

Pantheon Report

Generated at 2018-04-17 01:22:26 (UTC).

Data path: AWS California 1 Ethernet (*local*) →Stanford ppp0 (*remote*).

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).

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

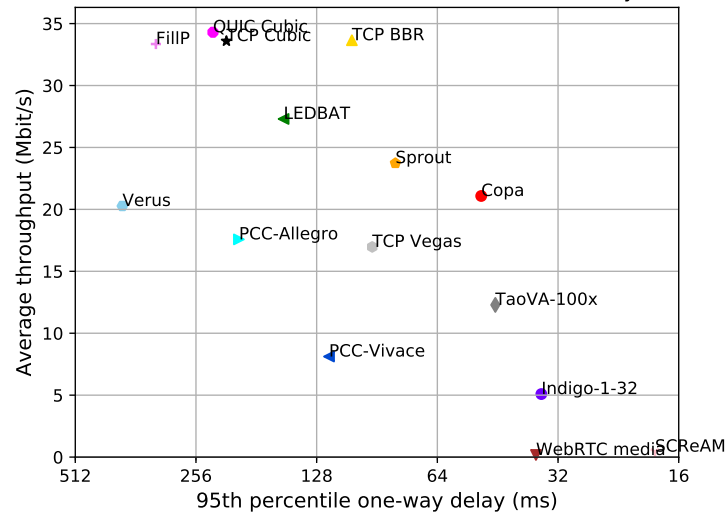
NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

Git summary:

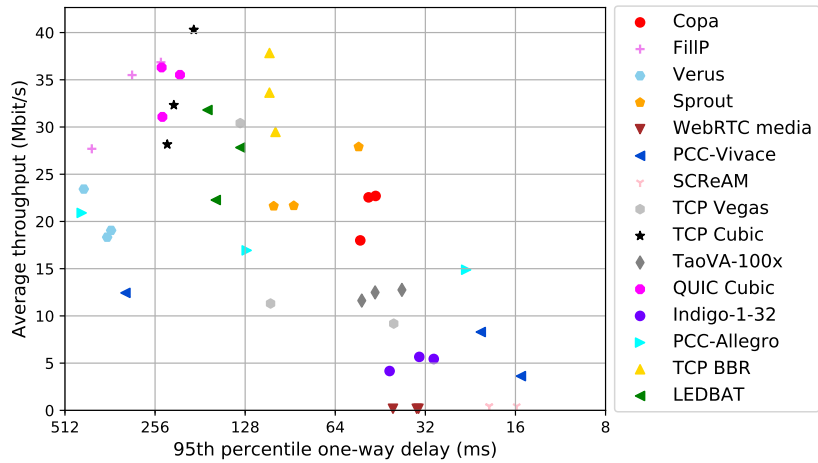
```
branch: master @ b3d6e7098641364fd3a292656a51aa81e316d0b4
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
M datagrump/sender.cc
third_party/fillp @ 11f8c46a2bf1dc797253db7e8ca04076272b2a44
third_party/genericCC @ d223989828276fa83a807da6e0341dc0c7b89aec
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaaeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
M src/examples/cellsim.cc
M src/examples/sproutbt2.cc
M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 7a4ba531e75b4a6f66f5c4580192120401784ce3
```

third_party/webrtc @ f271183af822eee5d0031620f4bebf38aedc5581

test from AWS California 1 Ethernet to Stanford ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)



test from AWS California 1 Ethernet to Stanford ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows

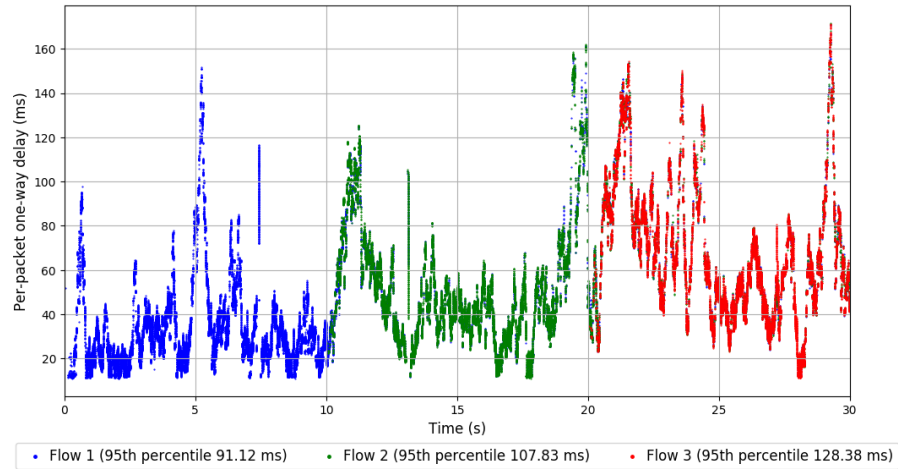
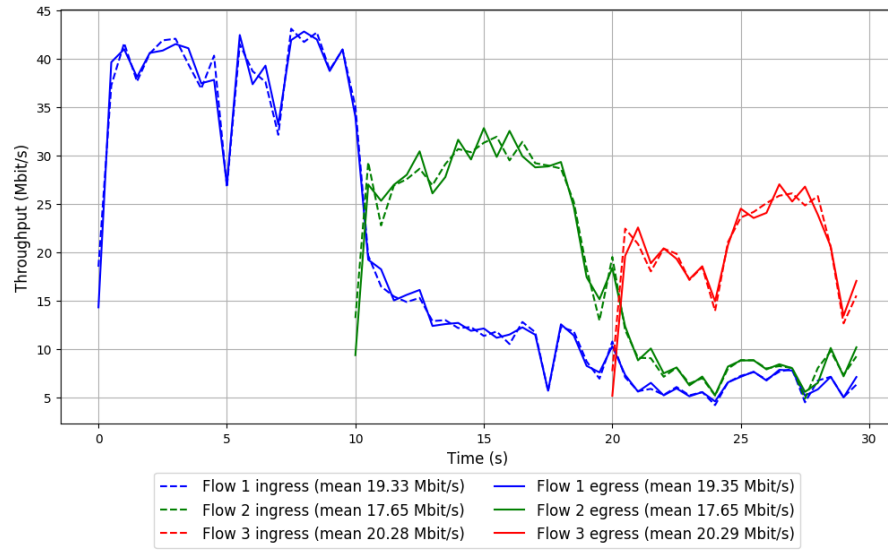


Run 1: Statistics of TCP BBR

Start at: 2018-04-17 00:27:33
End at: 2018-04-17 00:28:03
Local clock offset: 0.578 ms
Remote clock offset: -5.237 ms

Below is generated by plot.py at 2018-04-17 01:20:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 37.84 Mbit/s
95th percentile per-packet one-way delay: 106.136 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 19.35 Mbit/s
95th percentile per-packet one-way delay: 91.125 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 17.65 Mbit/s
95th percentile per-packet one-way delay: 107.832 ms
Loss rate: 0.06%
-- Flow 3:
Average throughput: 20.29 Mbit/s
95th percentile per-packet one-way delay: 128.384 ms
Loss rate: 0.12%

Run 1: Report of TCP BBR — Data Link

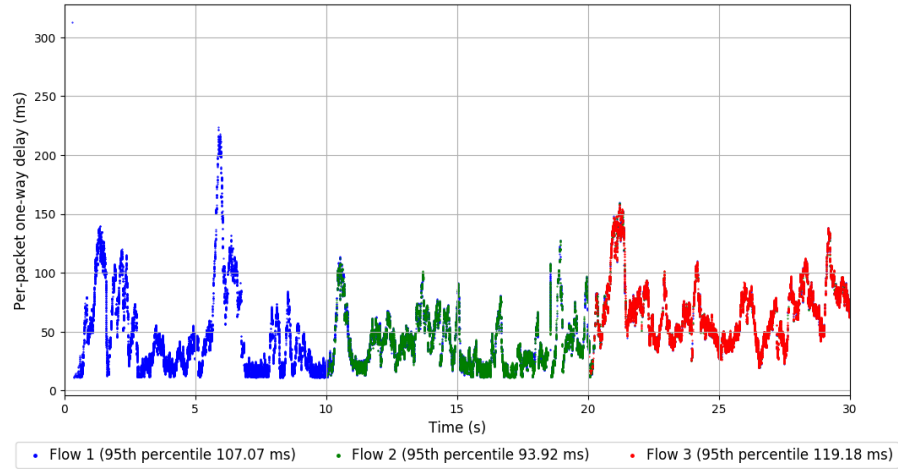
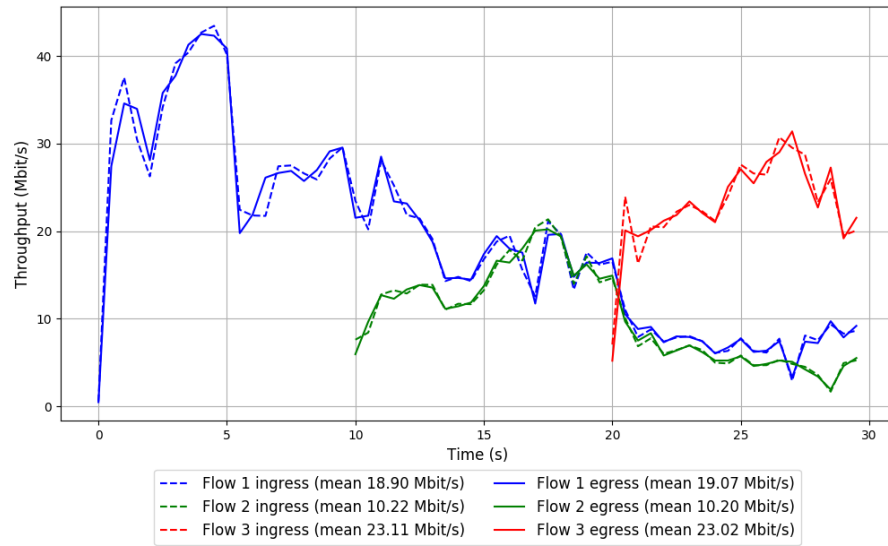


Run 2: Statistics of TCP BBR

Start at: 2018-04-17 00:50:08
End at: 2018-04-17 00:50:38
Local clock offset: 0.307 ms
Remote clock offset: -6.383 ms

Below is generated by plot.py at 2018-04-17 01:20:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 33.64 Mbit/s
95th percentile per-packet one-way delay: 106.166 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 19.07 Mbit/s
95th percentile per-packet one-way delay: 107.071 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 10.20 Mbit/s
95th percentile per-packet one-way delay: 93.919 ms
Loss rate: 0.14%
-- Flow 3:
Average throughput: 23.02 Mbit/s
95th percentile per-packet one-way delay: 119.176 ms
Loss rate: 0.41%

Run 2: Report of TCP BBR — Data Link

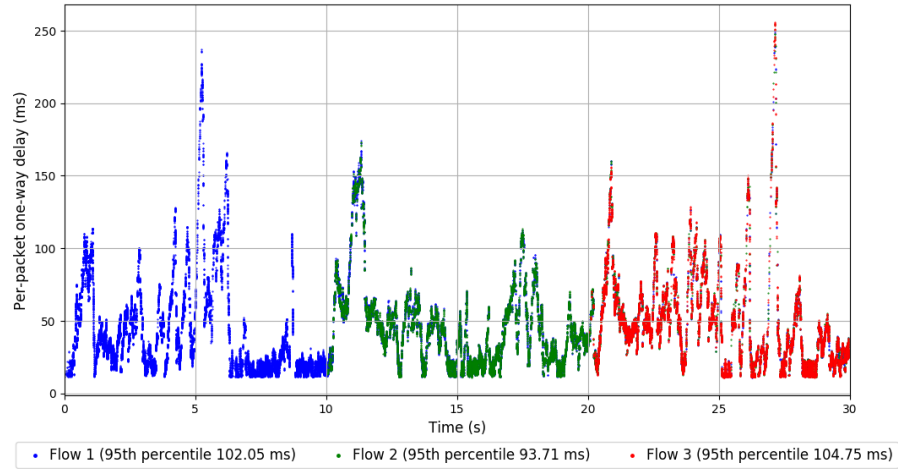
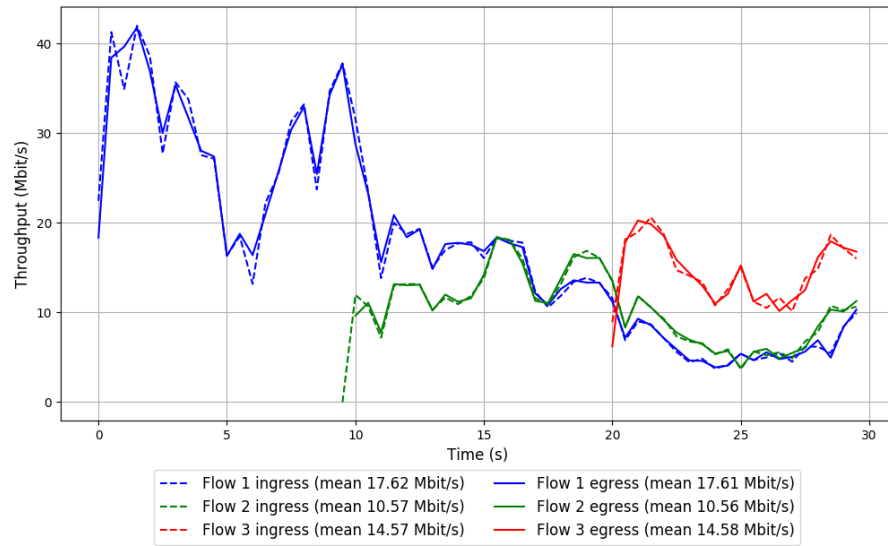


Run 3: Statistics of TCP BBR

Start at: 2018-04-17 01:12:42
End at: 2018-04-17 01:13:12
Local clock offset: 0.636 ms
Remote clock offset: -6.317 ms

Below is generated by plot.py at 2018-04-17 01:20:38
Datalink statistics
-- Total of 3 flows:
Average throughput: 29.48 Mbit/s
95th percentile per-packet one-way delay: 101.359 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 17.61 Mbit/s
95th percentile per-packet one-way delay: 102.053 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 10.56 Mbit/s
95th percentile per-packet one-way delay: 93.707 ms
Loss rate: 0.06%
-- Flow 3:
Average throughput: 14.58 Mbit/s
95th percentile per-packet one-way delay: 104.753 ms
Loss rate: 0.12%

Run 3: Report of TCP BBR — Data Link

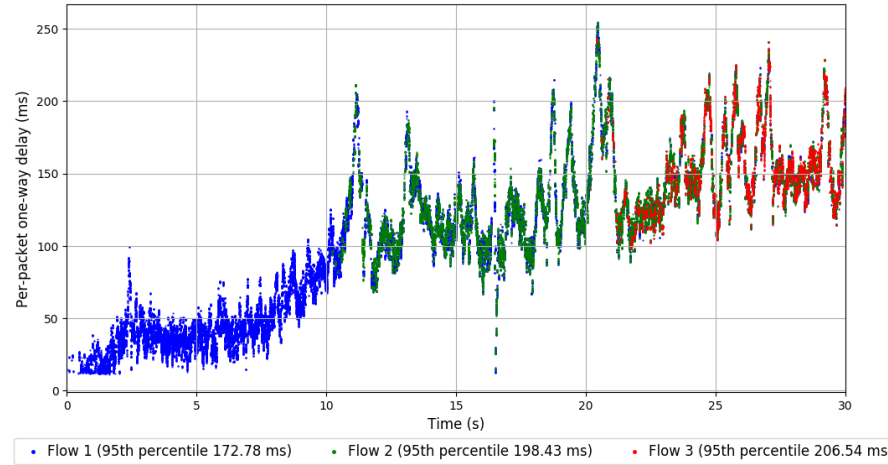
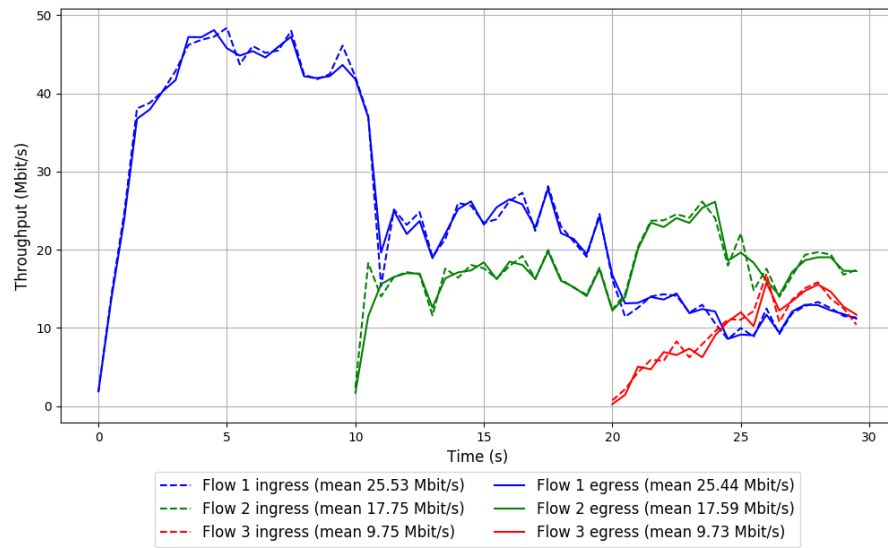


Run 1: Statistics of TCP Cubic

Start at: 2018-04-17 00:26:12
End at: 2018-04-17 00:26:42
Local clock offset: 0.521 ms
Remote clock offset: -5.046 ms

Below is generated by plot.py at 2018-04-17 01:20:39
Datalink statistics
-- Total of 3 flows:
Average throughput: 40.29 Mbit/s
95th percentile per-packet one-way delay: 190.077 ms
Loss rate: 0.69%
-- Flow 1:
Average throughput: 25.44 Mbit/s
95th percentile per-packet one-way delay: 172.778 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 17.59 Mbit/s
95th percentile per-packet one-way delay: 198.426 ms
Loss rate: 1.26%
-- Flow 3:
Average throughput: 9.73 Mbit/s
95th percentile per-packet one-way delay: 206.536 ms
Loss rate: 1.41%

Run 1: Report of TCP Cubic — Data Link

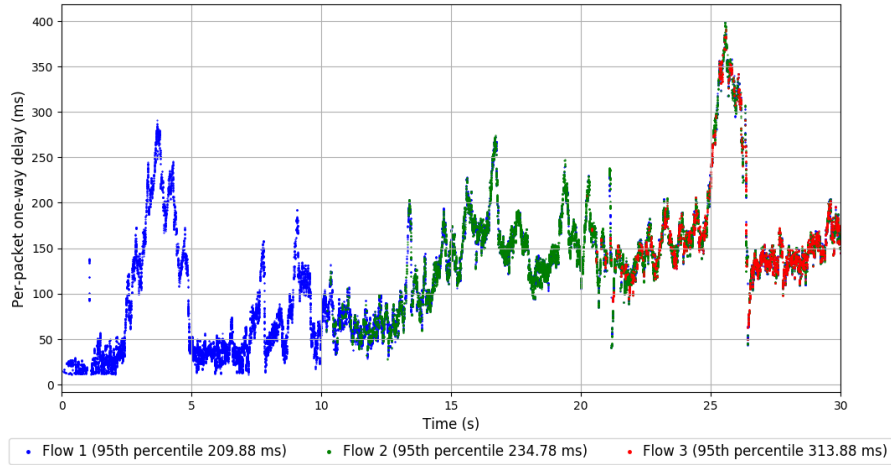
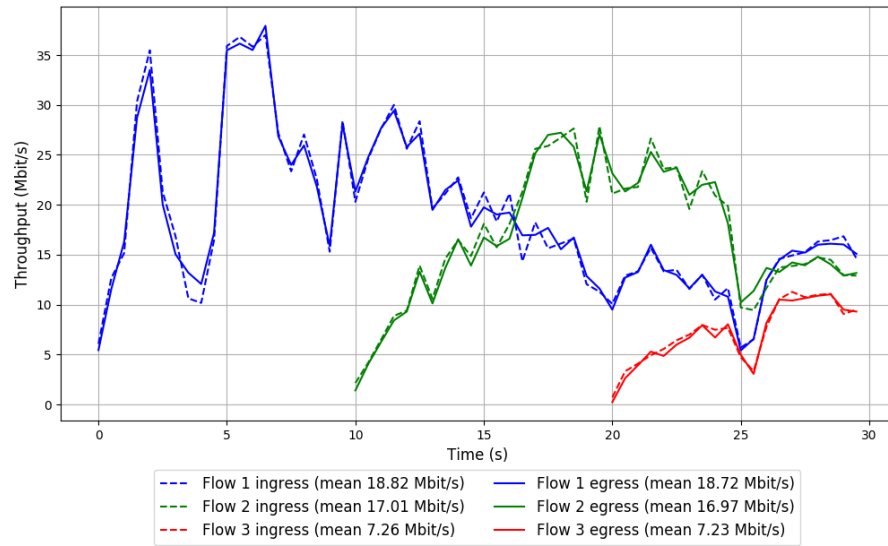


Run 2: Statistics of TCP Cubic

Start at: 2018-04-17 00:48:47
End at: 2018-04-17 00:49:17
Local clock offset: 0.307 ms
Remote clock offset: -6.377 ms

