

## Pantheon Report

Generated at 2019-05-29 19:27:50 (UTC).

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

Repeated the test of 21 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

### System info:

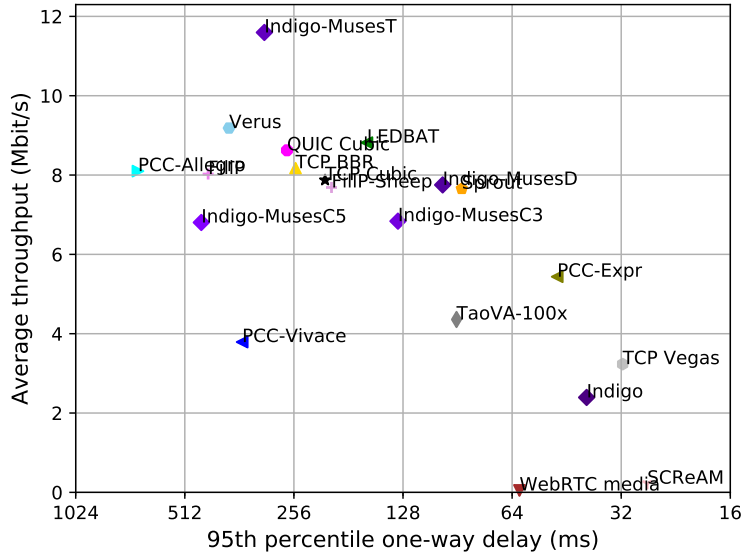
```
Linux 4.15.0-1035-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

### Git summary:

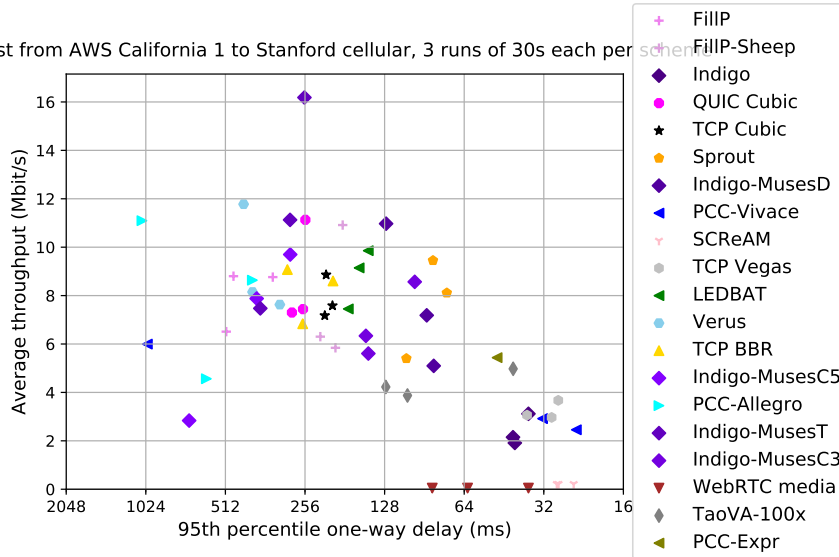
```
branch: muses @ 7a686f7c2ed0a333082c0bab1fa5c921ab47e6ee
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 5ce721187ad823da20955337730c746486ca4966
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 California 1 to Stanford cellular, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



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



scheme	# runs	mean avg tput (Mbit/s)	mean 95th-%ile delay (ms)	mean loss rate (%)
		flow 1	flow 1	flow 1
TCP BBR	3	8.17	253.40	0.36
Copa	0	N/A	N/A	N/A
TCP Cubic	3	7.87	210.02	0.27
FillP	3	8.02	441.46	1.71
FillP-Sheep	3	7.68	201.60	0.46
Indigo	3	2.39	39.87	0.09
Indigo-MusesC3	3	6.84	132.20	0.29
Indigo-MusesC5	3	6.81	461.08	0.79
Indigo-MusesD	3	7.75	99.50	0.09
Indigo-MusesT	3	11.59	308.89	0.42
LEDBAT	3	8.82	161.02	0.37
PCC-Allegro	3	8.10	689.45	10.49
PCC-Expr	1	5.44	48.06	0.05
QUIC Cubic	3	8.62	267.52	0.66
SReAM	3	0.22	27.13	0.04
Sprout	3	7.65	88.12	0.07
TaoVA-100x	3	4.36	91.11	0.05
TCP Vegas	3	3.23	31.71	0.03
Verus	3	9.19	386.61	1.62
PCC-Vivace	3	3.79	355.68	2.02
WebRTC media	3	0.05	61.08	0.00

Run 1: Statistics of TCP BBR

Start at: 2019-05-29 18:24:37

End at: 2019-05-29 18:25:07

Local clock offset: 4.349 ms

Remote clock offset: 0.695 ms

# Below is generated by plot.py at 2019-05-29 19:26:51

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.60 Mbit/s

95th percentile per-packet one-way delay: 200.599 ms

Loss rate: 0.67%

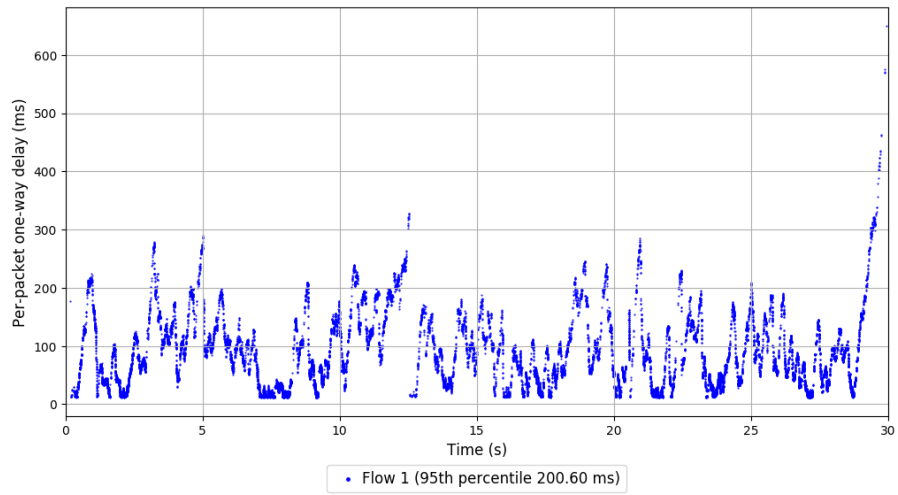
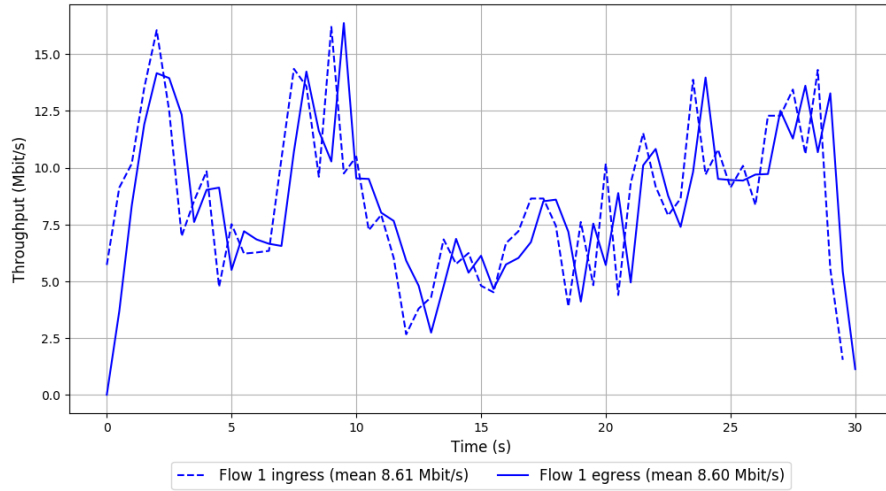
-- Flow 1:

Average throughput: 8.60 Mbit/s

95th percentile per-packet one-way delay: 200.599 ms

Loss rate: 0.67%

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



Run 2: Statistics of TCP BBR

Start at: 2019-05-29 18:50:24

End at: 2019-05-29 18:50:55

Local clock offset: 5.147 ms

Remote clock offset: -3.177 ms

# Below is generated by plot.py at 2019-05-29 19:26:52

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.08 Mbit/s

95th percentile per-packet one-way delay: 298.410 ms

Loss rate: 0.18%

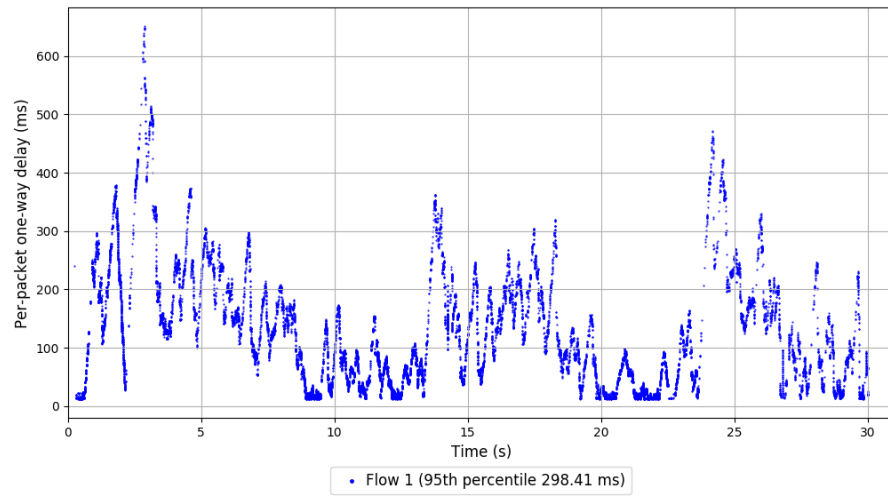
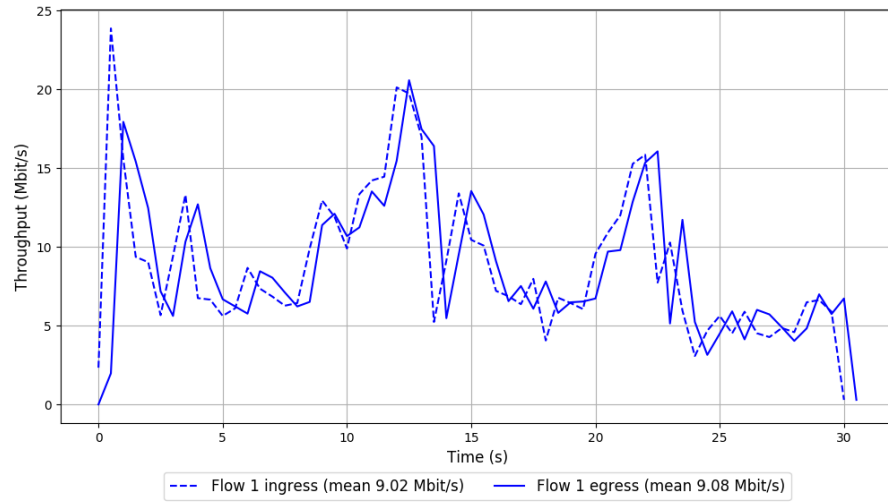
-- Flow 1:

Average throughput: 9.08 Mbit/s

95th percentile per-packet one-way delay: 298.410 ms

Loss rate: 0.18%

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





Run 3: Statistics of TCP BBR

Start at: 2019-05-29 19:16:17

End at: 2019-05-29 19:16:47

Local clock offset: 5.591 ms

Remote clock offset: 0.091 ms

# Below is generated by plot.py at 2019-05-29 19:26:52

# Datalink statistics

-- Total of 1 flow:

Average throughput: 6.84 Mbit/s

95th percentile per-packet one-way delay: 261.184 ms

Loss rate: 0.23%

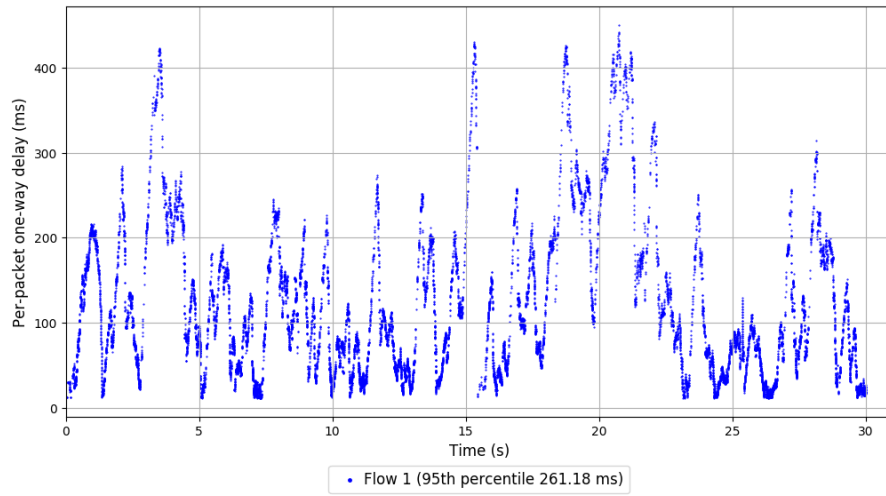
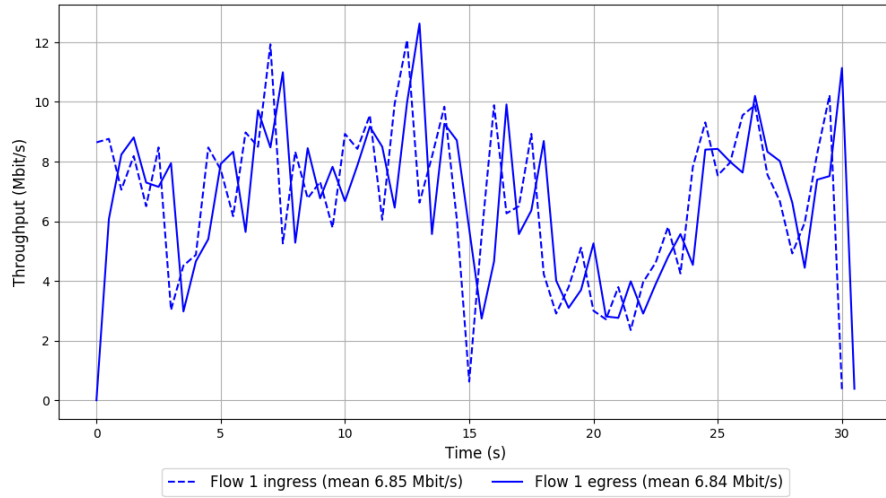
-- Flow 1:

Average throughput: 6.84 Mbit/s

95th percentile per-packet one-way delay: 261.184 ms

Loss rate: 0.23%

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



Run 1: Statistics of Copa

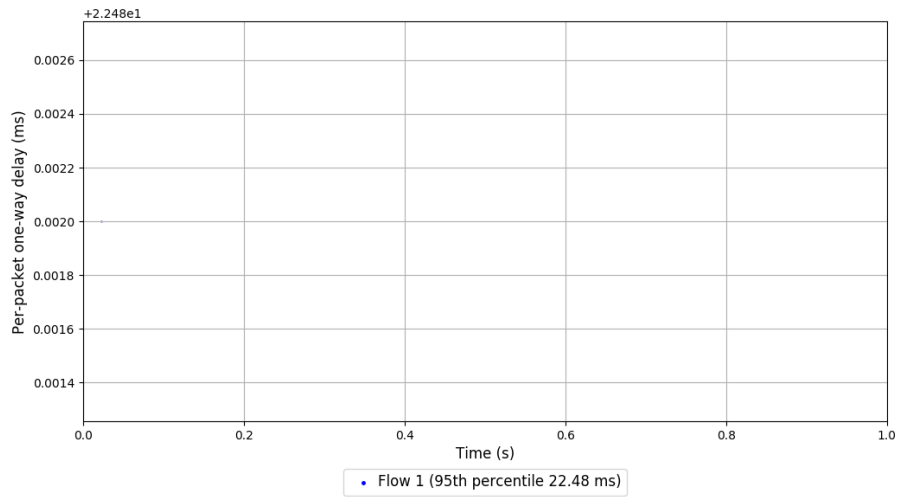
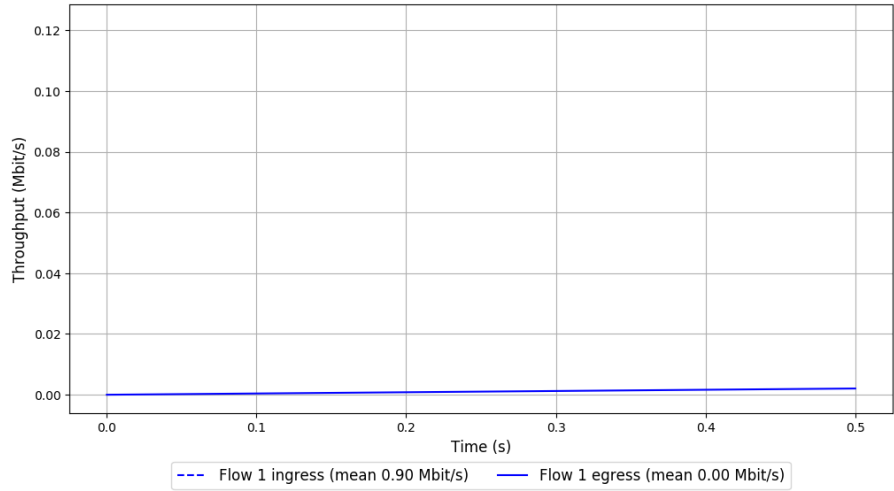
Start at: 2019-05-29 18:27:04

End at: 2019-05-29 18:27:34

Local clock offset: 4.514 ms

Remote clock offset: 0.802 ms

### Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

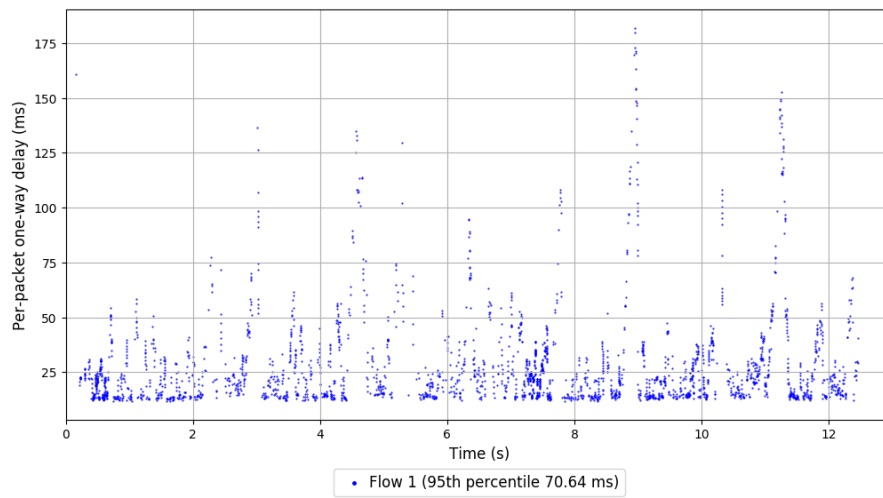
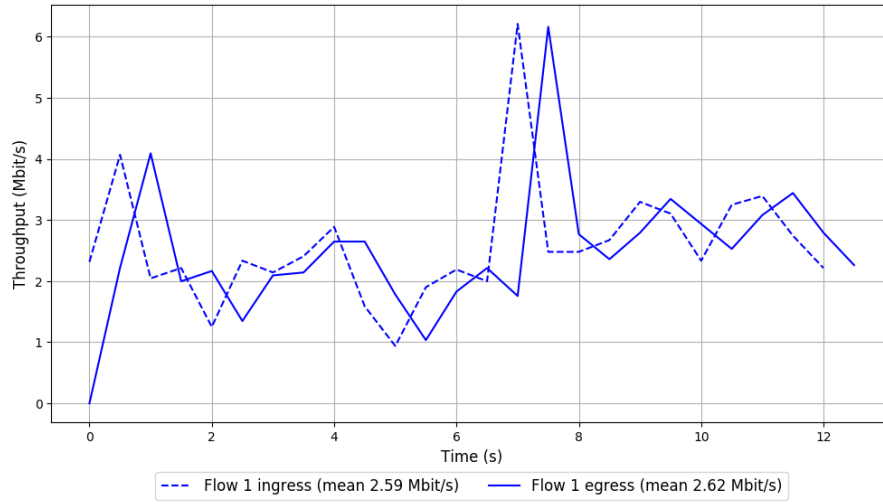
Start at: 2019-05-29 18:52:52

End at: 2019-05-29 18:53:22

Local clock offset: 5.189 ms

Remote clock offset: -3.31 ms

## Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

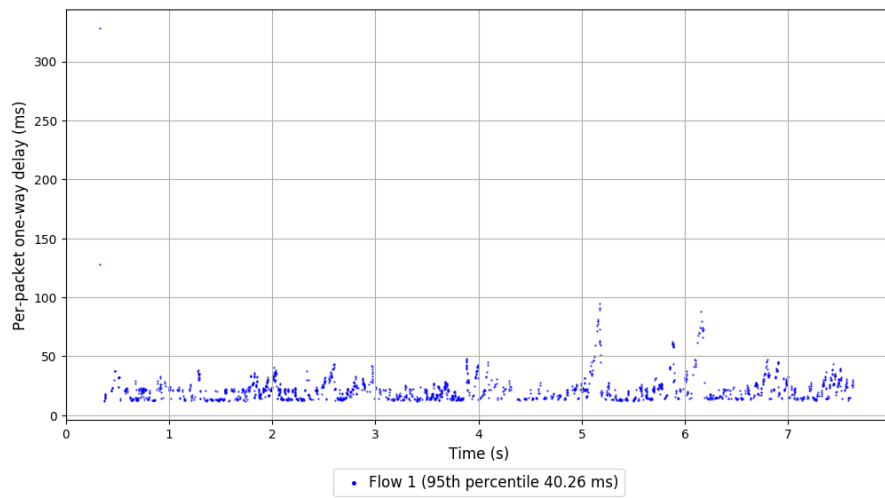
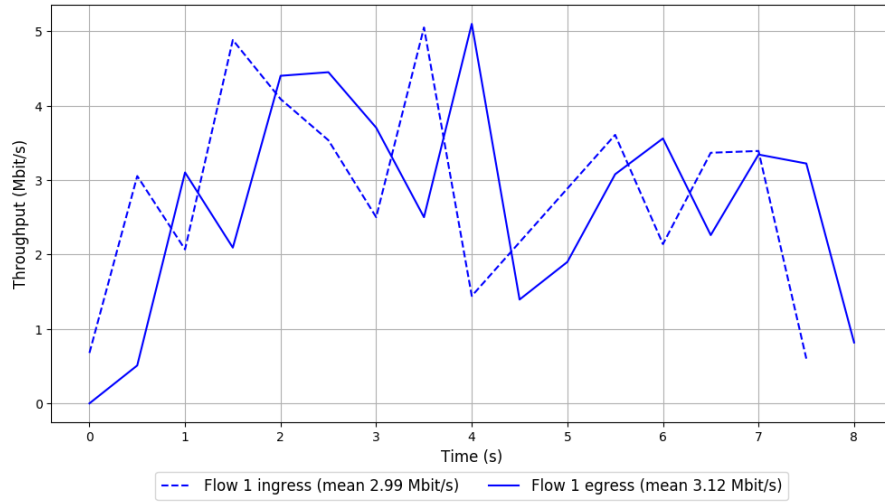
Start at: 2019-05-29 19:18:44

End at: 2019-05-29 19:19:14

Local clock offset: 5.577 ms

Remote clock offset: 0.488 ms

### Run 3: Report of Copa — Data Link





Run 1: Statistics of TCP Cubic

Start at: 2019-05-29 18:33:10

End at: 2019-05-29 18:33:40

Local clock offset: 4.868 ms

Remote clock offset: -0.82 ms

# Below is generated by plot.py at 2019-05-29 19:26:52

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.86 Mbit/s

95th percentile per-packet one-way delay: 212.987 ms

Loss rate: 0.14%

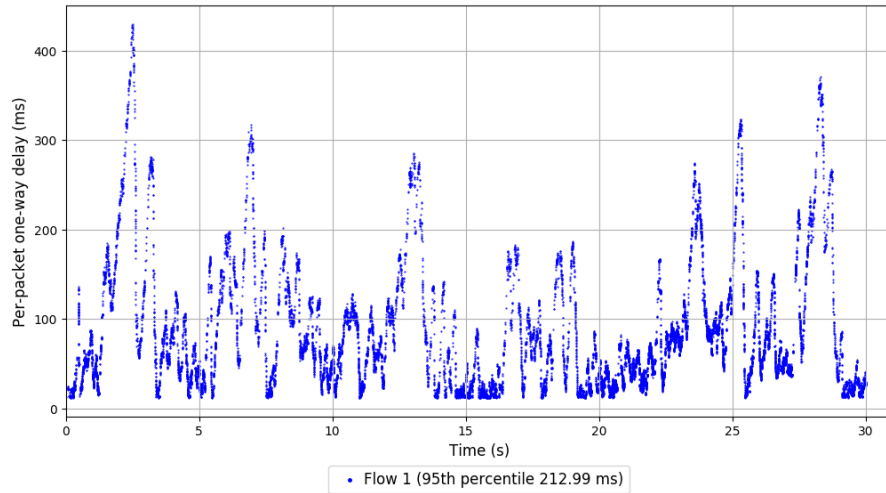
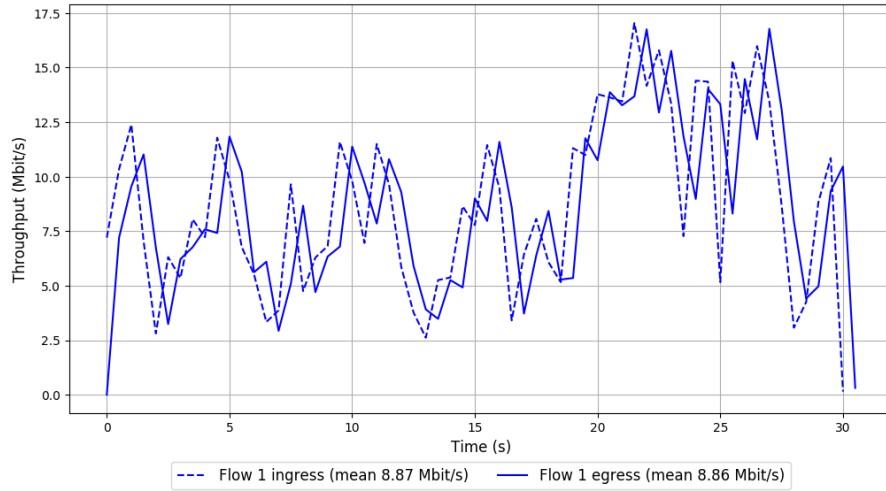
-- Flow 1:

