

## Pantheon Report

Generated at 2019-03-19 13:47:51 (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 3 flows with 10-second interval between two flows.

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

### System info:

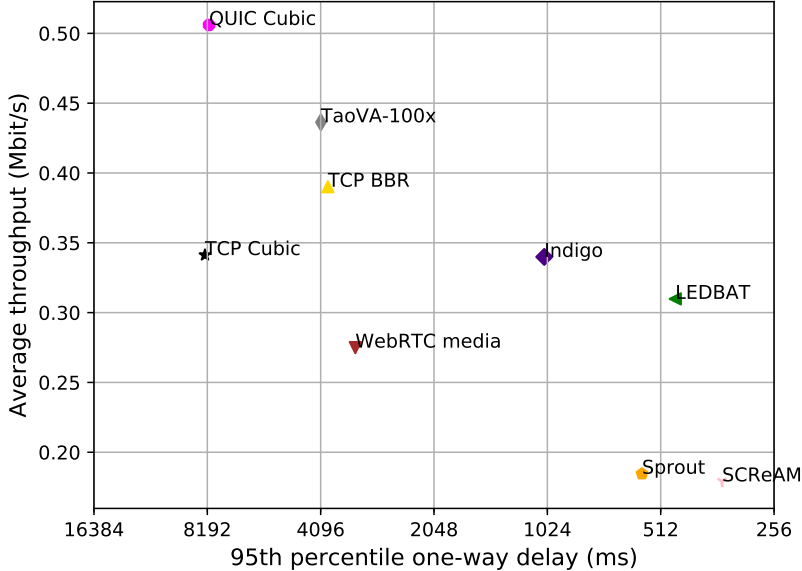
```
Linux 4.15.0-1033-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

### Git summary:

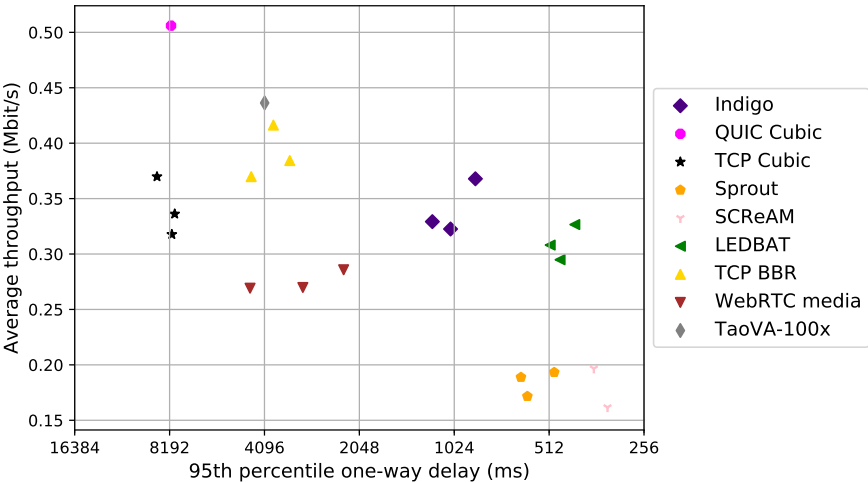
```
branch: muses @ 7a686f7c2ed0a333082c0bab1fa5c921ab47e6ee
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 5ce721187ad823da20955337730c746486ca4966
third_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
M src/examples/cellsim.cc
M src/examples/sproutbt2.cc
M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
```

```
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

test from Colombia cellular to AWS Brazil 2, 3 runs of 30s each per scheme  
 3 flows with 10s interval between flows (mean of all runs by scheme)



test from Colombia cellular to AWS Brazil 2, 3 runs of 30s each per scheme  
 3 flows with 10s interval between flows



scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	0.26	0.21	0.03	3775.62	3958.54	4129.20	7.61	14.03	51.75
Copa	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TCP Cubic	3	0.34	0.00	0.00	8310.68	7867.43	8507.31	32.13	53.44	92.16
FillP	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FillP-Sheep	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indigo	3	0.18	0.15	0.19	1081.23	944.69	1053.73	0.65	0.86	2.62
Indigo-MusesC3	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indigo-MusesC5	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indigo-MusesD	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indigo-MusesT	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LEDBAT	3	0.14	0.17	0.19	424.79	481.91	509.55	0.29	0.93	3.39
PCC-Allegro	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCC-Expr	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
QUIC Cubic	1	0.49	0.03	0.00	8106.48	6675.37	8541.47	28.27	1.42	66.67
SCReAM	2	0.08	0.09	0.12	349.42	349.22	363.17	0.91	1.23	1.77
Sprout	3	0.09	0.09	0.10	875.19	416.60	551.07	0.64	1.02	3.29
TaoVA-100x	1	0.25	0.20	0.20	3531.59	4087.55	4470.77	11.65	9.96	21.53
TCP Vegas	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Verus	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCC-Vivace	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WebRTC media	3	0.14	0.10	0.05	3240.31	3336.76	3337.43	3.67	17.76	3.81

Run 1: Statistics of TCP BBR

Start at: 2019-03-19 12:25:28

End at: 2019-03-19 12:25:58

Local clock offset: -1.751 ms

Remote clock offset: 2.869 ms

# Below is generated by plot.py at 2019-03-19 13:47:21

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 3404.788 ms

Loss rate: 16.57%

-- Flow 1:

Average throughput: 0.26 Mbit/s

95th percentile per-packet one-way delay: 3051.567 ms

Loss rate: 12.38%

-- Flow 2:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 3478.397 ms

Loss rate: 19.93%

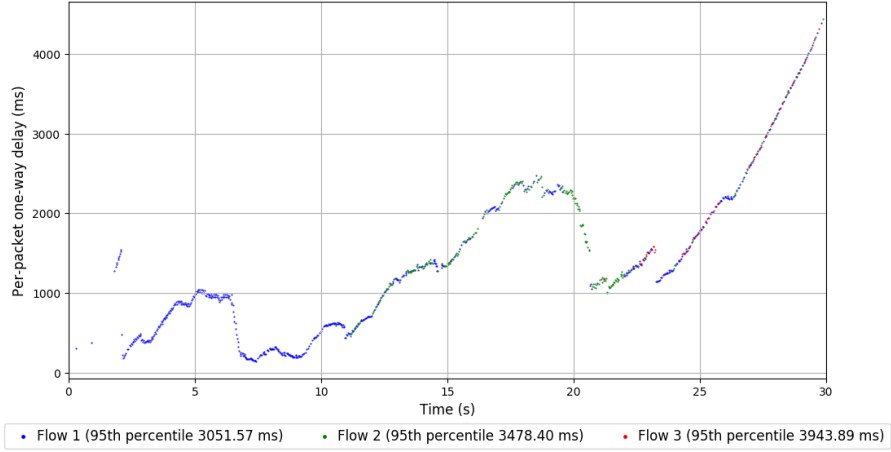
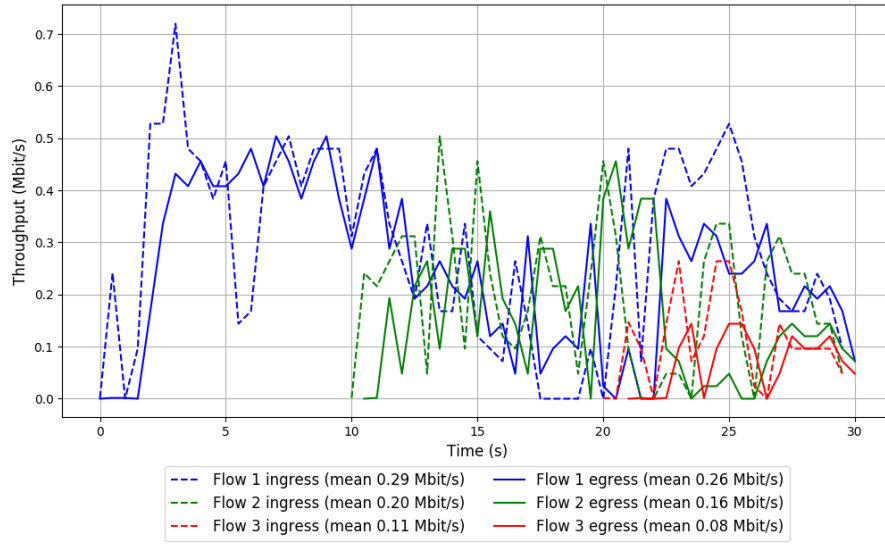
-- Flow 3:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 3943.891 ms

Loss rate: 38.10%

# Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-03-19 12:53:03

End at: 2019-03-19 12:53:33

Local clock offset: -4.715 ms

Remote clock offset: 4.005 ms

# Below is generated by plot.py at 2019-03-19 13:47:21

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.37 Mbit/s

95th percentile per-packet one-way delay: 4512.816 ms

Loss rate: 3.50%

-- Flow 1:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 4479.827 ms

Loss rate: 3.25%

-- Flow 2:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 4552.690 ms

Loss rate: 3.11%

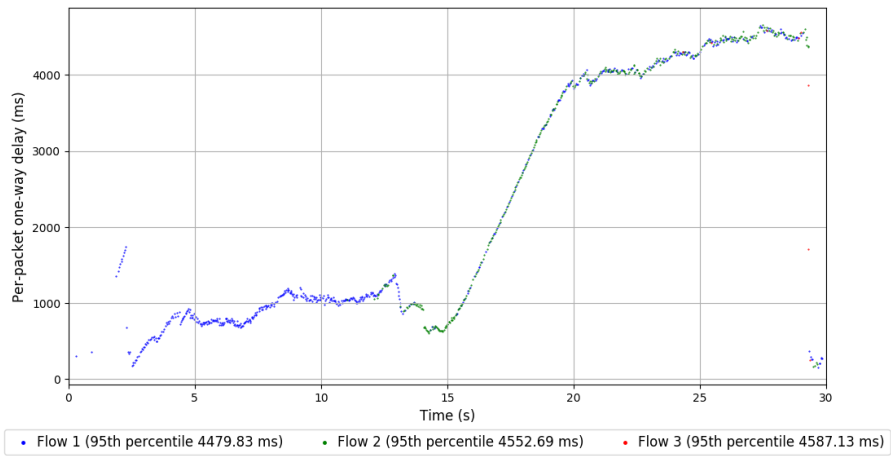
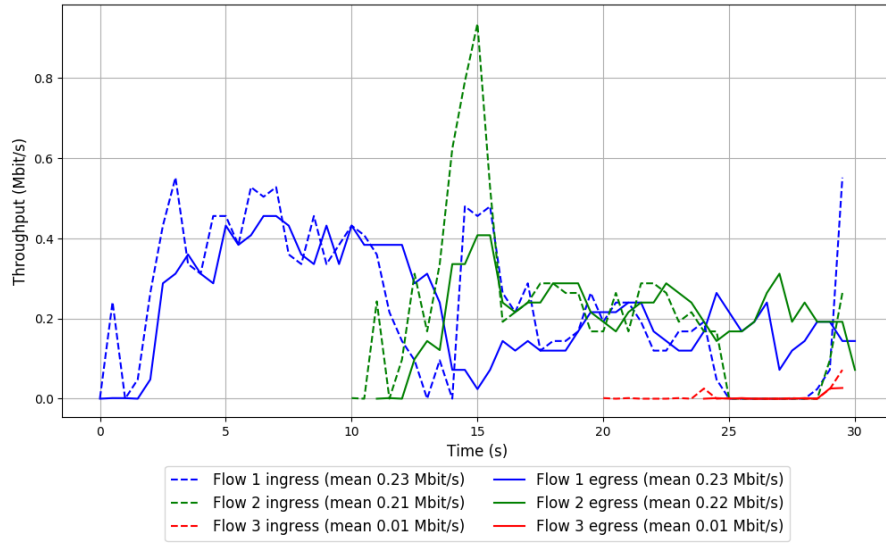
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 4587.131 ms

Loss rate: 55.89%

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





Run 3: Statistics of TCP BBR

Start at: 2019-03-19 13:20:56

End at: 2019-03-19 13:21:26

Local clock offset: -6.668 ms

Remote clock offset: 5.57 ms

# Below is generated by plot.py at 2019-03-19 13:47:21

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.42 Mbit/s

95th percentile per-packet one-way delay: 3837.994 ms

Loss rate: 12.31%

-- Flow 1:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 3795.460 ms

Loss rate: 7.21%

-- Flow 2:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 3844.520 ms

Loss rate: 19.06%

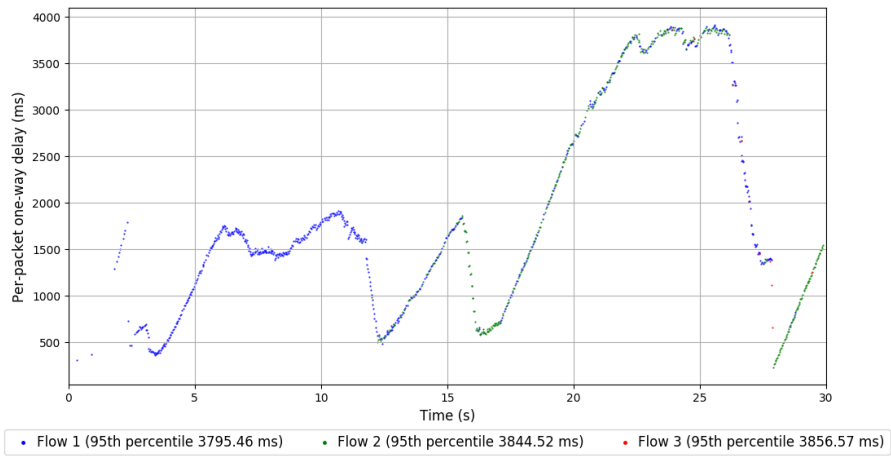
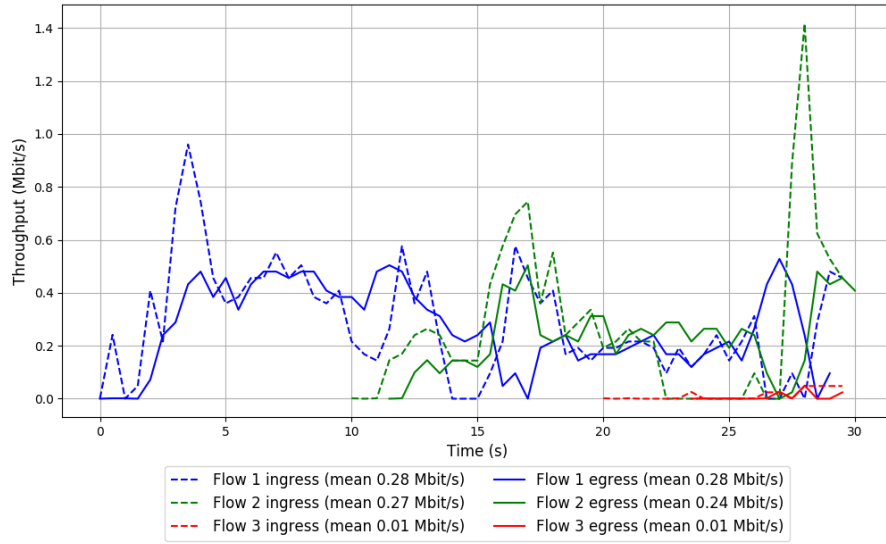
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 3856.575 ms

Loss rate: 61.26%

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



Run 1: Statistics of Copa

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 1: Report of Copa — Data Link

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Figure is missing

Run 2: Statistics of Copa

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 2: Report of Copa — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Copa

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 3: Report of Copa — Data Link

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Figure is missing



Run 1: Statistics of TCP Cubic

Start at: 2019-03-19 12:49:23

End at: 2019-03-19 12:49:53

Local clock offset: -3.792 ms

Remote clock offset: 3.064 ms

# Below is generated by plot.py at 2019-03-19 13:47:21

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.34 Mbit/s

95th percentile per-packet one-way delay: 7891.926 ms

Loss rate: 32.57%

-- Flow 1:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 7891.926 ms

Loss rate: 32.37%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 7723.241 ms

Loss rate: 53.44%

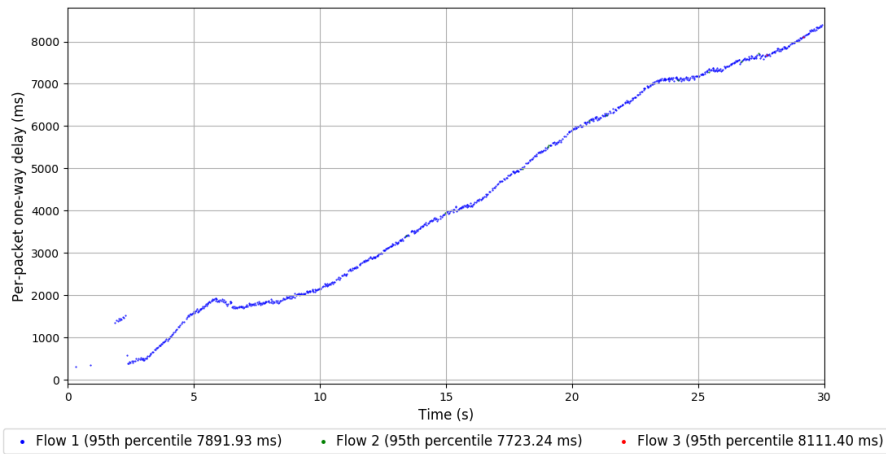
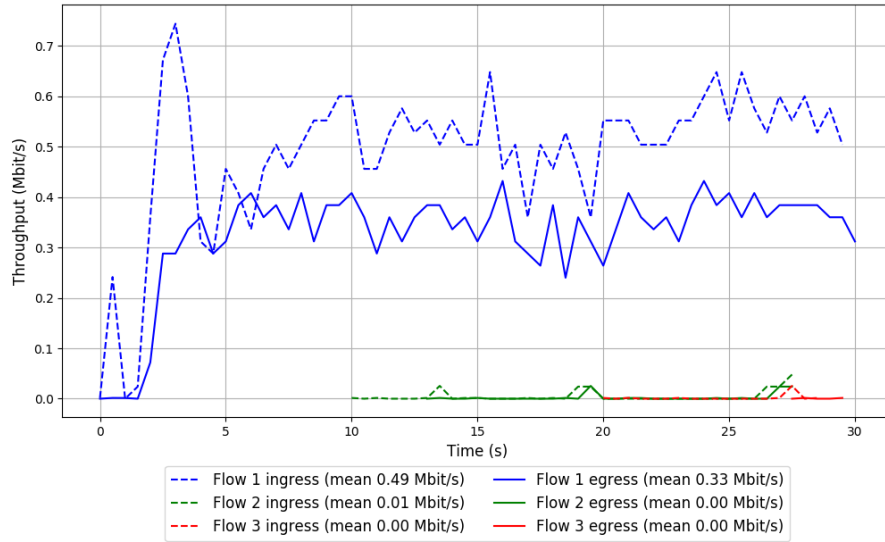
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8111.395 ms

Loss rate: 90.68%

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



Run 2: Statistics of TCP Cubic

Start at: 2019-03-19 13:17:16

End at: 2019-03-19 13:17:46

Local clock offset: -7.865 ms

Remote clock offset: 5.342 ms

# Below is generated by plot.py at 2019-03-19 13:47:21

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 8058.930 ms

Loss rate: 32.96%

-- Flow 1:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 8058.930 ms

Loss rate: 32.76%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 7679.609 ms

