

## Pantheon Report

Generated at 2018-08-01 23:49:22 (UTC).

Data path: Colombia ppp0 ppp0 (*remote*) → AWS Brazil 2 Ethernet (*local*).

Repeated the test of 17 congestion control schemes 3 times.

Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.

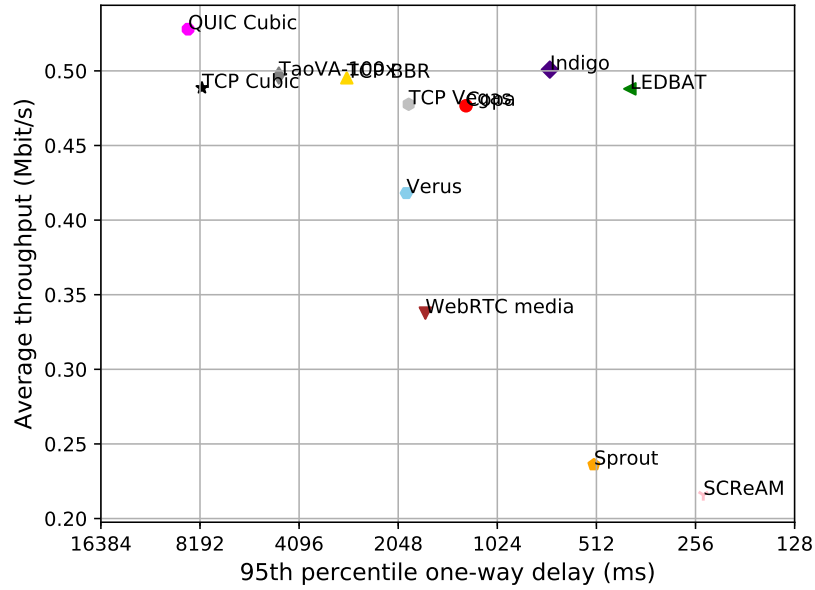
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

