

Pantheon Report

Generated at 2019-01-21 20:36:25 (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:

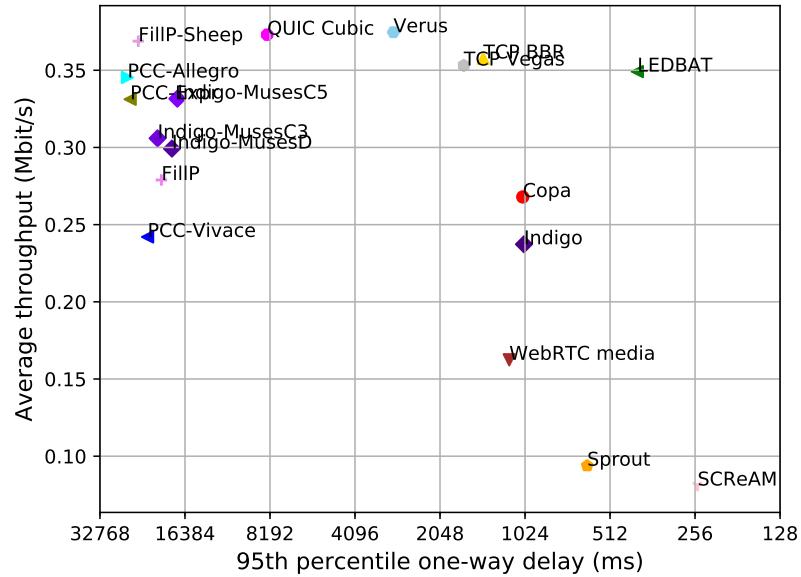
```
Linux 4.15.0-1031-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

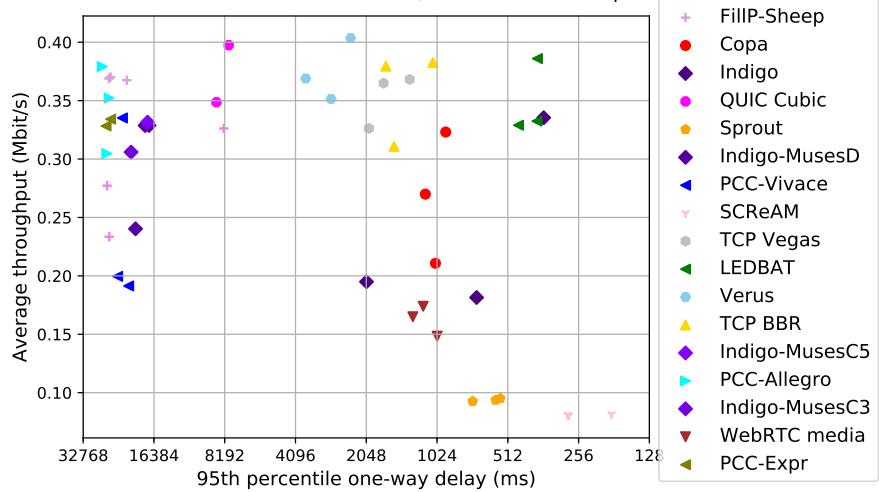
```
branch: muses @ 89d24e57783e7fbfec537a619071de937b639e38
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 1ddcff131048c6962f123bcd22b4d166a422adde
third_party/pantheon-tunnel @ f866d3f58d27af942717625ee3a354cc2e802bd
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
M src/examples/cellsim.cc
M src/examples/sproutbt2.cc
M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
M tools/plot.py
```

third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851

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



test from Colombia cellular to AWS Brazil 2, 3 runs of 30s each per scheme



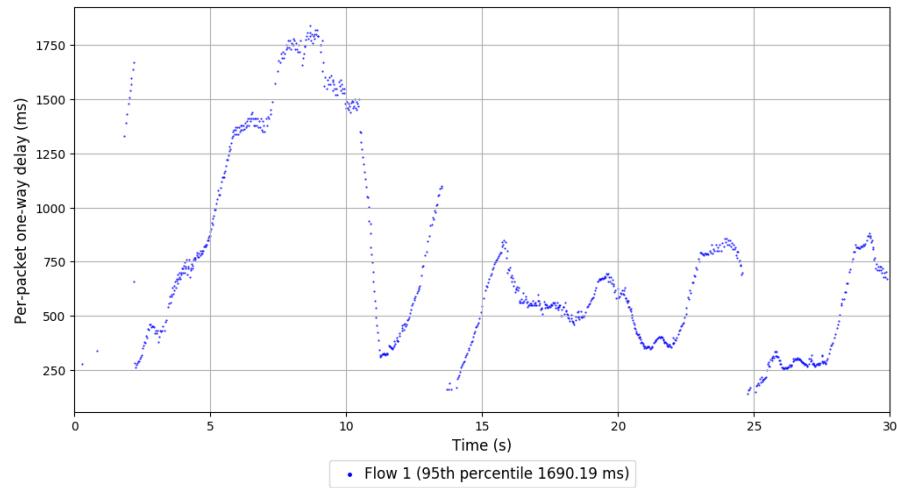
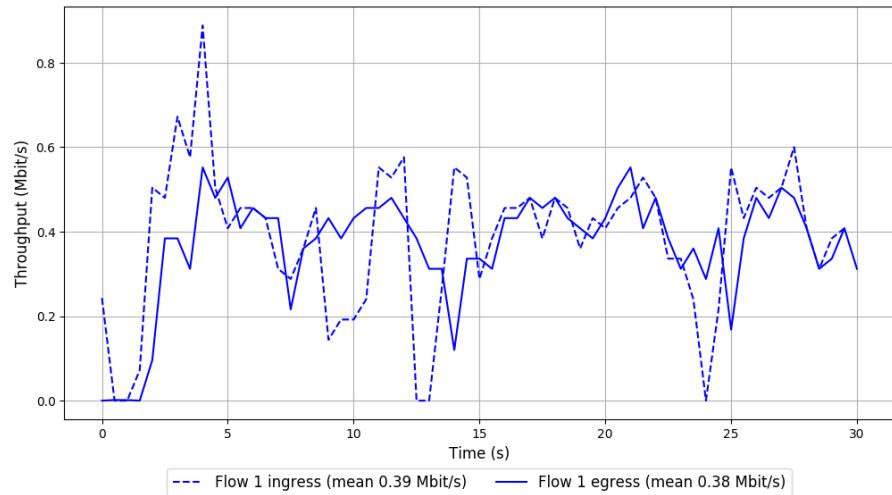
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	0.36	1439.04	2.78
Copa	3	0.27	1043.14	2.33
TCP Cubic	0	N/A	N/A	N/A
FillP	3	0.28	19853.26	59.36
FillP-Sheep	3	0.37	23971.05	41.77
Indigo	3	0.24	1033.04	1.41
Indigo-MusesC3	1	0.31	20489.92	97.20
Indigo-MusesC5	1	0.33	17438.08	65.52
Indigo-MusesD	3	0.30	18224.74	97.29
Indigo-MusesT	0	N/A	N/A	N/A
LEDBAT	3	0.35	409.90	1.24
PCC-Allegro	3	0.34	26183.02	98.91
PCC-Expr	2	0.33	25622.41	94.72
QUIC Cubic	2	0.38	8379.80	32.08
SCReAM	3	0.08	250.89	0.79
Sprout	3	0.09	616.94	1.14
TaoVA-100x	0	N/A	N/A	N/A
TCP Vegas	3	0.35	1687.34	2.47
Verus	3	0.37	2994.58	5.63
PCC-Vivace	3	0.24	22230.34	90.74
WebRTC media	3	0.16	1164.61	0.61

Run 1: Statistics of TCP BBR

```
Start at: 2019-01-21 19:42:25
End at: 2019-01-21 19:42:55
Local clock offset: -3.953 ms
Remote clock offset: 2.63 ms

# Below is generated by plot.py at 2019-01-21 20:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 1690.189 ms
Loss rate: 2.80%
-- Flow 1:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 1690.189 ms
Loss rate: 2.80%
```

Run 1: Report of TCP BBR — Data Link

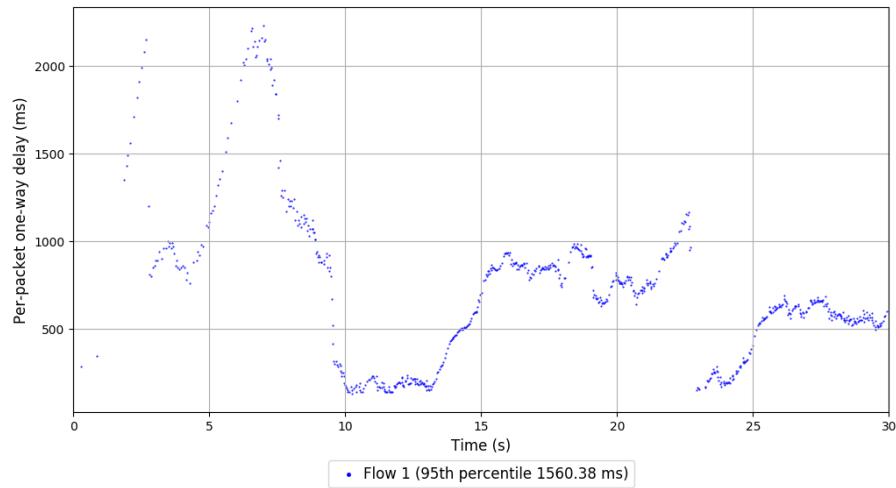
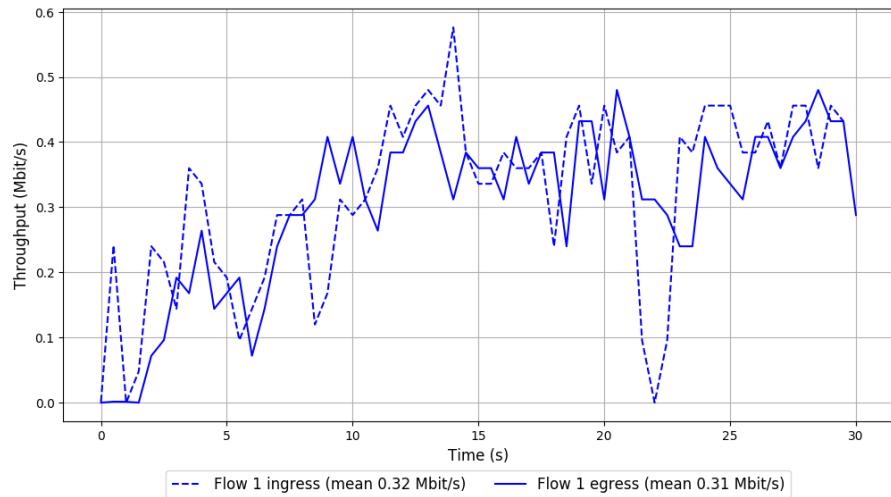


Run 2: Statistics of TCP BBR

```
Start at: 2019-01-21 20:08:17
End at: 2019-01-21 20:08:47
Local clock offset: -2.053 ms
Remote clock offset: 7.516 ms

# Below is generated by plot.py at 2019-01-21 20:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 1560.381 ms
Loss rate: 3.16%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 1560.381 ms
Loss rate: 3.16%
```

Run 2: Report of TCP BBR — Data Link

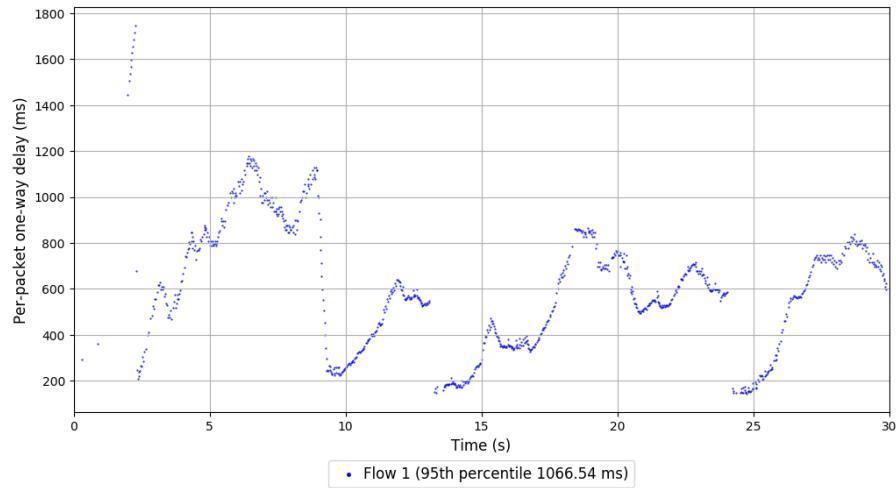
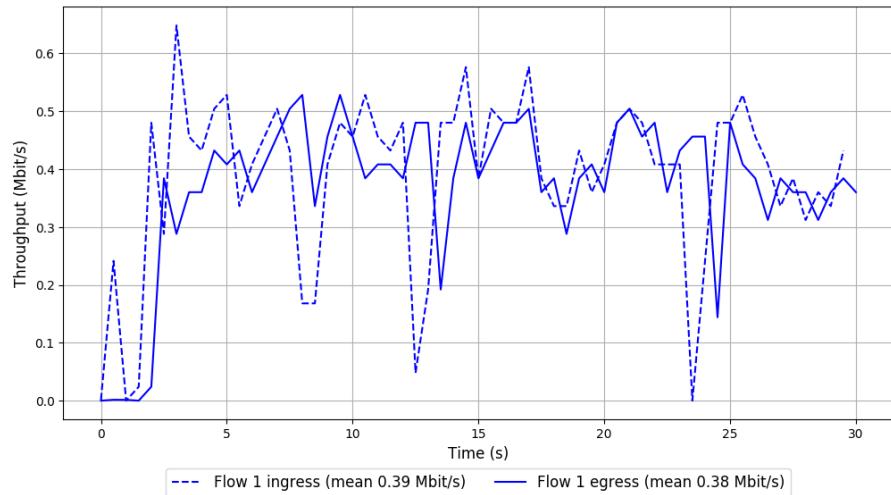


Run 3: Statistics of TCP BBR

```
Start at: 2019-01-21 20:34:09
End at: 2019-01-21 20:34:39
Local clock offset: -6.553 ms
Remote clock offset: 3.515 ms

# Below is generated by plot.py at 2019-01-21 20:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 1066.539 ms
Loss rate: 2.38%
-- Flow 1:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 1066.539 ms
Loss rate: 2.38%
```

Run 3: Report of TCP BBR — Data Link

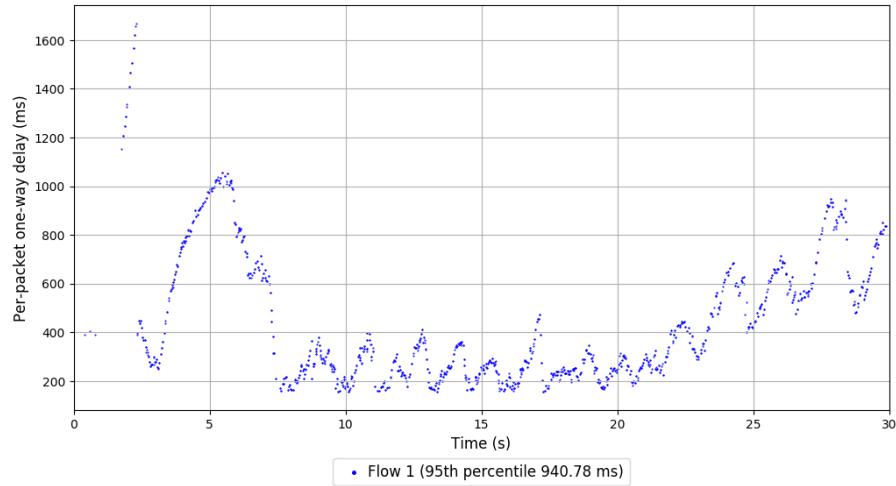
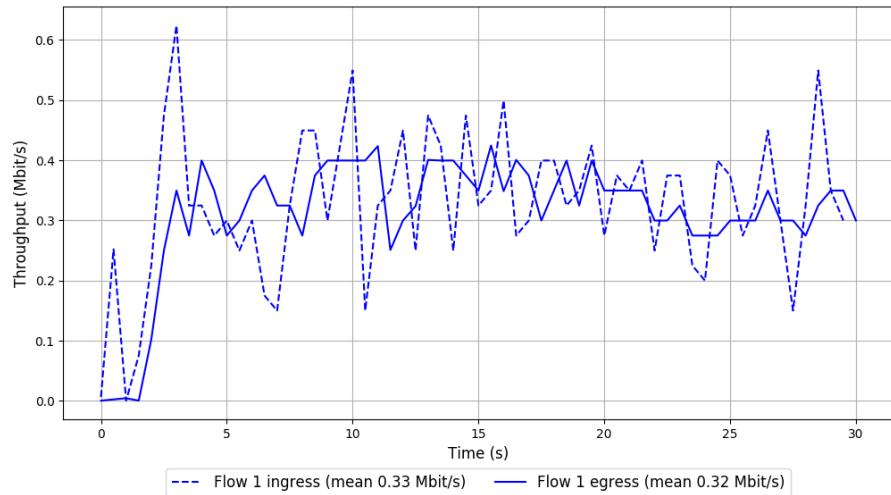


Run 1: Statistics of Copa

```
Start at: 2019-01-21 19:23:46
End at: 2019-01-21 19:24:16
Local clock offset: -3.66 ms
Remote clock offset: 2.734 ms

# Below is generated by plot.py at 2019-01-21 20:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 940.784 ms
Loss rate: 3.05%
-- Flow 1:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 940.784 ms
Loss rate: 3.05%
```

Run 1: Report of Copa — Data Link

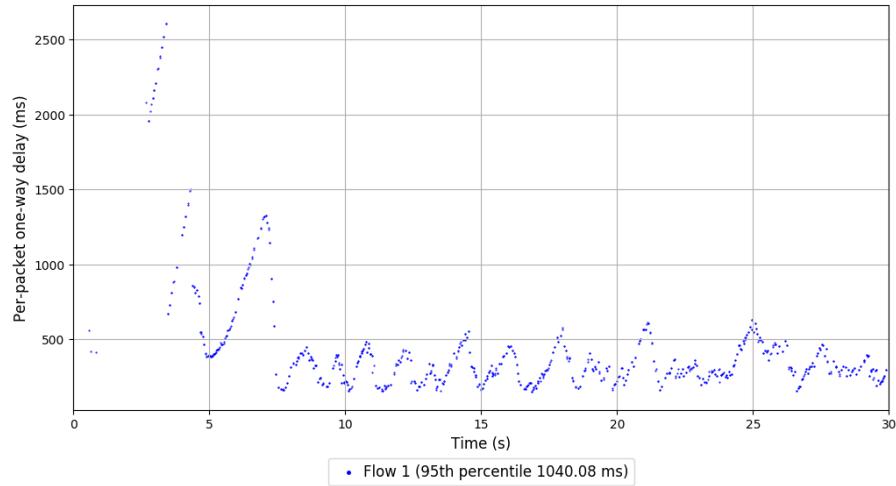
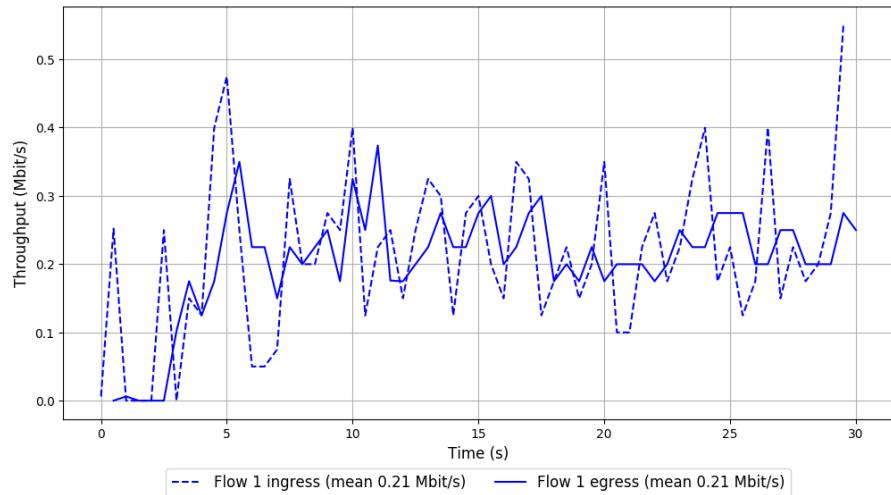


Run 2: Statistics of Copa

