

Pantheon Report

Generated at 2019-03-27 06:03:45 (UTC).

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

Repeated the test of 21 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

NTP offsets were measured against `gps.ntp.br` and have been applied to correct the timestamps in logs.

System info:

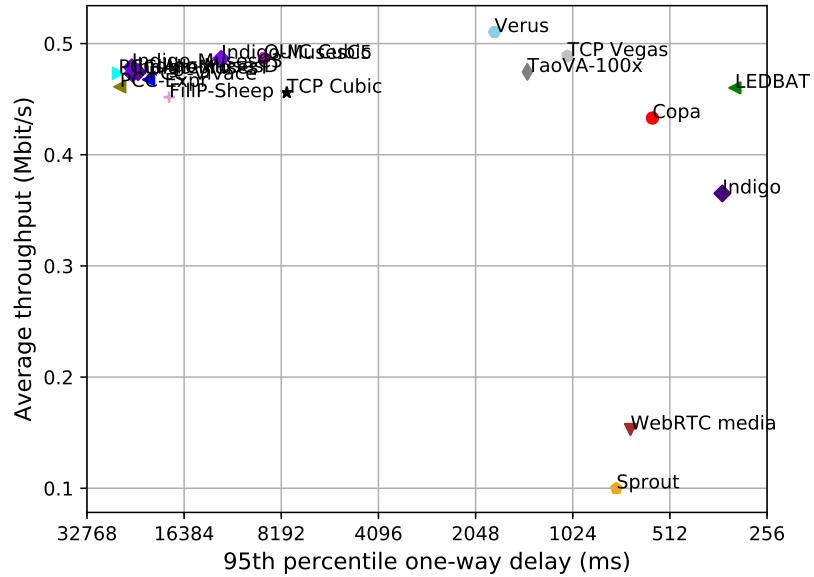
```
Linux 4.15.0-1034-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

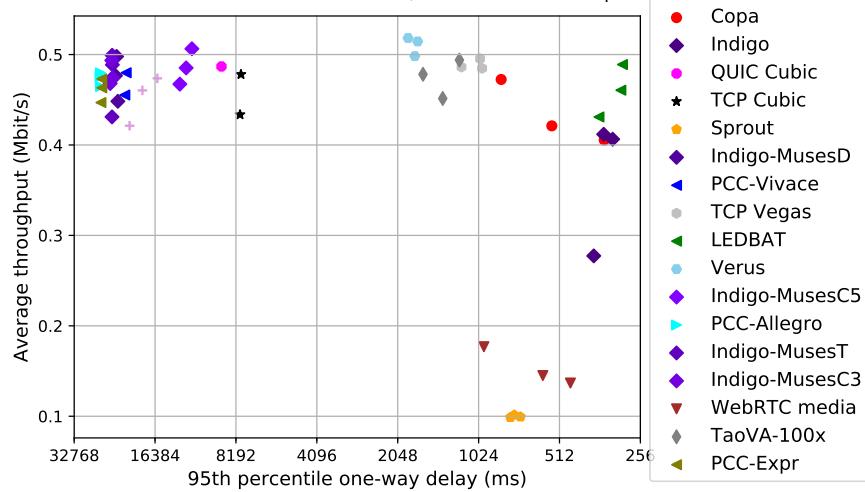
```
branch: muses @ 7a686f7c2ed0a333082c0bab1fa5c921ab47e6ee
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 5ce721187ad823da20955337730c746486ca4966
third_party/pantheon-tunnel @ f866d3f58d27af942717625ee3a354cc2e802bd
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-quic @ 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 Colombia cellular to AWS Brazil 2, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from Colombia cellular to AWS Brazil 2, 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	0	N/A	N/A	N/A
Copa	3	0.43	579.96	2.07
TCP Cubic	2	0.45	7878.67	31.45
FillP	0	N/A	N/A	N/A
FillP-Sheep	3	0.45	18233.00	22.00
Indigo	3	0.37	352.28	1.02
Indigo-MusesC3	3	0.48	23793.17	93.47
Indigo-MusesC5	3	0.49	12583.36	47.41
Indigo-MusesD	3	0.48	22771.66	94.38
Indigo-MusesT	3	0.47	23659.30	82.25
LEDBAT	3	0.46	322.10	1.27
PCC-Allegro	3	0.47	26179.44	98.73
PCC-Expr	3	0.46	25929.43	92.43
QUIC Cubic	1	0.49	9273.40	30.58
SCReAM	0	N/A	N/A	N/A
Sprout	3	0.10	749.99	0.69
TaoVA-100x	3	0.47	1416.06	2.97
TCP Vegas	3	0.49	1063.62	1.50
Verus	3	0.51	1789.73	4.20
PCC-Vivace	2	0.47	21108.96	77.21
WebRTC media	3	0.15	678.46	0.41

Run 1: Statistics of TCP BBR

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/bbr_st

Run 1: Report of TCP BBR — Data Link

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Run 2: Statistics of TCP BBR

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/bbr_sta

Run 2: Report of TCP BBR — Data Link

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Run 3: Statistics of TCP BBR

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/bbr_sta

Run 3: Report of TCP BBR — Data Link

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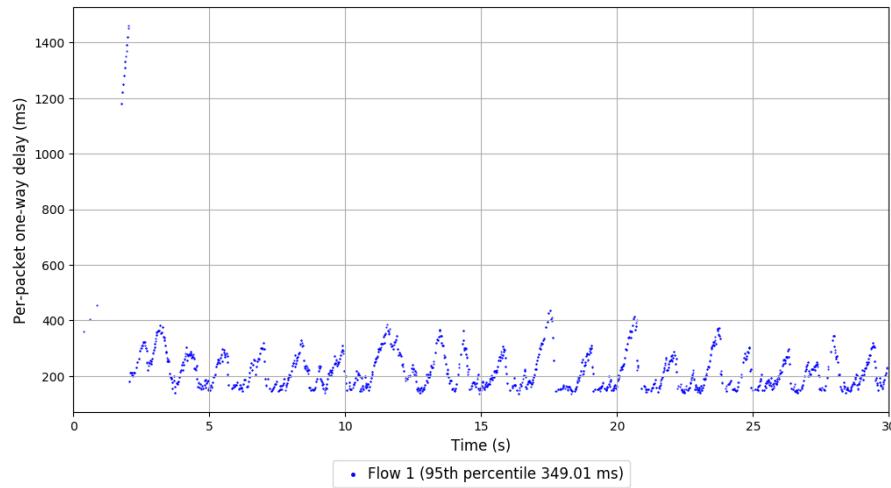
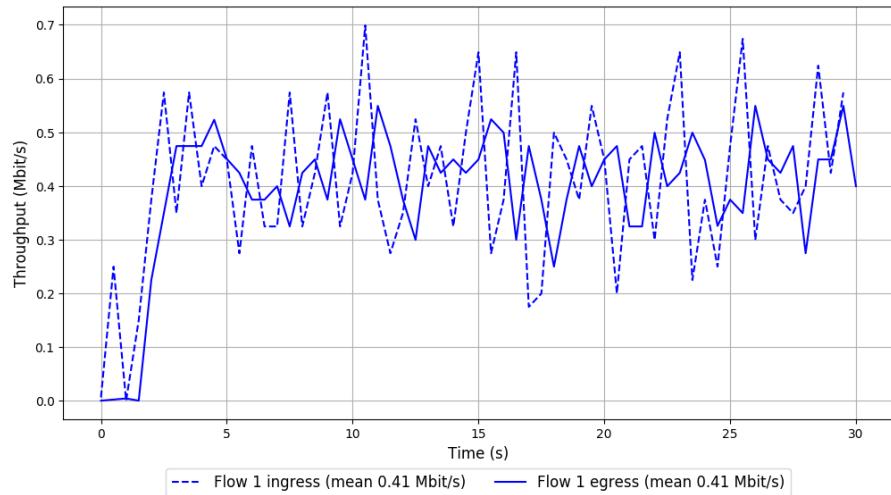
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Run 1: Statistics of Copa

```
Start at: 2019-03-27 05:06:19
End at: 2019-03-27 05:06:49
Local clock offset: -3.65 ms
Remote clock offset: -12.055 ms

# Below is generated by plot.py at 2019-03-27 06:03:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 349.007 ms
Loss rate: 1.44%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 349.007 ms
Loss rate: 1.44%
```

Run 1: Report of Copa — Data Link

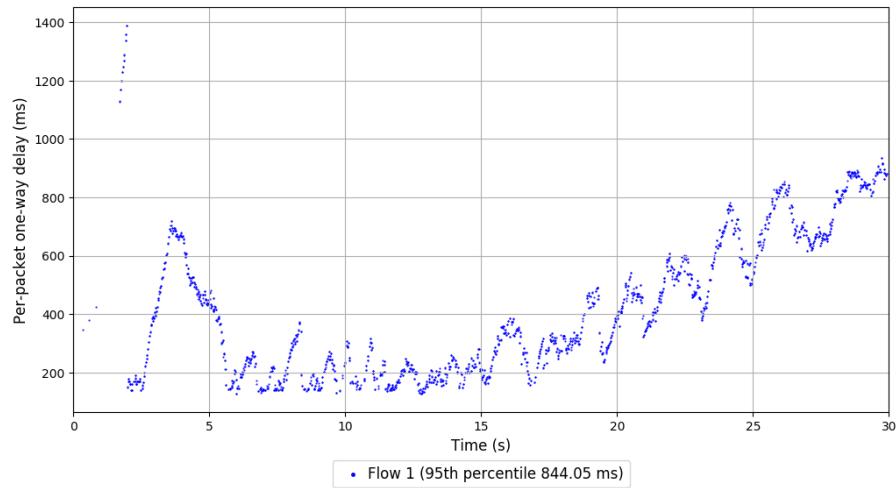
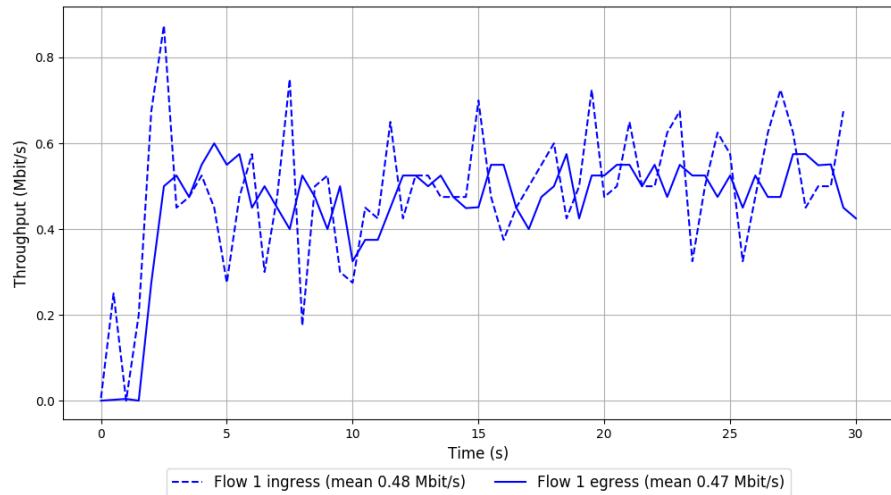


Run 2: Statistics of Copa

```
Start at: 2019-03-27 05:31:45
End at: 2019-03-27 05:32:15
Local clock offset: 3.741 ms
Remote clock offset: -3.882 ms

# Below is generated by plot.py at 2019-03-27 06:03:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 844.051 ms
Loss rate: 3.87%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 844.051 ms
Loss rate: 3.87%
```

Run 2: Report of Copa — Data Link

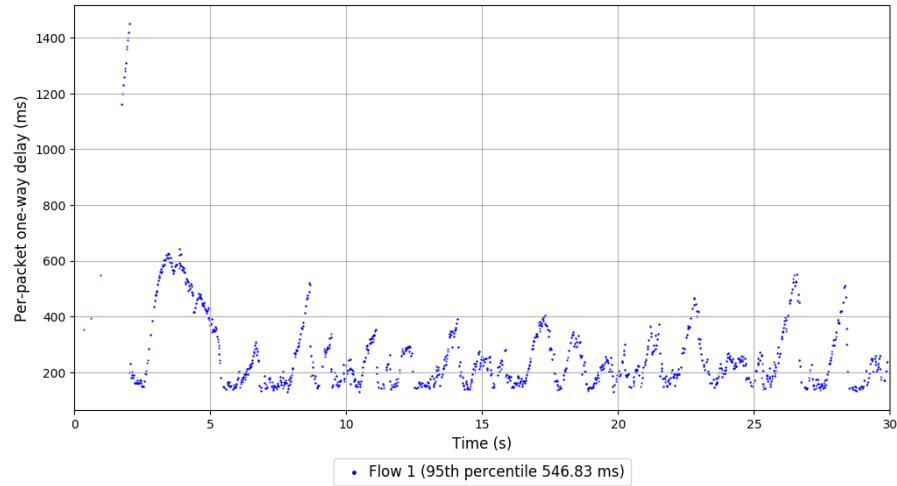
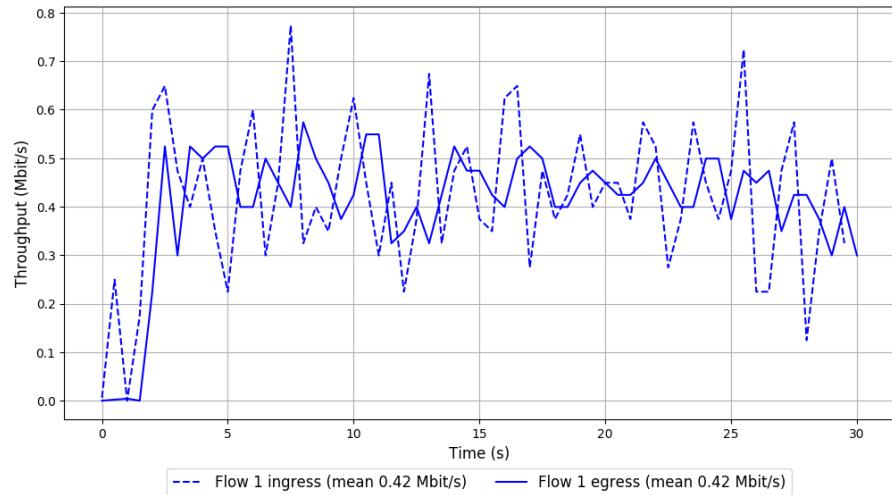


Run 3: Statistics of Copa

```
Start at: 2019-03-27 05:57:39
End at: 2019-03-27 05:58:09
Local clock offset: 5.522 ms
Remote clock offset: 11.43 ms

# Below is generated by plot.py at 2019-03-27 06:03:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 546.830 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 546.830 ms
Loss rate: 0.89%
```

Run 3: Report of Copa — Data Link

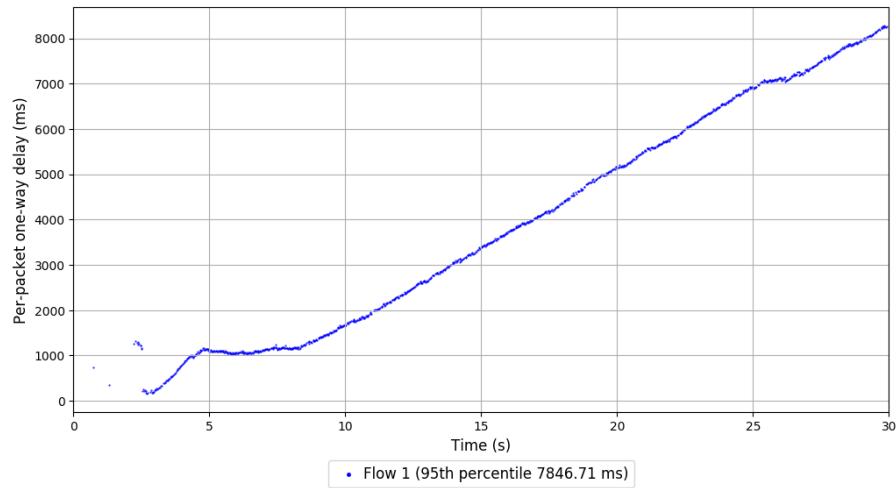
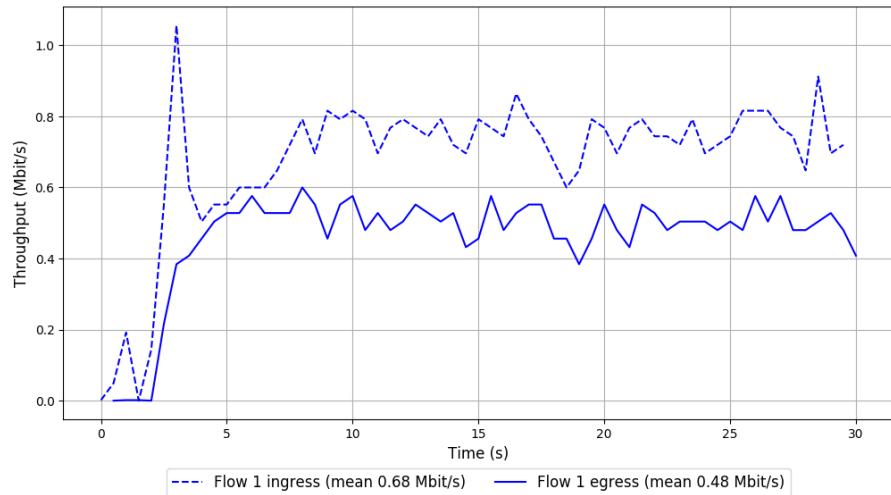


```
Run 1: Statistics of TCP Cubic
```

```
Start at: 2019-03-27 04:51:54
End at: 2019-03-27 04:52:24
Local clock offset: -2.907 ms
Remote clock offset: -3.799 ms

# Below is generated by plot.py at 2019-03-27 06:03:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 7846.708 ms
Loss rate: 31.28%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 7846.708 ms
Loss rate: 31.28%
```

Run 1: Report of TCP Cubic — Data Link

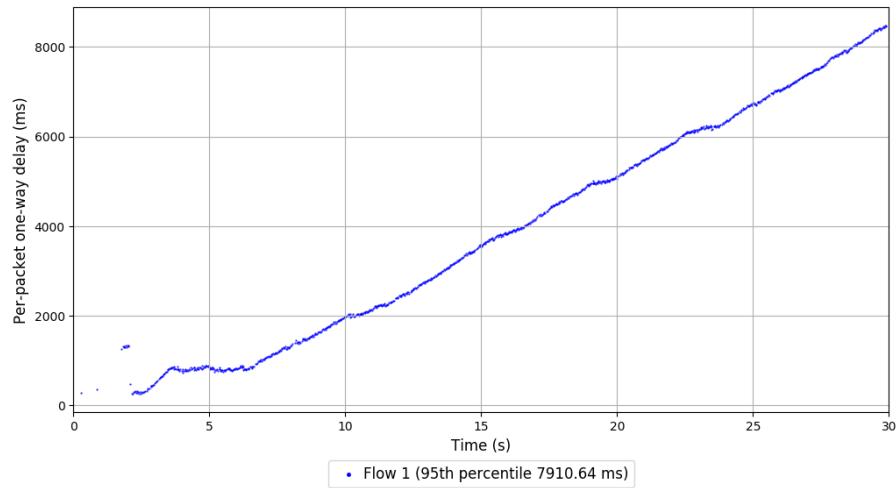
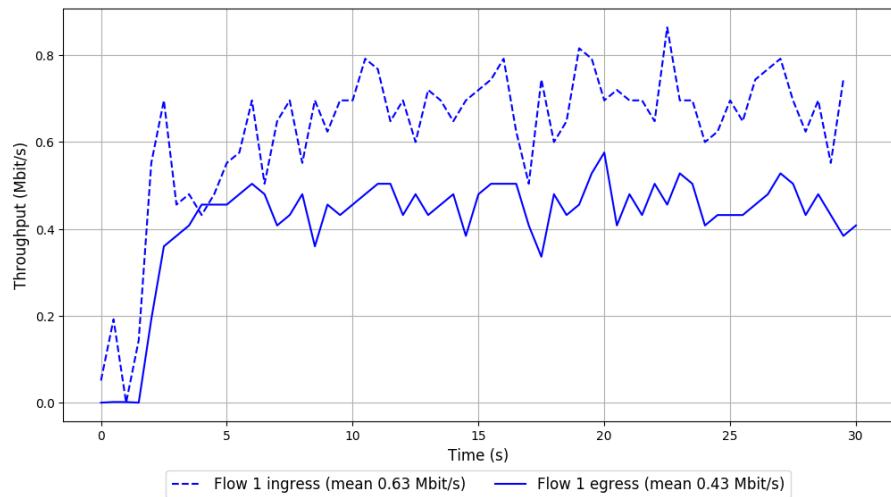


