

## Pantheon Report

Generated at 2018-01-16 02:03:43 (UTC).

Data path: India ppp0 (*remote*) → AWS India 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).

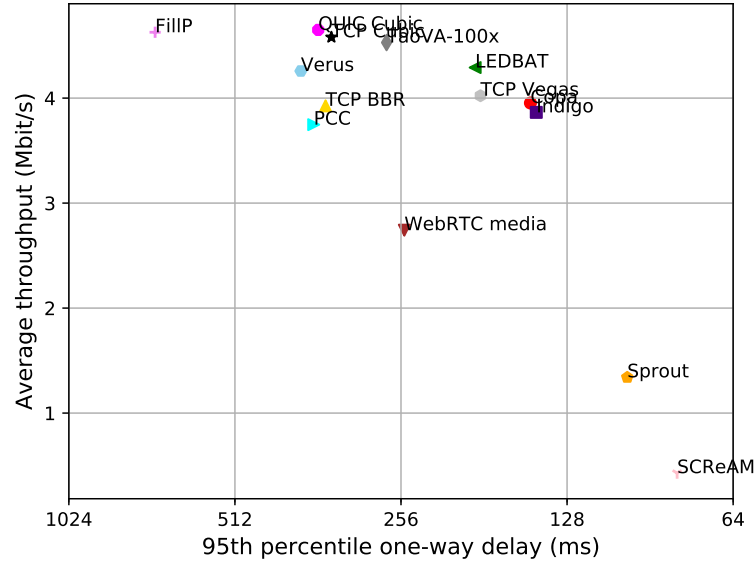
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo\_fast**).

NTP offsets were measured against **nets.org.sg** and have been applied to correct the timestamps in logs.

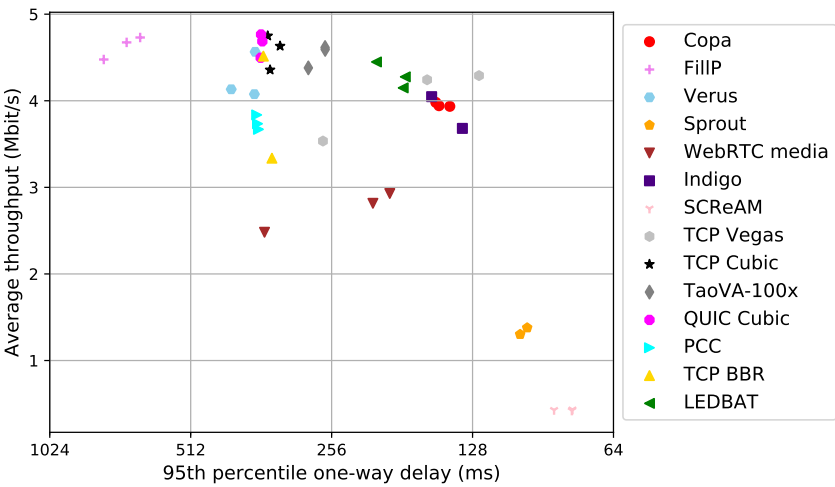
Git summary:

```
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 @ 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/vivace @ 423cbca3e8ea1d599e7b5cf725835e8a2b6bfac6
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

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



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



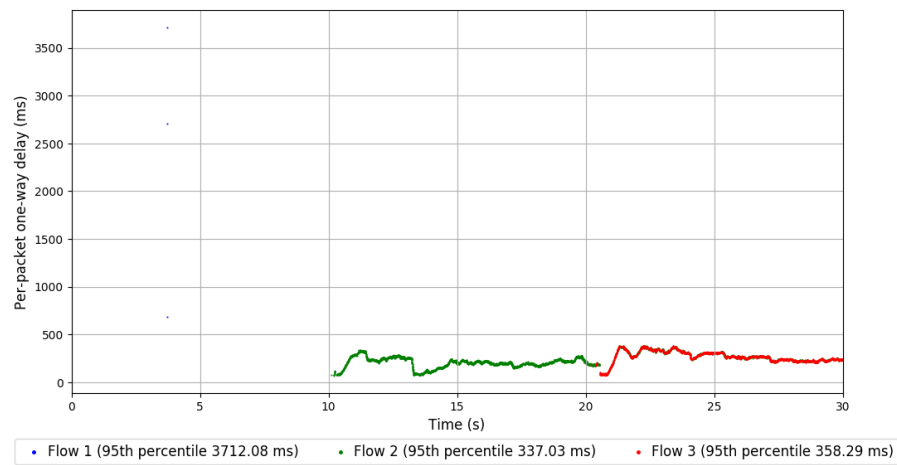
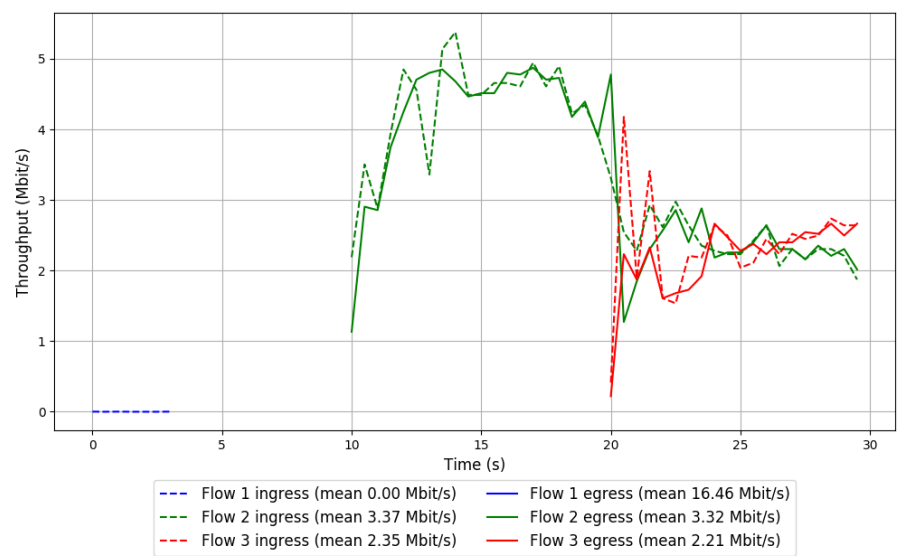
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	2	9.61	2.52	2.06	2033.23	348.26	359.10	0.56	1.76	7.21
TCP Cubic	3	3.58	1.19	0.64	342.55	336.28	292.68	0.96	2.13	3.54
LEDBAT	3	2.43	1.94	1.73	187.64	184.69	189.81	1.27	1.39	1.87
PCC	3	1.92	1.91	1.67	366.77	366.04	373.67	10.67	11.46	28.52
QUIC Cubic	3	3.32	1.42	1.22	360.34	362.74	365.33	2.14	3.87	7.36
SCReAM	3	0.22	0.21	0.22	81.33	79.24	82.64	0.47	0.54	1.00
WebRTC media	3	1.78	0.70	0.27	230.03	267.50	280.81	0.74	1.34	3.62
Sprout	2	0.71	0.67	0.57	97.66	99.78	99.32	1.69	1.41	1.24
TaoVA-100x	3	2.71	2.10	1.68	265.13	275.63	279.50	0.77	4.21	16.28
TCP Vegas	3	2.67	1.32	1.44	182.51	175.30	187.05	1.20	0.92	1.92
Verus	3	3.80	0.61	0.28	398.39	430.04	418.65	58.37	57.95	53.24
Copa	3	2.34	1.88	1.45	135.43	159.24	177.30	0.32	0.62	1.67
FillP	3	2.77	1.77	2.19	392.49	819.68	731.35	91.63	96.40	97.79
Indigo	2	1.54	2.69	1.64	144.49	147.70	137.75	0.92	2.38	2.21

Run 1: Statistics of TCP BBR

Start at: 2018-01-16 00:39:03  
End at: 2018-01-16 00:39:33  
Local clock offset: -13.023 ms  
Remote clock offset: -18.016 ms

# Below is generated by plot.py at 2018-01-16 02:02:51  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.34 Mbit/s  
95th percentile per-packet one-way delay: 343.382 ms  
Loss rate: 3.22%  
-- Flow 1:  
Average throughput: 16.46 Mbit/s  
95th percentile per-packet one-way delay: 3712.082 ms  
Loss rate: 0.00%  
-- Flow 2:  
Average throughput: 3.32 Mbit/s  
95th percentile per-packet one-way delay: 337.027 ms  
Loss rate: 1.68%  
-- Flow 3:  
Average throughput: 2.21 Mbit/s  
95th percentile per-packet one-way delay: 358.288 ms  
Loss rate: 7.63%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

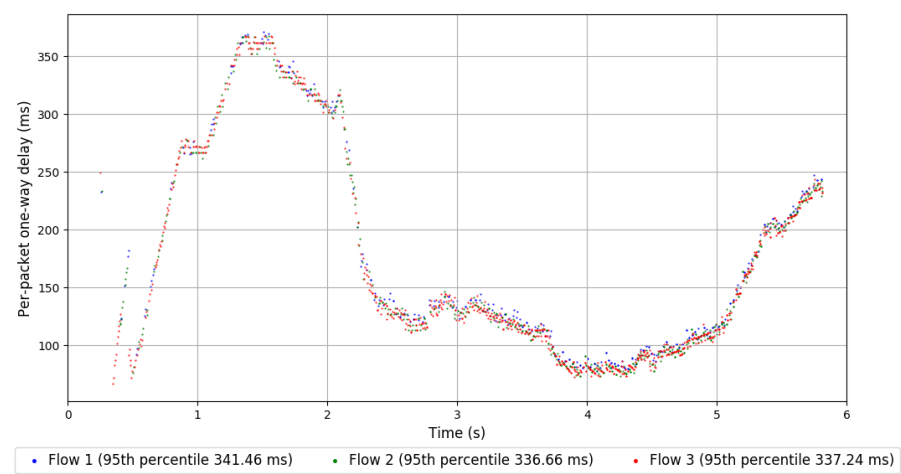
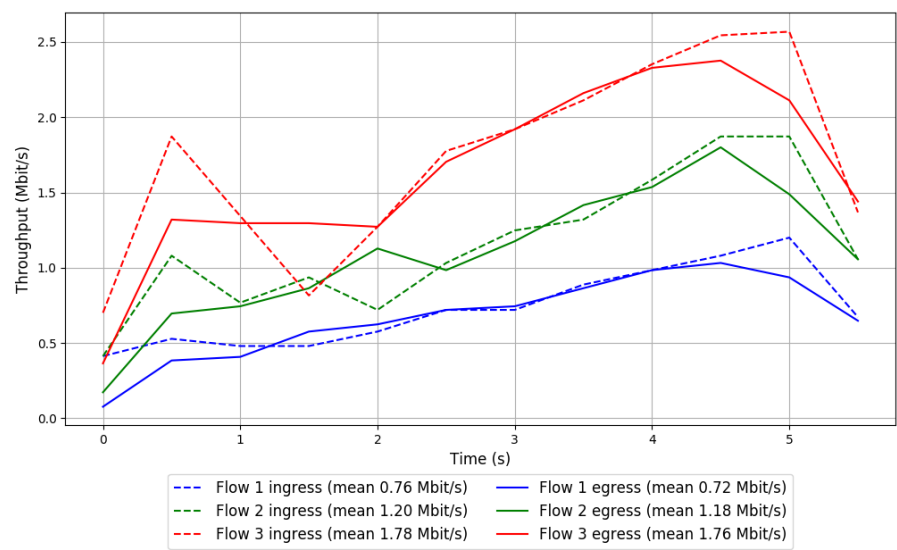
Start at: 2018-01-16 00:55:38

End at: 2018-01-16 00:56:08

Local clock offset: -14.267 ms

Remote clock offset: -16.96 ms

Run 2: Report of TCP BBR — Data Link



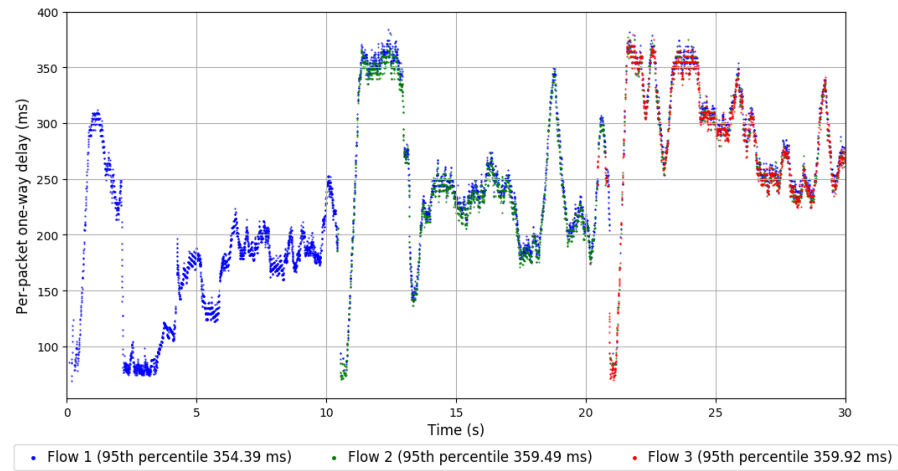
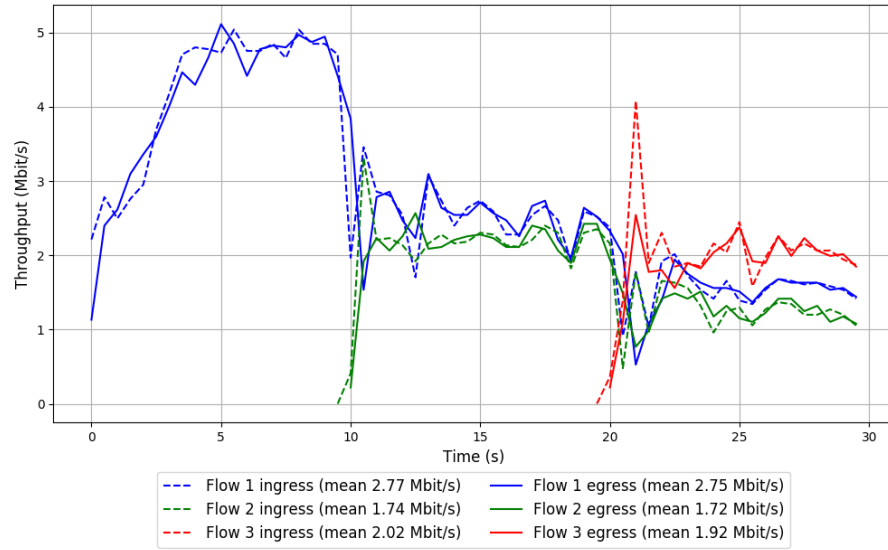
Run 3: Statistics of TCP BBR

Start at: 2018-01-16 01:12:11  
End at: 2018-01-16 01:12:41  
Local clock offset: -17.478 ms  
Remote clock offset: -16.328 ms

# Below is generated by plot.py at 2018-01-16 02:02:55  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.52 Mbit/s  
95th percentile per-packet one-way delay: 358.104 ms  
Loss rate: 2.13%  
-- Flow 1:  
Average throughput: 2.75 Mbit/s  
95th percentile per-packet one-way delay: 354.388 ms  
Loss rate: 1.13%  
-- Flow 2:  
Average throughput: 1.72 Mbit/s  
95th percentile per-packet one-way delay: 359.490 ms  
Loss rate: 1.84%  
-- Flow 3:  
Average throughput: 1.92 Mbit/s  
95th percentile per-packet one-way delay: 359.916 ms  
Loss rate: 6.80%



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

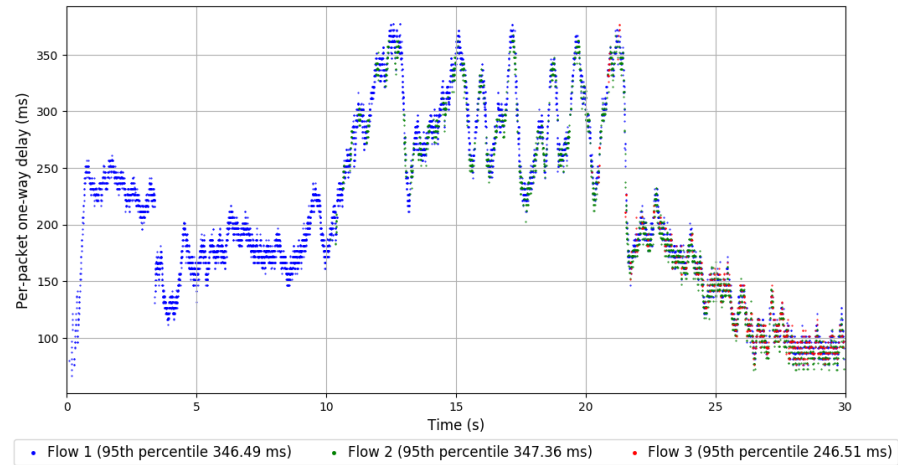
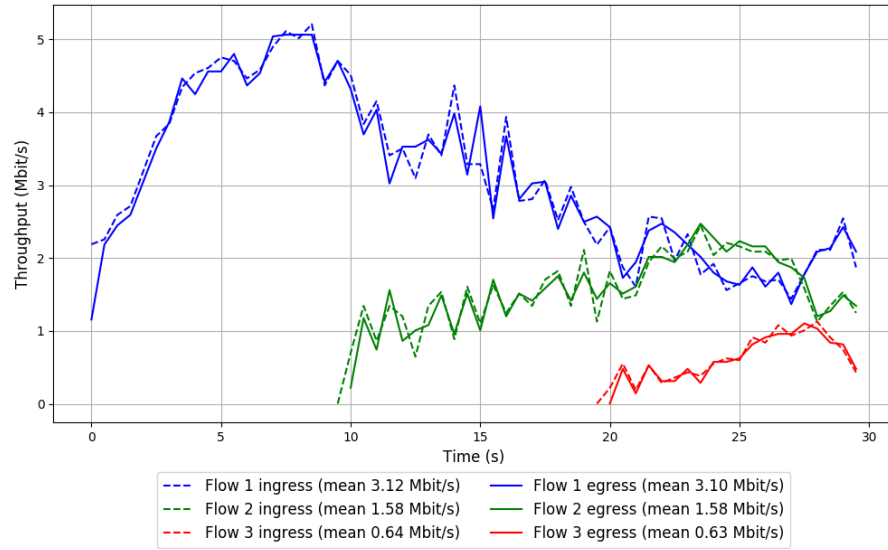


Run 1: Statistics of TCP Cubic

Start at: 2018-01-16 00:32:23  
End at: 2018-01-16 00:32:53  
Local clock offset: -12.632 ms  
Remote clock offset: -15.049 ms

# Below is generated by plot.py at 2018-01-16 02:02:55  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.36 Mbit/s  
95th percentile per-packet one-way delay: 346.485 ms  
Loss rate: 1.05%  
-- Flow 1:  
Average throughput: 3.10 Mbit/s  
95th percentile per-packet one-way delay: 346.486 ms  
Loss rate: 0.91%  
-- Flow 2:  
Average throughput: 1.58 Mbit/s  
95th percentile per-packet one-way delay: 347.362 ms  
Loss rate: 0.91%  
-- Flow 3:  
