

Pantheon Report

Generated at 2018-01-25 20:12:55 (UTC).

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

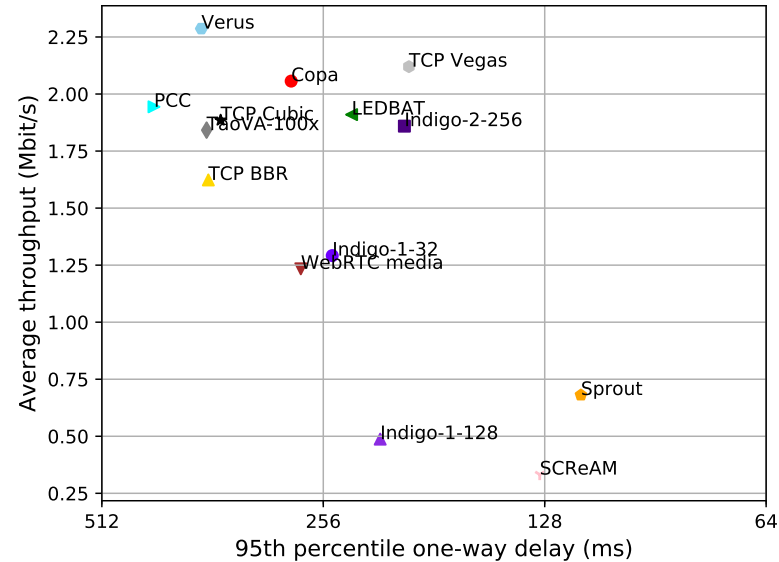
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

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

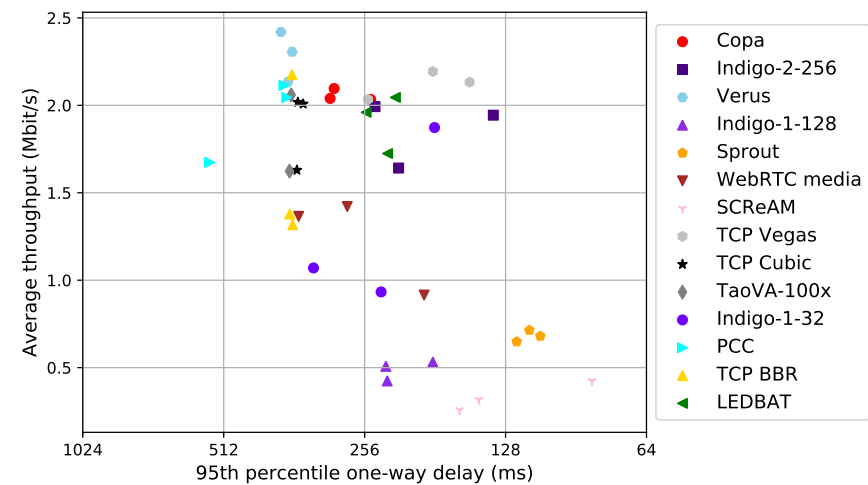
Git summary:

```
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 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



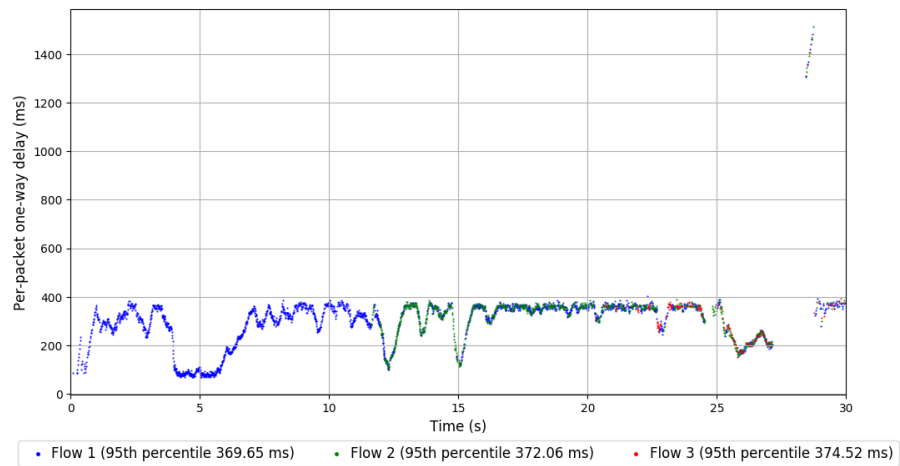
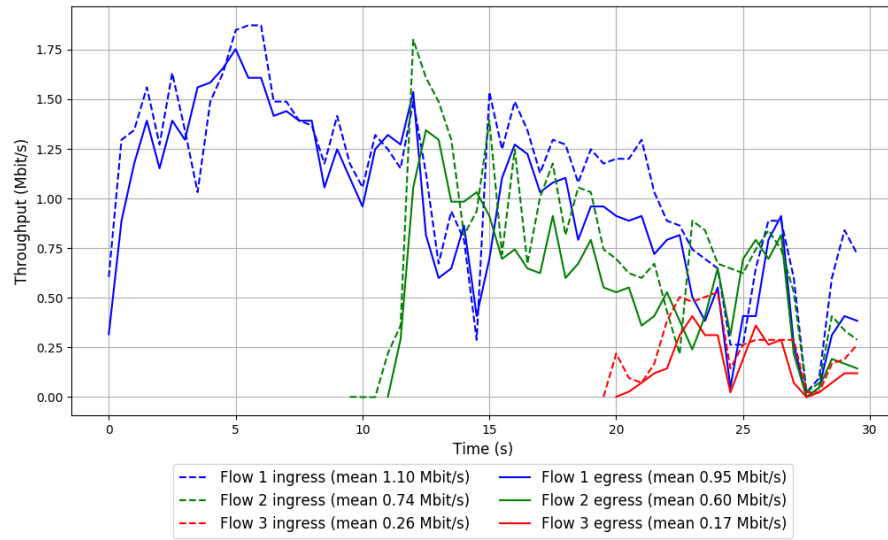
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	0.93	0.65	0.84	366.22	367.35	370.00	13.04	18.47	23.02
TCP Cubic	3	1.09	0.96	0.50	352.50	354.46	359.29	2.75	4.46	9.05
LEDBAT	3	1.11	0.89	0.64	227.94	244.52	233.24	2.14	2.40	4.83
PCC	3	1.21	0.87	0.51	373.07	589.51	773.87	48.16	72.36	91.58
QUIC Cubic	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SCReAM	3	0.16	0.18	0.18	131.39	123.56	117.66	0.56	0.96	2.02
WebRTC media	3	0.60	0.40	0.25	310.72	243.51	256.92	1.68	1.41	1.62
Sprout	3	0.34	0.34	0.34	114.89	111.97	120.16	0.81	0.79	1.92
TaoVA-100x	2	1.14	0.89	0.52	365.65	377.52	375.52	15.00	29.06	52.21
TCP Vegas	3	1.12	0.99	1.04	194.42	192.51	201.34	1.02	0.85	2.80
Verus	3	1.69	0.69	0.46	369.75	393.76	390.58	42.50	65.97	58.22
Copa	3	1.27	0.95	0.63	259.07	290.96	319.77	0.62	1.10	3.59
Indigo-2-256	3	0.80	0.93	1.37	195.20	206.28	191.13	2.35	2.32	2.20
Indigo-1-32	3	0.68	0.55	0.82	240.59	237.05	251.98	2.28	4.86	17.06
Indigo-1-128	3	0.22	0.26	0.30	222.72	186.84	255.77	10.37	8.45	22.99

Run 1: Statistics of TCP BBR

Start at: 2018-01-25 18:34:43
End at: 2018-01-25 18:35:13
Local clock offset: 1.219 ms
Remote clock offset: -15.593 ms

Below is generated by plot.py at 2018-01-25 20:12:19
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 369.958 ms
Loss rate: 17.75%
-- Flow 1:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 369.646 ms
Loss rate: 13.43%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 372.059 ms
Loss rate: 23.93%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 374.523 ms
Loss rate: 37.46%

Run 1: Report of TCP BBR — Data Link

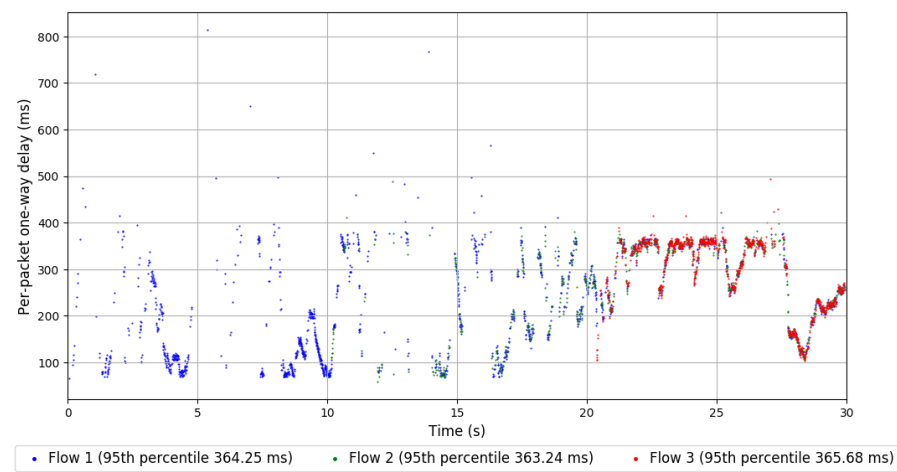
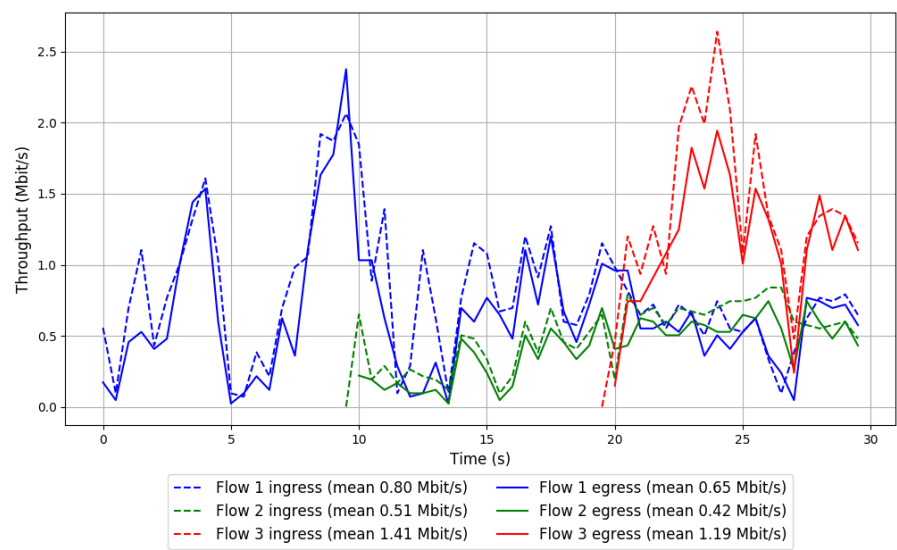


Run 2: Statistics of TCP BBR

Start at: 2018-01-25 18:52:18
End at: 2018-01-25 18:52:48
Local clock offset: 1.02 ms
Remote clock offset: -17.336 ms

Below is generated by plot.py at 2018-01-25 20:12:19
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 364.657 ms
Loss rate: 18.15%
-- Flow 1:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 364.250 ms
Loss rate: 18.19%
-- Flow 2:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 363.243 ms
Loss rate: 18.37%
-- Flow 3:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 365.675 ms
Loss rate: 17.93%

Run 2: Report of TCP BBR — Data Link

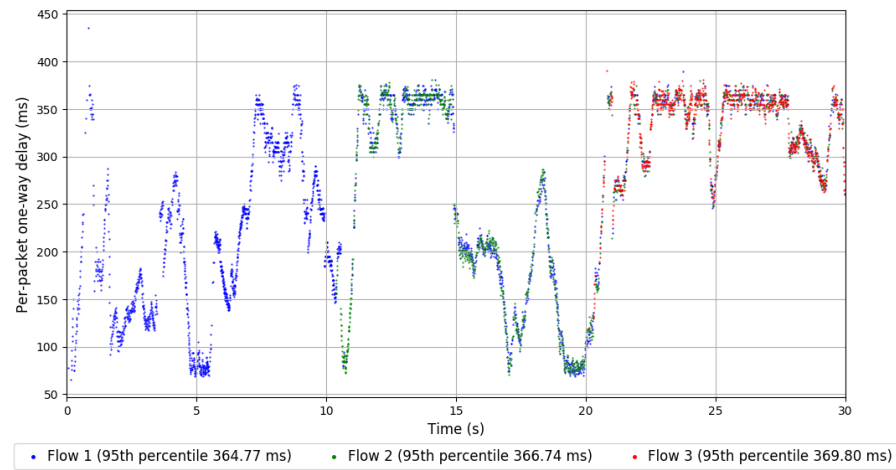
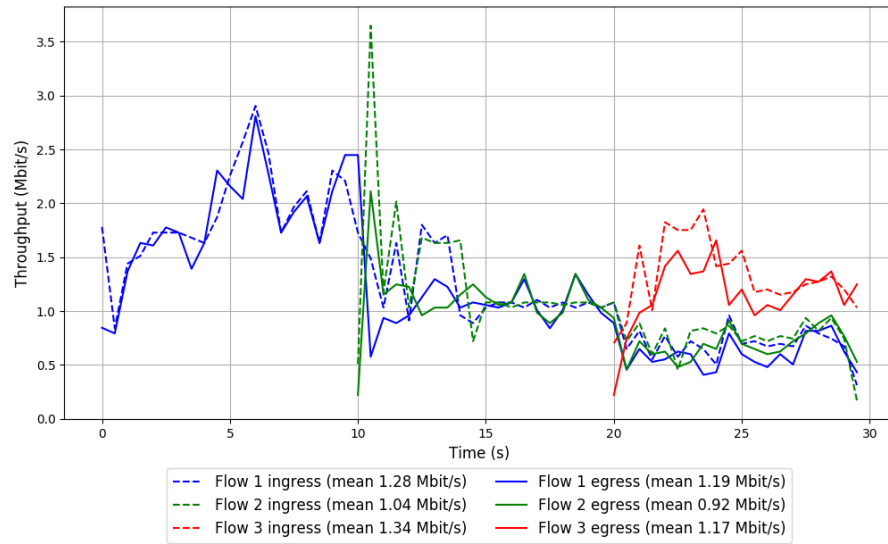


Run 3: Statistics of TCP BBR

Start at: 2018-01-25 19:09:55
End at: 2018-01-25 19:10:25
Local clock offset: 2.544 ms
Remote clock offset: -16.35 ms

Below is generated by plot.py at 2018-01-25 20:12:21
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 365.923 ms
Loss rate: 10.24%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 364.768 ms
Loss rate: 7.49%
-- Flow 2:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 366.737 ms
Loss rate: 13.10%
-- Flow 3:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 369.799 ms
Loss rate: 13.68%

Run 3: Report of TCP BBR — Data Link

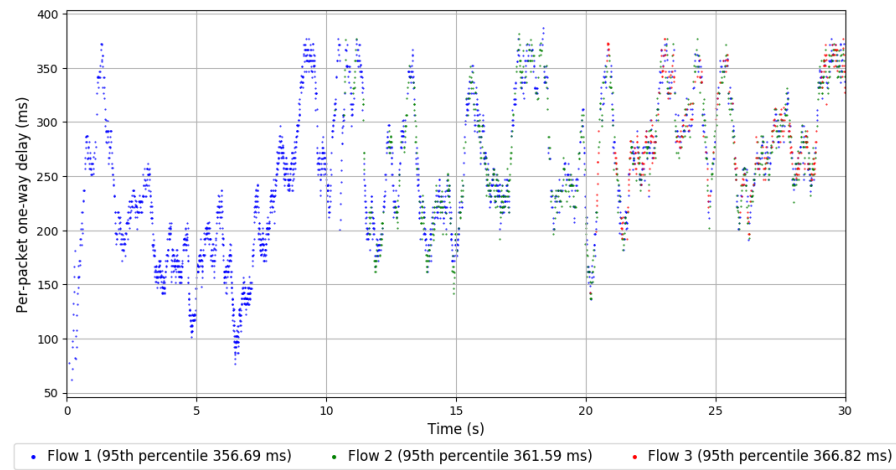
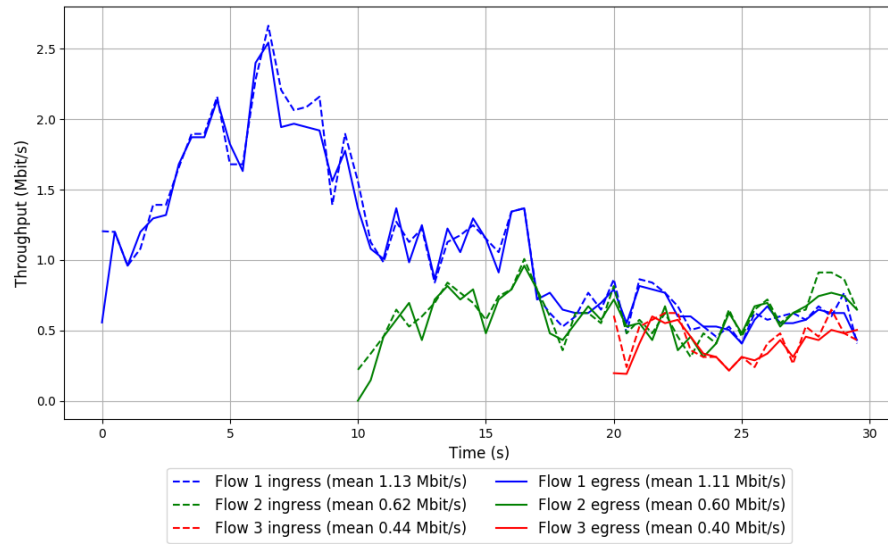


Run 1: Statistics of TCP Cubic

Start at: 2018-01-25 18:33:37
End at: 2018-01-25 18:34:07
Local clock offset: 2.22 ms
Remote clock offset: -16.763 ms

Below is generated by plot.py at 2018-01-25 20:12:21