Run 2: Statistics of TCP Cubic

```
Start at: 2019-03-27 05:17:21
End at: 2019-03-27 05:17:51
Local clock offset: -2.627 ms
Remote clock offset: -8.329 ms

# Below is generated by plot.py at 2019-03-27 06:03:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 7910.642 ms
Loss rate: 31.63%
-- Flow 1:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 7910.642 ms
Loss rate: 31.63%
```

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/cubic_s

Run 3: Report of TCP Cubic — Data Link

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Run 1: Statistics of FillP

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/fillp_s

Run 1: Report of FillP — Data Link

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Run 2: Statistics of FillP

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/fillp_s

Run 2: Report of FillP — Data Link

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Run 3: Statistics of FillP

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/fillp_s

Run 3: Report of FillP — Data Link

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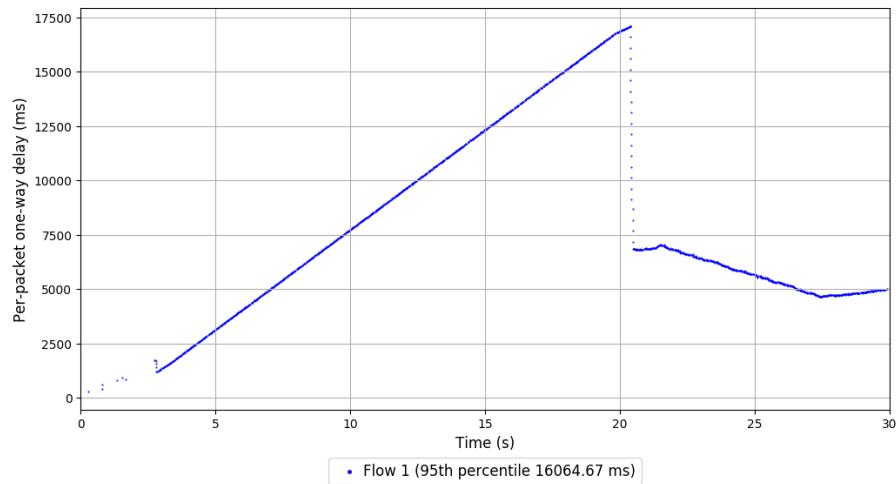
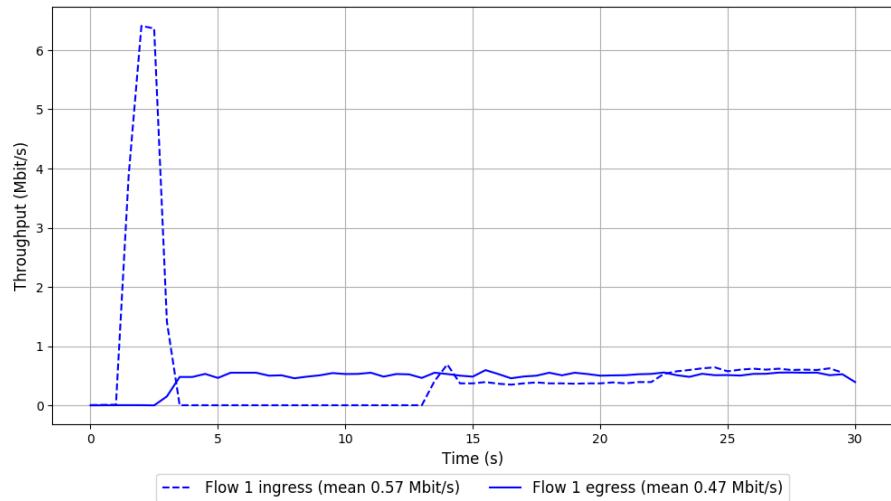
Figure is missing

```
Run 1: Statistics of FillP-Sheep
```

```
Start at: 2019-03-27 05:04:03
End at: 2019-03-27 05:04:33
Local clock offset: -4.345 ms
Remote clock offset: -6.783 ms

# Below is generated by plot.py at 2019-03-27 06:03:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 16064.671 ms
Loss rate: 18.00%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 16064.671 ms
Loss rate: 18.00%
```

Run 1: Report of FillP-Sheep — Data Link

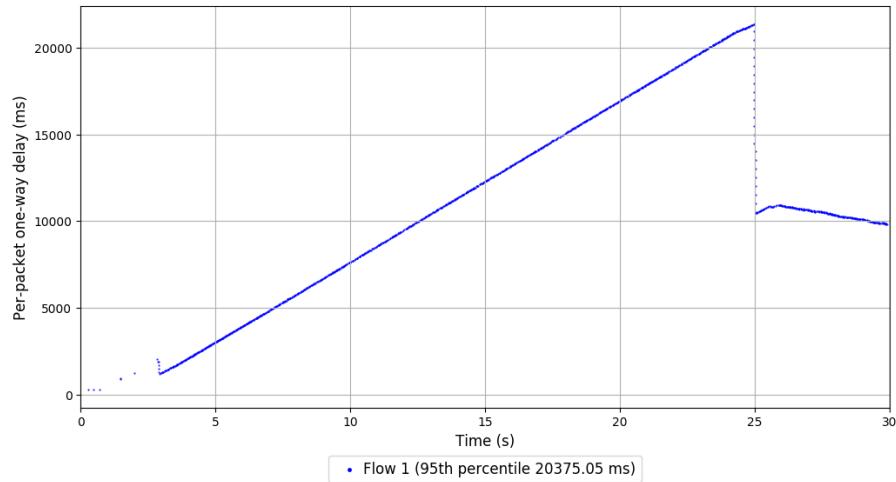
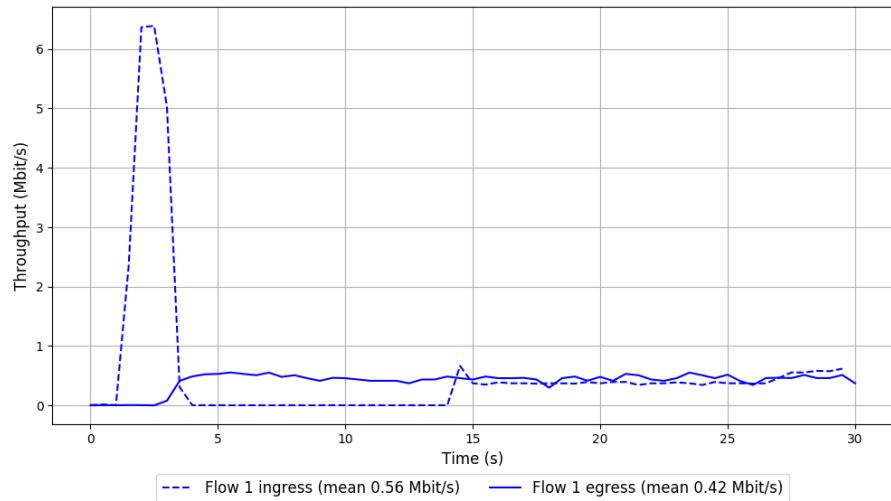


Run 2: Statistics of FillP-Sheep

```
Start at: 2019-03-27 05:29:29
End at: 2019-03-27 05:29:59
Local clock offset: 3.057 ms
Remote clock offset: -5.983 ms

# Below is generated by plot.py at 2019-03-27 06:03:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 20375.054 ms
Loss rate: 25.45%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 20375.054 ms
Loss rate: 25.45%
```

Run 2: Report of FillP-Sheep — Data Link

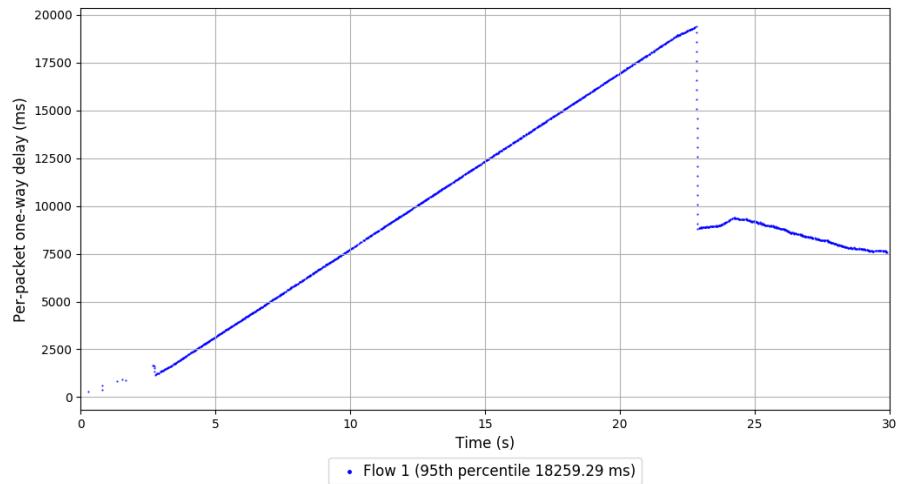
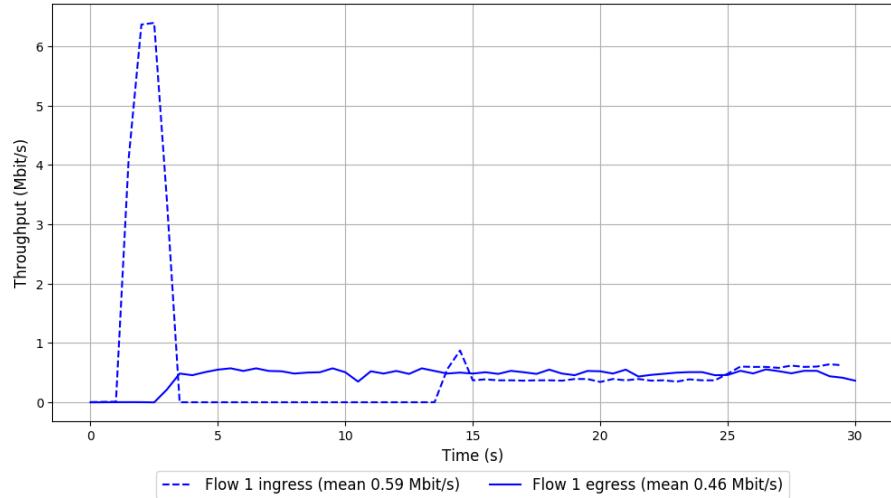


Run 3: Statistics of FillP-Sheep

```
Start at: 2019-03-27 05:55:23
End at: 2019-03-27 05:55:53
Local clock offset: 5.488 ms
Remote clock offset: 8.631 ms

# Below is generated by plot.py at 2019-03-27 06:03:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 18259.286 ms
Loss rate: 22.55%
-- Flow 1:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 18259.286 ms
Loss rate: 22.55%
```

Run 3: Report of FillP-Sheep — Data Link

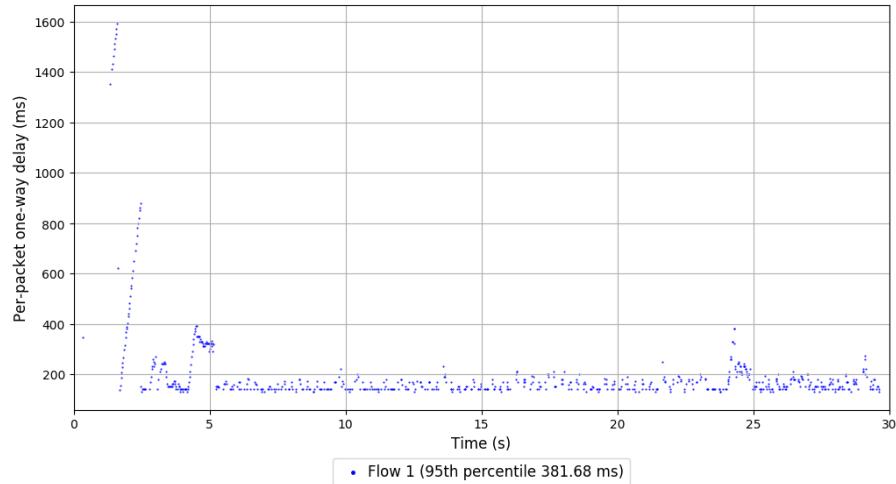
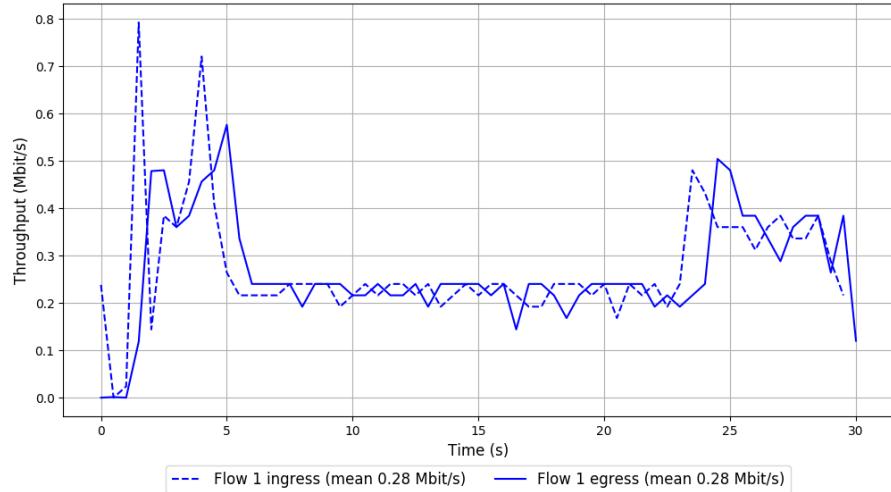


Run 1: Statistics of Indigo

```
Start at: 2019-03-27 05:05:11
End at: 2019-03-27 05:05:41
Local clock offset: -4.317 ms
Remote clock offset: -6.655 ms

# Below is generated by plot.py at 2019-03-27 06:03:17
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 381.677 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 381.677 ms
Loss rate: 1.17%
```

Run 1: Report of Indigo — Data Link

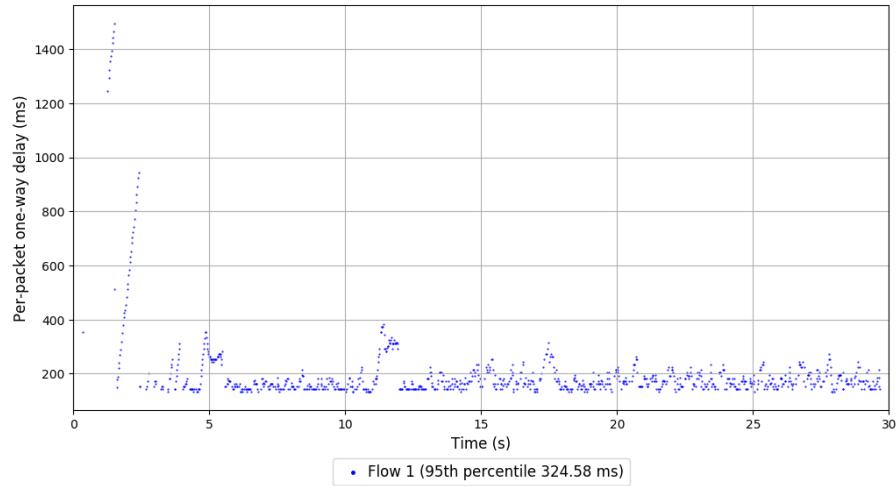
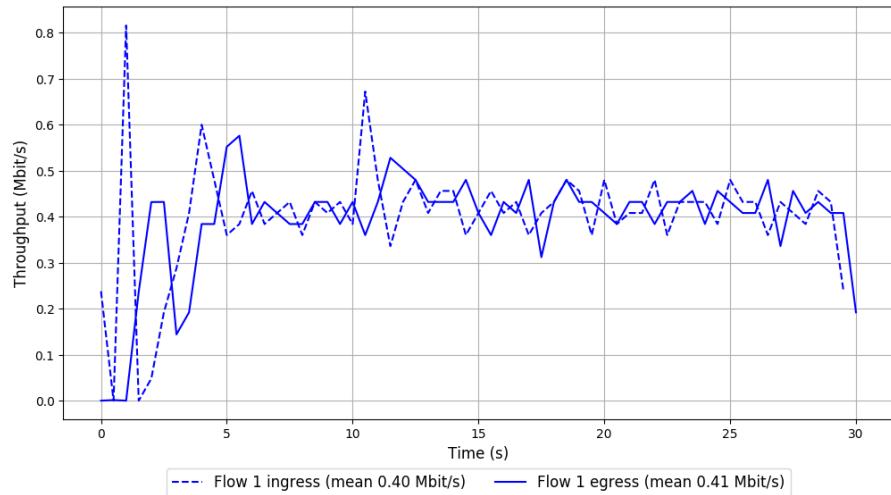


Run 2: Statistics of Indigo

```
Start at: 2019-03-27 05:30:37
End at: 2019-03-27 05:31:07
Local clock offset: 2.567 ms
Remote clock offset: -5.482 ms

# Below is generated by plot.py at 2019-03-27 06:03:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 324.585 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 324.585 ms
Loss rate: 0.90%
```

Run 2: Report of Indigo — Data Link

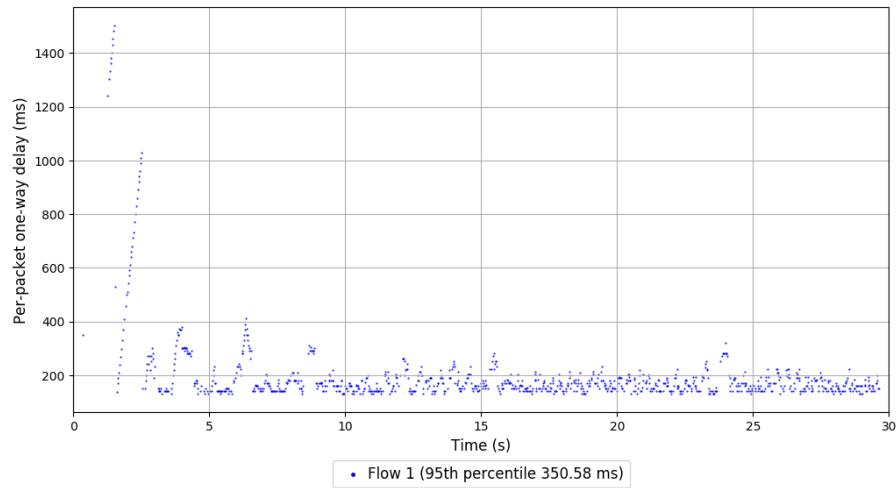
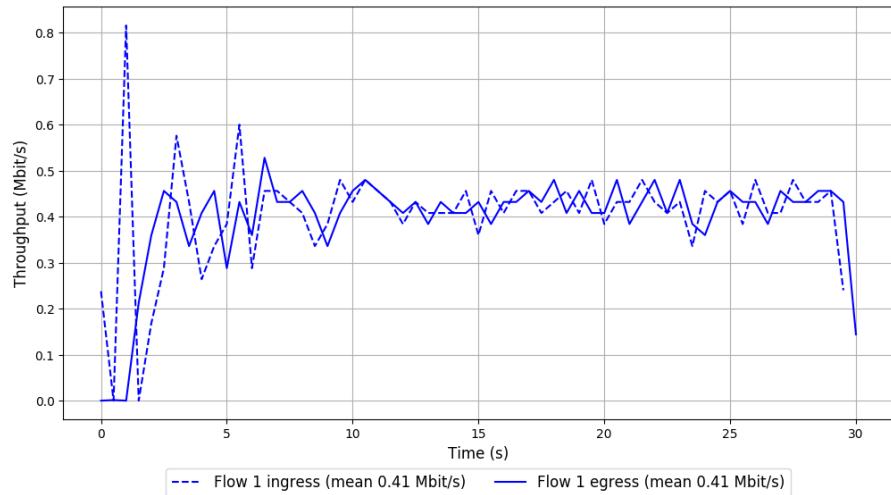


Run 3: Statistics of Indigo

```
Start at: 2019-03-27 05:56:31
End at: 2019-03-27 05:57:01
Local clock offset: 5.473 ms
Remote clock offset: 8.86 ms

# Below is generated by plot.py at 2019-03-27 06:03:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 350.578 ms
Loss rate: 0.99%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 350.578 ms
Loss rate: 0.99%
```

