

## Pantheon Report

Generated at 2018-01-26 02:15:44 (UTC).

Data path: China ppp0 (*remote*) → AWS Korea Ethernet (*local*).

Repeated the test of 15 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).

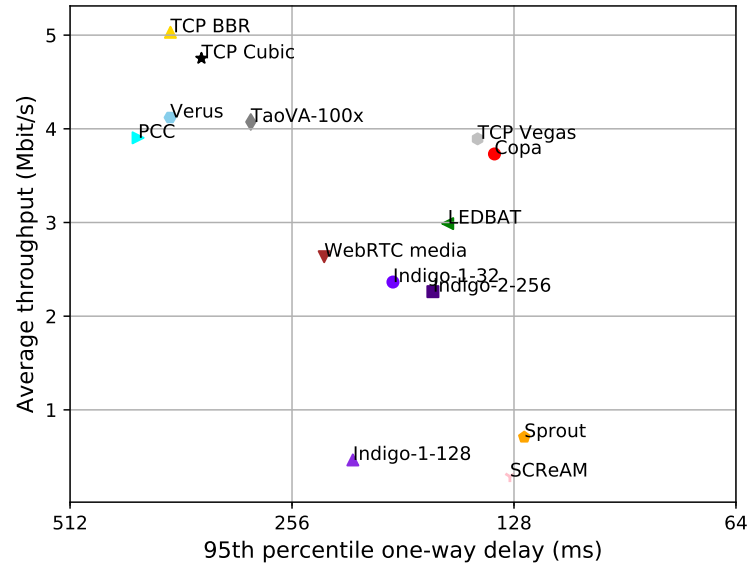
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo\_fast**).

NTP offsets were measured against `ntp.nict.jp` and have been applied to correct the timestamps in logs.

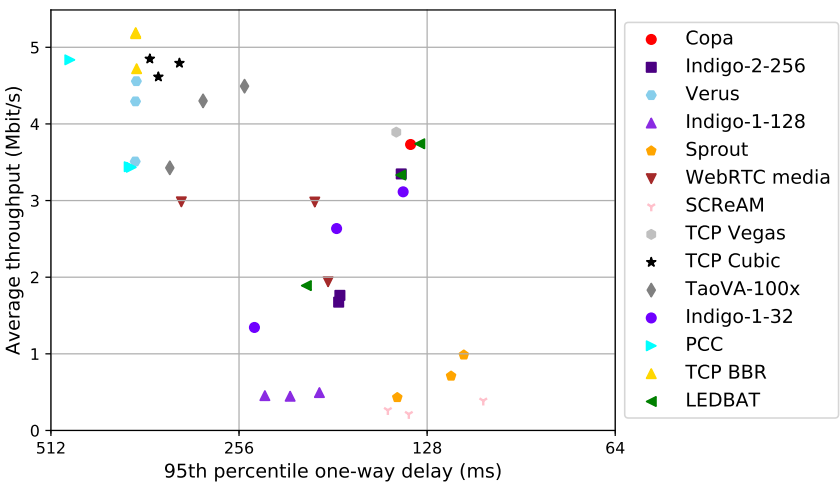
Git summary:

```
branch: master @ f23294ec38436c9f802847d477a41b7343ec76e6
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ ec9585325218d5048c4d4152fa42240af54c6e67
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
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 @ f1a14bffe749737437f61b1eae30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/vivace @ 423cbca3e8ea1d599e7b5cf725835e8a2b6bfac6
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

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



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



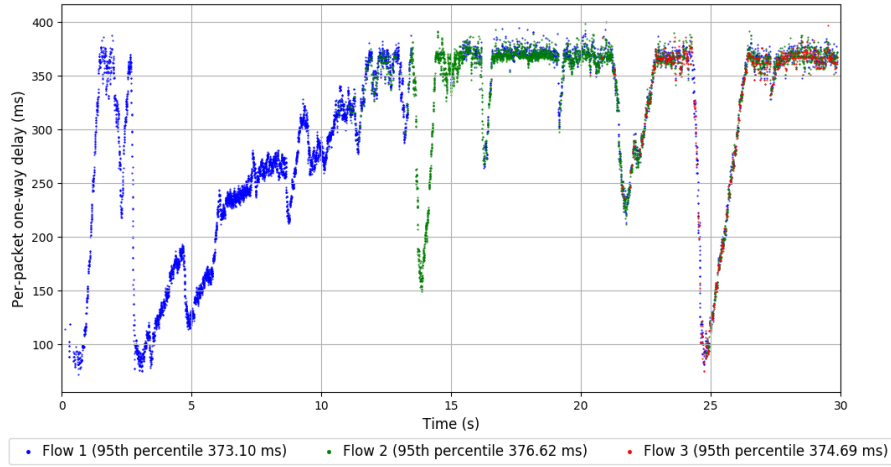
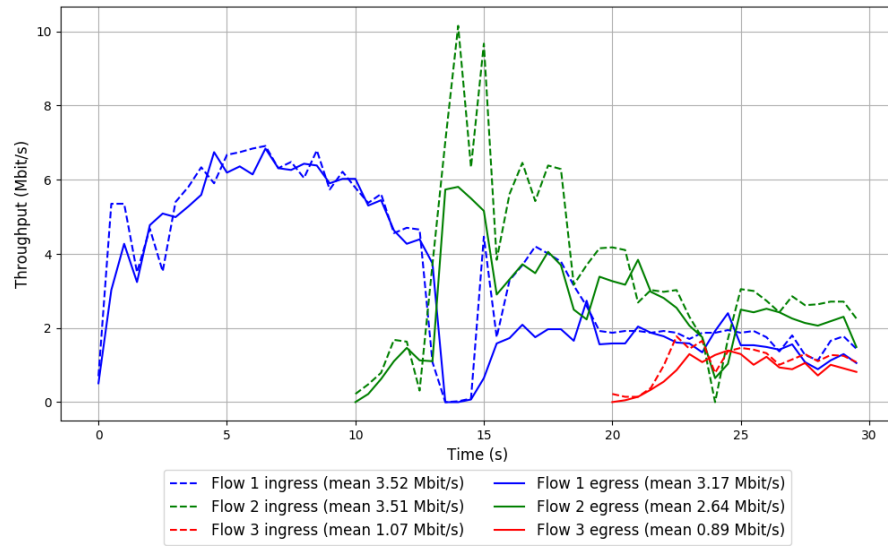
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	3.45	1.91	1.01	371.42	377.10	378.71	9.69	21.43	27.24
TCP Cubic	3	3.35	1.59	1.09	343.53	332.07	227.01	1.35	1.70	3.64
LEDBAT	3	1.89	1.14	1.05	155.24	158.55	166.11	1.24	1.42	2.48
PCC	3	2.32	1.62	1.58	378.02	377.87	779.29	20.56	24.35	74.09
QUIC Cubic	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SCReAM	3	0.12	0.15	0.20	132.71	127.37	119.37	0.39	0.68	1.43
WebRTC media	3	1.78	0.66	0.21	215.91	248.74	254.90	1.20	1.51	3.44
Sprout	3	0.34	0.34	0.44	123.38	125.27	120.81	1.15	1.16	1.05
TaoVA-100x	3	2.37	2.02	1.40	268.17	294.22	339.65	1.50	6.35	20.73
TCP Vegas	1	2.47	1.55	1.21	139.47	147.85	139.30	0.31	1.04	1.41
Verus	3	3.64	0.55	0.47	372.73	406.44	382.30	30.95	58.08	46.93
Copa	1	2.49	1.45	1.11	133.87	143.78	162.13	0.22	0.60	2.48
Indigo-2-256	3	1.08	1.15	1.08	162.81	166.24	164.31	1.06	1.07	1.84
Indigo-1-32	3	1.09	1.14	1.21	212.65	164.19	167.29	3.99	1.17	1.51
Indigo-1-128	3	0.21	0.22	0.37	200.77	167.25	212.50	3.53	2.81	1.59

Run 1: Statistics of TCP BBR

Start at: 2018-01-26 00:34:24  
End at: 2018-01-26 00:34:54  
Local clock offset: -0.533 ms  
Remote clock offset: -9.495 ms

# Below is generated by plot.py at 2018-01-26 02:15:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 5.19 Mbit/s  
95th percentile per-packet one-way delay: 374.629 ms  
Loss rate: 16.90%  
-- Flow 1:  
Average throughput: 3.17 Mbit/s  
95th percentile per-packet one-way delay: 373.104 ms  
Loss rate: 10.52%  
-- Flow 2:  
Average throughput: 2.64 Mbit/s  
95th percentile per-packet one-way delay: 376.622 ms  
Loss rate: 25.94%  
-- Flow 3:  
Average throughput: 0.89 Mbit/s  
95th percentile per-packet one-way delay: 374.689 ms  
Loss rate: 20.75%

# Run 1: Report of TCP BBR — Data Link

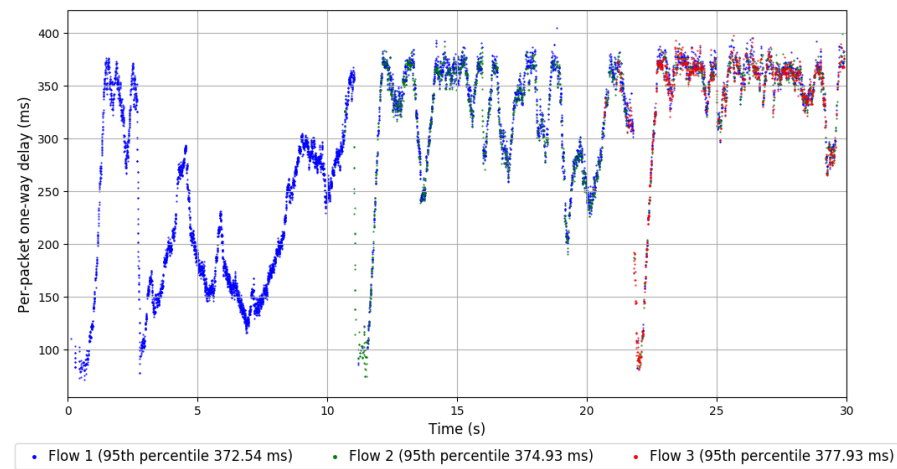
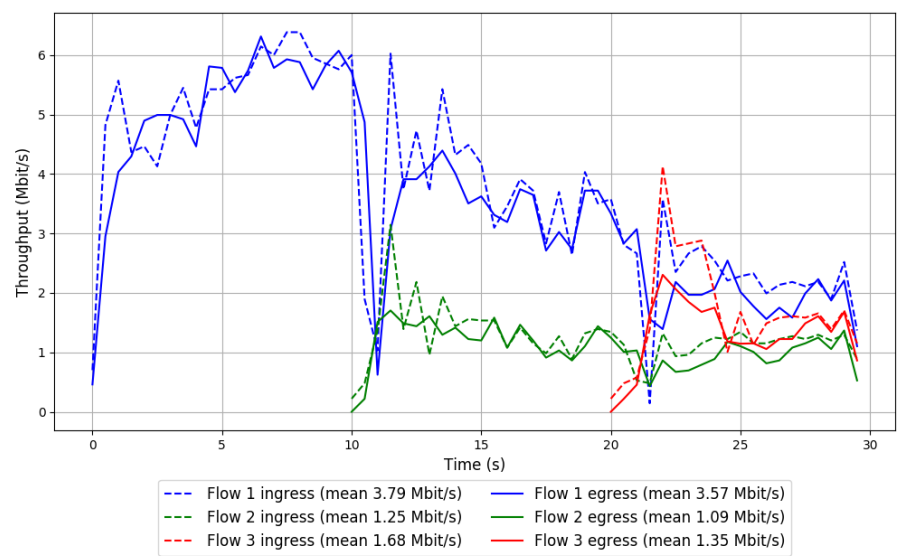


Run 2: Statistics of TCP BBR

Start at: 2018-01-26 00:53:21  
End at: 2018-01-26 00:53:51  
Local clock offset: 0.117 ms  
Remote clock offset: -10.181 ms

# Below is generated by plot.py at 2018-01-26 02:15:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.72 Mbit/s  
95th percentile per-packet one-way delay: 373.381 ms  
Loss rate: 9.14%  
-- Flow 1:  
Average throughput: 3.57 Mbit/s  
95th percentile per-packet one-way delay: 372.537 ms  
Loss rate: 6.23%  
-- Flow 2:  
Average throughput: 1.09 Mbit/s  
95th percentile per-packet one-way delay: 374.929 ms  
Loss rate: 13.73%  
-- Flow 3:  
Average throughput: 1.35 Mbit/s  
95th percentile per-packet one-way delay: 377.926 ms  
Loss rate: 22.09%

Run 2: Report of TCP BBR — Data Link



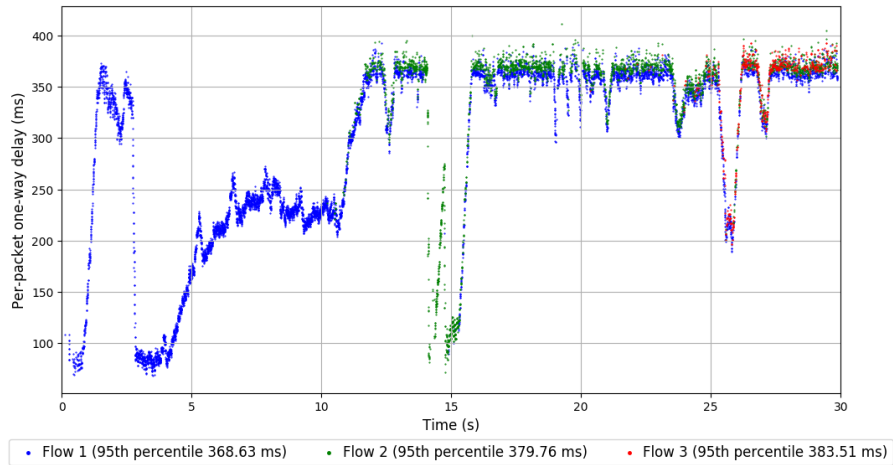
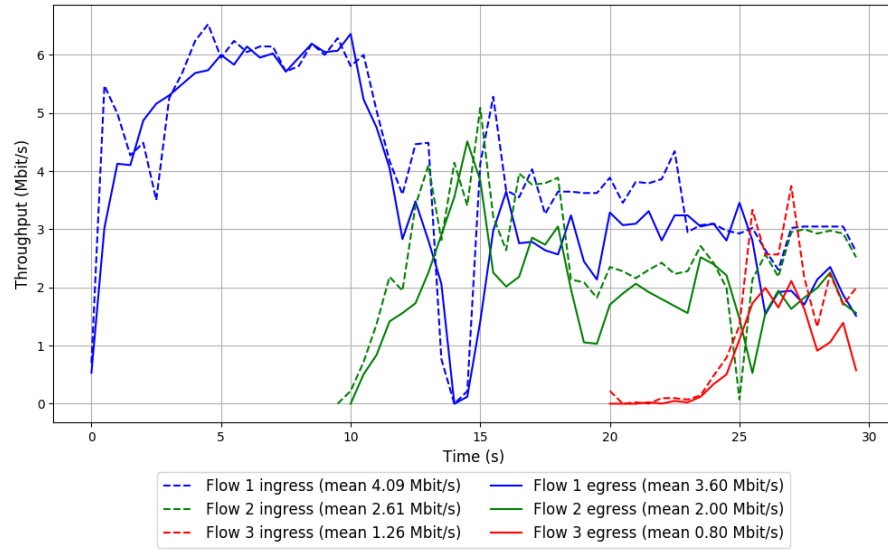
Run 3: Statistics of TCP BBR

Start at: 2018-01-26 01:12:19  
End at: 2018-01-26 01:12:49  
Local clock offset: 0.131 ms  
Remote clock offset: -10.504 ms

# Below is generated by plot.py at 2018-01-26 02:15:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 5.18 Mbit/s  
95th percentile per-packet one-way delay: 374.659 ms  
Loss rate: 17.52%  
-- Flow 1:  
Average throughput: 3.60 Mbit/s  
95th percentile per-packet one-way delay: 368.628 ms  
Loss rate: 12.32%  
-- Flow 2:  
Average throughput: 2.00 Mbit/s  
95th percentile per-packet one-way delay: 379.761 ms  