Average throughput: 0.63 Mbit/s  
95th percentile per-packet one-way delay: 246.506 ms  
Loss rate: 3.77%

## Run 1: Report of TCP Cubic — Data Link

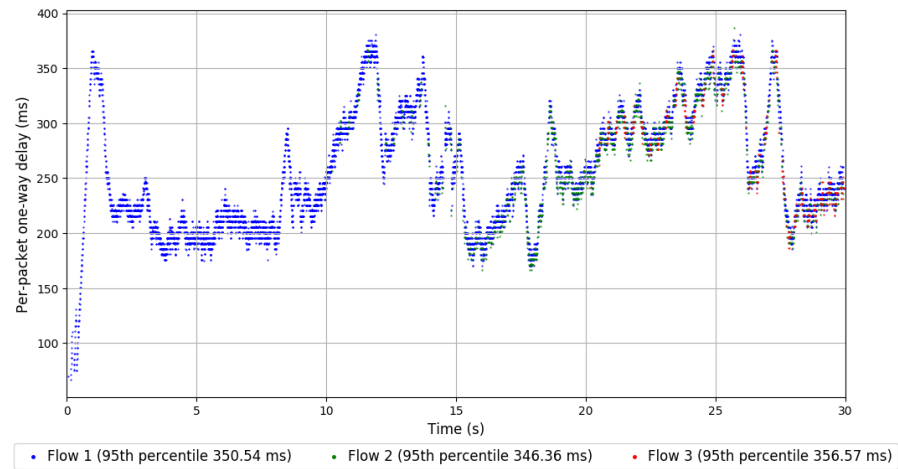
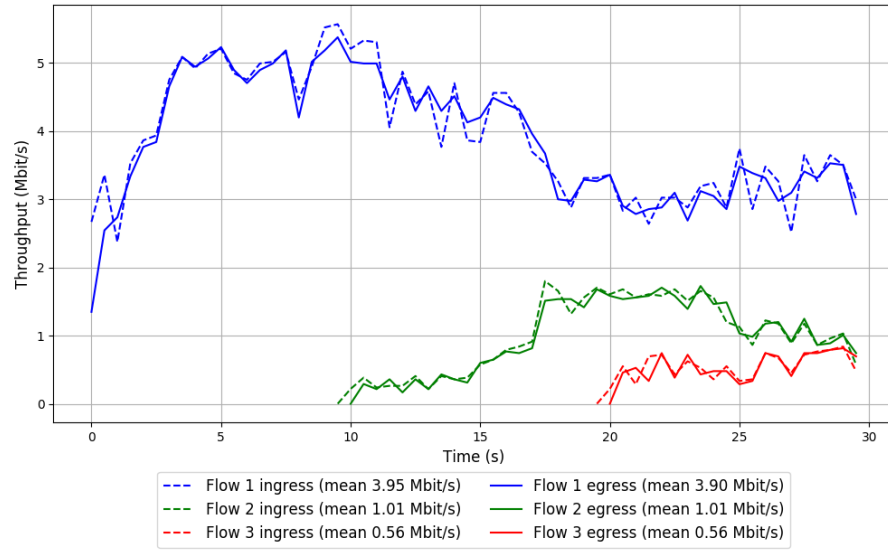


Run 2: Statistics of TCP Cubic

Start at: 2018-01-16 00:48:57  
End at: 2018-01-16 00:49:27  
Local clock offset: -17.374 ms  
Remote clock offset: -17.256 ms

# Below is generated by plot.py at 2018-01-16 02:02:56  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.75 Mbit/s  
95th percentile per-packet one-way delay: 350.583 ms  
Loss rate: 1.56%  
-- Flow 1:  
Average throughput: 3.90 Mbit/s  
95th percentile per-packet one-way delay: 350.539 ms  
Loss rate: 1.41%  
-- Flow 2:  
Average throughput: 1.01 Mbit/s  
95th percentile per-packet one-way delay: 346.357 ms  
Loss rate: 2.07%  
-- Flow 3:  
Average throughput: 0.56 Mbit/s  
95th percentile per-packet one-way delay: 356.572 ms  
Loss rate: 2.80%

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

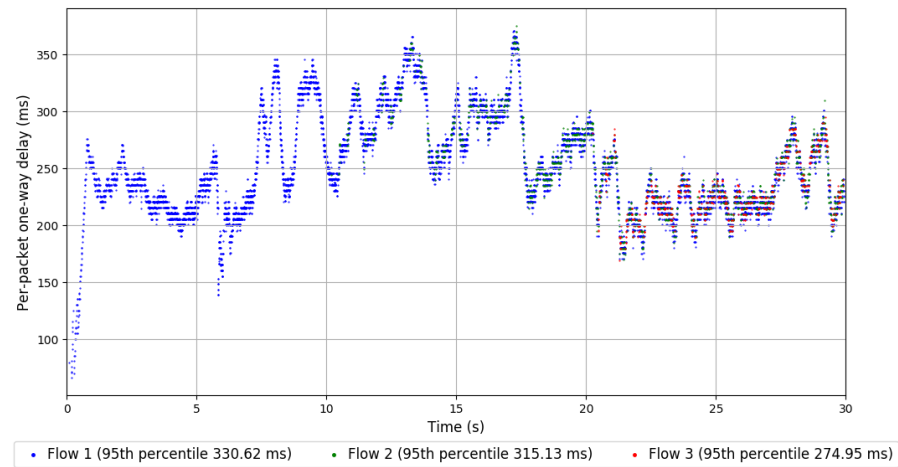
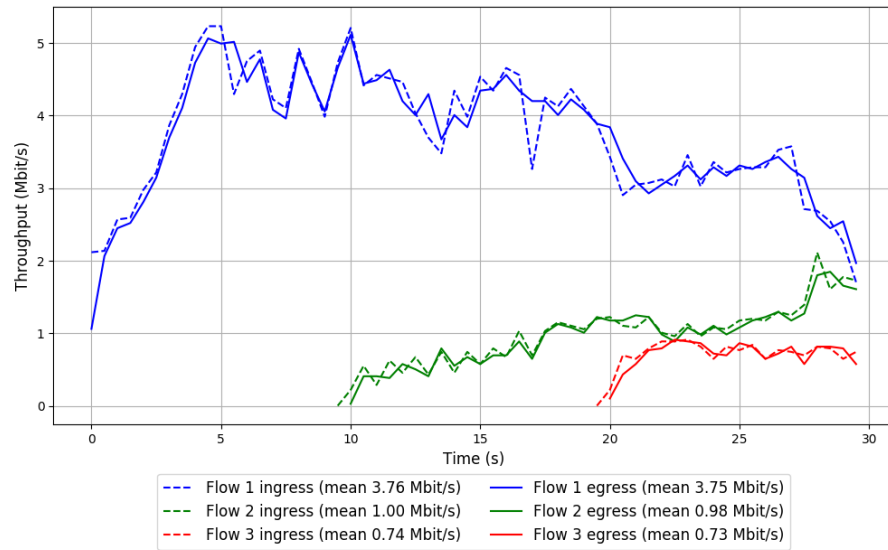


Run 3: Statistics of TCP Cubic

Start at: 2018-01-16 01:05:33  
End at: 2018-01-16 01:06:03  
Local clock offset: -17.705 ms  
Remote clock offset: -16.584 ms

# Below is generated by plot.py at 2018-01-16 02:02:56  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.63 Mbit/s  
95th percentile per-packet one-way delay: 329.838 ms  
Loss rate: 1.16%  
-- Flow 1:  
Average throughput: 3.75 Mbit/s  
95th percentile per-packet one-way delay: 330.621 ms  
Loss rate: 0.57%  
-- Flow 2:  
Average throughput: 0.98 Mbit/s  
95th percentile per-packet one-way delay: 315.130 ms  
Loss rate: 3.42%  
-- Flow 3:  
Average throughput: 0.73 Mbit/s  
95th percentile per-packet one-way delay: 274.954 ms  
Loss rate: 4.06%

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



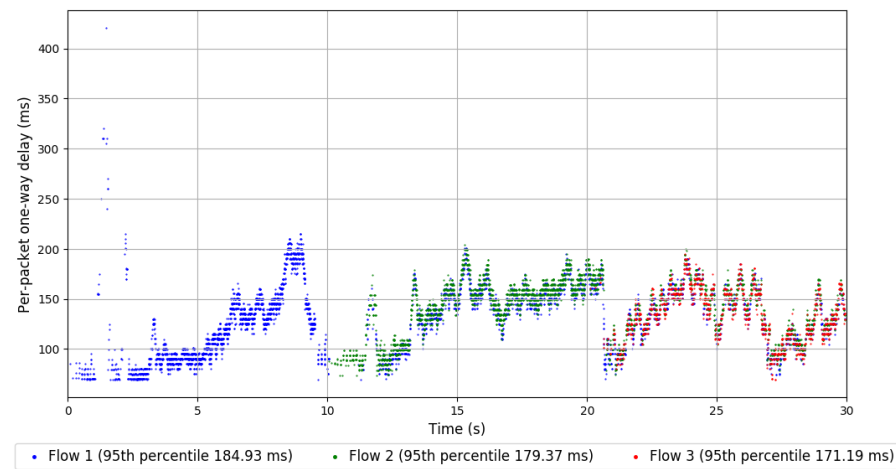
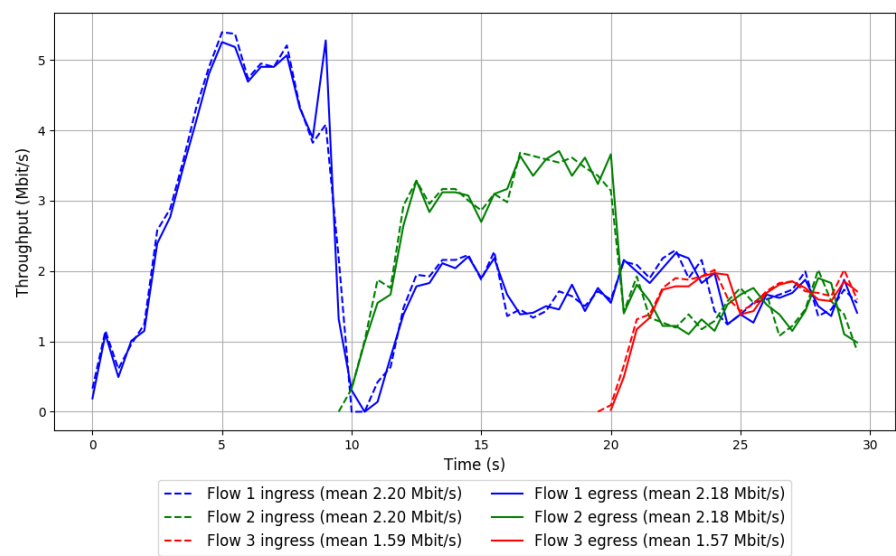
Run 1: Statistics of LEDBAT

Start at: 2018-01-16 00:37:57  
End at: 2018-01-16 00:38:27  
Local clock offset: -14.616 ms  
Remote clock offset: -15.975 ms

# Below is generated by plot.py at 2018-01-16 02:02:56  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.15 Mbit/s  
95th percentile per-packet one-way delay: 180.053 ms  
Loss rate: 1.29%  
-- Flow 1:  
Average throughput: 2.18 Mbit/s  
95th percentile per-packet one-way delay: 184.934 ms  
Loss rate: 1.26%  
-- Flow 2:  
Average throughput: 2.18 Mbit/s  
95th percentile per-packet one-way delay: 179.371 ms  
Loss rate: 0.96%  
-- Flow 3:  
Average throughput: 1.57 Mbit/s  
95th percentile per-packet one-way delay: 171.187 ms  
Loss rate: 2.30%



Run 1: Report of LEDBAT — Data Link

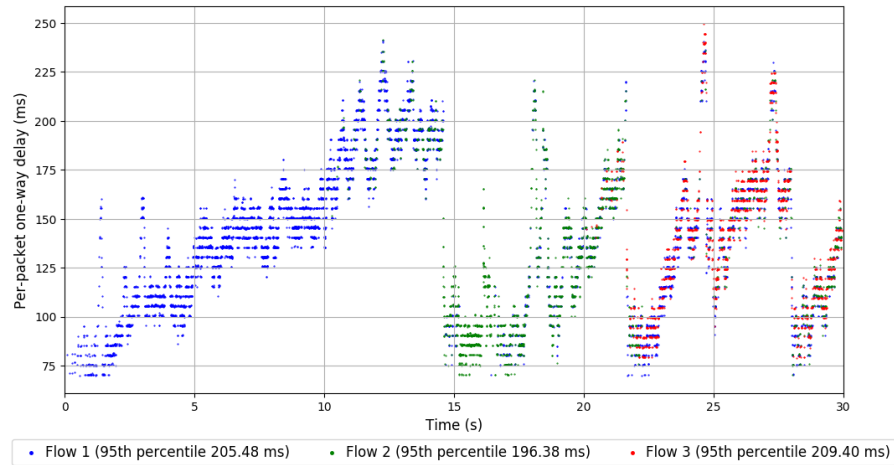
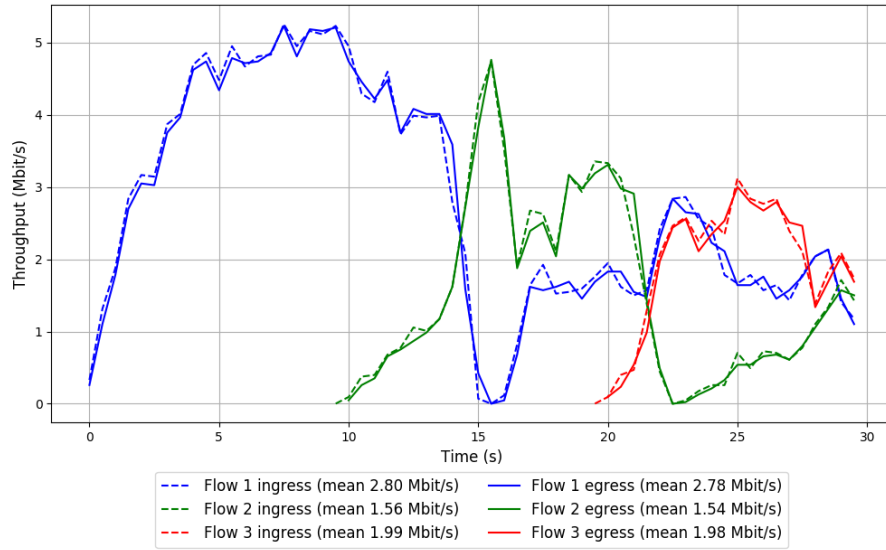


Run 2: Statistics of LEDBAT

Start at: 2018-01-16 00:54:32  
End at: 2018-01-16 00:55:02  
Local clock offset: -16.215 ms  
Remote clock offset: -17.028 ms

# Below is generated by plot.py at 2018-01-16 02:02:56  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.45 Mbit/s  
95th percentile per-packet one-way delay: 205.362 ms  
Loss rate: 1.28%  
-- Flow 1:  
Average throughput: 2.78 Mbit/s  
95th percentile per-packet one-way delay: 205.478 ms  
Loss rate: 0.91%  
-- Flow 2:  
Average throughput: 1.54 Mbit/s  
95th percentile per-packet one-way delay: 196.380 ms  
Loss rate: 1.81%  
-- Flow 3:  
Average throughput: 1.98 Mbit/s  
95th percentile per-packet one-way delay: 209.397 ms  
Loss rate: 2.01%

## Run 2: Report of LEDBAT — Data Link

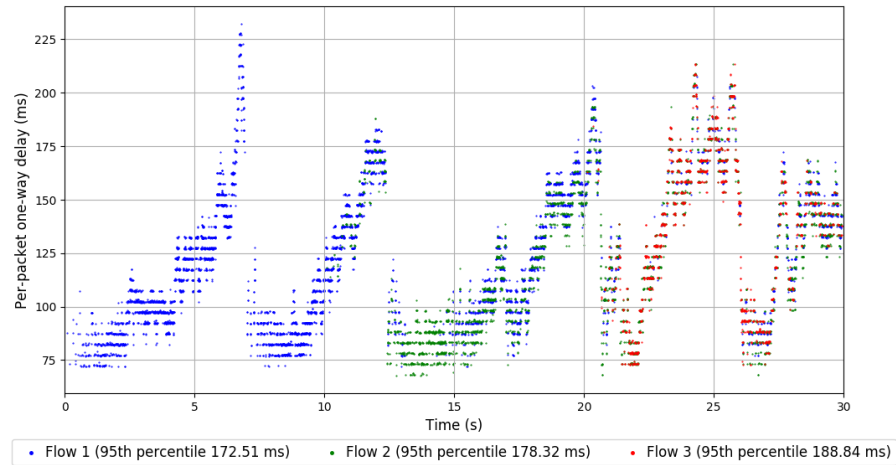
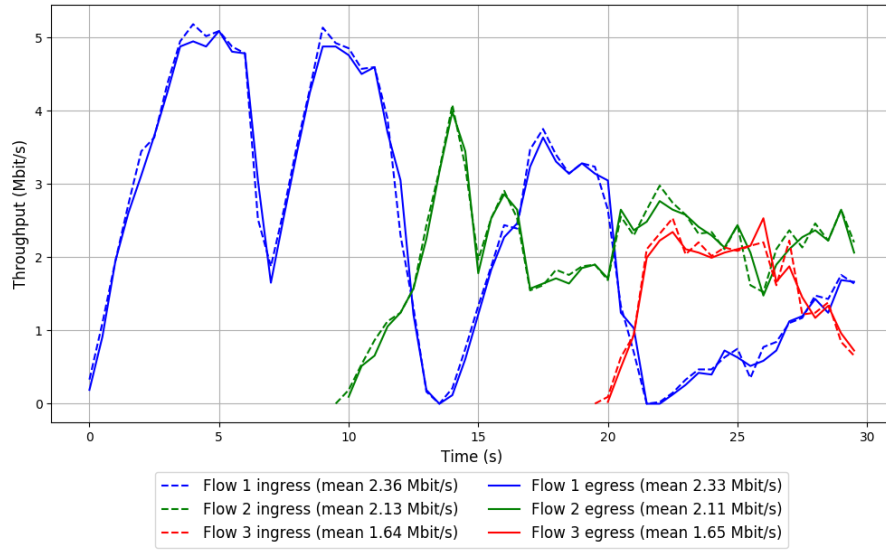


Run 3: Statistics of LEDBAT

Start at: 2018-01-16 01:11:05  
End at: 2018-01-16 01:11:36  
Local clock offset: -20.731 ms  
Remote clock offset: -17.862 ms

# Below is generated by plot.py at 2018-01-16 02:02:56  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.28 Mbit/s  
95th percentile per-packet one-way delay: 178.202 ms  
Loss rate: 1.52%  
-- Flow 1:  
Average throughput: 2.33 Mbit/s  
95th percentile per-packet one-way delay: 172.514 ms  
Loss rate: 1.64%  
-- Flow 2:  
Average throughput: 2.11 Mbit/s  
95th percentile per-packet one-way delay: 178.325 ms  
Loss rate: 1.41%  
-- Flow 3:  
Average throughput: 1.65 Mbit/s  
95th percentile per-packet one-way delay: 188.838 ms  
Loss rate: 1.29%

