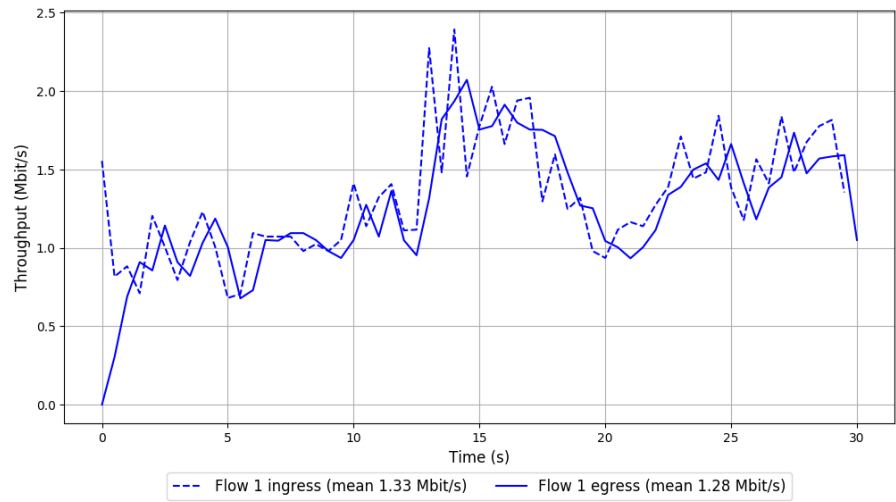


Run 1: Statistics of FillP

Start at: 2018-12-02 07:59:52  
End at: 2018-12-02 08:00:22  
Local clock offset: 2.837 ms  
Remote clock offset: -1.515 ms

# Below is generated by plot.py at 2018-12-02 08:59:50  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.28 Mbit/s  
95th percentile per-packet one-way delay: 335.077 ms  
Loss rate: 4.48%  
-- Flow 1:  
Average throughput: 1.28 Mbit/s  
95th percentile per-packet one-way delay: 335.077 ms  
Loss rate: 4.48%

## Run 1: Report of FillP — Data Link



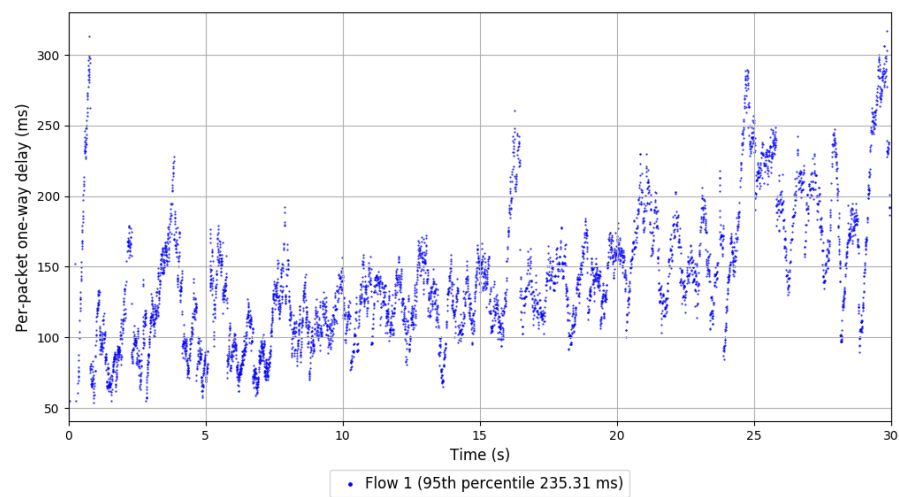
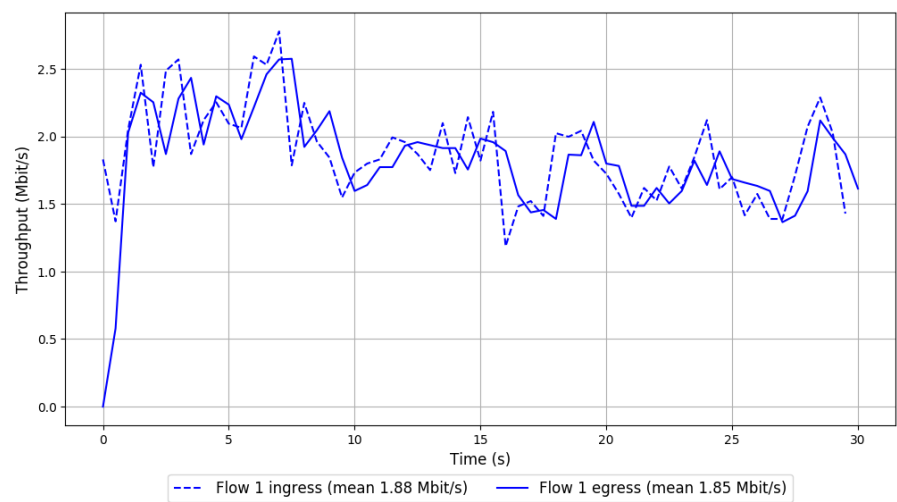


Run 2: Statistics of FillP

Start at: 2018-12-02 08:20:45  
End at: 2018-12-02 08:21:15  
Local clock offset: 0.731 ms  
Remote clock offset: -0.647 ms

# Below is generated by plot.py at 2018-12-02 08:59:50  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.85 Mbit/s  
95th percentile per-packet one-way delay: 235.308 ms  
Loss rate: 1.42%  
-- Flow 1:  
Average throughput: 1.85 Mbit/s  
95th percentile per-packet one-way delay: 235.308 ms  
Loss rate: 1.42%

Run 2: Report of FillP — Data Link

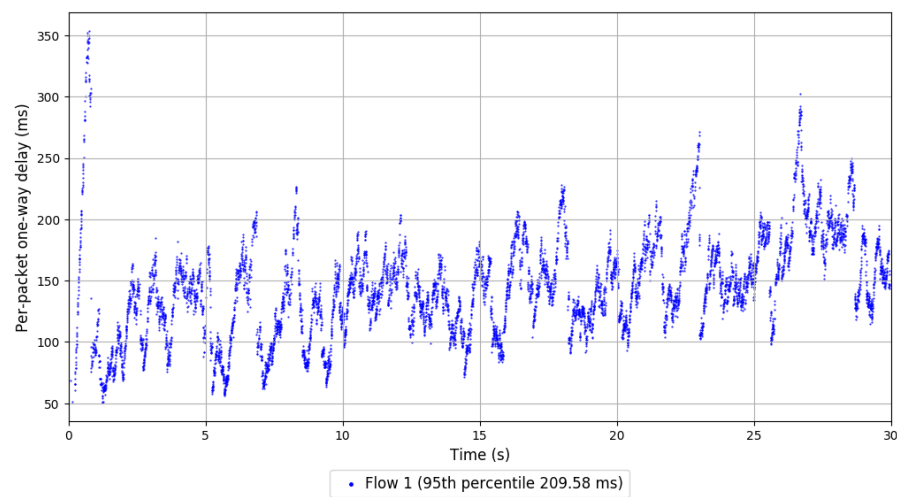
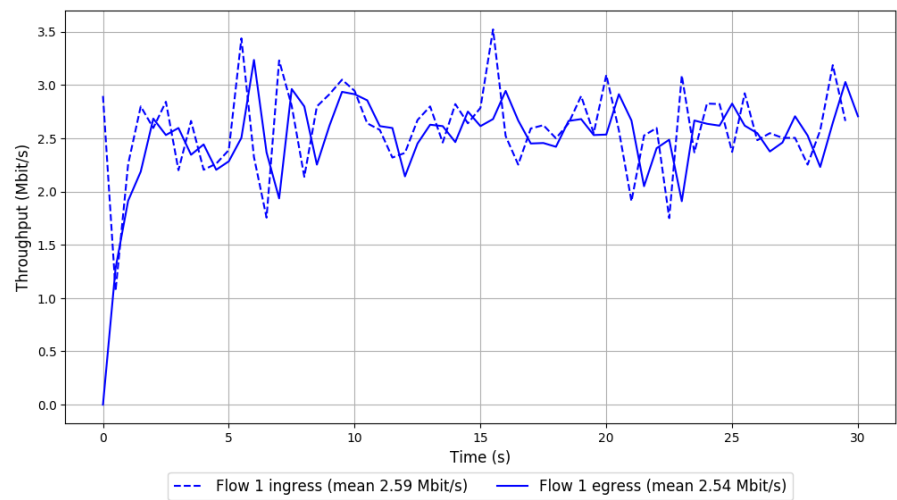


Run 3: Statistics of FillP

Start at: 2018-12-02 08:41:35  
End at: 2018-12-02 08:42:05  
Local clock offset: 1.367 ms  
Remote clock offset: -2.619 ms

# Below is generated by plot.py at 2018-12-02 08:59:53  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.54 Mbit/s  
95th percentile per-packet one-way delay: 209.576 ms  
Loss rate: 2.28%  
-- Flow 1:  
Average throughput: 2.54 Mbit/s  
95th percentile per-packet one-way delay: 209.576 ms  
Loss rate: 2.28%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2018-12-02 08:09:45

End at: 2018-12-02 08:10:15

Local clock offset: 1.034 ms

Remote clock offset: -0.673 ms

# Below is generated by plot.py at 2018-12-02 08:59:53

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.75 Mbit/s

95th percentile per-packet one-way delay: 153.291 ms

Loss rate: 1.59%

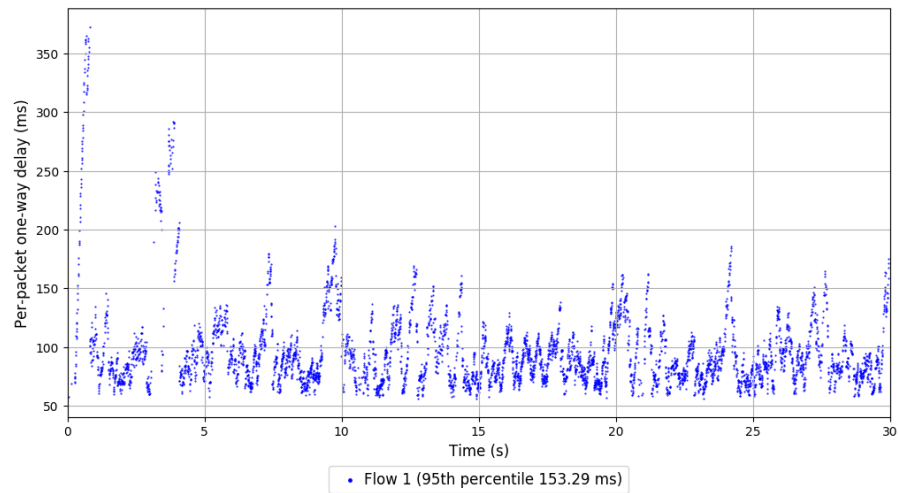
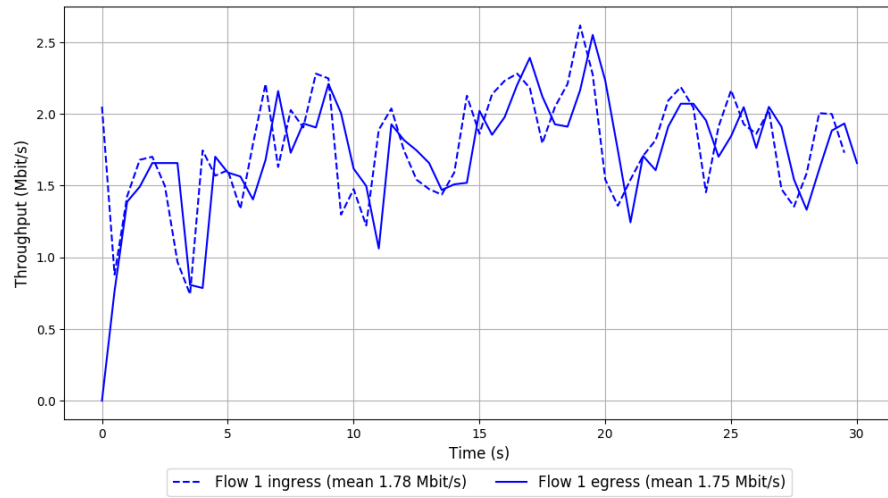
-- Flow 1:

Average throughput: 1.75 Mbit/s

95th percentile per-packet one-way delay: 153.291 ms

Loss rate: 1.59%

### Run 1: Report of FillP-Sheep — Data Link

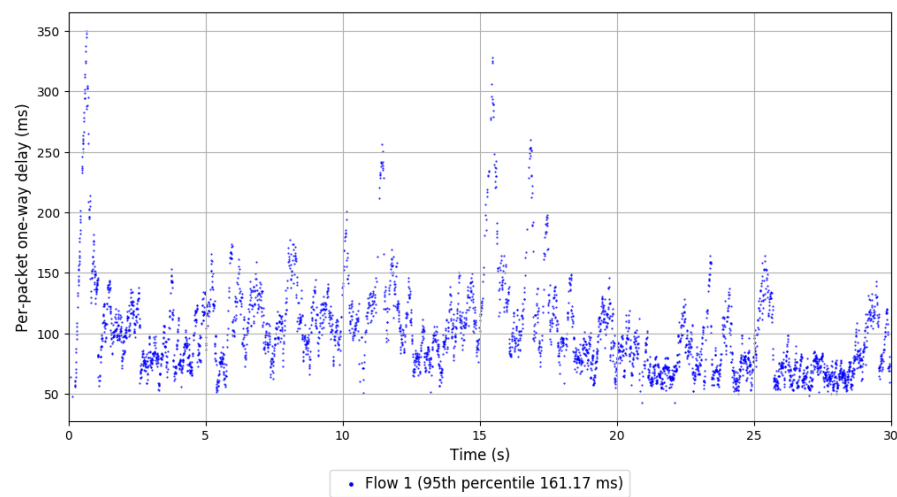
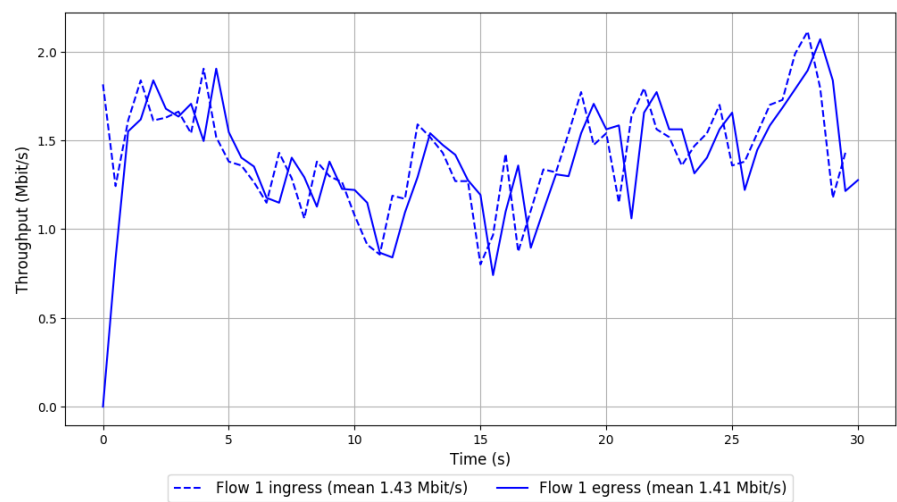


Run 2: Statistics of FillP-Sheep

Start at: 2018-12-02 08:30:38  
End at: 2018-12-02 08:31:08  
Local clock offset: -0.278 ms  
Remote clock offset: -1.064 ms

# Below is generated by plot.py at 2018-12-02 08:59:53  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.41 Mbit/s  
95th percentile per-packet one-way delay: 161.167 ms  
Loss rate: 1.37%  
-- Flow 1:  
Average throughput: 1.41 Mbit/s  
95th percentile per-packet one-way delay: 161.167 ms  
Loss rate: 1.37%

Run 2: Report of FillP-Sheep — Data Link



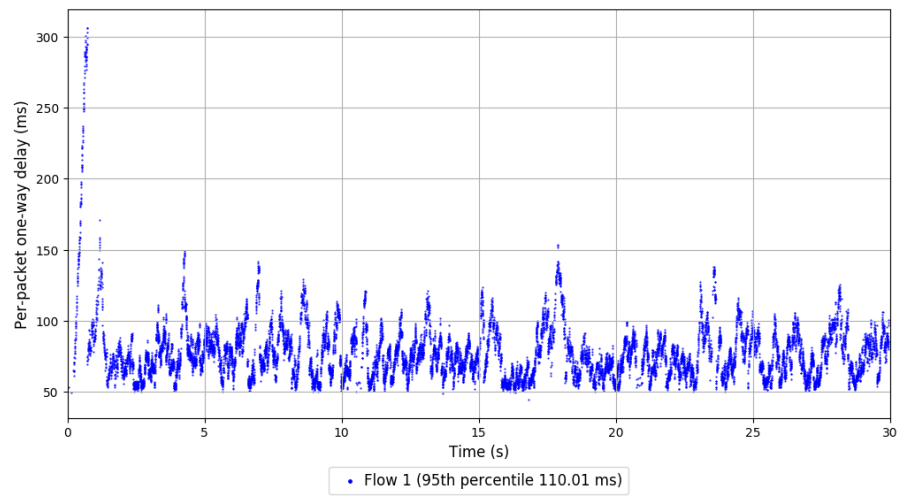
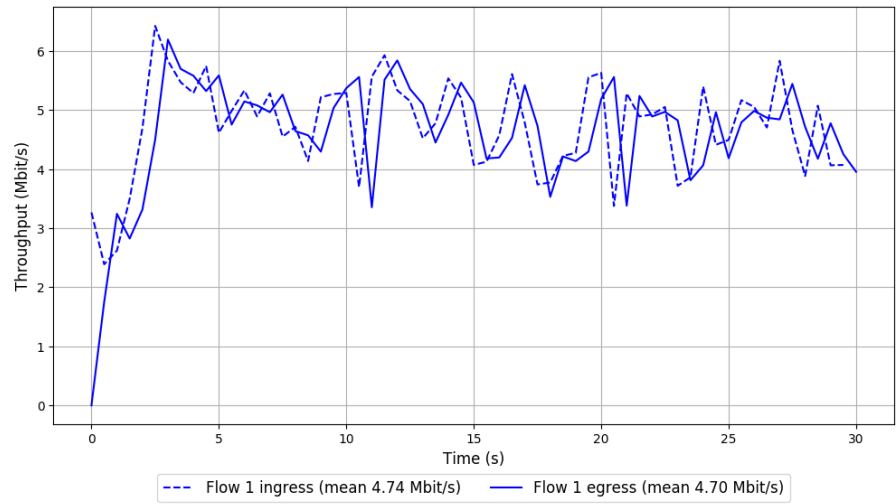


Run 3: Statistics of FillP-Sheep

Start at: 2018-12-02 08:51:25  
End at: 2018-12-02 08:51:55  
Local clock offset: -0.627 ms  
Remote clock offset: -2.102 ms

# Below is generated by plot.py at 2018-12-02 09:00:00  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 4.70 Mbit/s  
95th percentile per-packet one-way delay: 110.012 ms  
Loss rate: 0.91%  
-- Flow 1:  
Average throughput: 4.70 Mbit/s  
95th percentile per-packet one-way delay: 110.012 ms  
Loss rate: 0.91%

