

Pantheon Report

Generated at 2018-01-25 20:30:03 (UTC).

Data path: AWS Brazil 2 Ethernet (*local*) → Colombia ppp0 (*remote*).

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).

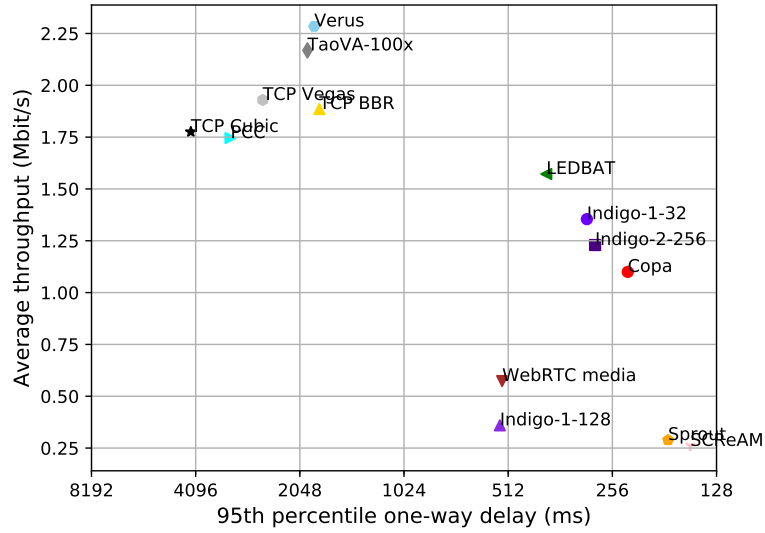
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).

NTP offsets were measured against **gps.ntp.br** and have been applied to correct the timestamps in logs.

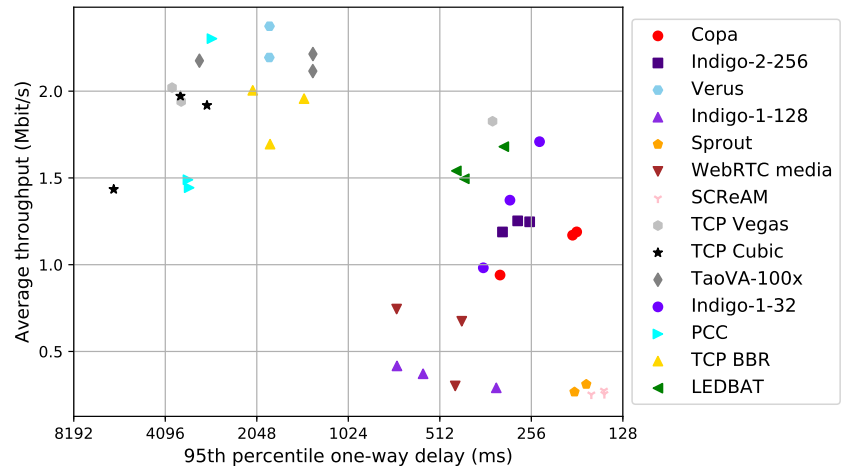
Git summary:

```
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 AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)



test from AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows



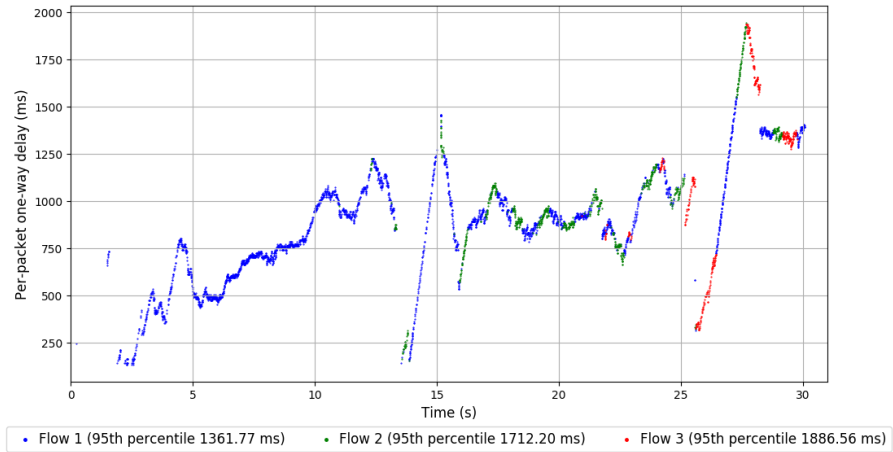
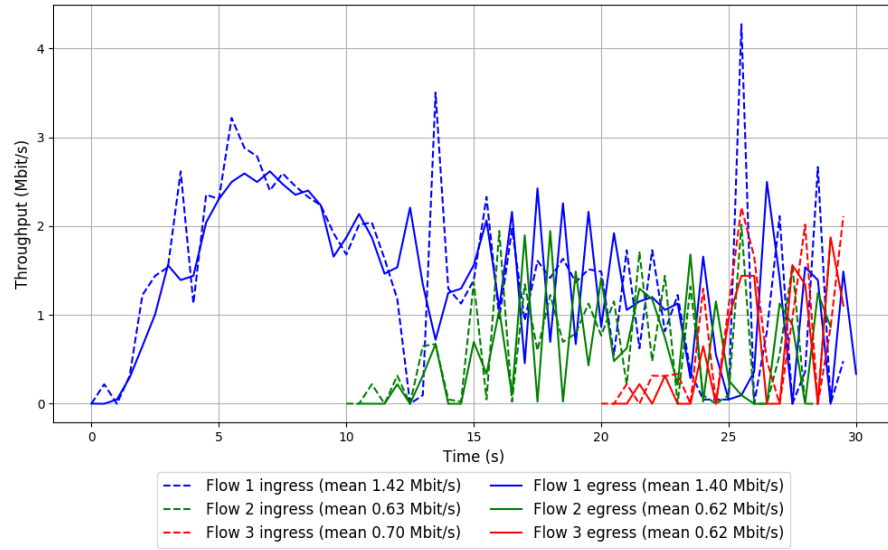
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	1.42	0.57	0.44	1457.69	1800.70	2091.12	3.18	10.05	27.65
TCP Cubic	3	1.56	0.32	0.00	4224.44	4250.14	4220.74	16.06	26.96	68.00
LEDBAT	3	1.08	0.62	0.22	371.95	407.82	454.06	0.60	1.10	1.71
PCC	3	0.59	1.46	0.54	3100.58	3176.47	2667.30	23.00	10.56	25.34
QUIC Cubic	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SCReAM	3	0.08	0.18	0.19	145.36	152.28	158.88	0.17	0.19	0.58
WebRTC media	3	0.36	0.15	0.07	525.92	541.86	526.57	1.37	1.50	4.82
Sprout	2	0.12	0.15	0.17	220.25	169.87	176.76	0.47	0.57	0.66
TaoVA-100x	3	1.31	0.90	0.92	1884.96	1555.60	2143.90	3.11	3.87	6.01
TCP Vegas	3	1.61	0.40	0.19	2624.84	2161.13	1826.89	10.01	26.69	35.43
Verus	2	1.98	0.45	0.01	1833.79	1854.47	1900.61	4.06	7.86	14.09
Copa	3	116.51	1.31	0.76	2490.22	228.00	241.63	0.00	0.64	2.57
Indigo-2-256	3	0.56	0.67	0.68	275.16	284.51	264.41	0.02	0.20	0.12
Indigo-1-32	3	0.67	0.62	0.71	306.77	320.40	287.51	0.06	0.19	0.55
Indigo-1-128	3	0.17	0.16	0.26	563.97	365.56	514.40	0.00	0.13	0.00

Run 1: Statistics of TCP BBR

Start at: 2018-01-25 19:31:52
End at: 2018-01-25 19:32:22
Local clock offset: 1.606 ms
Remote clock offset: -0.379 ms

Below is generated by plot.py at 2018-01-25 20:29:28
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 1431.636 ms
Loss rate: 5.30%
-- Flow 1:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 1361.766 ms
Loss rate: 1.98%
-- Flow 2:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 1712.204 ms
Loss rate: 7.68%
-- Flow 3:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 1886.564 ms
Loss rate: 21.44%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-01-25 19:52:14

End at: 2018-01-25 19:52:44

Local clock offset: 1.41 ms

Remote clock offset: 0.509 ms

Below is generated by plot.py at 2018-01-25 20:29:29

Datalink statistics

-- Total of 3 flows:

Average throughput: 2.00 Mbit/s

95th percentile per-packet one-way delay: 2111.743 ms

Loss rate: 5.45%

-- Flow 1:

Average throughput: 1.56 Mbit/s

95th percentile per-packet one-way delay: 1157.004 ms

Loss rate: 2.61%

-- Flow 2:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 1827.880 ms

Loss rate: 6.05%

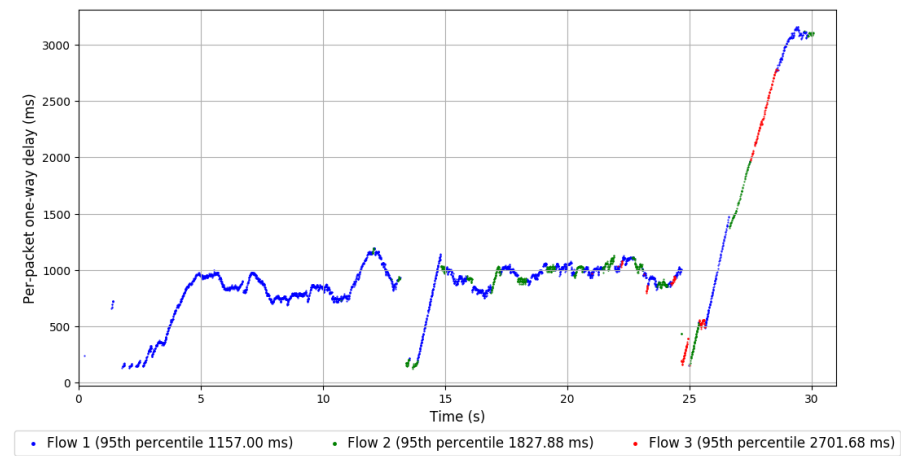
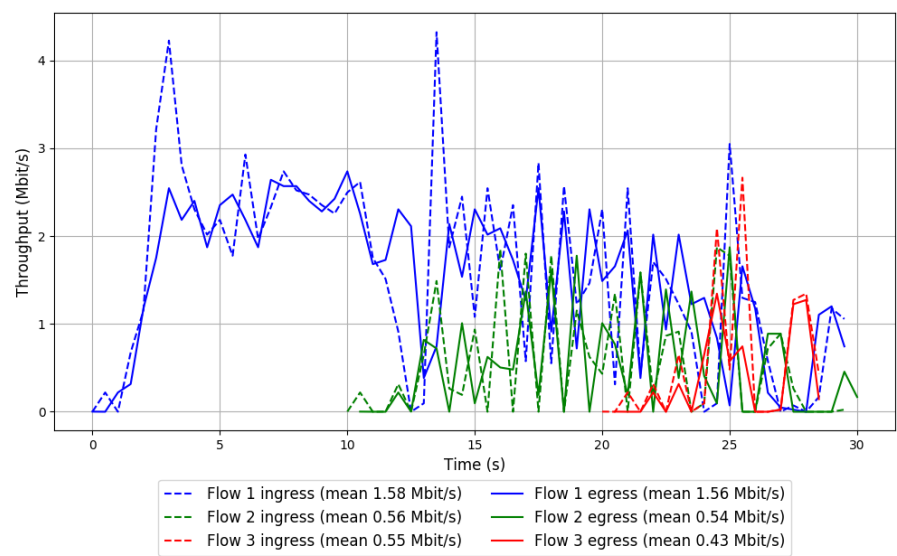
-- Flow 3:

Average throughput: 0.43 Mbit/s

95th percentile per-packet one-way delay: 2701.685 ms

Loss rate: 32.05%

Run 2: Report of TCP BBR — Data Link

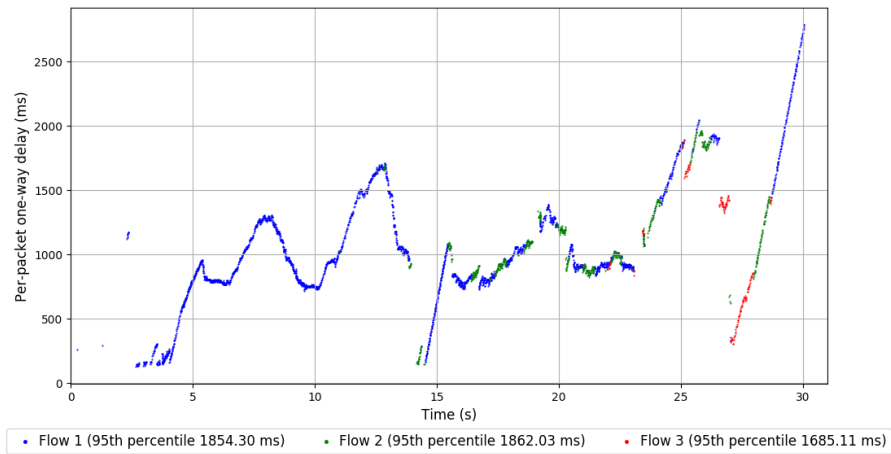
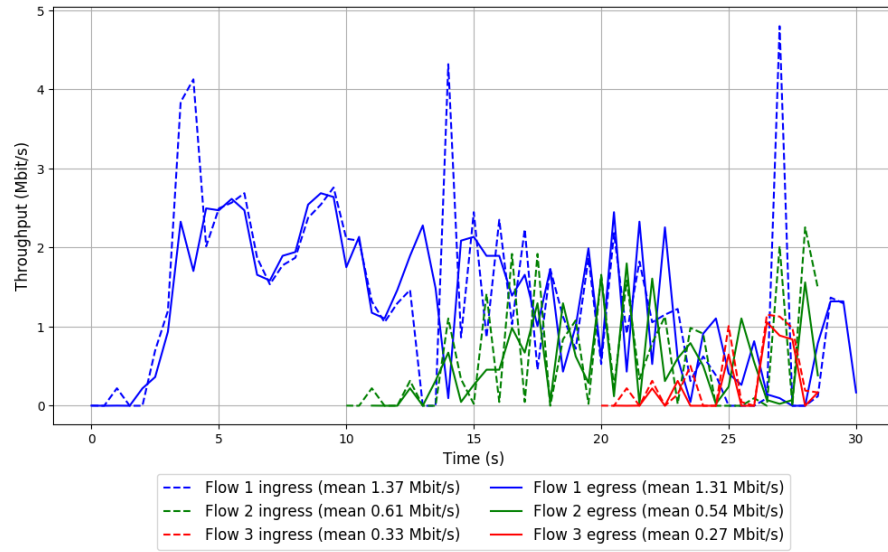


Run 3: Statistics of TCP BBR

Start at: 2018-01-25 20:12:37
End at: 2018-01-25 20:13:07
Local clock offset: 1.347 ms
Remote clock offset: -6.219 ms

Below is generated by plot.py at 2018-01-25 20:29:29
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.69 Mbit/s
95th percentile per-packet one-way delay: 1852.222 ms
Loss rate: 8.62%
-- Flow 1:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 1854.301 ms
Loss rate: 4.96%
-- Flow 2:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 1862.027 ms
Loss rate: 16.41%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 1685.106 ms
