

Pantheon Report

Generated at 2018-06-19 08:46:54 (UTC).

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

Repeated the test of 16 congestion control schemes 3 times.

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

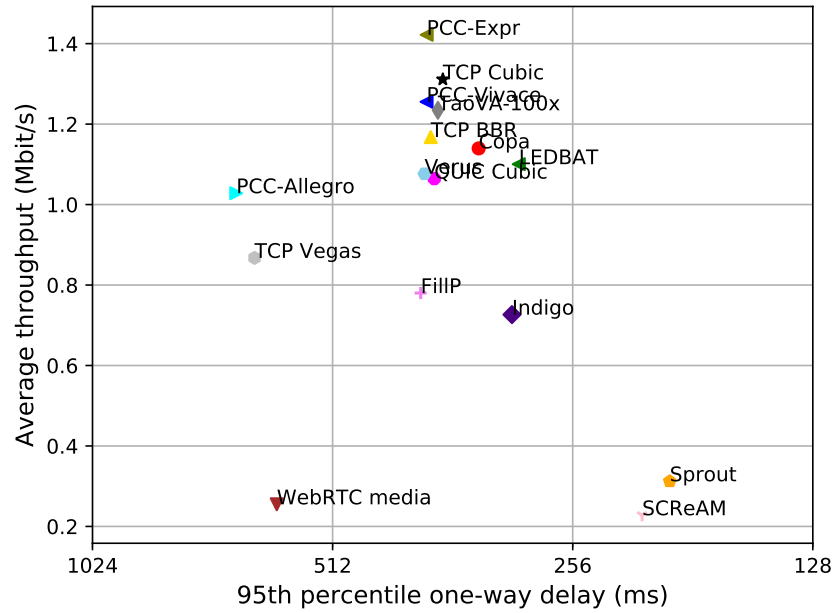
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

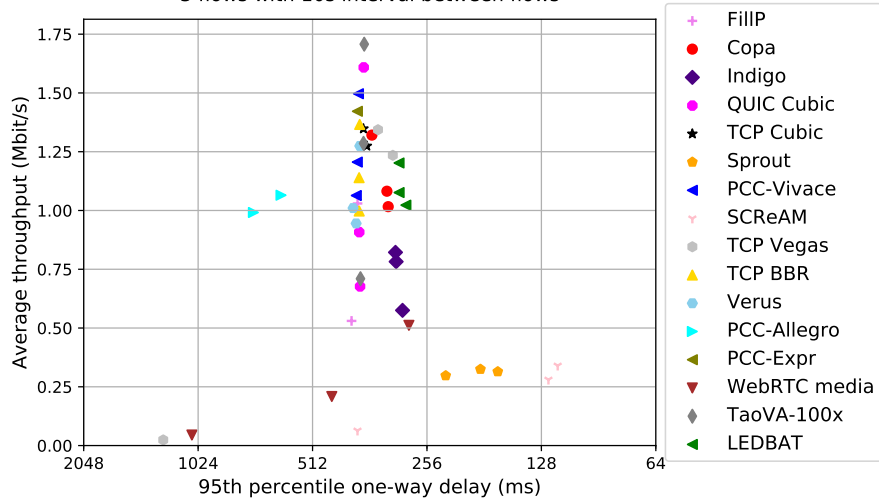
Git summary:

```
branch: master @ 9141c5f9450c85ea5ea2ea755a8e946998d3abf3
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/genericCC @ c7966e494a929986eaa5a9c169a7f381fe1bbbe5
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ 6f038ed31259d366f9840f65b82cbe8f464b1b39
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-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

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



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



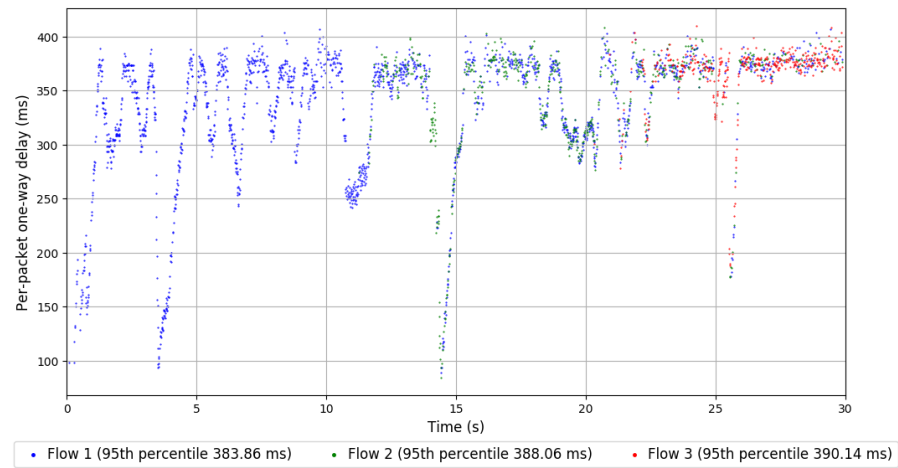
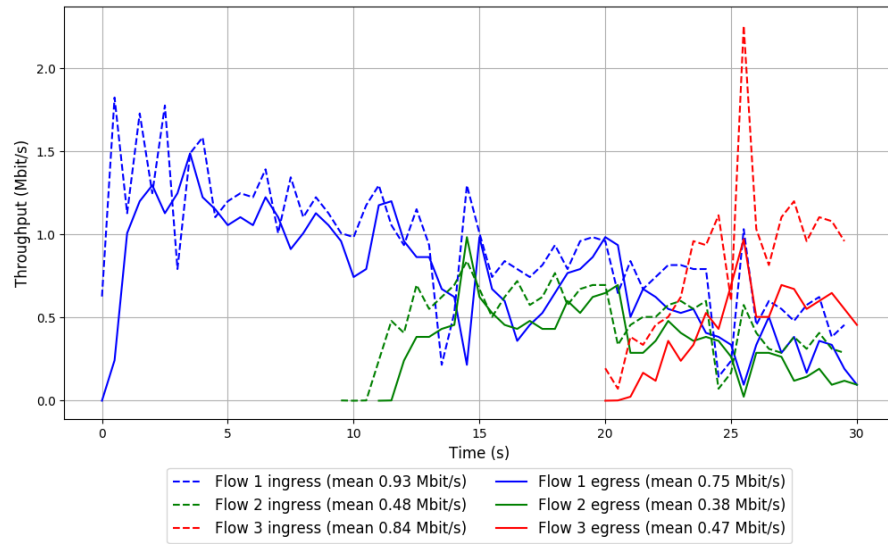
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	0.74	0.50	0.31	384.40	386.53	386.33	18.71	25.28	29.16
Copa	3	0.71	0.45	0.42	319.19	346.38	358.33	1.33	3.29	8.30
TCP Cubic	2	0.89	0.34	0.61	371.86	375.33	370.82	4.03	5.85	6.09
FillP	2	0.50	0.32	0.23	397.47	395.16	393.35	54.73	49.07	59.91
Indigo	3	0.33	0.31	0.60	292.08	294.32	310.87	3.53	3.43	5.68
LEDBAT	3	0.61	0.48	0.53	294.80	304.80	292.70	0.80	1.76	3.34
PCC-Allegro	2	0.61	0.50	0.34	519.26	670.60	738.34	80.78	87.73	93.85
PCC-Expr	1	1.42	0.00	0.00	390.25	366.83	383.40	80.82	92.31	91.67
QUIC Cubic	3	0.54	0.62	0.47	314.28	381.08	386.77	36.31	13.21	24.68
SCReAM	3	0.11	0.11	0.15	286.77	181.11	134.95	9.37	8.08	4.15
Sprout	3	0.15	0.16	0.16	185.76	184.85	213.48	4.78	1.39	3.36
TaoVA-100x	3	0.73	0.55	0.48	378.89	382.45	382.52	33.80	40.72	47.13
TCP Vegas	3	0.41	0.45	0.53	769.88	476.85	363.97	29.86	15.36	15.97
Verus	3	0.87	0.27	0.17	425.23	406.44	552.43	49.46	56.02	53.08
PCC-Vivace	3	0.76	0.54	0.44	388.32	392.27	392.83	44.63	59.91	65.17
WebRTC media	3	0.11	0.10	0.04	449.78	686.32	809.69	27.58	37.60	46.73

Run 1: Statistics of TCP BBR

Start at: 2018-06-19 07:43:43
End at: 2018-06-19 07:44:13
Local clock offset: 7.415 ms
Remote clock offset: -2.581 ms

Below is generated by plot.py at 2018-06-19 08:46:22
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 386.158 ms
Loss rate: 26.24%
-- Flow 1:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 383.860 ms
Loss rate: 20.32%
-- Flow 2:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 388.060 ms
Loss rate: 26.59%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 390.144 ms
Loss rate: 45.72%

Run 1: Report of TCP BBR — Data Link

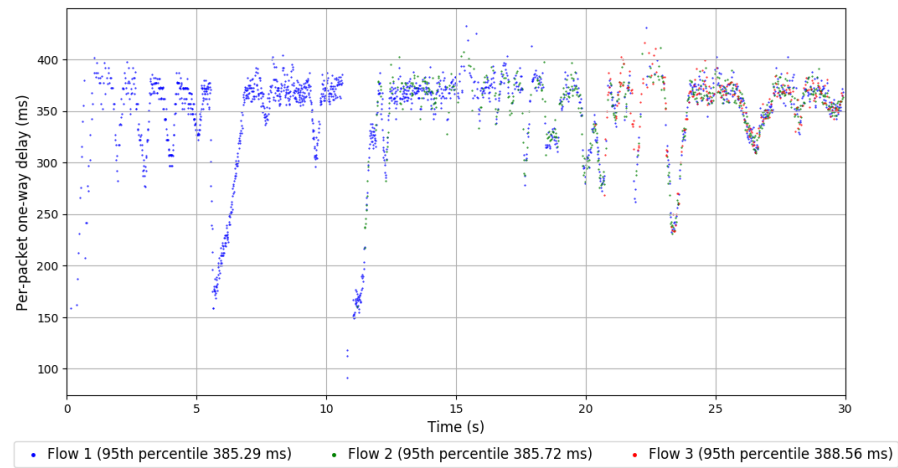
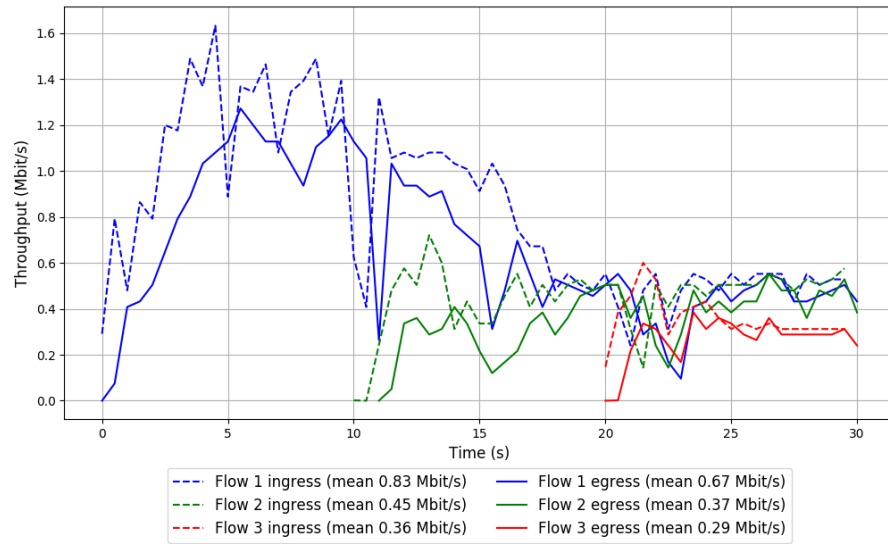


Run 2: Statistics of TCP BBR

Start at: 2018-06-19 08:06:21
End at: 2018-06-19 08:06:51
Local clock offset: 7.443 ms
Remote clock offset: -0.261 ms

Below is generated by plot.py at 2018-06-19 08:46:22
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 385.909 ms
Loss rate: 20.54%
-- Flow 1:
Average throughput: 0.67 Mbit/s
95th percentile per-packet one-way delay: 385.287 ms
Loss rate: 19.51%
-- Flow 2:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 385.720 ms
Loss rate: 22.73%
-- Flow 3:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 388.558 ms
Loss rate: 22.14%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-06-19 08:28:53

End at: 2018-06-19 08:29:23

Local clock offset: 5.744 ms

Remote clock offset: 1.53 ms

Below is generated by plot.py at 2018-06-19 08:46:22

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.37 Mbit/s

95th percentile per-packet one-way delay: 384.828 ms

Loss rate: 20.49%

-- Flow 1:

Average throughput: 0.81 Mbit/s

95th percentile per-packet one-way delay: 384.051 ms

Loss rate: 16.31%

-- Flow 2:

Average throughput: 0.76 Mbit/s

95th percentile per-packet one-way delay: 385.806 ms

Loss rate: 26.51%

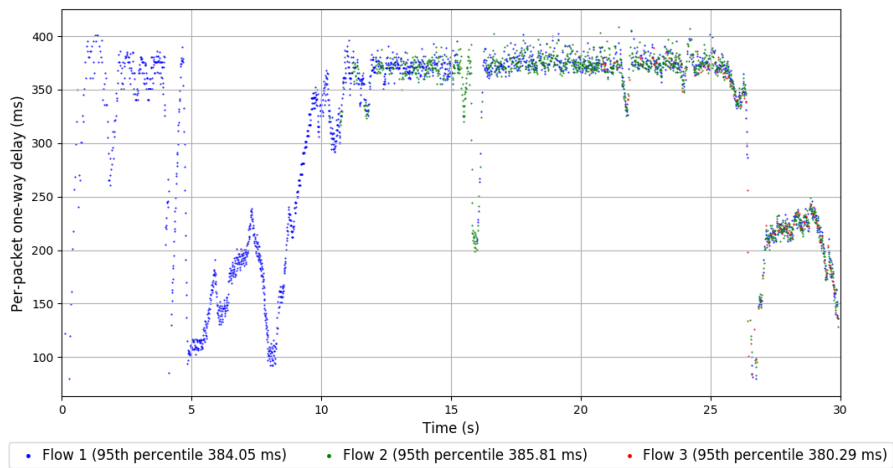
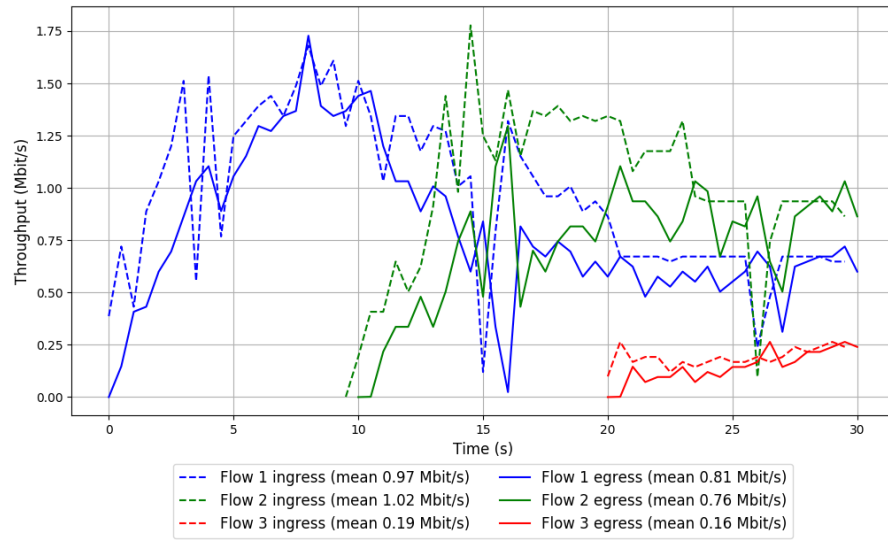
-- Flow 3:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 380.293 ms

Loss rate: 19.61%

Run 3: Report of TCP BBR — Data Link

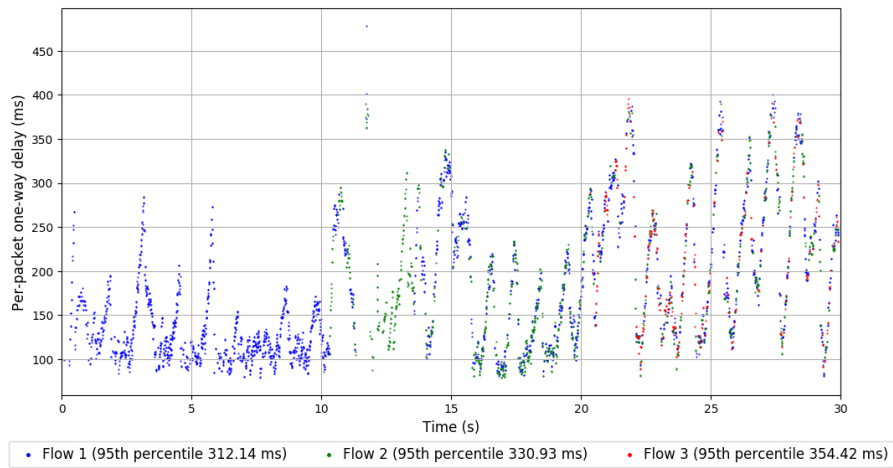
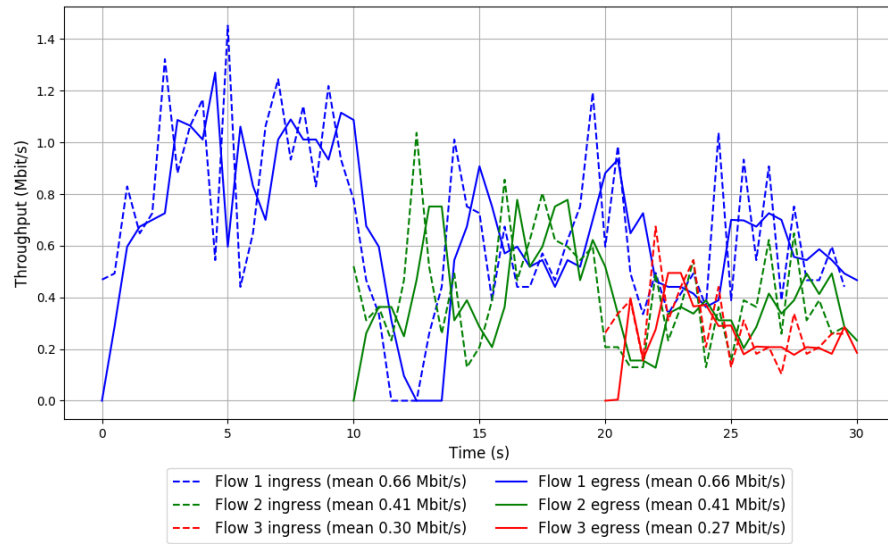


Run 1: Statistics of Copa

Start at: 2018-06-19 07:56:48