Run 3: Report of Indigo — Data Link

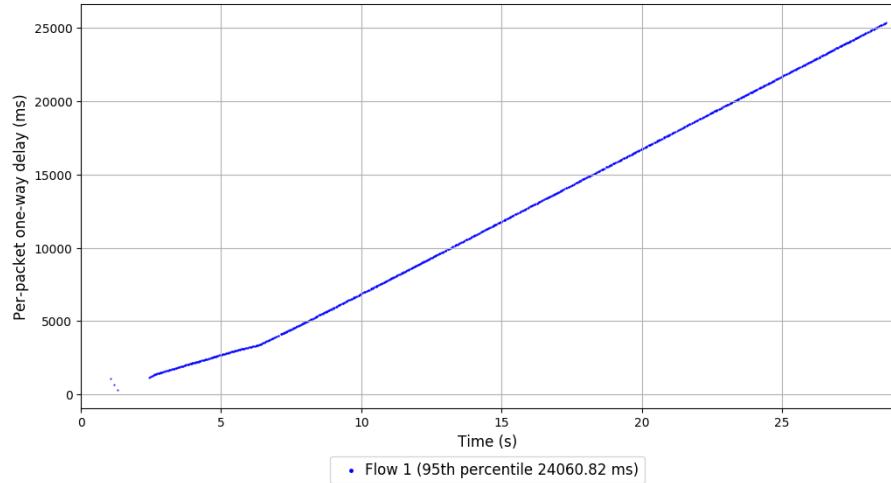
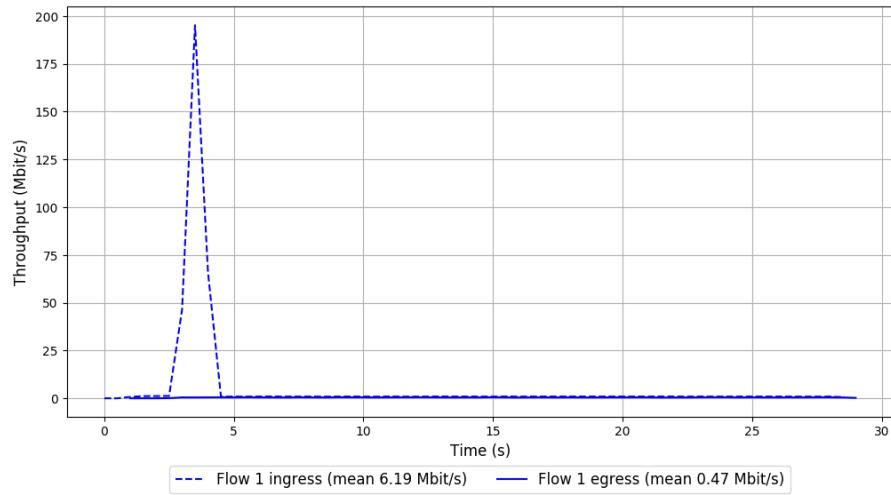


```
Run 1: Statistics of Indigo-MusesC3
```

```
Start at: 2019-03-27 05:07:27
End at: 2019-03-27 05:07:57
Local clock offset: -3.554 ms
Remote clock offset: -10.913 ms

# Below is generated by plot.py at 2019-03-27 06:03:20
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 24060.821 ms
Loss rate: 92.75%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 24060.821 ms
Loss rate: 92.75%
```

Run 1: Report of Indigo-MusesC3 — Data Link

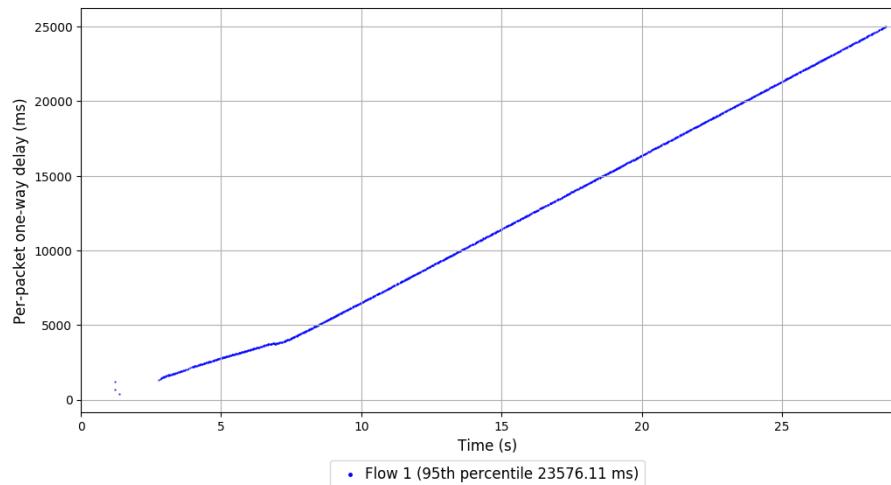
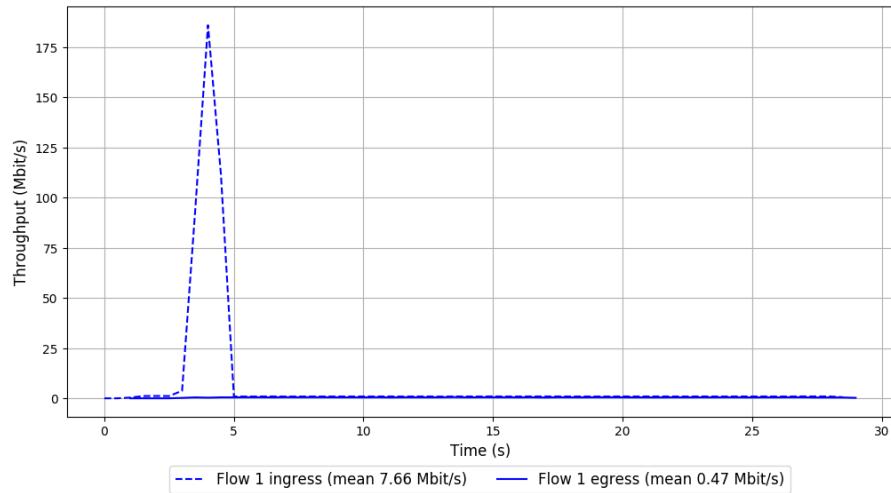


Run 2: Statistics of Indigo-MusesC3

```
Start at: 2019-03-27 05:32:53
End at: 2019-03-27 05:33:23
Local clock offset: 3.161 ms
Remote clock offset: -1.023 ms

# Below is generated by plot.py at 2019-03-27 06:03:21
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 23576.111 ms
Loss rate: 94.08%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 23576.111 ms
Loss rate: 94.08%
```

Run 2: Report of Indigo-MusesC3 — Data Link

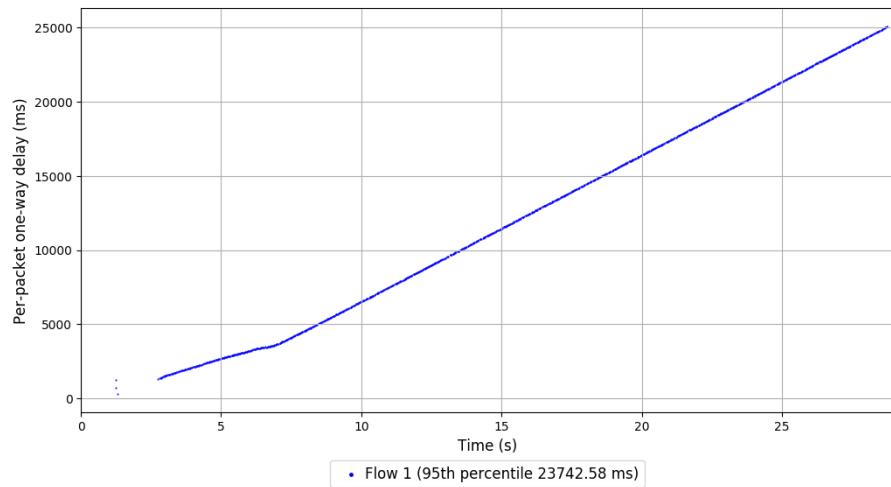
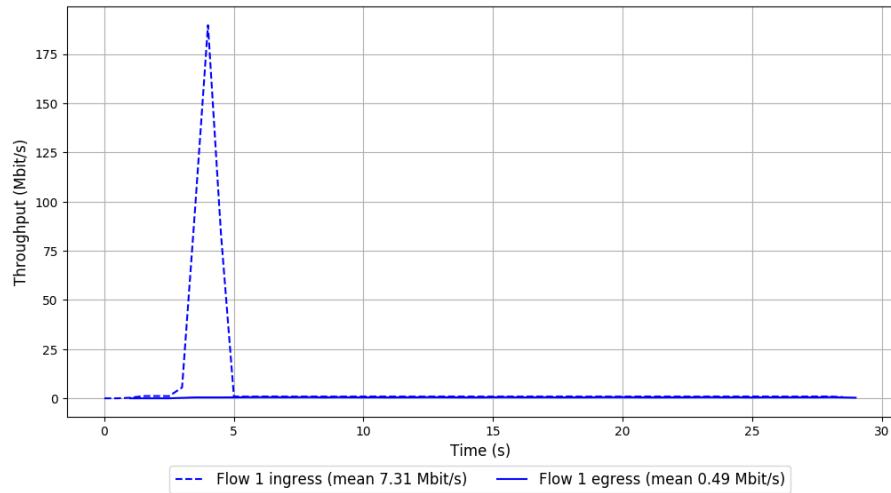


Run 3: Statistics of Indigo-MusesC3

```
Start at: 2019-03-27 05:58:47
End at: 2019-03-27 05:59:17
Local clock offset: 4.748 ms
Remote clock offset: 10.449 ms

# Below is generated by plot.py at 2019-03-27 06:03:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 23742.585 ms
Loss rate: 93.57%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 23742.585 ms
Loss rate: 93.57%
```

Run 3: Report of Indigo-MusesC3 — Data Link

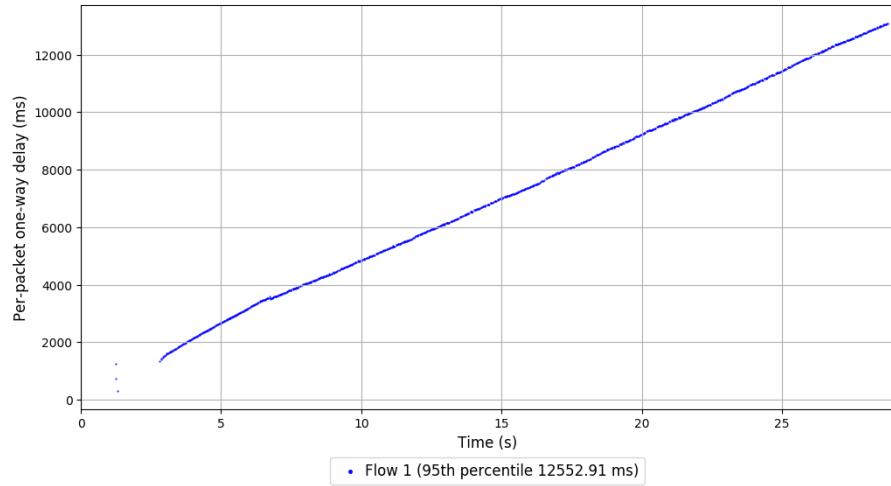
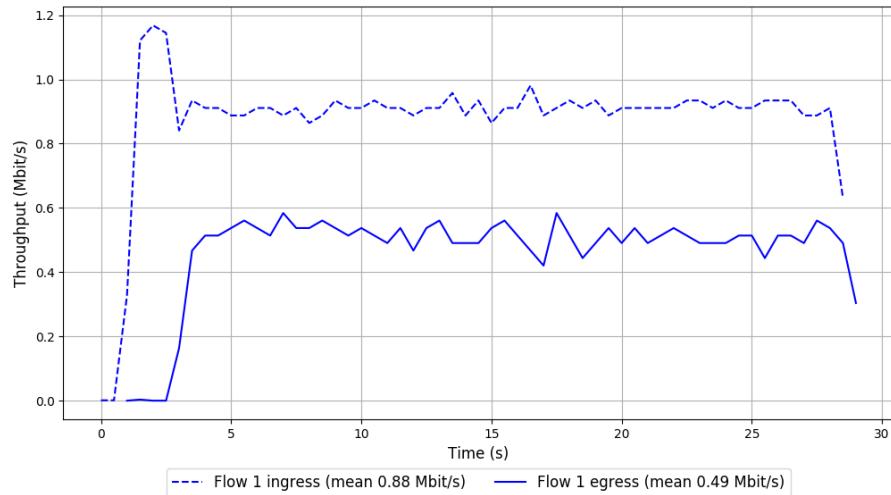


```
Run 1: Statistics of Indigo-MusesC5
```

```
Start at: 2019-03-27 04:54:10
End at: 2019-03-27 04:54:40
Local clock offset: -3.942 ms
Remote clock offset: -10.351 ms

# Below is generated by plot.py at 2019-03-27 06:03:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 12552.913 ms
Loss rate: 47.49%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 12552.913 ms
Loss rate: 47.49%
```

Run 1: Report of Indigo-MusesC5 — Data Link

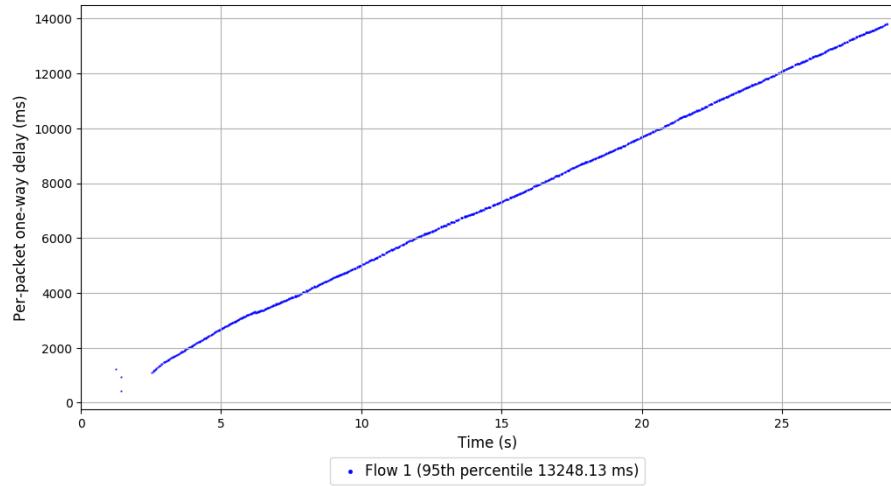
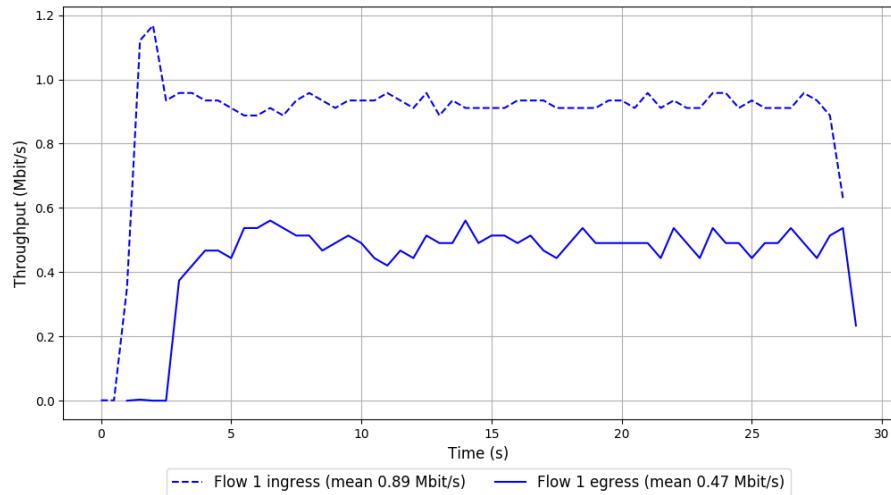


Run 2: Statistics of Indigo-MusesC5

```
Start at: 2019-03-27 05:19:37
End at: 2019-03-27 05:20:07
Local clock offset: -0.843 ms
Remote clock offset: -8.59 ms

# Below is generated by plot.py at 2019-03-27 06:03:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 13248.133 ms
Loss rate: 49.97%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 13248.133 ms
Loss rate: 49.97%
```

Run 2: Report of Indigo-MusesC5 — Data Link

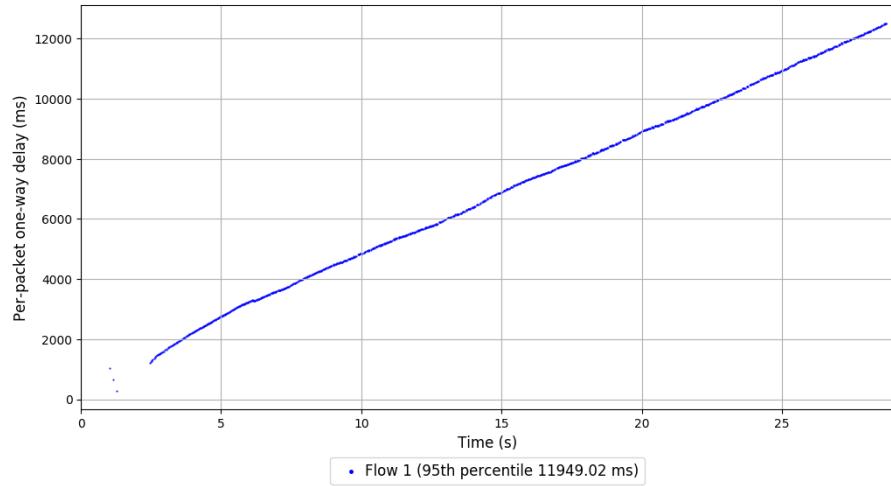
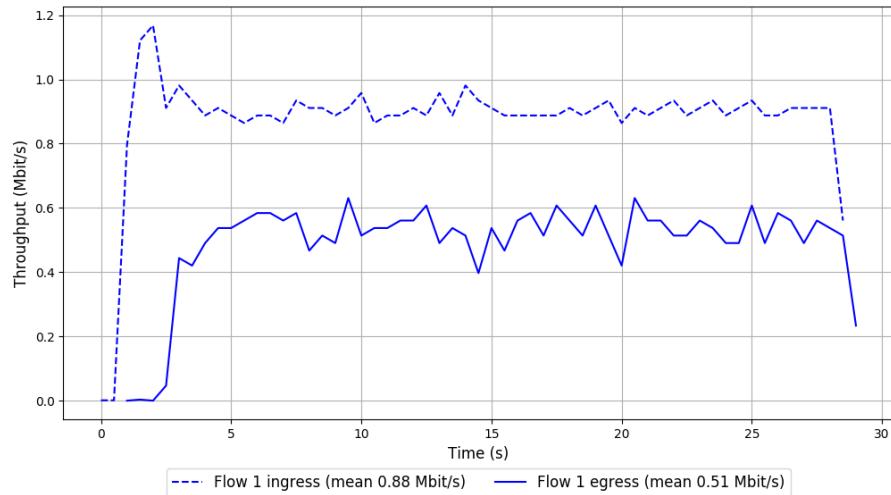


Run 3: Statistics of Indigo-MusesC5

```
Start at: 2019-03-27 05:45:31
End at: 2019-03-27 05:46:01
Local clock offset: 5.991 ms
Remote clock offset: 6.749 ms

# Below is generated by plot.py at 2019-03-27 06:03:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 11949.020 ms
Loss rate: 44.77%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 11949.020 ms
Loss rate: 44.77%
```