Average throughput: 8.86 Mbit/s

95th percentile per-packet one-way delay: 212.987 ms

Loss rate: 0.14%

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



Run 2: Statistics of TCP Cubic

Start at: 2019-05-29 18:58:58

End at: 2019-05-29 18:59:28

Local clock offset: 5.395 ms

Remote clock offset: -3.672 ms

# Below is generated by plot.py at 2019-05-29 19:26:52

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.58 Mbit/s

95th percentile per-packet one-way delay: 201.538 ms

Loss rate: 0.37%

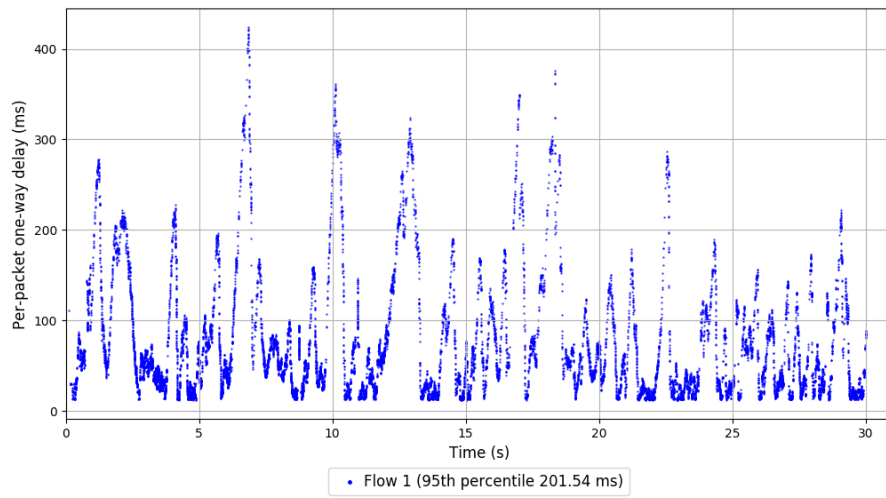
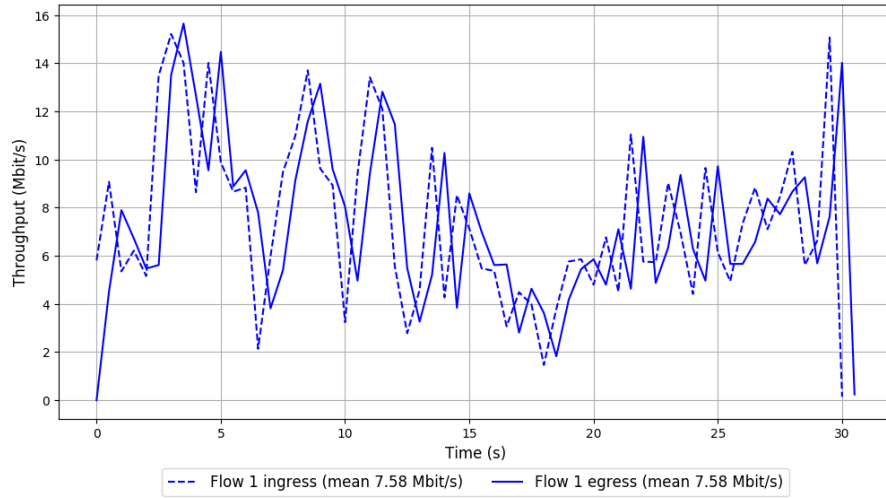
-- Flow 1:

Average throughput: 7.58 Mbit/s

95th percentile per-packet one-way delay: 201.538 ms

Loss rate: 0.37%

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



Run 3: Statistics of TCP Cubic

Start at: 2019-05-29 19:24:50

End at: 2019-05-29 19:25:20

Local clock offset: 5.689 ms

Remote clock offset: 1.181 ms

# Below is generated by plot.py at 2019-05-29 19:26:52

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.18 Mbit/s

95th percentile per-packet one-way delay: 215.524 ms

Loss rate: 0.30%

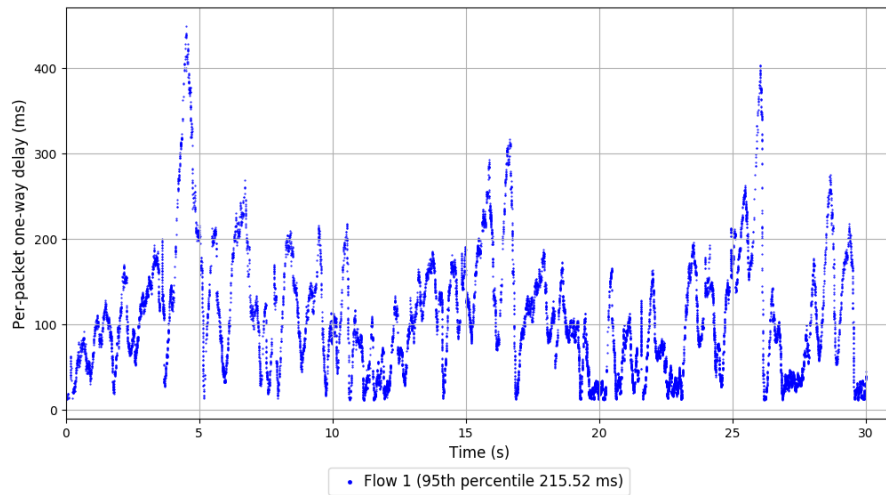
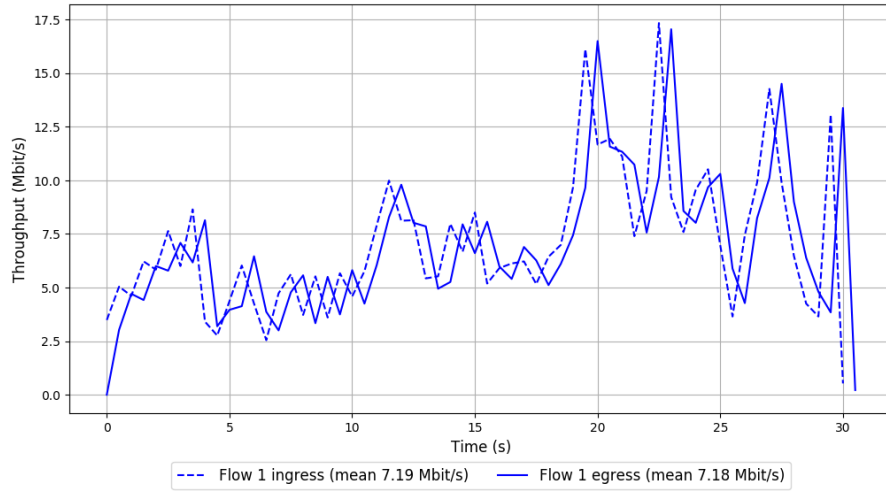
-- Flow 1:

Average throughput: 7.18 Mbit/s

95th percentile per-packet one-way delay: 215.524 ms

Loss rate: 0.30%

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



Run 1: Statistics of FillP

Start at: 2019-05-29 18:25:50

End at: 2019-05-29 18:26:20

Local clock offset: 4.414 ms

Remote clock offset: 0.746 ms

# Below is generated by plot.py at 2019-05-29 19:26:53

# Datalink statistics

-- Total of 1 flow:

Average throughput: 6.51 Mbit/s

95th percentile per-packet one-way delay: 508.202 ms

Loss rate: 0.61%

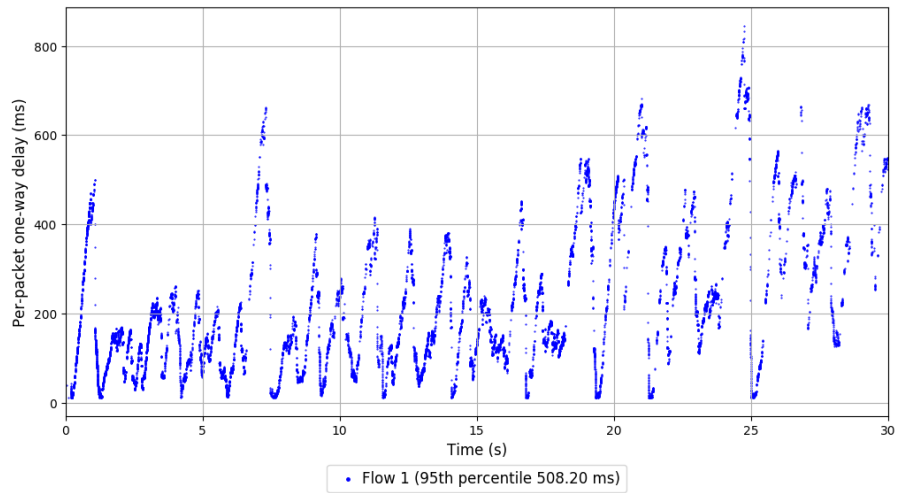
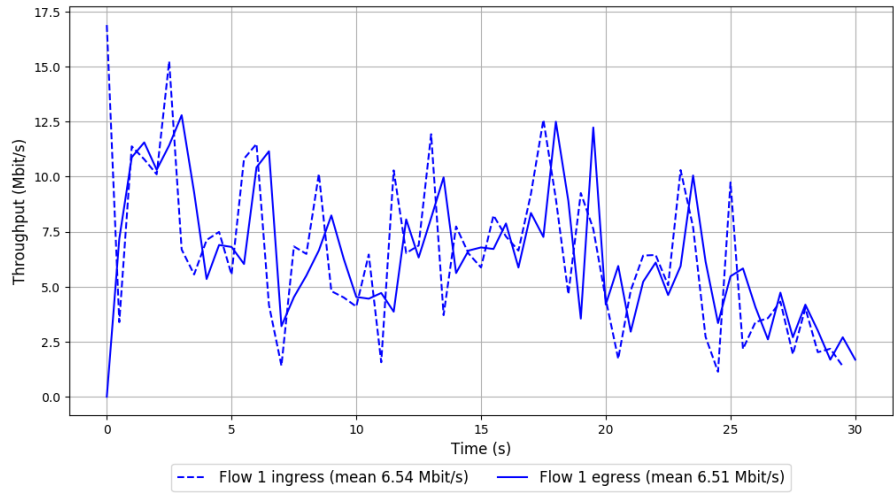
-- Flow 1:

Average throughput: 6.51 Mbit/s

95th percentile per-packet one-way delay: 508.202 ms

Loss rate: 0.61%

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





Run 2: Statistics of FillP

Start at: 2019-05-29 18:51:38

End at: 2019-05-29 18:52:08

Local clock offset: 5.188 ms

Remote clock offset: -3.379 ms

# Below is generated by plot.py at 2019-05-29 19:26:57

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.80 Mbit/s

95th percentile per-packet one-way delay: 477.261 ms

Loss rate: 4.16%

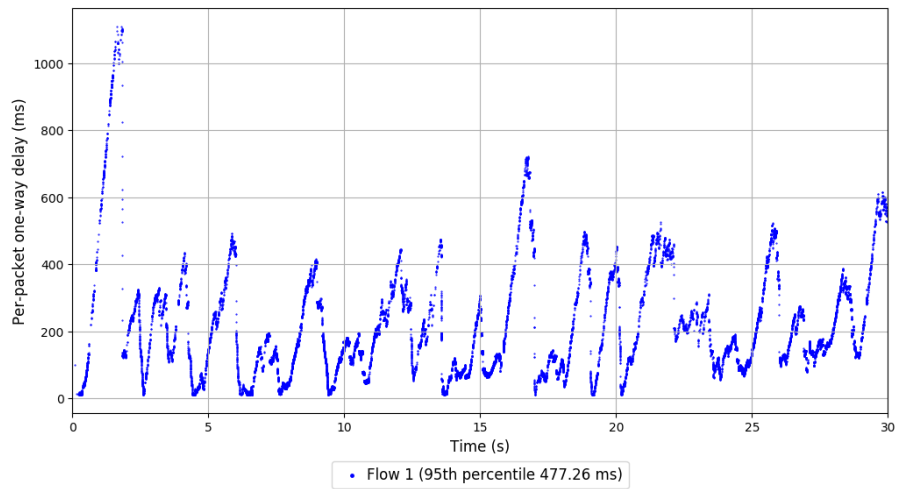
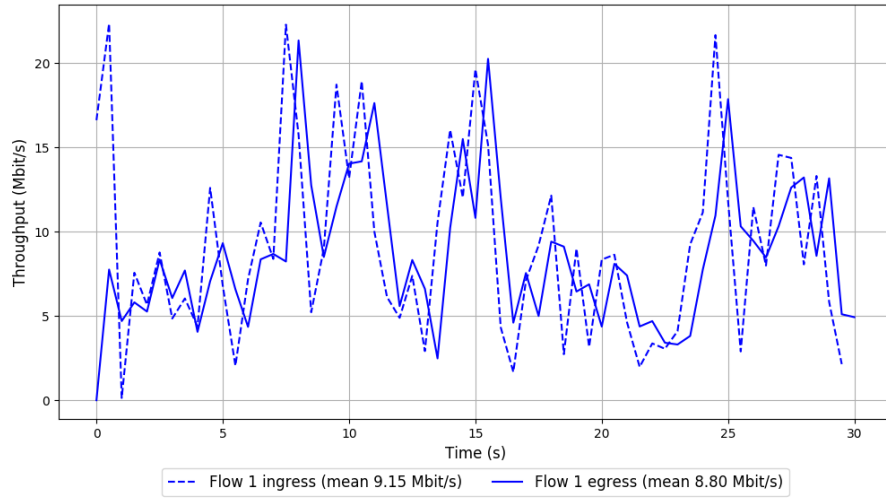
-- Flow 1:

Average throughput: 8.80 Mbit/s

95th percentile per-packet one-way delay: 477.261 ms

Loss rate: 4.16%

## Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2019-05-29 19:17:30

End at: 2019-05-29 19:18:00

Local clock offset: 5.567 ms

Remote clock offset: 0.32 ms

# Below is generated by plot.py at 2019-05-29 19:27:04

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.76 Mbit/s

95th percentile per-packet one-way delay: 338.921 ms

Loss rate: 0.37%

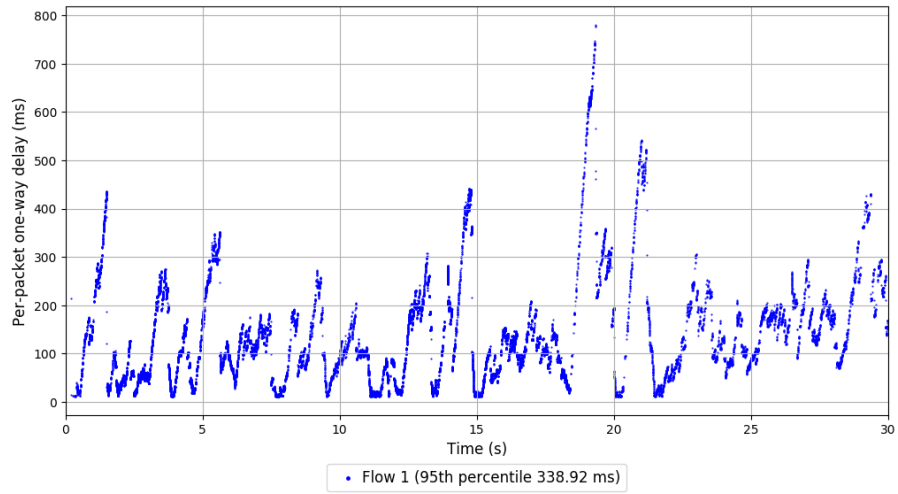
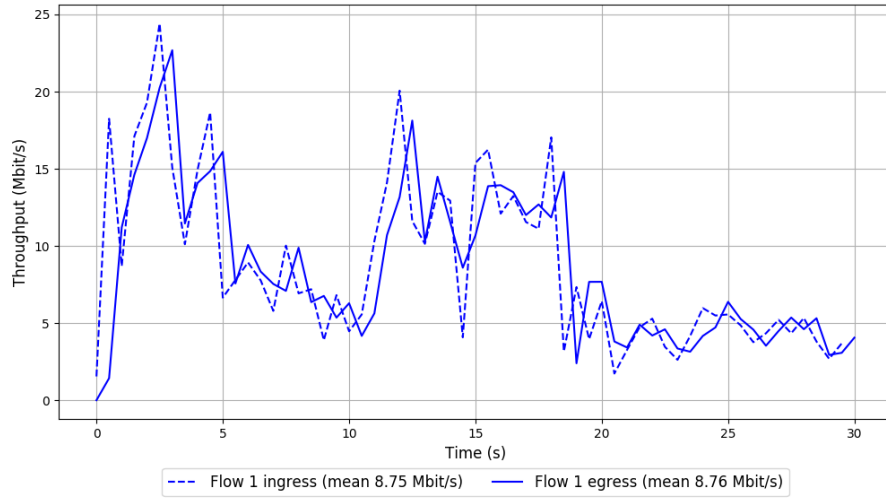
-- Flow 1:

Average throughput: 8.76 Mbit/s

95th percentile per-packet one-way delay: 338.921 ms

Loss rate: 0.37%

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



Run 1: Statistics of FillP-Sheep

Start at: 2019-05-29 18:22:10

End at: 2019-05-29 18:22:40

Local clock offset: 4.309 ms

Remote clock offset: 0.588 ms

# Below is generated by plot.py at 2019-05-29 19:27:07

# Datalink statistics

-- Total of 1 flow:

Average throughput: 10.91 Mbit/s

95th percentile per-packet one-way delay: 184.387 ms

Loss rate: 0.12%

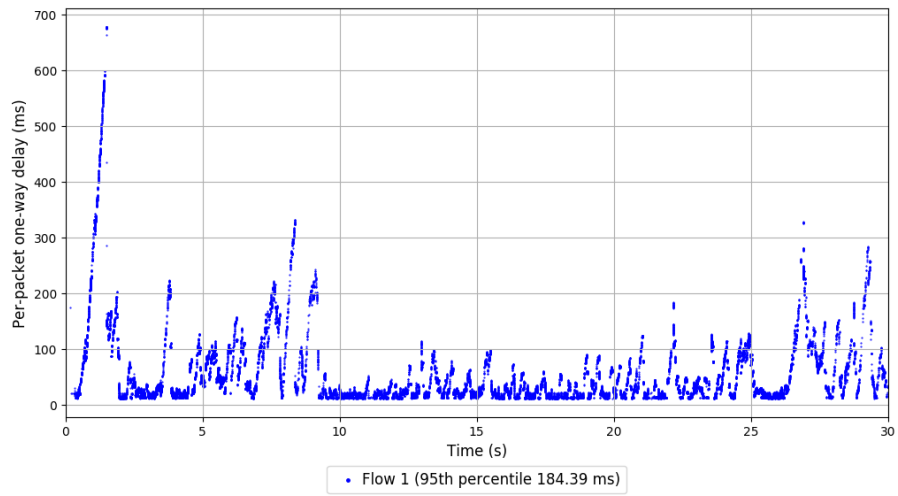
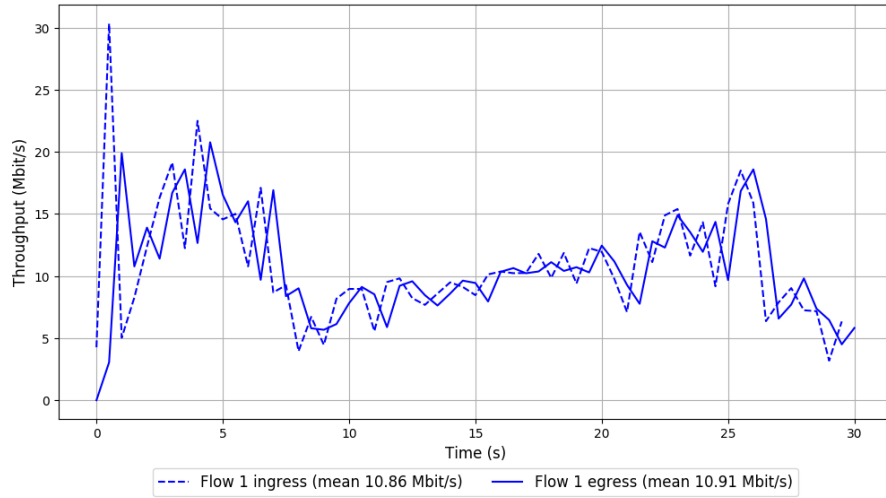
-- Flow 1:

Average throughput: 10.91 Mbit/s

95th percentile per-packet one-way delay: 184.387 ms

Loss rate: 0.12%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-05-29 18:47:58

End at: 2019-05-29 18:48:28

Local clock offset: 5.057 ms

Remote clock offset: -3.064 ms

# Below is generated by plot.py at 2019-05-29 19:27:07

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.84 Mbit/s

95th percentile per-packet one-way delay: 196.374 ms

Loss rate: 0.33%

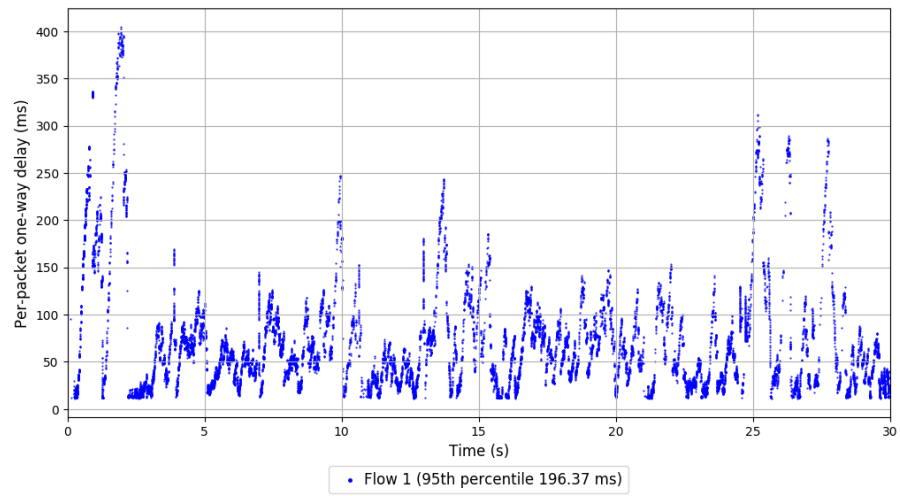
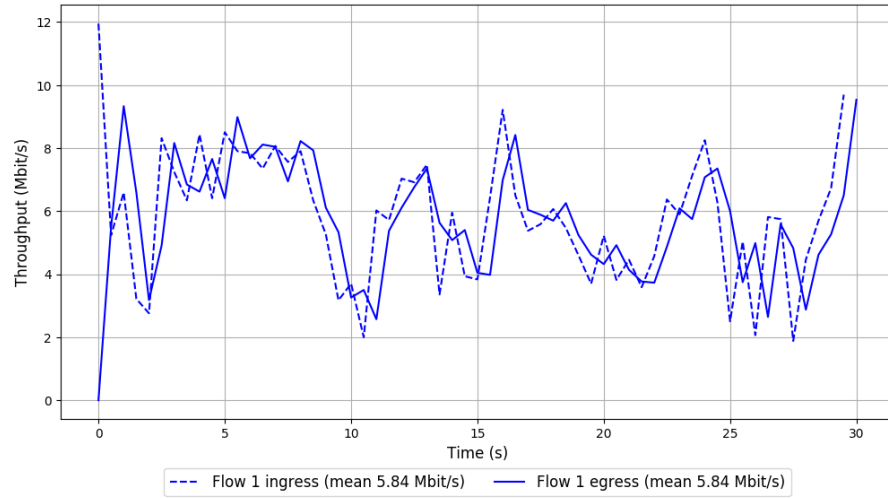
-- Flow 1:

Average throughput: 5.84 Mbit/s

95th percentile per-packet one-way delay: 196.374 ms

Loss rate: 0.33%

## Run 2: Report of FillP-Sheep — Data Link



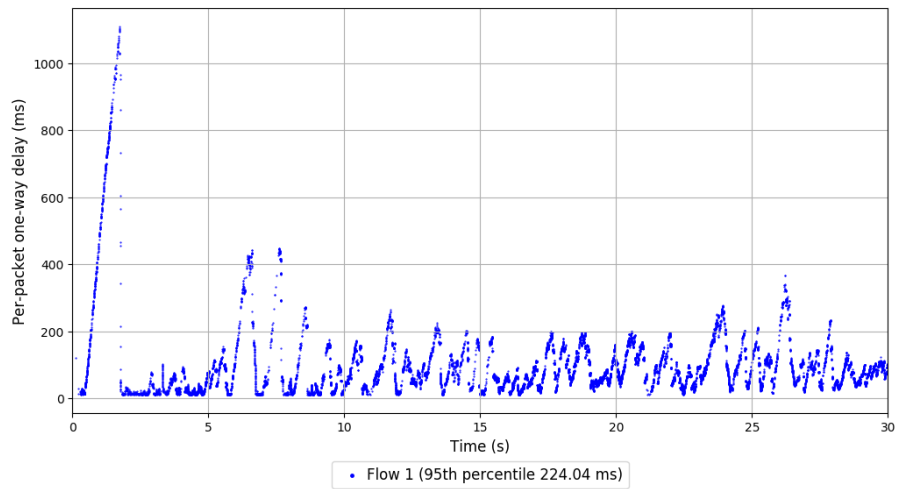
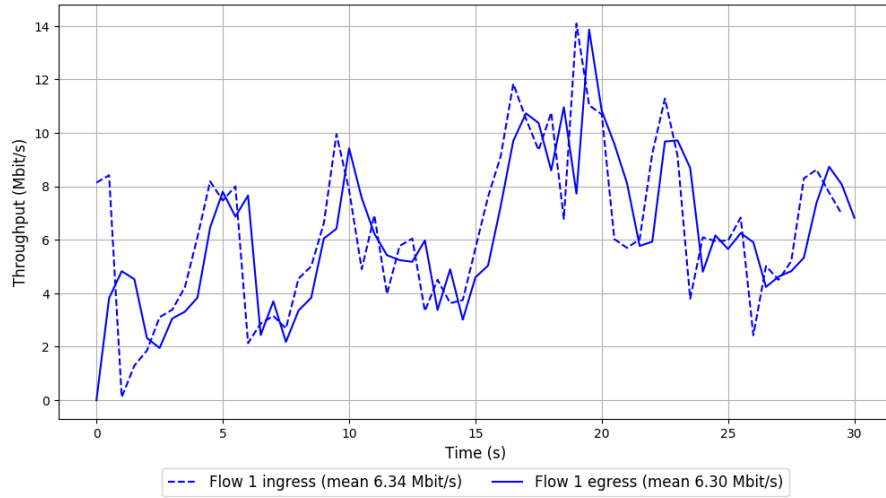


