

## 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:

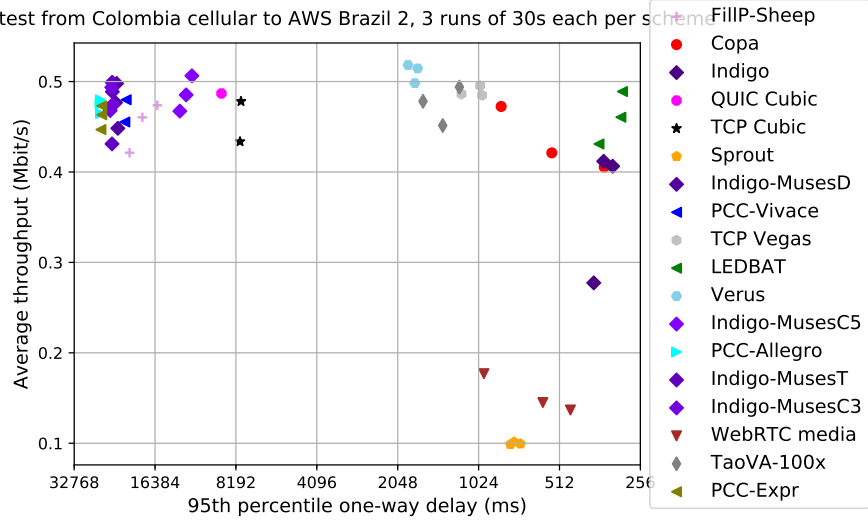
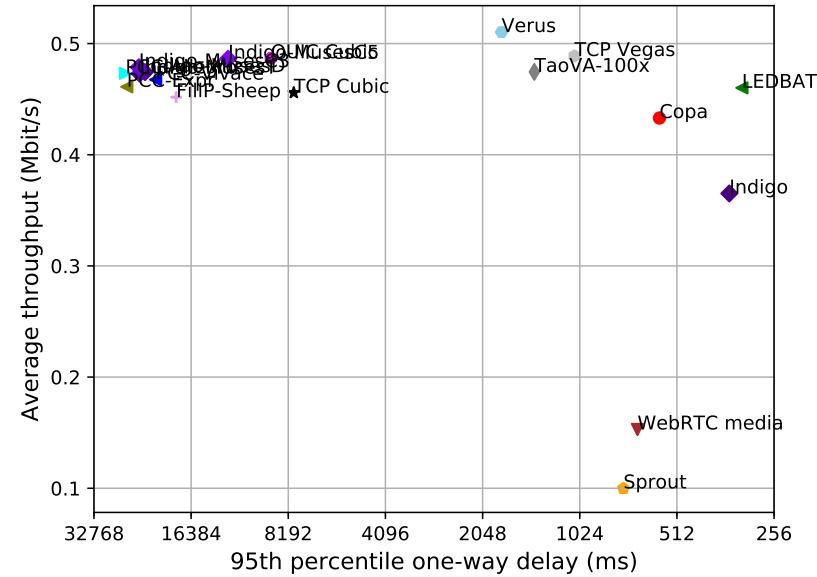
```
Linux 4.15.0-1034-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

### Git summary:

```
branch: muses @ 7a686f7c2ed0a333082c0bab1fa5c921ab47e6ee
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
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 Colombia cellular to AWS Brazil 2, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	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\_sta

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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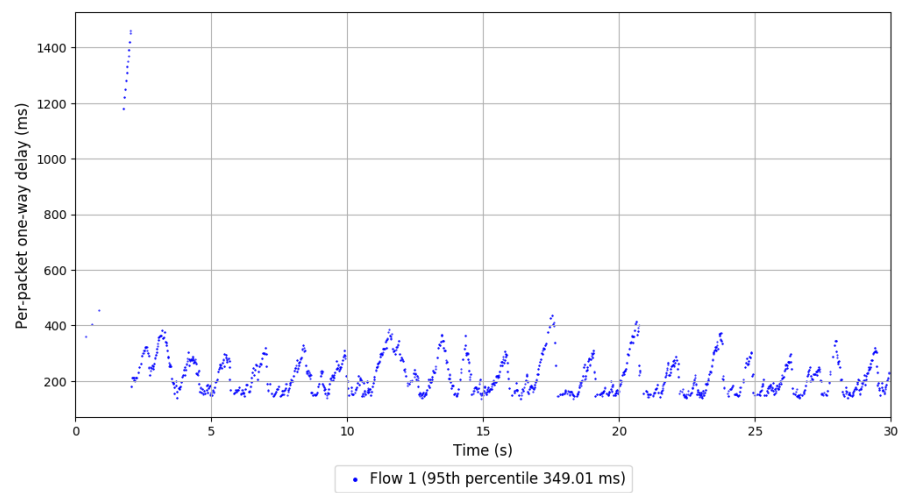
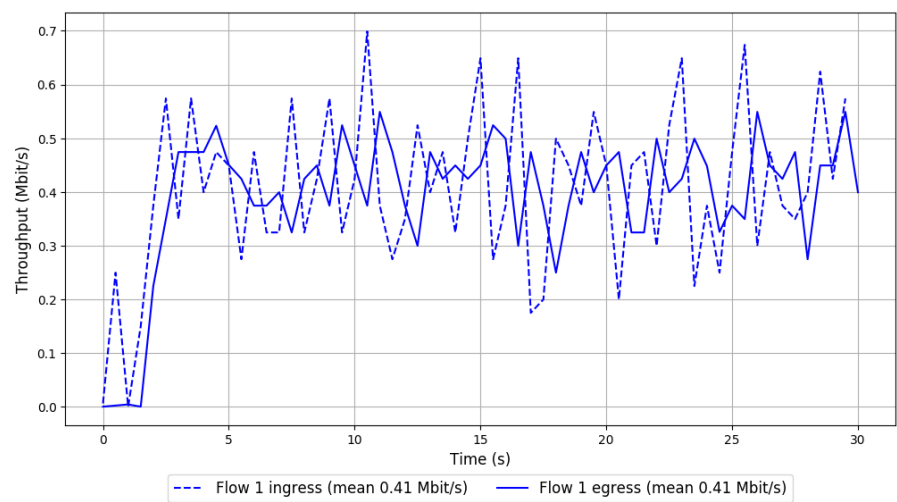
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Run 1: Statistics of Copa

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

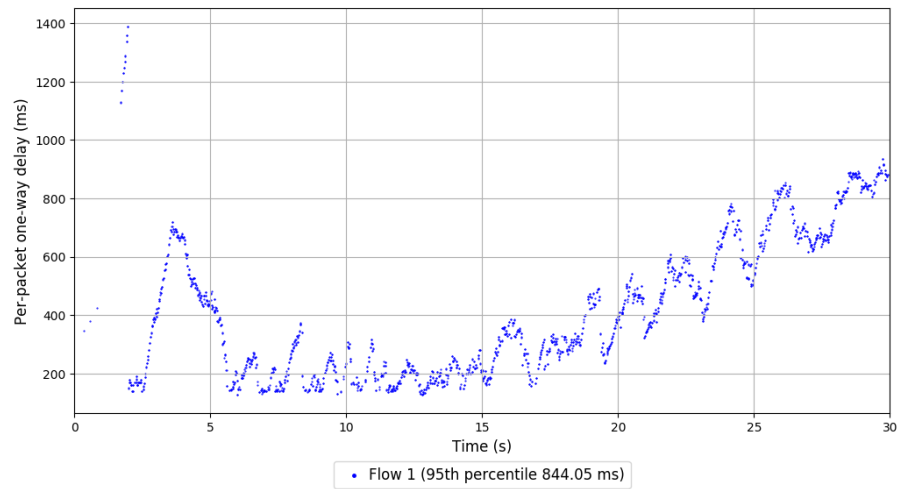
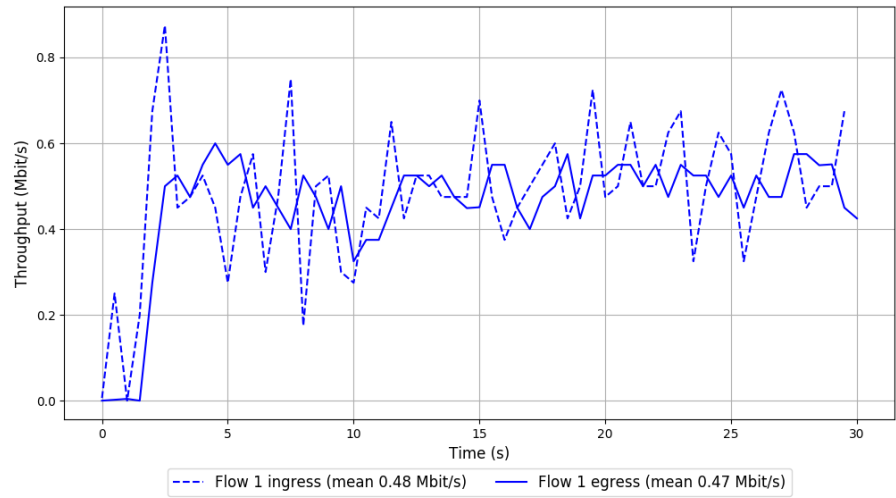


Run 2: Statistics of Copa

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%

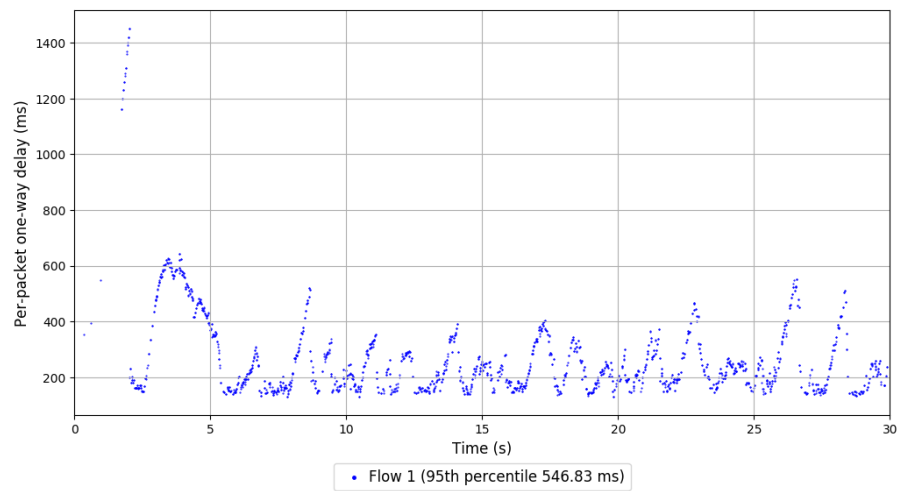
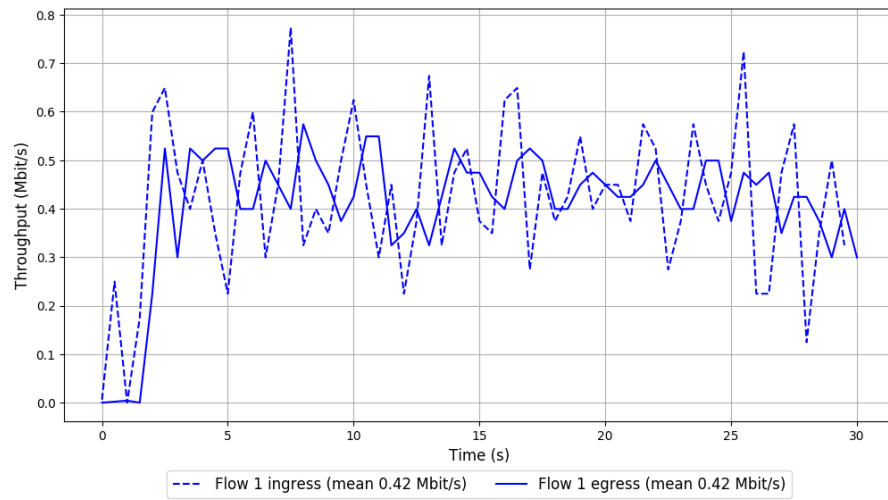
-- Flow 1:

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



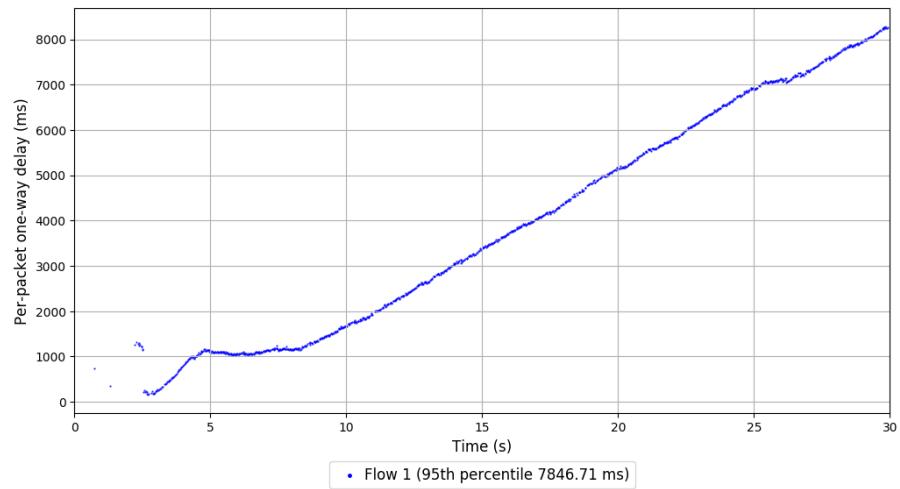
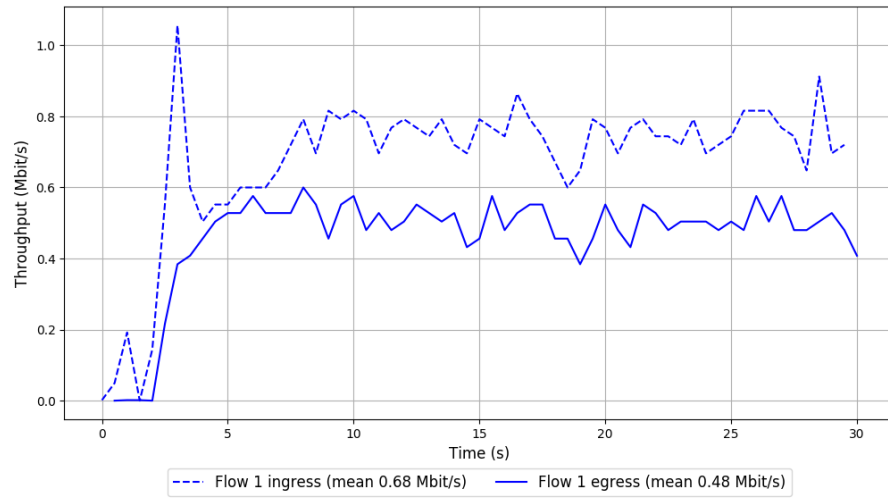


Run 1: Statistics of TCP Cubic

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

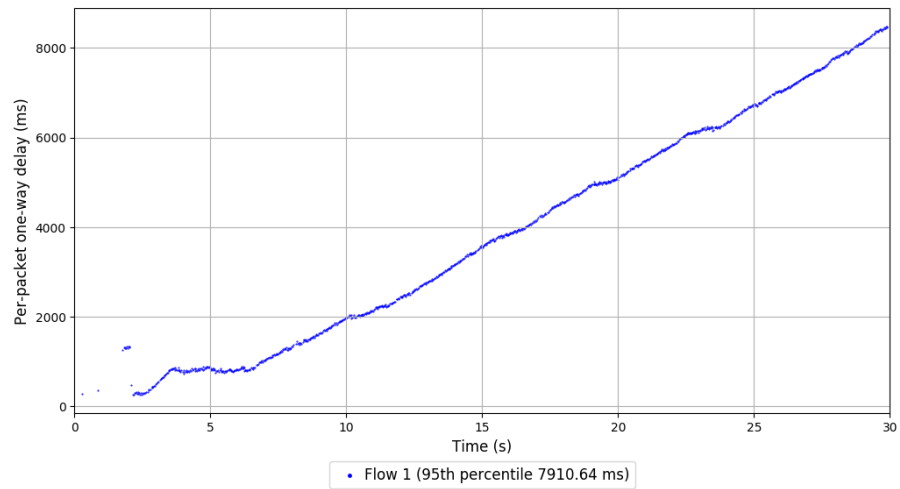
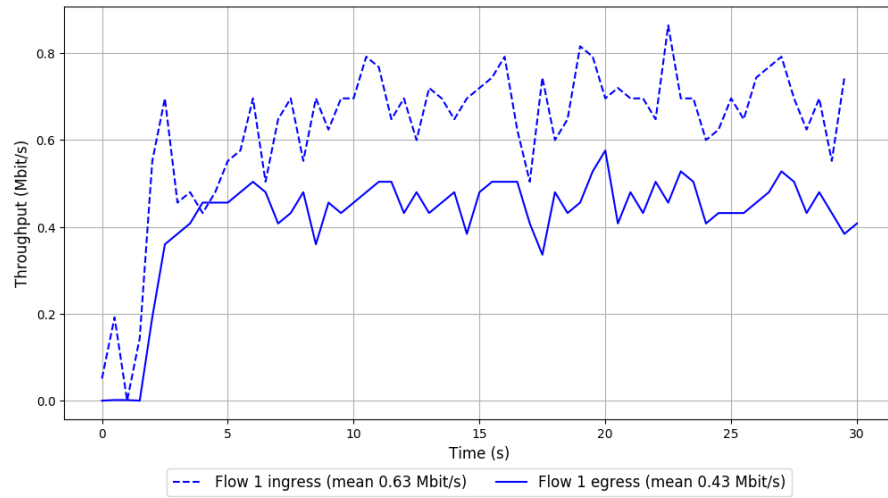


Run 2: Statistics of TCP Cubic

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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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%

