Pantheon Report

Generated at 2018-02-19 20:57:04 (UTC).

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

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.

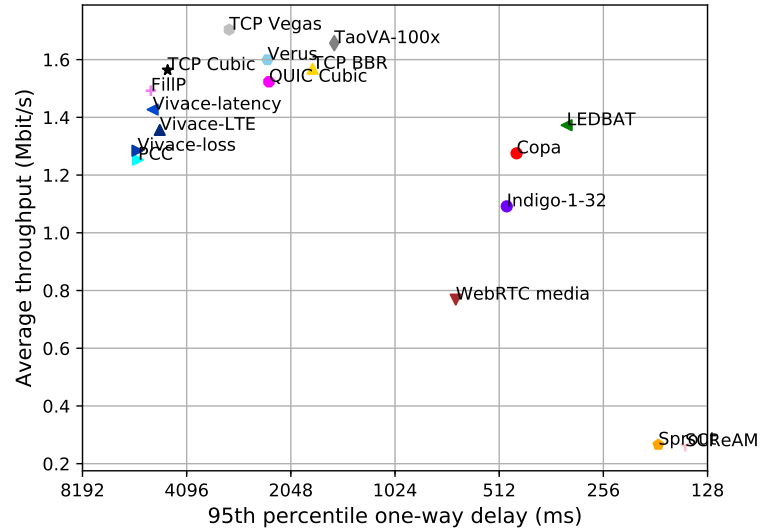Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

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

```
Git summary:
branch: master @ f12c42a2c63fdd9a862eefa0468859bf379b6623
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
 M datagrump/sender.cc
third_party/fillp @ 828bbf95fd4941149b5cec90f281d1c69ae1a5c6
third_party/genericCC @ 9249eea3238475c4d8cca1443d28df70bff6c4a2
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/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
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 @ a488197ddd041ace68a42849b2540ad834825f42
```
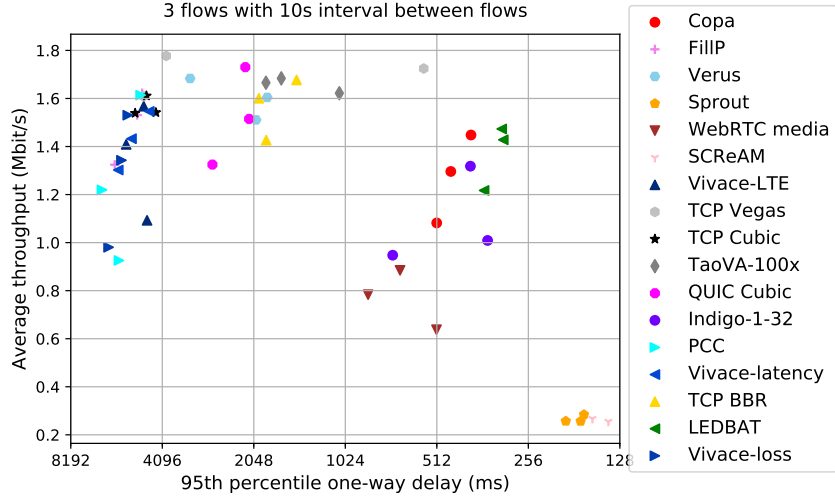
test from AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)

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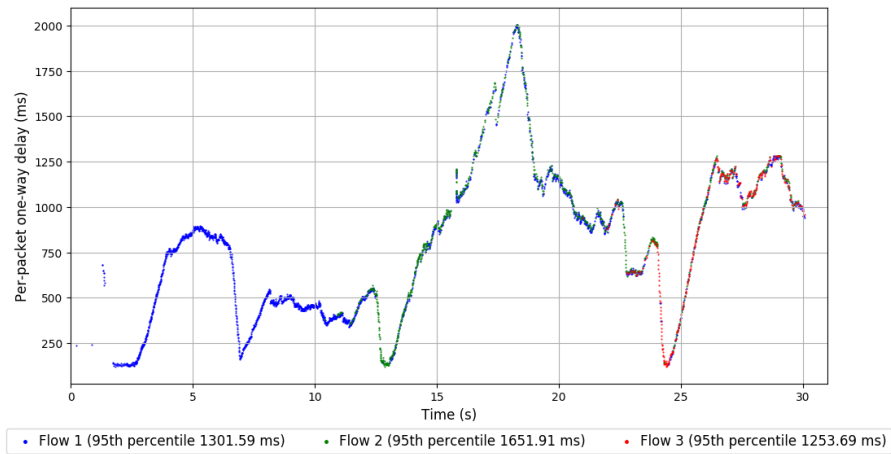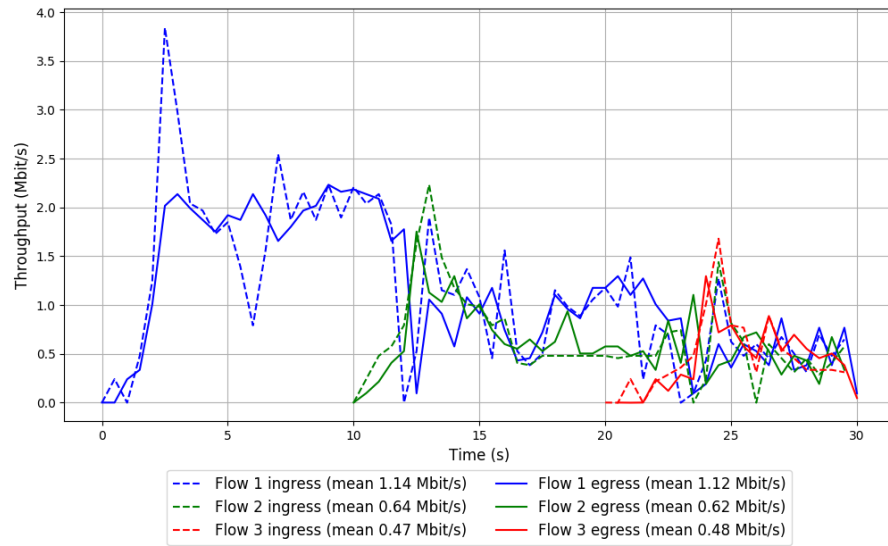3 flows with 10s interval between flows

scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	1.02	0.71	0.27	1678.71	1859.04	1642.82	2.37	6.00	10.56
TCP Cubic	3	1.52	0.09	0.00	4619.96	5156.35	4604.13	18.37	31.90	61.33
LEDBAT	3	1.01	0.40	0.30	350.04	325.66	356.64	0.12	0.47	3.21
PCC	3	0.94	0.46	0.00	5637.01	5627.19	5564.98	55.15	31.06	42.13
QUIC Cubic	3	1.15	0.51	0.12	2246.21	2502.98	2567.75	5.82	14.19	39.91
SCReAM	2	0.08	0.20	0.14	138.46	152.18	149.20	0.20	0.46	1.55
WebRTC media	3	0.52	0.19	0.07	609.11	727.30	747.95	0.59	3.17	8.10
Sprout	3	0.13	0.14	0.14	193.48	170.07	176.46	0.02	0.28	0.59
TaoVA-100x	3	0.94	0.71	0.76	1227.53	1415.66	1609.17	1.37	4.29	3.95
TCP Vegas	3	1.54	0.16	0.18	3083.55	2953.32	2962.06	13.44	4.03	39.76
Verus	3	1.59	0.01	0.01	2393.33	2230.90	2035.88	5.31	7.60	16.36
Copa	3	0.73	0.59	0.47	456.44	415.31	474.66	0.33	0.36	1.33
FillP	3	1.43	0.13	0.00	5195.63	5252.20	5312.61	95.71	71.38	77.11
Indigo-1-32	3	0.64	0.46	0.44	316.49	398.79	749.94	0.07	0.33	0.83
Vivace-latency	3	0.81	0.93	0.00	5091.32	5191.97	5056.59	35.07	43.95	37.17
Vivace-loss	3	0.96	0.49	0.00	5226.10	5751.16	5247.60	30.35	37.24	35.46
Vivace-LTE	3	0.56	1.02	0.35	4463.94	4893.99	4914.64	25.70	35.88	40.90

```
Run 1: Statistics of TCP BBR

Start at: 2018-02-19 19:56:54
End at: 2018-02-19 19:57:24
Local clock offset: -5.575 ms
Remote clock offset: -3.251 ms


# Below is generated by plot.py at 2018-02-19 20:56:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.68 Mbit/s
95th percentile per-packet one-way delay: 1481.519 ms
Loss rate: 2.98%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 1301.588 ms
Loss rate: 1.65%
-- Flow 2:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 1651.912 ms
Loss rate: 5.36%
-- Flow 3:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 1253.694 ms
Loss rate: 6.15%
```

Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2018-02-19 20:19:28
End at: 2018-02-19 20:19:58
Local clock offset: -3.932 ms
Remote clock offset: -3.748 ms


# Below is generated by plot.py at 2018-02-19 20:56:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.60 Mbit/s
95th percentile per-packet one-way delay: 1970.385 ms
Loss rate: 6.02%
-- Flow 1:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 1890.481 ms
Loss rate: 3.97%
-- Flow 2:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 2001.789 ms
Loss rate: 9.21%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 2022.166 ms
Loss rate: 14.26%
```
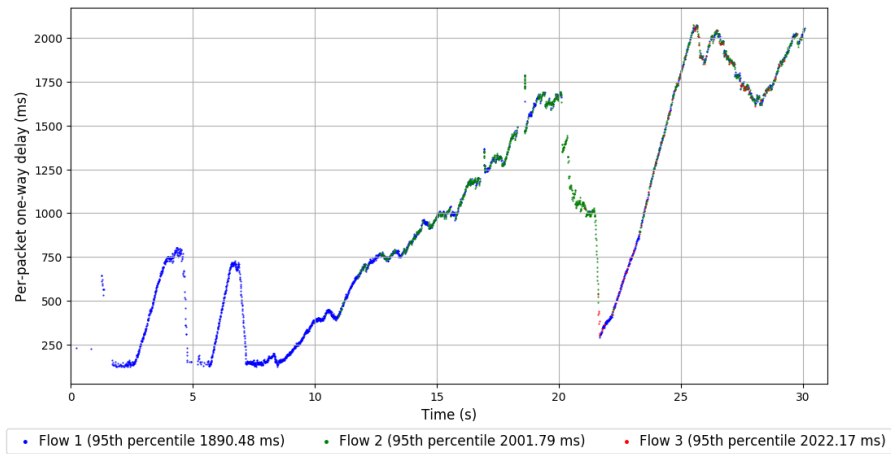
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2018-02-19 20:42:07
End at: 2018-02-19 20:42:37
Local clock offset: -2.849 ms
Remote clock offset: 0.263 ms


# Below is generated by plot.py at 2018-02-19 20:56:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 1864.400 ms
Loss rate: 2.50%
-- Flow 1:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 1844.061 ms
Loss rate: 1.50%
-- Flow 2:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 1923.412 ms
Loss rate: 3.42%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 1652.589 ms
Loss rate: 11.26%
```
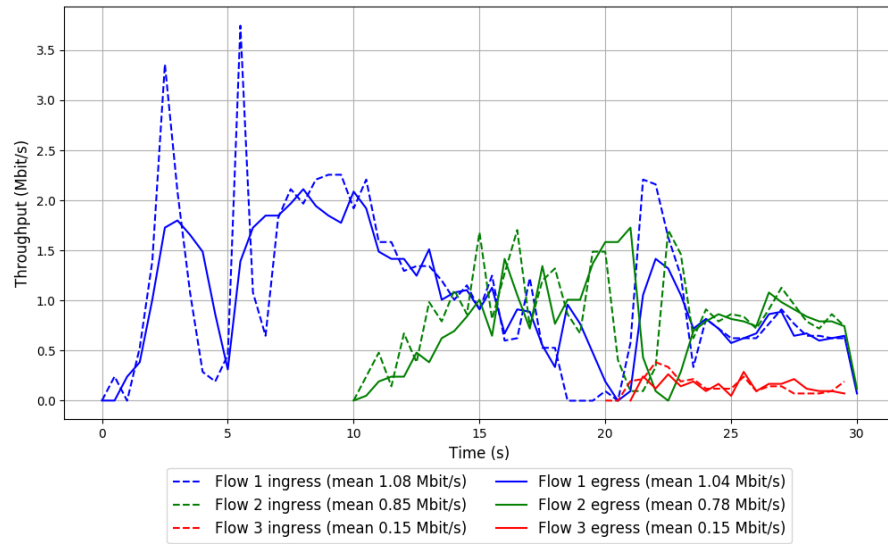
Run 3: Report of TCP BBR — Data Link

```
Run 1: Statistics of TCP Cubic

Start at: 2018-02-19 19:51:46
End at: 2018-02-19 19:52:16
Local clock offset: -5.718 ms
Remote clock offset: 2.397 ms


# Below is generated by plot.py at 2018-02-19 20:56:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 4617.731 ms
Loss rate: 16.30%
-- Flow 1:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 4617.837 ms
Loss rate: 15.83%
-- Flow 2:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 4607.970 ms
Loss rate: 28.27%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4543.621 ms
Loss rate: 59.38%
```
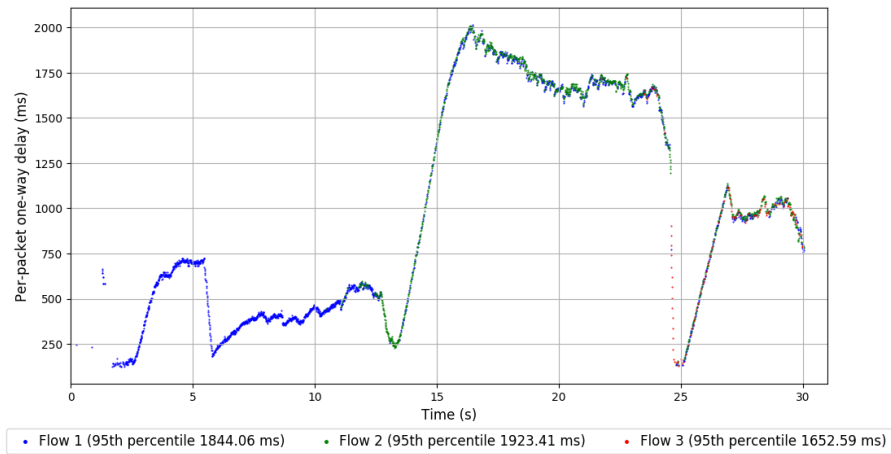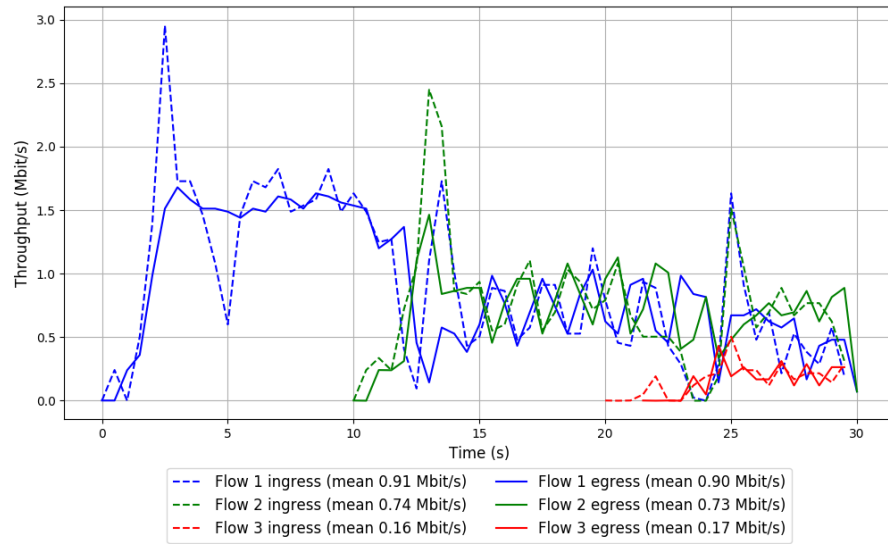
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 1.85 Mbit/s)   Flow 1 egress (mean 1.56 Mbit/s)
Flow 2 ingress (mean 0.11 Mbit/s)   Flow 2 egress (mean 0.09 Mbit/s)
Flow 3 ingress (mean 0.01 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 4617.84 ms)   Flow 2 (95th percentile 4607.97 ms)   Flow 3 (95th percentile 4543.62 ms)

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```
Run 2: Statistics of TCP Cubic

Start at: 2018-02-19 20:14:26
End at: 2018-02-19 20:14:56
Local clock offset: -4.467 ms
Remote clock offset: -4.412 ms


# Below is generated by plot.py at 2018-02-19 20:56:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 5031.079 ms
Loss rate: 20.93%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 5030.443 ms
Loss rate: 20.52%
-- Flow 2:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 5077.908 ms
Loss rate: 41.46%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4969.010 ms
Loss rate: 61.12%
```
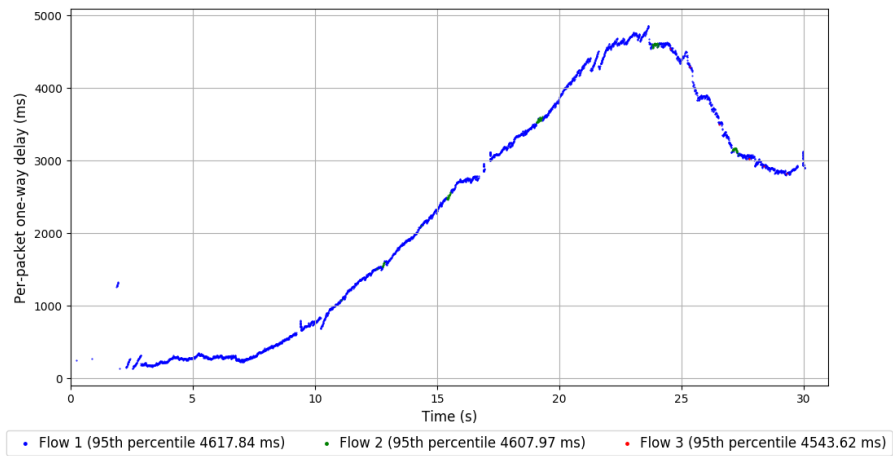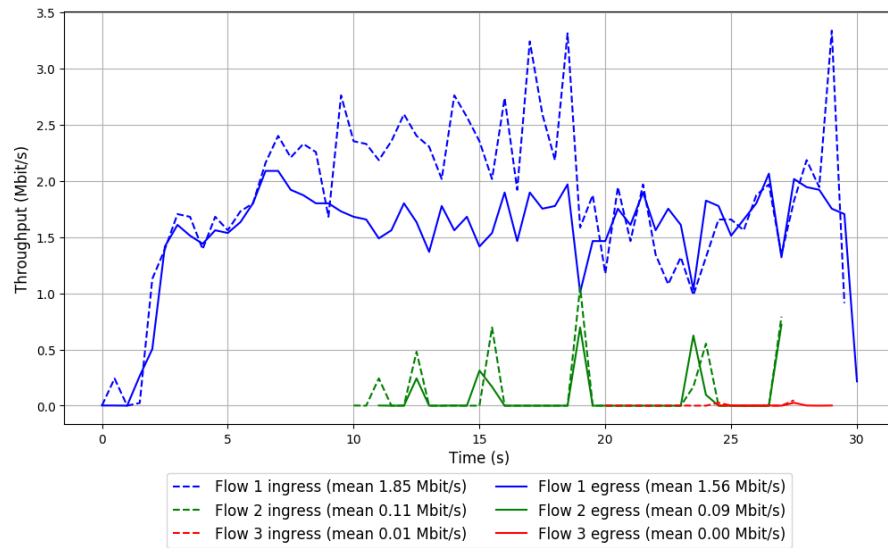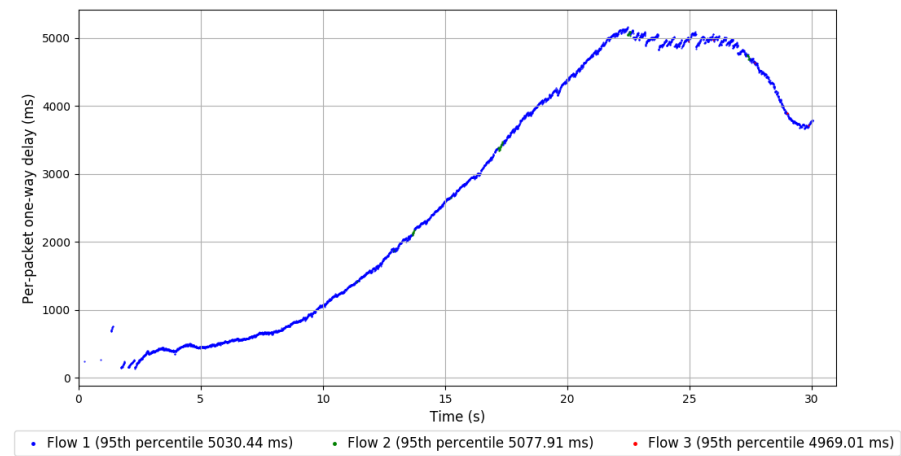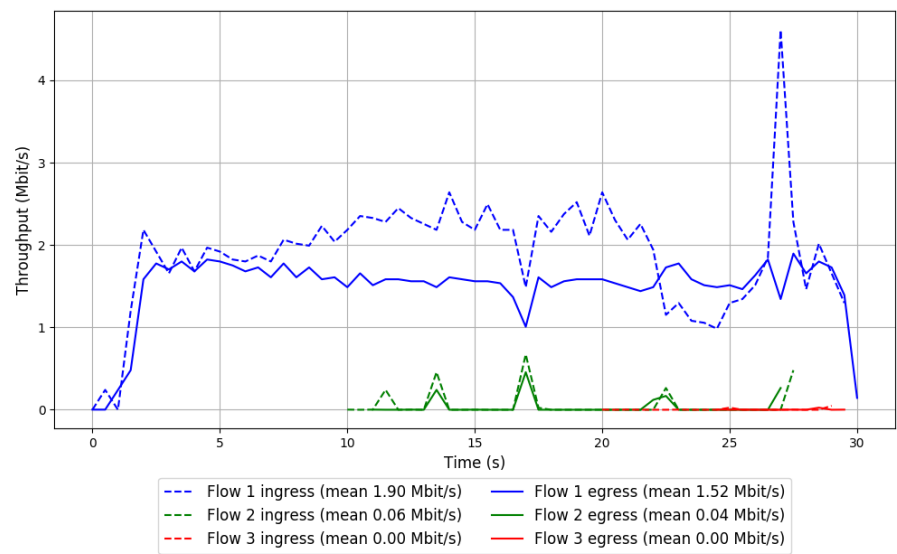
Run 2: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 1.90 Mbit/s) — Flow 1 egress (mean 1.52 Mbit/s)
Flow 2 ingress (mean 0.06 Mbit/s) — Flow 2 egress (mean 0.04 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s) — Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 5030.44 ms)   Flow 2 (95th percentile 5077.91 ms)   Flow 3 (95th percentile 4969.01 ms)

```
Run 3: Statistics of TCP Cubic

Start at: 2018-02-19 20:37:04
End at: 2018-02-19 20:37:34
Local clock offset: -3.046 ms
Remote clock offset: -3.784 ms