```
Start at: 2019-01-21 19:49:40
End at: 2019-01-21 19:50:10
Local clock offset: -3.617 ms
Remote clock offset: 2.403 ms

# Below is generated by plot.py at 2019-01-21 20:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 1040.079 ms
Loss rate: 3.32%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 1040.079 ms
Loss rate: 3.32%
```

Run 2: Report of Copa — Data Link

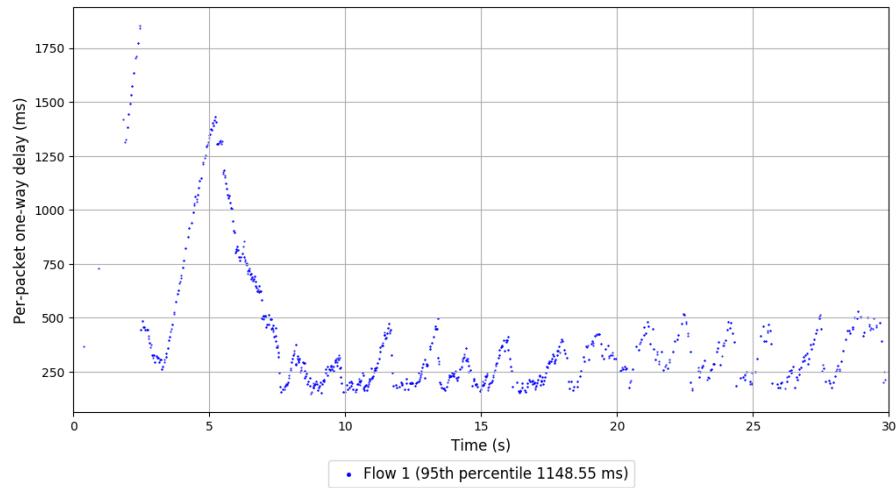
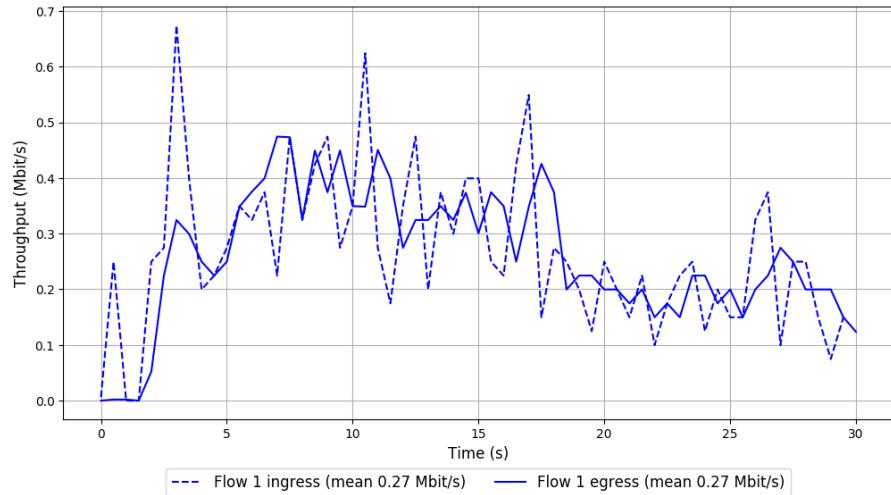


Run 3: Statistics of Copa

```
Start at: 2019-01-21 20:15:30
End at: 2019-01-21 20:16:00
Local clock offset: -2.738 ms
Remote clock offset: 8.784 ms

# Below is generated by plot.py at 2019-01-21 20:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 1148.552 ms
Loss rate: 0.63%
-- Flow 1:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 1148.552 ms
Loss rate: 0.63%
```

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/cubic_s

Run 1: Report of TCP Cubic — Data Link

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Run 2: Statistics of TCP Cubic

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/cubic_s

Run 2: Report of TCP Cubic — Data Link

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Run 3: Statistics of TCP Cubic

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/cubic_s

Run 3: Report of TCP Cubic — Data Link

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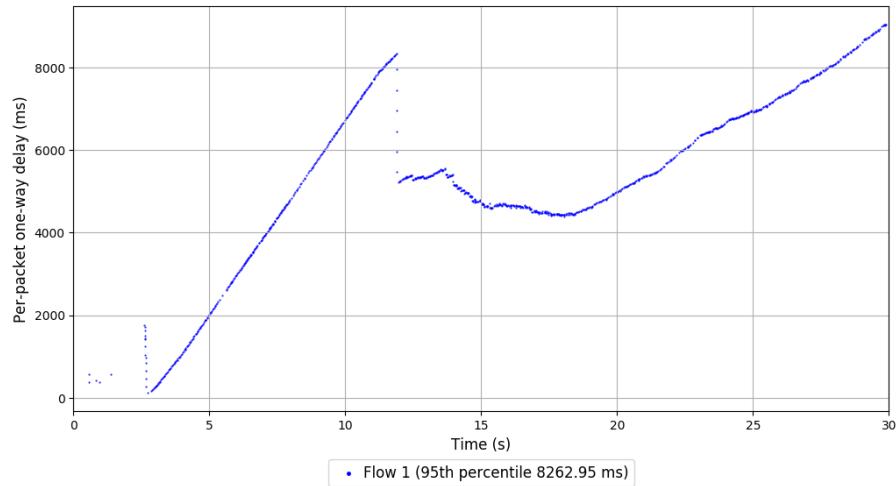
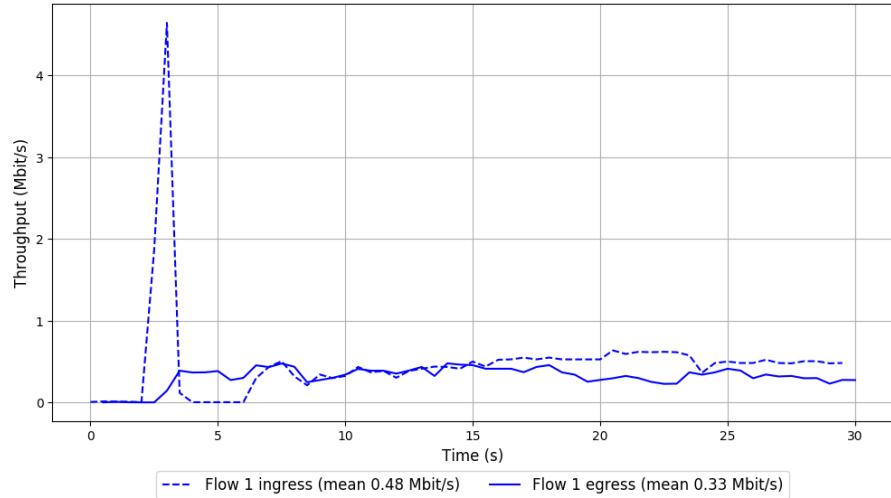
Figure is missing

```
Run 1: Statistics of FillP
```

```
Start at: 2019-01-21 19:19:58
End at: 2019-01-21 19:20:28
Local clock offset: -3.597 ms
Remote clock offset: 7.668 ms

# Below is generated by plot.py at 2019-01-21 20:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 8262.949 ms
Loss rate: 33.35%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 8262.949 ms
Loss rate: 33.35%
```

Run 1: Report of FillP — Data Link

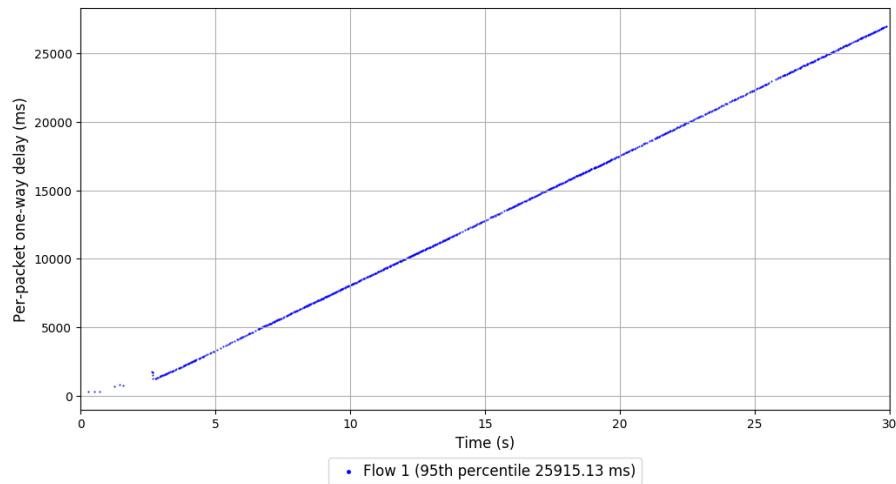
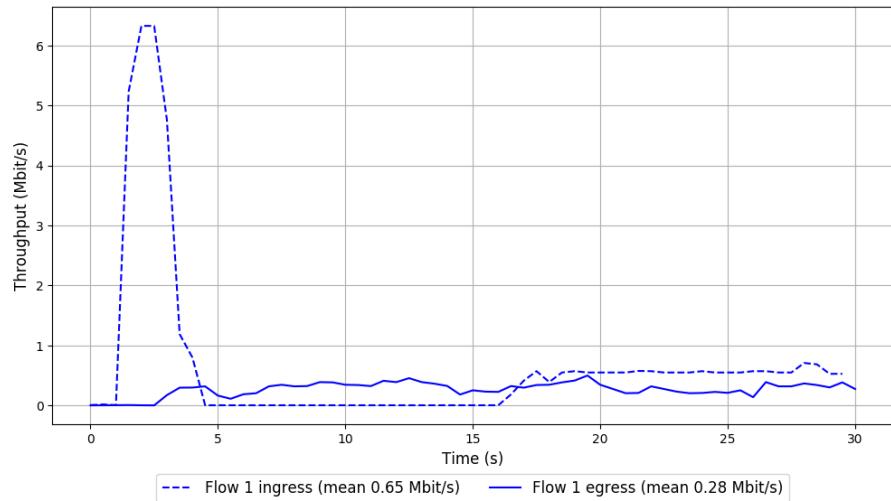


Run 2: Statistics of FillP

```
Start at: 2019-01-21 19:45:50
End at: 2019-01-21 19:46:20
Local clock offset: -3.996 ms
Remote clock offset: 7.913 ms

# Below is generated by plot.py at 2019-01-21 20:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 25915.127 ms
Loss rate: 58.24%
-- Flow 1:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 25915.127 ms
Loss rate: 58.24%
```

Run 2: Report of FillP — Data Link

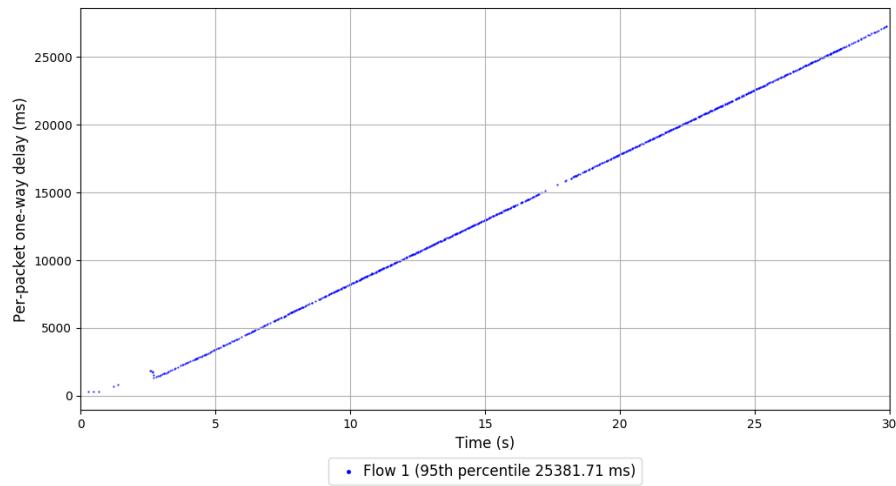
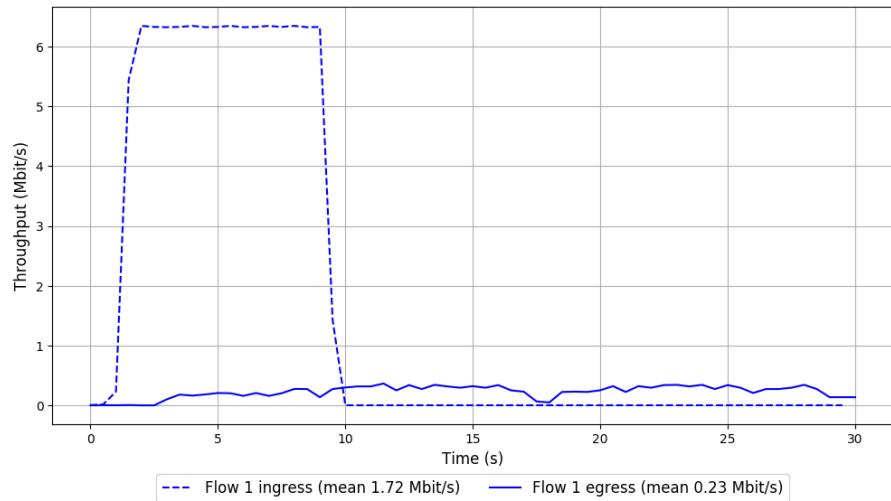


```
Run 3: Statistics of FillP
```

```
Start at: 2019-01-21 20:11:42
End at: 2019-01-21 20:12:12
Local clock offset: -2.76 ms
Remote clock offset: 8.57 ms

# Below is generated by plot.py at 2019-01-21 20:36:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 25381.710 ms
Loss rate: 86.48%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 25381.710 ms
Loss rate: 86.48%
```

Run 3: Report of FillP — Data Link

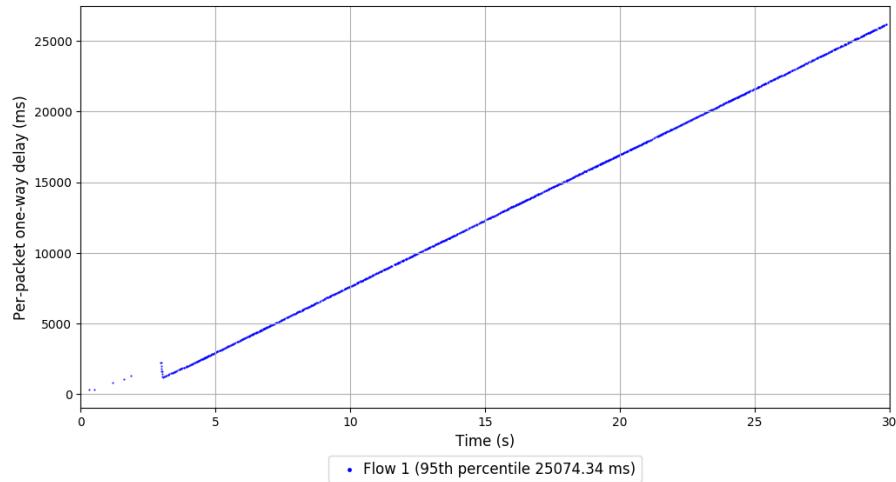
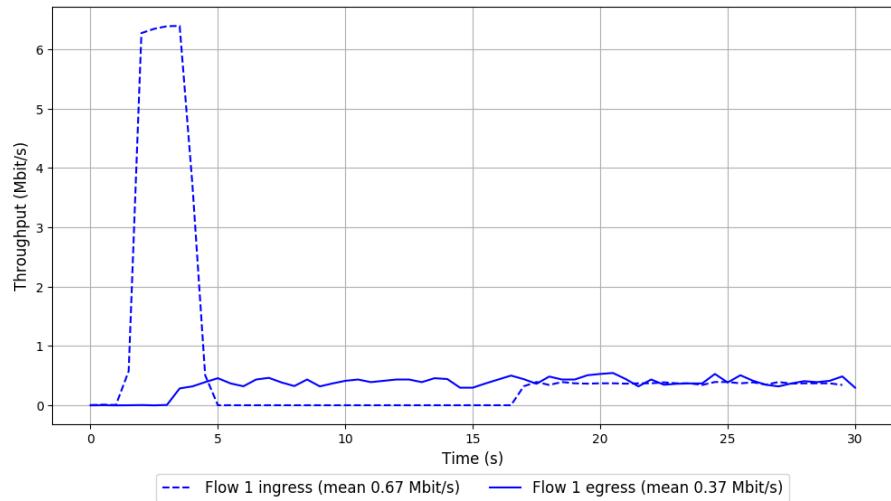


```
Run 1: Statistics of FillP-Sheep
```

```
Start at: 2019-01-21 19:41:18
End at: 2019-01-21 19:41:48
Local clock offset: -3.958 ms
Remote clock offset: 5.302 ms

# Below is generated by plot.py at 2019-01-21 20:36:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 25074.340 ms
Loss rate: 45.17%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 25074.340 ms
Loss rate: 45.17%
```

Run 1: Report of FillP-Sheep — Data Link

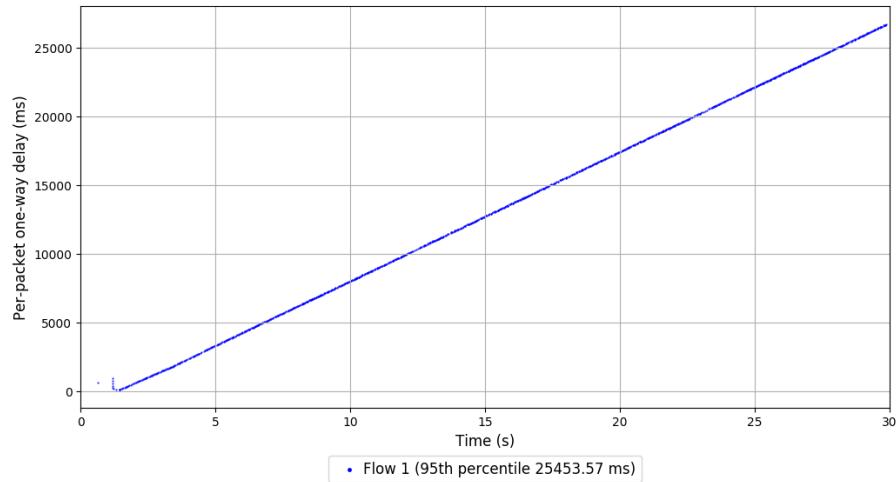
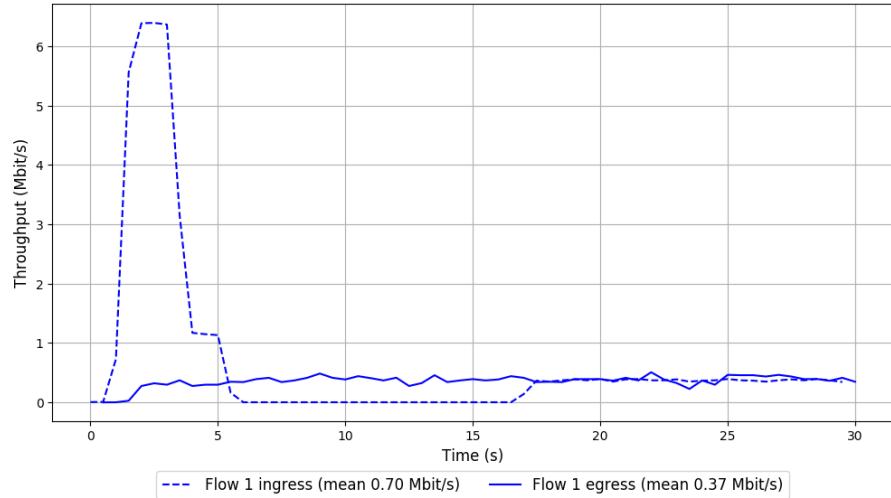


Run 2: Statistics of FillP-Sheep

