

Pantheon Report

Generated at 2018-01-02 22:16:12 (UTC).

Data path: Stanford ppp0 (*remote*) → AWS California 1 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).

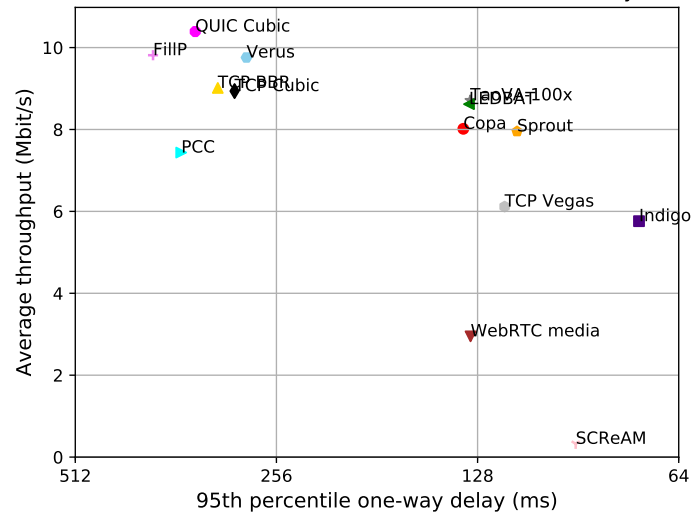
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

