

Pantheon Report

Generated at 2018-07-04 10:23:15 (UTC).

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

Repeated the test of 17 congestion control schemes 3 times.

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

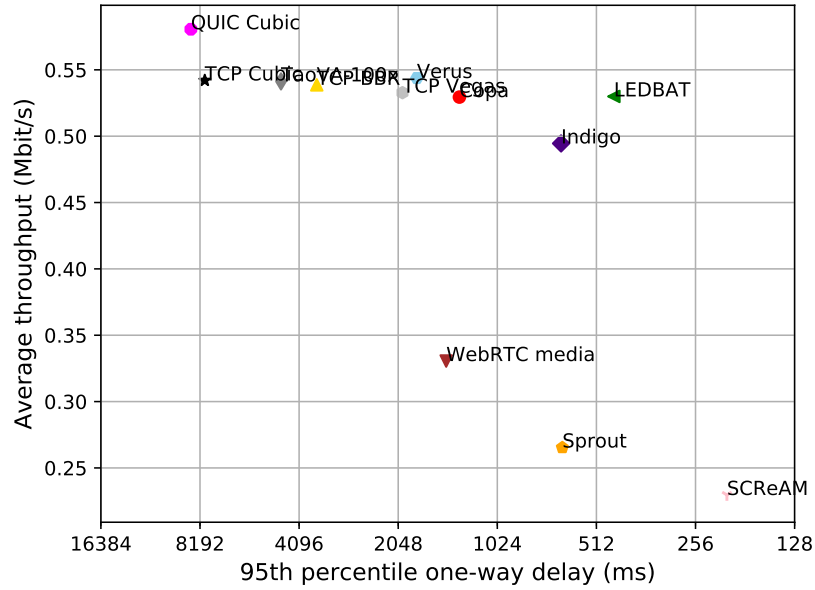
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