### Run 3: Report of FillP-Sheep — Data Link

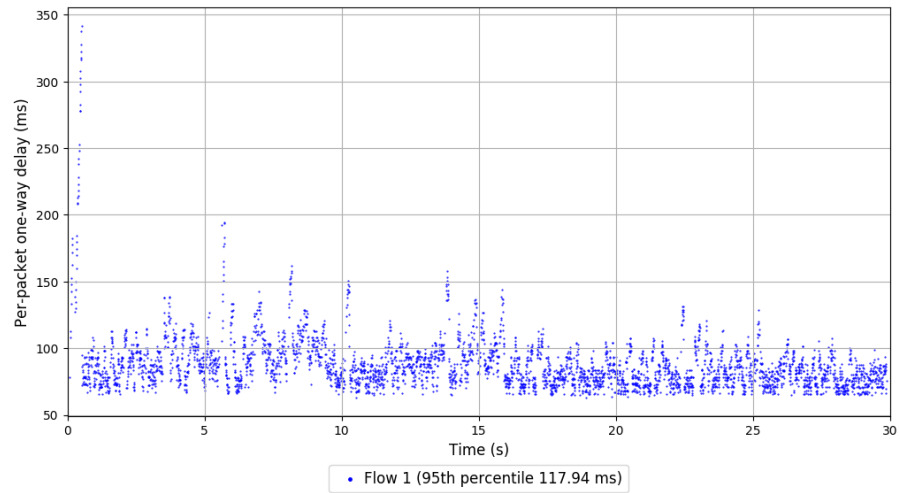
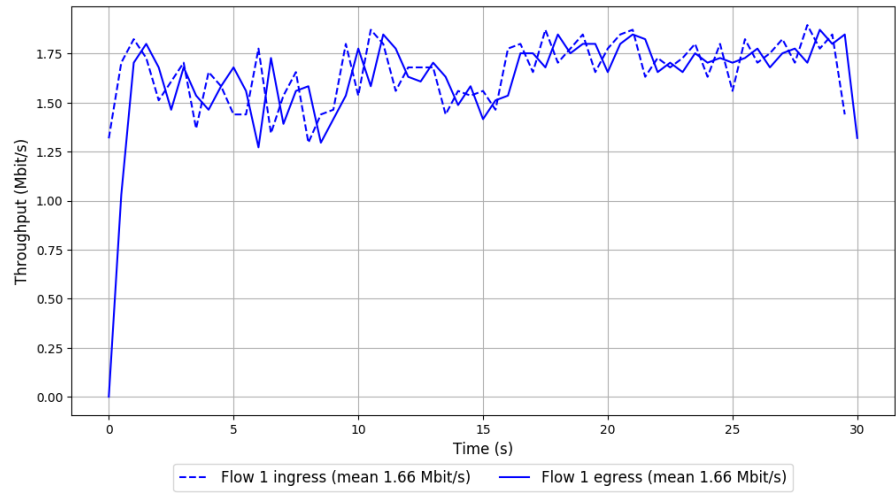


```
Run 1: Statistics of Indigo

Start at: 2018-12-02 07:57:40
End at: 2018-12-02 07:58:10
Local clock offset: 4.63 ms
Remote clock offset: -0.924 ms

# Below is generated by plot.py at 2018-12-02 09:00:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 117.945 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 117.945 ms
Loss rate: 0.75%
```

## Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-12-02 08:18:32

End at: 2018-12-02 08:19:02

Local clock offset: 2.0 ms

Remote clock offset: 0.035 ms

# Below is generated by plot.py at 2018-12-02 09:00:00

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 123.117 ms

Loss rate: 3.68%

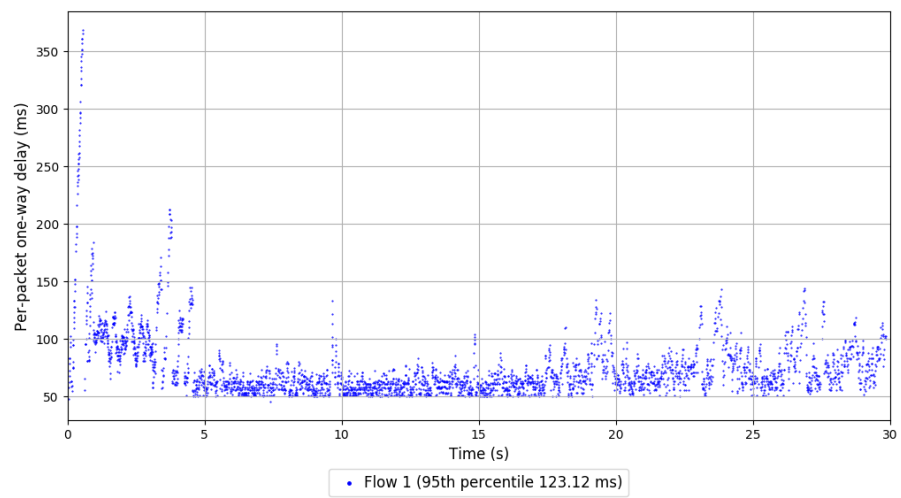
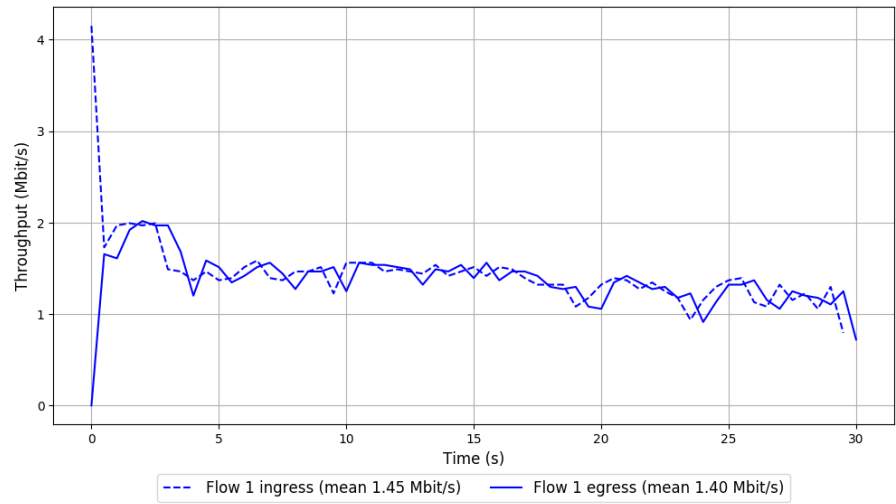
-- Flow 1:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 123.117 ms

Loss rate: 3.68%

## Run 2: Report of Indigo — Data Link

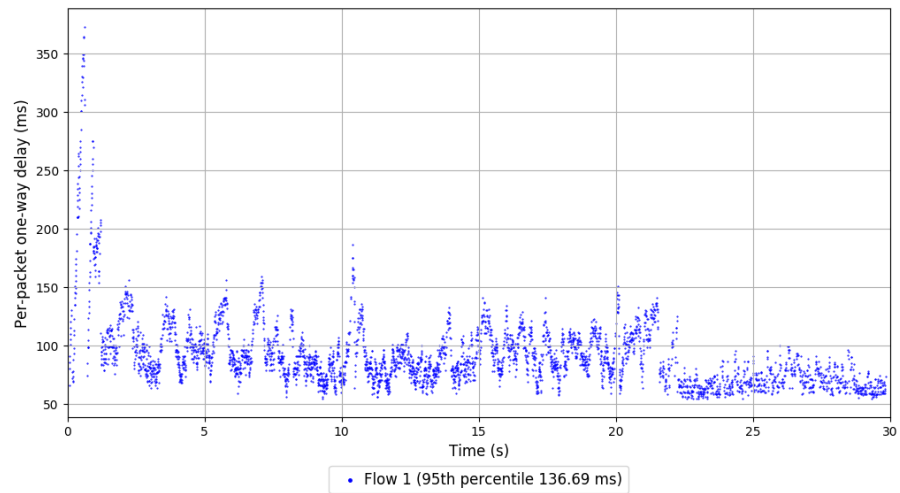
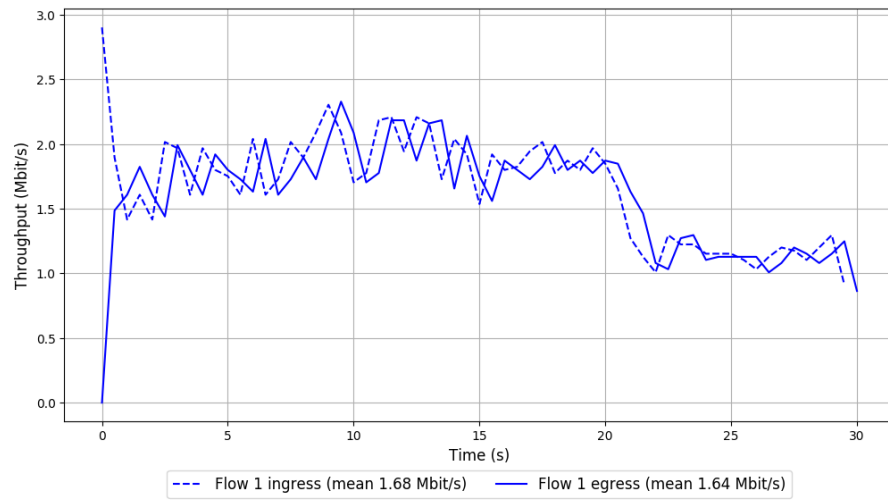


Run 3: Statistics of Indigo

Start at: 2018-12-02 08:39:24  
End at: 2018-12-02 08:39:54  
Local clock offset: 0.692 ms  
Remote clock offset: -1.708 ms

# Below is generated by plot.py at 2018-12-02 09:00:00  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.64 Mbit/s  
95th percentile per-packet one-way delay: 136.693 ms  
Loss rate: 2.75%  
-- Flow 1:  
Average throughput: 1.64 Mbit/s  
95th percentile per-packet one-way delay: 136.693 ms  
Loss rate: 2.75%

### Run 3: Report of Indigo — Data Link



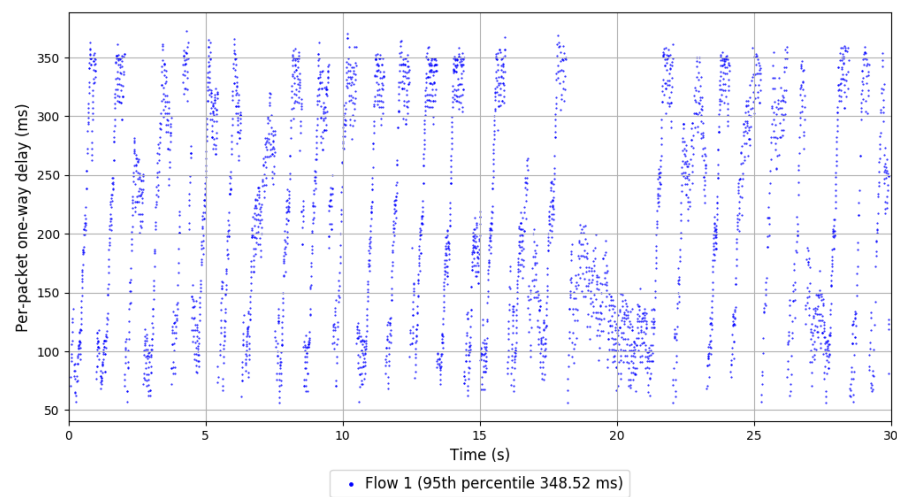
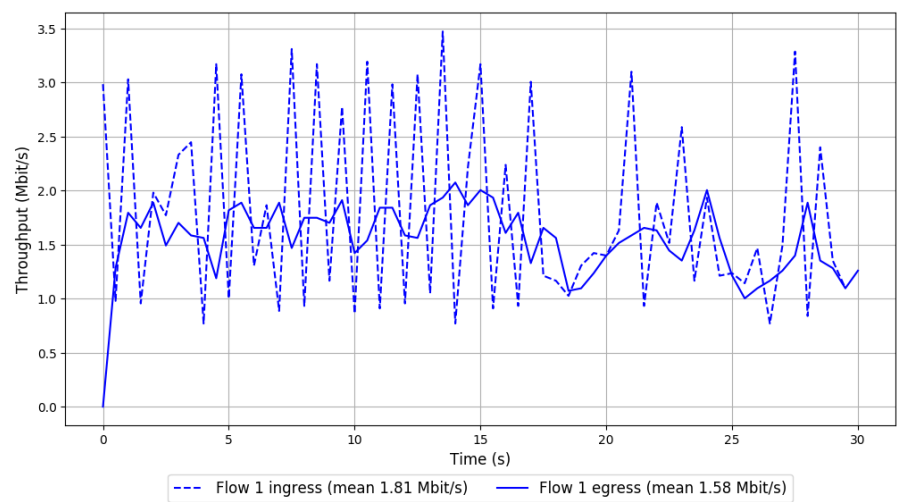


```
Run 1: Statistics of Indigo-96d2da3

Start at: 2018-12-02 08:13:03
End at: 2018-12-02 08:13:33
Local clock offset: 1.098 ms
Remote clock offset: -1.355 ms

# Below is generated by plot.py at 2018-12-02 09:00:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 348.519 ms
Loss rate: 12.92%
-- Flow 1:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 348.519 ms
Loss rate: 12.92%
```

Run 1: Report of Indigo-96d2da3 — Data Link



Run 2: Statistics of Indigo-96d2da3

Start at: 2018-12-02 08:33:54

End at: 2018-12-02 08:34:24

Local clock offset: 0.578 ms

Remote clock offset: -1.02 ms

# Below is generated by plot.py at 2018-12-02 09:00:00

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.72 Mbit/s

95th percentile per-packet one-way delay: 345.379 ms

Loss rate: 15.02%

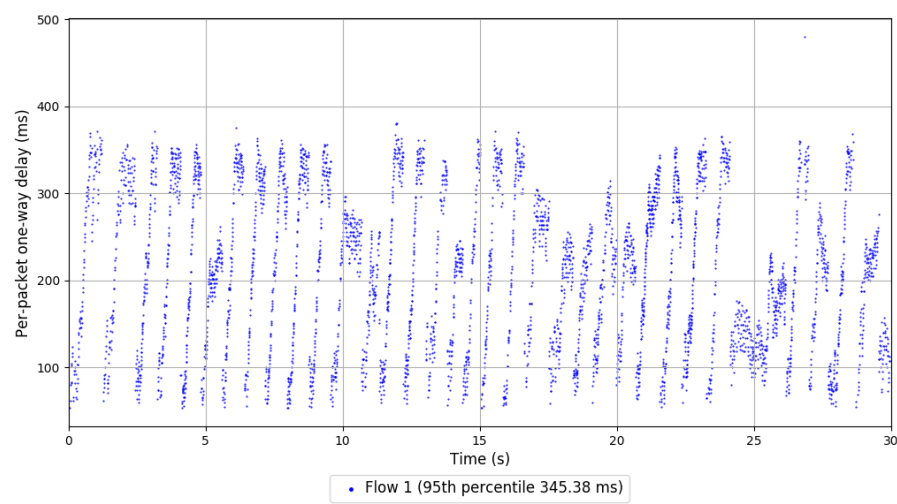
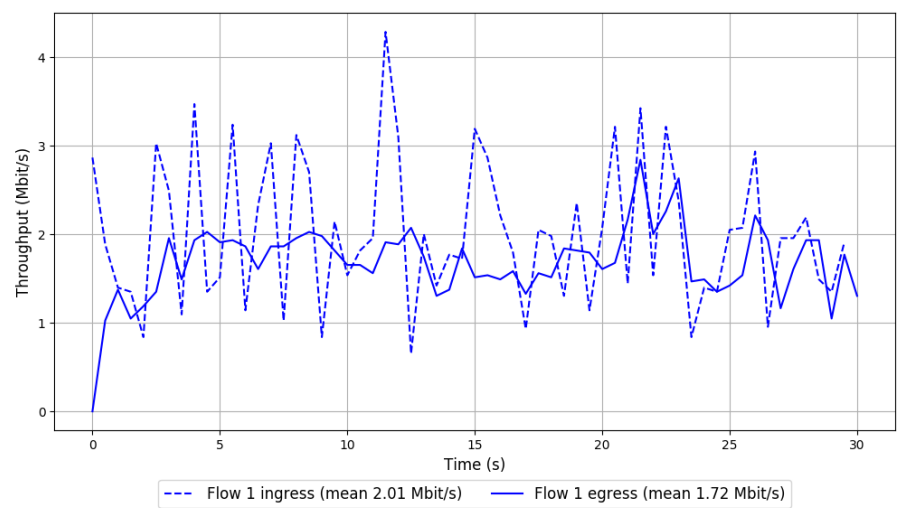
-- Flow 1:

Average throughput: 1.72 Mbit/s

95th percentile per-packet one-way delay: 345.379 ms

Loss rate: 15.02%

Run 2: Report of Indigo-96d2da3 — Data Link

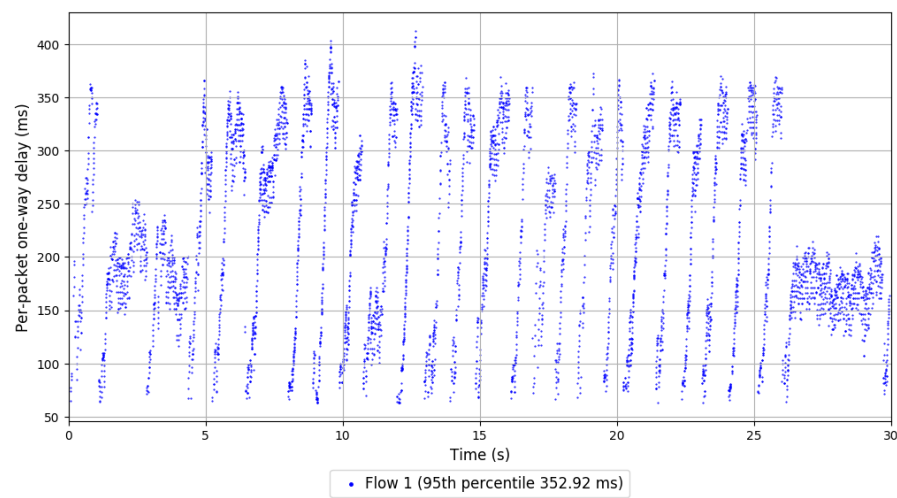
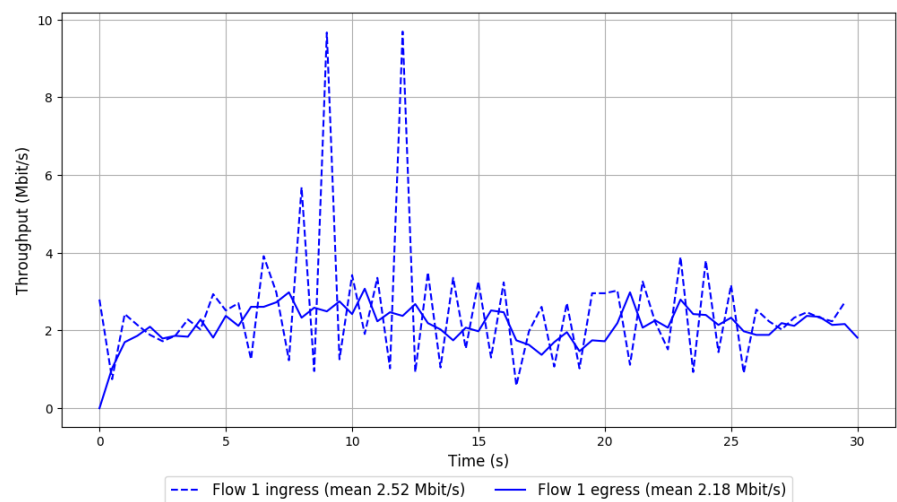


Run 3: Statistics of Indigo-96d2da3

Start at: 2018-12-02 08:54:41  
End at: 2018-12-02 08:55:11  
Local clock offset: 2.317 ms  
Remote clock offset: -2.968 ms

# Below is generated by plot.py at 2018-12-02 09:00:00  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.18 Mbit/s  
95th percentile per-packet one-way delay: 352.919 ms  
Loss rate: 13.66%  
-- Flow 1:  
Average throughput: 2.18 Mbit/s  
95th percentile per-packet one-way delay: 352.919 ms  
Loss rate: 13.66%