Loss rate: 24.61%  
-- Flow 3:  
Average throughput: 0.80 Mbit/s  
95th percentile per-packet one-way delay: 383.508 ms  
Loss rate: 38.89%



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

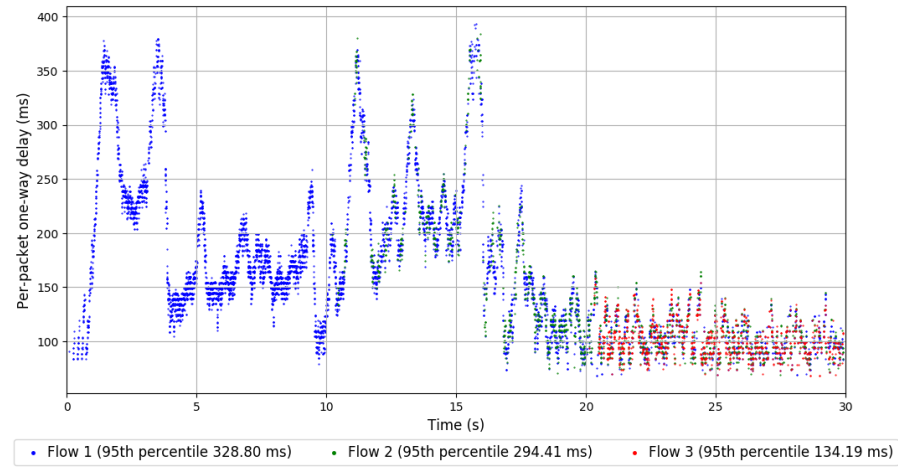
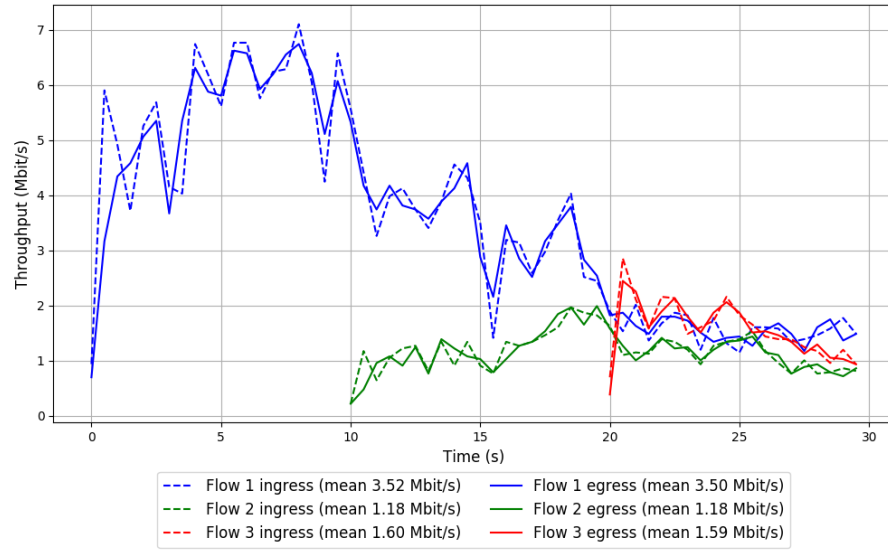


Run 1: Statistics of TCP Cubic

Start at: 2018-01-26 00:27:17  
End at: 2018-01-26 00:27:47  
Local clock offset: -0.62 ms  
Remote clock offset: -9.242 ms

# Below is generated by plot.py at 2018-01-26 02:15:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.79 Mbit/s  
95th percentile per-packet one-way delay: 318.865 ms  
Loss rate: 1.37%  
-- Flow 1:  
Average throughput: 3.50 Mbit/s  
95th percentile per-packet one-way delay: 328.798 ms  
Loss rate: 1.31%  
-- Flow 2:  
Average throughput: 1.18 Mbit/s  
95th percentile per-packet one-way delay: 294.406 ms  
Loss rate: 1.33%  
-- Flow 3:  
Average throughput: 1.59 Mbit/s  
95th percentile per-packet one-way delay: 134.188 ms  
Loss rate: 1.89%

# Run 1: Report of TCP Cubic — Data Link

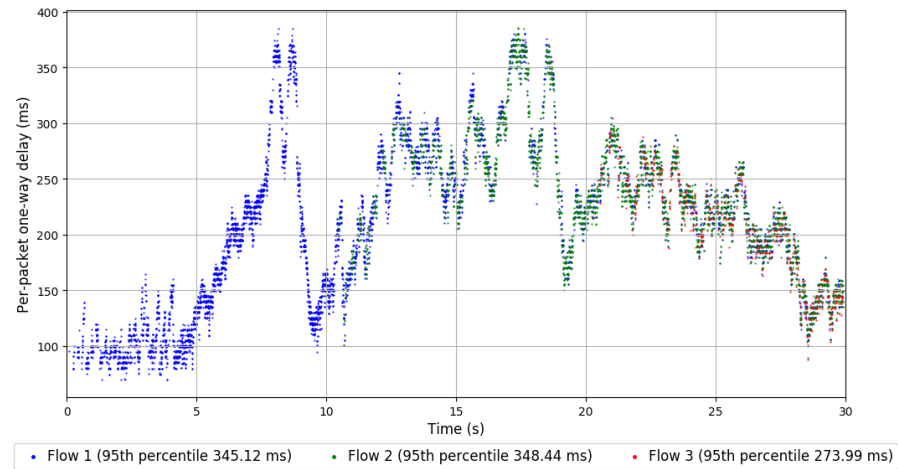
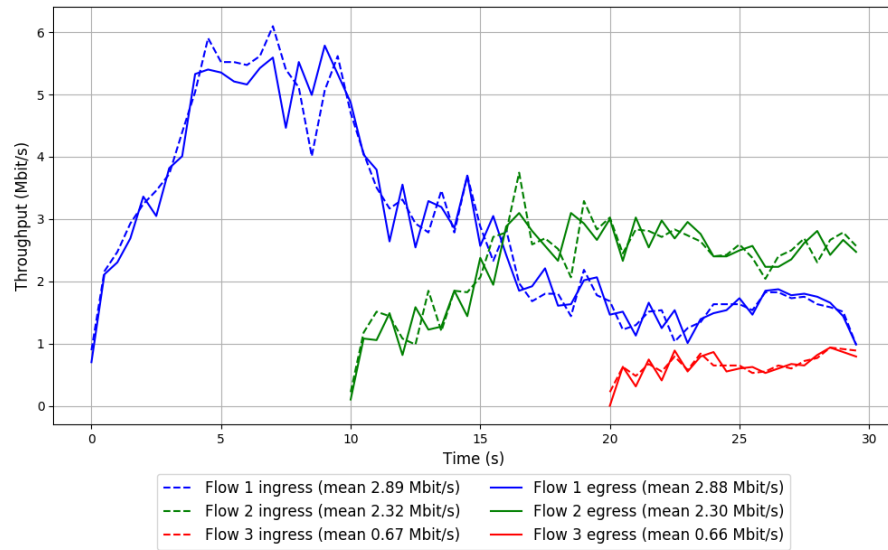


Run 2: Statistics of TCP Cubic

Start at: 2018-01-26 00:46:15  
End at: 2018-01-26 00:46:45  
Local clock offset: -0.119 ms  
Remote clock offset: -9.926 ms

# Below is generated by plot.py at 2018-01-26 02:15:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.61 Mbit/s  
95th percentile per-packet one-way delay: 344.601 ms  
Loss rate: 1.17%  
-- Flow 1:  
Average throughput: 2.88 Mbit/s  
95th percentile per-packet one-way delay: 345.123 ms  
Loss rate: 0.68%  
-- Flow 2:  
Average throughput: 2.30 Mbit/s  
95th percentile per-packet one-way delay: 348.441 ms  
Loss rate: 1.80%  
-- Flow 3:  
Average throughput: 0.66 Mbit/s  
95th percentile per-packet one-way delay: 273.989 ms  
Loss rate: 3.26%

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

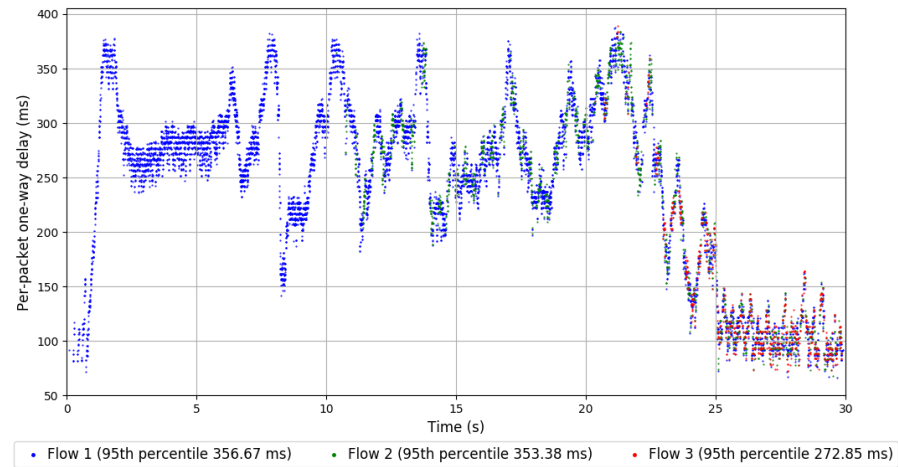
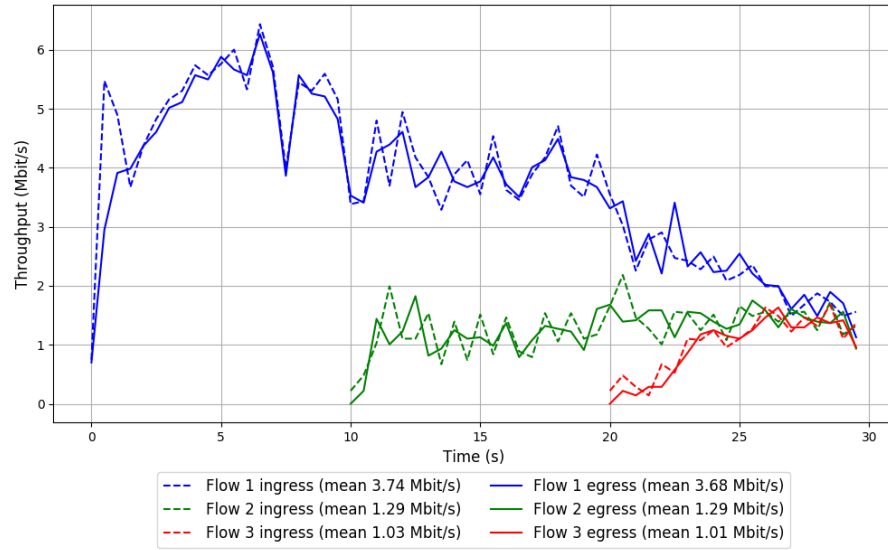


Run 3: Statistics of TCP Cubic

Start at: 2018-01-26 01:05:12  
End at: 2018-01-26 01:05:42  
Local clock offset: -0.403 ms  
Remote clock offset: -10.648 ms

# Below is generated by plot.py at 2018-01-26 02:15:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.85 Mbit/s  
95th percentile per-packet one-way delay: 355.626 ms  
Loss rate: 2.29%  
-- Flow 1:  
Average throughput: 3.68 Mbit/s  
95th percentile per-packet one-way delay: 356.667 ms  
Loss rate: 2.05%  
-- Flow 2:  
Average throughput: 1.29 Mbit/s  
95th percentile per-packet one-way delay: 353.376 ms  
Loss rate: 1.96%  
-- Flow 3:  
Average throughput: 1.01 Mbit/s  
95th percentile per-packet one-way delay: 272.845 ms  
Loss rate: 5.77%

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



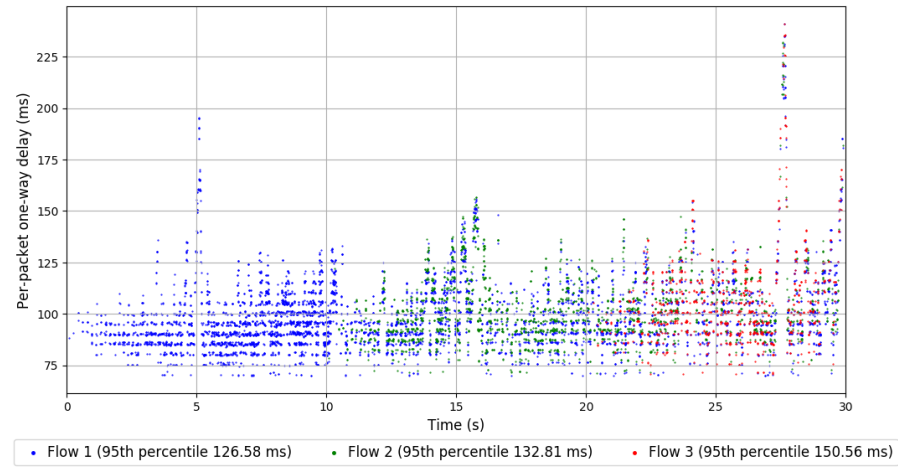
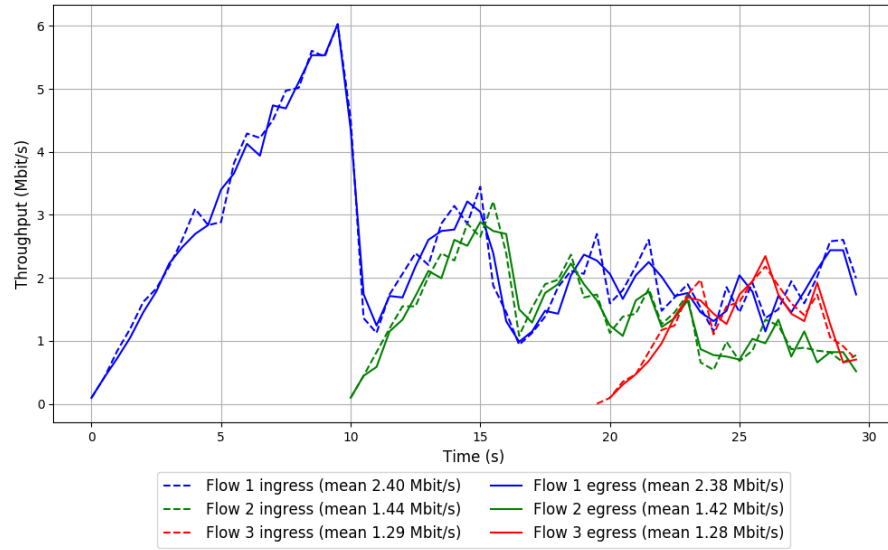
Run 1: Statistics of LEDBAT

Start at: 2018-01-26 00:22:33  
End at: 2018-01-26 00:23:03  
Local clock offset: -0.539 ms  
Remote clock offset: -9.151 ms

# Below is generated by plot.py at 2018-01-26 02:15:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.74 Mbit/s  
95th percentile per-packet one-way delay: 131.512 ms  
Loss rate: 1.46%  
-- Flow 1:  
Average throughput: 2.38 Mbit/s  
95th percentile per-packet one-way delay: 126.582 ms  
Loss rate: 1.29%  
-- Flow 2:  
Average throughput: 1.42 Mbit/s  
95th percentile per-packet one-way delay: 132.805 ms  
Loss rate: 1.56%  
-- Flow 3:  
Average throughput: 1.28 Mbit/s  
95th percentile per-packet one-way delay: 150.556 ms  
Loss rate: 2.20%



# Run 1: Report of LEDBAT — Data Link

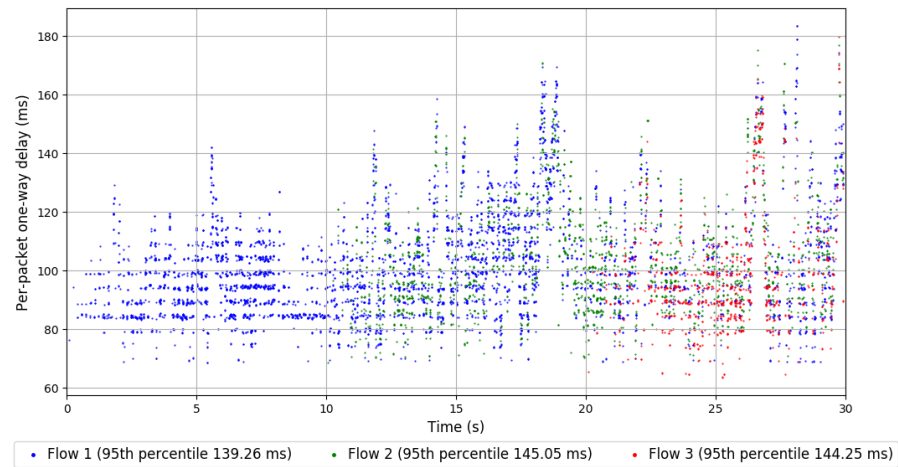
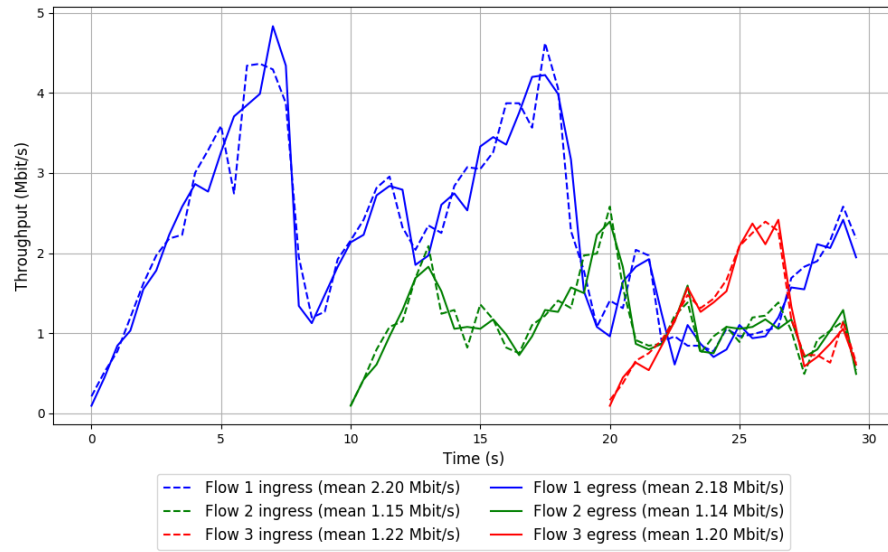


Run 2: Statistics of LEDBAT

Start at: 2018-01-26 00:41:31  
End at: 2018-01-26 00:42:01  
Local clock offset: -0.205 ms  
Remote clock offset: -9.736 ms

# Below is generated by plot.py at 2018-01-26 02:15:07  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.33 Mbit/s  
95th percentile per-packet one-way delay: 141.036 ms  
Loss rate: 1.30%  
-- Flow 1:  
Average throughput: 2.18 Mbit/s  
95th percentile per-packet one-way delay: 139.257 ms  
Loss rate: 1.30%  
-- Flow 2:  
Average throughput: 1.14 Mbit/s  
95th percentile per-packet one-way delay: 145.053 ms  
Loss rate: 1.18%  
-- Flow 3:  
Average throughput: 1.20 Mbit/s  