Below is generated by plot.py at 2018-04-17 01:20:39
Datalink statistics
-- Total of 3 flows:
Average throughput: 32.32 Mbit/s
95th percentile per-packet one-way delay: 221.586 ms
Loss rate: 0.68%
-- Flow 1:
Average throughput: 18.72 Mbit/s
95th percentile per-packet one-way delay: 209.885 ms
Loss rate: 0.51%
-- Flow 2:
Average throughput: 16.97 Mbit/s
95th percentile per-packet one-way delay: 234.781 ms
Loss rate: 0.62%
-- Flow 3:
Average throughput: 7.23 Mbit/s
95th percentile per-packet one-way delay: 313.885 ms
Loss rate: 2.34%

Run 2: Report of TCP Cubic — Data Link

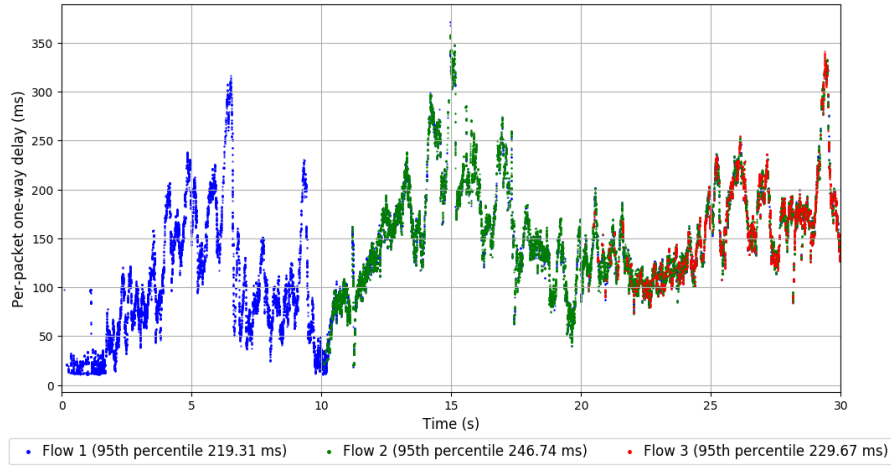
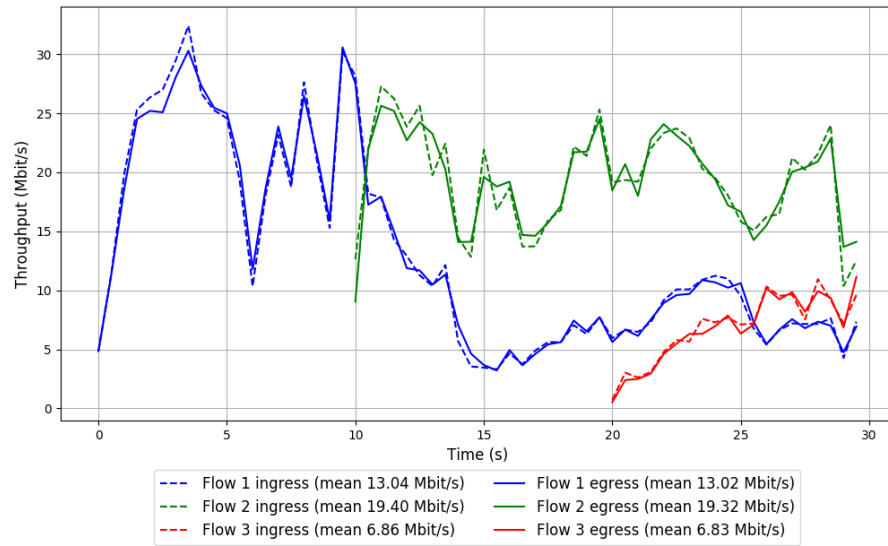


Run 3: Statistics of TCP Cubic

Start at: 2018-04-17 01:11:22
End at: 2018-04-17 01:11:52
Local clock offset: 0.748 ms
Remote clock offset: -6.379 ms

Below is generated by plot.py at 2018-04-17 01:20:39
Datalink statistics
-- Total of 3 flows:
Average throughput: 28.16 Mbit/s
95th percentile per-packet one-way delay: 233.062 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 13.02 Mbit/s
95th percentile per-packet one-way delay: 219.305 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 19.32 Mbit/s
95th percentile per-packet one-way delay: 246.738 ms
Loss rate: 0.48%
-- Flow 3:
Average throughput: 6.83 Mbit/s
95th percentile per-packet one-way delay: 229.674 ms
Loss rate: 1.74%

Run 3: Report of TCP Cubic — Data Link

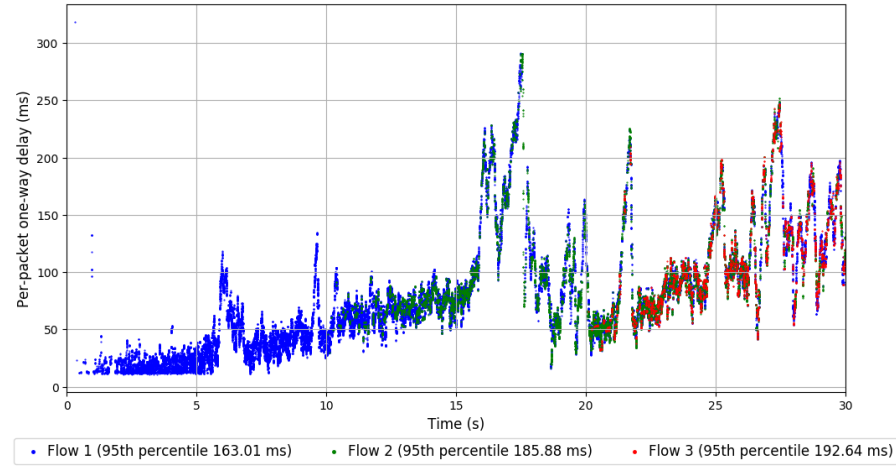
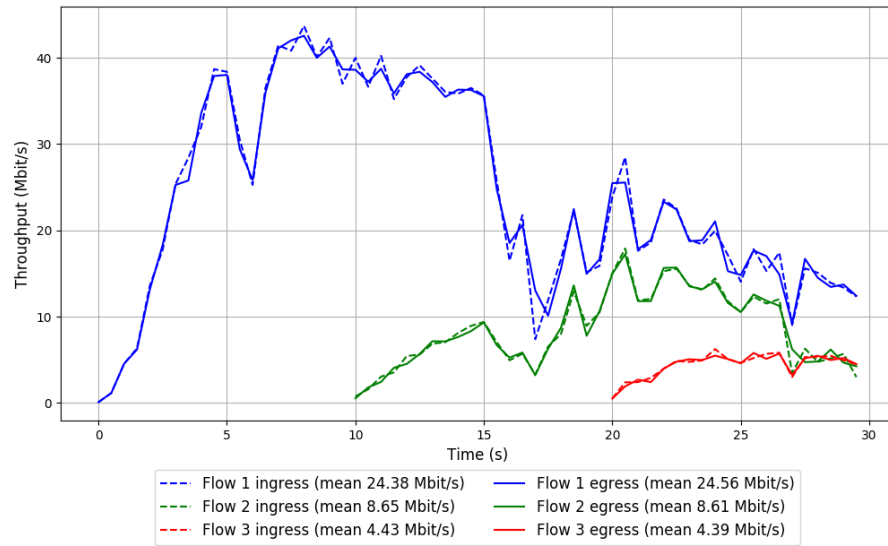


Run 1: Statistics of LEDBAT

Start at: 2018-04-17 00:23:33
End at: 2018-04-17 00:24:03
Local clock offset: 0.585 ms
Remote clock offset: -4.885 ms

Below is generated by plot.py at 2018-04-17 01:20:39
Datalink statistics
-- Total of 3 flows:
Average throughput: 31.80 Mbit/s
95th percentile per-packet one-way delay: 171.084 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 24.56 Mbit/s
95th percentile per-packet one-way delay: 163.013 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 8.61 Mbit/s
95th percentile per-packet one-way delay: 185.875 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 4.39 Mbit/s
95th percentile per-packet one-way delay: 192.640 ms
Loss rate: 1.39%

Run 1: Report of LEDBAT — Data Link

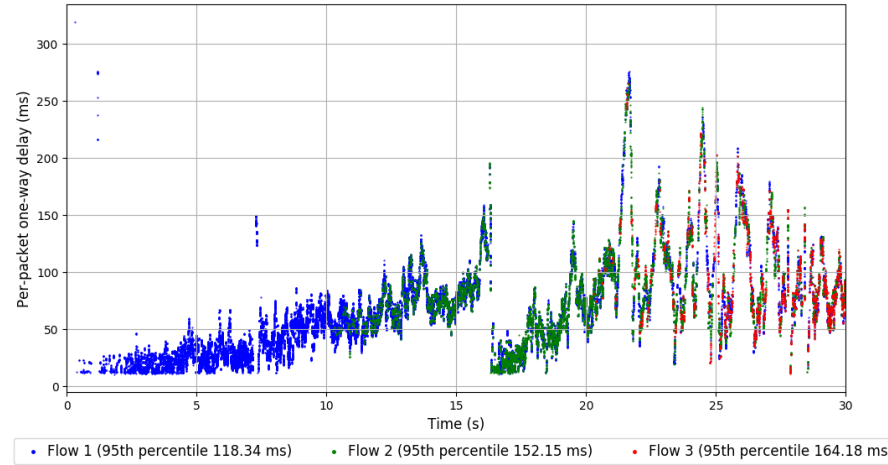
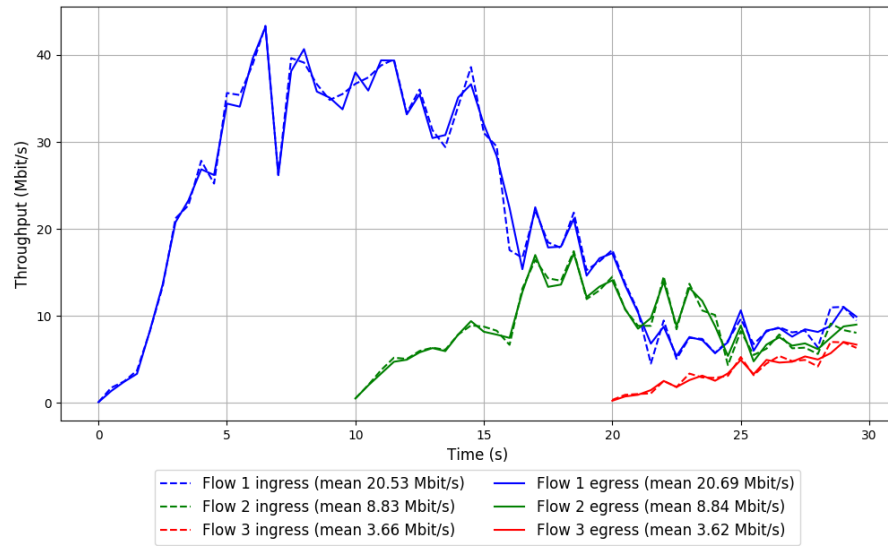


Run 2: Statistics of LEDBAT

Start at: 2018-04-17 00:46:07
End at: 2018-04-17 00:46:37
Local clock offset: 0.359 ms
Remote clock offset: -6.315 ms

Below is generated by plot.py at 2018-04-17 01:20:39
Datalink statistics
-- Total of 3 flows:
Average throughput: 27.83 Mbit/s
95th percentile per-packet one-way delay: 132.845 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 20.69 Mbit/s
95th percentile per-packet one-way delay: 118.340 ms
Loss rate: 0.20%
-- Flow 2:
Average throughput: 8.84 Mbit/s
95th percentile per-packet one-way delay: 152.153 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 3.62 Mbit/s
95th percentile per-packet one-way delay: 164.176 ms
Loss rate: 1.19%

Run 2: Report of LEDBAT — Data Link

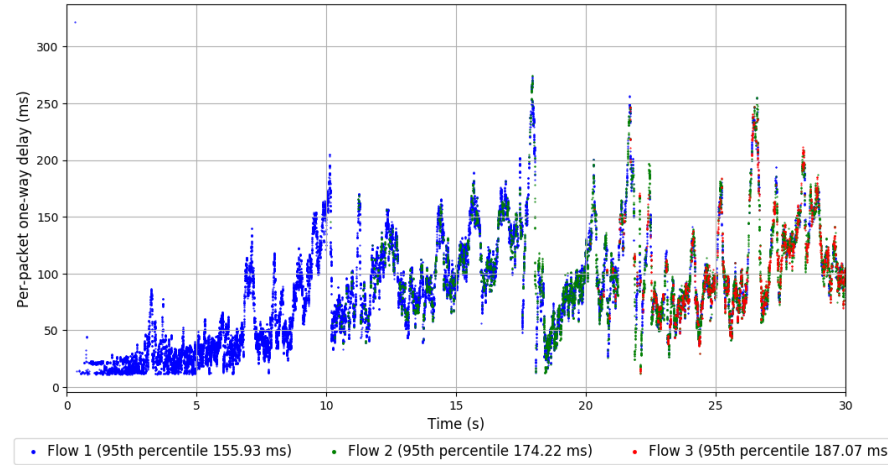
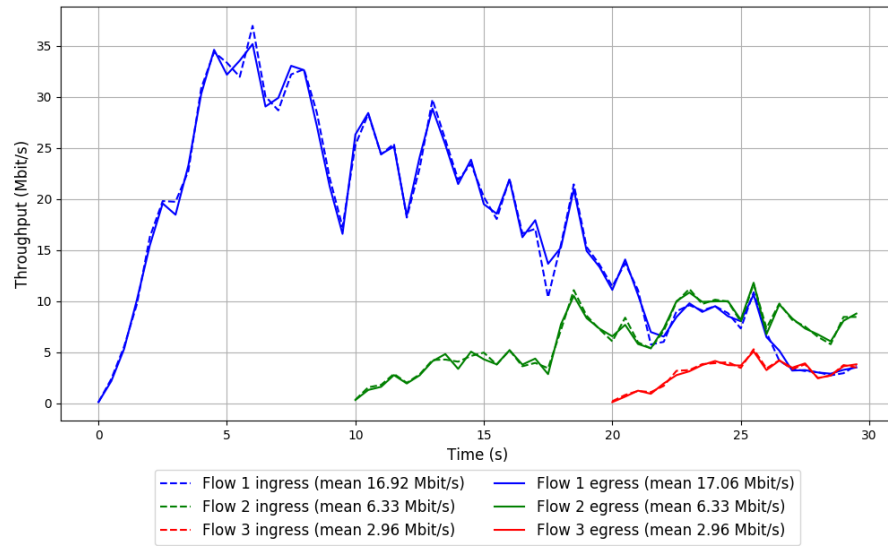


Run 3: Statistics of LEDBAT

Start at: 2018-04-17 01:08:43
End at: 2018-04-17 01:09:13
Local clock offset: 0.706 ms
Remote clock offset: -6.371 ms

Below is generated by plot.py at 2018-04-17 01:20:56
Datalink statistics
-- Total of 3 flows:
Average throughput: 22.27 Mbit/s
95th percentile per-packet one-way delay: 160.486 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 17.06 Mbit/s
95th percentile per-packet one-way delay: 155.927 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 6.33 Mbit/s
95th percentile per-packet one-way delay: 174.219 ms
Loss rate: 0.68%
-- Flow 3:
Average throughput: 2.96 Mbit/s
95th percentile per-packet one-way delay: 187.072 ms
Loss rate: 1.03%

Run 3: Report of LEDBAT — Data Link

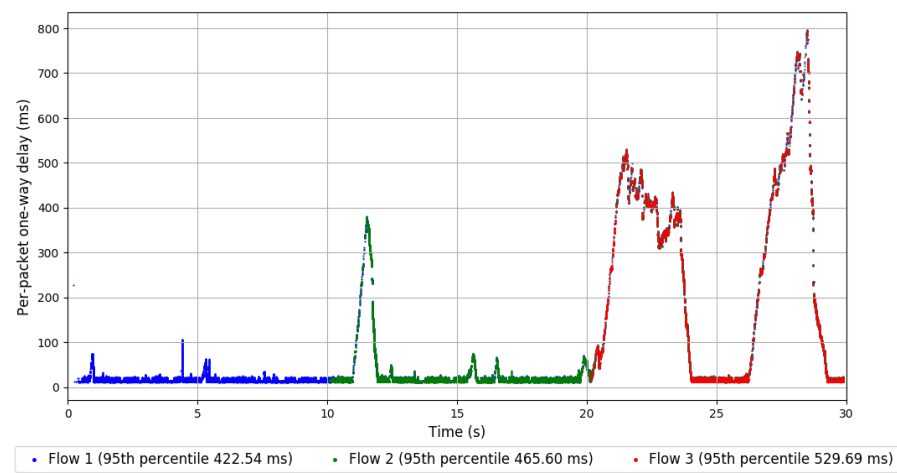
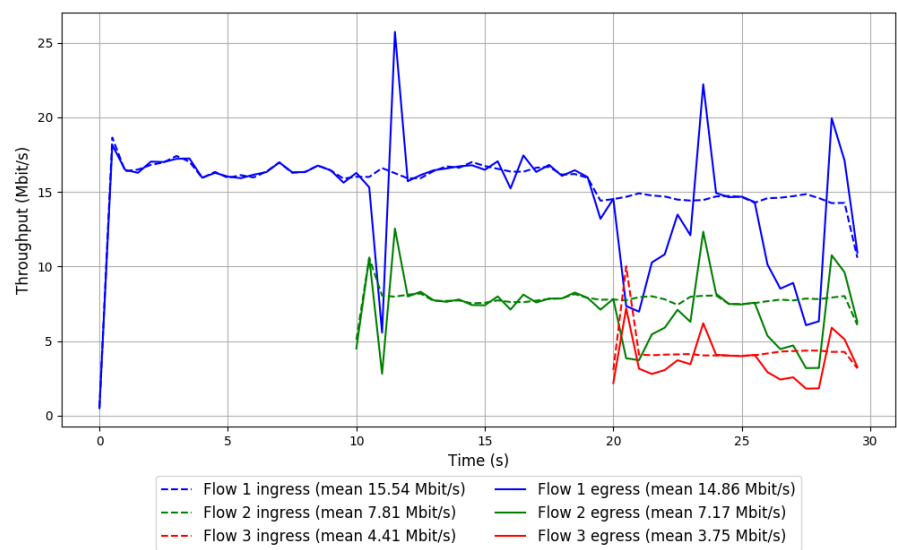


Run 1: Statistics of PCC-Allegro

Start at: 2018-04-17 00:24:53
End at: 2018-04-17 00:25:23
Local clock offset: 0.625 ms
Remote clock offset: -4.868 ms

Below is generated by plot.py at 2018-04-17 01:20:57
Datalink statistics
-- Total of 3 flows:
Average throughput: 20.91 Mbit/s
95th percentile per-packet one-way delay: 450.138 ms
Loss rate: 6.47%
-- Flow 1:
Average throughput: 14.86 Mbit/s
95th percentile per-packet one-way delay: 422.541 ms
Loss rate: 5.09%
-- Flow 2:
Average throughput: 7.17 Mbit/s
95th percentile per-packet one-way delay: 465.596 ms
Loss rate: 8.17%
-- Flow 3:
Average throughput: 3.75 Mbit/s
95th percentile per-packet one-way delay: 529.686 ms
Loss rate: 15.20%

Run 1: Report of PCC-Allegro — Data Link

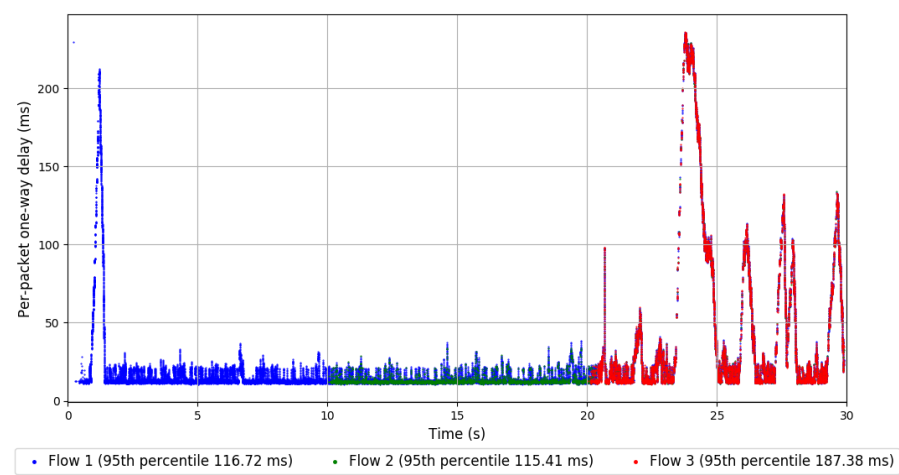
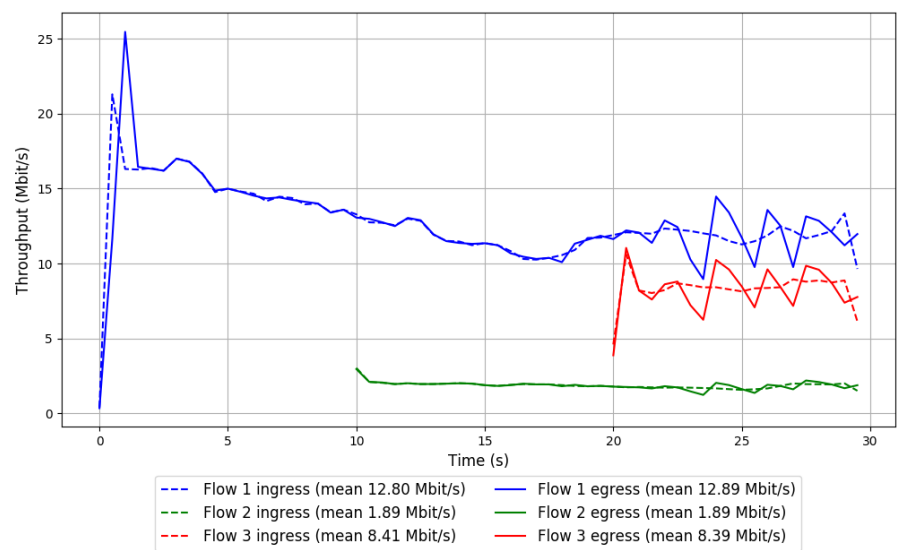


