

Pantheon Report

Generated at 2018-01-10 16:36:25 (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).

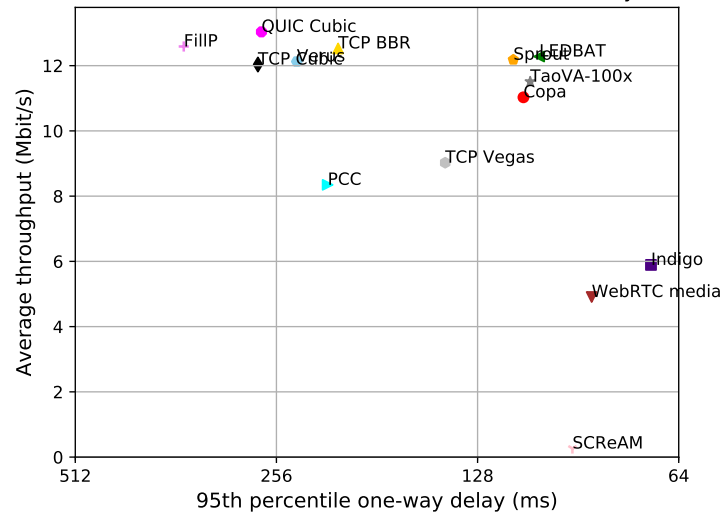
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

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

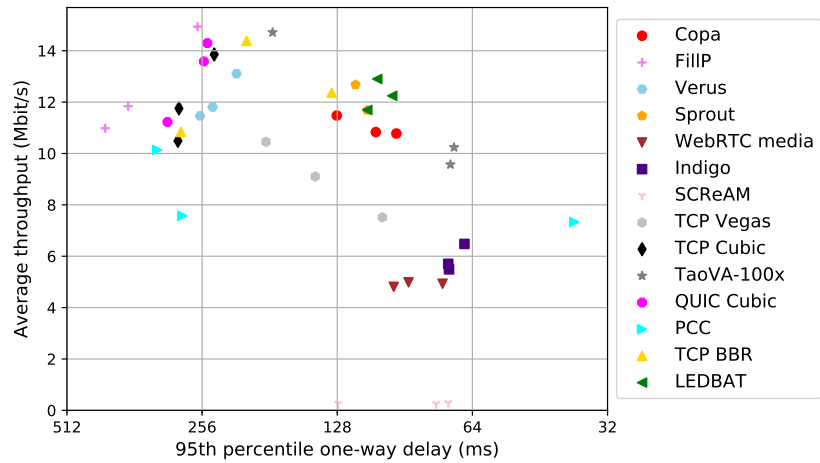
Git summary:

```
branch: master @ 56d1792c316a5efca3f2d21342905405fedffb48
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ ec9585325218d5048c4d4152fa42240af54c6e67
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



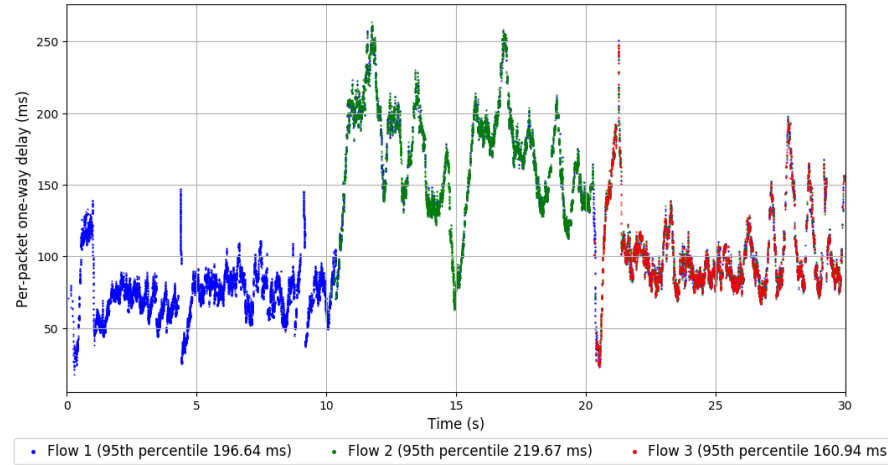
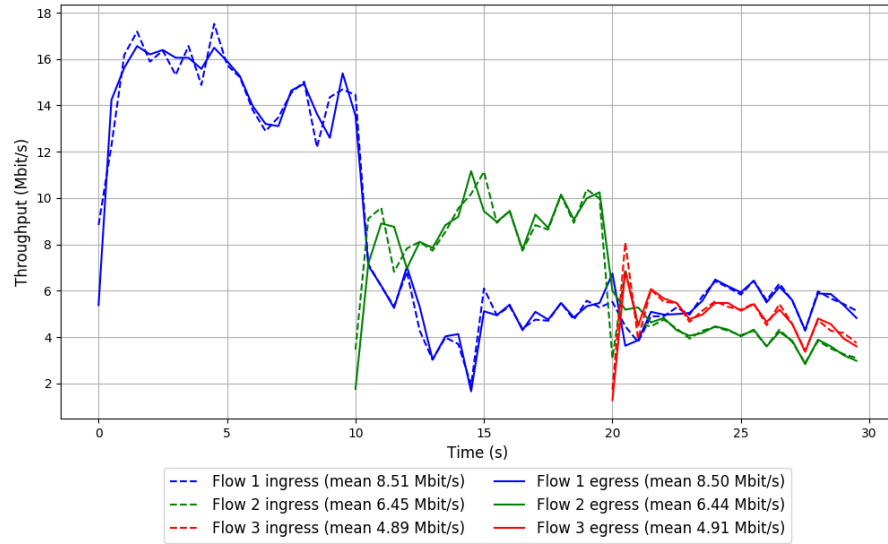
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	7.23	5.32	5.38	182.48	218.04	207.98	0.33	0.77	2.19
TCP Cubic	3	9.40	2.53	2.89	271.90	286.14	253.96	0.79	1.74	2.32
LEDBAT	3	7.21	5.60	4.13	106.67	94.85	96.35	0.46	0.83	1.45
PCC	3	5.39	3.43	2.04	198.94	218.24	248.03	2.90	4.07	9.98
QUIC Cubic	3	9.71	3.75	2.60	267.01	275.36	278.09	1.52	2.54	4.07
SCReAM	3	0.11	0.14	0.17	96.20	83.37	93.94	0.93	1.34	2.04
WebRTC media	3	2.96	1.57	0.40	86.52	84.06	85.62	1.78	1.12	3.02
Sprout	2	7.50	5.20	3.76	107.29	115.20	128.97	1.57	1.96	2.49
TaoVA-100x	3	6.61	5.22	5.50	111.37	65.07	70.96	0.43	1.17	2.66
TCP Vegas	3	4.90	4.78	2.89	138.85	126.00	62.25	0.10	0.21	0.31
Verus	3	7.31	5.53	3.49	233.41	241.28	249.37	28.60	18.75	26.23
Copa	3	6.92	5.22	2.71	104.29	115.89	116.22	0.15	0.29	1.12
FillP	3	10.64	1.31	3.41	352.96	336.61	339.48	52.20	93.80	93.32
Indigo	3	2.86	2.79	3.62	73.47	67.76	58.98	0.21	0.23	0.50

Run 1: Statistics of TCP BBR

Start at: 2018-01-10 14:50:28
End at: 2018-01-10 14:50:58
Local clock offset: -1.649 ms
Remote clock offset: -4.561 ms

Below is generated by plot.py at 2018-01-10 16:34:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 14.38 Mbit/s
95th percentile per-packet one-way delay: 203.818 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 8.50 Mbit/s
95th percentile per-packet one-way delay: 196.640 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 6.44 Mbit/s
95th percentile per-packet one-way delay: 219.669 ms
Loss rate: 0.47%
-- Flow 3:
Average throughput: 4.91 Mbit/s
95th percentile per-packet one-way delay: 160.936 ms
Loss rate: 1.19%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-01-10 15:08:20

End at: 2018-01-10 15:08:50

Local clock offset: -1.312 ms

Remote clock offset: -4.55 ms

Below is generated by plot.py at 2018-01-10 16:34:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 10.84 Mbit/s

95th percentile per-packet one-way delay: 285.392 ms

Loss rate: 1.30%

-- Flow 1:

Average throughput: 6.42 Mbit/s

95th percentile per-packet one-way delay: 222.144 ms

Loss rate: 0.43%

-- Flow 2:

Average throughput: 3.76 Mbit/s

95th percentile per-packet one-way delay: 291.297 ms

Loss rate: 1.42%

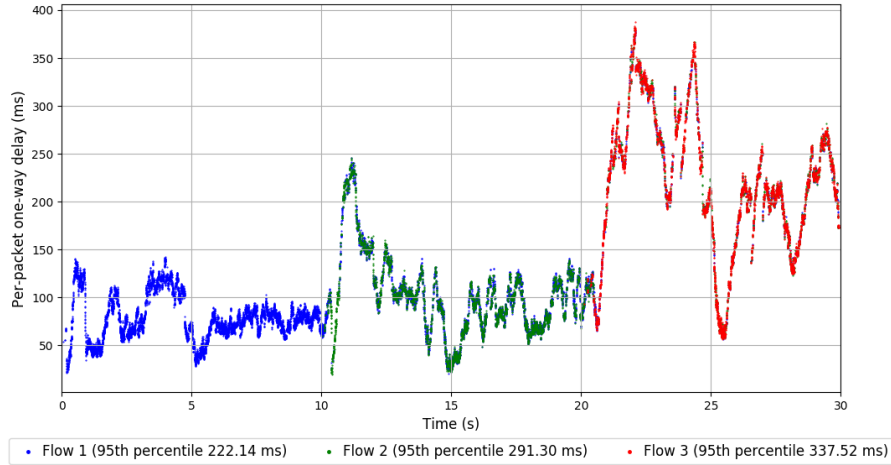
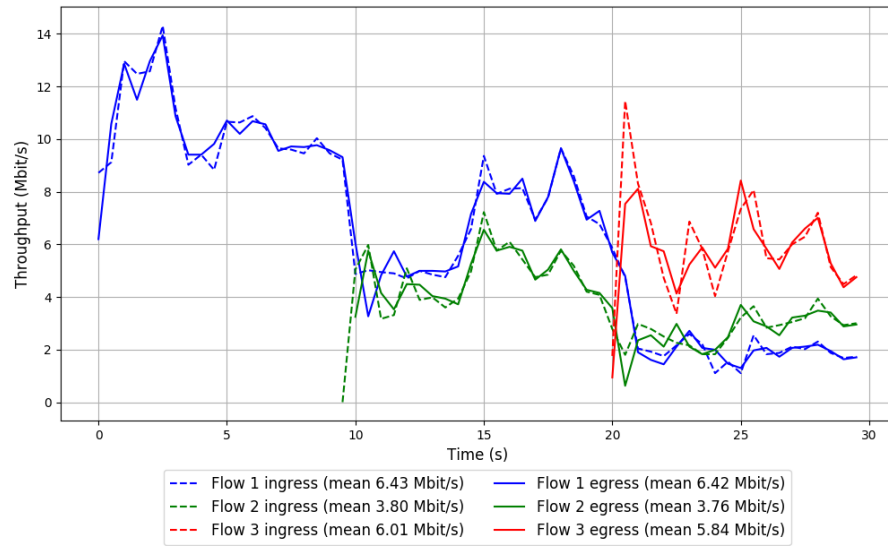
-- Flow 3:

Average throughput: 5.84 Mbit/s

95th percentile per-packet one-way delay: 337.517 ms

Loss rate: 3.95%

Run 2: Report of TCP BBR — Data Link

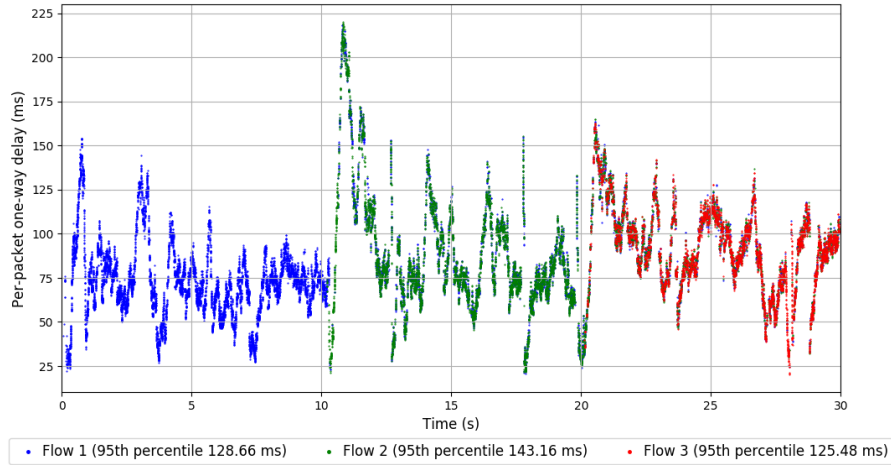
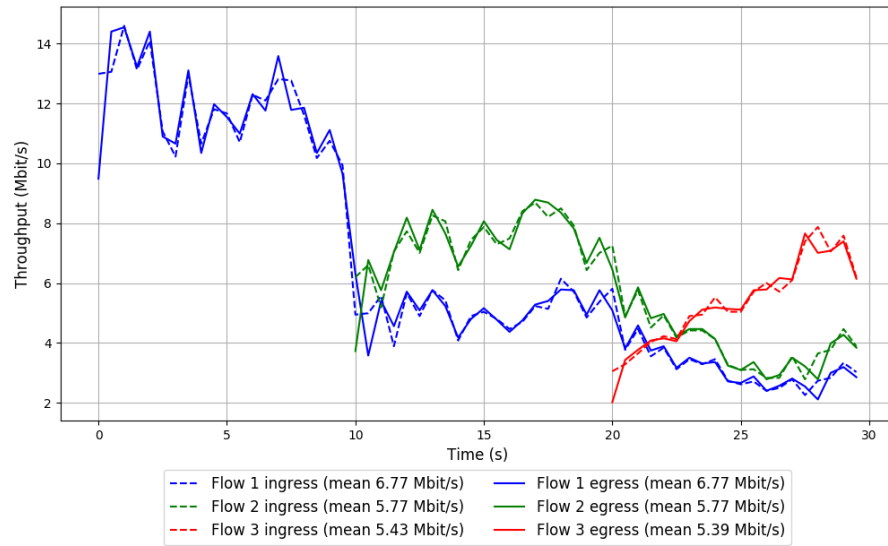


Run 3: Statistics of TCP BBR

Start at: 2018-01-10 15:26:12
End at: 2018-01-10 15:26:42
Local clock offset: -1.351 ms
Remote clock offset: -4.612 ms

Below is generated by plot.py at 2018-01-10 16:34:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 12.36 Mbit/s
95th percentile per-packet one-way delay: 131.716 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 6.77 Mbit/s
95th percentile per-packet one-way delay: 128.662 ms
Loss rate: 0.21%
-- Flow 2:
Average throughput: 5.77 Mbit/s
95th percentile per-packet one-way delay: 143.159 ms
Loss rate: 0.43%
-- Flow 3:
Average throughput: 5.39 Mbit/s
95th percentile per-packet one-way delay: 125.477 ms
Loss rate: 1.43%

Run 3: Report of TCP BBR — Data Link

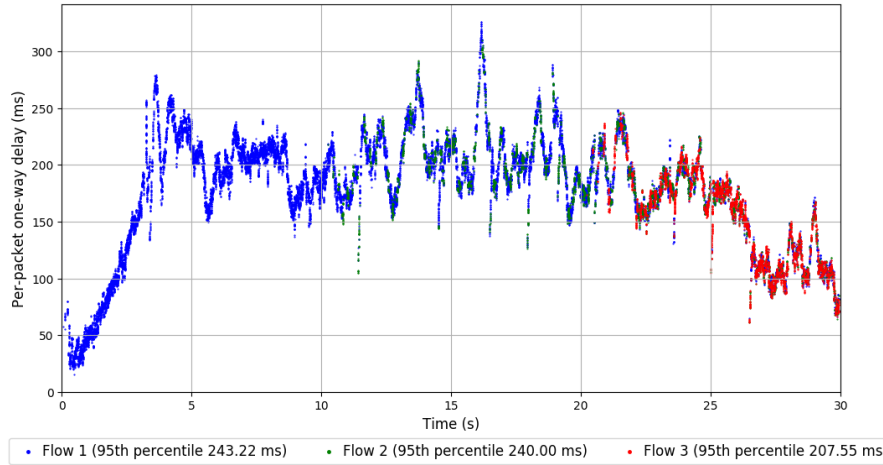
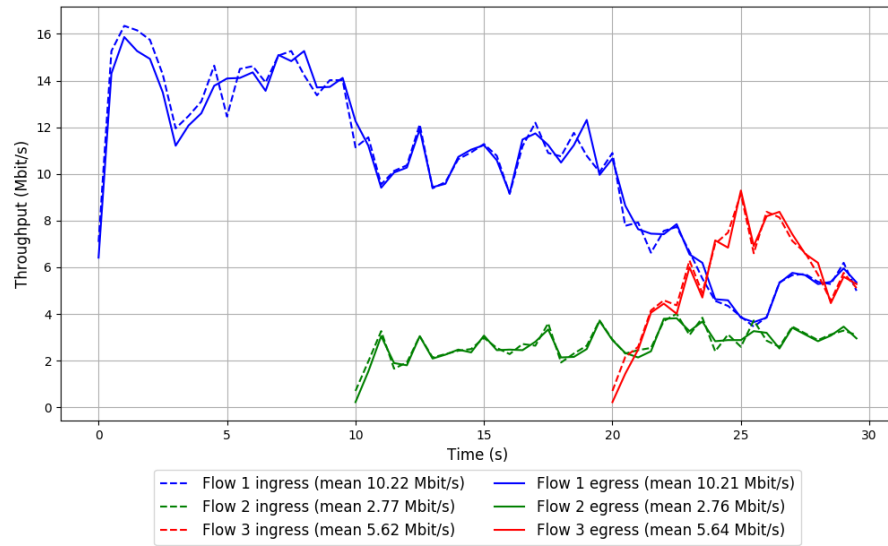


Run 1: Statistics of TCP Cubic

Start at: 2018-01-10 14:59:58
End at: 2018-01-10 15:00:28
Local clock offset: -1.503 ms
Remote clock offset: -4.524 ms

Below is generated by plot.py at 2018-01-10 16:34:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 13.86 Mbit/s