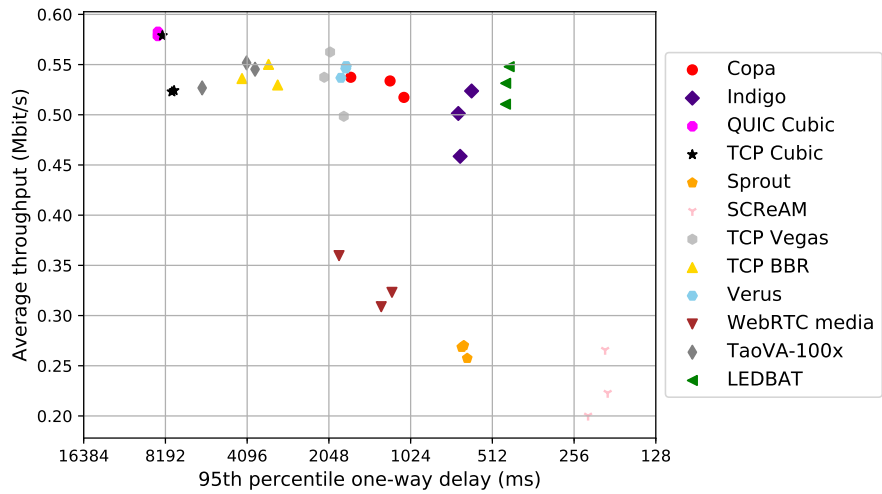
Git summary:

```
branch: master @ 9250dbeec7fb57193cdff1ba8c440b4e16ab30f0
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ 37162fe9af85249aeccac061c93e75640ef710b5
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfc58e562f4
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 Colombia ppp0 to AWS Brazil 2, 3 runs of 30s each per scheme
 3 flows with 10s interval between flows (mean of all runs by scheme)



test from Colombia ppp0 to AWS Brazil 2, 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	0.35	0.29	0.01	3601.35	3650.50	3661.84	4.82	13.45	55.53
Copa	3	0.33	0.26	0.11	1247.69	1339.39	1444.29	3.82	6.89	12.59
TCP Cubic	3	0.53	0.03	0.00	7819.04	7557.93	7966.72	31.08	47.27	92.35
FillP	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FillP-Sheep	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indigo	3	0.27	0.25	0.19	492.01	657.92	858.49	0.81	1.10	2.32
LEDBAT	3	0.23	0.35	0.25	359.77	462.32	483.59	0.06	0.64	7.95
PCC-Allegro	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCC-Expr	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
QUIC Cubic	2	0.58	0.00	0.00	8723.57	6005.10	9111.12	31.73	0.00	50.00
SCReAM	3	0.08	0.15	0.14	187.15	205.39	247.94	0.78	0.85	1.87
Sprout	3	0.13	0.13	0.15	590.89	638.63	753.22	0.85	0.64	2.42
TaoVA-100x	3	0.34	0.26	0.16	3764.21	4254.66	4765.93	6.07	8.76	44.72
TCP Vegas	3	0.35	0.21	0.17	1901.29	2044.08	2000.86	3.08	6.91	22.90
Verus	3	0.53	0.01	0.01	1799.06	1758.17	1807.16	4.33	7.93	18.18
PCC-Vivace	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WebRTC media	3	0.14	0.12	0.08	1389.54	1472.64	1293.50	0.35	0.33	2.82

Run 1: Statistics of TCP BBR

Start at: 2018-07-04 09:38:48

End at: 2018-07-04 09:39:18

Local clock offset: -2.174 ms

Remote clock offset: 6.603 ms

Below is generated by plot.py at 2018-07-04 10:22:42

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.55 Mbit/s

95th percentile per-packet one-way delay: 3417.018 ms

Loss rate: 4.04%

-- Flow 1:

Average throughput: 0.35 Mbit/s

95th percentile per-packet one-way delay: 3377.508 ms

Loss rate: 1.91%

-- Flow 2:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 3456.520 ms

Loss rate: 5.96%

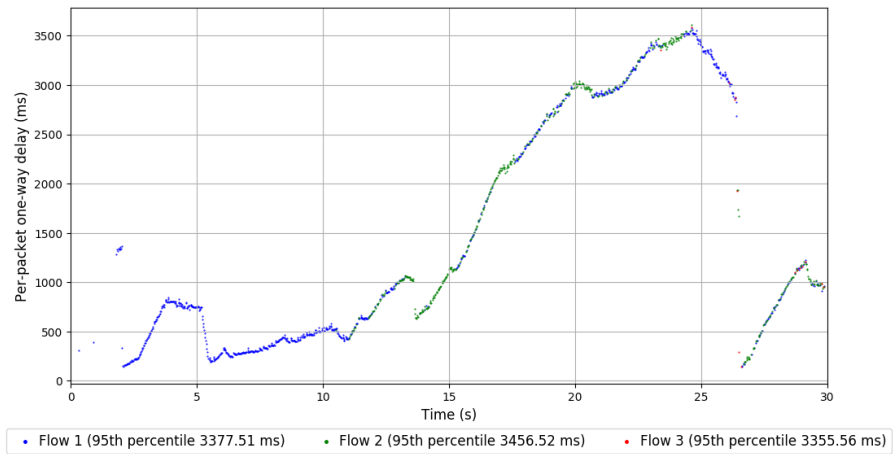
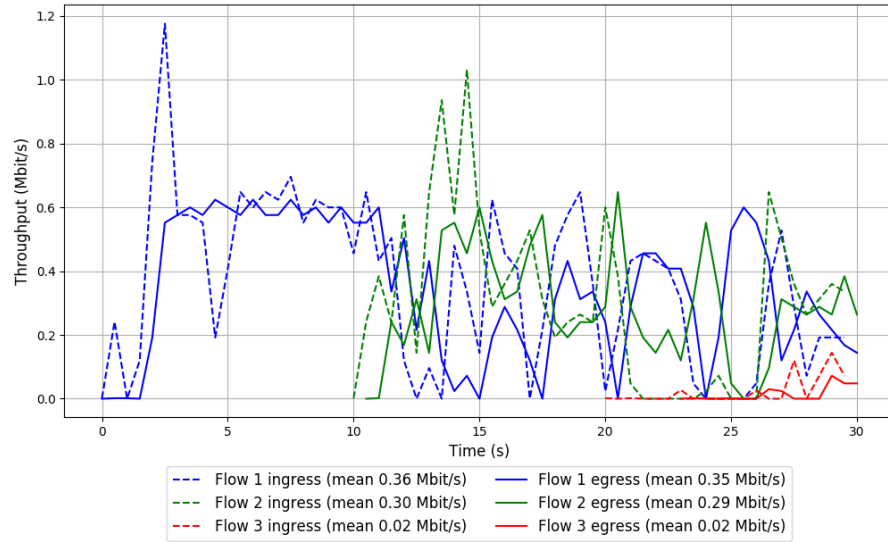
-- Flow 3:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 3355.562 ms

Loss rate: 51.63%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-07-04 09:59:11

End at: 2018-07-04 09:59:41

Local clock offset: -2.578 ms

Remote clock offset: 2.521 ms

Below is generated by plot.py at 2018-07-04 10:22:42

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 4278.980 ms

Loss rate: 8.84%

-- Flow 1:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 4275.321 ms

Loss rate: 2.64%

-- Flow 2:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 4282.539 ms

Loss rate: 16.41%

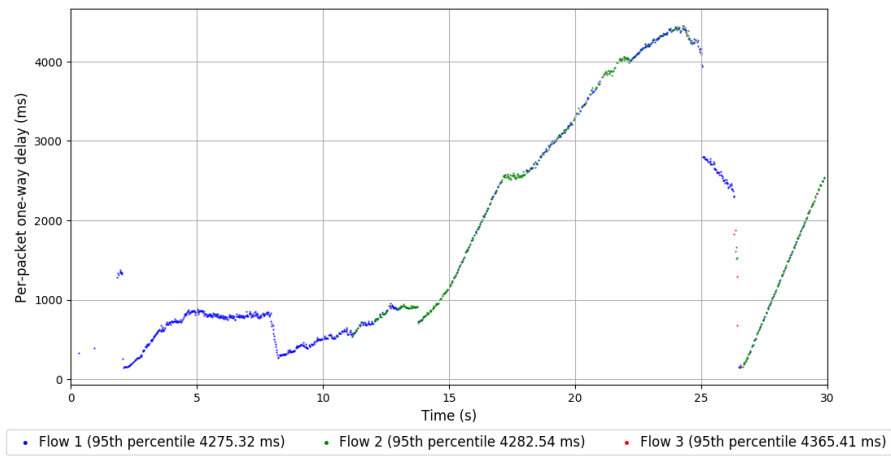
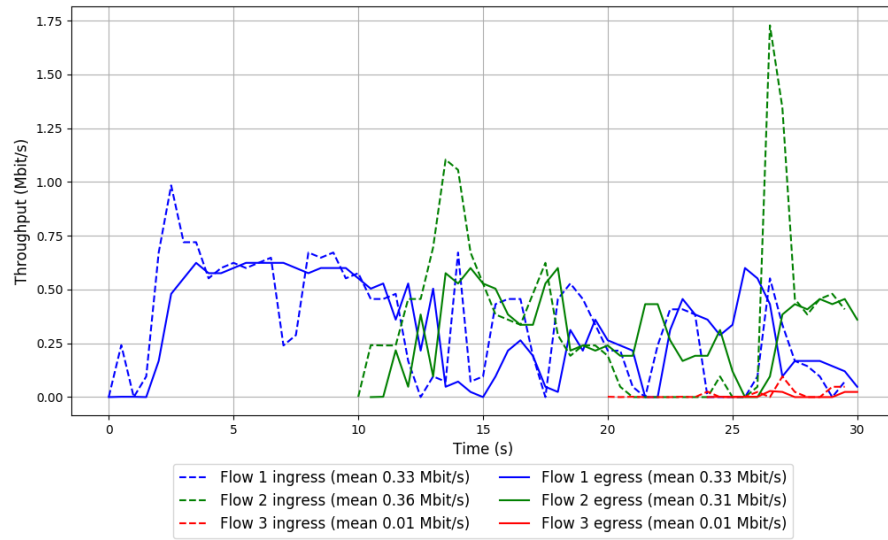
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 4365.409 ms

Loss rate: 61.58%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-07-04 10:19:36

End at: 2018-07-04 10:20:06

Local clock offset: -2.17 ms

Remote clock offset: 6.343 ms

Below is generated by plot.py at 2018-07-04 10:22:43

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 3162.586 ms

Loss rate: 13.18%

-- Flow 1:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 3151.223 ms

Loss rate: 9.92%

-- Flow 2:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 3212.432 ms

Loss rate: 17.98%

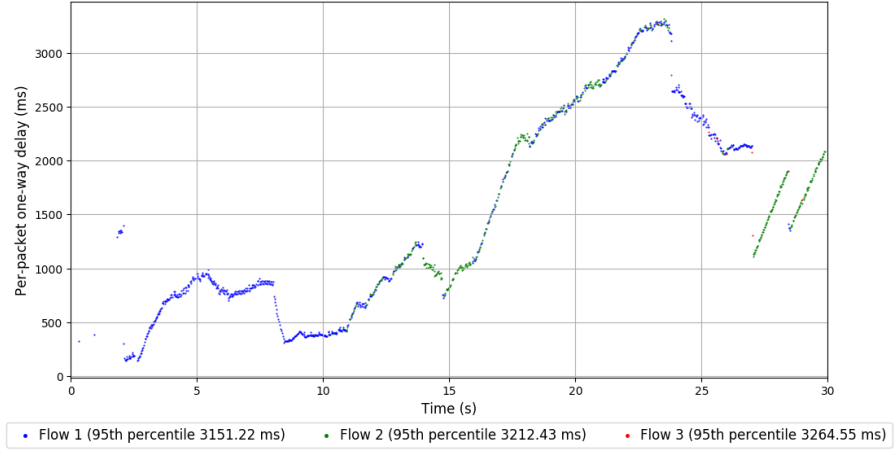
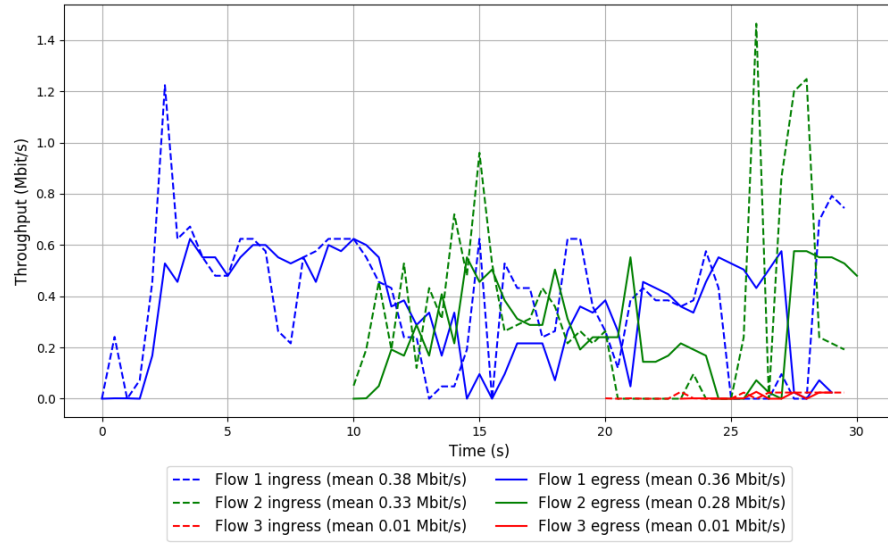
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 3264.548 ms

Loss rate: 53.37%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of Copa

Start at: 2018-07-04 09:30:25

End at: 2018-07-04 09:30:55

Local clock offset: -2.213 ms

Remote clock offset: 7.345 ms

Below is generated by plot.py at 2018-07-04 10:22:44

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 1219.087 ms

Loss rate: 5.60%

-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 1187.188 ms

Loss rate: 4.00%

-- Flow 2:

Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 1217.988 ms

Loss rate: 6.86%

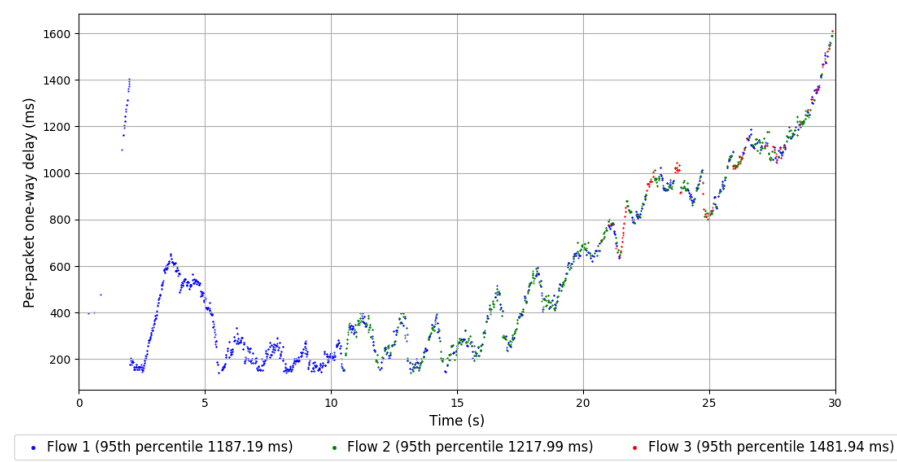
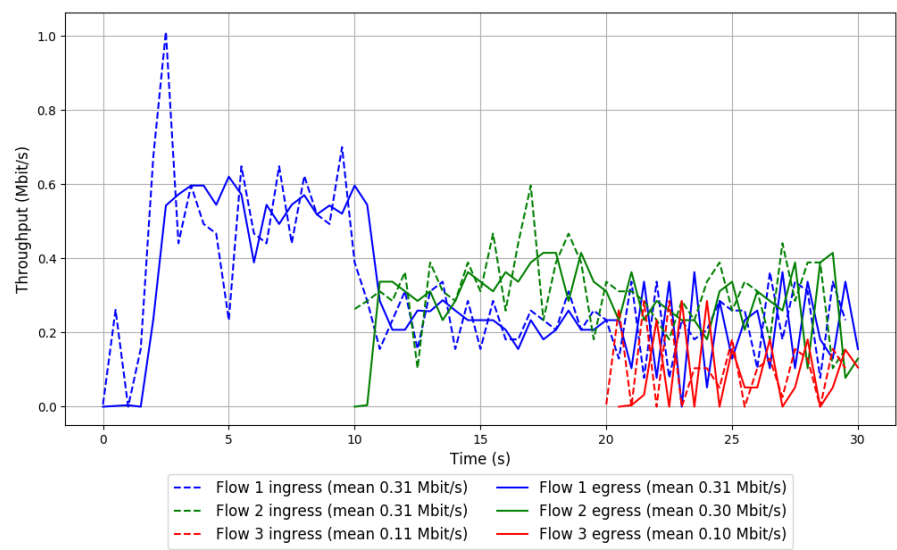
-- Flow 3:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 1481.941 ms

Loss rate: 12.44%

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-07-04 09:50:48

End at: 2018-07-04 09:51:18

Local clock offset: -2.517 ms

Remote clock offset: 6.682 ms

Below is generated by plot.py at 2018-07-04 10:22:44

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 1701.465 ms

Loss rate: 5.64%

-- Flow 1:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 1499.001 ms

Loss rate: 4.17%

-- Flow 2:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 1722.659 ms

Loss rate: 7.86%

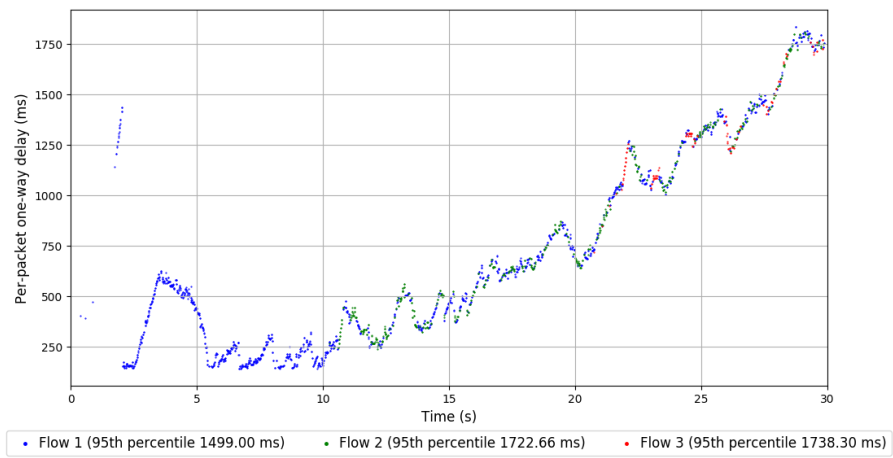
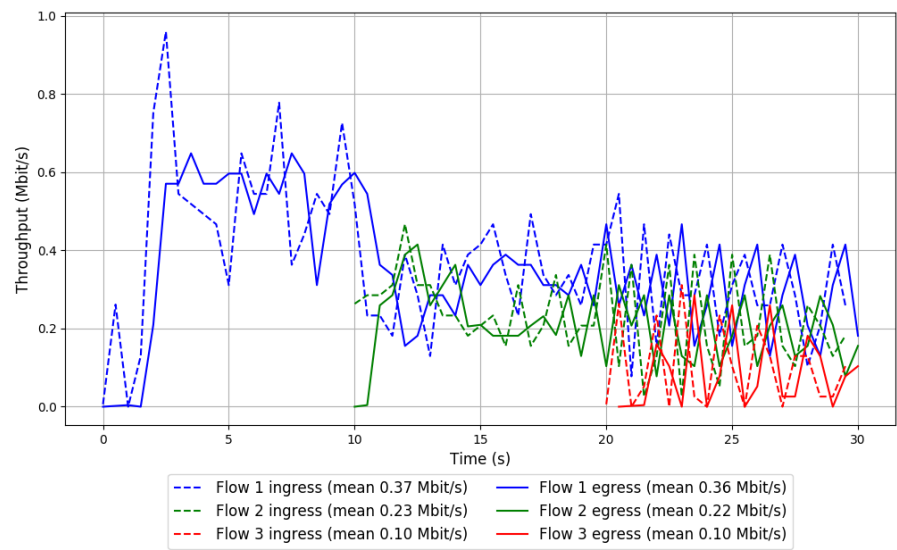
-- Flow 3:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 1738.299 ms

Loss rate: 11.78%

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-07-04 10:11:13

End at: 2018-07-04 10:11:43

Local clock offset: -2.502 ms

Remote clock offset: 6.846 ms

Below is generated by plot.py at 2018-07-04 10:22:44

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 1083.811 ms

Loss rate: 5.01%

-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 1056.866 ms

Loss rate: 3.28%

-- Flow 2:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 1077.534 ms

Loss rate: 5.95%

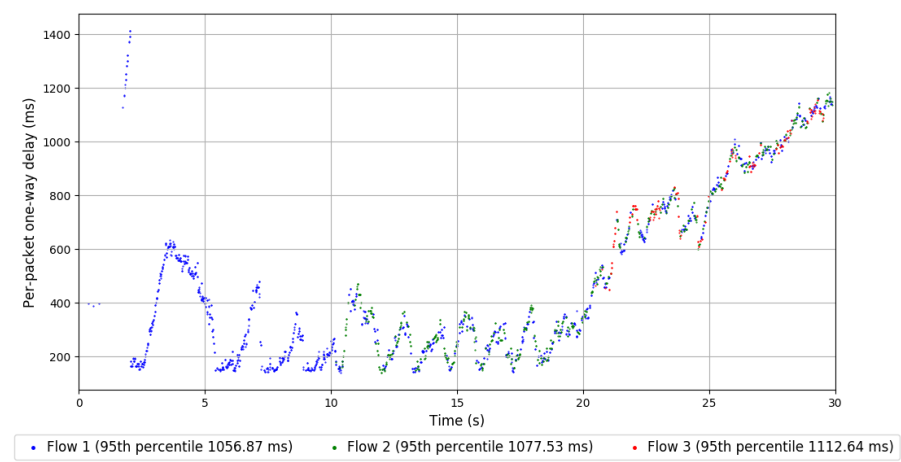
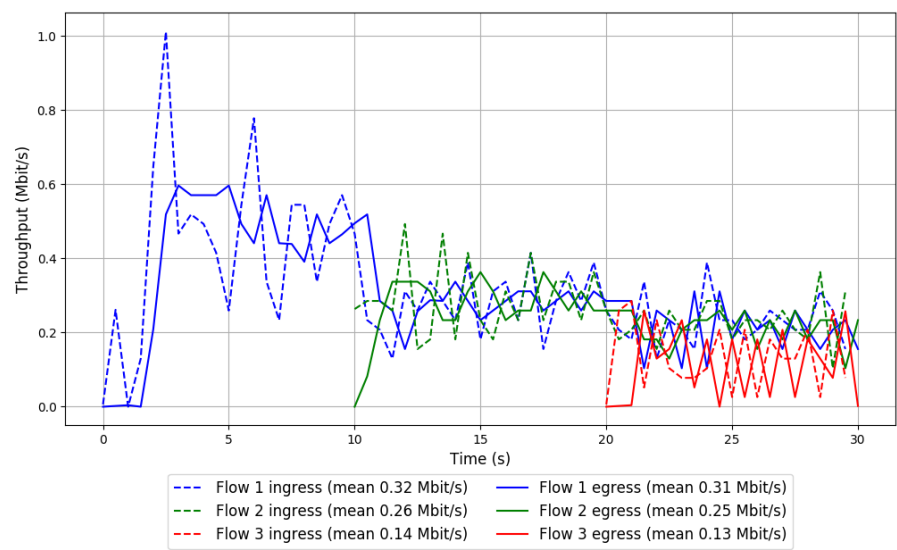
-- Flow 3:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 1112.641 ms

Loss rate: 13.56%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-07-04 09:41:12

End at: 2018-07-04 09:41:42

Local clock offset: -2.209 ms

Remote clock offset: 2.861 ms

Below is generated by plot.py at 2018-07-04 10:22:44

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 7754.326 ms

Loss rate: 31.64%

-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 7433.799 ms

Loss rate: 30.78%

-- Flow 2:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 7804.285 ms

Loss rate: 44.23%

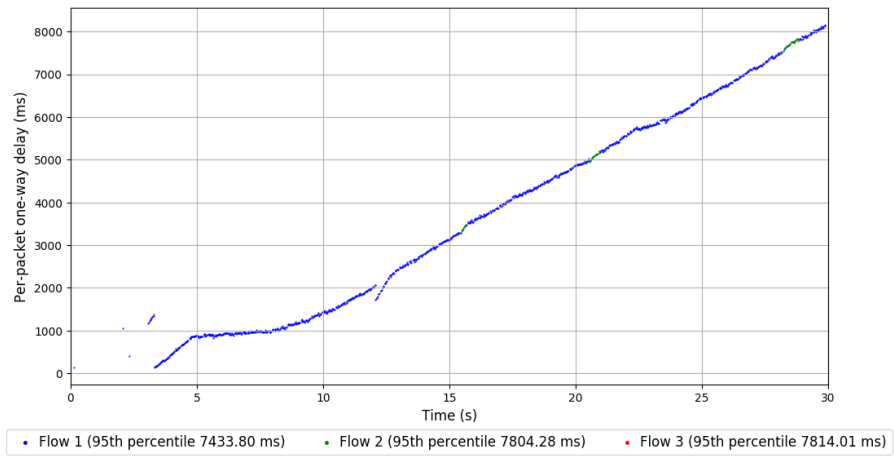
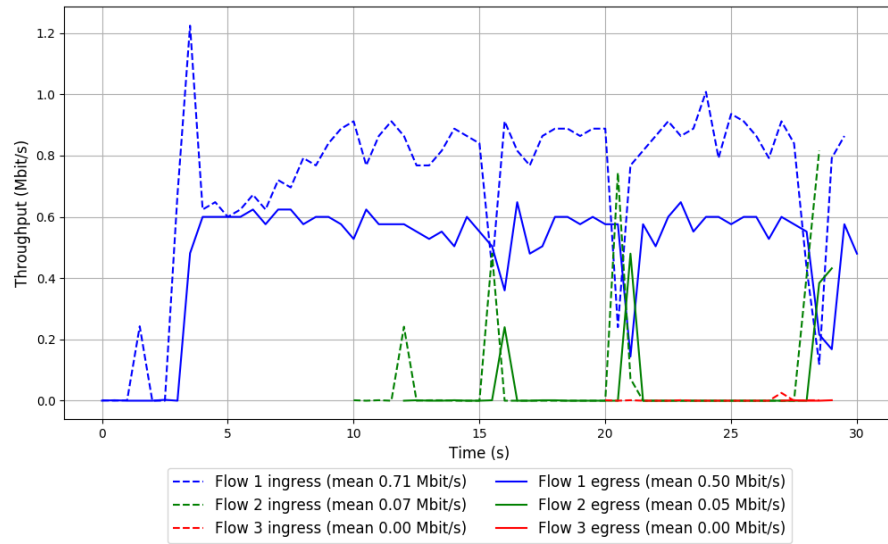
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 7814.005 ms

Loss rate: 90.64%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-07-04 10:01:36

End at: 2018-07-04 10:02:06

Local clock offset: -2.571 ms

Remote clock offset: 2.413 ms

Below is generated by plot.py at 2018-07-04 10:22:44

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8401.175 ms

Loss rate: 31.45%

-- Flow 1:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8401.175 ms

Loss rate: 31.33%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 7449.642 ms

Loss rate: 53.44%

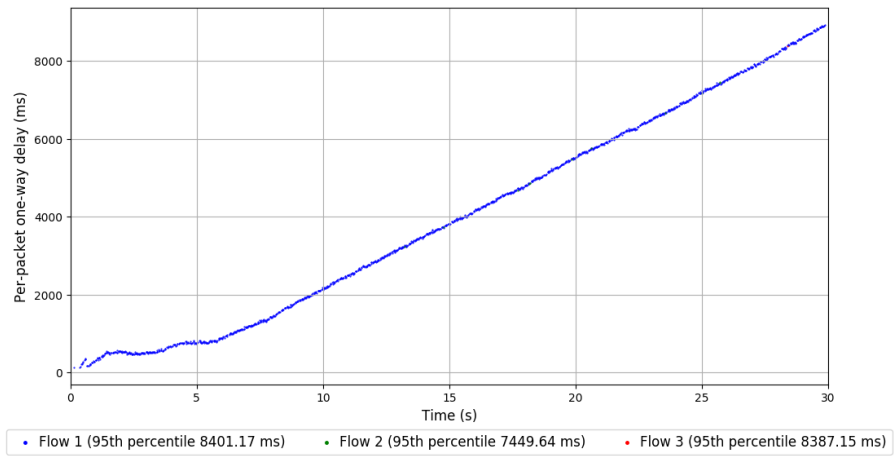
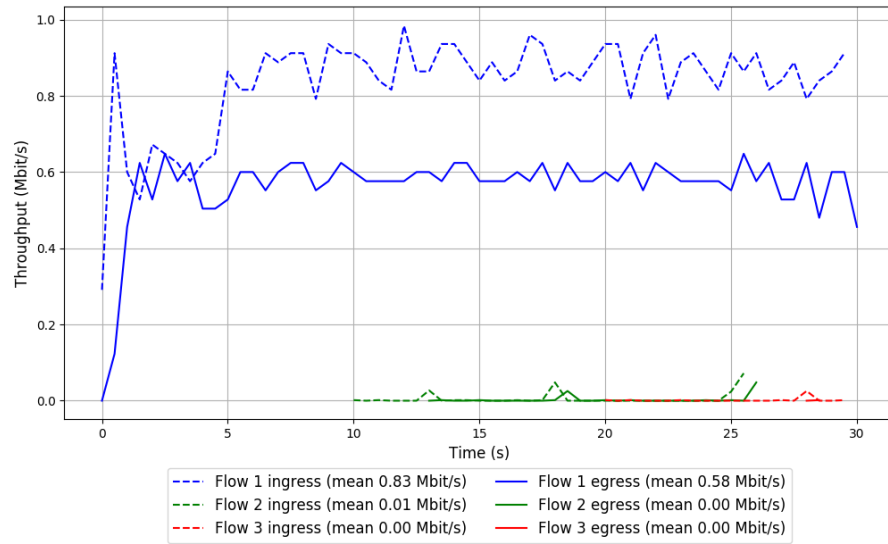
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8387.152 ms

Loss rate: 95.34%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-07-04 10:22:00

End at: 2018-07-04 10:22:30

Local clock offset: -2.115 ms

Remote clock offset: 2.582 ms

Below is generated by plot.py at 2018-07-04 10:22:46

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 7612.138 ms

Loss rate: 31.95%

-- Flow 1:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 7622.152 ms

Loss rate: 31.13%

-- Flow 2:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 7419.853 ms

Loss rate: 44.15%

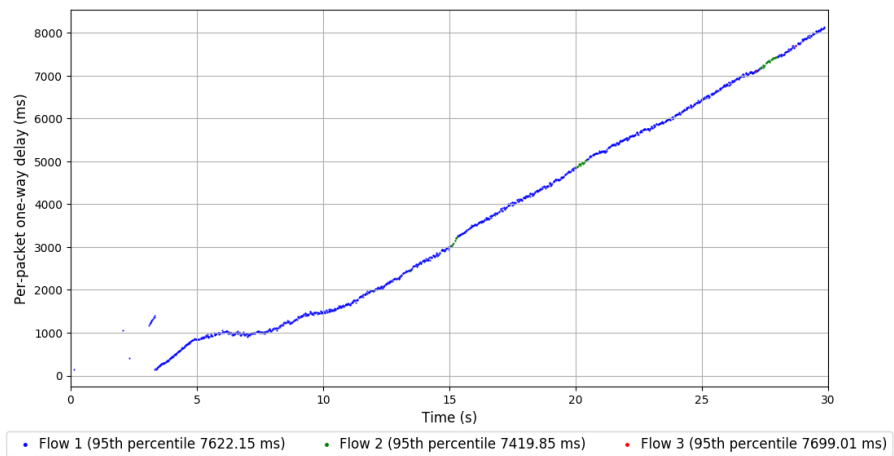
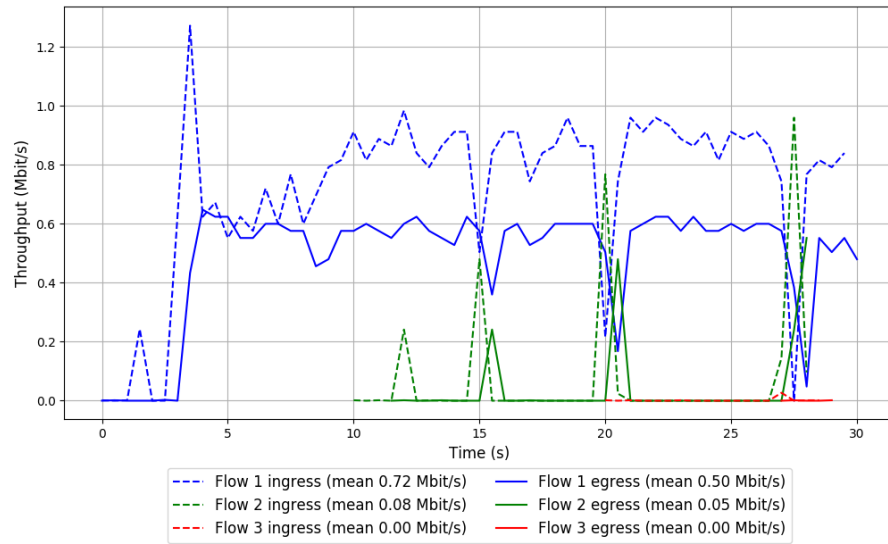
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 7699.009 ms

Loss rate: 91.06%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of FillP

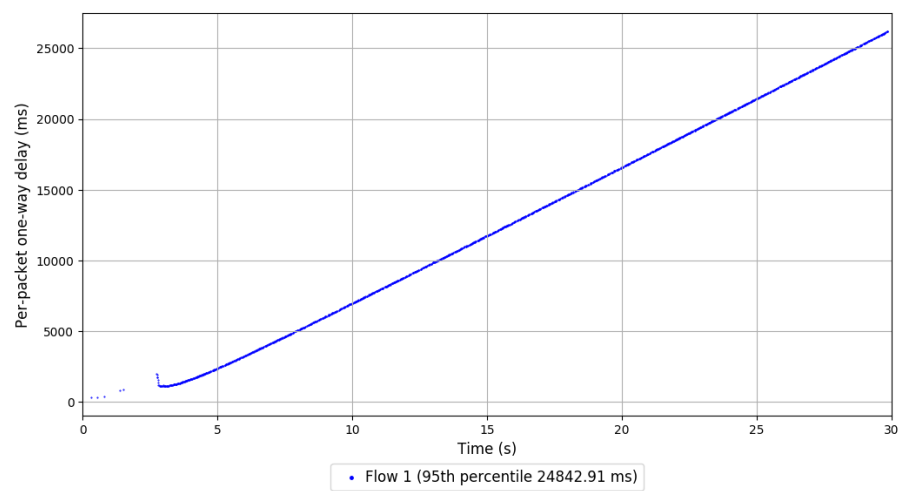
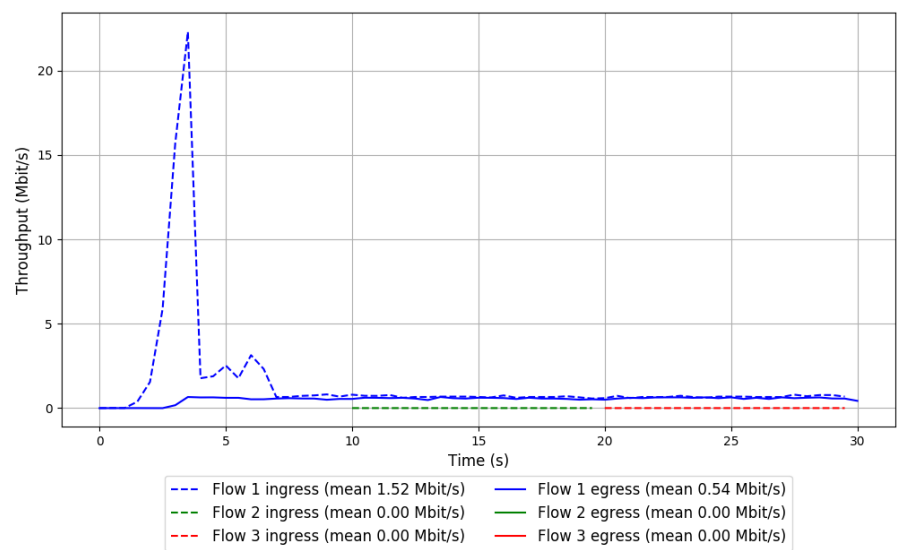
Start at: 2018-07-04 09:23:14

End at: 2018-07-04 09:23:44

Local clock offset: -2.263 ms

Remote clock offset: 8.402 ms

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

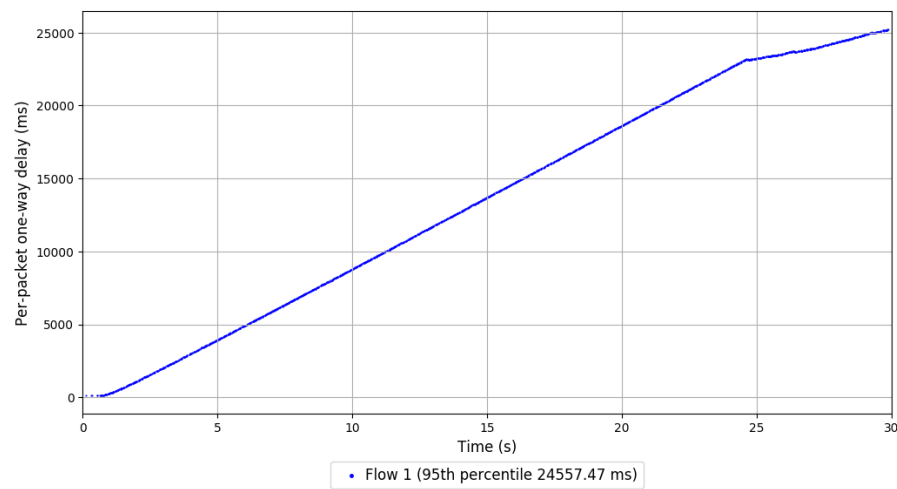
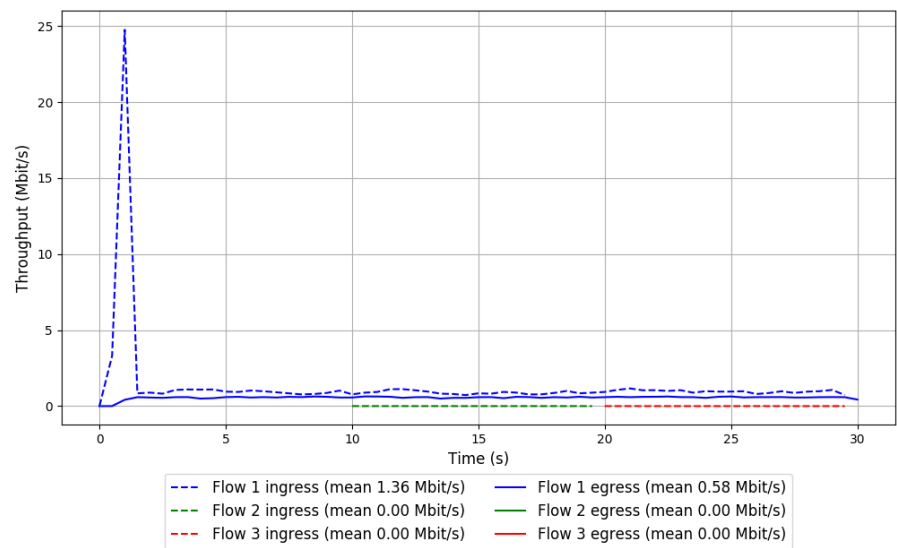
Start at: 2018-07-04 09:43:38

End at: 2018-07-04 09:44:08

Local clock offset: -2.359 ms

Remote clock offset: 7.898 ms

Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

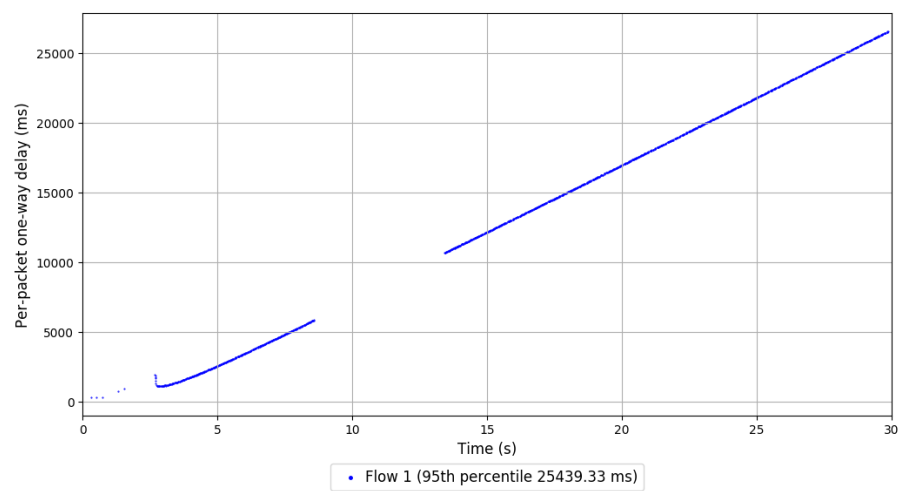
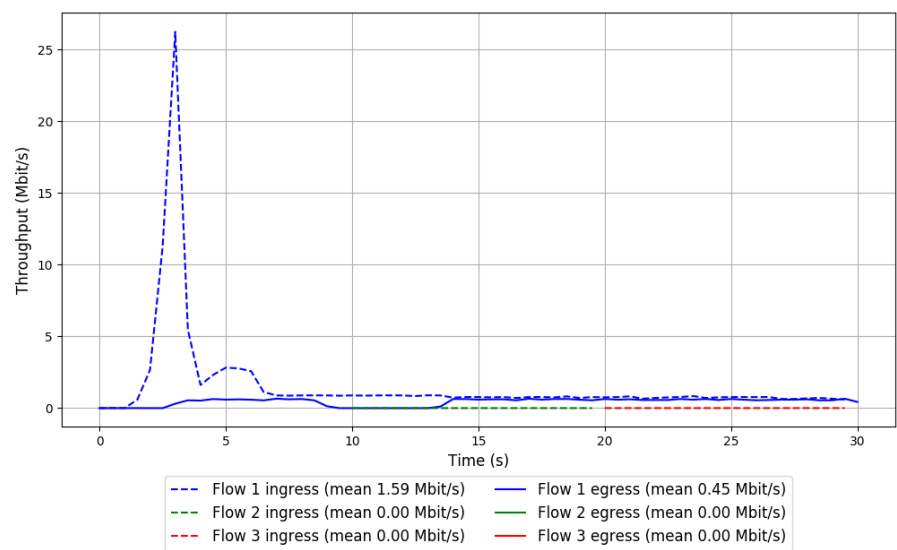
Start at: 2018-07-04 10:04:00

End at: 2018-07-04 10:04:30

Local clock offset: -2.567 ms

Remote clock offset: 1.214 ms

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

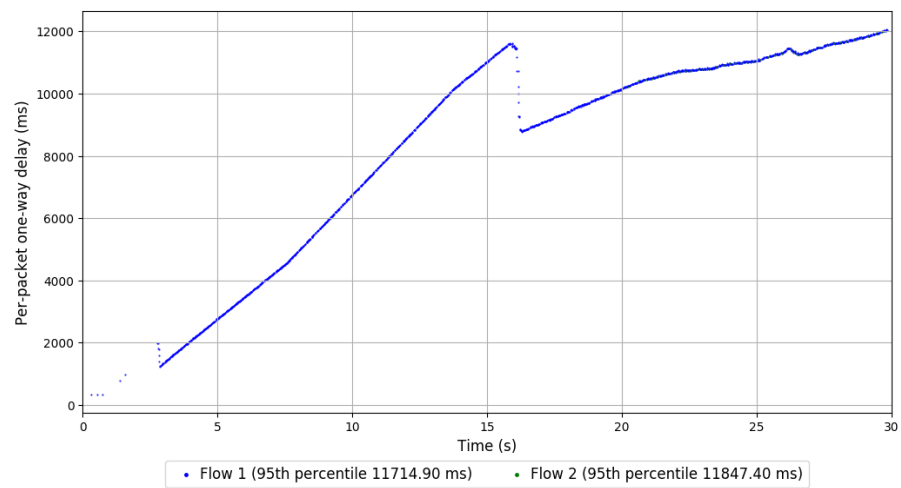
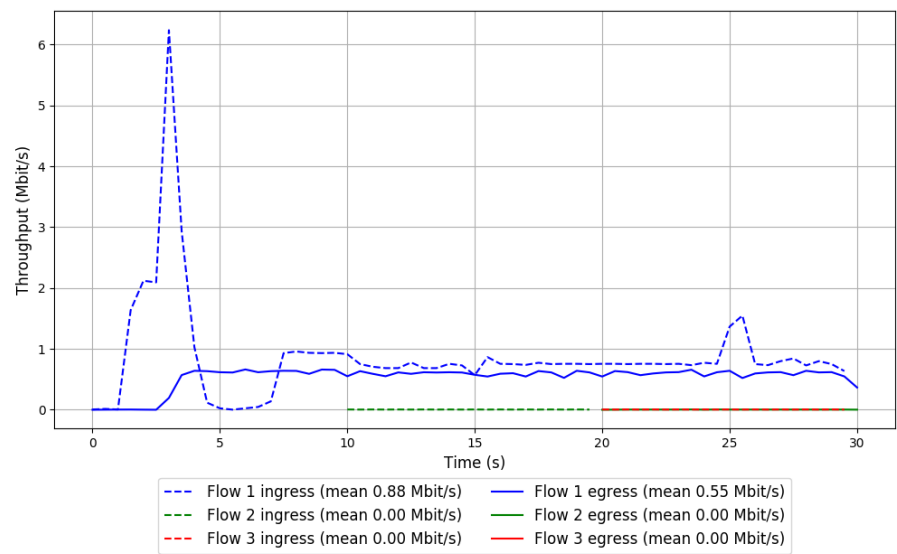
Start at: 2018-07-04 09:28:01

End at: 2018-07-04 09:28:31

Local clock offset: -2.247 ms

Remote clock offset: 7.619 ms

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

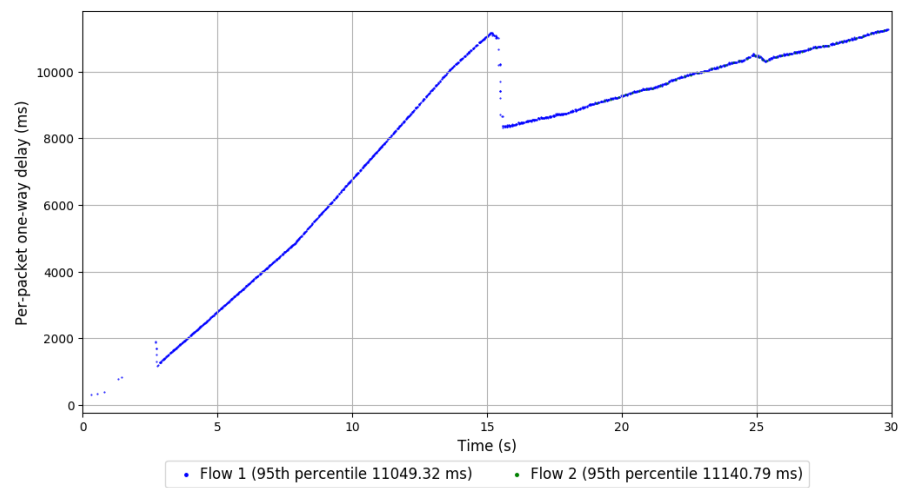
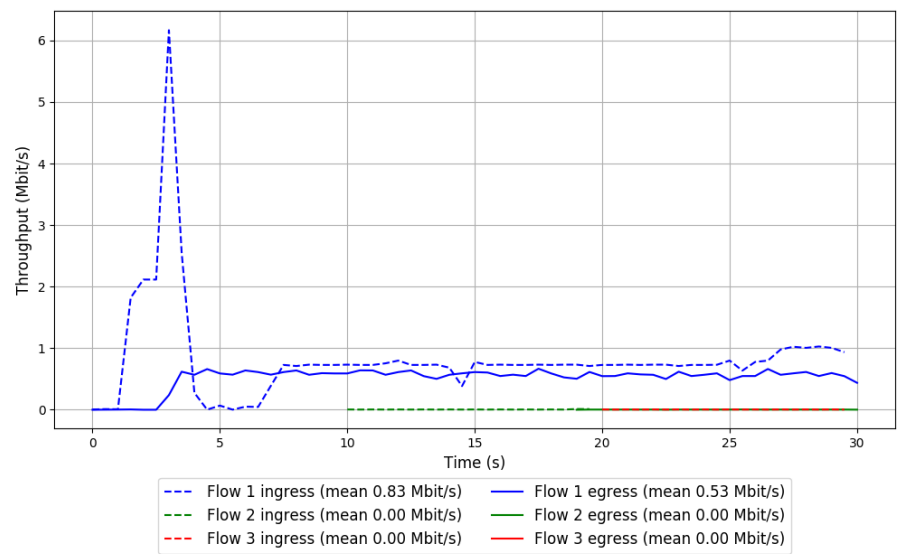
Start at: 2018-07-04 09:48:25

End at: 2018-07-04 09:48:55

Local clock offset: -2.461 ms

Remote clock offset: 6.854 ms

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

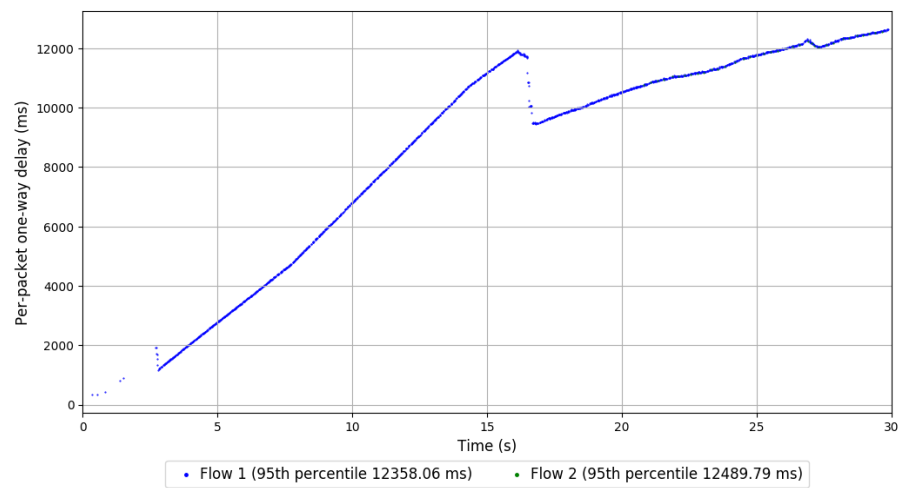
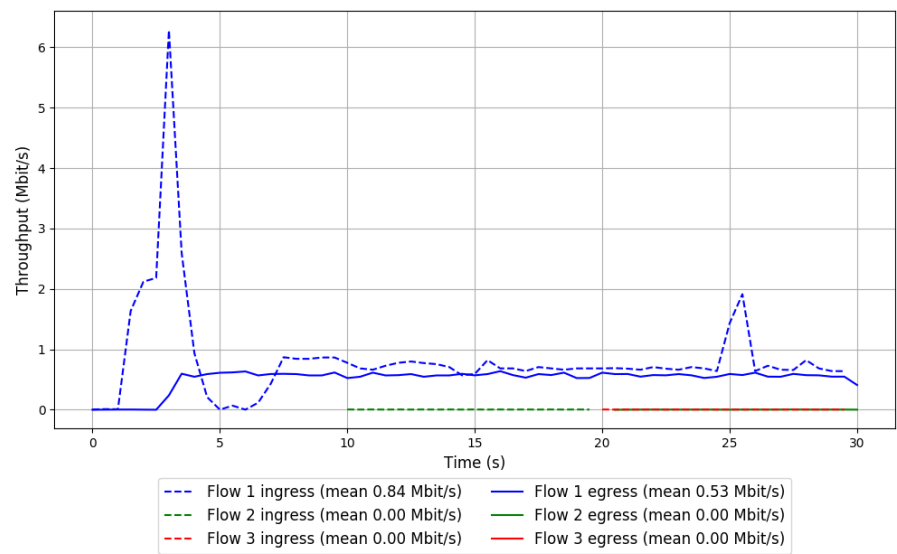
Start at: 2018-07-04 10:08:49

End at: 2018-07-04 10:09:19

Local clock offset: -2.62 ms

Remote clock offset: 0.959 ms

Run 3: Report of FillP-Sheep — Data Link

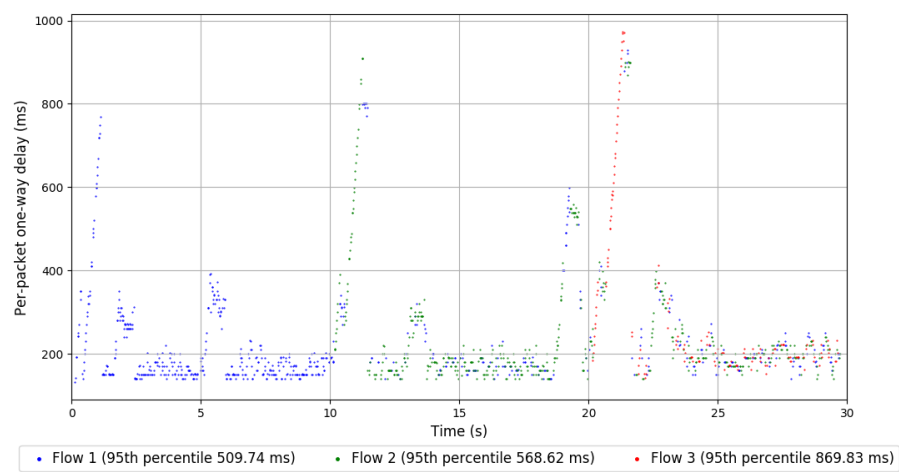
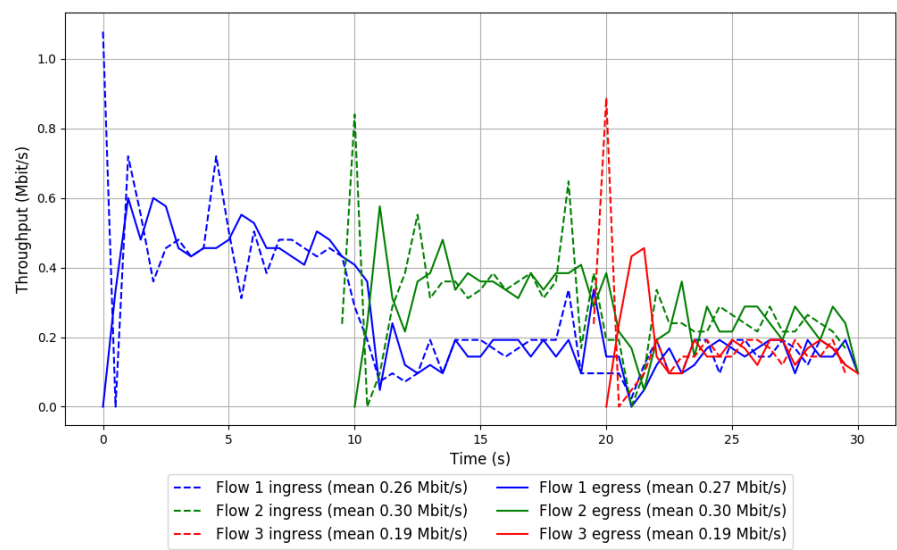


