

Pantheon Report

Generated at 2017-12-11 10:47:36 (UTC).

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

Repeated the test of 14 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).

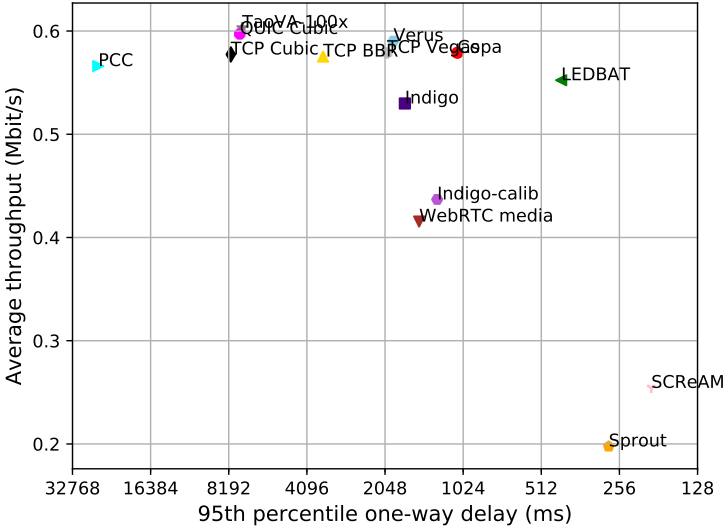
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

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

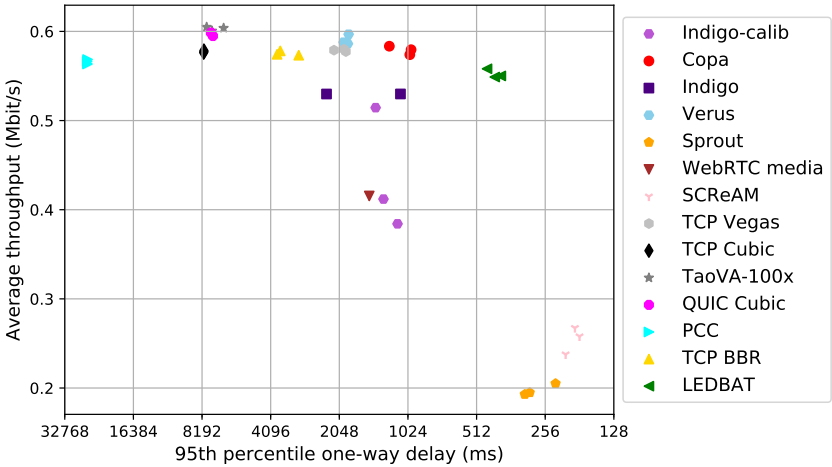
Git summary:

```
branch: indigos @ e3a57ad5ac5cfcaca0e3f983c8dd4cc3509e0262
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/genericCC @ b5b7c38e8391001927dc41c6cfa2627d03dde737
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-cellular @ aee99e8eb842cb053f8c9a80e28cd256a930bbc2
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/indigo-no-cwnd @ 3e58442c04028a11d7b02456e137604633ba2d6c
third_party/indigo-no-delivery-rate @ 57caa40858b964906edff4876d5a7e5bfff666c5
third_party/indigo-no-queuing-delay @ 03455460fd1a8ffbdad86fabb936fdca204b80db
third_party/indigo-no-send-rate @ b39dfa6b2c5f19cb7cd89626cb4f5bb81f9fecda
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ baf443516dea3eeddeccaf9b916cc313273ca4f4
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/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eae30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  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/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from Colombia ppp0 to AWS Brazil 2 Ethernet, 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 Ethernet, 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	0.36	0.33	0.03	3538.16	3556.98	2989.72	2.67	5.44	51.52
TCP Cubic	3	0.57	0.03	0.00	8047.92	6372.46	8393.89	31.08	37.91	75.13
LEDBAT	3	0.23	0.38	0.22	358.78	428.72	446.79	0.05	1.14	7.89
PCC	3	0.57	0.00	N/A	26061.04	N/A	N/A	98.60	N/A	N/A
QUIC Cubic	3	0.56	0.06	0.00	7384.55	7658.07	7487.34	29.12	32.83	33.33
SCReAM	3	0.08	0.17	0.17	178.97	189.82	216.10	0.80	1.09	1.85
WebRTC media	1	0.24	0.13	0.05	1388.03	1524.51	1519.71	0.23	2.21	4.15
Sprout	3	0.10	0.10	0.10	586.14	224.31	254.07	1.27	2.64	2.83
TaoVA-100x	3	0.39	0.36	0.07	7667.75	6230.82	6833.85	19.25	19.65	56.25
TCP Vegas	3	0.40	0.21	0.17	1857.87	2027.42	2039.58	3.72	7.10	25.17
Verus	3	0.58	0.01	0.01	1901.47	1834.27	1803.58	5.01	11.98	17.19
Copa	3	0.38	0.26	0.09	1049.73	1082.58	1118.65	3.09	6.32	20.75
Indigo	2	0.24	0.27	0.41	1422.83	1296.44	1907.06	9.76	3.33	17.66
Indigo-calib	3	0.17	0.21	0.40	1168.06	1156.06	1219.86	5.64	6.99	9.39

Run 1: Statistics of TCP BBR

Start at: 2017-12-11 09:13:43

End at: 2017-12-11 09:14:13

Local clock offset: -3.925 ms

Remote clock offset: 2.28 ms

Below is generated by plot.py at 2017-12-11 10:47:04

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 3839.047 ms

Loss rate: 4.07%

-- Flow 1:

Average throughput: 0.35 Mbit/s

95th percentile per-packet one-way delay: 3838.049 ms

Loss rate: 3.01%

-- Flow 2:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 3839.047 ms

Loss rate: 4.11%

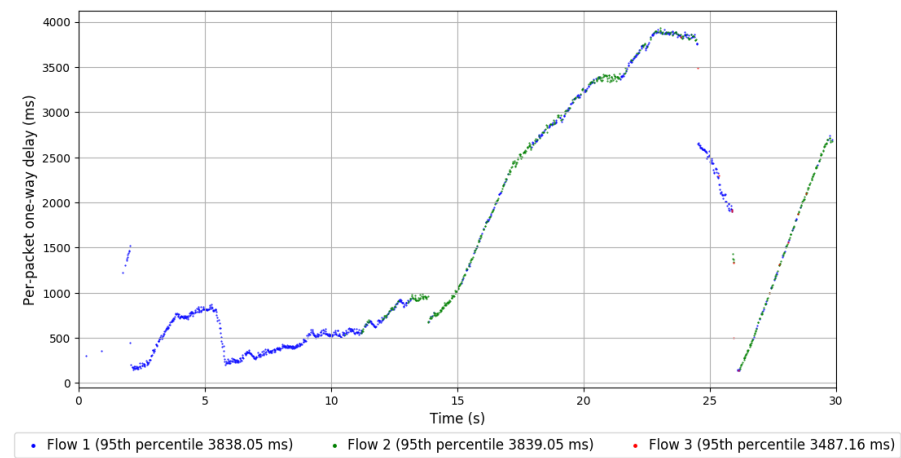
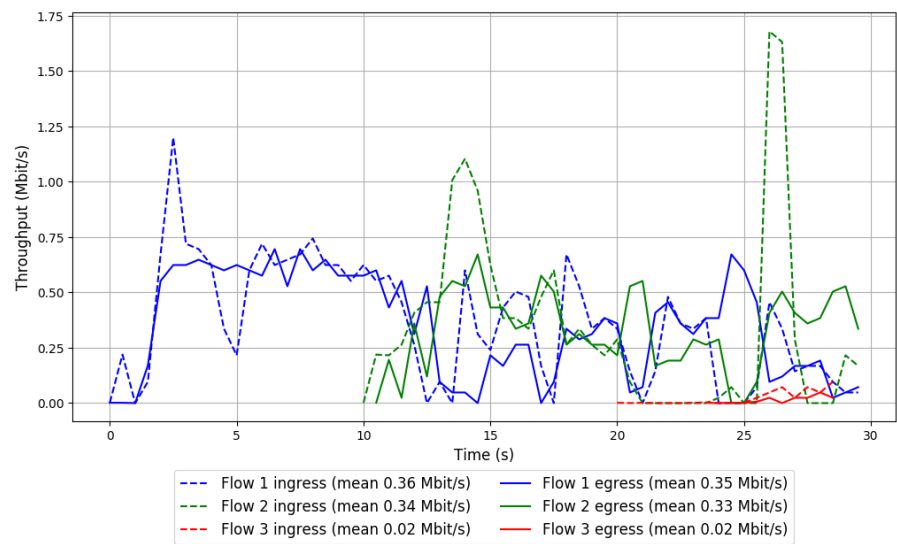
-- Flow 3:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 3487.160 ms

Loss rate: 60.79%

Run 1: Report of TCP BBR — Data Link

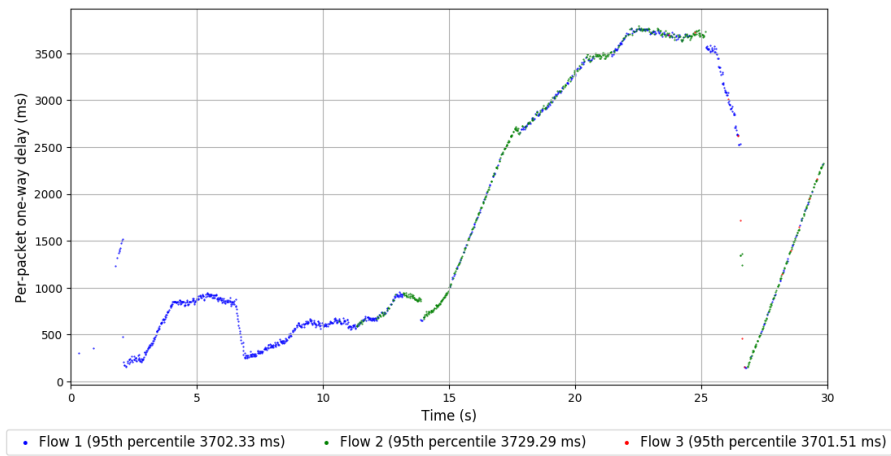
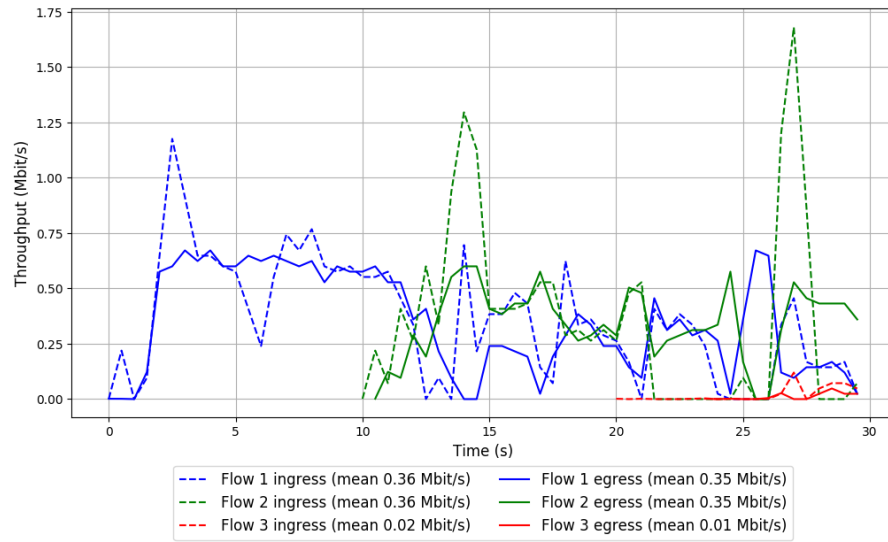


Run 2: Statistics of TCP BBR

Start at: 2017-12-11 09:31:11
End at: 2017-12-11 09:31:41
Local clock offset: -4.302 ms
Remote clock offset: -3.242 ms

Below is generated by plot.py at 2017-12-11 10:47:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 3718.063 ms