95th percentile per-packet one-way delay: 240.555 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 10.21 Mbit/s
95th percentile per-packet one-way delay: 243.222 ms
Loss rate: 0.40%
-- Flow 2:
Average throughput: 2.76 Mbit/s
95th percentile per-packet one-way delay: 240.002 ms
Loss rate: 1.70%
-- Flow 3:
Average throughput: 5.64 Mbit/s
95th percentile per-packet one-way delay: 207.549 ms
Loss rate: 1.57%

Run 1: Report of TCP Cubic — Data Link

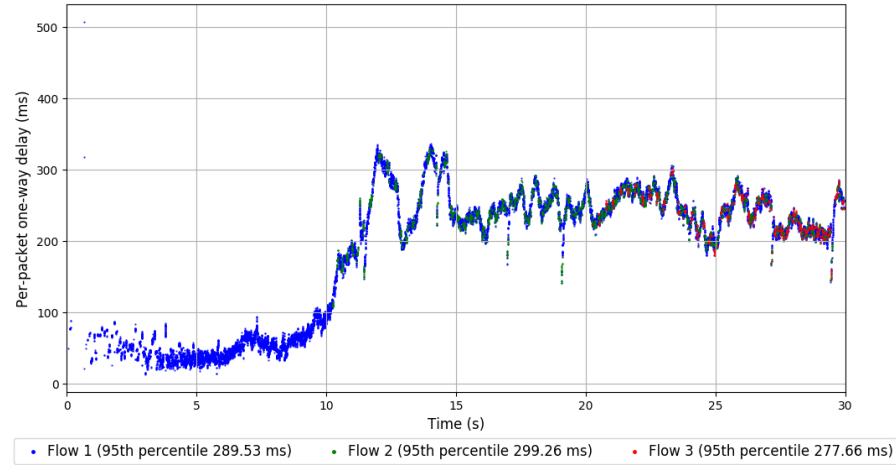
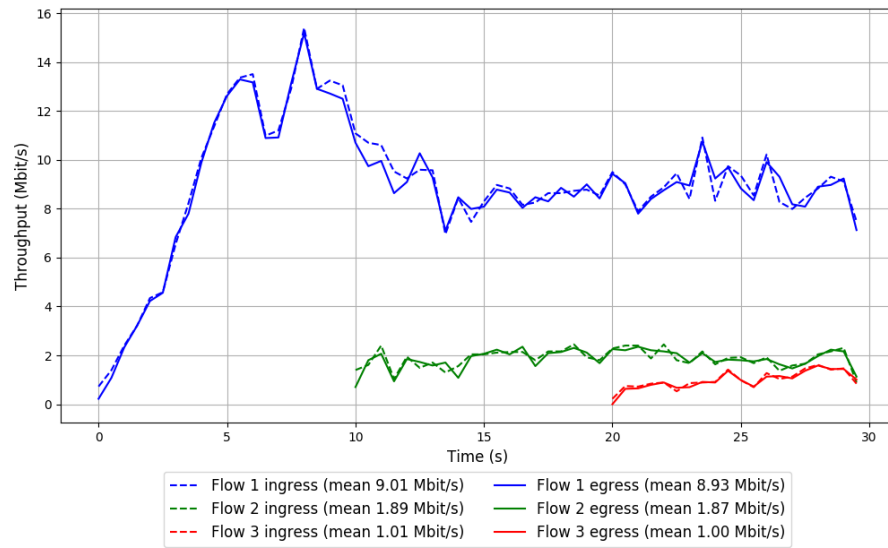


Run 2: Statistics of TCP Cubic

Start at: 2018-01-10 15:17:51
End at: 2018-01-10 15:18:21
Local clock offset: -1.244 ms
Remote clock offset: -4.518 ms

Below is generated by plot.py at 2018-01-10 16:34:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.49 Mbit/s
95th percentile per-packet one-way delay: 289.754 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 8.93 Mbit/s
95th percentile per-packet one-way delay: 289.530 ms
Loss rate: 1.11%
-- Flow 2:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 299.261 ms
Loss rate: 1.37%
-- Flow 3:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 277.660 ms
Loss rate: 2.77%

Run 2: Report of TCP Cubic — Data Link

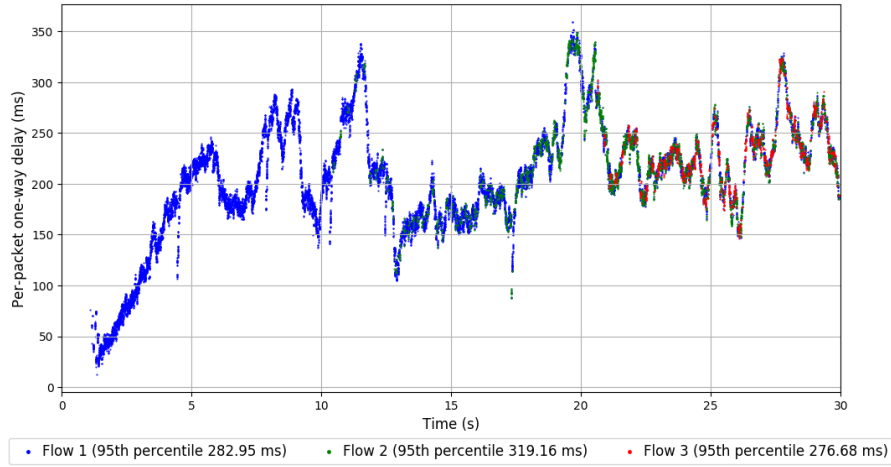
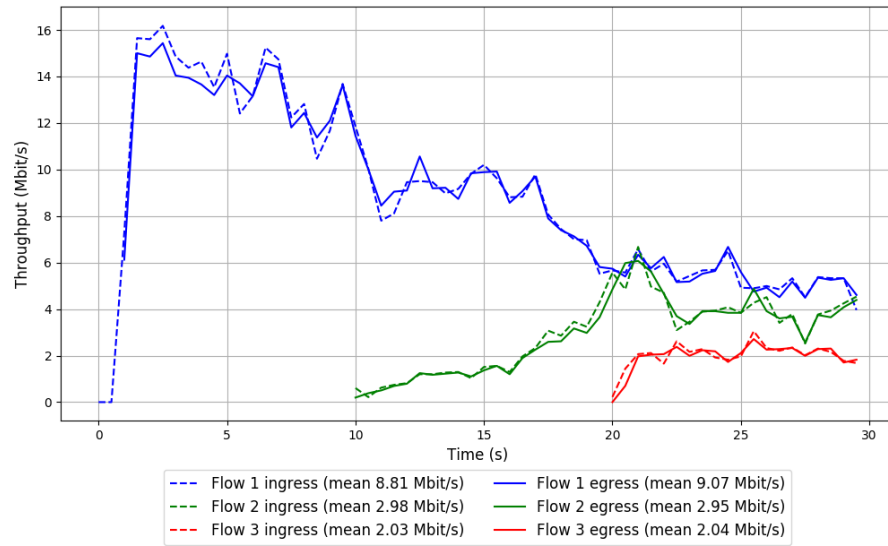


Run 3: Statistics of TCP Cubic

Start at: 2018-01-10 15:35:43
End at: 2018-01-10 15:36:13
Local clock offset: -1.243 ms
Remote clock offset: -4.776 ms

Below is generated by plot.py at 2018-01-10 16:34:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.76 Mbit/s
95th percentile per-packet one-way delay: 288.287 ms
Loss rate: 1.18%
-- Flow 1:
Average throughput: 9.07 Mbit/s
95th percentile per-packet one-way delay: 282.948 ms
Loss rate: 0.85%
-- Flow 2:
Average throughput: 2.95 Mbit/s
95th percentile per-packet one-way delay: 319.160 ms
Loss rate: 2.14%
-- Flow 3:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 276.675 ms
Loss rate: 2.63%

Run 3: Report of TCP Cubic — Data Link

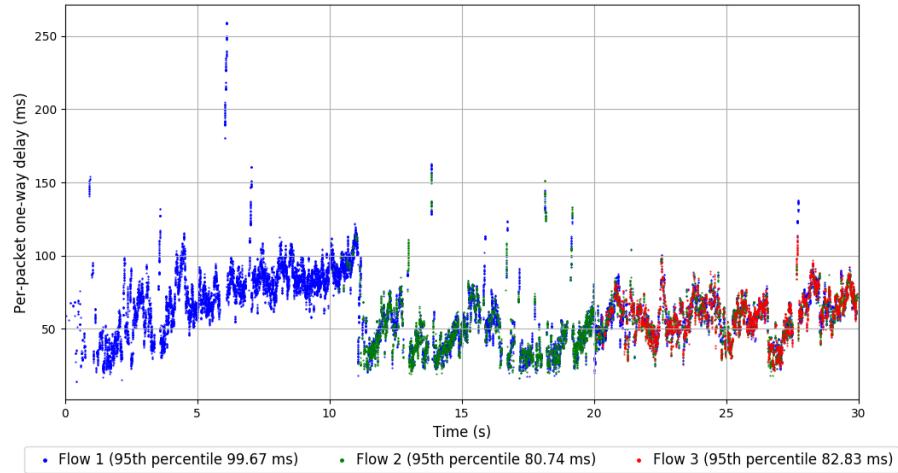
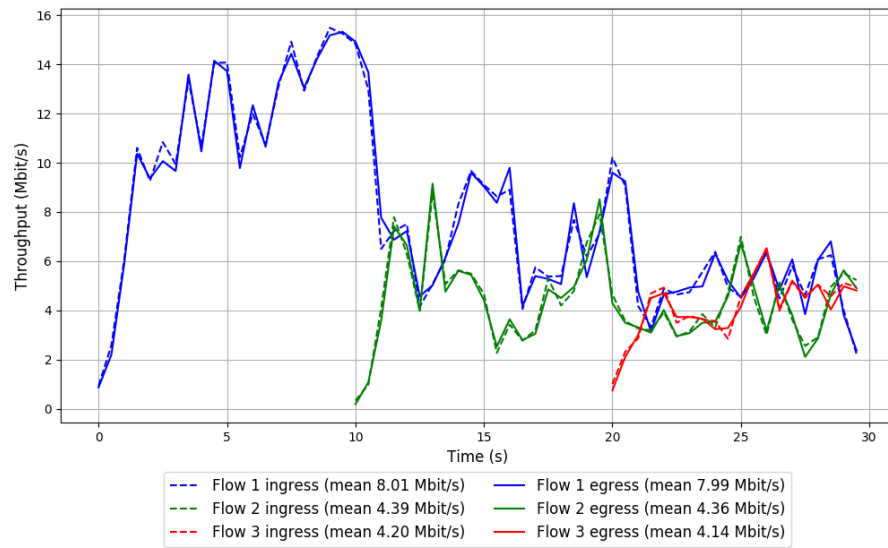


Run 1: Statistics of LEDBAT

Start at: 2018-01-10 14:51:39
End at: 2018-01-10 14:52:09
Local clock offset: -1.562 ms
Remote clock offset: -4.531 ms

Below is generated by plot.py at 2018-01-10 16:34:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 12.25 Mbit/s
95th percentile per-packet one-way delay: 96.564 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 7.99 Mbit/s
95th percentile per-packet one-way delay: 99.673 ms
Loss rate: 0.44%
-- Flow 2:
Average throughput: 4.36 Mbit/s
95th percentile per-packet one-way delay: 80.742 ms
Loss rate: 1.06%
-- Flow 3:
Average throughput: 4.14 Mbit/s
95th percentile per-packet one-way delay: 82.834 ms
Loss rate: 1.86%

Run 1: Report of LEDBAT — Data Link

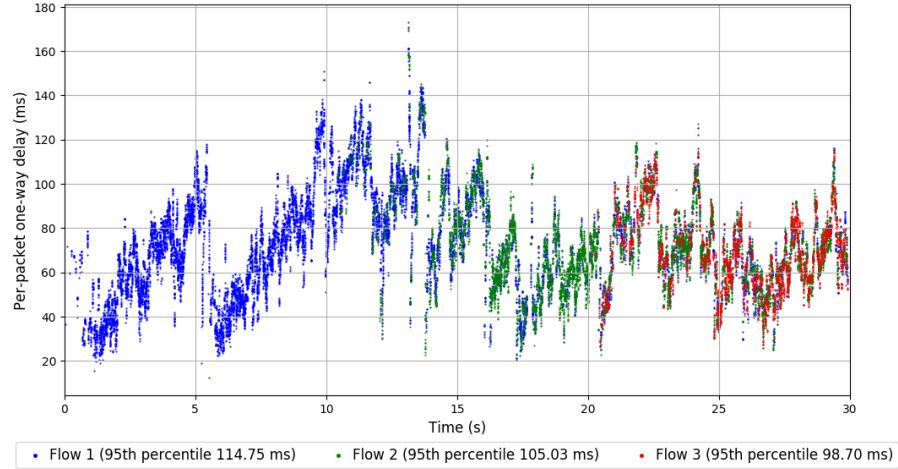
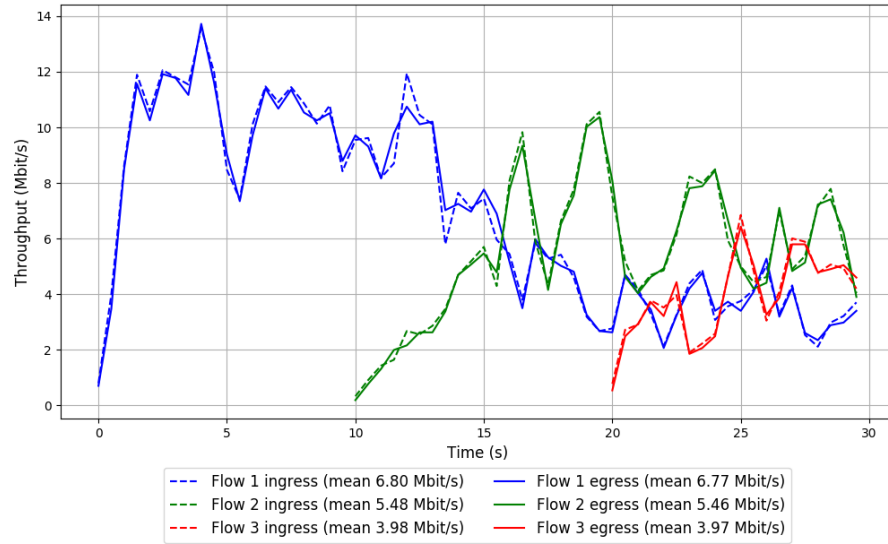


Run 2: Statistics of LEDBAT

Start at: 2018-01-10 15:09:32
End at: 2018-01-10 15:10:02
Local clock offset: -1.271 ms
Remote clock offset: -4.497 ms

Below is generated by plot.py at 2018-01-10 16:34:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.69 Mbit/s
95th percentile per-packet one-way delay: 109.736 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 6.77 Mbit/s
95th percentile per-packet one-way delay: 114.751 ms
Loss rate: 0.57%
-- Flow 2:
Average throughput: 5.46 Mbit/s
95th percentile per-packet one-way delay: 105.029 ms
Loss rate: 0.89%
-- Flow 3:
Average throughput: 3.97 Mbit/s
95th percentile per-packet one-way delay: 98.702 ms
Loss rate: 1.01%

Run 2: Report of LEDBAT — Data Link

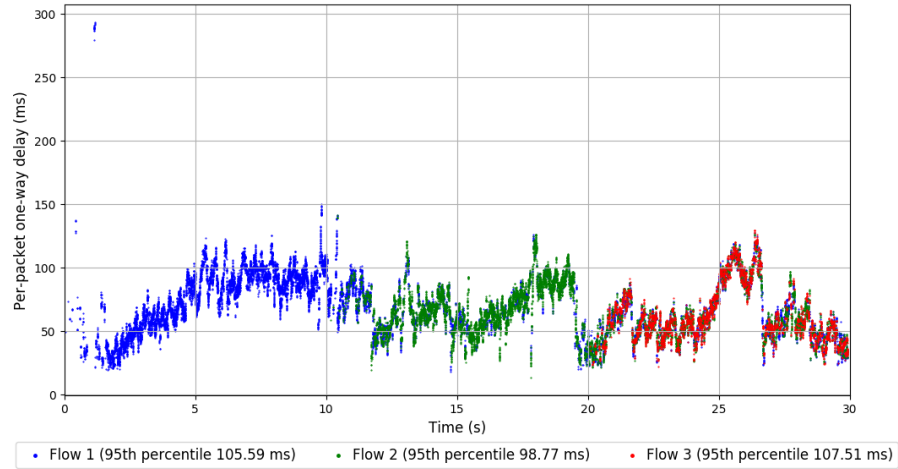
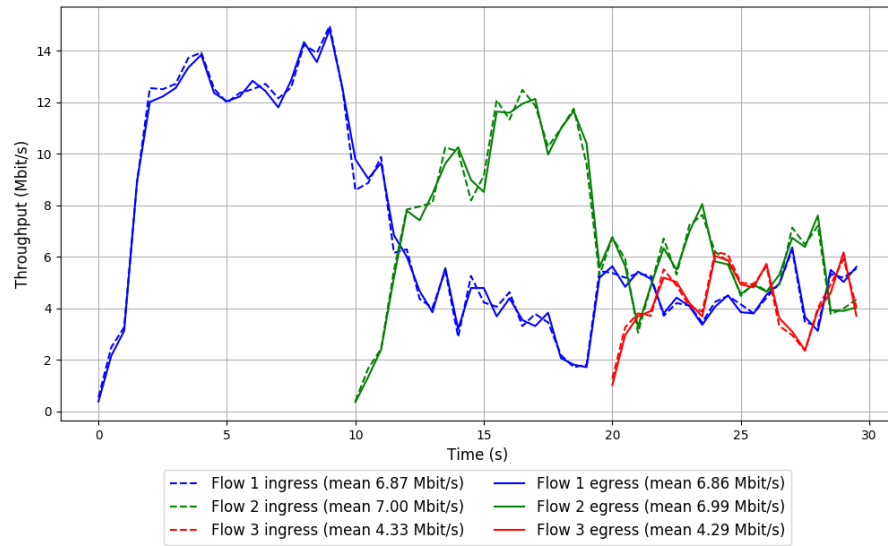


Run 3: Statistics of LEDBAT

Start at: 2018-01-10 15:27:24
End at: 2018-01-10 15:27:54
Local clock offset: -1.267 ms
Remote clock offset: -4.759 ms

Below is generated by plot.py at 2018-01-10 16:34:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 12.90 Mbit/s
95th percentile per-packet one-way delay: 104.278 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 6.86 Mbit/s
95th percentile per-packet one-way delay: 105.587 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 6.99 Mbit/s