```
Run 1: Statistics of Indigo

Start at: 2018-07-04 09:36:24
End at: 2018-07-04 09:36:54
Local clock offset: -2.15 ms
Remote clock offset: 7.87 ms

# Below is generated by plot.py at 2018-07-04 10:22:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 610.628 ms
Loss rate: 1.00%
-- Flow 1:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 509.739 ms
Loss rate: 0.61%
-- Flow 2:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 568.619 ms
Loss rate: 1.02%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 869.831 ms
Loss rate: 2.55%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-07-04 09:56:48

End at: 2018-07-04 09:57:18

Local clock offset: -2.567 ms

Remote clock offset: 5.4 ms

Below is generated by plot.py at 2018-07-04 10:22:51

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.46 Mbit/s

95th percentile per-packet one-way delay: 672.697 ms

Loss rate: 1.22%

-- Flow 1:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 523.085 ms

Loss rate: 1.06%

-- Flow 2:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 623.000 ms

Loss rate: 0.99%

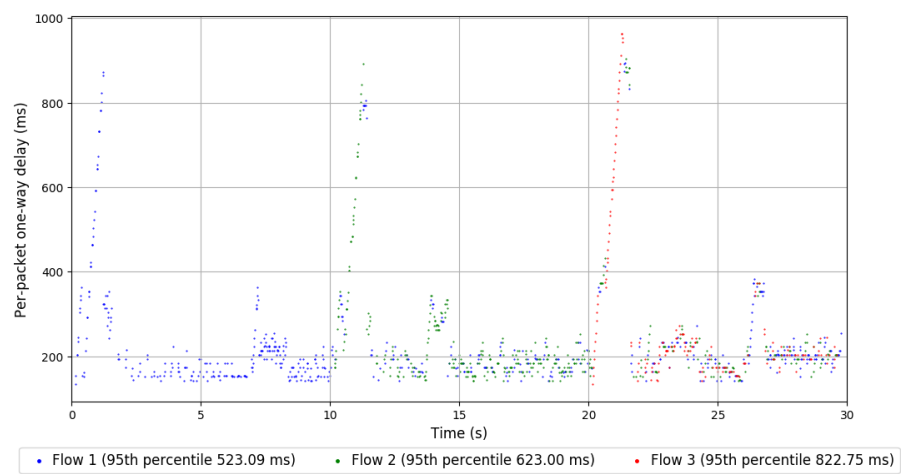
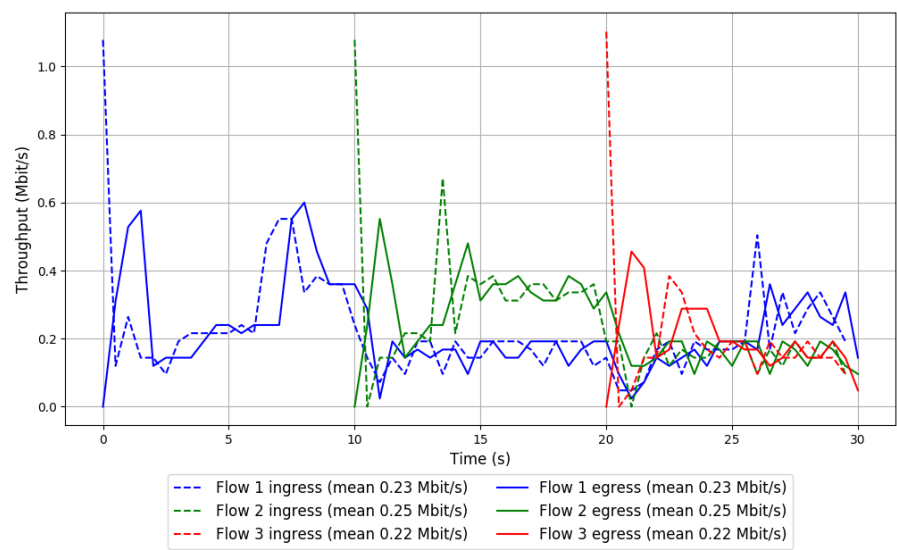
-- Flow 3:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 822.745 ms

Loss rate: 2.27%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-07-04 10:17:12

End at: 2018-07-04 10:17:42

Local clock offset: -2.298 ms

Remote clock offset: 2.994 ms

Below is generated by plot.py at 2018-07-04 10:22:52

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 683.420 ms

Loss rate: 1.04%

-- Flow 1:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 443.219 ms

Loss rate: 0.75%

-- Flow 2:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 782.142 ms

Loss rate: 1.29%

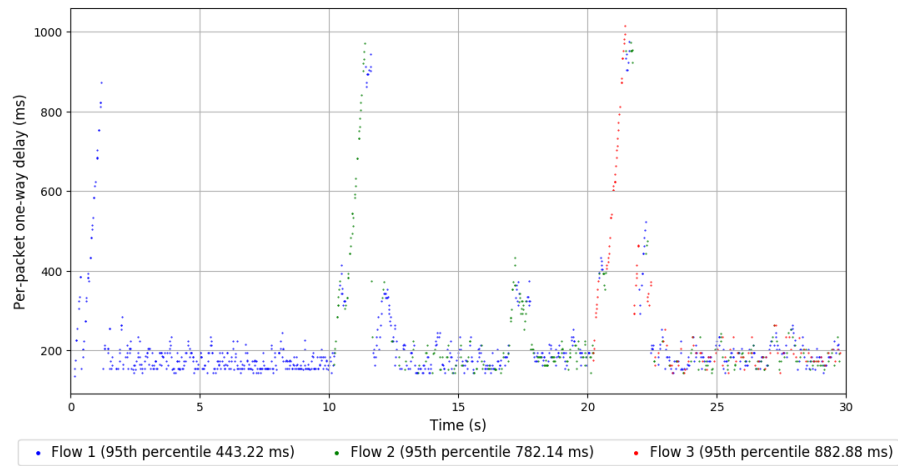
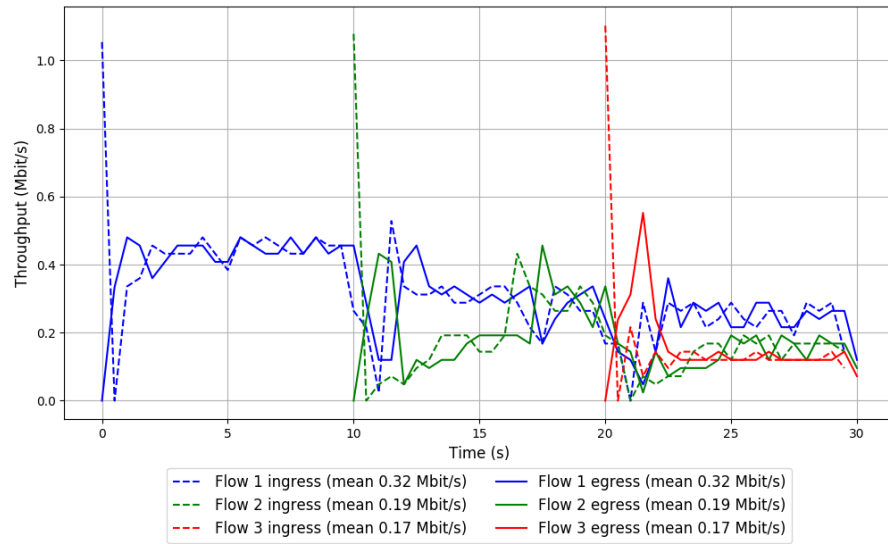
-- Flow 3:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 882.883 ms