Loss rate: 29.46%

Run 3: Report of TCP BBR — Data Link

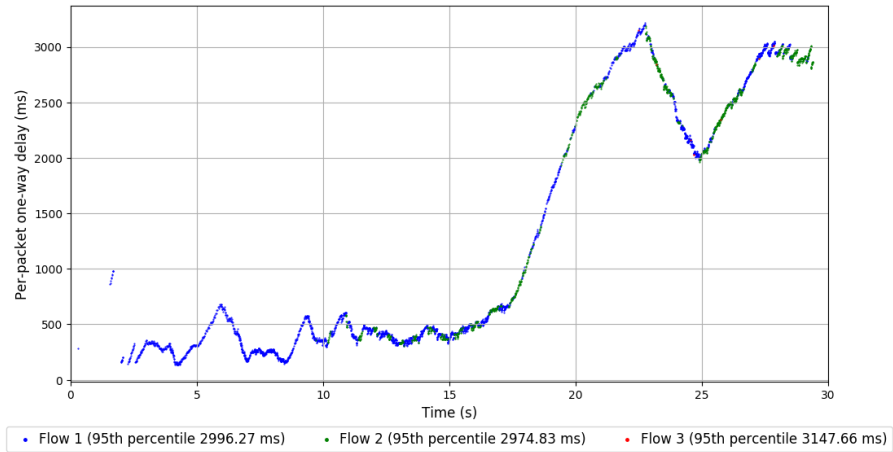
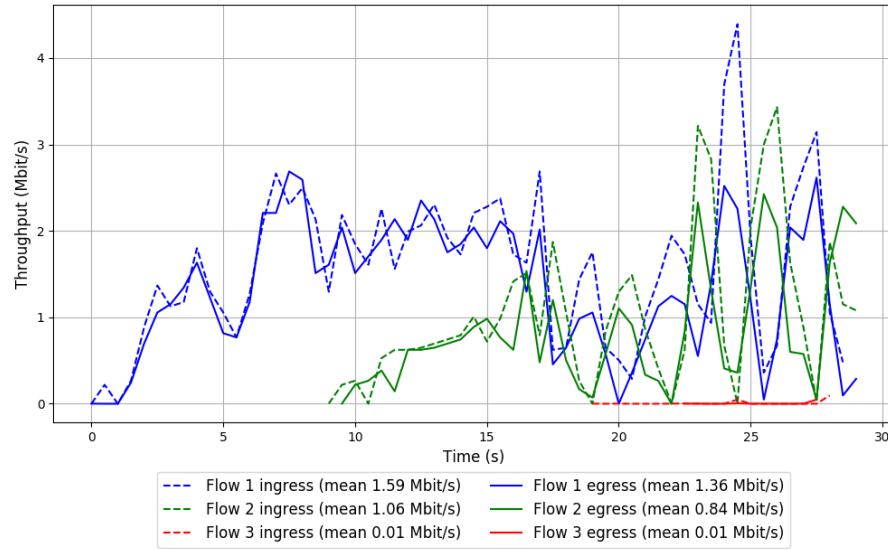


Run 1: Statistics of TCP Cubic

Start at: 2018-01-25 19:28:04
End at: 2018-01-25 19:28:34
Local clock offset: 1.59 ms
Remote clock offset: -5.161 ms

Below is generated by plot.py at 2018-01-25 20:29:29
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.92 Mbit/s
95th percentile per-packet one-way delay: 2986.568 ms
Loss rate: 16.47%
-- Flow 1:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 2996.271 ms
Loss rate: 14.07%
-- Flow 2:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 2974.828 ms
Loss rate: 21.53%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3147.660 ms
Loss rate: 62.01%

Run 1: Report of TCP Cubic — Data Link

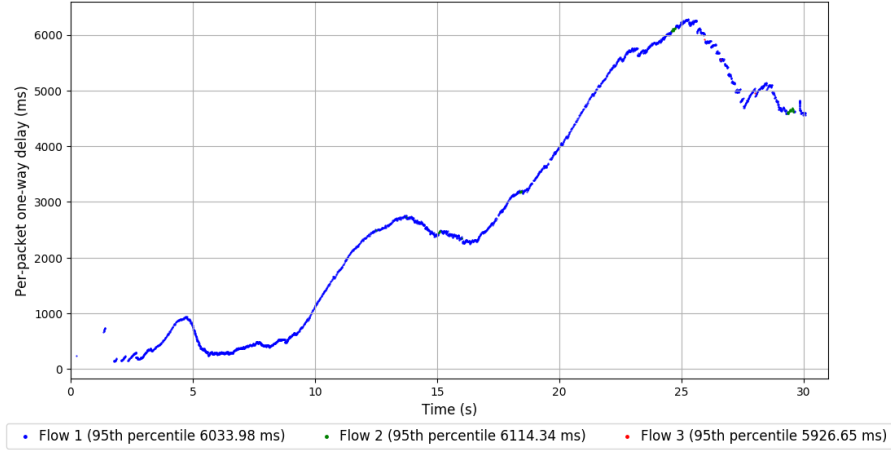
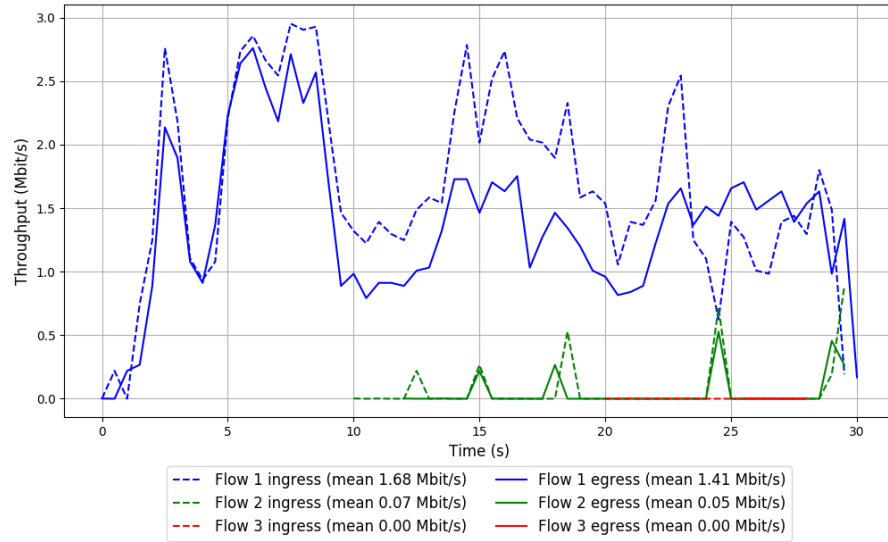


Run 2: Statistics of TCP Cubic

Start at: 2018-01-25 19:48:27
End at: 2018-01-25 19:48:57
Local clock offset: 1.44 ms
Remote clock offset: -0.344 ms

Below is generated by plot.py at 2018-01-25 20:29:29
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 6054.183 ms
Loss rate: 16.65%
-- Flow 1:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 6033.983 ms
Loss rate: 16.04%
-- Flow 2:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 6114.338 ms
Loss rate: 38.33%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5926.649 ms
Loss rate: 62.30%

Run 2: Report of TCP Cubic — Data Link

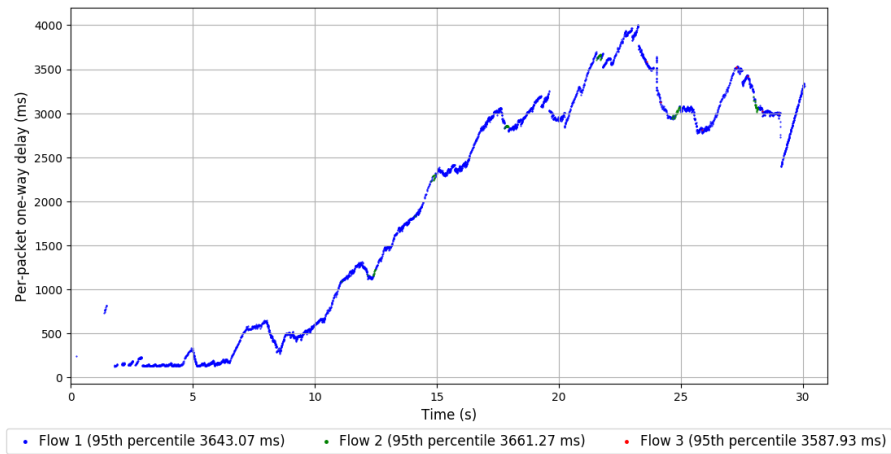
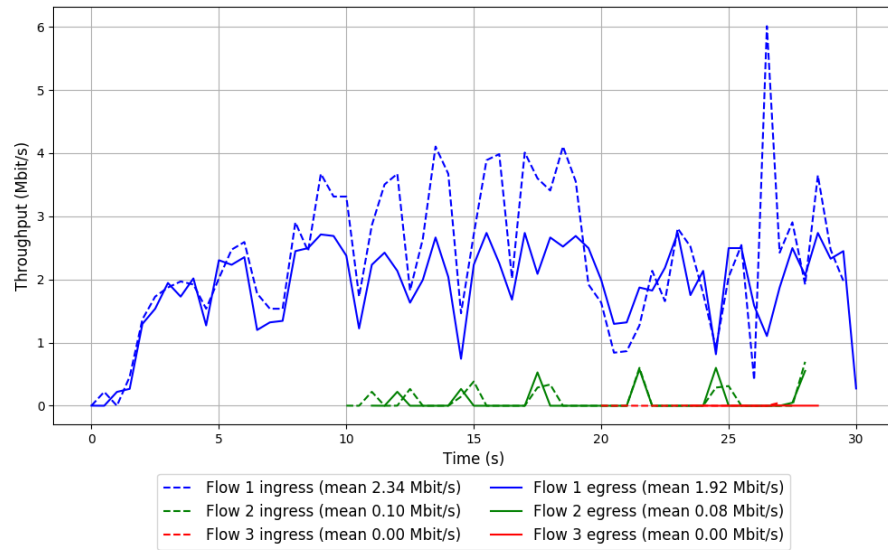


Run 3: Statistics of TCP Cubic

Start at: 2018-01-25 20:08:49
End at: 2018-01-25 20:09:19
Local clock offset: 1.35 ms
Remote clock offset: -5.275 ms

Below is generated by plot.py at 2018-01-25 20:29:29
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 3651.702 ms
Loss rate: 18.17%
-- Flow 1:
Average throughput: 1.92 Mbit/s
95th percentile per-packet one-way delay: 3643.067 ms
Loss rate: 18.07%
-- Flow 2:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 3661.267 ms
Loss rate: 21.03%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3587.926 ms
Loss rate: 79.70%

Run 3: Report of TCP Cubic — Data Link

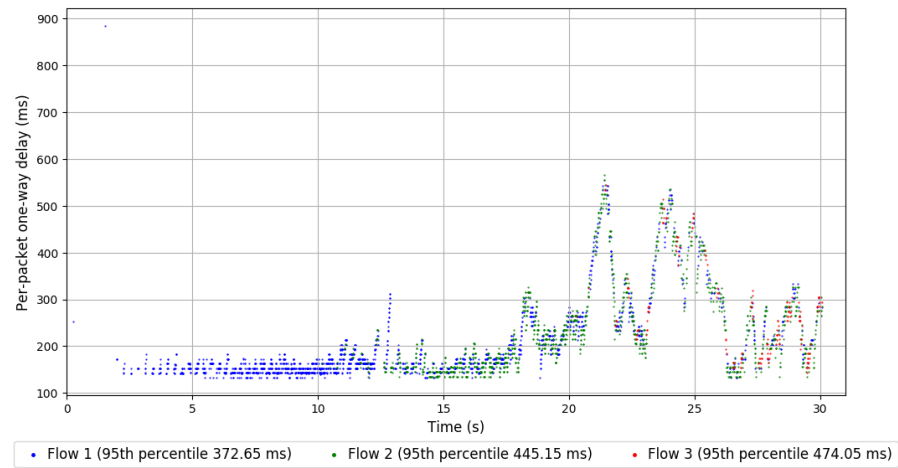
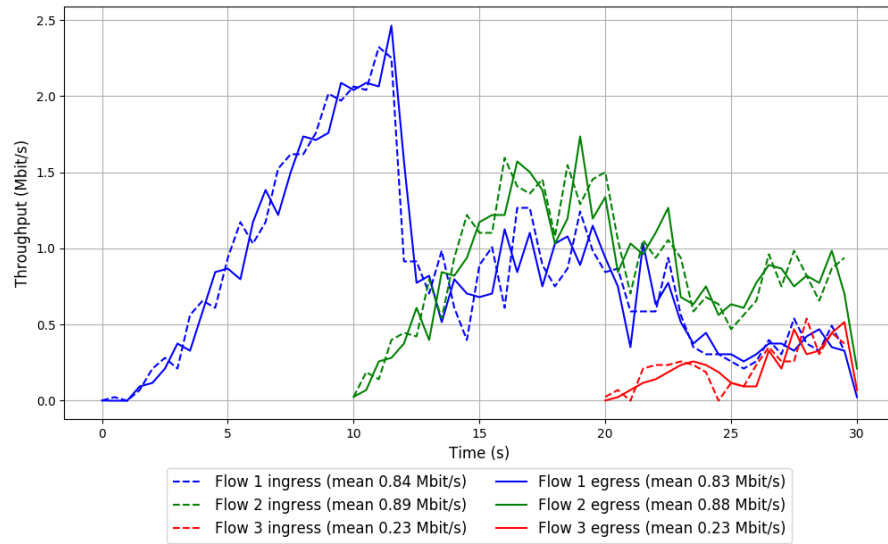


Run 1: Statistics of LEDBAT

Start at: 2018-01-25 19:39:32
End at: 2018-01-25 19:40:02
Local clock offset: 1.517 ms
Remote clock offset: -0.554 ms

Below is generated by plot.py at 2018-01-25 20:29:29
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 425.330 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 372.652 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 445.148 ms
Loss rate: 0.80%
-- Flow 3:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 474.051 ms
Loss rate: 0.00%

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-01-25 19:59:50

End at: 2018-01-25 20:00:20

Local clock offset: 1.373 ms

Remote clock offset: -1.36 ms

Below is generated by plot.py at 2018-01-25 20:29:29

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.54 Mbit/s

95th percentile per-packet one-way delay: 451.836 ms

Loss rate: 0.89%

-- Flow 1:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 447.485 ms

Loss rate: 0.94%

-- Flow 2:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 450.900 ms

Loss rate: 0.61%

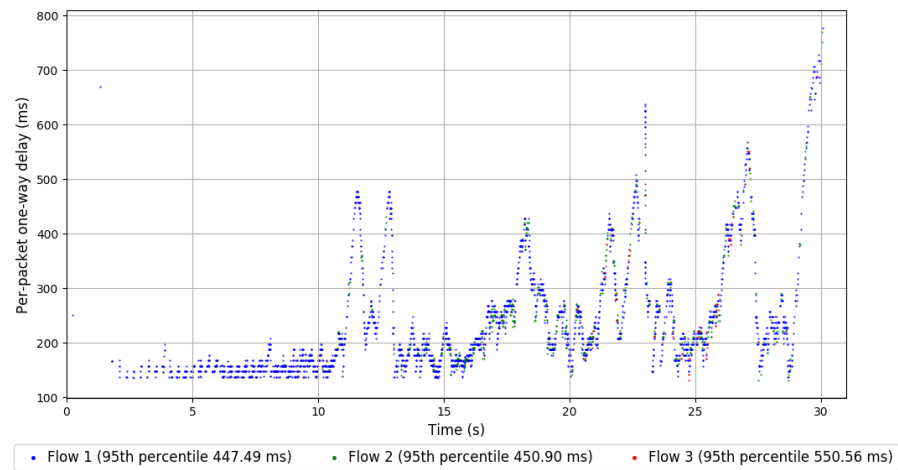
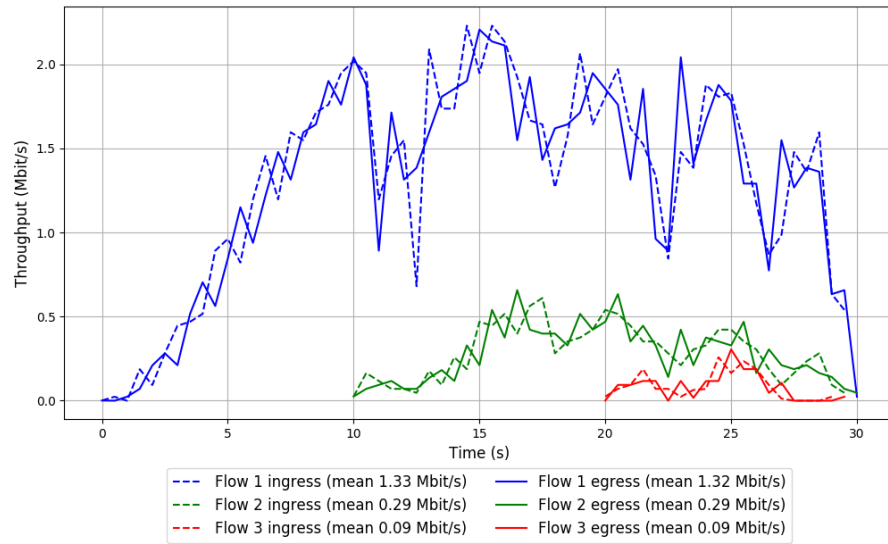
-- Flow 3:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 550.556 ms

Loss rate: 0.00%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-01-25 20:20:15

End at: 2018-01-25 20:20:45

Local clock offset: 1.352 ms

Remote clock offset: -0.47 ms

Below is generated by plot.py at 2018-01-25 20:29:35

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.68 Mbit/s

