

Pantheon Report

Generated at 2018-01-16 02:13:39 (UTC).

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

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).

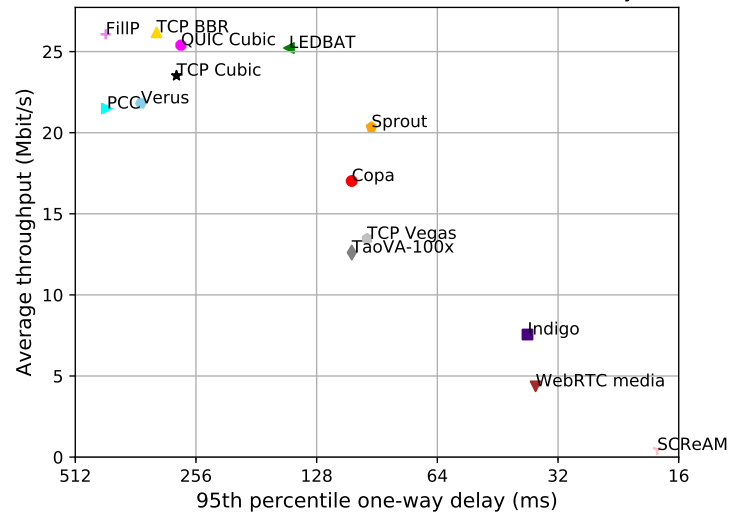
Tested BBR with qdisc of Fair Queuing (*fq*), and other schemes with the default Linux qdisc (*pfifo_fast*).