Run 3: Report of Indigo-96d2da3 — Data Link

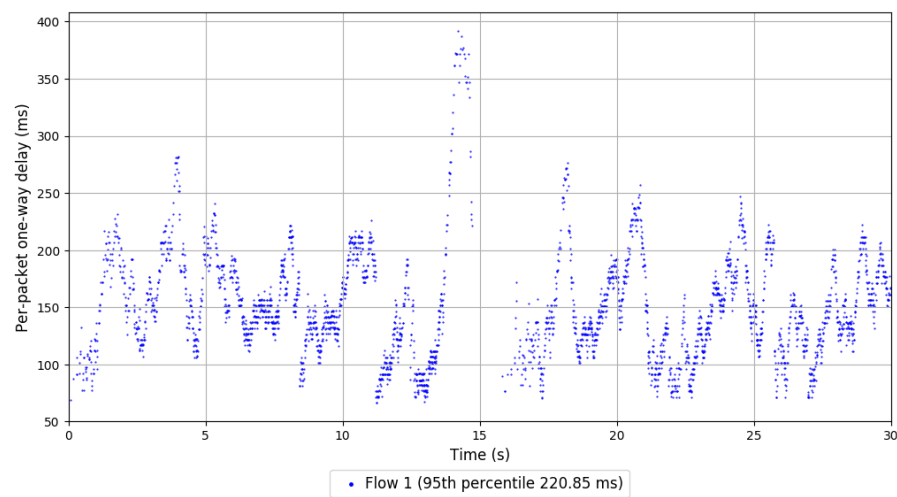
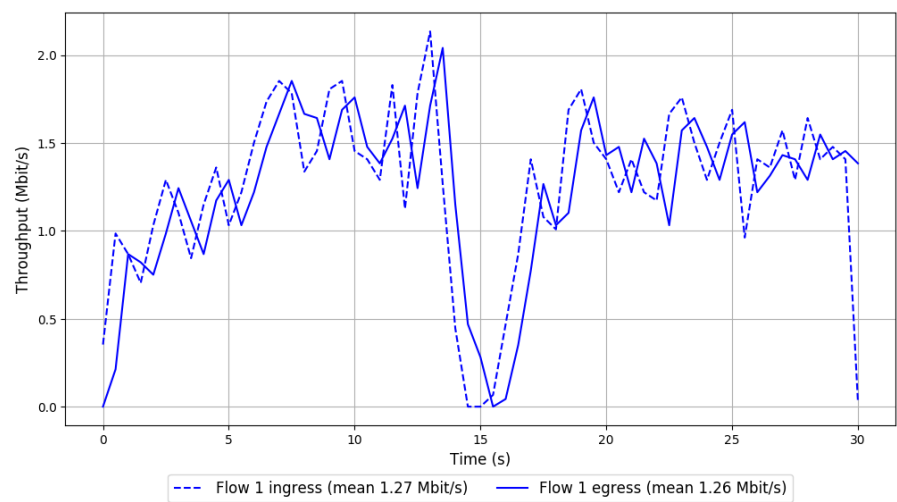


```
Run 1: Statistics of LEDBAT

Start at: 2018-12-02 08:03:09
End at: 2018-12-02 08:03:39
Local clock offset: 4.23 ms
Remote clock offset: -0.952 ms

# Below is generated by plot.py at 2018-12-02 09:00:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 220.852 ms
Loss rate: 1.35%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 220.852 ms
Loss rate: 1.35%
```

Run 1: Report of LEDBAT — Data Link



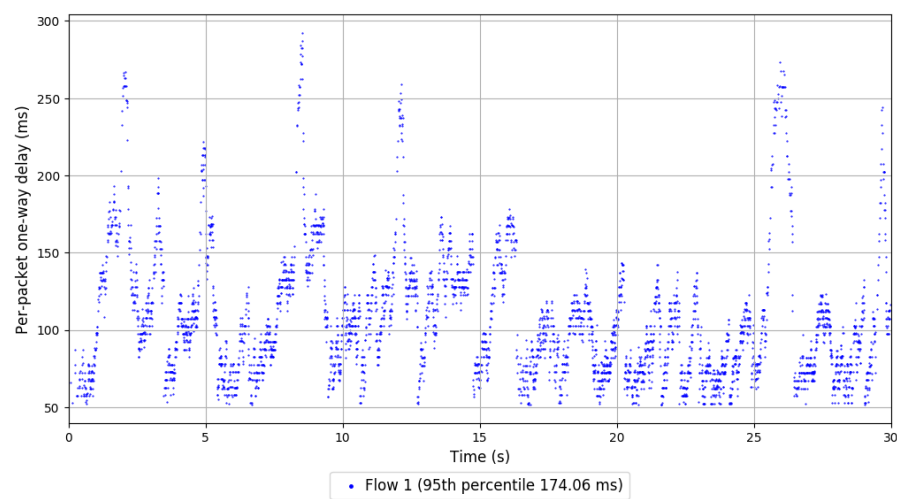
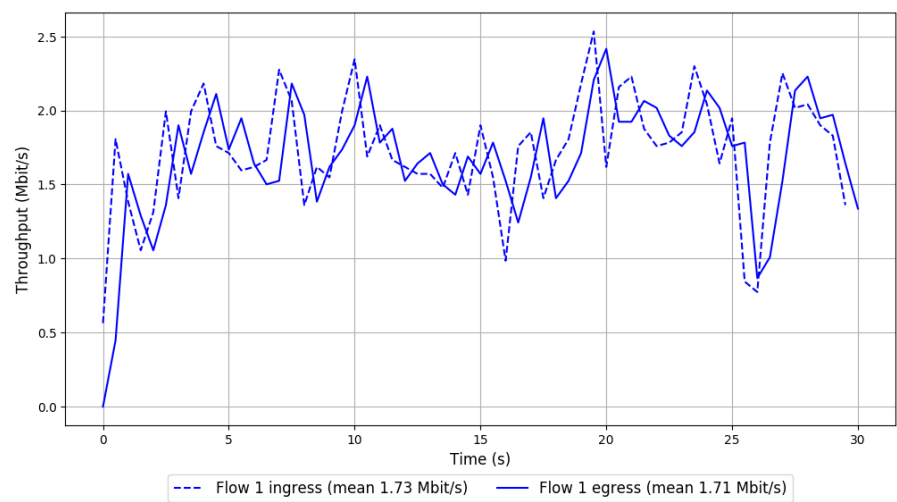


```
Run 2: Statistics of LEDBAT

Start at: 2018-12-02 08:24:03
End at: 2018-12-02 08:24:33
Local clock offset: 0.364 ms
Remote clock offset: -0.557 ms

# Below is generated by plot.py at 2018-12-02 09:00:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 174.062 ms
Loss rate: 1.20%
-- Flow 1:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 174.062 ms
Loss rate: 1.20%
```

Run 2: Report of LEDBAT — Data Link

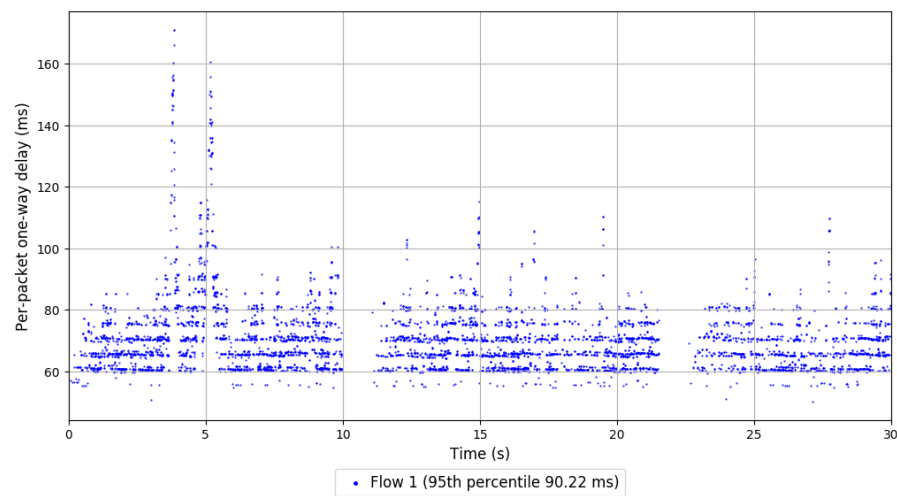
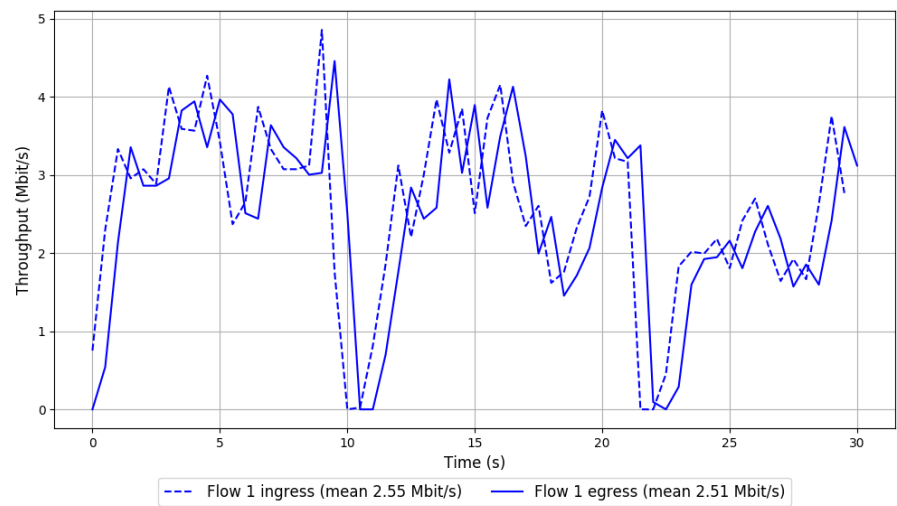


Run 3: Statistics of LEDBAT

Start at: 2018-12-02 08:44:51  
End at: 2018-12-02 08:45:21  
Local clock offset: 1.35 ms  
Remote clock offset: -1.994 ms

# Below is generated by plot.py at 2018-12-02 09:00:01  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.51 Mbit/s  
95th percentile per-packet one-way delay: 90.216 ms  
Loss rate: 1.97%  
-- Flow 1:  
Average throughput: 2.51 Mbit/s  
95th percentile per-packet one-way delay: 90.216 ms  
Loss rate: 1.97%

Run 3: Report of LEDBAT — Data Link

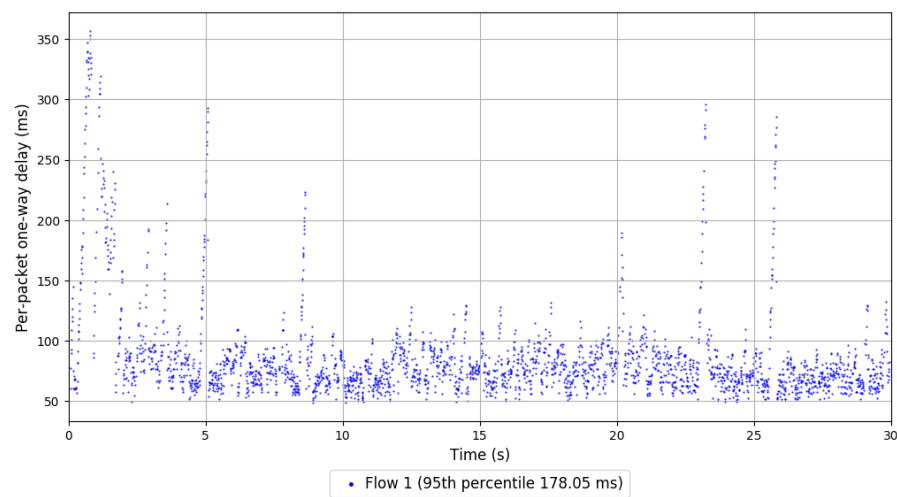
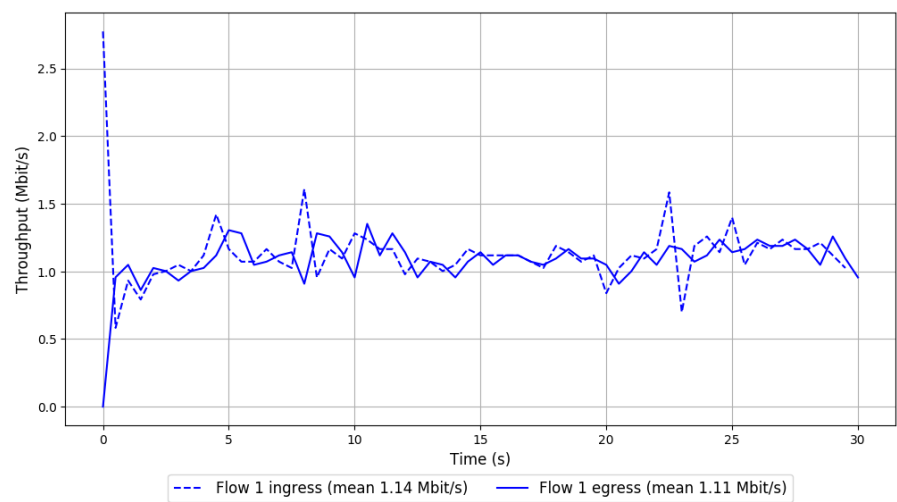


```
Run 1: Statistics of Indigo-Muses

Start at: 2018-12-02 08:08:39
End at: 2018-12-02 08:09:09
Local clock offset: 1.151 ms
Remote clock offset: 0.046 ms

# Below is generated by plot.py at 2018-12-02 09:00:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 178.052 ms
Loss rate: 3.11%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 178.052 ms
Loss rate: 3.11%
```

Run 1: Report of Indigo-Muses — Data Link

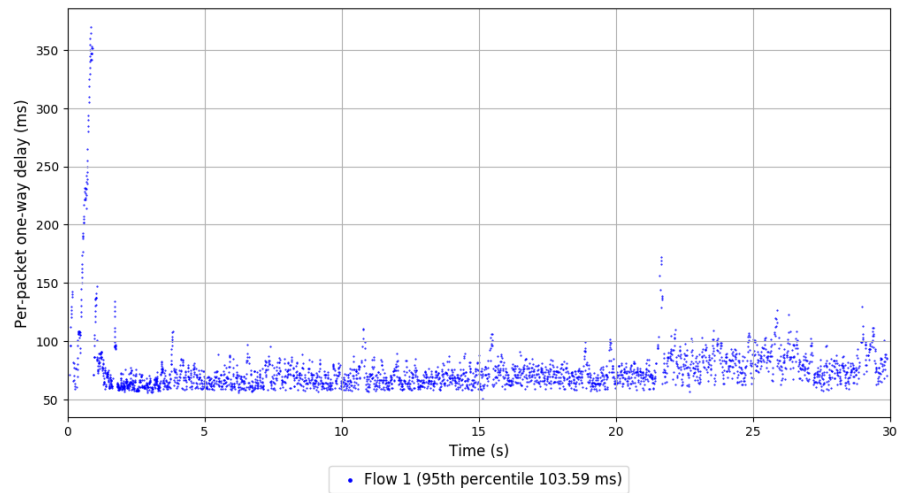
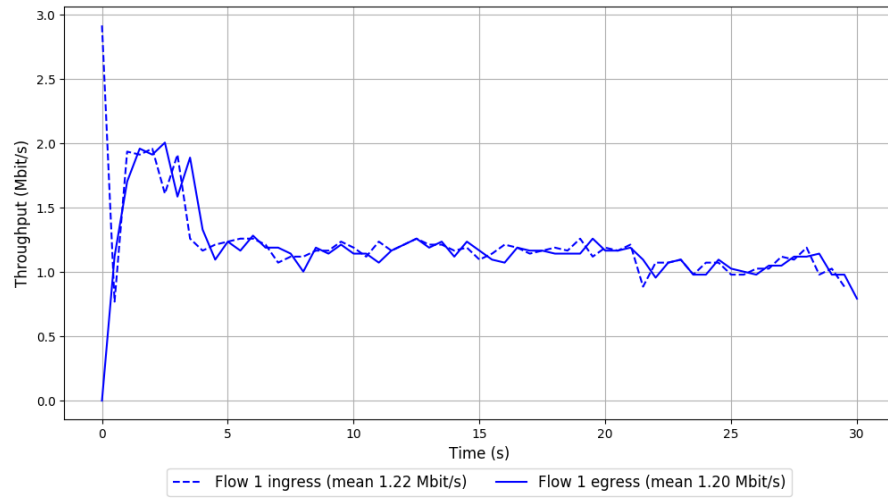


Run 2: Statistics of Indigo-Muses

Start at: 2018-12-02 08:29:32  
End at: 2018-12-02 08:30:02  
Local clock offset: -0.875 ms  
Remote clock offset: -0.802 ms

# Below is generated by plot.py at 2018-12-02 09:00:01  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.20 Mbit/s  
95th percentile per-packet one-way delay: 103.592 ms  
Loss rate: 2.13%  
-- Flow 1:  
Average throughput: 1.20 Mbit/s  
95th percentile per-packet one-way delay: 103.592 ms  
Loss rate: 2.13%

## Run 2: Report of Indigo-Muses — Data Link



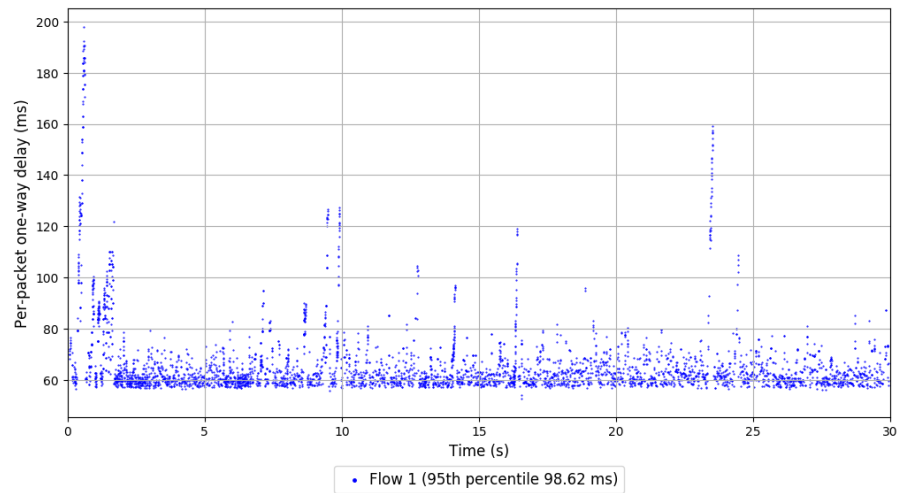
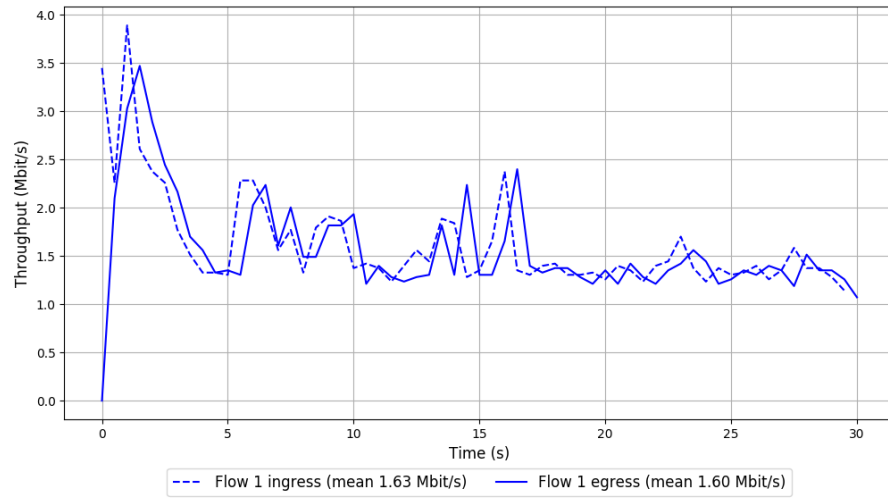