### Run 3: Report of LEDBAT — Data Link

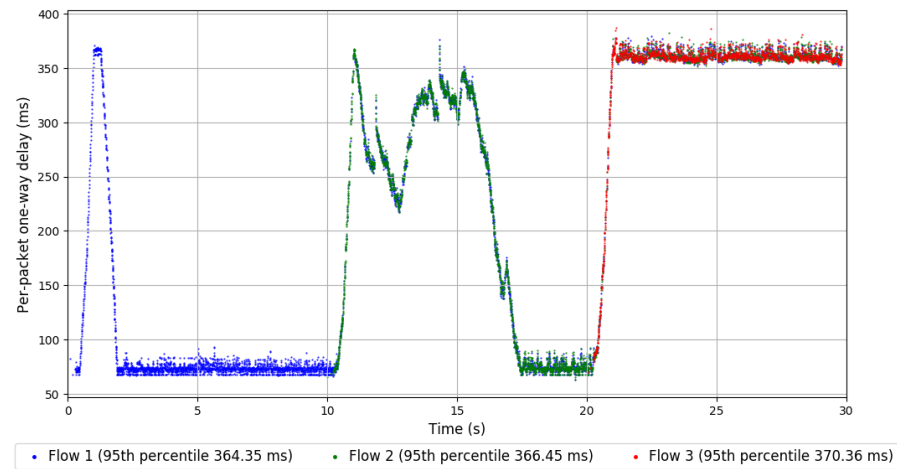
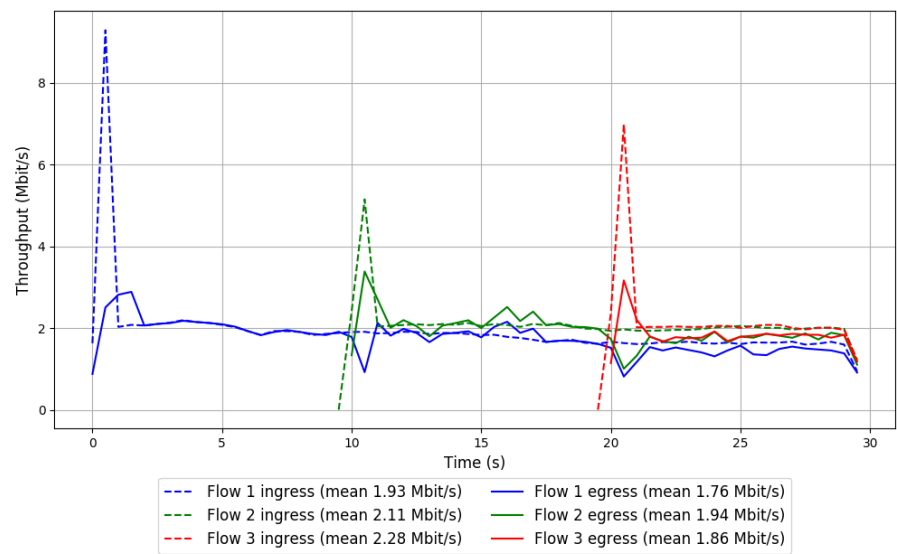


Run 1: Statistics of PCC

Start at: 2018-01-16 00:30:11  
End at: 2018-01-16 00:30:41  
Local clock offset: -17.008 ms  
Remote clock offset: -15.117 ms

# Below is generated by plot.py at 2018-01-16 02:03:02  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.67 Mbit/s  
95th percentile per-packet one-way delay: 366.863 ms  
Loss rate: 10.49%  
-- Flow 1:  
Average throughput: 1.76 Mbit/s  
95th percentile per-packet one-way delay: 364.347 ms  
Loss rate: 9.04%  
-- Flow 2:  
Average throughput: 1.94 Mbit/s  
95th percentile per-packet one-way delay: 366.446 ms  
Loss rate: 7.94%  
-- Flow 3:  
Average throughput: 1.86 Mbit/s  
95th percentile per-packet one-way delay: 370.356 ms  
Loss rate: 18.96%

Run 1: Report of PCC — Data Link



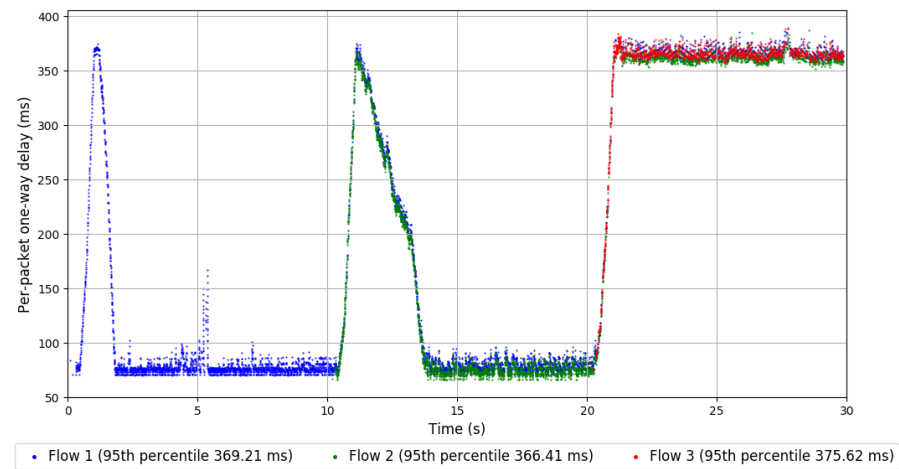
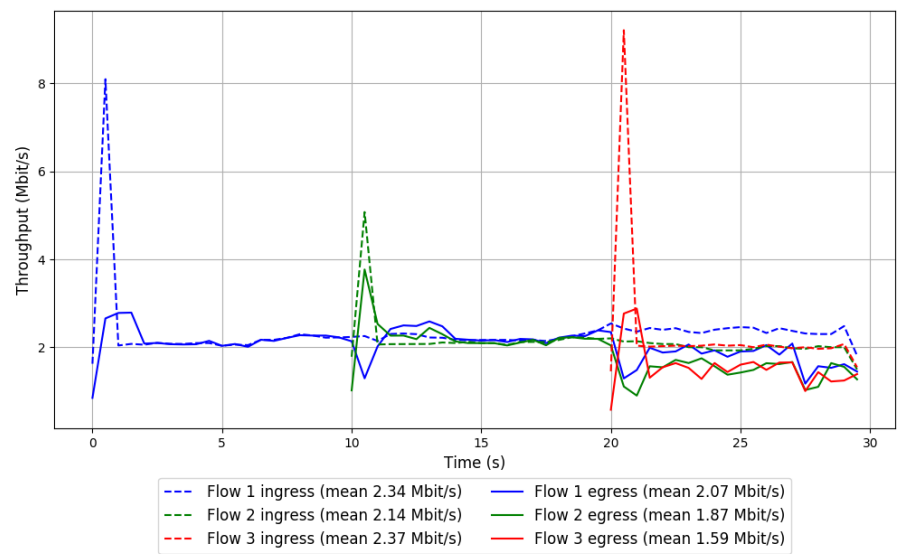
Run 2: Statistics of PCC

Start at: 2018-01-16 00:46:45  
End at: 2018-01-16 00:47:15  
Local clock offset: -17.131 ms  
Remote clock offset: -16.846 ms

# Below is generated by plot.py at 2018-01-16 02:03:05  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.84 Mbit/s  
95th percentile per-packet one-way delay: 370.092 ms  
Loss rate: 15.86%  
-- Flow 1:  
Average throughput: 2.07 Mbit/s  
95th percentile per-packet one-way delay: 369.209 ms  
Loss rate: 11.83%  
-- Flow 2:  
Average throughput: 1.87 Mbit/s  
95th percentile per-packet one-way delay: 366.407 ms  
Loss rate: 12.82%  
-- Flow 3:  
Average throughput: 1.59 Mbit/s  
95th percentile per-packet one-way delay: 375.625 ms  
Loss rate: 33.50%



Run 2: Report of PCC — Data Link

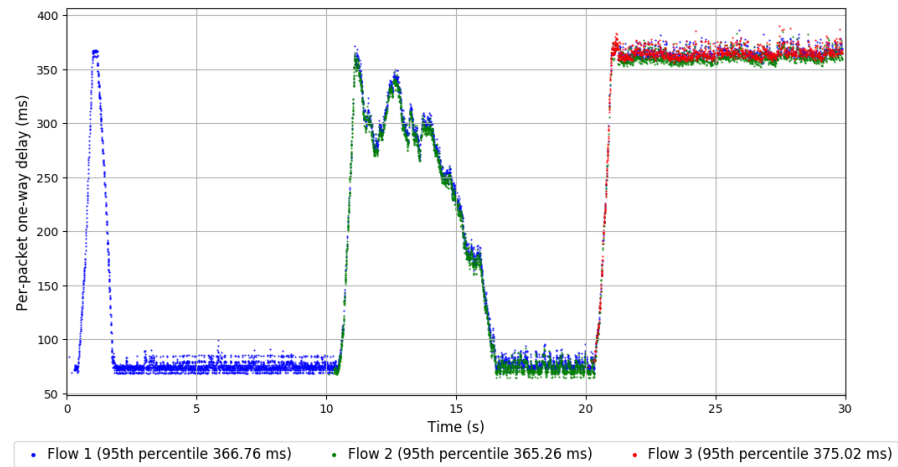
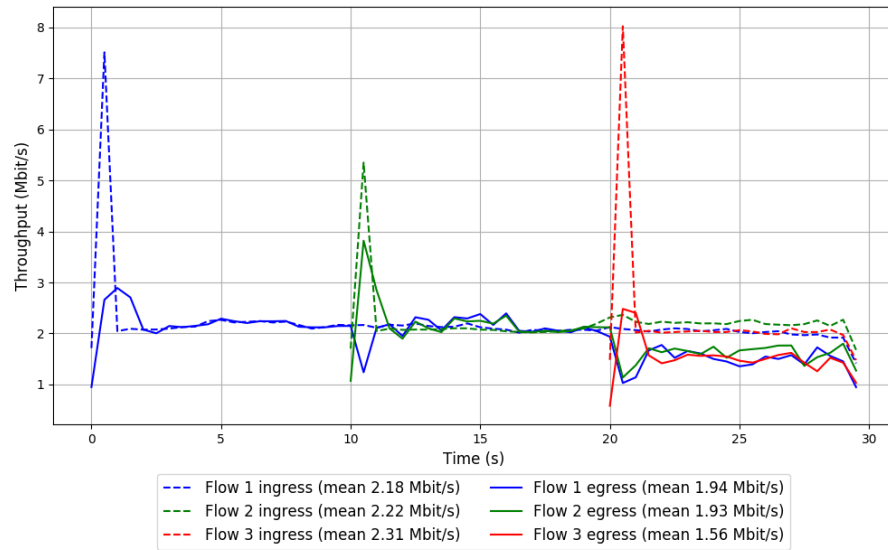


Run 3: Statistics of PCC

Start at: 2018-01-16 01:03:20  
End at: 2018-01-16 01:03:50  
Local clock offset: -17.29 ms  
Remote clock offset: -15.268 ms

# Below is generated by plot.py at 2018-01-16 02:03:06  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.73 Mbit/s  
95th percentile per-packet one-way delay: 368.557 ms  
Loss rate: 15.75%  
-- Flow 1:  
Average throughput: 1.94 Mbit/s  
95th percentile per-packet one-way delay: 366.757 ms  
Loss rate: 11.13%  
-- Flow 2:  
Average throughput: 1.93 Mbit/s  
95th percentile per-packet one-way delay: 365.262 ms  
Loss rate: 13.61%  
-- Flow 3:  
Average throughput: 1.56 Mbit/s  
95th percentile per-packet one-way delay: 375.016 ms  
Loss rate: 33.11%

### Run 3: Report of PCC — Data Link

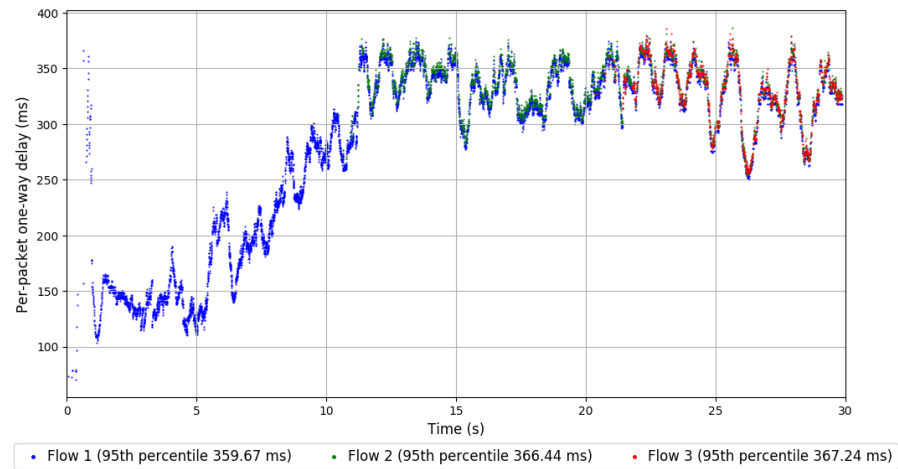
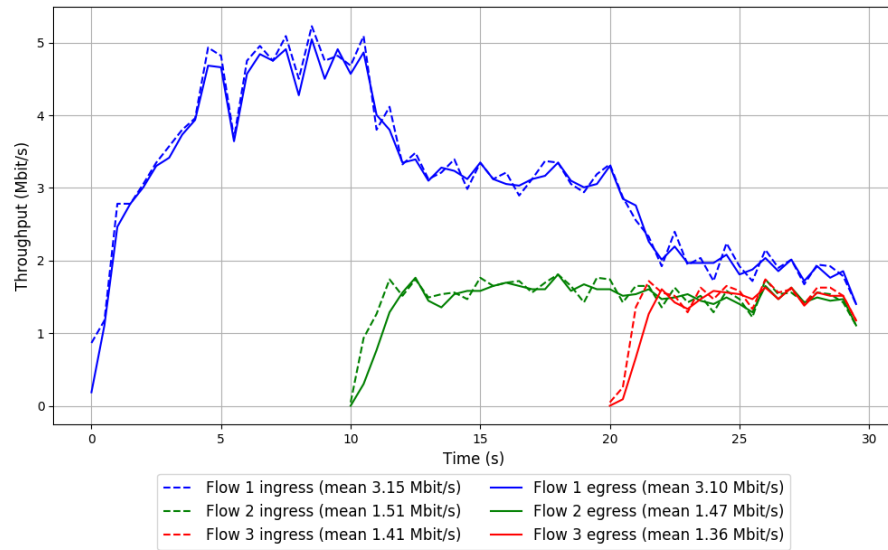


Run 1: Statistics of QUIC Cubic

Start at: 2018-01-16 00:25:46  
End at: 2018-01-16 00:26:16  
Local clock offset: -15.719 ms  
Remote clock offset: -17.806 ms

# Below is generated by plot.py at 2018-01-16 02:03:06  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.50 Mbit/s  
95th percentile per-packet one-way delay: 362.883 ms  
Loss rate: 2.87%  
-- Flow 1:  
Average throughput: 3.10 Mbit/s  
95th percentile per-packet one-way delay: 359.668 ms  
Loss rate: 2.02%  
-- Flow 2:  
Average throughput: 1.47 Mbit/s  
95th percentile per-packet one-way delay: 366.438 ms  
Loss rate: 3.89%  
-- Flow 3:  
Average throughput: 1.36 Mbit/s  
95th percentile per-packet one-way delay: 367.243 ms  
Loss rate: 6.46%

## Run 1: Report of QUIC Cubic — Data Link

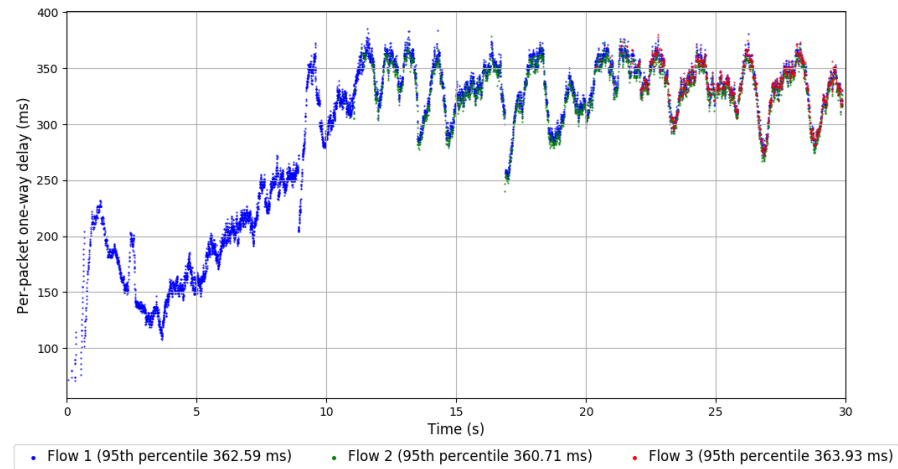
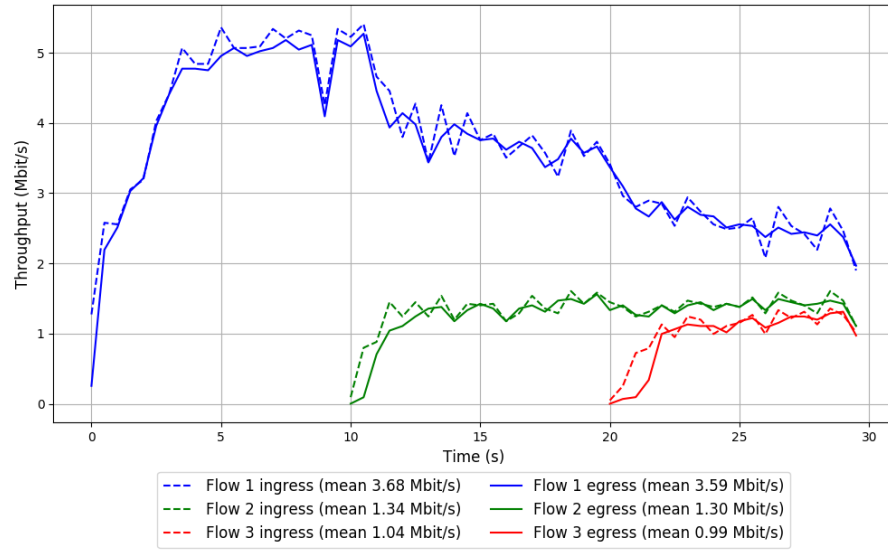


Run 2: Statistics of QUIC Cubic

Start at: 2018-01-16 00:42:21  
End at: 2018-01-16 00:42:51  
Local clock offset: -17.171 ms  
Remote clock offset: -17.194 ms

# Below is generated by plot.py at 2018-01-16 02:03:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.77 Mbit/s  
95th percentile per-packet one-way delay: 362.203 ms  
Loss rate: 3.18%  
-- Flow 1:  
Average throughput: 3.59 Mbit/s  
95th percentile per-packet one-way delay: 362.594 ms  
Loss rate: 2.40%  
-- Flow 2:  
Average throughput: 1.30 Mbit/s  
95th percentile per-packet one-way delay: 360.709 ms  
Loss rate: 4.45%  
-- Flow 3:  
Average throughput: 0.99 Mbit/s  
95th percentile per-packet one-way delay: 363.932 ms  
Loss rate: 8.17%

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



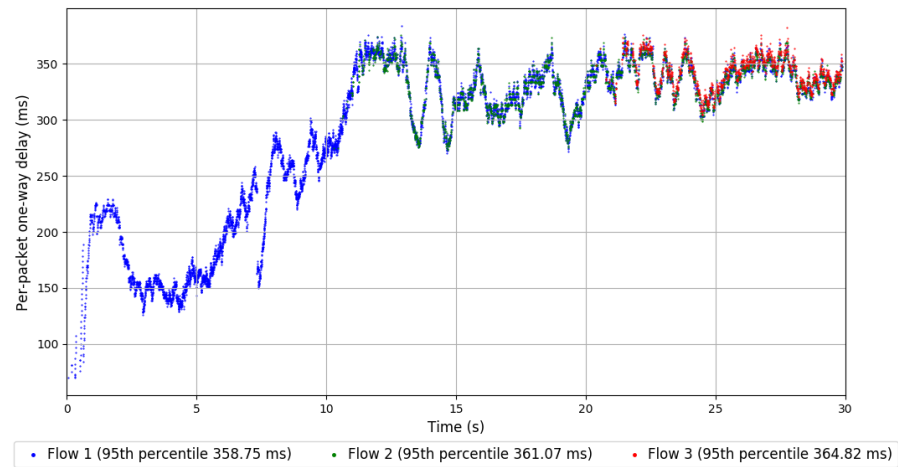
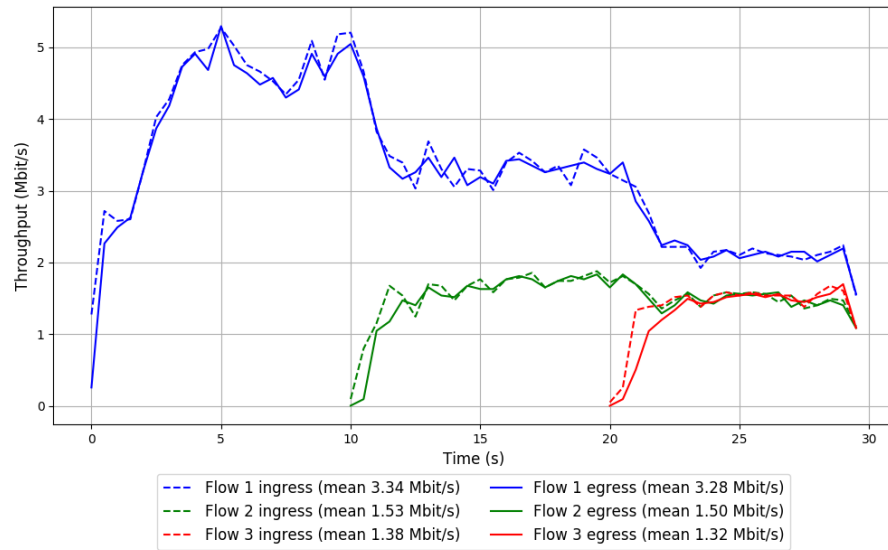