Loss rate: 2.13%

Run 3: Report of Indigo — Data Link

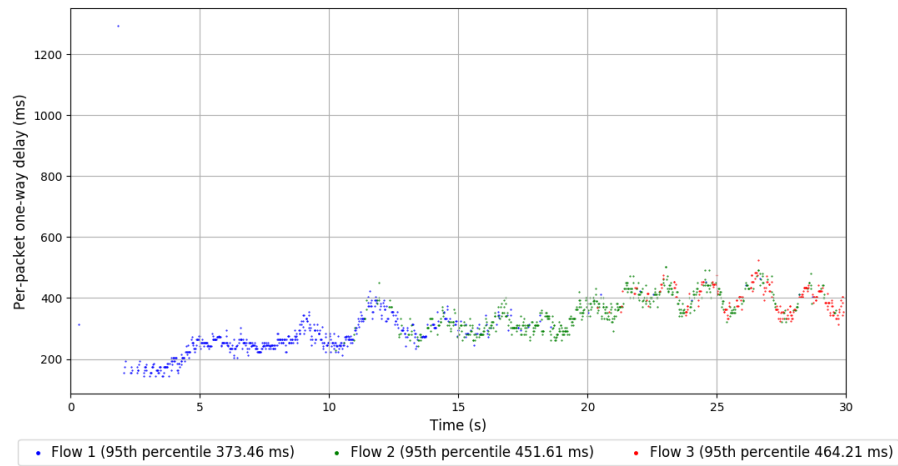
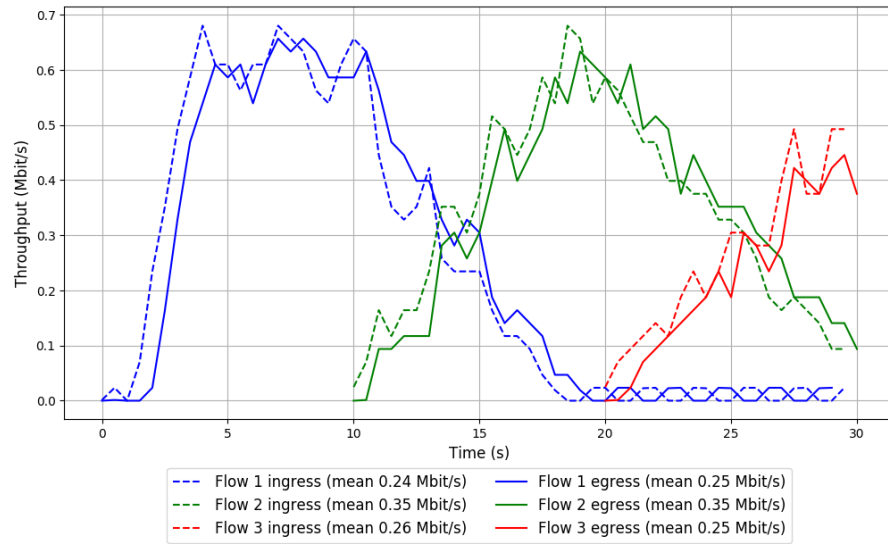


```
Run 1: Statistics of LEDBAT

Start at: 2018-07-04 09:29:13
End at: 2018-07-04 09:29:43
Local clock offset: -2.238 ms
Remote clock offset: 3.503 ms

# Below is generated by plot.py at 2018-07-04 10:22:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 444.006 ms
Loss rate: 1.71%
-- Flow 1:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 373.464 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 451.614 ms
Loss rate: 0.69%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 464.207 ms
Loss rate: 8.56%
```

Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-07-04 09:49:37

End at: 2018-07-04 09:50:07

Local clock offset: -2.479 ms

Remote clock offset: 6.91 ms

Below is generated by plot.py at 2018-07-04 10:22:53

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 457.425 ms

Loss rate: 1.62%

-- Flow 1:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 337.668 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.34 Mbit/s

95th percentile per-packet one-way delay: 467.357 ms

Loss rate: 0.36%

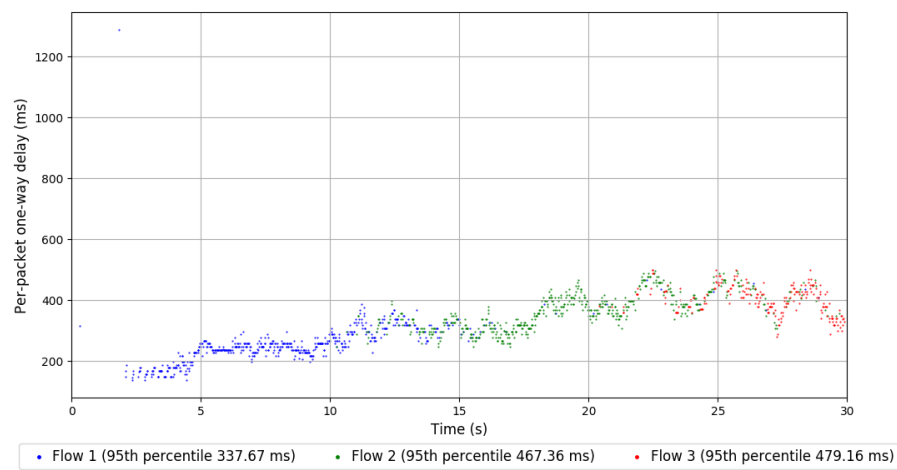
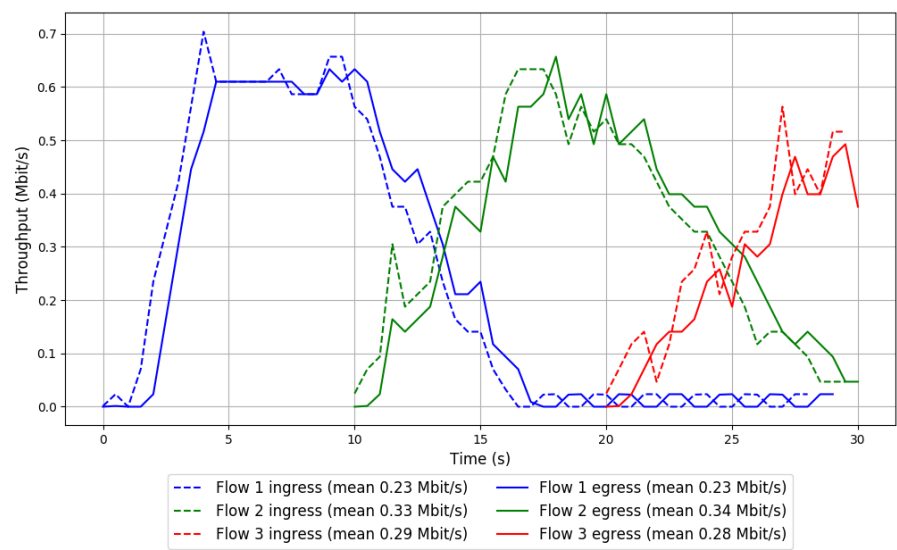
-- Flow 3:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 479.159 ms

Loss rate: 8.23%

Run 2: Report of LEDBAT — Data Link



Run 3: Statistics of LEDBAT

Start at: 2018-07-04 10:10:01

End at: 2018-07-04 10:10:31

Local clock offset: -2.55 ms

Remote clock offset: 6.984 ms

Below is generated by plot.py at 2018-07-04 10:22:53

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 458.128 ms

Loss rate: 1.38%

-- Flow 1:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 368.172 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.35 Mbit/s

95th percentile per-packet one-way delay: 467.992 ms

Loss rate: 0.86%

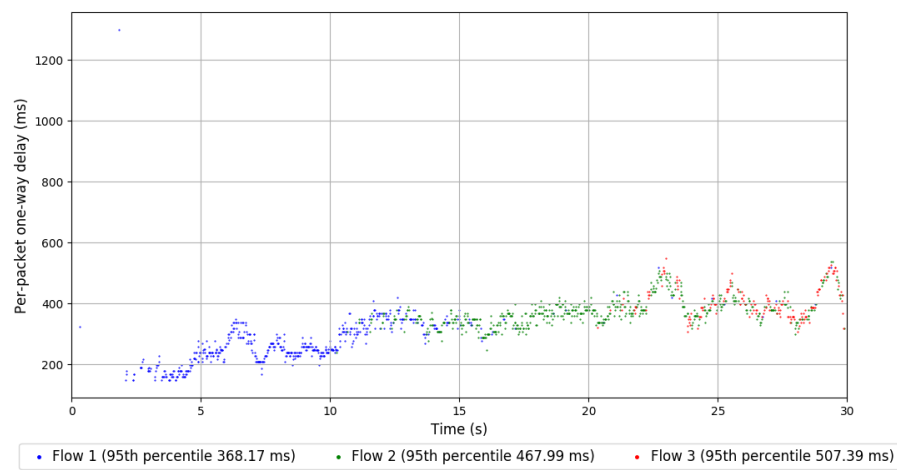
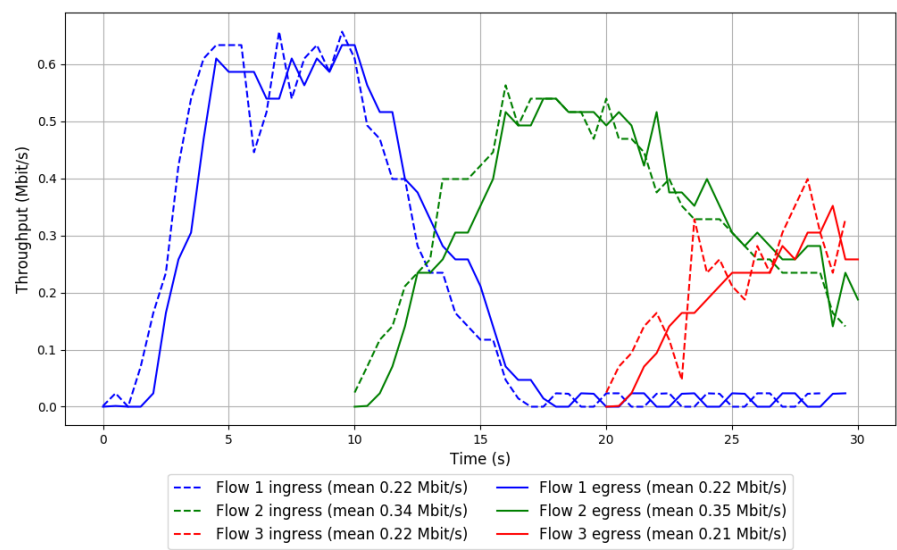
-- Flow 3:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 507.394 ms

Loss rate: 7.06%

Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC-Allegro

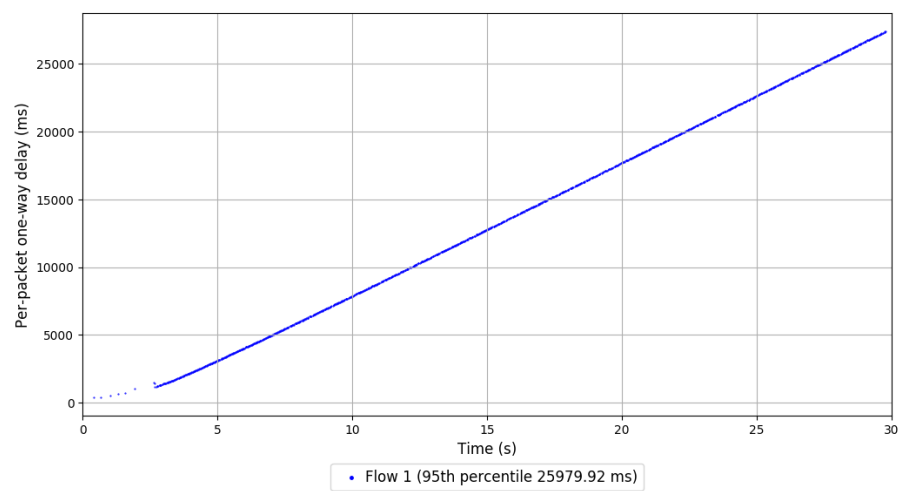
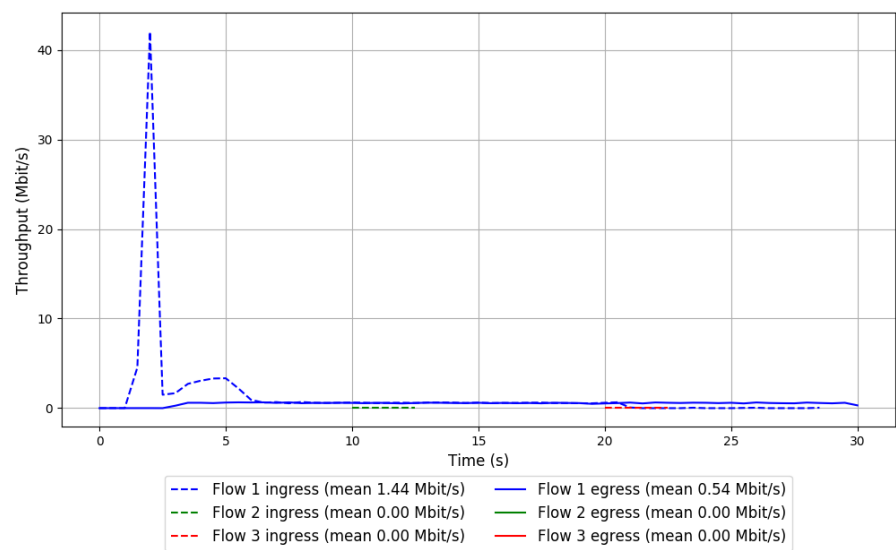
Start at: 2018-07-04 09:22:02

End at: 2018-07-04 09:22:32

Local clock offset: -2.332 ms

Remote clock offset: 3.581 ms

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

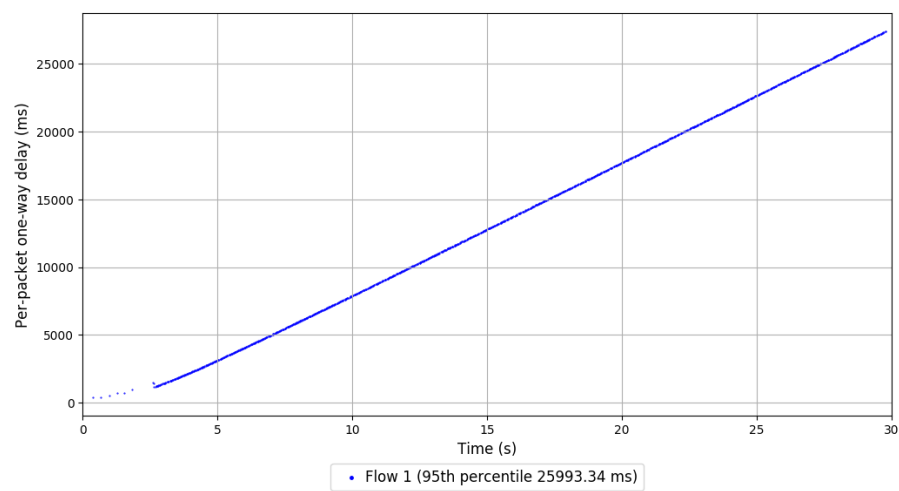
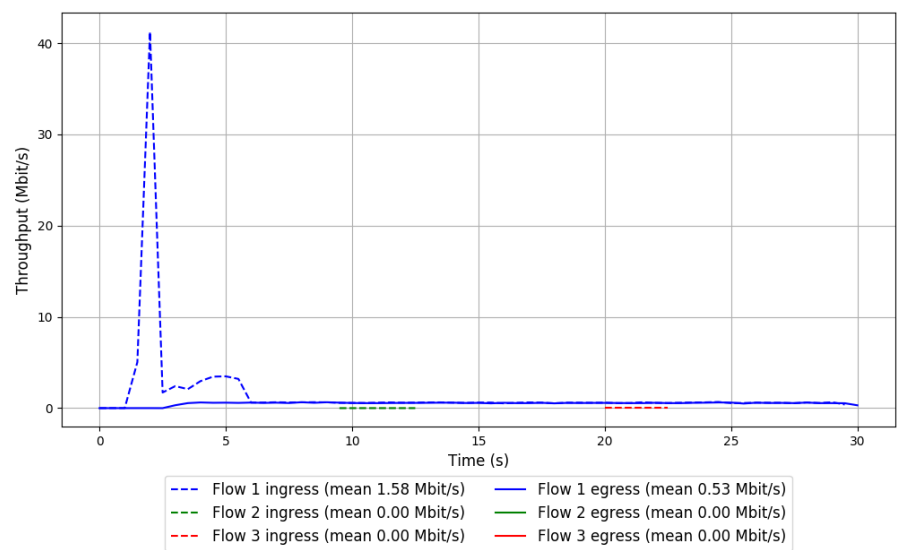
Start at: 2018-07-04 09:42:24

End at: 2018-07-04 09:42:54

Local clock offset: -2.213 ms

Remote clock offset: 1.816 ms

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

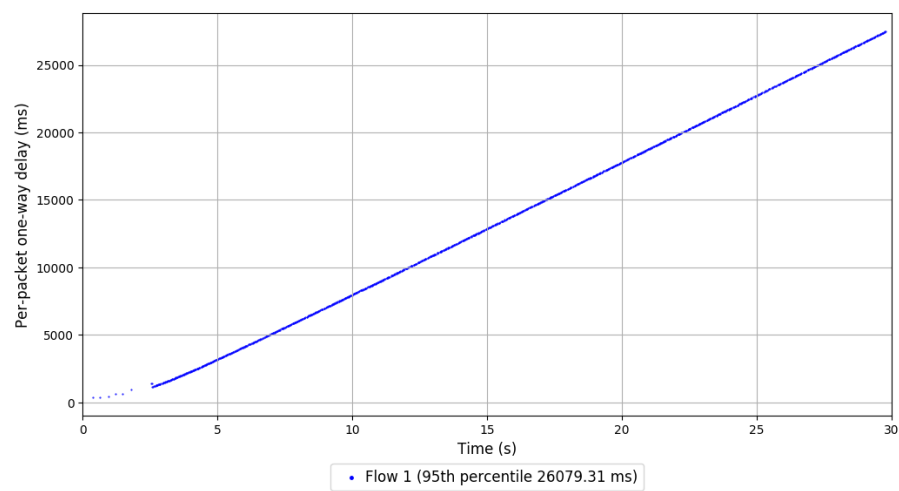
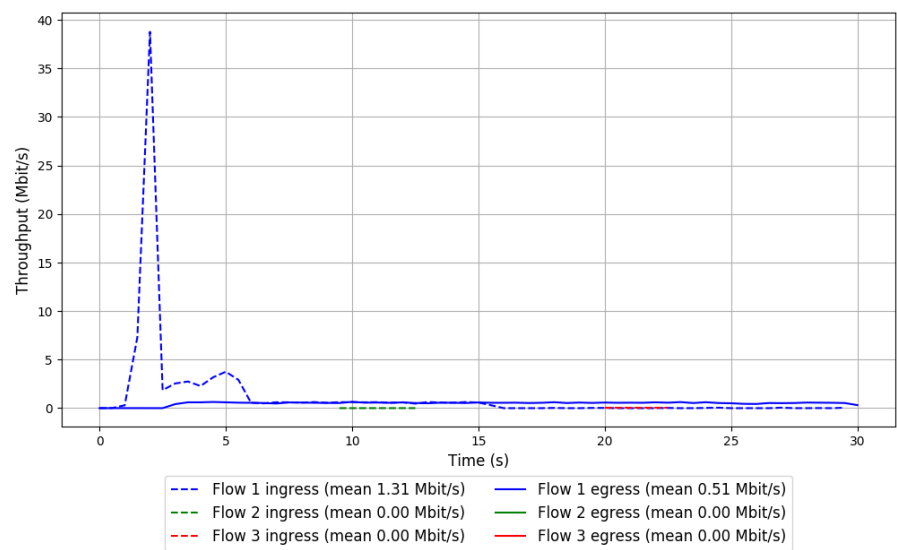
Start at: 2018-07-04 10:02:47

End at: 2018-07-04 10:03:18

Local clock offset: -2.631 ms

Remote clock offset: 6.282 ms

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

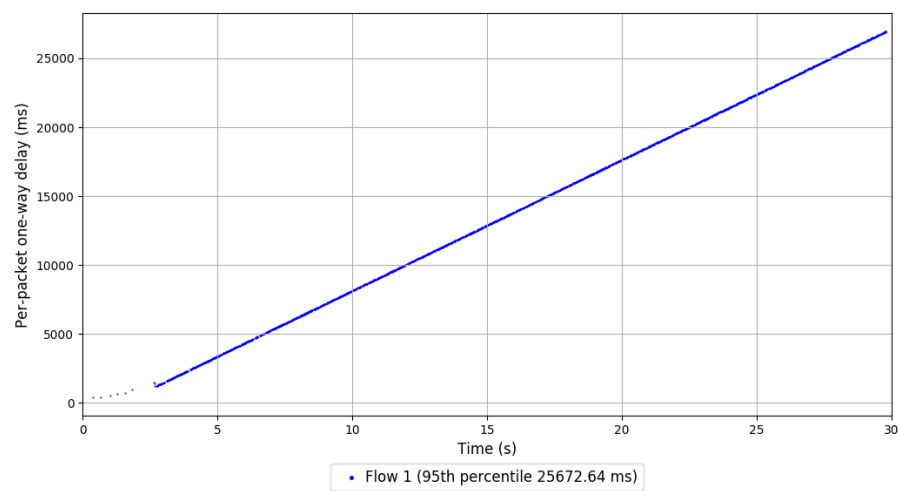
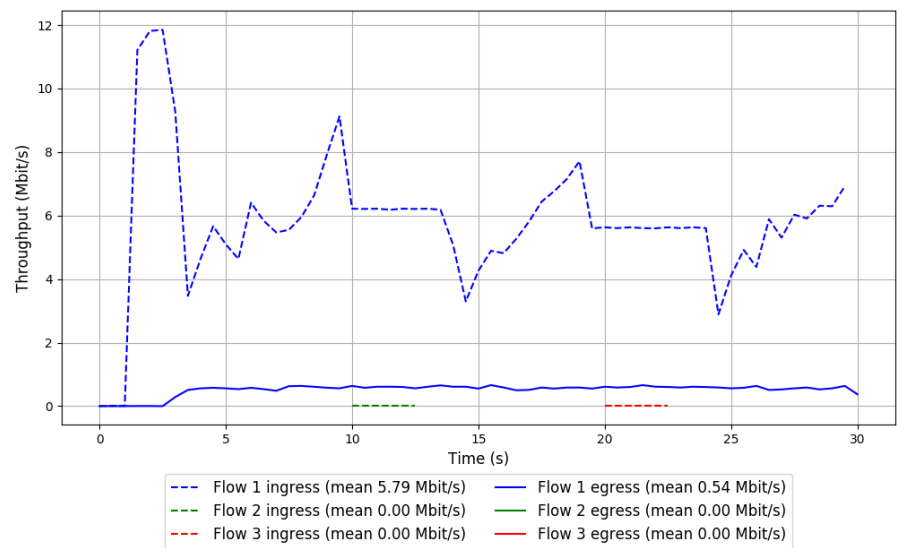
Start at: 2018-07-04 09:35:13