# Below is generated by plot.py at 2018-02-19 20:56:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 4299.749 ms
Loss rate: 19.26%
-- Flow 1:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 4211.599 ms
Loss rate: 18.76%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 5783.161 ms
Loss rate: 25.97%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4299.751 ms
Loss rate: 63.50%
```
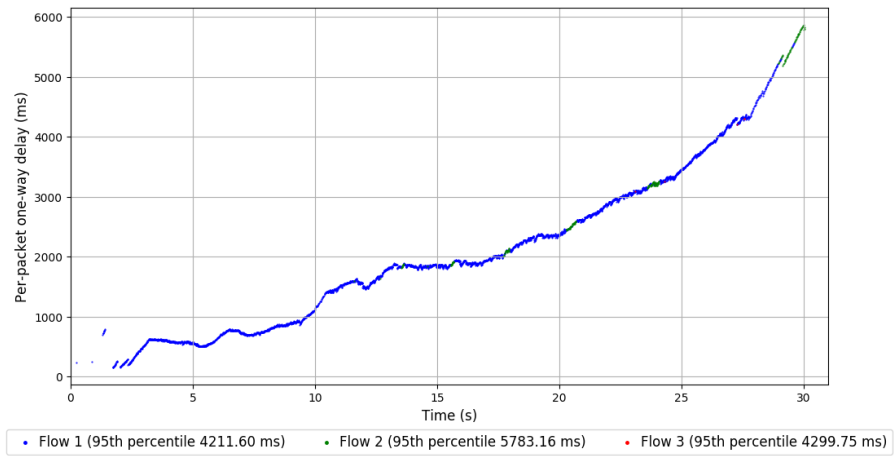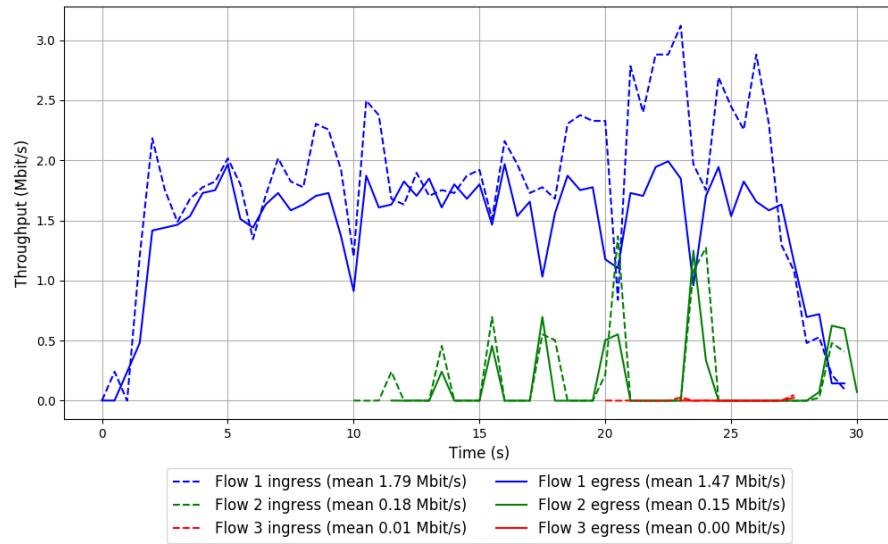
Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 1.79 Mbit/s)   Flow 1 egress (mean 1.47 Mbit/s)
Flow 2 ingress (mean 0.18 Mbit/s)   Flow 2 egress (mean 0.15 Mbit/s)
Flow 3 ingress (mean 0.01 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 4211.60 ms)   Flow 2 (95th percentile 5783.16 ms)   Flow 3 (95th percentile 4299.75 ms)

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```
Run 1: Statistics of LEDBAT

Start at: 2018-02-19 20:05:40
End at: 2018-02-19 20:06:10
Local clock offset: -5.59 ms
Remote clock offset: -3.27 ms

# Below is generated by plot.py at 2018-02-19 20:56:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 309.543 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 309.111 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 320.229 ms
Loss rate: 0.90%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 368.745 ms
Loss rate: 4.32%
```
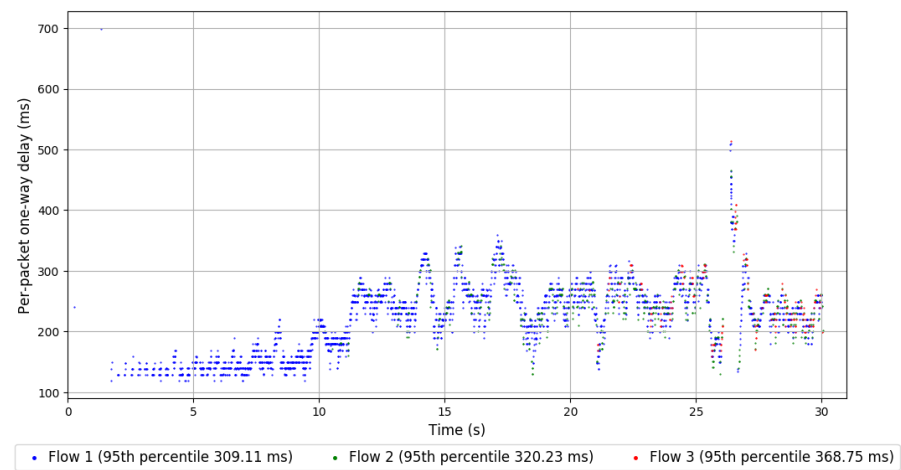
Run 1: Report of LEDBAT — Data Link

- Flow 1 ingress (mean 1.14 Mbit/s)
- Flow 1 egress (mean 1.14 Mbit/s)
- Flow 2 ingress (mean 0.33 Mbit/s)
- Flow 2 egress (mean 0.33 Mbit/s)
- Flow 3 ingress (mean 0.22 Mbit/s)
- Flow 3 egress (mean 0.21 Mbit/s)

- Flow 1 (95th percentile 309.11 ms)
- Flow 2 (95th percentile 320.23 ms)
- Flow 3 (95th percentile 368.75 ms)

```
Run 2: Statistics of LEDBAT

Start at: 2018-02-19 20:28:18
End at: 2018-02-19 20:28:48
Local clock offset: -3.318 ms
Remote clock offset: 0.059 ms


# Below is generated by plot.py at 2018-02-19 20:56:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 357.981 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 428.055 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 316.796 ms
Loss rate: 0.29%
-- Flow 3:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 349.556 ms
Loss rate: 4.98%
```
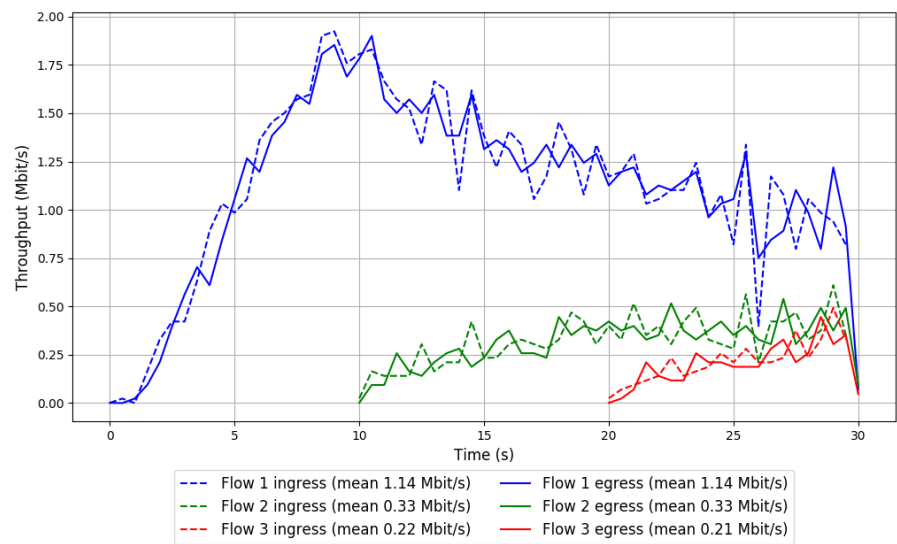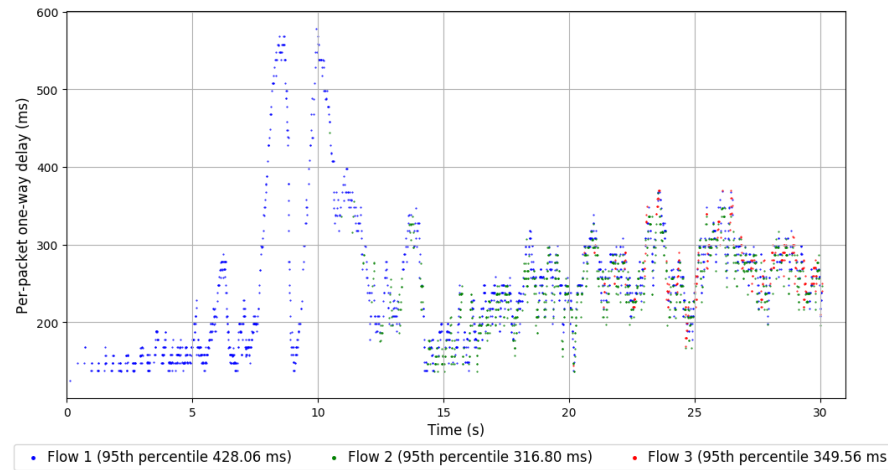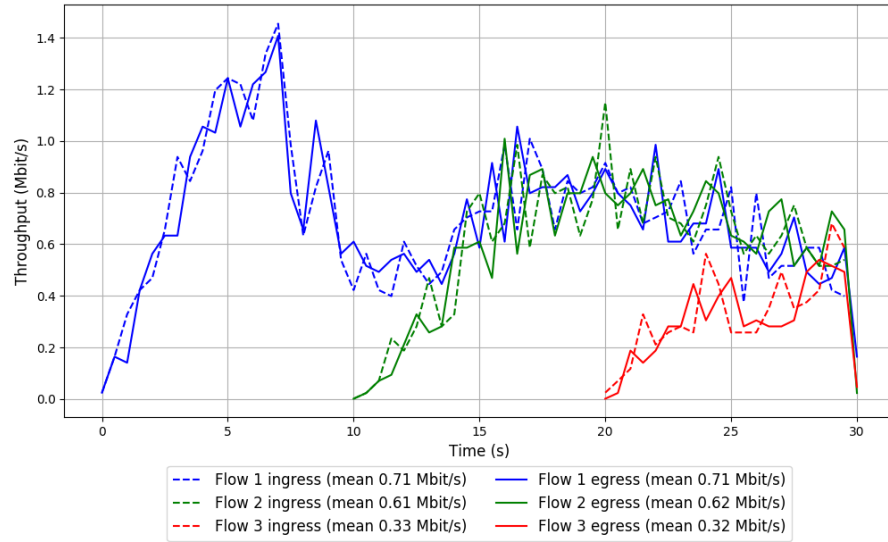
Run 2: Report of LEDBAT — Data Link

Flow 1 ingress (mean 0.71 Mbit/s) Flow 1 egress (mean 0.71 Mbit/s)
Flow 2 ingress (mean 0.61 Mbit/s) Flow 2 egress (mean 0.62 Mbit/s)
Flow 3 ingress (mean 0.33 Mbit/s) Flow 3 egress (mean 0.32 Mbit/s)

Flow 1 (95th percentile 428.06 ms) Flow 2 (95th percentile 316.80 ms) Flow 3 (95th percentile 349.56 ms)
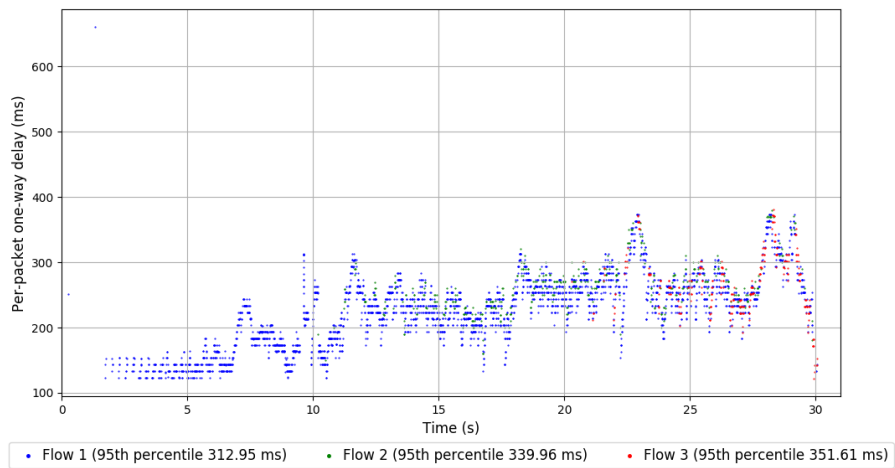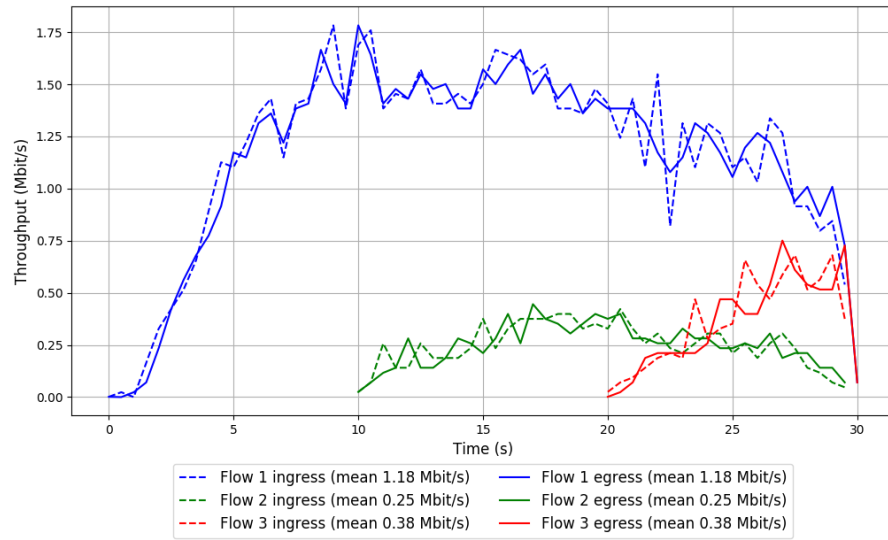
```
Run 3: Statistics of LEDBAT

Start at: 2018-02-19 20:50:52
End at: 2018-02-19 20:51:22
Local clock offset: -5.375 ms
Remote clock offset: -3.623 ms


# Below is generated by plot.py at 2018-02-19 20:56:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 313.334 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 312.946 ms
Loss rate: 0.20%
-- Flow 2:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 339.964 ms
Loss rate: 0.23%
-- Flow 3:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 351.613 ms
Loss rate: 0.32%
```

Run 3: Report of LEDBAT — Data Link

```
Run 1: Statistics of PCC

Start at: 2018-02-19 19:47:58
End at: 2018-02-19 19:48:28
Local clock offset: -5.823 ms
Remote clock offset: 3.211 ms


# Below is generated by plot.py at 2018-02-19 20:56:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 4824.745 ms
Loss rate: 66.67%
-- Flow 1:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 4828.189 ms
Loss rate: 66.69%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4710.570 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4723.253 ms
Loss rate: 26.53%
```
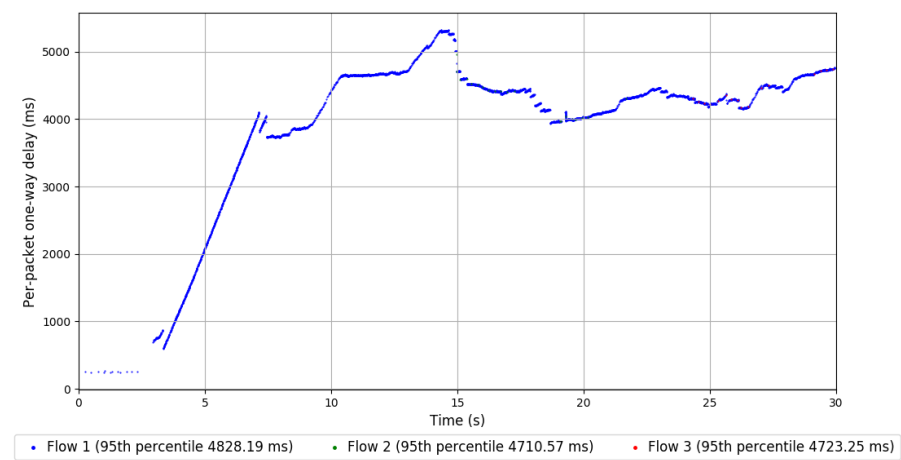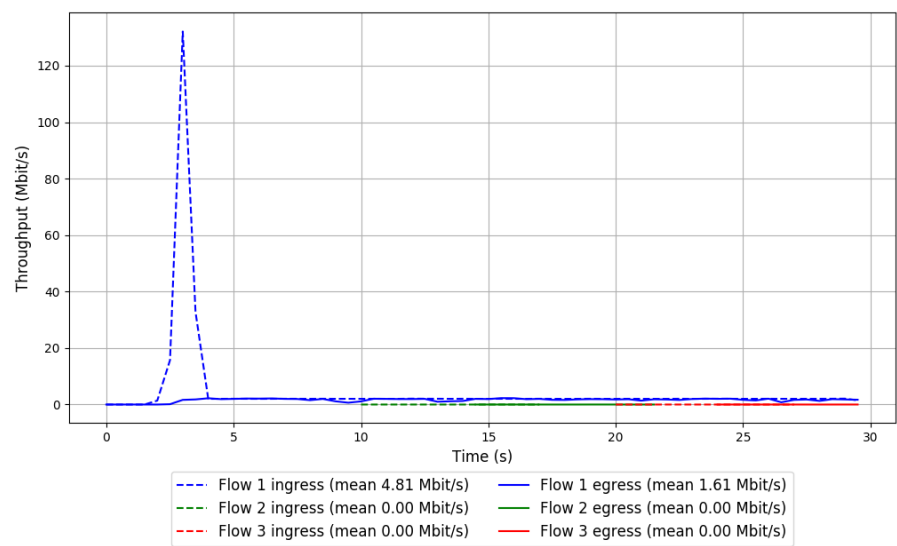
Run 1: Report of PCC — Data Link

Flow 1 ingress (mean 4.81 Mbit/s) — Flow 1 egress (mean 1.61 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s) — Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s) — Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 4828.19 ms) • Flow 2 (95th percentile 4710.57 ms) • Flow 3 (95th percentile 4723.25 ms)
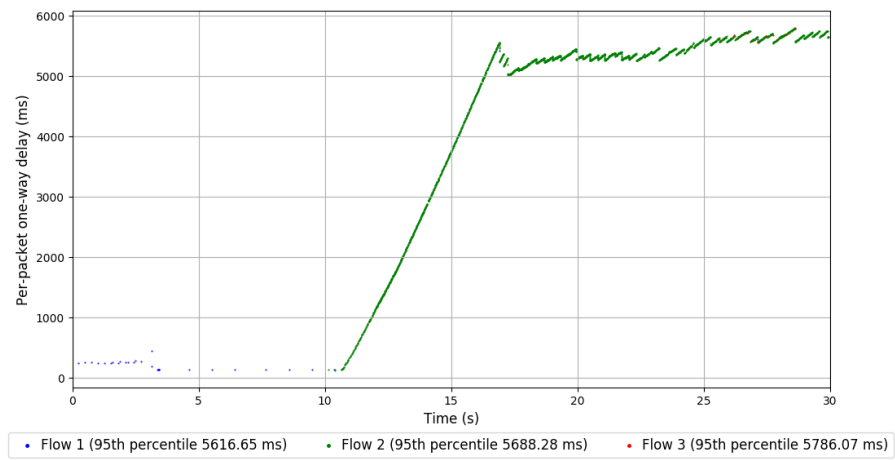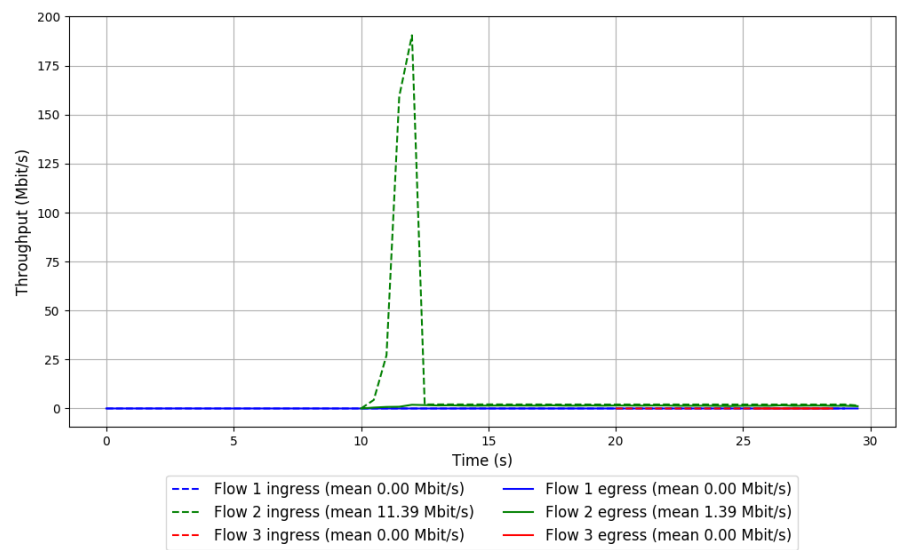
23

```
Run 2: Statistics of PCC

Start at: 2018-02-19 20:10:40
End at: 2018-02-19 20:11:10
Local clock offset: -4.964 ms
Remote clock offset: -4.356 ms


# Below is generated by plot.py at 2018-02-19 20:56:30
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 5688.281 ms
Loss rate: 87.84%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5616.651 ms
Loss rate: 11.99%
-- Flow 2:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 5688.281 ms
Loss rate: 87.86%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5786.067 ms
Loss rate: 52.11%
```

Run 2: Report of PCC — Data Link

Flow 1 ingress (mean 0.00 Mbit/s) — Flow 1 egress (mean 0.00 Mbit/s)
Flow 2 ingress (mean 11.39 Mbit/s) — Flow 2 egress (mean 1.39 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s) — Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 5616.65 ms)   Flow 2 (95th percentile 5688.28 ms)   Flow 3 (95th percentile 5786.07 ms)
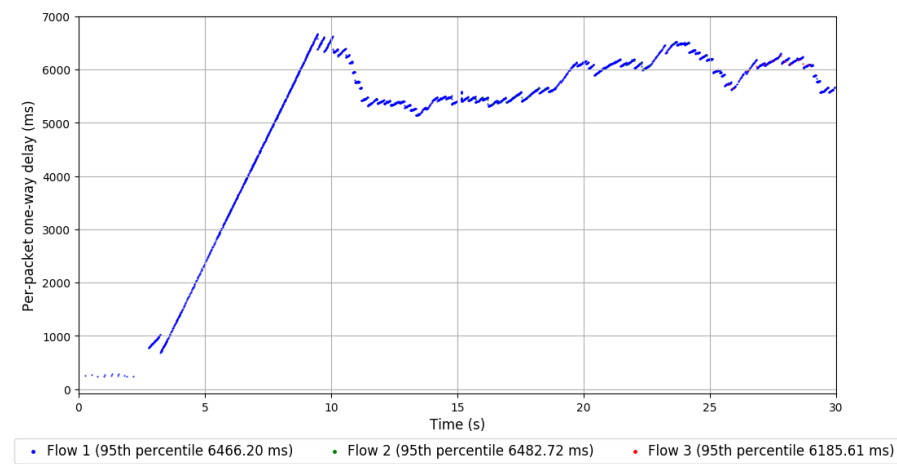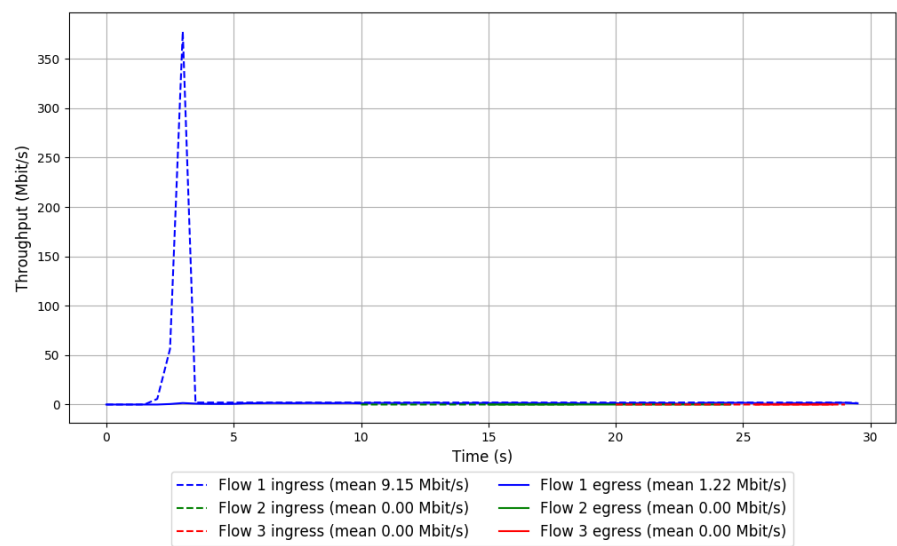
25

```
Run 3: Statistics of PCC

Start at: 2018-02-19 20:33:19
End at: 2018-02-19 20:33:49
Local clock offset: -3.107 ms
Remote clock offset: -4.676 ms


# Below is generated by plot.py at 2018-02-19 20:56:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 6466.197 ms
Loss rate: 86.75%
-- Flow 1:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 6466.197 ms
Loss rate: 86.76%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 6482.716 ms
Loss rate: 5.31%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 6185.609 ms
Loss rate: 47.76%
```