```
Start at: 2019-01-21 20:07:09
End at: 2019-01-21 20:07:39
Local clock offset: -2.146 ms
Remote clock offset: 7.254 ms

# Below is generated by plot.py at 2019-01-21 20:36:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 25453.566 ms
Loss rate: 48.29%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 25453.566 ms
Loss rate: 48.29%
```

Run 2: Report of FillP-Sheep — Data Link

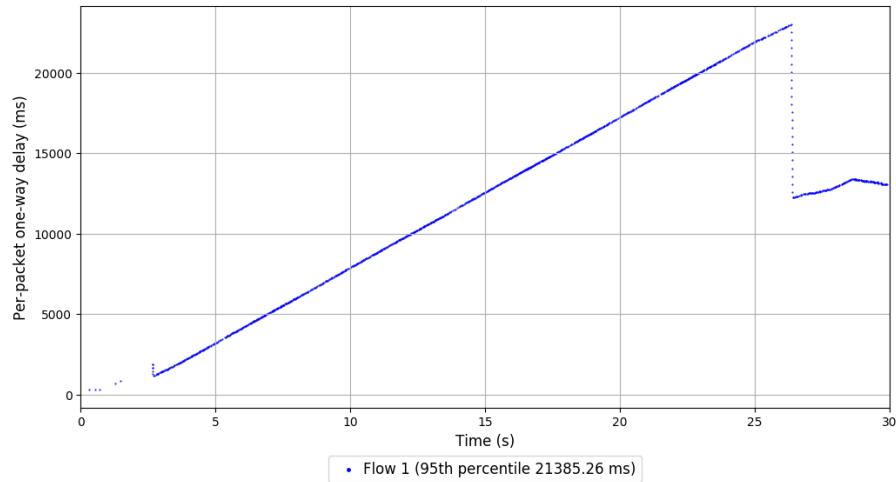
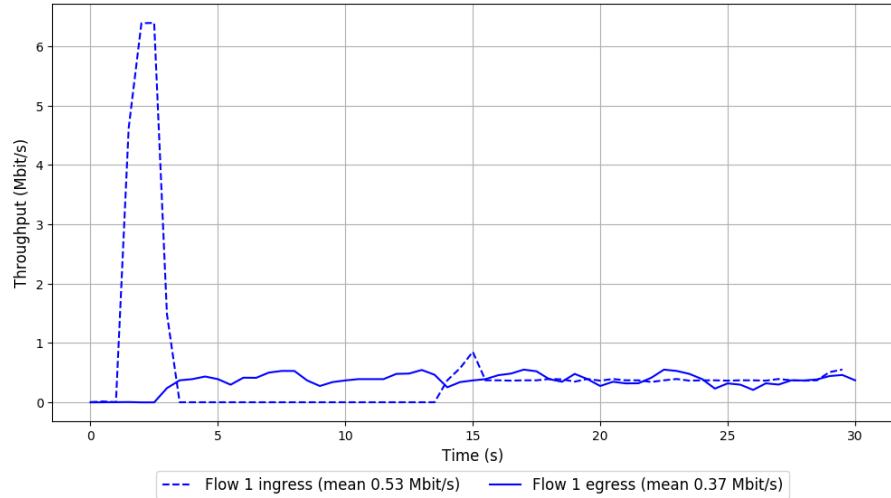


Run 3: Statistics of FillP-Sheep

```
Start at: 2019-01-21 20:33:01
End at: 2019-01-21 20:33:31
Local clock offset: -6.377 ms
Remote clock offset: 3.55 ms

# Below is generated by plot.py at 2019-01-21 20:36:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 21385.256 ms
Loss rate: 31.86%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 21385.256 ms
Loss rate: 31.86%
```

Run 3: Report of FillP-Sheep — Data Link

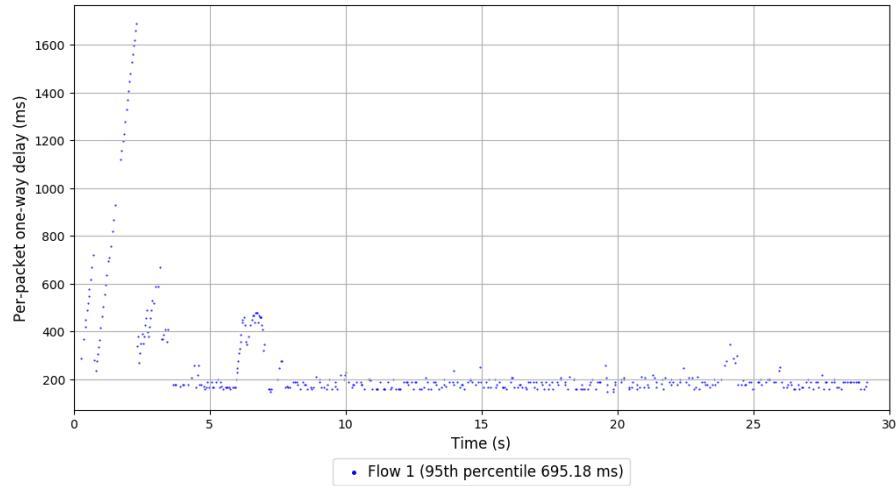
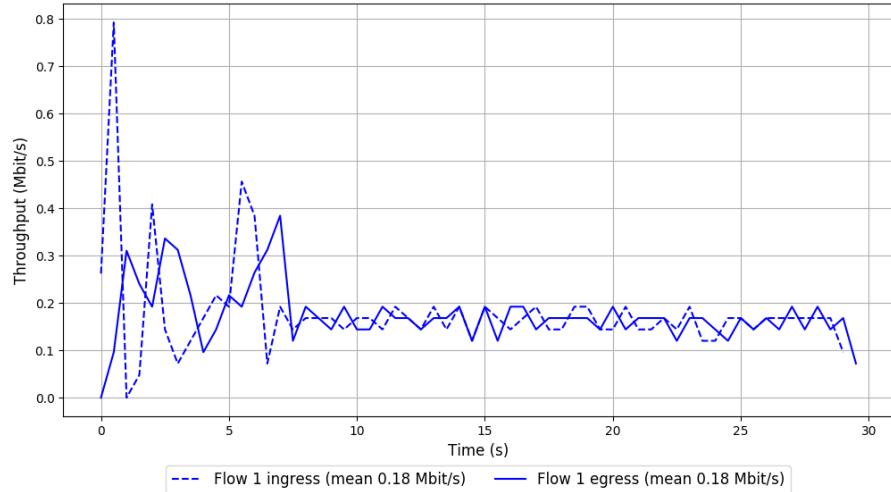


Run 1: Statistics of Indigo

```
Start at: 2019-01-21 19:40:09
End at: 2019-01-21 19:40:39
Local clock offset: -3.193 ms
Remote clock offset: 6.391 ms

# Below is generated by plot.py at 2019-01-21 20:36:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 695.182 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 695.182 ms
Loss rate: 0.91%
```

Run 1: Report of Indigo — Data Link

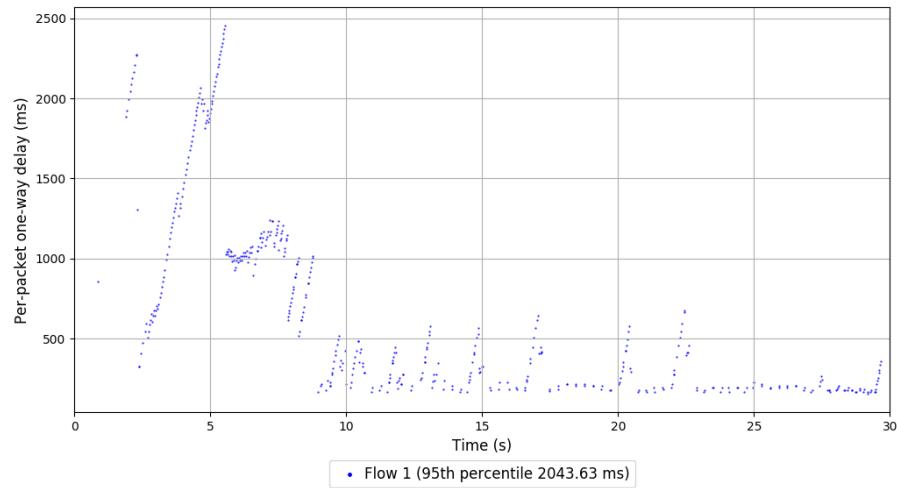
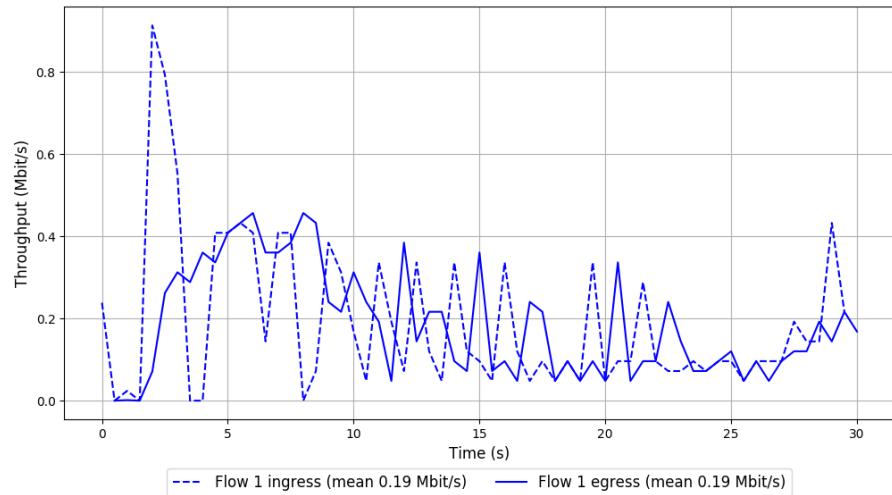


Run 2: Statistics of Indigo

```
Start at: 2019-01-21 20:06:01
End at: 2019-01-21 20:06:31
Local clock offset: -2.182 ms
Remote clock offset: 3.595 ms

# Below is generated by plot.py at 2019-01-21 20:36:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 2043.634 ms
Loss rate: 2.70%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 2043.634 ms
Loss rate: 2.70%
```

Run 2: Report of Indigo — Data Link

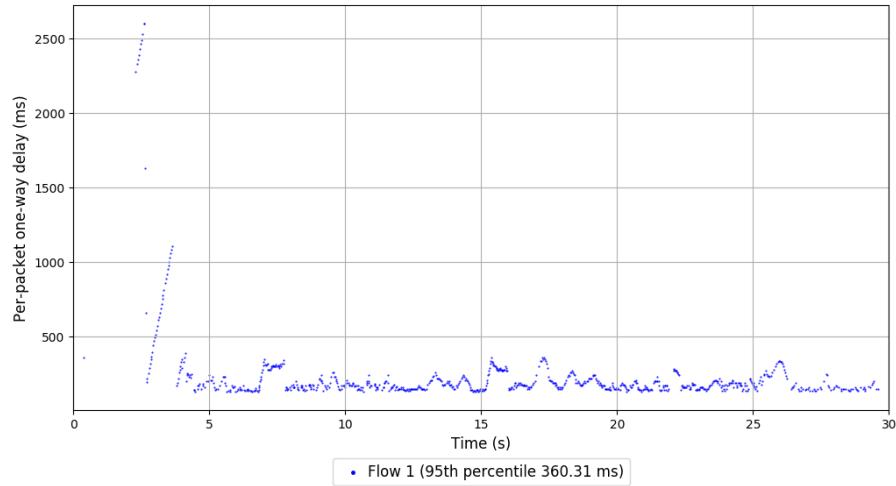
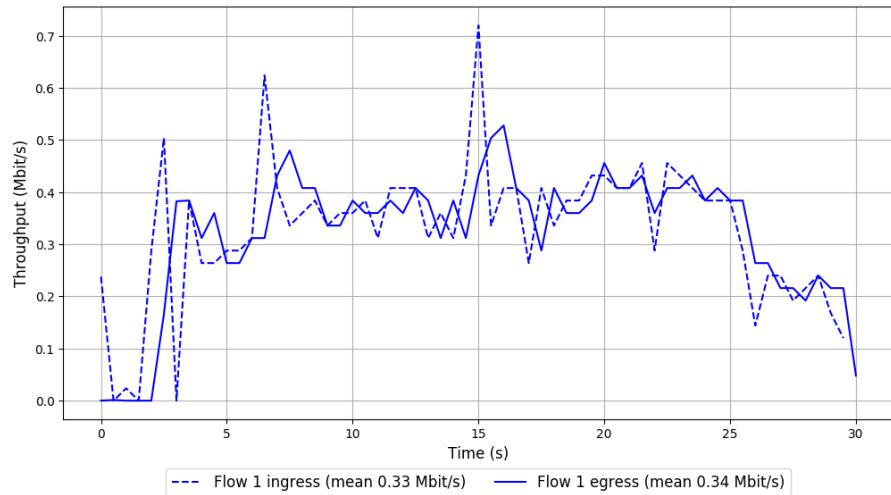


Run 3: Statistics of Indigo

```
Start at: 2019-01-21 20:31:53
End at: 2019-01-21 20:32:23
Local clock offset: -6.249 ms
Remote clock offset: 7.317 ms

# Below is generated by plot.py at 2019-01-21 20:36:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 360.310 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 360.310 ms
Loss rate: 0.61%
```

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-MusesC3

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo_

Run 1: Report of Indigo-MusesC3 — Data Link

Figure is missing

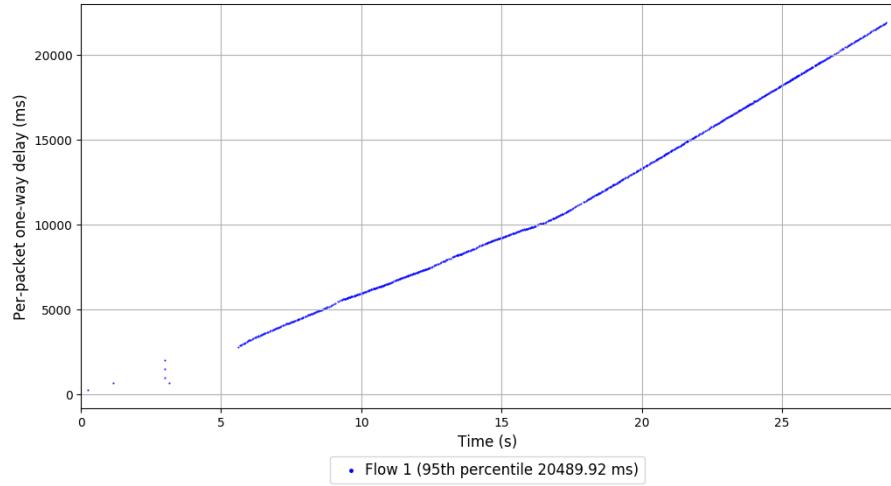
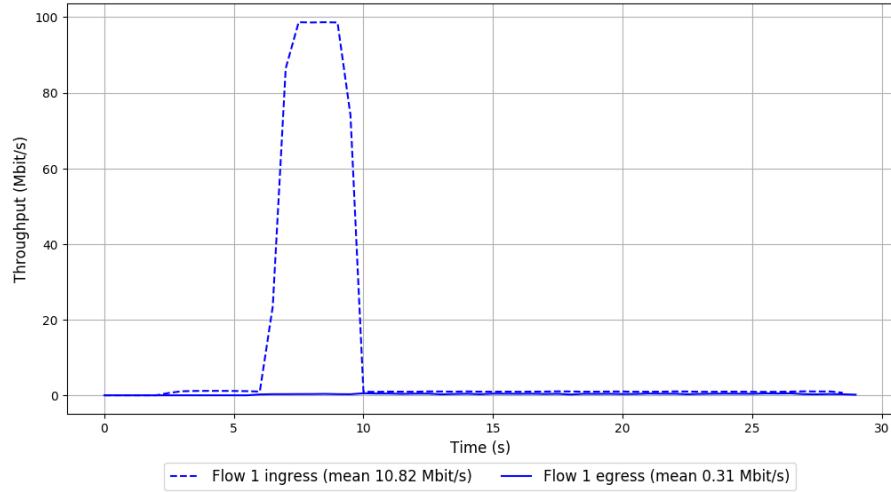
Figure is missing

Run 2: Statistics of Indigo-MusesC3

```
Start at: 2019-01-21 19:57:19
End at: 2019-01-21 19:57:49
Local clock offset: -2.356 ms
Remote clock offset: 3.195 ms

# Below is generated by plot.py at 2019-01-21 20:36:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 20489.922 ms
Loss rate: 97.20%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 20489.922 ms
Loss rate: 97.20%
```

Run 2: Report of Indigo-MusesC3 — Data Link



Run 3: Statistics of Indigo-MusesC3

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo_

Run 3: Report of Indigo-MusesC3 — Data Link

Figure is missing

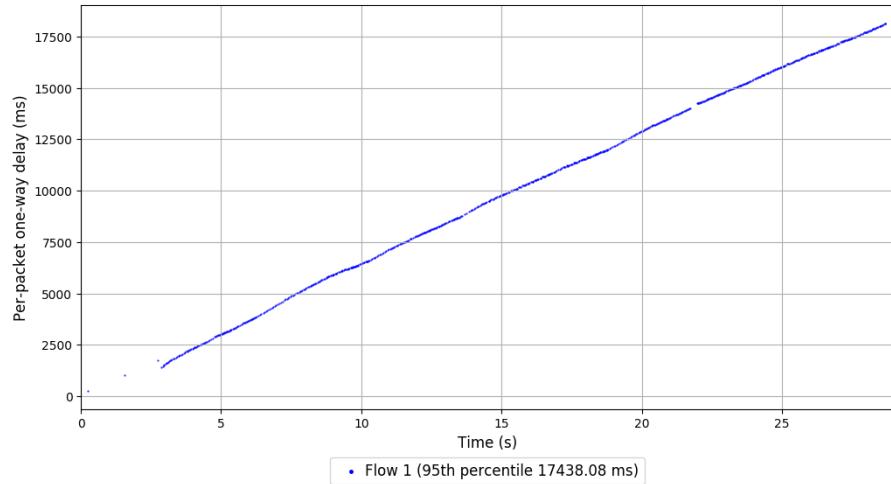
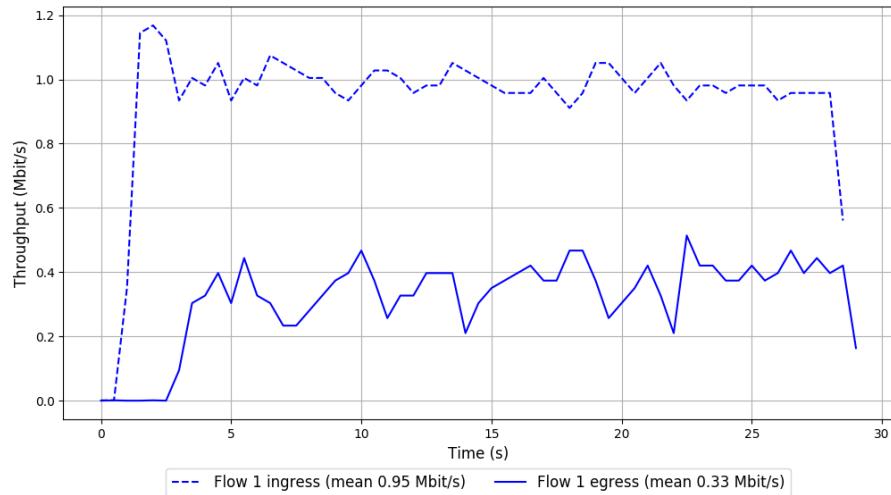
Figure is missing

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

```
Start at: 2019-01-21 19:21:06
End at: 2019-01-21 19:21:36
Local clock offset: -2.832 ms
Remote clock offset: 2.818 ms