95th percentile per-packet one-way delay: 315.326 ms

Loss rate: 1.16%

-- Flow 1:

Average throughput: 1.10 Mbit/s

95th percentile per-packet one-way delay: 295.728 ms

Loss rate: 0.43%

-- Flow 2:

Average throughput: 0.70 Mbit/s

95th percentile per-packet one-way delay: 327.427 ms

Loss rate: 1.90%

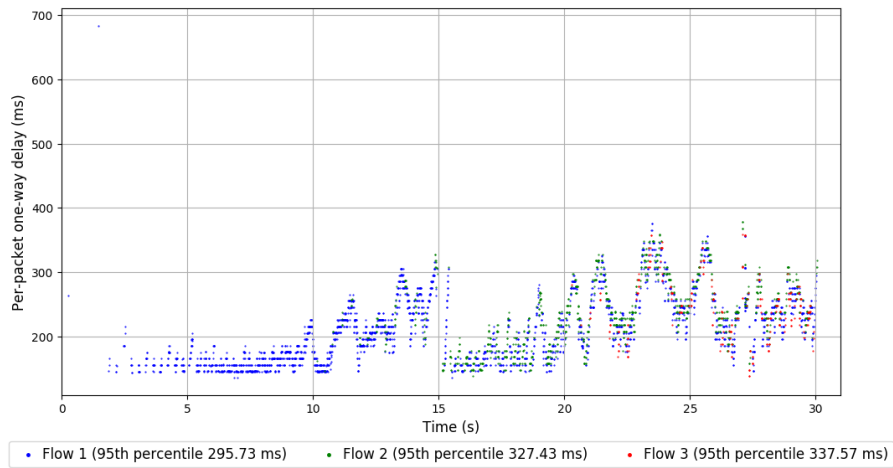
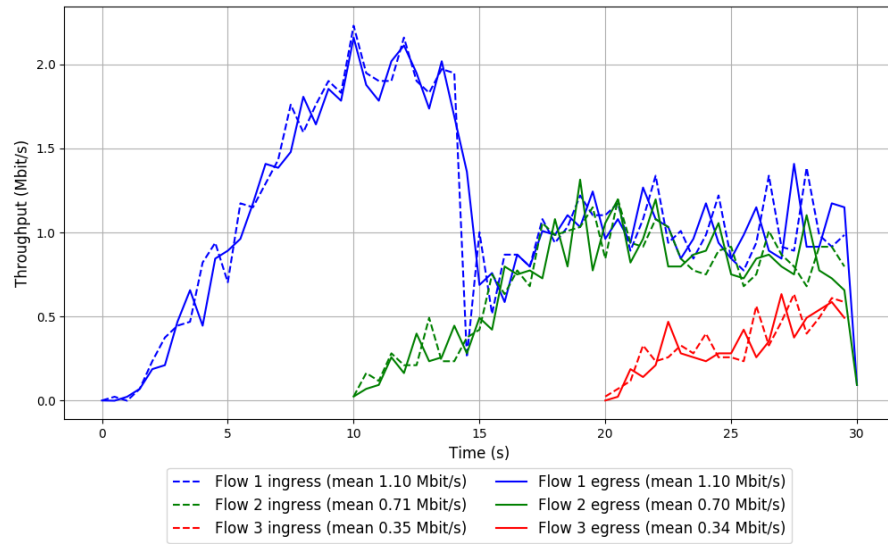
-- Flow 3:

Average throughput: 0.34 Mbit/s

95th percentile per-packet one-way delay: 337.574 ms

Loss rate: 5.12%

Run 3: Report of LEDBAT — Data Link

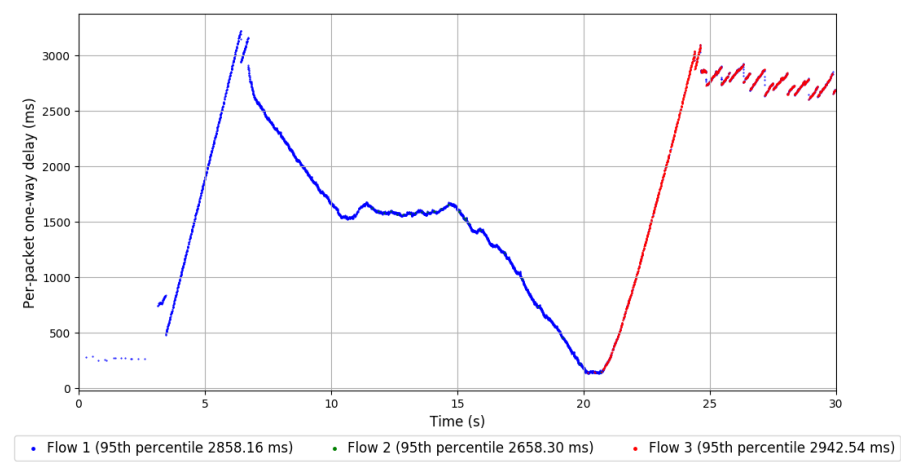
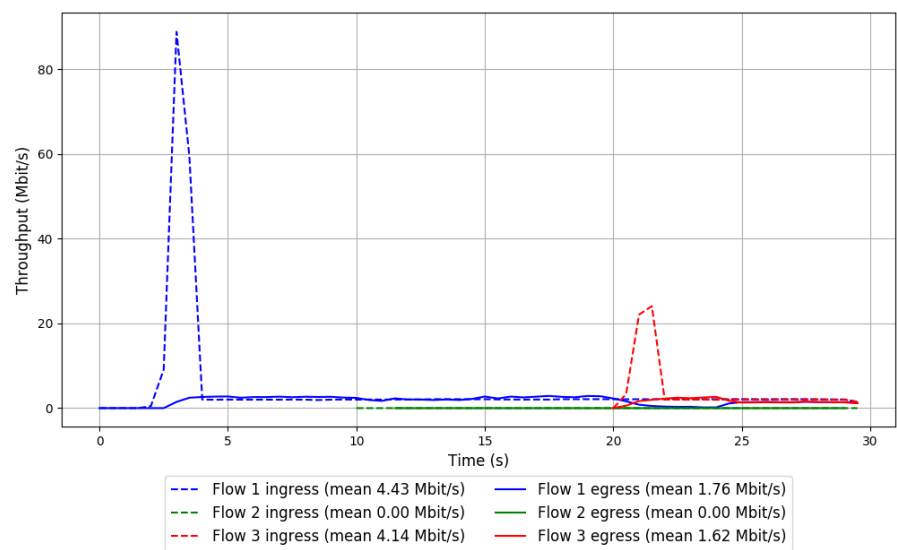


Run 1: Statistics of PCC

Start at: 2018-01-25 19:42:03
End at: 2018-01-25 19:42:33
Local clock offset: 1.501 ms
Remote clock offset: -0.576 ms

Below is generated by plot.py at 2018-01-25 20:29:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 2875.999 ms
Loss rate: 60.54%
-- Flow 1:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 2858.157 ms
Loss rate: 60.44%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2658.304 ms
Loss rate: 10.82%
-- Flow 3:
Average throughput: 1.62 Mbit/s
95th percentile per-packet one-way delay: 2942.537 ms
Loss rate: 60.90%

Run 1: Report of PCC — Data Link

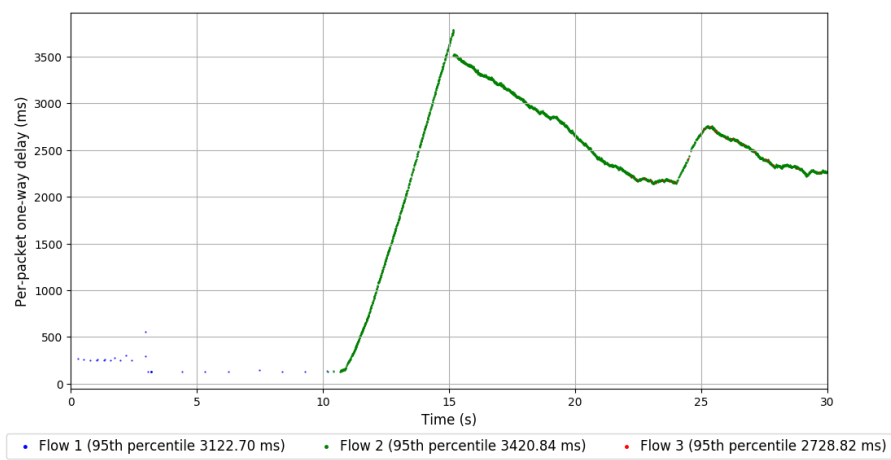
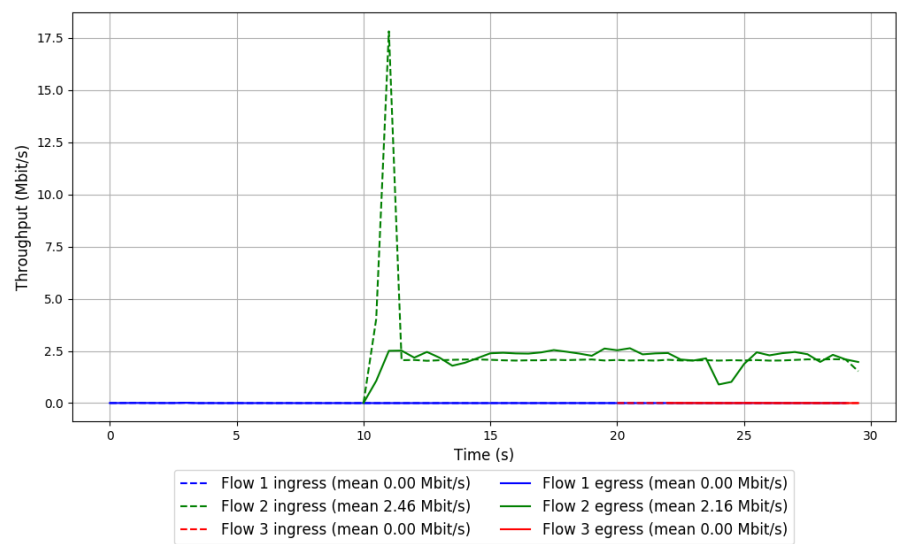


Run 2: Statistics of PCC

Start at: 2018-01-25 20:02:26
End at: 2018-01-25 20:02:56
Local clock offset: 1.271 ms
Remote clock offset: -1.407 ms

Below is generated by plot.py at 2018-01-25 20:29:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 3418.453 ms
Loss rate: 12.27%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3122.705 ms
Loss rate: 4.29%
-- Flow 2:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 3420.835 ms
Loss rate: 12.28%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2728.822 ms
Loss rate: 7.40%

Run 2: Report of PCC — Data Link

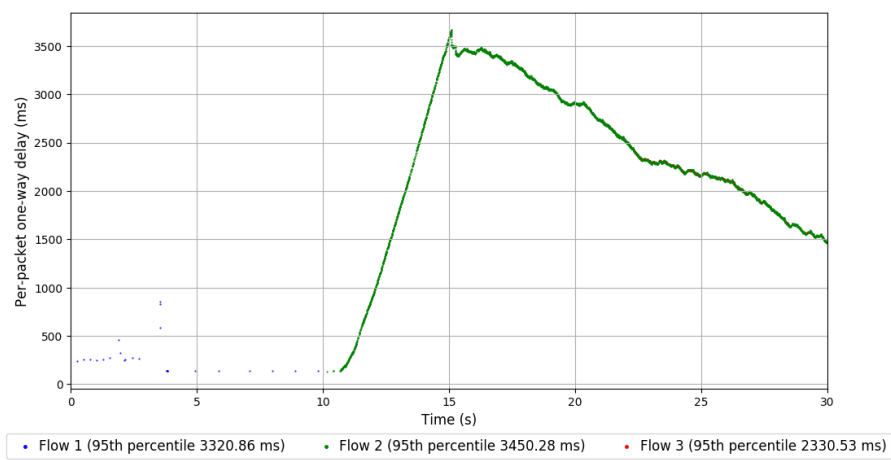
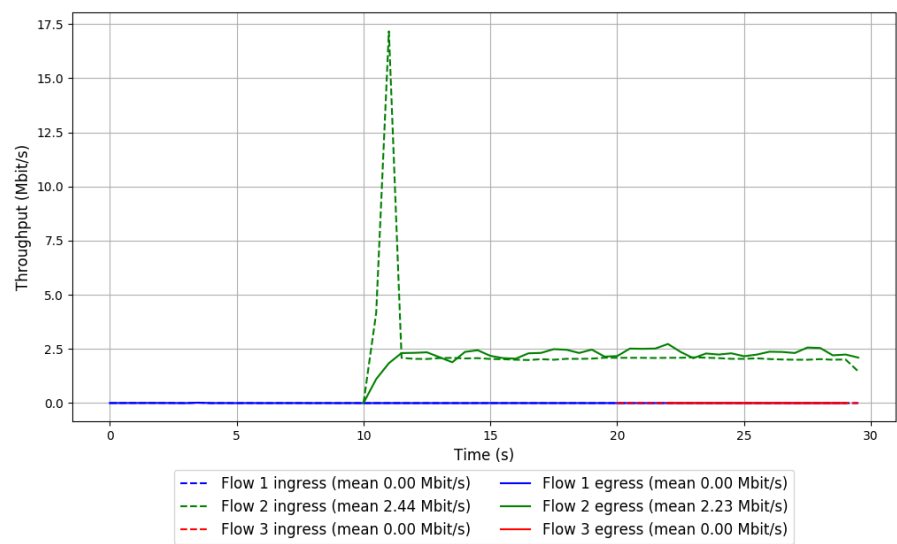


Run 3: Statistics of PCC

Start at: 2018-01-25 20:22:48
End at: 2018-01-25 20:23:18
Local clock offset: 1.331 ms
Remote clock offset: -0.627 ms

Below is generated by plot.py at 2018-01-25 20:29:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 3449.466 ms
Loss rate: 8.58%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3320.863 ms
Loss rate: 4.26%
-- Flow 2:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 3450.277 ms
Loss rate: 8.58%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2330.530 ms
Loss rate: 7.73%

Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

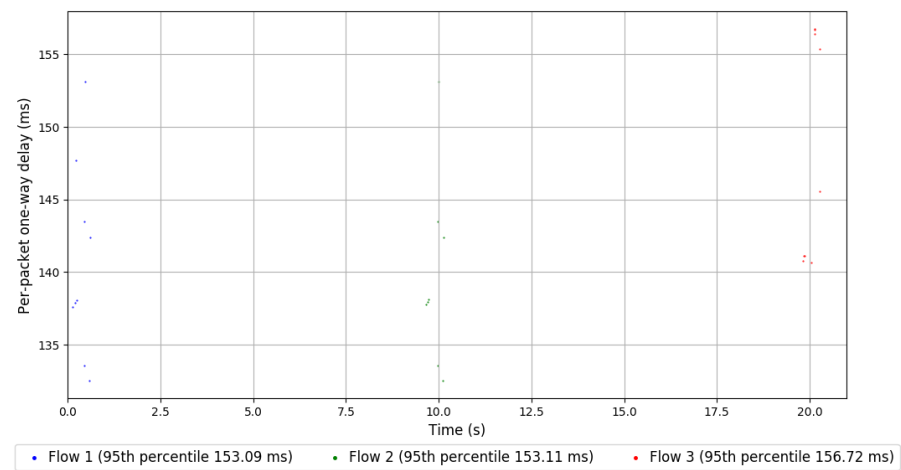
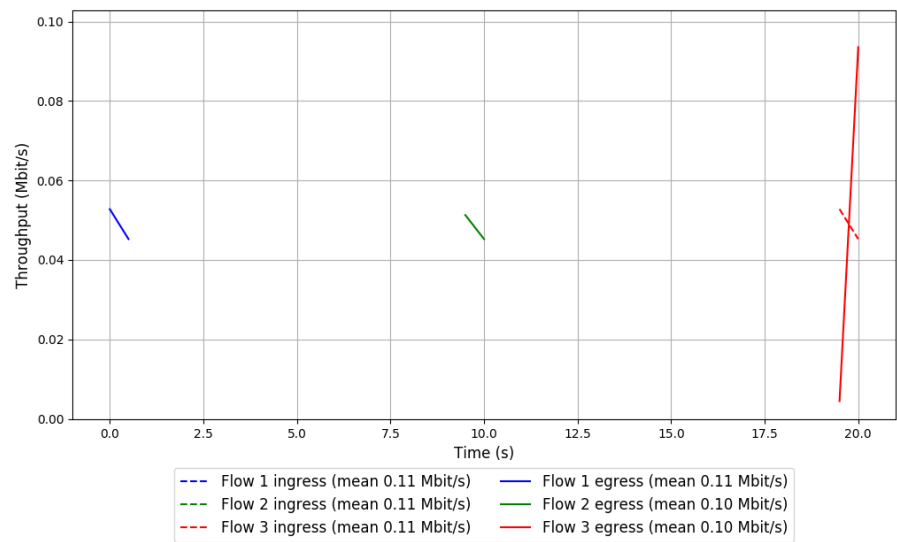
Start at: 2018-01-25 19:33:08

End at: 2018-01-25 19:33:38

Local clock offset: 1.606 ms

Remote clock offset: -1.34 ms

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

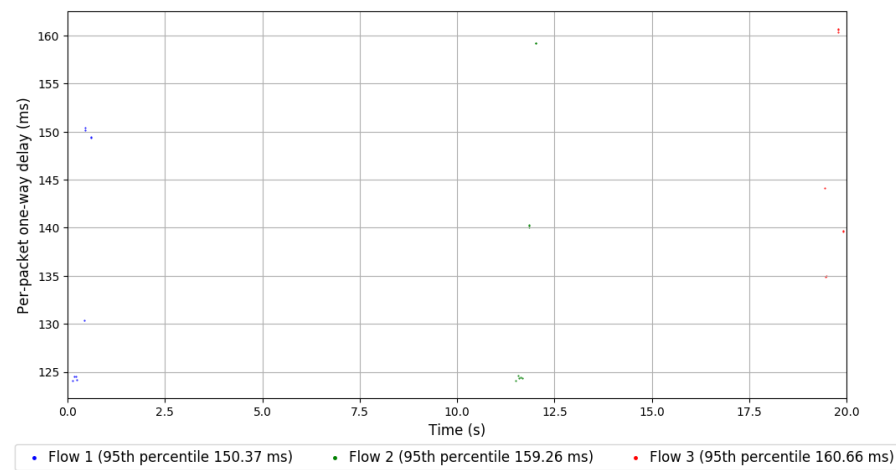
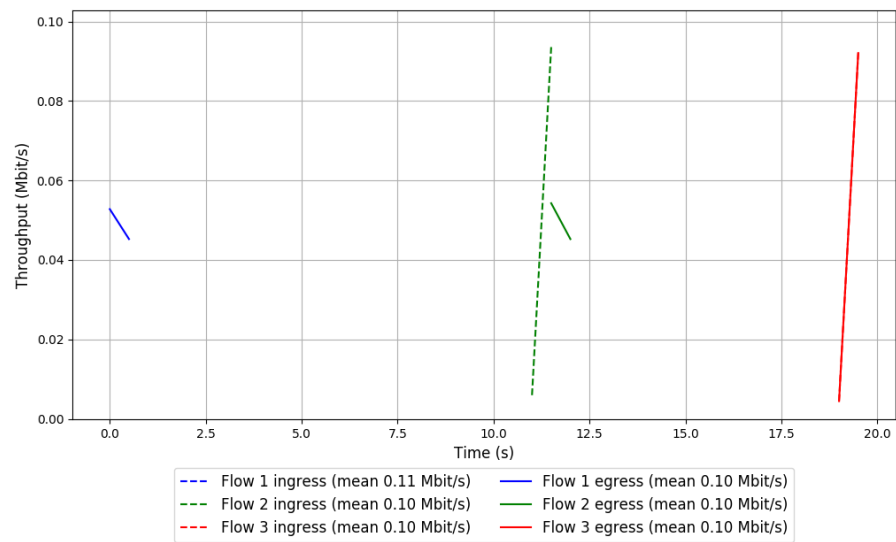
Start at: 2018-01-25 19:53:29

End at: 2018-01-25 19:53:59

Local clock offset: 1.338 ms

Remote clock offset: -6.083 ms

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

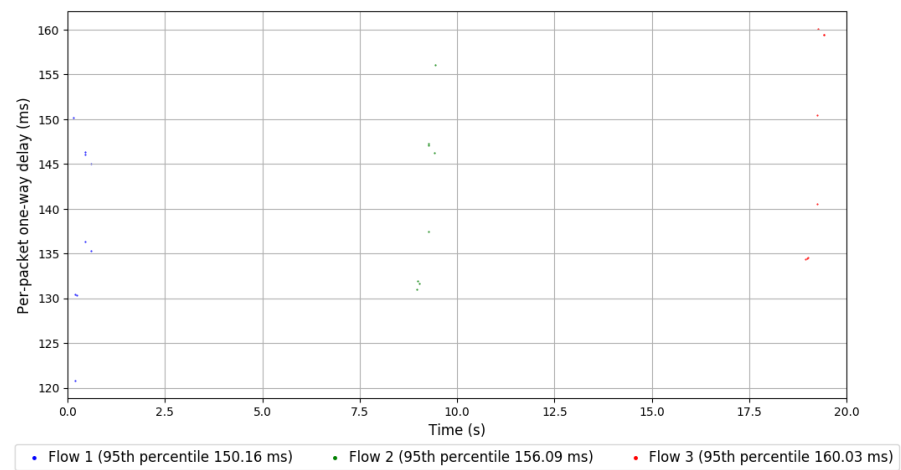
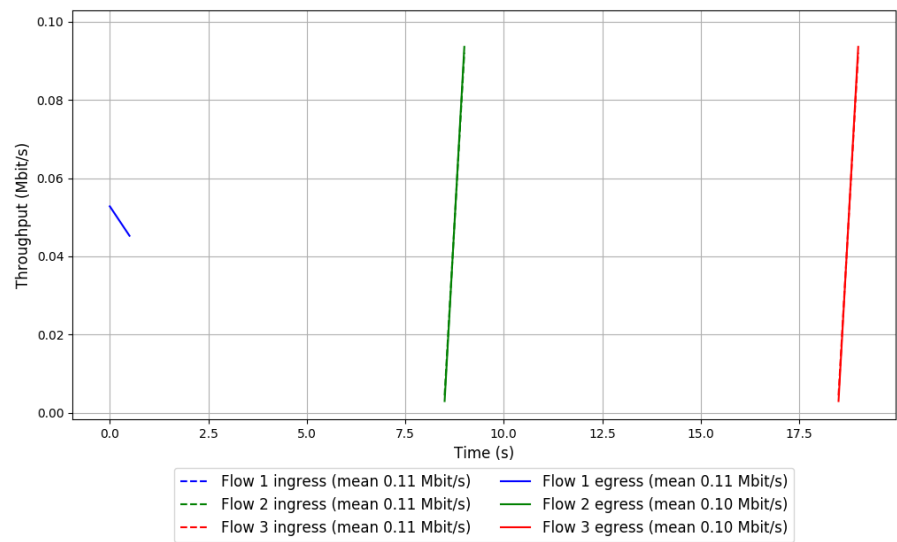
Start at: 2018-01-25 20:13:53

End at: 2018-01-25 20:14:23

Local clock offset: 1.295 ms

Remote clock offset: -5.345 ms

Run 3: Report of QUIC Cubic — Data Link

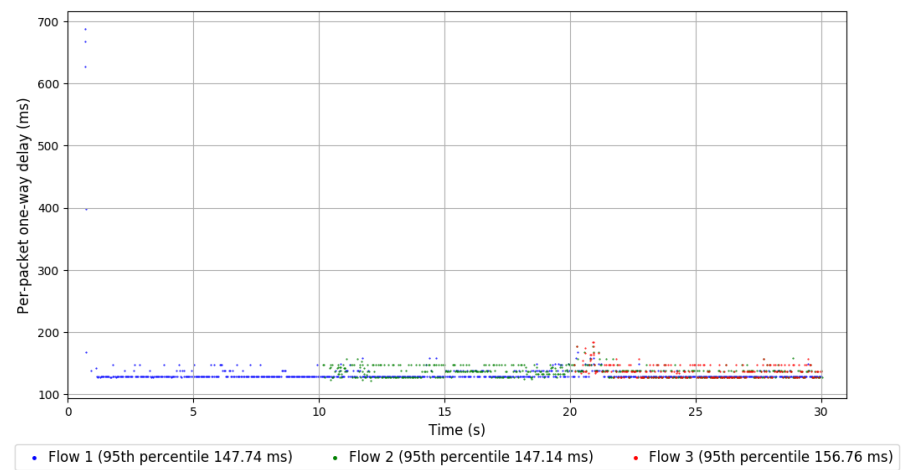
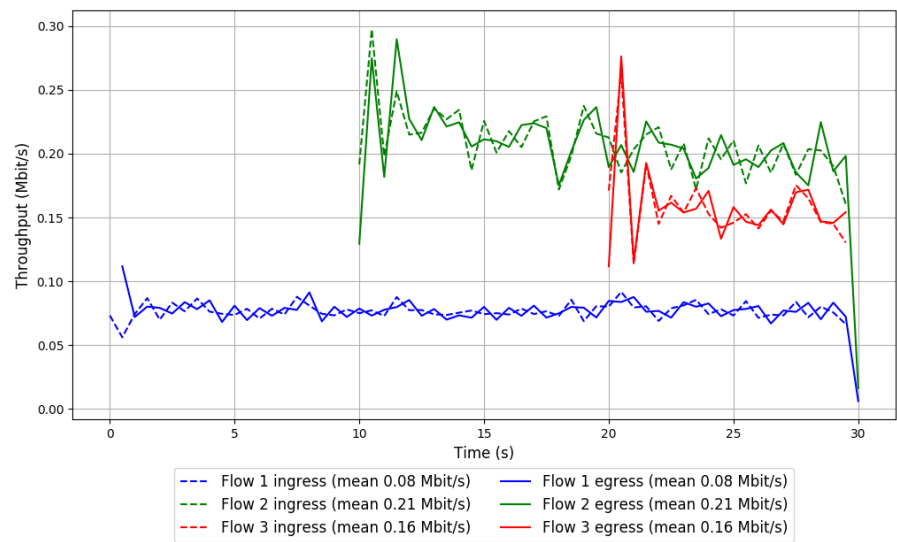


Run 1: Statistics of SCReAM

Start at: 2018-01-25 19:45:51
End at: 2018-01-25 19:46:21
Local clock offset: 1.47 ms
Remote clock offset: -5.078 ms

Below is generated by plot.py at 2018-01-25 20:29:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 147.707 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 147.738 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 147.140 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 156.757 ms