95th percentile per-packet one-way delay: 144.248 ms  
Loss rate: 1.57%

## Run 2: Report of LEDBAT — Data Link

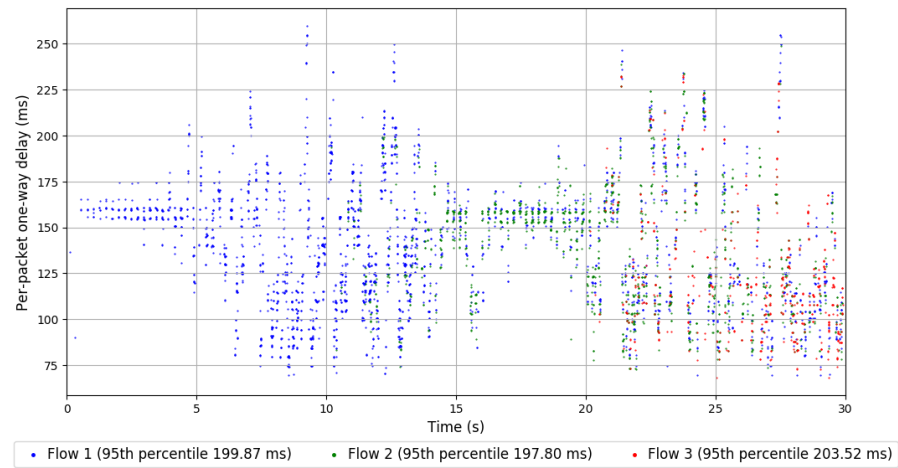
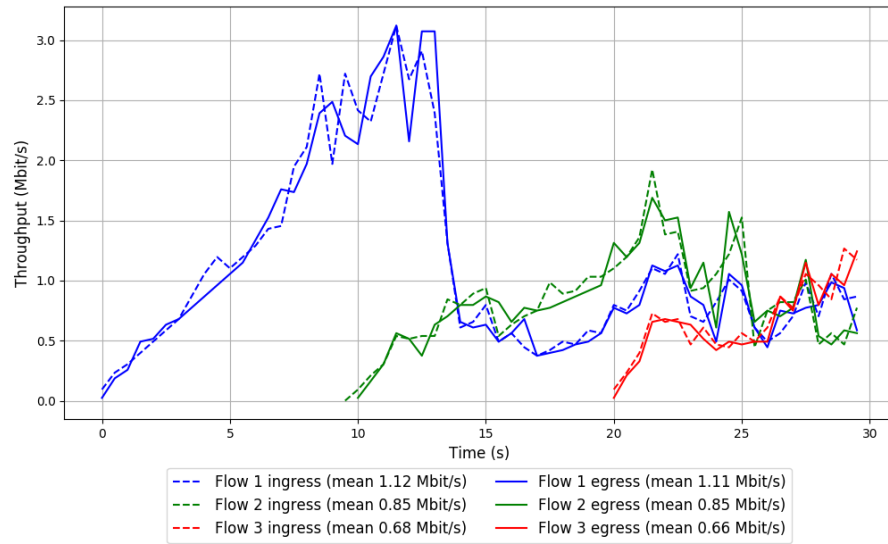


Run 3: Statistics of LEDBAT

Start at: 2018-01-26 01:00:29  
End at: 2018-01-26 01:00:59  
Local clock offset: -0.058 ms  
Remote clock offset: -10.464 ms

# Below is generated by plot.py at 2018-01-26 02:15:08  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 1.89 Mbit/s  
95th percentile per-packet one-way delay: 199.767 ms  
Loss rate: 1.54%  
-- Flow 1:  
Average throughput: 1.11 Mbit/s  
95th percentile per-packet one-way delay: 199.867 ms  
Loss rate: 1.12%  
-- Flow 2:  
Average throughput: 0.85 Mbit/s  
95th percentile per-packet one-way delay: 197.800 ms  
Loss rate: 1.52%  
-- Flow 3:  
Average throughput: 0.66 Mbit/s  
95th percentile per-packet one-way delay: 203.522 ms  
Loss rate: 3.68%

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

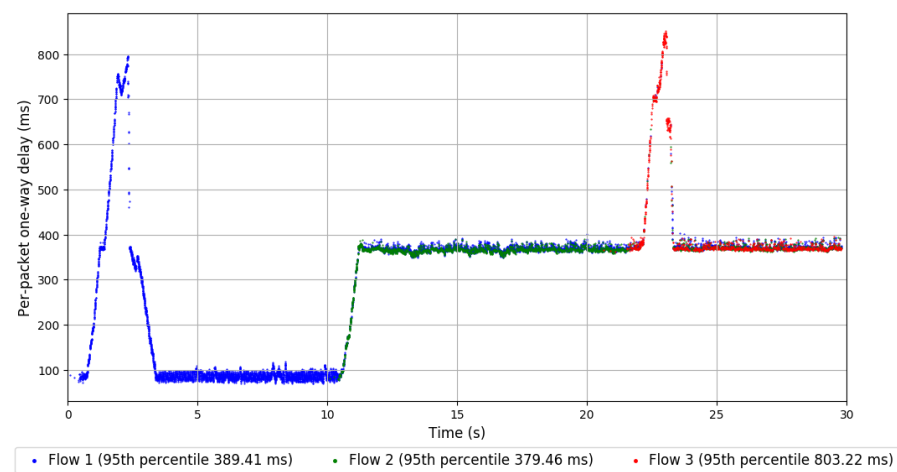
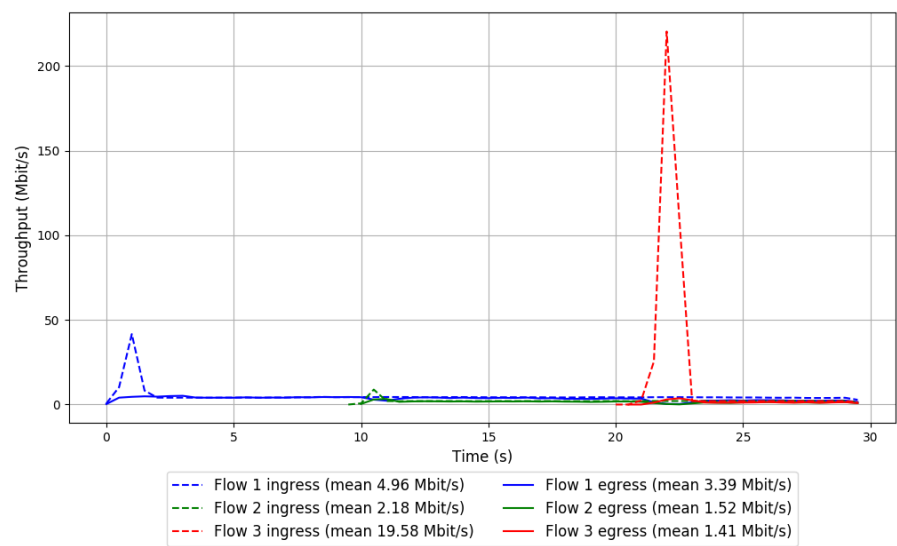


Run 1: Statistics of PCC

Start at: 2018-01-26 00:30:50  
End at: 2018-01-26 00:31:20  
Local clock offset: -0.725 ms  
Remote clock offset: -9.368 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.84 Mbit/s  
95th percentile per-packet one-way delay: 477.515 ms  
Loss rate: 62.58%  
-- Flow 1:  
Average throughput: 3.39 Mbit/s  
95th percentile per-packet one-way delay: 389.413 ms  
Loss rate: 31.99%  
-- Flow 2:  
Average throughput: 1.52 Mbit/s  
95th percentile per-packet one-way delay: 379.460 ms  
Loss rate: 30.62%  
-- Flow 3:  
Average throughput: 1.41 Mbit/s  
95th percentile per-packet one-way delay: 803.217 ms  
Loss rate: 93.29%

Run 1: Report of PCC — Data Link



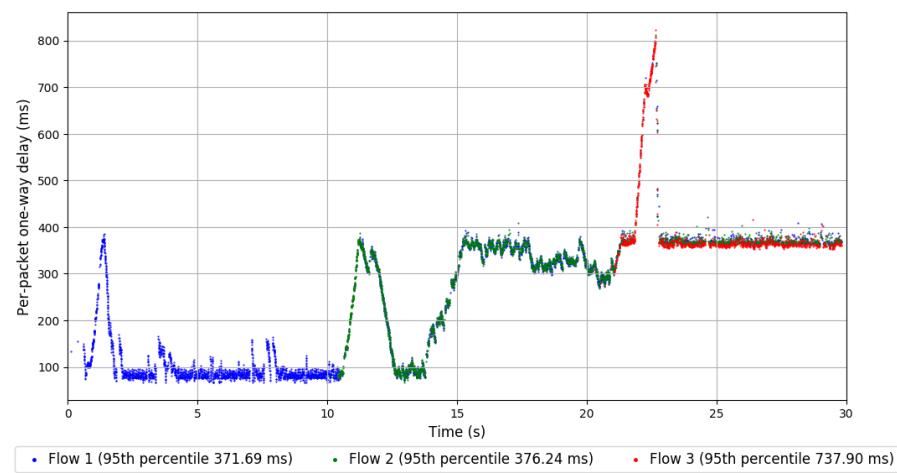
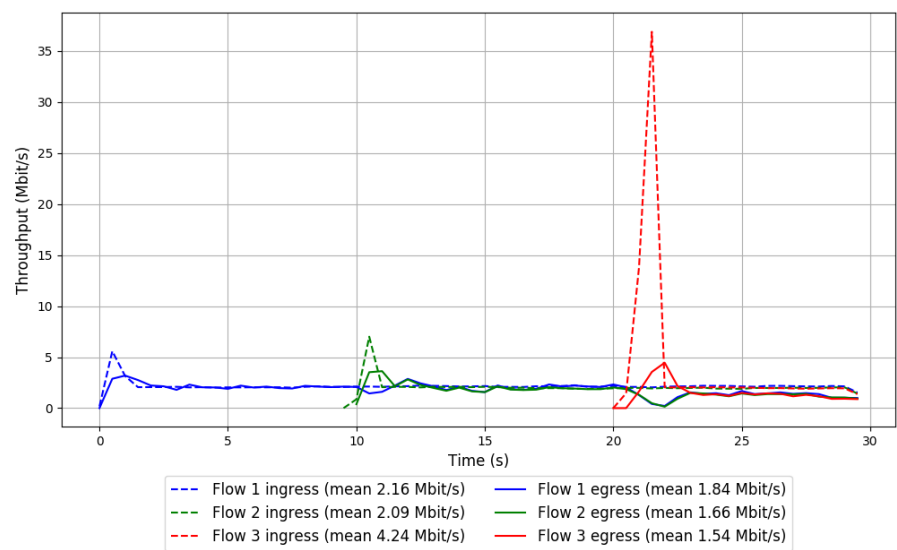
Run 2: Statistics of PCC

Start at: 2018-01-26 00:49:48  
End at: 2018-01-26 00:50:18  
Local clock offset: -0.236 ms  
Remote clock offset: -10.039 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.43 Mbit/s  
95th percentile per-packet one-way delay: 380.778 ms  
Loss rate: 31.03%  
-- Flow 1:  
Average throughput: 1.84 Mbit/s  
95th percentile per-packet one-way delay: 371.689 ms  
Loss rate: 15.49%  
-- Flow 2:  
Average throughput: 1.66 Mbit/s  
95th percentile per-packet one-way delay: 376.241 ms  
Loss rate: 21.18%  
-- Flow 3:  
Average throughput: 1.54 Mbit/s  
95th percentile per-packet one-way delay: 737.903 ms  
Loss rate: 64.89%



Run 2: Report of PCC — Data Link

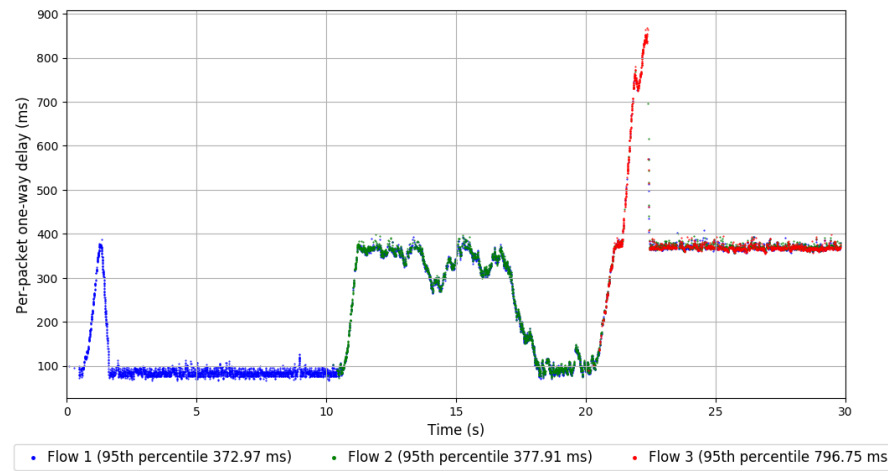
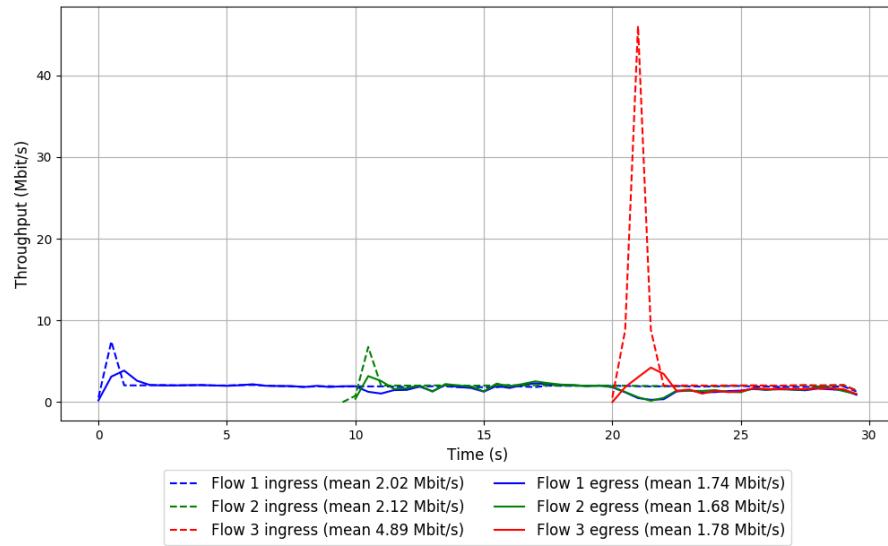


Run 3: Statistics of PCC

Start at: 2018-01-26 01:08:46  
End at: 2018-01-26 01:09:16  
Local clock offset: 0.415 ms  
Remote clock offset: -10.548 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.44 Mbit/s  
95th percentile per-packet one-way delay: 383.710 ms  
Loss rate: 32.11%  
-- Flow 1:  
Average throughput: 1.74 Mbit/s  
95th percentile per-packet one-way delay: 372.969 ms  
Loss rate: 14.19%  
-- Flow 2:  
Average throughput: 1.68 Mbit/s  
95th percentile per-packet one-way delay: 377.912 ms  
Loss rate: 21.25%  
-- Flow 3:  
Average throughput: 1.78 Mbit/s  
95th percentile per-packet one-way delay: 796.748 ms  
Loss rate: 64.09%

### Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

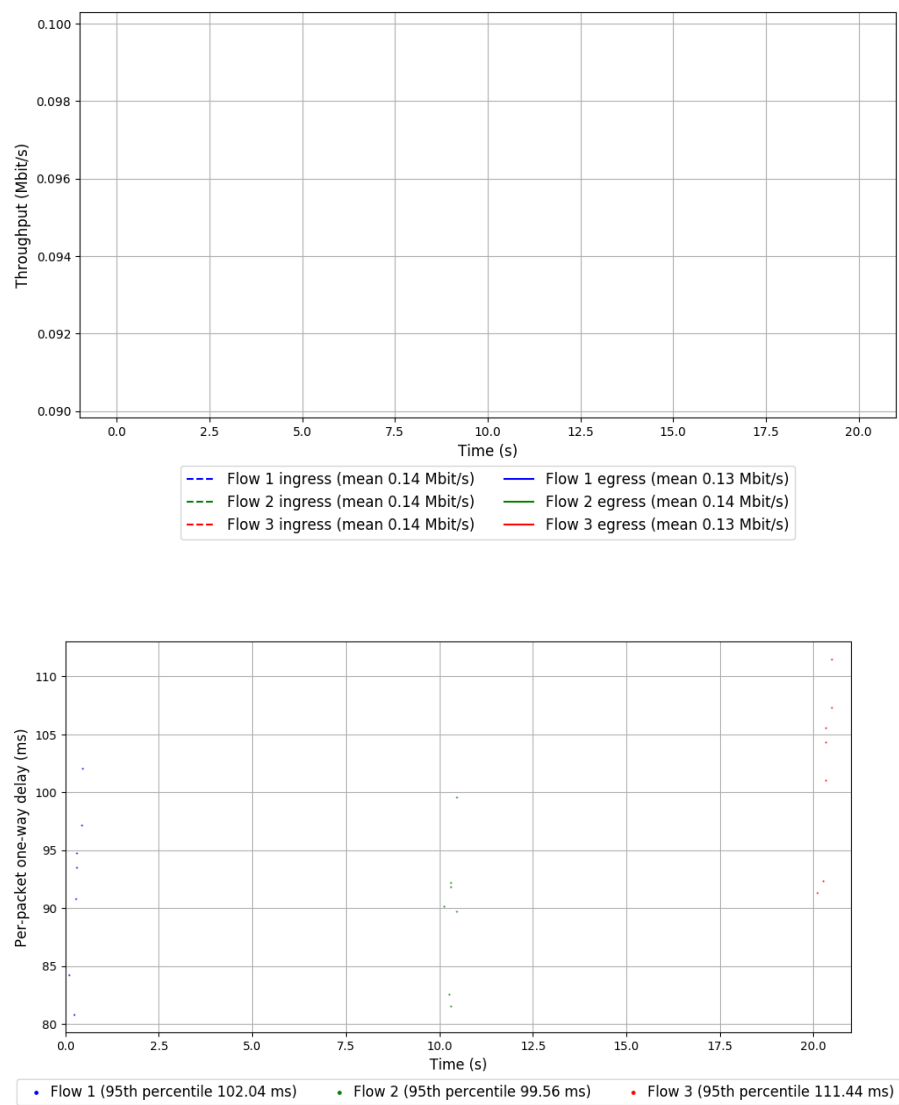
Start at: 2018-01-26 00:33:13

End at: 2018-01-26 00:33:43

Local clock offset: -0.192 ms

Remote clock offset: -9.403 ms

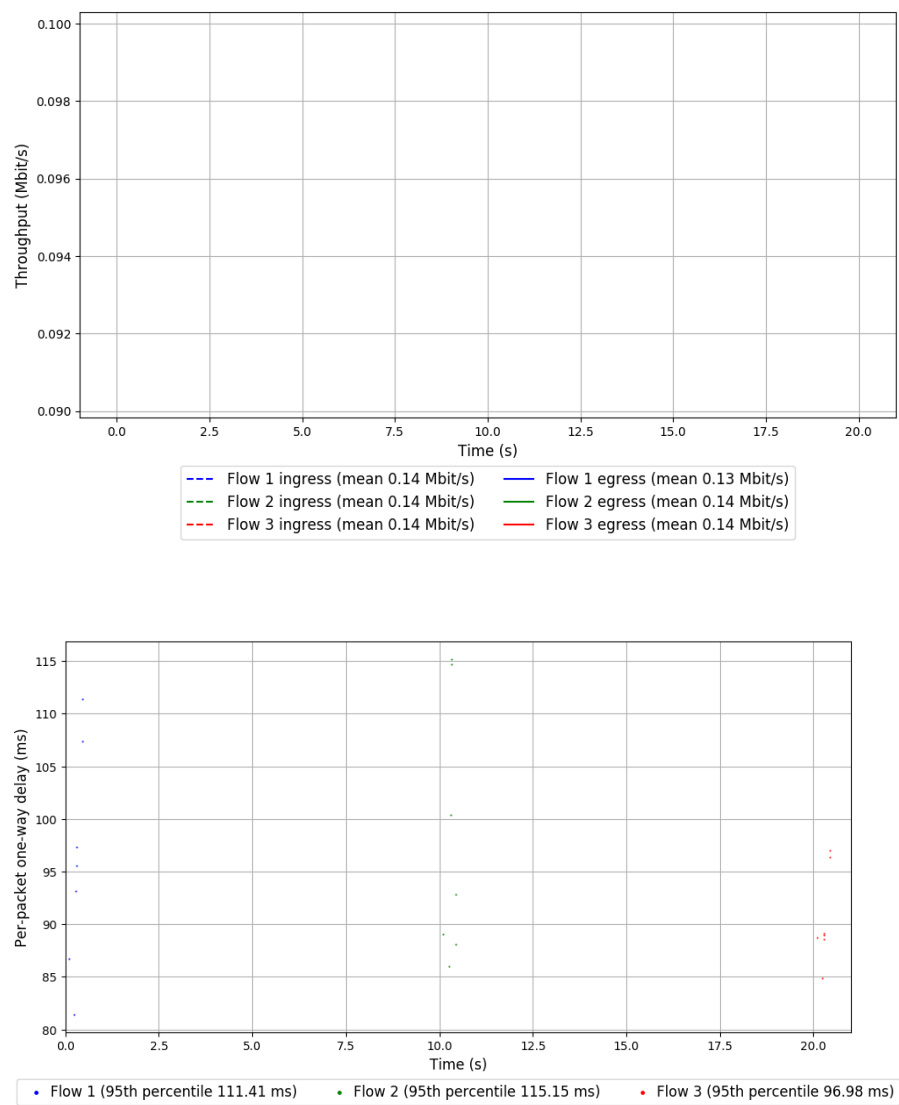
Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-01-26 00:52:10  
End at: 2018-01-26 00:52:40  
Local clock offset: -0.302 ms  
Remote clock offset: -10.079 ms

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-01-26 01:11:08

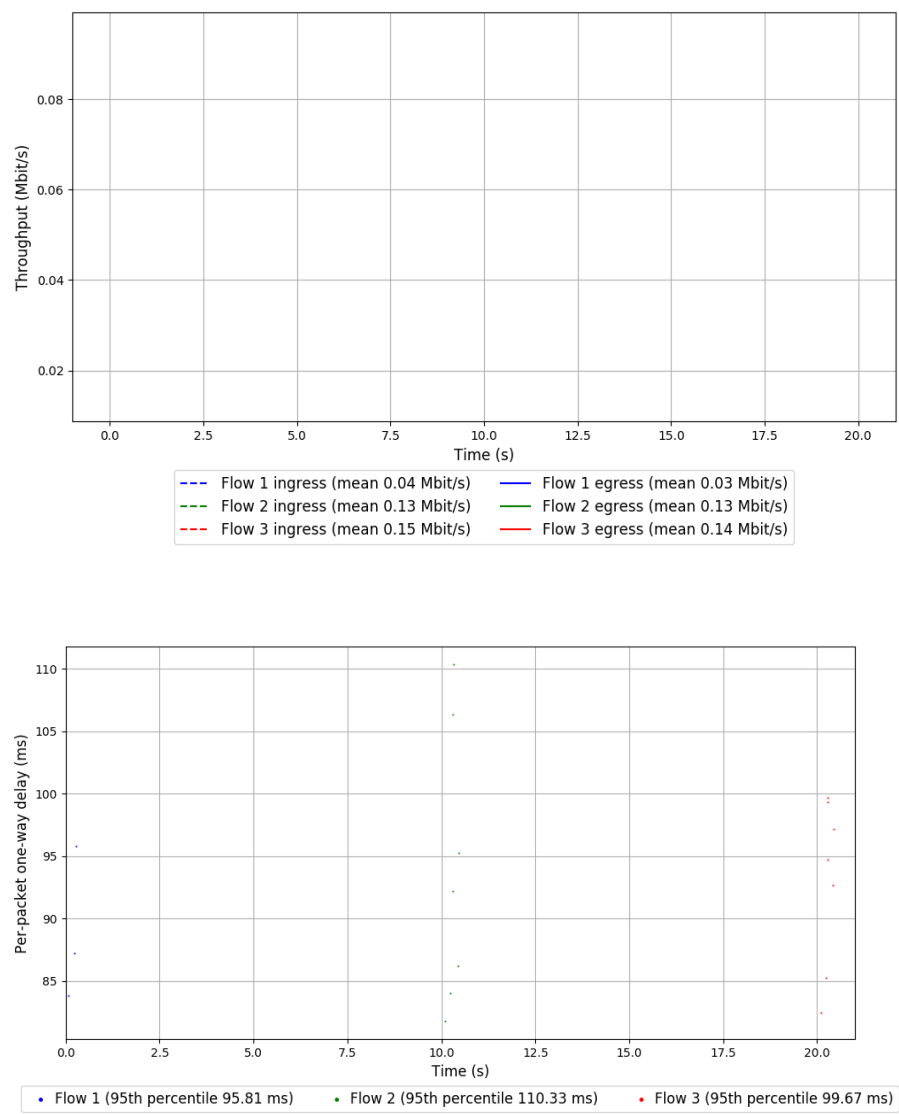
End at: 2018-01-26 01:11:38

Local clock offset: 0.077 ms

Remote clock offset: -10.527 ms



Run 3: Report of QUIC Cubic — Data Link

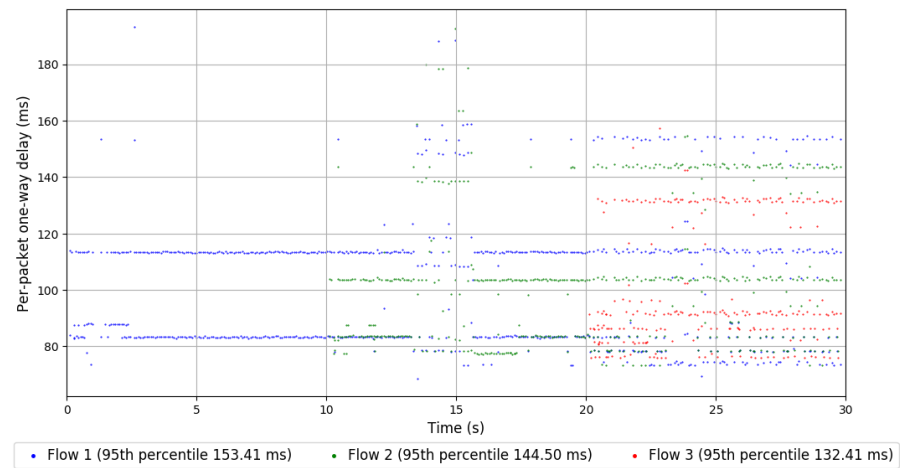
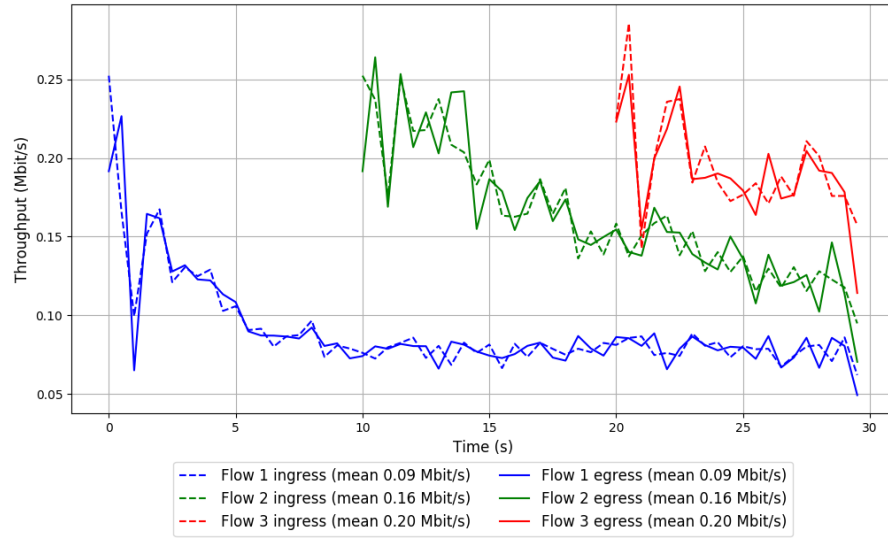


```
Run 1: Statistics of SReAM

Start at: 2018-01-26 00:32:02
End at: 2018-01-26 00:32:32
Local clock offset: -0.765 ms
Remote clock offset: -9.4 ms

# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 147.932 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 153.414 ms
Loss rate: 0.46%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 144.496 ms