Run 2: Statistics of PCC-Allegro

Start at: 2018-04-17 00:47:28
End at: 2018-04-17 00:47:58
Local clock offset: 0.233 ms
Remote clock offset: -6.288 ms

Below is generated by plot.py at 2018-04-17 01:20:57
Datalink statistics
-- Total of 3 flows:
Average throughput: 16.94 Mbit/s
95th percentile per-packet one-way delay: 126.494 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 12.89 Mbit/s
95th percentile per-packet one-way delay: 116.725 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 115.412 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 8.39 Mbit/s
95th percentile per-packet one-way delay: 187.381 ms
Loss rate: 0.07%

Run 2: Report of PCC-Allegro — Data Link

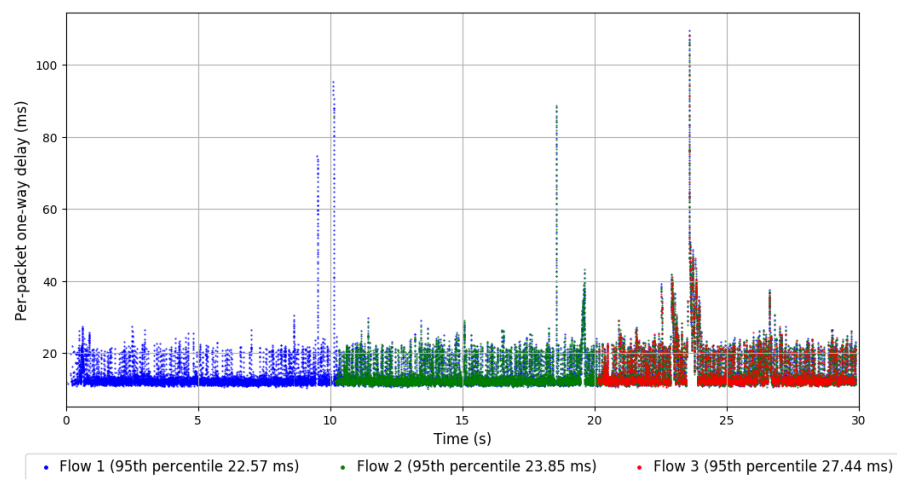
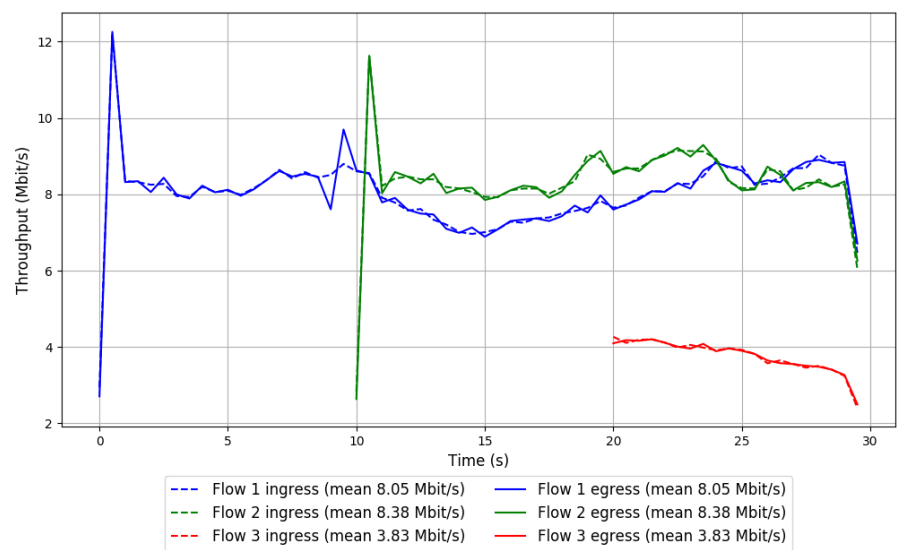


Run 3: Statistics of PCC-Allegro

Start at: 2018-04-17 01:10:03
End at: 2018-04-17 01:10:33
Local clock offset: 0.703 ms
Remote clock offset: -6.333 ms

Below is generated by plot.py at 2018-04-17 01:20:57
Datalink statistics
-- Total of 3 flows:
Average throughput: 14.89 Mbit/s
95th percentile per-packet one-way delay: 23.376 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 8.05 Mbit/s
95th percentile per-packet one-way delay: 22.573 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 8.38 Mbit/s
95th percentile per-packet one-way delay: 23.846 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 3.83 Mbit/s
95th percentile per-packet one-way delay: 27.441 ms
Loss rate: 0.00%

Run 3: Report of PCC-Allegro — Data Link

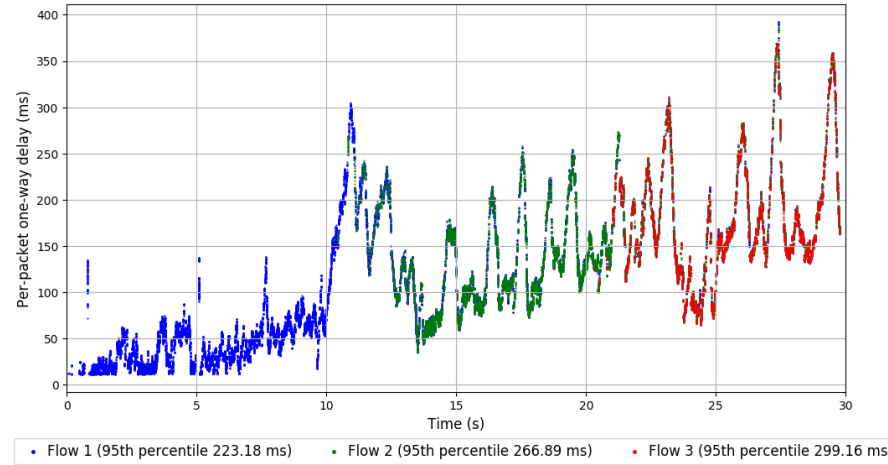
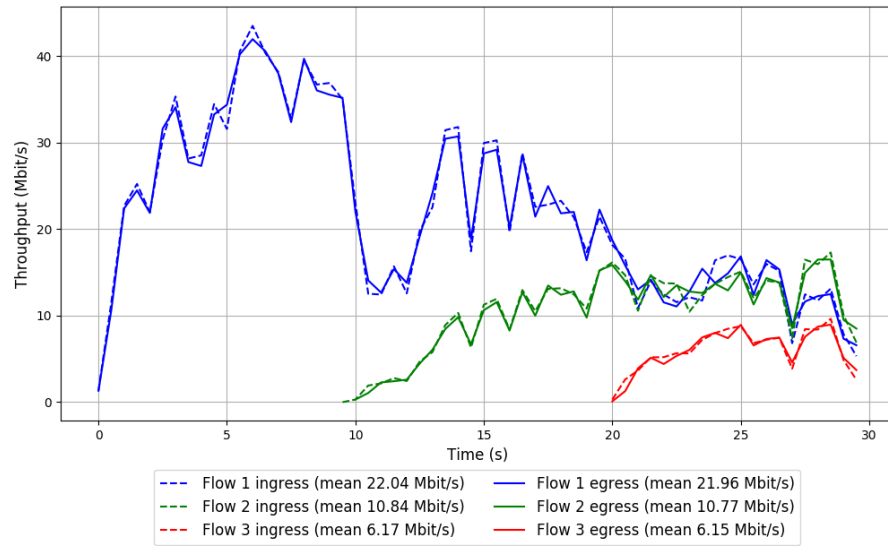


Run 1: Statistics of QUIC Cubic

Start at: 2018-04-17 00:19:33
End at: 2018-04-17 00:20:03
Local clock offset: 0.698 ms
Remote clock offset: -4.888 ms

Below is generated by plot.py at 2018-04-17 01:21:13
Datalink statistics
-- Total of 3 flows:
Average throughput: 31.07 Mbit/s
95th percentile per-packet one-way delay: 241.956 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 21.96 Mbit/s
95th percentile per-packet one-way delay: 223.183 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 10.77 Mbit/s
95th percentile per-packet one-way delay: 266.891 ms
Loss rate: 1.13%
-- Flow 3:
Average throughput: 6.15 Mbit/s
95th percentile per-packet one-way delay: 299.160 ms
Loss rate: 1.62%

Run 1: Report of QUIC Cubic — Data Link

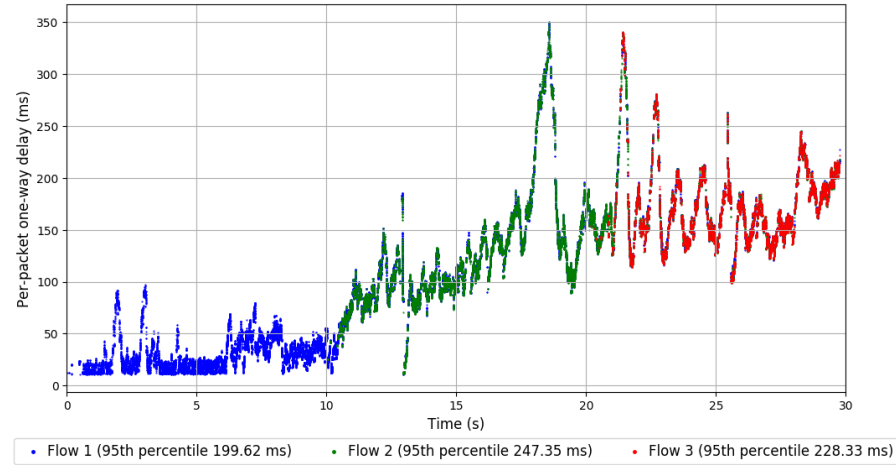
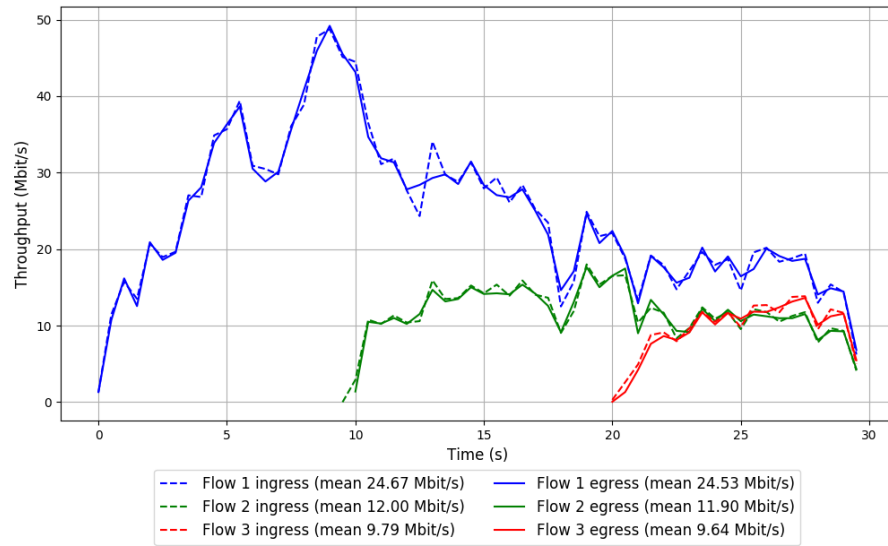


Run 2: Statistics of QUIC Cubic

Start at: 2018-04-17 00:42:07
End at: 2018-04-17 00:42:37
Local clock offset: 0.283 ms
Remote clock offset: -6.121 ms

Below is generated by plot.py at 2018-04-17 01:21:22
Datalink statistics
-- Total of 3 flows:
Average throughput: 35.52 Mbit/s
95th percentile per-packet one-way delay: 211.334 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 24.53 Mbit/s
95th percentile per-packet one-way delay: 199.616 ms
Loss rate: 0.52%
-- Flow 2:
Average throughput: 11.90 Mbit/s
95th percentile per-packet one-way delay: 247.352 ms
Loss rate: 1.03%
-- Flow 3:
Average throughput: 9.64 Mbit/s
95th percentile per-packet one-way delay: 228.334 ms
Loss rate: 2.88%

Run 2: Report of QUIC Cubic — Data Link

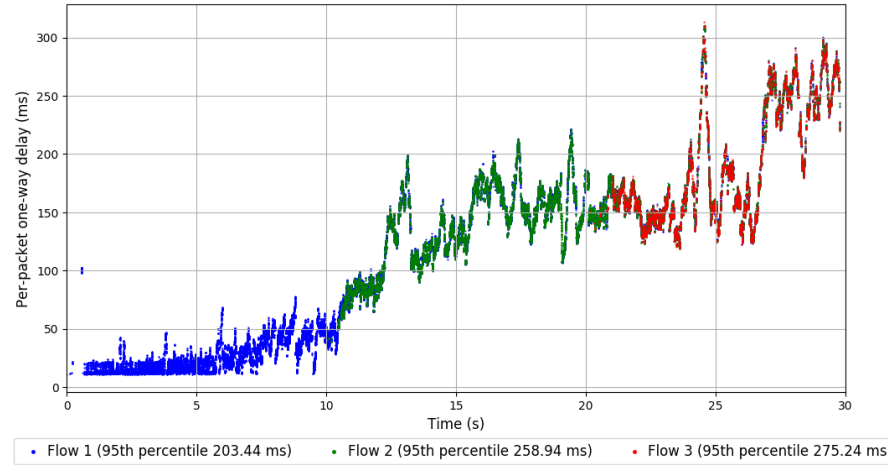
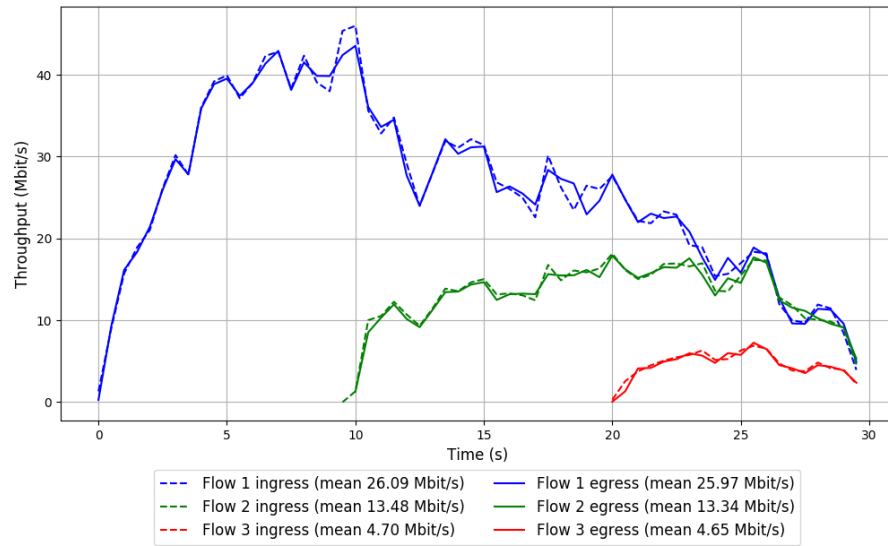


Run 3: Statistics of QUIC Cubic

Start at: 2018-04-17 01:04:43
End at: 2018-04-17 01:05:13
Local clock offset: 0.68 ms
Remote clock offset: -6.378 ms

Below is generated by plot.py at 2018-04-17 01:21:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 36.31 Mbit/s
95th percentile per-packet one-way delay: 243.382 ms
Loss rate: 0.69%
-- Flow 1:
Average throughput: 25.97 Mbit/s
95th percentile per-packet one-way delay: 203.442 ms
Loss rate: 0.44%
-- Flow 2:
Average throughput: 13.34 Mbit/s
95th percentile per-packet one-way delay: 258.938 ms
Loss rate: 1.10%
-- Flow 3:
Average throughput: 4.65 Mbit/s
95th percentile per-packet one-way delay: 275.238 ms
Loss rate: 2.57%

Run 3: Report of QUIC Cubic — Data Link

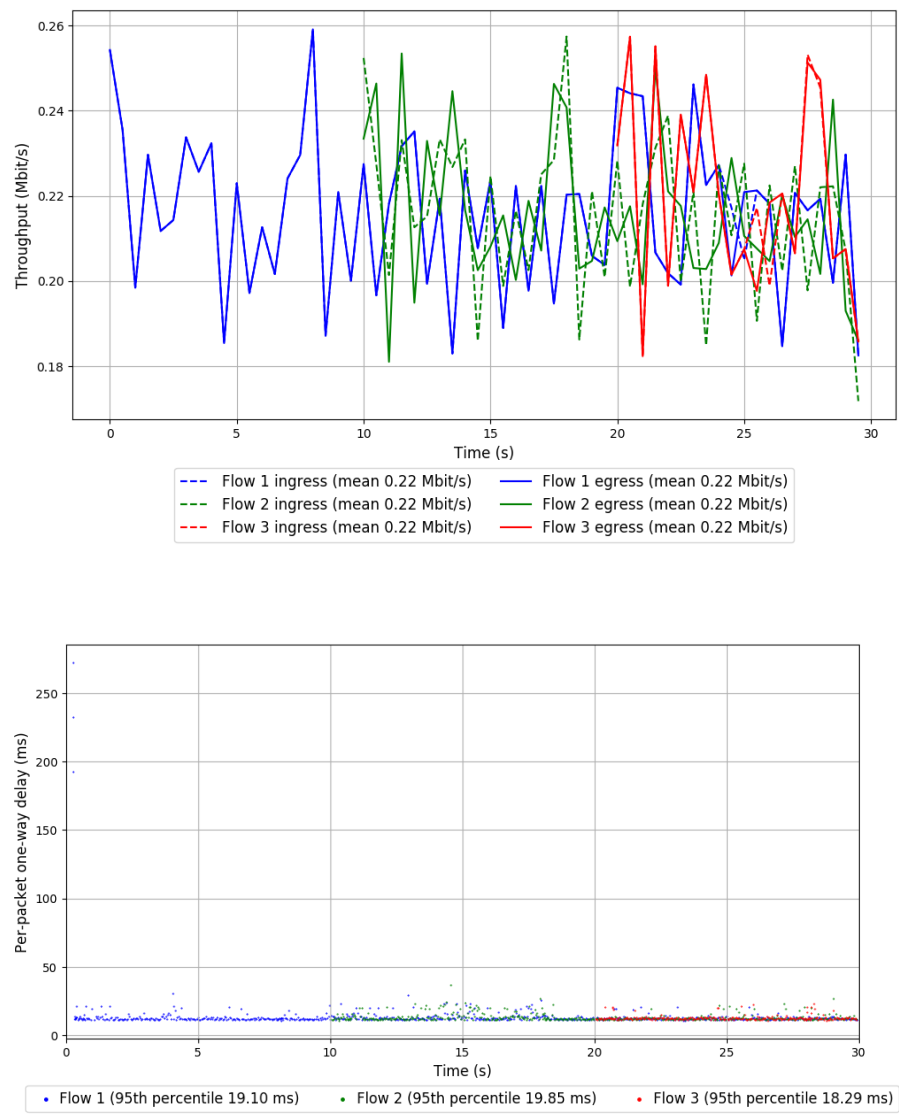


```
Run 1: Statistics of SReAM

Start at: 2018-04-17 00:15:37
End at: 2018-04-17 00:16:07
Local clock offset: 0.937 ms
Remote clock offset: -4.94 ms

# Below is generated by plot.py at 2018-04-17 01:21:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 19.579 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 19.102 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 19.853 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 18.289 ms
Loss rate: 0.00%
```