End at: 2018-06-19 07:57:18
Local clock offset: 8.085 ms
Remote clock offset: -1.975 ms

Below is generated by plot.py at 2018-06-19 08:46:22
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 323.774 ms
Loss rate: 2.67%
-- Flow 1:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 312.144 ms
Loss rate: 1.40%
-- Flow 2:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 330.927 ms
Loss rate: 2.15%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 354.423 ms
Loss rate: 12.69%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-06-19 08:19:10

End at: 2018-06-19 08:19:40

Local clock offset: 5.953 ms

Remote clock offset: 0.855 ms

Below is generated by plot.py at 2018-06-19 08:46:24

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.32 Mbit/s

95th percentile per-packet one-way delay: 357.379 ms

Loss rate: 4.11%

-- Flow 1:

Average throughput: 0.79 Mbit/s

95th percentile per-packet one-way delay: 339.246 ms

Loss rate: 1.63%

-- Flow 2:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 364.214 ms

Loss rate: 6.55%

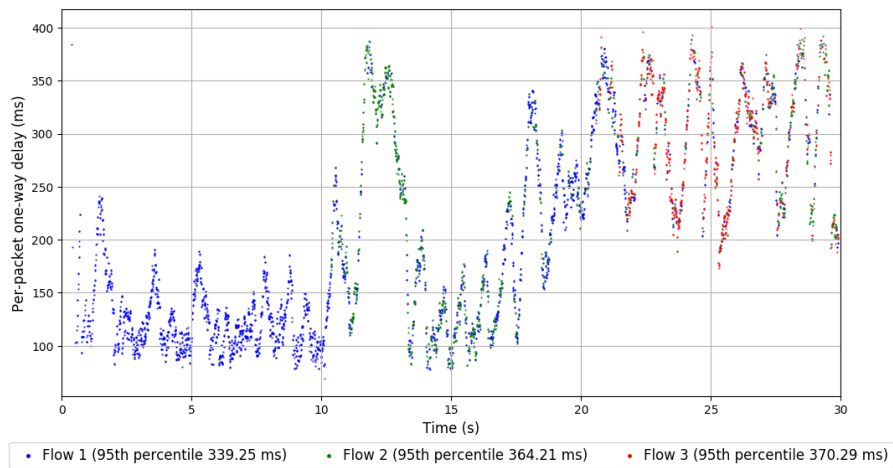
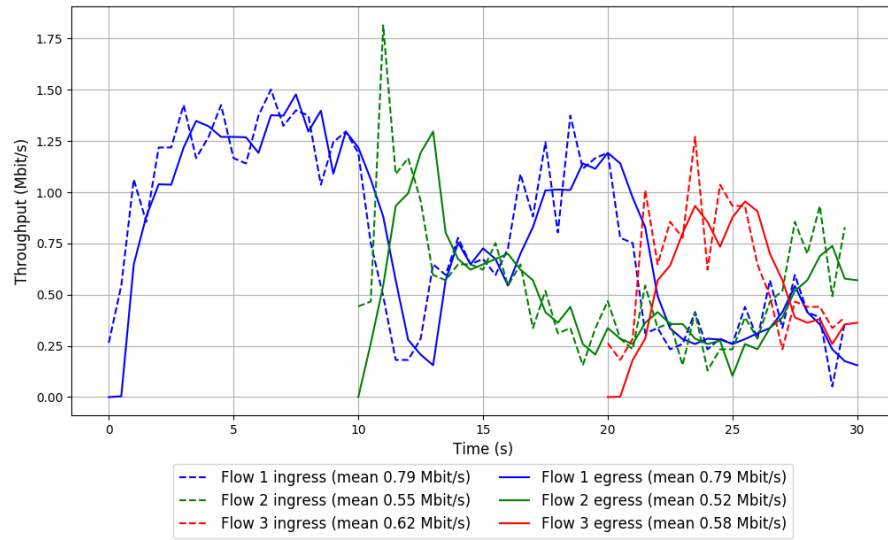
-- Flow 3:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 370.289 ms

Loss rate: 9.31%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-06-19 08:41:21

End at: 2018-06-19 08:41:51

Local clock offset: 6.983 ms

Remote clock offset: 2.25 ms

Below is generated by plot.py at 2018-06-19 08:46:24

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.08 Mbit/s

95th percentile per-packet one-way delay: 326.328 ms

Loss rate: 1.27%

-- Flow 1:

Average throughput: 0.67 Mbit/s

95th percentile per-packet one-way delay: 306.195 ms

Loss rate: 0.97%

-- Flow 2:

Average throughput: 0.42 Mbit/s

95th percentile per-packet one-way delay: 343.988 ms

Loss rate: 1.16%

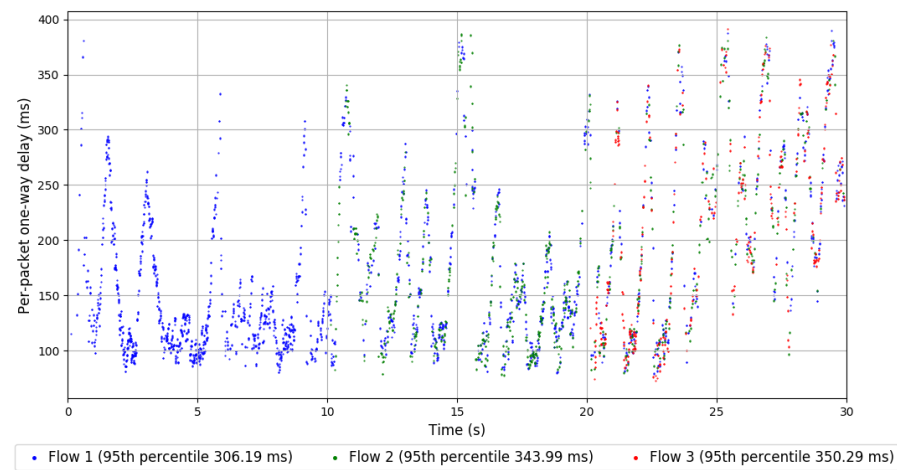
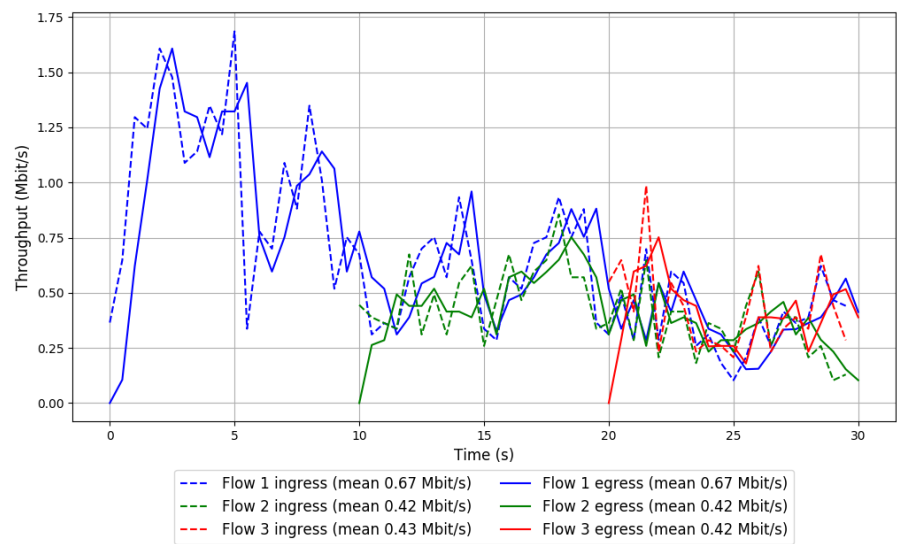
-- Flow 3:

Average throughput: 0.42 Mbit/s

95th percentile per-packet one-way delay: 350.286 ms

Loss rate: 2.91%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

/home/ubuntu/pantheon/data/2018-06-19T07-38-China-ppp0-to-AWS-Korea-3-runs-3-flows/cubic_sta

Run 1: Report of TCP Cubic — Data Link

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Run 2: Statistics of TCP Cubic

Start at: 2018-06-19 08:12:02

End at: 2018-06-19 08:12:32

Local clock offset: 6.419 ms

Remote clock offset: 0.248 ms

Below is generated by plot.py at 2018-06-19 08:46:24

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.35 Mbit/s

95th percentile per-packet one-way delay: 376.292 ms

Loss rate: 4.78%

-- Flow 1:

Average throughput: 0.90 Mbit/s

95th percentile per-packet one-way delay: 376.355 ms

Loss rate: 4.04%

-- Flow 2:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 376.242 ms

Loss rate: 6.41%

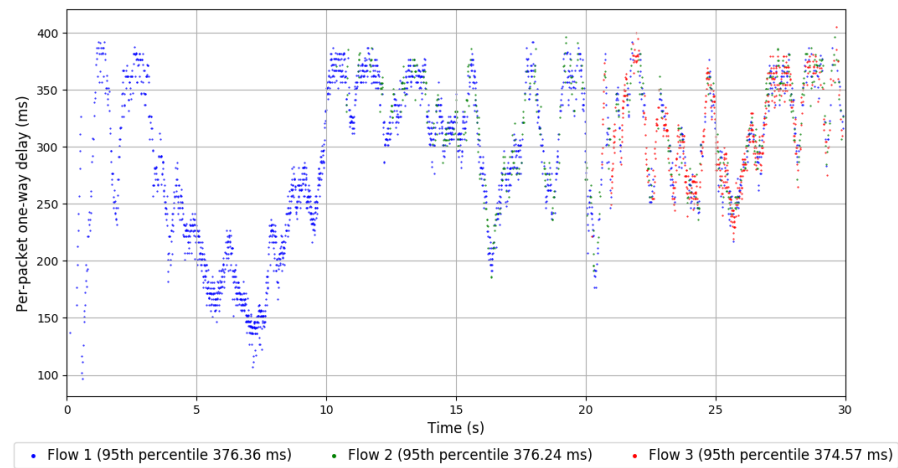
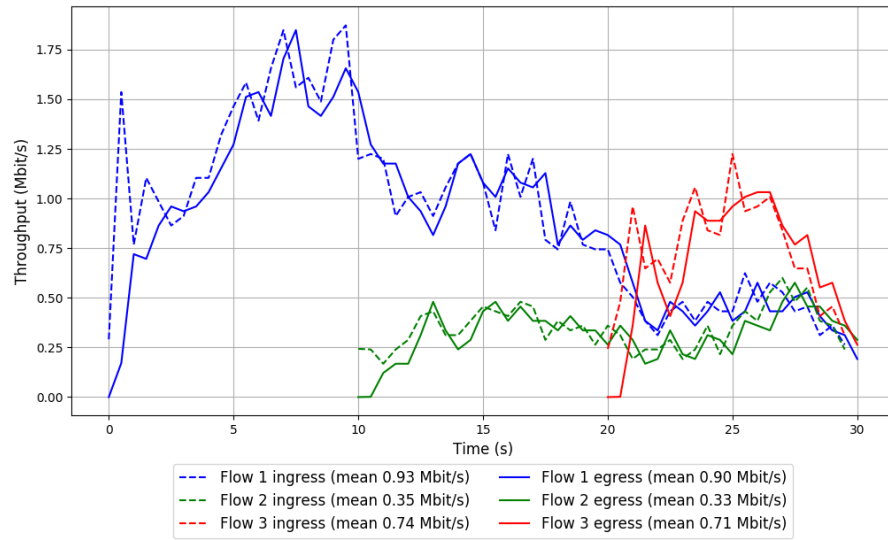
-- Flow 3:

Average throughput: 0.71 Mbit/s

95th percentile per-packet one-way delay: 374.574 ms

Loss rate: 6.06%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-06-19 08:34:25

End at: 2018-06-19 08:34:55

Local clock offset: 5.999 ms

Remote clock offset: 1.888 ms

Below is generated by plot.py at 2018-06-19 08:46:24

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 368.610 ms

Loss rate: 4.53%

-- Flow 1:

Average throughput: 0.87 Mbit/s

95th percentile per-packet one-way delay: 367.356 ms

Loss rate: 4.01%

-- Flow 2:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 374.418 ms

Loss rate: 5.29%

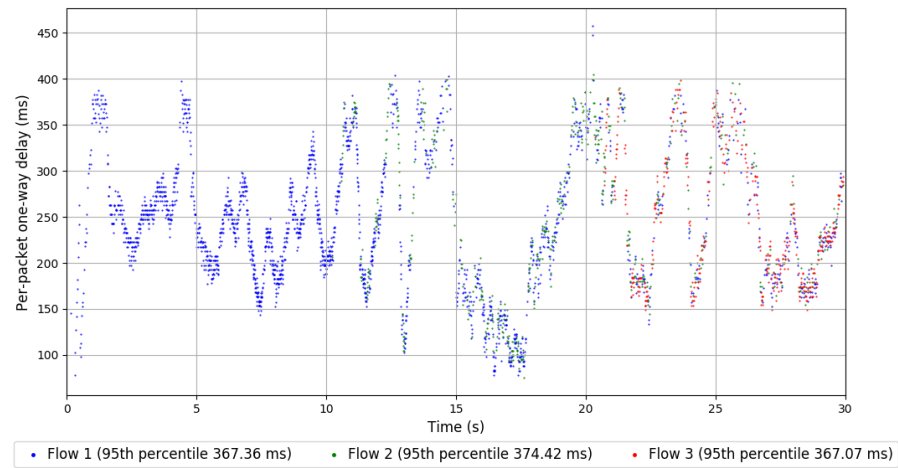
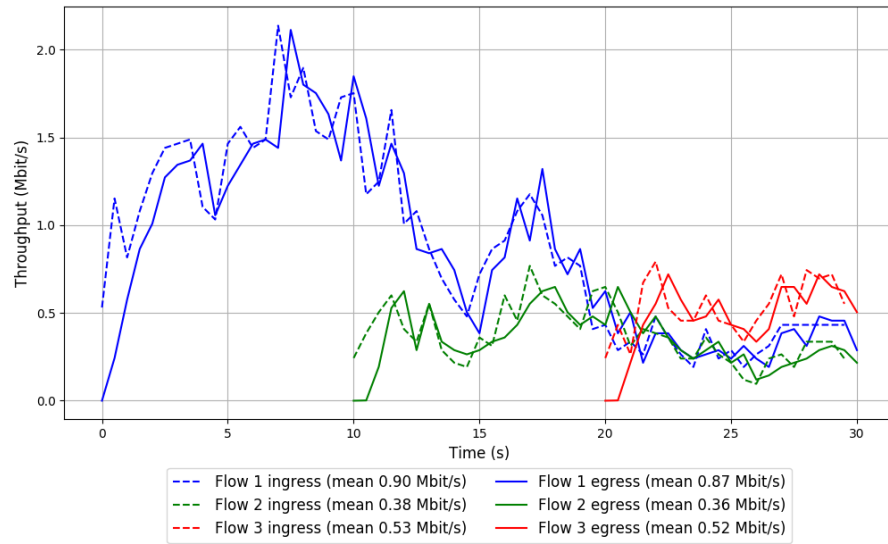
-- Flow 3:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 367.068 ms

Loss rate: 6.12%

Run 3: Report of TCP Cubic — Data Link

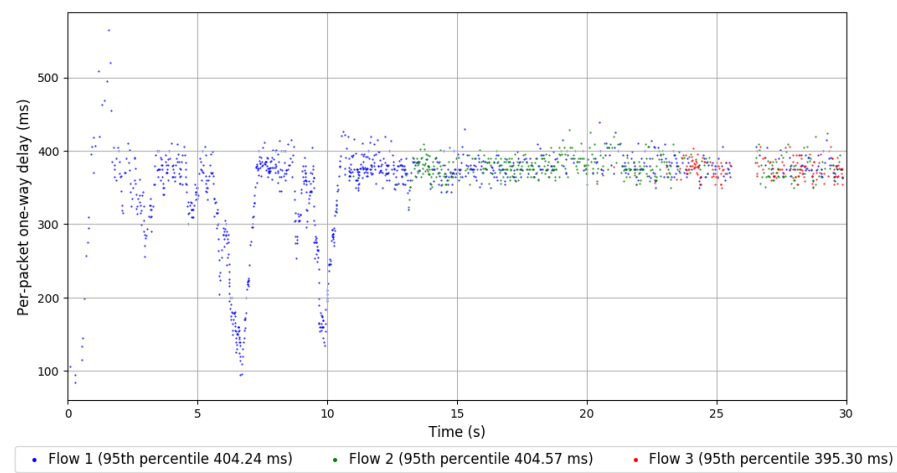
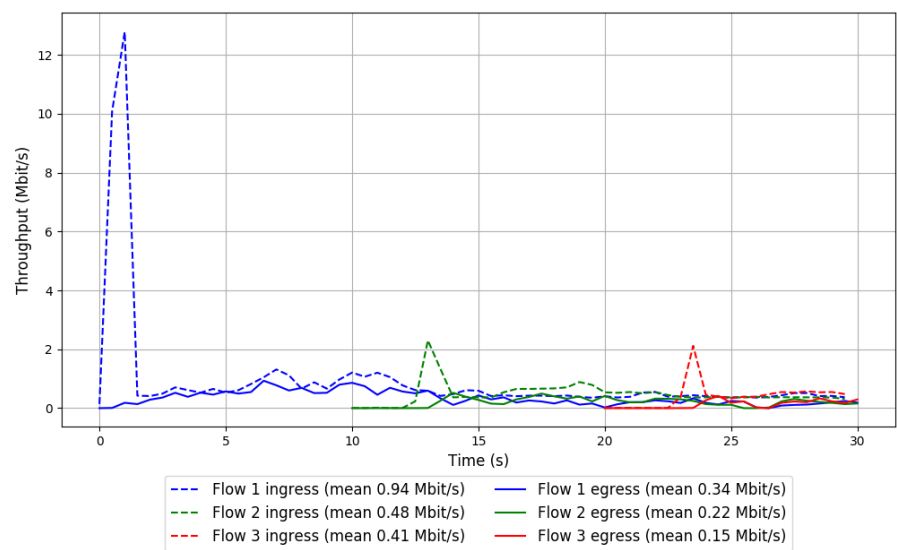


Run 1: Statistics of FillP

Start at: 2018-06-19 07:45:07
End at: 2018-06-19 07:45:37
Local clock offset: 7.551 ms
Remote clock offset: -2.647 ms

Below is generated by plot.py at 2018-06-19 08:46:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 404.269 ms
Loss rate: 62.19%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 404.243 ms
Loss rate: 63.72%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 404.574 ms