Loss rate: 0.76%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 132.408 ms
Loss rate: 1.81%
```

## Run 1: Report of SReAM — Data Link

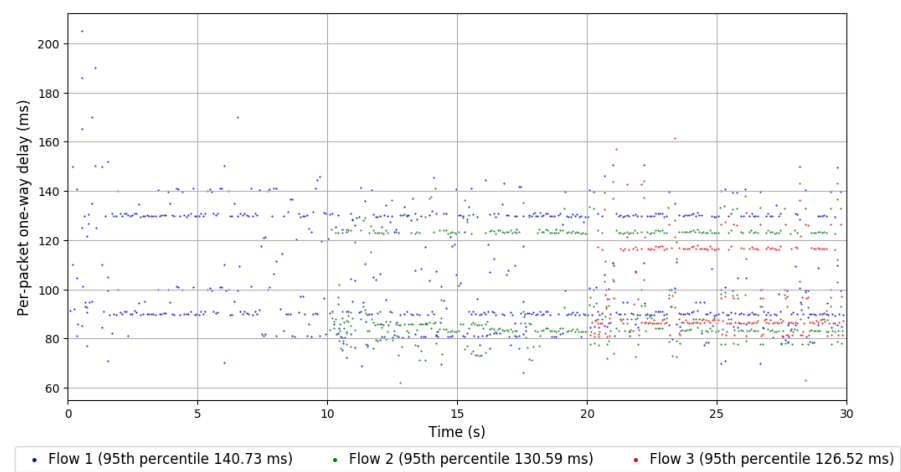
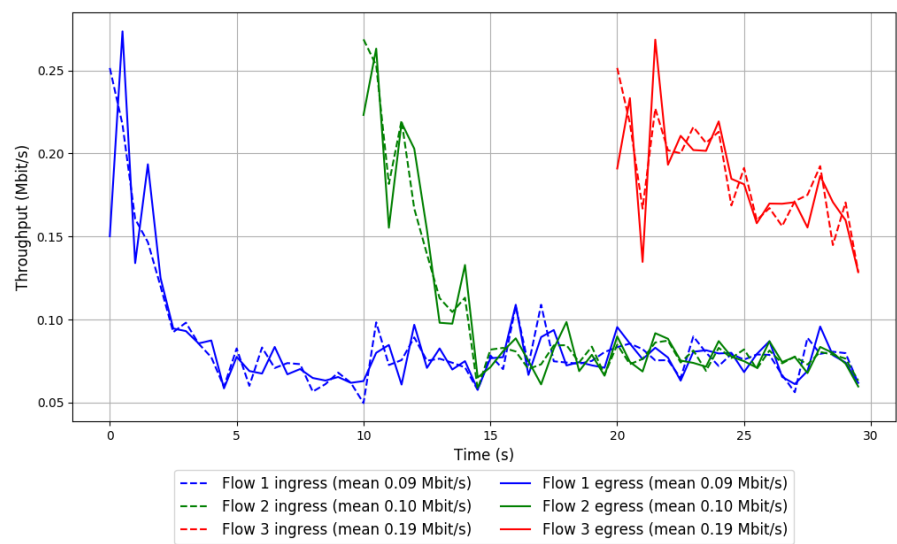


Run 2: Statistics of SReAM

Start at: 2018-01-26 00:50:59  
End at: 2018-01-26 00:51:30  
Local clock offset: -0.041 ms  
Remote clock offset: -10.089 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.21 Mbit/s  
95th percentile per-packet one-way delay: 136.926 ms  
Loss rate: 0.59%  
-- Flow 1:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 140.727 ms  
Loss rate: 0.36%  
-- Flow 2:  
Average throughput: 0.10 Mbit/s  
95th percentile per-packet one-way delay: 130.585 ms  
Loss rate: 0.50%  
-- Flow 3:  
Average throughput: 0.19 Mbit/s  
95th percentile per-packet one-way delay: 126.524 ms  
Loss rate: 1.00%

Run 2: Report of SReAM — Data Link

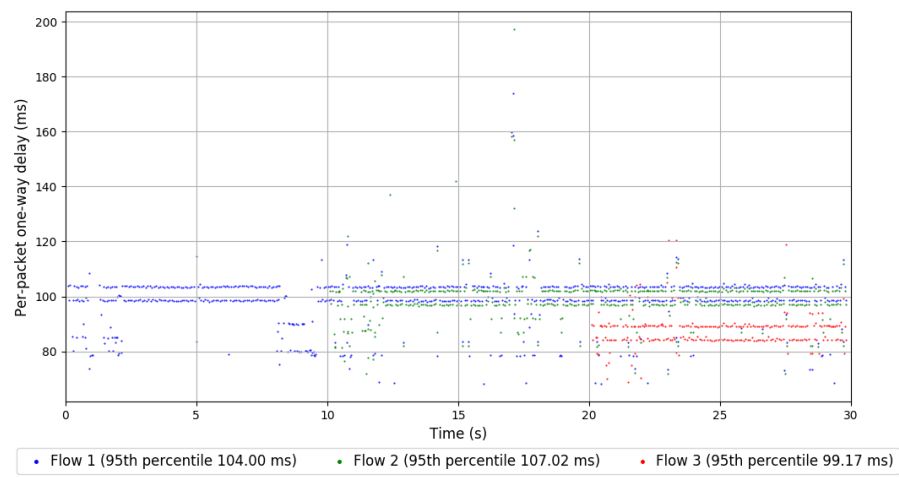
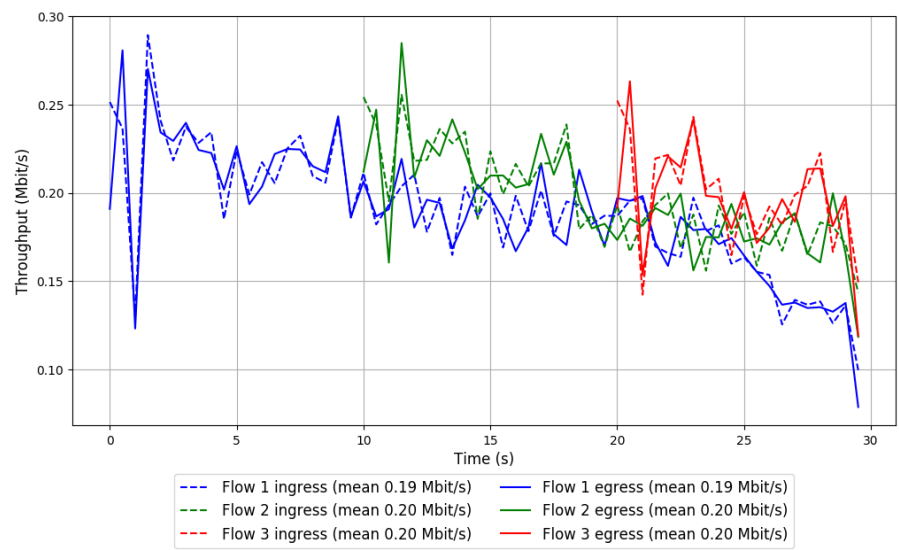


Run 3: Statistics of SReAM

Start at: 2018-01-26 01:09:57  
End at: 2018-01-26 01:10:27  
Local clock offset: 0.291 ms  
Remote clock offset: -10.553 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.39 Mbit/s  
95th percentile per-packet one-way delay: 104.078 ms  
Loss rate: 0.69%  
-- Flow 1:  
Average throughput: 0.19 Mbit/s  
95th percentile per-packet one-way delay: 104.001 ms  
Loss rate: 0.35%  
-- Flow 2:  
Average throughput: 0.20 Mbit/s  
95th percentile per-packet one-way delay: 107.018 ms  
Loss rate: 0.77%  
-- Flow 3:  
Average throughput: 0.20 Mbit/s  
95th percentile per-packet one-way delay: 99.175 ms  
Loss rate: 1.47%

Run 3: Report of SReAM — Data Link



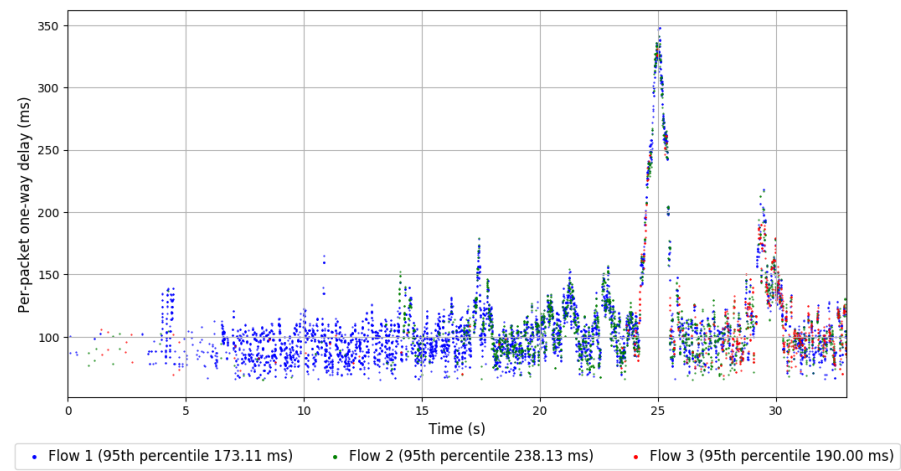
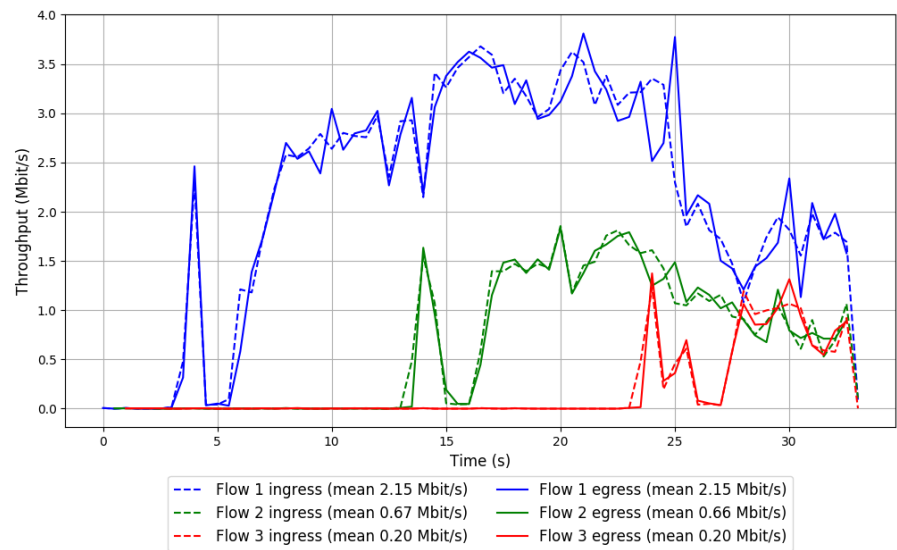
Run 1: Statistics of WebRTC media

Start at: 2018-01-26 00:24:55  
End at: 2018-01-26 00:25:25  
Local clock offset: -1.282 ms  
Remote clock offset: -9.183 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 2.98 Mbit/s  
95th percentile per-packet one-way delay: 193.640 ms  
Loss rate: 0.97%  
-- Flow 1:  
Average throughput: 2.15 Mbit/s  
95th percentile per-packet one-way delay: 173.108 ms  
Loss rate: 0.68%  
-- Flow 2:  
Average throughput: 0.66 Mbit/s  
95th percentile per-packet one-way delay: 238.131 ms  
Loss rate: 1.57%  
-- Flow 3:  
Average throughput: 0.20 Mbit/s  
95th percentile per-packet one-way delay: 189.996 ms  
Loss rate: 2.12%



Run 1: Report of WebRTC media — Data Link

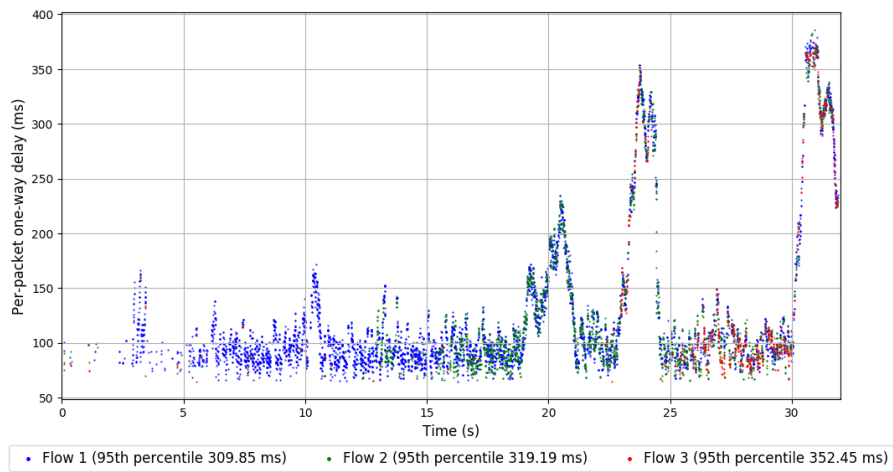
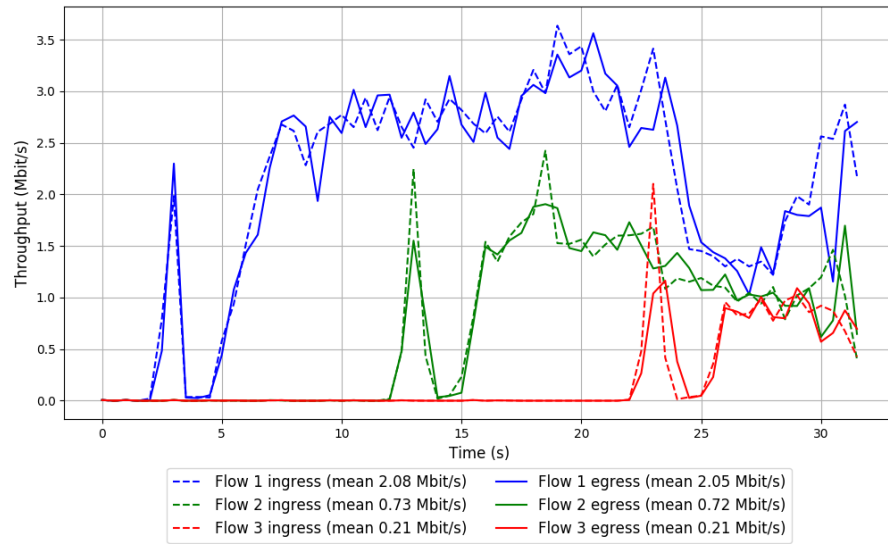


Run 2: Statistics of WebRTC media

Start at: 2018-01-26 00:43:53  
End at: 2018-01-26 00:44:23  
Local clock offset: -3.005 ms  
Remote clock offset: -9.804 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 2.98 Mbit/s  
95th percentile per-packet one-way delay: 316.601 ms  
Loss rate: 2.01%  
-- Flow 1:  
Average throughput: 2.05 Mbit/s  
95th percentile per-packet one-way delay: 309.847 ms  
Loss rate: 1.98%  
-- Flow 2:  
Average throughput: 0.72 Mbit/s  
95th percentile per-packet one-way delay: 319.189 ms  
Loss rate: 1.79%  
-- Flow 3:  
Average throughput: 0.21 Mbit/s  
95th percentile per-packet one-way delay: 352.449 ms  
Loss rate: 3.12%

## Run 2: Report of WebRTC media — Data Link

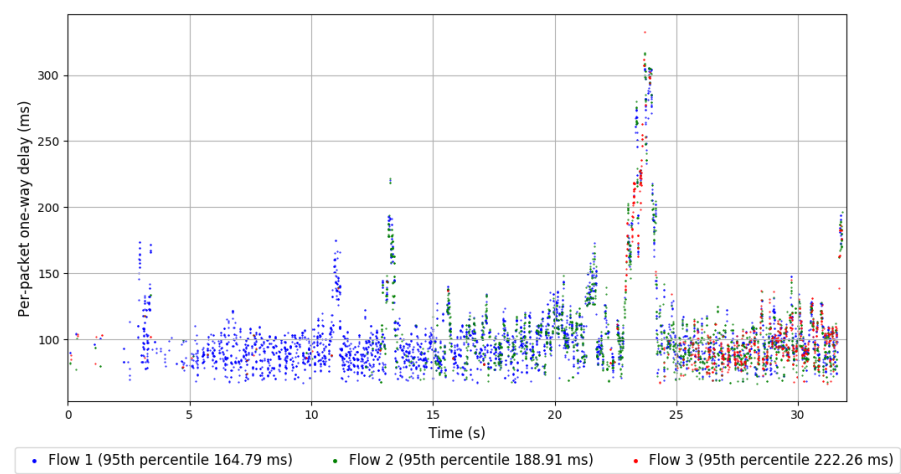
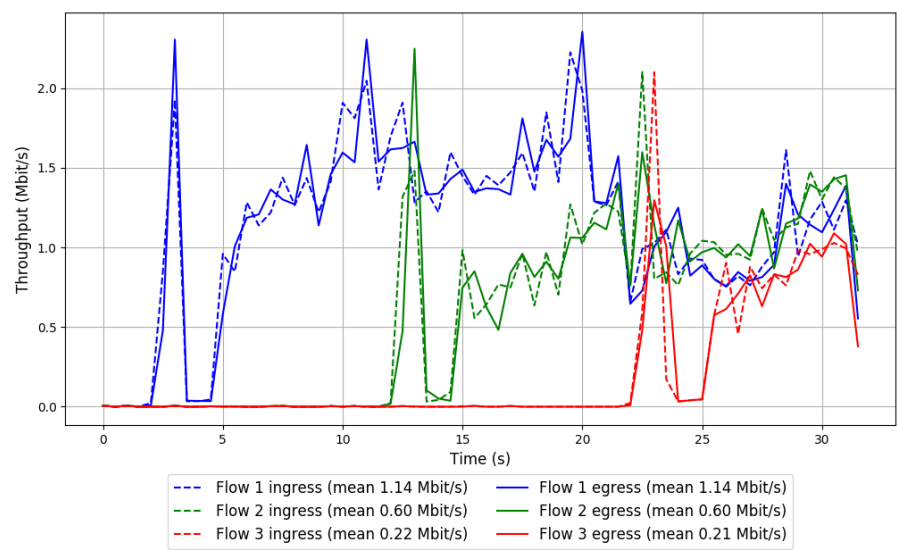


Run 3: Statistics of WebRTC media

Start at: 2018-01-26 01:02:50  
End at: 2018-01-26 01:03:20  
Local clock offset: -0.163 ms  
Remote clock offset: -10.654 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 1.94 Mbit/s  
95th percentile per-packet one-way delay: 184.371 ms  
Loss rate: 1.47%  
-- Flow 1:  
Average throughput: 1.14 Mbit/s  
95th percentile per-packet one-way delay: 164.788 ms  
Loss rate: 0.93%  
-- Flow 2:  
Average throughput: 0.60 Mbit/s  
95th percentile per-packet one-way delay: 188.912 ms  
Loss rate: 1.18%  
-- Flow 3:  
Average throughput: 0.21 Mbit/s  
95th percentile per-packet one-way delay: 222.260 ms  
Loss rate: 5.07%

Run 3: Report of WebRTC media — Data Link

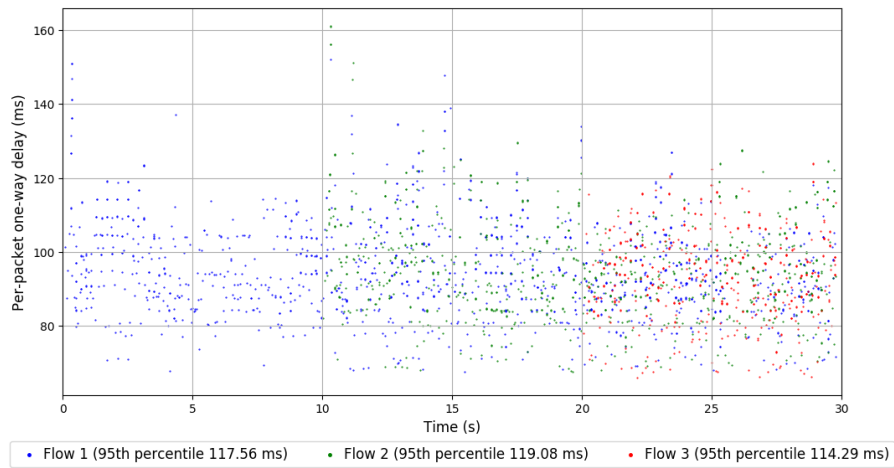
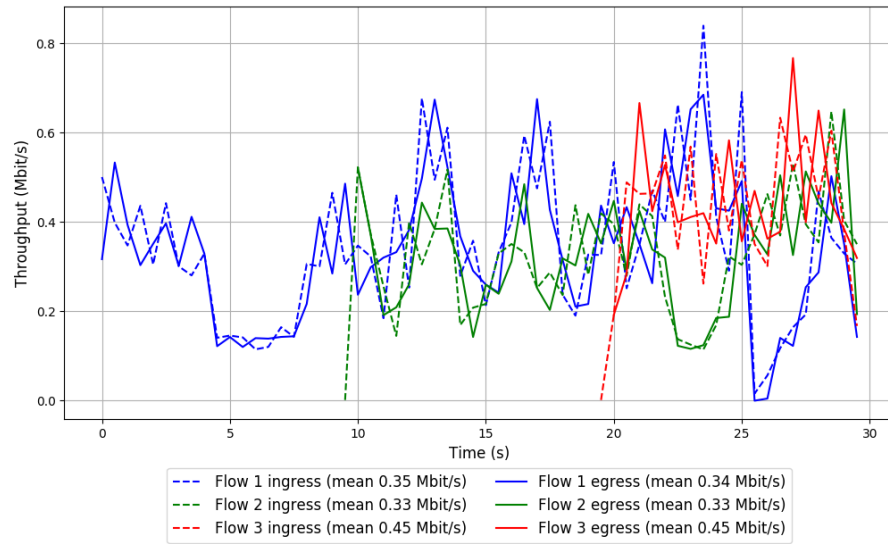


Run 1: Statistics of Sprout

Start at: 2018-01-26 00:35:35  
End at: 2018-01-26 00:36:05  
Local clock offset: -0.511 ms  
Remote clock offset: -9.504 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.71 Mbit/s  