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

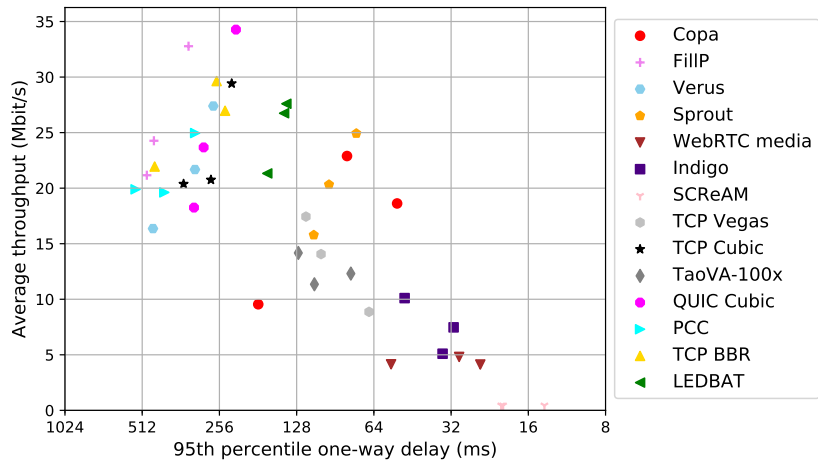
Git summary:

```
branch: master @ af8abdfba95588b0c5f2aeca9e856a1656b0c598
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 @ f1a14bffe749737437f61b1eaeab30b267cde681
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/vivace @ 423cbca3e8ea1d599e7b5cf725835e8a2b6bfac6
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from AWS California 1 Ethernet to Stanford ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)



test from AWS California 1 Ethernet to Stanford ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows



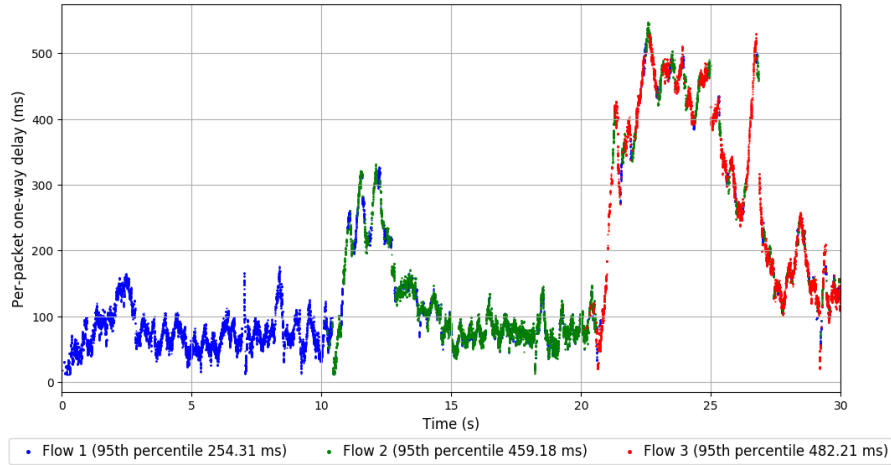
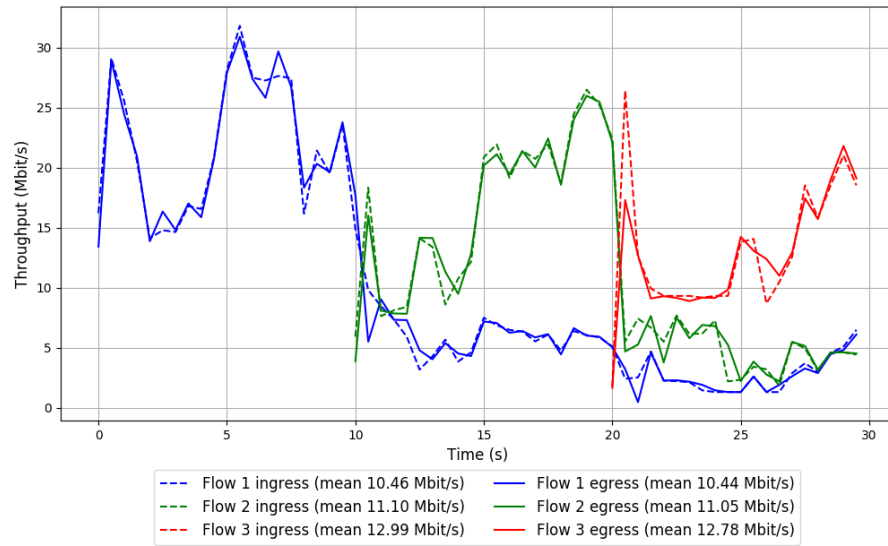
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	12.67	12.97	14.98	241.21	309.51	412.39	0.36	0.92	3.42
TCP Cubic	3	15.70	10.09	3.38	251.42	331.93	344.04	0.34	0.53	1.48
LEDBAT	3	18.50	8.13	3.93	144.59	160.23	171.78	0.19	0.47	1.24
PCC	3	16.64	4.78	5.04	420.76	438.33	481.44	6.47	9.39	17.06
QUIC Cubic	3	16.80	10.84	4.40	263.17	300.59	345.98	0.46	1.05	3.15
SCReAM	3	0.22	0.22	0.22	18.16	17.93	18.75	0.00	0.00	0.00
WebRTC media	3	2.34	1.54	0.51	31.23	36.87	53.28	0.00	0.00	0.00
Sprout	3	10.98	10.08	7.92	87.21	95.83	116.20	0.21	0.42	0.90
TaoVA-100x	3	5.15	5.78	13.02	73.98	93.99	117.25	0.14	0.18	1.10
TCP Vegas	3	6.29	7.47	6.60	74.63	143.45	57.74	0.00	0.01	0.00
Verus	3	13.95	8.61	6.63	342.50	371.34	361.57	5.60	17.06	11.86
Copa	3	11.28	7.06	3.09	101.91	103.61	166.56	0.02	0.08	0.17
FillP	3	13.35	10.95	16.96	405.84	449.93	459.87	60.62	74.19	75.68
Indigo	3	2.86	3.75	6.76	32.23	36.84	43.02	0.00	0.00	0.00

Run 1: Statistics of TCP BBR

Start at: 2018-01-16 01:28:59
End at: 2018-01-16 01:29:29
Local clock offset: 4.032 ms
Remote clock offset: -2.318 ms

Below is generated by plot.py at 2018-01-16 02:12:00
Datalink statistics
-- Total of 3 flows:
Average throughput: 21.95 Mbit/s
95th percentile per-packet one-way delay: 457.832 ms
Loss rate: 0.97%
-- Flow 1:
Average throughput: 10.44 Mbit/s
95th percentile per-packet one-way delay: 254.305 ms
Loss rate: 0.41%
-- Flow 2:
Average throughput: 11.05 Mbit/s
95th percentile per-packet one-way delay: 459.179 ms
Loss rate: 1.09%
-- Flow 3:
Average throughput: 12.78 Mbit/s
95th percentile per-packet one-way delay: 482.207 ms
Loss rate: 2.15%

Run 1: Report of TCP BBR — Data Link

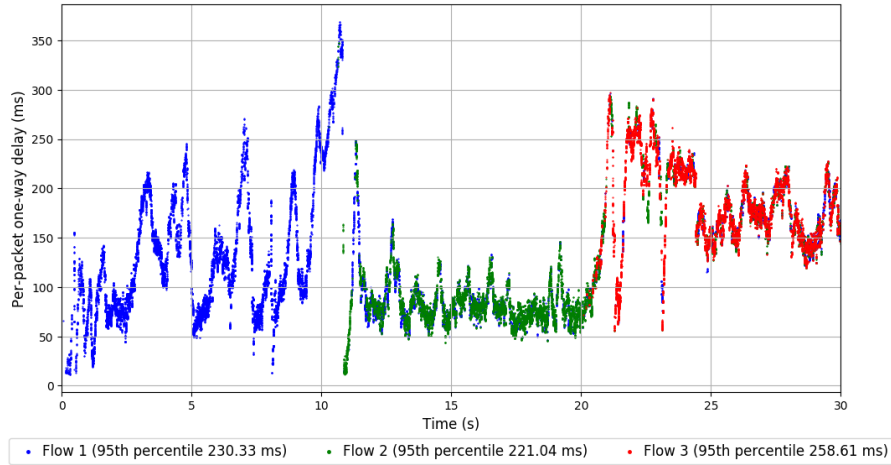
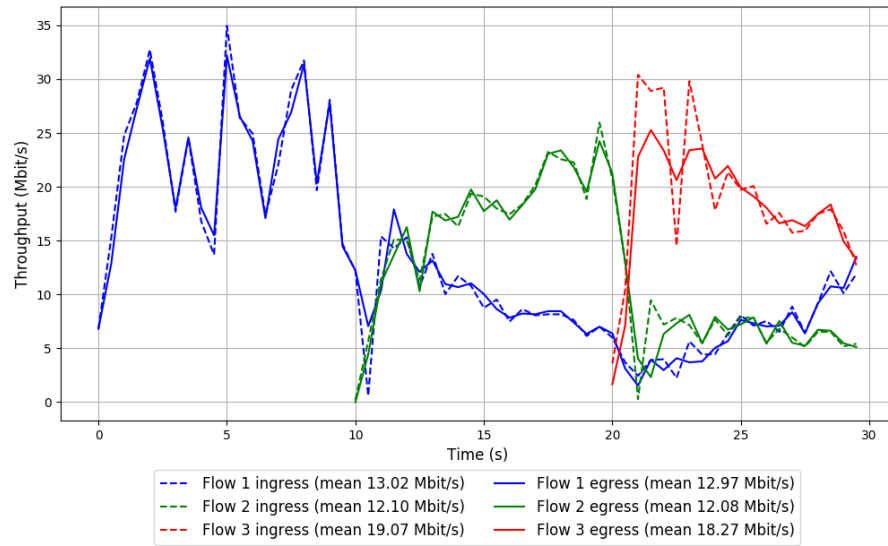


Run 2: Statistics of TCP BBR

Start at: 2018-01-16 01:46:52
End at: 2018-01-16 01:47:22
Local clock offset: 3.794 ms
Remote clock offset: -2.724 ms

Below is generated by plot.py at 2018-01-16 02:12:05
Datalink statistics
-- Total of 3 flows:
Average throughput: 26.97 Mbit/s
95th percentile per-packet one-way delay: 243.341 ms
Loss rate: 1.78%
-- Flow 1:
Average throughput: 12.97 Mbit/s
95th percentile per-packet one-way delay: 230.327 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 12.08 Mbit/s
95th percentile per-packet one-way delay: 221.036 ms
Loss rate: 1.44%
-- Flow 3:
Average throughput: 18.27 Mbit/s
95th percentile per-packet one-way delay: 258.606 ms
Loss rate: 4.77%

Run 2: Report of TCP BBR — Data Link

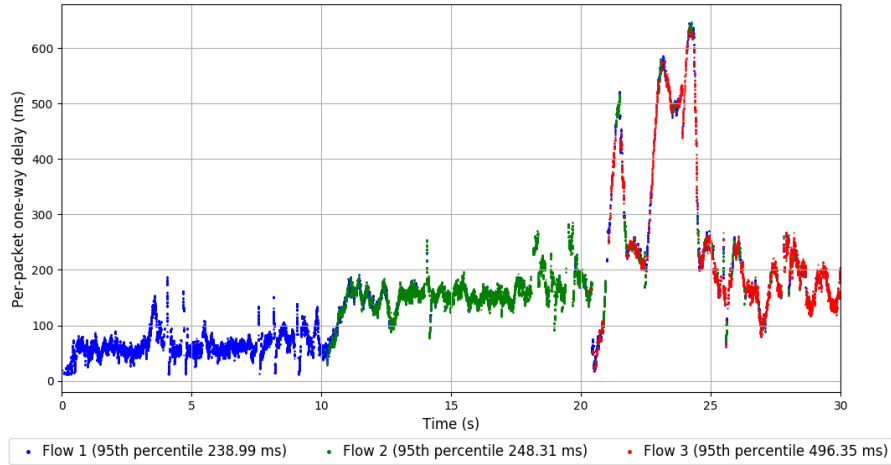
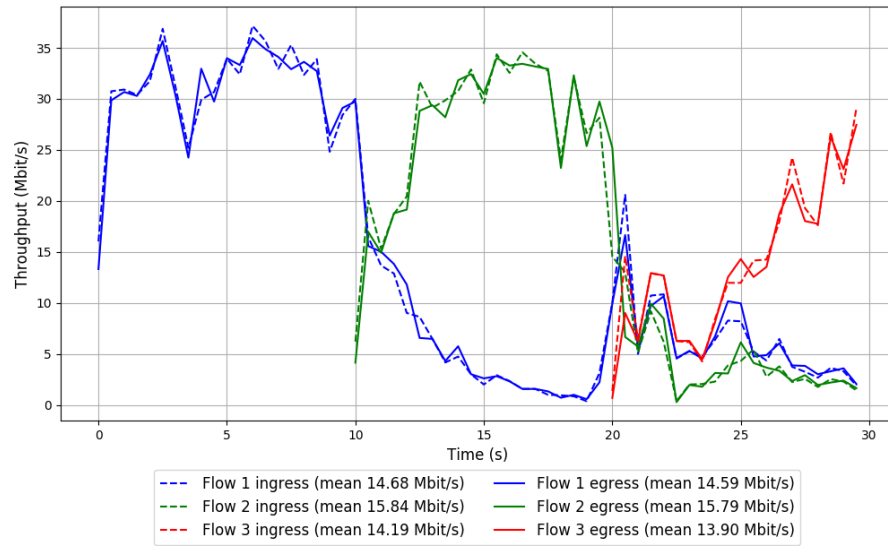


Run 3: Statistics of TCP BBR

Start at: 2018-01-16 02:04:49
End at: 2018-01-16 02:05:19
Local clock offset: 3.064 ms
Remote clock offset: -2.688 ms

Below is generated by plot.py at 2018-01-16 02:12:08
Datalink statistics
-- Total of 3 flows:
Average throughput: 29.64 Mbit/s
95th percentile per-packet one-way delay: 262.461 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 14.59 Mbit/s
95th percentile per-packet one-way delay: 238.992 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 15.79 Mbit/s
95th percentile per-packet one-way delay: 248.306 ms
Loss rate: 0.24%
-- Flow 3:
Average throughput: 13.90 Mbit/s
95th percentile per-packet one-way delay: 496.354 ms
Loss rate: 3.35%

Run 3: Report of TCP BBR — Data Link

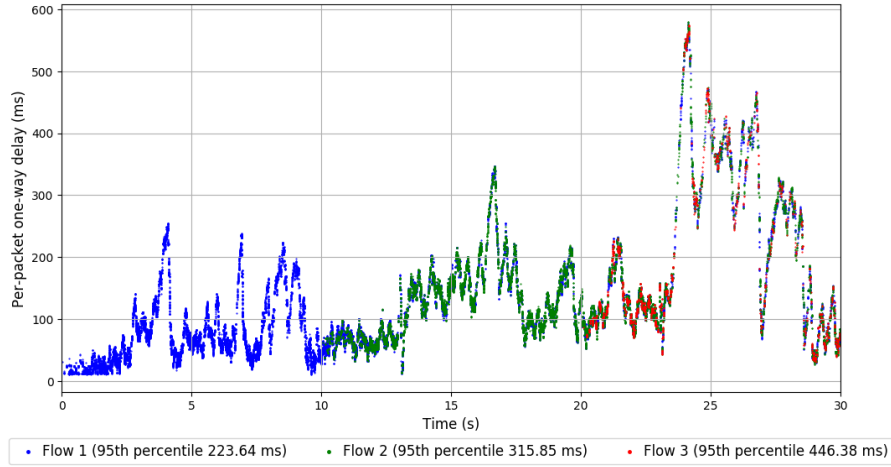
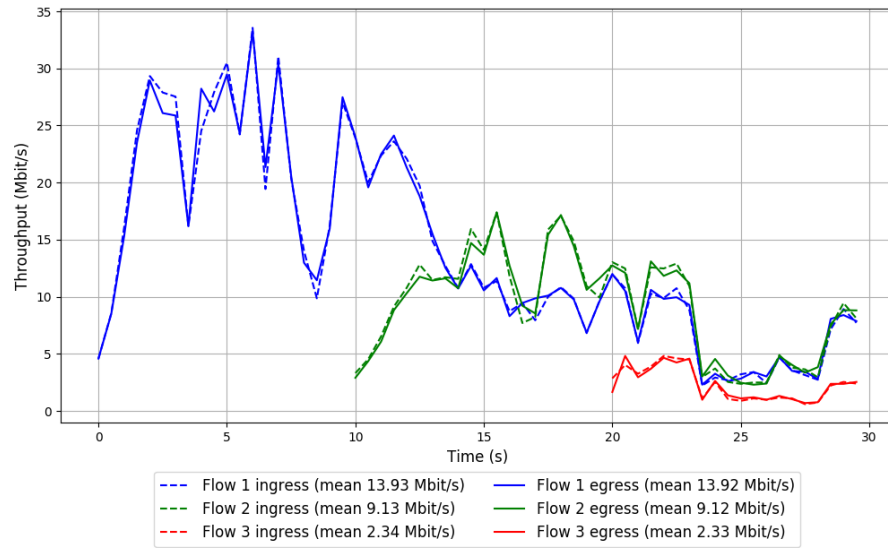


Run 1: Statistics of TCP Cubic

Start at: 2018-01-16 01:30:10
End at: 2018-01-16 01:30:41
Local clock offset: 4.076 ms
Remote clock offset: -2.346 ms

Below is generated by plot.py at 2018-01-16 02:12:08
Datalink statistics
-- Total of 3 flows:
Average throughput: 20.75 Mbit/s
95th percentile per-packet one-way delay: 276.273 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 13.92 Mbit/s
95th percentile per-packet one-way delay: 223.643 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 9.12 Mbit/s