# Below is generated by plot.py at 2019-01-21 20:36:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 17438.084 ms
Loss rate: 65.52%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 17438.084 ms
Loss rate: 65.52%
```

Run 1: Report of Indigo-MusesC5 — Data Link



Run 2: Statistics of Indigo-MusesC5

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo_

Run 2: Report of Indigo-MusesC5 — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Indigo-MusesC5

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo_

Run 3: Report of Indigo-MusesC5 — Data Link

Figure is missing

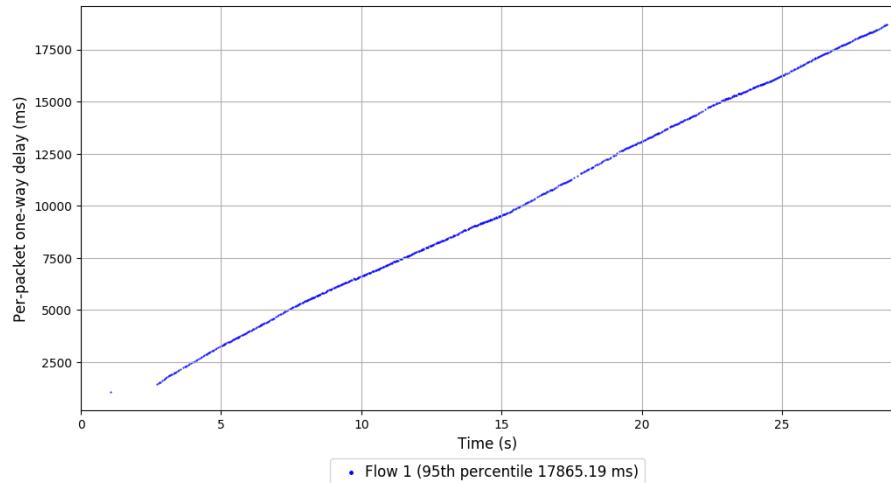
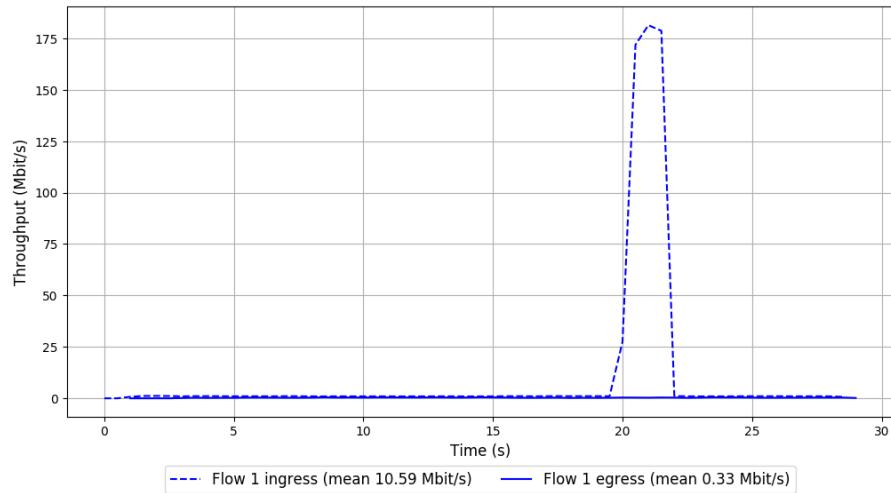
Figure is missing

Run 1: Statistics of Indigo-MusesD

```
Start at: 2019-01-21 19:24:54
End at: 2019-01-21 19:25:24
Local clock offset: -3.695 ms
Remote clock offset: 7.621 ms

# Below is generated by plot.py at 2019-01-21 20:36:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 17865.188 ms
Loss rate: 97.02%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 17865.188 ms
Loss rate: 97.02%
```

Run 1: Report of Indigo-MusesD — Data Link

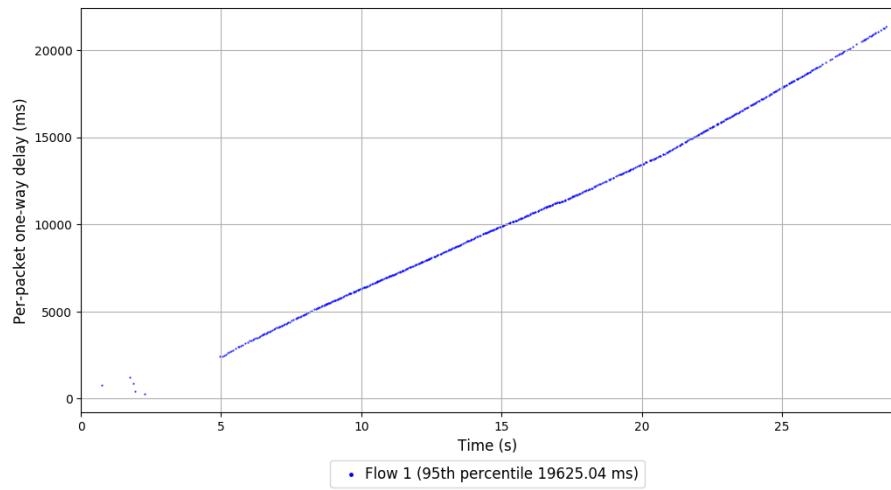
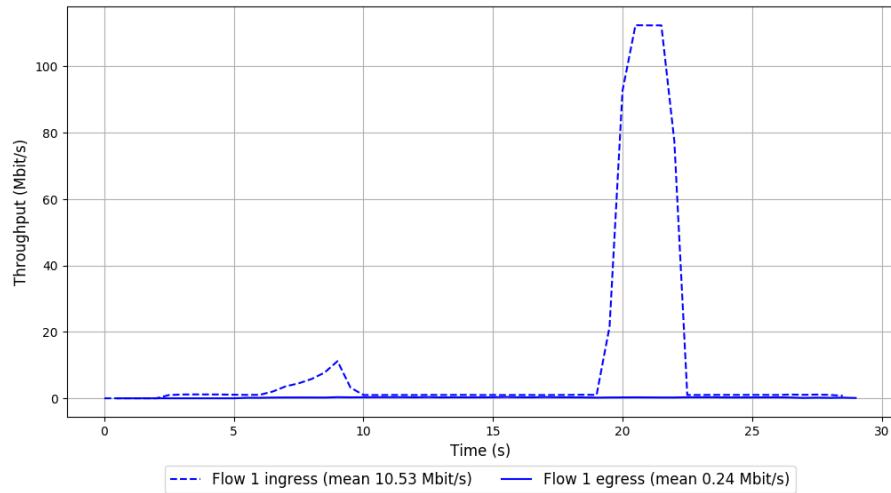


Run 2: Statistics of Indigo-MusesD

```
Start at: 2019-01-21 19:50:49
End at: 2019-01-21 19:51:19
Local clock offset: -2.77 ms
Remote clock offset: 2.424 ms

# Below is generated by plot.py at 2019-01-21 20:36:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 19625.039 ms
Loss rate: 97.79%
-- Flow 1:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 19625.039 ms
Loss rate: 97.79%
```

Run 2: Report of Indigo-MusesD — Data Link

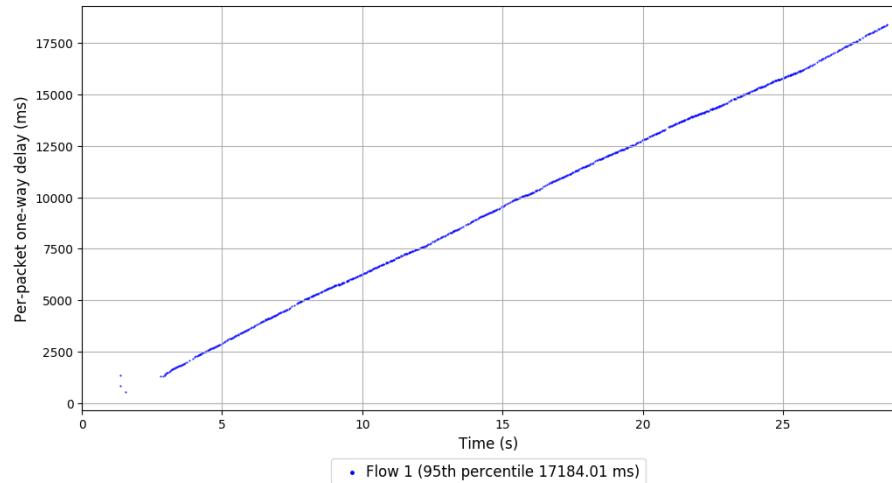
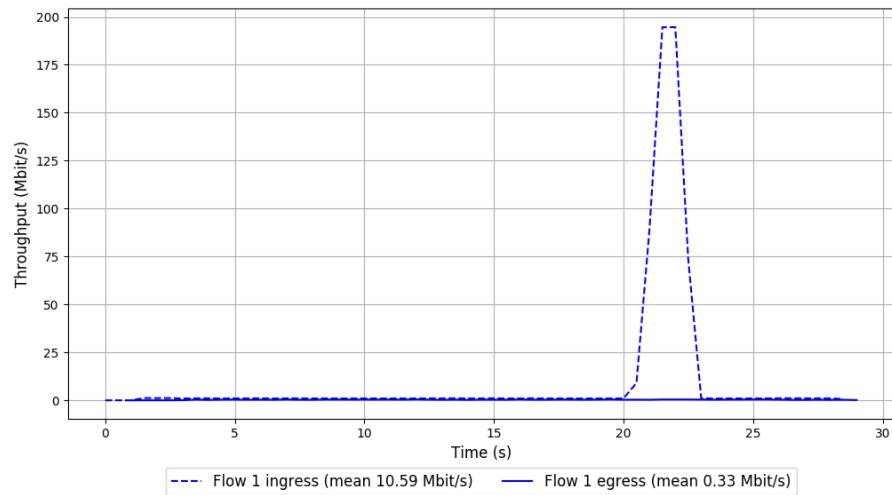


Run 3: Statistics of Indigo-MusesD

```
Start at: 2019-01-21 20:16:39
End at: 2019-01-21 20:17:09
Local clock offset: -2.104 ms
Remote clock offset: 3.888 ms

# Below is generated by plot.py at 2019-01-21 20:36:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 17184.005 ms
Loss rate: 97.05%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 17184.005 ms
Loss rate: 97.05%
```

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MusesT

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo_

Run 1: Report of Indigo-MusesT — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of Indigo-MusesT

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo_

Run 2: Report of Indigo-MusesT — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Indigo-MusesT

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/indigo_

Run 3: Report of Indigo-MusesT — Data Link

Figure is missing

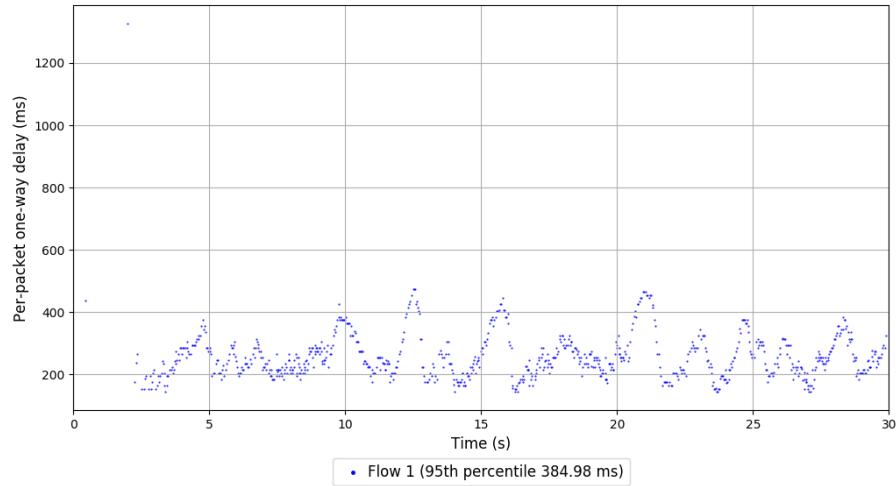
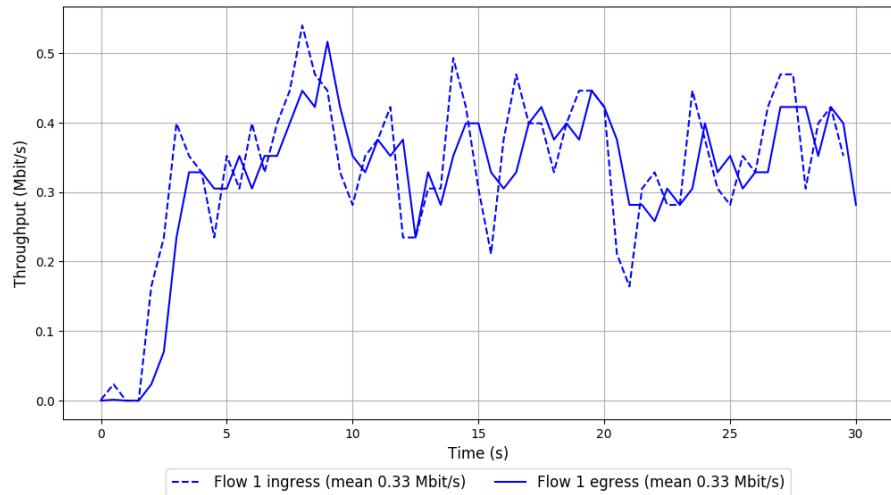
Figure is missing

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

```
Start at: 2019-01-21 19:39:01
End at: 2019-01-21 19:39:31
Local clock offset: -3.159 ms
Remote clock offset: 2.395 ms

# Below is generated by plot.py at 2019-01-21 20:36:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 384.978 ms
Loss rate: 1.42%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 384.978 ms
Loss rate: 1.42%
```

Run 1: Report of LEDBAT — Data Link

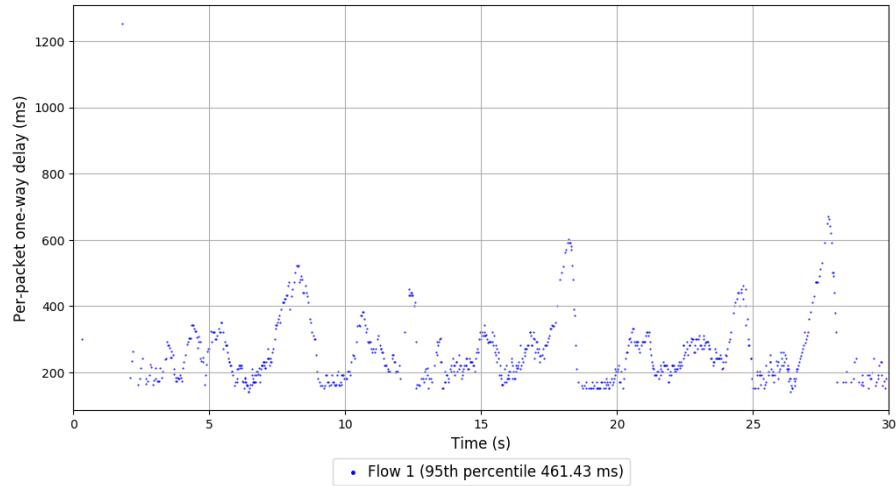
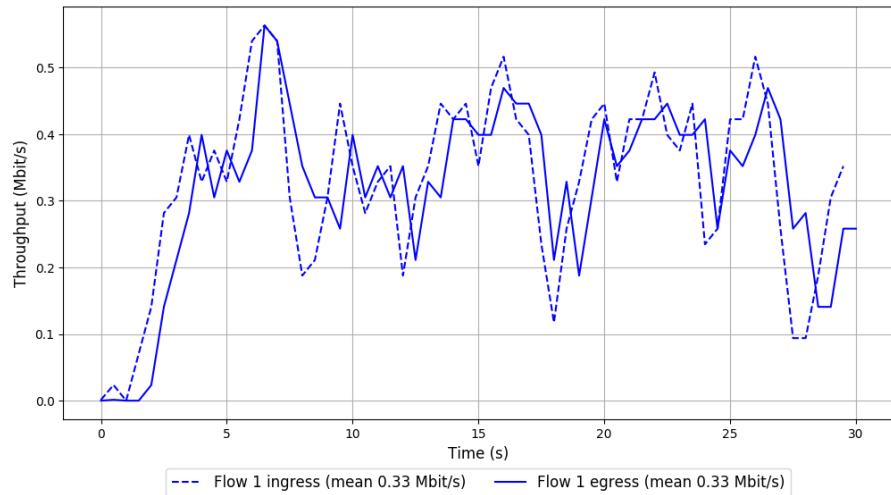


Run 2: Statistics of LEDBAT

```
Start at: 2019-01-21 20:04:53
End at: 2019-01-21 20:05:23
Local clock offset: -2.891 ms
Remote clock offset: 3.339 ms

# Below is generated by plot.py at 2019-01-21 20:36:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 461.429 ms
Loss rate: 1.07%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 461.429 ms
Loss rate: 1.07%
```

Run 2: Report of LEDBAT — Data Link

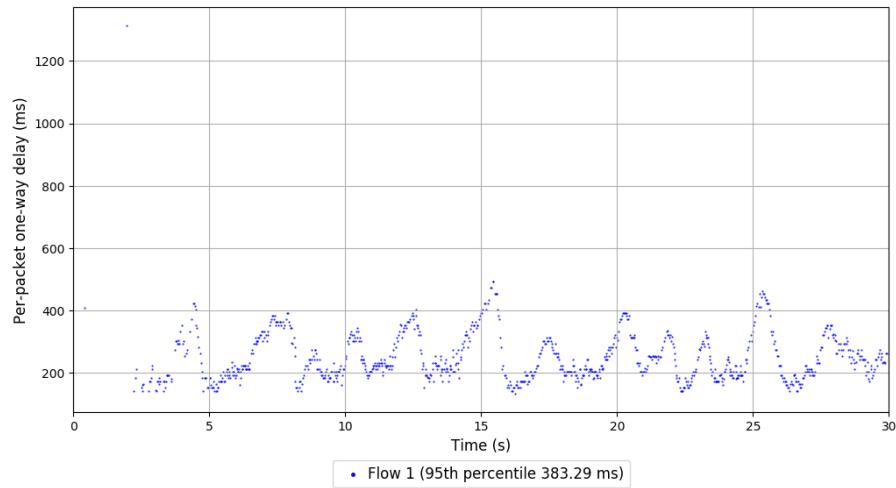
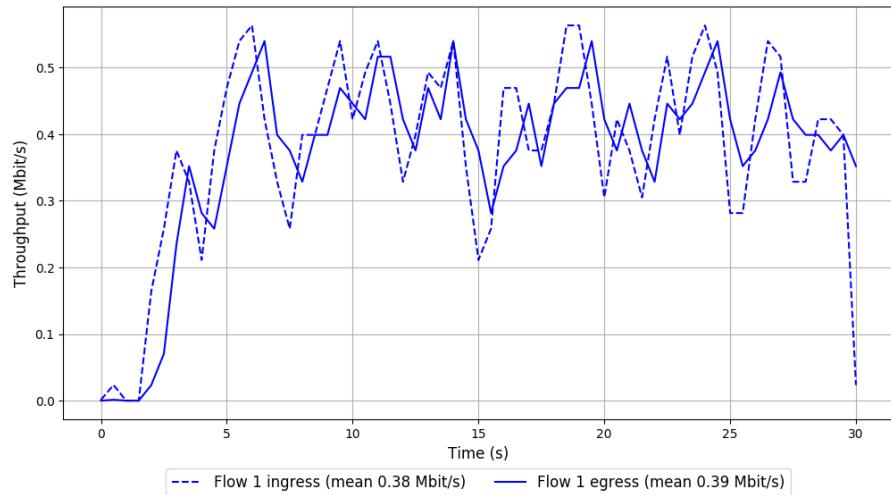


```
Run 3: Statistics of LEDBAT
```

```
Start at: 2019-01-21 20:30:44
End at: 2019-01-21 20:31:14
Local clock offset: -6.07 ms
Remote clock offset: 6.191 ms