Loss rate: 56.10%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 395.295 ms
Loss rate: 66.01%

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

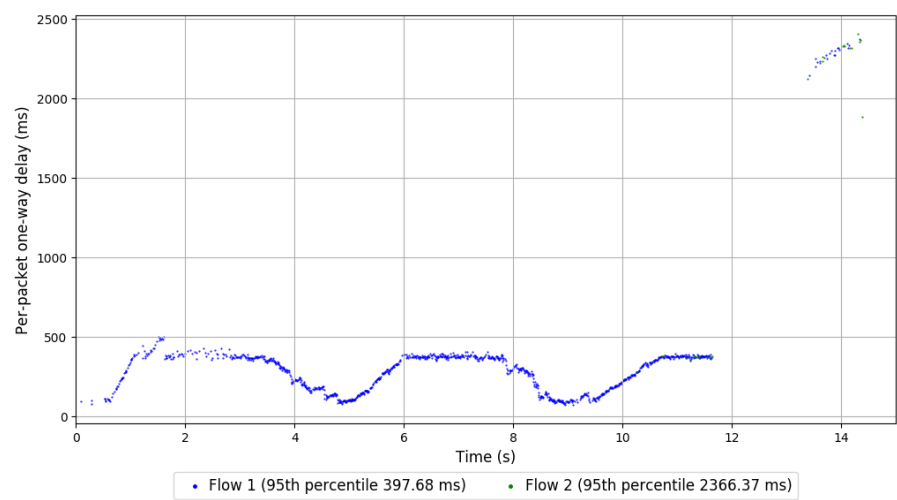
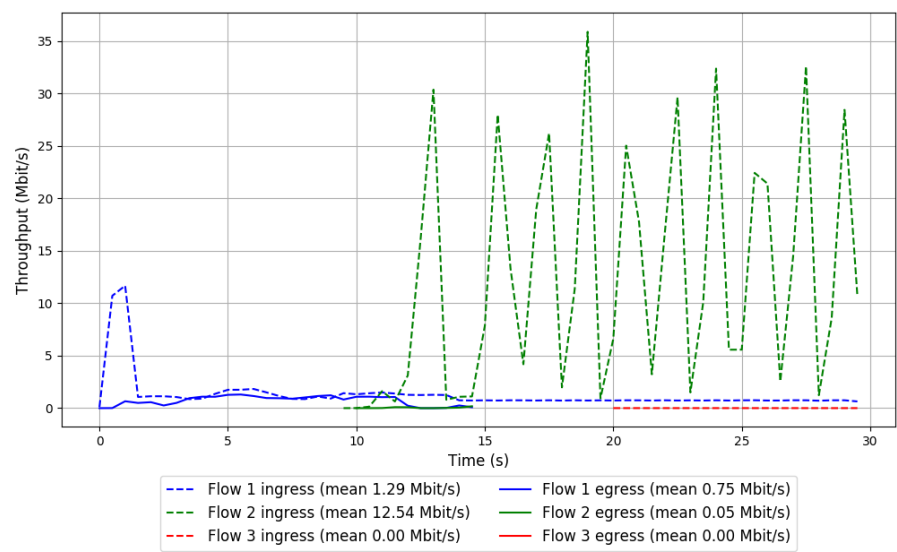
Start at: 2018-06-19 08:07:42

End at: 2018-06-19 08:08:12

Local clock offset: 7.079 ms

Remote clock offset: -0.152 ms

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

Start at: 2018-06-19 08:30:16

End at: 2018-06-19 08:30:46

Local clock offset: 5.844 ms

Remote clock offset: 1.536 ms

Below is generated by plot.py at 2018-06-19 08:46:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 389.832 ms

Loss rate: 45.79%

-- Flow 1:

Average throughput: 0.66 Mbit/s

95th percentile per-packet one-way delay: 390.694 ms

Loss rate: 45.75%

-- Flow 2:

Average throughput: 0.41 Mbit/s

95th percentile per-packet one-way delay: 385.744 ms

Loss rate: 42.04%

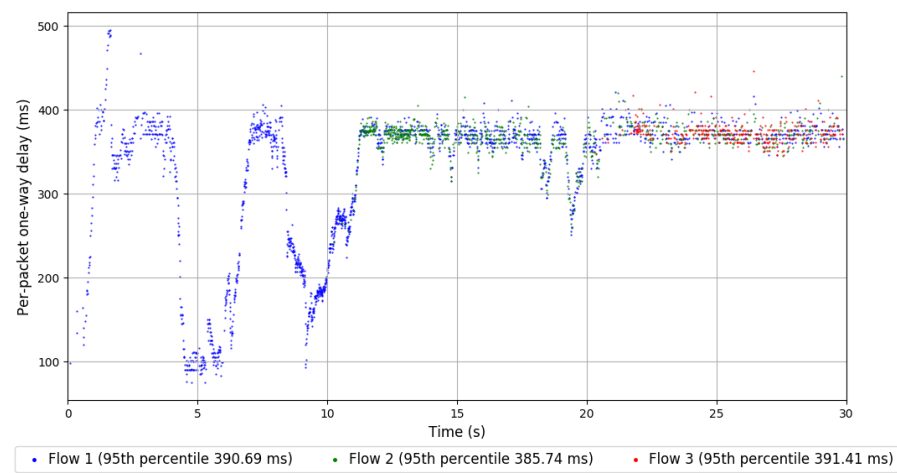
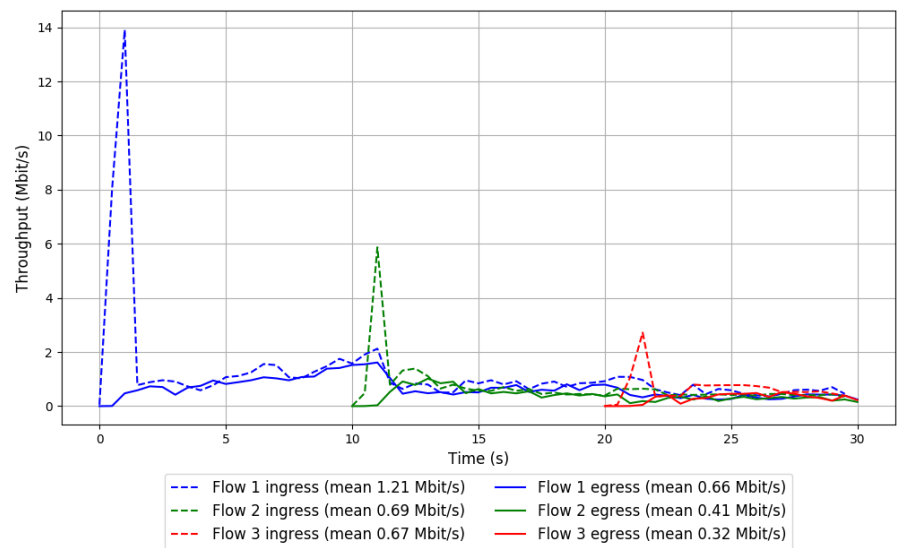
-- Flow 3:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 391.413 ms

Loss rate: 53.81%

Run 3: Report of FillP — Data Link

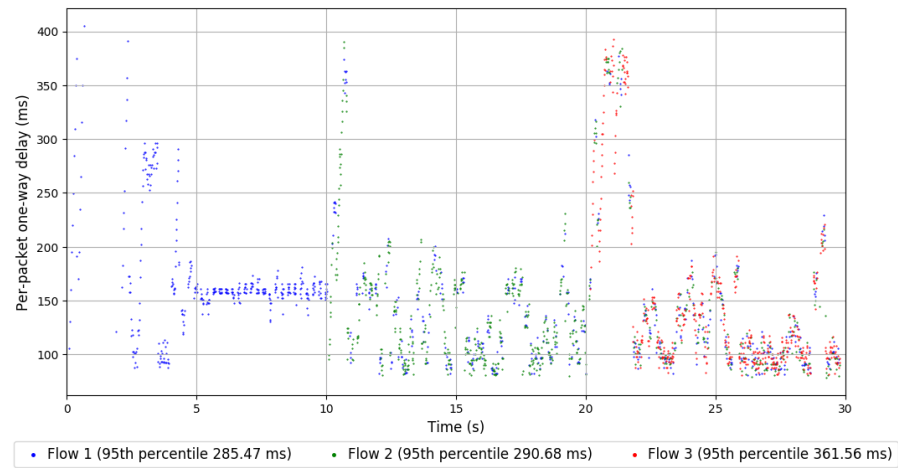
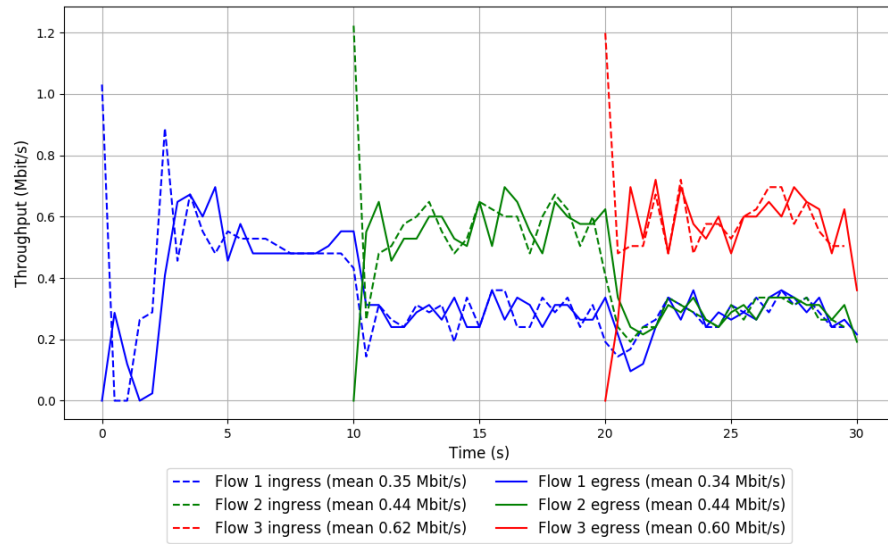


Run 1: Statistics of Indigo

Start at: 2018-06-19 07:54:01
End at: 2018-06-19 07:54:31
Local clock offset: 7.902 ms
Remote clock offset: -2.567 ms

Below is generated by plot.py at 2018-06-19 08:46:31
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 309.816 ms
Loss rate: 3.51%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 285.472 ms
Loss rate: 3.68%
-- Flow 2:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 290.676 ms
Loss rate: 1.91%
-- Flow 3:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 361.563 ms
Loss rate: 5.55%

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-06-19 08:16:15

End at: 2018-06-19 08:16:45

Local clock offset: 6.117 ms

Remote clock offset: 0.663 ms

Below is generated by plot.py at 2018-06-19 08:46:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.78 Mbit/s

95th percentile per-packet one-way delay: 308.548 ms

Loss rate: 5.24%

-- Flow 1:

Average throughput: 0.39 Mbit/s

95th percentile per-packet one-way delay: 279.453 ms

Loss rate: 3.13%

-- Flow 2:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 330.621 ms

Loss rate: 5.70%

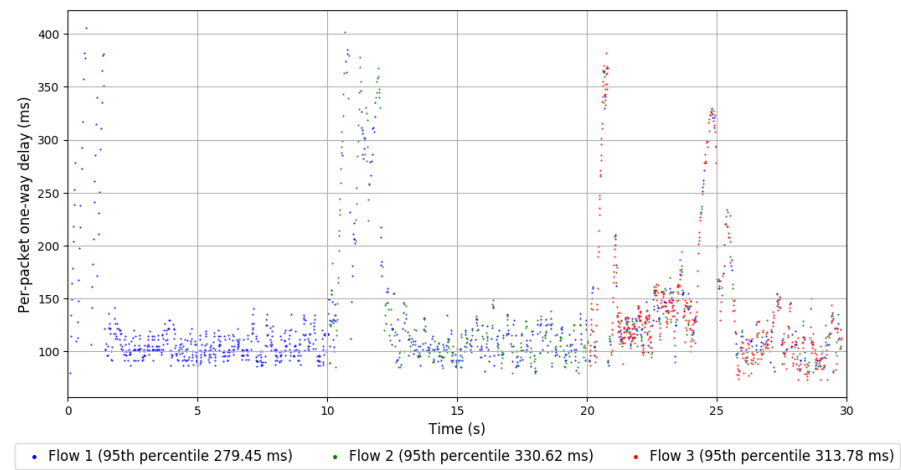
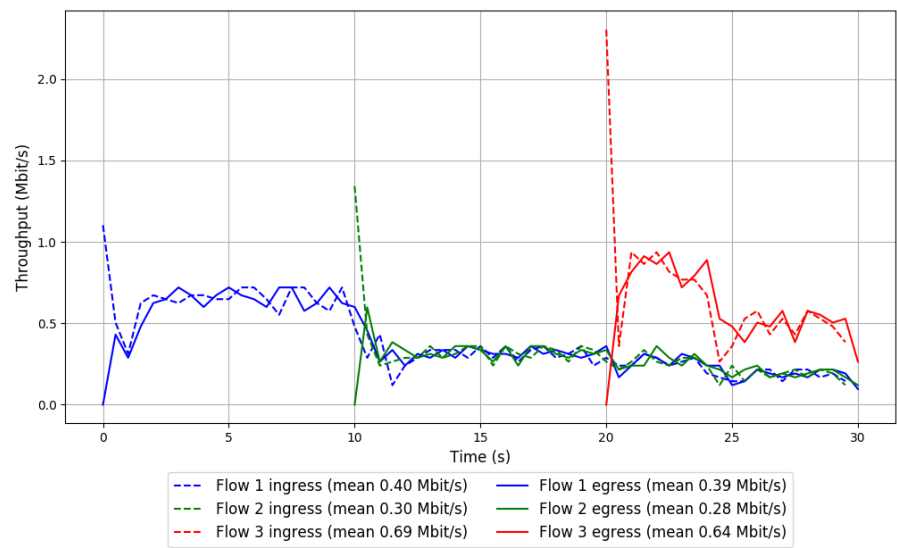
-- Flow 3:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 313.784 ms

Loss rate: 8.53%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-06-19 08:38:35

End at: 2018-06-19 08:39:05

Local clock offset: 6.638 ms

Remote clock offset: 2.146 ms

Below is generated by plot.py at 2018-06-19 08:46:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 296.858 ms

Loss rate: 3.26%

-- Flow 1:

Average throughput: 0.26 Mbit/s

95th percentile per-packet one-way delay: 311.315 ms

Loss rate: 3.78%

-- Flow 2:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 261.676 ms

Loss rate: 2.67%

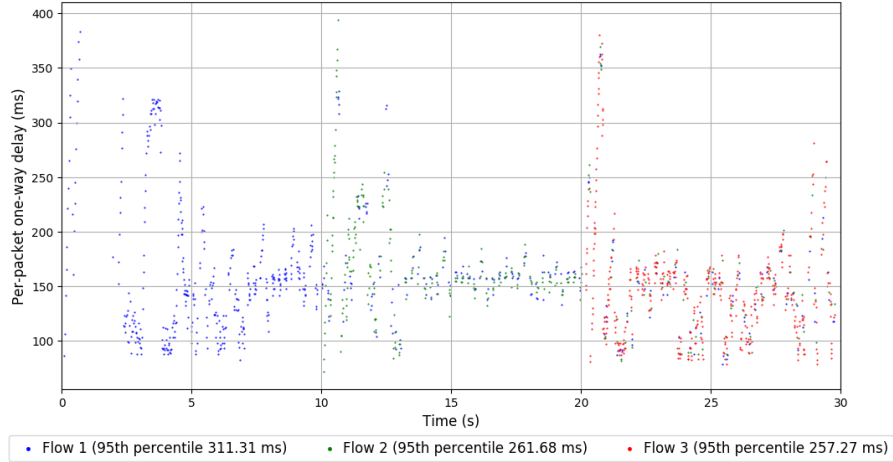
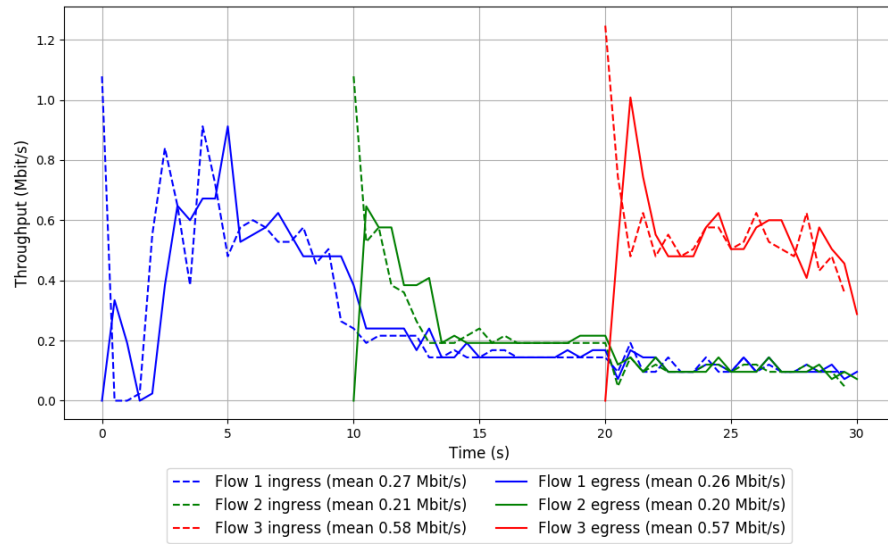
-- Flow 3:

Average throughput: 0.57 Mbit/s

95th percentile per-packet one-way delay: 257.274 ms

Loss rate: 2.97%

Run 3: Report of Indigo — Data Link

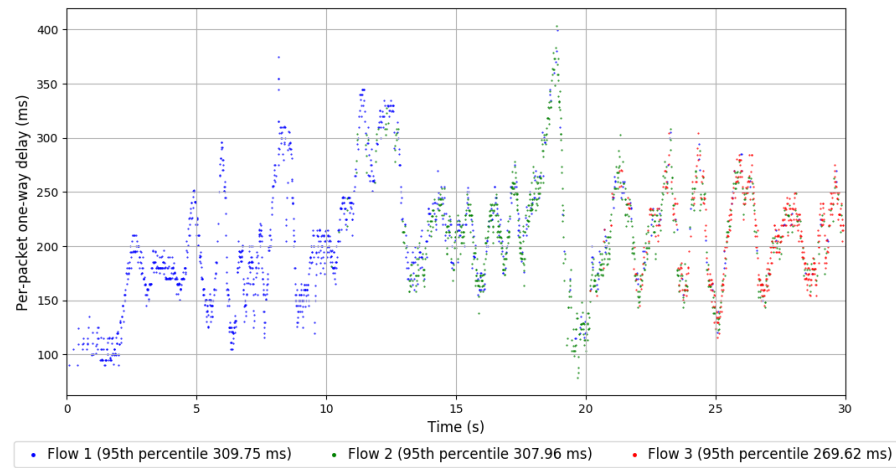
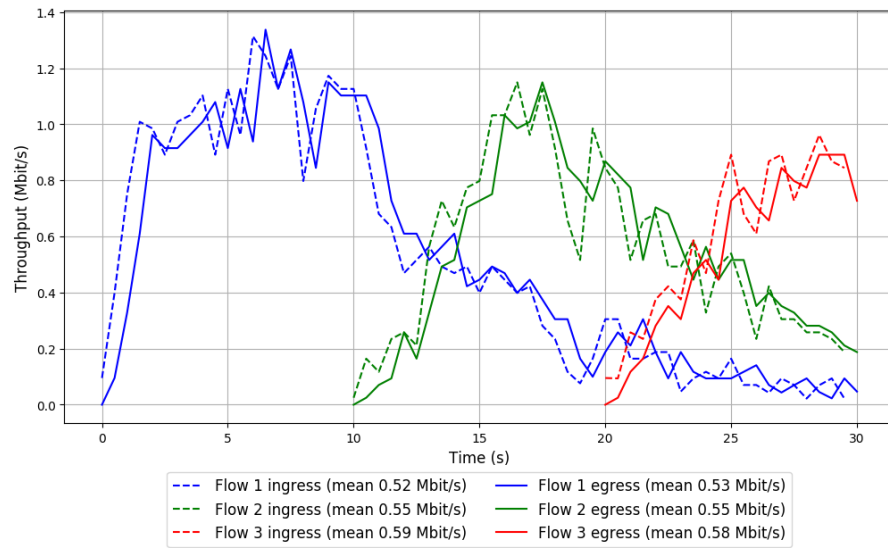


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Run 1: Statistics of LEDBAT

Start at: 2018-06-19 07:59:41
End at: 2018-06-19 08:00:11
Local clock offset: 8.401 ms
Remote clock offset: -1.297 ms

# Below is generated by plot.py at 2018-06-19 08:46:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 303.143 ms
Loss rate: 0.97%
-- Flow 1:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 309.753 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 307.956 ms
Loss rate: 0.64%
-- Flow 3:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 269.623 ms
Loss rate: 3.97%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-06-19 08:22:08

End at: 2018-06-19 08:22:38

Local clock offset: 5.925 ms

Remote clock offset: 0.993 ms

Below is generated by plot.py at 2018-06-19 08:46:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.20 Mbit/s

95th percentile per-packet one-way delay: 303.262 ms

Loss rate: 1.10%

-- Flow 1:

Average throughput: 0.67 Mbit/s

95th percentile per-packet one-way delay: 287.836 ms

Loss rate: 0.58%

-- Flow 2:

Average throughput: 0.55 Mbit/s

95th percentile per-packet one-way delay: 306.658 ms

Loss rate: 0.85%

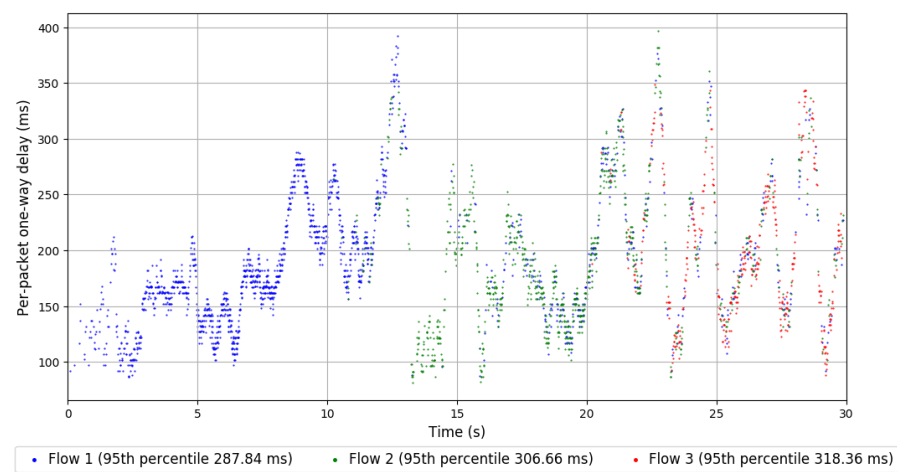
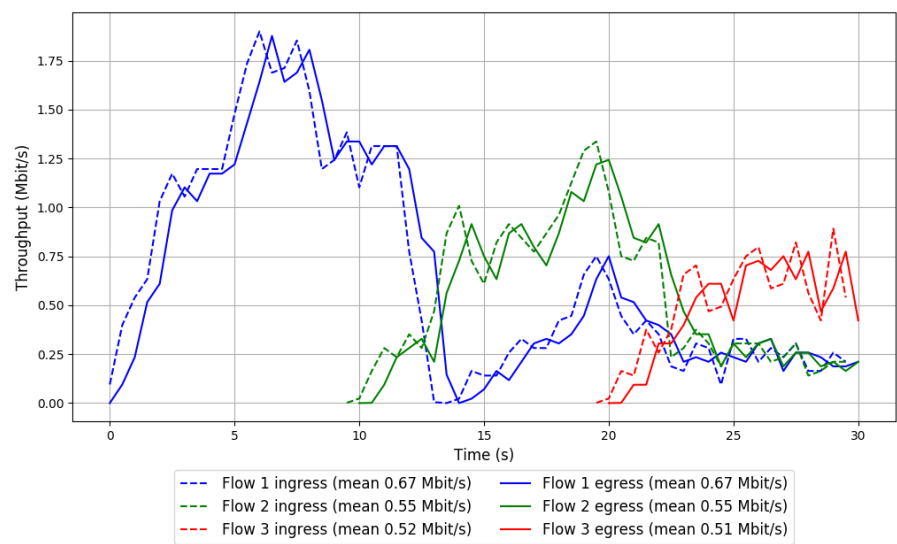
-- Flow 3:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 318.359 ms

Loss rate: 3.65%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-06-19 08:44:19

End at: 2018-06-19 08:44:49

Local clock offset: 7.043 ms

Remote clock offset: 2.444 ms

Below is generated by plot.py at 2018-06-19 08:46:31

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.02 Mbit/s

95th percentile per-packet one-way delay: 290.959 ms

Loss rate: 2.29%

-- Flow 1:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 286.800 ms

Loss rate: 1.74%

-- Flow 2:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 299.794 ms

Loss rate: 3.80%

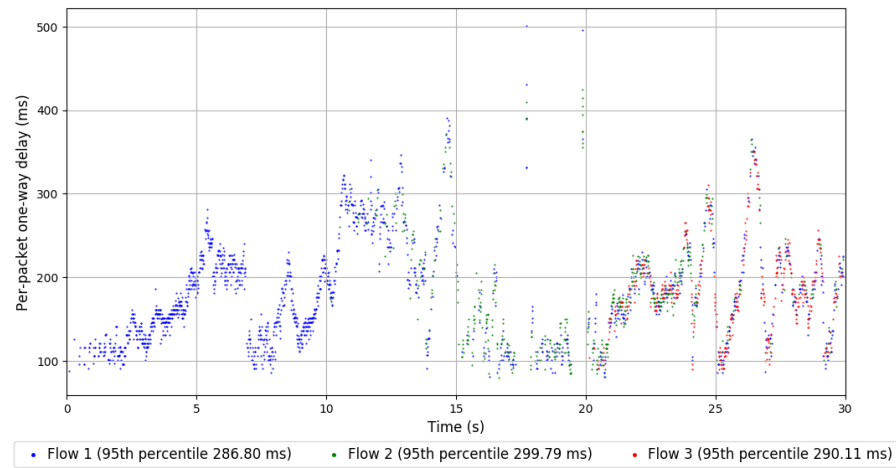
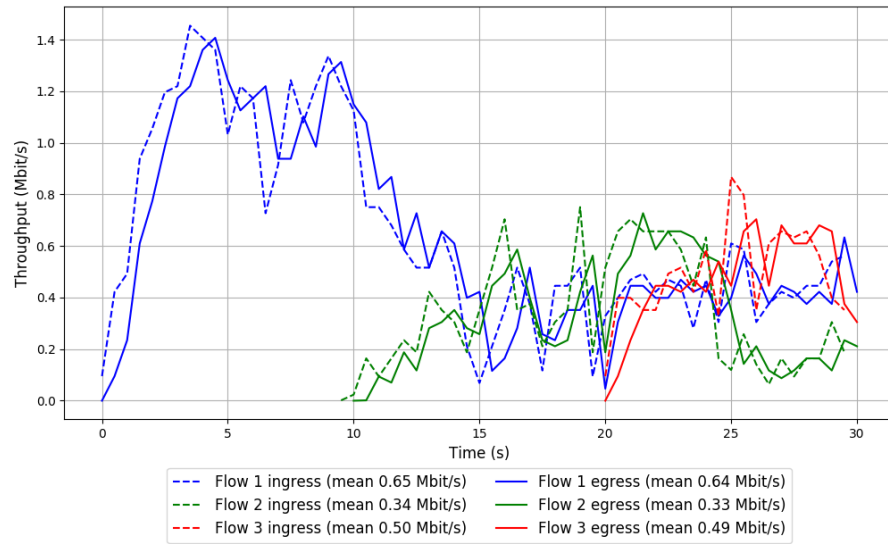
-- Flow 3:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 290.109 ms

Loss rate: 2.39%

Run 3: Report of LEDBAT — Data Link

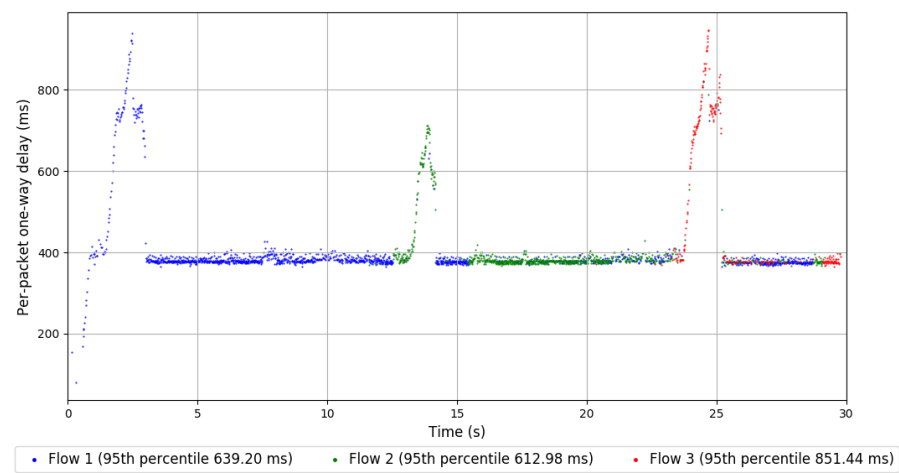
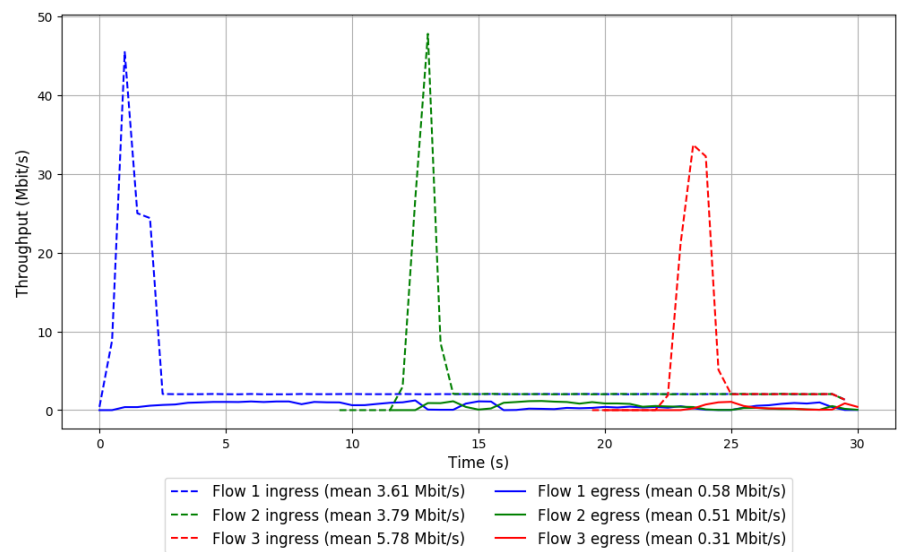


Run 1: Statistics of PCC-Allegro

Start at: 2018-06-19 07:55:20
End at: 2018-06-19 07:55:50
Local clock offset: 8.114 ms
Remote clock offset: -2.388 ms

Below is generated by plot.py at 2018-06-19 08:46:34
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 732.540 ms
Loss rate: 87.75%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 639.200 ms
Loss rate: 84.12%
-- Flow 2:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 612.983 ms
Loss rate: 87.62%
-- Flow 3:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 851.436 ms
Loss rate: 94.80%

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

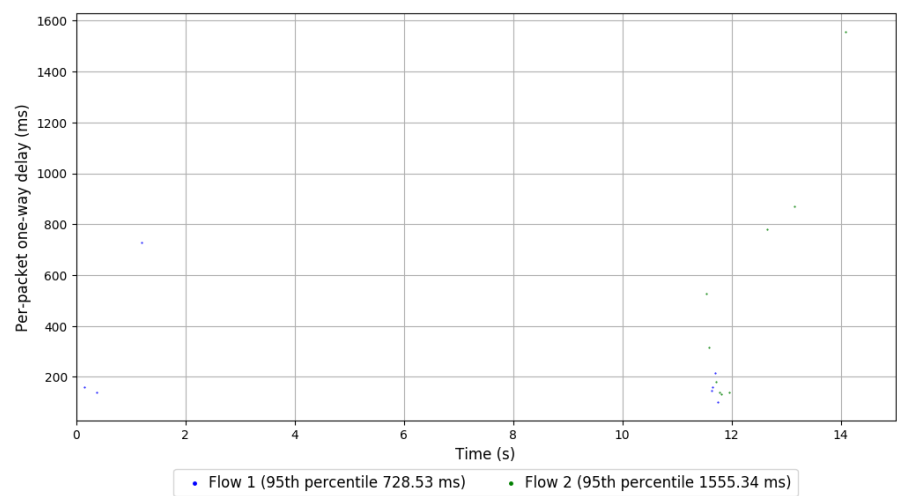
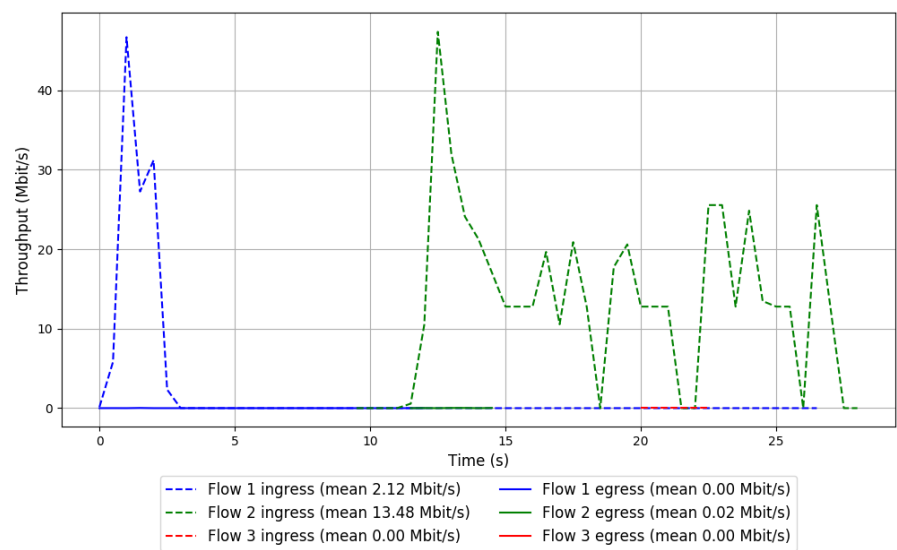
Start at: 2018-06-19 08:17:37

End at: 2018-06-19 08:18:07

Local clock offset: 6.01 ms

Remote clock offset: 0.751 ms

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

Start at: 2018-06-19 08:39:55

End at: 2018-06-19 08:40:25

Local clock offset: 6.881 ms

Remote clock offset: 2.268 ms

Below is generated by plot.py at 2018-06-19 08:46:34

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.06 Mbit/s

95th percentile per-packet one-way delay: 619.681 ms

Loss rate: 84.64%

-- Flow 1:

Average throughput: 0.65 Mbit/s

95th percentile per-packet one-way delay: 399.311 ms

Loss rate: 77.44%

-- Flow 2:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 728.222 ms

Loss rate: 87.84%

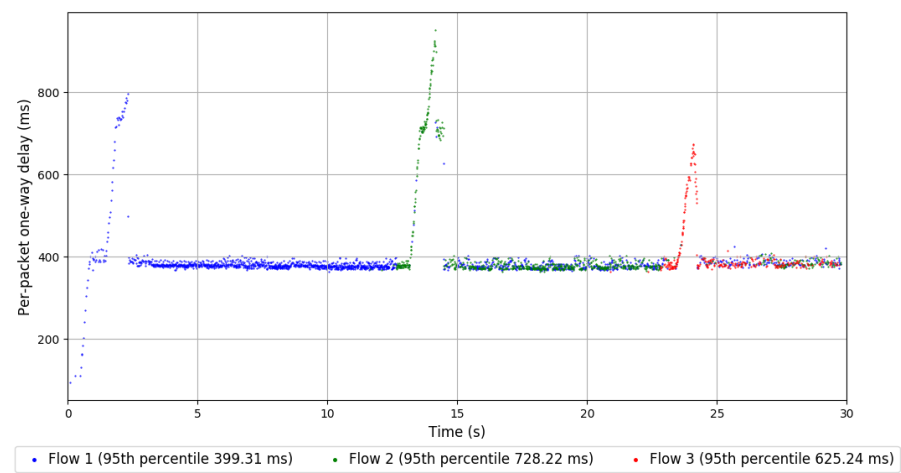
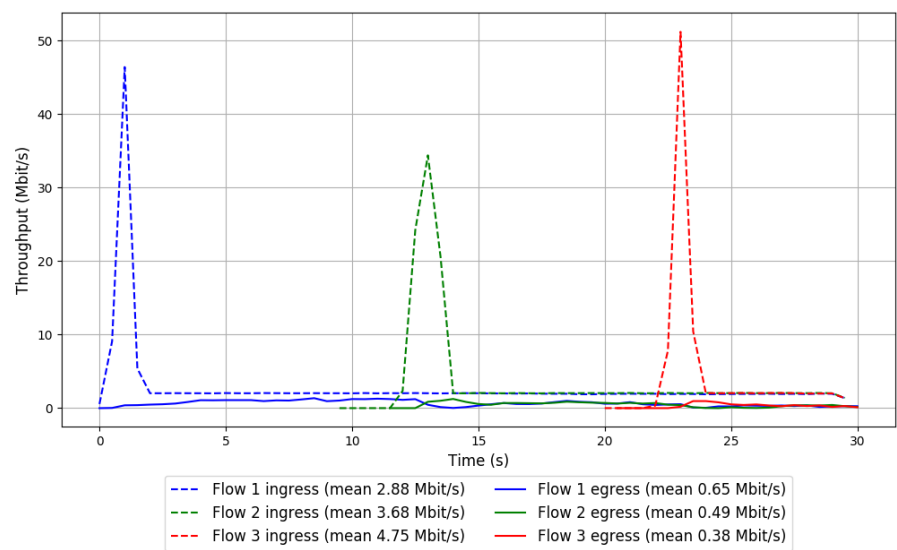
-- Flow 3:

Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 625.236 ms

Loss rate: 92.91%

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

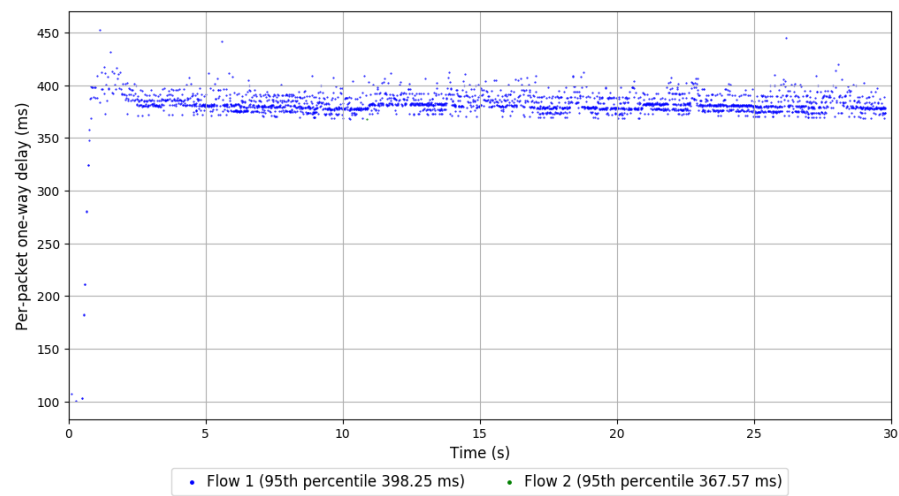
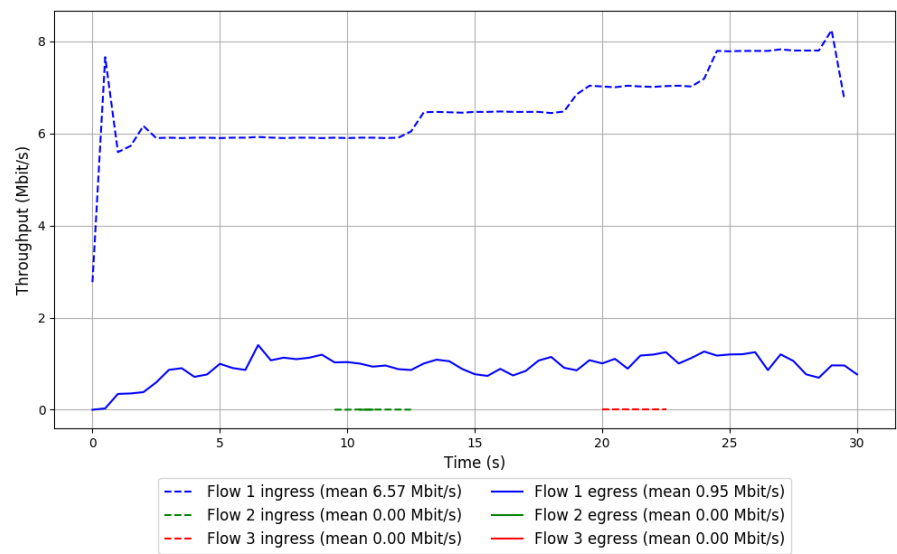
Start at: 2018-06-19 07:58:08

End at: 2018-06-19 07:58:38

Local clock offset: 8.097 ms

Remote clock offset: -1.634 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

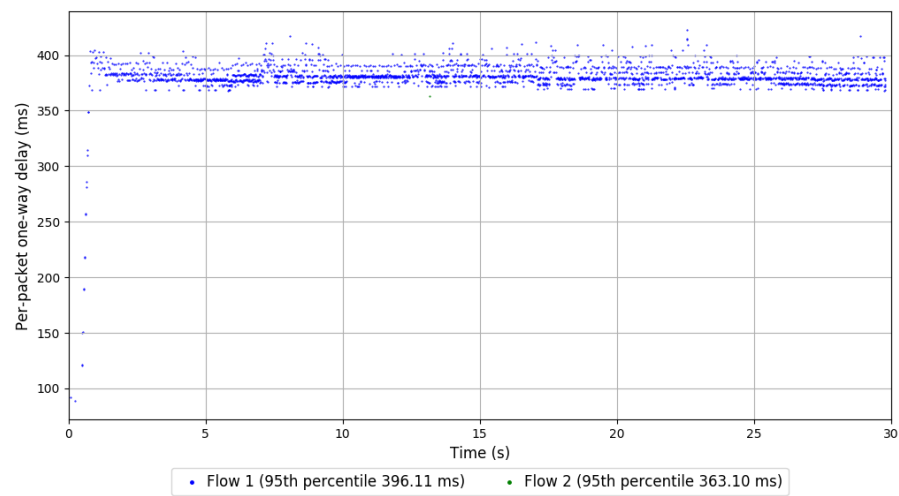
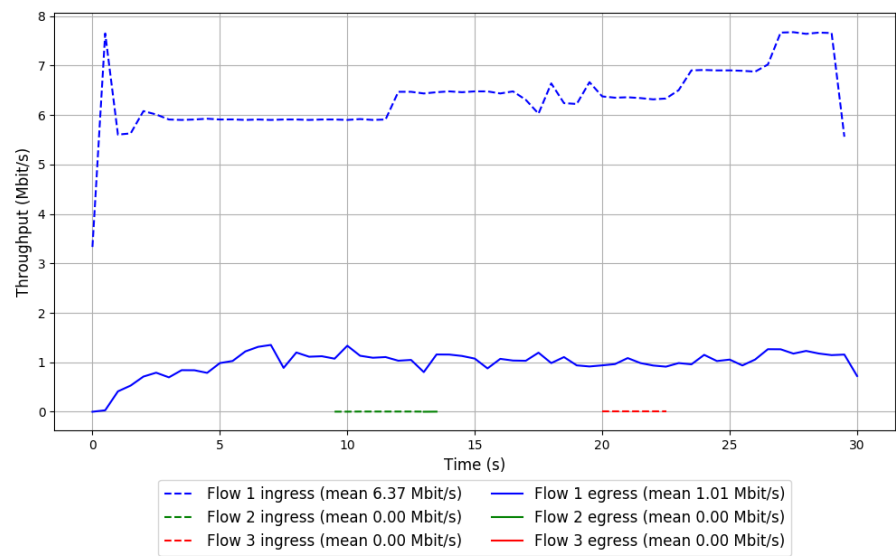
Start at: 2018-06-19 08:20:33

End at: 2018-06-19 08:21:03

Local clock offset: 6.001 ms

Remote clock offset: 1.011 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2018-06-19 08:42:42

End at: 2018-06-19 08:43:12

Local clock offset: 6.938 ms

Remote clock offset: 2.375 ms

Below is generated by plot.py at 2018-06-19 08:46:42

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.42 Mbit/s

95th percentile per-packet one-way delay: 390.248 ms

Loss rate: 80.82%

-- Flow 1:

Average throughput: 1.42 Mbit/s

95th percentile per-packet one-way delay: 390.248 ms

Loss rate: 80.82%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 366.830 ms

Loss rate: 92.31%

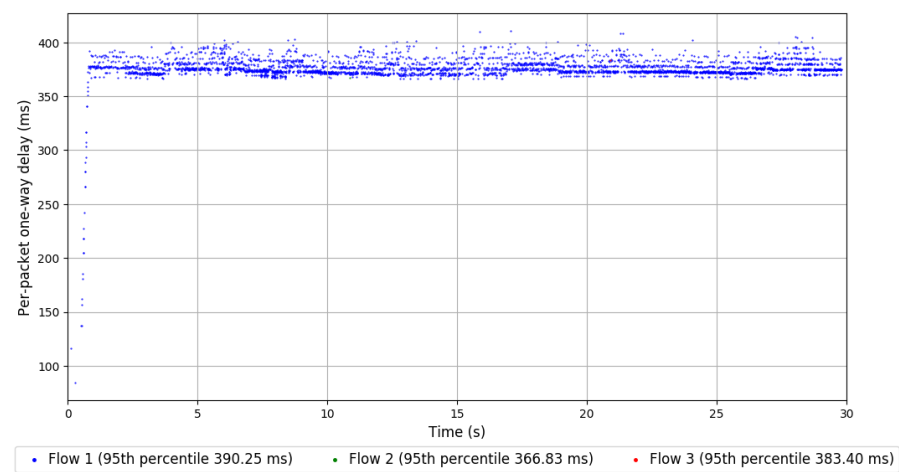
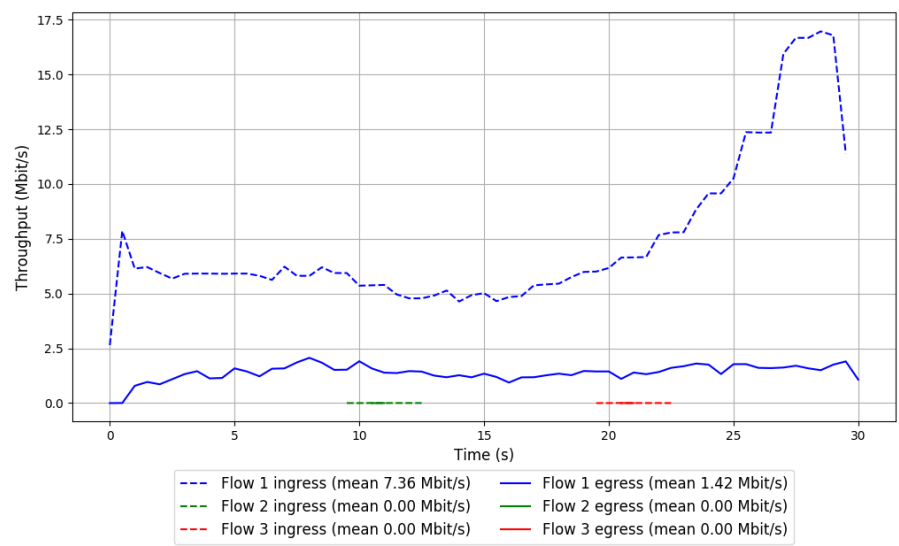
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 383.405 ms

Loss rate: 91.67%

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-06-19 07:42:23

End at: 2018-06-19 07:42:53

