Pantheon Report

Generated at 2018-07-24 13:50:31 (UTC).

Data path: AWS India 1 Ethernet (*local*) →India ppp0 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.
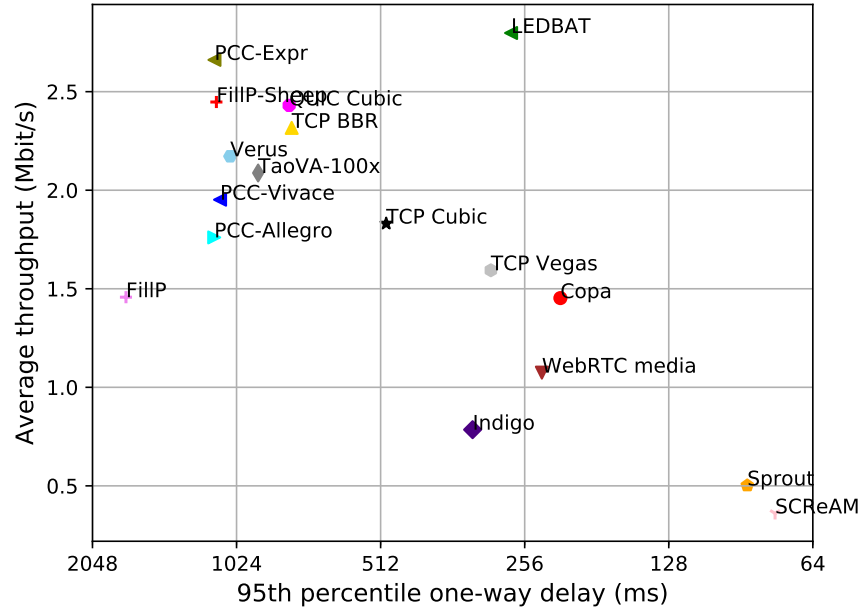
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.
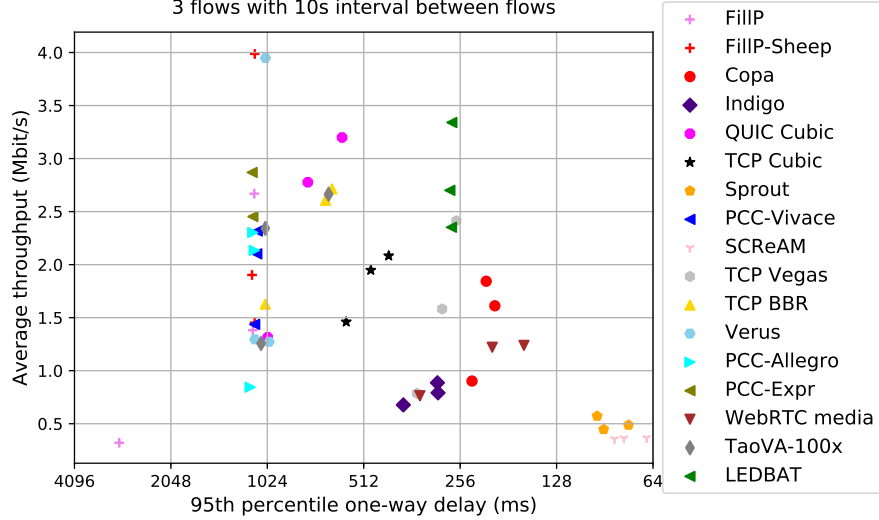
```
Git summary:
branch: master @ 640164b5b17c7c6561fff57729b3b5935d8596ce
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdfe58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ 6f038ed31259d366f9840f65b82cbe8f464b1b39
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
 M receiver/src/buffer.h
 M receiver/src/core.cpp
 M sender/src/buffer.h
 M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
 M src/ScreamClient
 M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
 M src/verus.hpp
 M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

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

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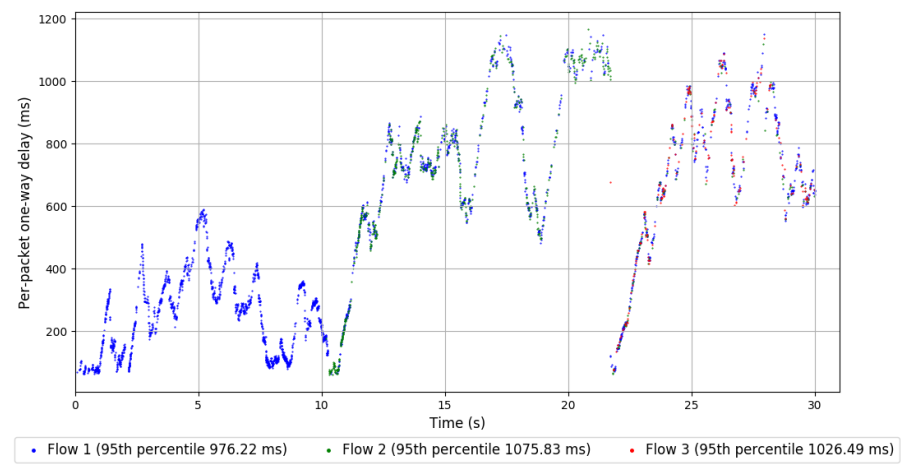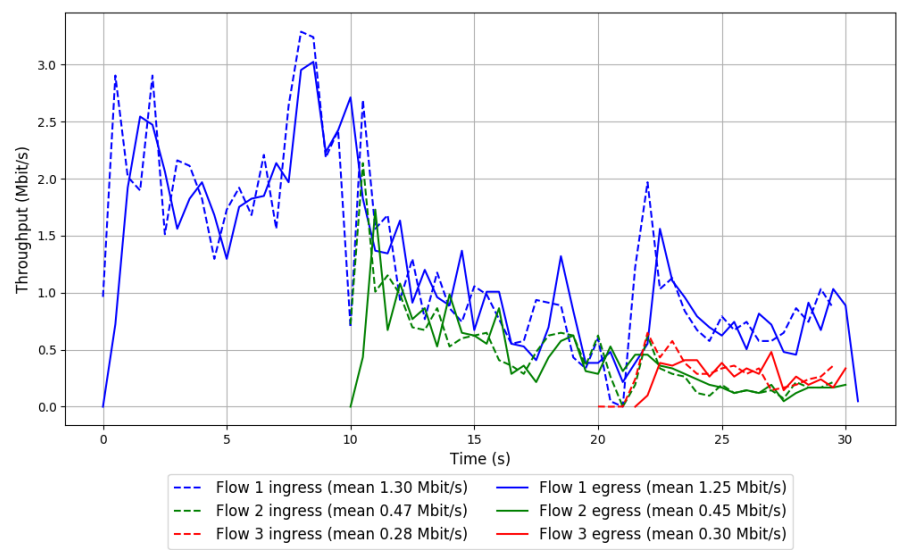3 flows with 10s interval between flows

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	1.58	0.67	0.92	772.24	814.83	688.70	2.28	3.67	5.60
Copa	3	0.77	0.72	0.62	211.95	221.17	204.16	0.13	0.69	0.19
TCP Cubic	3	1.04	0.84	0.72	453.33	514.87	596.90	1.22	1.72	3.30
FillP	3	0.88	0.80	0.23	1762.68	1586.40	1718.34	70.08	69.12	78.19
FillP-Sheep	3	1.50	1.20	0.62	1105.90	1132.34	1142.53	42.70	64.86	83.69
Indigo	3	0.38	0.38	0.48	315.49	385.14	366.96	0.54	0.68	1.42
LEDBAT	3	1.82	1.20	0.60	264.74	279.80	311.64	0.23	0.90	1.46
PCC-Allegro	3	1.11	0.67	0.74	1119.80	1114.49	1257.91	50.08	59.76	98.93
PCC-Expr	2	2.01	0.79	0.54	1134.17	1139.79	1148.41	63.39	74.18	62.56
QUIC Cubic	3	1.45	1.05	0.92	746.86	808.09	900.67	1.79	3.23	8.98
SCReAM	3	0.19	0.16	0.20	73.59	79.80	87.40	0.03	0.22	0.33
Sprout	3	0.23	0.26	0.29	85.75	89.29	92.34	0.17	0.41	0.43
TaoVA-100x	3	1.32	0.81	0.71	795.21	933.80	975.32	5.80	16.38	20.41
TCP Vegas	3	0.71	0.77	1.13	309.73	277.08	378.14	0.69	0.62	1.20
Verus	3	1.50	0.86	0.35	994.39	947.00	1025.51	26.80	7.86	7.67
PCC-Vivace	3	1.17	0.94	0.57	1101.95	1114.13	1121.26	22.51	34.97	49.56
WebRTC media	3	0.58	0.27	0.23	264.42	307.63	135.54	0.23	0.28	0.64

```
Run 1: Statistics of TCP BBR

Start at: 2018-07-24 13:08:00
End at: 2018-07-24 13:08:30
Local clock offset: 3.096 ms
Remote clock offset: -2.835 ms


# Below is generated by plot.py at 2018-07-24 13:49:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 1038.904 ms
Loss rate: 4.65%
-- Flow 1:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 976.221 ms
Loss rate: 3.91%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 1075.834 ms
Loss rate: 6.26%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 1026.487 ms
Loss rate: 9.54%
```
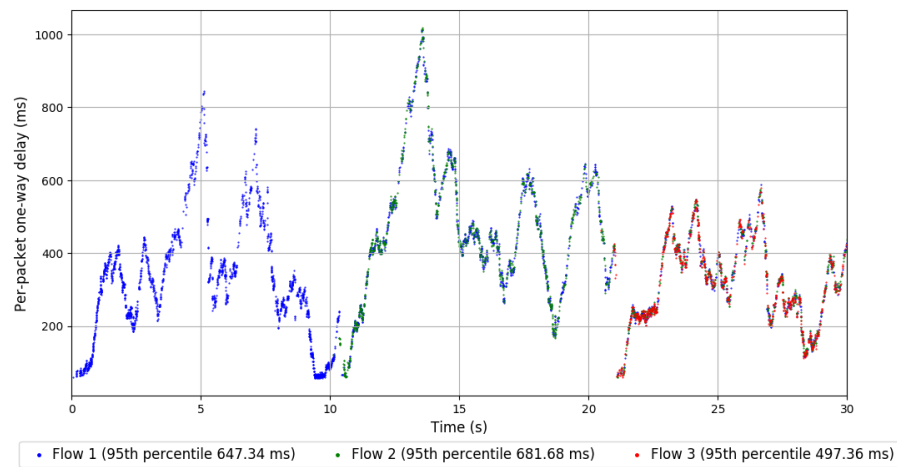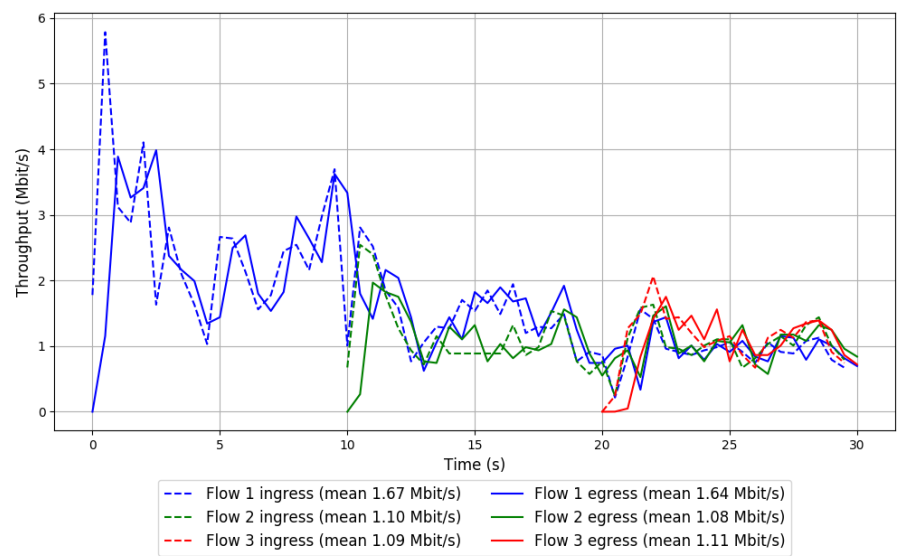
Run 1: Report of TCP BBR — Data Link

Flow 1 ingress (mean 1.30 Mbit/s) Flow 1 egress (mean 1.25 Mbit/s)
Flow 2 ingress (mean 0.47 Mbit/s) Flow 2 egress (mean 0.45 Mbit/s)
Flow 3 ingress (mean 0.28 Mbit/s) Flow 3 egress (mean 0.30 Mbit/s)

Flow 1 (95th percentile 976.22 ms) Flow 2 (95th percentile 1075.83 ms) Flow 3 (95th percentile 1026.49 ms)

```
Run 2: Statistics of TCP BBR

Start at: 2018-07-24 13:26:49
End at: 2018-07-24 13:27:19
Local clock offset: 3.077 ms
Remote clock offset: 1.885 ms


# Below is generated by plot.py at 2018-07-24 13:49:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.71 Mbit/s
95th percentile per-packet one-way delay: 643.402 ms
Loss rate: 1.96%
-- Flow 1:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 647.339 ms
Loss rate: 1.42%
-- Flow 2:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 681.676 ms
Loss rate: 2.40%
-- Flow 3:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 497.361 ms
Loss rate: 3.52%
```
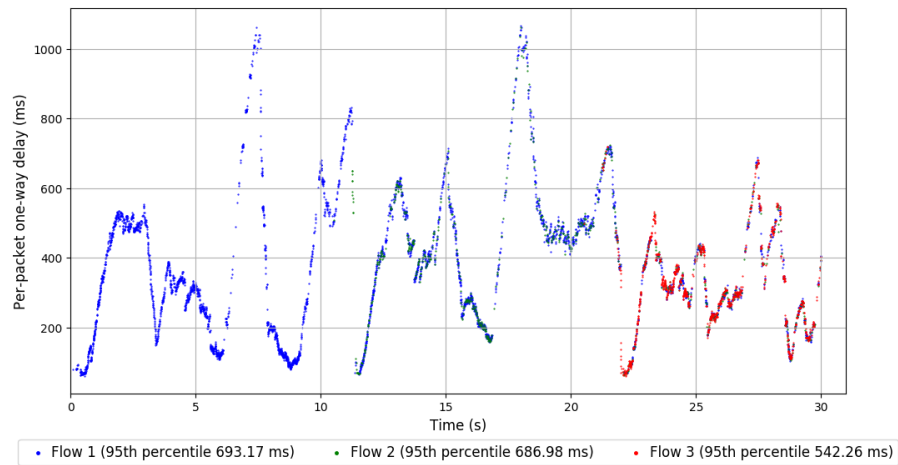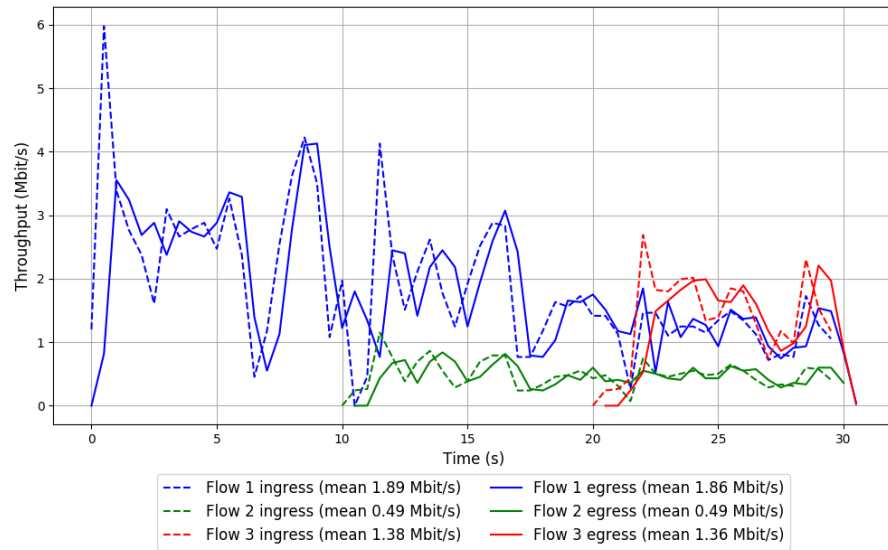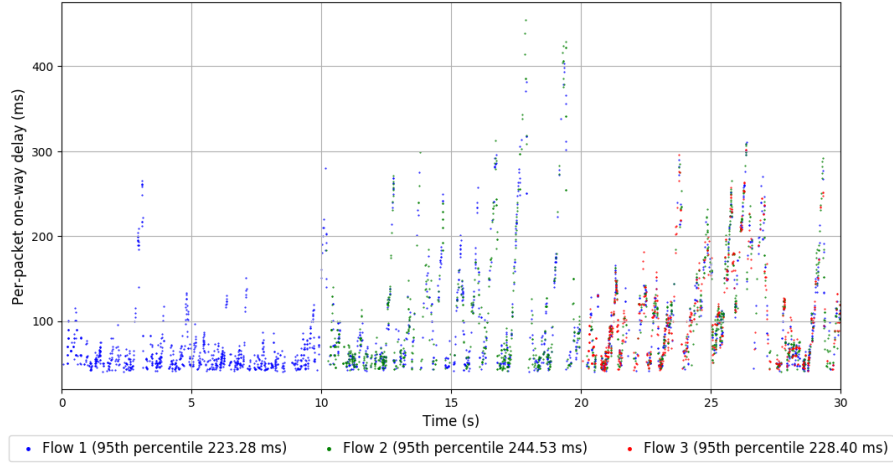
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2018-07-24 13:45:50
End at: 2018-07-24 13:46:20
Local clock offset: 0.185 ms
Remote clock offset: 6.334 ms


# Below is generated by plot.py at 2018-07-24 13:49:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.61 Mbit/s
95th percentile per-packet one-way delay: 673.663 ms
Loss rate: 1.99%
-- Flow 1:
Average throughput: 1.86 Mbit/s
95th percentile per-packet one-way delay: 693.171 ms
Loss rate: 1.51%
-- Flow 2:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 686.983 ms
Loss rate: 2.36%
-- Flow 3:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 542.261 ms
Loss rate: 3.75%
```

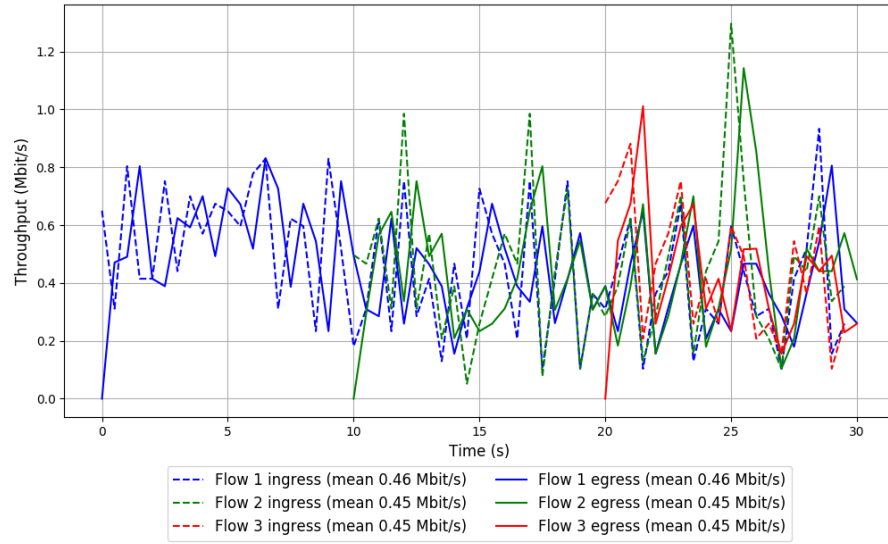Run 3: Report of TCP BBR — Data Link

```
Run 1: Statistics of Copa

Start at: 2018-07-24 13:04:41
End at: 2018-07-24 13:05:11
Local clock offset: 1.135 ms
Remote clock offset: -22.77 ms


# Below is generated by plot.py at 2018-07-24 13:49:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 235.083 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 223.283 ms
Loss rate: 0.09%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 244.535 ms
Loss rate: 0.31%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 228.395 ms
Loss rate: 0.02%
```
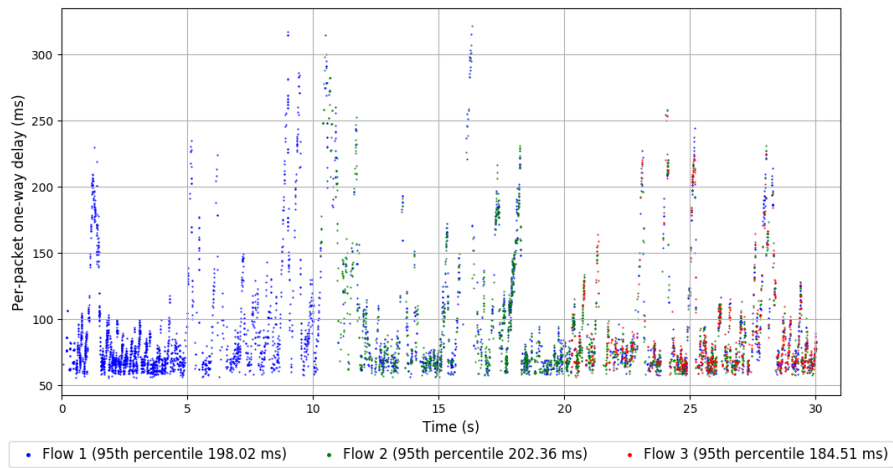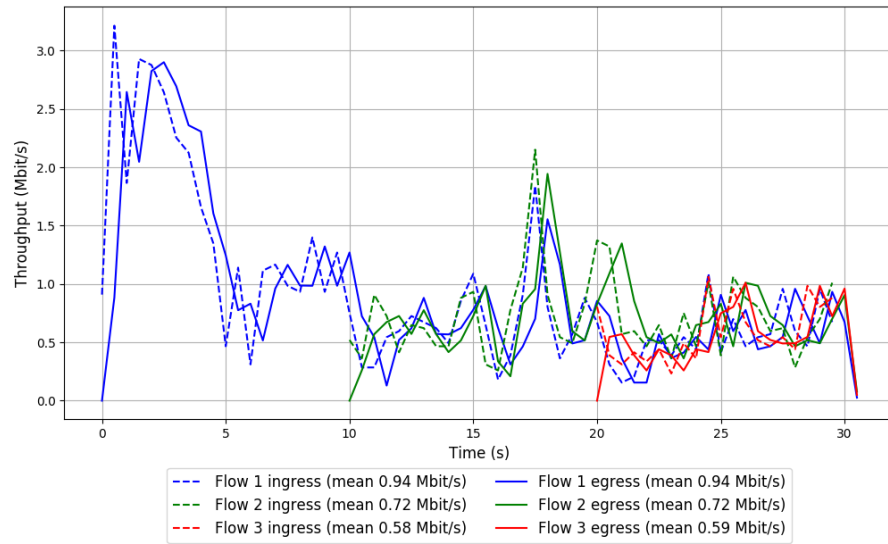
Run 1: Report of Copa — Data Link

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```
Run 2: Statistics of Copa