Run 3: Statistics of Indigo-Muses

Start at: 2018-12-02 08:50:20  
End at: 2018-12-02 08:50:50  
Local clock offset: 0.887 ms  
Remote clock offset: -2.084 ms

# Below is generated by plot.py at 2018-12-02 09:00:01  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.60 Mbit/s  
95th percentile per-packet one-way delay: 98.621 ms  
Loss rate: 2.39%  
-- Flow 1:  
Average throughput: 1.60 Mbit/s  
95th percentile per-packet one-way delay: 98.621 ms  
Loss rate: 2.39%

### Run 3: Report of Indigo-Muses — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2018-12-02 08:00:58

End at: 2018-12-02 08:01:28

Local clock offset: 1.277 ms

Remote clock offset: -1.266 ms

# Below is generated by plot.py at 2018-12-02 09:00:02

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.20 Mbit/s

95th percentile per-packet one-way delay: 369.295 ms

Loss rate: 46.09%

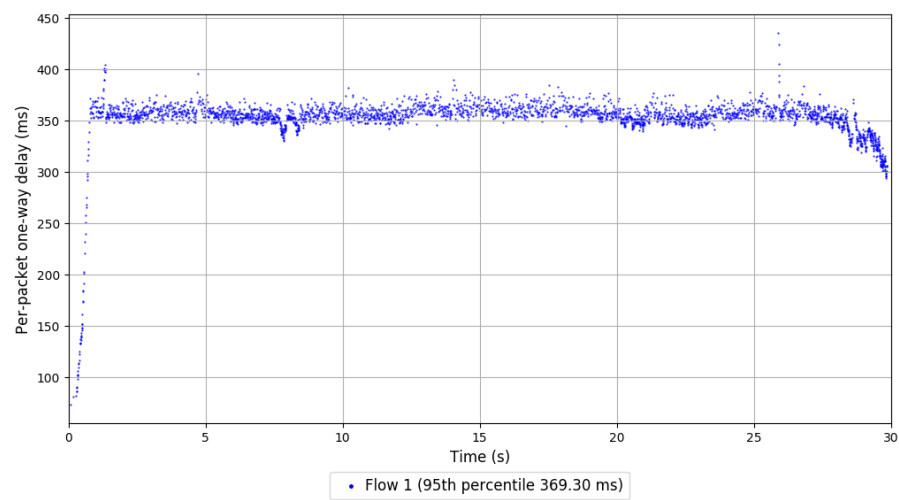
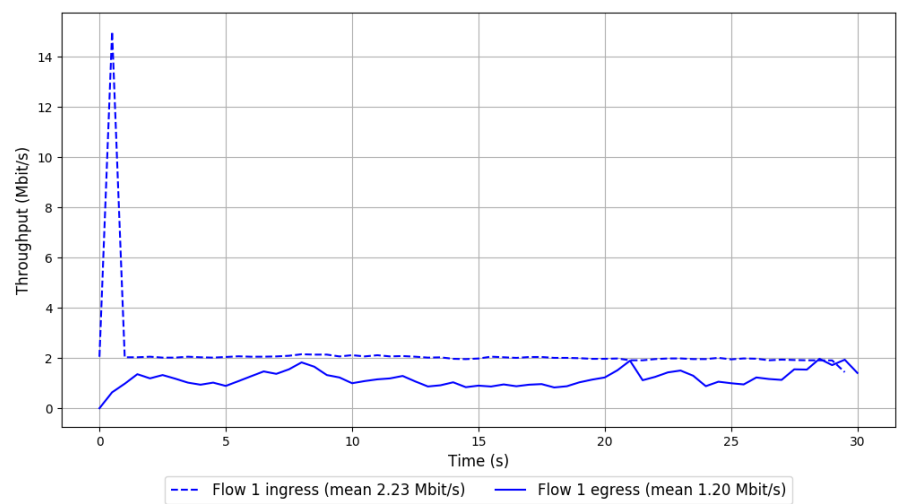
-- Flow 1:

Average throughput: 1.20 Mbit/s

95th percentile per-packet one-way delay: 369.295 ms

Loss rate: 46.09%

Run 1: Report of PCC-Allegro — Data Link

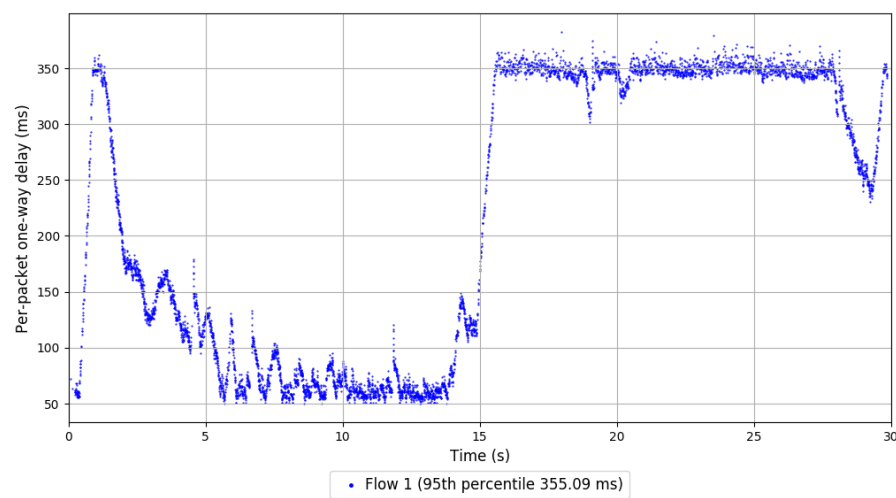
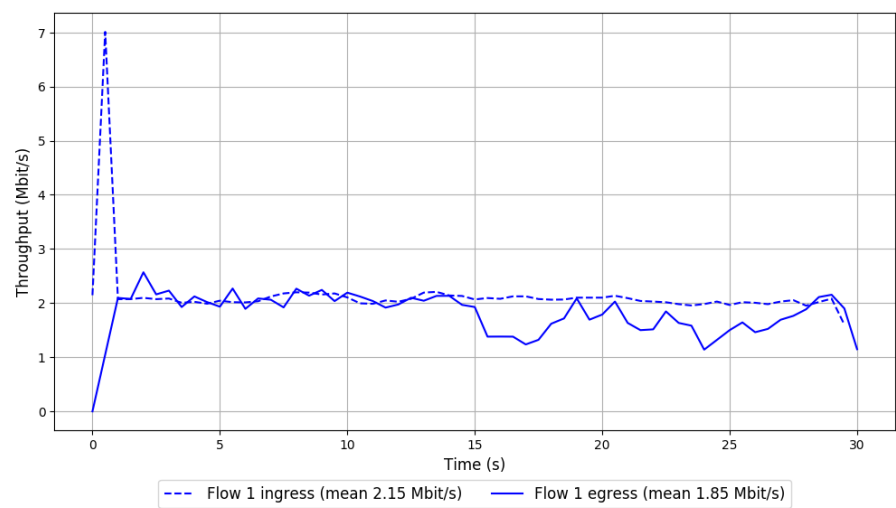


Run 2: Statistics of PCC-Allegro

Start at: 2018-12-02 08:21:51  
End at: 2018-12-02 08:22:21  
Local clock offset: 3.959 ms  
Remote clock offset: -0.275 ms

# Below is generated by plot.py at 2018-12-02 09:00:03  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.85 Mbit/s  
95th percentile per-packet one-way delay: 355.089 ms  
Loss rate: 14.27%  
-- Flow 1:  
Average throughput: 1.85 Mbit/s  
95th percentile per-packet one-way delay: 355.089 ms  
Loss rate: 14.27%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-12-02 08:42:40

End at: 2018-12-02 08:43:10

Local clock offset: -0.65 ms

Remote clock offset: -1.698 ms

# Below is generated by plot.py at 2018-12-02 09:00:09

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.86 Mbit/s

95th percentile per-packet one-way delay: 485.815 ms

Loss rate: 78.88%

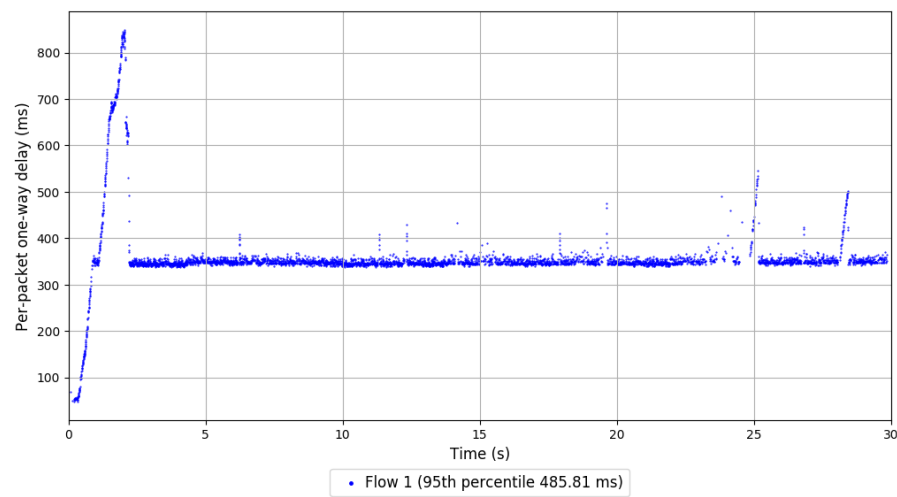
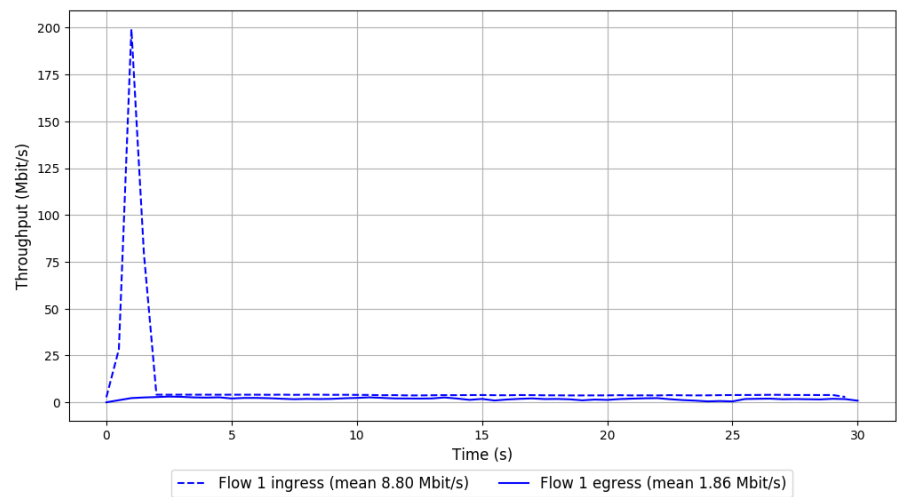
-- Flow 1:

Average throughput: 1.86 Mbit/s

95th percentile per-packet one-way delay: 485.815 ms

Loss rate: 78.88%

Run 3: Report of PCC-Allegro — Data Link



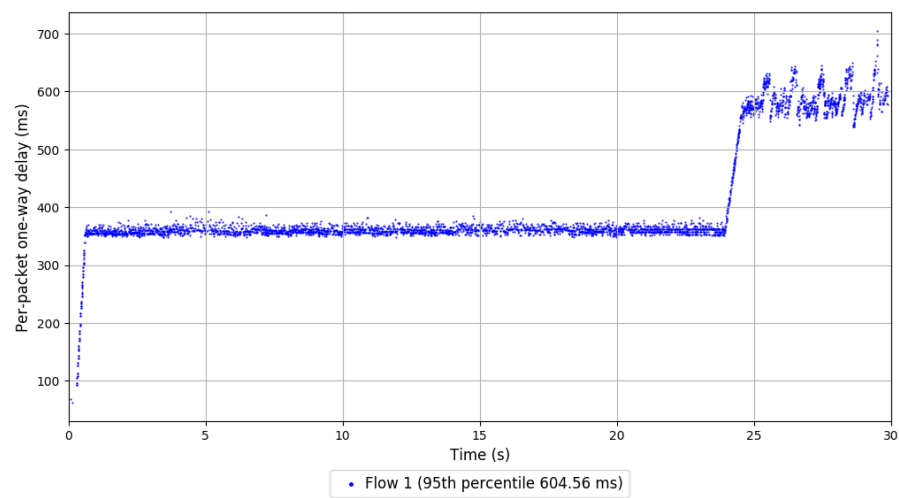
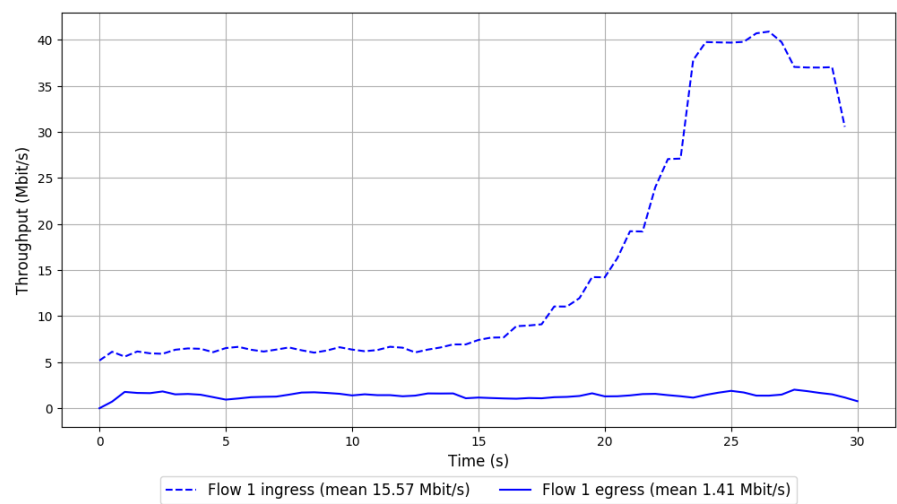


```
Run 1: Statistics of PCC-Expr

Start at: 2018-12-02 08:05:21
End at: 2018-12-02 08:05:51
Local clock offset: 4.626 ms
Remote clock offset: 0.24 ms

# Below is generated by plot.py at 2018-12-02 09:00:21
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 604.556 ms
Loss rate: 90.95%
-- Flow 1:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 604.556 ms
Loss rate: 90.95%
```

Run 1: Report of PCC-Expr — Data Link

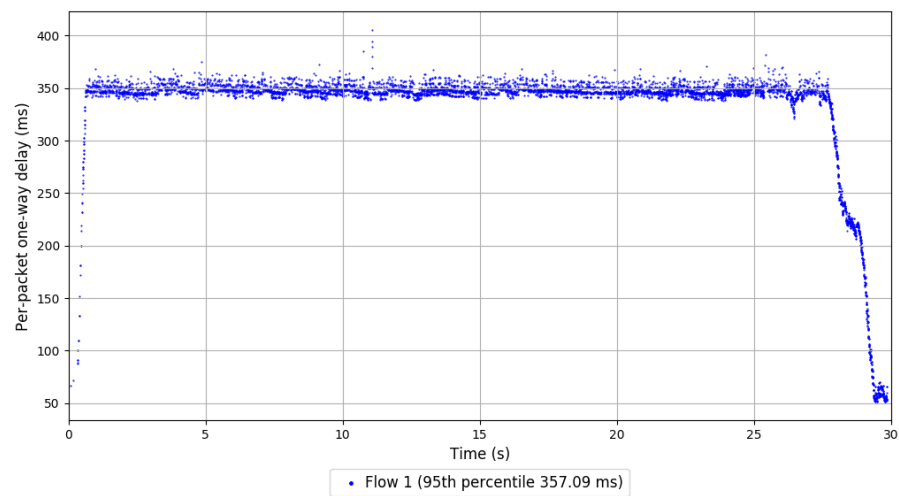
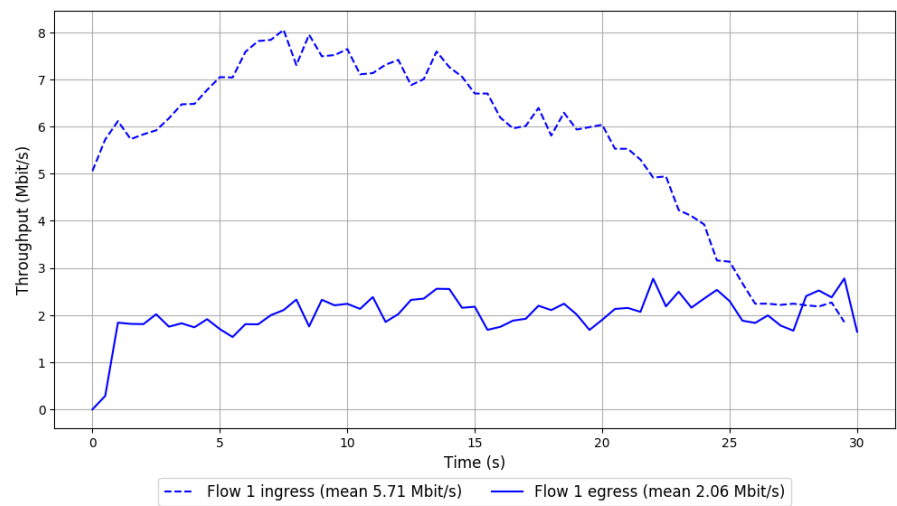


Run 2: Statistics of PCC-Expr

Start at: 2018-12-02 08:26:14  
End at: 2018-12-02 08:26:44  
Local clock offset: -0.341 ms  
Remote clock offset: -1.317 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.06 Mbit/s  
95th percentile per-packet one-way delay: 357.090 ms  
Loss rate: 64.03%  
-- Flow 1:  
Average throughput: 2.06 Mbit/s  
95th percentile per-packet one-way delay: 357.090 ms  
Loss rate: 64.03%

Run 2: Report of PCC-Expr — Data Link

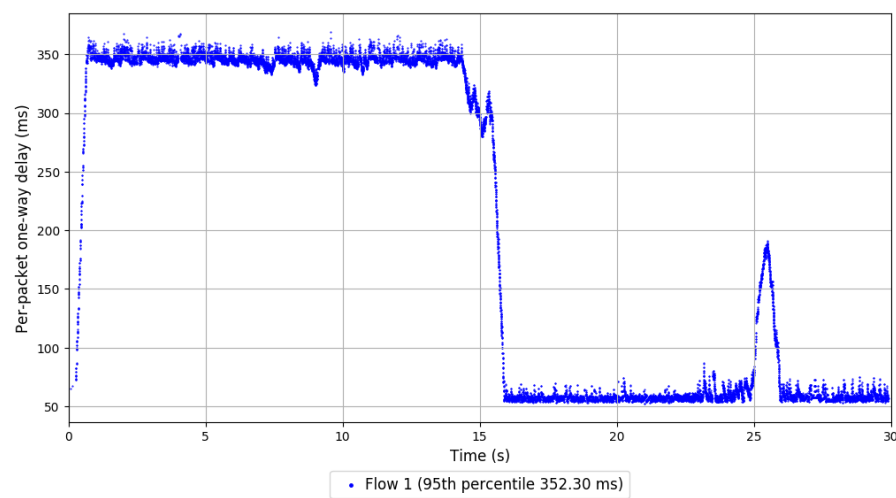
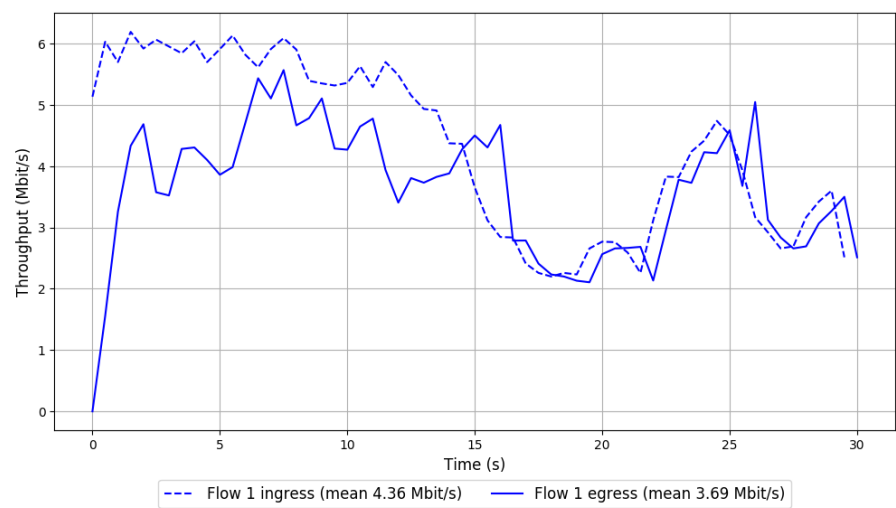