Local clock offset: 7.465 ms

Remote clock offset: -2.56 ms

Below is generated by plot.py at 2018-06-19 08:46:42

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.68 Mbit/s

95th percentile per-packet one-way delay: 383.946 ms

Loss rate: 17.68%

-- Flow 1:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 183.390 ms

Loss rate: 90.08%

-- Flow 2:

Average throughput: 0.76 Mbit/s

95th percentile per-packet one-way delay: 381.548 ms

Loss rate: 12.70%

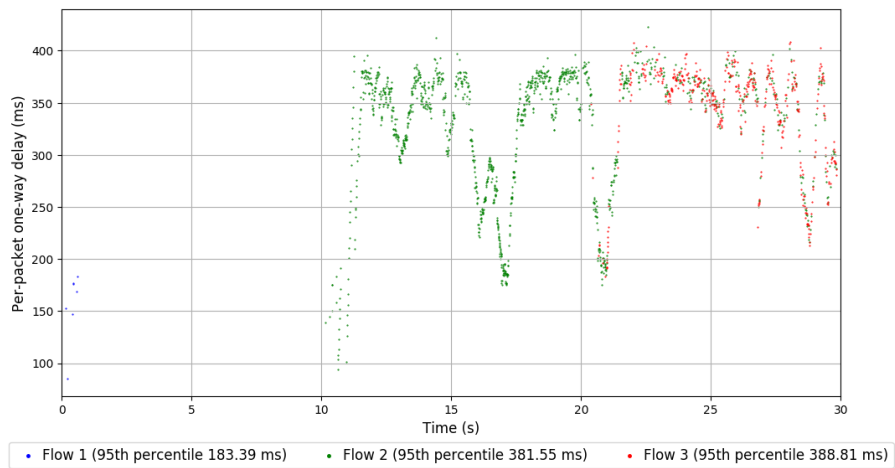
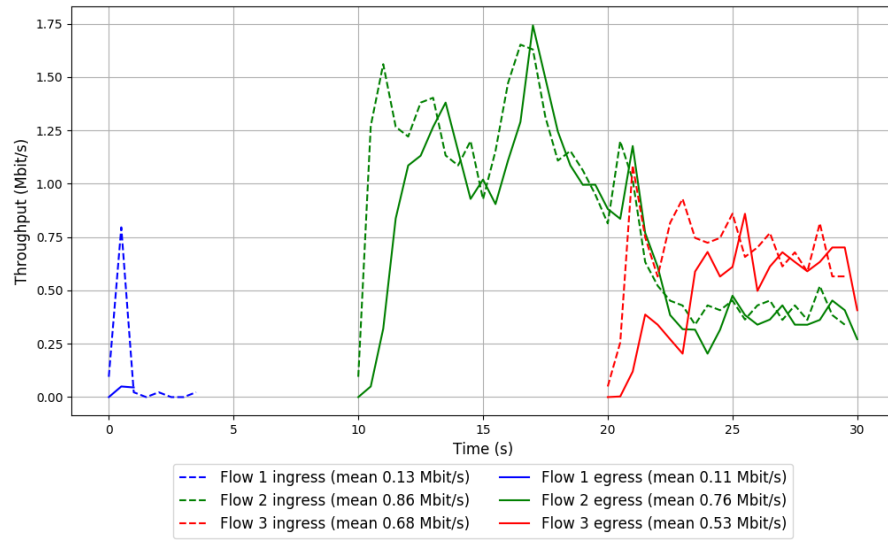
-- Flow 3:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 388.807 ms

Loss rate: 25.21%

Run 1: Report of QUIC Cubic — Data Link

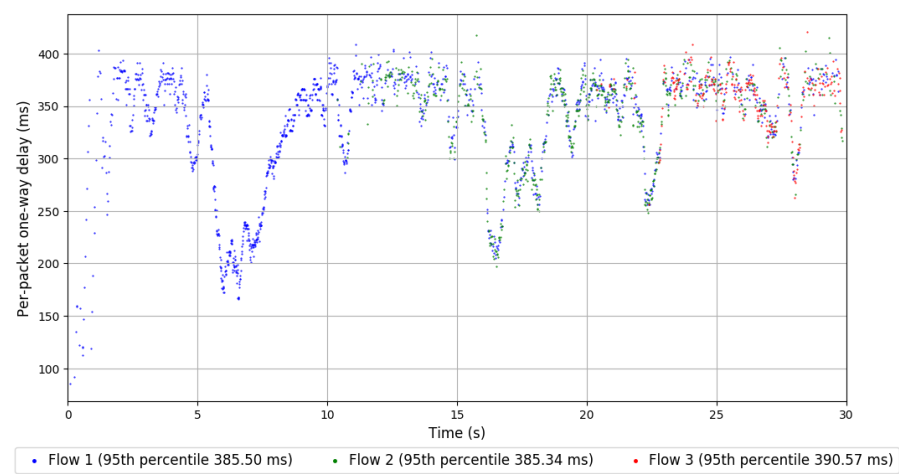
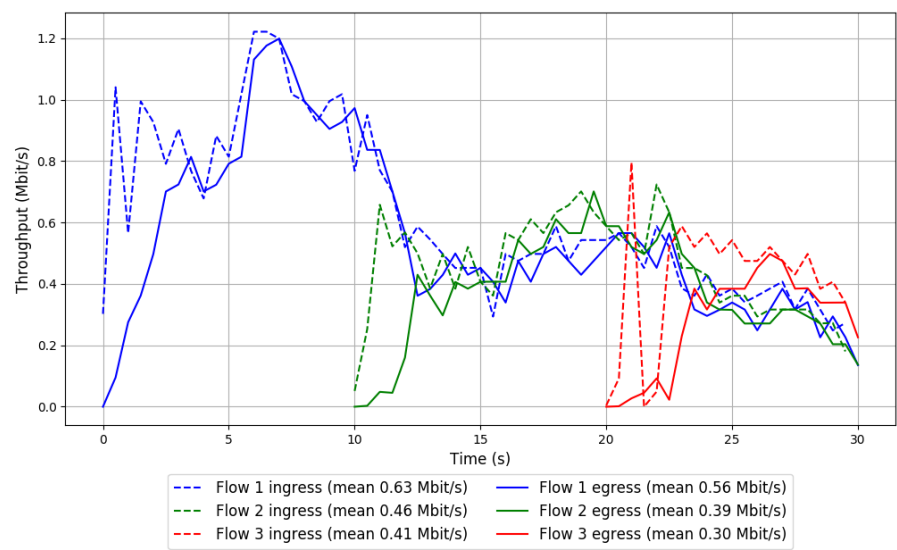


Run 2: Statistics of QUIC Cubic

Start at: 2018-06-19 08:05:01
End at: 2018-06-19 08:05:31
Local clock offset: 7.411 ms
Remote clock offset: -0.424 ms

Below is generated by plot.py at 2018-06-19 08:46:42
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 385.826 ms
Loss rate: 15.58%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 385.496 ms
Loss rate: 11.89%
-- Flow 2:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 385.338 ms
Loss rate: 16.65%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 390.573 ms
Loss rate: 30.17%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-06-19 08:27:31

End at: 2018-06-19 08:28:01

Local clock offset: 5.896 ms

Remote clock offset: 1.444 ms

Below is generated by plot.py at 2018-06-19 08:46:42

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.61 Mbit/s

95th percentile per-packet one-way delay: 375.544 ms

Loss rate: 9.46%

-- Flow 1:

Average throughput: 0.95 Mbit/s

95th percentile per-packet one-way delay: 373.958 ms

Loss rate: 6.96%

-- Flow 2:

Average throughput: 0.72 Mbit/s

95th percentile per-packet one-way delay: 376.353 ms

Loss rate: 10.29%

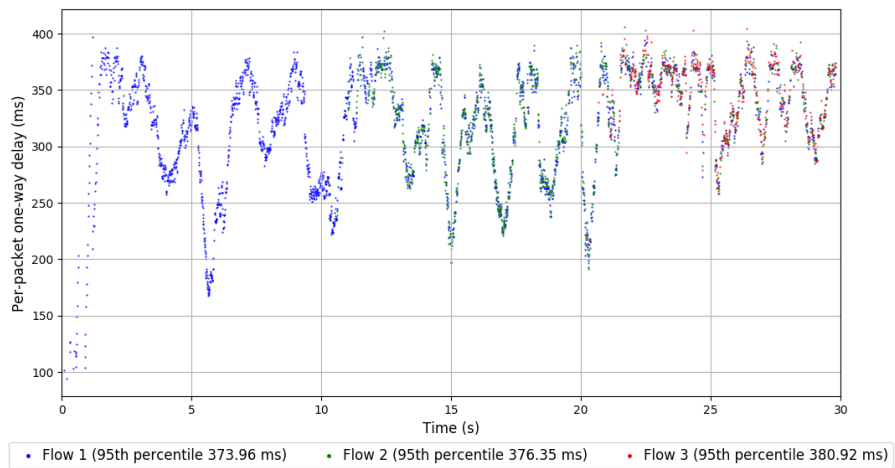
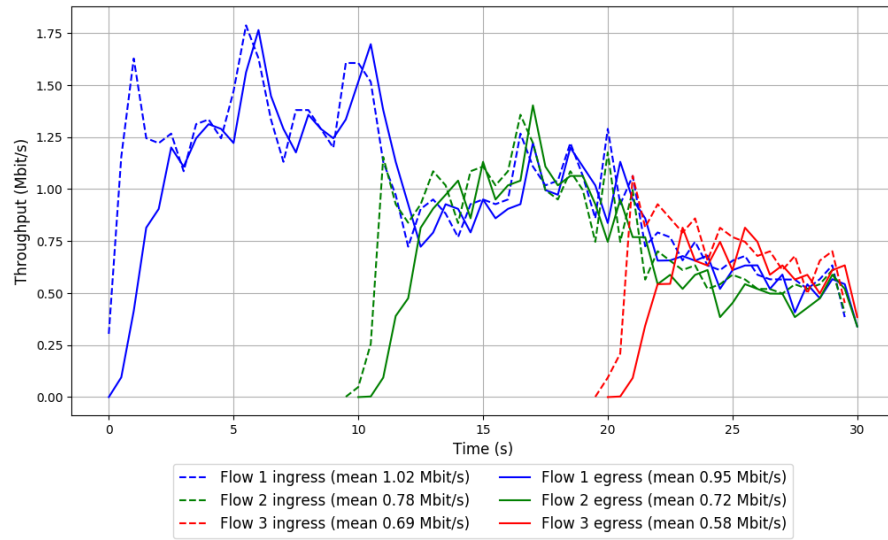
-- Flow 3:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 380.921 ms

Loss rate: 18.67%

Run 3: Report of QUIC Cubic — Data Link

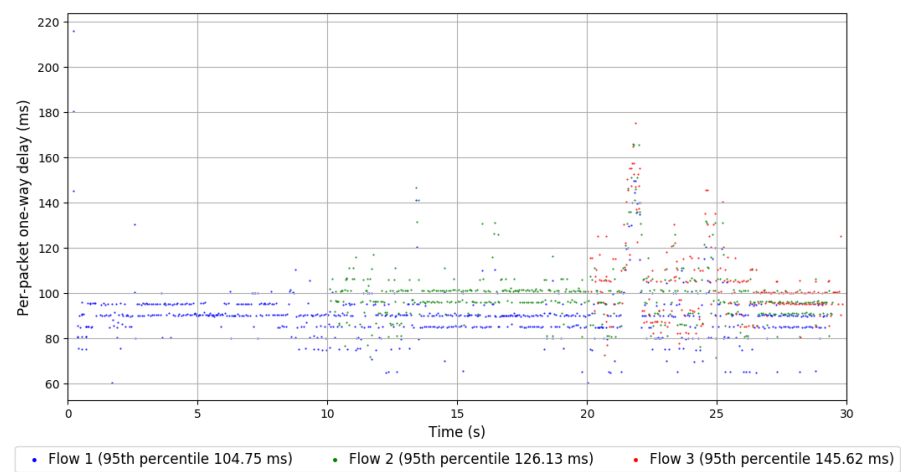
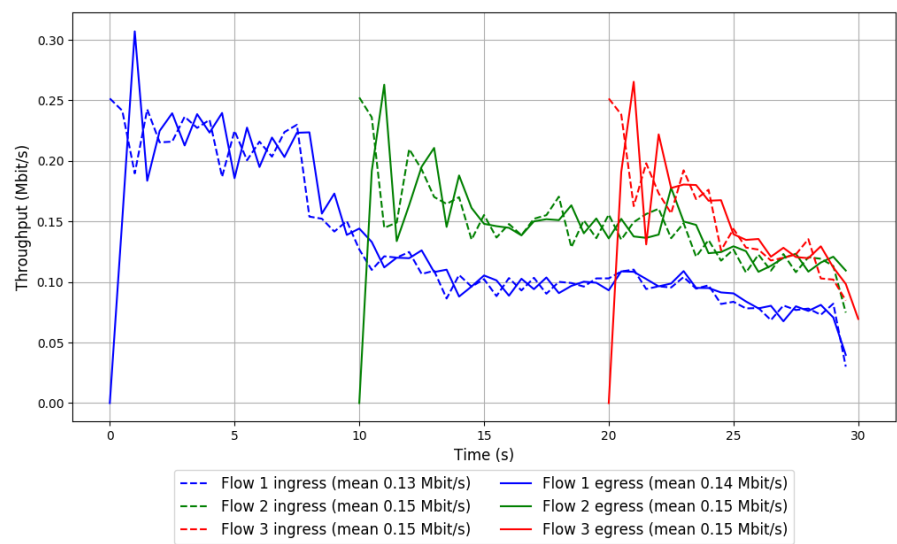


Run 1: Statistics of SCReAM

Start at: 2018-06-19 07:48:03
End at: 2018-06-19 07:48:33
Local clock offset: 7.576 ms
Remote clock offset: -2.606 ms

Below is generated by plot.py at 2018-06-19 08:46:42
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 122.657 ms
Loss rate: 1.32%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 104.745 ms
Loss rate: 1.07%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 126.131 ms
Loss rate: 1.69%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 145.616 ms
Loss rate: 1.24%

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2018-06-19 08:10:42

End at: 2018-06-19 08:11:12

Local clock offset: 6.557 ms

Remote clock offset: 0.168 ms

Below is generated by plot.py at 2018-06-19 08:46:42

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.34 Mbit/s

95th percentile per-packet one-way delay: 115.961 ms

Loss rate: 0.69%

-- Flow 1:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 125.549 ms

Loss rate: 0.50%

-- Flow 2:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 115.243 ms

Loss rate: 0.78%

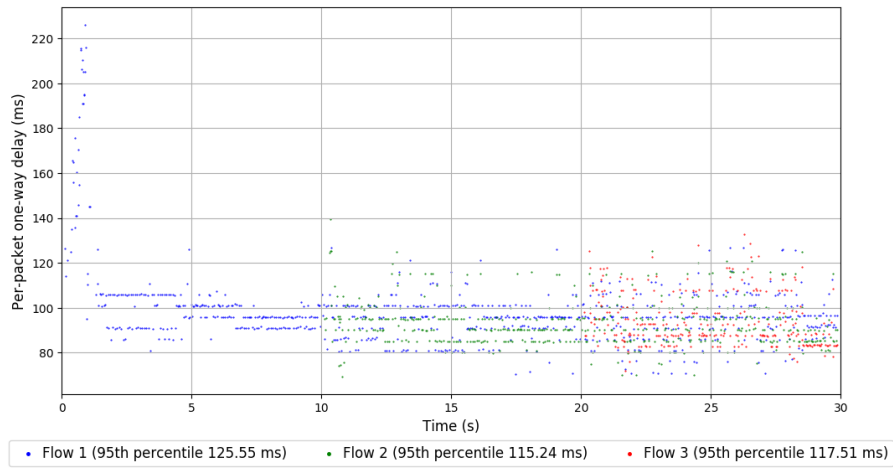
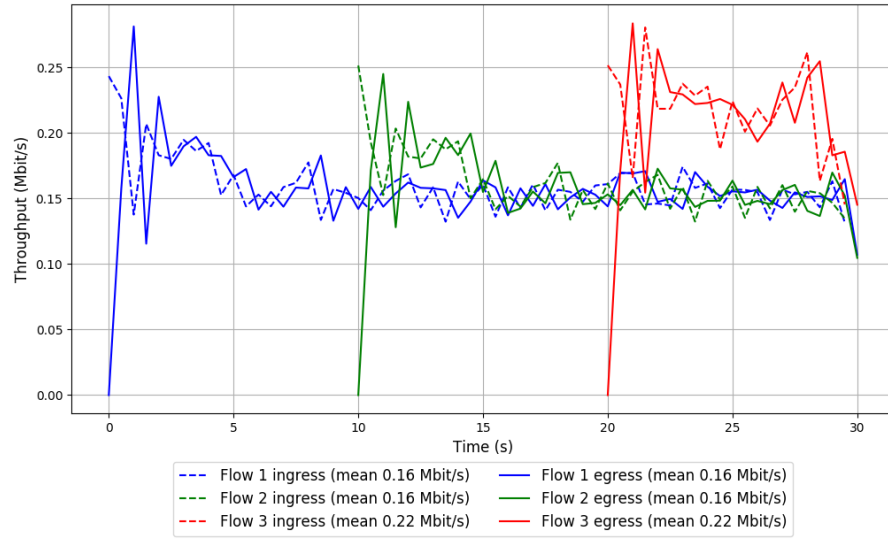
-- Flow 3:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 117.514 ms

Loss rate: 0.97%

Run 2: Report of SReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2018-06-19 08:33:06

End at: 2018-06-19 08:33:36

Local clock offset: 5.965 ms

Remote clock offset: 1.766 ms

Below is generated by plot.py at 2018-06-19 08:46:42

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 389.946 ms

Loss rate: 19.90%

-- Flow 1:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 630.023 ms

Loss rate: 26.53%

-- Flow 2:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 301.958 ms

Loss rate: 21.76%

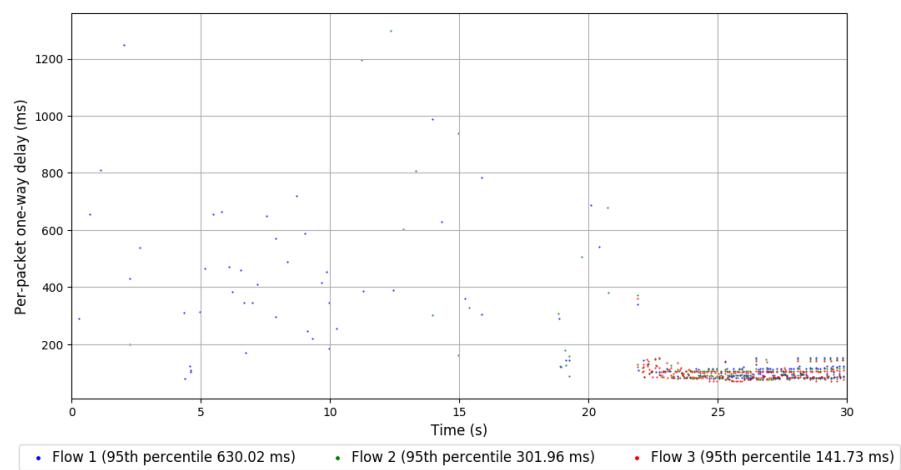
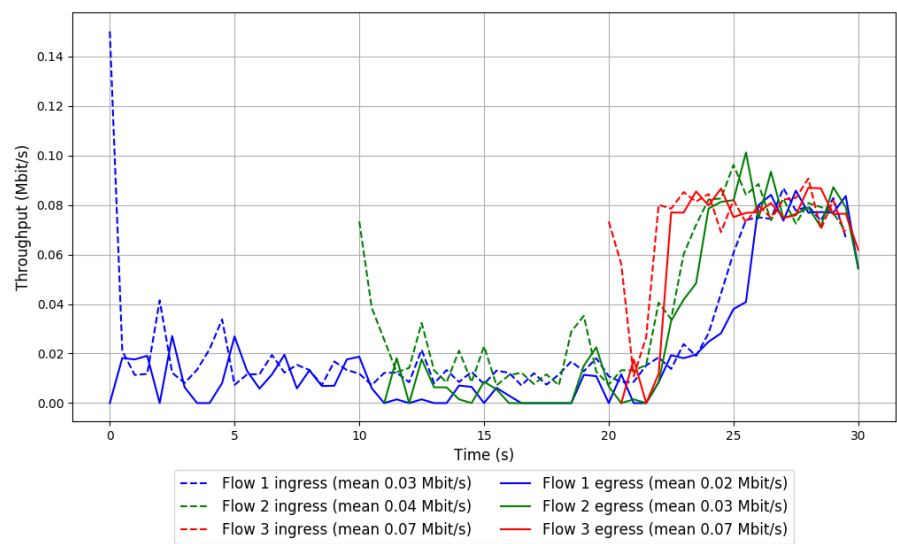
-- Flow 3:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 141.730 ms

Loss rate: 10.23%

Run 3: Report of SReAM — Data Link

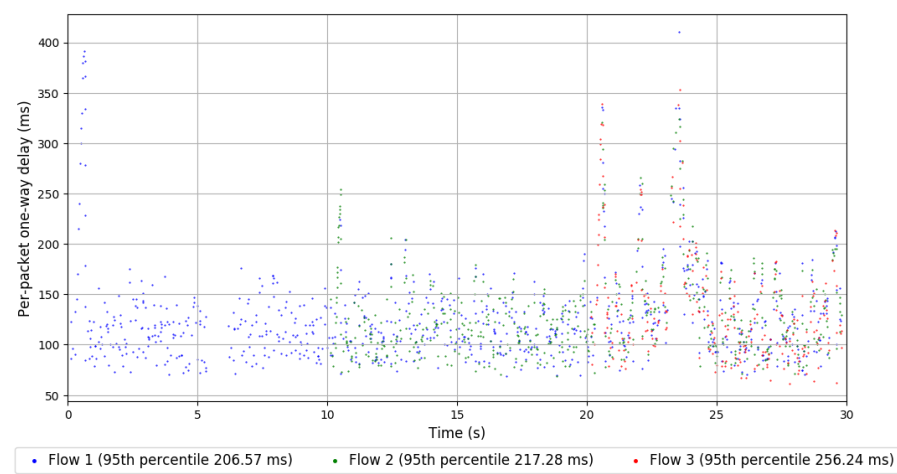