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 357.184 ms
Loss rate: 3.70%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 356.692 ms
Loss rate: 2.55%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 361.593 ms
Loss rate: 5.14%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 366.820 ms
Loss rate: 8.61%

Run 1: Report of TCP Cubic — Data Link

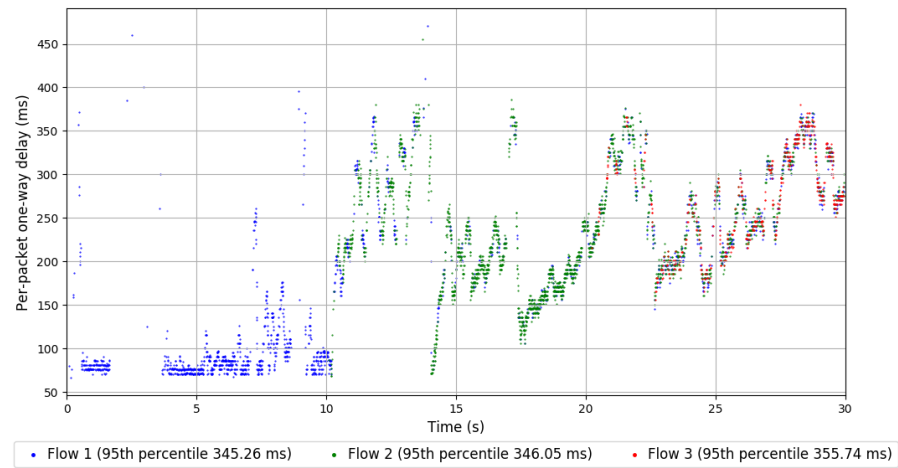
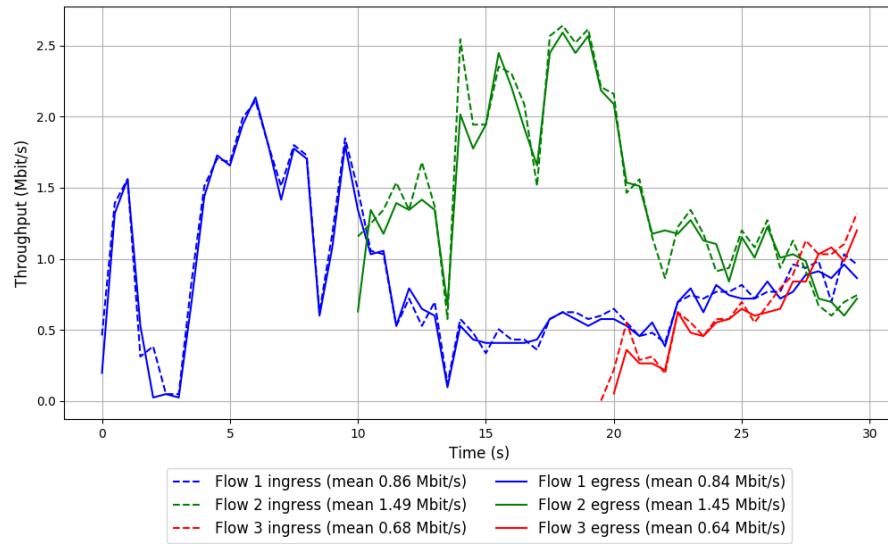


Run 2: Statistics of TCP Cubic

Start at: 2018-01-25 18:51:12
End at: 2018-01-25 18:51:42
Local clock offset: 4.25 ms
Remote clock offset: -14.849 ms

Below is generated by plot.py at 2018-01-25 20:12:21
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 346.311 ms
Loss rate: 3.88%
-- Flow 1:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 345.263 ms
Loss rate: 3.48%
-- Flow 2:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 346.053 ms
Loss rate: 3.06%
-- Flow 3:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 355.737 ms
Loss rate: 9.02%

Run 2: Report of TCP Cubic — Data Link

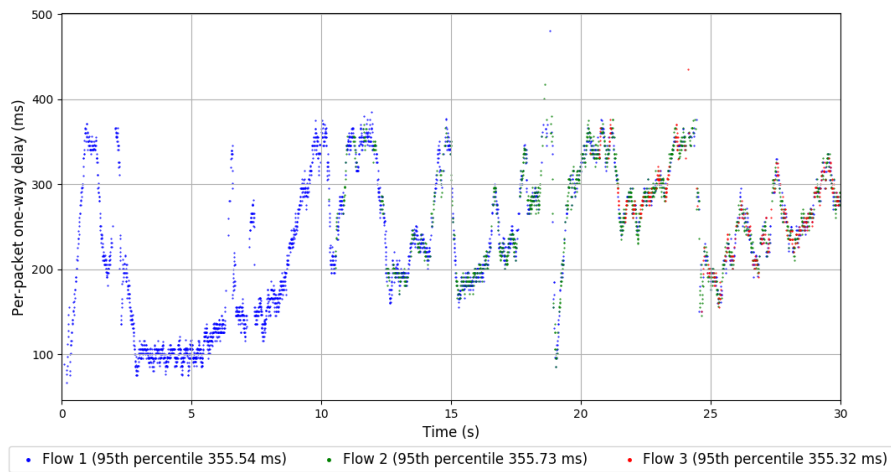
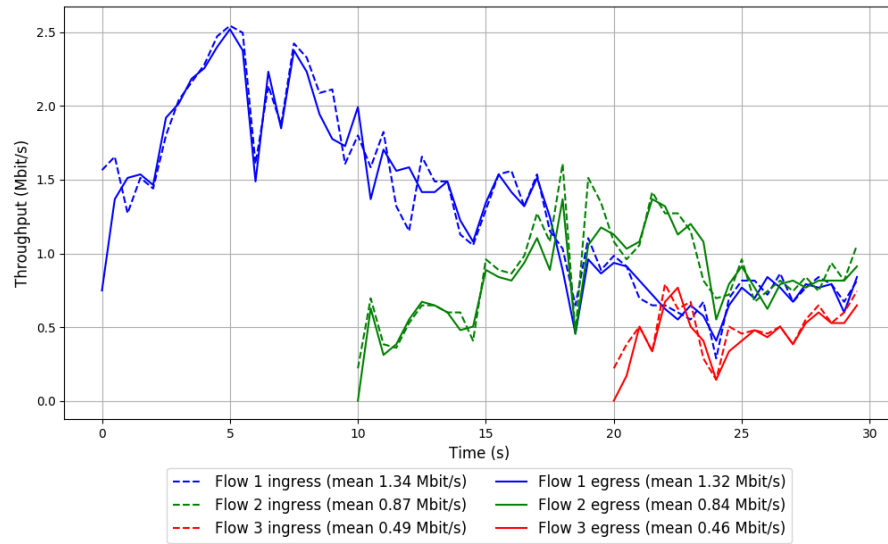


Run 3: Statistics of TCP Cubic

Start at: 2018-01-25 19:08:48
End at: 2018-01-25 19:09:18
Local clock offset: 3.83 ms
Remote clock offset: -15.807 ms

Below is generated by plot.py at 2018-01-25 20:12:21
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 355.568 ms
Loss rate: 3.61%
-- Flow 1:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 355.537 ms
Loss rate: 2.21%
-- Flow 2:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 355.732 ms
Loss rate: 5.17%
-- Flow 3:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 355.325 ms
Loss rate: 9.53%

Run 3: Report of TCP Cubic — Data Link

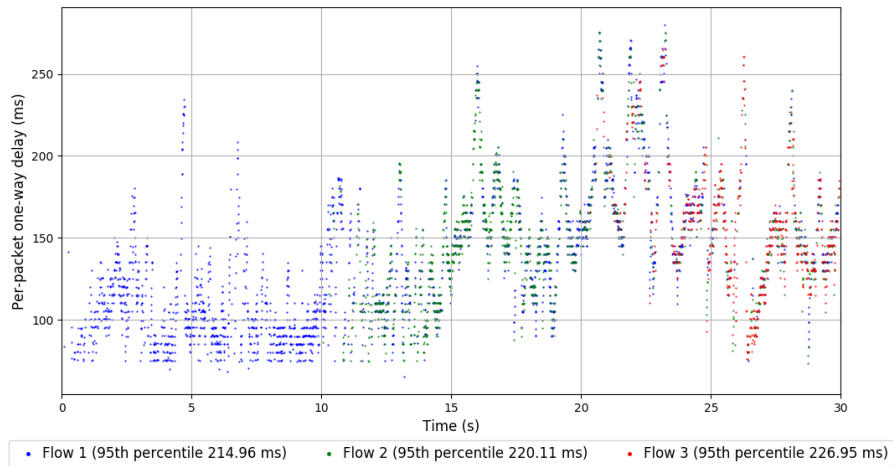
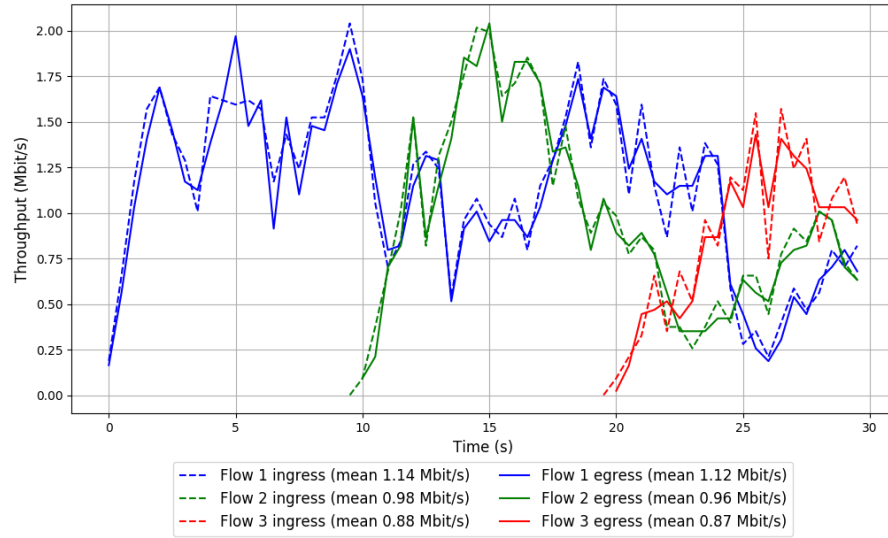


Run 1: Statistics of LEDBAT

Start at: 2018-01-25 18:27:01
End at: 2018-01-25 18:27:31
Local clock offset: 3.683 ms
Remote clock offset: -17.211 ms

Below is generated by plot.py at 2018-01-25 20:12:21
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 220.071 ms
Loss rate: 2.14%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 214.956 ms
Loss rate: 2.06%
-- Flow 2:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 220.109 ms
Loss rate: 1.86%
-- Flow 3:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 226.947 ms
Loss rate: 3.08%

Run 1: Report of LEDBAT — Data Link

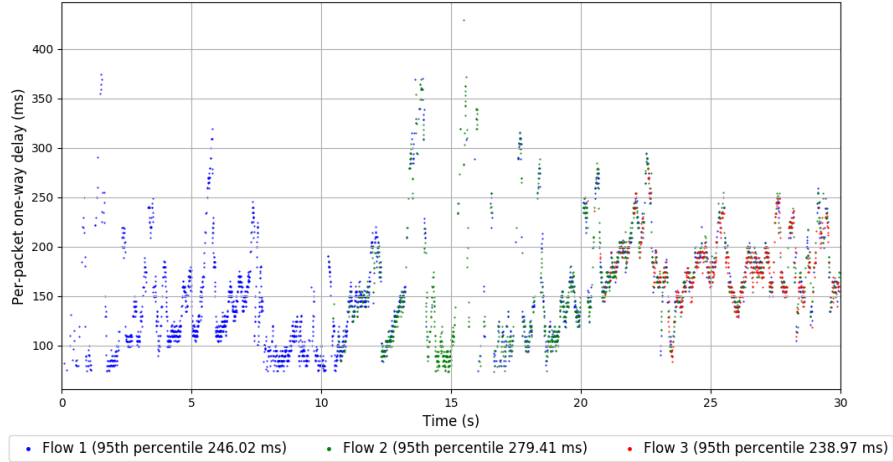
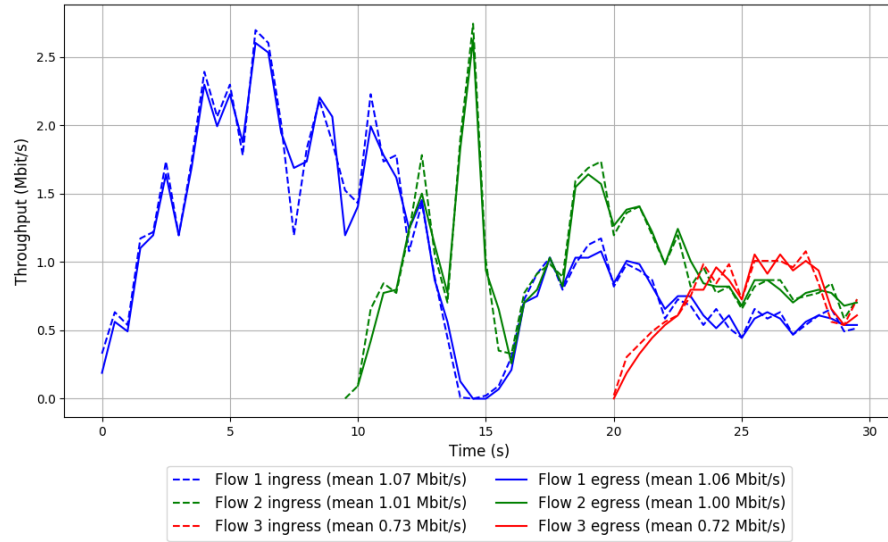


Run 2: Statistics of LEDBAT

Start at: 2018-01-25 18:44:36
End at: 2018-01-25 18:45:06
Local clock offset: 4.084 ms
Remote clock offset: -16.299 ms

Below is generated by plot.py at 2018-01-25 20:12:21
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 254.128 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 246.019 ms
Loss rate: 1.28%
-- Flow 2:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 279.414 ms
Loss rate: 1.45%
-- Flow 3:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 238.971 ms
Loss rate: 3.09%

Run 2: Report of LEDBAT — Data Link

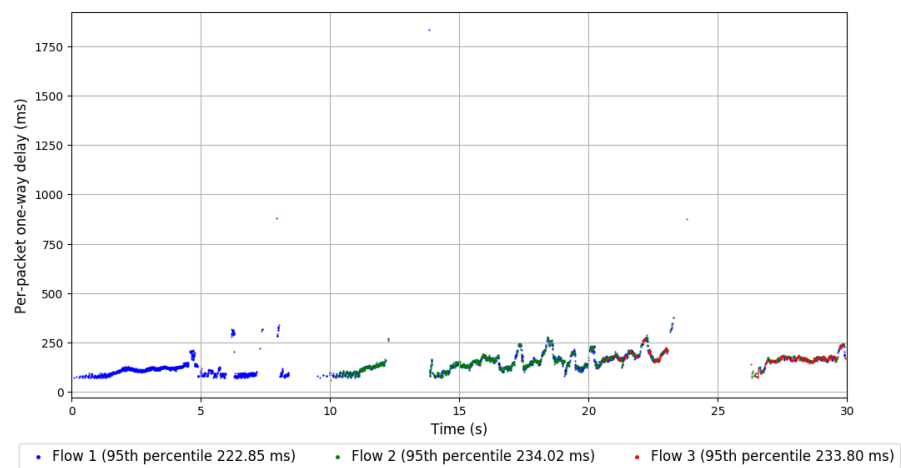
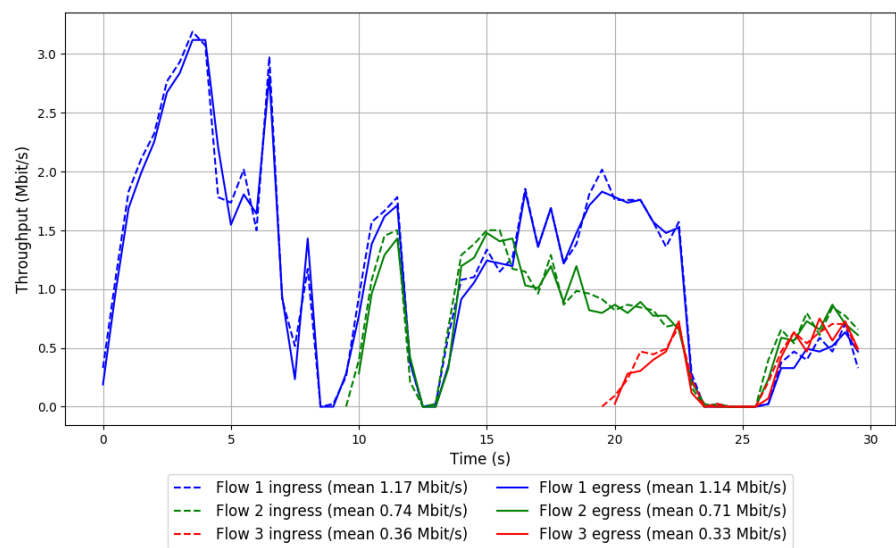


Run 3: Statistics of LEDBAT

Start at: 2018-01-25 19:02:12
End at: 2018-01-25 19:02:42
Local clock offset: 3.88 ms
Remote clock offset: -16.701 ms

Below is generated by plot.py at 2018-01-25 20:12:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.72 Mbit/s
95th percentile per-packet one-way delay: 228.683 ms
Loss rate: 3.65%
-- Flow 1:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 222.846 ms
Loss rate: 3.07%
-- Flow 2:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 234.023 ms
Loss rate: 3.89%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 233.801 ms
Loss rate: 8.33%