Loss rate: 0.35%

Run 1: Report of SReAM — Data Link

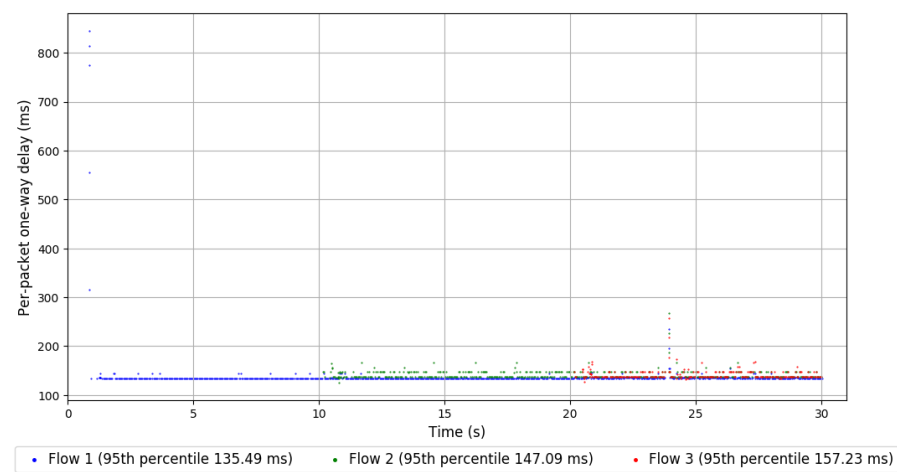
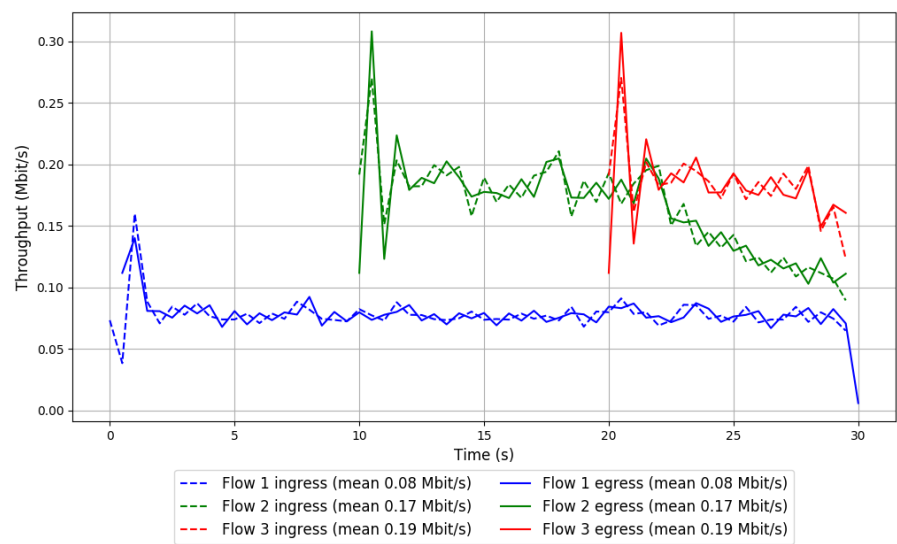


Run 2: Statistics of SReAM

Start at: 2018-01-25 20:06:13
End at: 2018-01-25 20:06:43
Local clock offset: 1.354 ms
Remote clock offset: -6.199 ms

Below is generated by plot.py at 2018-01-25 20:29:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 147.231 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 135.490 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 147.095 ms
Loss rate: 0.37%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 157.231 ms
Loss rate: 0.75%

Run 2: Report of SReAM — Data Link

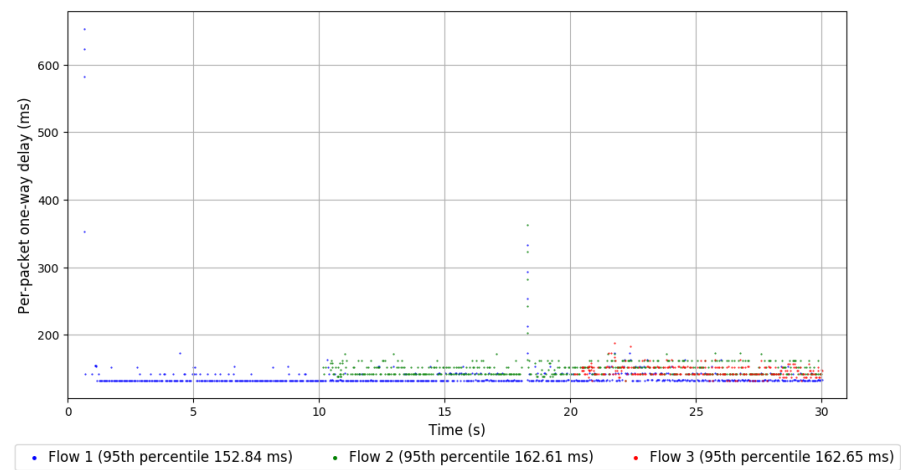
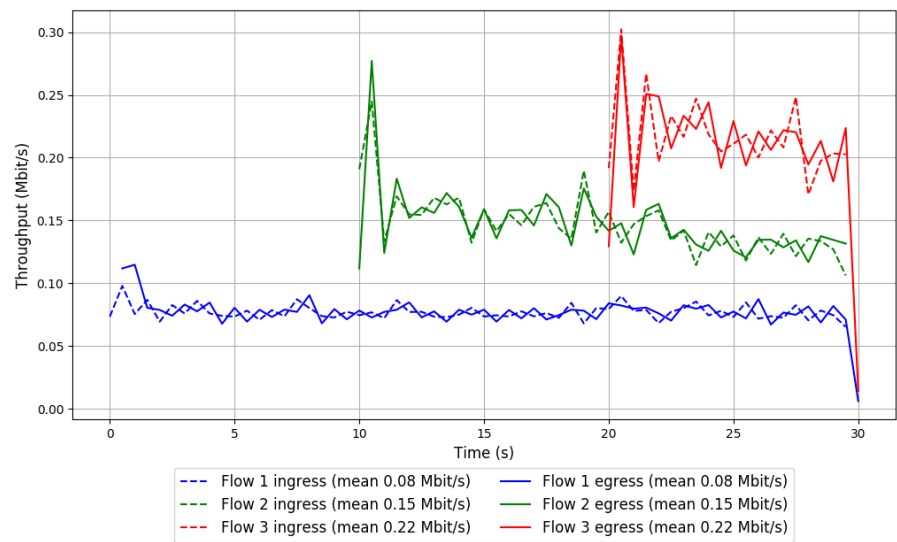


Run 3: Statistics of SCReAM

Start at: 2018-01-25 20:26:36
End at: 2018-01-25 20:27:06
Local clock offset: 1.316 ms
Remote clock offset: -0.472 ms

Below is generated by plot.py at 2018-01-25 20:29:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 162.517 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 152.843 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 162.609 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 162.645 ms
Loss rate: 0.65%

Run 3: Report of SCSReAM — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-01-25 19:47:11

End at: 2018-01-25 19:47:41

Local clock offset: 1.466 ms

Remote clock offset: -1.21 ms

Below is generated by plot.py at 2018-01-25 20:29:40

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.67 Mbit/s

95th percentile per-packet one-way delay: 433.626 ms

Loss rate: 0.26%

-- Flow 1:

Average throughput: 0.45 Mbit/s

95th percentile per-packet one-way delay: 423.909 ms

Loss rate: 0.06%

-- Flow 2:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 431.430 ms

Loss rate: 0.76%

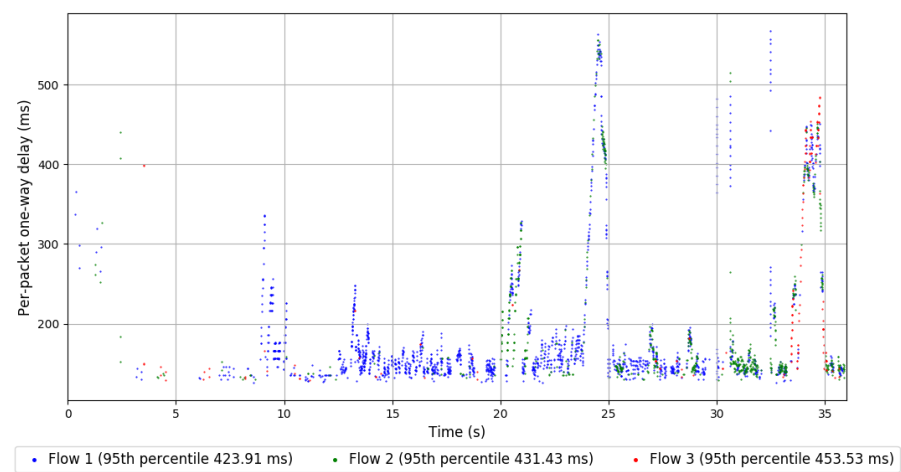
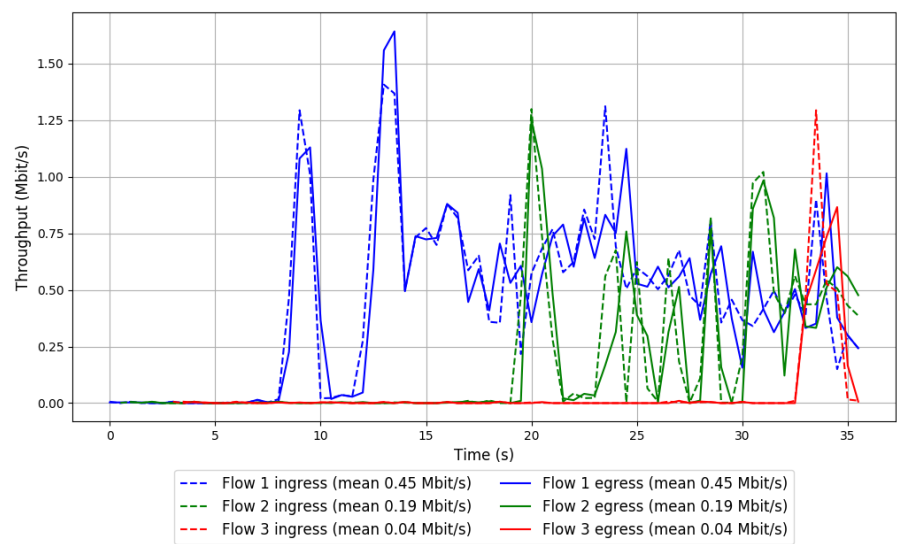
-- Flow 3:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 453.533 ms

Loss rate: 0.19%

Run 1: Report of WebRTC media — Data Link

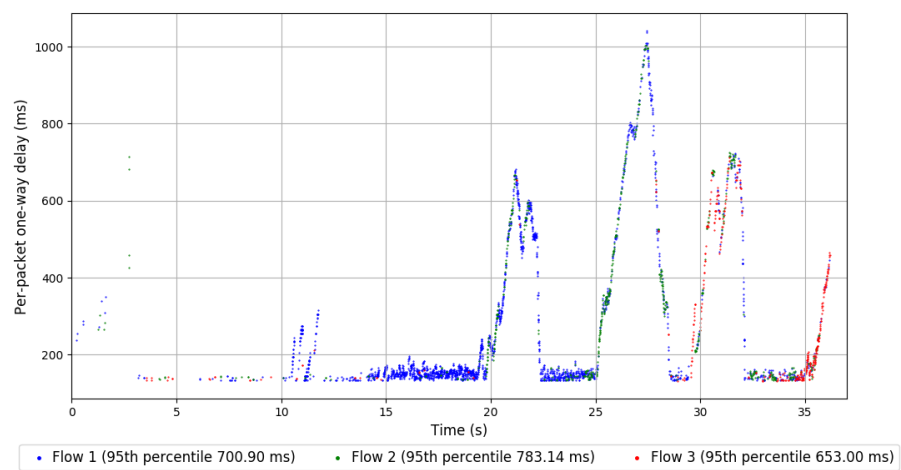
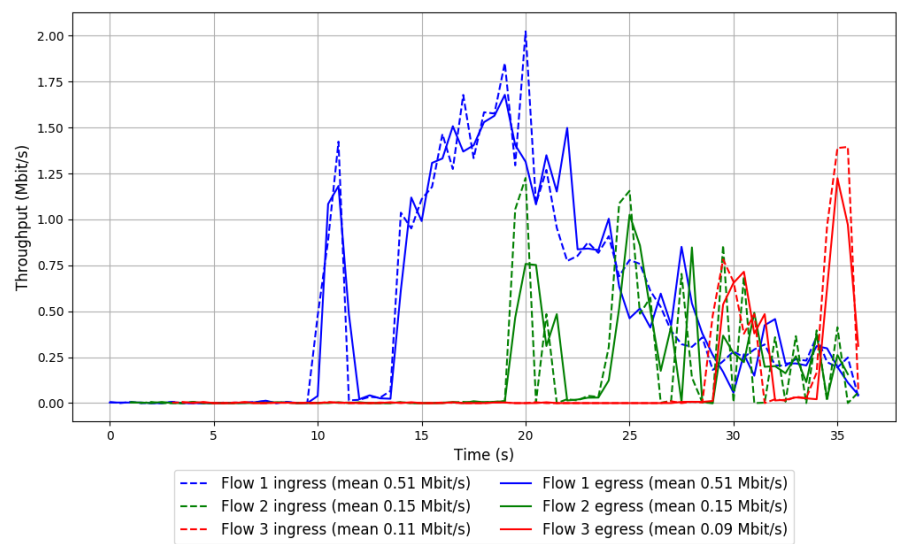


Run 2: Statistics of WebRTC media

Start at: 2018-01-25 20:07:33
End at: 2018-01-25 20:08:03
Local clock offset: 1.358 ms
Remote clock offset: -0.436 ms

Below is generated by plot.py at 2018-01-25 20:29:41
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 710.142 ms
Loss rate: 1.99%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 700.899 ms
Loss rate: 0.51%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 783.142 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 653.002 ms
Loss rate: 12.13%

Run 2: Report of WebRTC media — Data Link

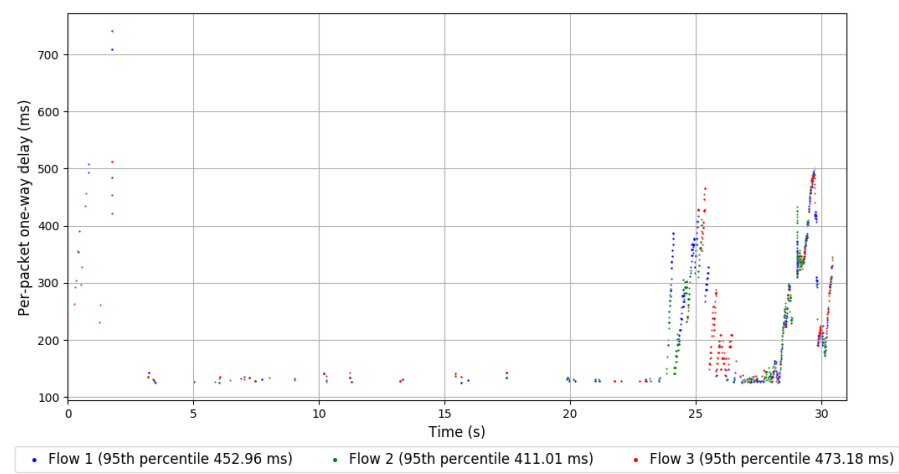
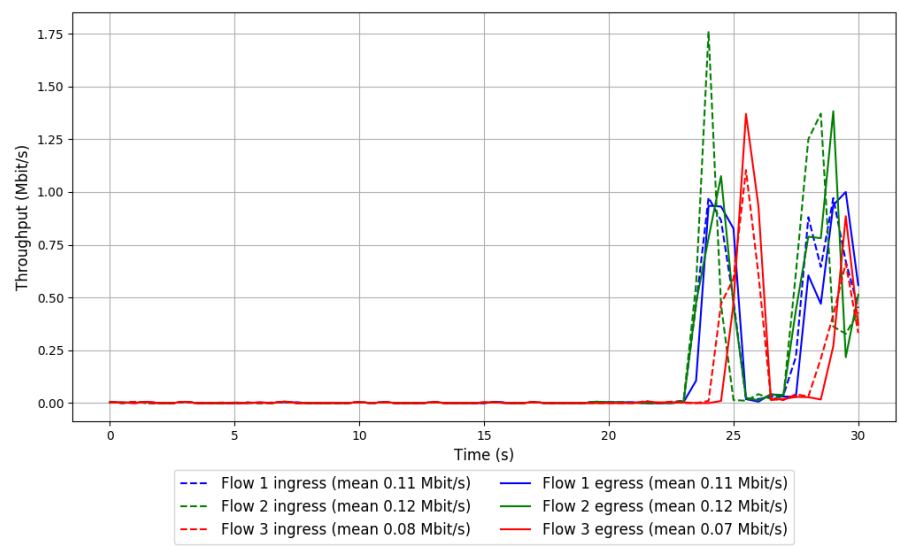


Run 3: Statistics of WebRTC media

Start at: 2018-01-25 20:27:52
End at: 2018-01-25 20:28:22
Local clock offset: 1.347 ms
Remote clock offset: -5.427 ms

Below is generated by plot.py at 2018-01-25 20:29:41
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 455.593 ms
Loss rate: 3.06%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 452.958 ms
Loss rate: 3.55%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 411.015 ms
Loss rate: 3.19%
-- Flow 3:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 473.182 ms
Loss rate: 2.13%

Run 3: Report of WebRTC media — Data Link

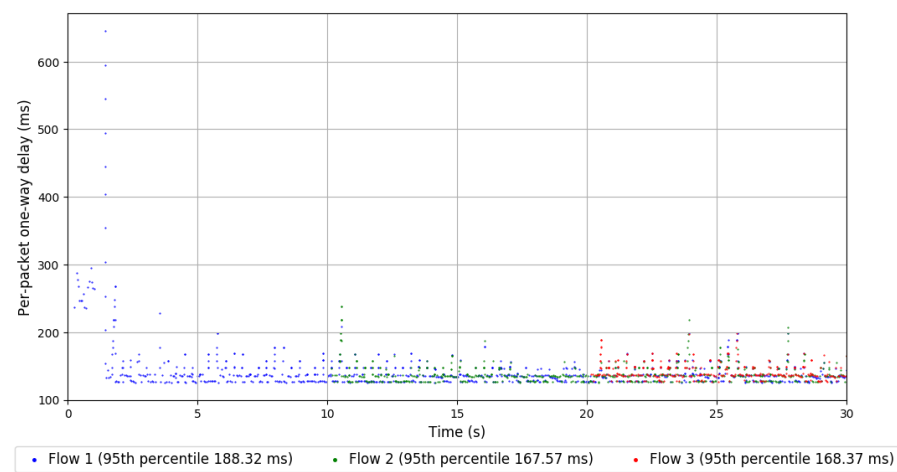
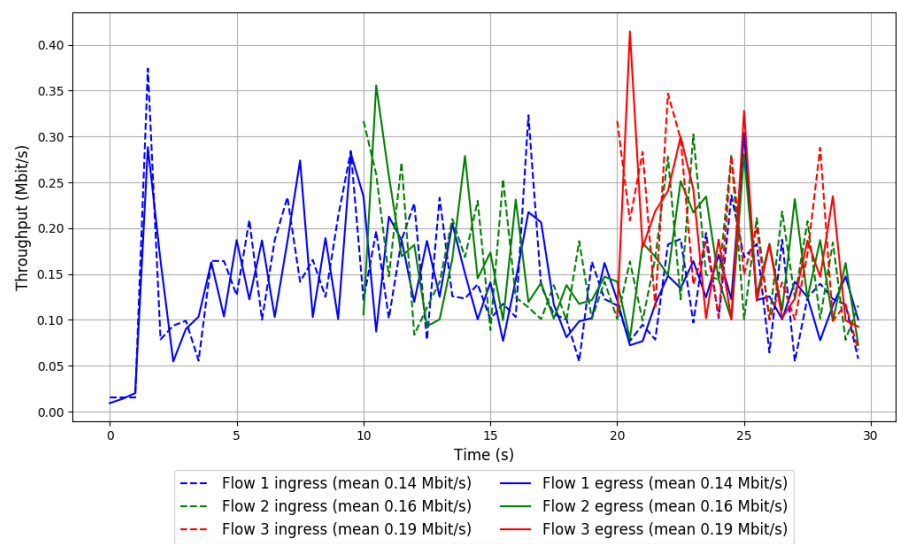


Run 1: Statistics of Sprout

Start at: 2018-01-25 19:30:36
End at: 2018-01-25 19:31:06
Local clock offset: 1.546 ms
Remote clock offset: -6.087 ms

Below is generated by plot.py at 2018-01-25 20:29:42