95th percentile per-packet one-way delay: 98.765 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 4.29 Mbit/s
95th percentile per-packet one-way delay: 107.514 ms
Loss rate: 1.48%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC

Start at: 2018-01-10 15:02:21

End at: 2018-01-10 15:02:51

Local clock offset: -1.467 ms

Remote clock offset: -4.44 ms

Below is generated by plot.py at 2018-01-10 16:34:53

Datalink statistics

-- Total of 3 flows:

Average throughput: 10.14 Mbit/s

95th percentile per-packet one-way delay: 322.341 ms

Loss rate: 9.30%

-- Flow 1:

Average throughput: 8.27 Mbit/s

95th percentile per-packet one-way delay: 317.462 ms

Loss rate: 7.63%

-- Flow 2:

Average throughput: 1.98 Mbit/s

95th percentile per-packet one-way delay: 323.042 ms

Loss rate: 10.55%

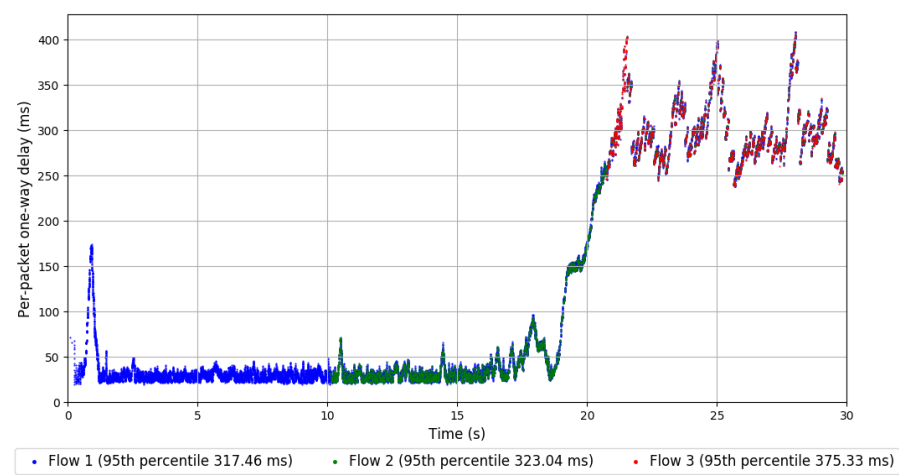
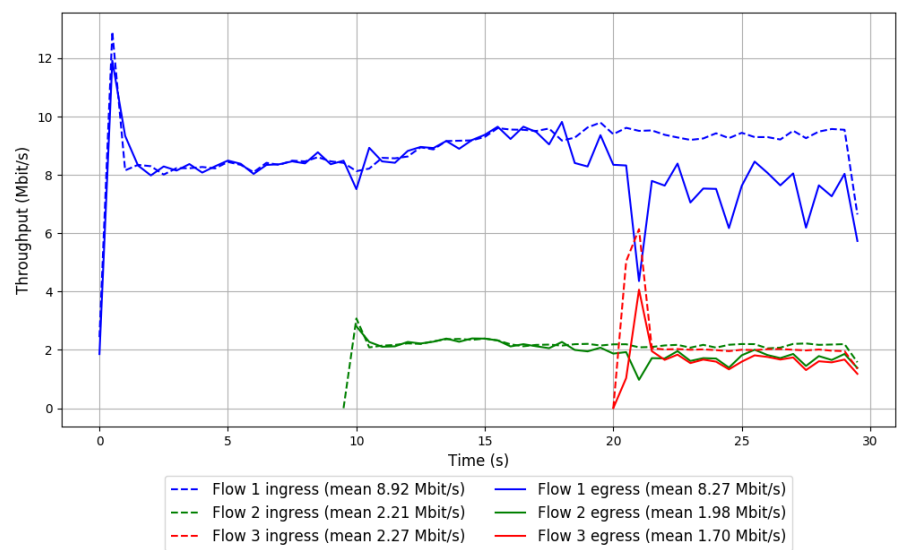
-- Flow 3:

Average throughput: 1.70 Mbit/s

95th percentile per-packet one-way delay: 375.333 ms

Loss rate: 26.85%

Run 1: Report of PCC — Data Link

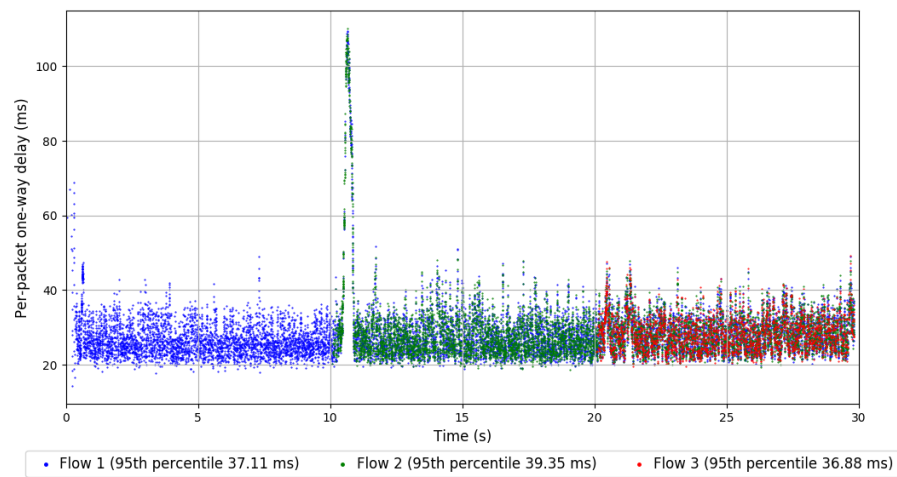
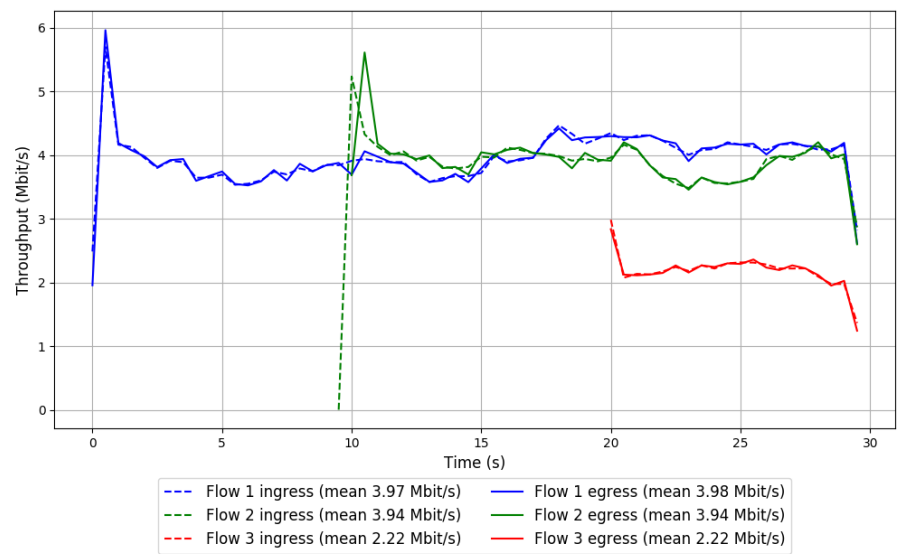


Run 2: Statistics of PCC

Start at: 2018-01-10 15:20:14
End at: 2018-01-10 15:20:44
Local clock offset: -1.355 ms
Remote clock offset: -4.507 ms

Below is generated by plot.py at 2018-01-10 16:34:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 7.33 Mbit/s
95th percentile per-packet one-way delay: 37.949 ms
Loss rate: 0.24%
-- Flow 1:
Average throughput: 3.98 Mbit/s
95th percentile per-packet one-way delay: 37.108 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 3.94 Mbit/s
95th percentile per-packet one-way delay: 39.352 ms
Loss rate: 0.28%
-- Flow 3:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 36.882 ms
Loss rate: 0.45%

Run 2: Report of PCC — Data Link

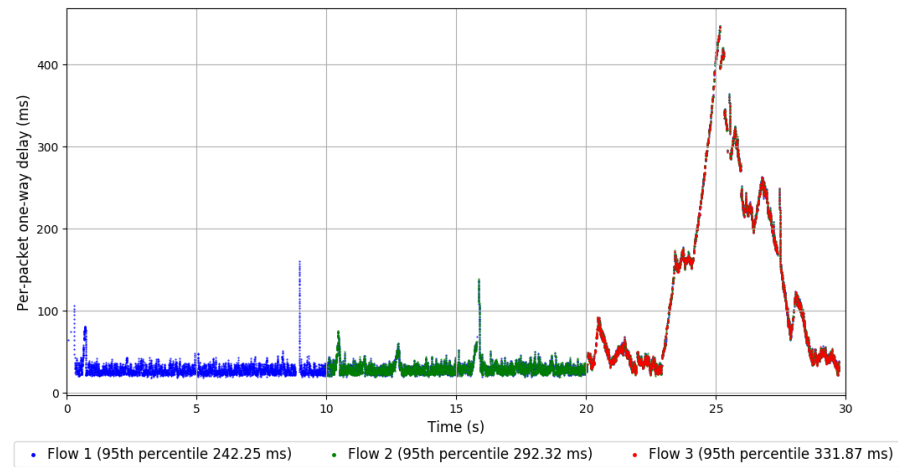
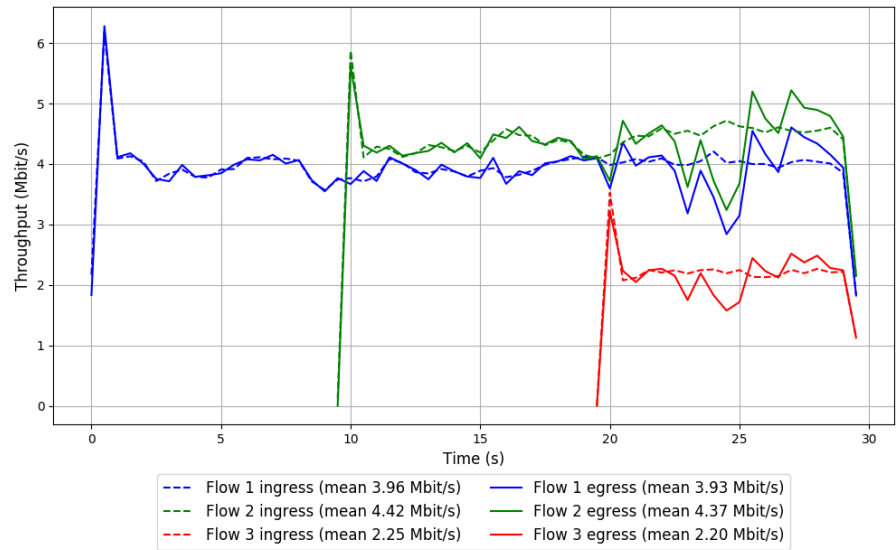


Run 3: Statistics of PCC

Start at: 2018-01-10 15:38:05
End at: 2018-01-10 15:38:35
Local clock offset: -1.29 ms
Remote clock offset: -4.686 ms

Below is generated by plot.py at 2018-01-10 16:34:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 7.57 Mbit/s
95th percentile per-packet one-way delay: 283.409 ms
Loss rate: 1.25%
-- Flow 1:
Average throughput: 3.93 Mbit/s
95th percentile per-packet one-way delay: 242.249 ms
Loss rate: 0.89%
-- Flow 2:
Average throughput: 4.37 Mbit/s
95th percentile per-packet one-way delay: 292.317 ms
Loss rate: 1.38%
-- Flow 3:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 331.873 ms
Loss rate: 2.64%

Run 3: Report of PCC — Data Link

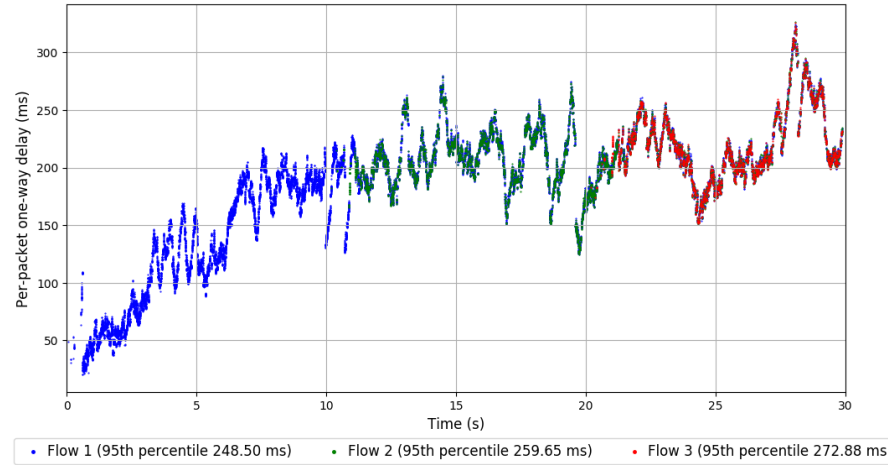
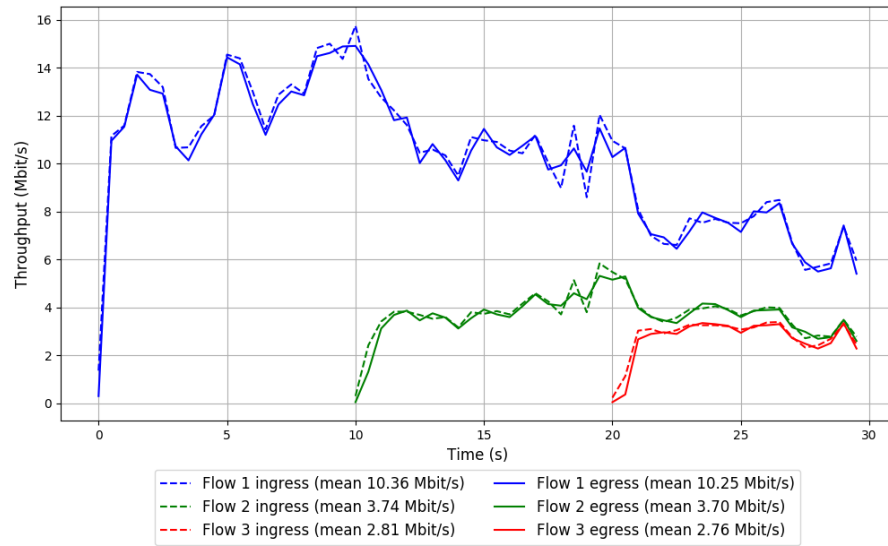


Run 1: Statistics of QUIC Cubic

Start at: 2018-01-10 14:57:36
End at: 2018-01-10 14:58:06
Local clock offset: -1.424 ms
Remote clock offset: -4.534 ms

Below is generated by plot.py at 2018-01-10 16:35:02
Datalink statistics
-- Total of 3 flows:
Average throughput: 13.58 Mbit/s
95th percentile per-packet one-way delay: 253.679 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 10.25 Mbit/s
95th percentile per-packet one-way delay: 248.498 ms
Loss rate: 1.28%
-- Flow 2:
Average throughput: 3.70 Mbit/s
95th percentile per-packet one-way delay: 259.650 ms
Loss rate: 2.23%
-- Flow 3:
Average throughput: 2.76 Mbit/s
95th percentile per-packet one-way delay: 272.882 ms
Loss rate: 3.88%

Run 1: Report of QUIC Cubic — Data Link

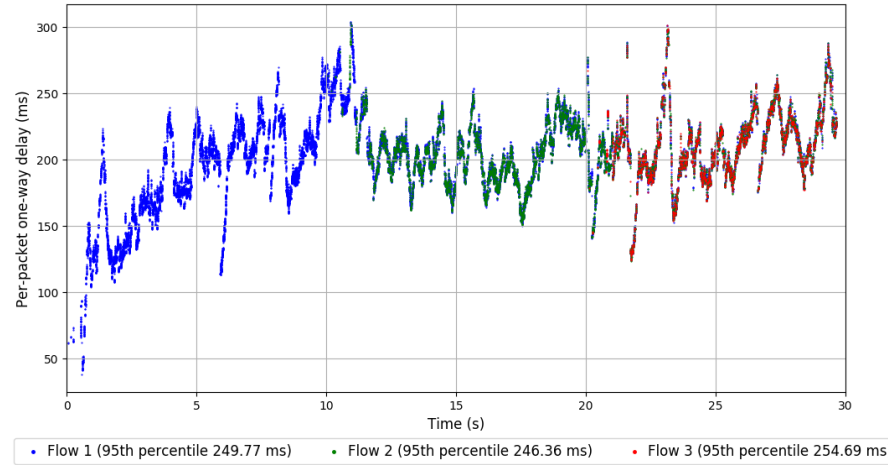
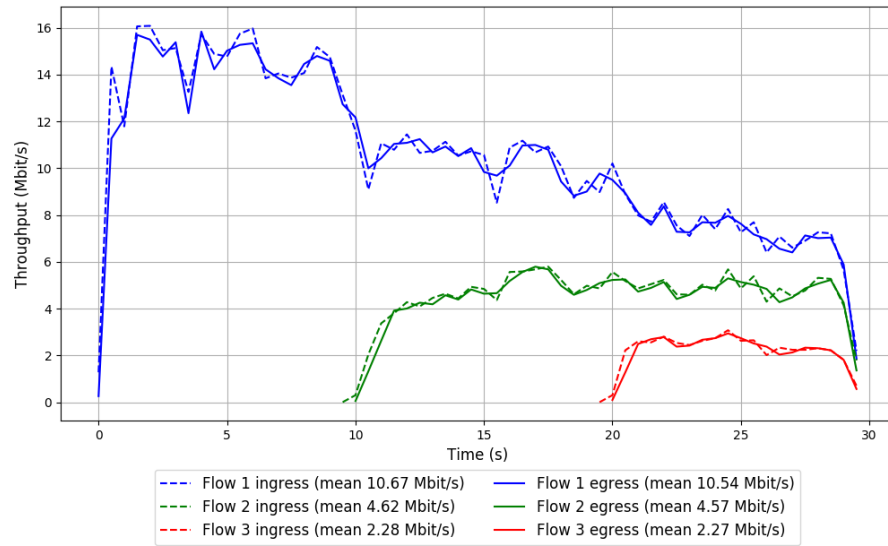


Run 2: Statistics of QUIC Cubic

Start at: 2018-01-10 15:15:28
End at: 2018-01-10 15:15:58
Local clock offset: -1.248 ms
Remote clock offset: -4.743 ms

Below is generated by plot.py at 2018-01-10 16:35:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 14.30 Mbit/s
95th percentile per-packet one-way delay: 249.241 ms
Loss rate: 1.78%
-- Flow 1:
Average throughput: 10.54 Mbit/s
95th percentile per-packet one-way delay: 249.769 ms
Loss rate: 1.44%
-- Flow 2:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 246.364 ms
Loss rate: 2.55%
-- Flow 3:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 254.686 ms
Loss rate: 3.42%

Run 2: Report of QUIC Cubic — Data Link

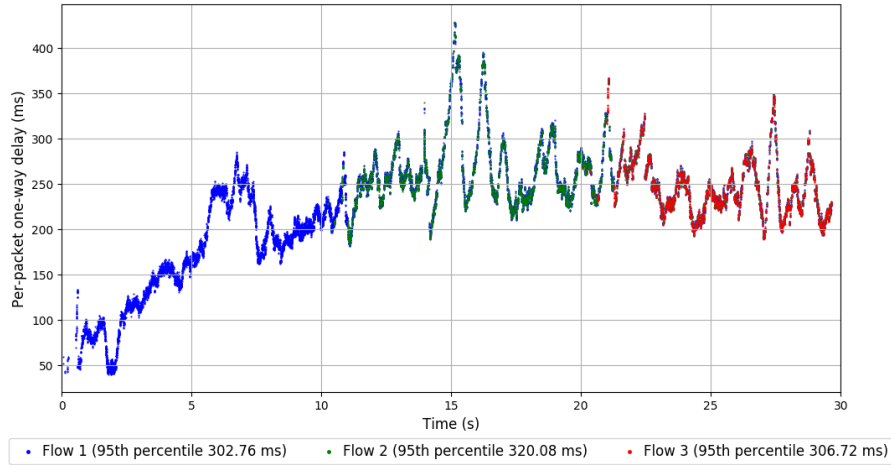
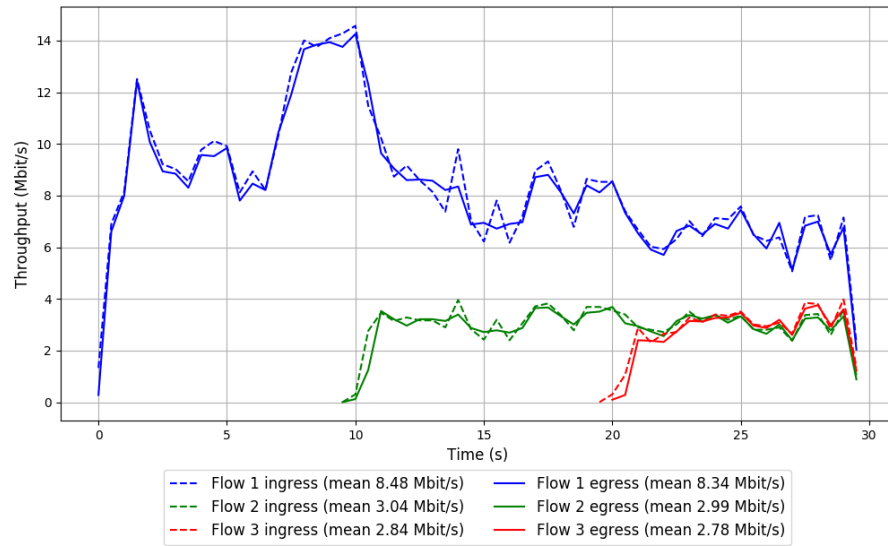