Run 3: Report of Indigo-MusesC5 — Data Link

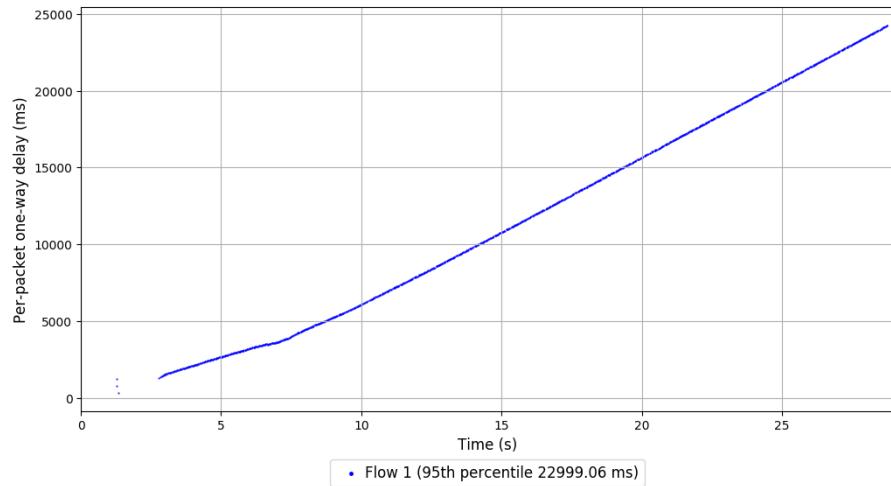
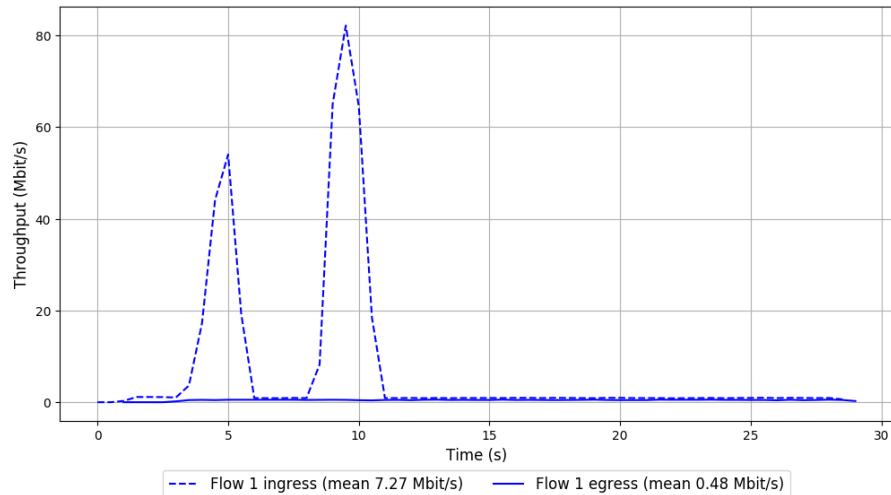


```
Run 1: Statistics of Indigo-MusesD
```

```
Start at: 2019-03-27 04:56:27
End at: 2019-03-27 04:56:57
Local clock offset: -3.245 ms
Remote clock offset: -9.609 ms

# Below is generated by plot.py at 2019-03-27 06:03:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 22999.060 ms
Loss rate: 93.75%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 22999.060 ms
Loss rate: 93.75%
```

Run 1: Report of Indigo-MusesD — Data Link

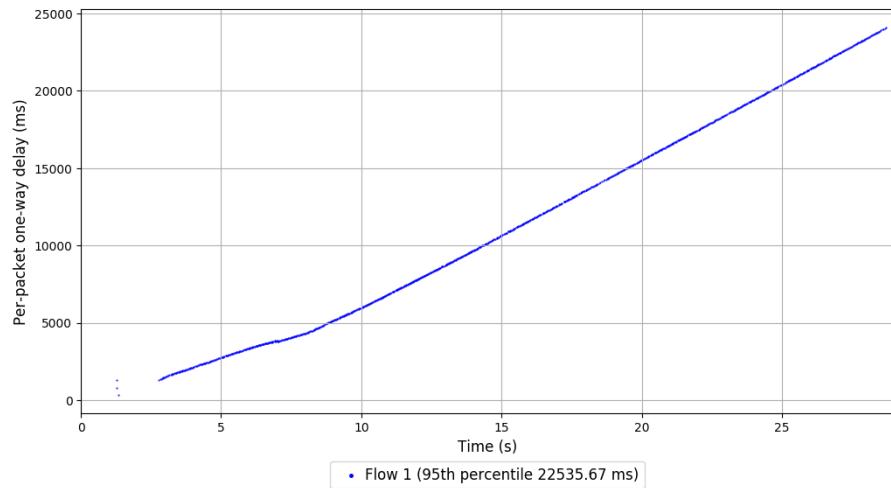
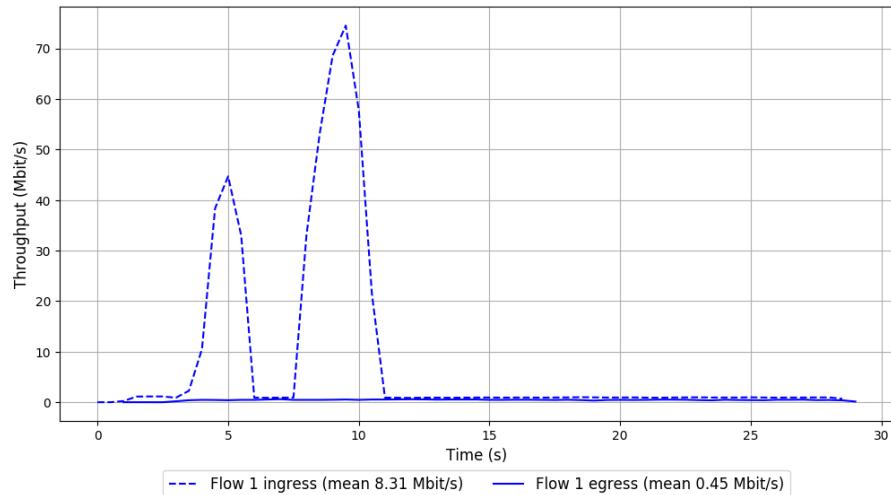


Run 2: Statistics of Indigo-MusesD

```
Start at: 2019-03-27 05:21:53
End at: 2019-03-27 05:22:23
Local clock offset: -0.5 ms
Remote clock offset: -10.026 ms

# Below is generated by plot.py at 2019-03-27 06:03:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 22535.673 ms
Loss rate: 94.86%
-- Flow 1:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 22535.673 ms
Loss rate: 94.86%
```

Run 2: Report of Indigo-MusesD — Data Link

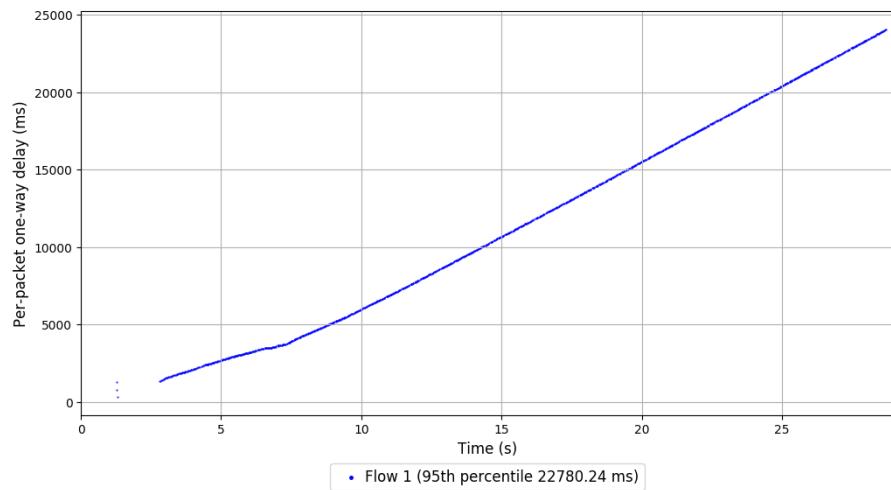
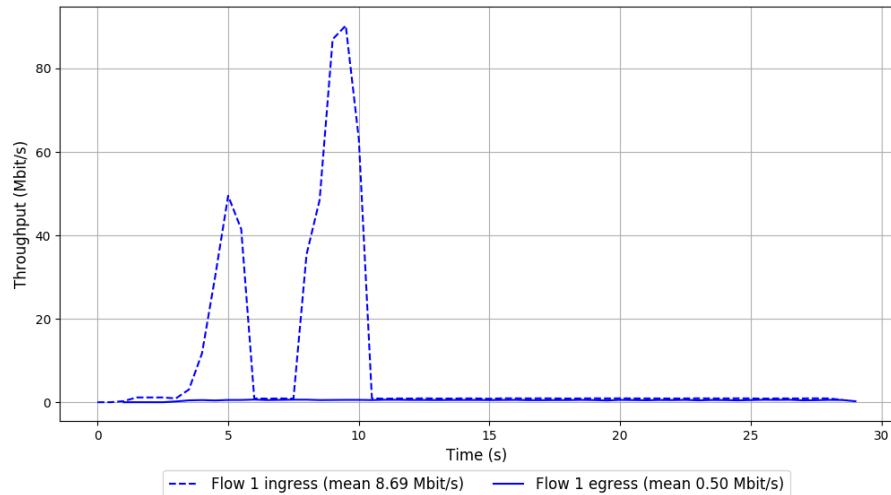


Run 3: Statistics of Indigo-MusesD

```
Start at: 2019-03-27 05:47:47
End at: 2019-03-27 05:48:17
Local clock offset: 5.814 ms
Remote clock offset: 9.073 ms

# Below is generated by plot.py at 2019-03-27 06:03:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 22780.240 ms
Loss rate: 94.54%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 22780.240 ms
Loss rate: 94.54%
```

Run 3: Report of Indigo-MusesD — Data Link

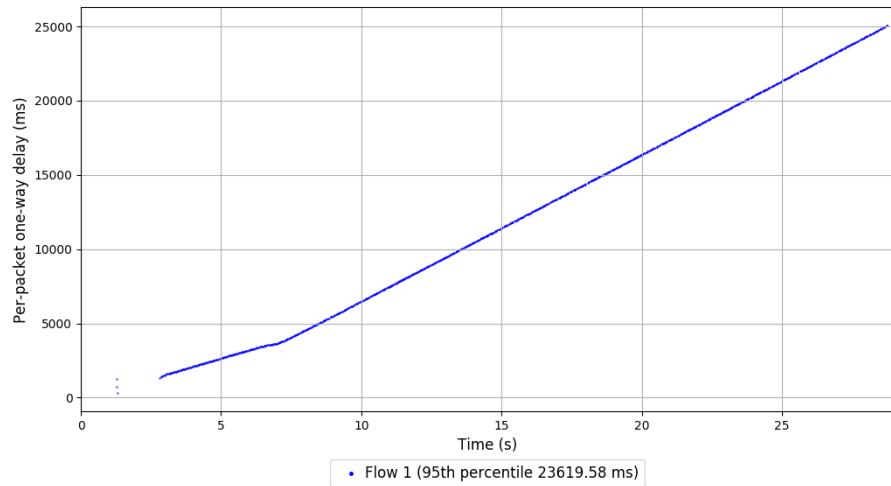
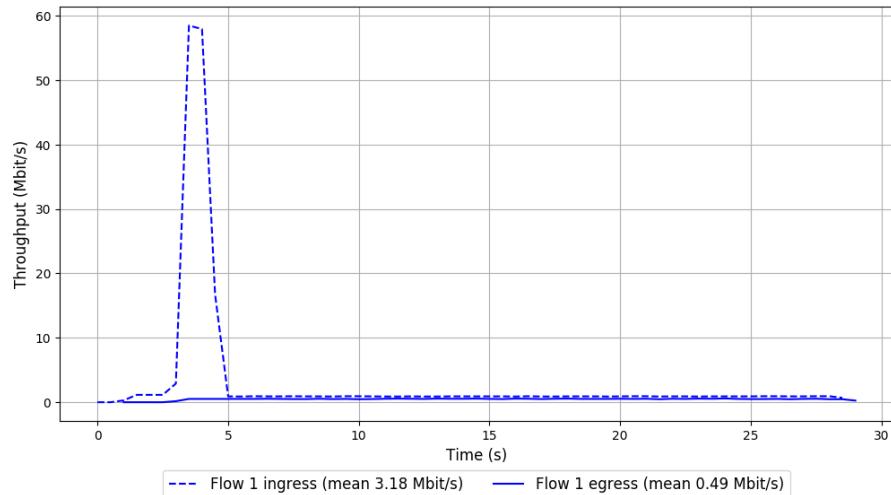


Run 1: Statistics of Indigo-MusesT

```
Start at: 2019-03-27 05:01:23
End at: 2019-03-27 05:01:53
Local clock offset: -4.223 ms
Remote clock offset: -11.439 ms

# Below is generated by plot.py at 2019-03-27 06:03:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 23619.579 ms
Loss rate: 85.33%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 23619.579 ms
Loss rate: 85.33%
```

Run 1: Report of Indigo-MusesT — Data Link

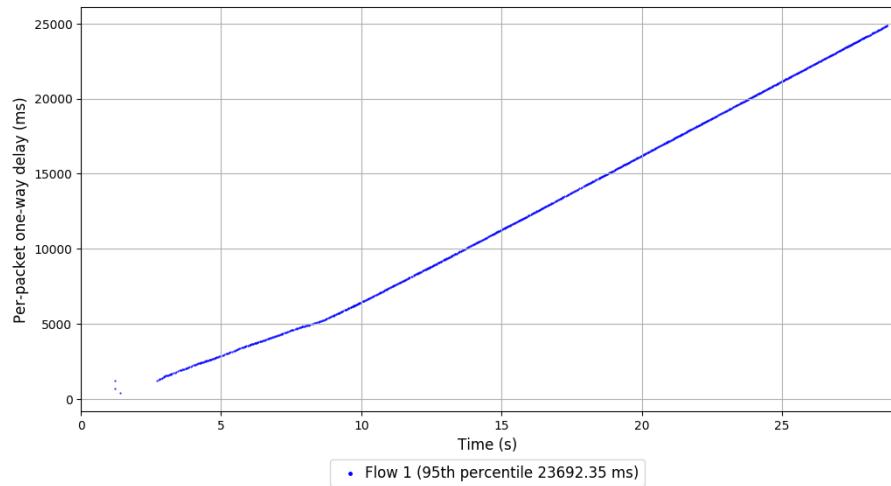
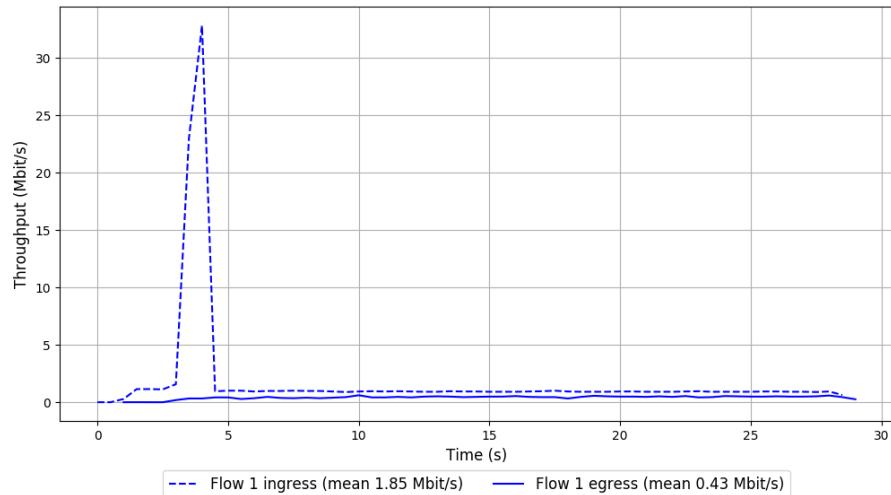


Run 2: Statistics of Indigo-MusesT

```
Start at: 2019-03-27 05:26:49
End at: 2019-03-27 05:27:19
Local clock offset: 1.569 ms
Remote clock offset: -9.661 ms

# Below is generated by plot.py at 2019-03-27 06:03:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 23692.348 ms
Loss rate: 77.74%
-- Flow 1:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 23692.348 ms
Loss rate: 77.74%
```

Run 2: Report of Indigo-MusesT — Data Link

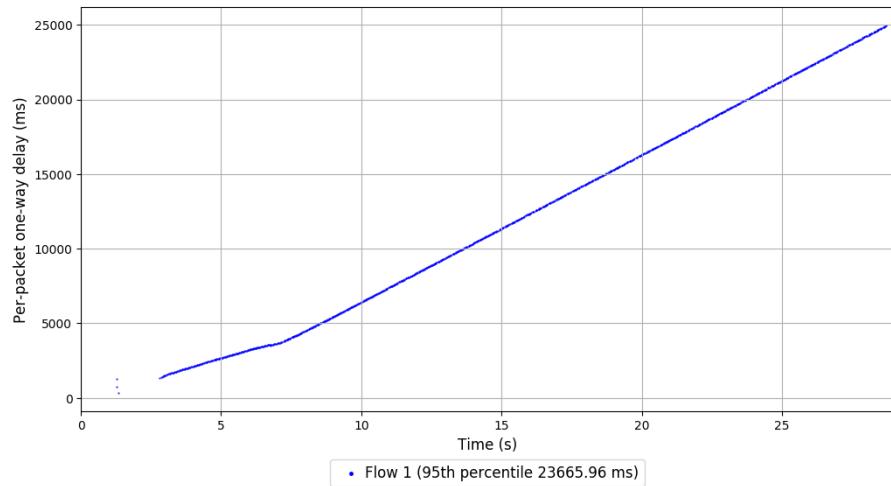
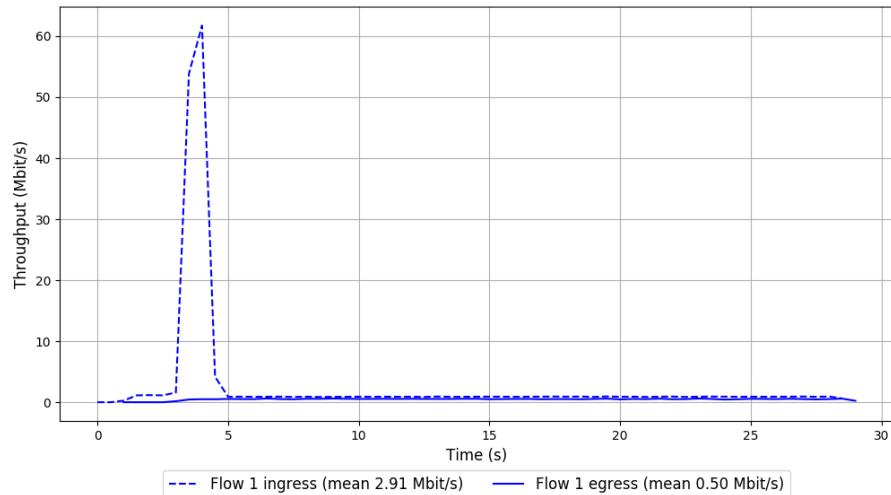


Run 3: Statistics of Indigo-MusesT

```
Start at: 2019-03-27 05:52:43
End at: 2019-03-27 05:53:13
Local clock offset: 5.452 ms
Remote clock offset: 10.181 ms

# Below is generated by plot.py at 2019-03-27 06:03:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 23665.961 ms
Loss rate: 83.68%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 23665.961 ms
Loss rate: 83.68%
```

Run 3: Report of Indigo-MusesT — Data Link

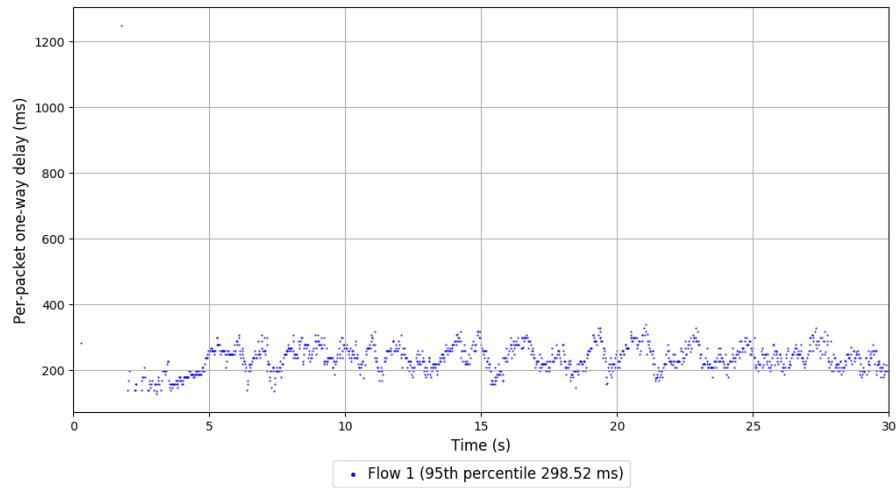
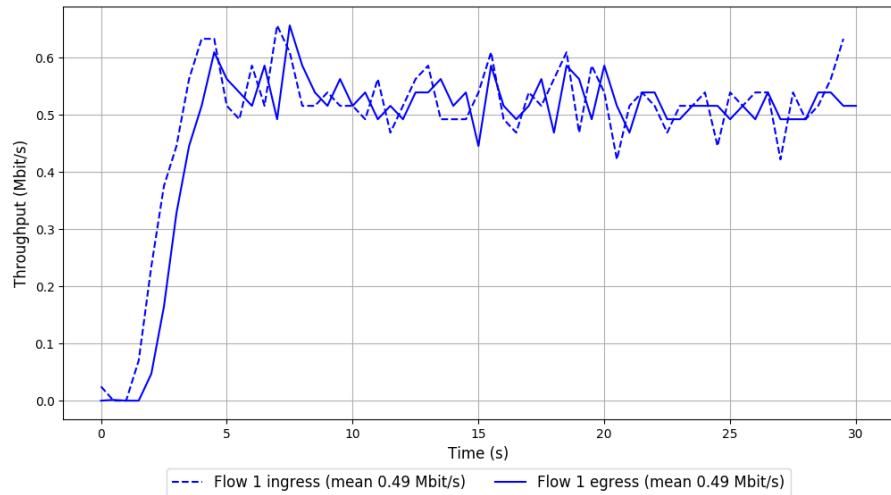