Run 1: Report of SReAM — Data Link

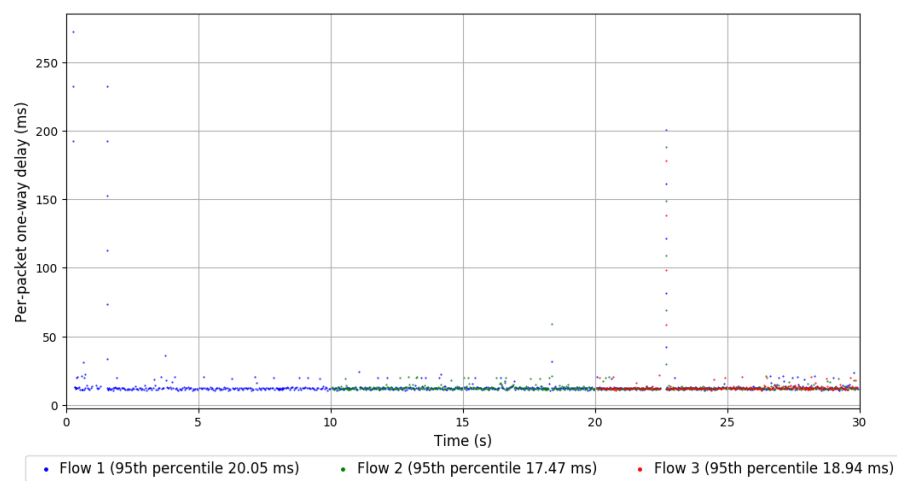
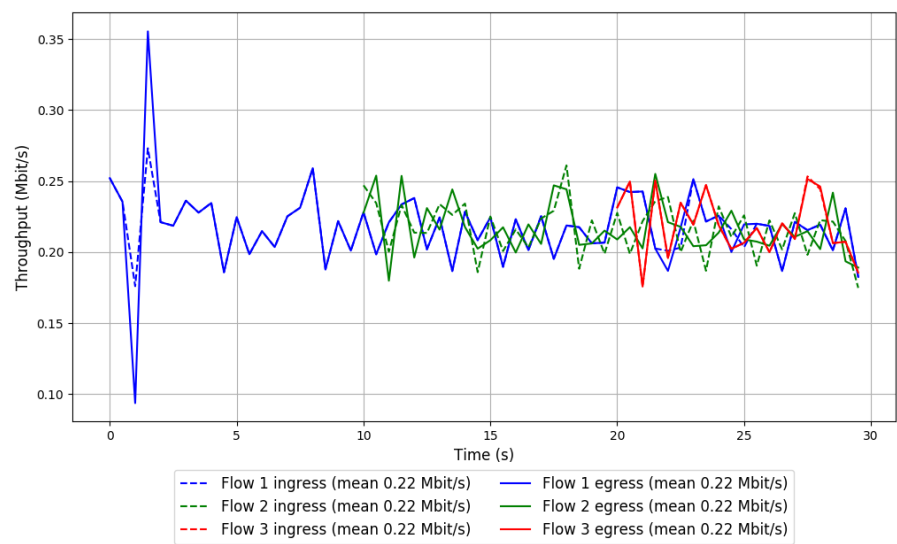


Run 2: Statistics of SReAM

Start at: 2018-04-17 00:38:10
End at: 2018-04-17 00:38:40
Local clock offset: 0.432 ms
Remote clock offset: -6.059 ms

Below is generated by plot.py at 2018-04-17 01:21:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 19.593 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.051 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 17.470 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 18.942 ms
Loss rate: 0.00%

Run 2: Report of SReAM — Data Link

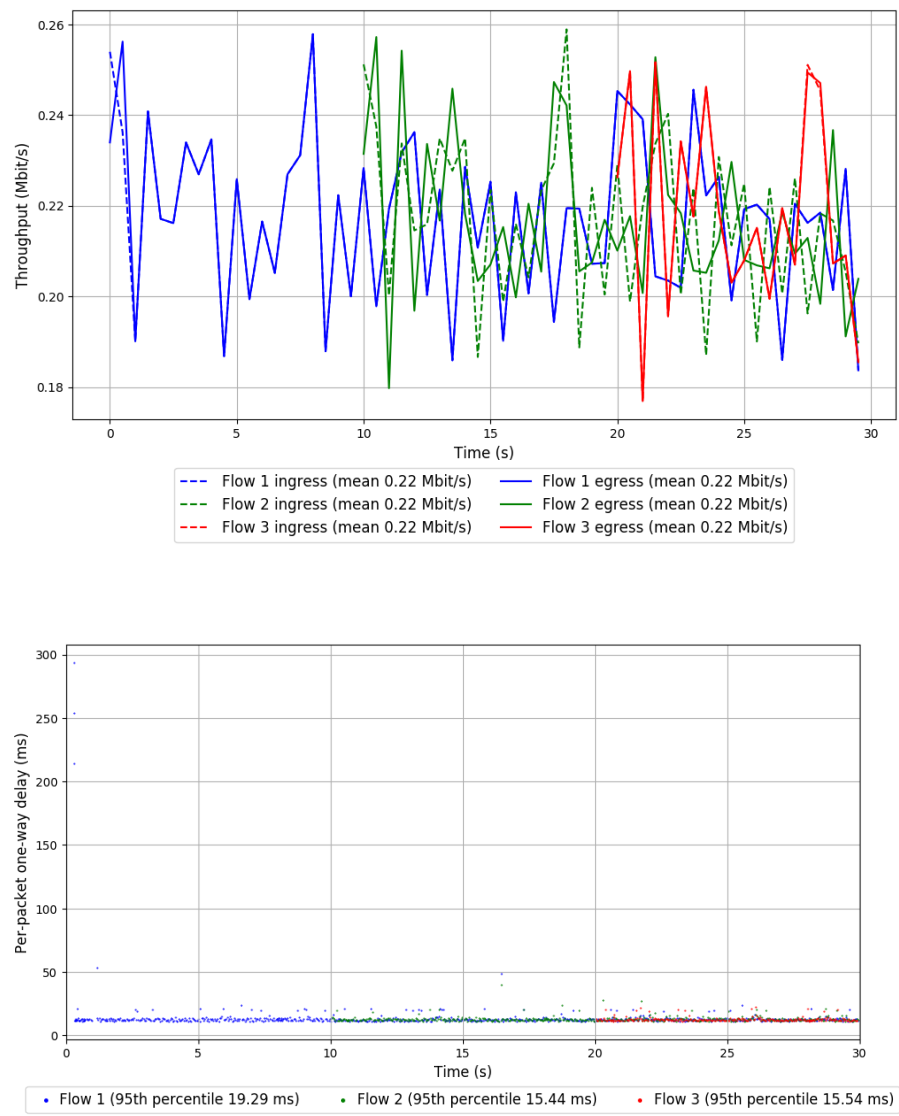


Run 3: Statistics of SReAM

Start at: 2018-04-17 01:00:46
End at: 2018-04-17 01:01:16
Local clock offset: 0.602 ms
Remote clock offset: -6.491 ms

Below is generated by plot.py at 2018-04-17 01:21:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 15.847 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 19.291 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 15.442 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 15.541 ms
Loss rate: 0.00%

Run 3: Report of SReAM — Data Link

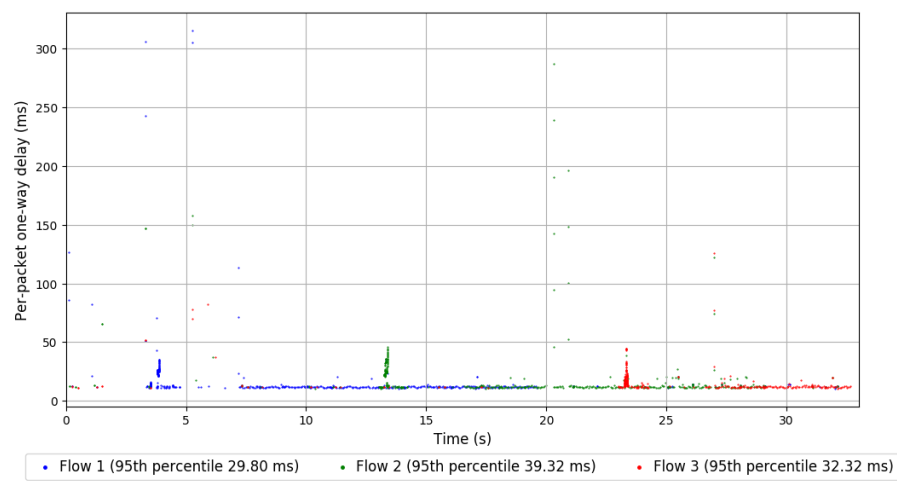
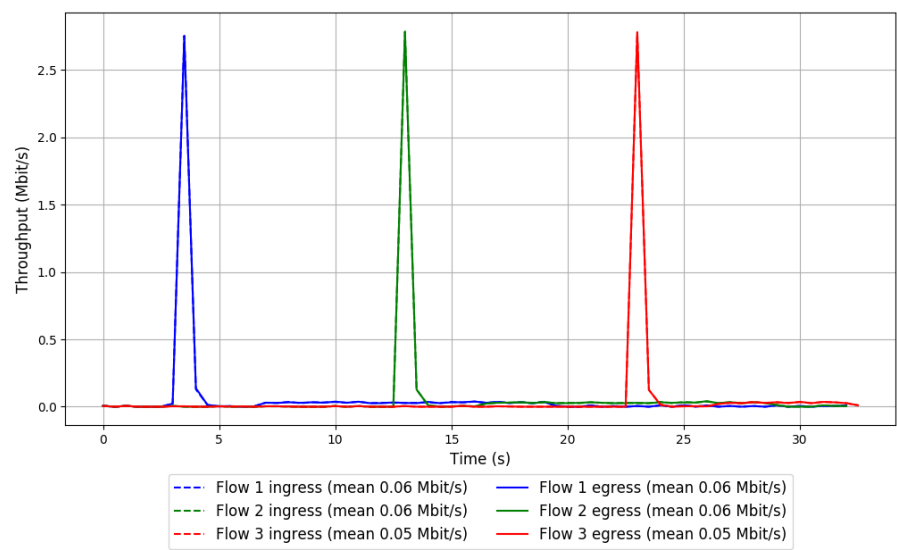


Run 1: Statistics of WebRTC media

Start at: 2018-04-17 00:16:56
End at: 2018-04-17 00:17:26
Local clock offset: 0.863 ms
Remote clock offset: -4.864 ms

Below is generated by plot.py at 2018-04-17 01:21:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 34.191 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 29.797 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 39.316 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 32.317 ms
Loss rate: 0.00%

Run 1: Report of WebRTC media — Data Link

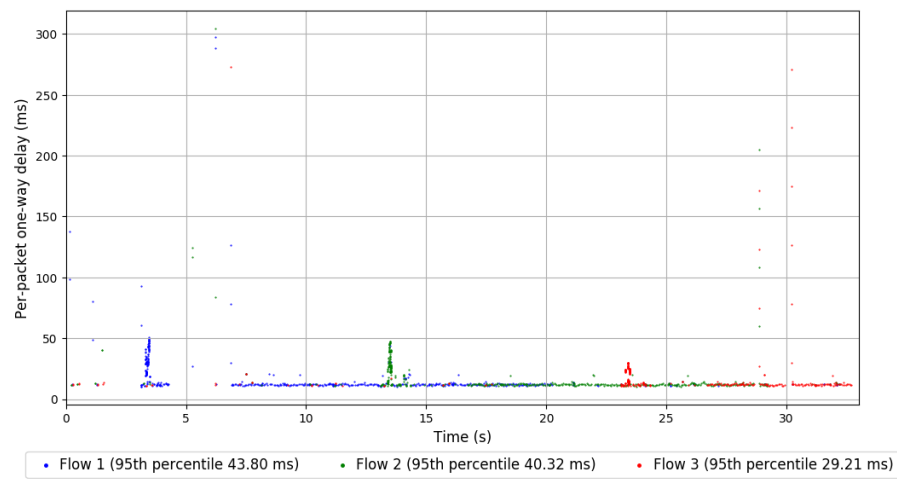
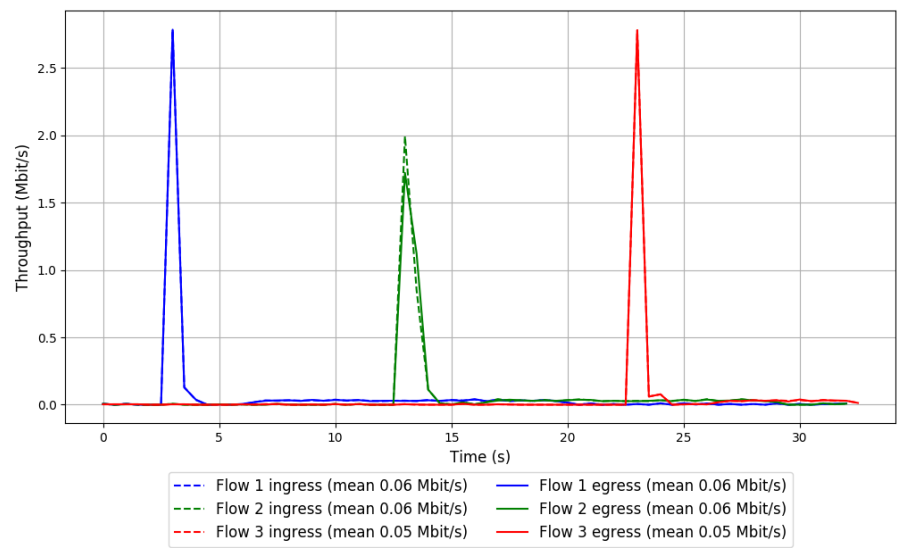


Run 2: Statistics of WebRTC media

Start at: 2018-04-17 00:39:29
End at: 2018-04-17 00:39:59
Local clock offset: 0.324 ms
Remote clock offset: -6.055 ms

Below is generated by plot.py at 2018-04-17 01:21:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 41.054 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 43.804 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 40.317 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 29.210 ms
Loss rate: 0.00%

Run 2: Report of WebRTC media — Data Link

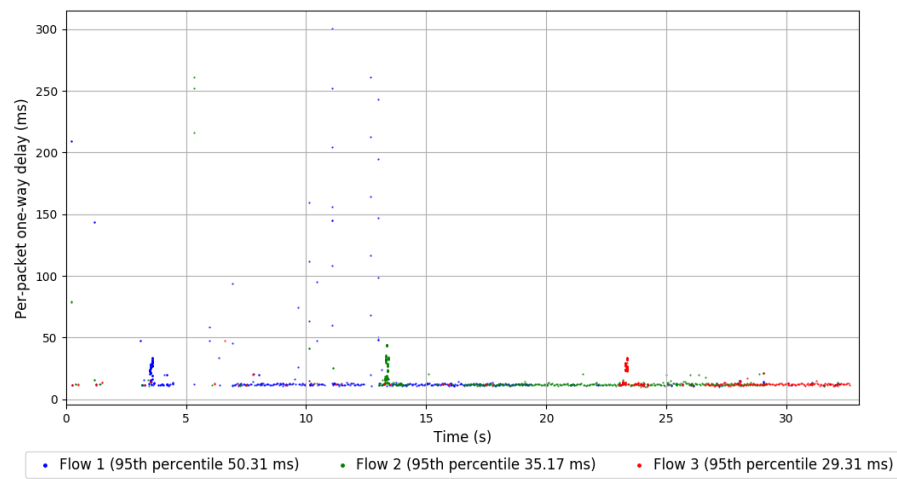
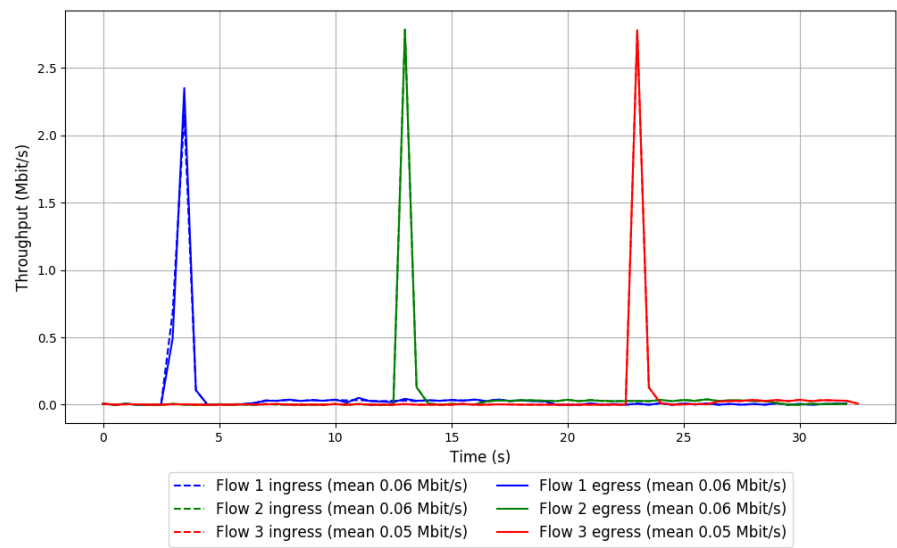


Run 3: Statistics of WebRTC media

Start at: 2018-04-17 01:02:05
End at: 2018-04-17 01:02:35
Local clock offset: 0.655 ms
Remote clock offset: -6.341 ms

Below is generated by plot.py at 2018-04-17 01:21:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 33.738 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 50.308 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 35.173 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 29.307 ms
Loss rate: 0.00%

Run 3: Report of WebRTC media — Data Link

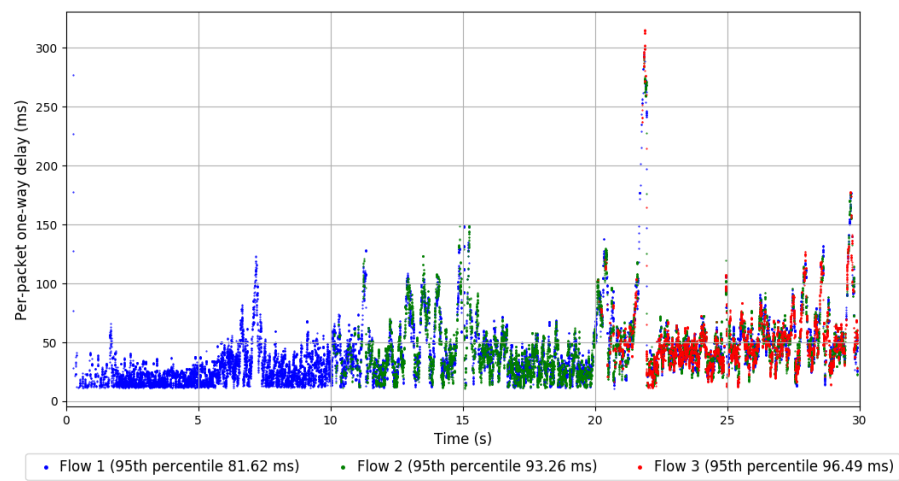
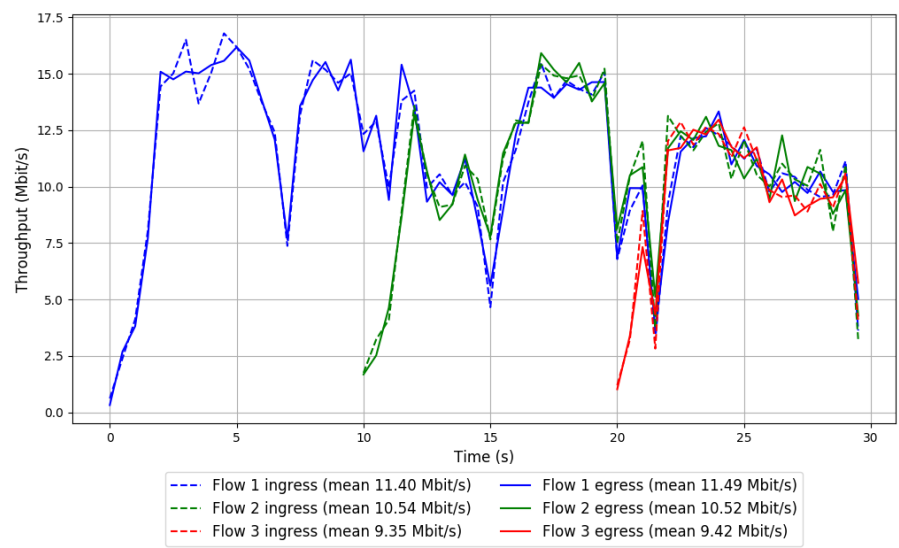


Run 1: Statistics of Sprout

Start at: 2018-04-17 00:11:38
End at: 2018-04-17 00:12:08
Local clock offset: 0.925 ms
Remote clock offset: -4.949 ms

Below is generated by plot.py at 2018-04-17 01:21:25
Datalink statistics
-- Total of 3 flows:
Average throughput: 21.67 Mbit/s
95th percentile per-packet one-way delay: 88.077 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 11.49 Mbit/s
95th percentile per-packet one-way delay: 81.621 ms
Loss rate: 0.04%
-- Flow 2:
Average throughput: 10.52 Mbit/s
95th percentile per-packet one-way delay: 93.256 ms
Loss rate: 0.18%
-- Flow 3:
Average throughput: 9.42 Mbit/s
95th percentile per-packet one-way delay: 96.493 ms
Loss rate: 0.00%