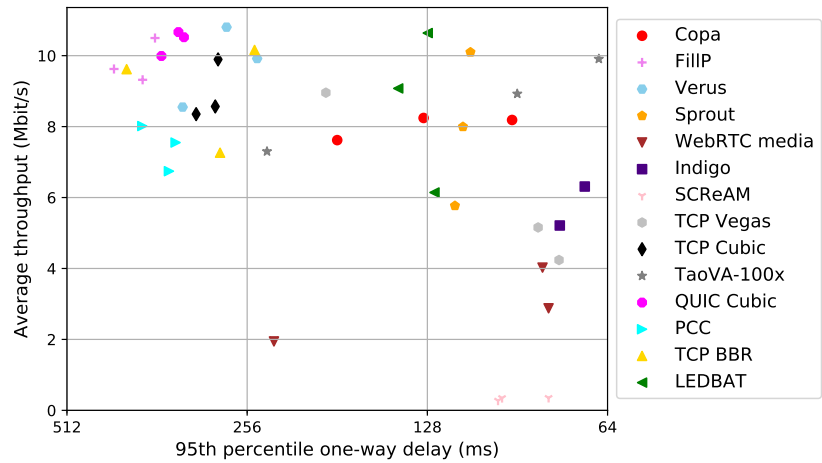
Git summary:

```
branch: master @ 904a5750834816b1e46a2c86405d707788d27c16
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ dcaef6b00654e660f73f7ed679d2eab61ce08639
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
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 @ f1a14bffe749737437f61b1eaaeb30b267cde681
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 Stanford ppp0 to AWS California 1 Ethernet, 3 runs of 30s each per scheme
 3 flows with 10s interval between flows (mean of all runs by scheme)



test from Stanford ppp0 to AWS California 1 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	5.60	3.37	3.60	275.31	316.80	324.51	1.59	2.27	7.61
TCP Cubic	3	6.87	2.04	2.23	294.09	295.88	298.70	0.90	1.66	3.09
LEDBAT	3	7.74	5.47	3.76	1254.79	128.18	140.47	0.18	0.47	1.39
PCC	3	4.12	3.18	3.63	332.78	357.12	385.29	4.66	7.19	14.91
QUIC Cubic	3	8.10	2.26	2.48	335.00	347.95	343.60	1.69	2.73	4.49
SCReAM	3	0.14	0.17	0.20	97.25	88.40	94.62	0.84	0.67	0.53
WebRTC media	3	1.46	1.01	0.50	126.69	116.97	148.12	2.36	1.09	2.84
Sprout	3	4.91	3.27	2.69	106.98	113.61	122.23	0.93	1.31	2.13
TaoVA-100x	3	4.94	3.95	4.39	101.97	136.42	174.00	0.76	0.53	1.21
TCP Vegas	3	3.38	2.48	2.99	118.35	114.61	76.96	0.12	0.25	0.44
Verus	3	5.58	4.78	3.07	276.41	289.81	291.90	26.83	7.07	14.56
Copa	3	5.44	2.62	3.67	133.44	134.27	119.85	0.30	0.65	1.10
FillP	3	7.06	2.76	2.98	399.31	362.78	403.37	56.43	90.01	94.75
Indigo	2	2.12	3.40	4.41	76.69	71.68	59.89	0.24	0.47	0.29

Run 1: Statistics of TCP BBR

Start at: 2018-01-02 20:43:22

End at: 2018-01-02 20:43:52

Local clock offset: 0.564 ms

Remote clock offset: -2.25 ms

Below is generated by plot.py at 2018-01-02 22:15:08

Datalink statistics

-- Total of 3 flows:

Average throughput: 7.26 Mbit/s

95th percentile per-packet one-way delay: 284.129 ms

Loss rate: 1.15%

-- Flow 1:

Average throughput: 4.09 Mbit/s

95th percentile per-packet one-way delay: 196.575 ms

Loss rate: 0.60%

-- Flow 2:

Average throughput: 2.91 Mbit/s

95th percentile per-packet one-way delay: 291.666 ms

Loss rate: 1.29%

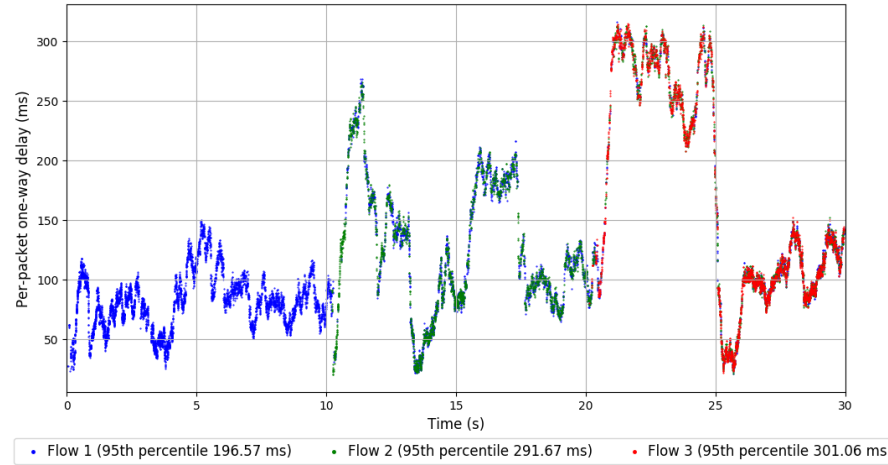
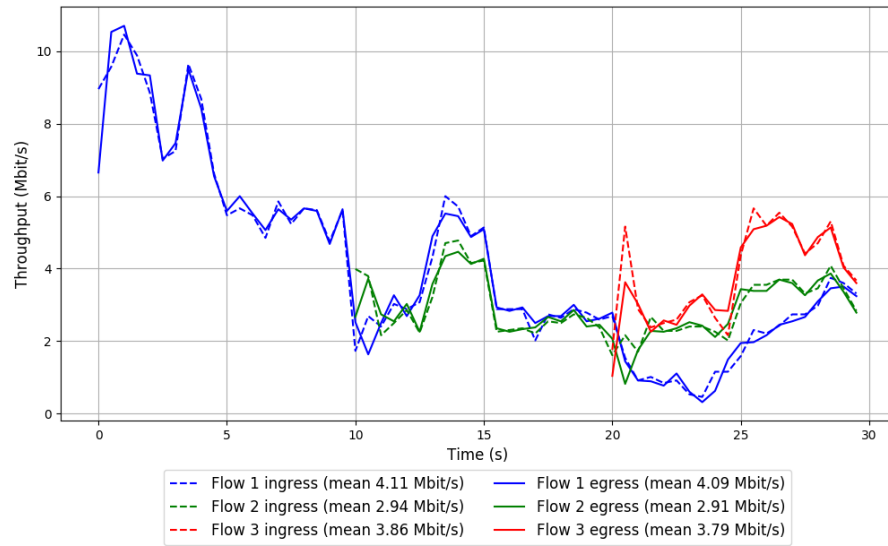
-- Flow 3:

Average throughput: 3.79 Mbit/s

95th percentile per-packet one-way delay: 301.063 ms

Loss rate: 2.70%

Run 1: Report of TCP BBR — Data Link

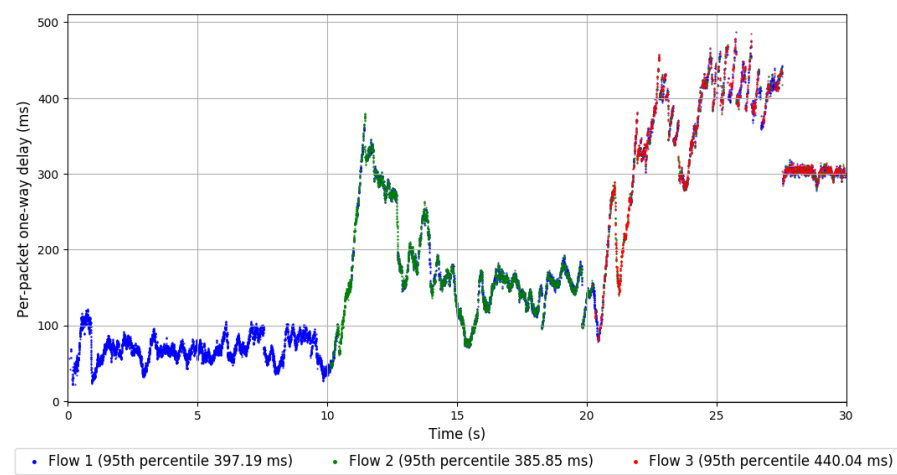
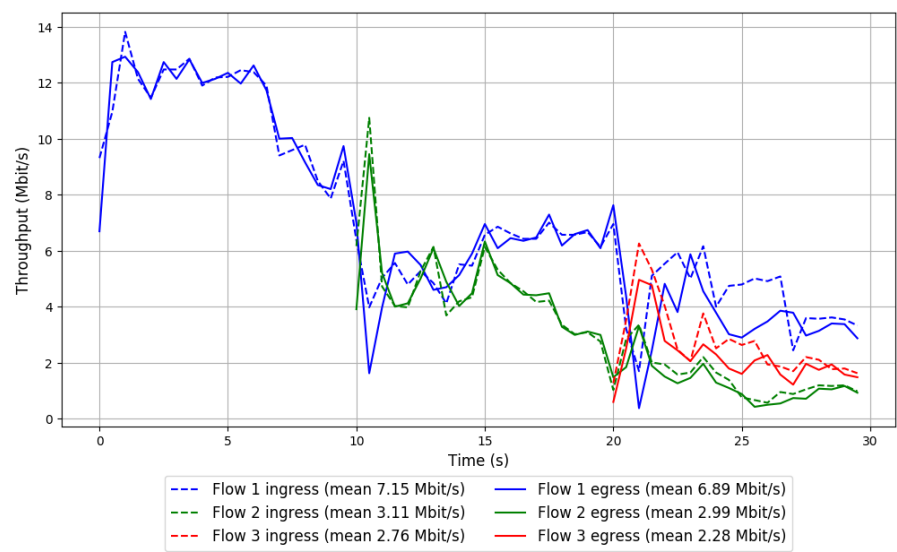


Run 2: Statistics of TCP BBR

Start at: 2018-01-02 21:01:13
End at: 2018-01-02 21:01:43
Local clock offset: 0.634 ms
Remote clock offset: -2.145 ms

Below is generated by plot.py at 2018-01-02 22:15:12
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.62 Mbit/s
95th percentile per-packet one-way delay: 407.011 ms
Loss rate: 5.31%
-- Flow 1:
Average throughput: 6.89 Mbit/s
95th percentile per-packet one-way delay: 397.195 ms
Loss rate: 3.88%
-- Flow 2:
Average throughput: 2.99 Mbit/s
95th percentile per-packet one-way delay: 385.845 ms
Loss rate: 4.41%
-- Flow 3:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 440.039 ms
Loss rate: 18.56%

Run 2: Report of TCP BBR — Data Link

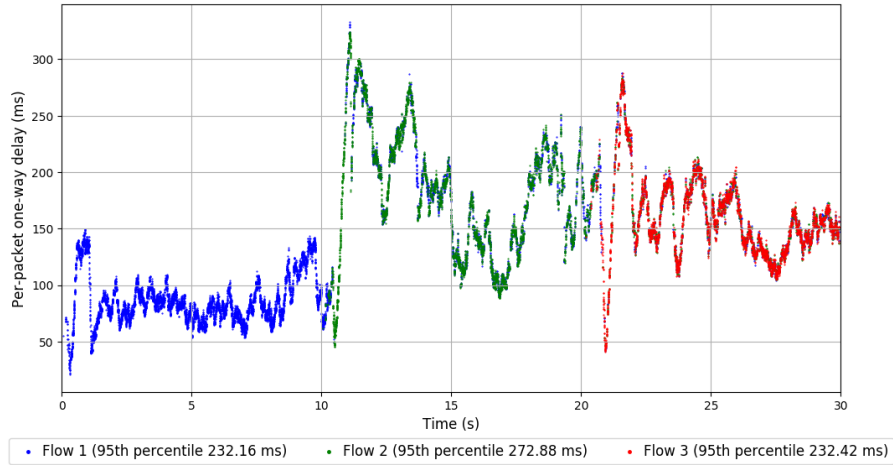
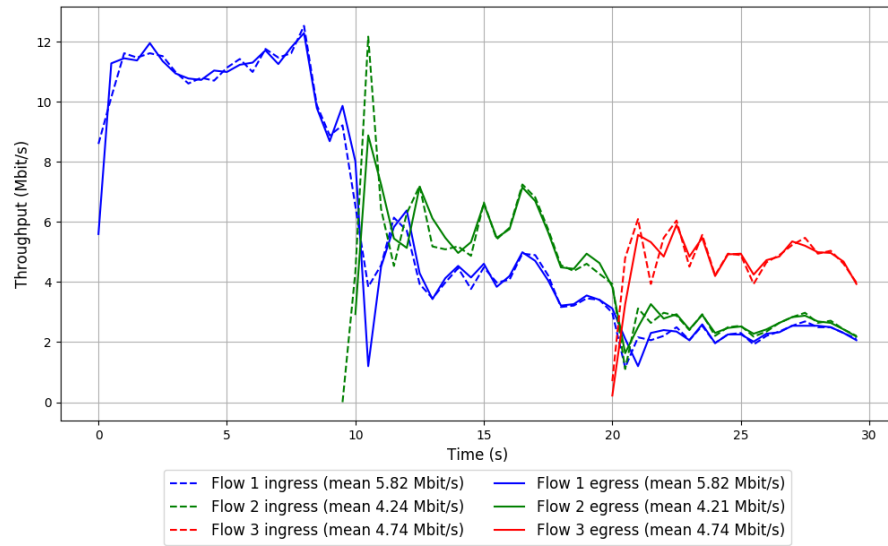


Run 3: Statistics of TCP BBR

Start at: 2018-01-02 21:19:04
End at: 2018-01-02 21:19:34
Local clock offset: 0.537 ms
Remote clock offset: -2.255 ms

Below is generated by plot.py at 2018-01-02 22:15:13
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.16 Mbit/s
95th percentile per-packet one-way delay: 248.815 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 5.82 Mbit/s
95th percentile per-packet one-way delay: 232.158 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 4.21 Mbit/s
95th percentile per-packet one-way delay: 272.885 ms
Loss rate: 1.12%
-- Flow 3:
Average throughput: 4.74 Mbit/s
95th percentile per-packet one-way delay: 232.421 ms
Loss rate: 1.58%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-01-02 20:35:04

End at: 2018-01-02 20:35:34

Local clock offset: 0.414 ms

Remote clock offset: -2.47 ms

Below is generated by plot.py at 2018-01-02 22:15:13

Datalink statistics

-- Total of 3 flows:

Average throughput: 8.35 Mbit/s

95th percentile per-packet one-way delay: 311.498 ms

Loss rate: 1.22%

-- Flow 1:

Average throughput: 6.02 Mbit/s

95th percentile per-packet one-way delay: 307.796 ms

Loss rate: 0.71%

-- Flow 2:

Average throughput: 1.91 Mbit/s

95th percentile per-packet one-way delay: 303.821 ms

Loss rate: 2.12%

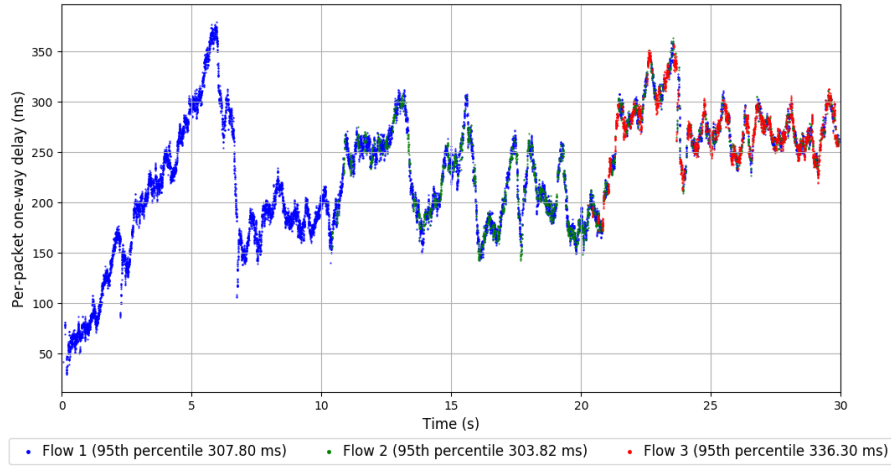
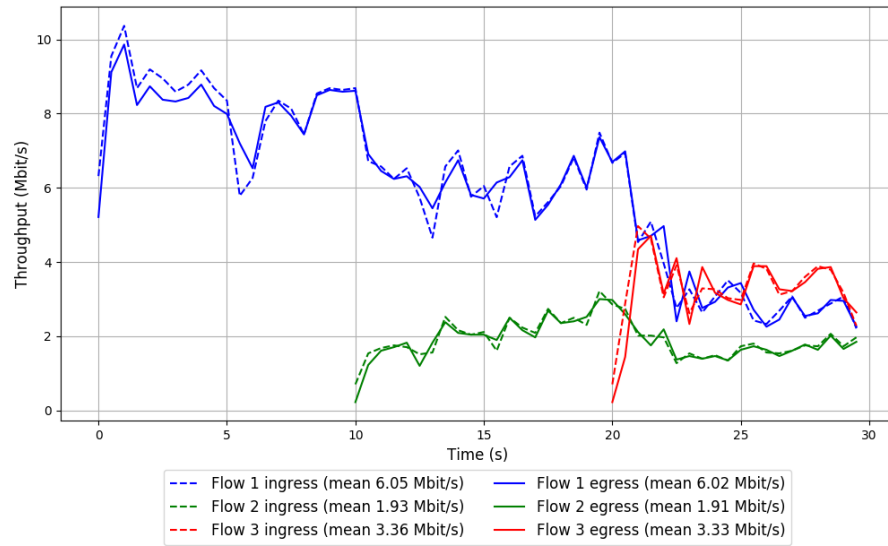
-- Flow 3:

Average throughput: 3.33 Mbit/s

95th percentile per-packet one-way delay: 336.298 ms

Loss rate: 2.94%

Run 1: Report of TCP Cubic — Data Link

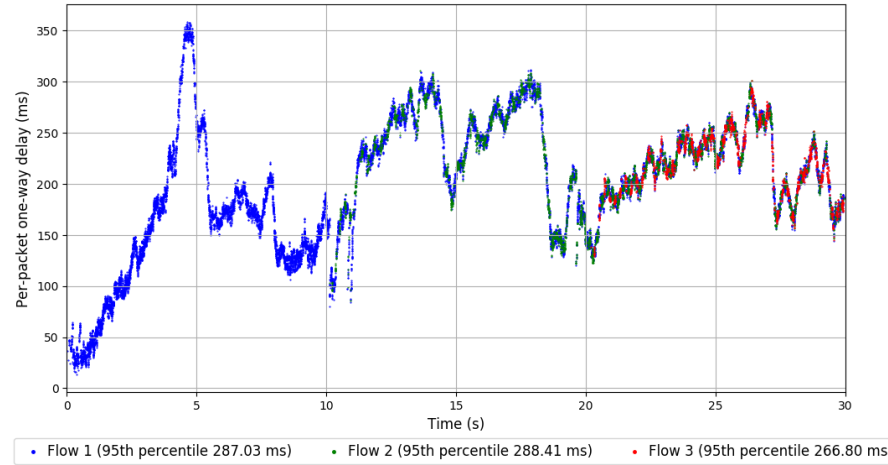
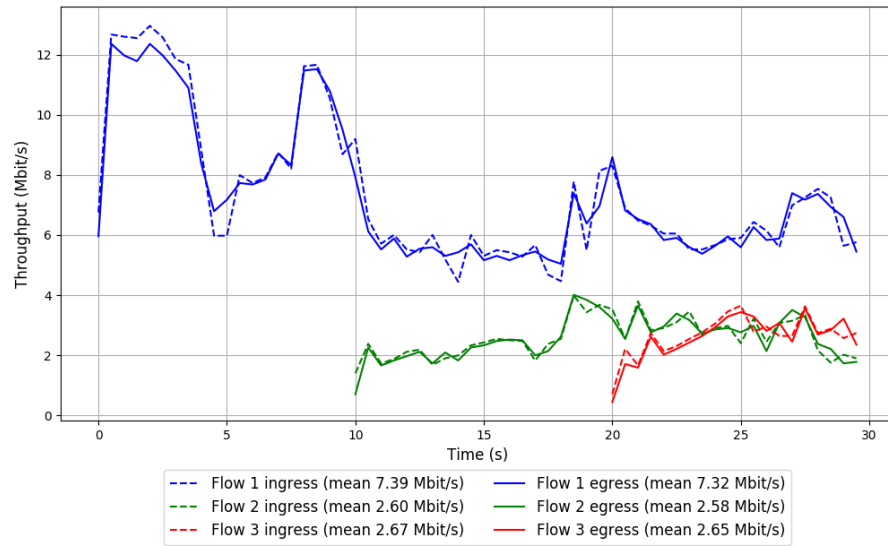


Run 2: Statistics of TCP Cubic

Start at: 2018-01-02 20:52:54
End at: 2018-01-02 20:53:24
Local clock offset: 0.492 ms
Remote clock offset: -2.133 ms

Below is generated by plot.py at 2018-01-02 22:15:13
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.89 Mbit/s
95th percentile per-packet one-way delay: 286.300 ms
Loss rate: 1.22%
-- Flow 1:
Average throughput: 7.32 Mbit/s
95th percentile per-packet one-way delay: 287.033 ms
Loss rate: 1.12%
-- Flow 2:
Average throughput: 2.58 Mbit/s
95th percentile per-packet one-way delay: 288.409 ms
Loss rate: 1.07%
-- Flow 3:
Average throughput: 2.65 Mbit/s
95th percentile per-packet one-way delay: 266.799 ms
Loss rate: 2.32%

Run 2: Report of TCP Cubic — Data Link

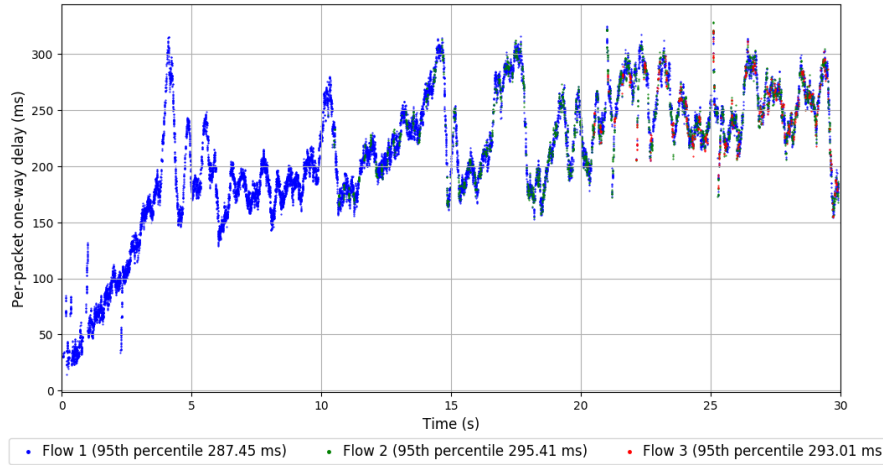
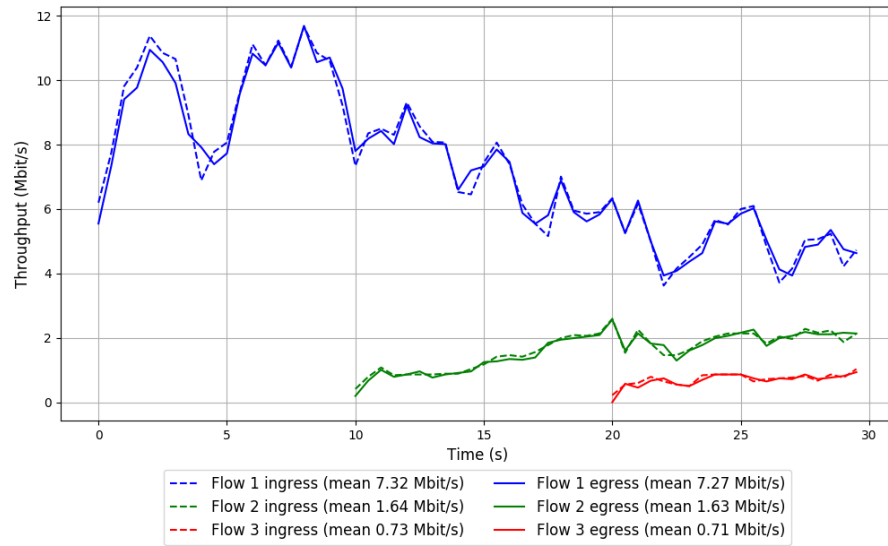


Run 3: Statistics of TCP Cubic

Start at: 2018-01-02 21:10:44
End at: 2018-01-02 21:11:14
Local clock offset: 0.628 ms
Remote clock offset: -2.223 ms

Below is generated by plot.py at 2018-01-02 22:15:13
Datalink statistics
-- Total of 3 flows:
Average throughput: 8.57 Mbit/s
95th percentile per-packet one-way delay: 289.394 ms
Loss rate: 1.08%
-- Flow 1:
Average throughput: 7.27 Mbit/s
95th percentile per-packet one-way delay: 287.448 ms
Loss rate: 0.88%
-- Flow 2:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 295.410 ms
Loss rate: 1.80%
-- Flow 3:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 293.014 ms
Loss rate: 4.02%

Run 3: Report of TCP Cubic — Data Link

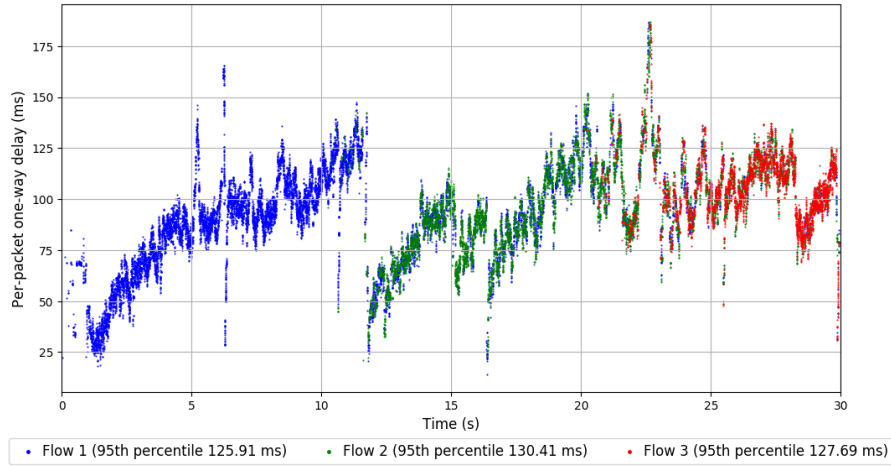
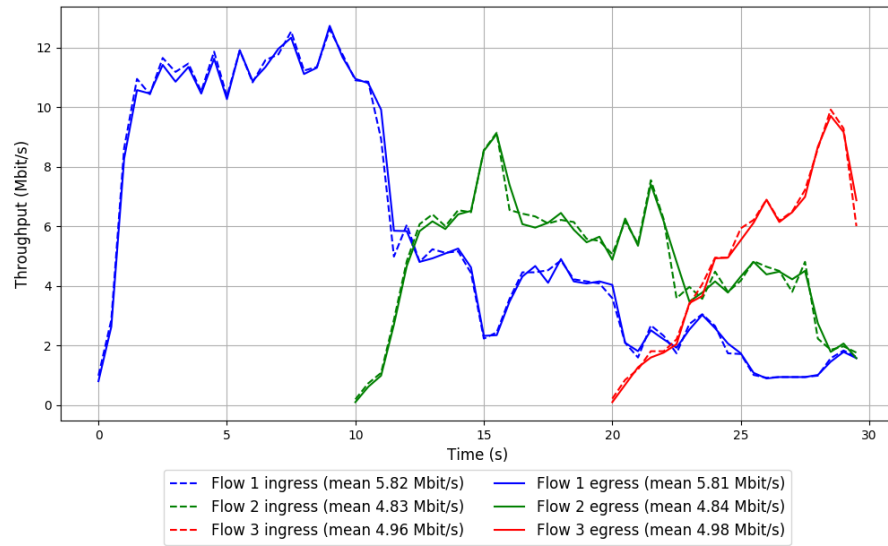


Run 1: Statistics of LEDBAT

Start at: 2018-01-02 20:38:37
End at: 2018-01-02 20:39:07
Local clock offset: 0.545 ms
Remote clock offset: -2.402 ms

Below is generated by plot.py at 2018-01-02 22:15:14
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.64 Mbit/s
95th percentile per-packet one-way delay: 127.831 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 5.81 Mbit/s