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 168.865 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 188.322 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 167.573 ms
Loss rate: 0.73%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 168.372 ms
Loss rate: 0.04%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

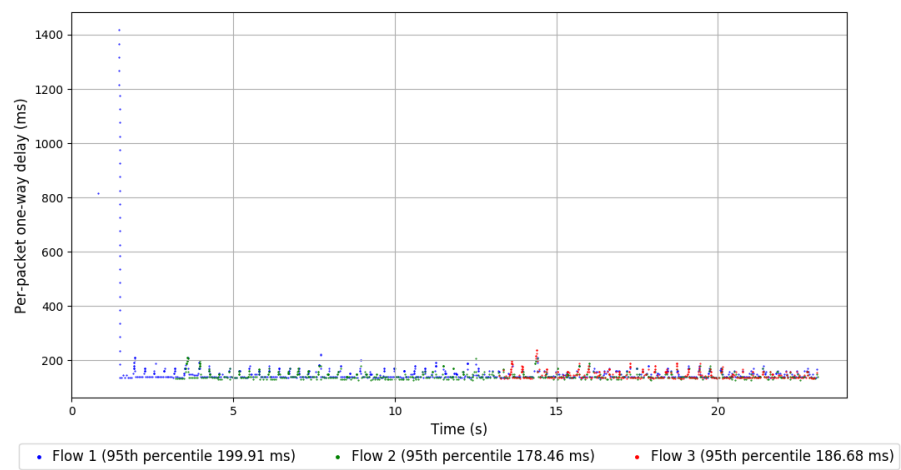
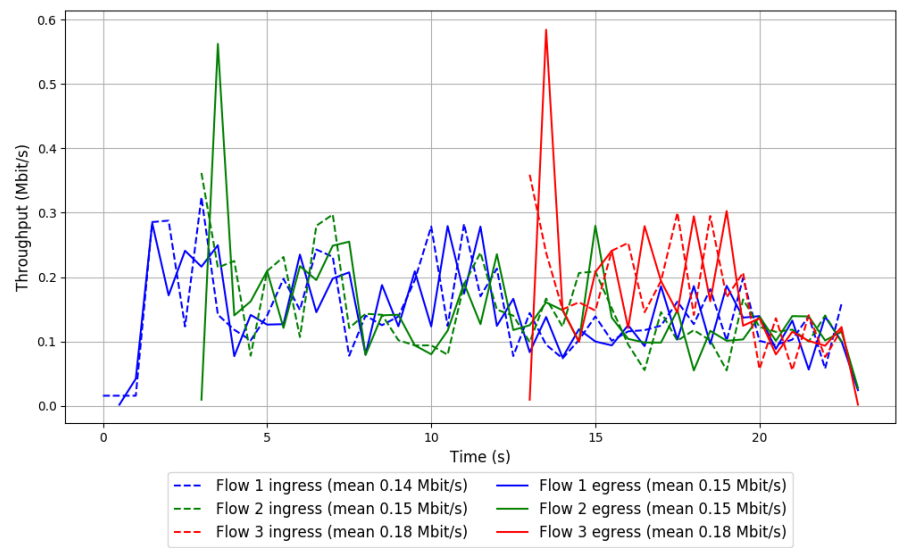
Start at: 2018-01-25 19:50:58

End at: 2018-01-25 19:51:28

Local clock offset: 1.425 ms

Remote clock offset: -0.325 ms

Run 2: Report of Sprout — Data Link

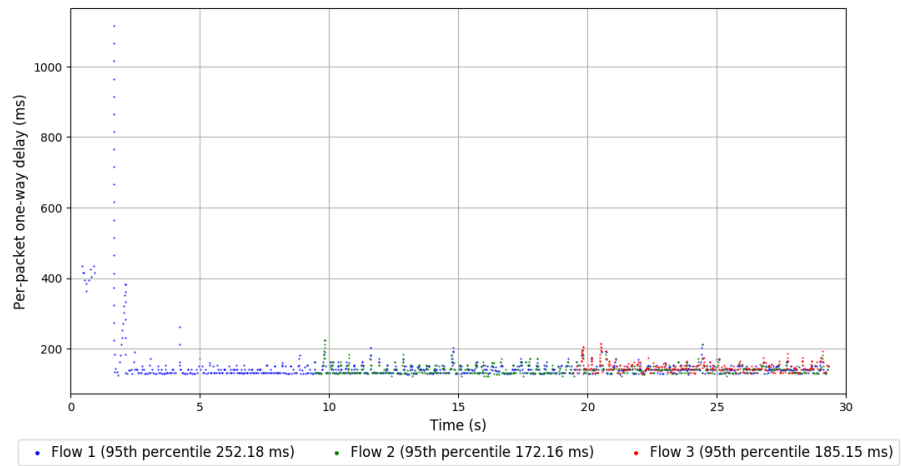
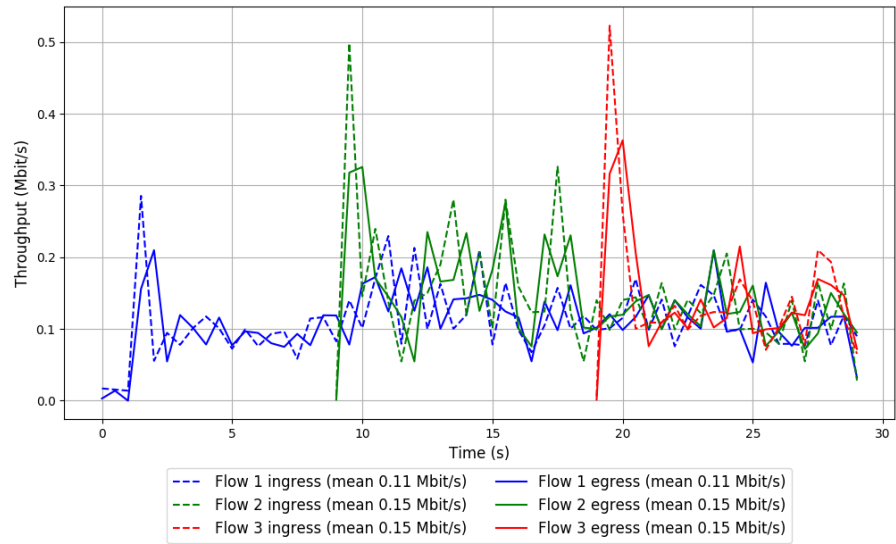


Run 3: Statistics of Sprout

Start at: 2018-01-25 20:11:21
End at: 2018-01-25 20:11:51
Local clock offset: 1.357 ms
Remote clock offset: -0.462 ms

```
# Below is generated by plot.py at 2018-01-25 20:29:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 184.618 ms
Loss rate: 0.81%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 252.177 ms
Loss rate: 0.95%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 172.162 ms
Loss rate: 0.42%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 185.145 ms
Loss rate: 1.28%
```

Run 3: Report of Sprout — Data Link

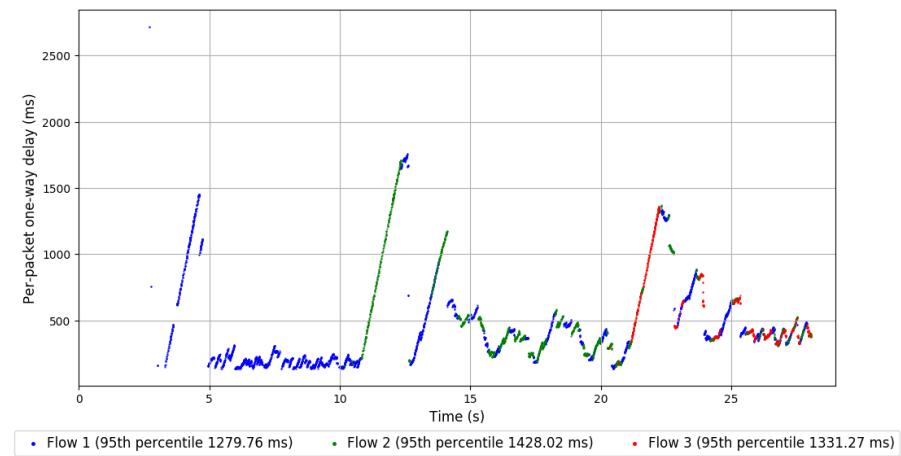
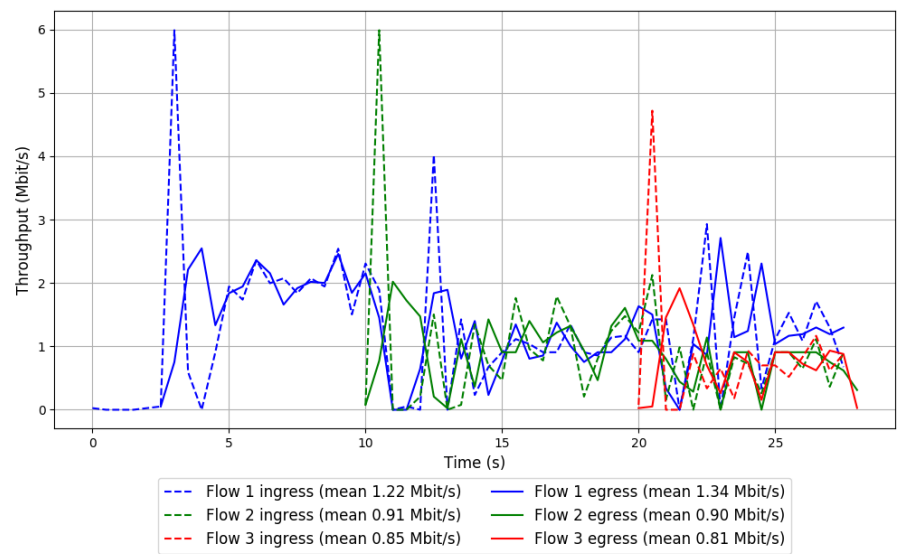


Run 1: Statistics of TaoVA-100x

Start at: 2018-01-25 19:36:56
End at: 2018-01-25 19:37:26
Local clock offset: 1.554 ms
Remote clock offset: -1.451 ms

Below is generated by plot.py at 2018-01-25 20:29:49
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.21 Mbit/s
95th percentile per-packet one-way delay: 1338.707 ms
Loss rate: 1.53%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 1279.762 ms
Loss rate: 0.99%
-- Flow 2:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 1428.019 ms
Loss rate: 1.35%
-- Flow 3:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 1331.268 ms
Loss rate: 4.72%

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

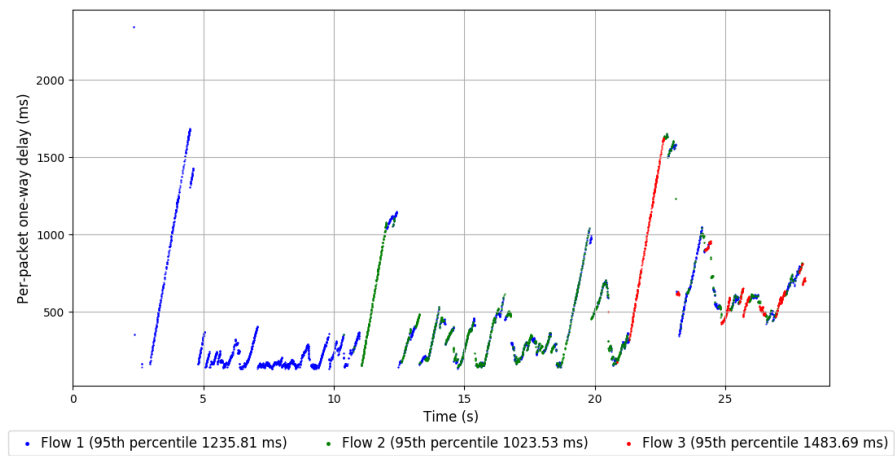
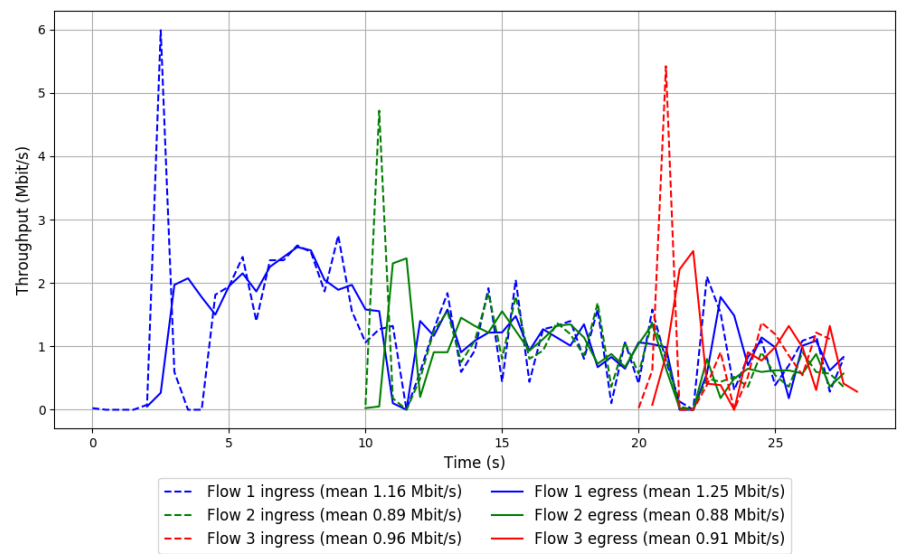


Run 2: Statistics of TaoVA-100x

Start at: 2018-01-25 19:57:19
End at: 2018-01-25 19:57:49
Local clock offset: 1.37 ms
Remote clock offset: -5.251 ms

Below is generated by plot.py at 2018-01-25 20:29:49
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 1339.829 ms
Loss rate: 1.66%
-- Flow 1:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 1235.807 ms
Loss rate: 1.24%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 1023.535 ms
Loss rate: 1.96%
-- Flow 3:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 1483.689 ms
Loss rate: 2.93%

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

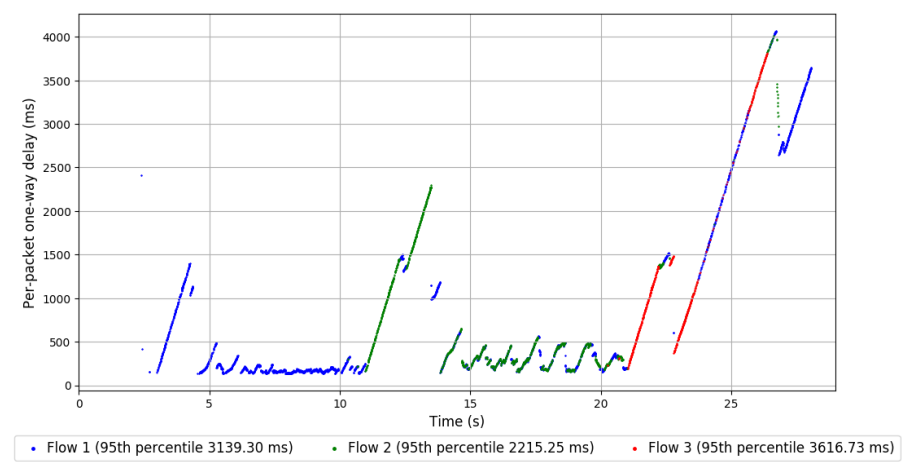
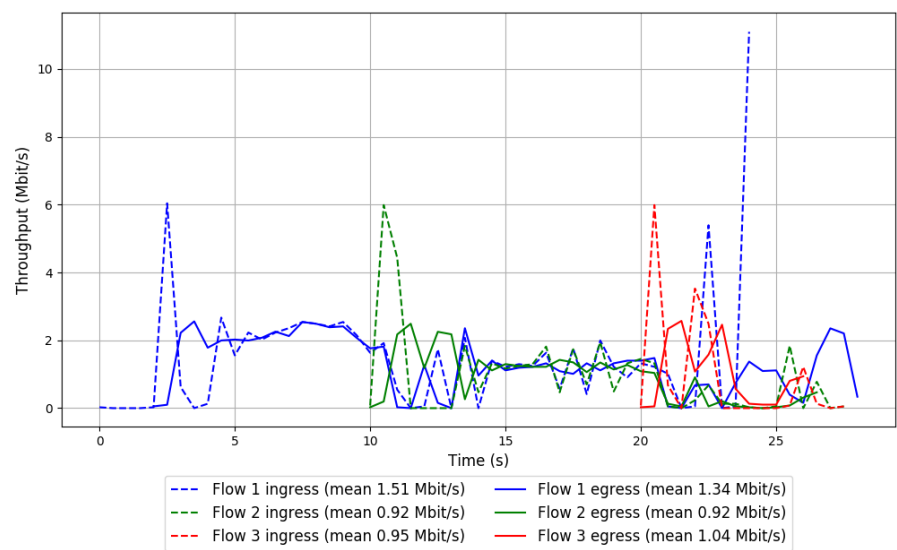


Run 3: Statistics of TaoVA-100x

Start at: 2018-01-25 20:17:40
End at: 2018-01-25 20:18:10
Local clock offset: 1.327 ms
Remote clock offset: -0.404 ms

Below is generated by plot.py at 2018-01-25 20:29:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 3162.669 ms
Loss rate: 7.82%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 3139.305 ms
Loss rate: 7.11%
-- Flow 2:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 2215.251 ms
Loss rate: 8.31%
-- Flow 3:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 3616.729 ms
Loss rate: 10.38%

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

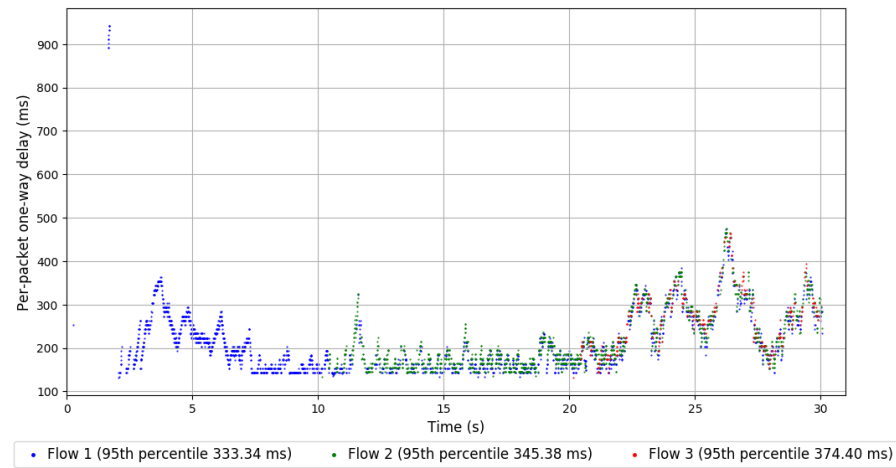
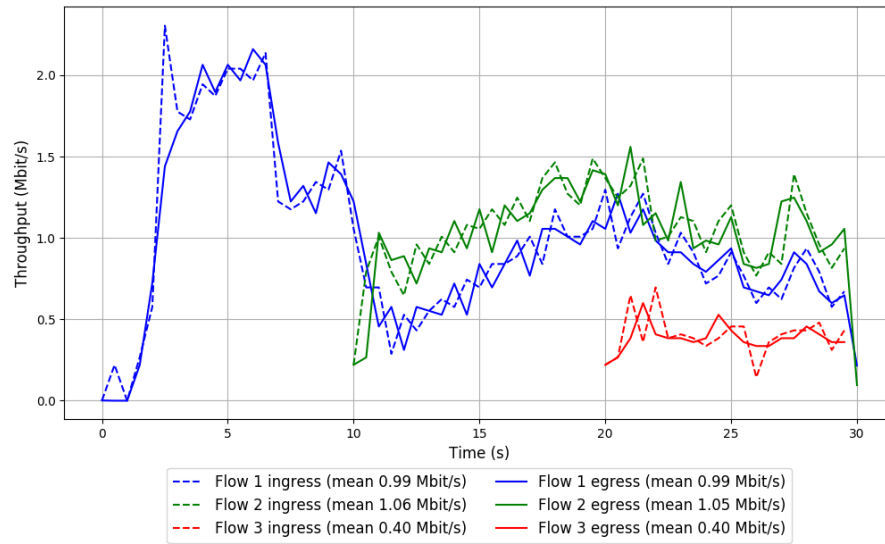


Run 1: Statistics of TCP Vegas

Start at: 2018-01-25 19:44:35
End at: 2018-01-25 19:45:05
Local clock offset: 1.491 ms
Remote clock offset: -0.209 ms

Below is generated by plot.py at 2018-01-25 20:29:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.83 Mbit/s
95th percentile per-packet one-way delay: 343.421 ms
Loss rate: 0.87%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 333.342 ms