Run 3: Statistics of PCC-Expr

Start at: 2018-12-02 08:47:02  
End at: 2018-12-02 08:47:32  
Local clock offset: 0.062 ms  
Remote clock offset: -2.723 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 3.69 Mbit/s  
95th percentile per-packet one-way delay: 352.303 ms  
Loss rate: 15.49%  
-- Flow 1:  
Average throughput: 3.69 Mbit/s  
95th percentile per-packet one-way delay: 352.303 ms  
Loss rate: 15.49%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-12-02 08:17:26

End at: 2018-12-02 08:17:56

Local clock offset: 1.398 ms

Remote clock offset: -0.816 ms

# Below is generated by plot.py at 2018-12-02 09:00:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 317.891 ms

Loss rate: 1.80%

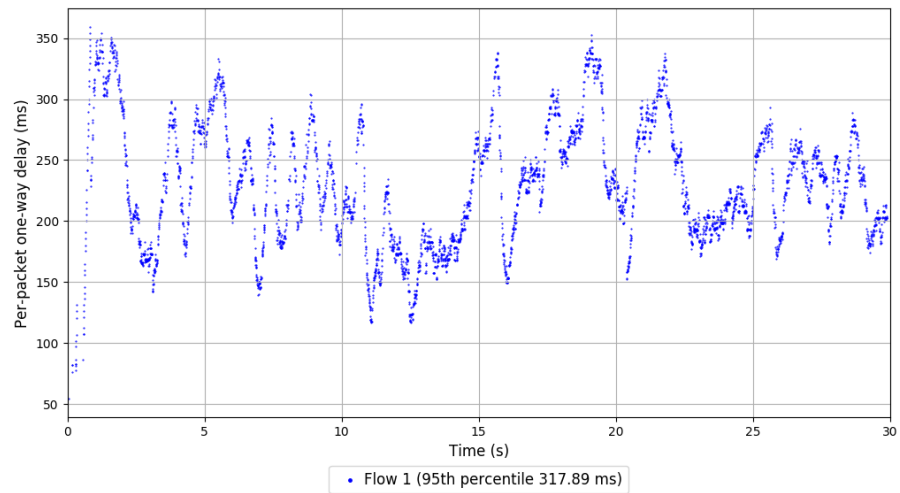
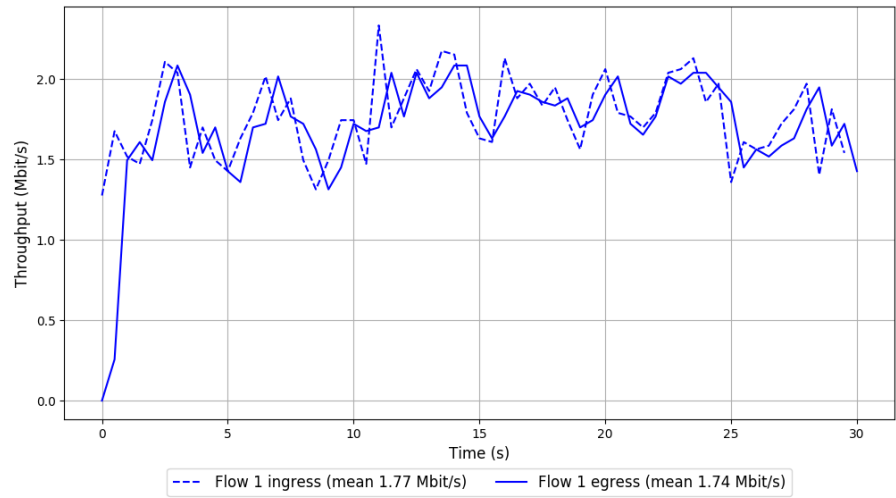
-- Flow 1:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 317.891 ms

Loss rate: 1.80%

### Run 1: Report of QUIC Cubic — Data Link





Run 2: Statistics of QUIC Cubic

Start at: 2018-12-02 08:38:18

End at: 2018-12-02 08:38:48

Local clock offset: -0.719 ms

Remote clock offset: -2.425 ms

# Below is generated by plot.py at 2018-12-02 09:00:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.34 Mbit/s

95th percentile per-packet one-way delay: 339.784 ms

Loss rate: 2.42%

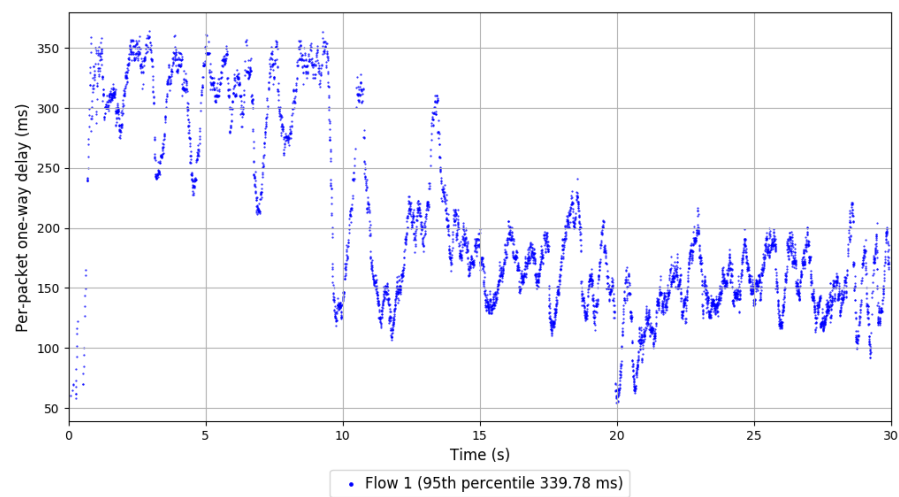
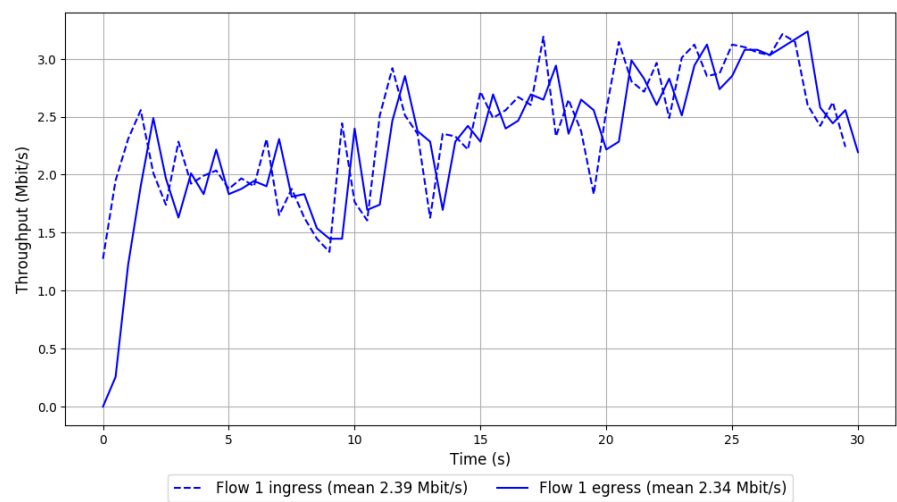
-- Flow 1:

Average throughput: 2.34 Mbit/s

95th percentile per-packet one-way delay: 339.784 ms

Loss rate: 2.42%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-12-02 08:59:05

End at: 2018-12-02 08:59:35

Local clock offset: -7.53 ms

Remote clock offset: -9.264 ms

# Below is generated by plot.py at 2018-12-02 09:00:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 266.693 ms

Loss rate: 2.36%

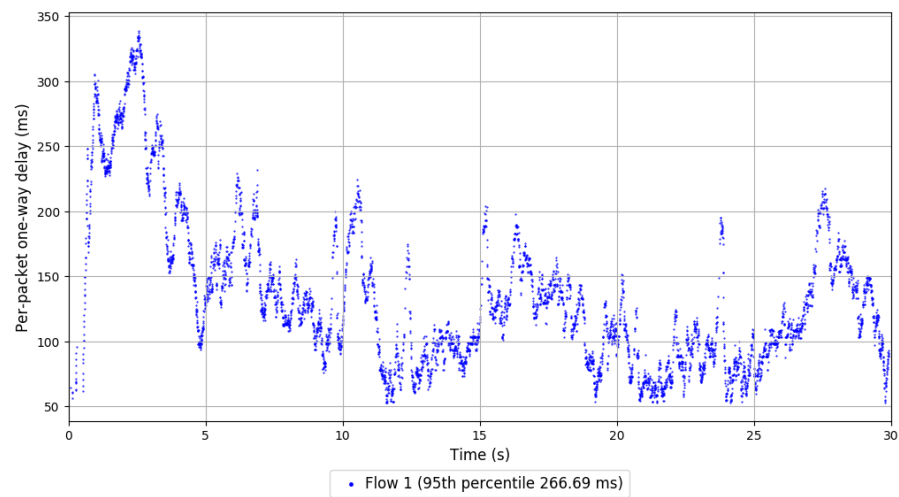
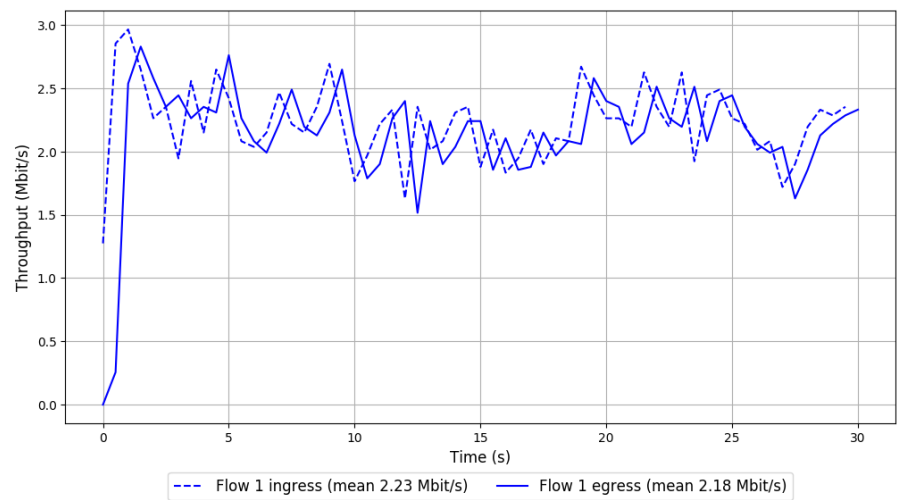
-- Flow 1:

Average throughput: 2.18 Mbit/s

95th percentile per-packet one-way delay: 266.693 ms

Loss rate: 2.36%

Run 3: Report of QUIC Cubic — Data Link

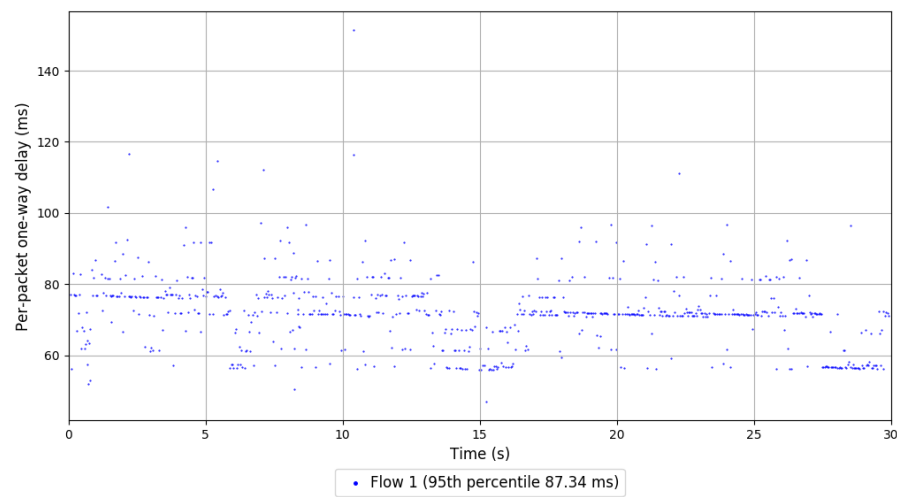
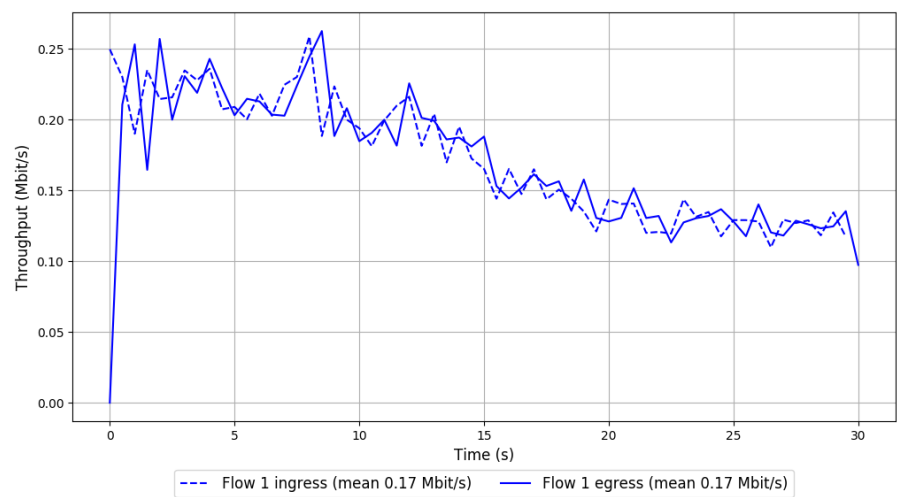


Run 1: Statistics of SCReAM

Start at: 2018-12-02 08:02:04  
End at: 2018-12-02 08:02:34  
Local clock offset: 4.718 ms  
Remote clock offset: -0.141 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.17 Mbit/s  
95th percentile per-packet one-way delay: 87.339 ms  
Loss rate: 0.57%  
-- Flow 1:  
Average throughput: 0.17 Mbit/s  
95th percentile per-packet one-way delay: 87.339 ms  
Loss rate: 0.57%

Run 1: Report of SReAM — Data Link

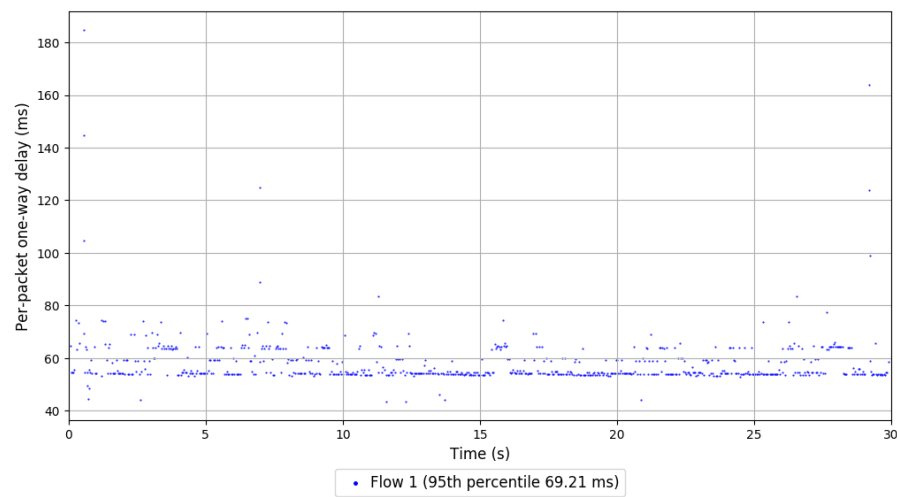
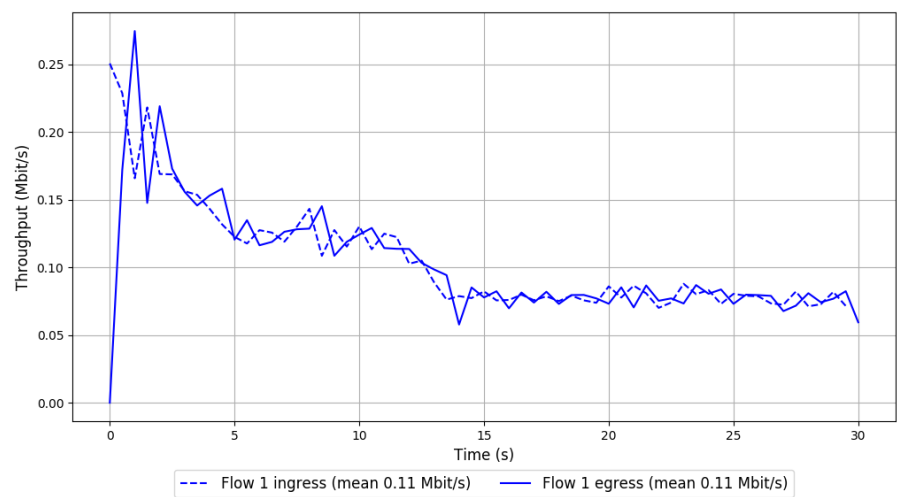


Run 2: Statistics of SReAM

Start at: 2018-12-02 08:22:57  
End at: 2018-12-02 08:23:27  
Local clock offset: 2.009 ms  
Remote clock offset: -0.204 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 69.214 ms  
Loss rate: 1.65%  
-- Flow 1:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 69.214 ms  
Loss rate: 1.65%

Run 2: Report of SReAM — Data Link





Run 3: Statistics of SCReAM

Start at: 2018-12-02 08:43:46

End at: 2018-12-02 08:44:16

Local clock offset: 0.641 ms

Remote clock offset: -1.89 ms

# Below is generated by plot.py at 2018-12-02 09:00:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 66.173 ms

Loss rate: 1.90%

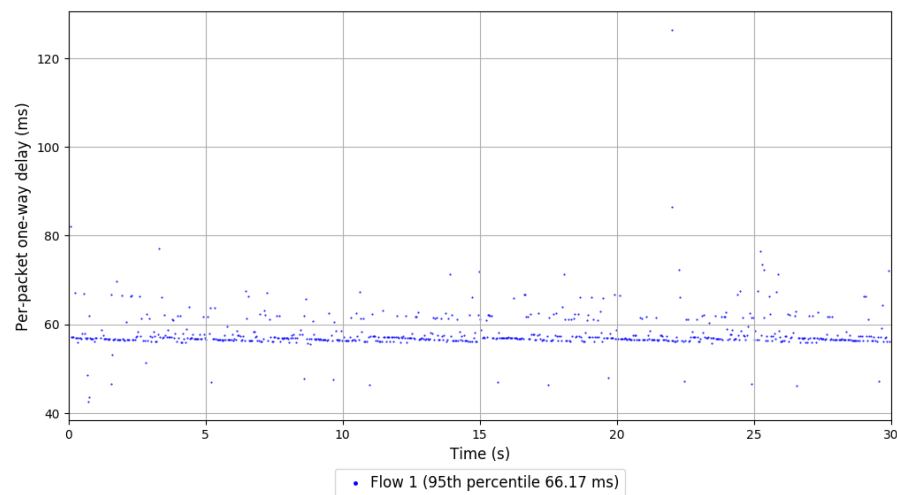
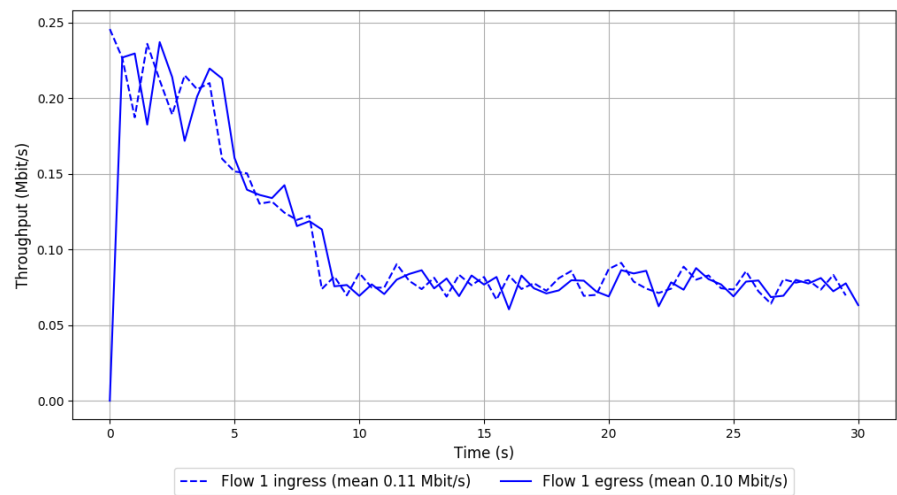
-- Flow 1:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 66.173 ms