End at: 2018-07-04 09:35:43

Local clock offset: -2.224 ms

Remote clock offset: 5.812 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

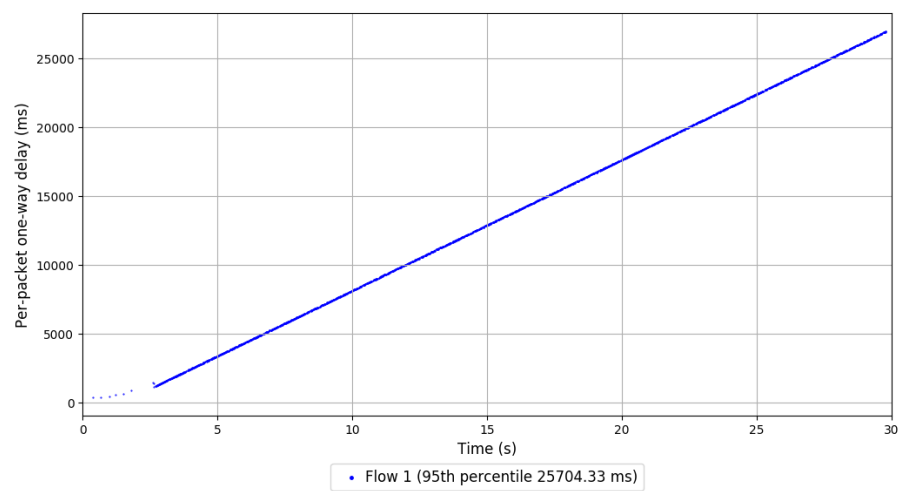
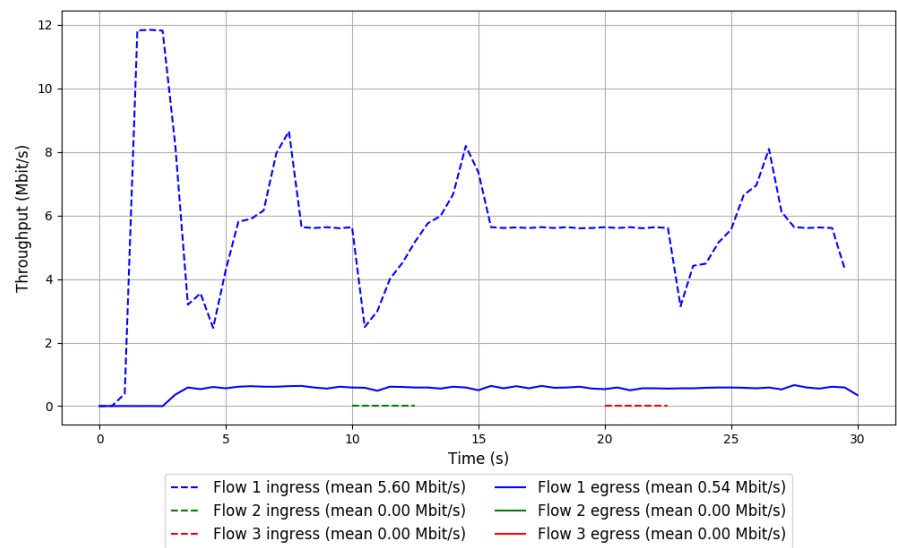
Start at: 2018-07-04 09:55:36

End at: 2018-07-04 09:56:06

Local clock offset: -2.562 ms

Remote clock offset: 5.447 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

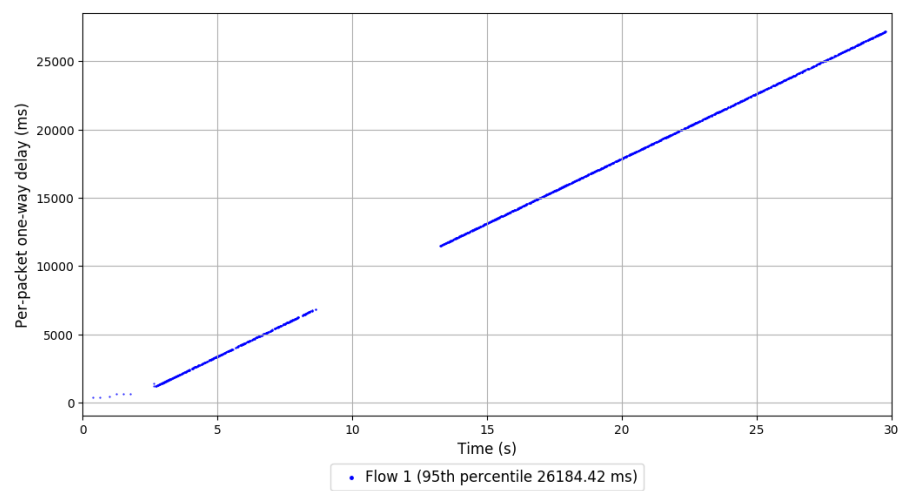
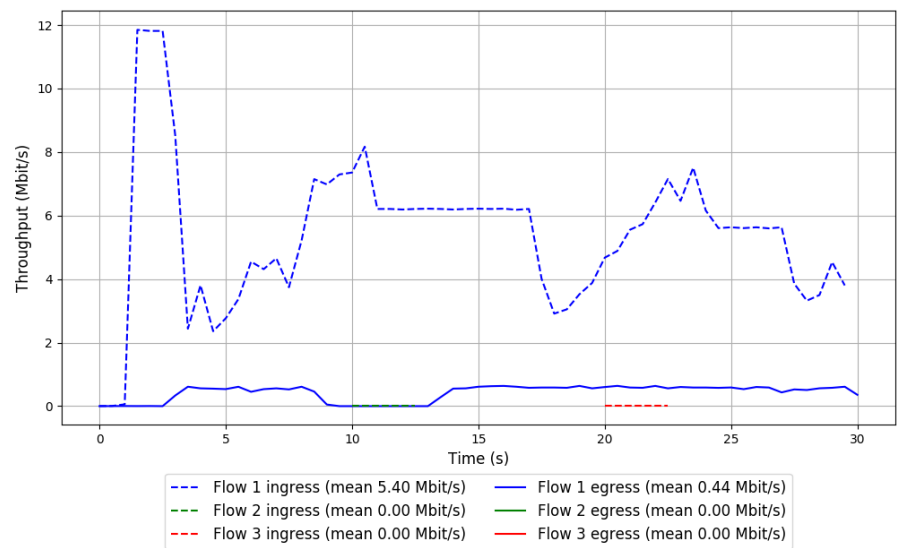
Start at: 2018-07-04 10:16:01

End at: 2018-07-04 10:16:31

Local clock offset: -2.282 ms

Remote clock offset: 6.706 ms

Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-07-04 09:32:48

End at: 2018-07-04 09:33:19

Local clock offset: -2.195 ms

Remote clock offset: 3.209 ms

Below is generated by plot.py at 2018-07-04 10:23:05

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8728.052 ms

Loss rate: 30.50%

-- Flow 1:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8717.817 ms

Loss rate: 30.50%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 5980.669 ms

Loss rate: 0.00%

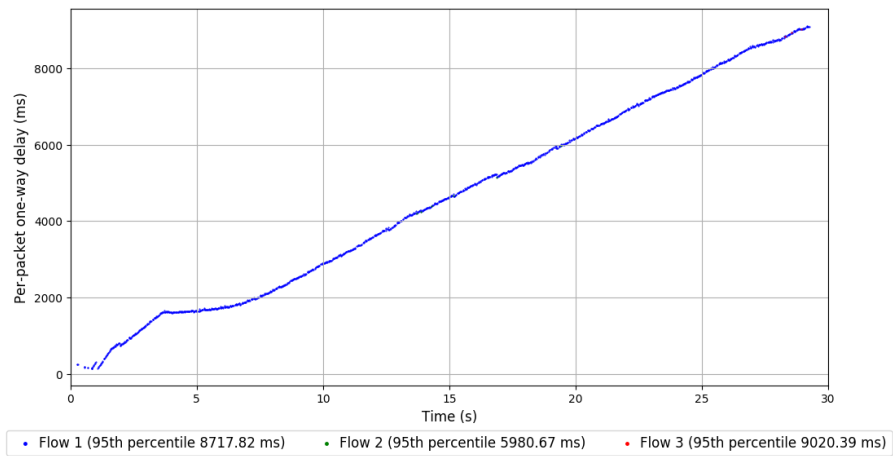
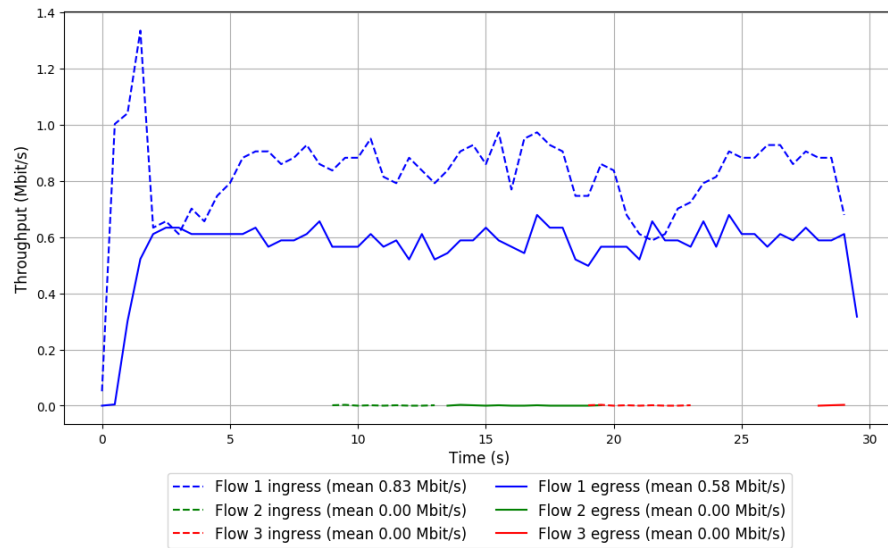
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 9020.391 ms

Loss rate: 50.00%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-07-04 09:53:12

End at: 2018-07-04 09:53:42

Local clock offset: -2.551 ms

Remote clock offset: 5.589 ms

Below is generated by plot.py at 2018-07-04 10:23:05

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8737.096 ms

Loss rate: 32.96%

-- Flow 1:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 8729.330 ms

Loss rate: 32.96%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 6029.538 ms

Loss rate: 0.00%

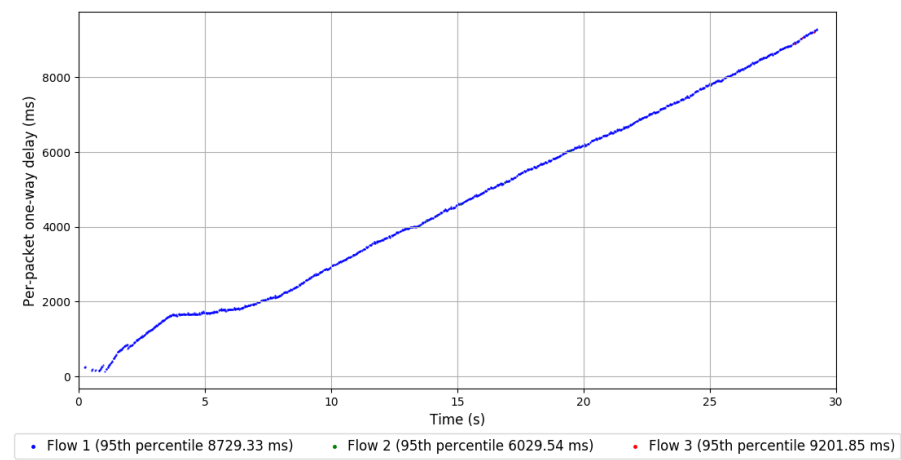
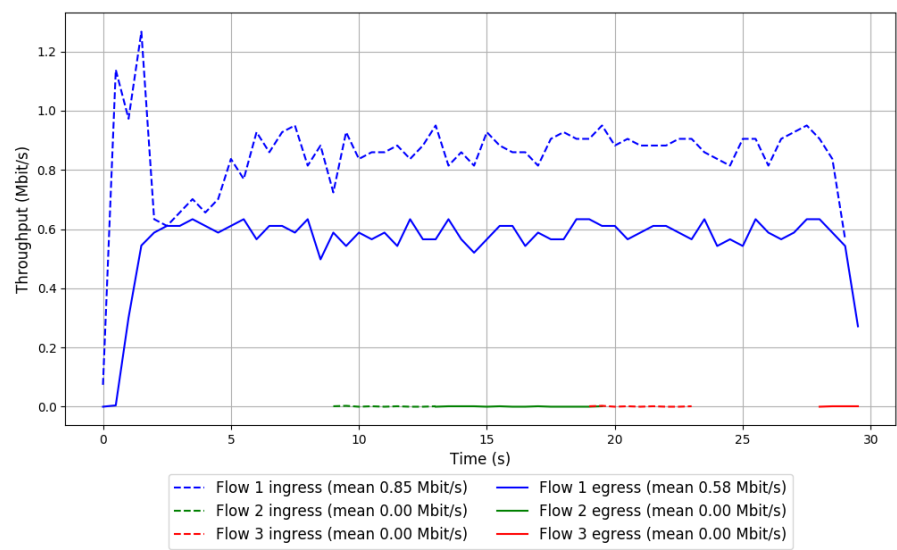
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 9201.850 ms

Loss rate: 50.00%

Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

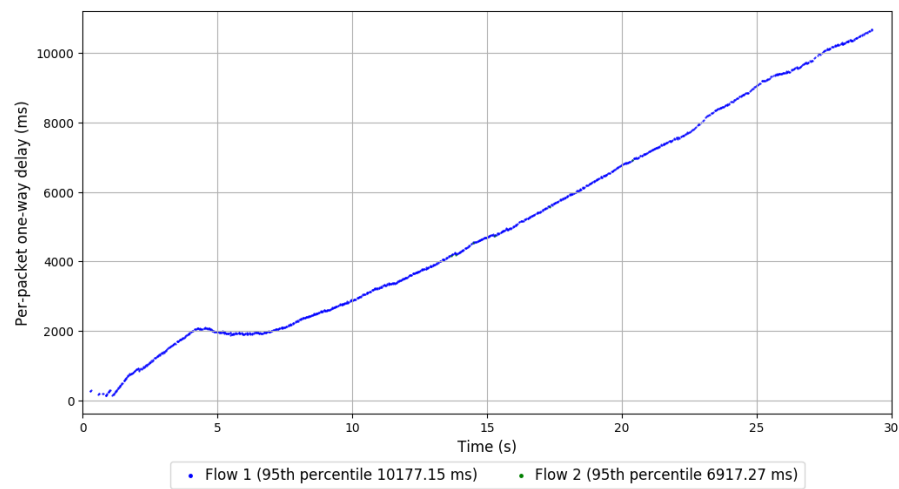
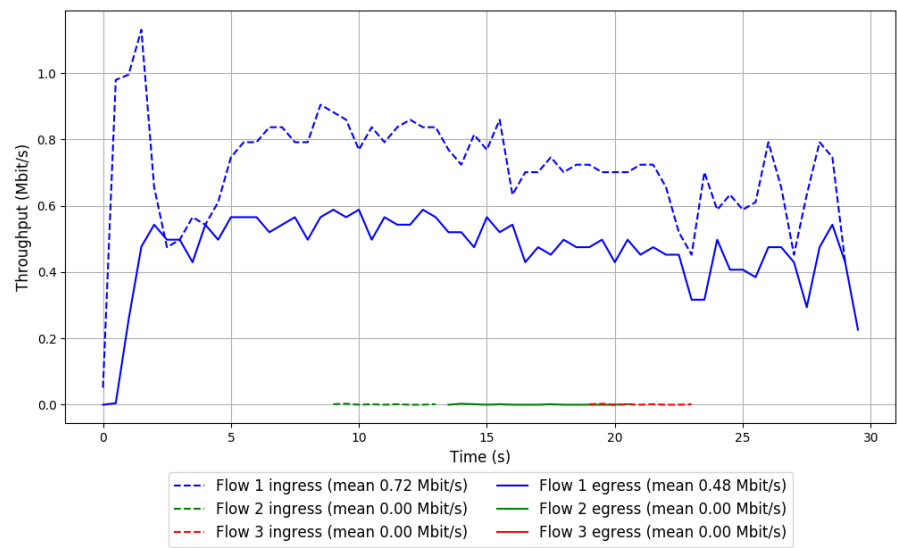
Start at: 2018-07-04 10:13:36

End at: 2018-07-04 10:14:06

Local clock offset: -2.365 ms

Remote clock offset: 1.009 ms

Run 3: Report of QUIC Cubic — Data Link

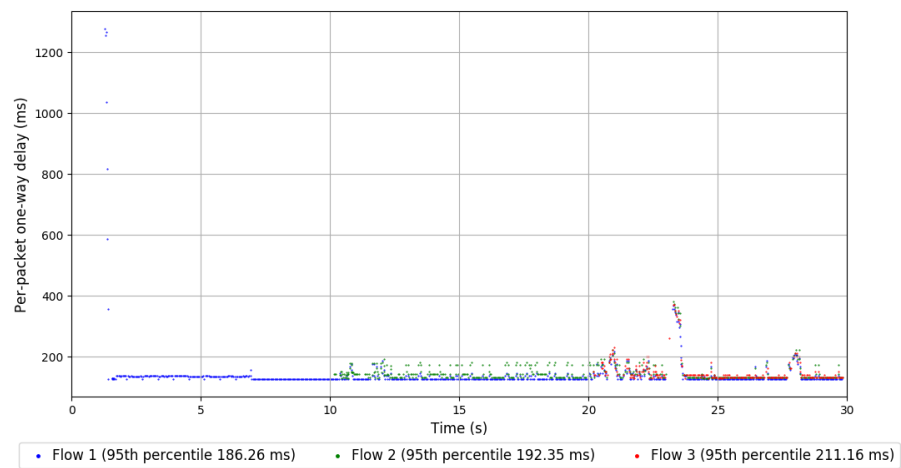
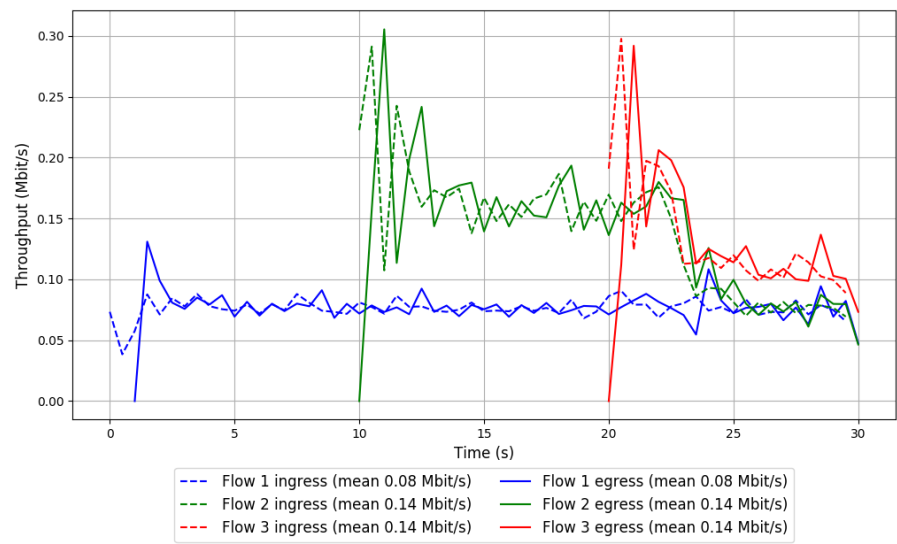


```
Run 1: Statistics of SCReAM

Start at: 2018-07-04 09:31:37
End at: 2018-07-04 09:32:07
Local clock offset: -2.216 ms
Remote clock offset: 8.386 ms

# Below is generated by plot.py at 2018-07-04 10:23:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 192.520 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 186.259 ms
Loss rate: 0.78%
-- Flow 2:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 192.355 ms
Loss rate: 0.70%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 211.156 ms
Loss rate: 1.47%
```