Run 3: Report of LEDBAT — Data Link

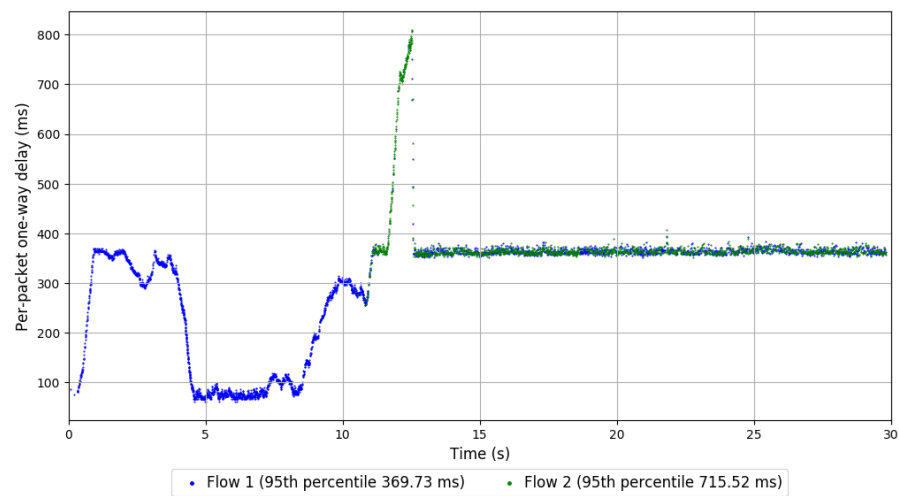
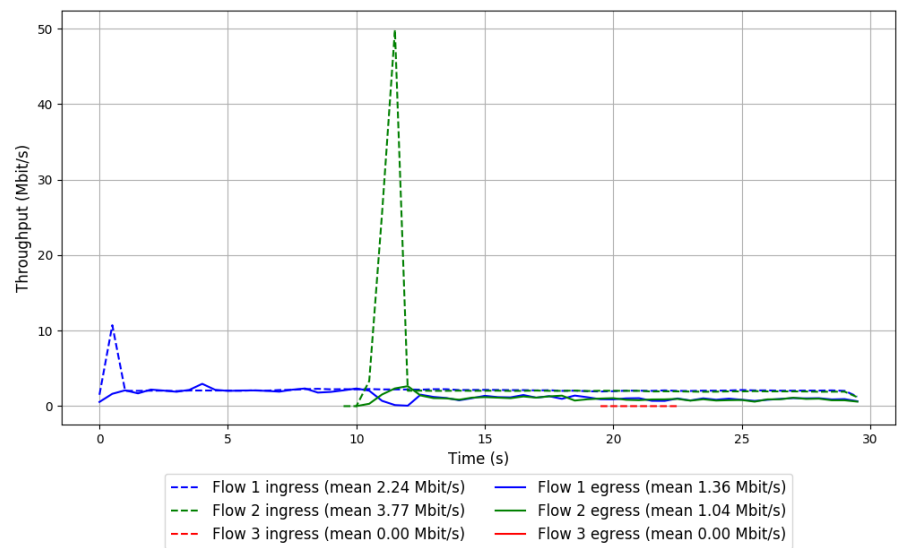


Run 1: Statistics of PCC

Start at: 2018-01-25 18:41:19
End at: 2018-01-25 18:41:49
Local clock offset: 0.879 ms
Remote clock offset: -14.406 ms

Below is generated by plot.py at 2018-01-25 20:12:29
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 375.406 ms
Loss rate: 57.07%
-- Flow 1:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 369.728 ms
Loss rate: 39.31%
-- Flow 2:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 715.519 ms
Loss rate: 72.89%
-- Flow 3:
Average throughput: 0.00 Mbit/s

Run 1: Report of PCC — Data Link

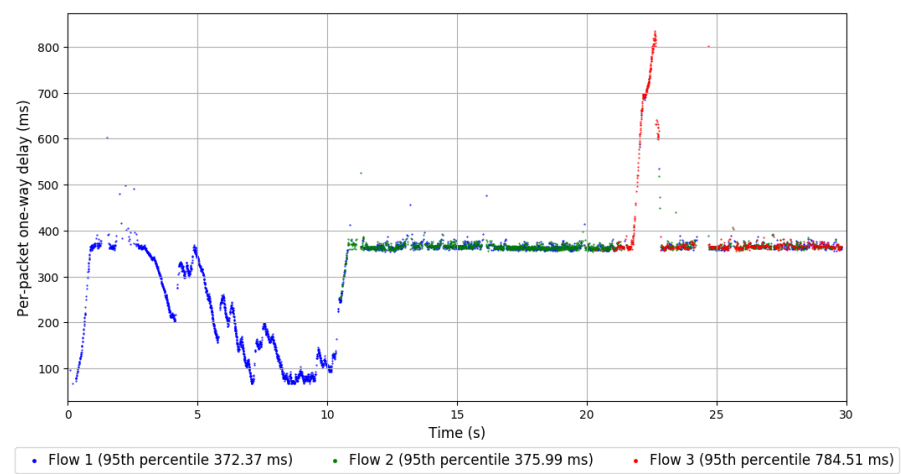
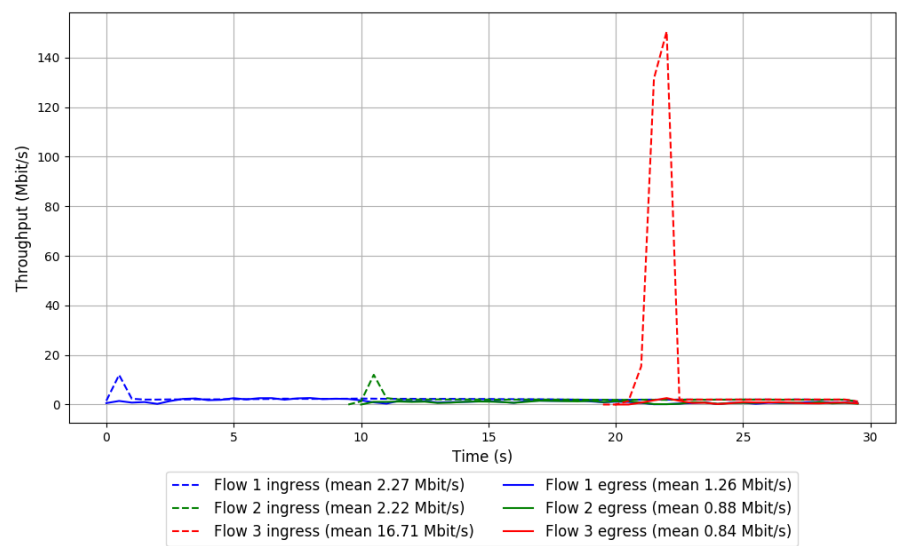


Run 2: Statistics of PCC

Start at: 2018-01-25 18:58:54
End at: 2018-01-25 18:59:24
Local clock offset: 2.623 ms
Remote clock offset: -16.57 ms

Below is generated by plot.py at 2018-01-25 20:12:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 380.695 ms
Loss rate: 77.26%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 372.367 ms
Loss rate: 44.72%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 375.988 ms
Loss rate: 60.50%
-- Flow 3:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 784.513 ms
Loss rate: 95.14%

Run 2: Report of PCC — Data Link

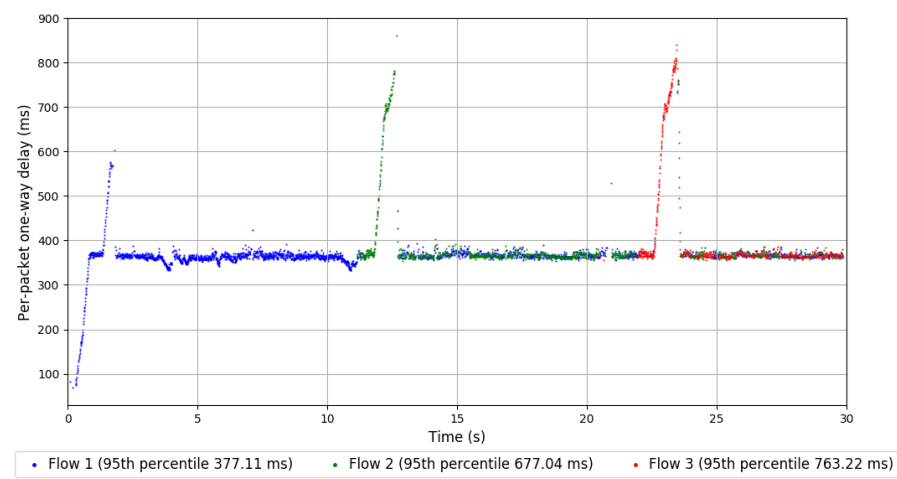
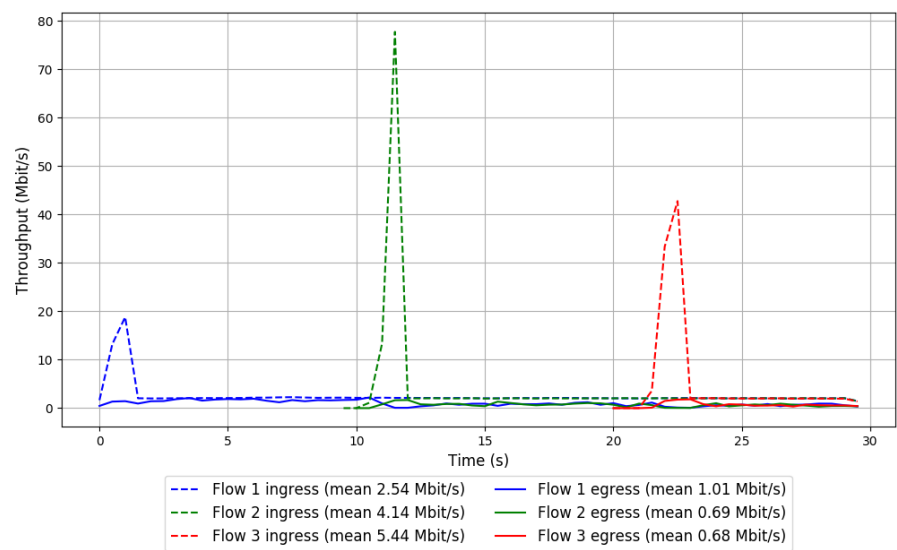


Run 3: Statistics of PCC

Start at: 2018-01-25 19:16:31
End at: 2018-01-25 19:17:01
Local clock offset: 0.909 ms
Remote clock offset: -17.042 ms

Below is generated by plot.py at 2018-01-25 20:12:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 548.631 ms
Loss rate: 76.46%
-- Flow 1:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 377.110 ms
Loss rate: 60.44%
-- Flow 2:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 677.038 ms
Loss rate: 83.69%
-- Flow 3:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 763.221 ms
Loss rate: 88.02%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

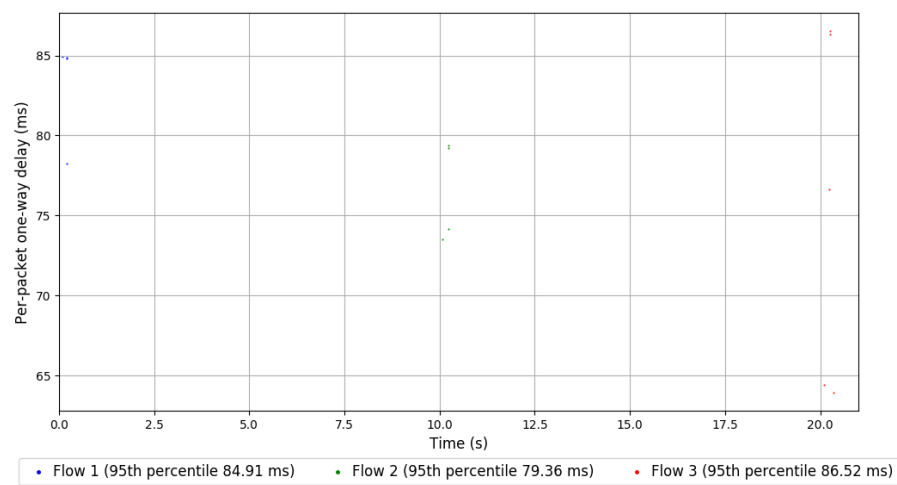
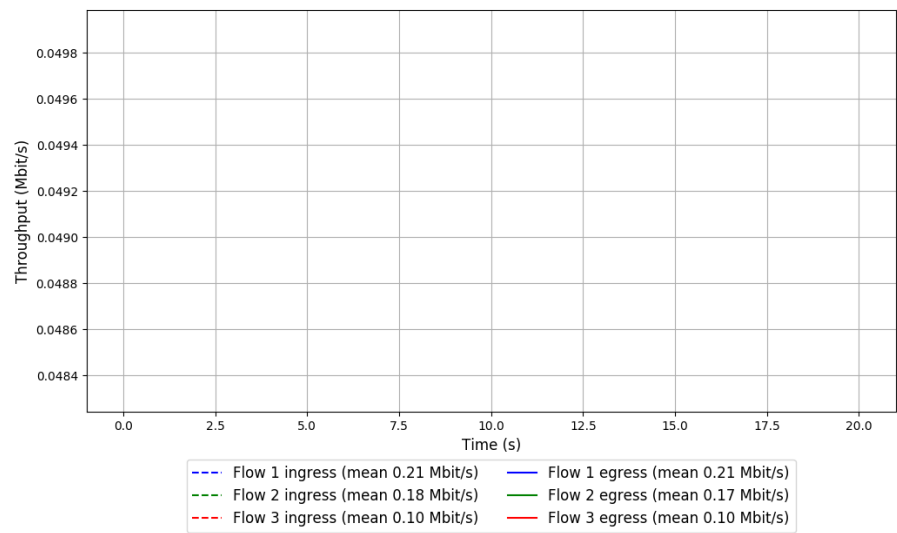
Start at: 2018-01-25 18:43:30

End at: 2018-01-25 18:44:00

Local clock offset: 3.649 ms

Remote clock offset: -16.159 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

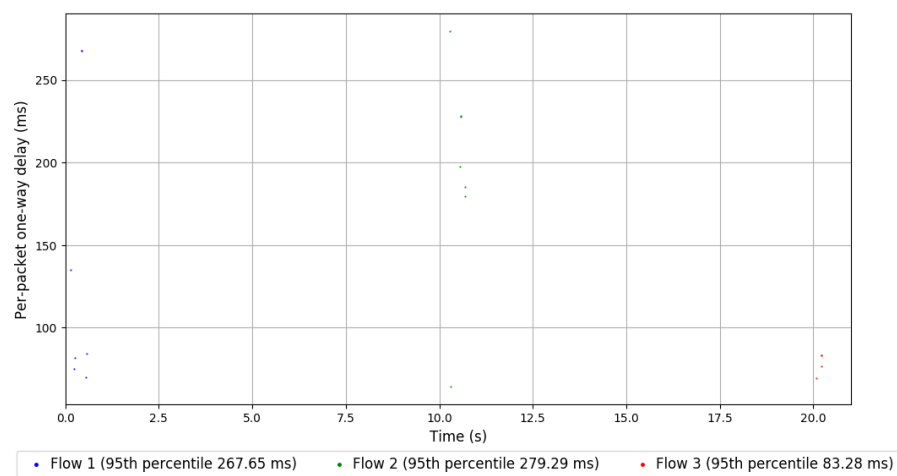
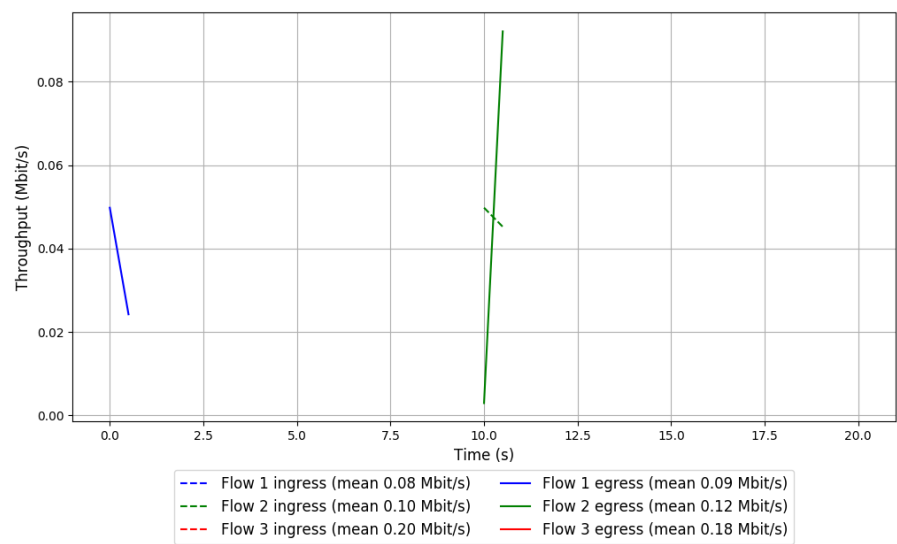
Start at: 2018-01-25 19:01:06

End at: 2018-01-25 19:01:36

Local clock offset: 3.832 ms

Remote clock offset: -18.228 ms

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

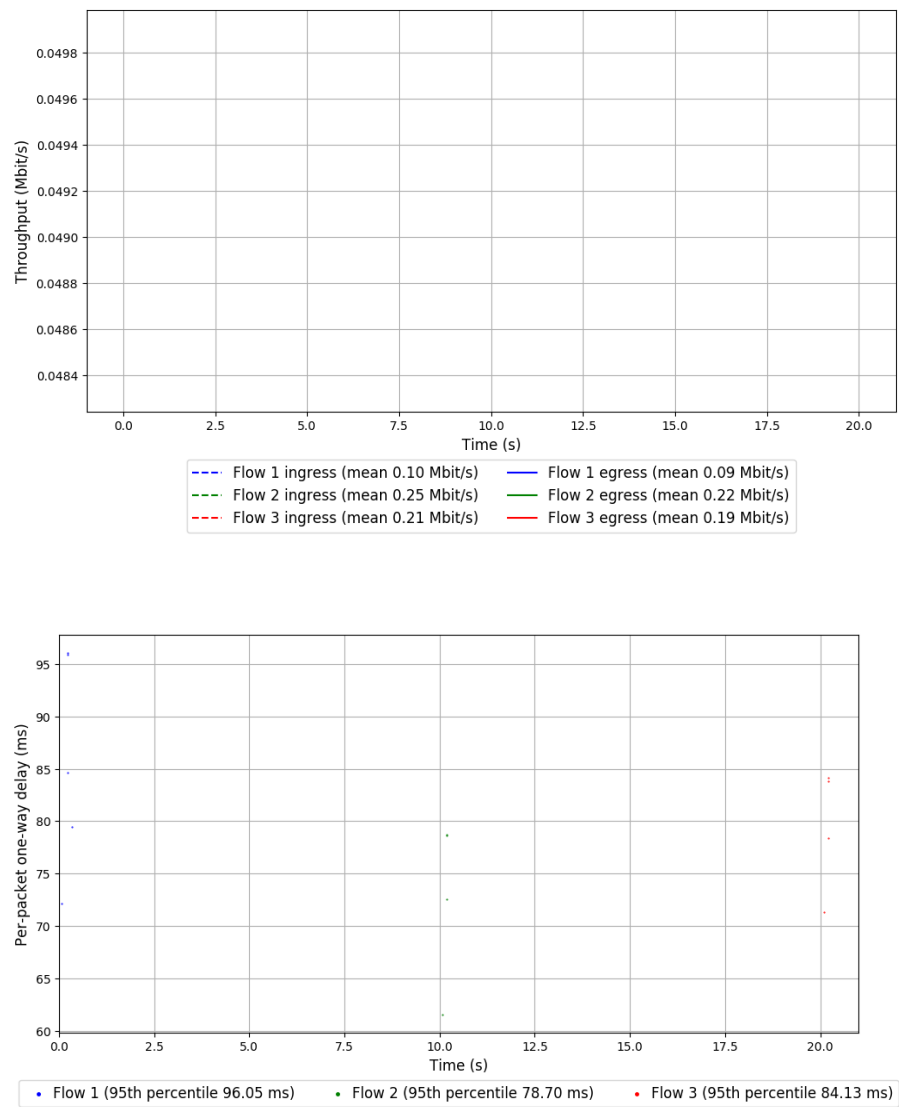
Start at: 2018-01-25 19:18:43

End at: 2018-01-25 19:19:13

Local clock offset: 2.161 ms

Remote clock offset: -16.458 ms

Run 3: Report of QUIC Cubic — Data Link

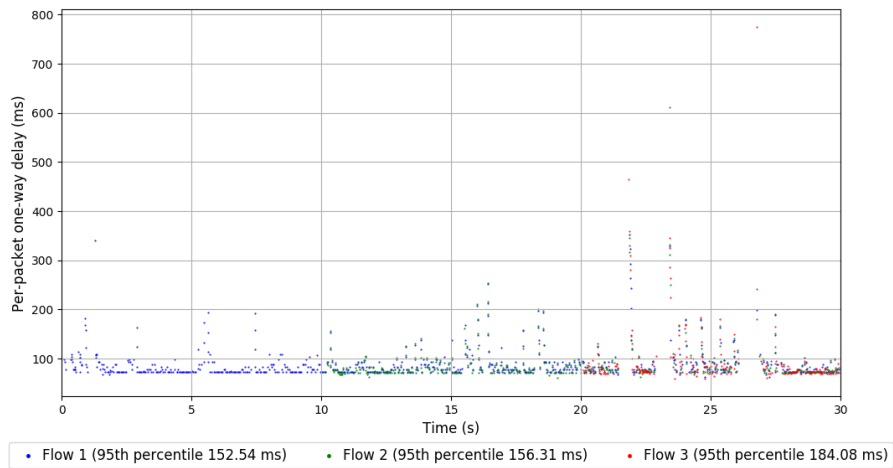
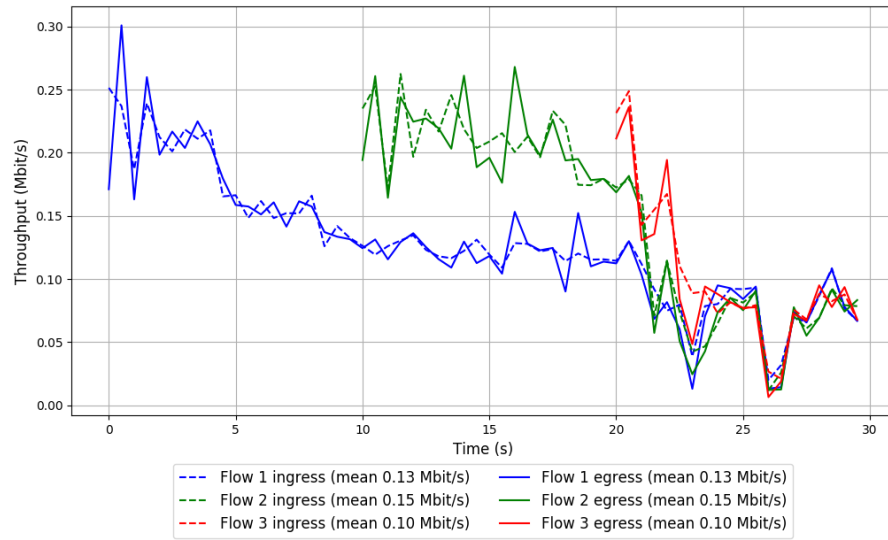


Run 1: Statistics of SCReAM

Start at: 2018-01-25 18:29:13
End at: 2018-01-25 18:29:43
Local clock offset: 2.063 ms
Remote clock offset: -17.207 ms

Below is generated by plot.py at 2018-01-25 20:12:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 160.521 ms
Loss rate: 2.15%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 152.545 ms
Loss rate: 1.42%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 156.309 ms
Loss rate: 2.09%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 184.081 ms
Loss rate: 5.07%

Run 1: Report of SReAM — Data Link

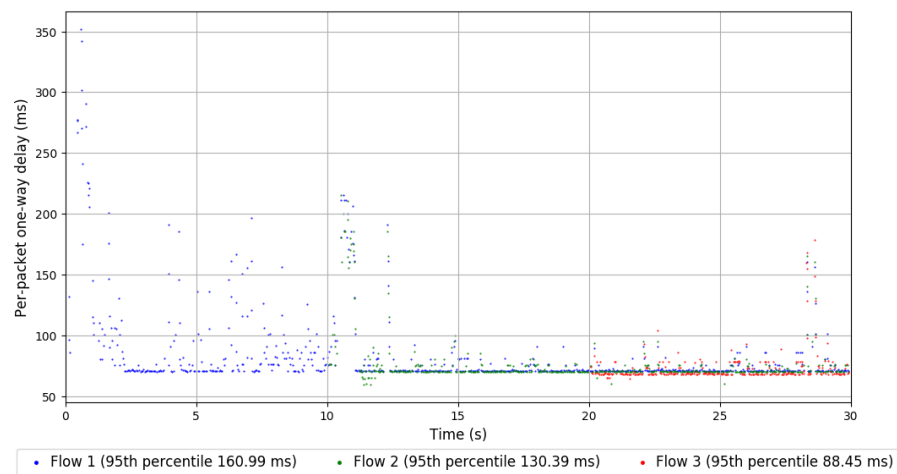
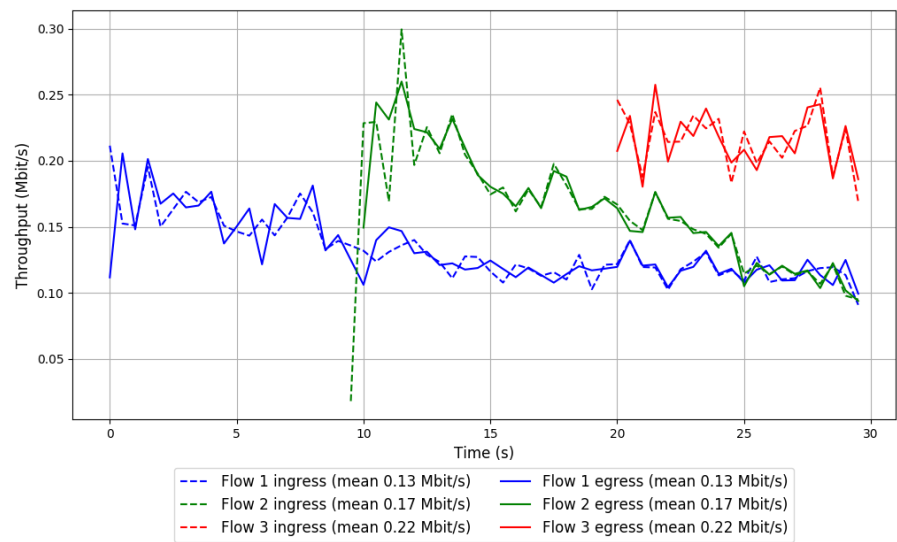


Run 2: Statistics of SReAM

Start at: 2018-01-25 18:46:49
End at: 2018-01-25 18:47:19
Local clock offset: 3.059 ms
Remote clock offset: -14.645 ms

Below is generated by plot.py at 2018-01-25 20:12:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 145.883 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 160.990 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 130.390 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 88.454 ms