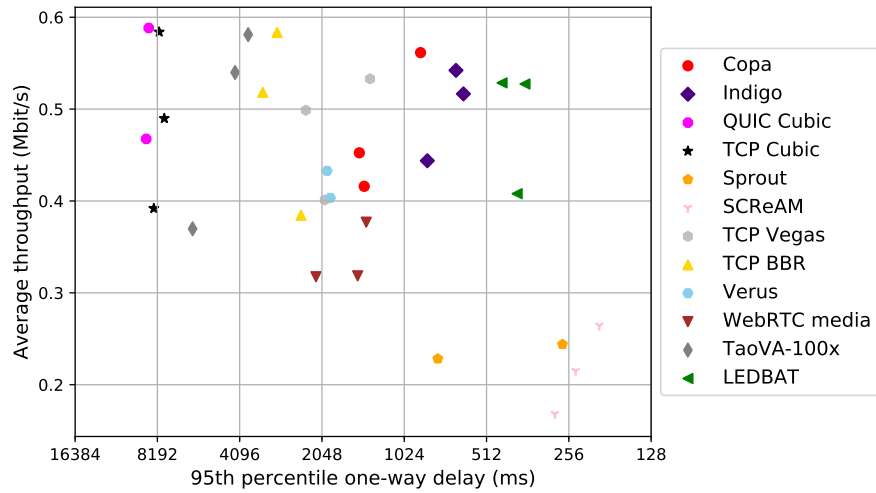
Git summary:

```
branch: master @ 640164b5b17c7c6561fff57729b3b5935d8596ce
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ 6f038ed31259d366f9840f65b82cbe8f464b1b39
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
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webRTC @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

test from Colombia ppp0 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 ppp0 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	0.30	0.27	0.04	2836.05	2975.79	2833.45	4.50	6.95	39.63
Copa	3	0.29	0.20	0.16	1215.99	1242.46	1325.71	3.00	6.22	13.23
TCP Cubic	3	0.48	0.02	0.00	8089.82	6670.33	8327.18	31.51	53.17	90.68
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	0.27	0.22	0.28	648.31	694.46	781.75	0.52	0.86	2.32
LEDBAT	3	0.23	0.26	0.29	365.64	399.02	421.08	0.04	0.40	5.88
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	2	0.52	0.02	0.01	8908.43	8482.55	9360.53	32.09	0.00	58.34
SCReAM	3	0.08	0.13	0.14	223.18	239.32	297.08	0.75	1.02	1.86
Sprout	2	0.12	0.11	0.14	472.41	319.86	752.65	0.99	1.48	2.29
TaoVA-100x	3	0.31	0.24	0.16	3744.58	4749.66	4415.78	14.20	10.61	43.58
TCP Vegas	3	0.27	0.23	0.22	1523.23	1953.32	1989.52	1.46	4.89	21.42
Verus	2	0.39	0.03	0.04	1935.99	1807.23	1744.27	2.53	22.48	29.21
PCC-Vivace	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WebRTC media	3	0.15	0.12	0.07	1669.57	1726.29	1638.41	0.26	0.67	7.94

Run 1: Statistics of TCP BBR

Start at: 2018-08-01 23:02:59

End at: 2018-08-01 23:03:29

Local clock offset: -5.812 ms

Remote clock offset: 4.719 ms

# Below is generated by plot.py at 2018-08-01 23:48:51

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 2987.065 ms

Loss rate: 9.39%

-- Flow 1:

Average throughput: 0.37 Mbit/s

95th percentile per-packet one-way delay: 2970.118 ms

Loss rate: 6.77%

-- Flow 2:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 2996.935 ms

Loss rate: 12.32%

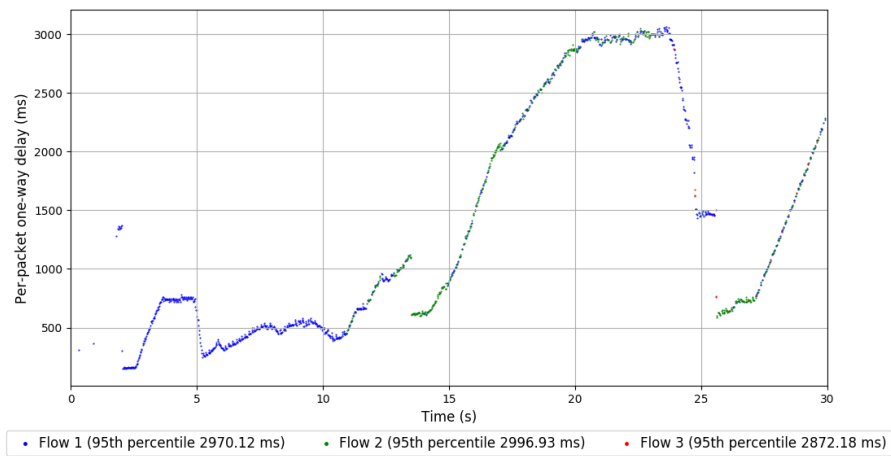
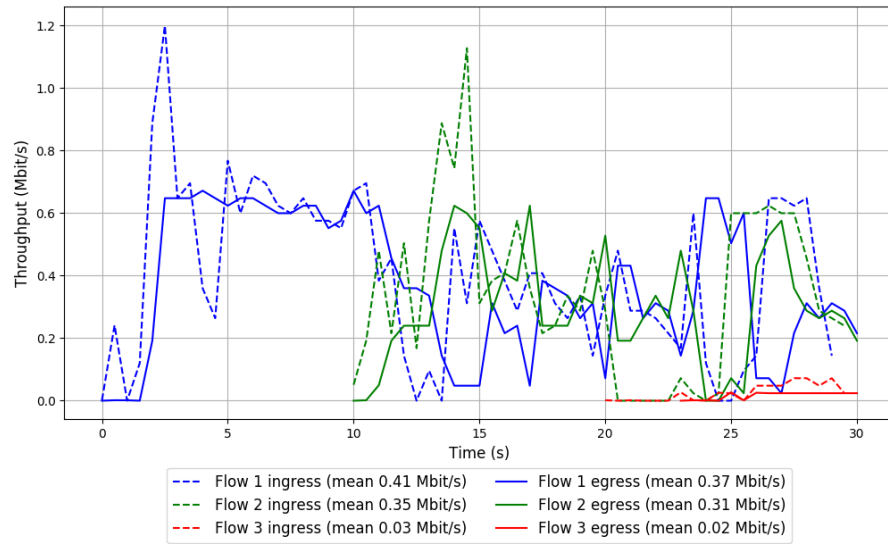
-- Flow 3:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 2872.181 ms

Loss rate: 51.48%

# Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-08-01 23:23:52

End at: 2018-08-01 23:24:22

Local clock offset: -6.369 ms

Remote clock offset: 9.057 ms

# Below is generated by plot.py at 2018-08-01 23:48:51

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 3371.722 ms

Loss rate: 3.77%

-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 3324.866 ms

Loss rate: 2.52%

-- Flow 2:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 3422.105 ms

Loss rate: 3.88%

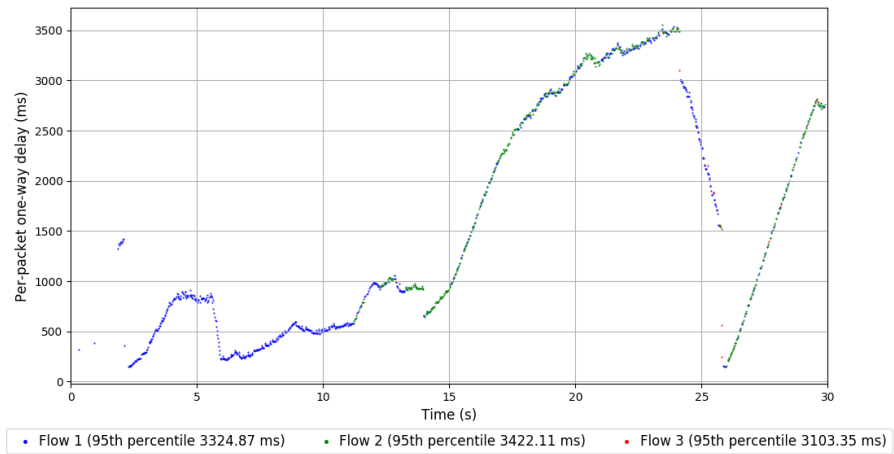
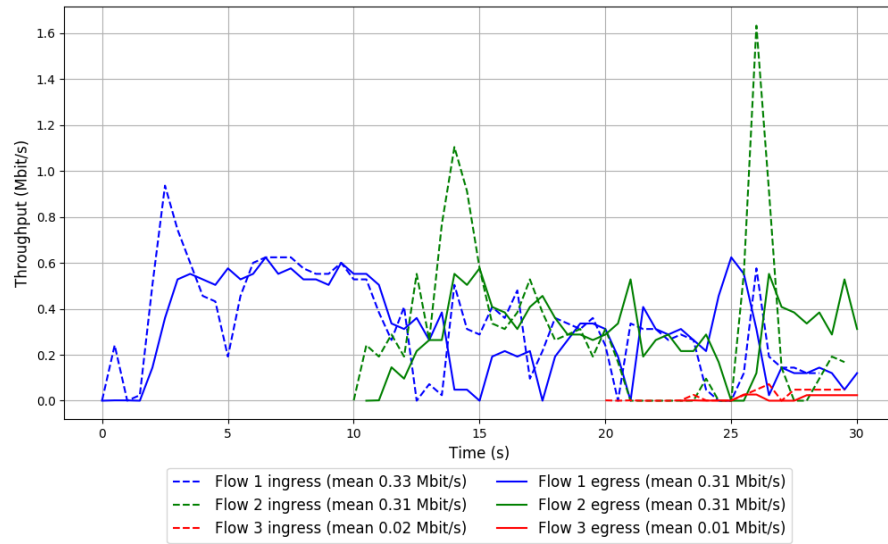
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 3103.350 ms

Loss rate: 57.58%

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



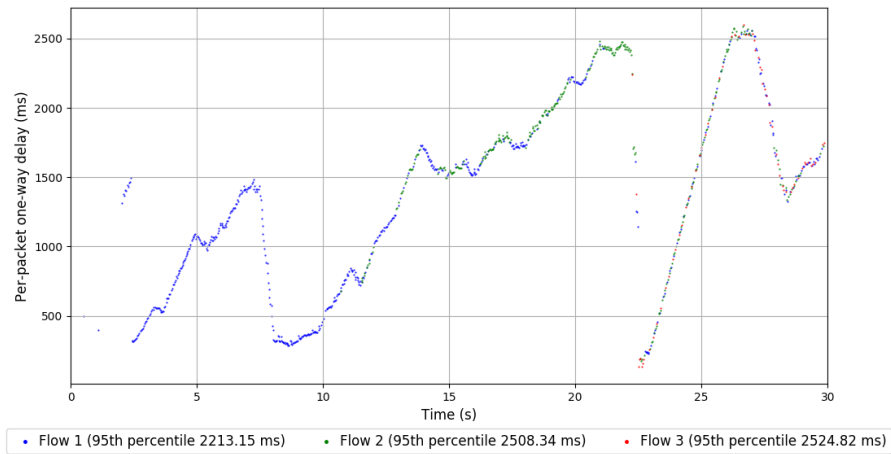
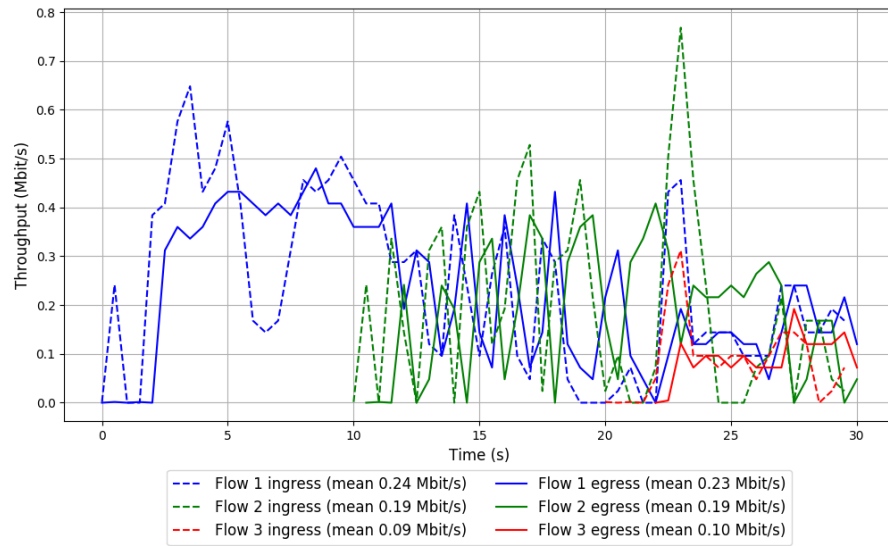
Run 3: Statistics of TCP BBR

Start at: 2018-08-01 23:44:33  
End at: 2018-08-01 23:45:03  
Local clock offset: -6.193 ms  
Remote clock offset: 14.458 ms

# Below is generated by plot.py at 2018-08-01 23:48:51  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.38 Mbit/s  
95th percentile per-packet one-way delay: 2442.980 ms  
Loss rate: 4.75%  
-- Flow 1:  
Average throughput: 0.23 Mbit/s  
95th percentile per-packet one-way delay: 2213.151 ms  
Loss rate: 4.20%  
-- Flow 2:  
Average throughput: 0.19 Mbit/s  
95th percentile per-packet one-way delay: 2508.344 ms  
Loss rate: 4.66%  
-- Flow 3:  
Average throughput: 0.10 Mbit/s  
95th percentile per-packet one-way delay: 2524.818 ms  
Loss rate: 9.83%



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



Run 1: Statistics of Copa

Start at: 2018-08-01 23:01:48

End at: 2018-08-01 23:02:18

Local clock offset: -5.762 ms

Remote clock offset: 9.557 ms

# Below is generated by plot.py at 2018-08-01 23:48:52

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 892.685 ms

Loss rate: 3.97%

-- Flow 1:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 880.169 ms

Loss rate: 2.47%

-- Flow 2:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 878.220 ms

Loss rate: 4.71%

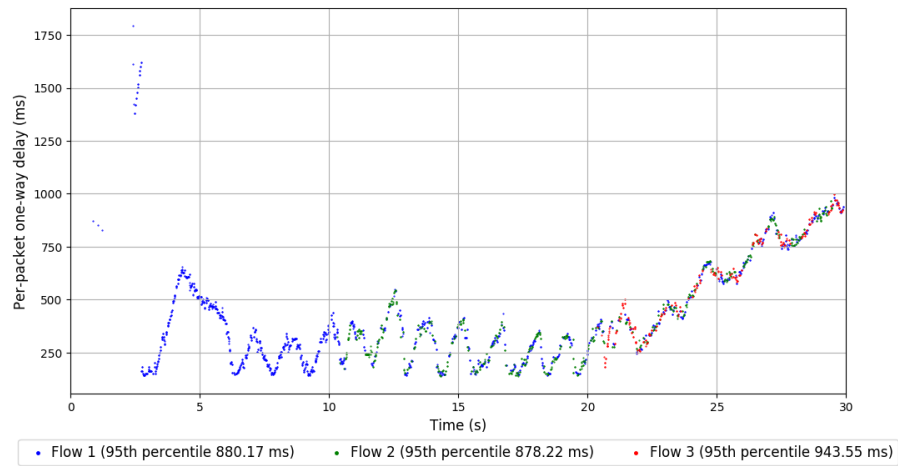
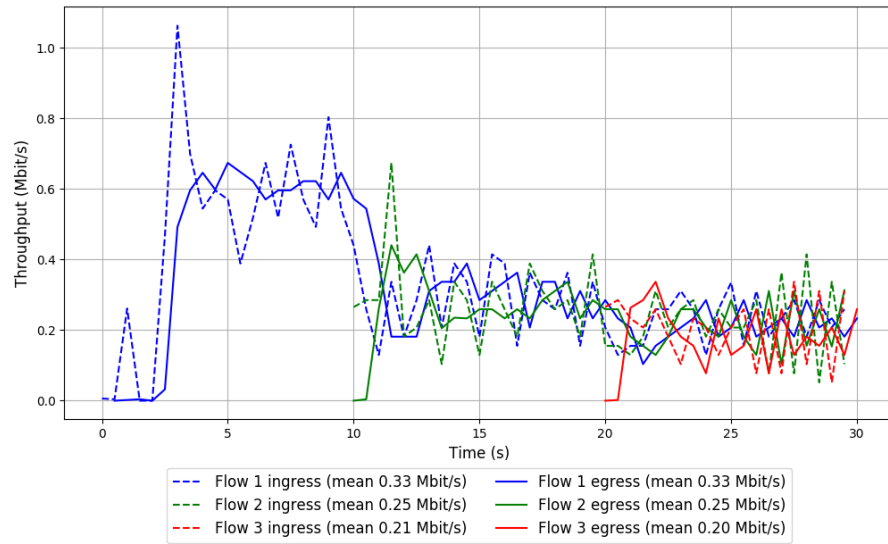
-- Flow 3:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 943.549 ms

Loss rate: 9.48%

## Run 1: Report of Copa — Data Link

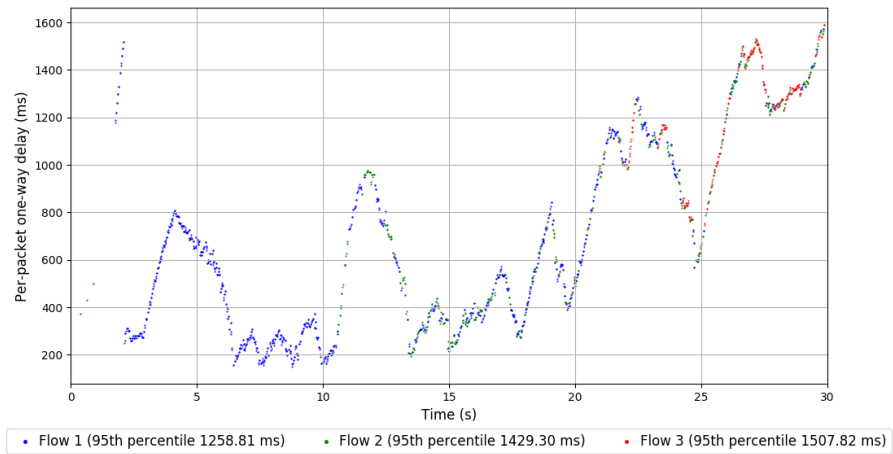
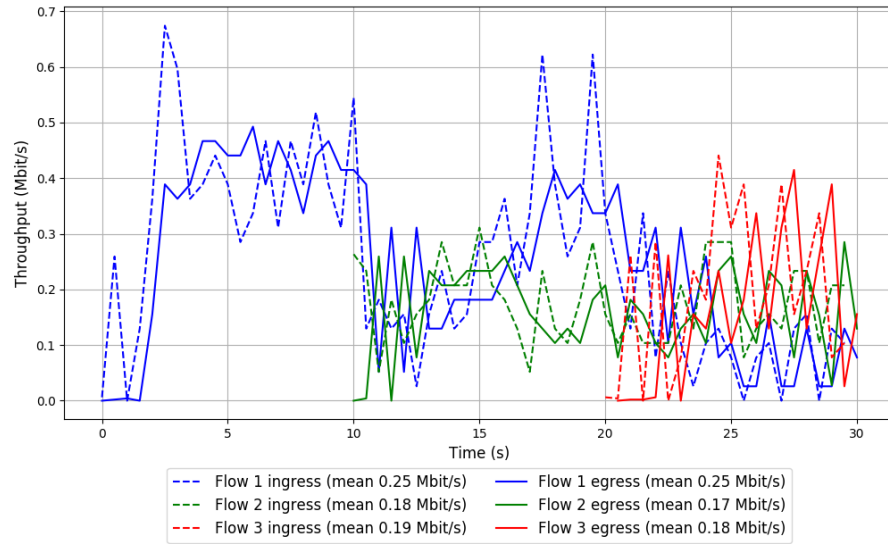


Run 2: Statistics of Copa

Start at: 2018-08-01 23:22:40  
End at: 2018-08-01 23:23:10  
Local clock offset: -6.386 ms  
Remote clock offset: 11.314 ms

# Below is generated by plot.py at 2018-08-01 23:48:52  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.42 Mbit/s  
95th percentile per-packet one-way delay: 1434.881 ms  
Loss rate: 5.58%  
-- Flow 1:  
Average throughput: 0.25 Mbit/s  
95th percentile per-packet one-way delay: 1258.807 ms  
Loss rate: 1.89%  
-- Flow 2:  
Average throughput: 0.17 Mbit/s  
95th percentile per-packet one-way delay: 1429.298 ms  
Loss rate: 8.05%  
-- Flow 3:  
Average throughput: 0.18 Mbit/s  
95th percentile per-packet one-way delay: 1507.822 ms  
Loss rate: 15.60%

## Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-08-01 23:43:21

End at: 2018-08-01 23:43:51

Local clock offset: -6.208 ms

Remote clock offset: 16.95 ms

# Below is generated by plot.py at 2018-08-01 23:48:52

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.45 Mbit/s

95th percentile per-packet one-way delay: 1495.091 ms

Loss rate: 5.68%

-- Flow 1:

Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 1509.006 ms

Loss rate: 4.65%

-- Flow 2:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 1419.856 ms

Loss rate: 5.90%

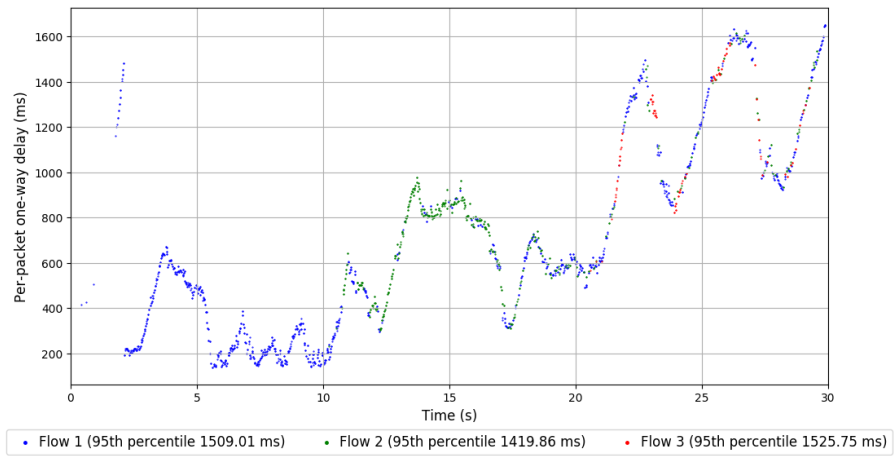
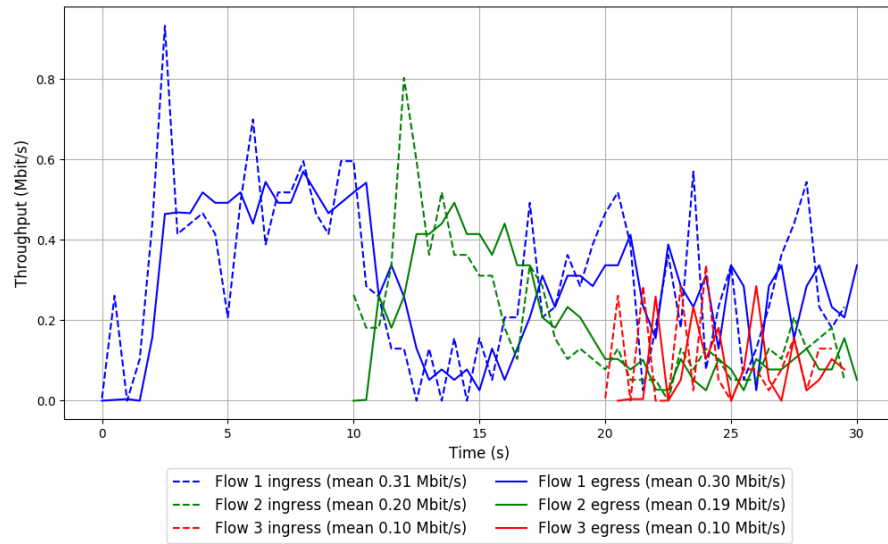
-- Flow 3:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 1525.751 ms

Loss rate: 14.61%

### Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-08-01 23:04:11

End at: 2018-08-01 23:04:41

Local clock offset: -5.964 ms

Remote clock offset: 5.848 ms

# Below is generated by plot.py at 2018-08-01 23:48:52

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8067.486 ms

Loss rate: 31.52%

-- Flow 1:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 8067.492 ms

Loss rate: 30.81%

-- Flow 2:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 6529.481 ms

Loss rate: 52.83%

-- Flow 3:

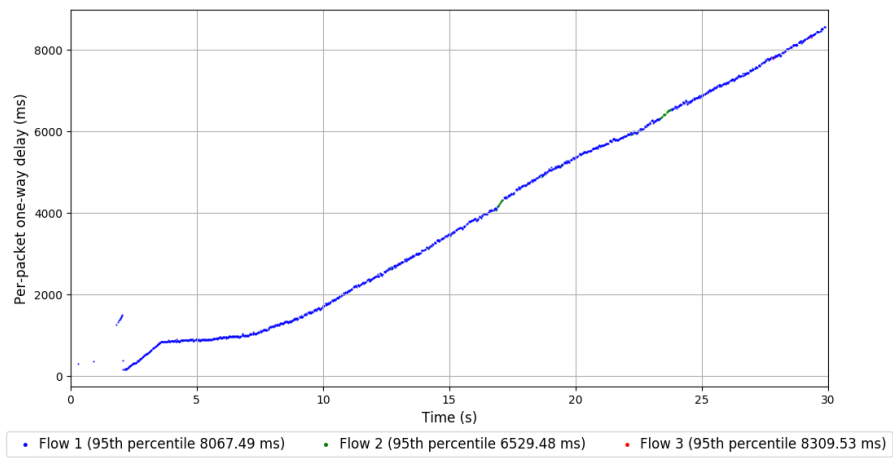
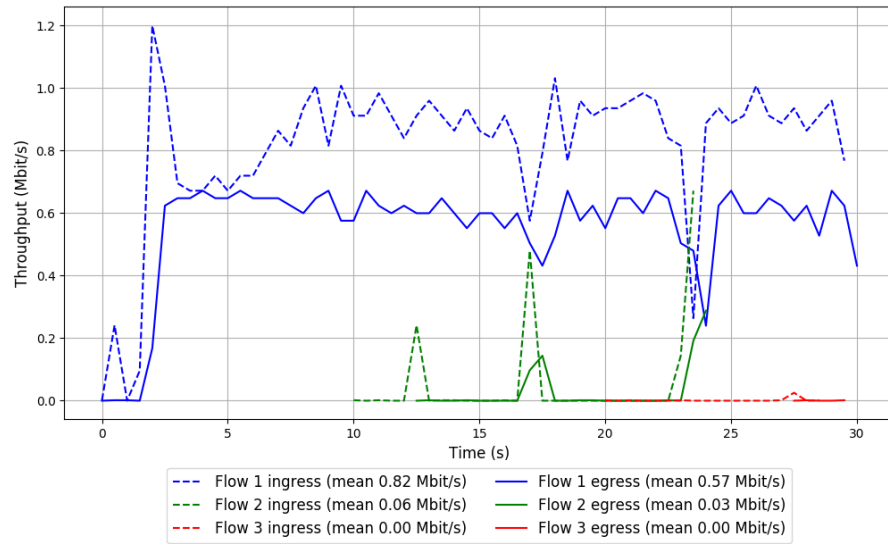
Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8309.535 ms

Loss rate: 90.68%



# Run 1: Report of TCP Cubic — Data Link

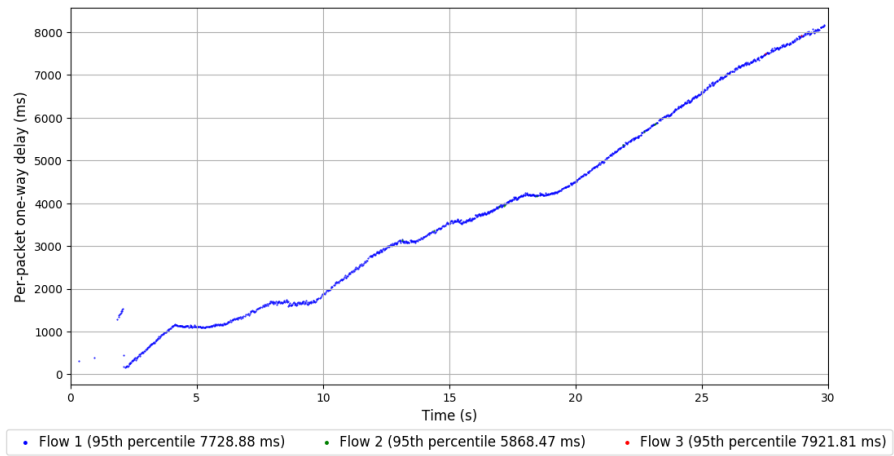
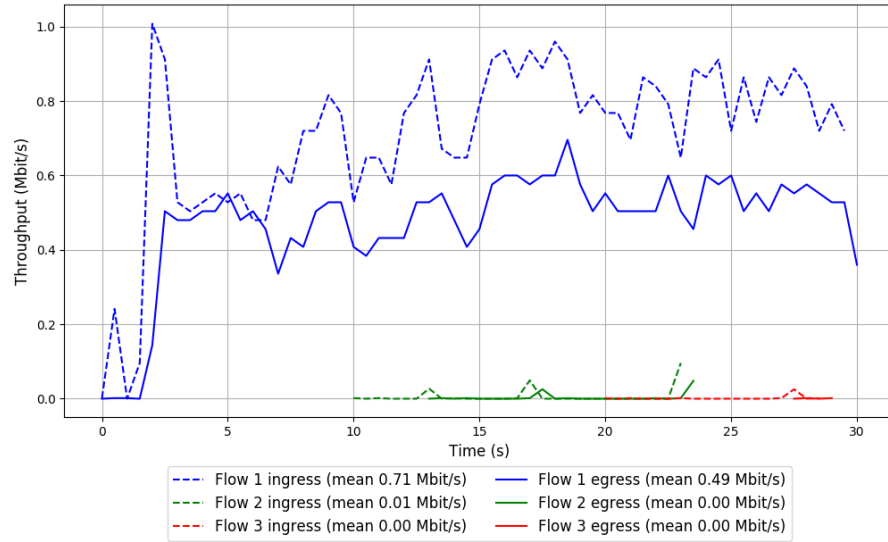


Run 2: Statistics of TCP Cubic

Start at: 2018-08-01 23:25:04  
End at: 2018-08-01 23:25:34  
Local clock offset: -6.304 ms  
Remote clock offset: 12.366 ms

# Below is generated by plot.py at 2018-08-01 23:48:52  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.49 Mbit/s  
95th percentile per-packet one-way delay: 7728.880 ms  
Loss rate: 31.92%  
-- Flow 1:  
Average throughput: 0.49 Mbit/s  
95th percentile per-packet one-way delay: 7728.880 ms  
Loss rate: 31.78%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 5868.470 ms  
Loss rate: 53.86%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 7921.810 ms  
Loss rate: 90.68%

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

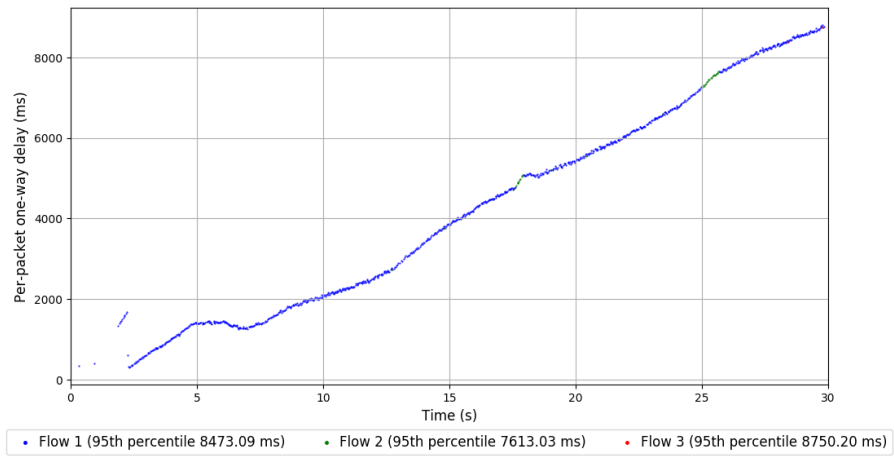
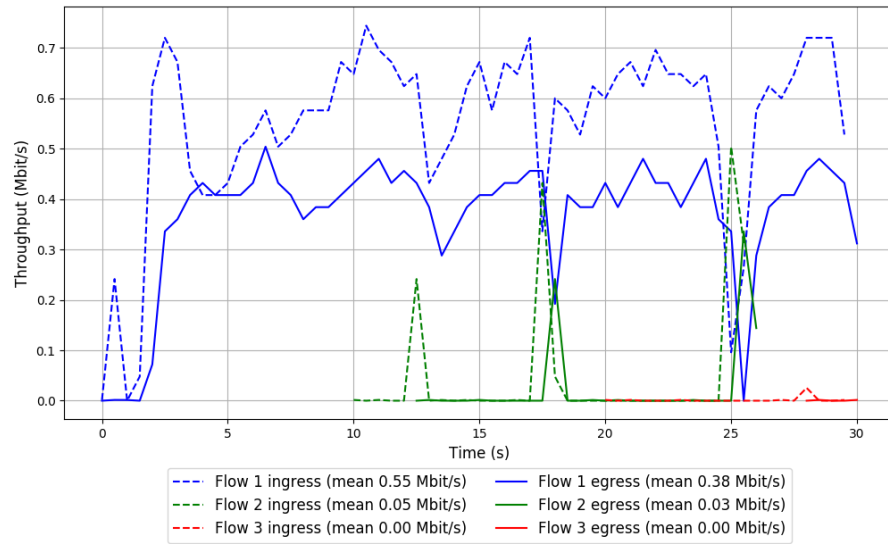


Run 3: Statistics of TCP Cubic

Start at: 2018-08-01 23:45:44  
End at: 2018-08-01 23:46:14  
Local clock offset: -6.264 ms  
Remote clock offset: 18.304 ms

# Below is generated by plot.py at 2018-08-01 23:48:54  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.39 Mbit/s  
95th percentile per-packet one-way delay: 8442.843 ms  
Loss rate: 32.94%  
-- Flow 1:  
Average throughput: 0.38 Mbit/s  
95th percentile per-packet one-way delay: 8473.095 ms  
Loss rate: 31.94%  
-- Flow 2:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 7613.030 ms  
Loss rate: 52.83%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 8750.202 ms  
Loss rate: 90.68%

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



Run 1: Statistics of FillP

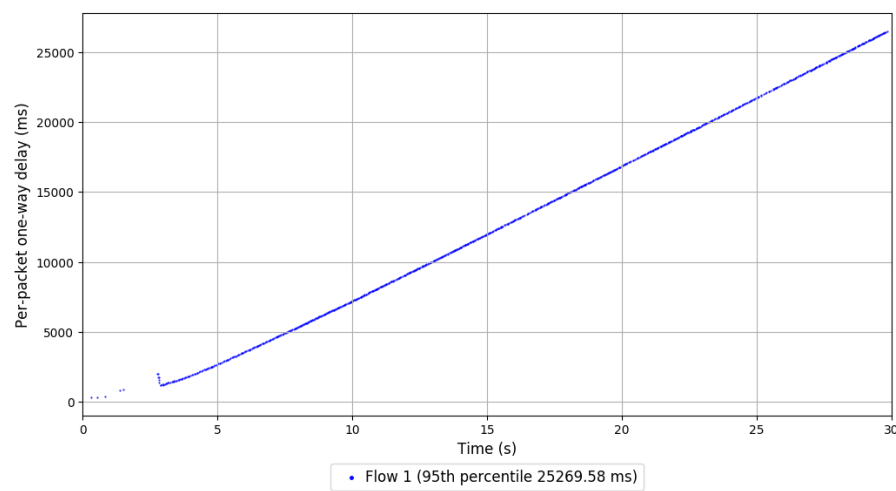
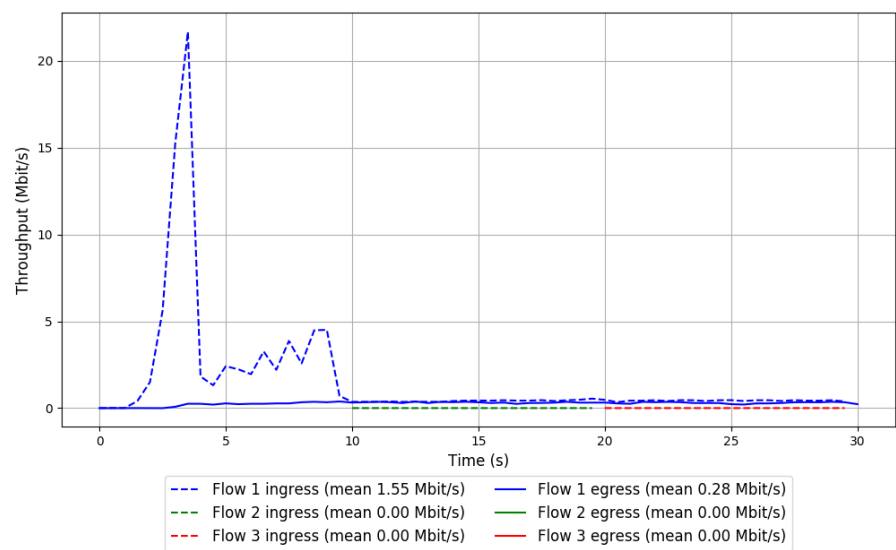
Start at: 2018-08-01 22:55:10

End at: 2018-08-01 22:55:40

Local clock offset: -5.114 ms

Remote clock offset: 5.368 ms

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-08-01 23:16:16

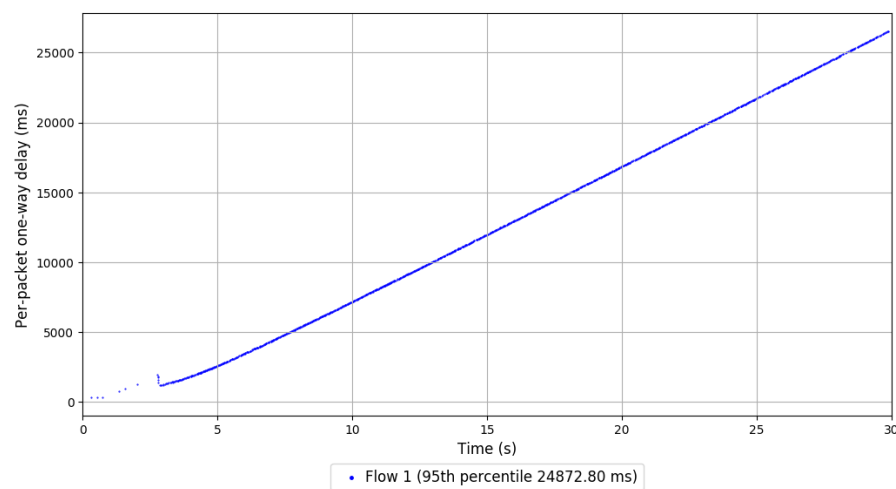
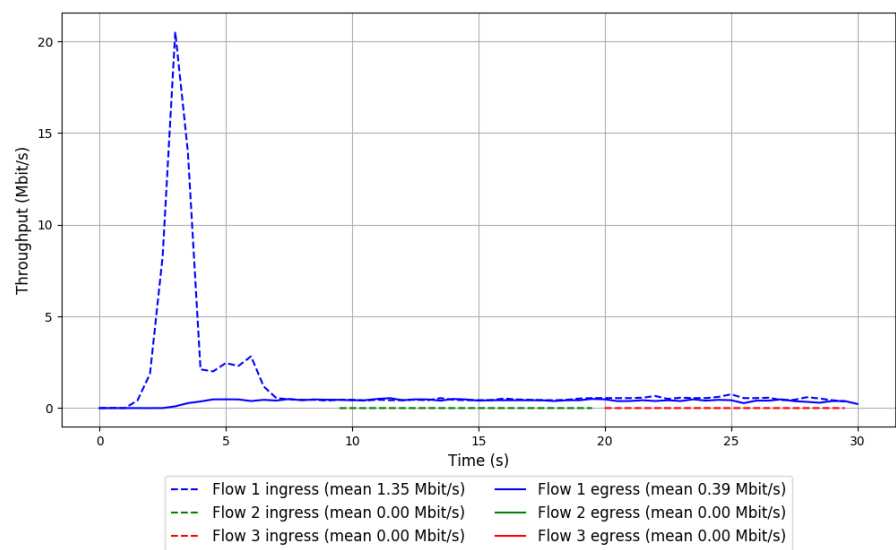
End at: 2018-08-01 23:16:46

Local clock offset: -6.277 ms

Remote clock offset: 10.057 ms



Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

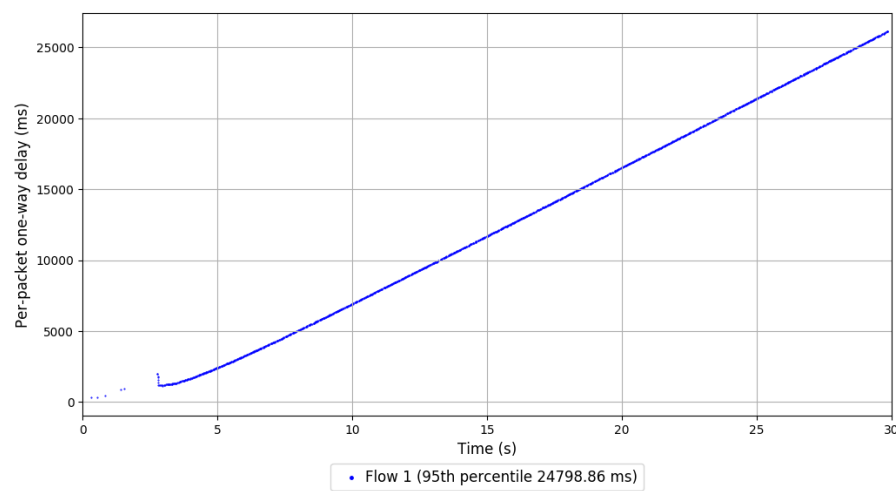
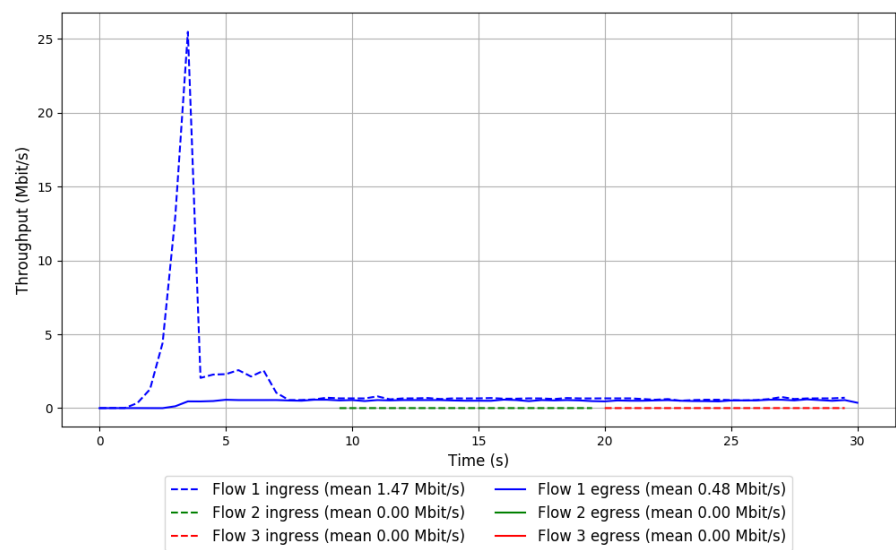
Start at: 2018-08-01 23:37:14

End at: 2018-08-01 23:37:44

Local clock offset: -6.267 ms

Remote clock offset: 17.126 ms

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

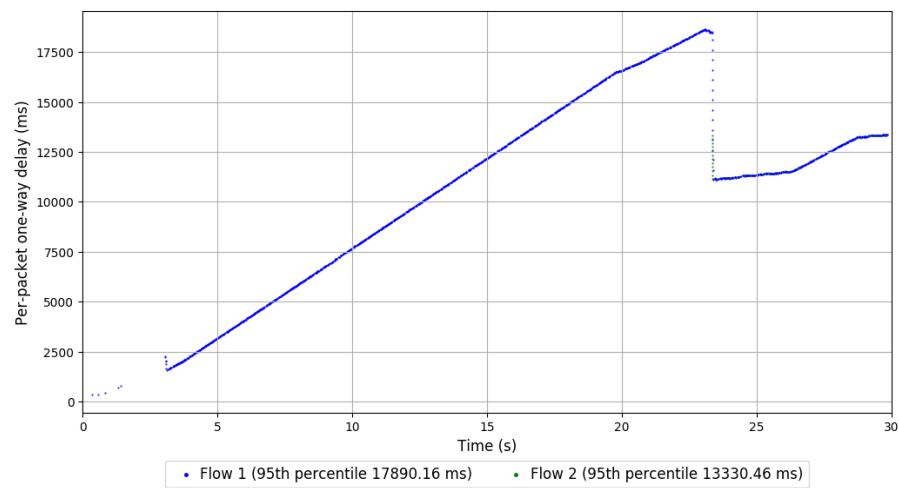
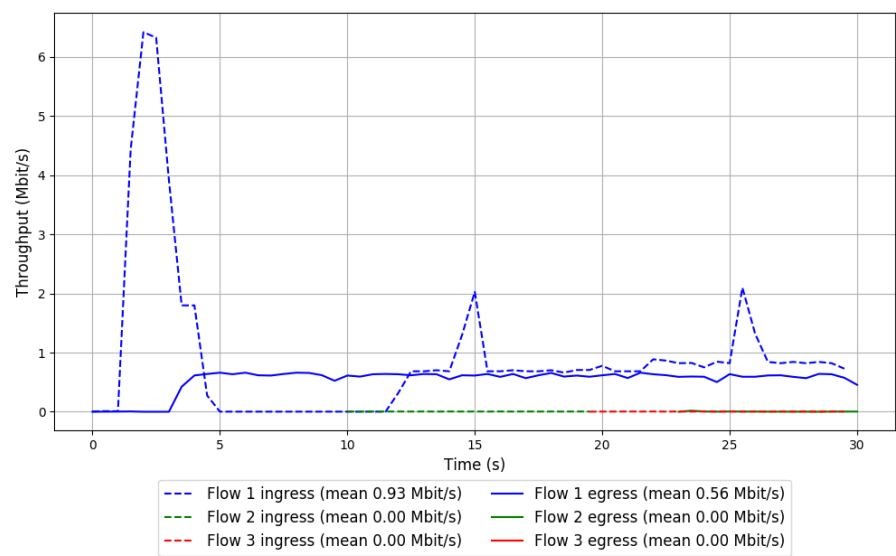
Start at: 2018-08-01 23:06:34

End at: 2018-08-01 23:07:04

Local clock offset: -6.022 ms

Remote clock offset: 8.735 ms

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

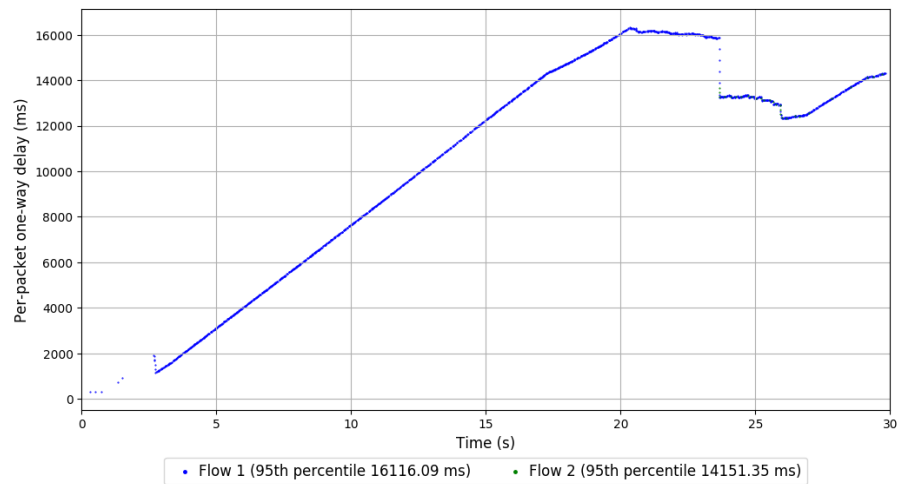
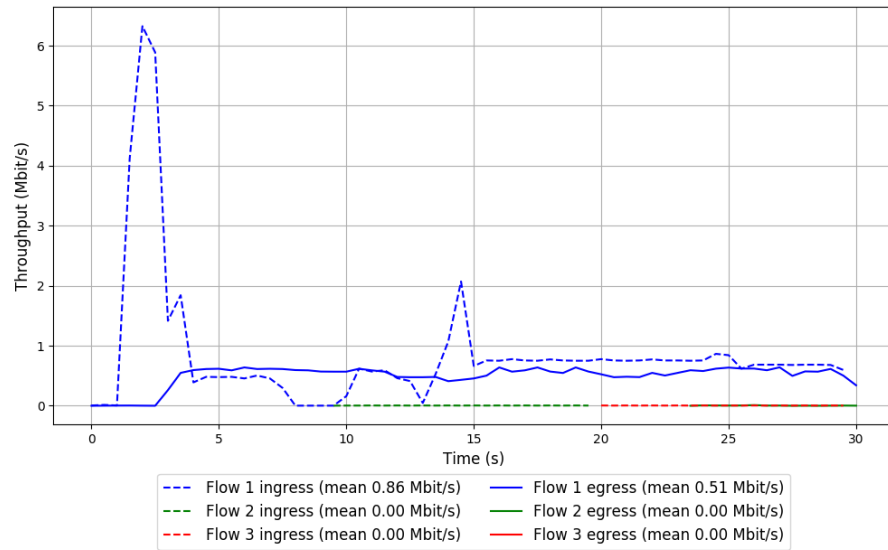
Start at: 2018-08-01 23:27:27

End at: 2018-08-01 23:27:57

Local clock offset: -6.26 ms

Remote clock offset: 14.587 ms

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



Run 3: Statistics of FillP-Sheep

Start at: 2018-08-01 23:48:08

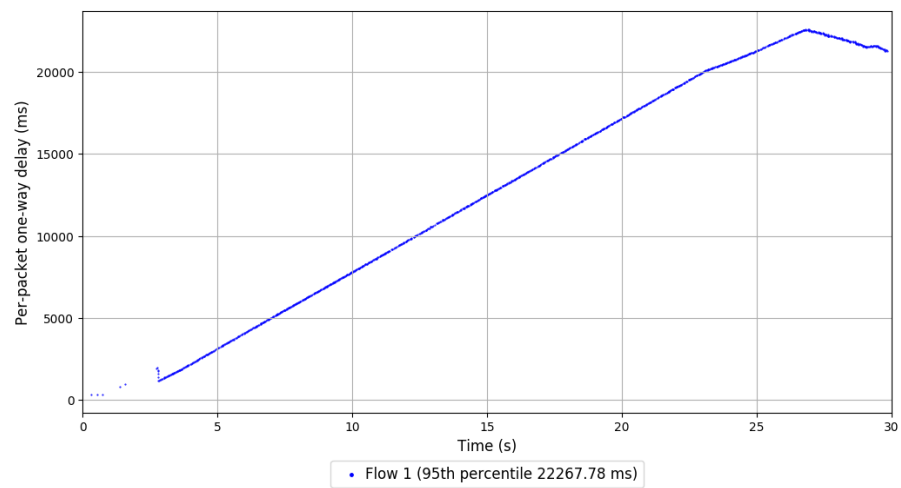
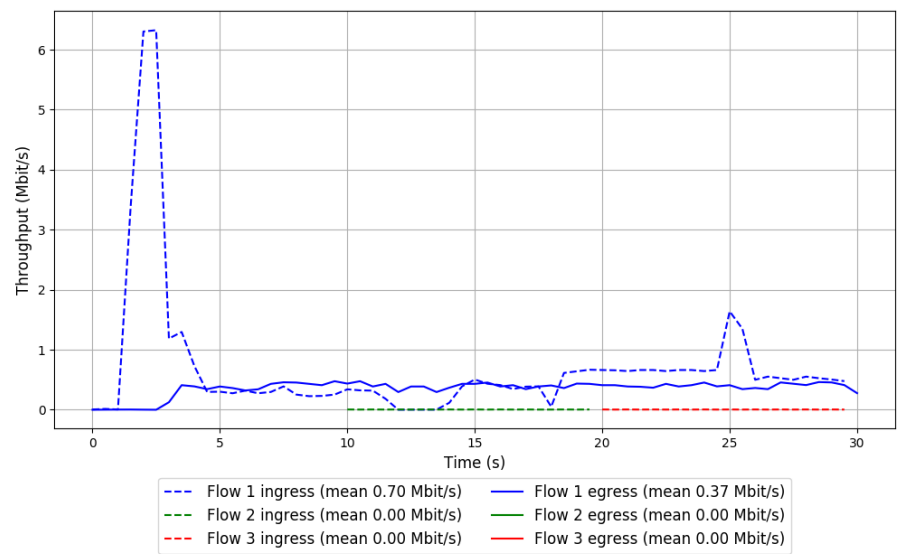
End at: 2018-08-01 23:48:38

Local clock offset: -6.173 ms

Remote clock offset: 18.479 ms



Run 3: Report of FillP-Sheep — Data Link

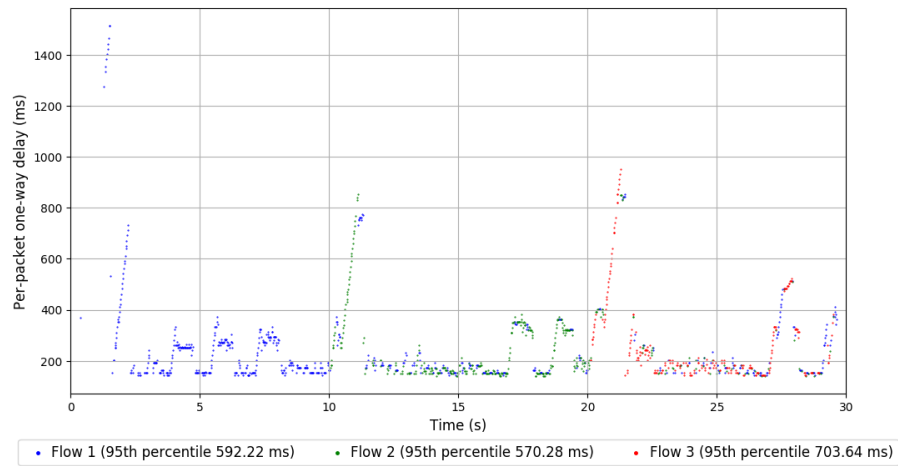
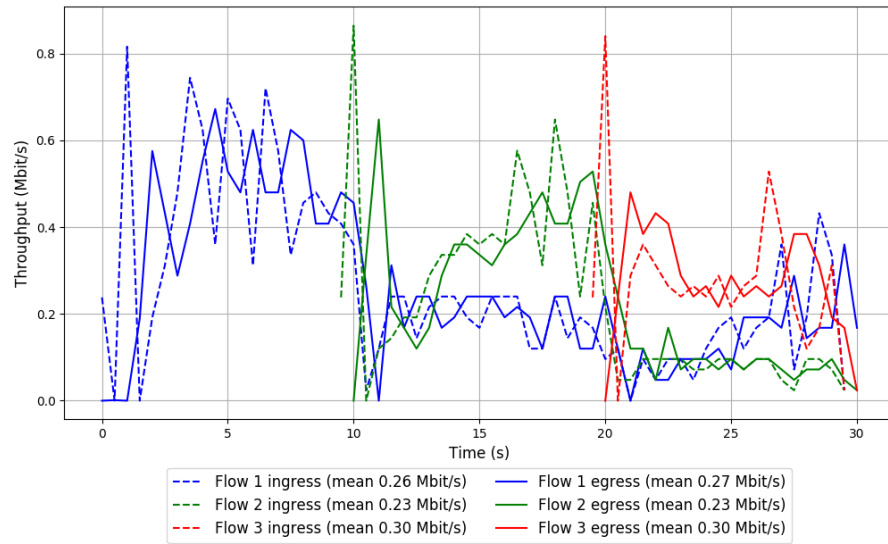


```
Run 1: Statistics of Indigo

Start at: 2018-08-01 22:47:57
End at: 2018-08-01 22:48:27
Local clock offset: -4.743 ms
Remote clock offset: 7.636 ms

# Below is generated by plot.py at 2018-08-01 23:48:58
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 622.053 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 592.222 ms
Loss rate: 0.92%
-- Flow 2:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 570.276 ms
Loss rate: 0.53%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 703.638 ms
Loss rate: 2.46%
```

# Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-01 23:08:57

End at: 2018-08-01 23:09:27

Local clock offset: -6.097 ms

Remote clock offset: 9.866 ms

# Below is generated by plot.py at 2018-08-01 23:48:59

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 662.350 ms

Loss rate: 0.97%

-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 572.724 ms

Loss rate: 0.27%

-- Flow 2:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 669.944 ms

Loss rate: 1.29%

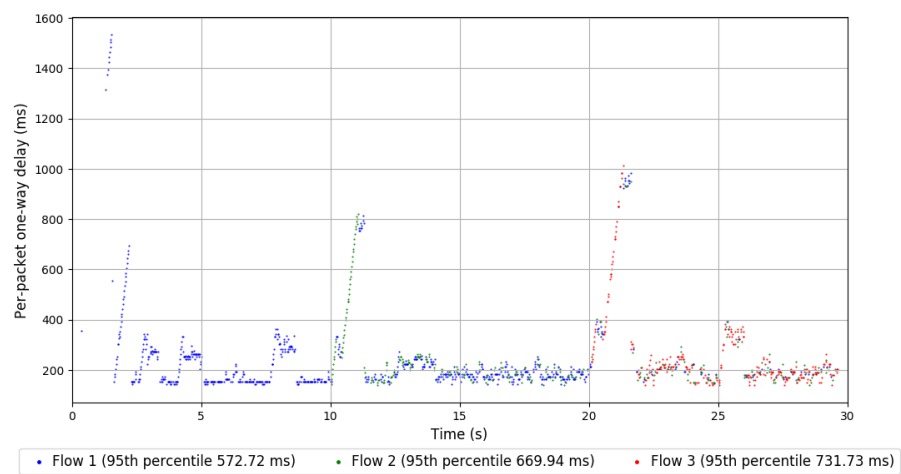
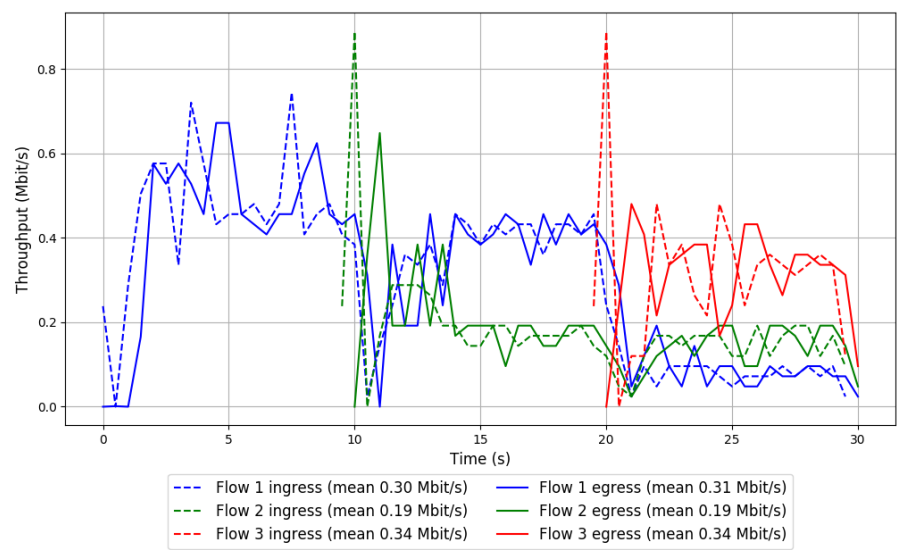
-- Flow 3:

Average throughput: 0.34 Mbit/s

95th percentile per-packet one-way delay: 731.728 ms

Loss rate: 2.53%

Run 2: Report of Indigo — Data Link

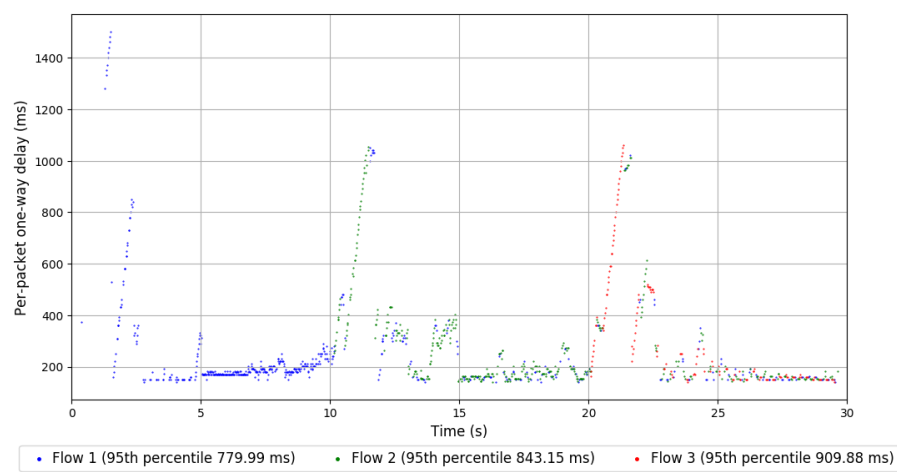
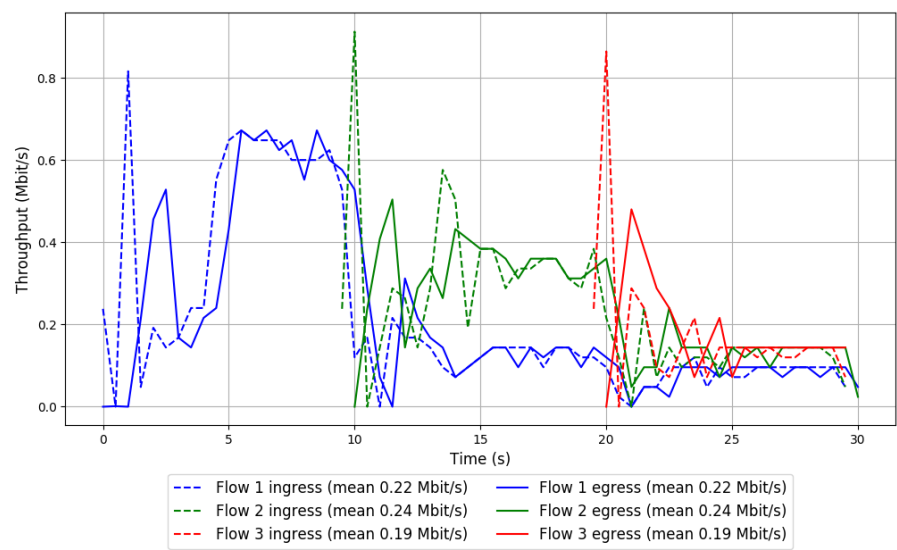


Run 3: Statistics of Indigo

Start at: 2018-08-01 23:29:51  
End at: 2018-08-01 23:30:21  
Local clock offset: -6.255 ms  
Remote clock offset: 11.465 ms

# Below is generated by plot.py at 2018-08-01 23:48:59  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.44 Mbit/s  
95th percentile per-packet one-way delay: 843.146 ms  
Loss rate: 0.73%  
-- Flow 1:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 779.989 ms  
Loss rate: 0.37%  
-- Flow 2:  
Average throughput: 0.24 Mbit/s  
95th percentile per-packet one-way delay: 843.146 ms  
Loss rate: 0.76%  
-- Flow 3:  
Average throughput: 0.19 Mbit/s  
95th percentile per-packet one-way delay: 909.883 ms  
Loss rate: 1.96%

Run 3: Report of Indigo — Data Link



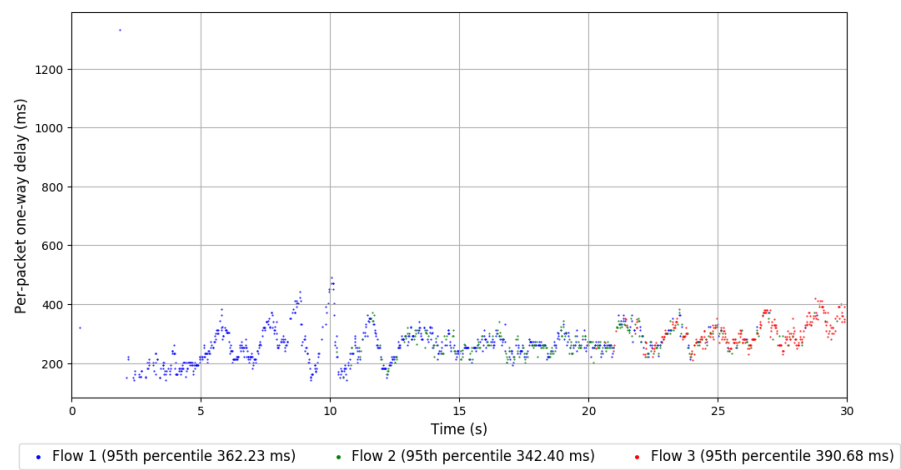
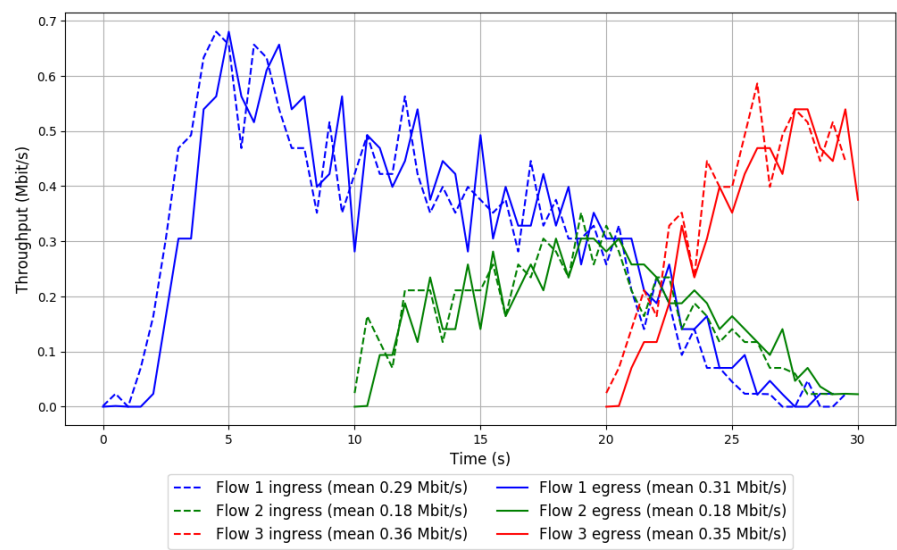
```
Run 1: Statistics of LEDBAT

Start at: 2018-08-01 22:51:31
End at: 2018-08-01 22:52:01
Local clock offset: -4.727 ms
Remote clock offset: 4.101 ms

# Below is generated by plot.py at 2018-08-01 23:49:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 370.532 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 362.231 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 342.397 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 390.681 ms
Loss rate: 5.54%
```



Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-08-01 23:12:32

End at: 2018-08-01 23:13:02

Local clock offset: -6.173 ms

Remote clock offset: 9.922 ms

# Below is generated by plot.py at 2018-08-01 23:49:01

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 449.394 ms

Loss rate: 1.55%

-- Flow 1:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 358.741 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 458.706 ms

Loss rate: 0.56%

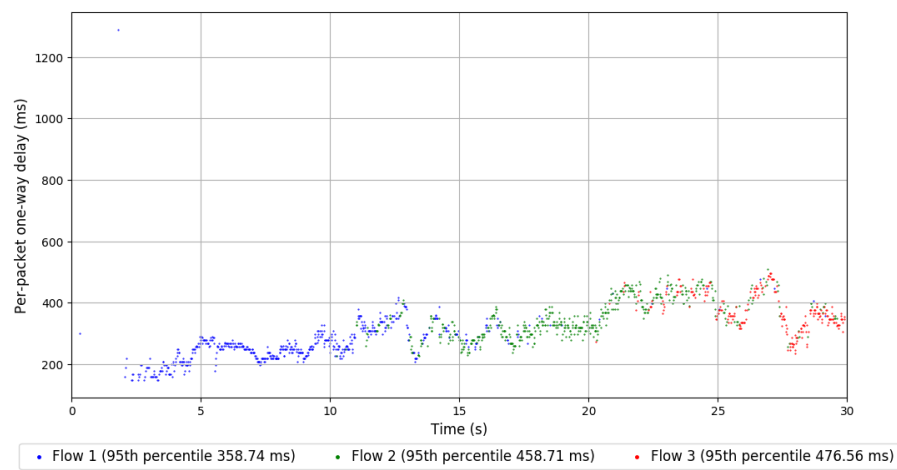
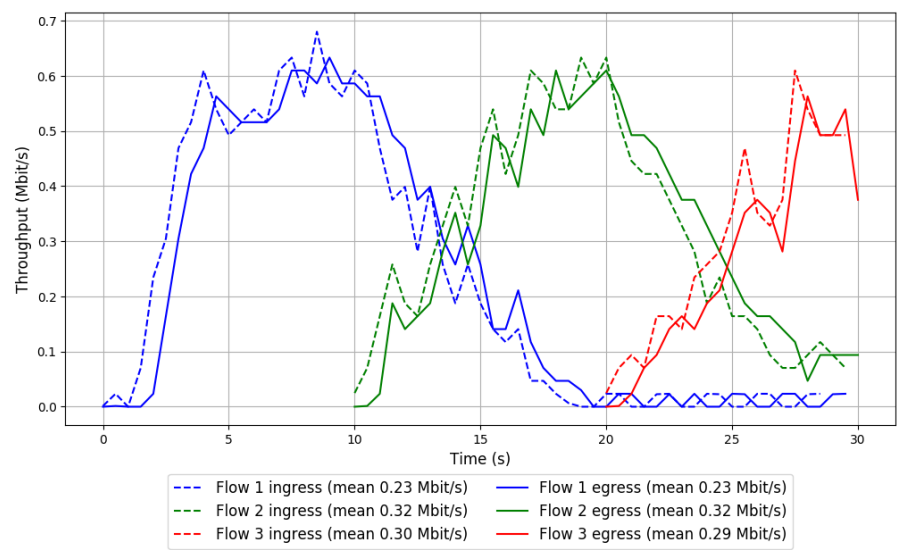
-- Flow 3:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 476.559 ms

Loss rate: 7.03%

Run 2: Report of LEDBAT — Data Link

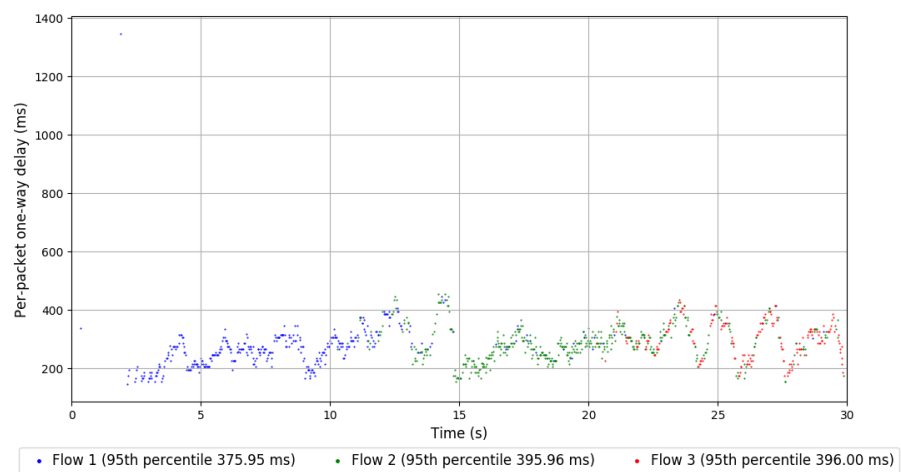
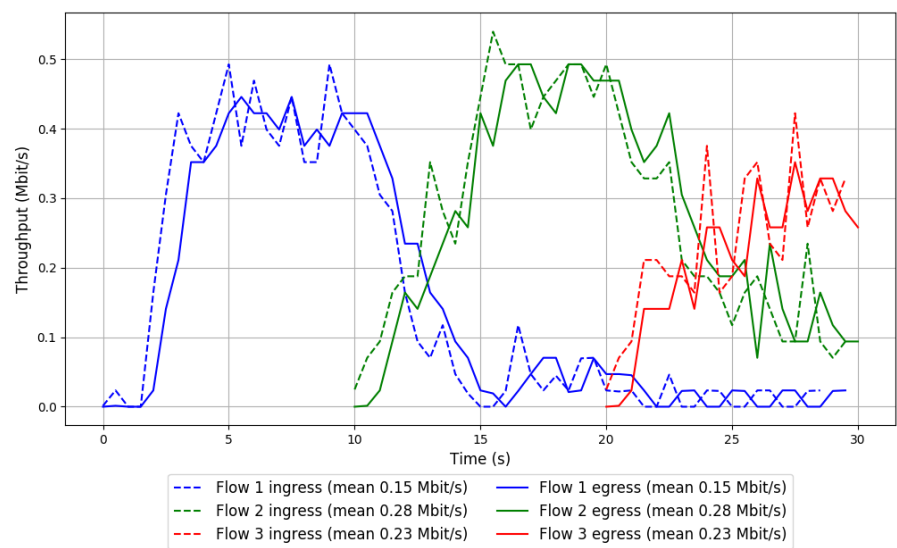


Run 3: Statistics of LEDBAT

Start at: 2018-08-01 23:33:32  
End at: 2018-08-01 23:34:02  
Local clock offset: -6.233 ms  
Remote clock offset: 16.327 ms

# Below is generated by plot.py at 2018-08-01 23:49:01  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.41 Mbit/s  
95th percentile per-packet one-way delay: 395.728 ms  
Loss rate: 1.25%  
-- Flow 1:  
Average throughput: 0.15 Mbit/s  
95th percentile per-packet one-way delay: 375.953 ms  
Loss rate: 0.00%  
-- Flow 2:  
Average throughput: 0.28 Mbit/s  
95th percentile per-packet one-way delay: 395.962 ms  
Loss rate: 0.64%  
-- Flow 3:  
Average throughput: 0.23 Mbit/s  
95th percentile per-packet one-way delay: 395.997 ms  
Loss rate: 5.07%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

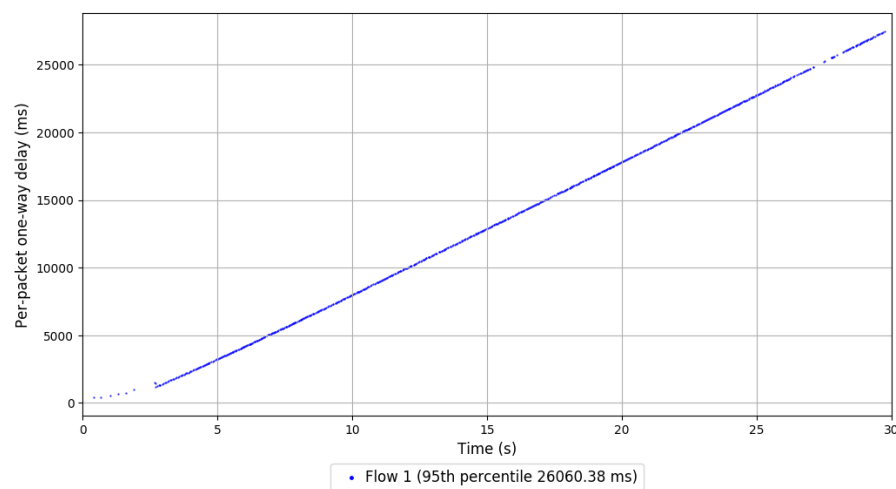
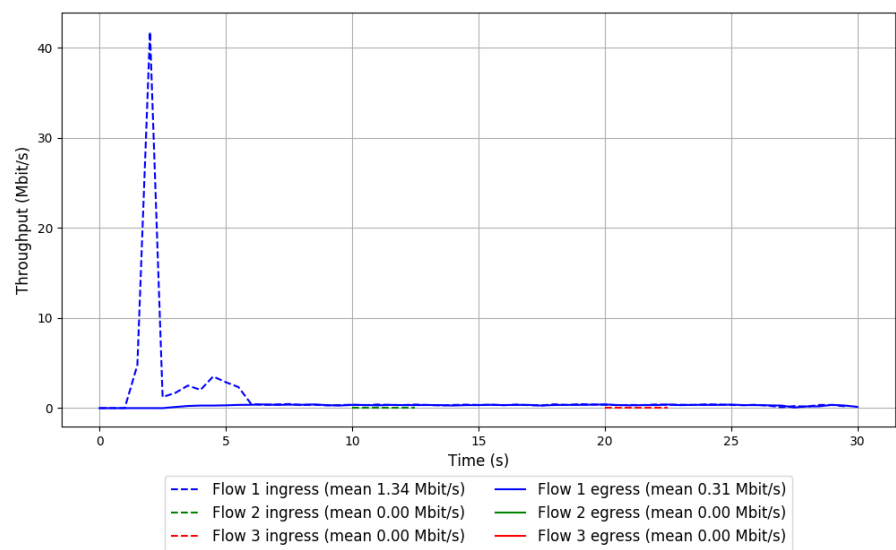
Start at: 2018-08-01 22:57:53

End at: 2018-08-01 22:58:23

Local clock offset: -5.418 ms

Remote clock offset: 4.506 ms

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-08-01 23:18:51

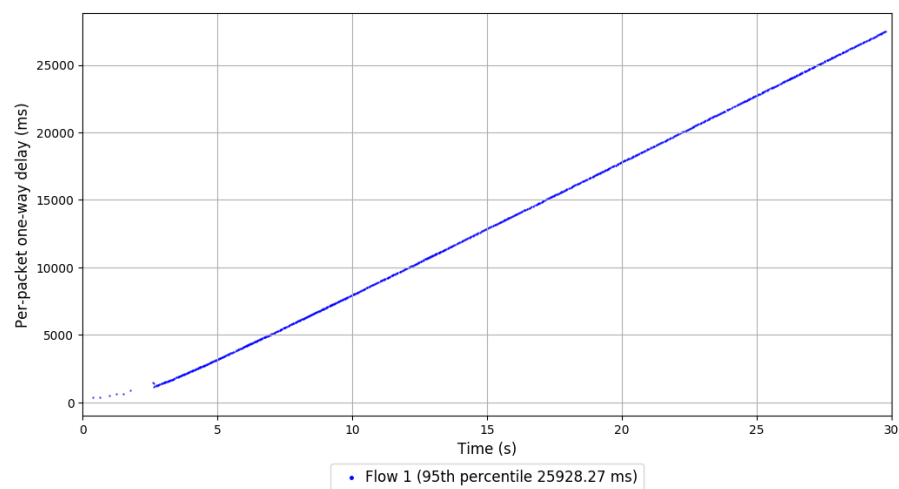
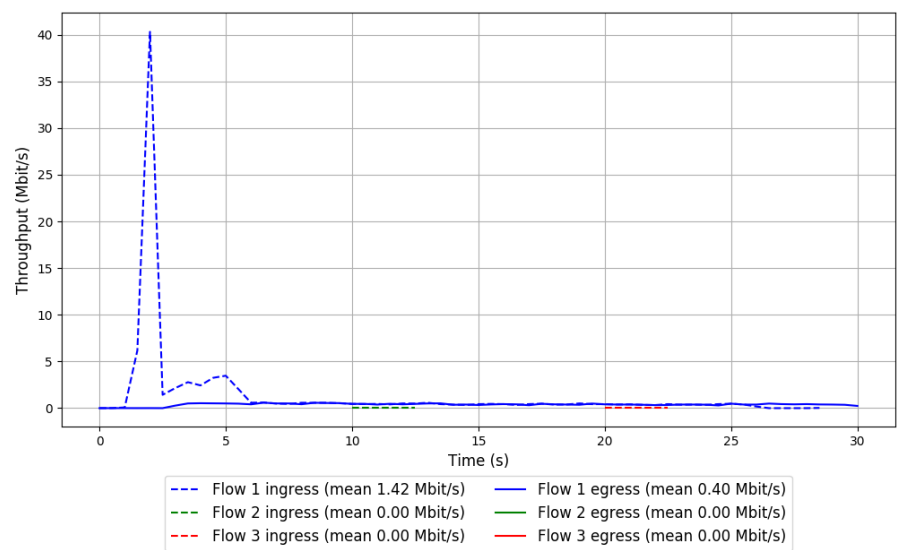
End at: 2018-08-01 23:19:21

Local clock offset: -6.276 ms

Remote clock offset: 6.448 ms



Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

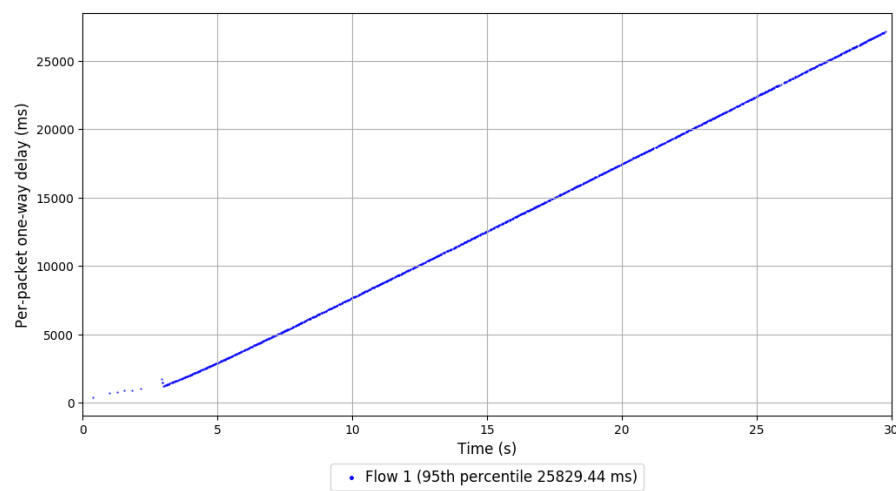
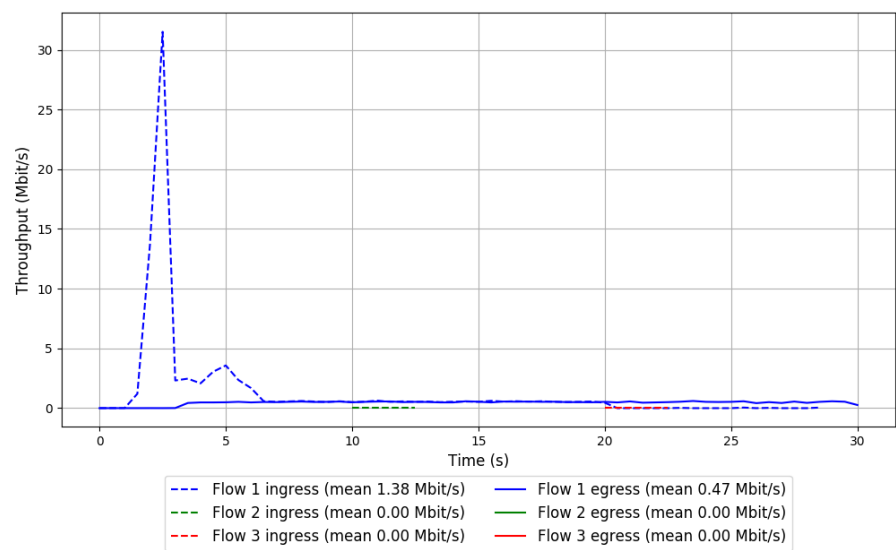
Start at: 2018-08-01 23:39:47

End at: 2018-08-01 23:40:17

Local clock offset: -6.197 ms

Remote clock offset: 18.641 ms

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

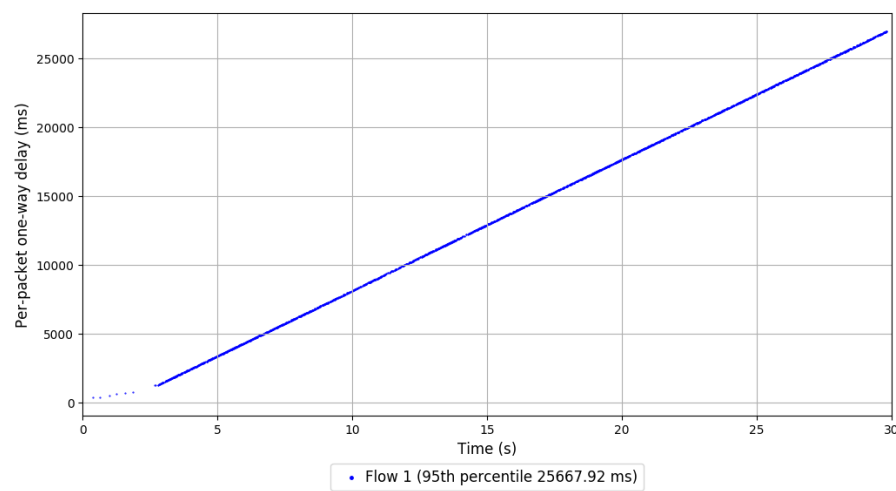
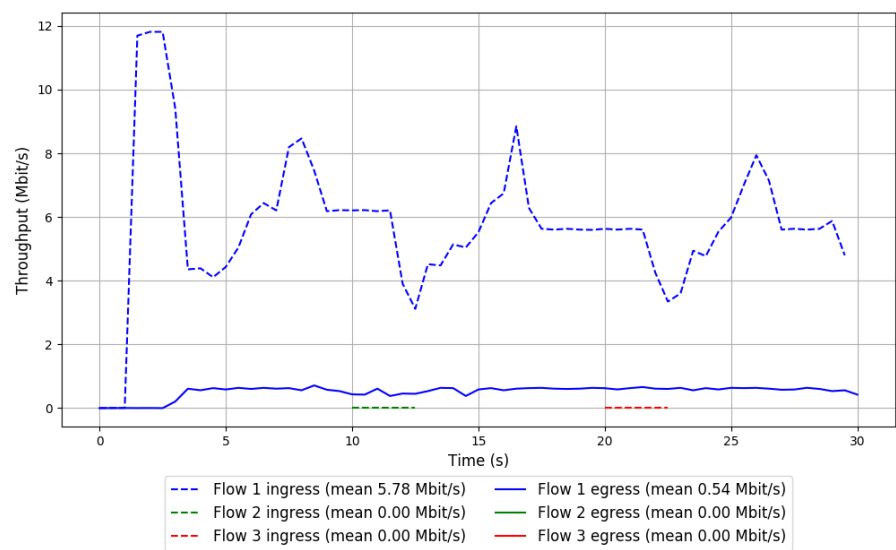
Start at: 2018-08-01 22:49:08

End at: 2018-08-01 22:49:38

Local clock offset: -4.694 ms

Remote clock offset: 4.919 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

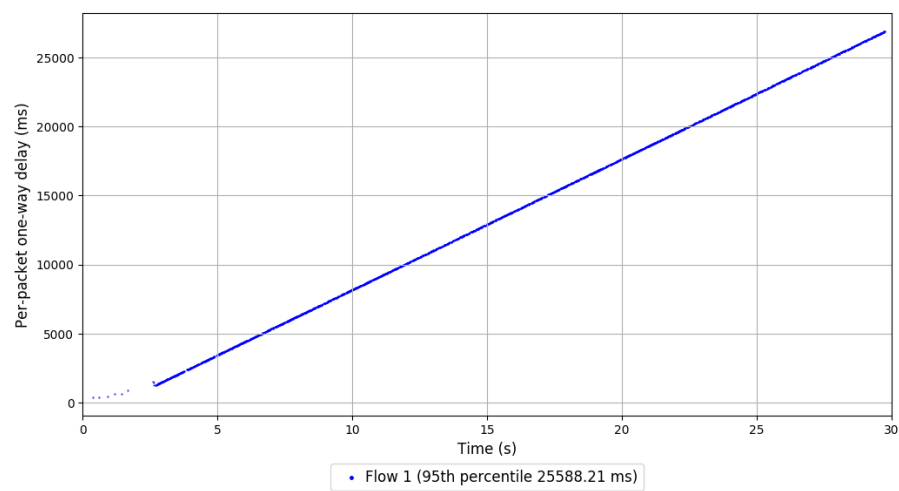
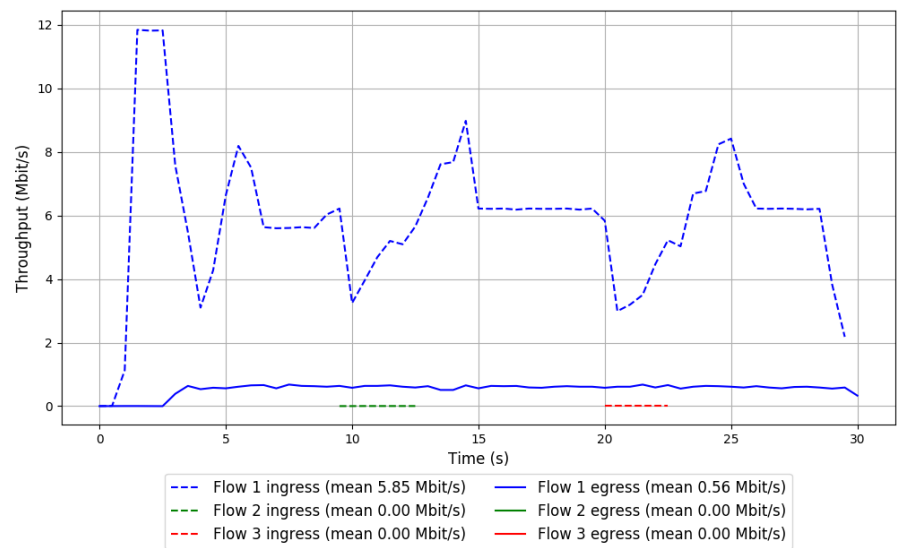
Start at: 2018-08-01 23:10:09

End at: 2018-08-01 23:10:39

Local clock offset: -6.136 ms

Remote clock offset: 6.154 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2018-08-01 23:31:03

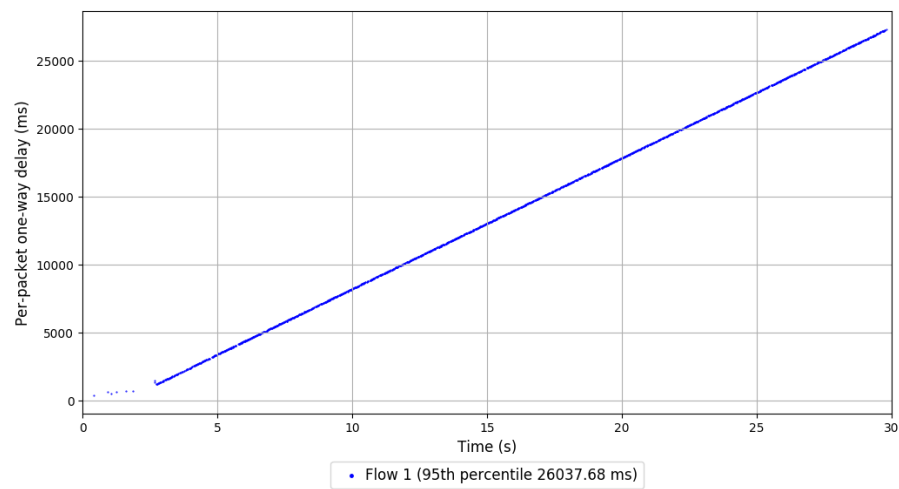
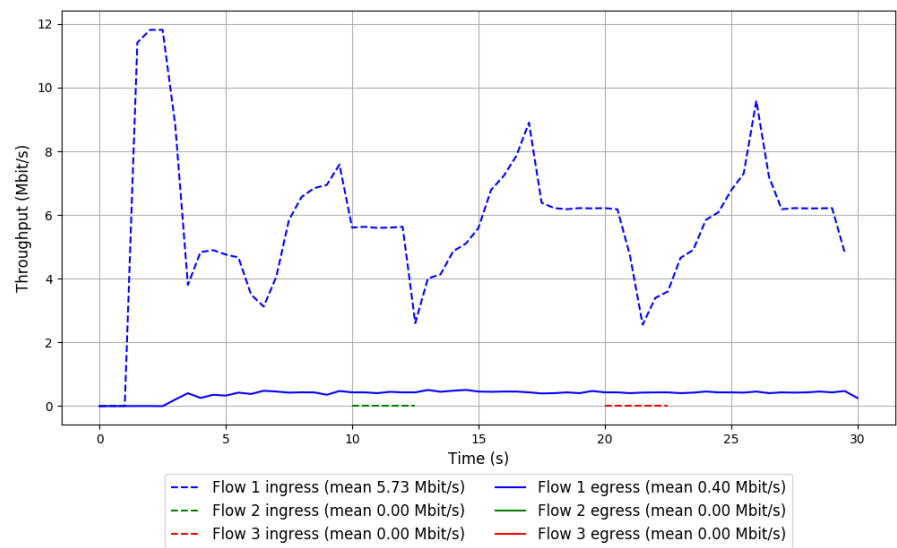
End at: 2018-08-01 23:31:33

Local clock offset: -6.287 ms

Remote clock offset: 10.739 ms



Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-08-01 23:00:36

End at: 2018-08-01 23:01:06

Local clock offset: -5.671 ms

Remote clock offset: 10.45 ms

# Below is generated by plot.py at 2018-08-01 23:49:13

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.59 Mbit/s

95th percentile per-packet one-way delay: 8811.472 ms

Loss rate: 32.67%

-- Flow 1:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8810.113 ms

Loss rate: 32.85%

-- Flow 2:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 8304.457 ms

Loss rate: 0.00%

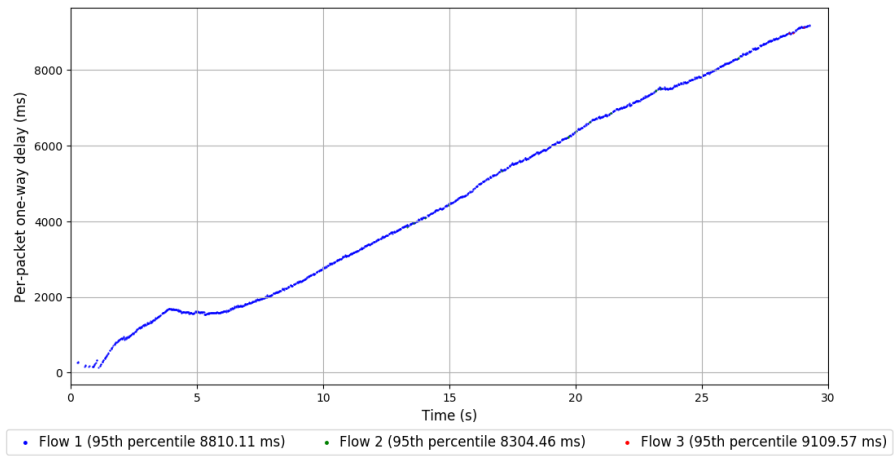
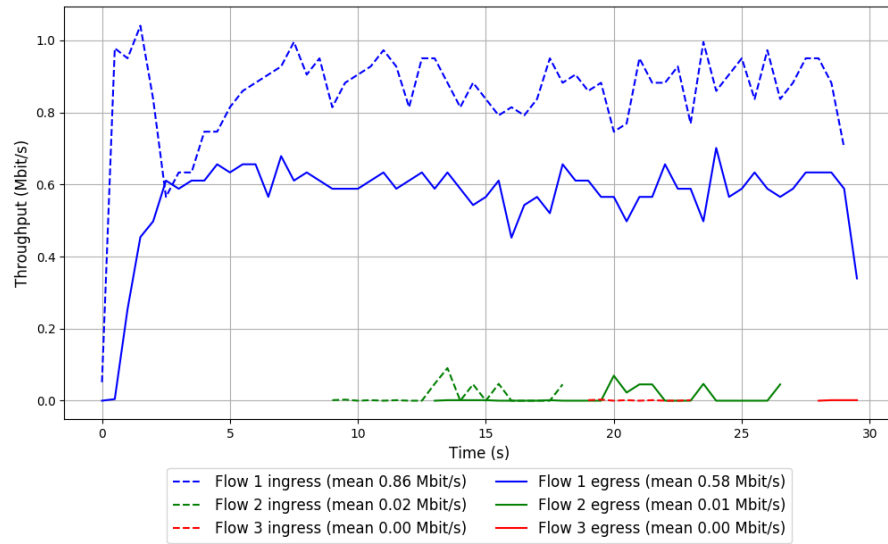
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 9109.569 ms

Loss rate: 50.00%

# Run 1: Report of QUIC Cubic — Data Link

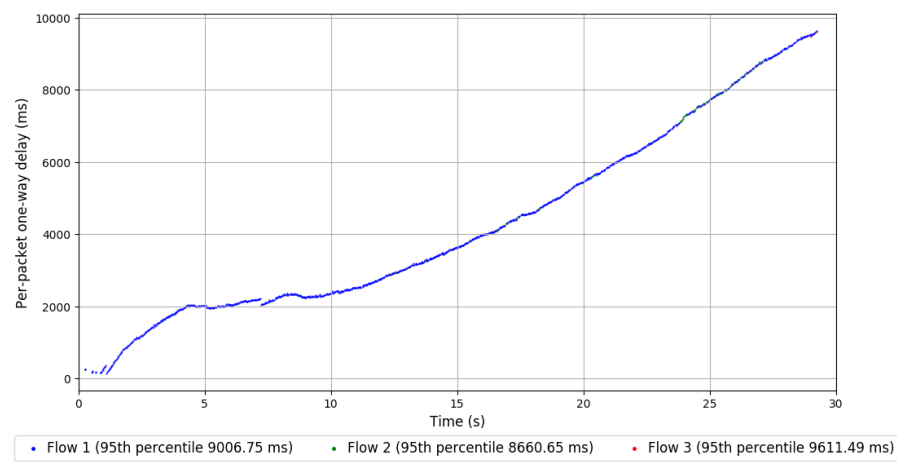
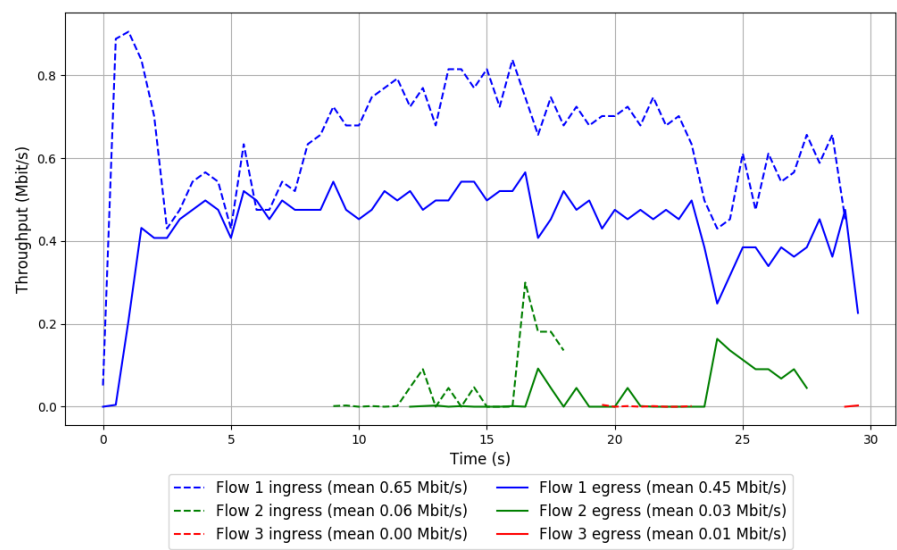


Run 2: Statistics of QUIC Cubic

Start at: 2018-08-01 23:21:29  
End at: 2018-08-01 23:21:59  
Local clock offset: -6.307 ms  
Remote clock offset: 10.383 ms

# Below is generated by plot.py at 2018-08-01 23:49:13  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.47 Mbit/s  
95th percentile per-packet one-way delay: 8999.021 ms  
Loss rate: 30.51%  
-- Flow 1:  
Average throughput: 0.45 Mbit/s  
95th percentile per-packet one-way delay: 9006.752 ms  
Loss rate: 31.34%  
-- Flow 2:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 8660.645 ms  
Loss rate: 0.00%  
-- Flow 3:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 9611.490 ms  
Loss rate: 66.67%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

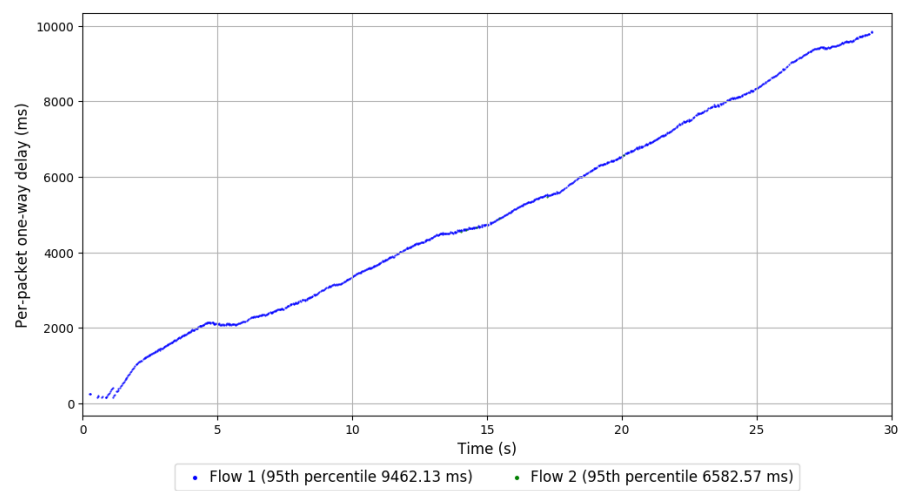
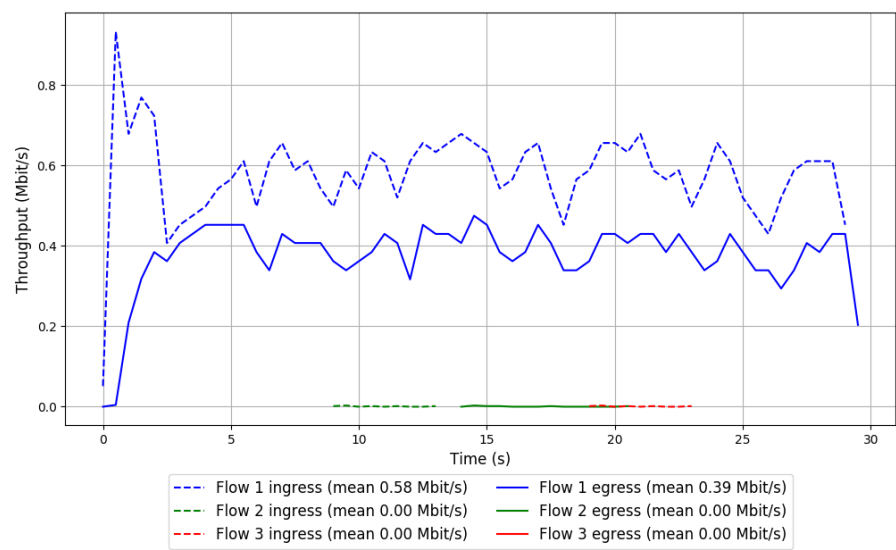
Start at: 2018-08-01 23:42:10

End at: 2018-08-01 23:42:40

Local clock offset: -6.2 ms

Remote clock offset: 16.817 ms

Run 3: Report of QUIC Cubic — Data Link



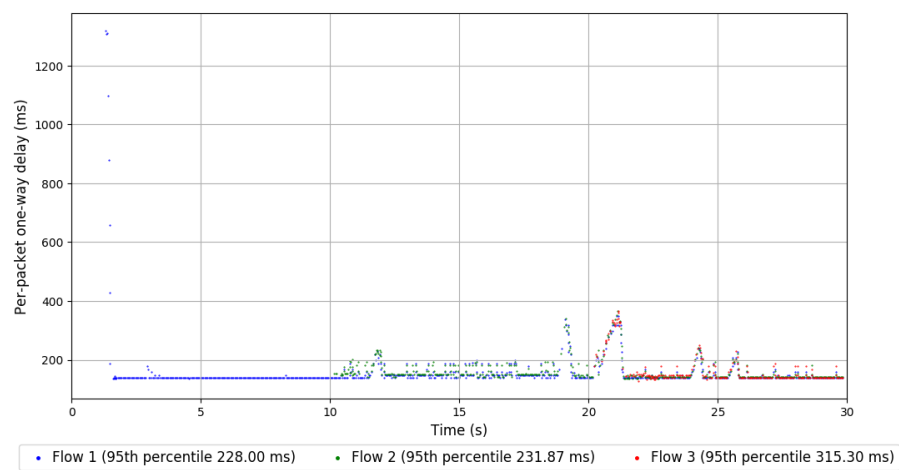
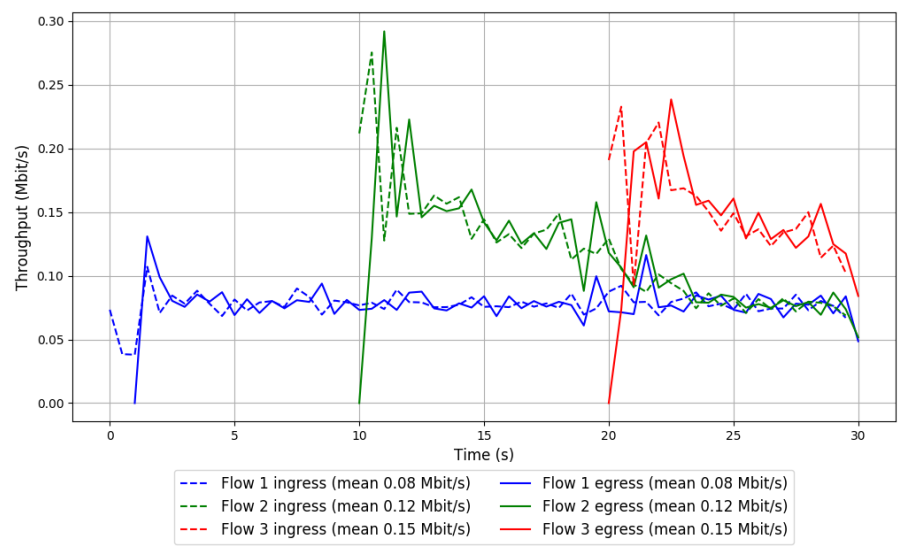
```
Run 1: Statistics of SCReAM

Start at: 2018-08-01 22:46:45
End at: 2018-08-01 22:47:15
Local clock offset: -4.848 ms
Remote clock offset: 4.89 ms

# Below is generated by plot.py at 2018-08-01 23:49:13
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 241.668 ms
Loss rate: 1.05%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 227.996 ms
Loss rate: 0.79%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 231.867 ms
Loss rate: 0.82%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 315.301 ms
Loss rate: 1.81%
```



Run 1: Report of SReAM — Data Link

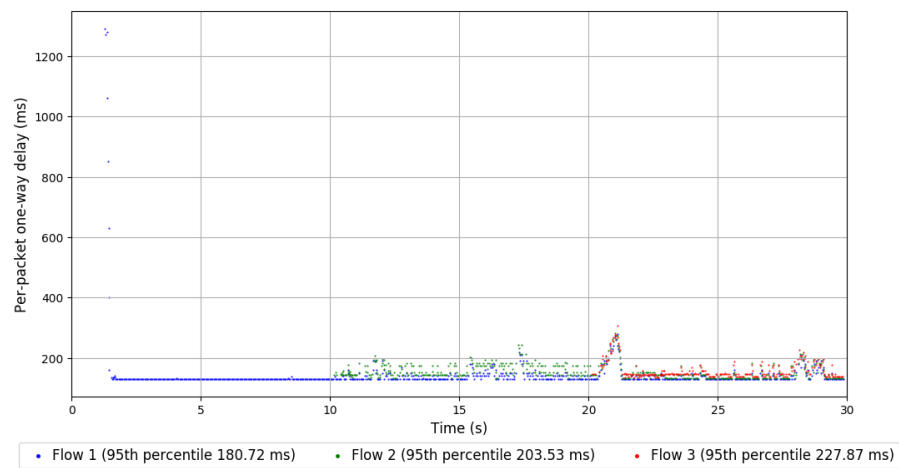
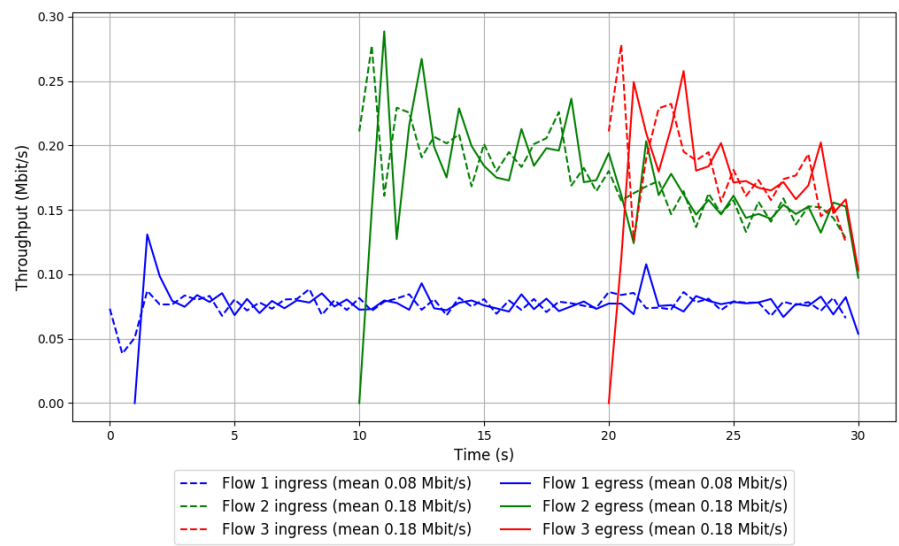


Run 2: Statistics of SCReAM

Start at: 2018-08-01 23:07:46  
End at: 2018-08-01 23:08:16  
Local clock offset: -6.118 ms  
Remote clock offset: 4.877 ms

# Below is generated by plot.py at 2018-08-01 23:49:13  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.26 Mbit/s  
95th percentile per-packet one-way delay: 198.055 ms  
Loss rate: 1.10%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 180.715 ms  
Loss rate: 0.66%  
-- Flow 2:  
Average throughput: 0.18 Mbit/s  
95th percentile per-packet one-way delay: 203.526 ms  
Loss rate: 1.02%  
-- Flow 3:  
Average throughput: 0.18 Mbit/s  
95th percentile per-packet one-way delay: 227.866 ms  
Loss rate: 1.83%

Run 2: Report of SReAM — Data Link

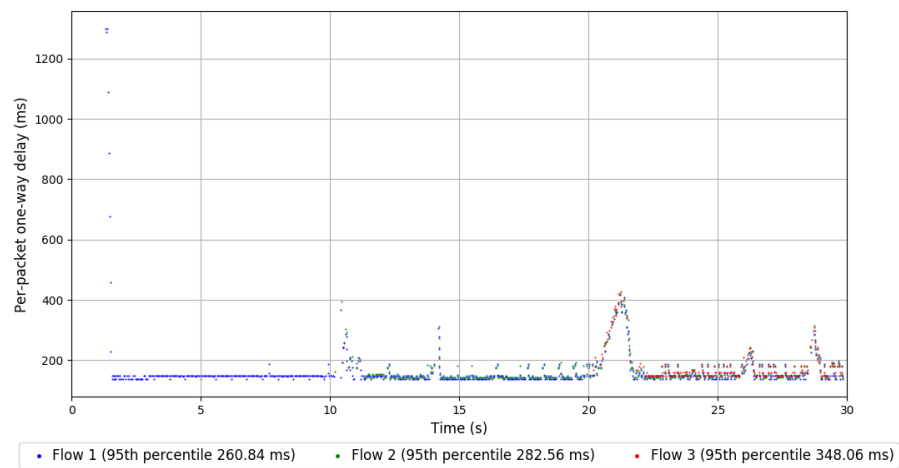
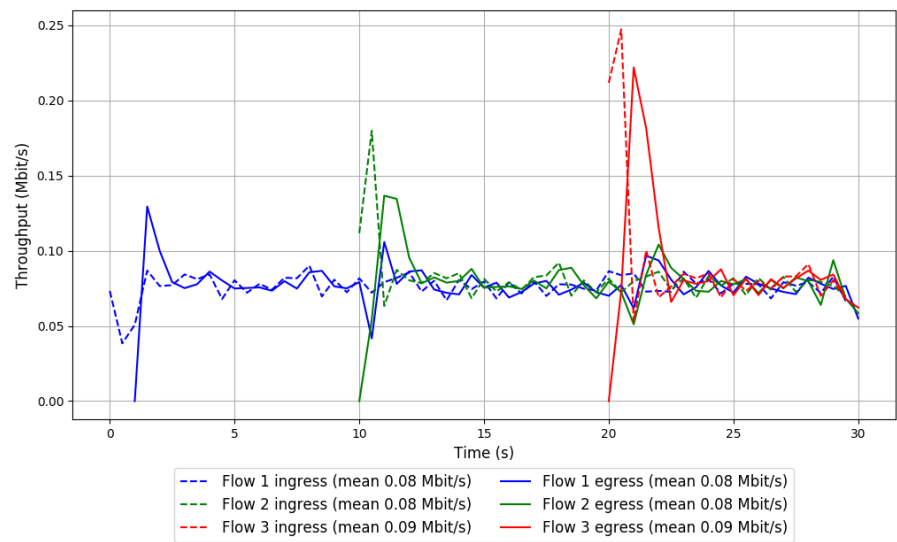


Run 3: Statistics of SReAM

Start at: 2018-08-01 23:28:39  
End at: 2018-08-01 23:29:09  
Local clock offset: -6.333 ms  
Remote clock offset: 11.081 ms

# Below is generated by plot.py at 2018-08-01 23:49:13  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.17 Mbit/s  
95th percentile per-packet one-way delay: 287.726 ms  
Loss rate: 1.15%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 260.843 ms  
Loss rate: 0.79%  
-- Flow 2:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 282.558 ms  
Loss rate: 1.21%  
-- Flow 3:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 348.064 ms  
Loss rate: 1.94%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

/home/ubuntu/pantheon/data/2018-08-01T22-46-Colombia-ppp0-to-AWS-Brazil-2-3-runs-3-flows/spr

Run 1: Report of Sprout — Data Link

Figure is missing

Figure is missing

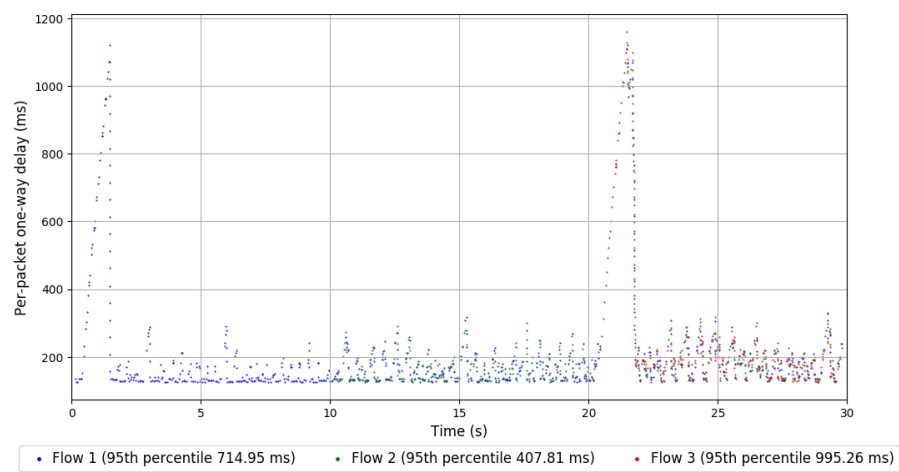
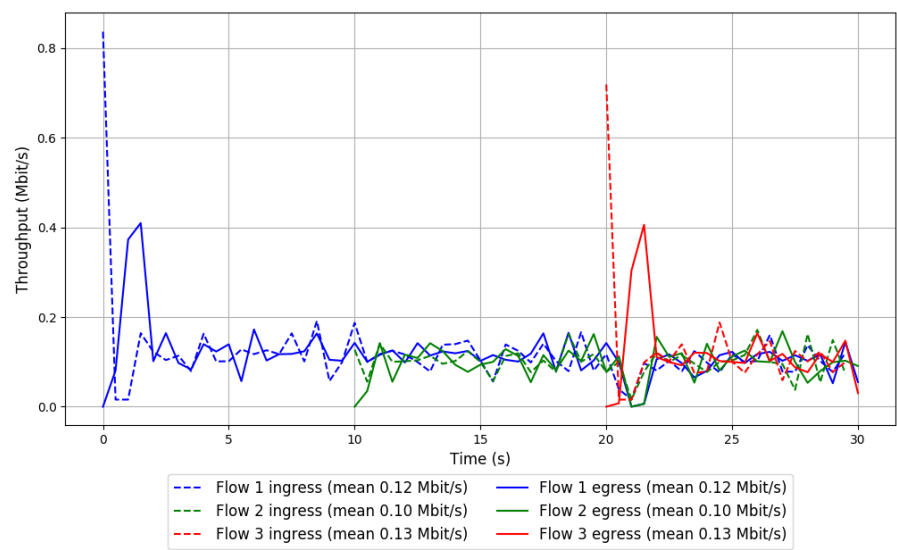
## Run 2: Statistics of Sprout

Start at: 2018-08-01 23:17:39  
End at: 2018-08-01 23:18:09  
Local clock offset: -6.259 ms  
Remote clock offset: 9.069 ms

```
# Below is generated by plot.py at 2018-08-01 23:49:13
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 772.011 ms
Loss rate: 1.59%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 714.953 ms
Loss rate: 1.02%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 407.806 ms
Loss rate: 1.79%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 995.257 ms
Loss rate: 2.88%
```



Run 2: Report of Sprout — Data Link

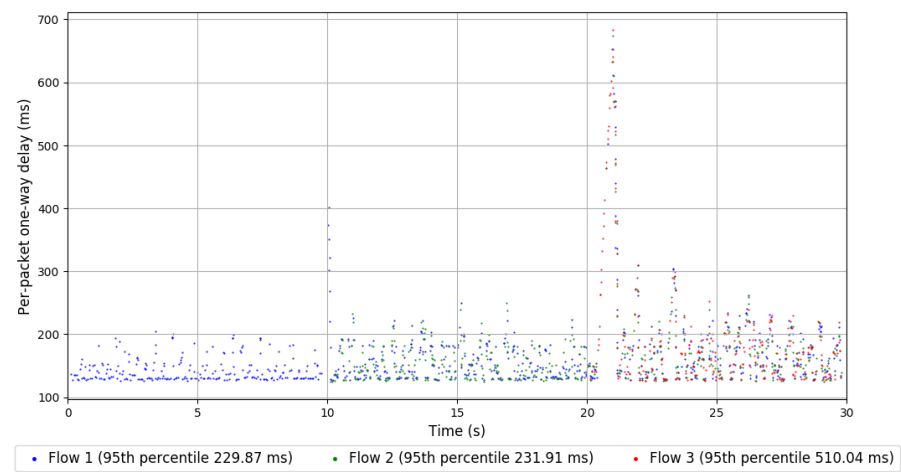
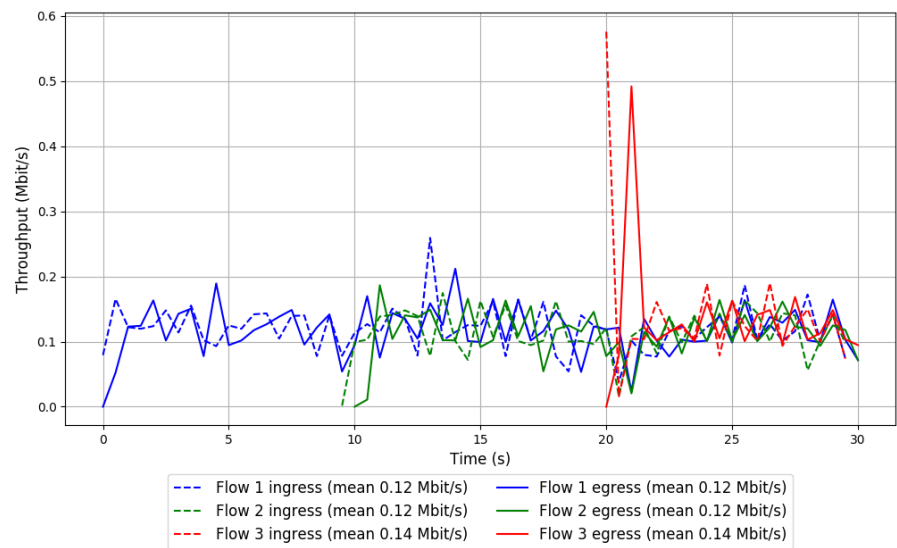


### Run 3: Statistics of Sprout

Start at: 2018-08-01 23:38:30  
End at: 2018-08-01 23:39:00  
Local clock offset: -6.203 ms  
Remote clock offset: 17.37 ms

```
# Below is generated by plot.py at 2018-08-01 23:49:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 270.046 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 229.865 ms
Loss rate: 0.96%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 231.910 ms
Loss rate: 1.18%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 510.044 ms
Loss rate: 1.69%
```

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2018-08-01 23:05:22

End at: 2018-08-01 23:05:52

Local clock offset: -5.97 ms

Remote clock offset: 5.872 ms

# Below is generated by plot.py at 2018-08-01 23:49:14

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 3813.631 ms

Loss rate: 8.31%

-- Flow 1:

Average throughput: 0.35 Mbit/s

95th percentile per-packet one-way delay: 2922.576 ms

Loss rate: 4.22%

-- Flow 2:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 3543.719 ms

Loss rate: 8.70%

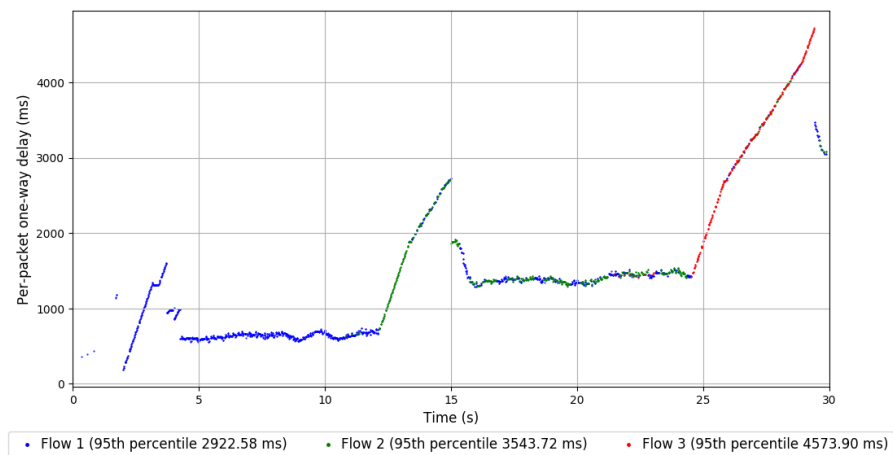
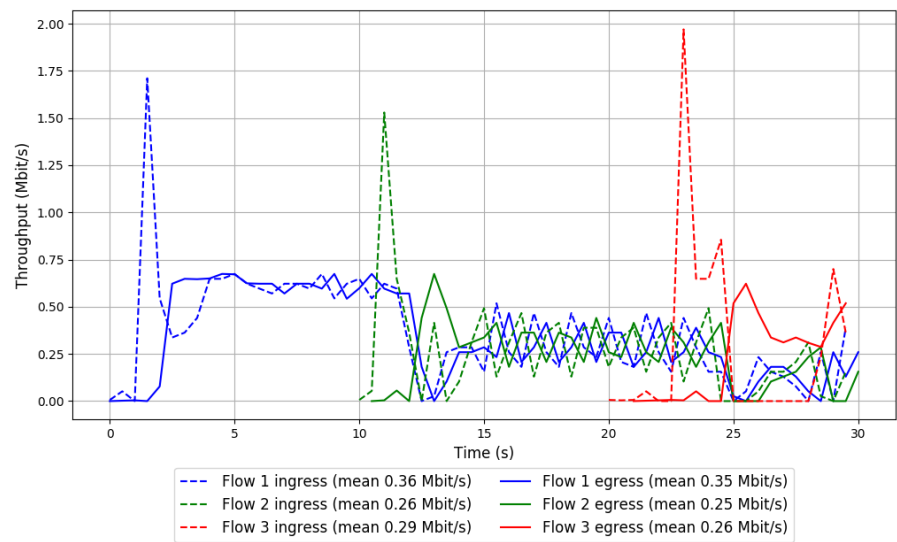
-- Flow 3:

Average throughput: 0.26 Mbit/s

95th percentile per-packet one-way delay: 4573.902 ms

Loss rate: 23.63%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-08-01 23:26:15

End at: 2018-08-01 23:26:45

Local clock offset: -6.272 ms

Remote clock offset: 9.353 ms

# Below is generated by plot.py at 2018-08-01 23:49:14

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 4257.808 ms

Loss rate: 11.72%

-- Flow 1:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 2706.715 ms

Loss rate: 11.34%

-- Flow 2:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 4056.523 ms

Loss rate: 9.15%

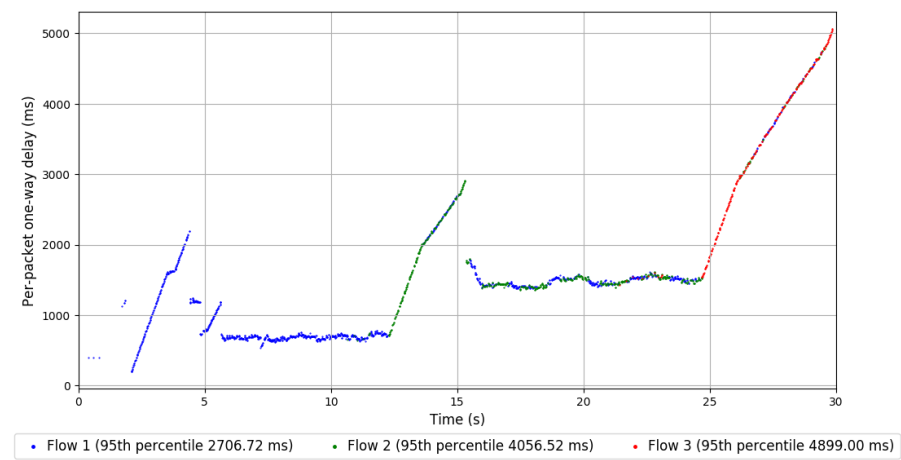
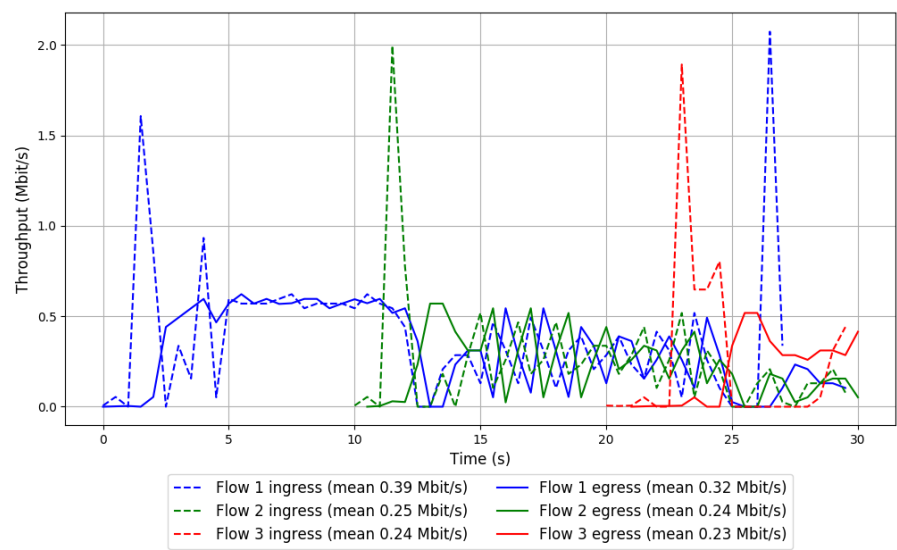
-- Flow 3:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 4899.000 ms

Loss rate: 18.65%

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



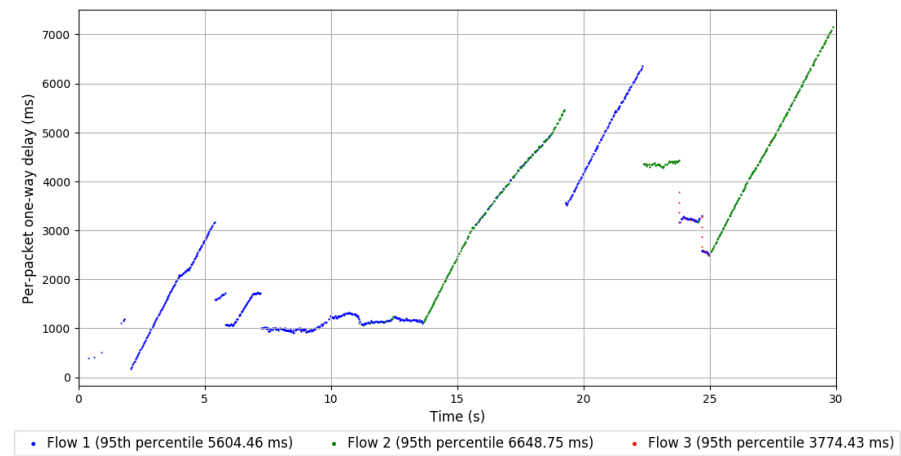
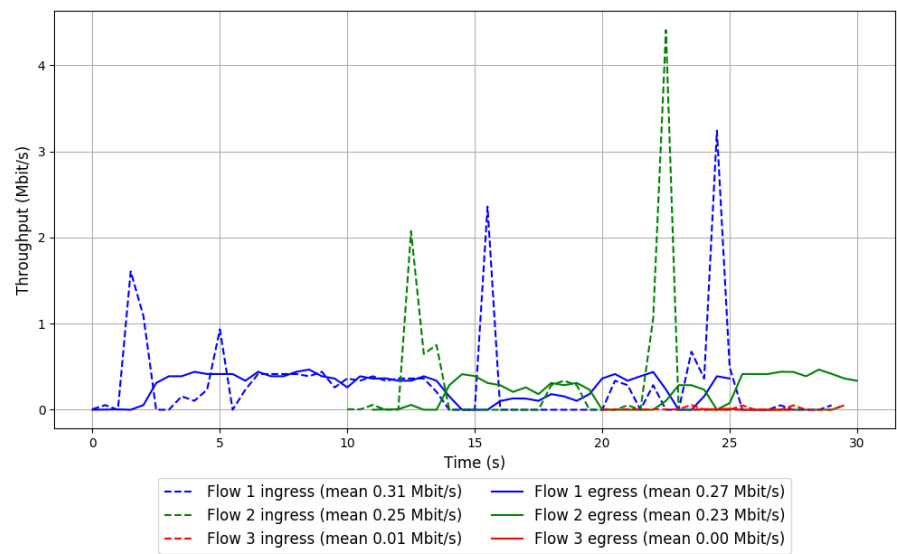
Run 3: Statistics of TaoVA-100x

Start at: 2018-08-01 23:46:56  
End at: 2018-08-01 23:47:26  
Local clock offset: -6.217 ms  
Remote clock offset: 18.538 ms

# Below is generated by plot.py at 2018-08-01 23:49:14  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.37 Mbit/s  
95th percentile per-packet one-way delay: 6089.073 ms  
Loss rate: 22.95%  
-- Flow 1:  
Average throughput: 0.27 Mbit/s  
95th percentile per-packet one-way delay: 5604.457 ms  
Loss rate: 27.04%  
-- Flow 2:  
Average throughput: 0.23 Mbit/s  
95th percentile per-packet one-way delay: 6648.748 ms  
Loss rate: 13.97%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 3774.433 ms  
Loss rate: 88.45%



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



Run 1: Statistics of TCP Vegas

Start at: 2018-08-01 22:53:58

End at: 2018-08-01 22:54:28

Local clock offset: -4.923 ms

Remote clock offset: 5.359 ms

# Below is generated by plot.py at 2018-08-01 23:49:14

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.40 Mbit/s

95th percentile per-packet one-way delay: 1998.834 ms

Loss rate: 5.61%

-- Flow 1:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 1898.629 ms

Loss rate: 2.04%

-- Flow 2:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 2070.531 ms

Loss rate: 5.37%

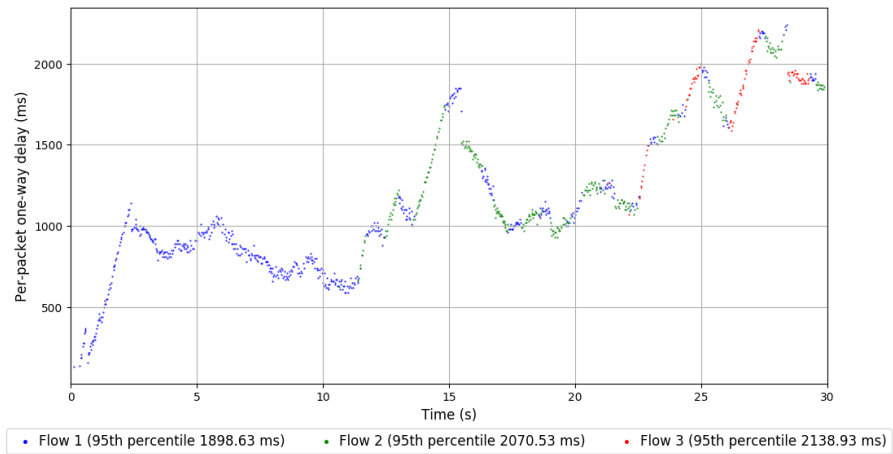
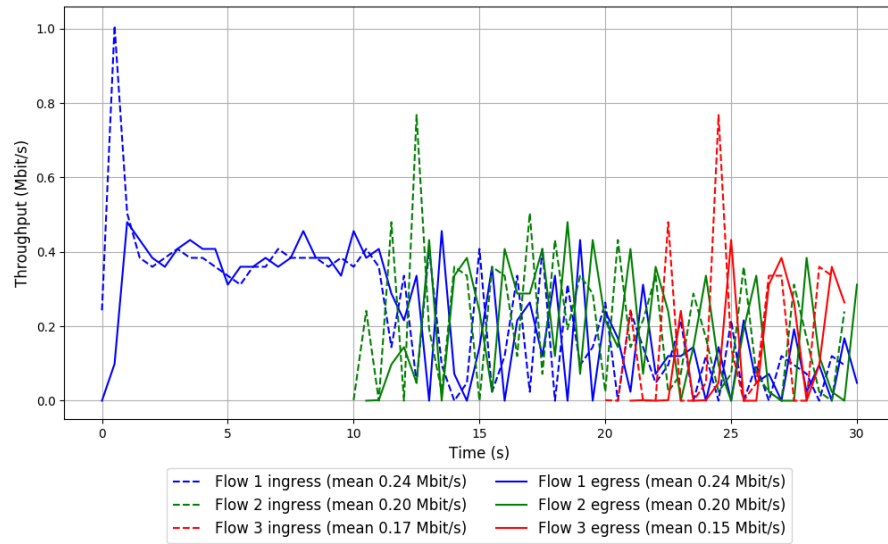
-- Flow 3:

Average throughput: 0.15 Mbit/s

95th percentile per-packet one-way delay: 2138.928 ms

Loss rate: 22.44%

# Run 1: Report of TCP Vegas — Data Link

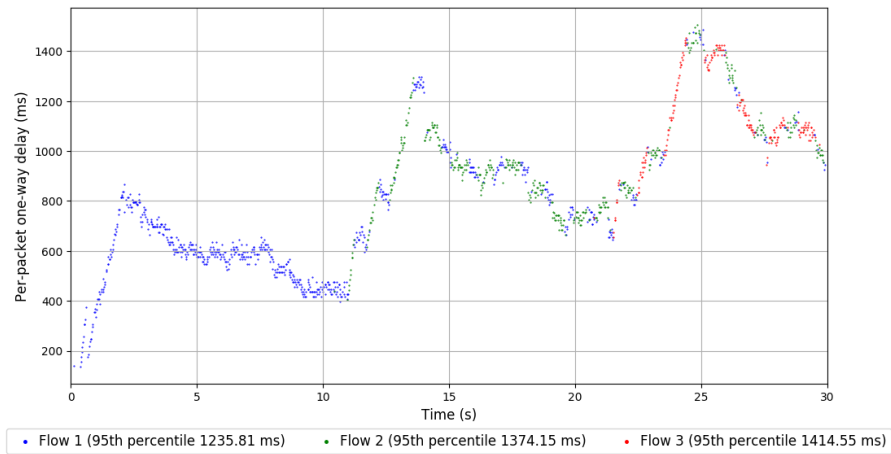
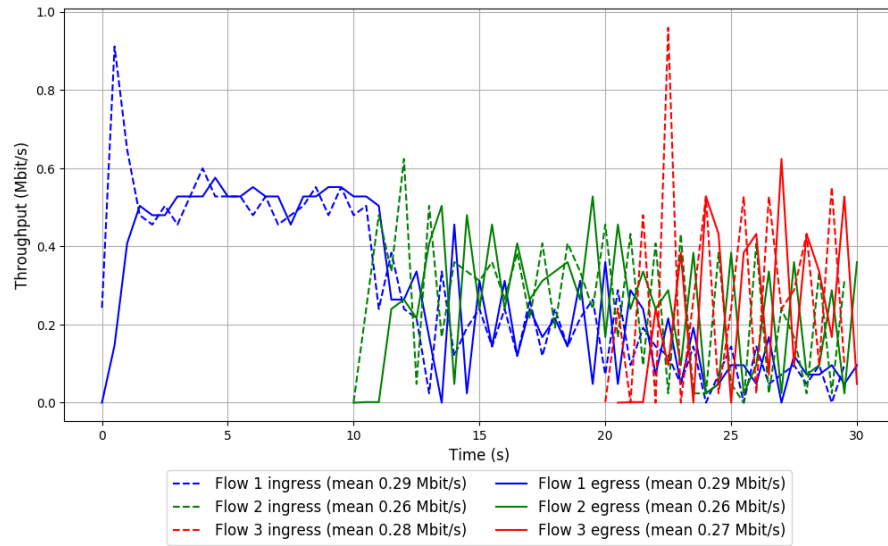


Run 2: Statistics of TCP Vegas

Start at: 2018-08-01 23:15:04  
End at: 2018-08-01 23:15:34  
Local clock offset: -6.237 ms  
Remote clock offset: 6.273 ms

# Below is generated by plot.py at 2018-08-01 23:49:15  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.53 Mbit/s  
95th percentile per-packet one-way delay: 1366.044 ms  
Loss rate: 3.51%  
-- Flow 1:  
Average throughput: 0.29 Mbit/s  
95th percentile per-packet one-way delay: 1235.808 ms  
Loss rate: 0.56%  
-- Flow 2:  
Average throughput: 0.26 Mbit/s  
95th percentile per-packet one-way delay: 1374.153 ms  
Loss rate: 3.28%  
-- Flow 3:  
Average throughput: 0.27 Mbit/s  
95th percentile per-packet one-way delay: 1414.545 ms  
Loss rate: 13.04%

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

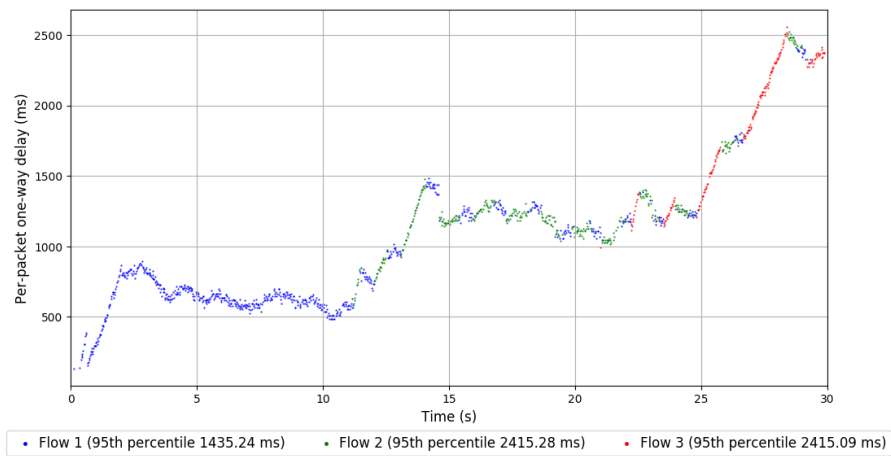
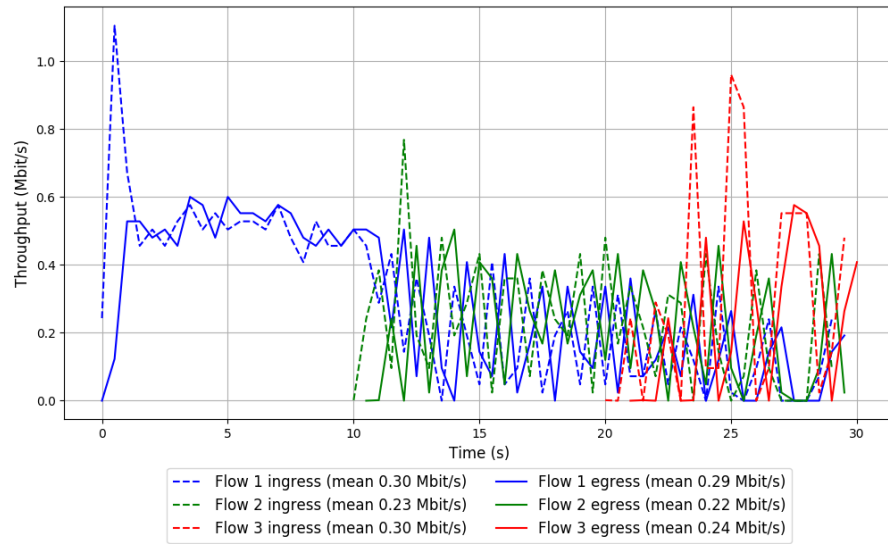


Run 3: Statistics of TCP Vegas

Start at: 2018-08-01 23:36:02  
End at: 2018-08-01 23:36:32  
Local clock offset: -6.25 ms  
Remote clock offset: 13.194 ms

# Below is generated by plot.py at 2018-08-01 23:49:16  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.50 Mbit/s  
95th percentile per-packet one-way delay: 2345.181 ms  
Loss rate: 7.96%  
-- Flow 1:  
Average throughput: 0.29 Mbit/s  
95th percentile per-packet one-way delay: 1435.243 ms  