Loss rate: 0.56%
-- Flow 2:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 345.376 ms
Loss rate: 0.85%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 374.404 ms
Loss rate: 3.30%

Run 1: Report of TCP Vegas — Data Link

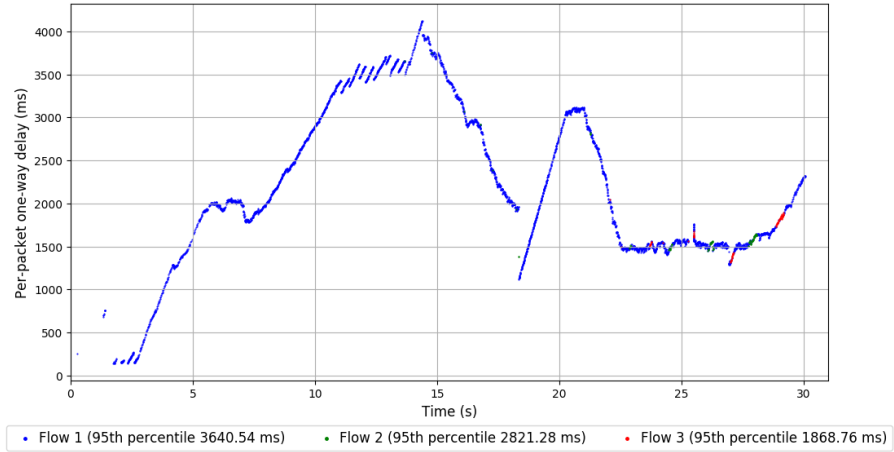
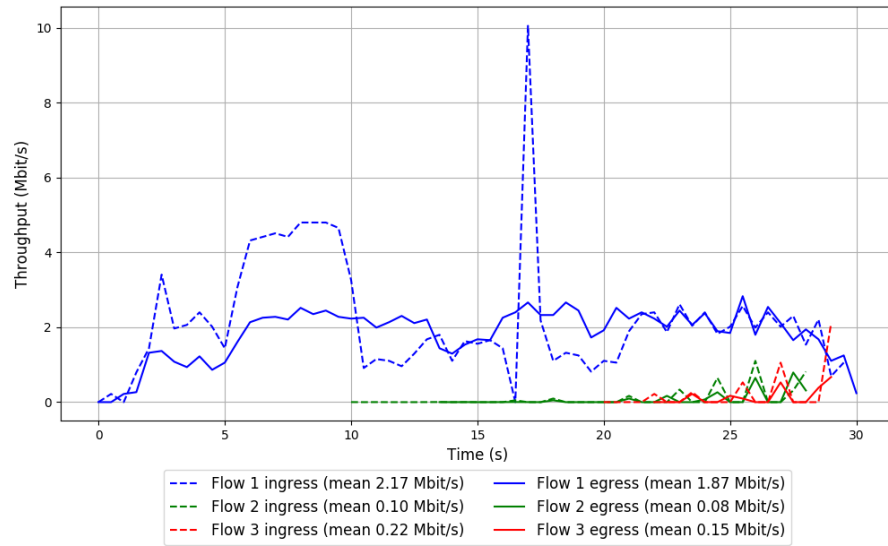


Run 2: Statistics of TCP Vegas

Start at: 2018-01-25 20:04:57
End at: 2018-01-25 20:05:27
Local clock offset: 1.275 ms
Remote clock offset: -0.394 ms

Below is generated by plot.py at 2018-01-25 20:29:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 3630.978 ms
Loss rate: 16.11%
-- Flow 1:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 3640.543 ms
Loss rate: 14.58%
-- Flow 2:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 2821.276 ms
Loss rate: 31.88%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 1868.759 ms
Loss rate: 50.44%

Run 2: Report of TCP Vegas — Data Link

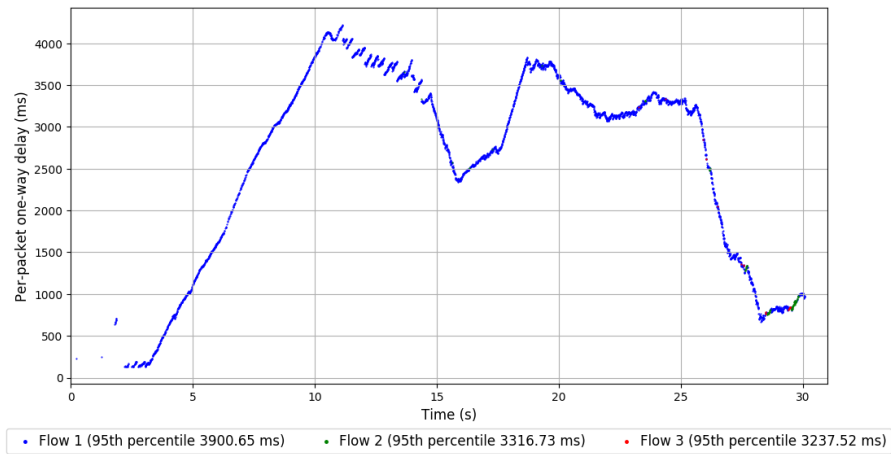
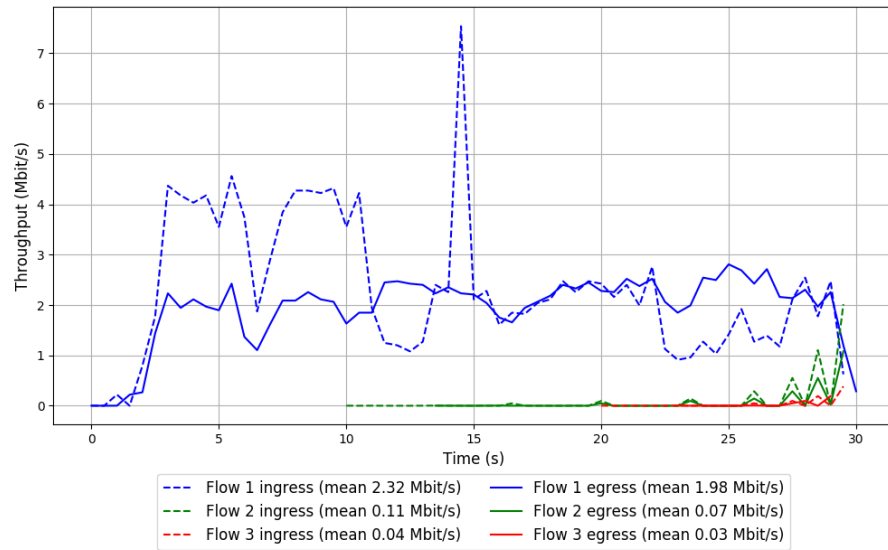


Run 3: Statistics of TCP Vegas

Start at: 2018-01-25 20:25:20
End at: 2018-01-25 20:25:50
Local clock offset: 1.328 ms
Remote clock offset: -5.397 ms

```
# Below is generated by plot.py at 2018-01-25 20:29:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 3891.125 ms
Loss rate: 16.03%
-- Flow 1:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 3900.649 ms
Loss rate: 14.88%
-- Flow 2:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 3316.731 ms
Loss rate: 47.34%
-- Flow 3:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 3237.517 ms
Loss rate: 52.54%
```

Run 3: Report of TCP Vegas — Data Link

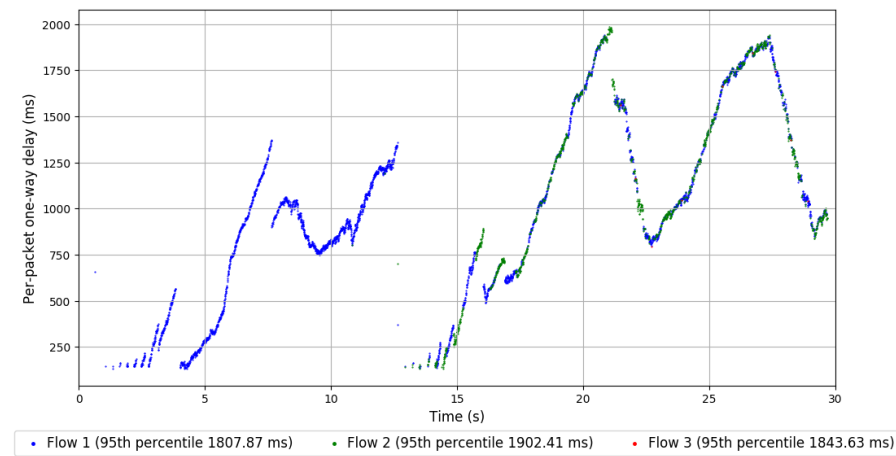
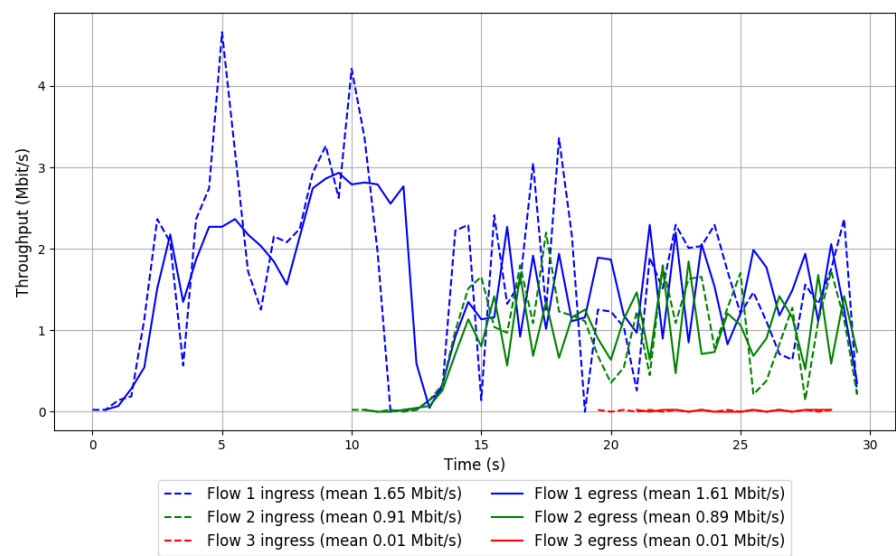


Run 1: Statistics of Verus

Start at: 2018-01-25 19:38:13
End at: 2018-01-25 19:38:43
Local clock offset: 1.537 ms
Remote clock offset: -5.352 ms

Below is generated by plot.py at 2018-01-25 20:29:50
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 1862.624 ms
Loss rate: 4.47%
-- Flow 1:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 1807.869 ms
Loss rate: 4.00%
-- Flow 2:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 1902.413 ms
Loss rate: 5.72%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1843.632 ms
Loss rate: 10.00%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

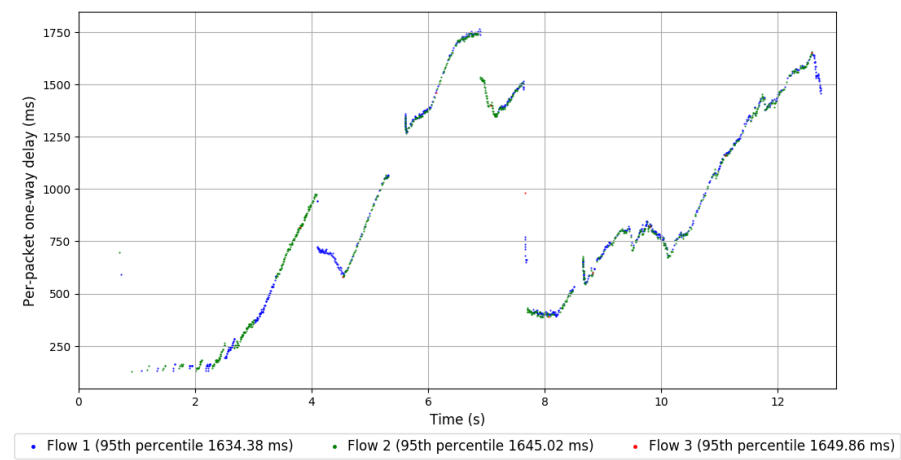
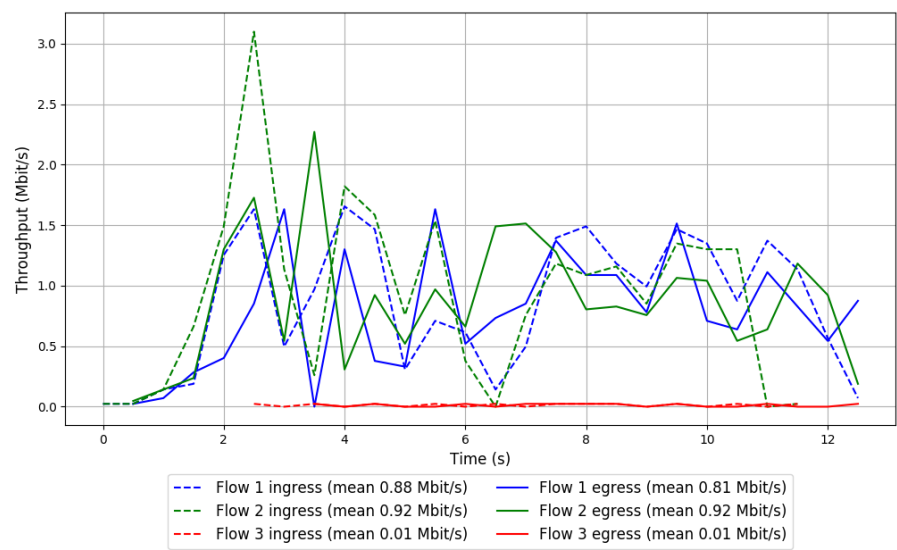
Start at: 2018-01-25 19:58:35

End at: 2018-01-25 19:59:05

Local clock offset: 1.372 ms

Remote clock offset: -5.273 ms

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-01-25 20:18:58

End at: 2018-01-25 20:19:28

Local clock offset: 1.26 ms

Remote clock offset: 0.458 ms

Below is generated by plot.py at 2018-01-25 20:29:55

Datalink statistics

-- Total of 3 flows:

Average throughput: 2.37 Mbit/s

95th percentile per-packet one-way delay: 1859.811 ms

Loss rate: 4.17%

-- Flow 1:

Average throughput: 2.36 Mbit/s

95th percentile per-packet one-way delay: 1859.714 ms

Loss rate: 4.13%

-- Flow 2:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1806.527 ms

Loss rate: 10.00%

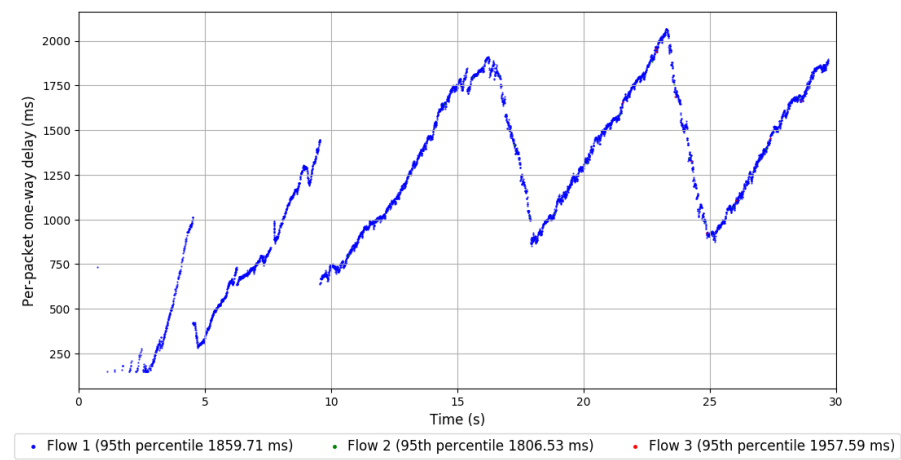
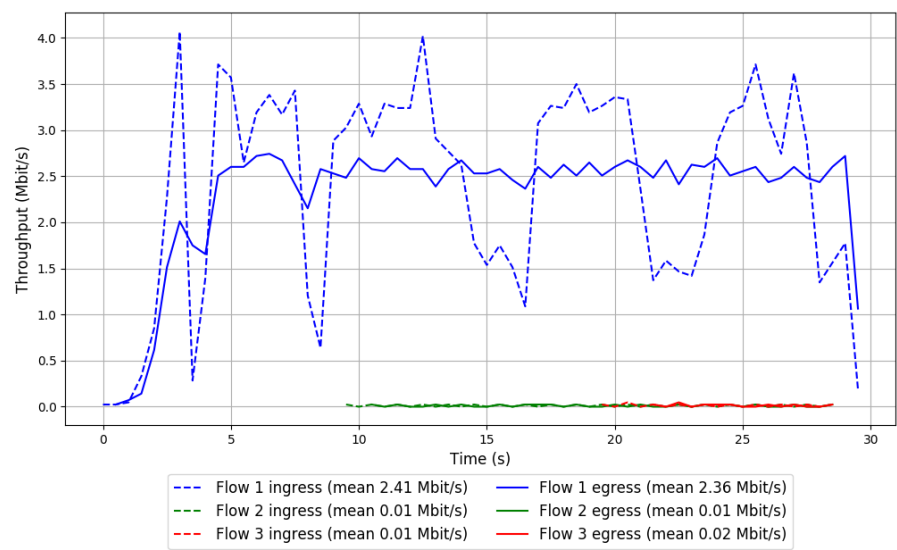
-- Flow 3:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 1957.592 ms

Loss rate: 18.18%

Run 3: Report of Verus — Data Link



Run 1: Statistics of Copa

Start at: 2018-01-25 19:35:39

End at: 2018-01-25 19:36:09

Local clock offset: 1.574 ms

Remote clock offset: 0.46 ms

Below is generated by plot.py at 2018-01-25 20:29:56

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.17 Mbit/s

95th percentile per-packet one-way delay: 187.337 ms

Loss rate: 0.35%

-- Flow 1:

Average throughput: 169.41 Mbit/s