Run 3: Statistics of QUIC Cubic

Start at: 2018-01-10 15:33:20
End at: 2018-01-10 15:33:50
Local clock offset: -1.329 ms
Remote clock offset: -4.893 ms

Below is generated by plot.py at 2018-01-10 16:35:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.23 Mbit/s
95th percentile per-packet one-way delay: 305.775 ms
Loss rate: 2.26%
-- Flow 1:
Average throughput: 8.34 Mbit/s
95th percentile per-packet one-way delay: 302.758 ms
Loss rate: 1.83%
-- Flow 2:
Average throughput: 2.99 Mbit/s
95th percentile per-packet one-way delay: 320.076 ms
Loss rate: 2.83%
-- Flow 3:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 306.717 ms
Loss rate: 4.92%

Run 3: Report of QUIC Cubic — Data Link

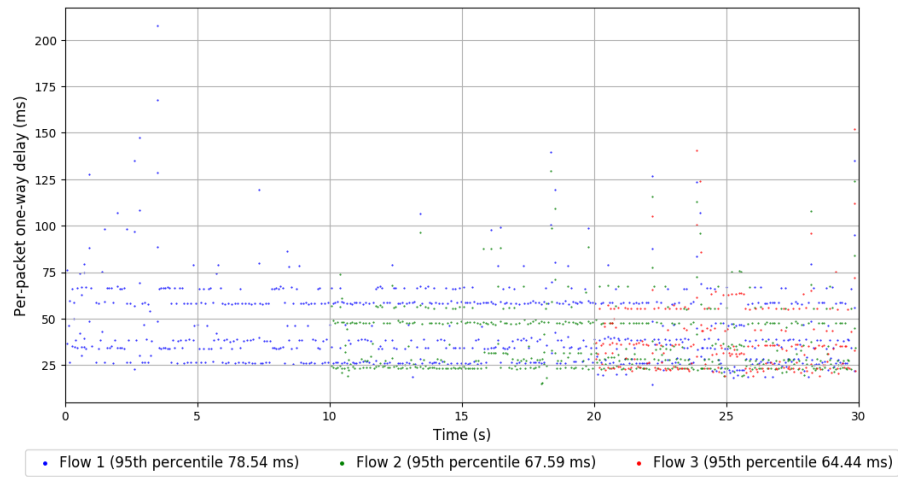
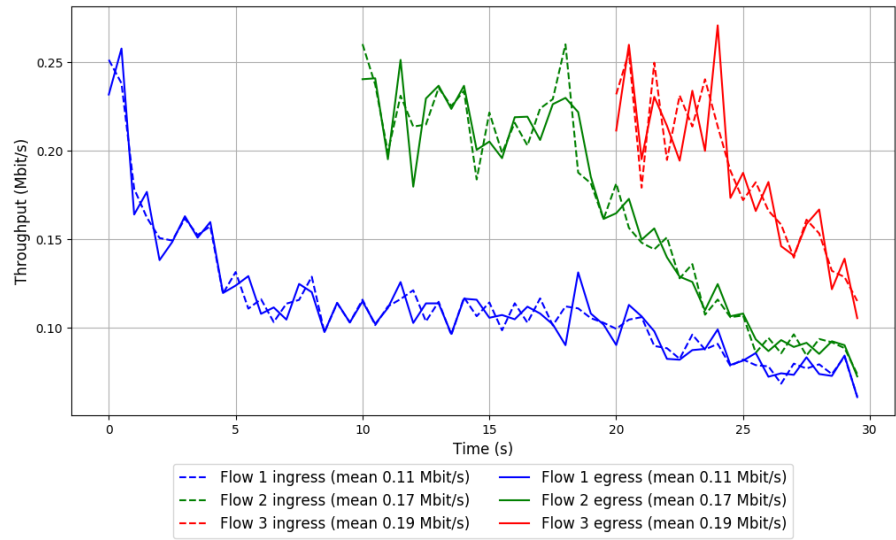


```
Run 1: Statistics of SCReAM

Start at: 2018-01-10 14:52:51
End at: 2018-01-10 14:53:21
Local clock offset: -1.599 ms
Remote clock offset: -4.471 ms

# Below is generated by plot.py at 2018-01-10 16:35:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 72.418 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 78.536 ms
Loss rate: 0.09%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 67.589 ms
Loss rate: 0.11%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 64.444 ms
Loss rate: 0.26%
```

Run 1: Report of SReAM — Data Link

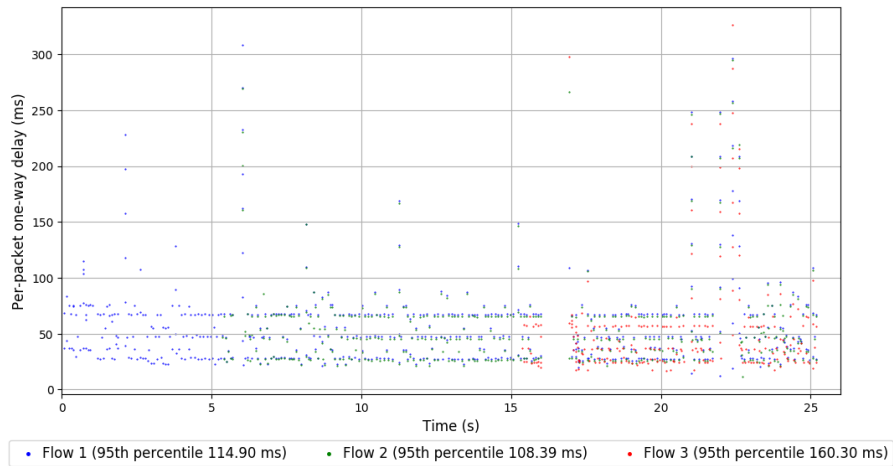
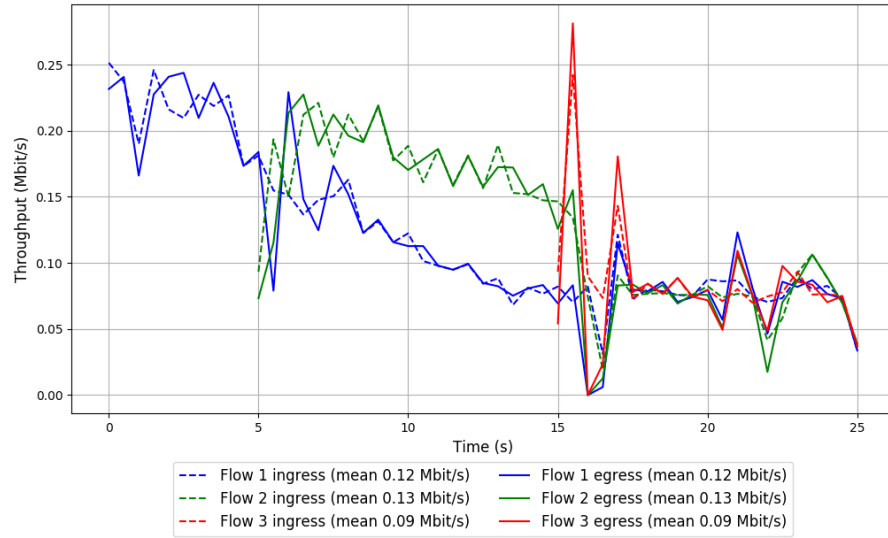


Run 2: Statistics of SCReAM

Start at: 2018-01-10 15:10:43
End at: 2018-01-10 15:11:13
Local clock offset: -1.272 ms
Remote clock offset: -4.643 ms

Below is generated by plot.py at 2018-01-10 16:35:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 127.470 ms
Loss rate: 2.57%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 114.903 ms
Loss rate: 1.93%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 108.394 ms
Loss rate: 2.29%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 160.303 ms
Loss rate: 5.50%

Run 2: Report of SReAM — Data Link

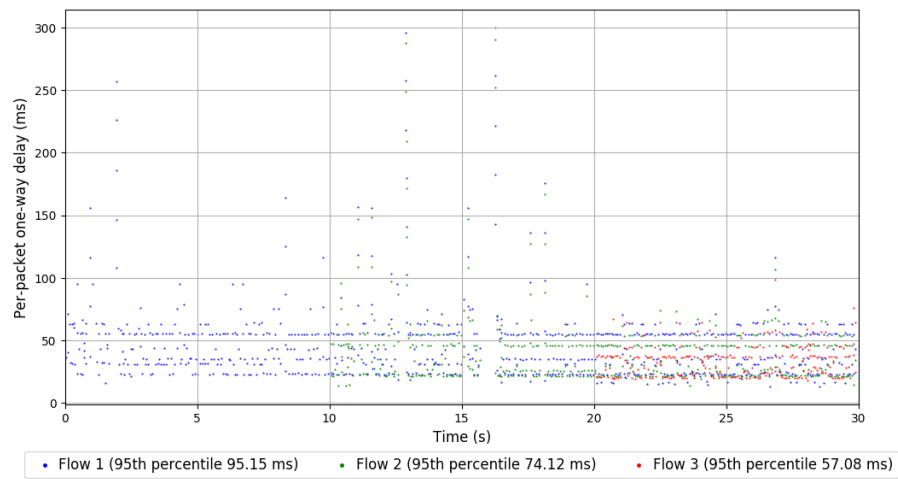
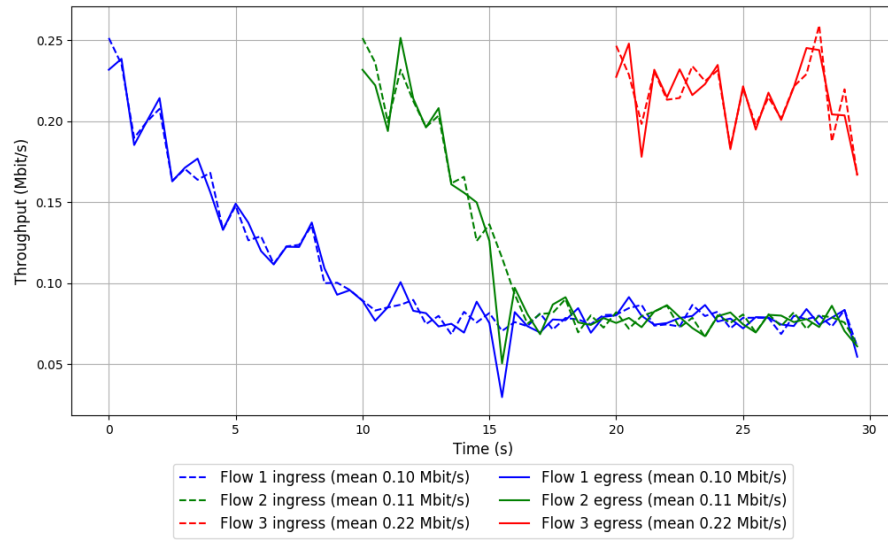


Run 3: Statistics of SCReAM

Start at: 2018-01-10 15:28:35
End at: 2018-01-10 15:29:05
Local clock offset: -1.352 ms
Remote clock offset: -4.683 ms

Below is generated by plot.py at 2018-01-10 16:35:04
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 77.066 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 95.149 ms
Loss rate: 0.76%
-- Flow 2:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 74.124 ms
Loss rate: 1.63%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 57.080 ms
Loss rate: 0.36%

Run 3: Report of SReAM — Data Link

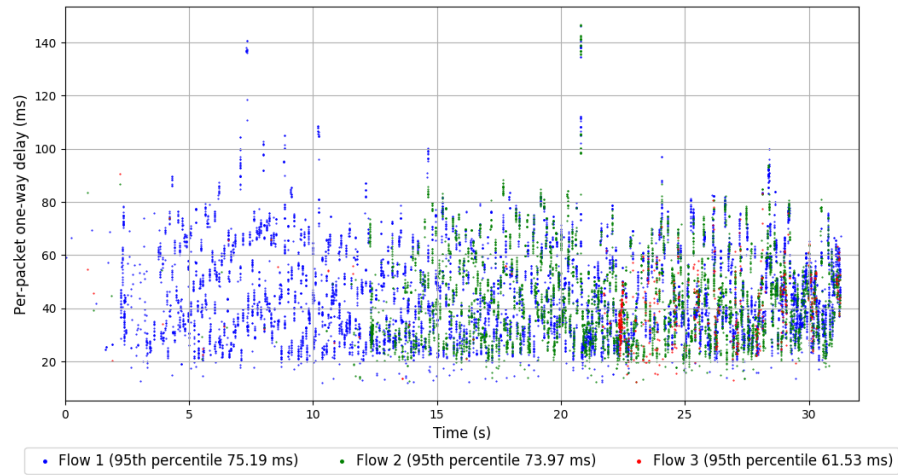
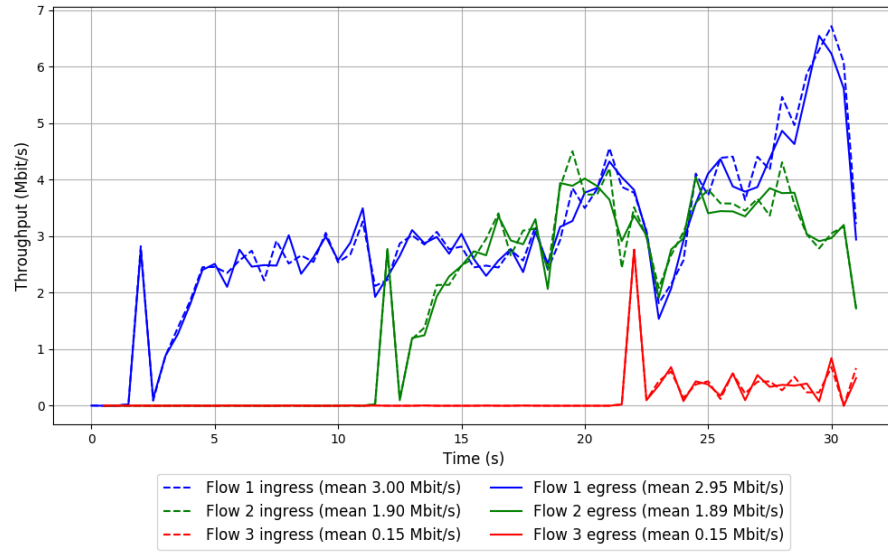


Run 1: Statistics of WebRTC media

Start at: 2018-01-10 14:56:25
End at: 2018-01-10 14:56:55
Local clock offset: -1.542 ms
Remote clock offset: -4.528 ms

Below is generated by plot.py at 2018-01-10 16:35:05
Datalink statistics
-- Total of 3 flows:
Average throughput: 4.93 Mbit/s
95th percentile per-packet one-way delay: 74.579 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 2.95 Mbit/s
95th percentile per-packet one-way delay: 75.188 ms
Loss rate: 1.85%
-- Flow 2:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 73.965 ms
Loss rate: 1.05%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 61.529 ms
Loss rate: 1.90%

Run 1: Report of WebRTC media — Data Link

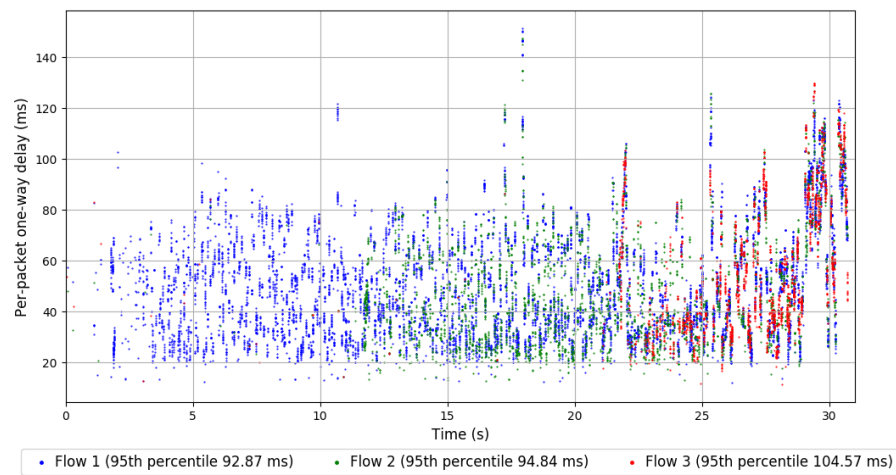
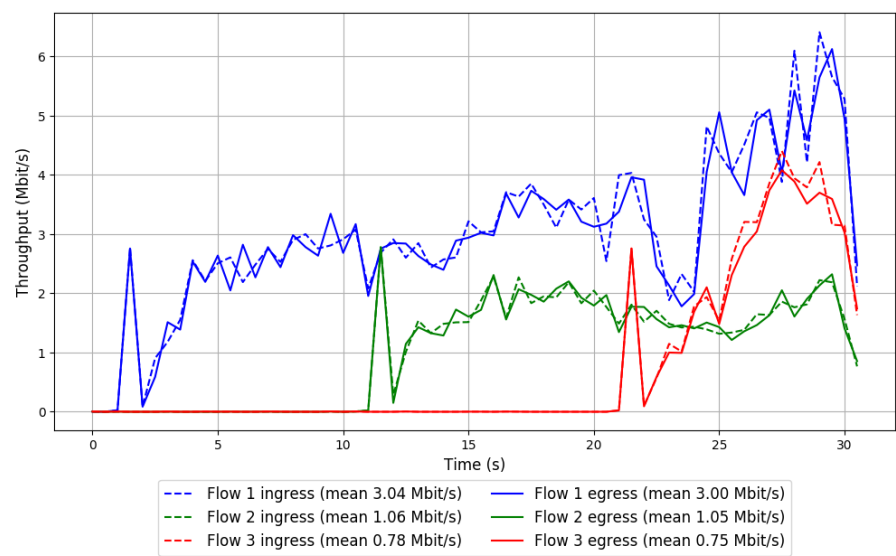


Run 2: Statistics of WebRTC media

Start at: 2018-01-10 15:14:17
End at: 2018-01-10 15:14:47
Local clock offset: -1.345 ms
Remote clock offset: -4.699 ms

Below is generated by plot.py at 2018-01-10 16:35:05
Datalink statistics
-- Total of 3 flows:
Average throughput: 4.81 Mbit/s
95th percentile per-packet one-way delay: 95.806 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 3.00 Mbit/s
95th percentile per-packet one-way delay: 92.867 ms
Loss rate: 1.48%
-- Flow 2:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 94.845 ms
Loss rate: 0.36%
-- Flow 3:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 104.566 ms
Loss rate: 3.88%

Run 2: Report of WebRTC media — Data Link