95th percentile per-packet one-way delay: 117.183 ms  
Loss rate: 1.58%  
-- Flow 1:  
Average throughput: 0.34 Mbit/s  
95th percentile per-packet one-way delay: 117.565 ms  
Loss rate: 2.46%  
-- Flow 2:  
Average throughput: 0.33 Mbit/s  
95th percentile per-packet one-way delay: 119.081 ms  
Loss rate: 1.21%  
-- Flow 3:  
Average throughput: 0.45 Mbit/s  
95th percentile per-packet one-way delay: 114.292 ms  
Loss rate: 0.05%

## Run 1: Report of Sprout — Data Link



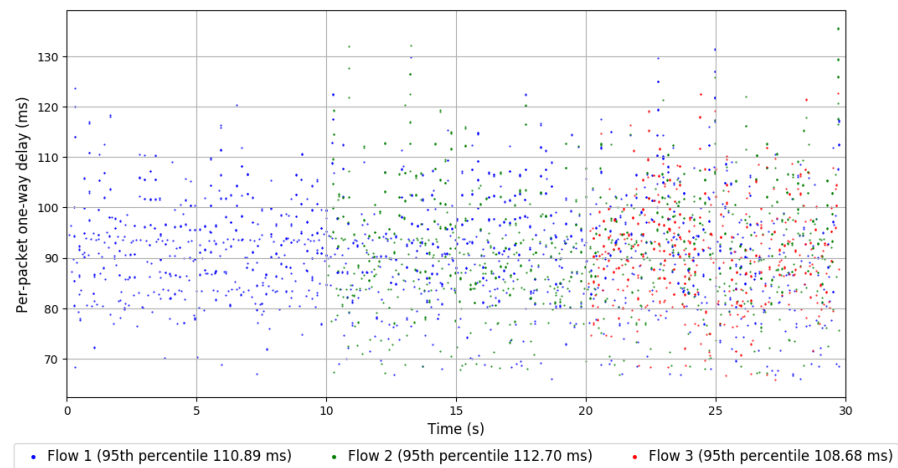
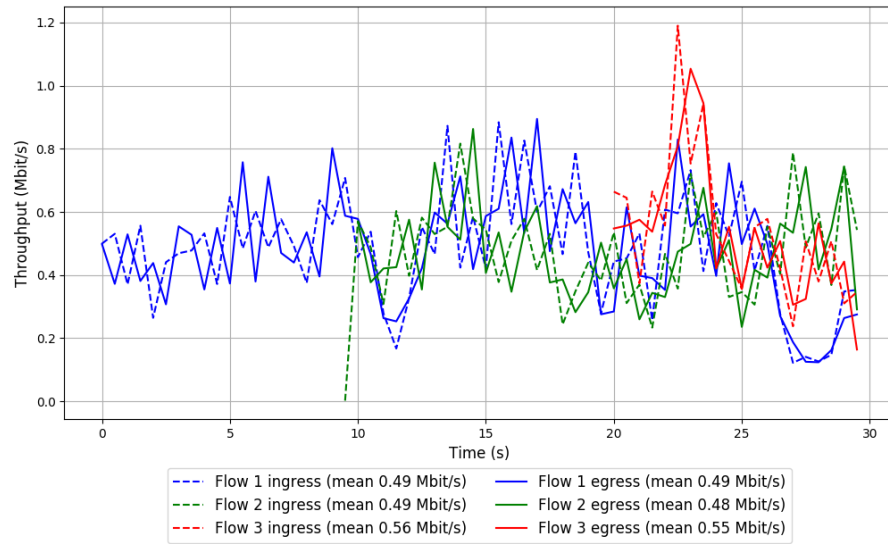
Run 2: Statistics of Sprout

Start at: 2018-01-26 00:54:33  
End at: 2018-01-26 00:55:03  
Local clock offset: 0.079 ms  
Remote clock offset: -10.205 ms

# Below is generated by plot.py at 2018-01-26 02:15:21  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.99 Mbit/s  
95th percentile per-packet one-way delay: 111.814 ms  
Loss rate: 1.63%  
-- Flow 1:  
Average throughput: 0.49 Mbit/s  
95th percentile per-packet one-way delay: 110.889 ms  
Loss rate: 0.94%  
-- Flow 2:  
Average throughput: 0.48 Mbit/s  
95th percentile per-packet one-way delay: 112.700 ms  
Loss rate: 2.22%  
-- Flow 3:  
Average throughput: 0.55 Mbit/s  
95th percentile per-packet one-way delay: 108.683 ms  
Loss rate: 2.42%



## Run 2: Report of Sprout — Data Link

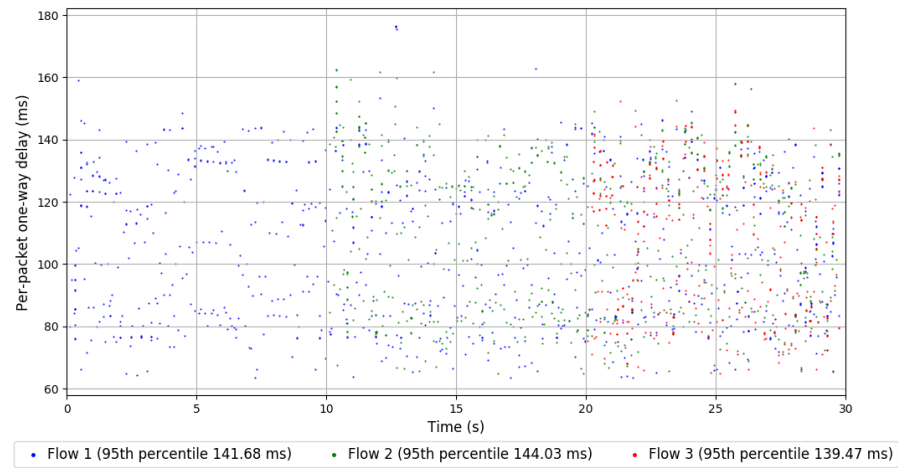
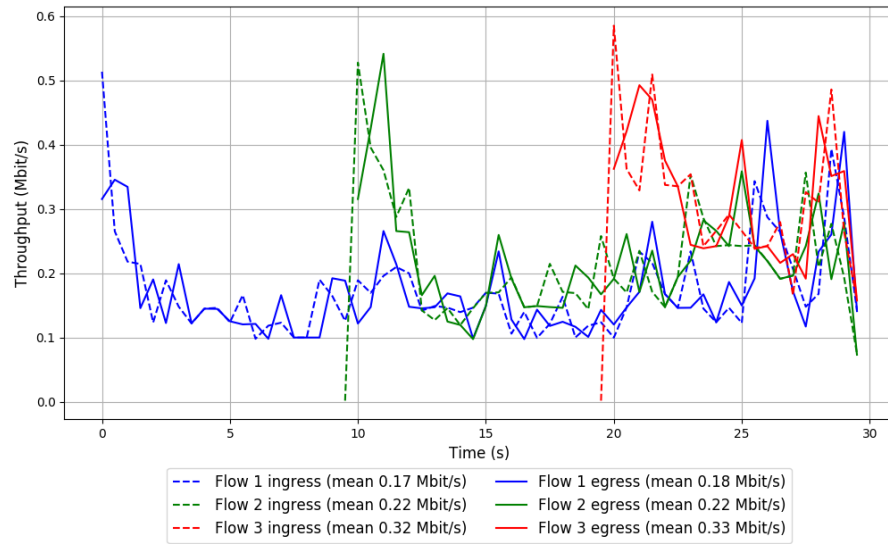


### Run 3: Statistics of Sprout

Start at: 2018-01-26 01:13:30  
End at: 2018-01-26 01:14:00  
Local clock offset: -2.562 ms  
Remote clock offset: -10.375 ms

```
# Below is generated by plot.py at 2018-01-26 02:15:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 142.879 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 141.681 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 144.030 ms
Loss rate: 0.05%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 139.468 ms
Loss rate: 0.69%
```

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

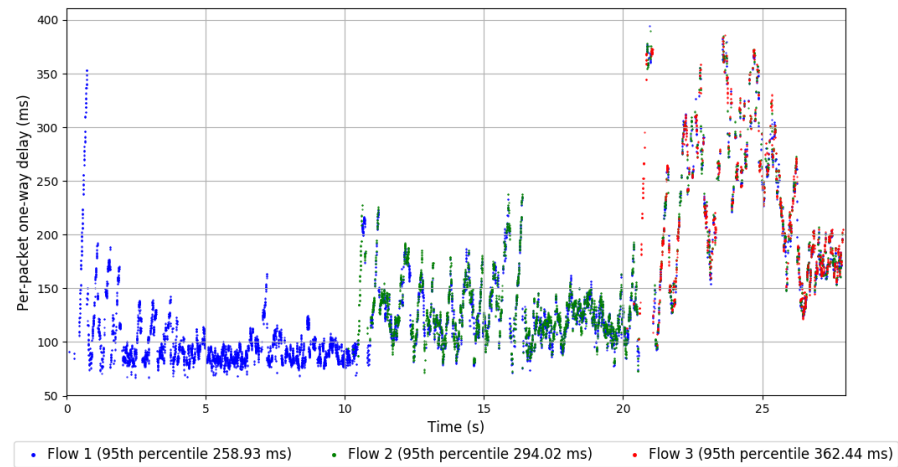
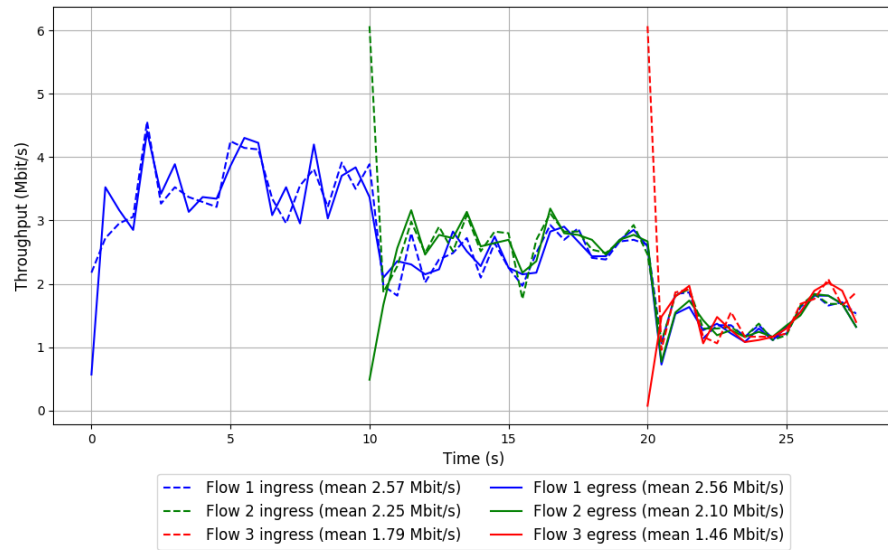


Run 1: Statistics of TaoVA-100x

Start at: 2018-01-26 00:39:08  
End at: 2018-01-26 00:39:38  
Local clock offset: -0.373 ms  
Remote clock offset: -9.623 ms

# Below is generated by plot.py at 2018-01-26 02:15:31  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.30 Mbit/s  
95th percentile per-packet one-way delay: 292.265 ms  
Loss rate: 5.32%  
-- Flow 1:  
Average throughput: 2.56 Mbit/s  
95th percentile per-packet one-way delay: 258.930 ms  
Loss rate: 1.11%  
-- Flow 2:  
Average throughput: 2.10 Mbit/s  
95th percentile per-packet one-way delay: 294.021 ms  
Loss rate: 7.51%  
-- Flow 3:  
Average throughput: 1.46 Mbit/s  
95th percentile per-packet one-way delay: 362.442 ms  
Loss rate: 20.45%

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

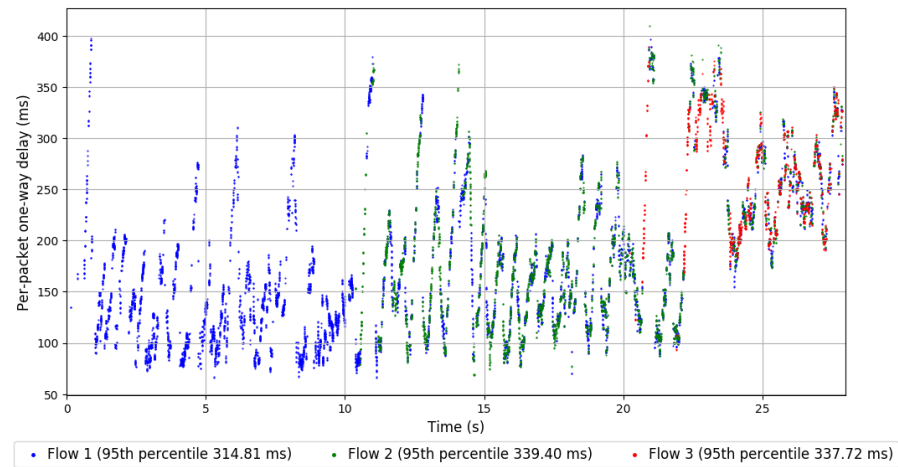
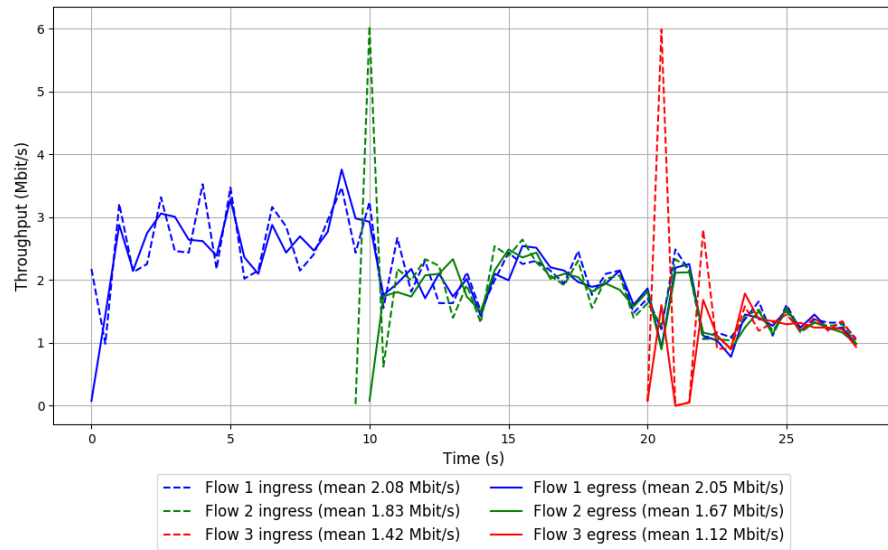


Run 2: Statistics of TaoVA-100x

Start at: 2018-01-26 00:58:06  
End at: 2018-01-26 00:58:36  
Local clock offset: -0.504 ms  
Remote clock offset: -10.399 ms

# Below is generated by plot.py at 2018-01-26 02:15:31  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.43 Mbit/s  
95th percentile per-packet one-way delay: 330.391 ms  
Loss rate: 6.86%  
-- Flow 1:  
Average throughput: 2.05 Mbit/s  
95th percentile per-packet one-way delay: 314.813 ms  
Loss rate: 2.25%  
-- Flow 2:  
Average throughput: 1.67 Mbit/s  
95th percentile per-packet one-way delay: 339.405 ms  
Loss rate: 9.38%  
-- Flow 3:  
Average throughput: 1.12 Mbit/s  
95th percentile per-packet one-way delay: 337.723 ms  
Loss rate: 23.38%

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



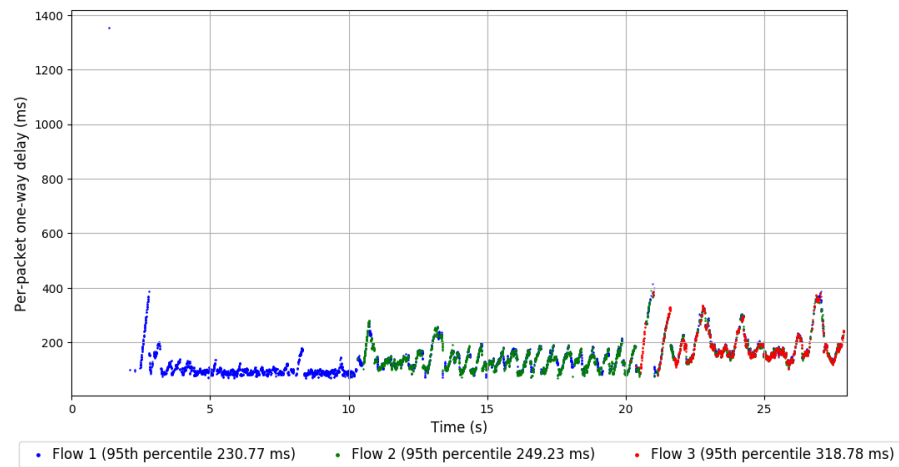
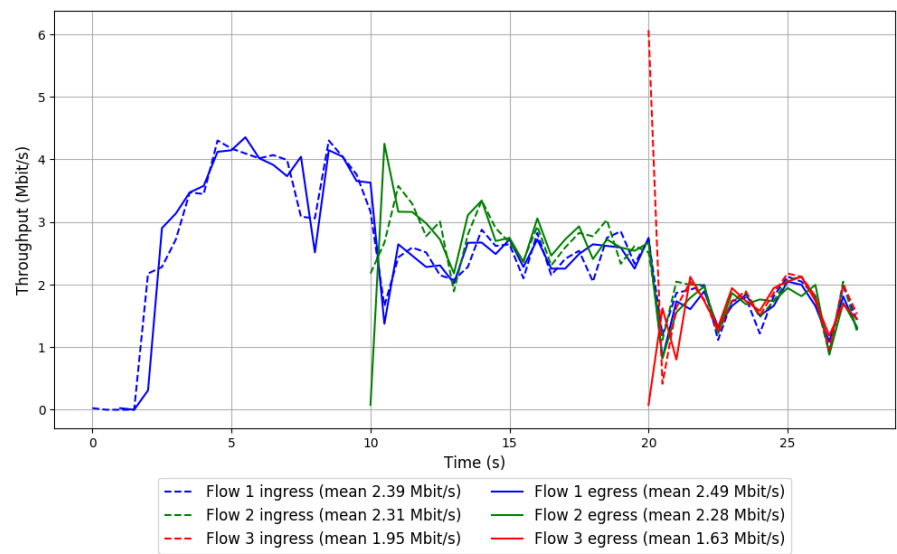
Run 3: Statistics of TaoVA-100x

Start at: 2018-01-26 01:17:03  
End at: 2018-01-26 01:17:33  
Local clock offset: 0.143 ms  
Remote clock offset: -10.439 ms

# Below is generated by plot.py at 2018-01-26 02:15:33  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.49 Mbit/s  
95th percentile per-packet one-way delay: 250.853 ms  
Loss rate: 3.62%  
-- Flow 1:  
Average throughput: 2.49 Mbit/s  
95th percentile per-packet one-way delay: 230.770 ms  
Loss rate: 1.13%  
-- Flow 2:  
Average throughput: 2.28 Mbit/s  
95th percentile per-packet one-way delay: 249.228 ms  