95th percentile per-packet one-way delay: 315.846 ms
Loss rate: 0.29%
-- Flow 3:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 446.377 ms
Loss rate: 0.98%

Run 1: Report of TCP Cubic — Data Link

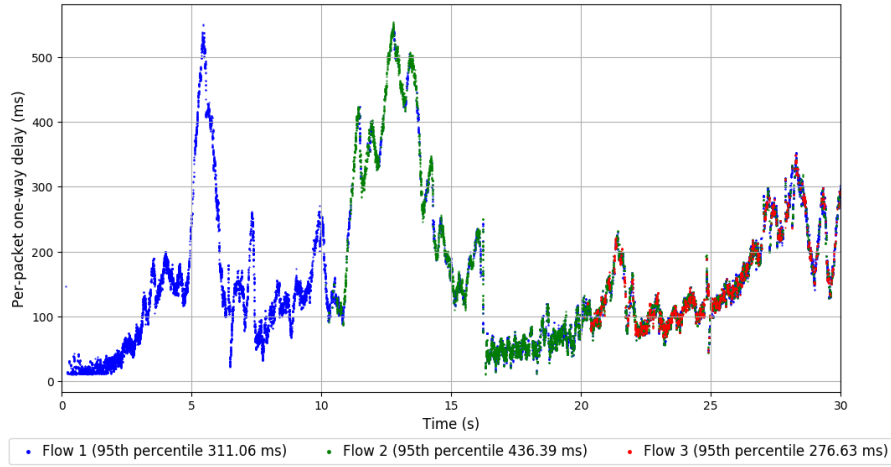
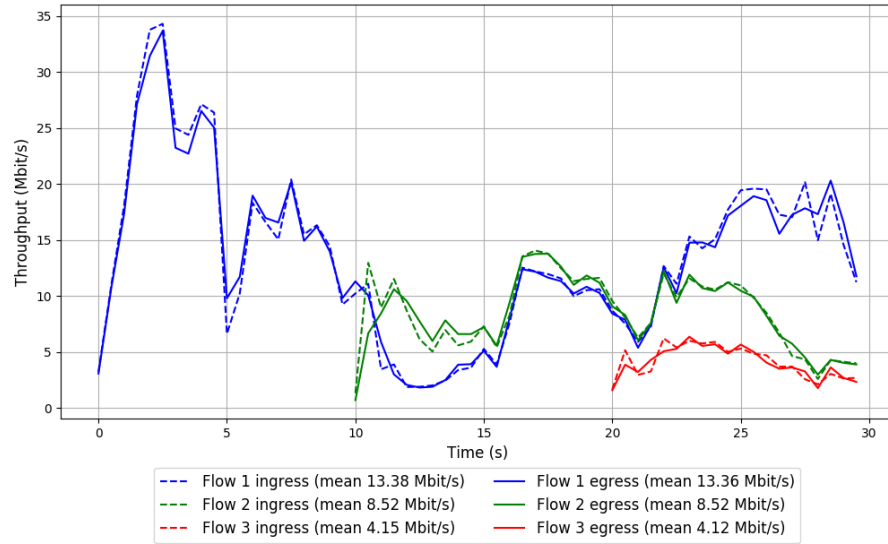


Run 2: Statistics of TCP Cubic

Start at: 2018-01-16 01:48:04
End at: 2018-01-16 01:48:34
Local clock offset: 3.765 ms
Remote clock offset: -2.654 ms

Below is generated by plot.py at 2018-01-16 02:12:08
Datalink statistics
-- Total of 3 flows:
Average throughput: 20.38 Mbit/s
95th percentile per-packet one-way delay: 353.193 ms
Loss rate: 0.69%
-- Flow 1:
Average throughput: 13.36 Mbit/s
95th percentile per-packet one-way delay: 311.057 ms
Loss rate: 0.63%
-- Flow 2:
Average throughput: 8.52 Mbit/s
95th percentile per-packet one-way delay: 436.392 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 4.12 Mbit/s
95th percentile per-packet one-way delay: 276.626 ms
Loss rate: 1.63%

Run 2: Report of TCP Cubic — Data Link

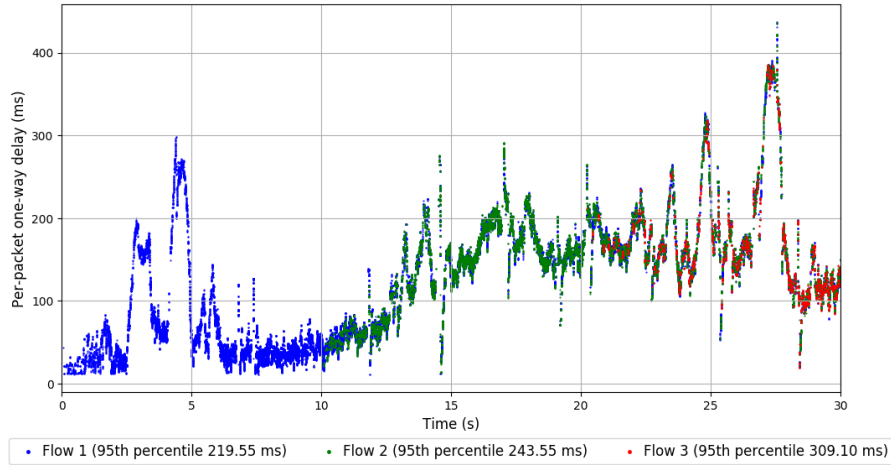
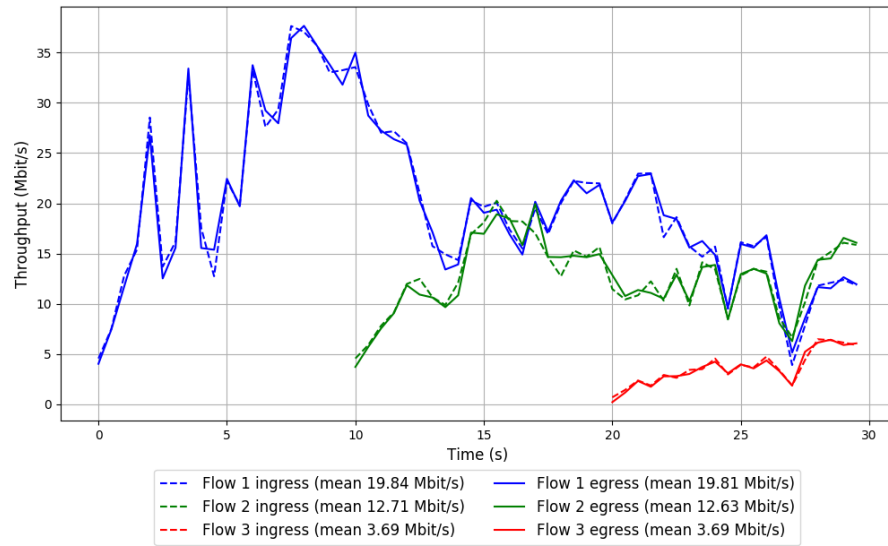


Run 3: Statistics of TCP Cubic

Start at: 2018-01-16 02:06:01
End at: 2018-01-16 02:06:31
Local clock offset: 2.907 ms
Remote clock offset: -2.702 ms

Below is generated by plot.py at 2018-01-16 02:12:08
Datalink statistics
-- Total of 3 flows:
Average throughput: 29.42 Mbit/s
95th percentile per-packet one-way delay: 229.346 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 19.81 Mbit/s
95th percentile per-packet one-way delay: 219.547 ms
Loss rate: 0.25%
-- Flow 2:
Average throughput: 12.63 Mbit/s
95th percentile per-packet one-way delay: 243.546 ms
Loss rate: 0.70%
-- Flow 3:
Average throughput: 3.69 Mbit/s
95th percentile per-packet one-way delay: 309.102 ms
Loss rate: 1.83%

Run 3: Report of TCP Cubic — Data Link

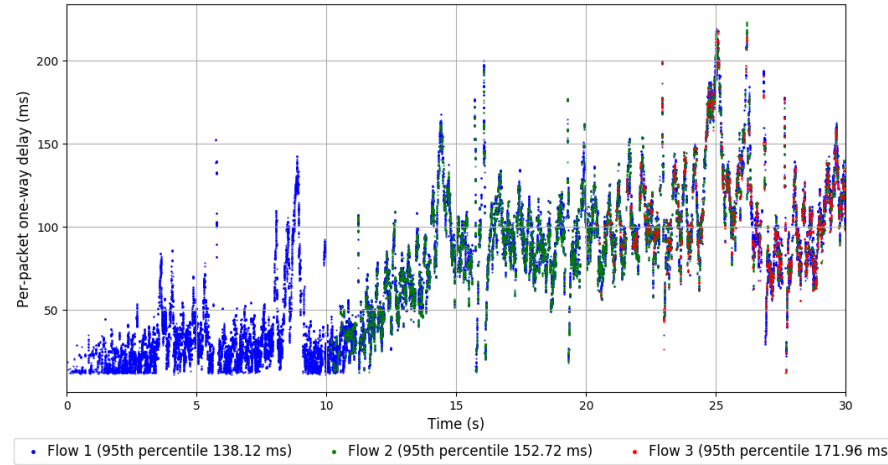
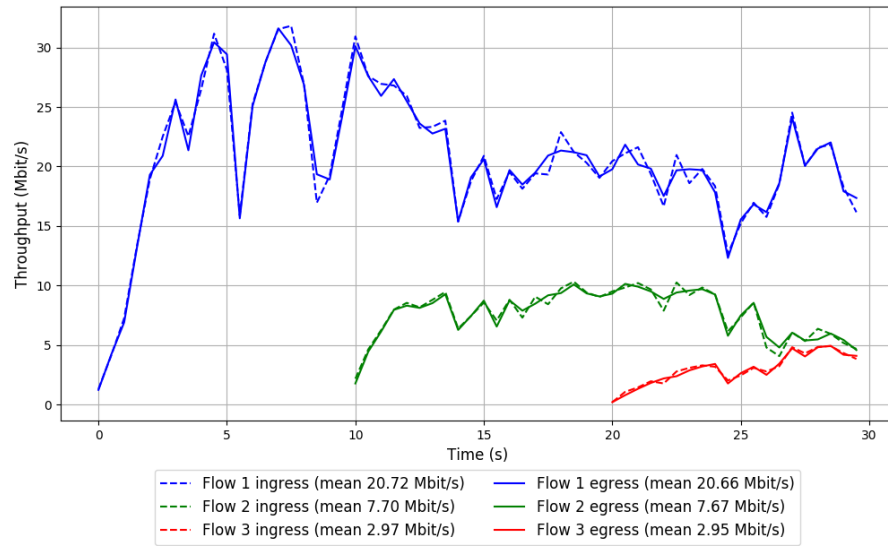


Run 1: Statistics of LEDBAT

Start at: 2018-01-16 01:21:48
End at: 2018-01-16 01:22:18
Local clock offset: 3.079 ms
Remote clock offset: -2.277 ms

Below is generated by plot.py at 2018-01-16 02:12:08
Datalink statistics
-- Total of 3 flows:
Average throughput: 26.74 Mbit/s
95th percentile per-packet one-way delay: 143.279 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 20.66 Mbit/s
95th percentile per-packet one-way delay: 138.122 ms
Loss rate: 0.28%
-- Flow 2:
Average throughput: 7.67 Mbit/s
95th percentile per-packet one-way delay: 152.724 ms
Loss rate: 0.38%
-- Flow 3:
Average throughput: 2.95 Mbit/s
95th percentile per-packet one-way delay: 171.963 ms
Loss rate: 1.47%

Run 1: Report of LEDBAT — Data Link

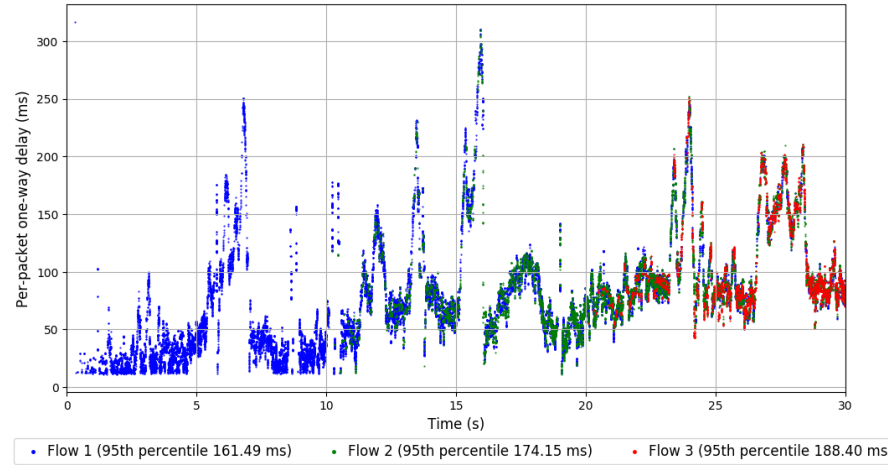
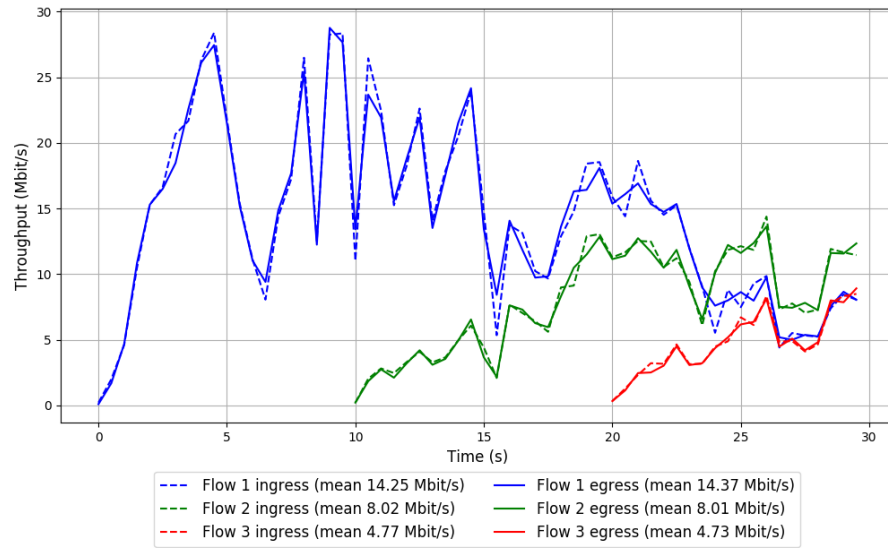


Run 2: Statistics of LEDBAT

Start at: 2018-01-16 01:39:41
End at: 2018-01-16 01:40:11
Local clock offset: 3.916 ms
Remote clock offset: -2.459 ms

Below is generated by plot.py at 2018-01-16 02:12:08
Datalink statistics
-- Total of 3 flows:
Average throughput: 21.33 Mbit/s
95th percentile per-packet one-way delay: 166.635 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 14.37 Mbit/s
95th percentile per-packet one-way delay: 161.486 ms
Loss rate: 0.16%
-- Flow 2:
Average throughput: 8.01 Mbit/s
95th percentile per-packet one-way delay: 174.152 ms
Loss rate: 0.41%
-- Flow 3:
Average throughput: 4.73 Mbit/s
95th percentile per-packet one-way delay: 188.404 ms
Loss rate: 1.19%

Run 2: Report of LEDBAT — Data Link

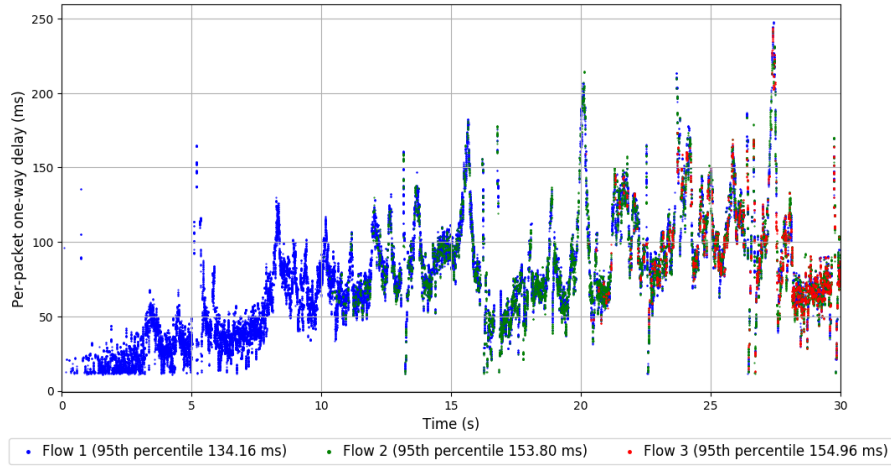
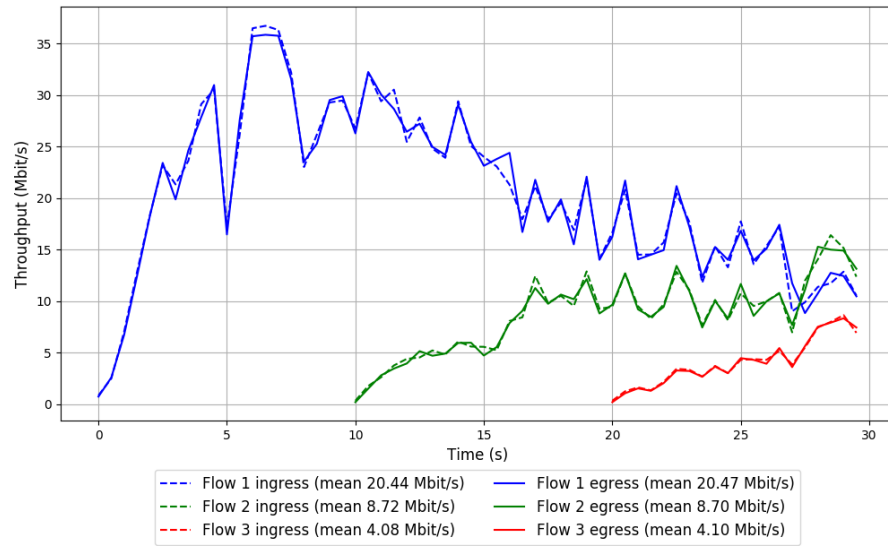


Run 3: Statistics of LEDBAT

Start at: 2018-01-16 01:57:37
End at: 2018-01-16 01:58:07
Local clock offset: 3.656 ms
Remote clock offset: -2.729 ms

Below is generated by plot.py at 2018-01-16 02:12:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 27.60 Mbit/s
95th percentile per-packet one-way delay: 140.394 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 20.47 Mbit/s
95th percentile per-packet one-way delay: 134.158 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 8.70 Mbit/s
95th percentile per-packet one-way delay: 153.804 ms
Loss rate: 0.61%
-- Flow 3:
Average throughput: 4.10 Mbit/s
95th percentile per-packet one-way delay: 154.964 ms
Loss rate: 1.07%

Run 3: Report of LEDBAT — Data Link

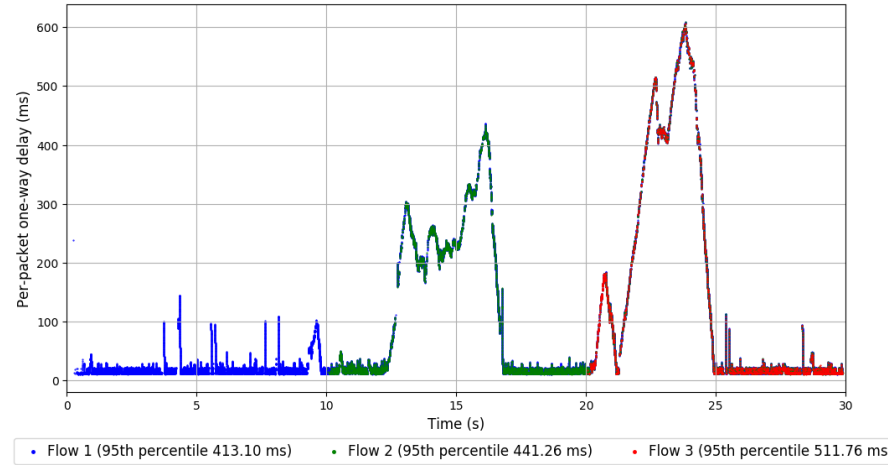
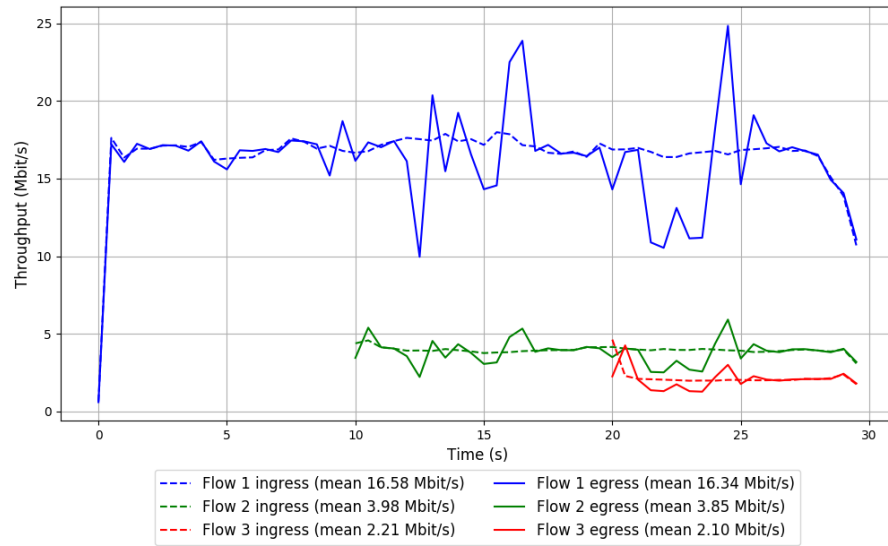


Run 1: Statistics of PCC

Start at: 2018-01-16 01:18:13
End at: 2018-01-16 01:18:43
Local clock offset: 2.69 ms
Remote clock offset: -2.378 ms