Loss rate: 1.79%  
-- Flow 2:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 2415.282 ms  
Loss rate: 6.01%  
-- Flow 3:  
Average throughput: 0.24 Mbit/s  
95th percentile per-packet one-way delay: 2415.092 ms  
Loss rate: 28.77%

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



Run 1: Statistics of Verus

/home/ubuntu/pantheon/data/2018-08-01T22-46-Colombia-ppp0-to-AWS-Brazil-2-3-runs-3-flows/ver



Run 1: Report of Verus — Data Link

Figure is missing

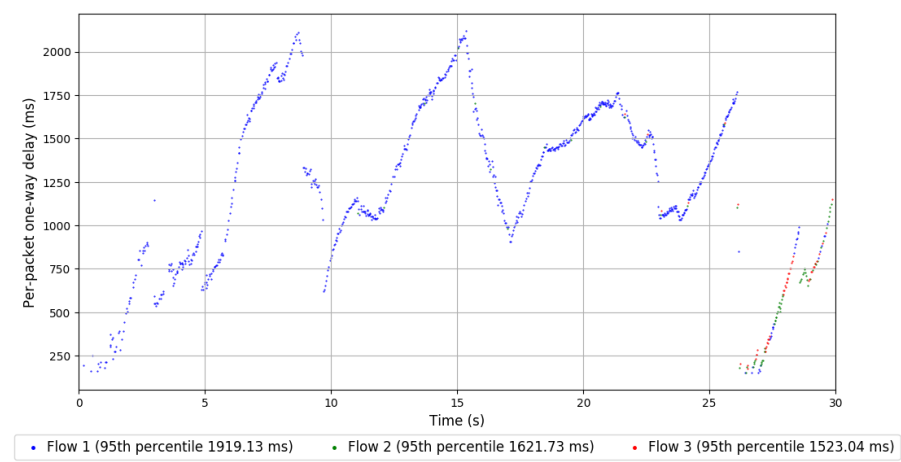
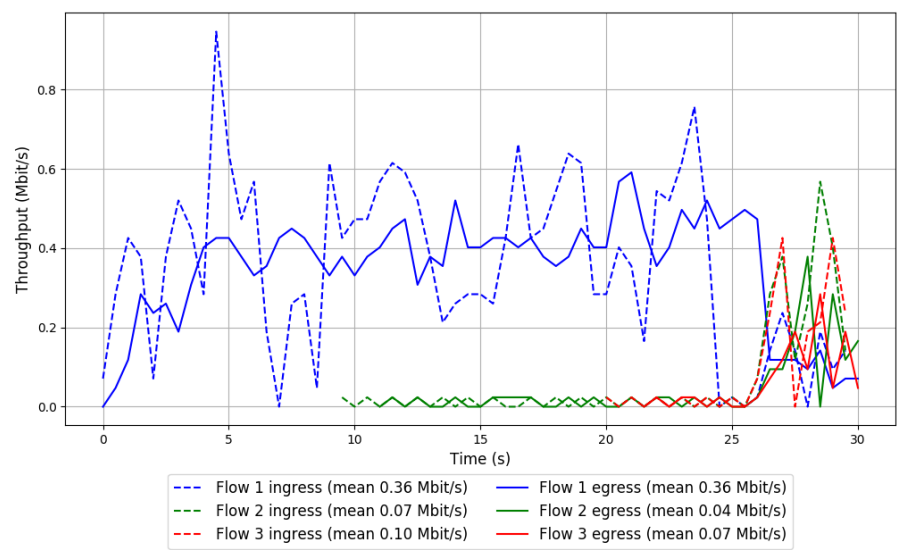
Figure is missing

Run 2: Statistics of Verus

Start at: 2018-08-01 23:20:17  
End at: 2018-08-01 23:20:47  
Local clock offset: -6.285 ms  
Remote clock offset: 10.396 ms

# Below is generated by plot.py at 2018-08-01 23:49:17  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.40 Mbit/s  
95th percentile per-packet one-way delay: 1907.510 ms  
Loss rate: 7.66%  
-- Flow 1:  
Average throughput: 0.36 Mbit/s  
95th percentile per-packet one-way delay: 1919.127 ms  
Loss rate: 1.33%  
-- Flow 2:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 1621.734 ms  
Loss rate: 35.45%  
-- Flow 3:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 1523.041 ms  
Loss rate: 40.24%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-08-01 23:40:58

End at: 2018-08-01 23:41:28

Local clock offset: -6.195 ms

Remote clock offset: 13.96 ms

# Below is generated by plot.py at 2018-08-01 23:49:18

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.43 Mbit/s

95th percentile per-packet one-way delay: 1961.390 ms

Loss rate: 3.98%

-- Flow 1:

Average throughput: 0.42 Mbit/s

95th percentile per-packet one-way delay: 1952.859 ms

Loss rate: 3.73%

-- Flow 2:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1992.729 ms

Loss rate: 9.52%

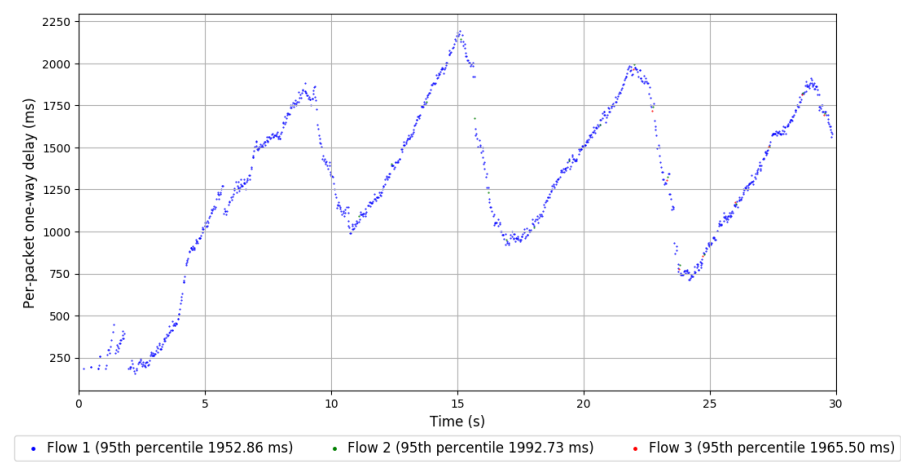
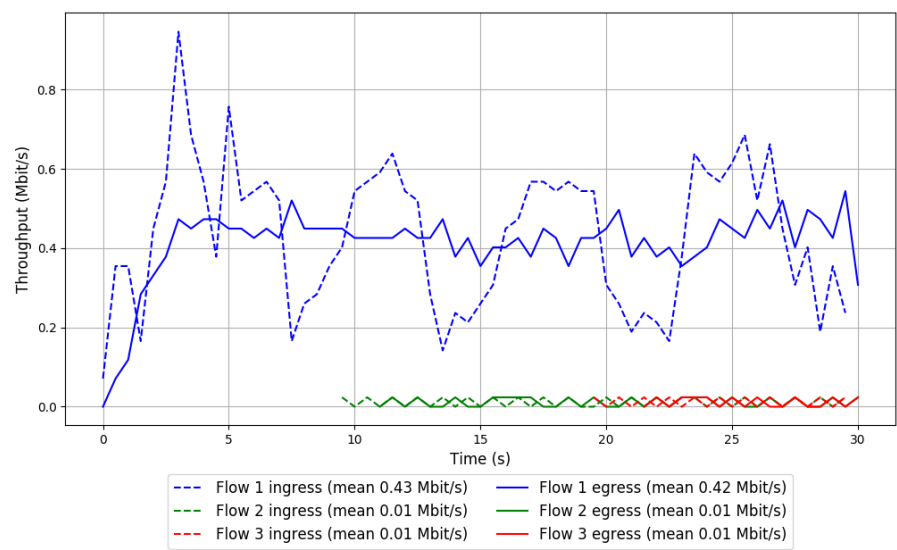
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1965.504 ms

Loss rate: 18.18%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

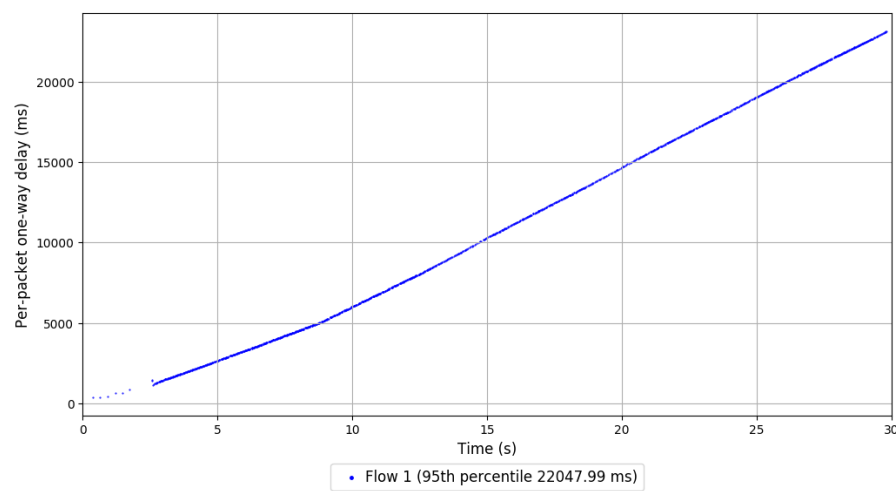
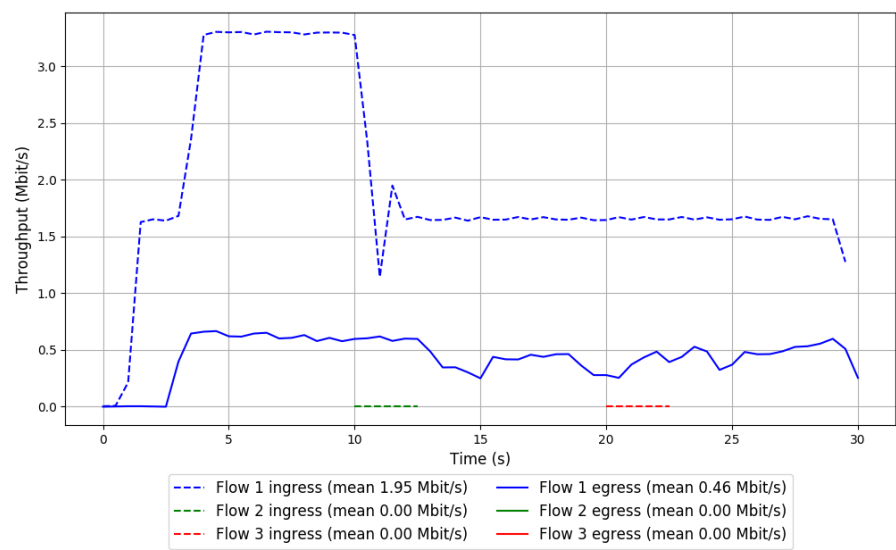
Start at: 2018-08-01 22:52:43

End at: 2018-08-01 22:53:13

Local clock offset: -4.73 ms

Remote clock offset: 7.995 ms

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-08-01 23:13:44

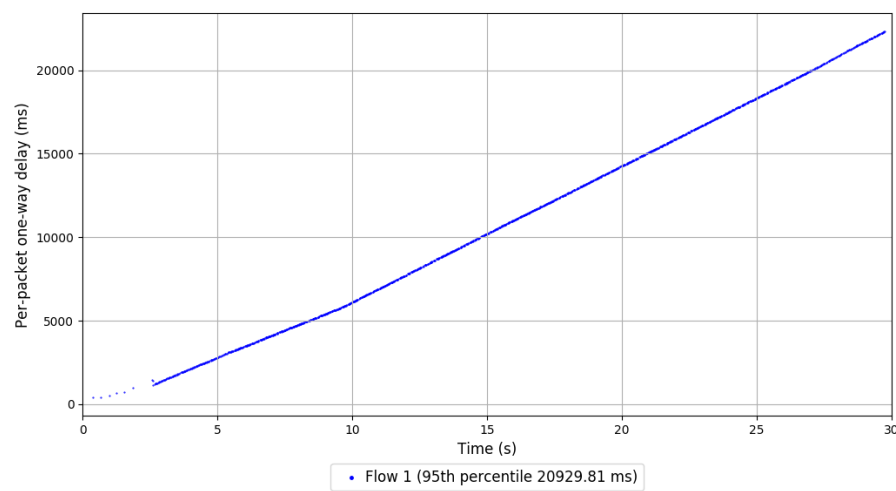
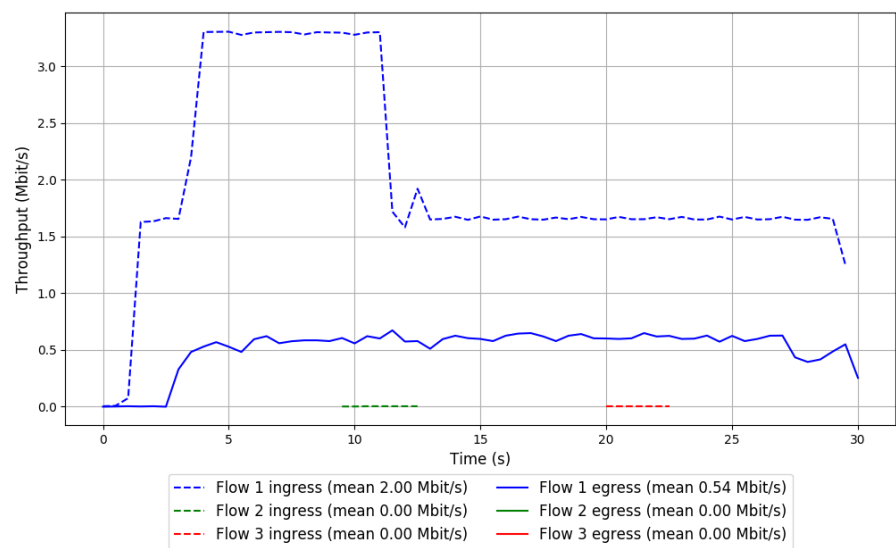
End at: 2018-08-01 23:14:14

Local clock offset: -6.202 ms

Remote clock offset: 8.818 ms



Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

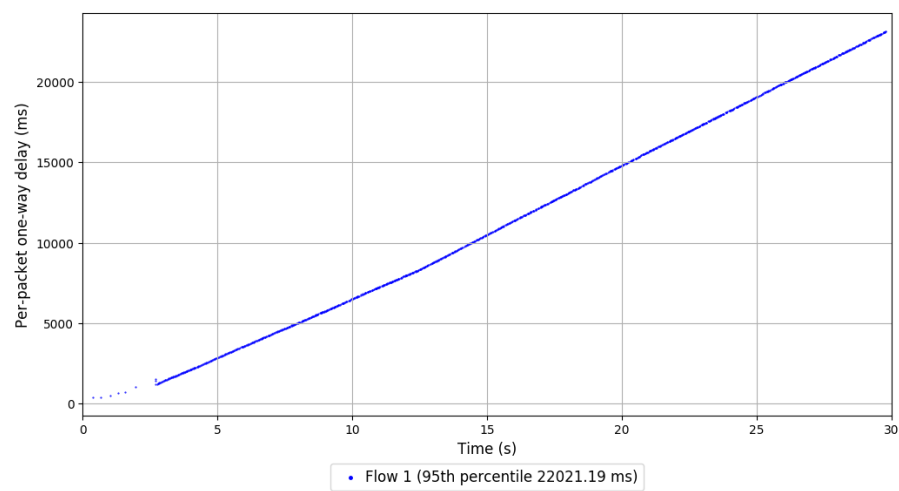
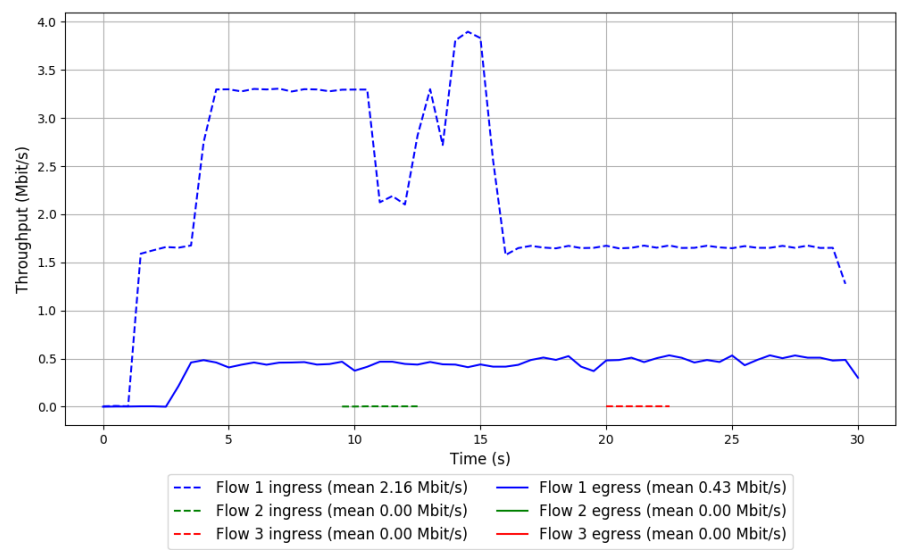
Start at: 2018-08-01 23:34:44

End at: 2018-08-01 23:35:14

Local clock offset: -6.212 ms

Remote clock offset: 16.667 ms

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-08-01 22:50:20

End at: 2018-08-01 22:50:50

Local clock offset: -4.691 ms

Remote clock offset: 3.943 ms

# Below is generated by plot.py at 2018-08-01 23:49:20

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 1410.281 ms

Loss rate: 0.90%

-- Flow 1:

Average throughput: 0.18 Mbit/s

95th percentile per-packet one-way delay: 1400.396 ms

Loss rate: 0.21%

-- Flow 2:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 1440.772 ms

Loss rate: 0.58%

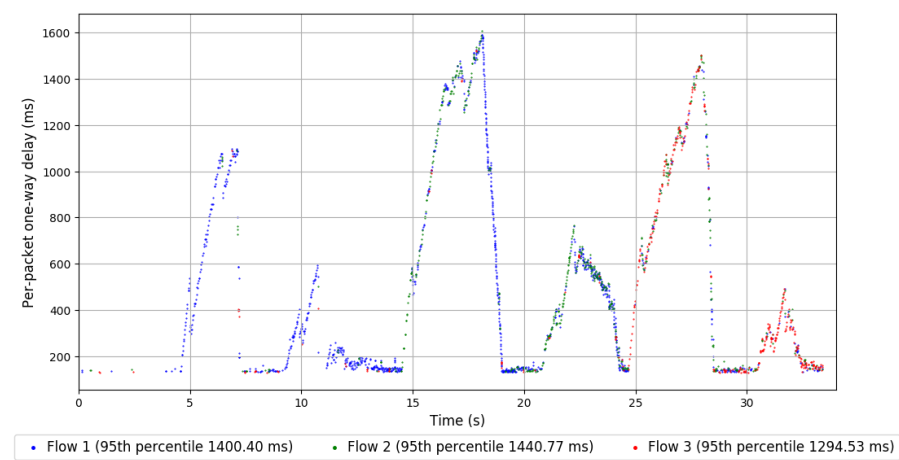
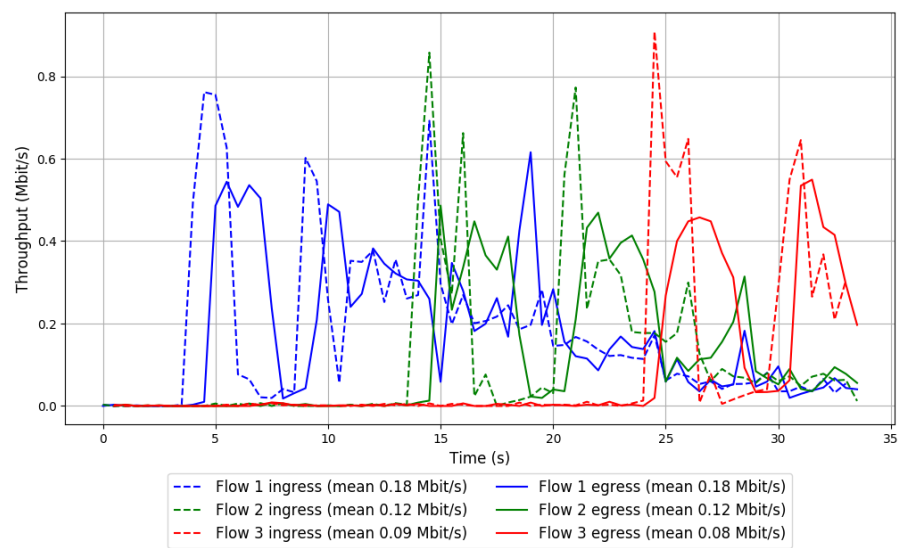
-- Flow 3:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 1294.527 ms

Loss rate: 2.77%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-08-01 23:11:21

End at: 2018-08-01 23:11:51

Local clock offset: -6.156 ms

Remote clock offset: 6.261 ms

# Below is generated by plot.py at 2018-08-01 23:49:20

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 1516.032 ms

Loss rate: 0.71%

-- Flow 1:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 1517.749 ms

Loss rate: 0.26%

-- Flow 2:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 1461.620 ms

Loss rate: 0.56%

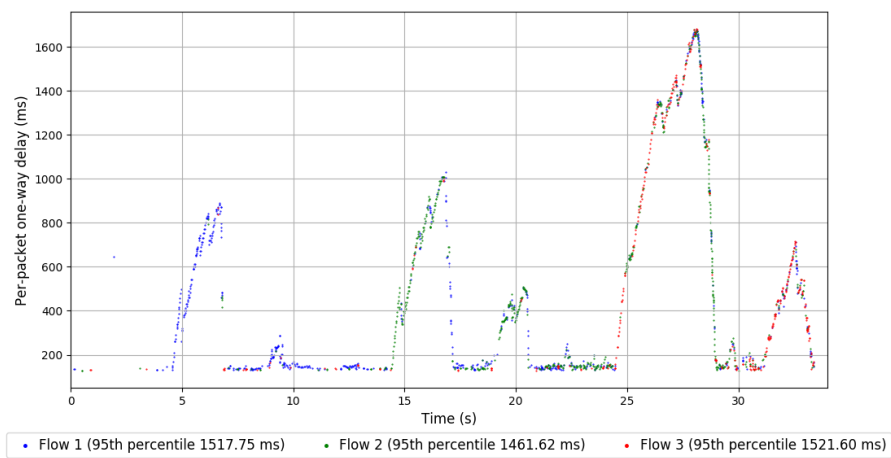
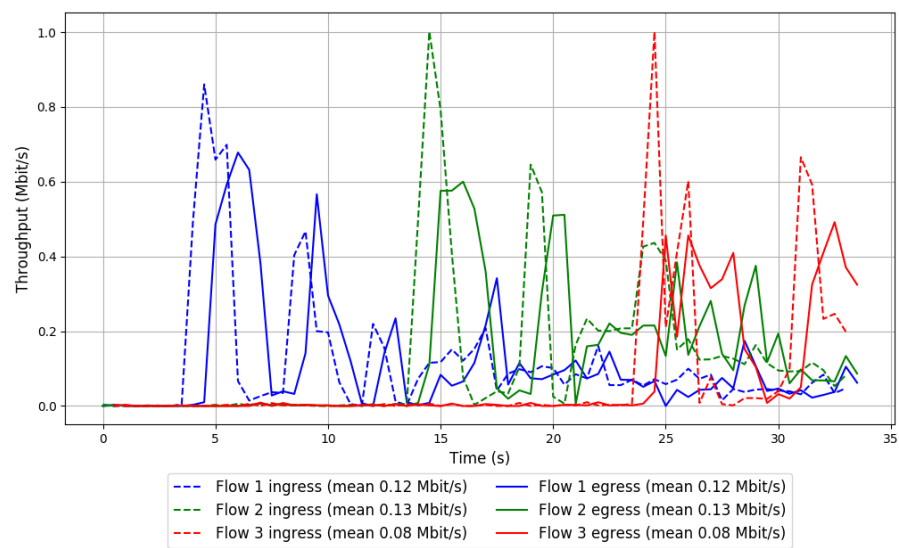
-- Flow 3:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 1521.604 ms

Loss rate: 1.66%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-08-01 23:32:20  
End at: 2018-08-01 23:32:50  
Local clock offset: -6.229 ms  
Remote clock offset: 12.323 ms

# Below is generated by plot.py at 2018-08-01 23:49:20  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.32 Mbit/s  
95th percentile per-packet one-way delay: 2154.471 ms  
Loss rate: 4.70%  
-- Flow 1:  
Average throughput: 0.15 Mbit/s  
95th percentile per-packet one-way delay: 2090.574 ms  
Loss rate: 0.32%  
-- Flow 2:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 2276.483 ms  
Loss rate: 0.86%  
-- Flow 3:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 2099.096 ms  
Loss rate: 19.39%



Run 3: Report of WebRTC media — Data Link