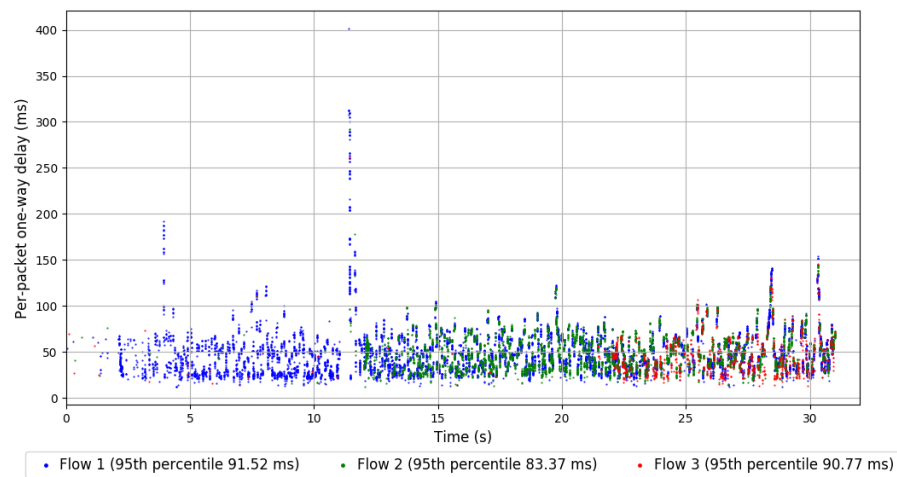
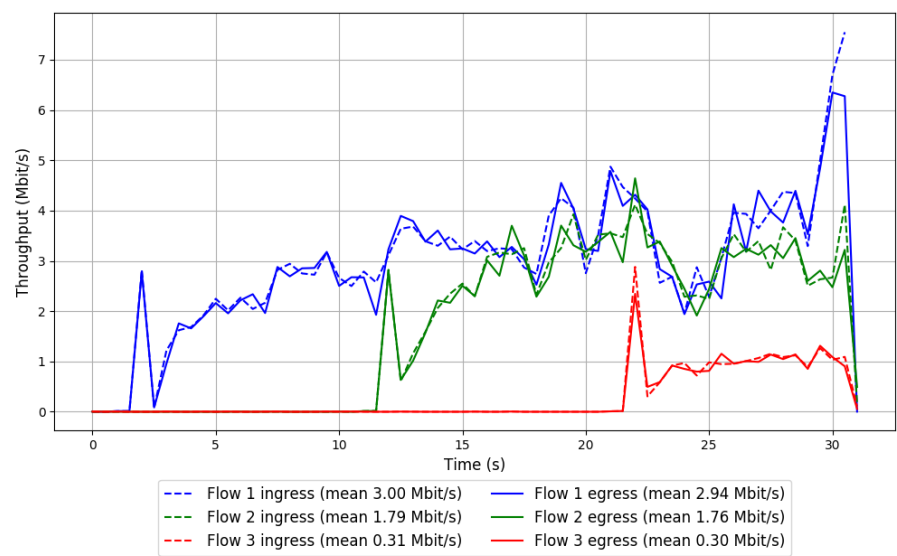


Run 3: Statistics of WebRTC media

Start at: 2018-01-10 15:32:09
End at: 2018-01-10 15:32:39
Local clock offset: -1.243 ms
Remote clock offset: -4.921 ms

Below is generated by plot.py at 2018-01-10 16:35:08
Datalink statistics
-- Total of 3 flows:
Average throughput: 4.98 Mbit/s
95th percentile per-packet one-way delay: 88.796 ms
Loss rate: 2.06%
-- Flow 1:
Average throughput: 2.94 Mbit/s
95th percentile per-packet one-way delay: 91.517 ms
Loss rate: 2.00%
-- Flow 2:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 83.374 ms
Loss rate: 1.96%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 90.771 ms
Loss rate: 3.29%

Run 3: Report of WebRTC media — Data Link



Run 1: Statistics of Sprout

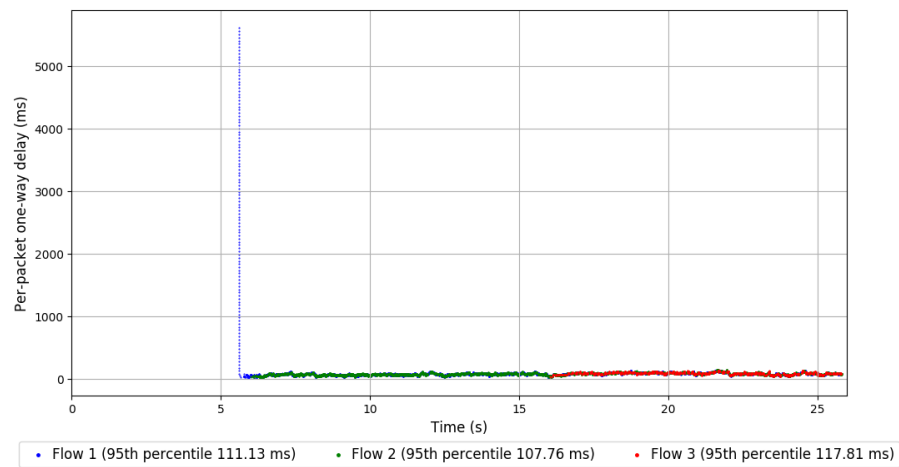
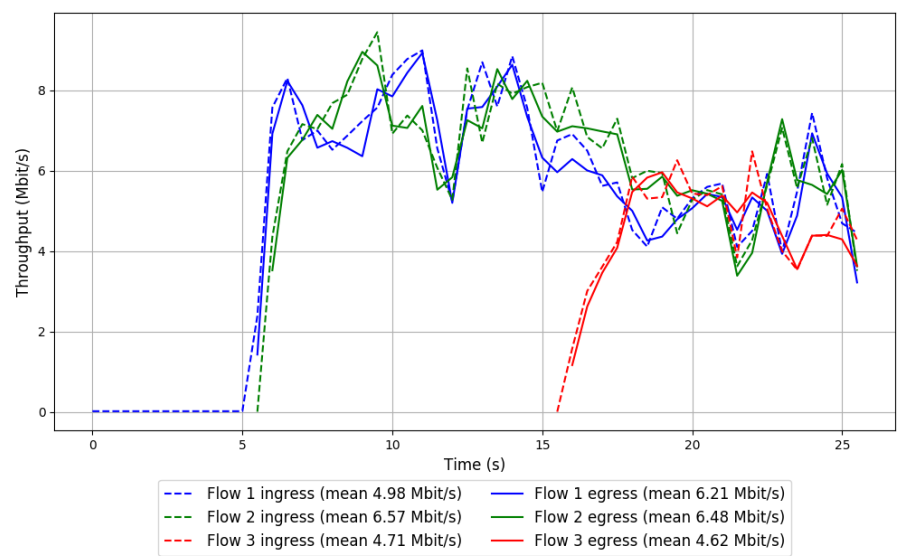
Start at: 2018-01-10 14:54:02

End at: 2018-01-10 14:54:32

Local clock offset: -1.493 ms

Remote clock offset: -4.481 ms

Run 1: Report of Sprout — Data Link

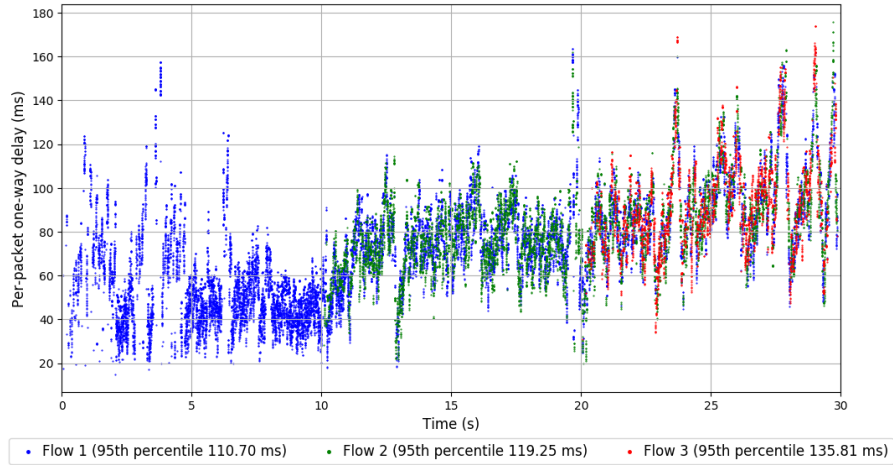
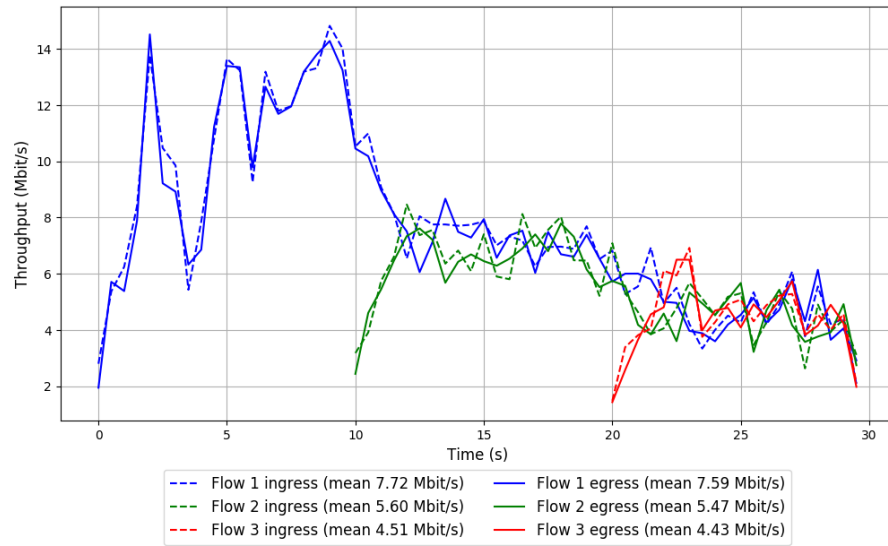


Run 2: Statistics of Sprout

Start at: 2018-01-10 15:11:54
End at: 2018-01-10 15:12:24
Local clock offset: -1.253 ms
Remote clock offset: -4.627 ms

```
# Below is generated by plot.py at 2018-01-10 16:35:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.68 Mbit/s
95th percentile per-packet one-way delay: 116.544 ms
Loss rate: 2.04%
-- Flow 1:
Average throughput: 7.59 Mbit/s
95th percentile per-packet one-way delay: 110.696 ms
Loss rate: 1.79%
-- Flow 2:
Average throughput: 5.47 Mbit/s
95th percentile per-packet one-way delay: 119.251 ms
Loss rate: 2.58%
-- Flow 3:
Average throughput: 4.43 Mbit/s
95th percentile per-packet one-way delay: 135.808 ms
Loss rate: 1.95%
```

Run 2: Report of Sprout — Data Link

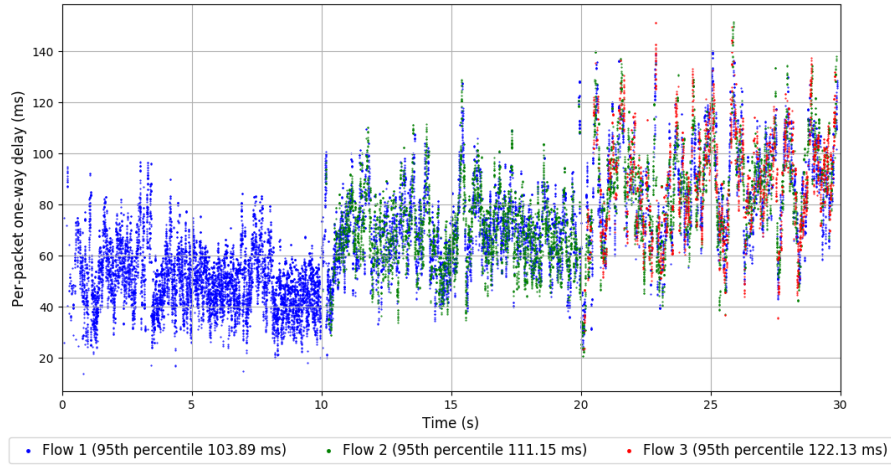
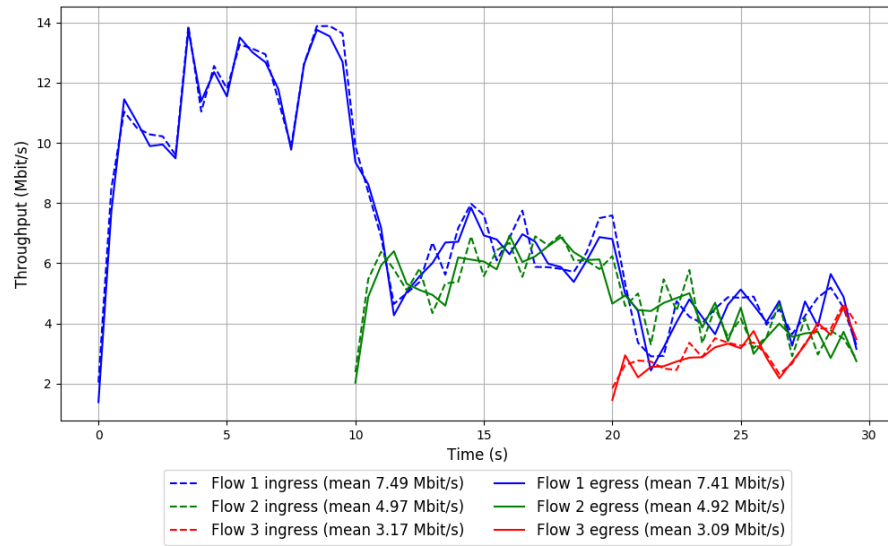


Run 3: Statistics of Sprout

Start at: 2018-01-10 15:29:46
End at: 2018-01-10 15:30:16
Local clock offset: -1.355 ms
Remote clock offset: -4.798 ms

```
# Below is generated by plot.py at 2018-01-10 16:35:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.69 Mbit/s
95th percentile per-packet one-way delay: 109.780 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 7.41 Mbit/s
95th percentile per-packet one-way delay: 103.888 ms
Loss rate: 1.35%
-- Flow 2:
Average throughput: 4.92 Mbit/s
95th percentile per-packet one-way delay: 111.154 ms
Loss rate: 1.34%
-- Flow 3:
Average throughput: 3.09 Mbit/s
95th percentile per-packet one-way delay: 122.129 ms
Loss rate: 3.03%
```

Run 3: Report of Sprout — Data Link

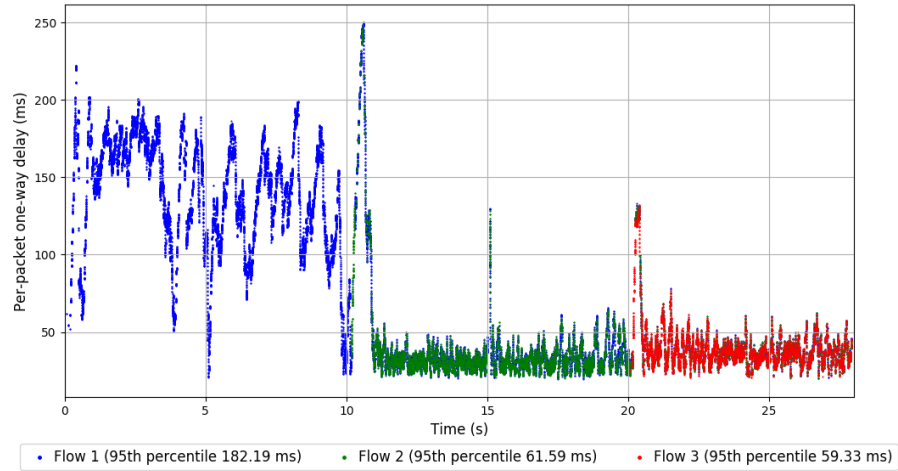
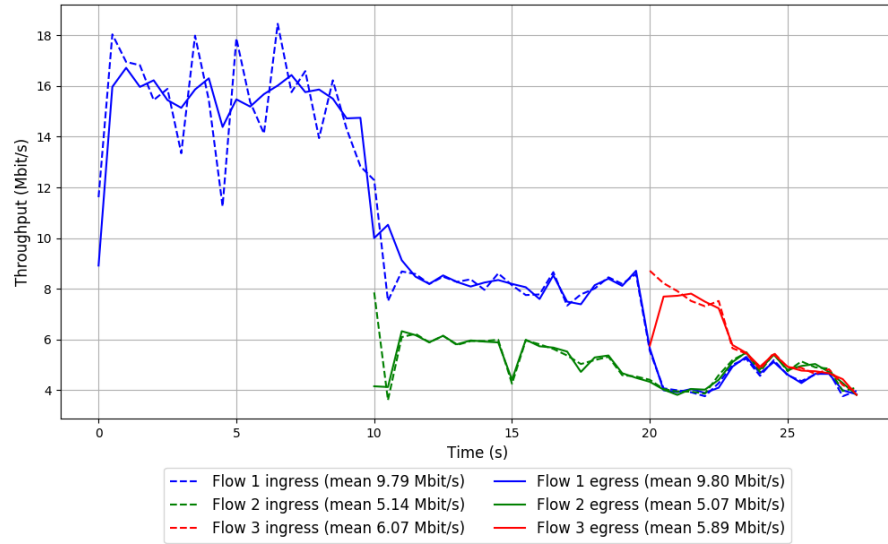


Run 1: Statistics of TaoVA-100x

Start at: 2018-01-10 14:48:04
End at: 2018-01-10 14:48:34
Local clock offset: -1.675 ms
Remote clock offset: -4.619 ms

Below is generated by plot.py at 2018-01-10 16:35:55
Datalink statistics
-- Total of 3 flows:
Average throughput: 14.71 Mbit/s
95th percentile per-packet one-way delay: 178.363 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 9.80 Mbit/s
95th percentile per-packet one-way delay: 182.188 ms
Loss rate: 0.21%
-- Flow 2:
Average throughput: 5.07 Mbit/s
95th percentile per-packet one-way delay: 61.590 ms
Loss rate: 1.71%
-- Flow 3:
Average throughput: 5.89 Mbit/s
95th percentile per-packet one-way delay: 59.332 ms
Loss rate: 3.44%

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

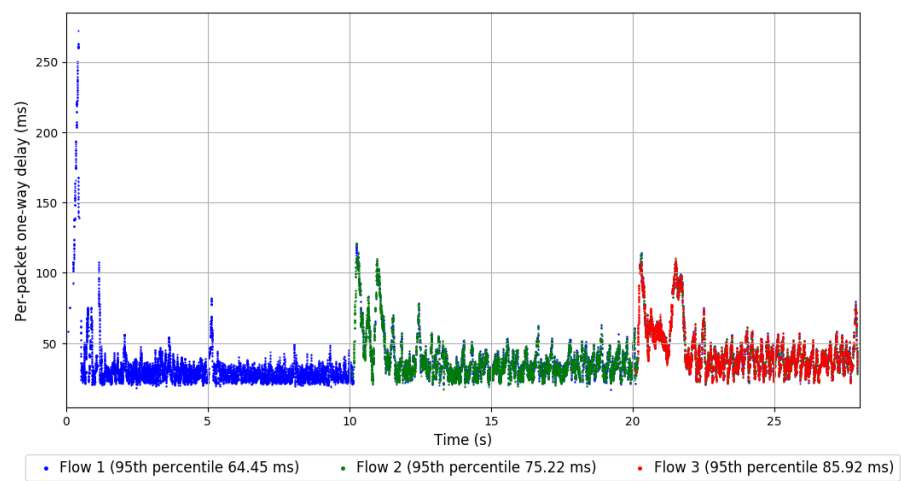
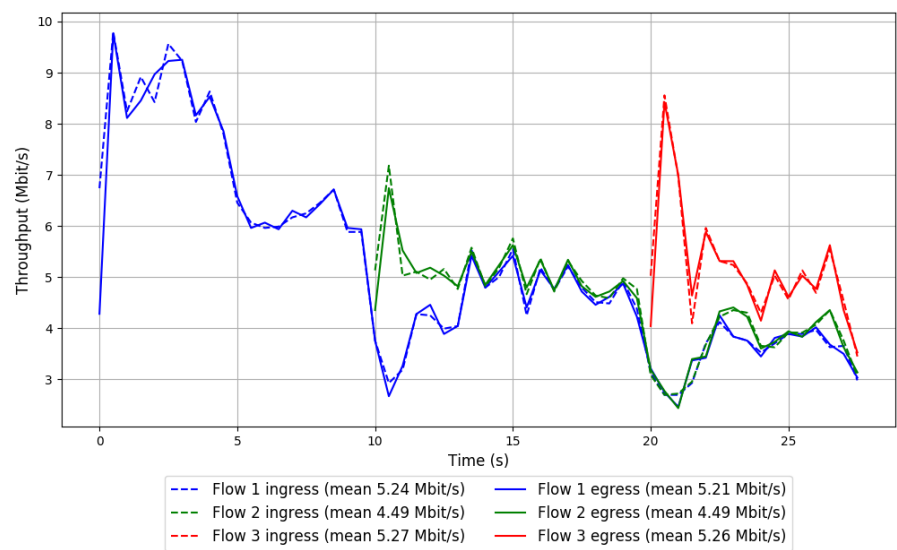


Run 2: Statistics of TaoVA-100x

Start at: 2018-01-10 15:05:57
End at: 2018-01-10 15:06:27
Local clock offset: -1.415 ms
Remote clock offset: -4.476 ms

Below is generated by plot.py at 2018-01-10 16:35:55
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.57 Mbit/s
95th percentile per-packet one-way delay: 71.639 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 5.21 Mbit/s
95th percentile per-packet one-way delay: 64.452 ms
Loss rate: 0.90%
-- Flow 2:
Average throughput: 4.49 Mbit/s
95th percentile per-packet one-way delay: 75.223 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 5.26 Mbit/s
95th percentile per-packet one-way delay: 85.921 ms