Below is generated by plot.py at 2018-01-16 02:12:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 19.62 Mbit/s
95th percentile per-packet one-way delay: 419.783 ms
Loss rate: 2.44%
-- Flow 1:
Average throughput: 16.34 Mbit/s
95th percentile per-packet one-way delay: 413.099 ms
Loss rate: 2.18%
-- Flow 2:
Average throughput: 3.85 Mbit/s
95th percentile per-packet one-way delay: 441.256 ms
Loss rate: 3.27%
-- Flow 3:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 511.760 ms
Loss rate: 5.18%

Run 1: Report of PCC — Data Link

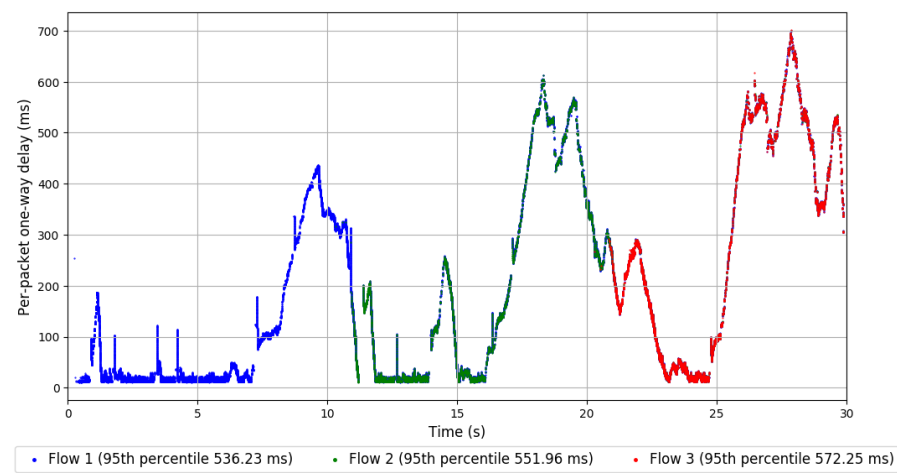
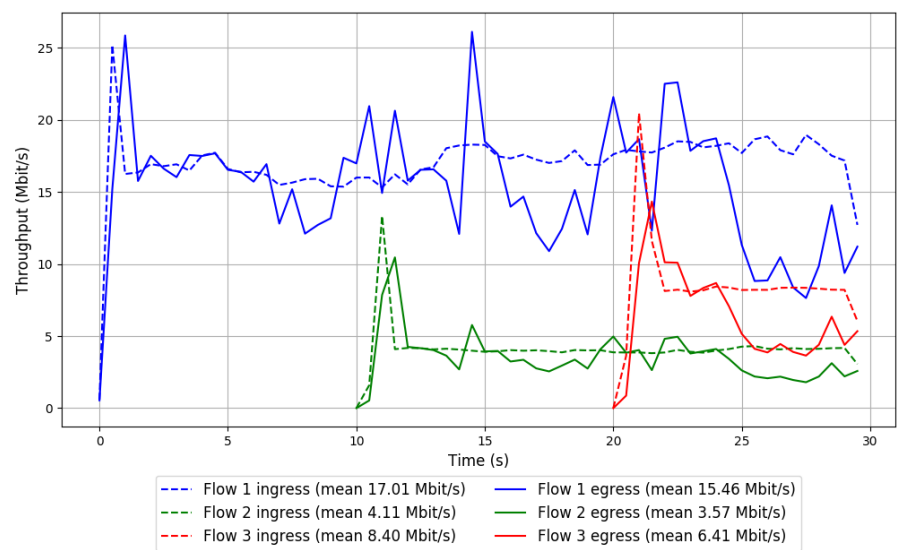


Run 2: Statistics of PCC

Start at: 2018-01-16 01:36:07
End at: 2018-01-16 01:36:37
Local clock offset: 3.958 ms
Remote clock offset: -2.464 ms

Below is generated by plot.py at 2018-01-16 02:12:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 19.89 Mbit/s
95th percentile per-packet one-way delay: 543.159 ms
Loss rate: 12.35%
-- Flow 1:
Average throughput: 15.46 Mbit/s
95th percentile per-packet one-way delay: 536.229 ms
Loss rate: 9.87%
-- Flow 2:
Average throughput: 3.57 Mbit/s
95th percentile per-packet one-way delay: 551.962 ms
Loss rate: 14.29%
-- Flow 3:
Average throughput: 6.41 Mbit/s
95th percentile per-packet one-way delay: 572.247 ms
Loss rate: 25.71%

Run 2: Report of PCC — Data Link

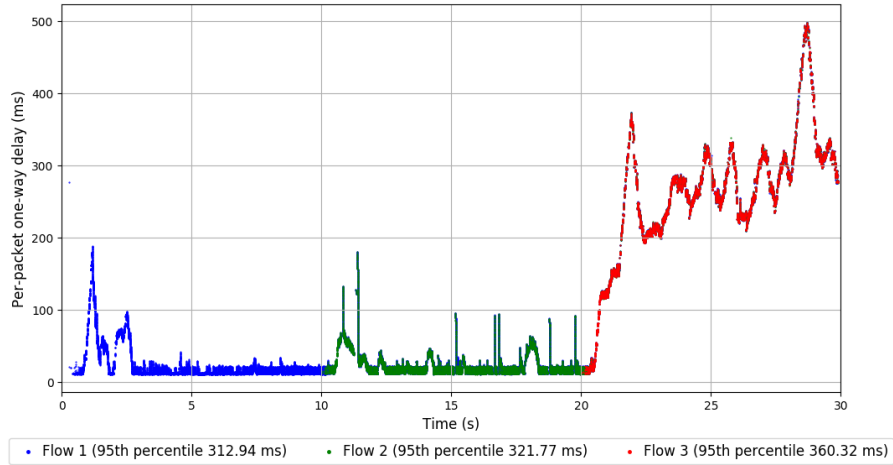
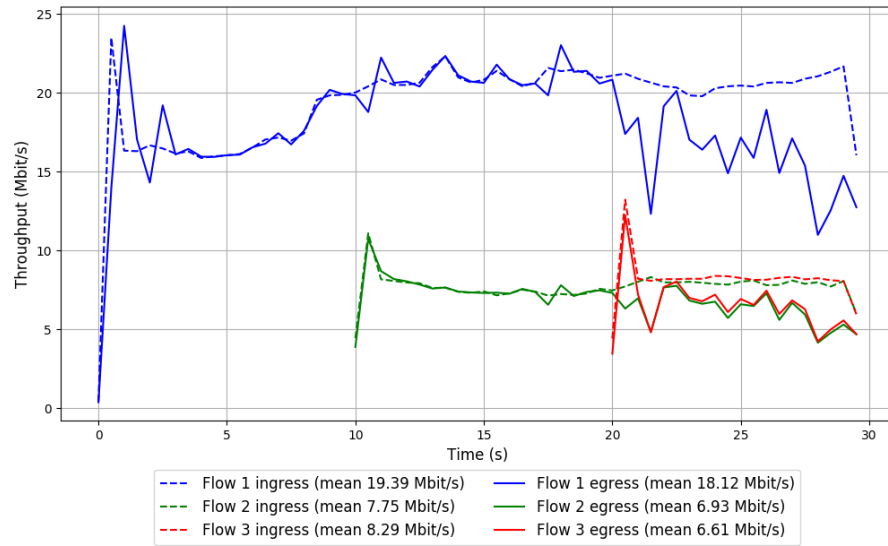


Run 3: Statistics of PCC

Start at: 2018-01-16 01:54:01
End at: 2018-01-16 01:54:31
Local clock offset: 3.795 ms
Remote clock offset: -2.642 ms

Below is generated by plot.py at 2018-01-16 02:12:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 24.96 Mbit/s
95th percentile per-packet one-way delay: 318.269 ms
Loss rate: 9.28%
-- Flow 1:
Average throughput: 18.12 Mbit/s
95th percentile per-packet one-way delay: 312.945 ms
Loss rate: 7.37%
-- Flow 2:
Average throughput: 6.93 Mbit/s
95th percentile per-packet one-way delay: 321.775 ms
Loss rate: 10.61%
-- Flow 3:
Average throughput: 6.61 Mbit/s
95th percentile per-packet one-way delay: 360.324 ms
Loss rate: 20.29%

Run 3: Report of PCC — Data Link

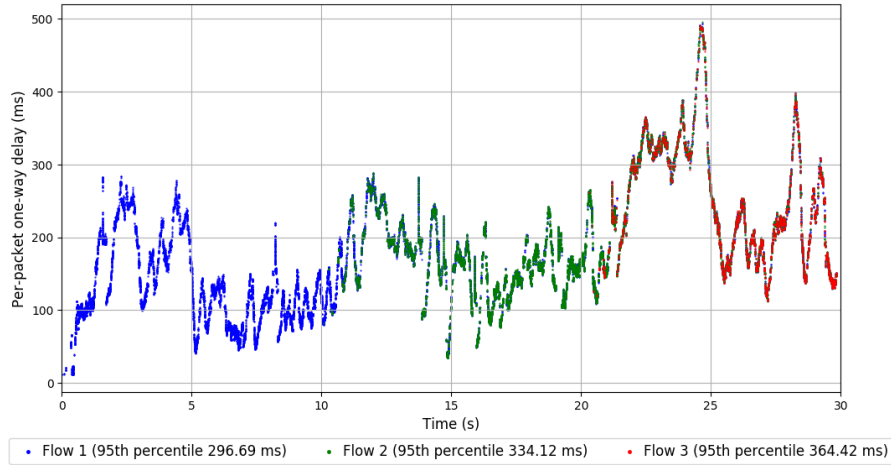
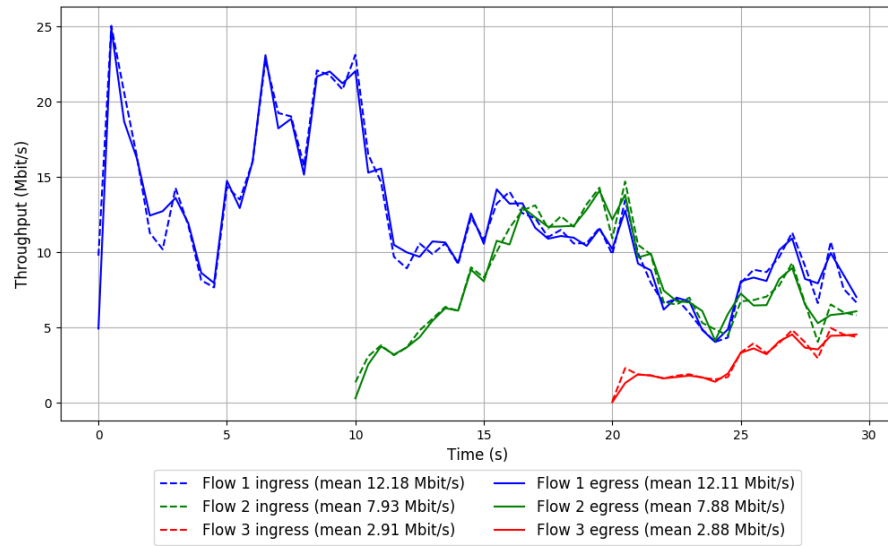


Run 1: Statistics of QUIC Cubic

Start at: 2018-01-16 01:27:47
End at: 2018-01-16 01:28:17
Local clock offset: 3.854 ms
Remote clock offset: -2.188 ms

Below is generated by plot.py at 2018-01-16 02:12:32
Datalink statistics
-- Total of 3 flows:
Average throughput: 18.25 Mbit/s
95th percentile per-packet one-way delay: 321.666 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 12.11 Mbit/s
95th percentile per-packet one-way delay: 296.695 ms
Loss rate: 0.45%
-- Flow 2:
Average throughput: 7.88 Mbit/s
95th percentile per-packet one-way delay: 334.118 ms
Loss rate: 0.85%
-- Flow 3:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 364.422 ms
Loss rate: 3.43%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-01-16 01:45:40

End at: 2018-01-16 01:46:10

Local clock offset: 3.789 ms

Remote clock offset: -2.63 ms

Below is generated by plot.py at 2018-01-16 02:12:35

Datalink statistics

-- Total of 3 flows:

Average throughput: 23.67 Mbit/s

95th percentile per-packet one-way delay: 294.917 ms

Loss rate: 0.69%

-- Flow 1:

Average throughput: 18.23 Mbit/s

95th percentile per-packet one-way delay: 282.385 ms

Loss rate: 0.47%

-- Flow 2:

Average throughput: 6.96 Mbit/s

95th percentile per-packet one-way delay: 338.194 ms

Loss rate: 1.11%

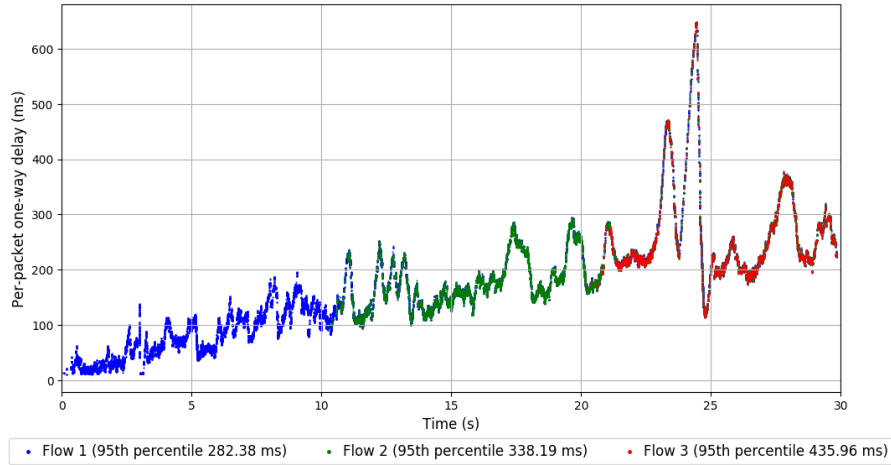
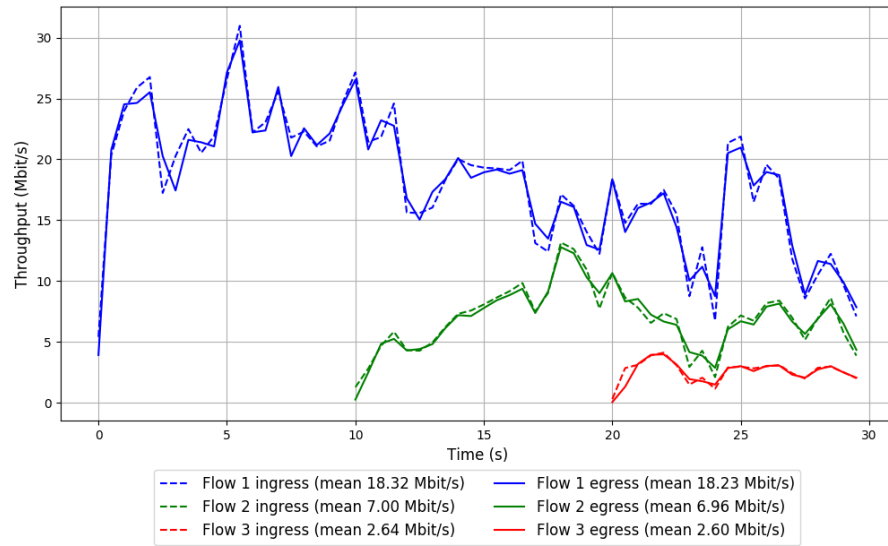
-- Flow 3:

Average throughput: 2.60 Mbit/s

95th percentile per-packet one-way delay: 435.965 ms

Loss rate: 3.07%

Run 2: Report of QUIC Cubic — Data Link

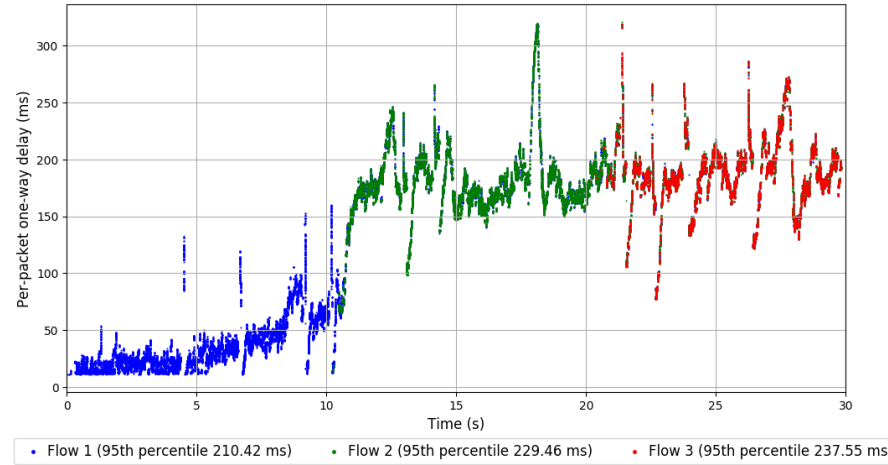
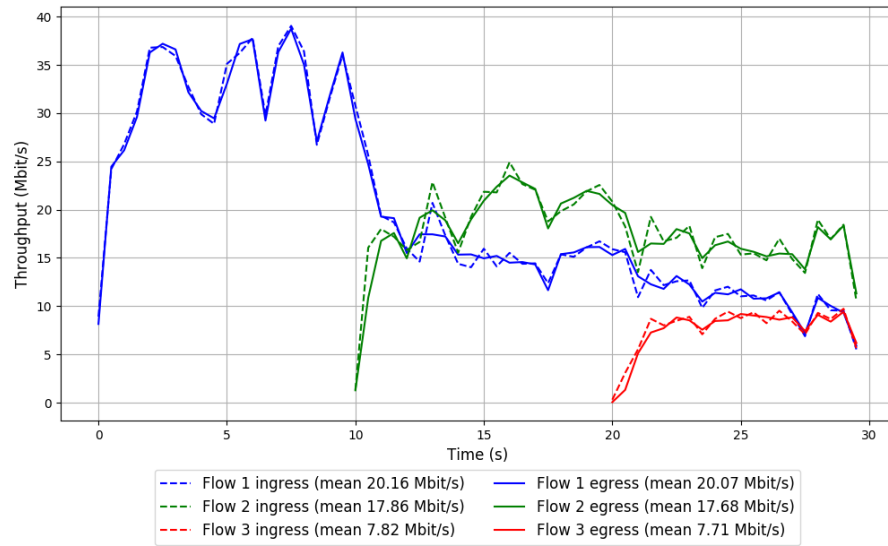


Run 3: Statistics of QUIC Cubic

Start at: 2018-01-16 02:03:36
End at: 2018-01-16 02:04:06
Local clock offset: 3.08 ms
Remote clock offset: -2.669 ms

Below is generated by plot.py at 2018-01-16 02:12:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 34.27 Mbit/s
95th percentile per-packet one-way delay: 220.729 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 20.07 Mbit/s
95th percentile per-packet one-way delay: 210.422 ms
Loss rate: 0.45%
-- Flow 2:
Average throughput: 17.68 Mbit/s
95th percentile per-packet one-way delay: 229.459 ms
Loss rate: 1.20%
-- Flow 3:
Average throughput: 7.71 Mbit/s
95th percentile per-packet one-way delay: 237.551 ms
Loss rate: 2.94%

Run 3: Report of QUIC Cubic — Data Link

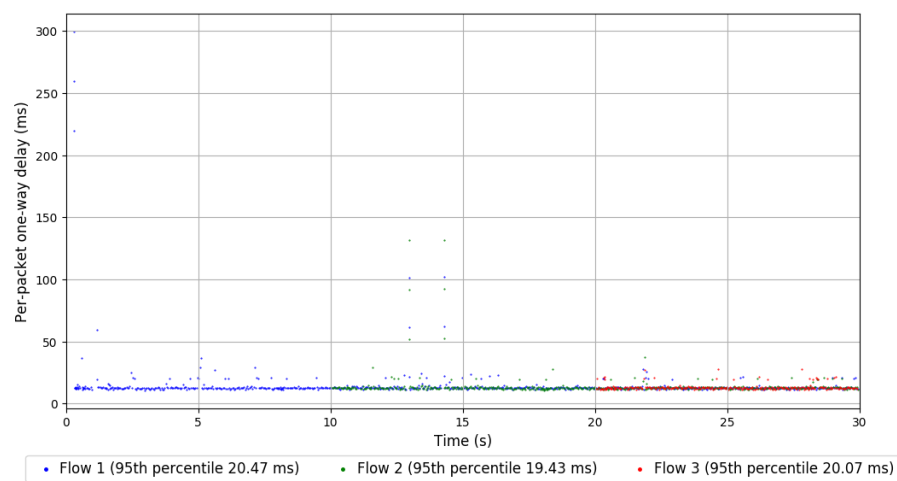
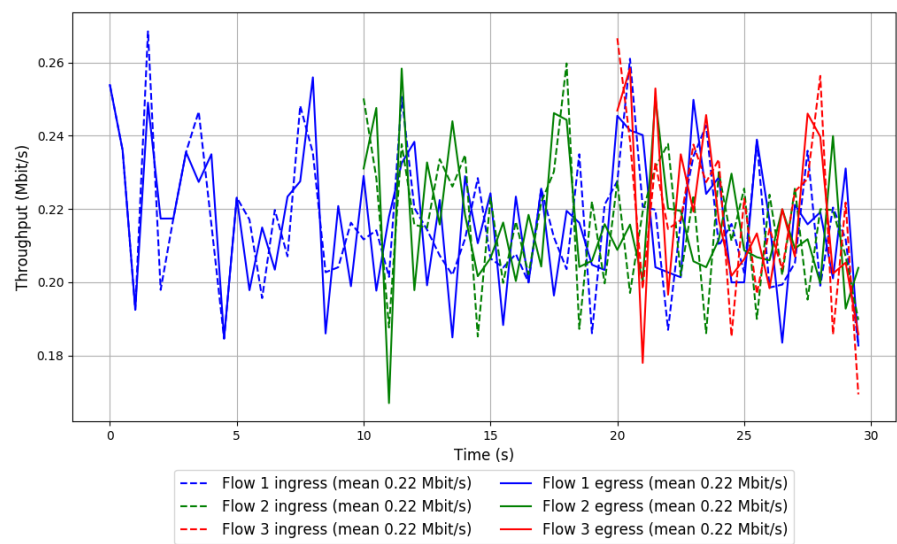