95th percentile per-packet one-way delay: 2868.676 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 184.622 ms

Loss rate: 0.23%

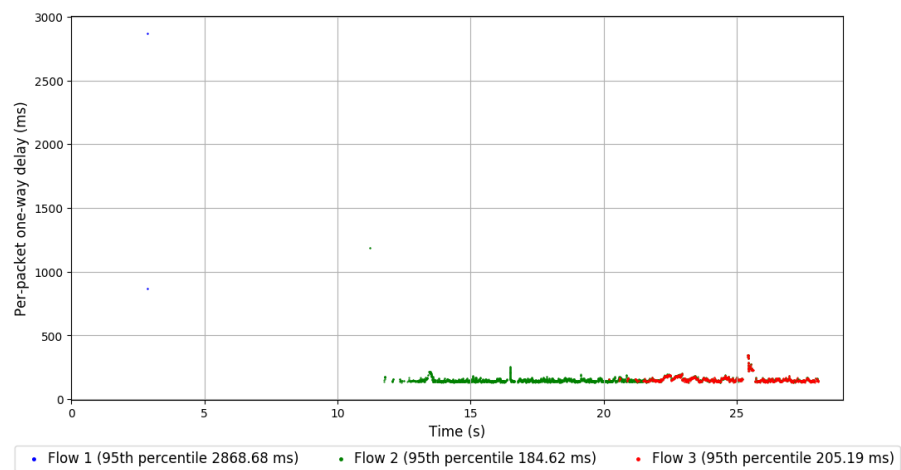
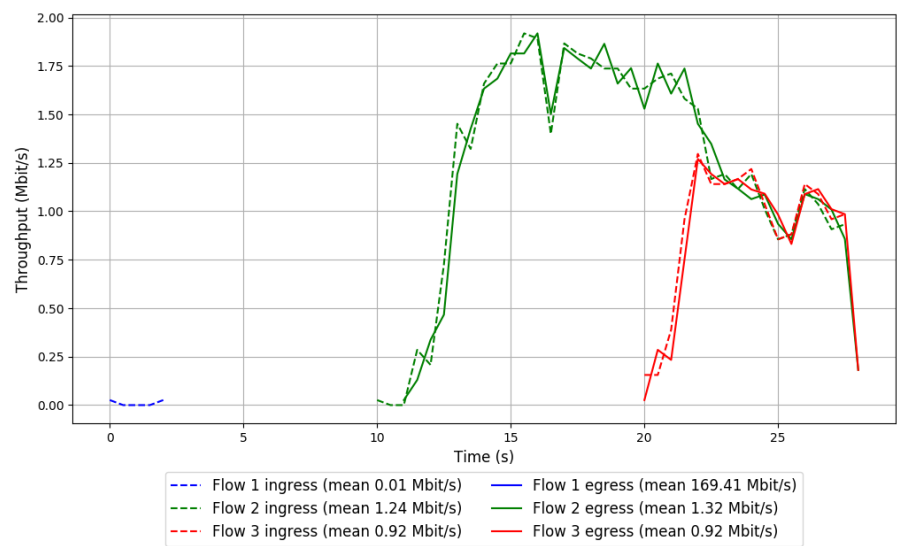
-- Flow 3:

Average throughput: 0.92 Mbit/s

95th percentile per-packet one-way delay: 205.187 ms

Loss rate: 0.71%

Run 1: Report of Copa — Data Link

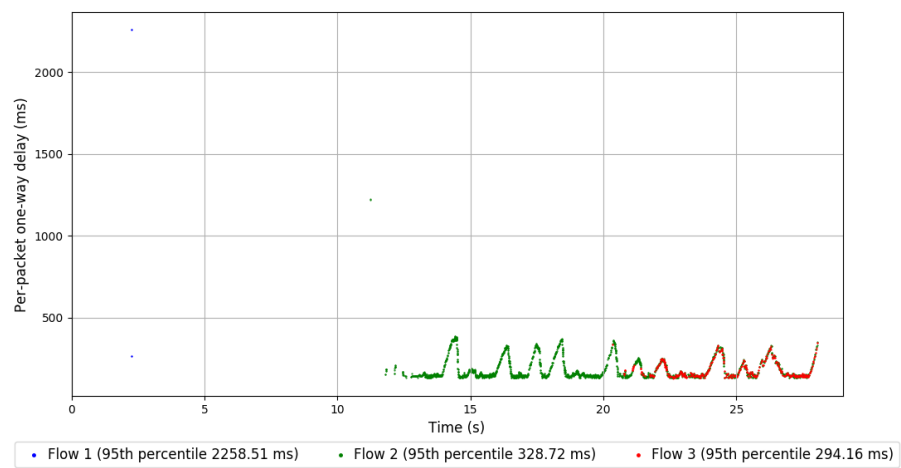
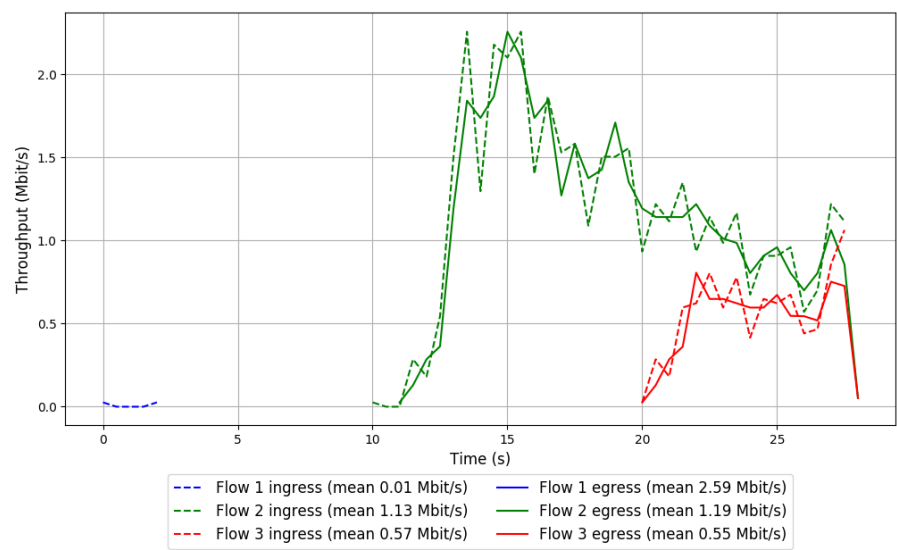


Run 2: Statistics of Copa

Start at: 2018-01-25 19:56:00
End at: 2018-01-25 19:56:30
Local clock offset: 1.412 ms
Remote clock offset: -0.384 ms

Below is generated by plot.py at 2018-01-25 20:29:56
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 324.450 ms
Loss rate: 2.30%
-- Flow 1:
Average throughput: 2.59 Mbit/s
95th percentile per-packet one-way delay: 2258.506 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 328.724 ms
Loss rate: 1.47%
-- Flow 3:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 294.158 ms
Loss rate: 6.00%

Run 2: Report of Copa — Data Link

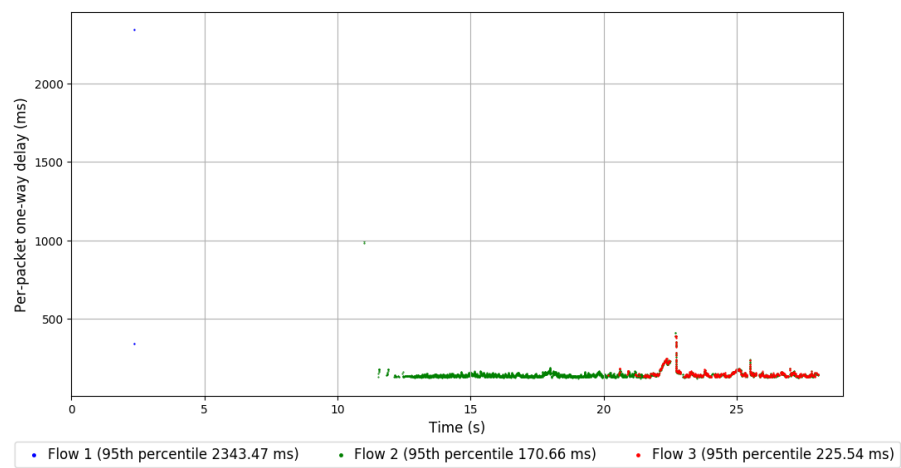
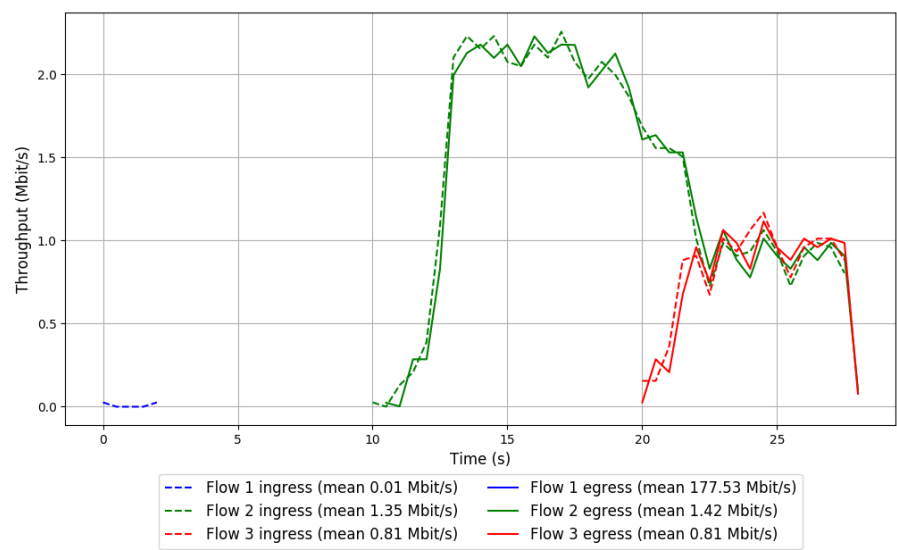


Run 3: Statistics of Copa

Start at: 2018-01-25 20:16:24
End at: 2018-01-25 20:16:54
Local clock offset: 1.348 ms
Remote clock offset: -5.289 ms

Below is generated by plot.py at 2018-01-25 20:29:57
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 181.582 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 177.53 Mbit/s
95th percentile per-packet one-way delay: 2343.468 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 170.656 ms
Loss rate: 0.22%
-- Flow 3:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 225.543 ms
Loss rate: 1.00%

Run 3: Report of Copa — Data Link

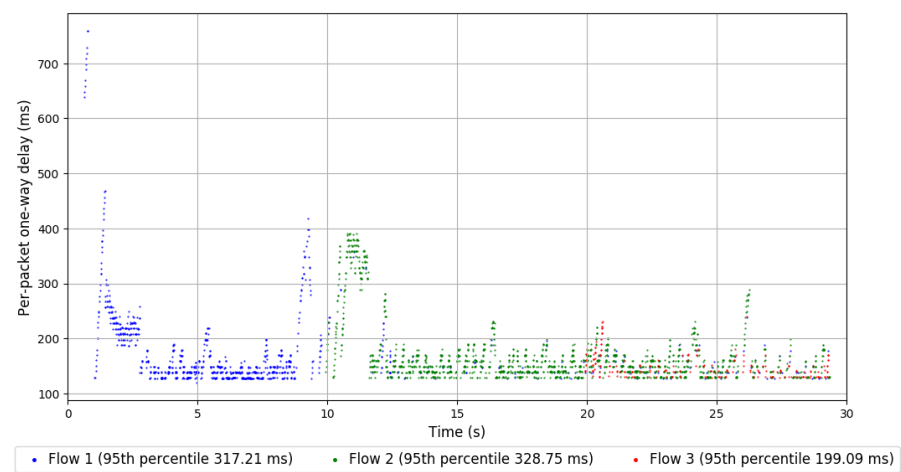
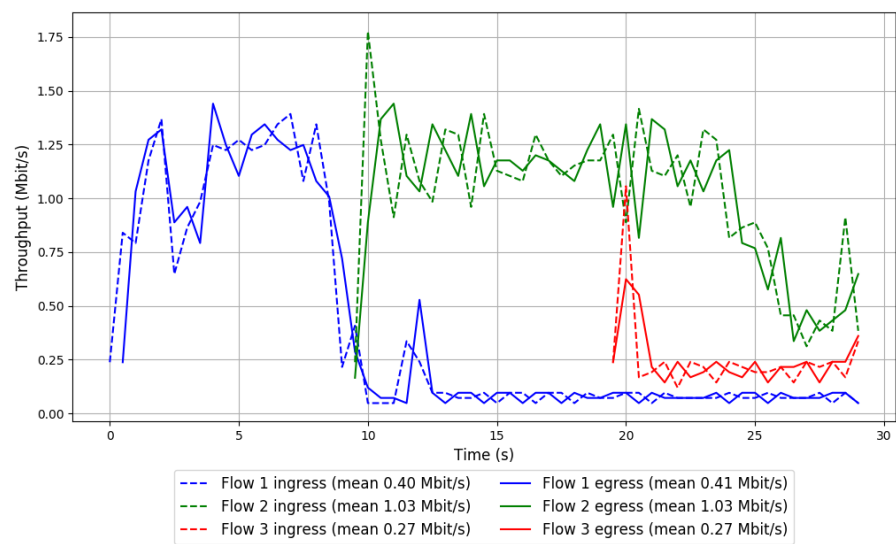


Run 1: Statistics of Indigo-2-256

Start at: 2018-01-25 19:40:47
End at: 2018-01-25 19:41:17
Local clock offset: 1.508 ms
Remote clock offset: -5.359 ms

Below is generated by plot.py at 2018-01-25 20:29:57
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 318.512 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 317.209 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 328.754 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 199.095 ms
Loss rate: 0.00%

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

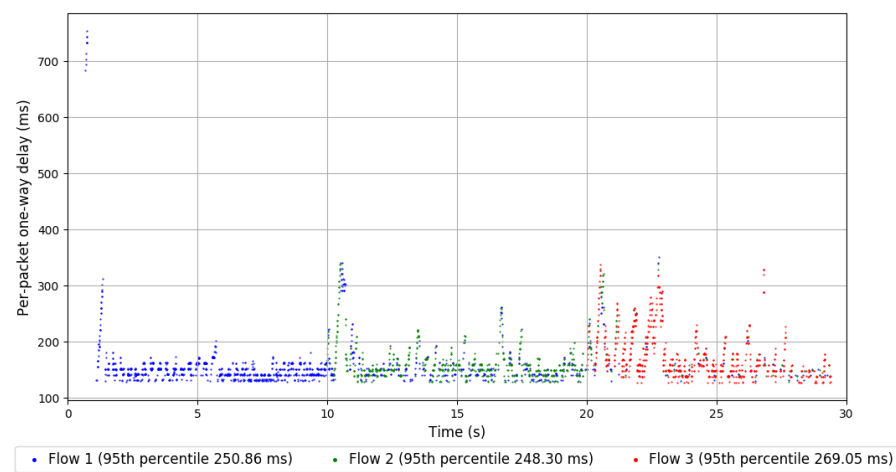
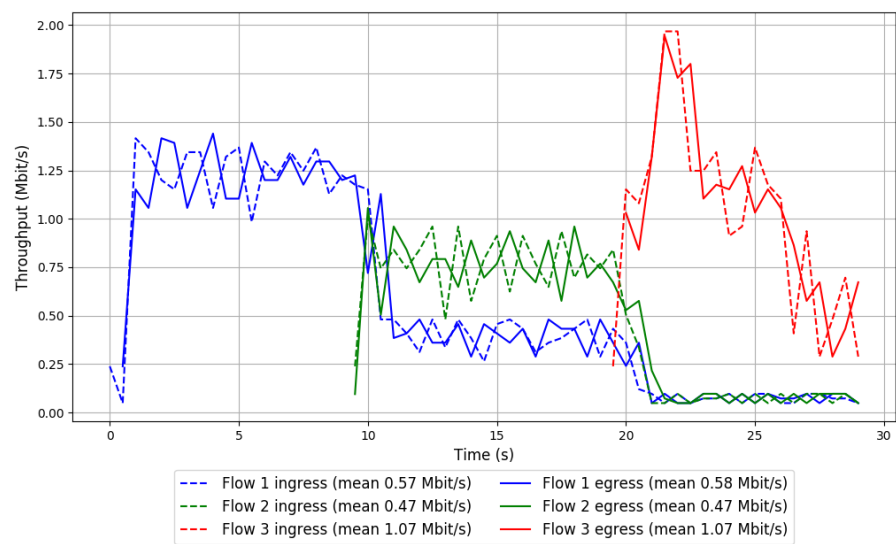


Run 2: Statistics of Indigo-2-256

Start at: 2018-01-25 20:01:08
End at: 2018-01-25 20:01:38
Local clock offset: 1.288 ms
Remote clock offset: -1.336 ms

Below is generated by plot.py at 2018-01-25 20:29:57
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 259.276 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 250.858 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 248.297 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 269.050 ms
Loss rate: 0.36%

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



Run 3: Statistics of Indigo-2-256

Start at: 2018-01-25 20:21:32

End at: 2018-01-25 20:22:02

Local clock offset: 1.346 ms

Remote clock offset: -6.31 ms

Below is generated by plot.py at 2018-01-25 20:29:57

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.25 Mbit/s

95th percentile per-packet one-way delay: 283.916 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.68 Mbit/s

95th percentile per-packet one-way delay: 257.425 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 276.487 ms

Loss rate: 0.00%

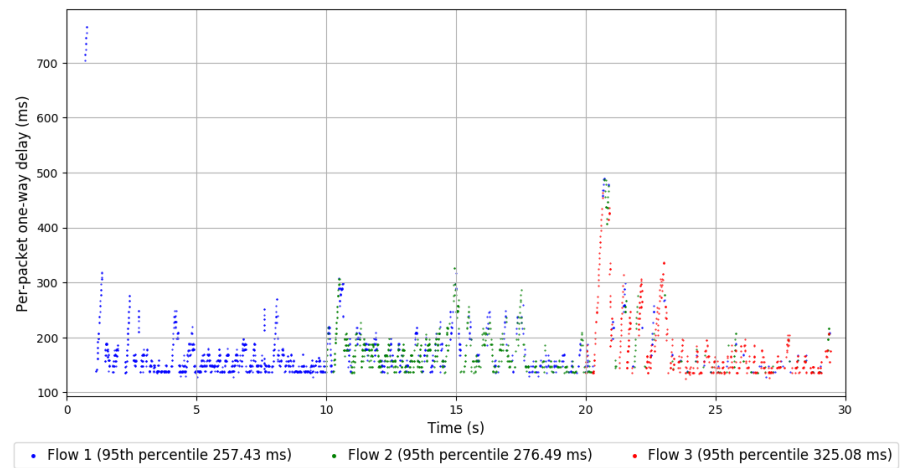
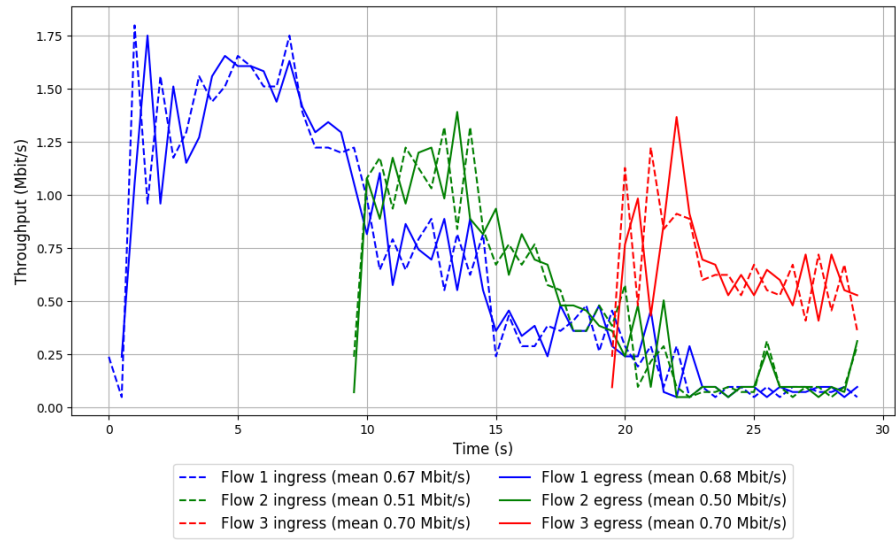
-- Flow 3:

Average throughput: 0.70 Mbit/s

95th percentile per-packet one-way delay: 325.084 ms

Loss rate: 0.00%

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



Run 1: Statistics of Indigo-1-32

Start at: 2018-01-25 19:34:23

End at: 2018-01-25 19:34:53