Loss rate: 53.44%

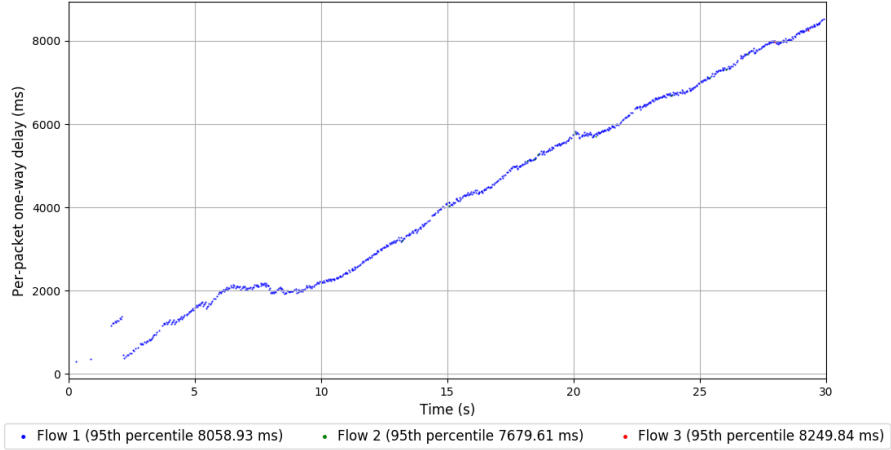
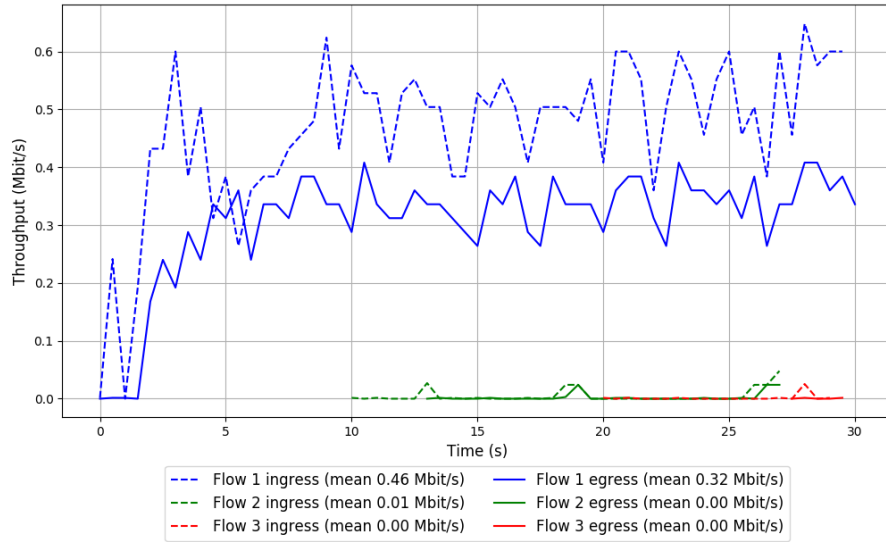
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8249.843 ms

Loss rate: 90.68%

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

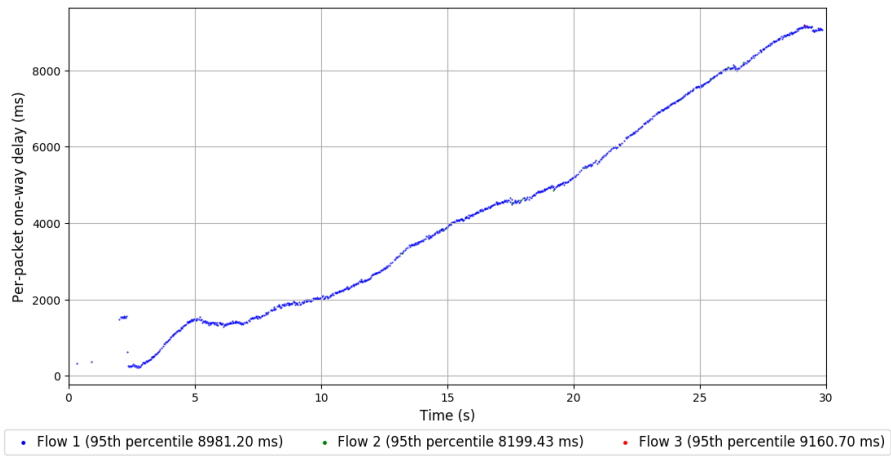
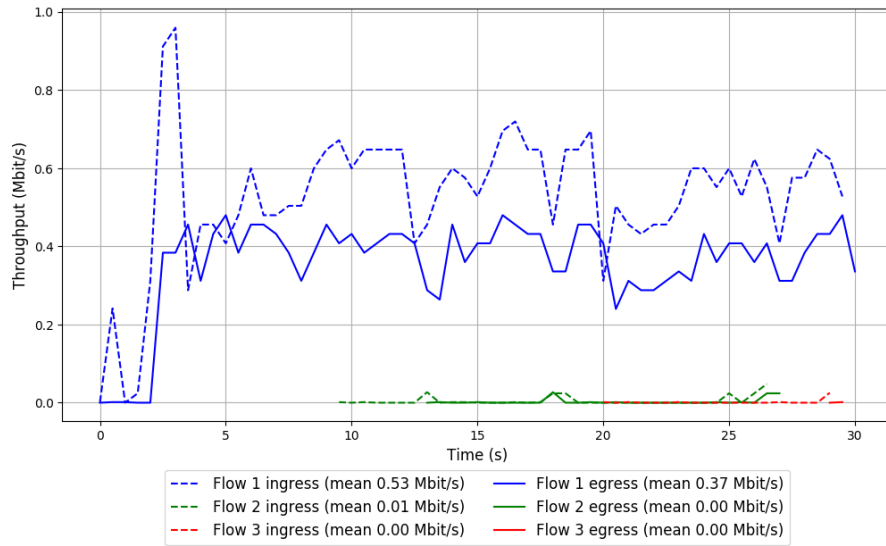


Run 3: Statistics of TCP Cubic

Start at: 2019-03-19 13:44:09  
End at: 2019-03-19 13:44:39  
Local clock offset: -6.466 ms  
Remote clock offset: -0.536 ms

```
# Below is generated by plot.py at 2019-03-19 13:47:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 8981.196 ms
Loss rate: 31.44%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 8981.196 ms
Loss rate: 31.26%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8199.426 ms
Loss rate: 53.44%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 9160.698 ms
Loss rate: 95.13%
```

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



Run 1: Statistics of FillP

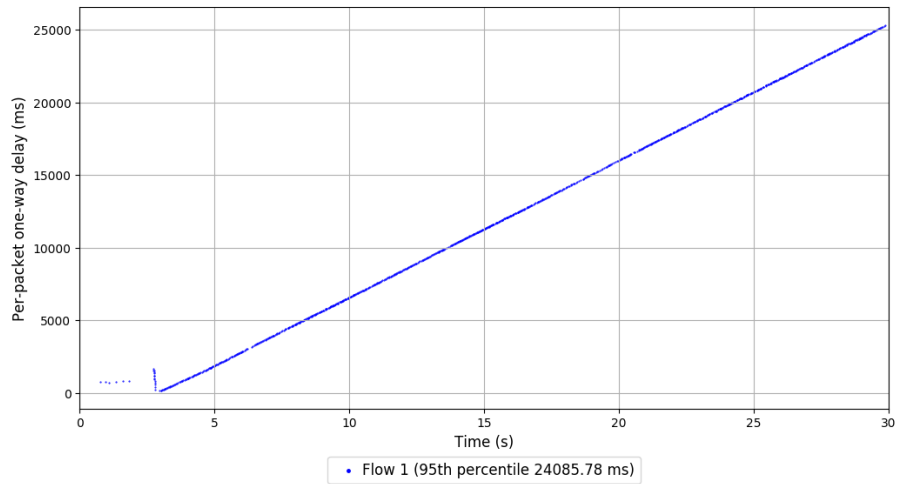
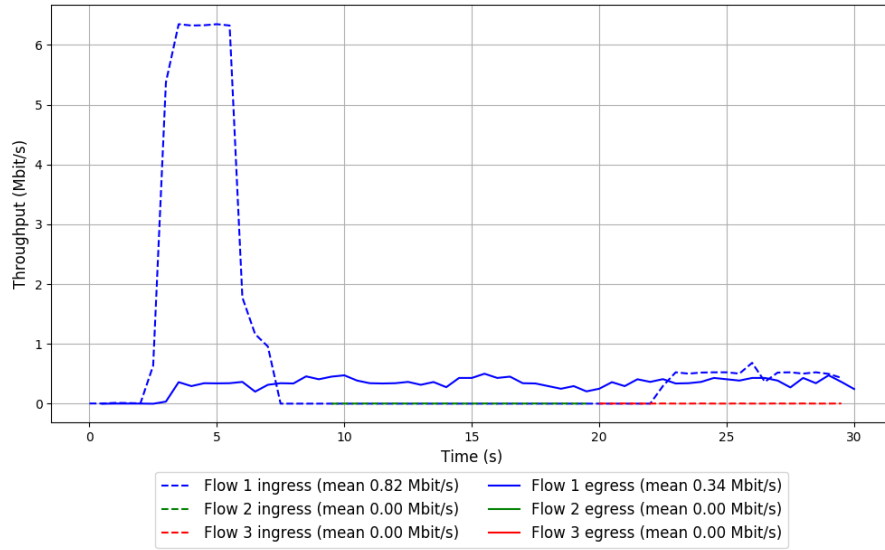
Start at: 2019-03-19 12:50:37

End at: 2019-03-19 12:51:07

Local clock offset: -4.045 ms

Remote clock offset: 4.953 ms

# Run 1: Report of FillP — Data Link





Run 2: Statistics of FillP

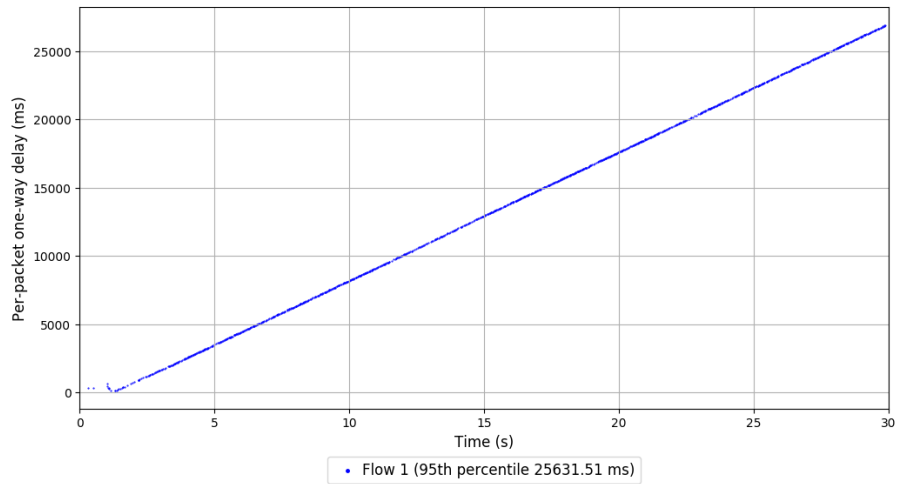
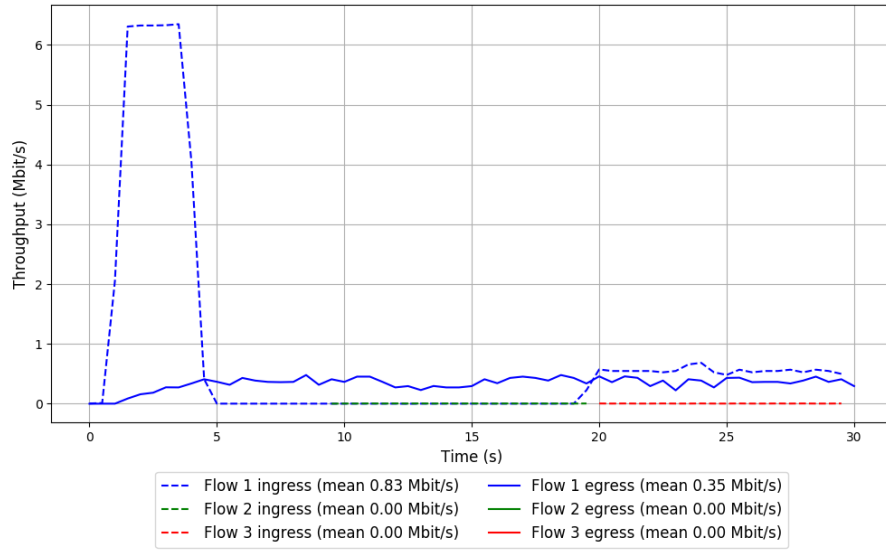
Start at: 2019-03-19 13:18:30

End at: 2019-03-19 13:19:00

Local clock offset: -6.982 ms

Remote clock offset: 5.353 ms

## Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

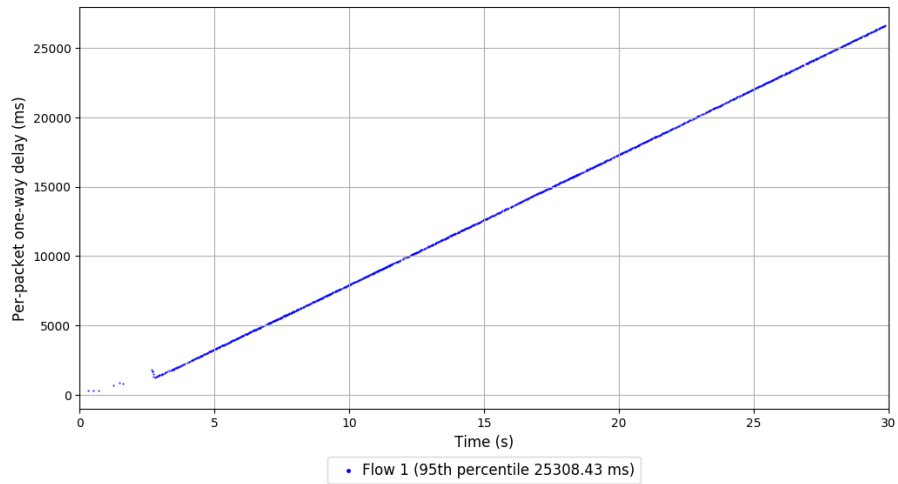
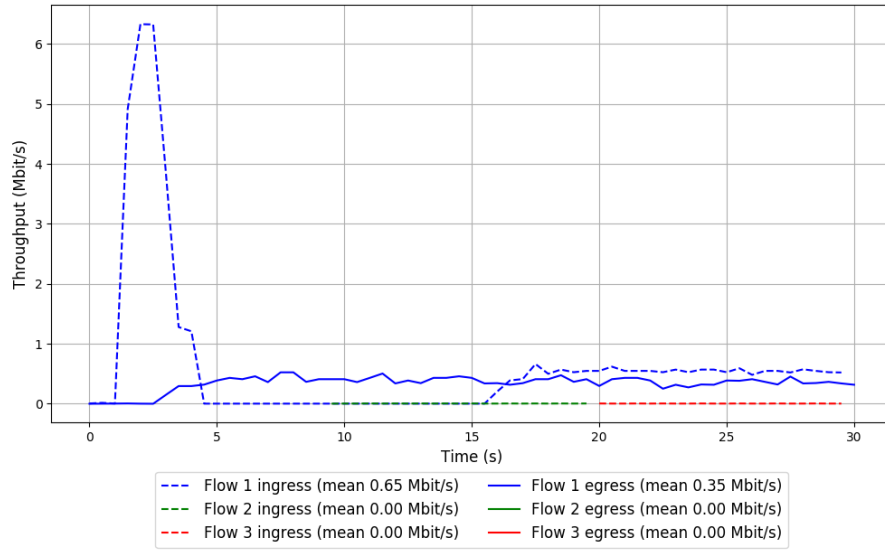
Start at: 2019-03-19 13:45:23

End at: 2019-03-19 13:45:53

Local clock offset: -6.501 ms

Remote clock offset: 4.608 ms

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



Run 1: Statistics of FillP-Sheep

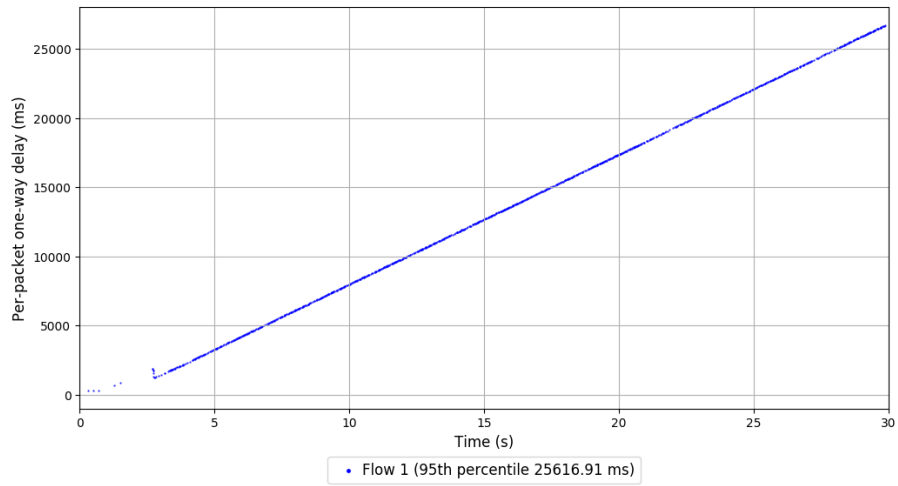
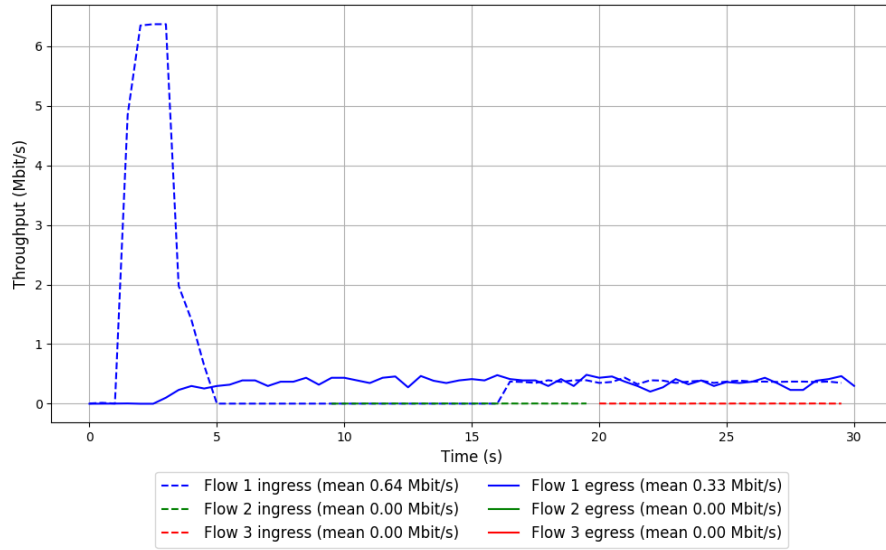
Start at: 2019-03-19 12:37:25