Run 3: Report of PCC — Data Link

Flow 1 ingress (mean 9.15 Mbit/s)   Flow 1 egress (mean 1.22 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s)   Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 6466.20 ms)   Flow 2 (95th percentile 6482.72 ms)   Flow 3 (95th percentile 6185.61 ms)
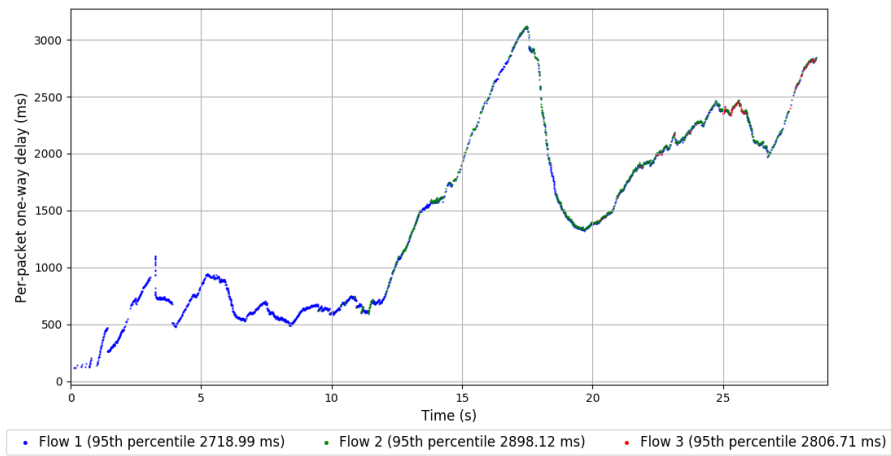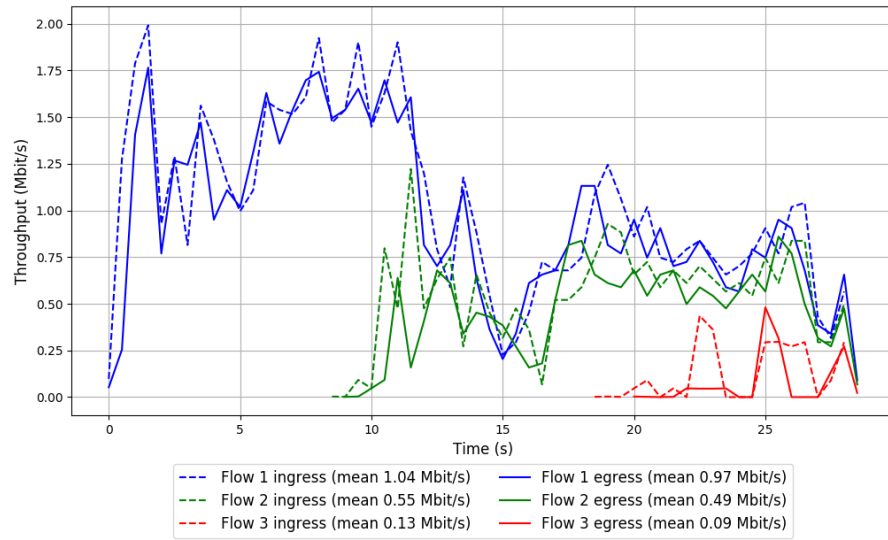
```
Run 1: Statistics of QUIC Cubic

Start at: 2018-02-19 19:53:01
End at: 2018-02-19 19:53:31
Local clock offset: -5.619 ms
Remote clock offset: -3.164 ms


# Below is generated by plot.py at 2018-02-19 20:56:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 2801.615 ms
Loss rate: 9.58%
-- Flow 1:
Average throughput: 0.97 Mbit/s
95th percentile per-packet one-way delay: 2718.985 ms
Loss rate: 6.35%
-- Flow 2:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 2898.117 ms
Loss rate: 14.38%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 2806.709 ms
Loss rate: 43.93%
```

Run 1: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 1.04 Mbit/s)　　Flow 1 egress (mean 0.97 Mbit/s)
Flow 2 ingress (mean 0.55 Mbit/s)　　Flow 2 egress (mean 0.49 Mbit/s)
Flow 3 ingress (mean 0.13 Mbit/s)　　Flow 3 egress (mean 0.09 Mbit/s)

Flow 1 (95th percentile 2718.99 ms)　　Flow 2 (95th percentile 2898.12 ms)　　Flow 3 (95th percentile 2806.71 ms)
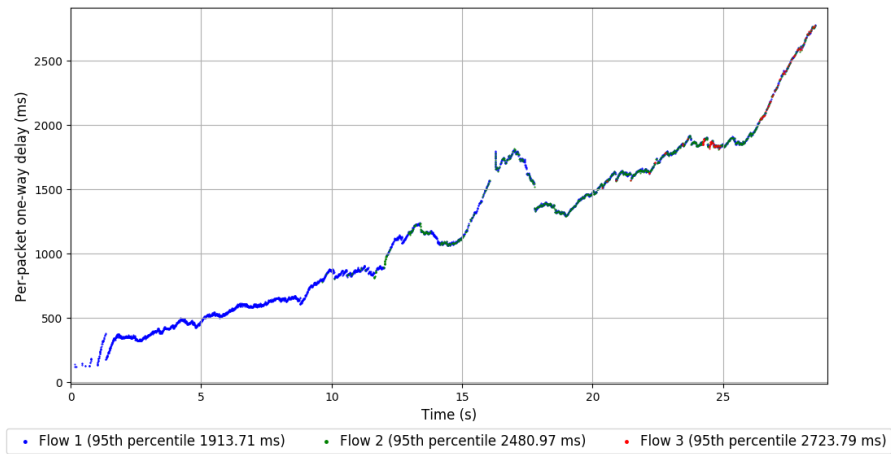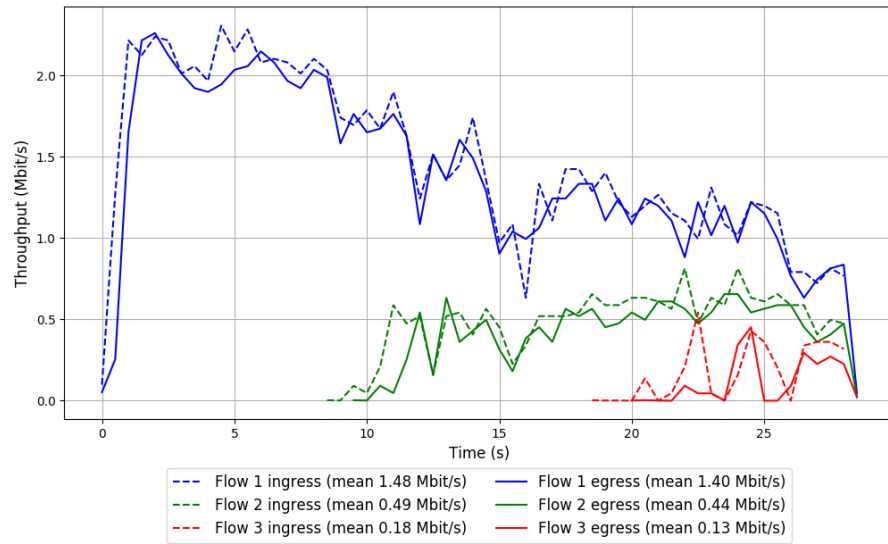
29

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-02-19 20:15:41
End at: 2018-02-19 20:16:11
Local clock offset: -4.306 ms
Remote clock offset: -3.672 ms

# Below is generated by plot.py at 2018-02-19 20:56:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.73 Mbit/s
95th percentile per-packet one-way delay: 2183.978 ms
Loss rate: 8.13%
-- Flow 1:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 1913.712 ms
Loss rate: 5.27%
-- Flow 2:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 2480.970 ms
Loss rate: 14.76%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 2723.787 ms
Loss rate: 39.86%
```
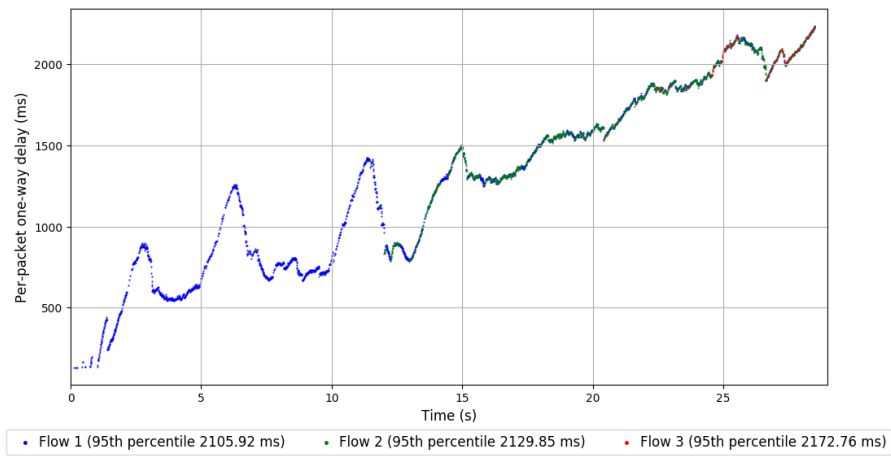
Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 1.48 Mbit/s) --- Flow 1 egress (mean 1.40 Mbit/s)
Flow 2 ingress (mean 0.49 Mbit/s) --- Flow 2 egress (mean 0.44 Mbit/s)
Flow 3 ingress (mean 0.18 Mbit/s) --- Flow 3 egress (mean 0.13 Mbit/s)

Flow 1 (95th percentile 1913.71 ms)   Flow 2 (95th percentile 2480.97 ms)   Flow 3 (95th percentile 2723.79 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-02-19 20:38:20
End at: 2018-02-19 20:38:50
Local clock offset: -2.932 ms
Remote clock offset: 1.105 ms


# Below is generated by plot.py at 2018-02-19 20:56:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 2121.844 ms
Loss rate: 9.05%
-- Flow 1:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 2105.923 ms
Loss rate: 5.83%
-- Flow 2:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 2129.848 ms
Loss rate: 13.43%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 2172.757 ms
Loss rate: 35.93%
```
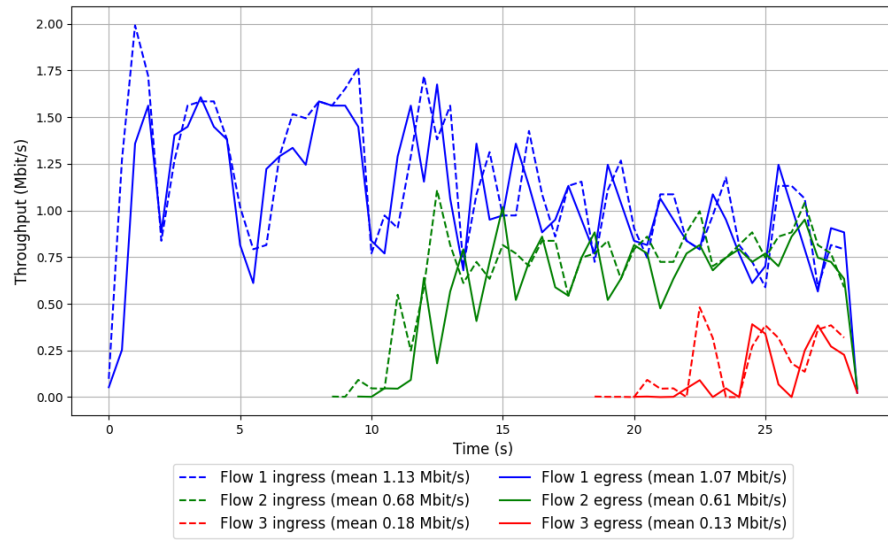
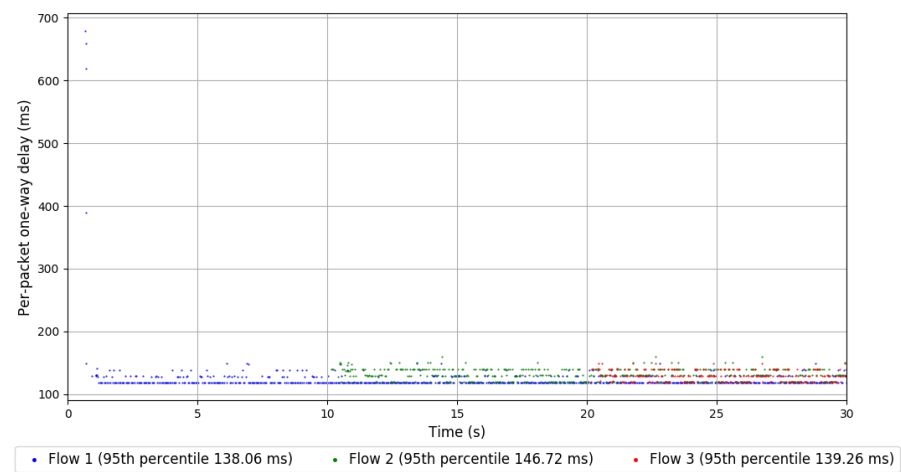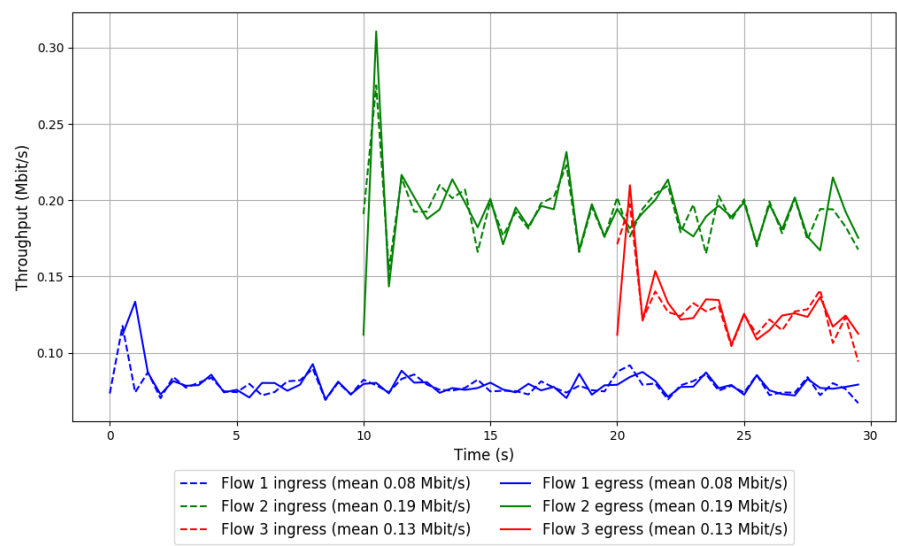Run 3: Report of QUIC Cubic — Data Link

```
Run 1: Statistics of SCReAM

Start at: 2018-02-19 20:00:40
End at: 2018-02-19 20:01:10
Local clock offset: -5.532 ms
Remote clock offset: -3.776 ms


# Below is generated by plot.py at 2018-02-19 20:56:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 139.614 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 138.063 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 146.720 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 139.262 ms
Loss rate: 0.34%
```

Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2018-02-19 20:23:15
End at: 2018-02-19 20:23:45
Local clock offset: -3.592 ms
Remote clock offset: -3.708 ms
```
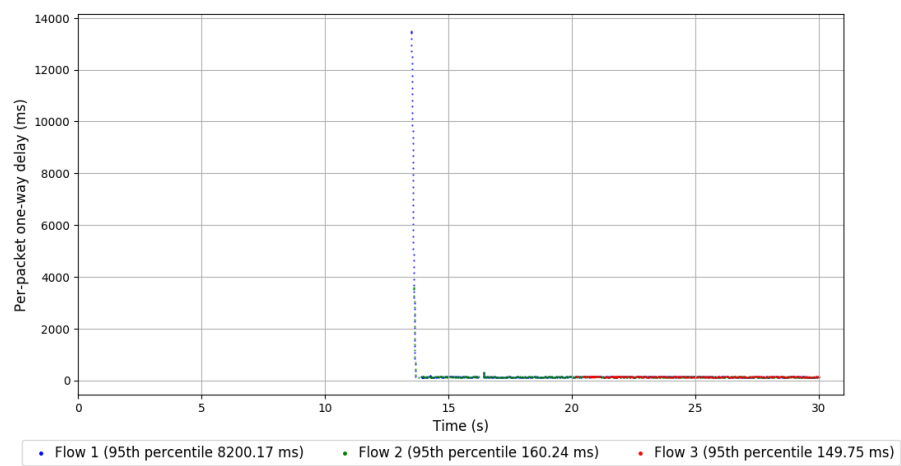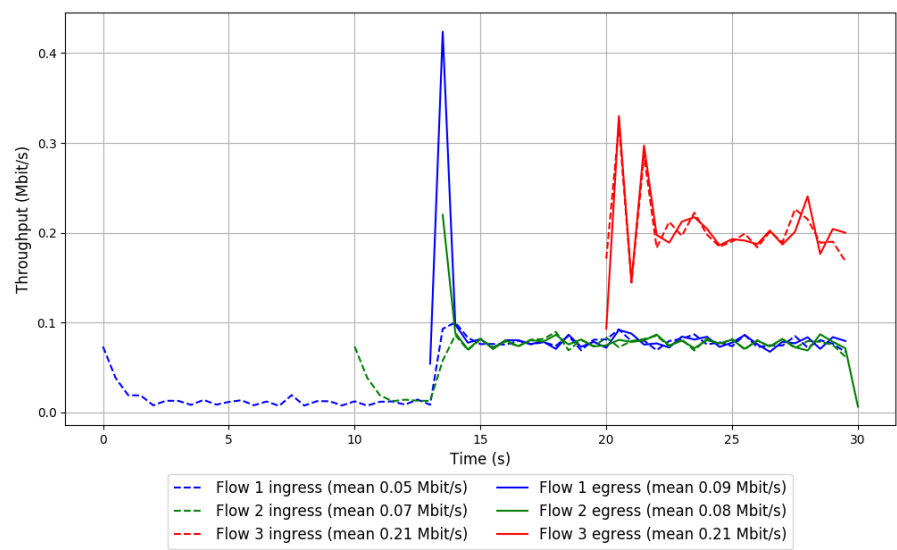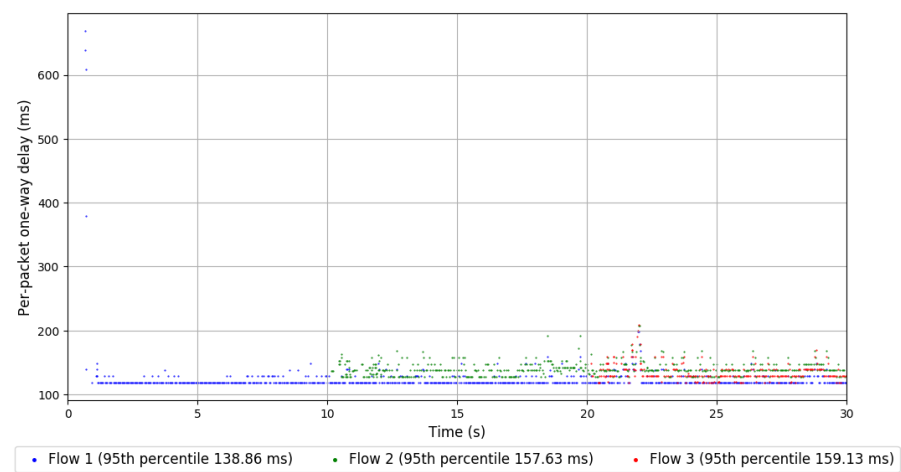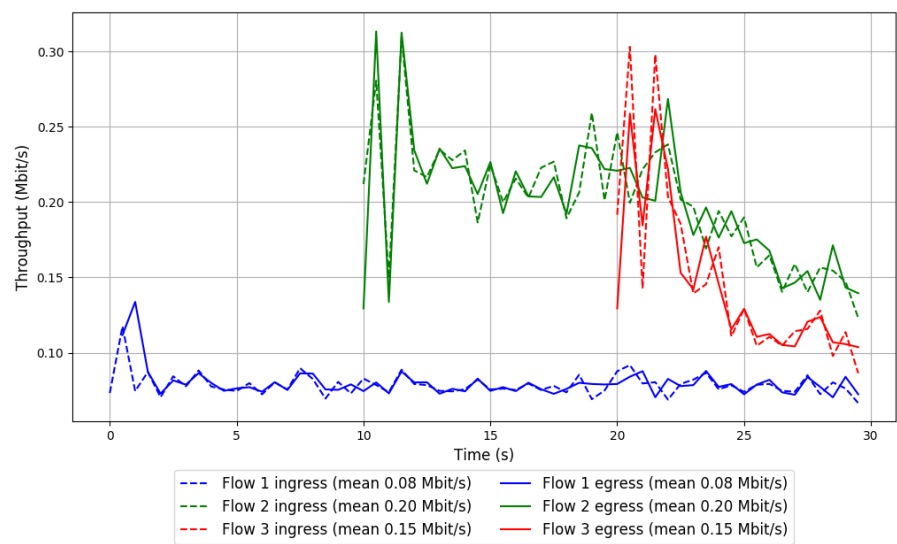
Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2018-02-19 20:45:53
End at: 2018-02-19 20:46:23
Local clock offset: -4.195 ms
Remote clock offset: -4.515 ms


# Below is generated by plot.py at 2018-02-19 20:56:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 157.488 ms
Loss rate: 0.87%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 138.860 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 157.635 ms
Loss rate: 0.53%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 159.130 ms
Loss rate: 2.77%
```

Run 3: Report of SCReAM — Data Link

Legend:
- Flow 1 ingress (mean 0.08 Mbit/s)
- Flow 1 egress (mean 0.08 Mbit/s)
- Flow 2 ingress (mean 0.20 Mbit/s)
- Flow 2 egress (mean 0.20 Mbit/s)
- Flow 3 ingress (mean 0.15 Mbit/s)
- Flow 3 egress (mean 0.15 Mbit/s)