Run 1: Report of SReAM — Data Link

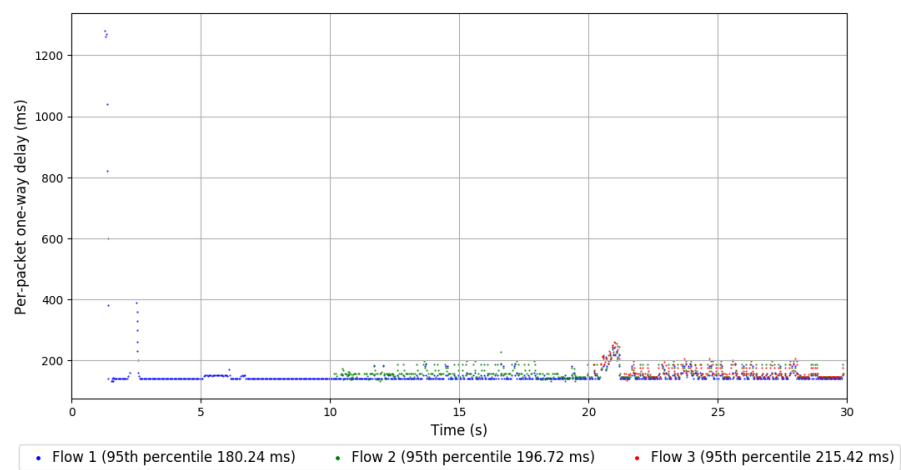
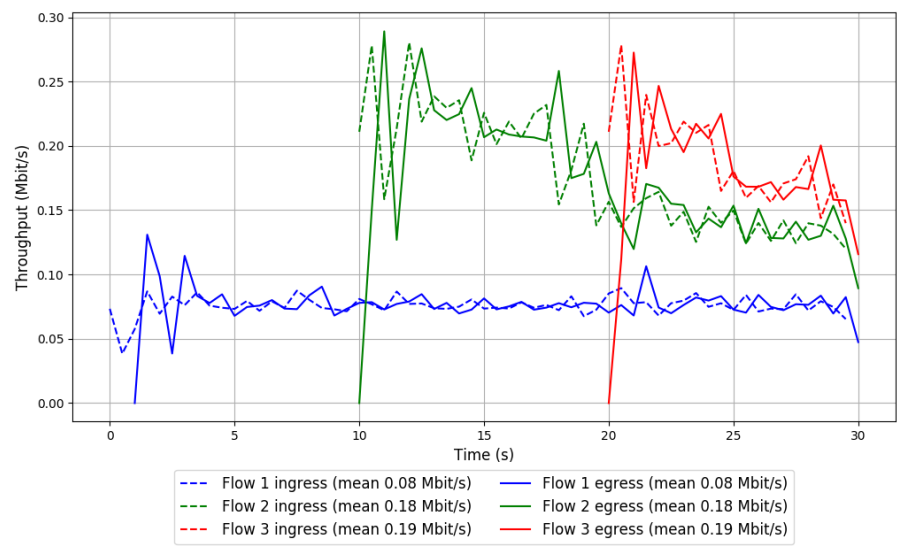


Run 2: Statistics of SCReAM

Start at: 2018-07-04 09:52:00
End at: 2018-07-04 09:52:30
Local clock offset: -2.524 ms
Remote clock offset: 2.797 ms

Below is generated by plot.py at 2018-07-04 10:23:05
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 196.766 ms
Loss rate: 1.16%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 180.241 ms
Loss rate: 0.78%
-- Flow 2:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 196.724 ms
Loss rate: 0.97%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 215.420 ms
Loss rate: 1.99%

Run 2: Report of SReAM — Data Link

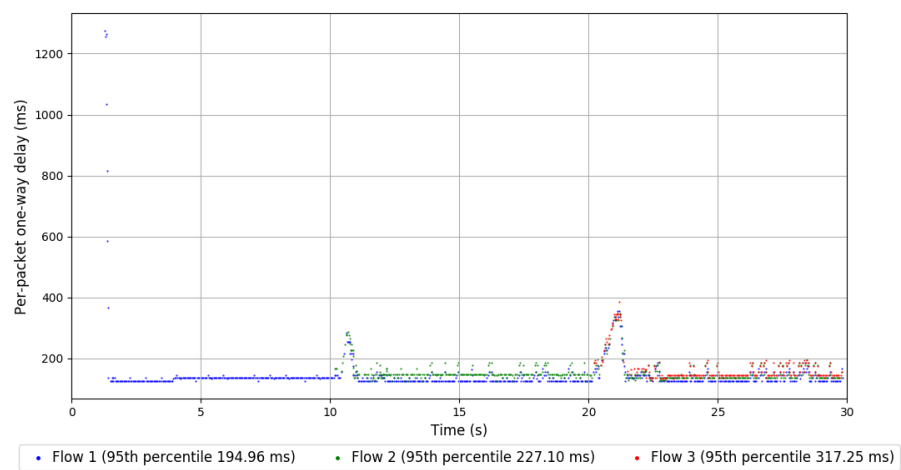
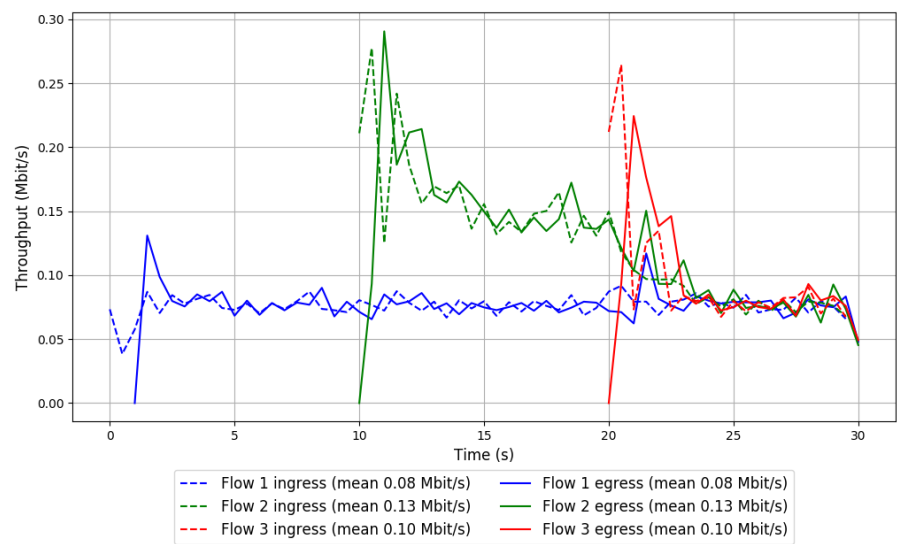


Run 3: Statistics of SCReAM

Start at: 2018-07-04 10:12:25
End at: 2018-07-04 10:12:55
Local clock offset: -2.441 ms
Remote clock offset: 6.754 ms

Below is generated by plot.py at 2018-07-04 10:23:05
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 227.367 ms
Loss rate: 1.06%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 194.958 ms
Loss rate: 0.79%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 227.105 ms
Loss rate: 0.89%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 317.249 ms
Loss rate: 2.15%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of Sprout

Start at: 2018-07-04 09:24:25

End at: 2018-07-04 09:24:55

Local clock offset: -2.344 ms

Remote clock offset: 4.208 ms

Below is generated by plot.py at 2018-07-04 10:23:05

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.27 Mbit/s

95th percentile per-packet one-way delay: 663.578 ms

Loss rate: 0.58%

-- Flow 1:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 623.521 ms

Loss rate: 0.41%

-- Flow 2:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 642.981 ms

Loss rate: 0.15%

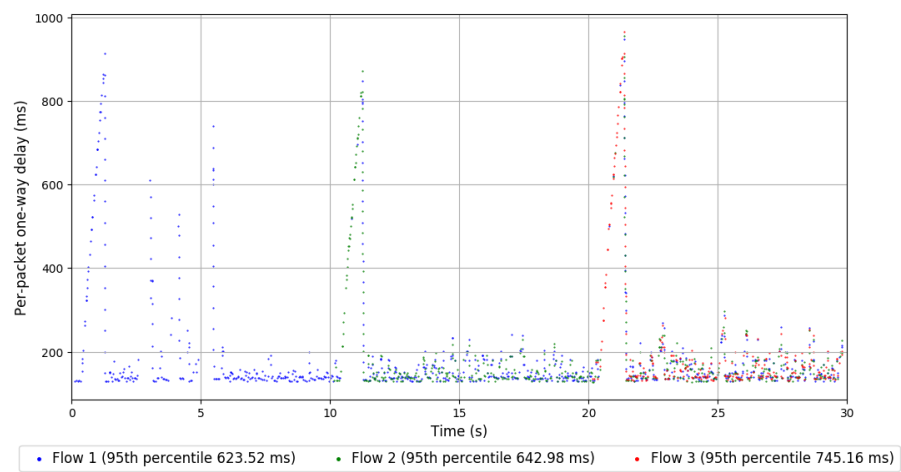
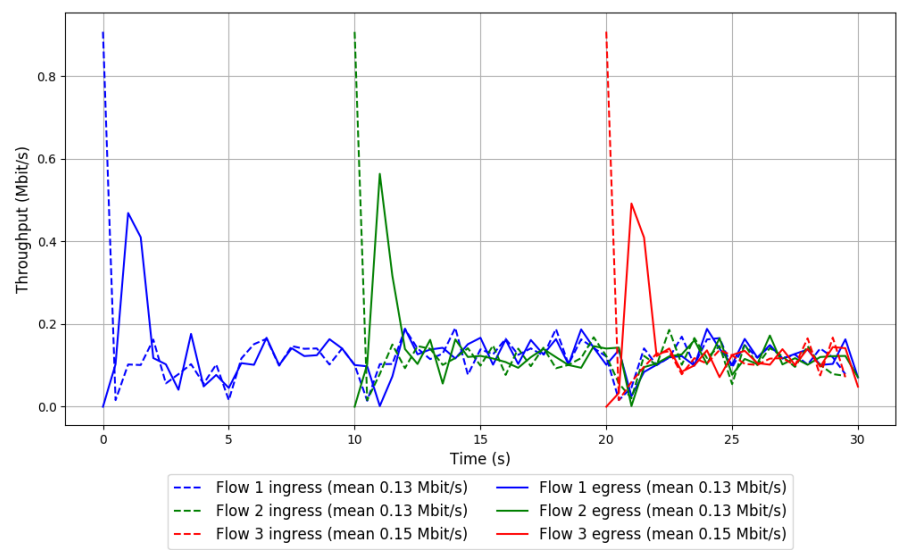
-- Flow 3:

Average throughput: 0.15 Mbit/s

95th percentile per-packet one-way delay: 745.156 ms

Loss rate: 1.82%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2018-07-04 09:44:49

End at: 2018-07-04 09:45:19

Local clock offset: -2.333 ms

Remote clock offset: 2.976 ms

Below is generated by plot.py at 2018-07-04 10:23:05

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.26 Mbit/s

95th percentile per-packet one-way delay: 633.636 ms

Loss rate: 1.47%

-- Flow 1:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 548.537 ms

Loss rate: 1.25%

-- Flow 2:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 647.430 ms

Loss rate: 0.83%

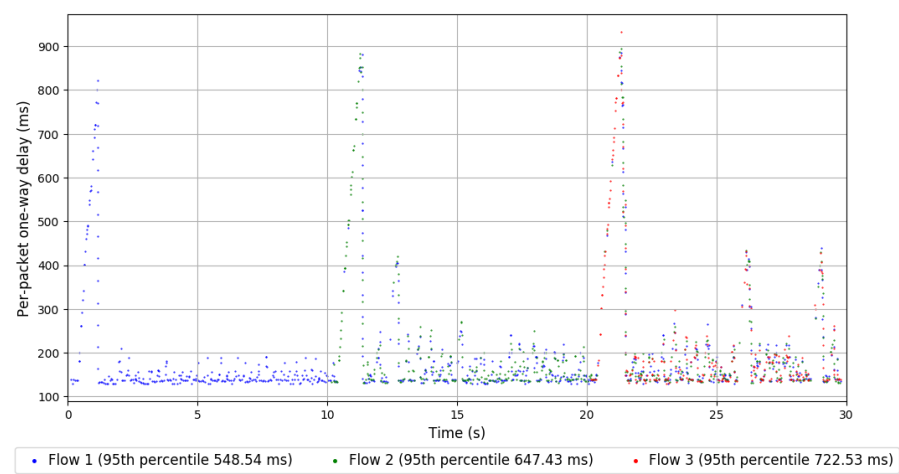
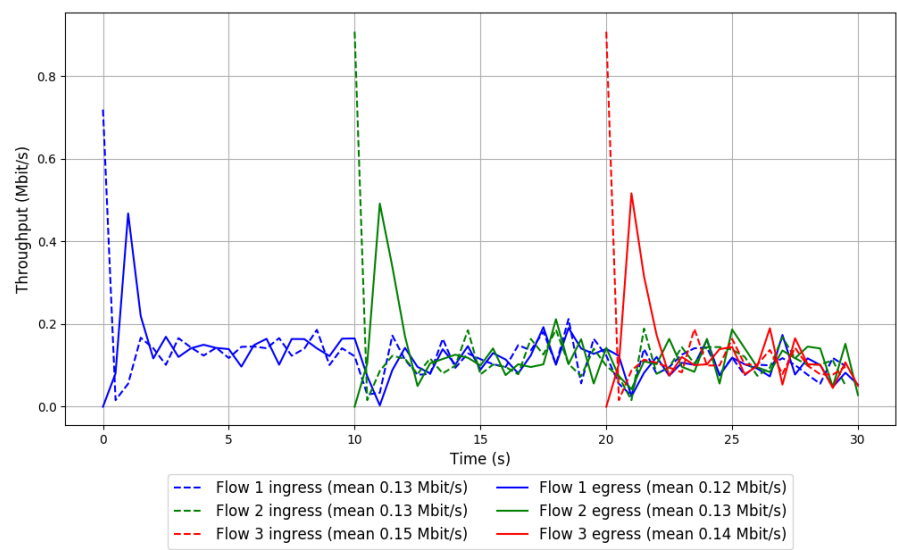
-- Flow 3:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 722.530 ms

Loss rate: 3.20%

Run 2: Report of Sprout — Data Link

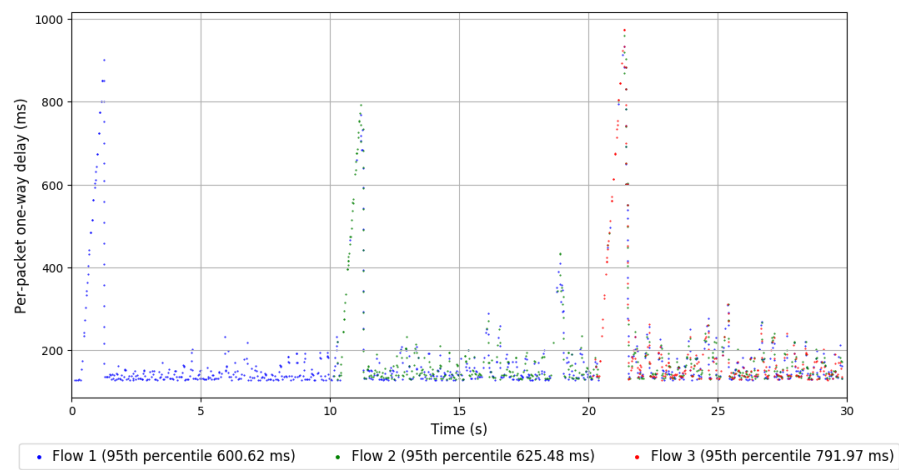
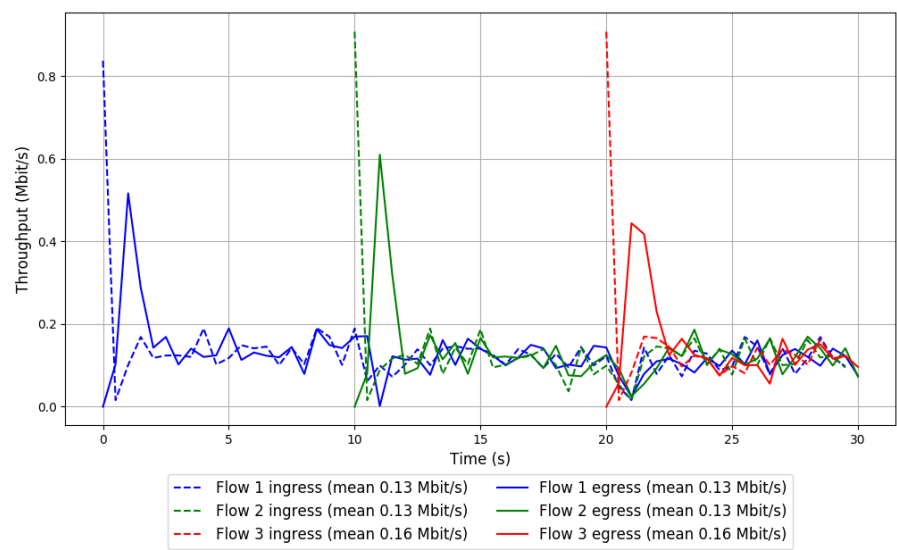


Run 3: Statistics of Sprout

Start at: 2018-07-04 10:05:13
End at: 2018-07-04 10:05:43
Local clock offset: -2.575 ms
Remote clock offset: 2.23 ms

```
# Below is generated by plot.py at 2018-07-04 10:23:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 652.288 ms
Loss rate: 1.15%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 600.617 ms
Loss rate: 0.88%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 625.477 ms
Loss rate: 0.93%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 791.968 ms
Loss rate: 2.24%
```

Run 3: Report of Sprout — Data Link

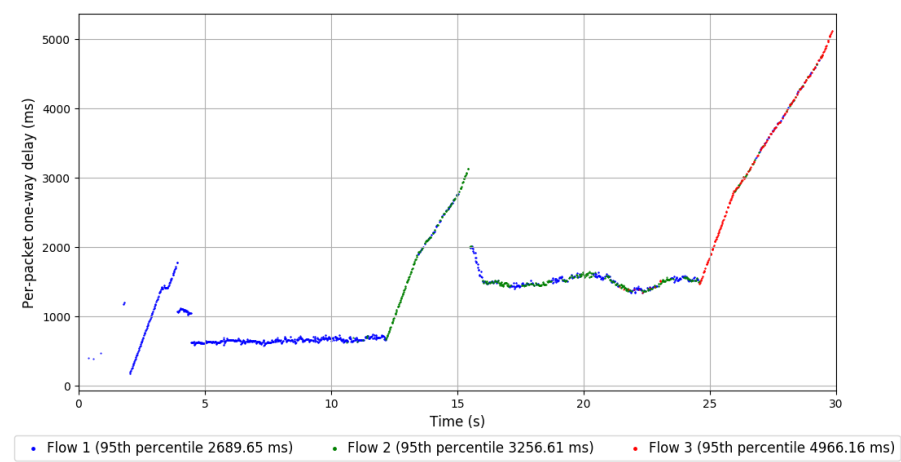
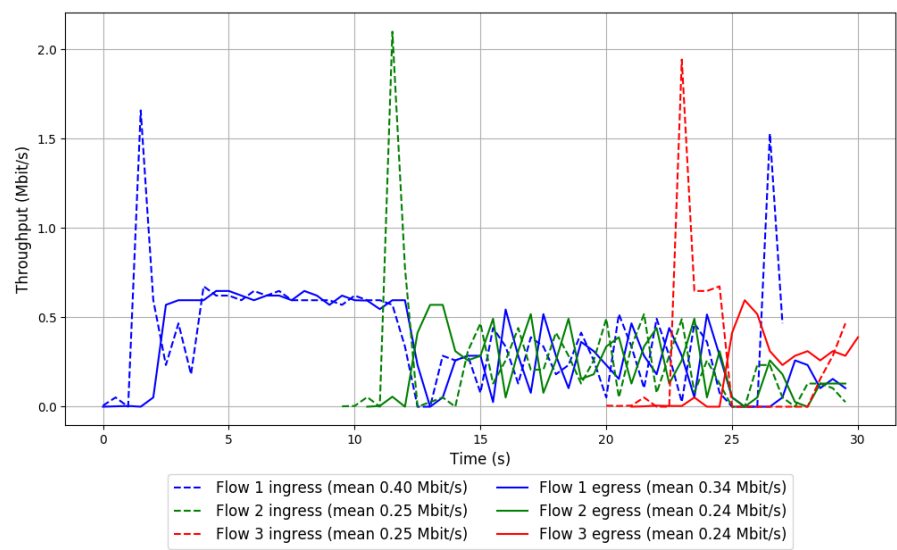


```
Run 1: Statistics of TaoVA-100x

Start at: 2018-07-04 09:34:01
End at: 2018-07-04 09:34:31
Local clock offset: -2.235 ms
Remote clock offset: 2.017 ms

# Below is generated by plot.py at 2018-07-04 10:23:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 4116.691 ms
Loss rate: 10.50%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 2689.653 ms
Loss rate: 9.22%
-- Flow 2:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 3256.610 ms
Loss rate: 9.30%
-- Flow 3:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 4966.164 ms
Loss rate: 18.55%
```

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-07-04 09:54:24

End at: 2018-07-04 09:54:54

Local clock offset: -2.552 ms

Remote clock offset: 6.662 ms

Below is generated by plot.py at 2018-07-04 10:23:06

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.55 Mbit/s

95th percentile per-packet one-way delay: 3830.197 ms

Loss rate: 7.81%

-- Flow 1:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 2965.564 ms

Loss rate: 4.49%

-- Flow 2:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 3464.968 ms

Loss rate: 9.04%

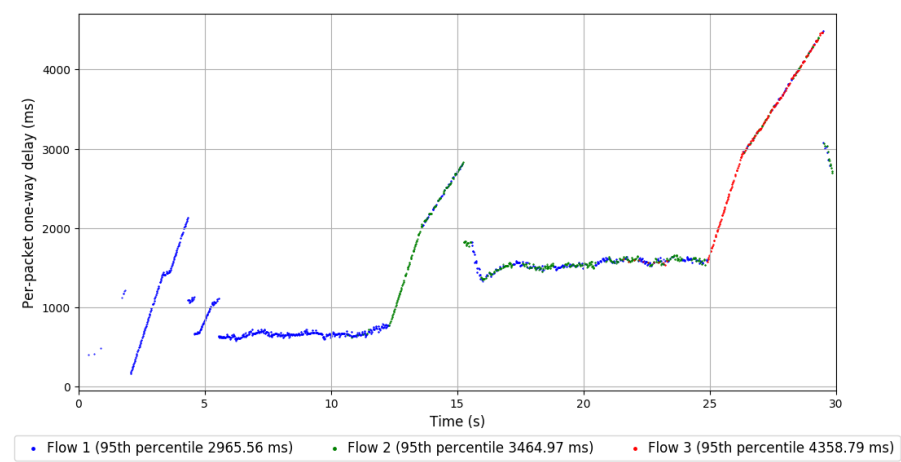
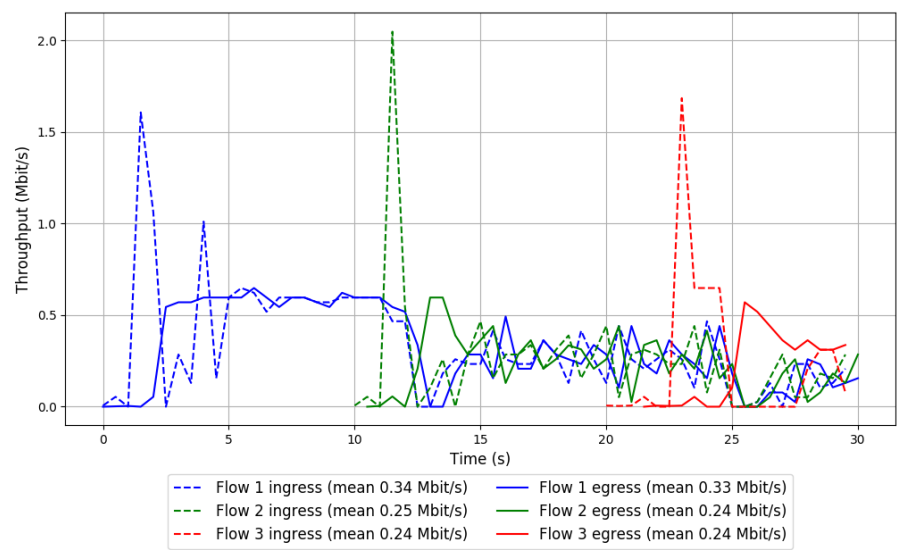
-- Flow 3:

Average throughput: 0.24 Mbit/s

95th percentile per-packet one-way delay: 4358.787 ms

Loss rate: 19.69%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-07-04 10:14:49

End at: 2018-07-04 10:15:19

Local clock offset: -2.326 ms

Remote clock offset: 7.437 ms

Below is generated by plot.py at 2018-07-04 10:23:08

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 5999.062 ms

Loss rate: 12.57%

-- Flow 1:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 5637.427 ms

Loss rate: 4.50%

-- Flow 2:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 6042.417 ms

Loss rate: 7.93%

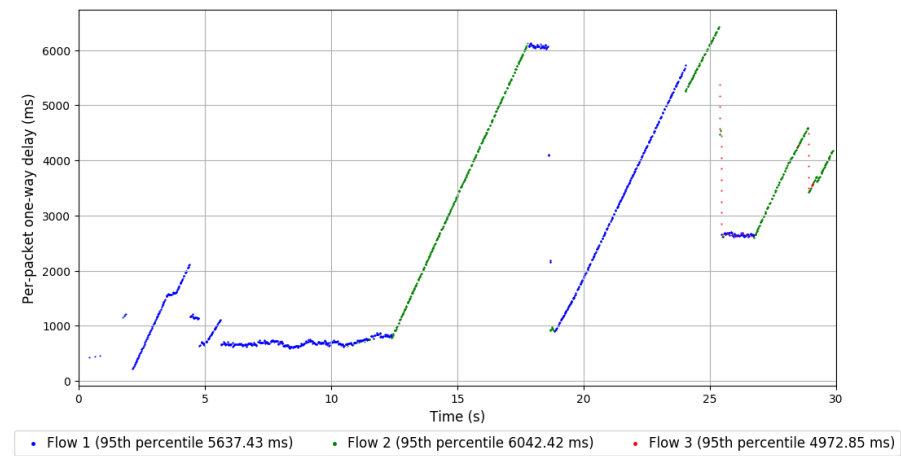
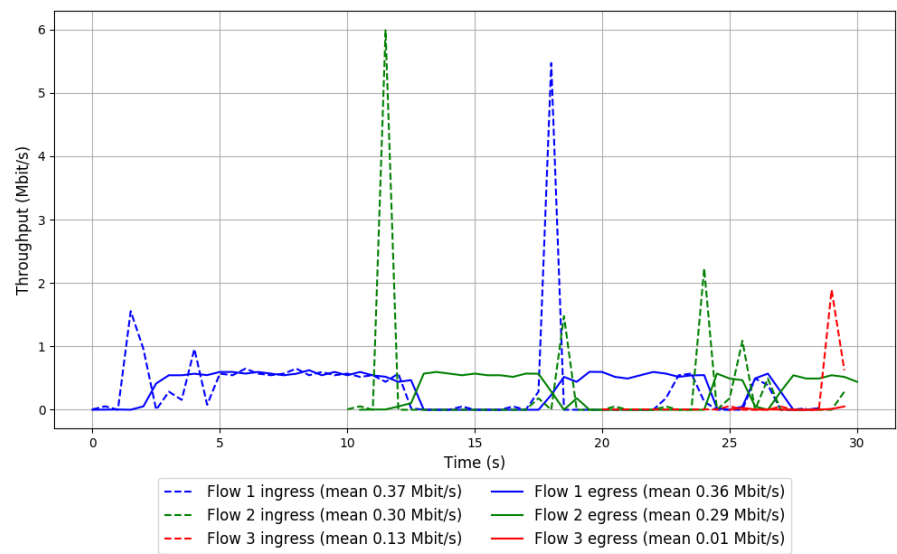
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 4972.851 ms

Loss rate: 95.92%

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



Run 1: Statistics of TCP Vegas

Start at: 2018-07-04 09:26:49

End at: 2018-07-04 09:27:19

Local clock offset: -2.33 ms

Remote clock offset: 2.649 ms

Below is generated by plot.py at 2018-07-04 10:23:08

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.56 Mbit/s

95th percentile per-packet one-way delay: 2027.389 ms

Loss rate: 6.23%

-- Flow 1:

Average throughput: 0.38 Mbit/s

95th percentile per-packet one-way delay: 1837.434 ms

Loss rate: 3.13%

-- Flow 2:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 2115.071 ms

Loss rate: 6.93%

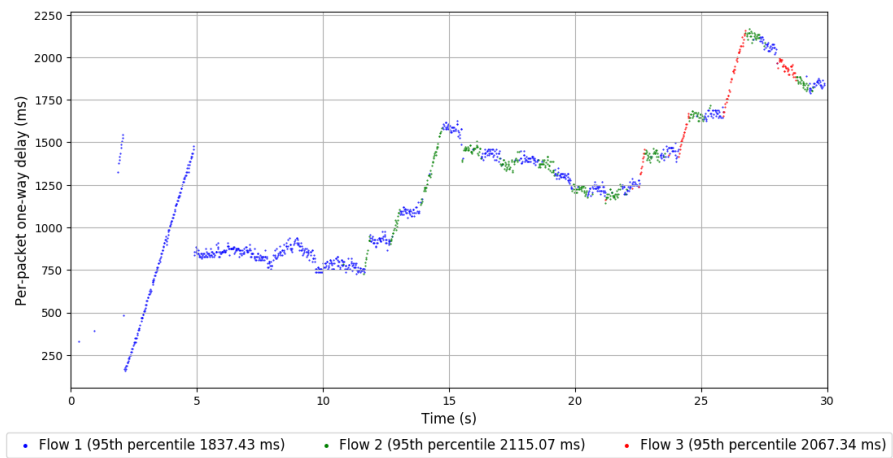
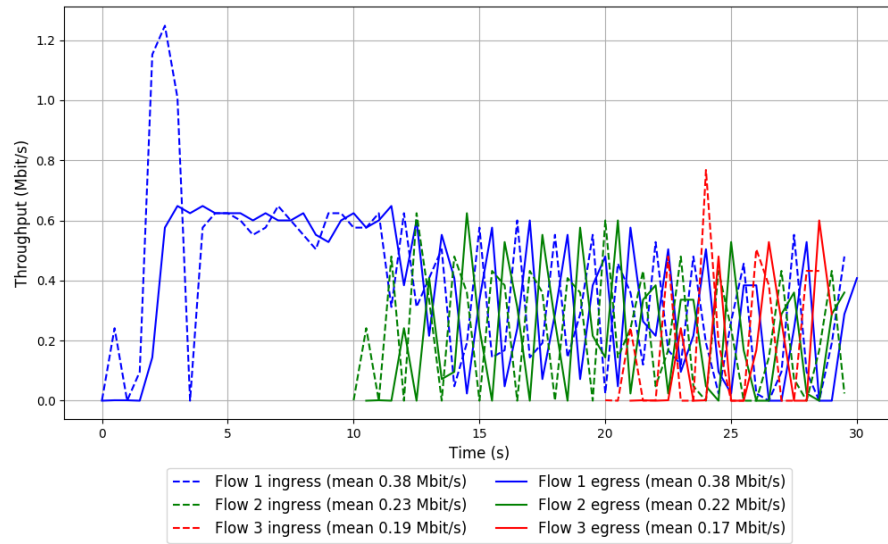
-- Flow 3:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 2067.340 ms

Loss rate: 25.13%

Run 1: Report of TCP Vegas — Data Link

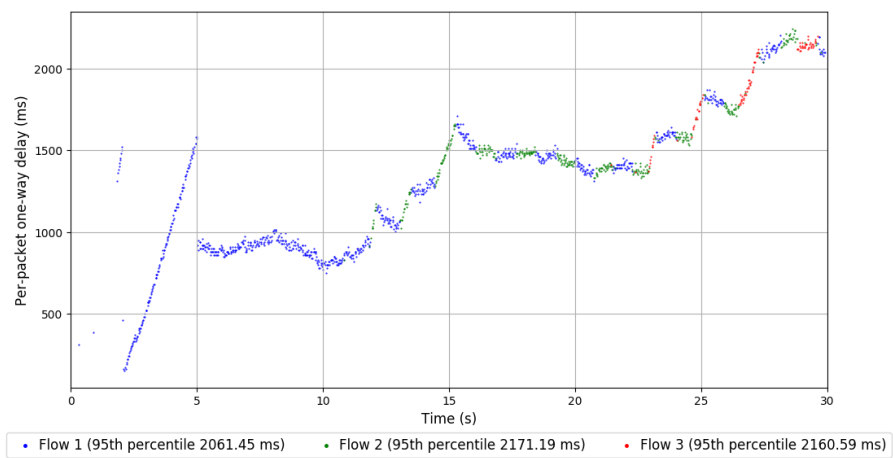
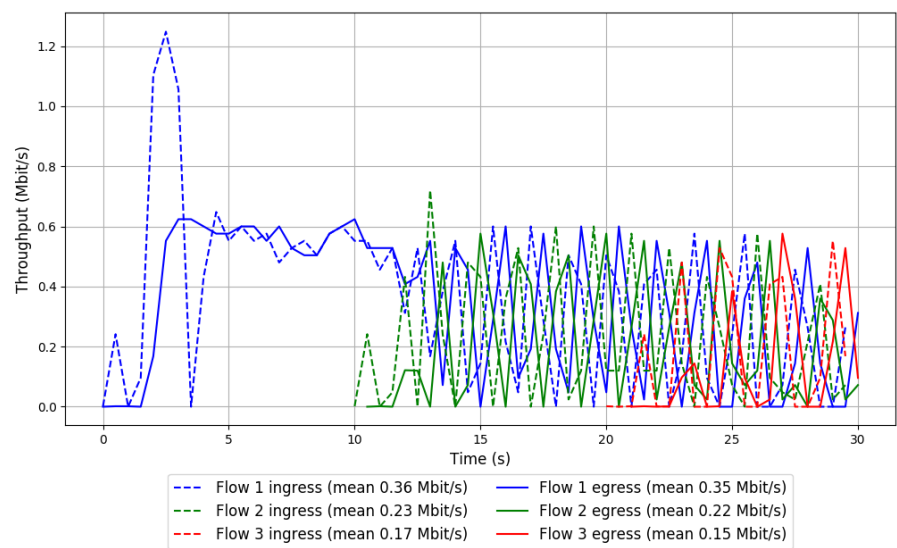


Run 2: Statistics of TCP Vegas

Start at: 2018-07-04 09:47:13
End at: 2018-07-04 09:47:43
Local clock offset: -2.421 ms
Remote clock offset: 5.795 ms

Below is generated by plot.py at 2018-07-04 10:23:08
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 2130.626 ms
Loss rate: 6.69%
-- Flow 1:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 2061.447 ms
Loss rate: 3.43%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 2171.194 ms
Loss rate: 7.98%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 2160.593 ms
Loss rate: 24.42%

Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2018-07-04 10:07:37

End at: 2018-07-04 10:08:07

Local clock offset: -2.621 ms

Remote clock offset: 4.885 ms

Below is generated by plot.py at 2018-07-04 10:23:09

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 1804.889 ms

Loss rate: 5.69%

-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 1804.999 ms

Loss rate: 2.67%

-- Flow 2:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 1845.982 ms

Loss rate: 5.83%

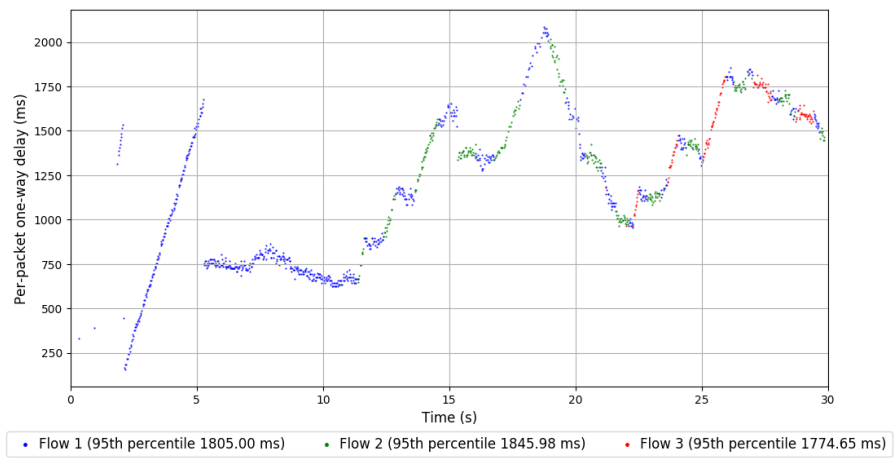
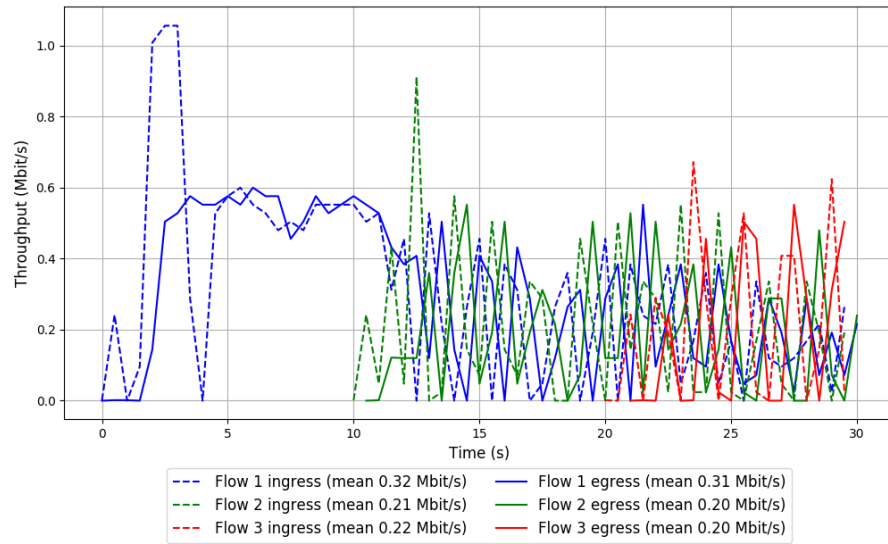
-- Flow 3:

Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 1774.651 ms

Loss rate: 19.16%

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-07-04 09:25:37

End at: 2018-07-04 09:26:07

Local clock offset: -2.276 ms

Remote clock offset: 4.074 ms

Below is generated by plot.py at 2018-07-04 10:23:09

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.55 Mbit/s

95th percentile per-packet one-way delay: 1774.927 ms

Loss rate: 3.59%

-- Flow 1:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 1779.398 ms

Loss rate: 3.53%

-- Flow 2:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1722.896 ms

Loss rate: 4.76%

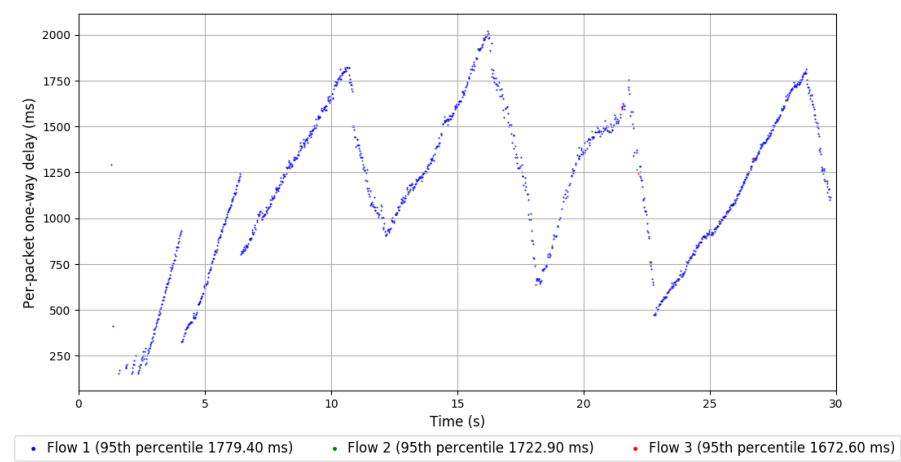
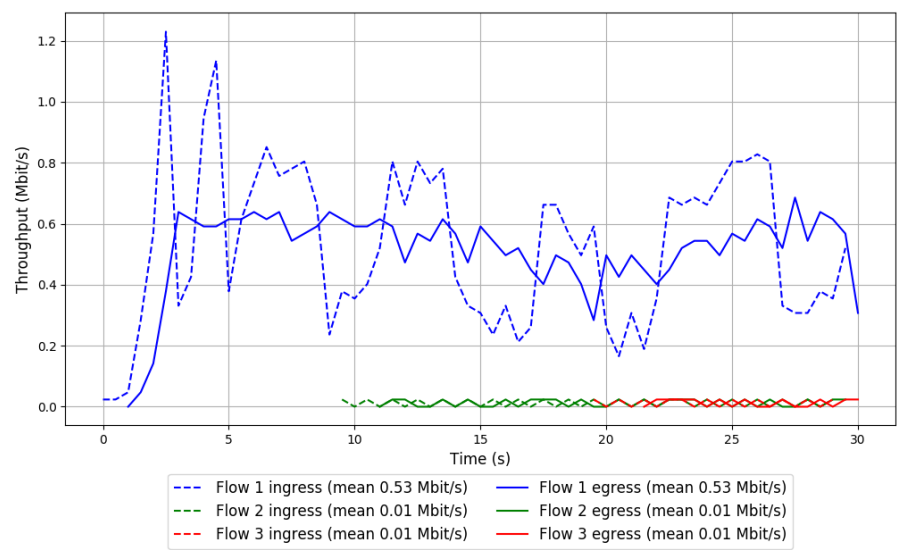
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1672.604 ms

Loss rate: 9.09%

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2018-07-04 09:46:01

End at: 2018-07-04 09:46:31

Local clock offset: -2.434 ms

Remote clock offset: 3.018 ms

Below is generated by plot.py at 2018-07-04 10:23:09

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.55 Mbit/s

95th percentile per-packet one-way delay: 1768.221 ms

Loss rate: 5.53%

-- Flow 1:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 1768.221 ms

Loss rate: 5.36%

-- Flow 2:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1692.224 ms

Loss rate: 9.52%

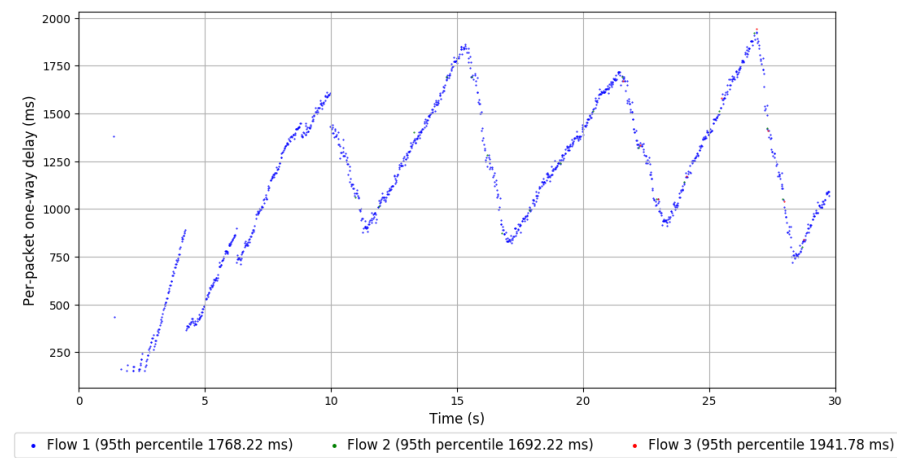
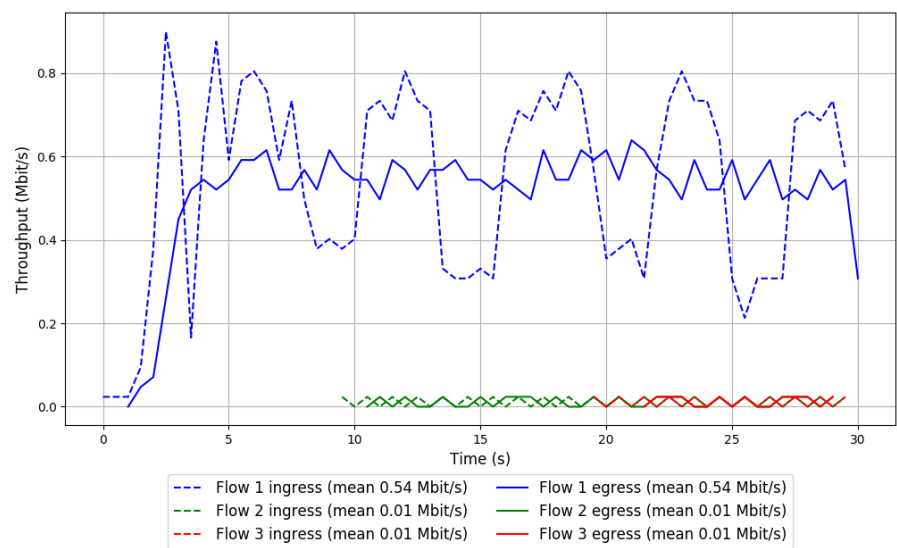
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1941.784 ms