Run 3: Statistics of FillP-Sheep

Start at: 2019-05-29 19:13:50  
End at: 2019-05-29 19:14:20  
Local clock offset: 5.596 ms  
Remote clock offset: -0.269 ms

# Below is generated by plot.py at 2019-05-29 19:27:07  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 6.30 Mbit/s  
95th percentile per-packet one-way delay: 224.039 ms  
Loss rate: 0.94%  
-- Flow 1:  
Average throughput: 6.30 Mbit/s  
95th percentile per-packet one-way delay: 224.039 ms  
Loss rate: 0.94%

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

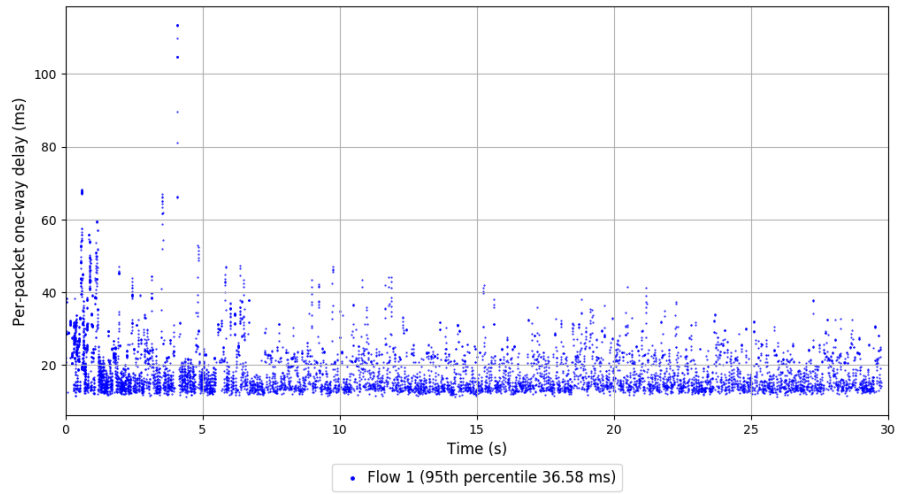
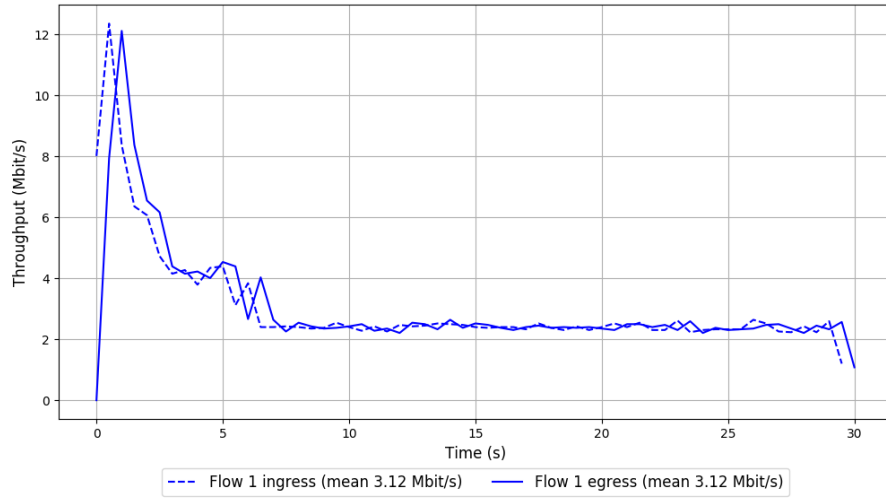


Run 1: Statistics of Indigo

Start at: 2019-05-29 18:31:57  
End at: 2019-05-29 18:32:27  
Local clock offset: 4.811 ms  
Remote clock offset: -0.416 ms

# Below is generated by plot.py at 2019-05-29 19:27:07  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 3.12 Mbit/s  
95th percentile per-packet one-way delay: 36.577 ms  
Loss rate: 0.08%  
-- Flow 1:  
Average throughput: 3.12 Mbit/s  
95th percentile per-packet one-way delay: 36.577 ms  
Loss rate: 0.08%

### Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-05-29 18:57:45

End at: 2019-05-29 18:58:15

Local clock offset: 5.362 ms

Remote clock offset: -3.564 ms

# Below is generated by plot.py at 2019-05-29 19:27:07

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.15 Mbit/s

95th percentile per-packet one-way delay: 41.841 ms

Loss rate: 0.19%

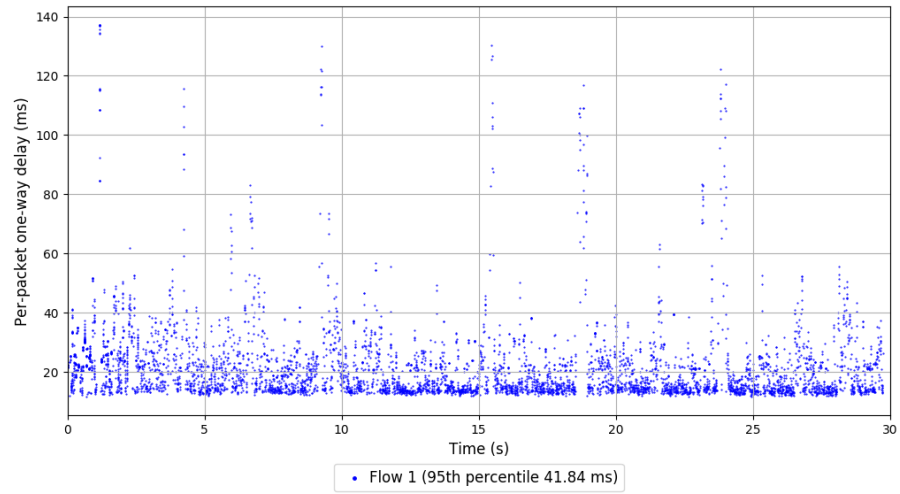
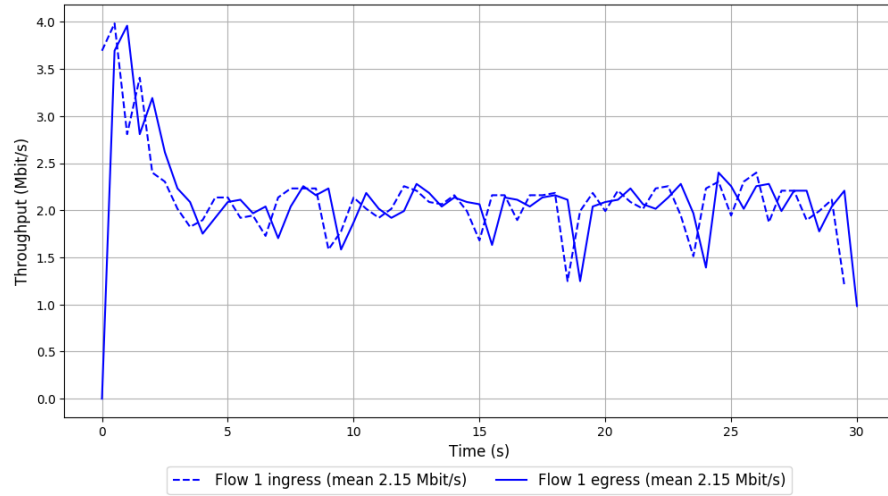
-- Flow 1:

Average throughput: 2.15 Mbit/s

95th percentile per-packet one-way delay: 41.841 ms

Loss rate: 0.19%

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-05-29 19:23:37

End at: 2019-05-29 19:24:07

Local clock offset: 5.626 ms

Remote clock offset: 1.059 ms

# Below is generated by plot.py at 2019-05-29 19:27:07

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.91 Mbit/s

95th percentile per-packet one-way delay: 41.184 ms

Loss rate: 0.00%

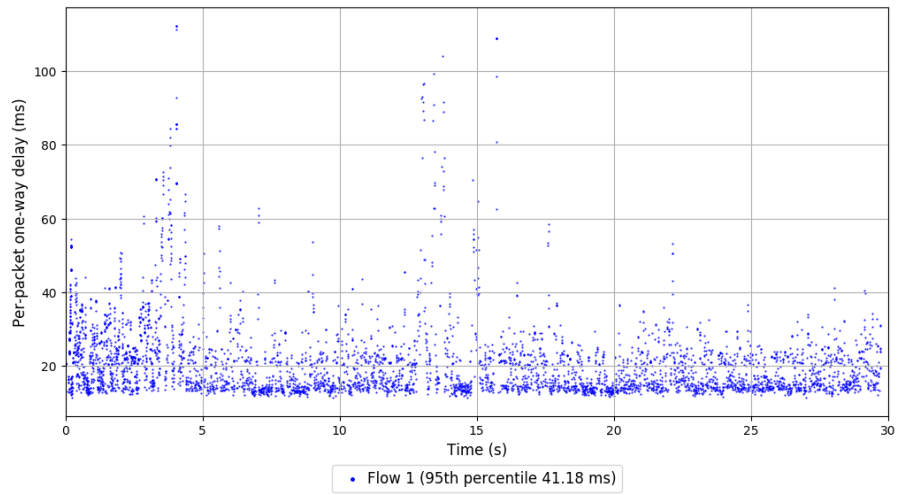
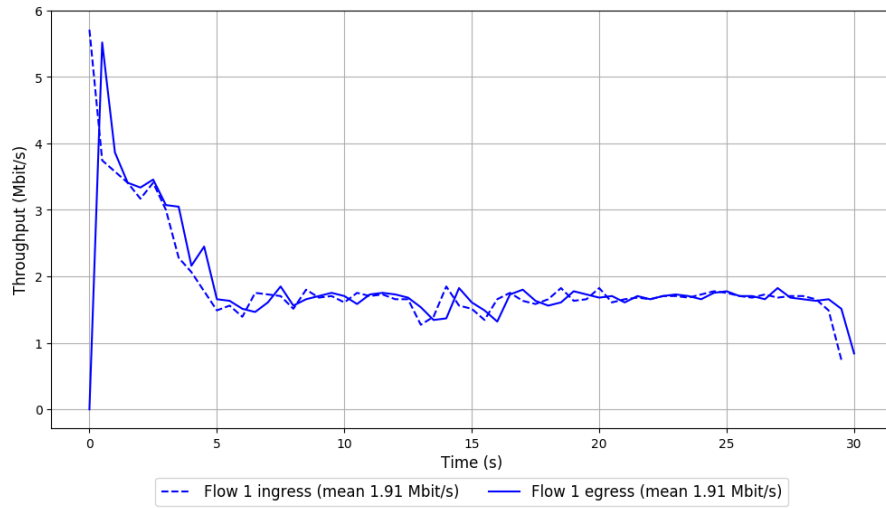
-- Flow 1:

Average throughput: 1.91 Mbit/s

95th percentile per-packet one-way delay: 41.184 ms

Loss rate: 0.00%

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





Run 1: Statistics of Indigo-MusesC3

Start at: 2019-05-29 18:23:23

End at: 2019-05-29 18:23:53

Local clock offset: 4.345 ms

Remote clock offset: 0.701 ms

# Below is generated by plot.py at 2019-05-29 19:27:07

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.57 Mbit/s

95th percentile per-packet one-way delay: 98.466 ms

Loss rate: 0.42%

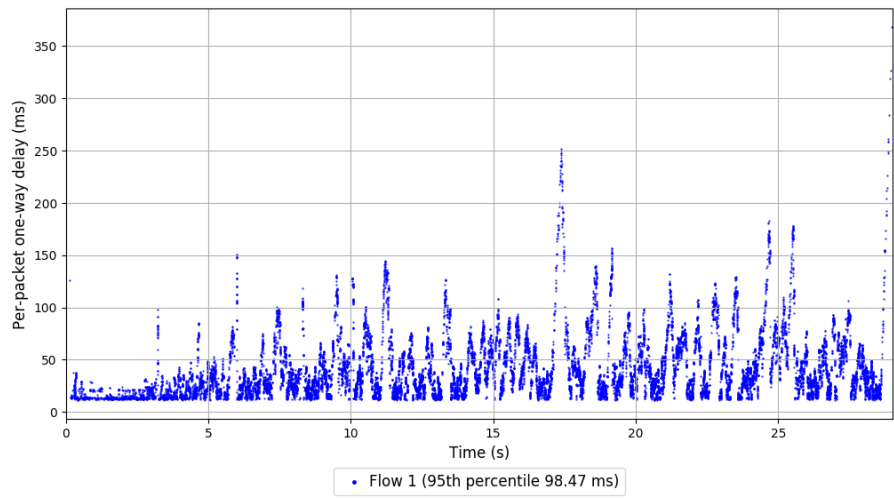
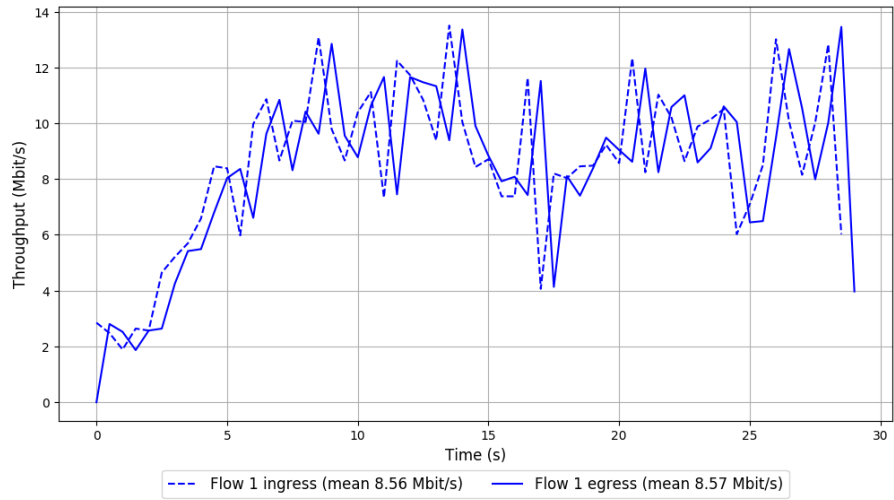
-- Flow 1:

Average throughput: 8.57 Mbit/s

95th percentile per-packet one-way delay: 98.466 ms

Loss rate: 0.42%

### Run 1: Report of Indigo-MusesC3 — Data Link

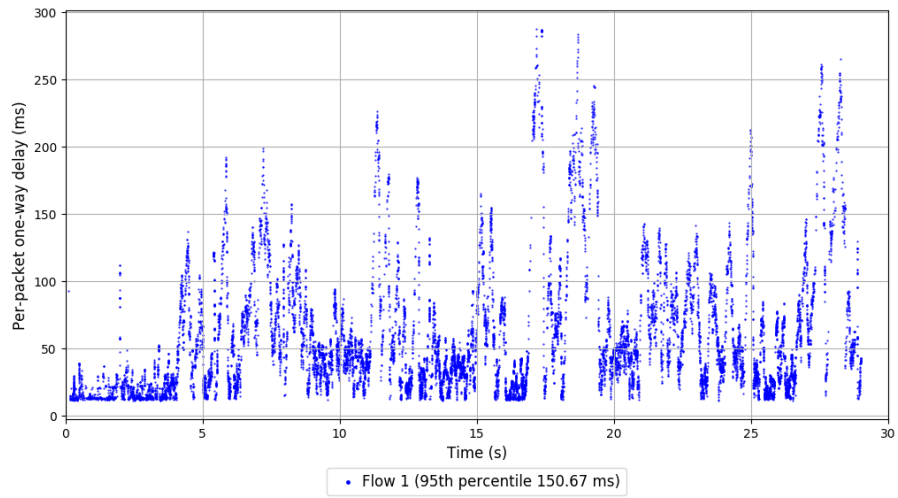
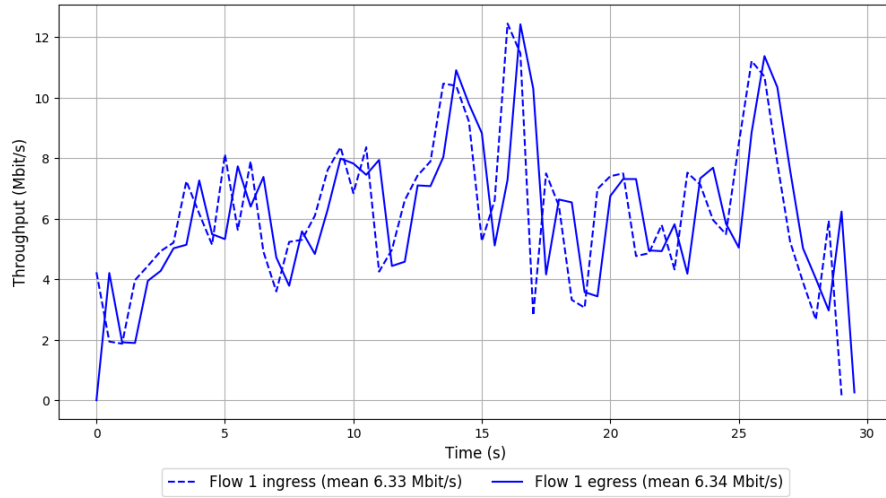


Run 2: Statistics of Indigo-MusesC3

Start at: 2019-05-29 18:49:11  
End at: 2019-05-29 18:49:41  
Local clock offset: 5.076 ms  
Remote clock offset: -3.091 ms

# Below is generated by plot.py at 2019-05-29 19:27:07  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 6.34 Mbit/s  
95th percentile per-packet one-way delay: 150.668 ms  
Loss rate: 0.16%  
-- Flow 1:  
Average throughput: 6.34 Mbit/s  
95th percentile per-packet one-way delay: 150.668 ms  
Loss rate: 0.16%

## Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

Start at: 2019-05-29 19:15:03

End at: 2019-05-29 19:15:33

Local clock offset: 5.584 ms

Remote clock offset: -0.036 ms

# Below is generated by plot.py at 2019-05-29 19:27:07

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.61 Mbit/s

95th percentile per-packet one-way delay: 147.462 ms

Loss rate: 0.30%

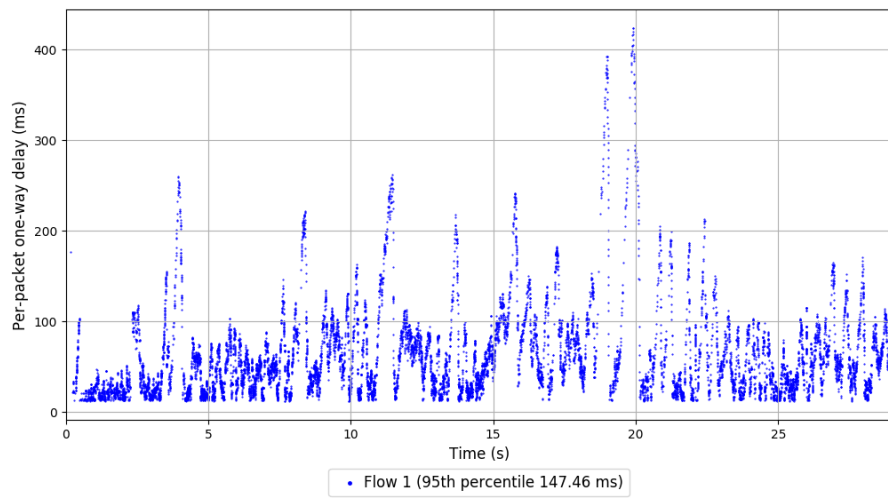
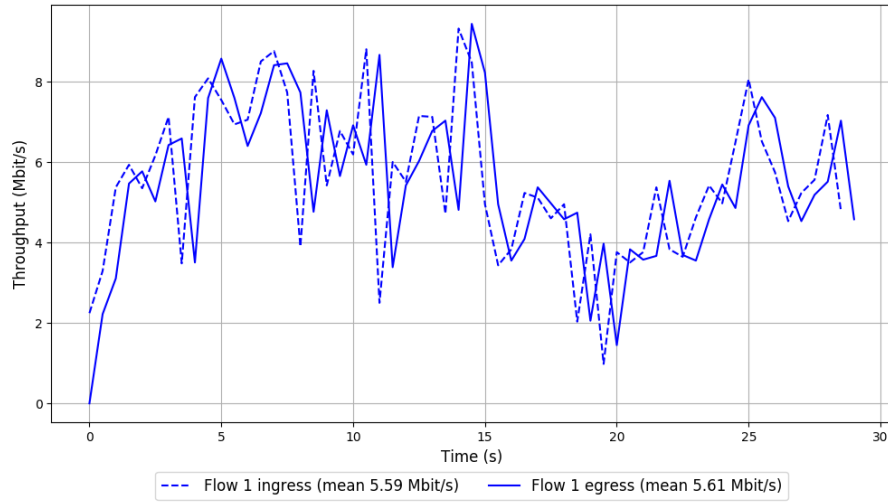
-- Flow 1:

Average throughput: 5.61 Mbit/s

95th percentile per-packet one-way delay: 147.462 ms

Loss rate: 0.30%

### Run 3: Report of Indigo-MusesC3 — Data Link



Run 1: Statistics of Indigo-MusesC5

Start at: 2019-05-29 18:34:24

End at: 2019-05-29 18:34:54

Local clock offset: 4.943 ms

Remote clock offset: -1.186 ms

# Below is generated by plot.py at 2019-05-29 19:27:08

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.70 Mbit/s

95th percentile per-packet one-way delay: 291.140 ms

Loss rate: 0.75%

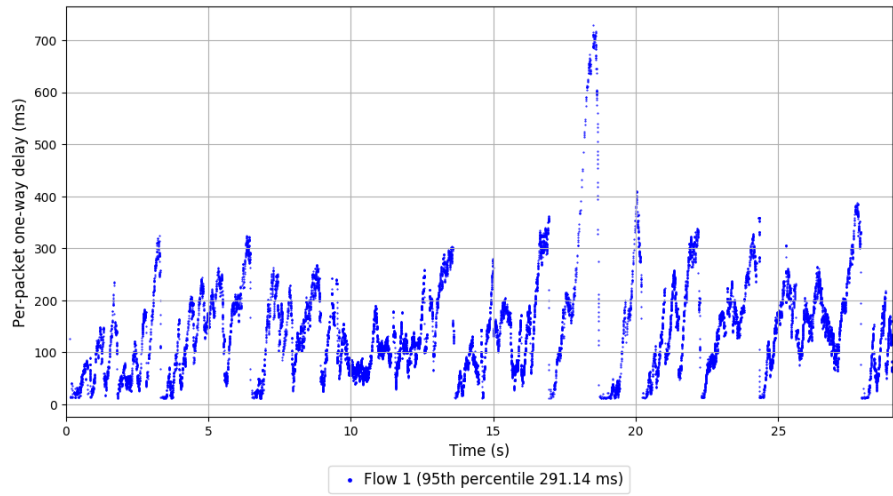
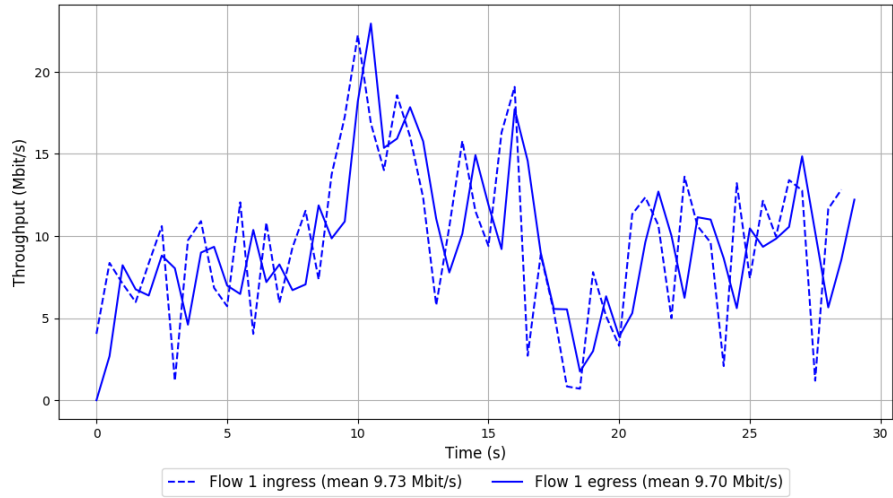
-- Flow 1:

Average throughput: 9.70 Mbit/s

95th percentile per-packet one-way delay: 291.140 ms

Loss rate: 0.75%

Run 1: Report of Indigo-MusesC5 — Data Link





Run 2: Statistics of Indigo-MusesC5

Start at: 2019-05-29 19:00:12

End at: 2019-05-29 19:00:42

Local clock offset: 5.444 ms

Remote clock offset: -3.727 ms

# Below is generated by plot.py at 2019-05-29 19:27:08

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.84 Mbit/s

95th percentile per-packet one-way delay: 702.149 ms

Loss rate: 1.03%

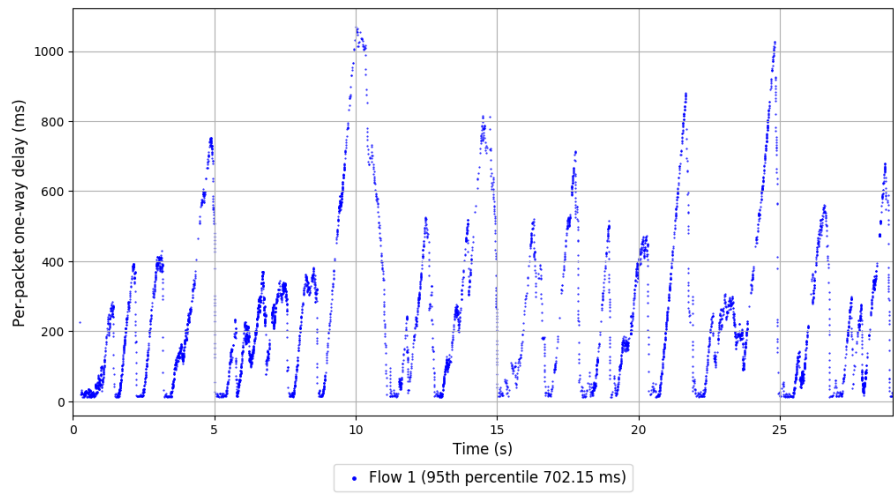
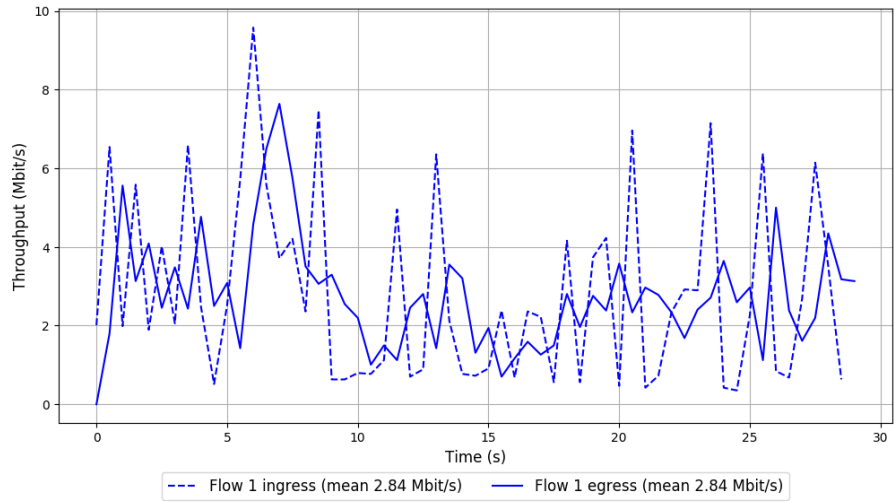
-- Flow 1:

Average throughput: 2.84 Mbit/s

95th percentile per-packet one-way delay: 702.149 ms

Loss rate: 1.03%

## Run 2: Report of Indigo-MusesC5 — Data Link



Run 3: Statistics of Indigo-MusesC5

Start at: 2019-05-29 19:26:04

End at: 2019-05-29 19:26:34

Local clock offset: 5.73 ms

Remote clock offset: 1.16 ms

# Below is generated by plot.py at 2019-05-29 19:27:11

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.88 Mbit/s

95th percentile per-packet one-way delay: 389.961 ms

Loss rate: 0.59%

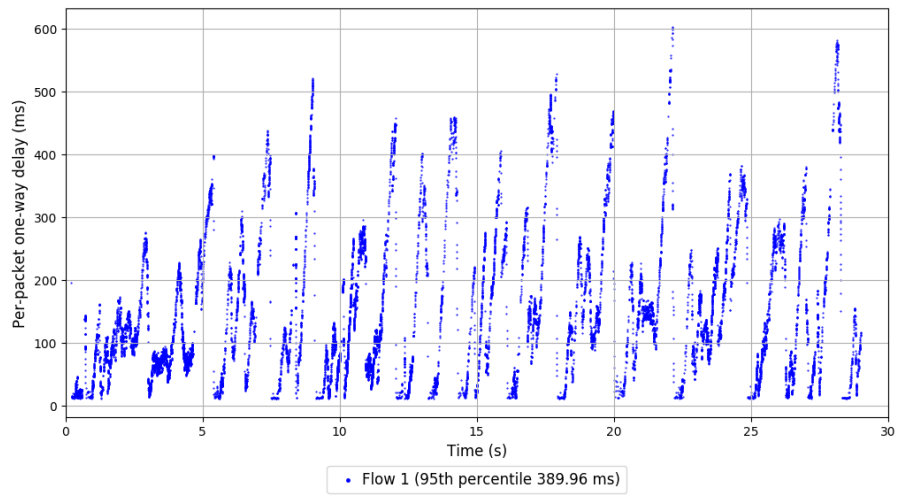
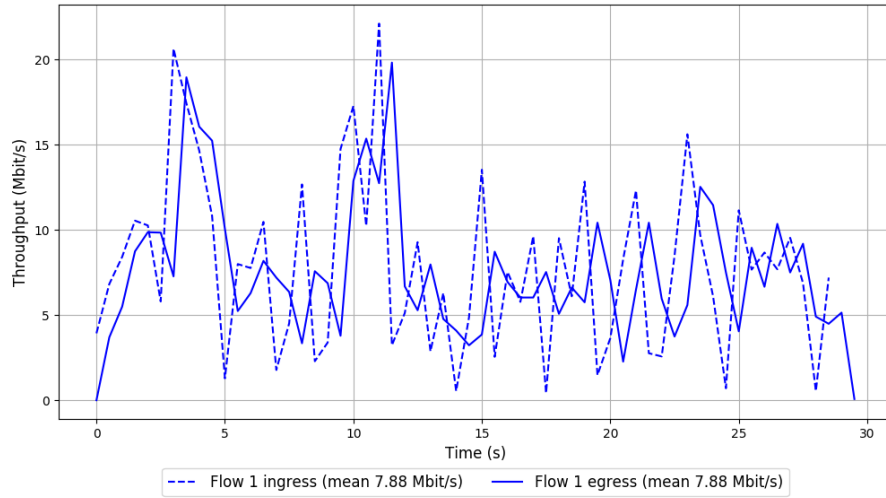
-- Flow 1:

Average throughput: 7.88 Mbit/s

95th percentile per-packet one-way delay: 389.961 ms

Loss rate: 0.59%

### Run 3: Report of Indigo-MusesC5 — Data Link



Run 1: Statistics of Indigo-MusesD

Start at: 2019-05-29 18:14:48

End at: 2019-05-29 18:15:18

Local clock offset: 4.7 ms

Remote clock offset: 0.506 ms

# Below is generated by plot.py at 2019-05-29 19:27:16

# Datalink statistics

-- Total of 1 flow:

Average throughput: 10.97 Mbit/s

95th percentile per-packet one-way delay: 126.352 ms

Loss rate: 0.15%

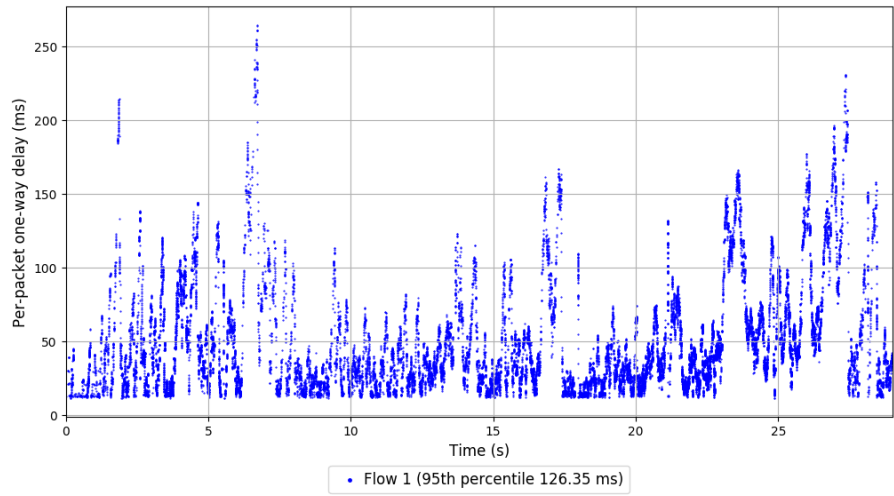
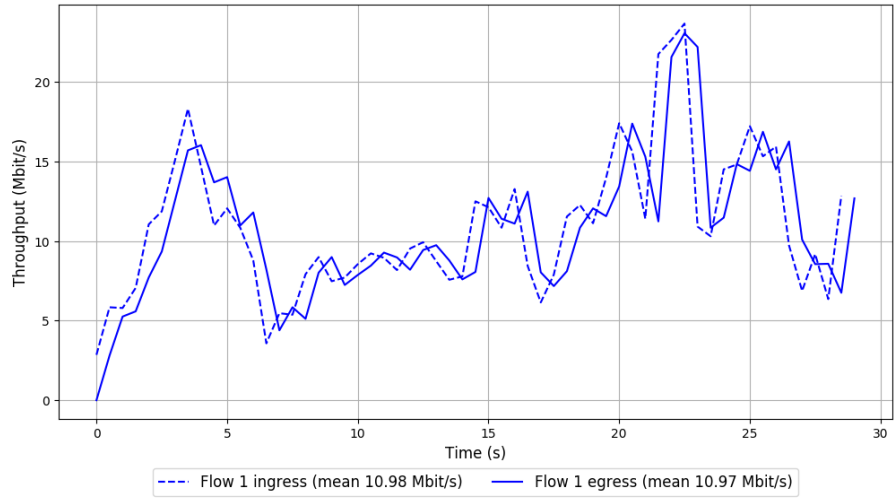
-- Flow 1:

Average throughput: 10.97 Mbit/s

95th percentile per-packet one-way delay: 126.352 ms

Loss rate: 0.15%

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-05-29 18:40:37

End at: 2019-05-29 18:41:07

Local clock offset: 5.038 ms

Remote clock offset: -2.253 ms

# Below is generated by plot.py at 2019-05-29 19:27:16

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.18 Mbit/s

95th percentile per-packet one-way delay: 88.695 ms

Loss rate: 0.07%

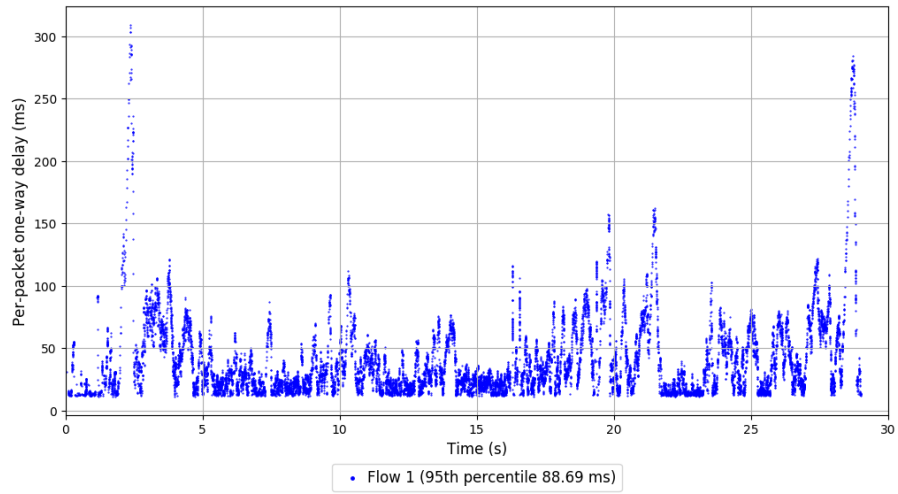
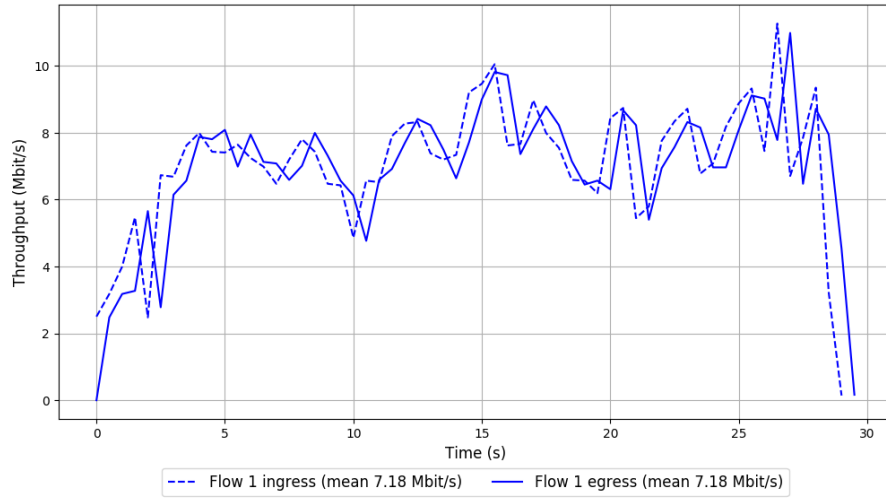
-- Flow 1:

Average throughput: 7.18 Mbit/s

95th percentile per-packet one-way delay: 88.695 ms

Loss rate: 0.07%

Run 2: Report of Indigo-MusesD — Data Link





Run 3: Statistics of Indigo-MusesD

Start at: 2019-05-29 19:06:24

End at: 2019-05-29 19:06:54

Local clock offset: 5.736 ms

Remote clock offset: -2.347 ms

# Below is generated by plot.py at 2019-05-29 19:27:16

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.10 Mbit/s

95th percentile per-packet one-way delay: 83.466 ms

Loss rate: 0.05%

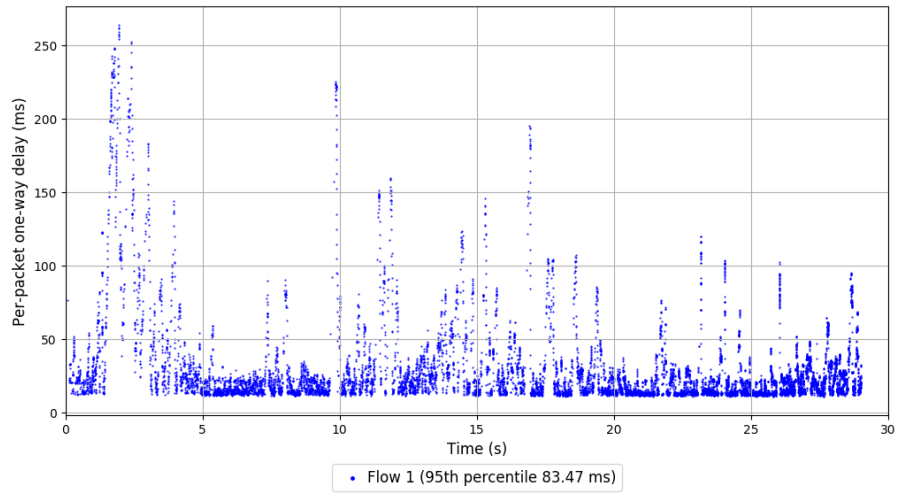
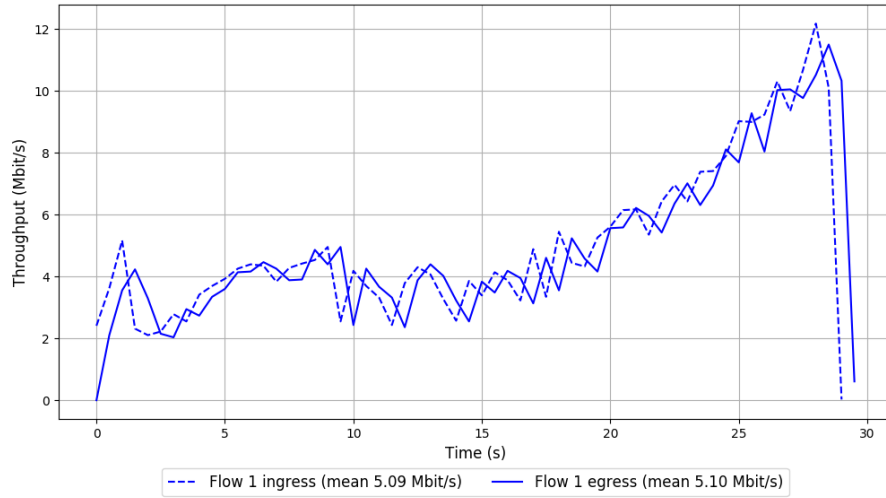
-- Flow 1:

Average throughput: 5.10 Mbit/s

95th percentile per-packet one-way delay: 83.466 ms

Loss rate: 0.05%

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



Run 1: Statistics of Indigo-MuseST

Start at: 2019-05-29 18:13:35

End at: 2019-05-29 18:14:05

Local clock offset: 4.573 ms

Remote clock offset: 0.475 ms

# Below is generated by plot.py at 2019-05-29 19:27:22

# Datalink statistics

-- Total of 1 flow:

Average throughput: 16.18 Mbit/s

95th percentile per-packet one-way delay: 257.295 ms

Loss rate: 0.52%

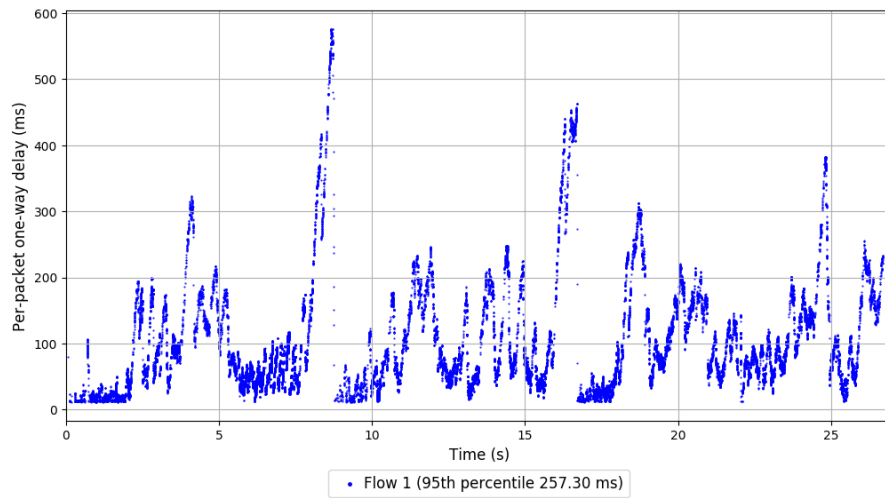
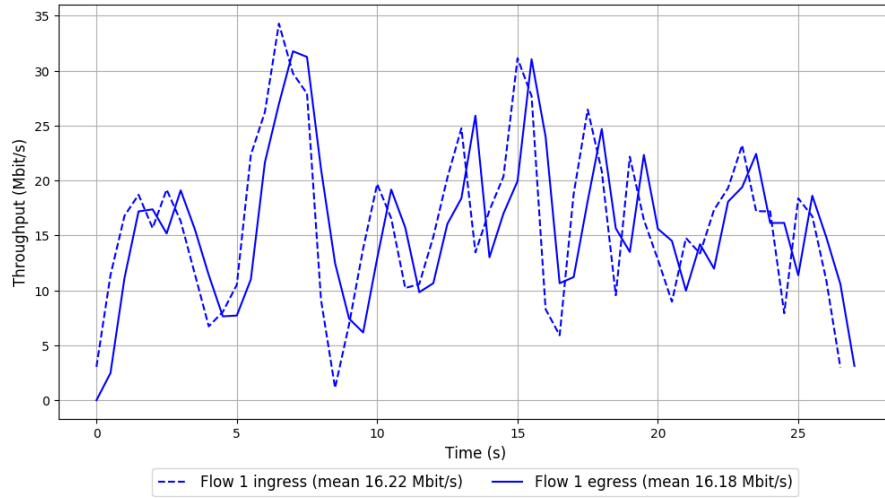
-- Flow 1:

Average throughput: 16.18 Mbit/s

95th percentile per-packet one-way delay: 257.295 ms

Loss rate: 0.52%

### Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MuseST

Start at: 2019-05-29 18:39:23

End at: 2019-05-29 18:39:53

Local clock offset: 5.057 ms

Remote clock offset: -2.173 ms

# Below is generated by plot.py at 2019-05-29 19:27:22

# Datalink statistics

-- Total of 1 flow:

Average throughput: 11.13 Mbit/s

95th percentile per-packet one-way delay: 291.547 ms

Loss rate: 0.39%

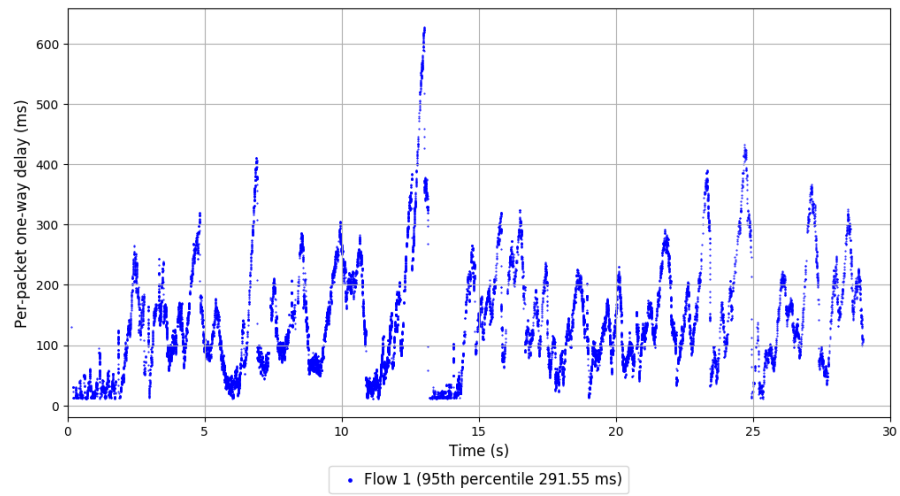
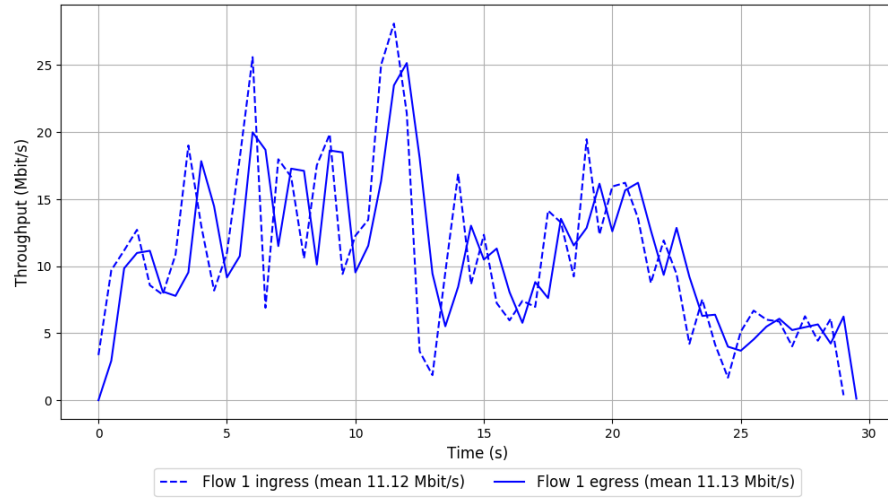
-- Flow 1:

Average throughput: 11.13 Mbit/s

95th percentile per-packet one-way delay: 291.547 ms

Loss rate: 0.39%

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



Run 3: Statistics of Indigo-MuseST

Start at: 2019-05-29 19:05:10

End at: 2019-05-29 19:05:41

Local clock offset: 5.669 ms

Remote clock offset: -2.848 ms

# Below is generated by plot.py at 2019-05-29 19:27:22

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.47 Mbit/s

95th percentile per-packet one-way delay: 377.817 ms

Loss rate: 0.35%

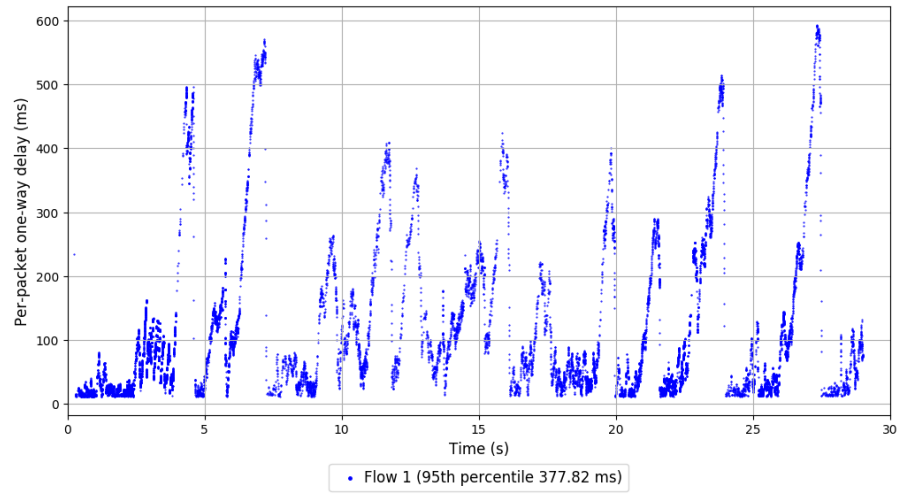
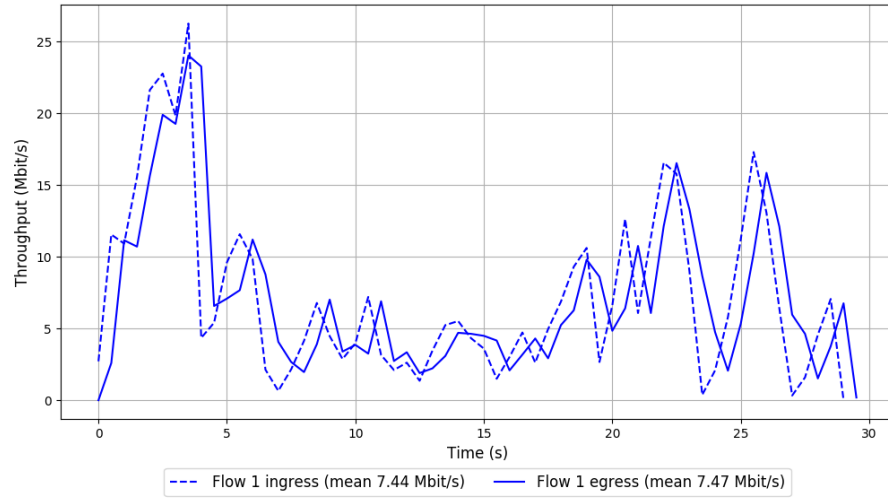
-- Flow 1:

Average throughput: 7.47 Mbit/s

95th percentile per-packet one-way delay: 377.817 ms

Loss rate: 0.35%

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





Run 1: Statistics of LEDBAT

Start at: 2019-05-29 18:20:56

End at: 2019-05-29 18:21:26

Local clock offset: 4.29 ms

Remote clock offset: 0.621 ms

# Below is generated by plot.py at 2019-05-29 19:27:22

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.86 Mbit/s

95th percentile per-packet one-way delay: 147.606 ms

Loss rate: 0.21%

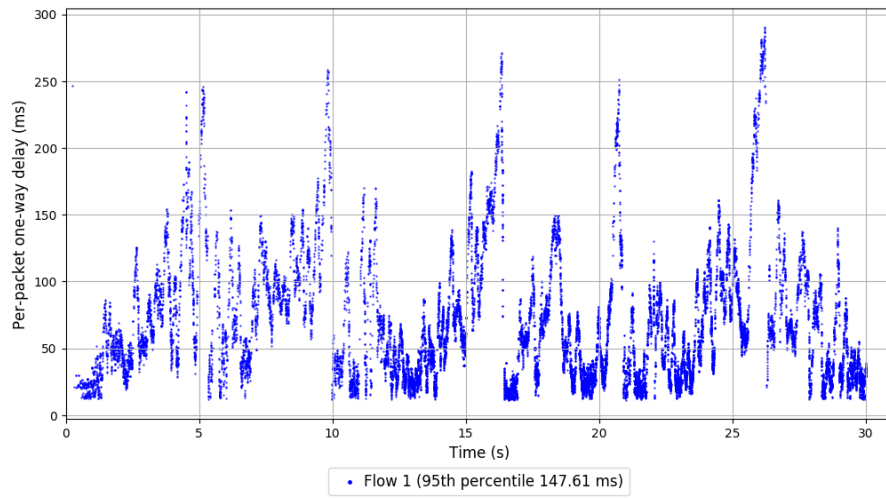
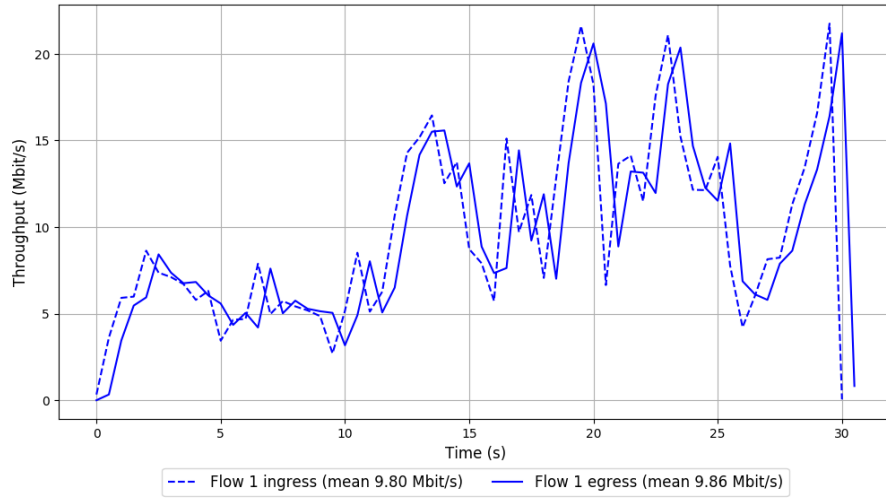
-- Flow 1:

Average throughput: 9.86 Mbit/s

95th percentile per-packet one-way delay: 147.606 ms

Loss rate: 0.21%

### Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-05-29 18:46:44

End at: 2019-05-29 18:47:14

Local clock offset: 5.047 ms

Remote clock offset: -3.02 ms

# Below is generated by plot.py at 2019-05-29 19:27:22

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.45 Mbit/s

95th percentile per-packet one-way delay: 175.645 ms

Loss rate: 0.53%

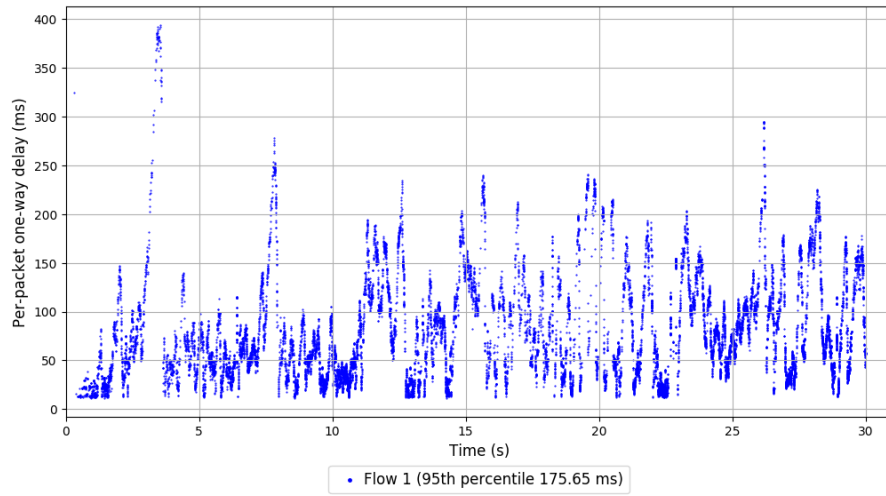
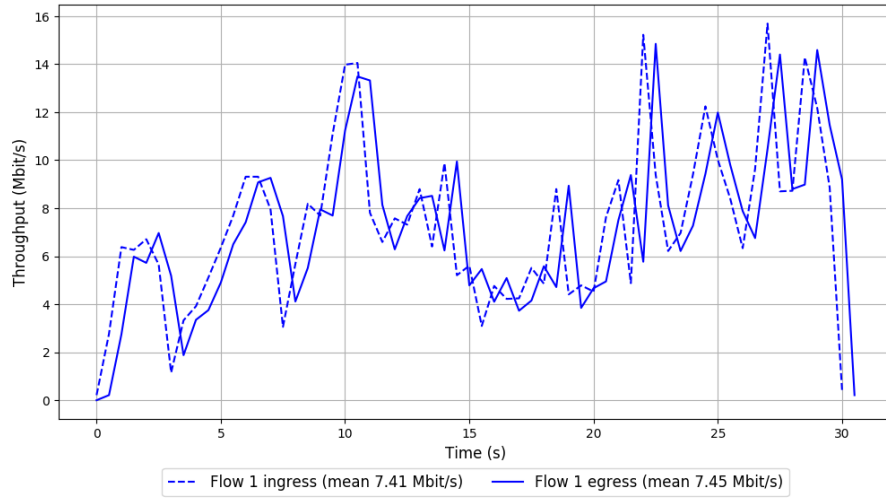
-- Flow 1:

Average throughput: 7.45 Mbit/s

95th percentile per-packet one-way delay: 175.645 ms

Loss rate: 0.53%

## Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-05-29 19:12:36

End at: 2019-05-29 19:13:06

Local clock offset: 5.61 ms

Remote clock offset: -0.626 ms

# Below is generated by plot.py at 2019-05-29 19:27:23

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.14 Mbit/s

95th percentile per-packet one-way delay: 159.803 ms

Loss rate: 0.37%

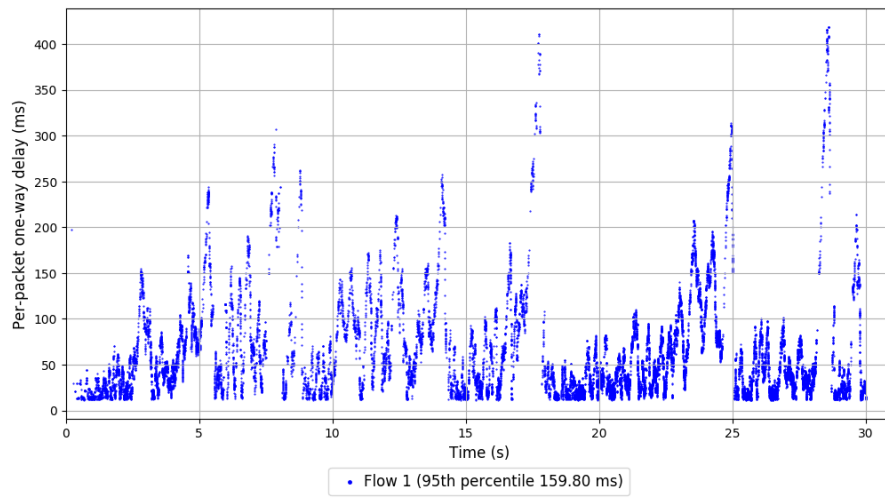
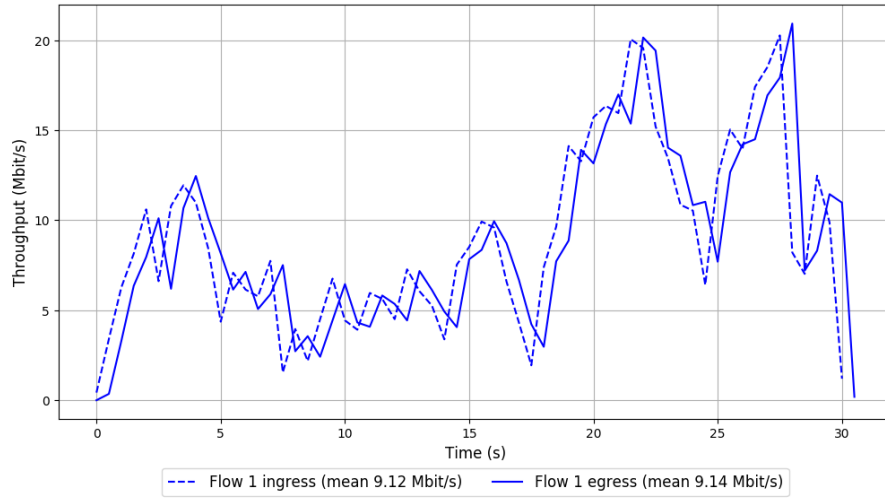
-- Flow 1:

Average throughput: 9.14 Mbit/s

95th percentile per-packet one-way delay: 159.803 ms

Loss rate: 0.37%

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



Run 1: Statistics of PCC-Allegro

Start at: 2019-05-29 18:11:08

End at: 2019-05-29 18:11:38

Local clock offset: 4.434 ms

Remote clock offset: 0.388 ms

# Below is generated by plot.py at 2019-05-29 19:27:26

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.64 Mbit/s

95th percentile per-packet one-way delay: 404.900 ms

Loss rate: 0.08%

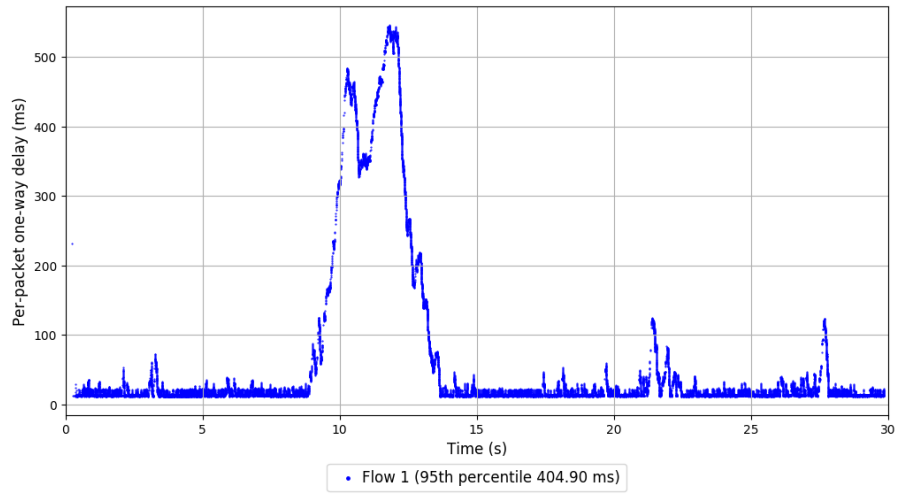
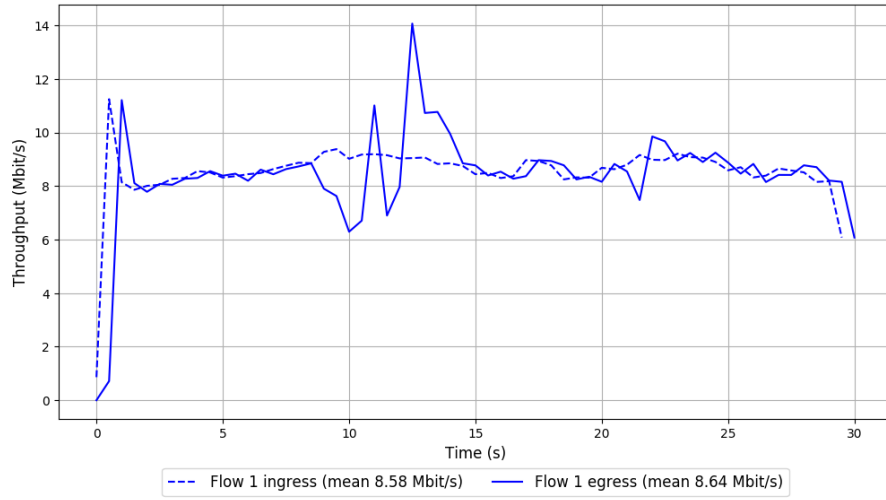
-- Flow 1:

Average throughput: 8.64 Mbit/s

95th percentile per-packet one-way delay: 404.900 ms

Loss rate: 0.08%

### Run 1: Report of PCC-Allegro — Data Link





Run 2: Statistics of PCC-Allegro

Start at: 2019-05-29 18:36:51

End at: 2019-05-29 18:37:21

Local clock offset: 5.066 ms

Remote clock offset: -1.764 ms

# Below is generated by plot.py at 2019-05-29 19:27:33

# Datalink statistics

-- Total of 1 flow:

Average throughput: 11.09 Mbit/s

95th percentile per-packet one-way delay: 1058.995 ms

Loss rate: 31.22%

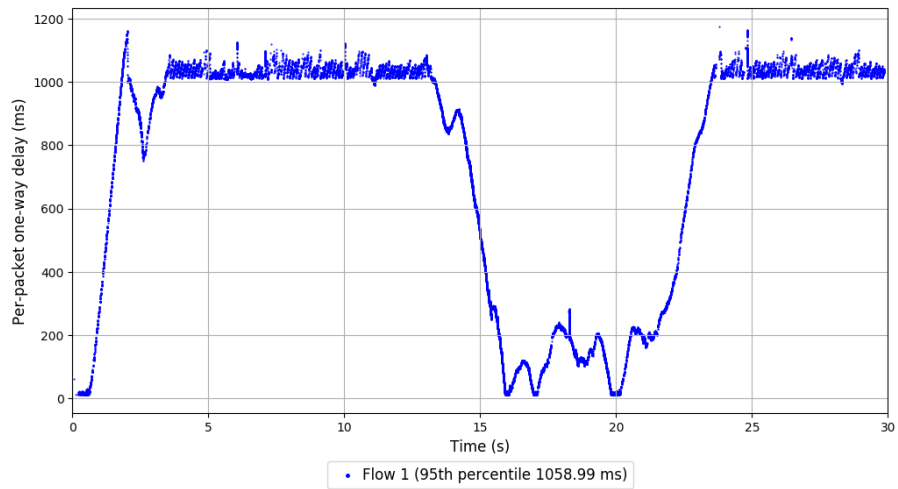
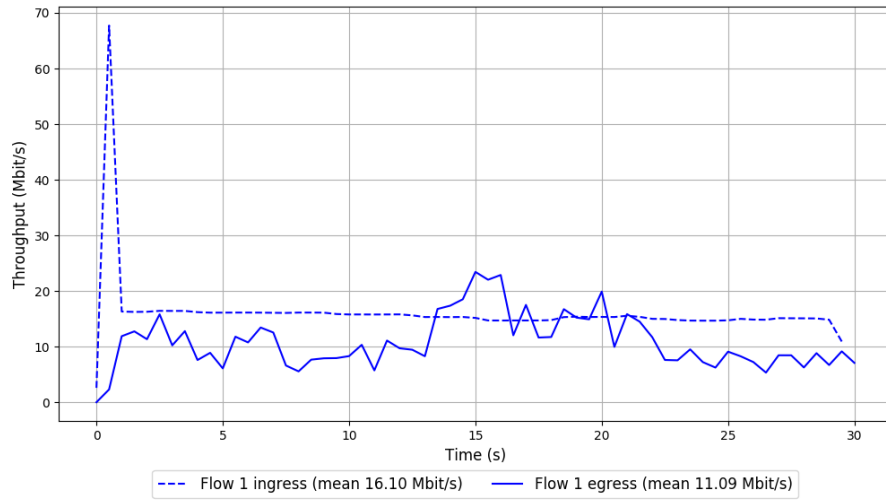
-- Flow 1:

Average throughput: 11.09 Mbit/s

95th percentile per-packet one-way delay: 1058.995 ms

Loss rate: 31.22%

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



Run 3: Statistics of PCC-Allegro

Start at: 2019-05-29 19:02:44

End at: 2019-05-29 19:03:14

Local clock offset: 5.557 ms

Remote clock offset: -3.83 ms

# Below is generated by plot.py at 2019-05-29 19:27:33

# Datalink statistics

-- Total of 1 flow:

Average throughput: 4.56 Mbit/s

95th percentile per-packet one-way delay: 604.447 ms

Loss rate: 0.18%

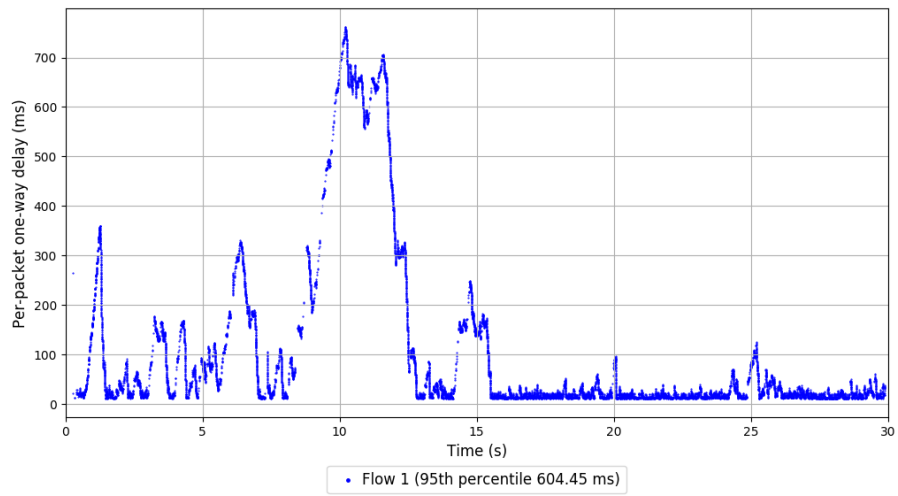
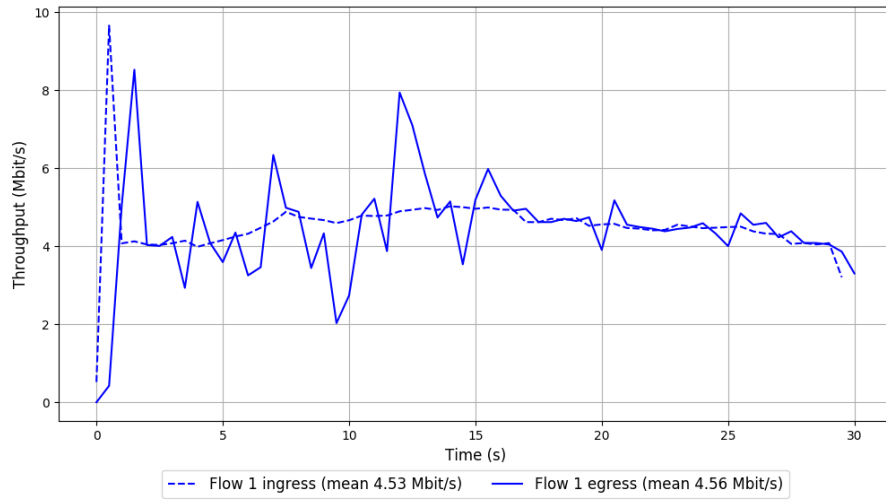
-- Flow 1:

Average throughput: 4.56 Mbit/s

95th percentile per-packet one-way delay: 604.447 ms

Loss rate: 0.18%

### Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2019-05-29 18:17:16

End at: 2019-05-29 18:17:46

Local clock offset: 4.701 ms

Remote clock offset: 0.531 ms

# Below is generated by plot.py at 2019-05-29 19:27:33

# Datalink statistics

-- Total of 1 flow:

Average throughput: 5.44 Mbit/s

95th percentile per-packet one-way delay: 48.062 ms

Loss rate: 0.05%

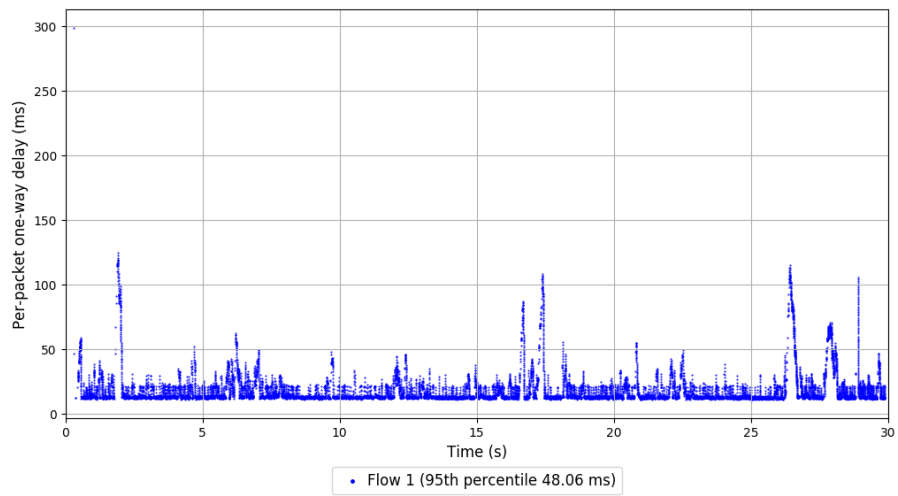
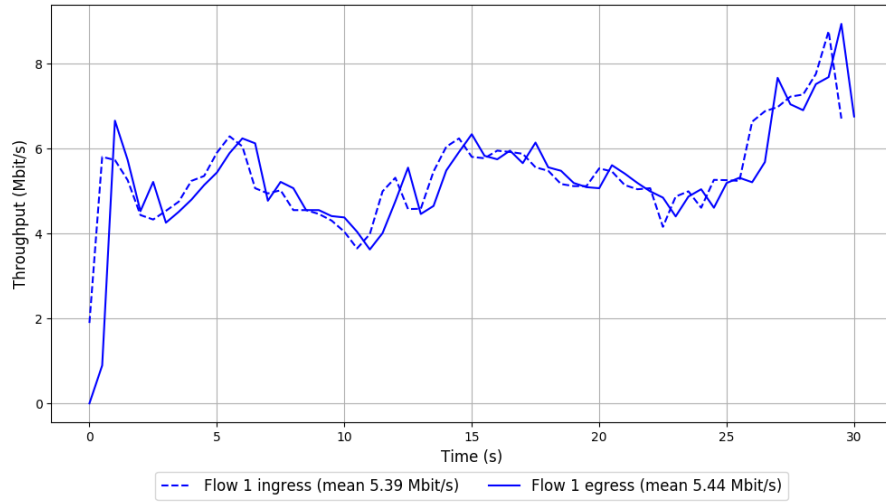
-- Flow 1:

Average throughput: 5.44 Mbit/s

95th percentile per-packet one-way delay: 48.062 ms

Loss rate: 0.05%

### Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

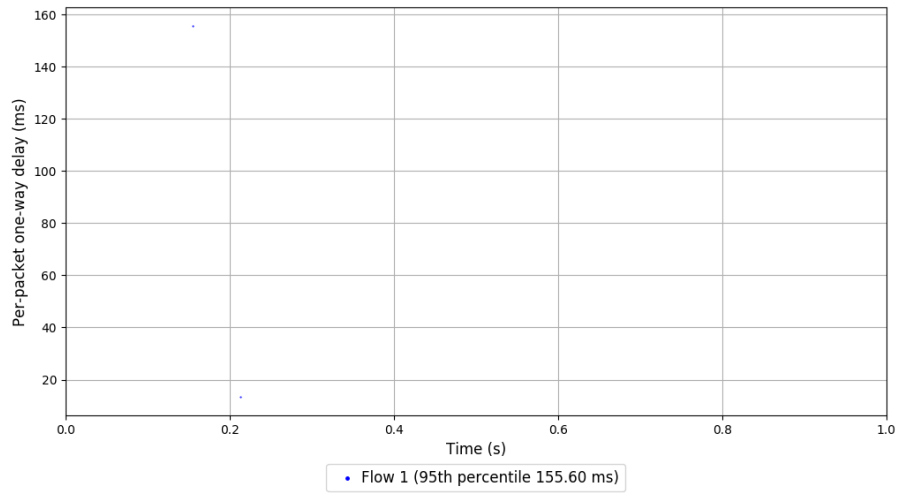
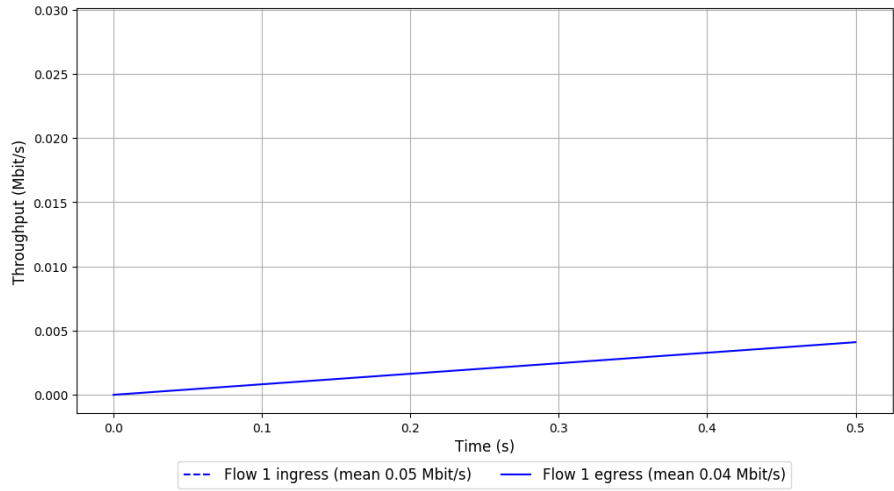
Start at: 2019-05-29 18:43:04