Loss rate: 1.90%

Run 3: Report of SReAM — Data Link

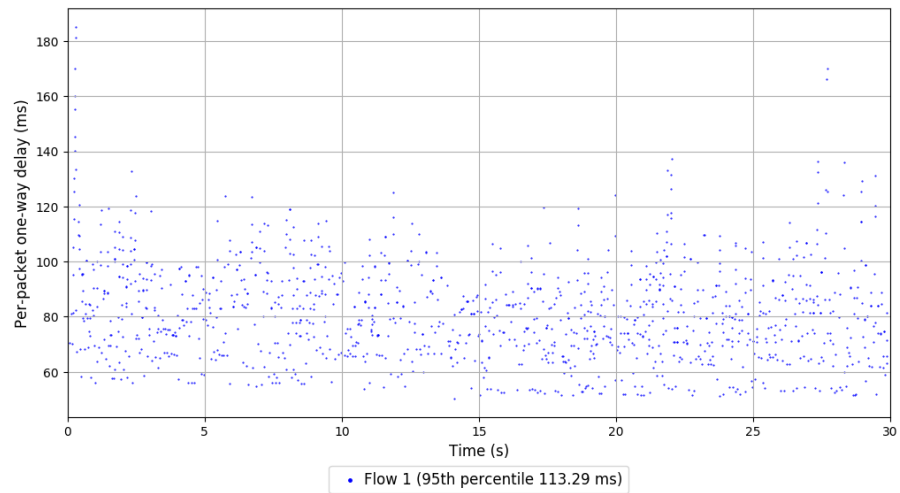
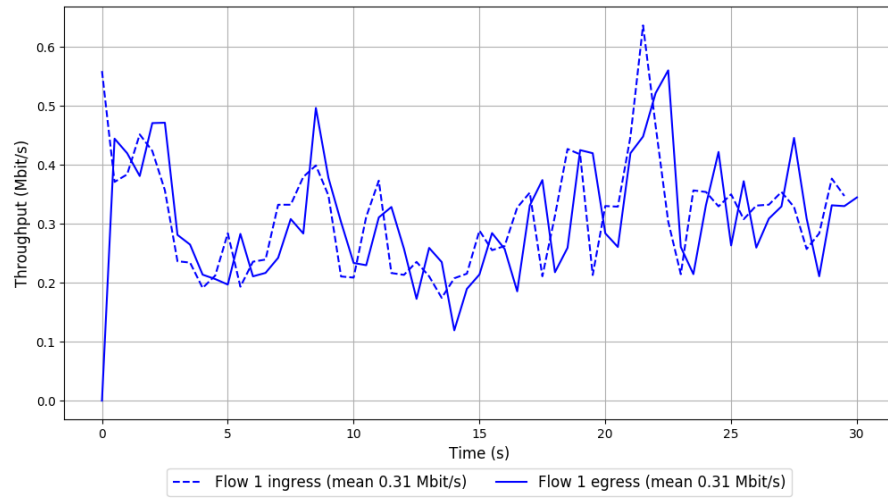


Run 1: Statistics of Sprout

Start at: 2018-12-02 08:10:51  
End at: 2018-12-02 08:11:21  
Local clock offset: 4.725 ms  
Remote clock offset: -1.328 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.31 Mbit/s  
95th percentile per-packet one-way delay: 113.294 ms  
Loss rate: 1.29%  
-- Flow 1:  
Average throughput: 0.31 Mbit/s  
95th percentile per-packet one-way delay: 113.294 ms  
Loss rate: 1.29%

## Run 1: Report of Sprout — Data Link

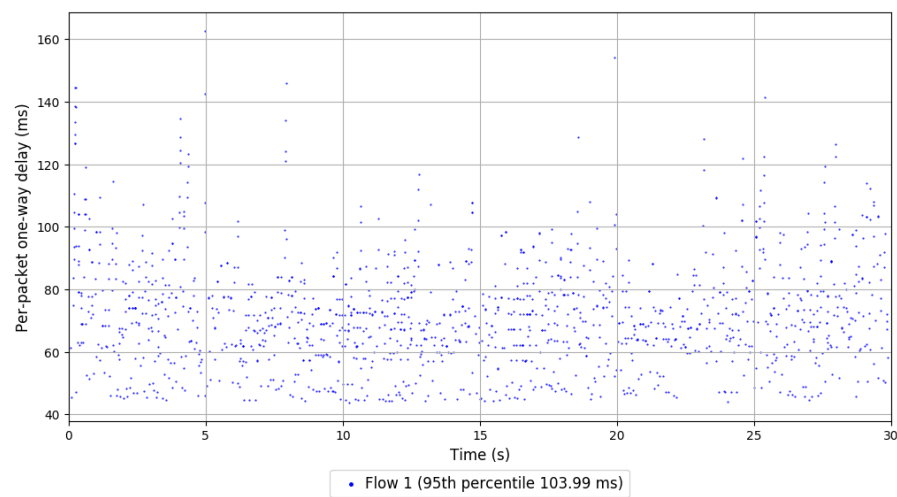
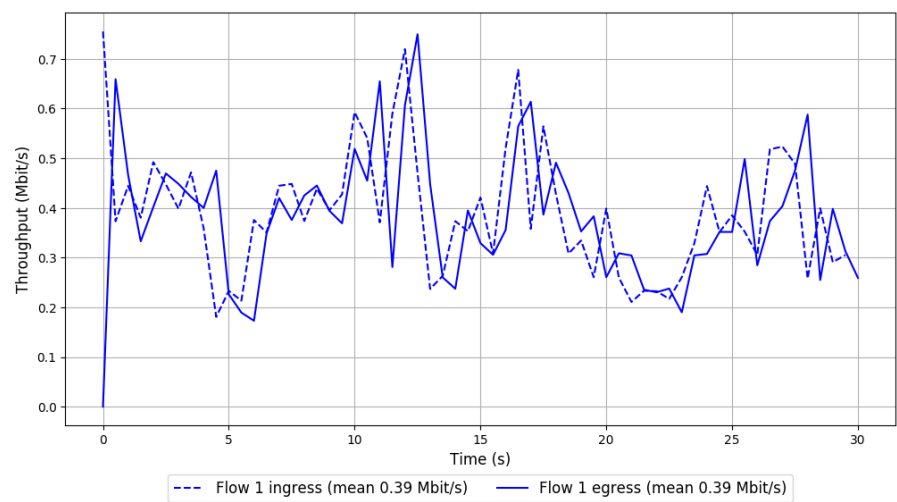


Run 2: Statistics of Sprout

Start at: 2018-12-02 08:31:43  
End at: 2018-12-02 08:32:13  
Local clock offset: 1.013 ms  
Remote clock offset: -0.614 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.39 Mbit/s  
95th percentile per-packet one-way delay: 103.991 ms  
Loss rate: 1.15%  
-- Flow 1:  
Average throughput: 0.39 Mbit/s  
95th percentile per-packet one-way delay: 103.991 ms  
Loss rate: 1.15%

Run 2: Report of Sprout — Data Link

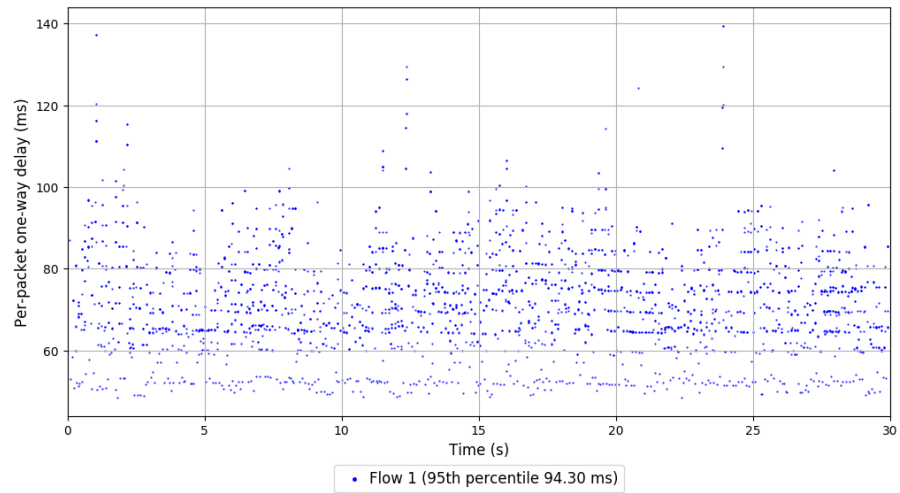
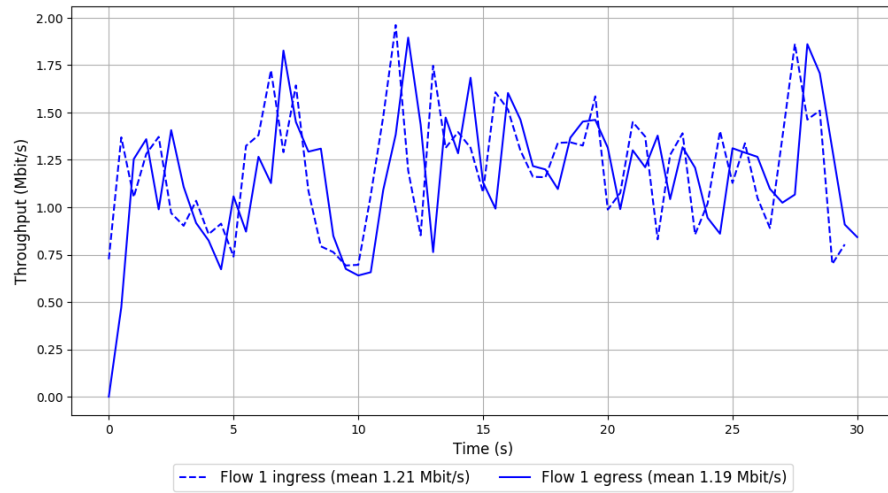


Run 3: Statistics of Sprout

Start at: 2018-12-02 08:52:31  
End at: 2018-12-02 08:53:01  
Local clock offset: -0.337 ms  
Remote clock offset: -1.921 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.19 Mbit/s  
95th percentile per-packet one-way delay: 94.301 ms  
Loss rate: 1.18%  
-- Flow 1:  
Average throughput: 1.19 Mbit/s  
95th percentile per-packet one-way delay: 94.301 ms  
Loss rate: 1.18%

### Run 3: Report of Sprout — Data Link





Run 1: Statistics of TaoVA-100x

Start at: 2018-12-02 07:58:46

End at: 2018-12-02 07:59:16

Local clock offset: 1.199 ms

Remote clock offset: -0.848 ms

# Below is generated by plot.py at 2018-12-02 09:00:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.67 Mbit/s

95th percentile per-packet one-way delay: 286.719 ms

Loss rate: 2.74%

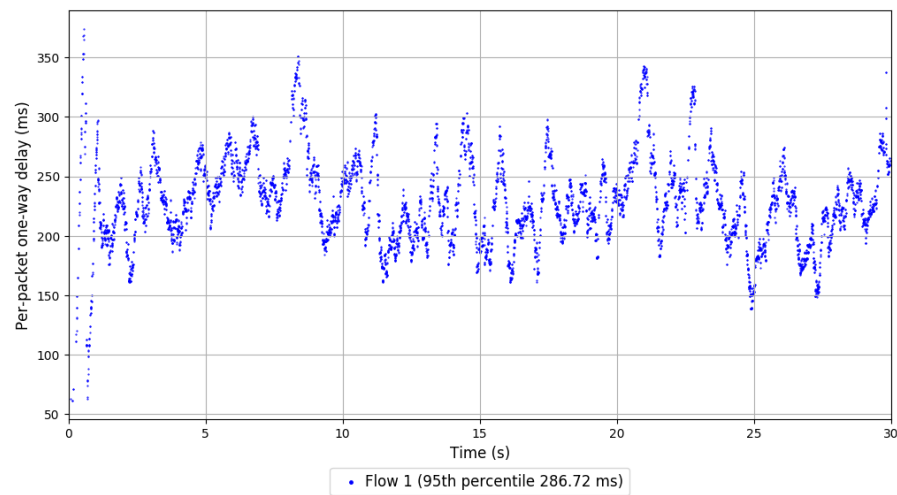
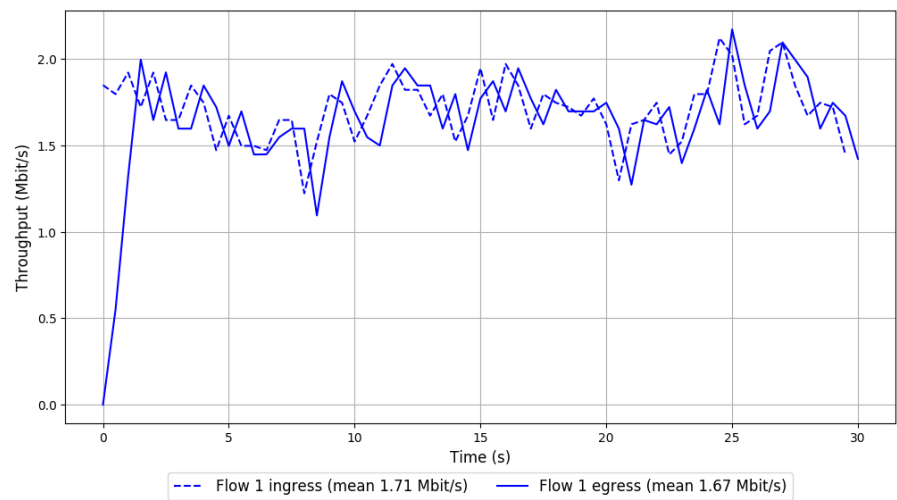
-- Flow 1:

Average throughput: 1.67 Mbit/s

95th percentile per-packet one-way delay: 286.719 ms

Loss rate: 2.74%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-12-02 08:19:38

End at: 2018-12-02 08:20:08

Local clock offset: 1.185 ms

Remote clock offset: 0.409 ms

# Below is generated by plot.py at 2018-12-02 09:00:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.11 Mbit/s

95th percentile per-packet one-way delay: 249.620 ms

Loss rate: 1.60%

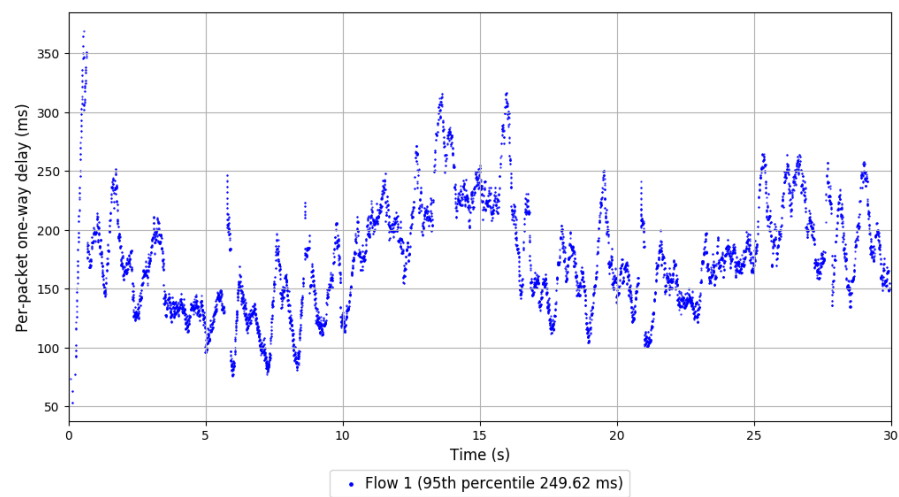
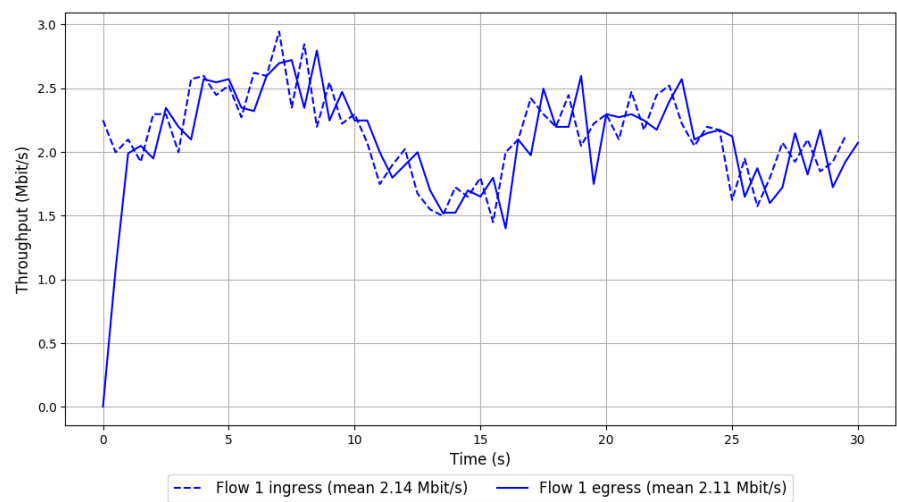
-- Flow 1:

Average throughput: 2.11 Mbit/s

95th percentile per-packet one-way delay: 249.620 ms

Loss rate: 1.60%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-12-02 08:40:29