Run 3: Statistics of QUIC Cubic

Start at: 2018-01-16 00:58:56  
End at: 2018-01-16 00:59:26  
Local clock offset: -16.647 ms  
Remote clock offset: -17.309 ms

# Below is generated by plot.py at 2018-01-16 02:03:08  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.69 Mbit/s  
95th percentile per-packet one-way delay: 359.967 ms  
Loss rate: 2.77%  
-- Flow 1:  
Average throughput: 3.28 Mbit/s  
95th percentile per-packet one-way delay: 358.752 ms  
Loss rate: 1.99%  
-- Flow 2:  
Average throughput: 1.50 Mbit/s  
95th percentile per-packet one-way delay: 361.069 ms  
Loss rate: 3.27%  
-- Flow 3:  
Average throughput: 1.32 Mbit/s  
95th percentile per-packet one-way delay: 364.823 ms  
Loss rate: 7.45%



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

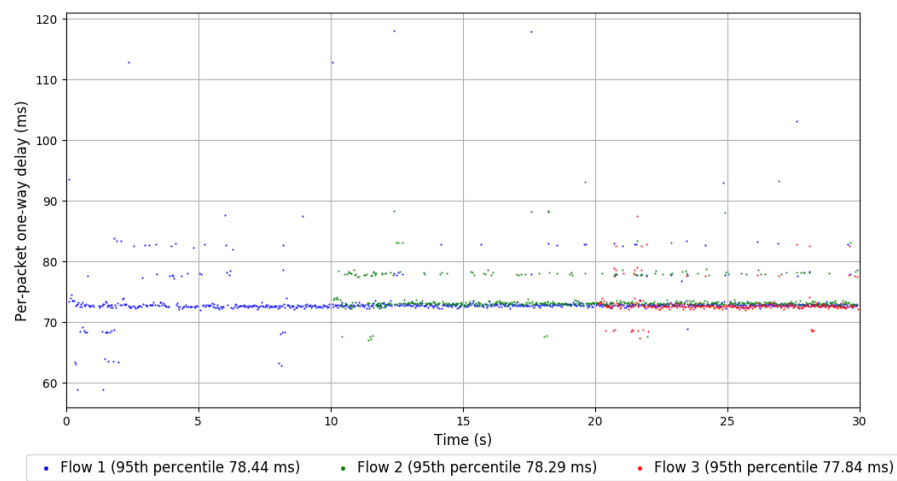
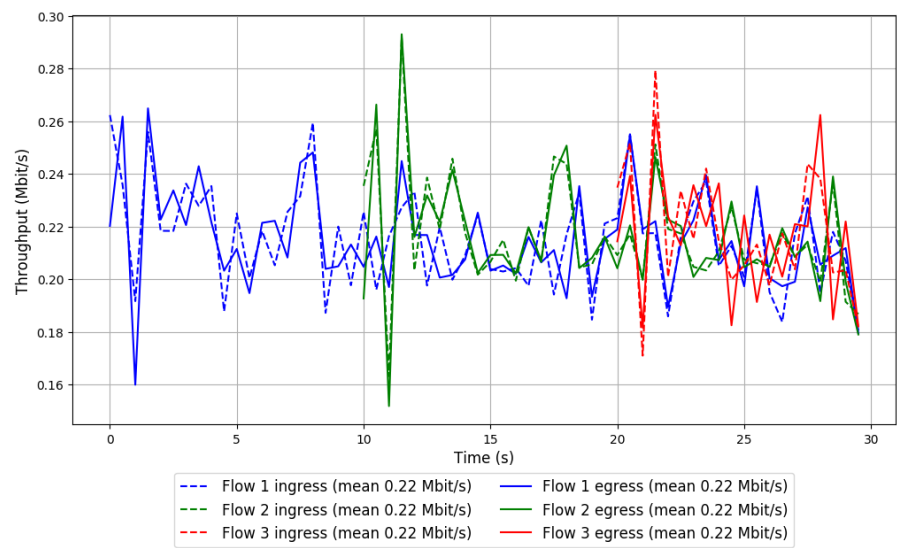


```
Run 1: Statistics of SReAM

Start at: 2018-01-16 00:24:37
End at: 2018-01-16 00:25:07
Local clock offset: -14.293 ms
Remote clock offset: -16.546 ms

# Below is generated by plot.py at 2018-01-16 02:03:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 78.317 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 78.436 ms
Loss rate: 0.25%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 78.290 ms
Loss rate: 0.42%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 77.842 ms
Loss rate: 0.35%
```

Run 1: Report of SReAM — Data Link

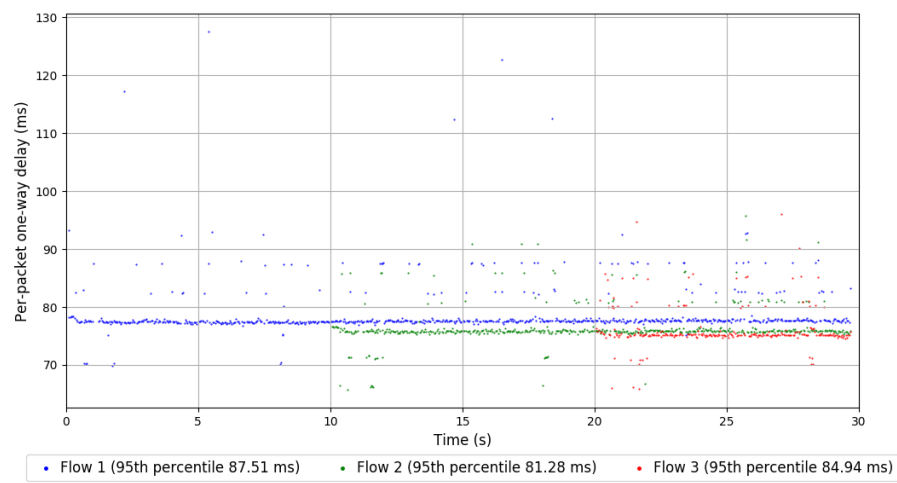
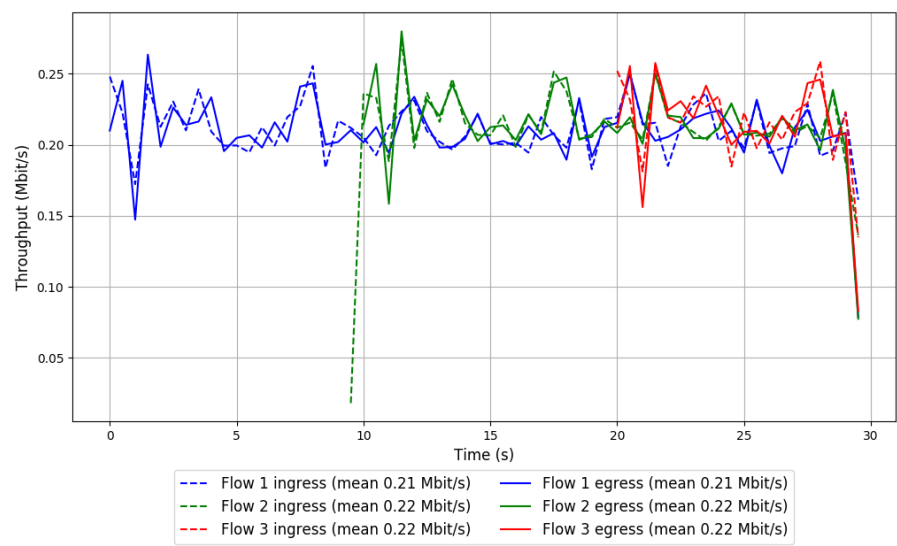


Run 2: Statistics of SReAM

Start at: 2018-01-16 00:41:15  
End at: 2018-01-16 00:41:45  
Local clock offset: -13.166 ms  
Remote clock offset: -16.969 ms

# Below is generated by plot.py at 2018-01-16 02:03:08  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.43 Mbit/s  
95th percentile per-packet one-way delay: 85.723 ms  
Loss rate: 1.11%  
-- Flow 1:  
Average throughput: 0.21 Mbit/s  
95th percentile per-packet one-way delay: 87.508 ms  
Loss rate: 0.90%  
-- Flow 2:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 81.277 ms  
Loss rate: 1.01%  
-- Flow 3:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 84.936 ms  
Loss rate: 1.93%

Run 2: Report of SReAM — Data Link

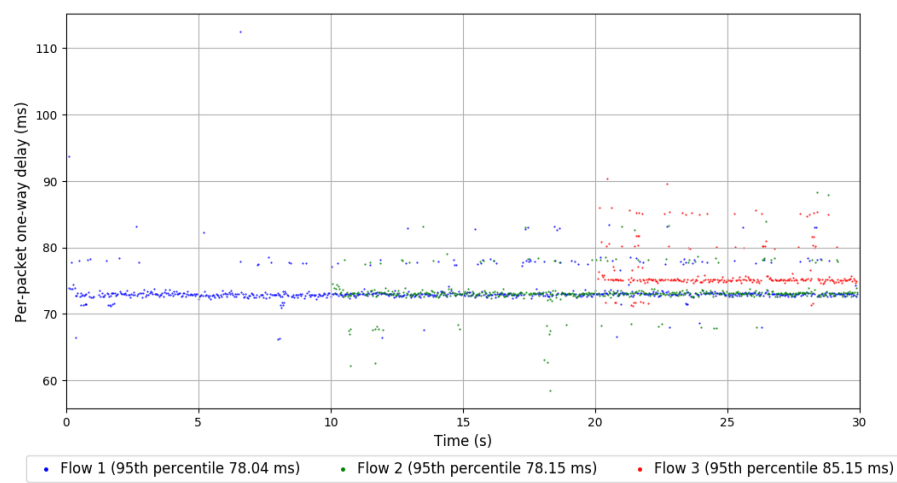
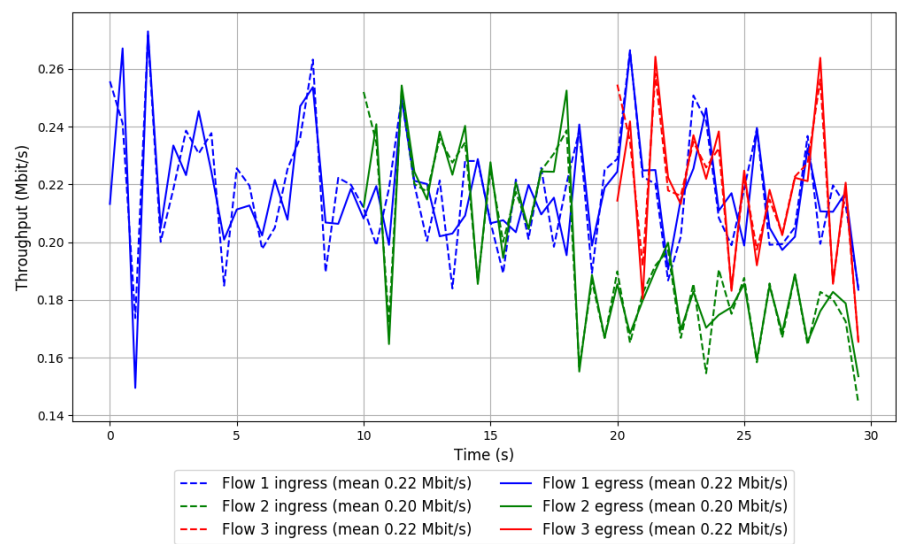


Run 3: Statistics of SReAM

Start at: 2018-01-16 00:57:50  
End at: 2018-01-16 00:58:20  
Local clock offset: -17.701 ms  
Remote clock offset: -17.158 ms

# Below is generated by plot.py at 2018-01-16 02:03:08  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.42 Mbit/s  
95th percentile per-packet one-way delay: 78.543 ms  
Loss rate: 0.32%  
-- Flow 1:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 78.040 ms  
Loss rate: 0.26%  
-- Flow 2:  
Average throughput: 0.20 Mbit/s  
95th percentile per-packet one-way delay: 78.151 ms  
Loss rate: 0.19%  
-- Flow 3:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 85.149 ms  
Loss rate: 0.73%

Run 3: Report of SReAM — Data Link



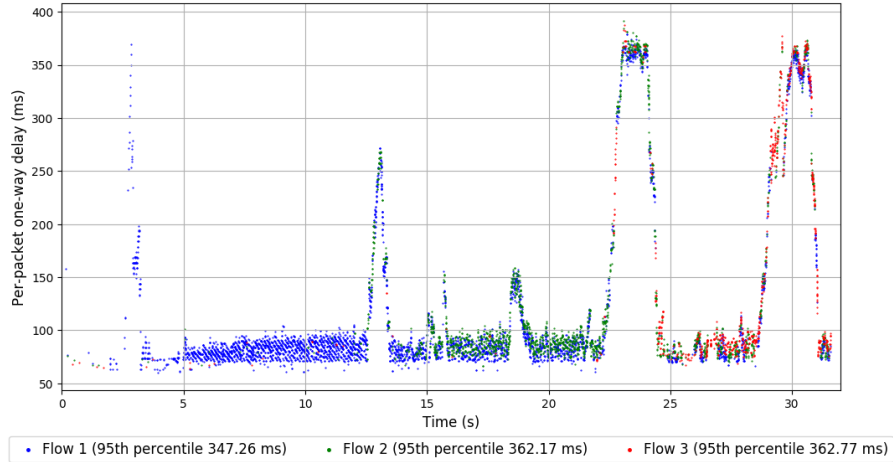
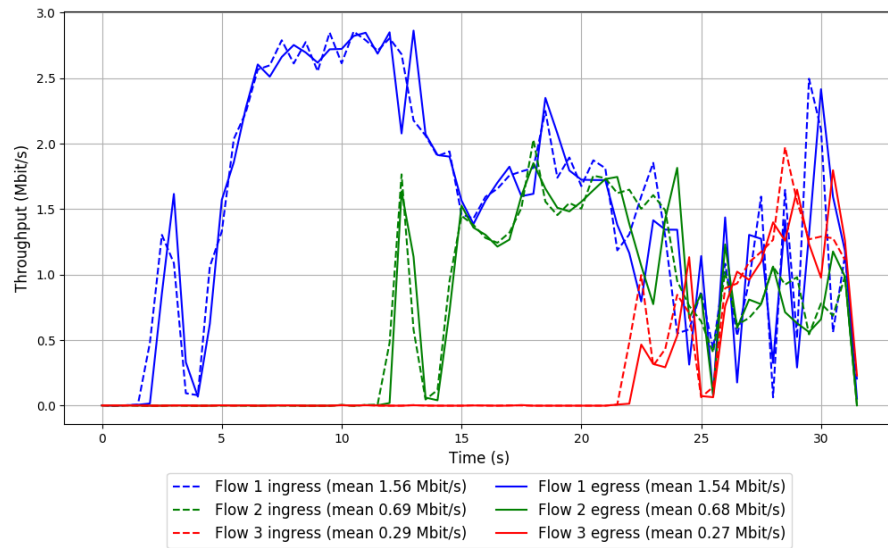
Run 1: Statistics of WebRTC media

Start at: 2018-01-16 00:27:59  
End at: 2018-01-16 00:28:29  
Local clock offset: -14.061 ms  
Remote clock offset: -16.662 ms

# Below is generated by plot.py at 2018-01-16 02:03:08  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 2.48 Mbit/s  
95th percentile per-packet one-way delay: 356.109 ms  
Loss rate: 2.33%  
-- Flow 1:  
Average throughput: 1.54 Mbit/s  
95th percentile per-packet one-way delay: 347.262 ms  
Loss rate: 1.39%  
-- Flow 2:  
Average throughput: 0.68 Mbit/s  
95th percentile per-packet one-way delay: 362.168 ms  
Loss rate: 2.45%  
-- Flow 3:  
Average throughput: 0.27 Mbit/s  
95th percentile per-packet one-way delay: 362.770 ms  
Loss rate: 7.15%



## Run 1: Report of WebRTC media — Data Link

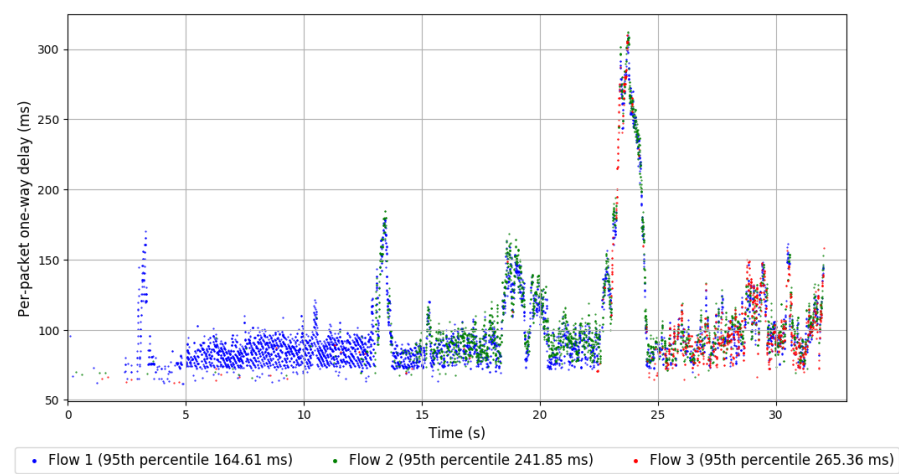
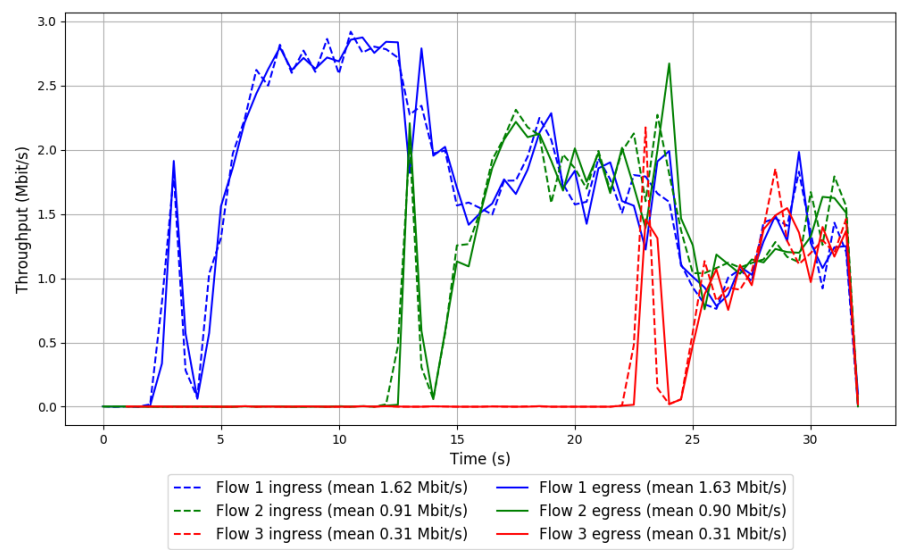


Run 2: Statistics of WebRTC media

Start at: 2018-01-16 00:44:33  
End at: 2018-01-16 00:45:03  
Local clock offset: -15.612 ms  
Remote clock offset: -18.893 ms

# Below is generated by plot.py at 2018-01-16 02:03:11  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 2.82 Mbit/s  
95th percentile per-packet one-way delay: 208.953 ms  
Loss rate: 0.63%  
-- Flow 1:  
Average throughput: 1.63 Mbit/s  