Local clock offset: 1.585 ms

Remote clock offset: 0.446 ms

Below is generated by plot.py at 2018-01-25 20:29:59

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.71 Mbit/s

95th percentile per-packet one-way delay: 240.597 ms

Loss rate: 0.27%

-- Flow 1:

Average throughput: 0.84 Mbit/s

95th percentile per-packet one-way delay: 242.230 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.83 Mbit/s

95th percentile per-packet one-way delay: 240.270 ms

Loss rate: 0.07%

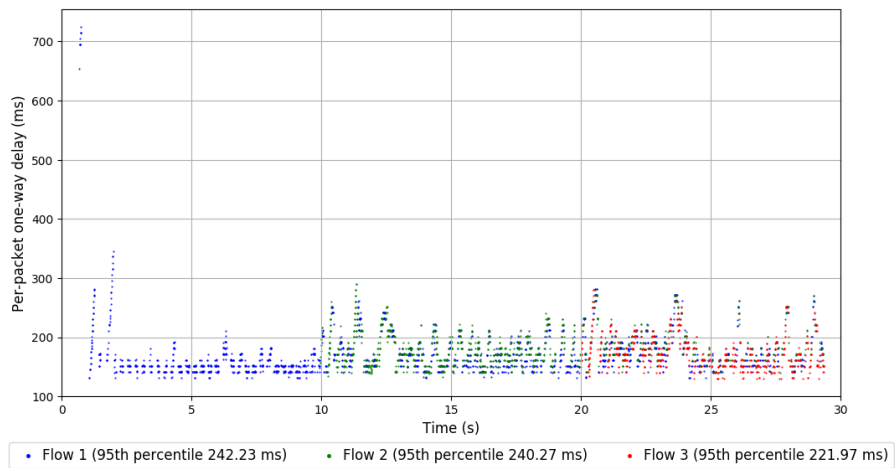
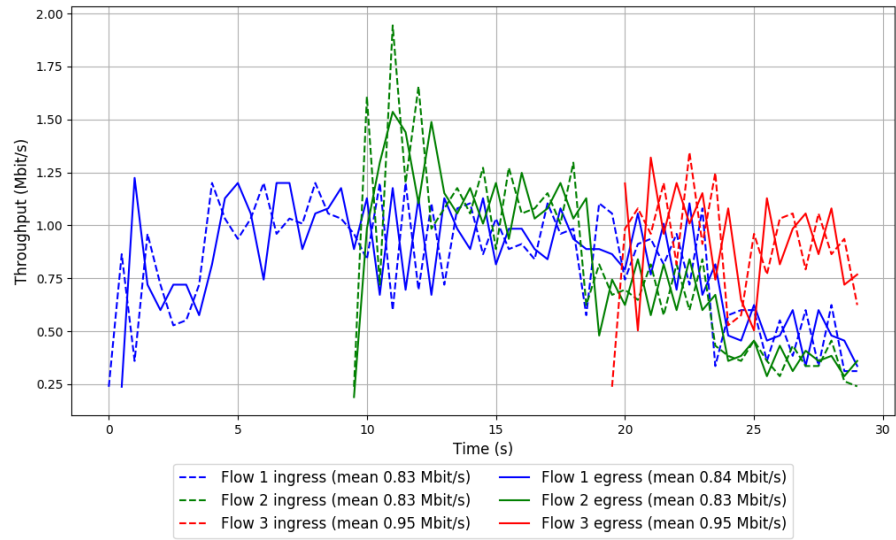
-- Flow 3:

Average throughput: 0.95 Mbit/s

95th percentile per-packet one-way delay: 221.972 ms

Loss rate: 1.34%

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

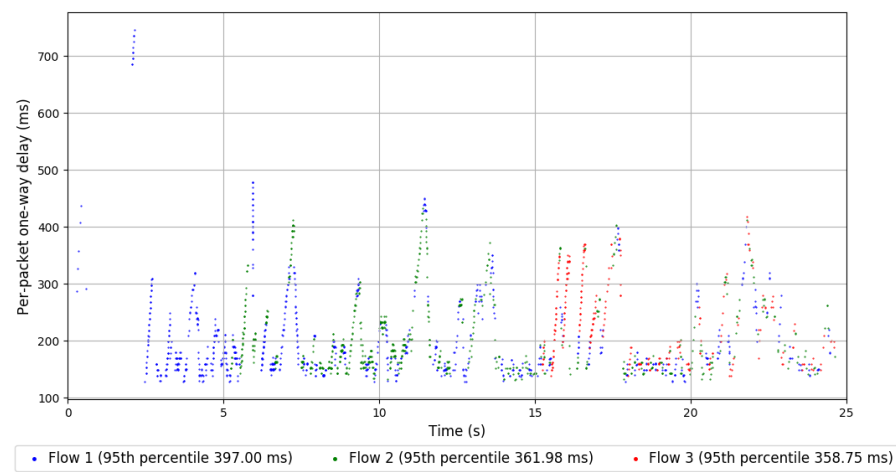
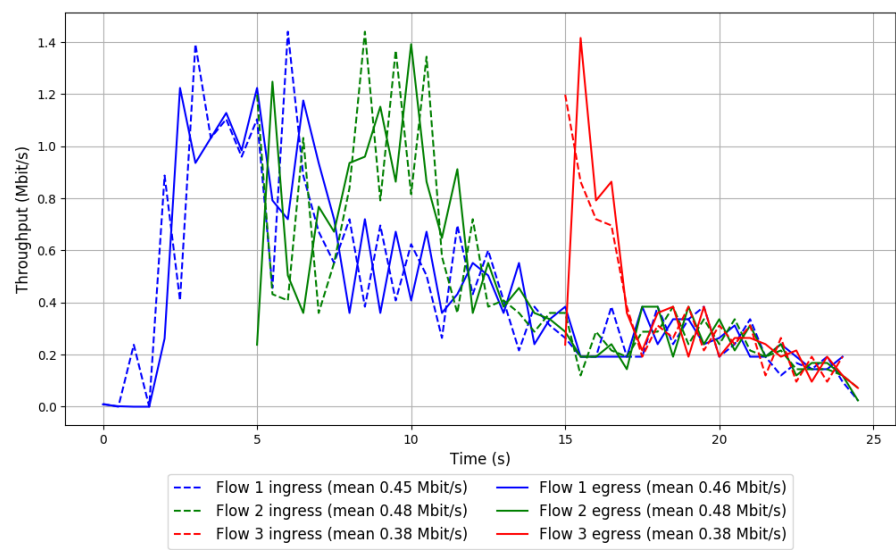


Run 2: Statistics of Indigo-1-32

Start at: 2018-01-25 19:54:45
End at: 2018-01-25 19:55:15
Local clock offset: 1.391 ms
Remote clock offset: -1.329 ms

Below is generated by plot.py at 2018-01-25 20:30:00
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 368.306 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 397.002 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 361.976 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 358.746 ms
Loss rate: 0.00%

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

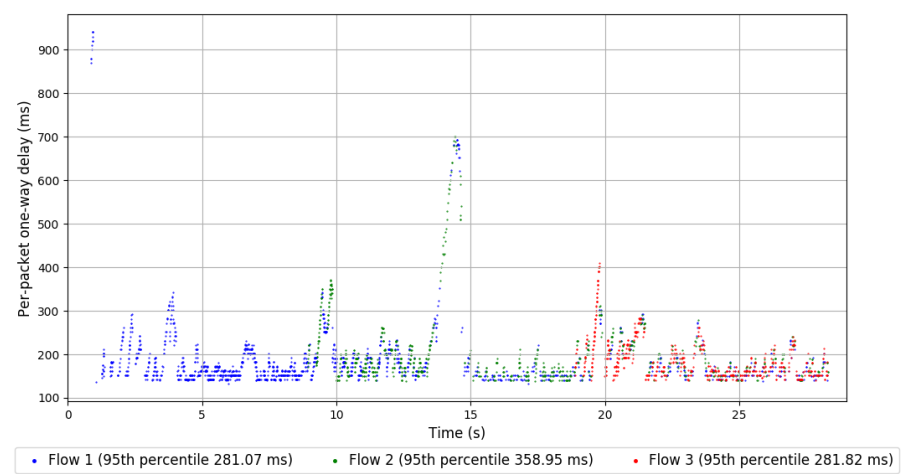
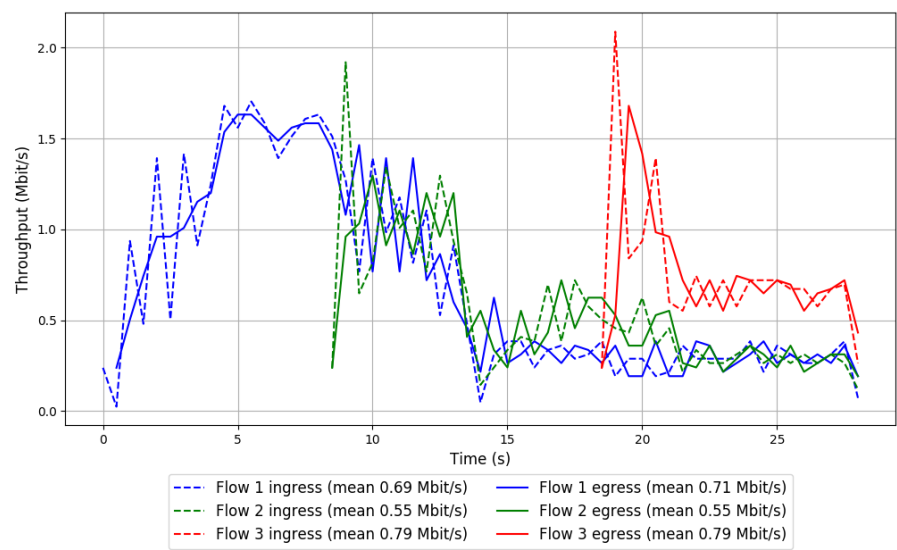


Run 3: Statistics of Indigo-1-32

Start at: 2018-01-25 20:15:08
End at: 2018-01-25 20:15:39
Local clock offset: 1.331 ms
Remote clock offset: -0.547 ms

Below is generated by plot.py at 2018-01-25 20:30:01
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 301.052 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 281.071 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 358.955 ms
Loss rate: 0.11%
-- Flow 3:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 281.824 ms
Loss rate: 0.32%

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

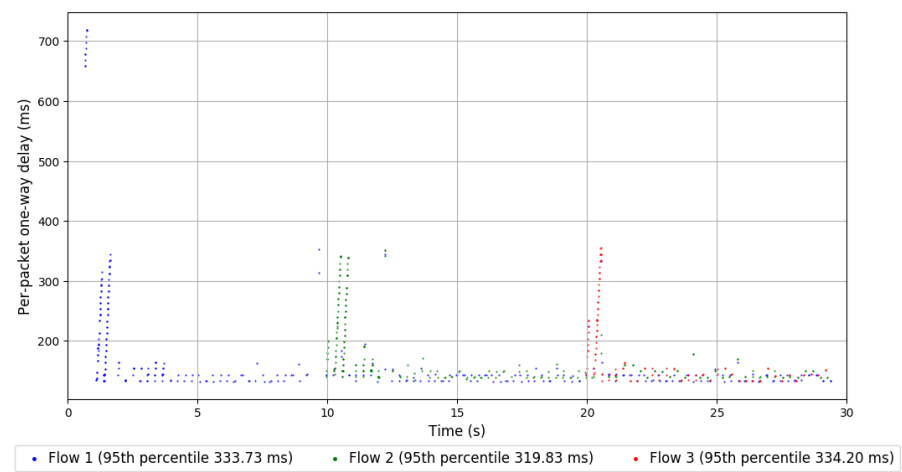
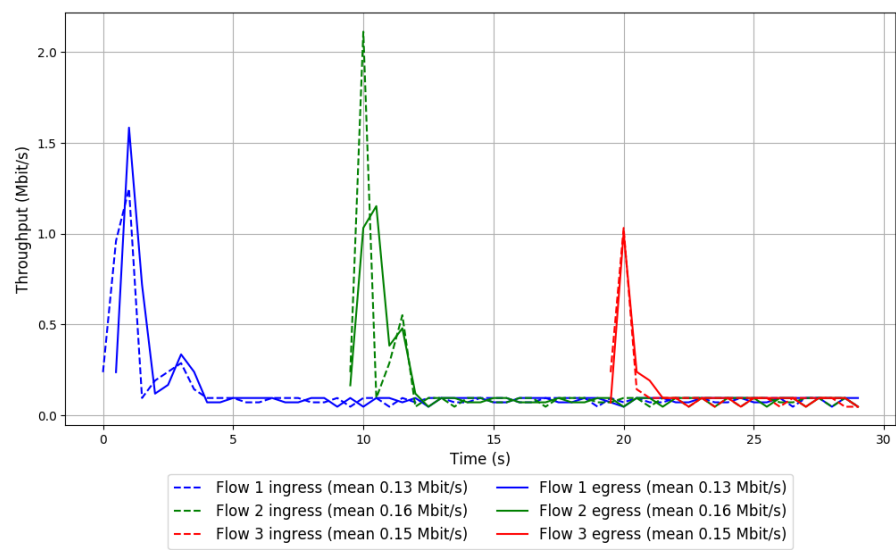


Run 1: Statistics of Indigo-1-128

Start at: 2018-01-25 19:43:20
End at: 2018-01-25 19:43:50
Local clock offset: 1.408 ms
Remote clock offset: -1.543 ms

Below is generated by plot.py at 2018-01-25 20:30:01
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 333.838 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 333.733 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 319.826 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 334.203 ms
Loss rate: 0.00%

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

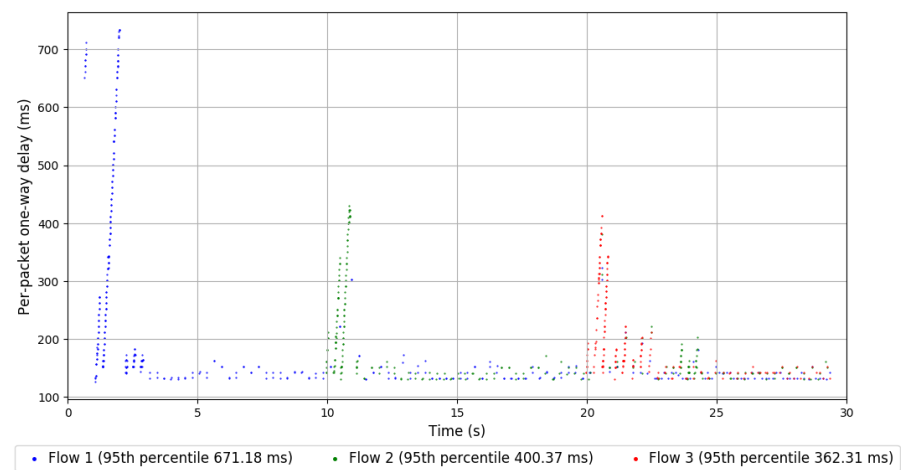
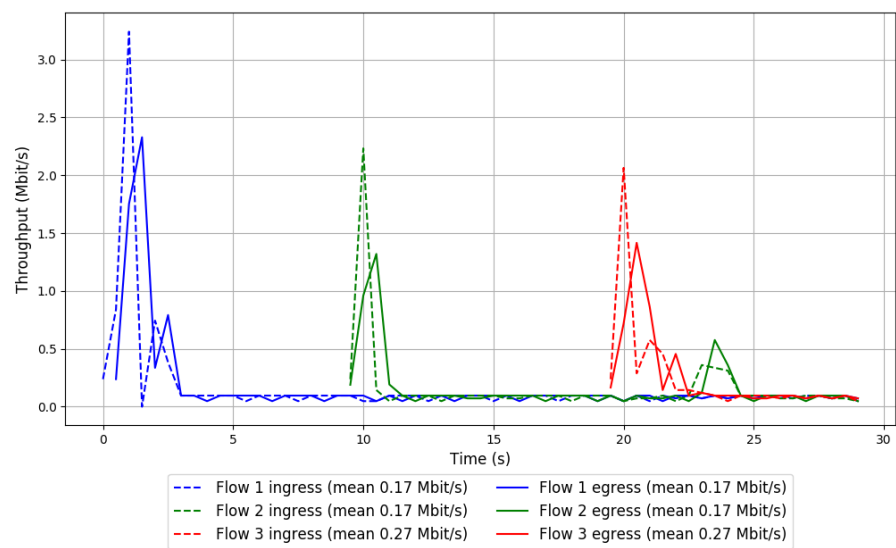


Run 2: Statistics of Indigo-1-128

Start at: 2018-01-25 20:03:42
End at: 2018-01-25 20:04:12
Local clock offset: 1.308 ms
Remote clock offset: -6.123 ms

Below is generated by plot.py at 2018-01-25 20:30:01
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 581.184 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 671.183 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 400.365 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 362.313 ms
Loss rate: 0.00%

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



Run 3: Statistics of Indigo-1-128

Start at: 2018-01-25 20:24:05
End at: 2018-01-25 20:24:35
Local clock offset: 1.334 ms
Remote clock offset: -6.265 ms

Below is generated by plot.py at 2018-01-25 20:30:01
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 708.339 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 687.006 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 376.475 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 846.693 ms
Loss rate: 0.00%

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

