

Pantheon Report

Generated at 2019-01-02 23:38:38 (UTC).

Data path: AWS India 1 on `ens5` (*local*) → India cellular on `ppp0` (*remote*).

Repeated the test of 19 congestion control schemes 3 times.

Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.

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

System info:

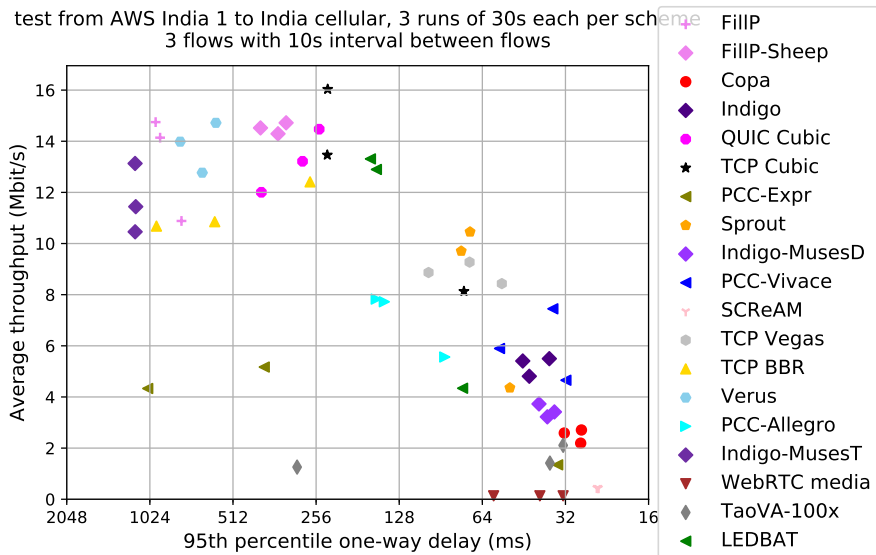
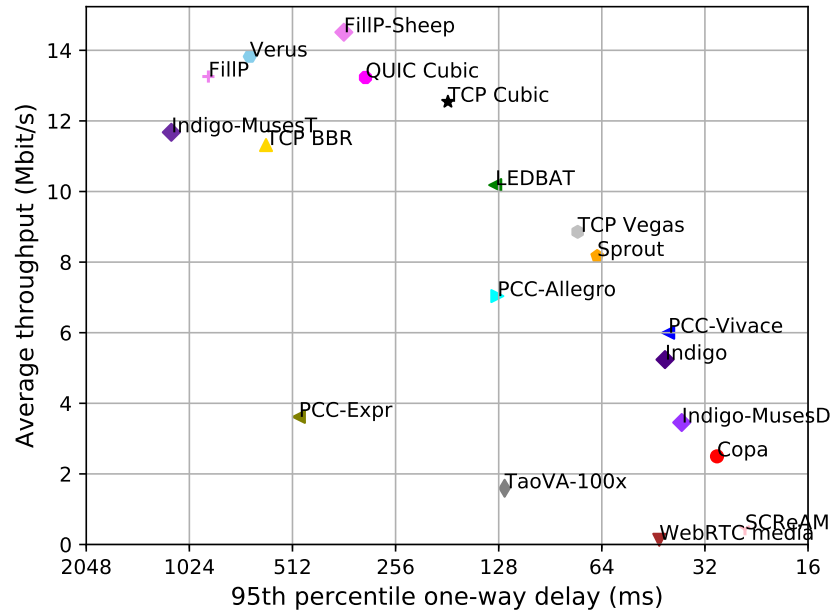
```
Linux 4.15.0-1029-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

Git summary:

```
branch: muses @ c654af0b7d59d4ef4b914cfac404e1fc2e96dc68
third_party/fillp @ d6da1459332fcee56963885d7eba17e6a32d4519
third_party/fillp-sheep @ 0e5bb722943babcd2b090d2c64fcd45e12e923f9
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 65ac1b19bbefed0c6349ae986009b4fa8643c40a
third_party/muses-refactored @ 31f8f0ba8ef8b1da76c2bc0cd0a7850c33ff64fb
third_party/pantheon-tunnel @ f866d3f58d27afd942717625ee3a354cc2e802bd
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/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
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 @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

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



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	7.22	4.76	2.91	600.64	627.34	572.07	2.11	2.20	4.85
Copa	3	1.08	1.71	0.83	27.08	28.95	29.80	52.08	24.33	58.37
TCP Cubic	3	7.49	5.97	3.46	168.17	190.05	180.65	1.55	2.36	2.55
FillP	3	7.64	5.92	5.27	791.99	854.18	1009.65	3.09	5.37	10.48
FillP-Sheep	3	7.88	6.59	6.89	280.80	393.47	556.16	1.33	1.81	3.19
Indigo	3	2.65	2.25	3.33	45.24	41.06	42.11	0.21	0.43	1.02
Indigo-MusesD	3	1.68	1.75	1.85	38.33	35.30	36.54	0.13	0.16	0.88
Indigo-MusesT	3	7.81	4.44	3.53	1150.41	1165.57	1190.54	77.03	83.56	85.21
LEDBAT	3	7.18	3.49	2.11	124.94	140.97	143.51	1.69	1.87	3.61
PCC-Allegro	3	2.75	5.37	2.16	106.20	147.08	110.07	0.23	0.29	0.27
PCC-Expr	3	1.36	2.51	1.83	483.17	507.75	384.57	60.40	46.60	66.23
QUIC Cubic	3	9.73	4.21	2.26	306.56	331.15	338.53	0.64	1.54	3.40
SCReAM	3	0.22	0.22	0.22	24.40	24.40	27.76	0.00	0.00	0.12
Sprout	3	4.39	4.08	3.25	62.56	65.98	71.55	1.70	2.95	2.94
TaoVA-100x	3	0.00	1.14	2.53	23.01	326.49	46.57	95.92	71.10	48.35
TCP Vegas	3	4.50	4.39	4.30	70.93	67.52	80.47	0.02	0.05	0.17
Verus	3	8.57	5.63	4.79	644.84	727.39	709.09	3.29	7.15	2.40
PCC-Vivace	3	2.67	2.73	4.59	36.03	40.51	47.58	0.33	0.62	0.34
WebRTC media	3	0.05	0.04	0.05	47.02	33.49	42.33	0.00	0.02	0.00

Run 1: Statistics of TCP BBR

Start at: 2019-01-02 22:51:47

End at: 2019-01-02 22:52:17

Local clock offset: 1.258 ms

Remote clock offset: 2.992 ms

Below is generated by plot.py at 2019-01-02 23:37:29

Datalink statistics

-- Total of 3 flows:

Average throughput: 10.68 Mbit/s

95th percentile per-packet one-way delay: 969.332 ms

Loss rate: 3.20%

-- Flow 1:

Average throughput: 7.53 Mbit/s

95th percentile per-packet one-way delay: 948.062 ms

Loss rate: 2.67%

-- Flow 2:

Average throughput: 4.25 Mbit/s

95th percentile per-packet one-way delay: 990.421 ms

Loss rate: 3.77%

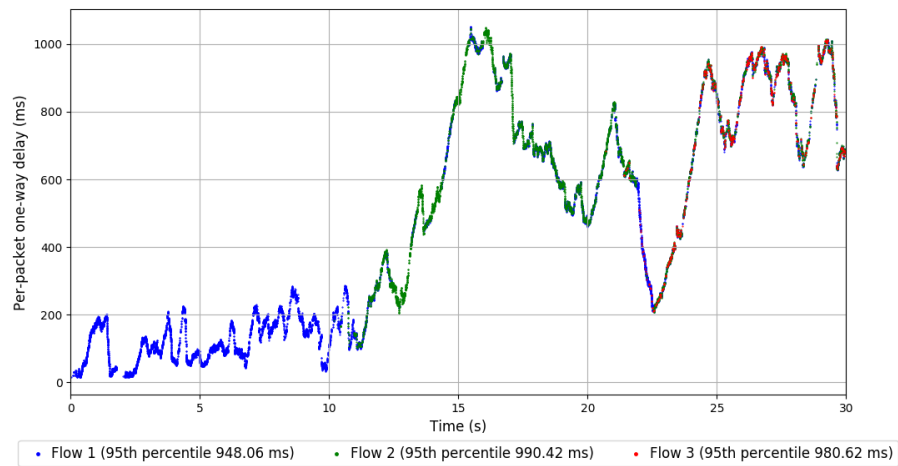
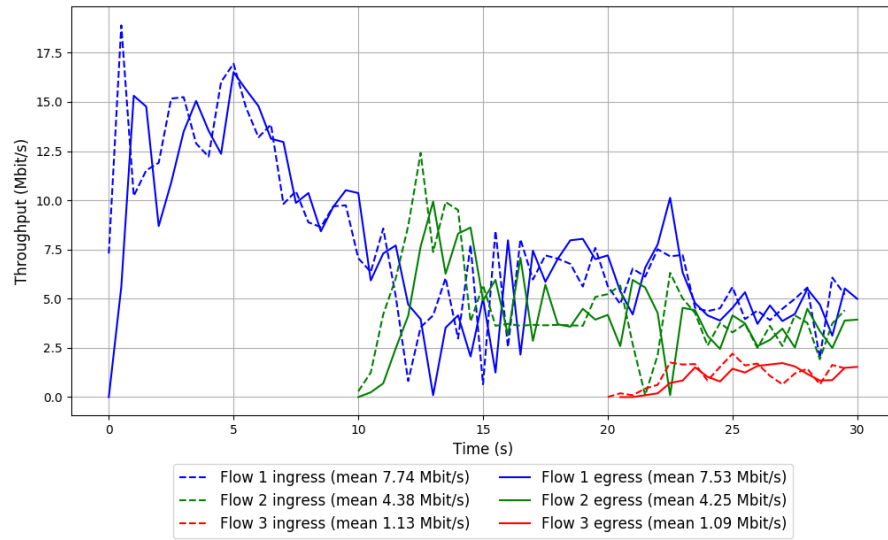
-- Flow 3:

Average throughput: 1.09 Mbit/s

95th percentile per-packet one-way delay: 980.624 ms

Loss rate: 9.52%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2019-01-02 23:14:11

End at: 2019-01-02 23:14:41

Local clock offset: 0.18 ms

Remote clock offset: 2.244 ms

Below is generated by plot.py at 2019-01-02 23:37:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 12.41 Mbit/s

95th percentile per-packet one-way delay: 269.204 ms

Loss rate: 1.24%

-- Flow 1:

Average throughput: 7.90 Mbit/s

95th percentile per-packet one-way delay: 258.130 ms

Loss rate: 0.96%

-- Flow 2:

Average throughput: 4.44 Mbit/s

95th percentile per-packet one-way delay: 289.947 ms

Loss rate: 1.37%

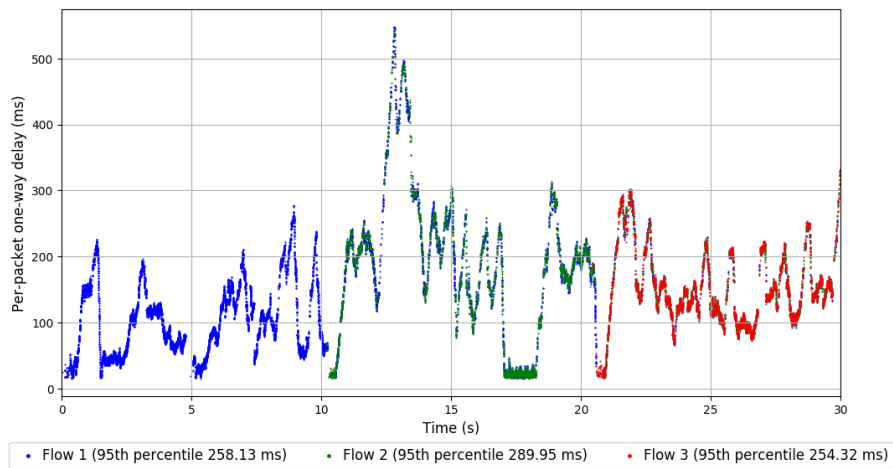
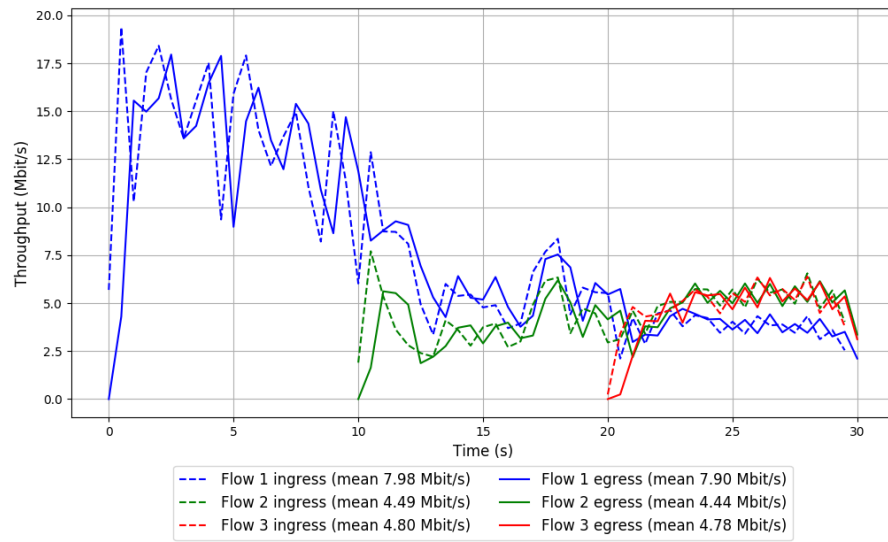
-- Flow 3:

Average throughput: 4.78 Mbit/s

95th percentile per-packet one-way delay: 254.323 ms

Loss rate: 2.36%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2019-01-02 23:36:32

End at: 2019-01-02 23:37:02

Local clock offset: 3.558 ms

Remote clock offset: 1.953 ms

Below is generated by plot.py at 2019-01-02 23:37:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 10.85 Mbit/s

95th percentile per-packet one-way delay: 596.228 ms

Loss rate: 2.27%

-- Flow 1:

Average throughput: 6.23 Mbit/s

95th percentile per-packet one-way delay: 595.730 ms

Loss rate: 2.69%

-- Flow 2:

Average throughput: 5.58 Mbit/s

95th percentile per-packet one-way delay: 601.650 ms

Loss rate: 1.47%

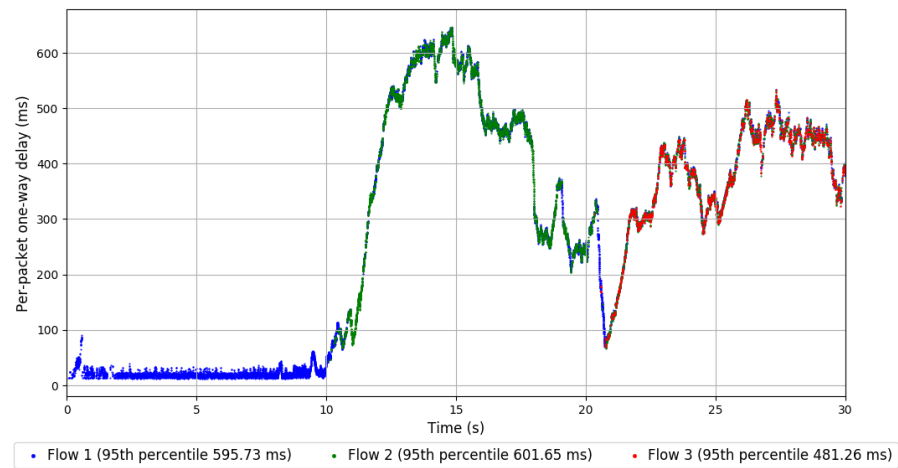
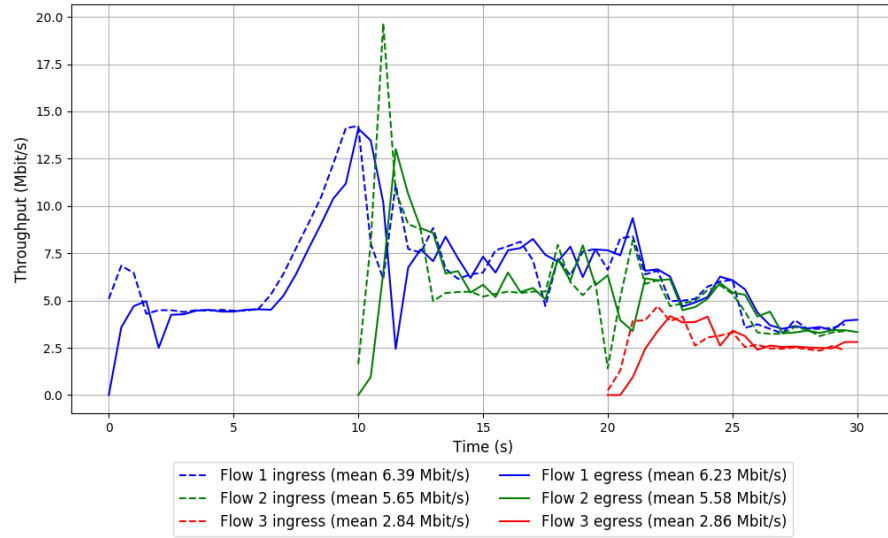
-- Flow 3:

Average throughput: 2.86 Mbit/s

95th percentile per-packet one-way delay: 481.262 ms

Loss rate: 2.67%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

Start at: 2019-01-02 22:35:16

End at: 2019-01-02 22:35:46

Local clock offset: 2.566 ms

Remote clock offset: 2.63 ms

Below is generated by plot.py at 2019-01-02 23:37:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 2.71 Mbit/s

95th percentile per-packet one-way delay: 28.008 ms

Loss rate: 29.16%

-- Flow 1:

Average throughput: 1.66 Mbit/s

95th percentile per-packet one-way delay: 27.875 ms

Loss rate: 27.94%

-- Flow 2:

Average throughput: 1.55 Mbit/s

95th percentile per-packet one-way delay: 28.334 ms

Loss rate: 28.59%

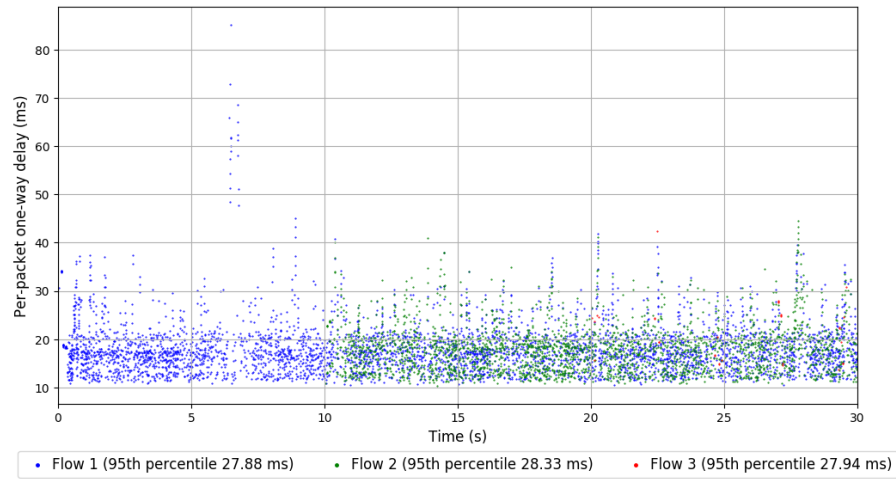
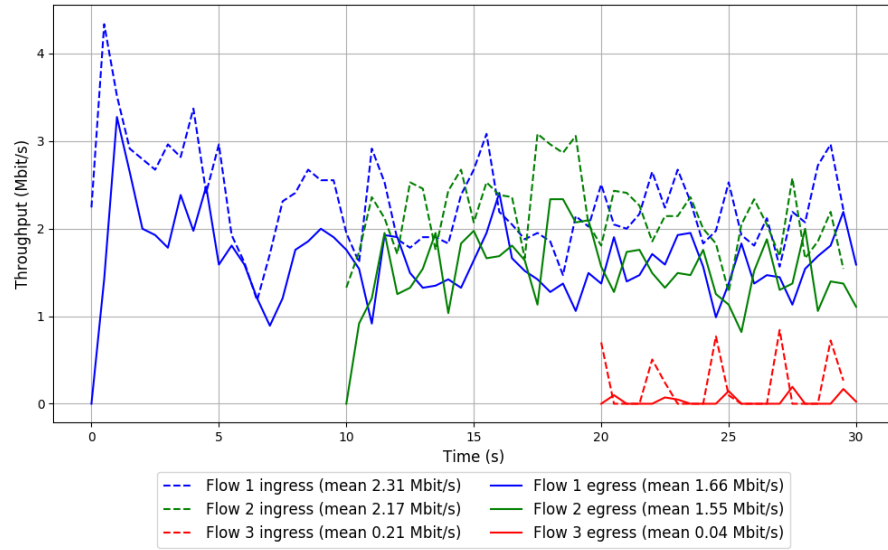
-- Flow 3:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 27.943 ms

Loss rate: 81.94%

Run 1: Report of Copa — Data Link

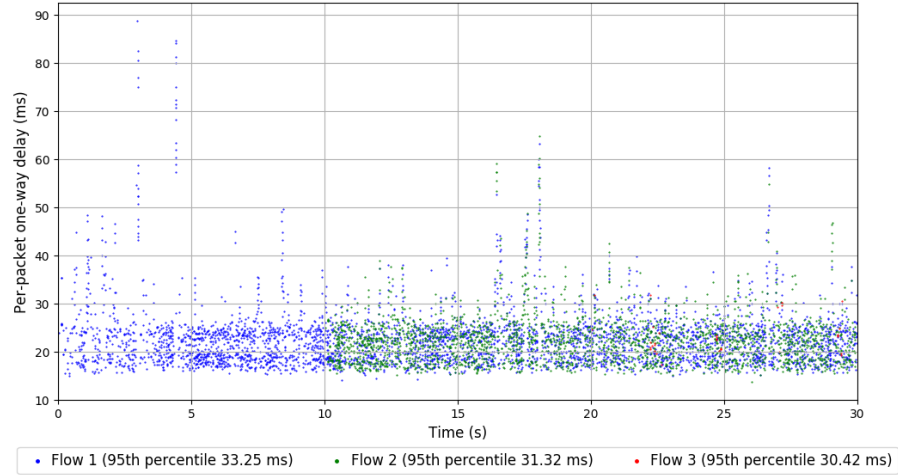
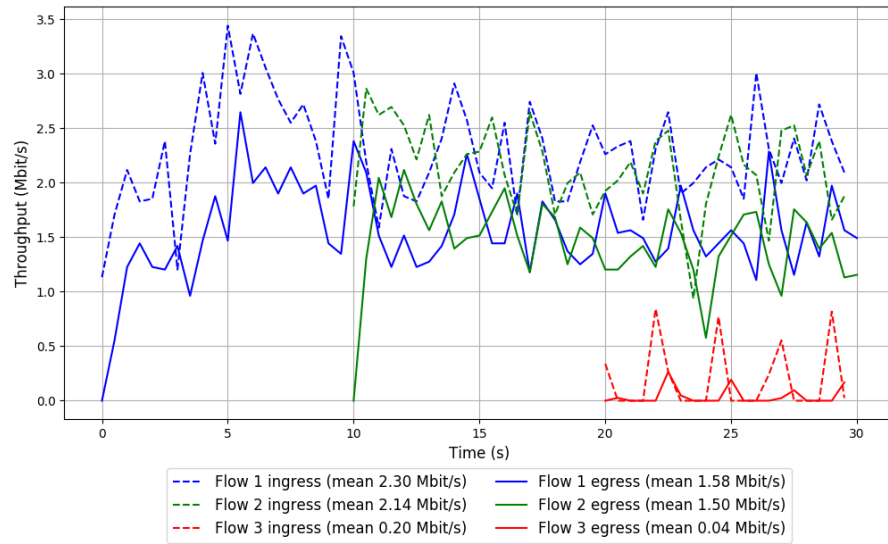


Run 2: Statistics of Copa

Start at: 2019-01-02 22:57:40
End at: 2019-01-02 22:58:10
Local clock offset: -0.129 ms
Remote clock offset: 3.21 ms

Below is generated by plot.py at 2019-01-02 23:37:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 2.59 Mbit/s
95th percentile per-packet one-way delay: 32.314 ms
Loss rate: 31.62%
-- Flow 1:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 33.251 ms
Loss rate: 31.05%
-- Flow 2:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 31.316 ms
Loss rate: 30.42%
-- Flow 3:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 30.421 ms
Loss rate: 78.71%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2019-01-02 23:20:01

End at: 2019-01-02 23:20:31

Local clock offset: 2.915 ms

Remote clock offset: 1.799 ms

Below is generated by plot.py at 2019-01-02 23:37:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 28.184 ms

Loss rate: 14.19%

-- Flow 1:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 20.121 ms

Loss rate: 97.24%

-- Flow 2:

Average throughput: 2.09 Mbit/s

95th percentile per-packet one-way delay: 27.213 ms

Loss rate: 13.97%

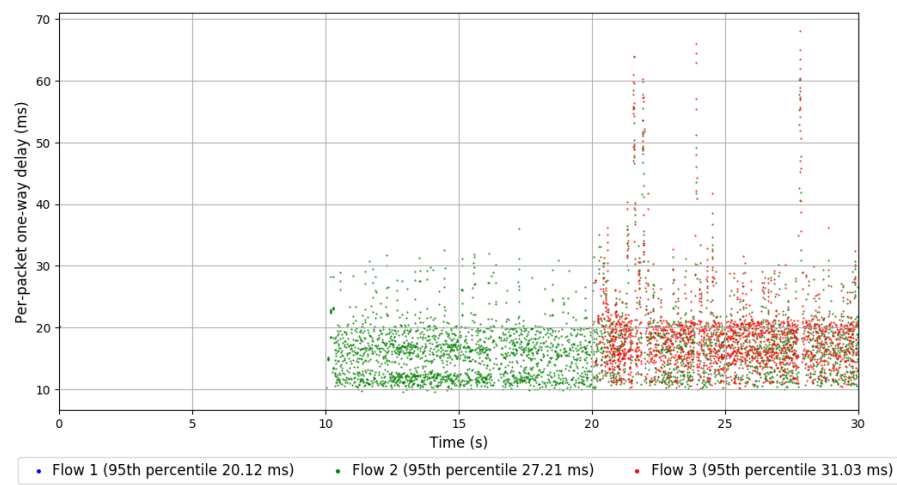
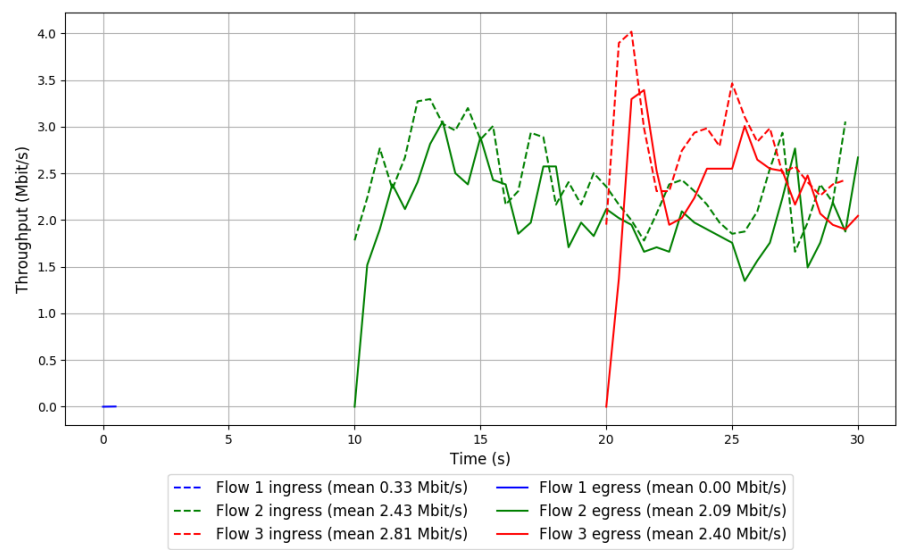
-- Flow 3:

Average throughput: 2.40 Mbit/s

95th percentile per-packet one-way delay: 31.029 ms

Loss rate: 14.47%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2019-01-02 22:49:22

End at: 2019-01-02 22:49:52

Local clock offset: 4.329 ms

Remote clock offset: 3.121 ms

Below is generated by plot.py at 2019-01-02 23:37:32

Datalink statistics

-- Total of 3 flows:

Average throughput: 13.46 Mbit/s

95th percentile per-packet one-way delay: 233.156 ms

Loss rate: 0.26%

-- Flow 1:

Average throughput: 7.07 Mbit/s

95th percentile per-packet one-way delay: 212.125 ms

Loss rate: 0.17%

-- Flow 2:

Average throughput: 8.07 Mbit/s

95th percentile per-packet one-way delay: 247.378 ms

Loss rate: 0.28%

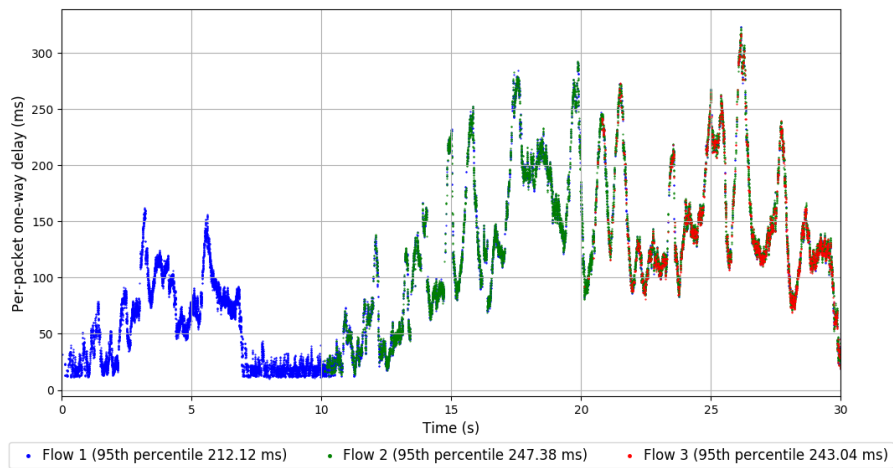
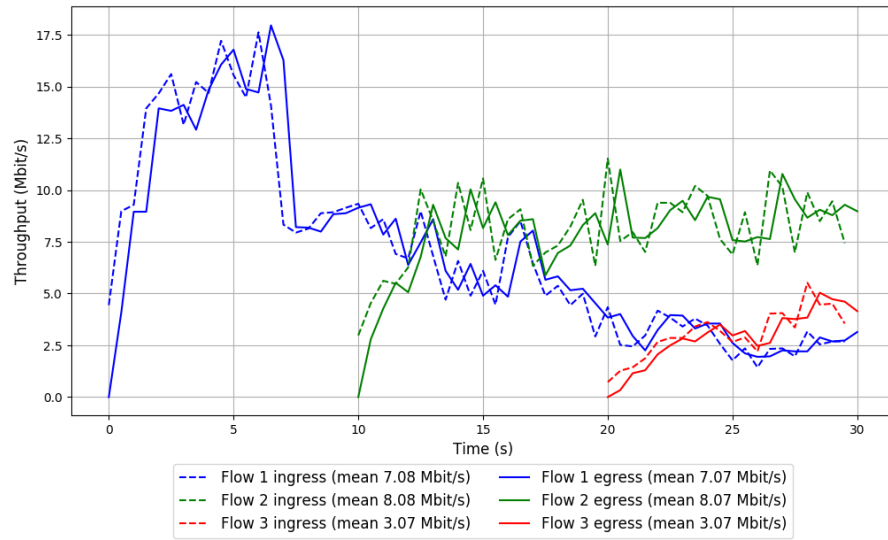
-- Flow 3:

Average throughput: 3.07 Mbit/s

95th percentile per-packet one-way delay: 243.037 ms

Loss rate: 0.75%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2019-01-02 23:11:49

End at: 2019-01-02 23:12:19

Local clock offset: 1.626 ms

Remote clock offset: 2.897 ms

Below is generated by plot.py at 2019-01-02 23:37:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 16.03 Mbit/s

95th percentile per-packet one-way delay: 232.471 ms

Loss rate: 0.94%

-- Flow 1:

Average throughput: 11.49 Mbit/s

95th percentile per-packet one-way delay: 229.347 ms

Loss rate: 0.52%

-- Flow 2:

Average throughput: 4.42 Mbit/s

95th percentile per-packet one-way delay: 236.858 ms

Loss rate: 1.75%

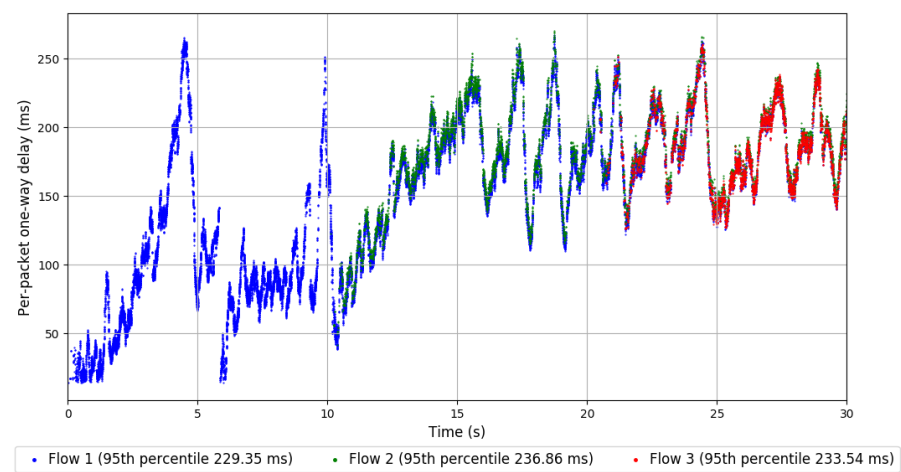
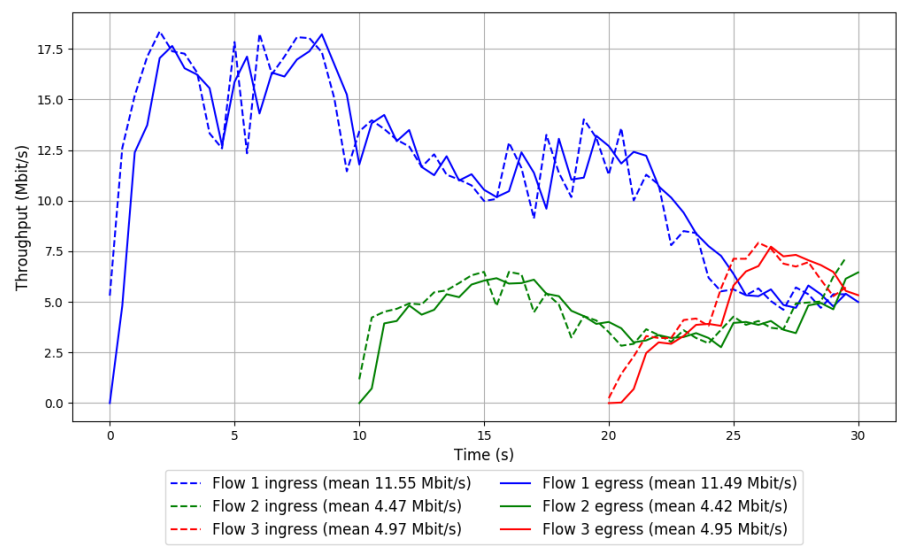
-- Flow 3:

Average throughput: 4.95 Mbit/s

95th percentile per-packet one-way delay: 233.544 ms

Loss rate: 2.38%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2019-01-02 23:34:11

End at: 2019-01-02 23:34:41

Local clock offset: 0.058 ms

Remote clock offset: 1.934 ms

Below is generated by plot.py at 2019-01-02 23:37:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 8.13 Mbit/s

95th percentile per-packet one-way delay: 74.631 ms

Loss rate: 4.48%

-- Flow 1:

Average throughput: 3.92 Mbit/s

95th percentile per-packet one-way delay: 63.028 ms

Loss rate: 3.96%

-- Flow 2:

Average throughput: 5.42 Mbit/s

95th percentile per-packet one-way delay: 85.918 ms

Loss rate: 5.05%

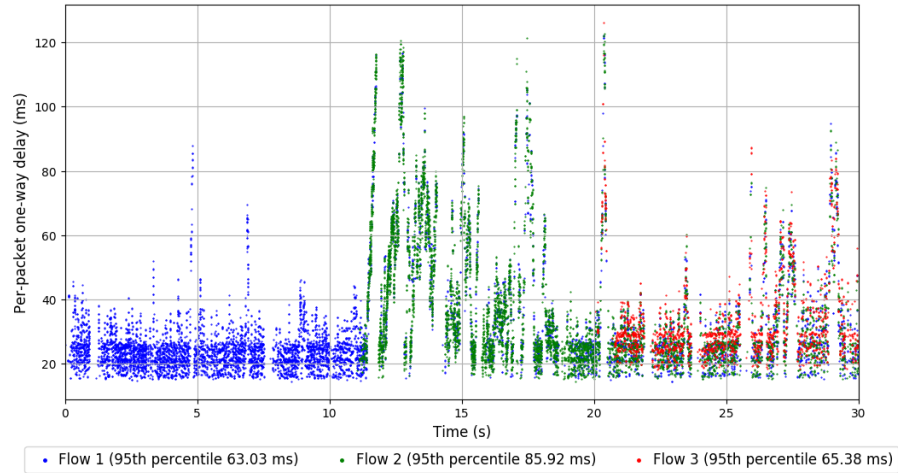
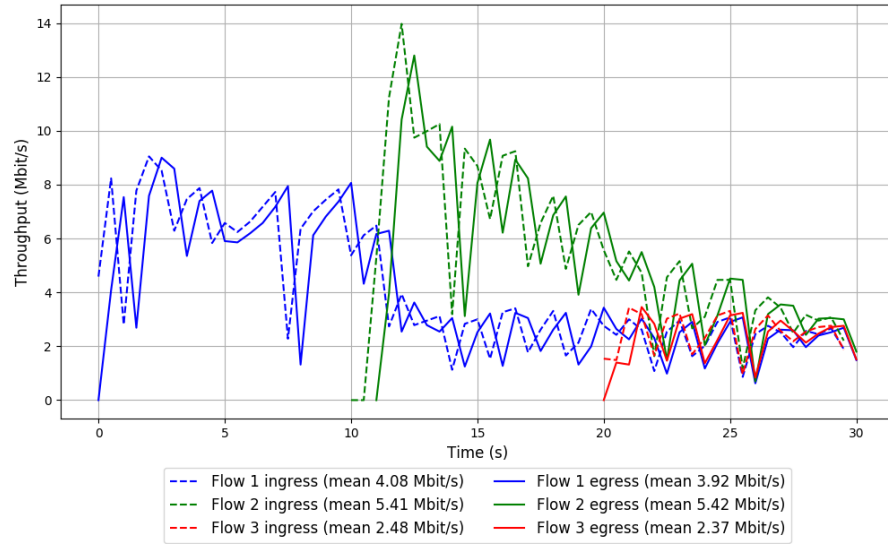
-- Flow 3:

Average throughput: 2.37 Mbit/s

95th percentile per-packet one-way delay: 65.380 ms

Loss rate: 4.52%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

Start at: 2019-01-02 22:42:20

End at: 2019-01-02 22:42:50

Local clock offset: 2.409 ms

Remote clock offset: 3.302 ms

Below is generated by plot.py at 2019-01-02 23:37:40

Datalink statistics

-- Total of 3 flows:

Average throughput: 14.75 Mbit/s

95th percentile per-packet one-way delay: 975.970 ms

Loss rate: 4.91%

-- Flow 1:

Average throughput: 8.55 Mbit/s

95th percentile per-packet one-way delay: 934.686 ms

Loss rate: 2.88%

-- Flow 2:

Average throughput: 6.64 Mbit/s

95th percentile per-packet one-way delay: 984.004 ms

Loss rate: 5.66%

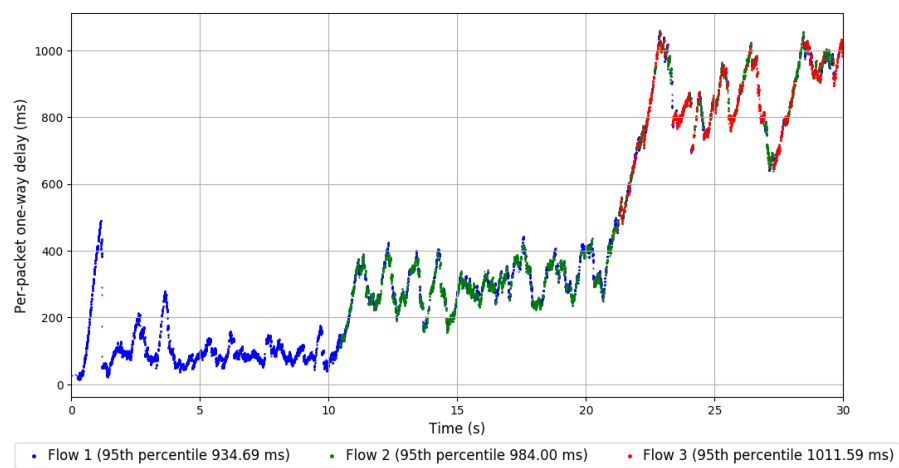
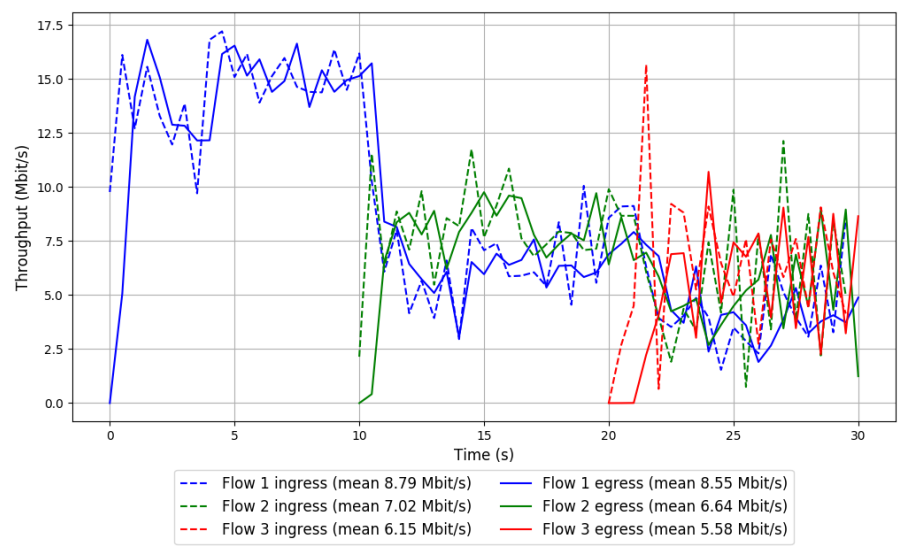
-- Flow 3:

Average throughput: 5.58 Mbit/s

95th percentile per-packet one-way delay: 1011.589 ms

Loss rate: 11.97%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2019-01-02 23:04:41

End at: 2019-01-02 23:05:11

Local clock offset: 2.652 ms

Remote clock offset: 3.033 ms

Below is generated by plot.py at 2019-01-02 23:37:40

Datalink statistics

-- Total of 3 flows:

Average throughput: 10.88 Mbit/s

95th percentile per-packet one-way delay: 786.761 ms

Loss rate: 2.90%

-- Flow 1:

Average throughput: 5.95 Mbit/s

95th percentile per-packet one-way delay: 644.995 ms

Loss rate: 2.00%

-- Flow 2:

Average throughput: 4.68 Mbit/s

95th percentile per-packet one-way delay: 680.824 ms

Loss rate: 1.77%

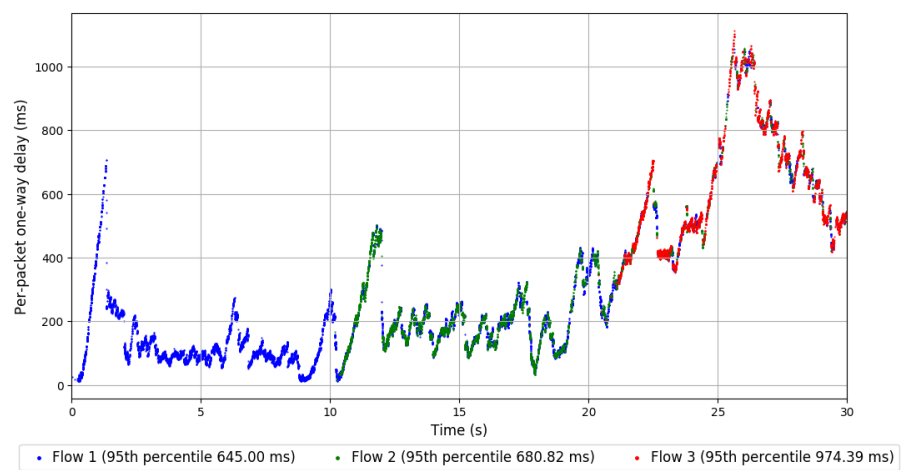
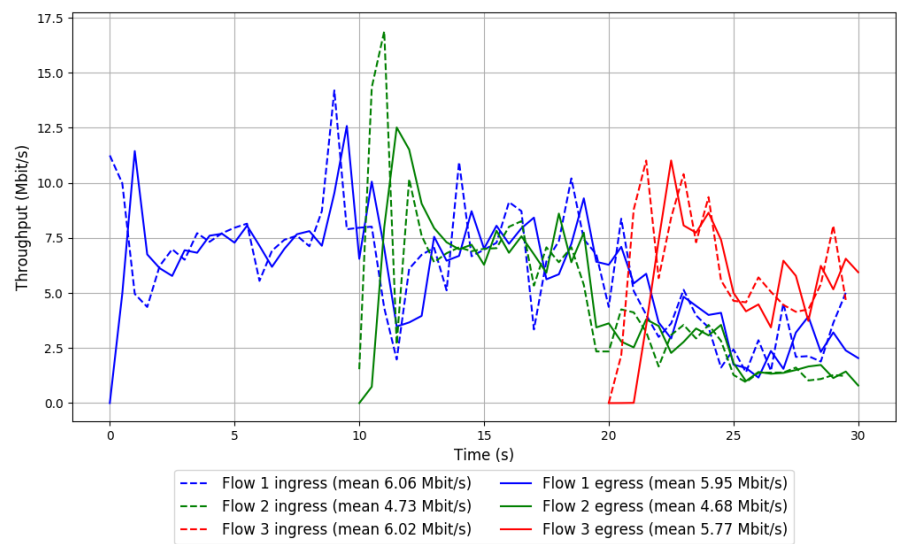
-- Flow 3:

Average throughput: 5.77 Mbit/s

95th percentile per-packet one-way delay: 974.390 ms

Loss rate: 7.43%

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2019-01-02 23:27:07

End at: 2019-01-02 23:27:37

Local clock offset: 2.683 ms

Remote clock offset: 2.17 ms

Below is generated by plot.py at 2019-01-02 23:37:48

Datalink statistics

-- Total of 3 flows:

Average throughput: 14.14 Mbit/s

95th percentile per-packet one-way delay: 940.228 ms

Loss rate: 6.55%

-- Flow 1:

Average throughput: 8.42 Mbit/s

95th percentile per-packet one-way delay: 796.293 ms

Loss rate: 4.40%

-- Flow 2:

Average throughput: 6.45 Mbit/s

95th percentile per-packet one-way delay: 897.699 ms

Loss rate: 8.67%

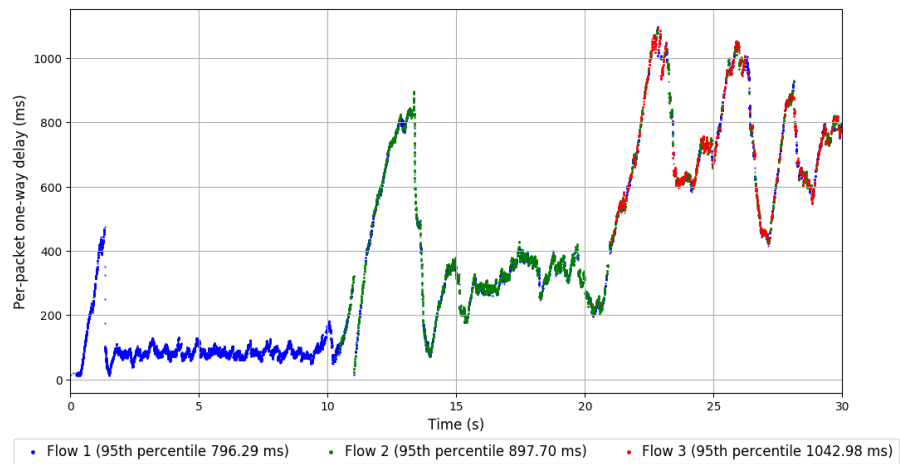
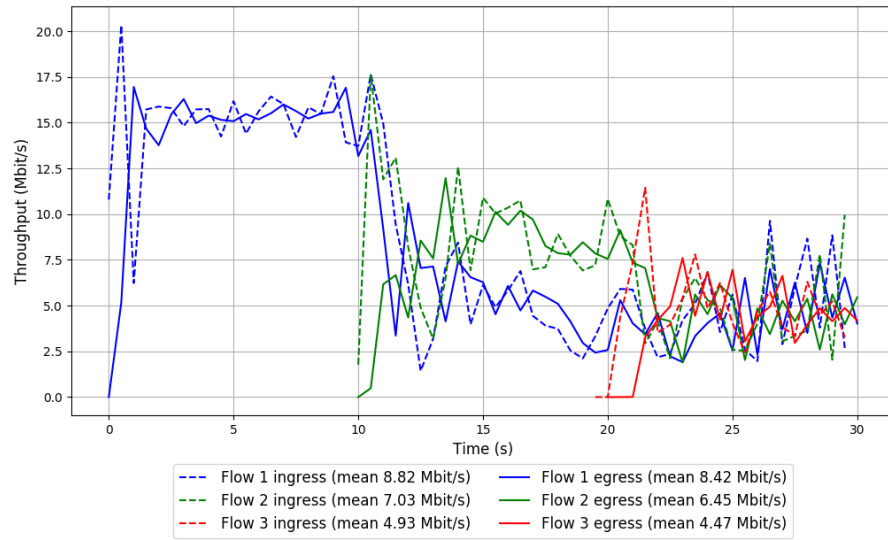
-- Flow 3:

Average throughput: 4.47 Mbit/s

95th percentile per-packet one-way delay: 1042.976 ms

Loss rate: 12.04%

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

Start at: 2019-01-02 22:44:42

End at: 2019-01-02 22:45:12

Local clock offset: 0.328 ms

Remote clock offset: 3.396 ms

Below is generated by plot.py at 2019-01-02 23:37:49

Datalink statistics

-- Total of 3 flows:

Average throughput: 14.72 Mbit/s

95th percentile per-packet one-way delay: 328.701 ms

Loss rate: 1.23%

-- Flow 1:

Average throughput: 8.70 Mbit/s

95th percentile per-packet one-way delay: 279.345 ms

Loss rate: 1.03%

-- Flow 2:

Average throughput: 6.15 Mbit/s

95th percentile per-packet one-way delay: 331.656 ms

Loss rate: 1.58%

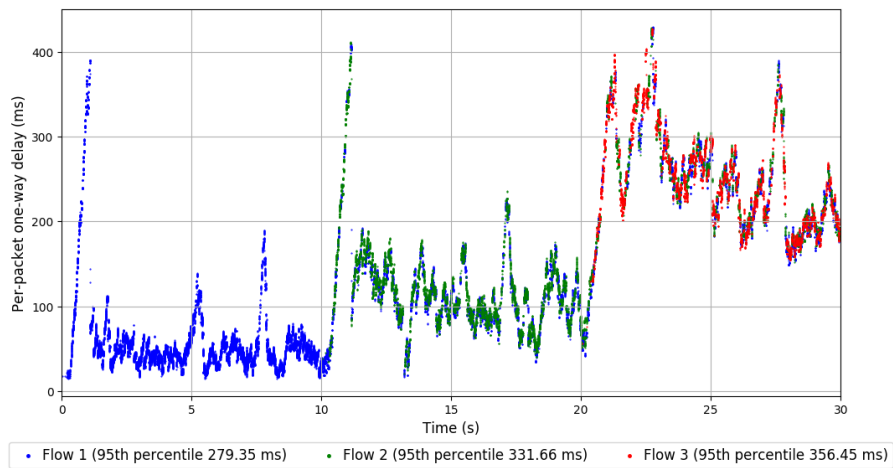
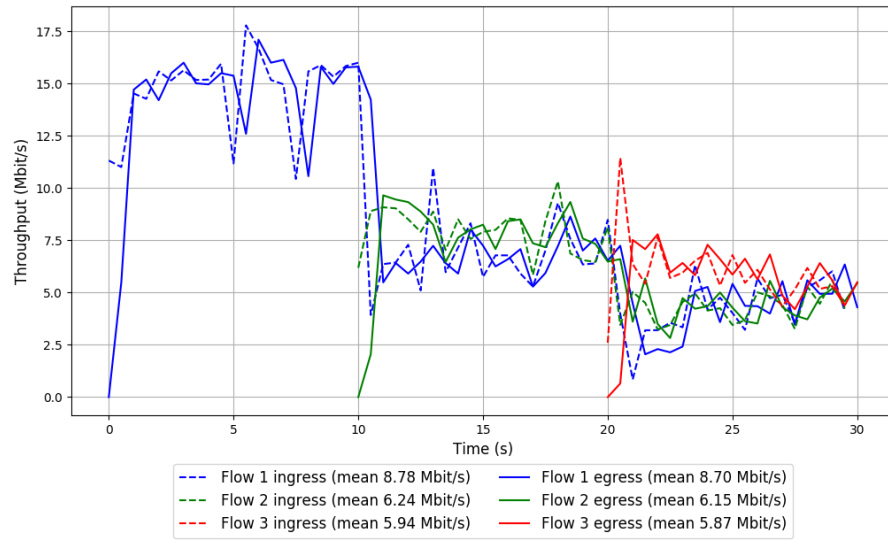
-- Flow 3:

Average throughput: 5.87 Mbit/s

95th percentile per-packet one-way delay: 356.449 ms

Loss rate: 1.40%

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

Start at: 2019-01-02 23:07:09

End at: 2019-01-02 23:07:39

Local clock offset: 3.374 ms

Remote clock offset: 2.121 ms

Below is generated by plot.py at 2019-01-02 23:37:49

Datalink statistics

-- Total of 3 flows:

Average throughput: 14.52 Mbit/s

95th percentile per-packet one-way delay: 407.039 ms

Loss rate: 1.64%

-- Flow 1:

Average throughput: 7.57 Mbit/s

95th percentile per-packet one-way delay: 270.950 ms

Loss rate: 1.08%

-- Flow 2:

Average throughput: 7.24 Mbit/s

95th percentile per-packet one-way delay: 499.906 ms

Loss rate: 0.88%

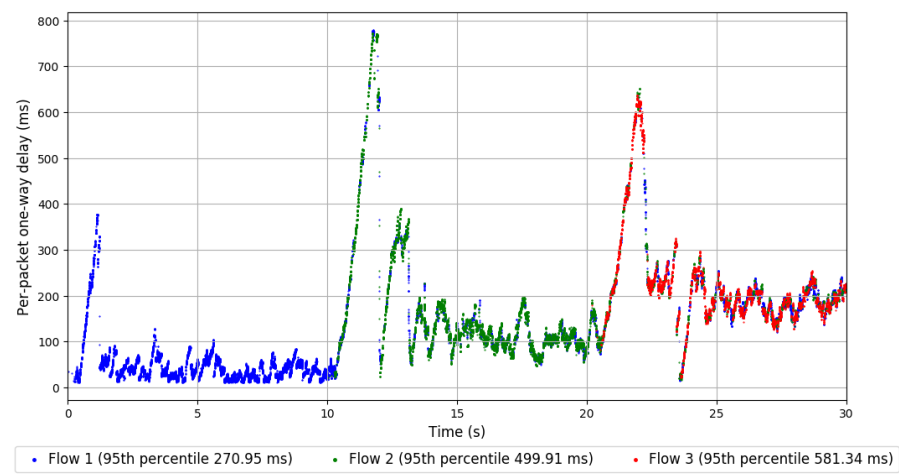
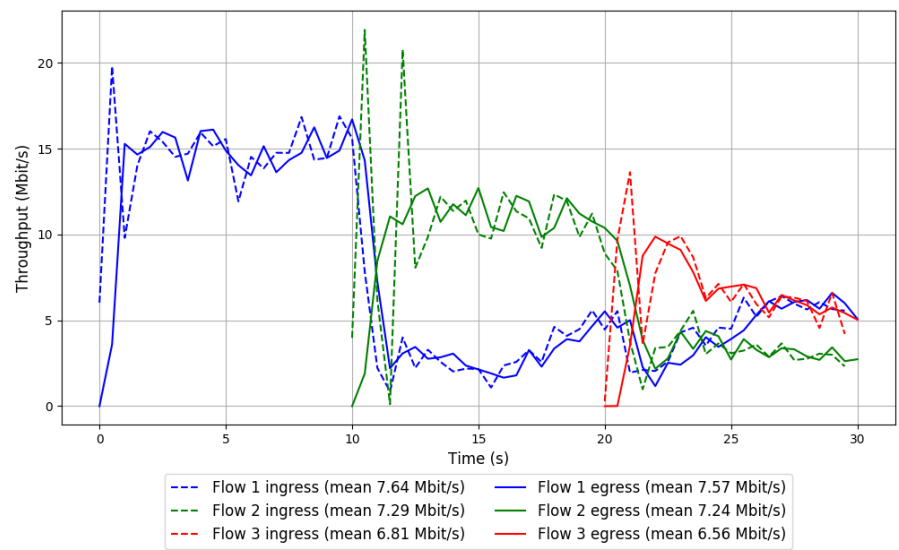
-- Flow 3:

Average throughput: 6.56 Mbit/s

95th percentile per-packet one-way delay: 581.339 ms

Loss rate: 5.21%

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2019-01-02 23:29:32

End at: 2019-01-02 23:30:02

Local clock offset: 1.577 ms

Remote clock offset: 1.73 ms

Below is generated by plot.py at 2019-01-02 23:37:50

Datalink statistics

-- Total of 3 flows:

Average throughput: 14.29 Mbit/s

95th percentile per-packet one-way delay: 351.715 ms

Loss rate: 2.41%

-- Flow 1:

Average throughput: 7.38 Mbit/s

95th percentile per-packet one-way delay: 292.090 ms

Loss rate: 1.89%

-- Flow 2:

Average throughput: 6.37 Mbit/s

95th percentile per-packet one-way delay: 348.840 ms

Loss rate: 2.96%

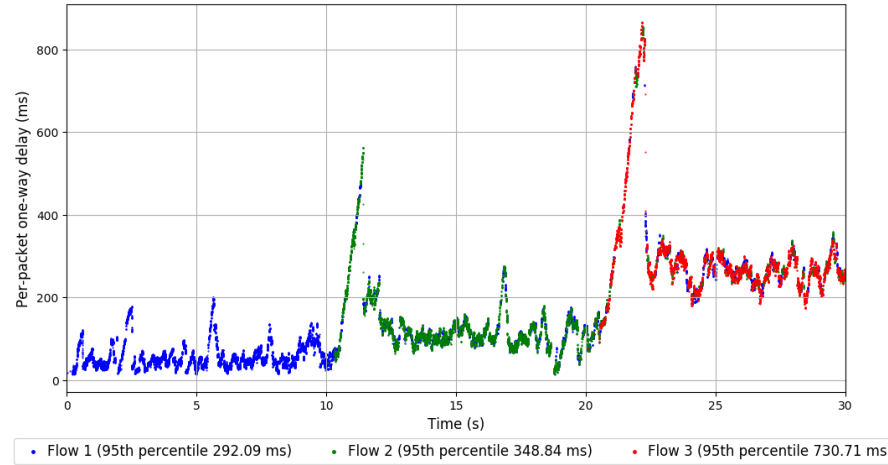
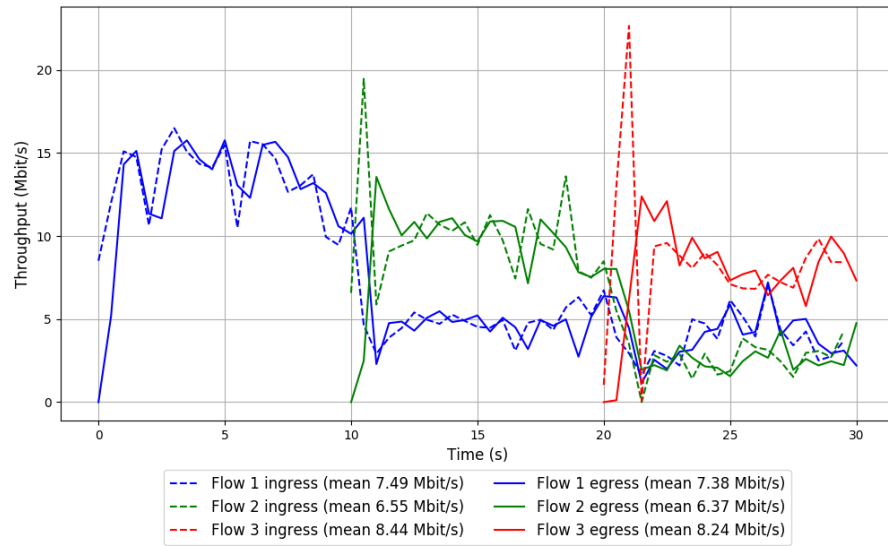
-- Flow 3:

Average throughput: 8.24 Mbit/s

95th percentile per-packet one-way delay: 730.706 ms

Loss rate: 2.97%

Run 3: Report of FillP-Sheep — Data Link

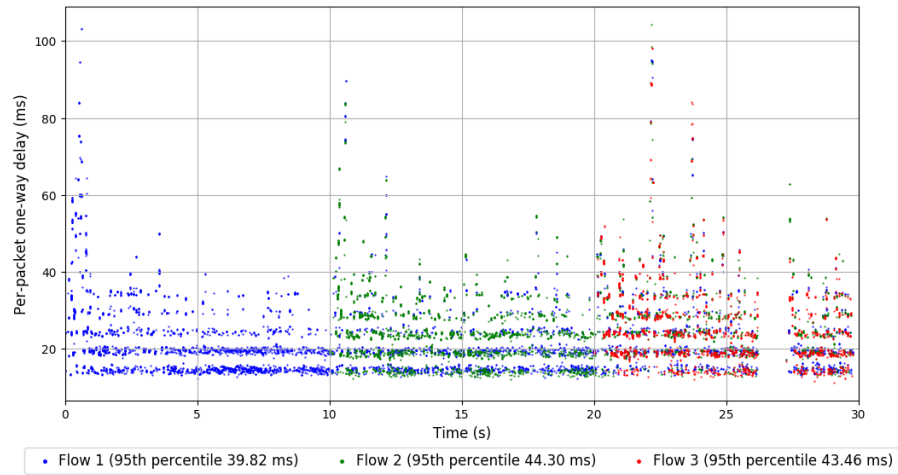
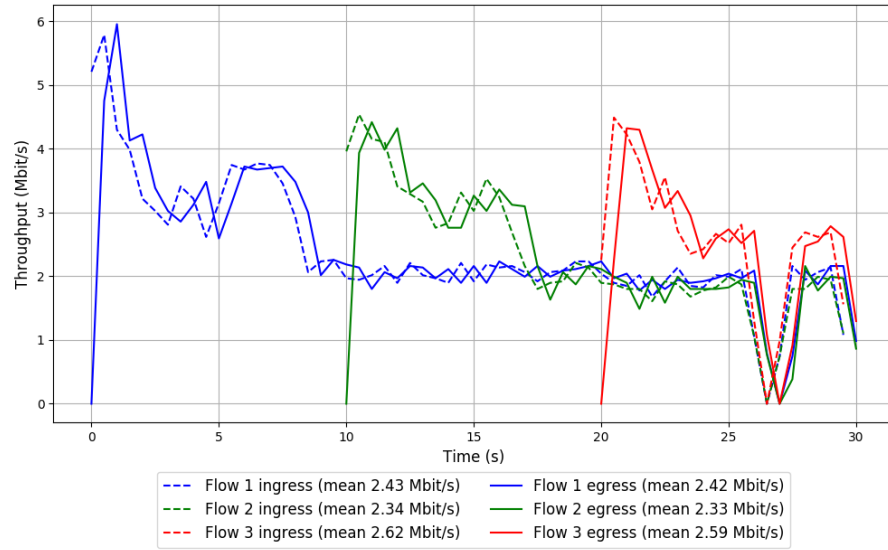


```
Run 1: Statistics of Indigo

Start at: 2019-01-02 22:38:47
End at: 2019-01-02 22:39:17
Local clock offset: 2.349 ms
Remote clock offset: 3.029 ms

# Below is generated by plot.py at 2019-01-02 23:37:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.81 Mbit/s
95th percentile per-packet one-way delay: 43.257 ms
Loss rate: 0.58%
-- Flow 1:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 39.818 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 44.302 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 2.59 Mbit/s
95th percentile per-packet one-way delay: 43.461 ms
Loss rate: 1.31%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2019-01-02 23:01:12

End at: 2019-01-02 23:01:42

Local clock offset: 2.834 ms

Remote clock offset: 2.681 ms

Below is generated by plot.py at 2019-01-02 23:37:50

Datalink statistics

-- Total of 3 flows:

Average throughput: 5.41 Mbit/s

95th percentile per-packet one-way delay: 45.688 ms

Loss rate: 0.50%

-- Flow 1:

Average throughput: 3.07 Mbit/s

95th percentile per-packet one-way delay: 59.810 ms

Loss rate: 0.20%

-- Flow 2:

Average throughput: 2.00 Mbit/s

95th percentile per-packet one-way delay: 41.197 ms

Loss rate: 0.27%

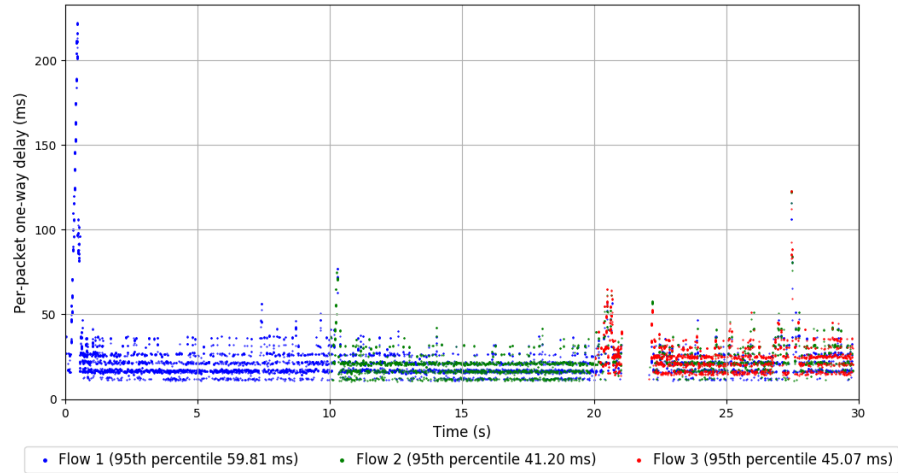
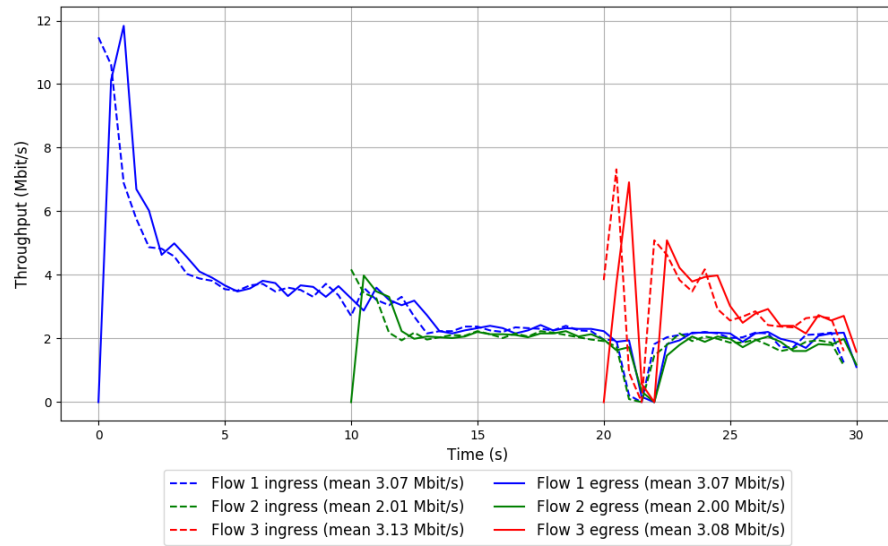
-- Flow 3:

Average throughput: 3.08 Mbit/s

95th percentile per-packet one-way delay: 45.073 ms

Loss rate: 1.73%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2019-01-02 23:23:37

End at: 2019-01-02 23:24:07

Local clock offset: 1.622 ms

Remote clock offset: 1.869 ms

Below is generated by plot.py at 2019-01-02 23:37:50

Datalink statistics

-- Total of 3 flows:

Average throughput: 5.50 Mbit/s

95th percentile per-packet one-way delay: 36.609 ms

Loss rate: 0.19%

-- Flow 1:

Average throughput: 2.47 Mbit/s

95th percentile per-packet one-way delay: 36.088 ms

Loss rate: 0.13%

-- Flow 2:

Average throughput: 2.43 Mbit/s

95th percentile per-packet one-way delay: 37.675 ms

Loss rate: 0.42%

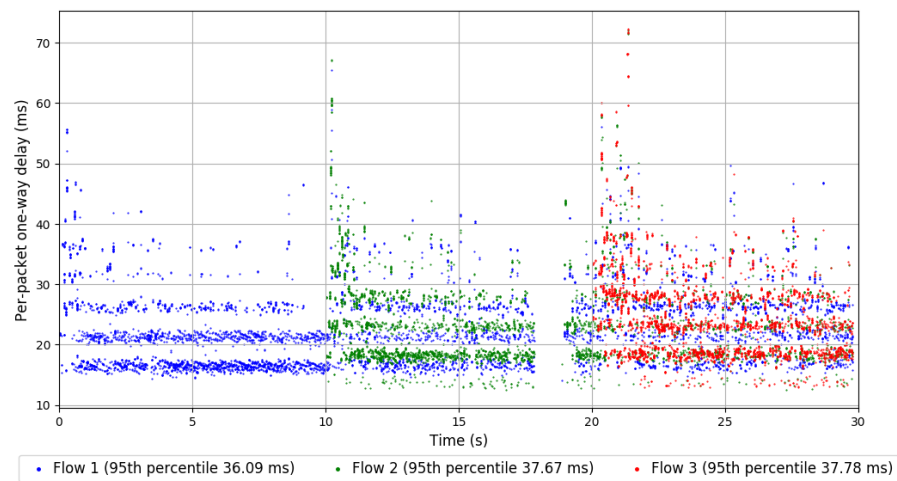
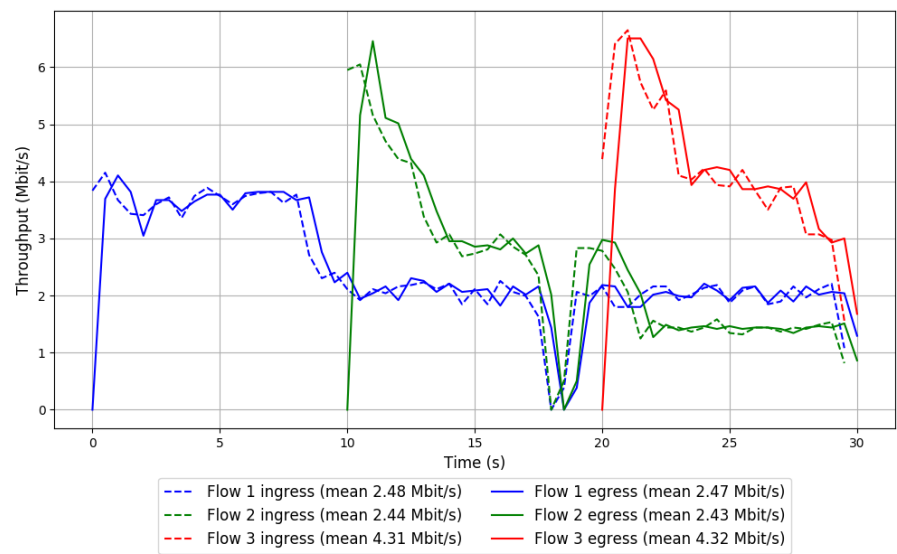
-- Flow 3:

Average throughput: 4.32 Mbit/s

95th percentile per-packet one-way delay: 37.784 ms

Loss rate: 0.03%

Run 3: Report of Indigo — Data Link

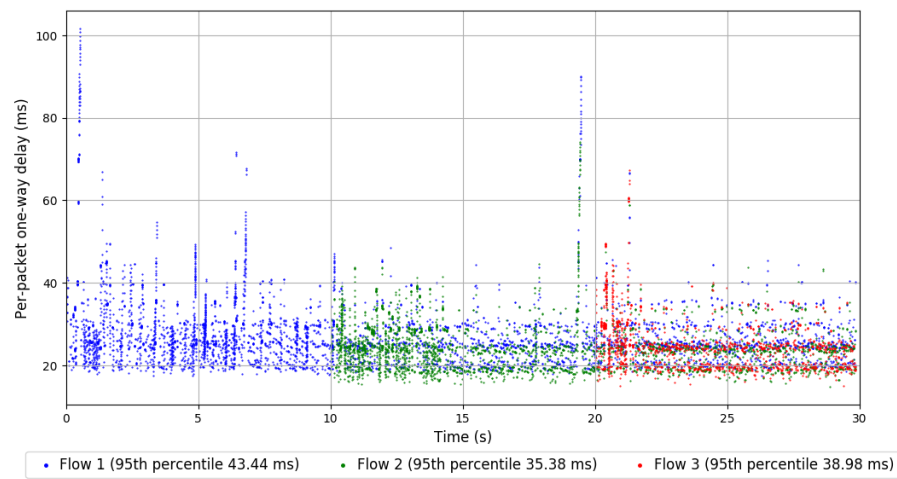
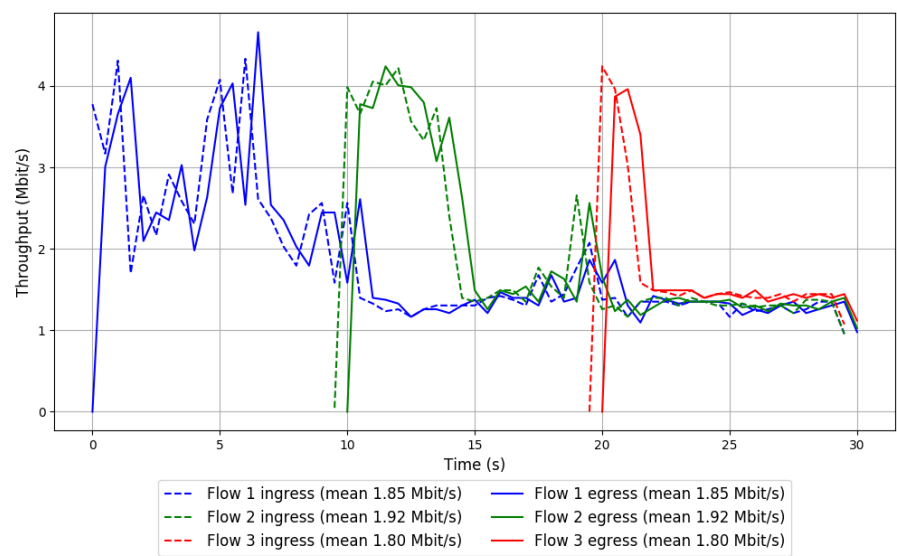


```
Run 1: Statistics of Indigo-MusesD

Start at: 2019-01-02 22:45:52
End at: 2019-01-02 22:46:22
Local clock offset: 0.095 ms
Remote clock offset: 3.1 ms