Loss rate: 2.17%  
-- Flow 3:  
Average throughput: 1.63 Mbit/s  
95th percentile per-packet one-way delay: 318.778 ms  
Loss rate: 18.35%



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



Run 1: Statistics of TCP Vegas

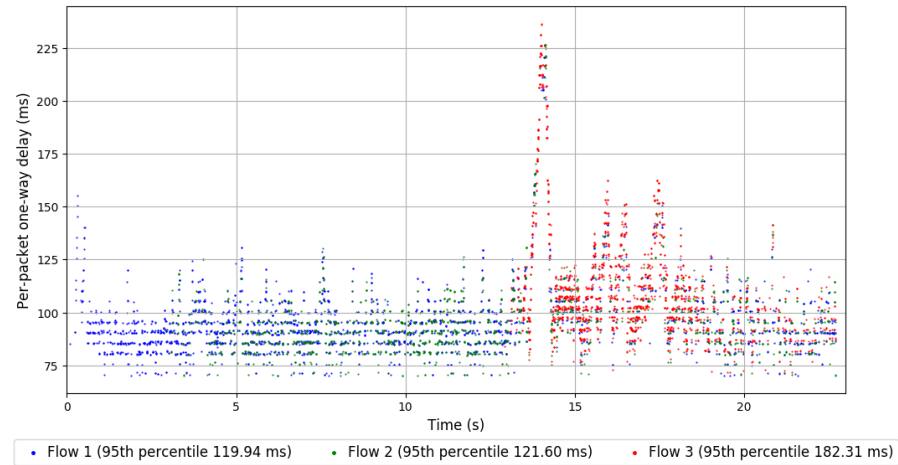
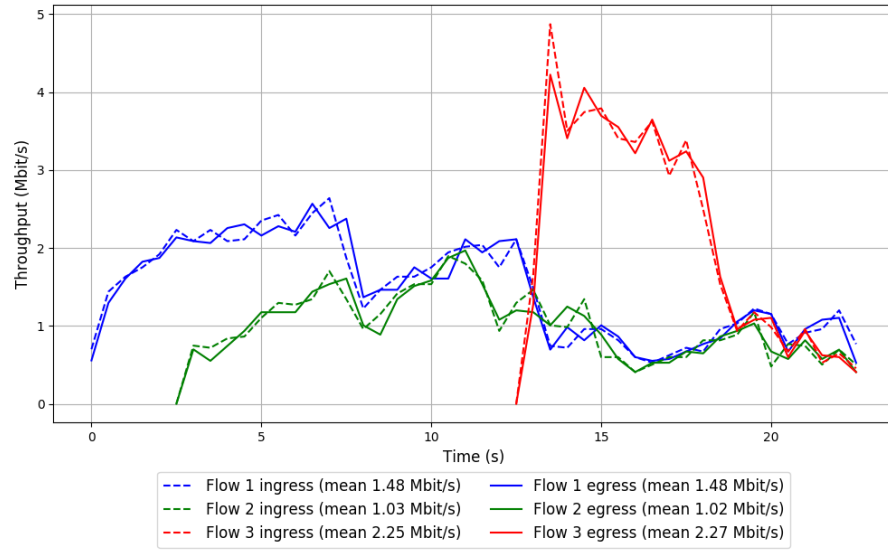
Start at: 2018-01-26 00:37:57

End at: 2018-01-26 00:38:27

Local clock offset: -0.441 ms

Remote clock offset: -9.508 ms

# Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

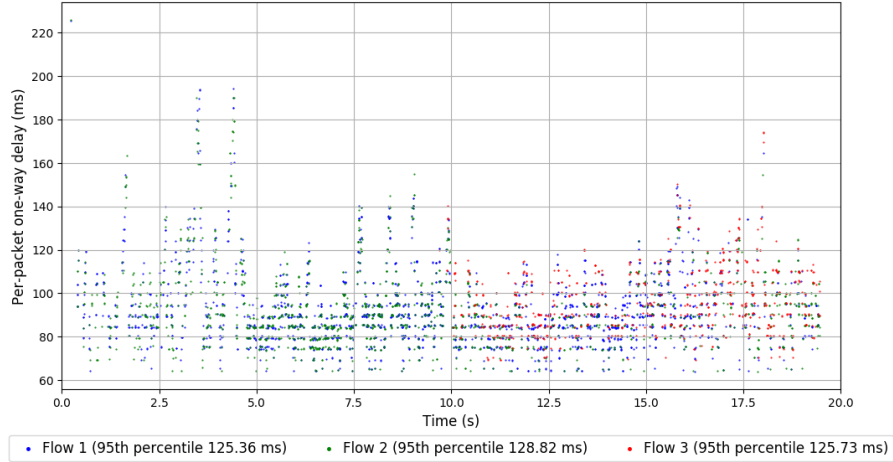
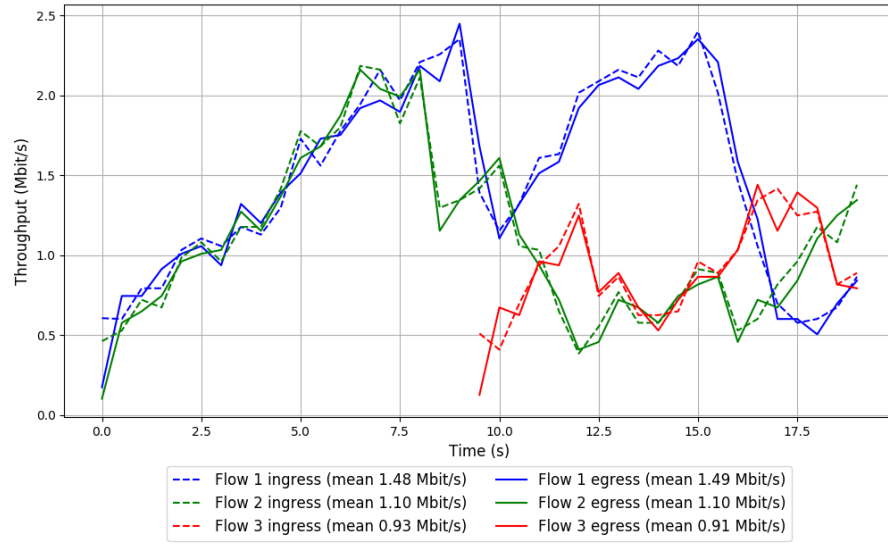
Start at: 2018-01-26 00:56:55

End at: 2018-01-26 00:57:25

Local clock offset: 0.116 ms

Remote clock offset: -10.322 ms

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

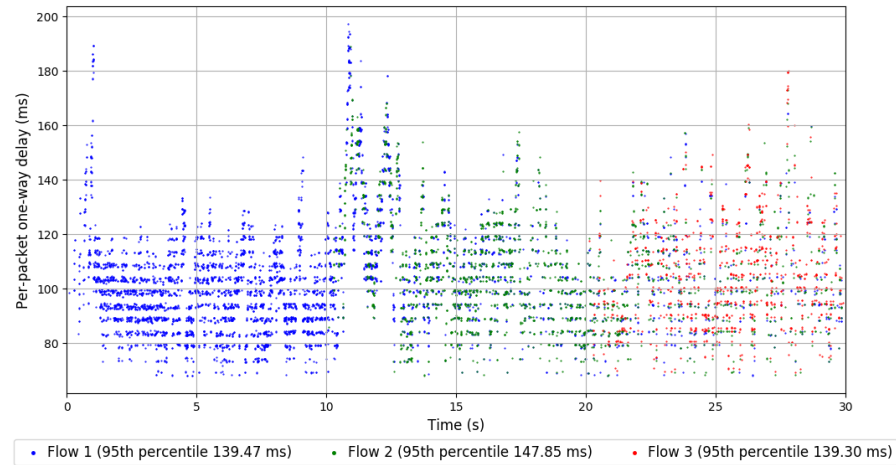
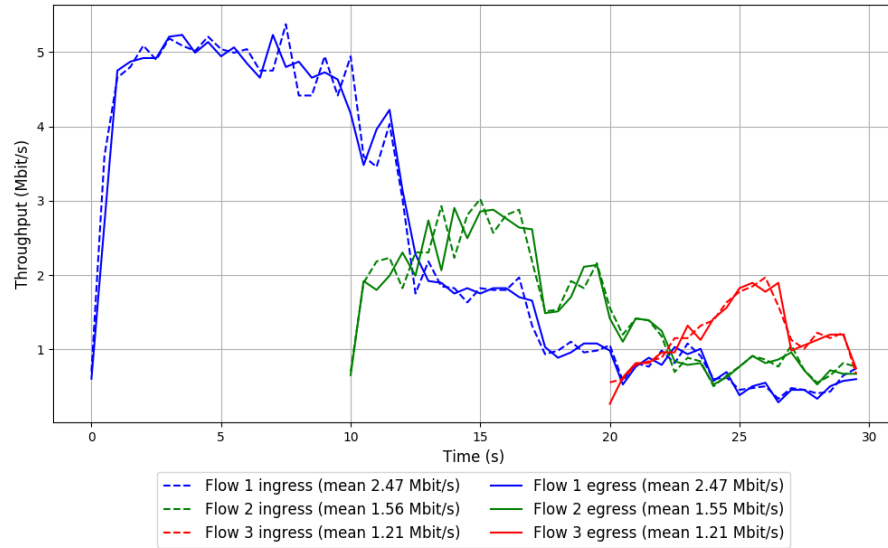


Run 3: Statistics of TCP Vegas

Start at: 2018-01-26 01:15:52  
End at: 2018-01-26 01:16:22  
Local clock offset: -0.286 ms  
Remote clock offset: -10.467 ms

# Below is generated by plot.py at 2018-01-26 02:15:33  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.89 Mbit/s  
95th percentile per-packet one-way delay: 143.410 ms  
Loss rate: 0.62%  
-- Flow 1:  
Average throughput: 2.47 Mbit/s  
95th percentile per-packet one-way delay: 139.470 ms  
Loss rate: 0.31%  
-- Flow 2:  
Average throughput: 1.55 Mbit/s  
95th percentile per-packet one-way delay: 147.855 ms  
Loss rate: 1.04%  
-- Flow 3:  
Average throughput: 1.21 Mbit/s  
95th percentile per-packet one-way delay: 139.296 ms  
Loss rate: 1.41%

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



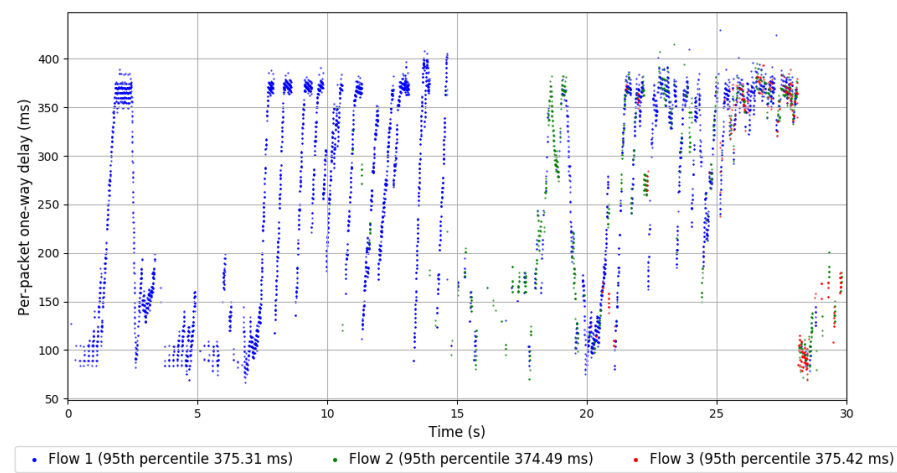
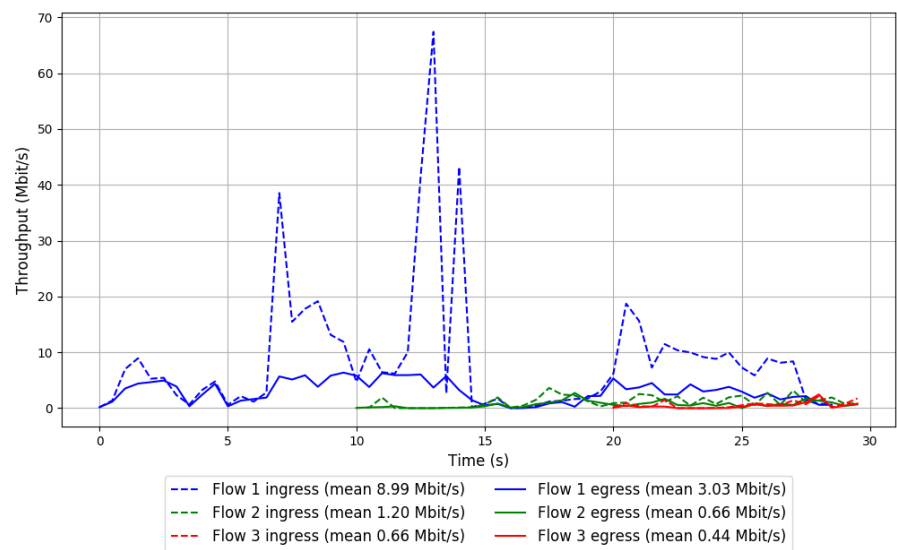
Run 1: Statistics of Verus

Start at: 2018-01-26 00:28:28  
End at: 2018-01-26 00:28:58  
Local clock offset: -0.5 ms  
Remote clock offset: -9.332 ms

# Below is generated by plot.py at 2018-01-26 02:15:33  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.51 Mbit/s  
95th percentile per-packet one-way delay: 375.306 ms  
Loss rate: 63.83%  
-- Flow 1:  
Average throughput: 3.03 Mbit/s  
95th percentile per-packet one-way delay: 375.306 ms  
Loss rate: 66.25%  
-- Flow 2:  
Average throughput: 0.66 Mbit/s  
95th percentile per-packet one-way delay: 374.490 ms  
Loss rate: 45.20%  
-- Flow 3:  
Average throughput: 0.44 Mbit/s  
95th percentile per-packet one-way delay: 375.415 ms  
Loss rate: 34.97%



Run 1: Report of Verus — Data Link

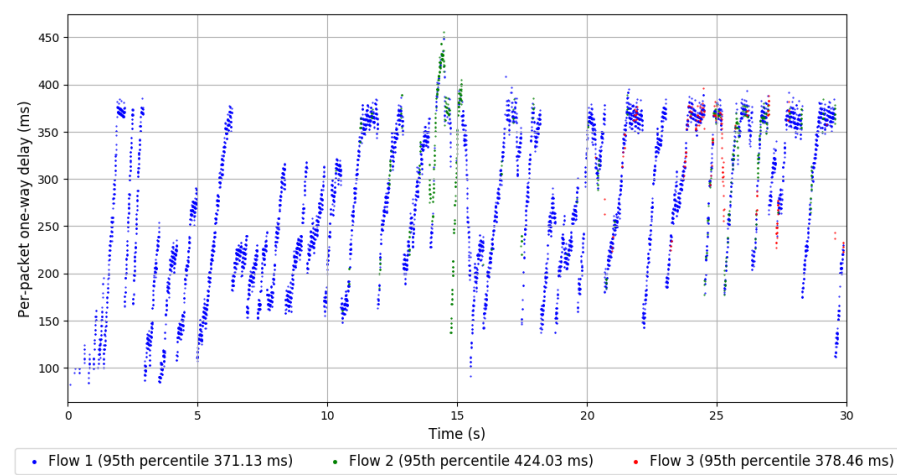
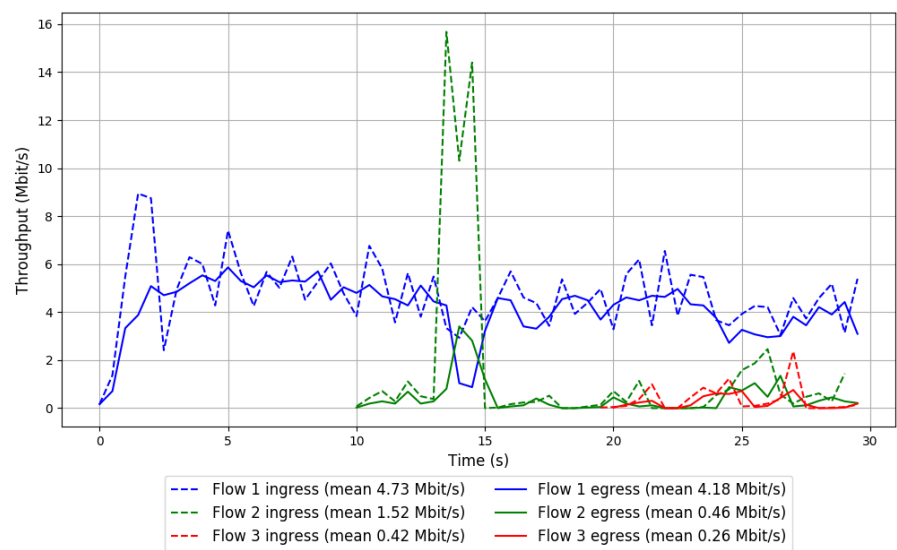


Run 2: Statistics of Verus

Start at: 2018-01-26 00:47:26  
End at: 2018-01-26 00:47:56  
Local clock offset: -0.651 ms  
Remote clock offset: -9.938 ms

# Below is generated by plot.py at 2018-01-26 02:15:33  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.56 Mbit/s  
95th percentile per-packet one-way delay: 373.713 ms  
Loss rate: 22.26%  
-- Flow 1:  
Average throughput: 4.18 Mbit/s  
95th percentile per-packet one-way delay: 371.127 ms  
Loss rate: 12.04%  
-- Flow 2:  
Average throughput: 0.46 Mbit/s  
95th percentile per-packet one-way delay: 424.029 ms  
Loss rate: 69.71%  
-- Flow 3:  
Average throughput: 0.26 Mbit/s  
95th percentile per-packet one-way delay: 378.462 ms  
Loss rate: 38.46%

Run 2: Report of Verus — Data Link

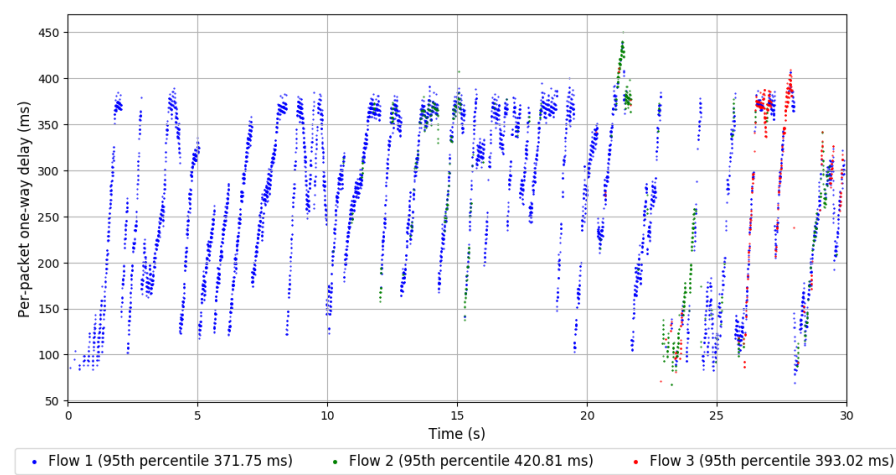
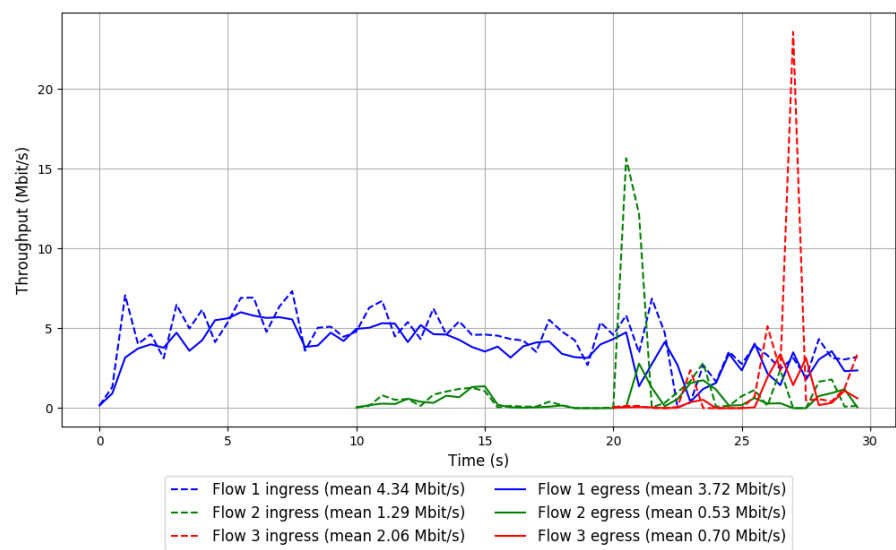


Run 3: Statistics of Verus

Start at: 2018-01-26 01:06:23  
End at: 2018-01-26 01:06:53  
Local clock offset: -0.41 ms  
Remote clock offset: -10.635 ms

# Below is generated by plot.py at 2018-01-26 02:15:35  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 4.29 Mbit/s  
95th percentile per-packet one-way delay: 374.867 ms  
Loss rate: 27.16%  
-- Flow 1:  
Average throughput: 3.72 Mbit/s  
95th percentile per-packet one-way delay: 371.745 ms  
Loss rate: 14.57%  
-- Flow 2:  
Average throughput: 0.53 Mbit/s  
95th percentile per-packet one-way delay: 420.811 ms  
Loss rate: 59.33%  
-- Flow 3:  
Average throughput: 0.70 Mbit/s  
95th percentile per-packet one-way delay: 393.016 ms  
Loss rate: 67.36%

Run 3: Report of Verus — Data Link

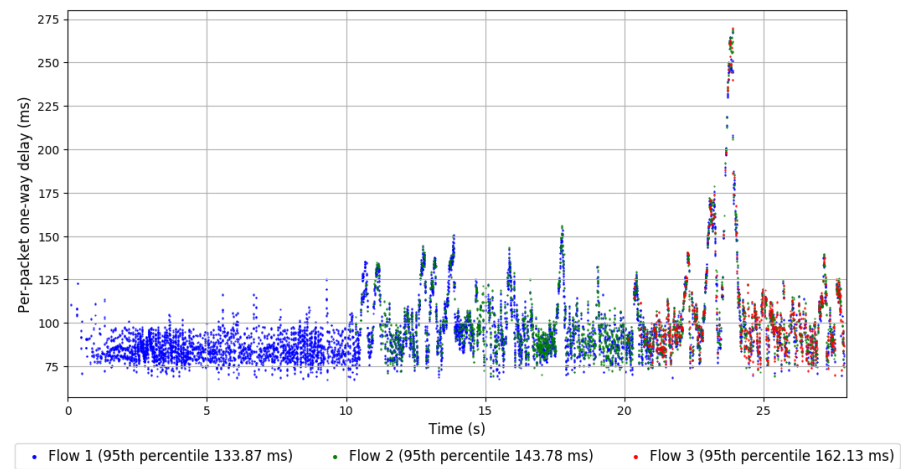
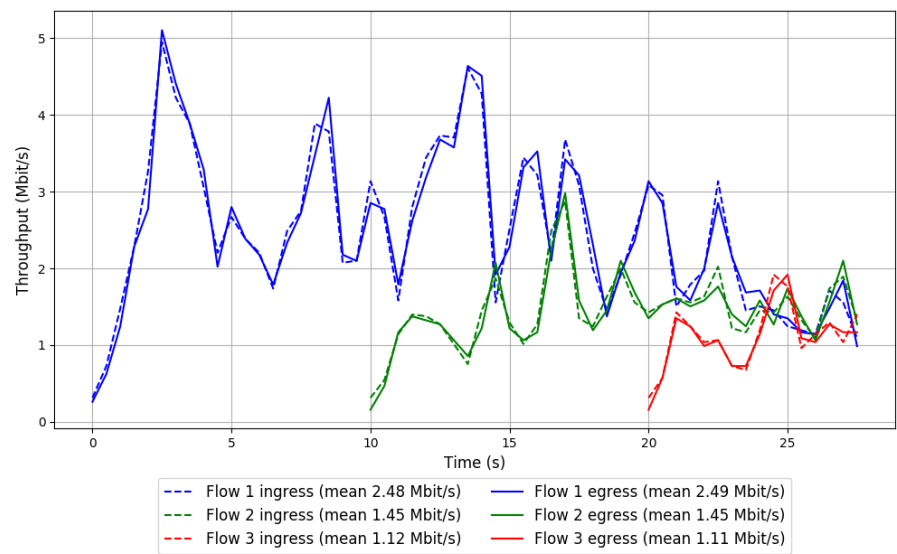


Run 1: Statistics of Copa

Start at: 2018-01-26 00:23:44  
End at: 2018-01-26 00:24:14  
Local clock offset: -0.396 ms  