Start at: 2018-07-24 13:23:30
End at: 2018-07-24 13:24:00
Local clock offset: 2.839 ms
Remote clock offset: 2.771 ms

# Below is generated by plot.py at 2018-07-24 13:49:51
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 199.473 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 198.022 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 202.359 ms
Loss rate: 0.44%
-- Flow 3:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 184.507 ms
Loss rate: 0.22%
```
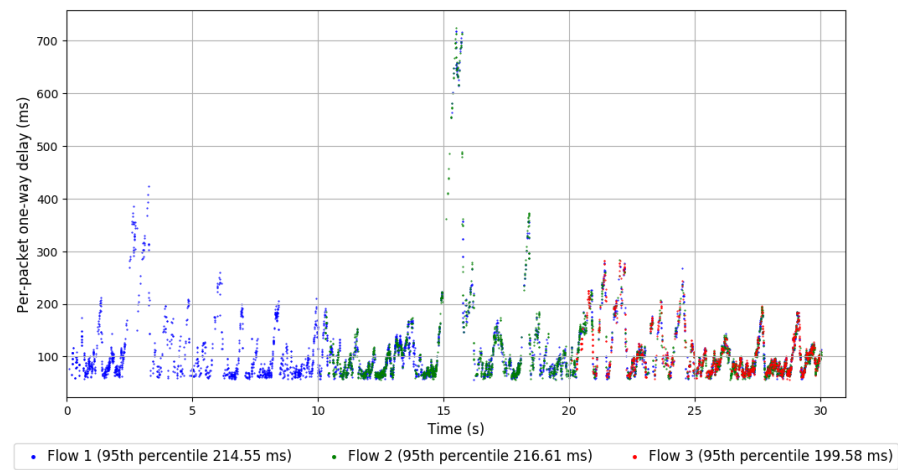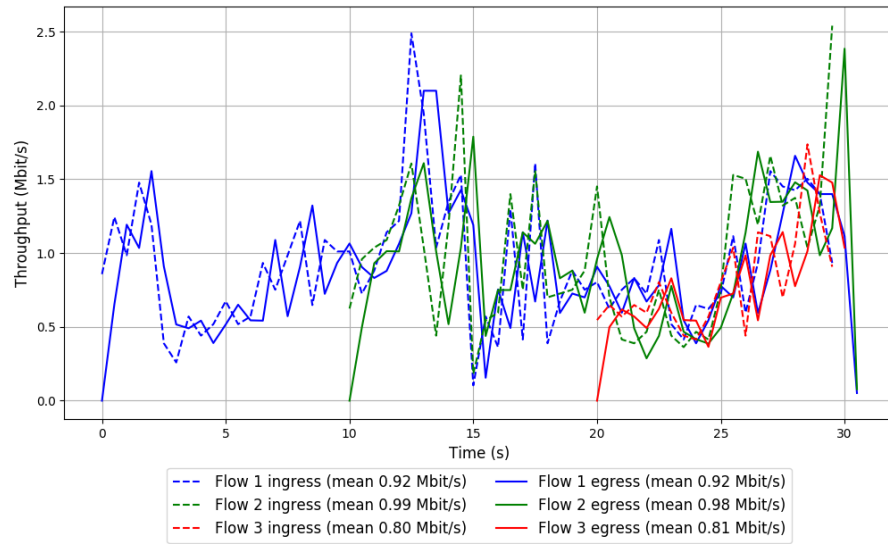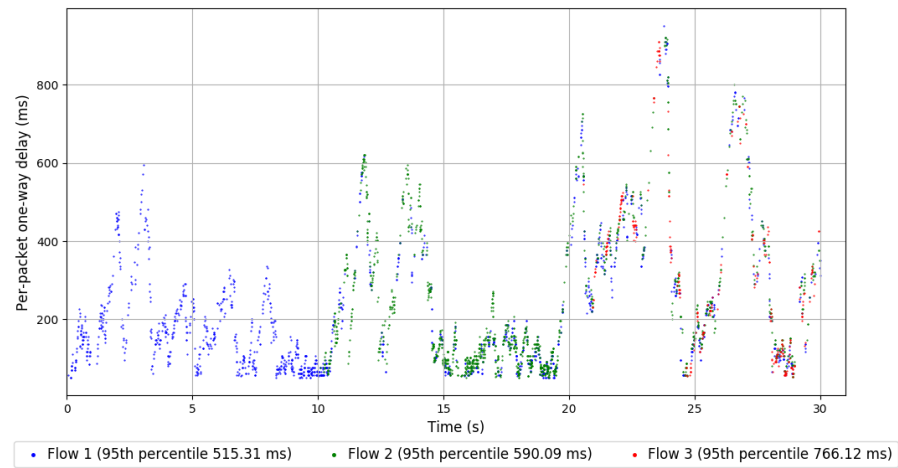
Run 2: Report of Copa — Data Link

- - - Flow 1 ingress (mean 0.94 Mbit/s)   —— Flow 1 egress (mean 0.94 Mbit/s)
- - - Flow 2 ingress (mean 0.72 Mbit/s)   —— Flow 2 egress (mean 0.72 Mbit/s)
- - - Flow 3 ingress (mean 0.58 Mbit/s)   —— Flow 3 egress (mean 0.59 Mbit/s)

- Flow 1 (95th percentile 198.02 ms)   • Flow 2 (95th percentile 202.36 ms)   • Flow 3 (95th percentile 184.51 ms)

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```
Run 3: Statistics of Copa

Start at: 2018-07-24 13:42:31
End at: 2018-07-24 13:43:01
Local clock offset: 0.948 ms
Remote clock offset: 4.669 ms


# Below is generated by plot.py at 2018-07-24 13:49:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.84 Mbit/s
95th percentile per-packet one-way delay: 212.281 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 214.547 ms
Loss rate: 0.24%
-- Flow 2:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 216.607 ms
Loss rate: 1.31%
-- Flow 3:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 199.576 ms
Loss rate: 0.32%
```
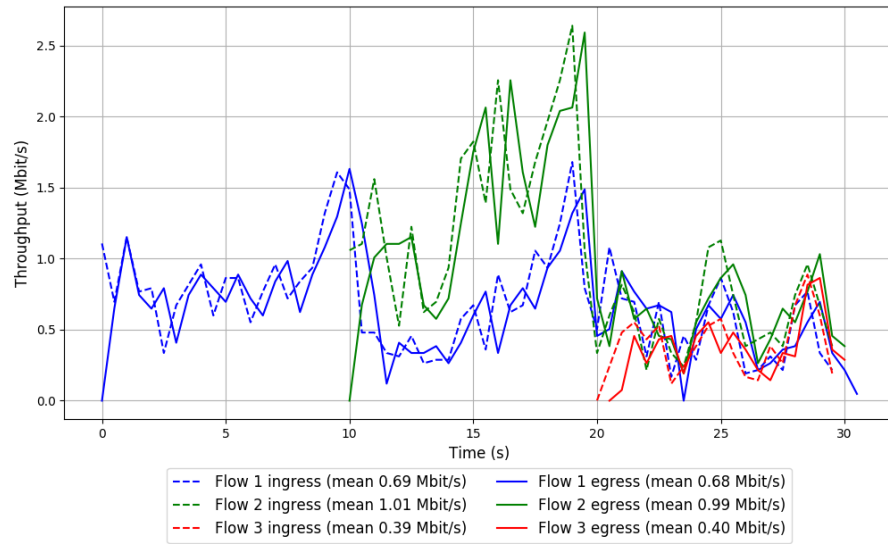
Run 3: Report of Copa — Data Link

- Flow 1 ingress (mean 0.92 Mbit/s)
- Flow 1 egress (mean 0.92 Mbit/s)
- Flow 2 ingress (mean 0.99 Mbit/s)
- Flow 2 egress (mean 0.98 Mbit/s)
- Flow 3 ingress (mean 0.80 Mbit/s)
- Flow 3 egress (mean 0.81 Mbit/s)

- Flow 1 (95th percentile 214.55 ms)
- Flow 2 (95th percentile 216.61 ms)
- Flow 3 (95th percentile 199.58 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2018-07-24 13:03:34
End at: 2018-07-24 13:04:04
Local clock offset: -1.095 ms
Remote clock offset: -19.193 ms


# Below is generated by plot.py at 2018-07-24 13:49:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 580.759 ms
Loss rate: 1.67%
-- Flow 1:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 515.306 ms
Loss rate: 1.46%
-- Flow 2:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 590.091 ms
Loss rate: 1.38%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 766.121 ms
Loss rate: 4.35%
```
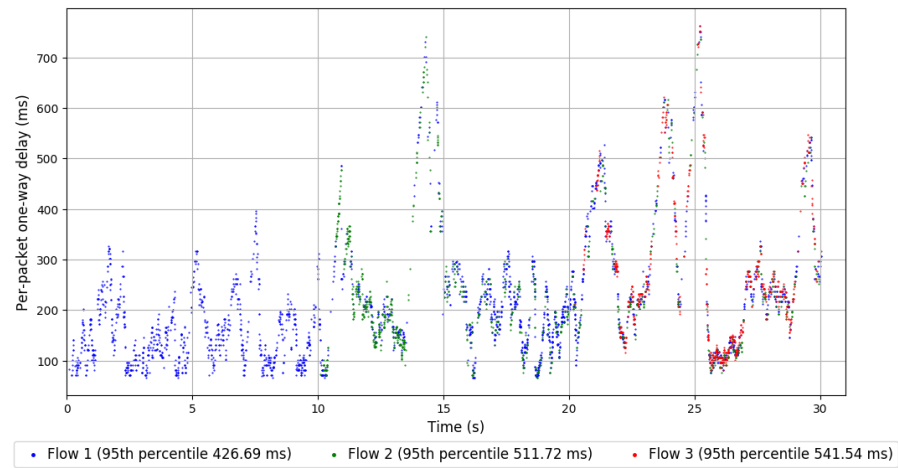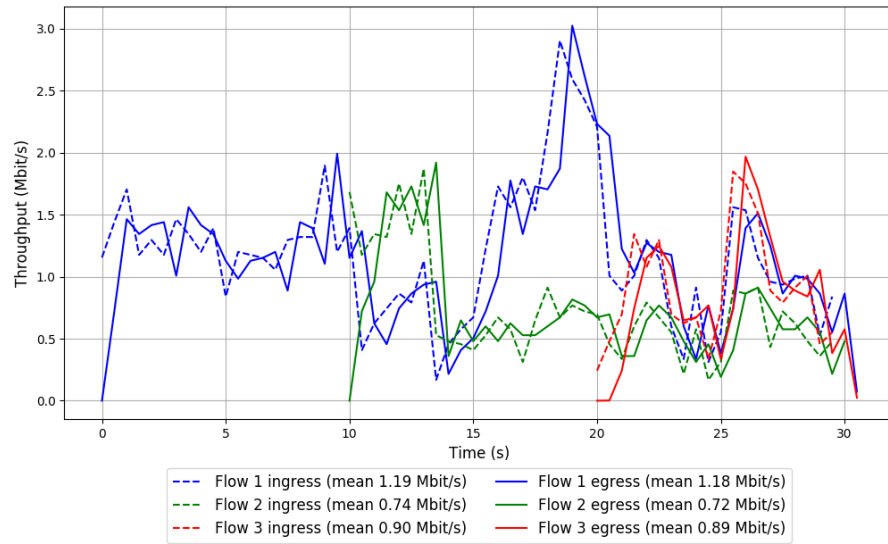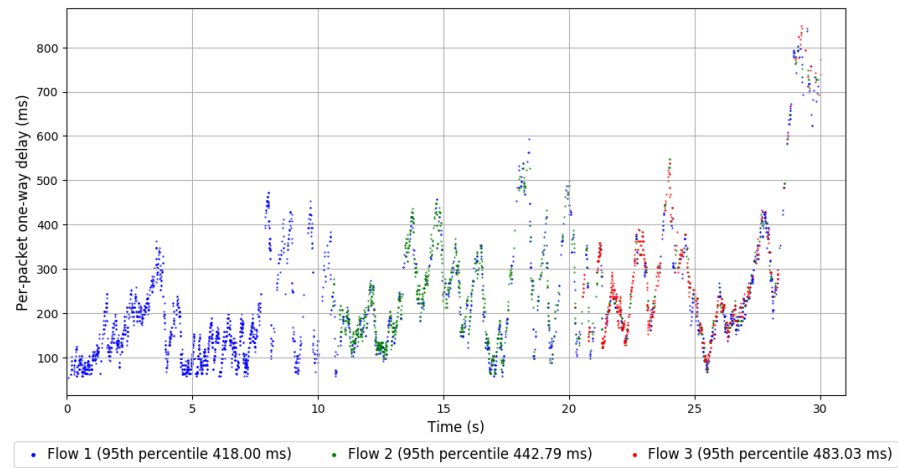
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 0.69 Mbit/s)   Flow 1 egress (mean 0.68 Mbit/s)
Flow 2 ingress (mean 1.01 Mbit/s)   Flow 2 egress (mean 0.99 Mbit/s)
Flow 3 ingress (mean 0.39 Mbit/s)   Flow 3 egress (mean 0.40 Mbit/s)

Flow 1 (95th percentile 515.31 ms)   Flow 2 (95th percentile 590.09 ms)   Flow 3 (95th percentile 766.12 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2018-07-24 13:22:24
End at: 2018-07-24 13:22:54
Local clock offset: 1.039 ms
Remote clock offset: 5.626 ms


# Below is generated by plot.py at 2018-07-24 13:49:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 486.689 ms
Loss rate: 1.60%
-- Flow 1:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 426.691 ms
Loss rate: 1.01%
-- Flow 2:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 511.724 ms
Loss rate: 2.13%
-- Flow 3:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 541.537 ms
Loss rate: 3.08%
```
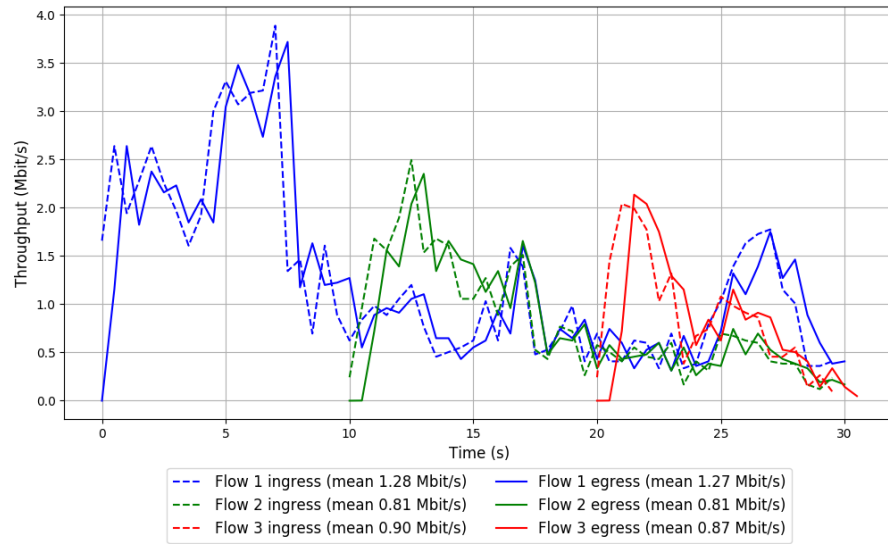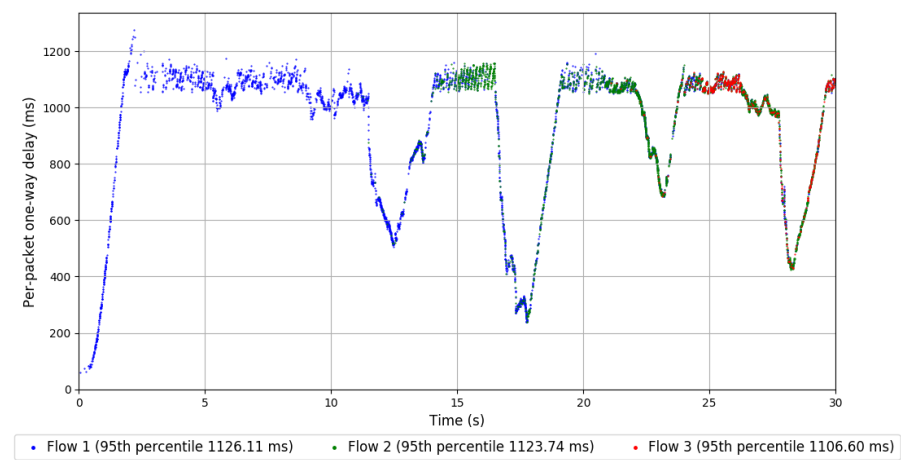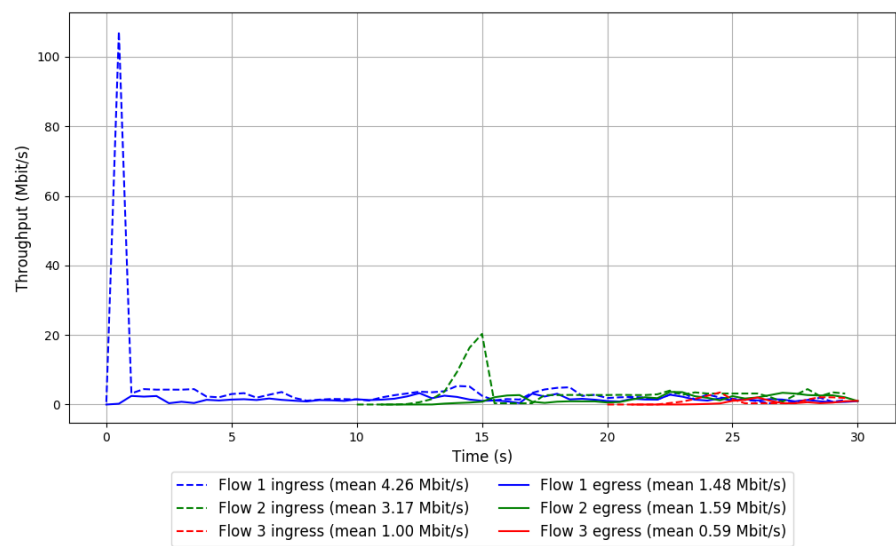
Run 2: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 1.19 Mbit/s) ---- Flow 1 egress (mean 1.18 Mbit/s) ——
Flow 2 ingress (mean 0.74 Mbit/s) ---- Flow 2 egress (mean 0.72 Mbit/s) ——
Flow 3 ingress (mean 0.90 Mbit/s) ---- Flow 3 egress (mean 0.89 Mbit/s) ——

• Flow 1 (95th percentile 426.69 ms)   • Flow 2 (95th percentile 511.72 ms)   • Flow 3 (95th percentile 541.54 ms)

```
Run 3: Statistics of TCP Cubic

Start at: 2018-07-24 13:41:25
End at: 2018-07-24 13:41:55
Local clock offset: 2.883 ms
Remote clock offset: 0.247 ms


# Below is generated by plot.py at 2018-07-24 13:49:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 427.876 ms
Loss rate: 1.48%
-- Flow 1:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 417.999 ms
Loss rate: 1.18%
-- Flow 2:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 442.788 ms
Loss rate: 1.64%
-- Flow 3:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 483.029 ms
Loss rate: 2.48%
```
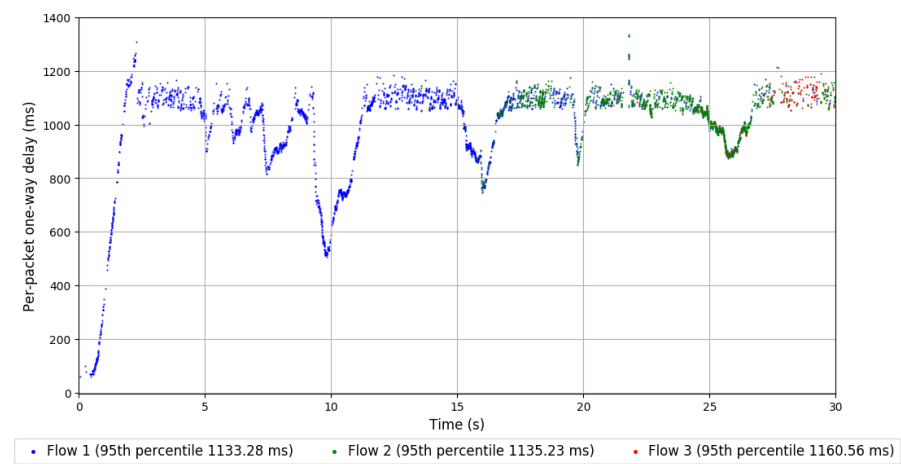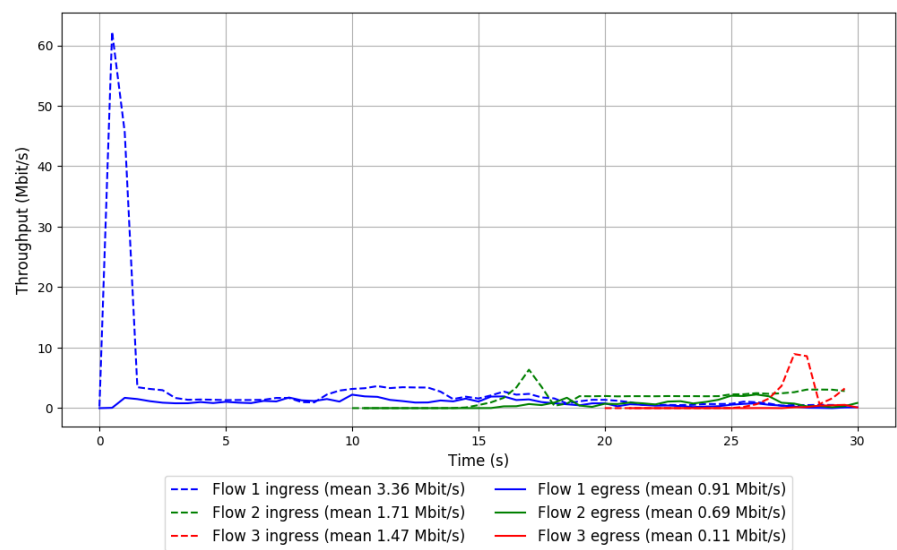
Run 3: Report of TCP Cubic — Data Link

```
Run 1: Statistics of FillP

Start at: 2018-07-24 12:58:02
End at: 2018-07-24 12:58:32
Local clock offset: -0.393 ms
Remote clock offset: -6.381 ms


# Below is generated by plot.py at 2018-07-24 13:49:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.67 Mbit/s
95th percentile per-packet one-way delay: 1124.541 ms
Loss rate: 60.21%
-- Flow 1:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 1126.112 ms
Loss rate: 65.17%
-- Flow 2:
Average throughput: 1.59 Mbit/s
95th percentile per-packet one-way delay: 1123.740 ms
Loss rate: 52.29%
-- Flow 3:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1106.599 ms
Loss rate: 46.78%
```
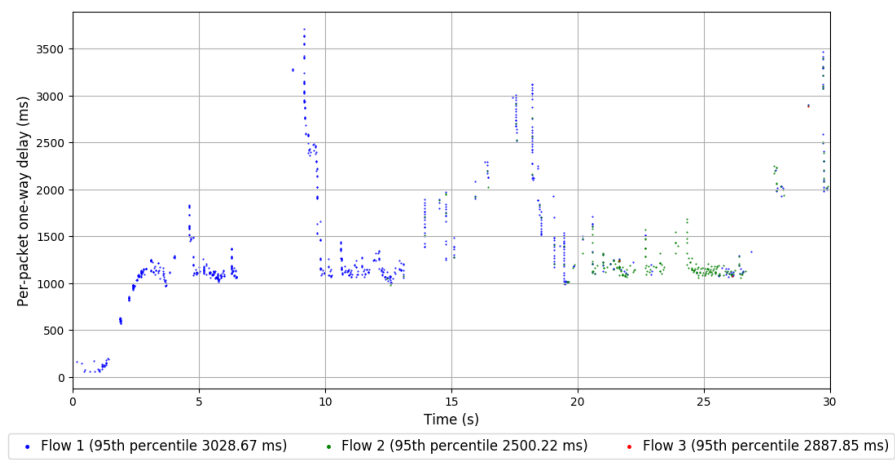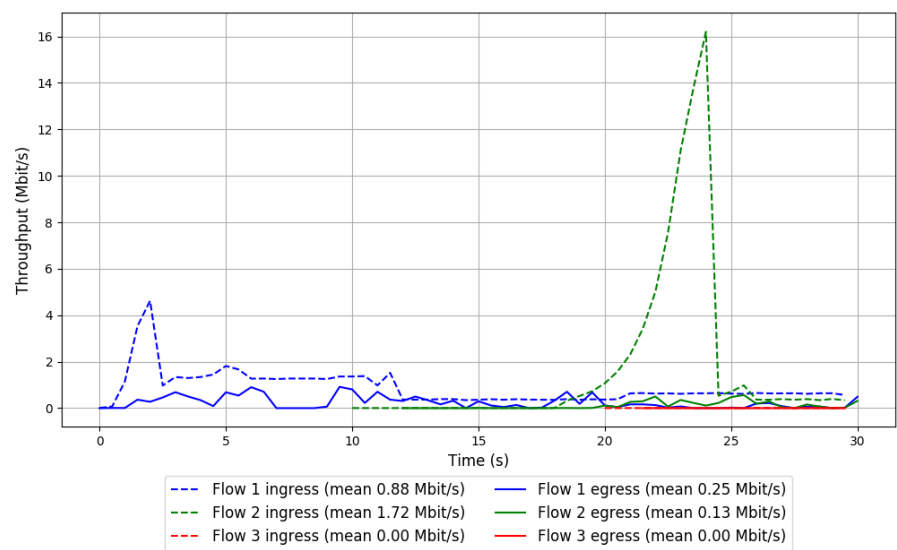
Run 1: Report of FillP — Data Link