```
Run 1: Statistics of SReAM

Start at: 2018-01-16 01:17:02
End at: 2018-01-16 01:17:32
Local clock offset: 2.539 ms
Remote clock offset: -2.331 ms

# Below is generated by plot.py at 2018-01-16 02:12:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 20.066 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.471 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 19.433 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.066 ms
Loss rate: 0.00%
```

Run 1: Report of SReAM — Data Link

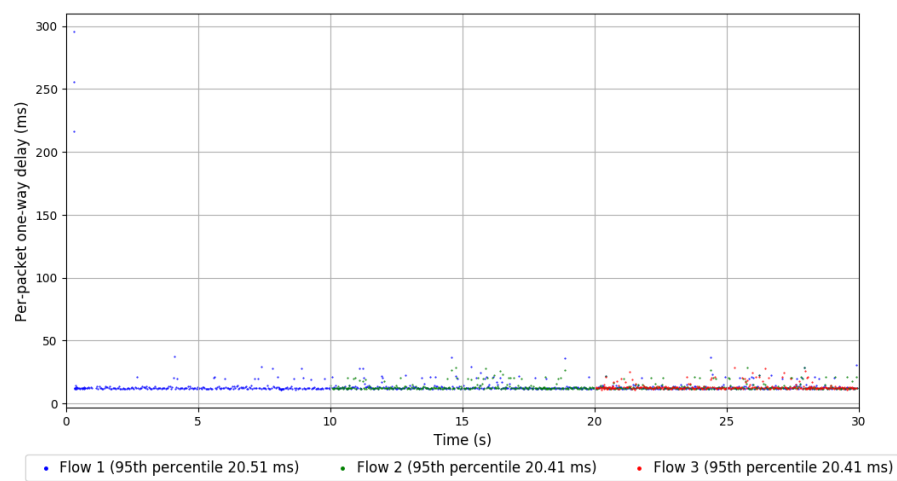
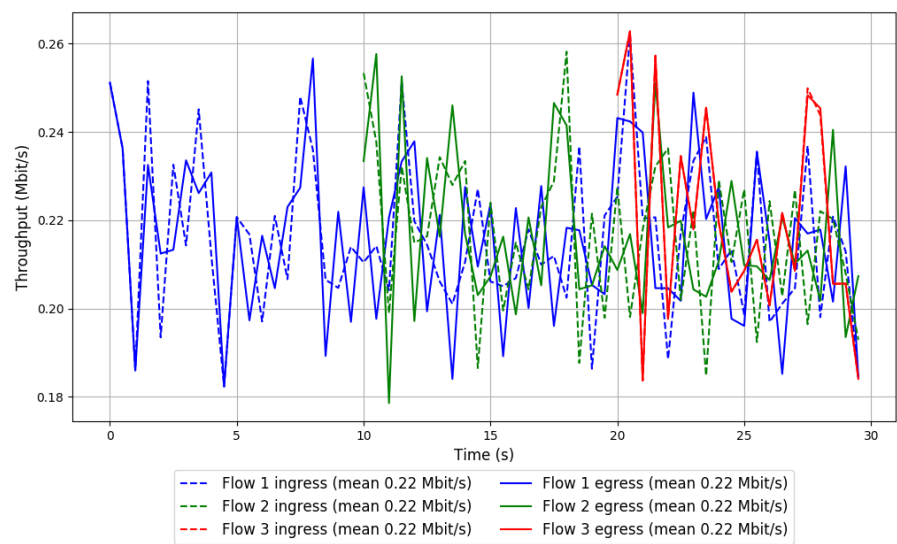


Run 2: Statistics of SReAM

Start at: 2018-01-16 01:34:56
End at: 2018-01-16 01:35:26
Local clock offset: 4.042 ms
Remote clock offset: -2.345 ms

Below is generated by plot.py at 2018-01-16 02:12:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 20.411 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.506 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.411 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.411 ms
Loss rate: 0.00%

Run 2: Report of SReAM — Data Link

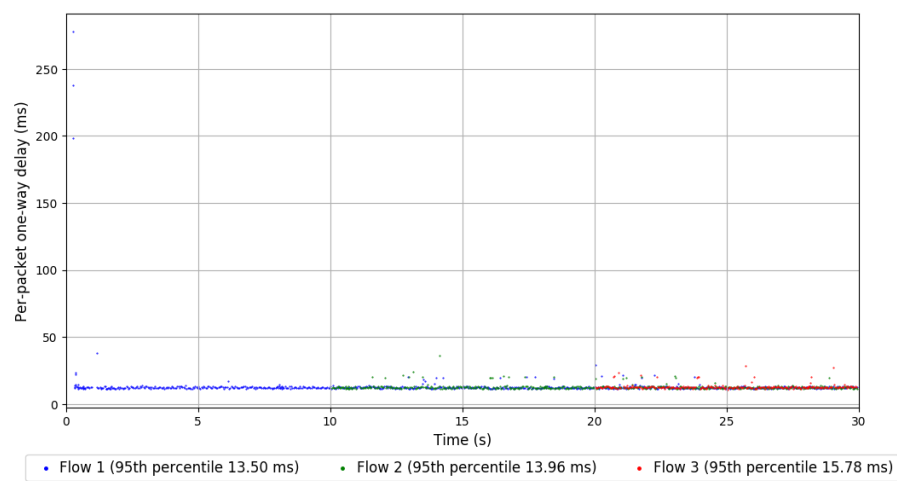
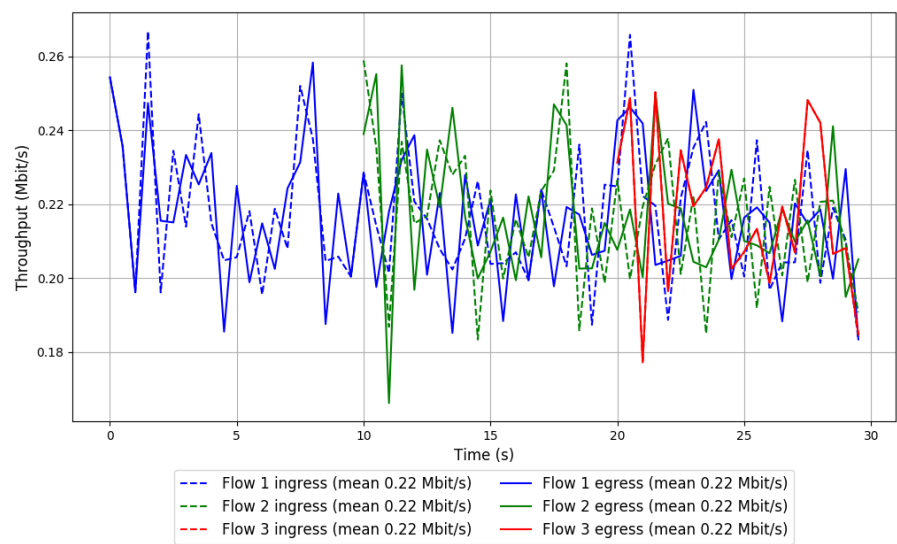


Run 3: Statistics of SReAM

Start at: 2018-01-16 01:52:51
End at: 2018-01-16 01:53:21
Local clock offset: 3.768 ms
Remote clock offset: -2.736 ms

Below is generated by plot.py at 2018-01-16 02:12:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 13.847 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 13.503 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 13.960 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 15.775 ms
Loss rate: 0.00%

Run 3: Report of SReAM — Data Link

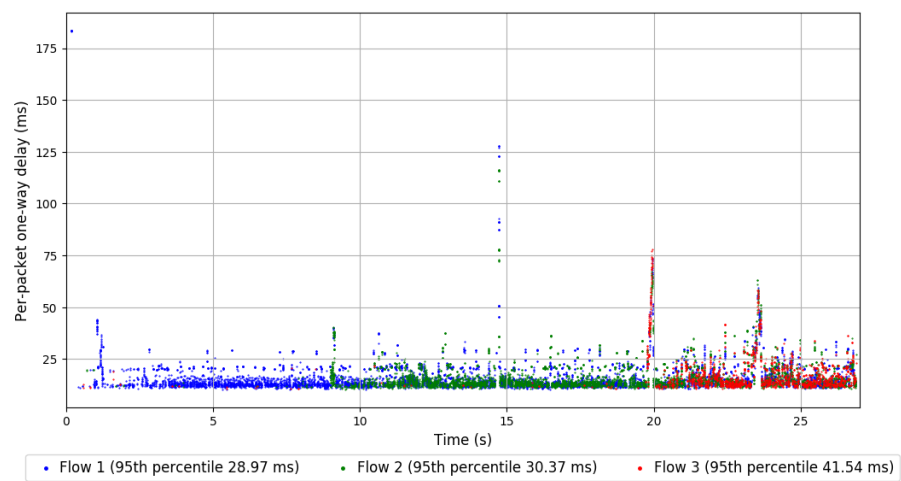
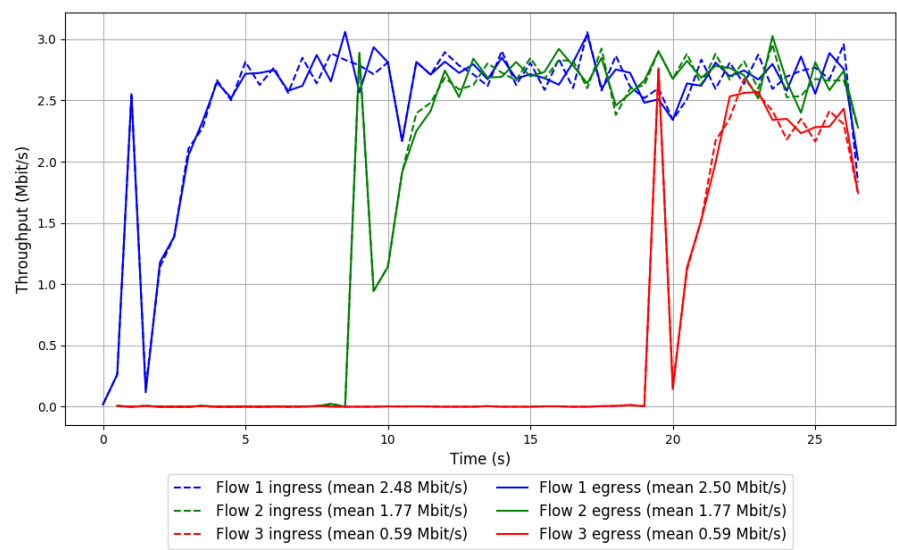


Run 1: Statistics of WebRTC media

Start at: 2018-01-16 01:31:22
End at: 2018-01-16 01:31:52
Local clock offset: 4.028 ms
Remote clock offset: -2.314 ms

Below is generated by plot.py at 2018-01-16 02:12:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 4.81 Mbit/s
95th percentile per-packet one-way delay: 29.772 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 2.50 Mbit/s
95th percentile per-packet one-way delay: 28.973 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 1.77 Mbit/s
95th percentile per-packet one-way delay: 30.371 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 41.544 ms
Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link

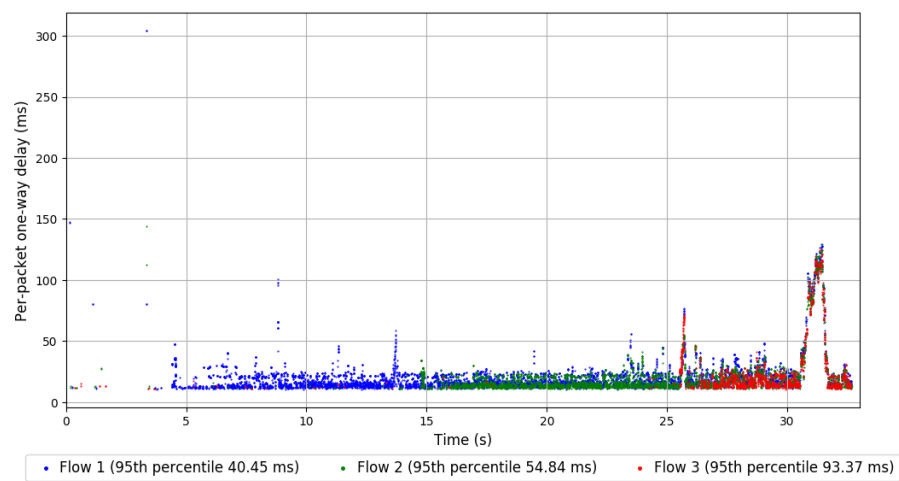
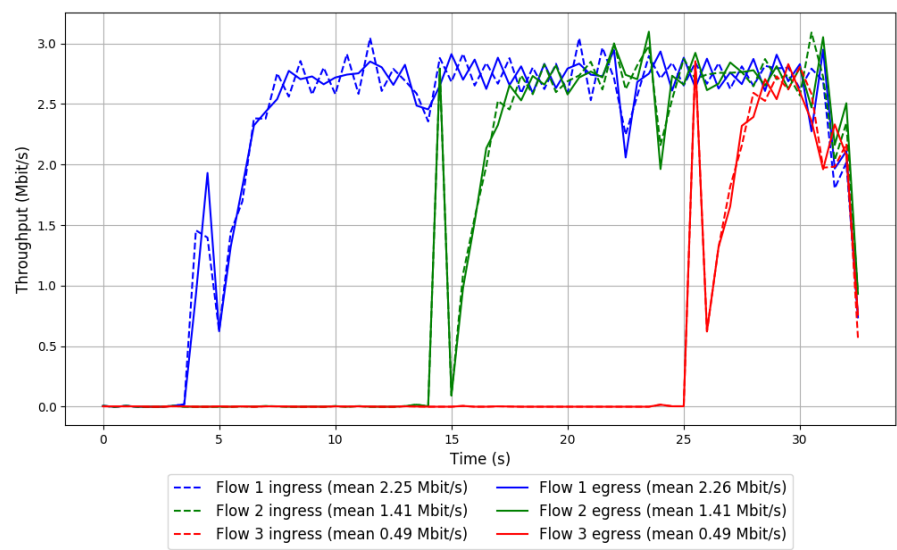


Run 2: Statistics of WebRTC media

Start at: 2018-01-16 01:49:16
End at: 2018-01-16 01:49:46
Local clock offset: 3.742 ms
Remote clock offset: -2.637 ms

Below is generated by plot.py at 2018-01-16 02:12:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 4.15 Mbit/s
95th percentile per-packet one-way delay: 54.835 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.26 Mbit/s
95th percentile per-packet one-way delay: 40.446 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 54.835 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 93.368 ms
Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-01-16 02:07:13

End at: 2018-01-16 02:07:43

Local clock offset: 2.788 ms

Remote clock offset: -2.85 ms

Below is generated by plot.py at 2018-01-16 02:12:50

Datalink statistics

-- Total of 3 flows:

Average throughput: 4.13 Mbit/s

95th percentile per-packet one-way delay: 24.623 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 2.26 Mbit/s

95th percentile per-packet one-way delay: 24.260 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 1.43 Mbit/s

95th percentile per-packet one-way delay: 25.392 ms

Loss rate: 0.00%

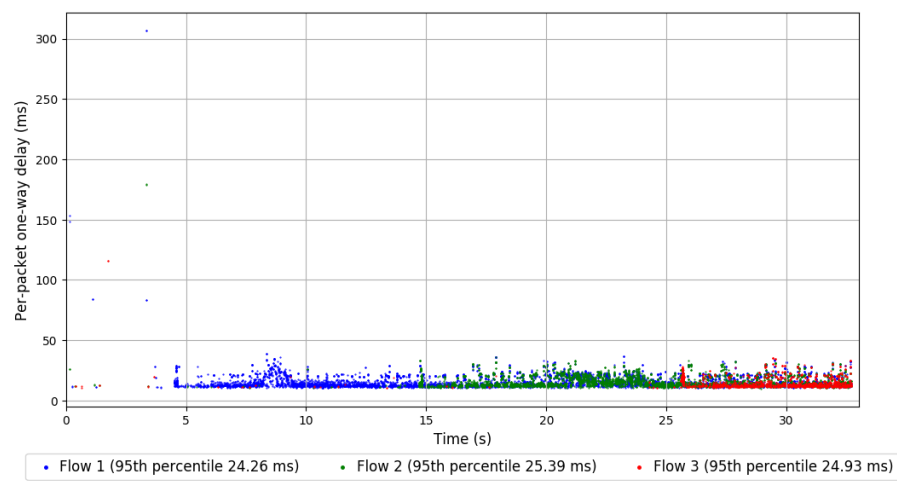
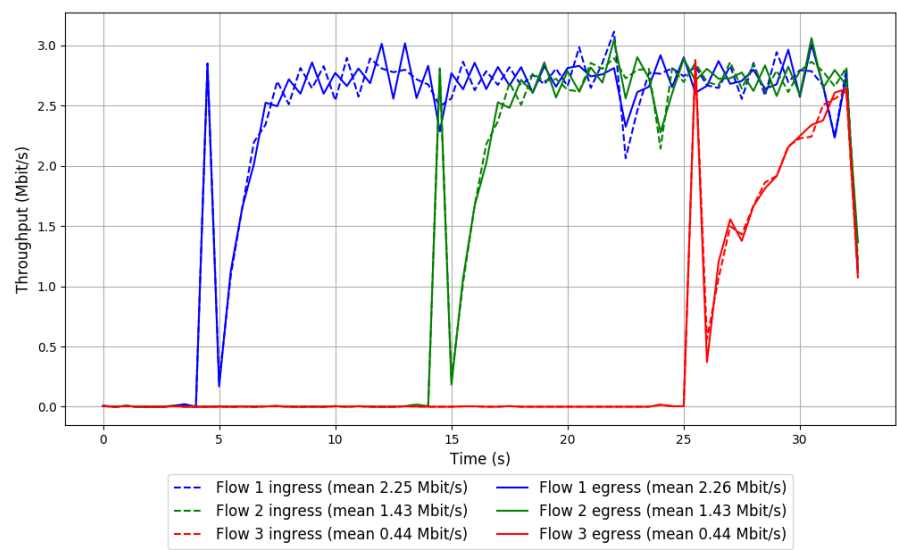
-- Flow 3:

Average throughput: 0.44 Mbit/s

95th percentile per-packet one-way delay: 24.934 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

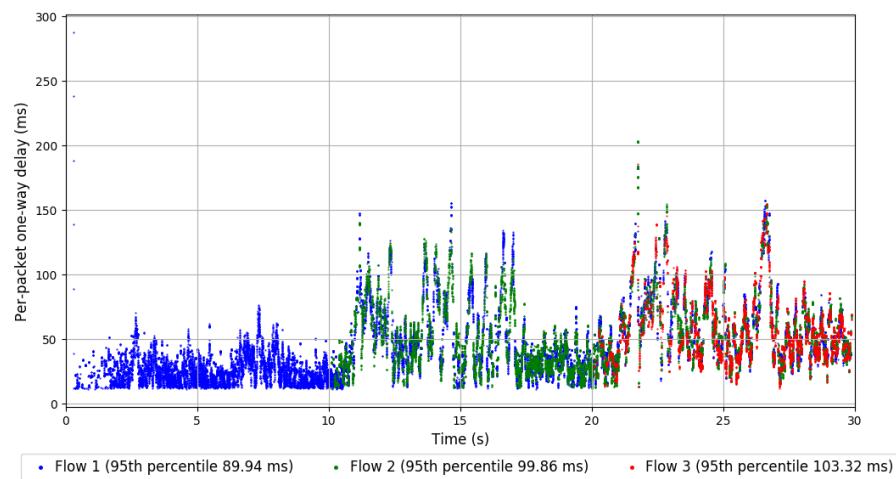
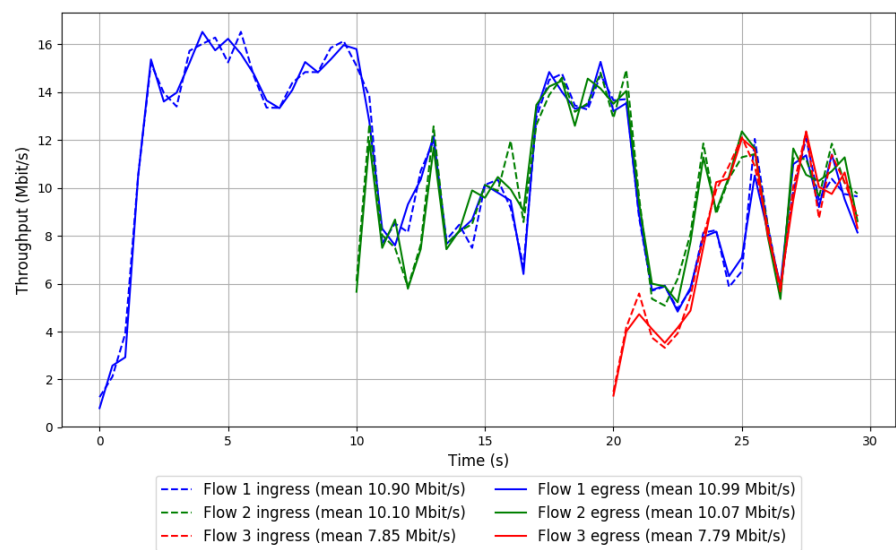


Run 1: Statistics of Sprout

Start at: 2018-01-16 01:25:25
End at: 2018-01-16 01:25:55
Local clock offset: 3.548 ms
Remote clock offset: -2.328 ms

Below is generated by plot.py at 2018-01-16 02:12:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 20.32 Mbit/s
95th percentile per-packet one-way delay: 95.734 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 10.99 Mbit/s
95th percentile per-packet one-way delay: 89.945 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 10.07 Mbit/s
95th percentile per-packet one-way delay: 99.863 ms
Loss rate: 0.50%
-- Flow 3:
Average throughput: 7.79 Mbit/s
95th percentile per-packet one-way delay: 103.317 ms
Loss rate: 1.30%

Run 1: Report of Sprout — Data Link

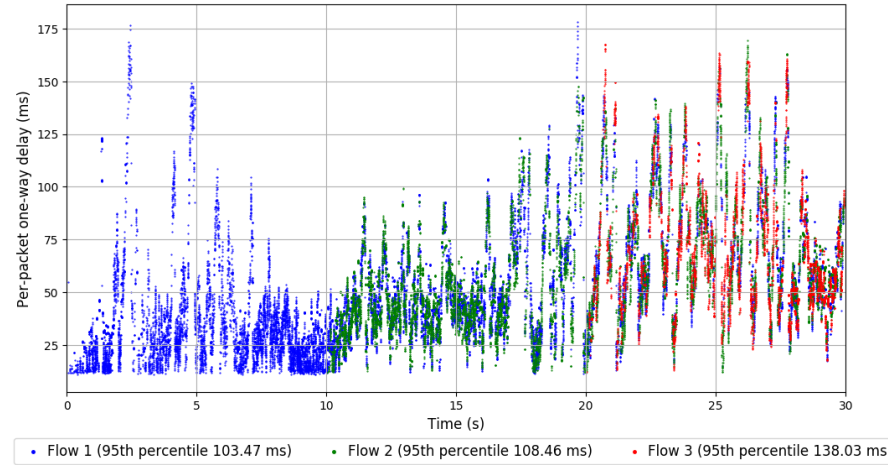
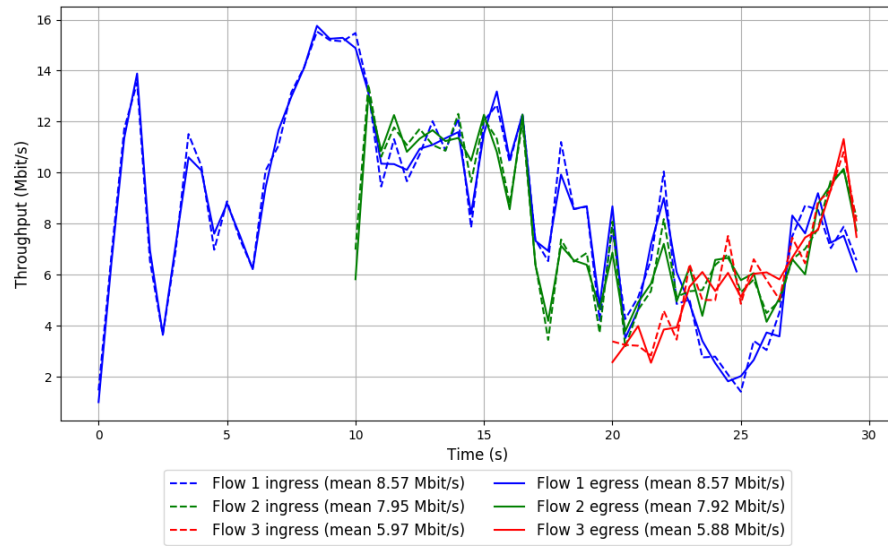


Run 2: Statistics of Sprout

Start at: 2018-01-16 01:43:17
End at: 2018-01-16 01:43:47
Local clock offset: 3.864 ms
Remote clock offset: -2.615 ms

Below is generated by plot.py at 2018-01-16 02:12:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 15.78 Mbit/s
95th percentile per-packet one-way delay: 109.772 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 8.57 Mbit/s
95th percentile per-packet one-way delay: 103.473 ms
Loss rate: 0.24%
-- Flow 2:
Average throughput: 7.92 Mbit/s
95th percentile per-packet one-way delay: 108.458 ms
Loss rate: 0.42%
-- Flow 3:
Average throughput: 5.88 Mbit/s
95th percentile per-packet one-way delay: 138.025 ms
Loss rate: 1.37%

Run 2: Report of Sprout — Data Link

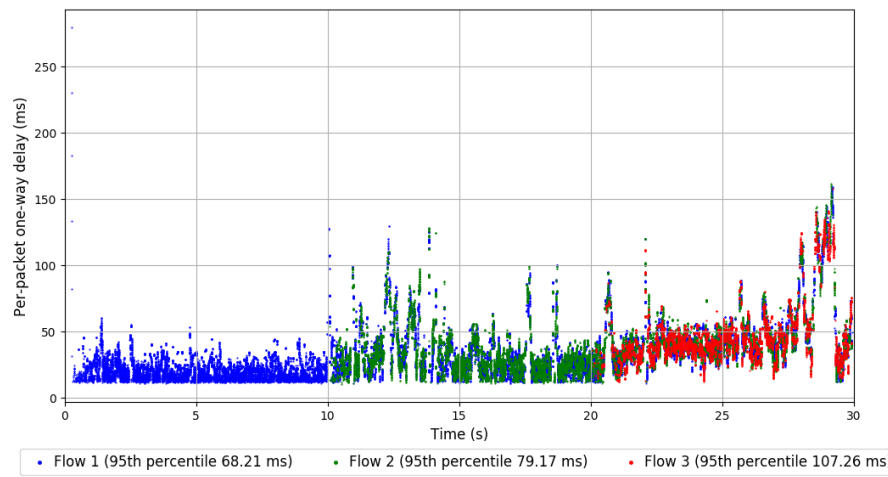
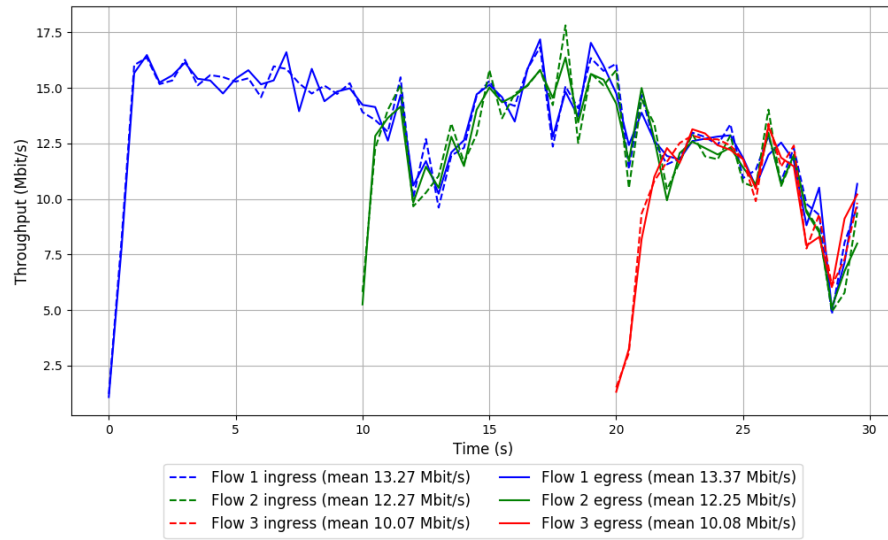


Run 3: Statistics of Sprout

Start at: 2018-01-16 02:01:13
End at: 2018-01-16 02:01:43
Local clock offset: 3.198 ms
Remote clock offset: -2.744 ms

```
# Below is generated by plot.py at 2018-01-16 02:12:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 24.93 Mbit/s
95th percentile per-packet one-way delay: 74.925 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 13.37 Mbit/s
95th percentile per-packet one-way delay: 68.208 ms
Loss rate: 0.04%
-- Flow 2:
Average throughput: 12.25 Mbit/s
95th percentile per-packet one-way delay: 79.174 ms
Loss rate: 0.34%
-- Flow 3:
Average throughput: 10.08 Mbit/s
95th percentile per-packet one-way delay: 107.259 ms
Loss rate: 0.02%
```

Run 3: Report of Sprout — Data Link

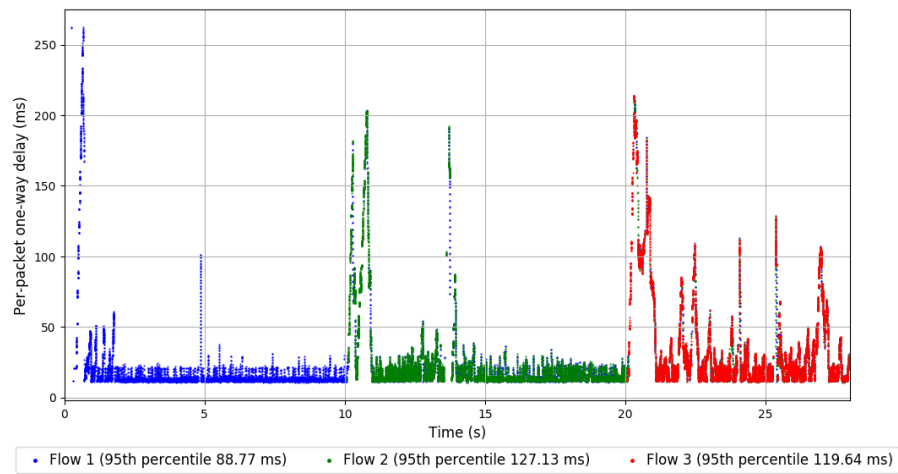
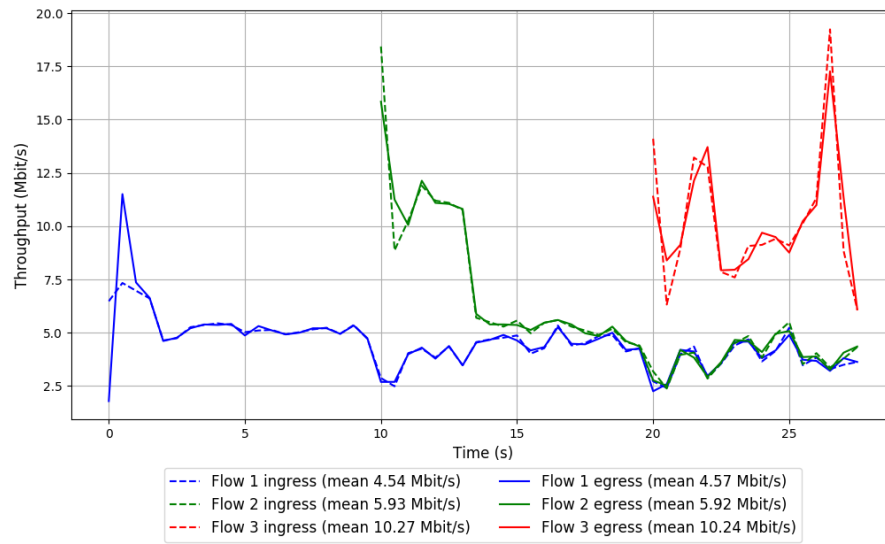


Run 1: Statistics of TaoVA-100x

Start at: 2018-01-16 01:23:00
End at: 2018-01-16 01:23:30
Local clock offset: 3.153 ms
Remote clock offset: -2.279 ms

Below is generated by plot.py at 2018-01-16 02:12:57
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.35 Mbit/s
95th percentile per-packet one-way delay: 109.140 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 88.769 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 5.92 Mbit/s
95th percentile per-packet one-way delay: 127.127 ms
Loss rate: 0.05%
-- Flow 3:
Average throughput: 10.24 Mbit/s
95th percentile per-packet one-way delay: 119.636 ms
Loss rate: 0.13%

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

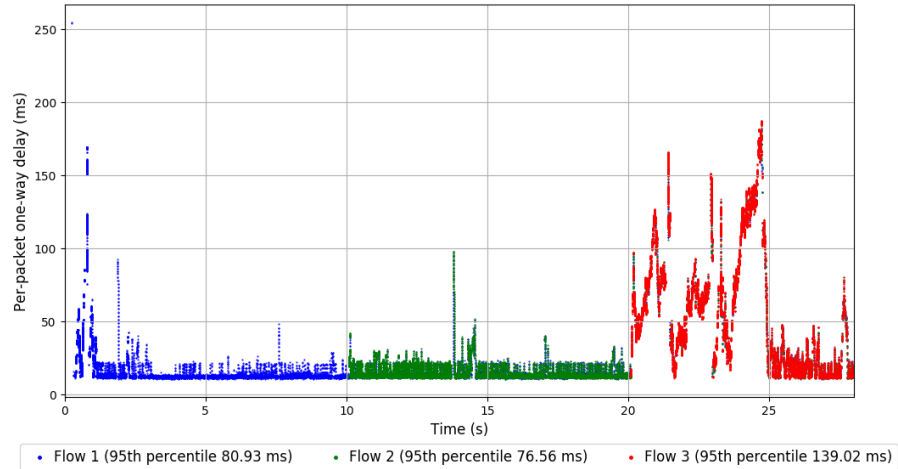
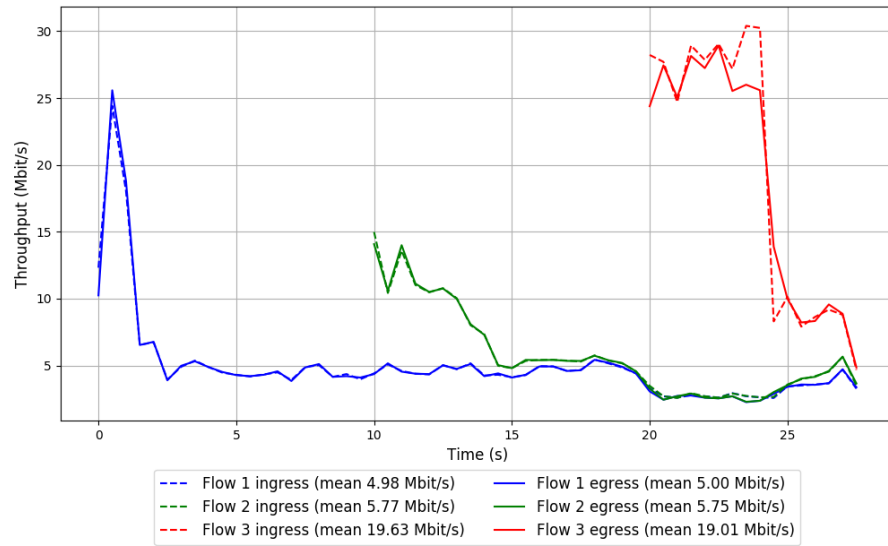


Run 2: Statistics of TaoVA-100x

Start at: 2018-01-16 01:40:53
End at: 2018-01-16 01:41:23
Local clock offset: 3.866 ms
Remote clock offset: -2.584 ms

Below is generated by plot.py at 2018-01-16 02:12:59
Datalink statistics
-- Total of 3 flows:
Average throughput: 14.17 Mbit/s
95th percentile per-packet one-way delay: 126.091 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 5.00 Mbit/s
95th percentile per-packet one-way delay: 80.934 ms
Loss rate: 0.39%
-- Flow 2:
Average throughput: 5.75 Mbit/s
95th percentile per-packet one-way delay: 76.556 ms
Loss rate: 0.49%
-- Flow 3:
Average throughput: 19.01 Mbit/s
95th percentile per-packet one-way delay: 139.018 ms
Loss rate: 3.17%

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

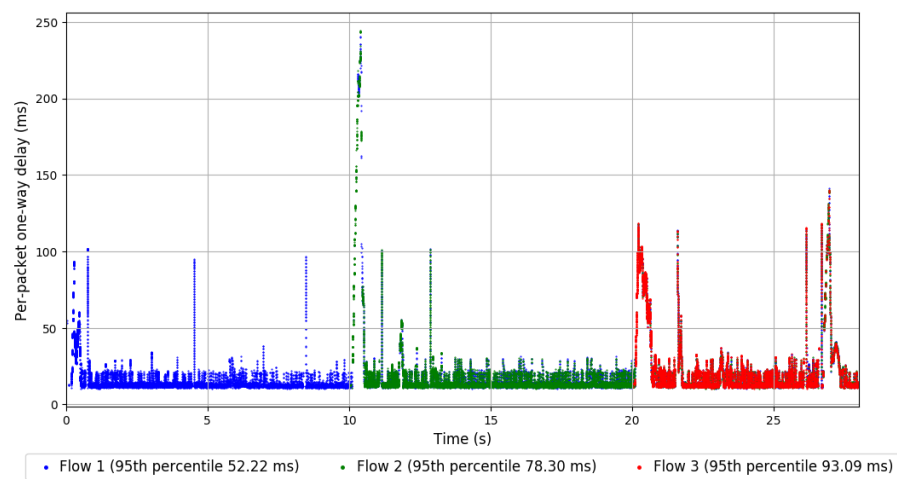
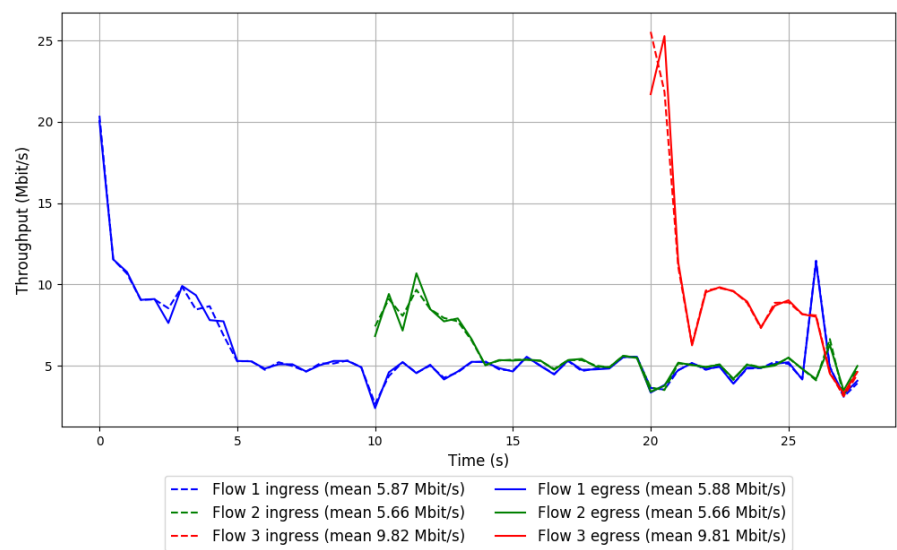


Run 3: Statistics of TaoVA-100x

Start at: 2018-01-16 01:58:49
End at: 2018-01-16 01:59:19
Local clock offset: 3.517 ms
Remote clock offset: -2.686 ms

Below is generated by plot.py at 2018-01-16 02:12:59
Datalink statistics
-- Total of 3 flows:
Average throughput: 12.31 Mbit/s
95th percentile per-packet one-way delay: 78.691 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 5.88 Mbit/s
95th percentile per-packet one-way delay: 52.223 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 5.66 Mbit/s
95th percentile per-packet one-way delay: 78.300 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 9.81 Mbit/s
95th percentile per-packet one-way delay: 93.087 ms
Loss rate: 0.00%

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

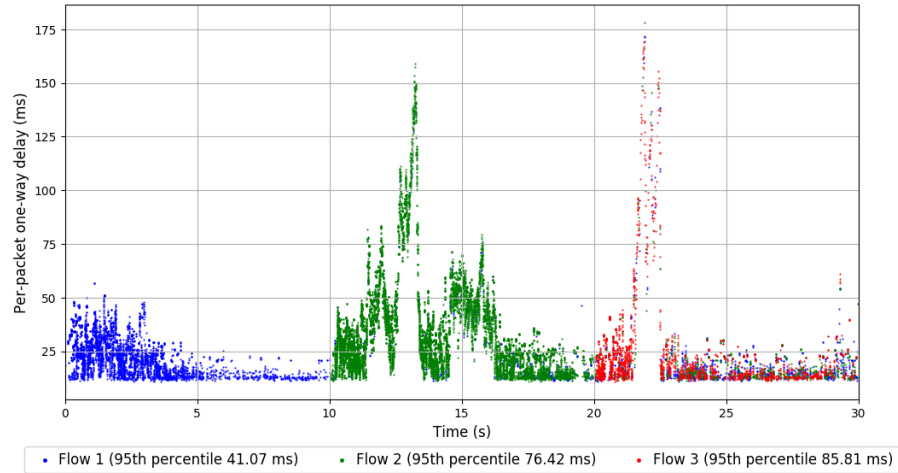
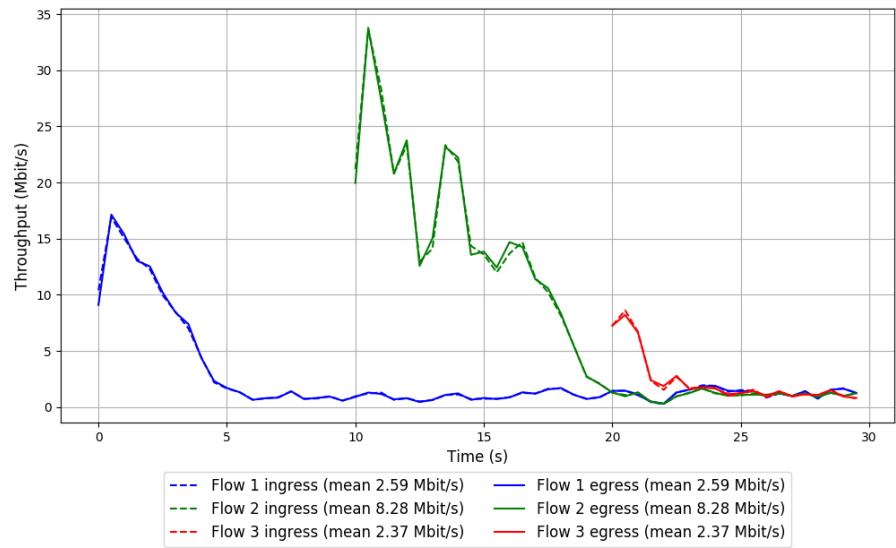


Run 1: Statistics of TCP Vegas

Start at: 2018-01-16 01:32:33
End at: 2018-01-16 01:33:03
Local clock offset: 4.053 ms
Remote clock offset: -2.294 ms

Below is generated by plot.py at 2018-01-16 02:12:59
Datalink statistics
-- Total of 3 flows:
Average throughput: 8.87 Mbit/s
95th percentile per-packet one-way delay: 66.849 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.59 Mbit/s
95th percentile per-packet one-way delay: 41.074 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 8.28 Mbit/s
95th percentile per-packet one-way delay: 76.425 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 85.809 ms
Loss rate: 0.00%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-01-16 01:50:27

End at: 2018-01-16 01:50:57

Local clock offset: 3.672 ms

Remote clock offset: -2.66 ms

Below is generated by plot.py at 2018-01-16 02:13:01

Datalink statistics

-- Total of 3 flows:

Average throughput: 14.06 Mbit/s

95th percentile per-packet one-way delay: 102.822 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 2.43 Mbit/s

95th percentile per-packet one-way delay: 65.729 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 11.39 Mbit/s

95th percentile per-packet one-way delay: 135.277 ms

Loss rate: 0.01%

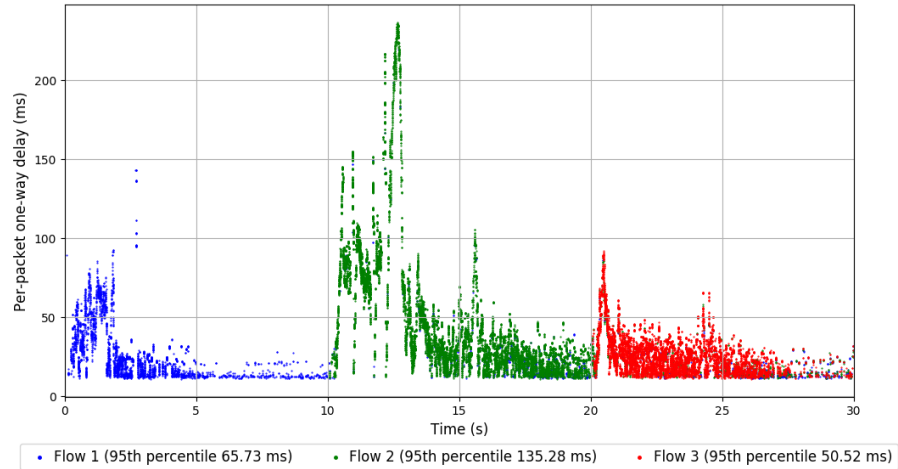
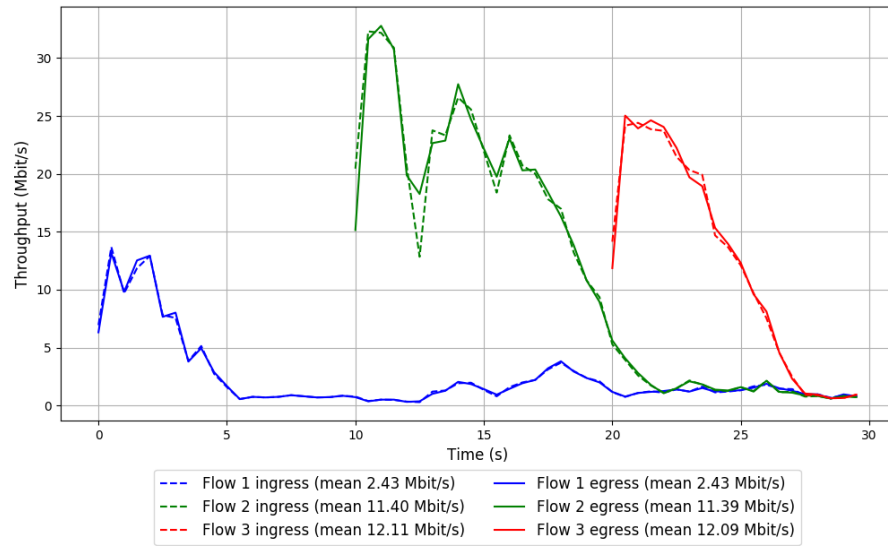
-- Flow 3:

Average throughput: 12.09 Mbit/s

95th percentile per-packet one-way delay: 50.519 ms

Loss rate: 0.00%

Run 2: Report of TCP Vegas — Data Link

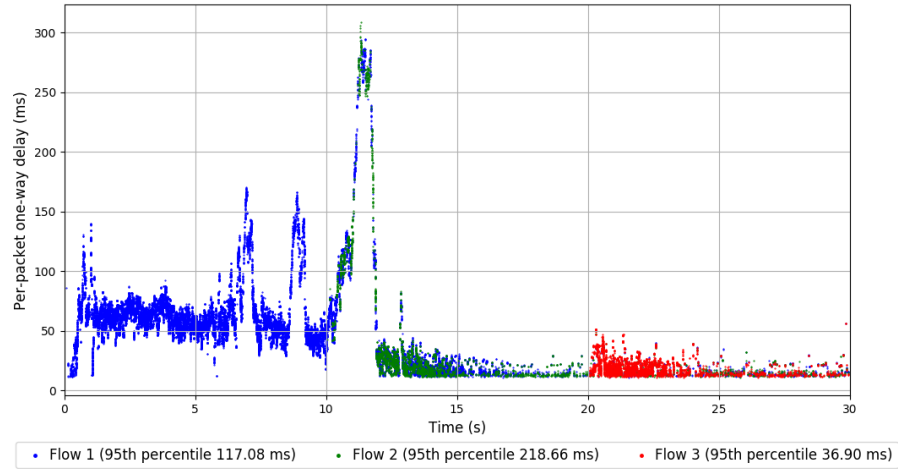
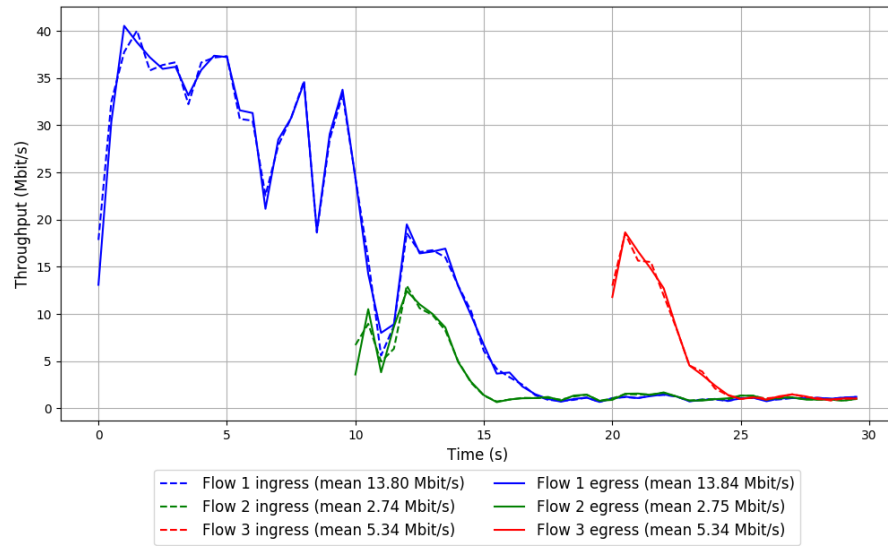


Run 3: Statistics of TCP Vegas

Start at: 2018-01-16 02:08:24
End at: 2018-01-16 02:08:54
Local clock offset: 2.645 ms
Remote clock offset: -2.853 ms

Below is generated by plot.py at 2018-01-16 02:13:05
Datalink statistics
-- Total of 3 flows:
Average throughput: 17.44 Mbit/s
95th percentile per-packet one-way delay: 117.761 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 13.84 Mbit/s
95th percentile per-packet one-way delay: 117.083 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 2.75 Mbit/s
95th percentile per-packet one-way delay: 218.659 ms
Loss rate: 0.02%
-- Flow 3:
Average throughput: 5.34 Mbit/s
95th percentile per-packet one-way delay: 36.900 ms
Loss rate: 0.00%

Run 3: Report of TCP Vegas — Data Link

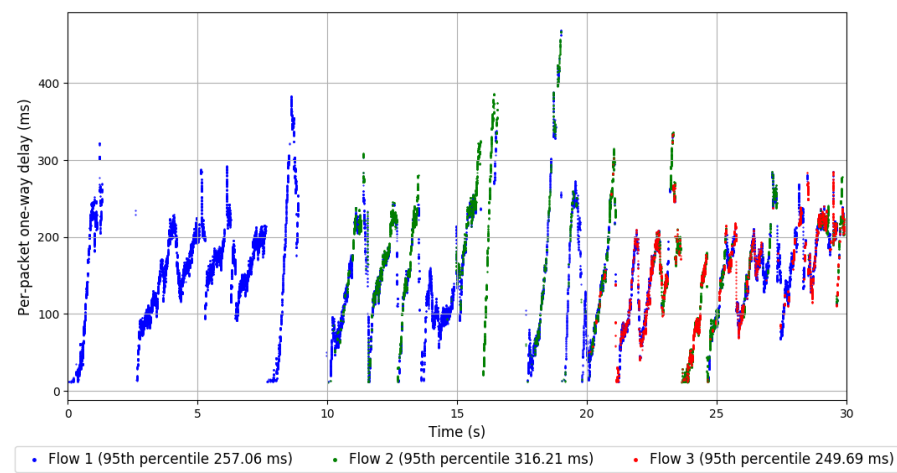
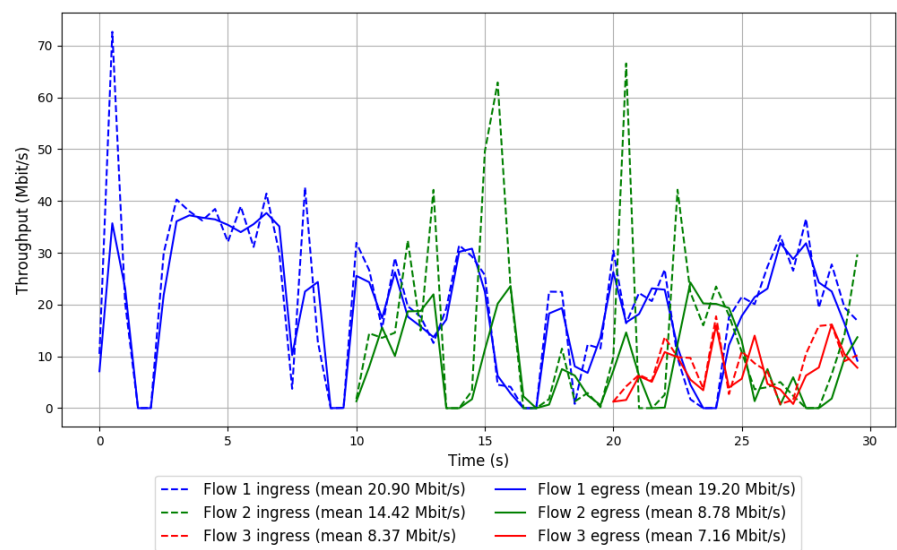


Run 1: Statistics of Verus

Start at: 2018-01-16 01:19:25
End at: 2018-01-16 01:19:55
Local clock offset: 2.799 ms
Remote clock offset: -2.399 ms

Below is generated by plot.py at 2018-01-16 02:13:20
Datalink statistics
-- Total of 3 flows:
Average throughput: 27.39 Mbit/s
95th percentile per-packet one-way delay: 270.373 ms
Loss rate: 17.40%
-- Flow 1:
Average throughput: 19.20 Mbit/s
95th percentile per-packet one-way delay: 257.059 ms
Loss rate: 8.15%
-- Flow 2:
Average throughput: 8.78 Mbit/s
95th percentile per-packet one-way delay: 316.212 ms
Loss rate: 38.53%
-- Flow 3:
Average throughput: 7.16 Mbit/s
95th percentile per-packet one-way delay: 249.688 ms
Loss rate: 14.81%

Run 1: Report of Verus — Data Link

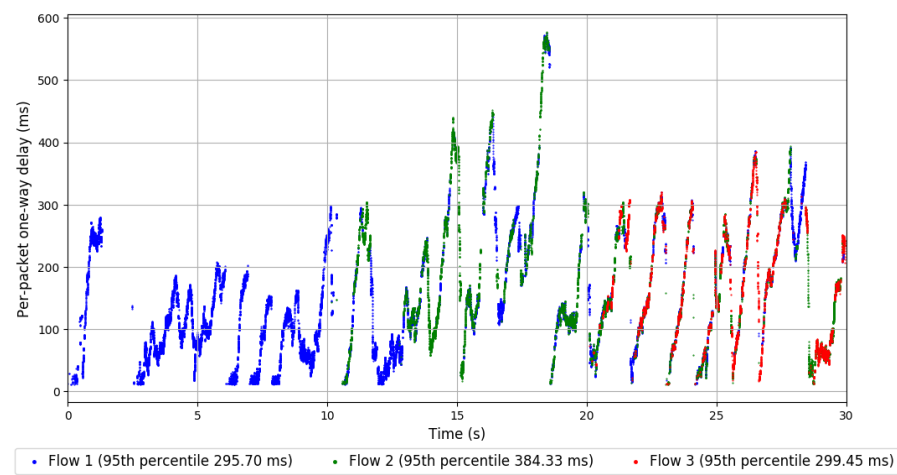
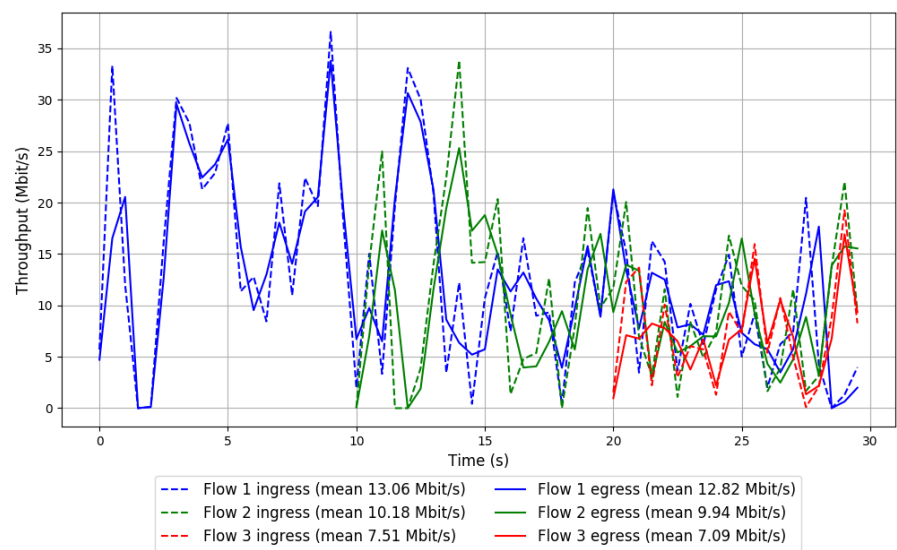


Run 2: Statistics of Verus

Start at: 2018-01-16 01:37:18