Remote clock offset: -9.138 ms

# Below is generated by plot.py at 2018-01-26 02:15:41  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.73 Mbit/s  
95th percentile per-packet one-way delay: 136.042 ms  
Loss rate: 0.51%  
-- Flow 1:  
Average throughput: 2.49 Mbit/s  
95th percentile per-packet one-way delay: 133.868 ms  
Loss rate: 0.22%  
-- Flow 2:  
Average throughput: 1.45 Mbit/s  
95th percentile per-packet one-way delay: 143.784 ms  
Loss rate: 0.60%  
-- Flow 3:  
Average throughput: 1.11 Mbit/s  
95th percentile per-packet one-way delay: 162.131 ms  
Loss rate: 2.48%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-01-26 00:42:42

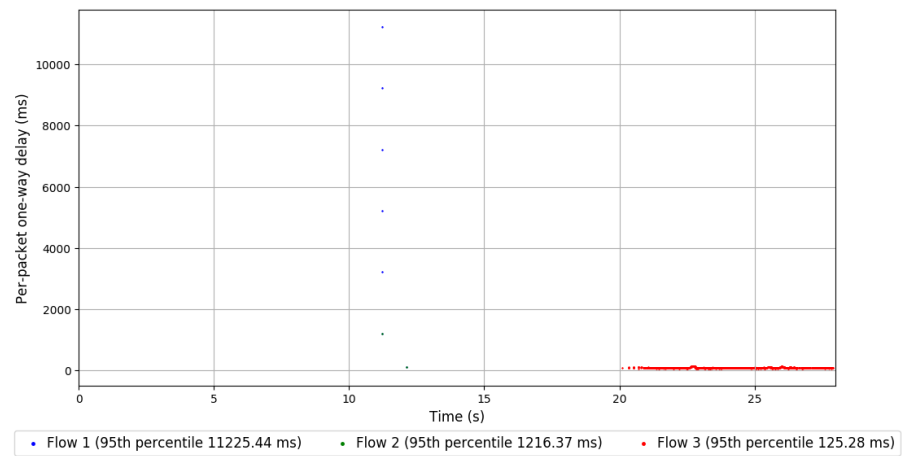
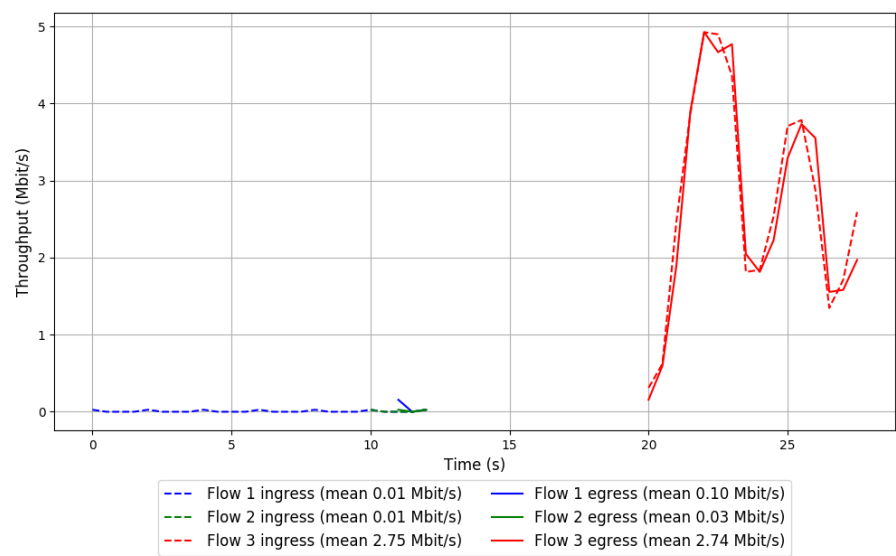
End at: 2018-01-26 00:43:12

Local clock offset: -0.092 ms

Remote clock offset: -9.772 ms



Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

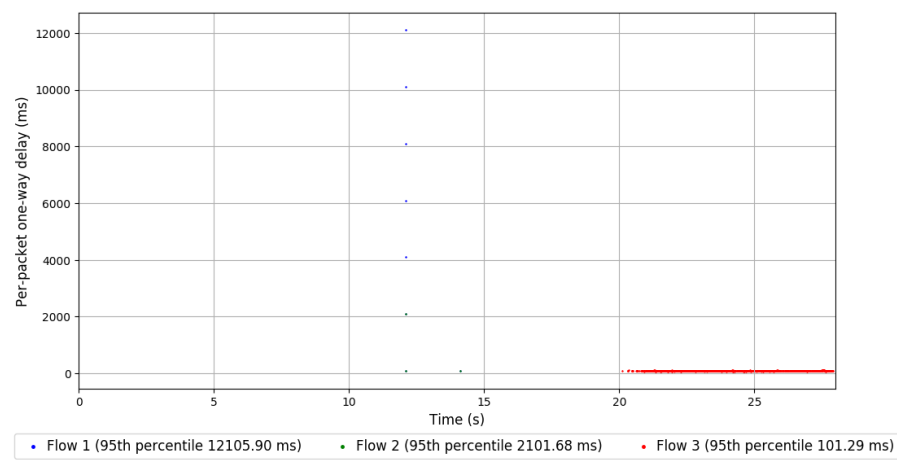
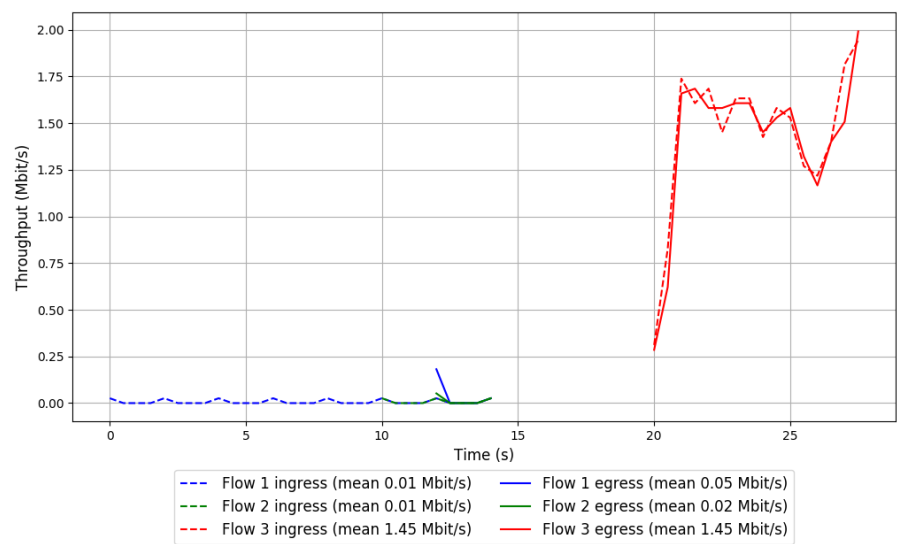
Start at: 2018-01-26 01:01:40

End at: 2018-01-26 01:02:10

Local clock offset: 0.018 ms

Remote clock offset: -10.568 ms

Run 3: Report of Copa — Data Link

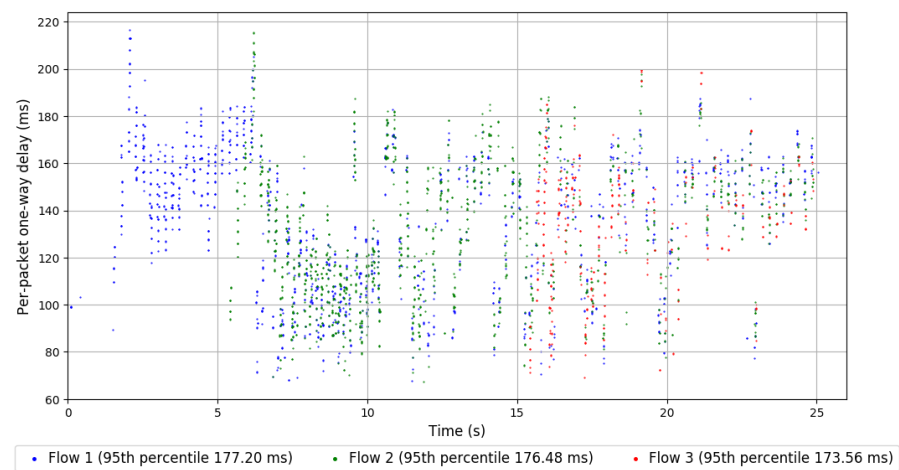
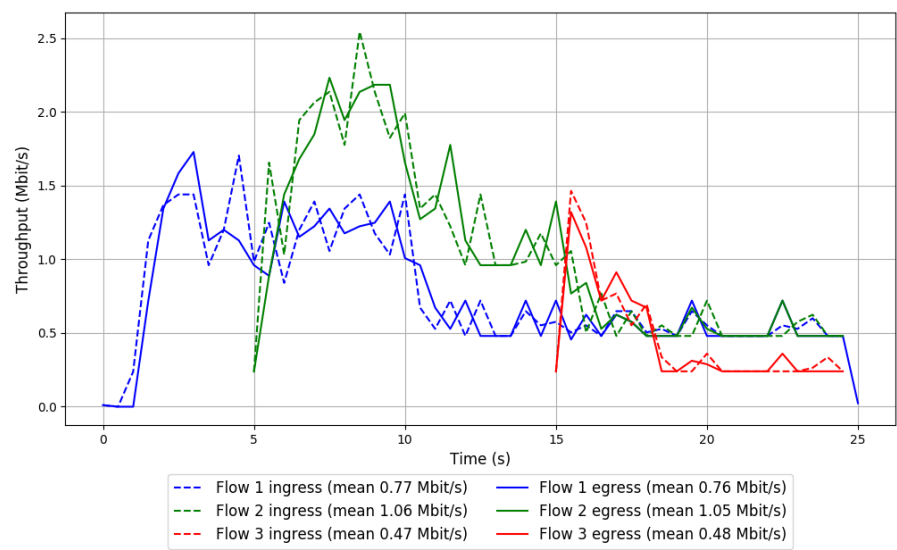


Run 1: Statistics of Indigo-2-256

Start at: 2018-01-26 00:29:40  
End at: 2018-01-26 00:30:10  
Local clock offset: -0.637 ms  
Remote clock offset: -9.368 ms

# Below is generated by plot.py at 2018-01-26 02:15:41  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 1.76 Mbit/s  
95th percentile per-packet one-way delay: 176.529 ms  
Loss rate: 1.40%  
-- Flow 1:  
Average throughput: 0.76 Mbit/s  
95th percentile per-packet one-way delay: 177.201 ms  
Loss rate: 1.37%  
-- Flow 2:  
Average throughput: 1.05 Mbit/s  
95th percentile per-packet one-way delay: 176.481 ms  
Loss rate: 1.45%  
-- Flow 3:  
Average throughput: 0.48 Mbit/s  
95th percentile per-packet one-way delay: 173.556 ms  
Loss rate: 1.31%

Run 1: Report of Indigo-2-256 — Data Link

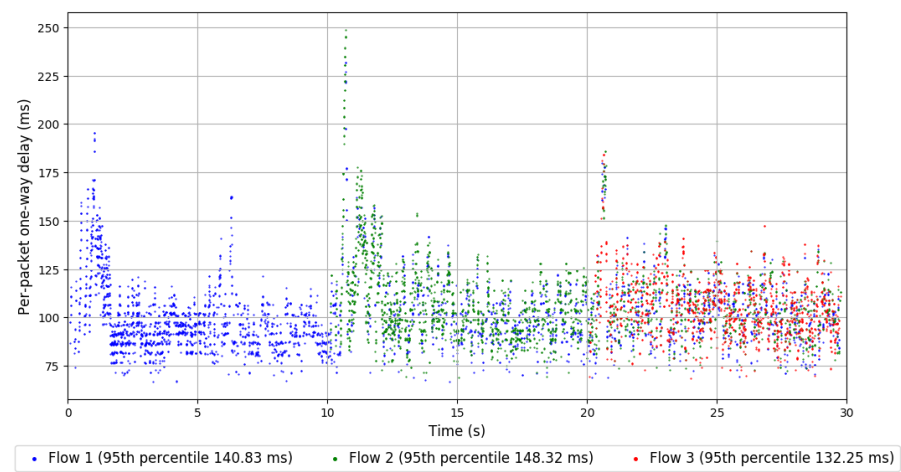
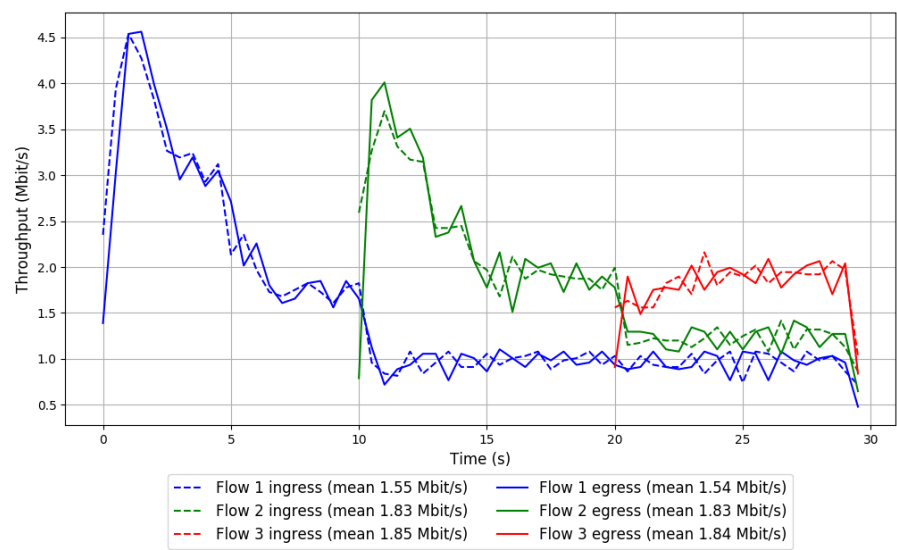


Run 2: Statistics of Indigo-2-256

Start at: 2018-01-26 00:48:37  
End at: 2018-01-26 00:49:07  
Local clock offset: 0.104 ms  
Remote clock offset: -10.007 ms

# Below is generated by plot.py at 2018-01-26 02:15:42  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.35 Mbit/s  
95th percentile per-packet one-way delay: 140.812 ms  
Loss rate: 1.17%  
-- Flow 1:  
Average throughput: 1.54 Mbit/s  
95th percentile per-packet one-way delay: 140.834 ms  
Loss rate: 1.32%  
-- Flow 2:  
Average throughput: 1.83 Mbit/s  
95th percentile per-packet one-way delay: 148.317 ms  
Loss rate: 0.60%  
-- Flow 3:  
Average throughput: 1.84 Mbit/s  
95th percentile per-packet one-way delay: 132.248 ms  
Loss rate: 1.92%

Run 2: Report of Indigo-2-256 — Data Link



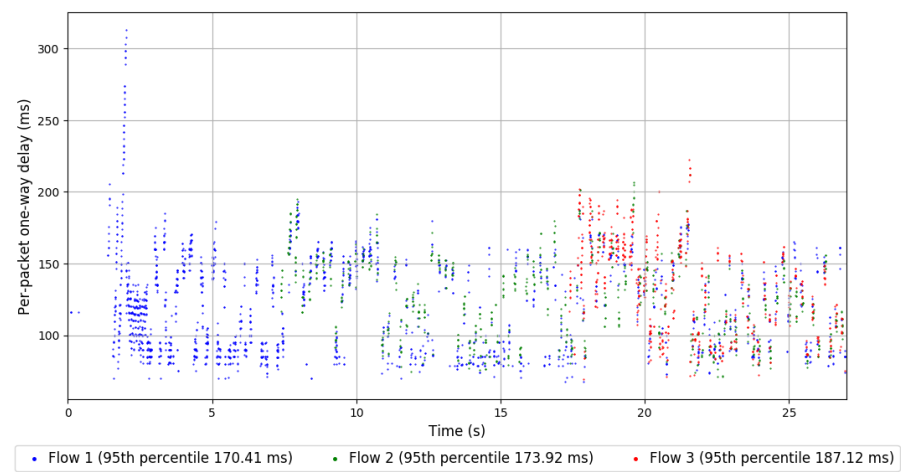
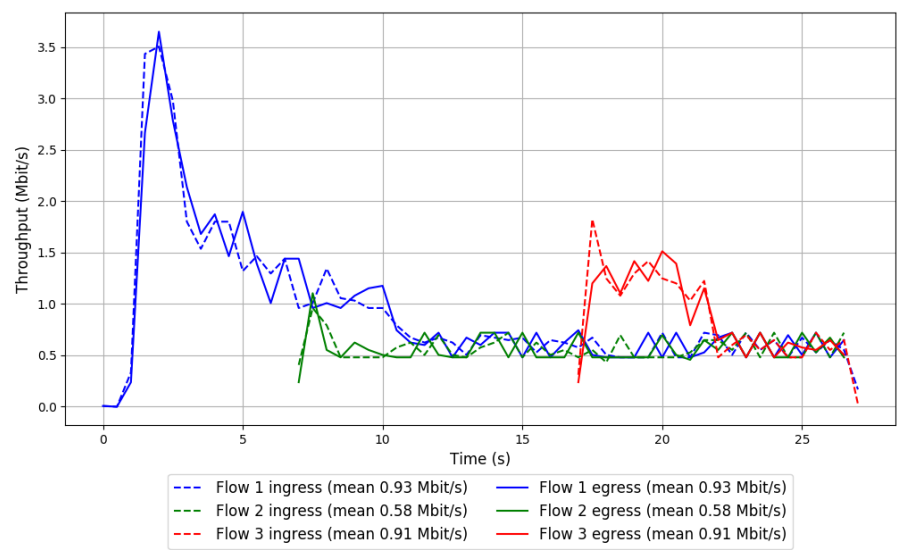
Run 3: Statistics of Indigo-2-256

Start at: 2018-01-26 01:07:35  
End at: 2018-01-26 01:08:05  
Local clock offset: -0.111 ms  
Remote clock offset: -10.523 ms

# Below is generated by plot.py at 2018-01-26 02:15:42  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 1.67 Mbit/s  
95th percentile per-packet one-way delay: 177.325 ms  
Loss rate: 1.01%  
-- Flow 1:  
Average throughput: 0.93 Mbit/s  
95th percentile per-packet one-way delay: 170.408 ms  
Loss rate: 0.48%  
-- Flow 2:  
Average throughput: 0.58 Mbit/s  
95th percentile per-packet one-way delay: 173.921 ms  
Loss rate: 1.16%  
-- Flow 3:  
Average throughput: 0.91 Mbit/s  
95th percentile per-packet one-way delay: 187.122 ms  
Loss rate: 2.30%



Run 3: Report of Indigo-2-256 — Data Link

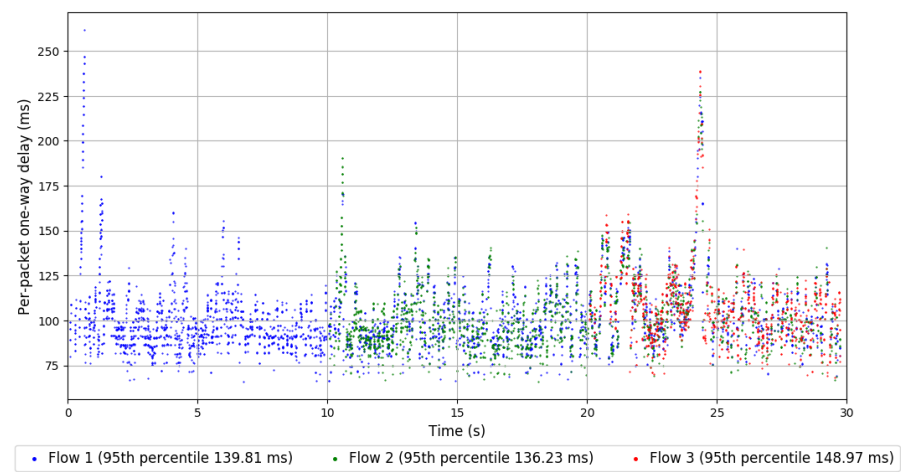
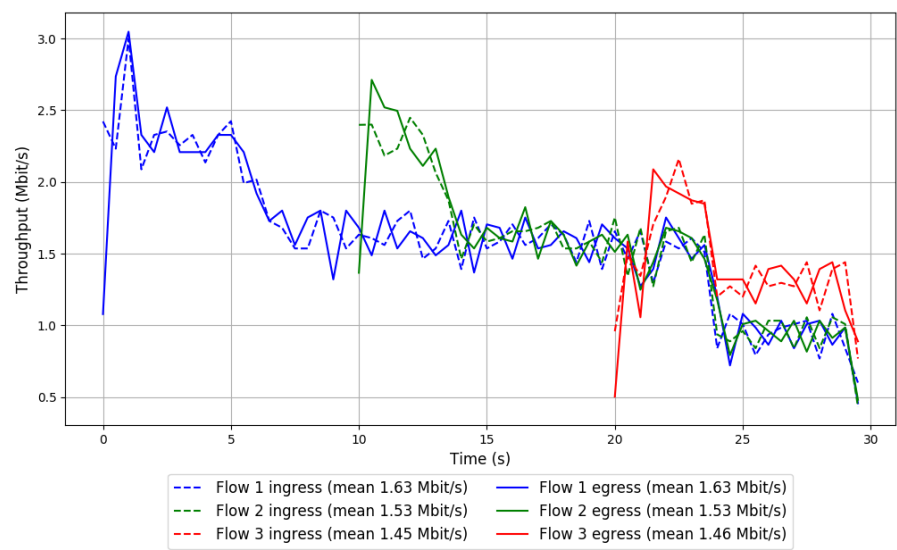


Run 1: Statistics of Indigo-1-32

Start at: 2018-01-26 00:21:21  
End at: 2018-01-26 00:21:52  
Local clock offset: -1.259 ms  
Remote clock offset: -8.996 ms

# Below is generated by plot.py at 2018-01-26 02:15:42  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 3.11 Mbit/s  
95th percentile per-packet one-way delay: 139.824 ms  
Loss rate: 0.50%  
-- Flow 1:  
Average throughput: 1.63 Mbit/s  
95th percentile per-packet one-way delay: 139.809 ms  
Loss rate: 0.42%  
-- Flow 2:  
Average throughput: 1.53 Mbit/s  
95th percentile per-packet one-way delay: 136.233 ms  