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2019-03-27 04:53:02
End at: 2019-03-27 04:53:32
Local clock offset: -2.988 ms
Remote clock offset: -6.387 ms

# Below is generated by plot.py at 2019-03-27 06:03:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 298.518 ms
Loss rate: 1.28%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 298.518 ms
Loss rate: 1.28%
```

Run 1: Report of LEDBAT — Data Link

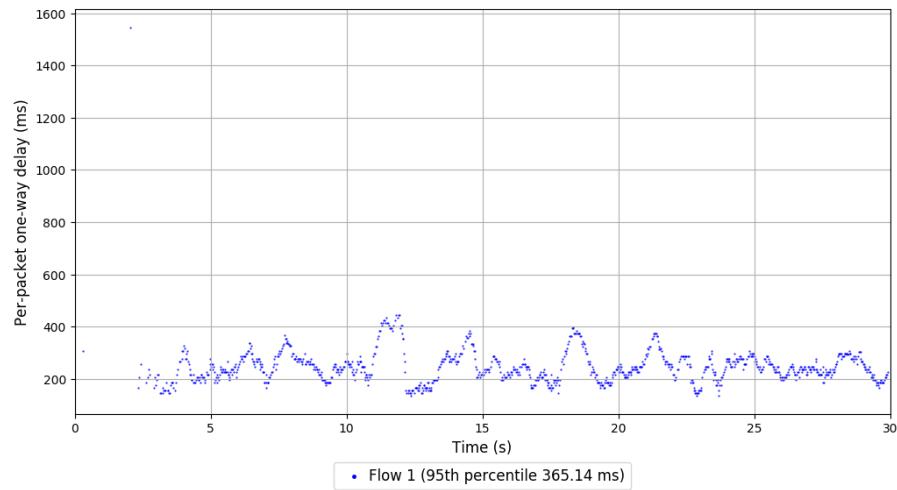
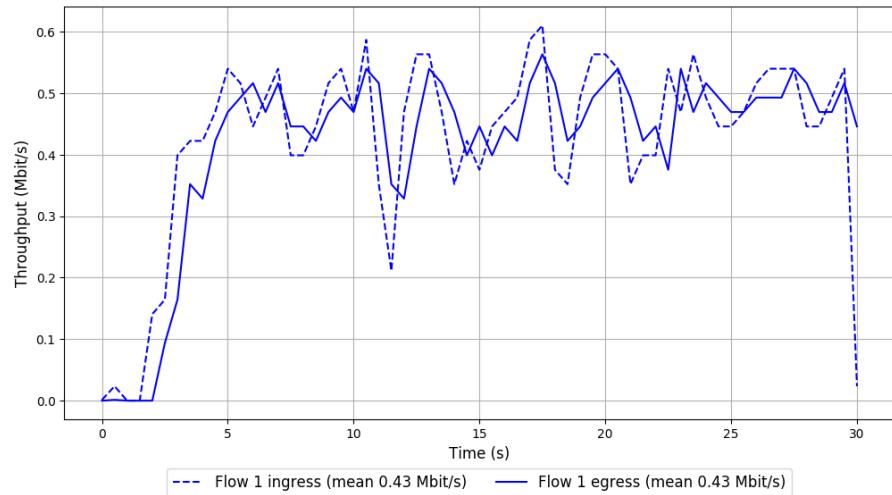


Run 2: Statistics of LEDBAT

```
Start at: 2019-03-27 05:18:29
End at: 2019-03-27 05:18:59
Local clock offset: -2.459 ms
Remote clock offset: -13.369 ms

# Below is generated by plot.py at 2019-03-27 06:03:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 365.136 ms
Loss rate: 1.27%
-- Flow 1:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 365.136 ms
Loss rate: 1.27%
```

Run 2: Report of LEDBAT — Data Link

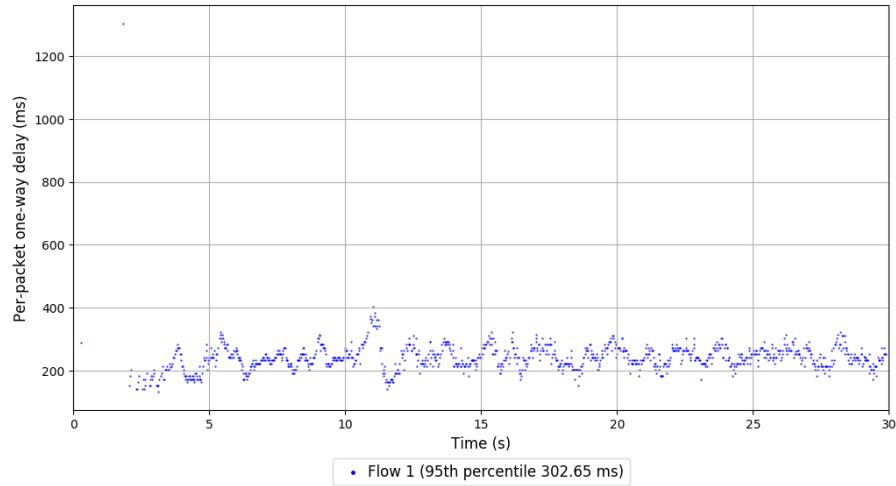
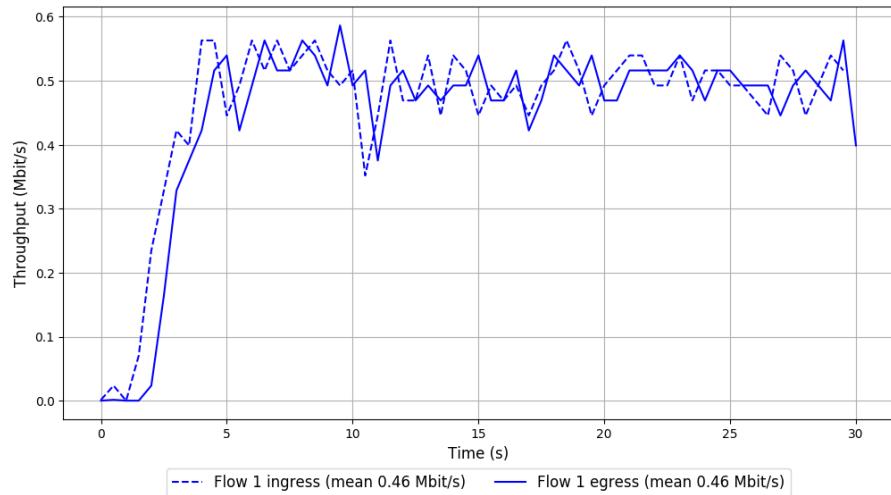


Run 3: Statistics of LEDBAT

```
Start at: 2019-03-27 05:44:23
End at: 2019-03-27 05:44:53
Local clock offset: 5.807 ms
Remote clock offset: 5.486 ms

# Below is generated by plot.py at 2019-03-27 06:03:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 302.649 ms
Loss rate: 1.27%
-- Flow 1:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 302.649 ms
Loss rate: 1.27%
```

Run 3: Report of LEDBAT — Data Link

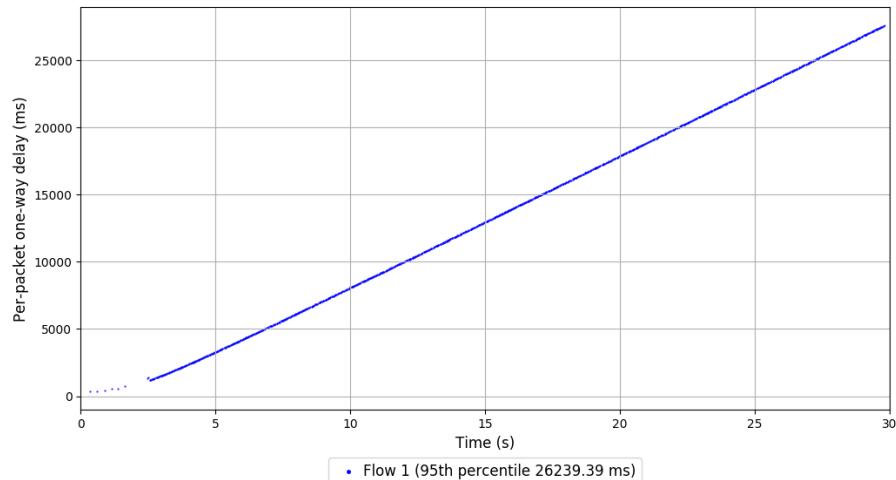
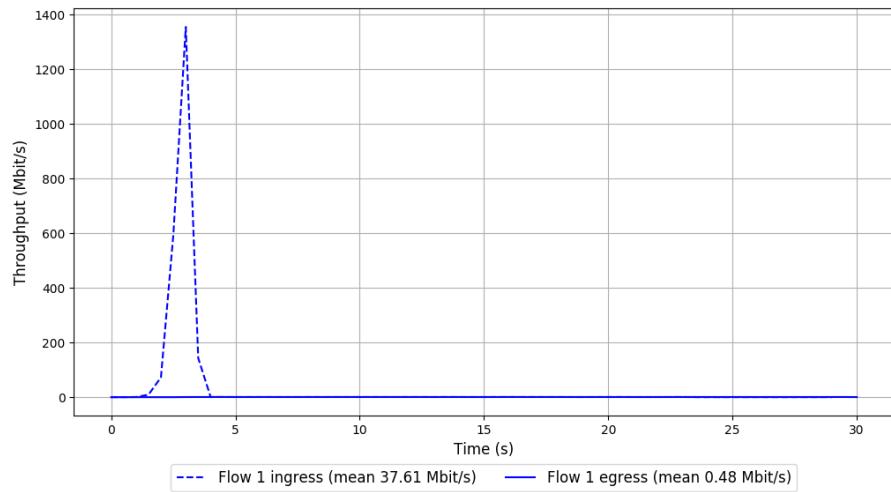


```
Run 1: Statistics of PCC-Allegro
```

```
Start at: 2019-03-27 04:50:43
End at: 2019-03-27 04:51:13
Local clock offset: -3.559 ms
Remote clock offset: -5.051 ms

# Below is generated by plot.py at 2019-03-27 06:03:42
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 26239.391 ms
Loss rate: 98.72%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 26239.391 ms
Loss rate: 98.72%
```

Run 1: Report of PCC-Allegro — Data Link

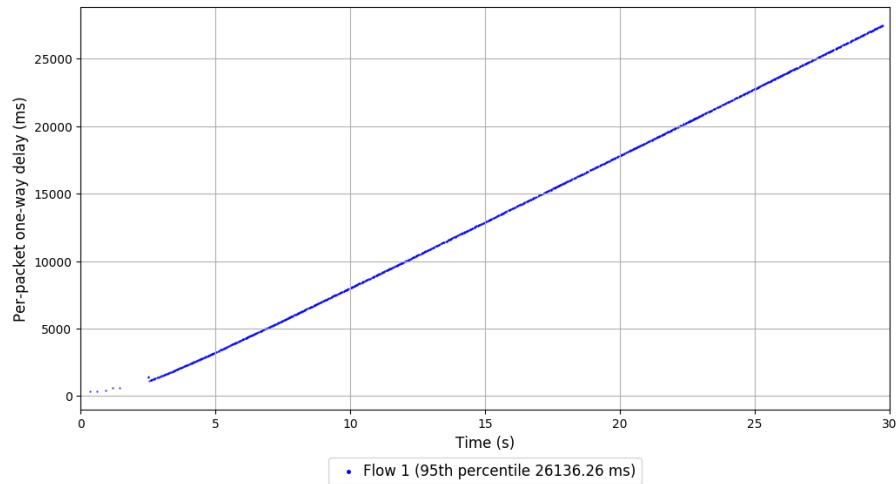
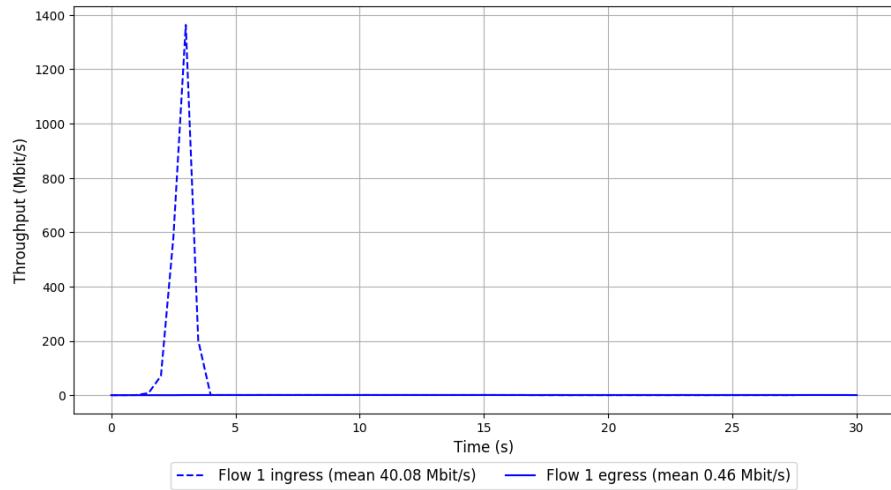


Run 2: Statistics of PCC-Allegro

```
Start at: 2019-03-27 05:16:11
End at: 2019-03-27 05:16:41
Local clock offset: -4.372 ms
Remote clock offset: -8.101 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 26136.258 ms
Loss rate: 98.78%
-- Flow 1:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 26136.258 ms
Loss rate: 98.78%
```

Run 2: Report of PCC-Allegro — Data Link

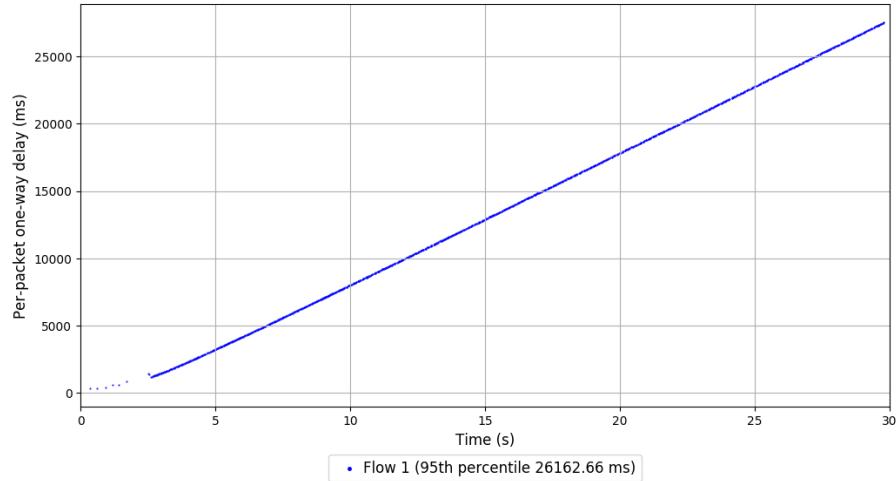
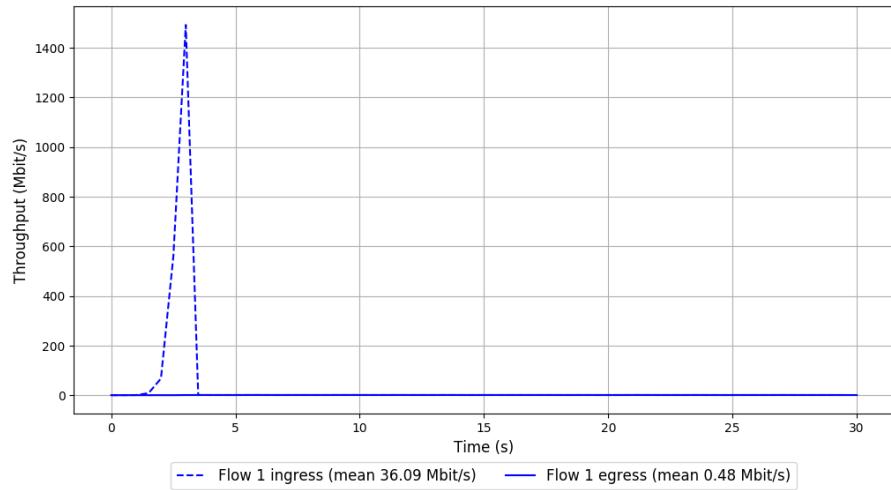


Run 3: Statistics of PCC-Allegro

```
Start at: 2019-03-27 05:41:42
End at: 2019-03-27 05:42:12
Local clock offset: 4.631 ms
Remote clock offset: 0.533 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 26162.659 ms
Loss rate: 98.69%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 26162.659 ms
Loss rate: 98.69%
```

Run 3: Report of PCC-Allegro — Data Link

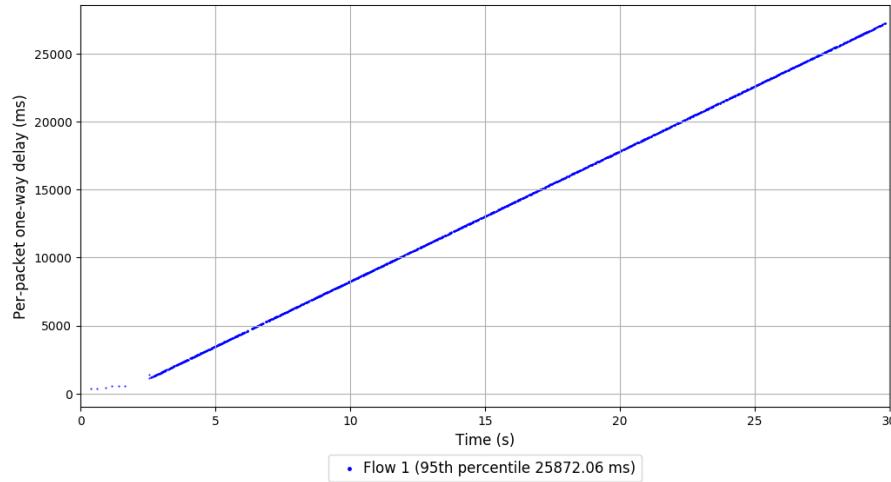
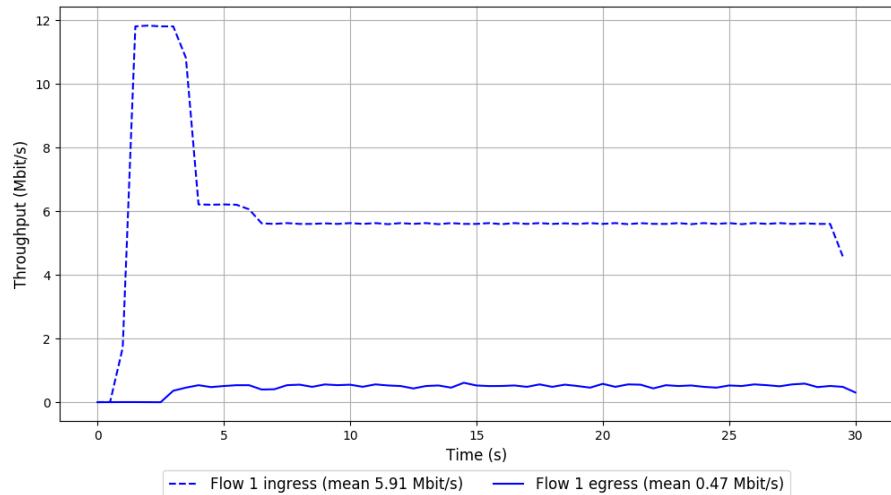