End at: 2018-01-16 01:37:48
Local clock offset: 4.065 ms
Remote clock offset: -2.483 ms

Below is generated by plot.py at 2018-01-16 02:13:20
Datalink statistics
-- Total of 3 flows:
Average throughput: 21.68 Mbit/s
95th percentile per-packet one-way delay: 318.831 ms
Loss rate: 2.76%
-- Flow 1:
Average throughput: 12.82 Mbit/s
95th percentile per-packet one-way delay: 295.699 ms
Loss rate: 1.98%
-- Flow 2:
Average throughput: 9.94 Mbit/s
95th percentile per-packet one-way delay: 384.329 ms
Loss rate: 3.05%
-- Flow 3:
Average throughput: 7.09 Mbit/s
95th percentile per-packet one-way delay: 299.452 ms
Loss rate: 6.08%

Run 2: Report of Verus — Data Link

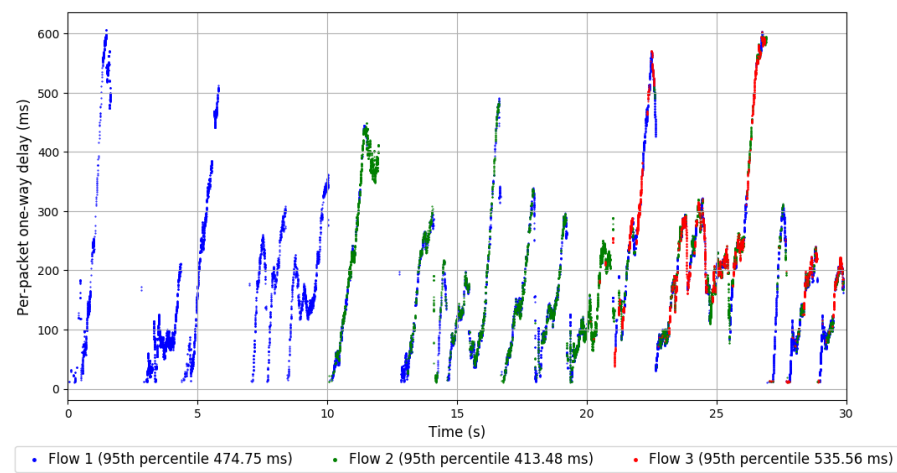
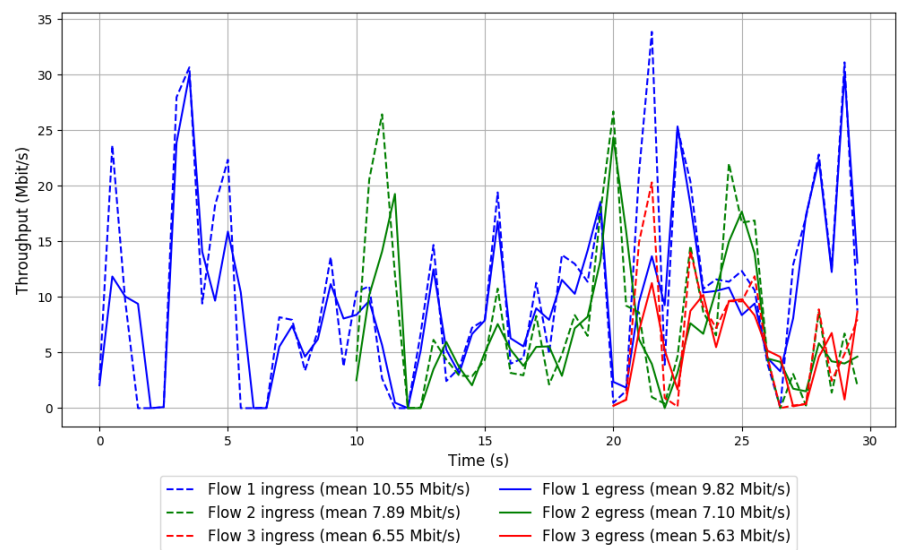


Run 3: Statistics of Verus

Start at: 2018-01-16 01:55:13
End at: 2018-01-16 01:55:43
Local clock offset: 3.839 ms
Remote clock offset: -2.74 ms

Below is generated by plot.py at 2018-01-16 02:13:20
Datalink statistics
-- Total of 3 flows:
Average throughput: 16.36 Mbit/s
95th percentile per-packet one-way delay: 464.692 ms
Loss rate: 8.48%
-- Flow 1:
Average throughput: 9.82 Mbit/s
95th percentile per-packet one-way delay: 474.749 ms
Loss rate: 6.66%
-- Flow 2:
Average throughput: 7.10 Mbit/s
95th percentile per-packet one-way delay: 413.479 ms
Loss rate: 9.59%
-- Flow 3:
Average throughput: 5.63 Mbit/s
95th percentile per-packet one-way delay: 535.564 ms
Loss rate: 14.69%

Run 3: Report of Verus — Data Link

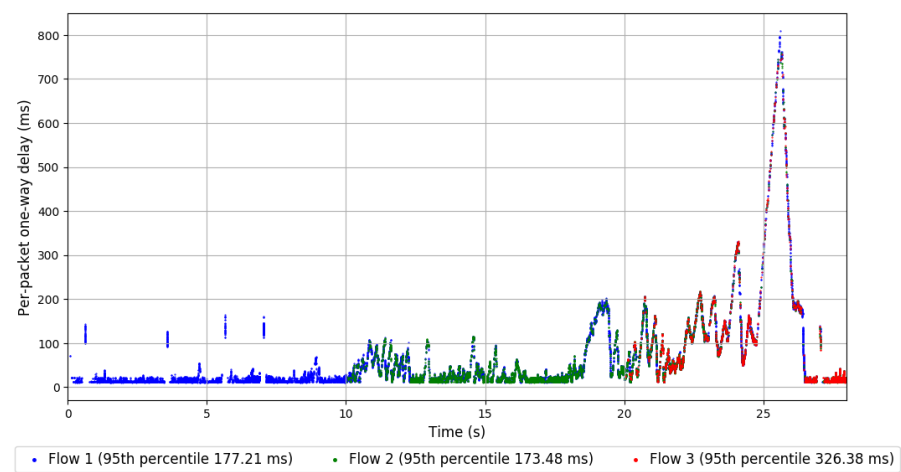
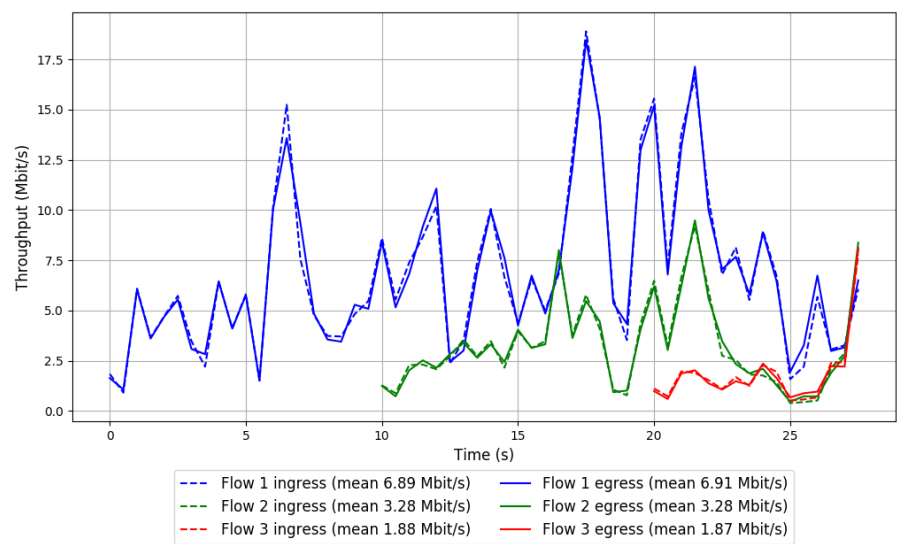


Run 1: Statistics of Copa

Start at: 2018-01-16 01:33:44
End at: 2018-01-16 01:34:14
Local clock offset: 4.045 ms
Remote clock offset: -2.417 ms

Below is generated by plot.py at 2018-01-16 02:13:20
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.55 Mbit/s
95th percentile per-packet one-way delay: 180.683 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 6.91 Mbit/s
95th percentile per-packet one-way delay: 177.207 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 3.28 Mbit/s
95th percentile per-packet one-way delay: 173.480 ms
Loss rate: 0.13%
-- Flow 3:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 326.385 ms
Loss rate: 0.35%

Run 1: Report of Copa — Data Link

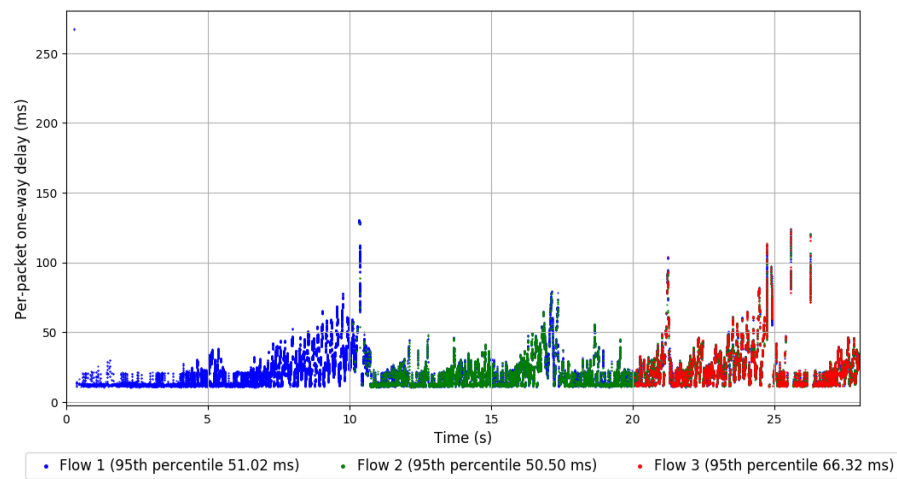
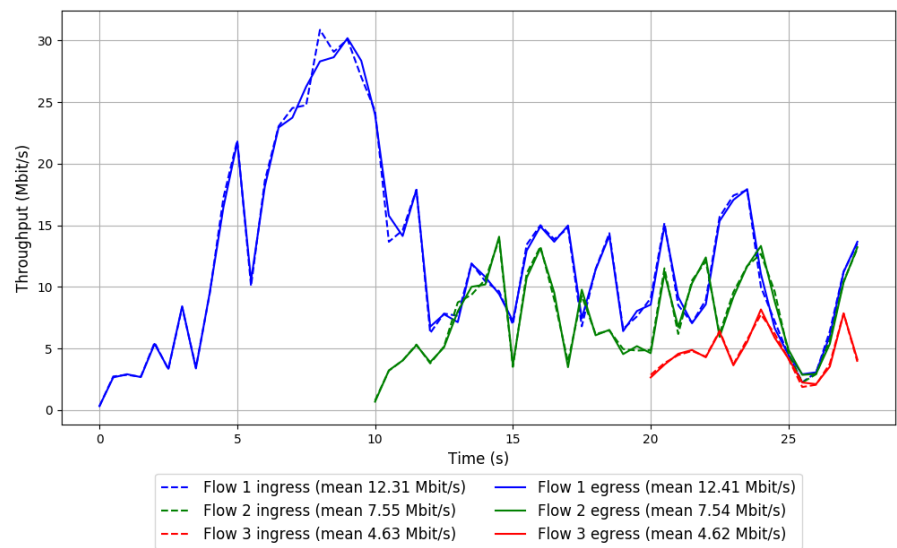


Run 2: Statistics of Copa

Start at: 2018-01-16 01:51:39
End at: 2018-01-16 01:52:09
Local clock offset: 3.765 ms
Remote clock offset: -2.679 ms

Below is generated by plot.py at 2018-01-16 02:13:28
Datalink statistics
-- Total of 3 flows:
Average throughput: 18.62 Mbit/s
95th percentile per-packet one-way delay: 51.946 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 12.41 Mbit/s
95th percentile per-packet one-way delay: 51.025 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 7.54 Mbit/s
95th percentile per-packet one-way delay: 50.496 ms
Loss rate: 0.12%
-- Flow 3:
Average throughput: 4.62 Mbit/s
95th percentile per-packet one-way delay: 66.320 ms
Loss rate: 0.17%

Run 2: Report of Copa — Data Link

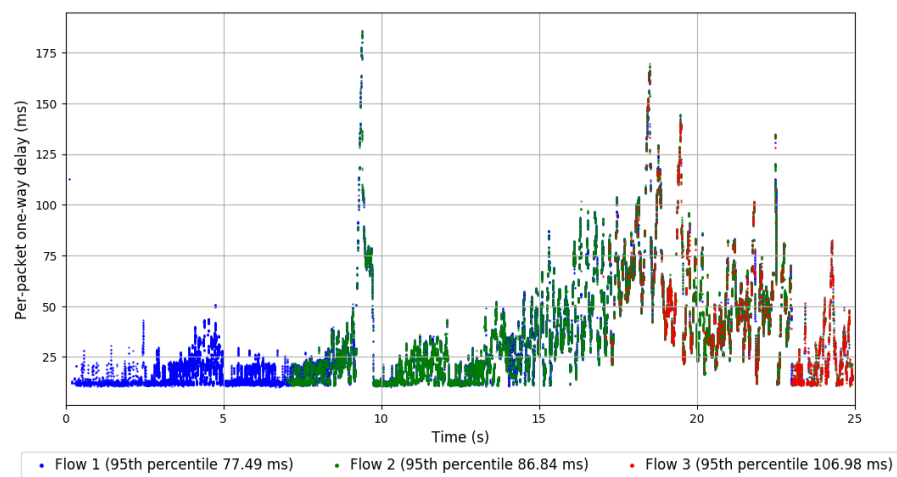
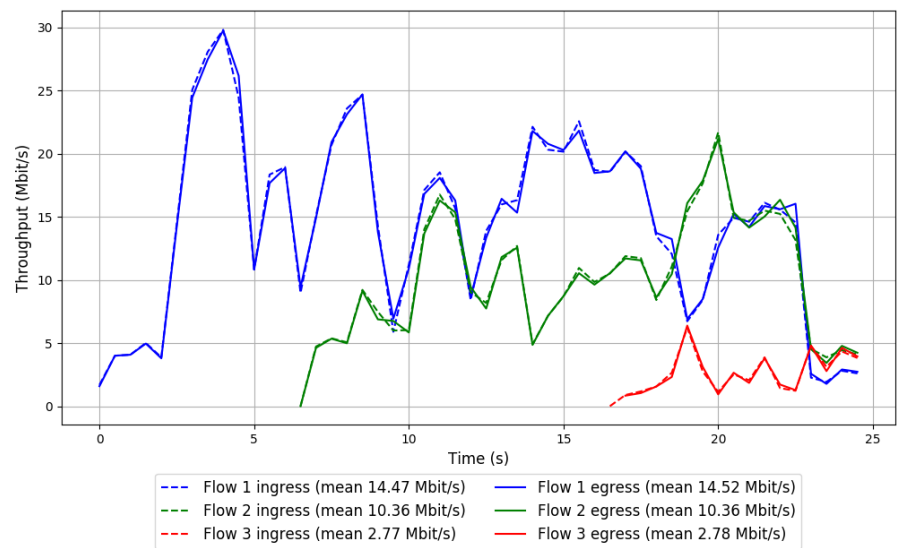


Run 3: Statistics of Copa

Start at: 2018-01-16 02:09:35
End at: 2018-01-16 02:10:05
Local clock offset: 2.56 ms
Remote clock offset: -2.872 ms

Below is generated by plot.py at 2018-01-16 02:13:30
Datalink statistics
-- Total of 3 flows:
Average throughput: 22.89 Mbit/s
95th percentile per-packet one-way delay: 81.453 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 14.52 Mbit/s
95th percentile per-packet one-way delay: 77.494 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 10.36 Mbit/s
95th percentile per-packet one-way delay: 86.842 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 106.985 ms
Loss rate: 0.00%

Run 3: Report of Copa — Data Link

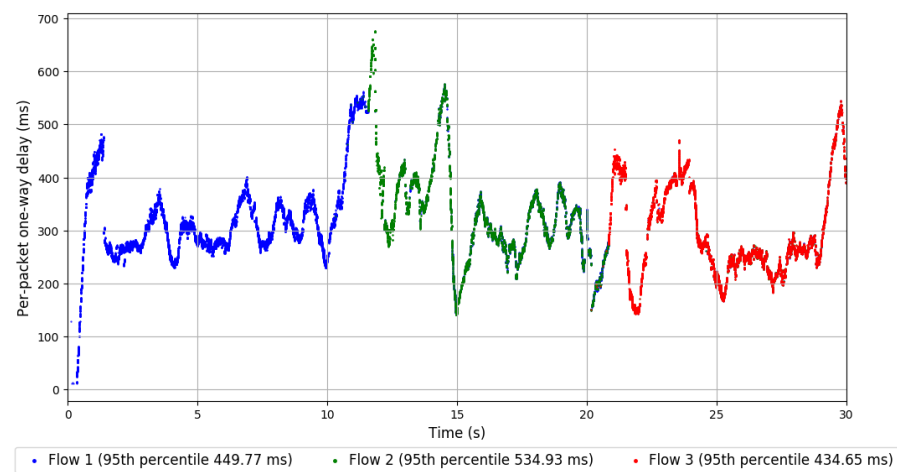
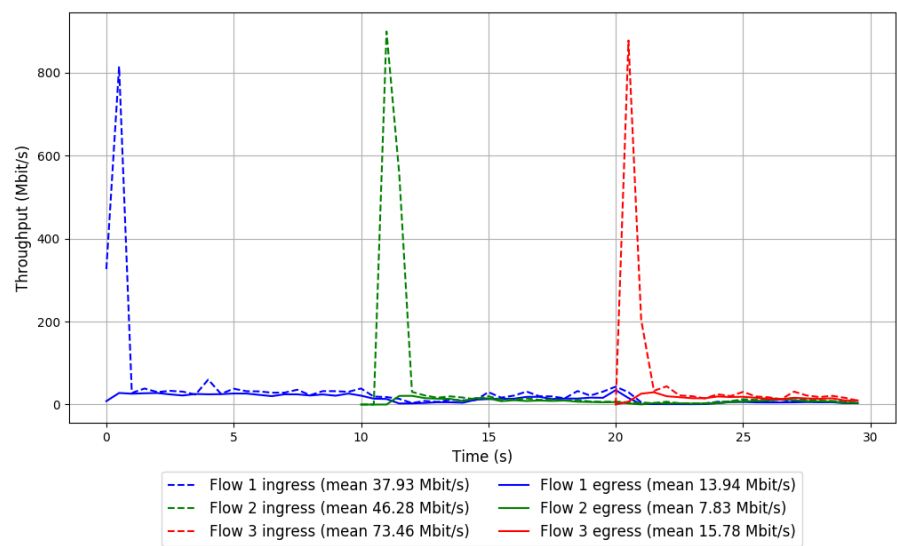


Run 1: Statistics of FillP

Start at: 2018-01-16 01:24:12
End at: 2018-01-16 01:24:42
Local clock offset: 3.398 ms
Remote clock offset: -2.326 ms

Below is generated by plot.py at 2018-01-16 02:13:35
Datalink statistics
-- Total of 3 flows:
Average throughput: 24.27 Mbit/s
95th percentile per-packet one-way delay: 460.886 ms
Loss rate: 74.01%
-- Flow 1:
Average throughput: 13.94 Mbit/s
95th percentile per-packet one-way delay: 449.774 ms
Loss rate: 63.38%
-- Flow 2:
Average throughput: 7.83 Mbit/s
95th percentile per-packet one-way delay: 534.932 ms
Loss rate: 83.34%
-- Flow 3:
Average throughput: 15.78 Mbit/s
95th percentile per-packet one-way delay: 434.654 ms
Loss rate: 78.78%

Run 1: Report of FillP — Data Link

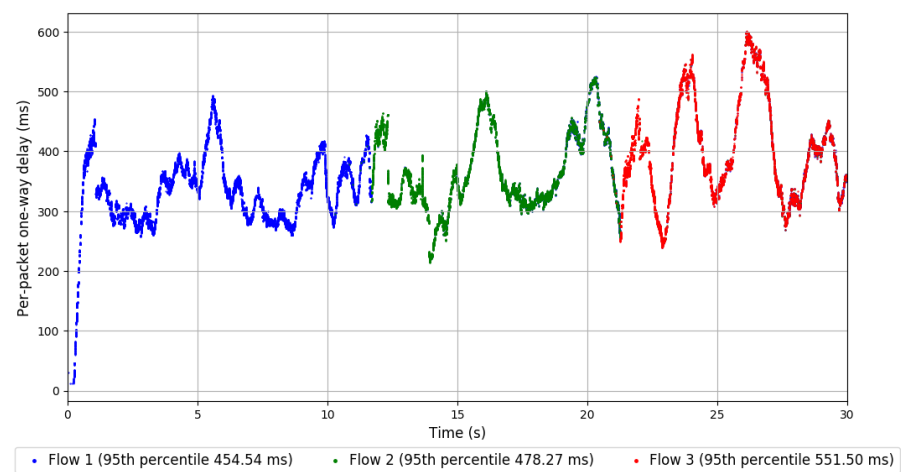
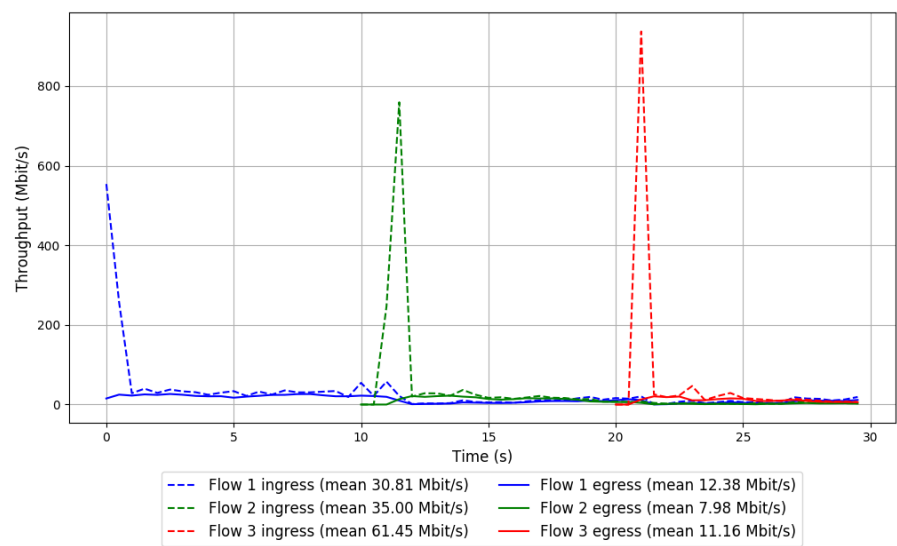


Run 2: Statistics of FillP

Start at: 2018-01-16 01:42:05
End at: 2018-01-16 01:42:35
Local clock offset: 3.903 ms
Remote clock offset: -2.599 ms

Below is generated by plot.py at 2018-01-16 02:13:35
Datalink statistics
-- Total of 3 flows:
Average throughput: 21.16 Mbit/s
95th percentile per-packet one-way delay: 491.096 ms
Loss rate: 71.60%
-- Flow 1:
Average throughput: 12.38 Mbit/s
95th percentile per-packet one-way delay: 454.536 ms
Loss rate: 59.83%
-- Flow 2:
Average throughput: 7.98 Mbit/s
95th percentile per-packet one-way delay: 478.274 ms
Loss rate: 77.51%
-- Flow 3:
Average throughput: 11.16 Mbit/s
95th percentile per-packet one-way delay: 551.498 ms
Loss rate: 82.64%

Run 2: Report of FillP — Data Link

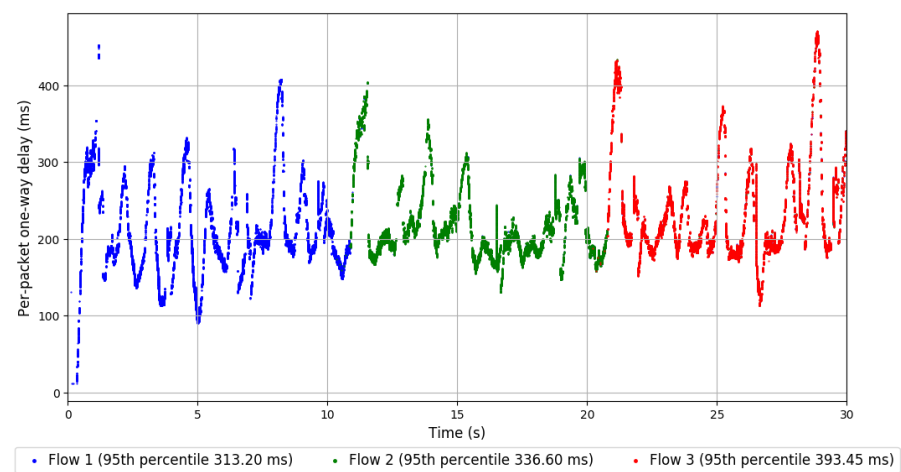
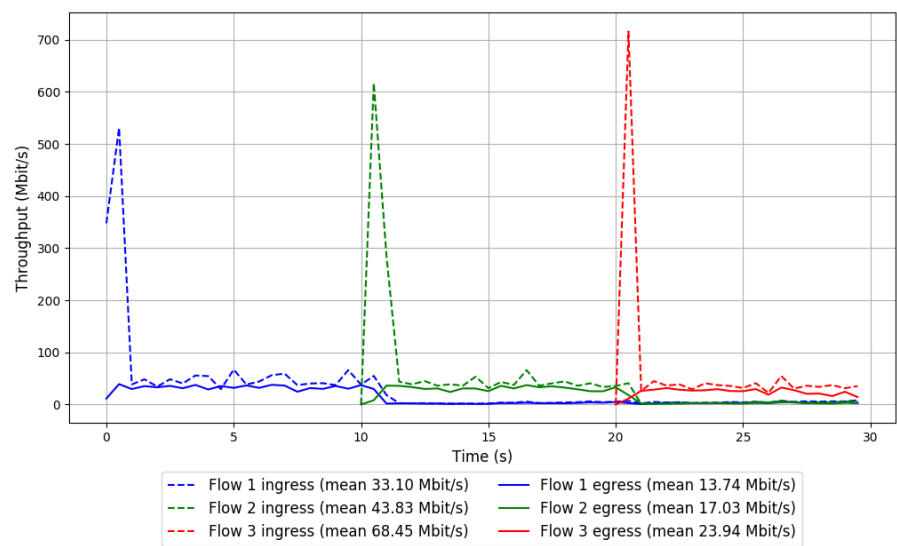


Run 3: Statistics of FillP

Start at: 2018-01-16 02:00:01
End at: 2018-01-16 02:00:31
Local clock offset: 3.408 ms
Remote clock offset: -2.703 ms

Below is generated by plot.py at 2018-01-16 02:13:37
Datalink statistics
-- Total of 3 flows:
Average throughput: 32.78 Mbit/s
95th percentile per-packet one-way delay: 337.782 ms
Loss rate: 61.57%
-- Flow 1:
Average throughput: 13.74 Mbit/s
95th percentile per-packet one-way delay: 313.202 ms
Loss rate: 58.64%
-- Flow 2:
Average throughput: 17.03 Mbit/s
95th percentile per-packet one-way delay: 336.595 ms
Loss rate: 61.73%
-- Flow 3:
Average throughput: 23.94 Mbit/s
95th percentile per-packet one-way delay: 393.446 ms
Loss rate: 65.63%

Run 3: Report of FillP — Data Link

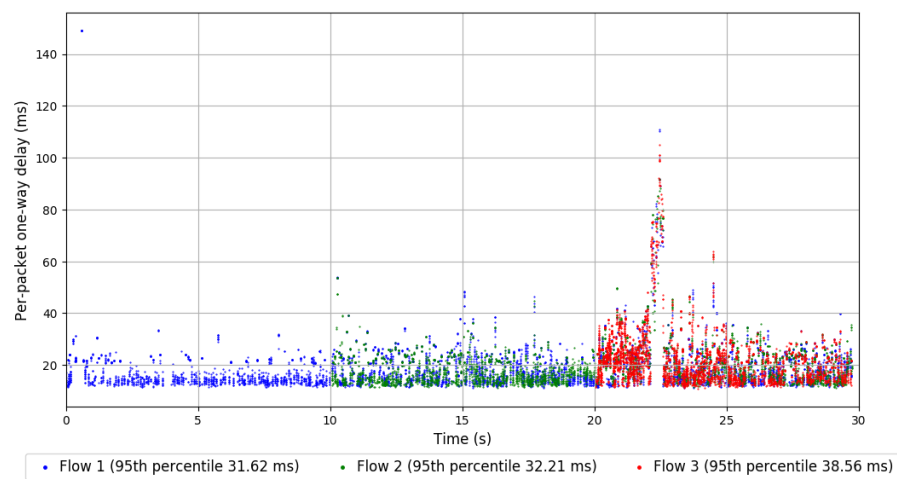
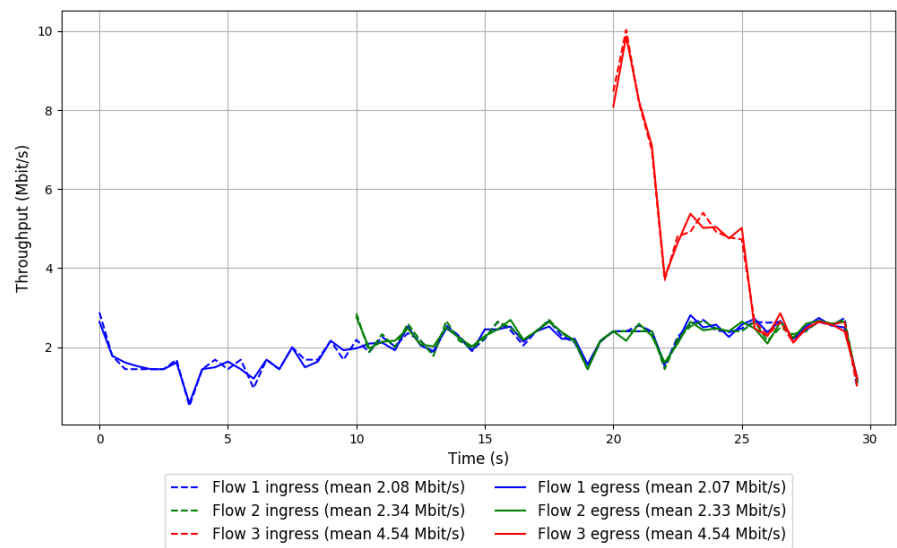