Loss rate: 5.14%
-- Flow 1:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 3702.327 ms
Loss rate: 3.05%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 3729.292 ms
Loss rate: 6.70%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3701.514 ms
Loss rate: 60.79%

Run 2: Report of TCP BBR — Data Link

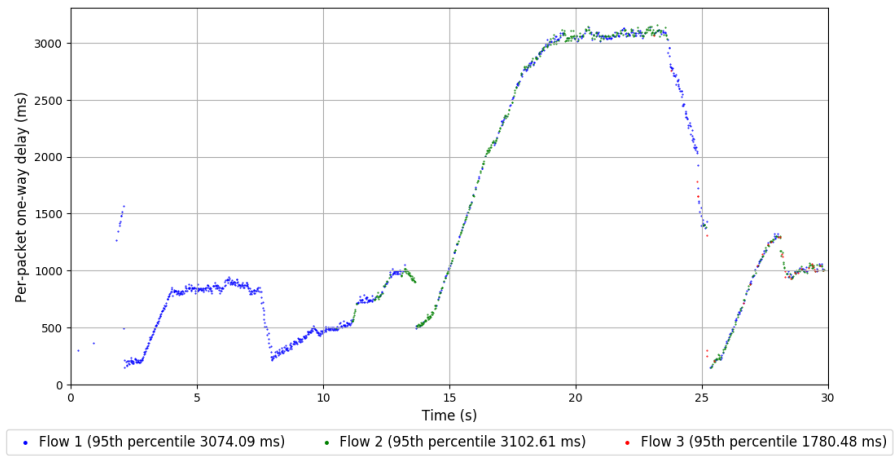
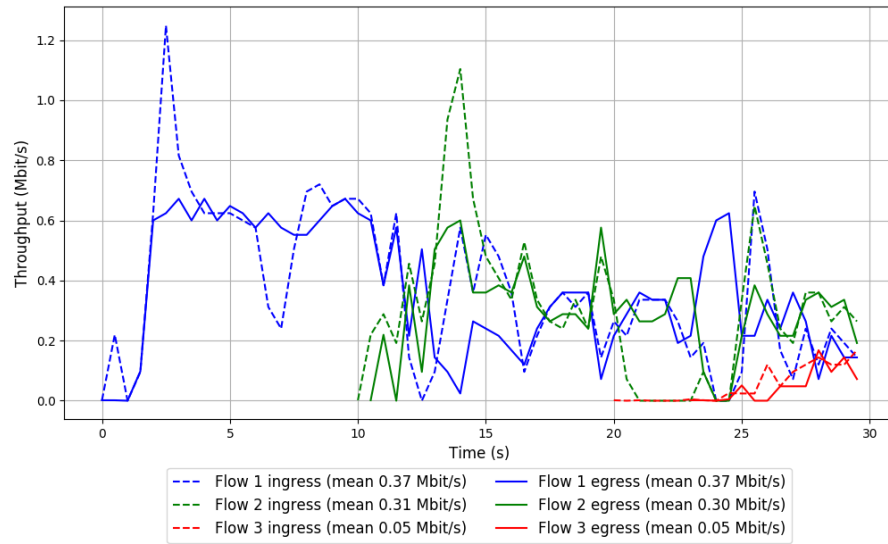


Run 3: Statistics of TCP BBR

Start at: 2017-12-11 09:48:39
End at: 2017-12-11 09:49:09
Local clock offset: -3.578 ms
Remote clock offset: -4.229 ms

Below is generated by plot.py at 2017-12-11 10:47:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 3086.112 ms
Loss rate: 4.08%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 3074.090 ms
Loss rate: 1.95%
-- Flow 2:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 3102.615 ms
Loss rate: 5.52%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 1780.479 ms
Loss rate: 32.98%

Run 3: Report of TCP BBR — Data Link

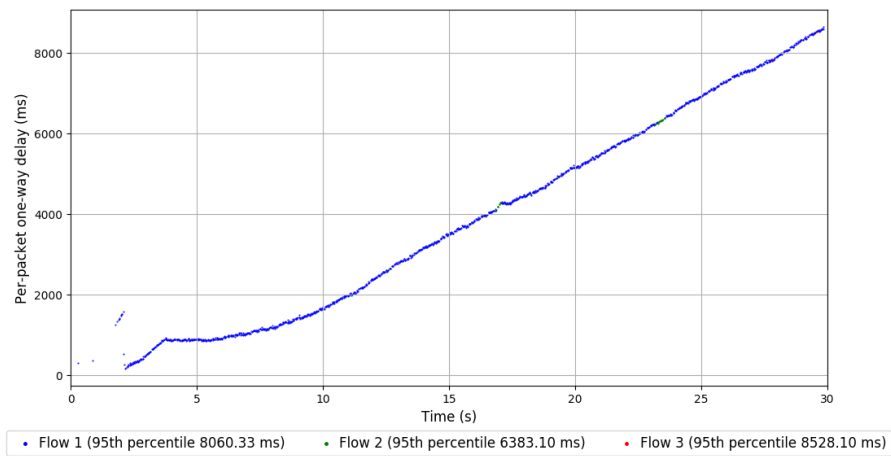
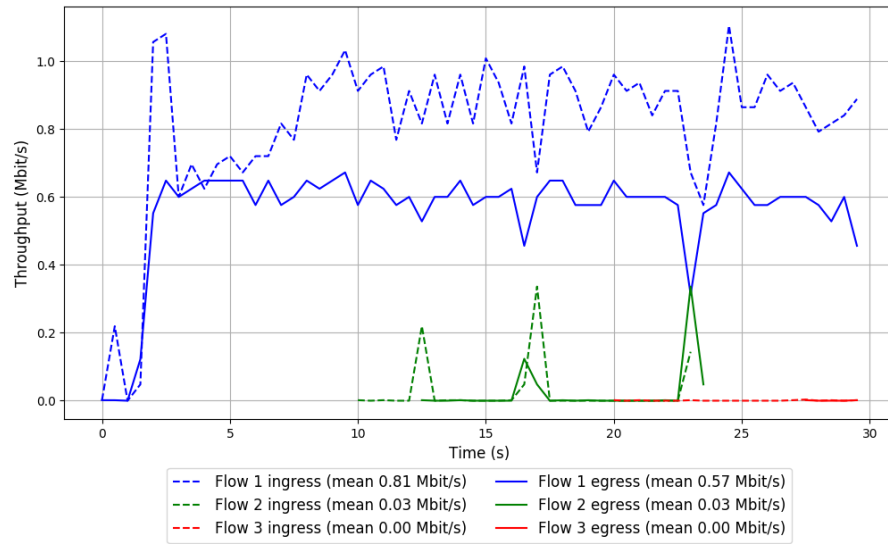


Run 1: Statistics of TCP Cubic

Start at: 2017-12-11 09:09:58
End at: 2017-12-11 09:10:28
Local clock offset: -4.005 ms
Remote clock offset: -4.638 ms

Below is generated by plot.py at 2017-12-11 10:47:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 8060.333 ms
Loss rate: 30.90%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 8060.333 ms
Loss rate: 30.97%
-- Flow 2:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 6383.104 ms
Loss rate: 25.44%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8528.096 ms
Loss rate: 75.13%

Run 1: Report of TCP Cubic — Data Link

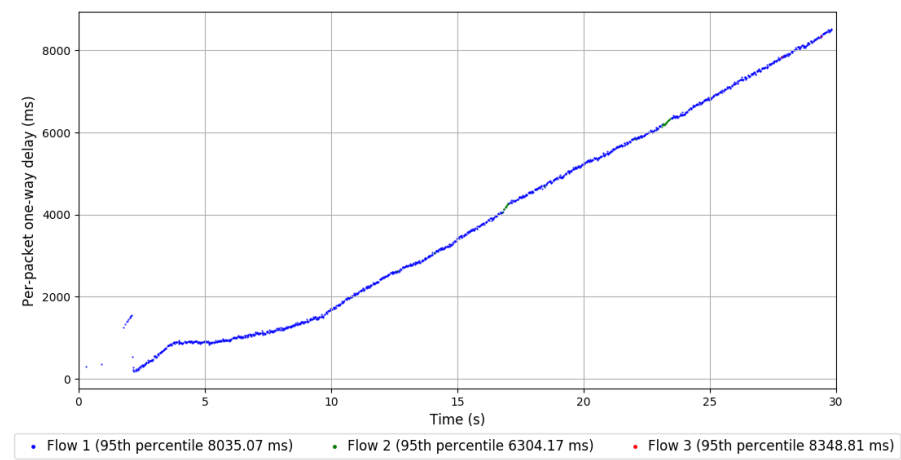
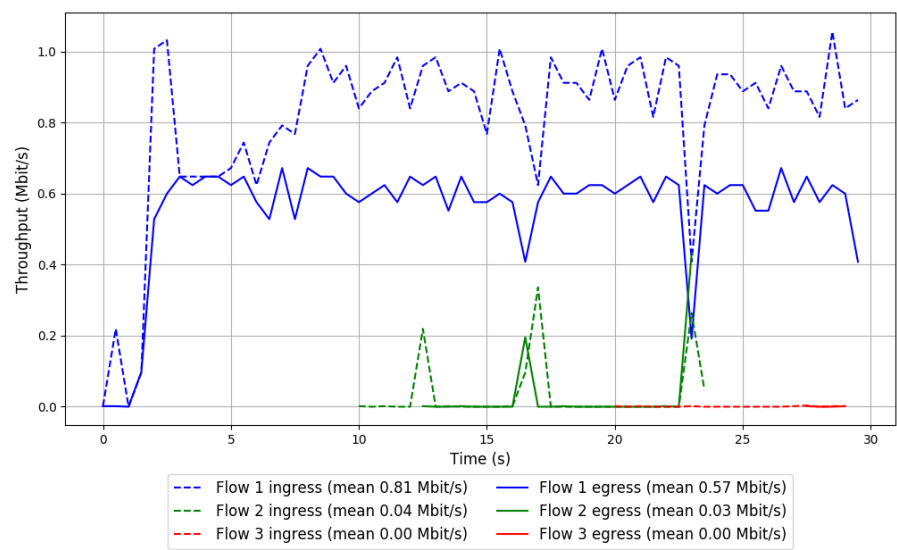


Run 2: Statistics of TCP Cubic

Start at: 2017-12-11 09:27:26
End at: 2017-12-11 09:27:56
Local clock offset: -4.167 ms
Remote clock offset: -4.147 ms

Below is generated by plot.py at 2017-12-11 10:47:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 8035.068 ms
Loss rate: 31.25%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 8035.068 ms
Loss rate: 31.17%
-- Flow 2:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 6304.166 ms
Loss rate: 34.66%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8348.809 ms
Loss rate: 75.13%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2017-12-11 09:44:54

End at: 2017-12-11 09:45:24

Local clock offset: -3.542 ms

Remote clock offset: 1.061 ms

Below is generated by plot.py at 2017-12-11 10:47:04

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8038.441 ms

Loss rate: 31.78%

-- Flow 1:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 8048.347 ms

Loss rate: 31.09%

-- Flow 2:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 6430.096 ms

Loss rate: 53.64%

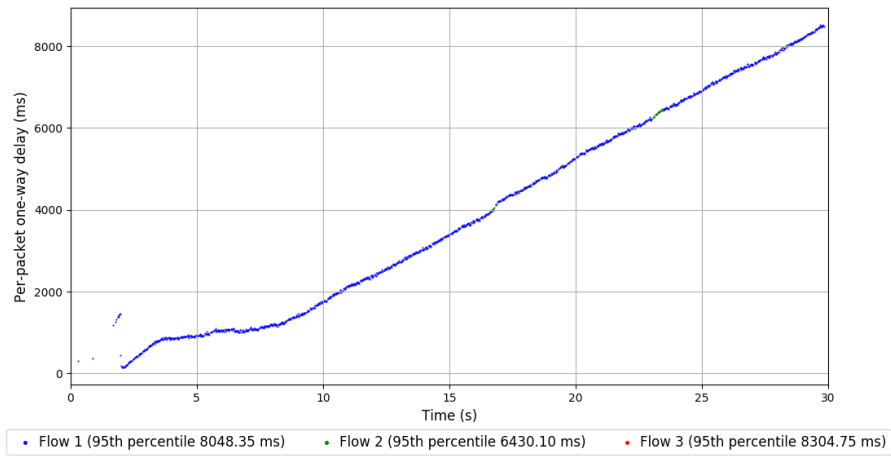
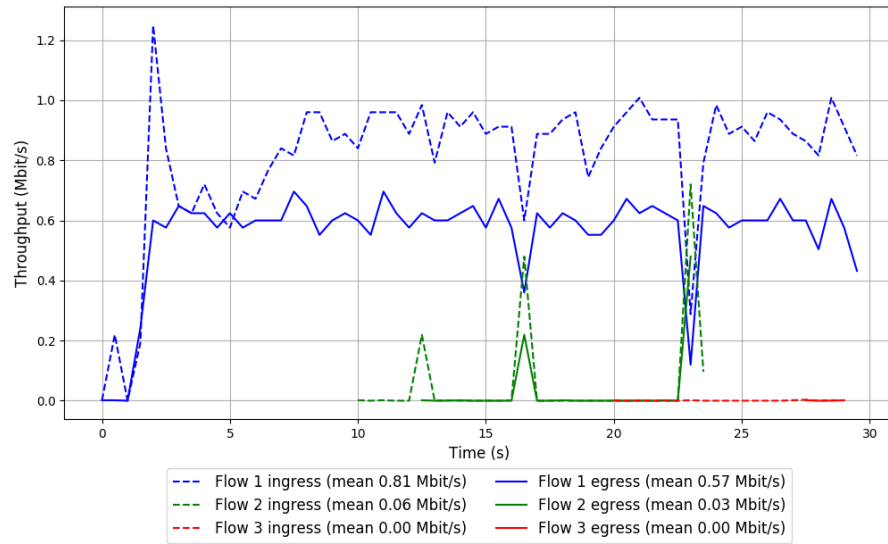
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8304.755 ms

Loss rate: 75.13%

Run 3: Report of TCP Cubic — Data Link

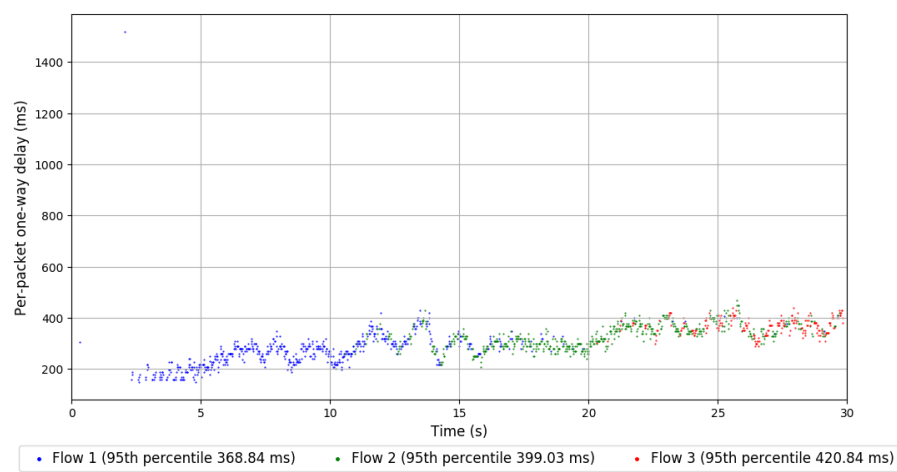
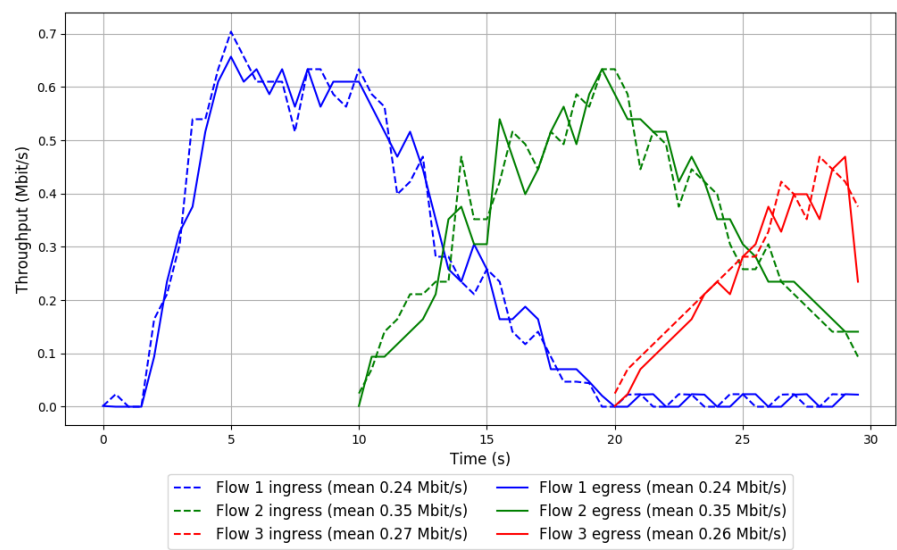


Run 1: Statistics of LEDBAT

Start at: 2017-12-11 09:16:12
End at: 2017-12-11 09:16:42
Local clock offset: -3.819 ms
Remote clock offset: -3.391 ms

Below is generated by plot.py at 2017-12-11 10:47:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 400.765 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 368.843 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 399.029 ms
Loss rate: 0.68%
-- Flow 3:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 420.838 ms