```
Run 1: Statistics of PCC-Expr
```

```
Start at: 2019-03-27 04:46:50
End at: 2019-03-27 04:47:20
Local clock offset: -2.215 ms
Remote clock offset: -8.29 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 25872.059 ms
Loss rate: 92.12%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 25872.059 ms
Loss rate: 92.12%
```

Run 1: Report of PCC-Expr — Data Link

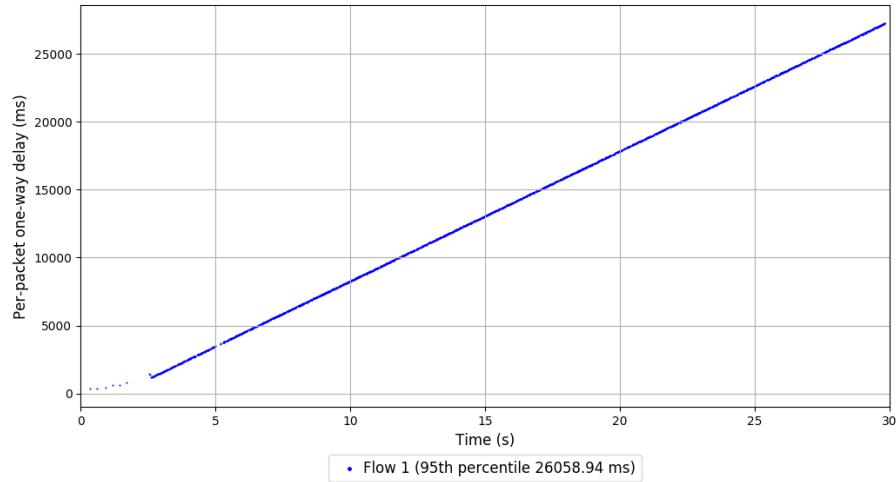
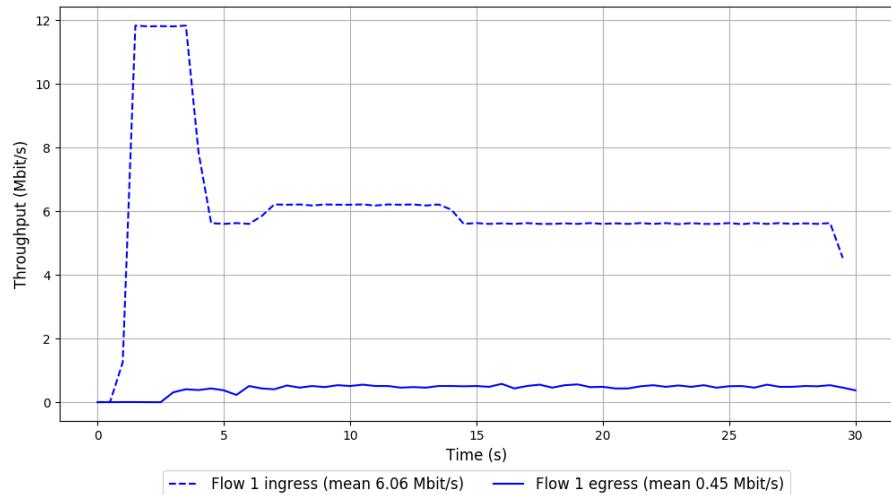


Run 2: Statistics of PCC-Expr

```
Start at: 2019-03-27 05:12:23
End at: 2019-03-27 05:12:53
Local clock offset: -3.591 ms
Remote clock offset: -7.579 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 26058.945 ms
Loss rate: 92.73%
-- Flow 1:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 26058.945 ms
Loss rate: 92.73%
```

Run 2: Report of PCC-Expr — Data Link

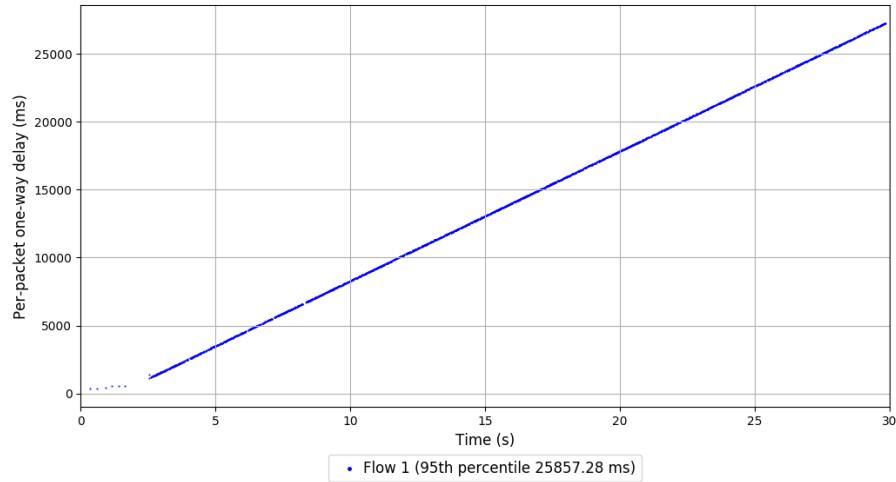
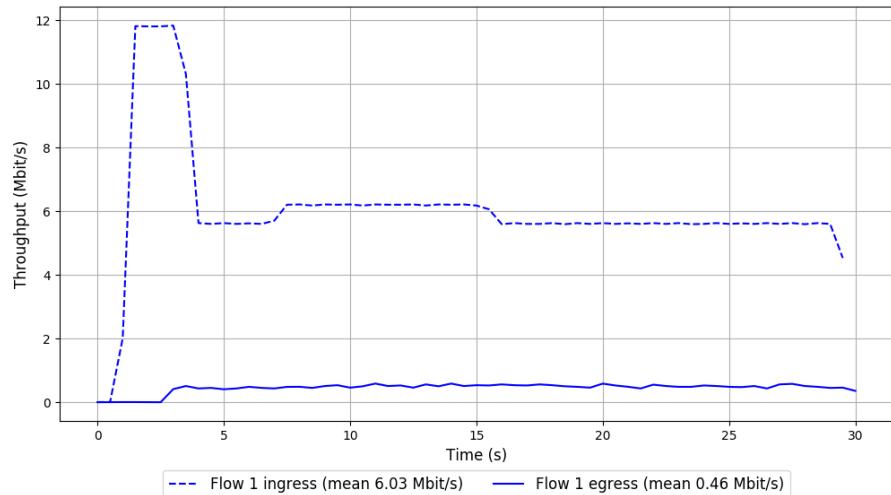


Run 3: Statistics of PCC-Expr

```
Start at: 2019-03-27 05:37:49
End at: 2019-03-27 05:38:19
Local clock offset: 4.857 ms
Remote clock offset: -0.954 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 25857.277 ms
Loss rate: 92.43%
-- Flow 1:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 25857.277 ms
Loss rate: 92.43%
```

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/quic_st

Run 1: Report of QUIC Cubic — Data Link

Figure is missing

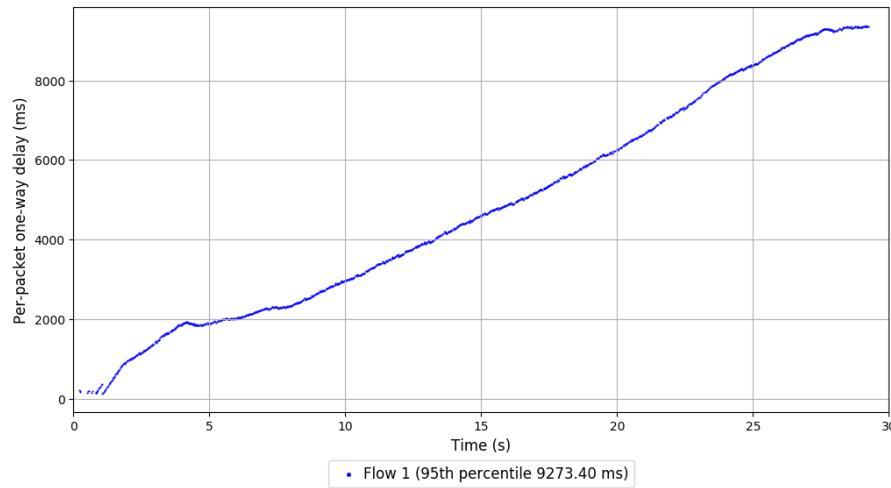
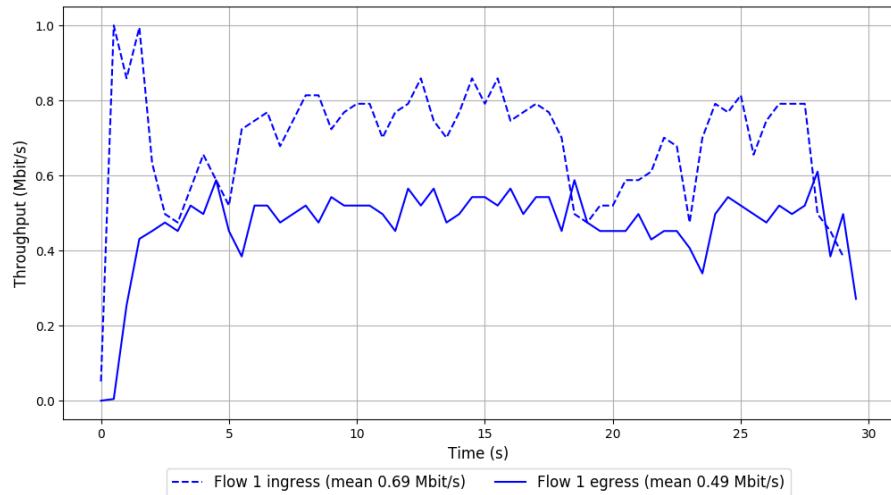
Figure is missing

Run 2: Statistics of QUIC Cubic

```
Start at: 2019-03-27 05:15:03
End at: 2019-03-27 05:15:33
Local clock offset: -3.607 ms
Remote clock offset: -13.134 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 9273.402 ms
Loss rate: 30.58%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 9273.402 ms
Loss rate: 30.58%
```

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/quic_st

Run 3: Report of QUIC Cubic — Data Link

Figure is missing

Figure is missing

Run 1: Statistics of SCReAM

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/scream

Run 1: Report of SCReAM — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of SCReAM

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/scream

Run 2: Report of SCReAM — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of SCReAM

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/scream

Run 3: Report of SCReAM — Data Link

Figure is missing

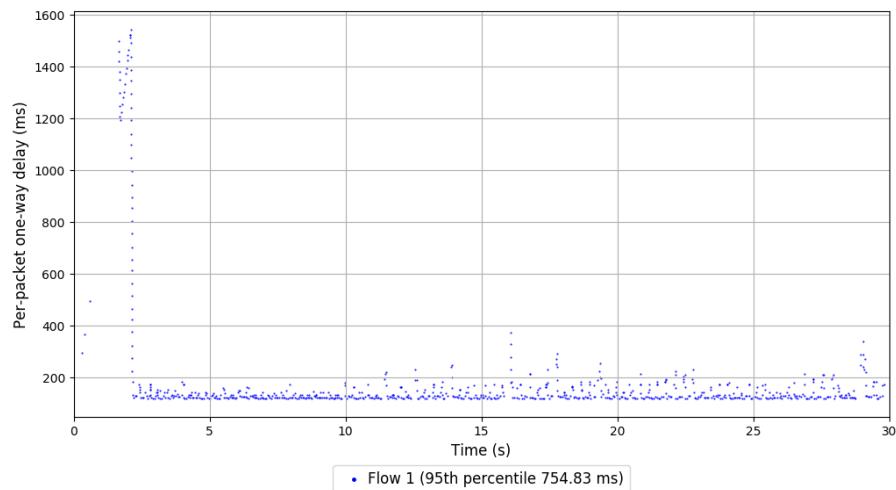
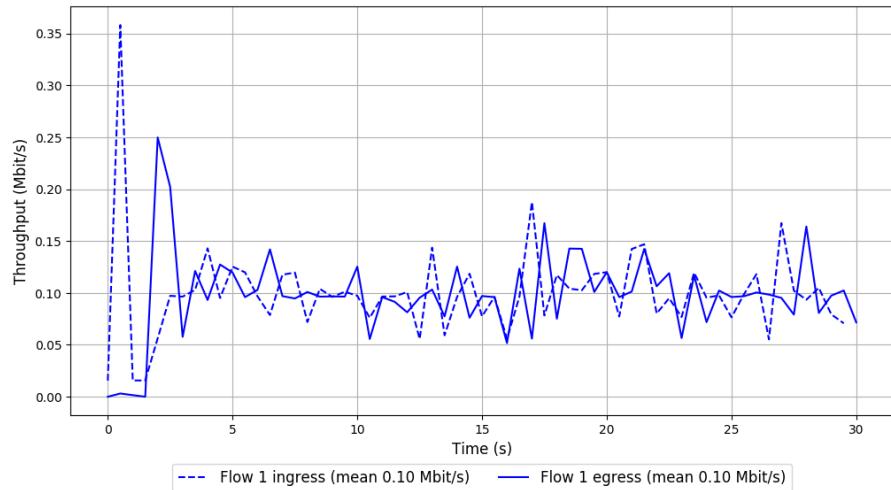
Figure is missing

Run 1: Statistics of Sprout

```
Start at: 2019-03-27 04:55:19
End at: 2019-03-27 04:55:49
Local clock offset: -4.021 ms
Remote clock offset: -4.524 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 754.832 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 754.832 ms
Loss rate: 0.43%
```

Run 1: Report of Sprout — Data Link

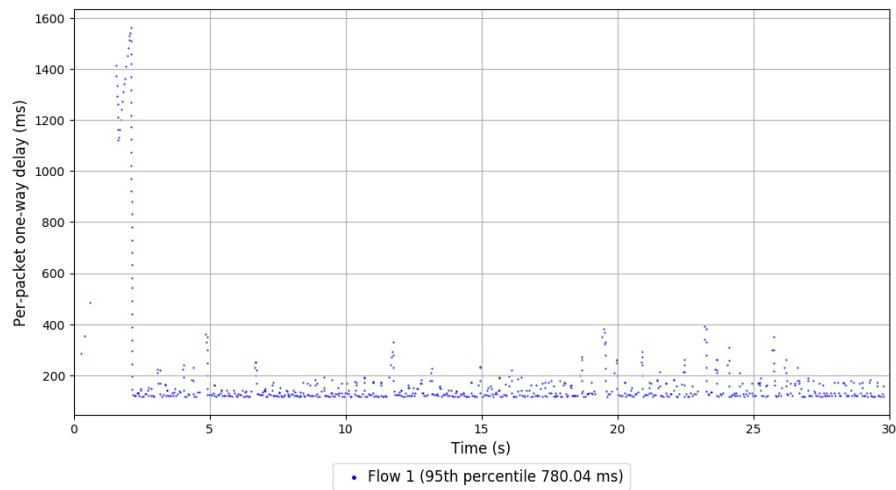
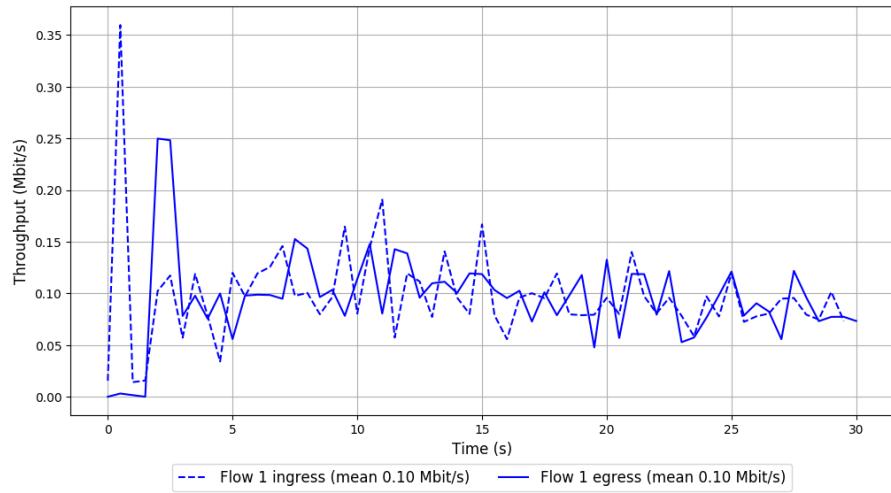


Run 2: Statistics of Sprout

```
Start at: 2019-03-27 05:20:45
End at: 2019-03-27 05:21:15
Local clock offset: -0.344 ms
Remote clock offset: -12.505 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 780.043 ms
Loss rate: 0.81%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 780.043 ms
Loss rate: 0.81%
```

Run 2: Report of Sprout — Data Link

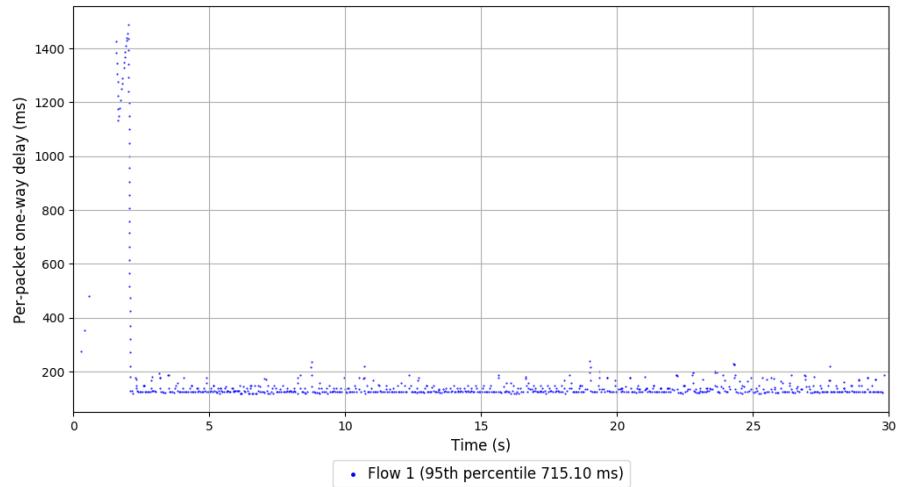
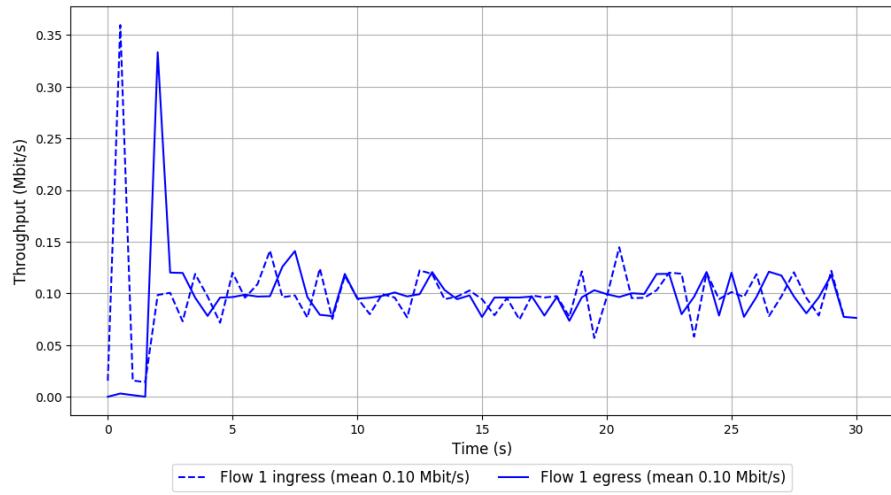


Run 3: Statistics of Sprout