Run 1: Report of Sprout — Data Link

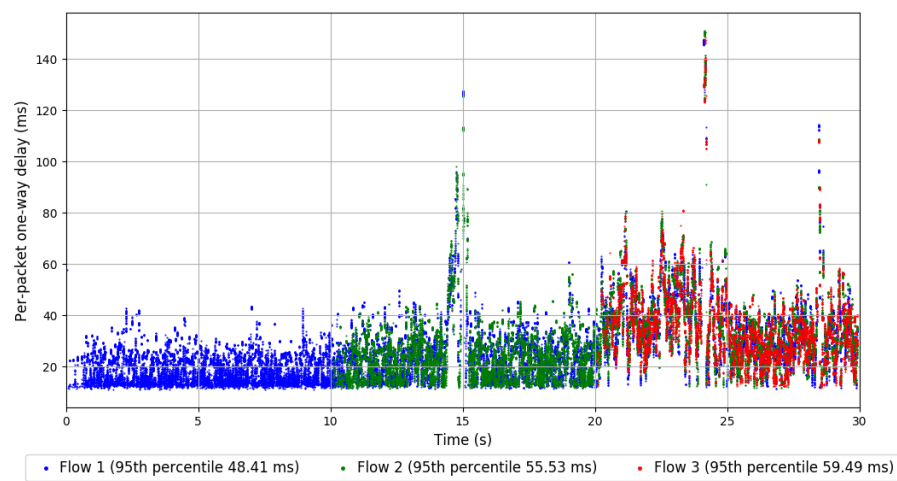
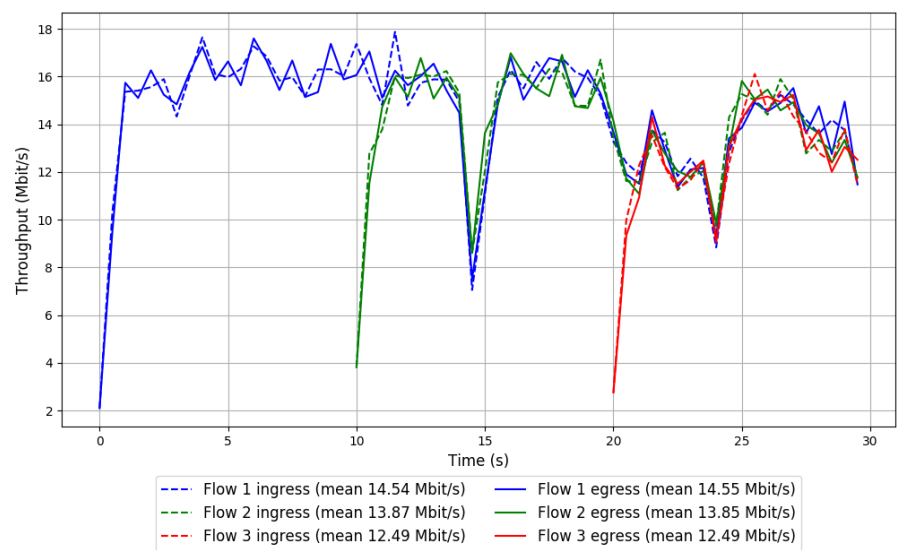


Run 2: Statistics of Sprout

Start at: 2018-04-17 00:34:11
End at: 2018-04-17 00:34:41
Local clock offset: 0.459 ms
Remote clock offset: -5.744 ms

Below is generated by plot.py at 2018-04-17 01:21:27
Datalink statistics
-- Total of 3 flows:
Average throughput: 27.90 Mbit/s
95th percentile per-packet one-way delay: 53.463 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 14.55 Mbit/s
95th percentile per-packet one-way delay: 48.413 ms
Loss rate: 0.04%
-- Flow 2:
Average throughput: 13.85 Mbit/s
95th percentile per-packet one-way delay: 55.530 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 12.49 Mbit/s
95th percentile per-packet one-way delay: 59.491 ms
Loss rate: 0.04%

Run 2: Report of Sprout — Data Link

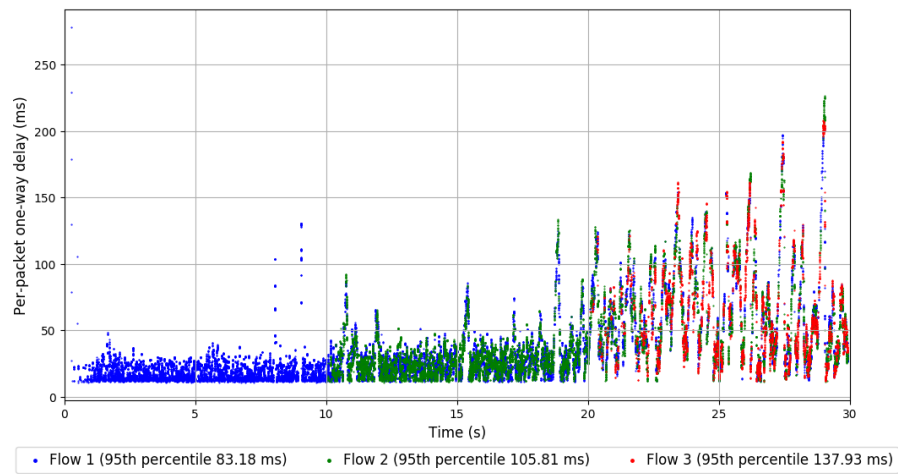
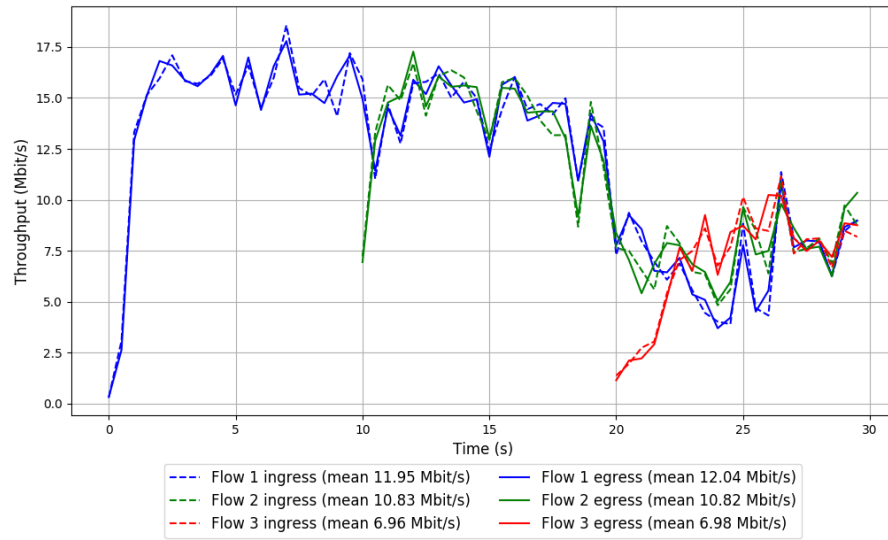


Run 3: Statistics of Sprout

Start at: 2018-04-17 00:56:47
End at: 2018-04-17 00:57:17
Local clock offset: 0.535 ms
Remote clock offset: -6.503 ms

```
# Below is generated by plot.py at 2018-04-17 01:21:27
# Datalink statistics
-- Total of 3 flows:
Average throughput: 21.63 Mbit/s
95th percentile per-packet one-way delay: 102.774 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 12.04 Mbit/s
95th percentile per-packet one-way delay: 83.176 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 10.82 Mbit/s
95th percentile per-packet one-way delay: 105.808 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 6.98 Mbit/s
95th percentile per-packet one-way delay: 137.925 ms
Loss rate: 0.00%
```

Run 3: Report of Sprout — Data Link

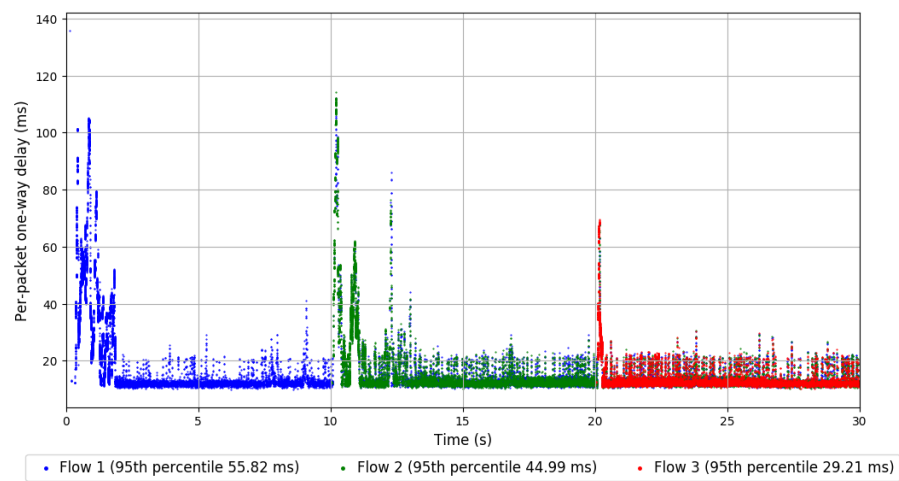
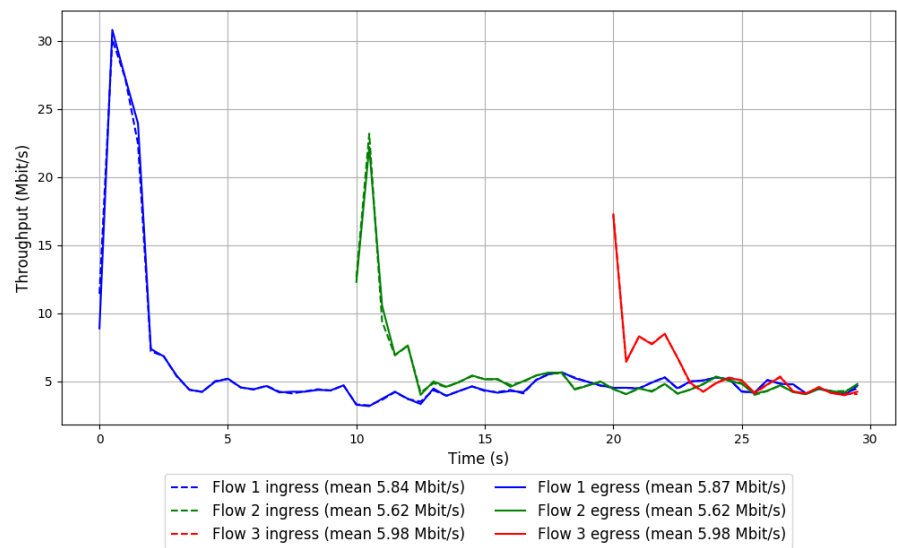


Run 1: Statistics of TaoVA-100x

Start at: 2018-04-17 00:28:53
End at: 2018-04-17 00:29:23
Local clock offset: 0.54 ms
Remote clock offset: -5.406 ms

Below is generated by plot.py at 2018-04-17 01:21:27
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.62 Mbit/s
95th percentile per-packet one-way delay: 52.200 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 5.87 Mbit/s
95th percentile per-packet one-way delay: 55.818 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 5.62 Mbit/s
95th percentile per-packet one-way delay: 44.989 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 5.98 Mbit/s
95th percentile per-packet one-way delay: 29.211 ms
Loss rate: 0.00%

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

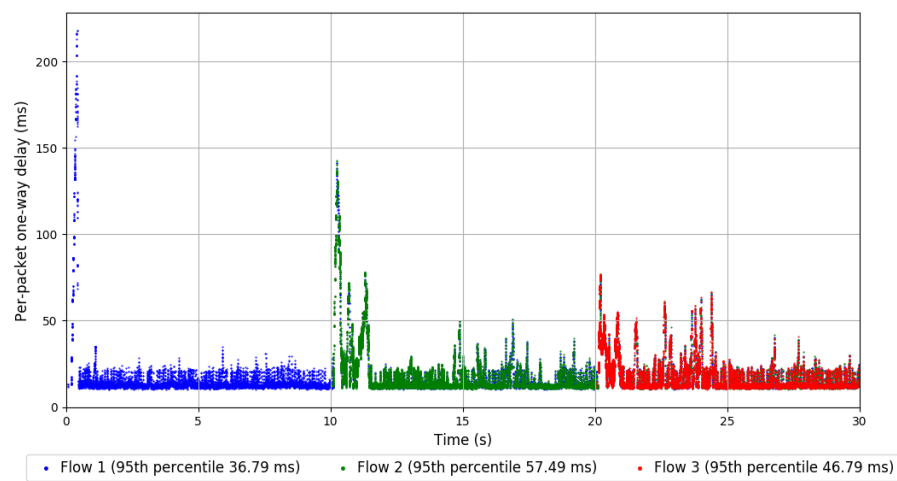
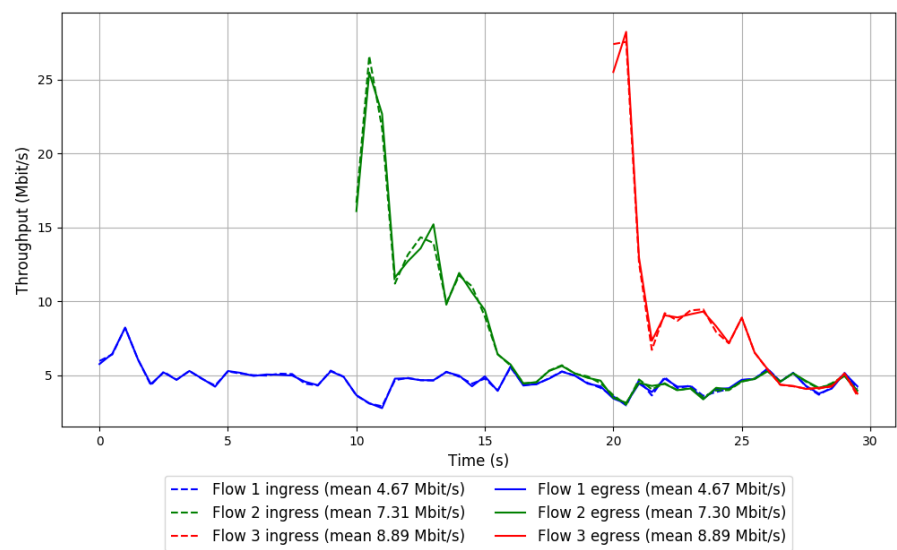


Run 2: Statistics of TaoVA-100x

Start at: 2018-04-17 00:51:28
End at: 2018-04-17 00:51:58
Local clock offset: 0.338 ms
Remote clock offset: -6.425 ms

Below is generated by plot.py at 2018-04-17 01:21:27
Datalink statistics
-- Total of 3 flows:
Average throughput: 12.49 Mbit/s
95th percentile per-packet one-way delay: 47.098 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 4.67 Mbit/s
95th percentile per-packet one-way delay: 36.788 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 7.30 Mbit/s
95th percentile per-packet one-way delay: 57.487 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 8.89 Mbit/s
95th percentile per-packet one-way delay: 46.788 ms
Loss rate: 0.00%

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

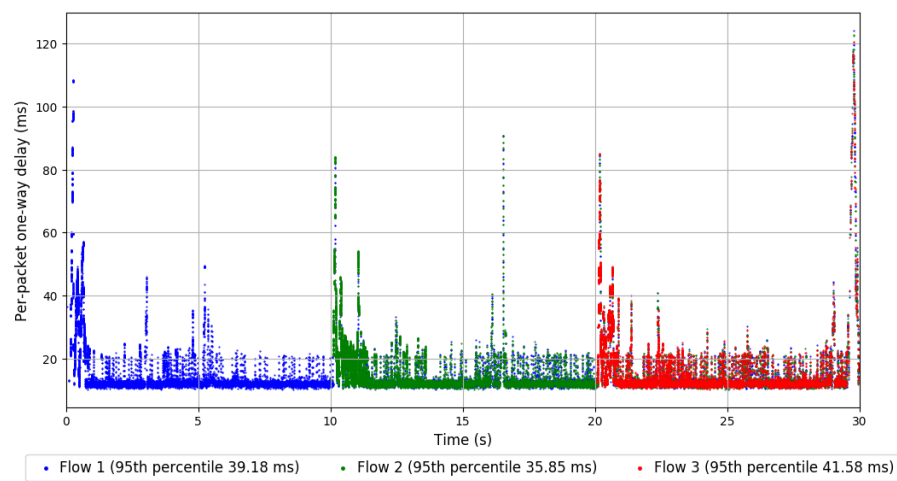
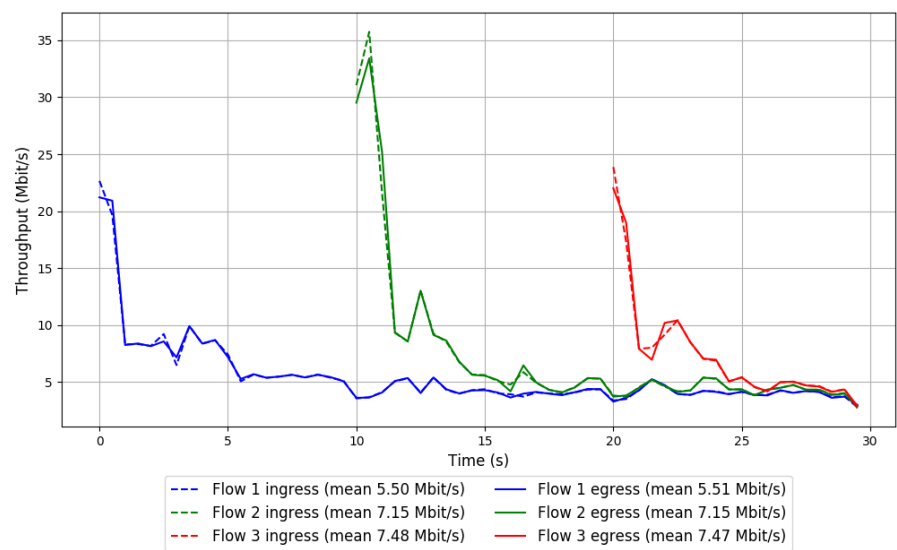


Run 3: Statistics of TaoVA-100x

Start at: 2018-04-17 01:14:03
End at: 2018-04-17 01:14:33
Local clock offset: 0.721 ms
Remote clock offset: -6.363 ms

Below is generated by plot.py at 2018-04-17 01:21:40
Datalink statistics
-- Total of 3 flows:
Average throughput: 12.75 Mbit/s
95th percentile per-packet one-way delay: 38.325 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 5.51 Mbit/s
95th percentile per-packet one-way delay: 39.181 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 7.15 Mbit/s
95th percentile per-packet one-way delay: 35.855 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 7.47 Mbit/s
95th percentile per-packet one-way delay: 41.580 ms
Loss rate: 0.02%

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

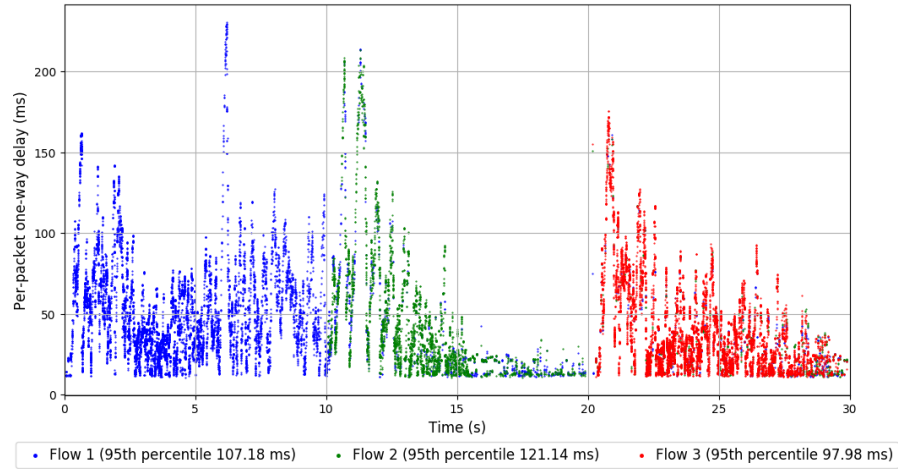
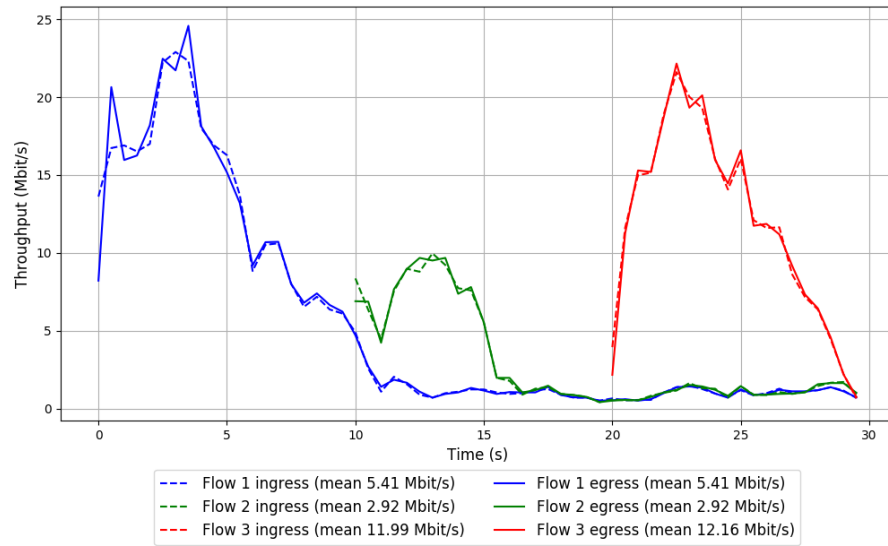


Run 1: Statistics of TCP Vegas

Start at: 2018-04-17 00:32:51
End at: 2018-04-17 00:33:22
Local clock offset: 0.46 ms
Remote clock offset: -5.736 ms

Below is generated by plot.py at 2018-04-17 01:21:40
Datalink statistics
-- Total of 3 flows:
Average throughput: 11.31 Mbit/s
95th percentile per-packet one-way delay: 105.288 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 5.41 Mbit/s
95th percentile per-packet one-way delay: 107.184 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 2.92 Mbit/s
95th percentile per-packet one-way delay: 121.145 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 12.16 Mbit/s
95th percentile per-packet one-way delay: 97.980 ms
Loss rate: 0.00%