Loss rate: 8.00%

Run 1: Report of LEDBAT — Data Link

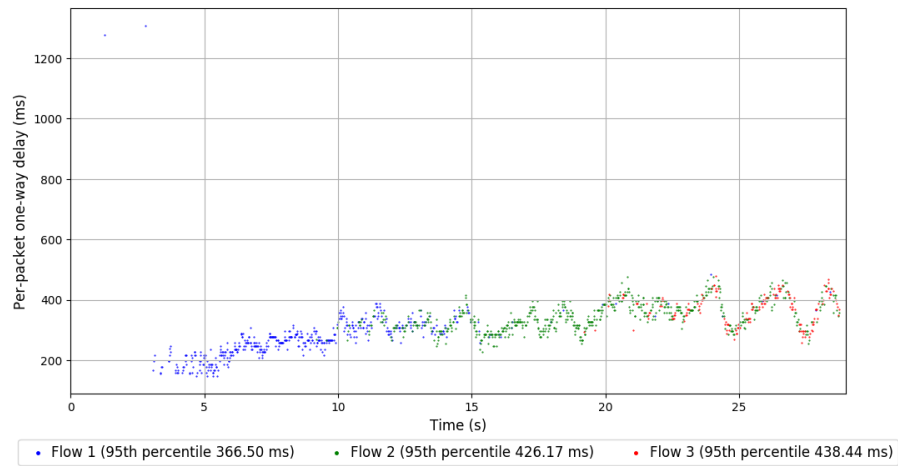
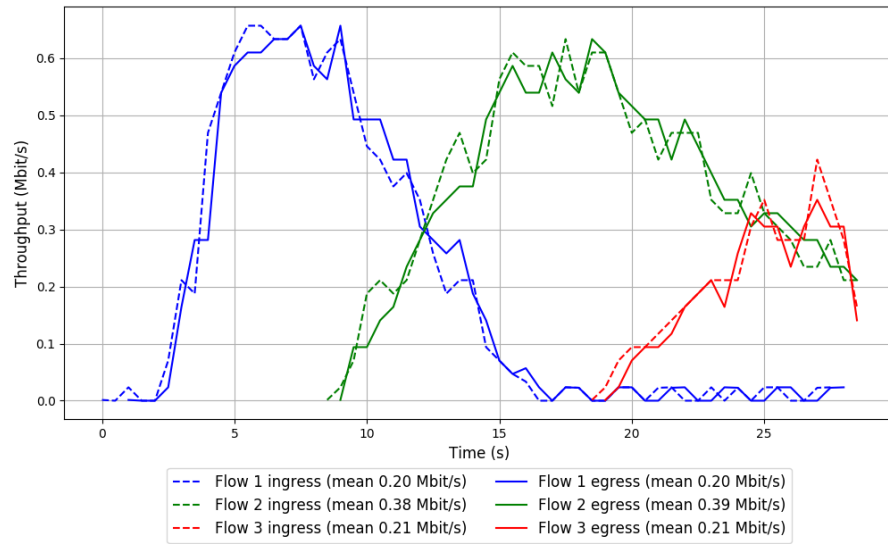


Run 2: Statistics of LEDBAT

Start at: 2017-12-11 09:33:40
End at: 2017-12-11 09:34:10
Local clock offset: -4.011 ms
Remote clock offset: -3.112 ms

Below is generated by plot.py at 2017-12-11 10:47:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 426.172 ms
Loss rate: 1.61%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 366.503 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 426.174 ms
Loss rate: 1.38%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 438.441 ms
Loss rate: 6.63%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2017-12-11 09:51:08

End at: 2017-12-11 09:51:38

Local clock offset: -3.549 ms

Remote clock offset: 1.621 ms

Below is generated by plot.py at 2017-12-11 10:47:07

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 460.754 ms

Loss rate: 1.81%

-- Flow 1:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 341.006 ms

Loss rate: 0.16%

-- Flow 2:

Average throughput: 0.39 Mbit/s

95th percentile per-packet one-way delay: 460.949 ms

Loss rate: 1.36%

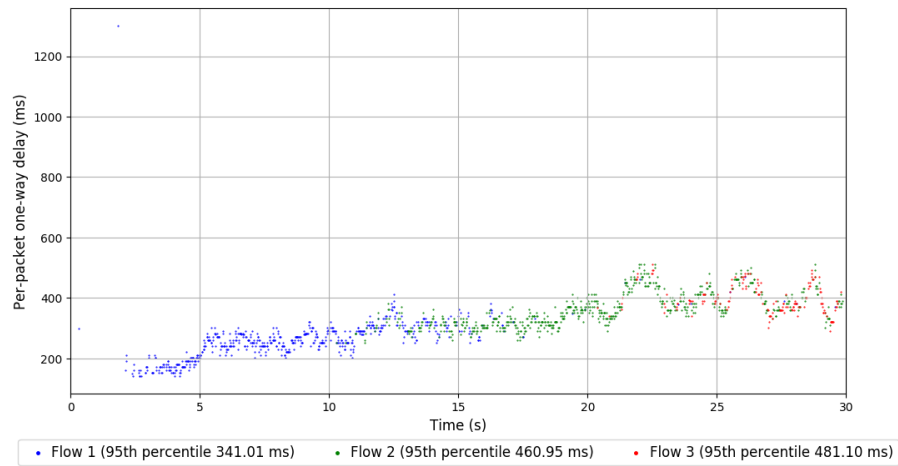
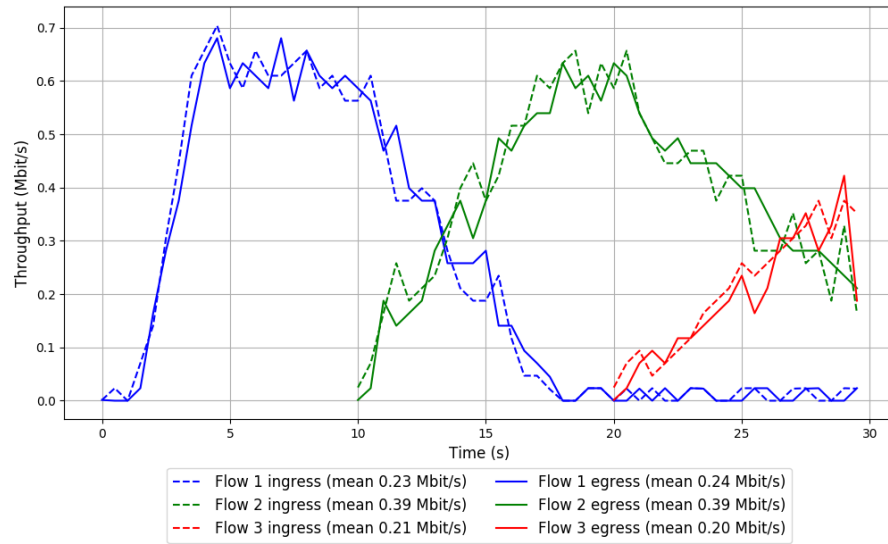
-- Flow 3:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 481.098 ms

Loss rate: 9.04%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC

Start at: 2017-12-11 09:18:41

End at: 2017-12-11 09:19:11

Local clock offset: -3.892 ms

Remote clock offset: 0.581 ms

Below is generated by plot.py at 2017-12-11 10:47:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 26125.583 ms

Loss rate: 98.60%

-- Flow 1:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 26125.583 ms

Loss rate: 98.60%

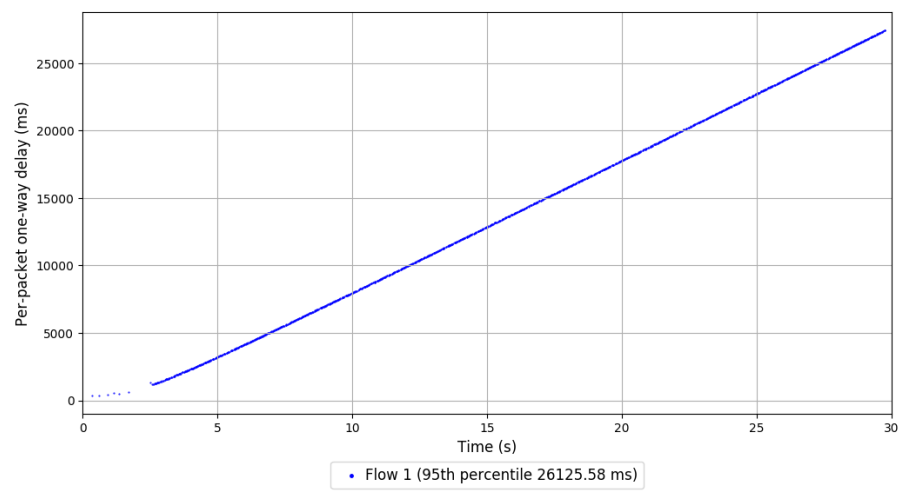
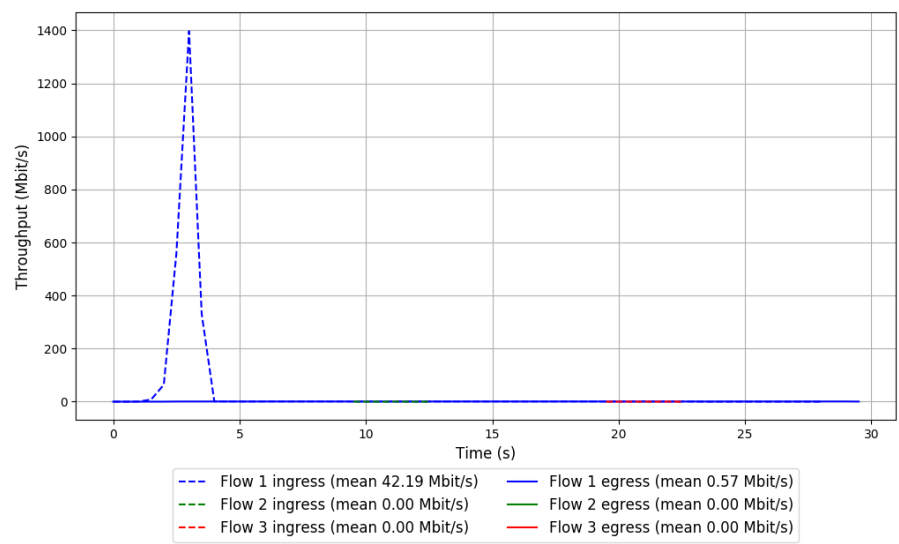
-- Flow 2:

Average throughput: 0.00 Mbit/s

-- Flow 3:

Average throughput: 0.00 Mbit/s

Run 1: Report of PCC — Data Link

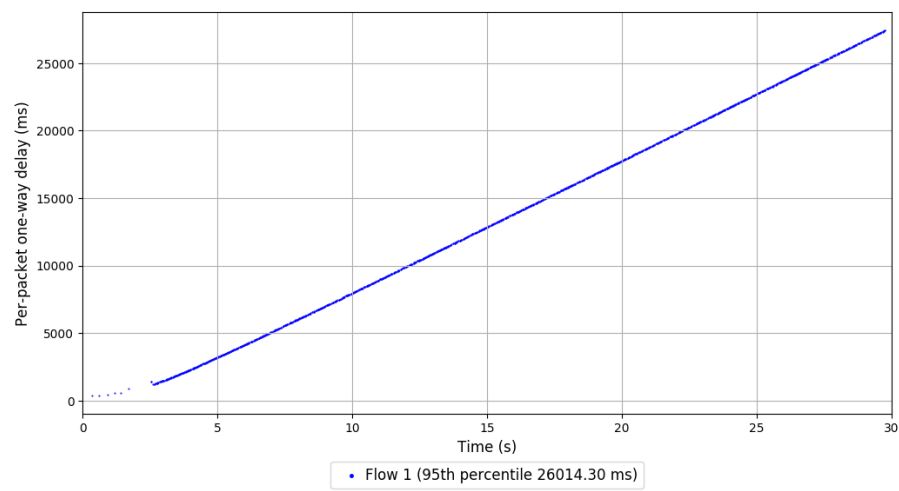
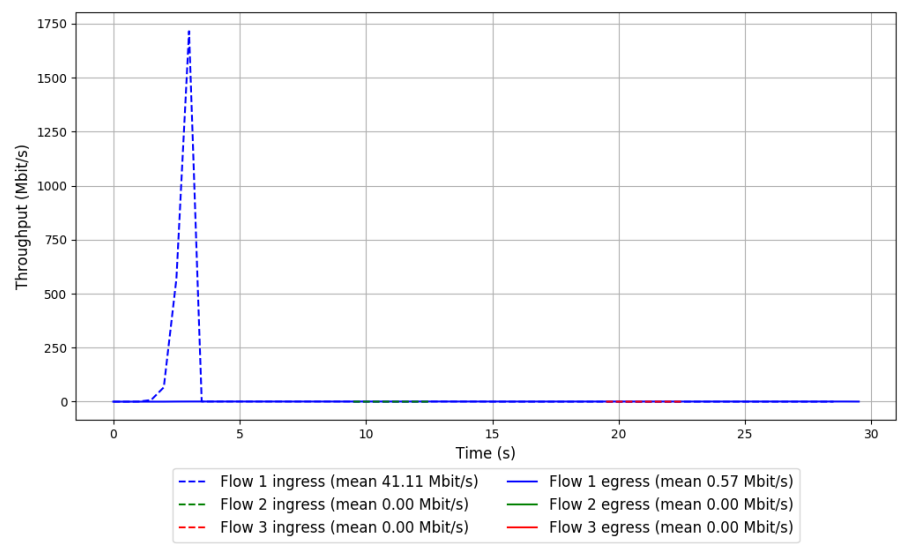


Run 2: Statistics of PCC

Start at: 2017-12-11 09:36:09
End at: 2017-12-11 09:36:39
Local clock offset: -3.791 ms
Remote clock offset: -3.244 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 26014.299 ms
Loss rate: 98.59%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 26014.299 ms
Loss rate: 98.59%
-- Flow 2:
Average throughput: 0.00 Mbit/s
-- Flow 3:
Average throughput: 0.00 Mbit/s

Run 2: Report of PCC — Data Link



Run 3: Statistics of PCC

Start at: 2017-12-11 09:53:37

End at: 2017-12-11 09:54:07

Local clock offset: -3.636 ms

Remote clock offset: 0.421 ms

Below is generated by plot.py at 2017-12-11 10:47:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 26043.252 ms

Loss rate: 98.61%

-- Flow 1:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 26043.252 ms

Loss rate: 98.61%

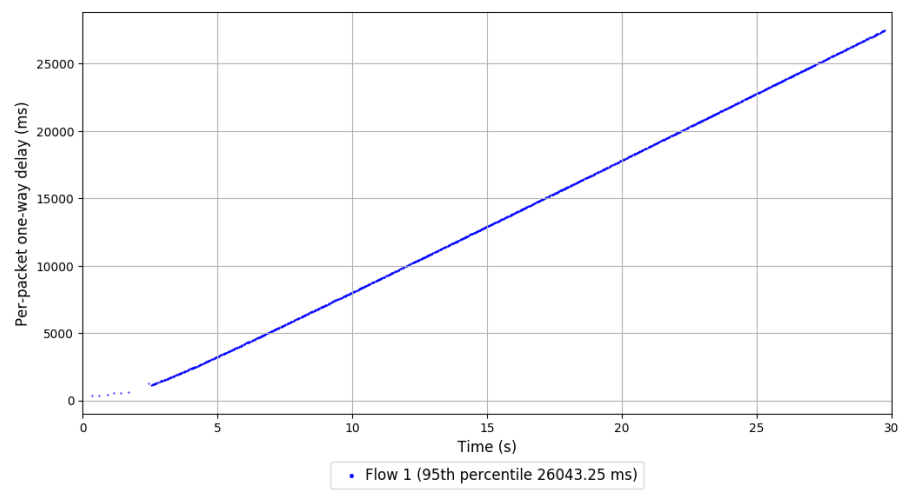
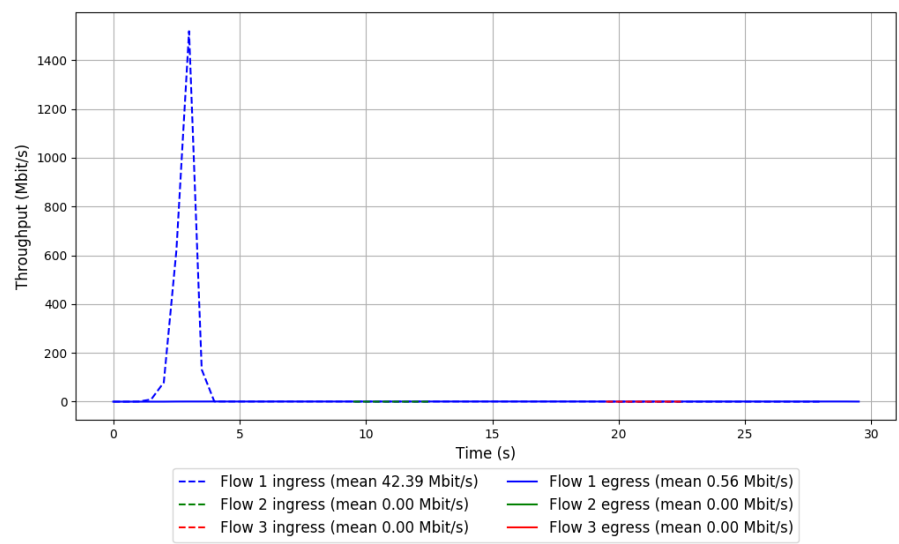
-- Flow 2:

Average throughput: 0.00 Mbit/s

-- Flow 3:

Average throughput: 0.00 Mbit/s

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2017-12-11 09:11:13

End at: 2017-12-11 09:11:43

Local clock offset: -4.018 ms

Remote clock offset: 2.162 ms

Below is generated by plot.py at 2017-12-11 10:47:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.59 Mbit/s

95th percentile per-packet one-way delay: 7338.889 ms

Loss rate: 29.11%

-- Flow 1:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 7316.692 ms

Loss rate: 28.96%