```
Start at: 2019-03-27 05:46:39
End at: 2019-03-27 05:47:09
Local clock offset: 5.134 ms
Remote clock offset: 2.475 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 715.103 ms
Loss rate: 0.83%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 715.103 ms
Loss rate: 0.83%
```

Run 3: Report of Sprout — Data Link

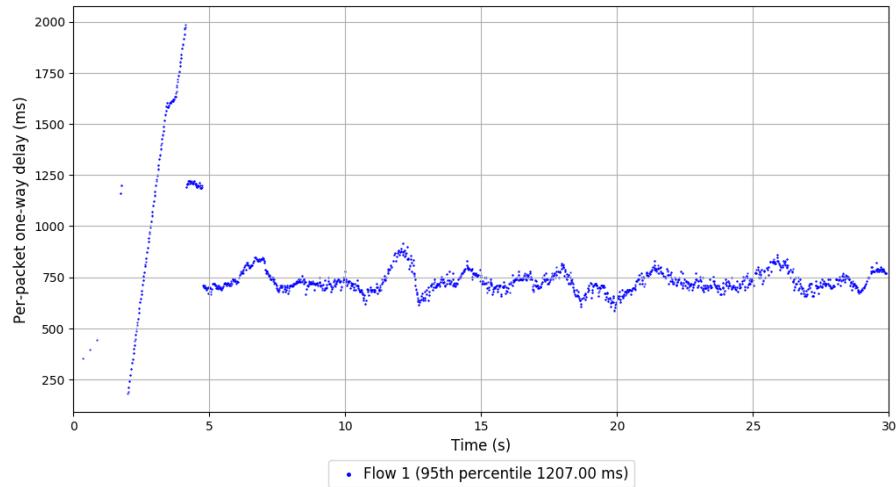
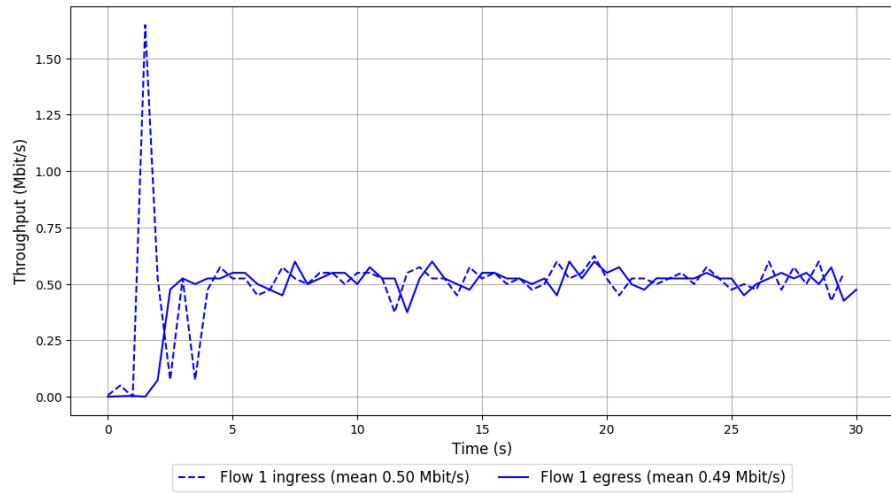


Run 1: Statistics of TaoVA-100x

```
Start at: 2019-03-27 05:00:15
End at: 2019-03-27 05:00:45
Local clock offset: -3.408 ms
Remote clock offset: -9.999 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1206.999 ms
Loss rate: 2.83%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1206.999 ms
Loss rate: 2.83%
```

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

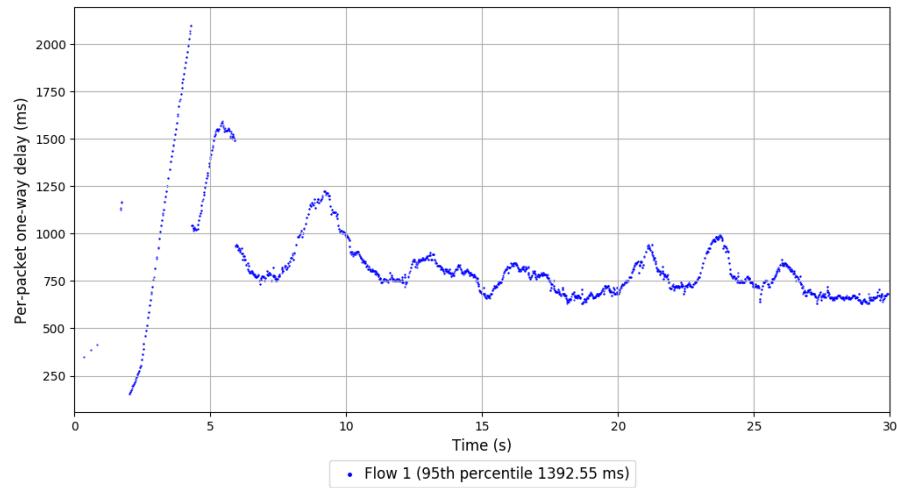
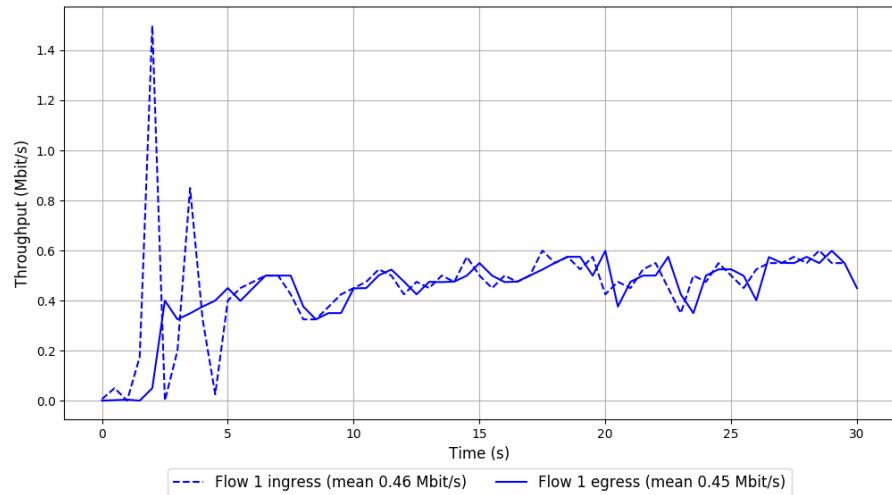


Run 2: Statistics of TaoVA-100x

```
Start at: 2019-03-27 05:25:41
End at: 2019-03-27 05:26:11
Local clock offset: 1.939 ms
Remote clock offset: -13.064 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 1392.548 ms
Loss rate: 3.08%
-- Flow 1:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 1392.548 ms
Loss rate: 3.08%
```

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

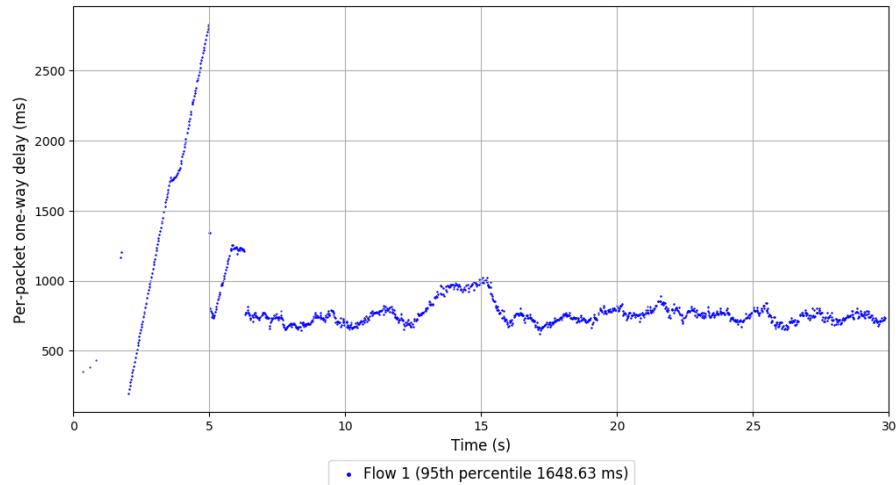
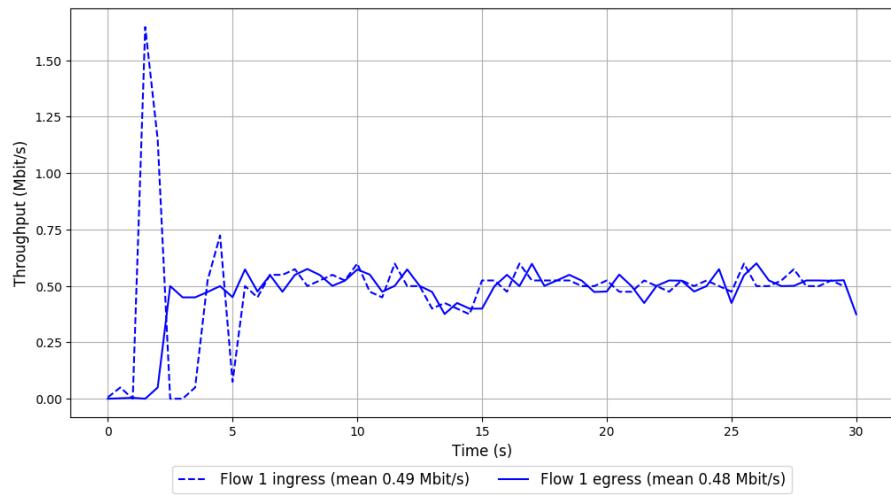


Run 3: Statistics of TaoVA-100x

```
Start at: 2019-03-27 05:51:35
End at: 2019-03-27 05:52:05
Local clock offset: 4.717 ms
Remote clock offset: 5.164 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 1648.629 ms
Loss rate: 3.00%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 1648.629 ms
Loss rate: 3.00%
```

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

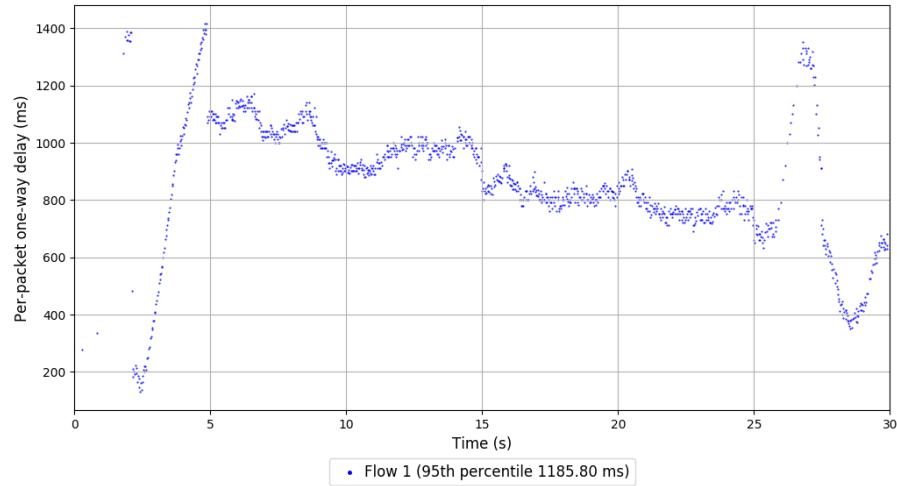
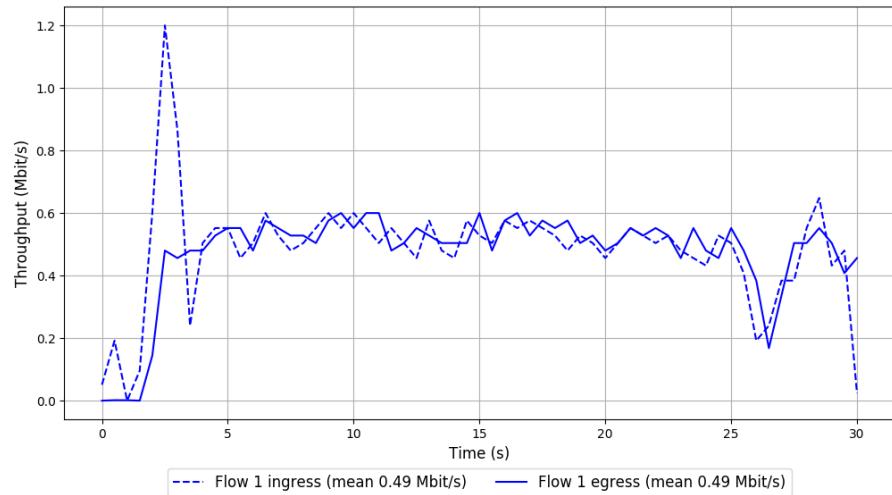


Run 1: Statistics of TCP Vegas

```
Start at: 2019-03-27 04:59:07
End at: 2019-03-27 04:59:37
Local clock offset: -3.388 ms
Remote clock offset: -4.972 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1185.799 ms
Loss rate: 2.12%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1185.799 ms
Loss rate: 2.12%
```

Run 1: Report of TCP Vegas — Data Link

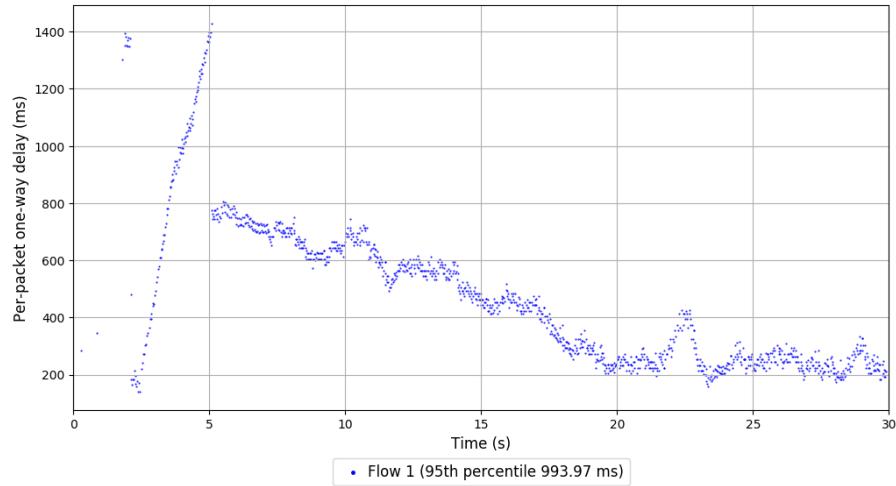
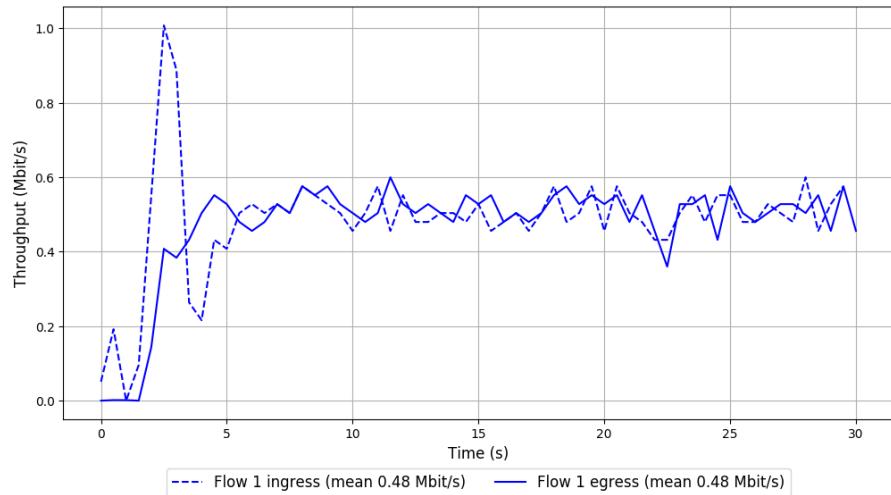


Run 2: Statistics of TCP Vegas

```
Start at: 2019-03-27 05:24:33
End at: 2019-03-27 05:25:03
Local clock offset: 0.741 ms
Remote clock offset: -13.009 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 993.966 ms
Loss rate: 1.16%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 993.966 ms
Loss rate: 1.16%
```

Run 2: Report of TCP Vegas — Data Link

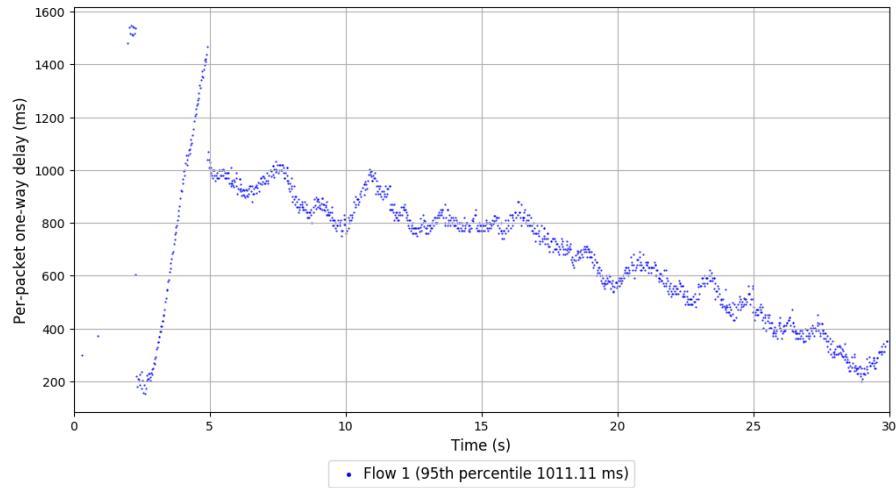
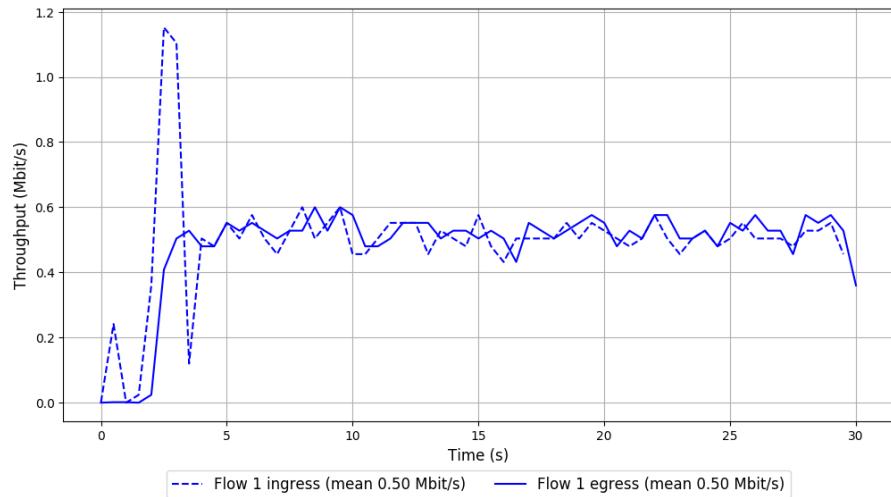


Run 3: Statistics of TCP Vegas

```
Start at: 2019-03-27 05:50:27
End at: 2019-03-27 05:50:57
Local clock offset: 4.842 ms
Remote clock offset: 4.817 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 1011.110 ms
Loss rate: 1.21%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 1011.110 ms
Loss rate: 1.21%
```

Run 3: Report of TCP Vegas — Data Link

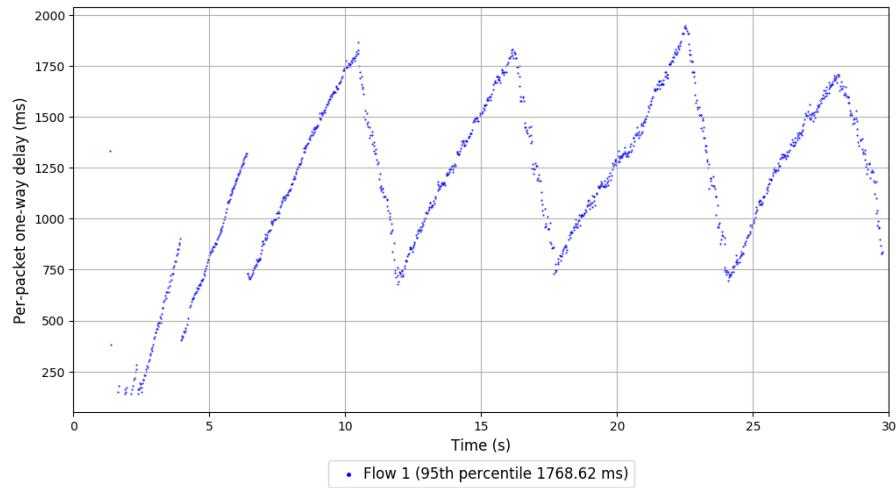
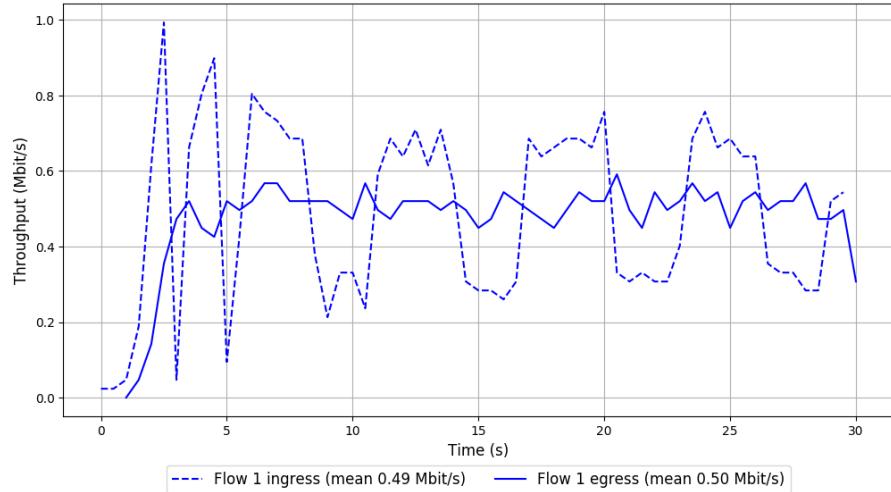


Run 1: Statistics of Verus