Legend:
- Flow 1 (95th percentile 138.86 ms)
- Flow 2 (95th percentile 157.63 ms)
- Flow 3 (95th percentile 159.13 ms)

```
Run 1: Statistics of WebRTC media

Start at: 2018-02-19 19:55:32
End at: 2018-02-19 19:56:02
Local clock offset: -5.591 ms
Remote clock offset: 1.716 ms


# Below is generated by plot.py at 2018-02-19 20:56:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 861.707 ms
Loss rate: 2.48%
-- Flow 1:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 845.526 ms
Loss rate: 0.92%
-- Flow 2:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 922.727 ms
Loss rate: 7.79%
-- Flow 3:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 752.660 ms
Loss rate: 12.16%
```
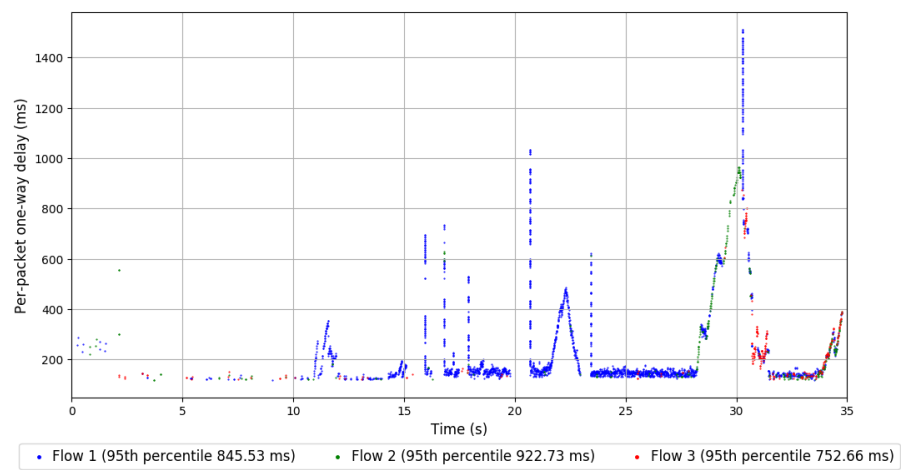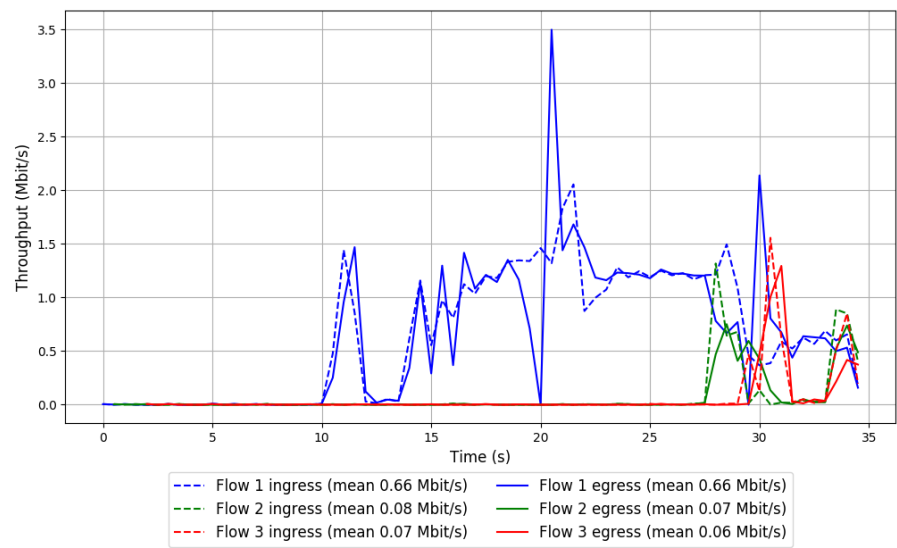
Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-02-19 20:18:13
End at: 2018-02-19 20:18:43
Local clock offset: -3.97 ms
Remote clock offset: 1.105 ms


# Below is generated by plot.py at 2018-02-19 20:56:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 676.465 ms
Loss rate: 0.81%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 512.797 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 723.934 ms
Loss rate: 0.83%
-- Flow 3:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 795.926 ms
Loss rate: 5.75%
```
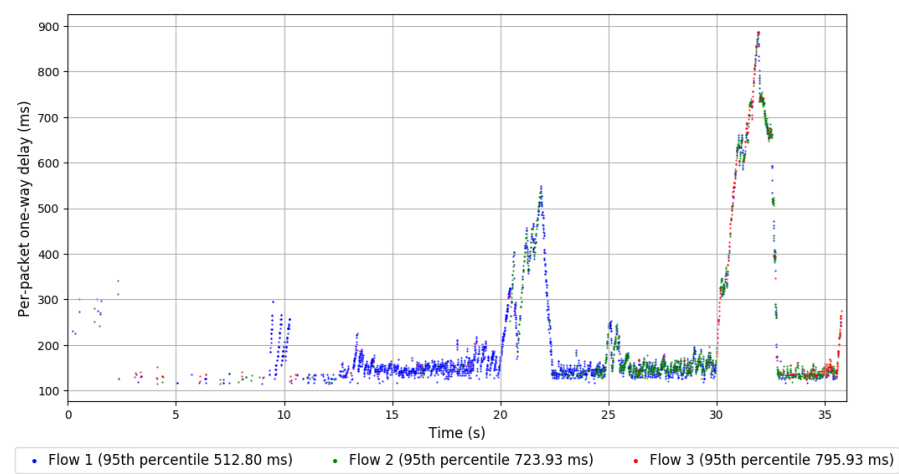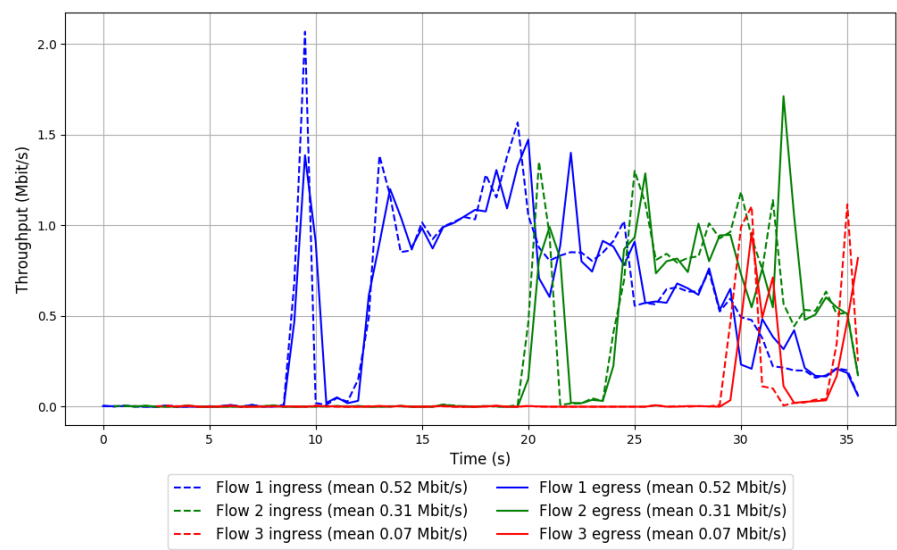
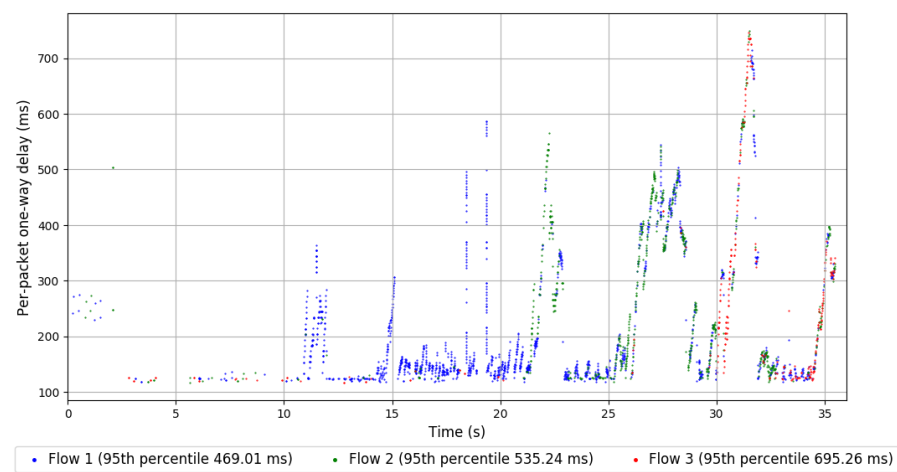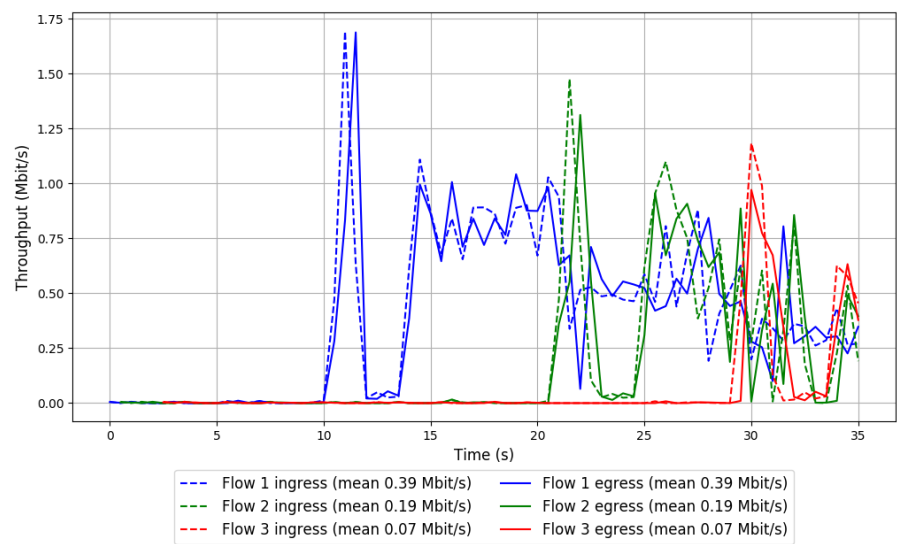Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-02-19 20:40:51
End at: 2018-02-19 20:41:21
Local clock offset: -2.873 ms
Remote clock offset: -4.548 ms


# Below is generated by plot.py at 2018-02-19 20:56:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 513.318 ms
Loss rate: 1.32%
-- Flow 1:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 469.009 ms
Loss rate: 0.69%
-- Flow 2:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 535.235 ms
Loss rate: 0.88%
-- Flow 3:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 695.257 ms
Loss rate: 6.38%
```

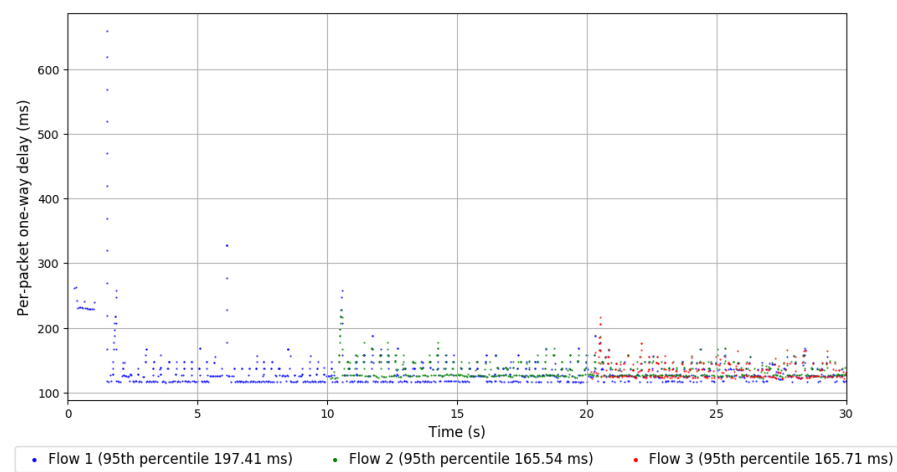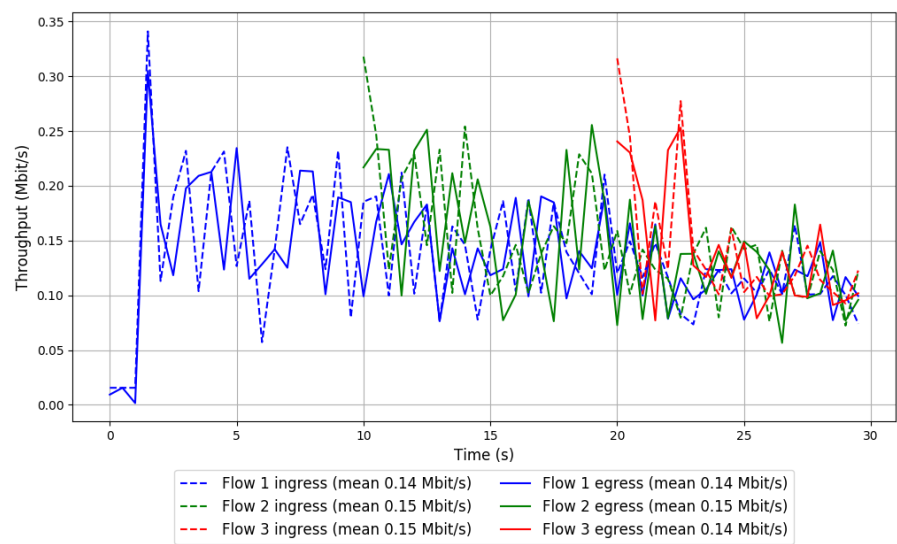## Run 3: Report of WebRTC media — Data Link

```
Run 1: Statistics of Sprout

Start at: 2018-02-19 20:03:10
End at: 2018-02-19 20:03:40
Local clock offset: -5.609 ms
Remote clock offset: -3.157 ms


# Below is generated by plot.py at 2018-02-19 20:56:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 167.975 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 197.410 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 165.536 ms
Loss rate: 0.80%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 165.708 ms
Loss rate: 1.65%
```

Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-02-19 20:25:47
End at: 2018-02-19 20:26:17
Local clock offset: -3.458 ms
Remote clock offset: 1.048 ms


# Below is generated by plot.py at 2018-02-19 20:56:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 192.789 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 203.072 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 183.032 ms
Loss rate: 0.03%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 192.123 ms
Loss rate: 0.06%
```
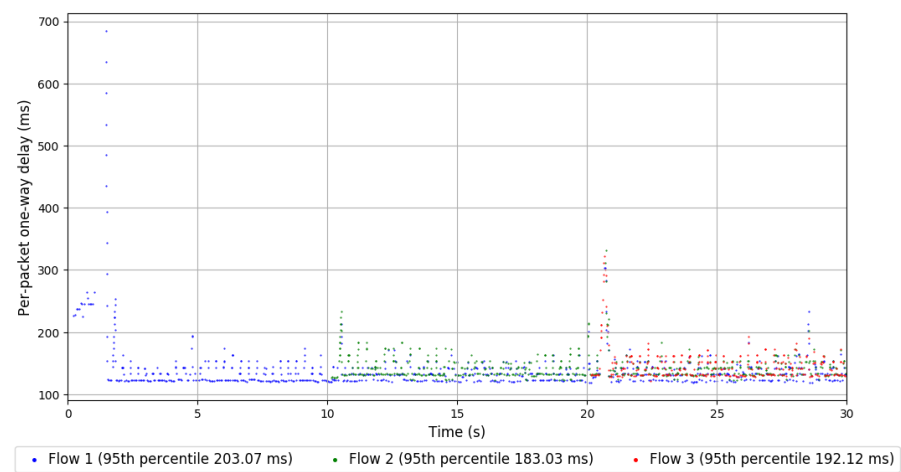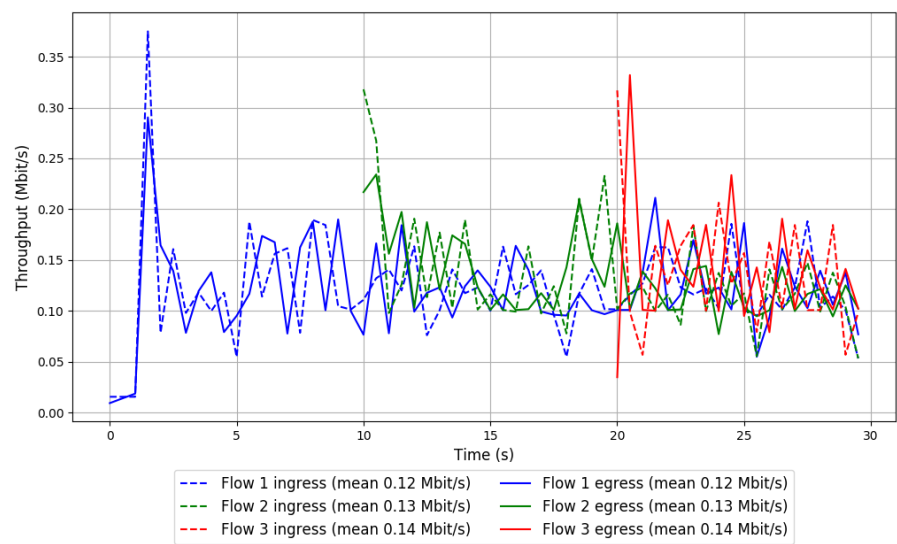
Run 2: Report of Sprout — Data Link

Flow 1 ingress (mean 0.12 Mbit/s) — — — Flow 1 egress (mean 0.12 Mbit/s) ———
Flow 2 ingress (mean 0.13 Mbit/s) — — — Flow 2 egress (mean 0.13 Mbit/s) ———
Flow 3 ingress (mean 0.14 Mbit/s) — — — Flow 3 egress (mean 0.14 Mbit/s) ———

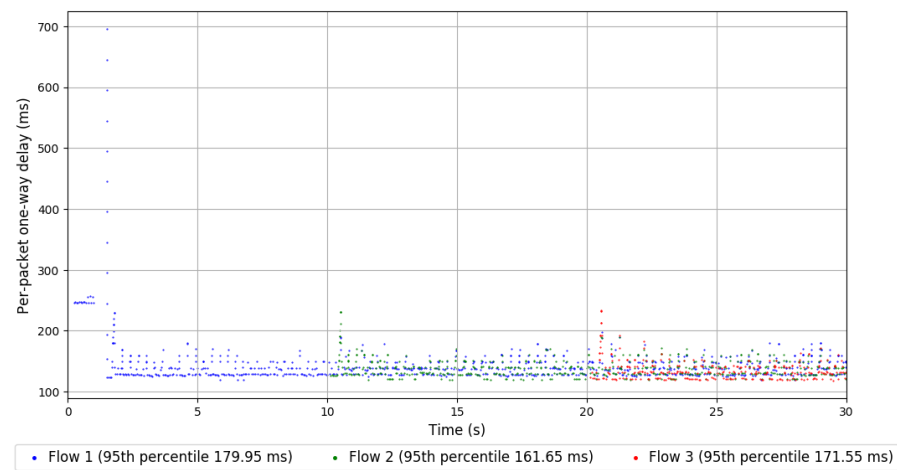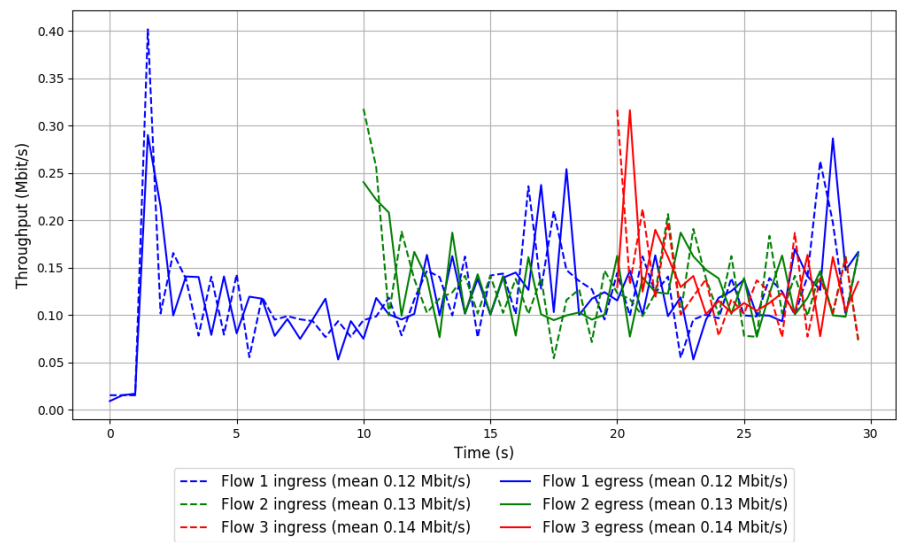• Flow 1 (95th percentile 203.07 ms)   • Flow 2 (95th percentile 183.03 ms)   • Flow 3 (95th percentile 192.12 ms)

```
Run 3: Statistics of Sprout

Start at: 2018-02-19 20:48:22
End at: 2018-02-19 20:48:52
Local clock offset: -4.852 ms
Remote clock offset: 1.137 ms


# Below is generated by plot.py at 2018-02-19 20:56:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 172.251 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 179.949 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 161.650 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 171.546 ms
Loss rate: 0.06%
```
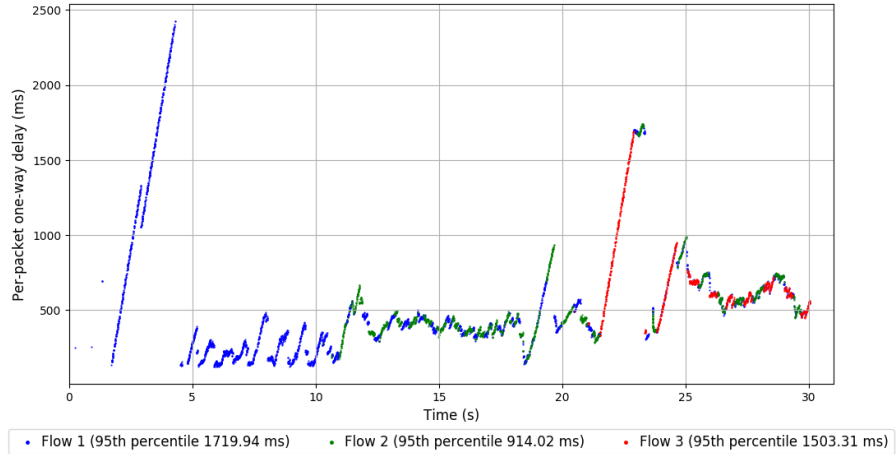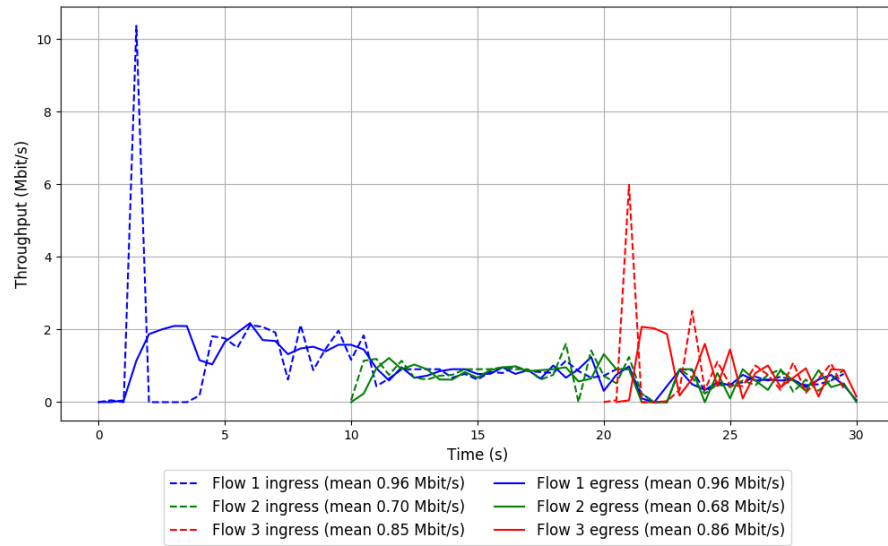
Run 3: Report of Sprout — Data Link

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

Start at: 2018-02-19 20:01:54
End at: 2018-02-19 20:02:24
Local clock offset: -5.6 ms
Remote clock offset: -3.819 ms


# Below is generated by plot.py at 2018-02-19 20:56:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.68 Mbit/s
95th percentile per-packet one-way delay: 1662.911 ms
Loss rate: 2.02%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 1719.944 ms
Loss rate: 1.35%
-- Flow 2:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 914.022 ms
Loss rate: 3.25%
-- Flow 3:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 1503.310 ms
Loss rate: 2.31%
```