Loss rate: 0.40%  
-- Flow 3:  
Average throughput: 1.46 Mbit/s  
95th percentile per-packet one-way delay: 148.966 ms  
Loss rate: 1.02%

Run 1: Report of Indigo-1-32 — Data Link

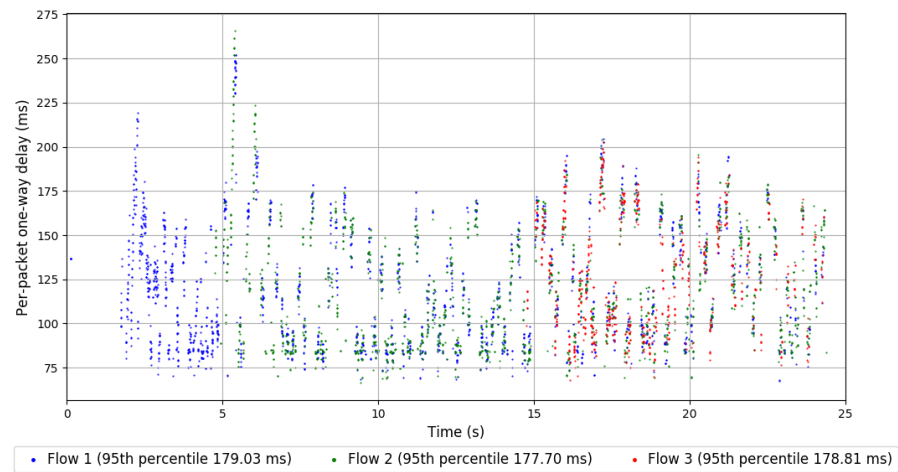
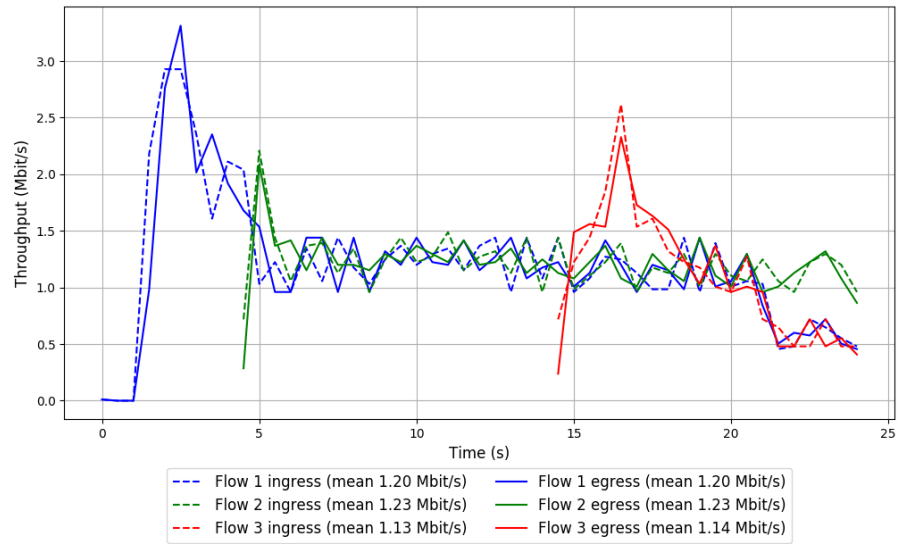


Run 2: Statistics of Indigo-1-32

Start at: 2018-01-26 00:40:20  
End at: 2018-01-26 00:40:50  
Local clock offset: -0.685 ms  
Remote clock offset: -9.672 ms

# Below is generated by plot.py at 2018-01-26 02:15:42  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 2.63 Mbit/s  
95th percentile per-packet one-way delay: 178.682 ms  
Loss rate: 1.19%  
-- Flow 1:  
Average throughput: 1.20 Mbit/s  
95th percentile per-packet one-way delay: 179.025 ms  
Loss rate: 1.23%  
-- Flow 2:  
Average throughput: 1.23 Mbit/s  
95th percentile per-packet one-way delay: 177.701 ms  
Loss rate: 1.18%  
-- Flow 3:  
Average throughput: 1.14 Mbit/s  
95th percentile per-packet one-way delay: 178.809 ms  
Loss rate: 1.09%

## Run 2: Report of Indigo-1-32 — Data Link

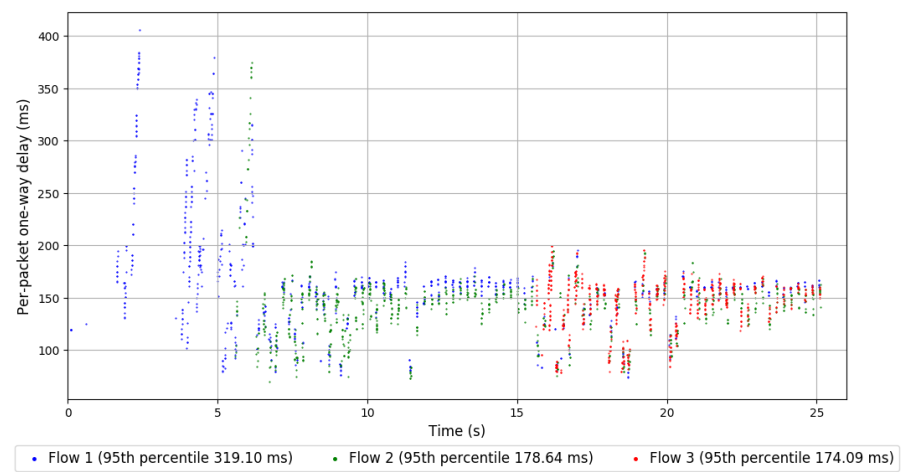
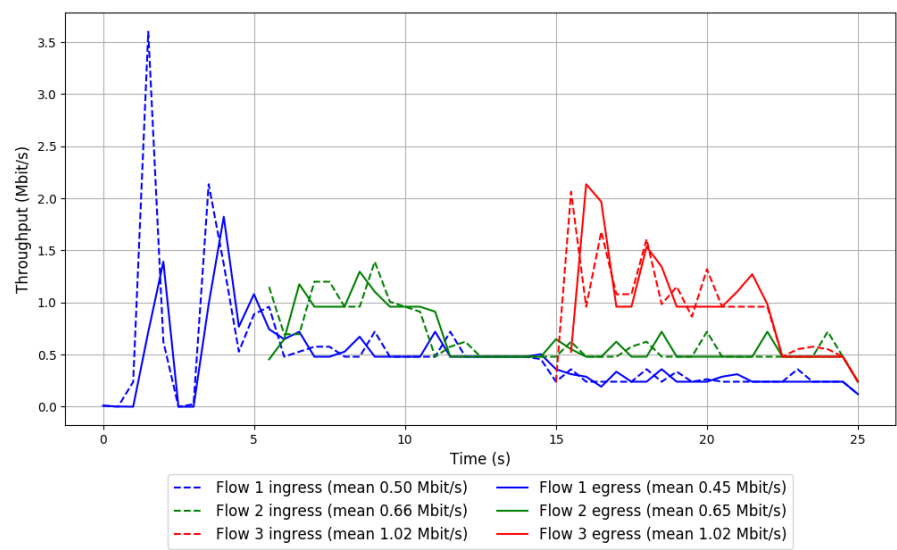


Run 3: Statistics of Indigo-1-32

Start at: 2018-01-26 00:59:17  
End at: 2018-01-26 00:59:47  
Local clock offset: -0.077 ms  
Remote clock offset: -10.459 ms

# Below is generated by plot.py at 2018-01-26 02:15:42  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 1.34 Mbit/s  
95th percentile per-packet one-way delay: 241.874 ms  
Loss rate: 5.05%  
-- Flow 1:  
Average throughput: 0.45 Mbit/s  
95th percentile per-packet one-way delay: 319.103 ms  
Loss rate: 10.32%  
-- Flow 2:  
Average throughput: 0.65 Mbit/s  
95th percentile per-packet one-way delay: 178.643 ms  
Loss rate: 1.94%  
-- Flow 3:  
Average throughput: 1.02 Mbit/s  
95th percentile per-packet one-way delay: 174.092 ms  
Loss rate: 2.43%

Run 3: Report of Indigo-1-32 — Data Link



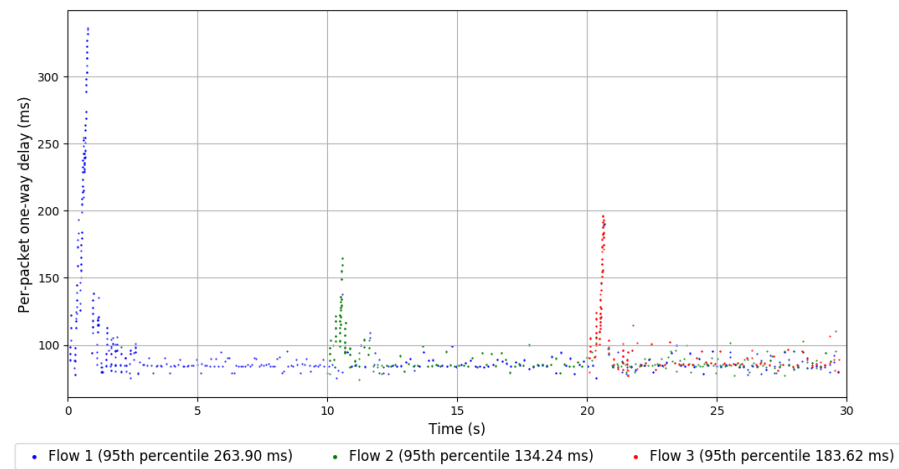
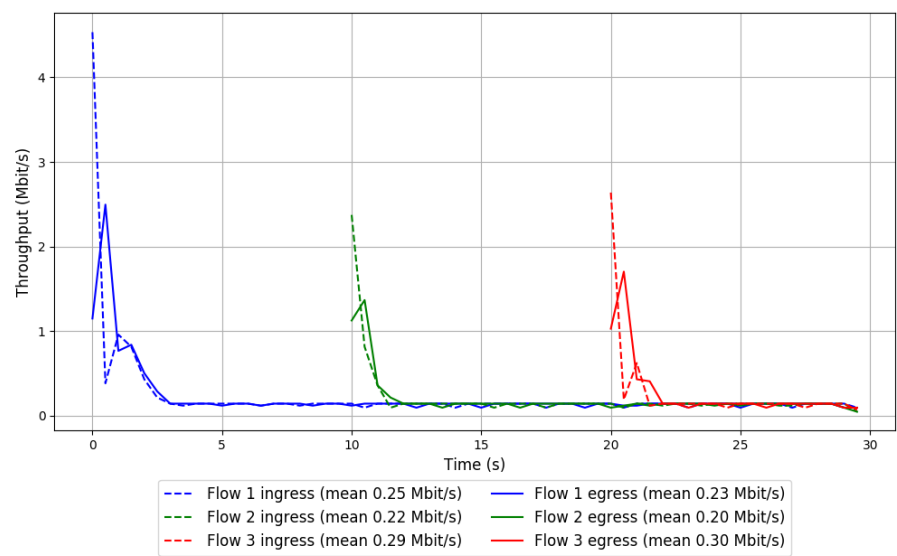
Run 1: Statistics of Indigo-1-128

Start at: 2018-01-26 00:26:06  
End at: 2018-01-26 00:26:36  
Local clock offset: -0.552 ms  
Remote clock offset: -9.279 ms

# Below is generated by plot.py at 2018-01-26 02:15:42  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.45 Mbit/s  
95th percentile per-packet one-way delay: 232.736 ms  
Loss rate: 6.81%  
-- Flow 1:  
Average throughput: 0.23 Mbit/s  
95th percentile per-packet one-way delay: 263.905 ms  
Loss rate: 8.97%  
-- Flow 2:  
Average throughput: 0.20 Mbit/s  
95th percentile per-packet one-way delay: 134.239 ms  
Loss rate: 7.35%  
-- Flow 3:  
Average throughput: 0.30 Mbit/s  
95th percentile per-packet one-way delay: 183.615 ms  
Loss rate: 0.42%



Run 1: Report of Indigo-1-128 — Data Link

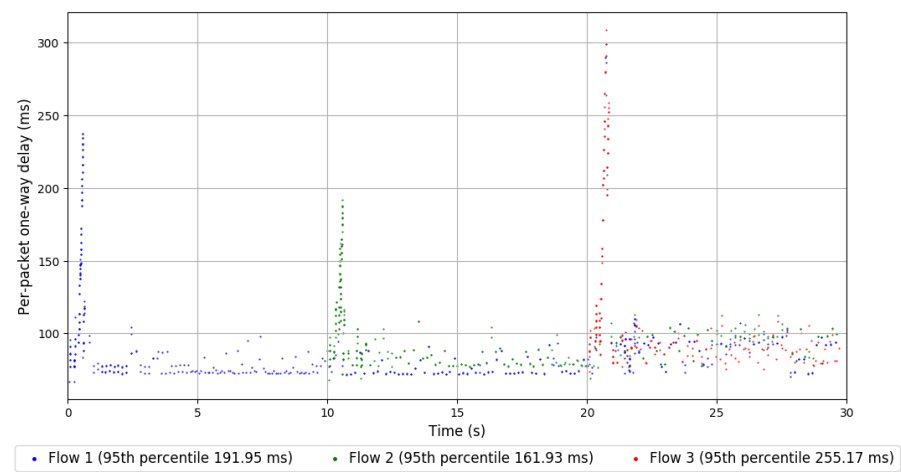
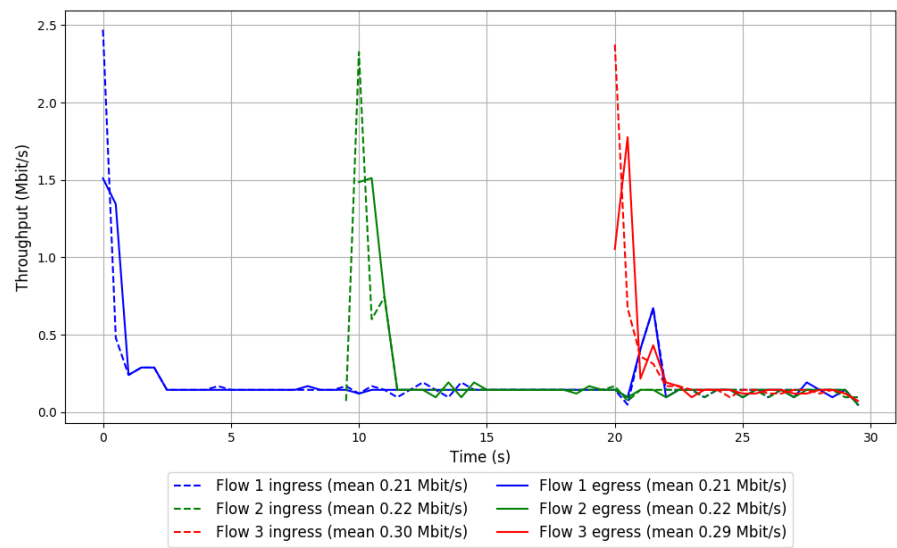


Run 2: Statistics of Indigo-1-128

Start at: 2018-01-26 00:45:04  
End at: 2018-01-26 00:45:34  
Local clock offset: -0.706 ms  
Remote clock offset: -9.841 ms

# Below is generated by plot.py at 2018-01-26 02:15:42  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.45 Mbit/s  
95th percentile per-packet one-way delay: 212.042 ms  
Loss rate: 1.60%  
-- Flow 1:  
Average throughput: 0.21 Mbit/s  
95th percentile per-packet one-way delay: 191.952 ms  
Loss rate: 1.18%  
-- Flow 2:  
Average throughput: 0.22 Mbit/s  
95th percentile per-packet one-way delay: 161.931 ms  
Loss rate: 0.54%  
-- Flow 3:  
Average throughput: 0.29 Mbit/s  
95th percentile per-packet one-way delay: 255.173 ms  
Loss rate: 4.10%

Run 2: Report of Indigo-1-128 — Data Link



Run 3: Statistics of Indigo-1-128

Start at: 2018-01-26 01:04:01  
End at: 2018-01-26 01:04:31  
Local clock offset: -2.705 ms  
Remote clock offset: -10.693 ms

# Below is generated by plot.py at 2018-01-26 02:15:42  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.49 Mbit/s  
95th percentile per-packet one-way delay: 190.357 ms  
Loss rate: 0.41%  
-- Flow 1:  
Average throughput: 0.18 Mbit/s  
95th percentile per-packet one-way delay: 146.443 ms  
Loss rate: 0.45%  
-- Flow 2:  
Average throughput: 0.23 Mbit/s  
95th percentile per-packet one-way delay: 205.586 ms  
Loss rate: 0.53%  
-- Flow 3:  
Average throughput: 0.51 Mbit/s  
95th percentile per-packet one-way delay: 198.717 ms  
Loss rate: 0.25%

### Run 3: Report of Indigo-1-128 — Data Link