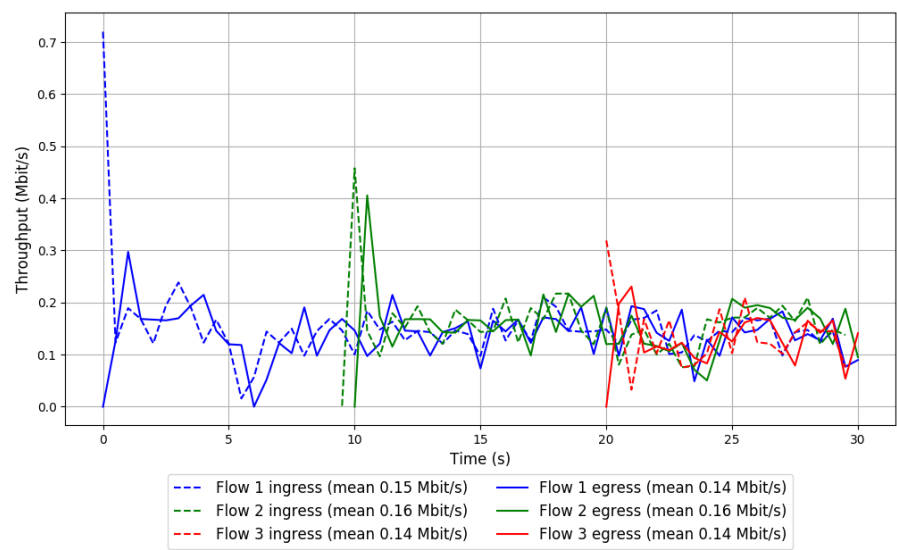


Run 1: Statistics of Sprout

Start at: 2018-06-19 08:01:02
End at: 2018-06-19 08:01:32
Local clock offset: 8.447 ms
Remote clock offset: -1.047 ms

Below is generated by plot.py at 2018-06-19 08:46:42
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 228.531 ms
Loss rate: 3.75%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 206.568 ms
Loss rate: 6.16%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 217.282 ms
Loss rate: 1.14%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 256.239 ms
Loss rate: 1.87%

Run 1: Report of Sprout — Data Link

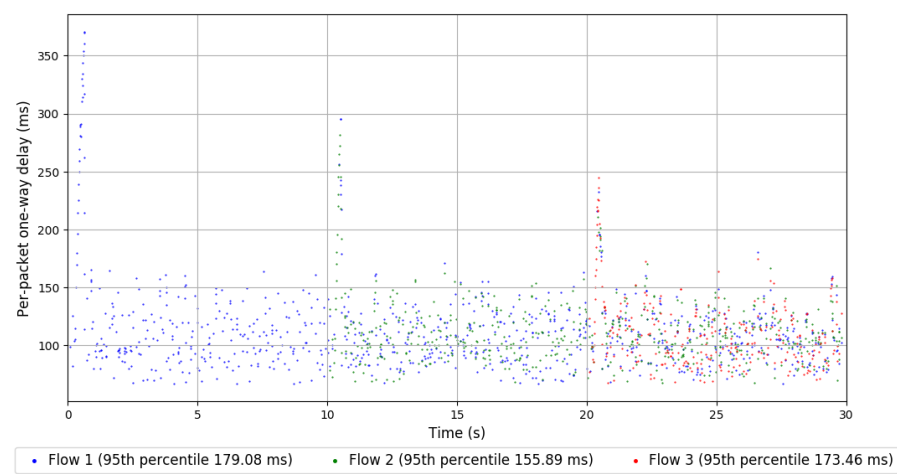
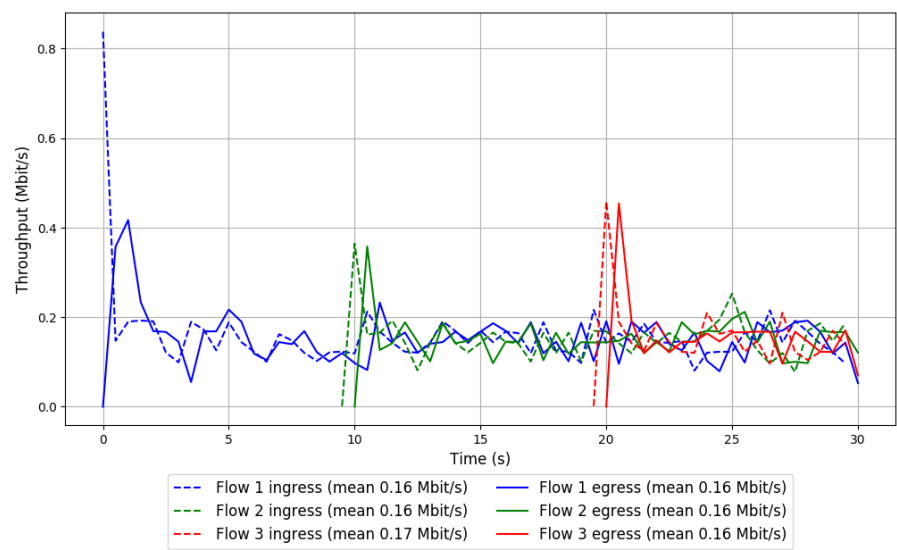


Run 2: Statistics of Sprout

Start at: 2018-06-19 08:23:30
End at: 2018-06-19 08:24:00
Local clock offset: 5.813 ms
Remote clock offset: 1.092 ms

Below is generated by plot.py at 2018-06-19 08:46:42
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 166.723 ms
Loss rate: 1.85%
-- Flow 1:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 179.082 ms
Loss rate: 2.23%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 155.894 ms
Loss rate: 1.12%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 173.458 ms
Loss rate: 2.15%

Run 2: Report of Sprout — Data Link

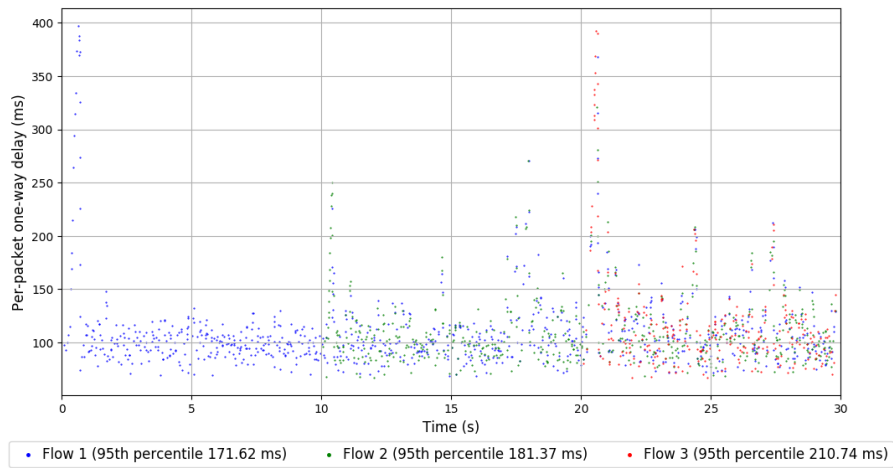
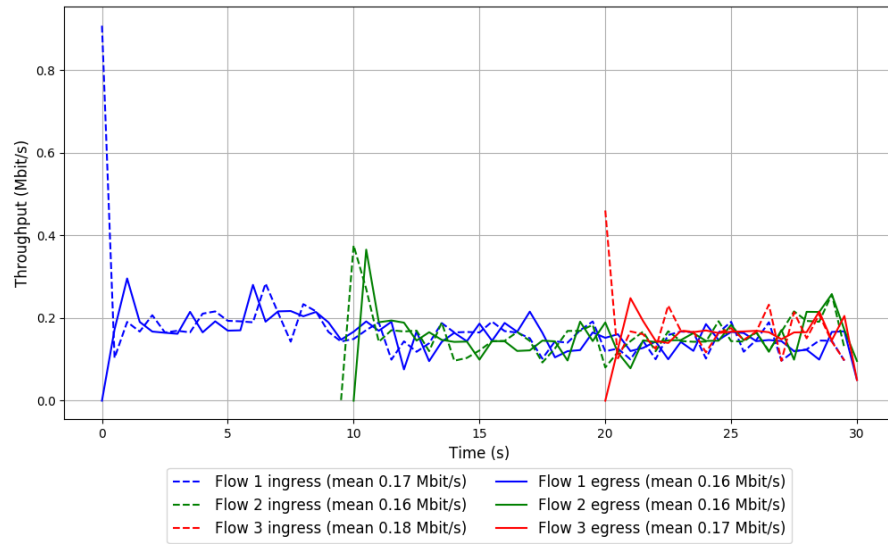


Run 3: Statistics of Sprout

Start at: 2018-06-19 08:45:39
End at: 2018-06-19 08:46:09
Local clock offset: 7.102 ms
Remote clock offset: 2.54 ms

```
# Below is generated by plot.py at 2018-06-19 08:46:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 185.156 ms
Loss rate: 4.68%
-- Flow 1:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 171.625 ms
Loss rate: 5.94%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 181.365 ms
Loss rate: 1.91%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 210.744 ms
Loss rate: 6.05%
```

Run 3: Report of Sprout — Data Link

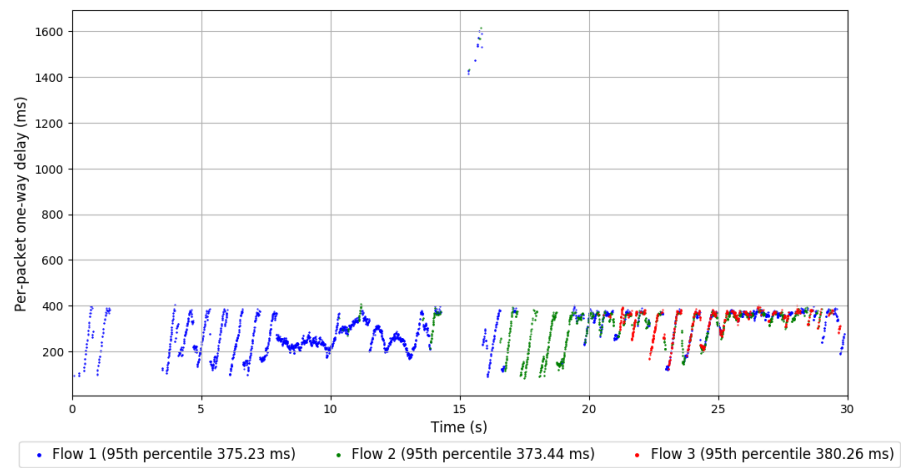
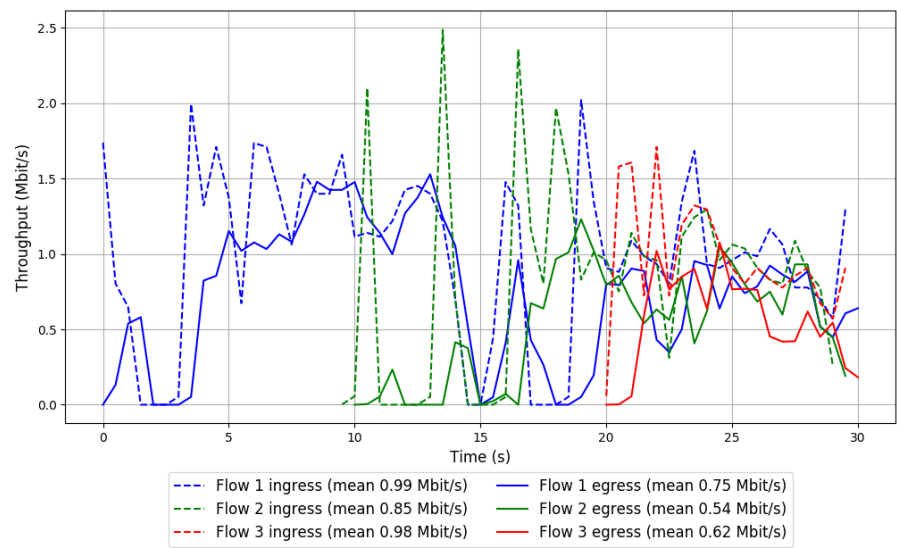


Run 1: Statistics of TaoVA-100x

Start at: 2018-06-19 07:52:36
End at: 2018-06-19 07:53:06
Local clock offset: 7.966 ms
Remote clock offset: -2.567 ms

Below is generated by plot.py at 2018-06-19 08:46:47
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 375.972 ms
Loss rate: 31.23%
-- Flow 1:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 375.229 ms
Loss rate: 25.05%
-- Flow 2:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 373.436 ms
Loss rate: 36.90%
-- Flow 3:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 380.258 ms
Loss rate: 40.63%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-06-19 08:14:48

End at: 2018-06-19 08:15:18

Local clock offset: 6.261 ms

Remote clock offset: 0.433 ms

Below is generated by plot.py at 2018-06-19 08:46:48

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.71 Mbit/s

95th percentile per-packet one-way delay: 374.366 ms

Loss rate: 23.46%

-- Flow 1:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 367.762 ms

Loss rate: 8.05%

-- Flow 2:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 397.262 ms

Loss rate: 57.47%

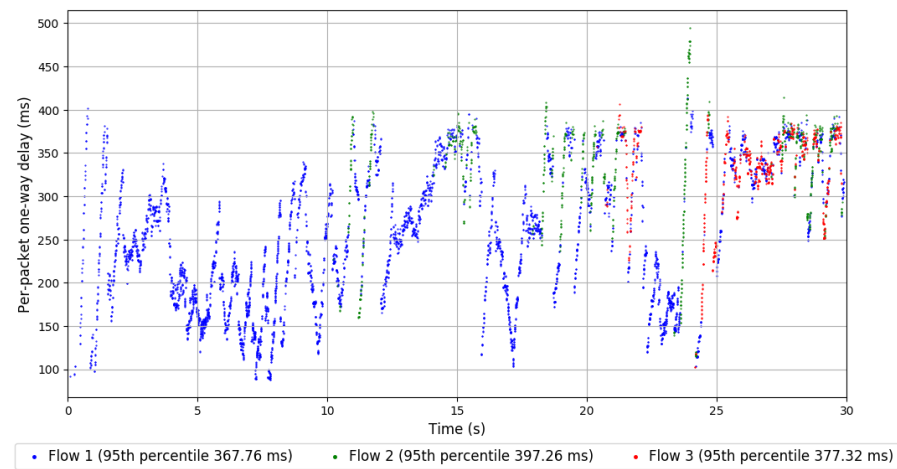
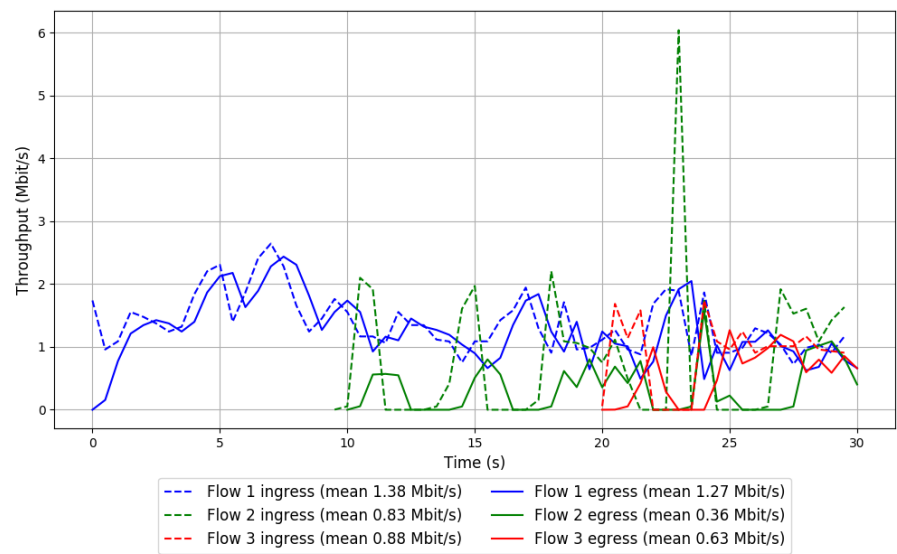
-- Flow 3:

Average throughput: 0.63 Mbit/s

95th percentile per-packet one-way delay: 377.321 ms

Loss rate: 32.10%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-06-19 08:37:11

End at: 2018-06-19 08:37:41

Local clock offset: 6.606 ms

Remote clock offset: 1.998 ms

Below is generated by plot.py at 2018-06-19 08:46:48

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.71 Mbit/s

95th percentile per-packet one-way delay: 382.990 ms

Loss rate: 48.89%

-- Flow 1:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 393.673 ms

Loss rate: 68.29%

-- Flow 2:

Average throughput: 0.74 Mbit/s

95th percentile per-packet one-way delay: 376.639 ms

Loss rate: 27.80%

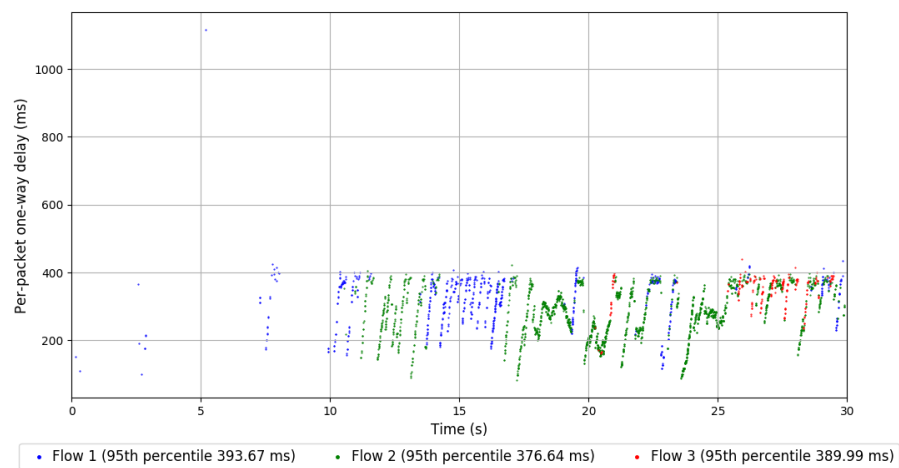
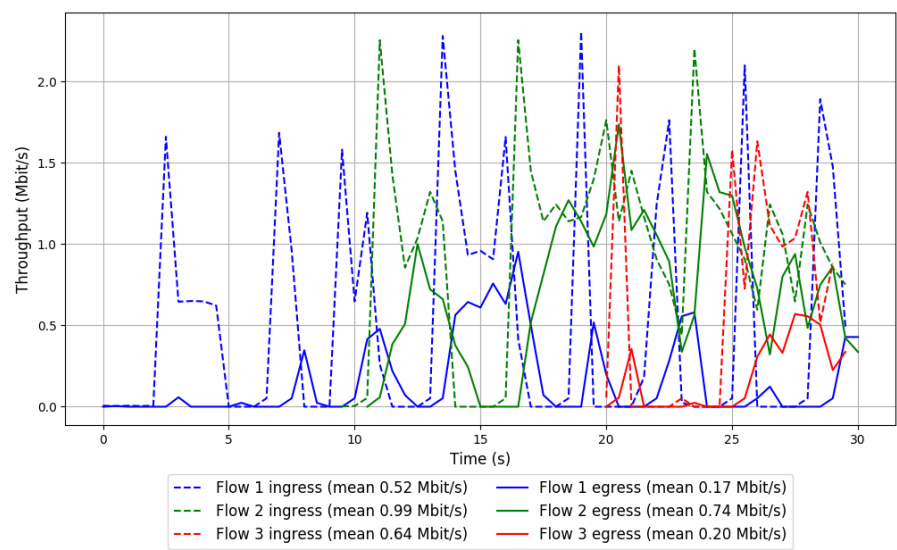
-- Flow 3:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 389.993 ms

Loss rate: 68.65%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-06-19 07:41:04

End at: 2018-06-19 07:41:34

Local clock offset: 7.223 ms