Loss rate: 18.18%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2018-07-04 10:06:25

End at: 2018-07-04 10:06:55

Local clock offset: -2.577 ms

Remote clock offset: 7.165 ms

Below is generated by plot.py at 2018-07-04 10:23:09

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 1849.572 ms

Loss rate: 4.36%

-- Flow 1:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 1849.572 ms

Loss rate: 4.09%

-- Flow 2:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1859.376 ms

Loss rate: 9.52%

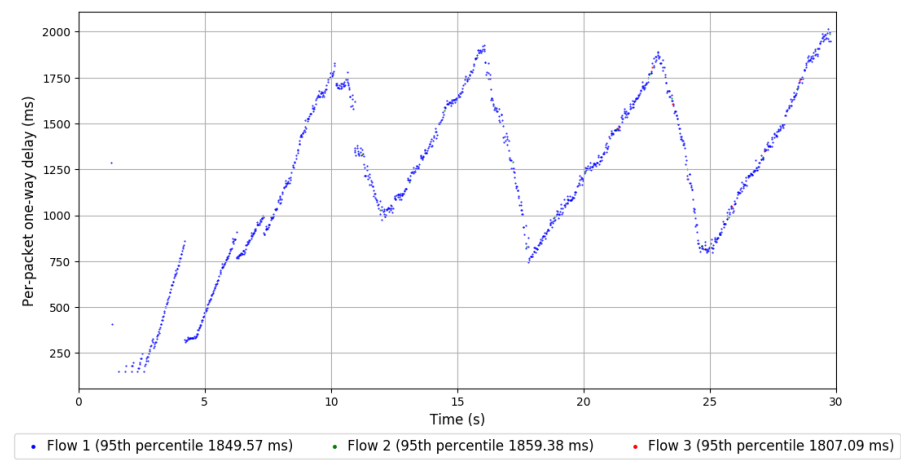
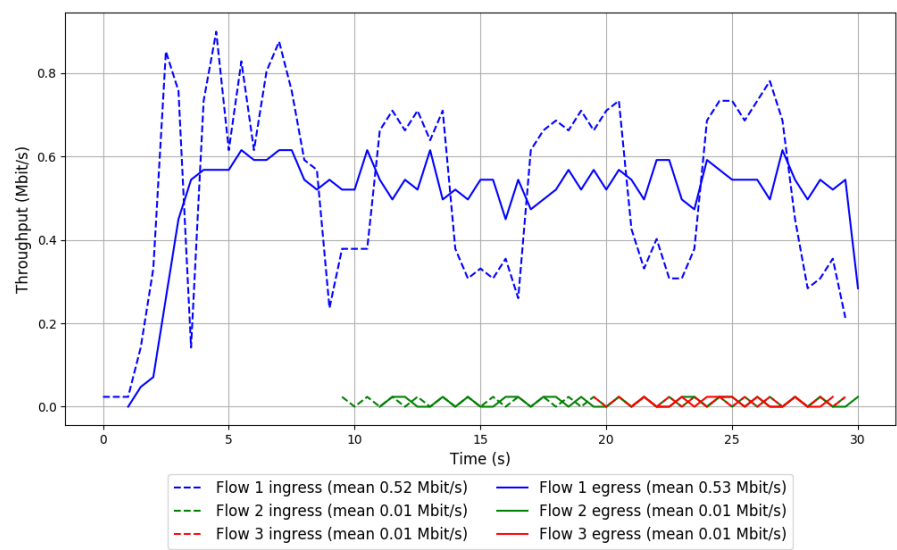
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1807.086 ms

Loss rate: 27.27%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

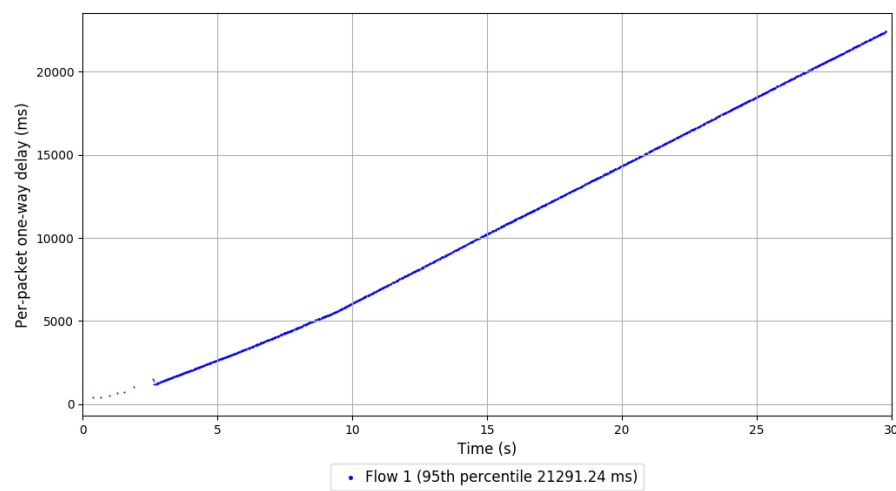
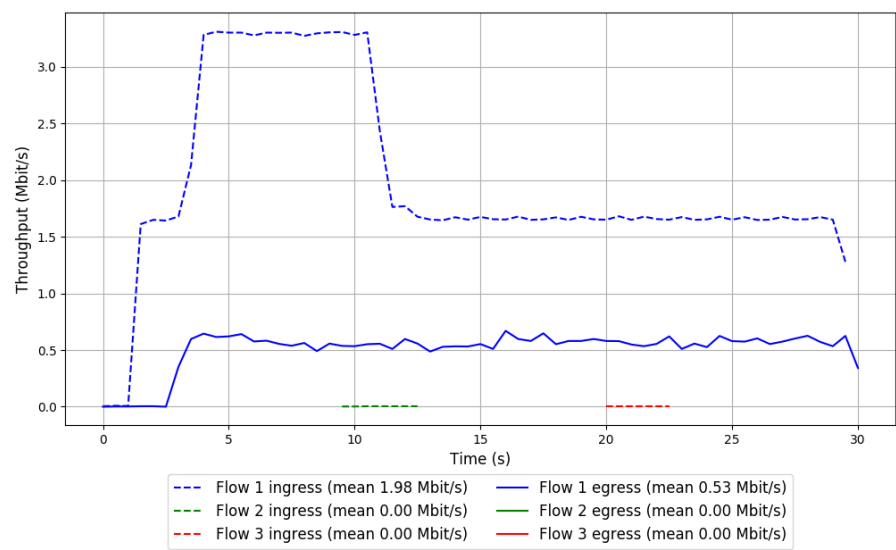
Start at: 2018-07-04 09:40:00

End at: 2018-07-04 09:40:30

Local clock offset: -2.095 ms

Remote clock offset: 6.693 ms

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

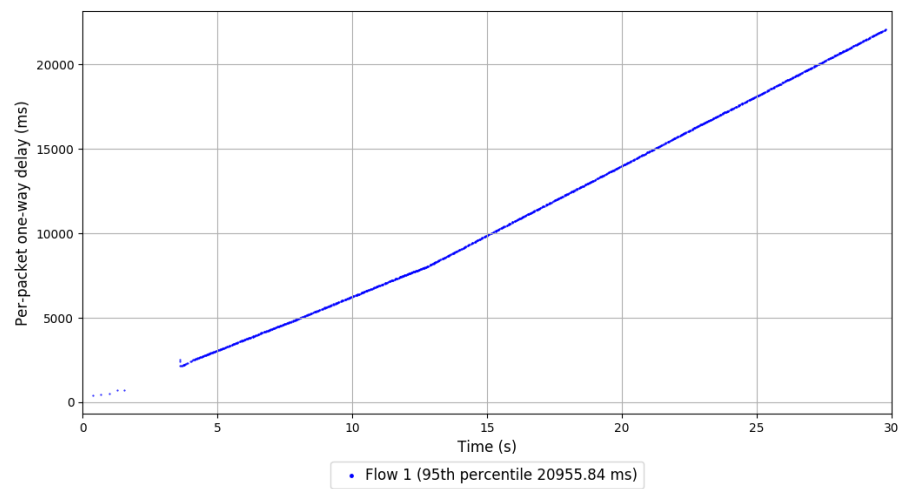
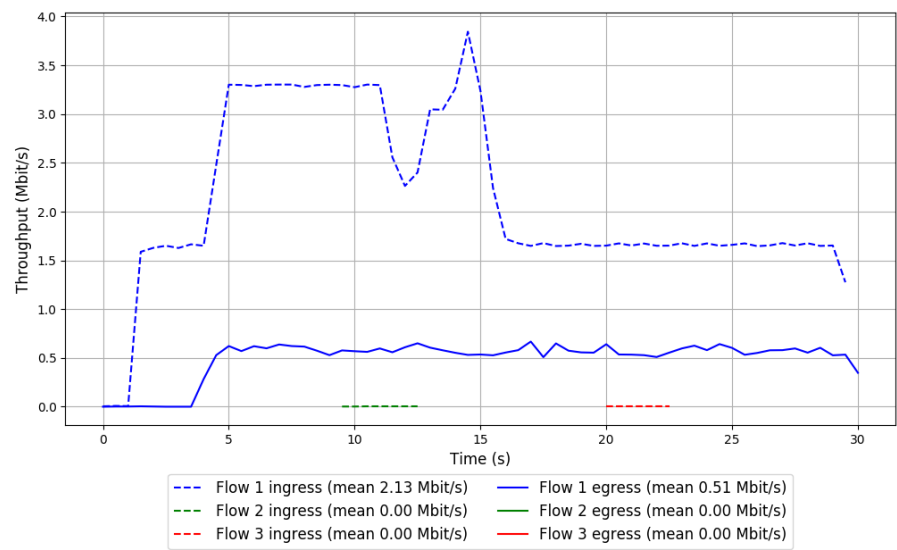
Start at: 2018-07-04 10:00:23

End at: 2018-07-04 10:00:53

Local clock offset: -2.565 ms

Remote clock offset: 7.62 ms

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

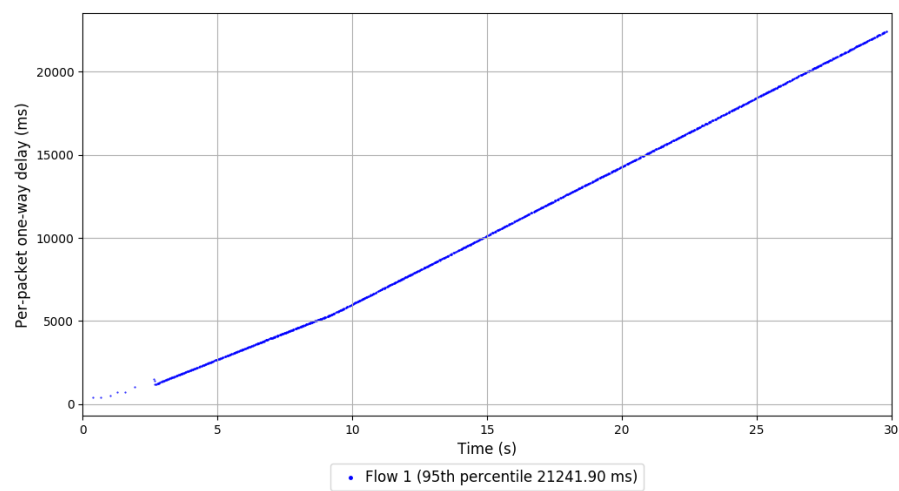
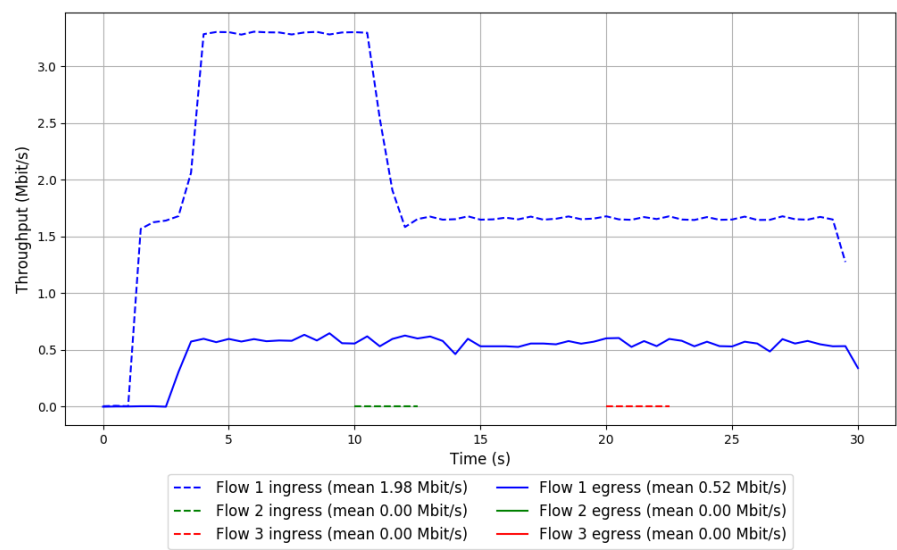
Start at: 2018-07-04 10:20:48

End at: 2018-07-04 10:21:18

Local clock offset: -2.193 ms

Remote clock offset: 7.524 ms

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-07-04 09:37:36

End at: 2018-07-04 09:38:06

Local clock offset: -2.183 ms

Remote clock offset: 2.725 ms

Below is generated by plot.py at 2018-07-04 10:23:13

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 1879.017 ms

Loss rate: 1.03%

-- Flow 1:

Average throughput: 0.17 Mbit/s

95th percentile per-packet one-way delay: 1892.983 ms

Loss rate: 0.32%

-- Flow 2:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 1902.481 ms

Loss rate: 0.10%

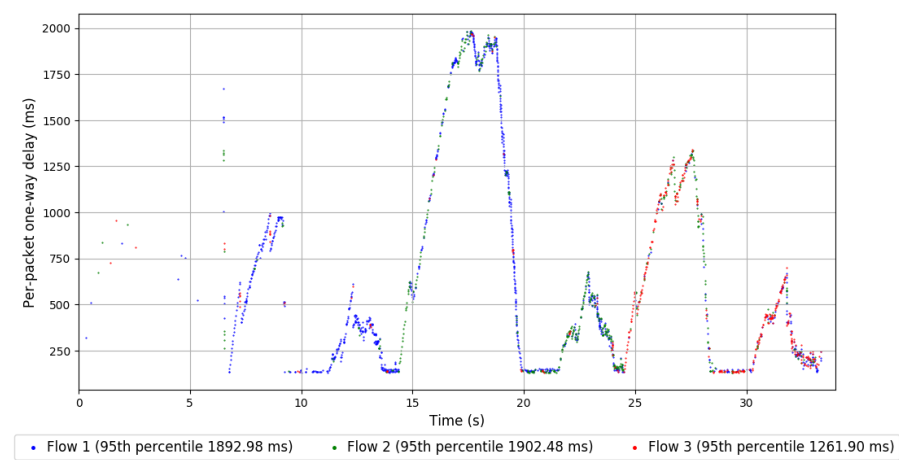
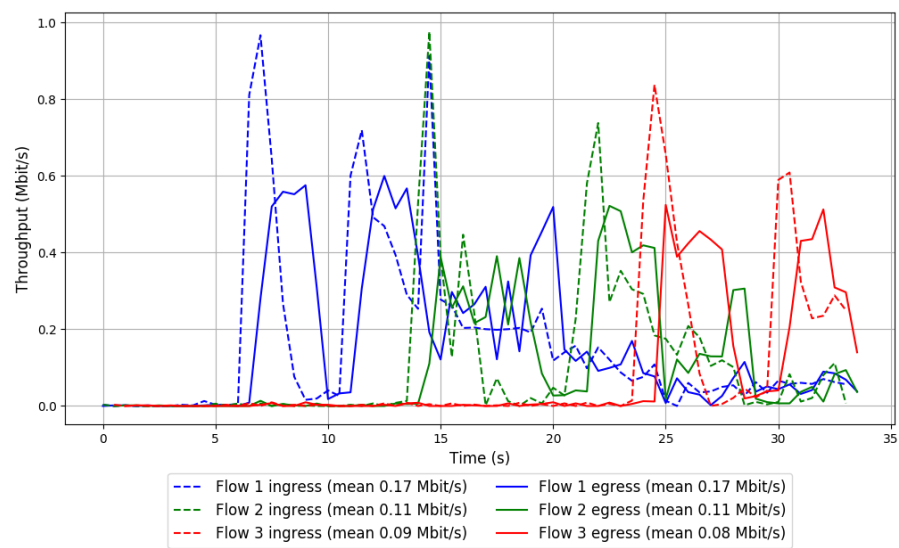
-- Flow 3:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 1261.902 ms

Loss rate: 3.67%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-07-04 09:58:00

End at: 2018-07-04 09:58:30

Local clock offset: -2.588 ms

Remote clock offset: 1.364 ms

Below is generated by plot.py at 2018-07-04 10:23:13

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 1199.511 ms

Loss rate: 0.96%

-- Flow 1:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 1087.735 ms

Loss rate: 0.44%

-- Flow 2:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 1194.216 ms

Loss rate: 0.44%

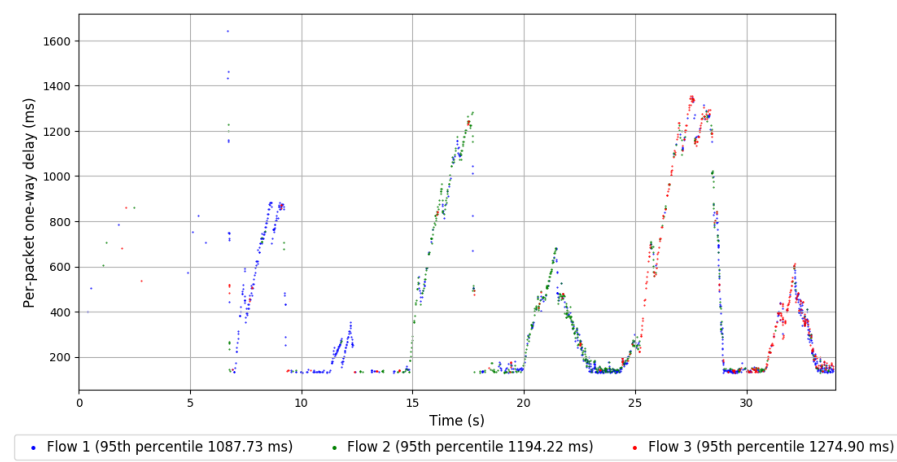
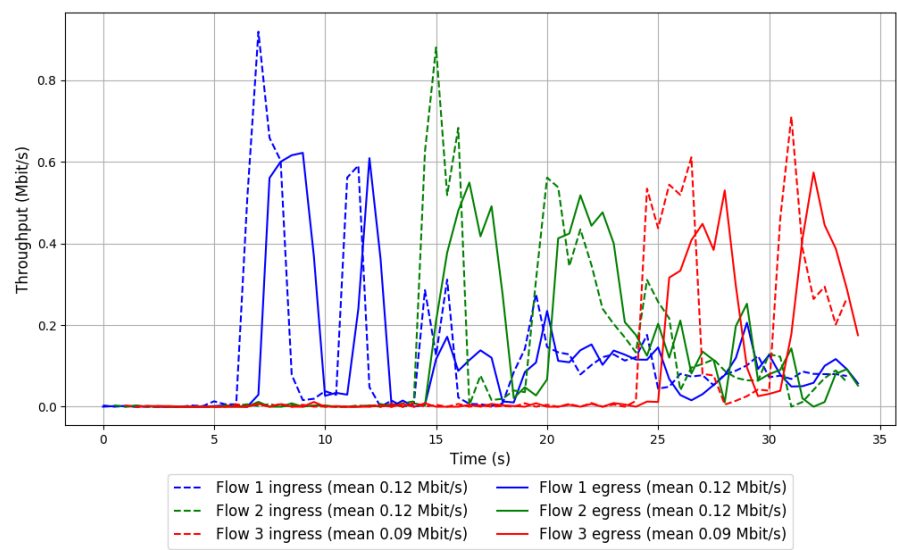
-- Flow 3:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 1274.899 ms

Loss rate: 2.44%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-07-04 10:18:25

End at: 2018-07-04 10:18:55

Local clock offset: -2.215 ms

Remote clock offset: 3.311 ms

Below is generated by plot.py at 2018-07-04 10:23:13

Datalink statistics

-- Total of 3 flows:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 1313.688 ms

Loss rate: 0.87%

-- Flow 1:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 1187.903 ms

Loss rate: 0.29%

-- Flow 2:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 1321.208 ms

Loss rate: 0.44%

-- Flow 3:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 1343.698 ms

Loss rate: 2.34%

Run 3: Report of WebRTC media — Data Link