# Below is generated by plot.py at 2019-01-21 20:36:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 383.290 ms
Loss rate: 1.22%
-- Flow 1:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 383.290 ms
Loss rate: 1.22%
```

Run 3: Report of LEDBAT — Data Link

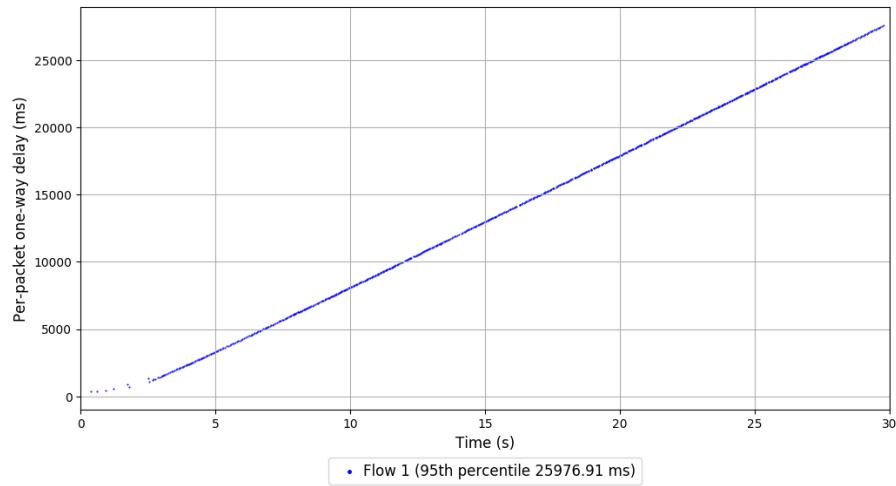
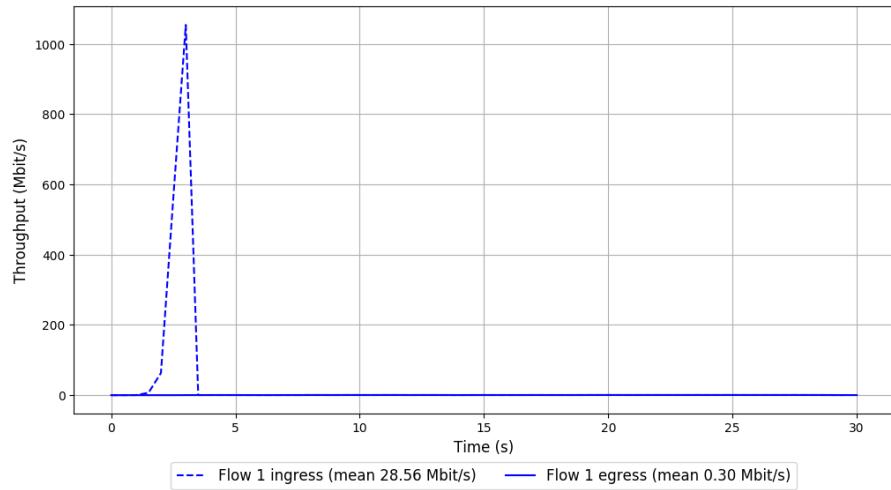


Run 1: Statistics of PCC-Allegro

```
Start at: 2019-01-21 19:32:55
End at: 2019-01-21 19:33:25
Local clock offset: -3.832 ms
Remote clock offset: 7.505 ms

# Below is generated by plot.py at 2019-01-21 20:36:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 25976.907 ms
Loss rate: 98.95%
-- Flow 1:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 25976.907 ms
Loss rate: 98.95%
```

Run 1: Report of PCC-Allegro — Data Link

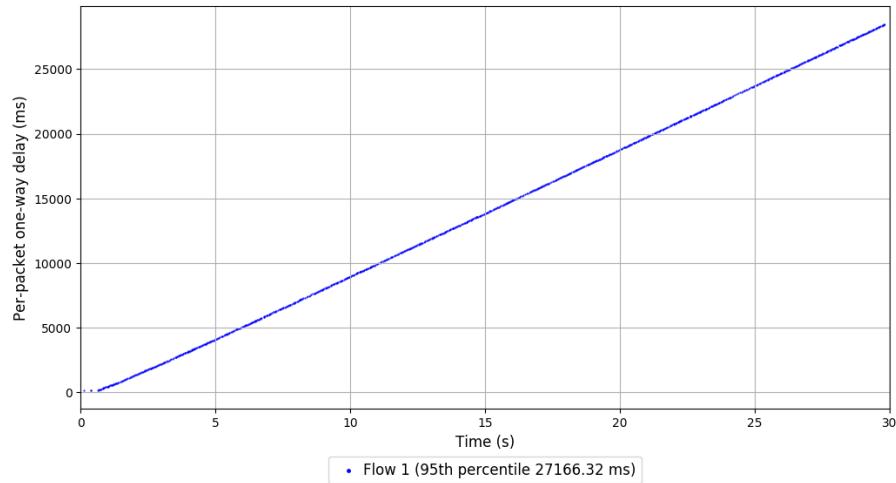
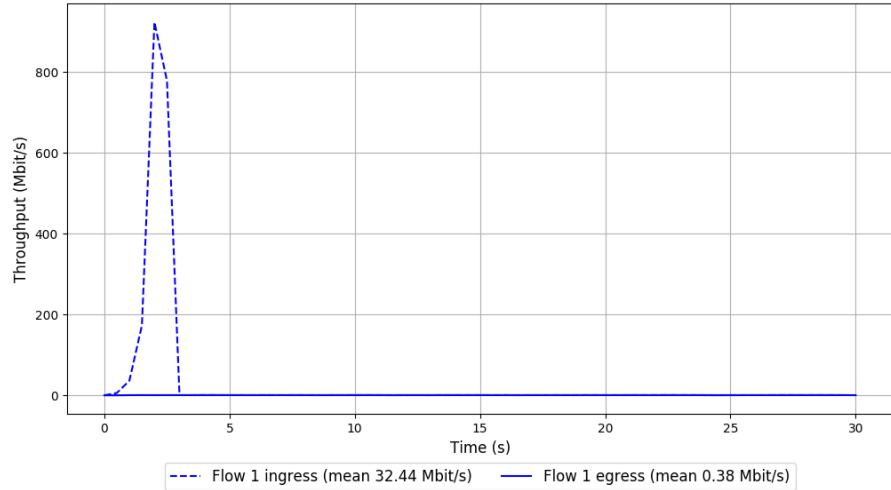


Run 2: Statistics of PCC-Allegro

```
Start at: 2019-01-21 19:58:48
End at: 2019-01-21 19:59:18
Local clock offset: -2.386 ms
Remote clock offset: 3.13 ms

# Below is generated by plot.py at 2019-01-21 20:36:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 27166.318 ms
Loss rate: 98.84%
-- Flow 1:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 27166.318 ms
Loss rate: 98.84%
```

Run 2: Report of PCC-Allegro — Data Link

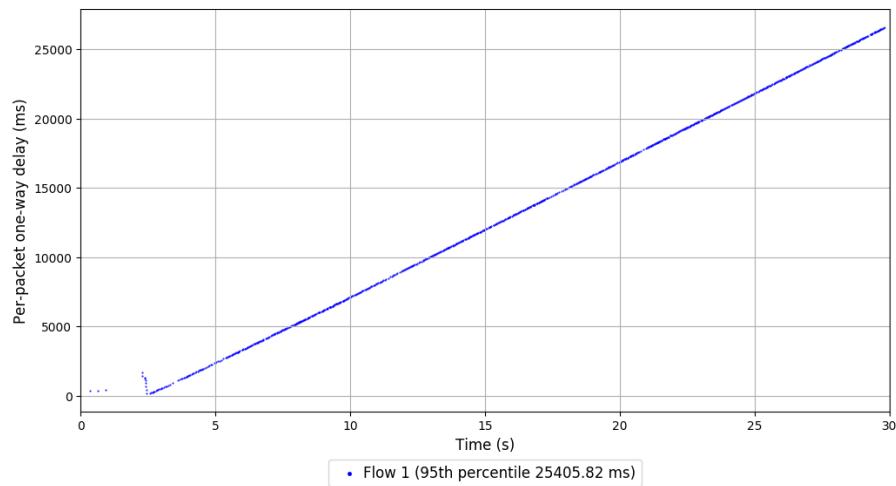
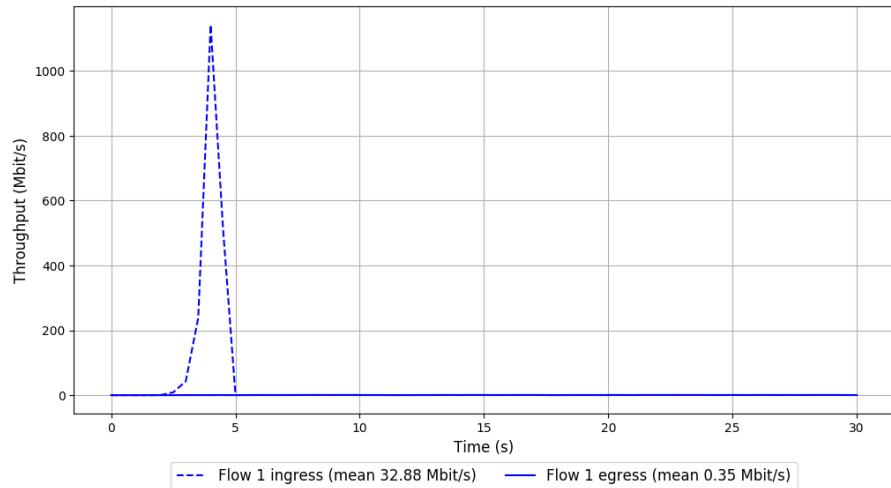


Run 3: Statistics of PCC-Allegro

```
Start at: 2019-01-21 20:24:39
End at: 2019-01-21 20:25:09
Local clock offset: -5.048 ms
Remote clock offset: 4.154 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 25405.821 ms
Loss rate: 98.94%
-- Flow 1:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 25405.821 ms
Loss rate: 98.94%
```

Run 3: Report of PCC-Allegro — Data Link

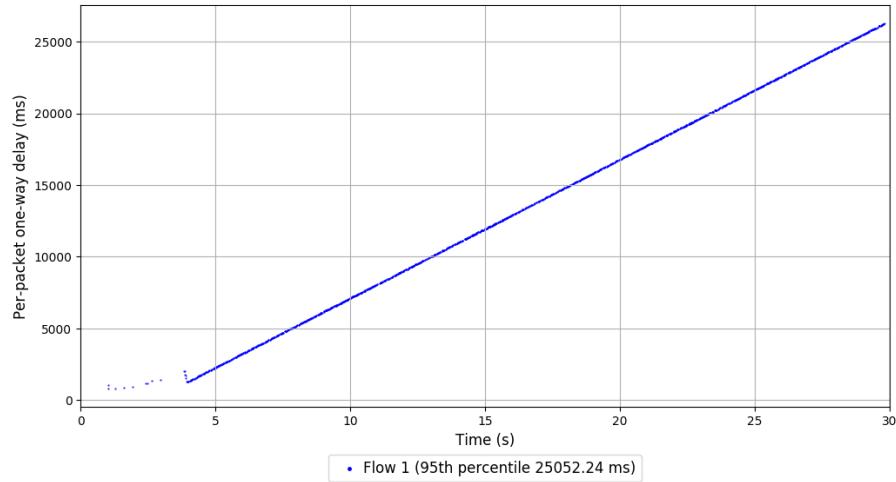
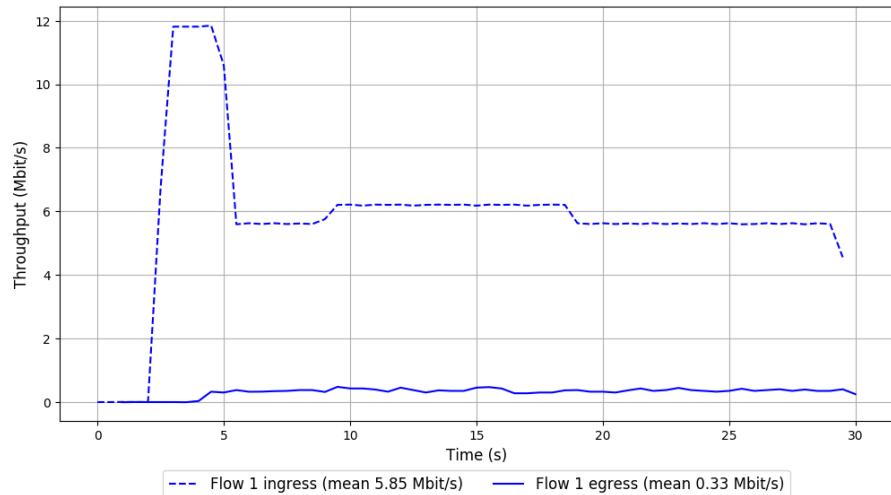


```
Run 1: Statistics of PCC-Expr
```

```
Start at: 2019-01-21 19:30:15
End at: 2019-01-21 19:30:45
Local clock offset: -3.795 ms
Remote clock offset: 5.39 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 25052.236 ms
Loss rate: 94.51%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 25052.236 ms
Loss rate: 94.51%
```

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

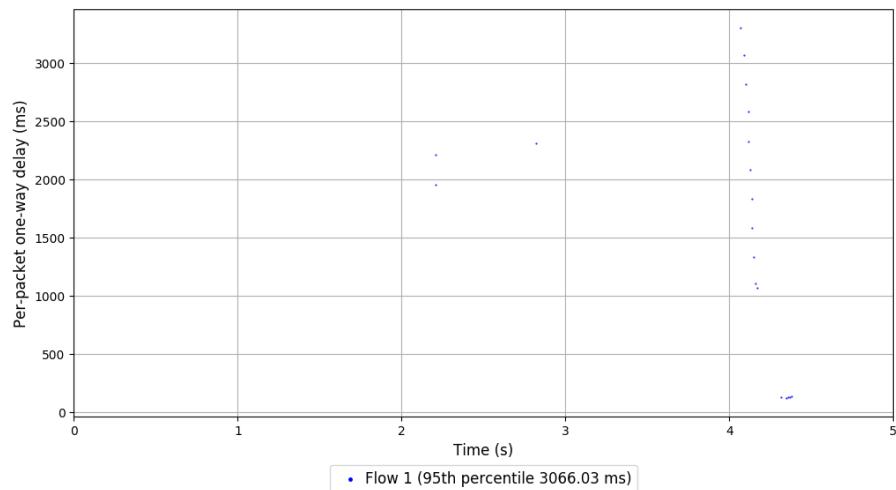
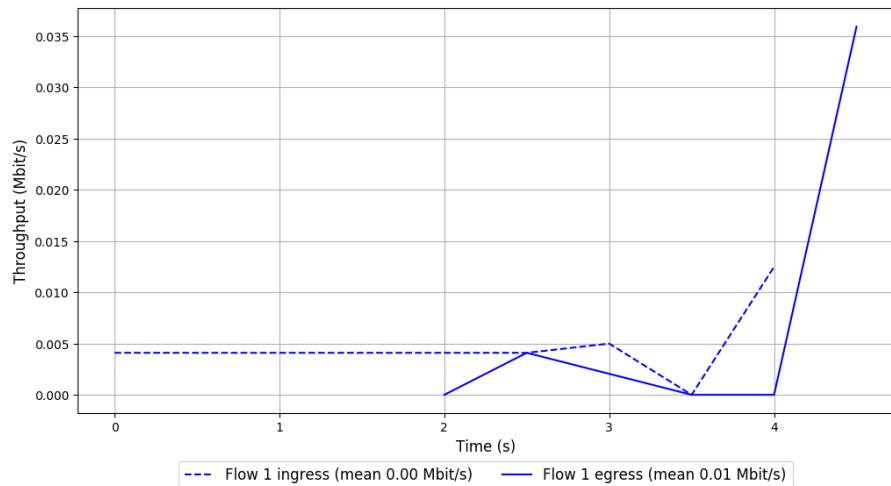
Start at: 2019-01-21 19:56:11

End at: 2019-01-21 19:56:41

Local clock offset: -2.409 ms

Remote clock offset: 7.975 ms

Run 2: Report of PCC-Expr — Data Link

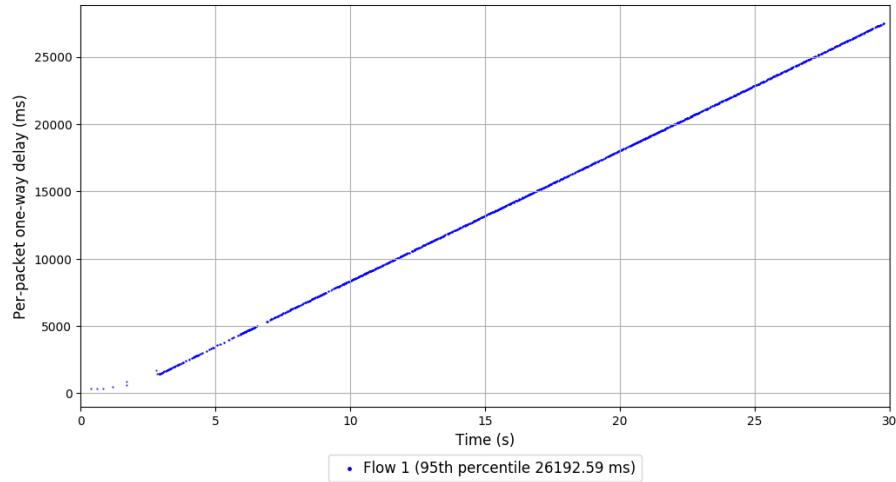
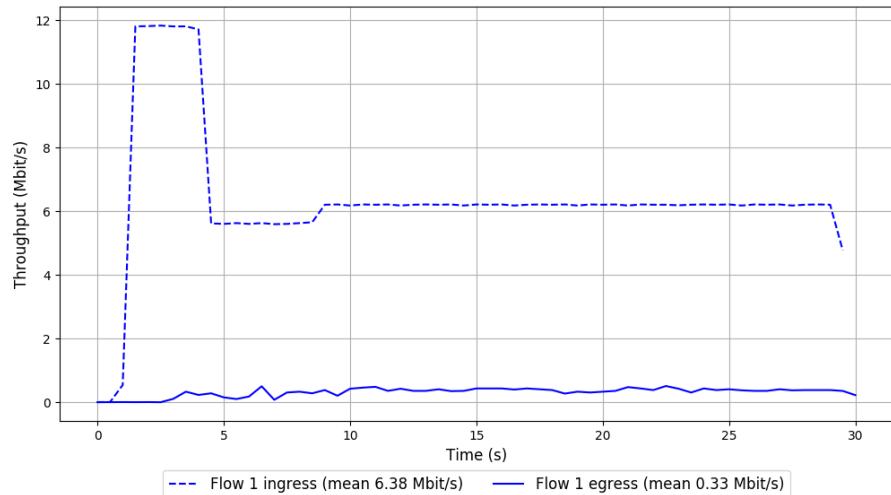


Run 3: Statistics of PCC-Expr