95th percentile per-packet one-way delay: 164.608 ms  
Loss rate: 0.33%  
-- Flow 2:  
Average throughput: 0.90 Mbit/s  
95th percentile per-packet one-way delay: 241.846 ms  
Loss rate: 0.78%  
-- Flow 3:  
Average throughput: 0.31 Mbit/s  
95th percentile per-packet one-way delay: 265.359 ms  
Loss rate: 1.79%

Run 2: Report of WebRTC media — Data Link

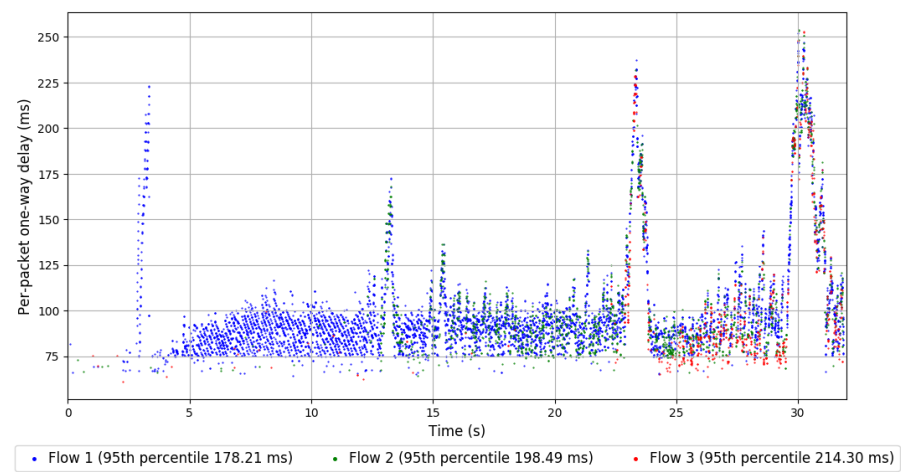
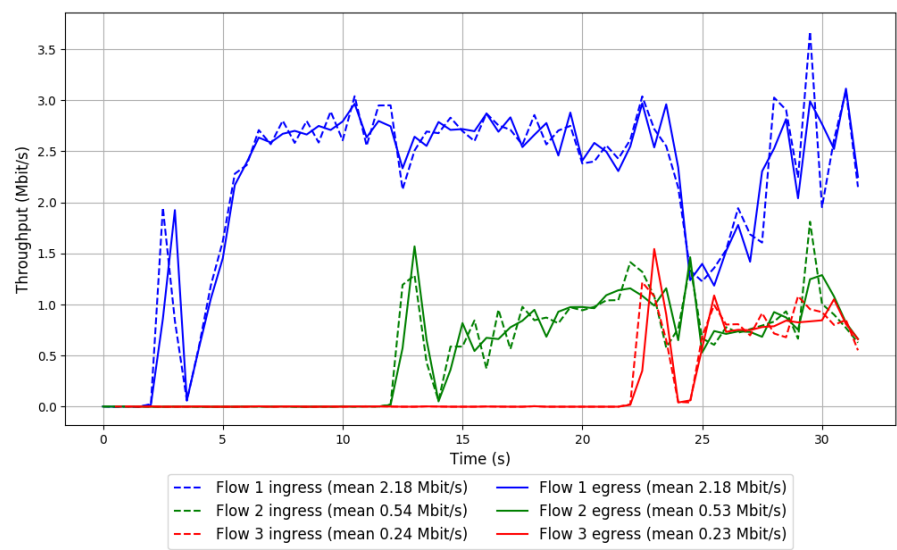


Run 3: Statistics of WebRTC media

Start at: 2018-01-16 01:01:08  
End at: 2018-01-16 01:01:38  
Local clock offset: -16.817 ms  
Remote clock offset: -17.916 ms

# Below is generated by plot.py at 2018-01-16 02:03:12  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 2.93 Mbit/s  
95th percentile per-packet one-way delay: 192.321 ms  
Loss rate: 0.66%  
-- Flow 1:  
Average throughput: 2.18 Mbit/s  
95th percentile per-packet one-way delay: 178.208 ms  
Loss rate: 0.49%  
-- Flow 2:  
Average throughput: 0.53 Mbit/s  
95th percentile per-packet one-way delay: 198.493 ms  
Loss rate: 0.78%  
-- Flow 3:  
Average throughput: 0.23 Mbit/s  
95th percentile per-packet one-way delay: 214.301 ms  
Loss rate: 1.92%

Run 3: Report of WebRTC media — Data Link



Run 1: Statistics of Sprout

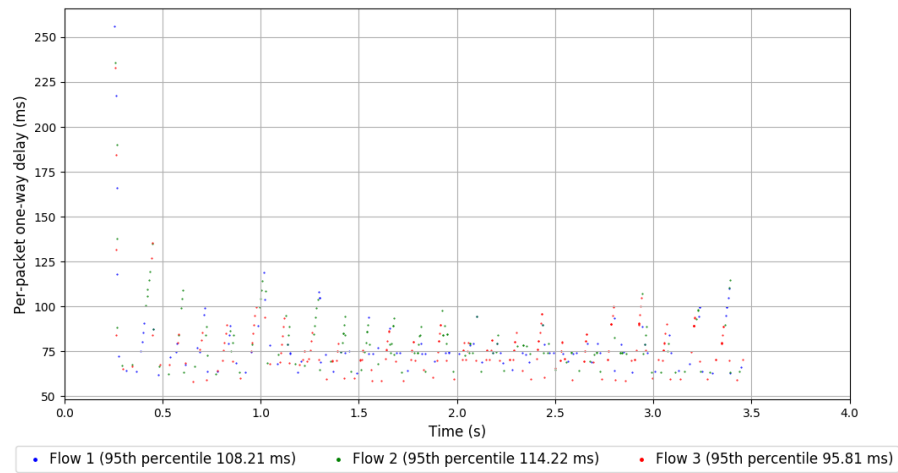
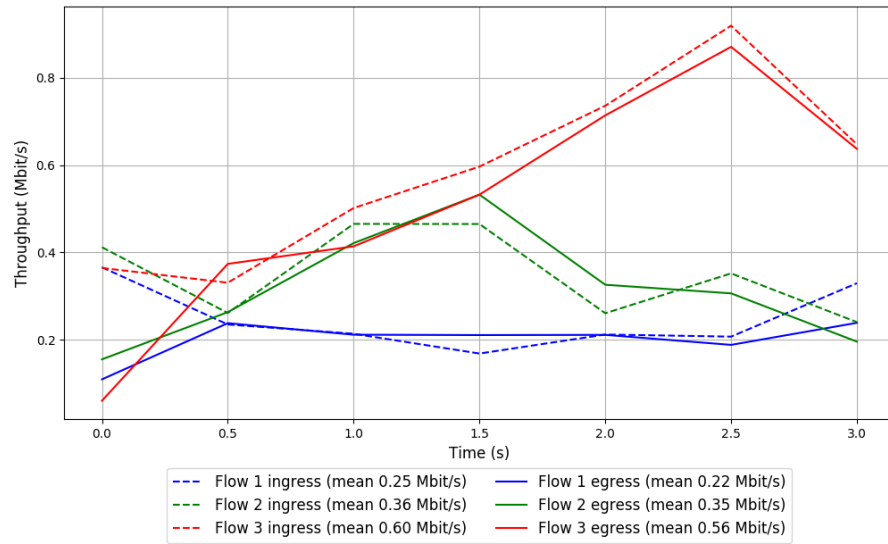
Start at: 2018-01-16 00:31:17

End at: 2018-01-16 00:31:47

Local clock offset: -14.589 ms

Remote clock offset: -15.257 ms

## Run 1: Report of Sprout — Data Link



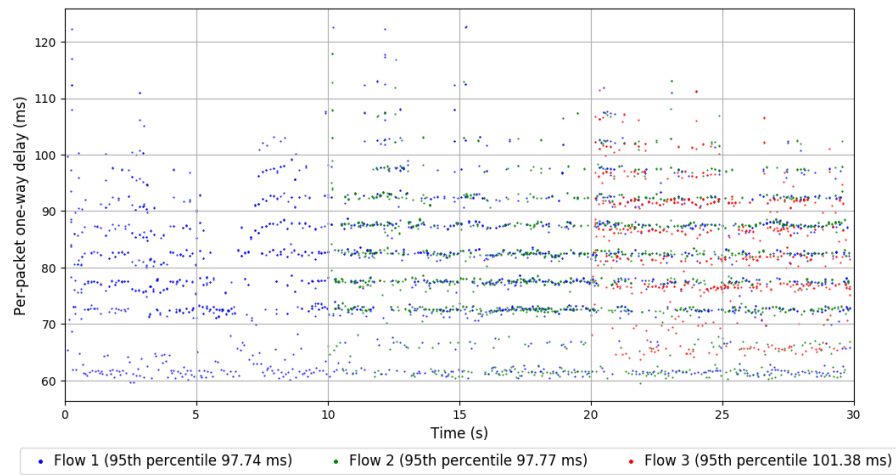
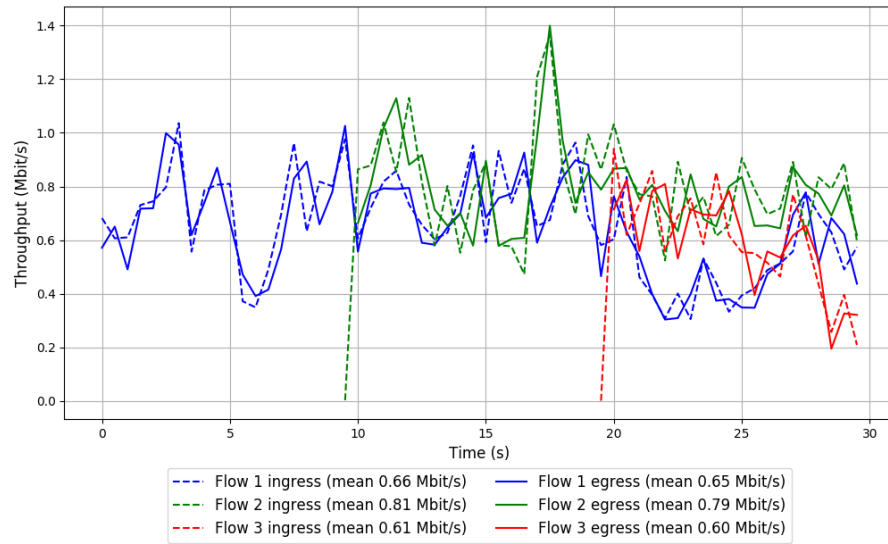
## Run 2: Statistics of Sprout

Start at: 2018-01-16 00:47:51  
End at: 2018-01-16 00:48:21  
Local clock offset: -16.349 ms  
Remote clock offset: -17.746 ms

```
# Below is generated by plot.py at 2018-01-16 02:03:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 97.846 ms
Loss rate: 1.65%
-- Flow 1:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 97.739 ms
Loss rate: 1.49%
-- Flow 2:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 97.774 ms
Loss rate: 2.07%
-- Flow 3:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 101.383 ms
Loss rate: 1.07%
```



## Run 2: Report of Sprout — Data Link

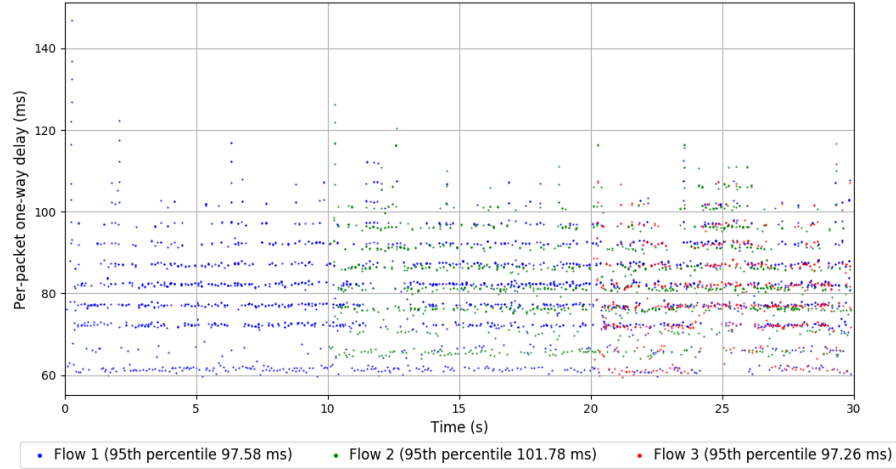
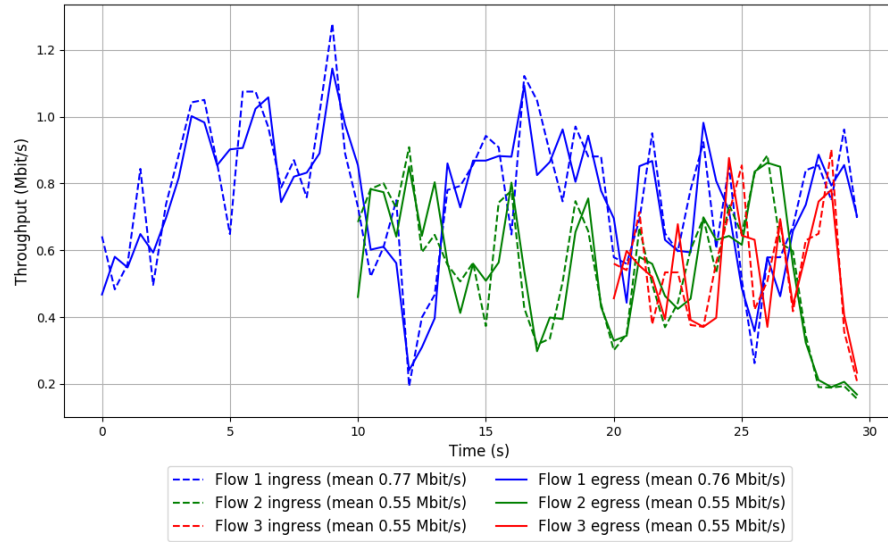


### Run 3: Statistics of Sprout

Start at: 2018-01-16 01:04:26  
End at: 2018-01-16 01:04:57  
Local clock offset: -16.317 ms  
Remote clock offset: -17.228 ms

```
# Below is generated by plot.py at 2018-01-16 02:03:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 101.298 ms
Loss rate: 1.51%
-- Flow 1:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 97.575 ms
Loss rate: 1.89%
-- Flow 2:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 101.782 ms
Loss rate: 0.75%
-- Flow 3:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 97.261 ms
Loss rate: 1.41%
```

### Run 3: Report of Sprout — Data Link

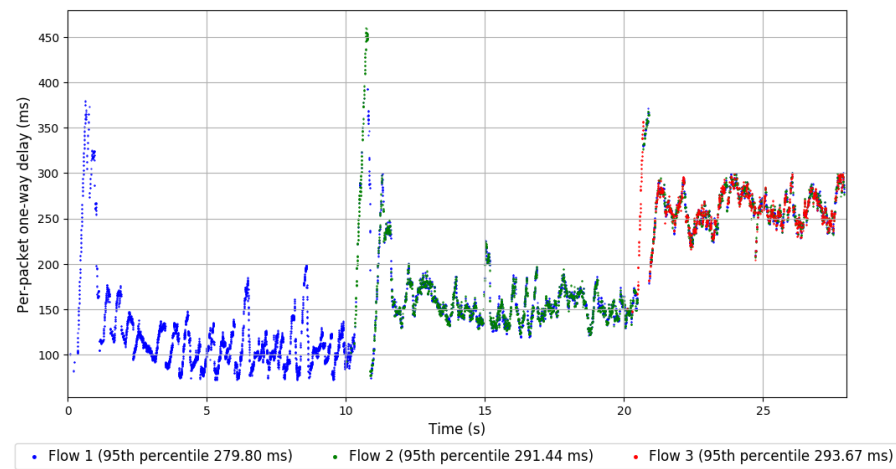
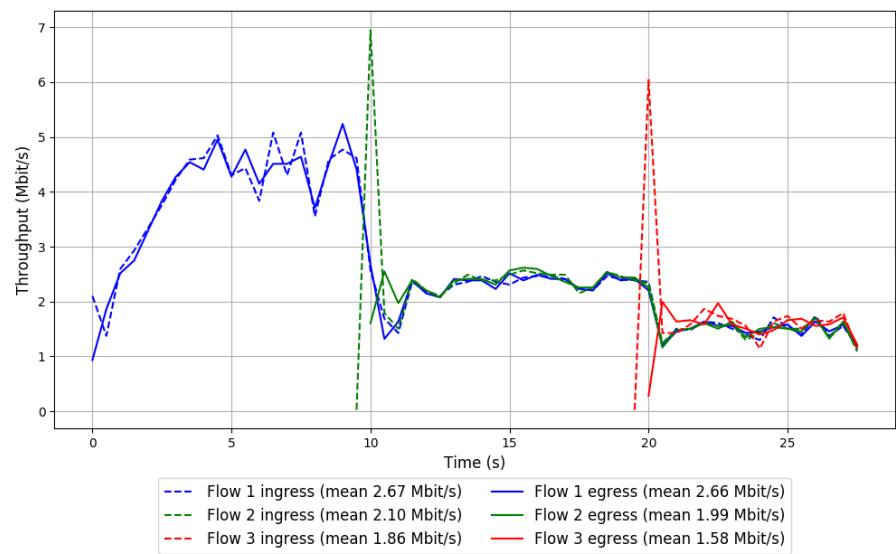


Run 1: Statistics of TaoVA-100x

Start at: 2018-01-16 00:26:53  
End at: 2018-01-16 00:27:23  
Local clock offset: -14.778 ms  
Remote clock offset: -15.823 ms

# Below is generated by plot.py at 2018-01-16 02:03:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.38 Mbit/s  
95th percentile per-packet one-way delay: 287.043 ms  
Loss rate: 4.11%  
-- Flow 1:  
Average throughput: 2.66 Mbit/s  
95th percentile per-packet one-way delay: 279.804 ms  
Loss rate: 0.77%  
-- Flow 2:  
Average throughput: 1.99 Mbit/s  
95th percentile per-packet one-way delay: 291.435 ms  
Loss rate: 5.57%  
-- Flow 3:  
Average throughput: 1.58 Mbit/s  
95th percentile per-packet one-way delay: 293.670 ms  
Loss rate: 17.20%

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

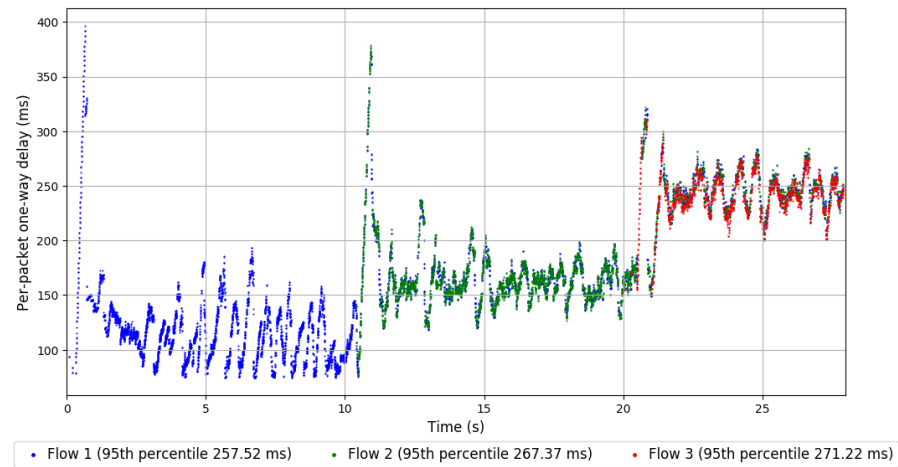
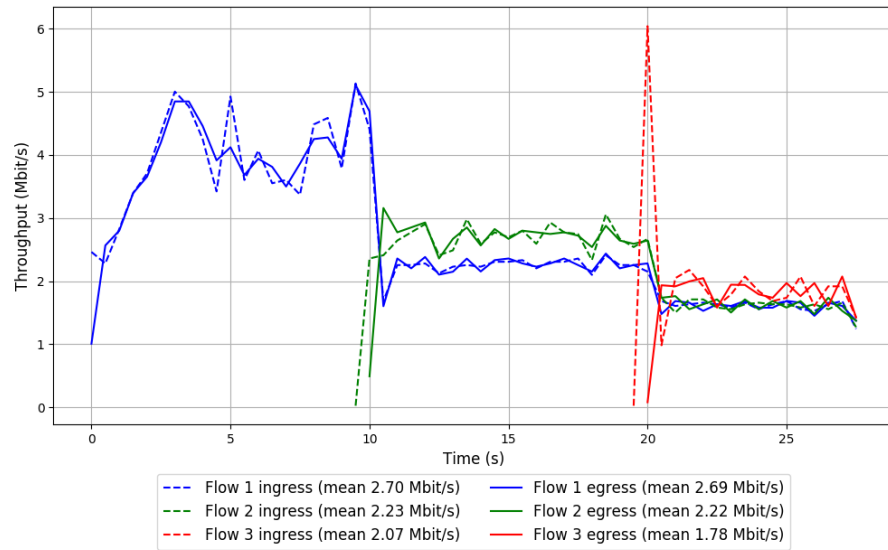


Run 2: Statistics of TaoVA-100x

Start at: 2018-01-16 00:43:27  
End at: 2018-01-16 00:43:57  
Local clock offset: -16.726 ms  
Remote clock offset: -18.428 ms

# Below is generated by plot.py at 2018-01-16 02:03:22  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.62 Mbit/s  
95th percentile per-packet one-way delay: 264.394 ms  
Loss rate: 2.62%  
-- Flow 1:  
Average throughput: 2.69 Mbit/s  
95th percentile per-packet one-way delay: 257.518 ms  
Loss rate: 0.73%  
-- Flow 2:  
Average throughput: 2.22 Mbit/s  