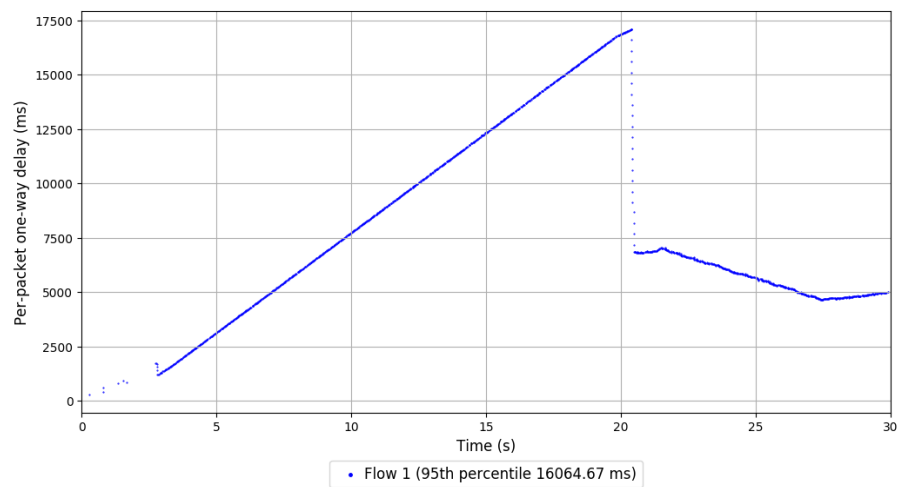
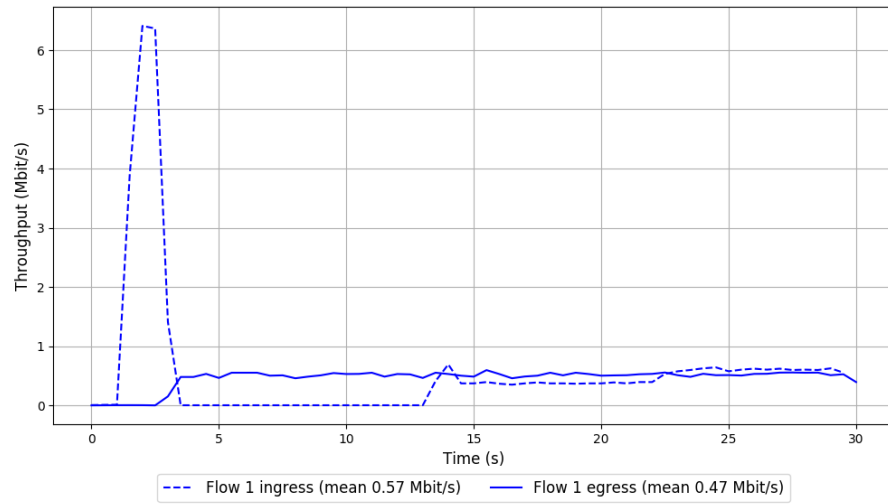
-- Flow 1:

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

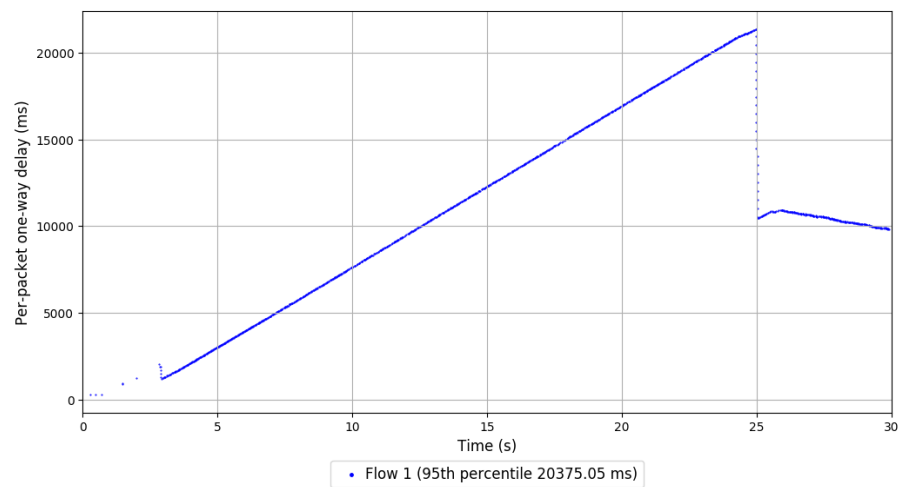
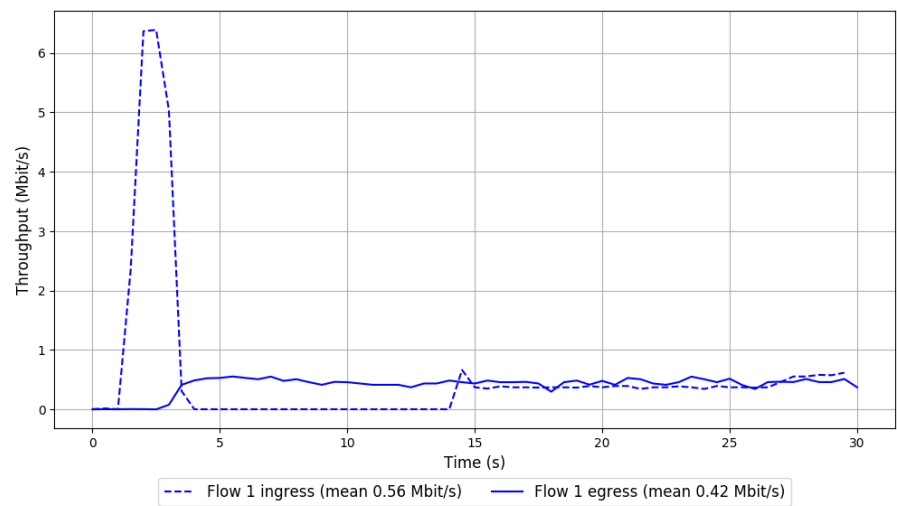


Run 2: Statistics of FillP-Sheep

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%

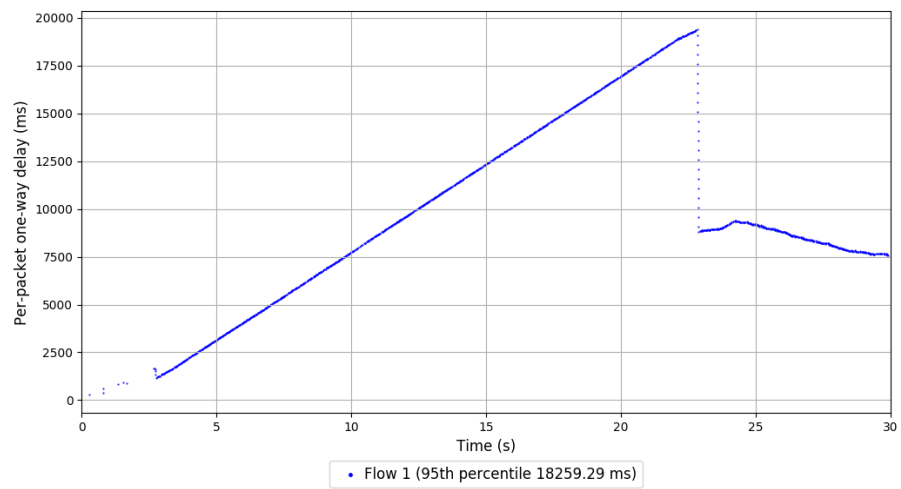
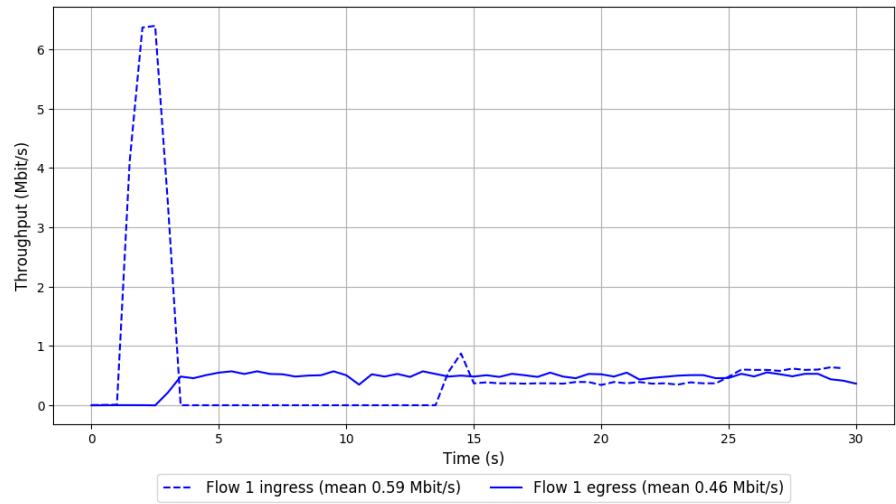
-- Flow 1:

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

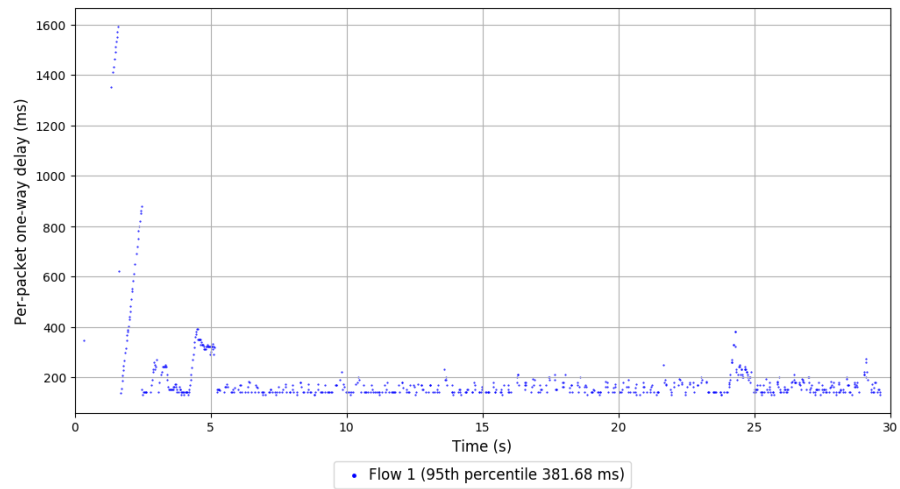
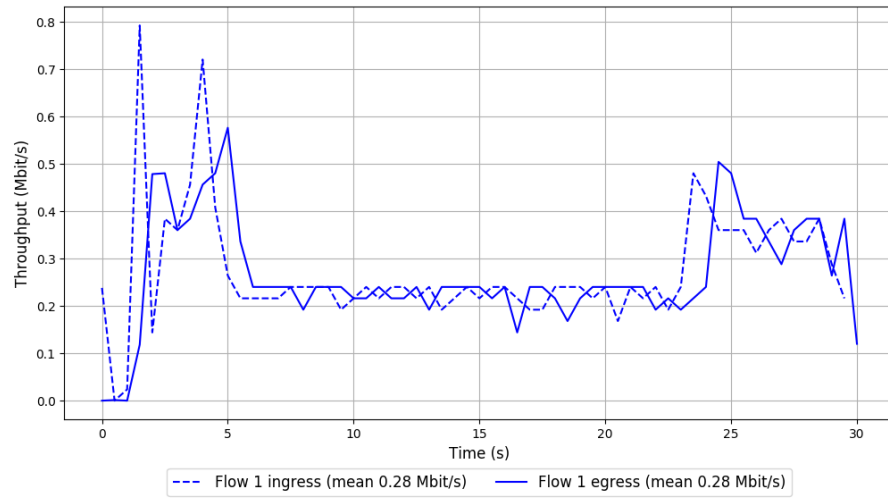


Run 1: Statistics of Indigo

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

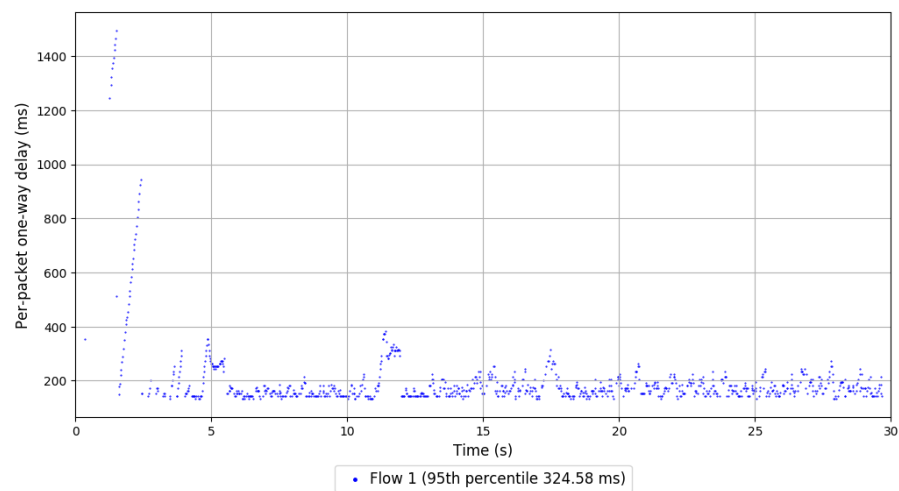
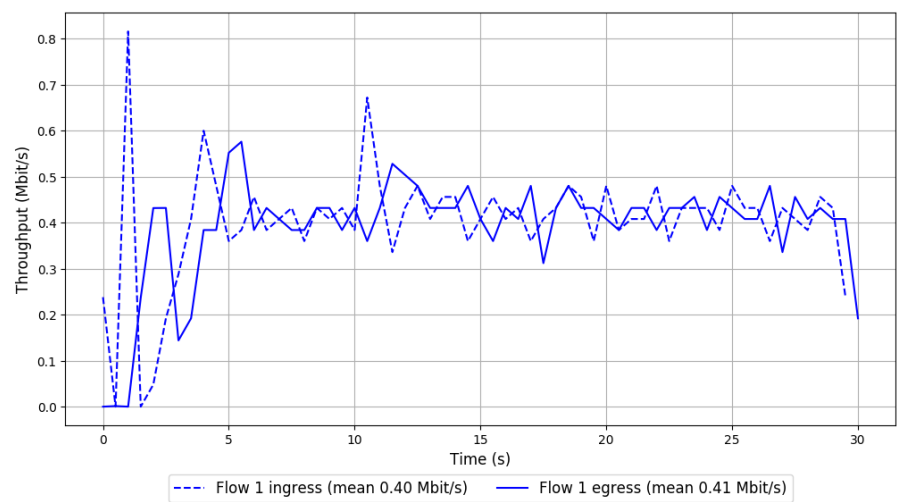


Run 2: Statistics of Indigo

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%

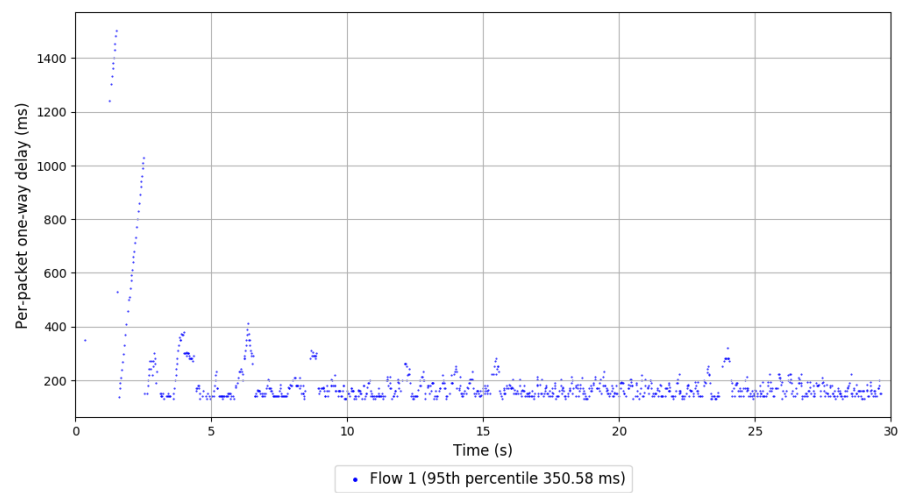
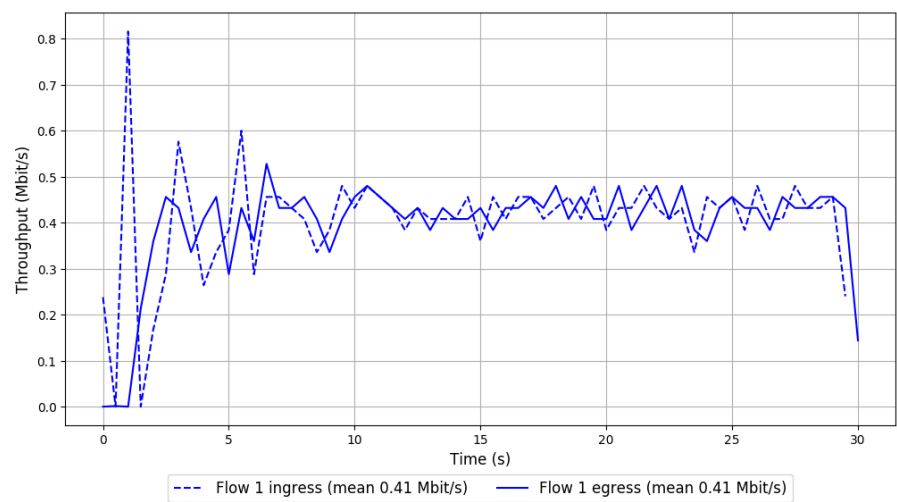
-- Flow 1:

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



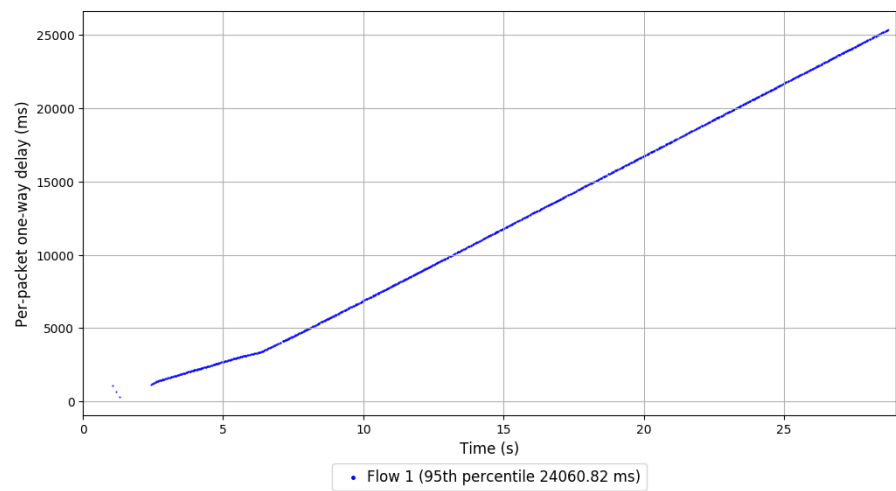
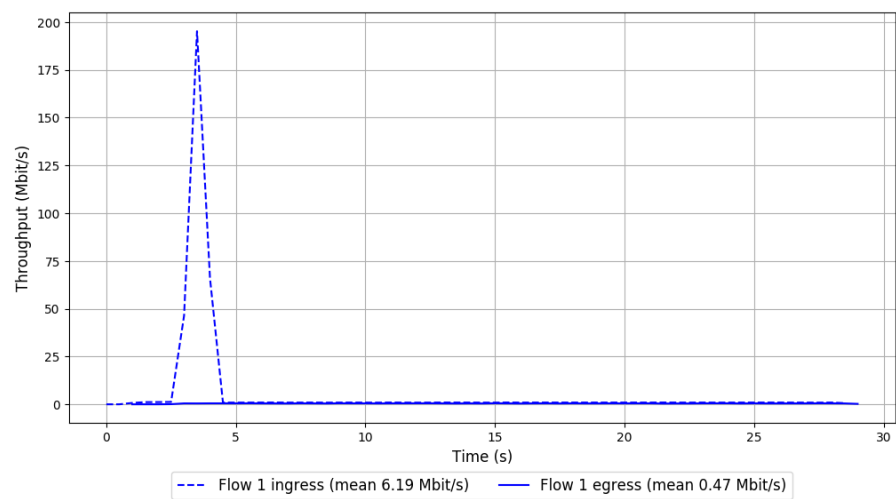


Run 1: Statistics of Indigo-MusesC3

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%

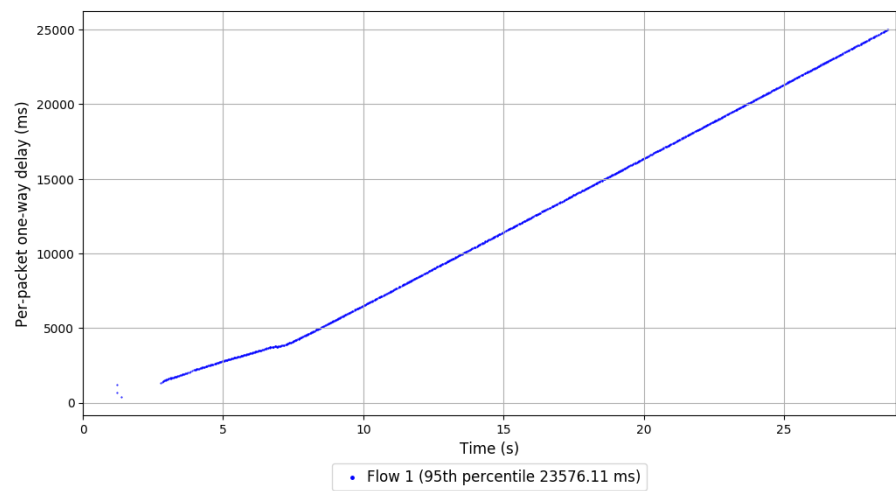
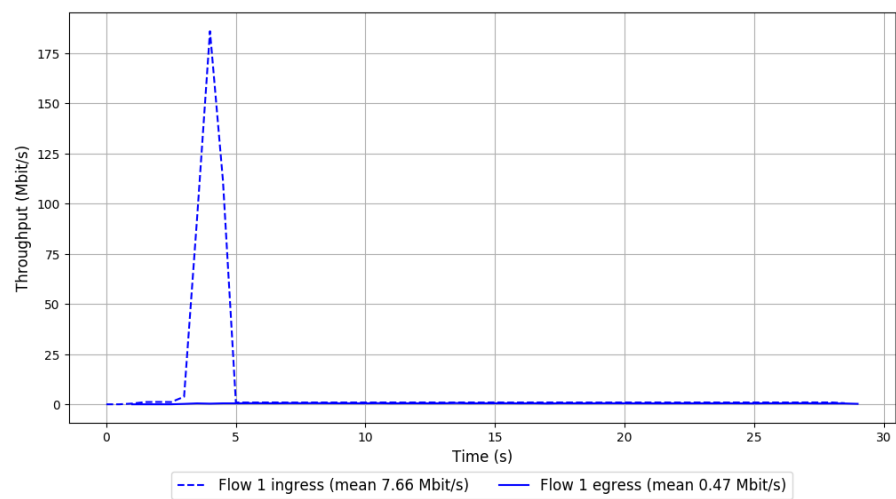
-- Flow 1:

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

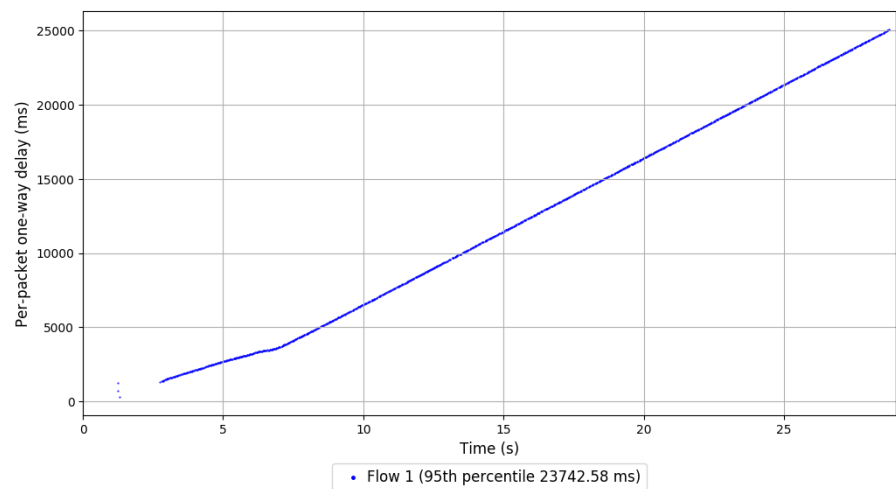
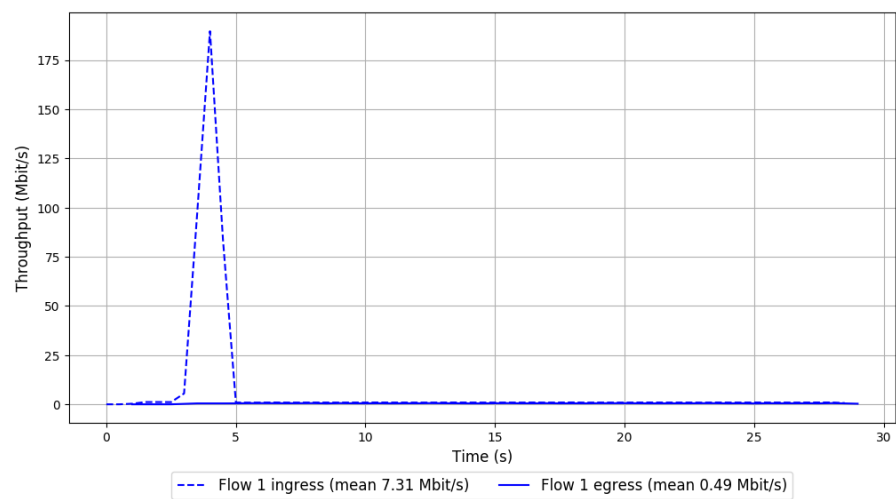


Run 3: Statistics of Indigo-MusesC3

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

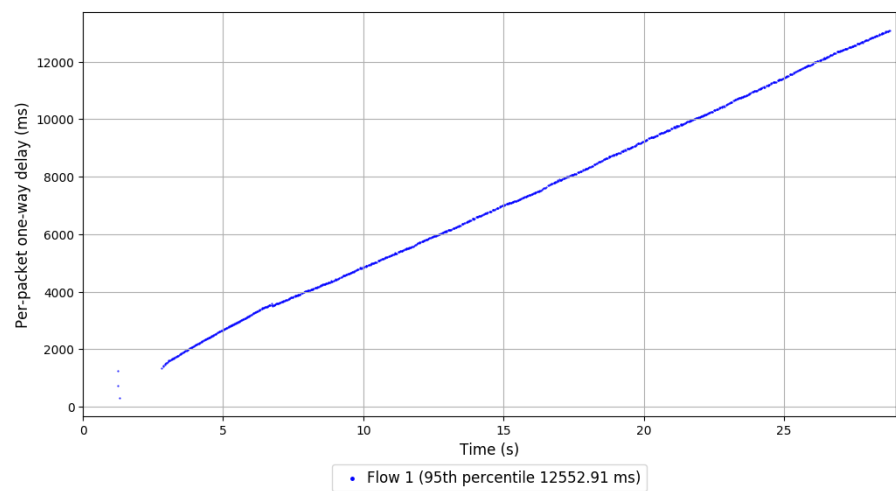
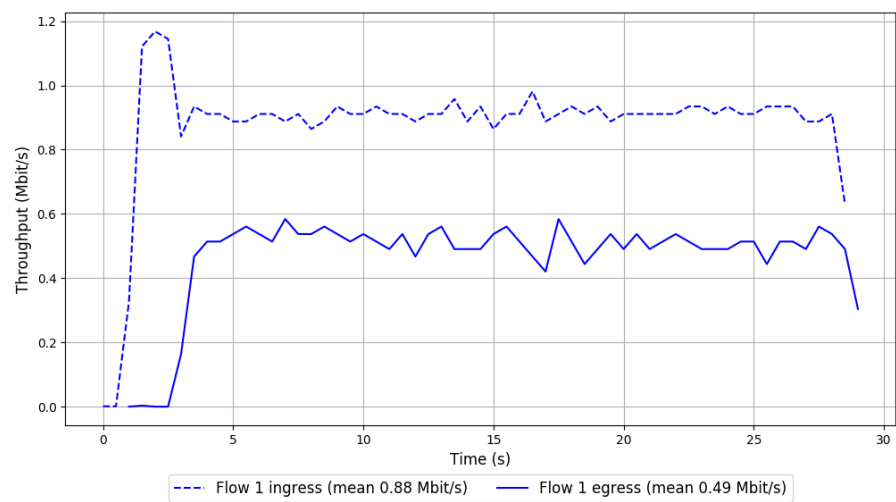


Run 1: Statistics of Indigo-MusesC5

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%

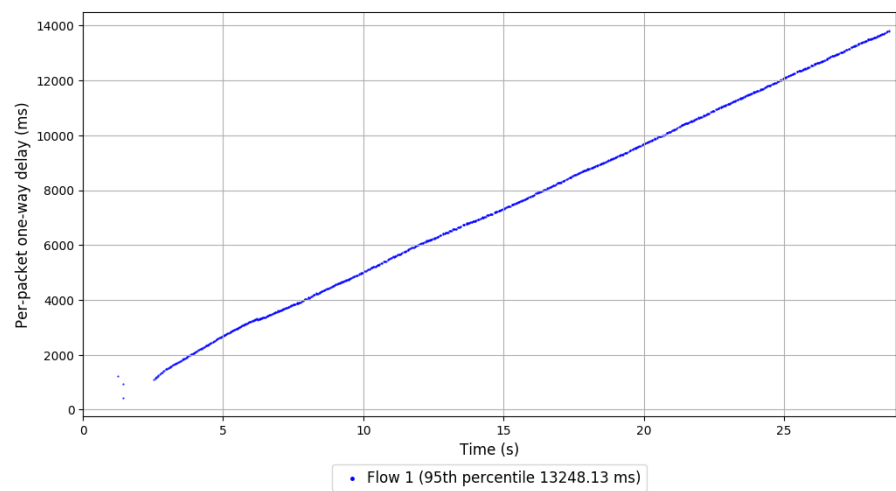
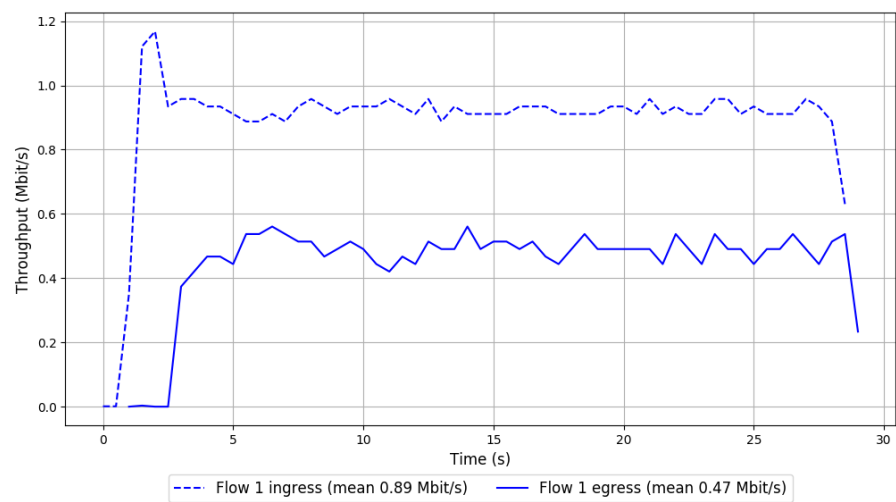
-- Flow 1:

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%

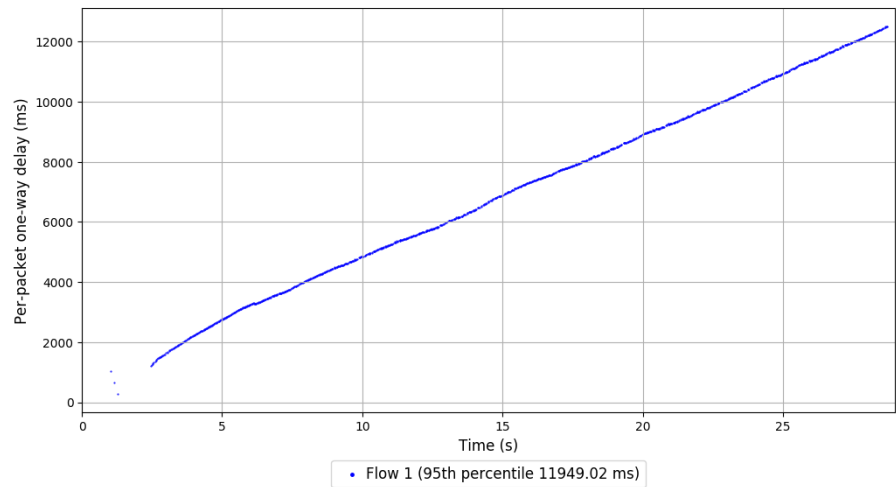
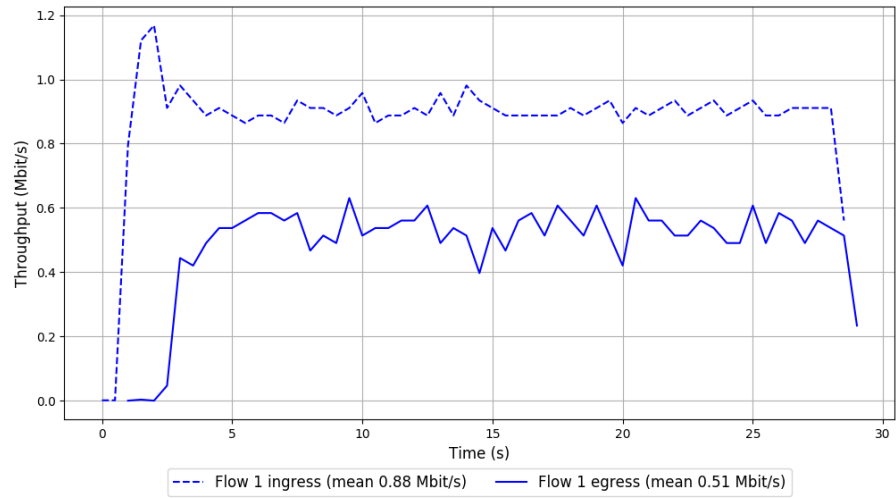
-- Flow 1:

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%

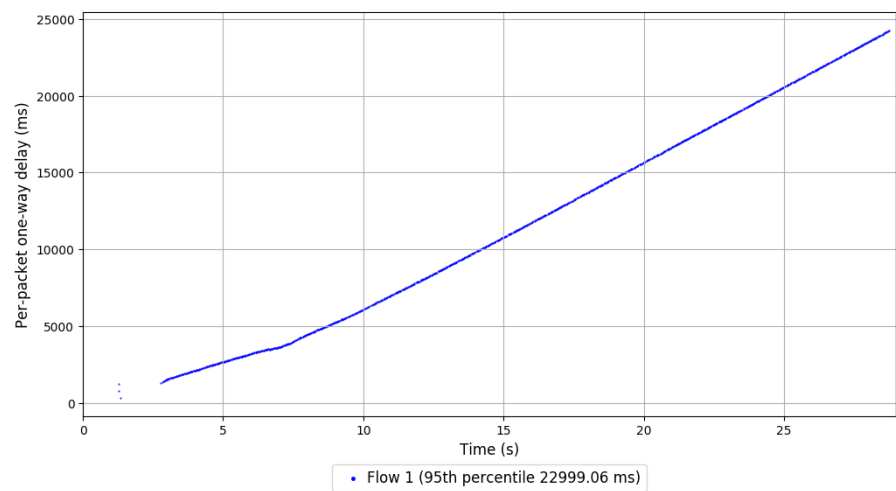
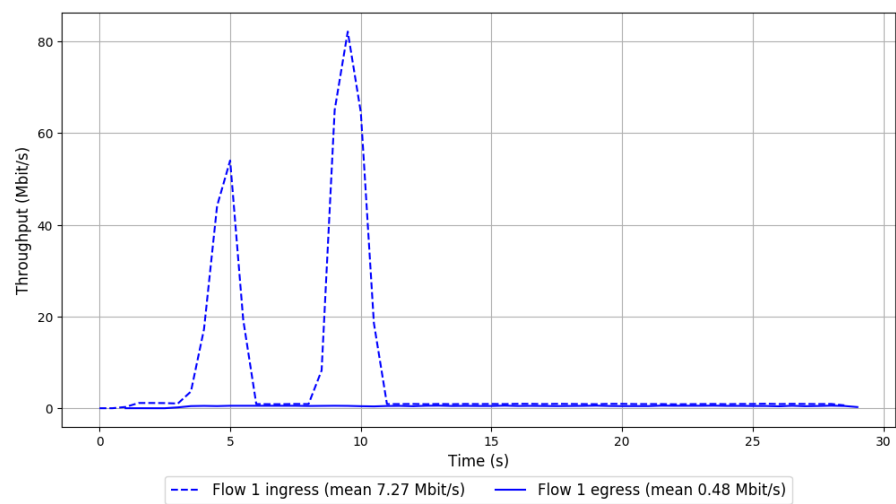
-- Flow 1:

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

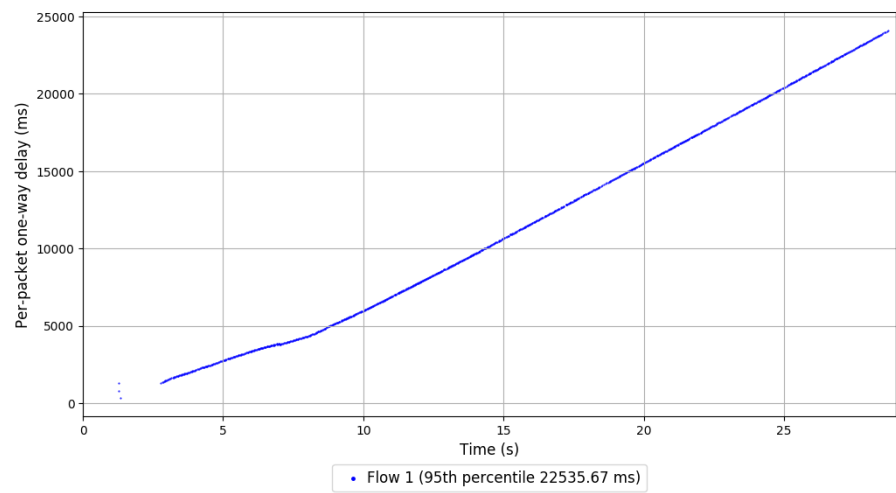
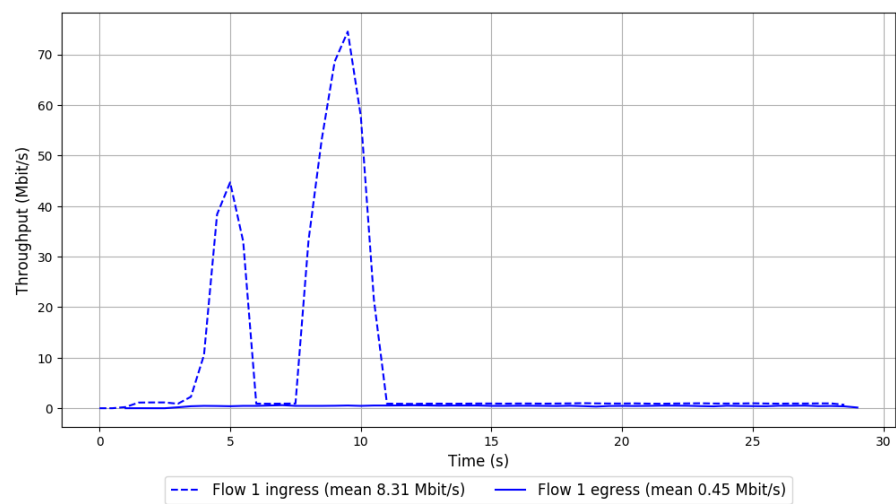


Run 2: Statistics of Indigo-MusesD

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%

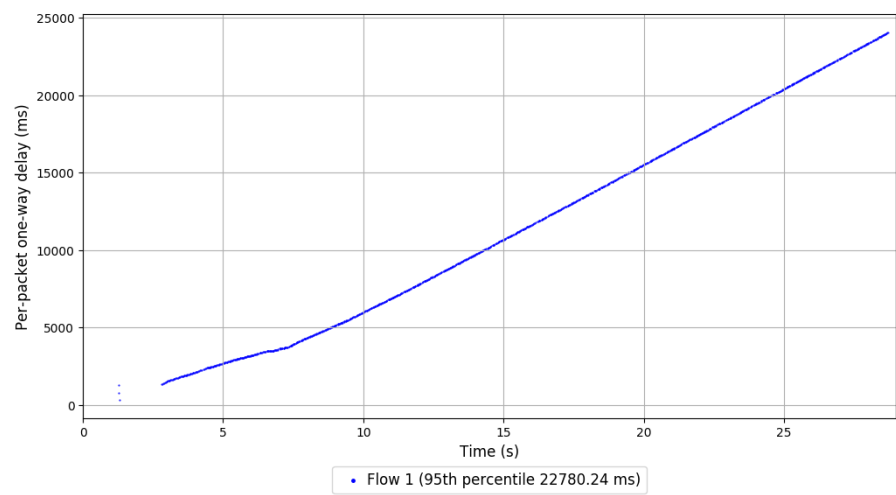
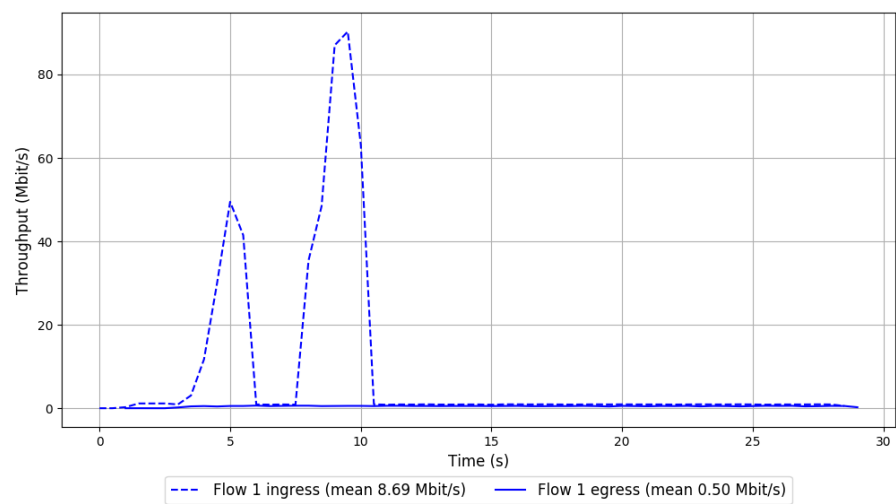
-- Flow 1:

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%

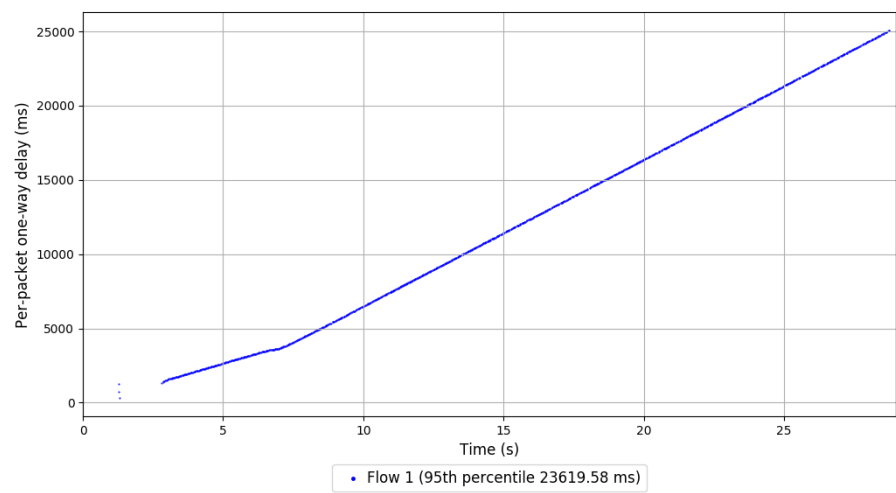
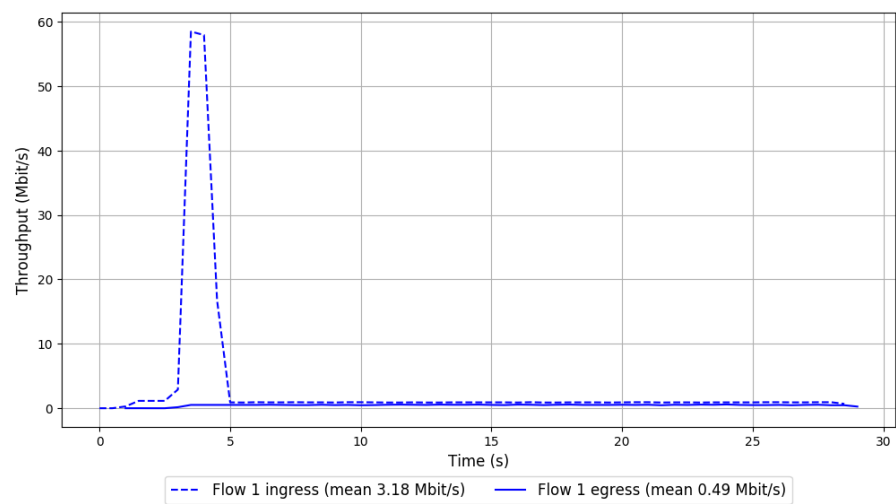
-- Flow 1:

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%

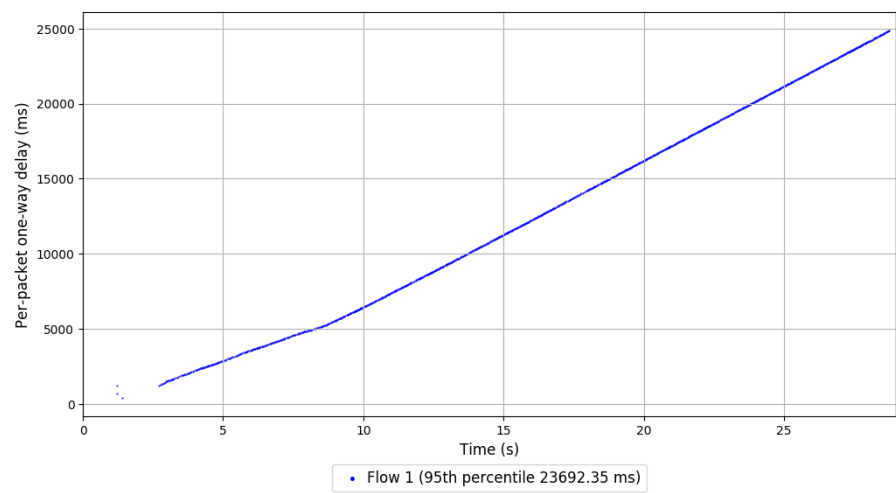
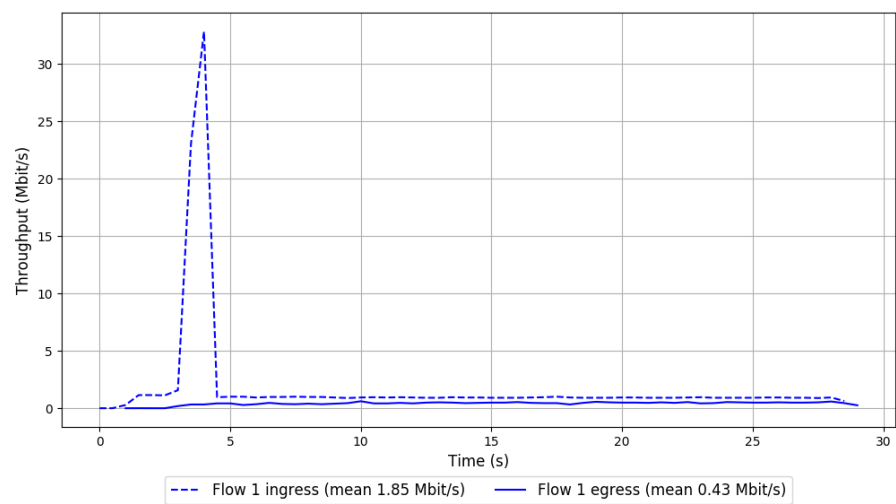
-- Flow 1:

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%

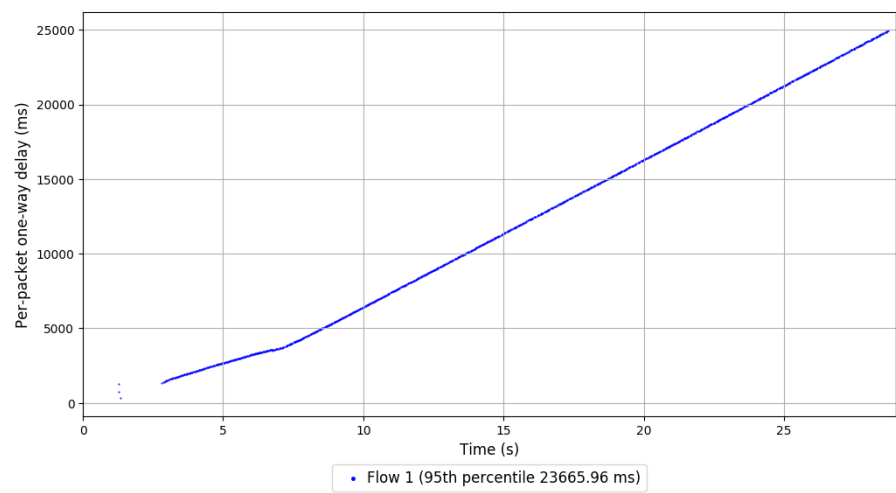
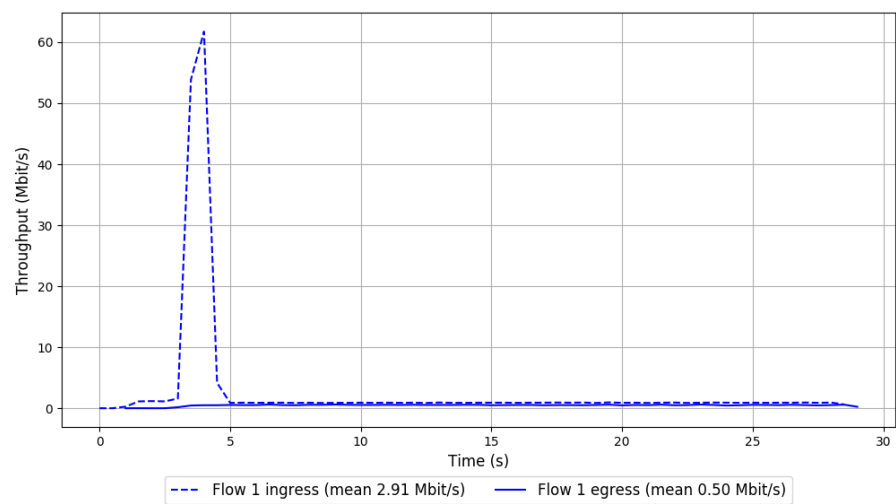
-- Flow 1:

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



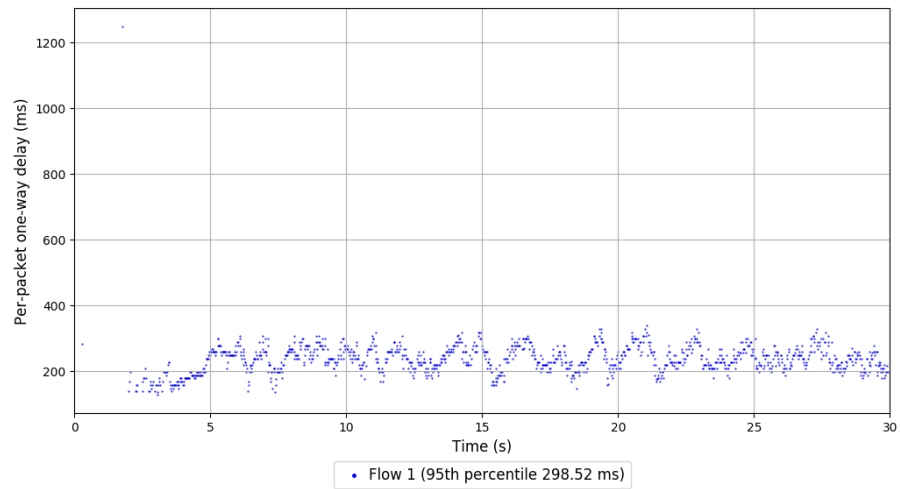
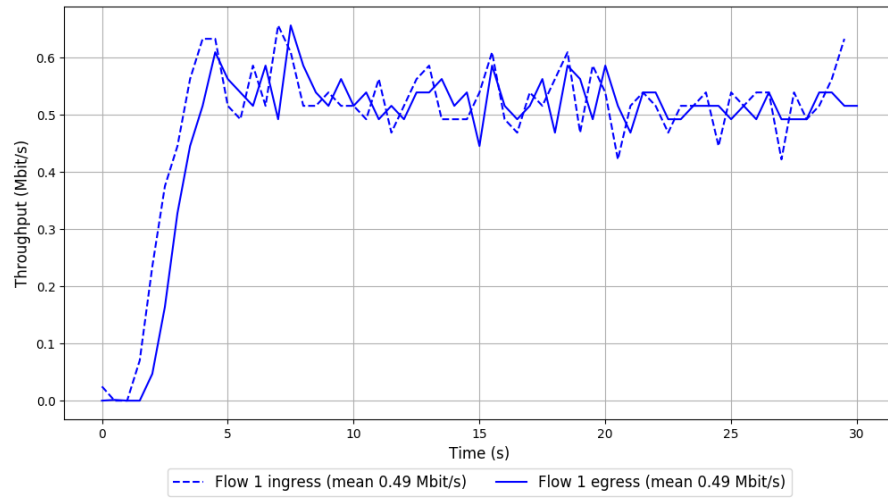