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

```
Run 2: Statistics of TaoVA-100x

Start at: 2018-02-19 20:24:30
End at: 2018-02-19 20:25:00
Local clock offset: -3.511 ms
Remote clock offset: 0.155 ms


# Below is generated by plot.py at 2018-02-19 20:56:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 1867.780 ms
Loss rate: 3.44%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 1261.952 ms
Loss rate: 1.30%
-- Flow 2:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 2488.297 ms
Loss rate: 6.88%
-- Flow 3:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 1647.341 ms
Loss rate: 4.87%
```
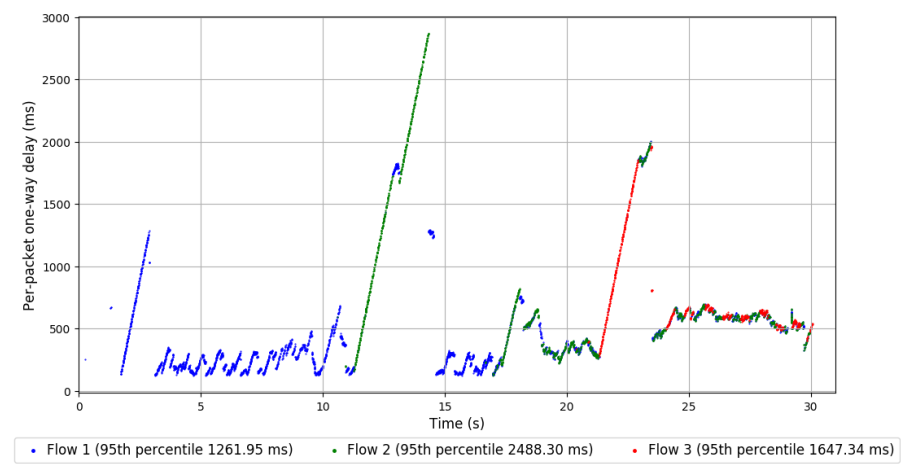
Run 2: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 0.97 Mbit/s)   Flow 1 egress (mean 0.96 Mbit/s)
Flow 2 ingress (mean 0.75 Mbit/s)   Flow 2 egress (mean 0.72 Mbit/s)
Flow 3 ingress (mean 0.75 Mbit/s)   Flow 3 egress (mean 0.73 Mbit/s)

Flow 1 (95th percentile 1261.95 ms)   Flow 2 (95th percentile 2488.30 ms)   Flow 3 (95th percentile 1647.34 ms)

```
Run 3: Statistics of TaoVA-100x

Start at: 2018-02-19 20:47:07
End at: 2018-02-19 20:47:37
Local clock offset: -4.509 ms
Remote clock offset: 1.9 ms


# Below is generated by plot.py at 2018-02-19 20:56:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.62 Mbit/s
95th percentile per-packet one-way delay: 1071.222 ms
Loss rate: 2.30%
-- Flow 1:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 700.701 ms
Loss rate: 1.46%
-- Flow 2:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 844.656 ms
Loss rate: 2.74%
-- Flow 3:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 1676.855 ms
Loss rate: 4.66%
```
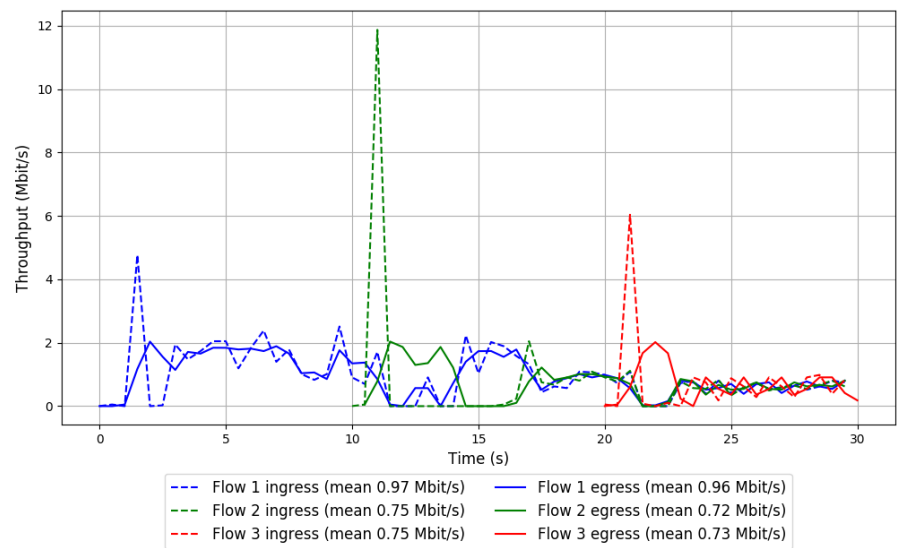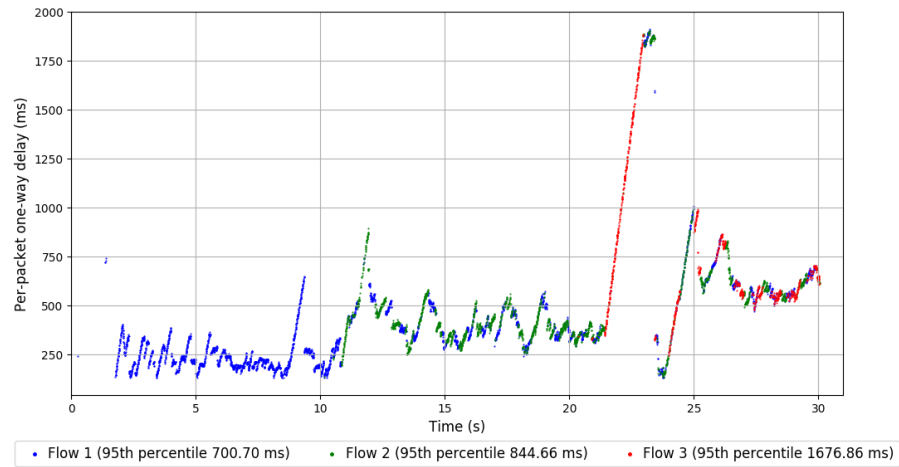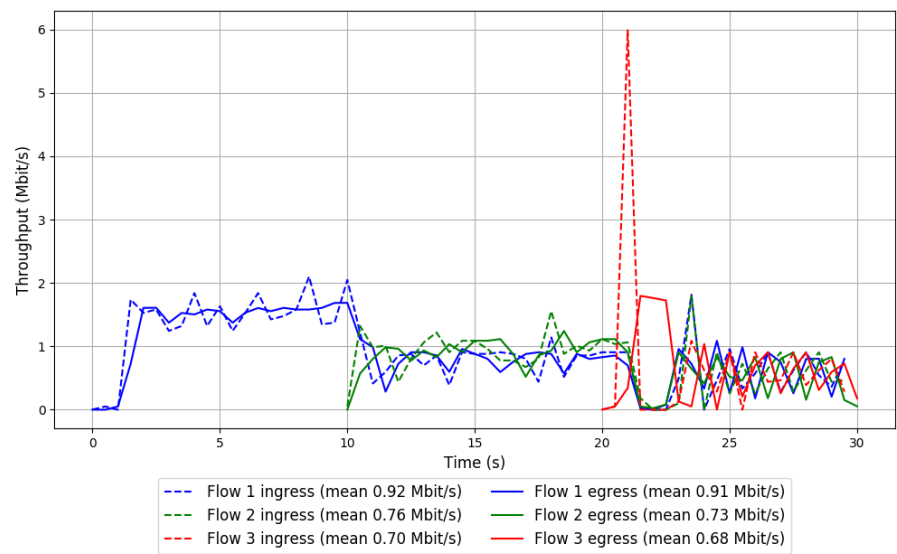
Run 3: Report of TaoVA-100x — Data Link

```
Run 1: Statistics of TCP Vegas

Start at: 2018-02-19 20:09:25
End at: 2018-02-19 20:09:55
Local clock offset: -5.285 ms
Remote clock offset: 1.345 ms


# Below is generated by plot.py at 2018-02-19 20:56:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.78 Mbit/s
95th percentile per-packet one-way delay: 3975.881 ms
Loss rate: 18.51%
-- Flow 1:
Average throughput: 1.75 Mbit/s
95th percentile per-packet one-way delay: 3975.898 ms
Loss rate: 18.56%
-- Flow 2:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 3655.471 ms
Loss rate: 11.21%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3505.168 ms
Loss rate: 54.29%
```
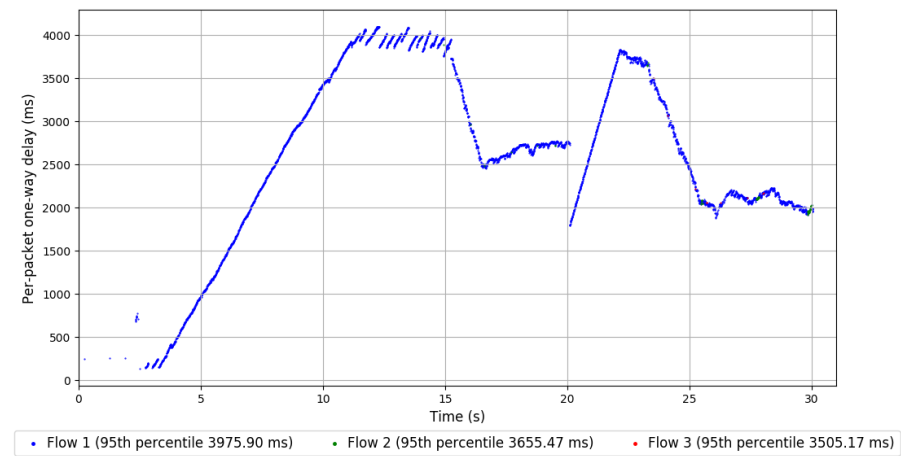
Run 1: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 2.14 Mbit/s) --- Flow 1 egress (mean 1.75 Mbit/s)
Flow 2 ingress (mean 0.04 Mbit/s) --- Flow 2 egress (mean 0.05 Mbit/s)
Flow 3 ingress (mean 0.01 Mbit/s) --- Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 3975.90 ms) • Flow 2 (95th percentile 3655.47 ms) • Flow 3 (95th percentile 3505.17 ms)

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```
Run 2: Statistics of TCP Vegas

Start at: 2018-02-19 20:32:03
End at: 2018-02-19 20:32:33
Local clock offset: -3.153 ms
Remote clock offset: 1.81 ms


# Below is generated by plot.py at 2018-02-19 20:56:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 4720.934 ms
Loss rate: 20.82%
-- Flow 1:
Average throughput: 1.60 Mbit/s
95th percentile per-packet one-way delay: 4720.934 ms
Loss rate: 20.85%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 4630.669 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4775.520 ms
Loss rate: 61.79%
```
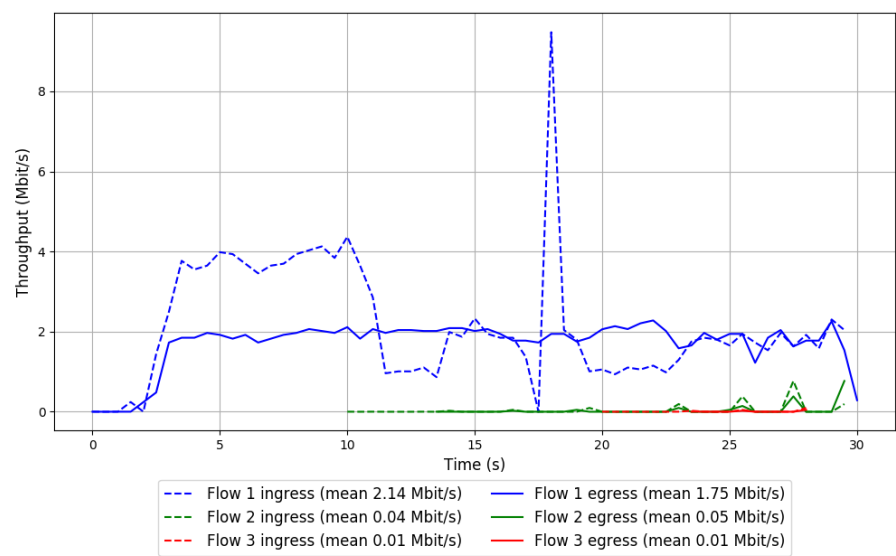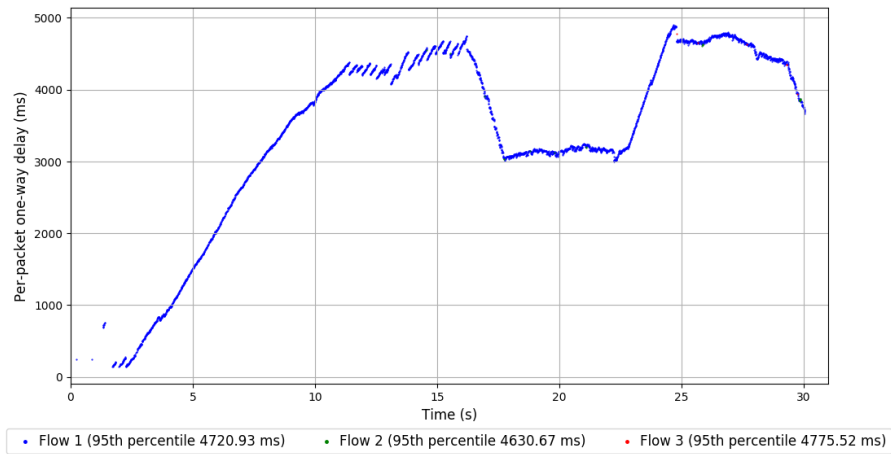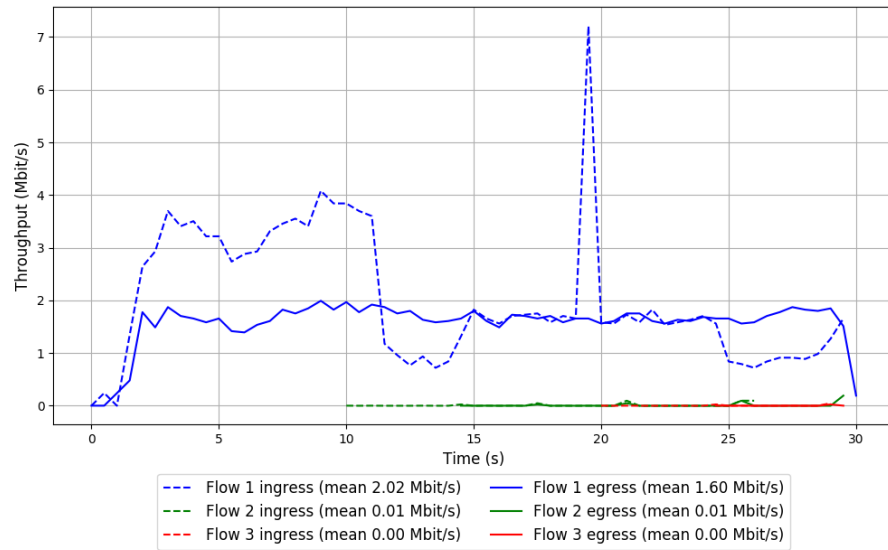
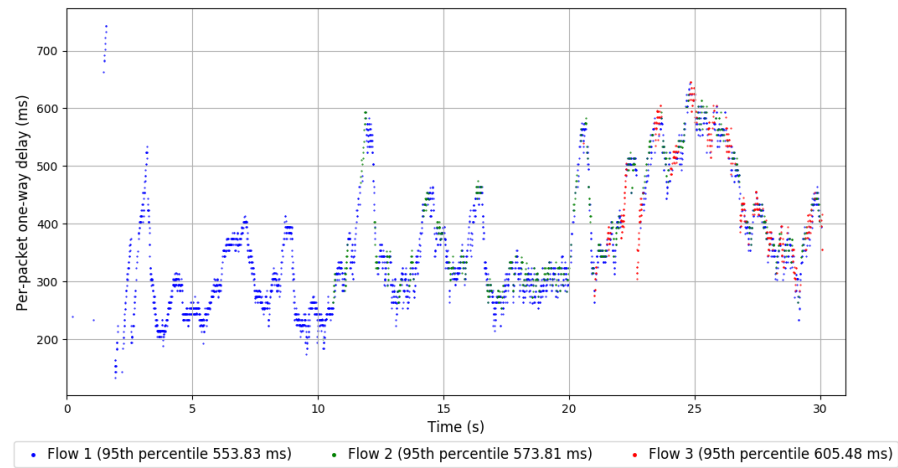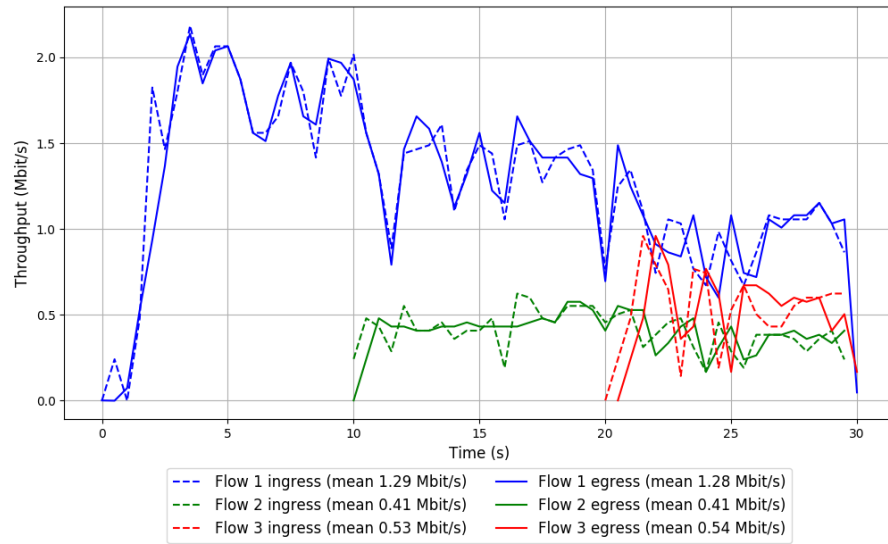## Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-02-19 20:54:37
End at: 2018-02-19 20:55:07
Local clock offset: -6.024 ms
Remote clock offset: -4.526 ms


# Below is generated by plot.py at 2018-02-19 20:56:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.72 Mbit/s
95th percentile per-packet one-way delay: 565.431 ms
Loss rate: 1.13%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 553.831 ms
Loss rate: 0.90%
-- Flow 2:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 573.811 ms
Loss rate: 0.88%
-- Flow 3:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 605.481 ms
Loss rate: 3.19%
```

Run 3: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: 2018-02-19 20:06:55
End at: 2018-02-19 20:07:25
Local clock offset: -5.526 ms
Remote clock offset: 2.382 ms


# Below is generated by plot.py at 2018-02-19 20:56:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.60 Mbit/s
95th percentile per-packet one-way delay: 1849.933 ms
Loss rate: 5.22%
-- Flow 1:
Average throughput: 1.59 Mbit/s
95th percentile per-packet one-way delay: 1850.583 ms
Loss rate: 5.21%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1813.019 ms
Loss rate: 5.00%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1821.030 ms
Loss rate: 9.09%
```
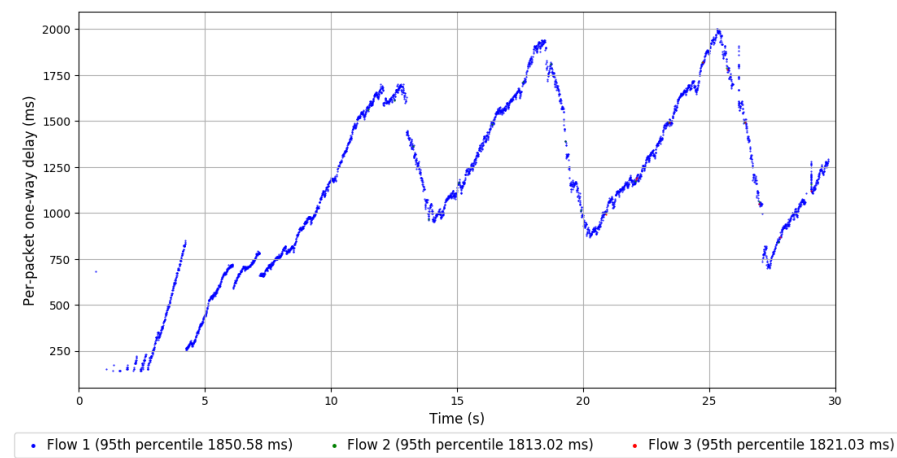
Run 1: Report of Verus — Data Link

Flow 1 ingress (mean 1.65 Mbit/s) Flow 1 egress (mean 1.59 Mbit/s)
Flow 2 ingress (mean 0.01 Mbit/s) Flow 2 egress (mean 0.01 Mbit/s)
Flow 3 ingress (mean 0.01 Mbit/s) Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 1850.58 ms)   Flow 2 (95th percentile 1813.02 ms)   Flow 3 (95th percentile 1821.03 ms)

```
Run 2: Statistics of Verus

Start at: 2018-02-19 20:29:33
End at: 2018-02-19 20:30:03
Local clock offset: -3.328 ms
Remote clock offset: 0.877 ms