```
Start at: 2019-01-21 20:21:59
End at: 2019-01-21 20:22:29
Local clock offset: -4.314 ms
Remote clock offset: 8.085 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 26192.593 ms
Loss rate: 94.93%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 26192.593 ms
Loss rate: 94.93%
```

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/quic_st

Run 1: Report of QUIC Cubic — Data Link

Figure is missing

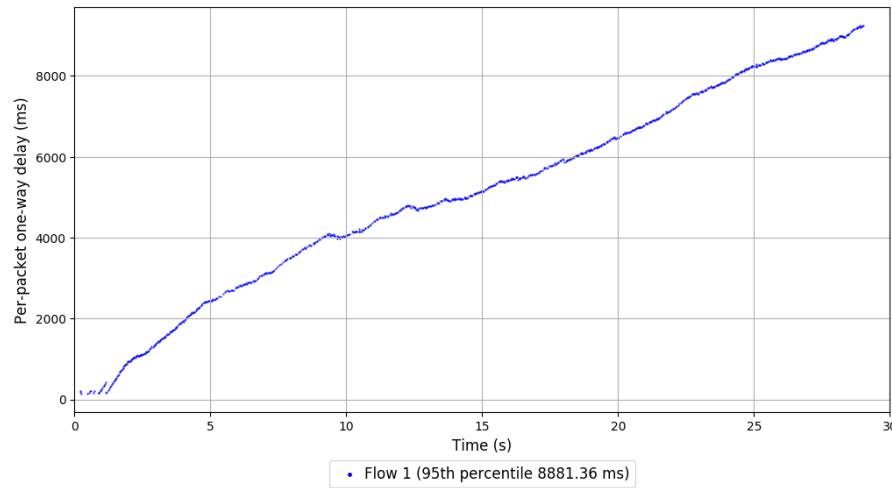
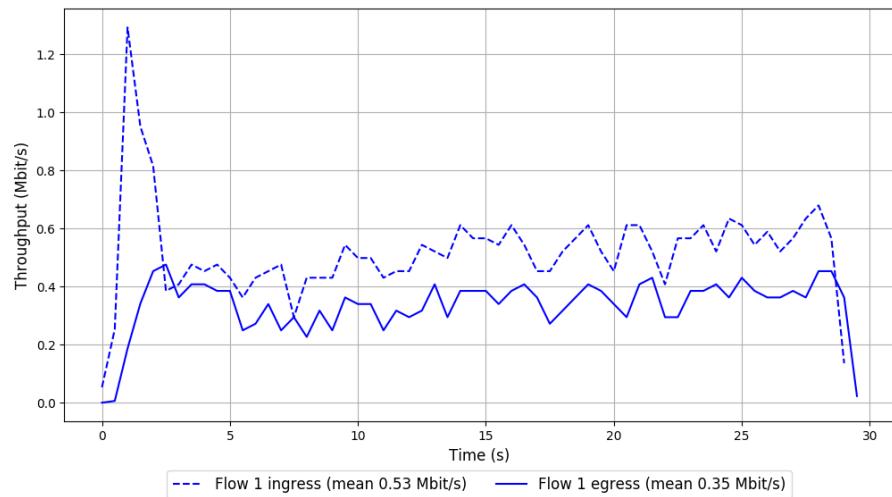
Figure is missing

Run 2: Statistics of QUIC Cubic

```
Start at: 2019-01-21 19:48:31
End at: 2019-01-21 19:49:01
Local clock offset: -3.688 ms
Remote clock offset: 7.251 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 8881.360 ms
Loss rate: 34.43%
-- Flow 1:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 8881.360 ms
Loss rate: 34.43%
```

Run 2: Report of QUIC Cubic — Data Link

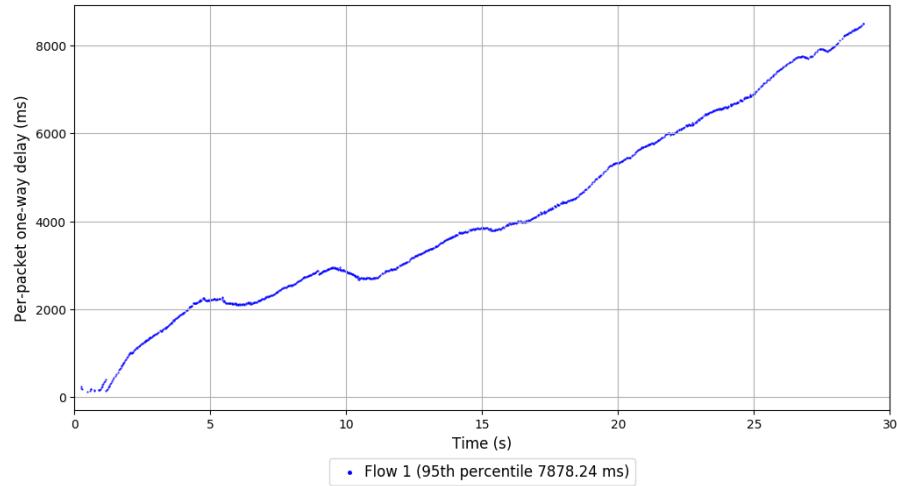
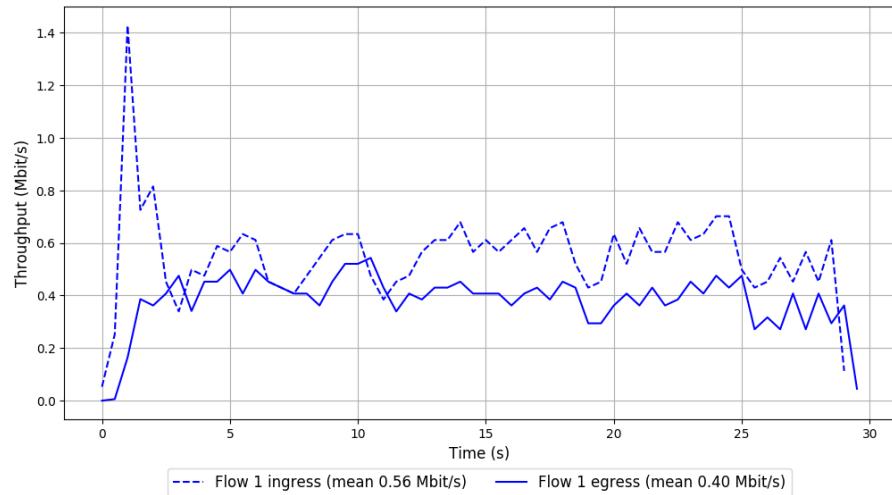


Run 3: Statistics of QUIC Cubic

```
Start at: 2019-01-21 20:14:22
End at: 2019-01-21 20:14:52
Local clock offset: -2.809 ms
Remote clock offset: 3.94 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 7878.244 ms
Loss rate: 29.73%
-- Flow 1:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 7878.244 ms
Loss rate: 29.73%
```

Run 3: Report of QUIC Cubic — Data Link

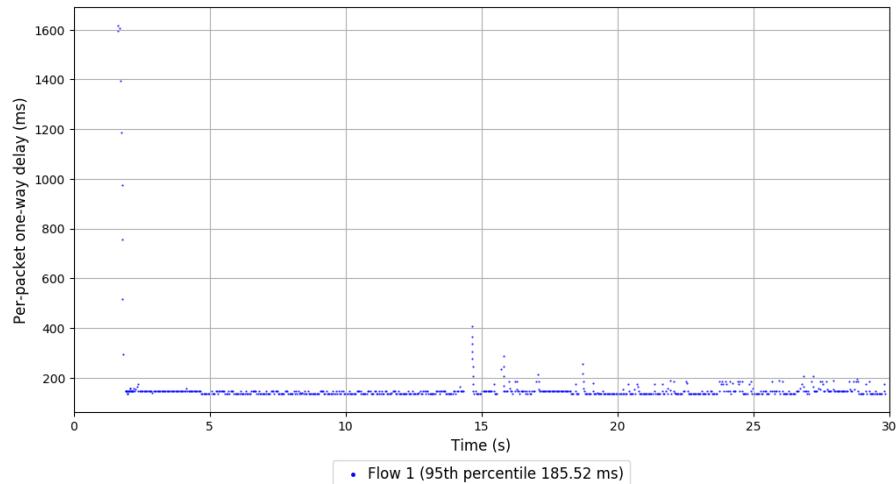
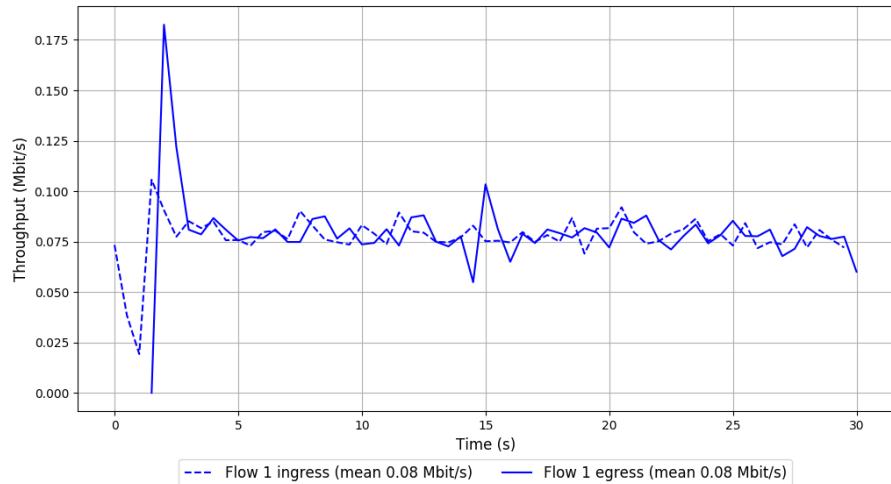


```
Run 1: Statistics of SCReAM
```

```
Start at: 2019-01-21 19:18:50
End at: 2019-01-21 19:19:20
Local clock offset: -3.498 ms
Remote clock offset: 1.39 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 185.517 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 185.517 ms
Loss rate: 0.78%
```

Run 1: Report of SCReAM — Data Link

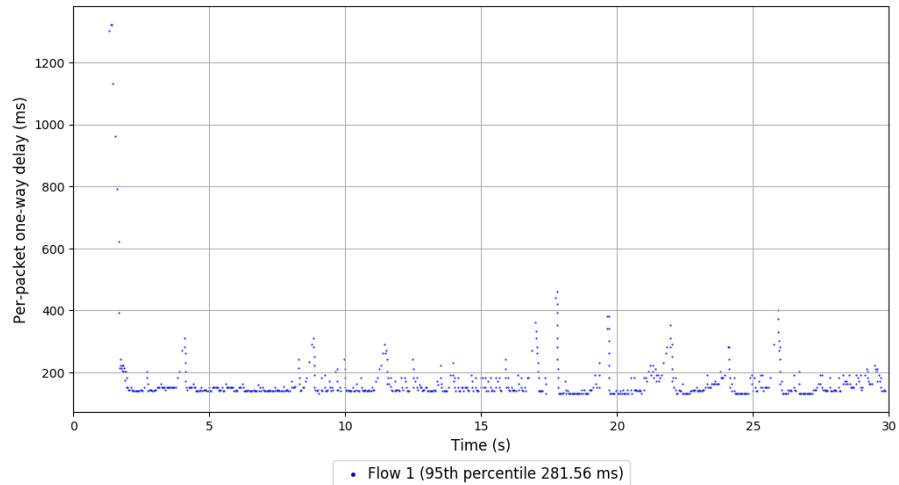
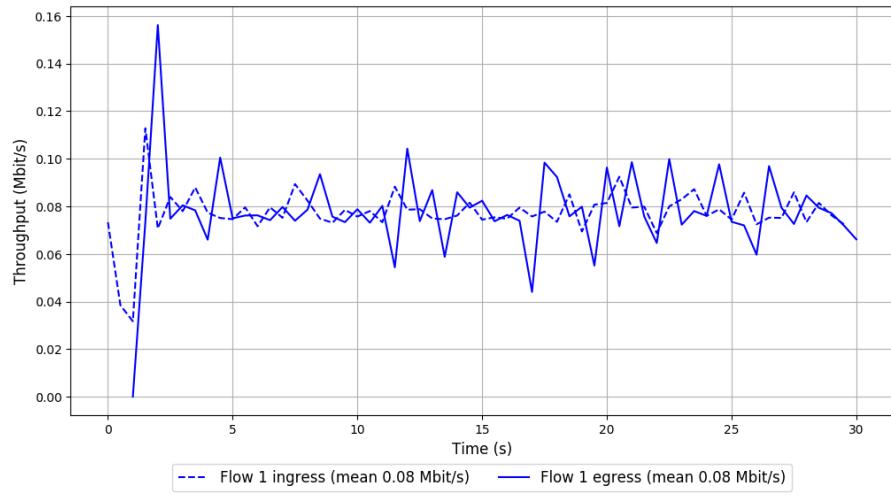


Run 2: Statistics of SCReAM

```
Start at: 2019-01-21 19:44:42
End at: 2019-01-21 19:45:12
Local clock offset: -4.064 ms
Remote clock offset: 7.668 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 281.560 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 281.560 ms
Loss rate: 0.79%
```

Run 2: Report of SCReAM — Data Link

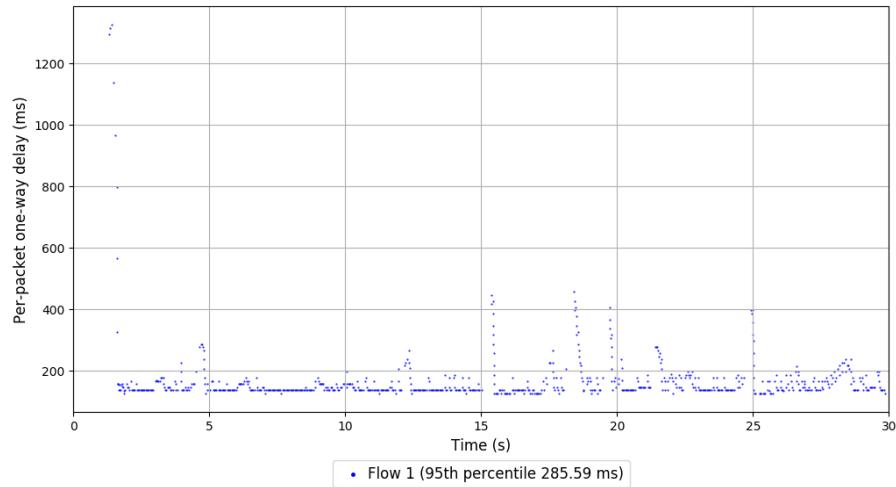
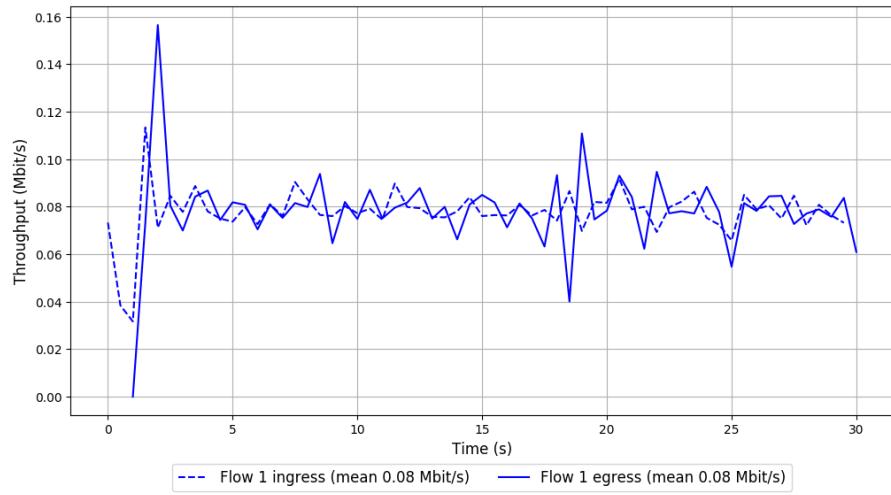


Run 3: Statistics of SCReAM

```
Start at: 2019-01-21 20:10:34
End at: 2019-01-21 20:11:04
Local clock offset: -2.022 ms
Remote clock offset: 8.862 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 285.591 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 285.591 ms
Loss rate: 0.79%
```

Run 3: Report of SCReAM — Data Link

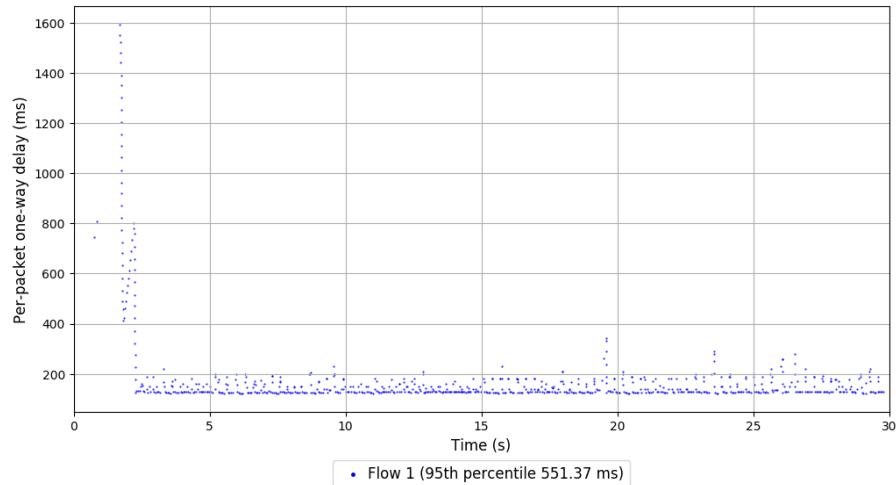
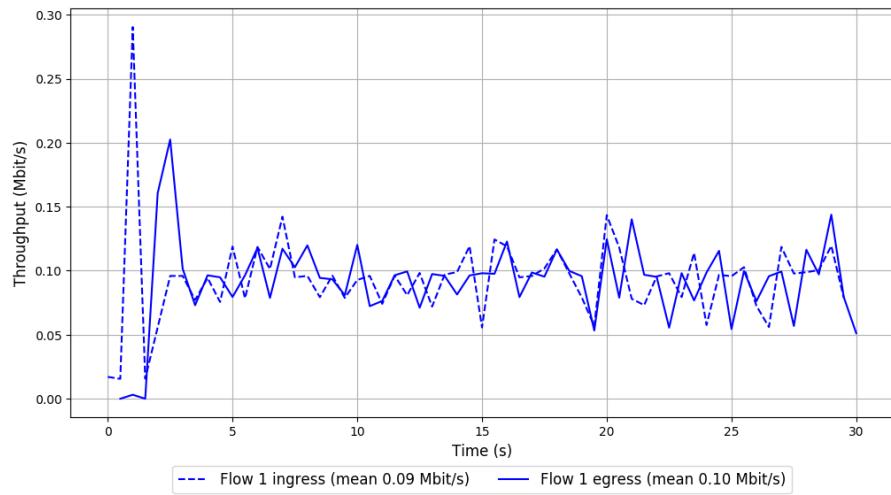


Run 1: Statistics of Sprout

```
Start at: 2019-01-21 19:43:34
End at: 2019-01-21 19:44:04
Local clock offset: -3.965 ms
Remote clock offset: 1.464 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 551.367 ms
Loss rate: 1.30%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 551.367 ms
Loss rate: 1.30%
```

Run 1: Report of Sprout — Data Link

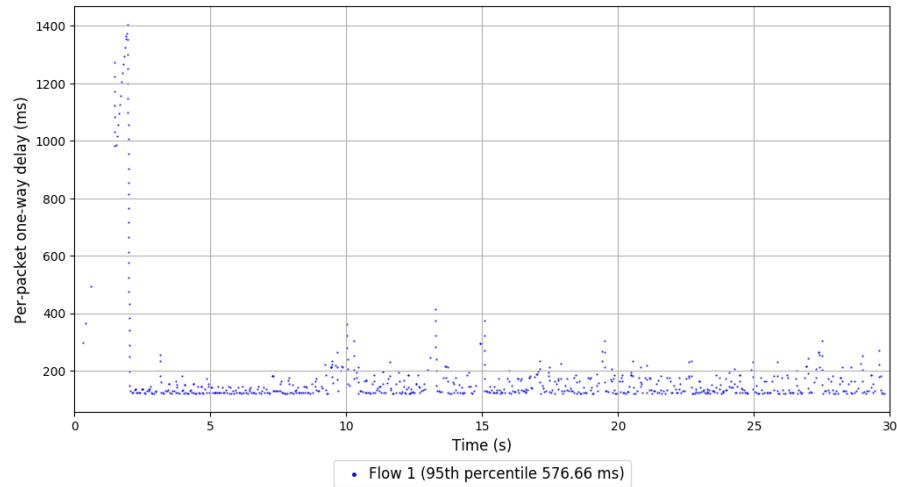
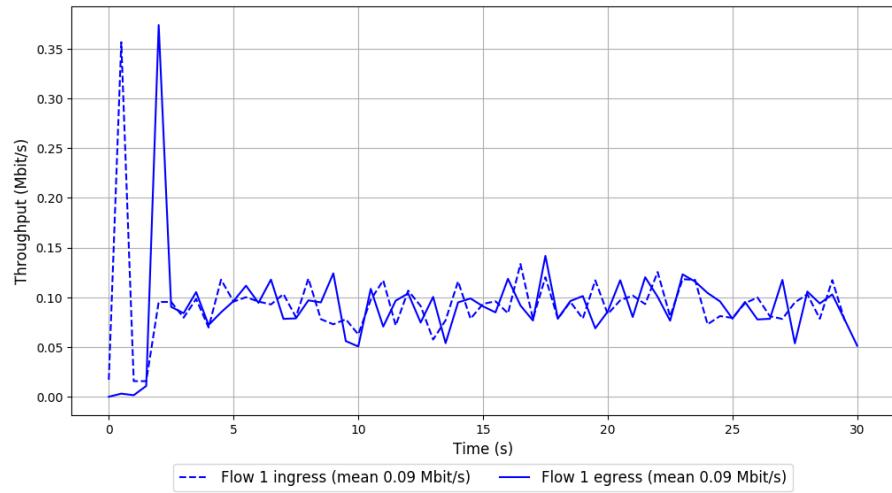


Run 2: Statistics of Sprout