End at: 2018-12-02 08:40:59

Local clock offset: 1.387 ms

Remote clock offset: -2.404 ms

# Below is generated by plot.py at 2018-12-02 09:00:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.43 Mbit/s

95th percentile per-packet one-way delay: 224.463 ms

Loss rate: 5.57%

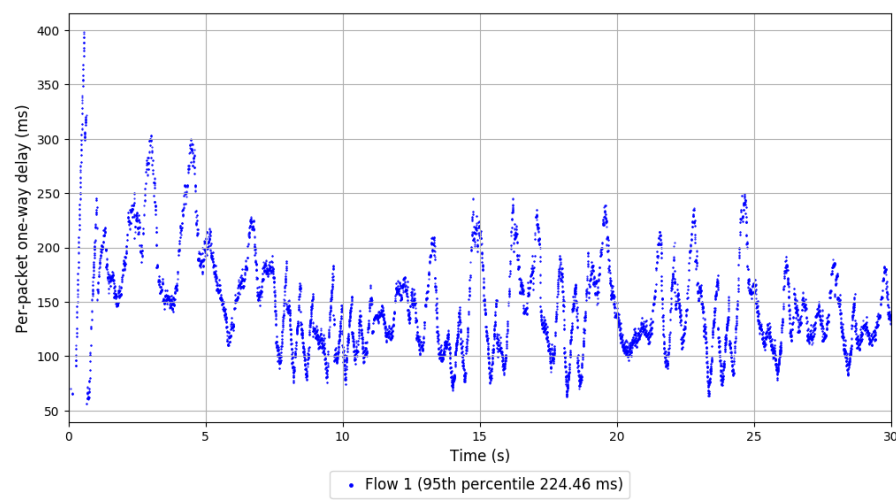
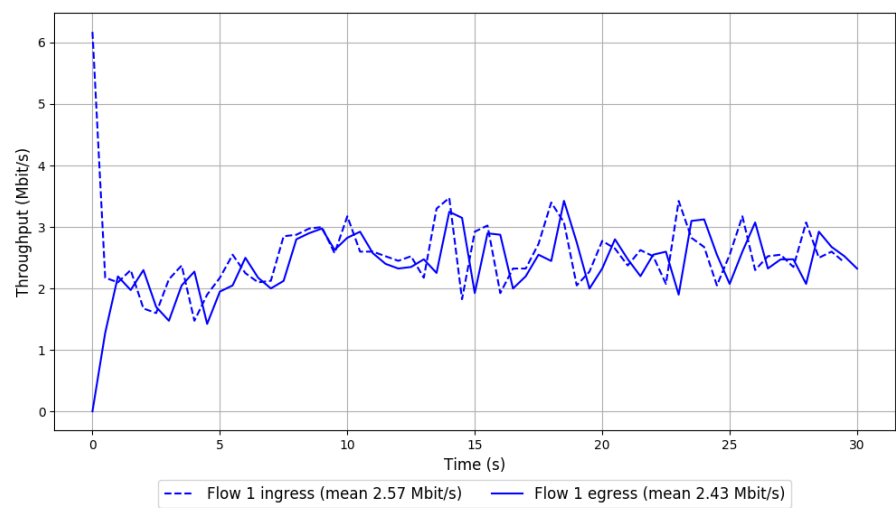
-- Flow 1:

Average throughput: 2.43 Mbit/s

95th percentile per-packet one-way delay: 224.463 ms

Loss rate: 5.57%

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

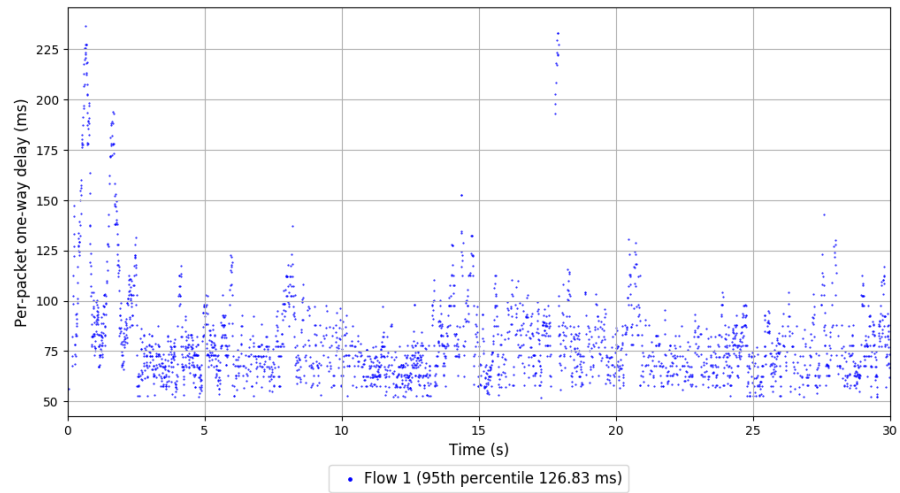
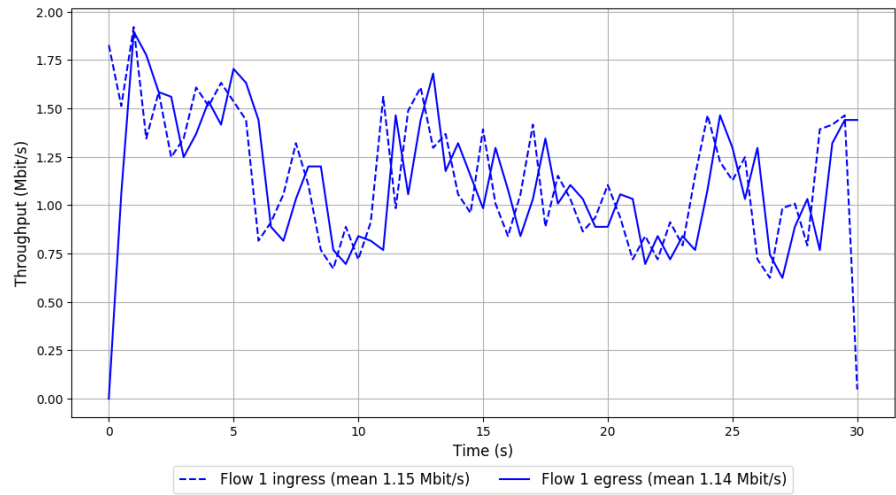


Run 1: Statistics of TCP Vegas

Start at: 2018-12-02 08:11:57  
End at: 2018-12-02 08:12:27  
Local clock offset: 4.441 ms  
Remote clock offset: -0.178 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.14 Mbit/s  
95th percentile per-packet one-way delay: 126.829 ms  
Loss rate: 1.25%  
-- Flow 1:  
Average throughput: 1.14 Mbit/s  
95th percentile per-packet one-way delay: 126.829 ms  
Loss rate: 1.25%

### Run 1: Report of TCP Vegas — Data Link



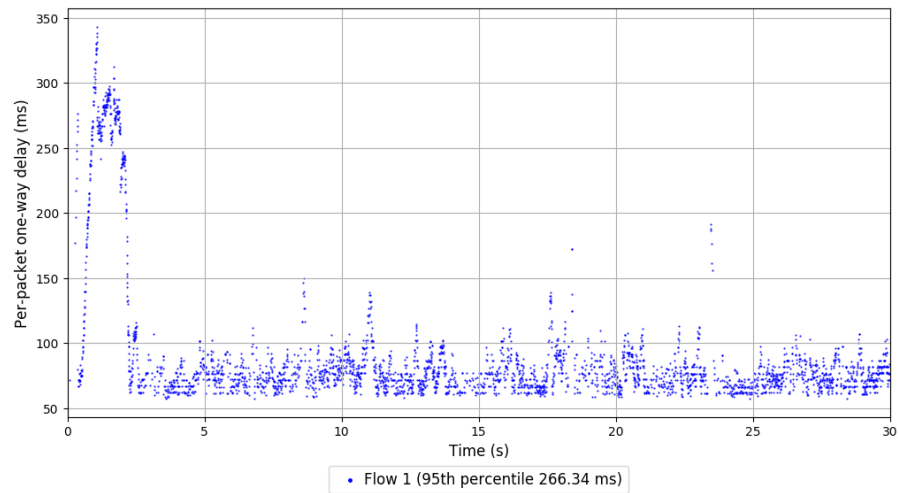
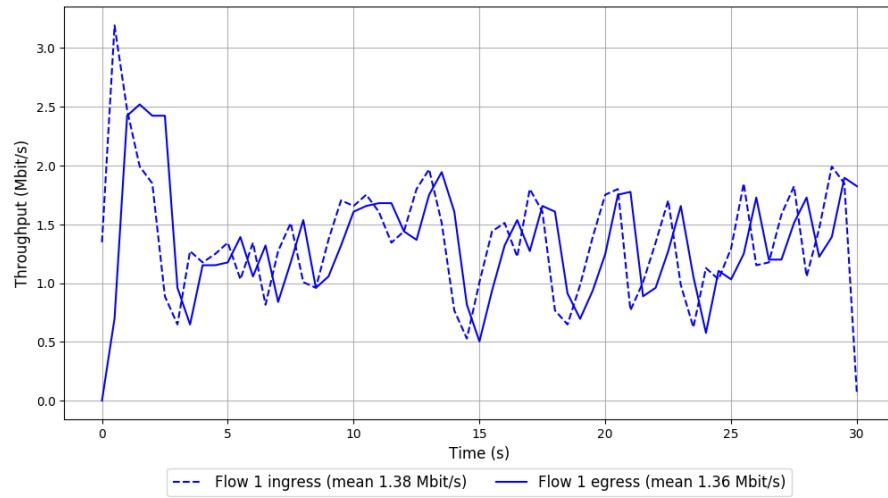


Run 2: Statistics of TCP Vegas

Start at: 2018-12-02 08:32:49  
End at: 2018-12-02 08:33:19  
Local clock offset: -0.76 ms  
Remote clock offset: -1.578 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.36 Mbit/s  
95th percentile per-packet one-way delay: 266.342 ms  
Loss rate: 1.45%  
-- Flow 1:  
Average throughput: 1.36 Mbit/s  
95th percentile per-packet one-way delay: 266.342 ms  
Loss rate: 1.45%

## Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2018-12-02 08:53:36

End at: 2018-12-02 08:54:06

Local clock offset: 1.995 ms

Remote clock offset: -2.48 ms

# Below is generated by plot.py at 2018-12-02 09:00:21

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.81 Mbit/s

95th percentile per-packet one-way delay: 112.127 ms

Loss rate: 2.72%

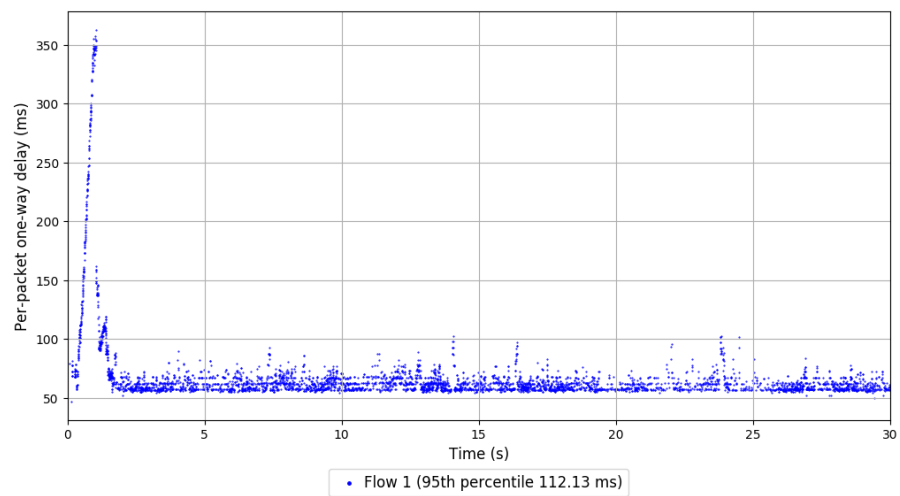
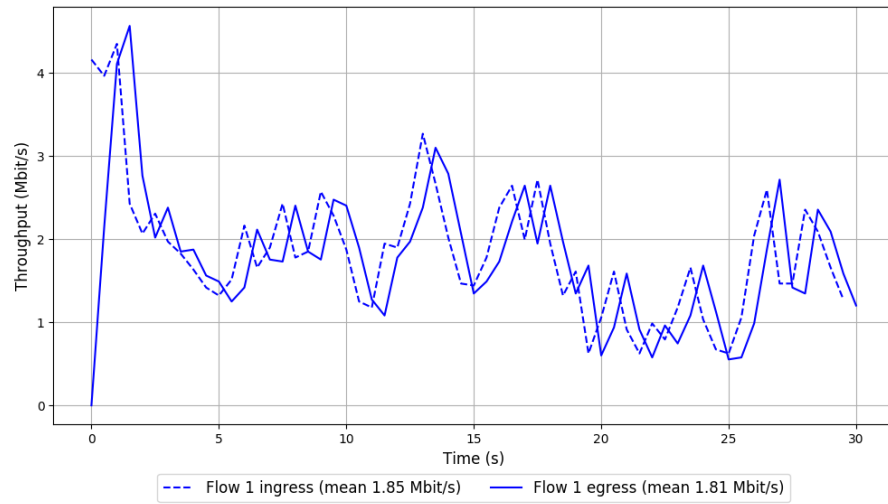
-- Flow 1:

Average throughput: 1.81 Mbit/s

95th percentile per-packet one-way delay: 112.127 ms

Loss rate: 2.72%

### Run 3: Report of TCP Vegas — Data Link

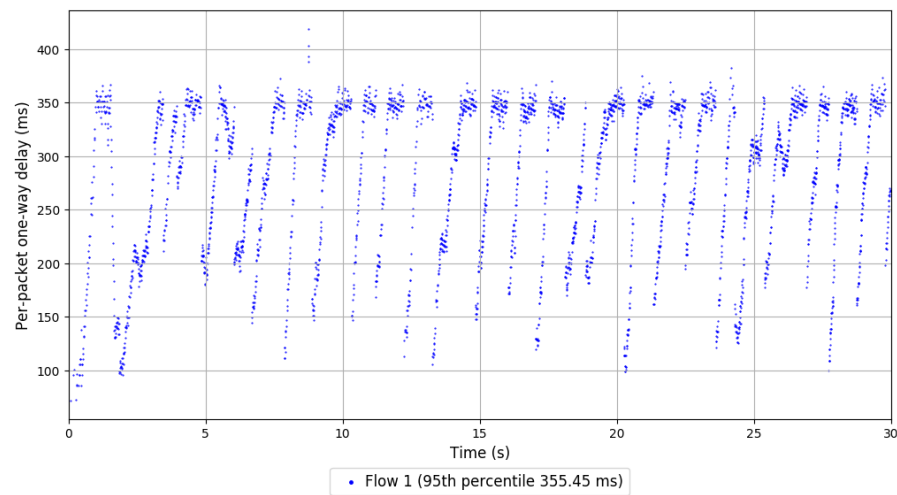
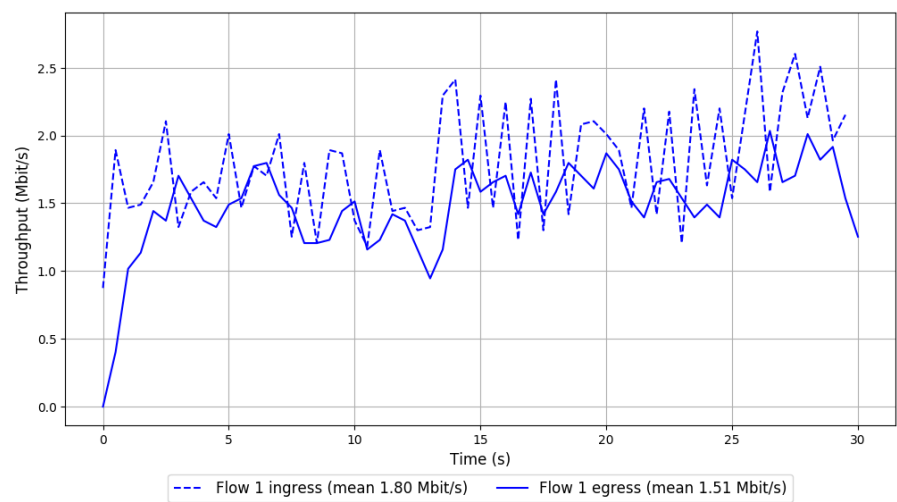


Run 1: Statistics of Verus

Start at: 2018-12-02 08:06:28  
End at: 2018-12-02 08:06:58  
Local clock offset: 3.899 ms  
Remote clock offset: -1.161 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.51 Mbit/s  
95th percentile per-packet one-way delay: 355.448 ms  
Loss rate: 15.97%  
-- Flow 1:  
Average throughput: 1.51 Mbit/s  
95th percentile per-packet one-way delay: 355.448 ms  
Loss rate: 15.97%

Run 1: Report of Verus — Data Link

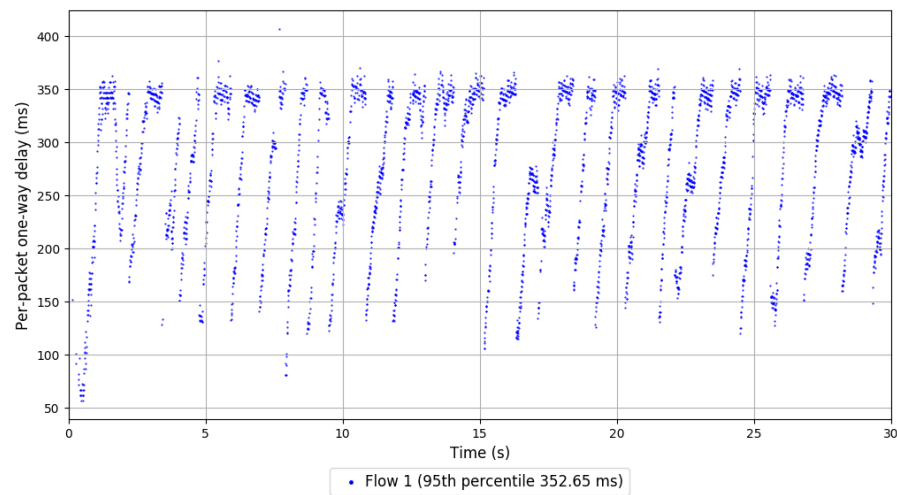
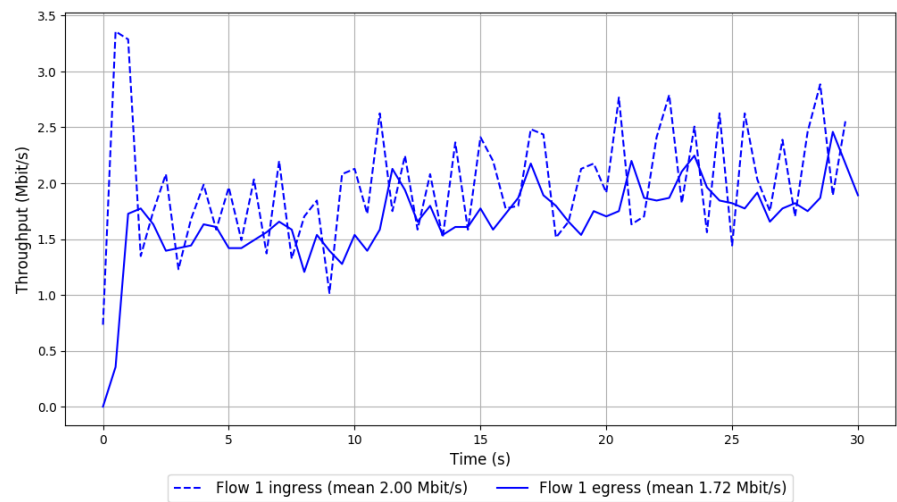


Run 2: Statistics of Verus

Start at: 2018-12-02 08:27:20  
End at: 2018-12-02 08:27:50  
Local clock offset: -0.279 ms  
Remote clock offset: -1.256 ms

# Below is generated by plot.py at 2018-12-02 09:00:21  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.72 Mbit/s  
95th percentile per-packet one-way delay: 352.647 ms  
Loss rate: 14.48%  
-- Flow 1:  
Average throughput: 1.72 Mbit/s  
95th percentile per-packet one-way delay: 352.647 ms  
Loss rate: 14.48%