95th percentile per-packet one-way delay: 267.367 ms  
Loss rate: 0.91%  
-- Flow 3:  
Average throughput: 1.78 Mbit/s  
95th percentile per-packet one-way delay: 271.222 ms  
Loss rate: 15.49%

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



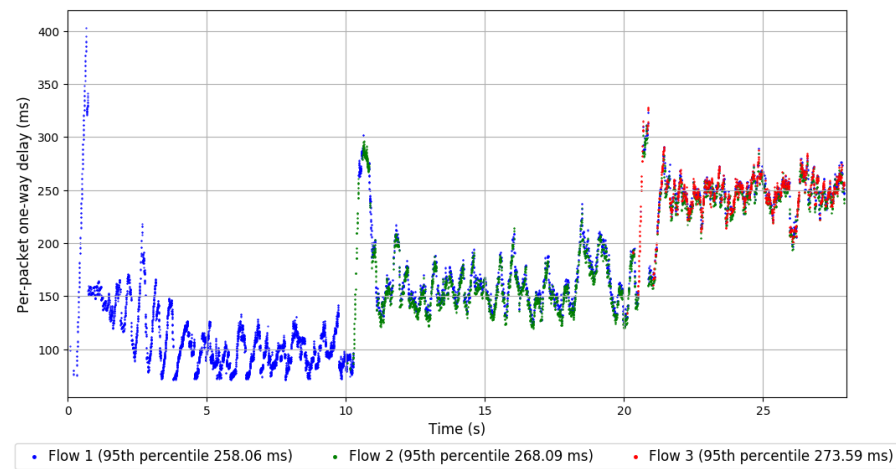
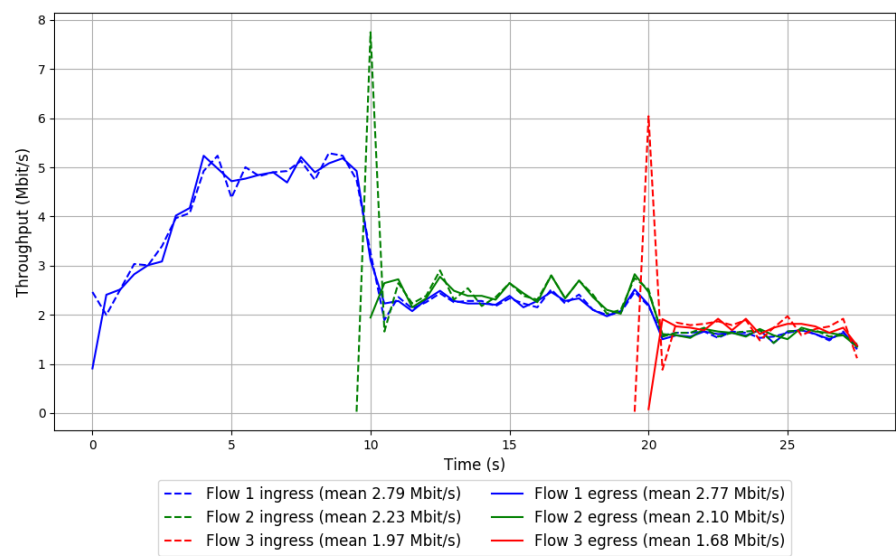
Run 3: Statistics of TaoVA-100x

Start at: 2018-01-16 01:00:02  
End at: 2018-01-16 01:00:32  
Local clock offset: -19.03 ms  
Remote clock offset: -17.133 ms

# Below is generated by plot.py at 2018-01-16 02:03:22  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.59 Mbit/s  
95th percentile per-packet one-way delay: 264.248 ms  
Loss rate: 4.21%  
-- Flow 1:  
Average throughput: 2.77 Mbit/s  
95th percentile per-packet one-way delay: 258.056 ms  
Loss rate: 0.82%  
-- Flow 2:  
Average throughput: 2.10 Mbit/s  
95th percentile per-packet one-way delay: 268.089 ms  
Loss rate: 6.16%  
-- Flow 3:  
Average throughput: 1.68 Mbit/s  
95th percentile per-packet one-way delay: 273.594 ms  
Loss rate: 16.14%



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

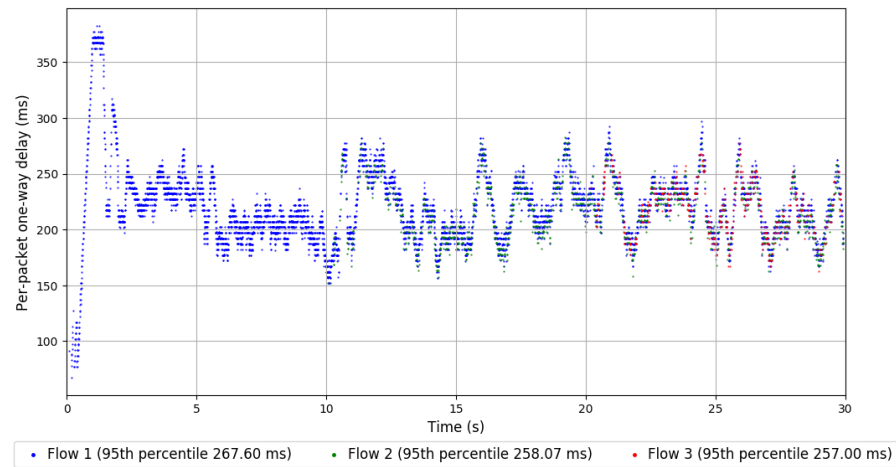
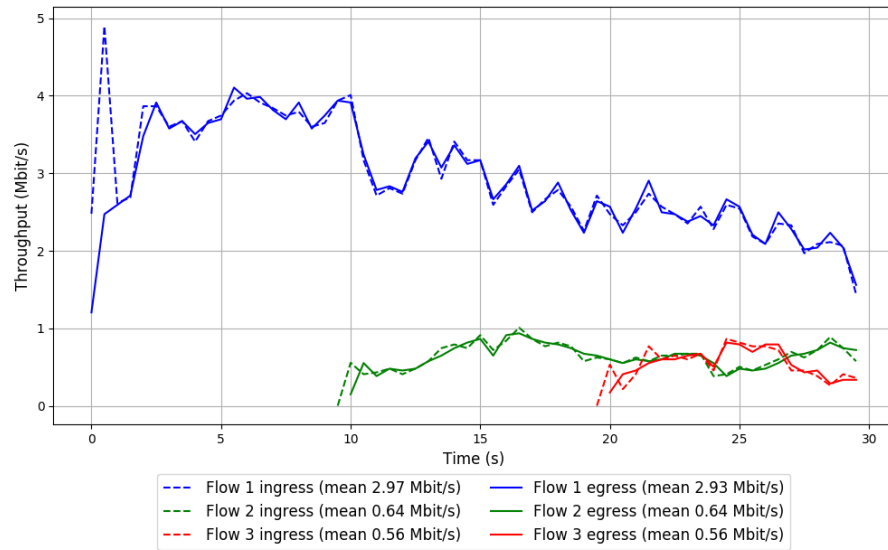


Run 1: Statistics of TCP Vegas

Start at: 2018-01-16 00:35:44  
End at: 2018-01-16 00:36:14  
Local clock offset: -12.313 ms  
Remote clock offset: -16.188 ms

# Below is generated by plot.py at 2018-01-16 02:03:22  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.53 Mbit/s  
95th percentile per-packet one-way delay: 267.157 ms  
Loss rate: 1.68%  
-- Flow 1:  
Average throughput: 2.93 Mbit/s  
95th percentile per-packet one-way delay: 267.598 ms  
Loss rate: 1.69%  
-- Flow 2:  
Average throughput: 0.64 Mbit/s  
95th percentile per-packet one-way delay: 258.067 ms  
Loss rate: 1.22%  
-- Flow 3:  
Average throughput: 0.56 Mbit/s  
95th percentile per-packet one-way delay: 257.004 ms  
Loss rate: 2.58%

# Run 1: Report of TCP Vegas — Data Link

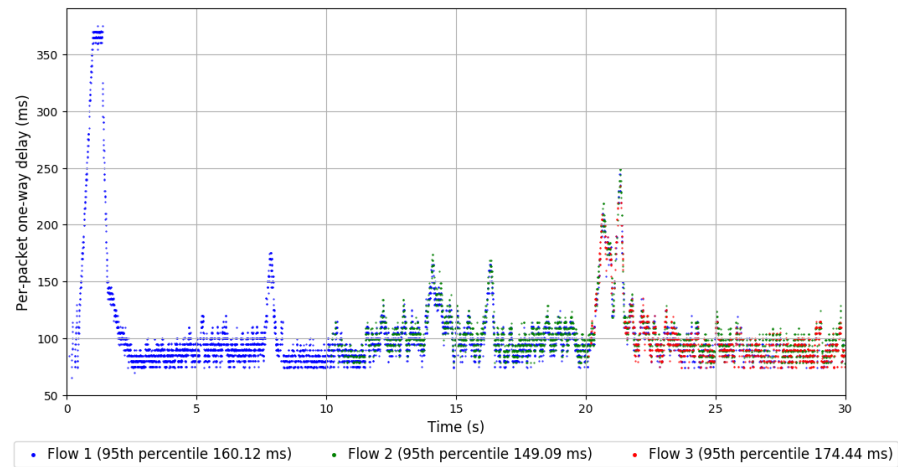
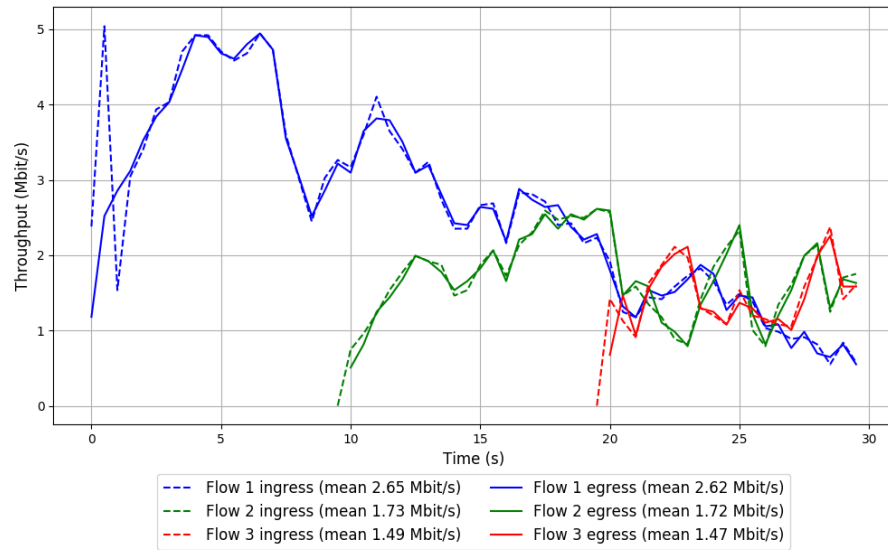


Run 2: Statistics of TCP Vegas

Start at: 2018-01-16 00:52:20  
End at: 2018-01-16 00:52:50  
Local clock offset: -13.762 ms  
Remote clock offset: -18.04 ms

# Below is generated by plot.py at 2018-01-16 02:03:22  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.24 Mbit/s  
95th percentile per-packet one-way delay: 160.050 ms  
Loss rate: 1.41%  
-- Flow 1:  
Average throughput: 2.62 Mbit/s  
95th percentile per-packet one-way delay: 160.117 ms  
Loss rate: 1.47%  
-- Flow 2:  
Average throughput: 1.72 Mbit/s  
95th percentile per-packet one-way delay: 149.086 ms  
Loss rate: 1.01%  
-- Flow 3:  
Average throughput: 1.47 Mbit/s  
95th percentile per-packet one-way delay: 174.438 ms  
Loss rate: 2.03%

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

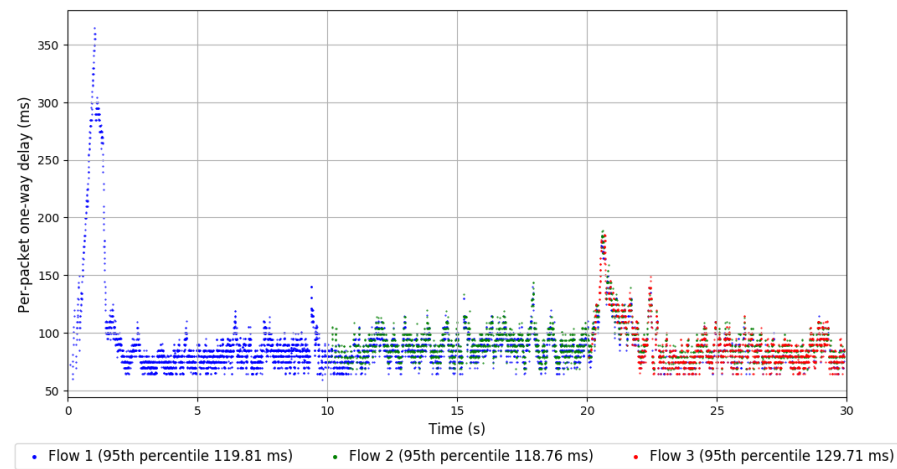
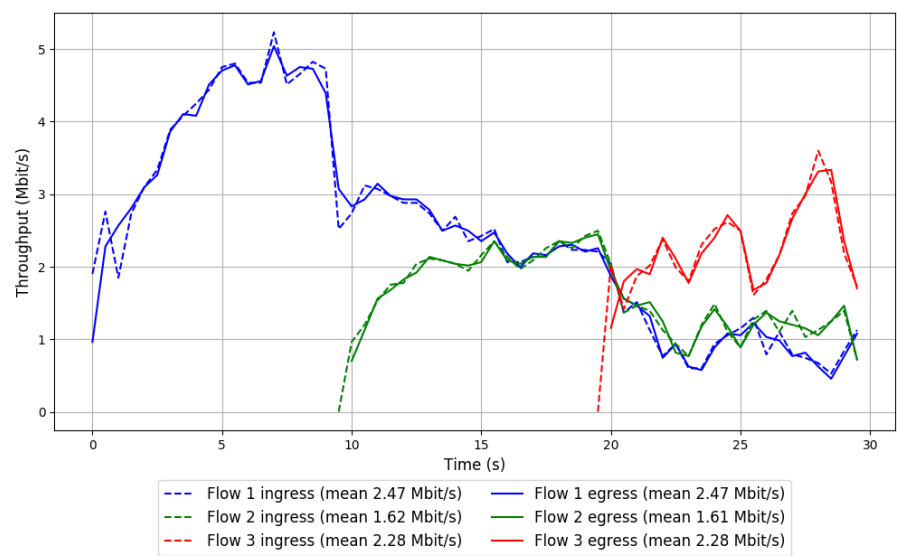


Run 3: Statistics of TCP Vegas

Start at: 2018-01-16 01:08:53  
End at: 2018-01-16 01:09:23  
Local clock offset: -23.315 ms  
Remote clock offset: -16.659 ms

# Below is generated by plot.py at 2018-01-16 02:03:22  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.29 Mbit/s  
95th percentile per-packet one-way delay: 124.001 ms  
Loss rate: 0.60%  
-- Flow 1:  
Average throughput: 2.47 Mbit/s  
95th percentile per-packet one-way delay: 119.812 ms  
Loss rate: 0.45%  
-- Flow 2:  
Average throughput: 1.61 Mbit/s  
95th percentile per-packet one-way delay: 118.760 ms  
Loss rate: 0.52%  
-- Flow 3:  
Average throughput: 2.28 Mbit/s  
95th percentile per-packet one-way delay: 129.710 ms  
Loss rate: 1.16%

Run 3: Report of TCP Vegas — Data Link



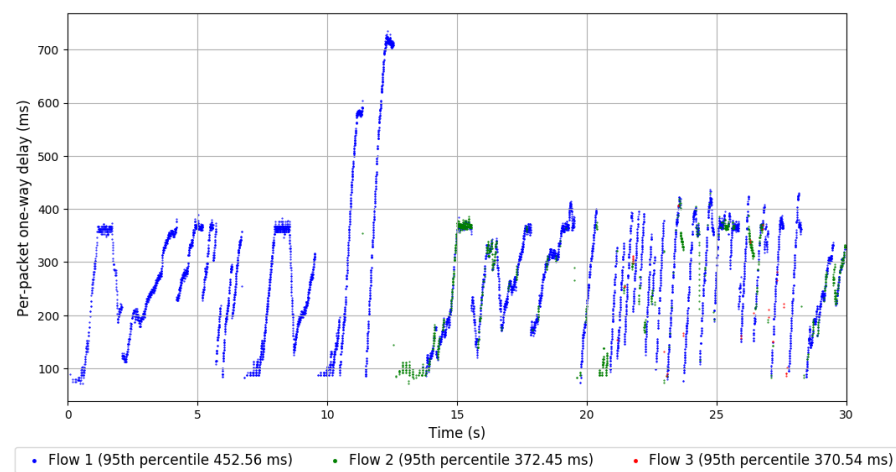
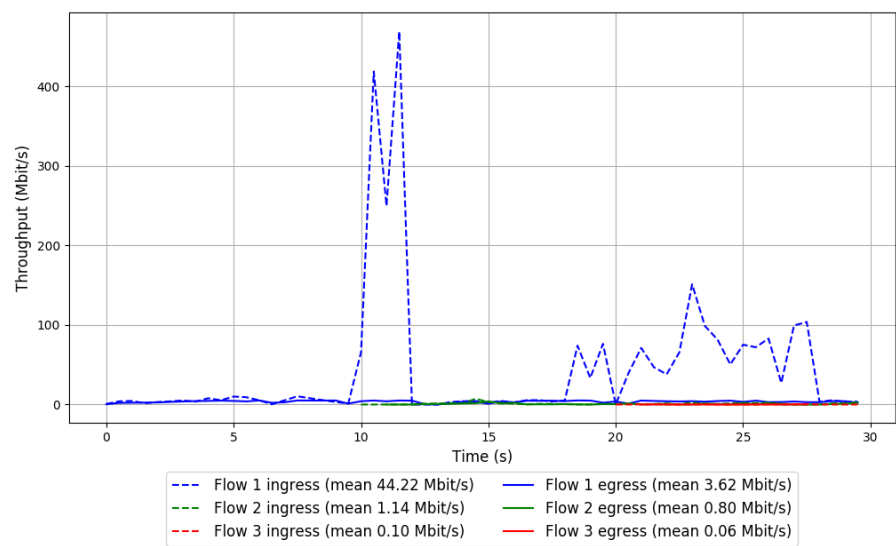
Run 1: Statistics of Verus

Start at: 2018-01-16 00:23:30  
End at: 2018-01-16 00:24:00  
Local clock offset: -11.024 ms  
Remote clock offset: -16.01 ms

# Below is generated by plot.py at 2018-01-16 02:03:35  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.13 Mbit/s  
95th percentile per-packet one-way delay: 419.450 ms  
Loss rate: 90.85%  
-- Flow 1:  
Average throughput: 3.62 Mbit/s  
95th percentile per-packet one-way delay: 452.556 ms  
Loss rate: 91.84%  
-- Flow 2:  
Average throughput: 0.80 Mbit/s  
95th percentile per-packet one-way delay: 372.446 ms  
Loss rate: 34.55%  