Remote clock offset: -2.53 ms

Below is generated by plot.py at 2018-06-19 08:46:48

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.23 Mbit/s

95th percentile per-packet one-way delay: 314.850 ms

Loss rate: 2.08%

-- Flow 1:

Average throughput: 0.59 Mbit/s

95th percentile per-packet one-way delay: 325.271 ms

Loss rate: 1.27%

-- Flow 2:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 314.850 ms

Loss rate: 1.97%

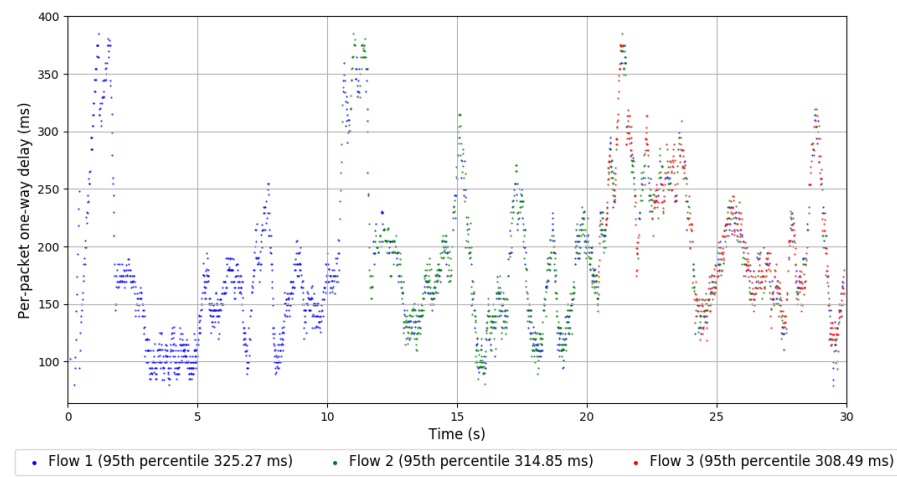
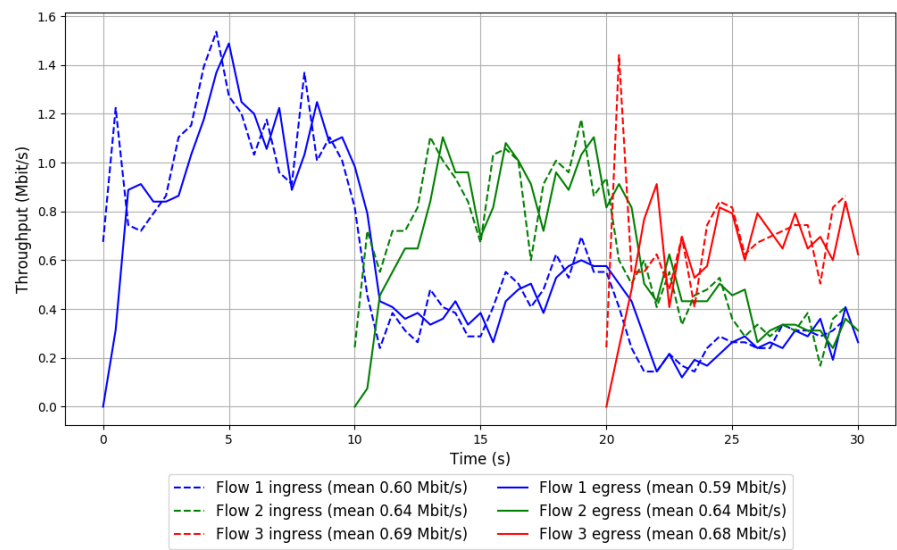
-- Flow 3:

Average throughput: 0.68 Mbit/s

95th percentile per-packet one-way delay: 308.489 ms

Loss rate: 4.35%

Run 1: Report of TCP Vegas — Data Link

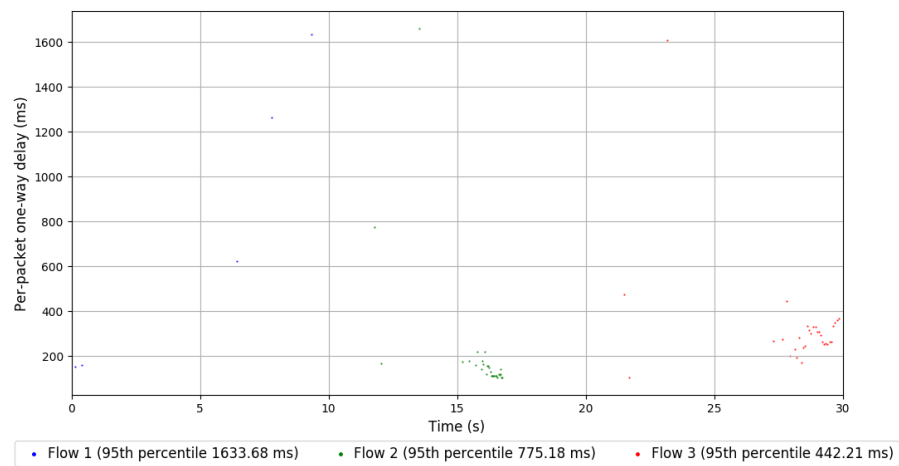
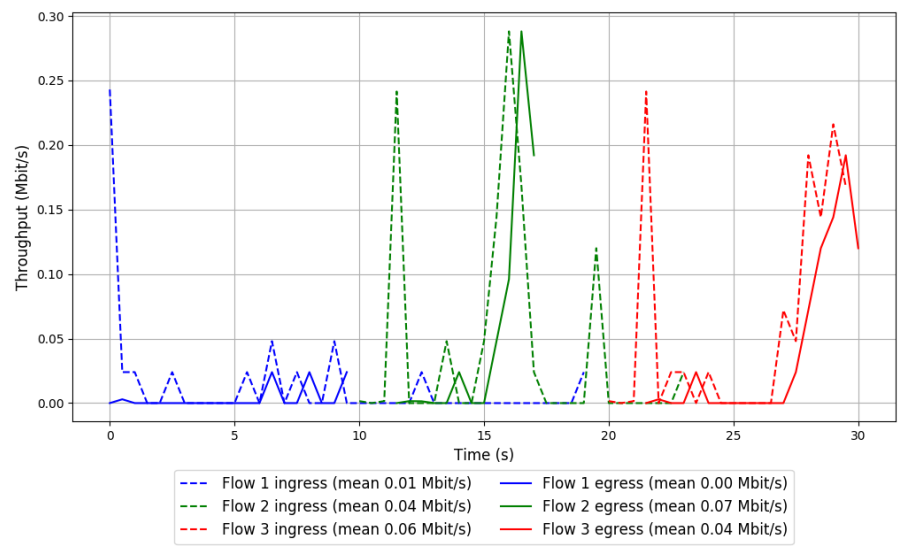


Run 2: Statistics of TCP Vegas

Start at: 2018-06-19 08:03:43
End at: 2018-06-19 08:04:13
Local clock offset: 7.854 ms
Remote clock offset: -0.618 ms

Below is generated by plot.py at 2018-06-19 08:46:48
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1264.846 ms
Loss rate: 48.60%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1633.680 ms
Loss rate: 85.22%
-- Flow 2:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 775.180 ms
Loss rate: 41.28%
-- Flow 3:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 442.211 ms
Loss rate: 39.56%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2018-06-19 08:26:09

End at: 2018-06-19 08:26:39

Local clock offset: 5.809 ms

Remote clock offset: 1.324 ms

Below is generated by plot.py at 2018-06-19 08:46:48

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.34 Mbit/s

95th percentile per-packet one-way delay: 344.420 ms

Loss rate: 3.20%

-- Flow 1:

Average throughput: 0.64 Mbit/s

95th percentile per-packet one-way delay: 350.686 ms

Loss rate: 3.09%

-- Flow 2:

Average throughput: 0.65 Mbit/s

95th percentile per-packet one-way delay: 340.517 ms

Loss rate: 2.83%

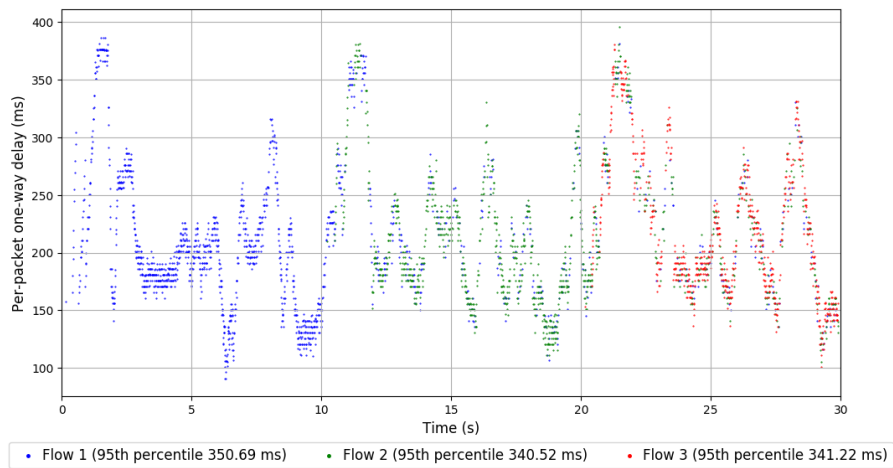
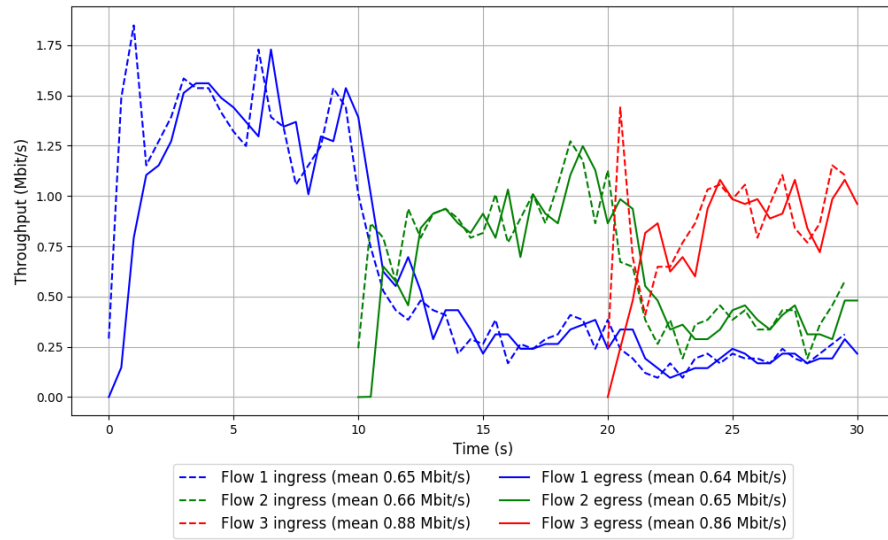
-- Flow 3:

Average throughput: 0.86 Mbit/s

95th percentile per-packet one-way delay: 341.222 ms

Loss rate: 3.99%

Run 3: Report of TCP Vegas — Data Link

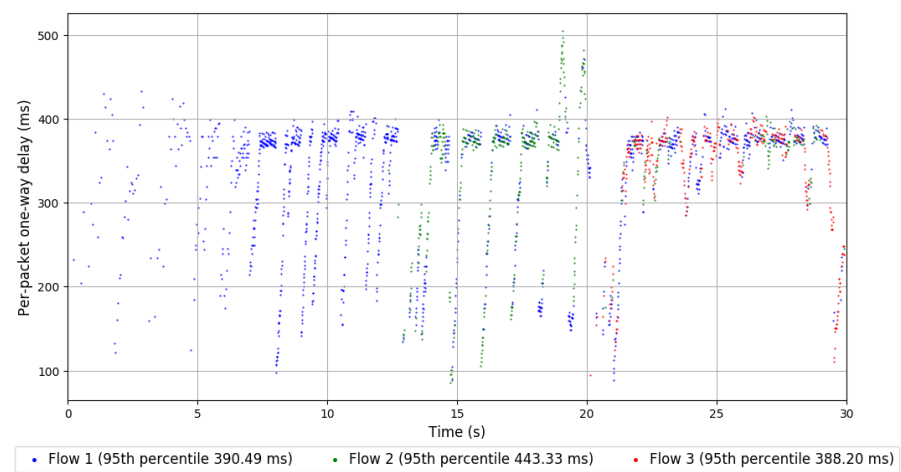
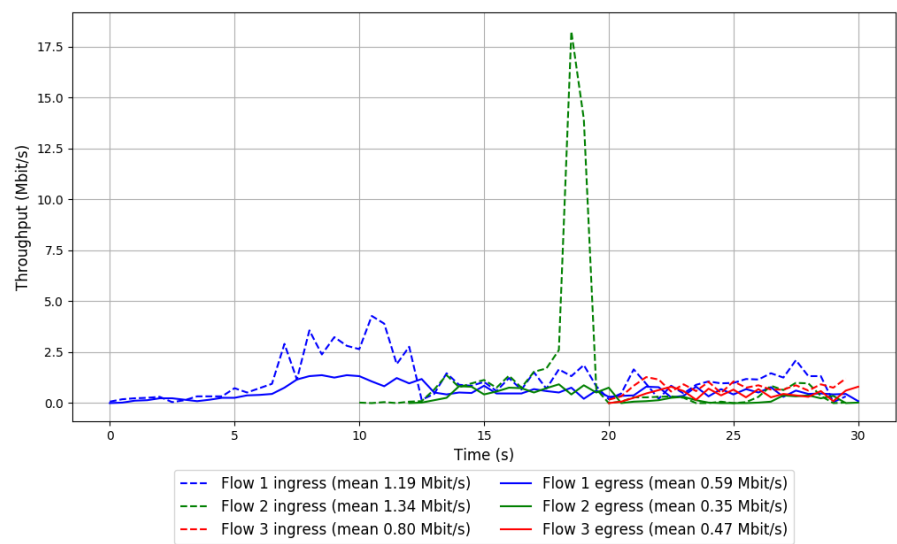


Run 1: Statistics of Verus

Start at: 2018-06-19 07:46:30
End at: 2018-06-19 07:47:00
Local clock offset: 7.745 ms
Remote clock offset: -2.573 ms

Below is generated by plot.py at 2018-06-19 08:46:48
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 393.171 ms
Loss rate: 59.75%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 390.494 ms
Loss rate: 51.10%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 443.331 ms
Loss rate: 76.91%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 388.205 ms
Loss rate: 41.47%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-06-19 08:09:20

End at: 2018-06-19 08:09:50

Local clock offset: 6.971 ms

Remote clock offset: 0.038 ms

Below is generated by plot.py at 2018-06-19 08:46:49

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.27 Mbit/s

95th percentile per-packet one-way delay: 384.546 ms

Loss rate: 25.49%

-- Flow 1:

Average throughput: 1.22 Mbit/s

95th percentile per-packet one-way delay: 383.954 ms

Loss rate: 24.07%

-- Flow 2:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 388.665 ms

Loss rate: 43.97%

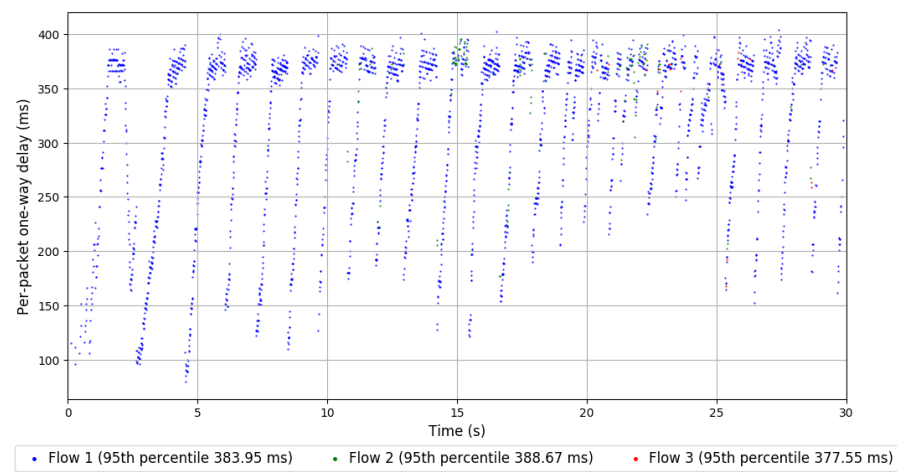
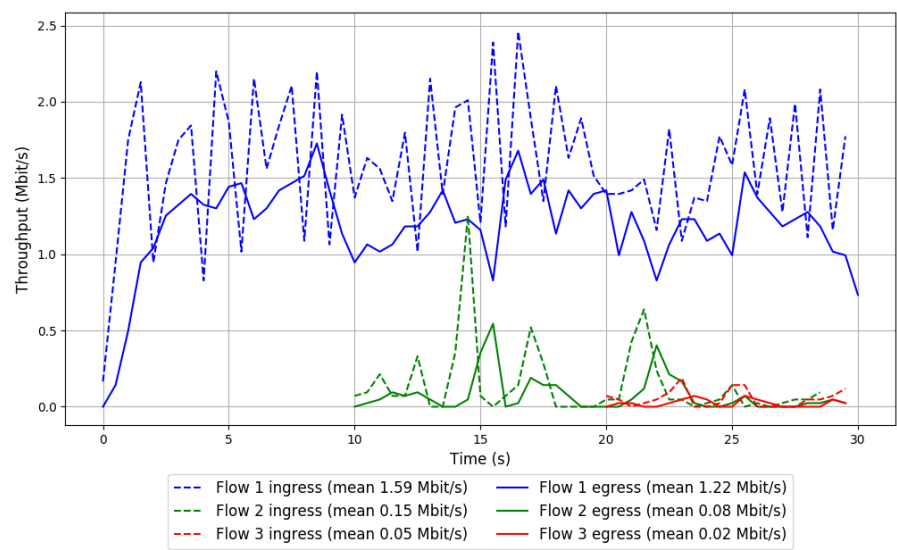
-- Flow 3:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 377.548 ms

Loss rate: 57.78%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-06-19 08:31:38

End at: 2018-06-19 08:32:08

Local clock offset: 5.576 ms

Remote clock offset: 1.665 ms

Below is generated by plot.py at 2018-06-19 08:46:50

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.01 Mbit/s

95th percentile per-packet one-way delay: 400.481 ms

Loss rate: 70.12%

-- Flow 1:

Average throughput: 0.80 Mbit/s

95th percentile per-packet one-way delay: 501.249 ms

Loss rate: 73.21%

-- Flow 2:

Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 387.314 ms

Loss rate: 47.18%

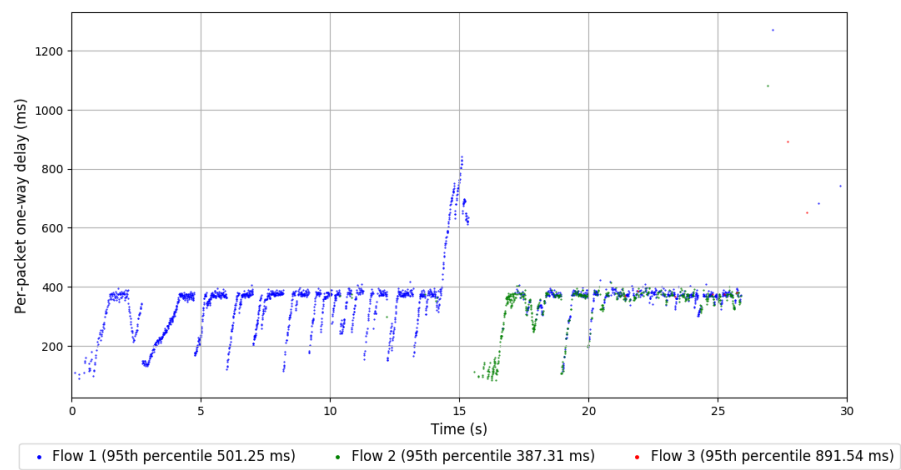
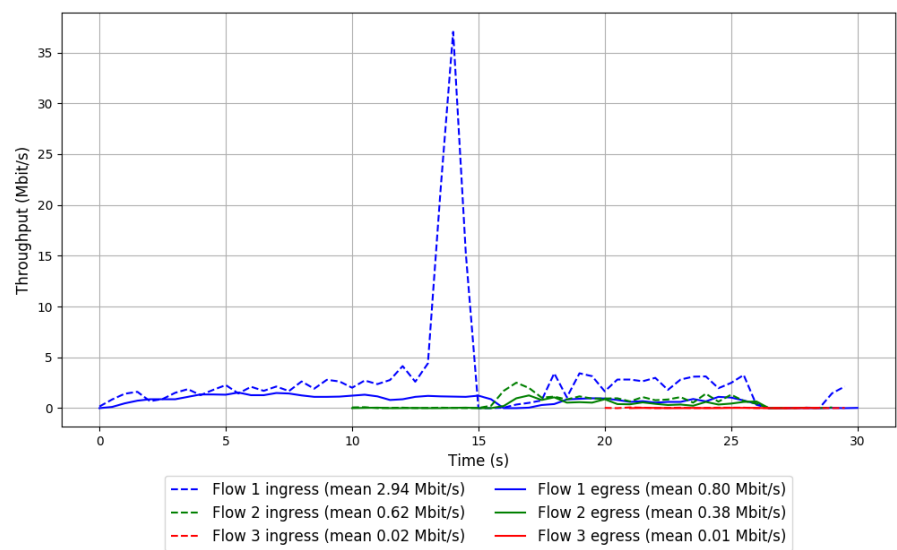
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 891.540 ms

Loss rate: 60.00%