```
Start at: 2019-01-21 20:09:25
End at: 2019-01-21 20:09:55
Local clock offset: -2.056 ms
Remote clock offset: 3.7 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 576.665 ms
Loss rate: 1.28%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 576.665 ms
Loss rate: 1.28%
```

Run 2: Report of Sprout — Data Link

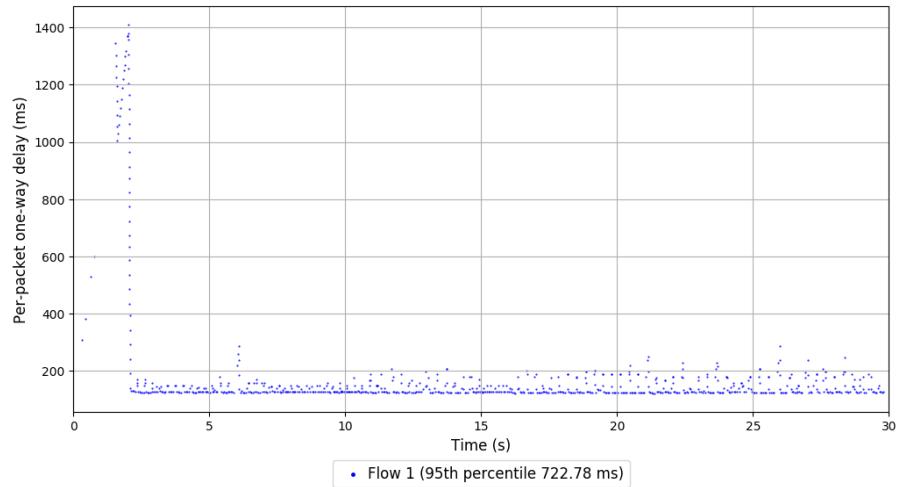
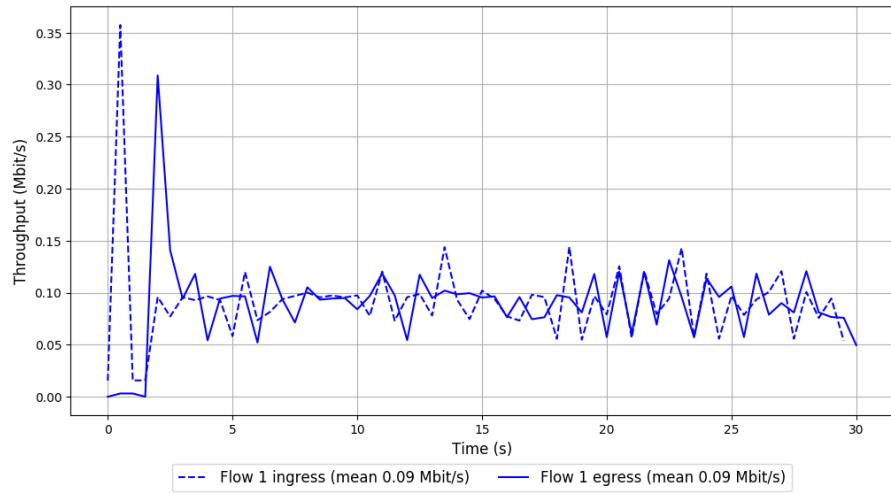


Run 3: Statistics of Sprout

```
Start at: 2019-01-21 20:35:17
End at: 2019-01-21 20:35:47
Local clock offset: -6.654 ms
Remote clock offset: 3.309 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 722.778 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 722.778 ms
Loss rate: 0.84%
```

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/taova_s

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

Figure is missing

Figure is missing

Run 2: Statistics of TaoVA-100x

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/taova_s

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

Figure is missing

Figure is missing

Run 3: Statistics of TaoVA-100x

/home/ubuntu/pantheon/data/2019-01-21T19-18-Colombia-cellular-to-AWS-Brazil-2-3-runs/taova_s

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

Figure is missing

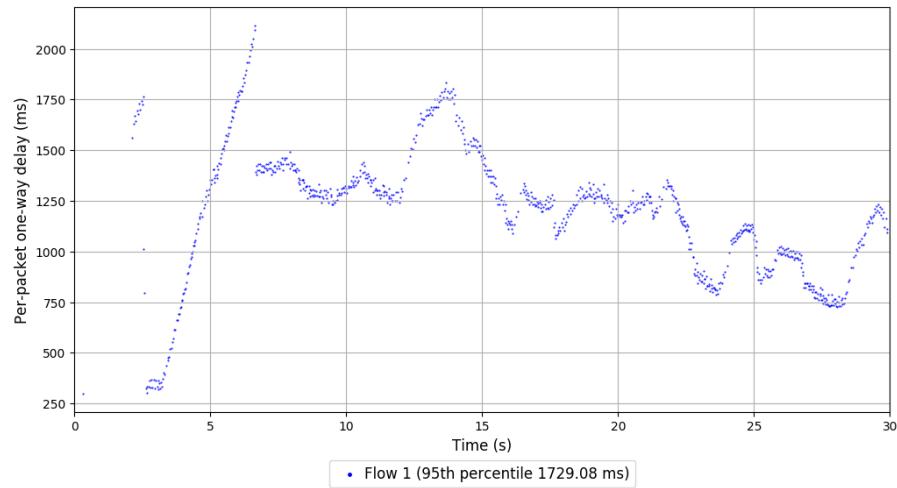
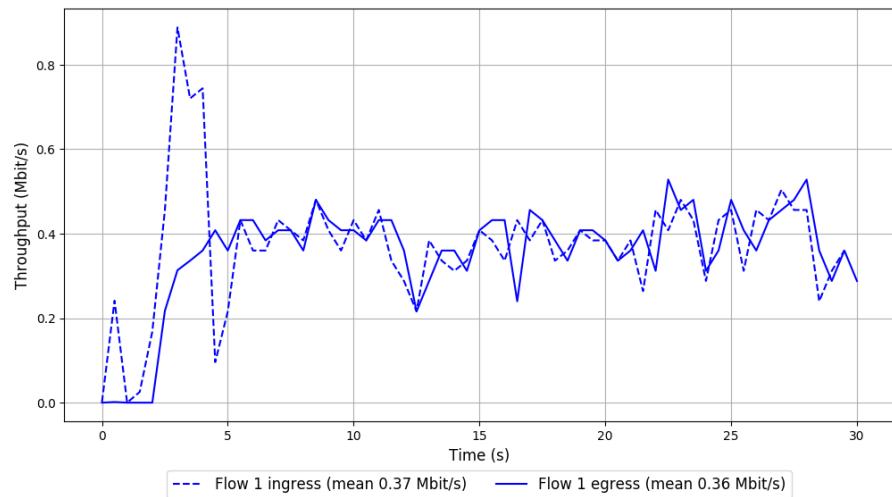
Figure is missing

Run 1: Statistics of TCP Vegas

```
Start at: 2019-01-21 19:36:44
End at: 2019-01-21 19:37:14
Local clock offset: -3.203 ms
Remote clock offset: 1.535 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 1729.076 ms
Loss rate: 3.43%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 1729.076 ms
Loss rate: 3.43%
```

Run 1: Report of TCP Vegas — Data Link

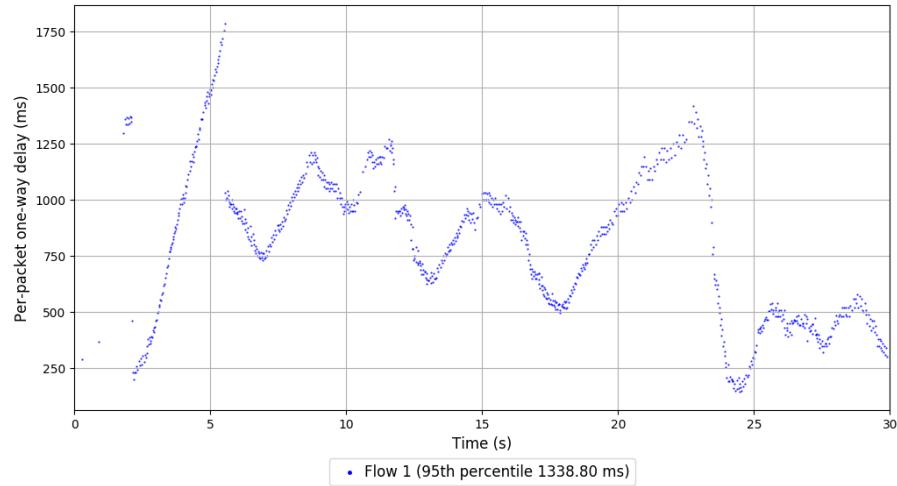
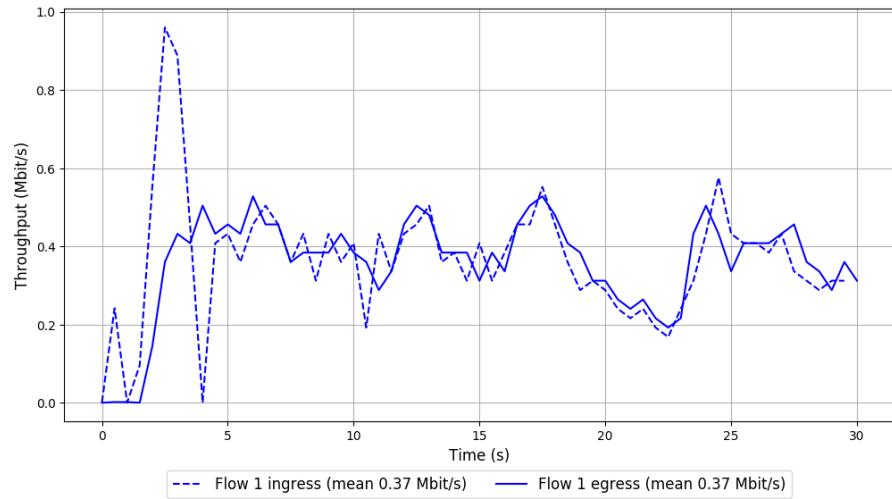


Run 2: Statistics of TCP Vegas

```
Start at: 2019-01-21 20:02:37
End at: 2019-01-21 20:03:07
Local clock offset: -2.944 ms
Remote clock offset: 8.141 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 1338.797 ms
Loss rate: 1.09%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 1338.797 ms
Loss rate: 1.09%
```

Run 2: Report of TCP Vegas — Data Link

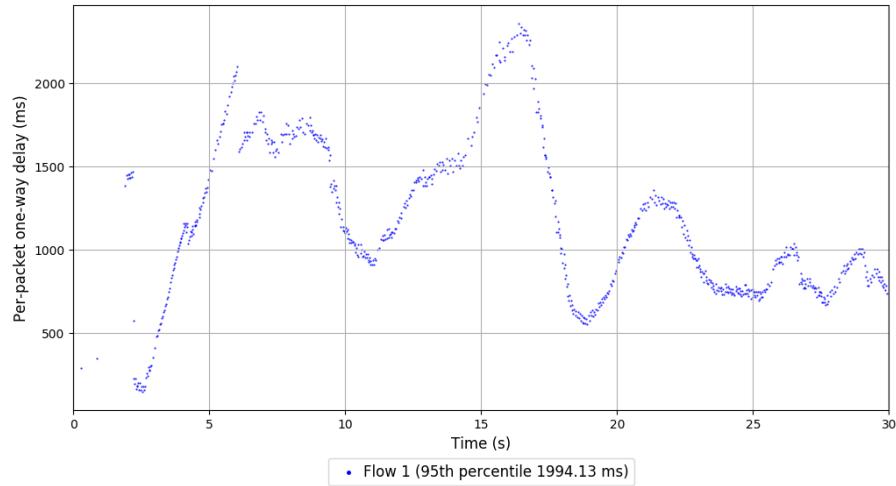
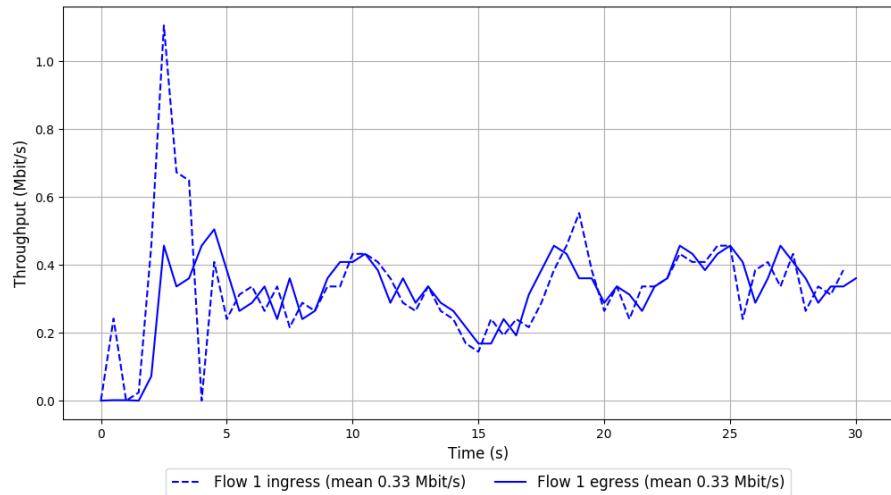


Run 3: Statistics of TCP Vegas

```
Start at: 2019-01-21 20:28:28
End at: 2019-01-21 20:28:58
Local clock offset: -6.535 ms
Remote clock offset: 2.662 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 1994.132 ms
Loss rate: 2.89%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 1994.132 ms
Loss rate: 2.89%
```

Run 3: Report of TCP Vegas — Data Link

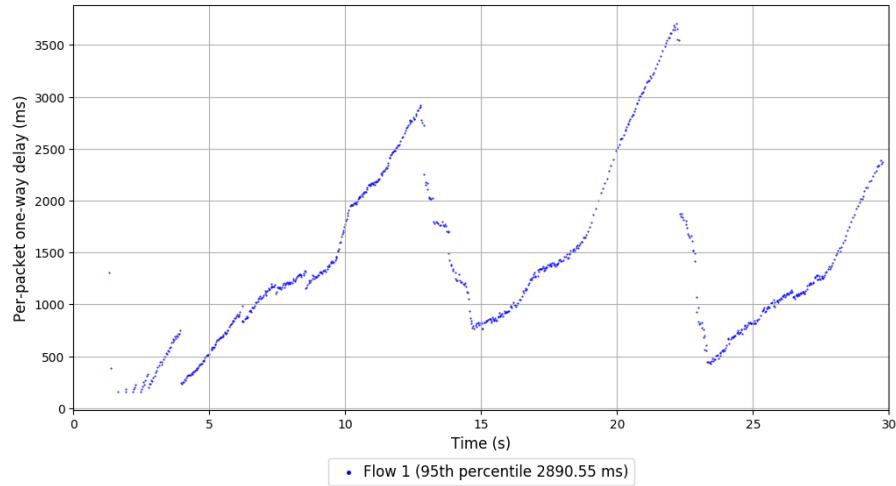
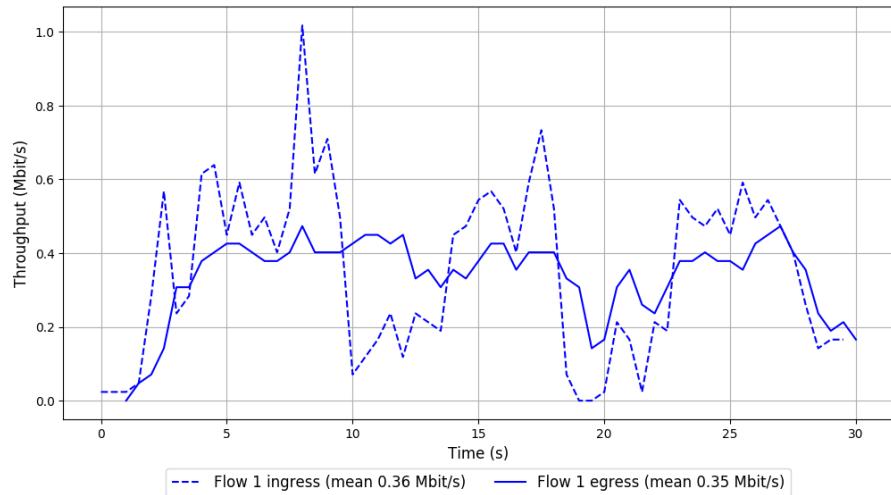


Run 1: Statistics of Verus

```
Start at: 2019-01-21 19:37:52
End at: 2019-01-21 19:38:22
Local clock offset: -3.895 ms
Remote clock offset: 5.473 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 2890.548 ms
Loss rate: 5.90%
-- Flow 1:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 2890.548 ms
Loss rate: 5.90%
```

Run 1: Report of Verus — Data Link

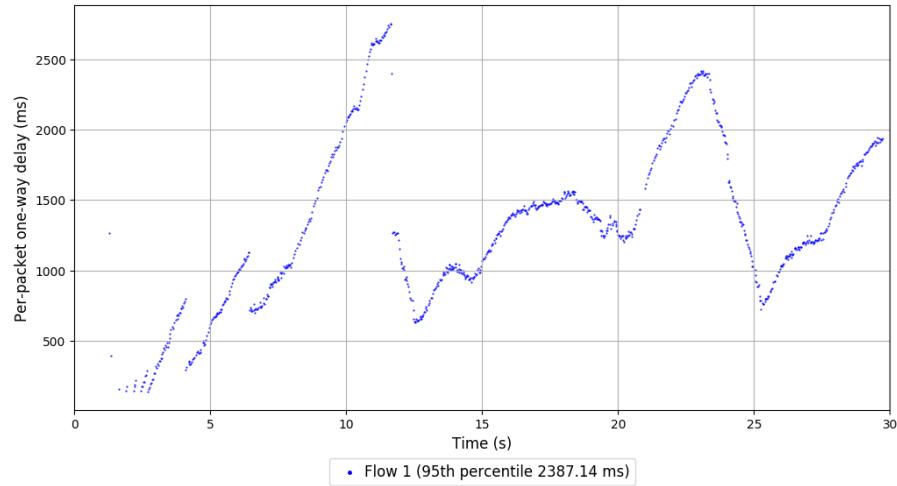
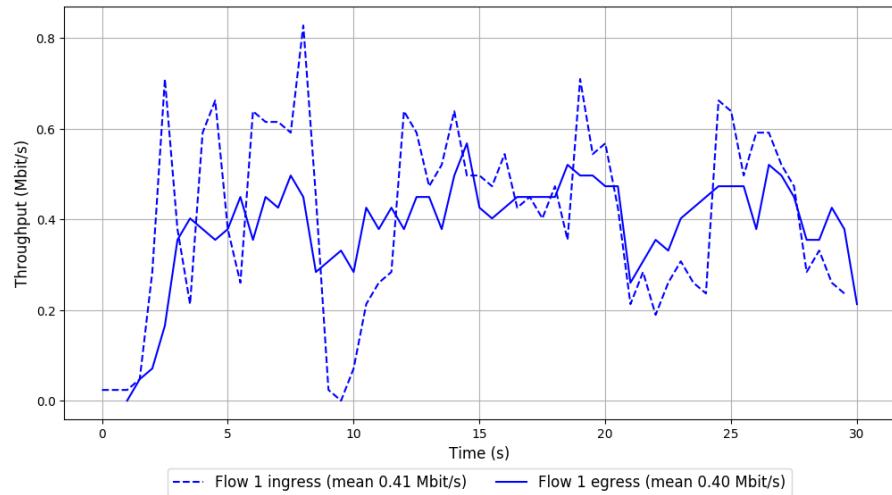


Run 2: Statistics of Verus