End at: 2019-05-29 18:43:34

Local clock offset: 5.014 ms

Remote clock offset: -2.588 ms

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





Run 3: Statistics of PCC-Expr

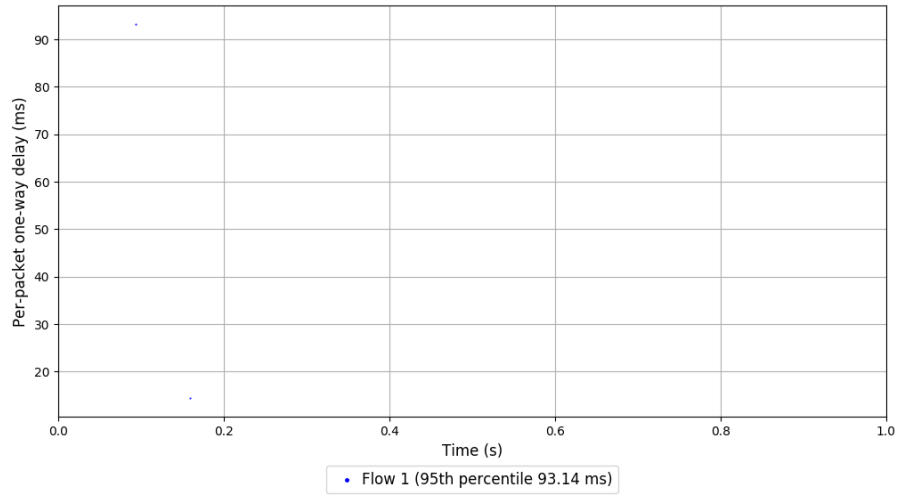
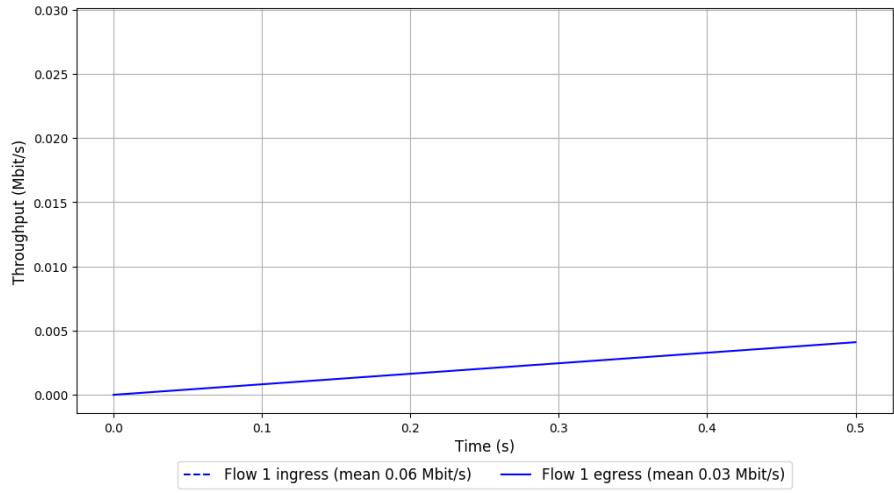
Start at: 2019-05-29 19:08:51

End at: 2019-05-29 19:09:21

Local clock offset: 5.678 ms

Remote clock offset: -1.418 ms

### Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-05-29 18:16:02

End at: 2019-05-29 18:16:32

Local clock offset: 4.818 ms

Remote clock offset: 0.45 ms

# Below is generated by plot.py at 2019-05-29 19:27:38

# Datalink statistics

-- Total of 1 flow:

Average throughput: 11.13 Mbit/s

95th percentile per-packet one-way delay: 255.215 ms

Loss rate: 0.59%

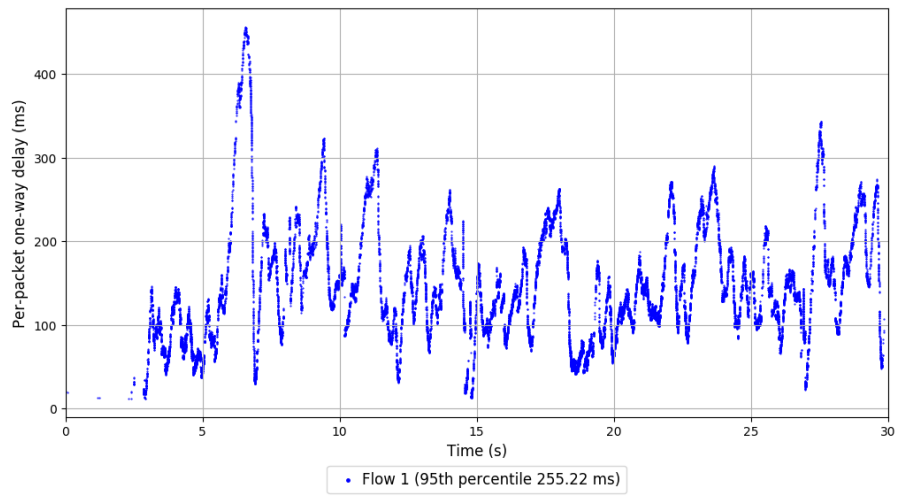
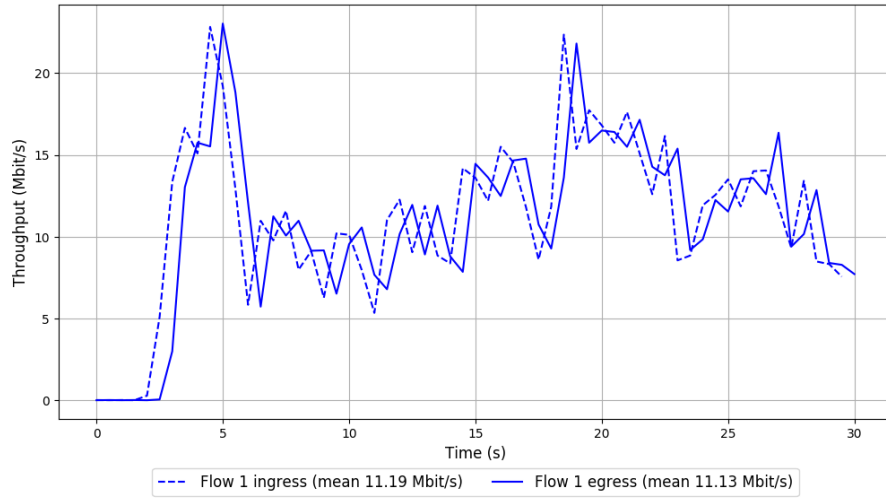
-- Flow 1:

Average throughput: 11.13 Mbit/s

95th percentile per-packet one-way delay: 255.215 ms

Loss rate: 0.59%

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



Run 2: Statistics of QUIC Cubic

Start at: 2019-05-29 18:41:50

End at: 2019-05-29 18:42:20

Local clock offset: 5.012 ms

Remote clock offset: -2.421 ms

# Below is generated by plot.py at 2019-05-29 19:27:38

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.30 Mbit/s

95th percentile per-packet one-way delay: 286.880 ms

Loss rate: 0.59%

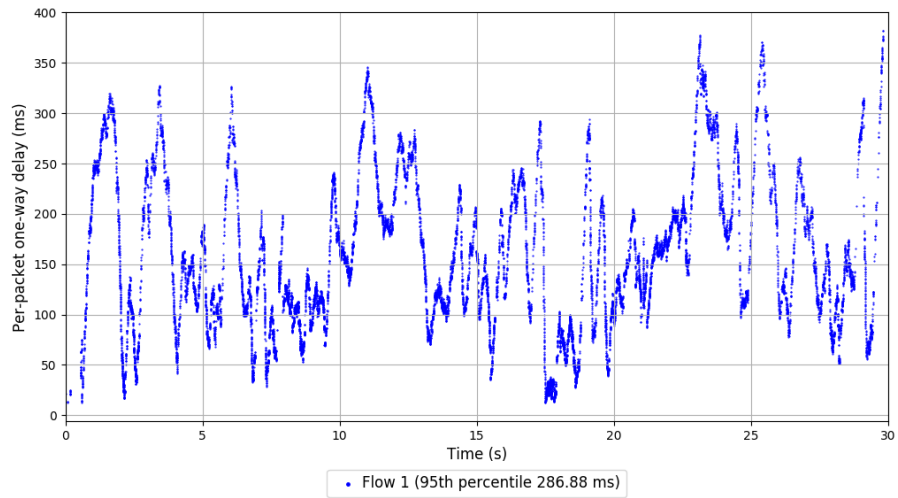
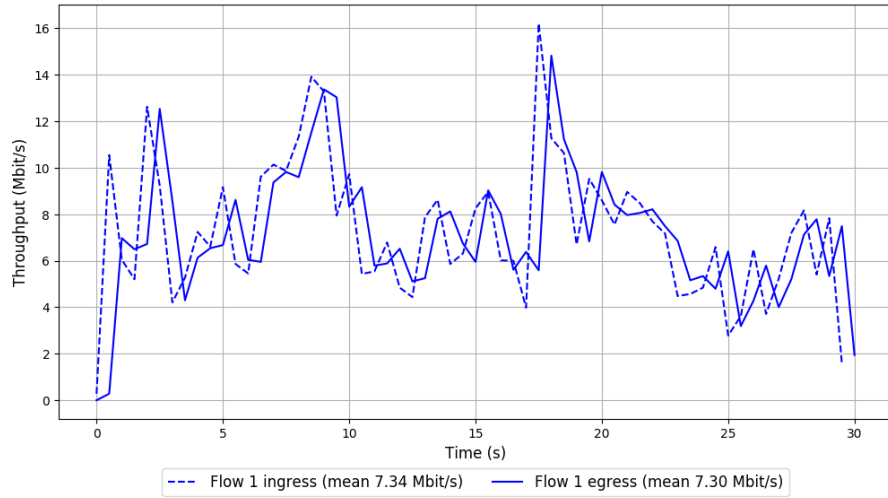
-- Flow 1:

Average throughput: 7.30 Mbit/s

95th percentile per-packet one-way delay: 286.880 ms

Loss rate: 0.59%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2019-05-29 19:07:37

End at: 2019-05-29 19:08:07

Local clock offset: 5.76 ms

Remote clock offset: -1.879 ms

# Below is generated by plot.py at 2019-05-29 19:27:38

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.44 Mbit/s

95th percentile per-packet one-way delay: 260.468 ms

Loss rate: 0.79%

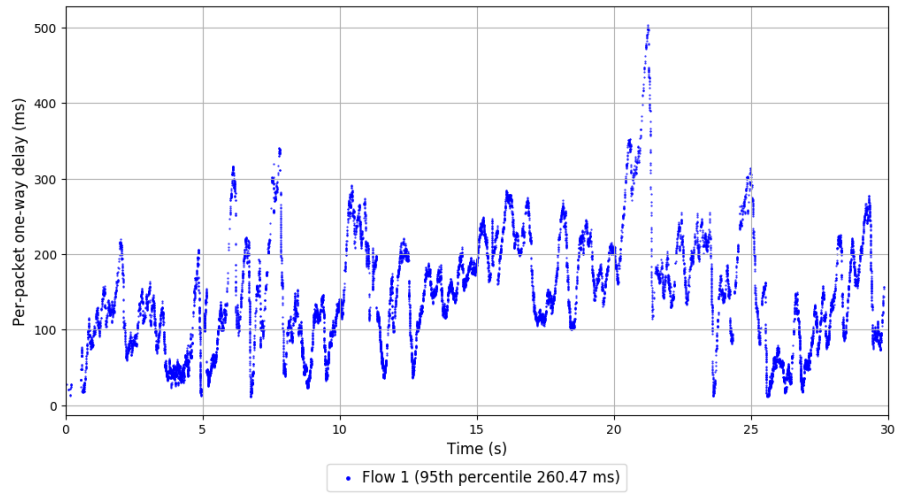
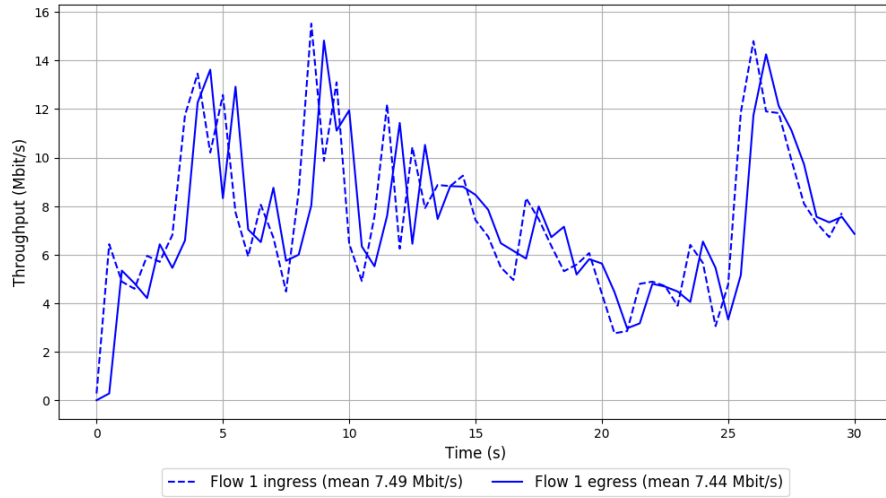
-- Flow 1:

Average throughput: 7.44 Mbit/s

95th percentile per-packet one-way delay: 260.468 ms

Loss rate: 0.79%

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





Run 1: Statistics of SCReAM

Start at: 2019-05-29 18:28:17

End at: 2019-05-29 18:28:47

Local clock offset: 4.603 ms

Remote clock offset: 0.733 ms

# Below is generated by plot.py at 2019-05-29 19:27:38

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 28.148 ms

Loss rate: 0.13%

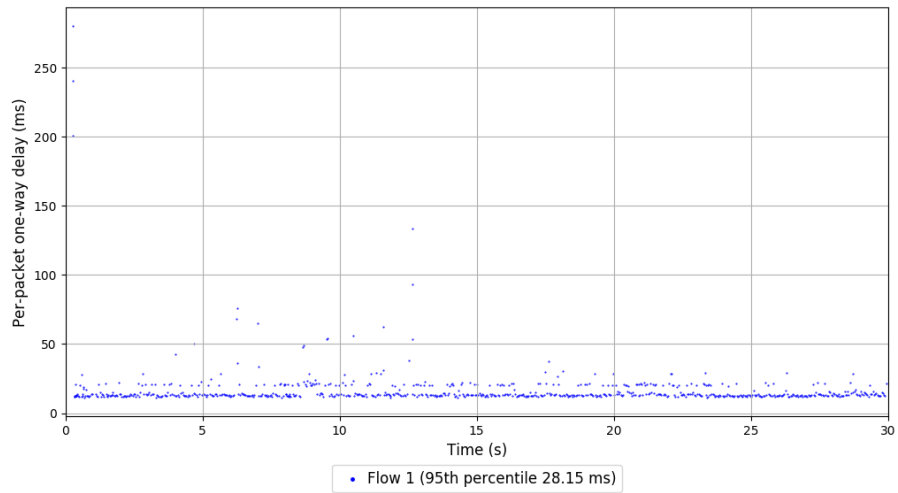
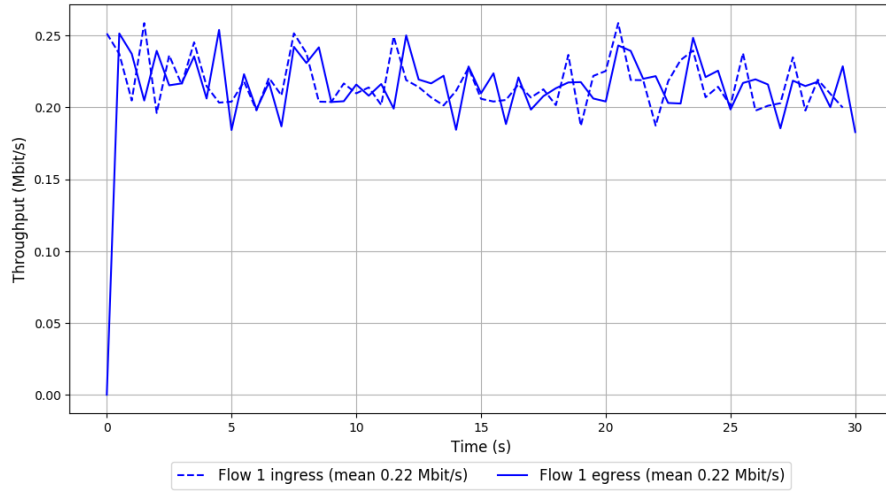
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 28.148 ms

Loss rate: 0.13%

### Run 1: Report of SCReAM — Data Link

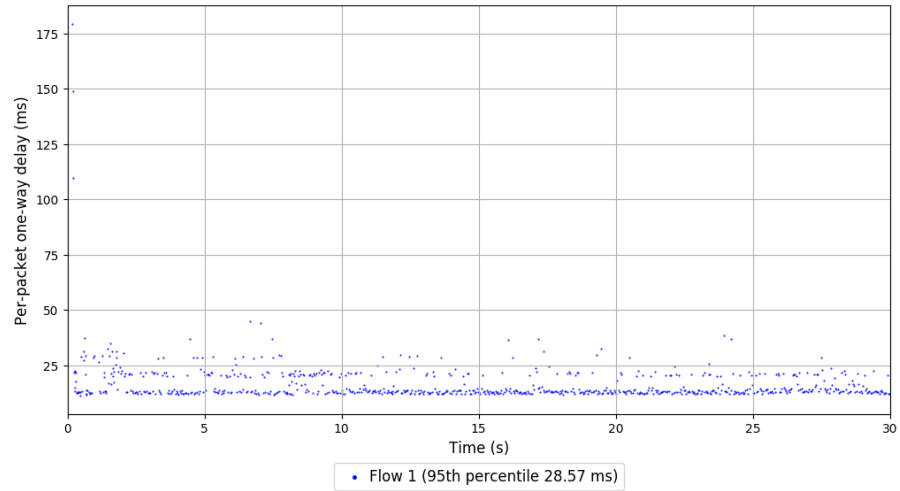
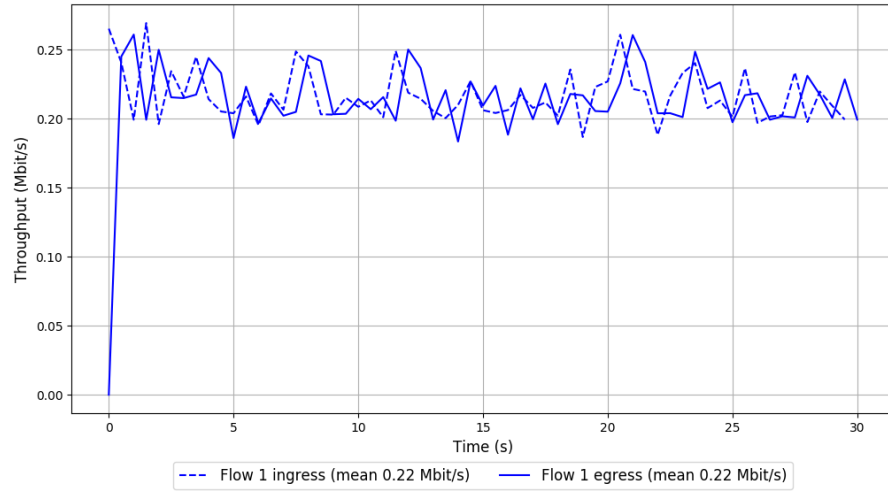


Run 2: Statistics of SCReAM

Start at: 2019-05-29 18:54:05  
End at: 2019-05-29 18:54:35  
Local clock offset: 5.218 ms  
Remote clock offset: -3.413 ms

# Below is generated by plot.py at 2019-05-29 19:27:38  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 28.567 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 28.567 ms  
Loss rate: 0.00%

## Run 2: Report of SCReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2019-05-29 19:19:57

End at: 2019-05-29 19:20:27

Local clock offset: 5.629 ms

Remote clock offset: 0.584 ms

# Below is generated by plot.py at 2019-05-29 19:27:38

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.663 ms

Loss rate: 0.00%

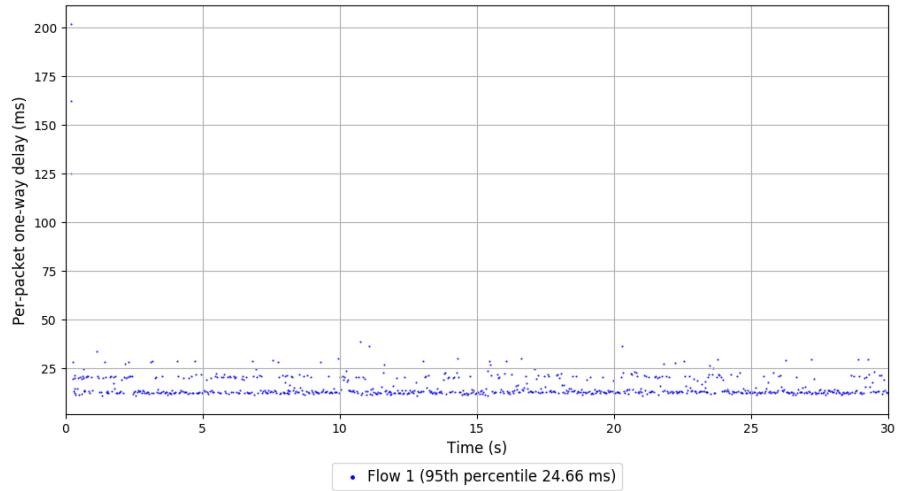
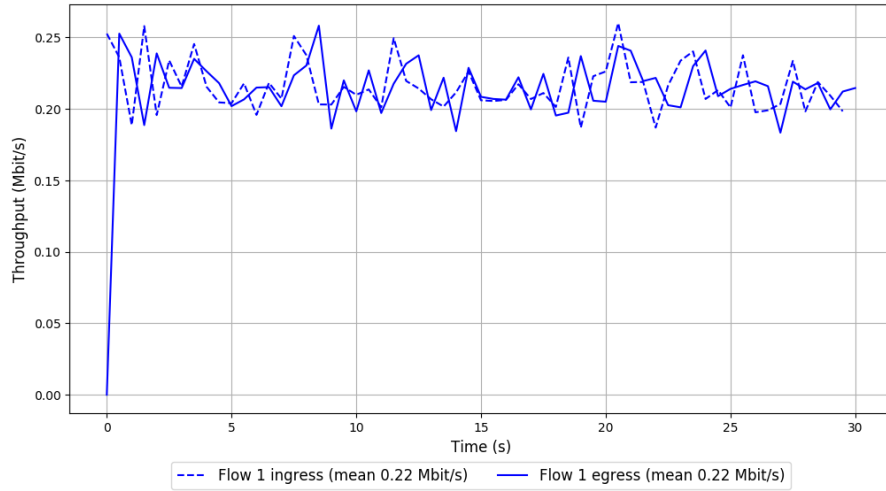
-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.663 ms

Loss rate: 0.00%

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



Run 1: Statistics of Sprout

Start at: 2019-05-29 18:12:21

End at: 2019-05-29 18:12:51

Local clock offset: 4.453 ms

Remote clock offset: 0.506 ms

# Below is generated by plot.py at 2019-05-29 19:27:39

# Datalink statistics

-- Total of 1 flow:

Average throughput: 9.45 Mbit/s

95th percentile per-packet one-way delay: 84.001 ms

Loss rate: 0.15%

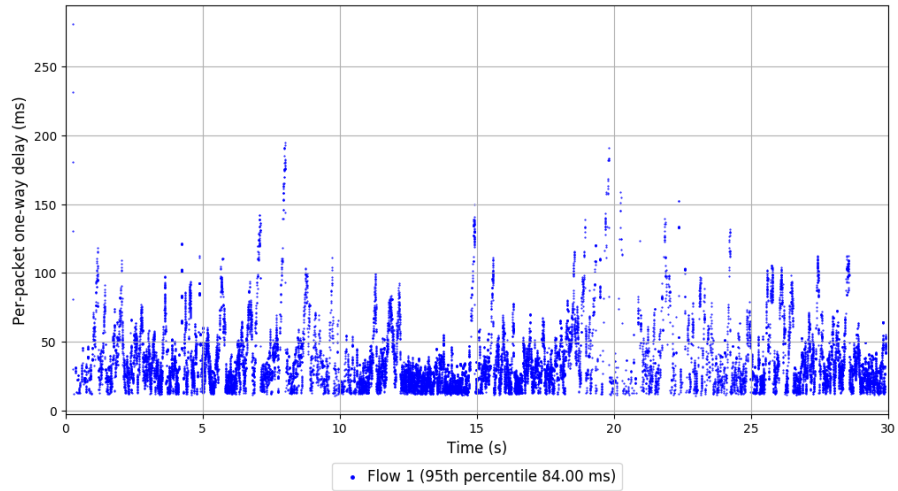
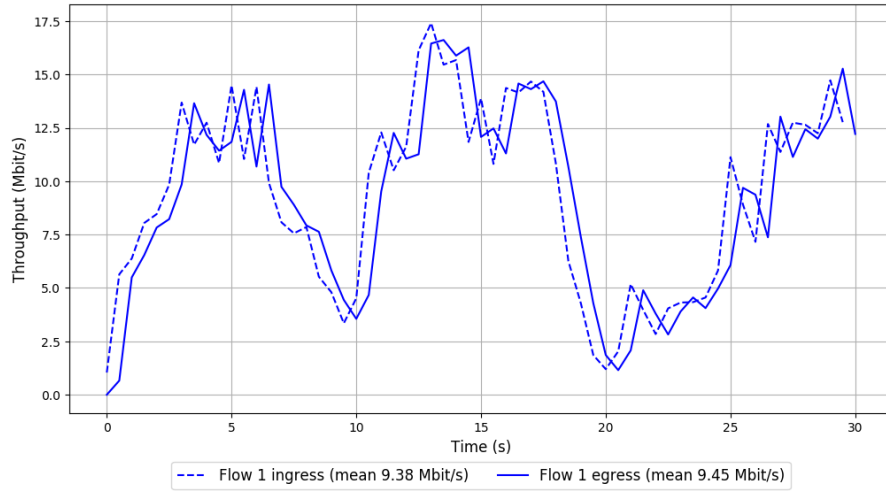
-- Flow 1:

Average throughput: 9.45 Mbit/s

95th percentile per-packet one-way delay: 84.001 ms

Loss rate: 0.15%

### Run 1: Report of Sprout — Data Link





Run 2: Statistics of Sprout

Start at: 2019-05-29 18:38:04

End at: 2019-05-29 18:38:35

Local clock offset: 5.091 ms

Remote clock offset: -2.014 ms

# Below is generated by plot.py at 2019-05-29 19:27:39

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.11 Mbit/s

95th percentile per-packet one-way delay: 74.461 ms

Loss rate: 0.02%

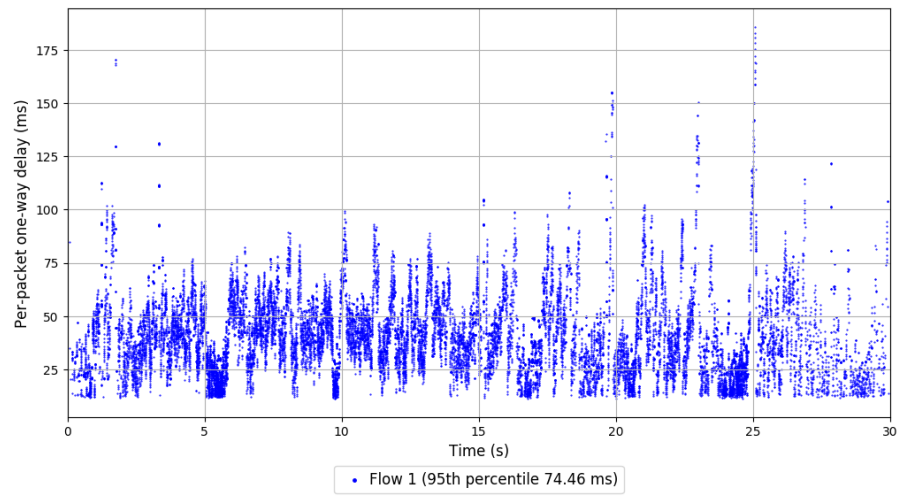
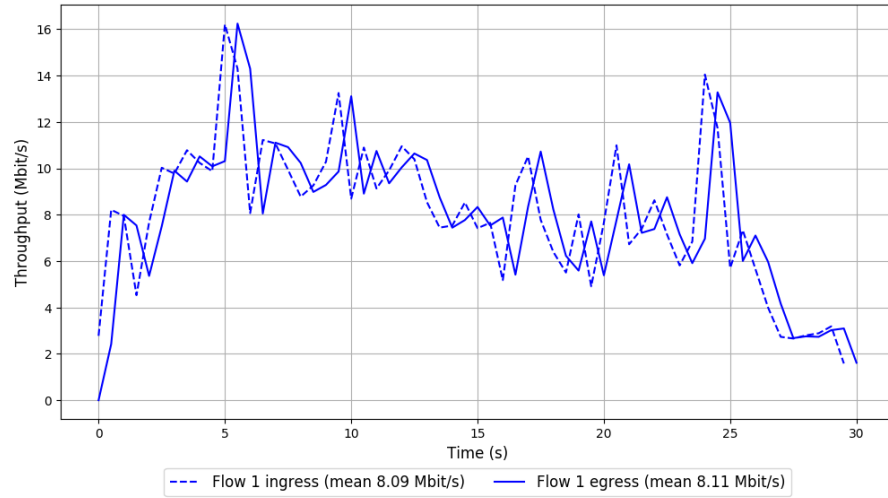
-- Flow 1:

Average throughput: 8.11 Mbit/s

95th percentile per-packet one-way delay: 74.461 ms

Loss rate: 0.02%

## Run 2: Report of Sprout — Data Link

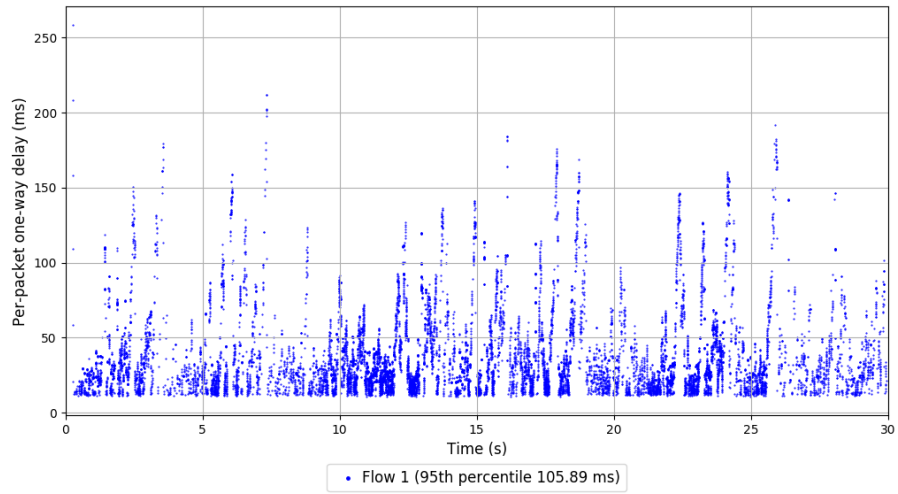
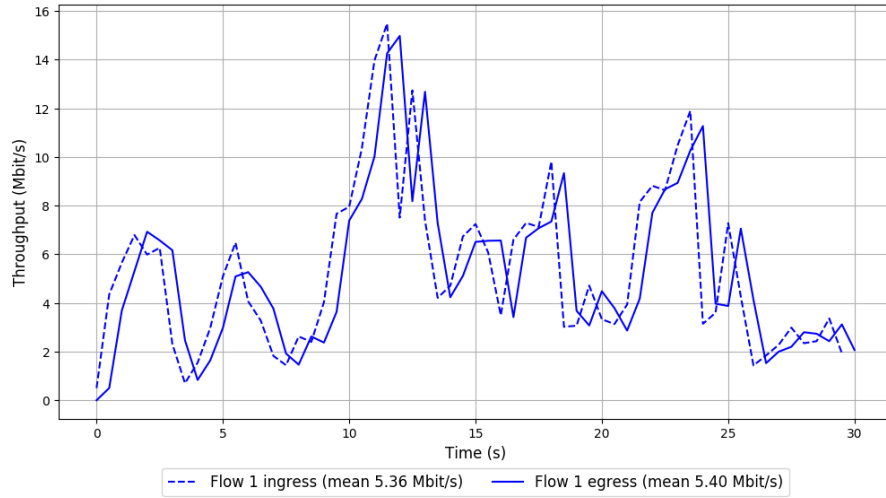


Run 3: Statistics of Sprout

Start at: 2019-05-29 19:03:57  
End at: 2019-05-29 19:04:27  
Local clock offset: 5.658 ms  
Remote clock offset: -3.356 ms

```
# Below is generated by plot.py at 2019-05-29 19:27:39
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.40 Mbit/s
95th percentile per-packet one-way delay: 105.892 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 5.40 Mbit/s
95th percentile per-packet one-way delay: 105.892 ms
Loss rate: 0.04%
```

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



Run 1: Statistics of TaoVA-100x

Start at: 2019-05-29 18:30:43

End at: 2019-05-29 18:31:13

Local clock offset: 4.739 ms

Remote clock offset: -0.072 ms

# Below is generated by plot.py at 2019-05-29 19:27:39

# Datalink statistics

-- Total of 1 flow:

Average throughput: 4.98 Mbit/s

95th percentile per-packet one-way delay: 41.783 ms

Loss rate: 0.05%

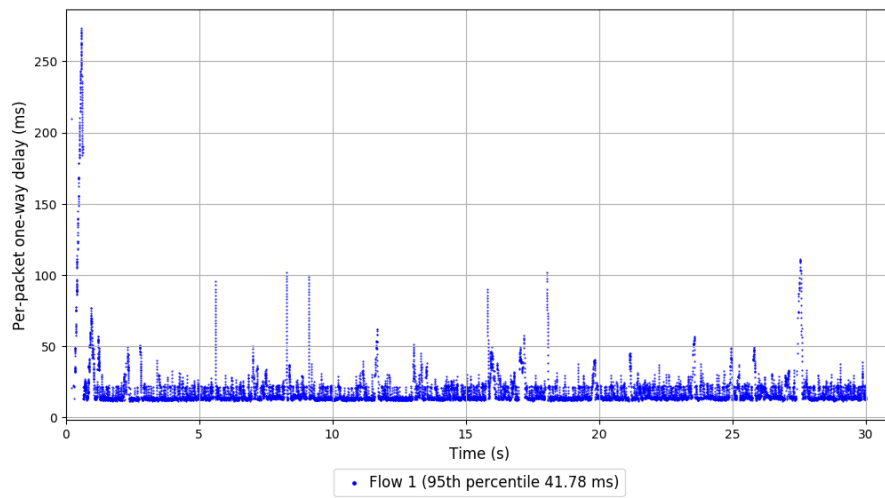
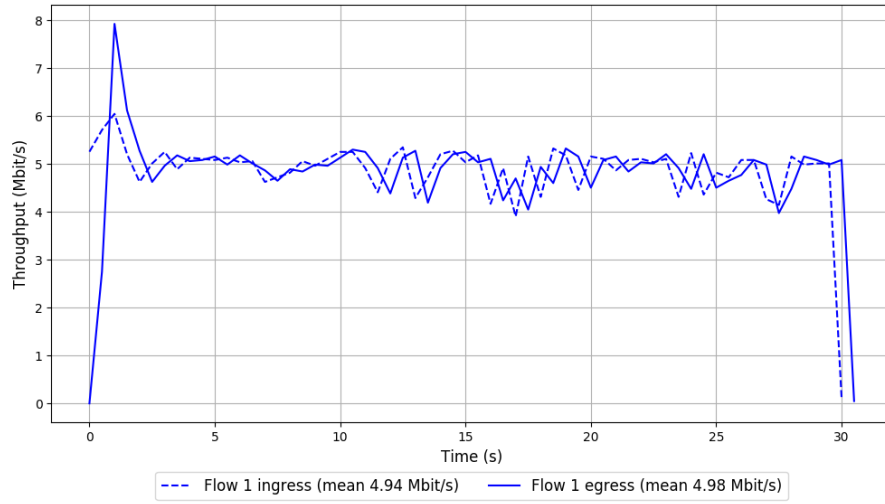
-- Flow 1:

Average throughput: 4.98 Mbit/s

95th percentile per-packet one-way delay: 41.783 ms

Loss rate: 0.05%

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



Run 2: Statistics of TaoVA-100x

Start at: 2019-05-29 18:56:31

End at: 2019-05-29 18:57:01

Local clock offset: 5.321 ms

Remote clock offset: -3.517 ms

# Below is generated by plot.py at 2019-05-29 19:27:40

# Datalink statistics

-- Total of 1 flow:

Average throughput: 4.23 Mbit/s

95th percentile per-packet one-way delay: 126.673 ms

Loss rate: 0.06%

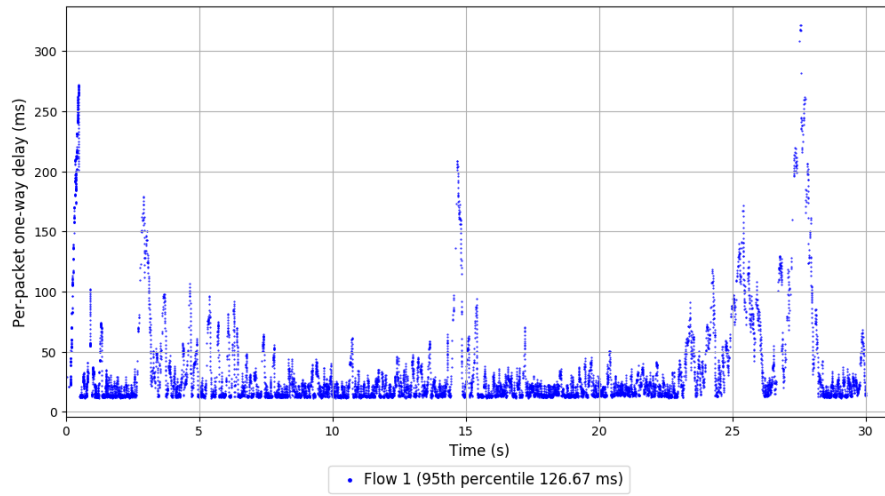
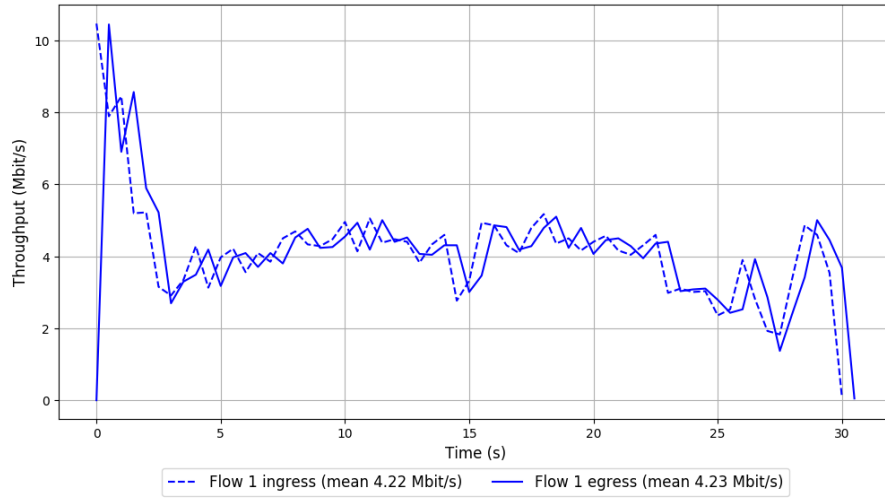
-- Flow 1:

Average throughput: 4.23 Mbit/s

95th percentile per-packet one-way delay: 126.673 ms

Loss rate: 0.06%

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





Run 3: Statistics of TaoVA-100x

Start at: 2019-05-29 19:22:23

End at: 2019-05-29 19:22:53

Local clock offset: 5.627 ms

Remote clock offset: 0.895 ms

# Below is generated by plot.py at 2019-05-29 19:27:40

# Datalink statistics

-- Total of 1 flow:

Average throughput: 3.87 Mbit/s

95th percentile per-packet one-way delay: 104.887 ms

Loss rate: 0.05%

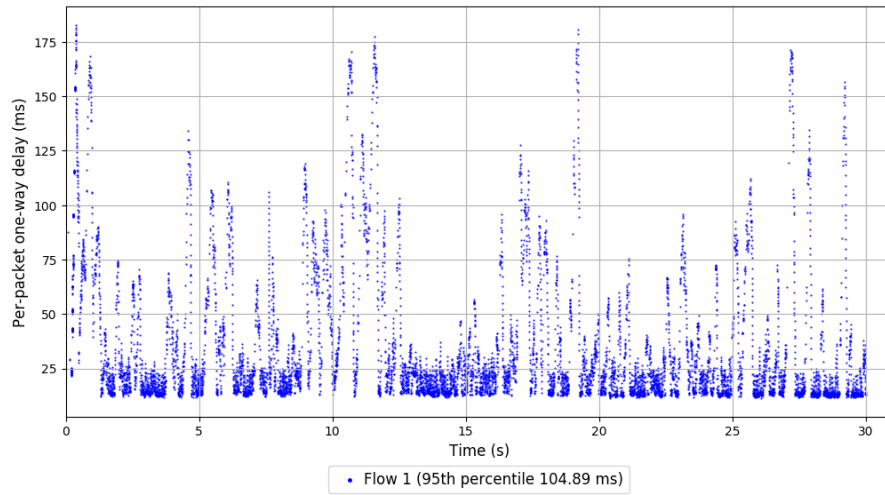
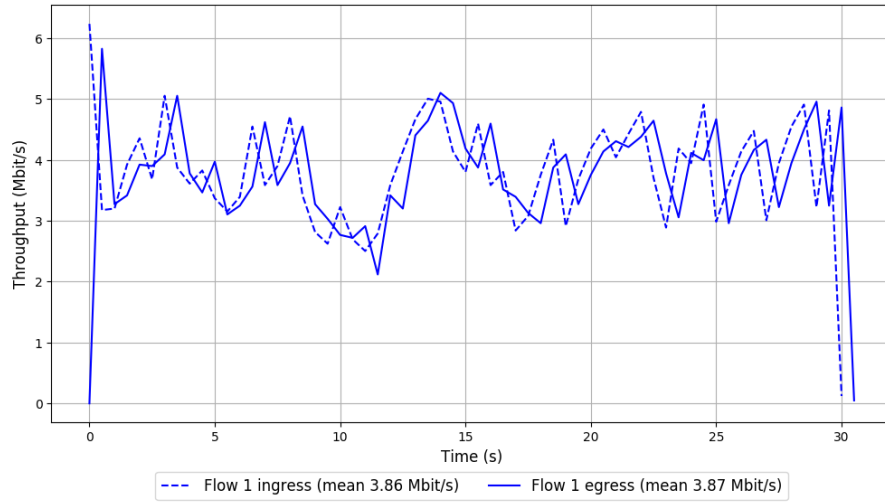
-- Flow 1:

Average throughput: 3.87 Mbit/s

95th percentile per-packet one-way delay: 104.887 ms

Loss rate: 0.05%

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



Run 1: Statistics of TCP Vegas

Start at: 2019-05-29 18:19:43

End at: 2019-05-29 18:20:13

Local clock offset: 4.308 ms

Remote clock offset: 0.549 ms

# Below is generated by plot.py at 2019-05-29 19:27:40

# Datalink statistics

-- Total of 1 flow:

Average throughput: 3.67 Mbit/s

95th percentile per-packet one-way delay: 28.212 ms

Loss rate: 0.02%

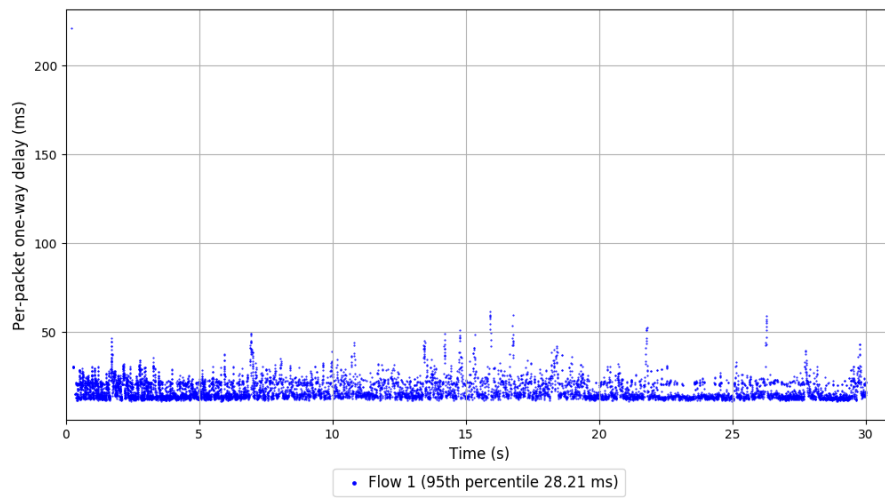
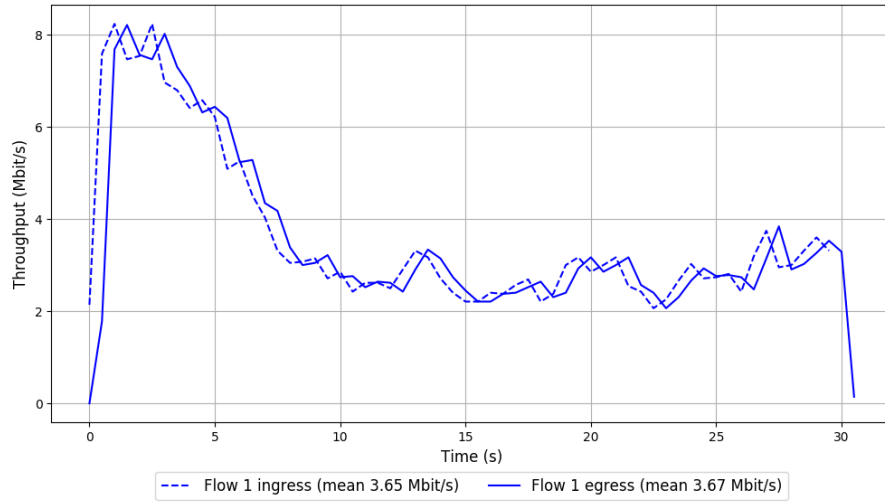
-- Flow 1:

Average throughput: 3.67 Mbit/s

95th percentile per-packet one-way delay: 28.212 ms

Loss rate: 0.02%

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



Run 2: Statistics of TCP Vegas

Start at: 2019-05-29 18:45:31

End at: 2019-05-29 18:46:01

Local clock offset: 5.04 ms

Remote clock offset: -2.767 ms

# Below is generated by plot.py at 2019-05-29 19:27:40

# Datalink statistics

-- Total of 1 flow:

Average throughput: 3.06 Mbit/s

95th percentile per-packet one-way delay: 37.021 ms

Loss rate: 0.03%

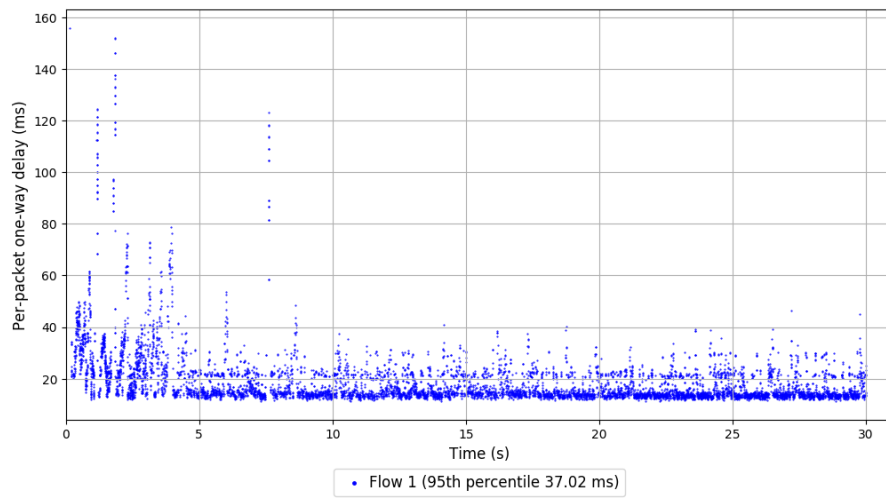
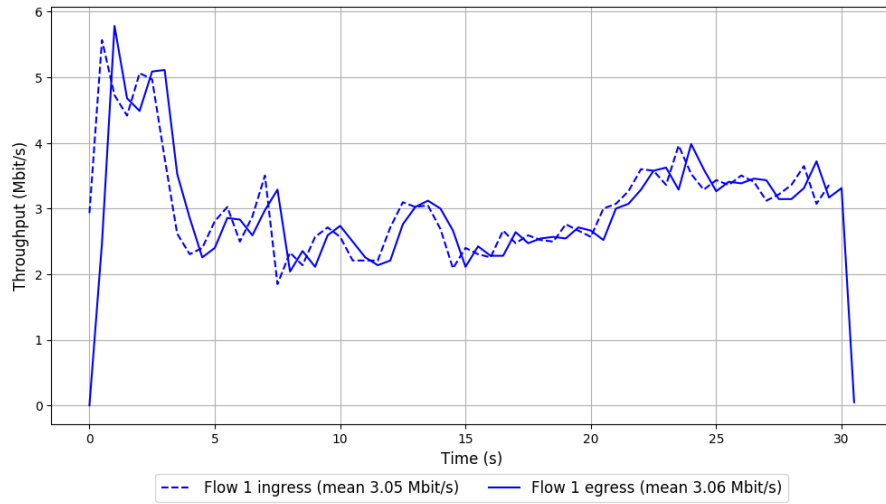
-- Flow 1:

Average throughput: 3.06 Mbit/s

95th percentile per-packet one-way delay: 37.021 ms

Loss rate: 0.03%

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

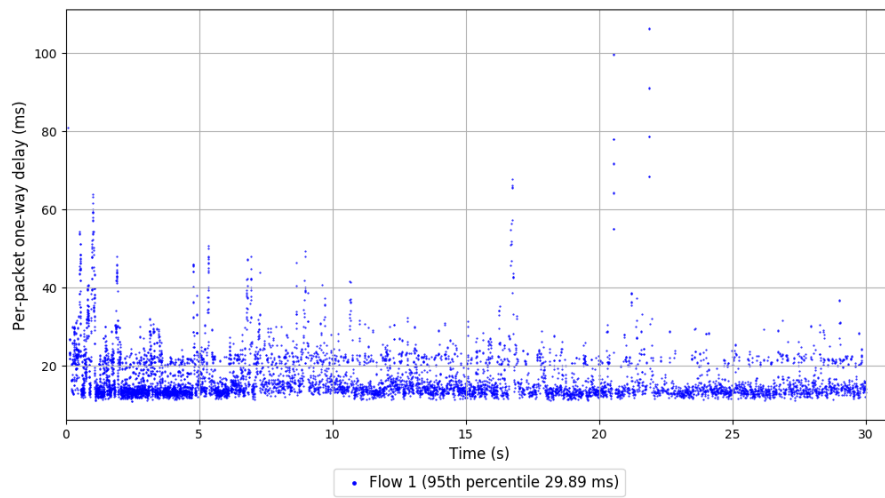
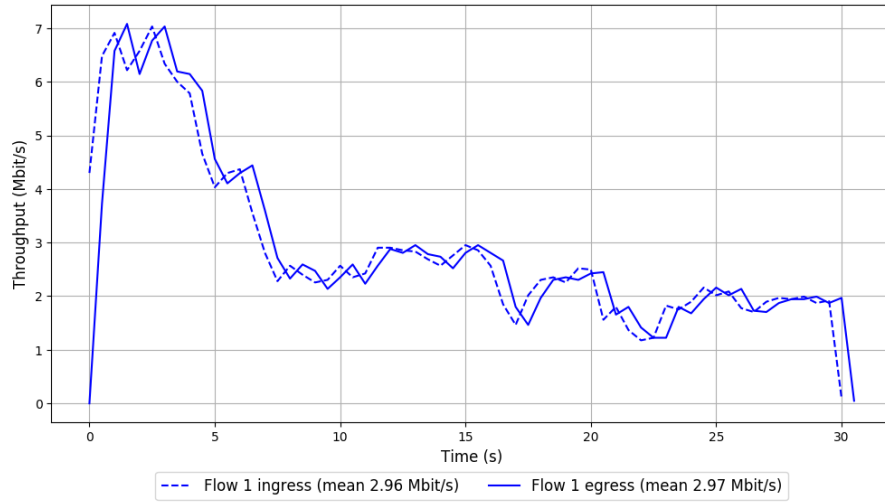


Run 3: Statistics of TCP Vegas

Start at: 2019-05-29 19:11:23  
End at: 2019-05-29 19:11:53  
Local clock offset: 5.635 ms  
Remote clock offset: -0.832 ms

# Below is generated by plot.py at 2019-05-29 19:27:41  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 2.97 Mbit/s  
95th percentile per-packet one-way delay: 29.892 ms  
Loss rate: 0.05%  
-- Flow 1:  
Average throughput: 2.97 Mbit/s  
95th percentile per-packet one-way delay: 29.892 ms  
Loss rate: 0.05%