Flow 1 ingress (mean 4.26 Mbit/s) Flow 1 egress (mean 1.48 Mbit/s)
Flow 2 ingress (mean 3.17 Mbit/s) Flow 2 egress (mean 1.59 Mbit/s)
Flow 3 ingress (mean 1.00 Mbit/s) Flow 3 egress (mean 0.59 Mbit/s)

Flow 1 (95th percentile 1126.11 ms)   Flow 2 (95th percentile 1123.74 ms)   Flow 3 (95th percentile 1106.60 ms)

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```
Run 2: Statistics of FillP

Start at: 2018-07-24 13:16:52
End at: 2018-07-24 13:17:22
Local clock offset: 4.005 ms
Remote clock offset: 3.541 ms


# Below is generated by plot.py at 2018-07-24 13:49:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 1136.447 ms
Loss rate: 72.30%
-- Flow 1:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 1133.276 ms
Loss rate: 72.89%
-- Flow 2:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 1135.234 ms
Loss rate: 61.44%
-- Flow 3:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 1160.556 ms
Loss rate: 93.51%
```
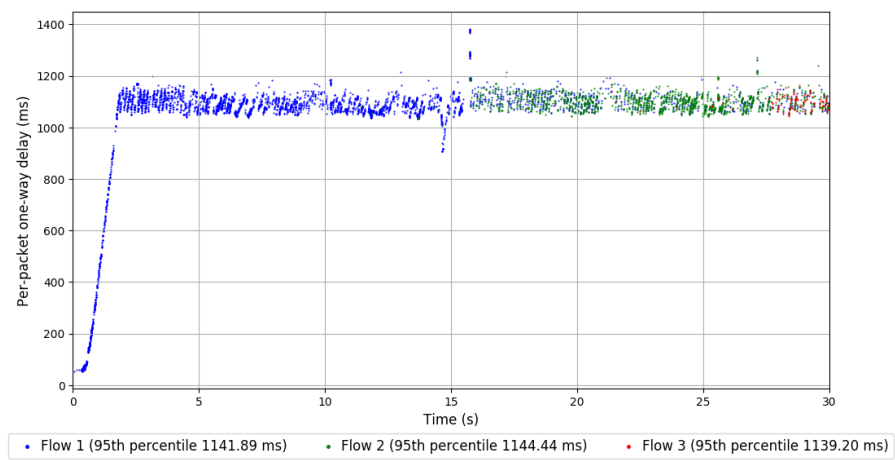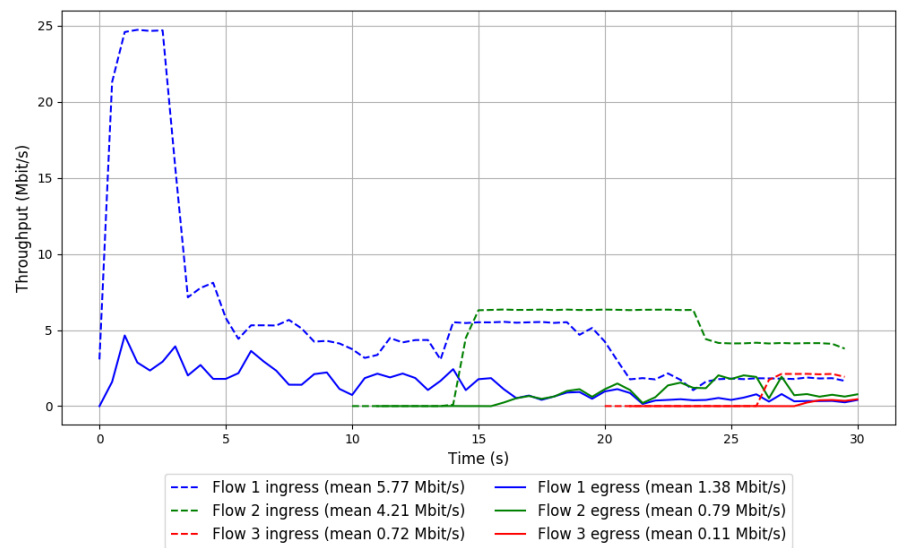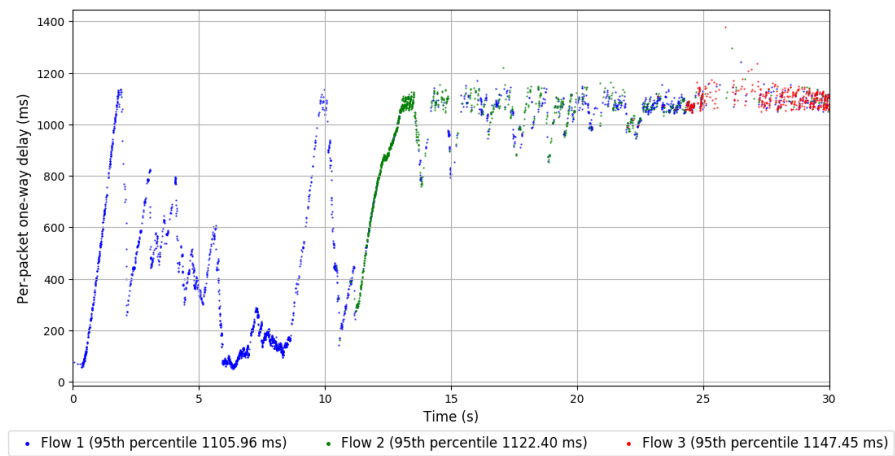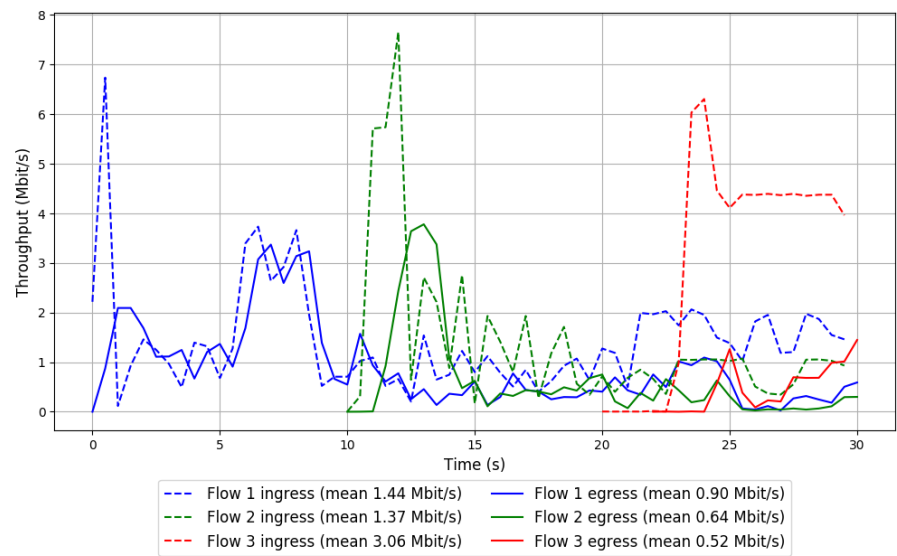
Run 2: Report of FillP — Data Link

```
Run 3: Statistics of FillP

Start at: 2018-07-24 13:35:50
End at: 2018-07-24 13:36:20
Local clock offset: 1.059 ms
Remote clock offset: -1.223 ms


# Below is generated by plot.py at 2018-07-24 13:49:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 2968.593 ms
Loss rate: 84.33%
-- Flow 1:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 3028.666 ms
Loss rate: 72.18%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 2500.219 ms
Loss rate: 93.64%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 2887.854 ms
Loss rate: 94.27%
```

Run 3: Report of FillP — Data Link

```
Run 1: Statistics of FillP-Sheep

Start at: 2018-07-24 13:10:14
End at: 2018-07-24 13:10:44
Local clock offset: 1.569 ms
Remote clock offset: -9.398 ms


# Below is generated by plot.py at 2018-07-24 13:50:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 1142.725 ms
Loss rate: 78.44%
-- Flow 1:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 1141.889 ms
Loss rate: 76.14%
-- Flow 2:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 1144.440 ms
Loss rate: 82.43%
-- Flow 3:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 1139.201 ms
Loss rate: 87.07%
```
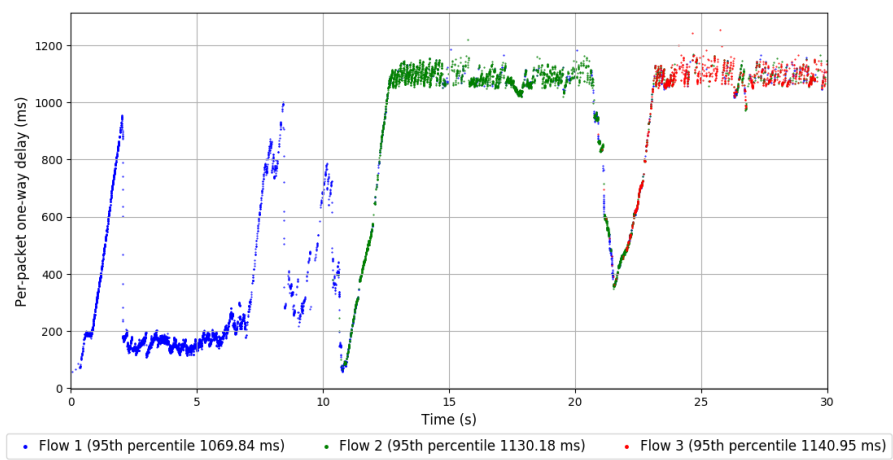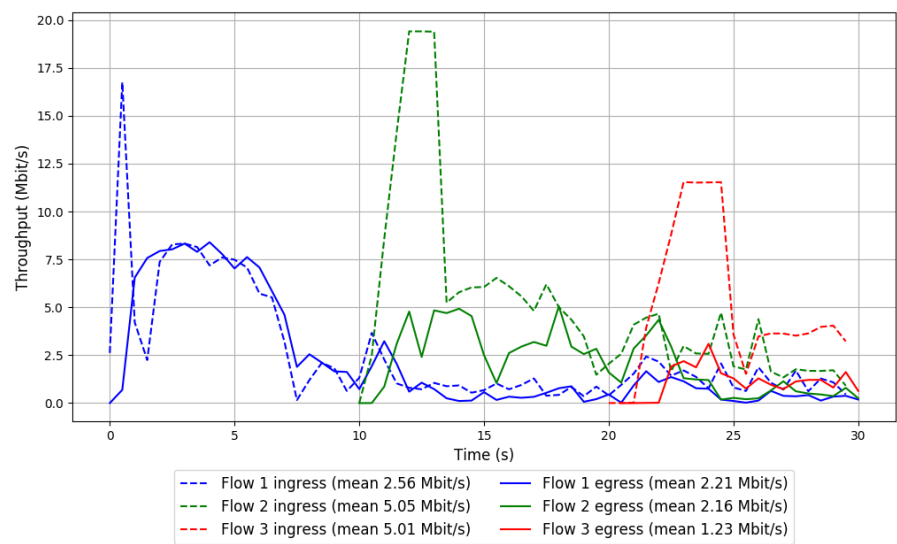
Run 1: Report of FillP-Sheep — Data Link

Flow 1 ingress (mean 5.77 Mbit/s) --- Flow 1 egress (mean 1.38 Mbit/s)
Flow 2 ingress (mean 4.21 Mbit/s) --- Flow 2 egress (mean 0.79 Mbit/s)
Flow 3 ingress (mean 0.72 Mbit/s) --- Flow 3 egress (mean 0.11 Mbit/s)

Flow 1 (95th percentile 1141.89 ms)   Flow 2 (95th percentile 1144.44 ms)   Flow 3 (95th percentile 1139.20 ms)

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```
Run 2: Statistics of FillP-Sheep

Start at: 2018-07-24 13:29:04
End at: 2018-07-24 13:29:34
Local clock offset: 3.058 ms
Remote clock offset: -4.045 ms


# Below is generated by plot.py at 2018-07-24 13:50:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 1121.426 ms
Loss rate: 56.89%
-- Flow 1:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 1105.960 ms
Loss rate: 37.71%
-- Flow 2:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 1122.399 ms
Loss rate: 54.20%
-- Flow 3:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 1147.447 ms
Loss rate: 86.43%
```

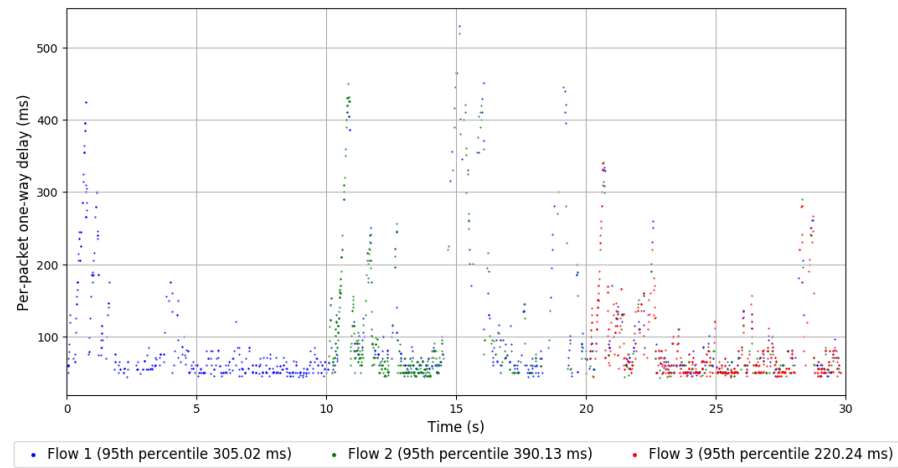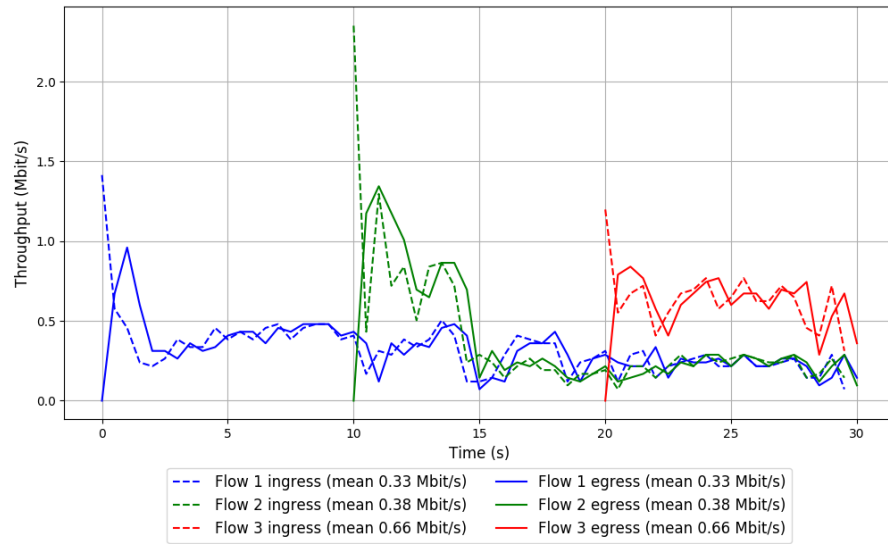Run 2: Report of FillP-Sheep — Data Link

```
Run 3: Statistics of FillP-Sheep

Start at: 2018-07-24 13:48:02
End at: 2018-07-24 13:48:32
Local clock offset: 1.9 ms
Remote clock offset: 3.895 ms


# Below is generated by plot.py at 2018-07-24 13:50:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.99 Mbit/s
95th percentile per-packet one-way delay: 1120.716 ms
Loss rate: 47.47%
-- Flow 1:
Average throughput: 2.21 Mbit/s
95th percentile per-packet one-way delay: 1069.836 ms
Loss rate: 14.24%
-- Flow 2:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 1130.181 ms
Loss rate: 57.96%
-- Flow 3:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 1140.950 ms
Loss rate: 77.57%
```
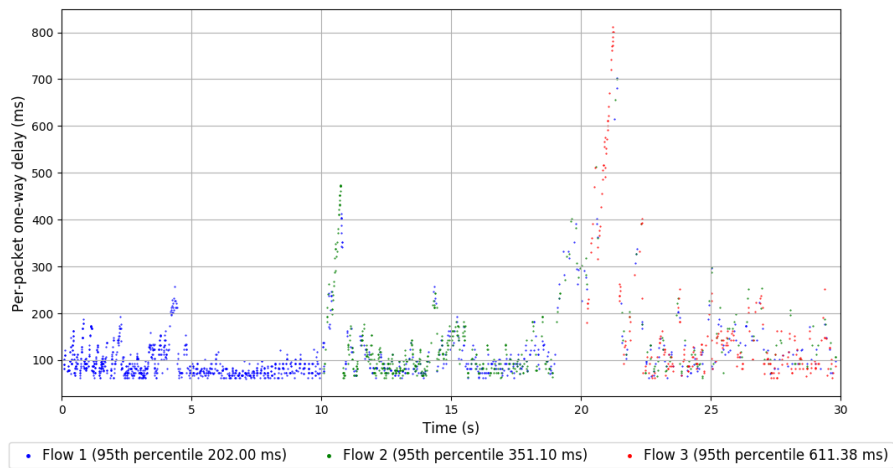
Run 3: Report of FillP-Sheep — Data Link

```
Run 1: Statistics of Indigo

Start at: 2018-07-24 13:01:21
End at: 2018-07-24 13:01:51
Local clock offset: 0.246 ms
Remote clock offset: -20.991 ms


# Below is generated by plot.py at 2018-07-24 13:50:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 300.120 ms
Loss rate: 0.71%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 305.018 ms
Loss rate: 0.62%
-- Flow 2:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 390.132 ms
Loss rate: 0.79%
-- Flow 3:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 220.244 ms
Loss rate: 0.75%
```
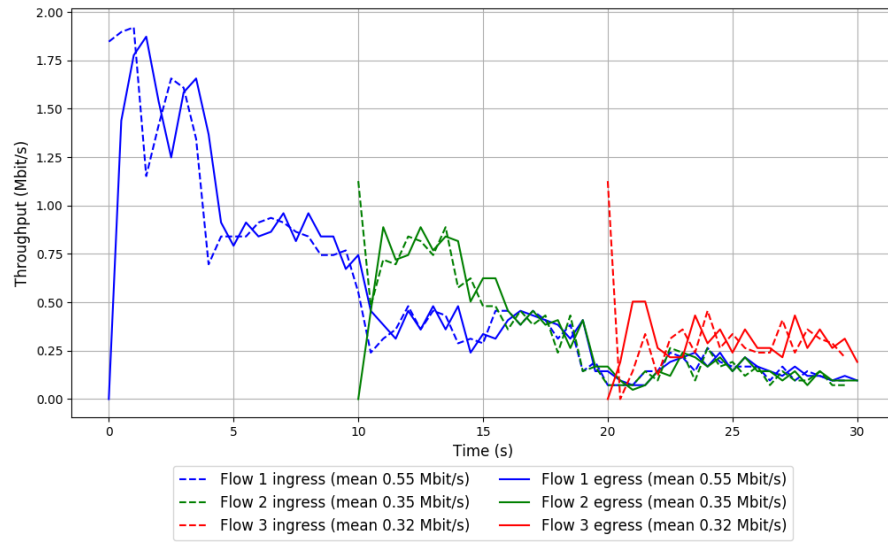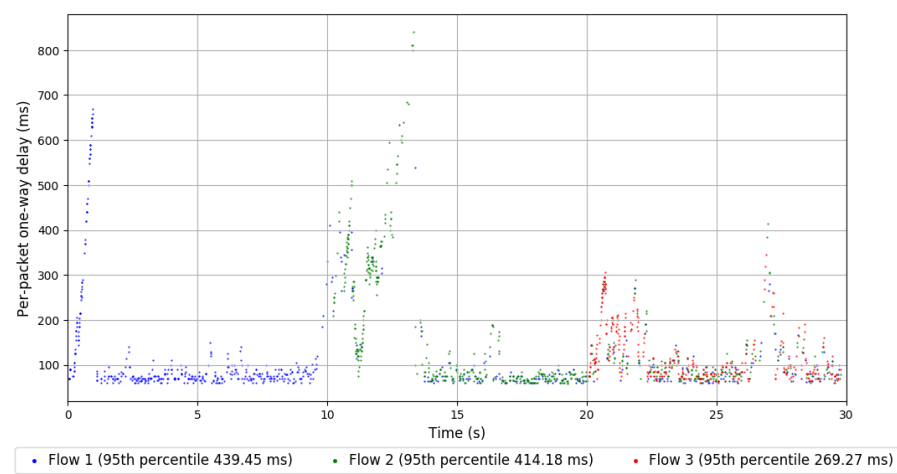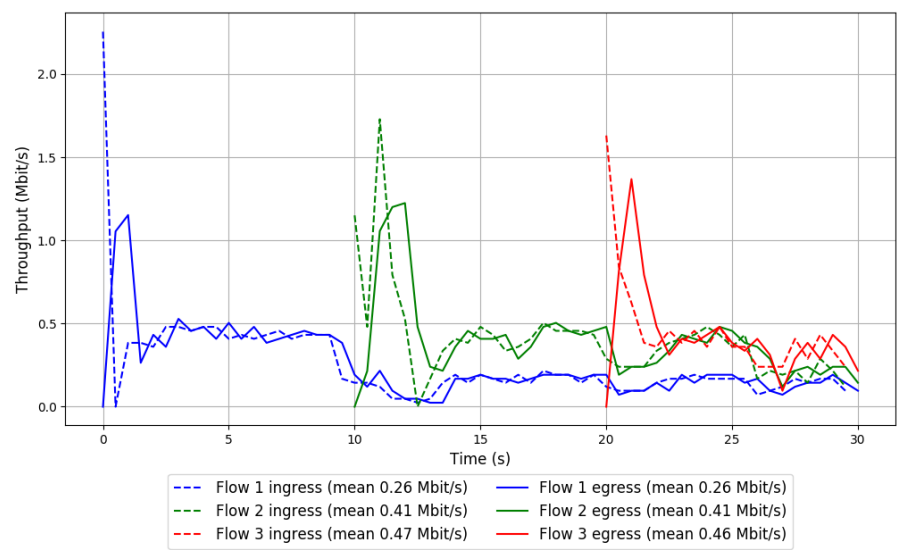
Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2018-07-24 13:20:11
End at: 2018-07-24 13:20:41
Local clock offset: 2.678 ms
Remote clock offset: 3.411 ms