-- Flow 3:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 370.538 ms  
Loss rate: 58.82%



Run 1: Report of Verus — Data Link

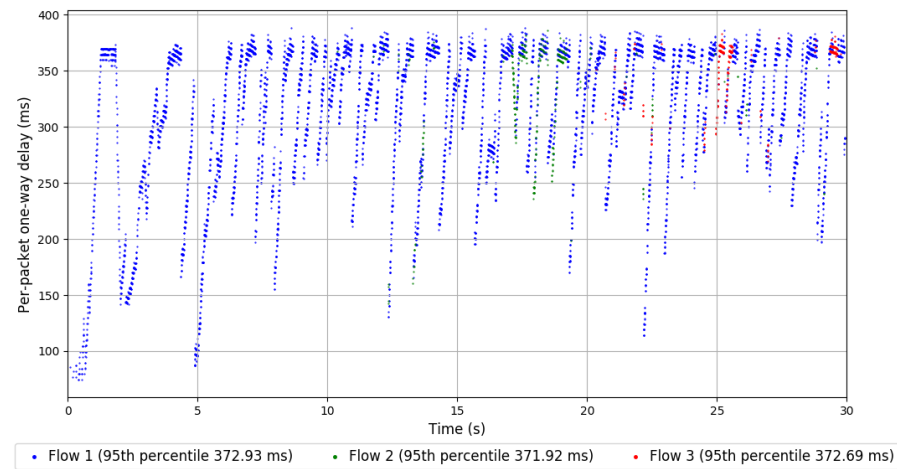
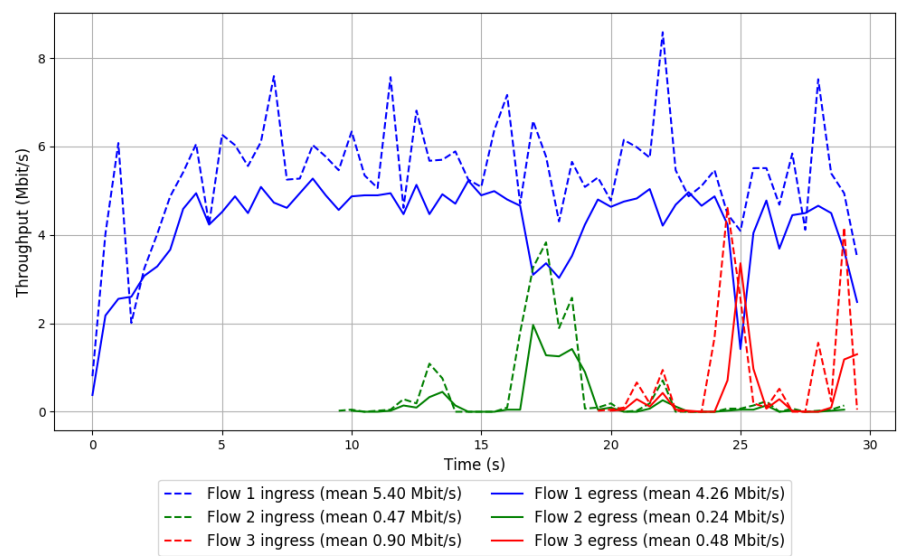


Run 2: Statistics of Verus

Start at: 2018-01-16 00:40:09  
End at: 2018-01-16 00:40:39  
Local clock offset: -16.819 ms  
Remote clock offset: -18.571 ms

# Below is generated by plot.py at 2018-01-16 02:03:35  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.57 Mbit/s  
95th percentile per-packet one-way delay: 372.916 ms  
Loss rate: 23.83%  
-- Flow 1:  
Average throughput: 4.26 Mbit/s  
95th percentile per-packet one-way delay: 372.934 ms  
Loss rate: 21.00%  
-- Flow 2:  
Average throughput: 0.24 Mbit/s  
95th percentile per-packet one-way delay: 371.917 ms  
Loss rate: 49.67%  
-- Flow 3:  
Average throughput: 0.48 Mbit/s  
95th percentile per-packet one-way delay: 372.689 ms  
Loss rate: 49.20%

Run 2: Report of Verus — Data Link

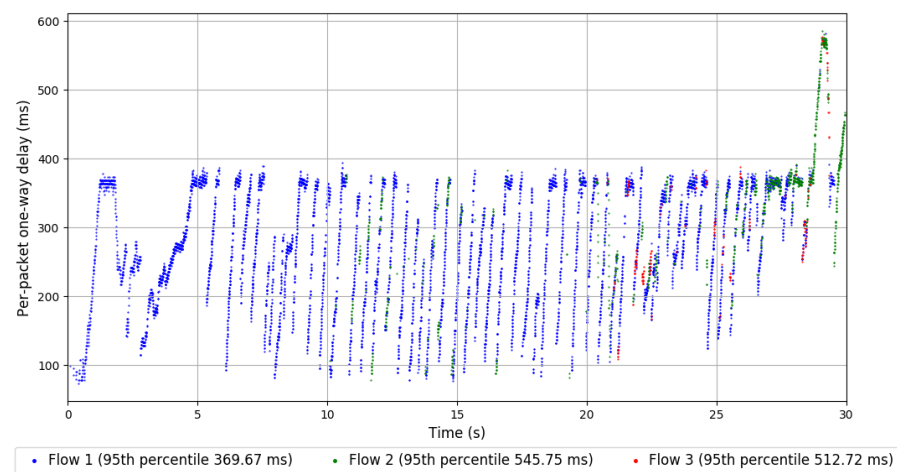
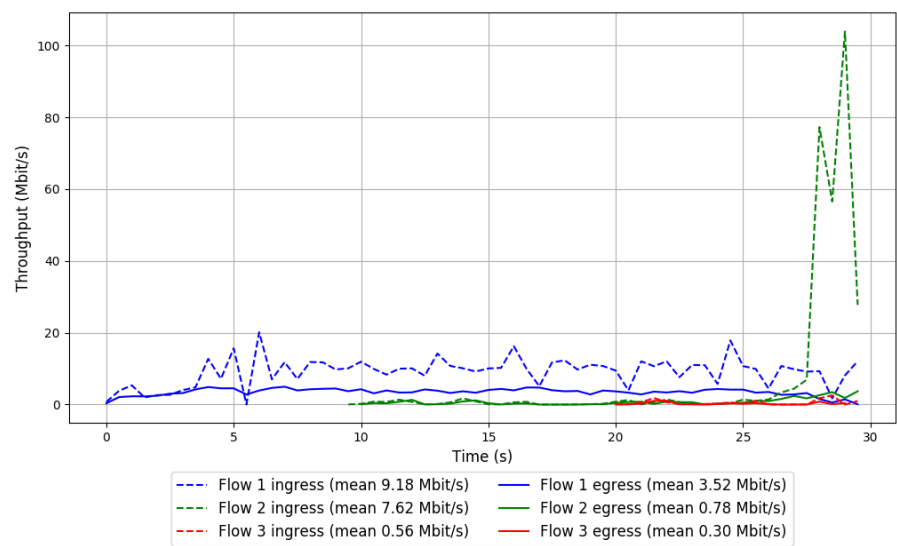


Run 3: Statistics of Verus

Start at: 2018-01-16 00:56:44  
End at: 2018-01-16 00:57:14  
Local clock offset: -17.545 ms  
Remote clock offset: -17.165 ms

# Below is generated by plot.py at 2018-01-16 02:03:35  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.08 Mbit/s  
95th percentile per-packet one-way delay: 374.281 ms  
Loss rate: 71.66%  
-- Flow 1:  
Average throughput: 3.52 Mbit/s  
95th percentile per-packet one-way delay: 369.672 ms  
Loss rate: 62.28%  
-- Flow 2:  
Average throughput: 0.78 Mbit/s  
95th percentile per-packet one-way delay: 545.753 ms  
Loss rate: 89.63%  
-- Flow 3:  
Average throughput: 0.30 Mbit/s  
95th percentile per-packet one-way delay: 512.721 ms  
Loss rate: 51.71%

Run 3: Report of Verus — Data Link

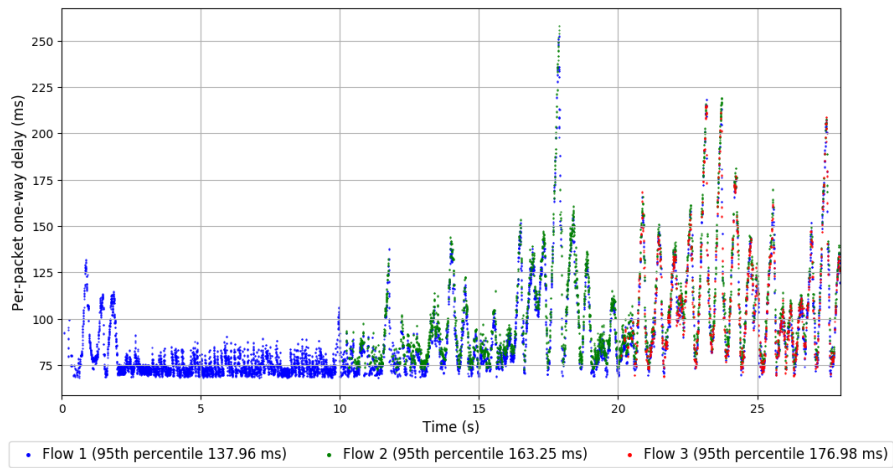
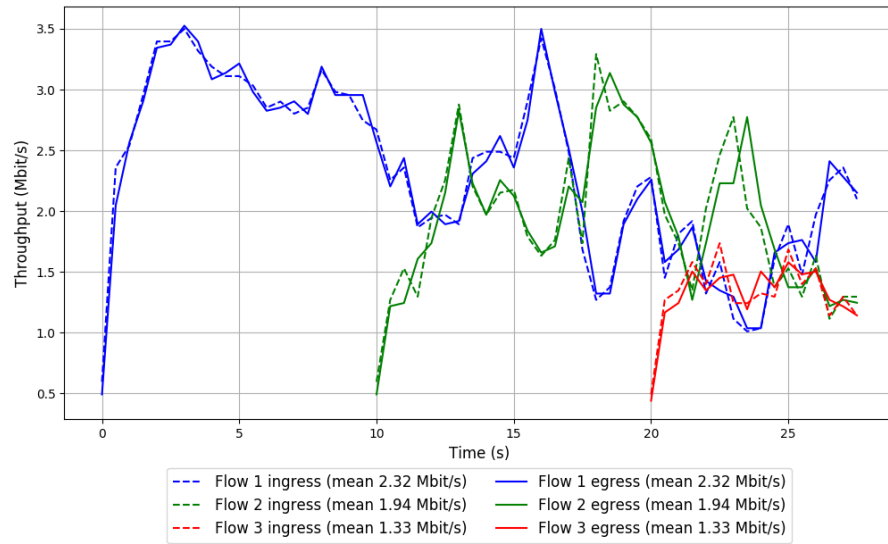


Run 1: Statistics of Copa

Start at: 2018-01-16 00:36:51  
End at: 2018-01-16 00:37:21  
Local clock offset: -16.776 ms  
Remote clock offset: -17.624 ms

# Below is generated by plot.py at 2018-01-16 02:03:35  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.94 Mbit/s  
95th percentile per-packet one-way delay: 150.966 ms  
Loss rate: 0.47%  
-- Flow 1:  
Average throughput: 2.32 Mbit/s  
95th percentile per-packet one-way delay: 137.959 ms  
Loss rate: 0.34%  
-- Flow 2:  
Average throughput: 1.94 Mbit/s  
95th percentile per-packet one-way delay: 163.253 ms  
Loss rate: 0.52%  
-- Flow 3:  
Average throughput: 1.33 Mbit/s  
95th percentile per-packet one-way delay: 176.980 ms  
Loss rate: 1.10%

## Run 1: Report of Copa — Data Link



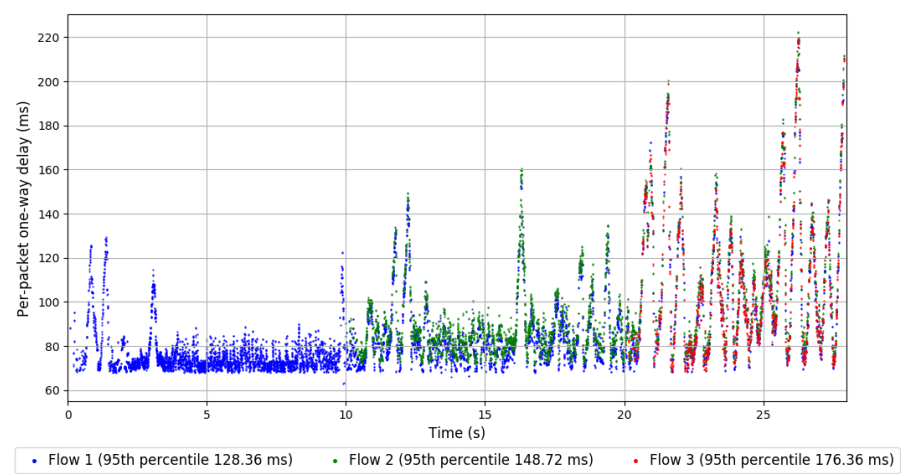
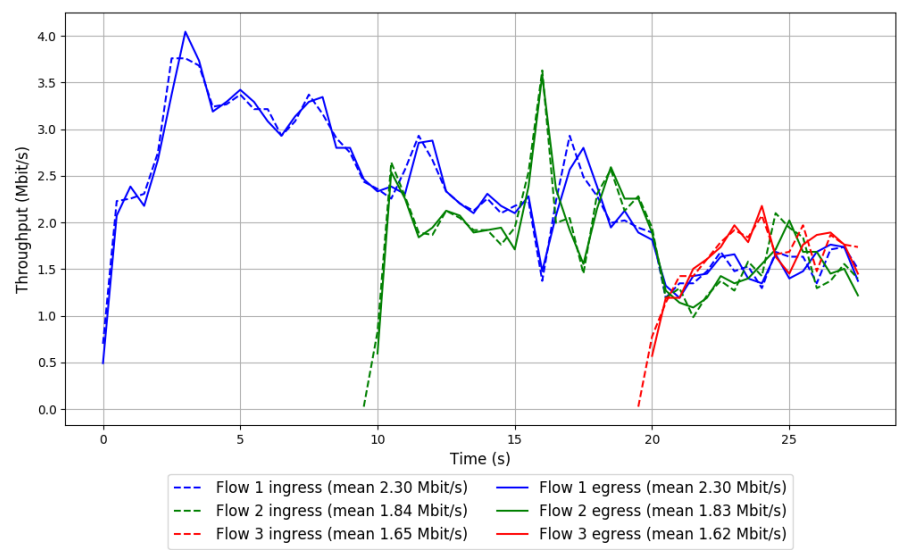
Run 2: Statistics of Copa

Start at: 2018-01-16 00:53:26  
End at: 2018-01-16 00:53:56  
Local clock offset: -17.246 ms  
Remote clock offset: -15.988 ms

# Below is generated by plot.py at 2018-01-16 02:03:35  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.94 Mbit/s  
95th percentile per-packet one-way delay: 143.155 ms  
Loss rate: 0.74%  
-- Flow 1:  
Average throughput: 2.30 Mbit/s  
95th percentile per-packet one-way delay: 128.361 ms  
Loss rate: 0.38%  
-- Flow 2:  
Average throughput: 1.83 Mbit/s  
95th percentile per-packet one-way delay: 148.724 ms  
Loss rate: 0.79%  
-- Flow 3:  
Average throughput: 1.62 Mbit/s  
95th percentile per-packet one-way delay: 176.363 ms  
Loss rate: 2.38%



Run 2: Report of Copa — Data Link

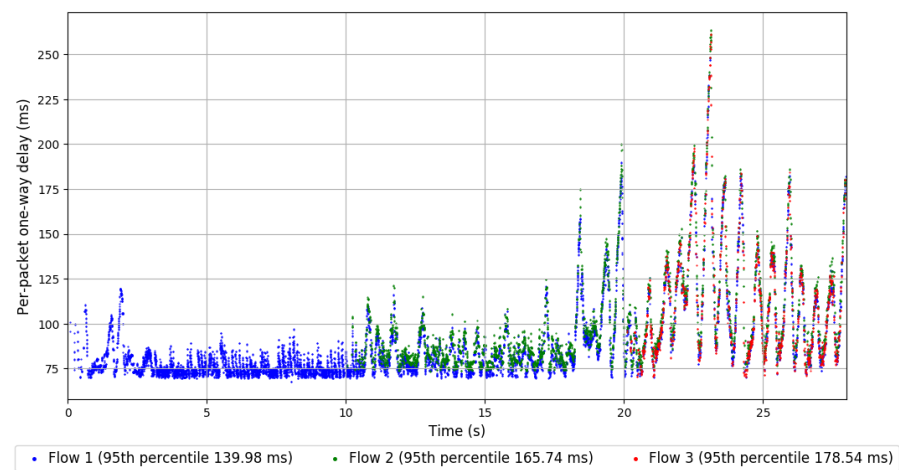
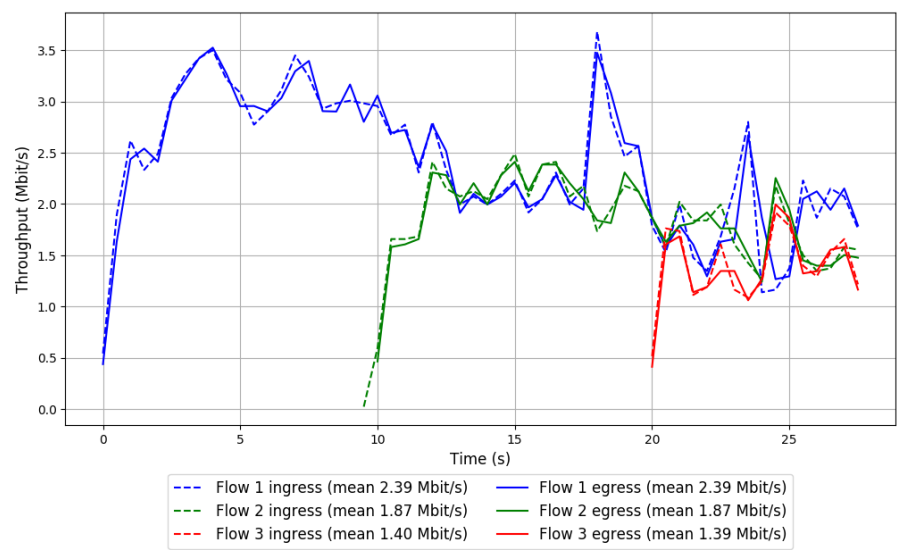


Run 3: Statistics of Copa

Start at: 2018-01-16 01:09:59  
End at: 2018-01-16 01:10:29  
Local clock offset: -16.741 ms  
Remote clock offset: -16.06 ms

# Below is generated by plot.py at 2018-01-16 02:03:35  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.98 Mbit/s  
95th percentile per-packet one-way delay: 153.350 ms  
Loss rate: 0.46%  
-- Flow 1:  
Average throughput: 2.39 Mbit/s  
95th percentile per-packet one-way delay: 139.978 ms  
Loss rate: 0.25%  
-- Flow 2:  
Average throughput: 1.87 Mbit/s  
95th percentile per-packet one-way delay: 165.742 ms  
Loss rate: 0.54%  
-- Flow 3:  
Average throughput: 1.39 Mbit/s  
95th percentile per-packet one-way delay: 178.543 ms  
Loss rate: 1.52%

Run 3: Report of Copa — Data Link