# Below is generated by plot.py at 2019-01-02 23:37:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.73 Mbit/s
95th percentile per-packet one-way delay: 39.906 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 43.442 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 1.92 Mbit/s
95th percentile per-packet one-way delay: 35.383 ms
Loss rate: 0.03%
-- Flow 3:
Average throughput: 1.80 Mbit/s
95th percentile per-packet one-way delay: 38.979 ms
Loss rate: 0.13%
```

Run 1: Report of Indigo-MusesD — Data Link



Run 2: Statistics of Indigo-MusesD

Start at: 2019-01-02 23:08:20

End at: 2019-01-02 23:08:50

Local clock offset: 3.027 ms

Remote clock offset: 2.726 ms

Below is generated by plot.py at 2019-01-02 23:37:50

Datalink statistics

-- Total of 3 flows:

Average throughput: 3.42 Mbit/s

95th percentile per-packet one-way delay: 35.086 ms

Loss rate: 0.05%

-- Flow 1:

Average throughput: 1.61 Mbit/s

95th percentile per-packet one-way delay: 34.312 ms

Loss rate: 0.05%

-- Flow 2:

Average throughput: 1.59 Mbit/s

95th percentile per-packet one-way delay: 32.577 ms

Loss rate: 0.00%

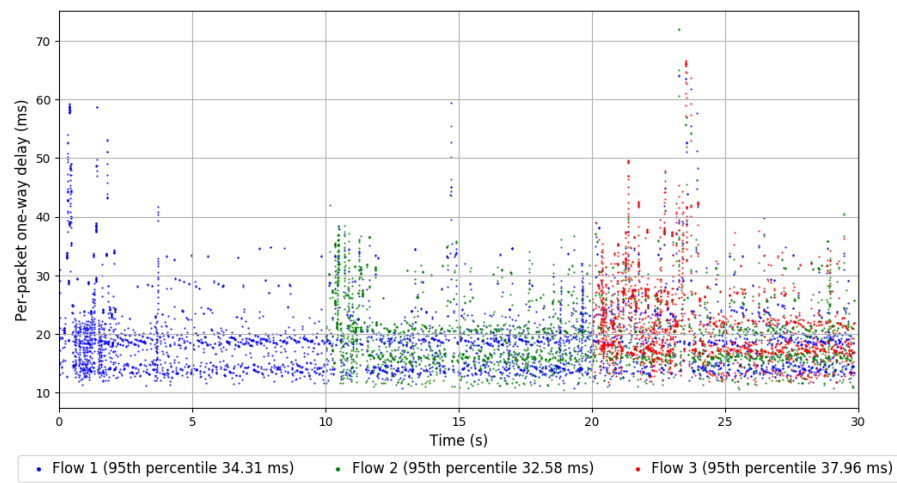
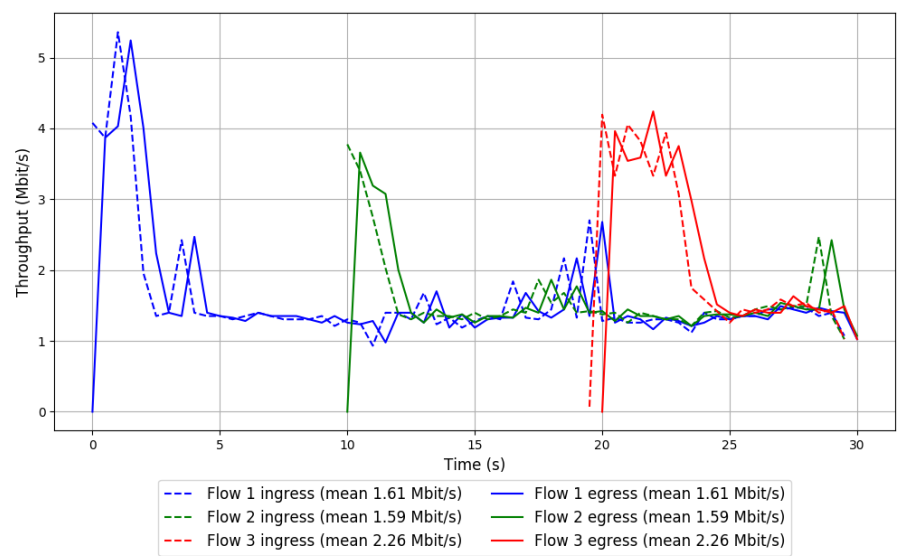
-- Flow 3:

Average throughput: 2.26 Mbit/s

95th percentile per-packet one-way delay: 37.961 ms

Loss rate: 0.10%

Run 2: Report of Indigo-MusesD — Data Link



Run 3: Statistics of Indigo-MusesD

Start at: 2019-01-02 23:30:44

End at: 2019-01-02 23:31:14

Local clock offset: 1.394 ms

Remote clock offset: 1.845 ms

Below is generated by plot.py at 2019-01-02 23:37:50

Datalink statistics

-- Total of 3 flows:

Average throughput: 3.22 Mbit/s

95th percentile per-packet one-way delay: 37.218 ms

Loss rate: 0.66%

-- Flow 1:

Average throughput: 1.57 Mbit/s

95th percentile per-packet one-way delay: 37.229 ms

Loss rate: 0.27%

-- Flow 2:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 37.927 ms

Loss rate: 0.44%

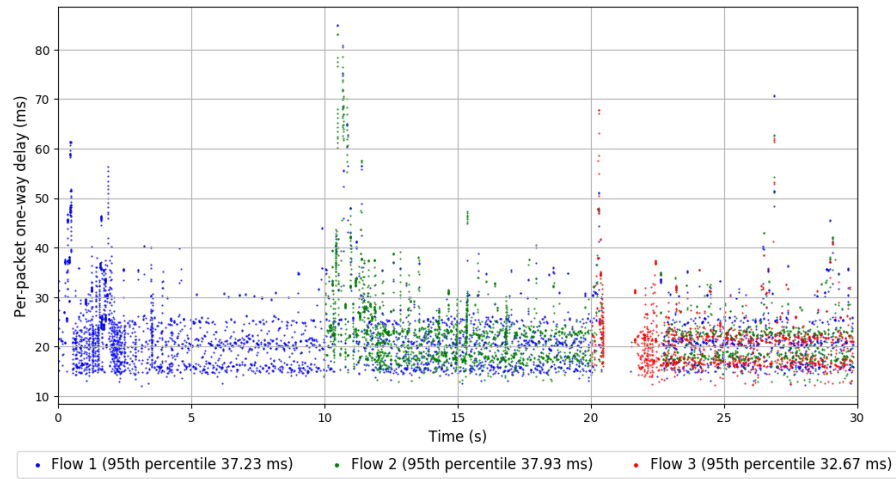
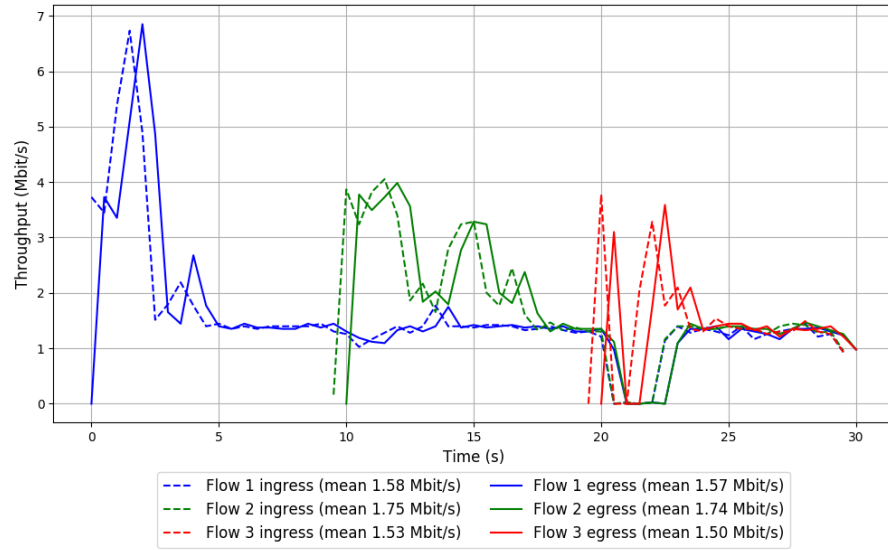
-- Flow 3:

Average throughput: 1.50 Mbit/s

95th percentile per-packet one-way delay: 32.674 ms

Loss rate: 2.40%

Run 3: Report of Indigo-MusesD — Data Link



Run 1: Statistics of Indigo-MusesT

Start at: 2019-01-02 22:31:45

End at: 2019-01-02 22:32:15

Local clock offset: 1.312 ms

Remote clock offset: 2.594 ms

Below is generated by plot.py at 2019-01-02 23:38:09

Datalink statistics

-- Total of 3 flows:

Average throughput: 11.44 Mbit/s

95th percentile per-packet one-way delay: 1152.079 ms

Loss rate: 79.02%

-- Flow 1:

Average throughput: 7.79 Mbit/s

95th percentile per-packet one-way delay: 1142.425 ms

Loss rate: 74.09%

-- Flow 2:

Average throughput: 4.41 Mbit/s

95th percentile per-packet one-way delay: 1170.804 ms

Loss rate: 84.32%

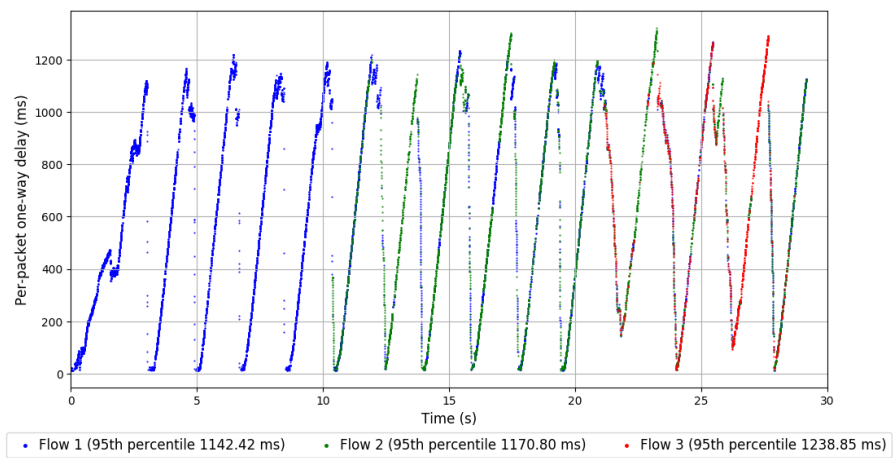
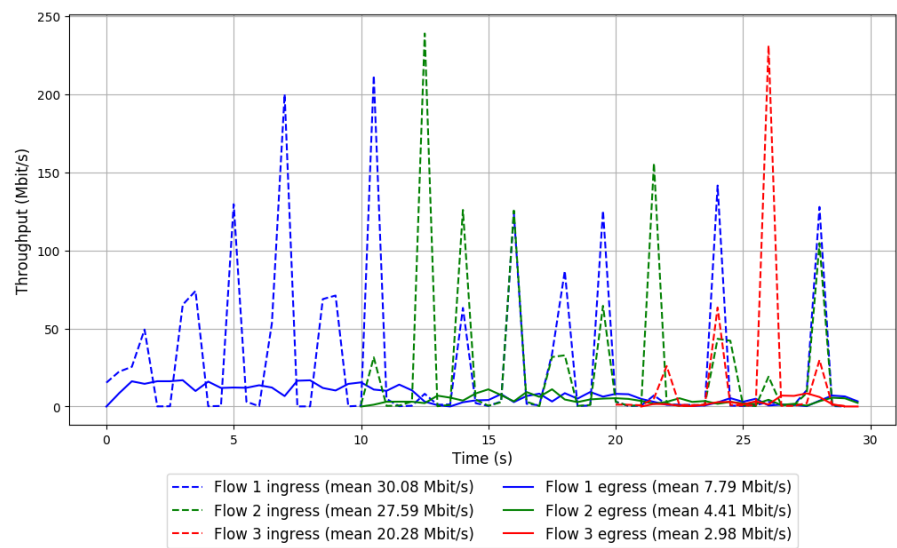
-- Flow 3:

Average throughput: 2.98 Mbit/s

95th percentile per-packet one-way delay: 1238.854 ms

Loss rate: 87.23%

Run 1: Report of Indigo-MusesT — Data Link



Run 2: Statistics of Indigo-MusesT

Start at: 2019-01-02 22:54:09

End at: 2019-01-02 22:54:39

Local clock offset: 2.062 ms

Remote clock offset: 2.714 ms

Below is generated by plot.py at 2019-01-02 23:38:10

Datalink statistics

-- Total of 3 flows:

Average throughput: 10.46 Mbit/s

95th percentile per-packet one-way delay: 1157.824 ms

Loss rate: 82.03%

-- Flow 1:

Average throughput: 6.88 Mbit/s

95th percentile per-packet one-way delay: 1159.975 ms

Loss rate: 79.24%

-- Flow 2:

Average throughput: 4.22 Mbit/s

95th percentile per-packet one-way delay: 1153.817 ms

Loss rate: 84.70%

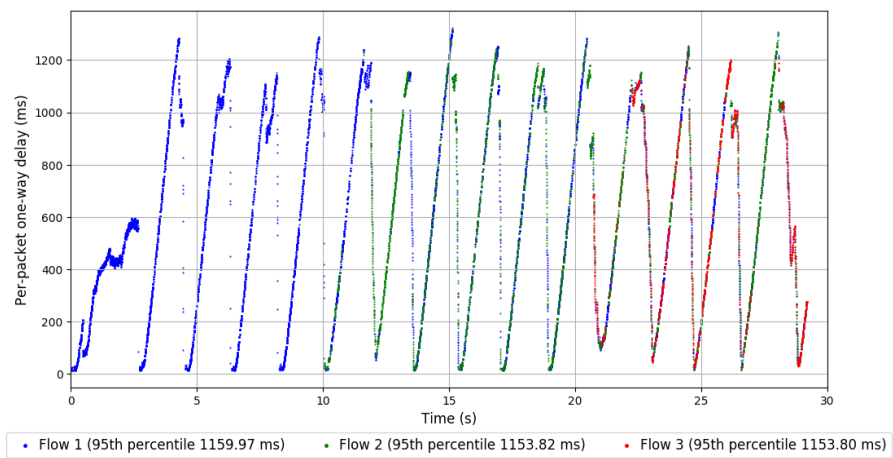
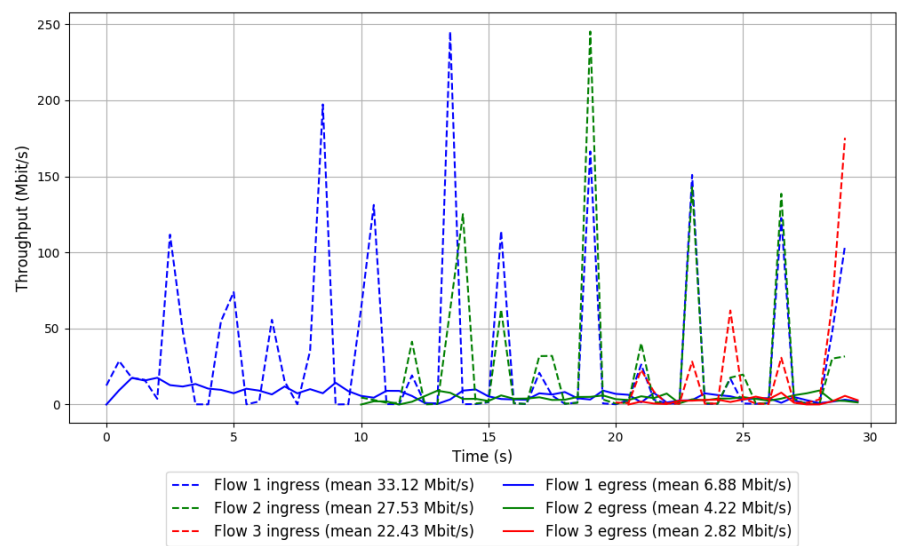
-- Flow 3:

Average throughput: 2.82 Mbit/s

95th percentile per-packet one-way delay: 1153.801 ms

Loss rate: 88.31%

Run 2: Report of Indigo-MusesT — Data Link



Run 3: Statistics of Indigo-MusesT

Start at: 2019-01-02 23:16:32

End at: 2019-01-02 23:17:02

Local clock offset: 0.081 ms

Remote clock offset: 2.668 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 13.13 Mbit/s

95th percentile per-packet one-way delay: 1158.370 ms

Loss rate: 79.04%

-- Flow 1:

Average throughput: 8.75 Mbit/s

95th percentile per-packet one-way delay: 1148.831 ms

Loss rate: 77.76%

-- Flow 2:

Average throughput: 4.68 Mbit/s

95th percentile per-packet one-way delay: 1172.085 ms

Loss rate: 81.66%

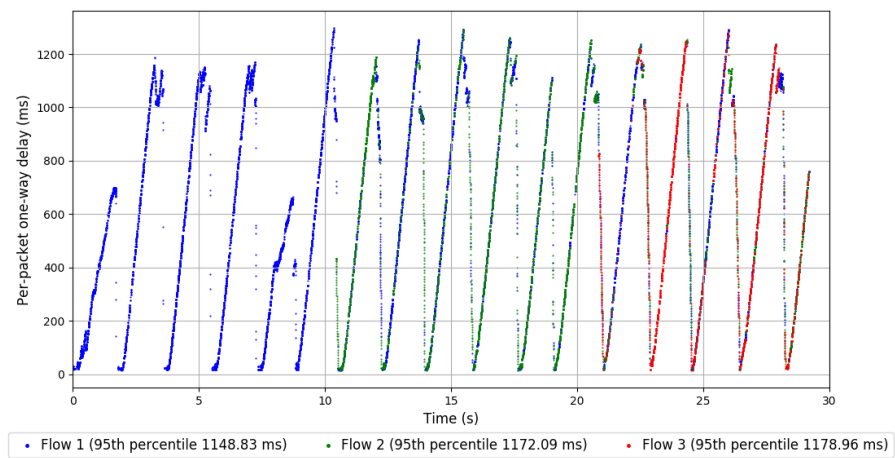
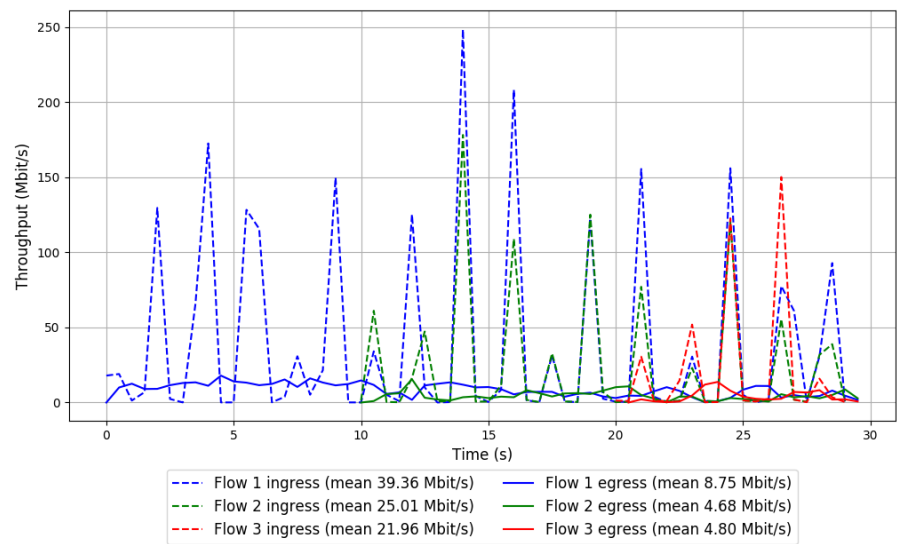
-- Flow 3:

Average throughput: 4.80 Mbit/s

95th percentile per-packet one-way delay: 1178.963 ms

Loss rate: 80.10%

Run 3: Report of Indigo-MusesT — Data Link

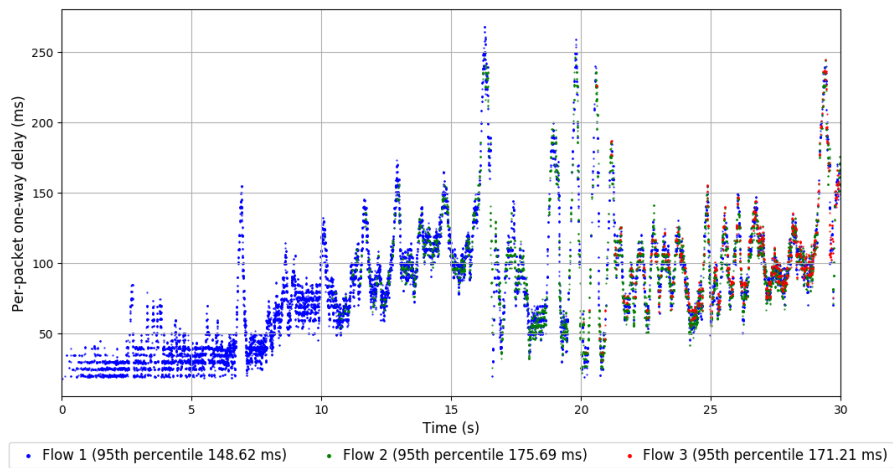
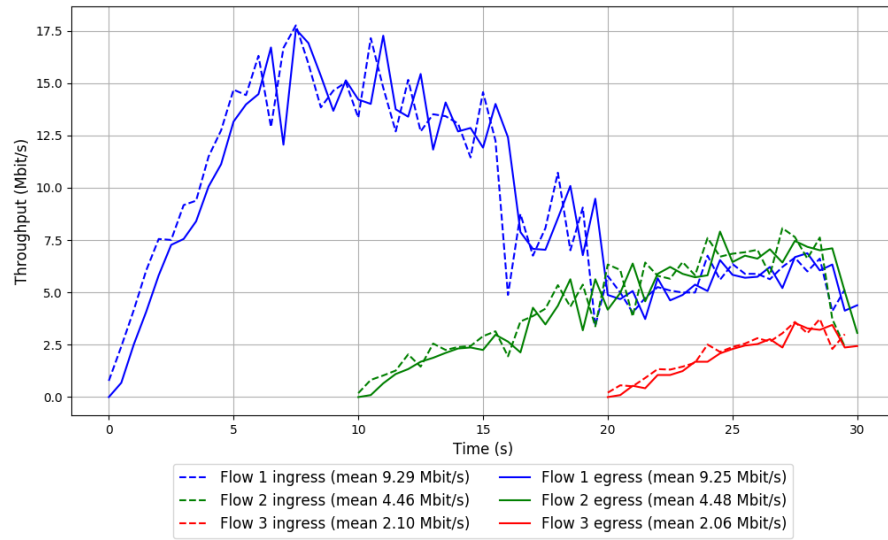



```
Run 1: Statistics of LEDBAT

Start at: 2019-01-02 22:47:01
End at: 2019-01-02 22:47:31
Local clock offset: -1.189 ms
Remote clock offset: 2.99 ms

# Below is generated by plot.py at 2019-01-02 23:38:17
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.90 Mbit/s
95th percentile per-packet one-way delay: 154.877 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 9.25 Mbit/s
95th percentile per-packet one-way delay: 148.622 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 4.48 Mbit/s
95th percentile per-packet one-way delay: 175.690 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 2.06 Mbit/s
95th percentile per-packet one-way delay: 171.212 ms
Loss rate: 2.75%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2019-01-02 23:09:30

End at: 2019-01-02 23:10:00

Local clock offset: 2.328 ms

Remote clock offset: 3.047 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 13.31 Mbit/s

95th percentile per-packet one-way delay: 162.787 ms

Loss rate: 0.58%

-- Flow 1:

Average throughput: 9.78 Mbit/s

95th percentile per-packet one-way delay: 159.373 ms

Loss rate: 0.35%

-- Flow 2:

Average throughput: 4.09 Mbit/s

95th percentile per-packet one-way delay: 164.489 ms

Loss rate: 0.87%

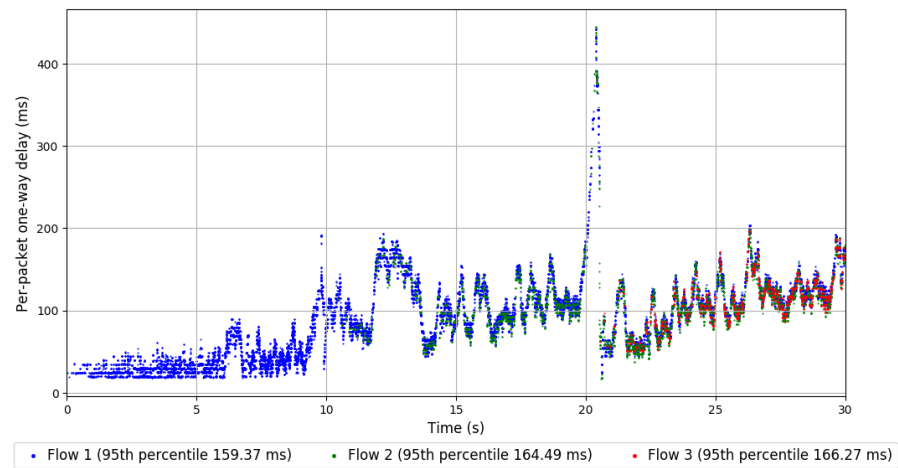
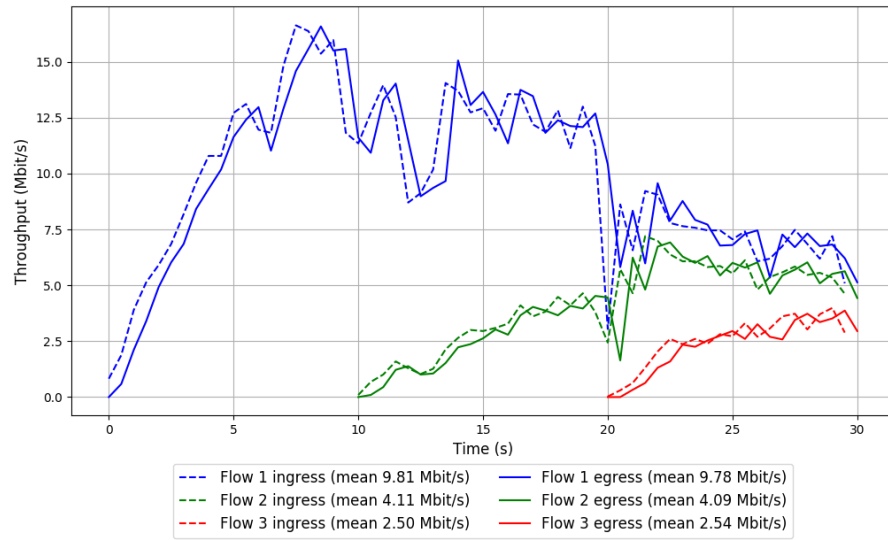
-- Flow 3:

Average throughput: 2.54 Mbit/s

95th percentile per-packet one-way delay: 166.270 ms

Loss rate: 2.26%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2019-01-02 23:31:52

End at: 2019-01-02 23:32:22

Local clock offset: -0.781 ms

Remote clock offset: 2.452 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 4.34 Mbit/s

95th percentile per-packet one-way delay: 75.474 ms

Loss rate: 4.63%

-- Flow 1:

Average throughput: 2.51 Mbit/s

95th percentile per-packet one-way delay: 66.818 ms

Loss rate: 4.35%

-- Flow 2:

Average throughput: 1.89 Mbit/s

95th percentile per-packet one-way delay: 82.719 ms

Loss rate: 4.65%

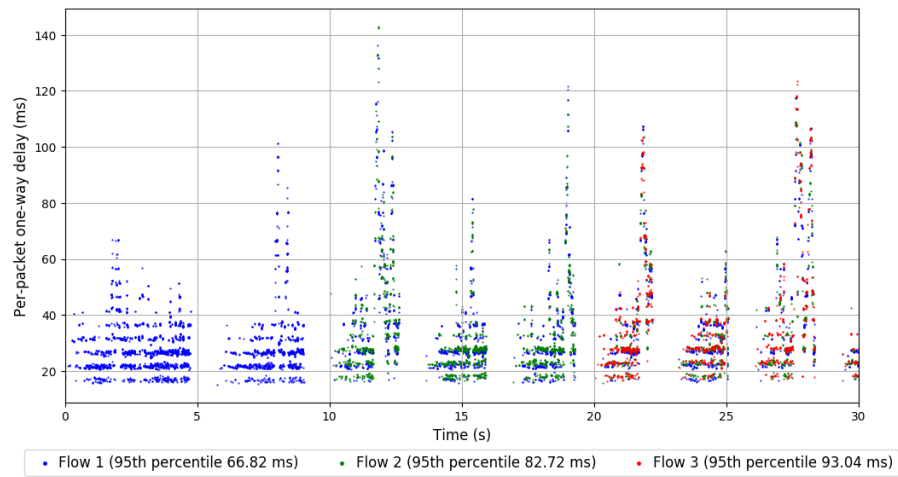
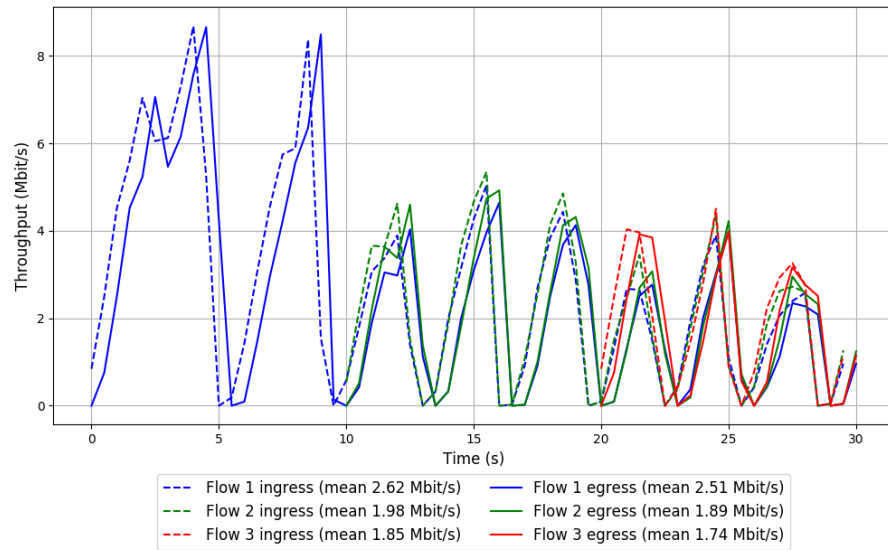
-- Flow 3:

Average throughput: 1.74 Mbit/s

95th percentile per-packet one-way delay: 93.044 ms

Loss rate: 5.83%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

Start at: 2019-01-02 22:37:36

End at: 2019-01-02 22:38:06

Local clock offset: -1.633 ms

Remote clock offset: 3.303 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 5.56 Mbit/s

95th percentile per-packet one-way delay: 87.536 ms

Loss rate: 0.10%

-- Flow 1:

Average throughput: 1.99 Mbit/s

95th percentile per-packet one-way delay: 66.703 ms

Loss rate: 0.10%

-- Flow 2:

Average throughput: 4.32 Mbit/s

95th percentile per-packet one-way delay: 107.670 ms

Loss rate: 0.08%

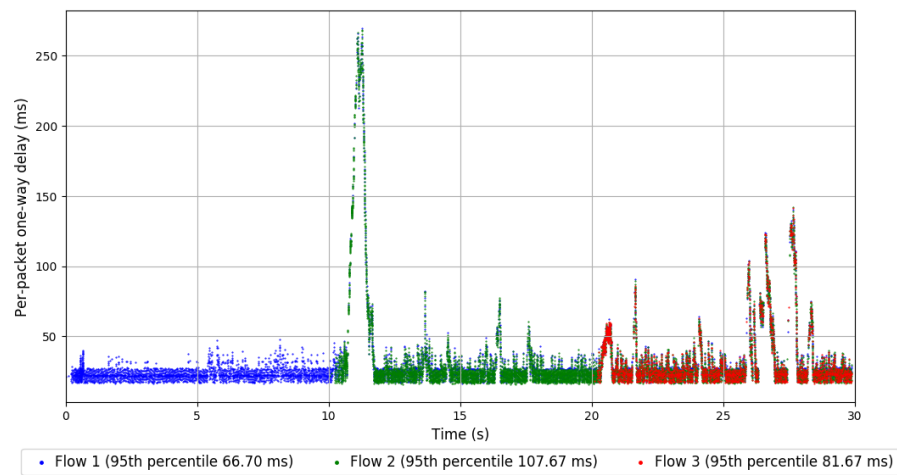
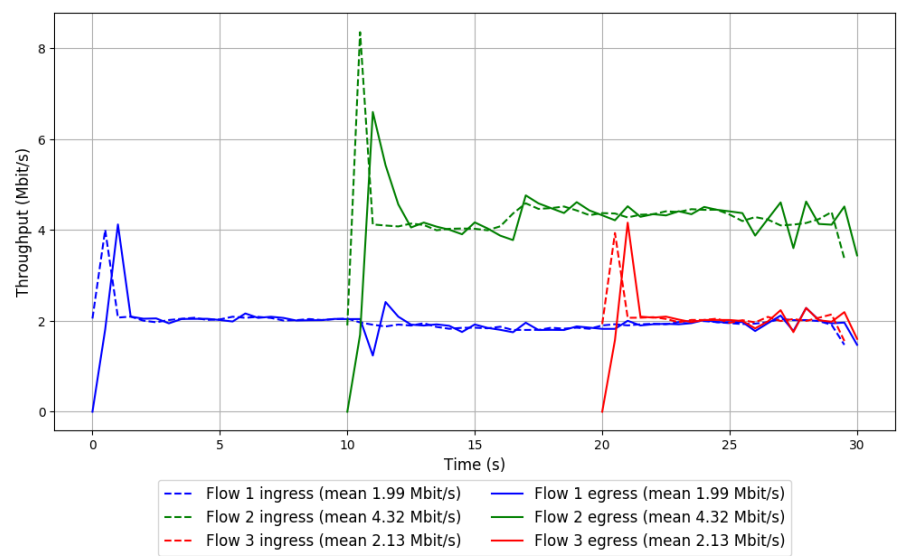
-- Flow 3:

Average throughput: 2.13 Mbit/s

95th percentile per-packet one-way delay: 81.673 ms

Loss rate: 0.17%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2019-01-02 23:00:02

End at: 2019-01-02 23:00:32

Local clock offset: 3.908 ms

Remote clock offset: 2.605 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 7.72 Mbit/s

95th percentile per-packet one-way delay: 144.897 ms

Loss rate: 0.26%

-- Flow 1:

Average throughput: 1.96 Mbit/s

95th percentile per-packet one-way delay: 107.956 ms

Loss rate: 0.21%

-- Flow 2:

Average throughput: 7.62 Mbit/s

95th percentile per-packet one-way delay: 158.430 ms

Loss rate: 0.25%

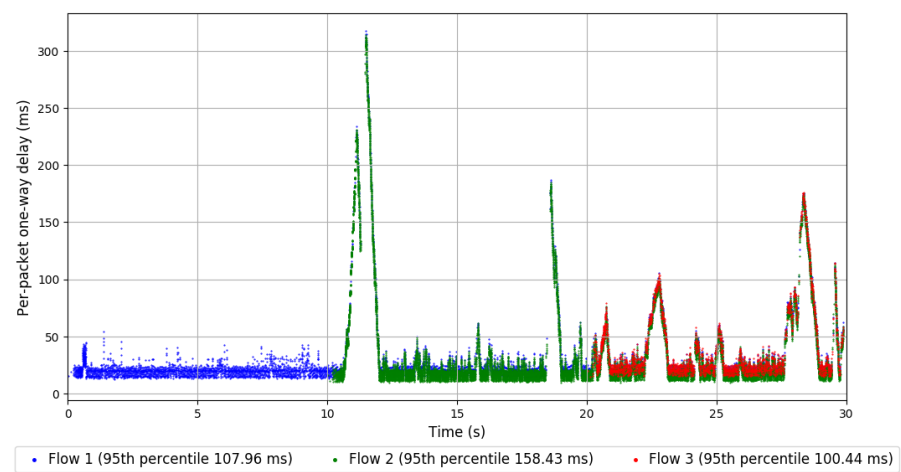
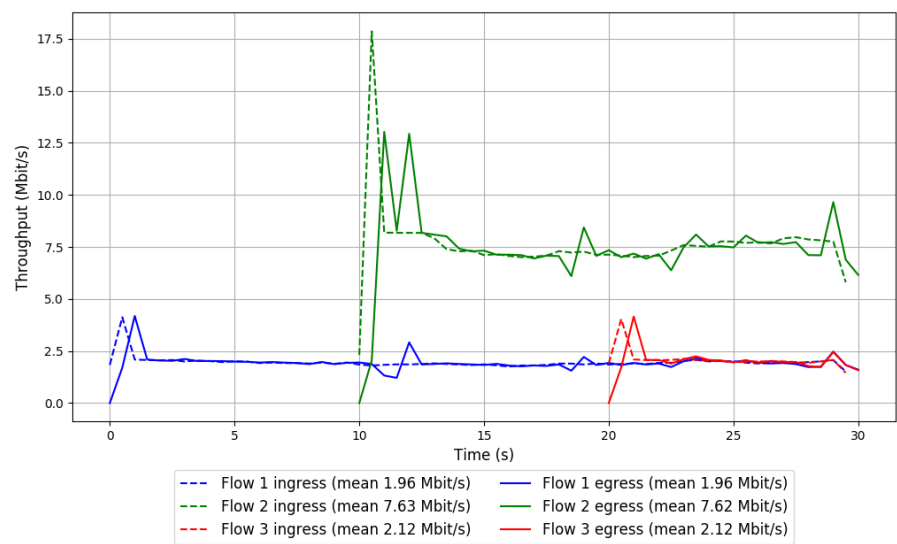
-- Flow 3:

Average throughput: 2.12 Mbit/s

95th percentile per-packet one-way delay: 100.440 ms

Loss rate: 0.47%

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2019-01-02 23:22:28

End at: 2019-01-02 23:22:58

Local clock offset: -0.097 ms

Remote clock offset: 2.708 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 7.83 Mbit/s

95th percentile per-packet one-way delay: 155.050 ms

Loss rate: 0.42%

-- Flow 1:

Average throughput: 4.31 Mbit/s

95th percentile per-packet one-way delay: 143.956 ms

Loss rate: 0.39%

-- Flow 2:

Average throughput: 4.17 Mbit/s

95th percentile per-packet one-way delay: 175.138 ms

Loss rate: 0.54%

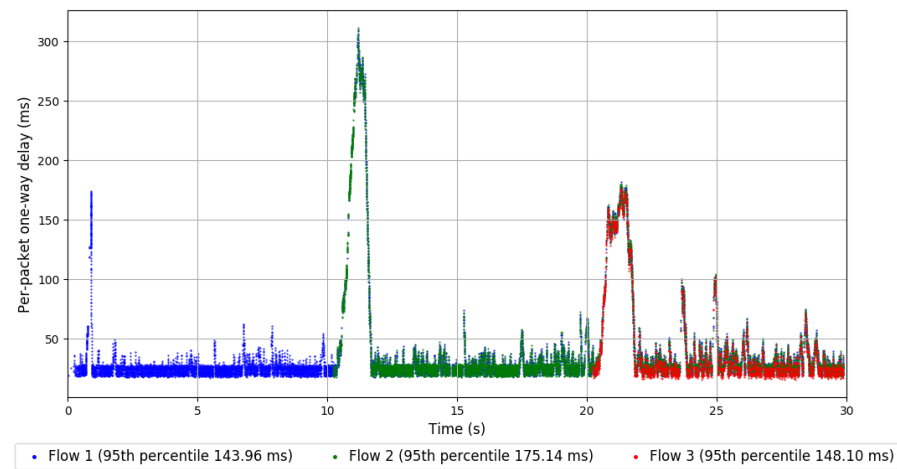
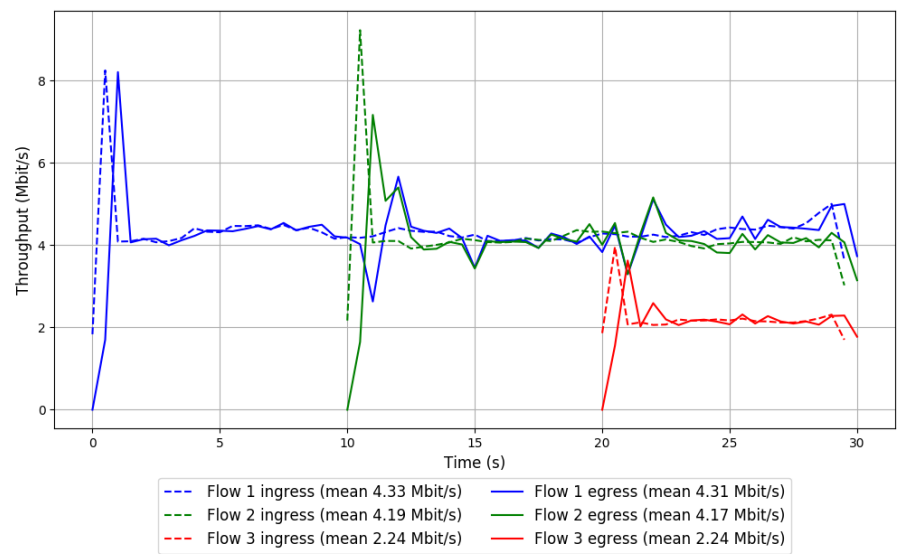
-- Flow 3:

Average throughput: 2.24 Mbit/s

95th percentile per-packet one-way delay: 148.098 ms

Loss rate: 0.17%

Run 3: Report of PCC-Allegro — Data Link

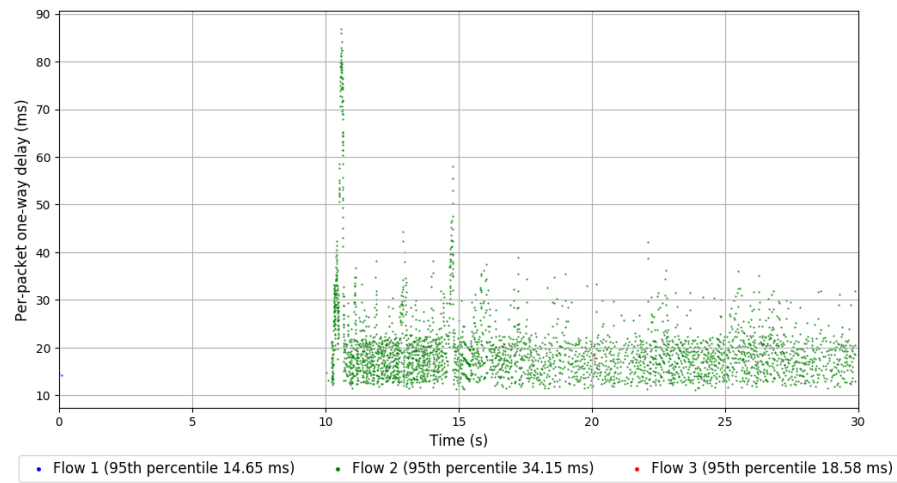
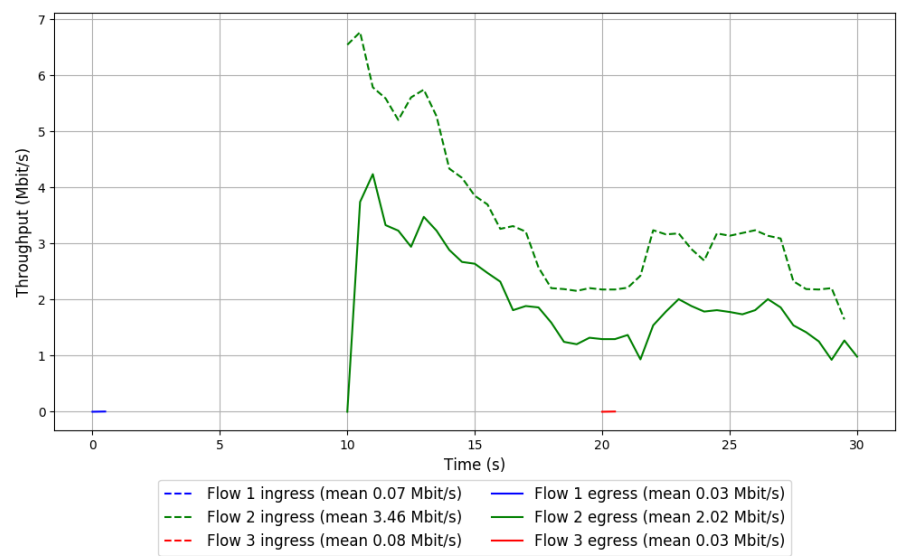


```
Run 1: Statistics of PCC-Expr

Start at: 2019-01-02 22:34:07
End at: 2019-01-02 22:34:37
Local clock offset: 2.376 ms
Remote clock offset: 3.217 ms

# Below is generated by plot.py at 2019-01-02 23:38:17
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 34.149 ms
Loss rate: 41.49%
-- Flow 1:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 14.653 ms
Loss rate: 85.71%
-- Flow 2:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 34.149 ms
Loss rate: 41.47%
-- Flow 3:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 18.579 ms
Loss rate: 85.71%
```

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2019-01-02 22:56:30

End at: 2019-01-02 22:57:00

Local clock offset: 2.984 ms

Remote clock offset: 2.316 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 4.33 Mbit/s

95th percentile per-packet one-way delay: 1042.841 ms

Loss rate: 50.81%

-- Flow 1:

Average throughput: 1.81 Mbit/s

95th percentile per-packet one-way delay: 1031.483 ms

Loss rate: 45.67%

-- Flow 2:

Average throughput: 2.71 Mbit/s

95th percentile per-packet one-way delay: 1042.126 ms

Loss rate: 51.31%

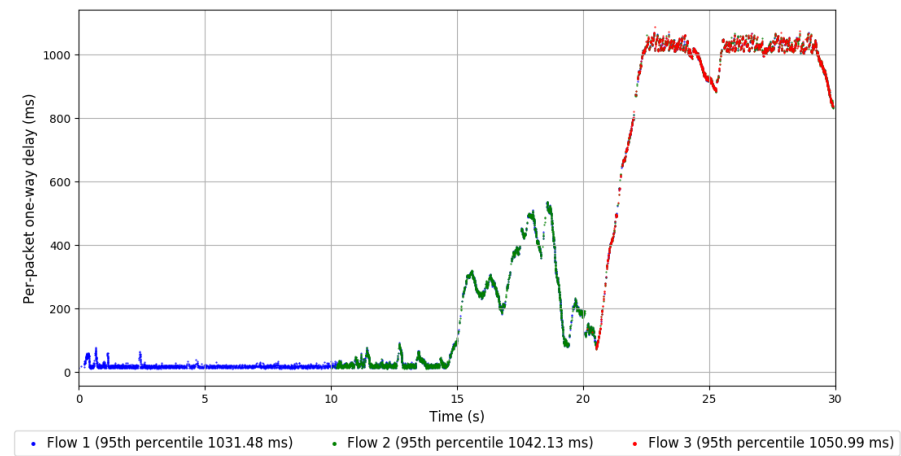
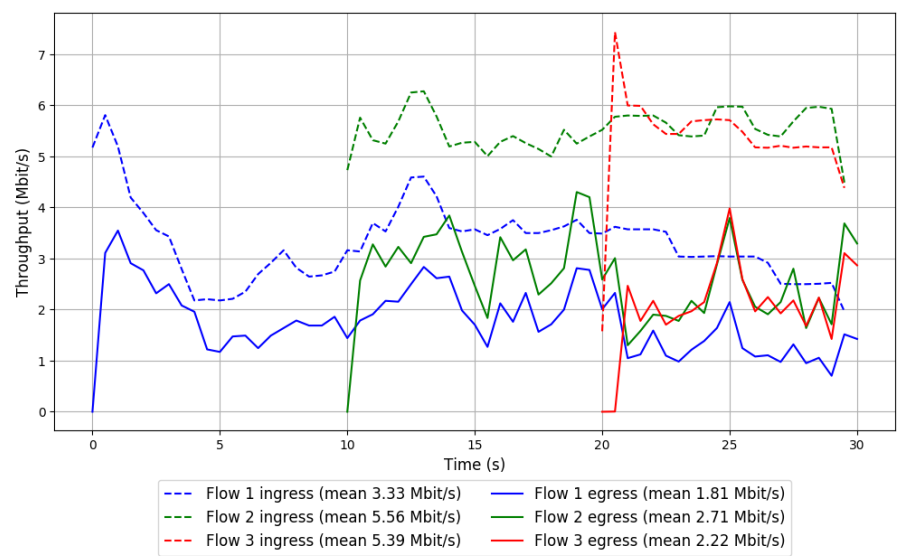
-- Flow 3:

Average throughput: 2.22 Mbit/s

95th percentile per-packet one-way delay: 1050.991 ms

Loss rate: 59.39%

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2019-01-02 23:18:51

End at: 2019-01-02 23:19:21

Local clock offset: 2.195 ms

Remote clock offset: 2.108 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 5.17 Mbit/s

95th percentile per-packet one-way delay: 394.631 ms

Loss rate: 49.70%

-- Flow 1:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 403.370 ms

Loss rate: 49.83%

-- Flow 2:

Average throughput: 2.81 Mbit/s

95th percentile per-packet one-way delay: 446.987 ms

Loss rate: 47.02%

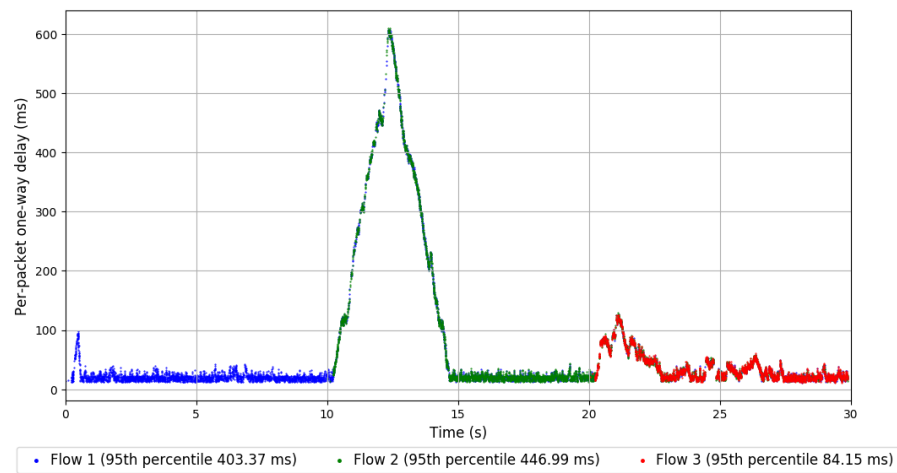
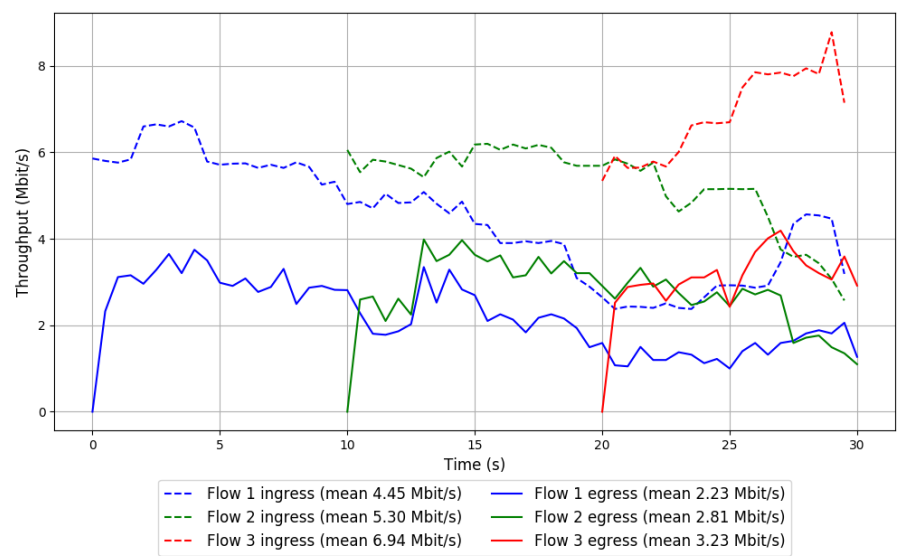
-- Flow 3:

Average throughput: 3.23 Mbit/s

95th percentile per-packet one-way delay: 84.149 ms

Loss rate: 53.58%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2019-01-02 22:41:06

End at: 2019-01-02 22:41:36

Local clock offset: -0.079 ms

Remote clock offset: 3.32 ms

Below is generated by plot.py at 2019-01-02 23:38:17

Datalink statistics

-- Total of 3 flows:

Average throughput: 13.22 Mbit/s

95th percentile per-packet one-way delay: 286.671 ms

Loss rate: 1.04%

-- Flow 1:

Average throughput: 9.23 Mbit/s

95th percentile per-packet one-way delay: 282.259 ms

Loss rate: 0.53%

-- Flow 2:

Average throughput: 4.90 Mbit/s

95th percentile per-packet one-way delay: 293.570 ms

Loss rate: 1.93%

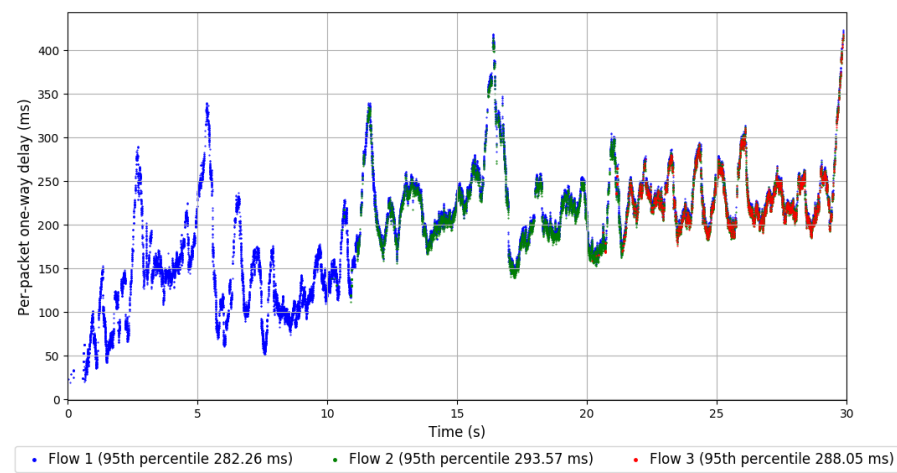
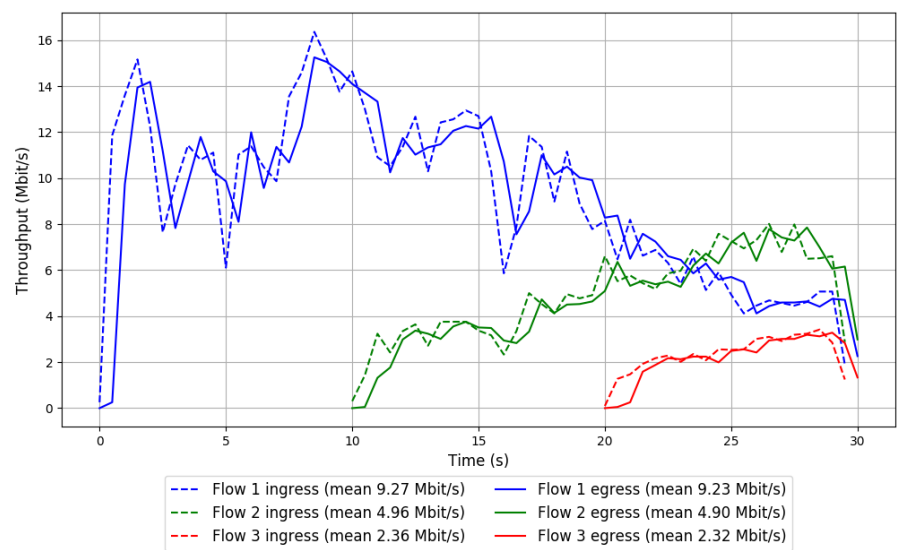
-- Flow 3:

Average throughput: 2.32 Mbit/s

95th percentile per-packet one-way delay: 288.053 ms

Loss rate: 3.37%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2019-01-02 23:03:31

End at: 2019-01-02 23:04:01

Local clock offset: 2.93 ms

Remote clock offset: 2.471 ms

Below is generated by plot.py at 2019-01-02 23:38:20

Datalink statistics

-- Total of 3 flows:

Average throughput: 12.00 Mbit/s

95th percentile per-packet one-way delay: 404.052 ms

Loss rate: 0.79%

-- Flow 1:

Average throughput: 9.27 Mbit/s

95th percentile per-packet one-way delay: 390.386 ms

Loss rate: 0.57%

-- Flow 2:

Average throughput: 3.41 Mbit/s

95th percentile per-packet one-way delay: 446.026 ms

Loss rate: 1.10%

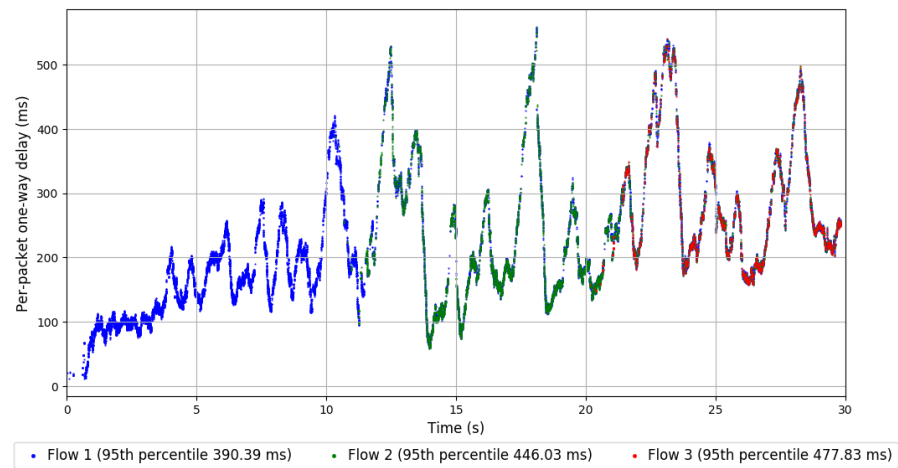
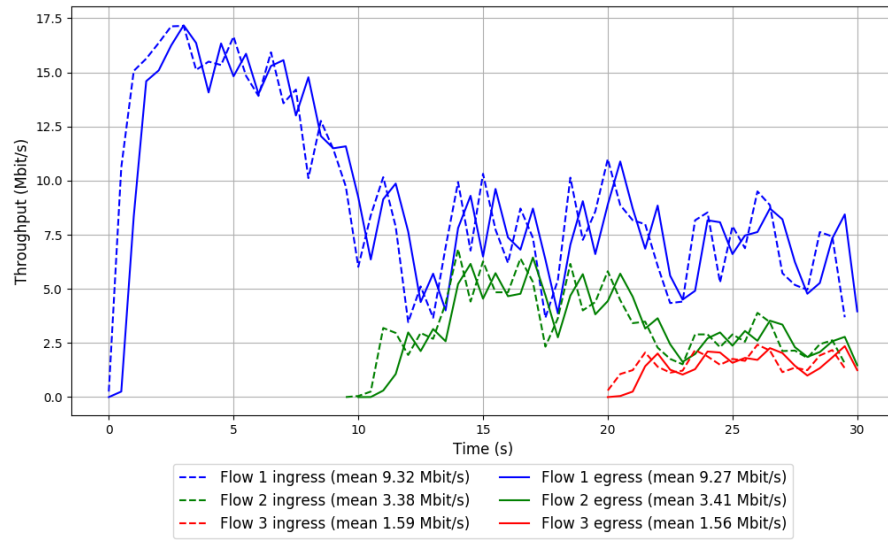
-- Flow 3:

Average throughput: 1.56 Mbit/s

95th percentile per-packet one-way delay: 477.831 ms

Loss rate: 3.34%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2019-01-02 23:25:55

End at: 2019-01-02 23:26:25

Local clock offset: -1.178 ms

Remote clock offset: 2.068 ms

Below is generated by plot.py at 2019-01-02 23:38:23

Datalink statistics

-- Total of 3 flows:

Average throughput: 14.47 Mbit/s

95th percentile per-packet one-way delay: 249.507 ms

Loss rate: 1.14%

-- Flow 1:

Average throughput: 10.68 Mbit/s

95th percentile per-packet one-way delay: 247.026 ms

Loss rate: 0.81%

-- Flow 2:

Average throughput: 4.33 Mbit/s

95th percentile per-packet one-way delay: 253.864 ms

Loss rate: 1.60%

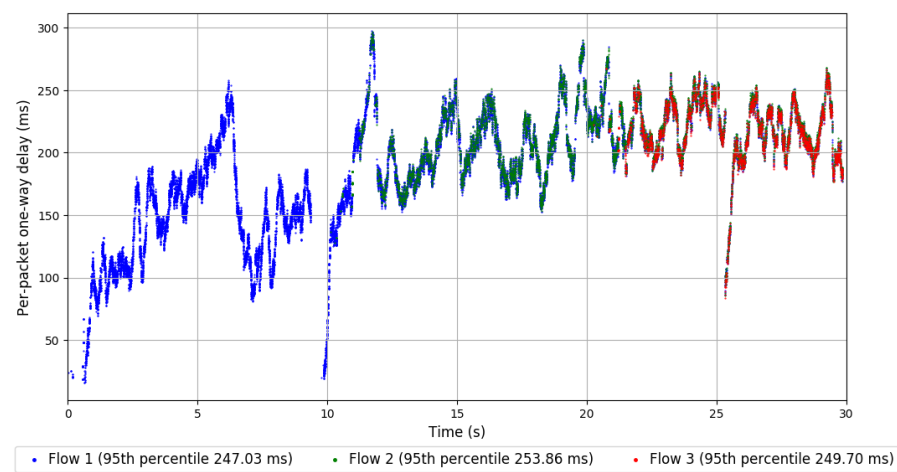
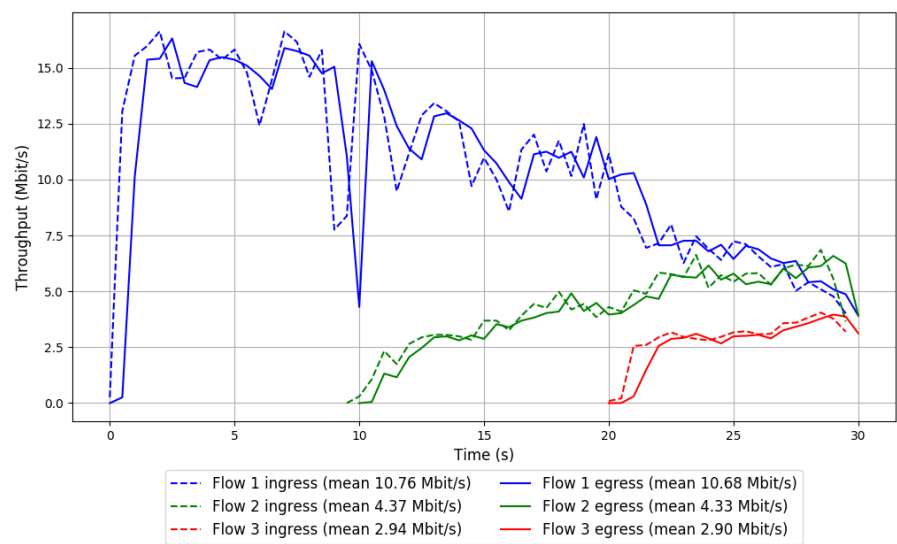
-- Flow 3:

Average throughput: 2.90 Mbit/s

95th percentile per-packet one-way delay: 249.696 ms

Loss rate: 3.49%

Run 3: Report of QUIC Cubic — Data Link



Run 1: Statistics of SReAM

Start at: 2019-01-02 22:39:57

End at: 2019-01-02 22:40:27

Local clock offset: 0.85 ms

Remote clock offset: 3.05 ms

Below is generated by plot.py at 2019-01-02 23:38:23

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.43 Mbit/s

95th percentile per-packet one-way delay: 24.646 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.639 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.638 ms

Loss rate: 0.00%

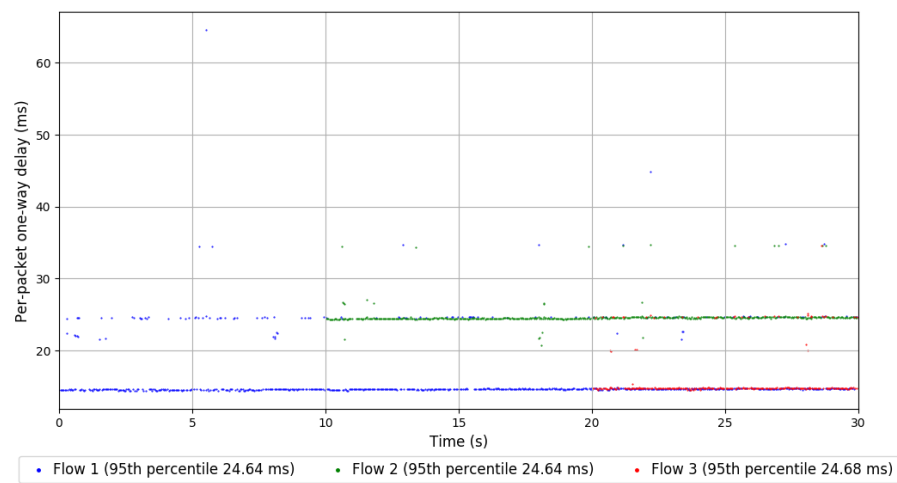
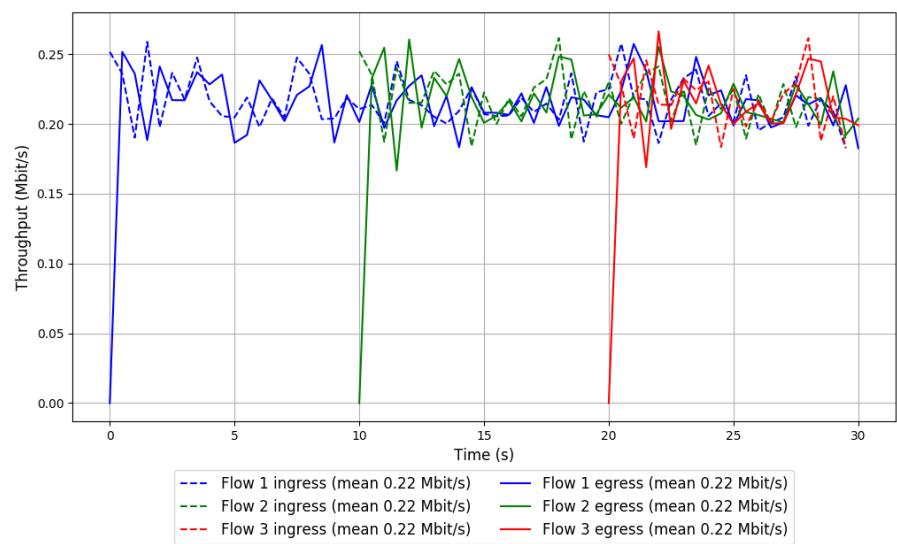
-- Flow 3:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.677 ms

Loss rate: 0.00%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SReAM

Start at: 2019-01-02 23:02:22

End at: 2019-01-02 23:02:52

Local clock offset: 1.534 ms

Remote clock offset: 3.142 ms

Below is generated by plot.py at 2019-01-02 23:38:23

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.43 Mbit/s

95th percentile per-packet one-way delay: 24.399 ms

Loss rate: 0.06%

-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.165 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.281 ms

Loss rate: 0.00%

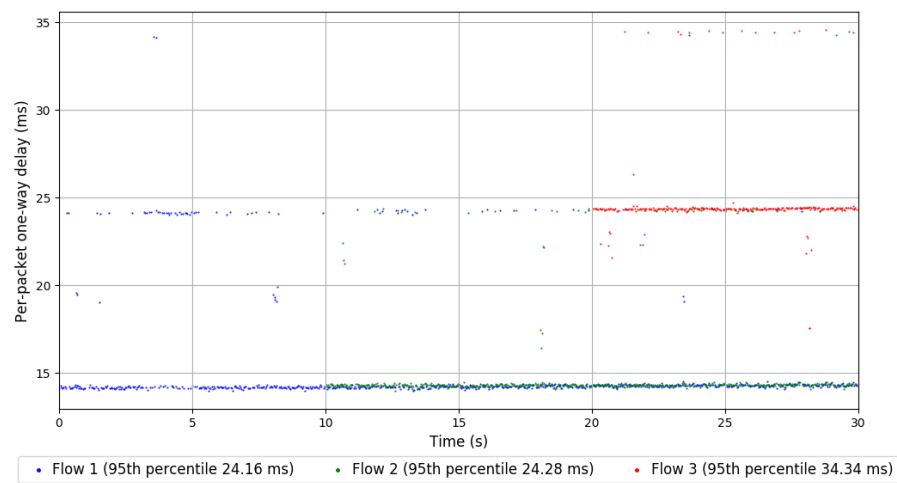
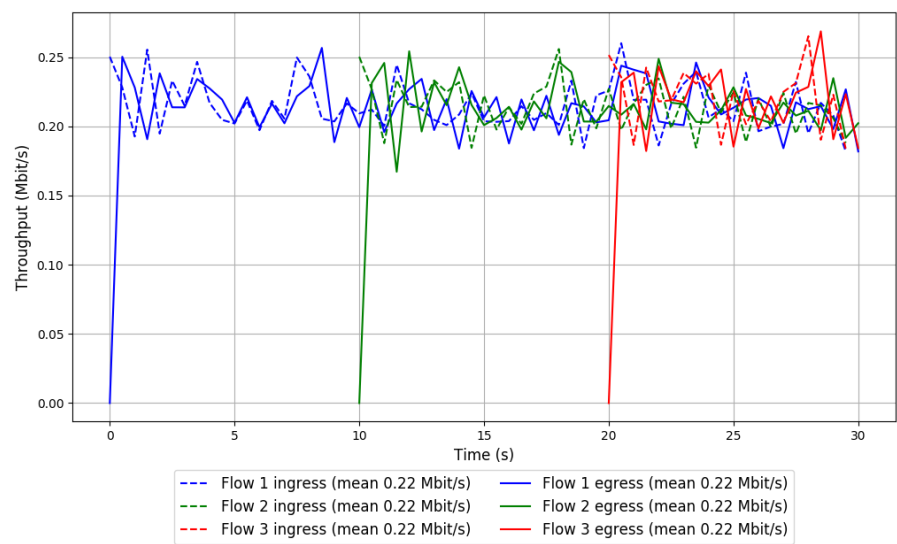
-- Flow 3:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 34.342 ms

Loss rate: 0.36%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SReAM

Start at: 2019-01-02 23:24:47

End at: 2019-01-02 23:25:17

Local clock offset: 1.447 ms

Remote clock offset: 2.499 ms

Below is generated by plot.py at 2019-01-02 23:38:23

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.43 Mbit/s

95th percentile per-packet one-way delay: 24.290 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 24.386 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.290 ms

Loss rate: 0.00%

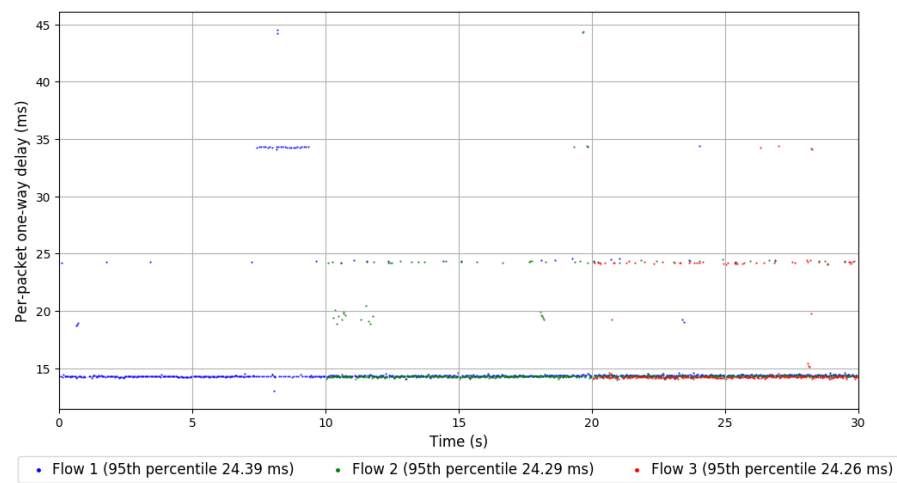
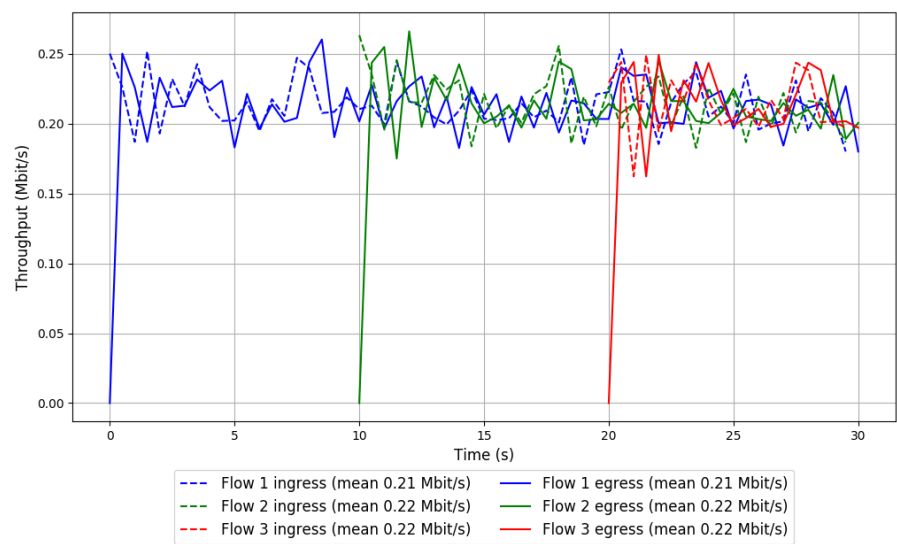
-- Flow 3:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 24.256 ms

Loss rate: 0.00%

Run 3: Report of SReAM — Data Link

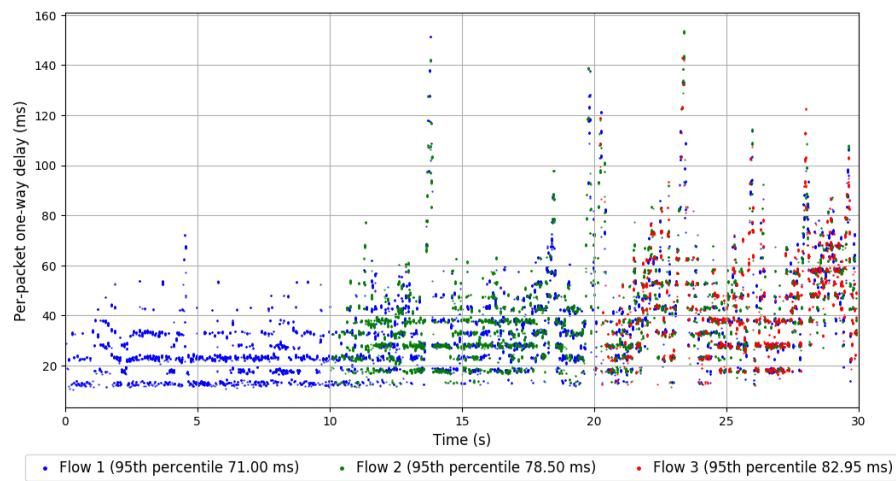
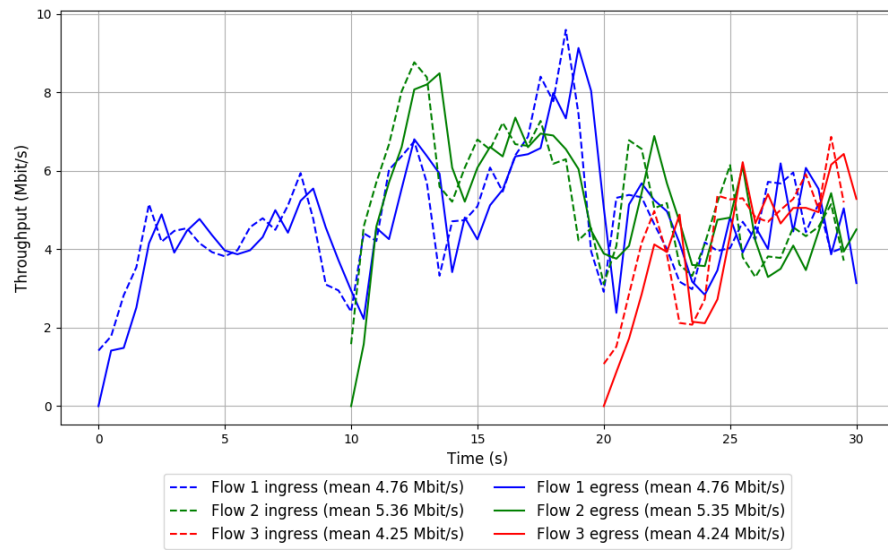


```
Run 1: Statistics of Sprout

Start at: 2019-01-02 22:50:36
End at: 2019-01-02 22:51:06
Local clock offset: 2.669 ms
Remote clock offset: 2.517 ms

# Below is generated by plot.py at 2019-01-02 23:38:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.71 Mbit/s
95th percentile per-packet one-way delay: 76.312 ms
Loss rate: 0.37%
-- Flow 1:
Average throughput: 4.76 Mbit/s
95th percentile per-packet one-way delay: 70.999 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 5.35 Mbit/s
95th percentile per-packet one-way delay: 78.499 ms
Loss rate: 0.25%
-- Flow 3:
Average throughput: 4.24 Mbit/s
95th percentile per-packet one-way delay: 82.949 ms
Loss rate: 0.63%
```

Run 1: Report of Sprout — Data Link

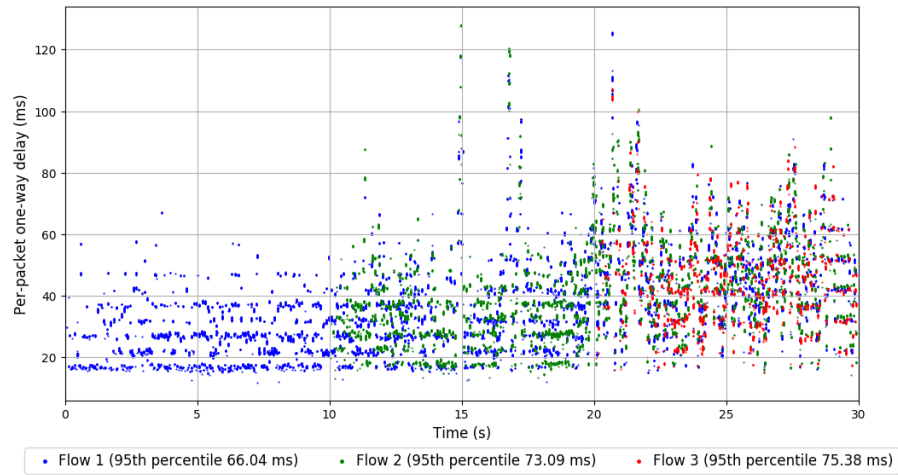
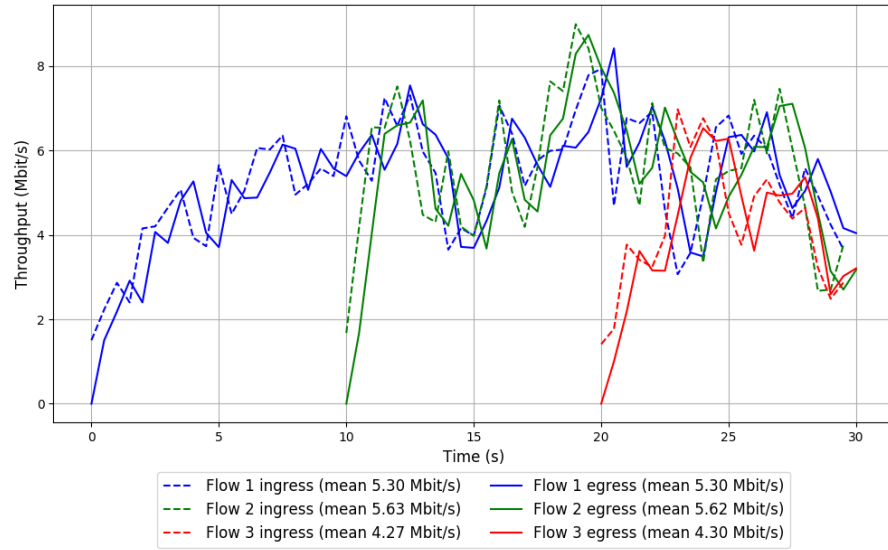


Run 2: Statistics of Sprout

Start at: 2019-01-02 23:13:00
End at: 2019-01-02 23:13:30
Local clock offset: 2.806 ms
Remote clock offset: 3.169 ms

Below is generated by plot.py at 2019-01-02 23:38:23
Datalink statistics
-- Total of 3 flows:
Average throughput: 10.46 Mbit/s
95th percentile per-packet one-way delay: 70.901 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 5.30 Mbit/s
95th percentile per-packet one-way delay: 66.036 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 5.62 Mbit/s
95th percentile per-packet one-way delay: 73.089 ms
Loss rate: 0.26%
-- Flow 3:
Average throughput: 4.30 Mbit/s
95th percentile per-packet one-way delay: 75.381 ms
Loss rate: 0.00%

Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2019-01-02 23:35:23

End at: 2019-01-02 23:35:53

Local clock offset: 0.06 ms

Remote clock offset: 2.462 ms

Below is generated by plot.py at 2019-01-02 23:38:23

Datalink statistics

-- Total of 3 flows:

Average throughput: 4.36 Mbit/s

95th percentile per-packet one-way delay: 50.870 ms

Loss rate: 5.76%

-- Flow 1:

Average throughput: 3.12 Mbit/s

95th percentile per-packet one-way delay: 50.648 ms

Loss rate: 4.72%

-- Flow 2:

Average throughput: 1.26 Mbit/s

95th percentile per-packet one-way delay: 46.352 ms

Loss rate: 8.34%

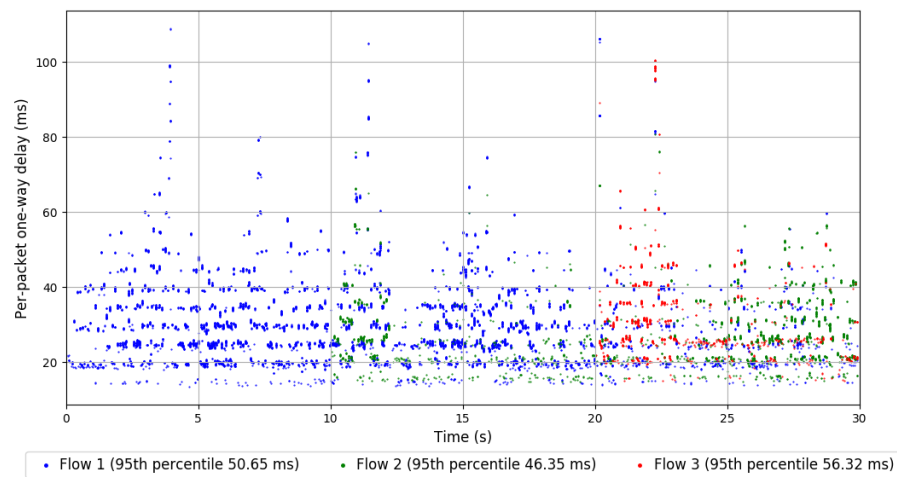
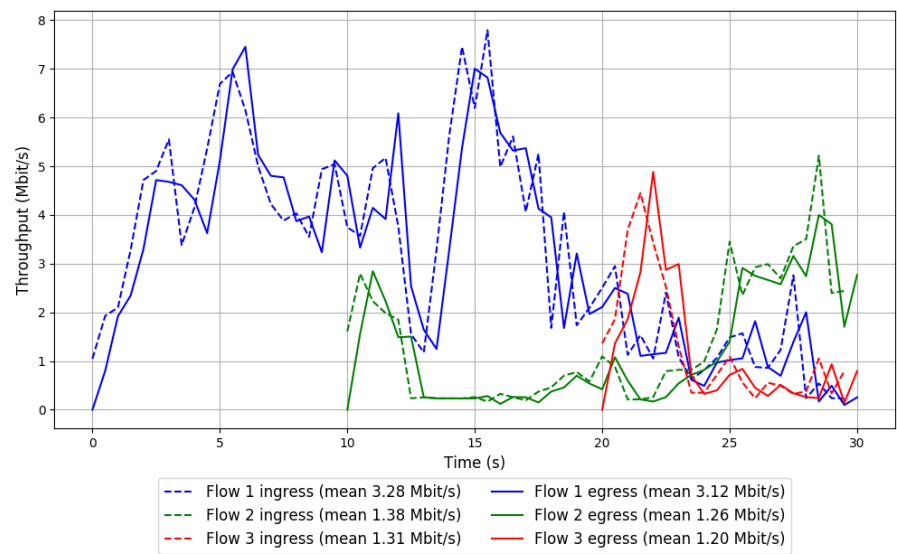
-- Flow 3:

Average throughput: 1.20 Mbit/s

95th percentile per-packet one-way delay: 56.322 ms

Loss rate: 8.20%

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2019-01-02 22:48:12

End at: 2019-01-02 22:48:42

Local clock offset: 0.185 ms

Remote clock offset: 2.786 ms

Below is generated by plot.py at 2019-01-02 23:38:23

Datalink statistics

-- Total of 3 flows:

Average throughput: 2.11 Mbit/s

95th percentile per-packet one-way delay: 32.617 ms

Loss rate: 28.88%

-- Flow 1:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 23.377 ms

Loss rate: 95.92%

-- Flow 2:

Average throughput: 3.17 Mbit/s

95th percentile per-packet one-way delay: 32.636 ms

Loss rate: 28.84%

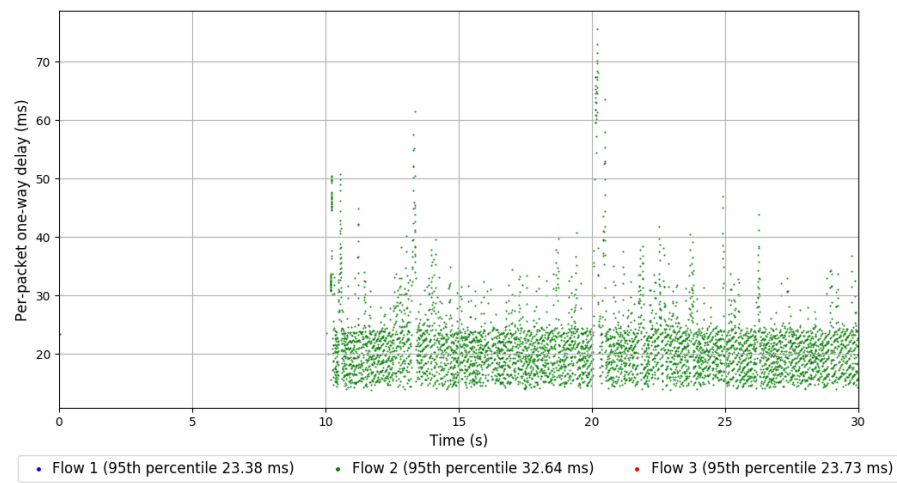
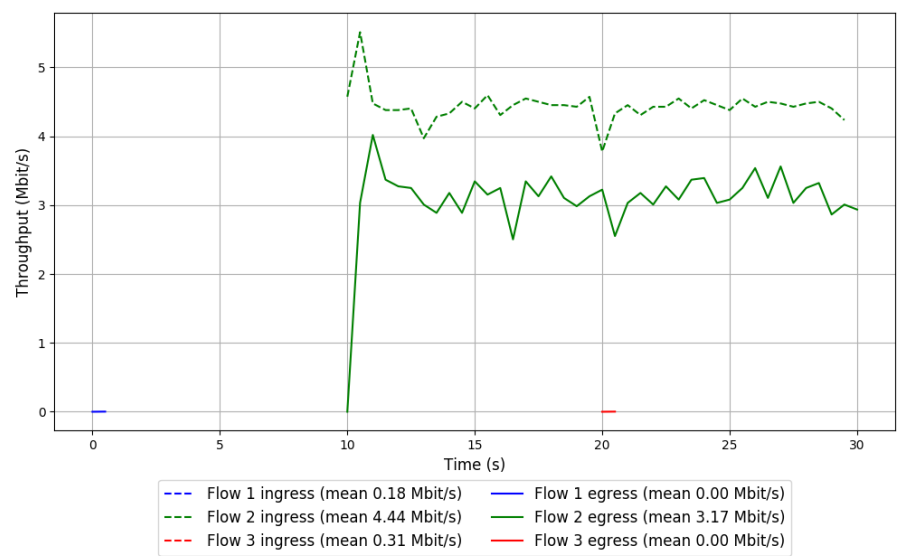
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 23.729 ms

Loss rate: 95.92%

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



Run 2: Statistics of TaoVA-100x

Start at: 2019-01-02 23:10:40

End at: 2019-01-02 23:11:10

Local clock offset: 1.201 ms

Remote clock offset: 2.221 ms

Below is generated by plot.py at 2019-01-02 23:38:23

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.26 Mbit/s

95th percentile per-packet one-way delay: 299.931 ms

Loss rate: 58.51%

-- Flow 1:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 21.767 ms

Loss rate: 95.92%

-- Flow 2:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 912.493 ms

Loss rate: 88.53%

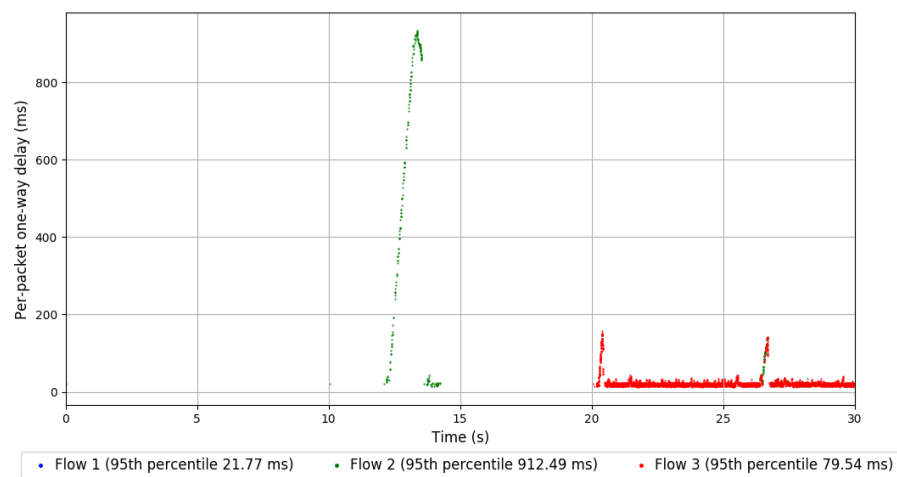
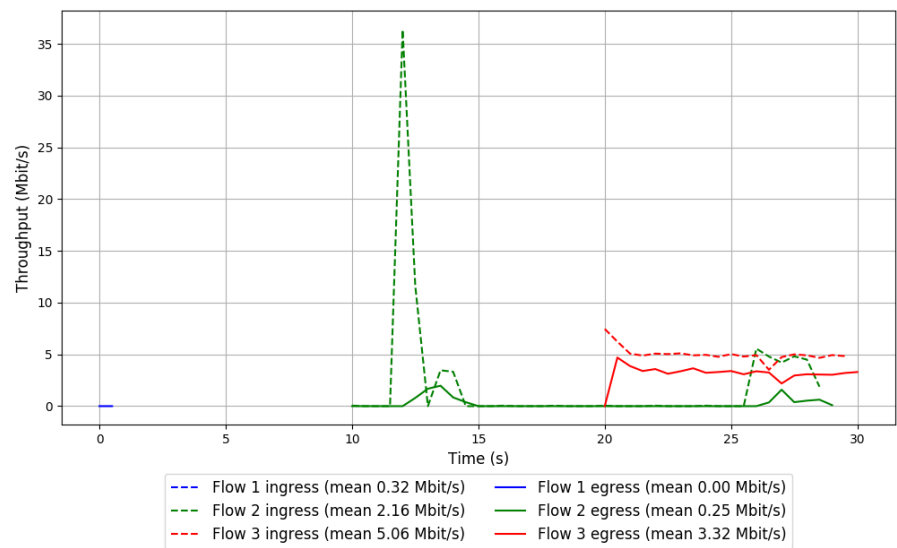
-- Flow 3:

Average throughput: 3.32 Mbit/s

95th percentile per-packet one-way delay: 79.541 ms

Loss rate: 34.43%

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

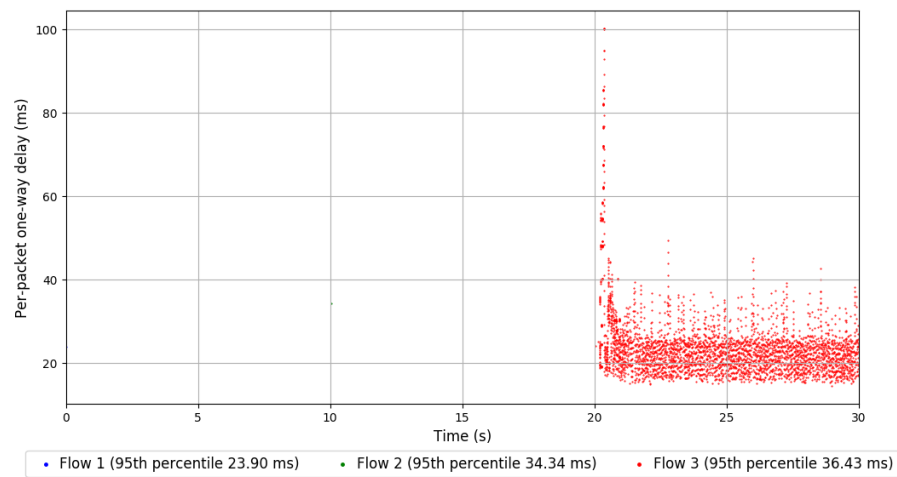
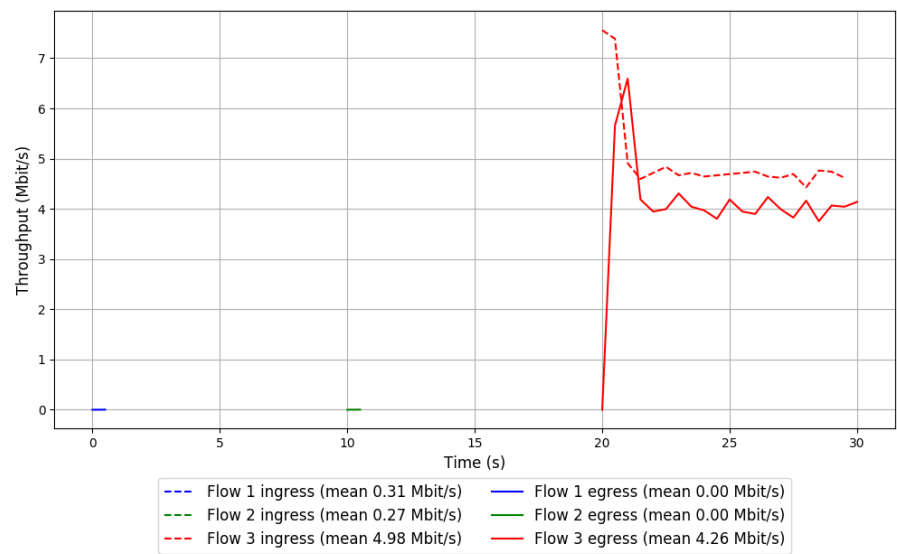


Run 3: Statistics of TaoVA-100x

Start at: 2019-01-02 23:33:02
End at: 2019-01-02 23:33:32
Local clock offset: -3.283 ms
Remote clock offset: -0.914 ms

Below is generated by plot.py at 2019-01-02 23:38:23
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 36.429 ms
Loss rate: 14.78%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 23.900 ms
Loss rate: 95.92%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 34.336 ms
Loss rate: 95.92%
-- Flow 3:
Average throughput: 4.26 Mbit/s
95th percentile per-packet one-way delay: 36.429 ms
Loss rate: 14.70%

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



Run 1: Statistics of TCP Vegas

Start at: 2019-01-02 22:30:34

End at: 2019-01-02 22:31:04

Local clock offset: 2.124 ms

Remote clock offset: 3.299 ms

Below is generated by plot.py at 2019-01-02 23:38:26

Datalink statistics

-- Total of 3 flows:

Average throughput: 8.43 Mbit/s

95th percentile per-packet one-way delay: 54.400 ms

Loss rate: 0.06%

-- Flow 1:

Average throughput: 3.66 Mbit/s

95th percentile per-packet one-way delay: 42.399 ms

Loss rate: 0.02%

-- Flow 2:

Average throughput: 5.29 Mbit/s

95th percentile per-packet one-way delay: 60.883 ms

Loss rate: 0.06%

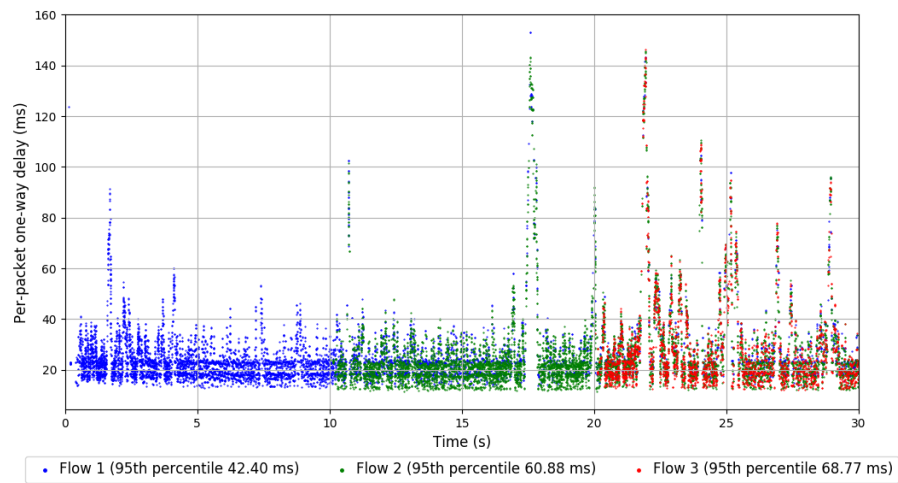
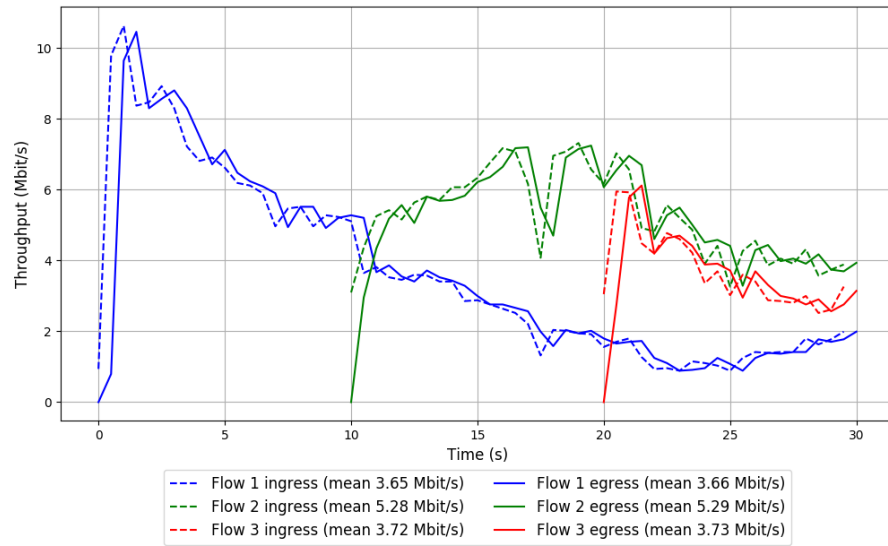
-- Flow 3:

Average throughput: 3.73 Mbit/s

95th percentile per-packet one-way delay: 68.765 ms

Loss rate: 0.16%

Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2019-01-02 22:52:59

End at: 2019-01-02 22:53:29

Local clock offset: 1.473 ms

Remote clock offset: 3.112 ms

Below is generated by plot.py at 2019-01-02 23:38:27

Datalink statistics

-- Total of 3 flows:

Average throughput: 8.87 Mbit/s

95th percentile per-packet one-way delay: 100.239 ms

Loss rate: 0.06%

-- Flow 1:

Average throughput: 4.67 Mbit/s

95th percentile per-packet one-way delay: 112.013 ms

Loss rate: 0.04%

-- Flow 2:

Average throughput: 4.69 Mbit/s

95th percentile per-packet one-way delay: 67.257 ms

Loss rate: 0.04%

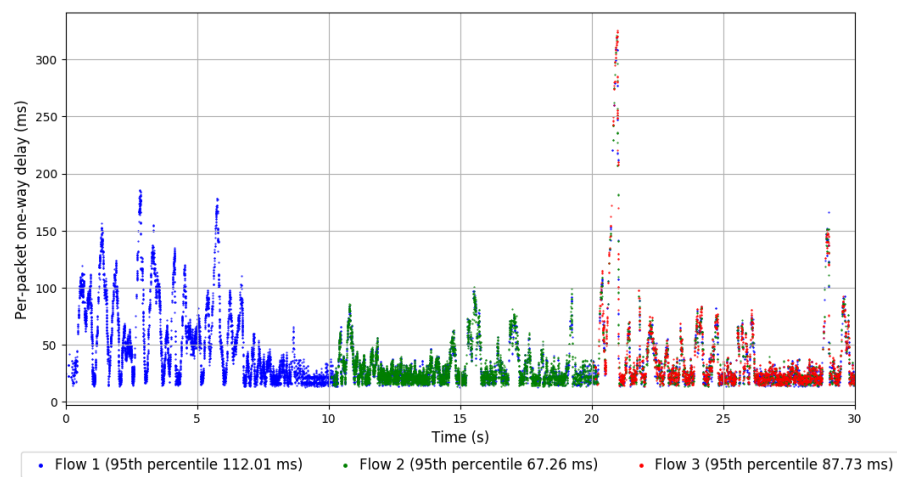
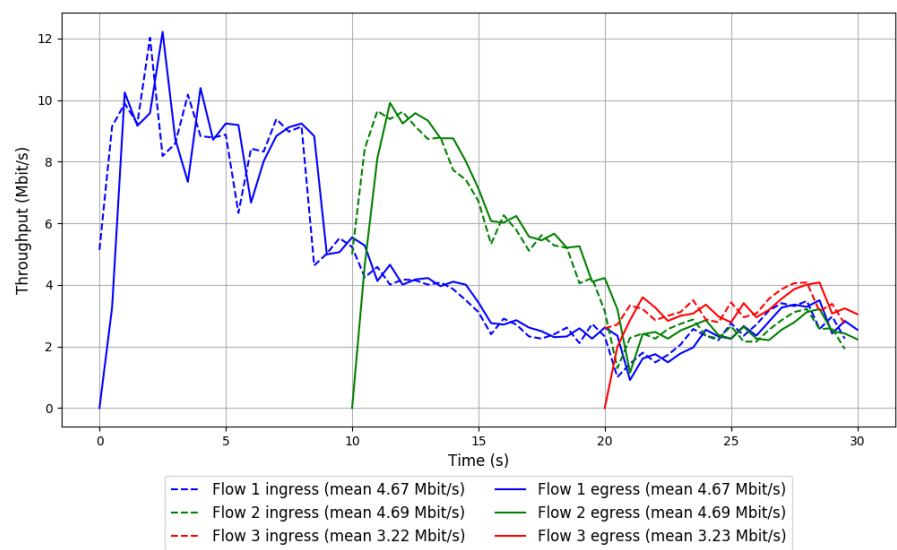
-- Flow 3:

Average throughput: 3.23 Mbit/s

95th percentile per-packet one-way delay: 87.729 ms

Loss rate: 0.19%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2019-01-02 23:15:21

End at: 2019-01-02 23:15:51

Local clock offset: 2.914 ms

Remote clock offset: 2.355 ms

Below is generated by plot.py at 2019-01-02 23:38:28

Datalink statistics

-- Total of 3 flows:

Average throughput: 9.27 Mbit/s

95th percentile per-packet one-way delay: 71.195 ms

Loss rate: 0.05%

-- Flow 1:

Average throughput: 5.17 Mbit/s

95th percentile per-packet one-way delay: 58.374 ms

Loss rate: 0.01%

-- Flow 2:

Average throughput: 3.20 Mbit/s

95th percentile per-packet one-way delay: 74.407 ms

Loss rate: 0.04%

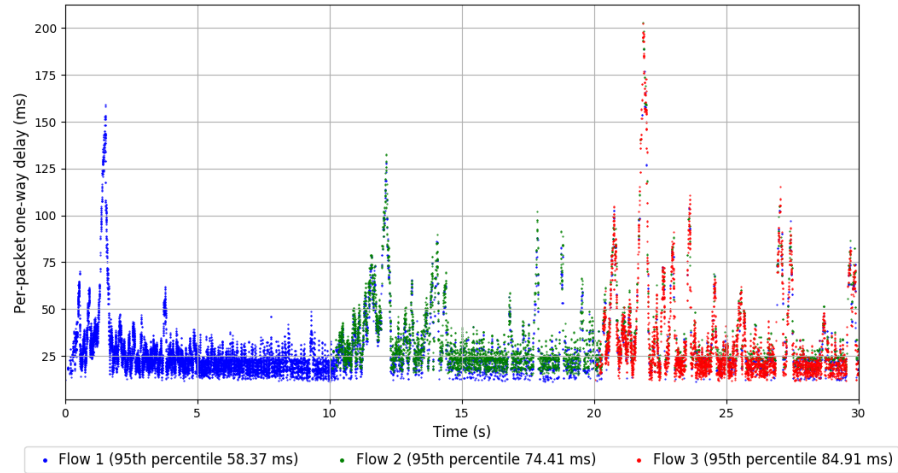
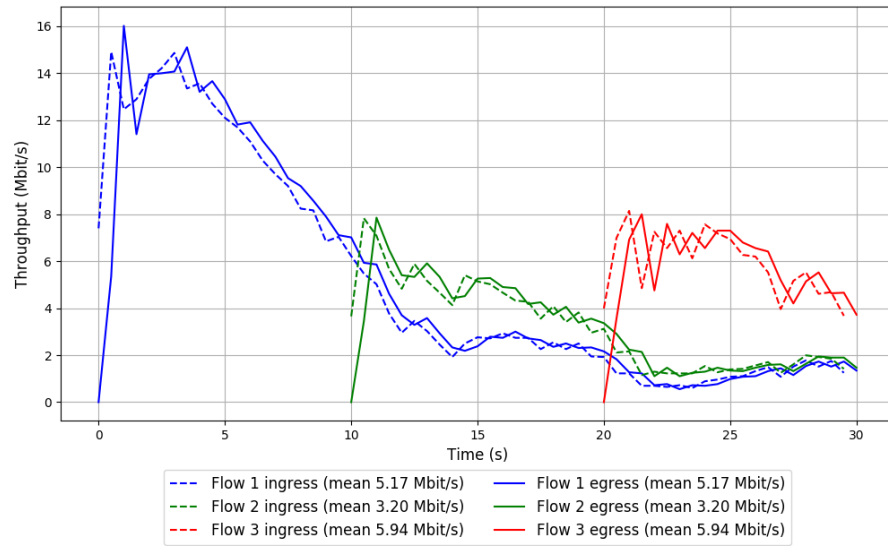
-- Flow 3:

Average throughput: 5.94 Mbit/s

95th percentile per-packet one-way delay: 84.905 ms

Loss rate: 0.16%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2019-01-02 22:43:30

End at: 2019-01-02 22:44:00

Local clock offset: 3.209 ms

Remote clock offset: 3.193 ms

Below is generated by plot.py at 2019-01-02 23:38:35

Datalink statistics

-- Total of 3 flows:

Average throughput: 14.72 Mbit/s

95th percentile per-packet one-way delay: 590.331 ms

Loss rate: 5.13%

-- Flow 1:

Average throughput: 9.07 Mbit/s

95th percentile per-packet one-way delay: 565.200 ms

Loss rate: 7.11%

-- Flow 2:

Average throughput: 6.37 Mbit/s

95th percentile per-packet one-way delay: 584.251 ms

Loss rate: 1.30%

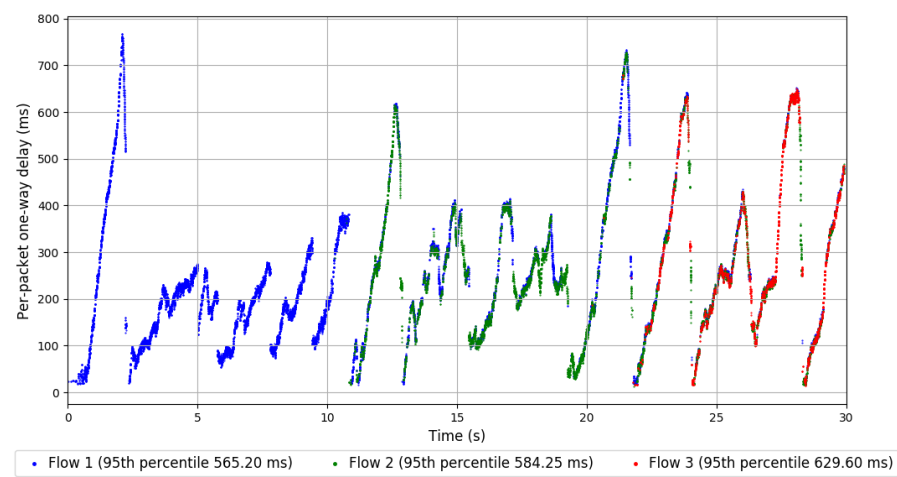
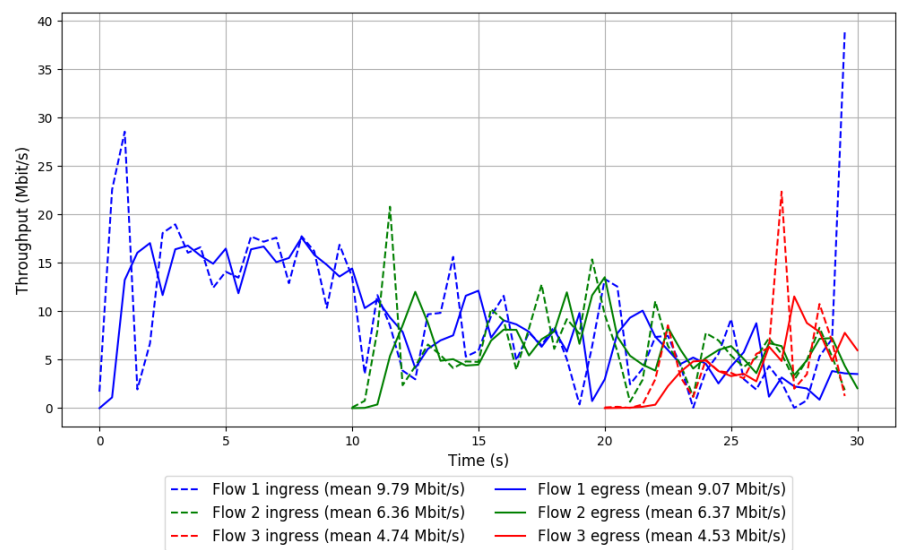
-- Flow 3:

Average throughput: 4.53 Mbit/s

95th percentile per-packet one-way delay: 629.601 ms

Loss rate: 3.08%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2019-01-02 23:05:52

End at: 2019-01-02 23:06:22

Local clock offset: 2.415 ms

Remote clock offset: 3.104 ms

Below is generated by plot.py at 2019-01-02 23:38:36

Datalink statistics

-- Total of 3 flows:

Average throughput: 13.98 Mbit/s

95th percentile per-packet one-way delay: 795.027 ms

Loss rate: 6.55%

-- Flow 1:

Average throughput: 8.49 Mbit/s

95th percentile per-packet one-way delay: 711.760 ms

Loss rate: 1.08%

-- Flow 2:

Average throughput: 6.26 Mbit/s

95th percentile per-packet one-way delay: 911.726 ms

Loss rate: 17.63%

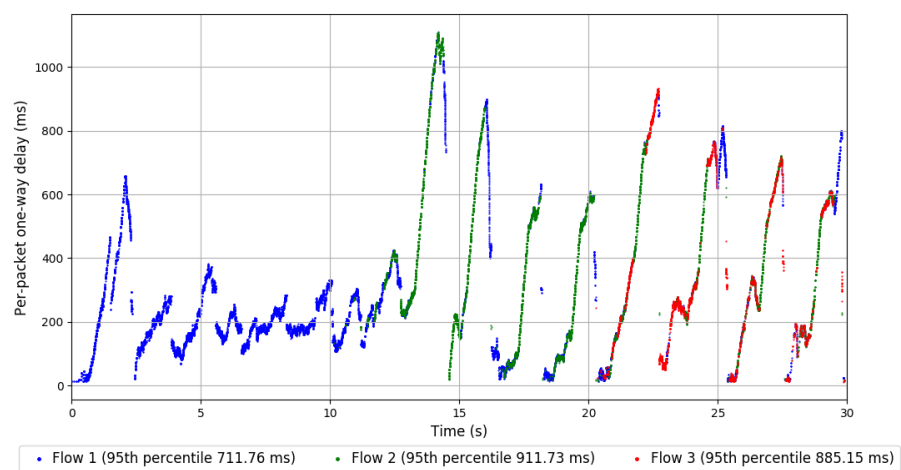
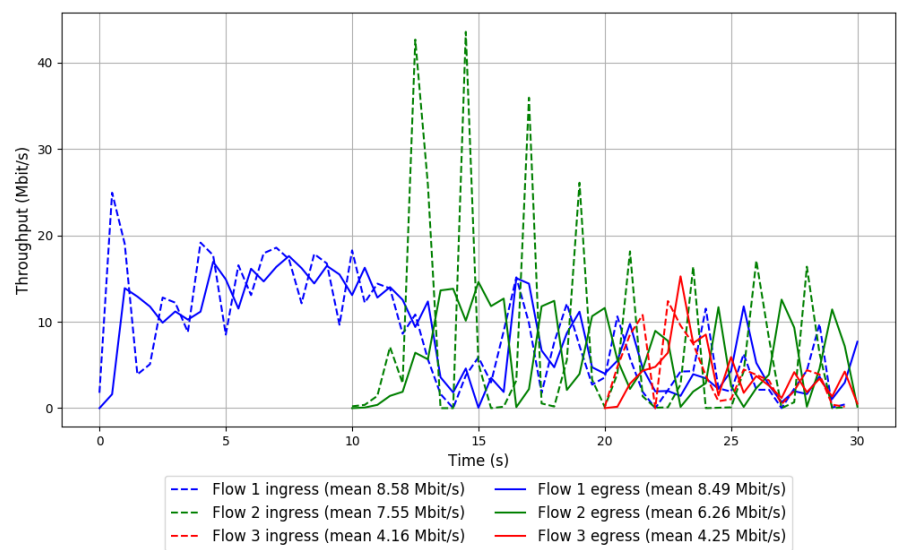
-- Flow 3:

Average throughput: 4.25 Mbit/s

95th percentile per-packet one-way delay: 885.148 ms

Loss rate: 0.20%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2019-01-02 23:28:18

End at: 2019-01-02 23:28:48

Local clock offset: 1.367 ms

Remote clock offset: 2.584 ms

Below is generated by plot.py at 2019-01-02 23:38:36

Datalink statistics

-- Total of 3 flows:

Average throughput: 12.77 Mbit/s

95th percentile per-packet one-way delay: 661.592 ms

Loss rate: 2.19%

-- Flow 1:

Average throughput: 8.15 Mbit/s

95th percentile per-packet one-way delay: 657.545 ms

Loss rate: 1.68%

-- Flow 2:

Average throughput: 4.26 Mbit/s

95th percentile per-packet one-way delay: 686.203 ms

Loss rate: 2.52%

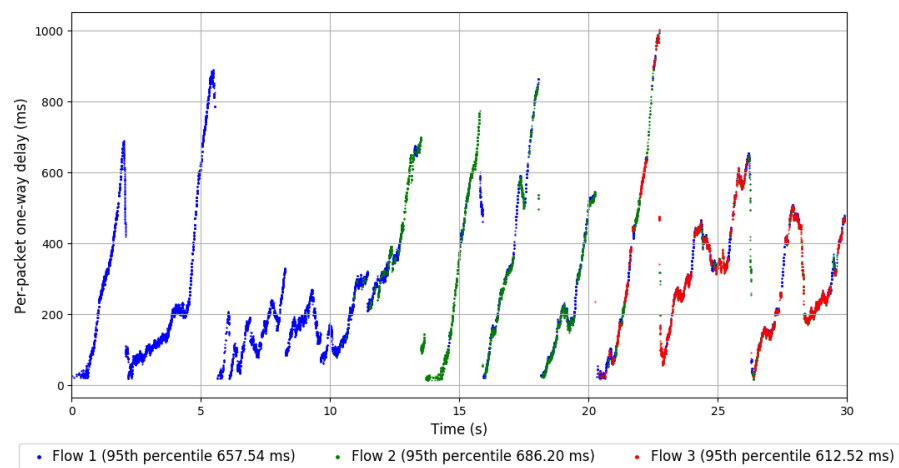
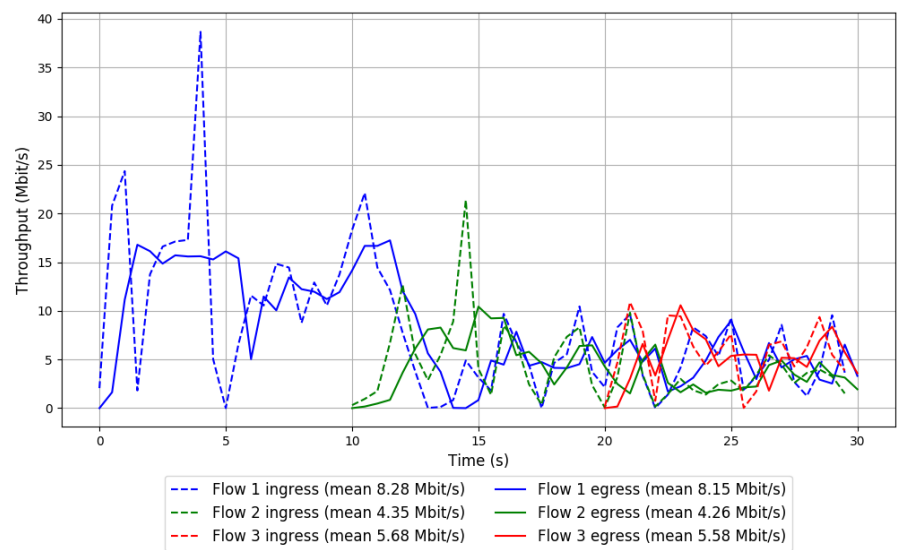
-- Flow 3:

Average throughput: 5.58 Mbit/s

95th percentile per-packet one-way delay: 612.525 ms

Loss rate: 3.91%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

Start at: 2019-01-02 22:36:26

End at: 2019-01-02 22:36:56

Local clock offset: 0.771 ms

Remote clock offset: 2.707 ms

Below is generated by plot.py at 2019-01-02 23:38:36

Datalink statistics

-- Total of 3 flows:

Average throughput: 4.65 Mbit/s

95th percentile per-packet one-way delay: 31.890 ms

Loss rate: 0.04%

-- Flow 1:

Average throughput: 2.19 Mbit/s

95th percentile per-packet one-way delay: 30.526 ms

Loss rate: 0.05%

-- Flow 2:

Average throughput: 2.34 Mbit/s

95th percentile per-packet one-way delay: 32.448 ms

Loss rate: 0.02%

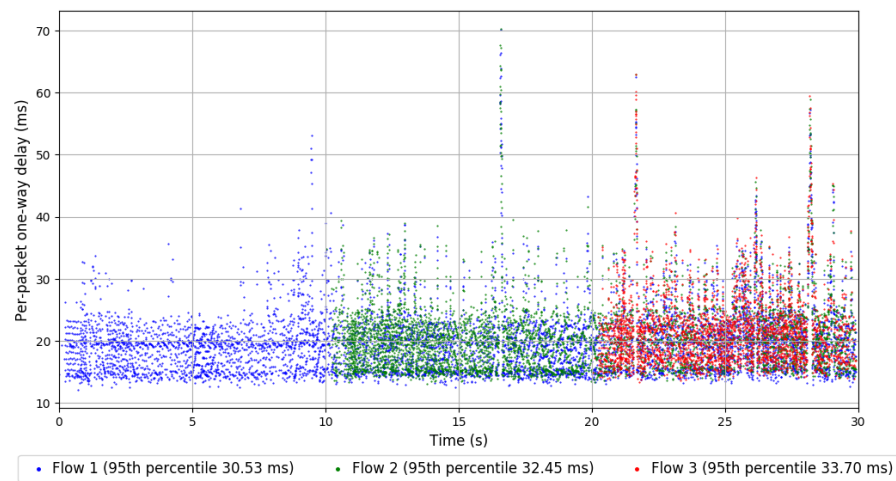
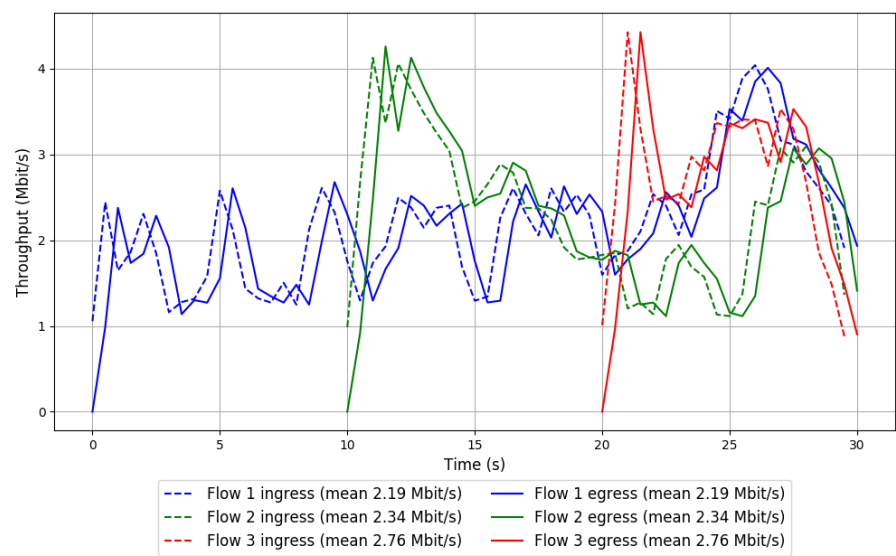
-- Flow 3:

Average throughput: 2.76 Mbit/s

95th percentile per-packet one-way delay: 33.698 ms

Loss rate: 0.04%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2019-01-02 22:58:51

End at: 2019-01-02 22:59:21

Local clock offset: 2.46 ms

Remote clock offset: 2.573 ms

Below is generated by plot.py at 2019-01-02 23:38:36

Datalink statistics

-- Total of 3 flows:

Average throughput: 5.90 Mbit/s

95th percentile per-packet one-way delay: 55.467 ms

Loss rate: 0.54%

-- Flow 1:

Average throughput: 2.23 Mbit/s

95th percentile per-packet one-way delay: 41.344 ms

Loss rate: 0.09%

-- Flow 2:

Average throughput: 1.94 Mbit/s

95th percentile per-packet one-way delay: 55.601 ms

Loss rate: 0.90%

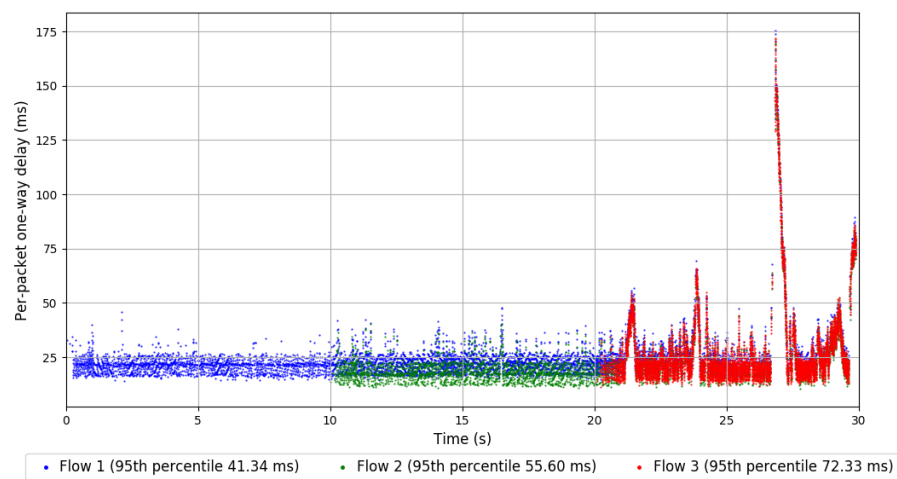
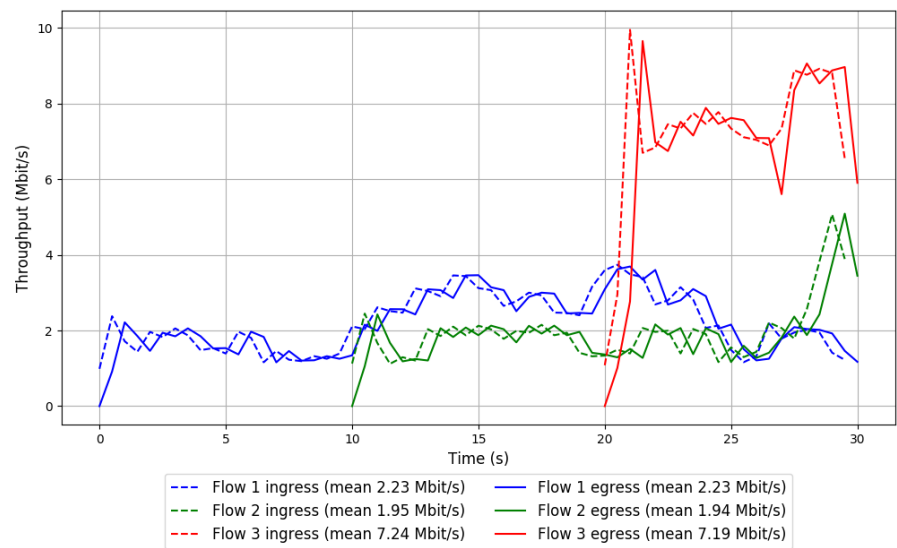
-- Flow 3:

Average throughput: 7.19 Mbit/s

95th percentile per-packet one-way delay: 72.331 ms

Loss rate: 0.77%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2019-01-02 23:21:11

End at: 2019-01-02 23:21:41

Local clock offset: 1.591 ms

Remote clock offset: 1.915 ms

Below is generated by plot.py at 2019-01-02 23:38:36

Datalink statistics

-- Total of 3 flows:

Average throughput: 7.45 Mbit/s

95th percentile per-packet one-way delay: 35.558 ms

Loss rate: 0.78%

-- Flow 1:

Average throughput: 3.58 Mbit/s

95th percentile per-packet one-way delay: 36.227 ms

Loss rate: 0.86%

-- Flow 2:

Average throughput: 3.91 Mbit/s

95th percentile per-packet one-way delay: 33.470 ms

Loss rate: 0.94%

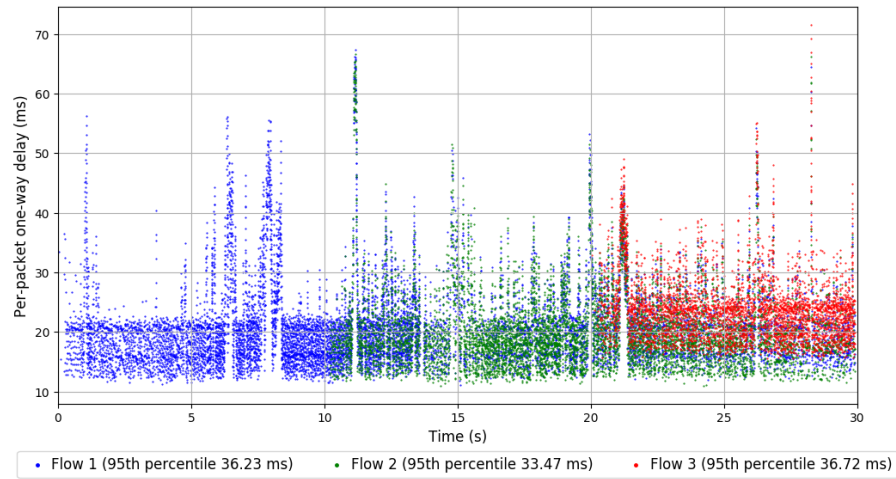
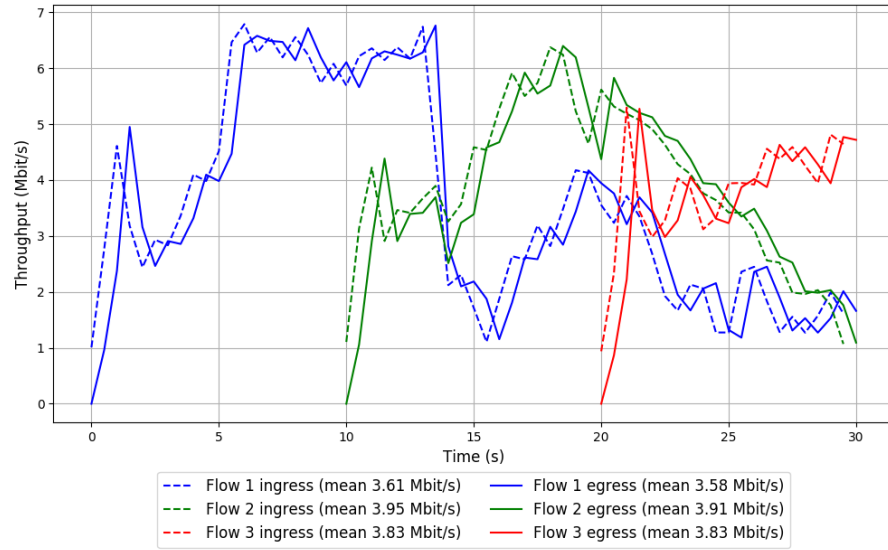
-- Flow 3:

Average throughput: 3.83 Mbit/s

95th percentile per-packet one-way delay: 36.719 ms

Loss rate: 0.21%

Run 3: Report of PCC-Vivace — Data Link

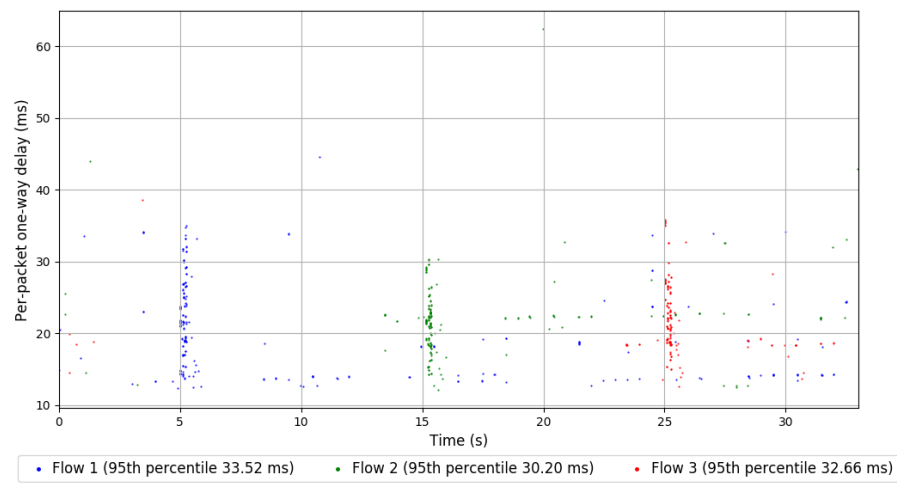
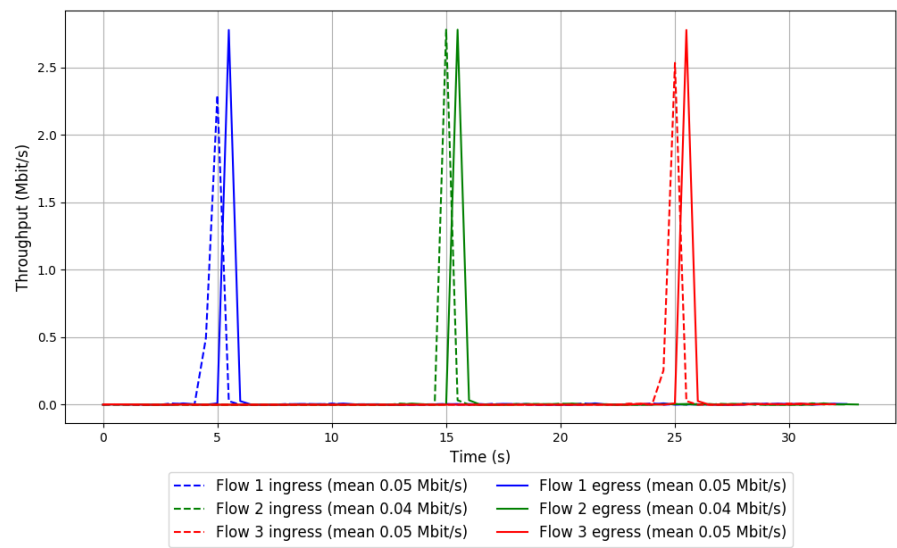


```
Run 1: Statistics of WebRTC media

Start at: 2019-01-02 22:32:58
End at: 2019-01-02 22:33:28
Local clock offset: 1.619 ms
Remote clock offset: 2.601 ms

# Below is generated by plot.py at 2019-01-02 23:38:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 32.622 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 33.521 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 30.203 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 32.664 ms
Loss rate: 0.00%
```

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2019-01-02 22:55:21

End at: 2019-01-02 22:55:51

Local clock offset: 3.068 ms

Remote clock offset: 2.707 ms

Below is generated by plot.py at 2019-01-02 23:38:36

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 58.249 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 64.312 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 31.857 ms

Loss rate: 0.00%

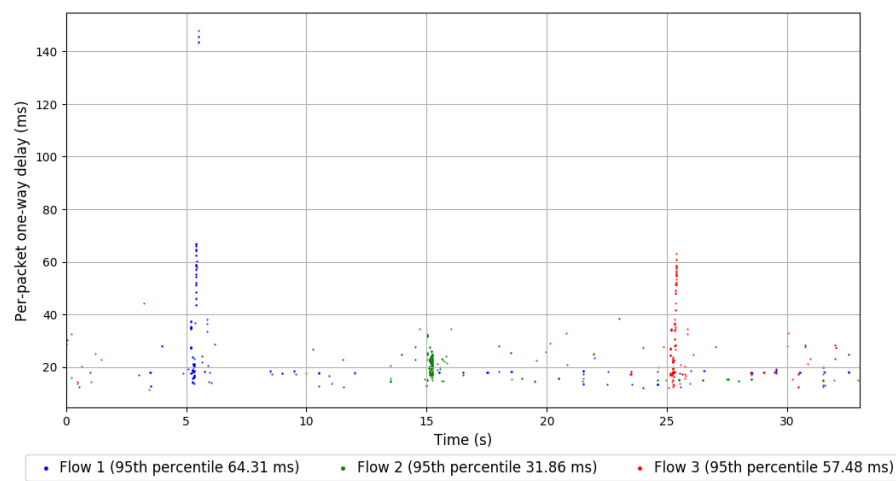
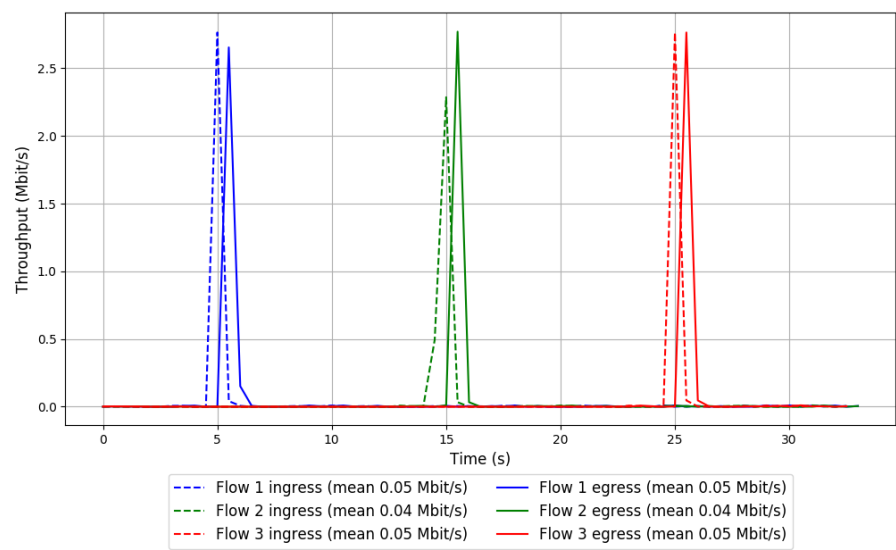
-- Flow 3:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 57.479 ms

Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2019-01-02 23:17:43

End at: 2019-01-02 23:18:13

Local clock offset: -1.451 ms

Remote clock offset: 2.634 ms

Below is generated by plot.py at 2019-01-02 23:38:36

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 39.614 ms

Loss rate: 0.02%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 43.240 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 38.416 ms

Loss rate: 0.05%

-- Flow 3:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 36.860 ms

Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