# Below is generated by plot.py at 2018-02-19 20:56:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.68 Mbit/s
95th percentile per-packet one-way delay: 3317.202 ms
Loss rate: 5.54%
-- Flow 1:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 3317.202 ms
Loss rate: 5.44%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3016.057 ms
Loss rate: 13.04%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2613.743 ms
Loss rate: 30.00%
```
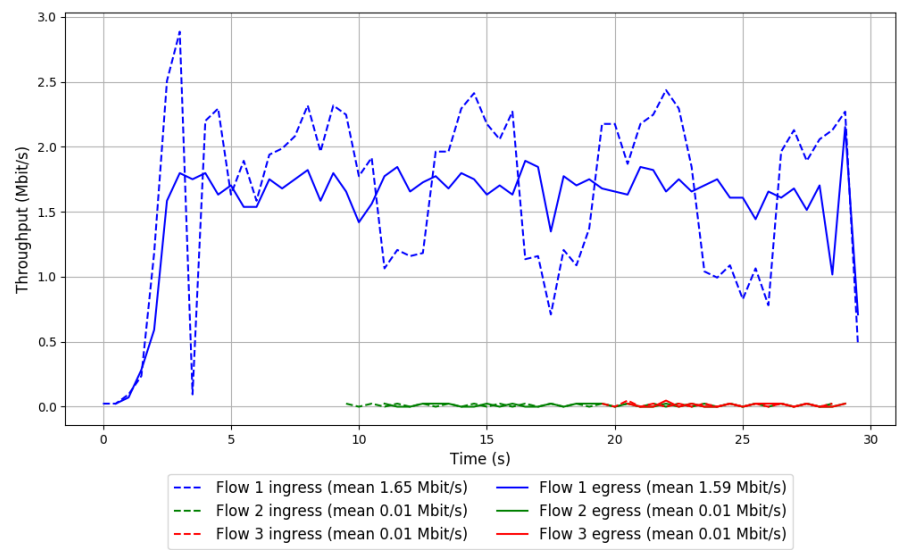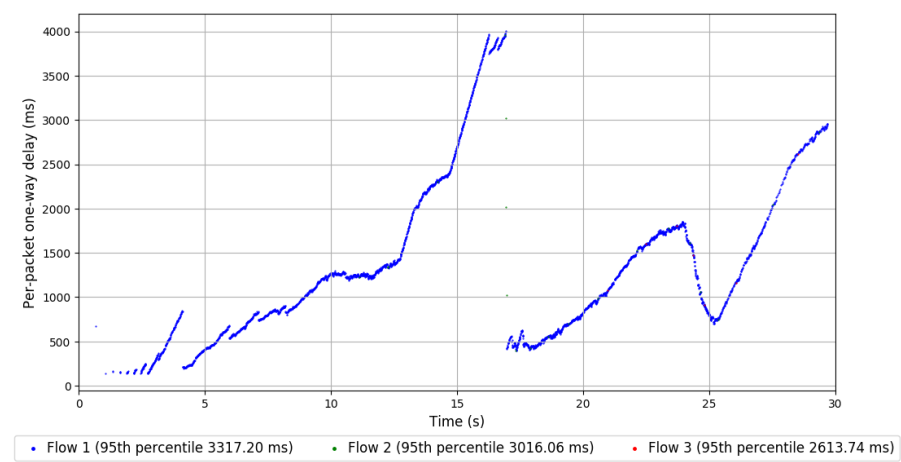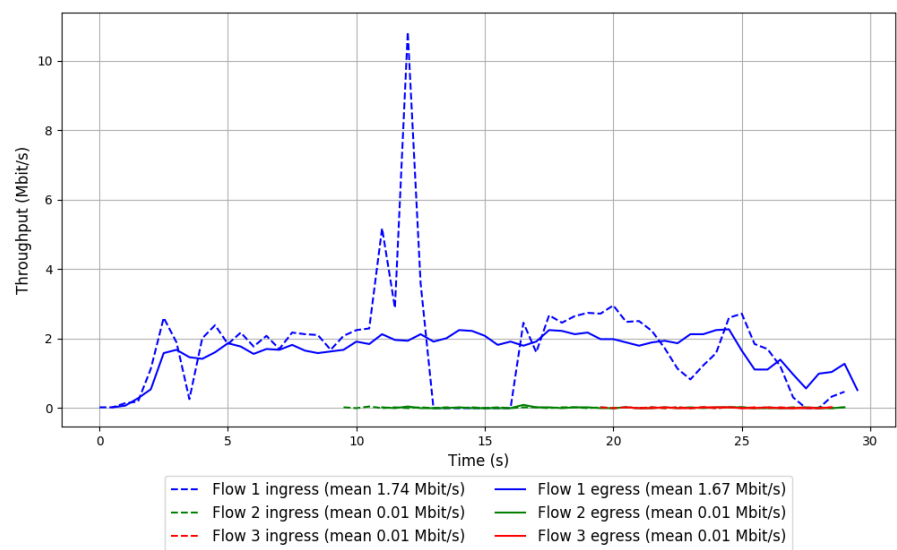
Run 2: Report of Verus — Data Link

Flow 1 ingress (mean 1.74 Mbit/s) --- Flow 1 egress (mean 1.67 Mbit/s)
Flow 2 ingress (mean 0.01 Mbit/s) --- Flow 2 egress (mean 0.01 Mbit/s)
Flow 3 ingress (mean 0.01 Mbit/s) --- Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 3317.20 ms)   Flow 2 (95th percentile 3016.06 ms)   Flow 3 (95th percentile 2613.74 ms)

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```
Run 3: Statistics of Verus

Start at: 2018-02-19 20:52:07
End at: 2018-02-19 20:52:37
Local clock offset: -5.73 ms
Remote clock offset: 0.311 ms


# Below is generated by plot.py at 2018-02-19 20:56:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 2012.212 ms
Loss rate: 5.29%
-- Flow 1:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 2012.212 ms
Loss rate: 5.28%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1863.615 ms
Loss rate: 4.76%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1672.863 ms
Loss rate: 10.00%
```
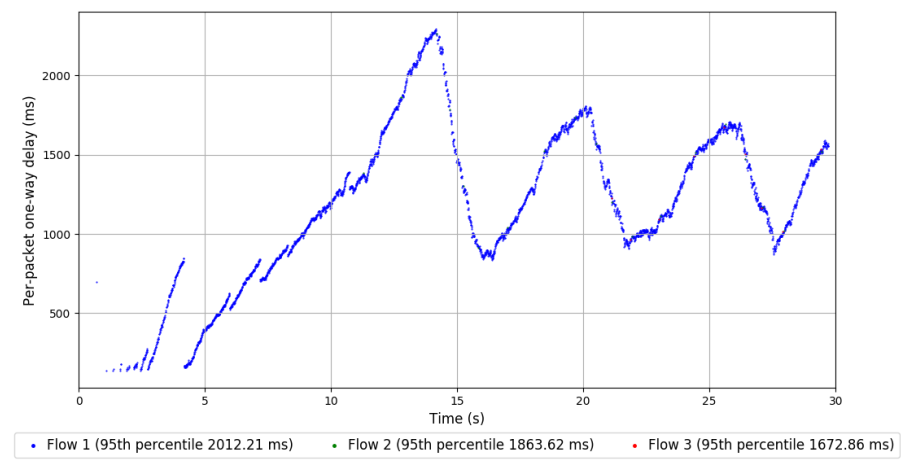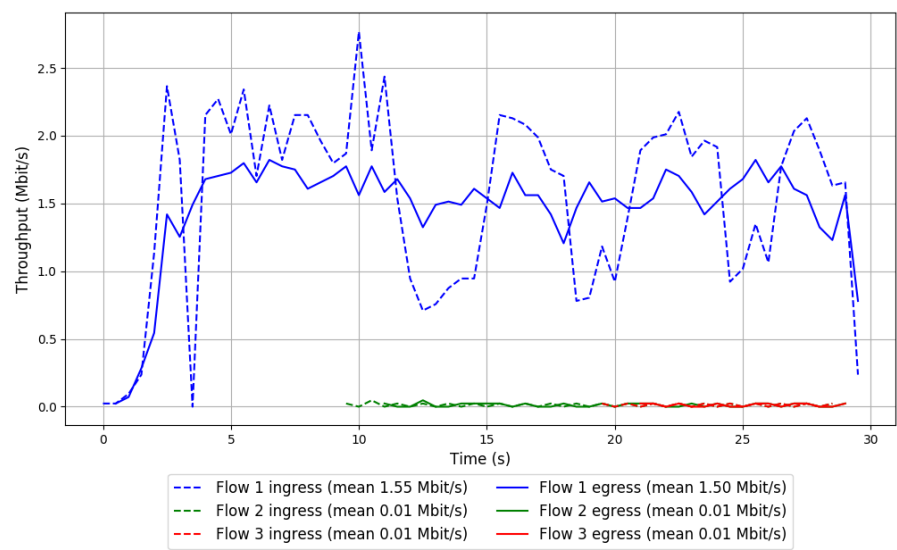
Run 3: Report of Verus — Data Link

- Flow 1 ingress (mean 1.55 Mbit/s) ---
- Flow 1 egress (mean 1.50 Mbit/s) —
- Flow 2 ingress (mean 0.01 Mbit/s) ---
- Flow 2 egress (mean 0.01 Mbit/s) —
- Flow 3 ingress (mean 0.01 Mbit/s) ---
- Flow 3 egress (mean 0.01 Mbit/s) —

- Flow 1 (95th percentile 2012.21 ms)
- Flow 2 (95th percentile 1863.62 ms)
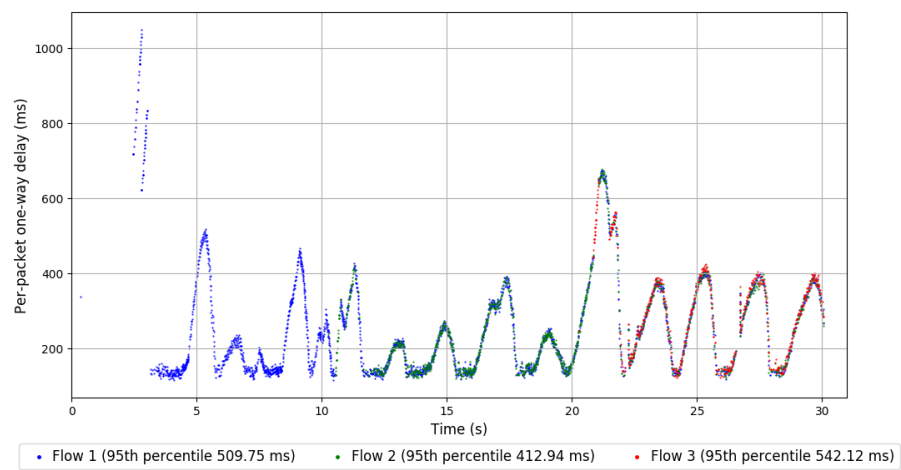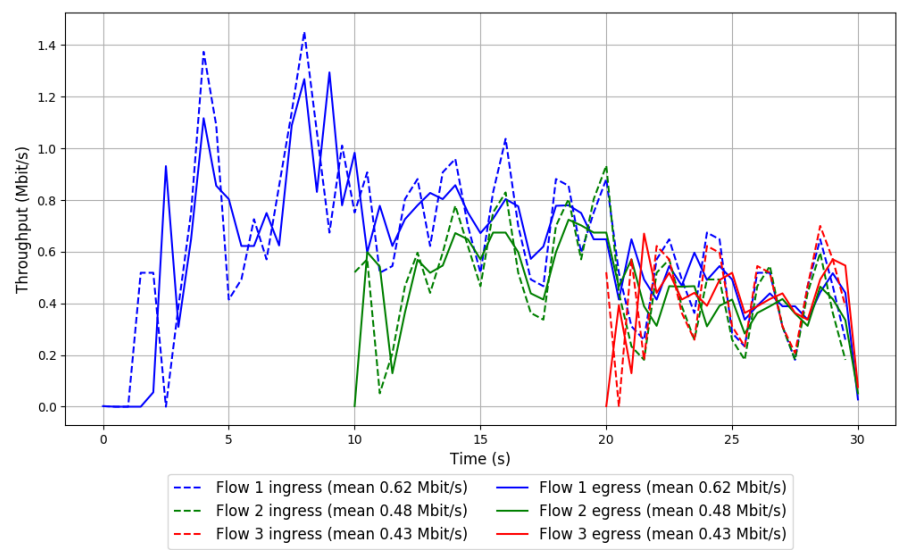- Flow 3 (95th percentile 1672.86 ms)

```
Run 1: Statistics of Copa

Start at: 2018-02-19 19:58:09
End at: 2018-02-19 19:58:39
Local clock offset: -5.569 ms
Remote clock offset: -2.721 ms


# Below is generated by plot.py at 2018-02-19 20:56:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 512.437 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 509.755 ms
Loss rate: 0.27%
-- Flow 2:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 412.935 ms
Loss rate: 0.27%
-- Flow 3:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 542.118 ms
Loss rate: 1.82%
```

Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 0.62 Mbit/s)   Flow 1 egress (mean 0.62 Mbit/s)
Flow 2 ingress (mean 0.48 Mbit/s)   Flow 2 egress (mean 0.48 Mbit/s)
Flow 3 ingress (mean 0.43 Mbit/s)   Flow 3 egress (mean 0.43 Mbit/s)

Flow 1 (95th percentile 509.75 ms)   Flow 2 (95th percentile 412.94 ms)   Flow 3 (95th percentile 542.12 ms)

```
Run 2: Statistics of Copa

Start at: 2018-02-19 20:20:43
End at: 2018-02-19 20:21:13
Local clock offset: -3.76 ms
Remote clock offset: 1.061 ms


# Below is generated by plot.py at 2018-02-19 20:56:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 395.204 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 393.910 ms
Loss rate: 0.21%
-- Flow 2:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 388.812 ms
Loss rate: 0.37%
-- Flow 3:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 409.850 ms
Loss rate: 0.82%
```
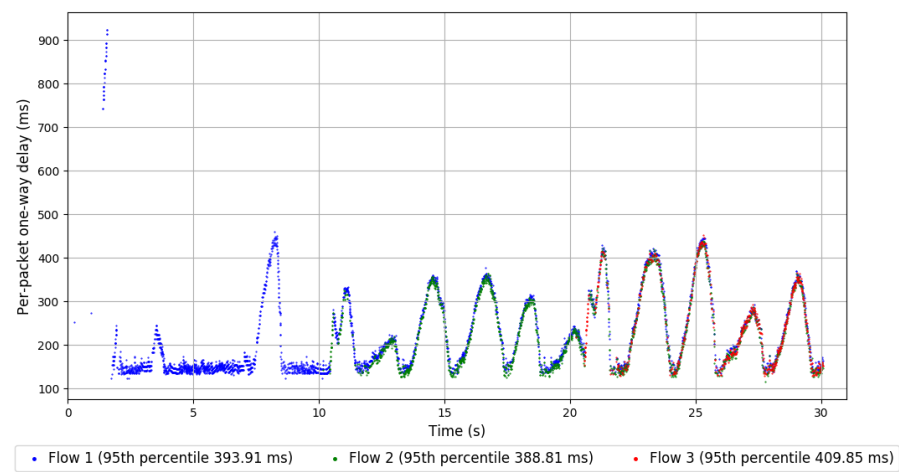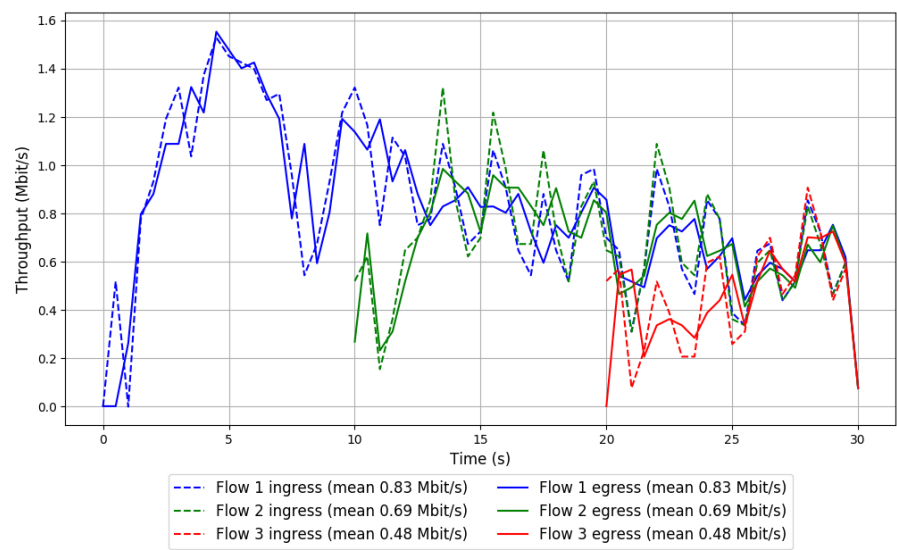
Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2018-02-19 20:43:22
End at: 2018-02-19 20:43:52
Local clock offset: -3.308 ms
Remote clock offset: 1.093 ms


# Below is generated by plot.py at 2018-02-19 20:56:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 460.526 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 465.670 ms
Loss rate: 0.51%
-- Flow 2:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 444.195 ms
Loss rate: 0.44%
-- Flow 3:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 472.013 ms
Loss rate: 1.34%
```
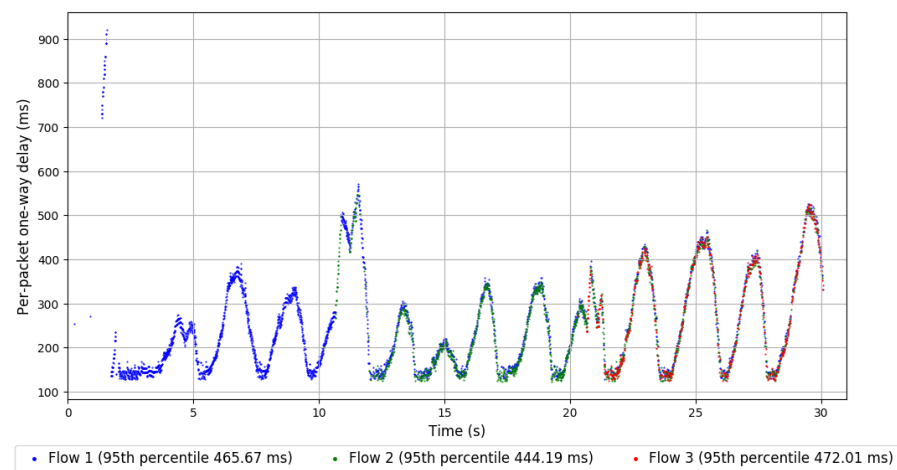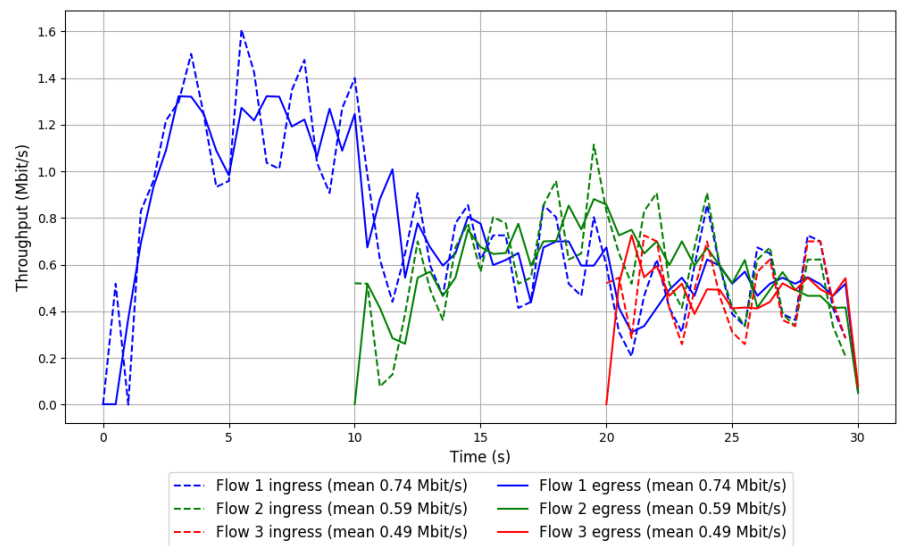
Run 3: Report of Copa — Data Link

Flow 1 ingress (mean 0.74 Mbit/s) --- Flow 1 egress (mean 0.74 Mbit/s)
Flow 2 ingress (mean 0.59 Mbit/s) --- Flow 2 egress (mean 0.59 Mbit/s)
Flow 3 ingress (mean 0.49 Mbit/s) --- Flow 3 egress (mean 0.49 Mbit/s)

Flow 1 (95th percentile 465.67 ms) • Flow 2 (95th percentile 444.19 ms) • Flow 3 (95th percentile 472.01 ms)
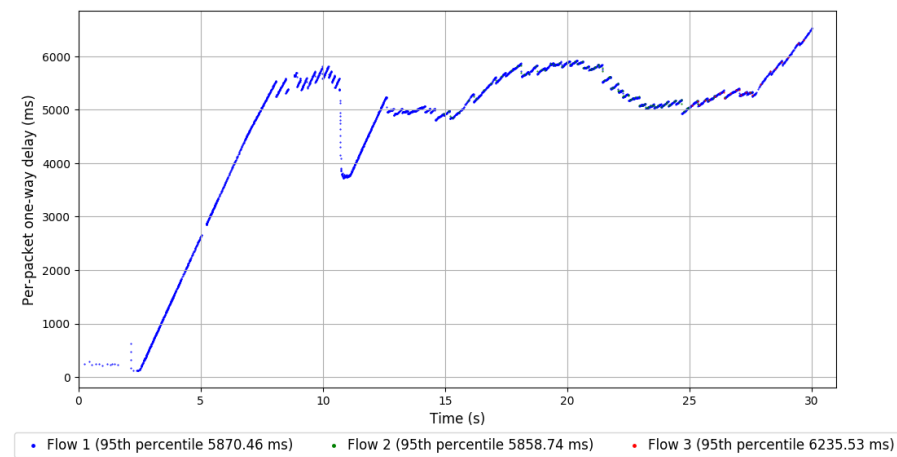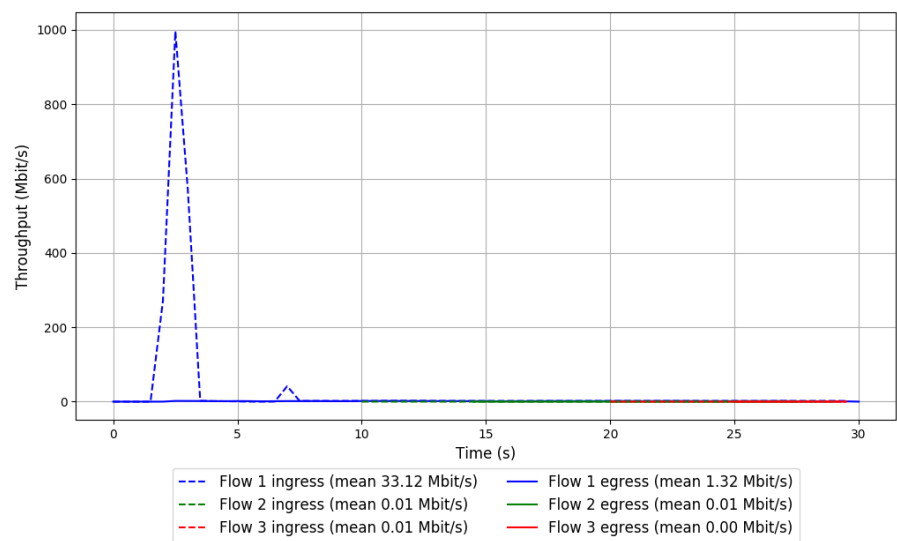
```
Run 1: Statistics of FillP

Start at: 2018-02-19 19:59:24
End at: 2018-02-19 19:59:54
Local clock offset: -5.546 ms
Remote clock offset: 1.981 ms


# Below is generated by plot.py at 2018-02-19 20:56:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 5870.737 ms
Loss rate: 96.02%
-- Flow 1:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 5870.462 ms
Loss rate: 96.03%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 5858.742 ms
Loss rate: 14.38%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 6235.530 ms
Loss rate: 79.63%
```

Run 1: Report of FillP — Data Link

Flow 1 ingress (mean 33.12 Mbit/s) — Flow 1 egress (mean 1.32 Mbit/s)
Flow 2 ingress (mean 0.01 Mbit/s) — Flow 2 egress (mean 0.01 Mbit/s)
Flow 3 ingress (mean 0.01 Mbit/s) — Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 5870.46 ms) — Flow 2 (95th percentile 5858.74 ms) — Flow 3 (95th percentile 6235.53 ms)

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```
Run 2: Statistics of FillP

Start at: 2018-02-19 20:21:58
End at: 2018-02-19 20:22:28
Local clock offset: -3.719 ms
Remote clock offset: 1.827 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.62 Mbit/s
95th percentile per-packet one-way delay: 4770.928 ms
Loss rate: 98.78%
-- Flow 1:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 4786.329 ms
Loss rate: 95.57%
-- Flow 2:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 4738.238 ms
Loss rate: 99.86%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4666.995 ms
Loss rate: 75.22%
```
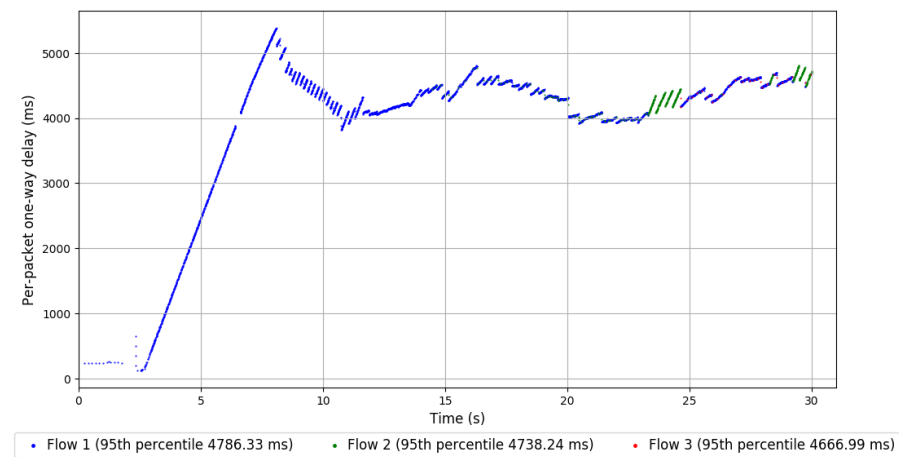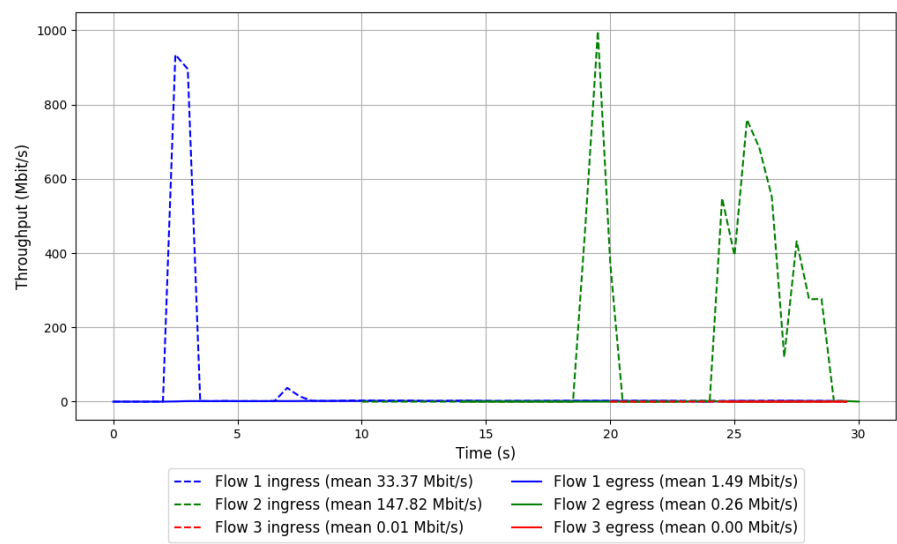
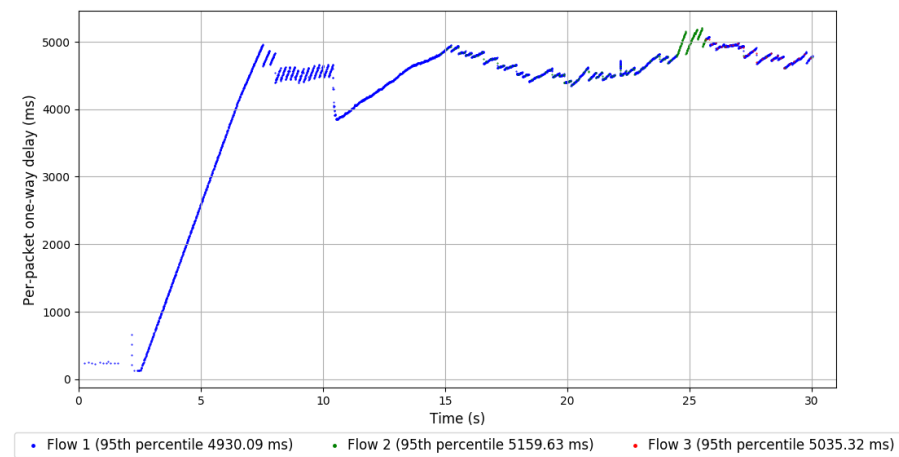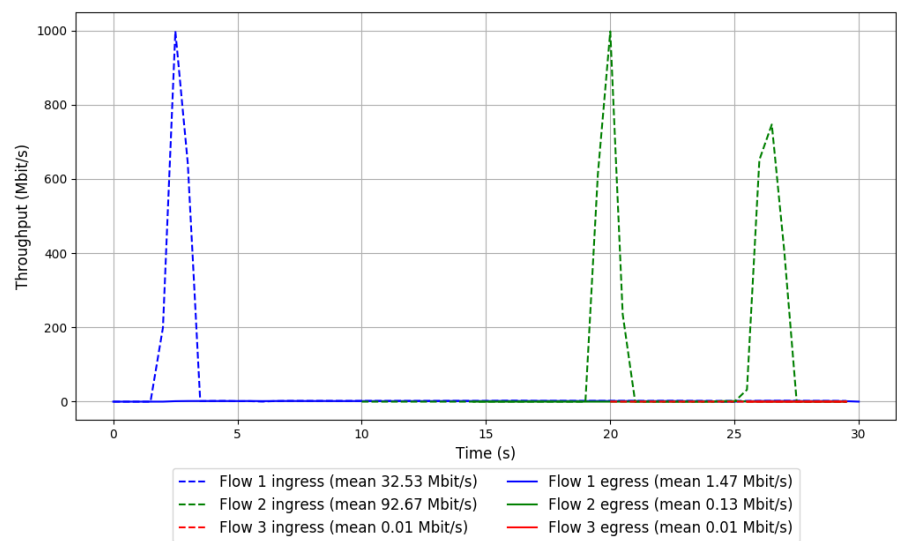## Run 2: Report of FillP — Data Link

```
Run 3: Statistics of FillP

Start at: 2018-02-19 20:44:36
End at: 2018-02-19 20:45:07
Local clock offset: -3.78 ms
Remote clock offset: -3.622 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.53 Mbit/s
95th percentile per-packet one-way delay: 4953.142 ms
Loss rate: 98.38%
-- Flow 1:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 4930.094 ms
Loss rate: 95.52%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 5159.632 ms
Loss rate: 99.90%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 5035.318 ms
Loss rate: 76.49%
```

Run 3: Report of FillP — Data Link

Flow 1 ingress (mean 32.53 Mbit/s) --- Flow 1 egress (mean 1.47 Mbit/s) ---
Flow 2 ingress (mean 92.67 Mbit/s) --- Flow 2 egress (mean 0.13 Mbit/s) ---
Flow 3 ingress (mean 0.01 Mbit/s) --- Flow 3 egress (mean 0.01 Mbit/s) ---

• Flow 1 (95th percentile 4930.09 ms)   • Flow 2 (95th percentile 5159.63 ms)   • Flow 3 (95th percentile 5035.32 ms)

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

Start at: 2018-02-19 20:04:25
End at: 2018-02-19 20:04:55
Local clock offset: -5.603 ms
Remote clock offset: 1.678 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 348.569 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 339.170 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 368.531 ms
Loss rate: 0.18%
-- Flow 3:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 349.581 ms
Loss rate: 1.76%
```
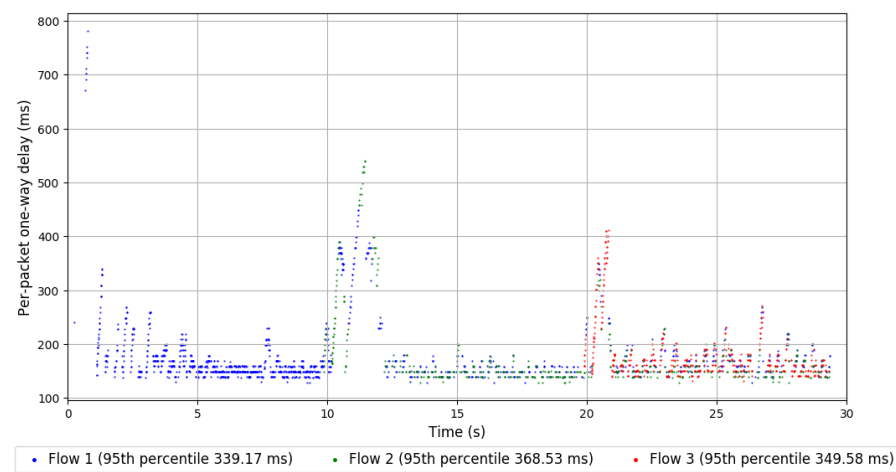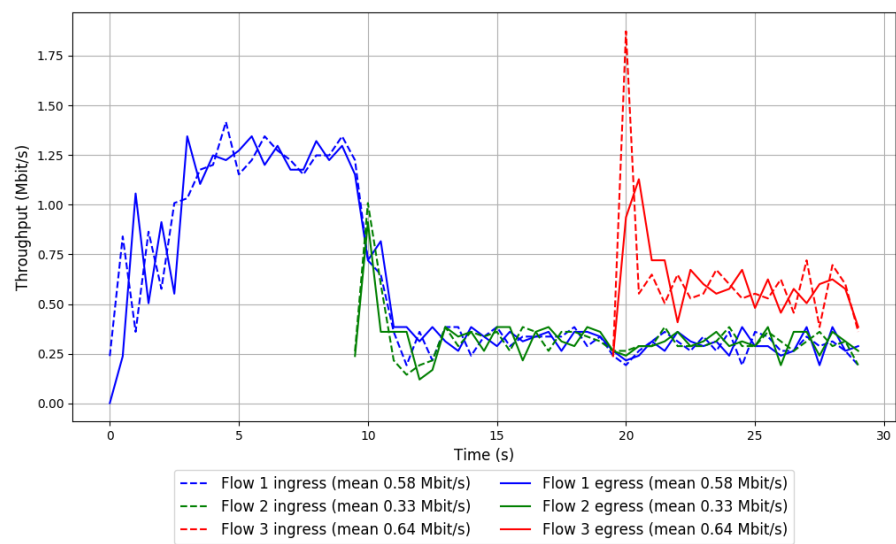
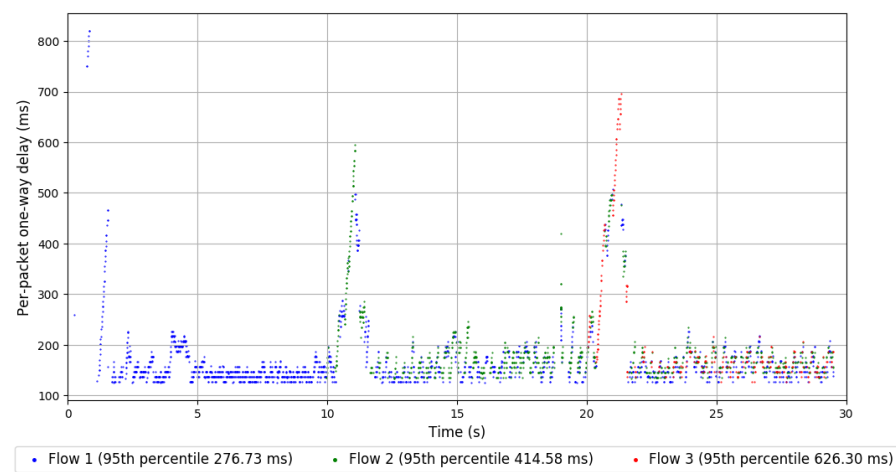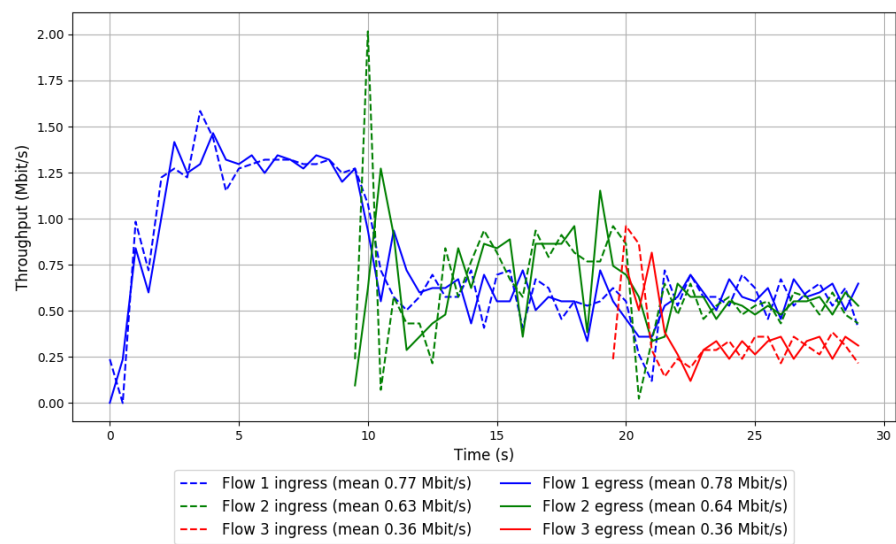Run 1: Report of Indigo-1-32 — Data Link

```
Run 2: Statistics of Indigo-1-32

Start at: 2018-02-19 20:27:02
End at: 2018-02-19 20:27:32
Local clock offset: -3.378 ms
Remote clock offset: -3.842 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 396.923 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 276.733 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 414.579 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 626.304 ms
Loss rate: 0.35%
```

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

```
Run 3: Statistics of Indigo-1-32

Start at: 2018-02-19 20:49:37
End at: 2018-02-19 20:50:07
Local clock offset: -5.147 ms
Remote clock offset: 1.931 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 715.235 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 333.573 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 413.269 ms
Loss rate: 0.61%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 1273.940 ms
Loss rate: 0.38%
```
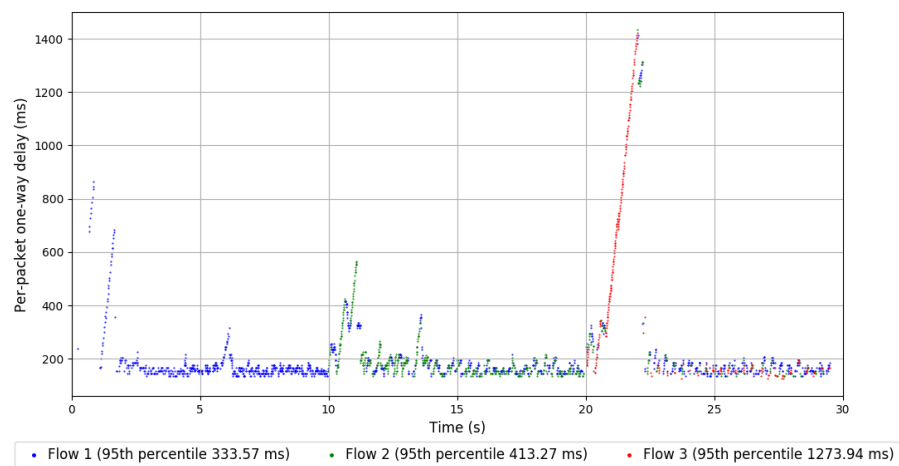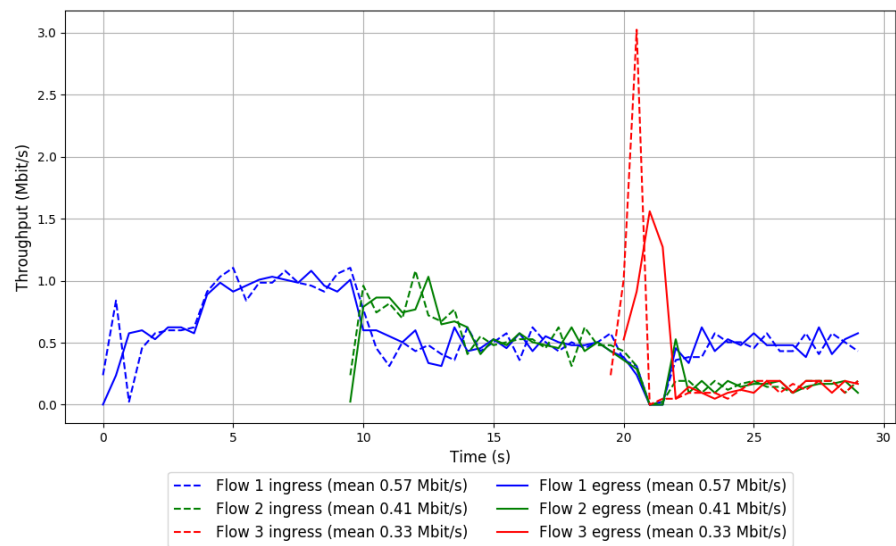
Run 3: Report of Indigo-1-32 — Data Link

```
Run 1: Statistics of Vivace-latency

Start at: 2018-02-19 19:54:16
End at: 2018-02-19 19:54:46
Local clock offset: -5.618 ms
Remote clock offset: -2.33 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 5173.060 ms
Loss rate: 39.27%
-- Flow 1:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 5103.983 ms
Loss rate: 34.26%
-- Flow 2:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 5240.931 ms
Loss rate: 44.88%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4559.864 ms
Loss rate: 37.21%
```
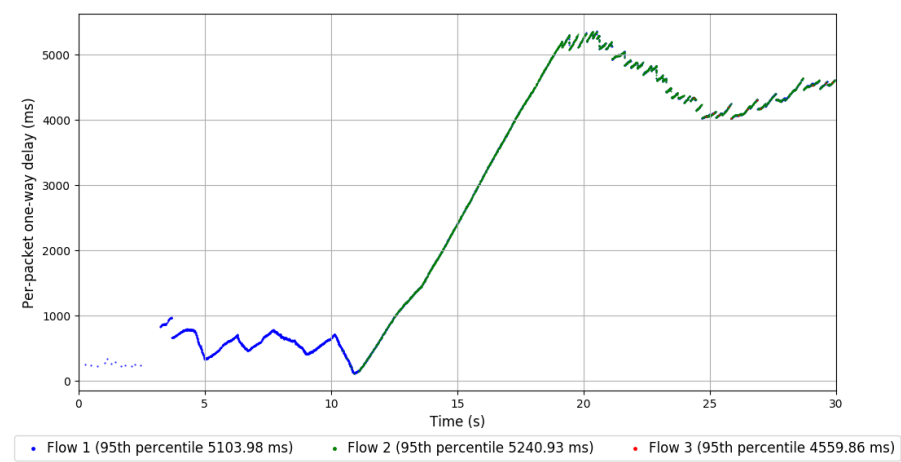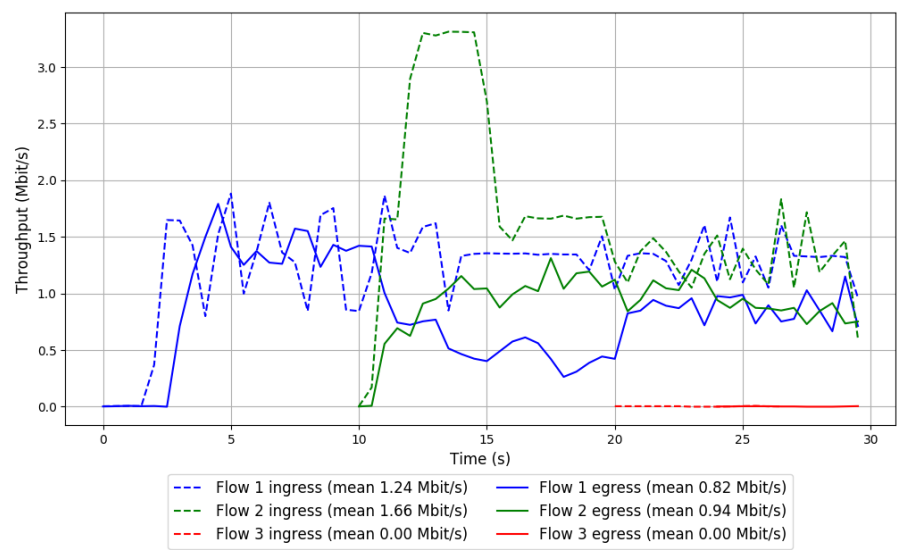
Run 1: Report of Vivace-latency — Data Link

Flow 1 ingress (mean 1.24 Mbit/s)   Flow 1 egress (mean 0.82 Mbit/s)
Flow 2 ingress (mean 1.66 Mbit/s)   Flow 2 egress (mean 0.94 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 5103.98 ms)   Flow 2 (95th percentile 5240.93 ms)   Flow 3 (95th percentile 4559.86 ms)
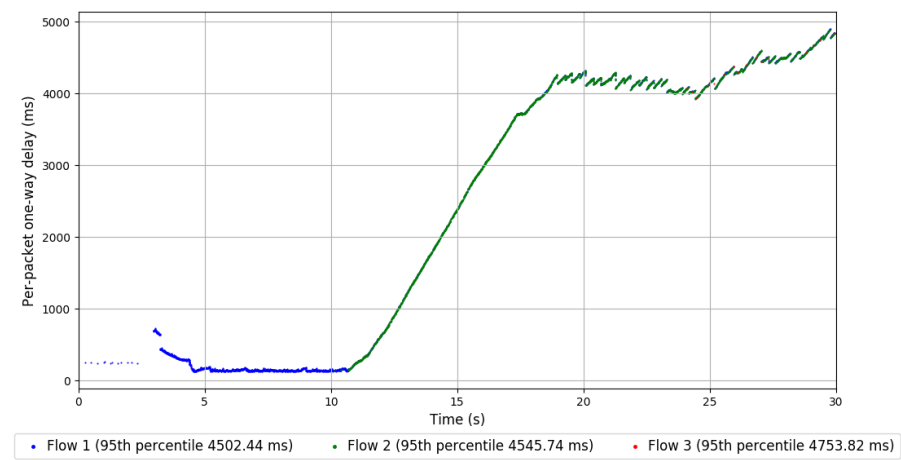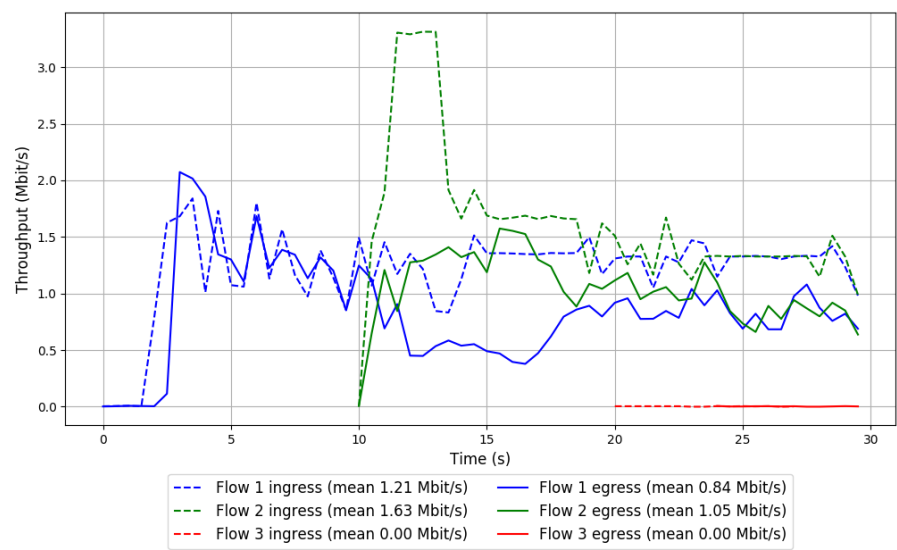
```
Run 2: Statistics of Vivace-latency

Start at: 2018-02-19 20:16:56
End at: 2018-02-19 20:17:26
Local clock offset: -4.191 ms
Remote clock offset: -3.721 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.55 Mbit/s
95th percentile per-packet one-way delay: 4521.392 ms
Loss rate: 32.96%
-- Flow 1:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 4502.437 ms
Loss rate: 30.64%
-- Flow 2:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 4545.741 ms
Loss rate: 35.56%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4753.820 ms
Loss rate: 26.53%
```

Run 2: Report of Vivace-latency — Data Link

```
Run 3: Statistics of Vivace-latency

Start at: 2018-02-19 20:39:35
End at: 2018-02-19 20:40:05
Local clock offset: -2.906 ms
Remote clock offset: 0.236 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 5717.772 ms
Loss rate: 45.44%
-- Flow 1:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 5667.550 ms
Loss rate: 40.30%
-- Flow 2:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 5789.251 ms
Loss rate: 51.42%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5856.075 ms
Loss rate: 47.76%
```
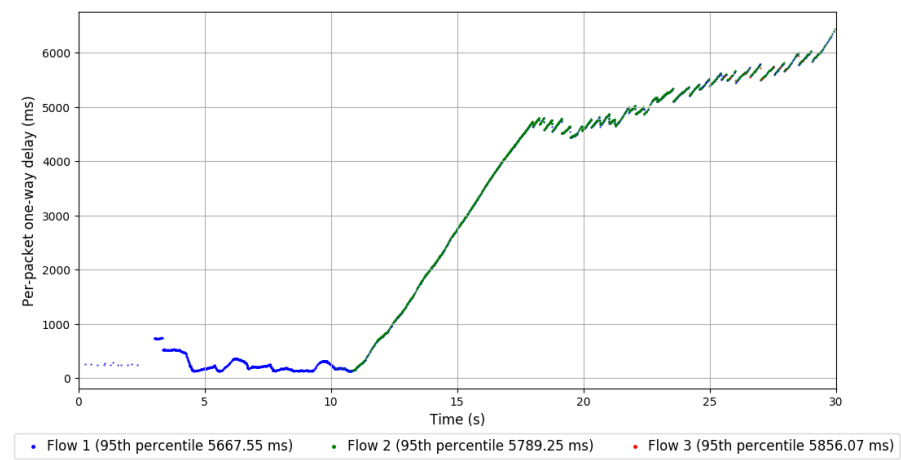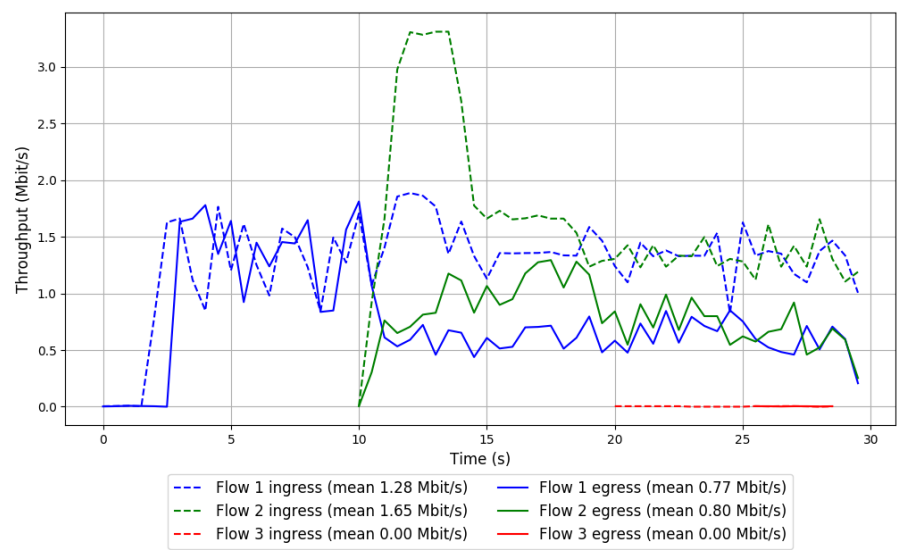
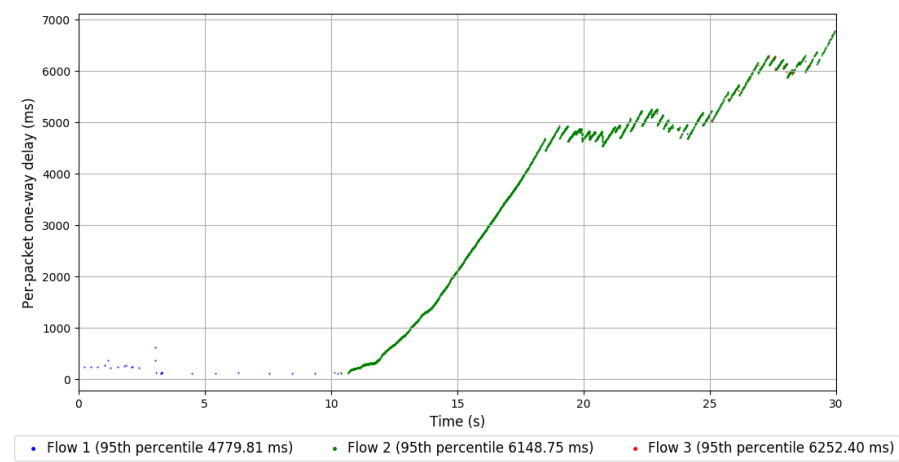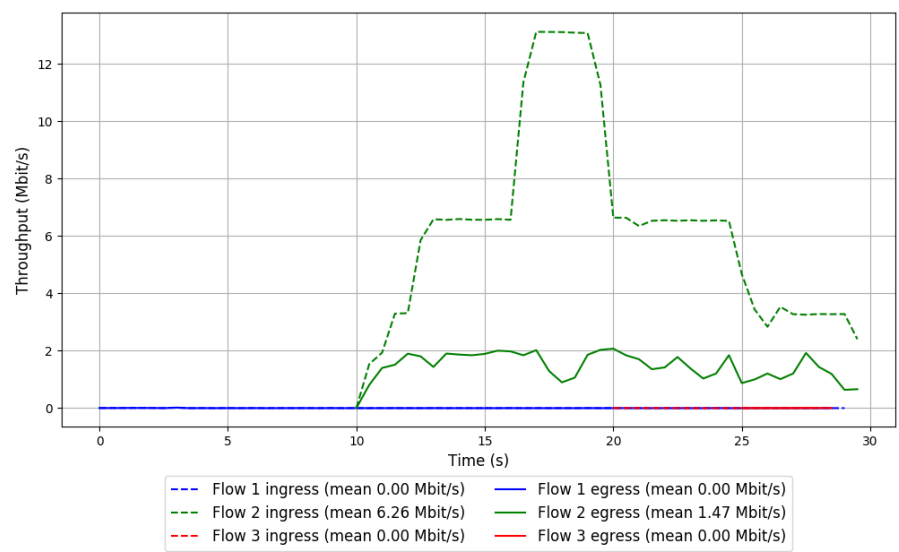Run 3: Report of Vivace-latency — Data Link

```
Run 1: Statistics of Vivace-loss

Start at: 2018-02-19 19:49:16
End at: 2018-02-19 19:49:46
Local clock offset: -5.722 ms
Remote clock offset: -3.253 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 6150.446 ms
Loss rate: 76.59%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4779.805 ms
Loss rate: 23.59%
-- Flow 2:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 6148.746 ms
Loss rate: 76.62%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 6252.396 ms
Loss rate: 47.76%
```

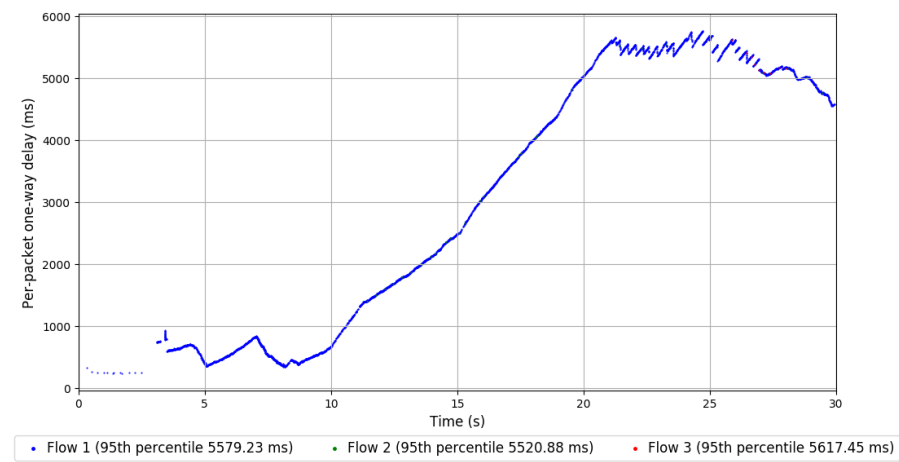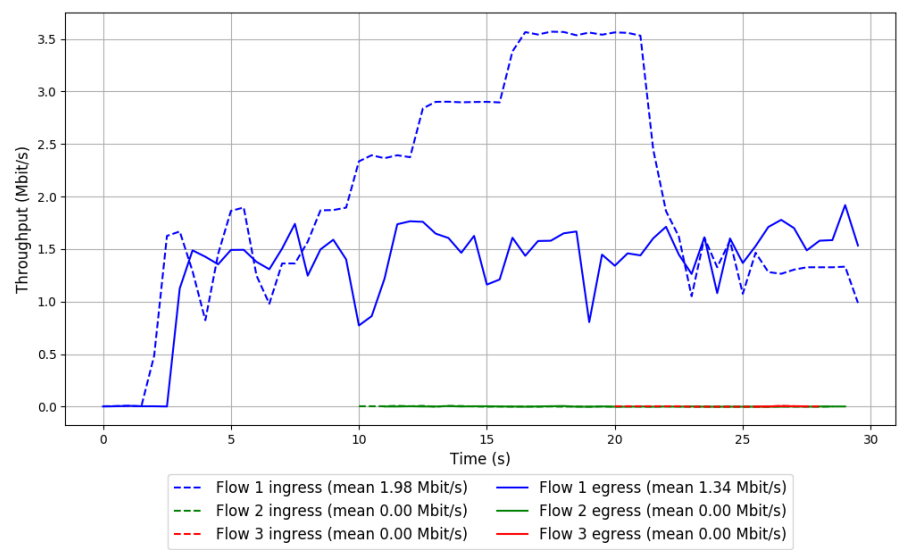Run 1: Report of Vivace-loss — Data Link

```
Run 2: Statistics of Vivace-loss

Start at: 2018-02-19 20:11:56
End at: 2018-02-19 20:12:26
Local clock offset: -4.731 ms
Remote clock offset: -3.575 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 5579.083 ms
Loss rate: 32.96%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 5579.232 ms
Loss rate: 32.96%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5520.876 ms
Loss rate: 18.95%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5617.448 ms
Loss rate: 58.62%
```

Run 2: Report of Vivace-loss — Data Link

Flow 1 ingress (mean 1.98 Mbit/s) — — — Flow 1 egress (mean 1.34 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s) — — — Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s) — — — Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 5579.23 ms)   Flow 2 (95th percentile 5520.88 ms)   Flow 3 (95th percentile 5617.45 ms)
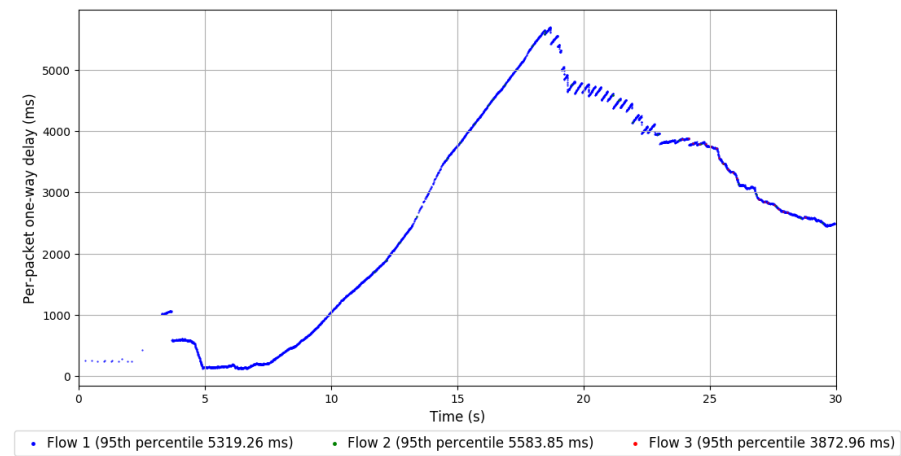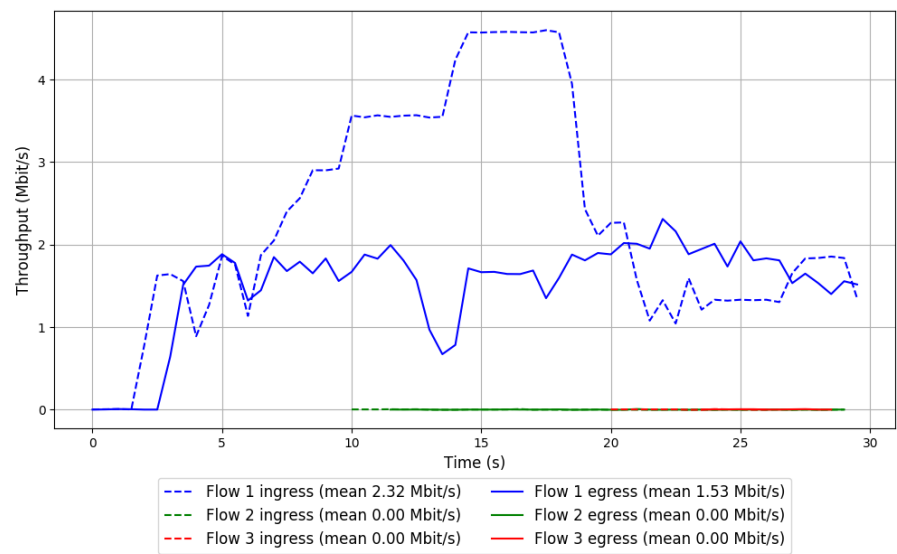
```
Run 3: Statistics of Vivace-loss

Start at: 2018-02-19 20:34:34
End at: 2018-02-19 20:35:04
Local clock offset: -3.073 ms
Remote clock offset: -3.778 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.53 Mbit/s
95th percentile per-packet one-way delay: 5319.255 ms
Loss rate: 34.47%
-- Flow 1:
Average throughput: 1.53 Mbit/s
95th percentile per-packet one-way delay: 5319.255 ms
Loss rate: 34.50%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5583.850 ms
Loss rate: 16.15%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3872.962 ms
Loss rate: 0.00%
```

Run 3: Report of Vivace-loss — Data Link

- Flow 1 ingress (mean 2.32 Mbit/s)
- Flow 2 ingress (mean 0.00 Mbit/s)
- Flow 3 ingress (mean 0.00 Mbit/s)
- Flow 1 egress (mean 1.53 Mbit/s)
- Flow 2 egress (mean 0.00 Mbit/s)
- Flow 3 egress (mean 0.00 Mbit/s)

- Flow 1 (95th percentile 5319.26 ms)
- Flow 2 (95th percentile 5583.85 ms)
- Flow 3 (95th percentile 3872.96 ms)

```
Run 1: Statistics of Vivace-LTE

Start at: 2018-02-19 19:50:30
End at: 2018-02-19 19:51:00
Local clock offset: -5.683 ms
Remote clock offset: 2.499 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 5384.567 ms
Loss rate: 39.48%
-- Flow 1:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 5376.073 ms
Loss rate: 35.65%
-- Flow 2:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 5396.650 ms
Loss rate: 43.85%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5368.294 ms
Loss rate: 44.83%
```
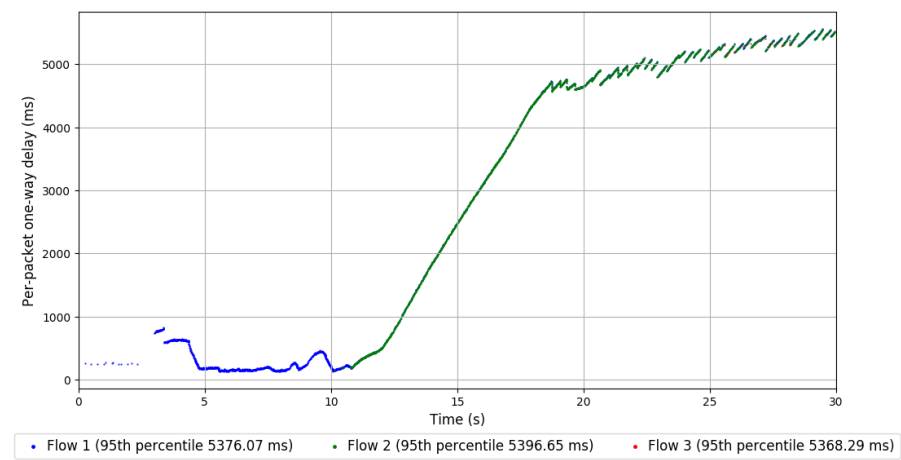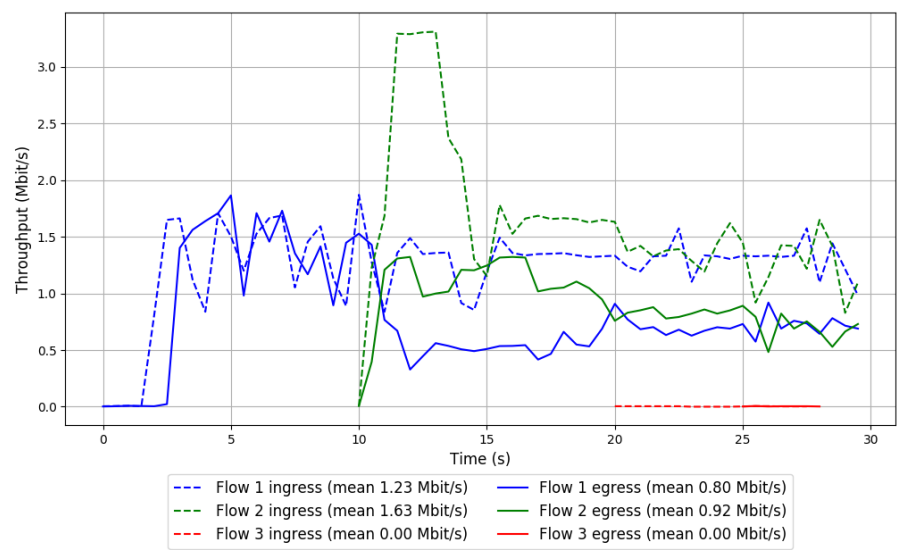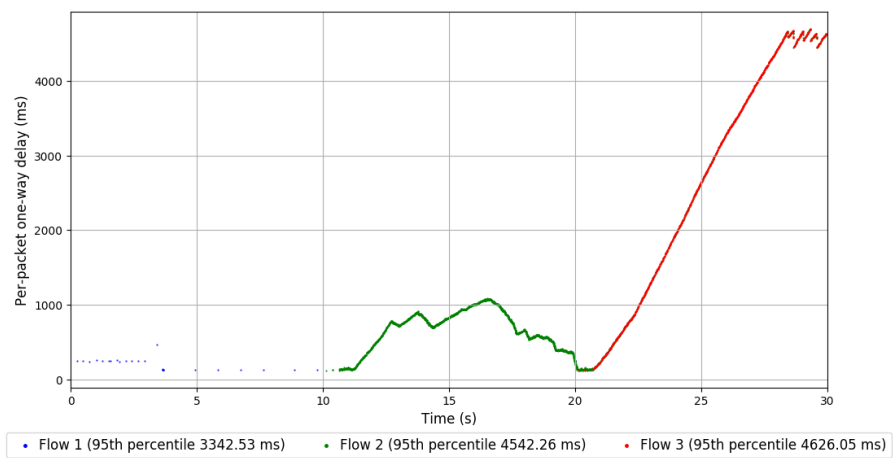
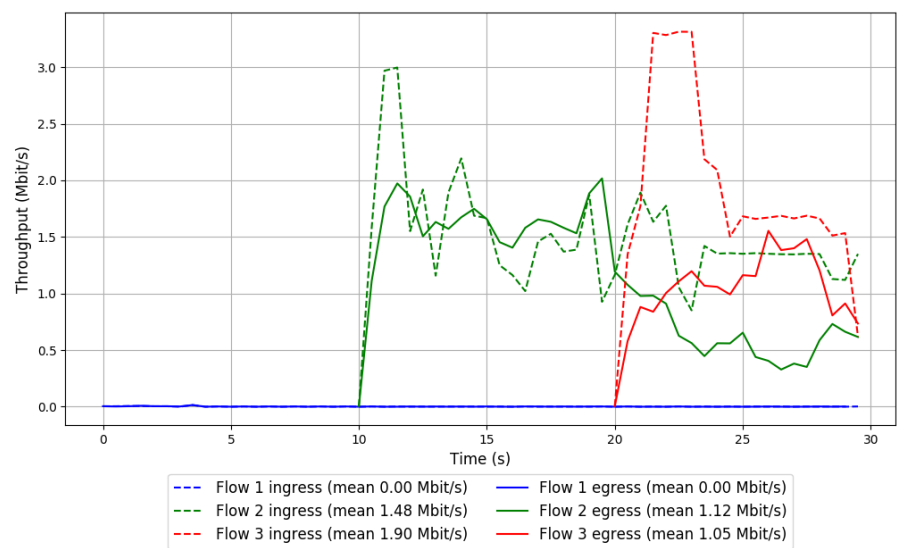Run 1: Report of Vivace-LTE — Data Link

```
Run 2: Statistics of Vivace-LTE

Start at: 2018-02-19 20:13:11
End at: 2018-02-19 20:13:41
Local clock offset: -4.602 ms
Remote clock offset: -4.454 ms

# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 4596.539 ms
Loss rate: 32.63%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3342.531 ms
Loss rate: 10.79%
-- Flow 2:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 4542.256 ms
Loss rate: 24.62%
-- Flow 3:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 4626.045 ms
Loss rate: 45.25%
```

Run 2: Report of Vivace-LTE — Data Link

```
Run 3: Statistics of Vivace-LTE

Start at: 2018-02-19 20:35:49
End at: 2018-02-19 20:36:19
Local clock offset: -3.021 ms
Remote clock offset: 1.087 ms


# Below is generated by plot.py at 2018-02-19 20:57:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.57 Mbit/s
95th percentile per-packet one-way delay: 4714.222 ms
Loss rate: 34.59%
-- Flow 1:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 4673.220 ms
Loss rate: 30.66%
-- Flow 2:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 4743.052 ms
Loss rate: 39.17%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4749.575 ms
Loss rate: 32.61%
```

Run 3: Report of Vivace-LTE — Data Link