Loss rate: 0.36%

Run 2: Report of SReAM — Data Link

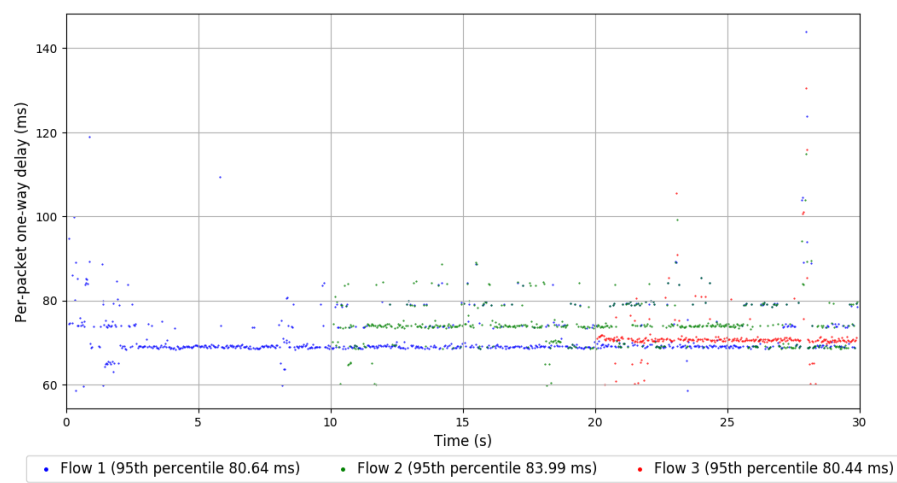
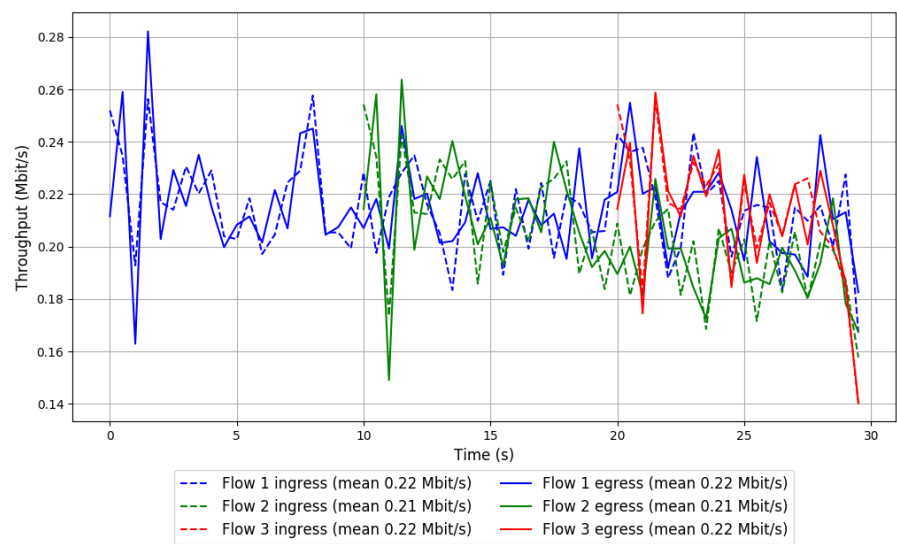


Run 3: Statistics of SReAM

Start at: 2018-01-25 19:04:23
End at: 2018-01-25 19:04:53
Local clock offset: 1.915 ms
Remote clock offset: -16.53 ms

Below is generated by plot.py at 2018-01-25 20:12:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 83.652 ms
Loss rate: 0.24%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 80.639 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 83.988 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 80.444 ms
Loss rate: 0.63%

Run 3: Report of SReAM — Data Link

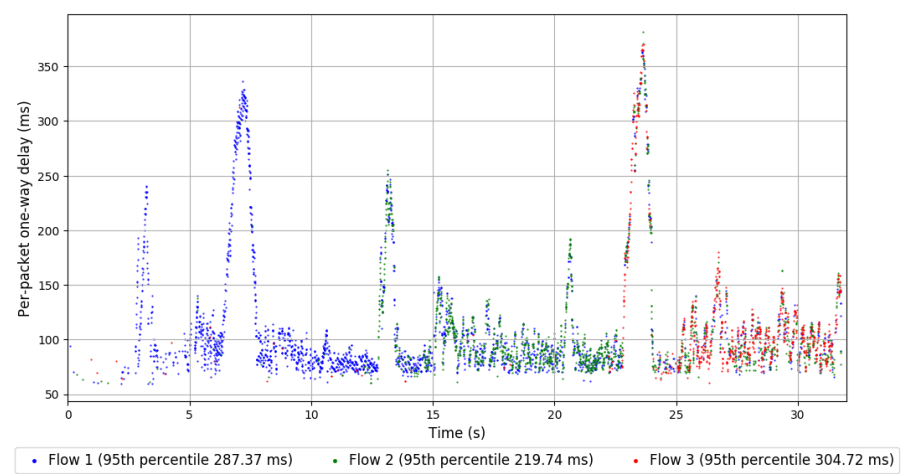
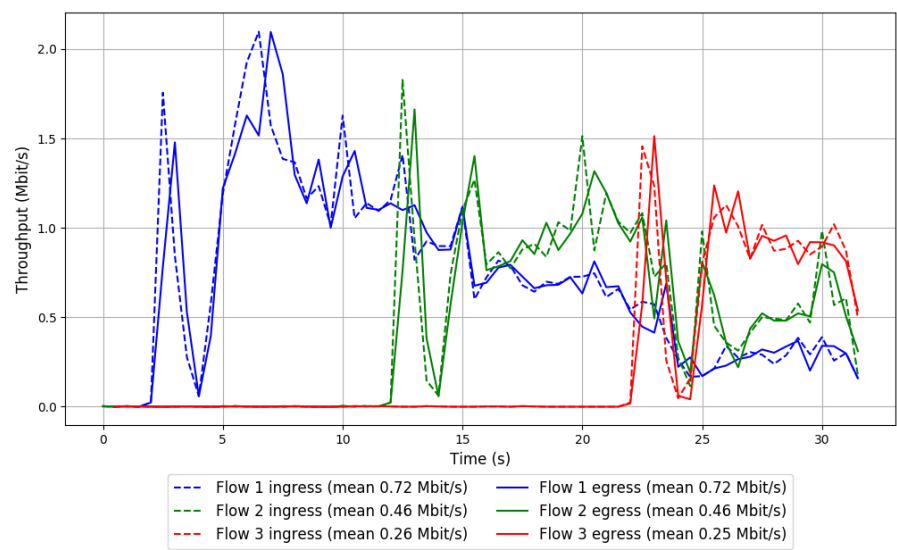


Run 1: Statistics of WebRTC media

Start at: 2018-01-25 18:40:13
End at: 2018-01-25 18:40:43
Local clock offset: 2.131 ms
Remote clock offset: -16.679 ms

Below is generated by plot.py at 2018-01-25 20:12:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 278.799 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 287.371 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 219.739 ms
Loss rate: 0.75%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 304.722 ms
Loss rate: 2.36%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-01-25 18:57:48

End at: 2018-01-25 18:58:18

Local clock offset: 3.523 ms

Remote clock offset: -18.3 ms

Below is generated by plot.py at 2018-01-25 20:12:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.92 Mbit/s

95th percentile per-packet one-way delay: 191.036 ms

Loss rate: 1.96%

-- Flow 1:

Average throughput: 0.34 Mbit/s

95th percentile per-packet one-way delay: 285.302 ms

Loss rate: 3.08%

-- Flow 2:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 171.932 ms

Loss rate: 0.64%

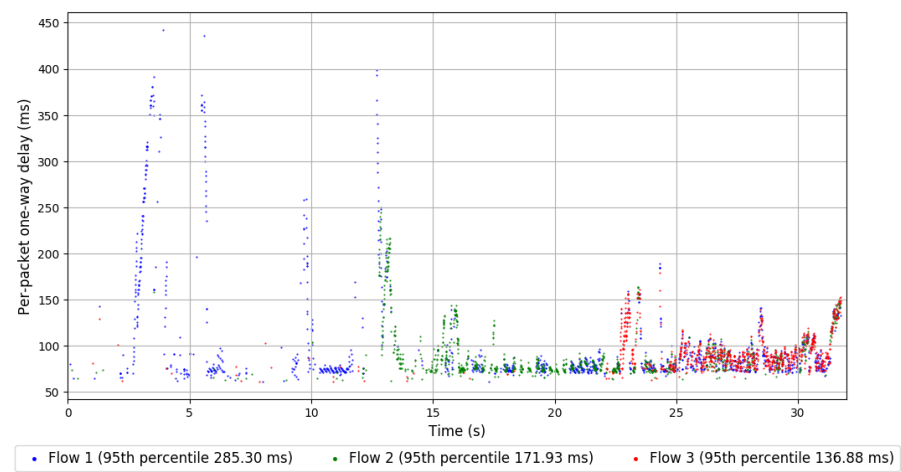
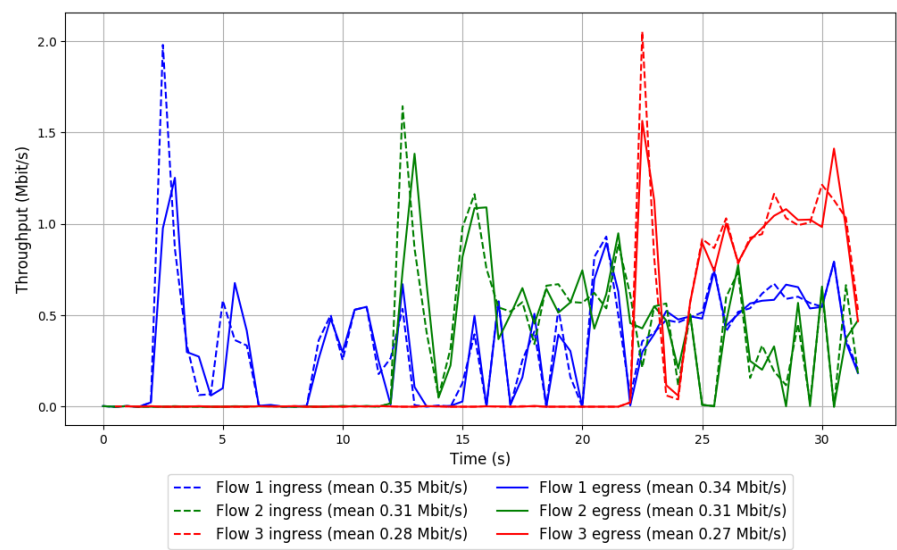
-- Flow 3:

Average throughput: 0.27 Mbit/s

95th percentile per-packet one-way delay: 136.881 ms

Loss rate: 1.97%

Run 2: Report of WebRTC media — Data Link

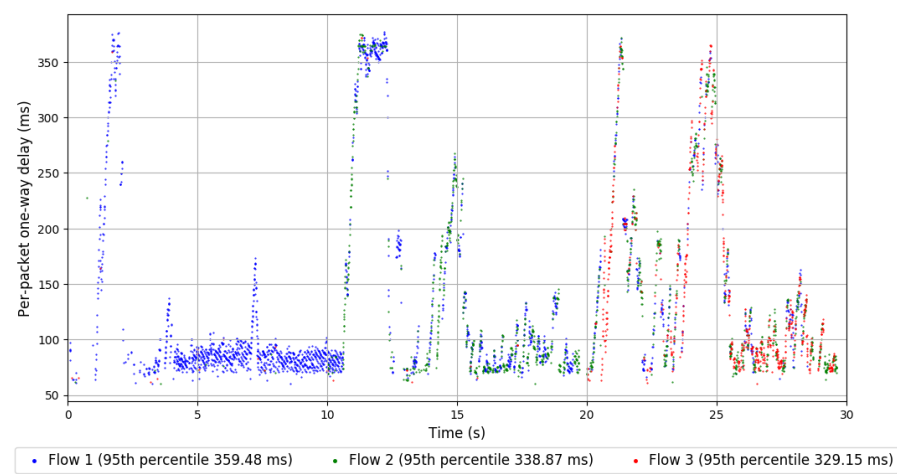
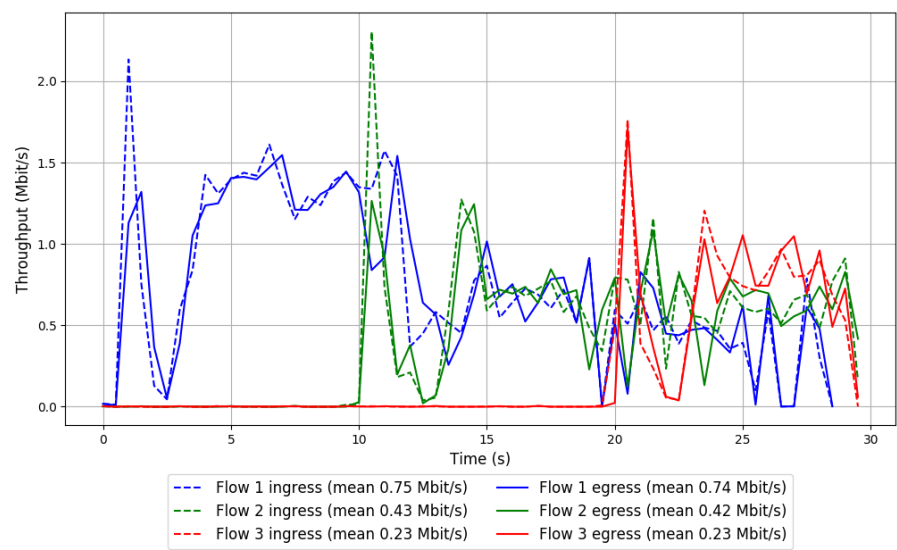


Run 3: Statistics of WebRTC media

Start at: 2018-01-25 19:15:26
End at: 2018-01-25 19:15:56
Local clock offset: 3.208 ms
Remote clock offset: -16.531 ms

Below is generated by plot.py at 2018-01-25 20:12:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 354.157 ms
Loss rate: 1.81%
-- Flow 1:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 359.476 ms
Loss rate: 1.59%
-- Flow 2:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 338.871 ms
Loss rate: 2.85%
-- Flow 3:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 329.148 ms
Loss rate: 0.54%

Run 3: Report of WebRTC media — Data Link

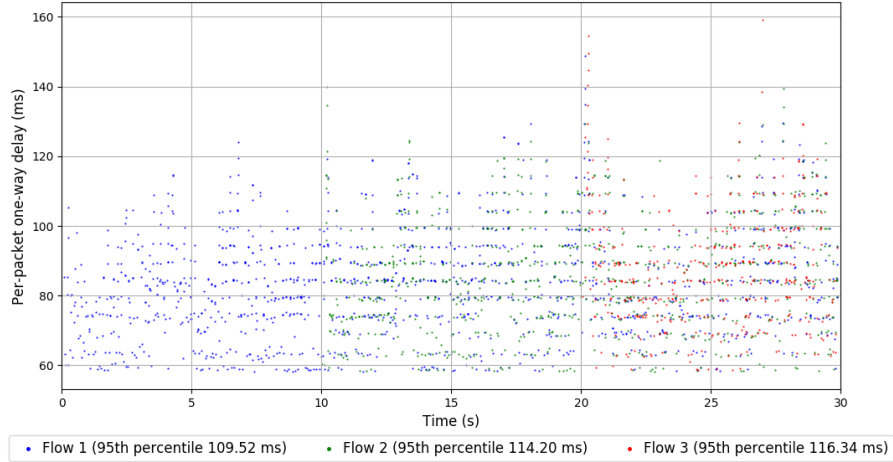
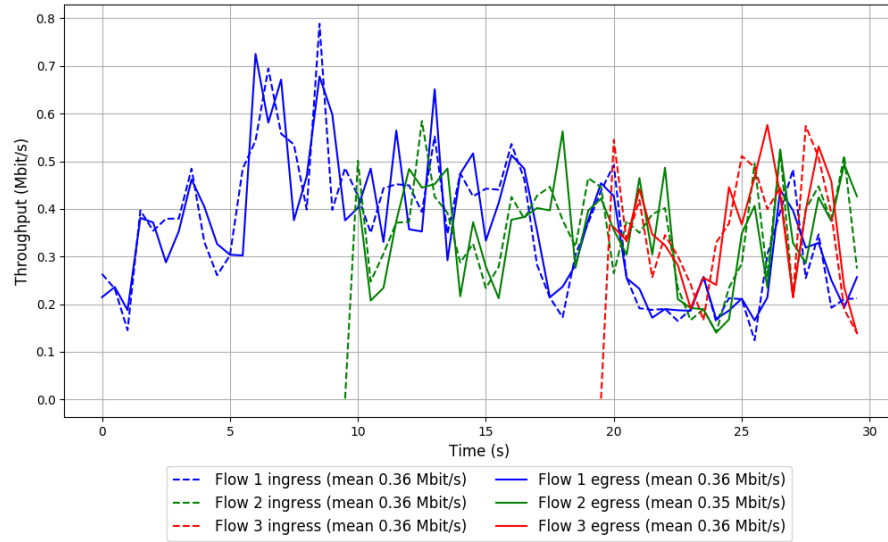


Run 1: Statistics of Sprout

Start at: 2018-01-25 18:38:01
End at: 2018-01-25 18:38:31
Local clock offset: 2.457 ms
Remote clock offset: -15.572 ms

Below is generated by plot.py at 2018-01-25 20:12:35
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 113.841 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 109.519 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 114.200 ms
Loss rate: 0.52%
-- Flow 3:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 116.342 ms
Loss rate: 1.77%

Run 1: Report of Sprout — Data Link

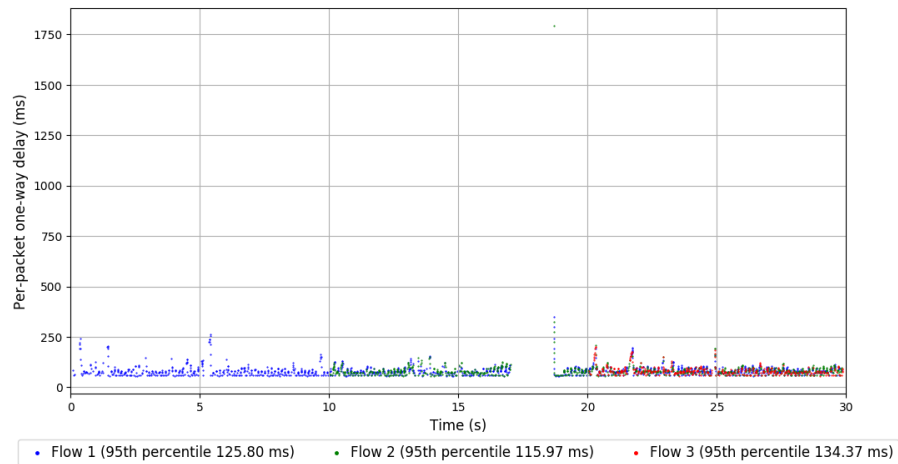
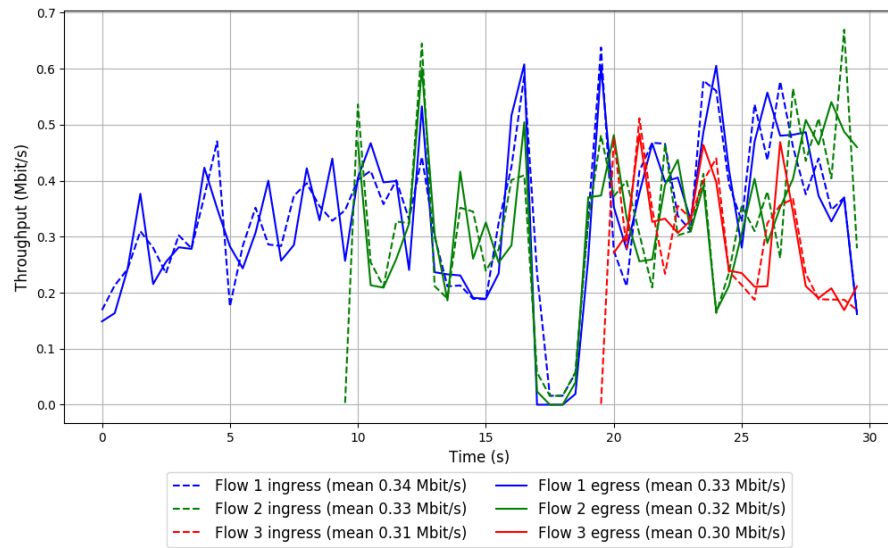


Run 2: Statistics of Sprout

Start at: 2018-01-25 18:55:36
End at: 2018-01-25 18:56:06
Local clock offset: 2.369 ms
Remote clock offset: -14.823 ms

```