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





Run 1: Statistics of Verus

Start at: 2019-05-29 18:18:29

End at: 2019-05-29 18:18:59

Local clock offset: 4.483 ms

Remote clock offset: 0.601 ms

# Below is generated by plot.py at 2019-05-29 19:27:47

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.15 Mbit/s

95th percentile per-packet one-way delay: 404.235 ms

Loss rate: 1.34%

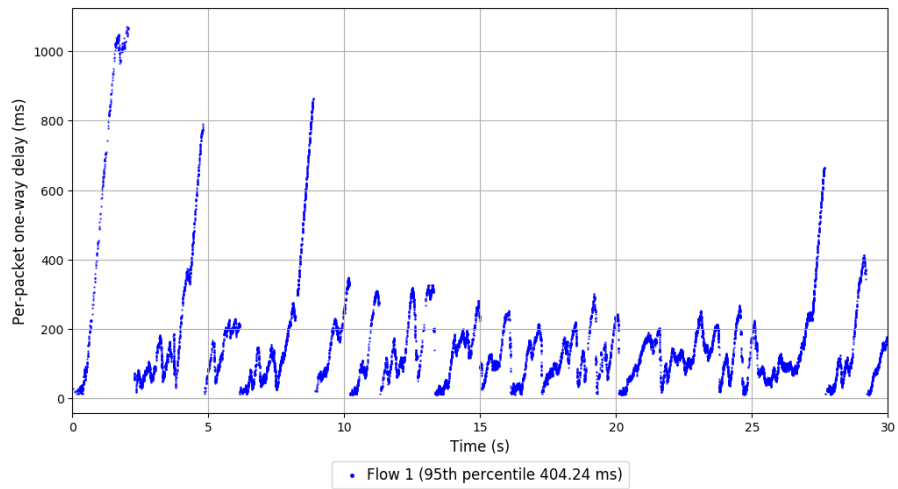
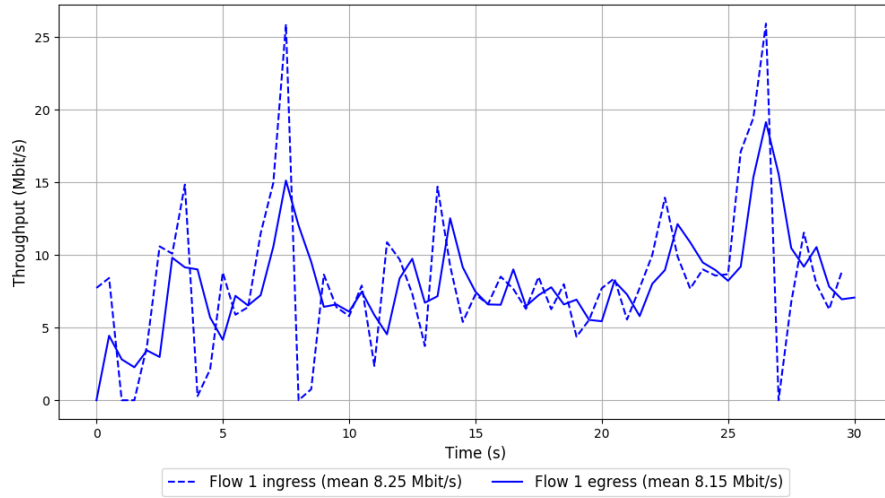
-- Flow 1:

Average throughput: 8.15 Mbit/s

95th percentile per-packet one-way delay: 404.235 ms

Loss rate: 1.34%

Run 1: Report of Verus — Data Link

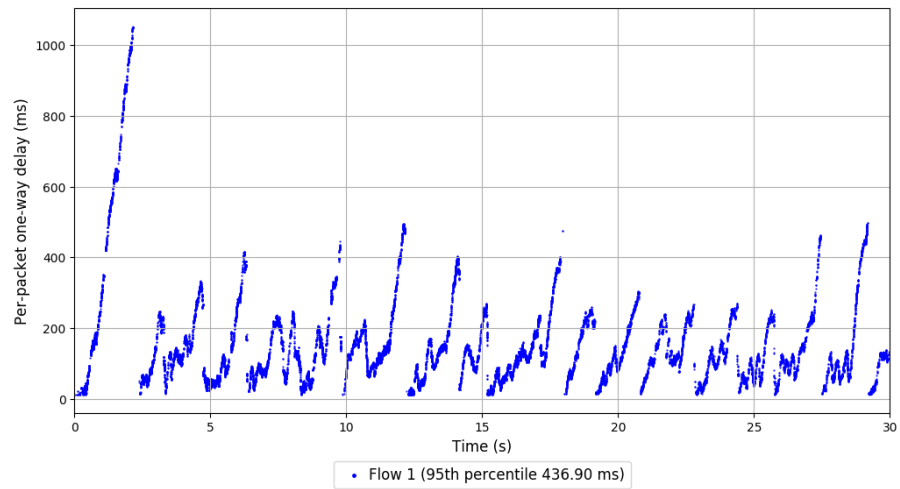
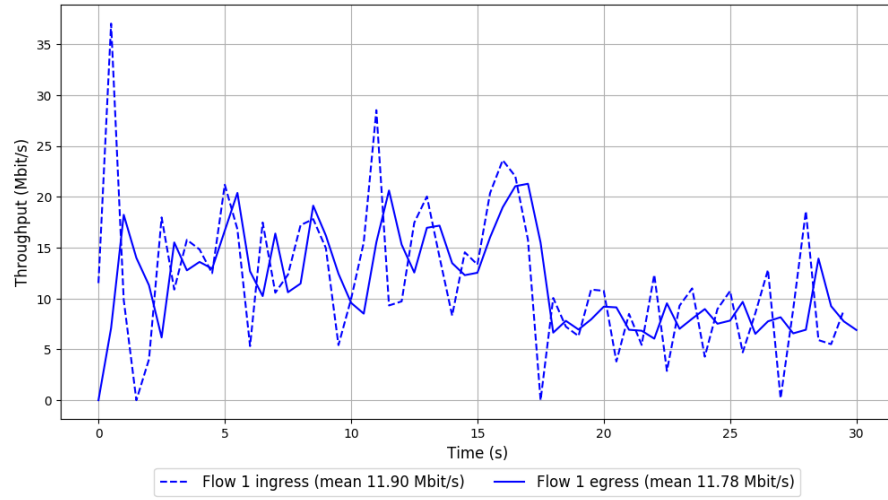


Run 2: Statistics of Verus

Start at: 2019-05-29 18:44:17  
End at: 2019-05-29 18:44:47  
Local clock offset: 5.035 ms  
Remote clock offset: -2.737 ms

# Below is generated by plot.py at 2019-05-29 19:27:48  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 11.78 Mbit/s  
95th percentile per-packet one-way delay: 436.899 ms  
Loss rate: 1.07%  
-- Flow 1:  
Average throughput: 11.78 Mbit/s  
95th percentile per-packet one-way delay: 436.899 ms  
Loss rate: 1.07%

## Run 2: Report of Verus — Data Link

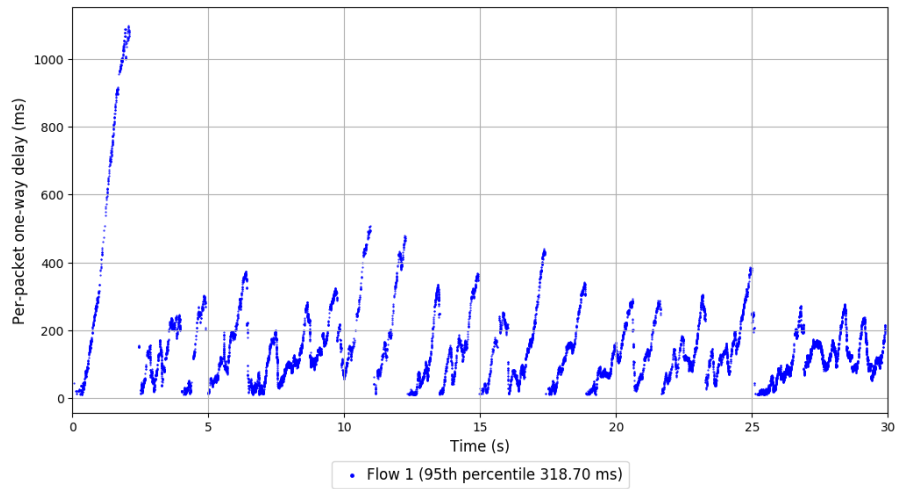
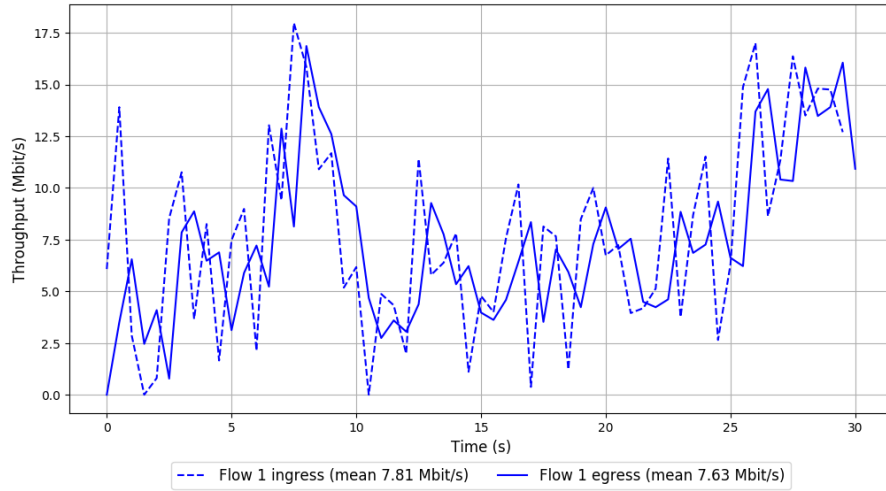


Run 3: Statistics of Verus

Start at: 2019-05-29 19:10:09  
End at: 2019-05-29 19:10:39  
Local clock offset: 5.648 ms  
Remote clock offset: -1.117 ms

# Below is generated by plot.py at 2019-05-29 19:27:48  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 7.63 Mbit/s  
95th percentile per-packet one-way delay: 318.703 ms  
Loss rate: 2.44%  
-- Flow 1:  
Average throughput: 7.63 Mbit/s  
95th percentile per-packet one-way delay: 318.703 ms  
Loss rate: 2.44%

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



Run 1: Statistics of PCC-Vivace

Start at: 2019-05-29 18:09:54

End at: 2019-05-29 18:10:24

Local clock offset: 4.995 ms

Remote clock offset: 0.417 ms

# Below is generated by plot.py at 2019-05-29 19:27:48

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.46 Mbit/s

95th percentile per-packet one-way delay: 24.109 ms

Loss rate: 0.05%

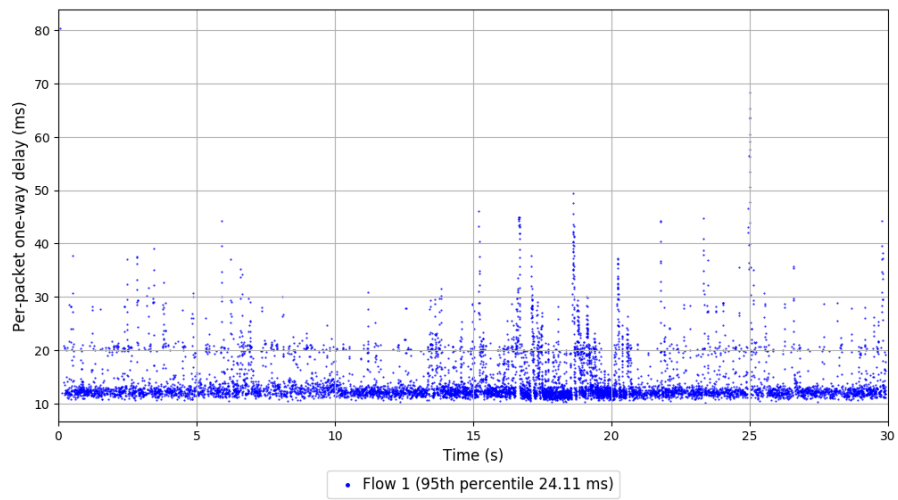
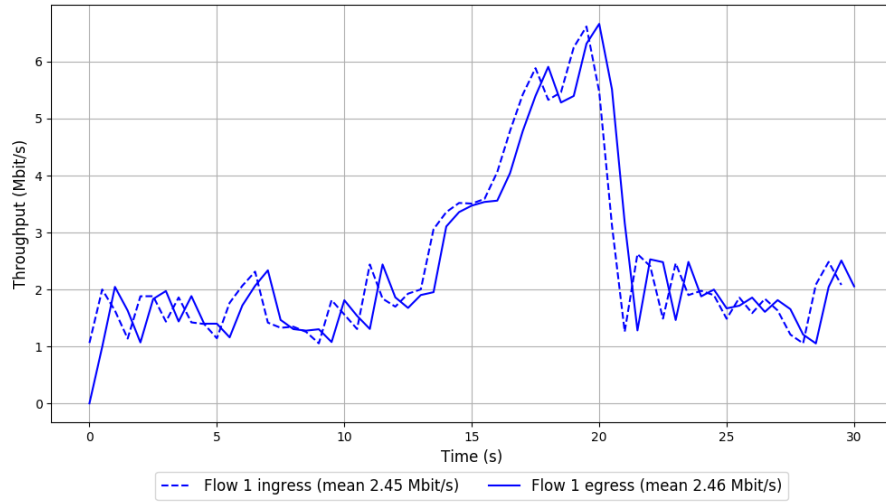
-- Flow 1:

Average throughput: 2.46 Mbit/s

95th percentile per-packet one-way delay: 24.109 ms

Loss rate: 0.05%

Run 1: Report of PCC-Vivace — Data Link





Run 2: Statistics of PCC-Vivace

Start at: 2019-05-29 18:35:37

End at: 2019-05-29 18:36:07

Local clock offset: 4.994 ms

Remote clock offset: -1.421 ms

# Below is generated by plot.py at 2019-05-29 19:27:48

# Datalink statistics

-- Total of 1 flow:

Average throughput: 2.92 Mbit/s

95th percentile per-packet one-way delay: 32.349 ms

Loss rate: 0.05%

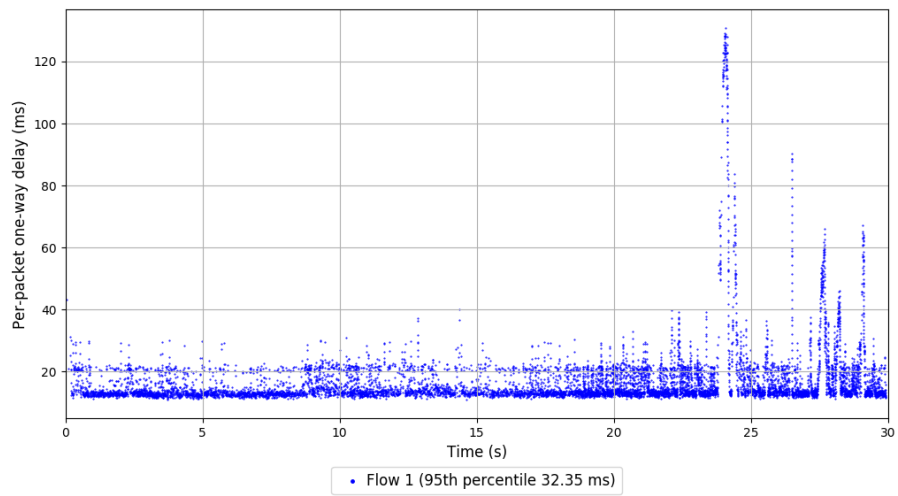
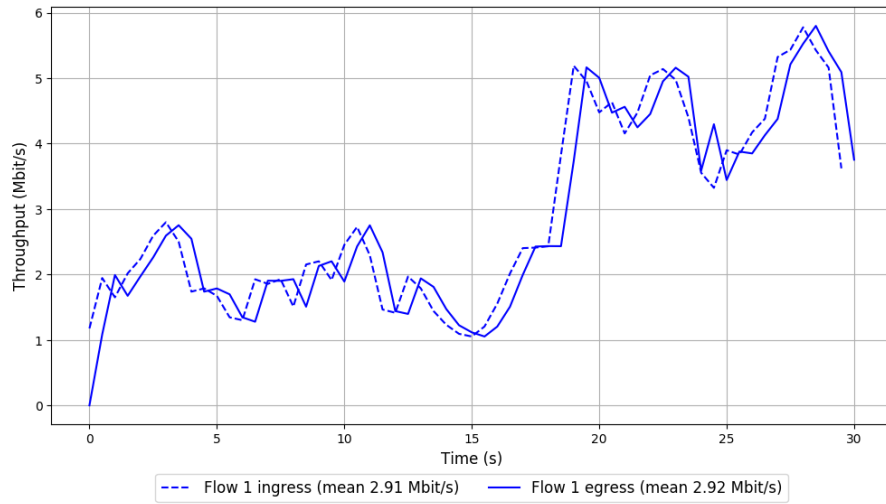
-- Flow 1:

Average throughput: 2.92 Mbit/s

95th percentile per-packet one-way delay: 32.349 ms

Loss rate: 0.05%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-05-29 19:01:25

End at: 2019-05-29 19:01:55

Local clock offset: 5.509 ms

Remote clock offset: -3.725 ms

# Below is generated by plot.py at 2019-05-29 19:27:48

# Datalink statistics

-- Total of 1 flow:

Average throughput: 6.00 Mbit/s

95th percentile per-packet one-way delay: 1010.567 ms

Loss rate: 5.97%

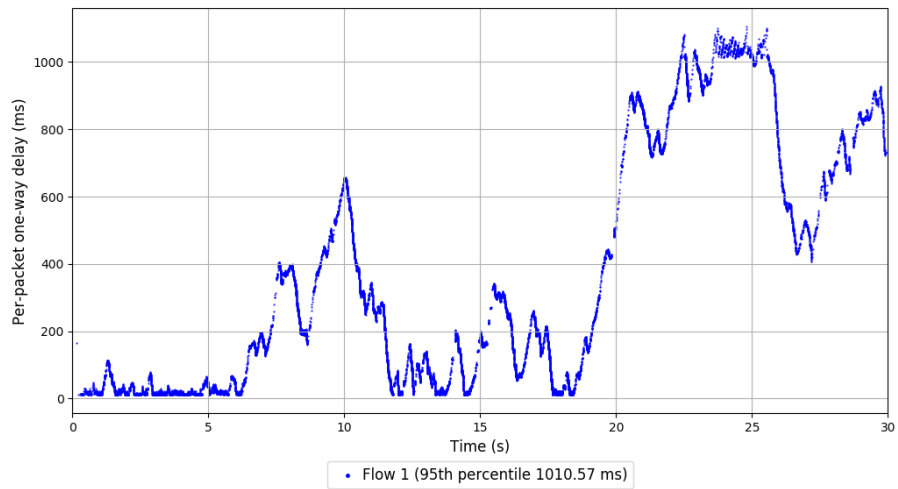
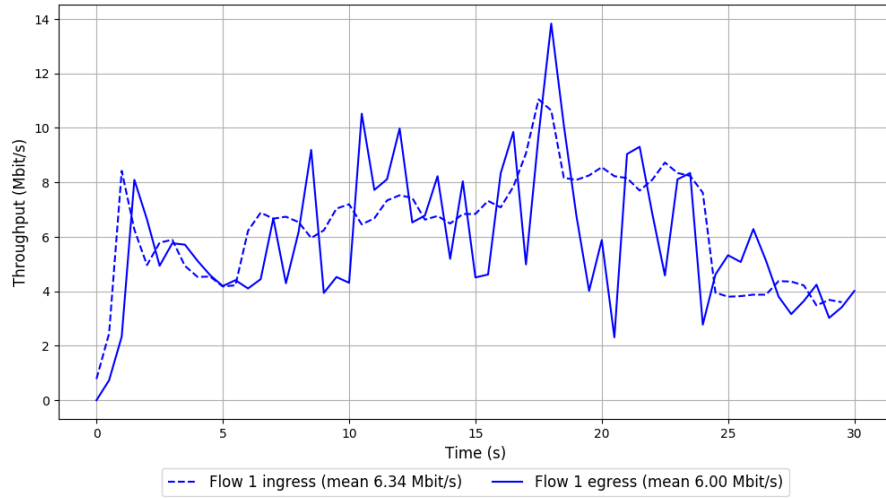
-- Flow 1:

Average throughput: 6.00 Mbit/s

95th percentile per-packet one-way delay: 1010.567 ms

Loss rate: 5.97%

### Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2019-05-29 18:29:30

End at: 2019-05-29 18:30:00

Local clock offset: 4.645 ms

Remote clock offset: 0.562 ms

# Below is generated by plot.py at 2019-05-29 19:27:48

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 62.148 ms

Loss rate: 0.00%

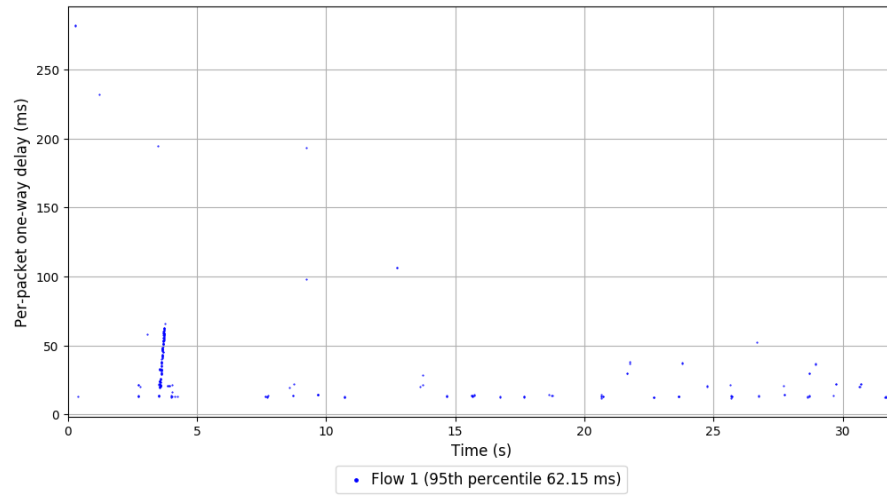
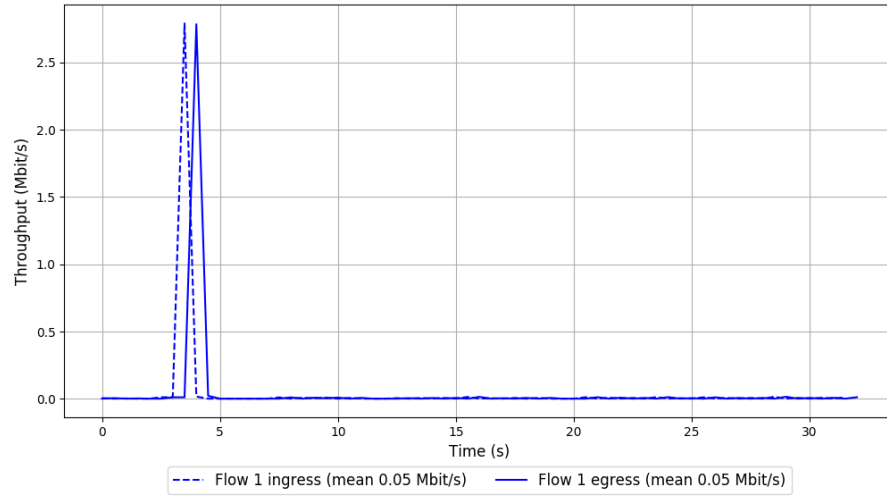
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 62.148 ms

Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-05-29 18:55:18

End at: 2019-05-29 18:55:48

Local clock offset: 5.265 ms

Remote clock offset: -3.487 ms

# Below is generated by plot.py at 2019-05-29 19:27:48

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 36.575 ms

Loss rate: 0.00%

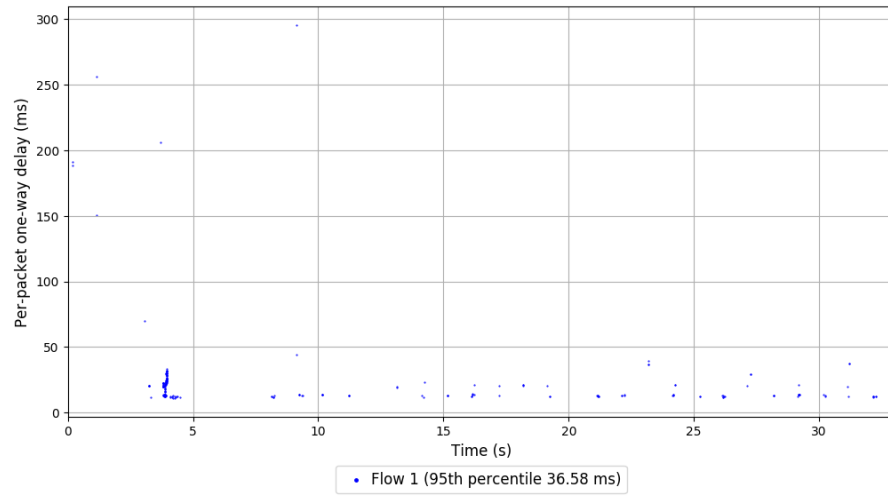
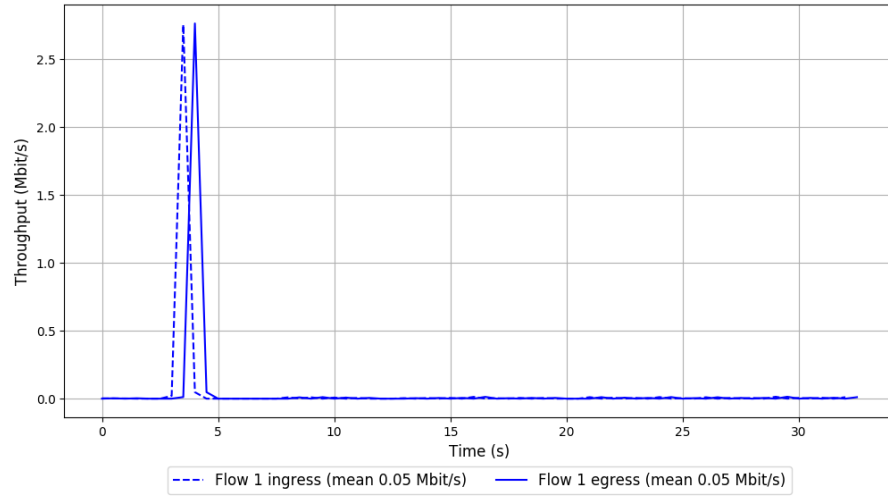
-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 36.575 ms

Loss rate: 0.00%

## Run 2: Report of WebRTC media — Data Link





Run 3: Statistics of WebRTC media

Start at: 2019-05-29 19:21:10

End at: 2019-05-29 19:21:40

Local clock offset: 5.631 ms

Remote clock offset: 0.777 ms

# Below is generated by plot.py at 2019-05-29 19:27:48

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 84.519 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 84.519 ms

Loss rate: 0.00%

### Run 3: Report of WebRTC media — Data Link