```
Start at: 2019-01-21 20:03:45
End at: 2019-01-21 20:04:15
Local clock offset: -2.98 ms
Remote clock offset: 8.102 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 2387.145 ms
Loss rate: 5.27%
-- Flow 1:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 2387.145 ms
Loss rate: 5.27%
```

Run 2: Report of Verus — Data Link

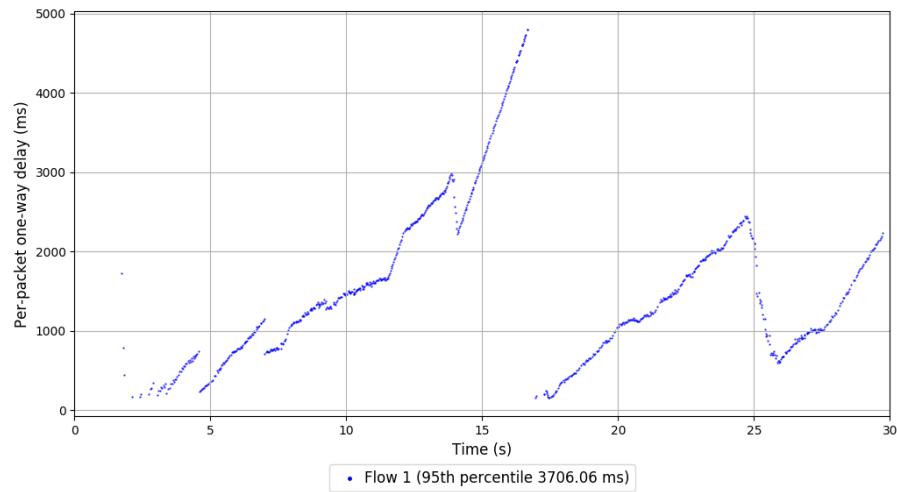
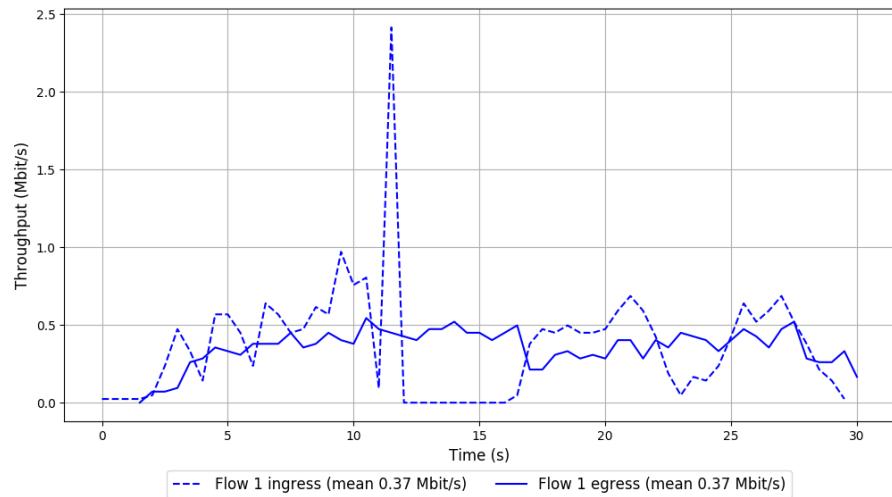


Run 3: Statistics of Verus

```
Start at: 2019-01-21 20:29:36
End at: 2019-01-21 20:30:06
Local clock offset: -6.002 ms
Remote clock offset: 7.494 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 3706.062 ms
Loss rate: 5.72%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 3706.062 ms
Loss rate: 5.72%
```

Run 3: Report of Verus — Data Link

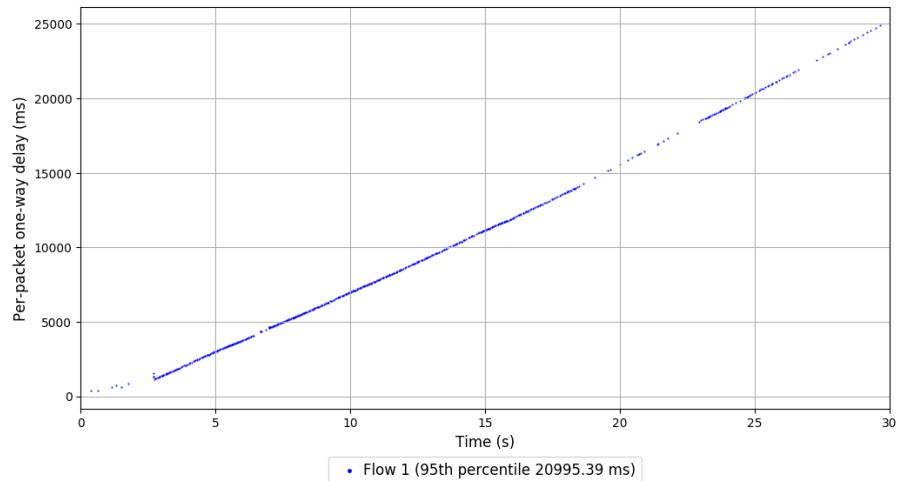
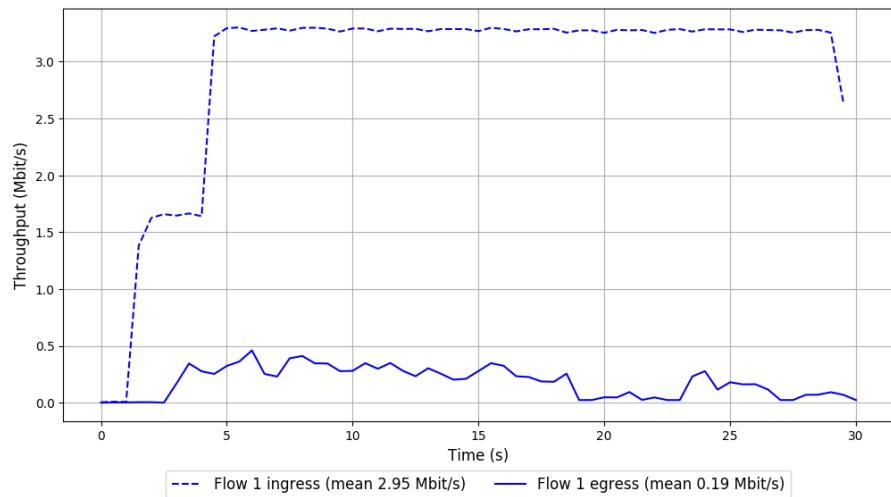


```
Run 1: Statistics of PCC-Vivace
```

```
Start at: 2019-01-21 19:27:34
End at: 2019-01-21 19:28:04
Local clock offset: -3.806 ms
Remote clock offset: 7.86 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 20995.391 ms
Loss rate: 93.64%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 20995.391 ms
Loss rate: 93.64%
```

Run 1: Report of PCC-Vivace — Data Link

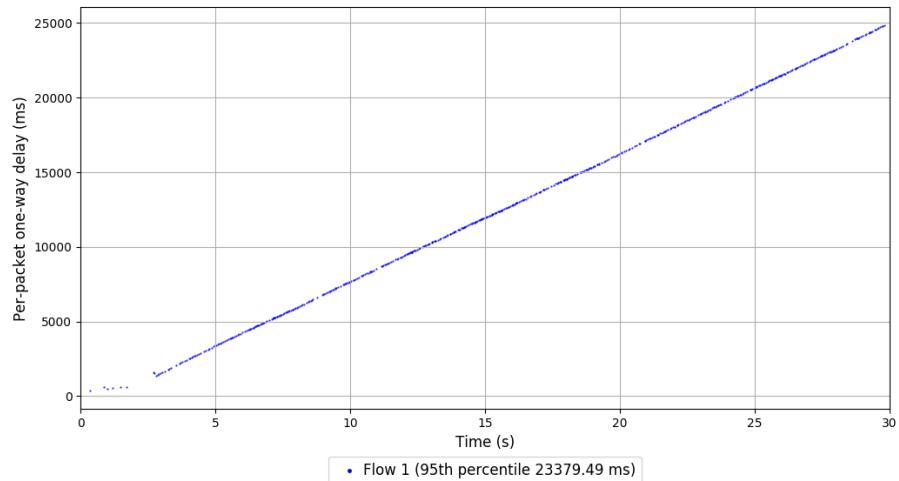
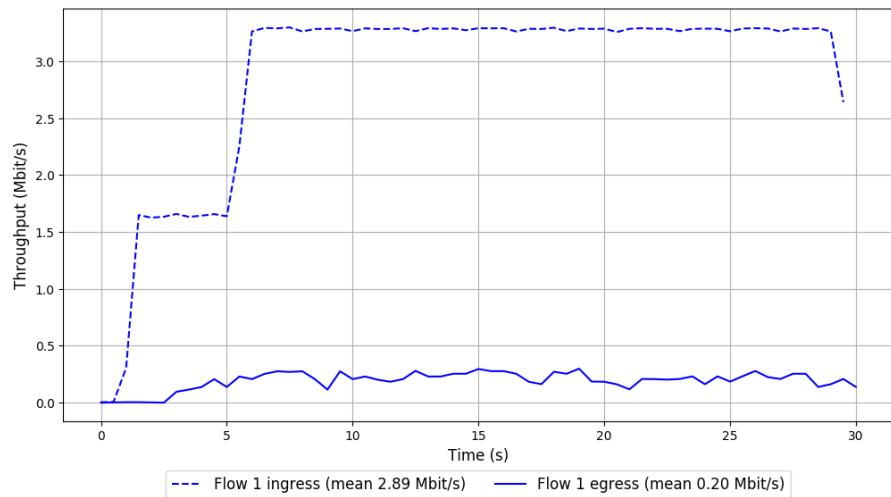


Run 2: Statistics of PCC-Vivace

```
Start at: 2019-01-21 19:53:29
End at: 2019-01-21 19:53:59
Local clock offset: -2.638 ms
Remote clock offset: 9.095 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 23379.492 ms
Loss rate: 93.20%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 23379.492 ms
Loss rate: 93.20%
```

Run 2: Report of PCC-Vivace — Data Link

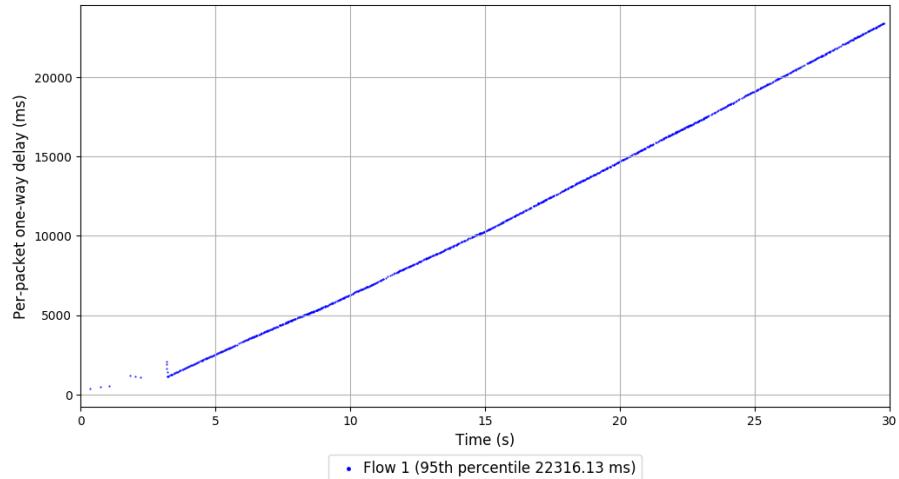
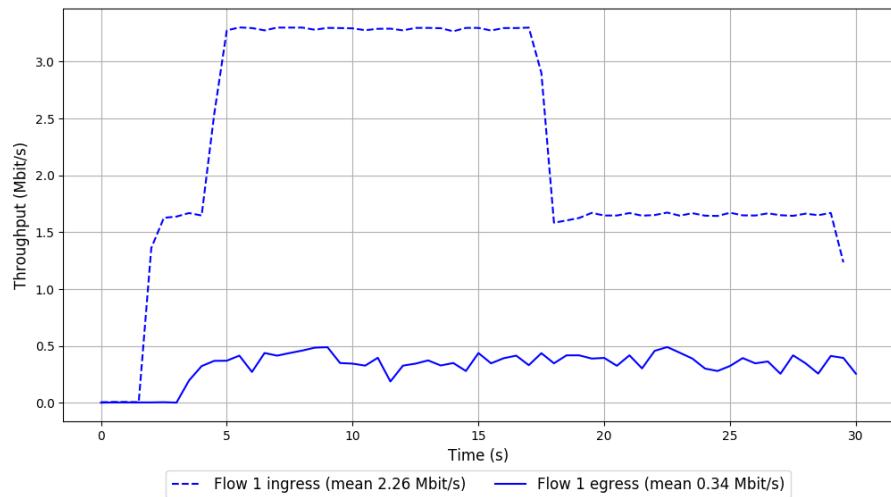


Run 3: Statistics of PCC-Vivace

```
Start at: 2019-01-21 20:19:19
End at: 2019-01-21 20:19:49
Local clock offset: -4.14 ms
Remote clock offset: 4.906 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 22316.127 ms
Loss rate: 85.37%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 22316.127 ms
Loss rate: 85.37%
```

Run 3: Report of PCC-Vivace — Data Link

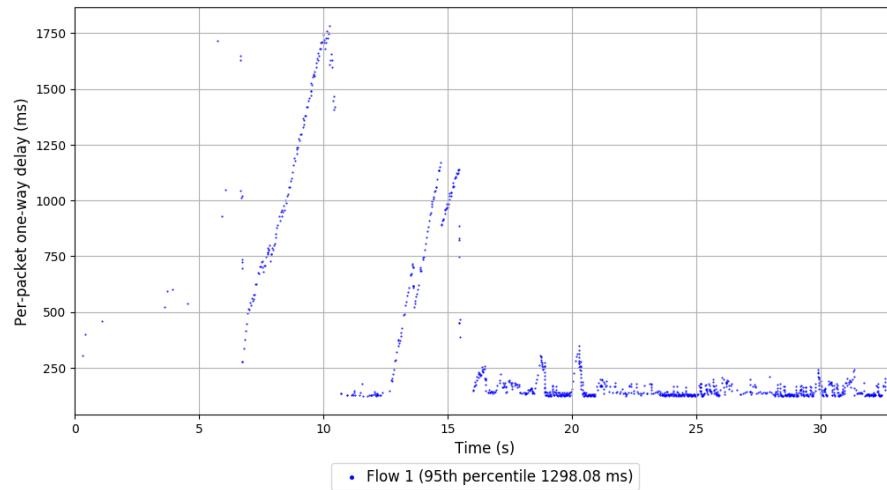
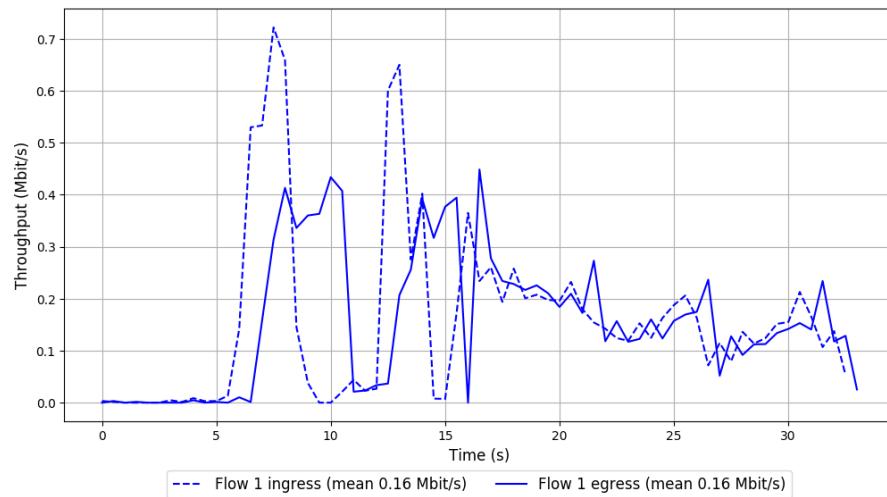


```
Run 1: Statistics of WebRTC media
```

```
Start at: 2019-01-21 19:35:36
End at: 2019-01-21 19:36:06
Local clock offset: -3.122 ms
Remote clock offset: 2.732 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 1298.084 ms
Loss rate: 0.65%
-- Flow 1:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 1298.084 ms
Loss rate: 0.65%
```

Run 1: Report of WebRTC media — Data Link

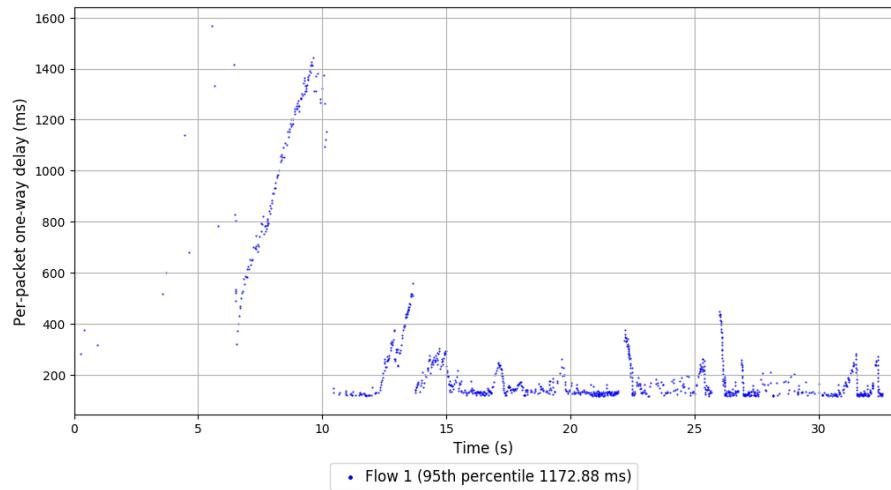
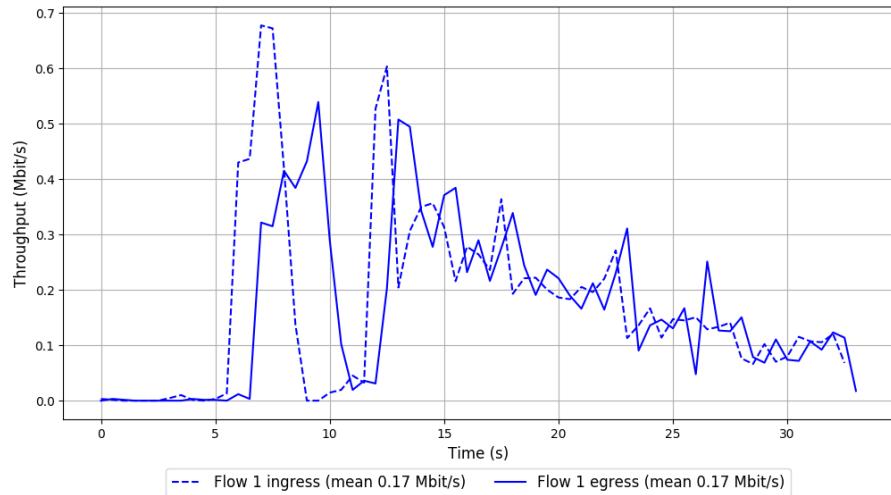


Run 2: Statistics of WebRTC media

```
Start at: 2019-01-21 20:01:29
End at: 2019-01-21 20:01:59
Local clock offset: -2.279 ms
Remote clock offset: 7.145 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 1172.881 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 1172.881 ms
Loss rate: 0.76%
```

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

```
Start at: 2019-01-21 20:27:20
End at: 2019-01-21 20:27:50
Local clock offset: -6.305 ms
Remote clock offset: 6.513 ms

# Below is generated by plot.py at 2019-01-21 20:36:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 1022.861 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 1022.861 ms
Loss rate: 0.42%
```

Run 3: Report of WebRTC media — Data Link