```
Start at: 2019-03-27 05:11:15
End at: 2019-03-27 05:11:45
Local clock offset: -4.374 ms
Remote clock offset: -11.335 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 1768.619 ms
Loss rate: 3.70%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 1768.619 ms
Loss rate: 3.70%
```

Run 1: Report of Verus — Data Link

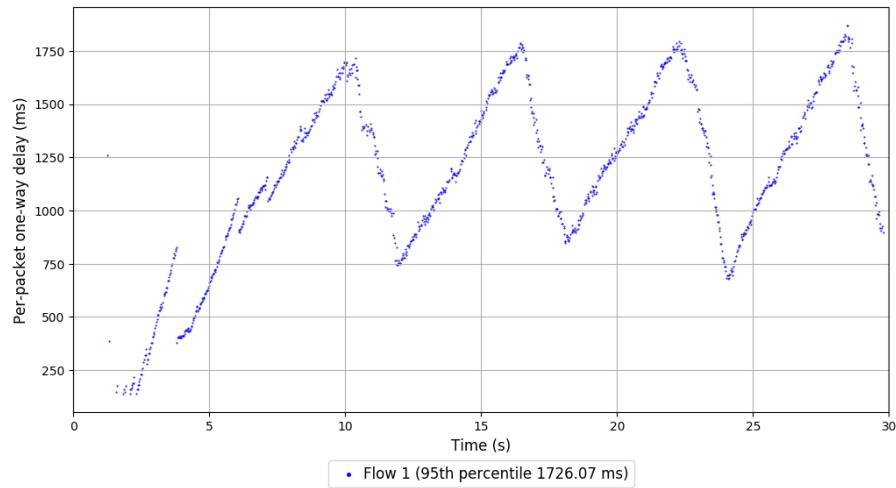
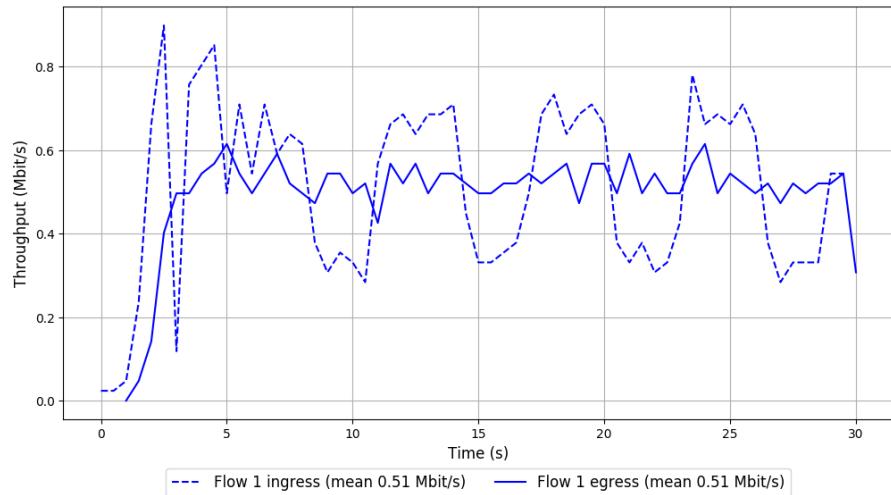


Run 2: Statistics of Verus

```
Start at: 2019-03-27 05:36:41
End at: 2019-03-27 05:37:11
Local clock offset: 3.904 ms
Remote clock offset: -1.422 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 1726.066 ms
Loss rate: 3.80%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 1726.066 ms
Loss rate: 3.80%
```

Run 2: Report of Verus — Data Link

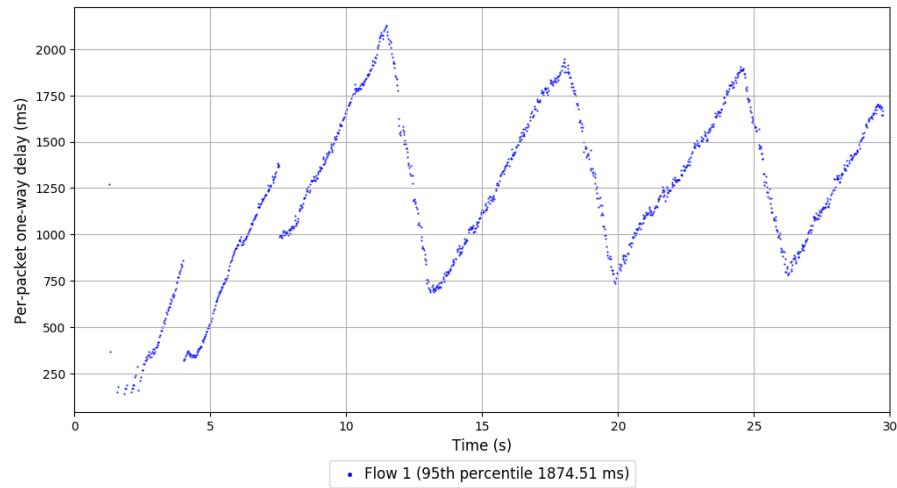
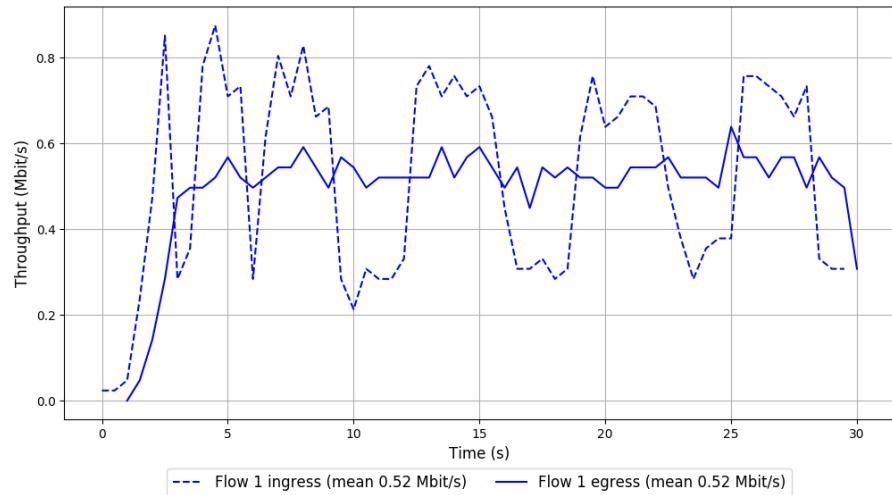


Run 3: Statistics of Verus

```
Start at: 2019-03-27 06:02:35
End at: 2019-03-27 06:03:05
Local clock offset: 5.607 ms
Remote clock offset: 12.438 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 1874.505 ms
Loss rate: 5.10%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 1874.505 ms
Loss rate: 5.10%
```

Run 3: Report of Verus — Data Link

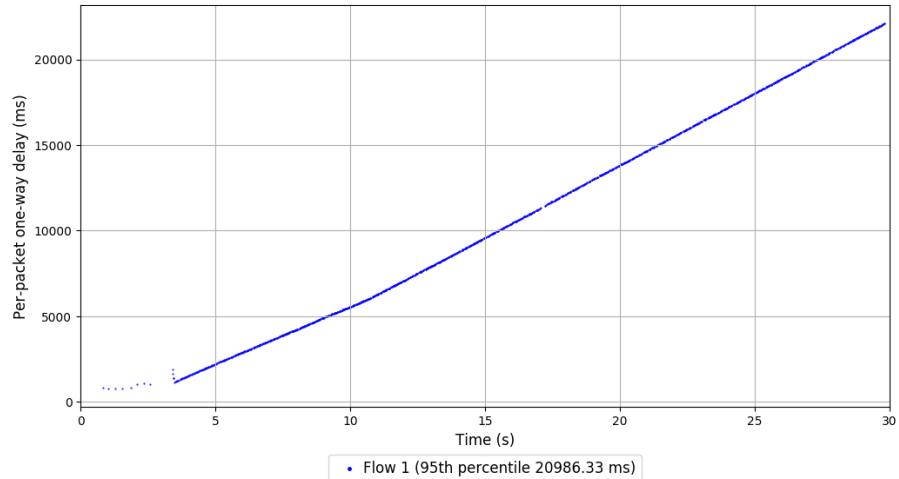
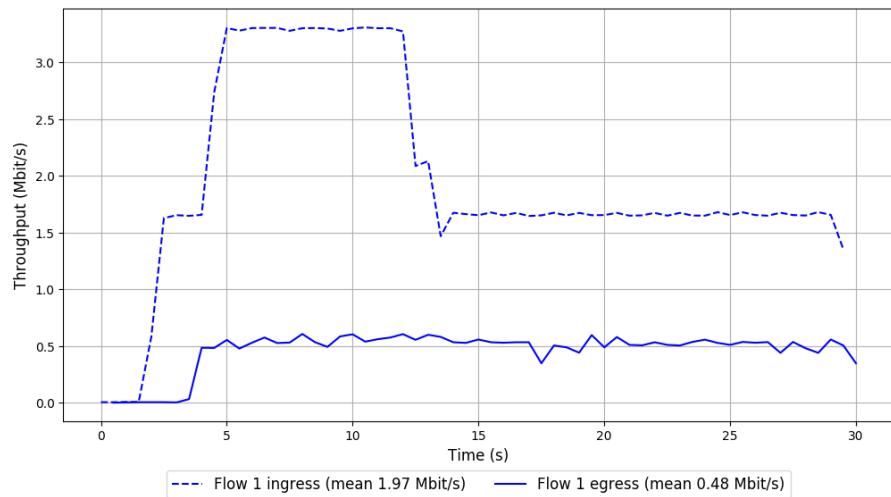


```
Run 1: Statistics of PCC-Vivace
```

```
Start at: 2019-03-27 04:48:04
End at: 2019-03-27 04:48:34
Local clock offset: -3.249 ms
Remote clock offset: -4.686 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 20986.331 ms
Loss rate: 76.42%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 20986.331 ms
Loss rate: 76.42%
```

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

/home/ubuntu/pantheon/data/2019-03-27T04-46-Colombia-cellular-to-AWS-Brazil-2-3-runs/vivace_

Run 2: Report of PCC-Vivace — Data Link

Figure is missing

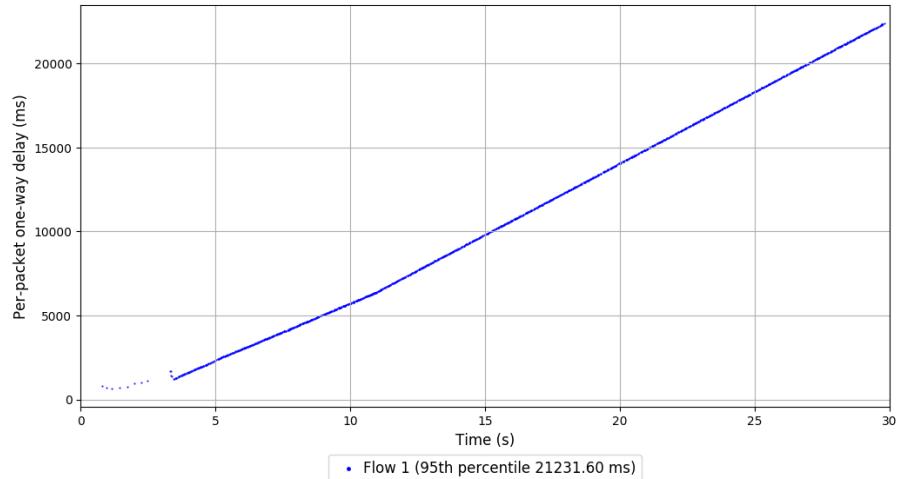
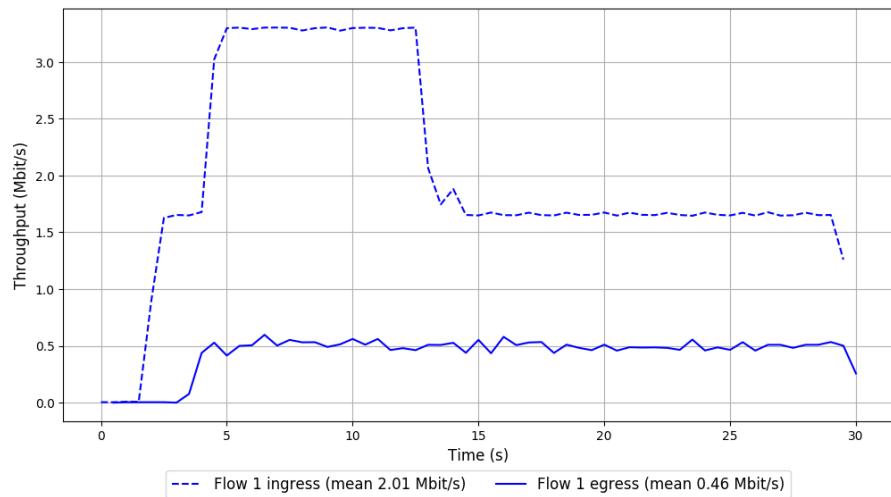
Figure is missing

Run 3: Statistics of PCC-Vivace

```
Start at: 2019-03-27 05:39:02
End at: 2019-03-27 05:39:32
Local clock offset: 4.312 ms
Remote clock offset: 2.756 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 21231.595 ms
Loss rate: 78.00%
-- Flow 1:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 21231.595 ms
Loss rate: 78.00%
```

Run 3: Report of PCC-Vivace — Data Link

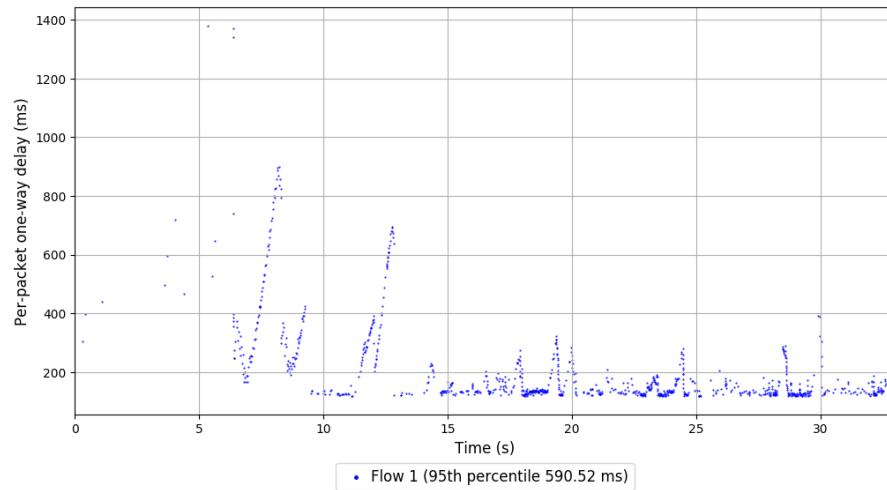
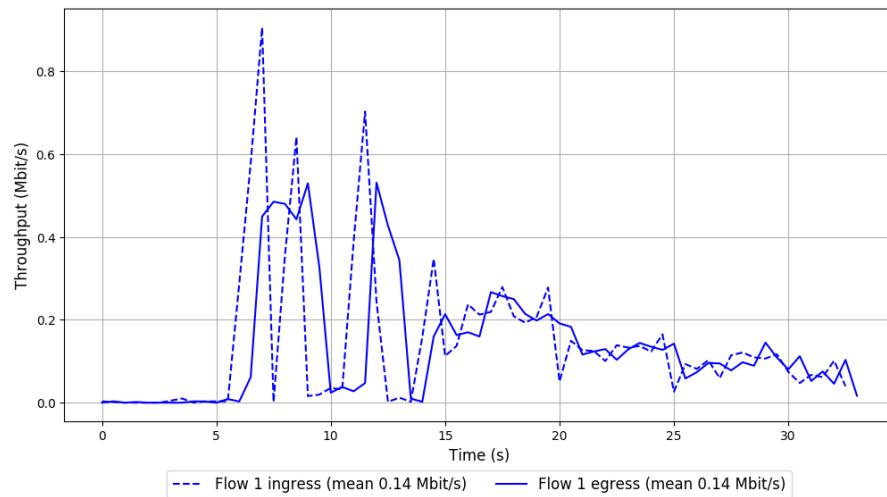


```
Run 1: Statistics of WebRTC media

Start at: 2019-03-27 05:10:07
End at: 2019-03-27 05:10:37
Local clock offset: -3.662 ms
Remote clock offset: -11.224 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 590.523 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 590.523 ms
Loss rate: 0.49%
```

Run 1: Report of WebRTC media — Data Link

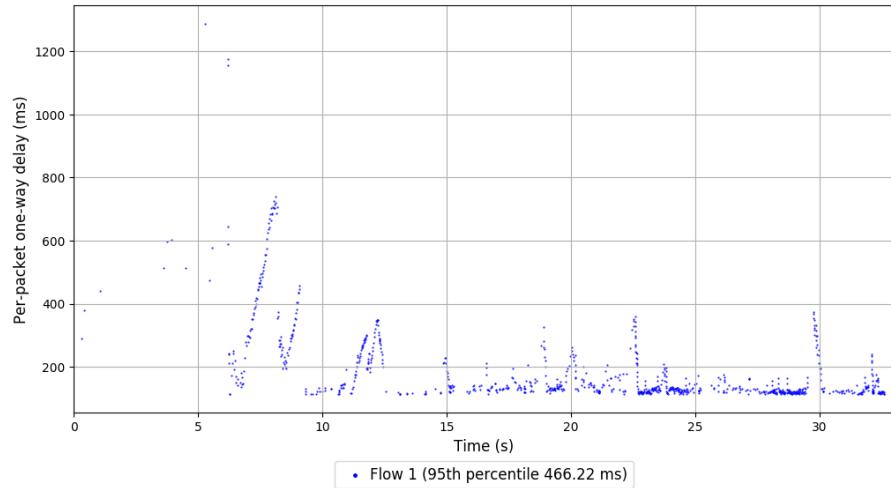
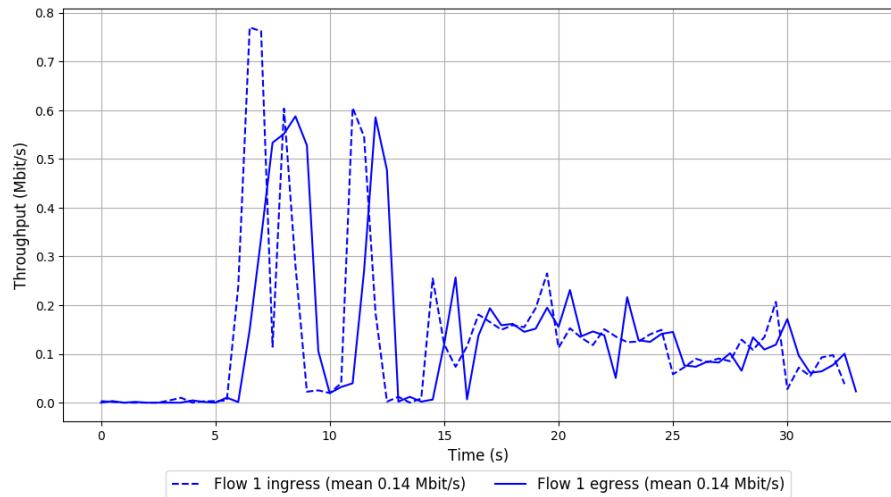


```
Run 2: Statistics of WebRTC media
```

```
Start at: 2019-03-27 05:35:33
End at: 2019-03-27 05:36:03
Local clock offset: 3.715 ms
Remote clock offset: 1.285 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 466.216 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 466.216 ms
Loss rate: 0.43%
```

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

```
Start at: 2019-03-27 06:01:27
End at: 2019-03-27 06:01:57
Local clock offset: 4.851 ms
Remote clock offset: 7.216 ms

# Below is generated by plot.py at 2019-03-27 06:03:43
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 978.629 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 978.629 ms
Loss rate: 0.30%
```

Run 3: Report of WebRTC media — Data Link