# Below is generated by plot.py at 2018-07-24 13:50:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 301.426 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 201.999 ms
Loss rate: 0.22%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 351.096 ms
Loss rate: 0.52%
-- Flow 3:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 611.382 ms
Loss rate: 1.92%
```
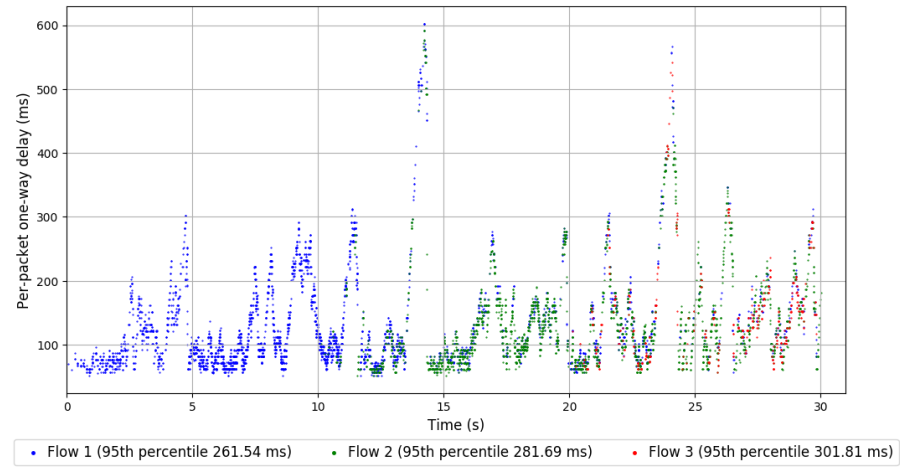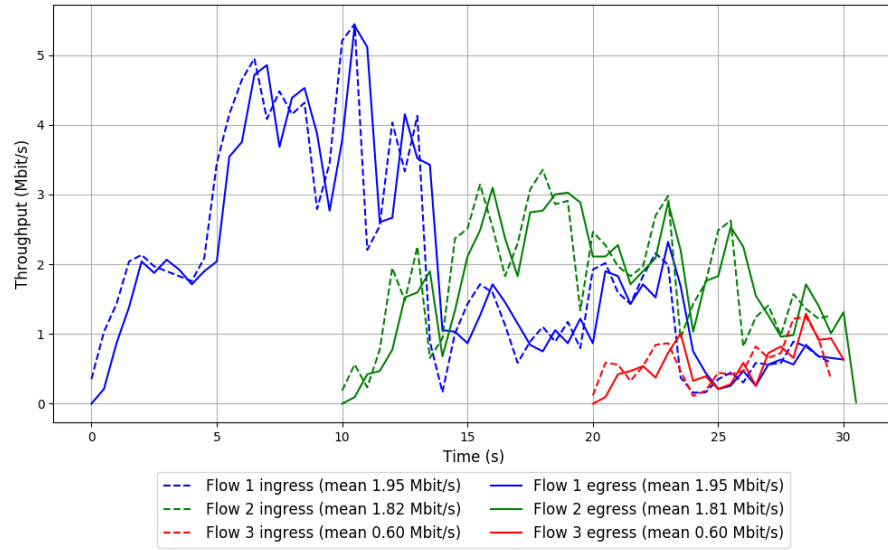
Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2018-07-24 13:39:14
End at: 2018-07-24 13:39:44
Local clock offset: 2.489 ms
Remote clock offset: 2.015 ms

# Below is generated by plot.py at 2018-07-24 13:50:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 385.178 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 439.450 ms
Loss rate: 0.78%
-- Flow 2:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 414.179 ms
Loss rate: 0.74%
-- Flow 3:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 269.269 ms
Loss rate: 1.58%
```
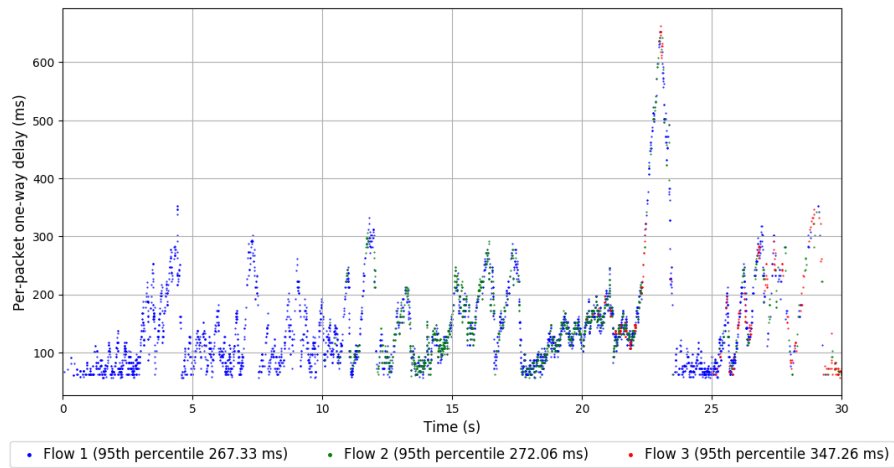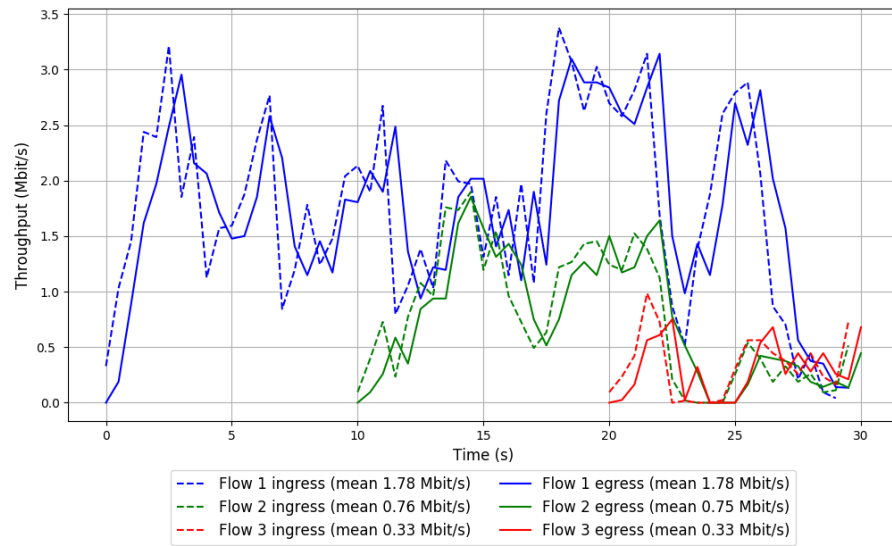
Run 3: Report of Indigo — Data Link

```
Run 1: Statistics of LEDBAT

Start at: 2018-07-24 12:53:37
End at: 2018-07-24 12:54:07
Local clock offset: 2.464 ms
Remote clock offset: -10.064 ms


# Below is generated by plot.py at 2018-07-24 13:50:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.34 Mbit/s
95th percentile per-packet one-way delay: 271.792 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 261.542 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 1.81 Mbit/s
95th percentile per-packet one-way delay: 281.685 ms
Loss rate: 0.68%
-- Flow 3:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 301.814 ms
Loss rate: 1.97%
```

Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2018-07-24 13:12:26
End at: 2018-07-24 13:12:56
Local clock offset: 0.837 ms
Remote clock offset: -3.378 ms


# Below is generated by plot.py at 2018-07-24 13:50:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.35 Mbit/s
95th percentile per-packet one-way delay: 272.539 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 1.78 Mbit/s
95th percentile per-packet one-way delay: 267.329 ms
Loss rate: 0.16%
-- Flow 2:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 272.065 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 347.259 ms
Loss rate: 2.14%
```
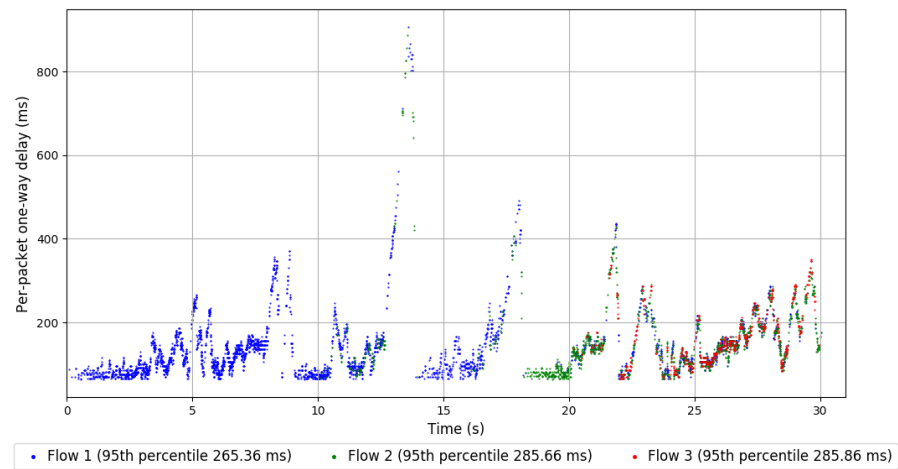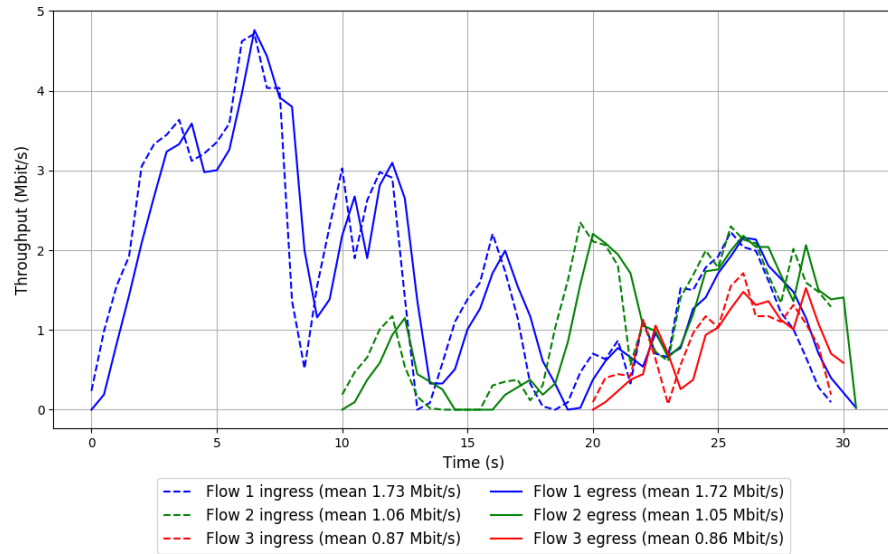
Run 2: Report of LEDBAT — Data Link

```
Run 3: Statistics of LEDBAT

Start at: 2018-07-24 13:31:21
End at: 2018-07-24 13:31:51
Local clock offset: 0.425 ms
Remote clock offset: 7.188 ms

# Below is generated by plot.py at 2018-07-24 13:50:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.70 Mbit/s
95th percentile per-packet one-way delay: 275.702 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 1.72 Mbit/s
95th percentile per-packet one-way delay: 265.364 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 285.663 ms
Loss rate: 1.49%
-- Flow 3:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 285.858 ms
Loss rate: 0.28%
```
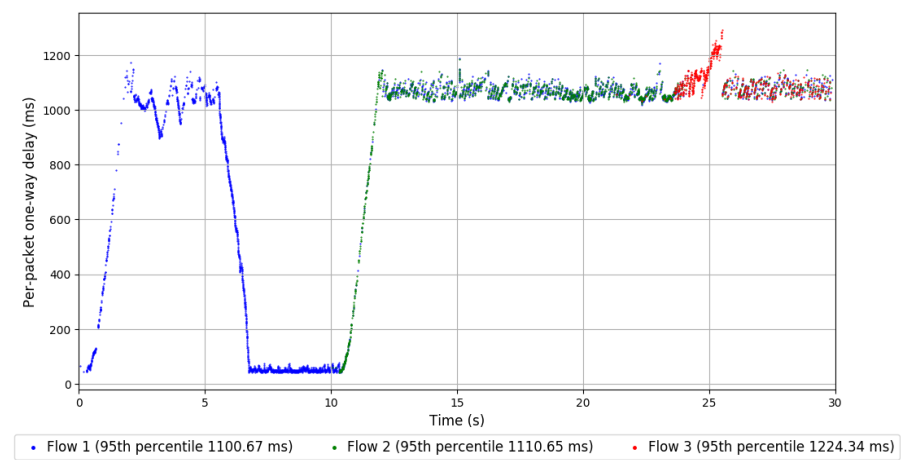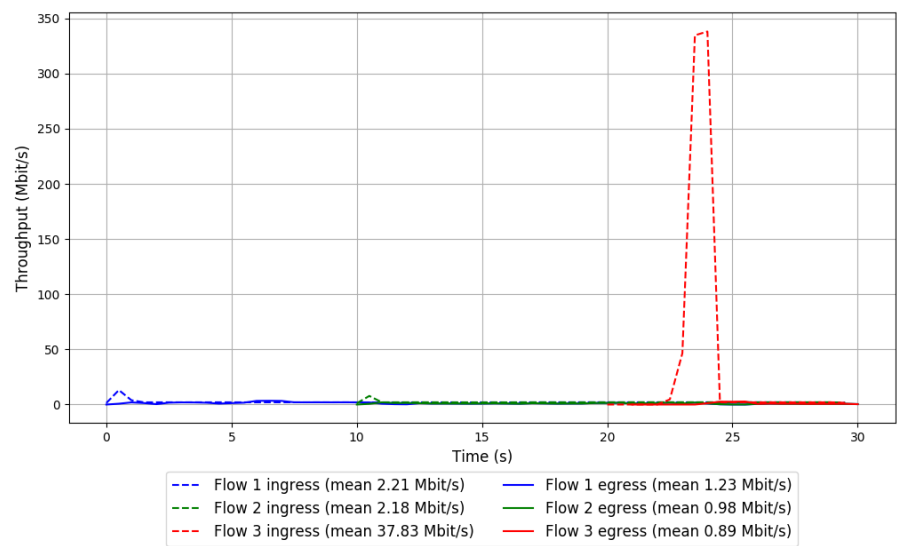
Run 3: Report of LEDBAT — Data Link

```
Run 1: Statistics of PCC-Allegro

Start at: 2018-07-24 13:05:47
End at: 2018-07-24 13:06:17
Local clock offset: 3.682 ms
Remote clock offset: -20.629 ms


# Below is generated by plot.py at 2018-07-24 13:50:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 1125.010 ms
Loss rate: 86.81%
-- Flow 1:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 1100.672 ms
Loss rate: 44.50%
-- Flow 2:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 1110.652 ms
Loss rate: 55.18%
-- Flow 3:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 1224.344 ms
Loss rate: 97.98%
```

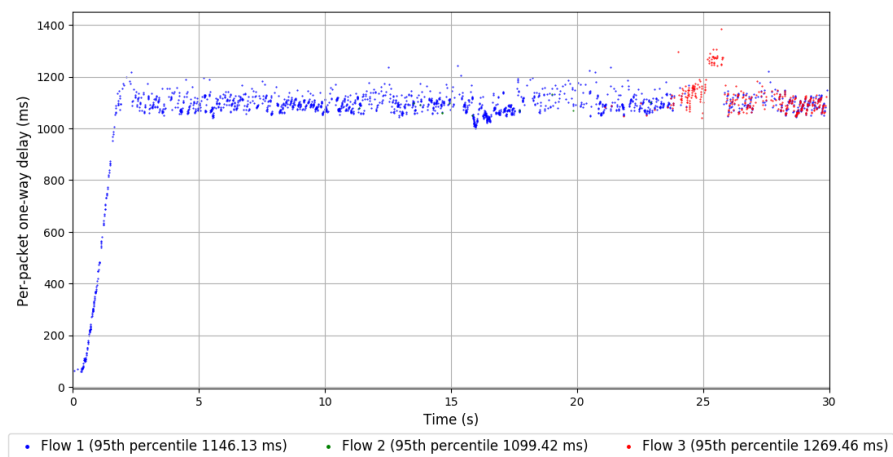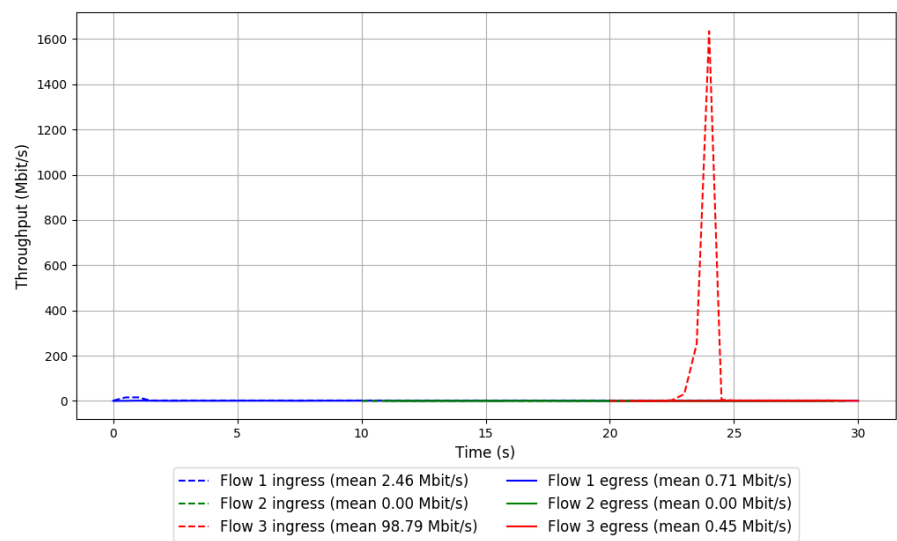Run 1: Report of PCC-Allegro — Data Link

Flow 1 ingress (mean 2.21 Mbit/s) — — — — Flow 1 egress (mean 1.23 Mbit/s)
Flow 2 ingress (mean 2.18 Mbit/s) — — — — Flow 2 egress (mean 0.98 Mbit/s)
Flow 3 ingress (mean 37.83 Mbit/s) — — — — Flow 3 egress (mean 0.89 Mbit/s)

• Flow 1 (95th percentile 1100.67 ms)   • Flow 2 (95th percentile 1110.65 ms)   • Flow 3 (95th percentile 1224.34 ms)

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```
Run 2: Statistics of PCC-Allegro

Start at: 2018-07-24 13:24:37
End at: 2018-07-24 13:25:07
Local clock offset: 0.542 ms
Remote clock offset: -2.797 ms


# Below is generated by plot.py at 2018-07-24 13:50:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 1158.407 ms
Loss rate: 97.59%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 1146.127 ms
Loss rate: 71.15%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1099.421 ms
Loss rate: 64.60%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 1269.460 ms
Loss rate: 99.59%
```
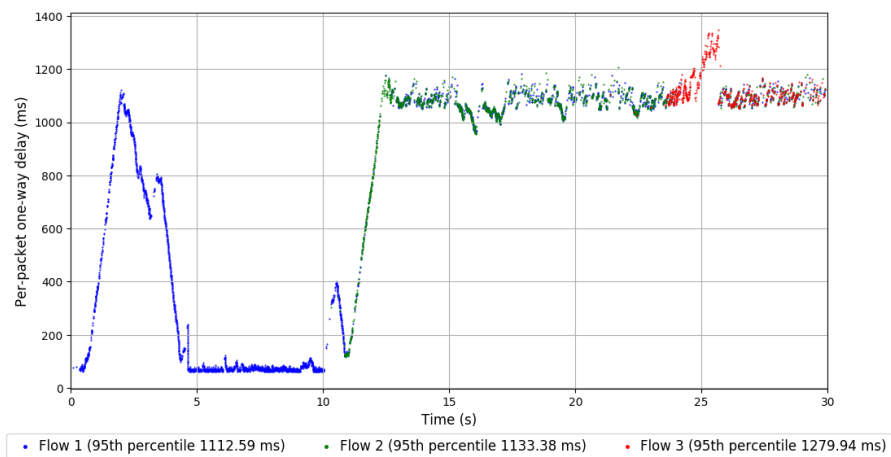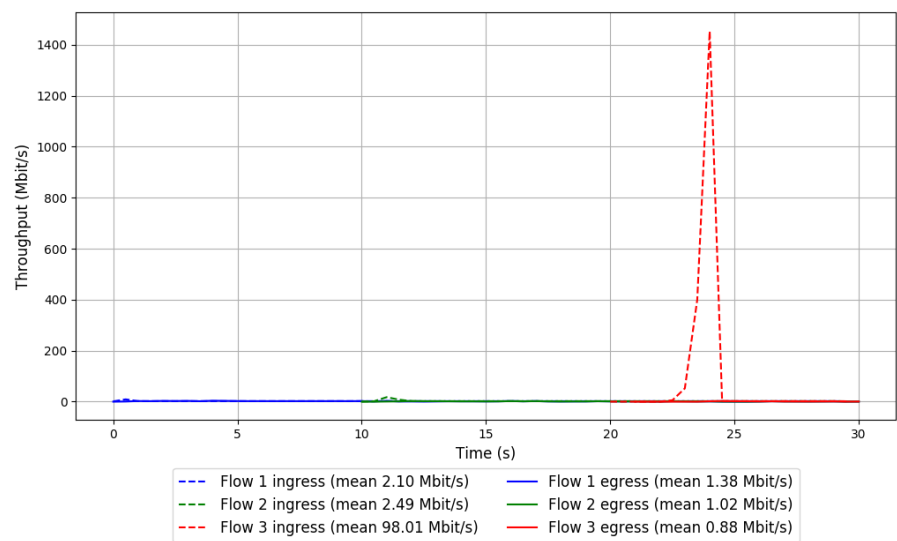
Run 2: Report of PCC-Allegro — Data Link

```
Run 3: Statistics of PCC-Allegro

Start at: 2018-07-24 13:43:37
End at: 2018-07-24 13:44:07
Local clock offset: 0.968 ms
Remote clock offset: 8.093 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 1136.692 ms
Loss rate: 93.63%
-- Flow 1:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 1112.591 ms
Loss rate: 34.58%
-- Flow 2:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 1133.382 ms
Loss rate: 59.51%
-- Flow 3:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 1279.941 ms
Loss rate: 99.22%
```
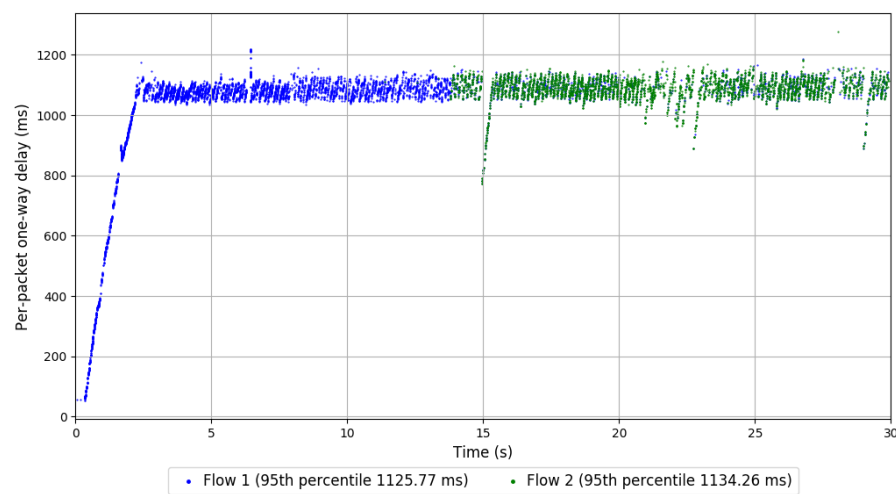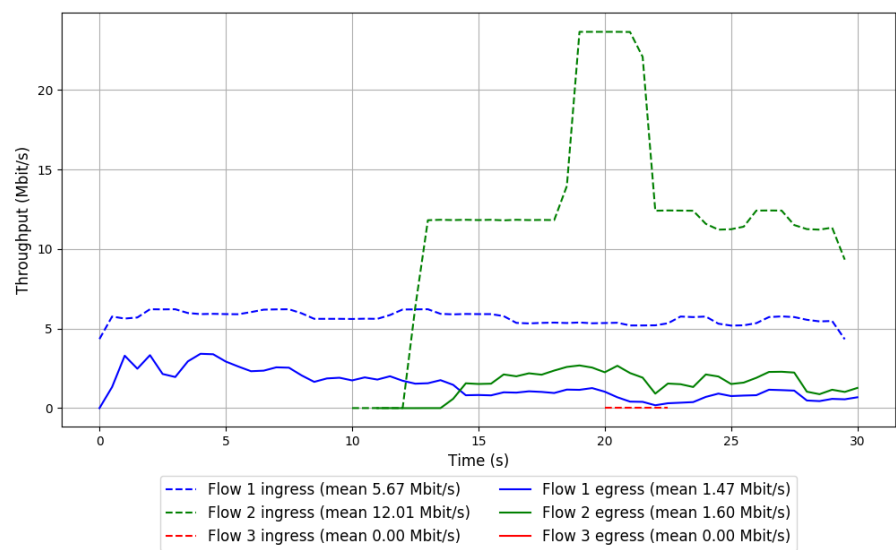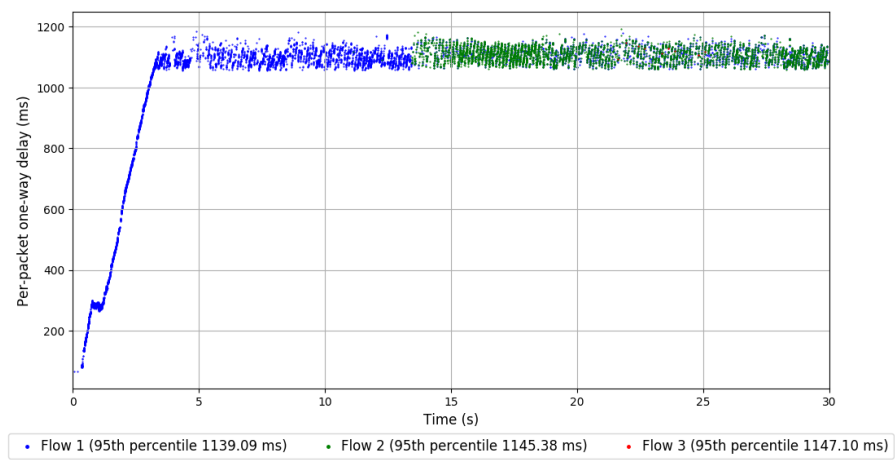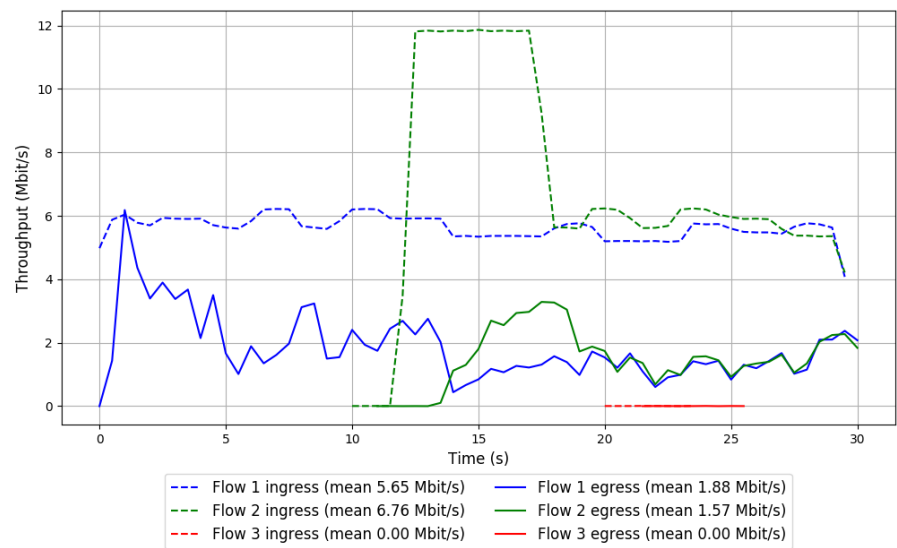
Run 3: Report of PCC-Allegro — Data Link