Loss rate: 0.75%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-01-10 15:23:49

End at: 2018-01-10 15:24:19

Local clock offset: -1.25 ms

Remote clock offset: -4.65 ms

Below is generated by plot.py at 2018-01-10 16:35:55

Datalink statistics

-- Total of 3 flows:

Average throughput: 10.24 Mbit/s

95th percentile per-packet one-way delay: 70.320 ms

Loss rate: 1.19%

-- Flow 1:

Average throughput: 4.82 Mbit/s

95th percentile per-packet one-way delay: 87.460 ms

Loss rate: 0.18%

-- Flow 2:

Average throughput: 6.10 Mbit/s

95th percentile per-packet one-way delay: 58.399 ms

Loss rate: 1.40%

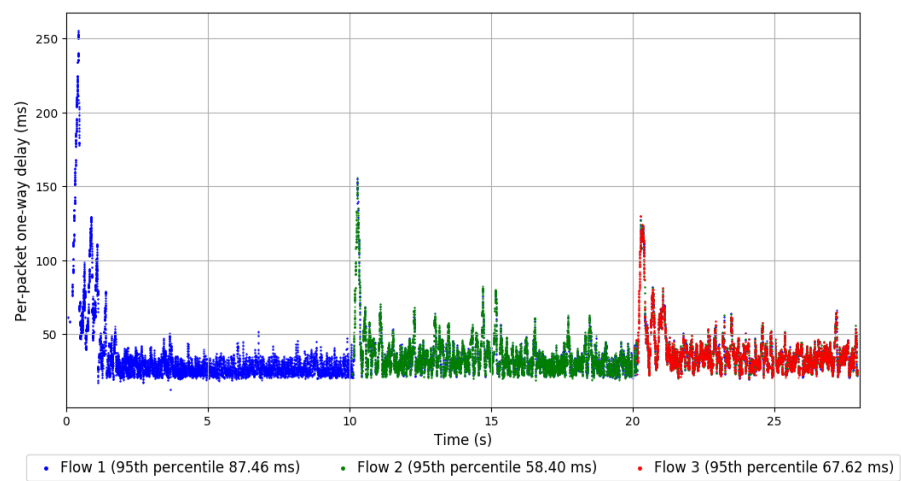
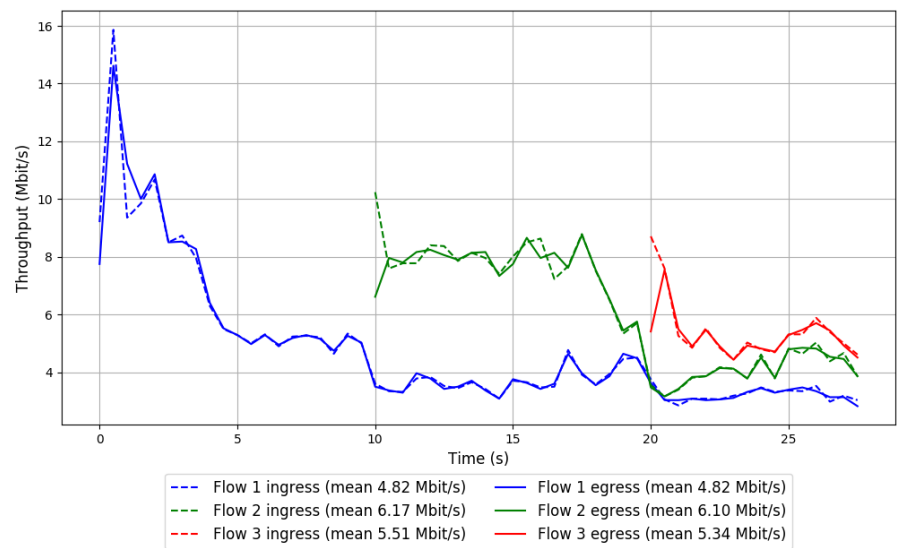
-- Flow 3:

Average throughput: 5.34 Mbit/s

95th percentile per-packet one-way delay: 67.625 ms

Loss rate: 3.78%

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

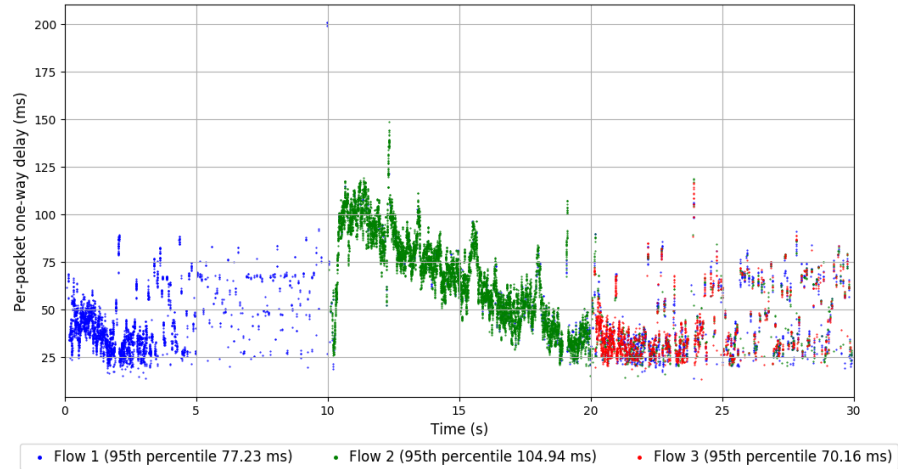
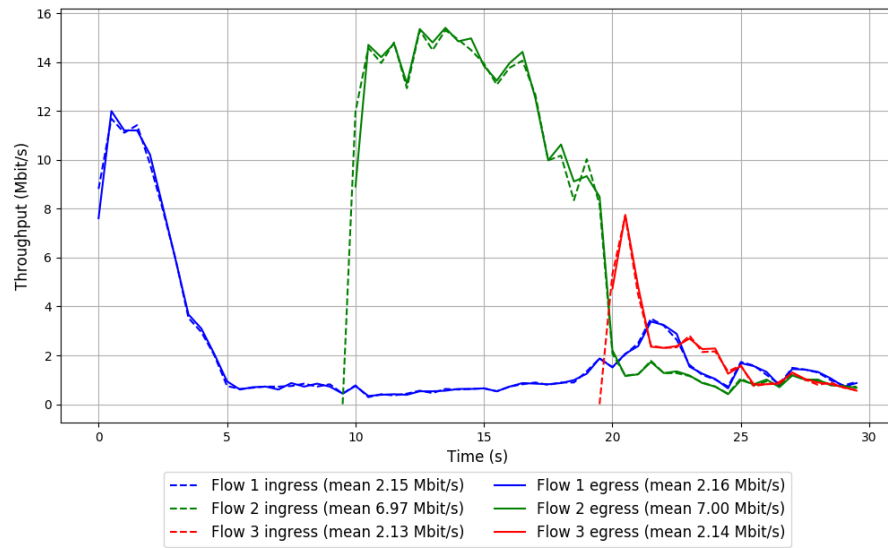


Run 1: Statistics of TCP Vegas

Start at: 2018-01-10 14:58:47
End at: 2018-01-10 14:59:17
Local clock offset: -1.408 ms
Remote clock offset: -4.523 ms

Below is generated by plot.py at 2018-01-10 16:35:55
Datalink statistics
-- Total of 3 flows:
Average throughput: 7.51 Mbit/s
95th percentile per-packet one-way delay: 101.554 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 77.231 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 7.00 Mbit/s
95th percentile per-packet one-way delay: 104.940 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 70.162 ms
Loss rate: 0.34%

Run 1: Report of TCP Vegas — Data Link

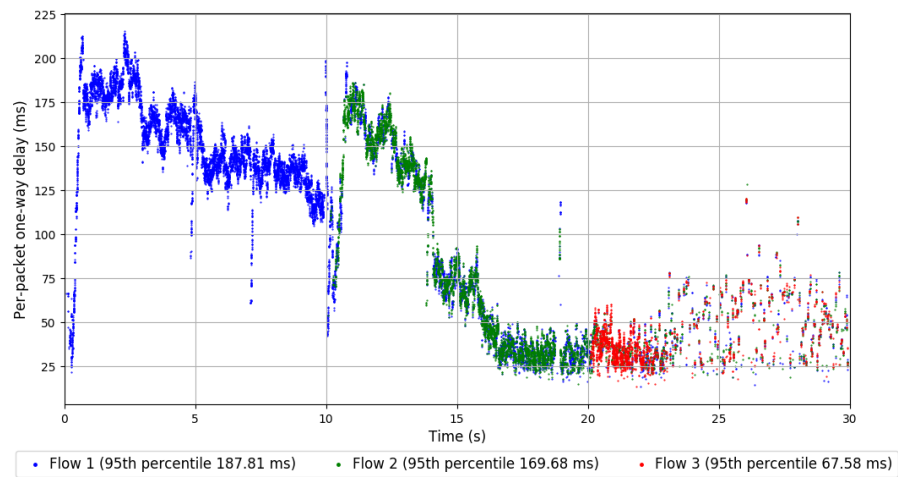
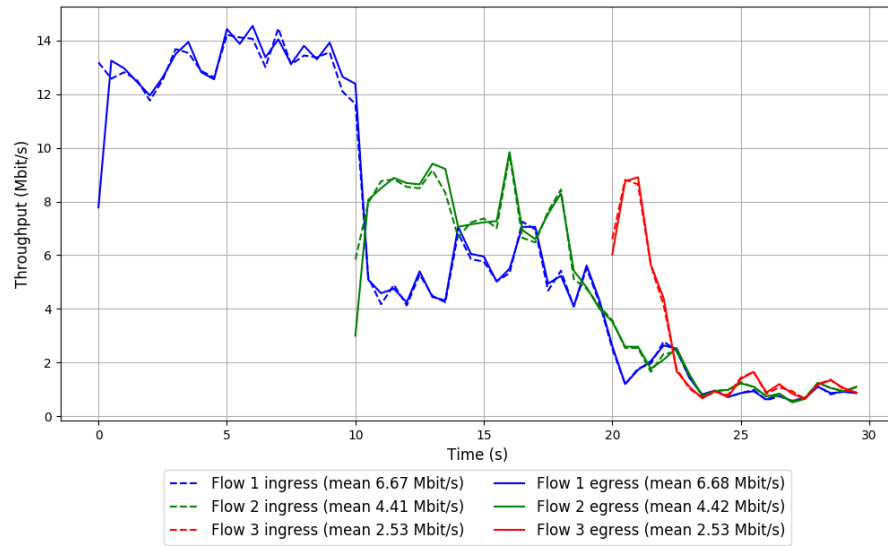


Run 2: Statistics of TCP Vegas

Start at: 2018-01-10 15:16:40
End at: 2018-01-10 15:17:10
Local clock offset: -1.33 ms
Remote clock offset: -4.664 ms

Below is generated by plot.py at 2018-01-10 16:35:55
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.45 Mbit/s
95th percentile per-packet one-way delay: 184.431 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 6.68 Mbit/s
95th percentile per-packet one-way delay: 187.806 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 4.42 Mbit/s
95th percentile per-packet one-way delay: 169.676 ms
Loss rate: 0.25%
-- Flow 3:
Average throughput: 2.53 Mbit/s
95th percentile per-packet one-way delay: 67.577 ms
Loss rate: 0.24%

Run 2: Report of TCP Vegas — Data Link

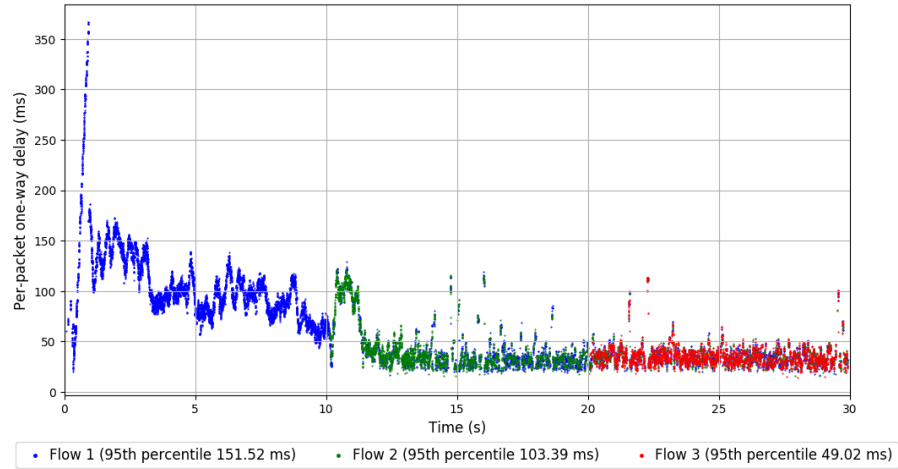
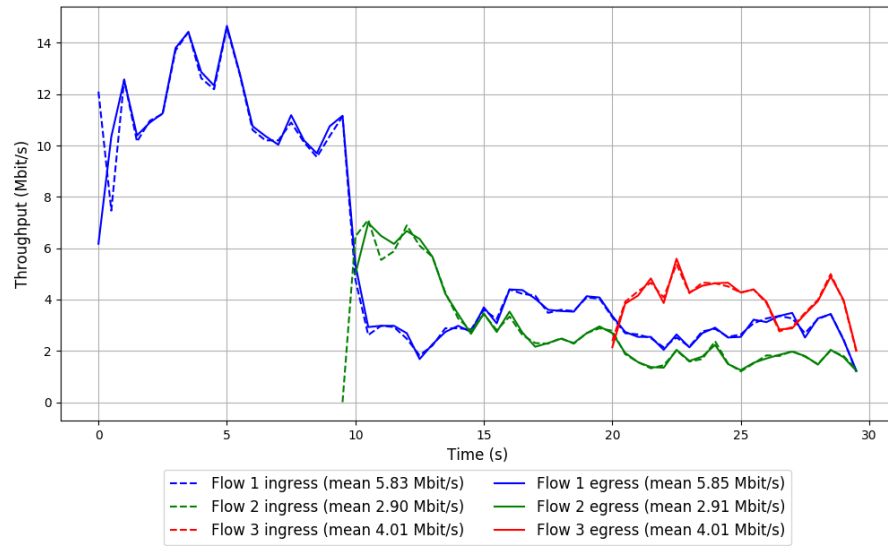


Run 3: Statistics of TCP Vegas

Start at: 2018-01-10 15:34:31
End at: 2018-01-10 15:35:01
Local clock offset: -1.331 ms
Remote clock offset: -4.766 ms

Below is generated by plot.py at 2018-01-10 16:35:55
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.10 Mbit/s
95th percentile per-packet one-way delay: 143.344 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 5.85 Mbit/s
95th percentile per-packet one-way delay: 151.519 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 2.91 Mbit/s
95th percentile per-packet one-way delay: 103.394 ms
Loss rate: 0.29%
-- Flow 3:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 49.019 ms
Loss rate: 0.36%

Run 3: Report of TCP Vegas — Data Link

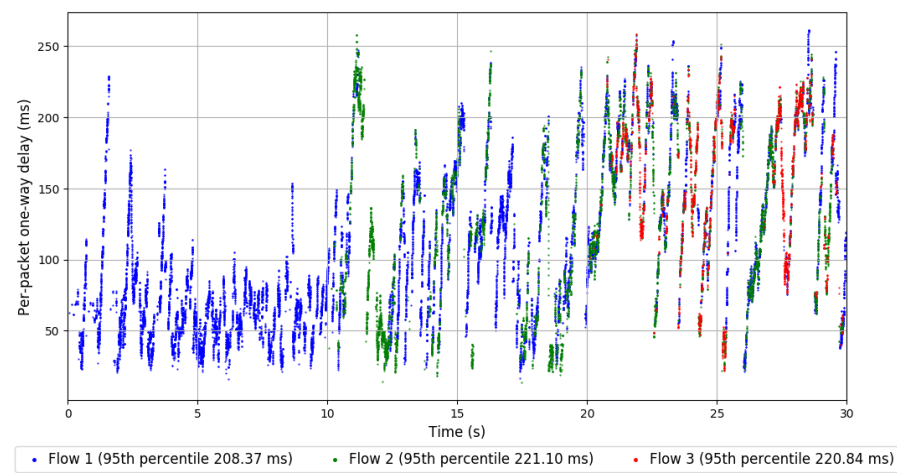
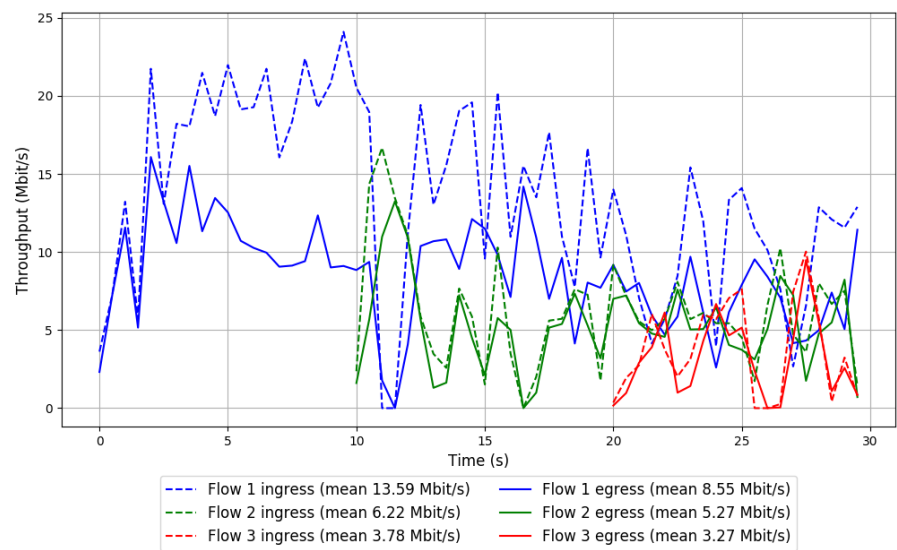


Run 1: Statistics of Verus

Start at: 2018-01-10 14:55:13
End at: 2018-01-10 14:55:43
Local clock offset: -1.542 ms
Remote clock offset: -4.584 ms

Below is generated by plot.py at 2018-01-10 16:35:55
Datalink statistics
-- Total of 3 flows:
Average throughput: 13.11 Mbit/s
95th percentile per-packet one-way delay: 214.580 ms
Loss rate: 30.82%
-- Flow 1:
Average throughput: 8.55 Mbit/s
95th percentile per-packet one-way delay: 208.371 ms
Loss rate: 36.99%
-- Flow 2:
Average throughput: 5.27 Mbit/s
95th percentile per-packet one-way delay: 221.105 ms
Loss rate: 15.49%
-- Flow 3:
Average throughput: 3.27 Mbit/s
95th percentile per-packet one-way delay: 220.843 ms
Loss rate: 14.44%

Run 1: Report of Verus — Data Link

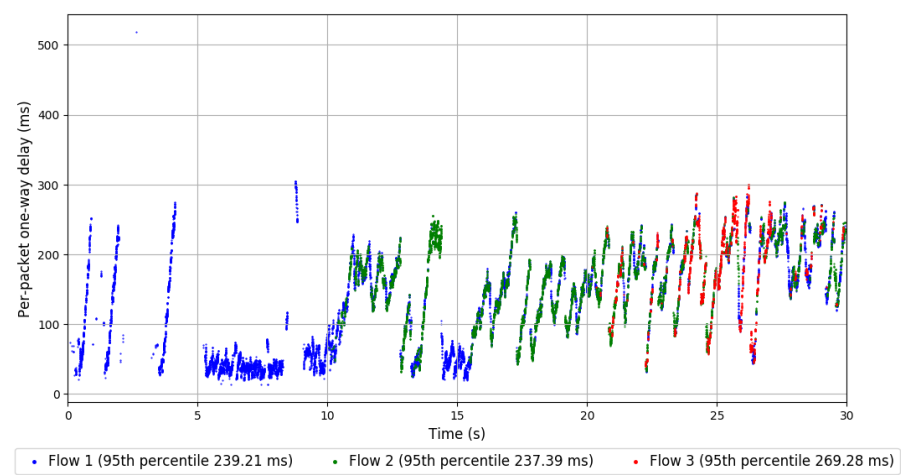
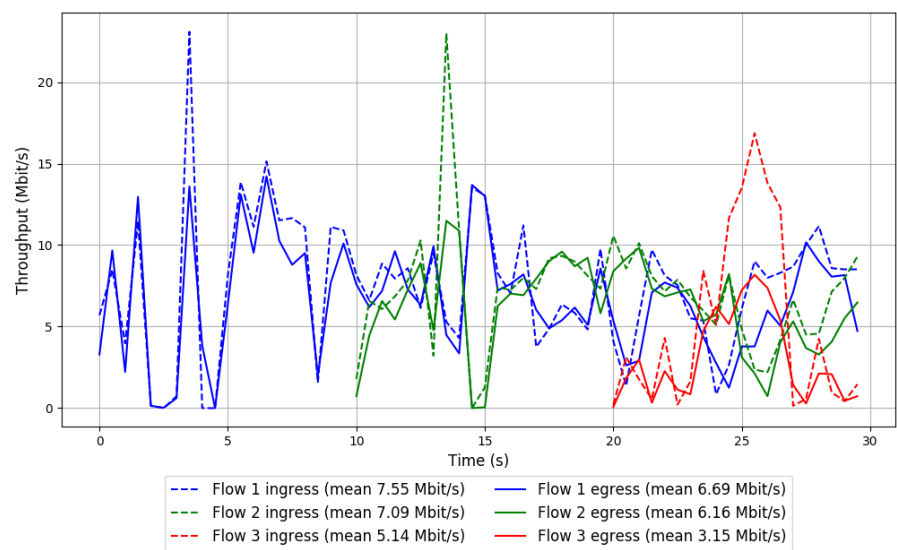


Run 2: Statistics of Verus

Start at: 2018-01-10 15:13:05
End at: 2018-01-10 15:13:35
Local clock offset: -1.233 ms