# Below is generated by plot.py at 2018-01-25 20:12:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 121.163 ms
Loss rate: 1.61%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 125.798 ms
Loss rate: 1.77%
-- Flow 2:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 115.965 ms
Loss rate: 1.22%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 134.368 ms
Loss rate: 1.94%
```


Run 2: Report of Sprout — Data Link

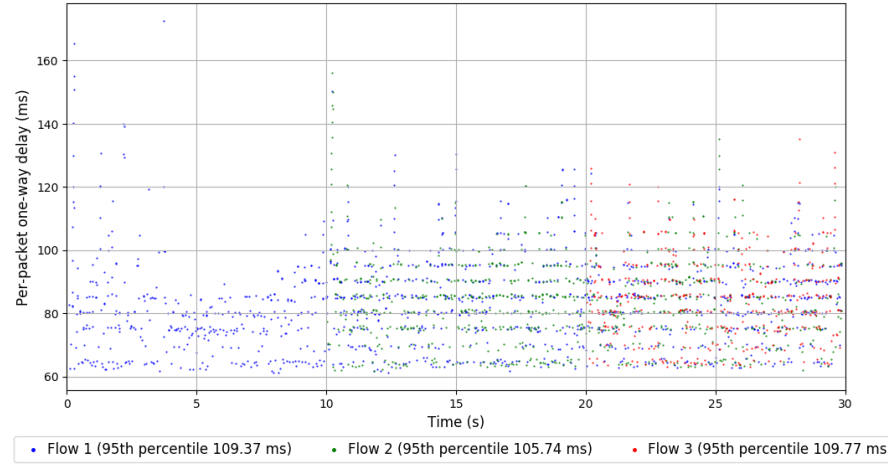
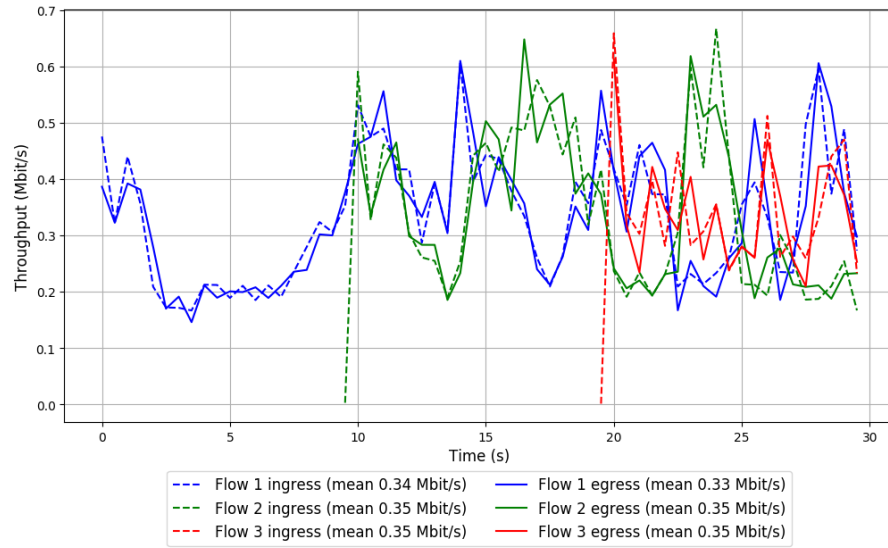


Run 3: Statistics of Sprout

Start at: 2018-01-25 19:13:14
End at: 2018-01-25 19:13:44
Local clock offset: 3.487 ms
Remote clock offset: -17.432 ms

```
# Below is generated by plot.py at 2018-01-25 20:12:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 107.863 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 109.366 ms
Loss rate: 0.66%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 105.740 ms
Loss rate: 0.62%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 109.765 ms
Loss rate: 2.04%
```

Run 3: Report of Sprout — Data Link

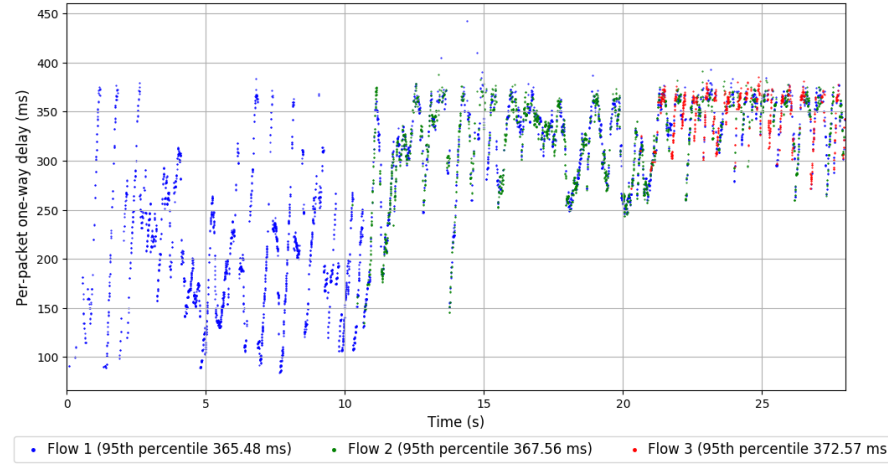
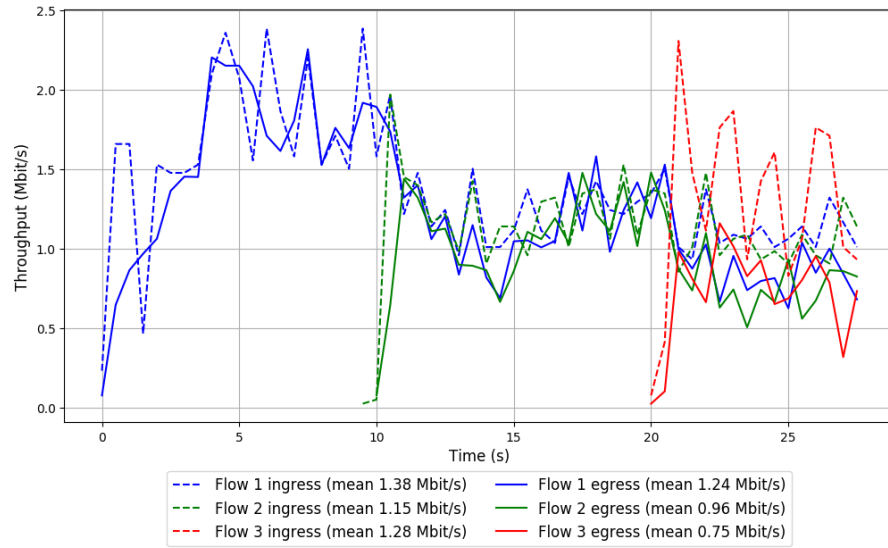


Run 1: Statistics of TaoVA-100x

Start at: 2018-01-25 18:28:07
End at: 2018-01-25 18:28:37
Local clock offset: 3.711 ms
Remote clock offset: -16.468 ms

Below is generated by plot.py at 2018-01-25 20:12:40
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.06 Mbit/s
95th percentile per-packet one-way delay: 367.347 ms
Loss rate: 17.23%
-- Flow 1:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 365.479 ms
Loss rate: 10.05%
-- Flow 2:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 367.557 ms
Loss rate: 17.69%
-- Flow 3:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 372.571 ms
Loss rate: 43.56%

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

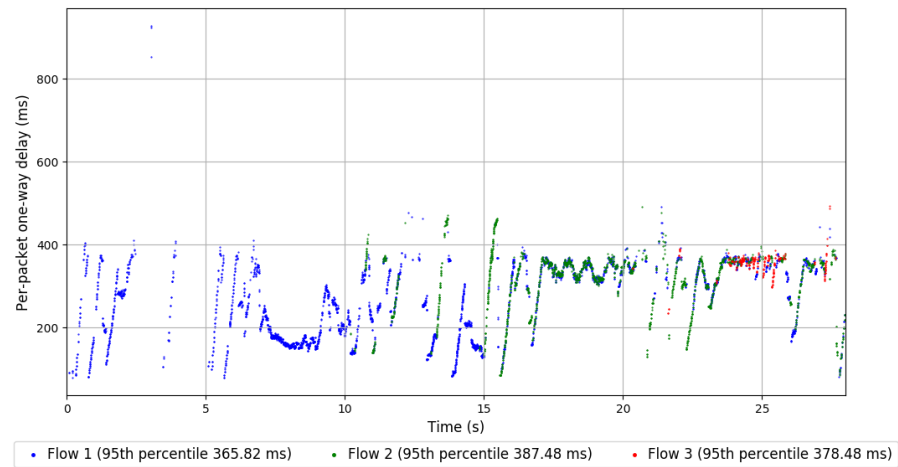
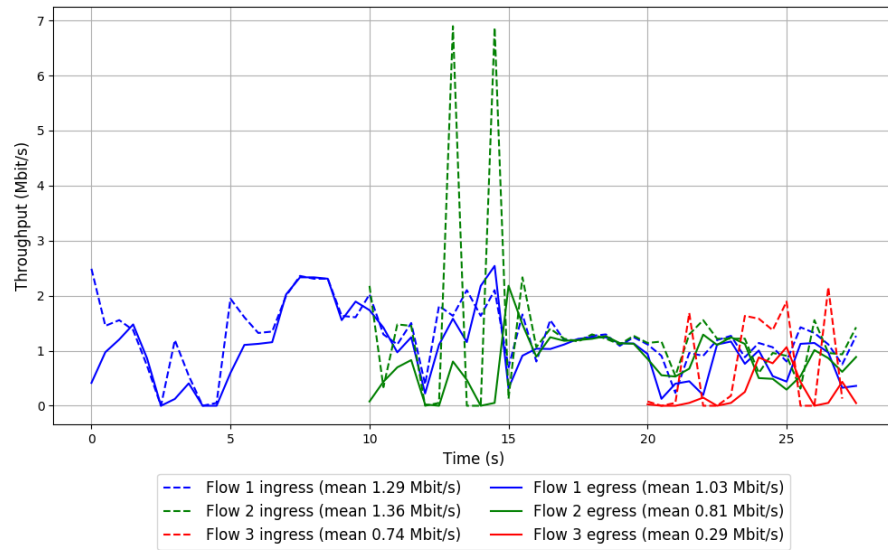


Run 2: Statistics of TaoVA-100x

Start at: 2018-01-25 18:45:42
End at: 2018-01-25 18:46:12
Local clock offset: 4.656 ms
Remote clock offset: -15.616 ms

Below is generated by plot.py at 2018-01-25 20:12:41
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.62 Mbit/s
95th percentile per-packet one-way delay: 370.416 ms
Loss rate: 30.88%
-- Flow 1:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 365.825 ms
Loss rate: 19.94%
-- Flow 2:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 387.483 ms
Loss rate: 40.43%
-- Flow 3:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 378.475 ms
Loss rate: 60.86%

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



Run 3: Statistics of TaoVA-100x

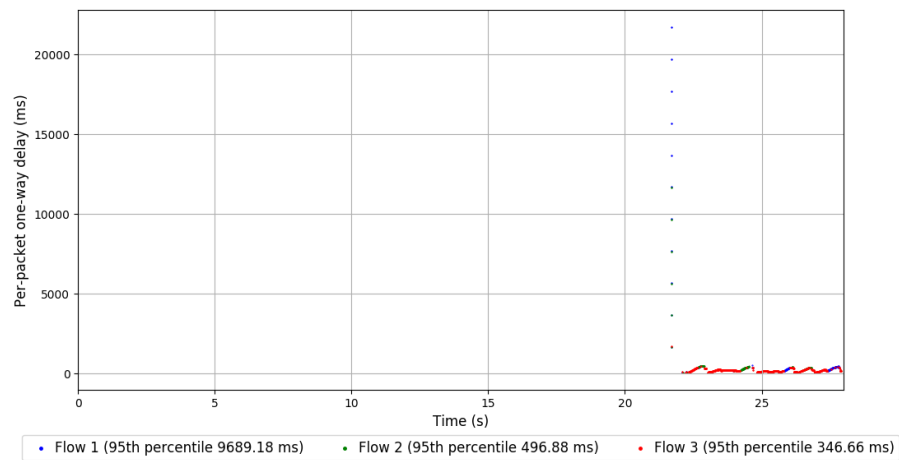
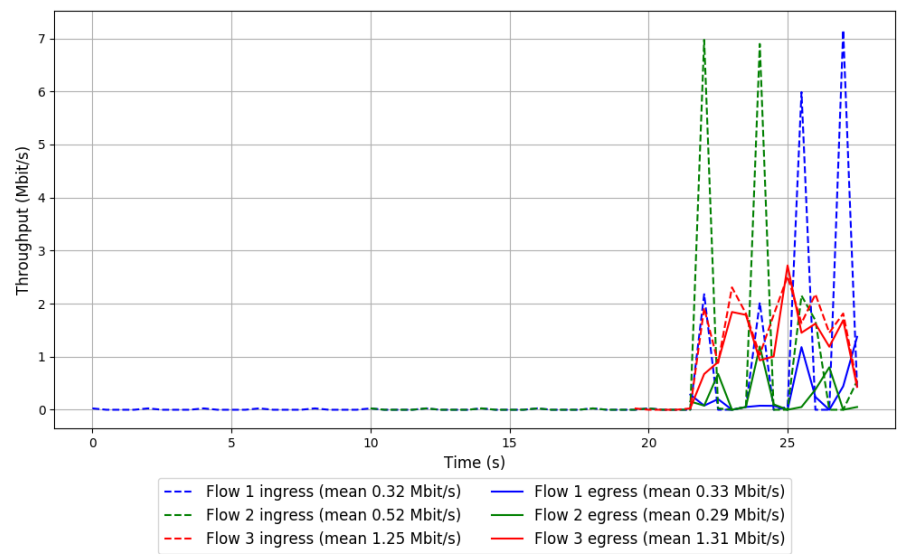
Start at: 2018-01-25 19:03:18

End at: 2018-01-25 19:03:48

Local clock offset: 4.011 ms

Remote clock offset: -18.009 ms

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

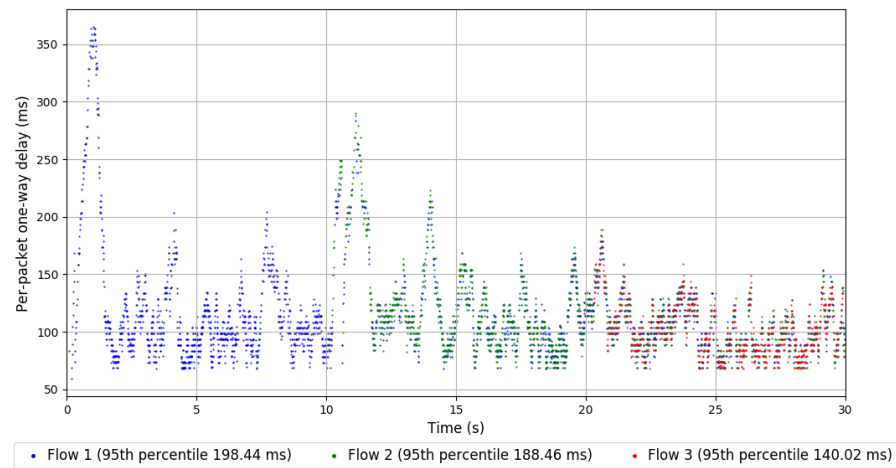
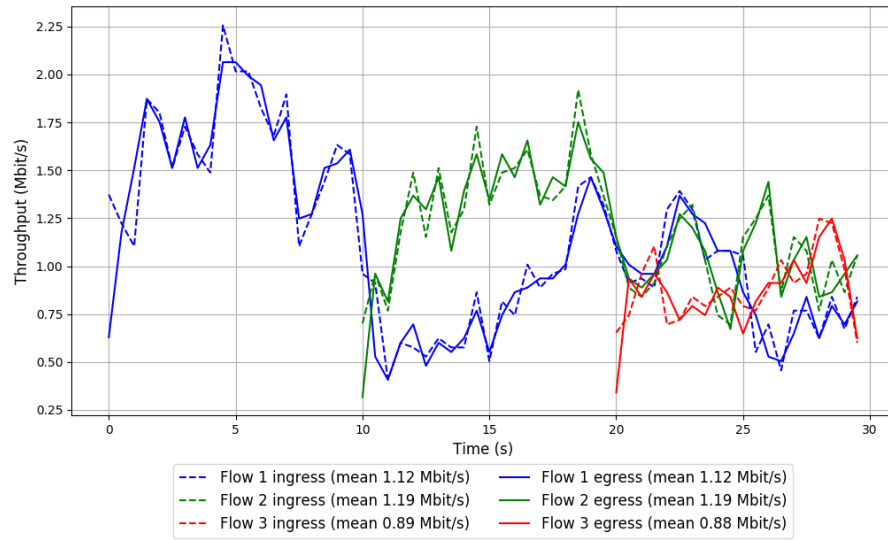


Run 1: Statistics of TCP Vegas

Start at: 2018-01-25 18:36:55
End at: 2018-01-25 18:37:25
Local clock offset: 0.672 ms
Remote clock offset: -15.65 ms

Below is generated by plot.py at 2018-01-25 20:12:41
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 182.996 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 198.443 ms
Loss rate: 0.96%
-- Flow 2:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 188.464 ms
Loss rate: 0.61%
-- Flow 3:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 140.017 ms
Loss rate: 2.45%

Run 1: Report of TCP Vegas — Data Link

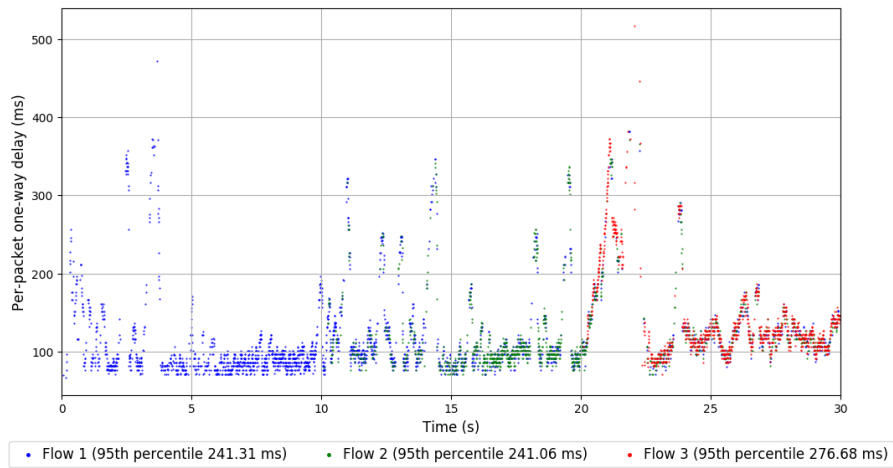
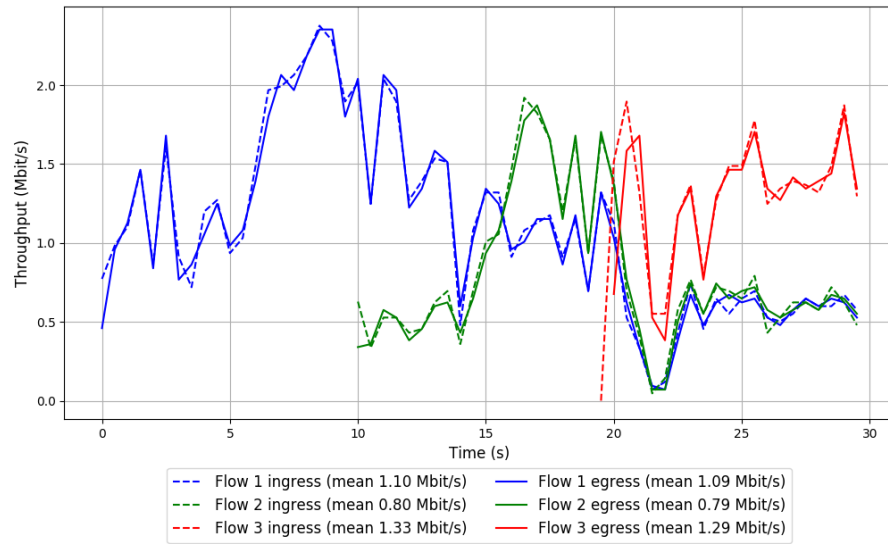


Run 2: Statistics of TCP Vegas

Start at: 2018-01-25 18:54:30
End at: 2018-01-25 18:55:00
Local clock offset: 2.609 ms
Remote clock offset: -18.816 ms