End at: 2019-03-19 12:37:55

Local clock offset: -3.054 ms

Remote clock offset: 5.14 ms

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



Run 2: Statistics of FillP-Sheep

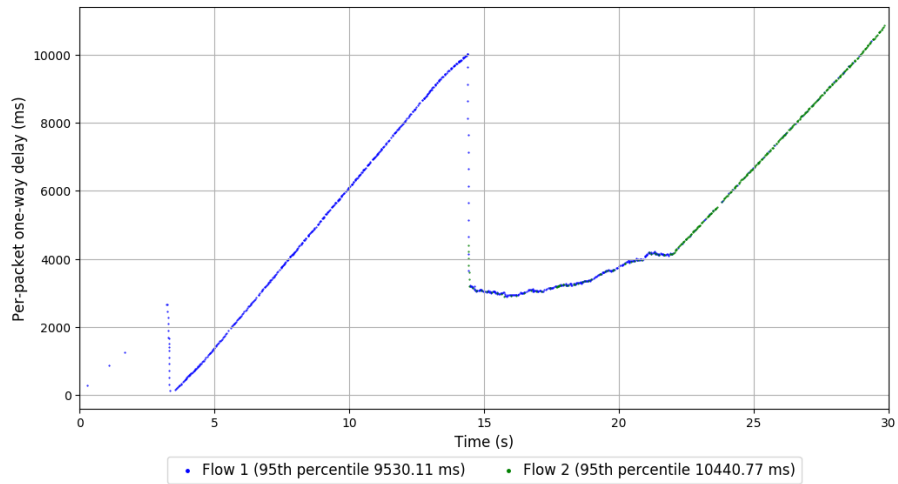
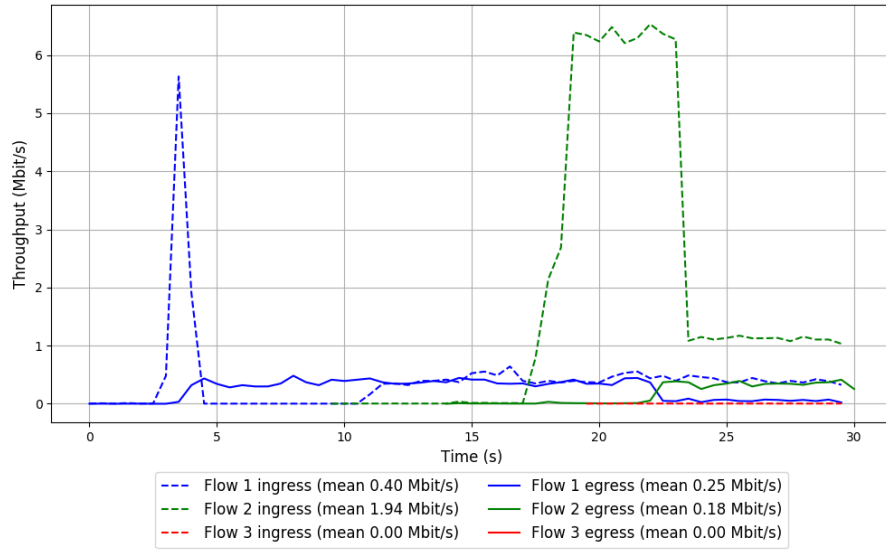
Start at: 2019-03-19 13:05:01

End at: 2019-03-19 13:05:31

Local clock offset: -6.403 ms

Remote clock offset: -0.903 ms

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





Run 3: Statistics of FillP-Sheep

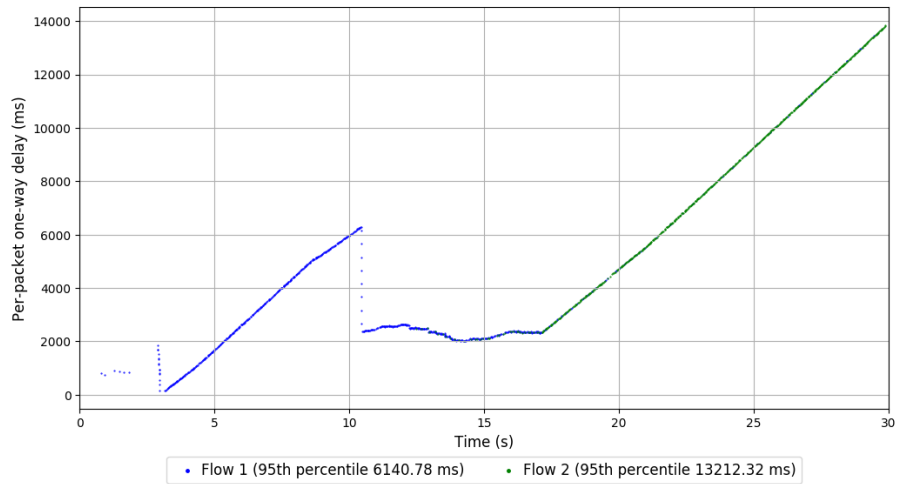
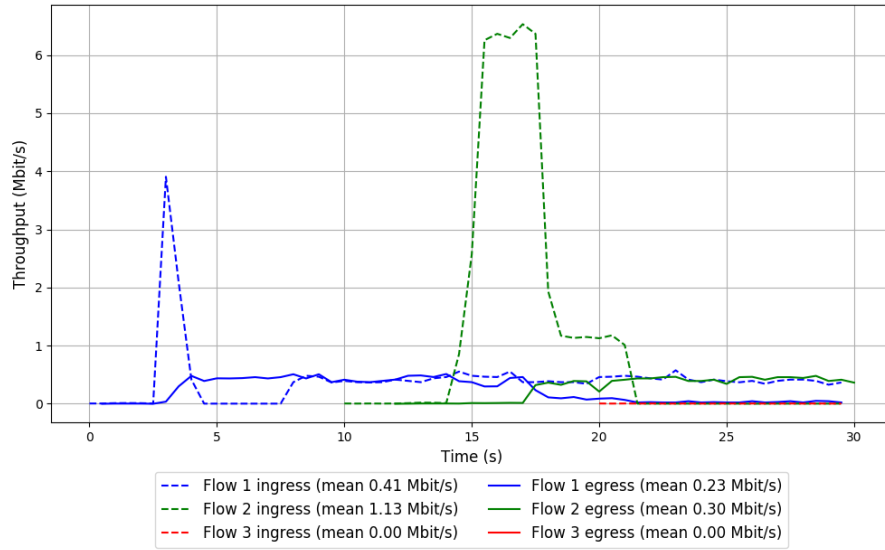
Start at: 2019-03-19 13:32:24

End at: 2019-03-19 13:32:54

Local clock offset: -7.123 ms

Remote clock offset: -0.625 ms

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



Run 1: Statistics of Indigo

Start at: 2019-03-19 12:42:39

End at: 2019-03-19 12:43:09

Local clock offset: -1.713 ms

Remote clock offset: 0.144 ms

# Below is generated by plot.py at 2019-03-19 13:47:26

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 1201.514 ms

Loss rate: 0.99%

-- Flow 1:

Average throughput: 0.15 Mbit/s

95th percentile per-packet one-way delay: 1235.336 ms

Loss rate: 0.54%

-- Flow 2:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 991.876 ms

Loss rate: 0.64%

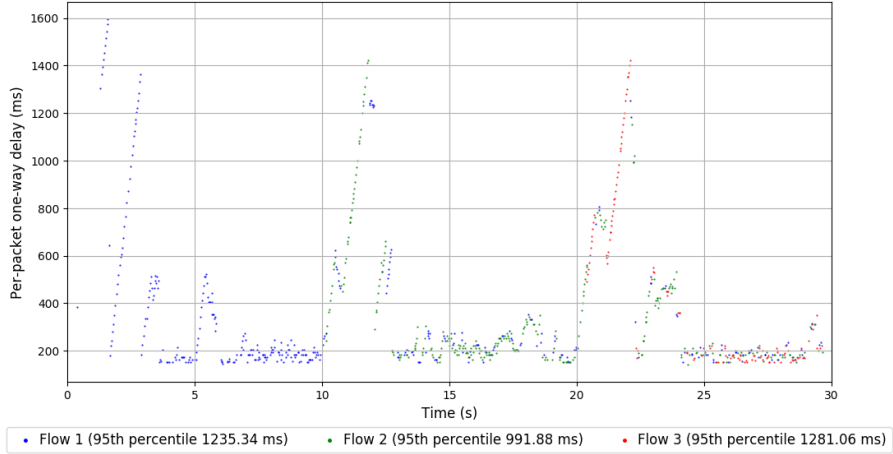
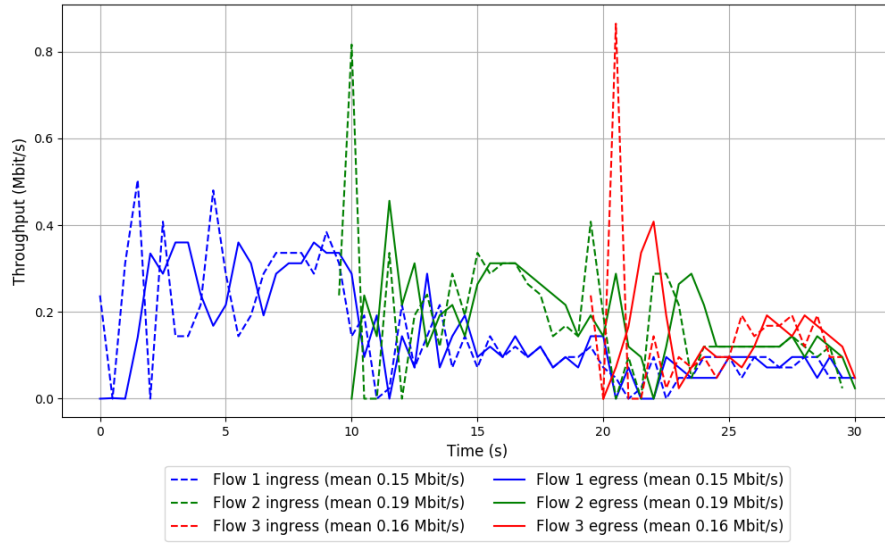
-- Flow 3:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 1281.055 ms

Loss rate: 3.15%

# Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-03-19 13:10:31

End at: 2019-03-19 13:11:01

Local clock offset: -6.882 ms

Remote clock offset: 5.324 ms

# Below is generated by plot.py at 2019-03-19 13:47:26

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 1051.978 ms

Loss rate: 1.13%

-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 1060.906 ms

Loss rate: 0.96%

-- Flow 2:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 1002.338 ms

Loss rate: 1.19%

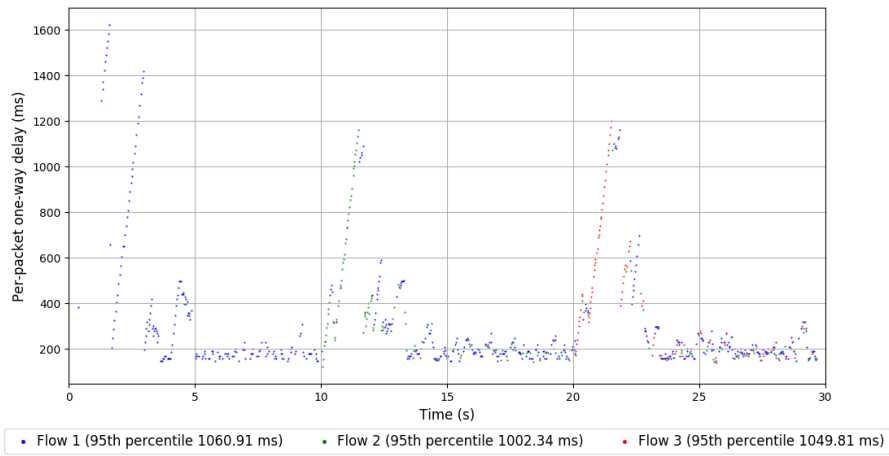
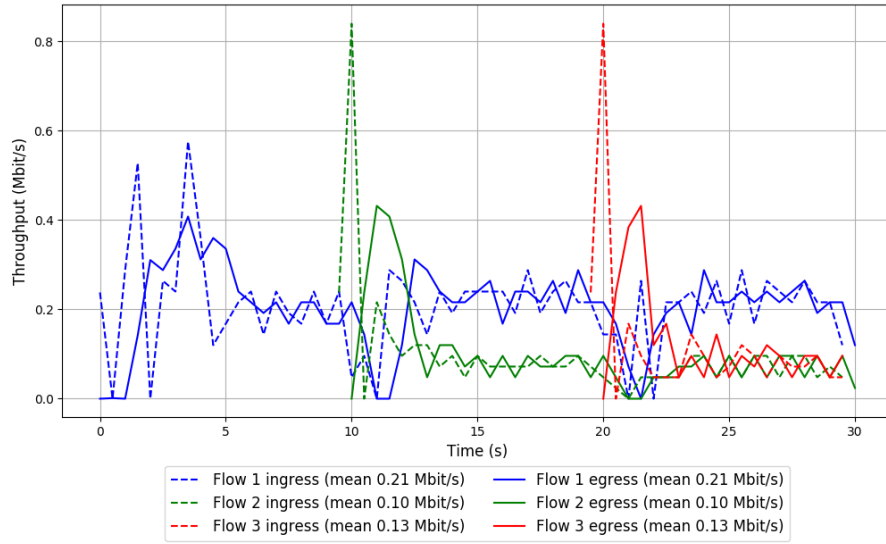
-- Flow 3:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 1049.808 ms

Loss rate: 1.89%

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-03-19 13:37:41

End at: 2019-03-19 13:38:11

Local clock offset: -6.399 ms

Remote clock offset: 3.062 ms

# Below is generated by plot.py at 2019-03-19 13:47:26

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.37 Mbit/s

95th percentile per-packet one-way delay: 877.382 ms

Loss rate: 1.10%

-- Flow 1:

Average throughput: 0.18 Mbit/s

95th percentile per-packet one-way delay: 947.448 ms

Loss rate: 0.46%

-- Flow 2:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 839.851 ms

Loss rate: 0.76%

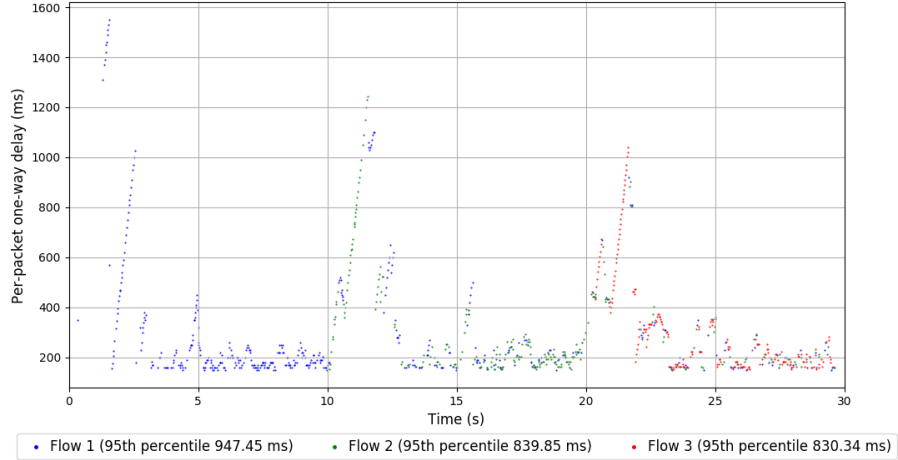
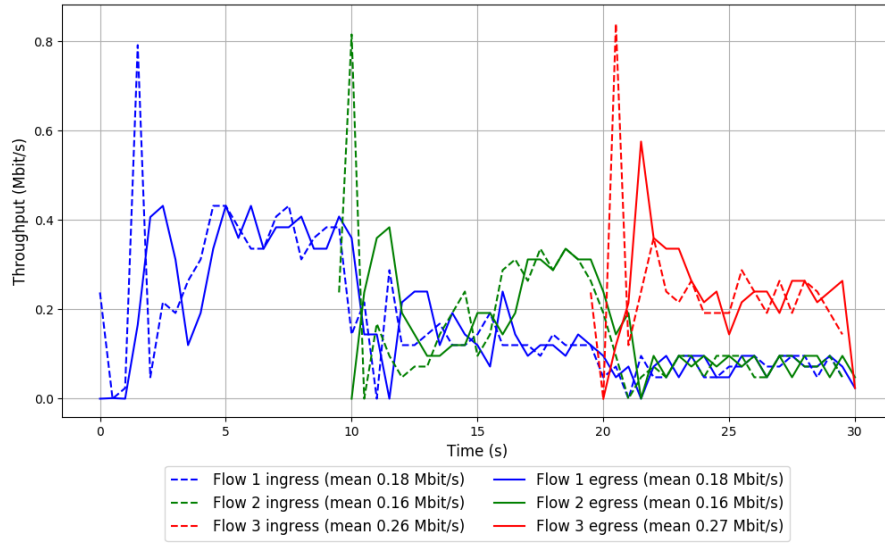
-- Flow 3:

Average throughput: 0.27 Mbit/s

95th percentile per-packet one-way delay: 830.340 ms

Loss rate: 2.82%

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





Run 1: Statistics of Indigo-MusesC3

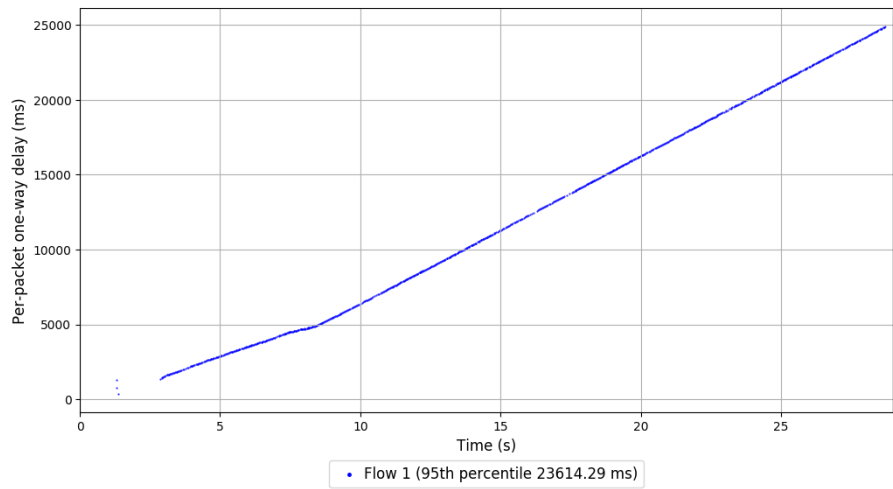
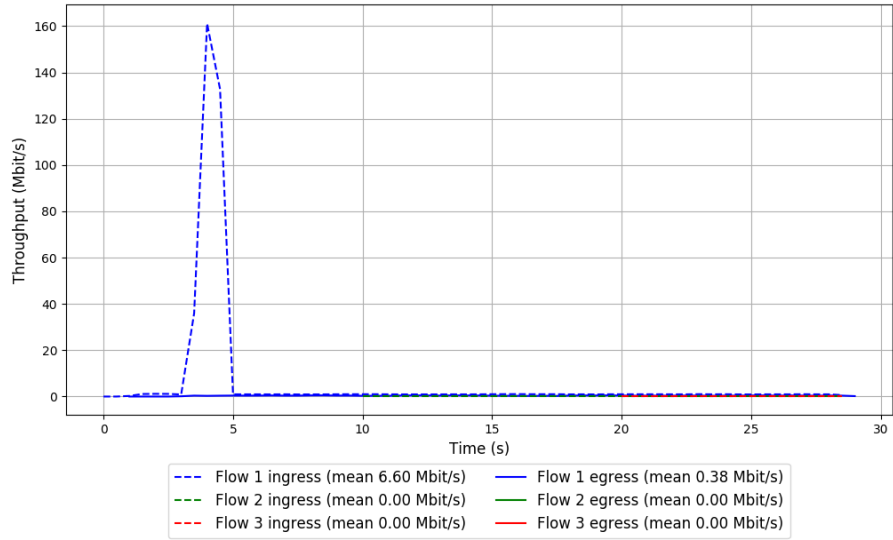
Start at: 2019-03-19 12:46:38

End at: 2019-03-19 12:47:08

Local clock offset: -2.798 ms

Remote clock offset: 0.225 ms

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



Run 2: Statistics of Indigo-MusesC3

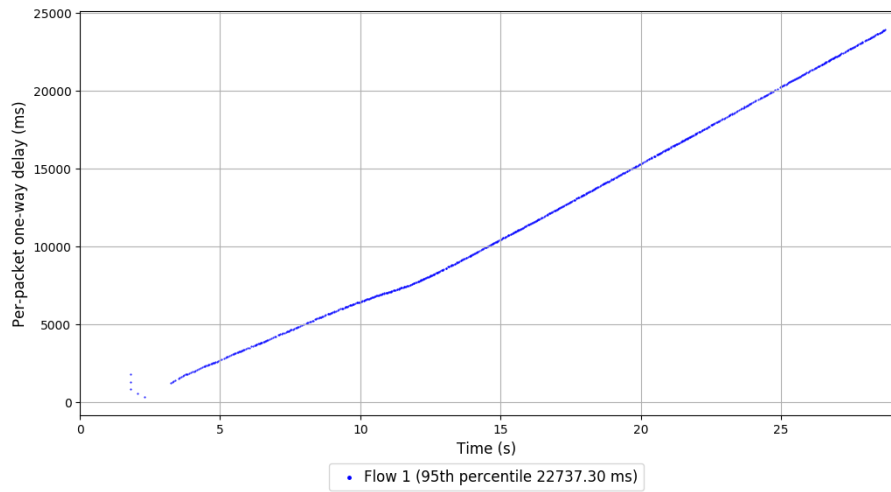
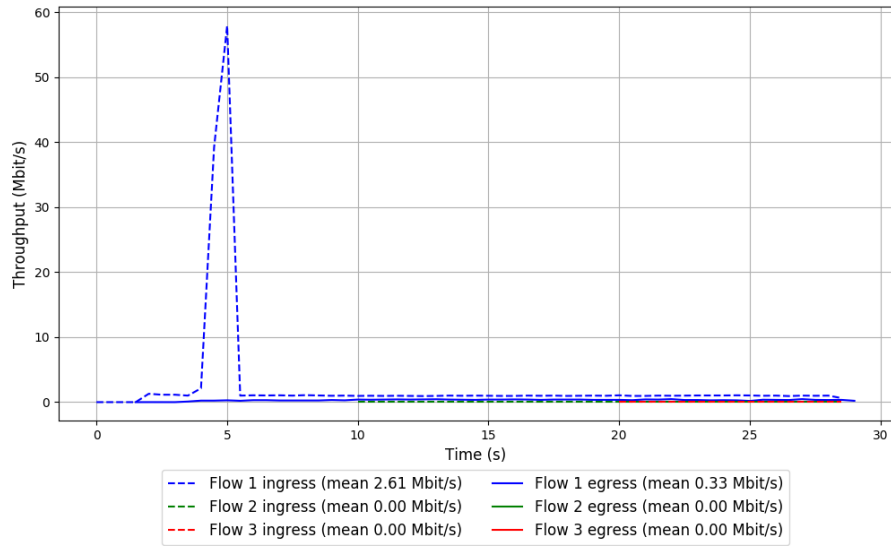
Start at: 2019-03-19 13:14:31

End at: 2019-03-19 13:15:01

Local clock offset: -7.937 ms

Remote clock offset: -0.741 ms

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



Run 3: Statistics of Indigo-MusesC3

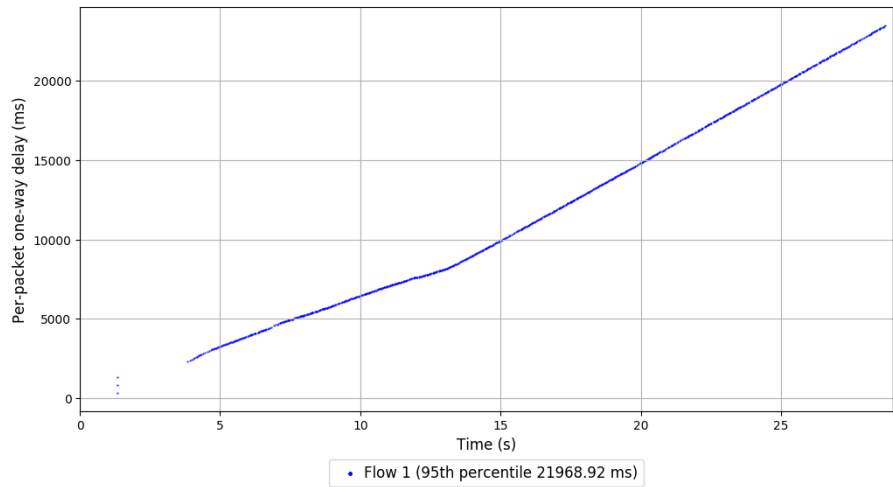
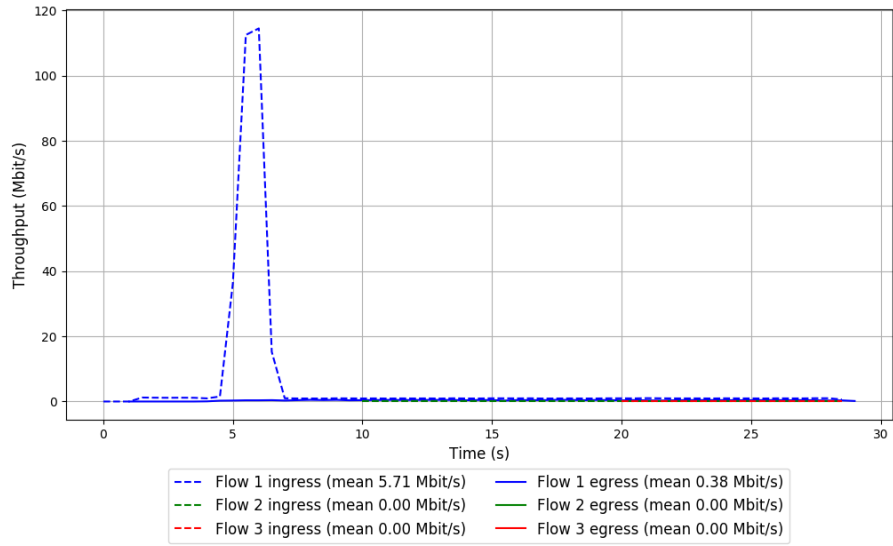
Start at: 2019-03-19 13:41:22

End at: 2019-03-19 13:41:52

Local clock offset: -7.157 ms

Remote clock offset: 5.416 ms

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



Run 1: Statistics of Indigo-MusesC5

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 1: Report of Indigo-MusesC5 — Data Link

Figure is missing

Figure is missing



Run 2: Statistics of Indigo-MusesC5

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 2: Report of Indigo-MusesC5 — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Indigo-MusesC5

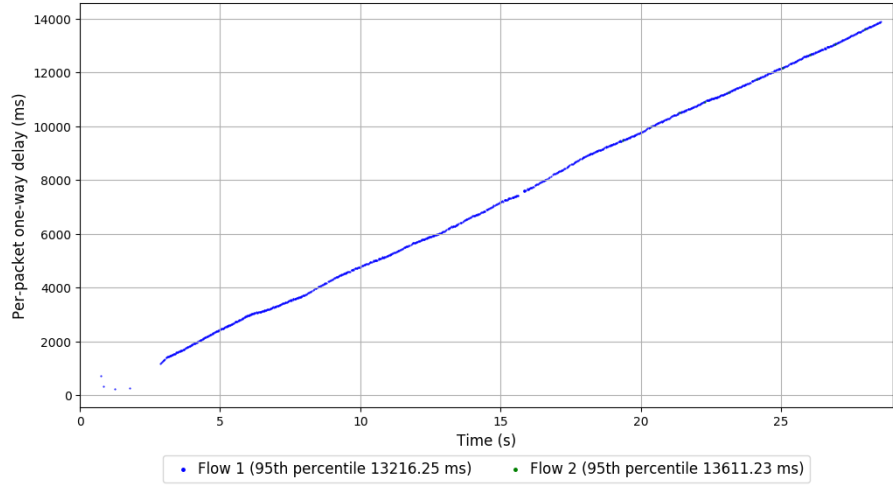
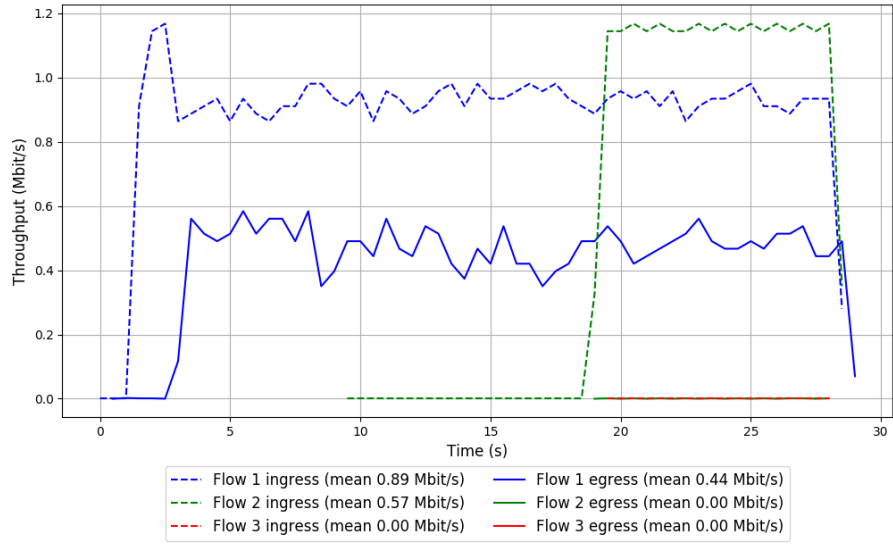
Start at: 2019-03-19 13:31:07

End at: 2019-03-19 13:31:37

Local clock offset: -7.056 ms

Remote clock offset: -0.649 ms

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



Run 1: Statistics of Indigo-MusesD

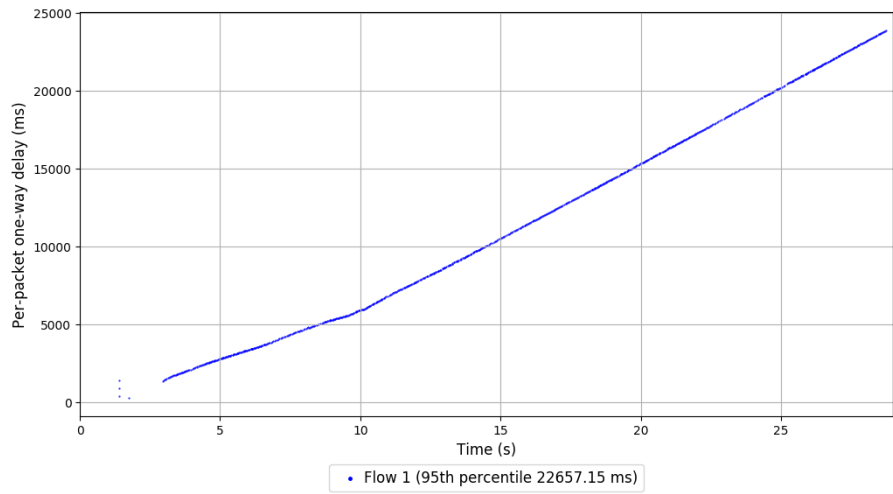
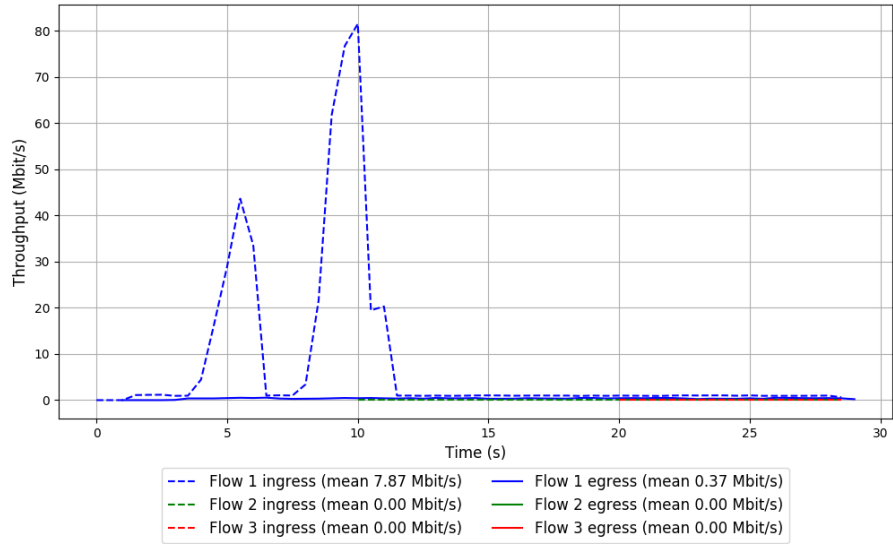
Start at: 2019-03-19 12:43:53

End at: 2019-03-19 12:44:23

Local clock offset: -3.272 ms

Remote clock offset: -0.975 ms

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



Run 2: Statistics of Indigo-MusesD

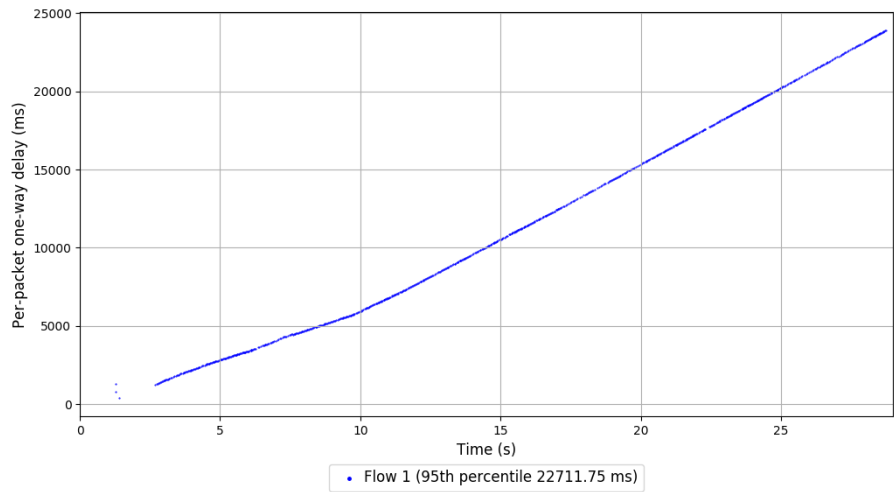
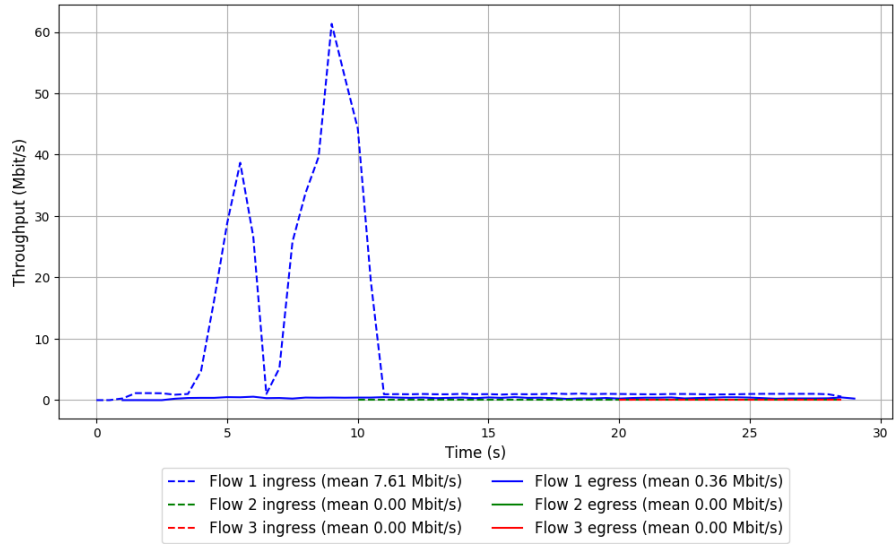
Start at: 2019-03-19 13:11:45

End at: 2019-03-19 13:12:15

Local clock offset: -7.808 ms

Remote clock offset: 5.257 ms

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





Run 3: Statistics of Indigo-MusesD

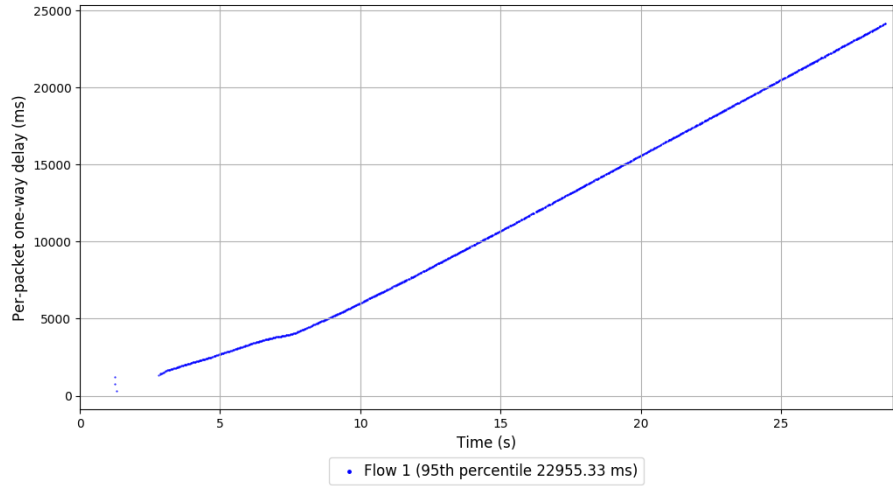
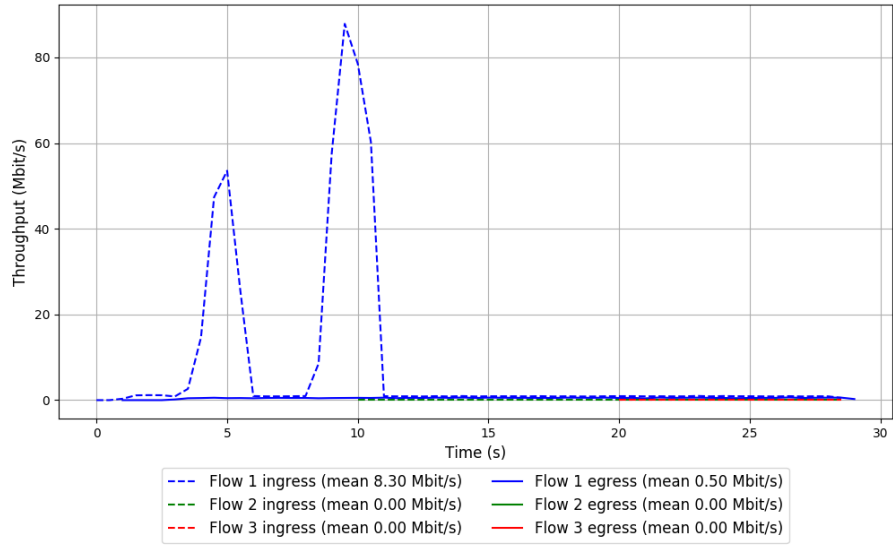
Start at: 2019-03-19 13:38:54

End at: 2019-03-19 13:39:24

Local clock offset: -6.353 ms

Remote clock offset: 3.215 ms

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



Run 1: Statistics of Indigo-MuseST

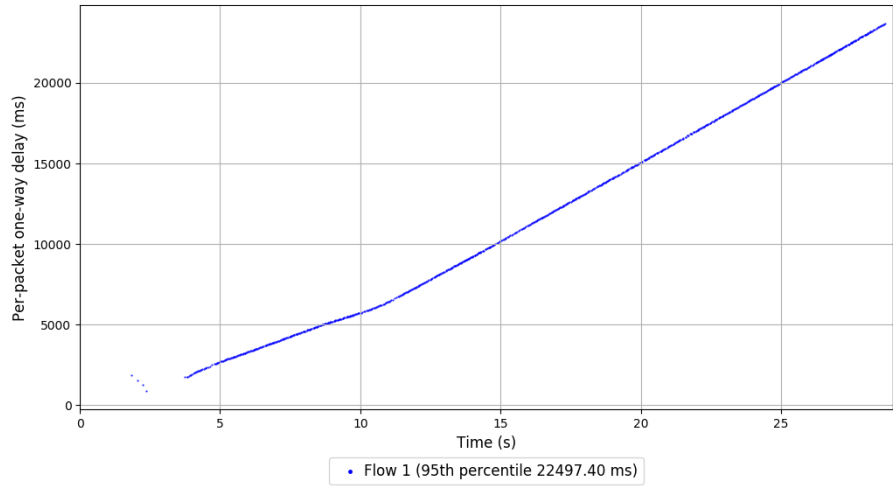
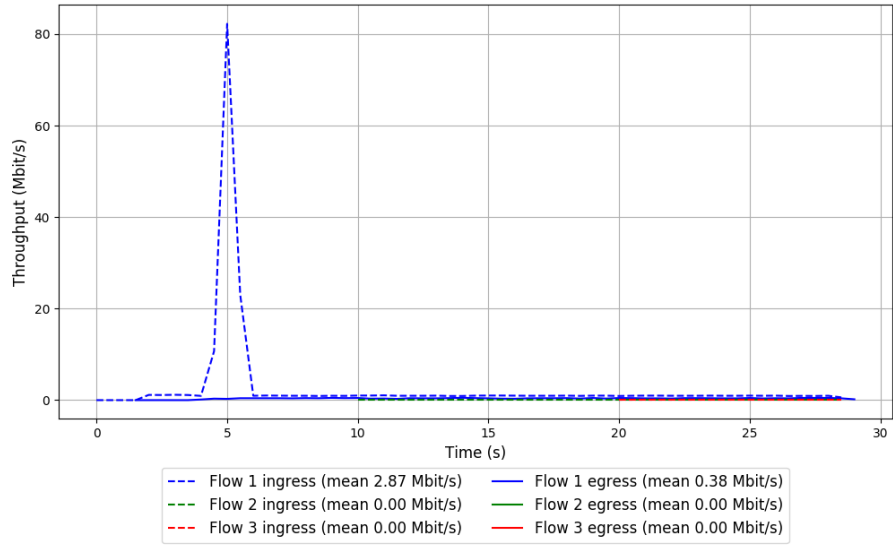
Start at: 2019-03-19 12:29:09

End at: 2019-03-19 12:29:39

Local clock offset: -1.568 ms

Remote clock offset: 5.17 ms

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



Run 2: Statistics of Indigo-MuseST

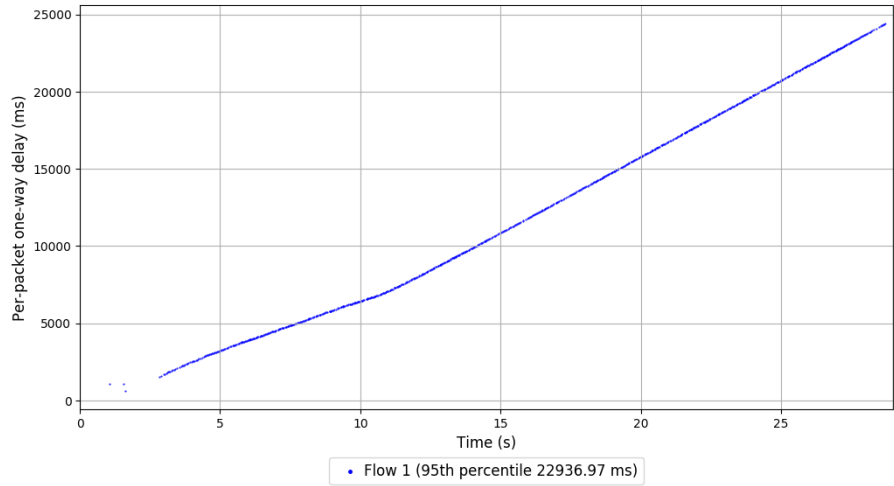
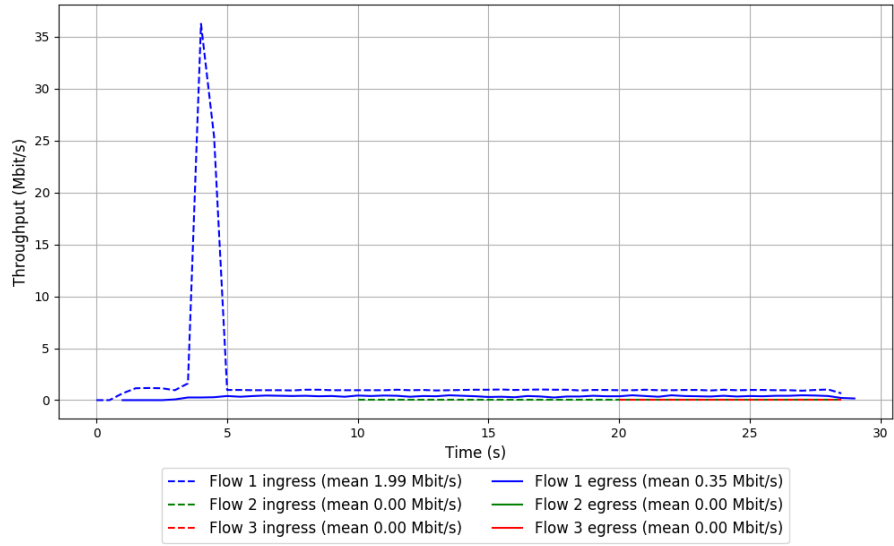
Start at: 2019-03-19 12:56:45

End at: 2019-03-19 12:57:15

Local clock offset: -6.188 ms

Remote clock offset: 5.296 ms

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



Run 3: Statistics of Indigo-MuseST

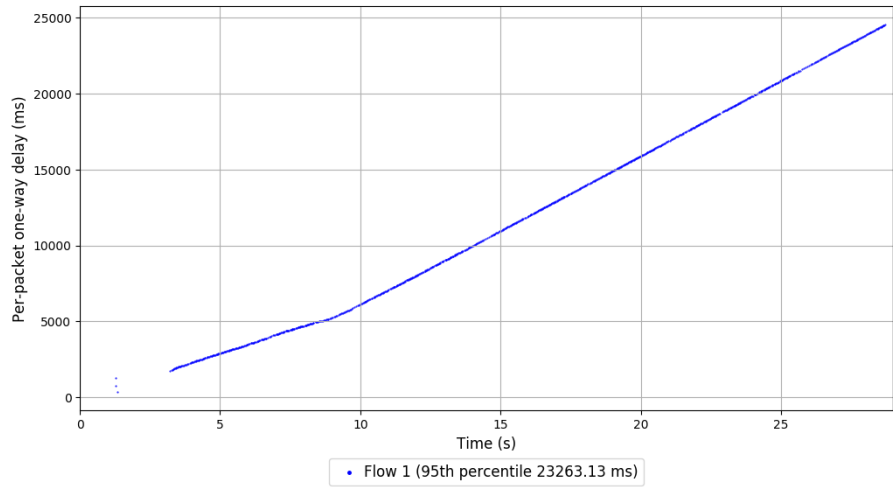
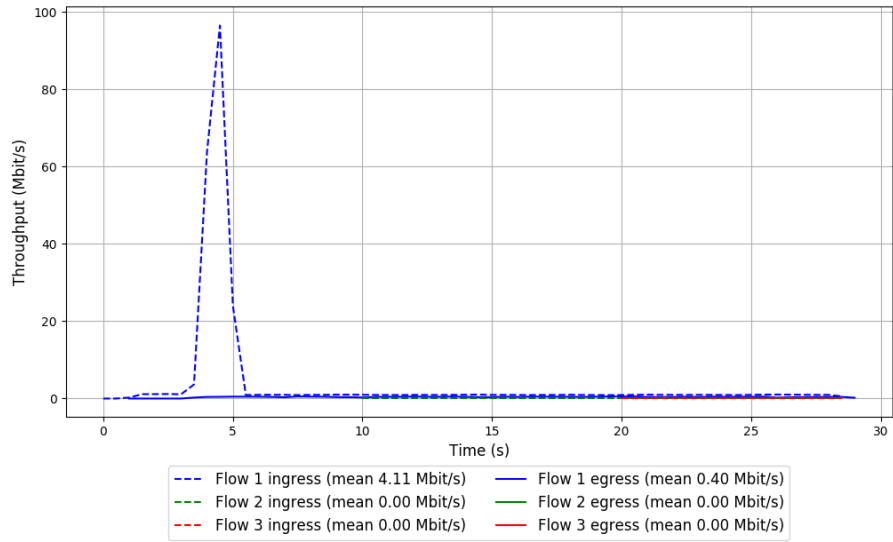
Start at: 2019-03-19 13:24:37

End at: 2019-03-19 13:25:07

Local clock offset: -6.415 ms

Remote clock offset: -0.614 ms

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





Run 1: Statistics of LEDBAT

Start at: 2019-03-19 12:51:50

End at: 2019-03-19 12:52:20

Local clock offset: -4.385 ms

Remote clock offset: 2.969 ms

# Below is generated by plot.py at 2019-03-19 13:47:35

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 424.482 ms

Loss rate: 1.70%

-- Flow 1:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 384.381 ms

Loss rate: 0.38%

-- Flow 2:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 424.483 ms

Loss rate: 1.07%

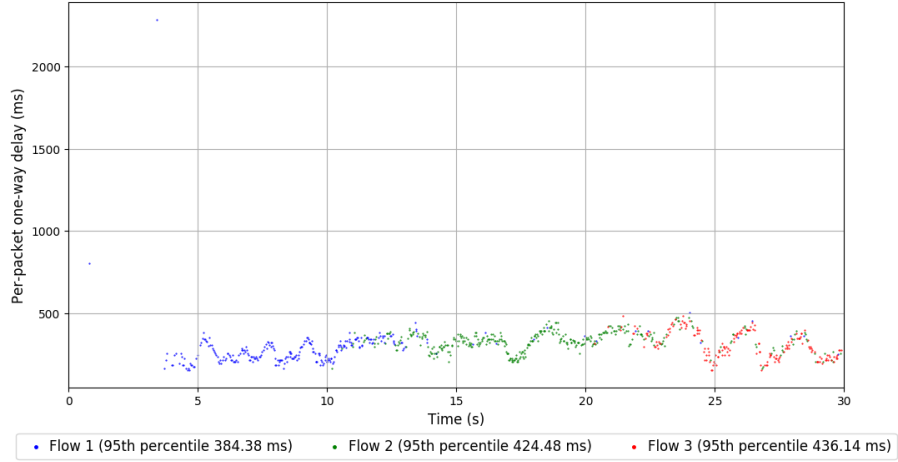
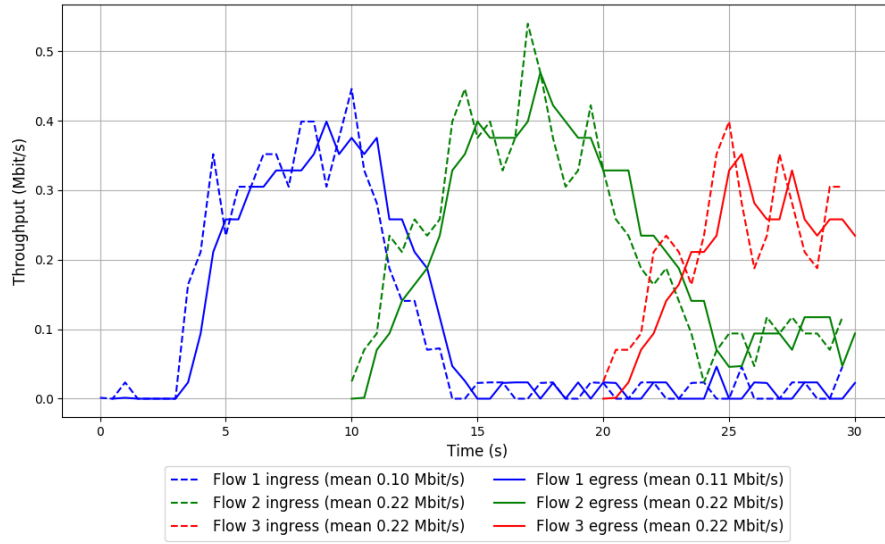
-- Flow 3:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 436.141 ms

Loss rate: 4.79%

# Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-03-19 13:19:43

End at: 2019-03-19 13:20:13

Local clock offset: -6.781 ms

Remote clock offset: 0.184 ms

# Below is generated by plot.py at 2019-03-19 13:47:35

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 472.795 ms

Loss rate: 0.34%

-- Flow 1:

Average throughput: 0.15 Mbit/s

95th percentile per-packet one-way delay: 454.606 ms

Loss rate: 0.23%

-- Flow 2:

Average throughput: 0.18 Mbit/s

95th percentile per-packet one-way delay: 472.678 ms

Loss rate: 0.29%

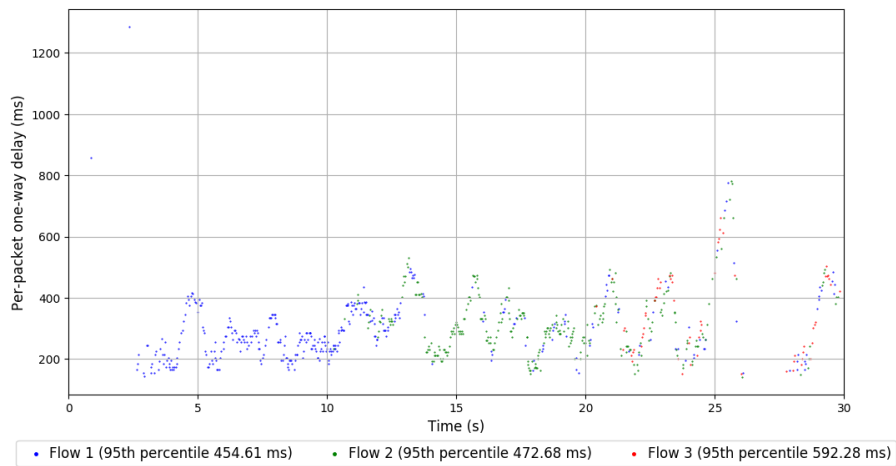
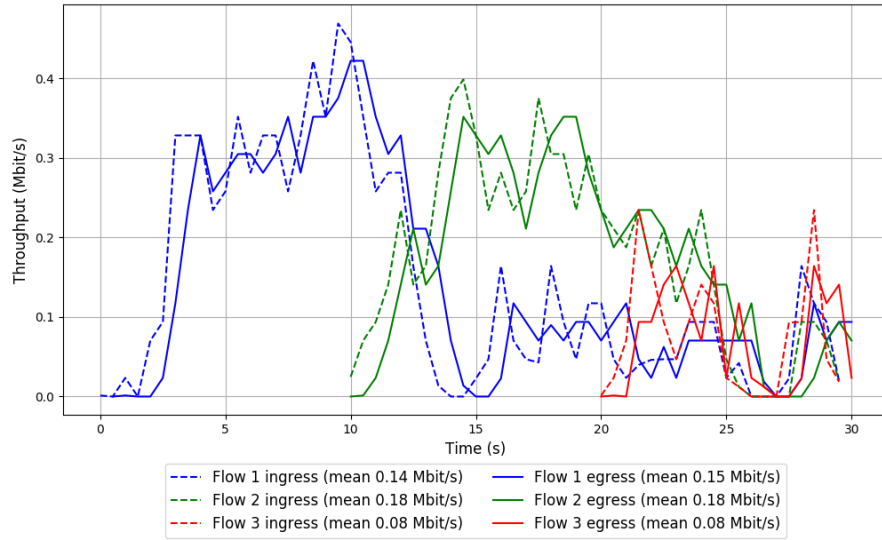
-- Flow 3:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 592.277 ms

Loss rate: 1.24%

Run 2: Report of LEDBAT — Data Link

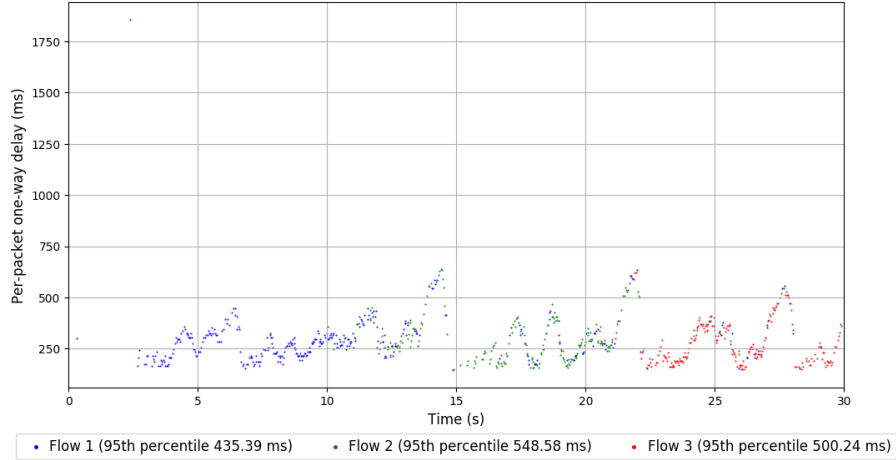
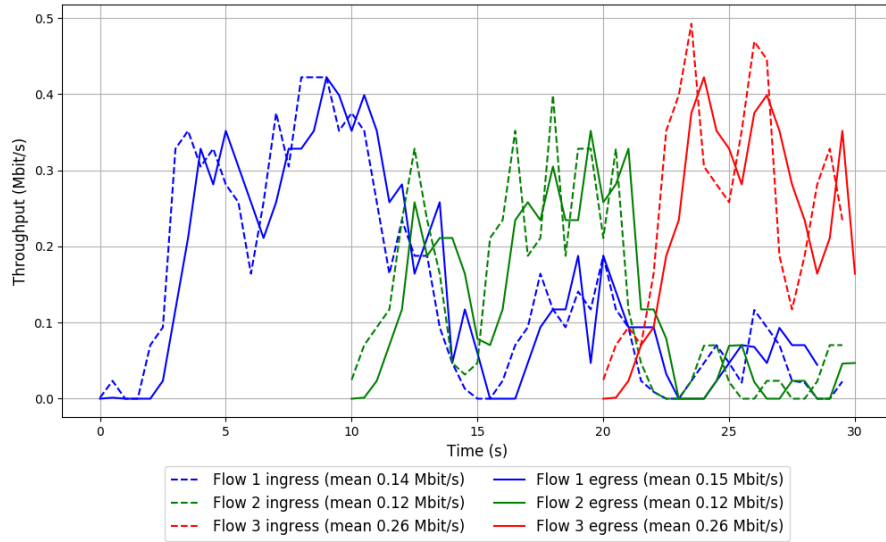


Run 3: Statistics of LEDBAT

Start at: 2019-03-19 13:46:37  
End at: 2019-03-19 13:47:07  
Local clock offset: -6.475 ms  
Remote clock offset: -0.056 ms

```
# Below is generated by plot.py at 2019-03-19 13:47:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 508.178 ms
Loss rate: 1.64%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 435.393 ms
Loss rate: 0.27%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 548.581 ms
Loss rate: 1.42%
-- Flow 3:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 500.235 ms
Loss rate: 4.13%
```

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



Run 1: Statistics of PCC-Allegro

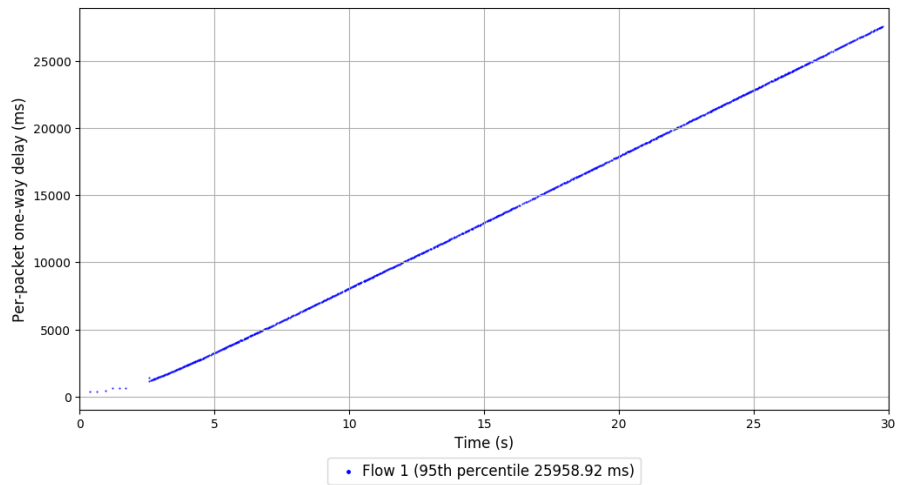
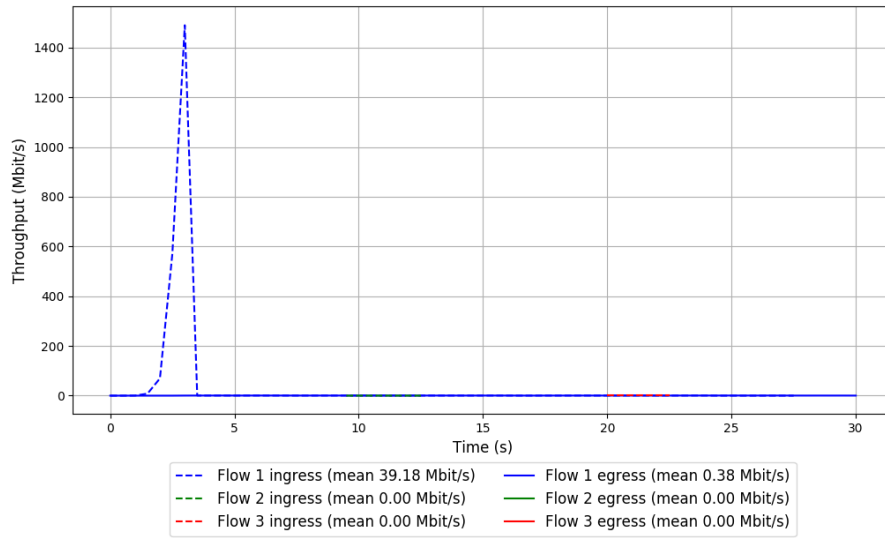
Start at: 2019-03-19 12:34:39

End at: 2019-03-19 12:35:09

Local clock offset: -2.899 ms

Remote clock offset: -0.878 ms

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





Run 2: Statistics of PCC-Allegro

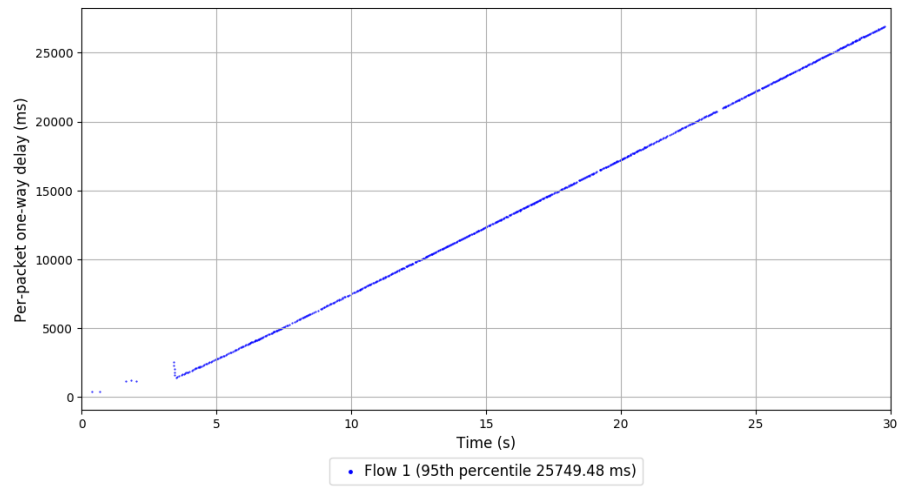
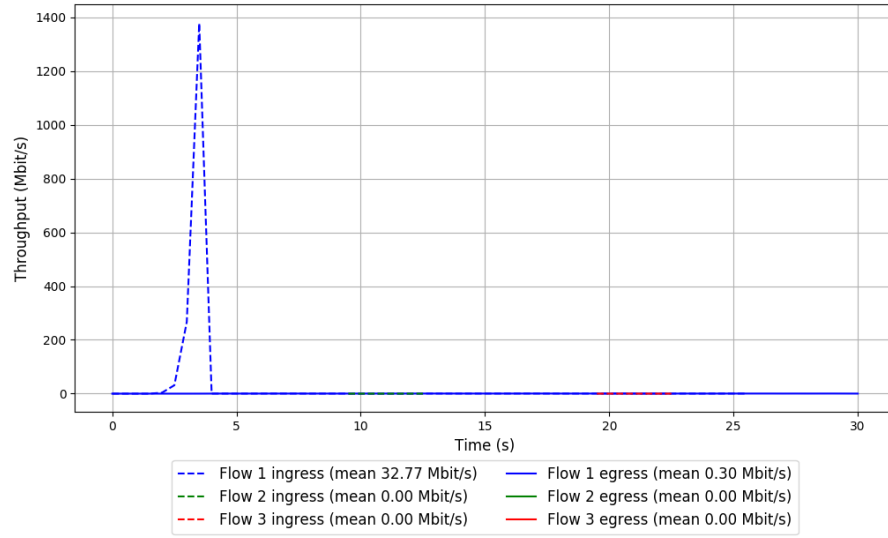
Start at: 2019-03-19 13:02:15

End at: 2019-03-19 13:02:45

Local clock offset: -6.888 ms

Remote clock offset: 0.165 ms

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



Run 3: Statistics of PCC-Allegro

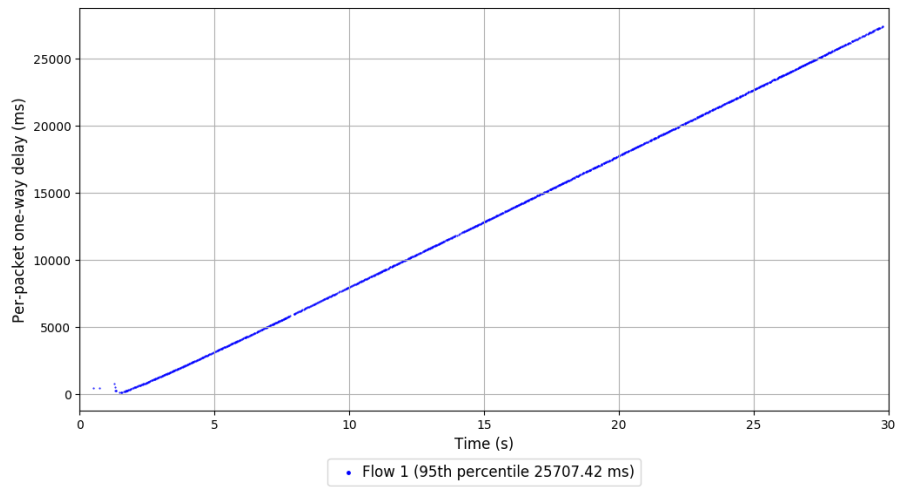
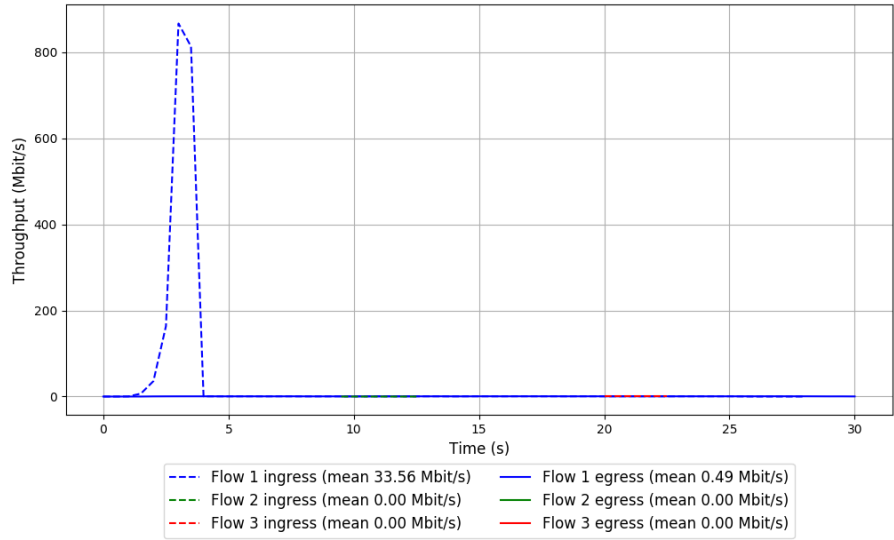
Start at: 2019-03-19 13:29:52

End at: 2019-03-19 13:30:22

Local clock offset: -6.37 ms

Remote clock offset: -0.598 ms

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



Run 1: Statistics of PCC-Expr

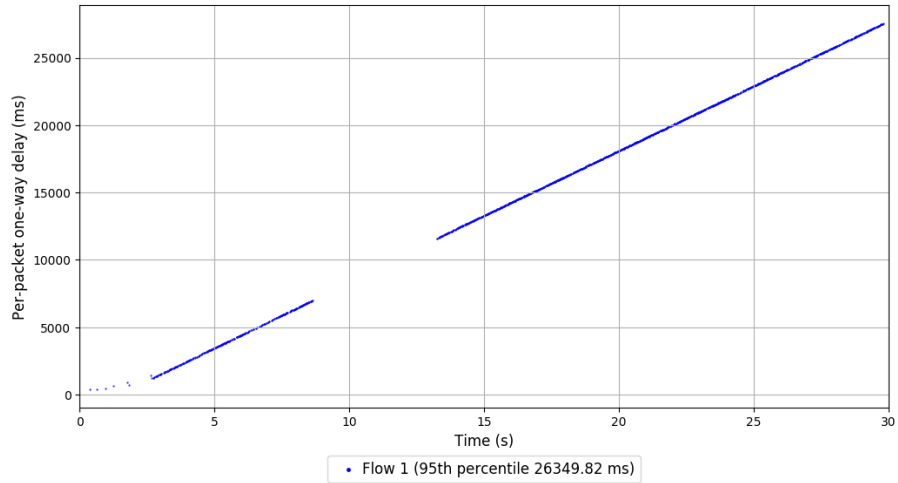
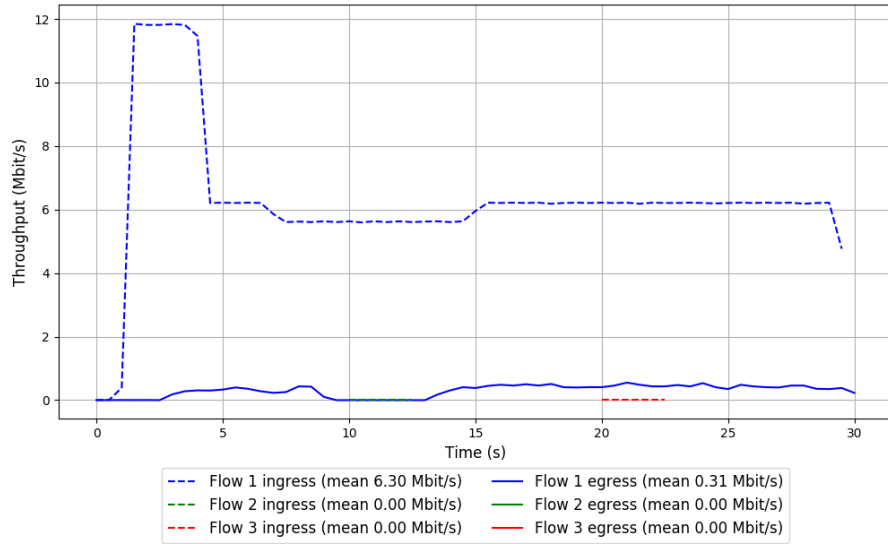
Start at: 2019-03-19 12:39:53

End at: 2019-03-19 12:40:23

Local clock offset: -2.407 ms

Remote clock offset: -0.98 ms

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



Run 2: Statistics of PCC-Expr

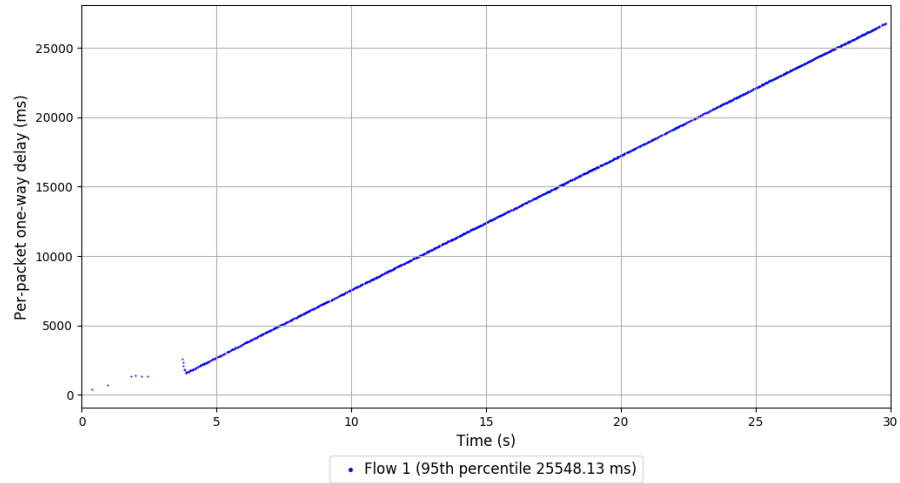
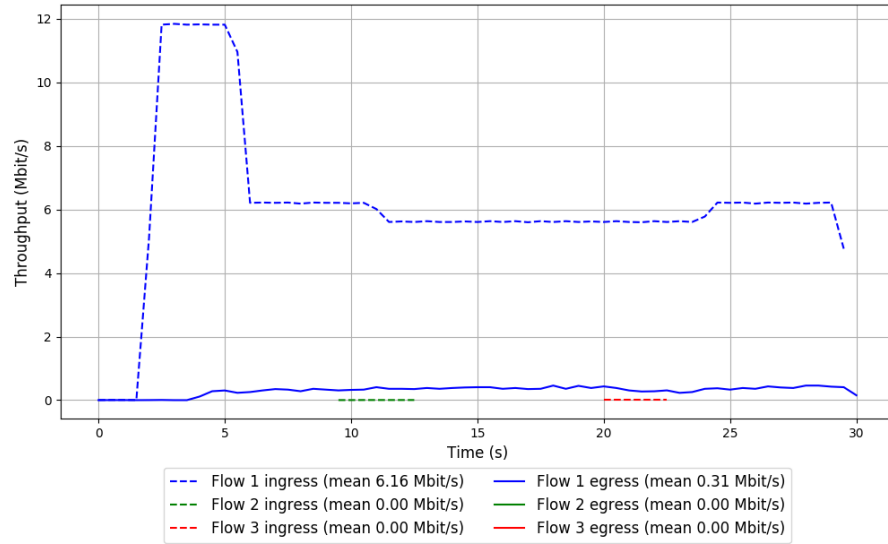
Start at: 2019-03-19 13:07:46

End at: 2019-03-19 13:08:16

Local clock offset: -7.437 ms

Remote clock offset: -0.703 ms

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





Run 3: Statistics of PCC-Expr

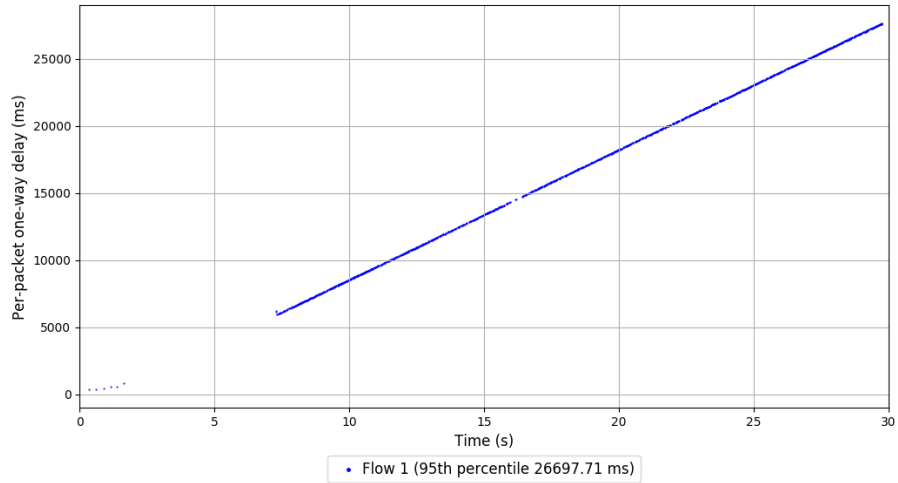
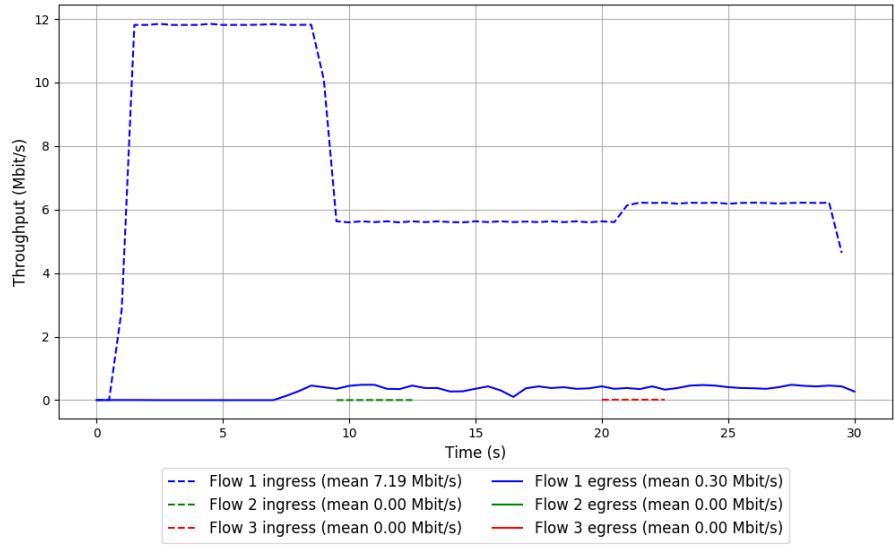
Start at: 2019-03-19 13:34:55

End at: 2019-03-19 13:35:25

Local clock offset: -7.134 ms

Remote clock offset: 5.821 ms

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



Run 1: Statistics of QUIC Cubic

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 1: Report of QUIC Cubic — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of QUIC Cubic

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 2: Report of QUIC Cubic — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of QUIC Cubic

Start at: 2019-03-19 13:28:37

End at: 2019-03-19 13:29:07

Local clock offset: -7.082 ms

Remote clock offset: -0.74 ms

# Below is generated by plot.py at 2019-03-19 13:47:50

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 8106.479 ms

Loss rate: 27.57%

-- Flow 1:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 8106.479 ms

Loss rate: 28.27%

-- Flow 2:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 6675.367 ms

Loss rate: 1.42%

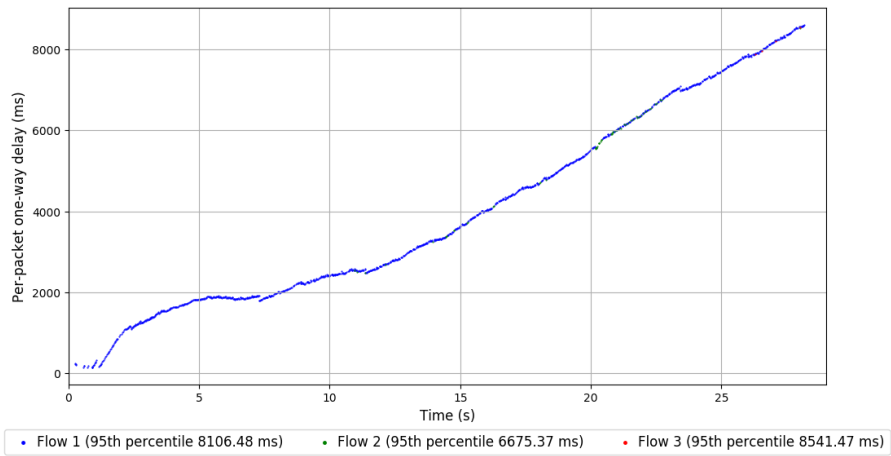
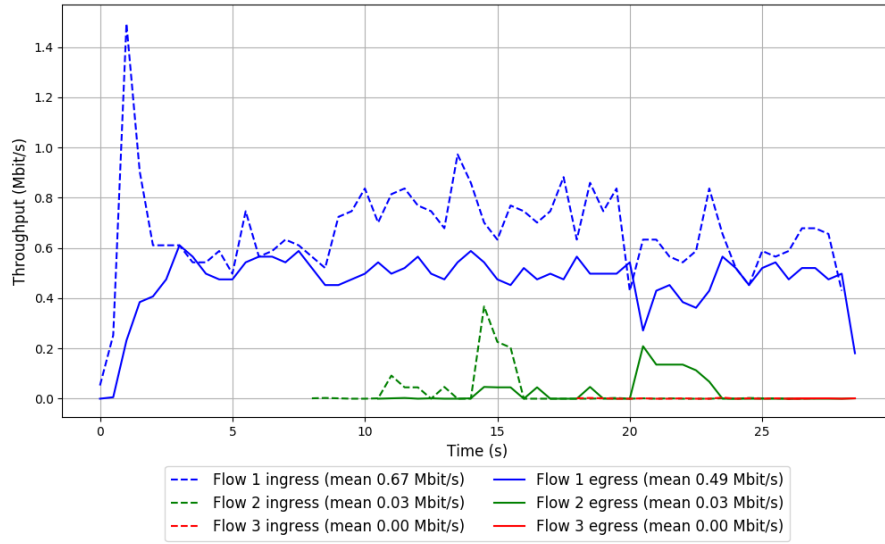
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8541.469 ms