Remote clock offset: -4.743 ms

Below is generated by plot.py at 2018-01-10 16:35:55
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.81 Mbit/s
95th percentile per-packet one-way delay: 242.598 ms
Loss rate: 15.64%
-- Flow 1:
Average throughput: 6.69 Mbit/s
95th percentile per-packet one-way delay: 239.205 ms
Loss rate: 11.52%
-- Flow 2:
Average throughput: 6.16 Mbit/s
95th percentile per-packet one-way delay: 237.390 ms
Loss rate: 13.49%
-- Flow 3:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 269.283 ms
Loss rate: 39.96%

Run 2: Report of Verus — Data Link

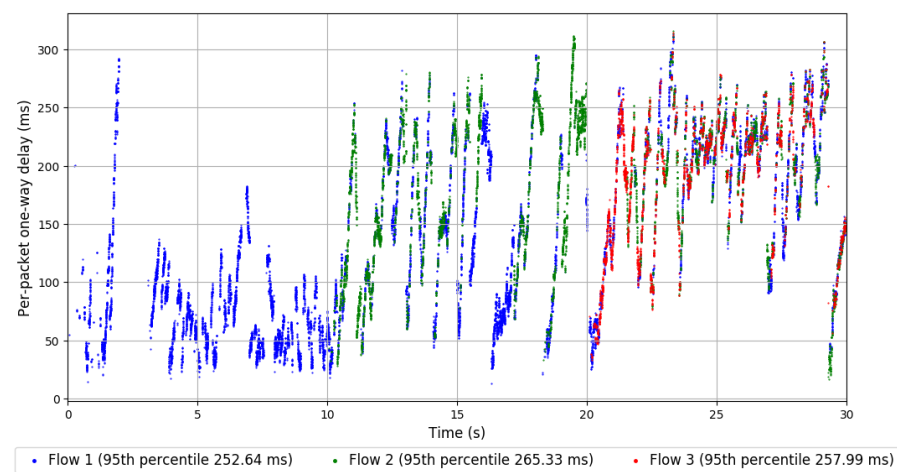
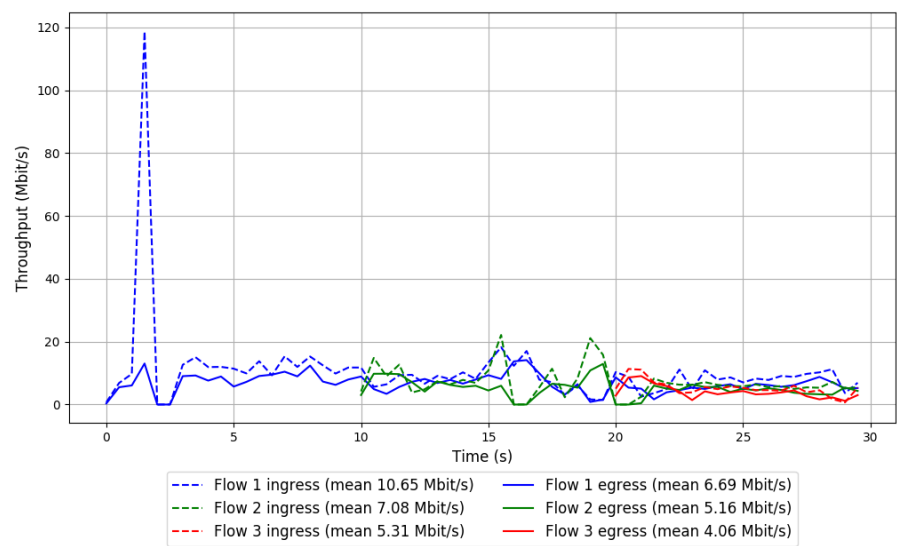


Run 3: Statistics of Verus

Start at: 2018-01-10 15:30:57
End at: 2018-01-10 15:31:27
Local clock offset: -1.269 ms
Remote clock offset: -4.809 ms

Below is generated by plot.py at 2018-01-10 16:35:56
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.47 Mbit/s
95th percentile per-packet one-way delay: 258.758 ms
Loss rate: 33.19%
-- Flow 1:
Average throughput: 6.69 Mbit/s
95th percentile per-packet one-way delay: 252.643 ms
Loss rate: 37.29%
-- Flow 2:
Average throughput: 5.16 Mbit/s
95th percentile per-packet one-way delay: 265.335 ms
Loss rate: 27.27%
-- Flow 3:
Average throughput: 4.06 Mbit/s
95th percentile per-packet one-way delay: 257.990 ms
Loss rate: 24.30%

Run 3: Report of Verus — Data Link



Run 1: Statistics of Copa

Start at: 2018-01-10 15:03:32

End at: 2018-01-10 15:04:02

Local clock offset: -1.447 ms

Remote clock offset: -4.34 ms

Below is generated by plot.py at 2018-01-10 16:36:10

Datalink statistics

-- Total of 3 flows:

Average throughput: 10.78 Mbit/s

95th percentile per-packet one-way delay: 94.514 ms

Loss rate: 0.13%

-- Flow 1:

Average throughput: 7.06 Mbit/s

95th percentile per-packet one-way delay: 89.686 ms

Loss rate: 0.07%

-- Flow 2:

Average throughput: 4.69 Mbit/s

95th percentile per-packet one-way delay: 99.360 ms

Loss rate: 0.14%

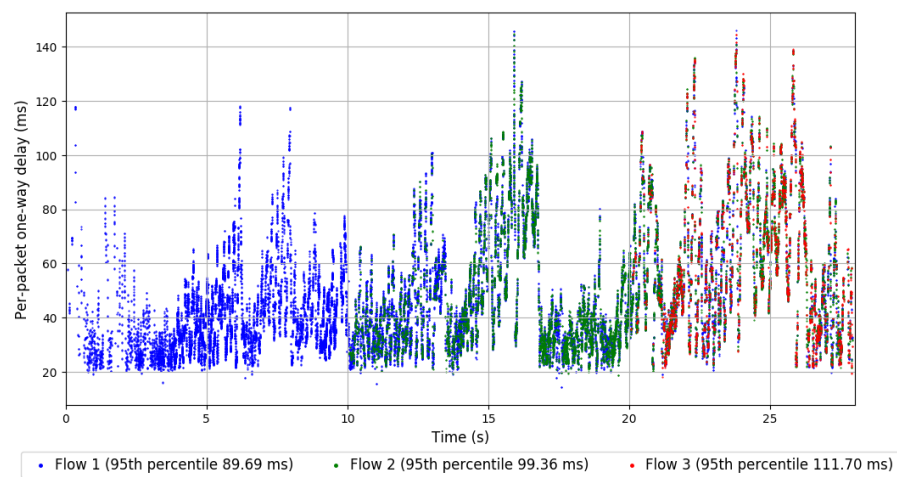
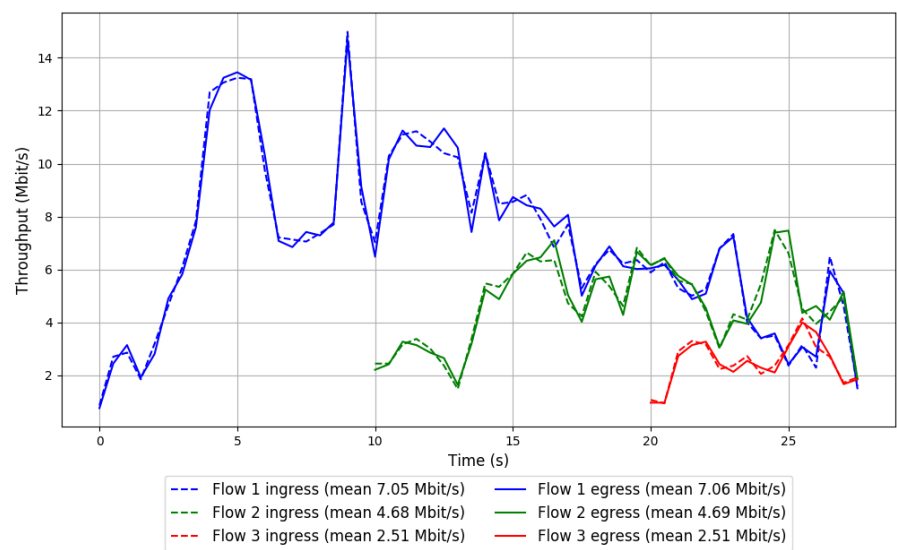
-- Flow 3:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 111.699 ms

Loss rate: 0.72%

Run 1: Report of Copa — Data Link

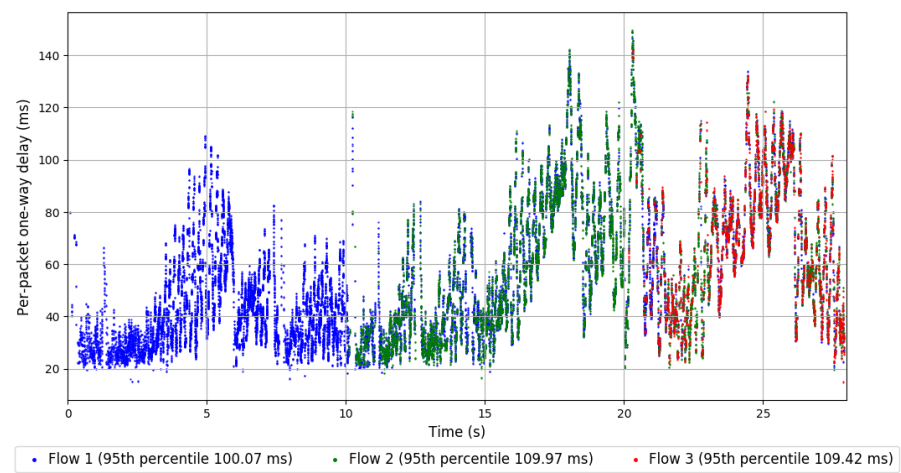
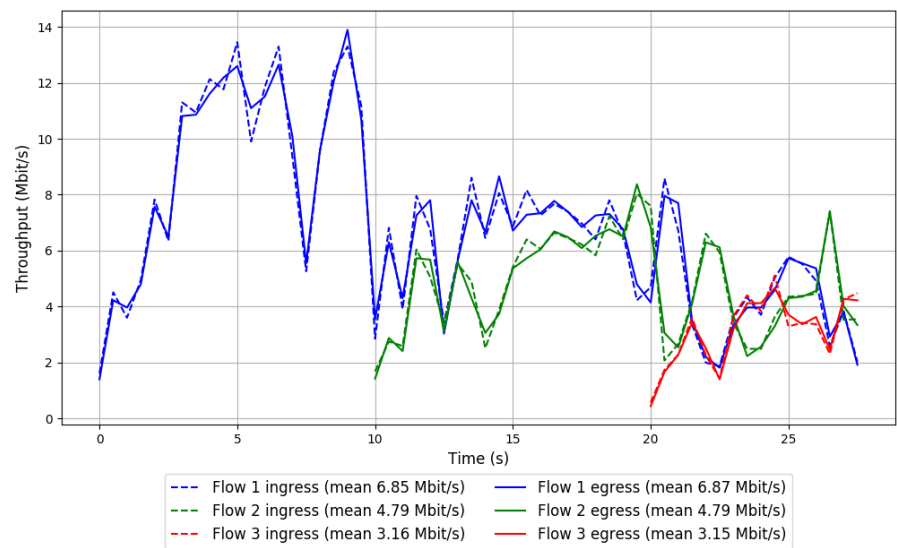


Run 2: Statistics of Copa

Start at: 2018-01-10 15:21:25
End at: 2018-01-10 15:21:55
Local clock offset: -1.259 ms
Remote clock offset: -4.579 ms

Below is generated by plot.py at 2018-01-10 16:36:14
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.83 Mbit/s
95th percentile per-packet one-way delay: 105.034 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 6.87 Mbit/s
95th percentile per-packet one-way delay: 100.074 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 4.79 Mbit/s
95th percentile per-packet one-way delay: 109.967 ms
Loss rate: 0.38%
-- Flow 3:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 109.417 ms
Loss rate: 1.04%

Run 2: Report of Copa — Data Link

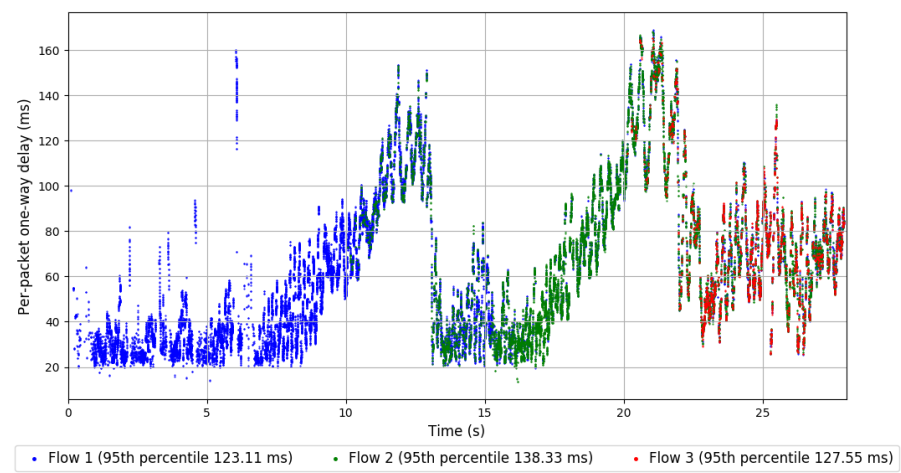
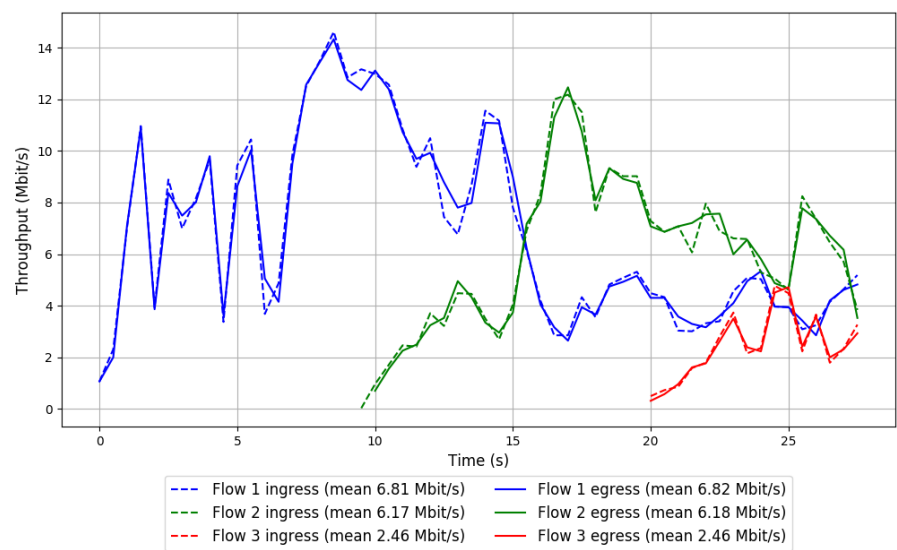


Run 3: Statistics of Copa

Start at: 2018-01-10 15:39:16
End at: 2018-01-10 15:39:46
Local clock offset: -1.367 ms
Remote clock offset: -4.602 ms

Below is generated by plot.py at 2018-01-10 16:36:16
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.48 Mbit/s
95th percentile per-packet one-way delay: 128.327 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 6.82 Mbit/s
95th percentile per-packet one-way delay: 123.106 ms
Loss rate: 0.27%
-- Flow 2:
Average throughput: 6.18 Mbit/s
95th percentile per-packet one-way delay: 138.330 ms
Loss rate: 0.36%
-- Flow 3:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 127.553 ms
Loss rate: 1.59%

Run 3: Report of Copa — Data Link

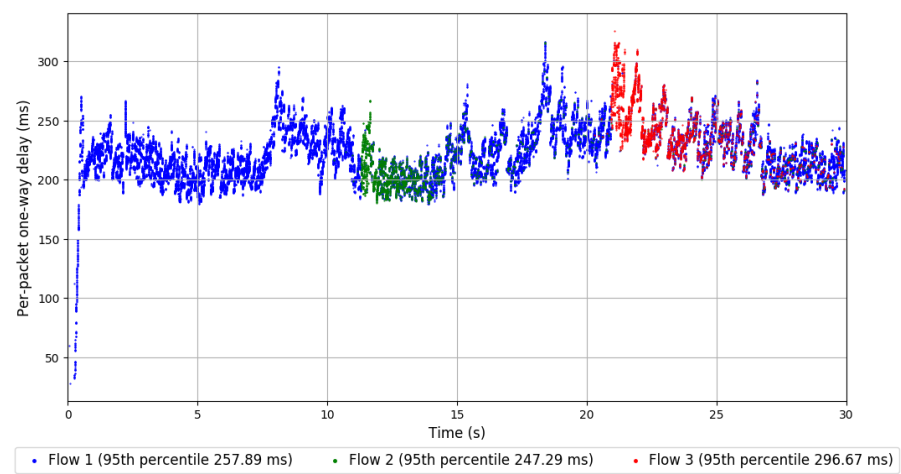
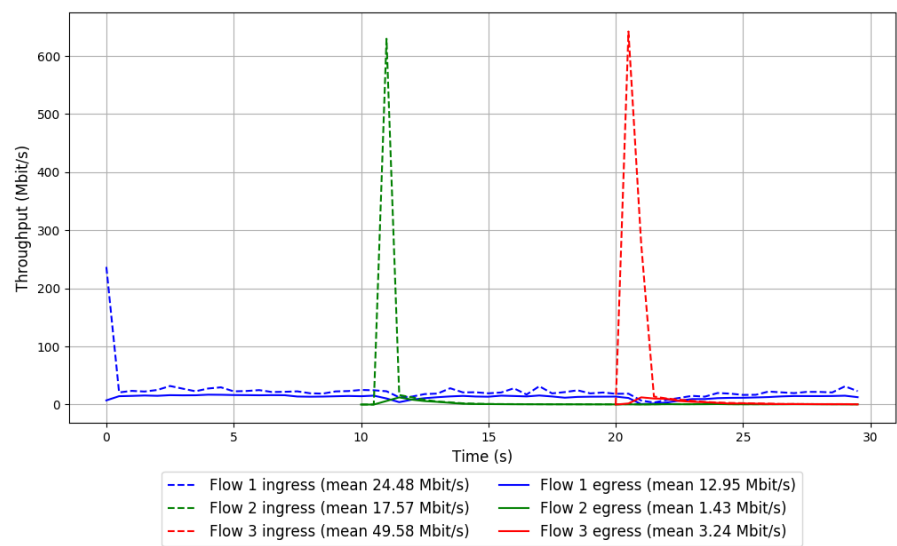


Run 1: Statistics of FillP

Start at: 2018-01-10 14:46:52
End at: 2018-01-10 14:47:22
Local clock offset: -1.662 ms
Remote clock offset: -4.625 ms

Below is generated by plot.py at 2018-01-10 16:36:22
Datalink statistics
-- Total of 3 flows:
Average throughput: 14.94 Mbit/s
95th percentile per-packet one-way delay: 262.091 ms
Loss rate: 71.63%
-- Flow 1:
Average throughput: 12.95 Mbit/s
95th percentile per-packet one-way delay: 257.892 ms
Loss rate: 47.22%
-- Flow 2:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 247.289 ms
Loss rate: 91.96%
-- Flow 3:
Average throughput: 3.24 Mbit/s
95th percentile per-packet one-way delay: 296.670 ms
Loss rate: 93.65%

Run 1: Report of FillP — Data Link

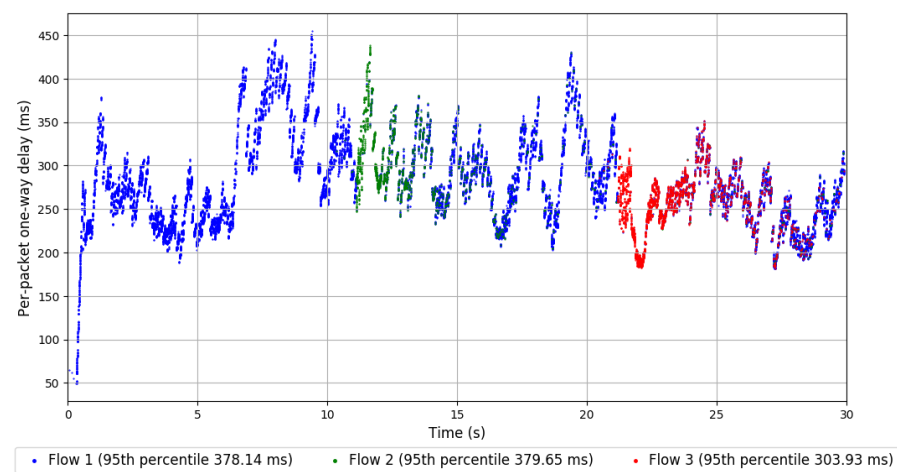
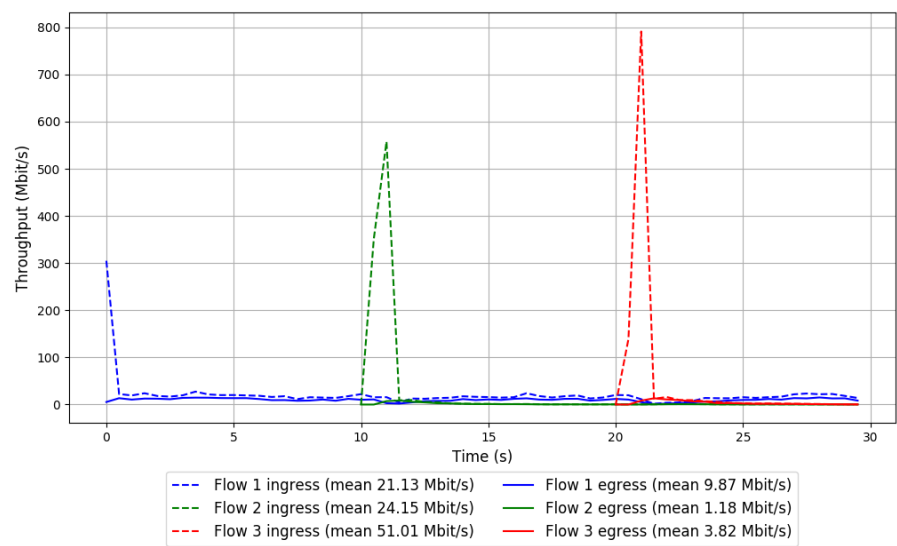


Run 2: Statistics of FillP

Start at: 2018-01-10 15:04:44
End at: 2018-01-10 15:05:14
Local clock offset: -1.348 ms
Remote clock offset: -4.372 ms

Below is generated by plot.py at 2018-01-10 16:36:22
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.84 Mbit/s
95th percentile per-packet one-way delay: 374.061 ms
Loss rate: 78.14%
-- Flow 1:
Average throughput: 9.87 Mbit/s
95th percentile per-packet one-way delay: 378.139 ms
Loss rate: 53.42%
-- Flow 2:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 379.648 ms
Loss rate: 95.21%
-- Flow 3:
Average throughput: 3.82 Mbit/s
95th percentile per-packet one-way delay: 303.932 ms
Loss rate: 92.88%

Run 2: Report of FillP — Data Link

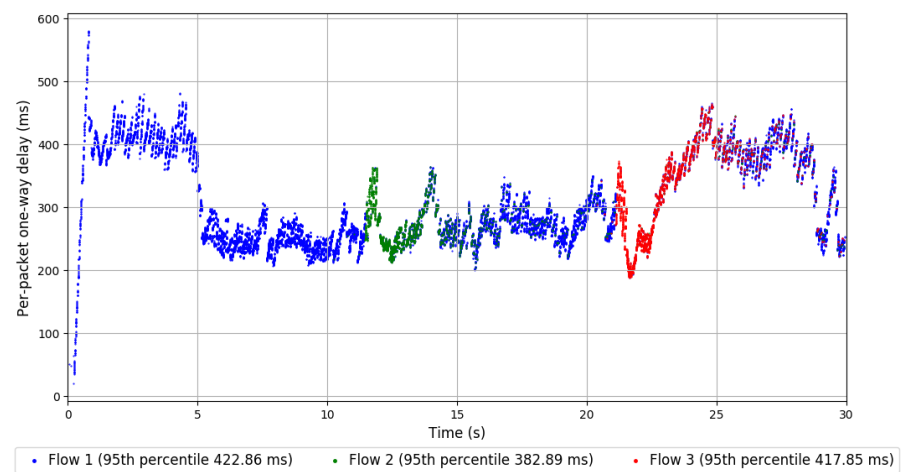
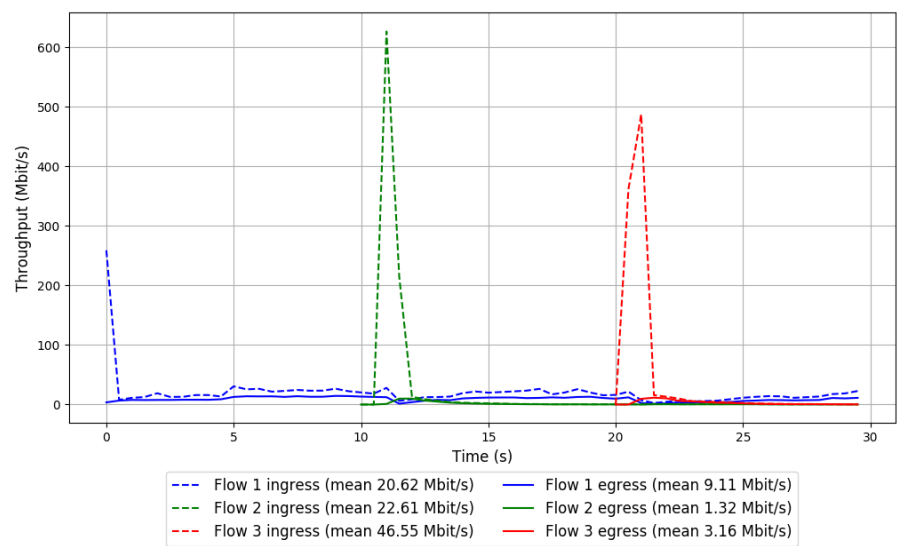


Run 3: Statistics of FillP

Start at: 2018-01-10 15:22:37
End at: 2018-01-10 15:23:07
Local clock offset: -1.349 ms
Remote clock offset: -4.556 ms

Below is generated by plot.py at 2018-01-10 16:36:23
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.98 Mbit/s
95th percentile per-packet one-way delay: 420.761 ms
Loss rate: 78.49%
-- Flow 1:
Average throughput: 9.11 Mbit/s
95th percentile per-packet one-way delay: 422.862 ms
Loss rate: 55.95%
-- Flow 2:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 382.887 ms
Loss rate: 94.23%
-- Flow 3:
Average throughput: 3.16 Mbit/s
95th percentile per-packet one-way delay: 417.852 ms
Loss rate: 93.42%

Run 3: Report of FillP — Data Link

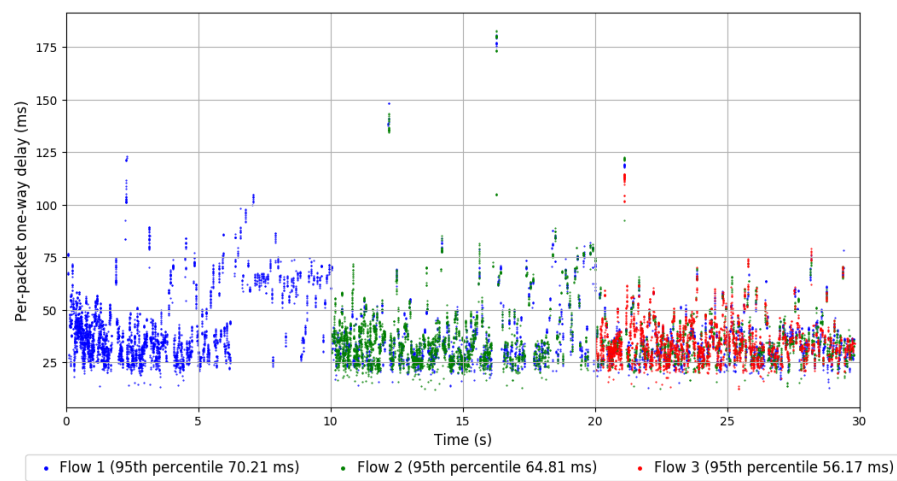
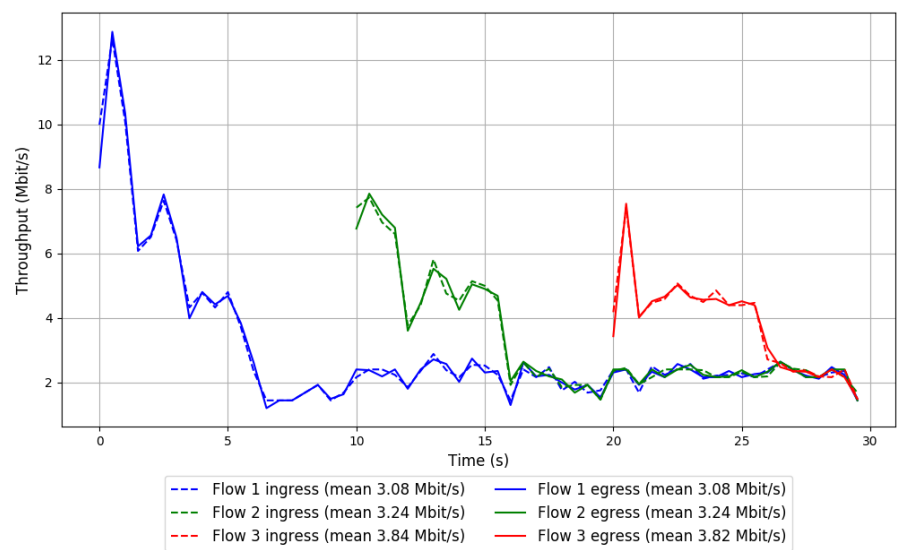


```
Run 1: Statistics of Indigo

Start at: 2018-01-10 14:49:17
End at: 2018-01-10 14:49:47
Local clock offset: -1.563 ms
Remote clock offset: -4.53 ms

# Below is generated by plot.py at 2018-01-10 16:36:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.48 Mbit/s
95th percentile per-packet one-way delay: 66.672 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 3.08 Mbit/s
95th percentile per-packet one-way delay: 70.206 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 3.24 Mbit/s
95th percentile per-packet one-way delay: 64.815 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 3.82 Mbit/s
95th percentile per-packet one-way delay: 56.169 ms
Loss rate: 0.77%
```

Run 1: Report of Indigo — Data Link

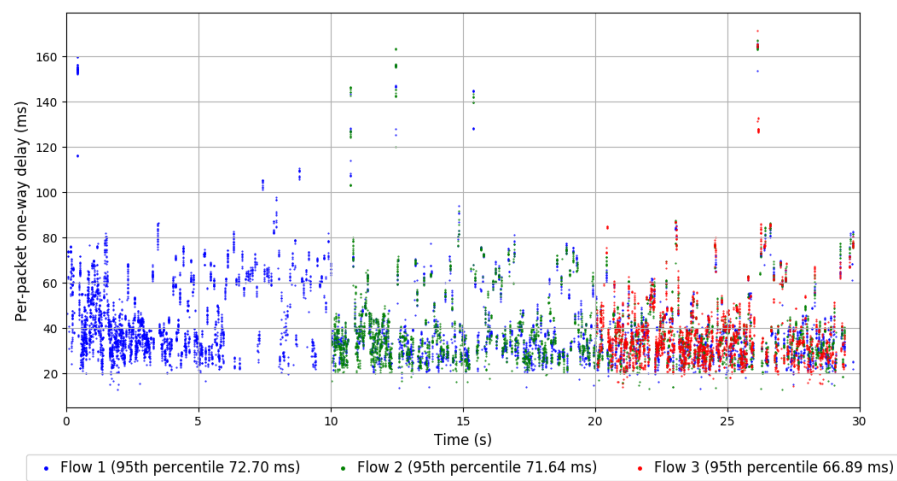
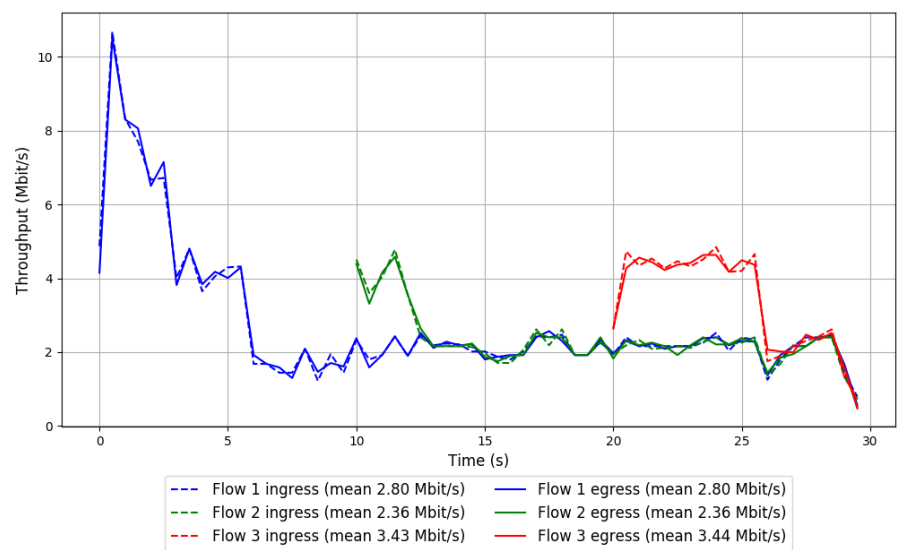


Run 2: Statistics of Indigo

Start at: 2018-01-10 15:07:08
End at: 2018-01-10 15:07:38
Local clock offset: -1.315 ms
Remote clock offset: -4.534 ms

Below is generated by plot.py at 2018-01-10 16:36:23
Datalink statistics
-- Total of 3 flows:
Average throughput: 5.49 Mbit/s
95th percentile per-packet one-way delay: 72.151 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 2.80 Mbit/s
95th percentile per-packet one-way delay: 72.696 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 2.36 Mbit/s
95th percentile per-packet one-way delay: 71.641 ms
Loss rate: 0.26%
-- Flow 3:
Average throughput: 3.44 Mbit/s
95th percentile per-packet one-way delay: 66.888 ms
Loss rate: 0.36%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-01-10 15:25:01
End at: 2018-01-10 15:25:31
Local clock offset: -1.326 ms
Remote clock offset: -4.635 ms

Below is generated by plot.py at 2018-01-10 16:36:23
Datalink statistics
-- Total of 3 flows:
Average throughput: 5.71 Mbit/s
95th percentile per-packet one-way delay: 72.438 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 2.69 Mbit/s
95th percentile per-packet one-way delay: 77.519 ms
Loss rate: 0.15%
-- Flow 2:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 66.838 ms
Loss rate: 0.22%
-- Flow 3:
Average throughput: 3.59 Mbit/s
95th percentile per-packet one-way delay: 53.868 ms
Loss rate: 0.38%

Run 3: Report of Indigo — Data Link