Run 3: Report of Verus — Data Link

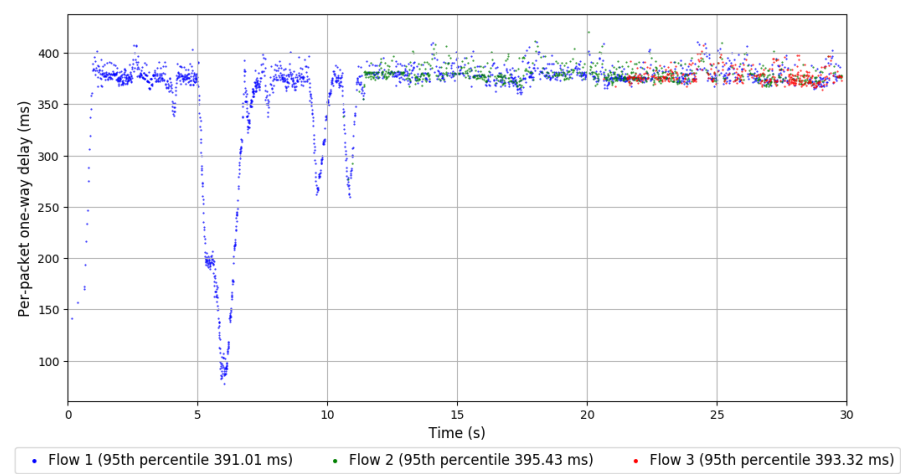
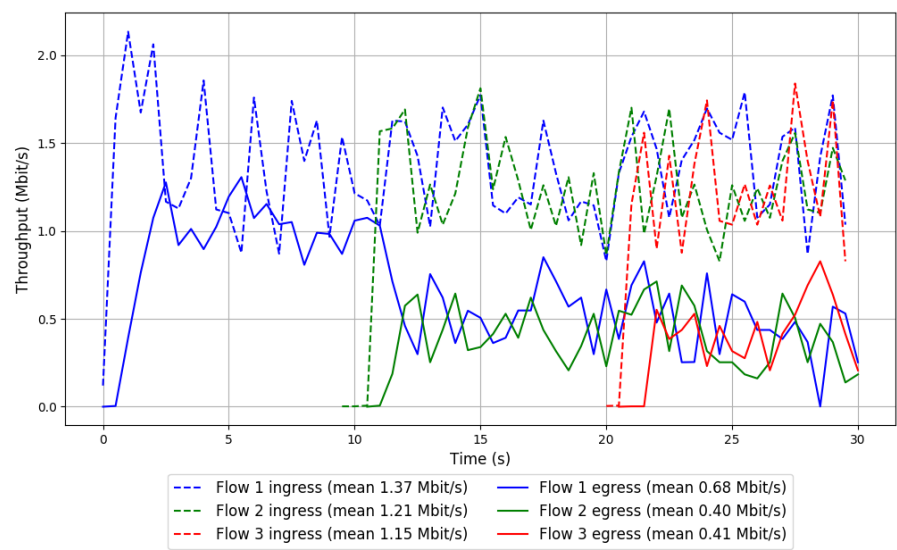


Run 1: Statistics of PCC-Vivace

Start at: 2018-06-19 07:51:10
End at: 2018-06-19 07:51:40
Local clock offset: 7.761 ms
Remote clock offset: -2.568 ms

Below is generated by plot.py at 2018-06-19 08:46:52
Datalink statistics
-- Total of 3 flows:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 392.893 ms
Loss rate: 58.66%
-- Flow 1:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 391.011 ms
Loss rate: 50.95%
-- Flow 2:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 395.432 ms
Loss rate: 68.05%
-- Flow 3:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 393.321 ms
Loss rate: 66.47%

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-06-19 08:13:22

End at: 2018-06-19 08:13:52

Local clock offset: 6.539 ms

Remote clock offset: 0.413 ms

Below is generated by plot.py at 2018-06-19 08:46:52

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.50 Mbit/s

95th percentile per-packet one-way delay: 387.819 ms

Loss rate: 45.85%

-- Flow 1:

Average throughput: 0.90 Mbit/s

95th percentile per-packet one-way delay: 385.022 ms

Loss rate: 37.29%

-- Flow 2:

Average throughput: 0.65 Mbit/s

95th percentile per-packet one-way delay: 389.710 ms

Loss rate: 53.64%

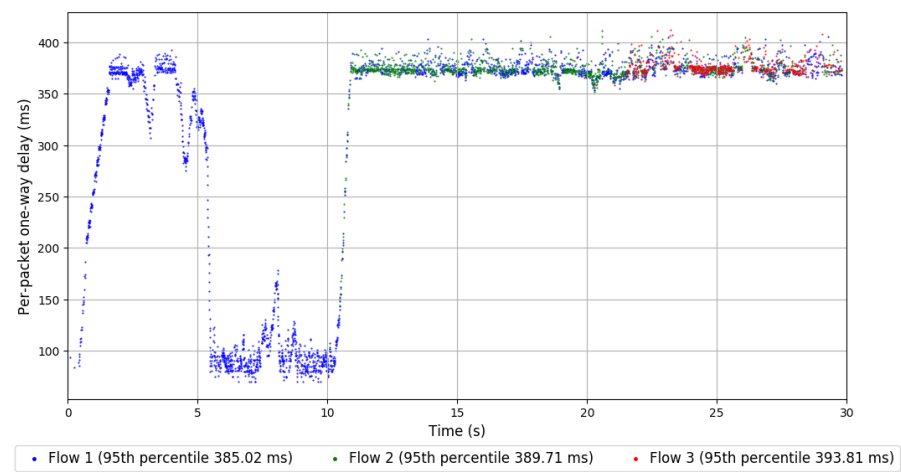
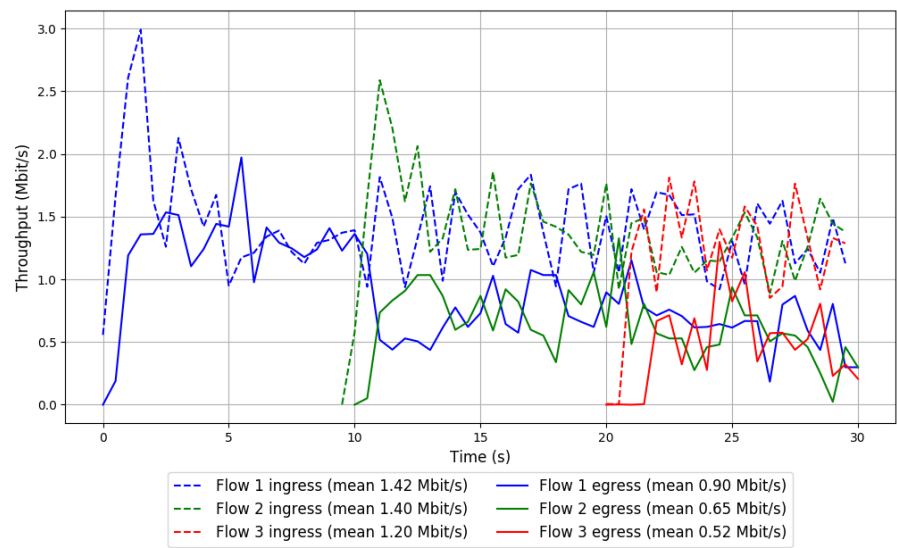
-- Flow 3:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 393.811 ms

Loss rate: 58.33%

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

Start at: 2018-06-19 08:35:44

End at: 2018-06-19 08:36:14

Local clock offset: 6.307 ms

Remote clock offset: 1.892 ms

Below is generated by plot.py at 2018-06-19 08:46:52

Datalink statistics

-- Total of 3 flows:

Average throughput: 1.21 Mbit/s

95th percentile per-packet one-way delay: 390.502 ms

Loss rate: 53.96%

-- Flow 1:

Average throughput: 0.70 Mbit/s

95th percentile per-packet one-way delay: 388.938 ms

Loss rate: 45.65%

-- Flow 2:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 391.666 ms

Loss rate: 58.04%

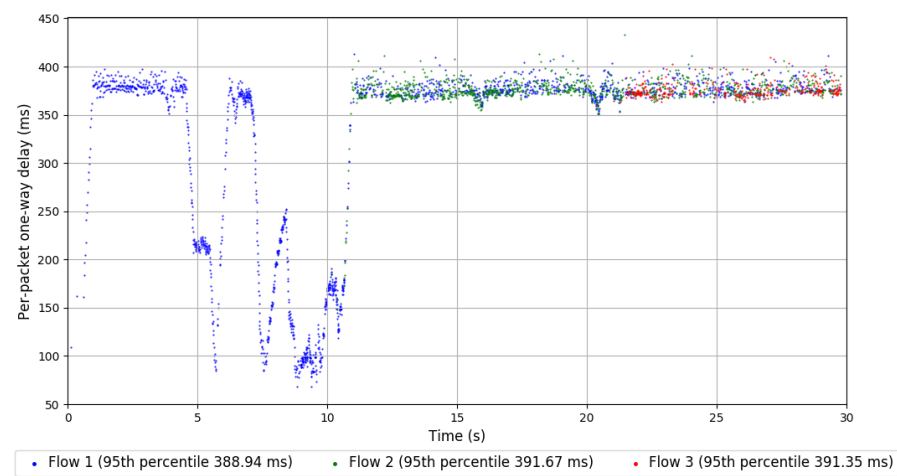
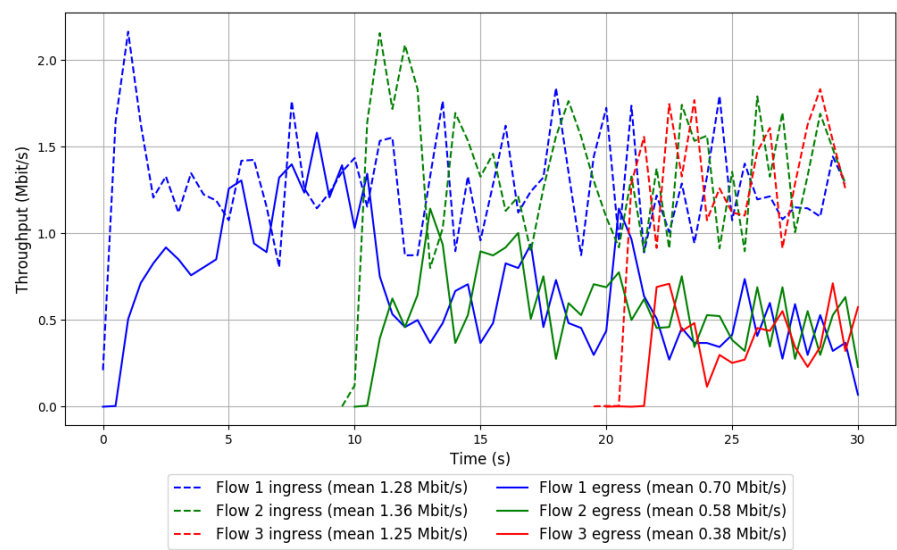
-- Flow 3:

Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 391.354 ms

Loss rate: 70.72%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-06-19 07:39:44

End at: 2018-06-19 07:40:14

Local clock offset: 6.972 ms

Remote clock offset: -2.51 ms

Below is generated by plot.py at 2018-06-19 08:46:52

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 455.649 ms

Loss rate: 47.58%

-- Flow 1:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 459.944 ms

Loss rate: 50.92%

-- Flow 2:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 444.631 ms

Loss rate: 42.01%

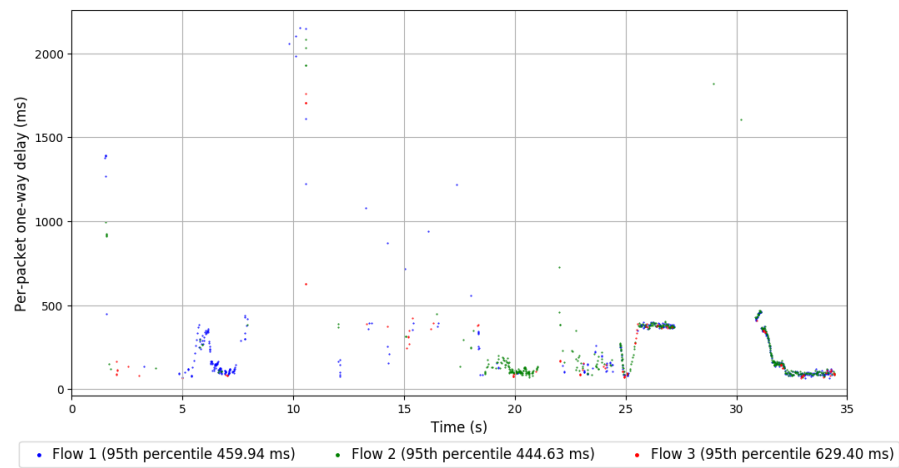
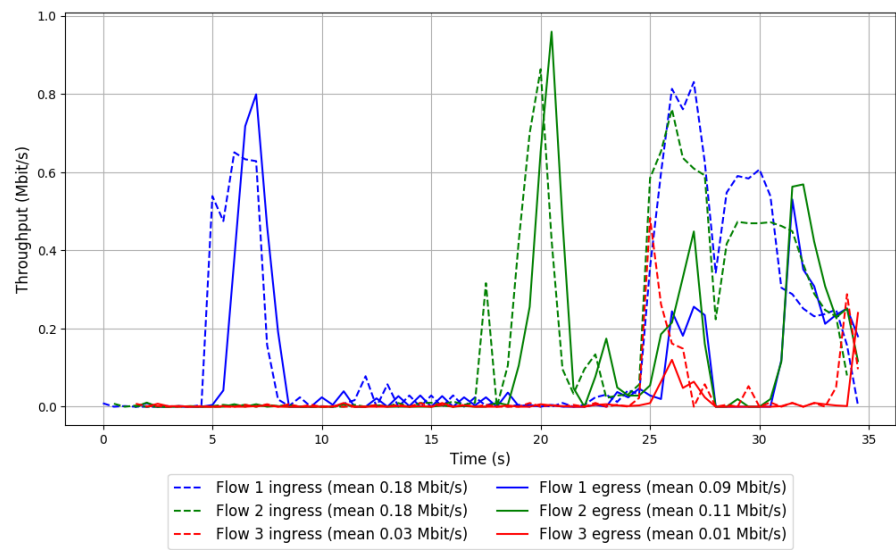
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 629.398 ms

Loss rate: 61.54%

Run 1: Report of WebRTC media — Data Link

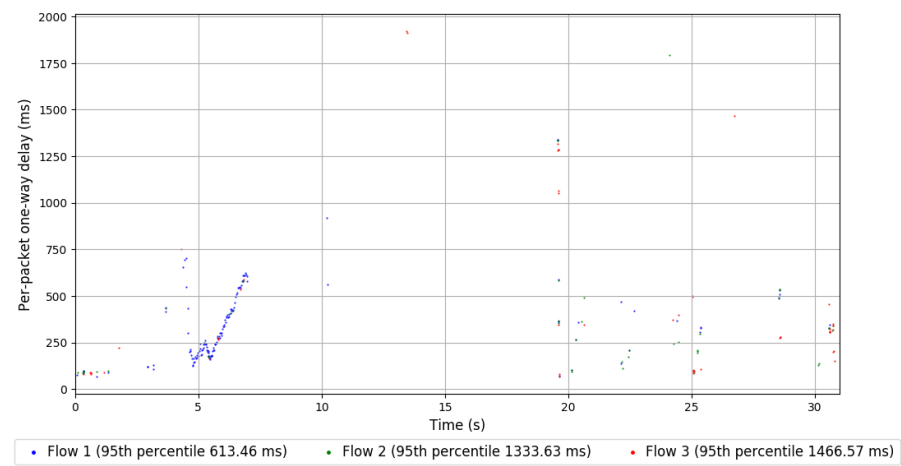
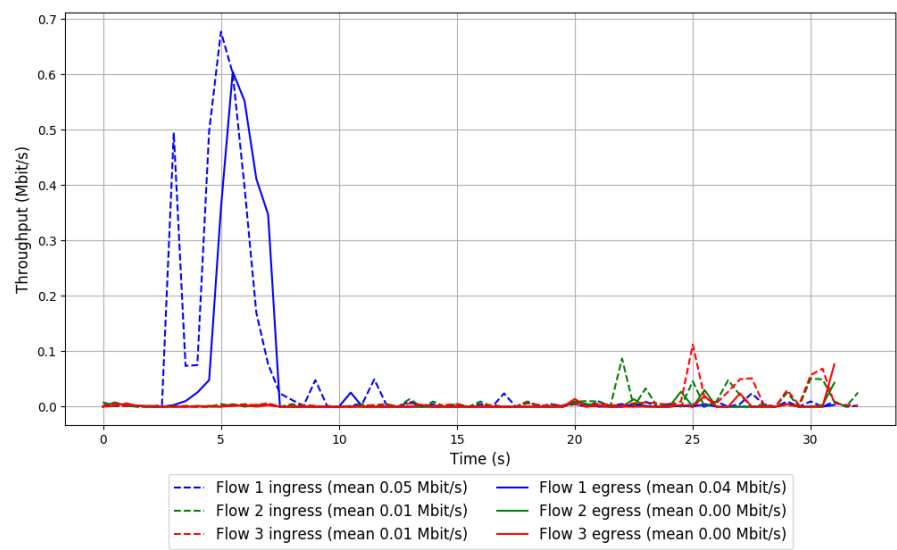


Run 2: Statistics of WebRTC media

Start at: 2018-06-19 08:02:21
End at: 2018-06-19 08:02:51
Local clock offset: 8.165 ms
Remote clock offset: -0.887 ms

Below is generated by plot.py at 2018-06-19 08:46:52
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 1063.350 ms
Loss rate: 38.85%
-- Flow 1:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 613.462 ms
Loss rate: 28.51%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1333.626 ms
Loss rate: 70.36%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1466.568 ms
Loss rate: 70.75%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-06-19 08:24:50

End at: 2018-06-19 08:25:20

Local clock offset: 5.838 ms

Remote clock offset: 1.177 ms

Below is generated by plot.py at 2018-06-19 08:46:53

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 285.593 ms

Loss rate: 3.16%

-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 275.928 ms

Loss rate: 3.31%

-- Flow 2:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 280.702 ms

Loss rate: 0.44%

-- Flow 3:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 333.107 ms

Loss rate: 7.91%

Run 3: Report of WebRTC media — Data Link