95th percentile per-packet one-way delay: 125.914 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 4.84 Mbit/s
95th percentile per-packet one-way delay: 130.414 ms
Loss rate: 0.37%
-- Flow 3:
Average throughput: 4.98 Mbit/s
95th percentile per-packet one-way delay: 127.694 ms
Loss rate: 1.22%

Run 1: Report of LEDBAT — Data Link

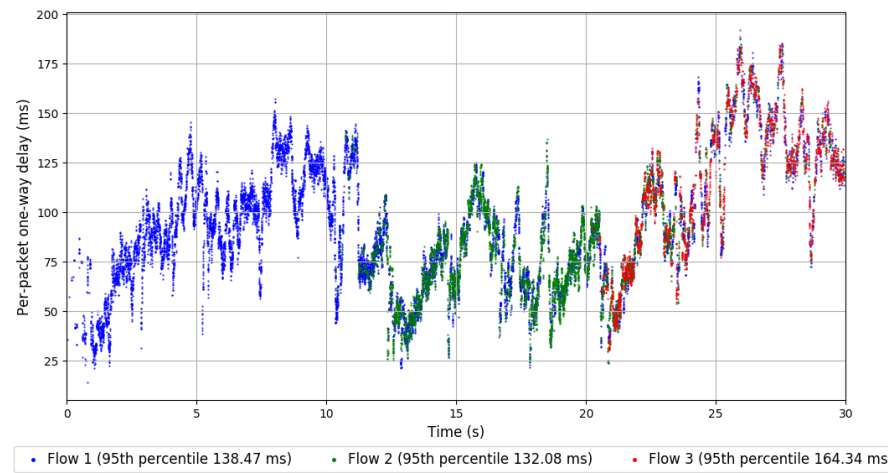
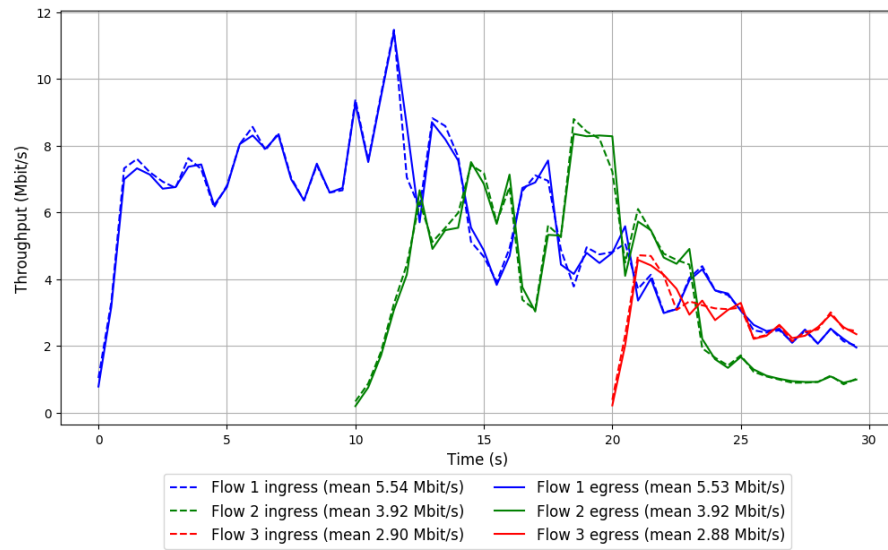


Run 2: Statistics of LEDBAT

Start at: 2018-01-02 20:56:28
End at: 2018-01-02 20:56:58
Local clock offset: 0.591 ms
Remote clock offset: -2.008 ms

Below is generated by plot.py at 2018-01-02 22:15:14
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.08 Mbit/s
95th percentile per-packet one-way delay: 143.191 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 5.53 Mbit/s
95th percentile per-packet one-way delay: 138.474 ms
Loss rate: 0.28%
-- Flow 2:
Average throughput: 3.92 Mbit/s
95th percentile per-packet one-way delay: 132.084 ms
Loss rate: 0.45%
-- Flow 3:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 164.345 ms
Loss rate: 1.43%

Run 2: Report of LEDBAT — Data Link

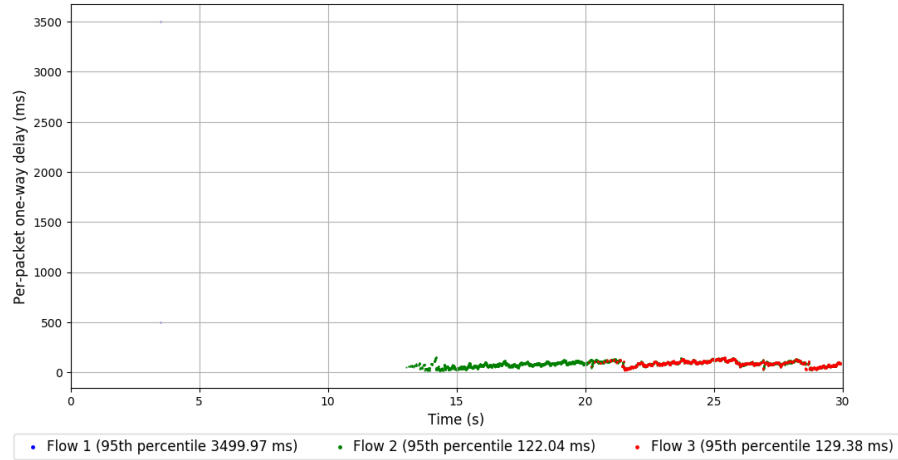
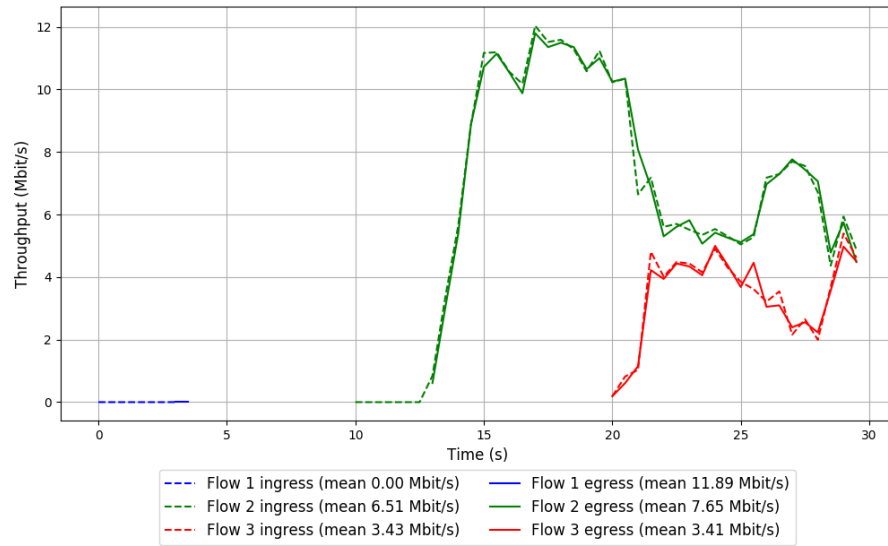


Run 3: Statistics of LEDBAT

Start at: 2018-01-02 21:14:19
End at: 2018-01-02 21:14:49
Local clock offset: 0.58 ms
Remote clock offset: -2.127 ms

Below is generated by plot.py at 2018-01-02 22:15:18
Datalink statistics
-- Total of 3 flows:
Average throughput: 6.14 Mbit/s
95th percentile per-packet one-way delay: 124.557 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 11.89 Mbit/s
95th percentile per-packet one-way delay: 3499.969 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 7.65 Mbit/s
95th percentile per-packet one-way delay: 122.037 ms
Loss rate: 0.59%
-- Flow 3:
Average throughput: 3.41 Mbit/s
95th percentile per-packet one-way delay: 129.378 ms
Loss rate: 1.52%

Run 3: Report of LEDBAT — Data Link

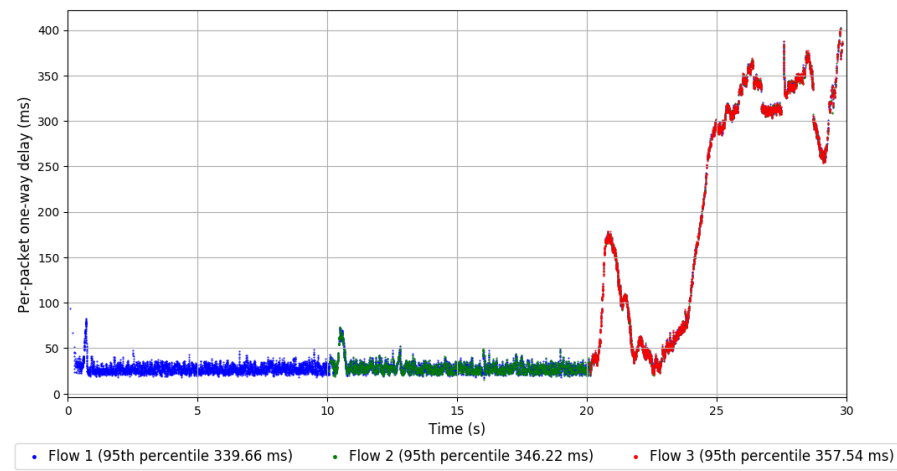
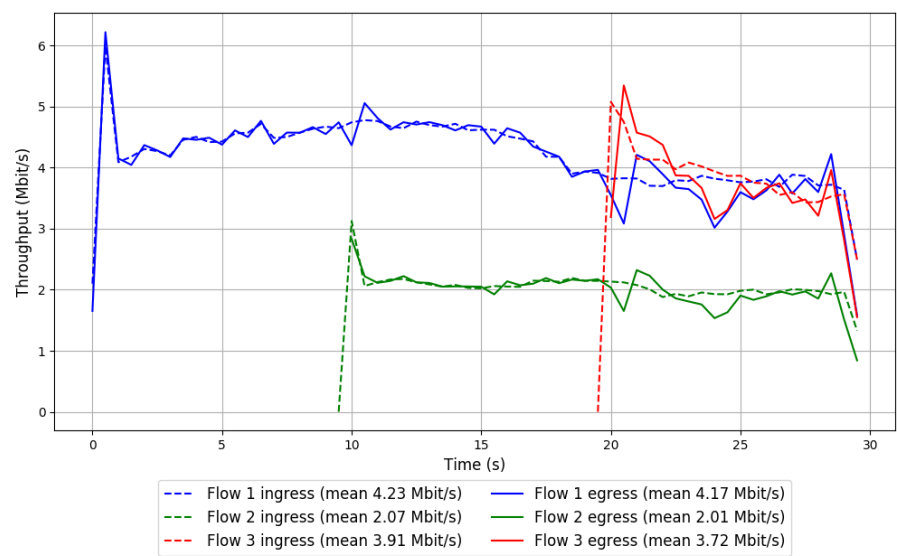


Run 1: Statistics of PCC

Start at: 2018-01-02 20:36:15
End at: 2018-01-02 20:36:45
Local clock offset: 0.448 ms
Remote clock offset: -2.508 ms

Below is generated by plot.py at 2018-01-02 22:15:24
Datalink statistics
-- Total of 3 flows:
Average throughput: 6.74 Mbit/s
95th percentile per-packet one-way delay: 345.875 ms
Loss rate: 2.57%
-- Flow 1:
Average throughput: 4.17 Mbit/s
95th percentile per-packet one-way delay: 339.664 ms
Loss rate: 1.68%
-- Flow 2:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 346.224 ms
Loss rate: 2.72%
-- Flow 3:
Average throughput: 3.72 Mbit/s
95th percentile per-packet one-way delay: 357.539 ms
Loss rate: 5.34%

Run 1: Report of PCC — Data Link

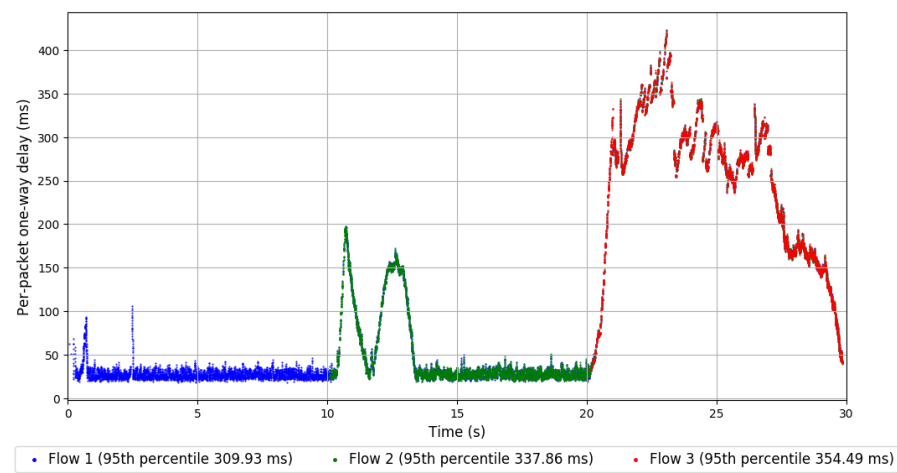
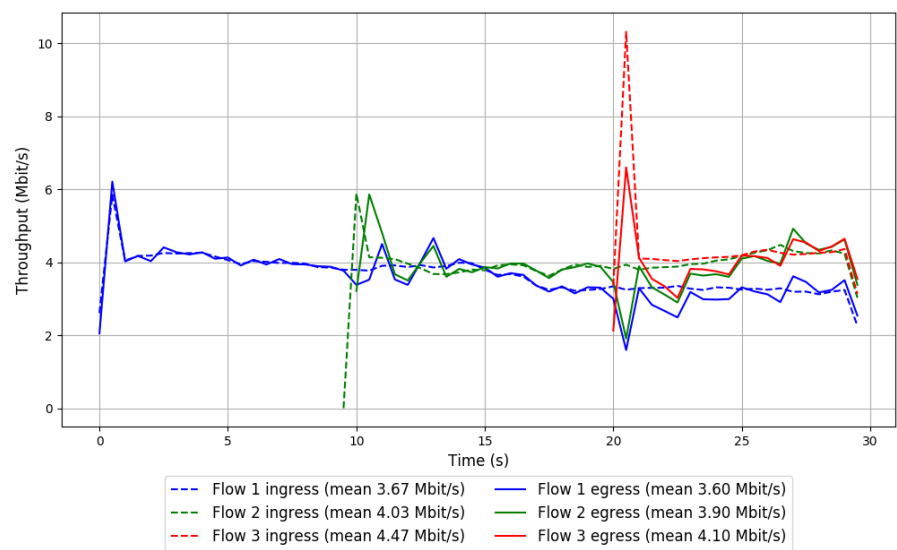


Run 2: Statistics of PCC

Start at: 2018-01-02 20:54:06
End at: 2018-01-02 20:54:36
Local clock offset: 0.507 ms
Remote clock offset: -2.113 ms

Below is generated by plot.py at 2018-01-02 22:15:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 7.55 Mbit/s
95th percentile per-packet one-way delay: 337.103 ms
Loss rate: 3.73%
-- Flow 1:
Average throughput: 3.60 Mbit/s
95th percentile per-packet one-way delay: 309.932 ms
Loss rate: 1.96%
-- Flow 2:
Average throughput: 3.90 Mbit/s
95th percentile per-packet one-way delay: 337.855 ms
Loss rate: 3.37%
-- Flow 3:
Average throughput: 4.10 Mbit/s
95th percentile per-packet one-way delay: 354.489 ms
Loss rate: 8.75%

Run 2: Report of PCC — Data Link

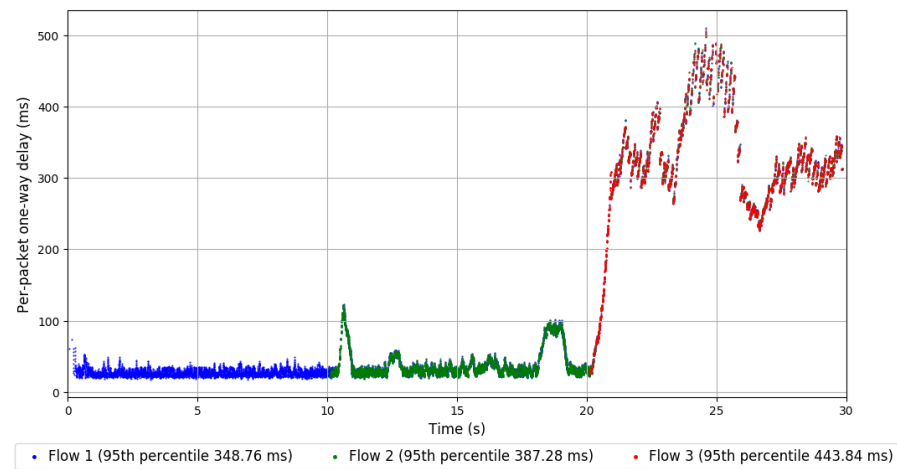
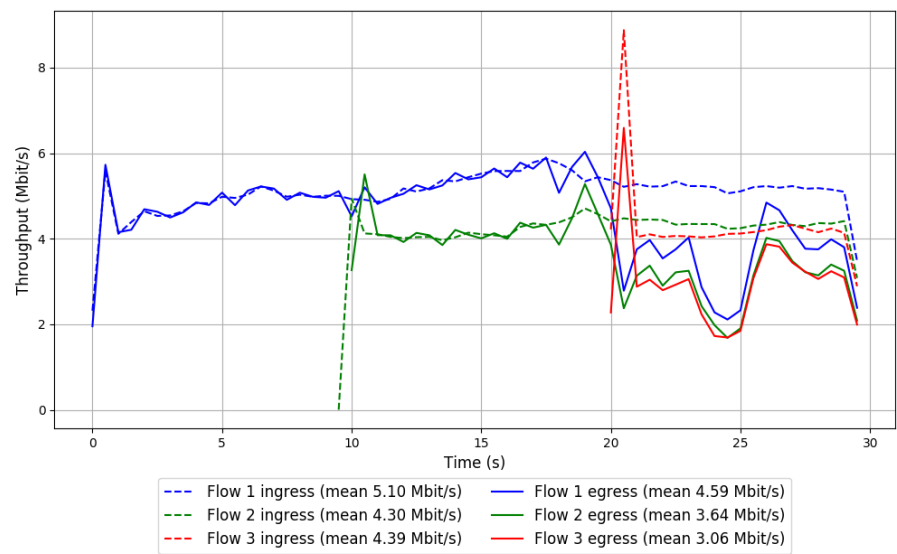


Run 3: Statistics of PCC

Start at: 2018-01-02 21:11:56
End at: 2018-01-02 21:12:26
Local clock offset: 0.642 ms
Remote clock offset: -2.217 ms

Below is generated by plot.py at 2018-01-02 22:15:28
Datalink statistics
-- Total of 3 flows:
Average throughput: 8.02 Mbit/s
95th percentile per-packet one-way delay: 383.182 ms
Loss rate: 15.02%
-- Flow 1:
Average throughput: 4.59 Mbit/s
95th percentile per-packet one-way delay: 348.756 ms
Loss rate: 10.34%
-- Flow 2:
Average throughput: 3.64 Mbit/s
95th percentile per-packet one-way delay: 387.281 ms
Loss rate: 15.48%
-- Flow 3:
Average throughput: 3.06 Mbit/s
95th percentile per-packet one-way delay: 443.836 ms
Loss rate: 30.63%

Run 3: Report of PCC — Data Link

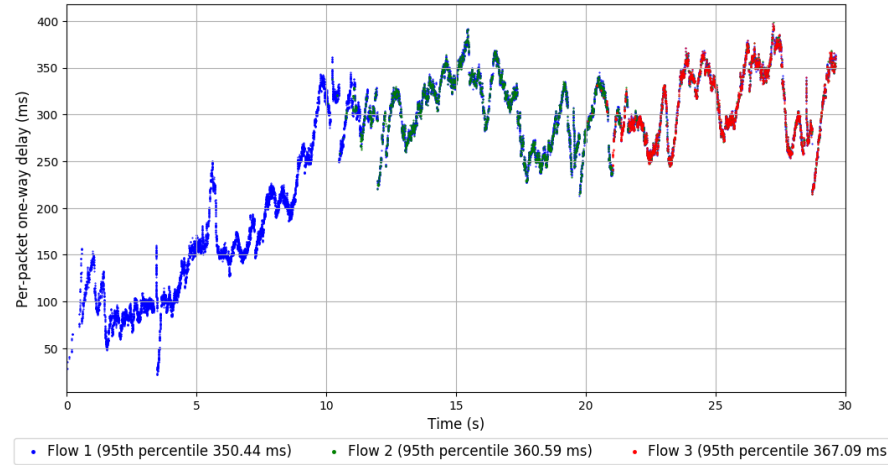
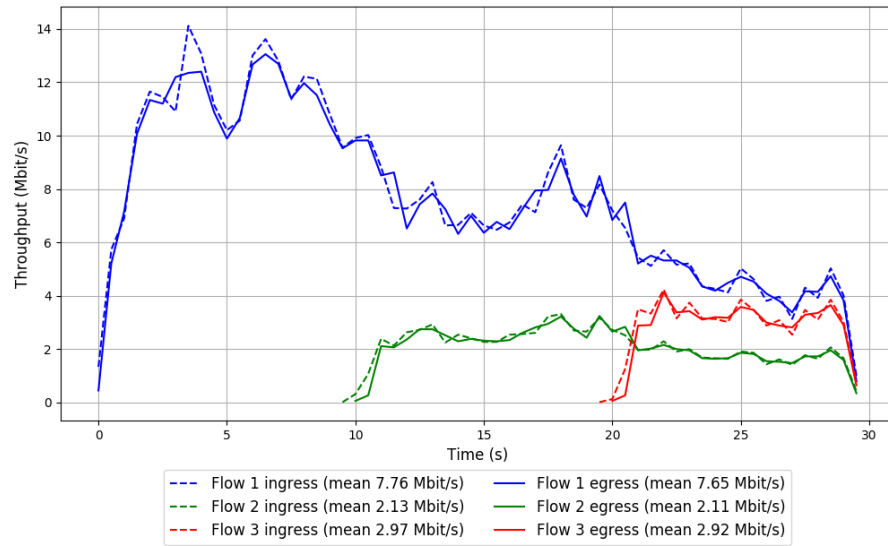


Run 1: Statistics of QUIC Cubic

Start at: 2018-01-02 20:33:52
End at: 2018-01-02 20:34:22
Local clock offset: 0.4 ms
Remote clock offset: -2.525 ms

Below is generated by plot.py at 2018-01-02 22:15:30
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.99 Mbit/s
95th percentile per-packet one-way delay: 356.010 ms
Loss rate: 1.96%
-- Flow 1:
Average throughput: 7.65 Mbit/s
95th percentile per-packet one-way delay: 350.440 ms
Loss rate: 1.52%
-- Flow 2:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 360.587 ms
Loss rate: 2.65%
-- Flow 3:
Average throughput: 2.92 Mbit/s
95th percentile per-packet one-way delay: 367.086 ms
Loss rate: 4.41%

Run 1: Report of QUIC Cubic — Data Link

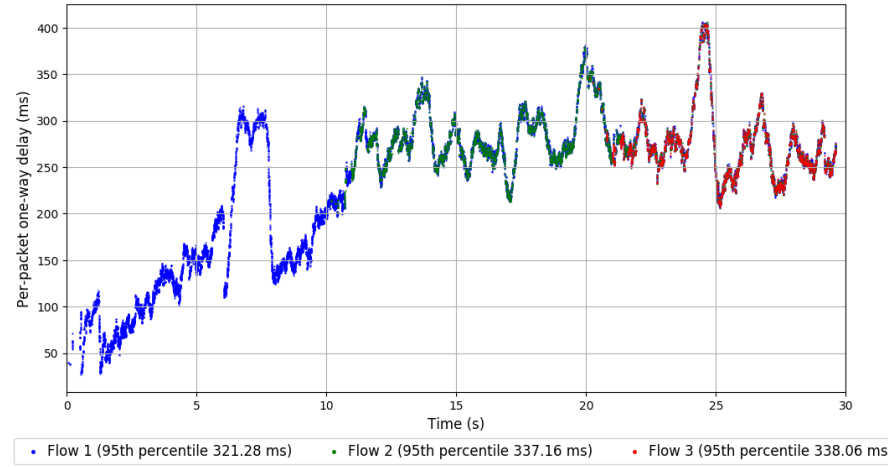
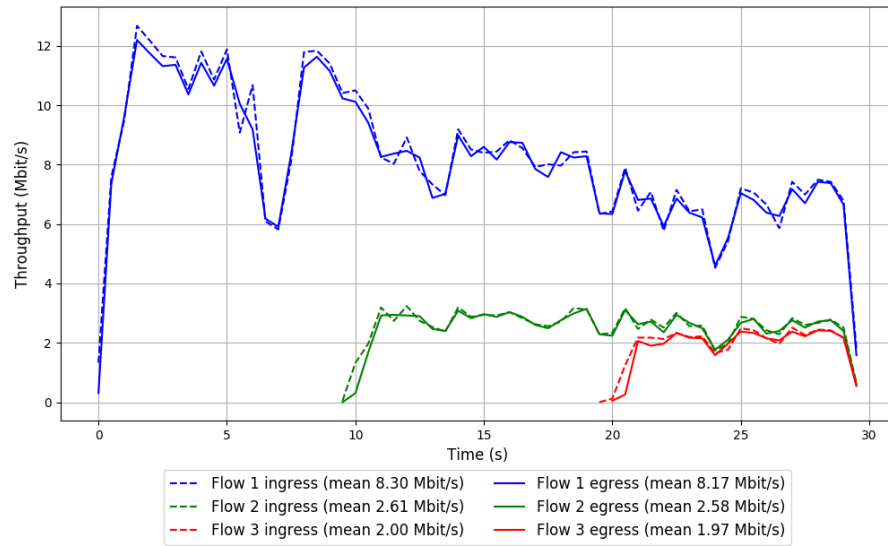


Run 2: Statistics of QUIC Cubic

Start at: 2018-01-02 20:51:43
End at: 2018-01-02 20:52:13
Local clock offset: 0.601 ms
Remote clock offset: -2.096 ms

Below is generated by plot.py at 2018-01-02 22:15:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.52 Mbit/s
95th percentile per-packet one-way delay: 326.473 ms
Loss rate: 2.01%
-- Flow 1:
Average throughput: 8.17 Mbit/s
95th percentile per-packet one-way delay: 321.280 ms
Loss rate: 1.68%
-- Flow 2:
Average throughput: 2.58 Mbit/s
95th percentile per-packet one-way delay: 337.163 ms
Loss rate: 2.50%
-- Flow 3:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 338.058 ms
Loss rate: 4.88%

Run 2: Report of QUIC Cubic — Data Link

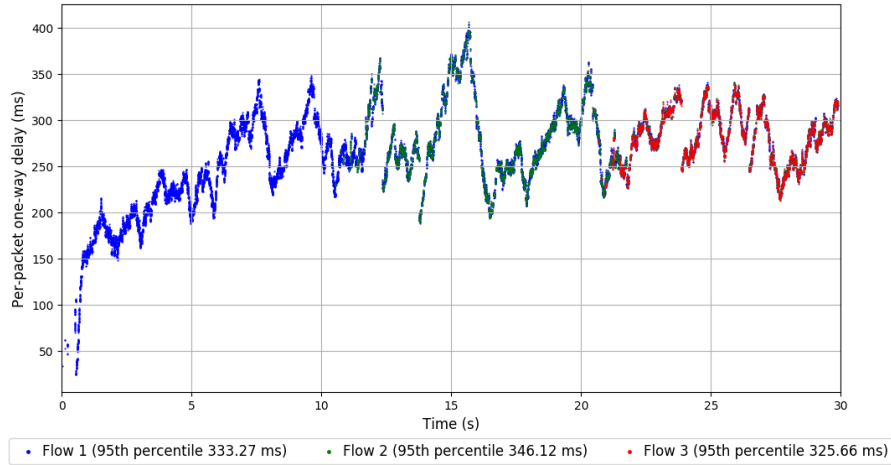
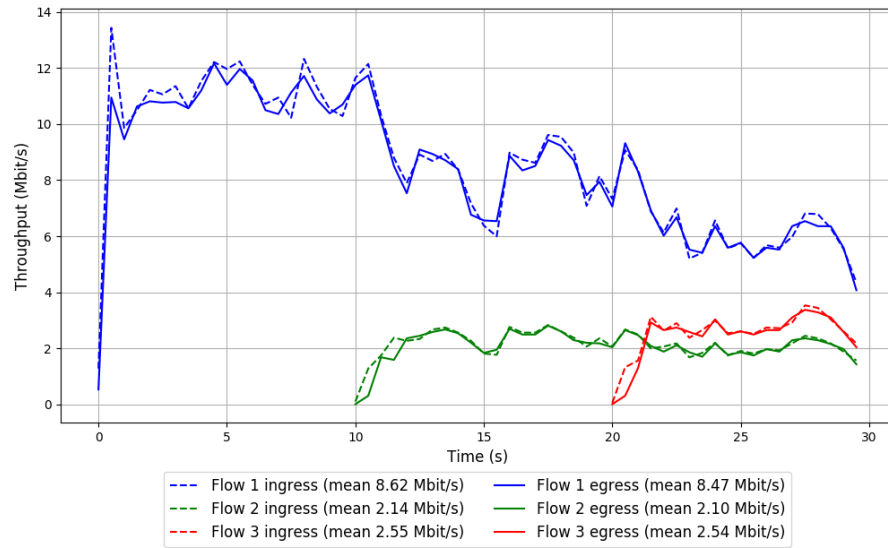


Run 3: Statistics of QUIC Cubic

Start at: 2018-01-02 21:09:33
End at: 2018-01-02 21:10:03
Local clock offset: 0.608 ms
Remote clock offset: -2.176 ms

Below is generated by plot.py at 2018-01-02 22:15:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.66 Mbit/s
95th percentile per-packet one-way delay: 333.465 ms
Loss rate: 2.20%
-- Flow 1:
Average throughput: 8.47 Mbit/s
95th percentile per-packet one-way delay: 333.267 ms
Loss rate: 1.87%
-- Flow 2:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 346.115 ms
Loss rate: 3.03%
-- Flow 3:
Average throughput: 2.54 Mbit/s
95th percentile per-packet one-way delay: 325.664 ms
Loss rate: 4.18%

Run 3: Report of QUIC Cubic — Data Link

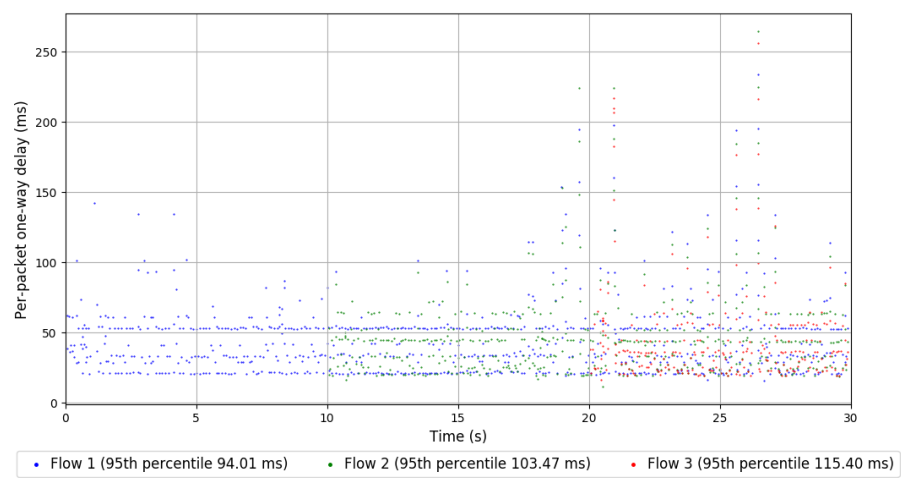
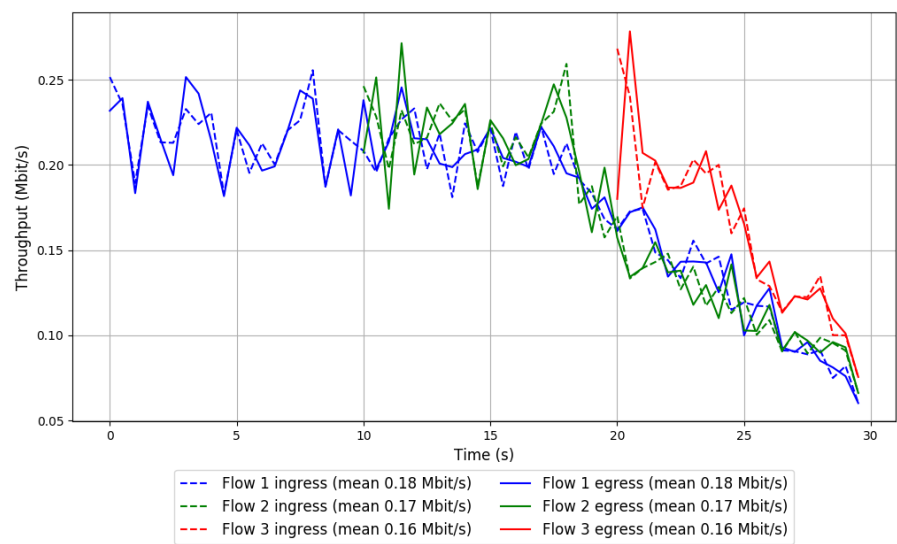


```
Run 1: Statistics of SCReAM

Start at: 2018-01-02 20:41:00
End at: 2018-01-02 20:41:30
Local clock offset: 0.443 ms
Remote clock offset: -2.39 ms

# Below is generated by plot.py at 2018-01-02 22:15:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 96.035 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 94.014 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 103.469 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 115.403 ms
Loss rate: 0.22%
```

Run 1: Report of SReAM — Data Link

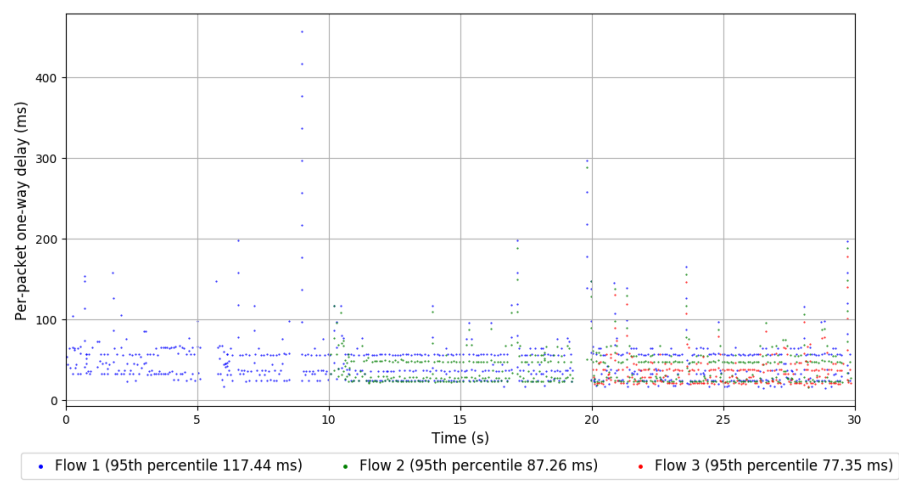
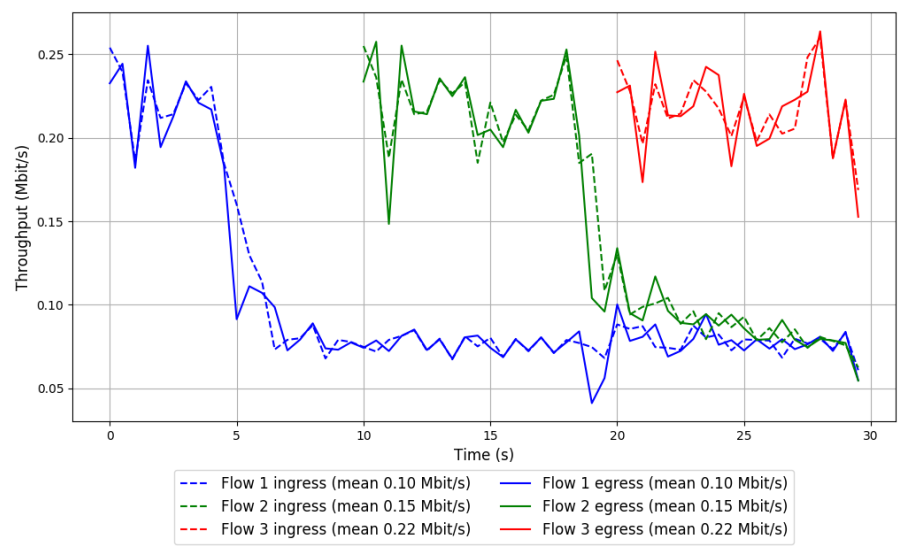


Run 2: Statistics of SCReAM

Start at: 2018-01-02 20:58:50
End at: 2018-01-02 20:59:20
Local clock offset: 0.502 ms
Remote clock offset: -2.04 ms

Below is generated by plot.py at 2018-01-02 22:15:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 97.532 ms
Loss rate: 1.69%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 117.441 ms
Loss rate: 2.38%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 87.262 ms
Loss rate: 1.66%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 77.346 ms
Loss rate: 0.75%

Run 2: Report of SReAM — Data Link

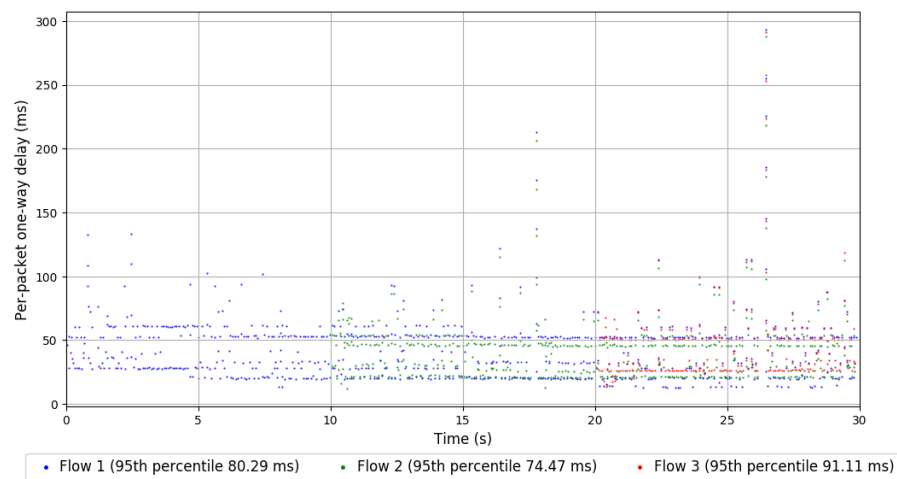
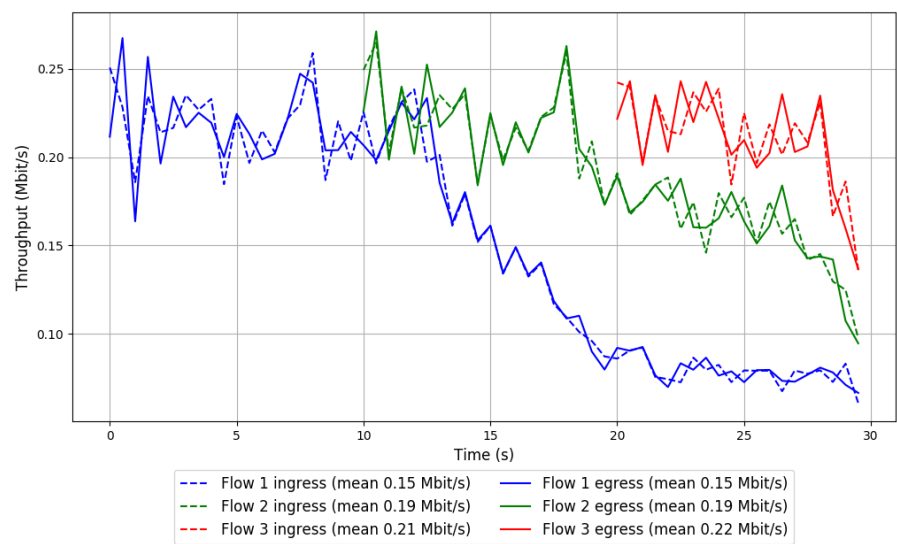


Run 3: Statistics of SCReAM

Start at: 2018-01-02 21:16:41
End at: 2018-01-02 21:17:11
Local clock offset: 0.496 ms
Remote clock offset: -2.239 ms

Below is generated by plot.py at 2018-01-02 22:15:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 80.293 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 80.293 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 74.468 ms
Loss rate: 0.27%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 91.113 ms
Loss rate: 0.62%

Run 3: Report of SReAM — Data Link

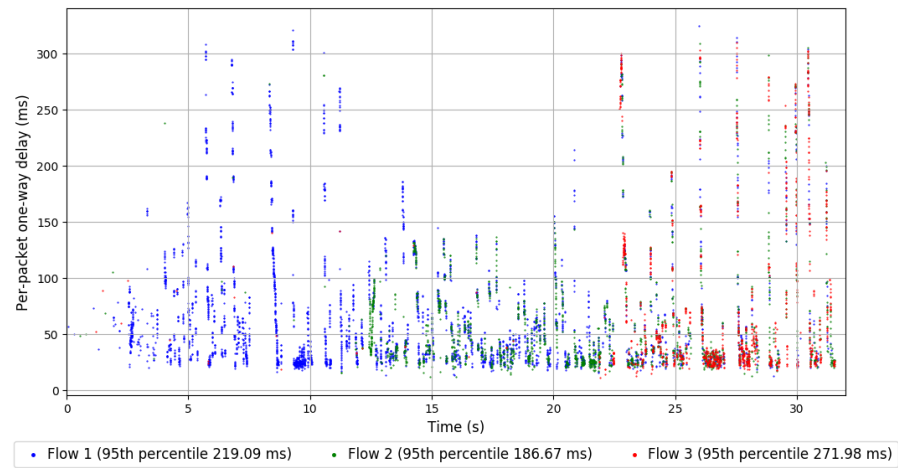
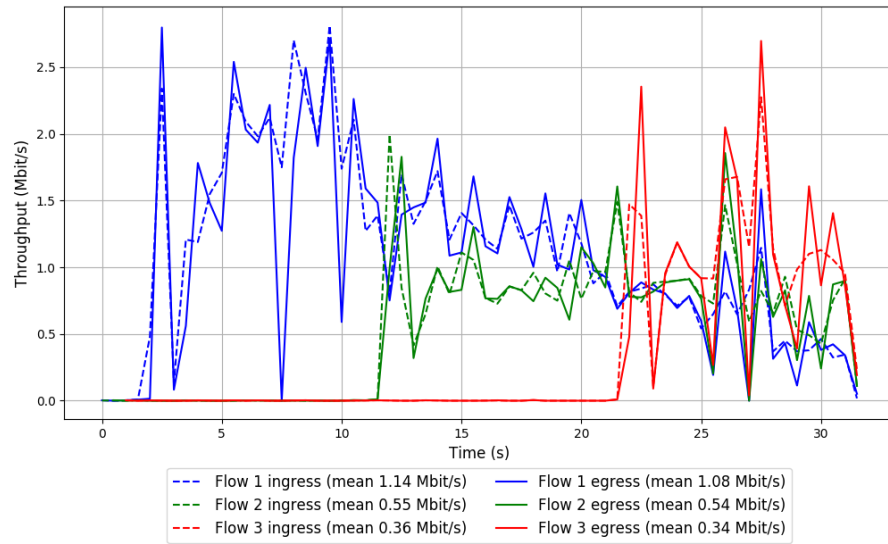


Run 1: Statistics of WebRTC media

Start at: 2018-01-02 20:32:41
End at: 2018-01-02 20:33:11
Local clock offset: 0.5 ms
Remote clock offset: -2.524 ms

Below is generated by plot.py at 2018-01-02 22:15:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 230.937 ms
Loss rate: 4.68%
-- Flow 1:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 219.090 ms
Loss rate: 5.76%
-- Flow 2:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 186.670 ms
Loss rate: 1.98%
-- Flow 3:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 271.983 ms
Loss rate: 5.35%

Run 1: Report of WebRTC media — Data Link

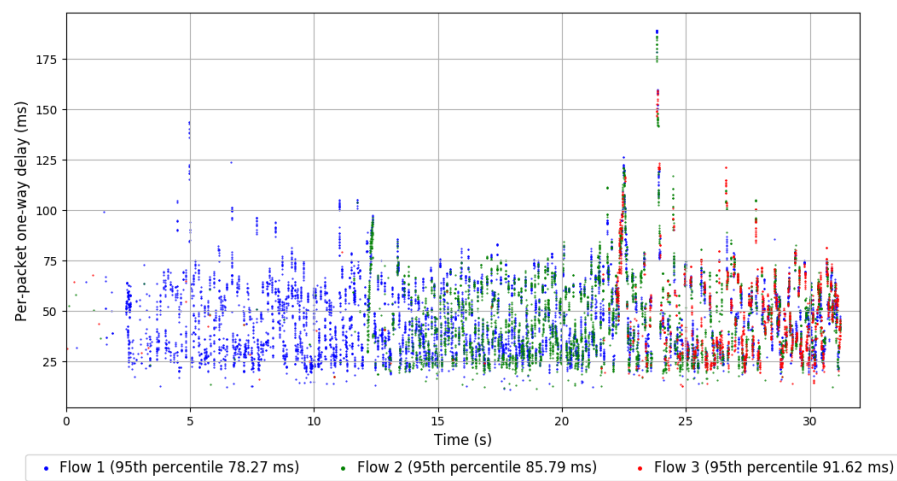
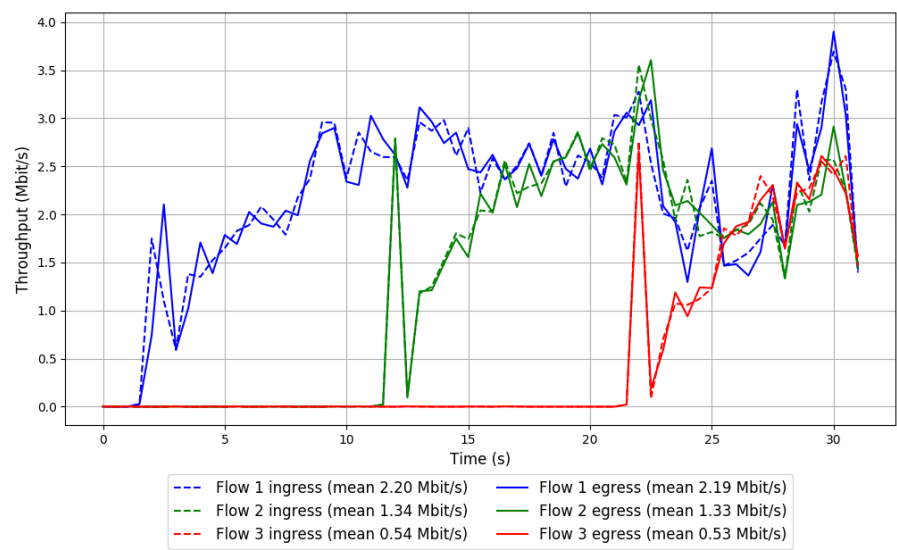


Run 2: Statistics of WebRTC media

Start at: 2018-01-02 20:50:32
End at: 2018-01-02 20:51:02
Local clock offset: 0.505 ms
Remote clock offset: -2.155 ms

Below is generated by plot.py at 2018-01-02 22:15:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 4.02 Mbit/s
95th percentile per-packet one-way delay: 82.193 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 78.271 ms
Loss rate: 0.44%
-- Flow 2:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 85.787 ms
Loss rate: 0.33%
-- Flow 3:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 91.621 ms
Loss rate: 1.21%

Run 2: Report of WebRTC media — Data Link

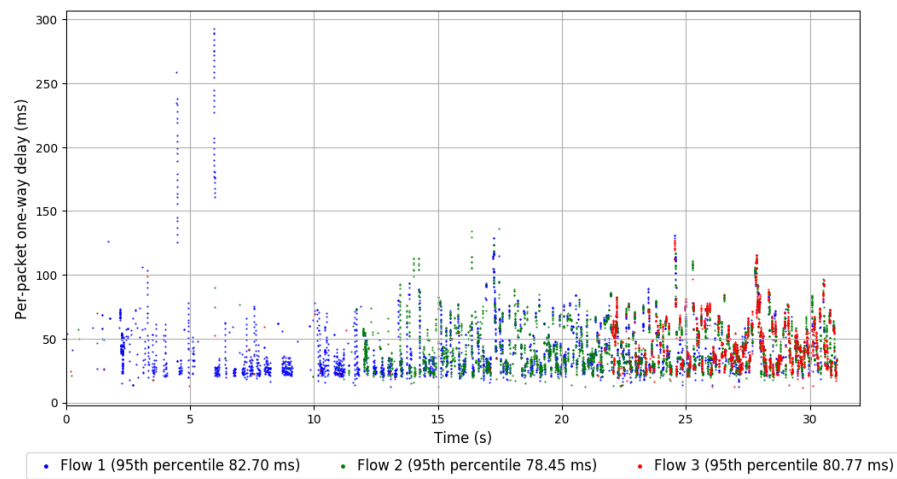
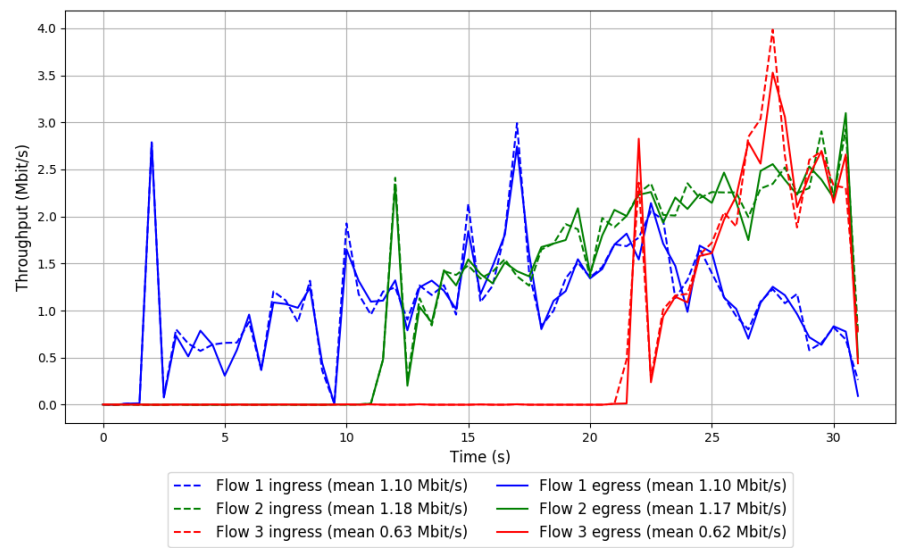


Run 3: Statistics of WebRTC media

Start at: 2018-01-02 21:08:22
End at: 2018-01-02 21:08:52
Local clock offset: 0.643 ms
Remote clock offset: -2.214 ms

Below is generated by plot.py at 2018-01-02 22:15:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 80.304 ms
Loss rate: 1.13%
-- Flow 1:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 82.700 ms
Loss rate: 0.87%
-- Flow 2:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 78.449 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 80.767 ms
Loss rate: 1.95%

Run 3: Report of WebRTC media — Data Link

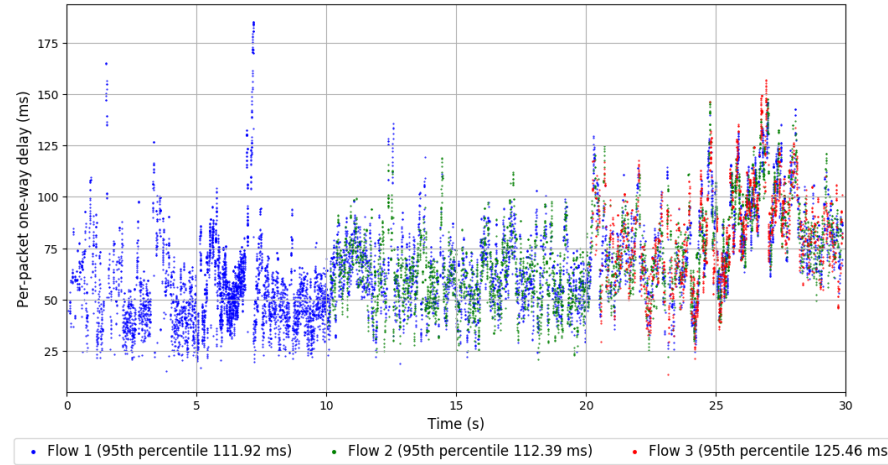
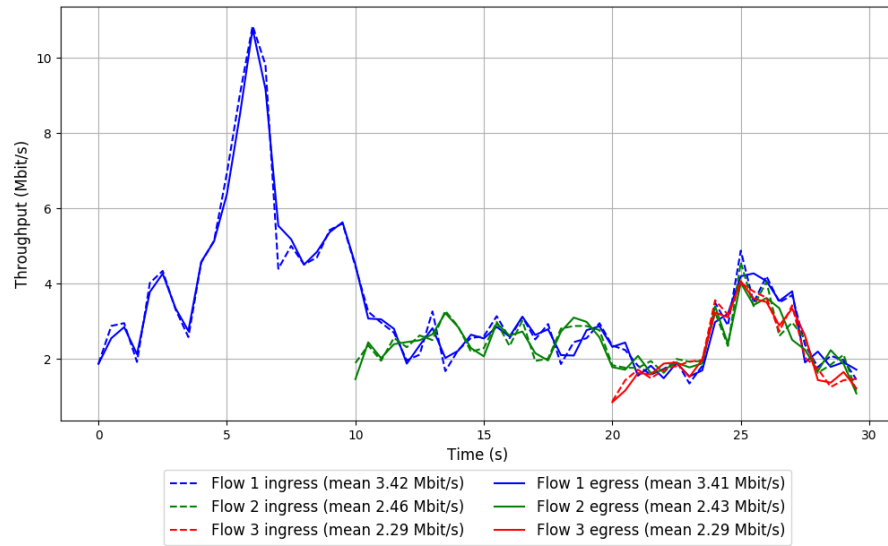


Run 1: Statistics of Sprout

Start at: 2018-01-02 20:42:11
End at: 2018-01-02 20:42:41
Local clock offset: 0.488 ms
Remote clock offset: -2.305 ms

Below is generated by plot.py at 2018-01-02 22:15:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 5.77 Mbit/s
95th percentile per-packet one-way delay: 115.115 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 3.41 Mbit/s
95th percentile per-packet one-way delay: 111.919 ms
Loss rate: 0.59%
-- Flow 2:
Average throughput: 2.43 Mbit/s
95th percentile per-packet one-way delay: 112.385 ms
Loss rate: 1.27%
-- Flow 3:
Average throughput: 2.29 Mbit/s
95th percentile per-packet one-way delay: 125.461 ms
Loss rate: 1.40%

Run 1: Report of Sprout — Data Link

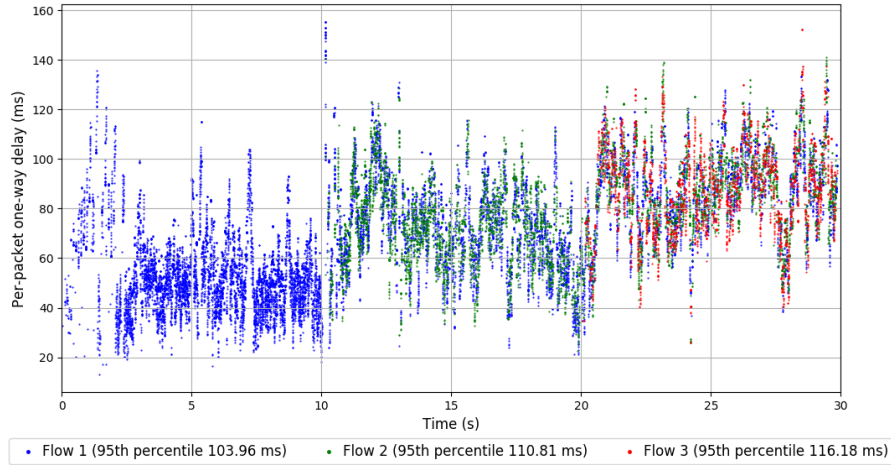
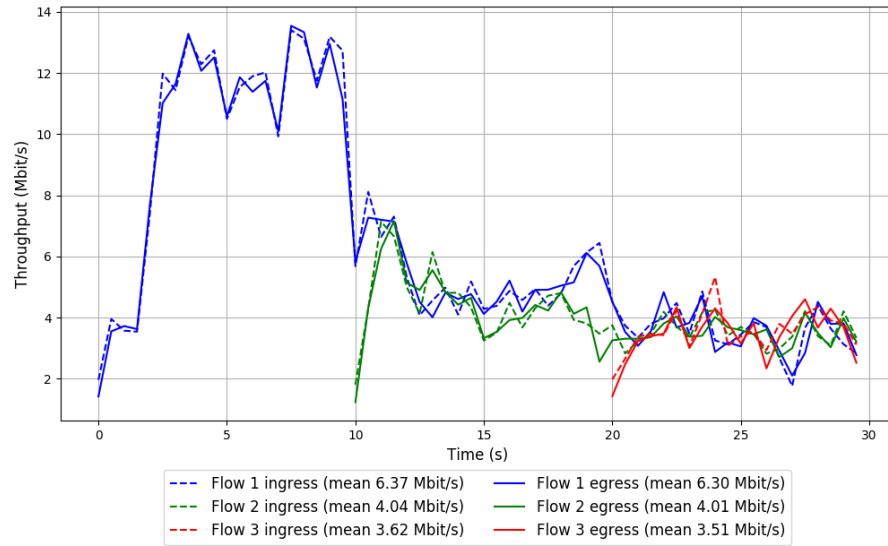


Run 2: Statistics of Sprout

Start at: 2018-01-02 21:00:01
End at: 2018-01-02 21:00:31
Local clock offset: 0.525 ms
Remote clock offset: -2.135 ms

```
# Below is generated by plot.py at 2018-01-02 22:15:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.10 Mbit/s
95th percentile per-packet one-way delay: 108.451 ms
Loss rate: 1.54%
-- Flow 1:
Average throughput: 6.30 Mbit/s
95th percentile per-packet one-way delay: 103.958 ms
Loss rate: 1.17%
-- Flow 2:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 110.812 ms
Loss rate: 1.56%
-- Flow 3:
Average throughput: 3.51 Mbit/s
95th percentile per-packet one-way delay: 116.176 ms
Loss rate: 3.47%
```


Run 2: Report of Sprout — Data Link

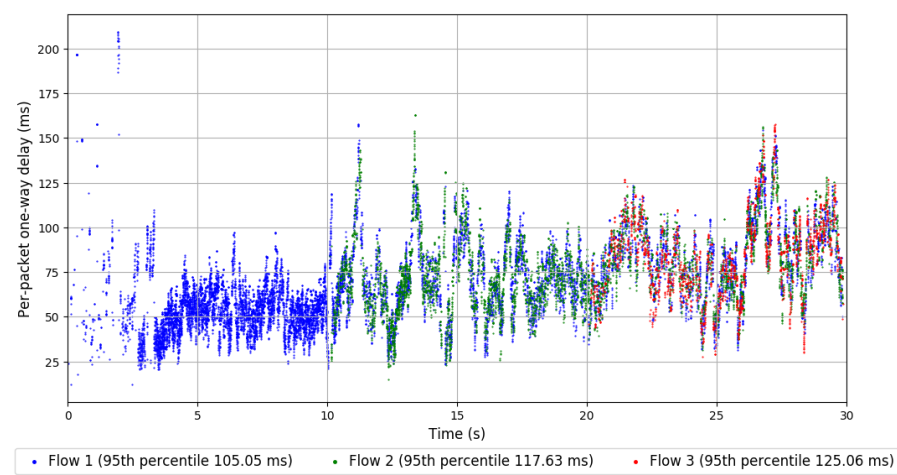
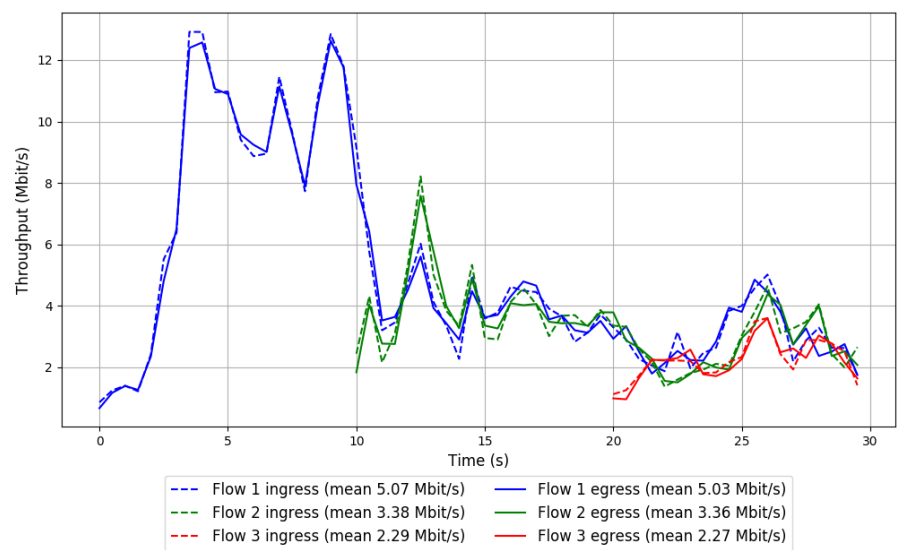


Run 3: Statistics of Sprout

Start at: 2018-01-02 21:17:53
End at: 2018-01-02 21:18:23
Local clock offset: 0.56 ms
Remote clock offset: -2.249 ms

```
# Below is generated by plot.py at 2018-01-02 22:15:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.00 Mbit/s
95th percentile per-packet one-way delay: 111.623 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 5.03 Mbit/s
95th percentile per-packet one-way delay: 105.053 ms
Loss rate: 1.04%
-- Flow 2:
Average throughput: 3.36 Mbit/s
95th percentile per-packet one-way delay: 117.630 ms
Loss rate: 1.09%
-- Flow 3:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 125.059 ms
Loss rate: 1.51%
```

Run 3: Report of Sprout — Data Link

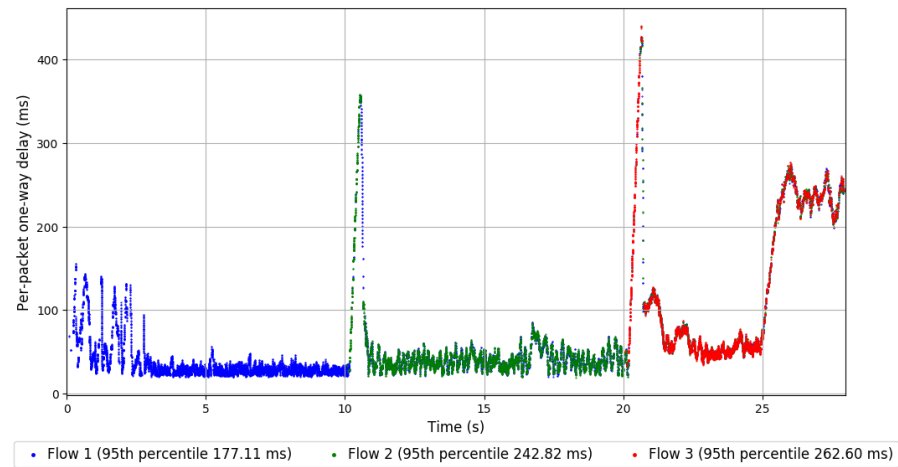
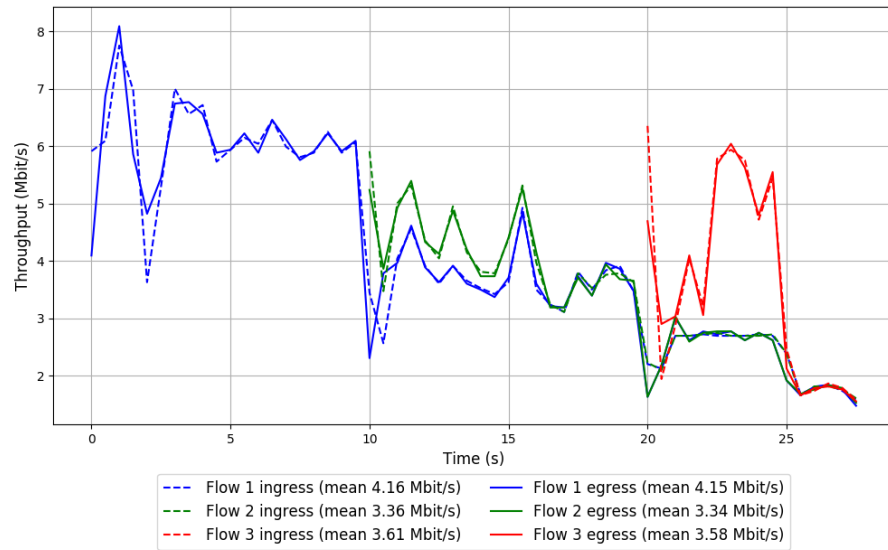


Run 1: Statistics of TaoVA-100x

Start at: 2018-01-02 20:31:30
End at: 2018-01-02 20:32:00
Local clock offset: 0.492 ms
Remote clock offset: -2.525 ms

Below is generated by plot.py at 2018-01-02 22:15:47
Datalink statistics
-- Total of 3 flows:
Average throughput: 7.30 Mbit/s
95th percentile per-packet one-way delay: 237.192 ms
Loss rate: 0.83%
-- Flow 1:
Average throughput: 4.15 Mbit/s
95th percentile per-packet one-way delay: 177.106 ms
Loss rate: 0.56%
-- Flow 2:
Average throughput: 3.34 Mbit/s
95th percentile per-packet one-way delay: 242.823 ms
Loss rate: 0.93%
-- Flow 3:
Average throughput: 3.58 Mbit/s
95th percentile per-packet one-way delay: 262.595 ms
Loss rate: 1.74%

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

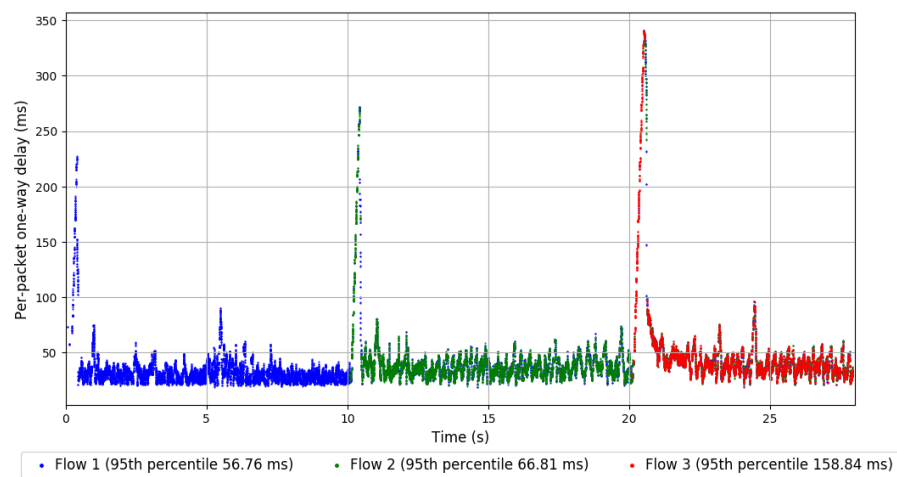
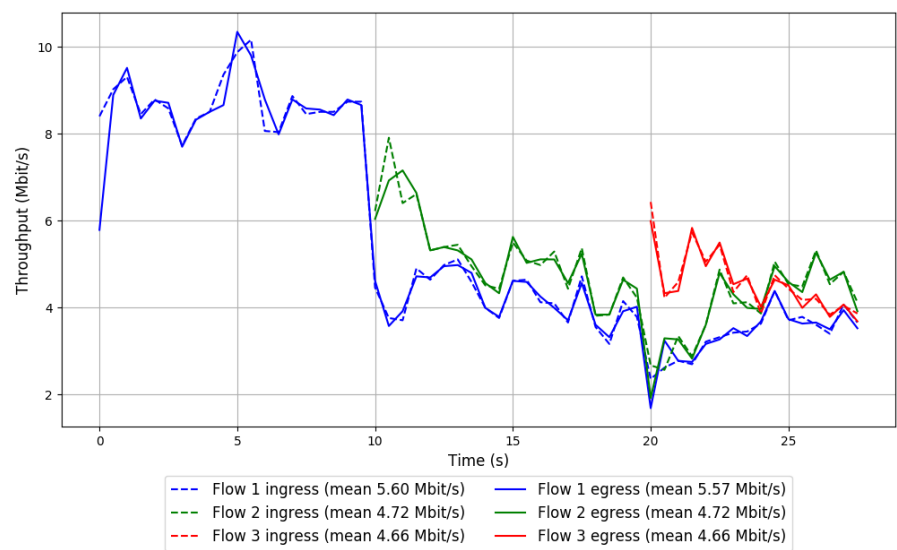


Run 2: Statistics of TaoVA-100x

Start at: 2018-01-02 20:49:20
End at: 2018-01-02 20:49:50
Local clock offset: 0.459 ms
Remote clock offset: -2.119 ms

Below is generated by plot.py at 2018-01-02 22:15:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.91 Mbit/s
95th percentile per-packet one-way delay: 66.185 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 5.57 Mbit/s
95th percentile per-packet one-way delay: 56.759 ms
Loss rate: 0.83%
-- Flow 2:
Average throughput: 4.72 Mbit/s
95th percentile per-packet one-way delay: 66.815 ms
Loss rate: 0.35%
-- Flow 3:
Average throughput: 4.66 Mbit/s
95th percentile per-packet one-way delay: 158.843 ms
Loss rate: 0.74%

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

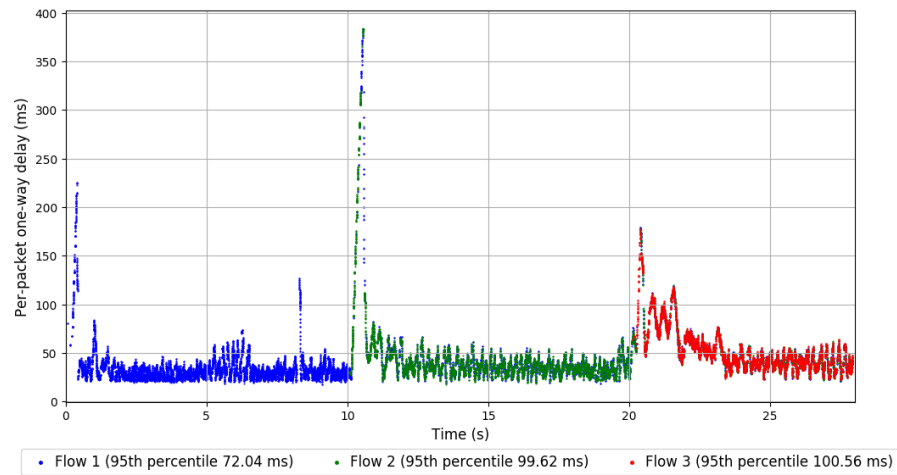
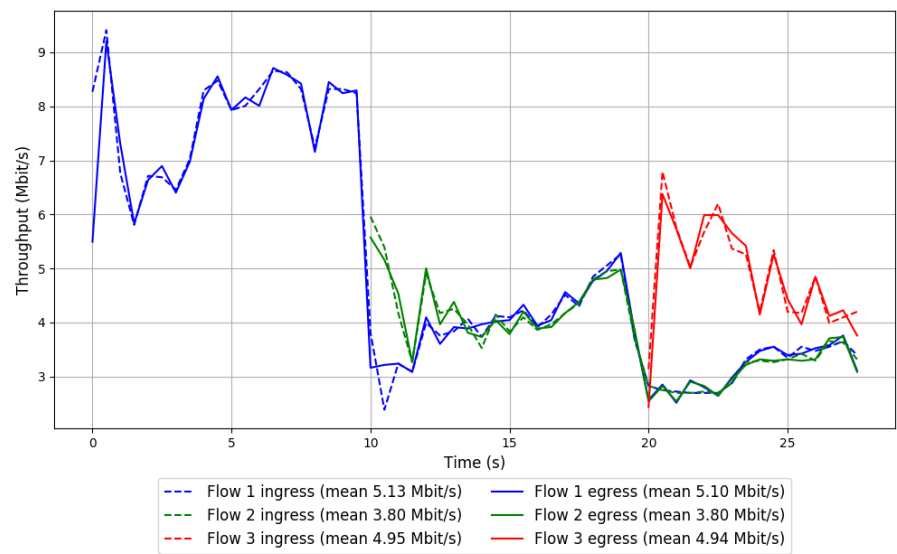


Run 3: Statistics of TaoVA-100x

Start at: 2018-01-02 21:07:10
End at: 2018-01-02 21:07:40
Local clock offset: 0.517 ms
Remote clock offset: -2.193 ms

Below is generated by plot.py at 2018-01-02 22:15:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 8.93 Mbit/s
95th percentile per-packet one-way delay: 90.578 ms
Loss rate: 0.77%
-- Flow 1:
Average throughput: 5.10 Mbit/s
95th percentile per-packet one-way delay: 72.037 ms
Loss rate: 0.88%
-- Flow 2:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 99.620 ms
Loss rate: 0.30%
-- Flow 3:
Average throughput: 4.94 Mbit/s
95th percentile per-packet one-way delay: 100.556 ms
Loss rate: 1.16%

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

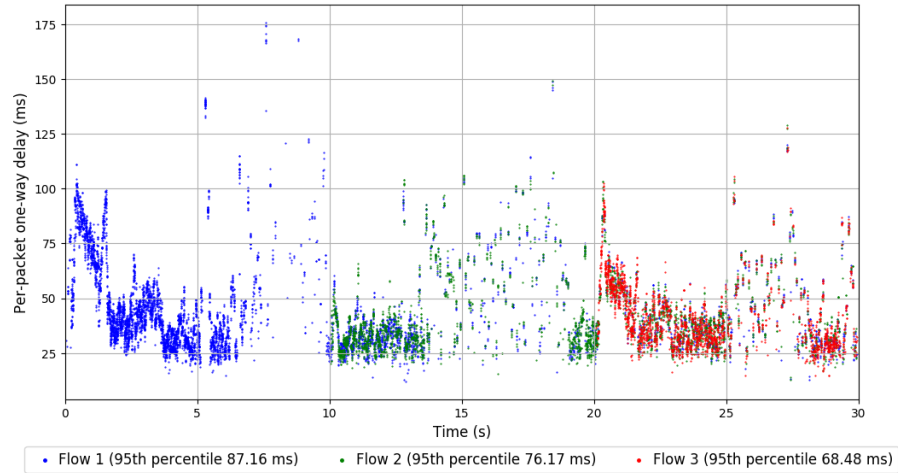
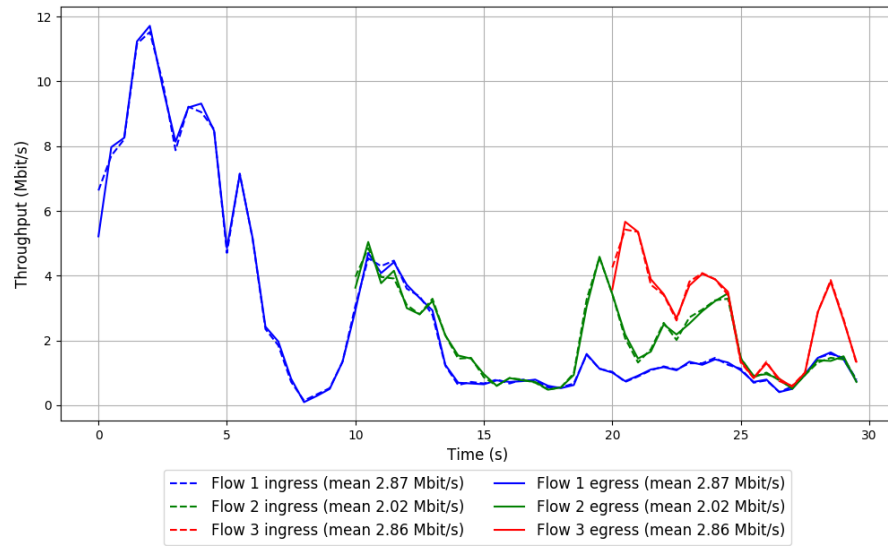


Run 1: Statistics of TCP Vegas

Start at: 2018-01-02 20:37:26
End at: 2018-01-02 20:37:56
Local clock offset: 0.446 ms
Remote clock offset: -2.485 ms

Below is generated by plot.py at 2018-01-02 22:15:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 5.16 Mbit/s
95th percentile per-packet one-way delay: 83.598 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 2.87 Mbit/s
95th percentile per-packet one-way delay: 87.160 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 76.172 ms
Loss rate: 0.18%
-- Flow 3:
Average throughput: 2.86 Mbit/s
95th percentile per-packet one-way delay: 68.480 ms
Loss rate: 0.38%

Run 1: Report of TCP Vegas — Data Link

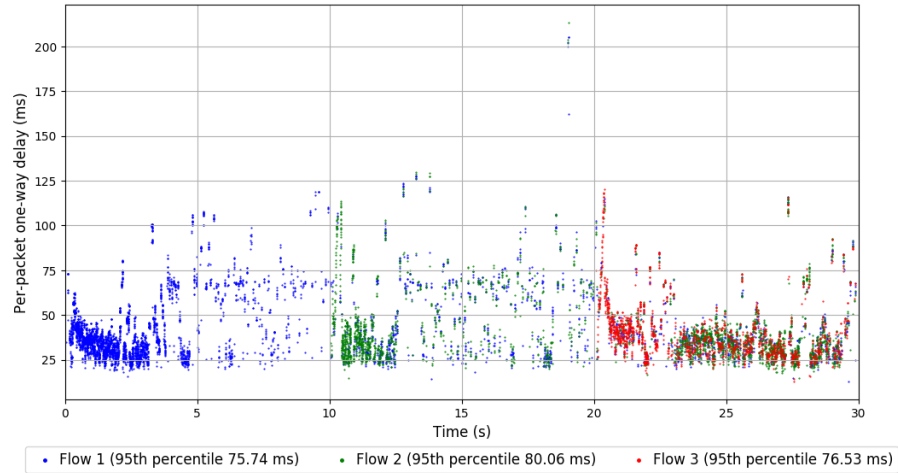
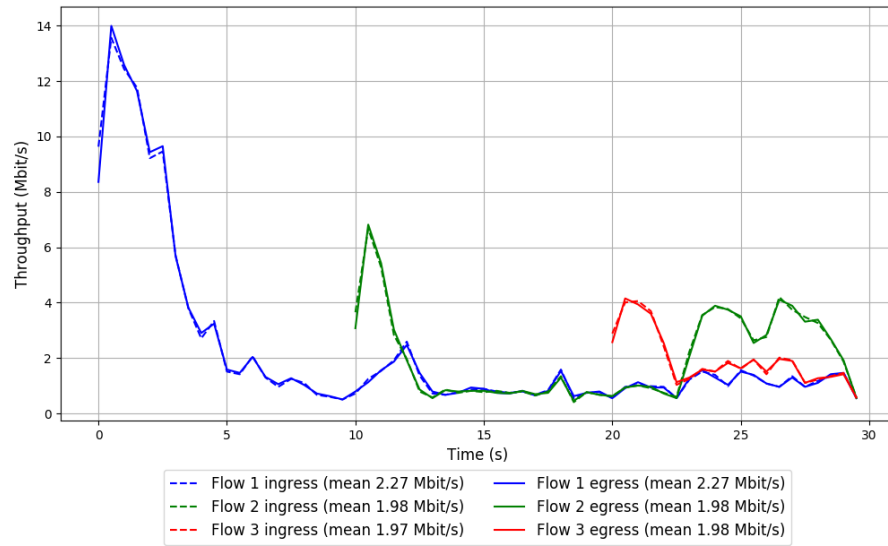


Run 2: Statistics of TCP Vegas

Start at: 2018-01-02 20:55:17
End at: 2018-01-02 20:55:47
Local clock offset: 0.611 ms
Remote clock offset: -2.027 ms

Below is generated by plot.py at 2018-01-02 22:15:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 4.24 Mbit/s
95th percentile per-packet one-way delay: 77.136 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 75.743 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 80.060 ms
Loss rate: 0.24%
-- Flow 3:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 76.528 ms
Loss rate: 0.43%

Run 2: Report of TCP Vegas — Data Link

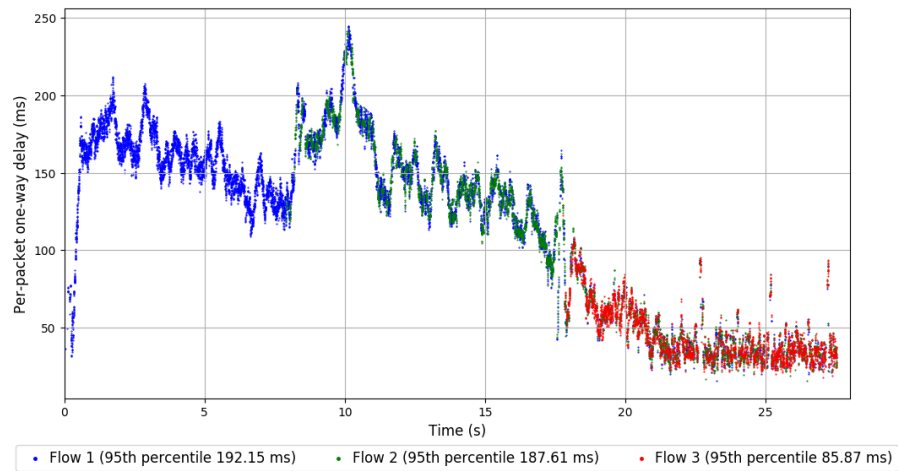
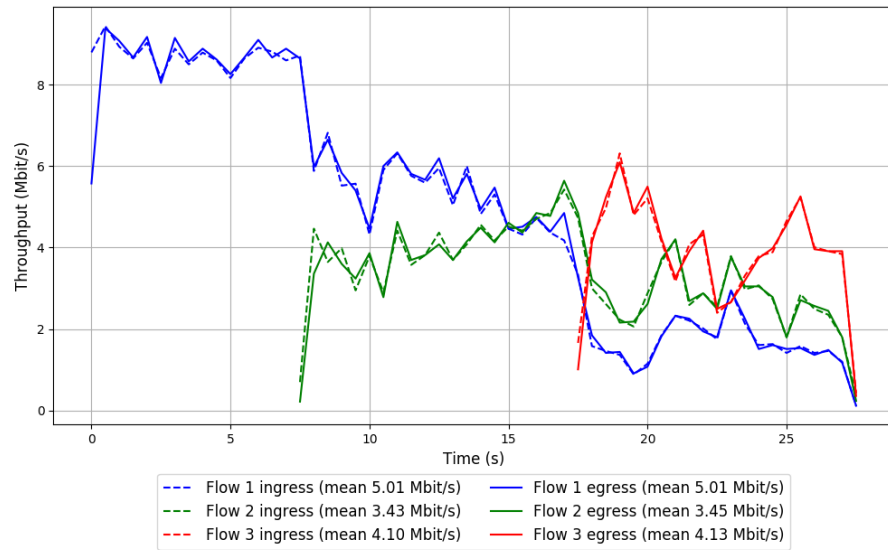


Run 3: Statistics of TCP Vegas

Start at: 2018-01-02 21:13:07
End at: 2018-01-02 21:13:37
Local clock offset: 0.538 ms
Remote clock offset: -2.231 ms

Below is generated by plot.py at 2018-01-02 22:15:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 8.96 Mbit/s
95th percentile per-packet one-way delay: 189.117 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 5.01 Mbit/s
95th percentile per-packet one-way delay: 192.150 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 3.45 Mbit/s
95th percentile per-packet one-way delay: 187.606 ms
Loss rate: 0.32%
-- Flow 3:
Average throughput: 4.13 Mbit/s
95th percentile per-packet one-way delay: 85.873 ms
Loss rate: 0.50%

Run 3: Report of TCP Vegas — Data Link

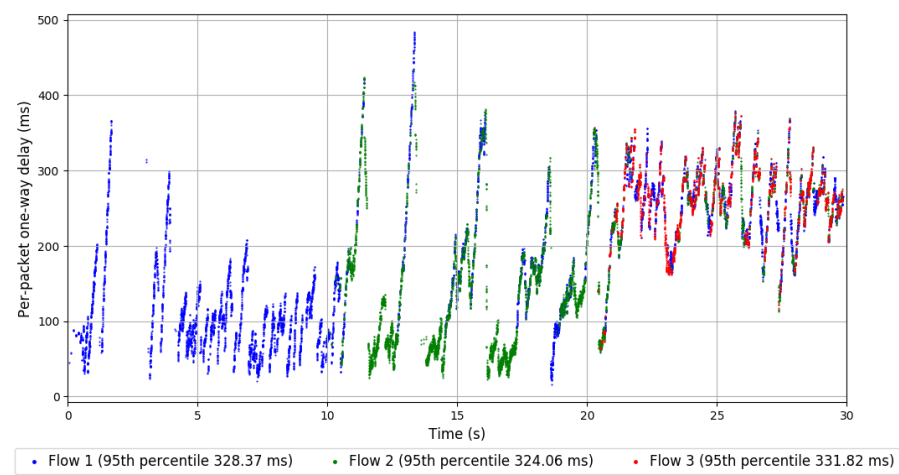
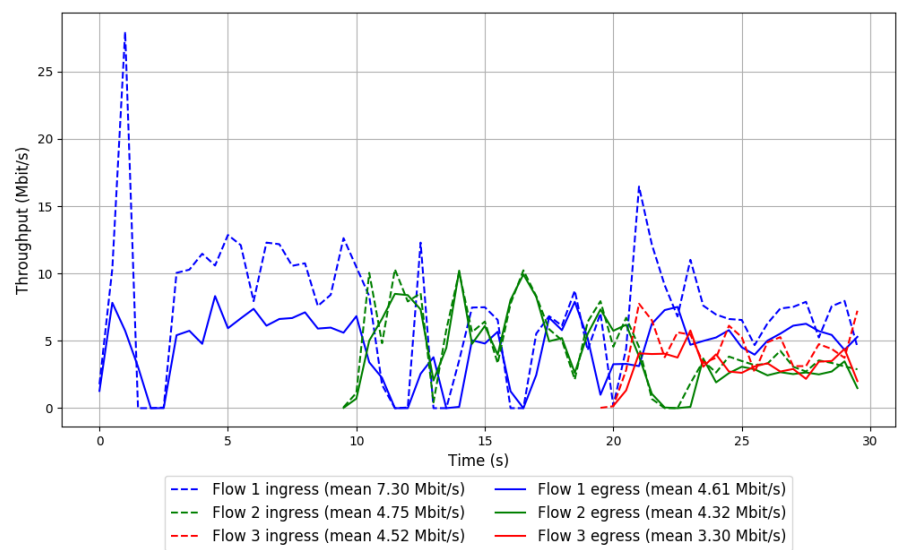


Run 1: Statistics of Verus

Start at: 2018-01-02 20:39:49
End at: 2018-01-02 20:40:19
Local clock offset: 0.52 ms
Remote clock offset: -2.427 ms

Below is generated by plot.py at 2018-01-02 22:15:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 8.55 Mbit/s
95th percentile per-packet one-way delay: 328.111 ms
Loss rate: 28.52%
-- Flow 1:
Average throughput: 4.61 Mbit/s
95th percentile per-packet one-way delay: 328.372 ms
Loss rate: 36.63%
-- Flow 2:
Average throughput: 4.32 Mbit/s
95th percentile per-packet one-way delay: 324.056 ms
Loss rate: 9.42%
-- Flow 3:
Average throughput: 3.30 Mbit/s
95th percentile per-packet one-way delay: 331.819 ms
Loss rate: 29.71%

Run 1: Report of Verus — Data Link

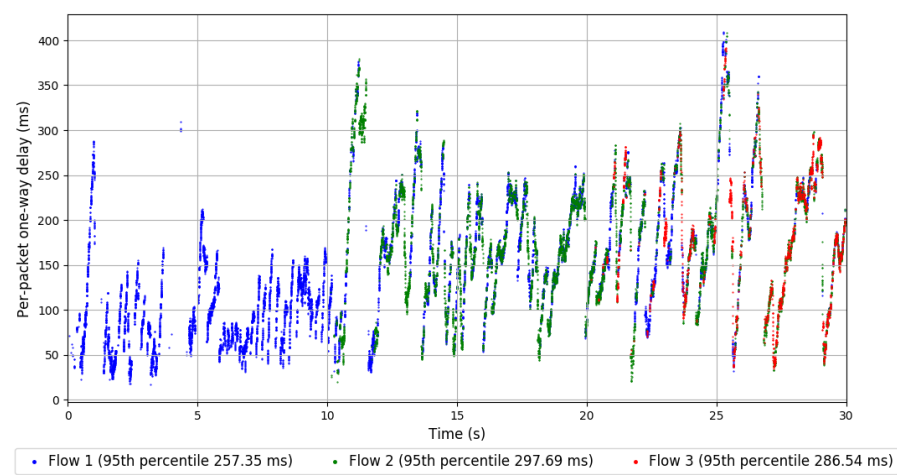
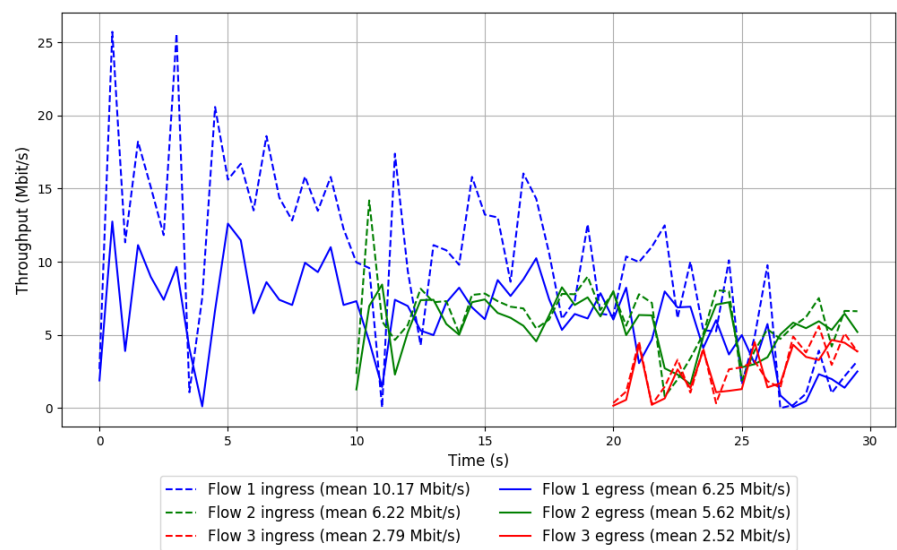


Run 2: Statistics of Verus

Start at: 2018-01-02 20:57:39
End at: 2018-01-02 20:58:09
Local clock offset: 0.613 ms
Remote clock offset: -2.11 ms

Below is generated by plot.py at 2018-01-02 22:15:56
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.80 Mbit/s
95th percentile per-packet one-way delay: 277.079 ms
Loss rate: 29.29%
-- Flow 1:
Average throughput: 6.25 Mbit/s
95th percentile per-packet one-way delay: 257.352 ms
Loss rate: 38.74%
-- Flow 2:
Average throughput: 5.62 Mbit/s
95th percentile per-packet one-way delay: 297.691 ms
Loss rate: 10.35%
-- Flow 3:
Average throughput: 2.52 Mbit/s
95th percentile per-packet one-way delay: 286.542 ms
Loss rate: 9.87%

Run 2: Report of Verus — Data Link

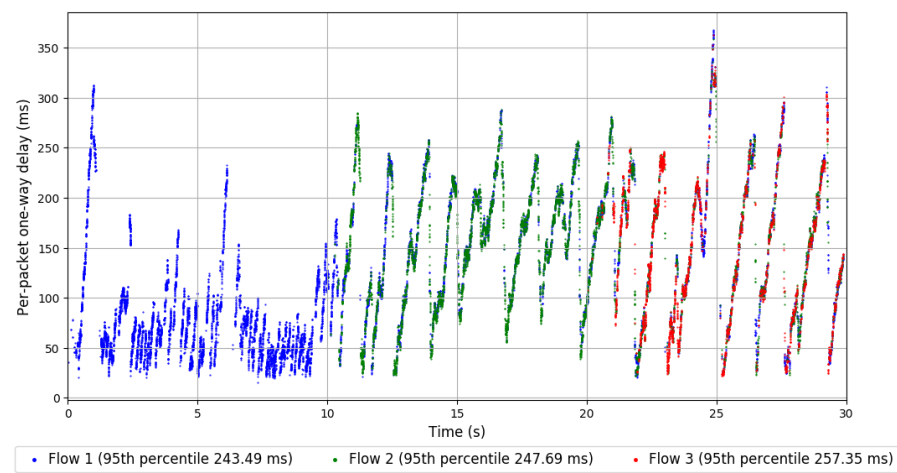
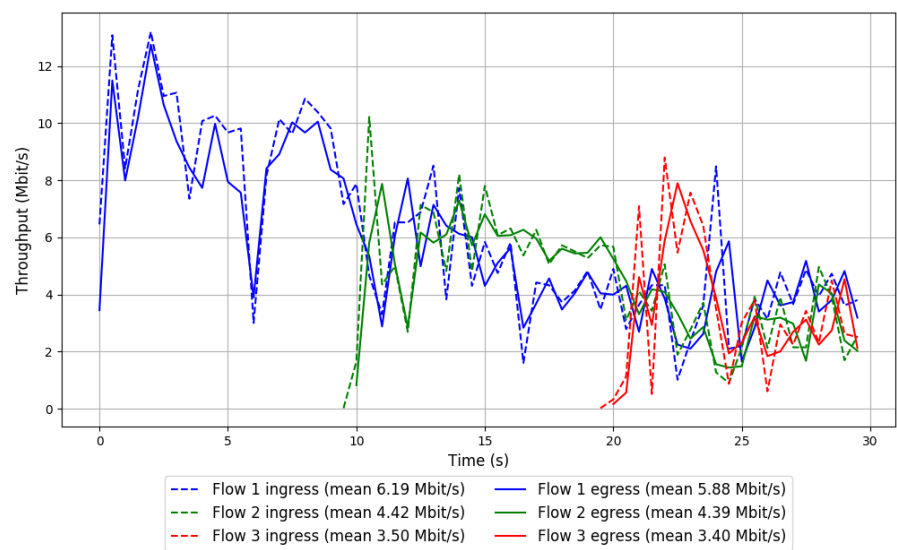


Run 3: Statistics of Verus

Start at: 2018-01-02 21:15:30
End at: 2018-01-02 21:16:00
Local clock offset: 0.506 ms
Remote clock offset: -2.155 ms

Below is generated by plot.py at 2018-01-02 22:15:56
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.92 Mbit/s
95th percentile per-packet one-way delay: 246.354 ms
Loss rate: 3.94%
-- Flow 1:
Average throughput: 5.88 Mbit/s
95th percentile per-packet one-way delay: 243.494 ms
Loss rate: 5.11%
-- Flow 2:
Average throughput: 4.39 Mbit/s
95th percentile per-packet one-way delay: 247.688 ms
Loss rate: 1.43%
-- Flow 3:
Average throughput: 3.40 Mbit/s
95th percentile per-packet one-way delay: 257.346 ms
Loss rate: 4.10%

Run 3: Report of Verus — Data Link

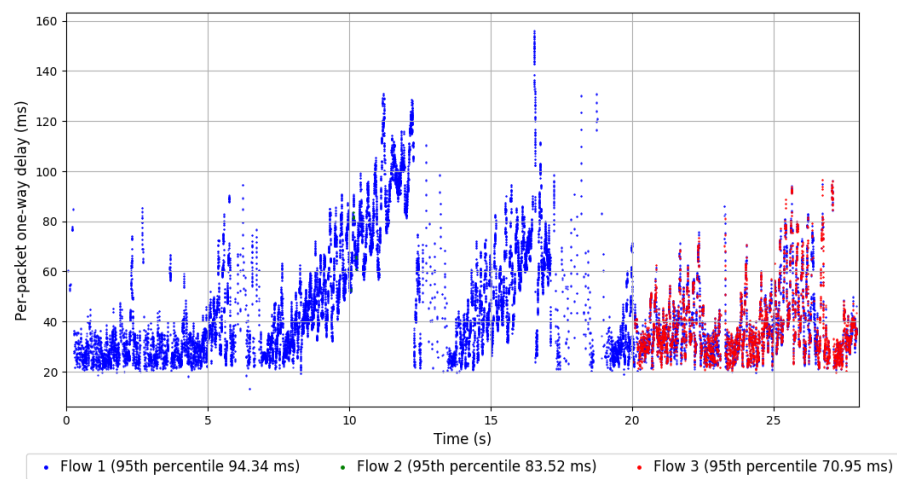
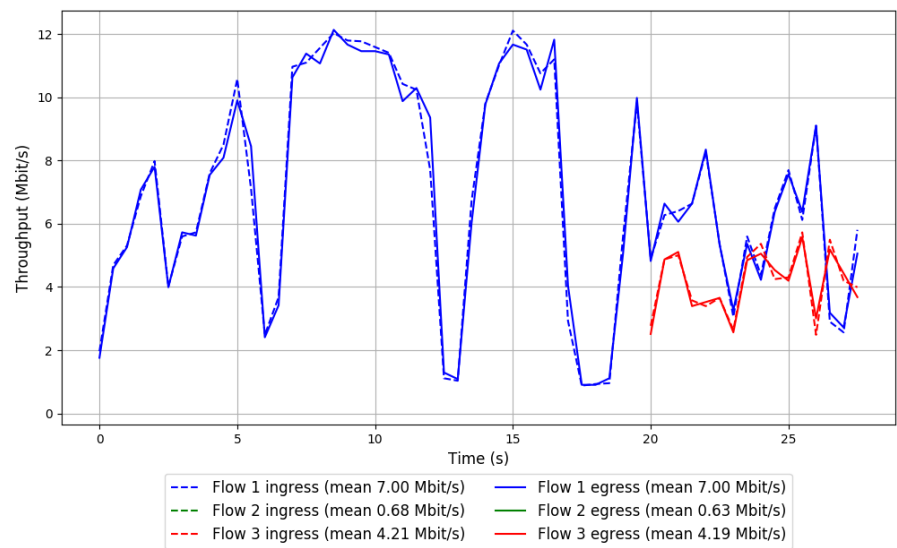


Run 1: Statistics of Copa

Start at: 2018-01-02 20:44:33
End at: 2018-01-02 20:45:03
Local clock offset: 0.471 ms
Remote clock offset: -2.332 ms

Below is generated by plot.py at 2018-01-02 22:15:59
Datalink statistics
-- Total of 3 flows:
Average throughput: 8.19 Mbit/s
95th percentile per-packet one-way delay: 92.397 ms
Loss rate: 0.31%
-- Flow 1:
Average throughput: 7.00 Mbit/s
95th percentile per-packet one-way delay: 94.339 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 83.520 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 4.19 Mbit/s
95th percentile per-packet one-way delay: 70.950 ms
Loss rate: 0.82%

Run 1: Report of Copa — Data Link

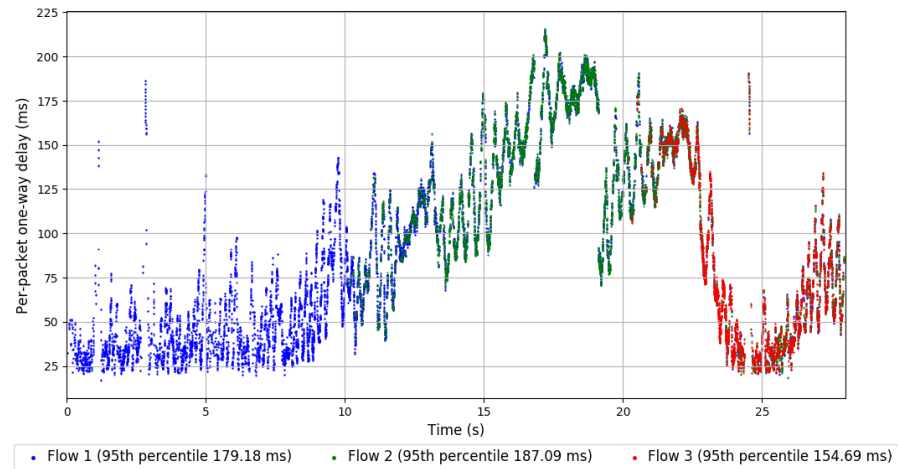
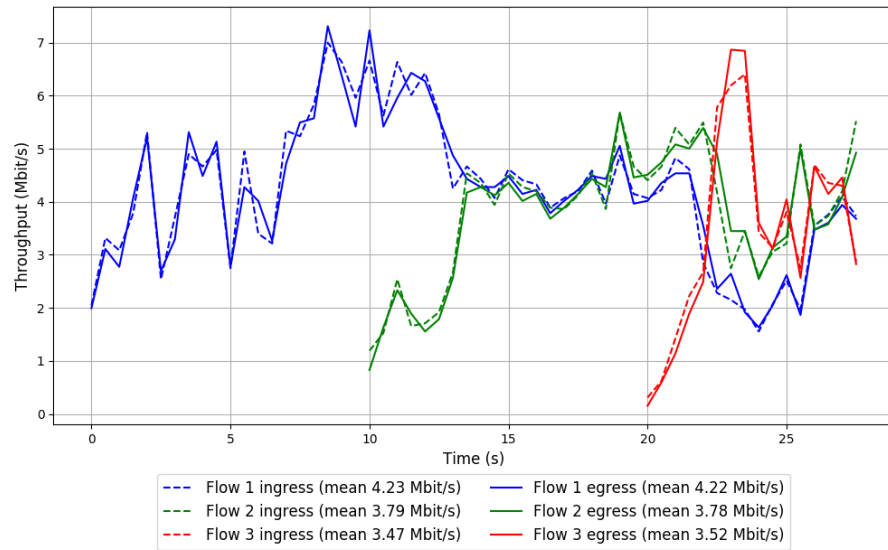


Run 2: Statistics of Copa

Start at: 2018-01-02 21:02:24
End at: 2018-01-02 21:02:54
Local clock offset: 0.54 ms
Remote clock offset: -2.067 ms

Below is generated by plot.py at 2018-01-02 22:16:03
Datalink statistics
-- Total of 3 flows:
Average throughput: 7.62 Mbit/s
95th percentile per-packet one-way delay: 181.051 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 4.22 Mbit/s
95th percentile per-packet one-way delay: 179.182 ms
Loss rate: 0.32%
-- Flow 2:
Average throughput: 3.78 Mbit/s
95th percentile per-packet one-way delay: 187.089 ms
Loss rate: 0.86%
-- Flow 3:
Average throughput: 3.52 Mbit/s
95th percentile per-packet one-way delay: 154.689 ms
Loss rate: 0.80%

Run 2: Report of Copa — Data Link

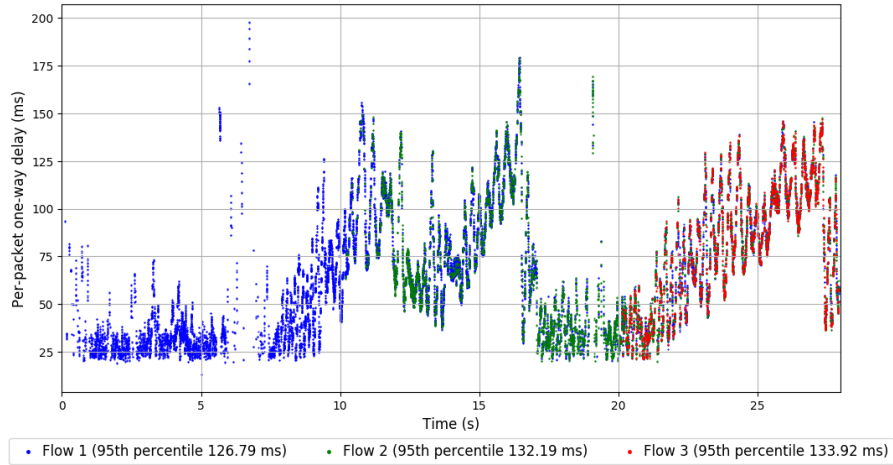
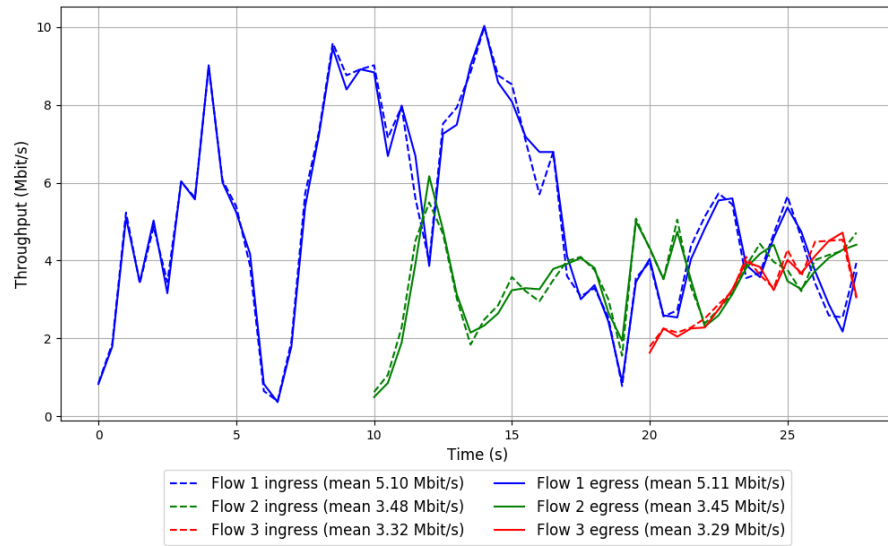


Run 3: Statistics of Copa

Start at: 2018-01-02 21:20:15
End at: 2018-01-02 21:20:45
Local clock offset: 0.519 ms
Remote clock offset: -2.165 ms

```
# Below is generated by plot.py at 2018-01-02 22:16:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.24 Mbit/s
95th percentile per-packet one-way delay: 129.867 ms
Loss rate: 0.70%
-- Flow 1:
Average throughput: 5.11 Mbit/s
95th percentile per-packet one-way delay: 126.787 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 3.45 Mbit/s
95th percentile per-packet one-way delay: 132.195 ms
Loss rate: 1.08%
-- Flow 3:
Average throughput: 3.29 Mbit/s
95th percentile per-packet one-way delay: 133.921 ms
Loss rate: 1.68%
```

Run 3: Report of Copa — Data Link

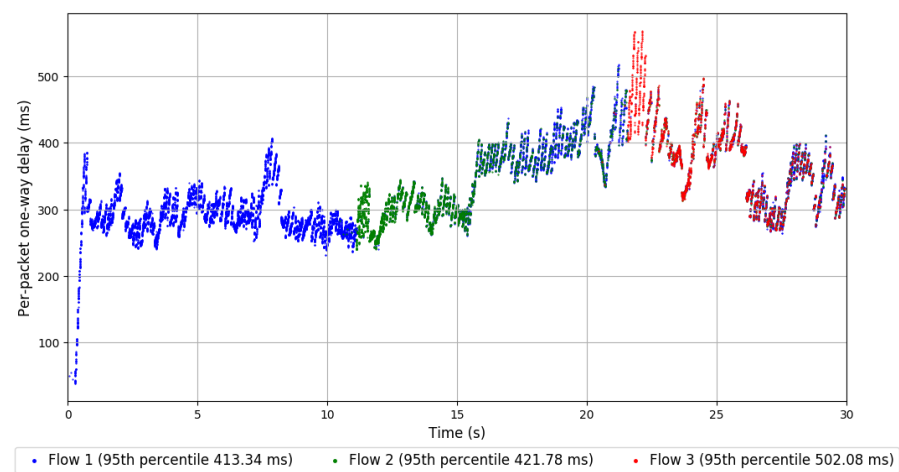
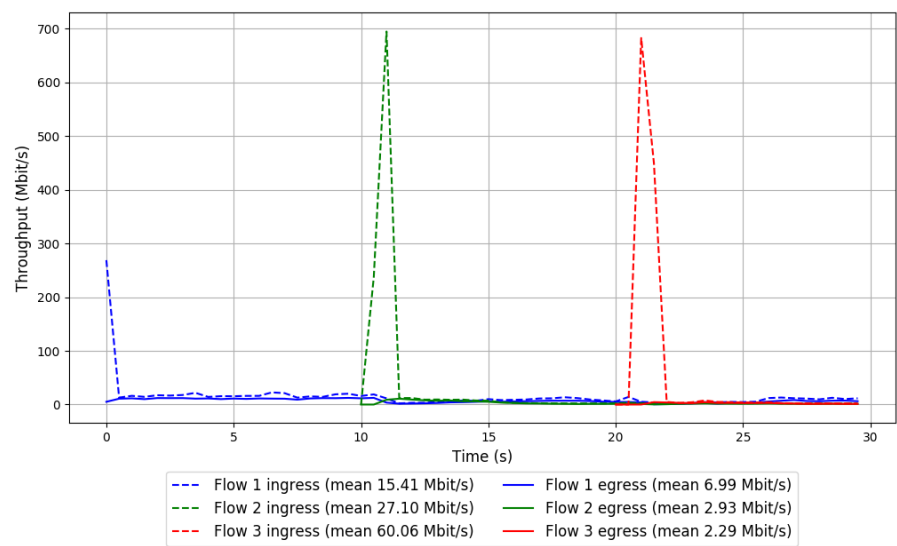


Run 1: Statistics of FillP

Start at: 2018-01-02 20:27:55
End at: 2018-01-02 20:28:25
Local clock offset: 0.382 ms
Remote clock offset: -2.511 ms

Below is generated by plot.py at 2018-01-02 22:16:10
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.62 Mbit/s
95th percentile per-packet one-way delay: 427.278 ms
Loss rate: 81.97%
-- Flow 1:
Average throughput: 6.99 Mbit/s
95th percentile per-packet one-way delay: 413.340 ms
Loss rate: 54.73%
-- Flow 2:
Average throughput: 2.93 Mbit/s
95th percentile per-packet one-way delay: 421.778 ms
Loss rate: 89.44%
-- Flow 3:
Average throughput: 2.29 Mbit/s
95th percentile per-packet one-way delay: 502.084 ms
Loss rate: 96.35%

Run 1: Report of FillP — Data Link

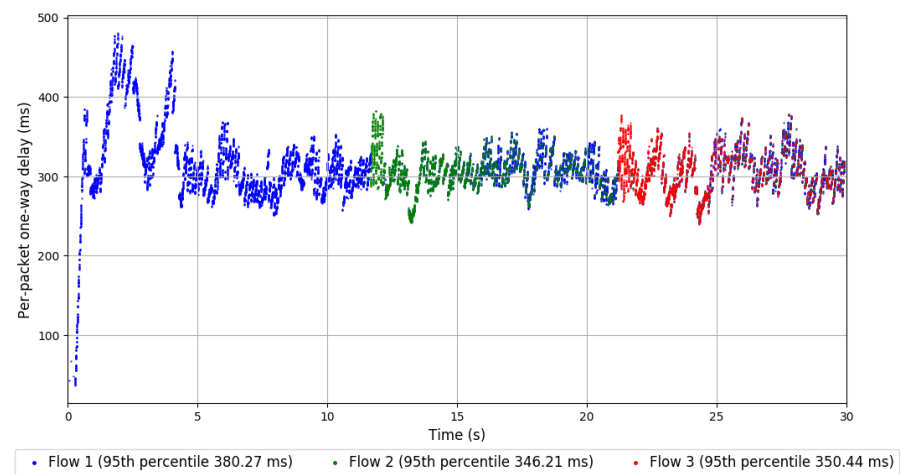
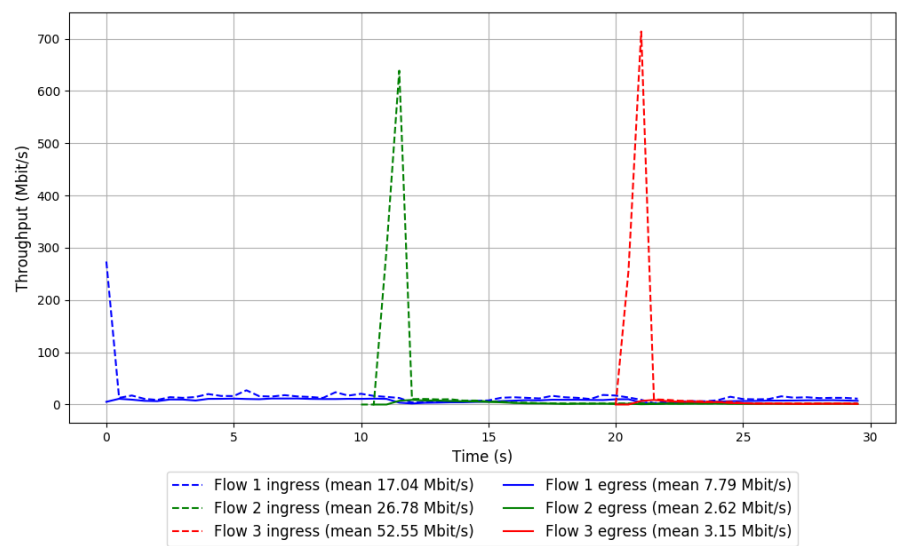


Run 2: Statistics of FillP

Start at: 2018-01-02 20:45:45
End at: 2018-01-02 20:46:15
Local clock offset: 0.575 ms
Remote clock offset: -2.302 ms

Below is generated by plot.py at 2018-01-02 22:16:11
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.50 Mbit/s
95th percentile per-packet one-way delay: 364.934 ms
Loss rate: 79.94%
-- Flow 1:
Average throughput: 7.79 Mbit/s
95th percentile per-packet one-way delay: 380.266 ms
Loss rate: 54.36%
-- Flow 2:
Average throughput: 2.62 Mbit/s
95th percentile per-packet one-way delay: 346.210 ms
Loss rate: 90.51%
-- Flow 3:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 350.445 ms
Loss rate: 94.20%

Run 2: Report of FillP — Data Link

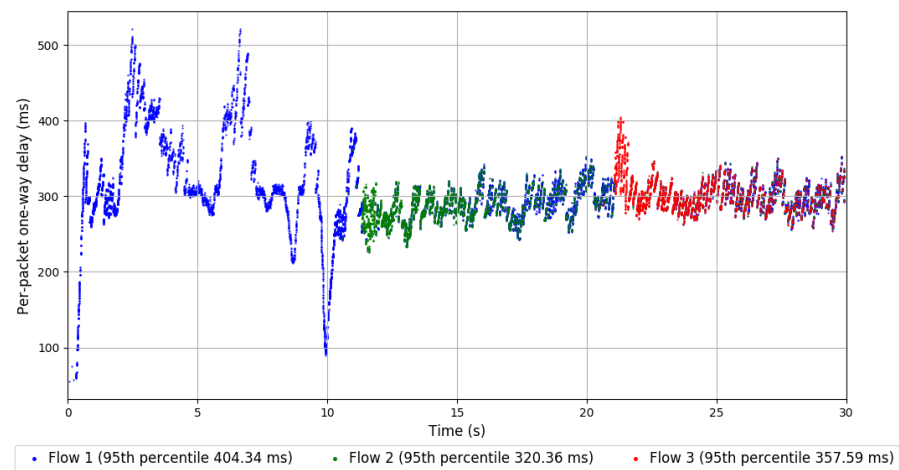
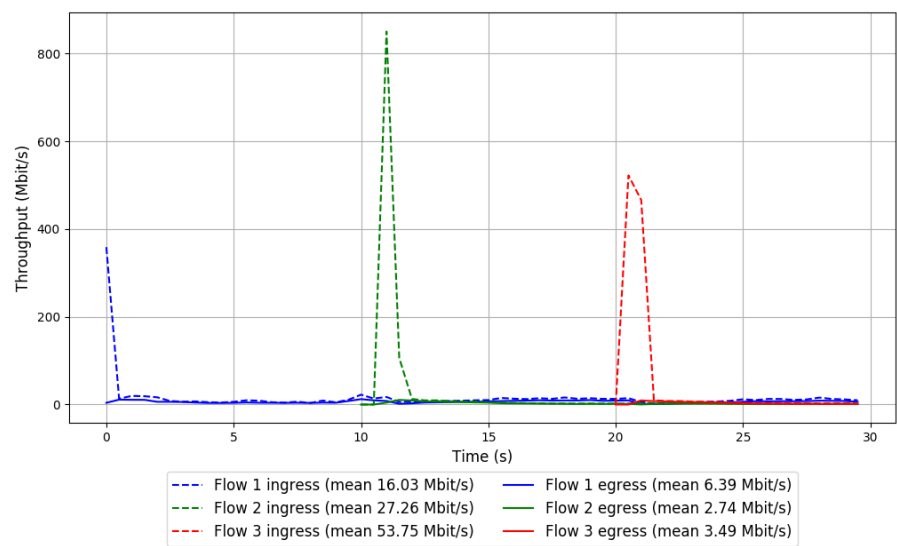


Run 3: Statistics of FillP

Start at: 2018-01-02 21:03:35
End at: 2018-01-02 21:04:05
Local clock offset: 0.514 ms
Remote clock offset: -2.065 ms

Below is generated by plot.py at 2018-01-02 22:16:11
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.32 Mbit/s
95th percentile per-packet one-way delay: 382.718 ms
Loss rate: 82.09%
-- Flow 1:
Average throughput: 6.39 Mbit/s
95th percentile per-packet one-way delay: 404.337 ms
Loss rate: 60.20%
-- Flow 2:
Average throughput: 2.74 Mbit/s
95th percentile per-packet one-way delay: 320.356 ms
Loss rate: 90.07%
-- Flow 3:
Average throughput: 3.49 Mbit/s
95th percentile per-packet one-way delay: 357.587 ms
Loss rate: 93.70%

Run 3: Report of FillP — Data Link

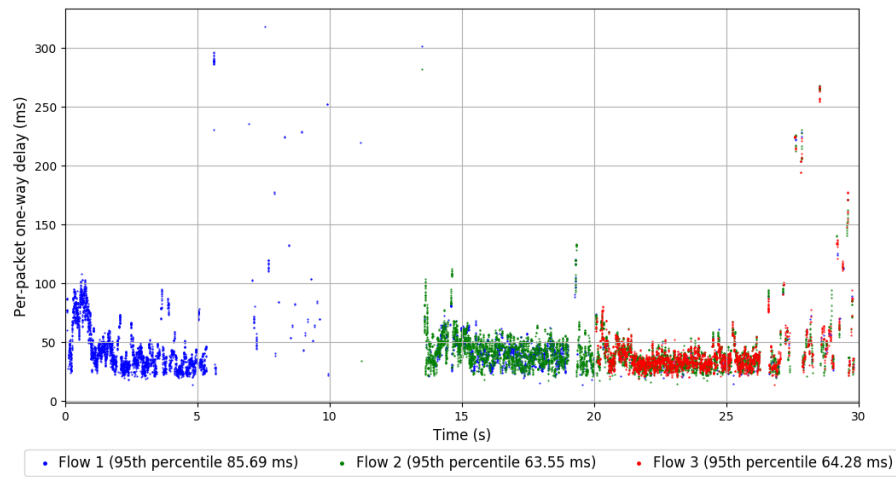
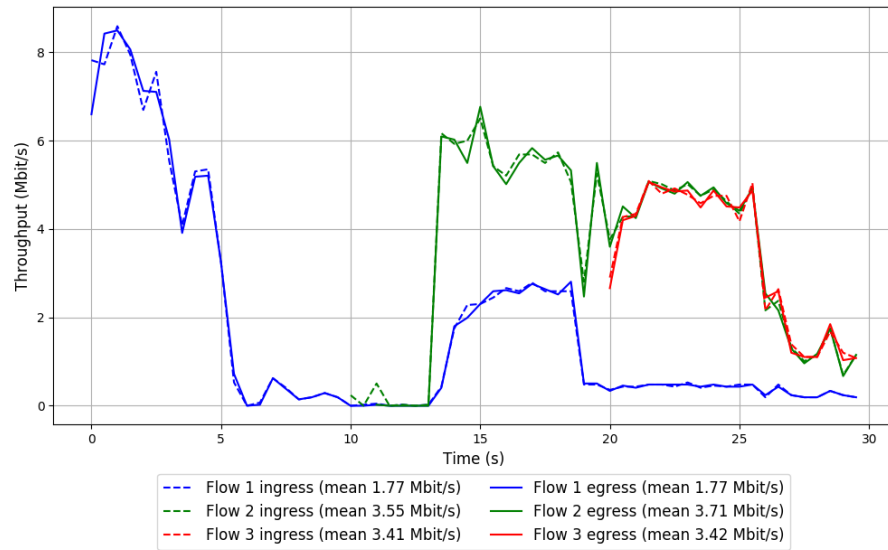


```
Run 1: Statistics of Indigo

Start at: 2018-01-02 20:29:07
End at: 2018-01-02 20:29:37
Local clock offset: 0.459 ms
Remote clock offset: -2.466 ms

# Below is generated by plot.py at 2018-01-02 22:16:11
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.21 Mbit/s
95th percentile per-packet one-way delay: 76.912 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 1.77 Mbit/s
95th percentile per-packet one-way delay: 85.685 ms
Loss rate: 0.45%
-- Flow 2:
Average throughput: 3.71 Mbit/s
95th percentile per-packet one-way delay: 63.551 ms
Loss rate: 0.74%
-- Flow 3:
Average throughput: 3.42 Mbit/s
95th percentile per-packet one-way delay: 64.282 ms
Loss rate: 0.36%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

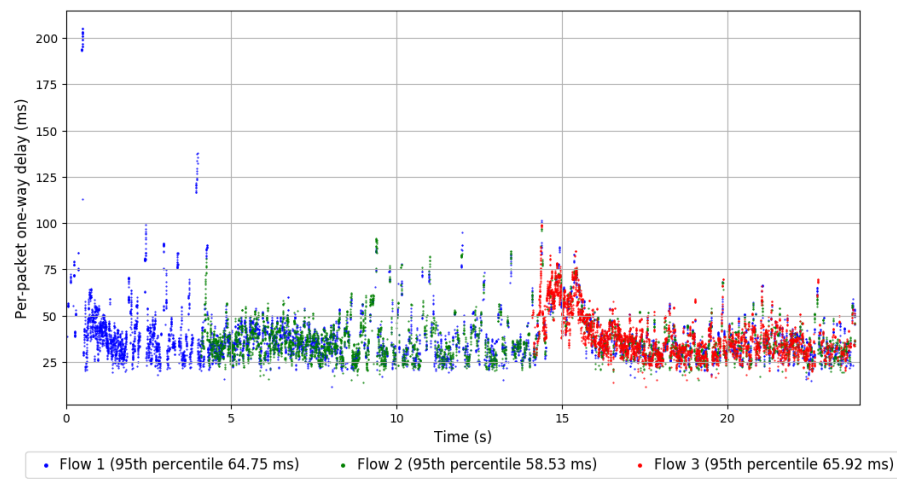
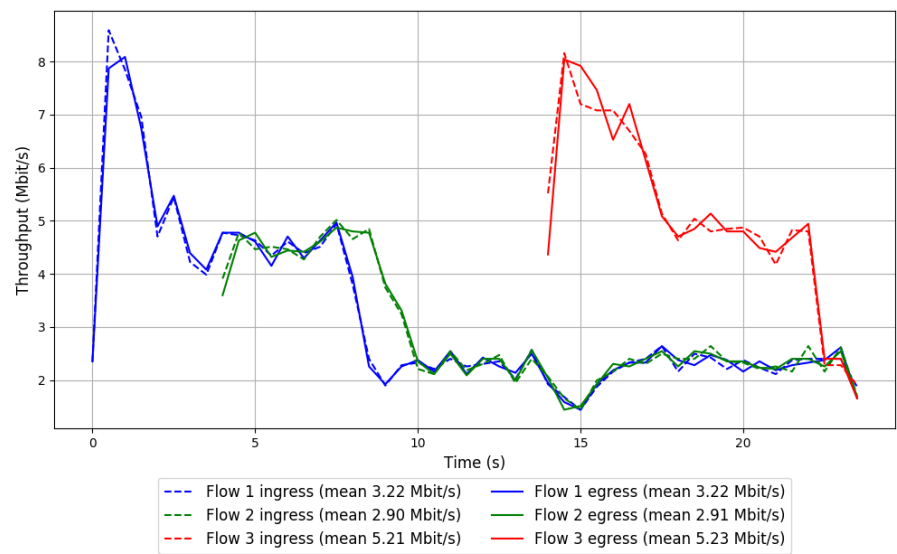
Start at: 2018-01-02 20:46:57

End at: 2018-01-02 20:47:27

Local clock offset: 0.47 ms

Remote clock offset: -2.176 ms

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-01-02 21:04:47
End at: 2018-01-02 21:05:17
Local clock offset: 0.549 ms
Remote clock offset: -2.172 ms

Below is generated by plot.py at 2018-01-02 22:16:11
Datalink statistics
-- Total of 3 flows:
Average throughput: 6.31 Mbit/s
95th percentile per-packet one-way delay: 69.865 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 2.47 Mbit/s
95th percentile per-packet one-way delay: 67.700 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 3.09 Mbit/s
95th percentile per-packet one-way delay: 79.816 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 5.40 Mbit/s
95th percentile per-packet one-way delay: 55.490 ms
Loss rate: 0.23%

Run 3: Report of Indigo — Data Link