-- Flow 2:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 7599.723 ms

Loss rate: 31.31%

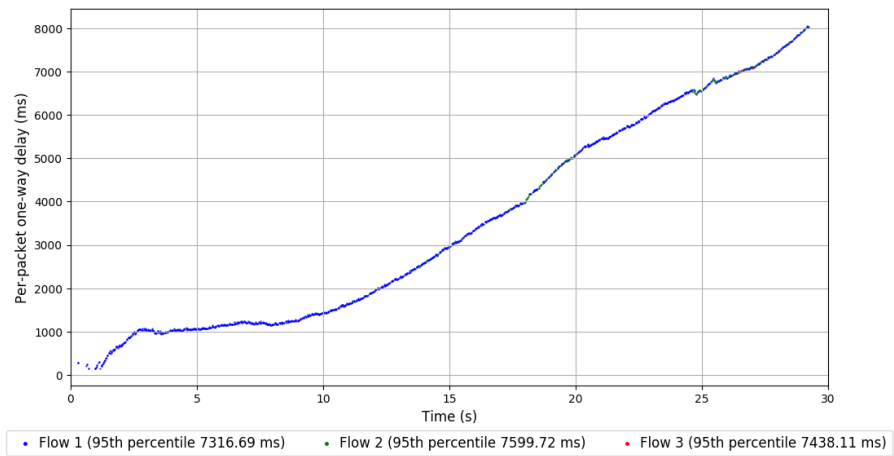
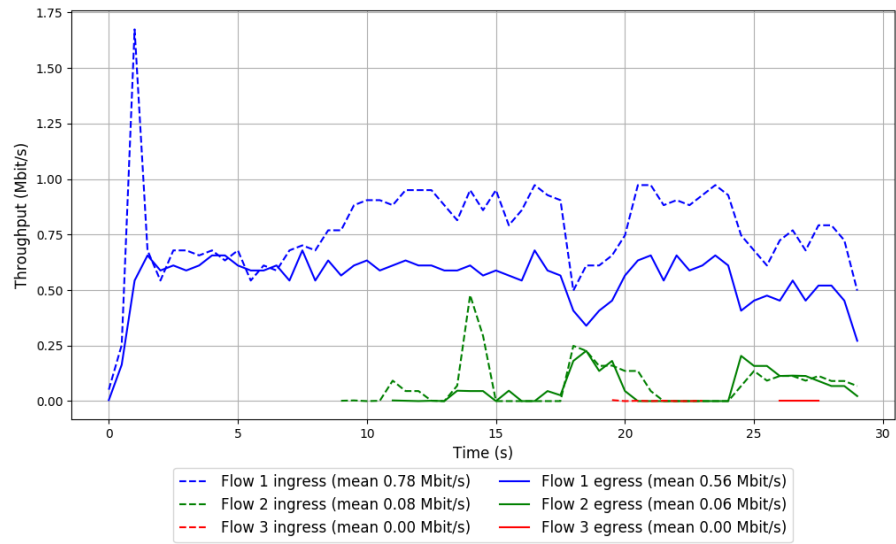
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 7438.107 ms

Loss rate: 33.33%

Run 1: Report of QUIC Cubic — Data Link

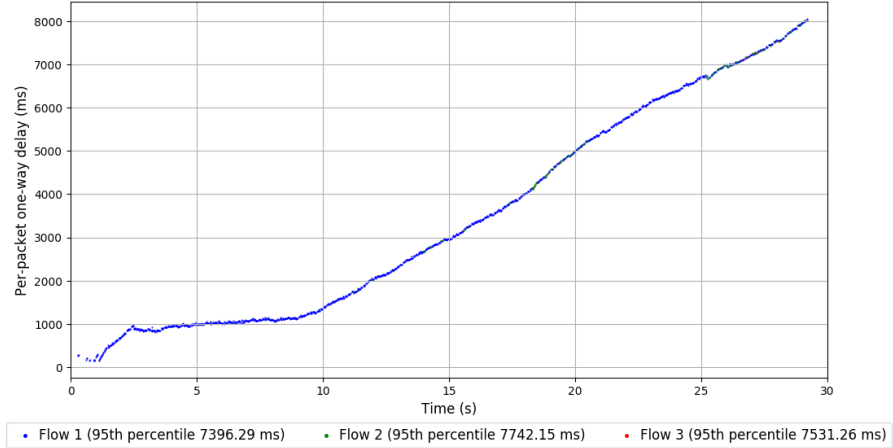
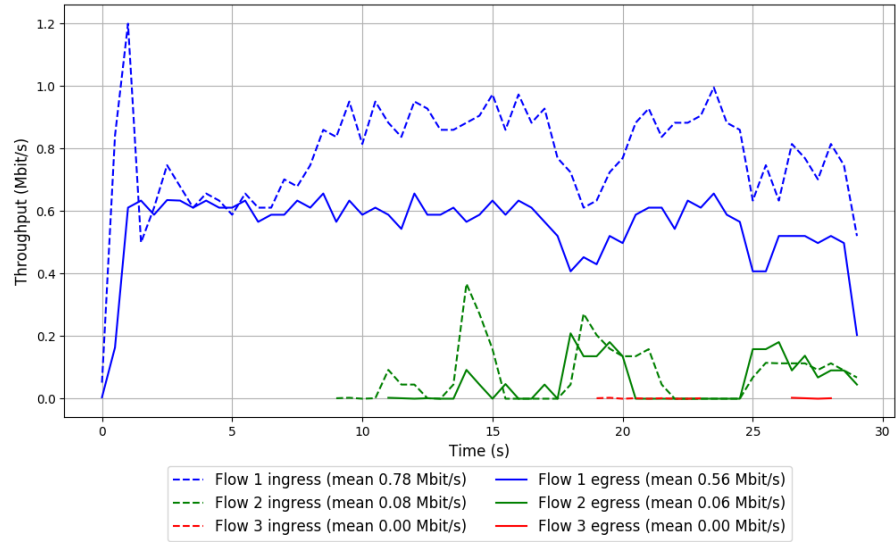


Run 2: Statistics of QUIC Cubic

Start at: 2017-12-11 09:28:41
End at: 2017-12-11 09:29:11
Local clock offset: -4.314 ms
Remote clock offset: -3.237 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 7451.154 ms
Loss rate: 29.47%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 7396.289 ms
Loss rate: 29.22%
-- Flow 2:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 7742.150 ms
Loss rate: 33.23%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 7531.262 ms
Loss rate: 33.33%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2017-12-11 09:46:09

End at: 2017-12-11 09:46:39

Local clock offset: -3.489 ms

Remote clock offset: 0.621 ms

Below is generated by plot.py at 2017-12-11 10:47:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.60 Mbit/s

95th percentile per-packet one-way delay: 7492.540 ms

Loss rate: 29.46%

-- Flow 1:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 7440.671 ms

Loss rate: 29.17%

-- Flow 2:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 7632.340 ms

Loss rate: 33.96%

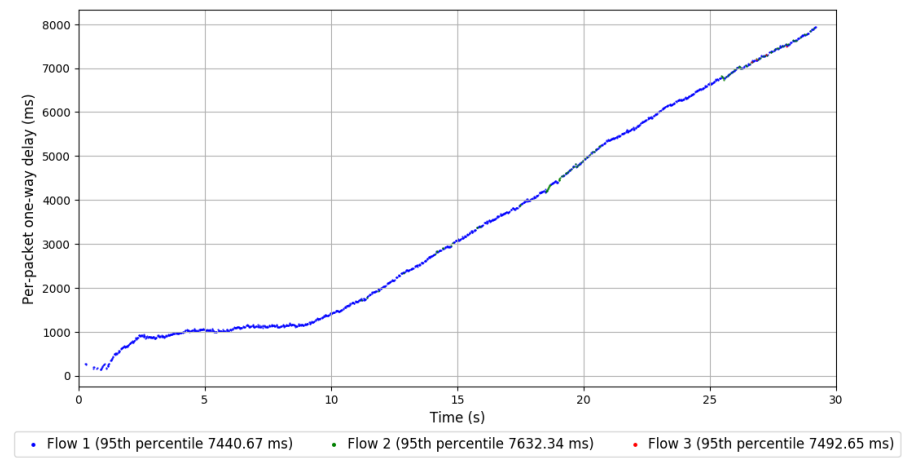
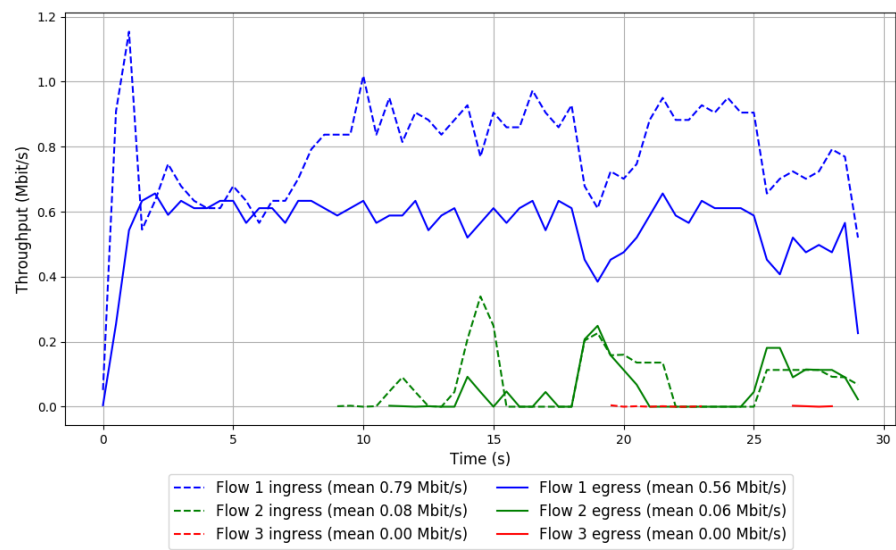
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 7492.646 ms

Loss rate: 33.33%

Run 3: Report of QUIC Cubic — Data Link

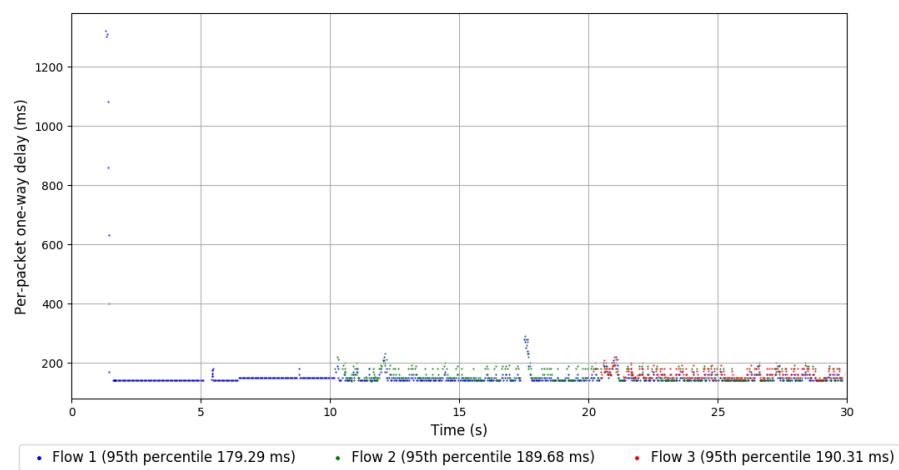
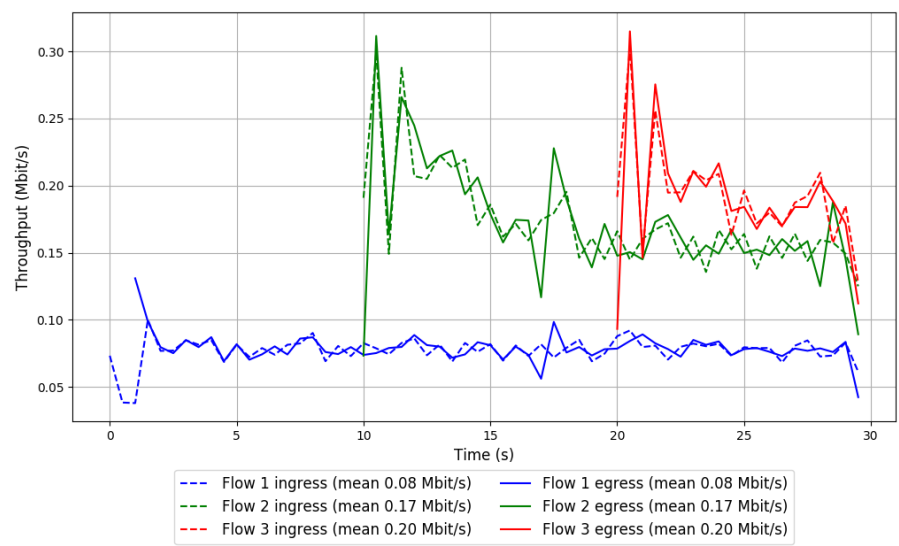


Run 1: Statistics of SCReAM

Start at: 2017-12-11 09:06:14
End at: 2017-12-11 09:06:44
Local clock offset: -4.292 ms
Remote clock offset: -4.611 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 189.623 ms
Loss rate: 1.20%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 179.295 ms
Loss rate: 0.80%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 189.683 ms
Loss rate: 1.13%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 190.309 ms
Loss rate: 1.82%

Run 1: Report of SReAM — Data Link

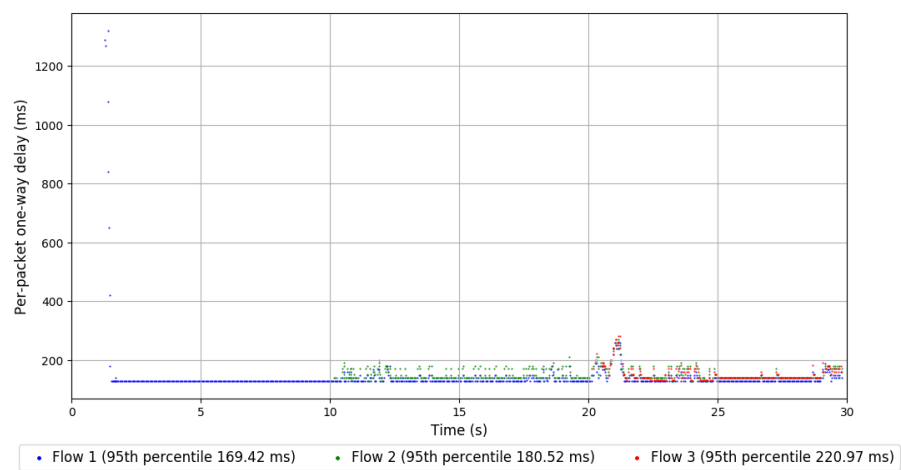
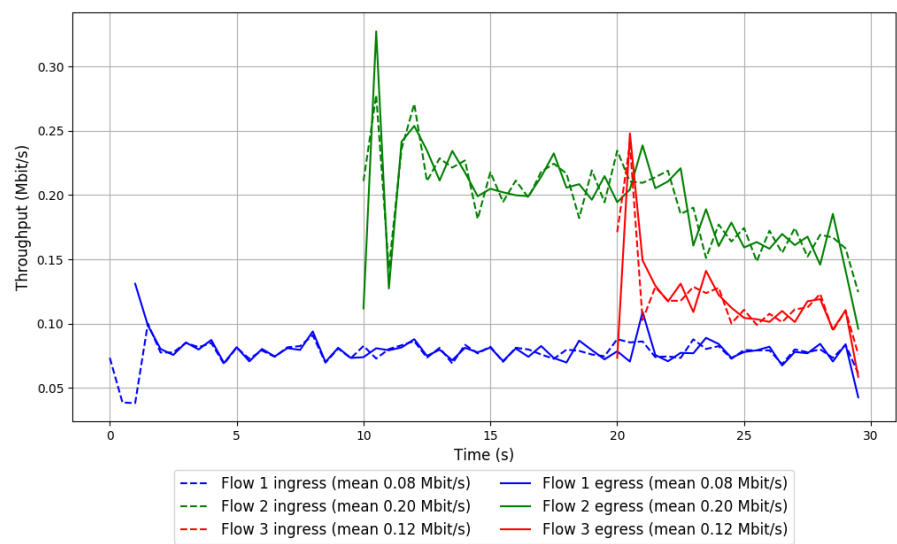


Run 2: Statistics of SReAM

Start at: 2017-12-11 09:23:42
End at: 2017-12-11 09:24:12
Local clock offset: -4.043 ms
Remote clock offset: 1.539 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 181.048 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 169.424 ms
Loss rate: 0.79%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 180.520 ms
Loss rate: 1.11%
-- Flow 3:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 220.967 ms
Loss rate: 2.10%

Run 2: Report of SCSReAM — Data Link

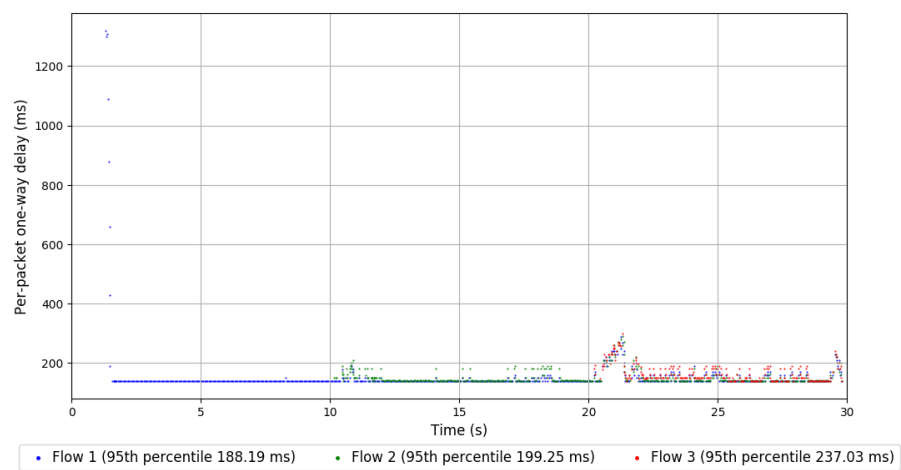
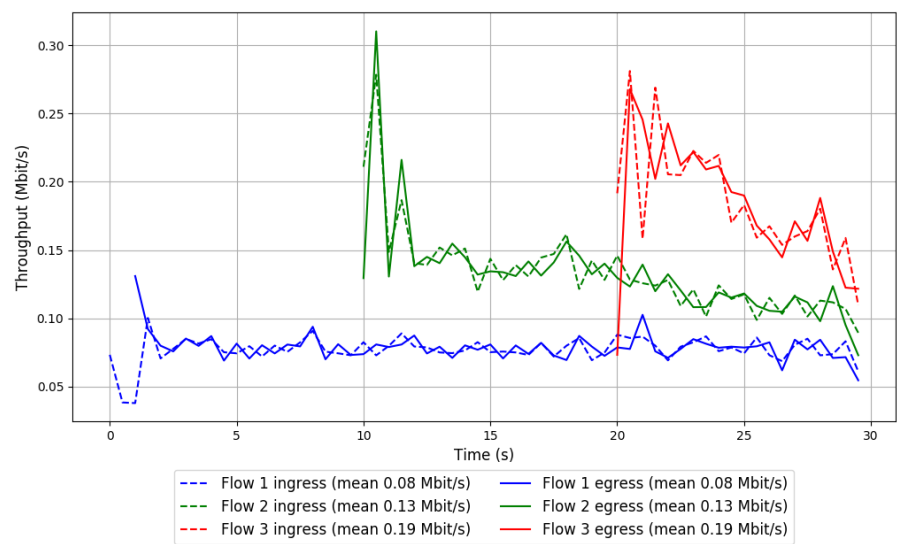


Run 3: Statistics of SCReAM

Start at: 2017-12-11 09:41:10
End at: 2017-12-11 09:41:40
Local clock offset: -3.557 ms
Remote clock offset: -3.767 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 208.329 ms
Loss rate: 1.12%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 188.185 ms
Loss rate: 0.80%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 199.247 ms
Loss rate: 1.04%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 237.031 ms
Loss rate: 1.63%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of WebRTC media

Start at: 2017-12-11 09:03:45

End at: 2017-12-11 09:04:15

Local clock offset: -4.785 ms

Remote clock offset: -3.77 ms

Below is generated by plot.py at 2017-12-11 10:47:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.42 Mbit/s

95th percentile per-packet one-way delay: 1513.316 ms

Loss rate: 1.29%

-- Flow 1:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 1388.030 ms

Loss rate: 0.23%

-- Flow 2:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 1524.505 ms

Loss rate: 2.21%

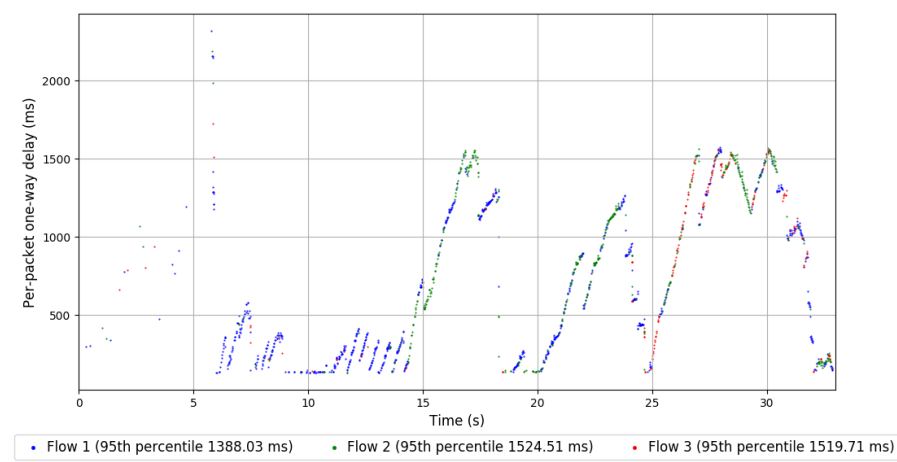
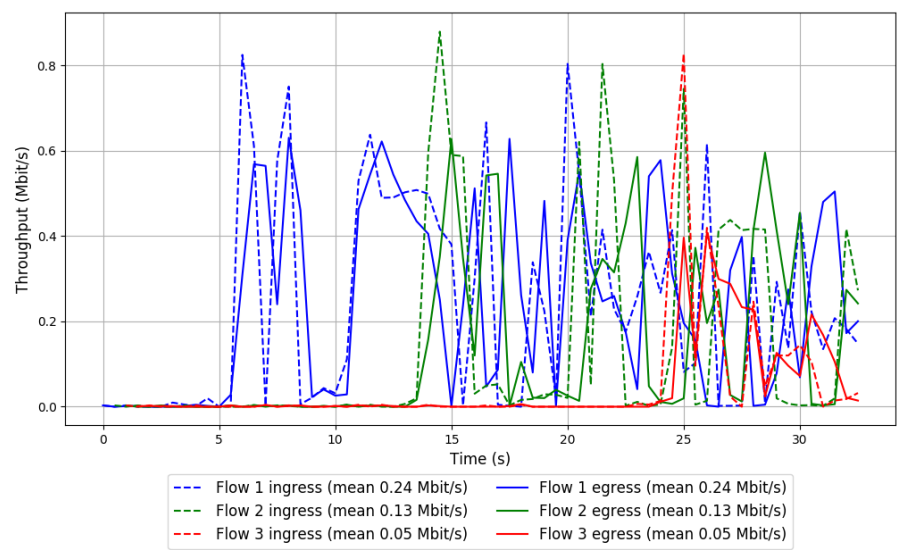
-- Flow 3:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 1519.710 ms

Loss rate: 4.15%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

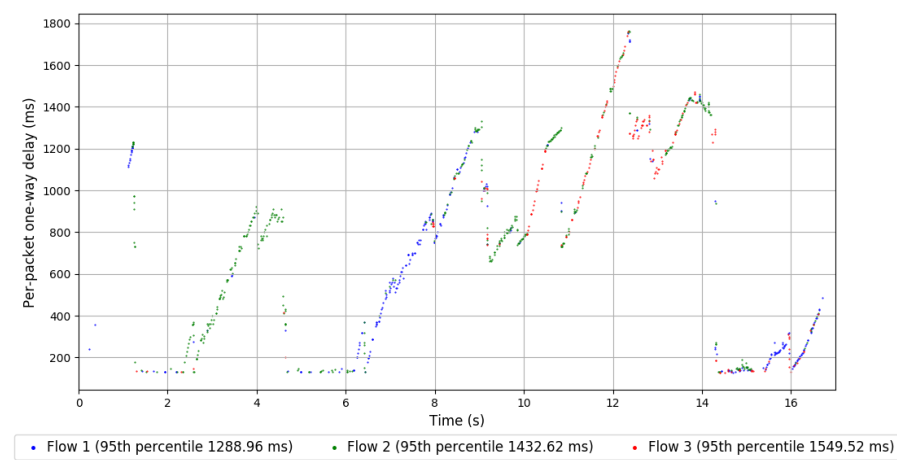
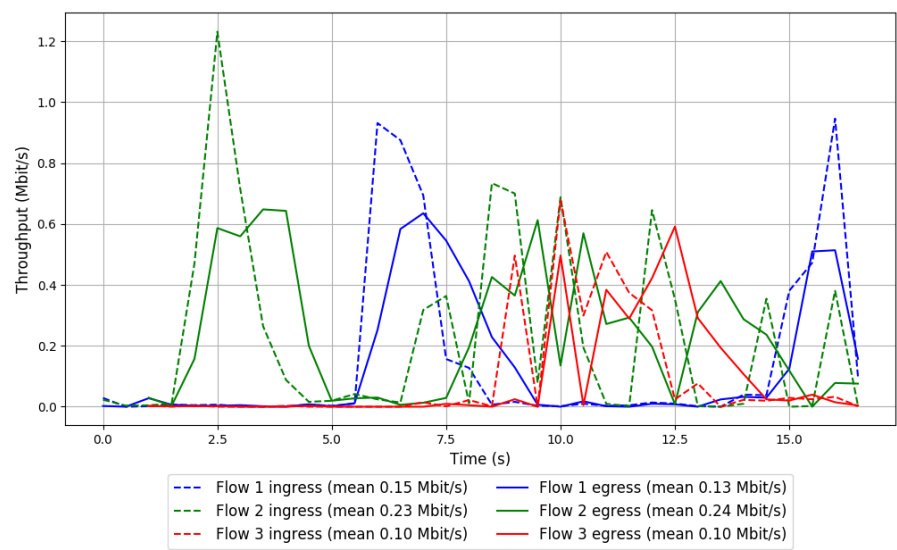
Start at: 2017-12-11 09:21:13

End at: 2017-12-11 09:21:43

Local clock offset: -3.966 ms

Remote clock offset: 1.502 ms

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

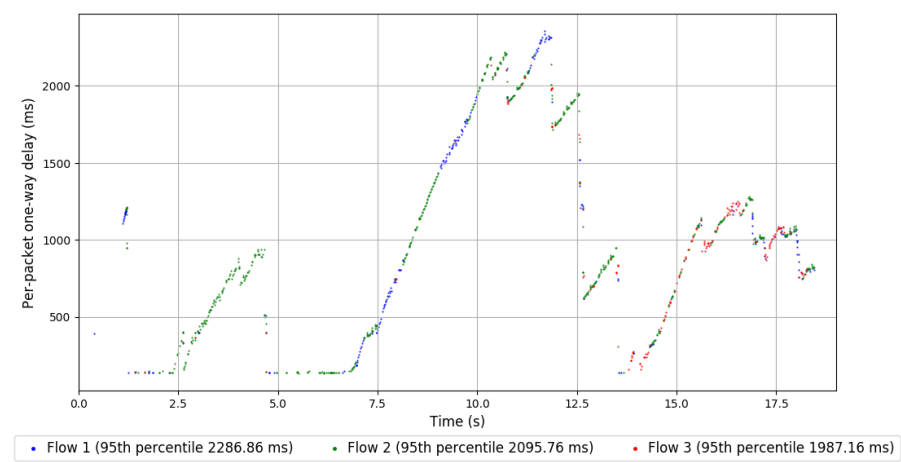
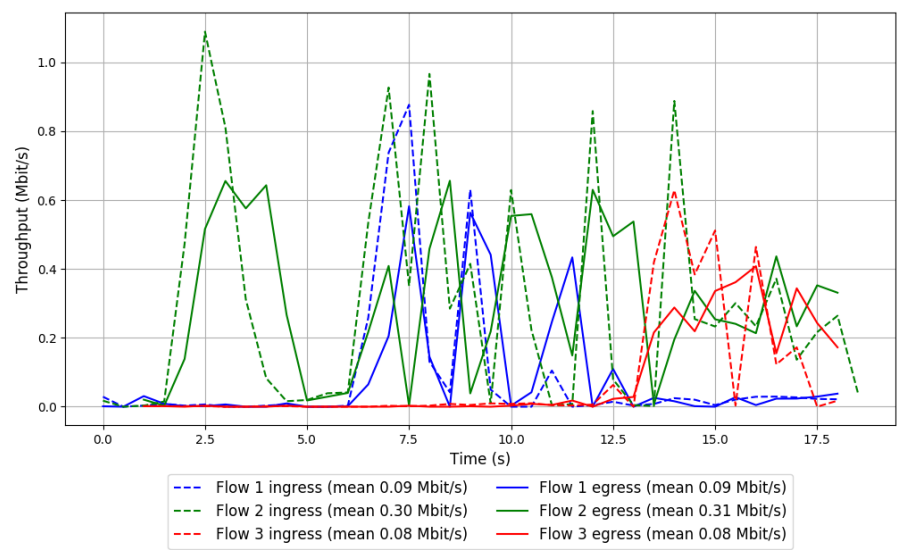
Start at: 2017-12-11 09:38:41

End at: 2017-12-11 09:39:11

Local clock offset: -3.73 ms

Remote clock offset: -4.033 ms

Run 3: Report of WebRTC media — Data Link

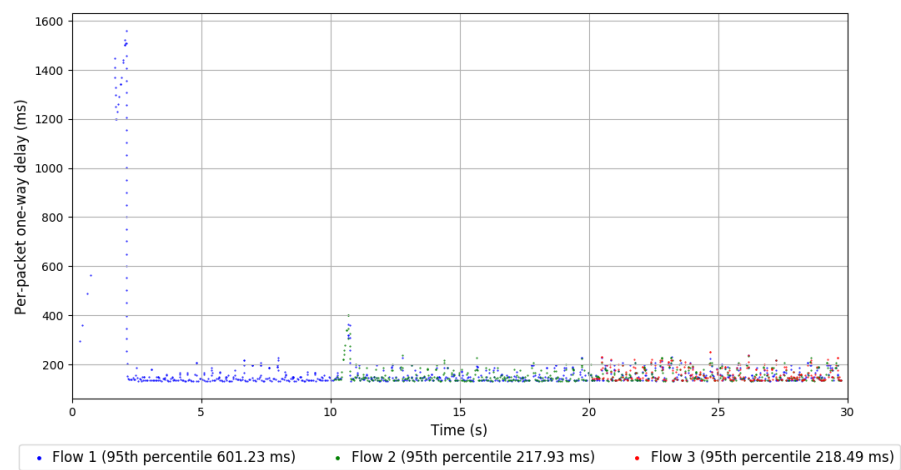
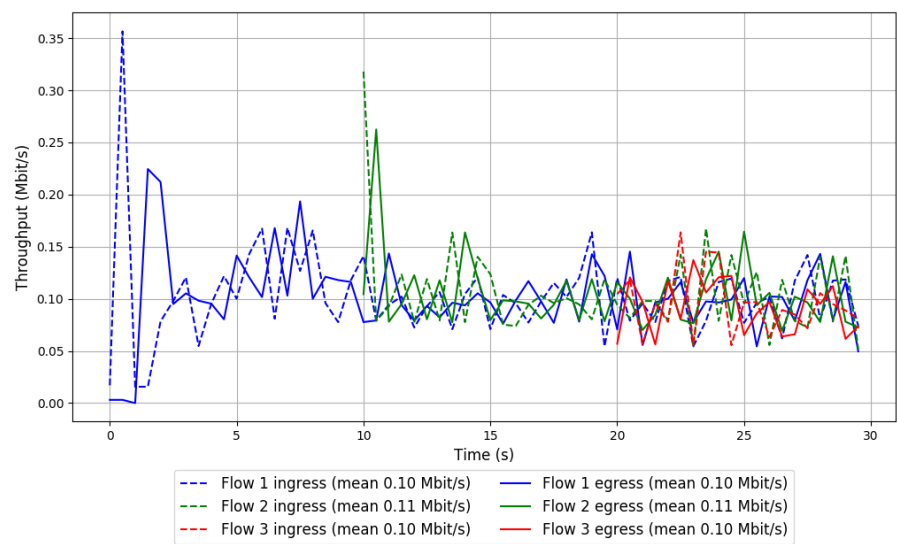


Run 1: Statistics of Sprout

Start at: 2017-12-11 09:14:57
End at: 2017-12-11 09:15:27
Local clock offset: -3.828 ms
Remote clock offset: -4.214 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 230.593 ms
Loss rate: 1.62%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 601.228 ms
Loss rate: 1.32%
-- Flow 2:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 217.928 ms
Loss rate: 1.67%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 218.489 ms
Loss rate: 2.48%

Run 1: Report of Sprout — Data Link

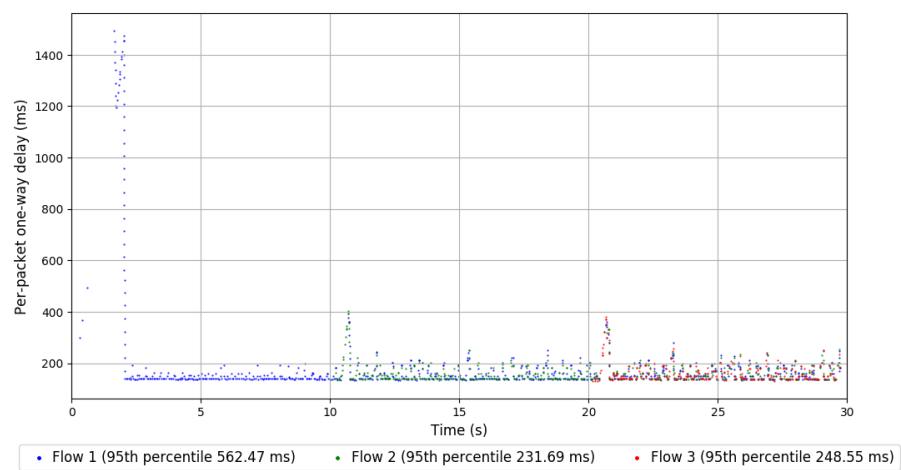
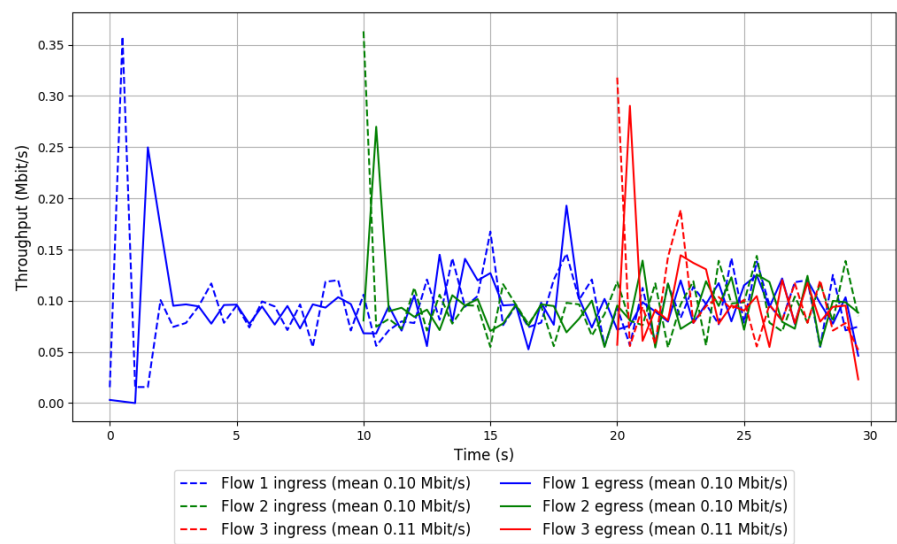


Run 2: Statistics of Sprout

Start at: 2017-12-11 09:32:26
End at: 2017-12-11 09:32:56
Local clock offset: -4.149 ms
Remote clock offset: -3.318 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 299.392 ms
Loss rate: 2.26%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 562.466 ms
Loss rate: 1.45%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 231.685 ms
Loss rate: 3.32%
-- Flow 3:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 248.552 ms
Loss rate: 2.46%

Run 2: Report of Sprout — Data Link

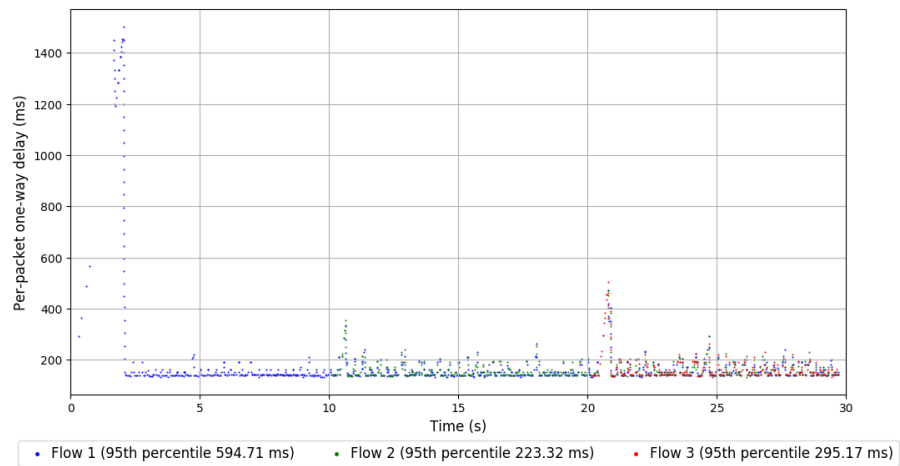
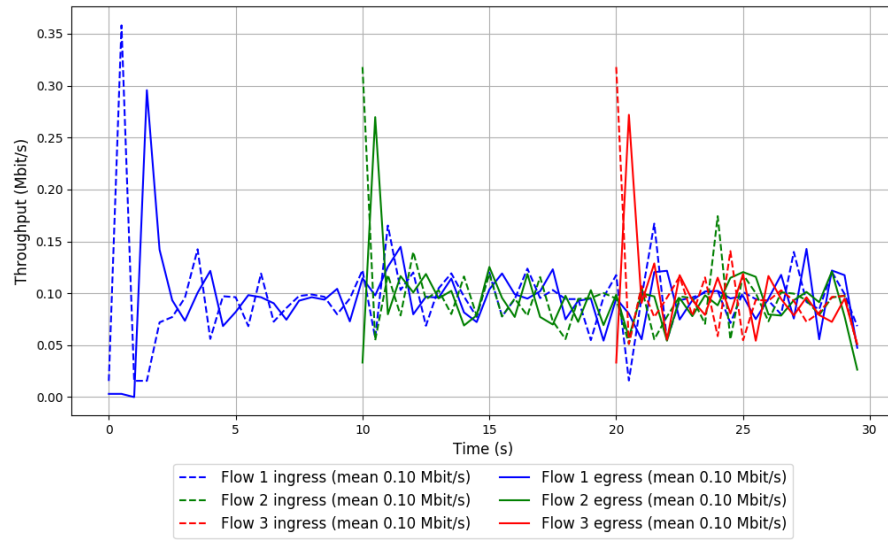


Run 3: Statistics of Sprout

Start at: 2017-12-11 09:49:53
End at: 2017-12-11 09:50:23
Local clock offset: -3.608 ms
Remote clock offset: -3.118 ms

```
# Below is generated by plot.py at 2017-12-11 10:47:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 314.702 ms
Loss rate: 2.10%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 594.714 ms
Loss rate: 1.05%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 223.325 ms
Loss rate: 2.92%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 295.169 ms
Loss rate: 3.54%
```

Run 3: Report of Sprout — Data Link

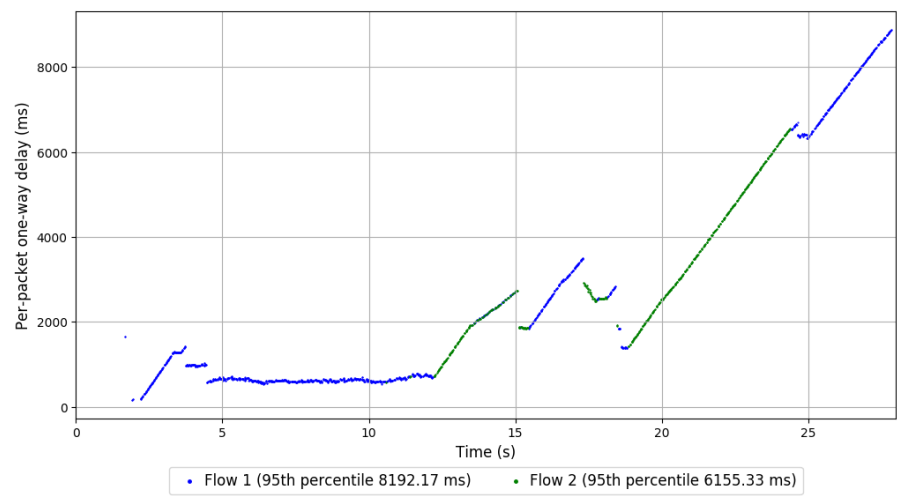
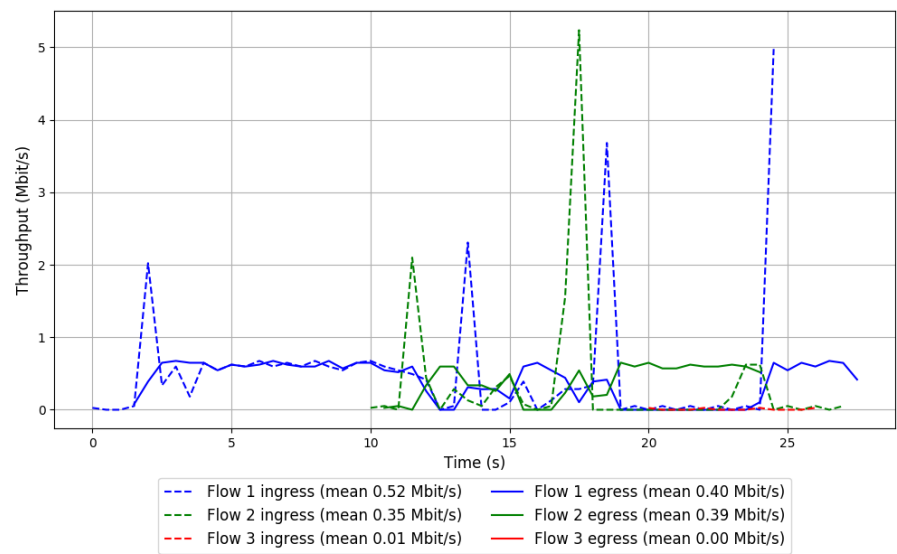


Run 1: Statistics of TaoVA-100x

Start at: 2017-12-11 09:12:28
End at: 2017-12-11 09:12:58
Local clock offset: -3.897 ms
Remote clock offset: -4.189 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 7821.456 ms
Loss rate: 18.00%
-- Flow 1:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 8192.167 ms
Loss rate: 20.14%
-- Flow 2:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 6155.332 ms
Loss rate: 12.79%
-- Flow 3:
Average throughput: 0.00 Mbit/s

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

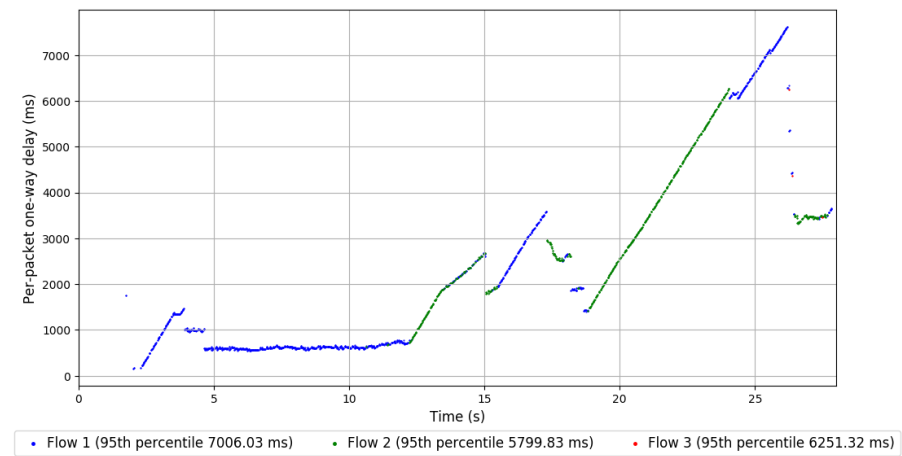
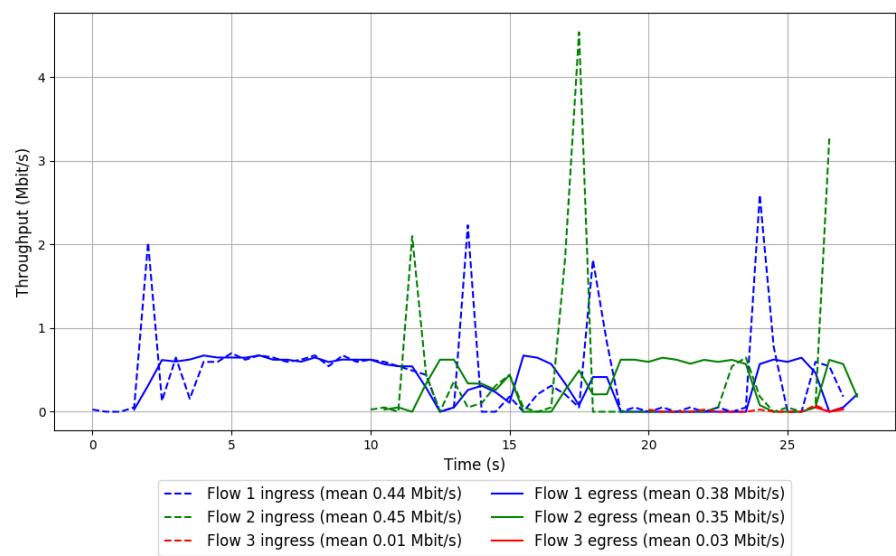


Run 2: Statistics of TaoVA-100x

Start at: 2017-12-11 09:29:56
End at: 2017-12-11 09:30:26
Local clock offset: -4.329 ms
Remote clock offset: -3.314 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 6589.110 ms
Loss rate: 20.22%
-- Flow 1:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 7006.029 ms
Loss rate: 18.60%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 5799.834 ms
Loss rate: 22.22%
-- Flow 3:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 6251.321 ms
Loss rate: 62.50%

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

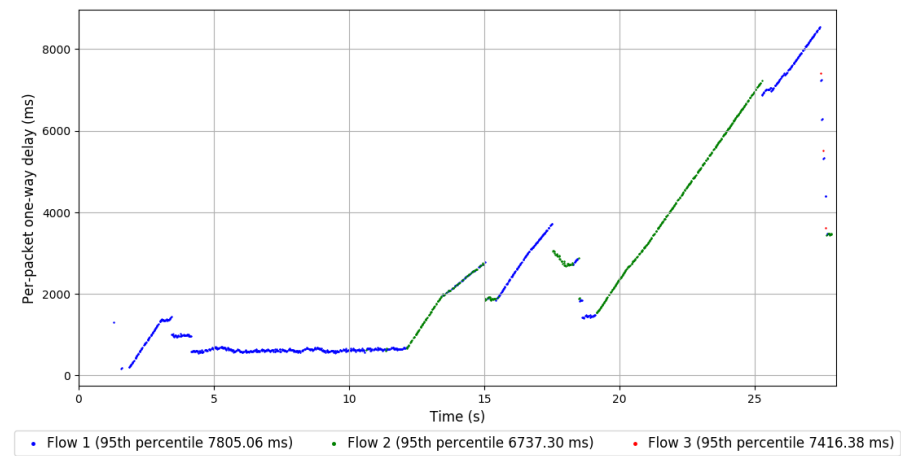
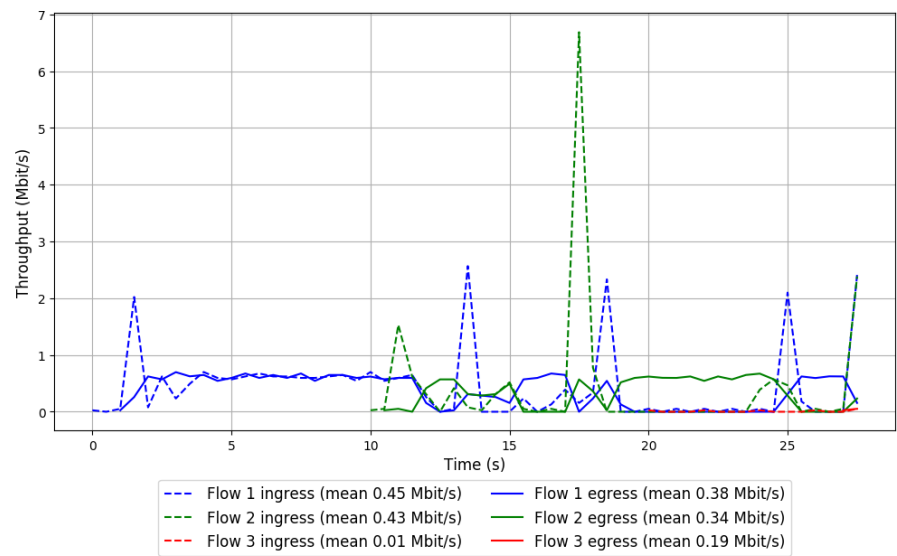


Run 3: Statistics of TaoVA-100x

Start at: 2017-12-11 09:47:24
End at: 2017-12-11 09:47:54
Local clock offset: -3.466 ms
Remote clock offset: -3.419 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 7406.263 ms
Loss rate: 21.00%
-- Flow 1:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 7805.058 ms
Loss rate: 19.00%
-- Flow 2:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 6737.303 ms
Loss rate: 23.95%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 7416.380 ms
Loss rate: 50.00%

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

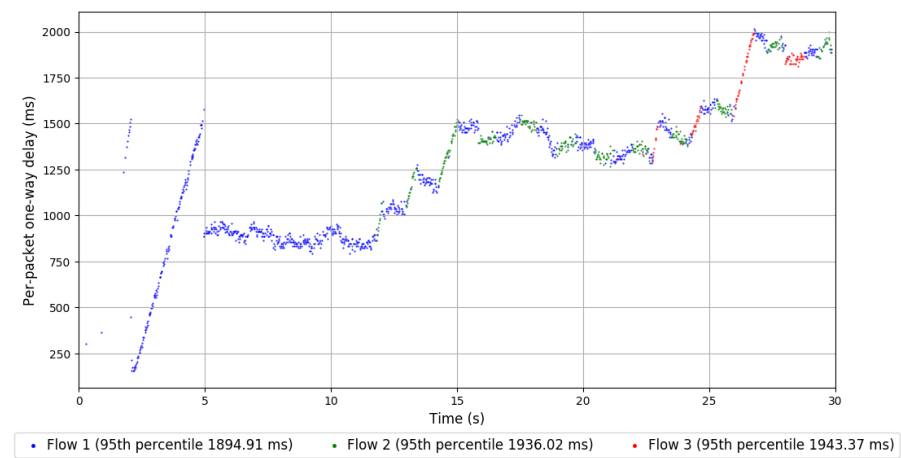
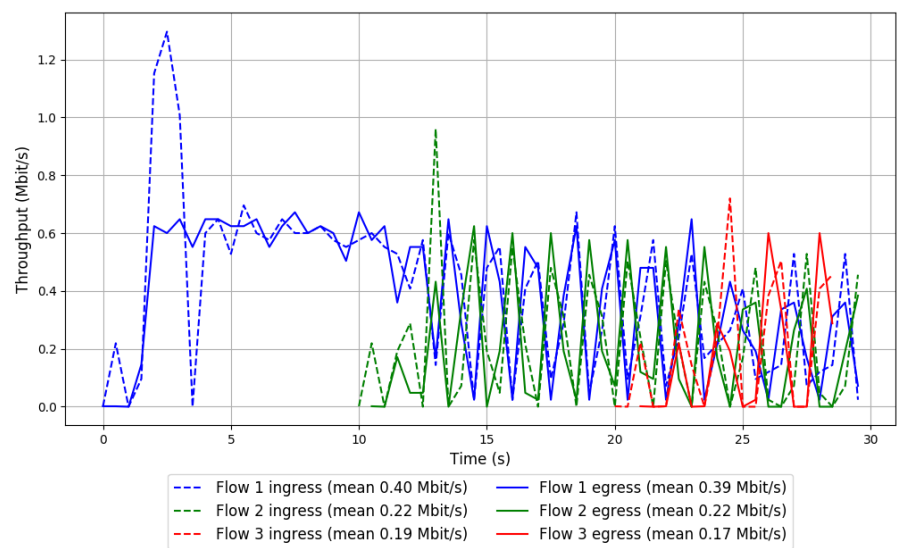


Run 1: Statistics of TCP Vegas

Start at: 2017-12-11 09:17:27
End at: 2017-12-11 09:17:57
Local clock offset: -3.841 ms
Remote clock offset: -4.099 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1916.114 ms
Loss rate: 6.26%
-- Flow 1:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 1894.906 ms
Loss rate: 3.39%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 1936.020 ms
Loss rate: 6.75%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 1943.372 ms
Loss rate: 25.29%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2017-12-11 09:34:55

End at: 2017-12-11 09:35:25

Local clock offset: -3.976 ms

Remote clock offset: 1.599 ms

Below is generated by plot.py at 2017-12-11 10:47:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 1955.046 ms

Loss rate: 6.36%

-- Flow 1:

Average throughput: 0.40 Mbit/s

95th percentile per-packet one-way delay: 1875.845 ms

Loss rate: 3.69%

-- Flow 2:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 1975.048 ms

Loss rate: 6.79%

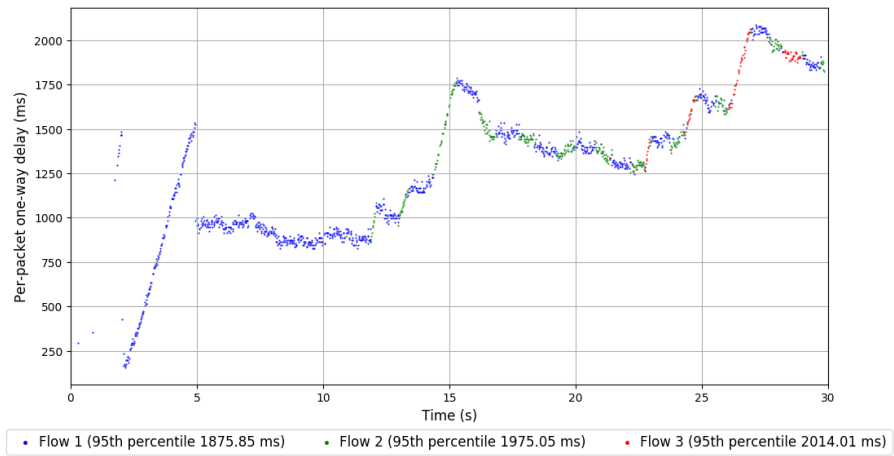
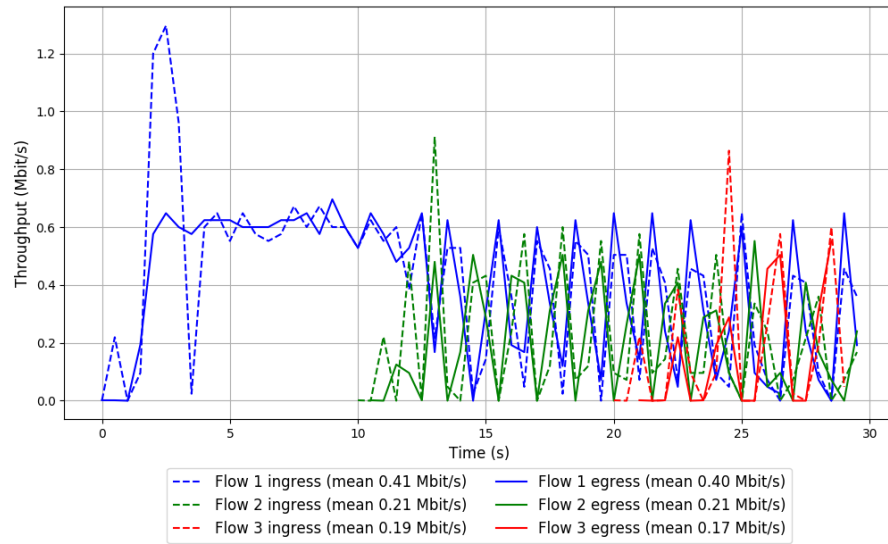
-- Flow 3:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 2014.014 ms

Loss rate: 24.94%

Run 2: Report of TCP Vegas — Data Link

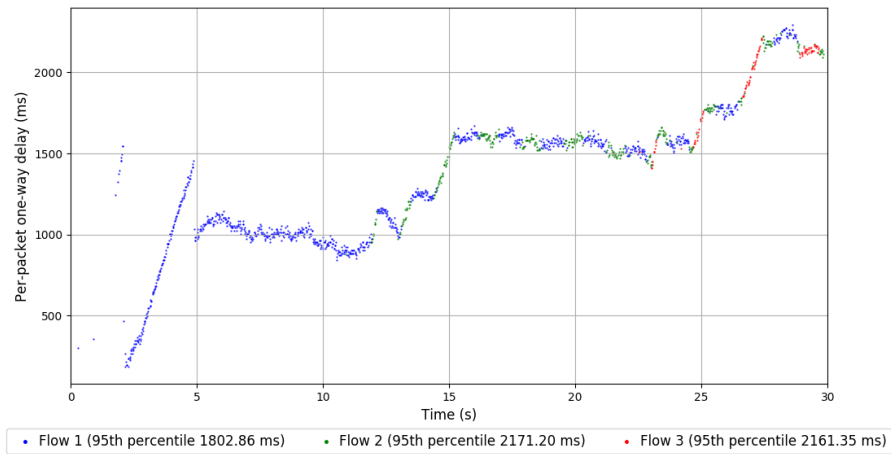
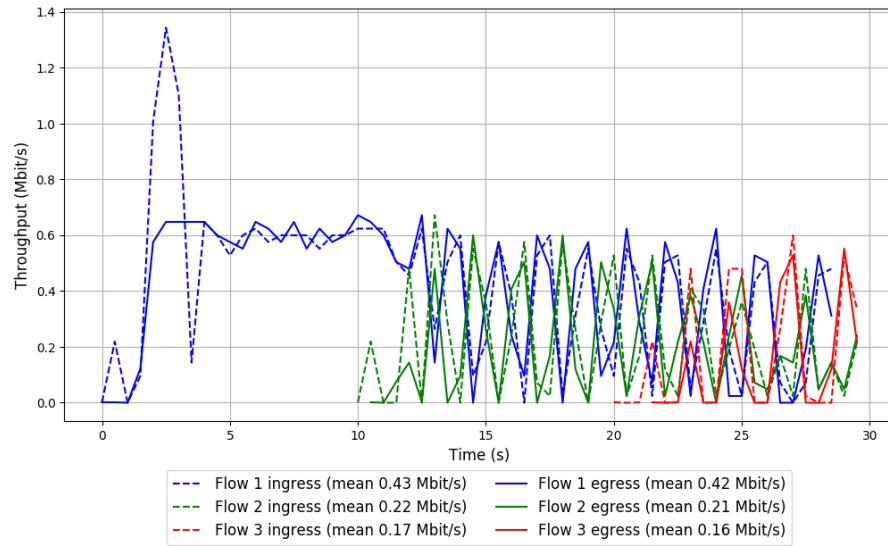


Run 3: Statistics of TCP Vegas

Start at: 2017-12-11 09:52:23
End at: 2017-12-11 09:52:53
Local clock offset: -3.597 ms
Remote clock offset: -4.088 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 2161.268 ms
Loss rate: 6.92%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 1802.855 ms
Loss rate: 4.08%
-- Flow 2:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 2171.203 ms
Loss rate: 7.77%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 2161.350 ms
Loss rate: 25.29%

Run 3: Report of TCP Vegas — Data Link

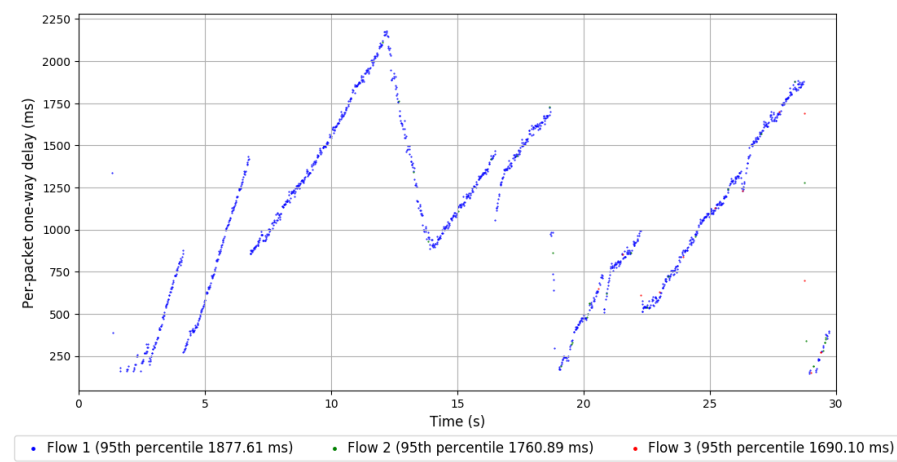
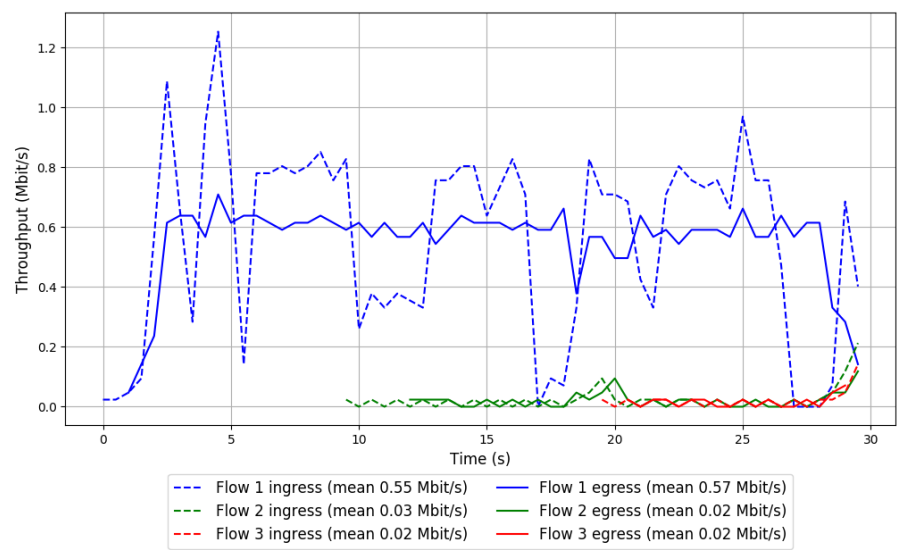


Run 1: Statistics of Verus

Start at: 2017-12-11 09:08:43
End at: 2017-12-11 09:09:13
Local clock offset: -4.075 ms
Remote clock offset: -3.756 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1877.606 ms
Loss rate: 3.70%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 1877.606 ms
Loss rate: 2.79%
-- Flow 2:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1760.890 ms
Loss rate: 21.43%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1690.102 ms
Loss rate: 31.58%

Run 1: Report of Verus — Data Link

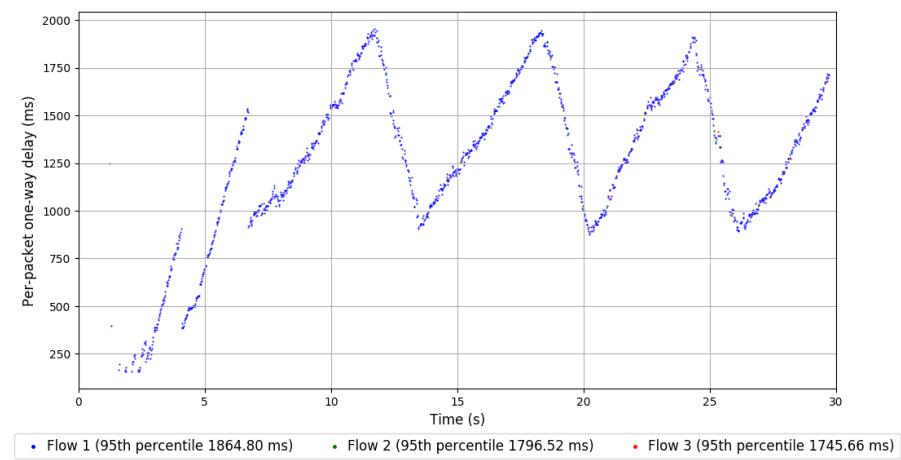
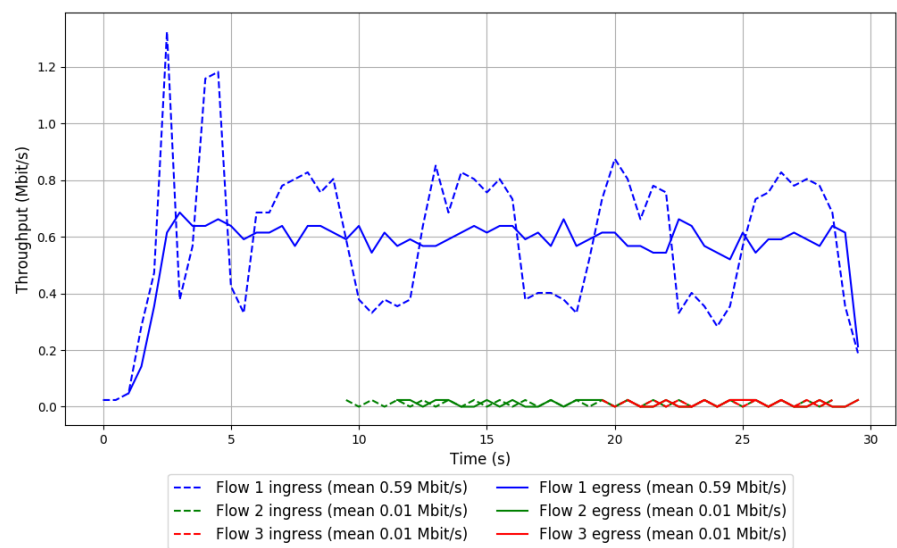


Run 2: Statistics of Verus

Start at: 2017-12-11 09:26:11
End at: 2017-12-11 09:26:41
Local clock offset: -4.096 ms
Remote clock offset: -3.286 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 1864.071 ms
Loss rate: 5.65%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1864.804 ms
Loss rate: 5.63%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1796.523 ms
Loss rate: 5.00%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1745.665 ms
Loss rate: 10.00%

Run 2: Report of Verus — Data Link

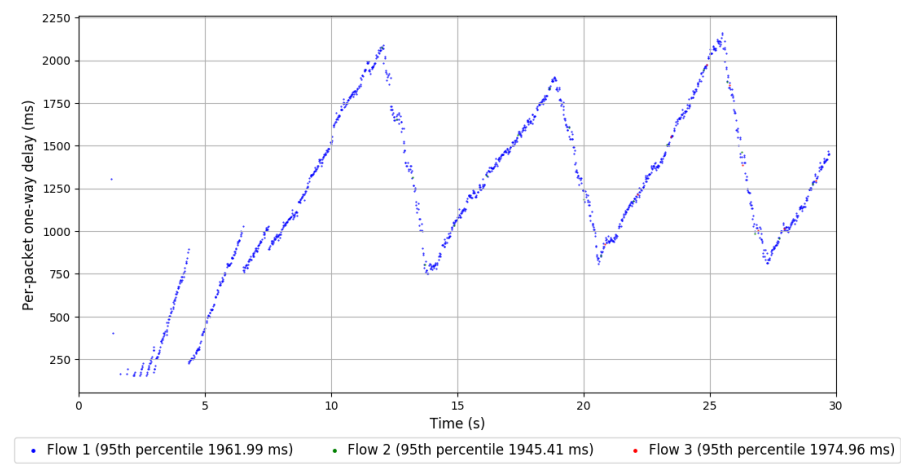
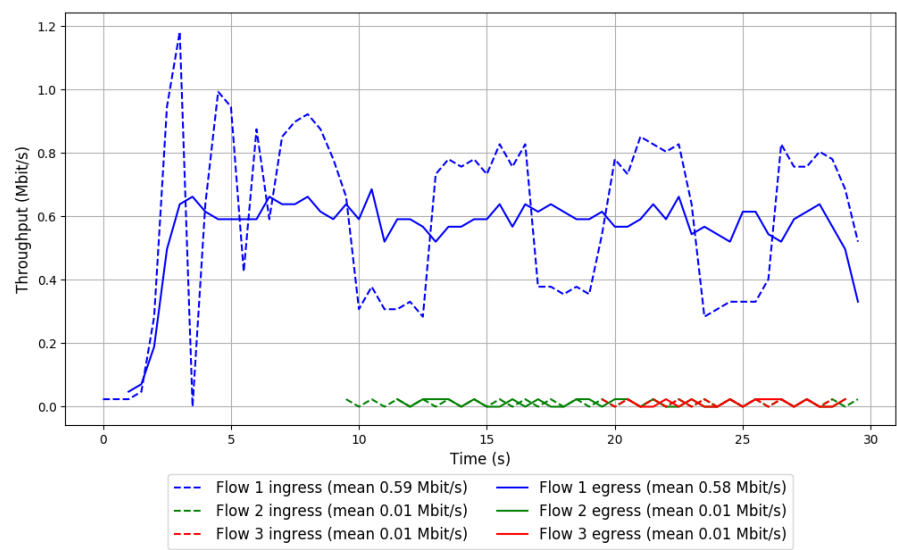


Run 3: Statistics of Verus

Start at: 2017-12-11 09:43:39
End at: 2017-12-11 09:44:09
Local clock offset: -3.484 ms
Remote clock offset: 1.046 ms

```
# Below is generated by plot.py at 2017-12-11 10:47:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1961.992 ms
Loss rate: 6.67%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1961.992 ms
Loss rate: 6.61%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1945.409 ms
Loss rate: 9.52%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1974.964 ms
Loss rate: 10.00%
```

Run 3: Report of Verus — Data Link



Run 1: Statistics of Copa

Start at: 2017-12-11 09:04:59

End at: 2017-12-11 09:05:29

Local clock offset: -4.416 ms

Remote clock offset: 0.155 ms

Below is generated by plot.py at 2017-12-11 10:47:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 1004.821 ms

Loss rate: 4.93%

-- Flow 1:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 972.430 ms

Loss rate: 2.95%

-- Flow 2:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 1004.883 ms

Loss rate: 5.76%

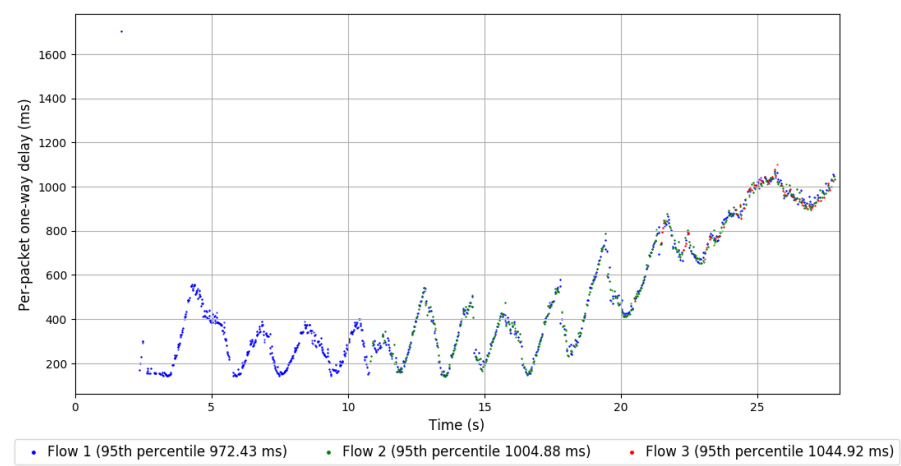
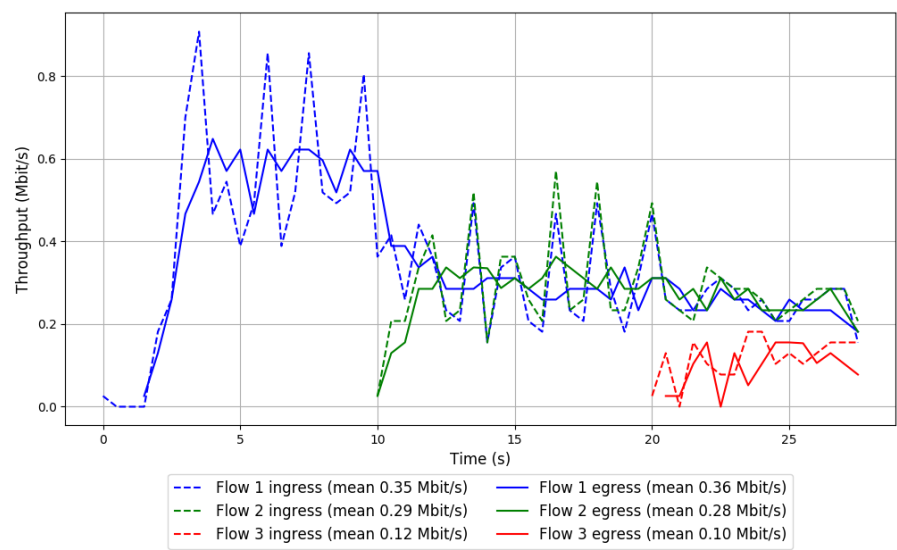
-- Flow 3:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 1044.918 ms

Loss rate: 20.83%

Run 1: Report of Copa — Data Link

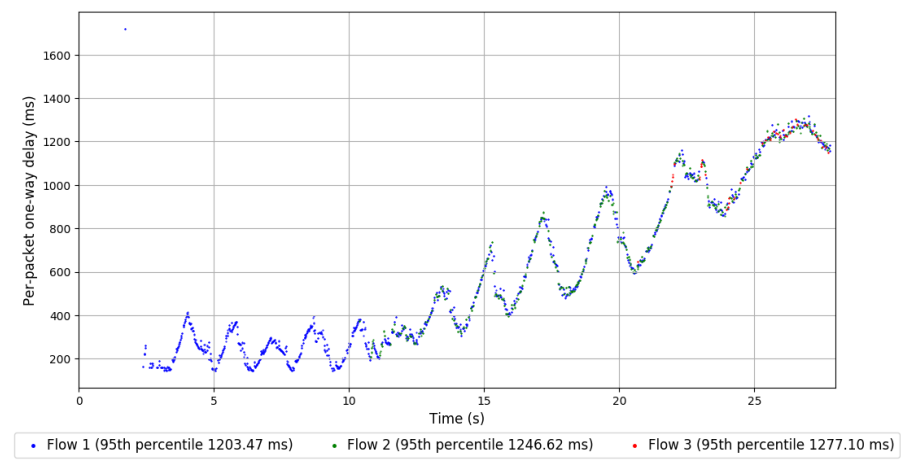
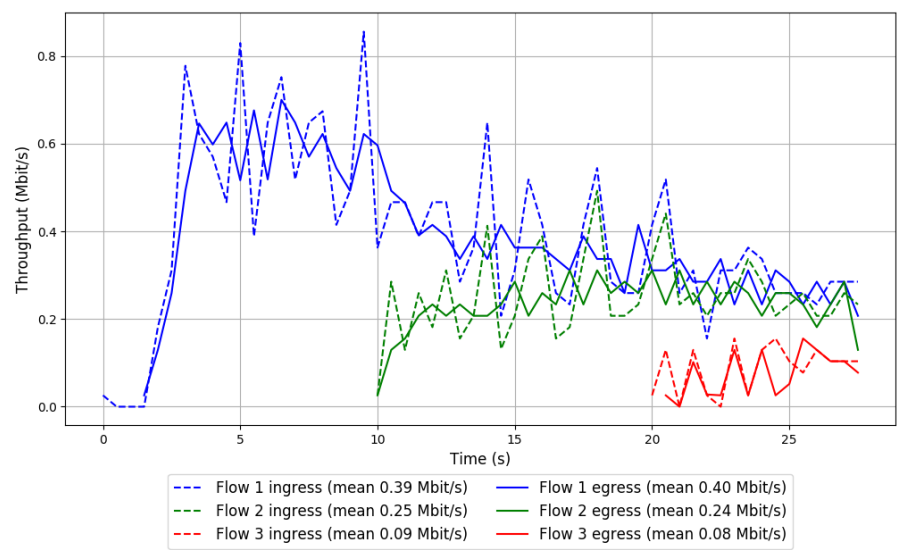


Run 2: Statistics of Copa

Start at: 2017-12-11 09:22:27
End at: 2017-12-11 09:22:57
Local clock offset: -3.939 ms
Remote clock offset: -3.349 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1235.681 ms
Loss rate: 5.25%
-- Flow 1:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 1203.472 ms
Loss rate: 3.47%
-- Flow 2:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 1246.621 ms
Loss rate: 7.14%
-- Flow 3:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 1277.097 ms
Loss rate: 20.37%

Run 2: Report of Copa — Data Link

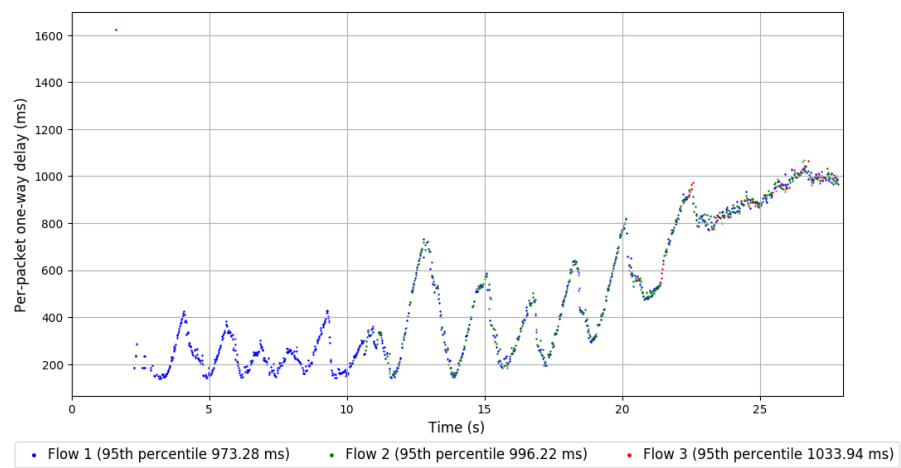
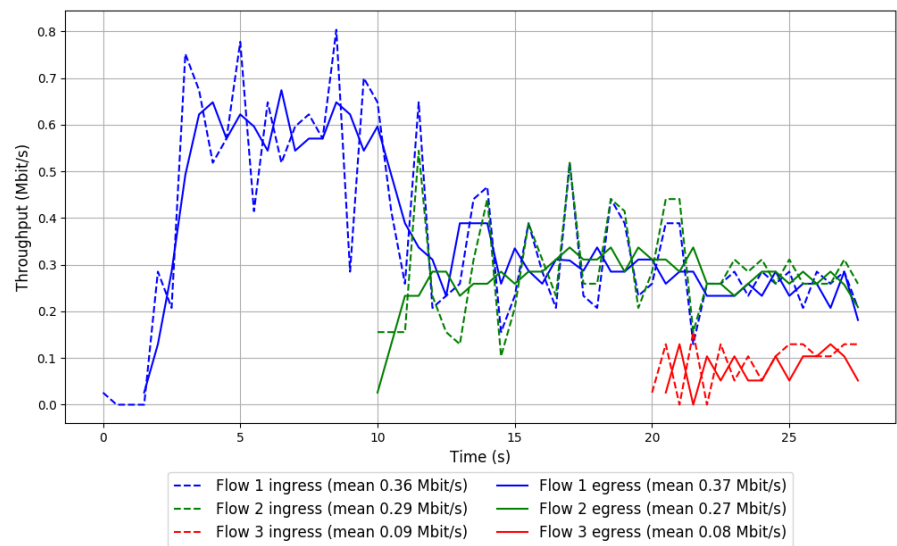


Run 3: Statistics of Copa

Start at: 2017-12-11 09:39:55
End at: 2017-12-11 09:40:25
Local clock offset: -3.604 ms
Remote clock offset: 1.506 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 992.201 ms
Loss rate: 4.72%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 973.276 ms
Loss rate: 2.84%
-- Flow 2:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 996.222 ms
Loss rate: 6.05%
-- Flow 3:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 1033.944 ms
Loss rate: 21.05%

Run 3: Report of Copa — Data Link