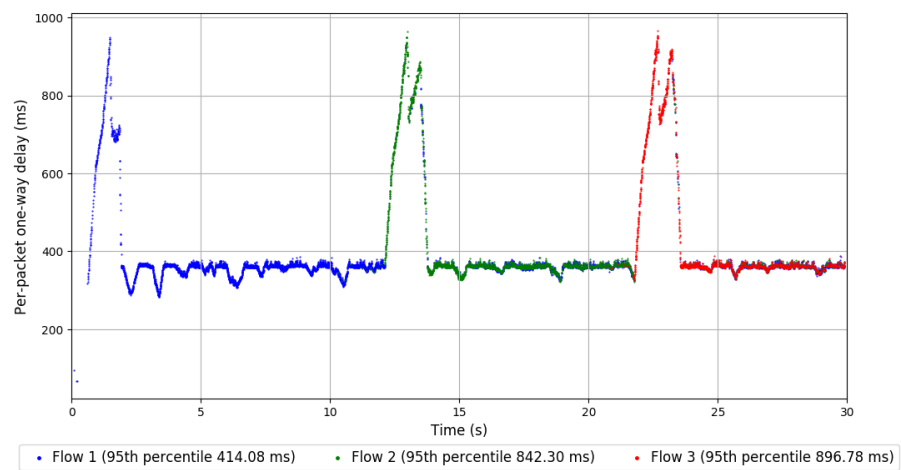
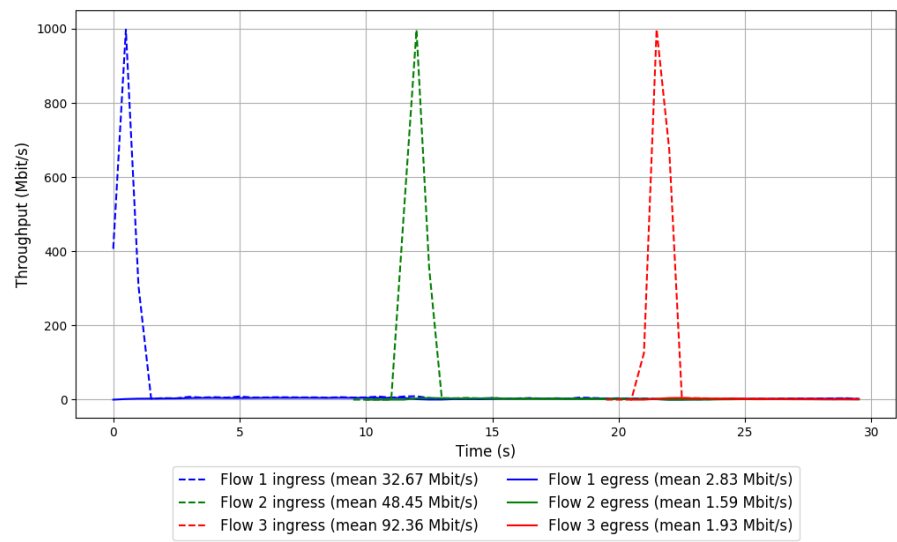


Run 1: Statistics of FillP

Start at: 2018-01-16 00:33:29  
End at: 2018-01-16 00:33:59  
Local clock offset: -14.52 ms  
Remote clock offset: -16.917 ms

# Below is generated by plot.py at 2018-01-16 02:03:40  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.48 Mbit/s  
95th percentile per-packet one-way delay: 785.185 ms  
Loss rate: 95.33%  
-- Flow 1:  
Average throughput: 2.83 Mbit/s  
95th percentile per-packet one-way delay: 414.084 ms  
Loss rate: 91.35%  
-- Flow 2:  
Average throughput: 1.59 Mbit/s  
95th percentile per-packet one-way delay: 842.297 ms  
Loss rate: 96.78%  
-- Flow 3:  
Average throughput: 1.93 Mbit/s  
95th percentile per-packet one-way delay: 896.784 ms  
Loss rate: 98.05%

Run 1: Report of FillP — Data Link

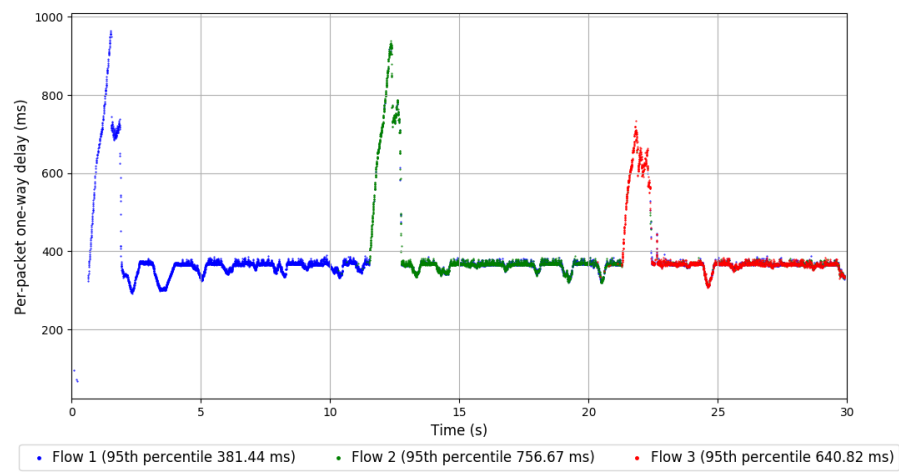
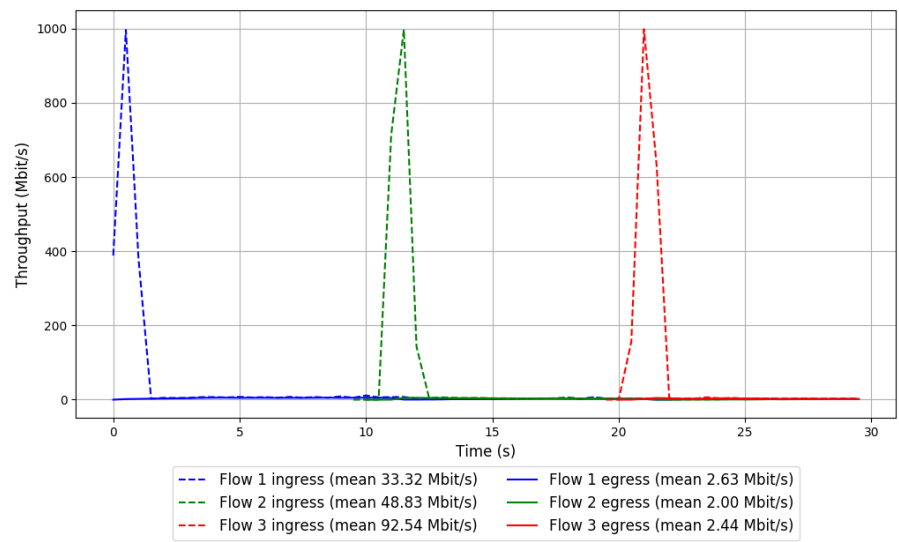


Run 2: Statistics of FillP

Start at: 2018-01-16 00:50:03  
End at: 2018-01-16 00:50:33  
Local clock offset: -14.334 ms  
Remote clock offset: -17.664 ms

# Below is generated by plot.py at 2018-01-16 02:03:41  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.73 Mbit/s  
95th percentile per-packet one-way delay: 656.492 ms  
Loss rate: 95.12%  
-- Flow 1:  
Average throughput: 2.63 Mbit/s  
95th percentile per-packet one-way delay: 381.444 ms  
Loss rate: 92.13%  
-- Flow 2:  
Average throughput: 2.00 Mbit/s  
95th percentile per-packet one-way delay: 756.674 ms  
Loss rate: 95.97%  
-- Flow 3:  
Average throughput: 2.44 Mbit/s  
95th percentile per-packet one-way delay: 640.815 ms  
Loss rate: 97.47%

Run 2: Report of FillP — Data Link



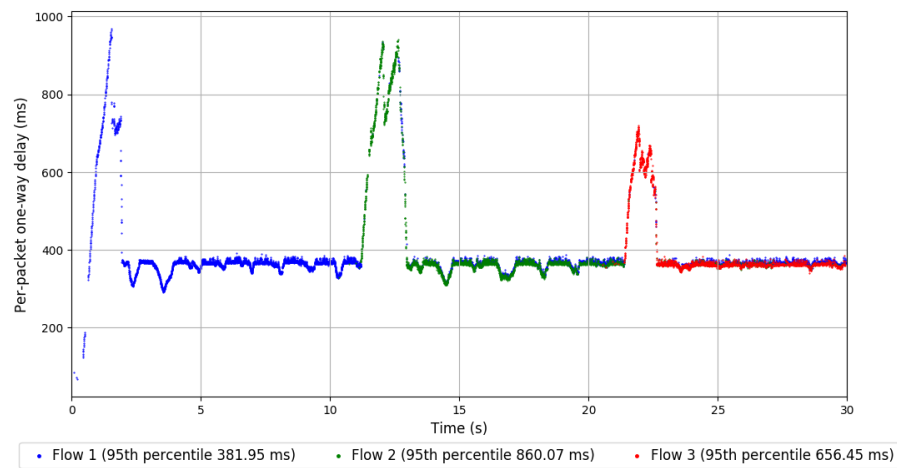
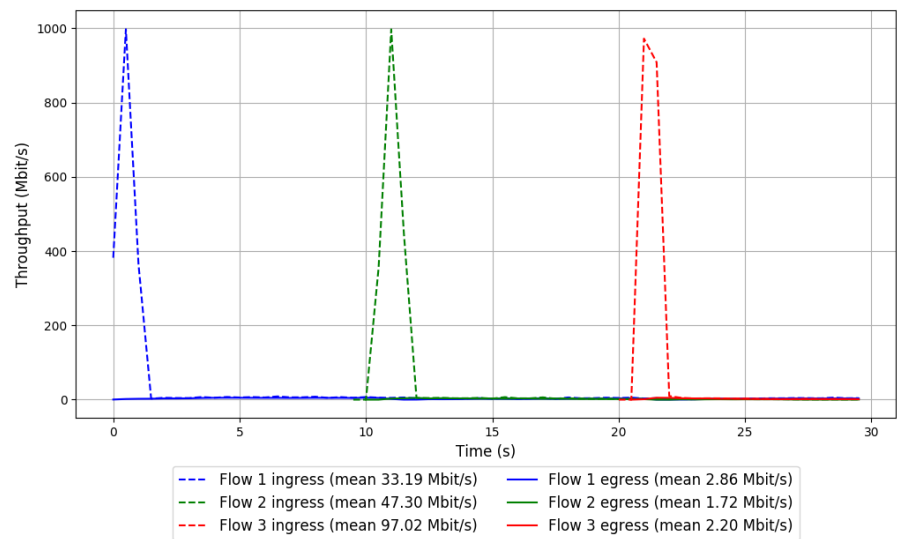
Run 3: Statistics of FillP

Start at: 2018-01-16 01:06:38  
End at: 2018-01-16 01:07:08  
Local clock offset: -15.689 ms  
Remote clock offset: -17.707 ms

# Below is generated by plot.py at 2018-01-16 02:03:41  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.67 Mbit/s  
95th percentile per-packet one-way delay: 701.588 ms  
Loss rate: 95.19%  
-- Flow 1:  
Average throughput: 2.86 Mbit/s  
95th percentile per-packet one-way delay: 381.954 ms  
Loss rate: 91.41%  
-- Flow 2:  
Average throughput: 1.72 Mbit/s  
95th percentile per-packet one-way delay: 860.072 ms  
Loss rate: 96.45%  
-- Flow 3:  
Average throughput: 2.20 Mbit/s  
95th percentile per-packet one-way delay: 656.449 ms  
Loss rate: 97.85%



Run 3: Report of FillP — Data Link



Run 1: Statistics of Indigo

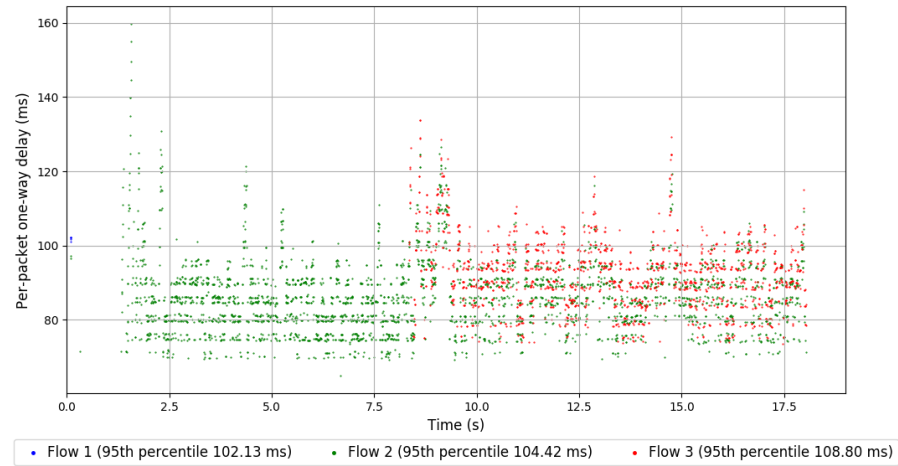
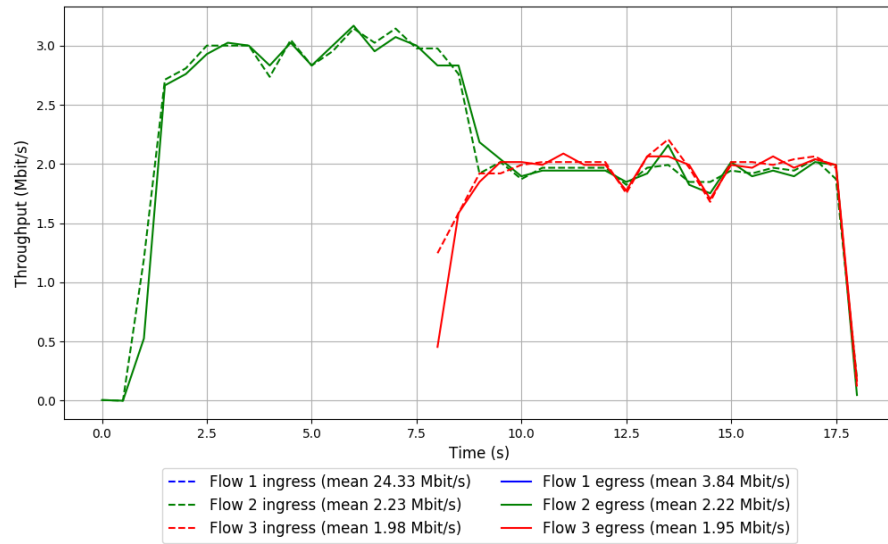
Start at: 2018-01-16 00:34:38

End at: 2018-01-16 00:35:08

Local clock offset: -13.979 ms

Remote clock offset: -15.735 ms

## Run 1: Report of Indigo — Data Link

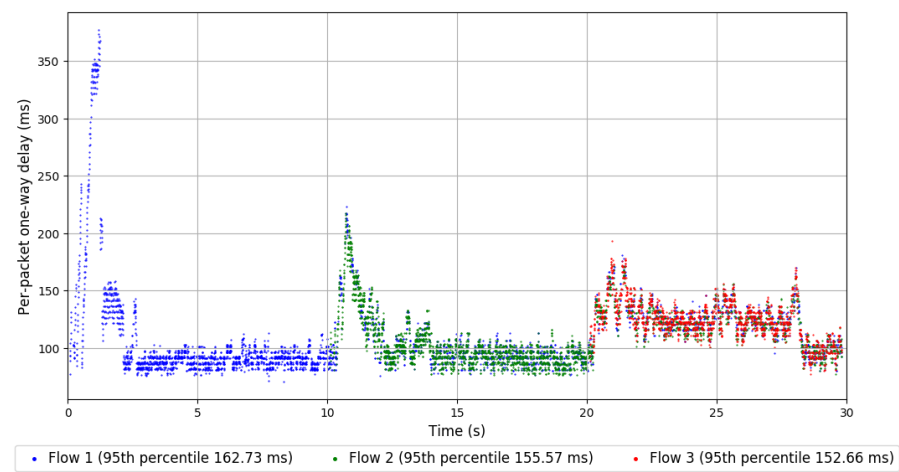
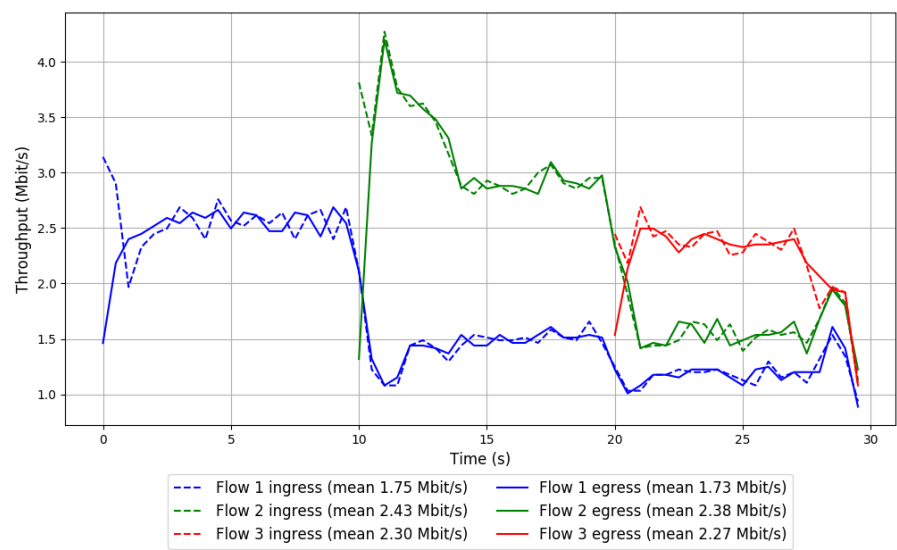


Run 2: Statistics of Indigo

Start at: 2018-01-16 00:51:14  
End at: 2018-01-16 00:51:44  
Local clock offset: -15.252 ms  
Remote clock offset: -18.07 ms

# Below is generated by plot.py at 2018-01-16 02:03:41  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.05 Mbit/s  
95th percentile per-packet one-way delay: 156.530 ms  
Loss rate: 1.93%  
-- Flow 1:  
Average throughput: 1.73 Mbit/s  
95th percentile per-packet one-way delay: 162.731 ms  
Loss rate: 1.47%  
-- Flow 2:  
Average throughput: 2.38 Mbit/s  
95th percentile per-packet one-way delay: 155.570 ms  
Loss rate: 2.37%  
-- Flow 3:  
Average throughput: 2.27 Mbit/s  
95th percentile per-packet one-way delay: 152.662 ms  
Loss rate: 2.03%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-01-16 01:07:47  
End at: 2018-01-16 01:08:18  
Local clock offset: -14.849 ms  
Remote clock offset: -19.83 ms

# Below is generated by plot.py at 2018-01-16 02:03:41  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.68 Mbit/s  
95th percentile per-packet one-way delay: 134.566 ms  
Loss rate: 1.66%  
-- Flow 1:  
Average throughput: 1.35 Mbit/s  
95th percentile per-packet one-way delay: 126.258 ms  
Loss rate: 0.36%  
-- Flow 2:  
Average throughput: 3.01 Mbit/s  
95th percentile per-packet one-way delay: 139.827 ms  
Loss rate: 2.40%  
-- Flow 3:  
Average throughput: 1.01 Mbit/s  
95th percentile per-packet one-way delay: 122.829 ms  
Loss rate: 2.38%

Run 3: Report of Indigo — Data Link