Below is generated by plot.py at 2018-01-25 20:12:41
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 251.669 ms
Loss rate: 1.90%
-- Flow 1:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 241.305 ms
Loss rate: 1.17%
-- Flow 2:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 241.065 ms
Loss rate: 1.59%
-- Flow 3:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 276.679 ms
Loss rate: 4.07%

Run 2: Report of TCP Vegas — Data Link

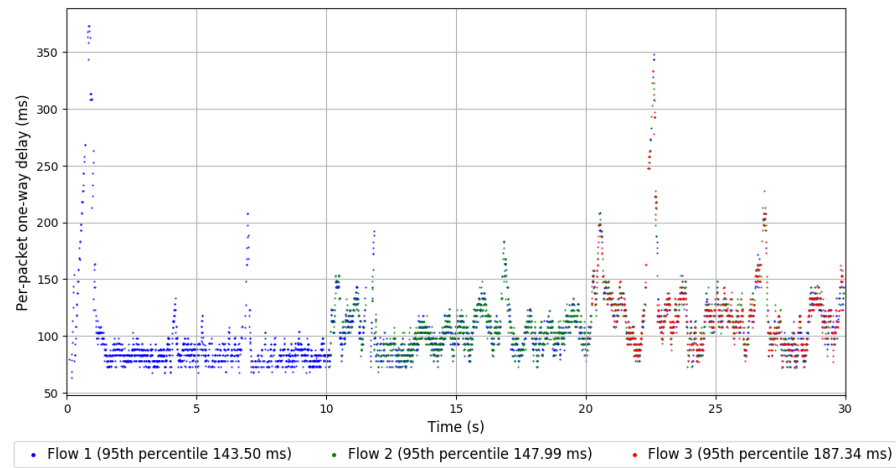
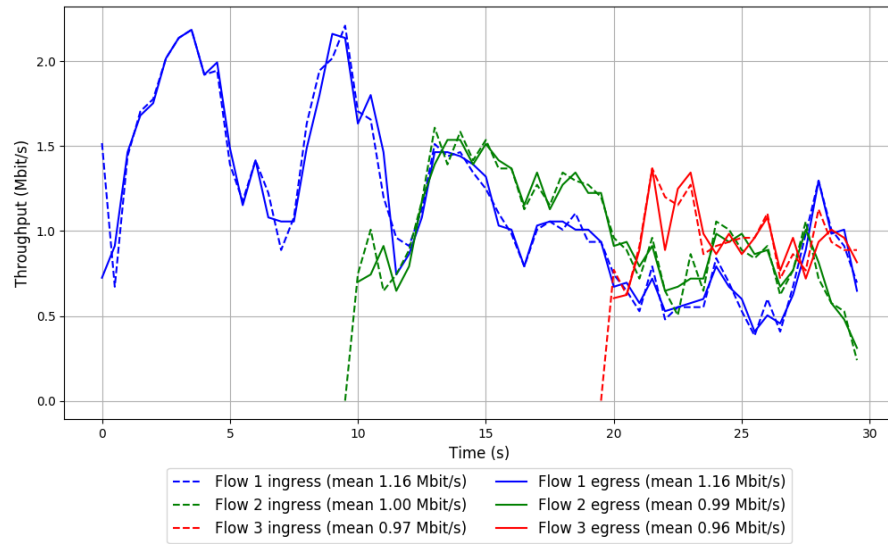


Run 3: Statistics of TCP Vegas

Start at: 2018-01-25 19:12:07
End at: 2018-01-25 19:12:37
Local clock offset: 0.949 ms
Remote clock offset: -16.648 ms

Below is generated by plot.py at 2018-01-25 20:12:41
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 152.782 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 143.502 ms
Loss rate: 0.93%
-- Flow 2:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 147.990 ms
Loss rate: 0.36%
-- Flow 3:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 187.337 ms
Loss rate: 1.87%

Run 3: Report of TCP Vegas — Data Link

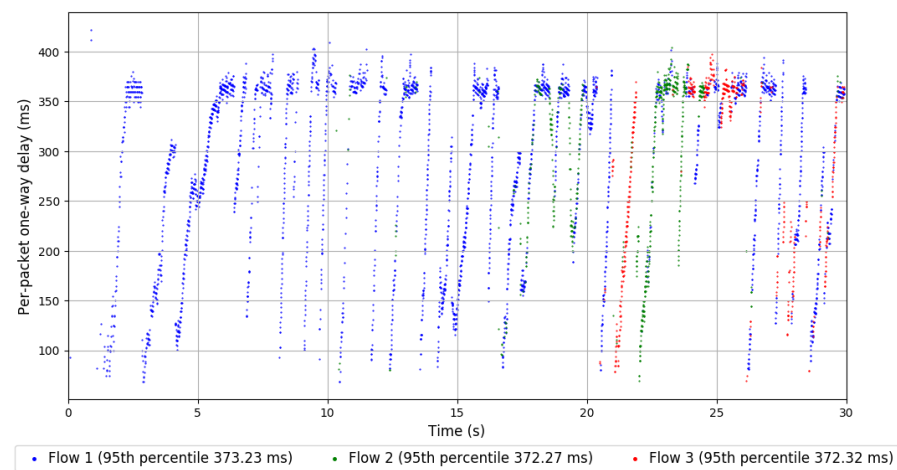
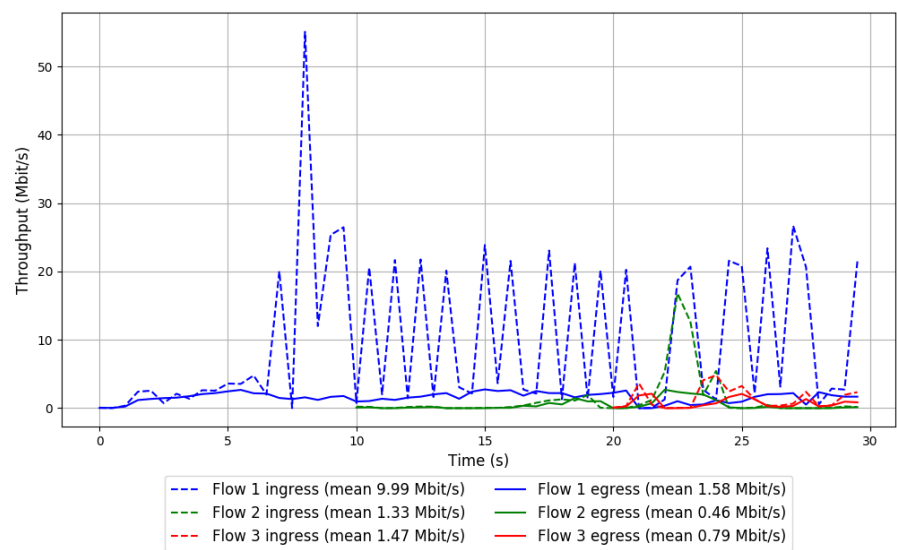


Run 1: Statistics of Verus

Start at: 2018-01-25 18:35:49
End at: 2018-01-25 18:36:19
Local clock offset: 2.92 ms
Remote clock offset: -14.498 ms

Below is generated by plot.py at 2018-01-25 20:12:48
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 373.019 ms
Loss rate: 81.22%
-- Flow 1:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 373.228 ms
Loss rate: 84.17%
-- Flow 2:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 372.271 ms
Loss rate: 66.04%
-- Flow 3:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 372.320 ms
Loss rate: 48.42%

Run 1: Report of Verus — Data Link

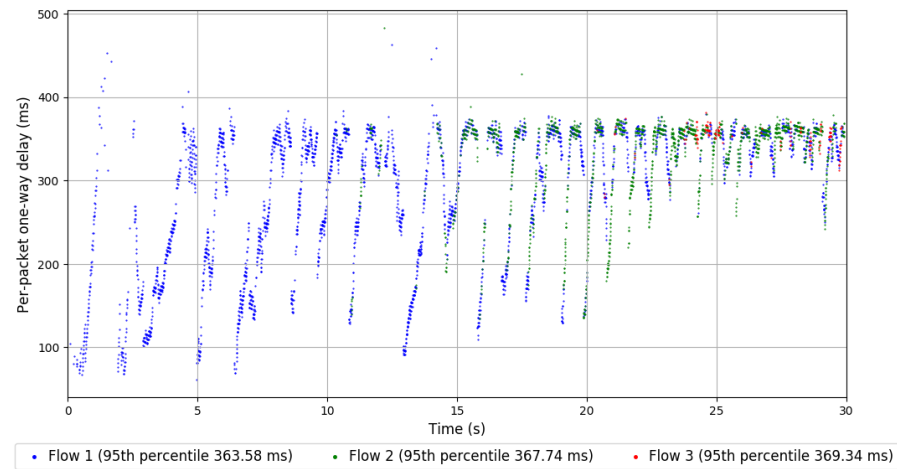
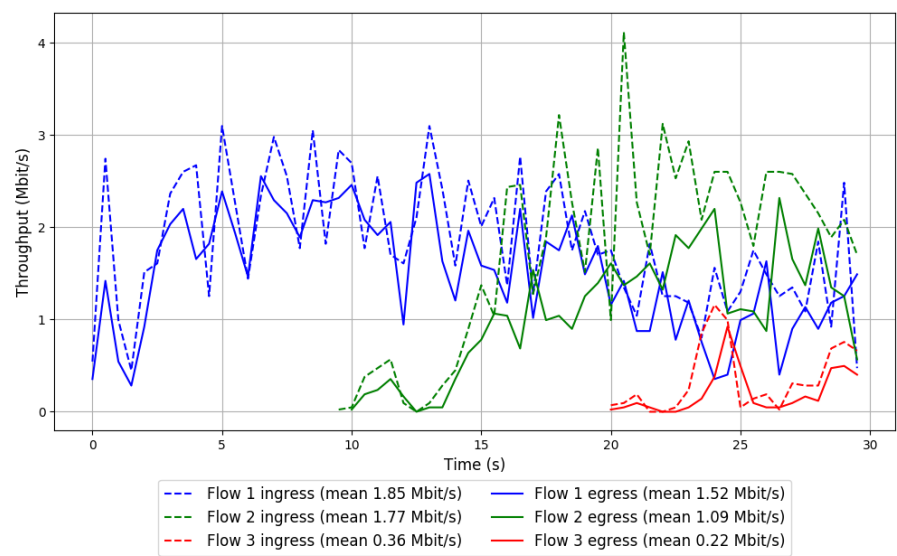


Run 2: Statistics of Verus

Start at: 2018-01-25 18:53:24
End at: 2018-01-25 18:53:54
Local clock offset: 1.104 ms
Remote clock offset: -15.649 ms

Below is generated by plot.py at 2018-01-25 20:12:48
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 365.562 ms
Loss rate: 26.88%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 363.584 ms
Loss rate: 17.81%
-- Flow 2:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 367.740 ms
Loss rate: 39.64%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 369.339 ms
Loss rate: 41.08%

Run 2: Report of Verus — Data Link

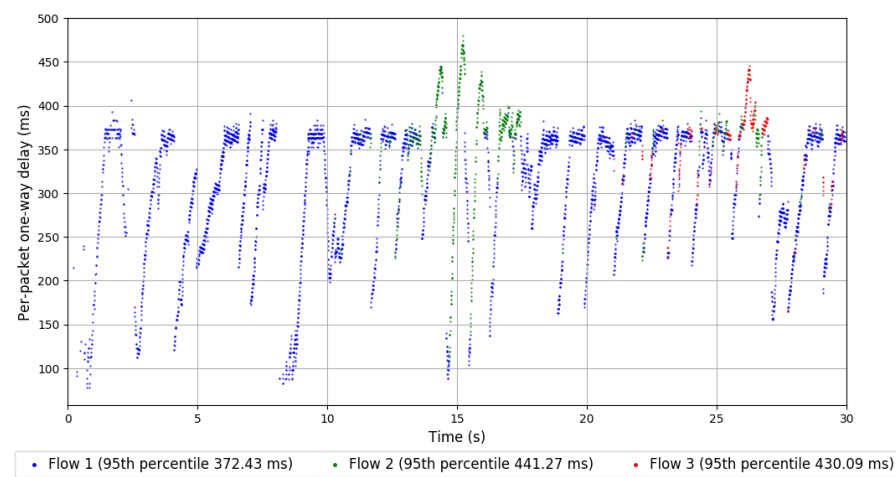
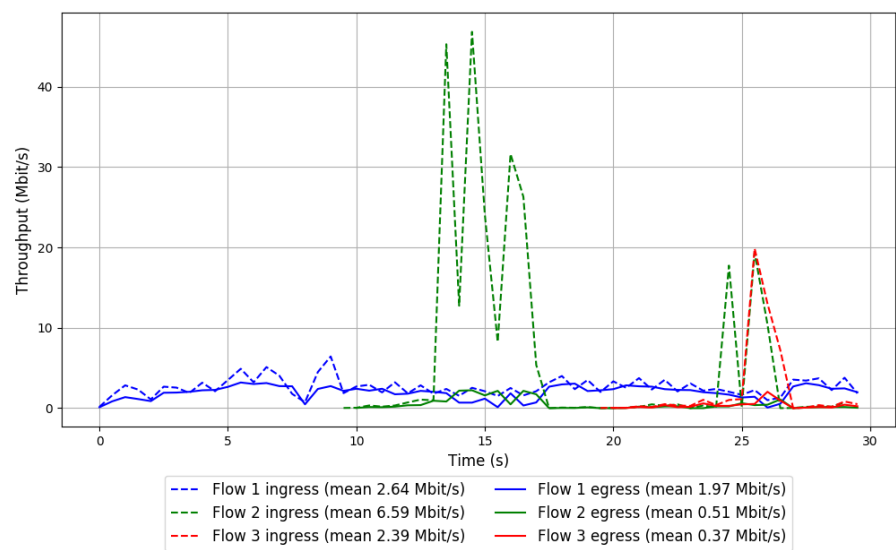


Run 3: Statistics of Verus

Start at: 2018-01-25 19:11:01
End at: 2018-01-25 19:11:31
Local clock offset: 4.453 ms
Remote clock offset: -17.839 ms

Below is generated by plot.py at 2018-01-25 20:12:48
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 386.445 ms
Loss rate: 68.71%
-- Flow 1:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 372.426 ms
Loss rate: 25.52%
-- Flow 2:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 441.269 ms
Loss rate: 92.23%
-- Flow 3:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 430.089 ms
Loss rate: 85.17%

Run 3: Report of Verus — Data Link

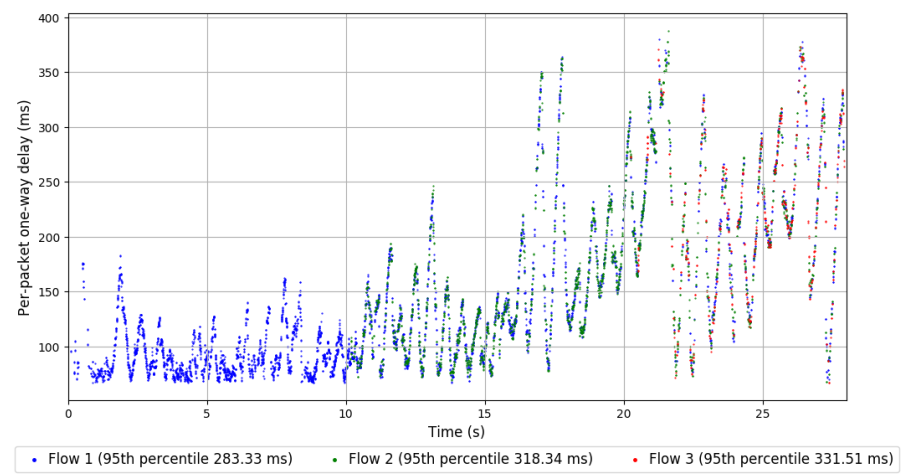
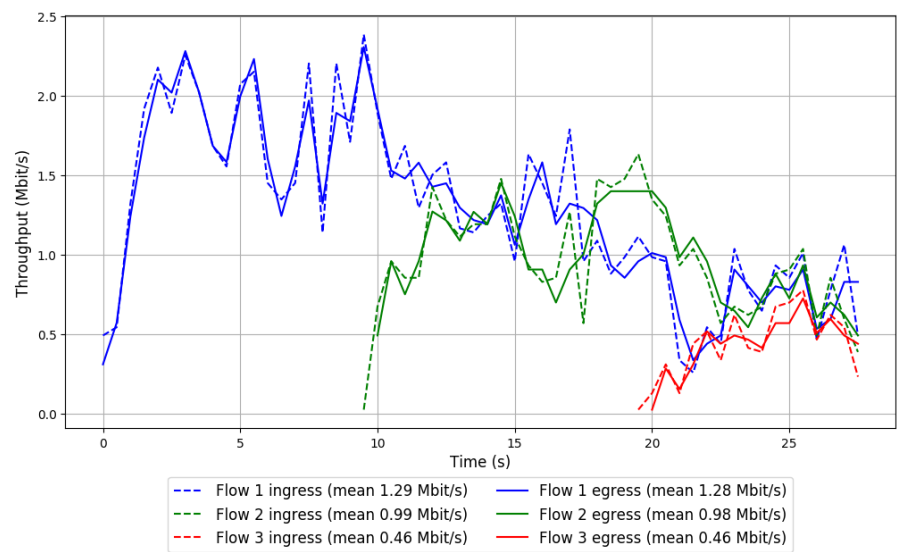


Run 1: Statistics of Copa

Start at: 2018-01-25 18:30:20
End at: 2018-01-25 18:30:50
Local clock offset: 1.292 ms
Remote clock offset: -16.182 ms

Below is generated by plot.py at 2018-01-25 20:12:49
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 303.328 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 283.335 ms
Loss rate: 0.96%
-- Flow 2:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 318.343 ms
Loss rate: 1.46%
-- Flow 3:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 331.507 ms
Loss rate: 4.38%