Run 1: Statistics of Indigo

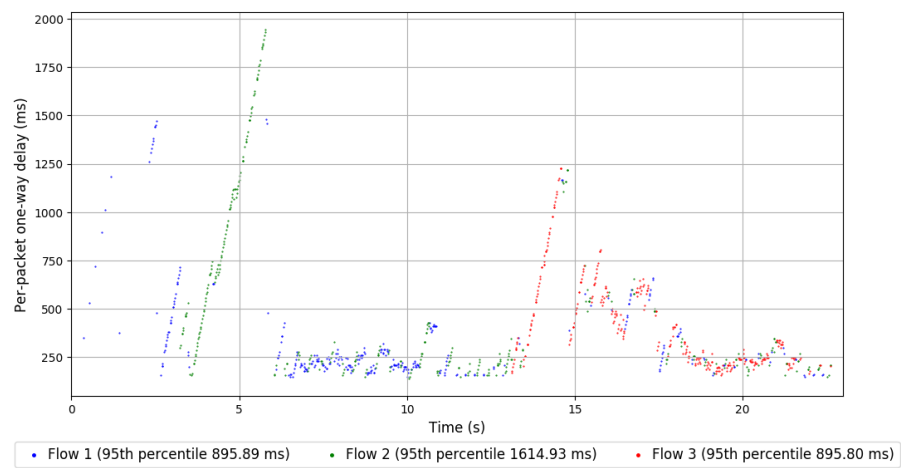
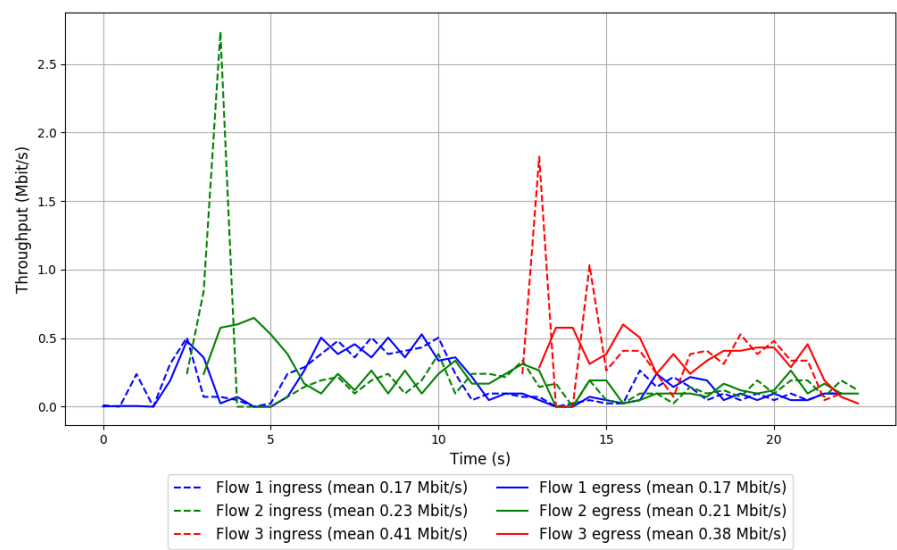
Start at: 2017-12-11 09:02:30

End at: 2017-12-11 09:03:00

Local clock offset: -5.18 ms

Remote clock offset: 1.04 ms

Run 1: Report of Indigo — Data Link

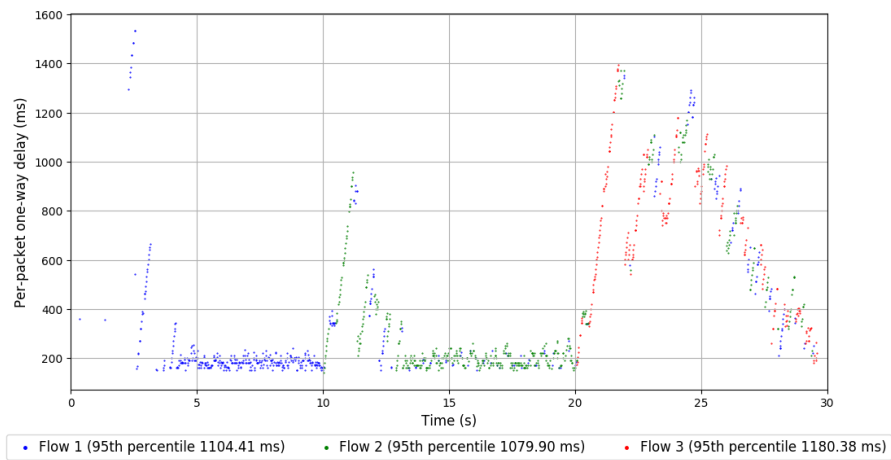
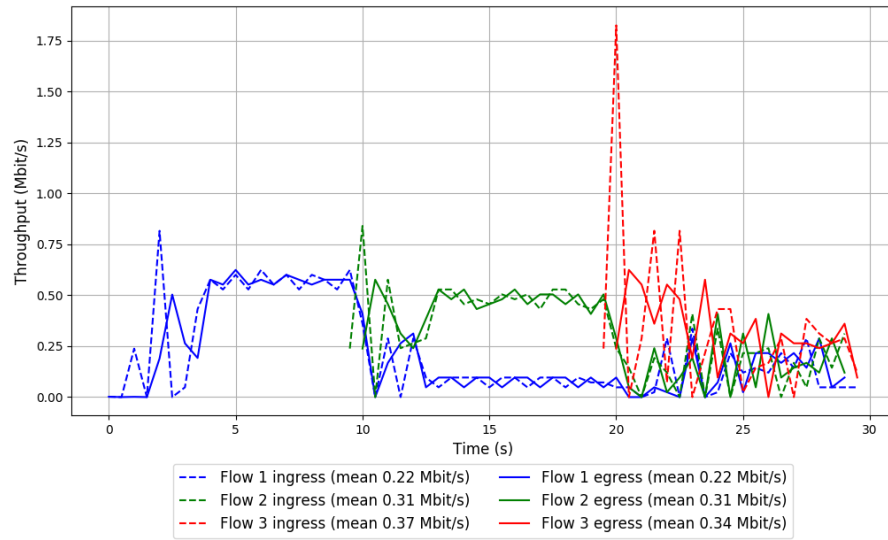


Run 2: Statistics of Indigo

Start at: 2017-12-11 09:19:58
End at: 2017-12-11 09:20:28
Local clock offset: -3.859 ms
Remote clock offset: -4.241 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 1104.412 ms
Loss rate: 3.80%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 1104.412 ms
Loss rate: 1.51%
-- Flow 2:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 1079.901 ms
Loss rate: 2.73%
-- Flow 3:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 1180.383 ms
Loss rate: 9.77%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2017-12-11 09:37:26

End at: 2017-12-11 09:37:56

Local clock offset: -3.782 ms

Remote clock offset: 1.7 ms

Below is generated by plot.py at 2017-12-11 10:47:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 2330.468 ms

Loss rate: 16.73%

-- Flow 1:

Average throughput: 0.27 Mbit/s

95th percentile per-packet one-way delay: 1741.242 ms

Loss rate: 18.00%

-- Flow 2:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 1512.983 ms

Loss rate: 3.93%

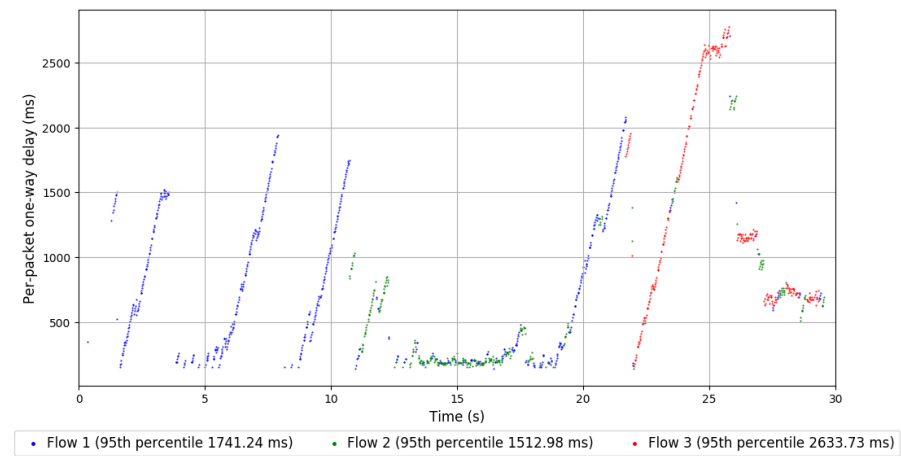
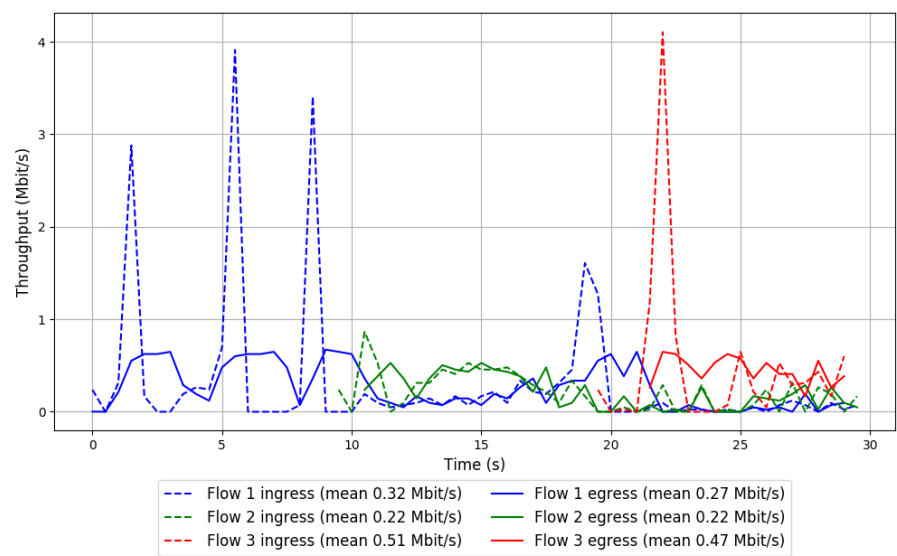
-- Flow 3:

Average throughput: 0.47 Mbit/s

95th percentile per-packet one-way delay: 2633.729 ms

Loss rate: 25.56%

Run 3: Report of Indigo — Data Link

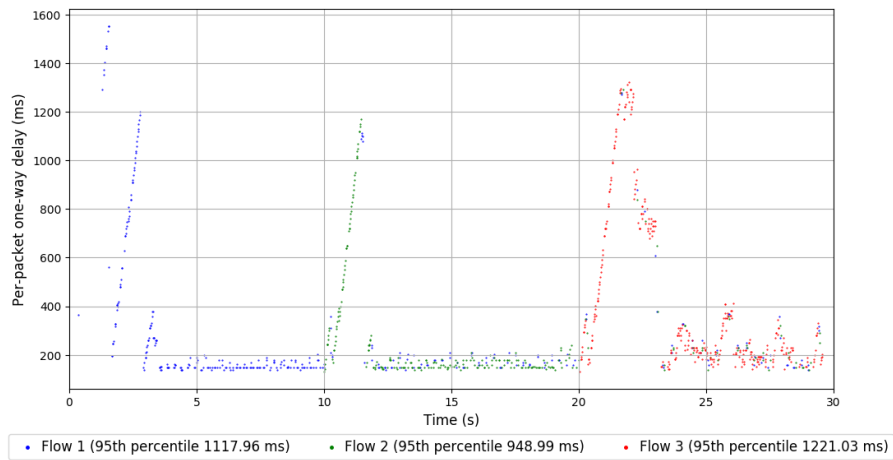
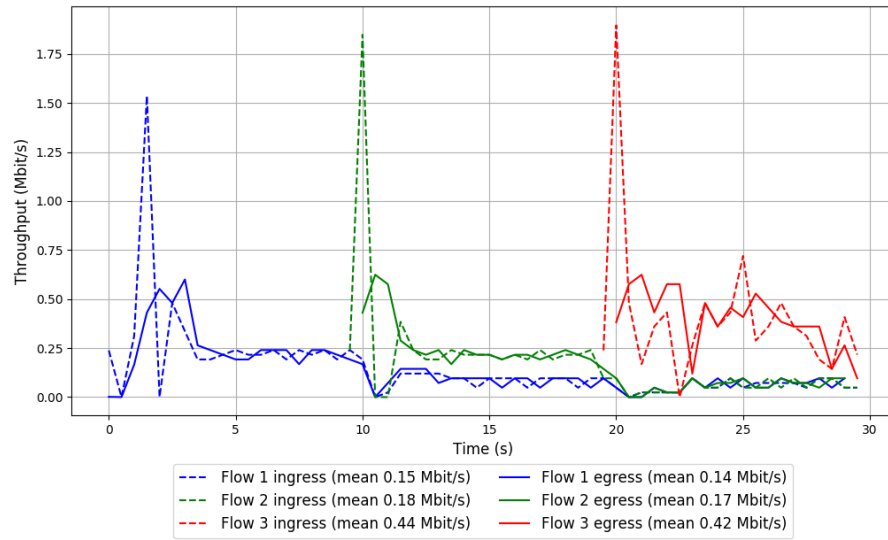


```
Run 1: Statistics of Indigo-calib

Start at: 2017-12-11 09:07:29
End at: 2017-12-11 09:07:59
Local clock offset: -4.251 ms
Remote clock offset: 1.898 ms

# Below is generated by plot.py at 2017-12-11 10:47:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 1137.710 ms
Loss rate: 7.15%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 1117.964 ms
Loss rate: 6.67%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 948.994 ms
Loss rate: 7.27%
-- Flow 3:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 1221.027 ms
Loss rate: 7.54%
```

Run 1: Report of Indigo-calib — Data Link

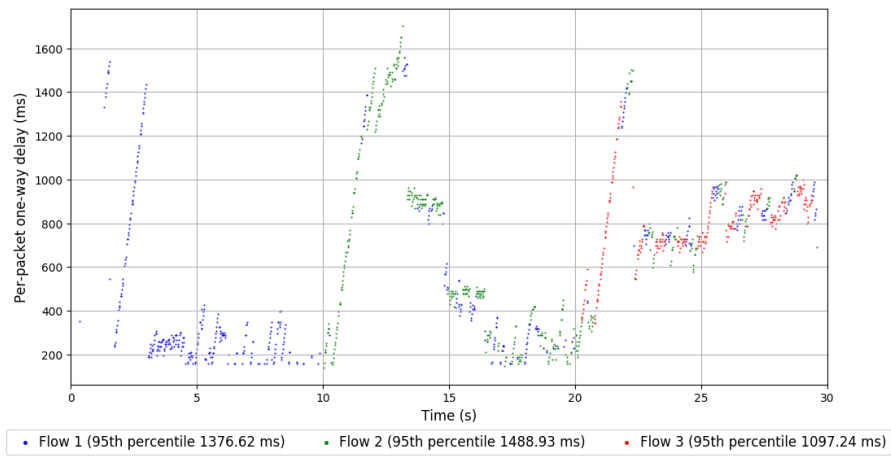
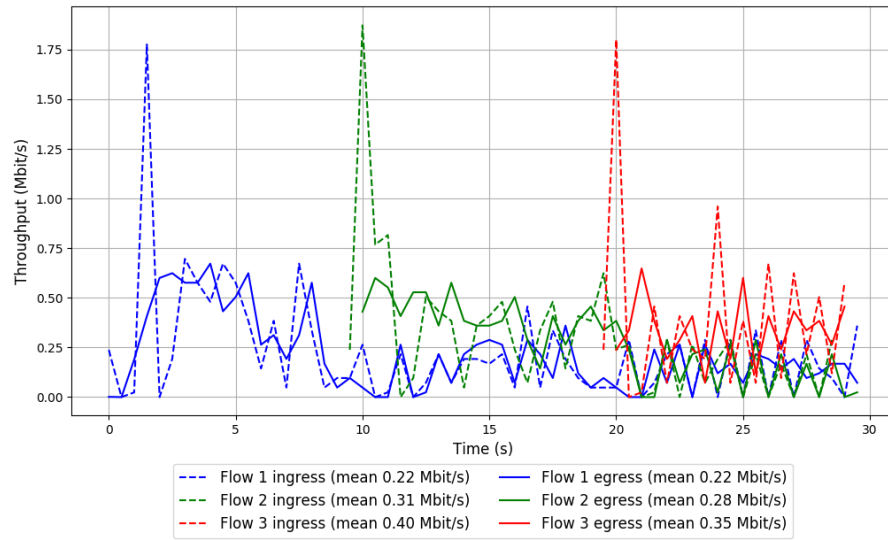


Run 2: Statistics of Indigo-calib

Start at: 2017-12-11 09:24:57
End at: 2017-12-11 09:25:27
Local clock offset: -4.044 ms
Remote clock offset: -2.916 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 1419.113 ms
Loss rate: 7.94%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 1376.621 ms
Loss rate: 4.33%
-- Flow 2:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 1488.933 ms
Loss rate: 6.20%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 1097.237 ms
Loss rate: 16.77%

Run 2: Report of Indigo-calib — Data Link



Run 3: Statistics of Indigo-calib

Start at: 2017-12-11 09:42:25
End at: 2017-12-11 09:42:55
Local clock offset: -3.504 ms
Remote clock offset: -2.954 ms

Below is generated by plot.py at 2017-12-11 10:47:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 1311.058 ms
Loss rate: 5.64%
-- Flow 1:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 1009.591 ms
Loss rate: 5.91%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 1030.250 ms
Loss rate: 7.49%
-- Flow 3:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 1341.317 ms
Loss rate: 3.85%

Run 3: Report of Indigo-calib — Data Link