Loss rate: 66.67%

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





Run 1: Statistics of SCReAM

Start at: 2019-03-19 12:38:39

End at: 2019-03-19 12:39:09

Local clock offset: -3.072 ms

Remote clock offset: 3.752 ms

# Below is generated by plot.py at 2019-03-19 13:47:50

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 334.193 ms

Loss rate: 1.46%

-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 329.810 ms

Loss rate: 0.98%

-- Flow 2:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 328.972 ms

Loss rate: 1.66%

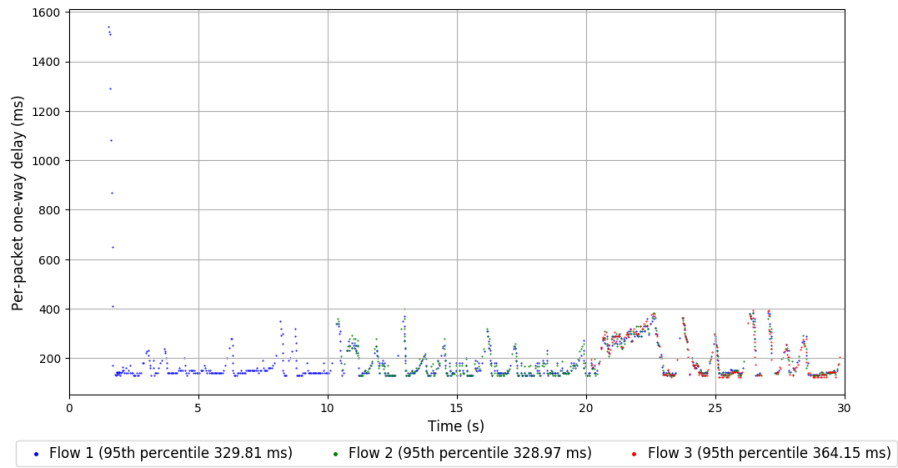
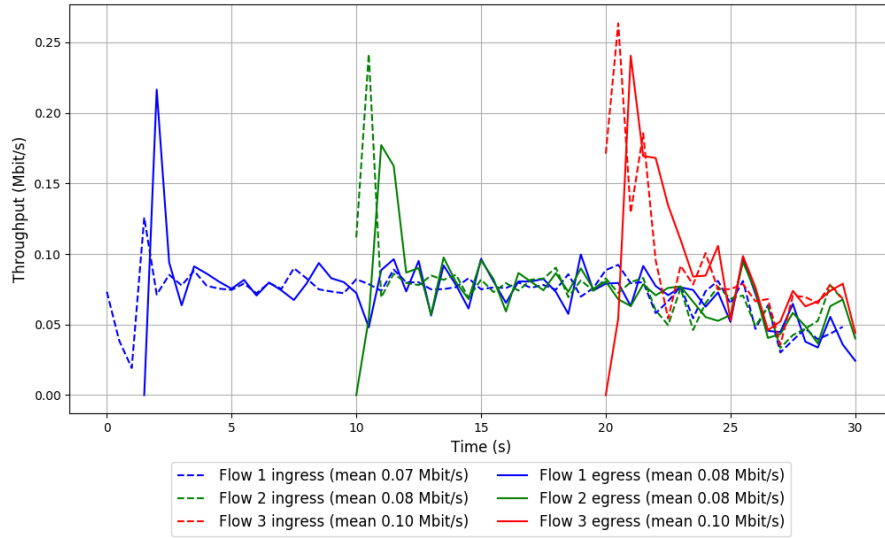
-- Flow 3:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 364.148 ms

Loss rate: 2.24%

# Run 1: Report of SCReAM — Data Link



Run 2: Statistics of SCReAM

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 2: Report of SReAM — Data Link

Figure is missing

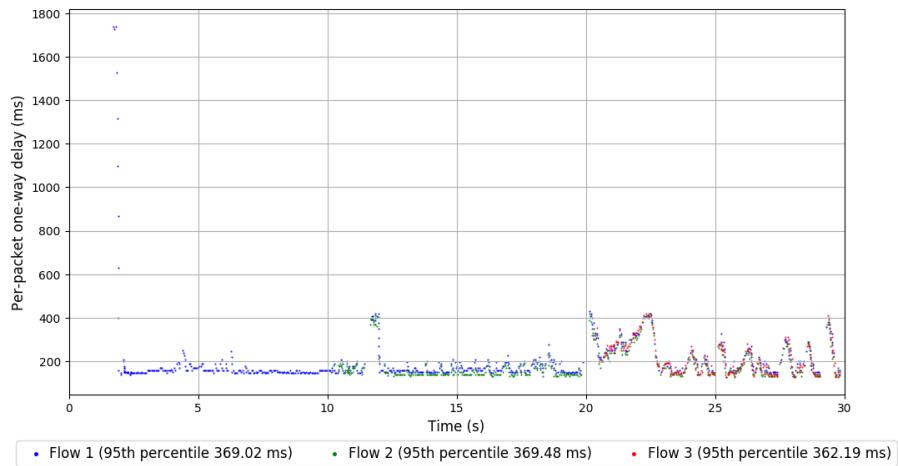
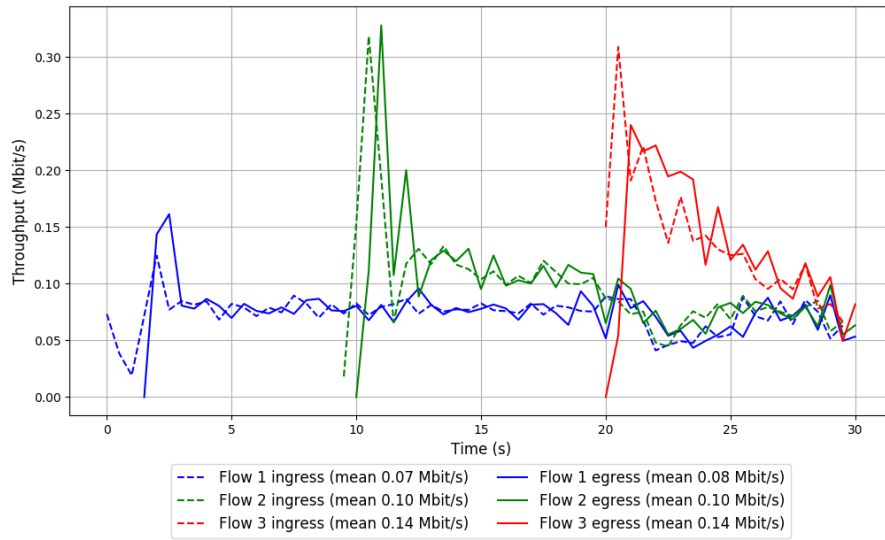
Figure is missing

Run 3: Statistics of SCReAM

Start at: 2019-03-19 13:33:42  
End at: 2019-03-19 13:34:12  
Local clock offset: -7.057 ms  
Remote clock offset: -0.553 ms

```
# Below is generated by plot.py at 2019-03-19 13:47:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 369.283 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 369.025 ms
Loss rate: 0.84%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 369.477 ms
Loss rate: 0.81%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 362.188 ms
Loss rate: 1.29%
```

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

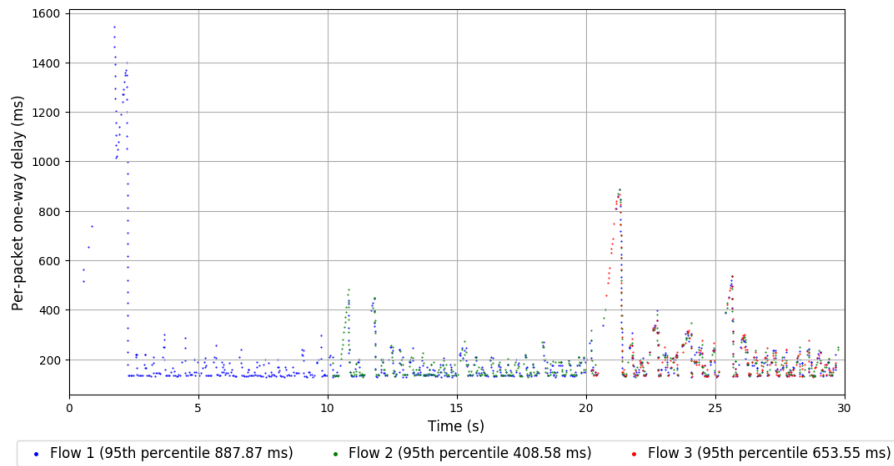
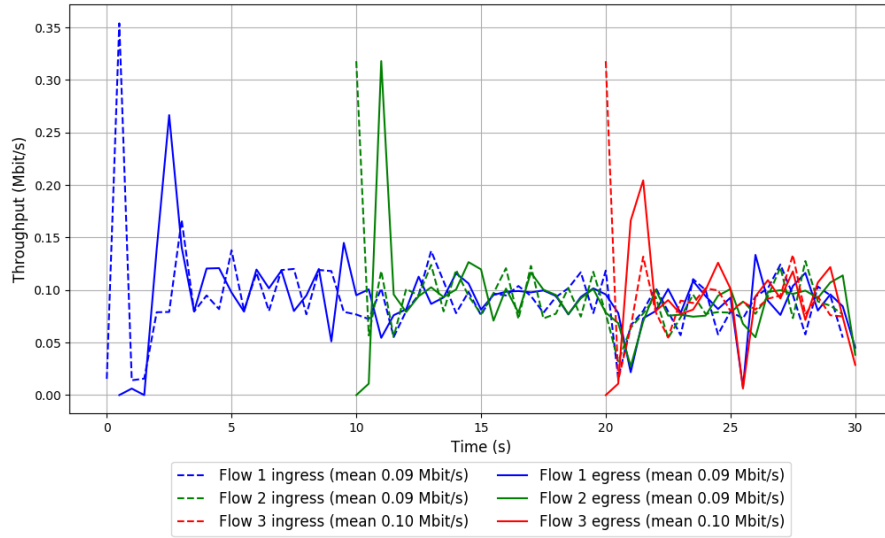


Run 1: Statistics of Sprout

Start at: 2019-03-19 12:27:55  
End at: 2019-03-19 12:28:25  
Local clock offset: -1.442 ms  
Remote clock offset: -0.923 ms

```
# Below is generated by plot.py at 2019-03-19 13:47:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 628.980 ms
Loss rate: 1.54%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 887.874 ms
Loss rate: 0.93%
-- Flow 2:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 408.577 ms
Loss rate: 1.30%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 653.550 ms
Loss rate: 3.73%
```

# Run 1: Report of Sprout — Data Link





Run 2: Statistics of Sprout

Start at: 2019-03-19 12:55:31

End at: 2019-03-19 12:56:01

Local clock offset: -5.969 ms

Remote clock offset: 4.066 ms

# Below is generated by plot.py at 2019-03-19 13:47:50

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 493.226 ms

Loss rate: 0.48%

-- Flow 1:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 639.227 ms

Loss rate: 0.12%

-- Flow 2:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 370.733 ms

Loss rate: 0.21%

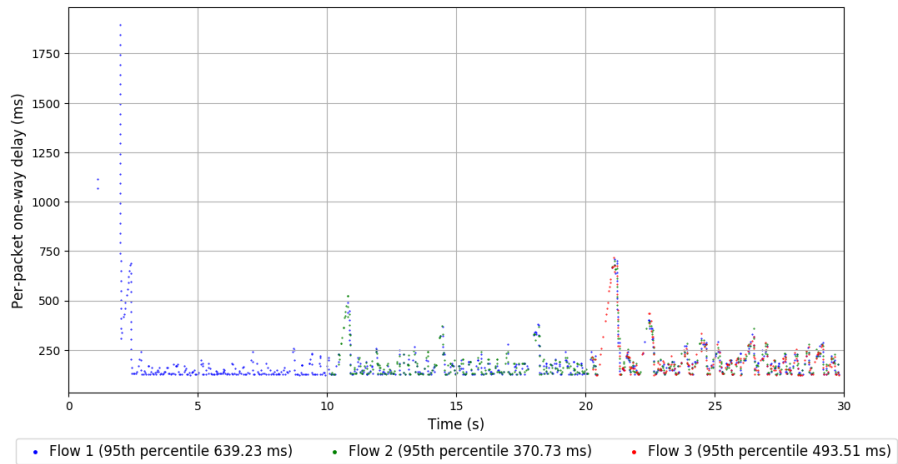
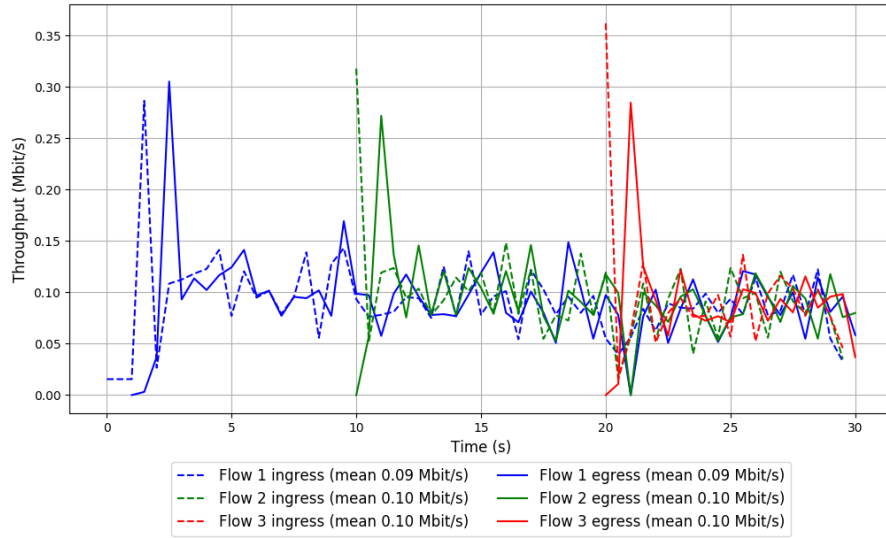
-- Flow 3:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 493.509 ms

Loss rate: 2.07%

## Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2019-03-19 13:23:23

End at: 2019-03-19 13:23:53

Local clock offset: -6.497 ms

Remote clock offset: 4.255 ms

# Below is generated by plot.py at 2019-03-19 13:47:50

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 600.126 ms

Loss rate: 1.64%

-- Flow 1:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 1098.467 ms

Loss rate: 0.87%

-- Flow 2:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 470.485 ms

Loss rate: 1.56%

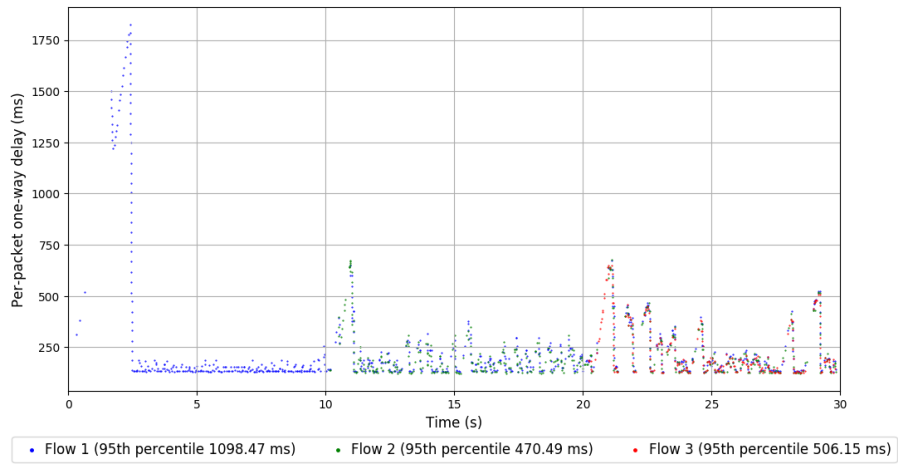
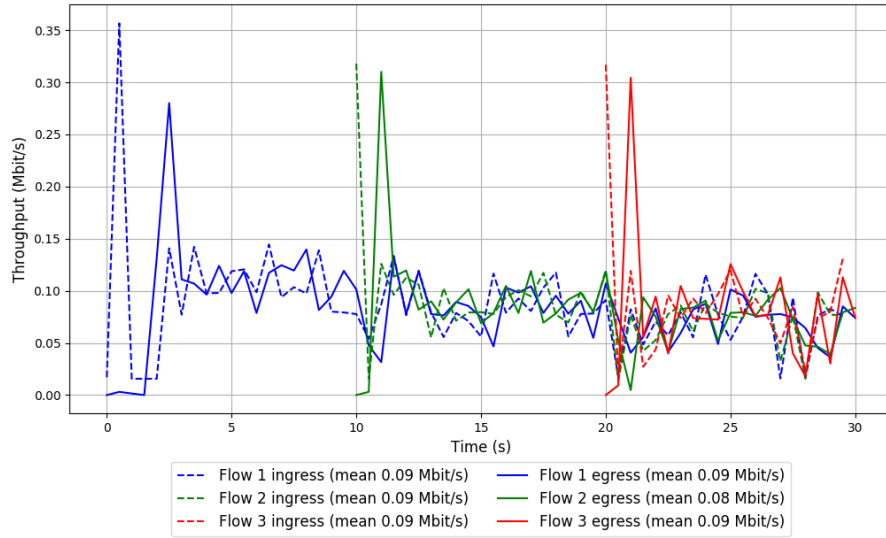
-- Flow 3:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 506.153 ms

Loss rate: 4.08%

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



Run 1: Statistics of TaoVA-100x

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

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

Figure is missing

Figure is missing

Run 2: Statistics of TaoVA-100x

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

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

Figure is missing

Figure is missing



Run 3: Statistics of TaoVA-100x

Start at: 2019-03-19 13:40:08

End at: 2019-03-19 13:40:38

Local clock offset: -6.457 ms

Remote clock offset: 5.527 ms

# Below is generated by plot.py at 2019-03-19 13:47:50

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.44 Mbit/s

95th percentile per-packet one-way delay: 4090.904 ms

Loss rate: 12.50%

-- Flow 1:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 3531.593 ms

Loss rate: 11.65%

-- Flow 2:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 4087.550 ms

Loss rate: 9.96%

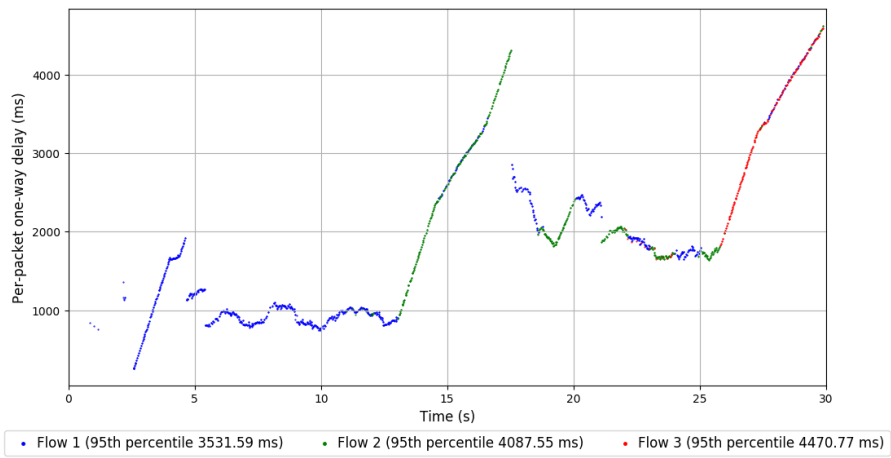
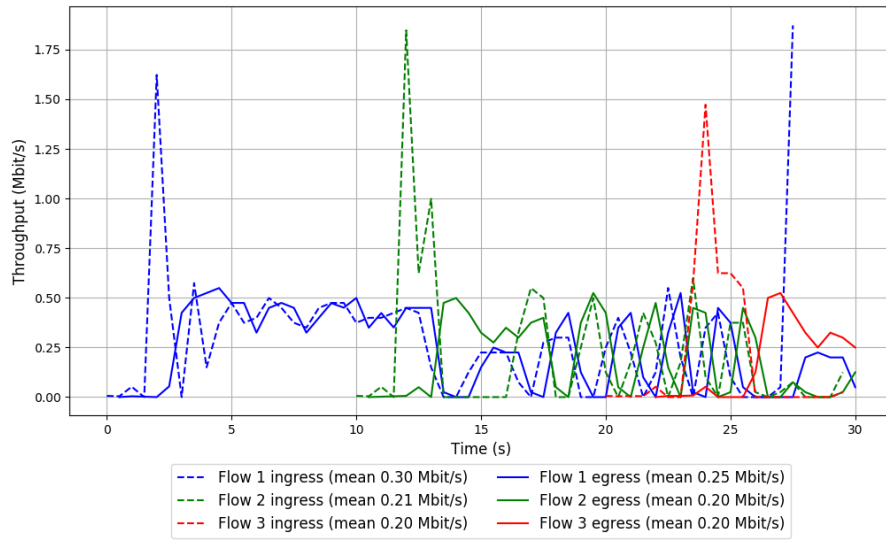
-- Flow 3:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 4470.767 ms

Loss rate: 21.53%

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



Run 1: Statistics of TCP Vegas

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 1: Report of TCP Vegas — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of TCP Vegas

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 2: Report of TCP Vegas — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of TCP Vegas

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 3: Report of TCP Vegas — Data Link

Figure is missing

Figure is missing



Run 1: Statistics of Verus

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 1: Report of Verus — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of Verus

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 2: Report of Verus — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Verus

/home/ubuntu/pantheon/data/2019-03-19T12-24-Colombia-cellular-to-AWS-Brazil-2-3-runs-3-flows

Run 3: Report of Verus — Data Link

Figure is missing

Figure is missing

Run 1: Statistics of PCC-Vivace

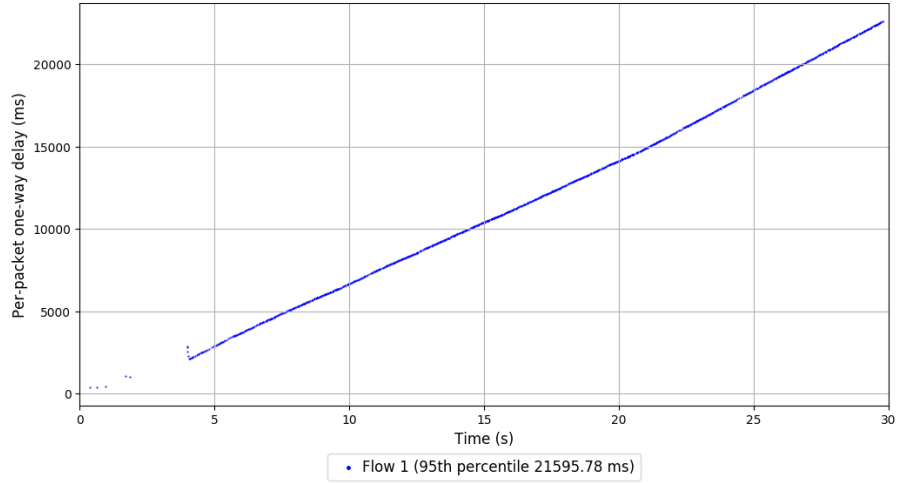
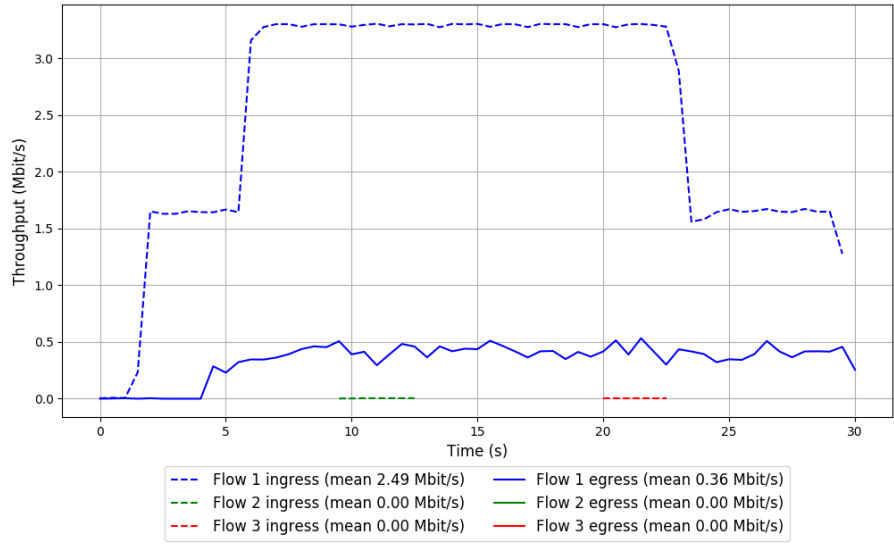
Start at: 2019-03-19 12:31:54

End at: 2019-03-19 12:32:24

Local clock offset: -2.668 ms

Remote clock offset: 0.087 ms

Run 1: Report of PCC-Vivace — Data Link





Run 2: Statistics of PCC-Vivace

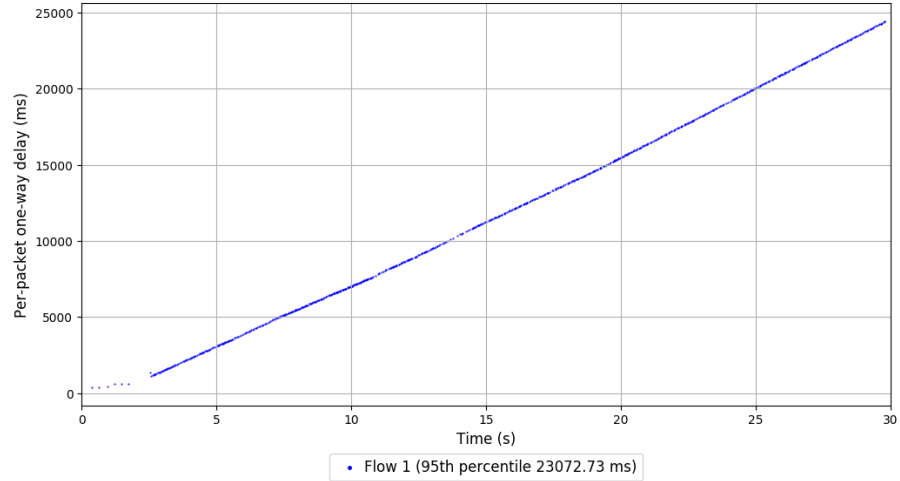
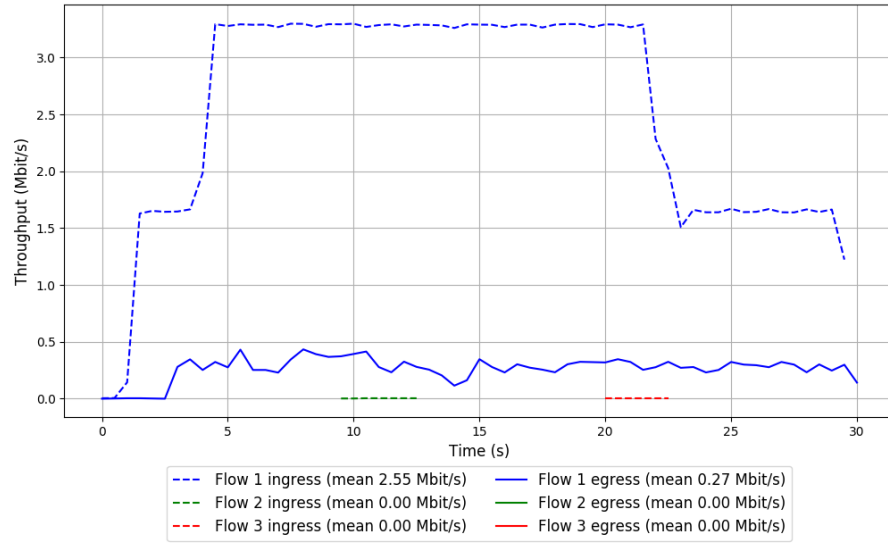
Start at: 2019-03-19 12:59:30

End at: 2019-03-19 13:00:00

Local clock offset: -5.769 ms

Remote clock offset: 3.888 ms

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



Run 3: Statistics of PCC-Vivace

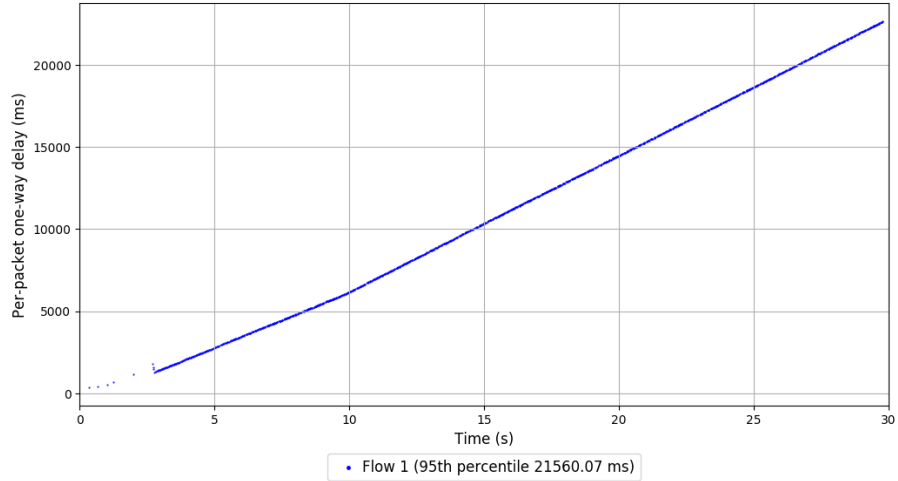
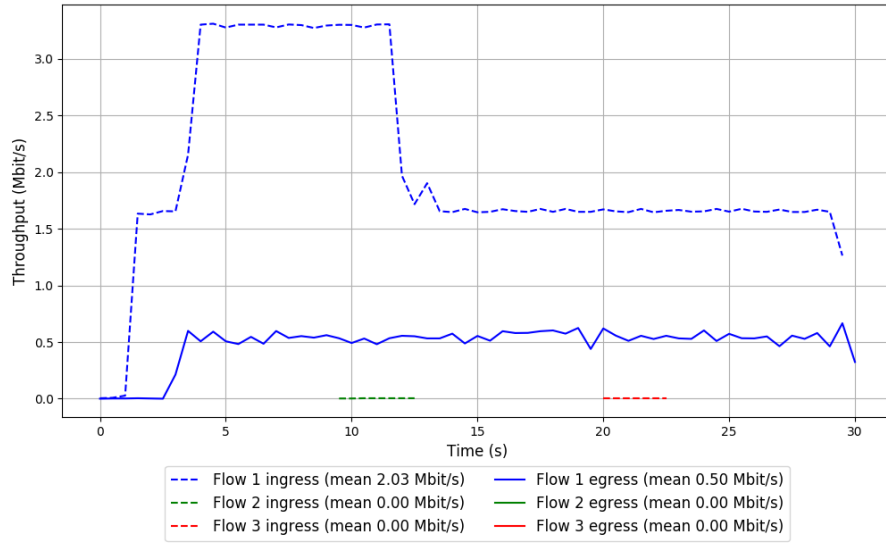
Start at: 2019-03-19 13:27:24

End at: 2019-03-19 13:27:54

Local clock offset: -7.096 ms

Remote clock offset: 5.533 ms

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

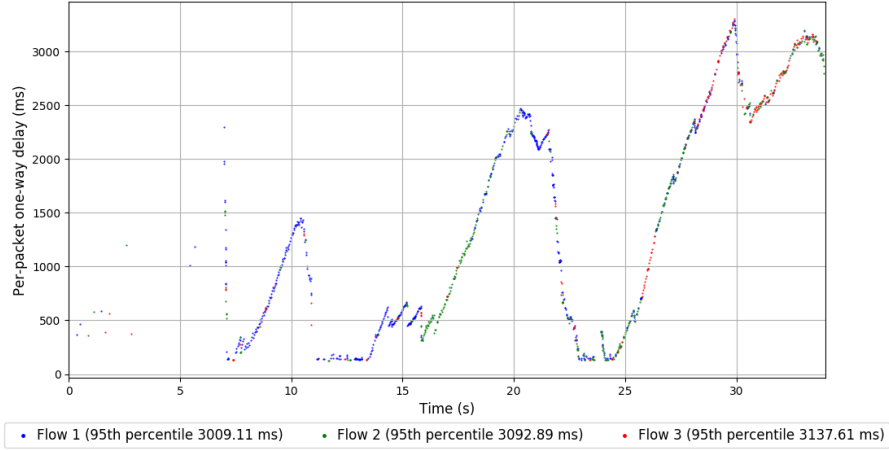
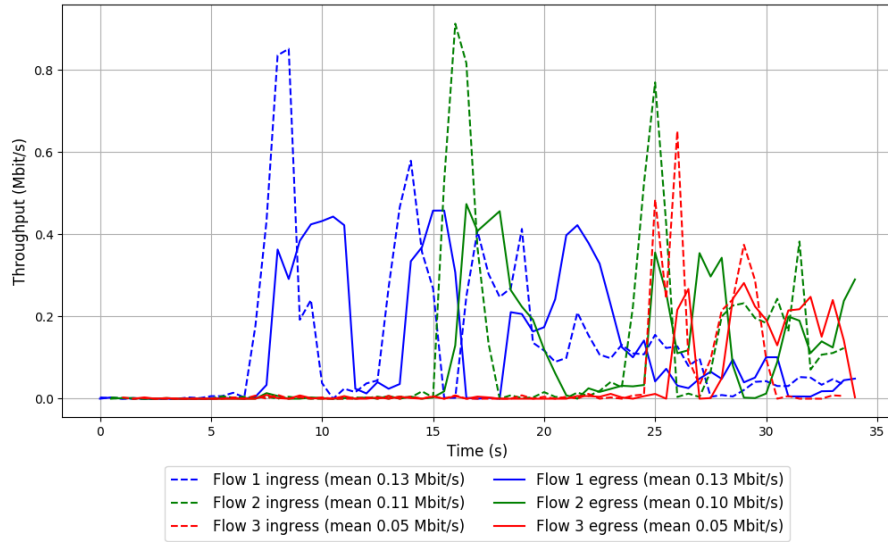


Run 1: Statistics of WebRTC media

Start at: 2019-03-19 12:26:42  
End at: 2019-03-19 12:27:12  
Local clock offset: -1.984 ms  
Remote clock offset: -0.005 ms

```
# Below is generated by plot.py at 2019-03-19 13:47:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 3094.481 ms
Loss rate: 6.22%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 3009.107 ms
Loss rate: 2.75%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 3092.887 ms
Loss rate: 12.83%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 3137.610 ms
Loss rate: 0.72%
```

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-03-19 12:54:17

End at: 2019-03-19 12:54:47

Local clock offset: -5.003 ms

Remote clock offset: 0.275 ms

# Below is generated by plot.py at 2019-03-19 13:47:50

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 2297.433 ms

Loss rate: 6.72%

-- Flow 1:

Average throughput: 0.15 Mbit/s

95th percentile per-packet one-way delay: 2257.935 ms

Loss rate: 2.05%

-- Flow 2:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 2352.361 ms

Loss rate: 15.43%

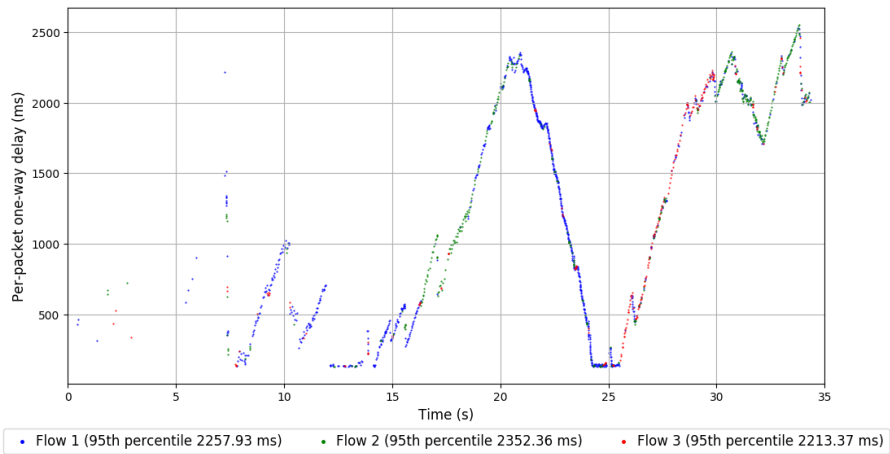
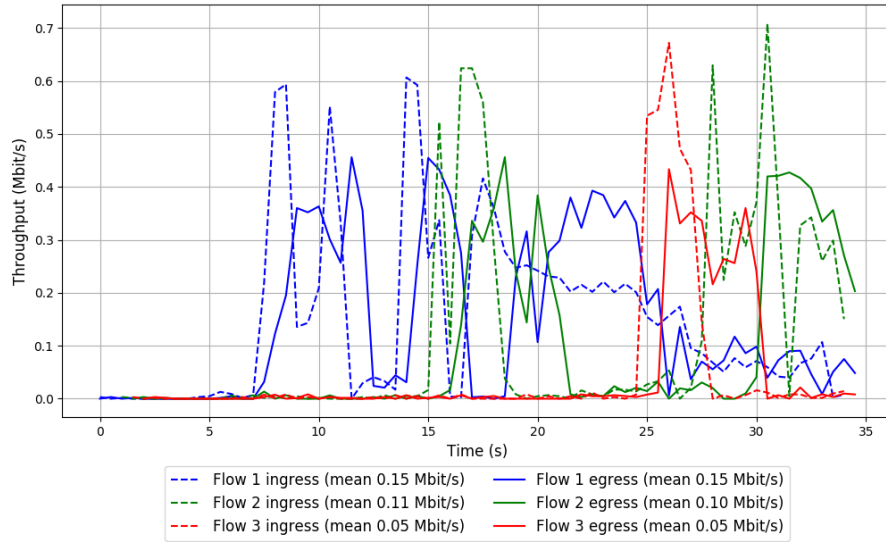
-- Flow 3:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 2213.374 ms

Loss rate: 0.91%

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





Run 3: Statistics of WebRTC media

Start at: 2019-03-19 13:22:10

End at: 2019-03-19 13:22:40

Local clock offset: -7.333 ms

Remote clock offset: 4.14 ms

# Below is generated by plot.py at 2019-03-19 13:47:50

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.27 Mbit/s

95th percentile per-packet one-way delay: 4550.620 ms

Loss rate: 13.98%

-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 4453.880 ms

Loss rate: 6.20%

-- Flow 2:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 4565.042 ms

Loss rate: 25.02%

-- Flow 3:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 4661.317 ms

Loss rate: 9.79%

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