Run 1: Report of Copa — Data Link

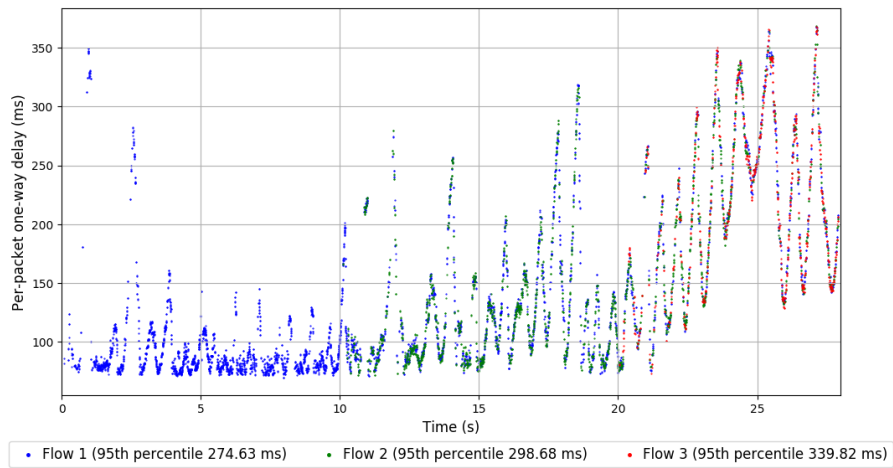
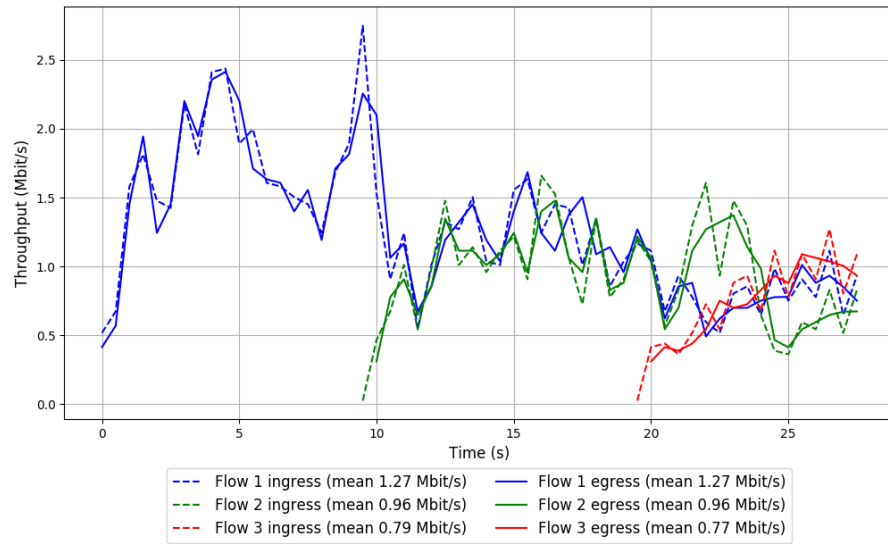


Run 2: Statistics of Copa

Start at: 2018-01-25 18:47:54
End at: 2018-01-25 18:48:24
Local clock offset: 3.536 ms
Remote clock offset: -17.681 ms

Below is generated by plot.py at 2018-01-25 20:12:52
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 297.410 ms
Loss rate: 1.24%
-- Flow 1:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 274.627 ms
Loss rate: 0.73%
-- Flow 2:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 298.680 ms
Loss rate: 1.21%
-- Flow 3:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 339.817 ms
Loss rate: 4.19%

Run 2: Report of Copa — Data Link

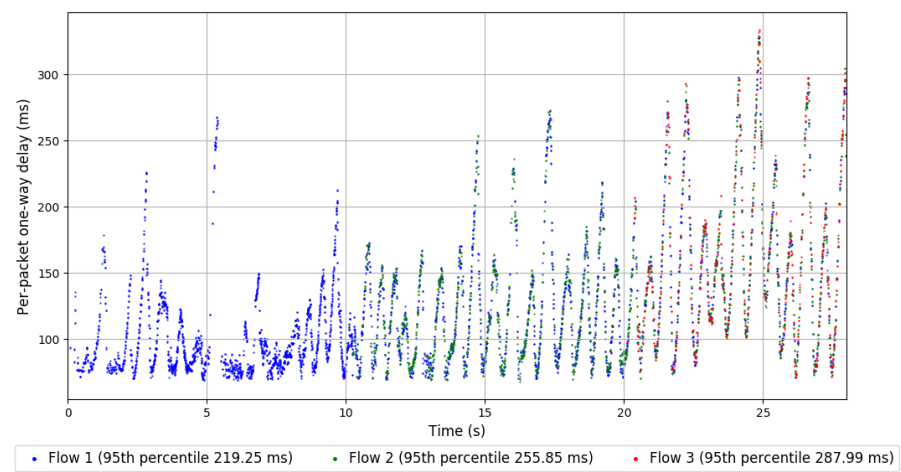
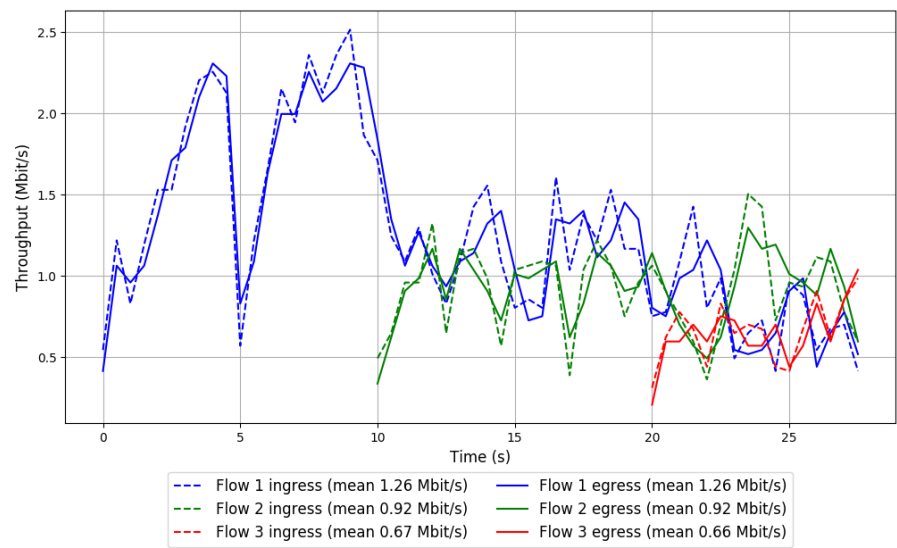


Run 3: Statistics of Copa

Start at: 2018-01-25 19:05:30
End at: 2018-01-25 19:06:00
Local clock offset: 3.333 ms
Remote clock offset: -16.313 ms

```
# Below is generated by plot.py at 2018-01-25 20:12:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 248.456 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 219.250 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 255.848 ms
Loss rate: 0.63%
-- Flow 3:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 287.985 ms
Loss rate: 2.21%
```

Run 3: Report of Copa — Data Link

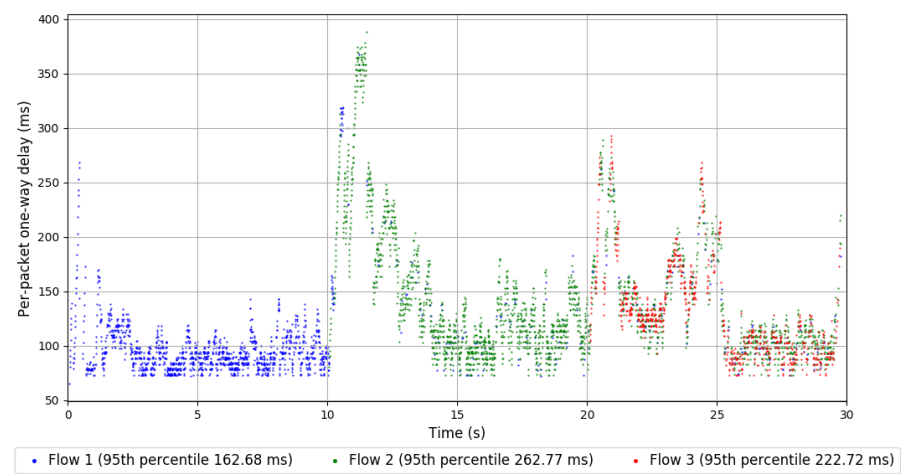
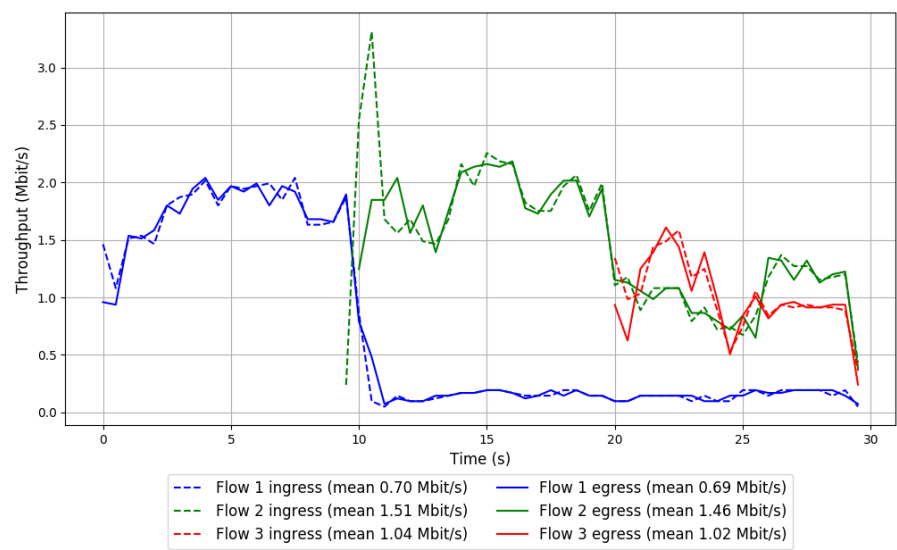


Run 1: Statistics of Indigo-2-256

Start at: 2018-01-25 18:31:26
End at: 2018-01-25 18:31:56
Local clock offset: 2.671 ms
Remote clock offset: -18.076 ms

Below is generated by plot.py at 2018-01-25 20:12:52
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 243.242 ms
Loss rate: 2.37%
-- Flow 1:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 162.676 ms
Loss rate: 0.69%
-- Flow 2:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 262.772 ms
Loss rate: 3.46%
-- Flow 3:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 222.724 ms
Loss rate: 2.61%

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

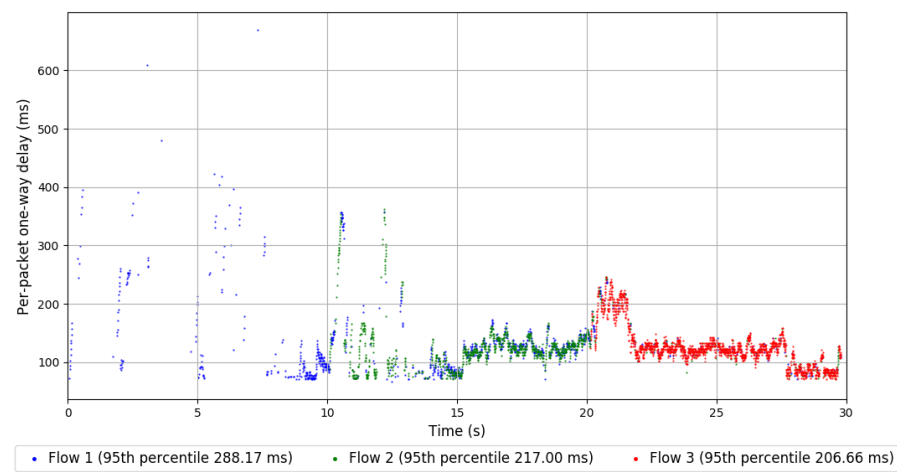
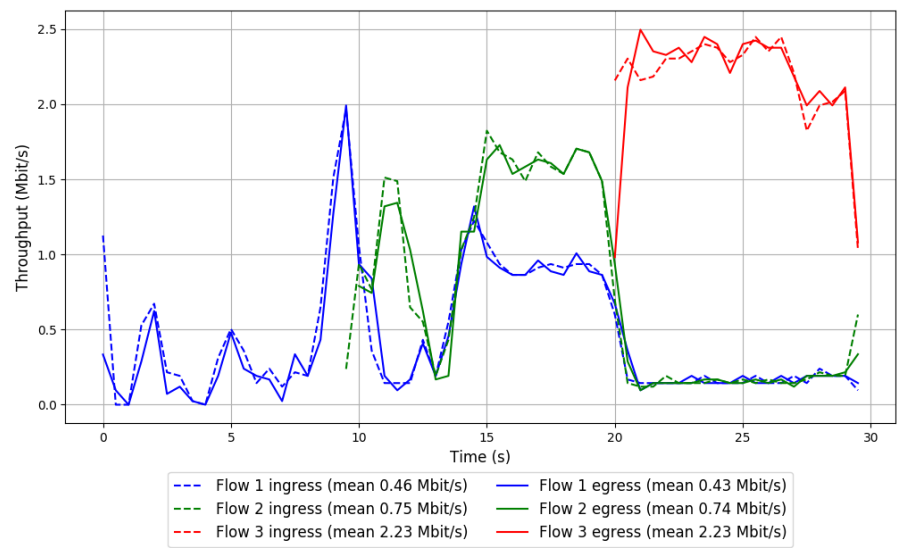


Run 2: Statistics of Indigo-2-256

Start at: 2018-01-25 18:49:01
End at: 2018-01-25 18:49:31
Local clock offset: 4.737 ms
Remote clock offset: -16.076 ms

Below is generated by plot.py at 2018-01-25 20:12:52
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 216.611 ms
Loss rate: 2.66%
-- Flow 1:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 288.167 ms
Loss rate: 5.57%
-- Flow 2:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 216.999 ms
Loss rate: 2.03%
-- Flow 3:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 206.659 ms
Loss rate: 1.27%

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

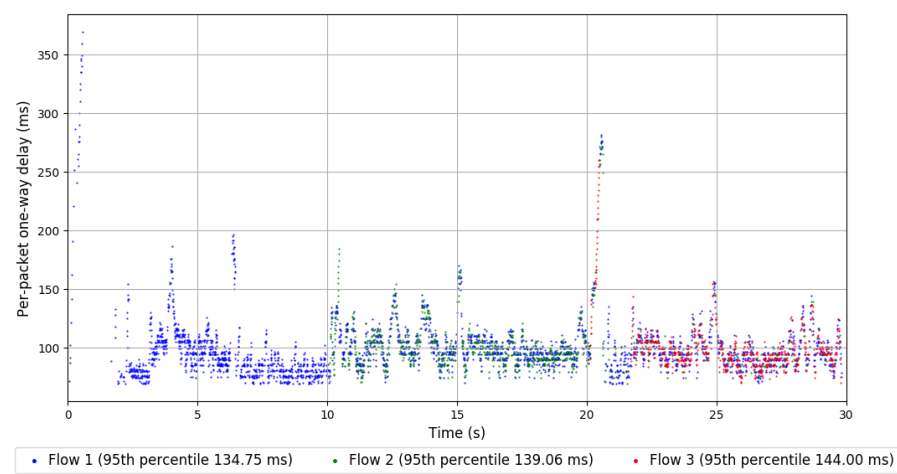
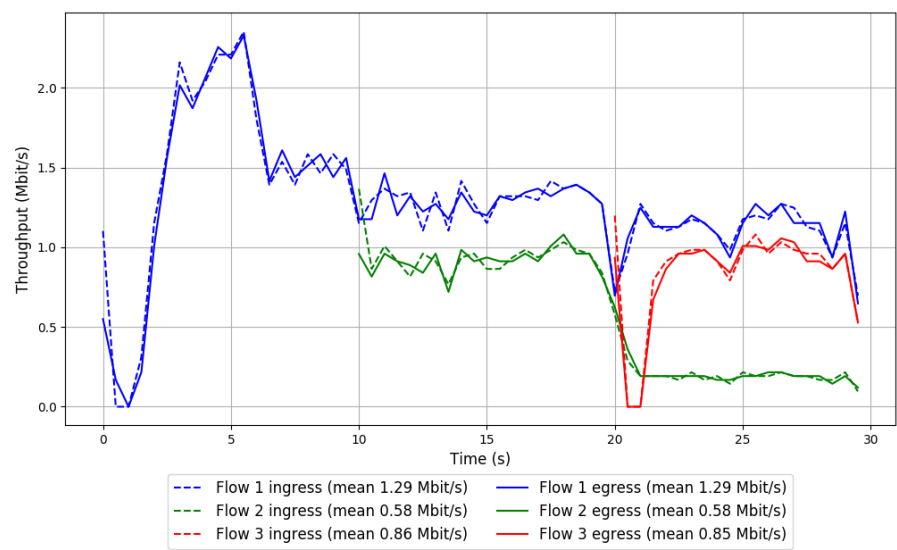


Run 3: Statistics of Indigo-2-256

Start at: 2018-01-25 19:06:36
End at: 2018-01-25 19:07:06
Local clock offset: 1.382 ms
Remote clock offset: -18.045 ms

Below is generated by plot.py at 2018-01-25 20:12:52
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 135.933 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 134.746 ms
Loss rate: 0.78%
-- Flow 2:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 139.064 ms
Loss rate: 1.46%
-- Flow 3:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 144.001 ms
Loss rate: 2.71%

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

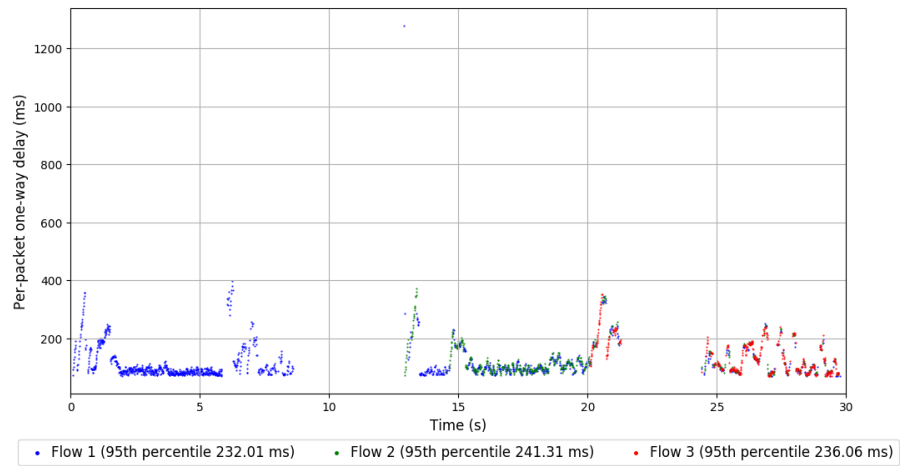
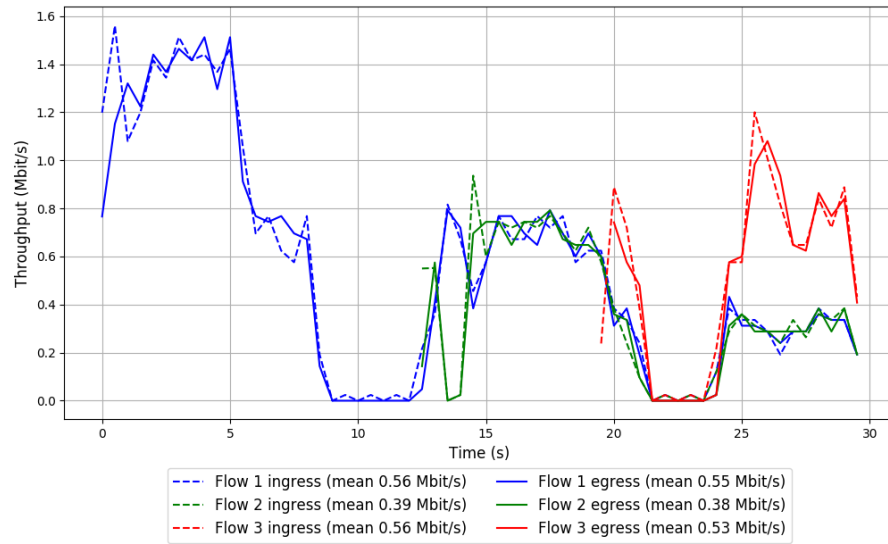


Run 1: Statistics of Indigo-1-32

Start at: 2018-01-25 18:42:25
End at: 2018-01-25 18:42:55
Local clock offset: 0.72 ms
Remote clock offset: -16.389 ms

Below is generated by plot.py at 2018-01-25 20:12:52
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 236.057 ms