Run 1: Report of TCP Vegas — Data Link

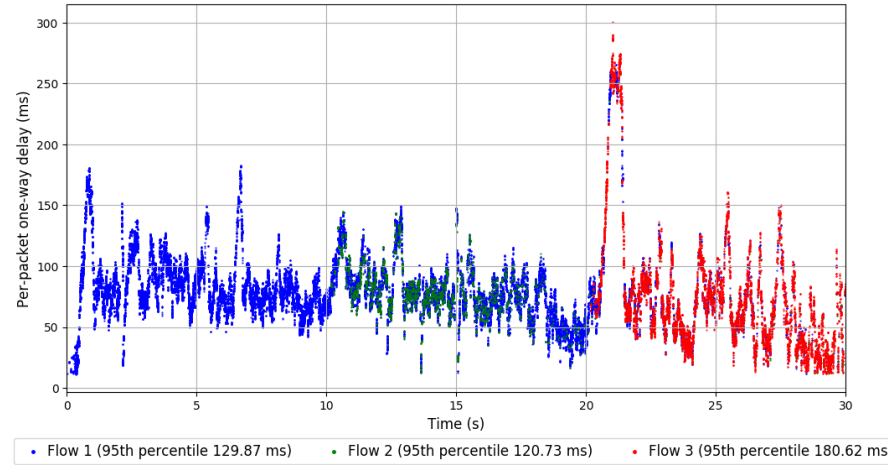
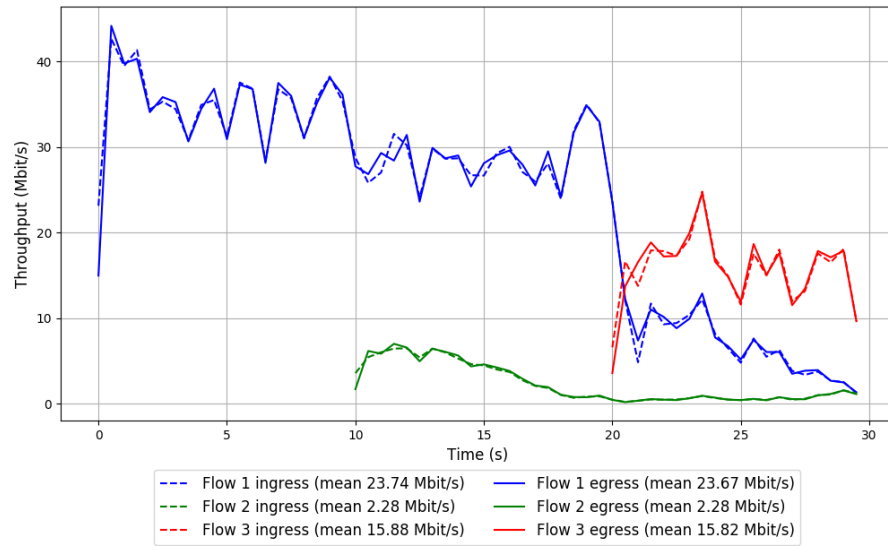


Run 2: Statistics of TCP Vegas

Start at: 2018-04-17 00:55:27
End at: 2018-04-17 00:55:57
Local clock offset: 0.507 ms
Remote clock offset: -6.493 ms

Below is generated by plot.py at 2018-04-17 01:21:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 30.41 Mbit/s
95th percentile per-packet one-way delay: 132.963 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 23.67 Mbit/s
95th percentile per-packet one-way delay: 129.867 ms
Loss rate: 0.04%
-- Flow 2:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 120.729 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 15.82 Mbit/s
95th percentile per-packet one-way delay: 180.621 ms
Loss rate: 0.37%

Run 2: Report of TCP Vegas — Data Link

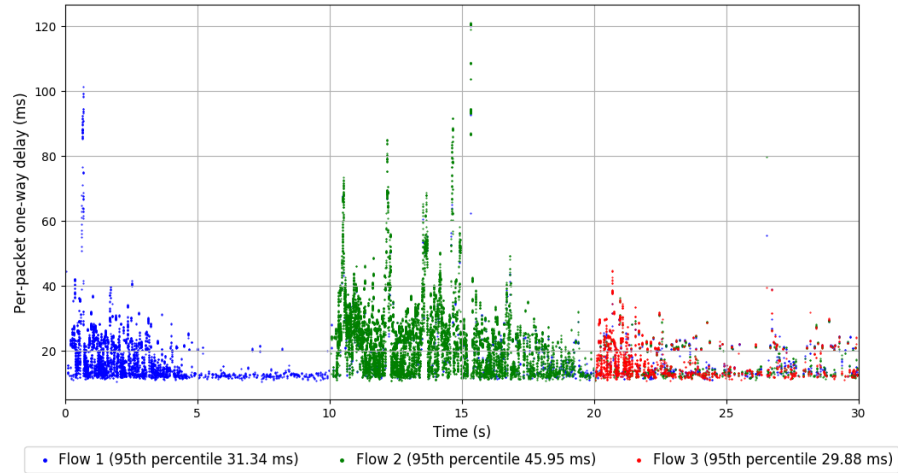
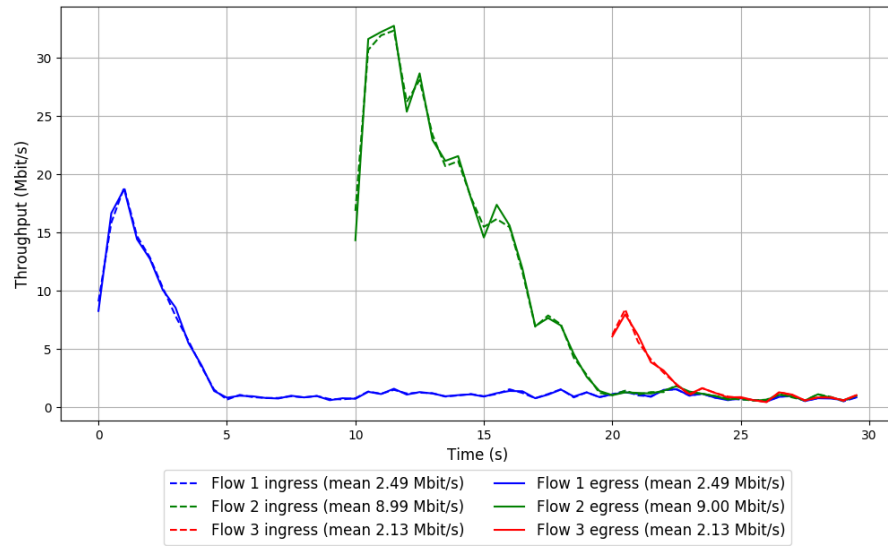


Run 3: Statistics of TCP Vegas

Start at: 2018-04-17 01:18:02
End at: 2018-04-17 01:18:32
Local clock offset: 0.678 ms
Remote clock offset: -6.397 ms

Below is generated by plot.py at 2018-04-17 01:21:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 9.18 Mbit/s
95th percentile per-packet one-way delay: 40.816 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 31.344 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 9.00 Mbit/s
95th percentile per-packet one-way delay: 45.953 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 29.879 ms
Loss rate: 0.00%

Run 3: Report of TCP Vegas — Data Link

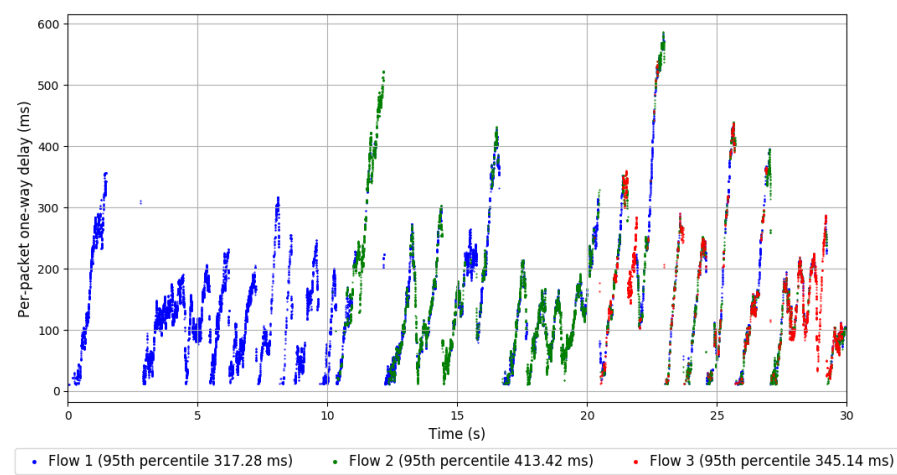
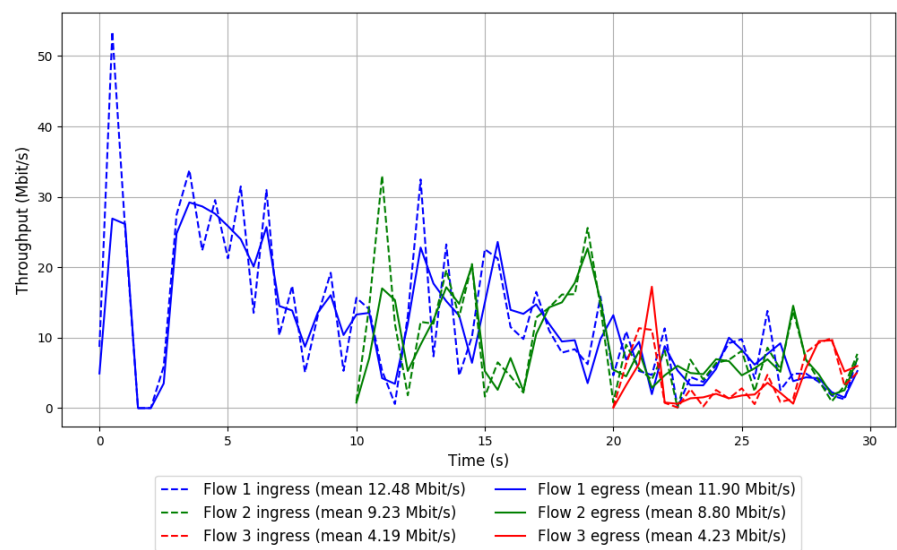


Run 1: Statistics of Verus

Start at: 2018-04-17 00:31:32
End at: 2018-04-17 00:32:02
Local clock offset: 0.498 ms
Remote clock offset: -5.659 ms

Below is generated by plot.py at 2018-04-17 01:21:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 19.06 Mbit/s
95th percentile per-packet one-way delay: 358.964 ms
Loss rate: 4.65%
-- Flow 1:
Average throughput: 11.90 Mbit/s
95th percentile per-packet one-way delay: 317.279 ms
Loss rate: 4.63%
-- Flow 2:
Average throughput: 8.80 Mbit/s
95th percentile per-packet one-way delay: 413.423 ms
Loss rate: 5.34%
-- Flow 3:
Average throughput: 4.23 Mbit/s
95th percentile per-packet one-way delay: 345.140 ms
Loss rate: 1.81%

Run 1: Report of Verus — Data Link

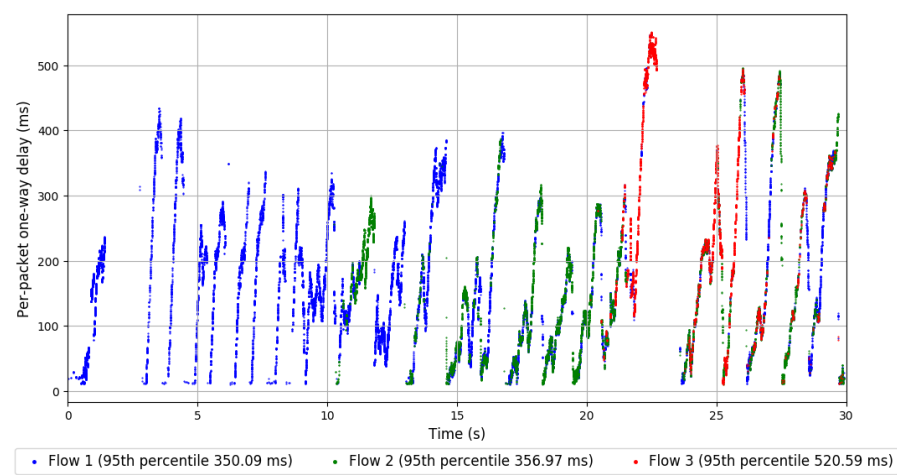
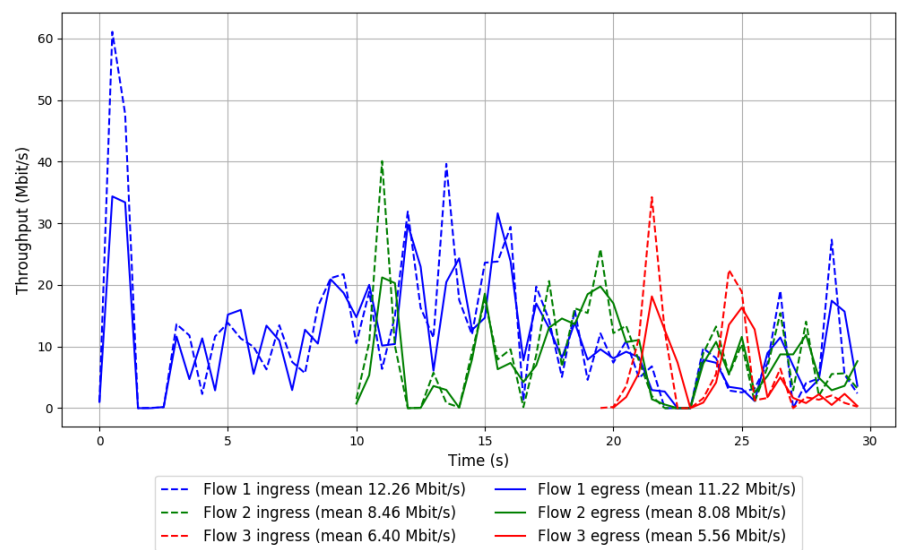


Run 2: Statistics of Verus

Start at: 2018-04-17 00:54:07
End at: 2018-04-17 00:54:37
Local clock offset: 0.362 ms
Remote clock offset: -6.464 ms

Below is generated by plot.py at 2018-04-17 01:21:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 18.34 Mbit/s
95th percentile per-packet one-way delay: 370.091 ms
Loss rate: 8.30%
-- Flow 1:
Average throughput: 11.22 Mbit/s
95th percentile per-packet one-way delay: 350.094 ms
Loss rate: 8.49%
-- Flow 2:
Average throughput: 8.08 Mbit/s
95th percentile per-packet one-way delay: 356.966 ms
Loss rate: 5.70%
-- Flow 3:
Average throughput: 5.56 Mbit/s
95th percentile per-packet one-way delay: 520.585 ms
Loss rate: 14.20%

Run 2: Report of Verus — Data Link

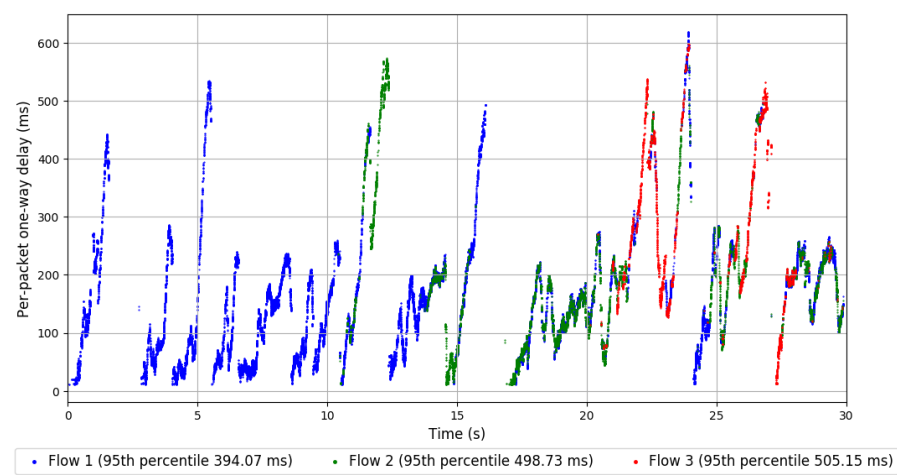
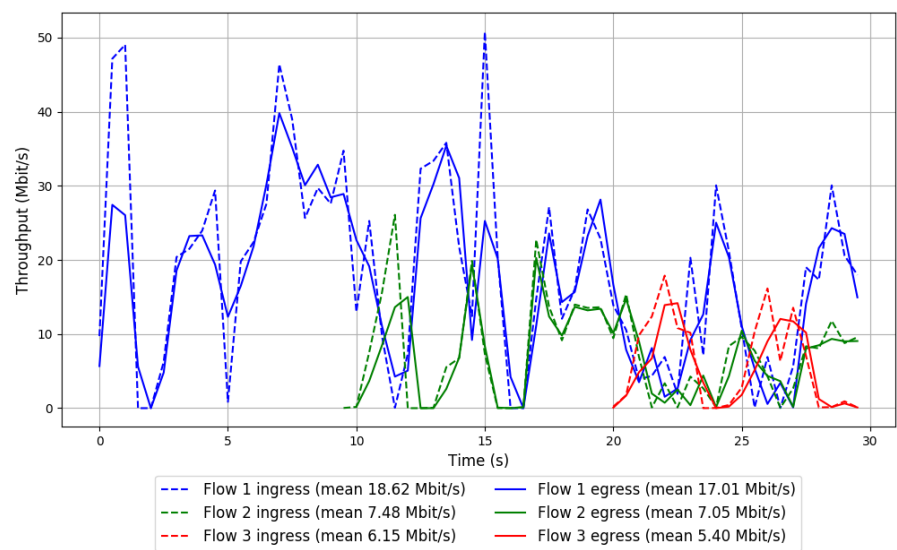


Run 3: Statistics of Verus

Start at: 2018-04-17 01:16:42
End at: 2018-04-17 01:17:12
Local clock offset: 0.656 ms
Remote clock offset: -6.372 ms

Below is generated by plot.py at 2018-04-17 01:21:53
Datalink statistics
-- Total of 3 flows:
Average throughput: 23.43 Mbit/s
95th percentile per-packet one-way delay: 442.879 ms
Loss rate: 8.53%
-- Flow 1:
Average throughput: 17.01 Mbit/s
95th percentile per-packet one-way delay: 394.068 ms
Loss rate: 8.58%
-- Flow 2:
Average throughput: 7.05 Mbit/s
95th percentile per-packet one-way delay: 498.729 ms
Loss rate: 6.45%
-- Flow 3:
Average throughput: 5.40 Mbit/s
95th percentile per-packet one-way delay: 505.148 ms
Loss rate: 13.24%

Run 3: Report of Verus — Data Link

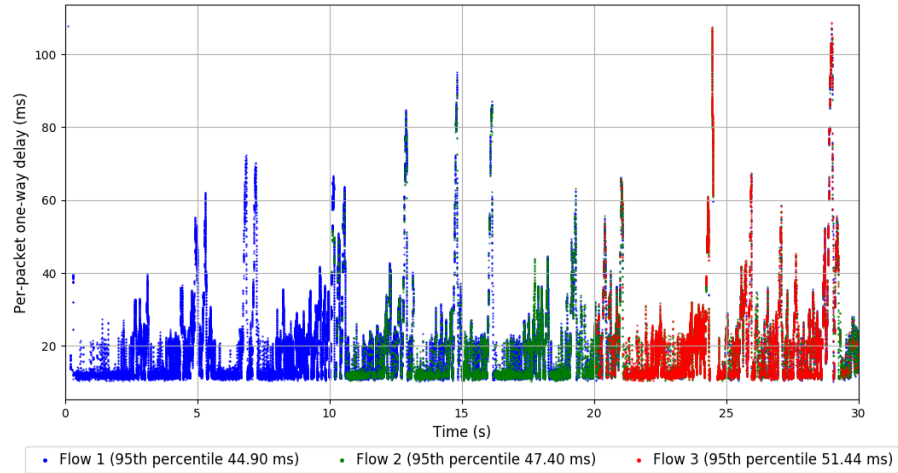
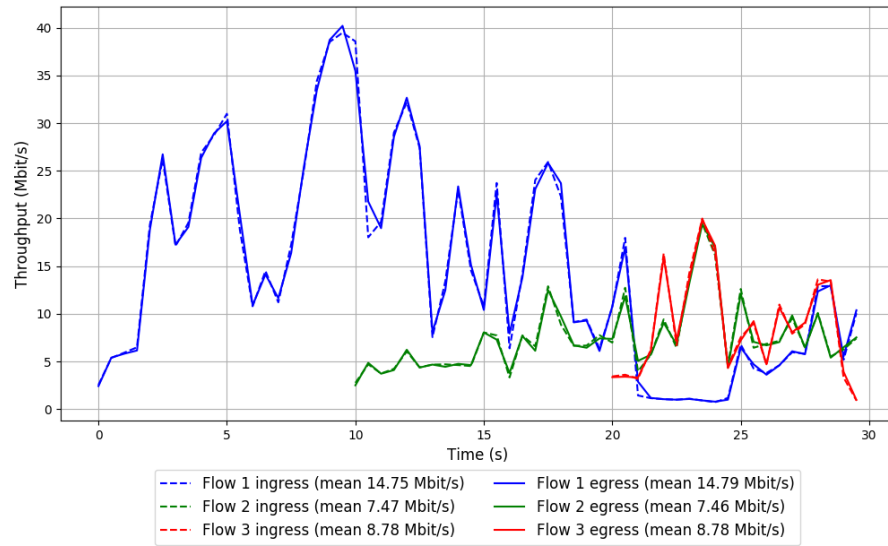


Run 1: Statistics of Copa

Start at: 2018-04-17 00:22:12
End at: 2018-04-17 00:22:42
Local clock offset: 0.614 ms
Remote clock offset: -4.903 ms