Run 1: Statistics of LEDBAT

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

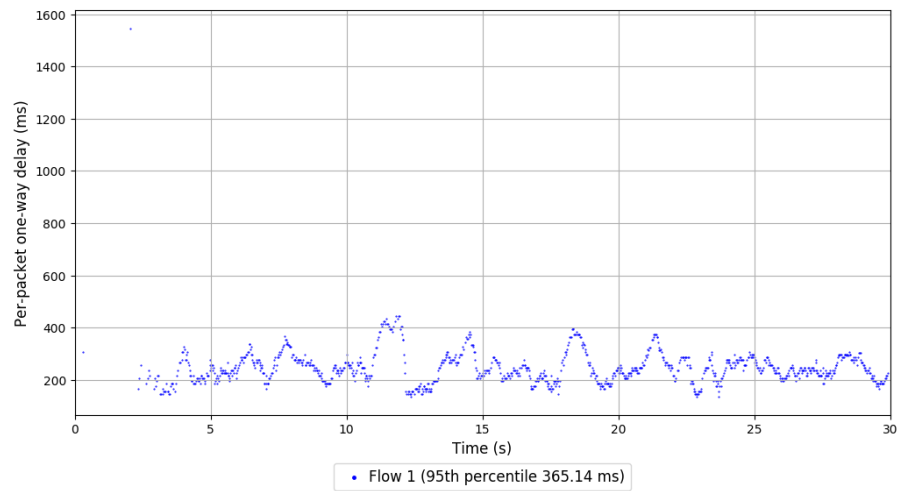
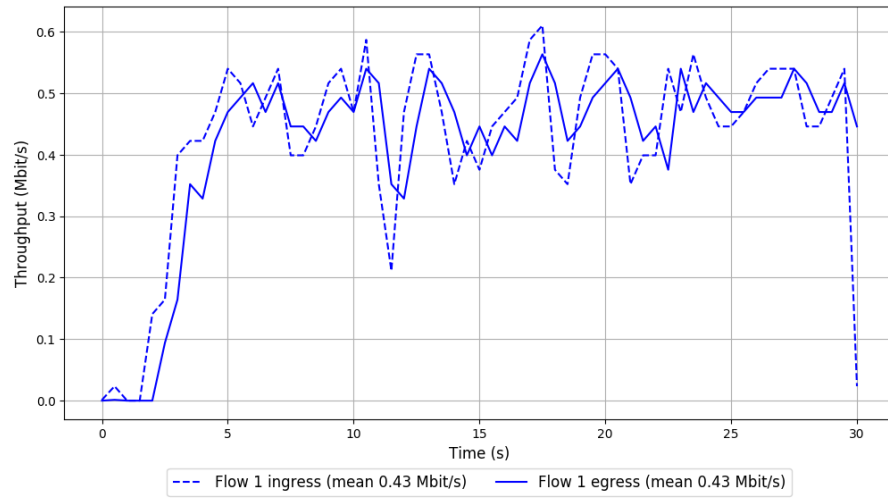


Run 2: Statistics of LEDBAT

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%

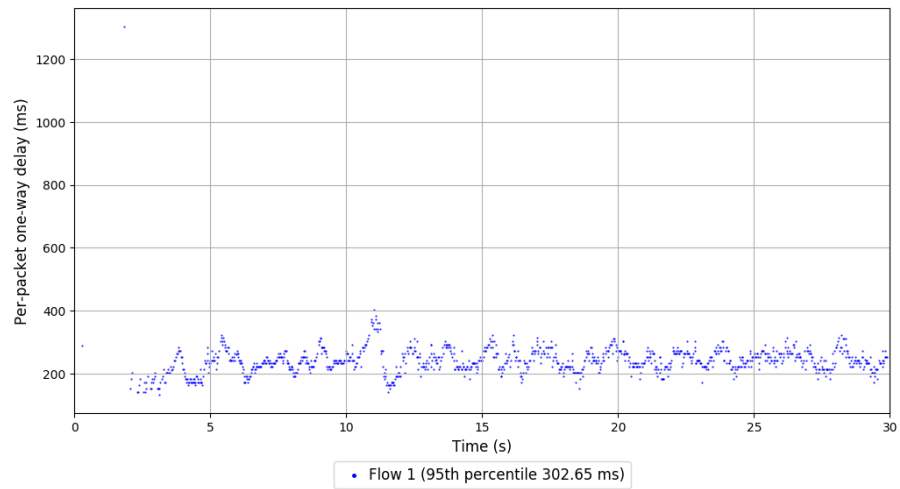
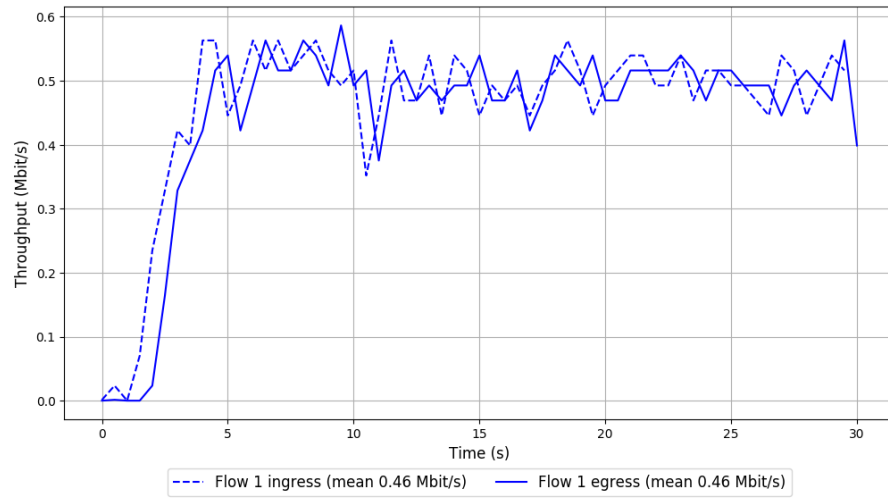
-- Flow 1:

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%

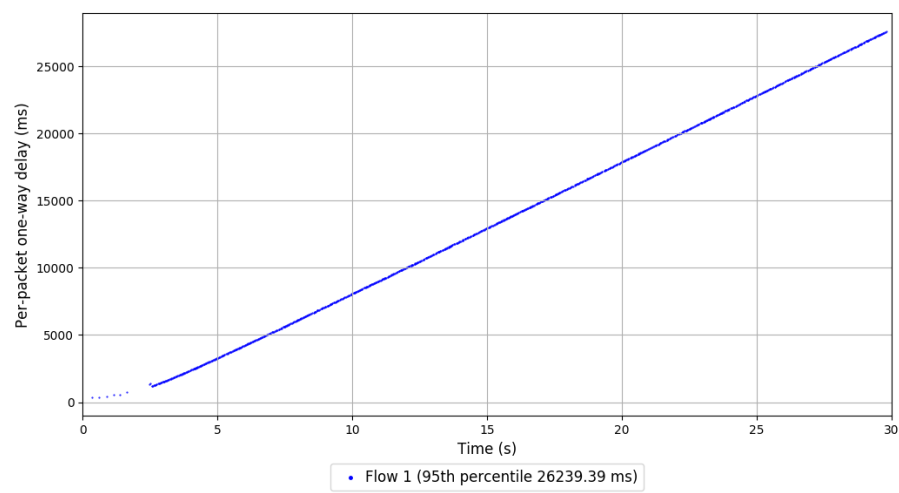
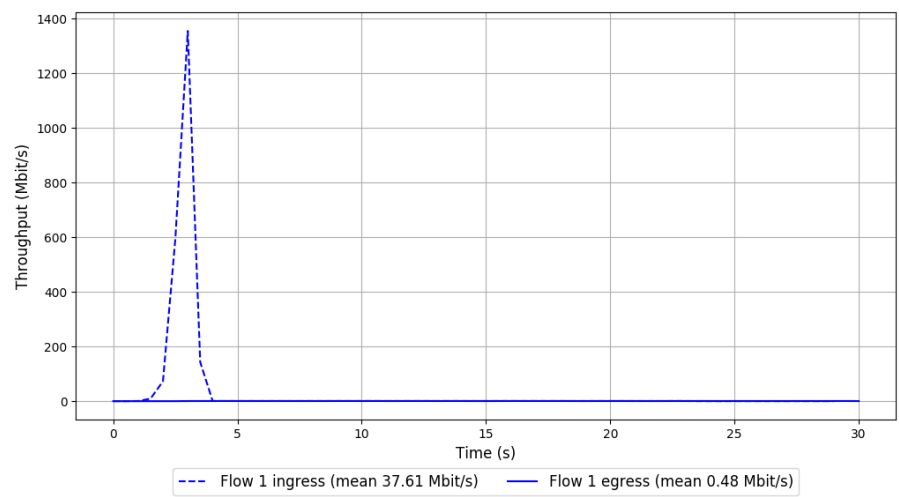
-- Flow 1:

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



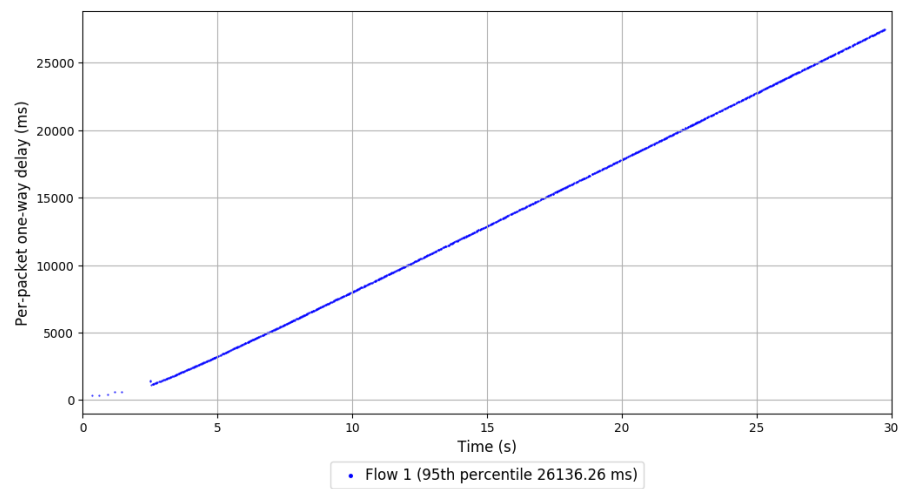
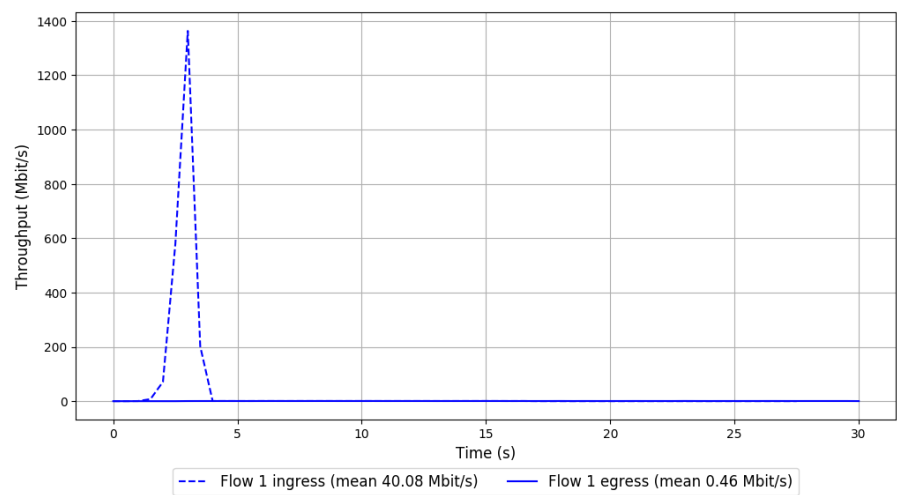


Run 2: Statistics of PCC-Allegro

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%

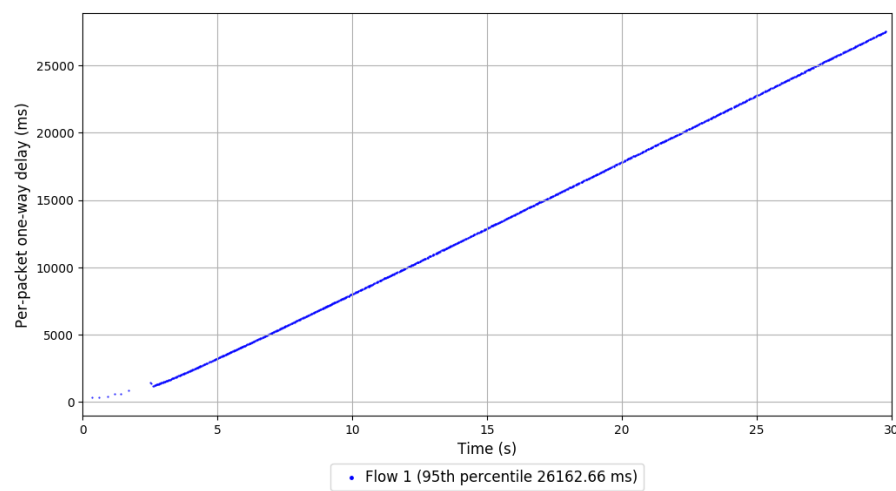
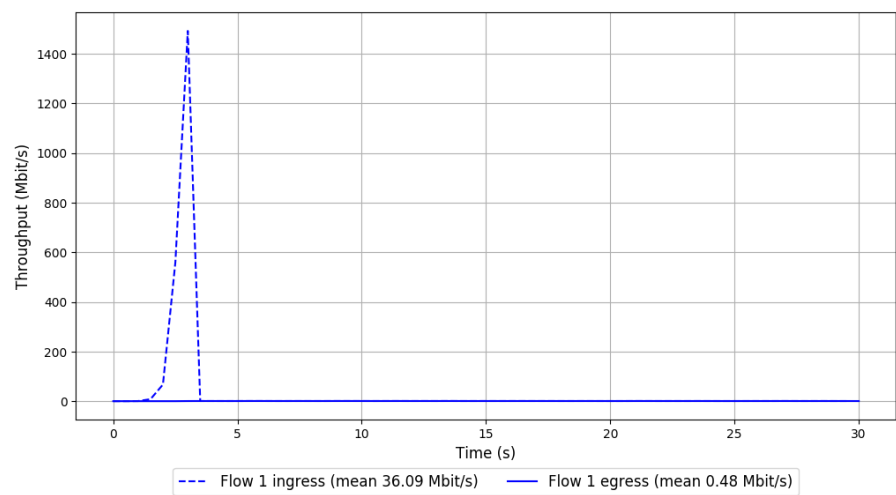
-- Flow 1:

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%

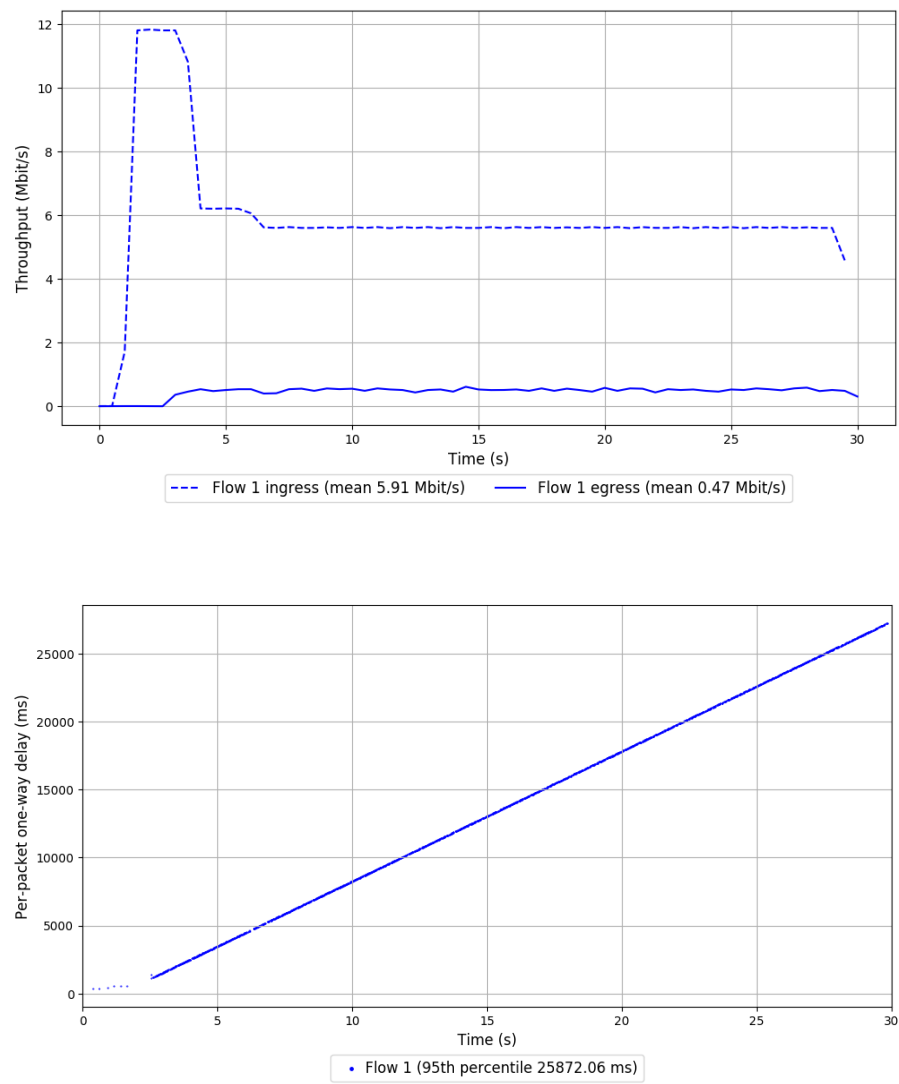
-- Flow 1:

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

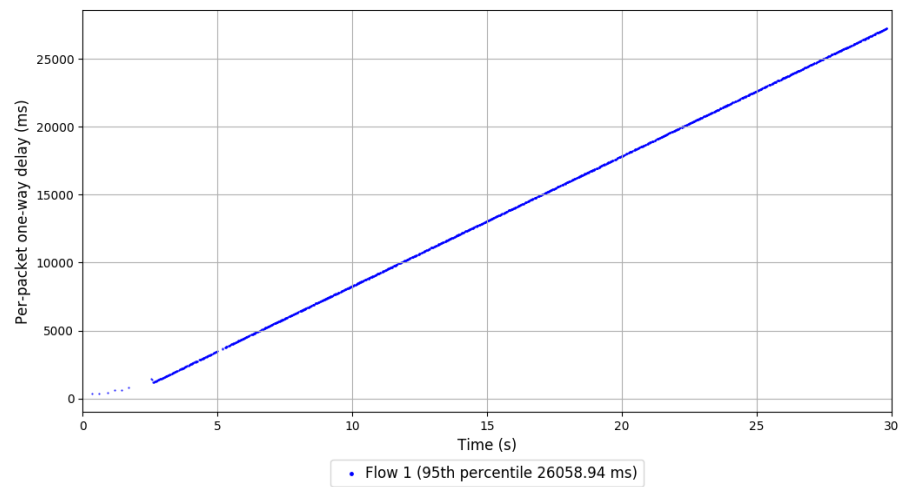
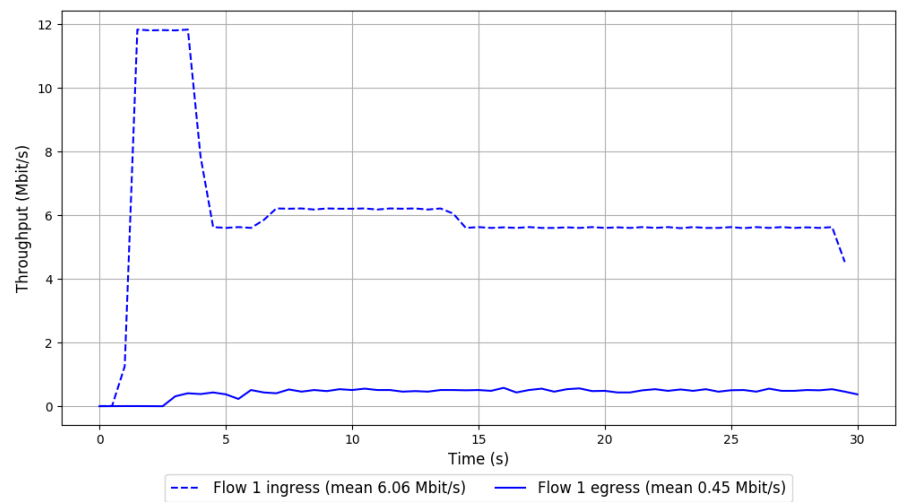


Run 2: Statistics of PCC-Expr

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



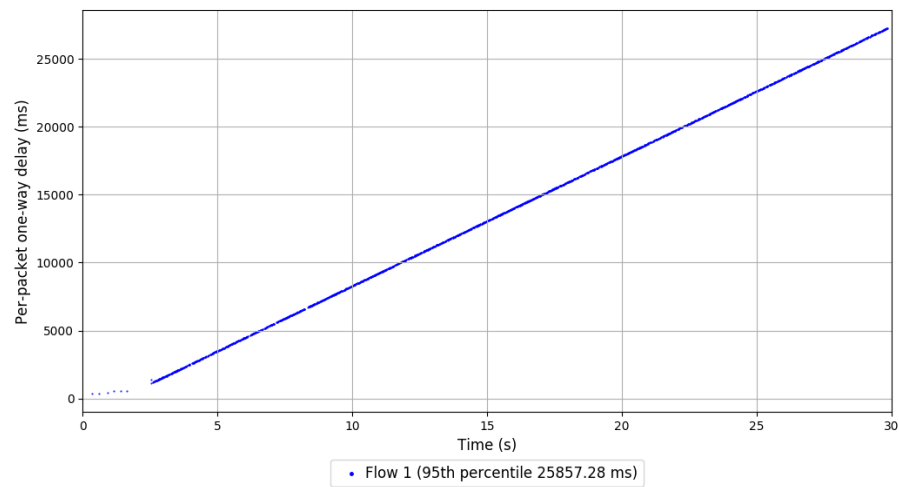
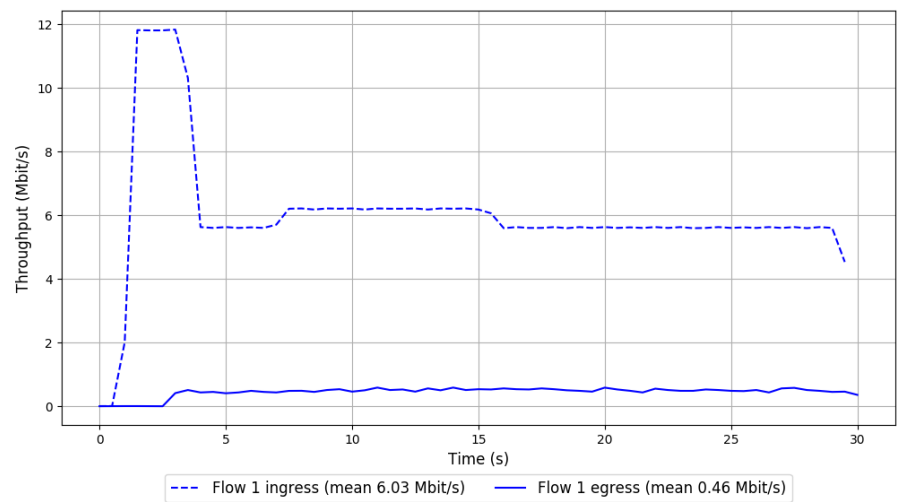


Run 3: Statistics of PCC-Expr

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

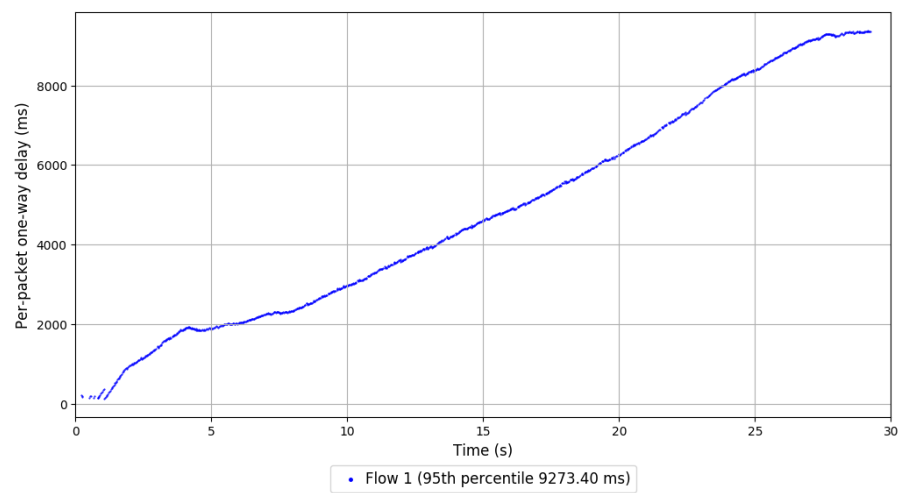
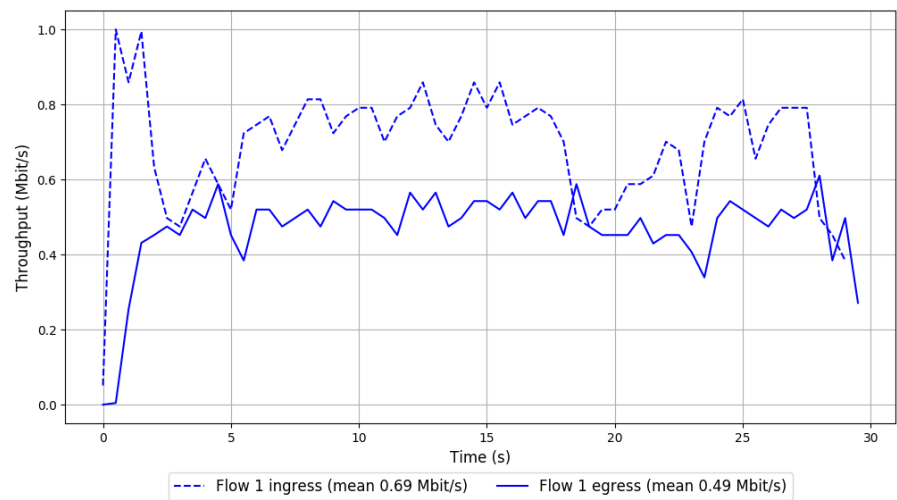
Figure is missing

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 SReAM — 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 SReAM — 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 SReAM — Data Link

Figure is missing

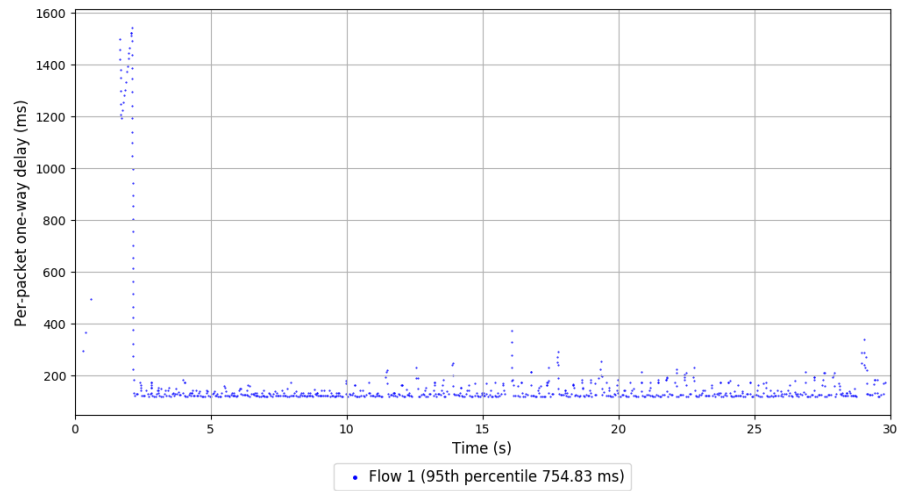
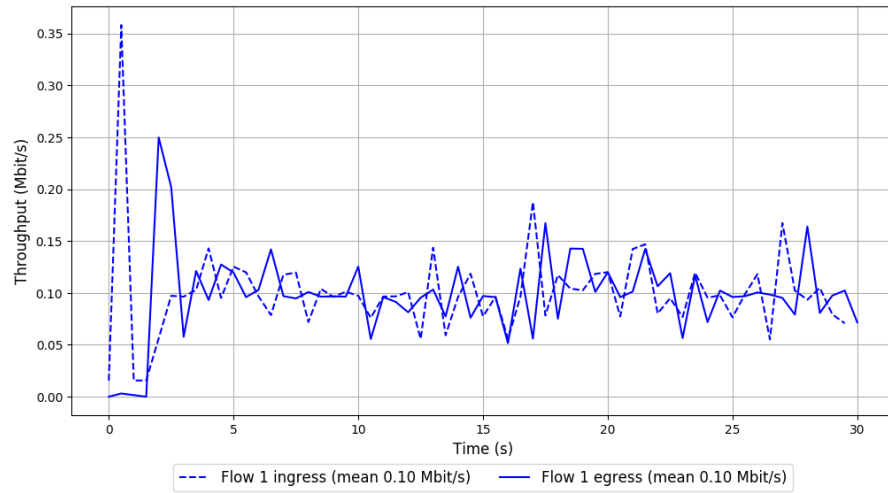
Figure is missing

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



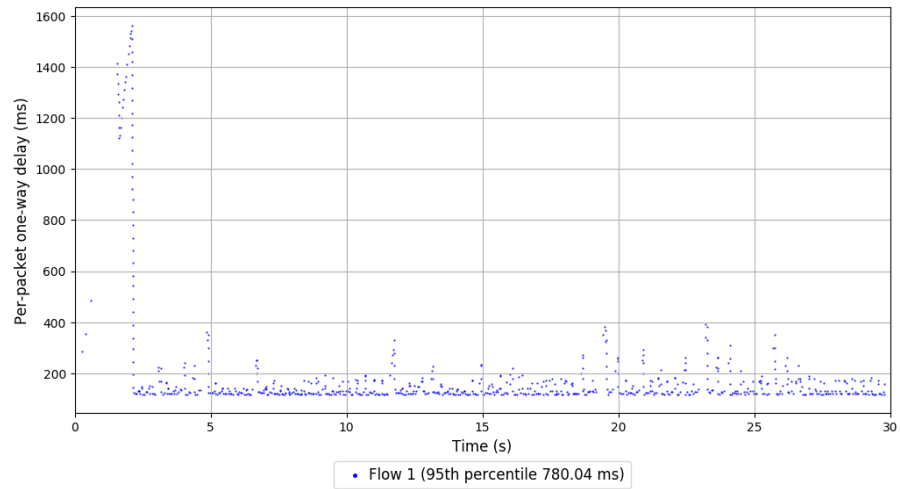
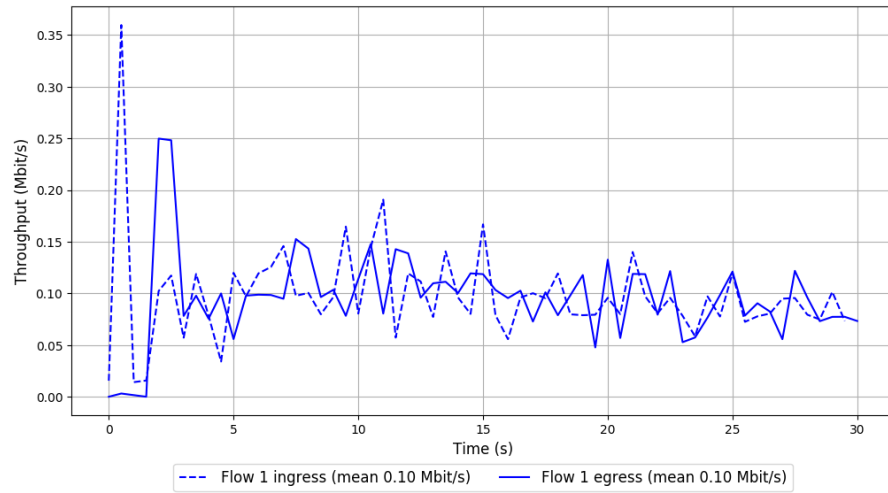


Run 2: Statistics of Sprout

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%

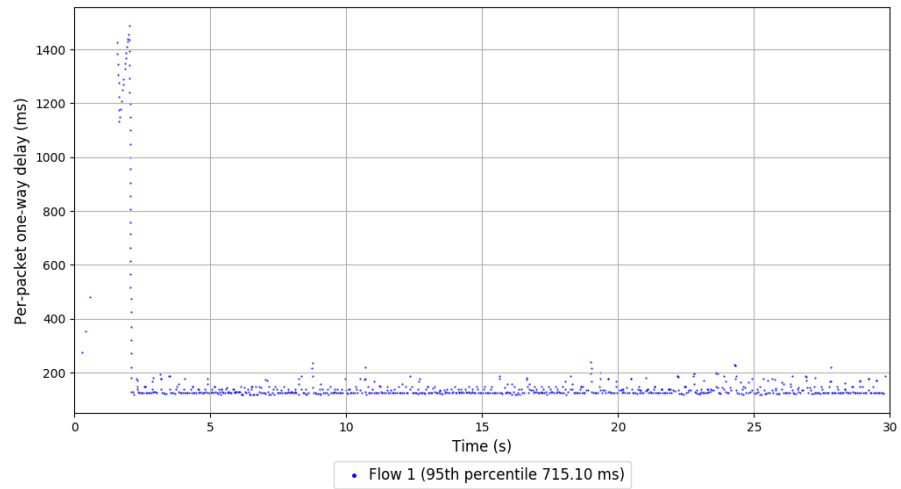
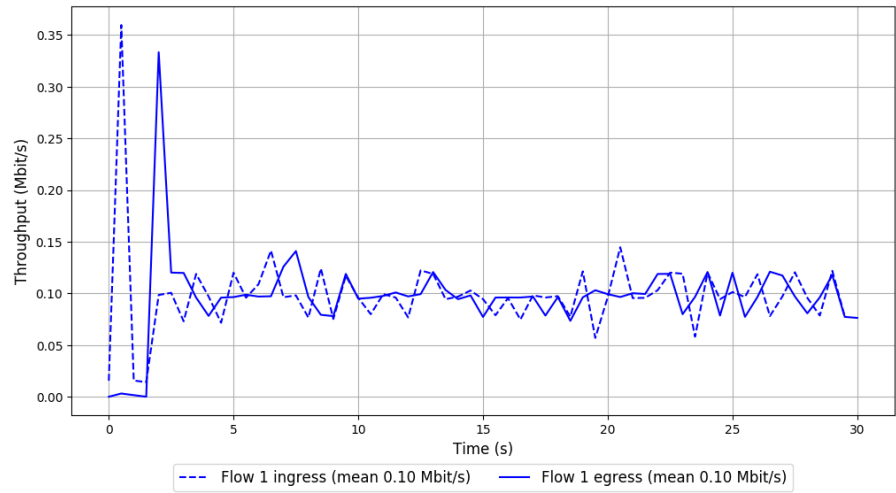
-- Flow 1:

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%

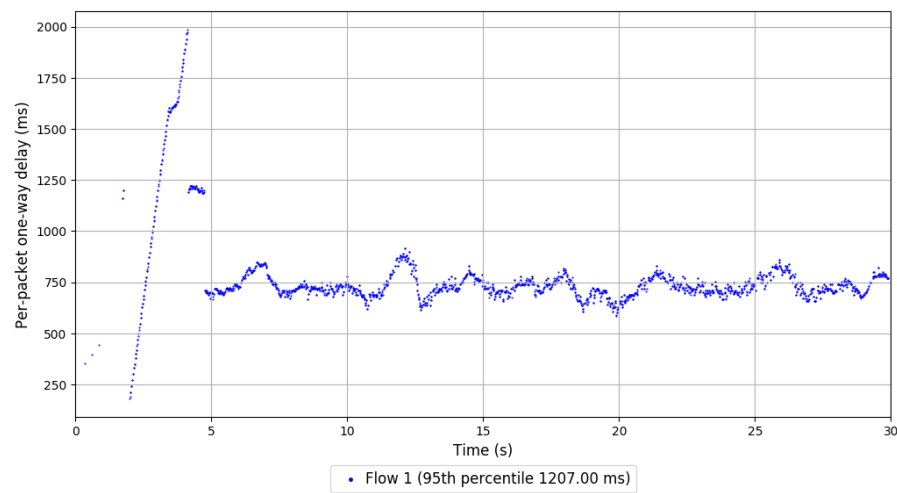
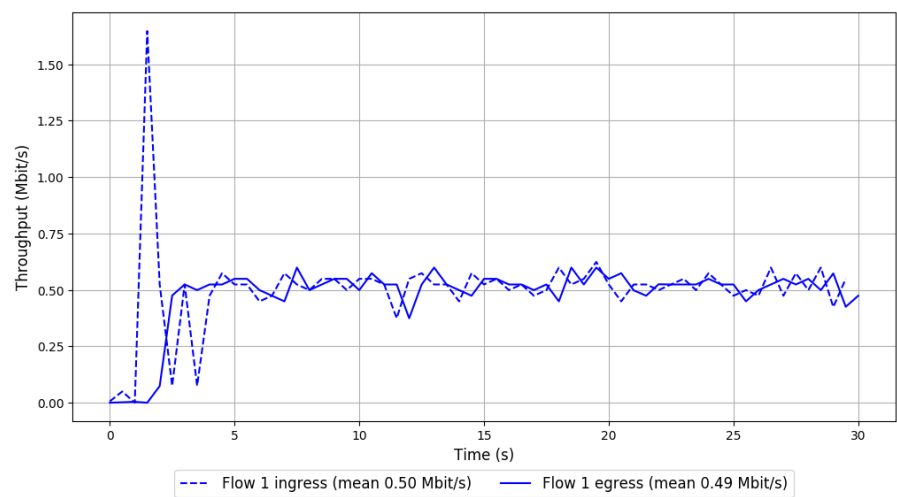
-- Flow 1:

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

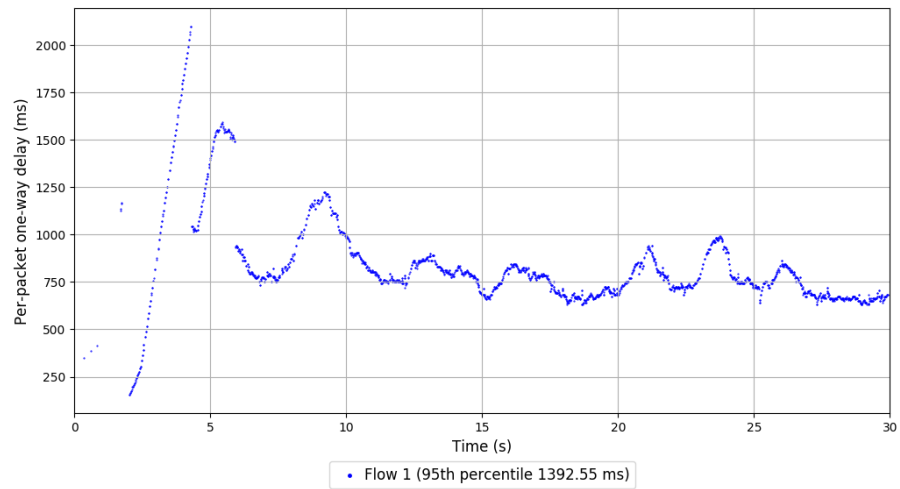
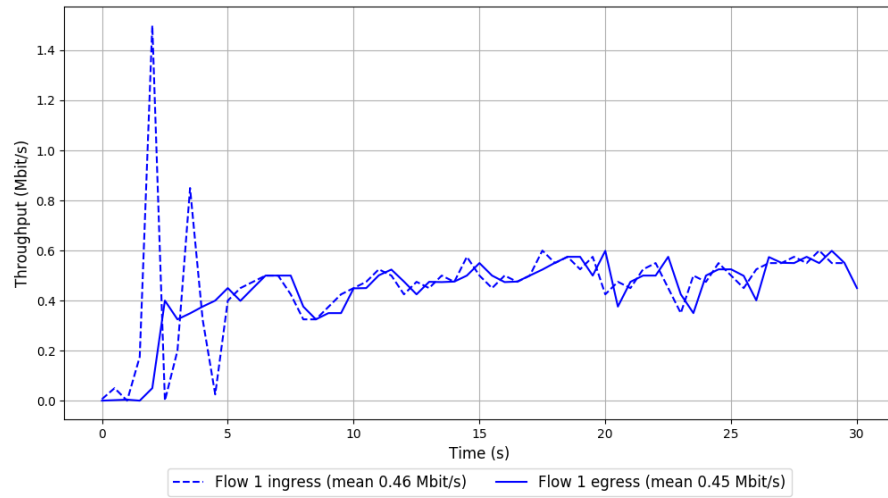


Run 2: Statistics of TaoVA-100x

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%

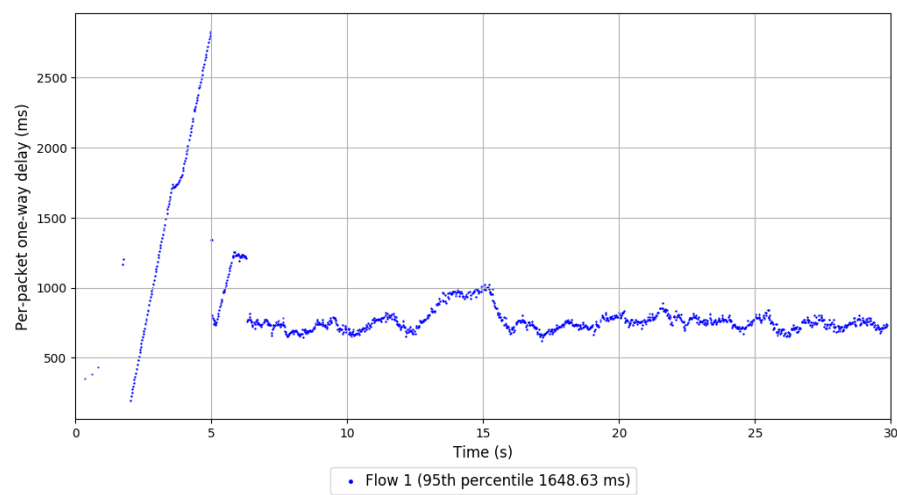
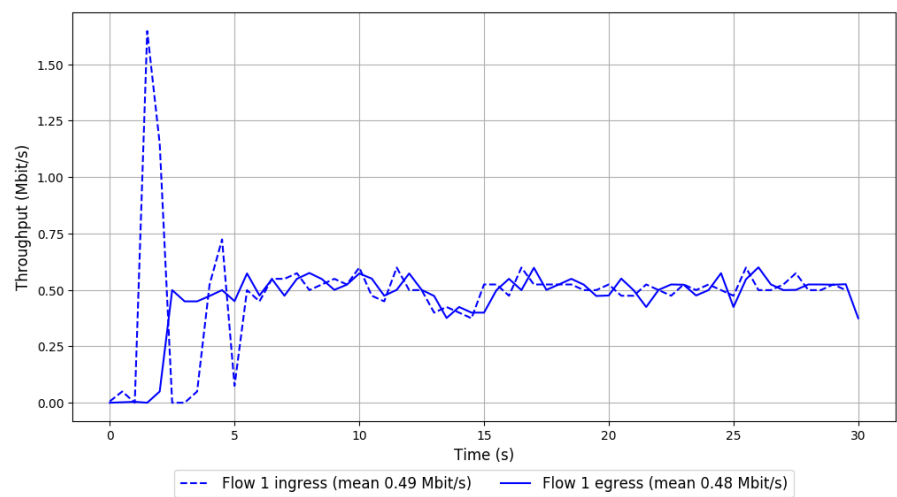
-- Flow 1:

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

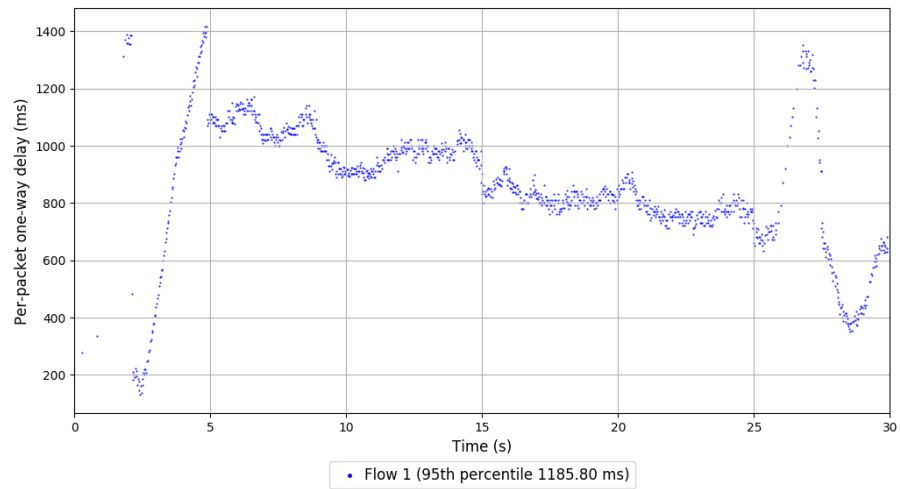
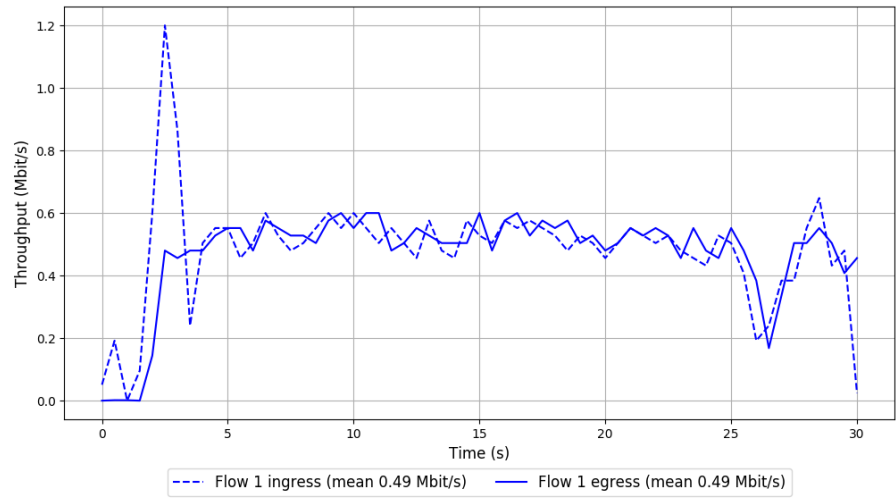


Run 1: Statistics of TCP Vegas

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

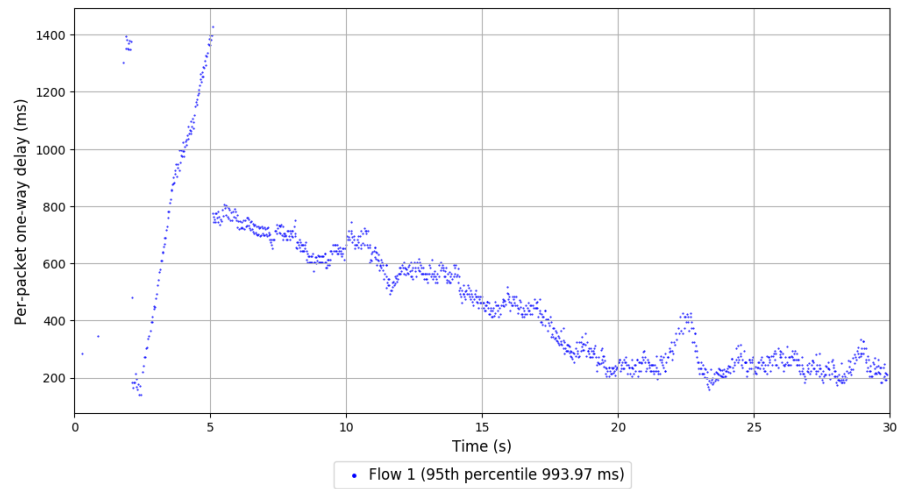
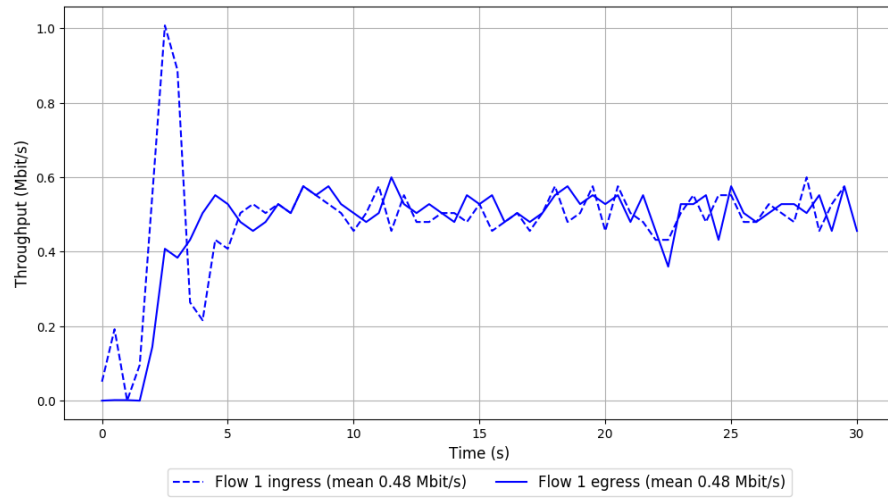


Run 2: Statistics of TCP Vegas

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%

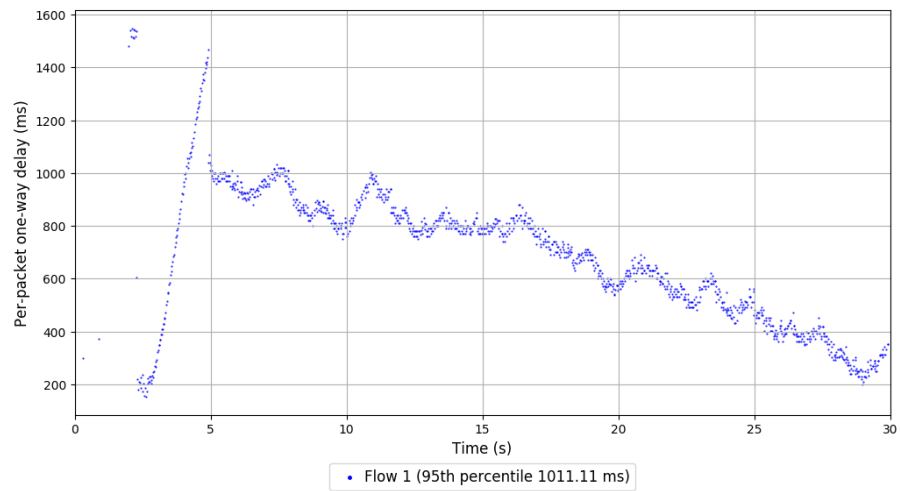
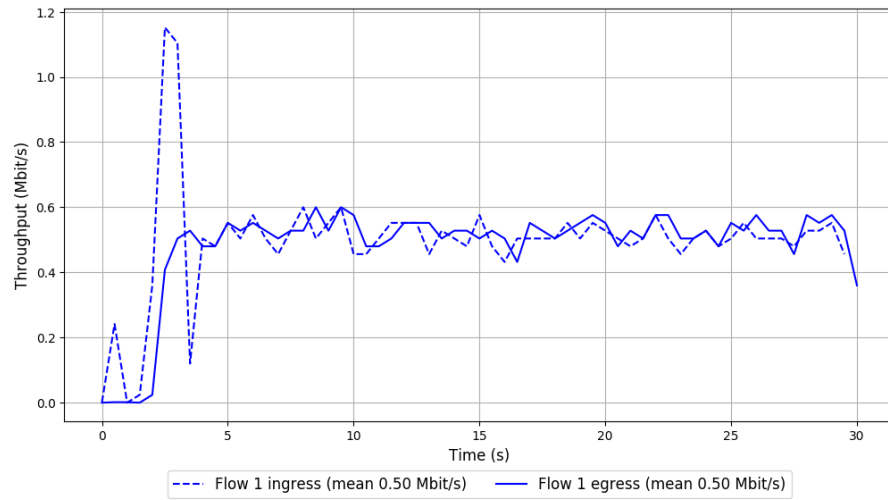
-- Flow 1:

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



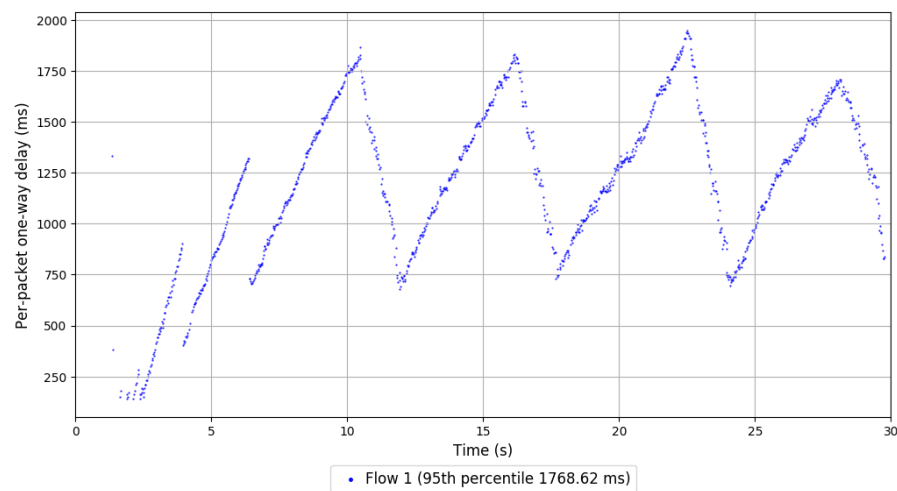
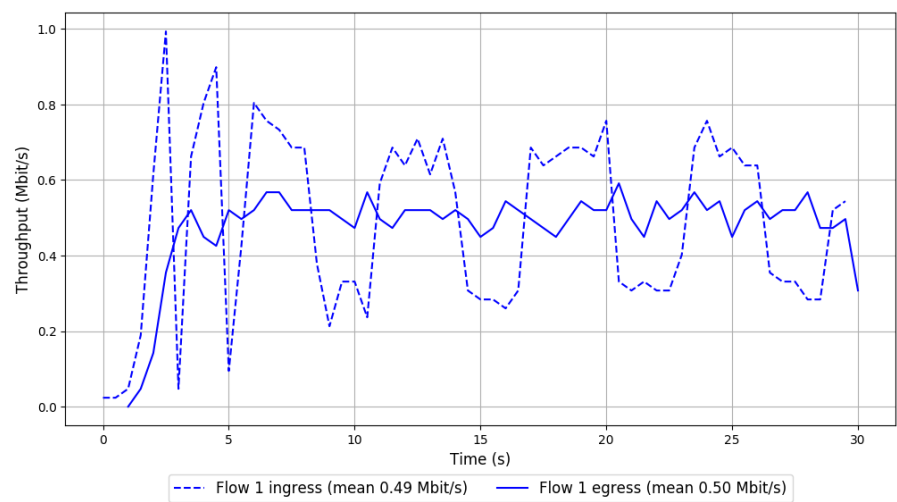