Loss rate: 3.79%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 232.011 ms
Loss rate: 2.58%
-- Flow 2:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 241.314 ms
Loss rate: 4.72%
-- Flow 3:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 236.057 ms
Loss rate: 6.42%

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

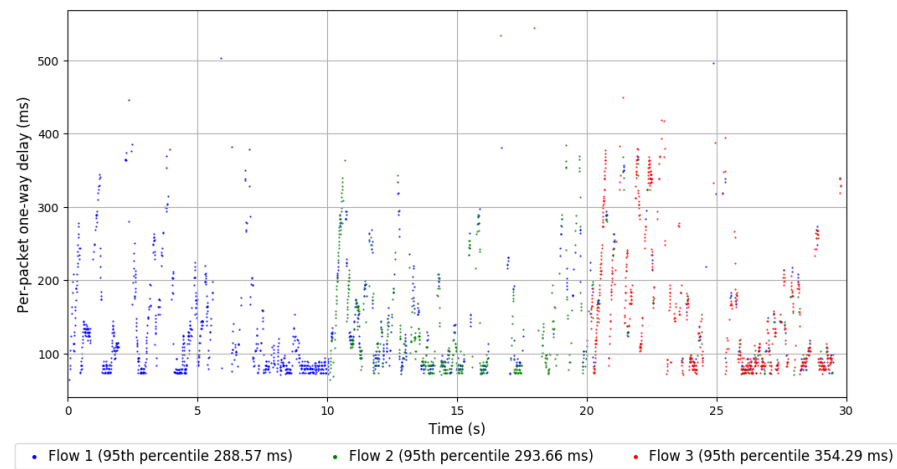
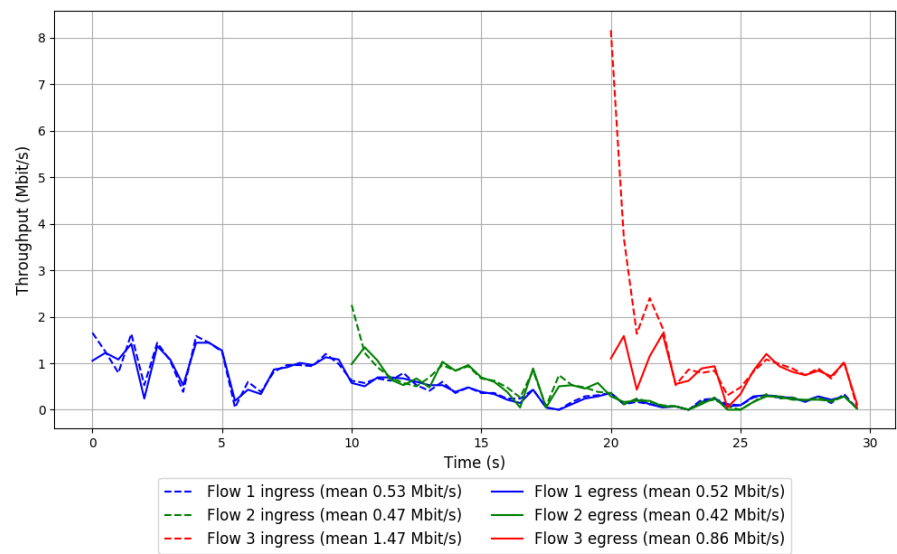


Run 2: Statistics of Indigo-1-32

Start at: 2018-01-25 19:00:00
End at: 2018-01-25 19:00:30
Local clock offset: -2.397 ms
Remote clock offset: -23.483 ms

Below is generated by plot.py at 2018-01-25 20:12:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 329.199 ms
Loss rate: 18.94%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 288.572 ms
Loss rate: 3.64%
-- Flow 2:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 293.663 ms
Loss rate: 8.86%
-- Flow 3:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 354.294 ms
Loss rate: 42.28%

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

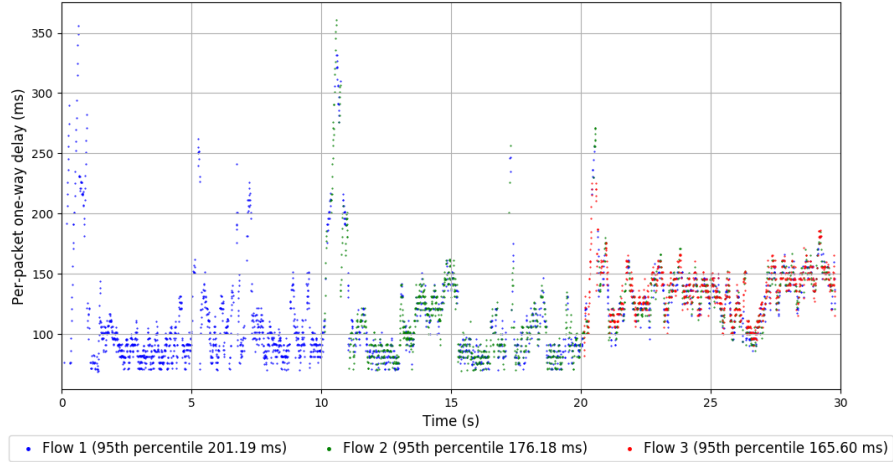
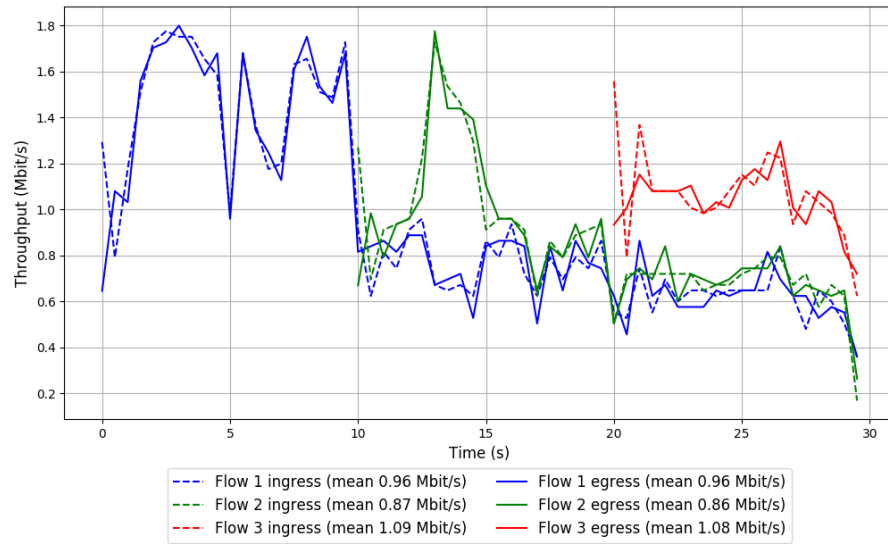


Run 3: Statistics of Indigo-1-32

Start at: 2018-01-25 19:17:38
End at: 2018-01-25 19:18:08
Local clock offset: 2.565 ms
Remote clock offset: -14.829 ms

Below is generated by plot.py at 2018-01-25 20:12:54
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 181.509 ms
Loss rate: 1.09%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 201.195 ms
Loss rate: 0.63%
-- Flow 2:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 176.175 ms
Loss rate: 0.99%
-- Flow 3:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 165.597 ms
Loss rate: 2.48%

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

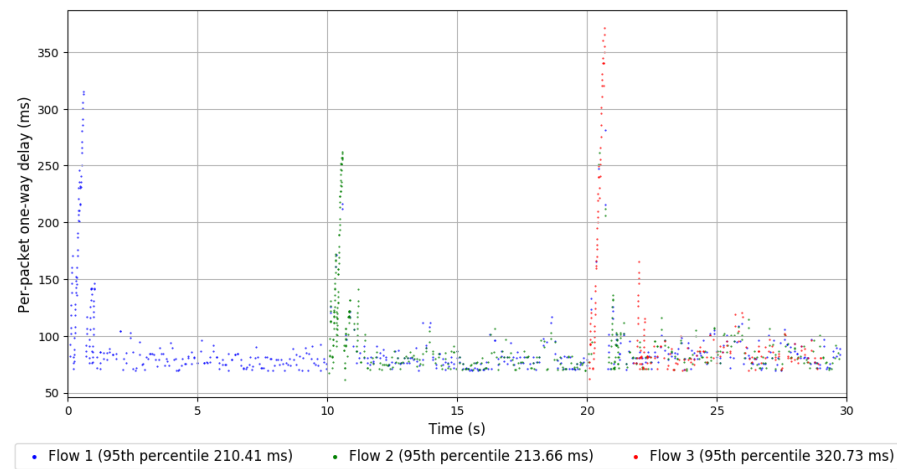
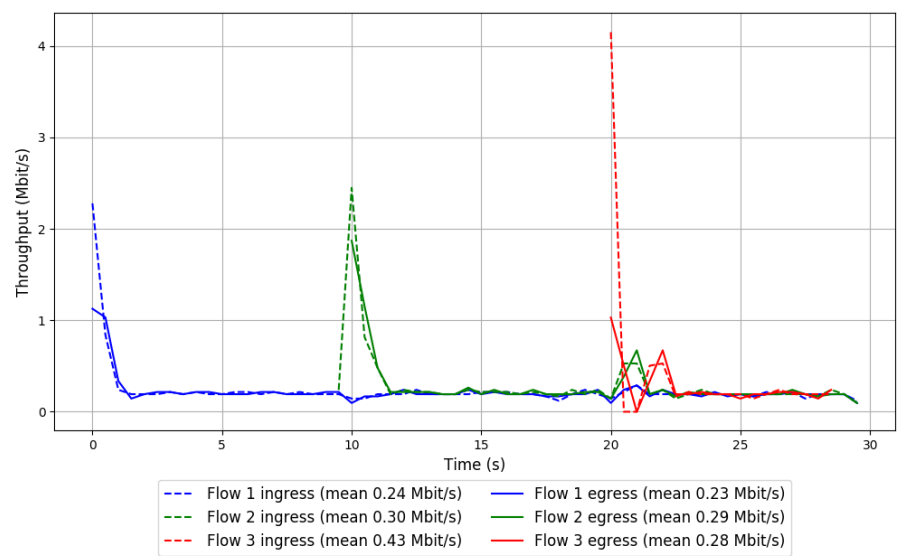


Run 1: Statistics of Indigo-1-128

Start at: 2018-01-25 18:32:32
End at: 2018-01-25 18:33:02
Local clock offset: 3.288 ms
Remote clock offset: -15.409 ms

Below is generated by plot.py at 2018-01-25 20:12:54
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 230.610 ms
Loss rate: 11.69%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 210.413 ms
Loss rate: 6.17%
-- Flow 2:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 213.663 ms
Loss rate: 4.00%
-- Flow 3:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 320.726 ms
Loss rate: 34.07%

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

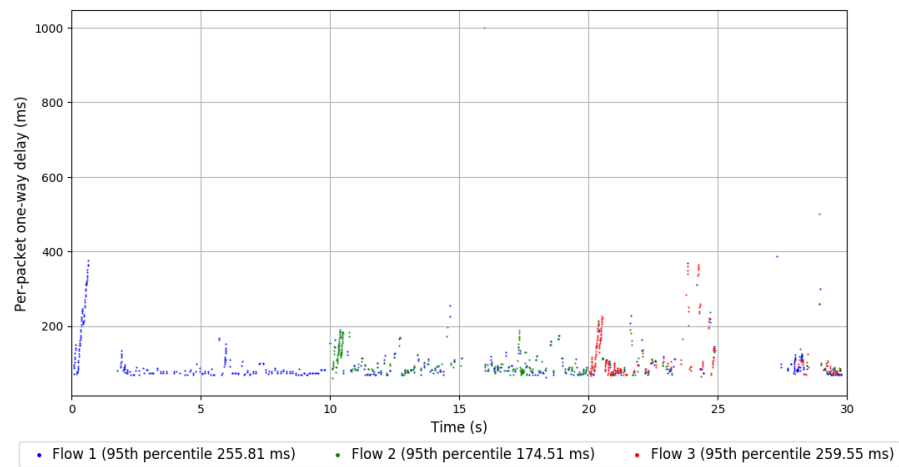
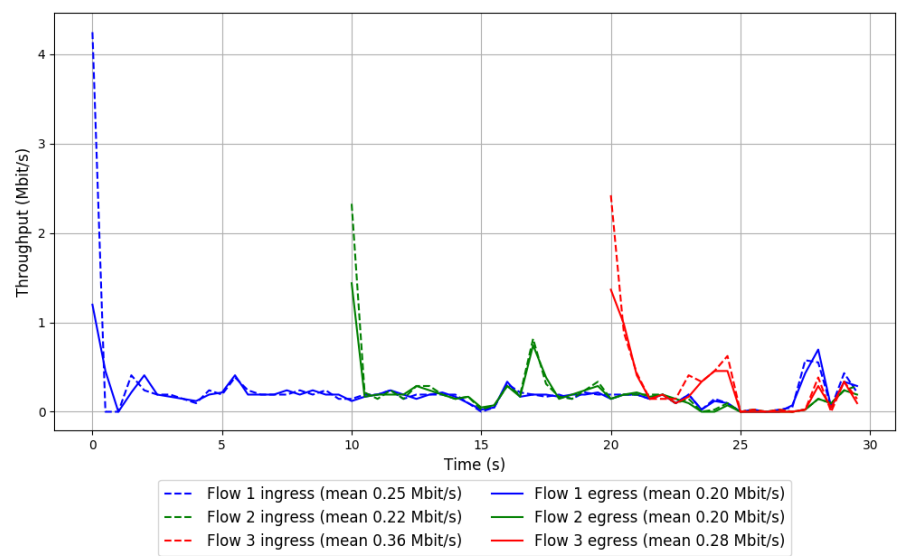


Run 2: Statistics of Indigo-1-128

Start at: 2018-01-25 18:50:07
End at: 2018-01-25 18:50:37
Local clock offset: 3.458 ms
Remote clock offset: -15.528 ms

Below is generated by plot.py at 2018-01-25 20:12:54
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 229.039 ms
Loss rate: 17.73%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 255.807 ms
Loss rate: 18.48%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 174.515 ms
Loss rate: 13.01%
-- Flow 3:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 259.546 ms
Loss rate: 22.15%

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



Run 3: Statistics of Indigo-1-128

Start at: 2018-01-25 19:07:43
End at: 2018-01-25 19:08:13
Local clock offset: 0.493 ms
Remote clock offset: -16.261 ms

Below is generated by plot.py at 2018-01-25 20:12:54
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 183.020 ms
Loss rate: 8.49%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 201.947 ms
Loss rate: 6.45%
-- Flow 2:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 172.345 ms
Loss rate: 8.33%
-- Flow 3:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 187.035 ms
Loss rate: 12.74%

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