Below is generated by plot.py at 2018-04-17 01:22:14
Datalink statistics
-- Total of 3 flows:
Average throughput: 22.70 Mbit/s
95th percentile per-packet one-way delay: 46.923 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 14.79 Mbit/s
95th percentile per-packet one-way delay: 44.904 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 7.46 Mbit/s
95th percentile per-packet one-way delay: 47.400 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 8.78 Mbit/s
95th percentile per-packet one-way delay: 51.443 ms
Loss rate: 0.00%

Run 1: Report of Copa — Data Link

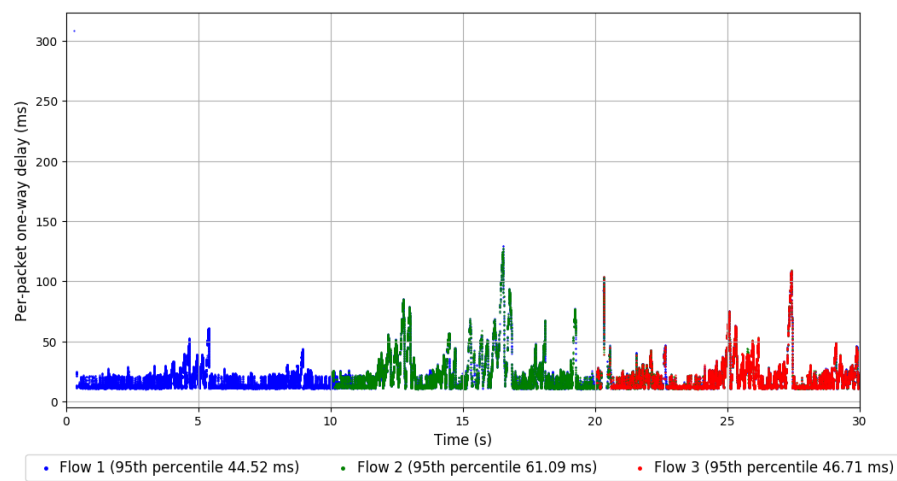
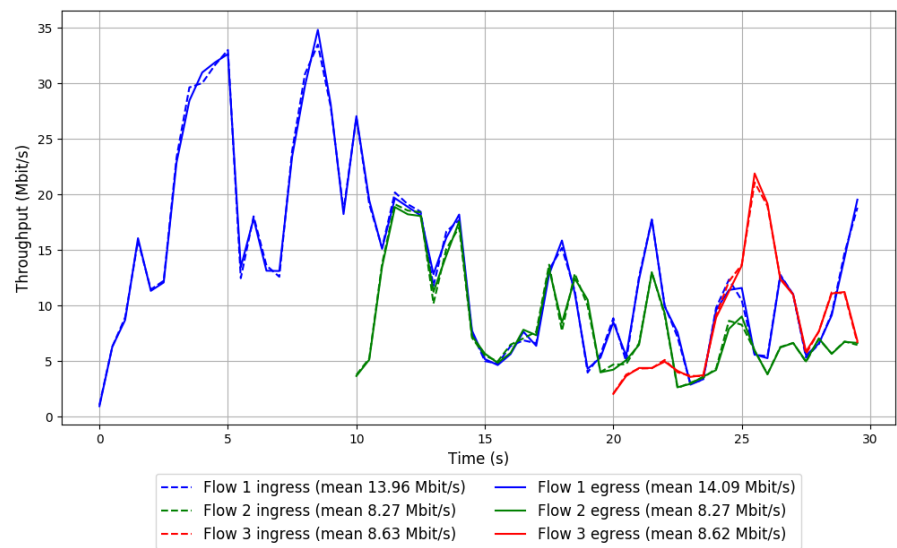


Run 2: Statistics of Copa

Start at: 2018-04-17 00:44:46
End at: 2018-04-17 00:45:16
Local clock offset: 0.357 ms
Remote clock offset: -6.194 ms

Below is generated by plot.py at 2018-04-17 01:22:17
Datalink statistics
-- Total of 3 flows:
Average throughput: 22.55 Mbit/s
95th percentile per-packet one-way delay: 49.530 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 14.09 Mbit/s
95th percentile per-packet one-way delay: 44.524 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 8.27 Mbit/s
95th percentile per-packet one-way delay: 61.095 ms
Loss rate: 0.02%
-- Flow 3:
Average throughput: 8.62 Mbit/s
95th percentile per-packet one-way delay: 46.709 ms
Loss rate: 0.00%

Run 2: Report of Copa — Data Link

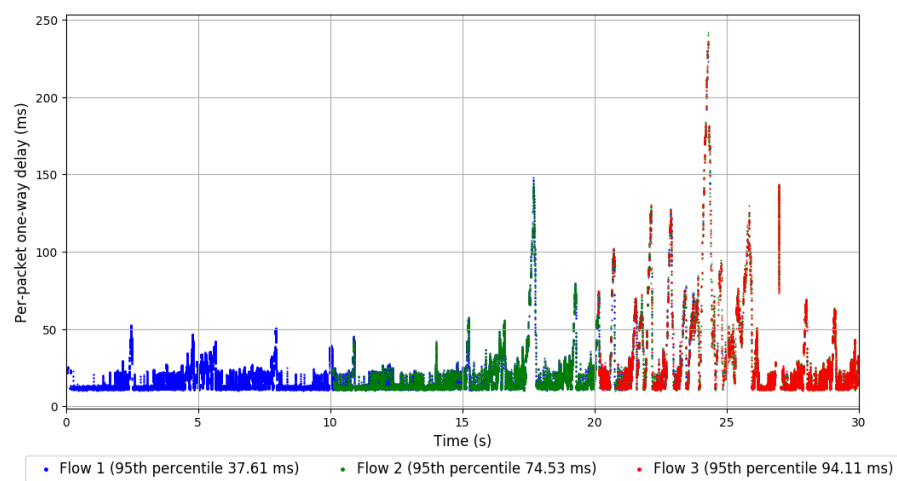
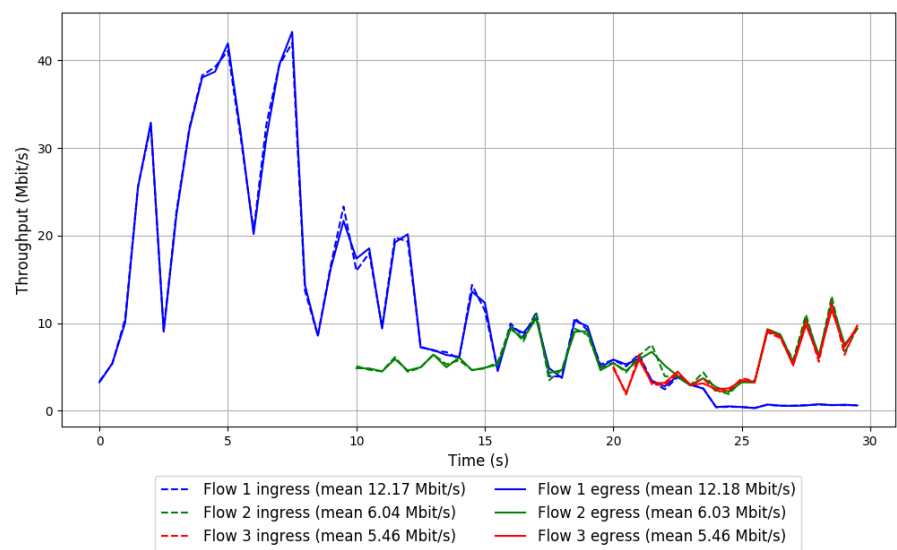


Run 3: Statistics of Copa

Start at: 2018-04-17 01:07:23
End at: 2018-04-17 01:07:53
Local clock offset: 0.687 ms
Remote clock offset: -6.384 ms

```
# Below is generated by plot.py at 2018-04-17 01:22:17
# Datalink statistics
-- Total of 3 flows:
Average throughput: 17.99 Mbit/s
95th percentile per-packet one-way delay: 52.797 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 12.18 Mbit/s
95th percentile per-packet one-way delay: 37.611 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 6.03 Mbit/s
95th percentile per-packet one-way delay: 74.525 ms
Loss rate: 0.11%
-- Flow 3:
Average throughput: 5.46 Mbit/s
95th percentile per-packet one-way delay: 94.112 ms
Loss rate: 0.26%
```

Run 3: Report of Copa — Data Link

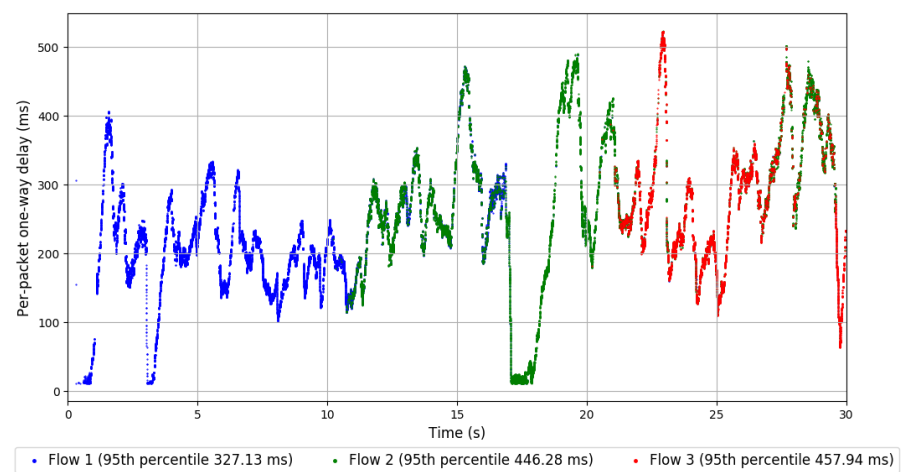
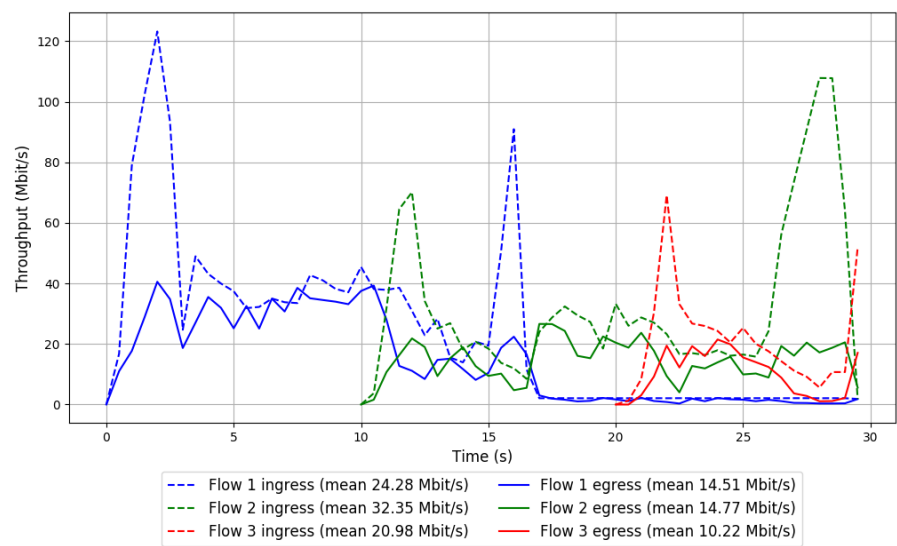


Run 1: Statistics of FillP

Start at: 2018-04-17 00:12:58
End at: 2018-04-17 00:13:28
Local clock offset: 0.914 ms
Remote clock offset: -4.918 ms

Below is generated by plot.py at 2018-04-17 01:22:21
Datalink statistics
-- Total of 3 flows:
Average throughput: 27.69 Mbit/s
95th percentile per-packet one-way delay: 416.471 ms
Loss rate: 48.03%
-- Flow 1:
Average throughput: 14.51 Mbit/s
95th percentile per-packet one-way delay: 327.130 ms
Loss rate: 40.86%
-- Flow 2:
Average throughput: 14.77 Mbit/s
95th percentile per-packet one-way delay: 446.282 ms
Loss rate: 54.80%
-- Flow 3:
Average throughput: 10.22 Mbit/s
95th percentile per-packet one-way delay: 457.945 ms
Loss rate: 52.07%

Run 1: Report of FillP — Data Link

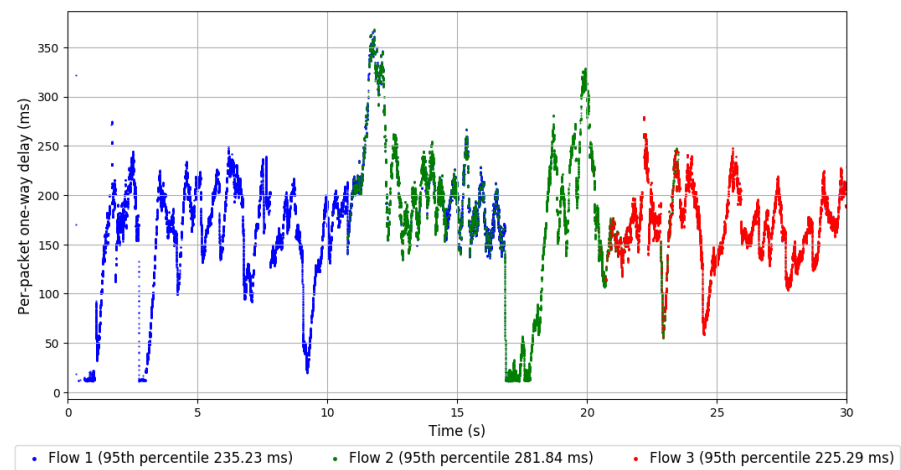
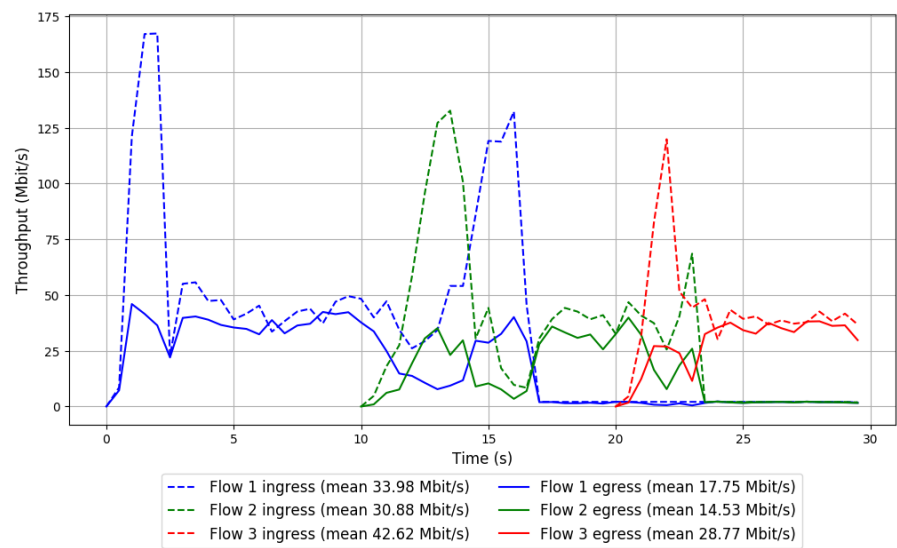


Run 2: Statistics of FillP

Start at: 2018-04-17 00:35:31
End at: 2018-04-17 00:36:01
Local clock offset: 0.467 ms
Remote clock offset: -5.938 ms

Below is generated by plot.py at 2018-04-17 01:22:24
Datalink statistics
-- Total of 3 flows:
Average throughput: 36.86 Mbit/s
95th percentile per-packet one-way delay: 244.738 ms
Loss rate: 46.81%
-- Flow 1:
Average throughput: 17.75 Mbit/s
95th percentile per-packet one-way delay: 235.233 ms
Loss rate: 48.32%
-- Flow 2:
Average throughput: 14.53 Mbit/s
95th percentile per-packet one-way delay: 281.838 ms
Loss rate: 53.35%
-- Flow 3:
Average throughput: 28.77 Mbit/s
95th percentile per-packet one-way delay: 225.295 ms
Loss rate: 33.69%

Run 2: Report of FillP — Data Link

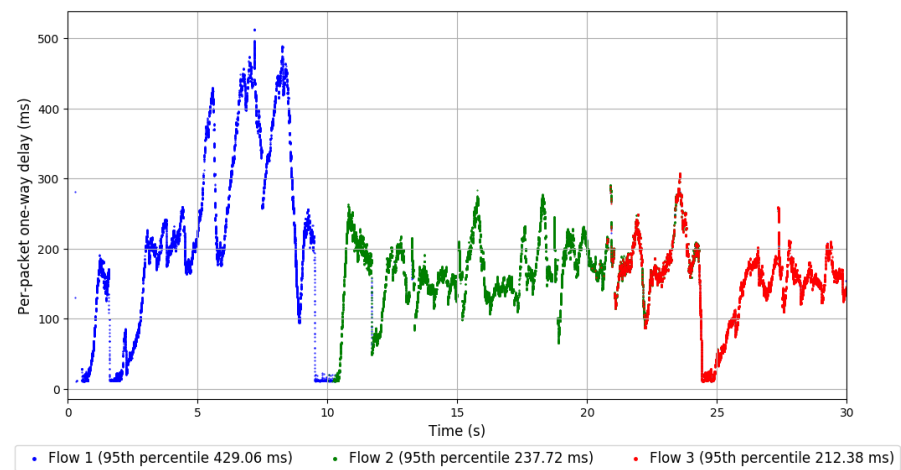
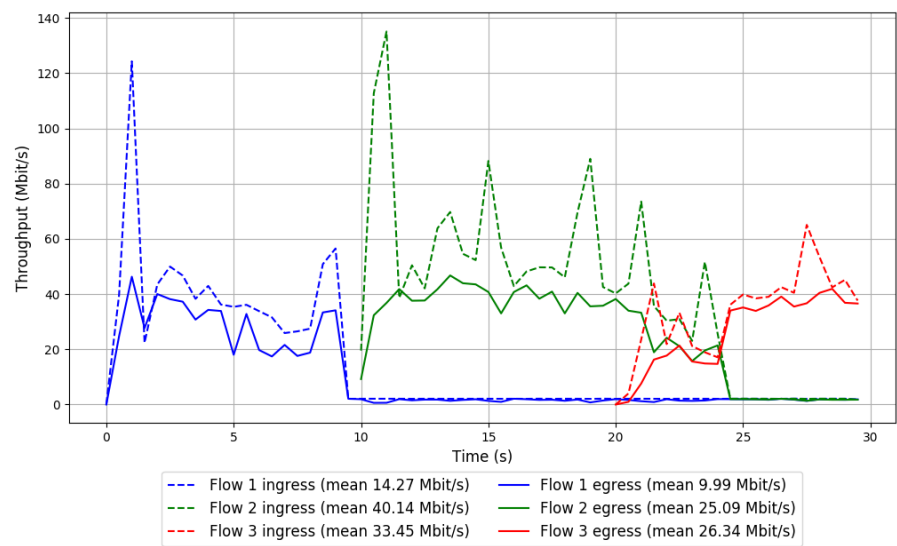


Run 3: Statistics of FillP

Start at: 2018-04-17 00:58:07
End at: 2018-04-17 00:58:37
Local clock offset: 0.593 ms
Remote clock offset: -6.533 ms

Below is generated by plot.py at 2018-04-17 01:22:24
Datalink statistics
-- Total of 3 flows:
Average throughput: 35.50 Mbit/s
95th percentile per-packet one-way delay: 305.483 ms
Loss rate: 32.39%
-- Flow 1:
Average throughput: 9.99 Mbit/s
95th percentile per-packet one-way delay: 429.064 ms
Loss rate: 30.57%
-- Flow 2:
Average throughput: 25.09 Mbit/s
95th percentile per-packet one-way delay: 237.717 ms
Loss rate: 37.49%
-- Flow 3:
Average throughput: 26.34 Mbit/s
95th percentile per-packet one-way delay: 212.376 ms
Loss rate: 22.42%