Run 1: Statistics of Verus

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

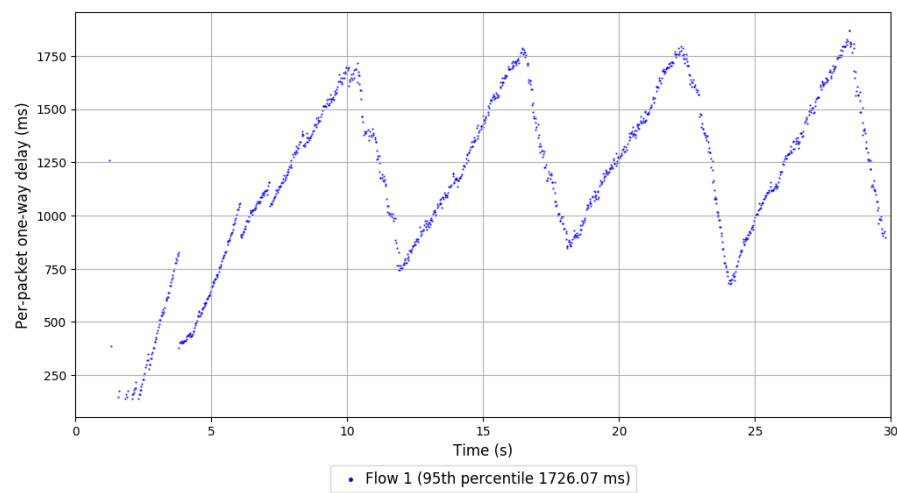
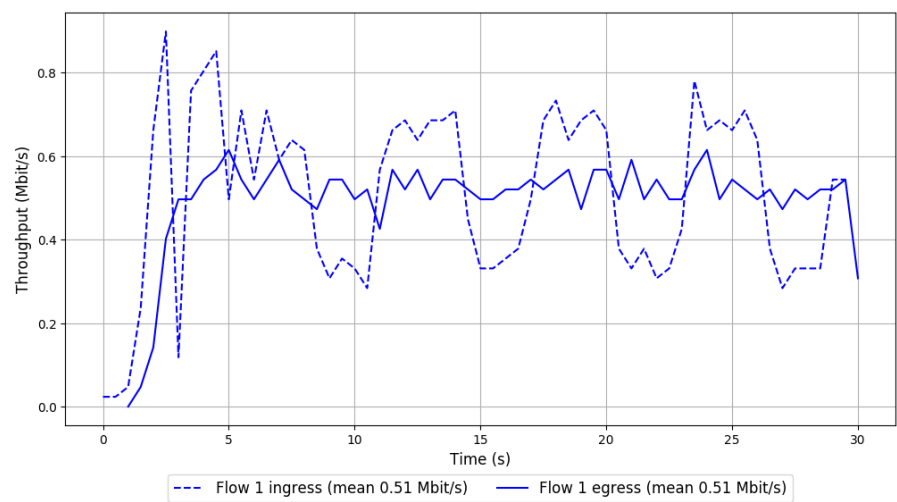


Run 2: Statistics of Verus

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

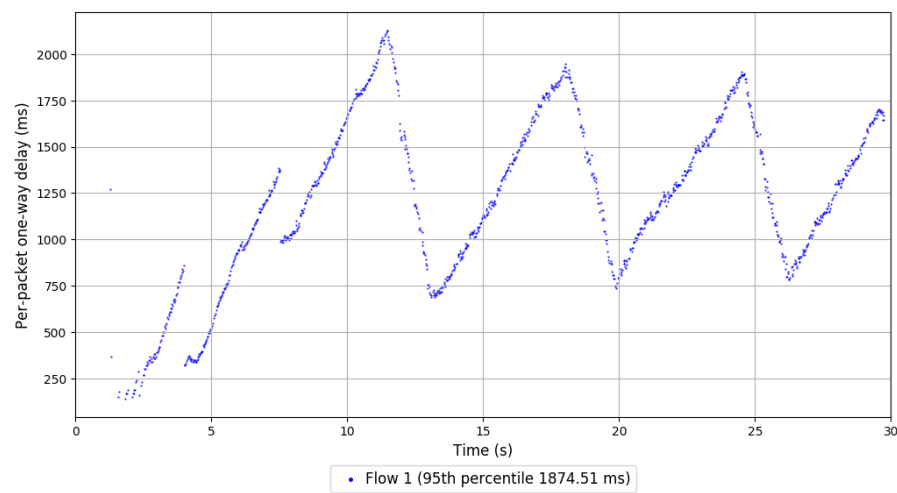
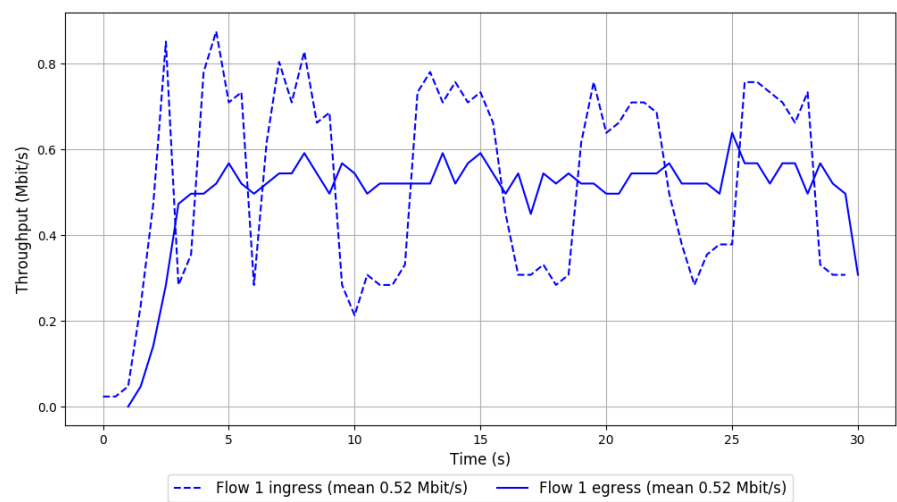


Run 3: Statistics of Verus

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%

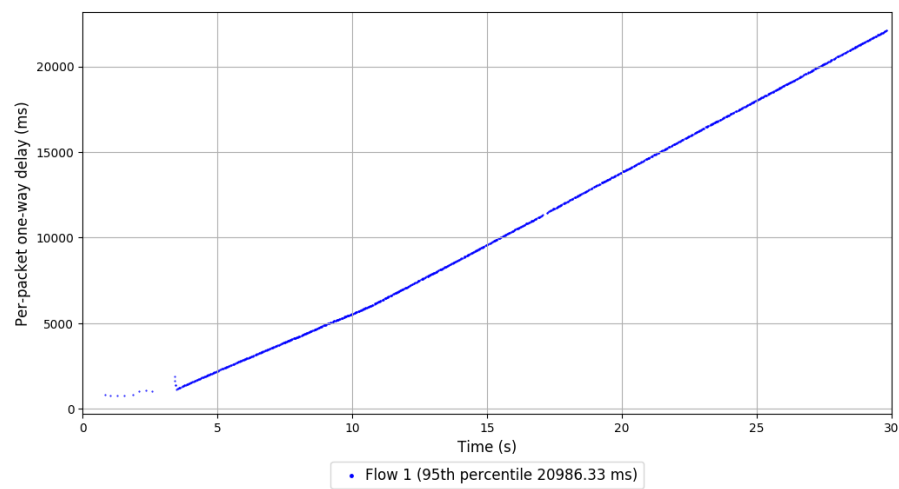
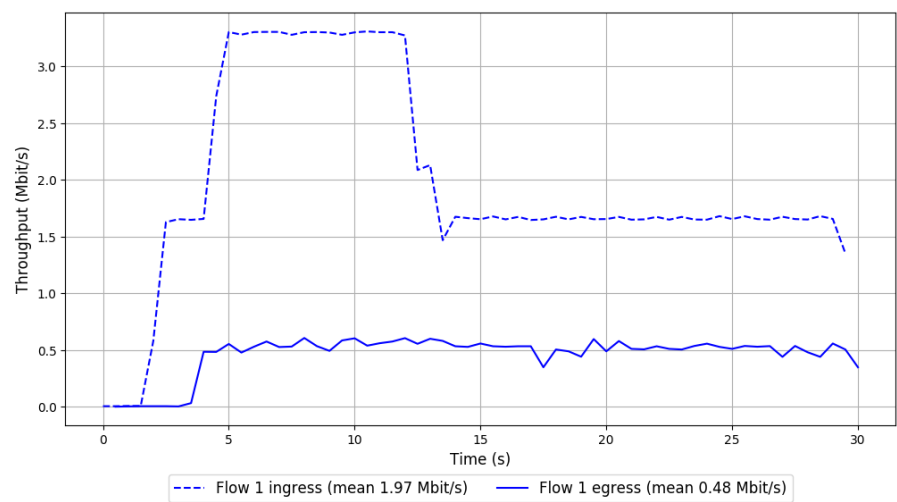
-- Flow 1:

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%

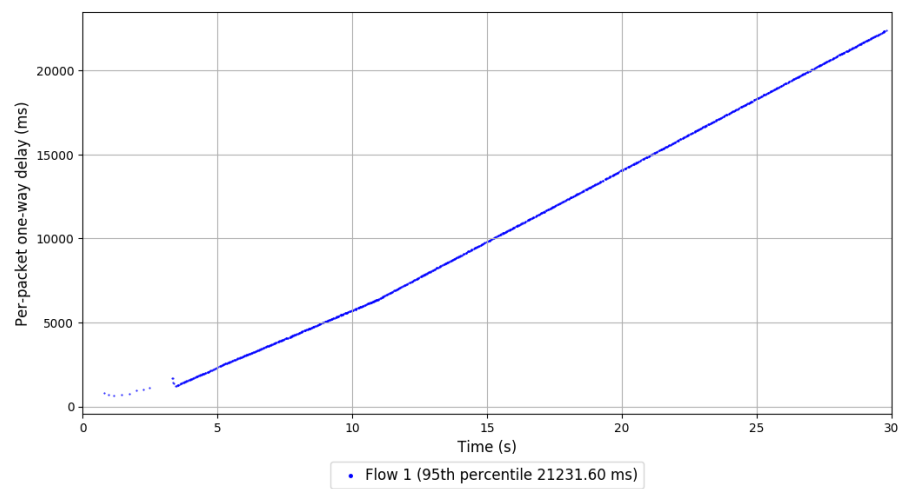
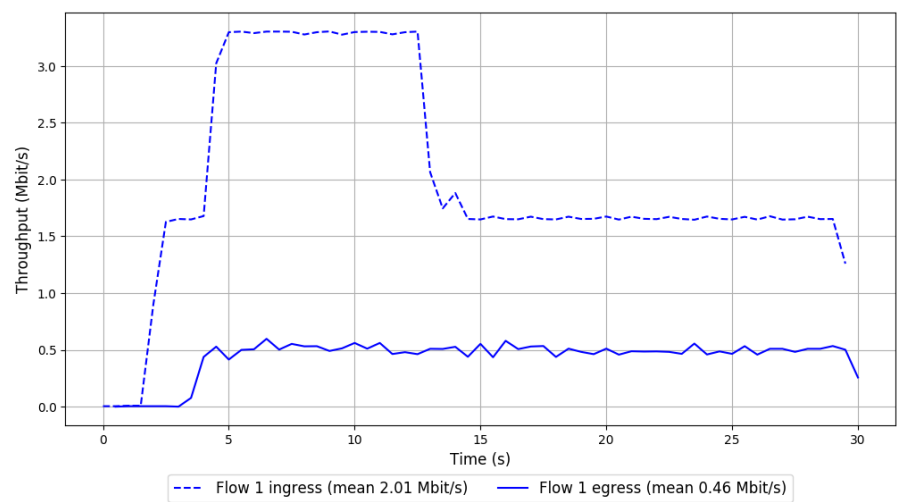
-- Flow 1:

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

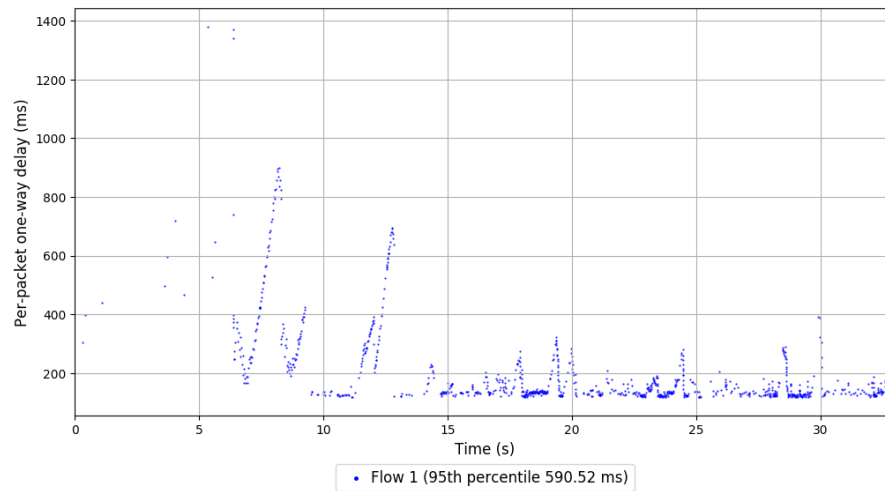
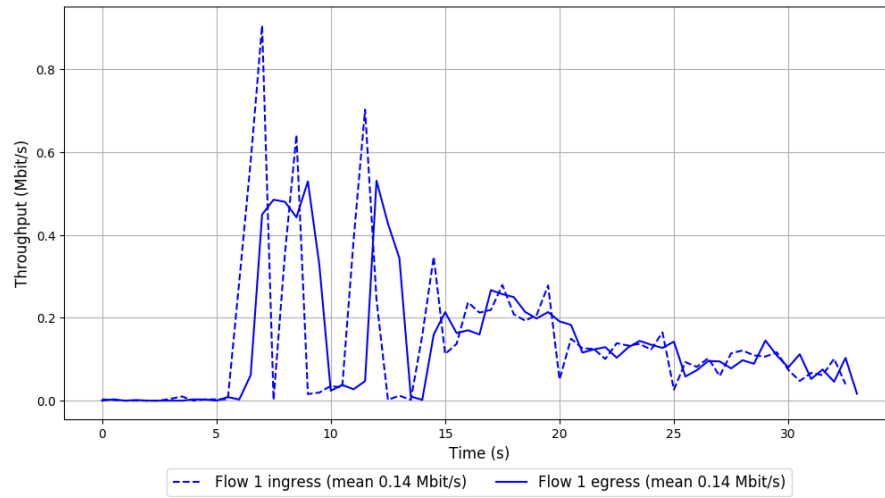


Run 1: Statistics of WebRTC media

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%

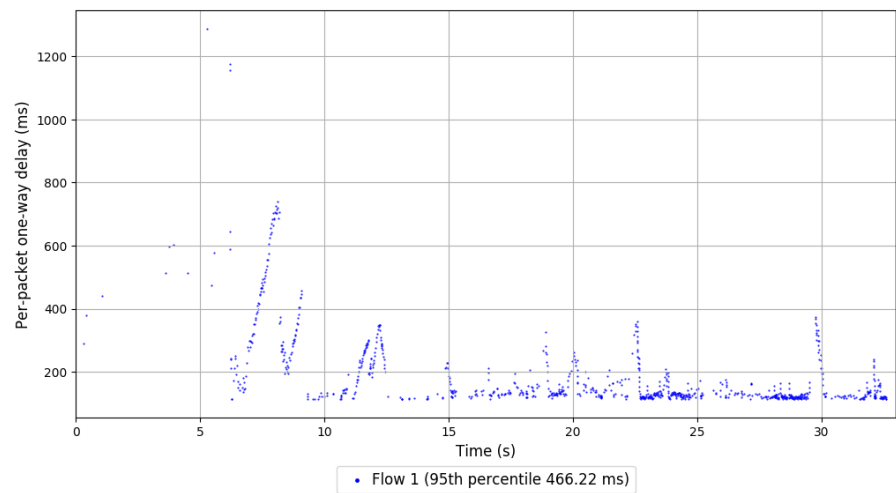
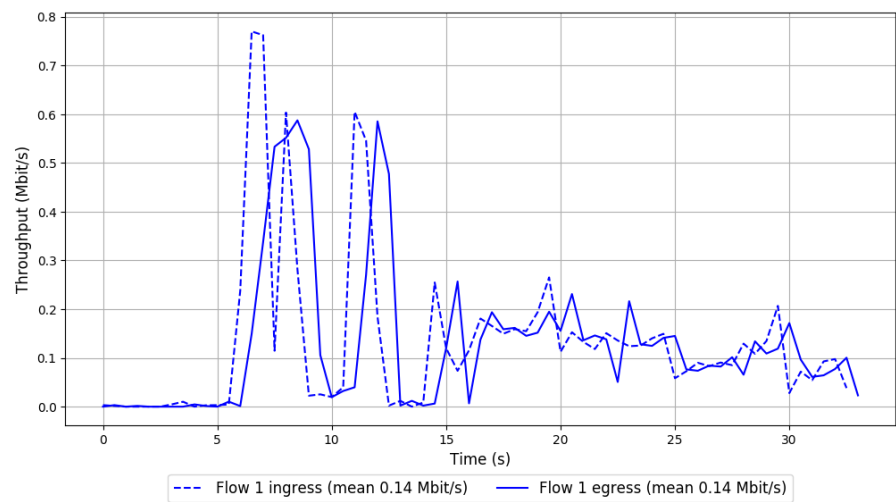
-- Flow 1:

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