Run 2: Report of Verus — Data Link



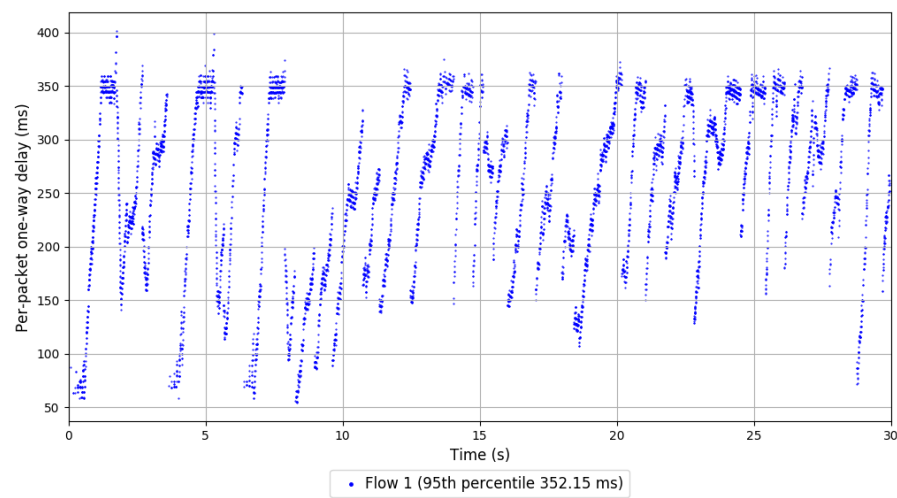
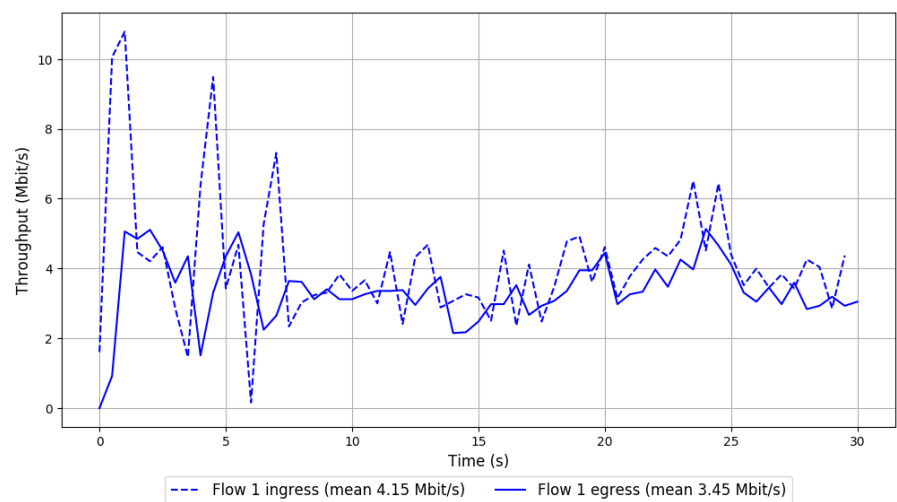


Run 3: Statistics of Verus

Start at: 2018-12-02 08:48:08  
End at: 2018-12-02 08:48:38  
Local clock offset: 1.702 ms  
Remote clock offset: -1.967 ms

# Below is generated by plot.py at 2018-12-02 09:00:23  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 3.45 Mbit/s  
95th percentile per-packet one-way delay: 352.155 ms  
Loss rate: 17.18%  
-- Flow 1:  
Average throughput: 3.45 Mbit/s  
95th percentile per-packet one-way delay: 352.155 ms  
Loss rate: 17.18%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2018-12-02 08:07:34

End at: 2018-12-02 08:08:04

Local clock offset: 2.953 ms

Remote clock offset: 0.427 ms

# Below is generated by plot.py at 2018-12-02 09:00:23

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 354.365 ms

Loss rate: 7.55%

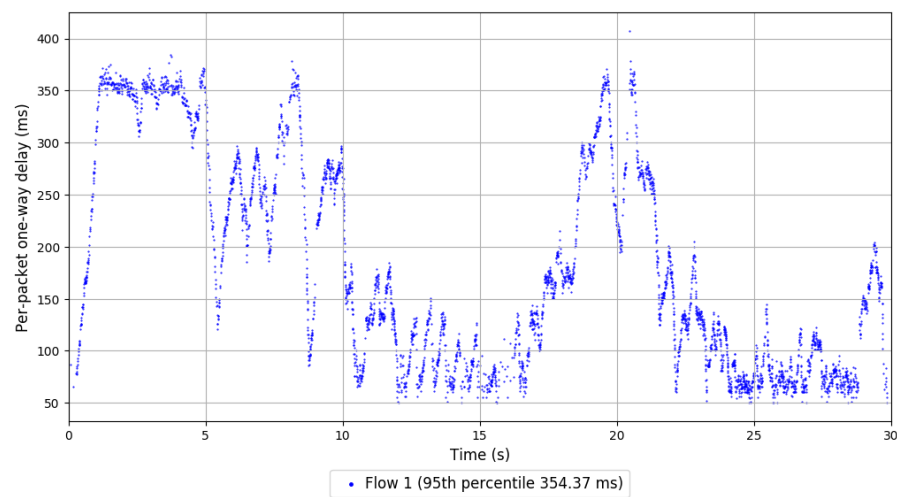
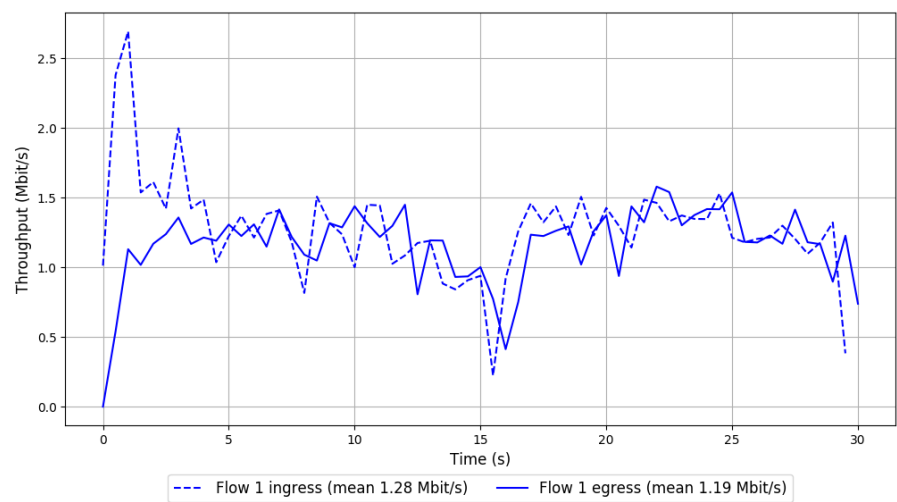
-- Flow 1:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 354.365 ms

Loss rate: 7.55%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-12-02 08:28:26

End at: 2018-12-02 08:28:56

Local clock offset: 1.973 ms

Remote clock offset: -0.058 ms

# Below is generated by plot.py at 2018-12-02 09:00:23

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 324.892 ms

Loss rate: 4.98%

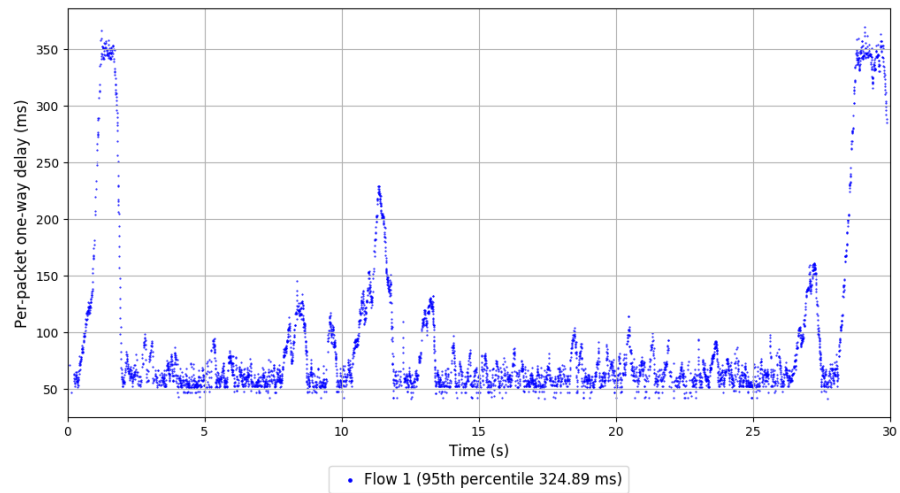
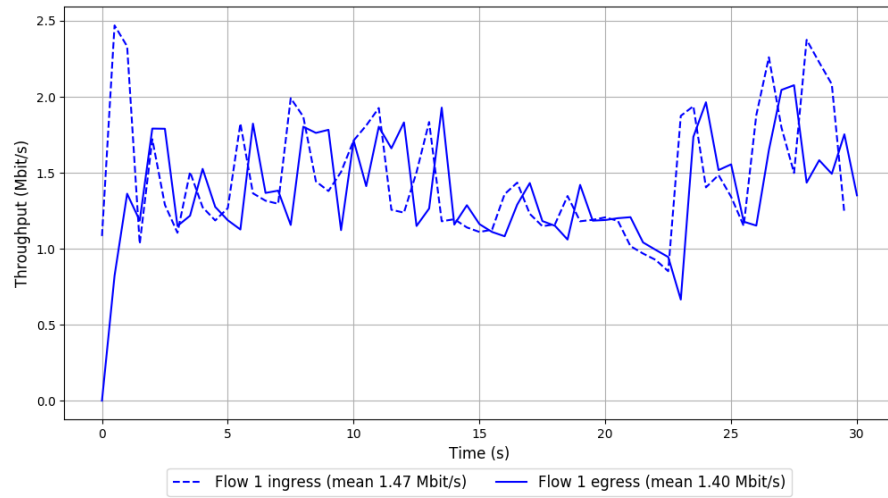
-- Flow 1:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 324.892 ms

Loss rate: 4.98%

## Run 2: Report of PCC-Vivace — Data Link

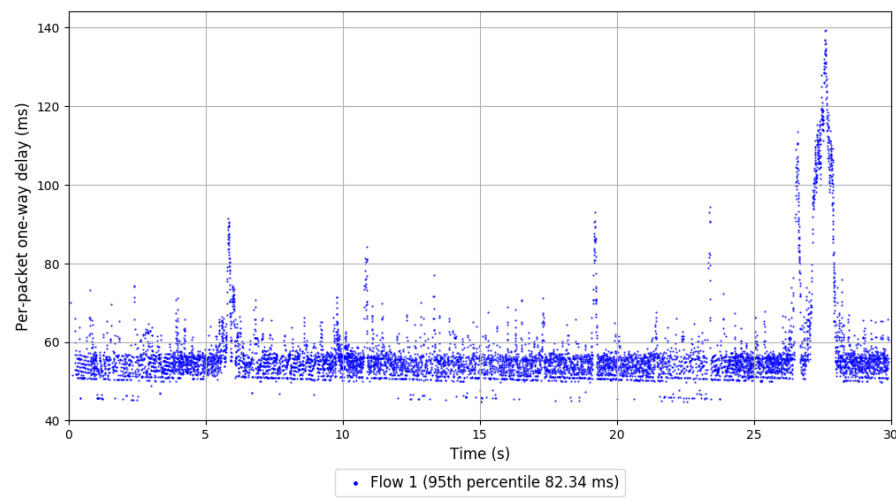
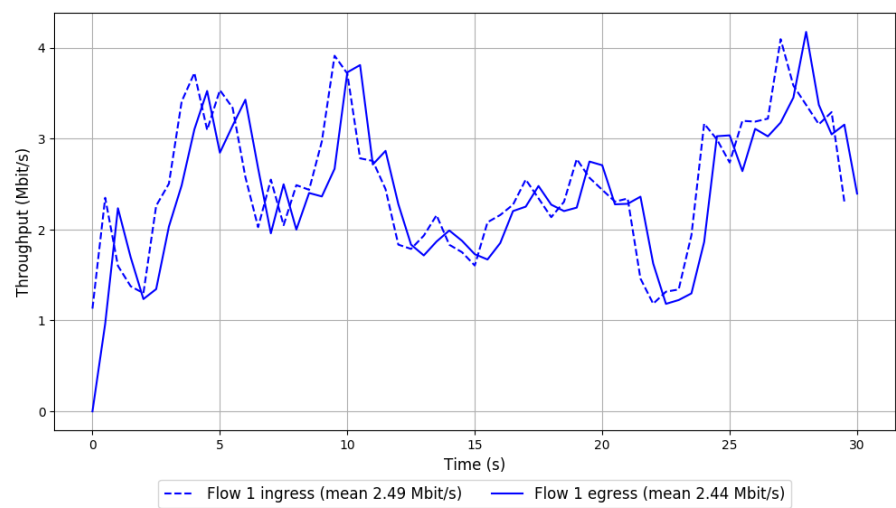


Run 3: Statistics of PCC-Vivace

Start at: 2018-12-02 08:49:13  
End at: 2018-12-02 08:49:43  
Local clock offset: -0.854 ms  
Remote clock offset: -1.896 ms

# Below is generated by plot.py at 2018-12-02 09:00:23  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.44 Mbit/s  
95th percentile per-packet one-way delay: 82.341 ms  
Loss rate: 2.47%  
-- Flow 1:  
Average throughput: 2.44 Mbit/s  
95th percentile per-packet one-way delay: 82.341 ms  
Loss rate: 2.47%

Run 3: Report of PCC-Vivace — Data Link



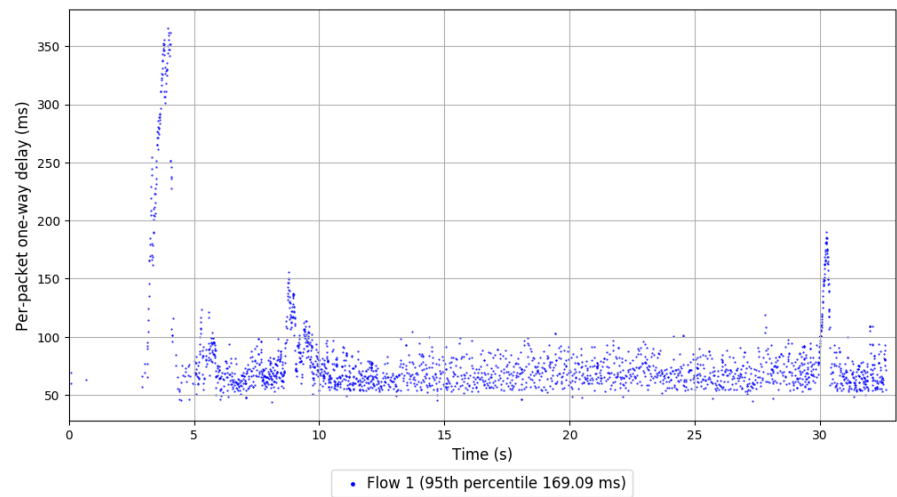
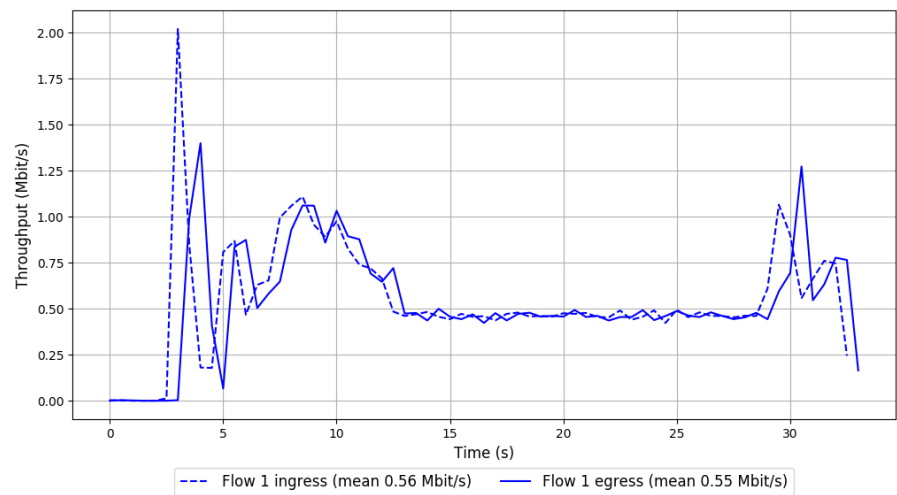


```
Run 1: Statistics of WebRTC media

Start at: 2018-12-02 08:04:15
End at: 2018-12-02 08:04:45
Local clock offset: 1.466 ms
Remote clock offset: -0.801 ms

# Below is generated by plot.py at 2018-12-02 09:00:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 169.095 ms
Loss rate: 1.94%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 169.095 ms
Loss rate: 1.94%
```

Run 1: Report of WebRTC media — Data Link

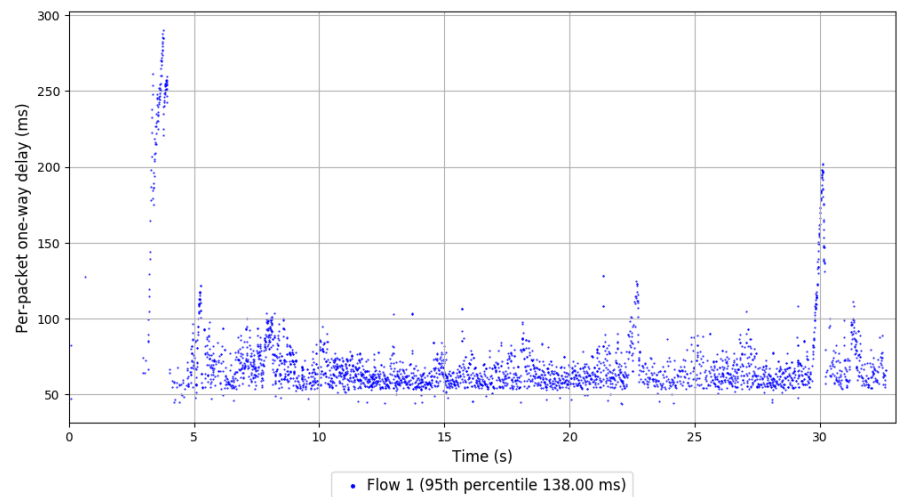
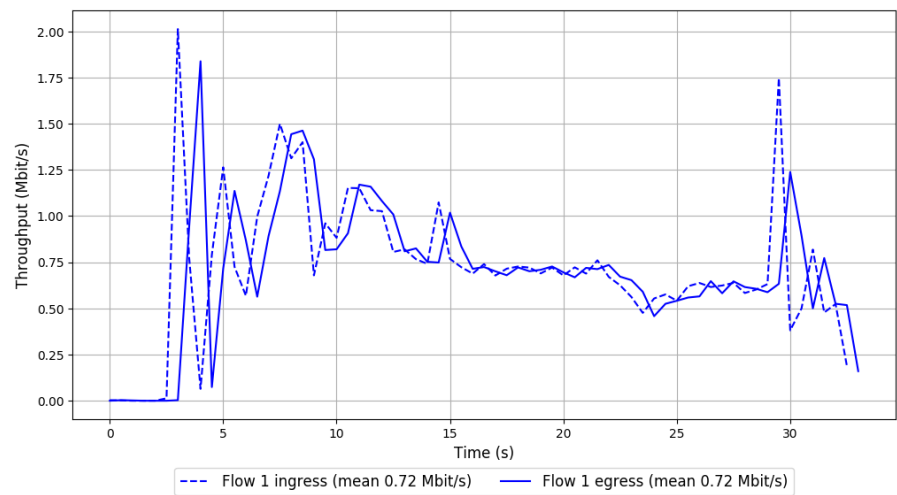


Run 2: Statistics of WebRTC media

Start at: 2018-12-02 08:25:08  
End at: 2018-12-02 08:25:38  
Local clock offset: 3.338 ms  
Remote clock offset: -1.095 ms

# Below is generated by plot.py at 2018-12-02 09:00:23  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.72 Mbit/s  
95th percentile per-packet one-way delay: 138.005 ms  
Loss rate: 0.66%  
-- Flow 1:  
Average throughput: 0.72 Mbit/s  
95th percentile per-packet one-way delay: 138.005 ms  
Loss rate: 0.66%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-12-02 08:45:57  
End at: 2018-12-02 08:46:27  
Local clock offset: -1.104 ms  
Remote clock offset: -2.772 ms

# Below is generated by plot.py at 2018-12-02 09:00:24  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.80 Mbit/s  
95th percentile per-packet one-way delay: 100.157 ms  
Loss rate: 1.34%  
-- Flow 1:  
Average throughput: 2.80 Mbit/s  
95th percentile per-packet one-way delay: 100.157 ms  
Loss rate: 1.34%

Run 3: Report of WebRTC media — Data Link