Run 3: Report of FillP — Data Link

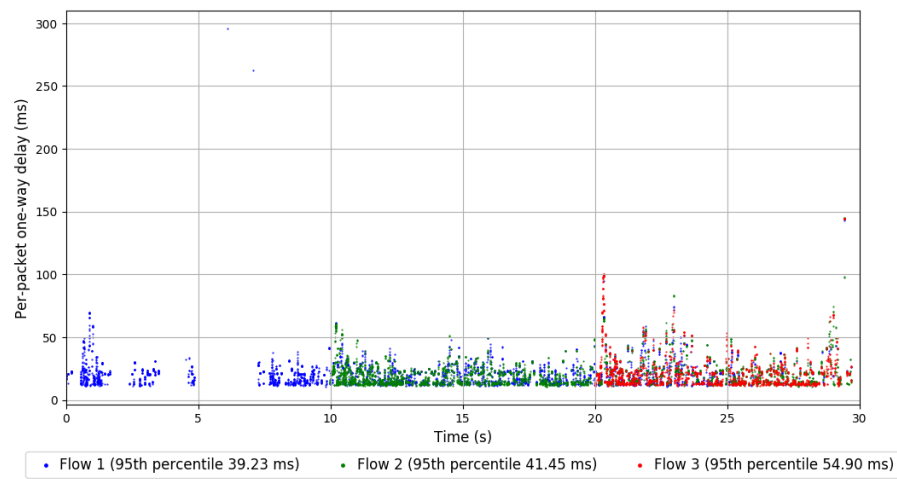
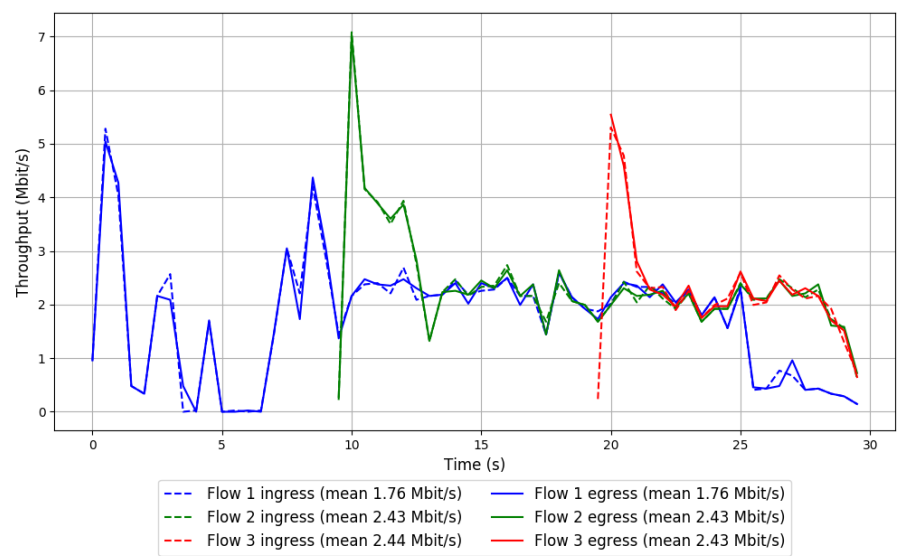


```
Run 1: Statistics of Indigo-1-32

Start at: 2018-04-17 00:30:13
End at: 2018-04-17 00:30:43
Local clock offset: 0.522 ms
Remote clock offset: -5.554 ms

# Below is generated by plot.py at 2018-04-17 01:22:24
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.16 Mbit/s
95th percentile per-packet one-way delay: 42.134 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 39.229 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 2.43 Mbit/s
95th percentile per-packet one-way delay: 41.451 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 2.43 Mbit/s
95th percentile per-packet one-way delay: 54.903 ms
Loss rate: 0.15%
```

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



Run 2: Statistics of Indigo-1-32

Start at: 2018-04-17 00:52:48

End at: 2018-04-17 00:53:18

Local clock offset: 0.413 ms

Remote clock offset: -6.45 ms

Below is generated by plot.py at 2018-04-17 01:22:24

Datalink statistics

-- Total of 3 flows:

Average throughput: 5.44 Mbit/s

95th percentile per-packet one-way delay: 30.001 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 2.78 Mbit/s

95th percentile per-packet one-way delay: 31.910 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 2.89 Mbit/s

95th percentile per-packet one-way delay: 28.618 ms

Loss rate: 0.00%

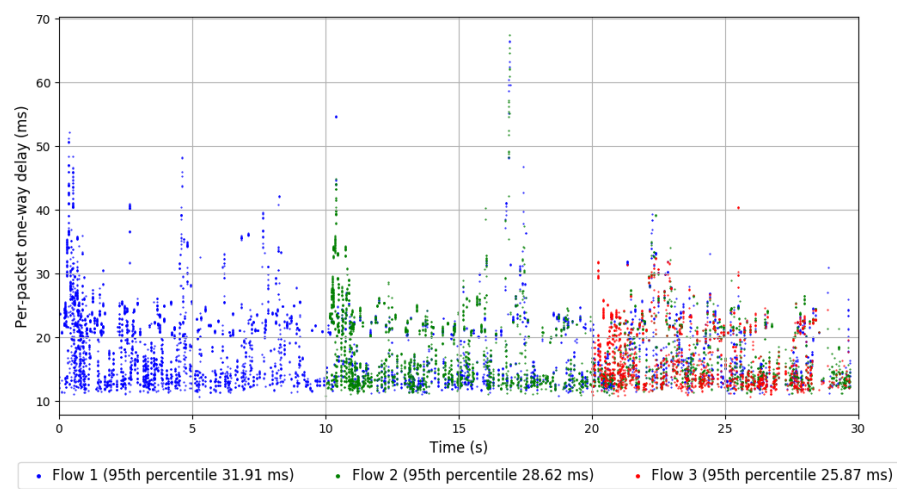
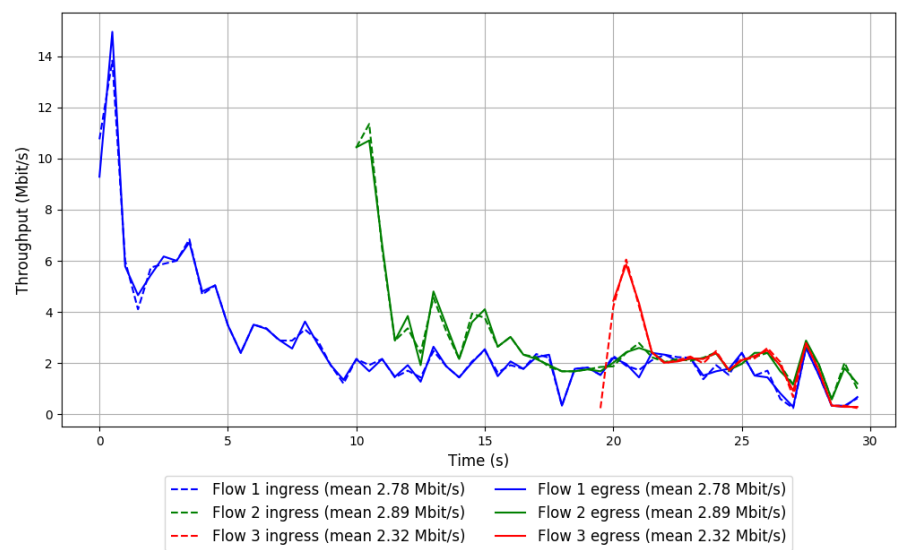
-- Flow 3:

Average throughput: 2.32 Mbit/s

95th percentile per-packet one-way delay: 25.874 ms

Loss rate: 0.00%

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



Run 3: Statistics of Indigo-1-32

Start at: 2018-04-17 01:15:23

End at: 2018-04-17 01:15:53

Local clock offset: 0.763 ms

Remote clock offset: -6.37 ms

Below is generated by plot.py at 2018-04-17 01:22:24

Datalink statistics

-- Total of 3 flows:

Average throughput: 5.66 Mbit/s

95th percentile per-packet one-way delay: 33.526 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 2.64 Mbit/s

95th percentile per-packet one-way delay: 35.069 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 2.69 Mbit/s

95th percentile per-packet one-way delay: 30.804 ms

Loss rate: 0.00%

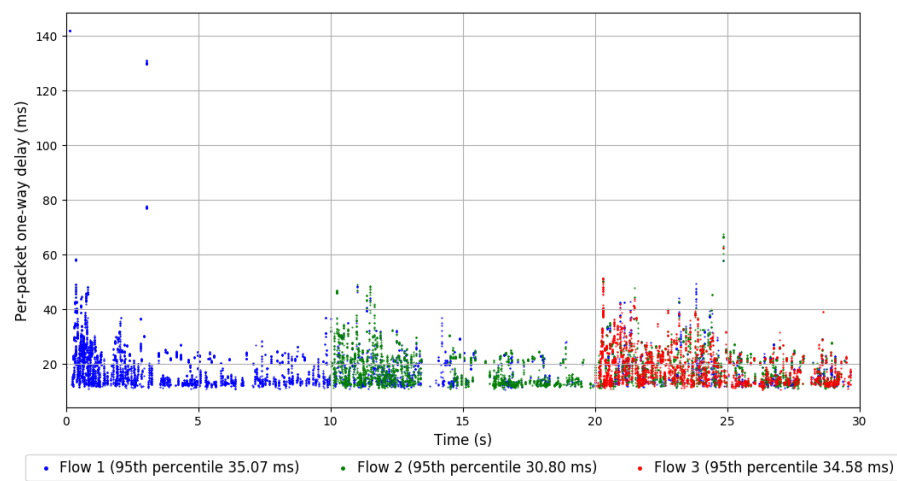
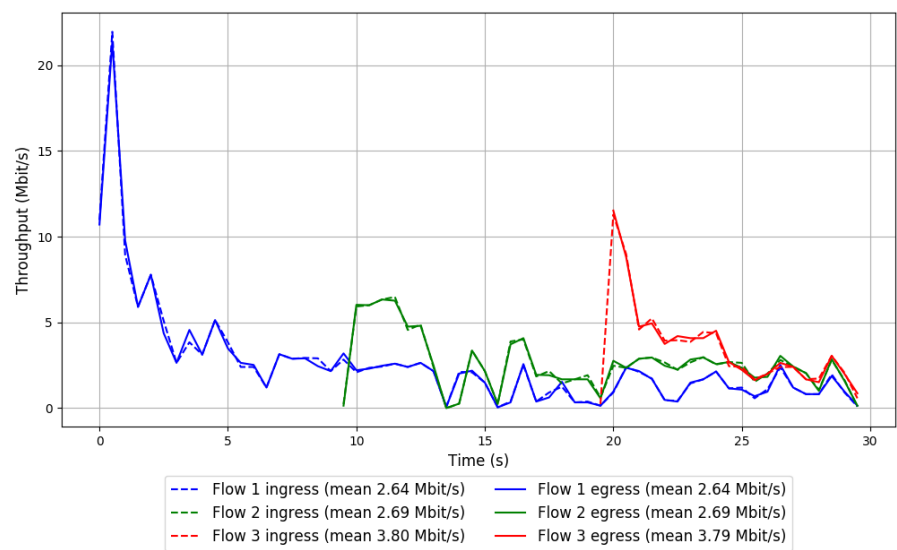
-- Flow 3:

Average throughput: 3.79 Mbit/s

95th percentile per-packet one-way delay: 34.576 ms

Loss rate: 0.00%

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

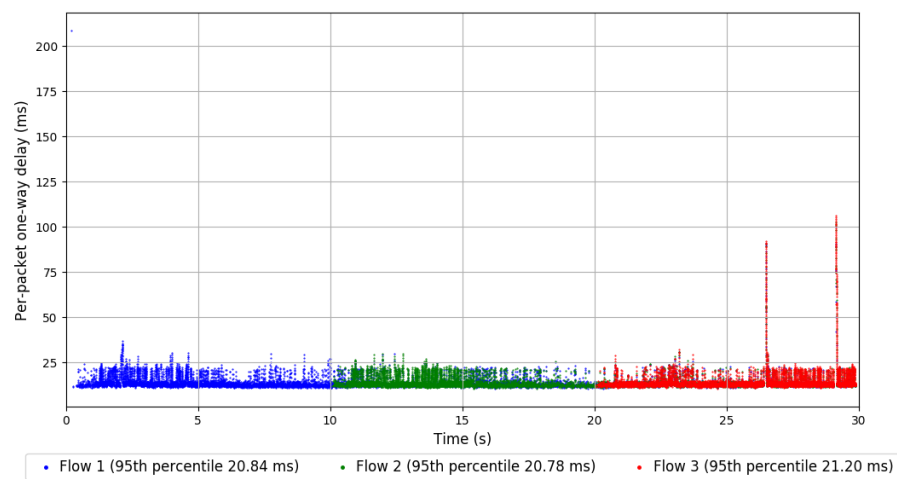
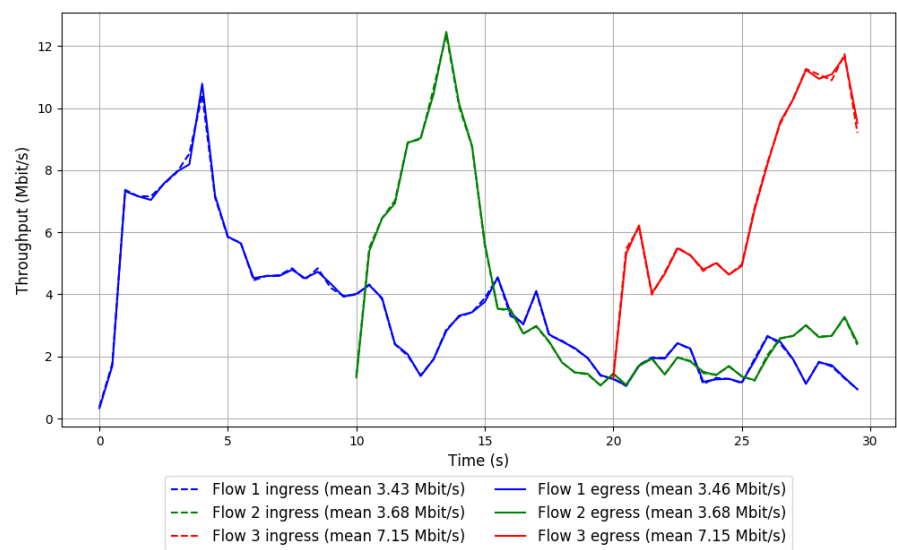


Run 1: Statistics of PCC-Vivace

Start at: 2018-04-17 00:14:18
End at: 2018-04-17 00:14:48
Local clock offset: 0.951 ms
Remote clock offset: -4.877 ms

Below is generated by plot.py at 2018-04-17 01:22:24
Datalink statistics
-- Total of 3 flows:
Average throughput: 8.29 Mbit/s
95th percentile per-packet one-way delay: 20.892 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.46 Mbit/s
95th percentile per-packet one-way delay: 20.841 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 3.68 Mbit/s
95th percentile per-packet one-way delay: 20.783 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 7.15 Mbit/s
95th percentile per-packet one-way delay: 21.203 ms
Loss rate: 0.00%

Run 1: Report of PCC-Vivace — Data Link

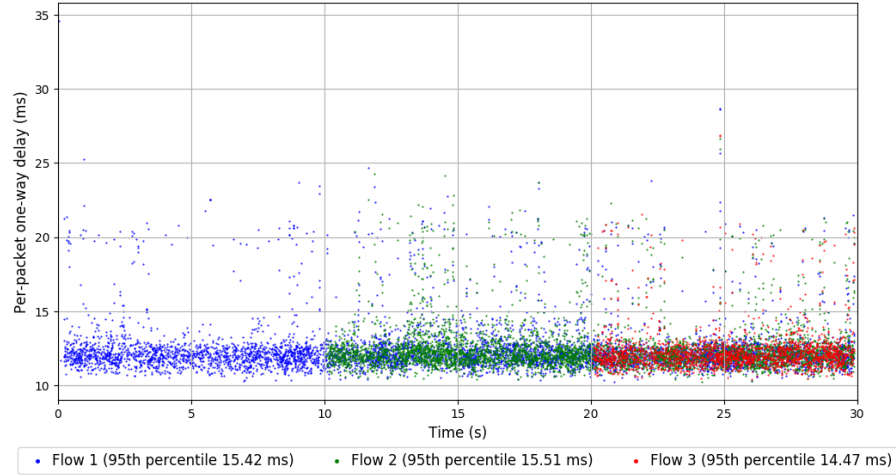
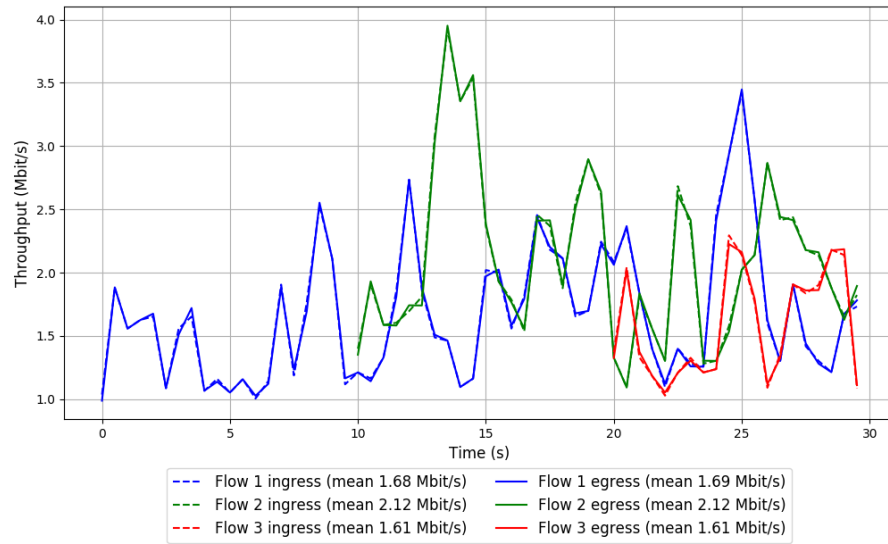


Run 2: Statistics of PCC-Vivace

Start at: 2018-04-17 00:36:51
End at: 2018-04-17 00:37:21
Local clock offset: 0.435 ms
Remote clock offset: -6.011 ms

Below is generated by plot.py at 2018-04-17 01:22:24
Datalink statistics
-- Total of 3 flows:
Average throughput: 3.62 Mbit/s
95th percentile per-packet one-way delay: 15.343 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.69 Mbit/s
95th percentile per-packet one-way delay: 15.417 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 15.511 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 14.472 ms
Loss rate: 0.00%

Run 2: Report of PCC-Vivace — Data Link

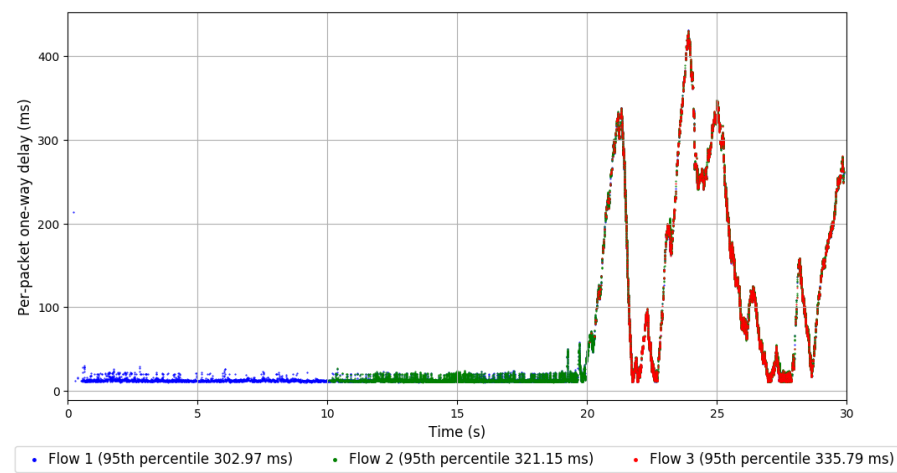
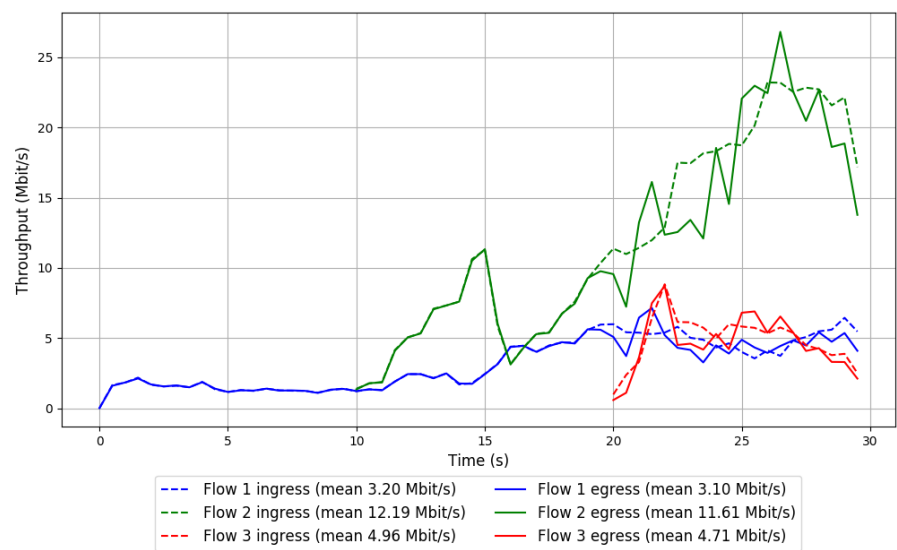


Run 3: Statistics of PCC-Vivace

Start at: 2018-04-17 00:59:26
End at: 2018-04-17 00:59:56
Local clock offset: 0.588 ms
Remote clock offset: -6.516 ms

Below is generated by plot.py at 2018-04-17 01:22:24
Datalink statistics
-- Total of 3 flows:
Average throughput: 12.44 Mbit/s
95th percentile per-packet one-way delay: 321.547 ms
Loss rate: 4.55%
-- Flow 1:
Average throughput: 3.10 Mbit/s
95th percentile per-packet one-way delay: 302.967 ms
Loss rate: 3.52%
-- Flow 2:
Average throughput: 11.61 Mbit/s
95th percentile per-packet one-way delay: 321.153 ms
Loss rate: 4.76%
-- Flow 3:
Average throughput: 4.71 Mbit/s
95th percentile per-packet one-way delay: 335.787 ms
Loss rate: 5.51%

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of PCC-Expr

Start at: 2018-04-17 00:18:15

End at: 2018-04-17 00:18:45

Local clock offset: 0.866 ms

Remote clock offset: -4.941 ms

Run 1: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of PCC-Expr

Start at: 2018-04-17 00:40:48

End at: 2018-04-17 00:41:18

Local clock offset: 0.409 ms

Remote clock offset: -6.175 ms

Run 2: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of PCC-Expr

Start at: 2018-04-17 01:03:24

End at: 2018-04-17 01:03:54

Local clock offset: 0.665 ms

Remote clock offset: -6.363 ms

Run 3: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing