Pantheon Report

Generated at 2018-09-11 02:37:26 (UTC).

Data path: AWS Brazil 2 on `ens5` (*local*) →Colombia cellular on `ppp0` (*remote*).

Repeated the test of 18 congestion control schemes 3 times.

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

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

```
System info:
Linux 4.15.0-1020-aws
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
net.ipv4.tcp_mem = 184101 245469 368202

Git summary:
branch: muses @ f30bceca2aec2ef14a3cf71e25642f4a30905a03
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 65ac1b19bbefed0c6349ae986009b4fa8643c40a
third_party/pantheon-tunnel @ cbfce6db5ff5740dafe1771f813cd646339e1952
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
 M receiver/src/buffer.h
 M receiver/src/core.cpp
 M sender/src/buffer.h
 M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
 M src/ScreamClient
 M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
 M src/examples/cellsim.cc
 M src/examples/sproutbt2.cc
 M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
```
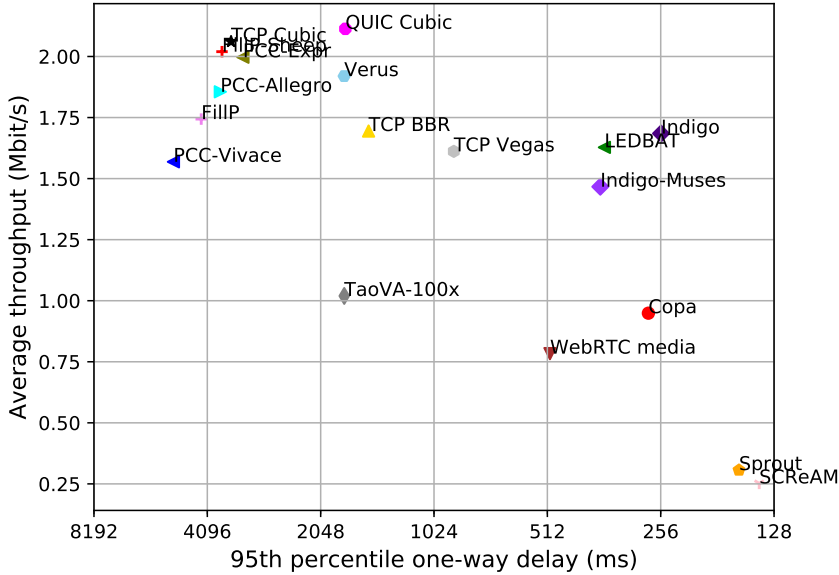
```
 M src/verus.hpp
 M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

test from AWS Brazil 2 to Colombia cellular, 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 to Colombia cellular, 3 runs of 30s each per scheme
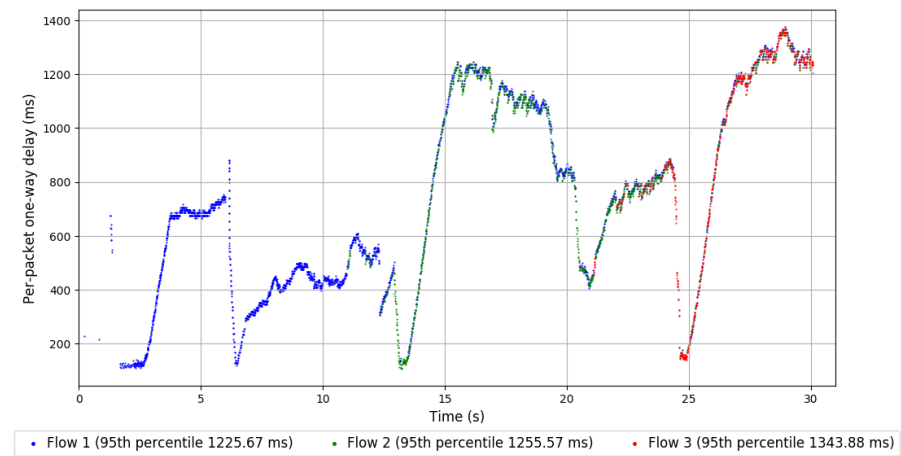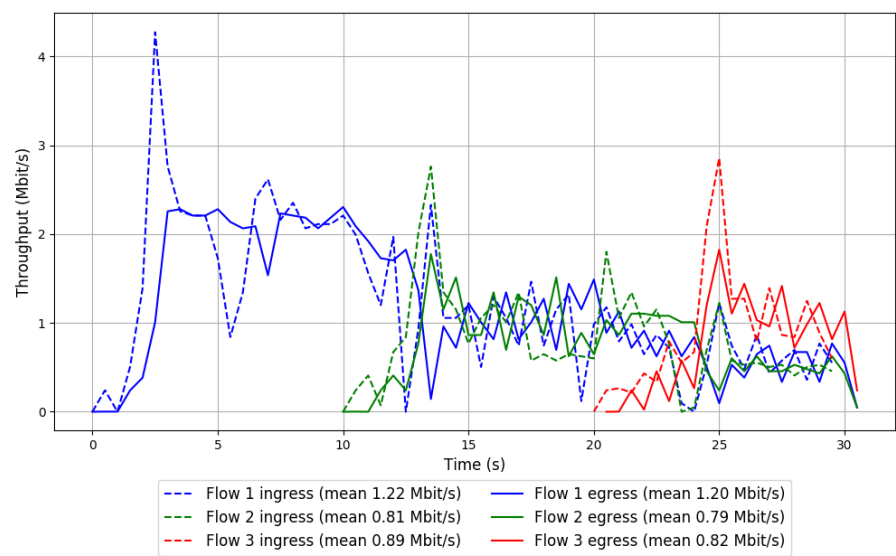3 flows with 10s interval between flows
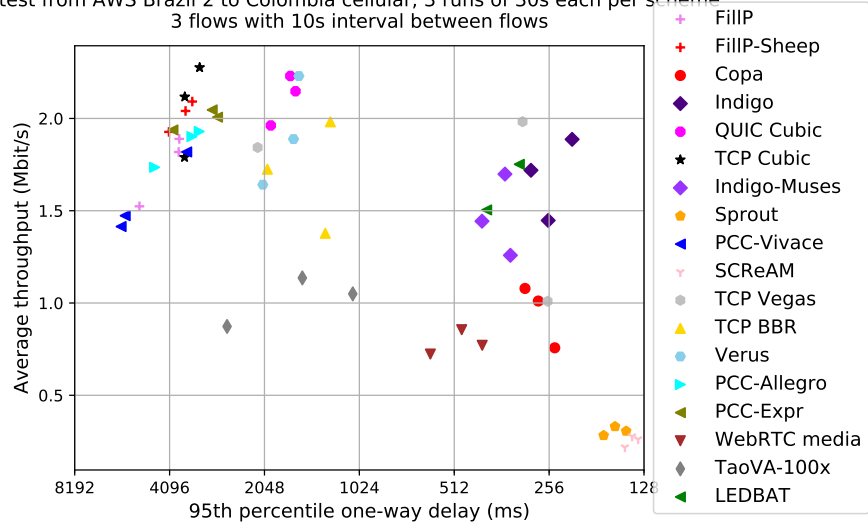
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	0.99	0.68	0.79	1261.61	1531.26	1683.97	3.36	5.34	15.36
Copa	3	0.01	1.10	0.76	236.36	280.58	257.32	94.05	0.08	0.36
TCP Cubic	3	1.70	0.54	0.02	3499.07	3562.73	3452.90	10.80	21.42	38.50
FillP	3	1.54	0.41	0.01	4251.16	4214.65	3937.86	90.33	64.26	96.11
FillP-Sheep	3	1.33	1.11	0.01	3699.58	3769.99	3682.59	27.89	57.09	99.66
Indigo	3	0.93	0.70	0.89	234.38	345.50	221.04	0.29	0.25	0.13
LEDBAT	2	1.24	0.42	0.32	360.93	345.87	386.67	0.47	0.60	2.32
Indigo-Muses	3	0.81	0.61	0.76	469.54	323.13	354.12	0.13	0.13	0.26
PCC-Allegro	3	1.85	0.00	0.00	3783.02	3598.85	3200.92	57.41	0.00	8.57
PCC-Expr	3	2.00	0.00	0.00	3295.22	2682.15	2778.95	65.13	72.36	57.76
QUIC Cubic	3	1.51	0.75	0.29	1671.28	1809.90	1855.30	3.84	7.62	21.87
SCReAM	3	0.08	0.16	0.18	133.47	130.98	140.22	0.09	0.35	0.43
Sprout	3	0.14	0.16	0.17	166.25	146.49	149.61	0.70	0.92	0.90
TaoVA-100x	3	0.01	1.12	0.97	232.17	1904.31	900.15	85.45	3.28	2.31
TCP Vegas	3	1.04	0.58	0.60	1018.77	741.64	776.36	1.64	3.03	8.23
Verus	3	1.78	0.22	0.01	1844.90	1758.61	1723.21	4.49	7.03	19.39
PCC-Vivace	3	0.92	0.99	0.00	4750.34	5117.32	4407.05	31.29	42.67	18.34
WebRTC media	3	0.28	0.43	0.08	443.85	509.48	573.22	0.19	0.09	0.69

```
Run 1: Statistics of TCP BBR

Start at: 2018-09-11 01:47:54
End at: 2018-09-11 01:48:24
Local clock offset: -17.291 ms
Remote clock offset: 1.138 ms


# Below is generated by plot.py at 2018-09-11 02:36:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 1265.381 ms
Loss rate: 3.64%
-- Flow 1:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 1225.668 ms
Loss rate: 1.97%
-- Flow 2:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 1255.568 ms
Loss rate: 3.65%
-- Flow 3:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 1343.877 ms
Loss rate: 10.49%
```

Run 1: Report of TCP BBR — Data Link

- Flow 1 ingress (mean 1.22 Mbit/s)
- Flow 1 egress (mean 1.20 Mbit/s)
- Flow 2 ingress (mean 0.81 Mbit/s)
- Flow 2 egress (mean 0.79 Mbit/s)
- Flow 3 ingress (mean 0.89 Mbit/s)
- Flow 3 egress (mean 0.82 Mbit/s)

- Flow 1 (95th percentile 1225.67 ms)
- Flow 2 (95th percentile 1255.57 ms)
- Flow 3 (95th percentile 1343.88 ms)

```
Run 2: Statistics of TCP BBR

Start at: 2018-09-11 02:10:04
End at: 2018-09-11 02:10:34
Local clock offset: -9.119 ms
Remote clock offset: 0.515 ms


# Below is generated by plot.py at 2018-09-11 02:36:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.72 Mbit/s
95th percentile per-packet one-way delay: 2004.494 ms
Loss rate: 9.74%
-- Flow 1:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 1272.791 ms
Loss rate: 6.45%
-- Flow 2:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 1994.055 ms
Loss rate: 7.93%
-- Flow 3:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 2406.053 ms
Loss rate: 22.94%
```
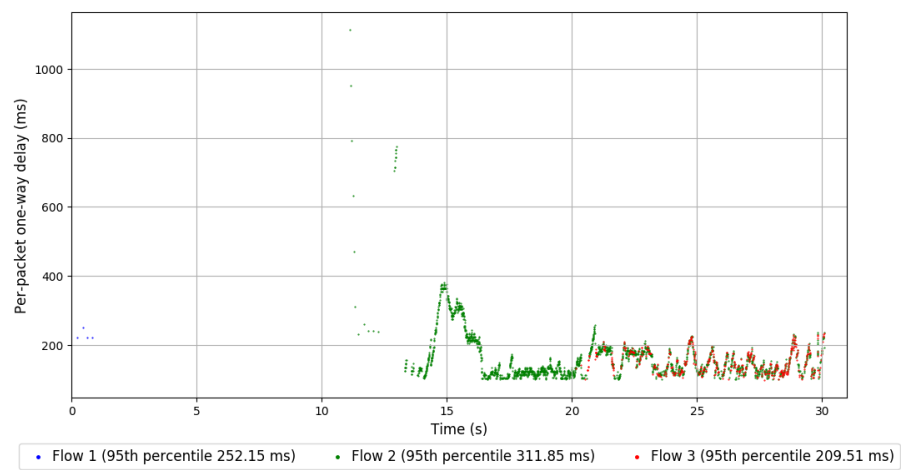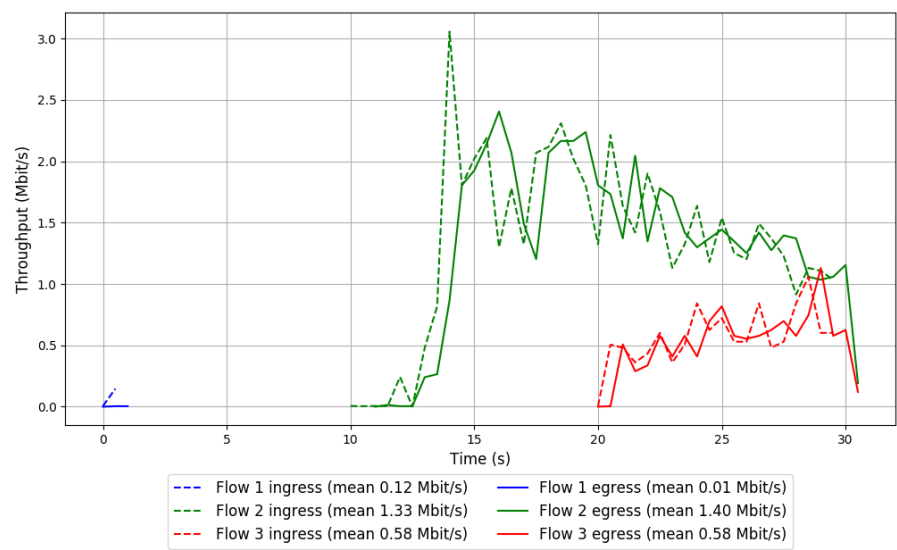
Run 2: Report of TCP BBR — Data Link
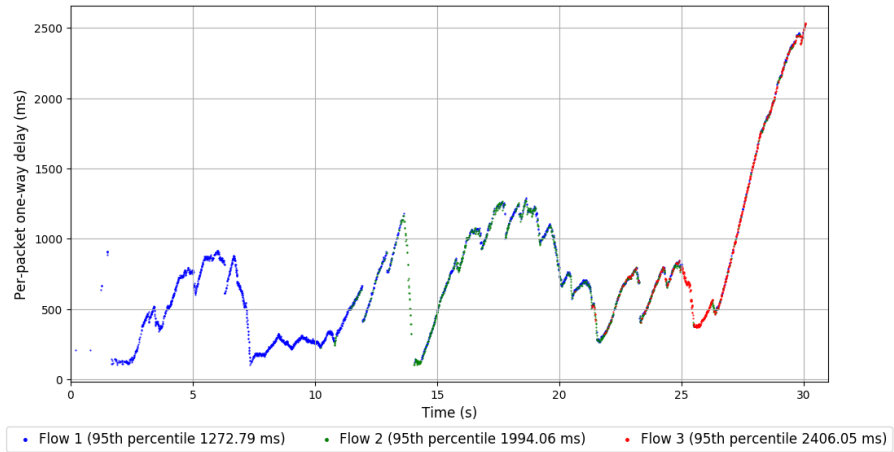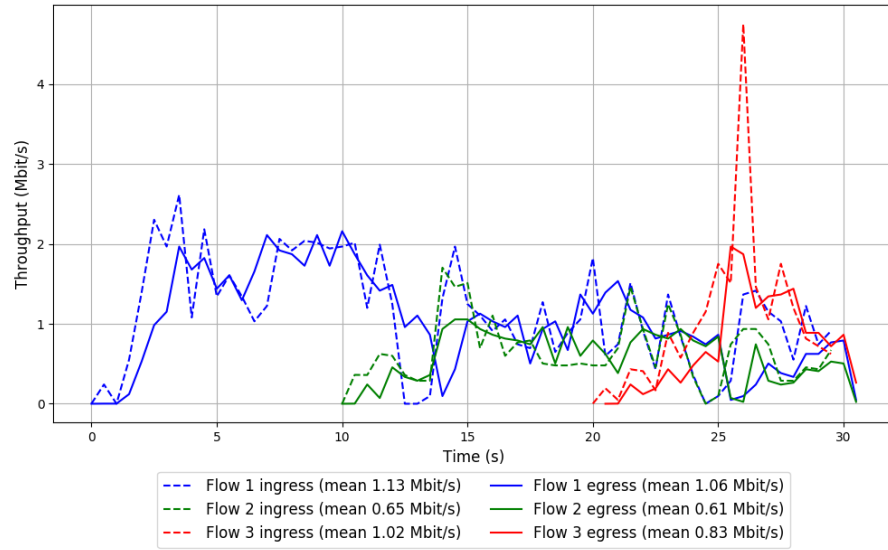
```
Run 3: Statistics of TCP BBR

Start at: 2018-09-11 02:32:17
End at: 2018-09-11 02:32:47
Local clock offset: -5.553 ms
Remote clock offset: -1.227 ms


# Below is generated by plot.py at 2018-09-11 02:36:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 1313.558 ms
Loss rate: 4.62%
-- Flow 1:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 1286.374 ms
Loss rate: 1.66%
-- Flow 2:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 1344.148 ms
Loss rate: 4.45%
-- Flow 3:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 1301.986 ms
Loss rate: 12.66%
```

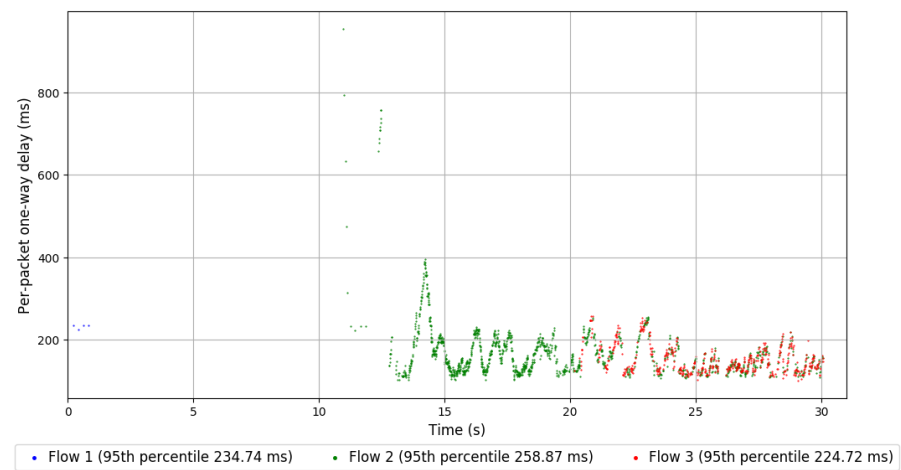## Run 3: Report of TCP BBR — Data Link
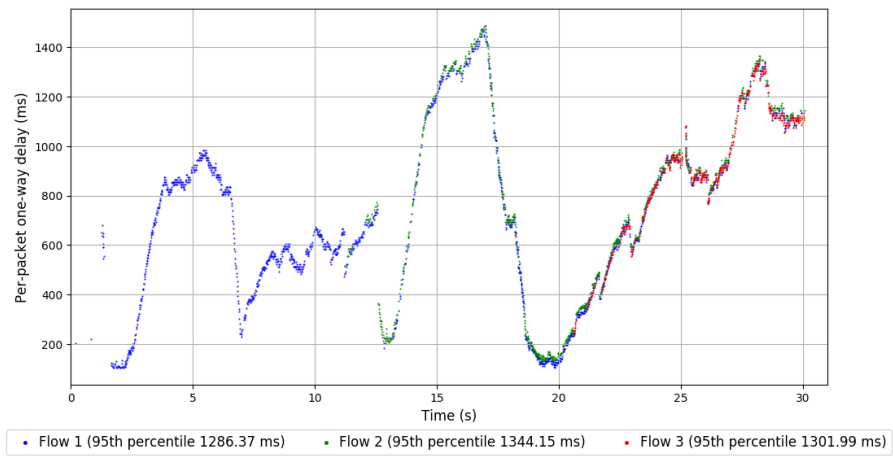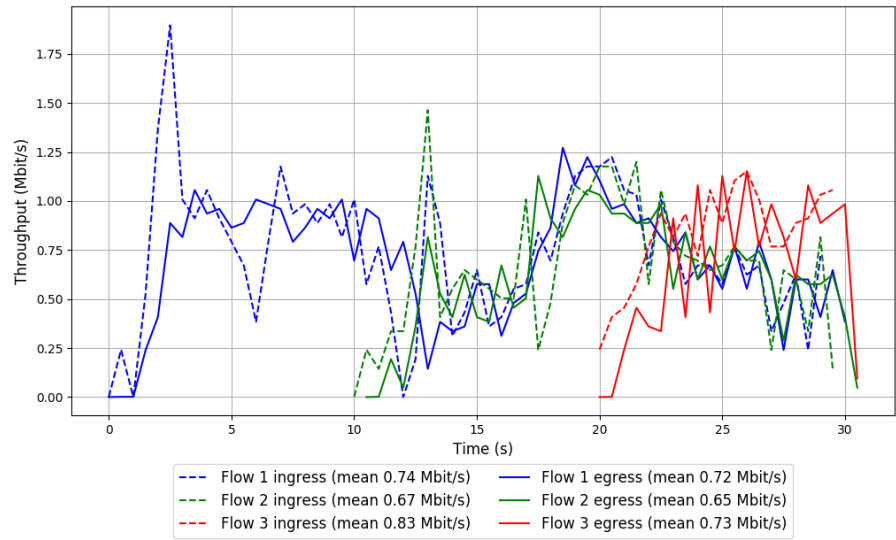
```
Run 1: Statistics of Copa

Start at: 2018-09-11 01:38:04
End at: 2018-09-11 01:38:34
Local clock offset: -18.271 ms
Remote clock offset: -3.218 ms


# Below is generated by plot.py at 2018-09-11 02:36:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 305.338 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 252.145 ms
Loss rate: 94.63%
-- Flow 2:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 311.850 ms
Loss rate: 0.05%
-- Flow 3:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 209.513 ms
Loss rate: 0.21%
```
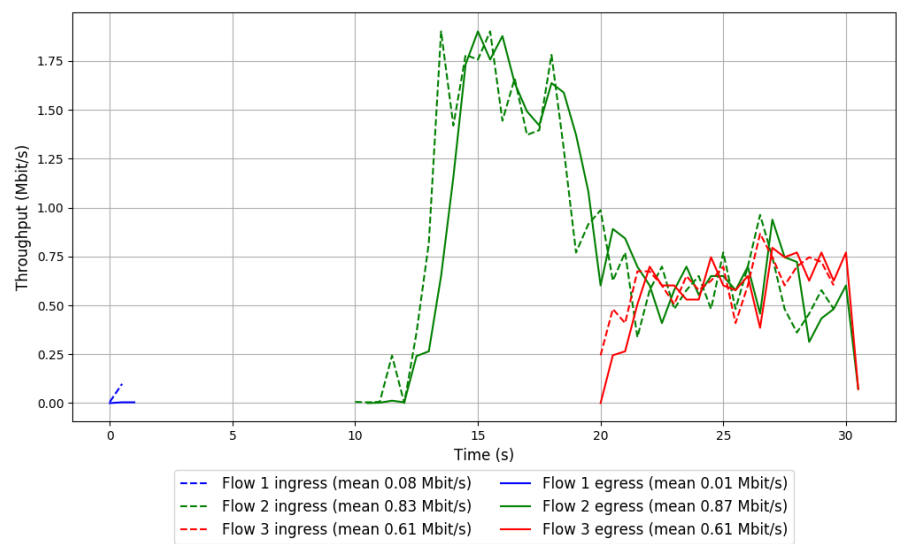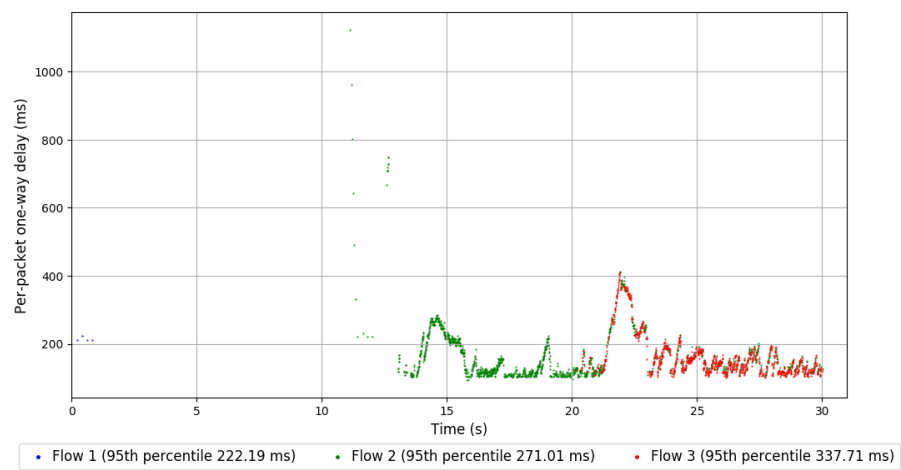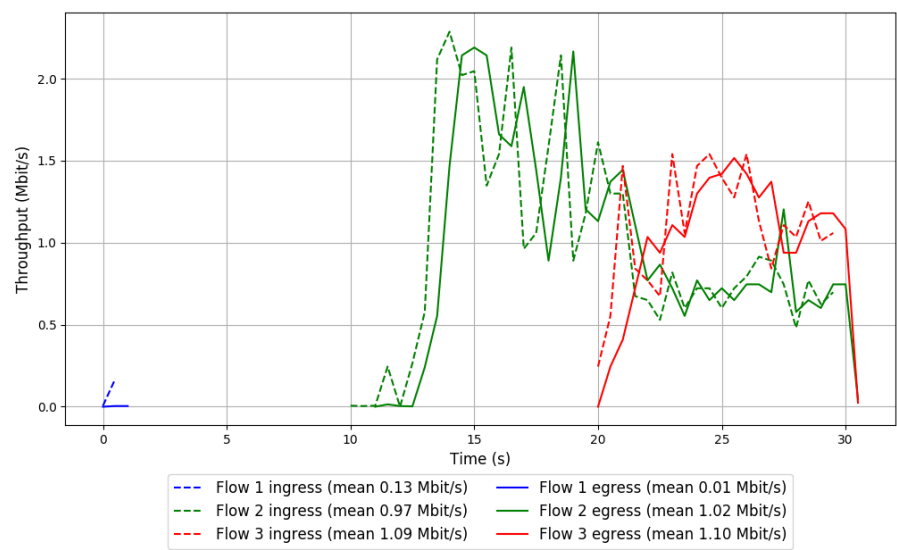
Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 0.12 Mbit/s)   Flow 1 egress (mean 0.01 Mbit/s)
Flow 2 ingress (mean 1.33 Mbit/s)   Flow 2 egress (mean 1.40 Mbit/s)
Flow 3 ingress (mean 0.58 Mbit/s)   Flow 3 egress (mean 0.58 Mbit/s)

Flow 1 (95th percentile 252.15 ms)   Flow 2 (95th percentile 311.85 ms)   Flow 3 (95th percentile 209.51 ms)

```
Run 2: Statistics of Copa

Start at: 2018-09-11 02:00:13
End at: 2018-09-11 02:00:44
Local clock offset: -16.235 ms
Remote clock offset: 0.777 ms


# Below is generated by plot.py at 2018-09-11 02:36:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 245.719 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 234.744 ms
Loss rate: 92.16%
-- Flow 2:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 258.867 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 224.718 ms
Loss rate: 0.20%
```
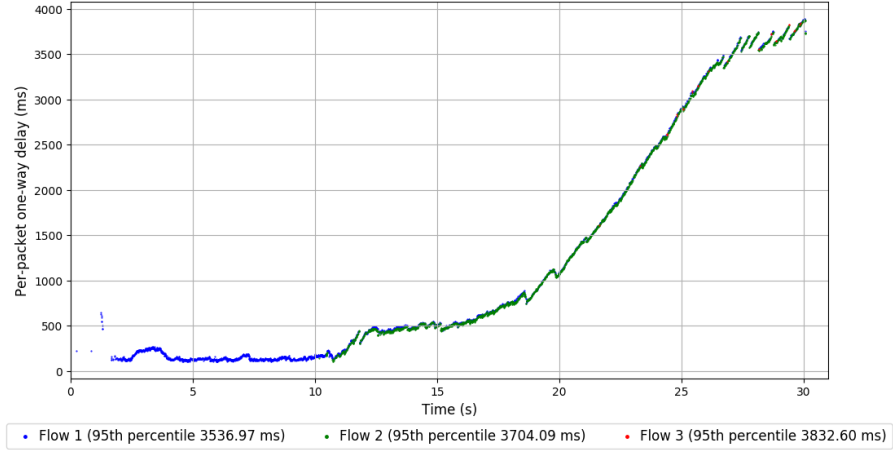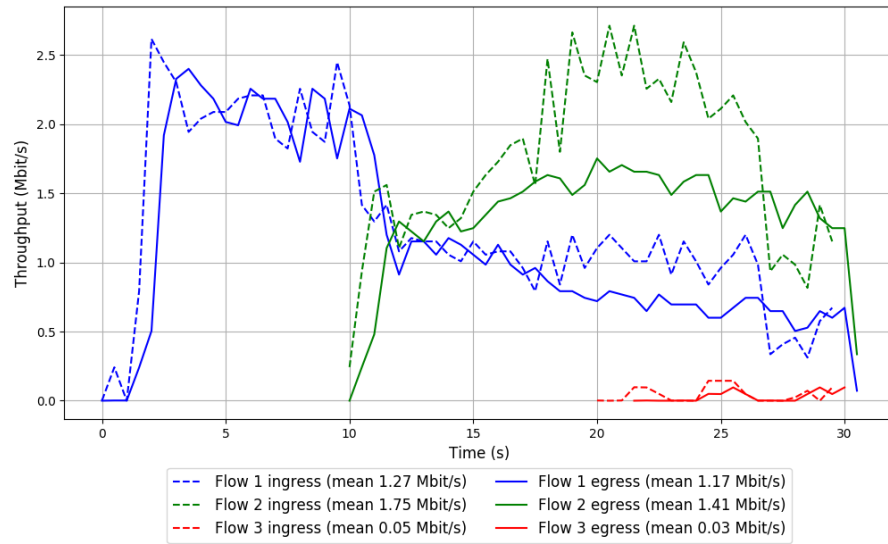
Run 2: Report of Copa — Data Link

Flow 1 ingress (mean 0.08 Mbit/s)   Flow 1 egress (mean 0.01 Mbit/s)
Flow 2 ingress (mean 0.83 Mbit/s)   Flow 2 egress (mean 0.87 Mbit/s)
Flow 3 ingress (mean 0.61 Mbit/s)   Flow 3 egress (mean 0.61 Mbit/s)

Flow 1 (95th percentile 234.74 ms)   Flow 2 (95th percentile 258.87 ms)   Flow 3 (95th percentile 224.72 ms)

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```
Run 3: Statistics of Copa

Start at: 2018-09-11 02:22:28
End at: 2018-09-11 02:22:58
Local clock offset: -5.045 ms
Remote clock offset: -1.639 ms


# Below is generated by plot.py at 2018-09-11 02:36:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 277.065 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 222.187 ms
Loss rate: 95.36%
-- Flow 2:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 271.009 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 337.715 ms
Loss rate: 0.66%
```

Run 3: Report of Copa — Data Link

Flow 1 ingress (mean 0.13 Mbit/s) --- Flow 1 egress (mean 0.01 Mbit/s) ——
Flow 2 ingress (mean 0.97 Mbit/s) --- Flow 2 egress (mean 1.02 Mbit/s) ——
Flow 3 ingress (mean 1.09 Mbit/s) --- Flow 3 egress (mean 1.10 Mbit/s) ——

• Flow 1 (95th percentile 222.19 ms) • Flow 2 (95th percentile 271.01 ms) • Flow 3 (95th percentile 337.71 ms)

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```
Run 1: Statistics of TCP Cubic

Start at: 2018-09-11 01:33:08
End at: 2018-09-11 01:33:38
Local clock offset: -18.195 ms
Remote clock offset: -2.796 ms


# Below is generated by plot.py at 2018-09-11 02:36:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 3665.784 ms
Loss rate: 13.92%
-- Flow 1:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 3536.973 ms
Loss rate: 8.52%
-- Flow 2:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 3704.089 ms
Loss rate: 19.44%
-- Flow 3:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 3832.596 ms
Loss rate: 41.77%
```
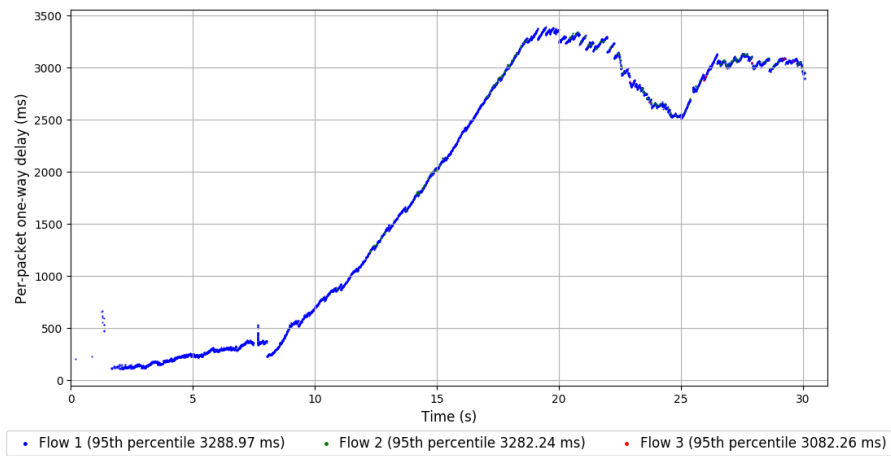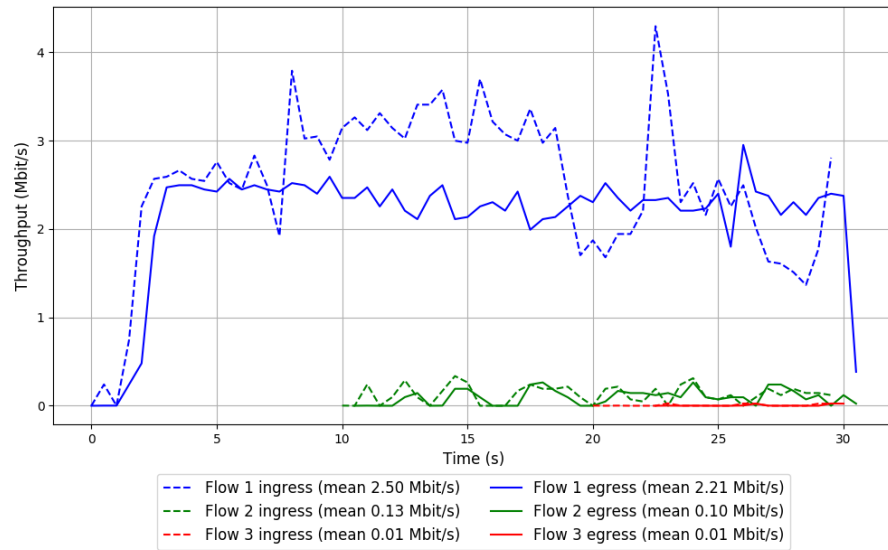
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 1.27 Mbit/s) --- Flow 1 egress (mean 1.17 Mbit/s)
Flow 2 ingress (mean 1.75 Mbit/s) --- Flow 2 egress (mean 1.41 Mbit/s)
Flow 3 ingress (mean 0.05 Mbit/s) --- Flow 3 egress (mean 0.03 Mbit/s)

Flow 1 (95th percentile 3536.97 ms)　Flow 2 (95th percentile 3704.09 ms)　Flow 3 (95th percentile 3832.60 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2018-09-11 01:55:18
End at: 2018-09-11 01:55:48
Local clock offset: -17.552 ms
Remote clock offset: -3.195 ms


# Below is generated by plot.py at 2018-09-11 02:36:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.79 Mbit/s
95th percentile per-packet one-way delay: 3672.193 ms
Loss rate: 12.10%
-- Flow 1:
Average throughput: 1.73 Mbit/s
95th percentile per-packet one-way delay: 3671.264 ms
Loss rate: 11.68%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 3701.865 ms
Loss rate: 21.58%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3443.826 ms
Loss rate: 36.86%
```

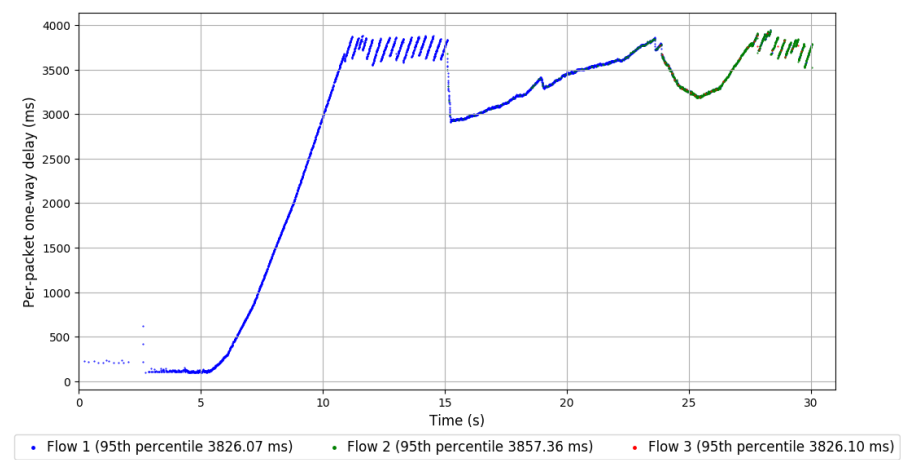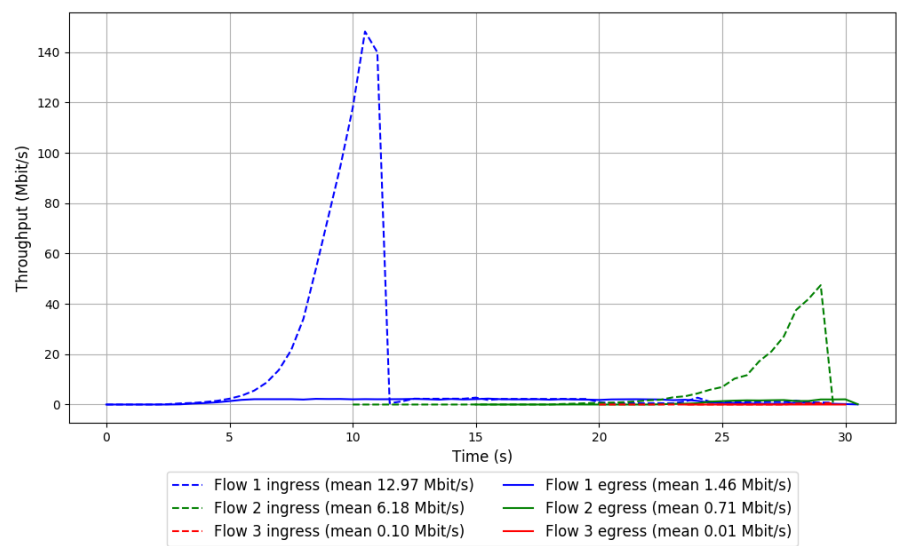Run 2: Report of TCP Cubic — Data Link
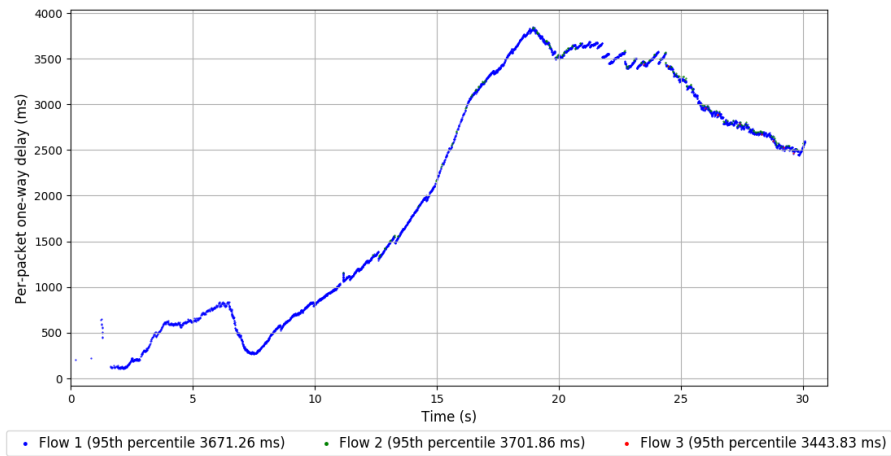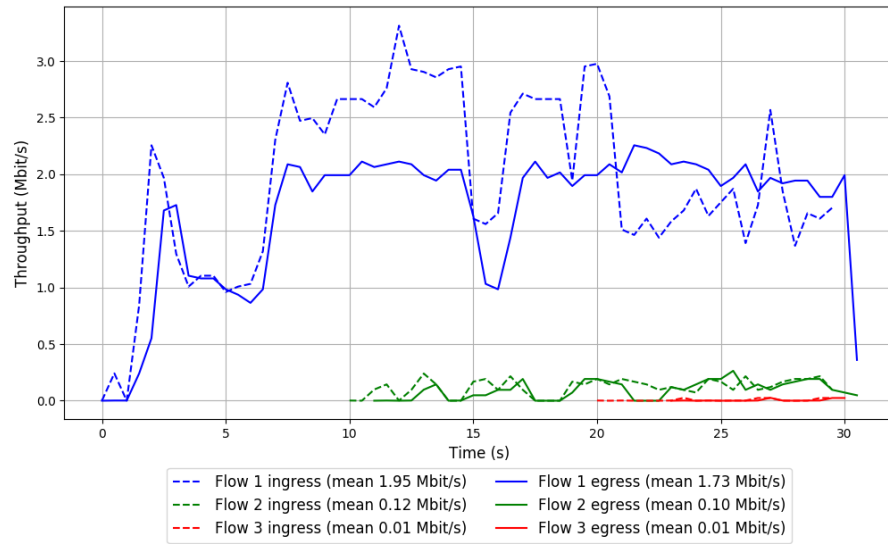
```
Run 3: Statistics of TCP Cubic

Start at: 2018-09-11 02:17:32
End at: 2018-09-11 02:18:02
Local clock offset: -6.032 ms
Remote clock offset: 1.174 ms


# Below is generated by plot.py at 2018-09-11 02:36:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 3288.932 ms
Loss rate: 12.59%
-- Flow 1:
Average throughput: 2.21 Mbit/s
95th percentile per-packet one-way delay: 3288.972 ms
Loss rate: 12.21%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 3282.243 ms
Loss rate: 23.24%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3082.265 ms
Loss rate: 36.86%
```

Run 3: Report of TCP Cubic — Data Link

- Flow 1 ingress (mean 2.50 Mbit/s)
- Flow 1 egress (mean 2.21 Mbit/s)
- Flow 2 ingress (mean 0.13 Mbit/s)
- Flow 2 egress (mean 0.10 Mbit/s)
- Flow 3 ingress (mean 0.01 Mbit/s)
- Flow 3 egress (mean 0.01 Mbit/s)

- Flow 1 (95th percentile 3288.97 ms)
- Flow 2 (95th percentile 3282.24 ms)
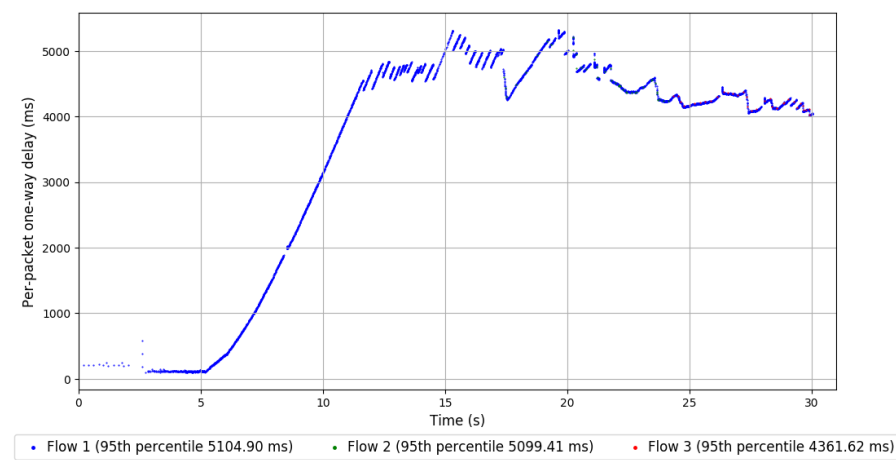- Flow 3 (95th percentile 3082.26 ms)

```
Run 1: Statistics of FillP

Start at: 2018-09-11 01:35:36
End at: 2018-09-11 01:36:06
Local clock offset: -18.519 ms
Remote clock offset: -3.348 ms

# Below is generated by plot.py at 2018-09-11 02:37:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.82 Mbit/s
95th percentile per-packet one-way delay: 3832.655 ms
Loss rate: 89.42%
-- Flow 1:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 3826.068 ms
Loss rate: 88.78%
-- Flow 2:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 3857.359 ms
Loss rate: 91.38%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3826.099 ms
Loss rate: 96.92%
```
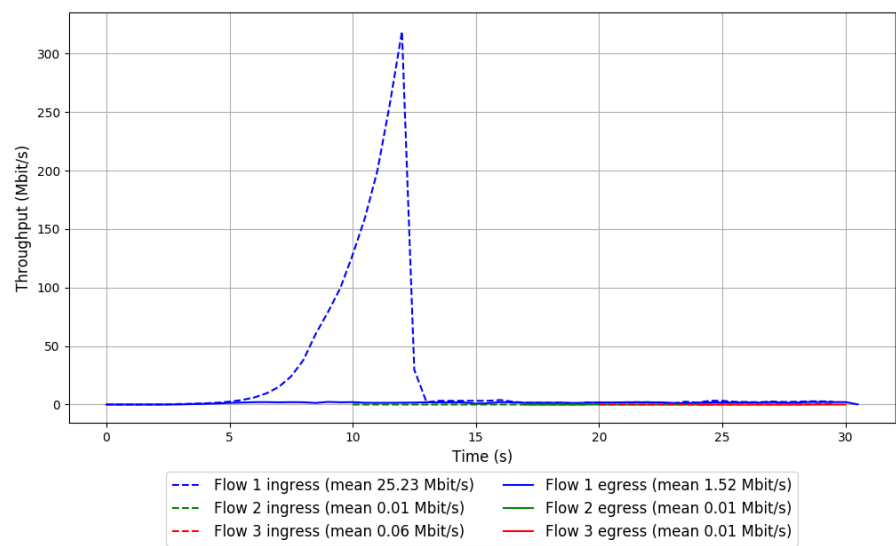
Run 1: Report of FillP — Data Link

Flow 1 ingress (mean 12.97 Mbit/s) — Flow 1 egress (mean 1.46 Mbit/s)
Flow 2 ingress (mean 6.18 Mbit/s) — Flow 2 egress (mean 0.71 Mbit/s)
Flow 3 ingress (mean 0.10 Mbit/s) — Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 3826.07 ms)   Flow 2 (95th percentile 3857.36 ms)   Flow 3 (95th percentile 3826.10 ms)

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```
Run 2: Statistics of FillP

Start at: 2018-09-11 01:57:45
End at: 2018-09-11 01:58:15
Local clock offset: -18.49 ms
Remote clock offset: 0.718 ms


# Below is generated by plot.py at 2018-09-11 02:37:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 3816.574 ms
Loss rate: 87.39%
-- Flow 1:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 3822.520 ms
Loss rate: 88.21%
-- Flow 2:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 3687.182 ms
Loss rate: 76.70%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3625.863 ms
Loss rate: 97.41%
```
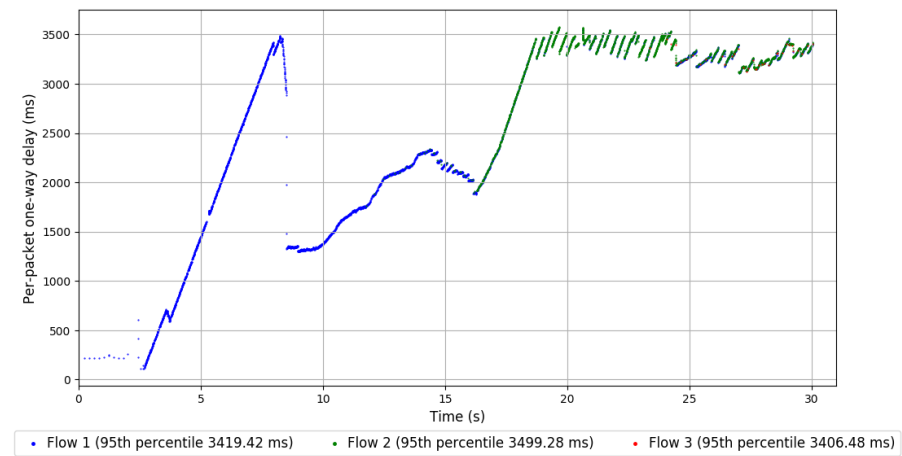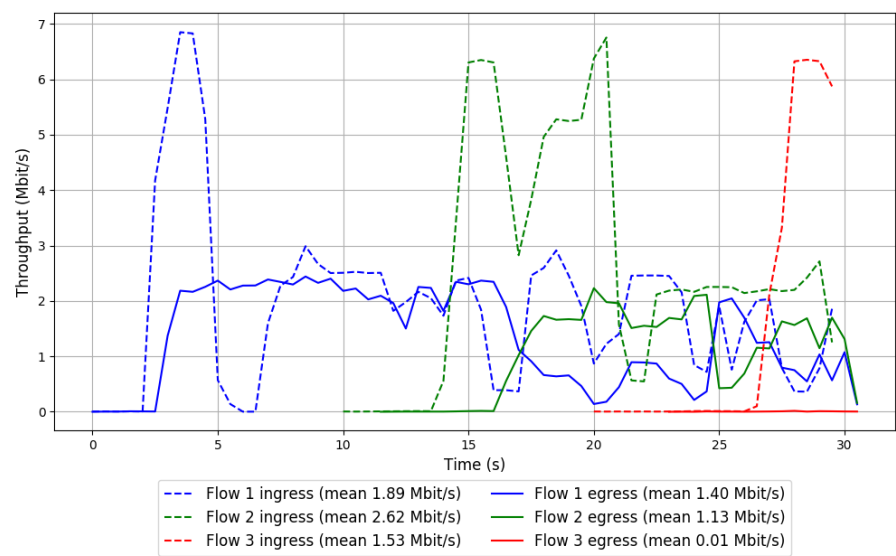
Run 2: Report of FillP — Data Link
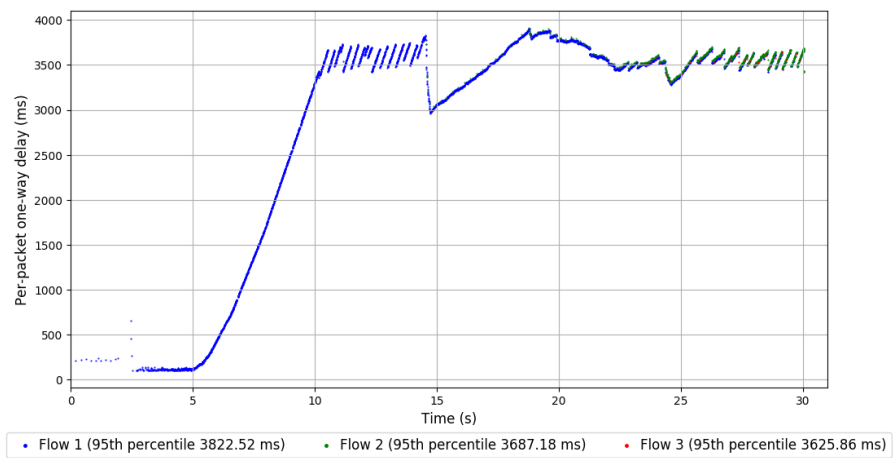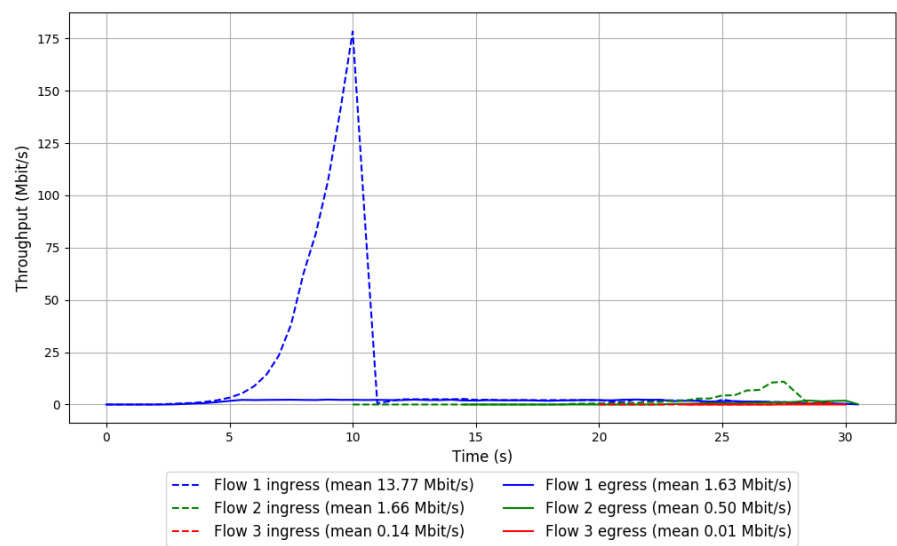
```
Run 3: Statistics of FillP

Start at: 2018-09-11 02:20:00
End at: 2018-09-11 02:20:30
Local clock offset: -5.474 ms
Remote clock offset: -2.023 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 5104.860 ms
Loss rate: 93.99%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 5104.902 ms
Loss rate: 93.99%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 5099.406 ms
Loss rate: 24.70%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 4361.617 ms
Loss rate: 93.99%
```
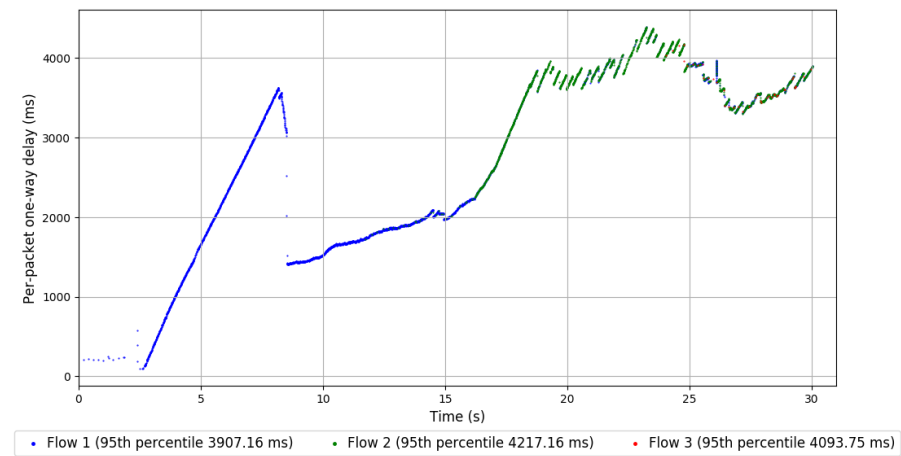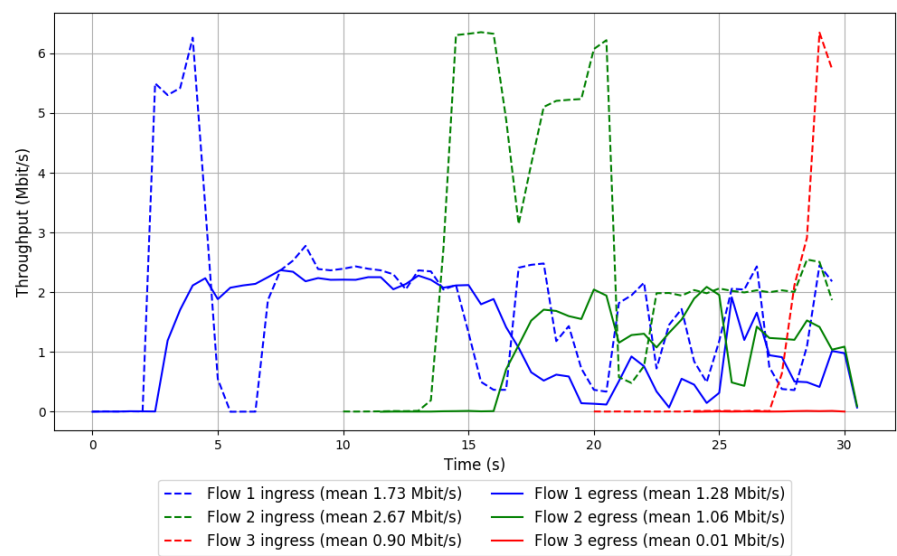
Run 3: Report of FillP — Data Link

Flow 1 ingress (mean 25.23 Mbit/s) — — — Flow 1 egress (mean 1.52 Mbit/s)
Flow 2 ingress (mean 0.01 Mbit/s) — — — Flow 2 egress (mean 0.01 Mbit/s)
Flow 3 ingress (mean 0.06 Mbit/s) — — — Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 5104.90 ms)   Flow 2 (95th percentile 5099.41 ms)   Flow 3 (95th percentile 4361.62 ms)

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```
Run 1: Statistics of FillP-Sheep

Start at: 2018-09-11 01:36:50
End at: 2018-09-11 01:37:20
Local clock offset: -18.41 ms
Remote clock offset: 1.012 ms

# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 3470.349 ms
Loss rate: 49.53%
-- Flow 1:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 3419.424 ms
Loss rate: 26.23%
-- Flow 2:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 3499.278 ms
Loss rate: 60.23%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3406.484 ms
Loss rate: 99.74%
```

# Run 1: Report of FillP-Sheep — Data Link

Flow 1 ingress (mean 1.89 Mbit/s) --- Flow 1 egress (mean 1.40 Mbit/s)
Flow 2 ingress (mean 2.62 Mbit/s) --- Flow 2 egress (mean 1.13 Mbit/s)
Flow 3 ingress (mean 1.53 Mbit/s) --- Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 3419.42 ms) • Flow 2 (95th percentile 3499.28 ms) • Flow 3 (95th percentile 3406.48 ms)

```
Run 2: Statistics of FillP-Sheep

Start at: 2018-09-11 01:59:00
End at: 2018-09-11 01:59:30
Local clock offset: -17.755 ms
Remote clock offset: -13.518 ms

# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 3645.764 ms
Loss rate: 45.82%
-- Flow 1:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 3772.154 ms
Loss rate: 30.92%
-- Flow 2:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 3593.523 ms
Loss rate: 47.47%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 3547.527 ms
Loss rate: 99.70%
```

Run 2: Report of FillP-Sheep — Data Link
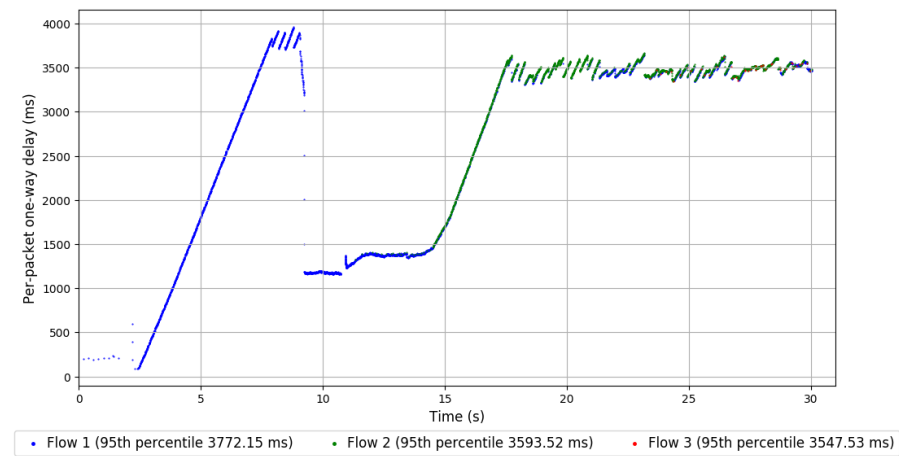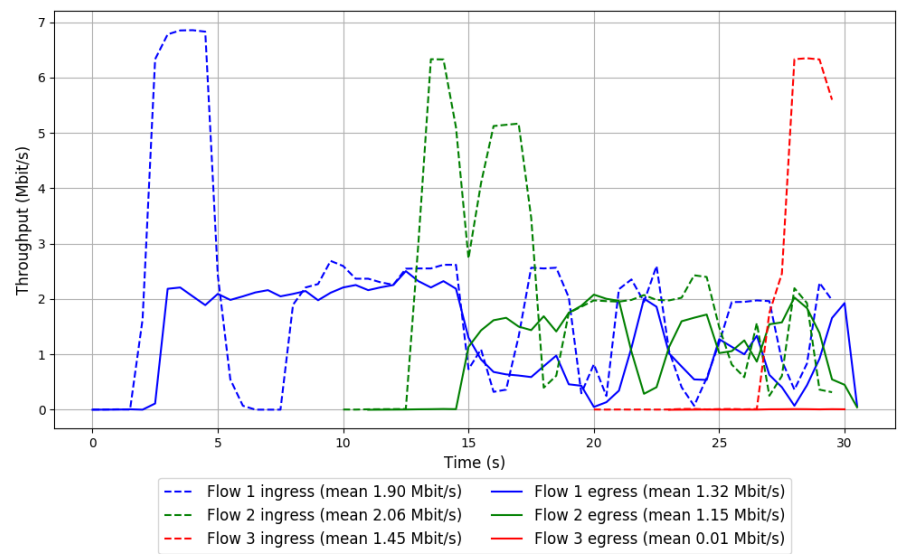
```
Run 3: Statistics of FillP-Sheep

Start at: 2018-09-11 02:21:14
End at: 2018-09-11 02:21:44
Local clock offset: -6.014 ms
Remote clock offset: -1.863 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 4116.215 ms
Loss rate: 49.54%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 3907.164 ms
Loss rate: 26.53%
-- Flow 2:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 4217.159 ms
Loss rate: 63.56%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 4093.754 ms
Loss rate: 99.53%
```

Run 3: Report of FillP-Sheep — Data Link

Flow 1 ingress (mean 1.73 Mbit/s)   Flow 1 egress (mean 1.28 Mbit/s)
Flow 2 ingress (mean 2.67 Mbit/s)   Flow 2 egress (mean 1.06 Mbit/s)
Flow 3 ingress (mean 0.90 Mbit/s)   Flow 3 egress (mean 0.01 Mbit/s)

Flow 1 (95th percentile 3907.16 ms)   Flow 2 (95th percentile 4217.16 ms)   Flow 3 (95th percentile 4093.75 ms)

```
Run 1: Statistics of Indigo

Start at: 2018-09-11 01:41:46
End at: 2018-09-11 01:42:16
Local clock offset: -18.062 ms
Remote clock offset: 0.492 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 216.426 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 205.135 ms
Loss rate: 0.40%
-- Flow 2:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 266.431 ms
Loss rate: 0.40%
-- Flow 3:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 216.671 ms
Loss rate: 0.11%
```
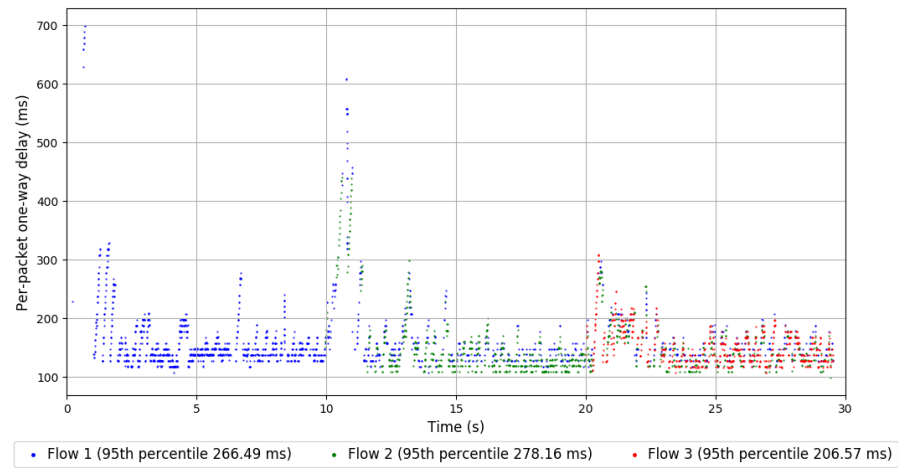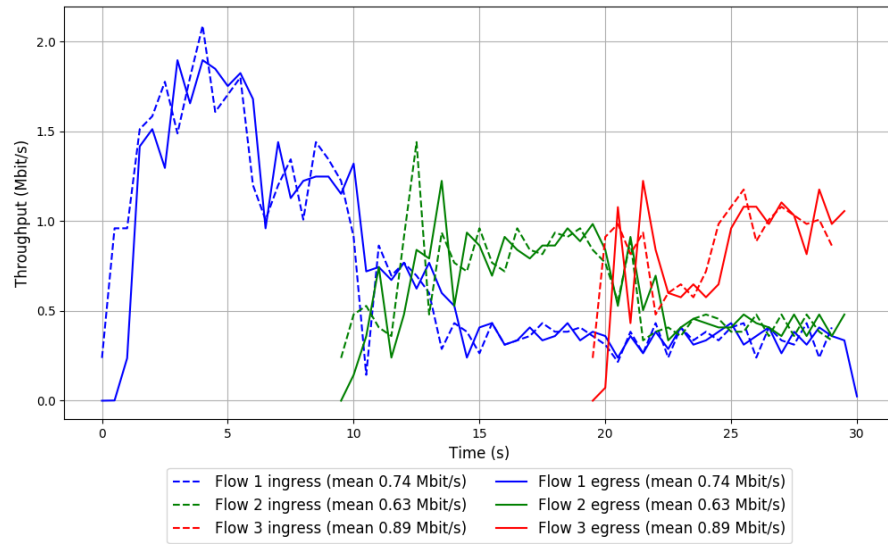
Run 1: Report of Indigo — Data Link
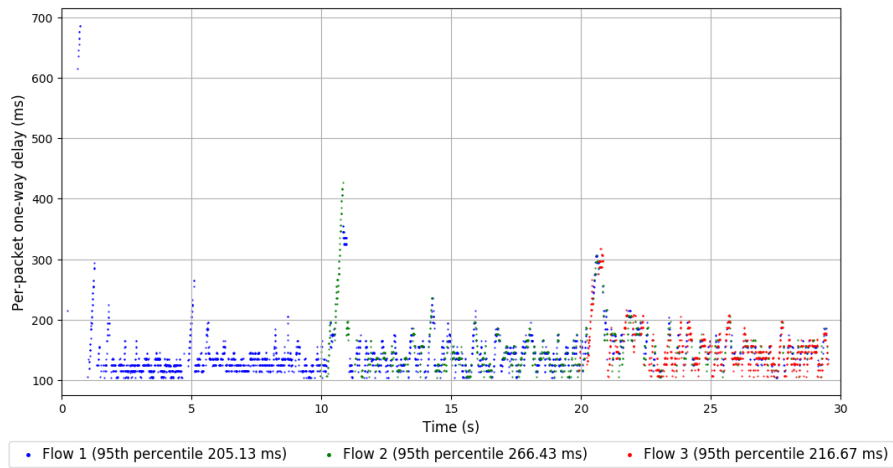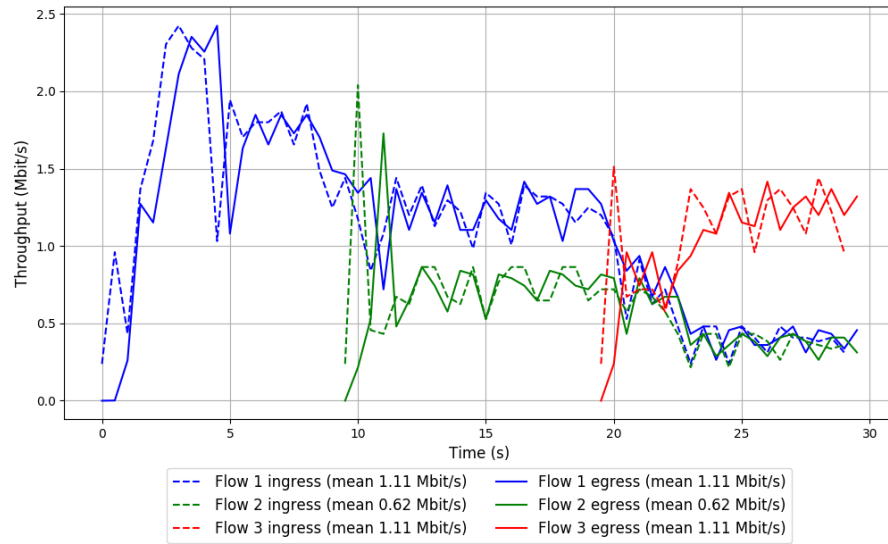
```
Run 2: Statistics of Indigo

Start at: 2018-09-11 02:03:54
End at: 2018-09-11 02:04:24
Local clock offset: -11.922 ms
Remote clock offset: -2.752 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.72 Mbit/s
95th percentile per-packet one-way delay: 292.311 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 231.524 ms
Loss rate: 0.04%
-- Flow 2:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 491.910 ms
Loss rate: 0.36%
-- Flow 3:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 239.891 ms
Loss rate: 0.00%
```

Run 2: Report of Indigo — Data Link
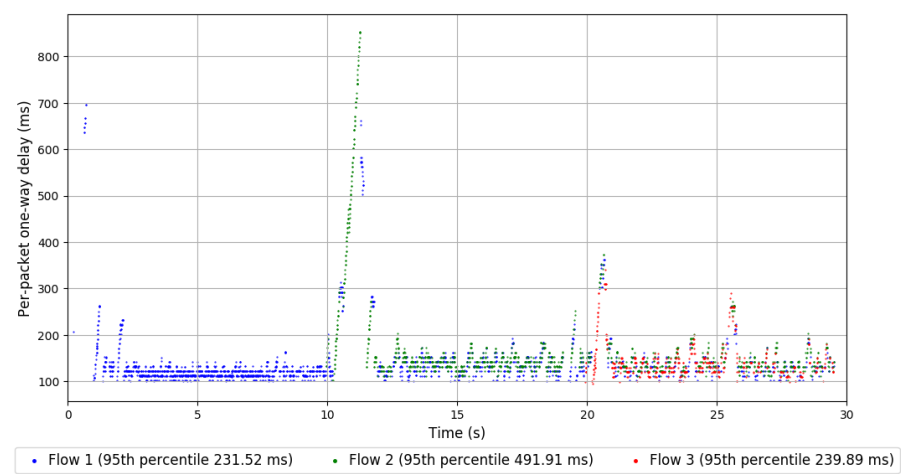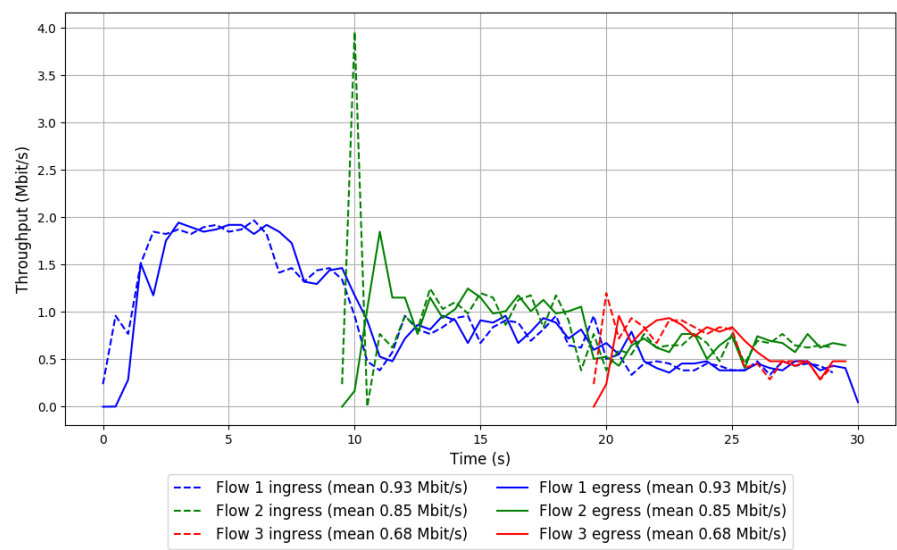
```
Run 3: Statistics of Indigo

Start at: 2018-09-11 02:26:09
End at: 2018-09-11 02:26:39
Local clock offset: -5.206 ms
Remote clock offset: 2.563 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 257.768 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 266.493 ms
Loss rate: 0.44%
-- Flow 2:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 278.158 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 206.572 ms
Loss rate: 0.28%
```

Run 3: Report of Indigo — Data Link

```
Run 1: Statistics of LEDBAT

Start at: 2018-09-11 01:45:27
End at: 2018-09-11 01:45:57
Local clock offset: -18.022 ms
Remote clock offset: 1.03 ms
```

Run 1: Report of LEDBAT — Data Link
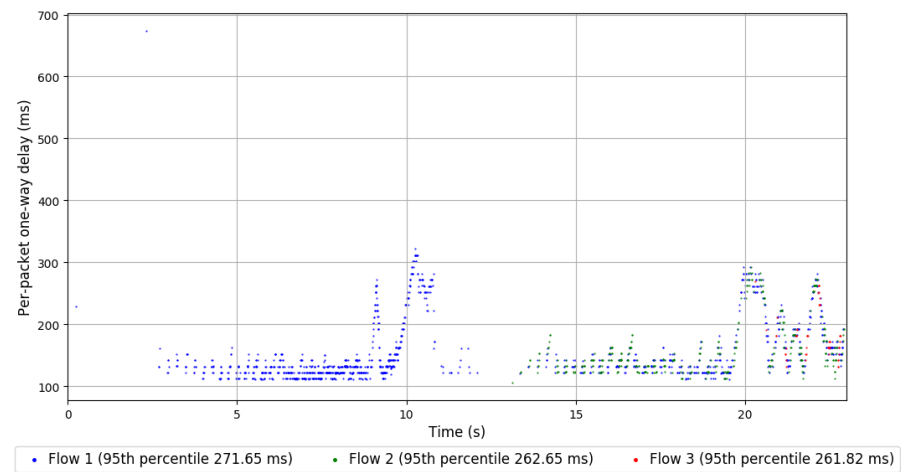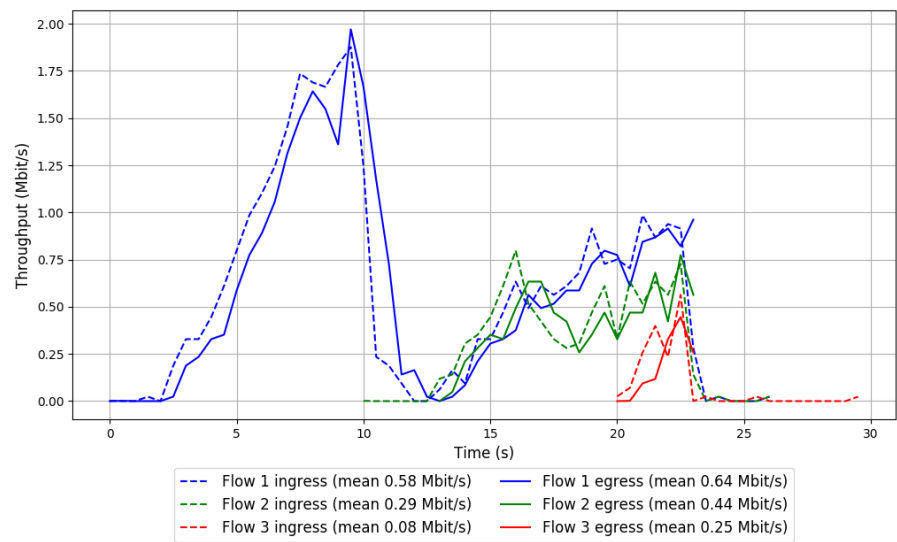
```
Run 2: Statistics of LEDBAT

Start at: 2018-09-11 02:07:36
End at: 2018-09-11 02:08:06
Local clock offset: -9.577 ms
Remote clock offset: -3.139 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.75 Mbit/s
95th percentile per-packet one-way delay: 318.380 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 308.128 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 307.523 ms
Loss rate: 0.49%
-- Flow 3:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 407.689 ms
Loss rate: 1.10%
```

Run 2: Report of LEDBAT — Data Link
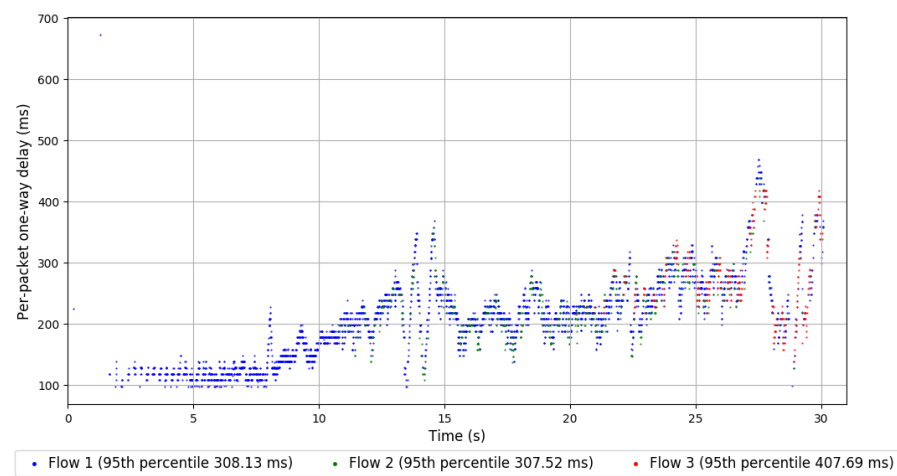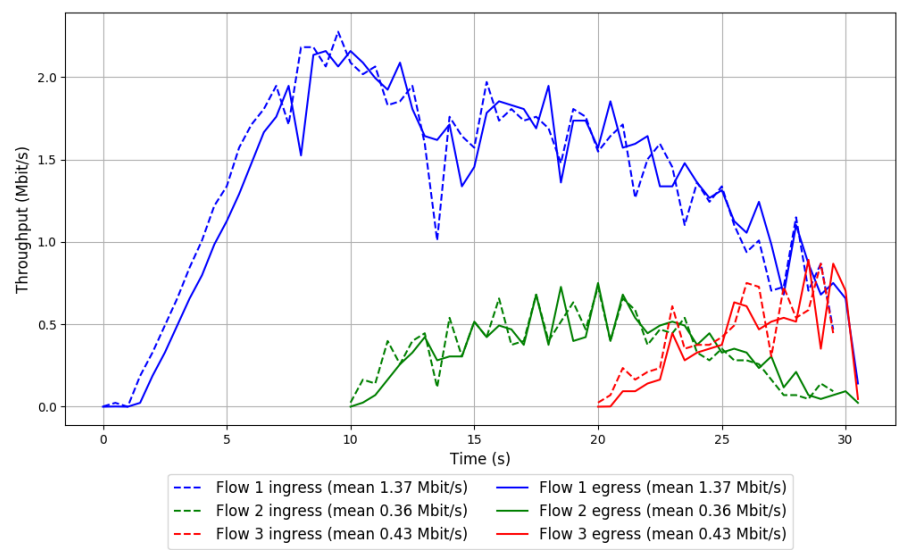
```
Run 3: Statistics of LEDBAT

Start at: 2018-09-11 02:29:50
End at: 2018-09-11 02:30:20
Local clock offset: -4.727 ms
Remote clock offset: -1.658 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 404.119 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 413.732 ms
Loss rate: 0.56%
-- Flow 2:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 384.214 ms
Loss rate: 0.72%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 365.644 ms
Loss rate: 3.54%
```

Run 3: Report of LEDBAT — Data Link
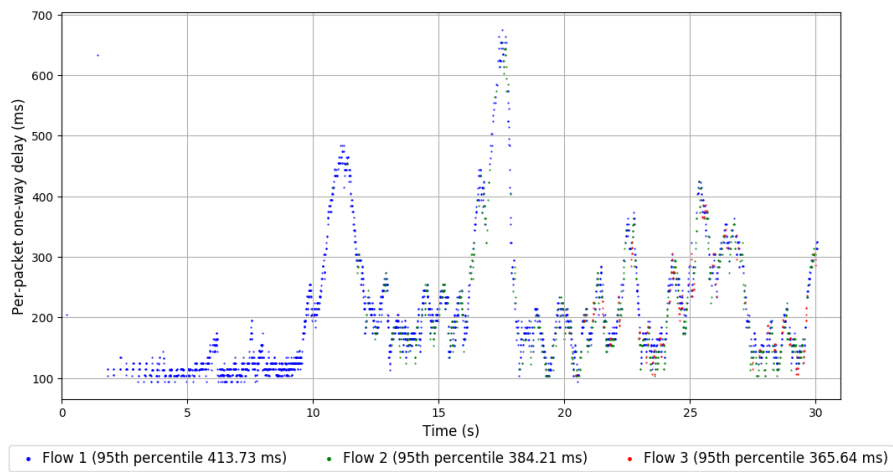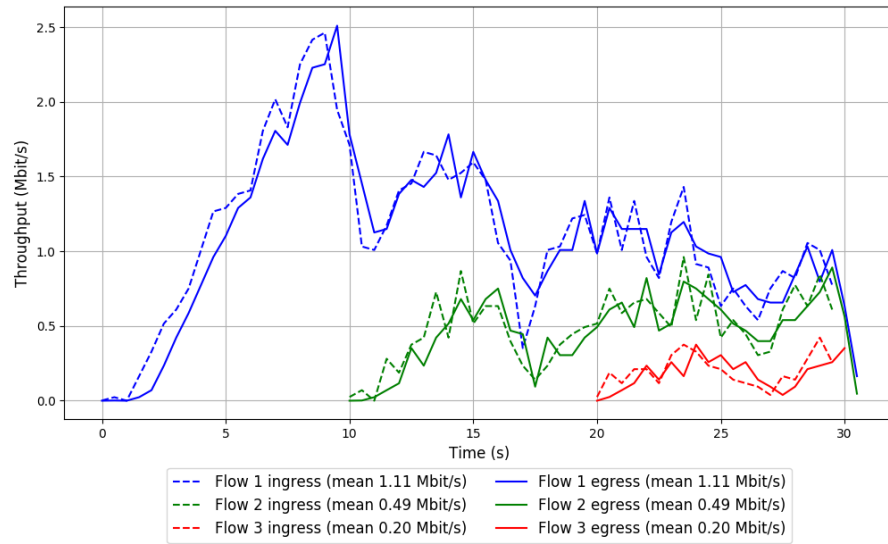
```
Run 1: Statistics of Indigo-Muses

Start at: 2018-09-11 01:34:22
End at: 2018-09-11 01:34:52
Local clock offset: -17.961 ms
Remote clock offset: 0.667 ms

# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 418.011 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 443.360 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 405.766 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 398.562 ms
Loss rate: 0.00%
```
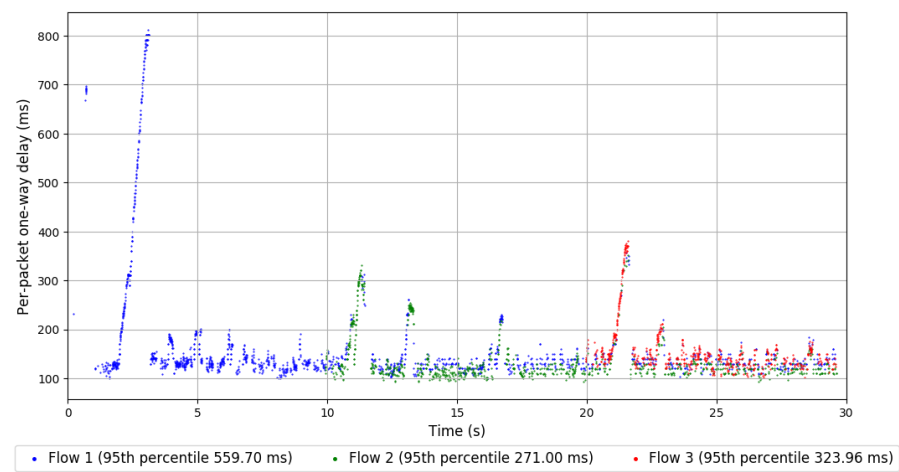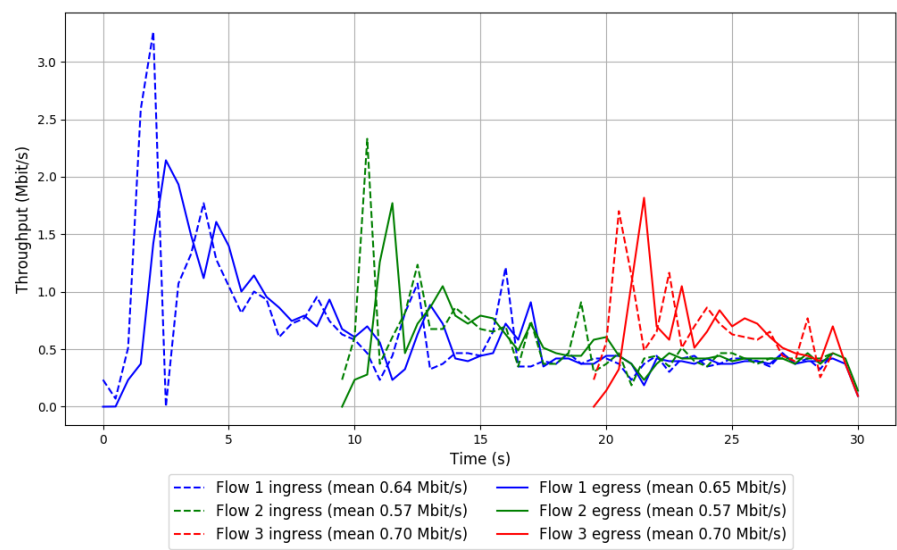
Run 1: Report of Indigo-Muses — Data Link
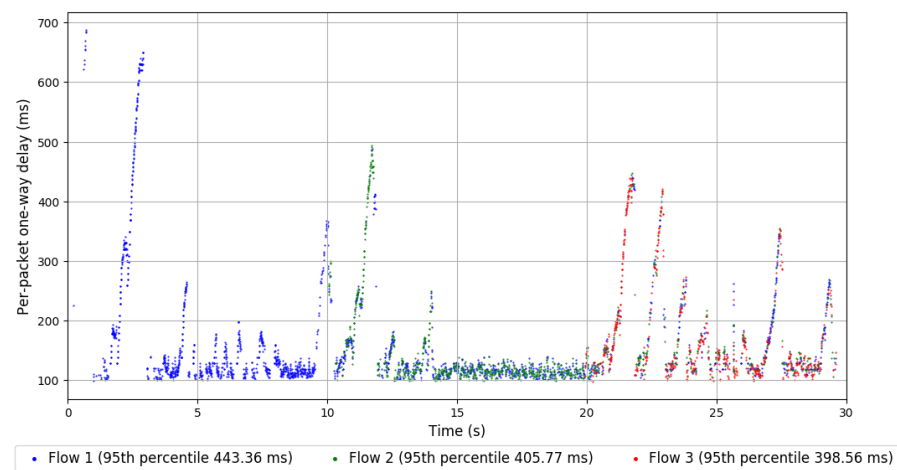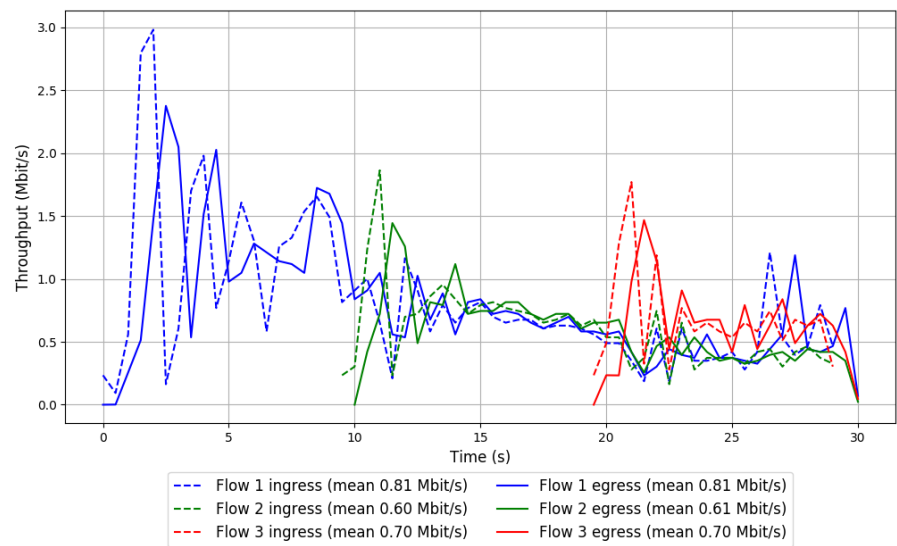
```
Run 2: Statistics of Indigo-Muses

Start at: 2018-09-11 01:56:32
End at: 2018-09-11 01:57:02
Local clock offset: -18.425 ms
Remote clock offset: -2.81 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 339.733 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 559.695 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 271.005 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 323.957 ms
Loss rate: 0.52%
```

# Run 2: Report of Indigo-Muses — Data Link

Flow 1 ingress (mean 0.64 Mbit/s)   Flow 1 egress (mean 0.65 Mbit/s)
Flow 2 ingress (mean 0.57 Mbit/s)   Flow 2 egress (mean 0.57 Mbit/s)
Flow 3 ingress (mean 0.70 Mbit/s)   Flow 3 egress (mean 0.70 Mbit/s)

Flow 1 (95th percentile 559.70 ms)   Flow 2 (95th percentile 271.00 ms)   Flow 3 (95th percentile 323.96 ms)

```
Run 3: Statistics of Indigo-Muses

Start at: 2018-09-11 02:18:46
End at: 2018-09-11 02:19:16
Local clock offset: -5.742 ms
Remote clock offset: -1.753 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.70 Mbit/s
95th percentile per-packet one-way delay: 353.469 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 0.97 Mbit/s
95th percentile per-packet one-way delay: 405.552 ms
Loss rate: 0.16%
-- Flow 2:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 292.628 ms
Loss rate: 0.18%
-- Flow 3:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 339.827 ms
Loss rate: 0.27%
```

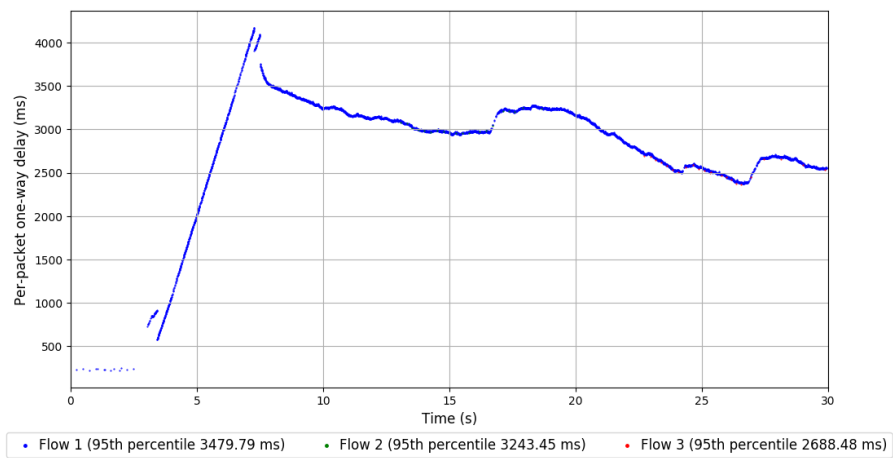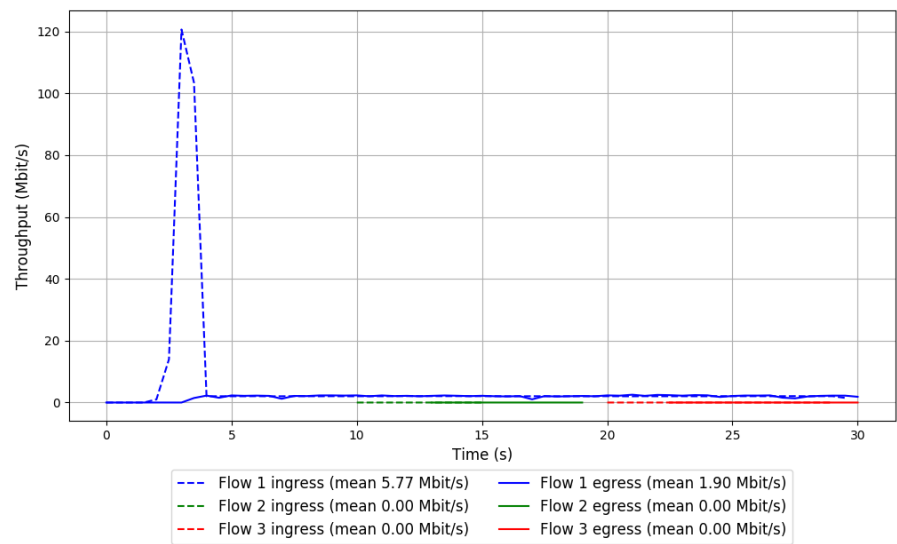Run 3: Report of Indigo-Muses — Data Link
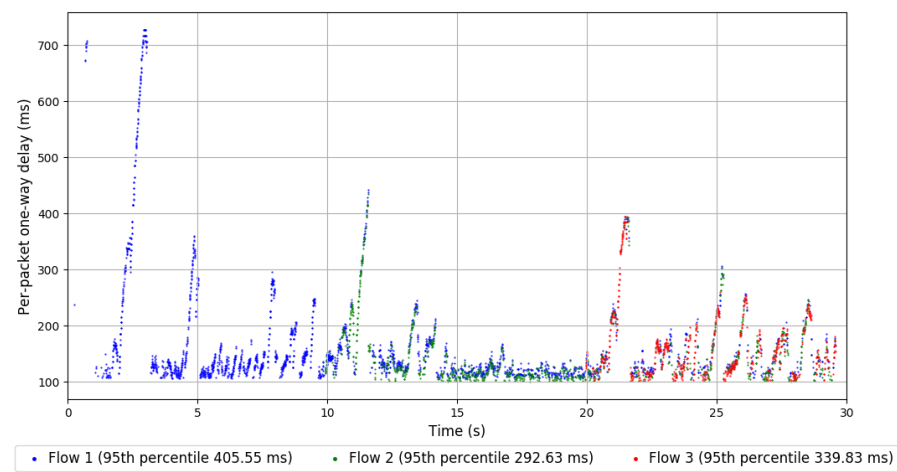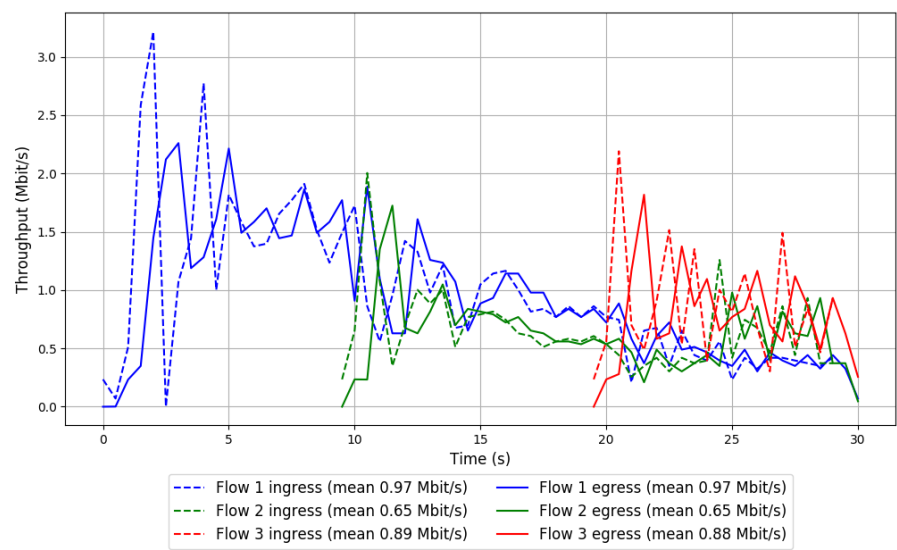
```
Run 1: Statistics of PCC-Allegro

Start at: 2018-09-11 01:46:40
End at: 2018-09-11 01:47:10
Local clock offset: -18.035 ms
Remote clock offset: 0.981 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 3299.462 ms
Loss rate: 49.29%
-- Flow 1:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 3299.977 ms
Loss rate: 49.31%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2974.758 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2661.390 ms
Loss rate: 7.97%
```

Run 1: Report of PCC-Allegro — Data Link
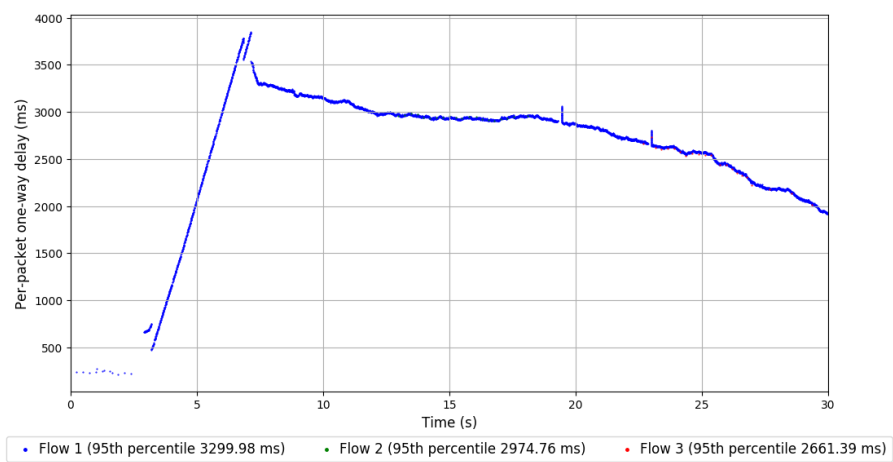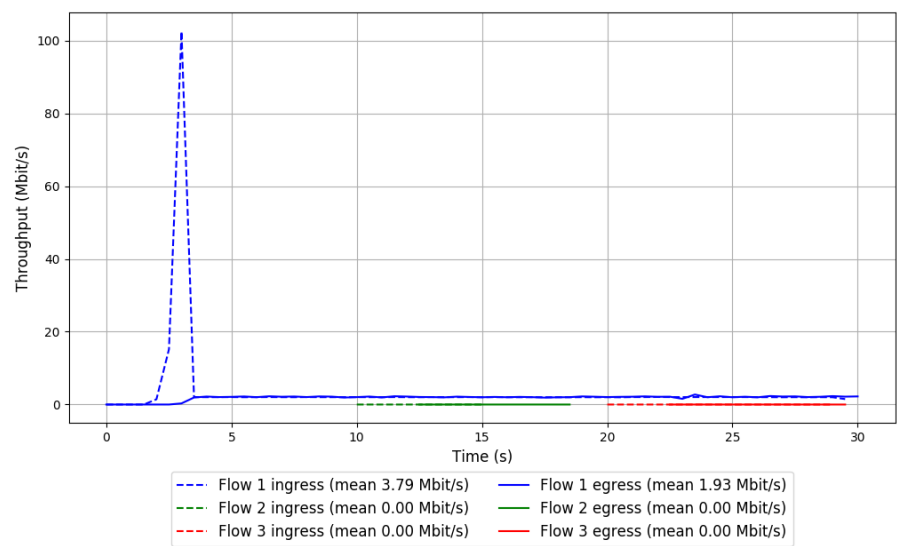
```
Run 2: Statistics of PCC-Allegro

Start at: 2018-09-11 02:08:50
End at: 2018-09-11 02:09:20
Local clock offset: -9.686 ms
Remote clock offset: -7.692 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 3478.931 ms
Loss rate: 67.22%
-- Flow 1:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 3479.792 ms
Loss rate: 67.24%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3243.448 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2688.481 ms
Loss rate: 7.13%
```

Run 2: Report of PCC-Allegro — Data Link

- - - Flow 1 ingress (mean 5.77 Mbit/s) —— Flow 1 egress (mean 1.90 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 3479.79 ms)   • Flow 2 (95th percentile 3243.45 ms)   • Flow 3 (95th percentile 2688.48 ms)

```
Run 3: Statistics of PCC-Allegro

Start at: 2018-09-11 02:31:04
End at: 2018-09-11 02:31:34
Local clock offset: -5.947 ms
Remote clock offset: -1.555 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 4569.758 ms
Loss rate: 55.67%
-- Flow 1:
Average throughput: 1.73 Mbit/s
95th percentile per-packet one-way delay: 4569.294 ms
Loss rate: 55.69%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4578.356 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4252.882 ms
Loss rate: 10.61%
```

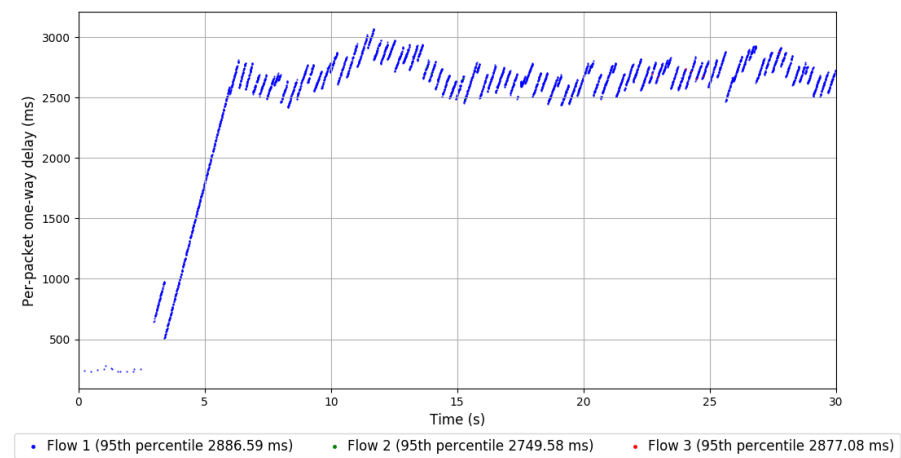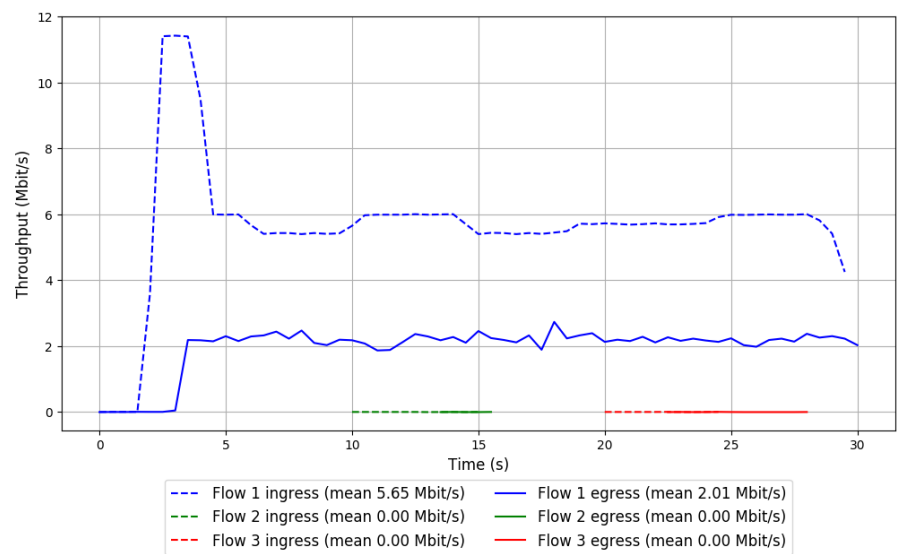Run 3: Report of PCC-Allegro — Data Link
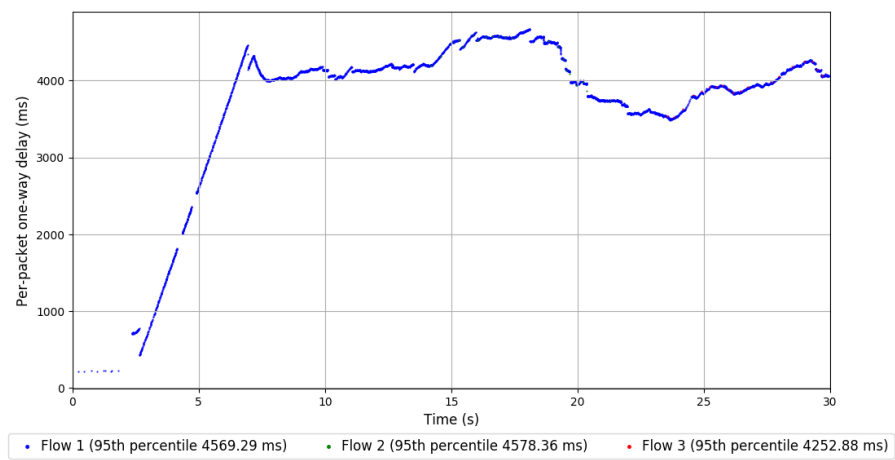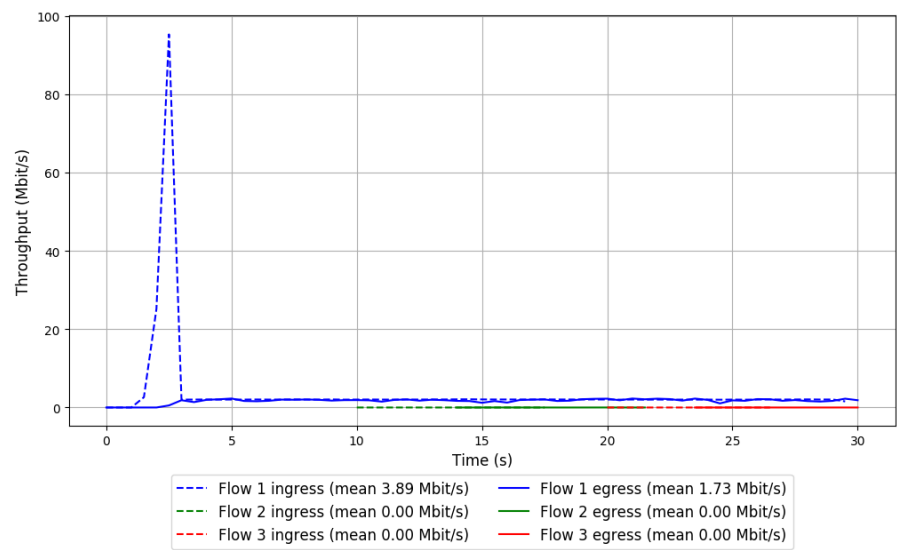
```
Run 1: Statistics of PCC-Expr

Start at: 2018-09-11 01:44:13
End at: 2018-09-11 01:44:43
Local clock offset: -17.27 ms
Remote clock offset: 0.666 ms


# Below is generated by plot.py at 2018-09-11 02:37:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 3997.261 ms
Loss rate: 65.57%
-- Flow 1:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 3997.261 ms
Loss rate: 65.57%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2589.083 ms
Loss rate: 86.15%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2725.422 ms
Loss rate: 48.03%
```

Run 1: Report of PCC-Expr — Data Link
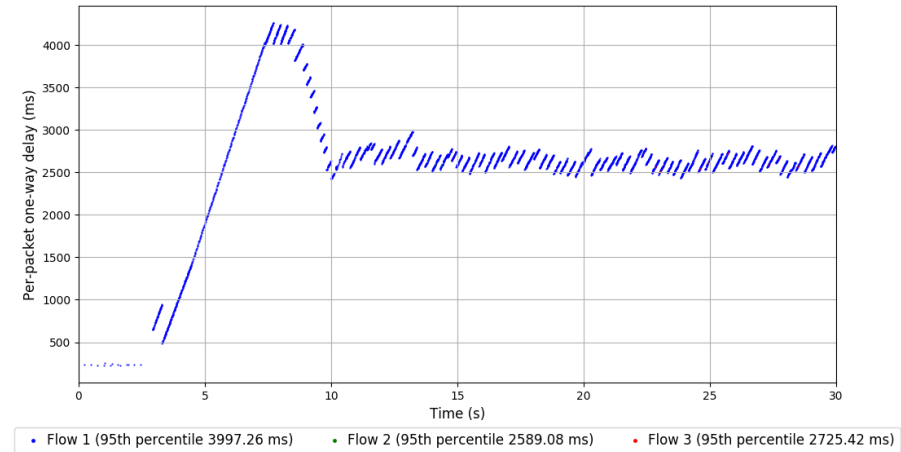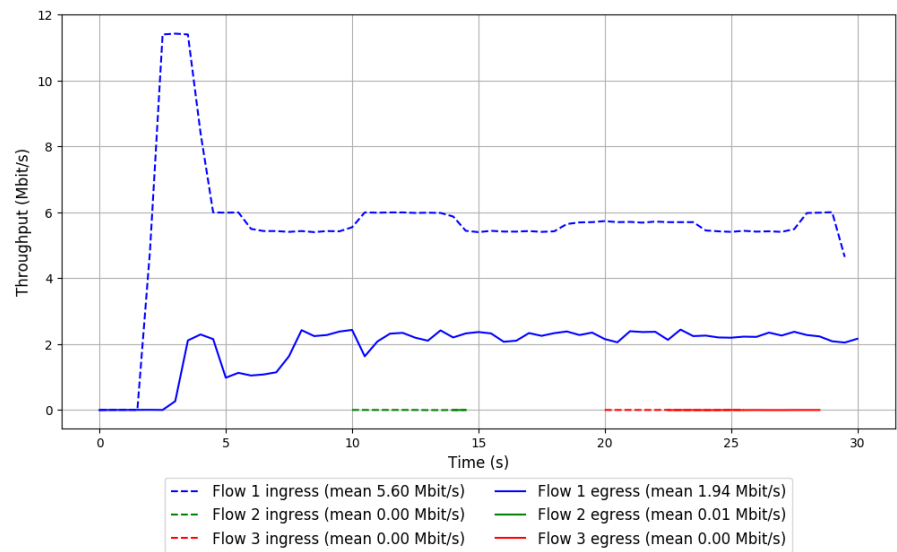
```
Run 2: Statistics of PCC-Expr

Start at: 2018-09-11 02:06:22
End at: 2018-09-11 02:06:52
Local clock offset: -11.105 ms
Remote clock offset: 0.596 ms


# Below is generated by plot.py at 2018-09-11 02:37:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 2886.424 ms
Loss rate: 64.70%
-- Flow 1:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 2886.589 ms
Loss rate: 64.69%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2749.583 ms
Loss rate: 76.30%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2877.082 ms
Loss rate: 59.62%
```

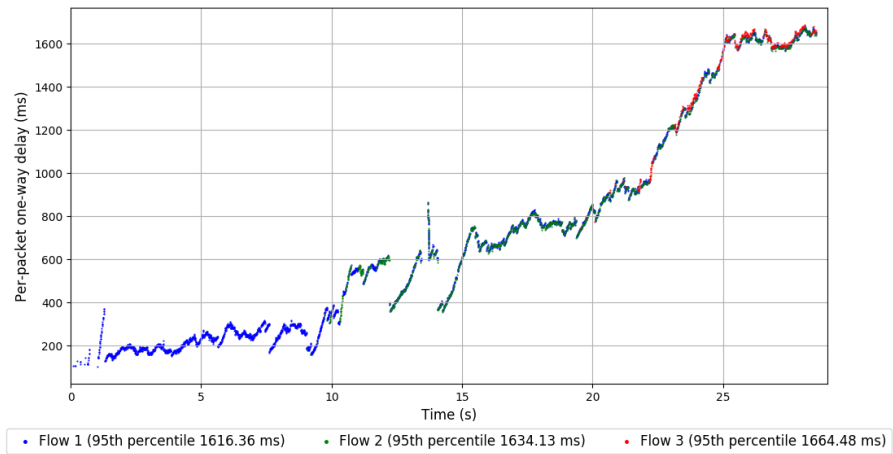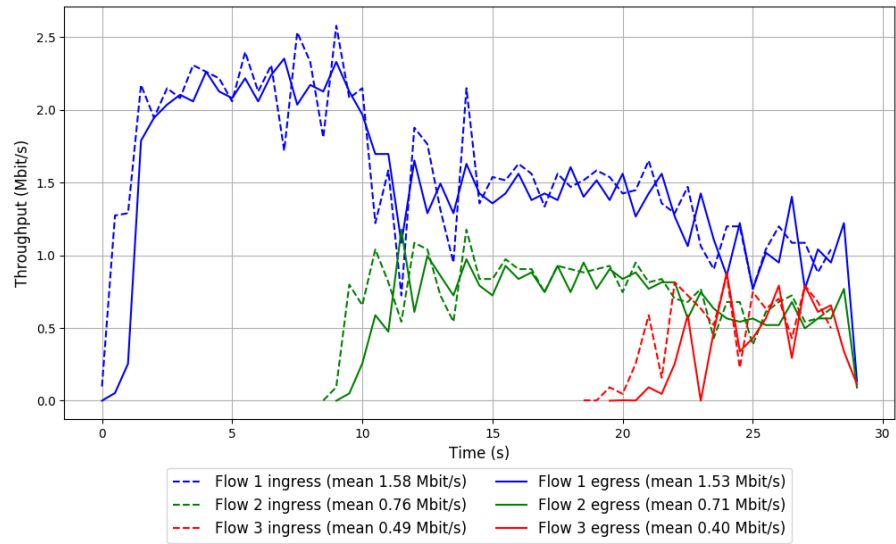Run 2: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 5.65 Mbit/s)
Flow 1 egress (mean 2.01 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 2886.59 ms)
Flow 2 (95th percentile 2749.58 ms)
Flow 3 (95th percentile 2877.08 ms)

```
Run 3: Statistics of PCC-Expr

Start at: 2018-09-11 02:28:35
End at: 2018-09-11 02:29:05
Local clock offset: -5.109 ms
Remote clock offset: 1.958 ms


# Below is generated by plot.py at 2018-09-11 02:37:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 3001.189 ms
Loss rate: 65.12%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 3001.805 ms
Loss rate: 65.12%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2707.775 ms
Loss rate: 54.63%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2734.334 ms
Loss rate: 65.63%
```

Run 3: Report of PCC-Expr — Data Link
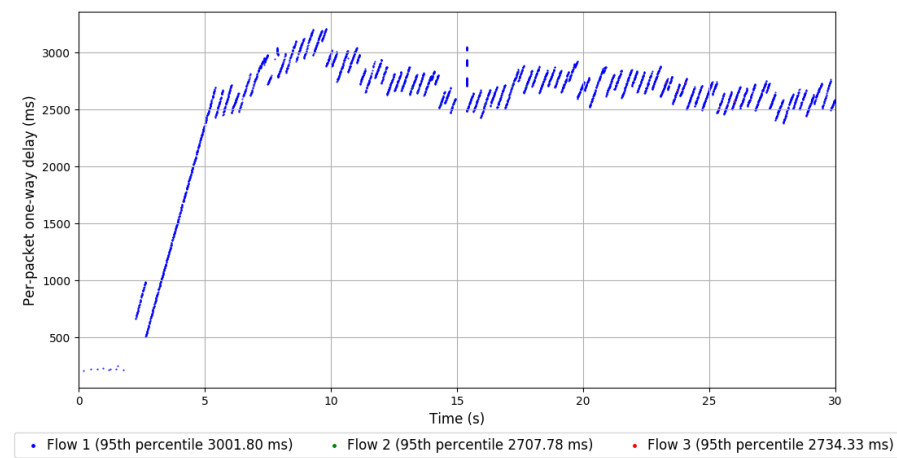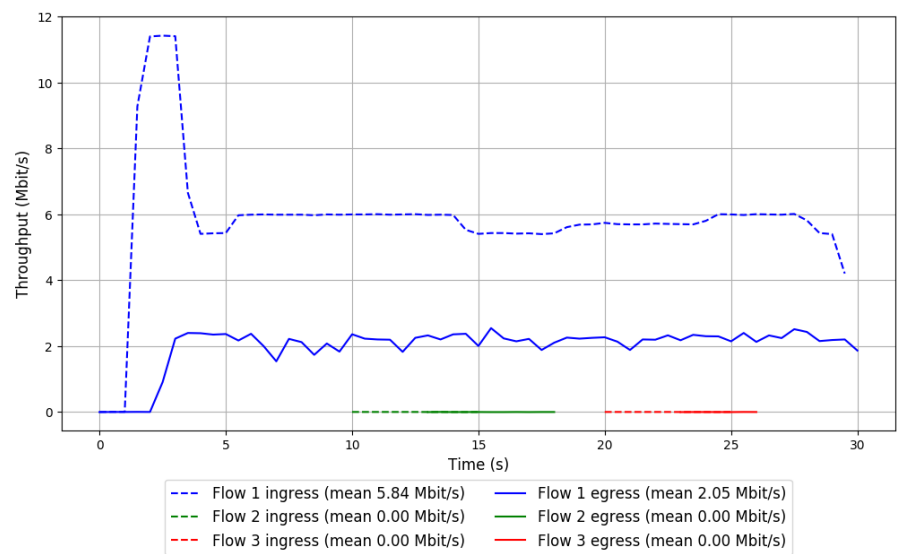
```
Run 1: Statistics of QUIC Cubic

Start at: 2018-09-11 01:51:36
End at: 2018-09-11 01:52:06
Local clock offset: -18.238 ms
Remote clock offset: 0.336 ms


# Below is generated by plot.py at 2018-09-11 02:37:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 1632.127 ms
Loss rate: 5.49%
-- Flow 1:
Average throughput: 1.53 Mbit/s
95th percentile per-packet one-way delay: 1616.362 ms
Loss rate: 3.49%
-- Flow 2:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 1634.128 ms
Loss rate: 6.17%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 1664.485 ms
Loss rate: 22.62%
```

Run 1: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 1.58 Mbit/s) — — — Flow 1 egress (mean 1.53 Mbit/s)
Flow 2 ingress (mean 0.76 Mbit/s) — — — Flow 2 egress (mean 0.71 Mbit/s)
Flow 3 ingress (mean 0.49 Mbit/s) — — — Flow 3 egress (mean 0.40 Mbit/s)

Flow 1 (95th percentile 1616.36 ms)   Flow 2 (95th percentile 1634.13 ms)   Flow 3 (95th percentile 1664.48 ms)

66

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-09-11 02:13:51
End at: 2018-09-11 02:14:21
Local clock offset: -7.868 ms
Remote clock offset: -2.823 ms


# Below is generated by plot.py at 2018-09-11 02:37:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 1695.597 ms
Loss rate: 5.83%
-- Flow 1:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 1682.211 ms
Loss rate: 4.34%
-- Flow 2:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 1710.771 ms
Loss rate: 9.20%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 1752.355 ms
Loss rate: 18.35%
```

Run 2: Report of QUIC Cubic — Data Link
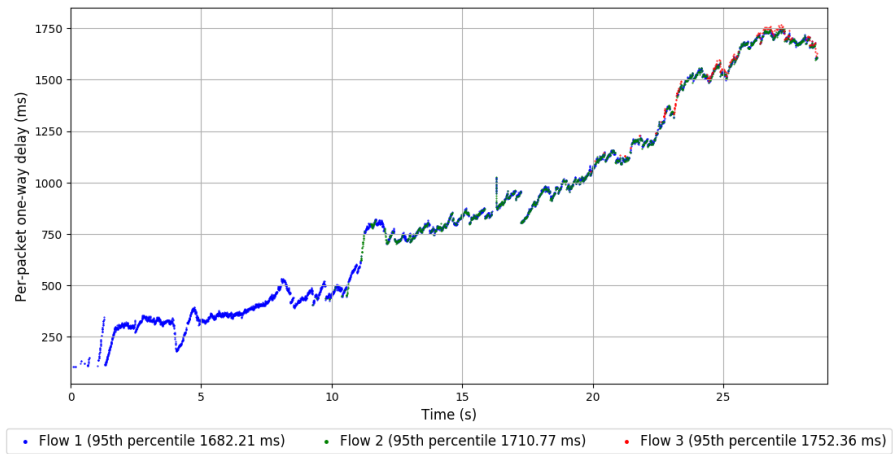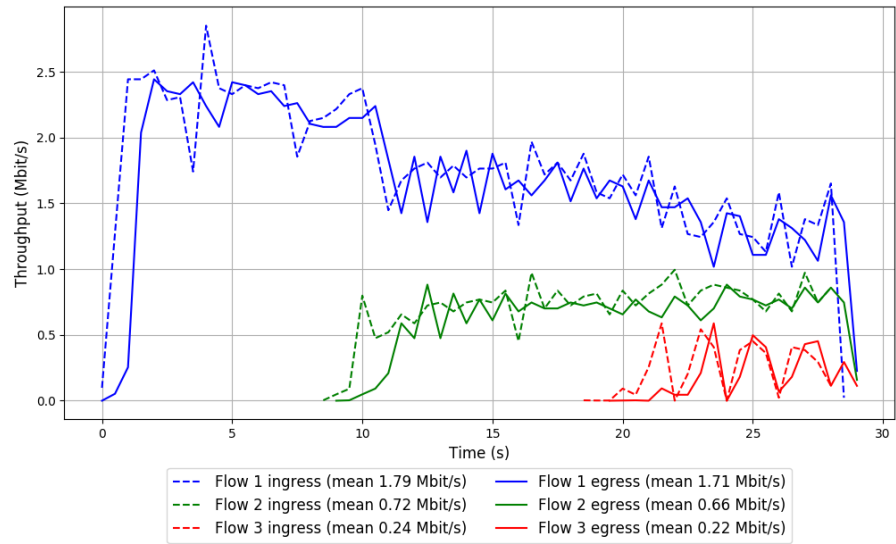
```
Run 3: Statistics of QUIC Cubic

Start at: 2018-09-11 02:35:58
End at: 2018-09-11 02:36:28
Local clock offset: -6.41 ms
Remote clock offset: 2.228 ms

# Below is generated by plot.py at 2018-09-11 02:37:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 1955.624 ms
Loss rate: 5.85%
-- Flow 1:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 1715.271 ms
Loss rate: 3.69%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 2084.807 ms
Loss rate: 7.48%
-- Flow 3:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 2149.061 ms
Loss rate: 24.63%
```

# Run 3: Report of QUIC Cubic — Data Link
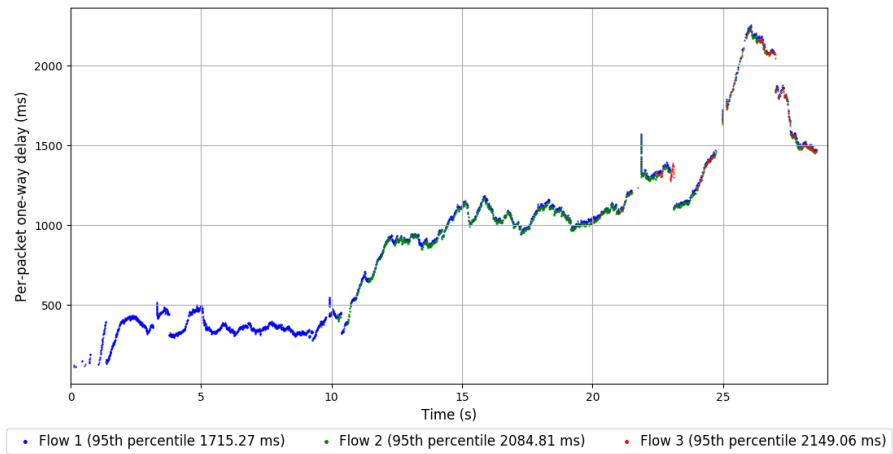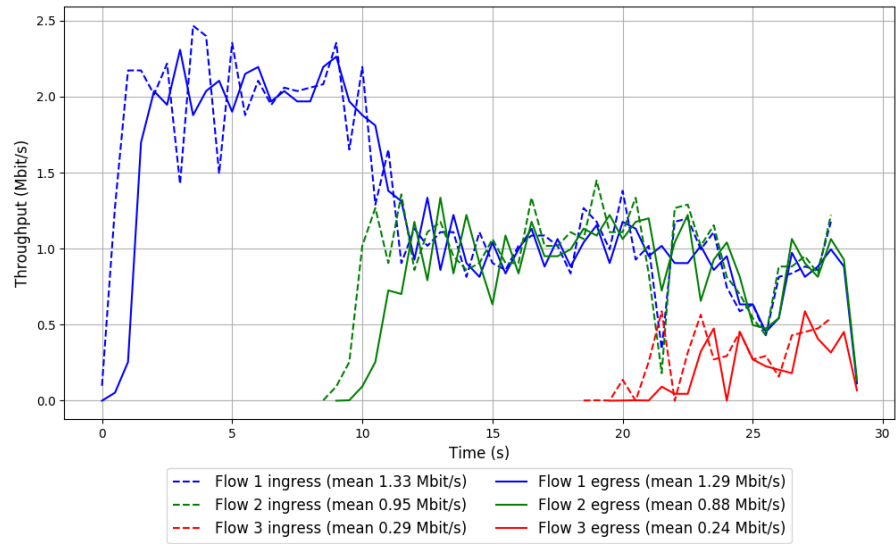
```
Run 1: Statistics of SCReAM

Start at: 2018-09-11 01:40:32
End at: 2018-09-11 01:41:02
Local clock offset: -17.339 ms
Remote clock offset: -2.9 ms

# Below is generated by plot.py at 2018-09-11 02:37:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 133.696 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 123.838 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 123.520 ms
Loss rate: 0.90%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 143.790 ms
Loss rate: 0.26%
```

Run 1: Report of SCReAM — Data Link
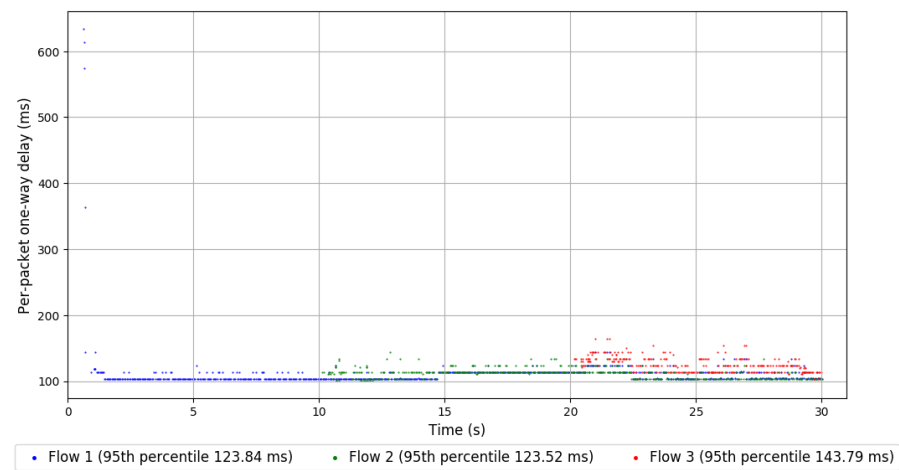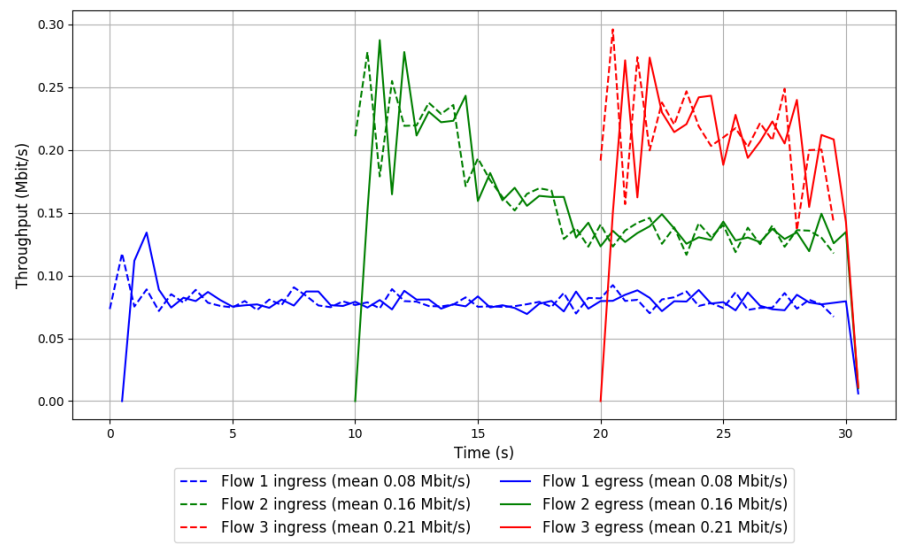
```
Run 2: Statistics of SCReAM

Start at: 2018-09-11 02:02:41
End at: 2018-09-11 02:03:11
Local clock offset: -12.915 ms
Remote clock offset: 0.43 ms


# Below is generated by plot.py at 2018-09-11 02:37:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 147.168 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 127.183 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 147.227 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 147.174 ms
Loss rate: 0.69%
```

Run 2: Report of SCReAM — Data Link
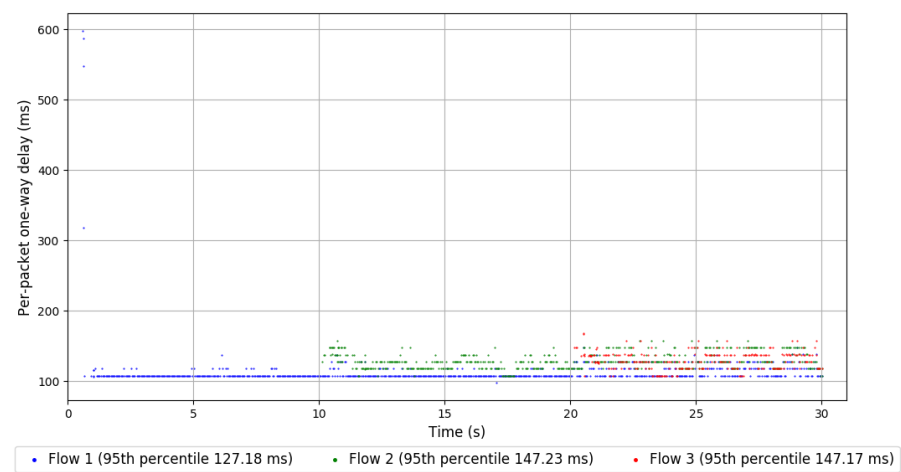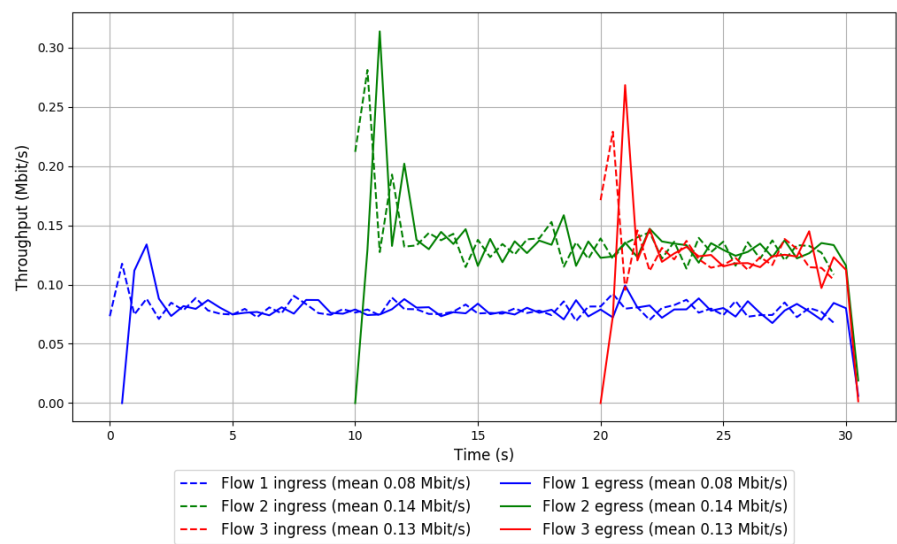
```
Run 3: Statistics of SCReAM

Start at: 2018-09-11 02:24:55
End at: 2018-09-11 02:25:25
Local clock offset: -5.457 ms
Remote clock offset: 2.718 ms

# Below is generated by plot.py at 2018-09-11 02:37:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 139.632 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 149.376 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 122.194 ms
Loss rate: 0.16%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 129.700 ms
Loss rate: 0.35%
```

Run 3: Report of SCReAM — Data Link
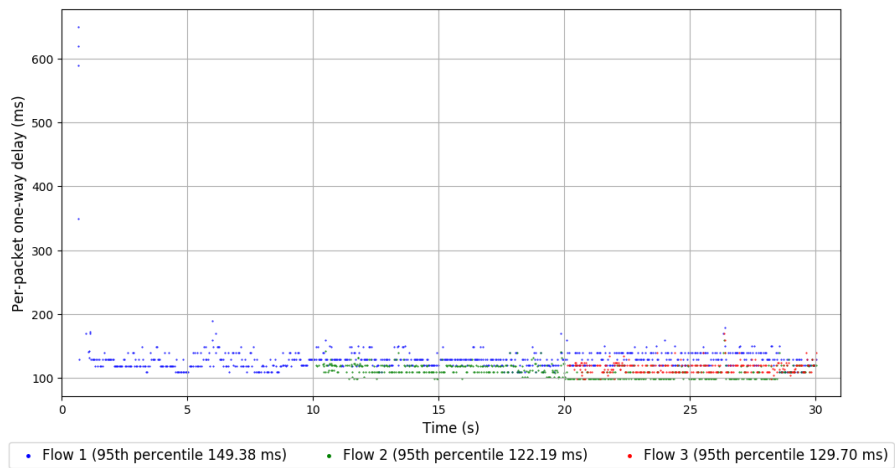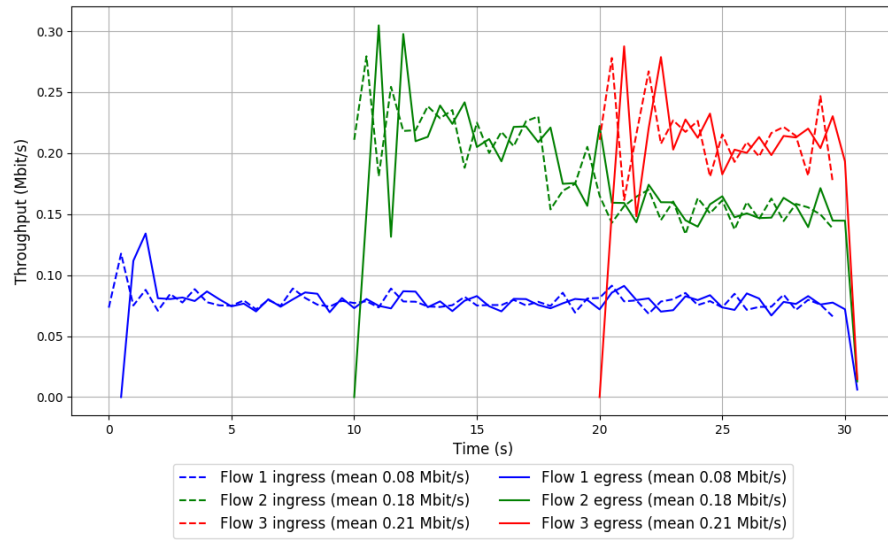
```
Run 1: Statistics of Sprout

Start at: 2018-09-11 01:31:54
End at: 2018-09-11 01:32:24
Local clock offset: -19.244 ms
Remote clock offset: -3.238 ms


# Below is generated by plot.py at 2018-09-11 02:37:13
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 171.900 ms
Loss rate: 1.97%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 183.866 ms
Loss rate: 2.06%
-- Flow 2:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 165.311 ms
Loss rate: 1.41%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 154.845 ms
Loss rate: 2.65%
```

Run 1: Report of Sprout — Data Link
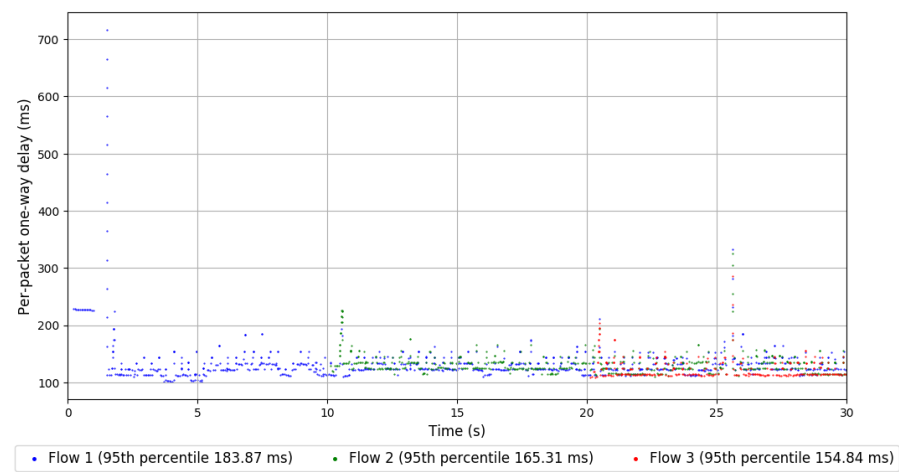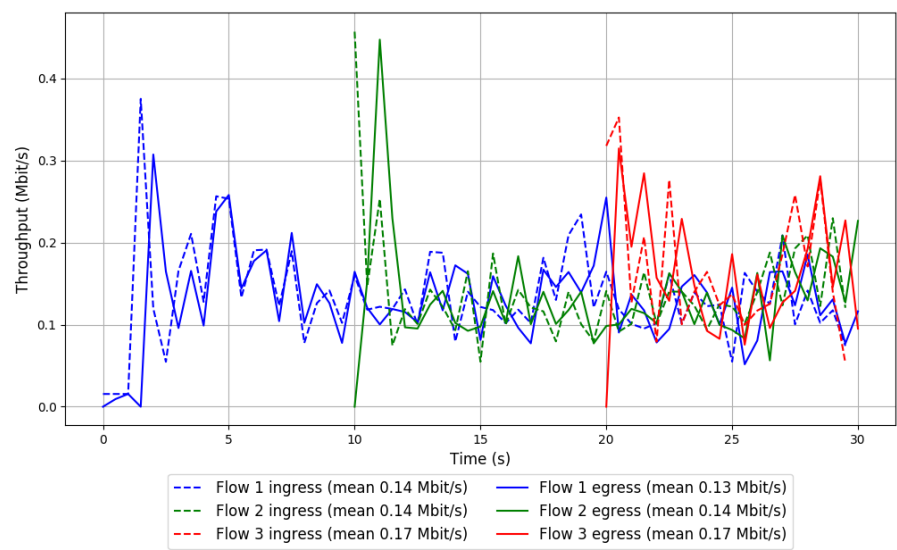
```
Run 2: Statistics of Sprout

Start at: 2018-09-11 01:54:04
End at: 2018-09-11 01:54:34
Local clock offset: -18.328 ms
Remote clock offset: 0.296 ms


# Below is generated by plot.py at 2018-09-11 02:37:13
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 158.191 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 168.766 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 137.140 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 146.523 ms
Loss rate: 0.00%
```

Run 2: Report of Sprout — Data Link
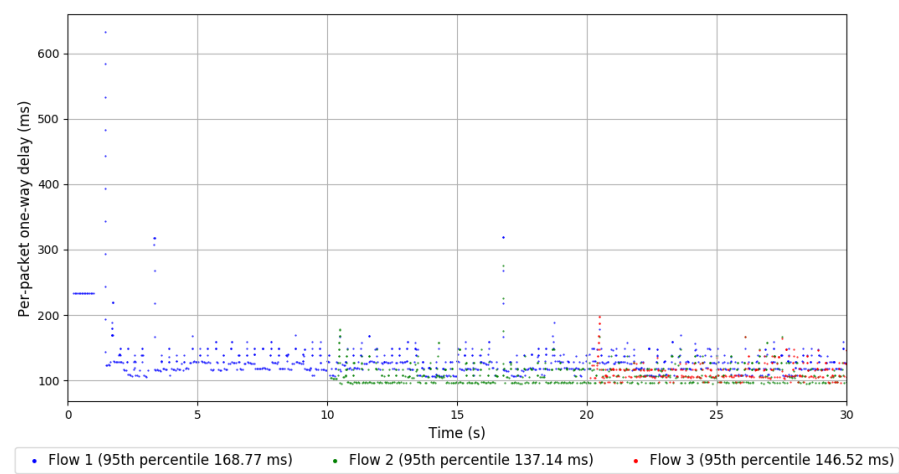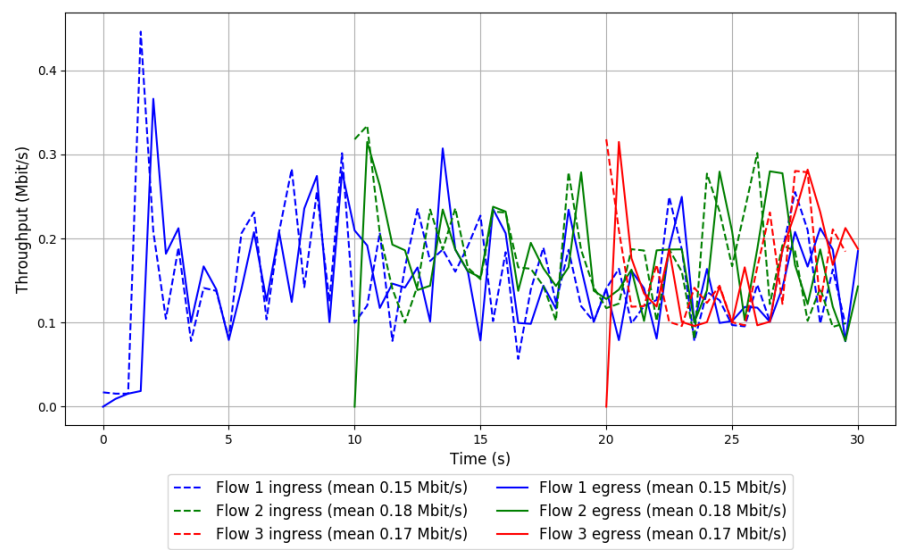
```
Run 3: Statistics of Sprout

Start at: 2018-09-11 02:16:19
End at: 2018-09-11 02:16:49
Local clock offset: -6.324 ms
Remote clock offset: -2.43 ms


# Below is generated by plot.py at 2018-09-11 02:37:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 145.839 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 146.117 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 137.016 ms
Loss rate: 1.34%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 147.461 ms
Loss rate: 0.05%
```

Run 3: Report of Sprout — Data Link
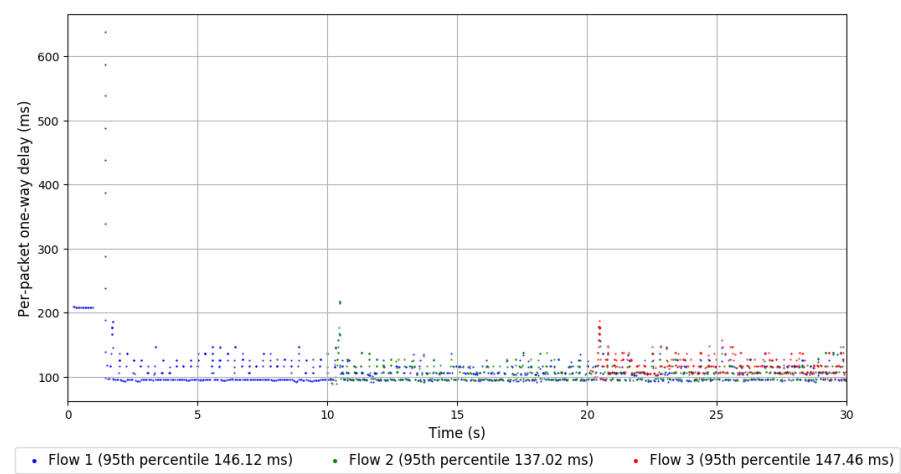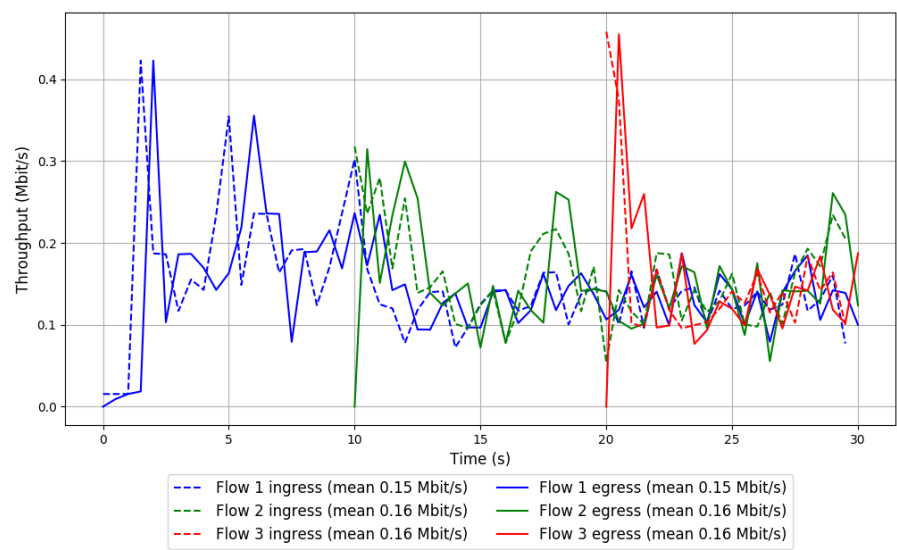
```
Run 1: Statistics of TaoVA-100x

Start at: 2018-09-11 01:49:08
End at: 2018-09-11 01:49:38
Local clock offset: -17.329 ms
Remote clock offset: 0.642 ms


# Below is generated by plot.py at 2018-09-11 02:37:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 1552.930 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 224.931 ms
Loss rate: 85.45%
-- Flow 2:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 1644.421 ms
Loss rate: 0.88%
-- Flow 3:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 1239.005 ms
Loss rate: 1.65%
```

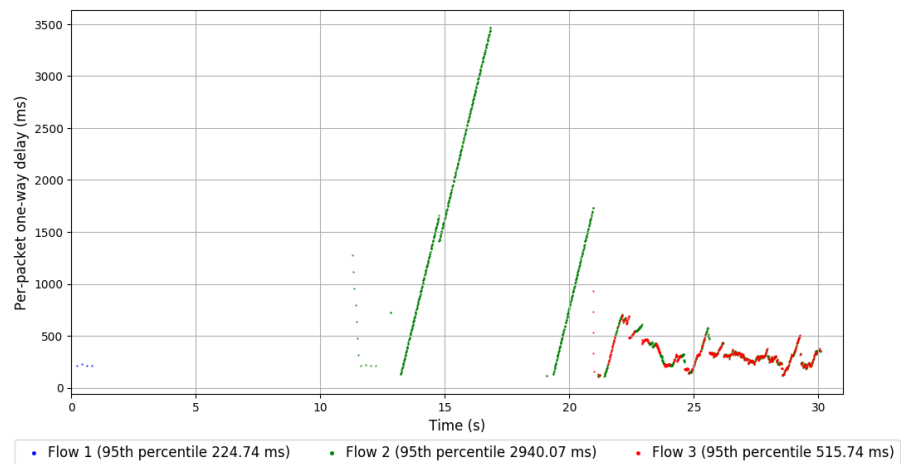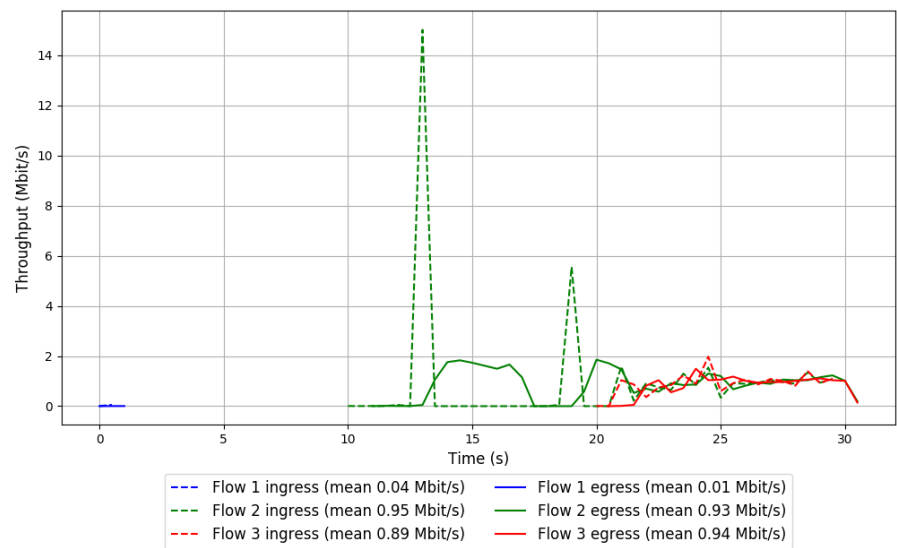## Run 1: Report of TaoVA-100x — Data Link
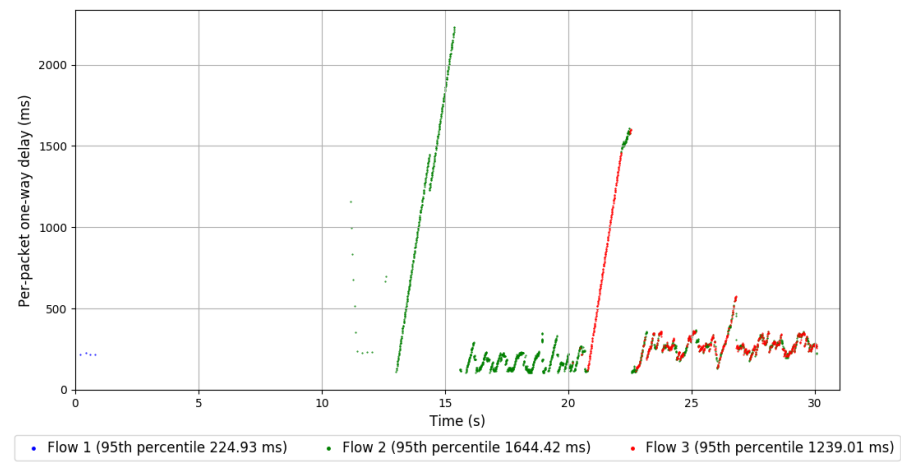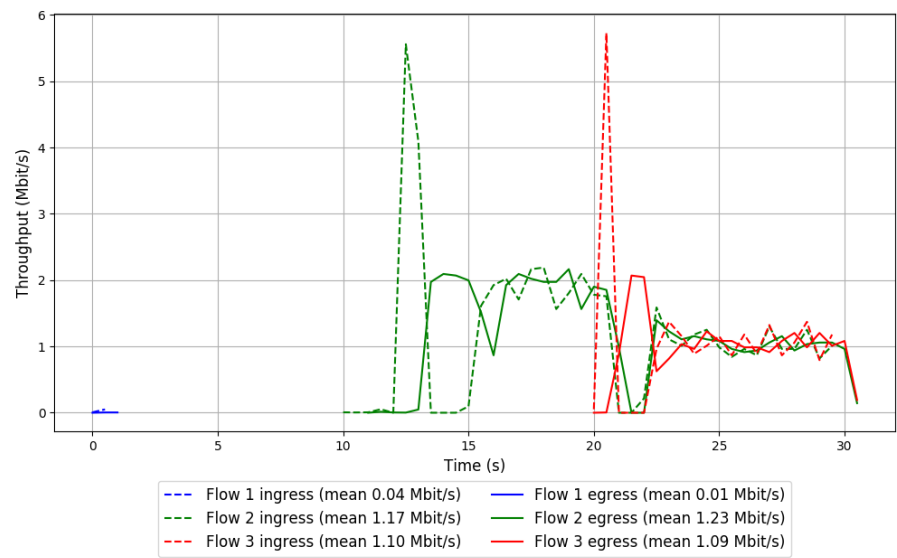
```
Run 2: Statistics of TaoVA-100x

Start at: 2018-09-11 02:11:22
End at: 2018-09-11 02:11:52
Local clock offset: -8.628 ms
Remote clock offset: -0.727 ms


# Below is generated by plot.py at 2018-09-11 02:37:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 2691.458 ms
Loss rate: 6.23%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 224.735 ms
Loss rate: 85.45%
-- Flow 2:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 2940.067 ms
Loss rate: 7.63%
-- Flow 3:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 515.739 ms
Loss rate: 2.99%
```

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

Flow 1 ingress (mean 0.04 Mbit/s) — — — Flow 1 egress (mean 0.01 Mbit/s)
Flow 2 ingress (mean 0.95 Mbit/s) — — — Flow 2 egress (mean 0.93 Mbit/s)
Flow 3 ingress (mean 0.89 Mbit/s) — — — Flow 3 egress (mean 0.94 Mbit/s)

Flow 1 (95th percentile 224.74 ms)   Flow 2 (95th percentile 2940.07 ms)   Flow 3 (95th percentile 515.74 ms)

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

Start at: 2018-09-11 02:33:31
End at: 2018-09-11 02:34:01
Local clock offset: -6.746 ms
Remote clock offset: 2.294 ms

# Below is generated by plot.py at 2018-09-11 02:37:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 1074.560 ms
Loss rate: 1.67%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 246.846 ms
Loss rate: 85.45%
-- Flow 2:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 1128.440 ms
Loss rate: 1.32%
-- Flow 3:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 945.695 ms
Loss rate: 2.28%
```

Run 3: Report of TaoVA-100x — Data Link
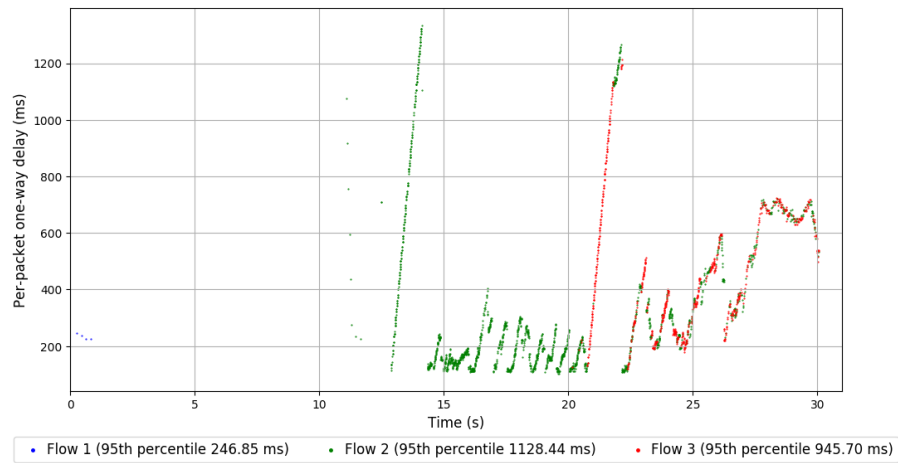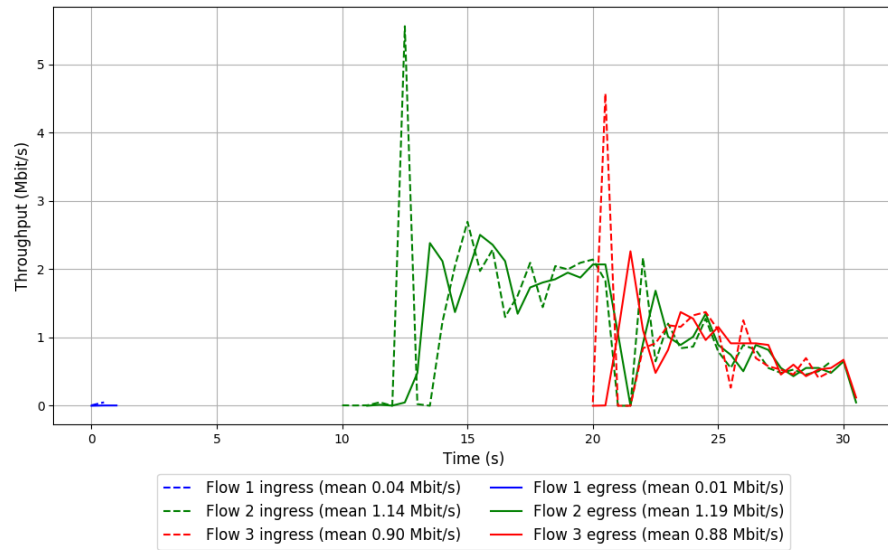
```
Run 1: Statistics of TCP Vegas

Start at: 2018-09-11 01:43:00
End at: 2018-09-11 01:43:30
Local clock offset: -18.038 ms
Remote clock offset: 0.632 ms


# Below is generated by plot.py at 2018-09-11 02:37:17
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 258.894 ms
Loss rate: 1.84%
-- Flow 1:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 242.057 ms
Loss rate: 1.05%
-- Flow 2:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 242.277 ms
Loss rate: 2.14%
-- Flow 3:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 278.441 ms
Loss rate: 3.24%
```

Run 1: Report of TCP Vegas — Data Link
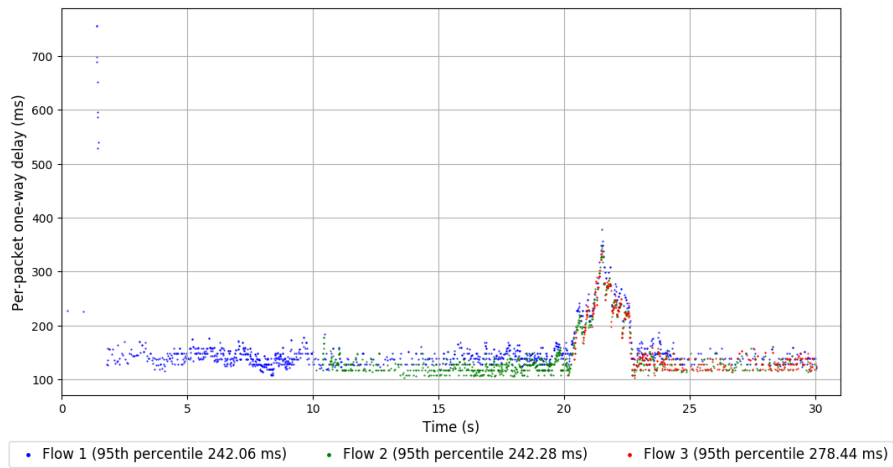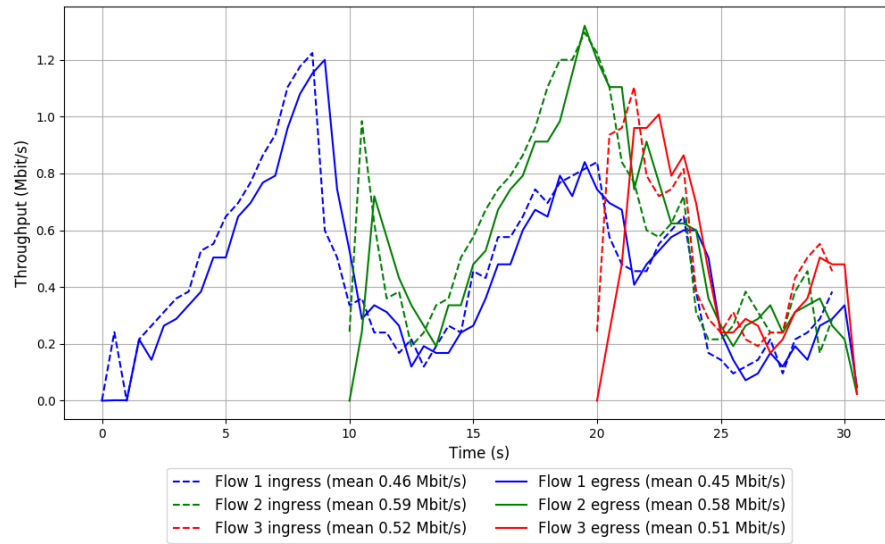
```
Run 2: Statistics of TCP Vegas

Start at: 2018-09-11 02:05:08
End at: 2018-09-11 02:05:38
Local clock offset: -11.081 ms
Remote clock offset: -3.148 ms


# Below is generated by plot.py at 2018-09-11 02:37:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.84 Mbit/s
95th percentile per-packet one-way delay: 2152.467 ms
Loss rate: 5.19%
-- Flow 1:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 2522.304 ms
Loss rate: 3.79%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 1657.873 ms
Loss rate: 6.62%
-- Flow 3:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 1713.244 ms
Loss rate: 20.48%
```

Run 2: Report of TCP Vegas — Data Link
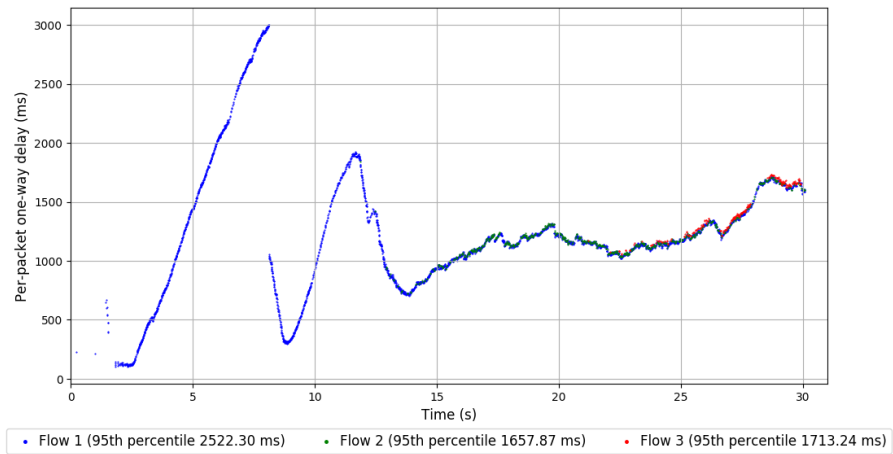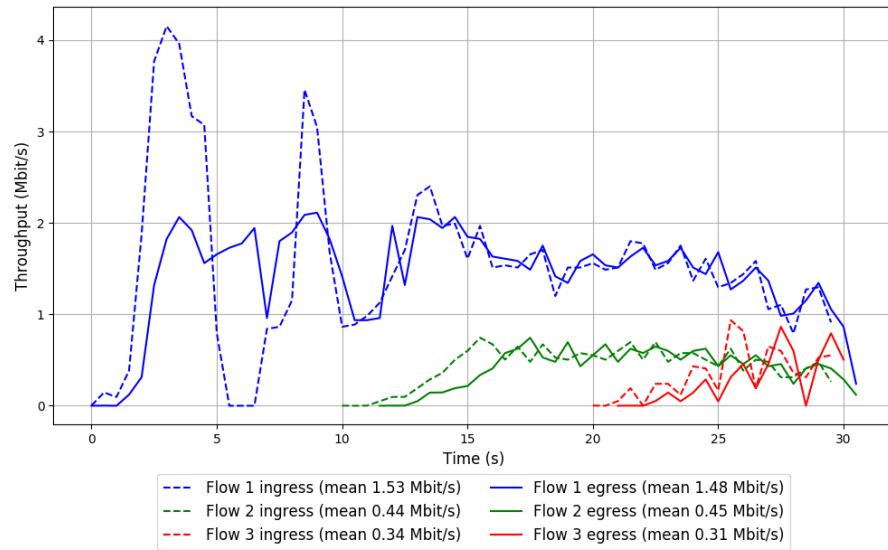
```
Run 3: Statistics of TCP Vegas

Start at: 2018-09-11 02:27:22
End at: 2018-09-11 02:27:52
Local clock offset: -4.261 ms
Remote clock offset: -1.646 ms


# Below is generated by plot.py at 2018-09-11 02:37:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 310.810 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 291.951 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 324.757 ms
Loss rate: 0.34%
-- Flow 3:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 337.410 ms
Loss rate: 0.96%
```

Run 3: Report of TCP Vegas — Data Link
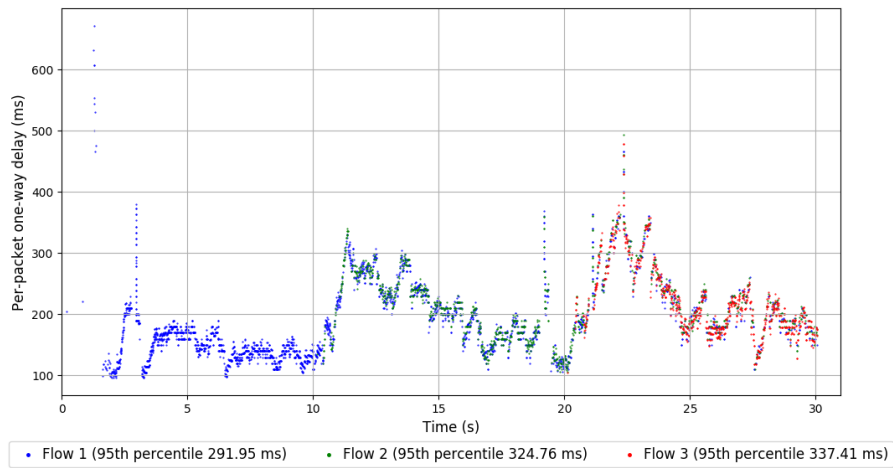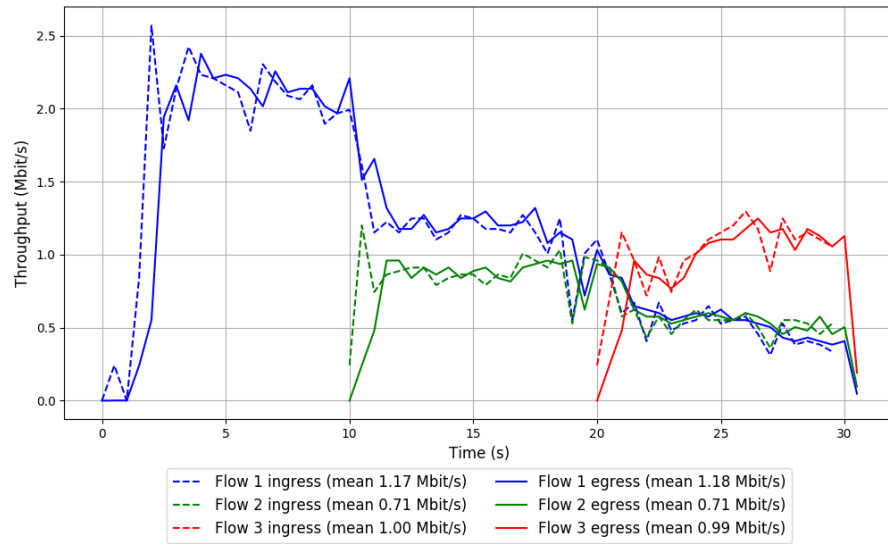
```
Run 1: Statistics of Verus

Start at: 2018-09-11 01:39:18
End at: 2018-09-11 01:39:48
Local clock offset: -17.404 ms
Remote clock offset: -2.854 ms


# Below is generated by plot.py at 2018-09-11 02:37:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 1592.780 ms
Loss rate: 4.64%
-- Flow 1:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 1591.650 ms
Loss rate: 4.63%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1607.414 ms
Loss rate: 4.76%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1518.266 ms
Loss rate: 10.00%
```

Run 1: Report of Verus — Data Link
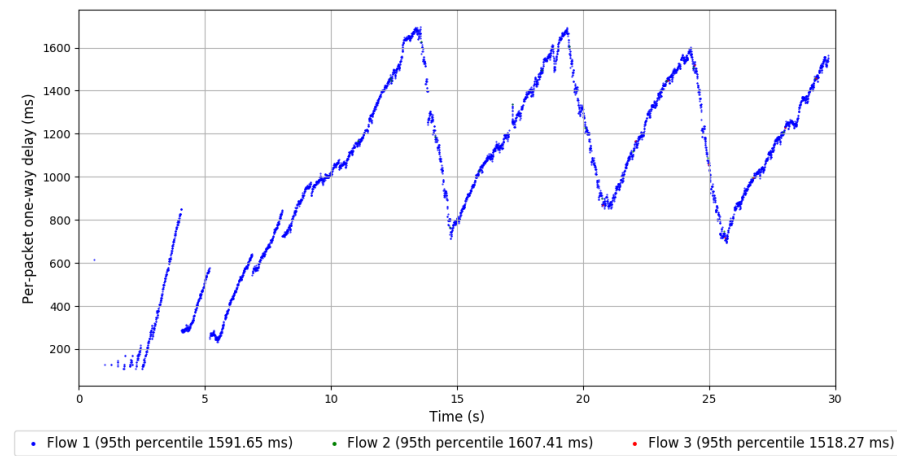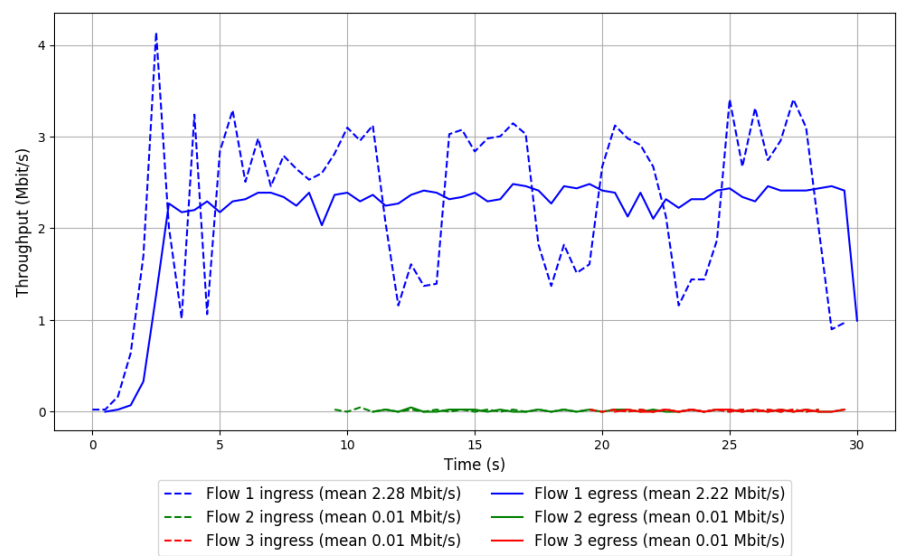
```
Run 2: Statistics of Verus

Start at: 2018-09-11 02:01:27
End at: 2018-09-11 02:01:57
Local clock offset: -14.744 ms
Remote clock offset: -2.817 ms

# Below is generated by plot.py at 2018-09-11 02:37:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 2072.186 ms
Loss rate: 4.62%
-- Flow 1:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 2286.539 ms
Loss rate: 3.65%
-- Flow 2:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 2041.196 ms
Loss rate: 7.25%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2005.382 ms
Loss rate: 30.00%
```

Run 2: Report of Verus — Data Link
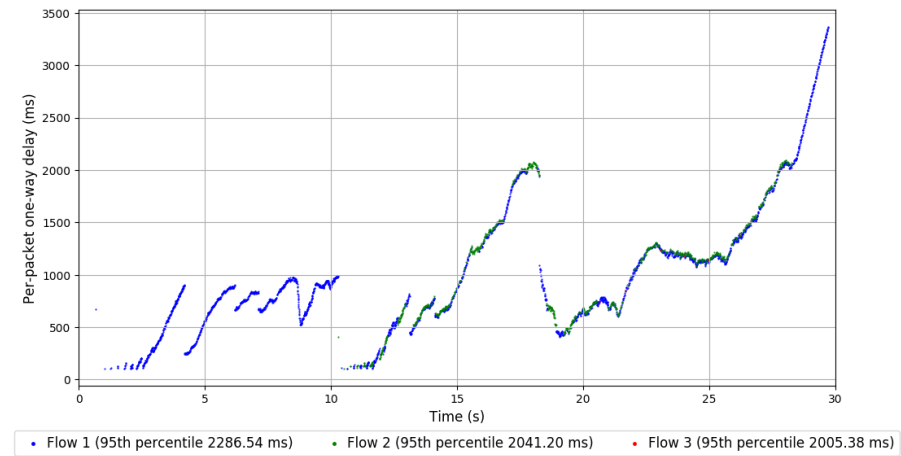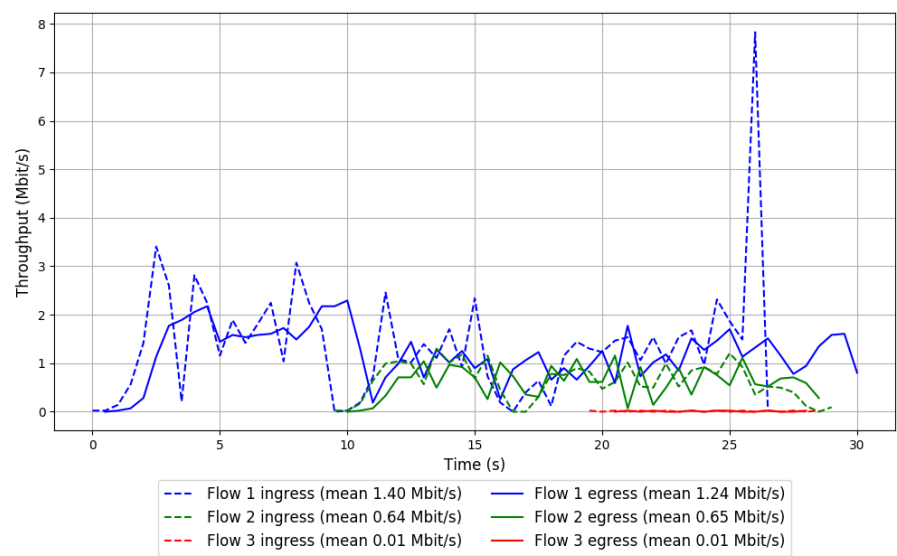
```
Run 3: Statistics of Verus

Start at: 2018-09-11 02:23:42
End at: 2018-09-11 02:24:12
Local clock offset: -4.8 ms
Remote clock offset: -1.645 ms


# Below is generated by plot.py at 2018-09-11 02:37:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 1656.526 ms
Loss rate: 5.22%
-- Flow 1:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 1656.526 ms
Loss rate: 5.18%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1627.225 ms
Loss rate: 9.09%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1645.987 ms
Loss rate: 18.18%
```

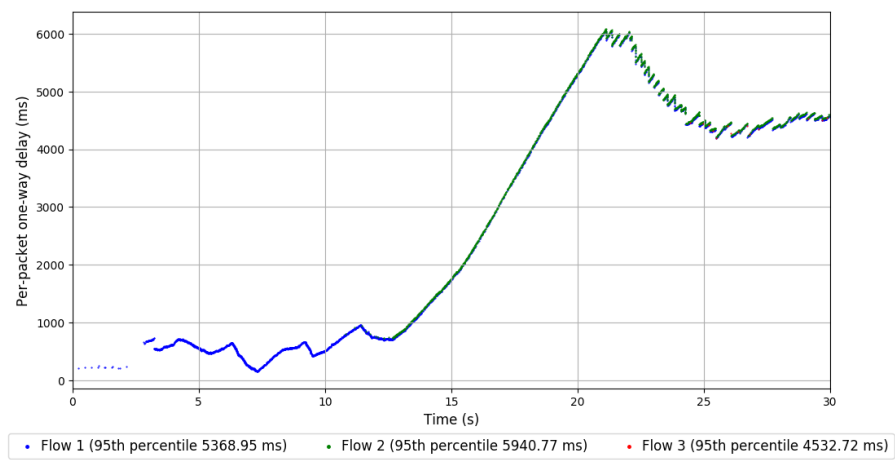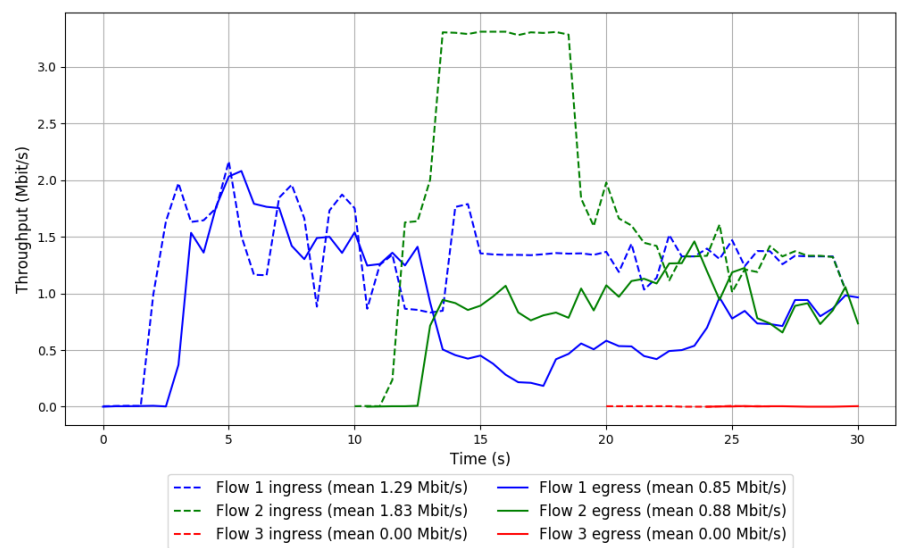## Run 3: Report of Verus — Data Link
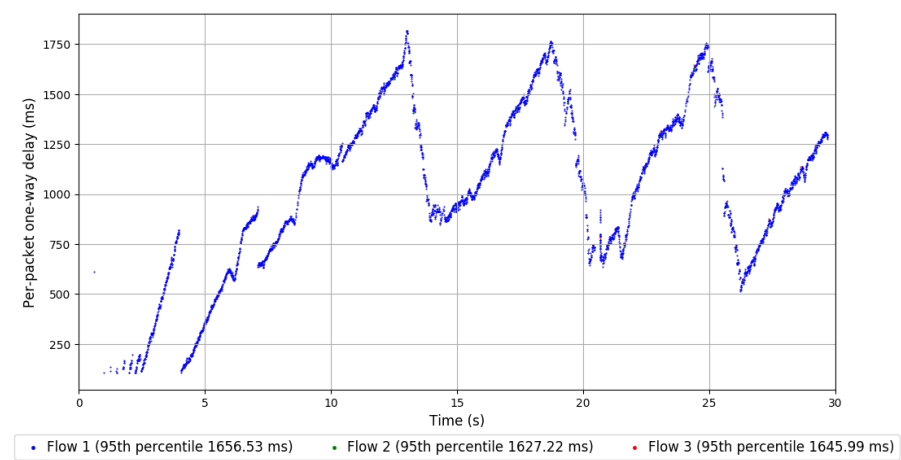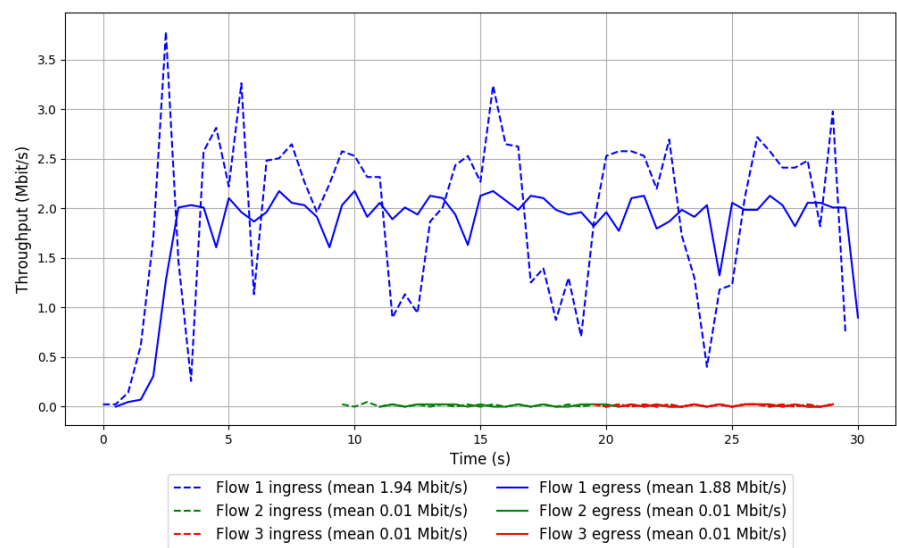
```
Run 1: Statistics of PCC-Vivace

Start at: 2018-09-11 01:30:40
End at: 2018-09-11 01:31:10
Local clock offset: -18.802 ms
Remote clock offset: 0.43 ms


# Below is generated by plot.py at 2018-09-11 02:37:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 5838.040 ms
Loss rate: 43.88%
-- Flow 1:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 5368.949 ms
Loss rate: 34.57%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 5940.770 ms
Loss rate: 53.81%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4532.719 ms
Loss rate: 32.61%
```

Run 1: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 1.29 Mbit/s) --- Flow 1 egress (mean 0.85 Mbit/s)
Flow 2 ingress (mean 1.83 Mbit/s) --- Flow 2 egress (mean 0.88 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s) --- Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 5368.95 ms) · Flow 2 (95th percentile 5940.77 ms) · Flow 3 (95th percentile 4532.72 ms)
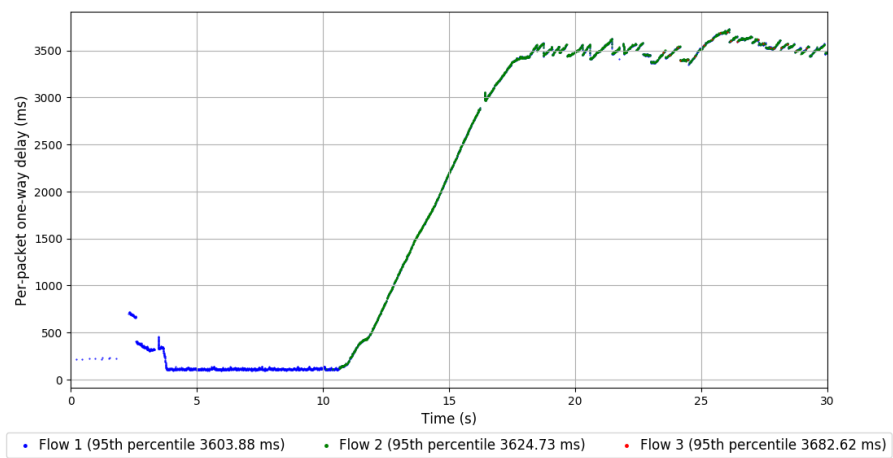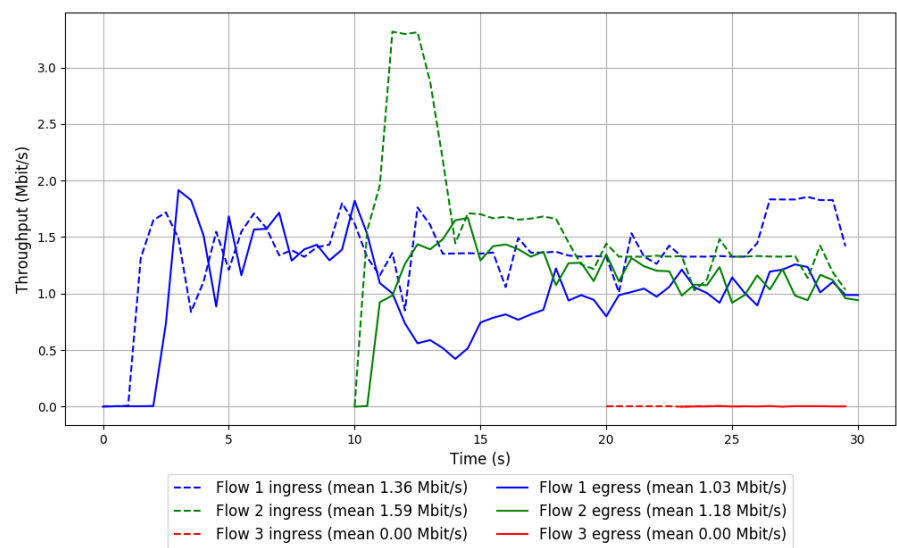
```
Run 2: Statistics of PCC-Vivace

Start at: 2018-09-11 01:52:50
End at: 2018-09-11 01:53:20
Local clock offset: -18.219 ms
Remote clock offset: -3.116 ms


# Below is generated by plot.py at 2018-09-11 02:37:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.82 Mbit/s
95th percentile per-packet one-way delay: 3614.649 ms
Loss rate: 25.07%
-- Flow 1:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 3603.877 ms
Loss rate: 24.71%
-- Flow 2:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 3624.731 ms
Loss rate: 25.55%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 3682.622 ms
Loss rate: 0.00%
```

Run 2: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 1.36 Mbit/s) — — —   Flow 1 egress (mean 1.03 Mbit/s)
Flow 2 ingress (mean 1.59 Mbit/s) — — —   Flow 2 egress (mean 1.18 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s) — — —   Flow 3 egress (mean 0.00 Mbit/s)

Flow 1 (95th percentile 3603.88 ms)   Flow 2 (95th percentile 3624.73 ms)   Flow 3 (95th percentile 3682.62 ms)
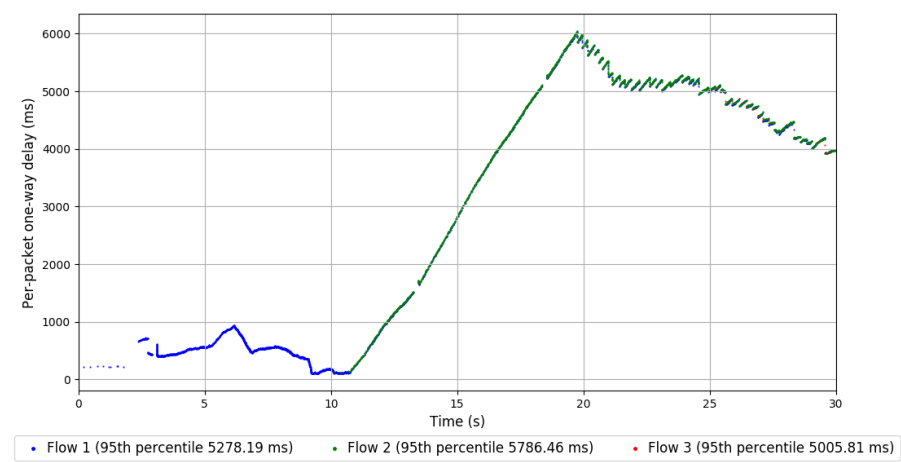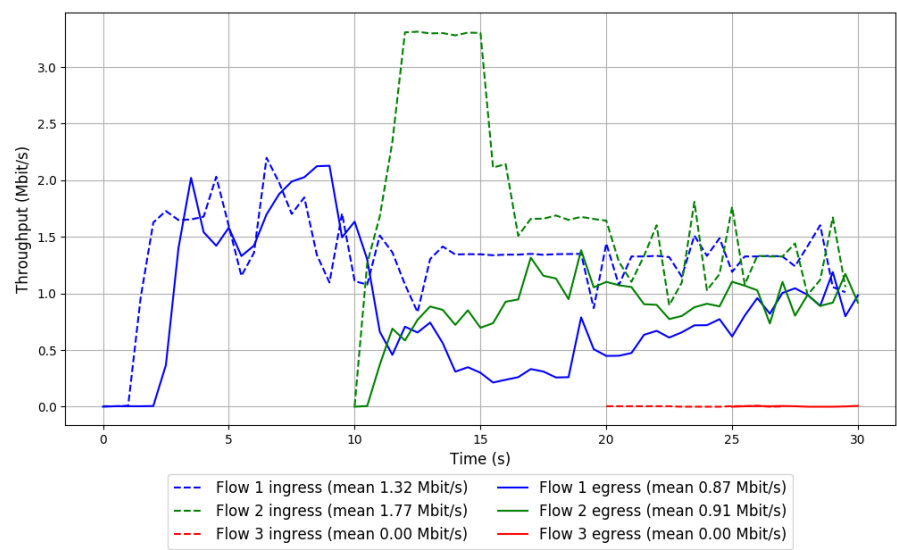
```
Run 3: Statistics of PCC-Vivace

Start at: 2018-09-11 02:15:05
End at: 2018-09-11 02:15:35
Local clock offset: -7.476 ms
Remote clock offset: -2.596 ms


# Below is generated by plot.py at 2018-09-11 02:37:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 5666.301 ms
Loss rate: 41.22%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 5278.188 ms
Loss rate: 34.59%
-- Flow 2:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 5786.462 ms
Loss rate: 48.66%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5005.813 ms
Loss rate: 22.41%
```

## Run 3: Report of PCC-Vivace — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2018-09-11 01:50:22
End at: 2018-09-11 01:50:52
Local clock offset: -18.127 ms
Remote clock offset: -2.831 ms


# Below is generated by plot.py at 2018-09-11 02:37:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 484.892 ms
Loss rate: 0.18%
-- Flow 1:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 364.106 ms
Loss rate: 0.33%
-- Flow 2:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 504.673 ms
Loss rate: 0.07%
-- Flow 3:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 648.815 ms
Loss rate: 0.25%
```

Run 1: Report of WebRTC media — Data Link
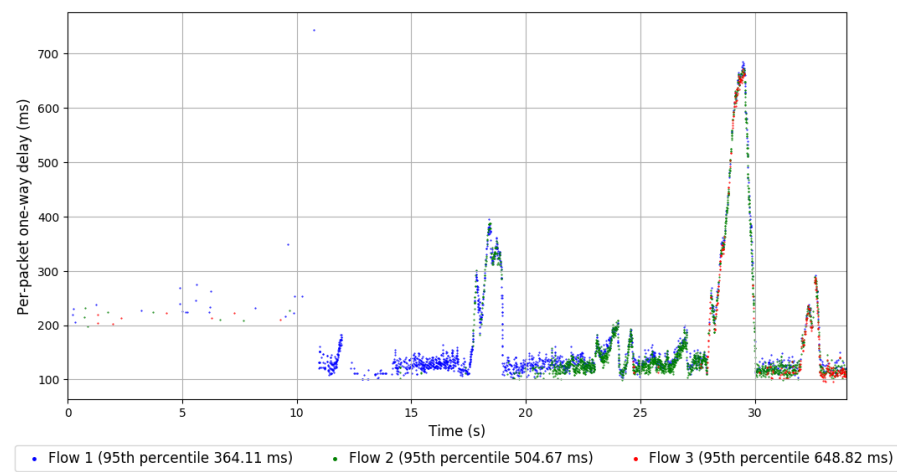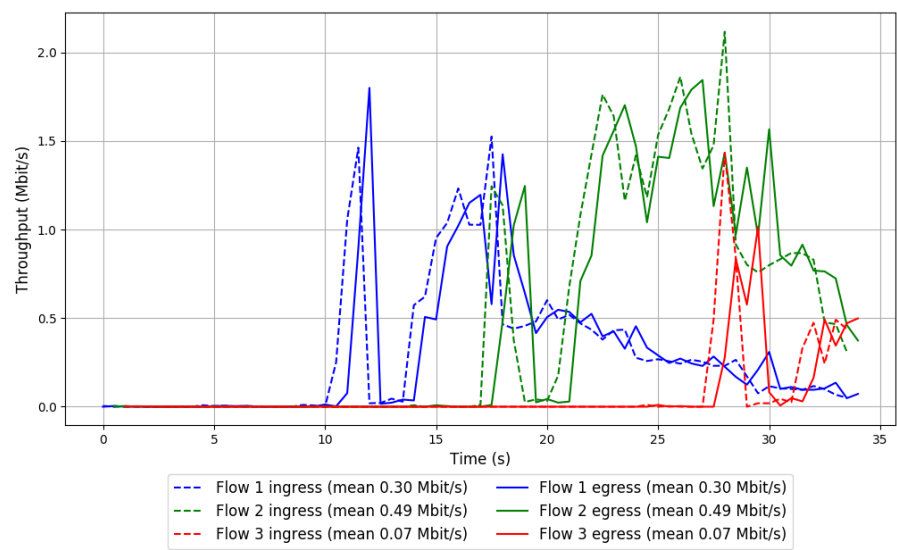
```
Run 2: Statistics of WebRTC media

Start at: 2018-09-11 02:12:36
End at: 2018-09-11 02:13:06
Local clock offset: -7.405 ms
Remote clock offset: 1.061 ms


# Below is generated by plot.py at 2018-09-11 02:37:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 609.556 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 548.430 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 603.131 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 674.289 ms
Loss rate: 0.98%
```
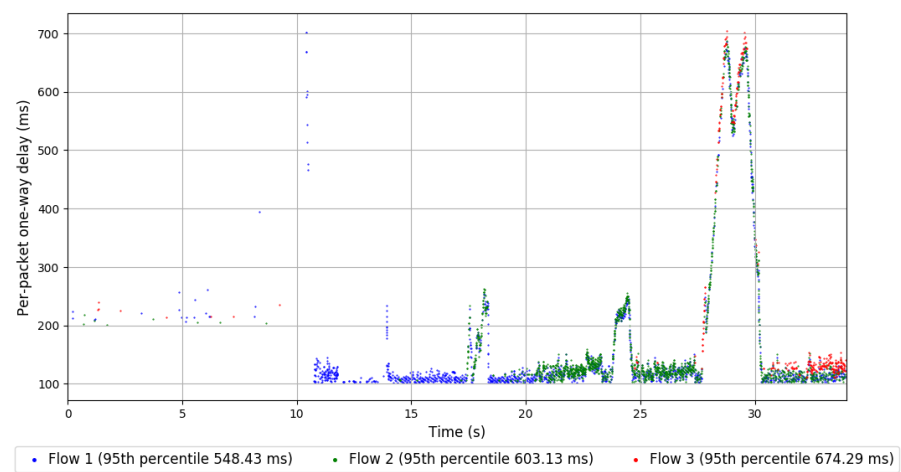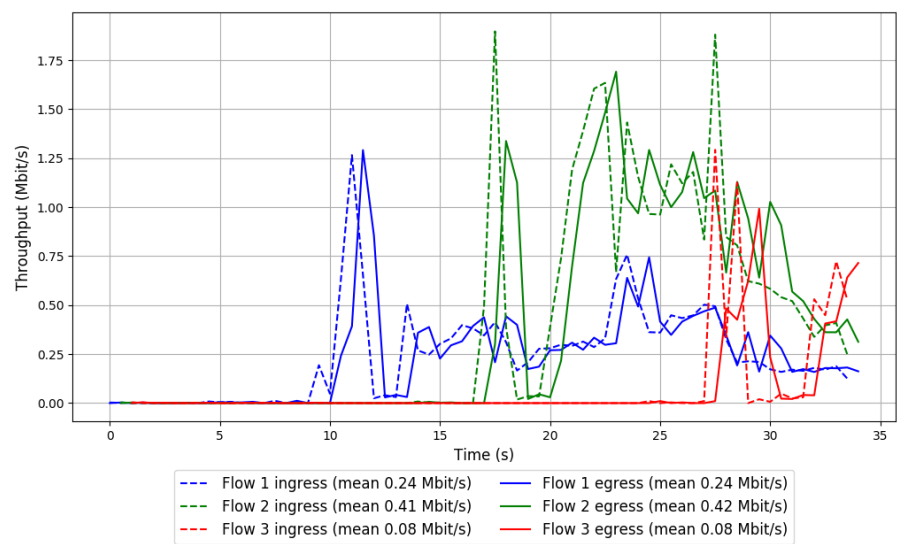
Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-09-11 02:34:44
End at: 2018-09-11 02:35:15
Local clock offset: -6.967 ms
Remote clock offset: 2.355 ms


# Below is generated by plot.py at 2018-09-11 02:37:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 417.372 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 419.017 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 420.641 ms
Loss rate: 0.12%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 396.545 ms
Loss rate: 0.85%
```

Run 3: Report of WebRTC media — Data Link