- - - Flow 1 ingress (mean 2.10 Mbit/s)   —— Flow 1 egress (mean 1.38 Mbit/s)
- - - Flow 2 ingress (mean 2.49 Mbit/s)   —— Flow 2 egress (mean 1.02 Mbit/s)
- - - Flow 3 ingress (mean 98.01 Mbit/s)   —— Flow 3 egress (mean 0.88 Mbit/s)

• Flow 1 (95th percentile 1112.59 ms)   • Flow 2 (95th percentile 1133.38 ms)   • Flow 3 (95th percentile 1279.94 ms)

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```
Run 1: Statistics of PCC-Expr

Start at: 2018-07-24 13:09:06
End at: 2018-07-24 13:09:36
Local clock offset: 3.475 ms
Remote clock offset: -15.855 ms
```

Run 1: Report of PCC-Expr — Data Link

```
Run 2: Statistics of PCC-Expr

Start at: 2018-07-24 13:27:56
End at: 2018-07-24 13:28:26
Local clock offset: 1.898 ms
Remote clock offset: 5.094 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.87 Mbit/s
95th percentile per-packet one-way delay: 1142.038 ms
Loss rate: 71.77%
-- Flow 1:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 1139.091 ms
Loss rate: 66.80%
-- Flow 2:
Average throughput: 1.57 Mbit/s
95th percentile per-packet one-way delay: 1145.375 ms
Loss rate: 78.03%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1147.096 ms
Loss rate: 37.52%
```
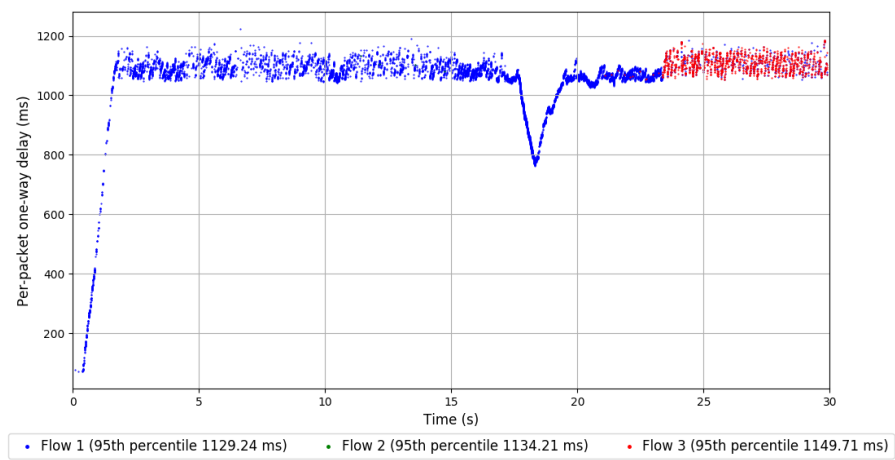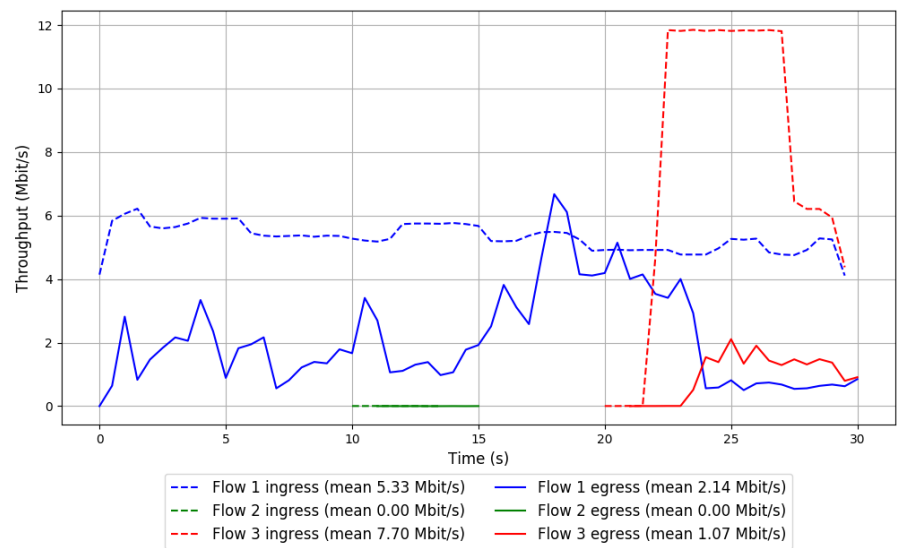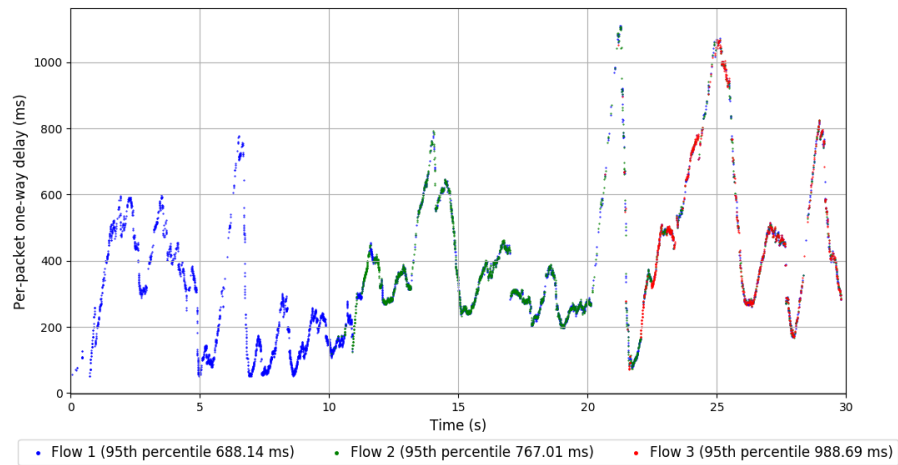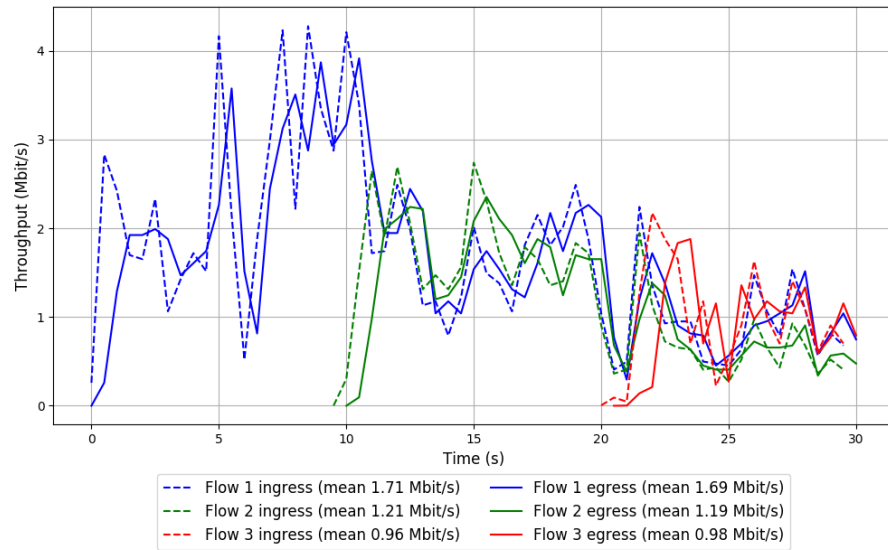
Run 2: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 5.65 Mbit/s)   Flow 1 egress (mean 1.88 Mbit/s)
Flow 2 ingress (mean 6.76 Mbit/s)   Flow 2 egress (mean 1.57 Mbit/s)
Flow 3 ingress (mean 0.00 Mbit/s)   Flow 3 egress (mean 0.00 Mbit/s)

• Flow 1 (95th percentile 1139.09 ms)   • Flow 2 (95th percentile 1145.38 ms)   • Flow 3 (95th percentile 1147.10 ms)

```
Run 3: Statistics of PCC-Expr

Start at: 2018-07-24 13:46:56
End at: 2018-07-24 13:47:26
Local clock offset: 3.452 ms
Remote clock offset: 4.281 ms

# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.45 Mbit/s
95th percentile per-packet one-way delay: 1135.910 ms
Loss rate: 68.90%
-- Flow 1:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 1129.242 ms
Loss rate: 59.98%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1134.211 ms
Loss rate: 70.33%
-- Flow 3:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 1149.715 ms
Loss rate: 87.59%
```

Run 3: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 5.33 Mbit/s)   Flow 1 egress (mean 2.14 Mbit/s)
Flow 2 ingress (mean 0.00 Mbit/s)   Flow 2 egress (mean 0.00 Mbit/s)
Flow 3 ingress (mean 7.70 Mbit/s)   Flow 3 egress (mean 1.07 Mbit/s)

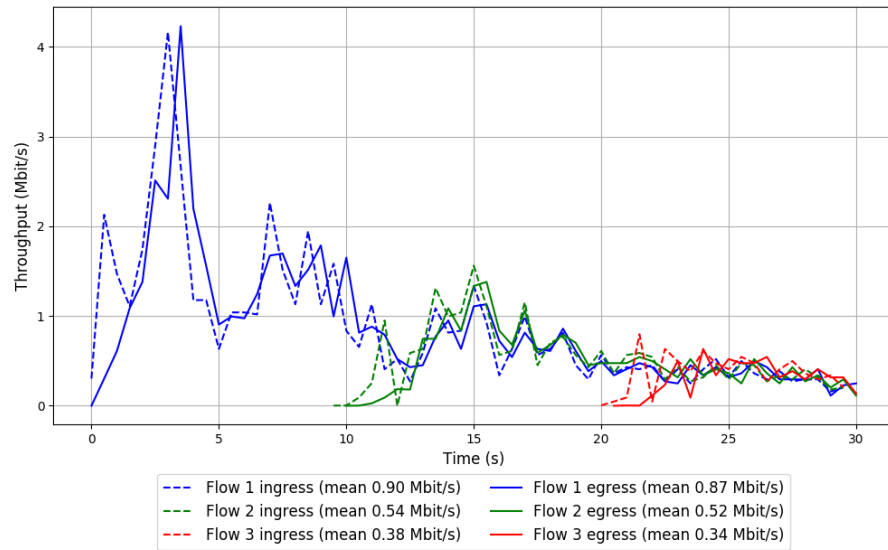Flow 1 (95th percentile 1129.24 ms)   Flow 2 (95th percentile 1134.21 ms)   Flow 3 (95th percentile 1149.71 ms)

```
Run 1: Statistics of QUIC Cubic

Start at: 2018-07-24 12:56:56
End at: 2018-07-24 12:57:26
Local clock offset: 0.715 ms
Remote clock offset: -12.278 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 765.411 ms
Loss rate: 2.07%
-- Flow 1:
Average throughput: 1.69 Mbit/s
95th percentile per-packet one-way delay: 688.145 ms
Loss rate: 1.53%
-- Flow 2:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 767.008 ms
Loss rate: 2.17%
-- Flow 3:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 988.688 ms
Loss rate: 4.72%
```

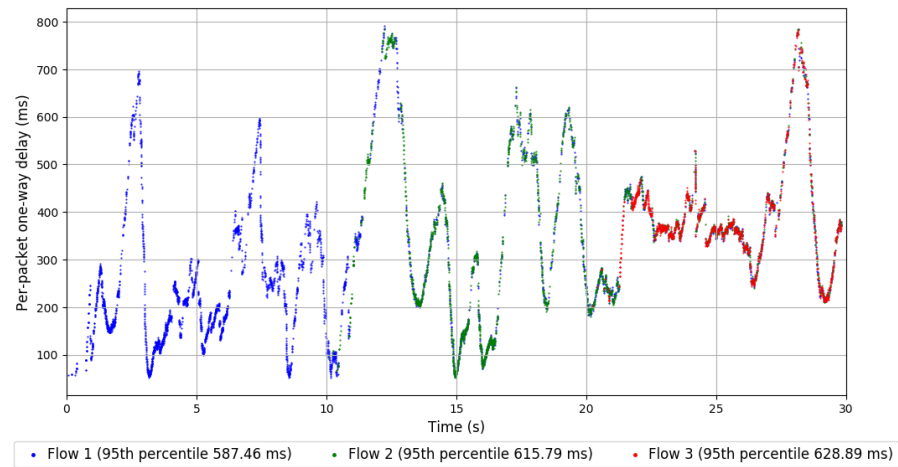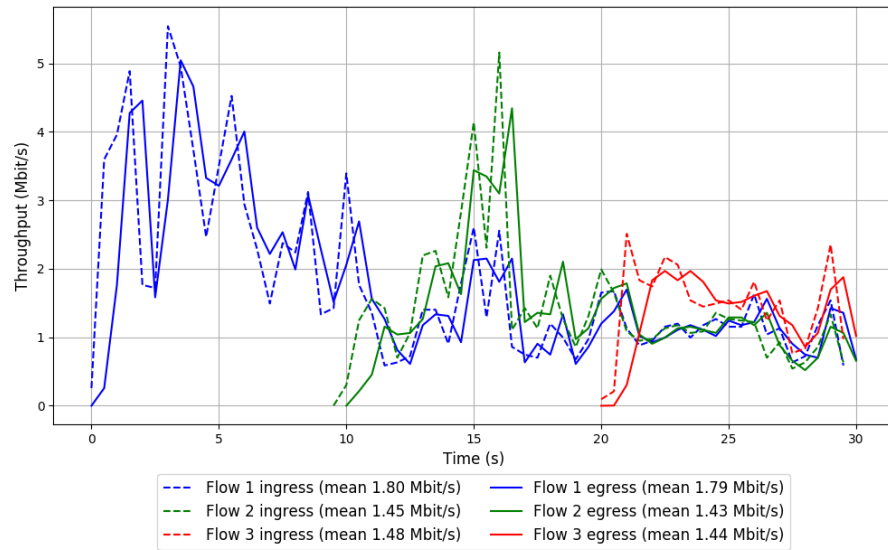Run 1: Report of QUIC Cubic — Data Link

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-07-24 13:15:45
End at: 2018-07-24 13:16:15
Local clock offset: 2.307 ms
Remote clock offset: -1.143 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 1021.394 ms
Loss rate: 4.76%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 964.971 ms
Loss rate: 2.67%
-- Flow 2:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 1041.491 ms
Loss rate: 5.60%
-- Flow 3:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 1084.415 ms
Loss rate: 17.46%
```

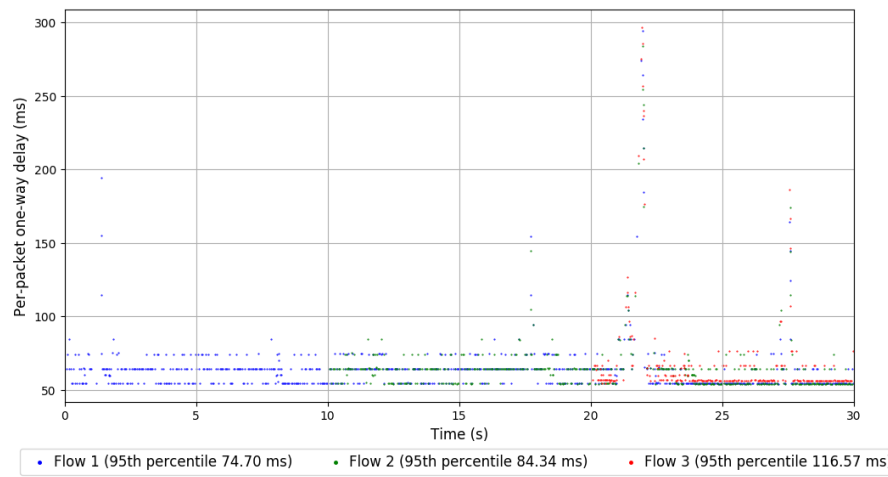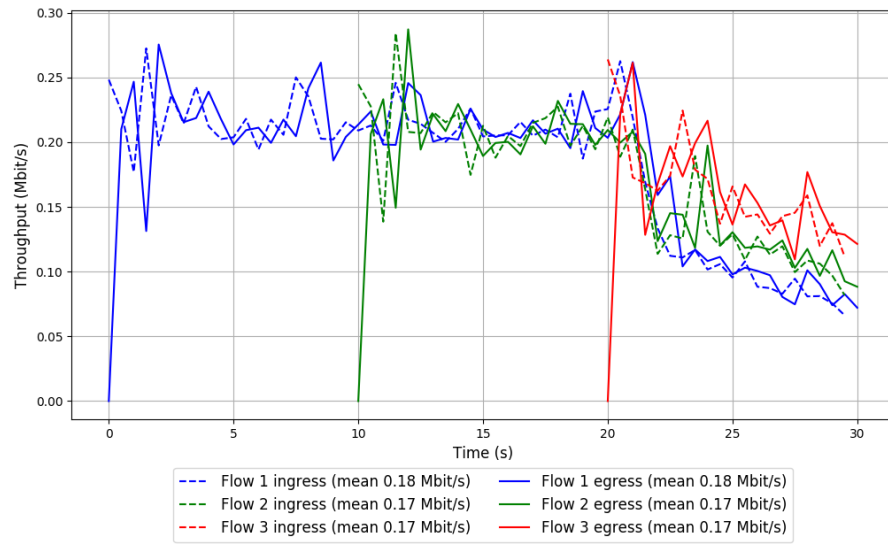Run 2: Report of QUIC Cubic — Data Link

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-07-24 13:34:40
End at: 2018-07-24 13:35:10
Local clock offset: 3.241 ms
Remote clock offset: -2.301 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.20 Mbit/s
95th percentile per-packet one-way delay: 598.178 ms
Loss rate: 1.93%
-- Flow 1:
Average throughput: 1.79 Mbit/s
95th percentile per-packet one-way delay: 587.455 ms
Loss rate: 1.18%
-- Flow 2:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 615.786 ms
Loss rate: 1.92%
-- Flow 3:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 628.895 ms
Loss rate: 4.76%
```

Run 3: Report of QUIC Cubic — Data Link

```
Run 1: Statistics of SCReAM

Start at: 2018-07-24 13:11:20
End at: 2018-07-24 13:11:50
Local clock offset: 1.232 ms
Remote clock offset: -4.992 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 84.365 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 74.702 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 84.341 ms
Loss rate: 0.35%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 116.571 ms
Loss rate: 0.29%
```
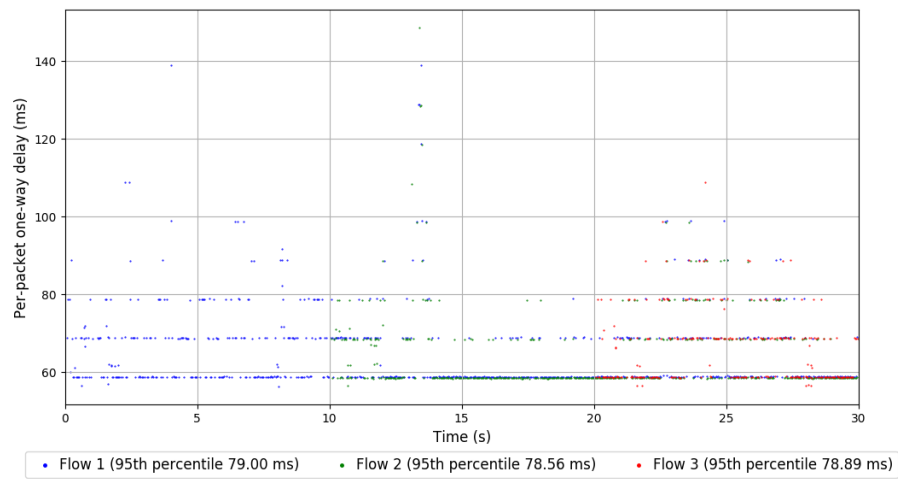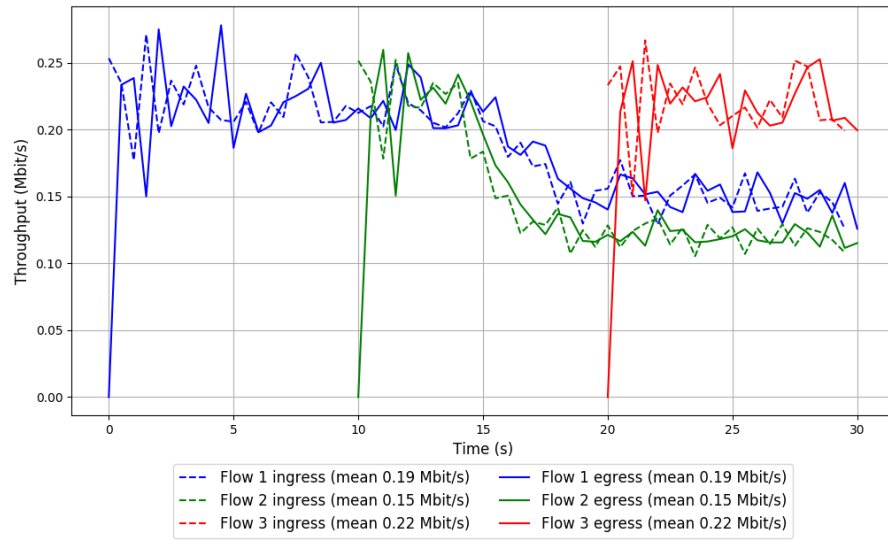
Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2018-07-24 13:30:15
End at: 2018-07-24 13:30:45
Local clock offset: 2.697 ms
Remote clock offset: 0.555 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 78.890 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 78.998 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 78.563 ms
Loss rate: 0.16%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 78.889 ms
Loss rate: 0.35%
```
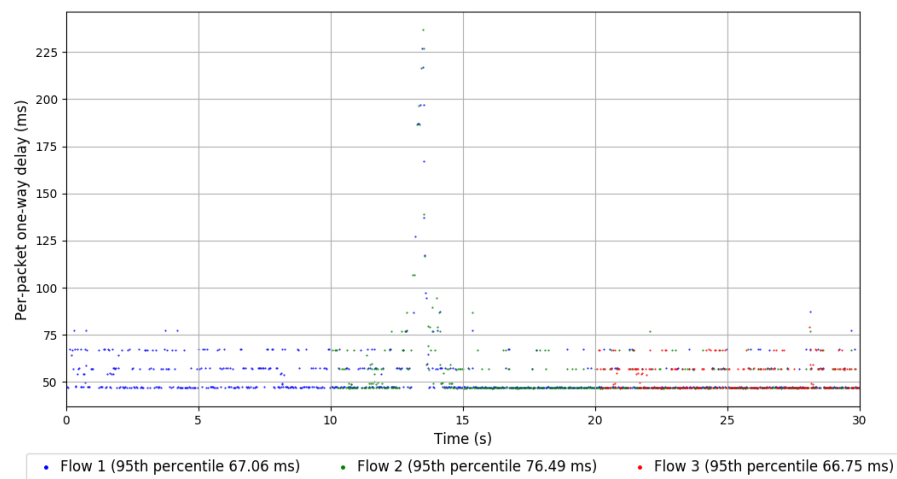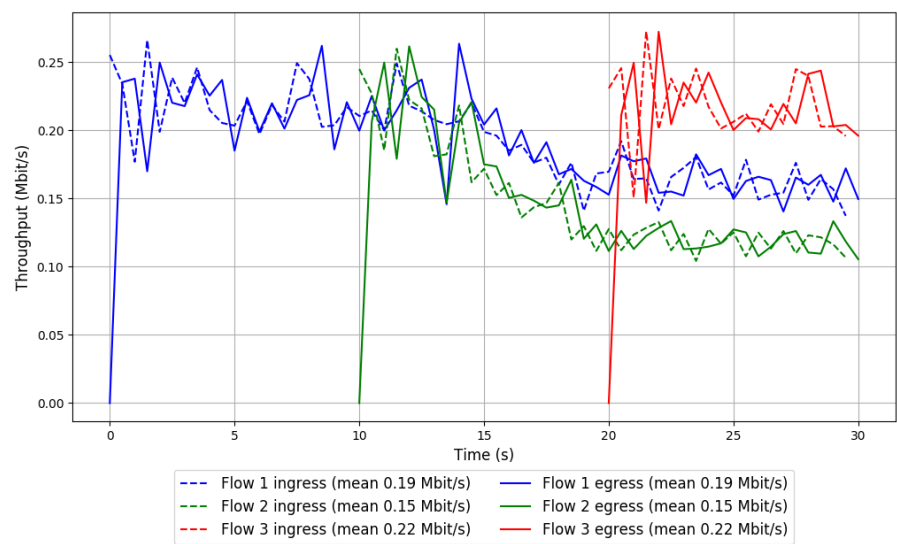
Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2018-07-24 13:49:08
End at: 2018-07-24 13:49:38
Local clock offset: 3.406 ms
Remote clock offset: -2.765 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 67.007 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 67.065 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 76.491 ms
Loss rate: 0.16%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 66.750 ms
Loss rate: 0.35%
```
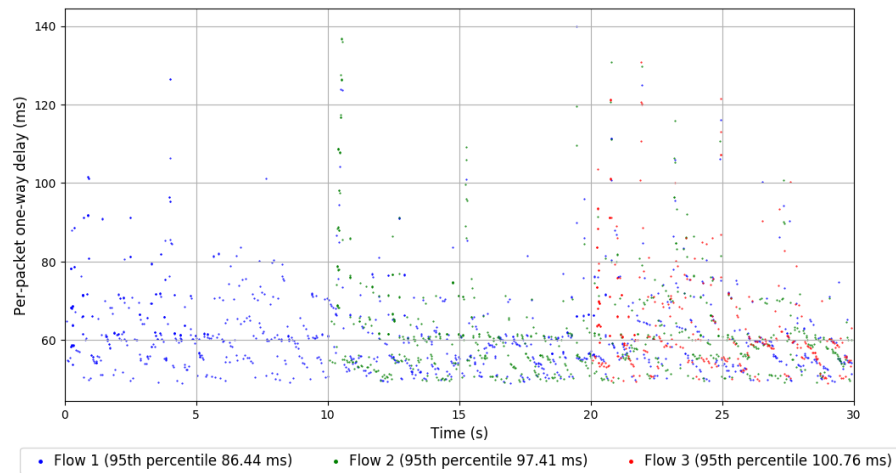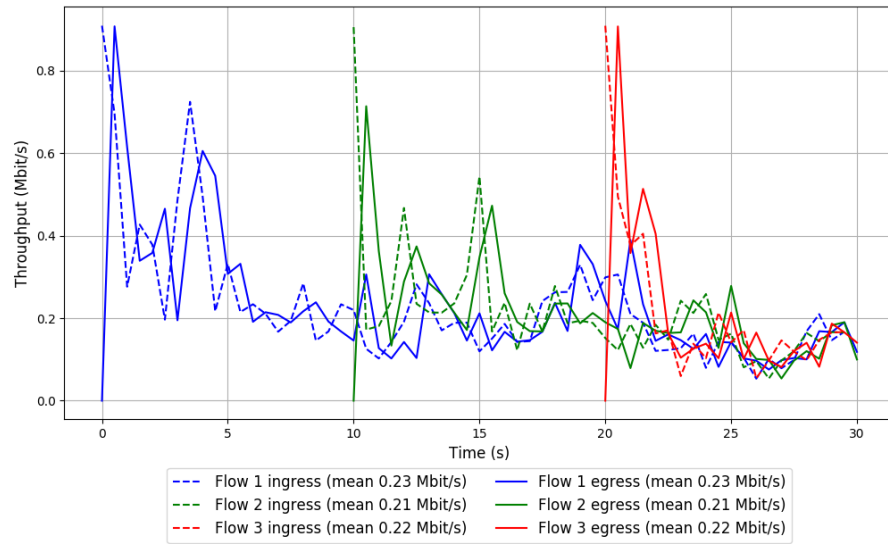
Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of Sprout

Start at: 2018-07-24 12:54:43
End at: 2018-07-24 12:55:13
Local clock offset: 1.9 ms
Remote clock offset: -10.906 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 91.245 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 86.436 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 97.413 ms
Loss rate: 0.79%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 100.762 ms
Loss rate: 0.63%
```
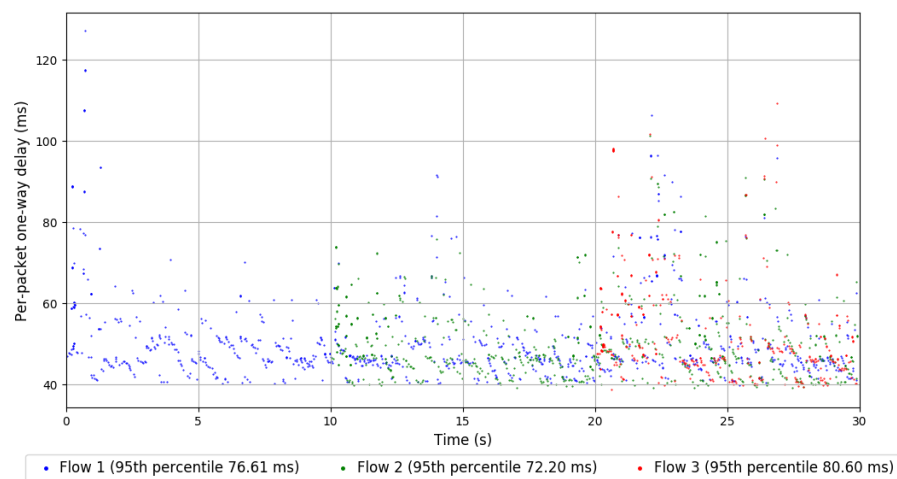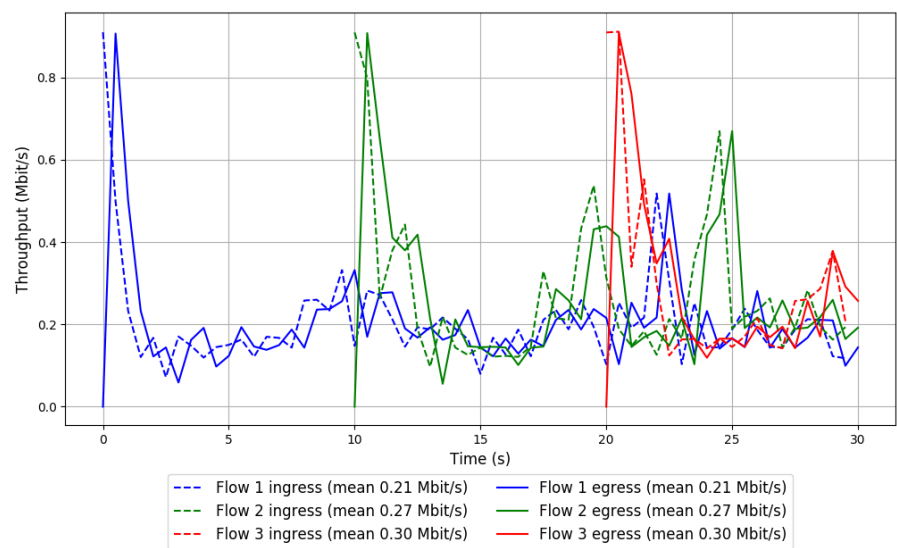
Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-07-24 13:13:33
End at: 2018-07-24 13:14:03
Local clock offset: 3.157 ms
Remote clock offset: -15.758 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 76.312 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 76.615 ms
Loss rate: 0.16%
-- Flow 2:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 72.204 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 80.602 ms
Loss rate: 0.65%
```
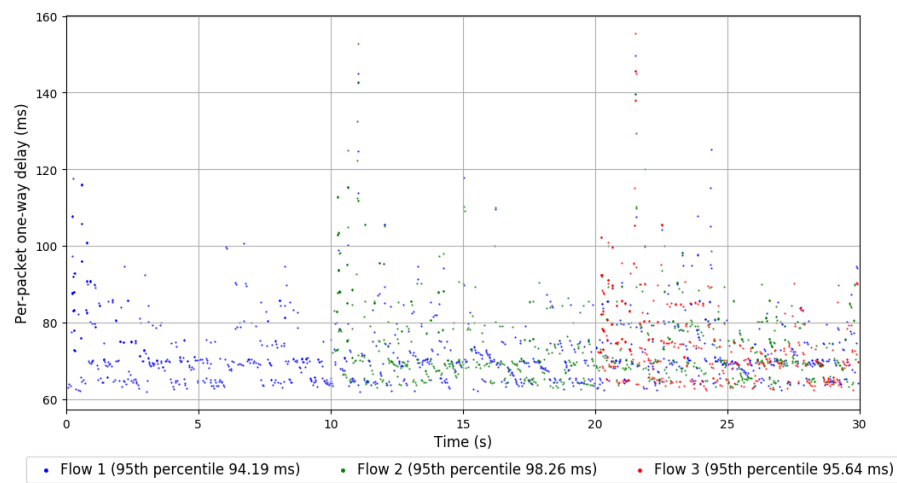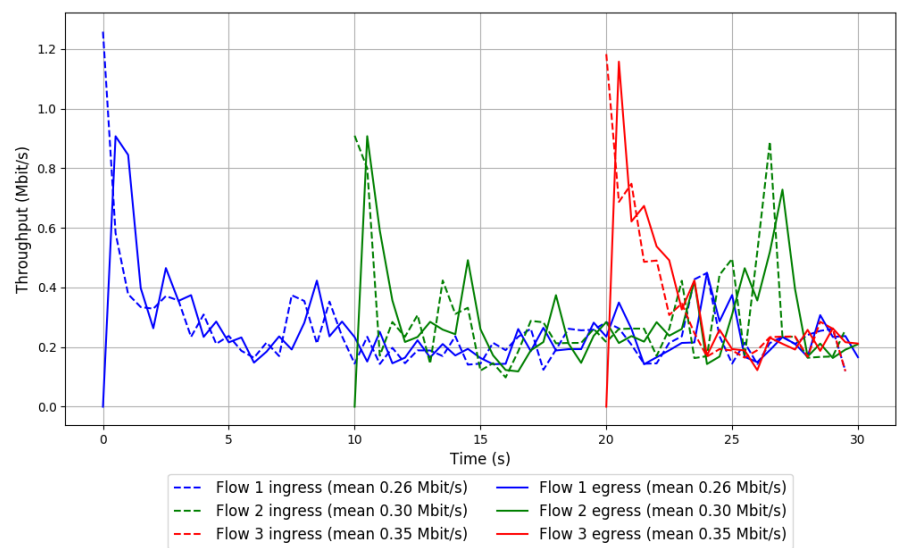
Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2018-07-24 13:32:27
End at: 2018-07-24 13:32:57
Local clock offset: 0.963 ms
Remote clock offset: 7.25 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 95.643 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 94.189 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 98.263 ms
Loss rate: 0.43%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 95.643 ms
Loss rate: 0.00%
```
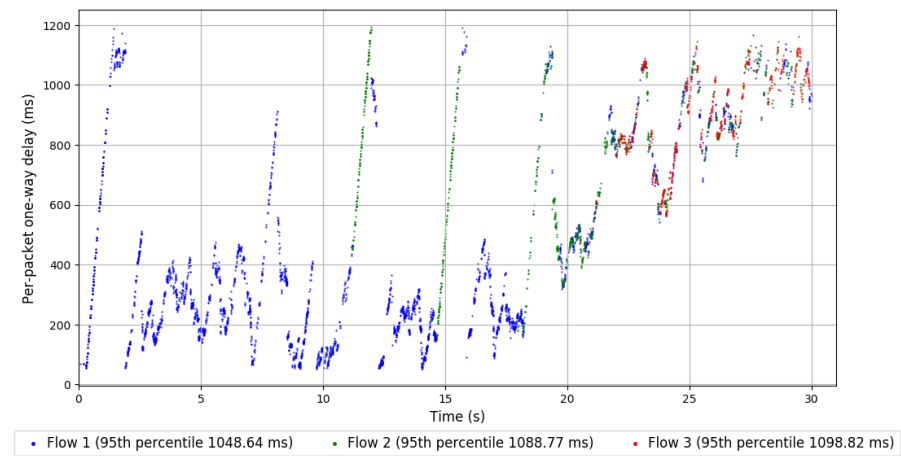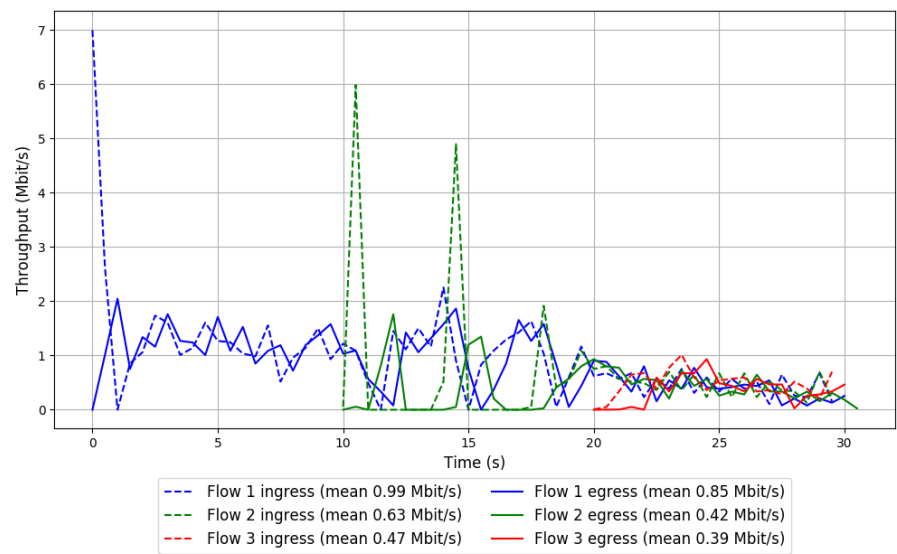
Run 3: Report of Sprout — Data Link

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

Start at: 2018-07-24 12:59:09
End at: 2018-07-24 12:59:39
Local clock offset: 0.717 ms
Remote clock offset: -10.662 ms


# Below is generated by plot.py at 2018-07-24 13:50:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 1071.058 ms
Loss rate: 19.76%
-- Flow 1:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 1048.644 ms
Loss rate: 13.95%
-- Flow 2:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 1088.767 ms
Loss rate: 33.17%
-- Flow 3:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 1098.816 ms
Loss rate: 20.83%
```

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

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

Start at: 2018-07-24 13:17:58
End at: 2018-07-24 13:18:28
Local clock offset: 2.789 ms
Remote clock offset: 6.597 ms

# Below is generated by plot.py at 2018-07-24 13:50:24
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 1038.609 ms
Loss rate: 8.65%
-- Flow 1:
Average throughput: 1.62 Mbit/s
95th percentile per-packet one-way delay: 703.482 ms
Loss rate: 2.58%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 1063.200 ms
Loss rate: 14.04%
-- Flow 3:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 1123.989 ms
Loss rate: 37.09%
```
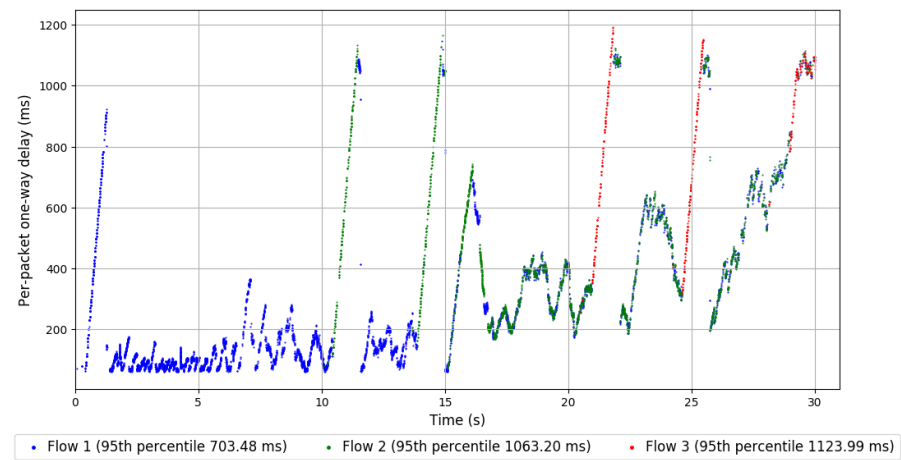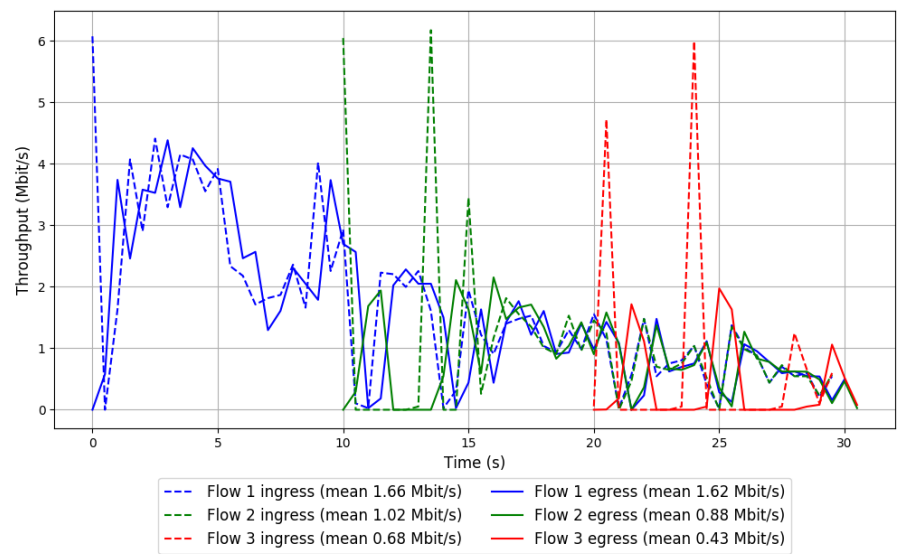
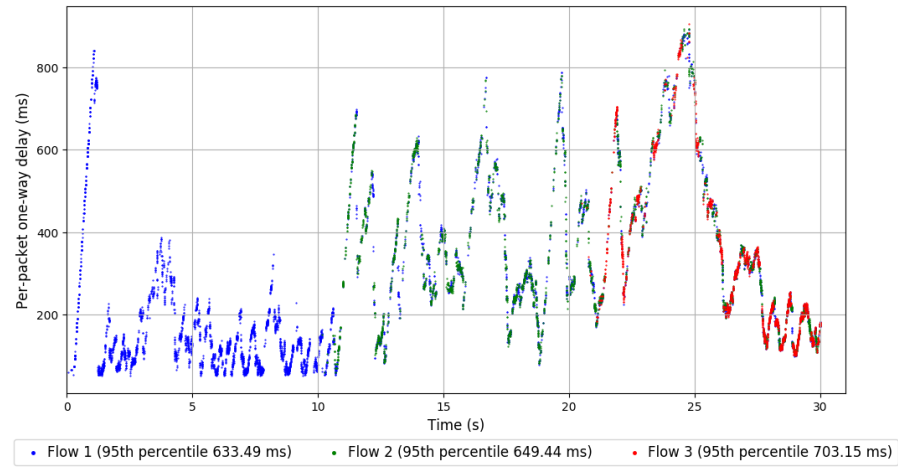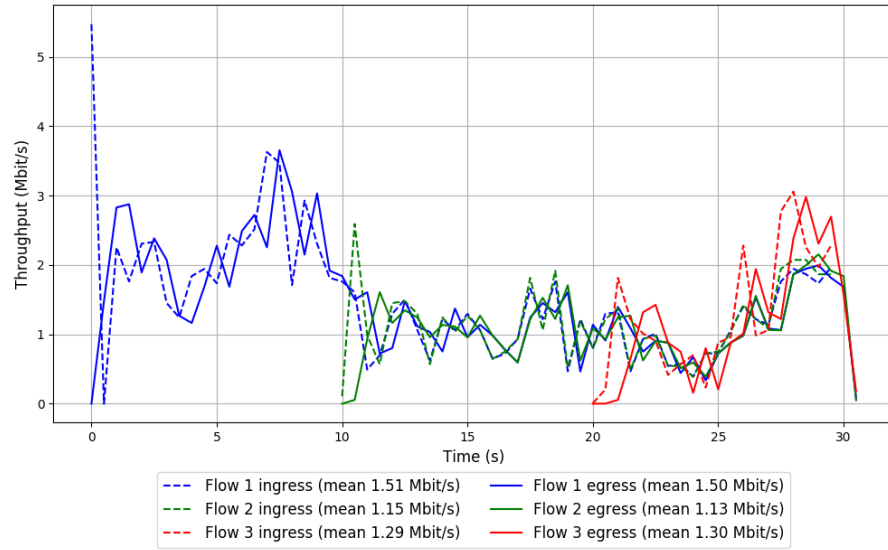Run 2: Report of TaoVA-100x — Data Link

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

Start at: 2018-07-24 13:36:56
End at: 2018-07-24 13:37:26
Local clock offset: 0.436 ms
Remote clock offset: -3.899 ms


# Below is generated by plot.py at 2018-07-24 13:50:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.66 Mbit/s
95th percentile per-packet one-way delay: 659.331 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 633.491 ms
Loss rate: 0.88%
-- Flow 2:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 649.437 ms
Loss rate: 1.92%
-- Flow 3:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 703.146 ms
Loss rate: 3.30%
```

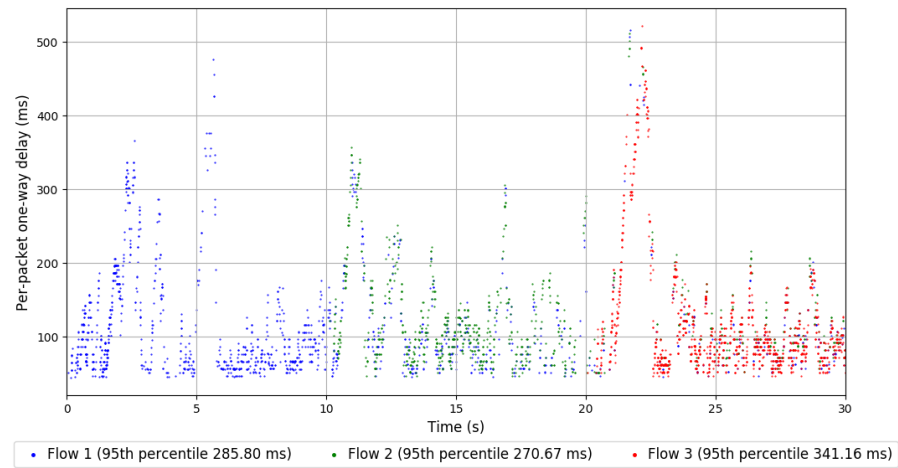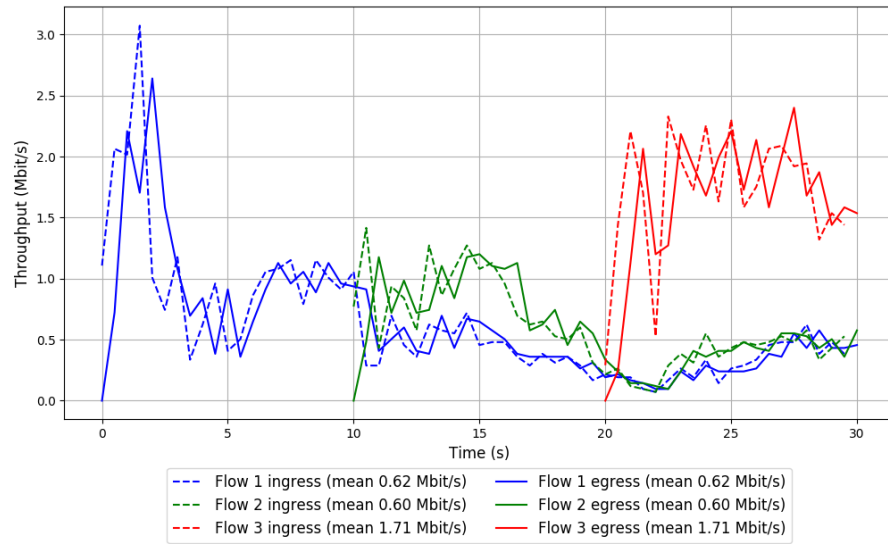## Run 3: Report of TaoVA-100x — Data Link

```
Run 1: Statistics of TCP Vegas

Start at: 2018-07-24 13:02:28
End at: 2018-07-24 13:02:58
Local clock offset: 2.391 ms
Remote clock offset: -19.557 ms


# Below is generated by plot.py at 2018-07-24 13:50:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 291.371 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 285.804 ms
Loss rate: 0.45%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 270.669 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 341.158 ms
Loss rate: 0.56%
```

Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2018-07-24 13:21:17
End at: 2018-07-24 13:21:47
Local clock offset: 2.568 ms
Remote clock offset: 5.951 ms


# Below is generated by plot.py at 2018-07-24 13:50:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 349.166 ms
Loss rate: 1.46%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 400.543 ms
Loss rate: 1.44%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 280.252 ms
Loss rate: 0.94%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 425.166 ms
Loss rate: 2.65%
```
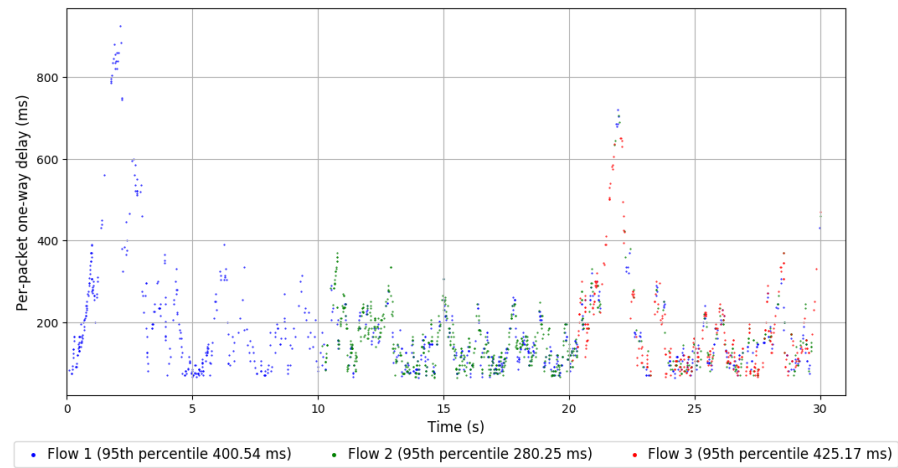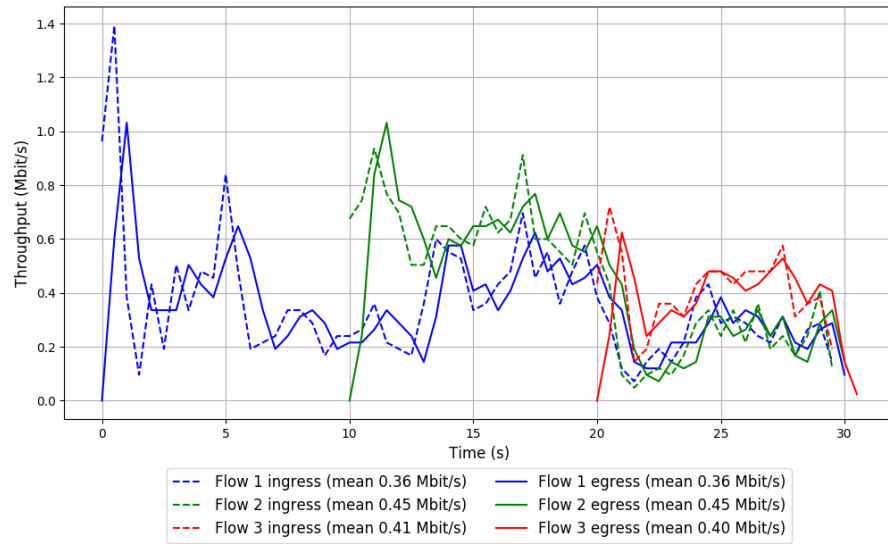
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-07-24 13:40:19
End at: 2018-07-24 13:40:49
Local clock offset: 2.491 ms
Remote clock offset: 4.717 ms


# Below is generated by plot.py at 2018-07-24 13:50:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.41 Mbit/s
95th percentile per-packet one-way delay: 263.197 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 242.843 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 280.329 ms
Loss rate: 0.33%
-- Flow 3:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 368.085 ms
Loss rate: 0.38%
```
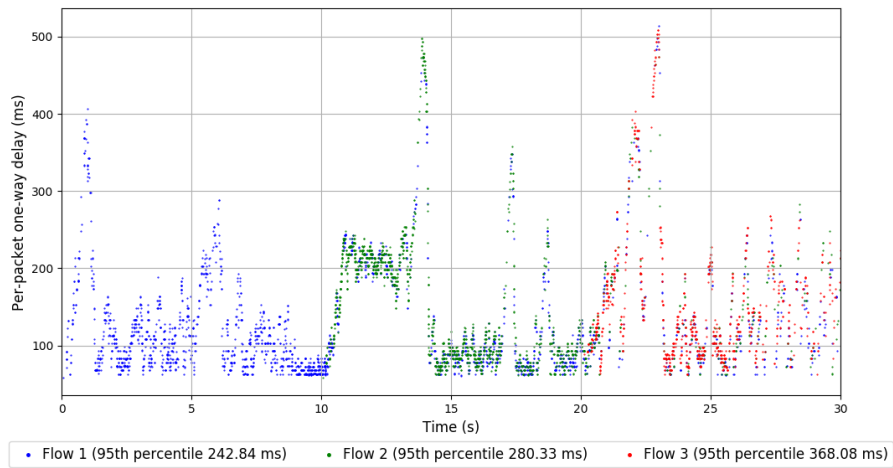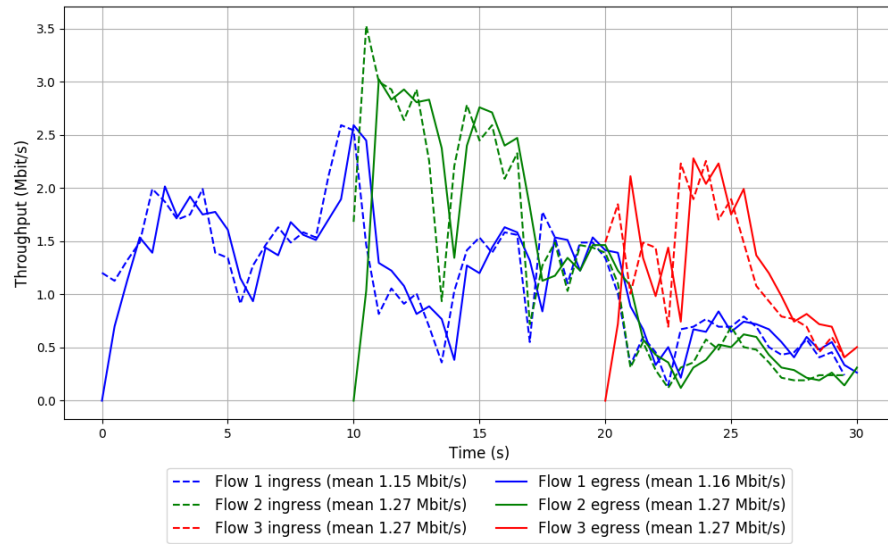
Run 3: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 1.15 Mbit/s)   Flow 1 egress (mean 1.16 Mbit/s)
Flow 2 ingress (mean 1.27 Mbit/s)   Flow 2 egress (mean 1.27 Mbit/s)
Flow 3 ingress (mean 1.27 Mbit/s)   Flow 3 egress (mean 1.27 Mbit/s)

Flow 1 (95th percentile 242.84 ms)   Flow 2 (95th percentile 280.33 ms)   Flow 3 (95th percentile 368.08 ms)
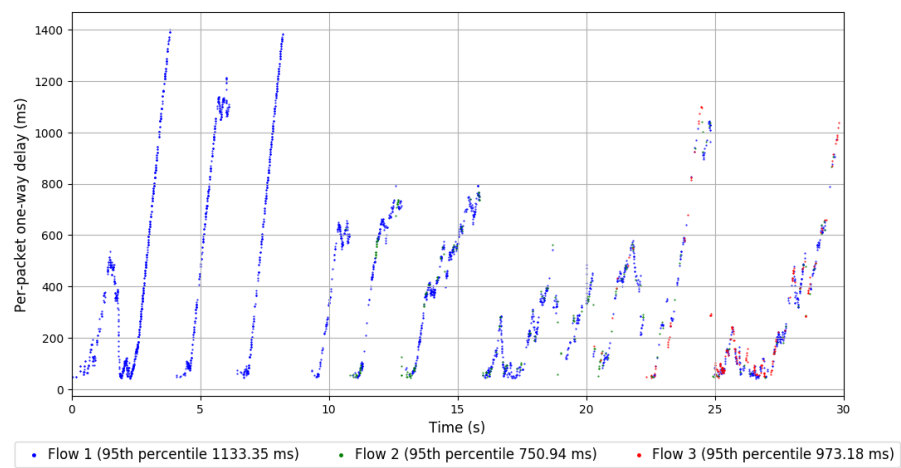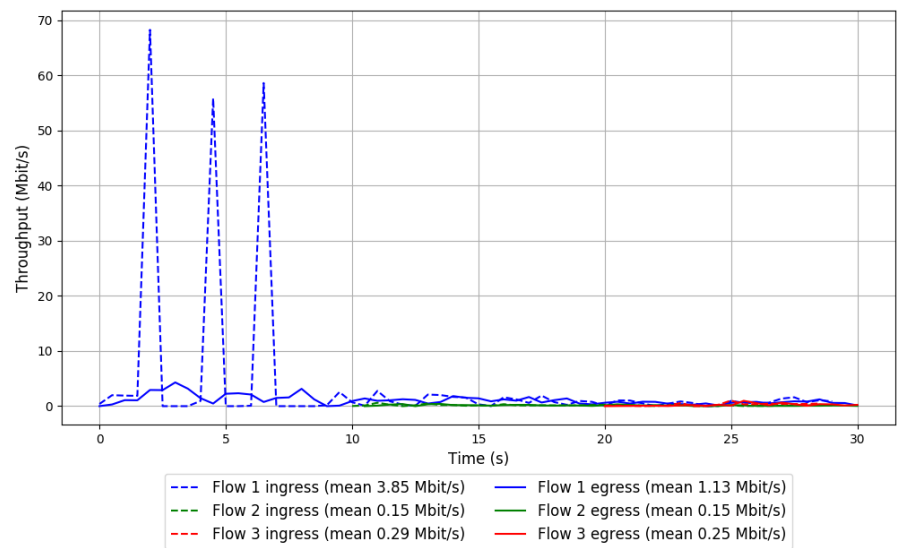
```
Run 1: Statistics of Verus

Start at: 2018-07-24 13:00:15
End at: 2018-07-24 13:00:45
Local clock offset: 0.85 ms
Remote clock offset: -20.815 ms


# Below is generated by plot.py at 2018-07-24 13:50:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 1119.837 ms
Loss rate: 67.46%
-- Flow 1:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 1133.346 ms
Loss rate: 70.46%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 750.940 ms
Loss rate: 5.98%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 973.177 ms
Loss rate: 5.63%
```

Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2018-07-24 13:19:04
End at: 2018-07-24 13:19:34
Local clock offset: 0.883 ms
Remote clock offset: 0.521 ms


# Below is generated by plot.py at 2018-07-24 13:50:26
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 1010.434 ms
Loss rate: 6.98%
-- Flow 1:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 894.084 ms
Loss rate: 6.60%
-- Flow 2:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 1011.972 ms
Loss rate: 7.43%
-- Flow 3:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 1042.019 ms
Loss rate: 7.87%
```
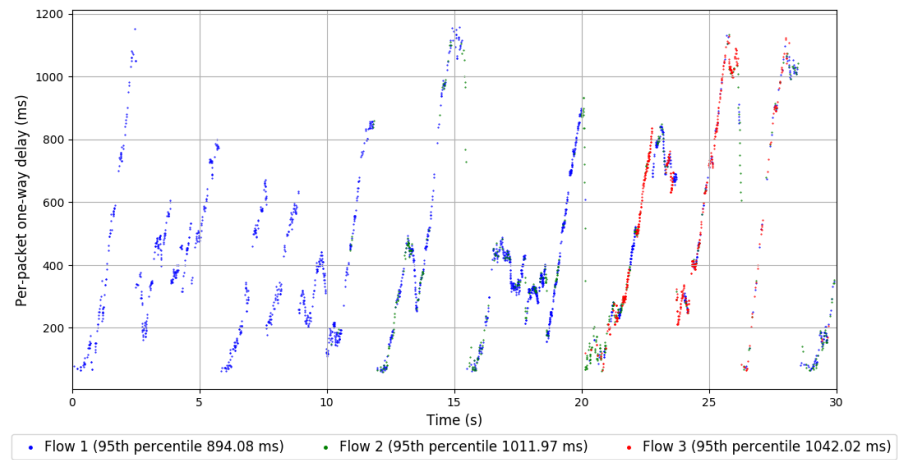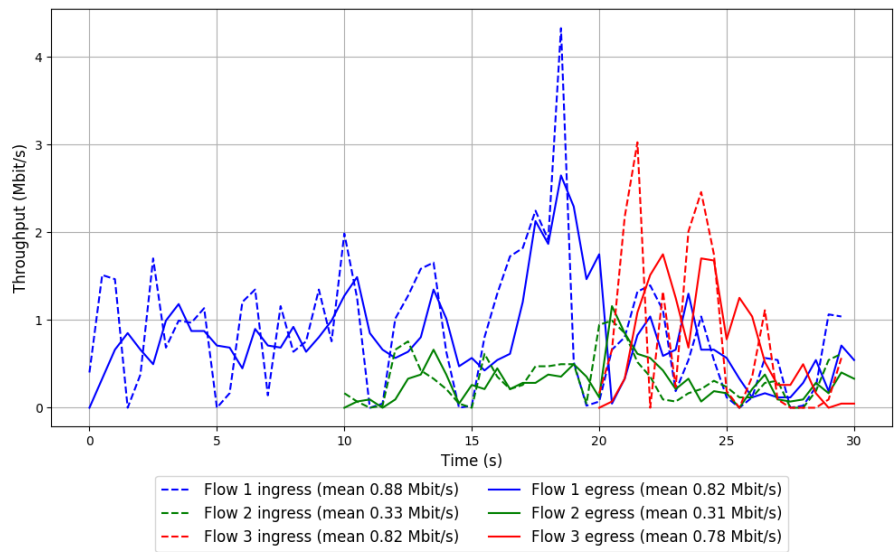
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2018-07-24 13:38:02
End at: 2018-07-24 13:38:32
Local clock offset: 0.757 ms
Remote clock offset: 1.889 ms


# Below is generated by plot.py at 2018-07-24 13:50:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.95 Mbit/s
95th percentile per-packet one-way delay: 1037.955 ms
Loss rate: 5.87%
-- Flow 1:
Average throughput: 2.55 Mbit/s
95th percentile per-packet one-way delay: 955.754 ms
Loss rate: 3.33%
-- Flow 2:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 1078.089 ms
Loss rate: 10.16%
-- Flow 3:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 1061.331 ms
Loss rate: 9.52%
```
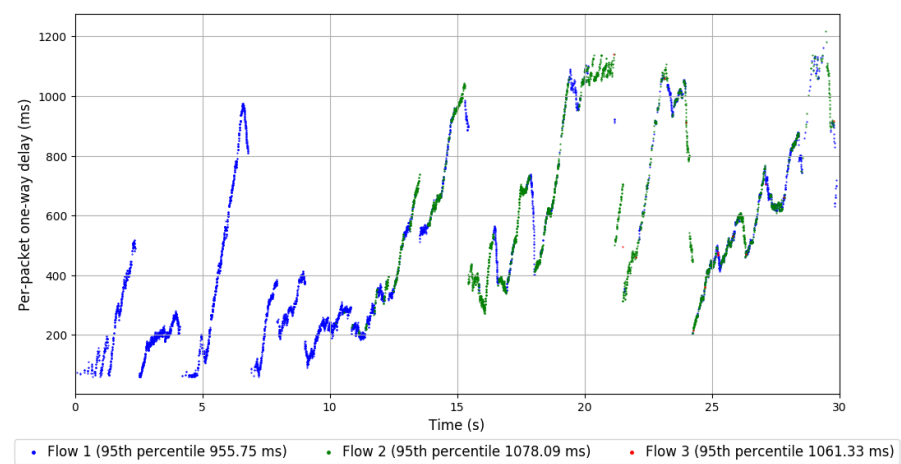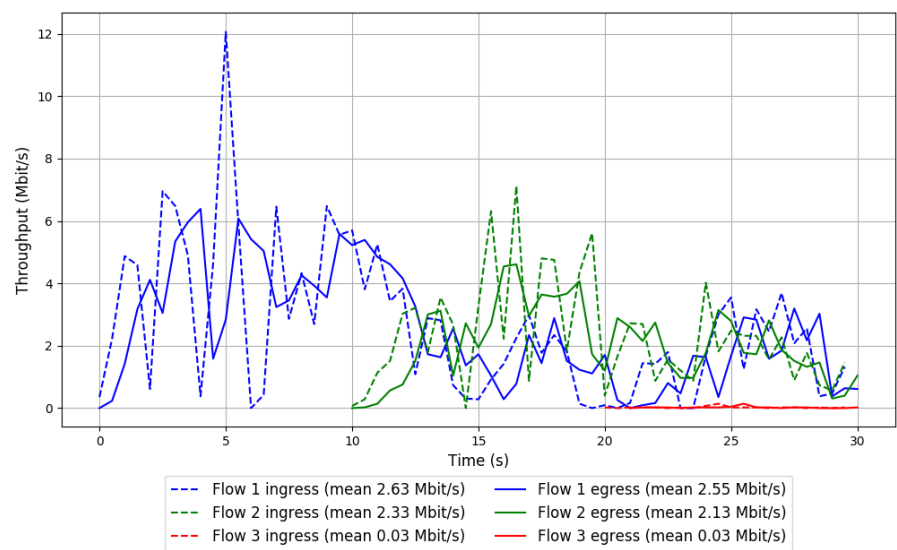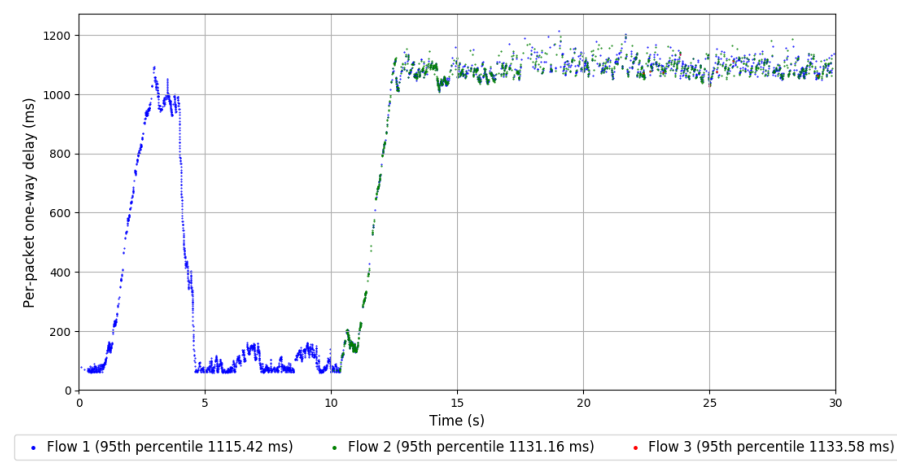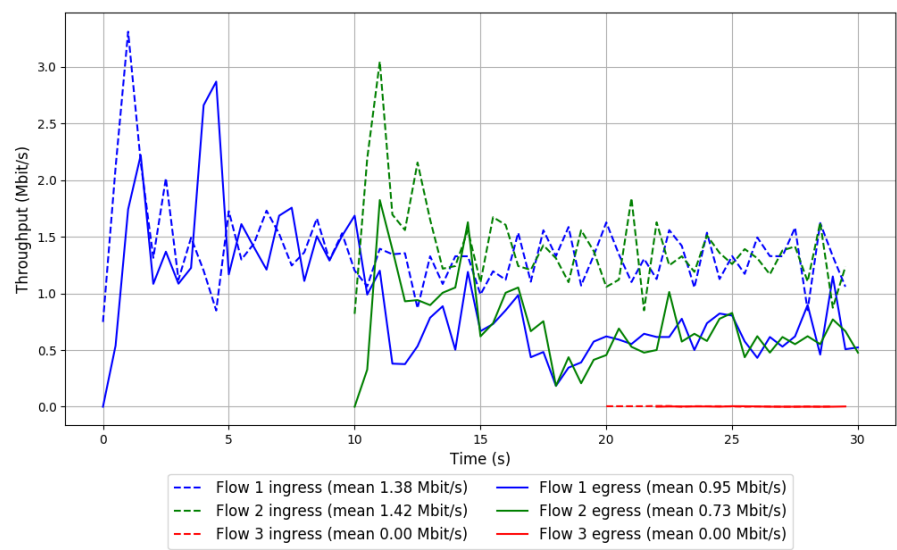
Run 3: Report of Verus — Data Link

```
Run 1: Statistics of PCC-Vivace

Start at: 2018-07-24 13:06:53
End at: 2018-07-24 13:07:23
Local clock offset: 3.102 ms
Remote clock offset: -2.623 ms


# Below is generated by plot.py at 2018-07-24 13:50:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 1121.444 ms
Loss rate: 38.39%
-- Flow 1:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 1115.419 ms
Loss rate: 31.17%
-- Flow 2:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 1131.163 ms
Loss rate: 48.91%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 1133.583 ms
Loss rate: 59.48%
```

Run 1: Report of PCC-Vivace — Data Link

- - - Flow 1 ingress (mean 1.38 Mbit/s)   —— Flow 1 egress (mean 0.95 Mbit/s)
- - - Flow 2 ingress (mean 1.42 Mbit/s)   —— Flow 2 egress (mean 0.73 Mbit/s)
- - - Flow 3 ingress (mean 0.00 Mbit/s)   —— Flow 3 egress (mean 0.00 Mbit/s)

• Flow 1 (95th percentile 1115.42 ms)   • Flow 2 (95th percentile 1131.16 ms)   • Flow 3 (95th percentile 1133.58 ms)

```
Run 2: Statistics of PCC-Vivace

Start at: 2018-07-24 13:25:43
End at: 2018-07-24 13:26:13
Local clock offset: 2.016 ms
Remote clock offset: 4.646 ms


# Below is generated by plot.py at 2018-07-24 13:50:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.32 Mbit/s
95th percentile per-packet one-way delay: 1100.158 ms
Loss rate: 23.21%
-- Flow 1:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 1092.640 ms
Loss rate: 16.04%
-- Flow 2:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 1106.240 ms
Loss rate: 28.03%
-- Flow 3:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 1106.260 ms
Loss rate: 36.09%
```
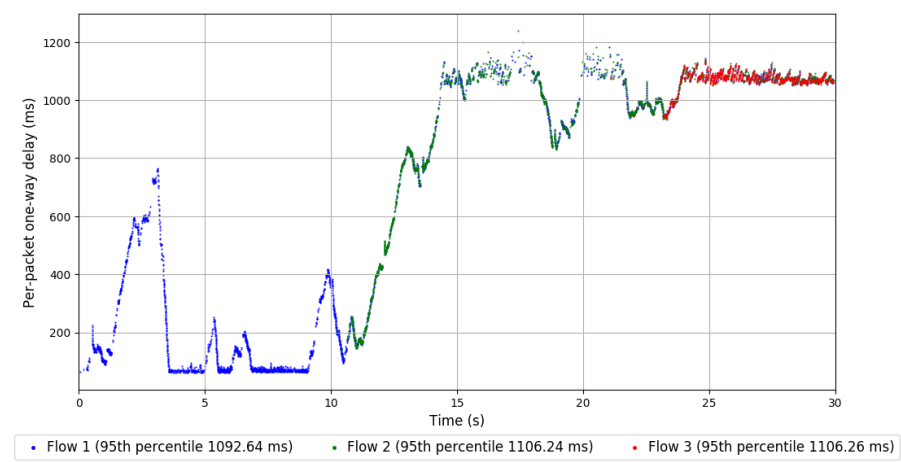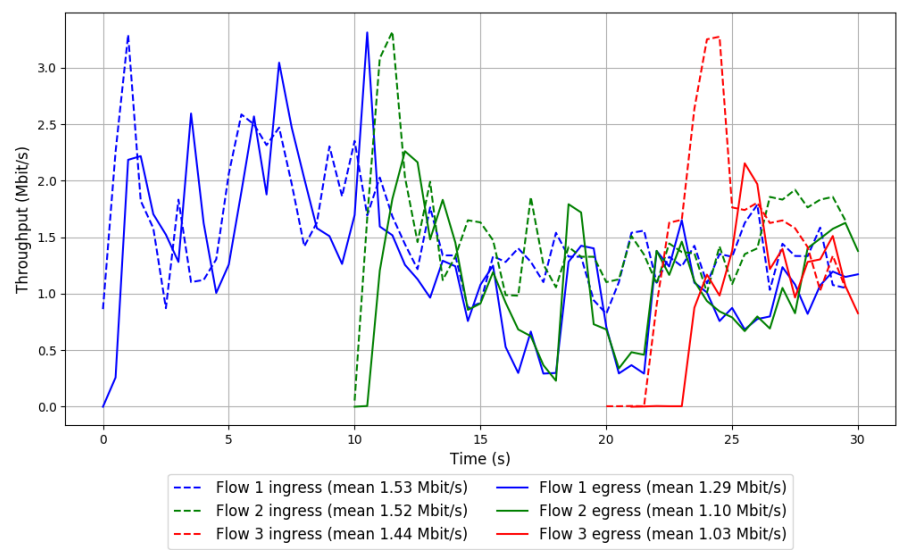
Run 2: Report of PCC-Vivace — Data Link

```
Run 3: Statistics of PCC-Vivace

Start at: 2018-07-24 13:44:44
End at: 2018-07-24 13:45:14
Local clock offset: 1.017 ms
Remote clock offset: 7.131 ms

# Below is generated by plot.py at 2018-07-24 13:50:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 1104.451 ms
Loss rate: 27.54%
-- Flow 1:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 1097.791 ms
Loss rate: 20.33%
-- Flow 2:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 1104.991 ms
Loss rate: 27.98%
-- Flow 3:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 1123.928 ms
Loss rate: 53.10%
```
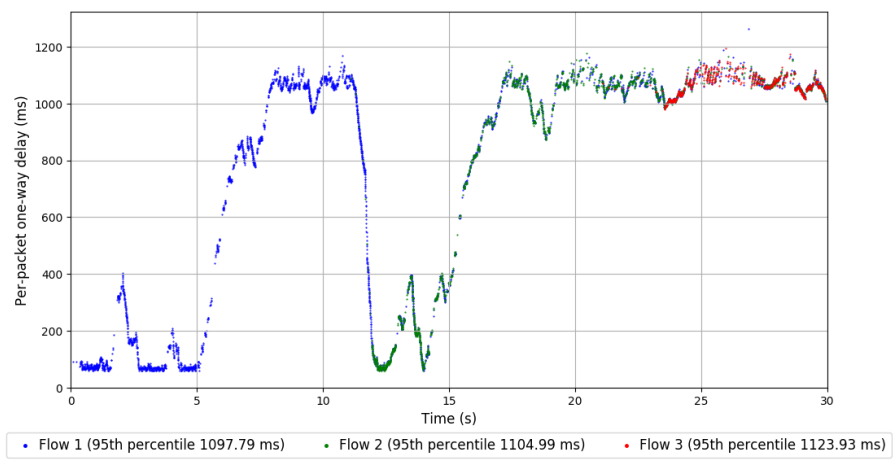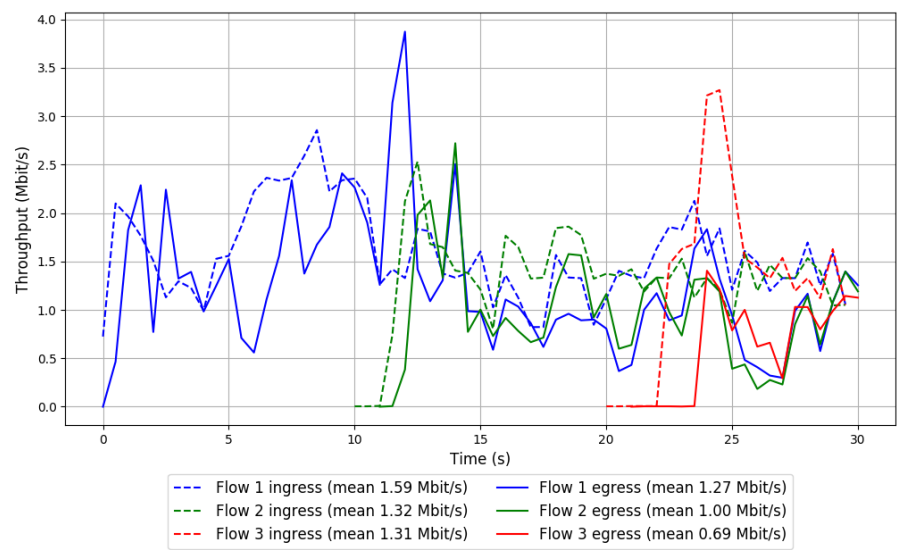
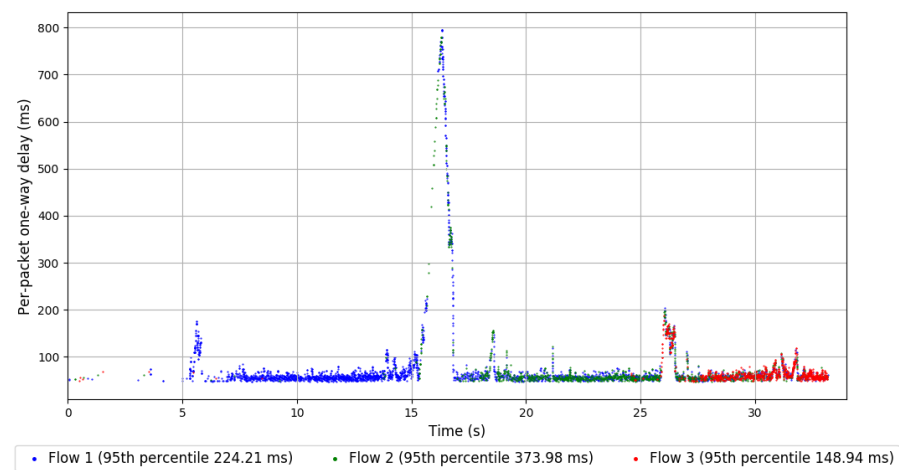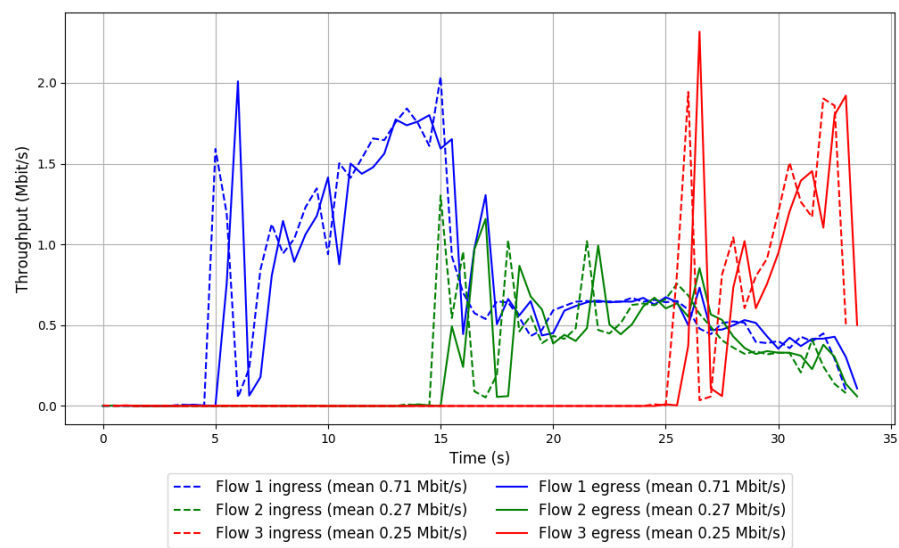Run 3: Report of PCC-Vivace — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2018-07-24 12:55:49
End at: 2018-07-24 12:56:19
Local clock offset: 0.776 ms
Remote clock offset: -15.263 ms


# Below is generated by plot.py at 2018-07-24 13:50:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 203.244 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 224.214 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 373.980 ms
Loss rate: 0.25%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 148.941 ms
Loss rate: 0.86%
```

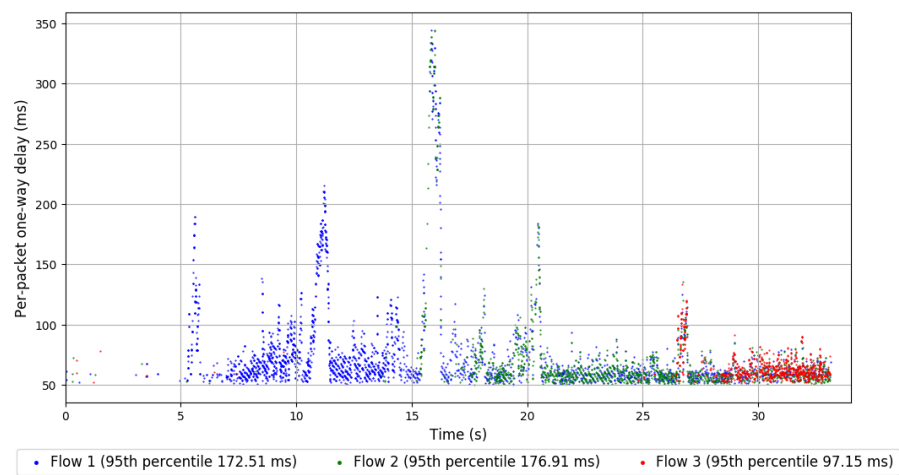Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-07-24 13:14:39
End at: 2018-07-24 13:15:09
Local clock offset: 2.352 ms
Remote clock offset: -4.962 ms


# Below is generated by plot.py at 2018-07-24 13:50:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 161.840 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 172.508 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 176.905 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 97.151 ms
Loss rate: 0.90%
```

Run 2: Report of WebRTC media — Data Link

Flow 1 ingress (mean 0.66 Mbit/s) Flow 1 egress (mean 0.66 Mbit/s)
Flow 2 ingress (mean 0.35 Mbit/s) Flow 2 egress (mean 0.34 Mbit/s)
Flow 3 ingress (mean 0.25 Mbit/s) Flow 3 egress (mean 0.24 Mbit/s)

Flow 1 (95th percentile 172.51 ms)   Flow 2 (95th percentile 176.91 ms)   Flow 3 (95th percentile 97.15 ms)
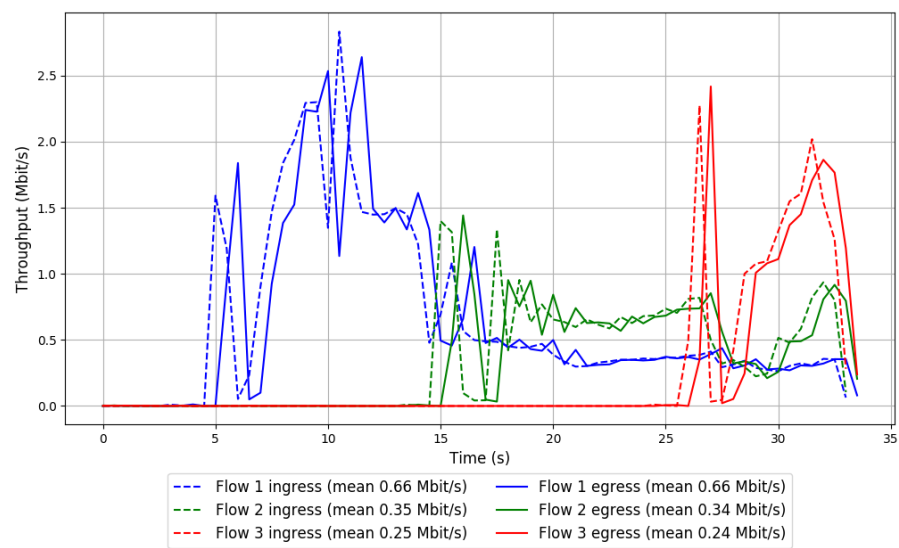
103

```
Run 3: Statistics of WebRTC media

Start at: 2018-07-24 13:33:34
End at: 2018-07-24 13:34:04
Local clock offset: 2.059 ms
Remote clock offset: 4.235 ms


# Below is generated by plot.py at 2018-07-24 13:50:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 341.993 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 396.550 ms
Loss rate: 0.48%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 371.991 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 160.533 ms
Loss rate: 0.17%
```

Run 3: Report of WebRTC media — Data Link

Flow 1 ingress (mean 0.38 Mbit/s)   Flow 1 egress (mean 0.37 Mbit/s)
Flow 2 ingress (mean 0.20 Mbit/s)   Flow 2 egress (mean 0.20 Mbit/s)
Flow 3 ingress (mean 0.19 Mbit/s)   Flow 3 egress (mean 0.19 Mbit/s)

Flow 1 (95th percentile 396.55 ms)   Flow 2 (95th percentile 371.99 ms)   Flow 3 (95th percentile 160.53 ms)