```
Run 1: Statistics of Indigo

Start at: 2018-01-16 01:26:36
End at: 2018-01-16 01:27:06
Local clock offset: 3.616 ms
Remote clock offset: -2.236 ms

# Below is generated by plot.py at 2018-01-16 02:13:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.10 Mbit/s
95th percentile per-packet one-way delay: 34.545 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 31.623 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 32.208 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 4.54 Mbit/s
95th percentile per-packet one-way delay: 38.561 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link

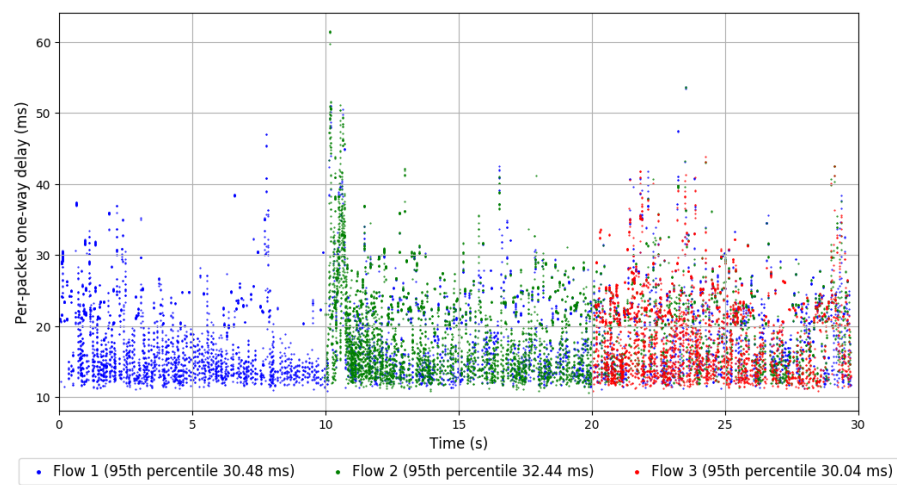
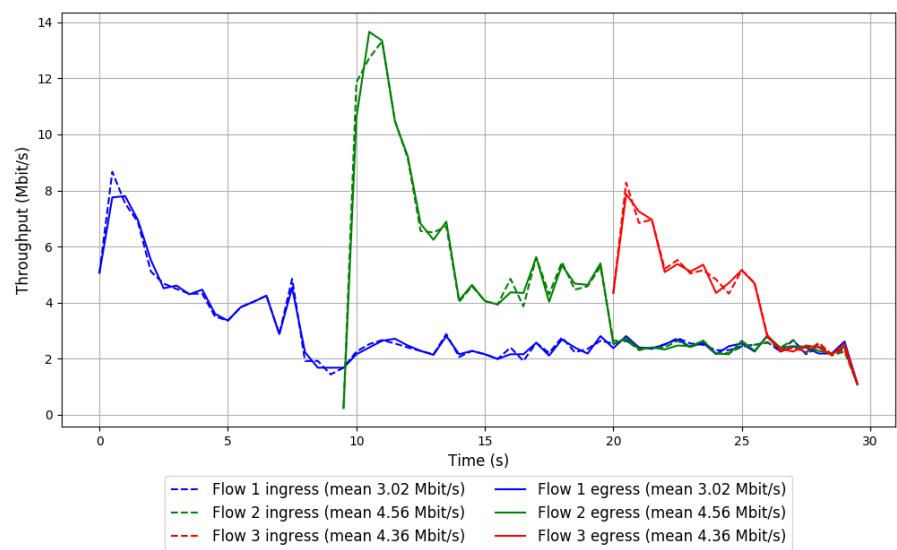


Run 2: Statistics of Indigo

Start at: 2018-01-16 01:44:29
End at: 2018-01-16 01:44:59
Local clock offset: 3.734 ms
Remote clock offset: -2.668 ms

Below is generated by plot.py at 2018-01-16 02:13:37
Datalink statistics
-- Total of 3 flows:
Average throughput: 7.47 Mbit/s
95th percentile per-packet one-way delay: 31.292 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.02 Mbit/s
95th percentile per-packet one-way delay: 30.480 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 4.56 Mbit/s
95th percentile per-packet one-way delay: 32.444 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 4.36 Mbit/s
95th percentile per-packet one-way delay: 30.035 ms
Loss rate: 0.00%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-01-16 02:02:25
End at: 2018-01-16 02:02:55
Local clock offset: 3.194 ms
Remote clock offset: -2.658 ms

Below is generated by plot.py at 2018-01-16 02:13:37
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.10 Mbit/s
95th percentile per-packet one-way delay: 48.572 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.50 Mbit/s
95th percentile per-packet one-way delay: 34.598 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 4.37 Mbit/s
95th percentile per-packet one-way delay: 45.879 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 11.37 Mbit/s
95th percentile per-packet one-way delay: 60.460 ms
Loss rate: 0.00%

Run 3: Report of Indigo — Data Link

