Pantheon Report

Generated at 2018-08-22 01:54:23 (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.

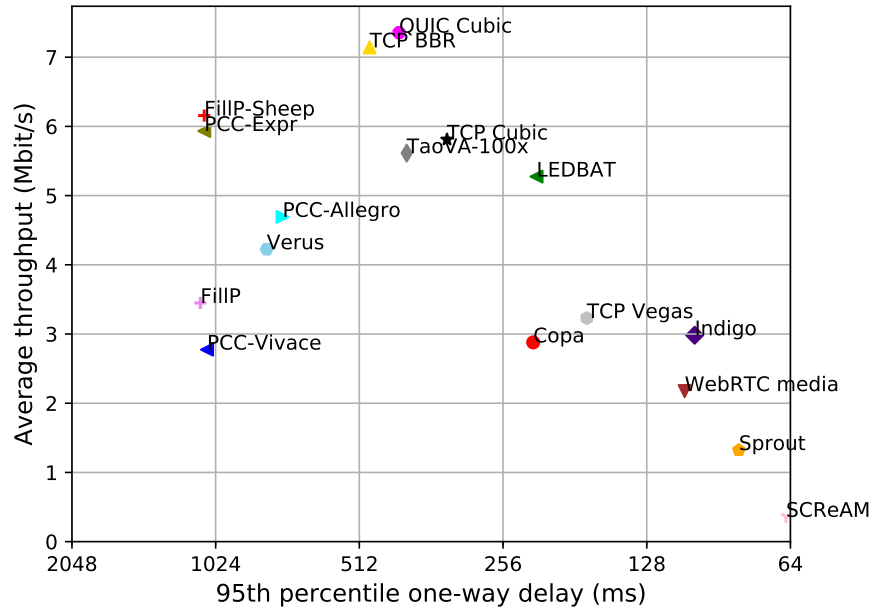NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

```
System info:
Linux 4.15.0-1017-aws
net.core.default_qdisc = fq_codel
net.core.rmem_default = 16777216
net.core.rmem_max = 33554432
net.core.wmem_default = 212992
net.core.wmem_max = 212992
net.ipv4.tcp_rmem = 4096 87380 6291456
net.ipv4.tcp_wmem = 4096 16384 4194304

Git summary:
branch: master @ 7719b900495aa706f8452ab7d4a94dd562e9296e
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
```
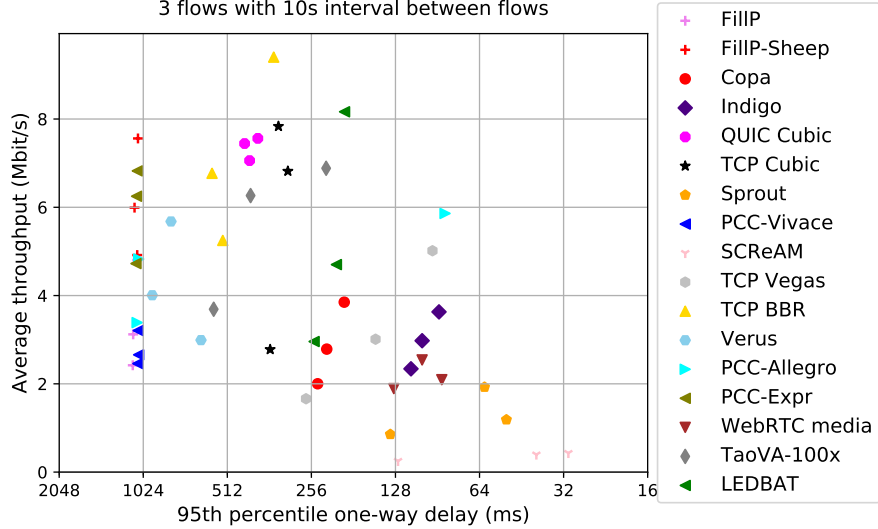
test from AWS India 1 to India ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)

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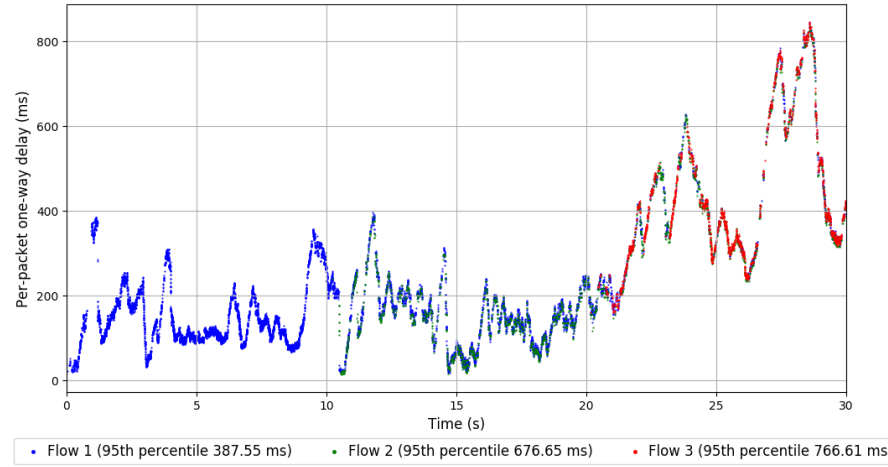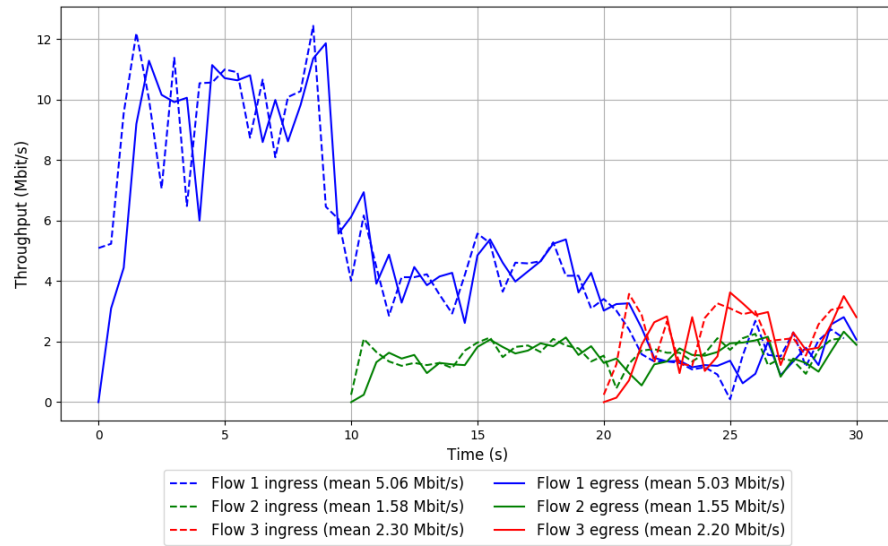3 flows with 10s interval between flows

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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	4.62	2.28	3.09	368.42	522.80	617.00	0.54	1.61	3.41
Copa	3	1.64	1.42	0.91	215.18	231.30	211.35	0.39	0.87	0.89
TCP Cubic	3	3.23	2.46	2.89	304.66	373.39	398.73	0.72	1.12	1.31
FillP	3	2.64	0.81	1.02	1099.46	1108.99	1139.52	63.40	44.22	61.65
FillP-Sheep	3	3.29	2.75	3.42	1116.38	1085.75	1089.25	25.67	50.73	57.05
Indigo	3	1.37	1.47	1.94	94.08	112.33	123.23	0.05	0.19	0.28
LEDBAT	3	3.07	2.57	1.51	204.59	227.53	264.00	0.21	0.45	0.54
PCC-Allegro	3	2.41	2.26	2.43	726.27	730.64	791.51	11.30	17.47	49.96
PCC-Expr	3	3.69	2.45	2.30	1074.72	1086.27	1093.93	39.40	58.39	72.74
QUIC Cubic	3	5.42	2.24	1.40	373.61	594.39	818.60	1.09	2.02	6.08
SCReAM	3	0.18	0.17	0.20	65.09	67.32	74.91	0.00	0.00	0.28
Sprout	3	0.70	0.64	0.62	69.36	95.03	89.38	0.05	0.34	0.01
TaoVA-100x	3	3.06	2.84	2.02	380.79	376.84	505.32	0.46	0.66	2.10
TCP Vegas	3	1.43	1.71	1.99	160.82	174.32	198.04	0.08	0.22	0.55
Verus	3	2.66	1.75	1.34	726.76	826.55	777.90	4.48	14.32	5.54
PCC-Vivace	3	1.41	1.67	0.87	1052.90	1071.05	958.69	16.36	19.60	43.32
WebRTC media	3	1.17	0.74	0.28	99.34	110.66	117.02	0.03	0.02	0.07

```
Run 1: Statistics of TCP BBR

Start at: 2018-08-22 01:06:46
End at: 2018-08-22 01:07:16
Local clock offset: 1.752 ms
Remote clock offset: -60.714 ms


# Below is generated by plot.py at 2018-08-22 01:53:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.77 Mbit/s
95th percentile per-packet one-way delay: 580.710 ms
Loss rate: 1.64%
-- Flow 1:
Average throughput: 5.03 Mbit/s
95th percentile per-packet one-way delay: 387.552 ms
Loss rate: 0.69%
-- Flow 2:
Average throughput: 1.55 Mbit/s
95th percentile per-packet one-way delay: 676.647 ms
Loss rate: 3.11%
-- Flow 3:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 766.611 ms
Loss rate: 5.90%
```

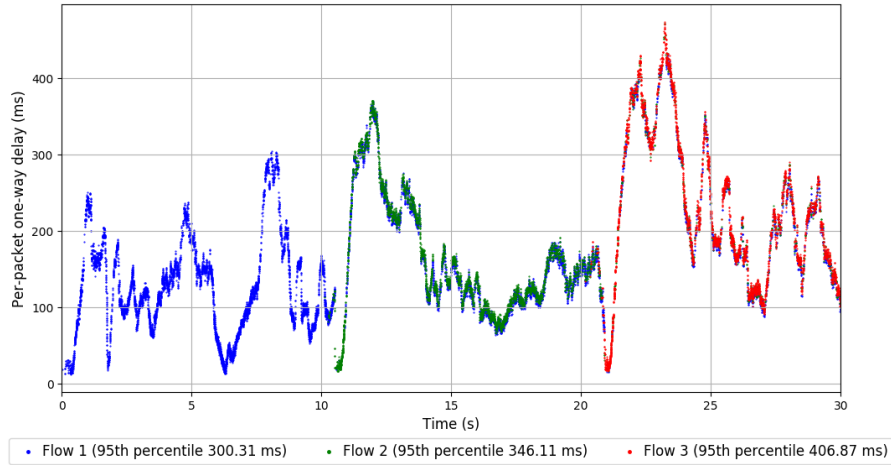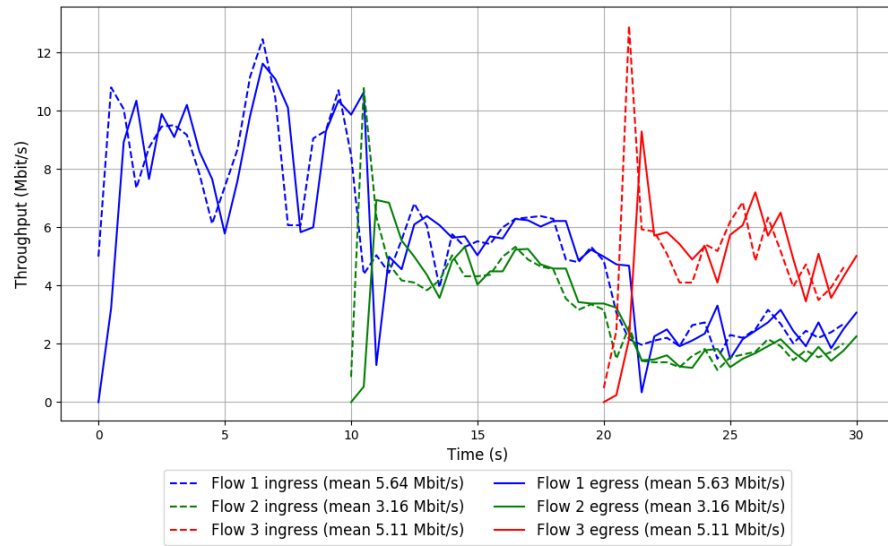Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2018-08-22 01:25:23
End at: 2018-08-22 01:25:53
Local clock offset: 1.952 ms
Remote clock offset: -62.579 ms


# Below is generated by plot.py at 2018-08-22 01:53:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.40 Mbit/s
95th percentile per-packet one-way delay: 349.318 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 5.63 Mbit/s
95th percentile per-packet one-way delay: 300.313 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 3.16 Mbit/s
95th percentile per-packet one-way delay: 346.105 ms
Loss rate: 0.44%
-- Flow 3:
Average throughput: 5.11 Mbit/s
95th percentile per-packet one-way delay: 406.873 ms
Loss rate: 1.09%
```

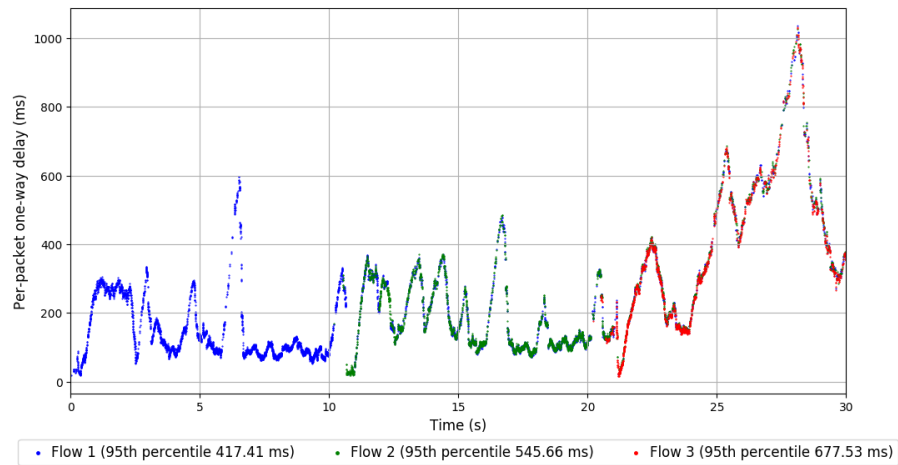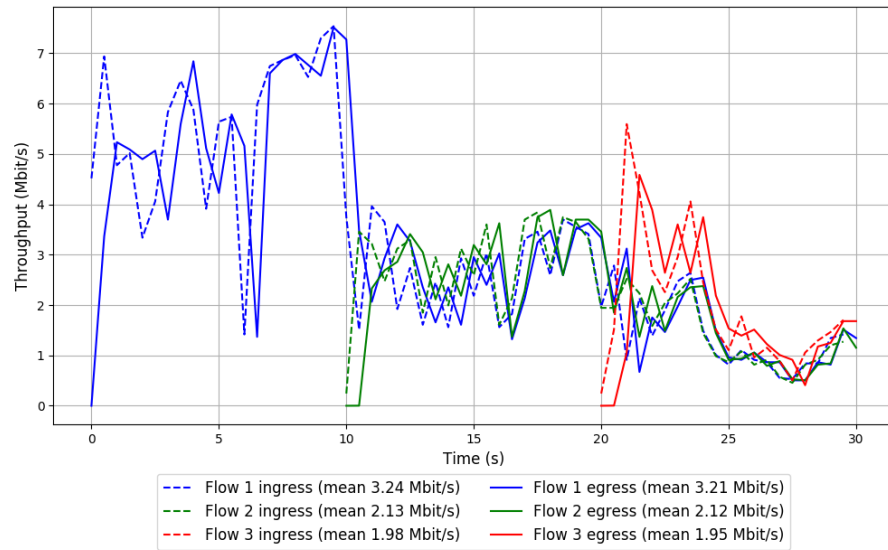Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2018-08-22 01:44:00
End at: 2018-08-22 01:44:30
Local clock offset: 3.354 ms
Remote clock offset: -63.379 ms


# Below is generated by plot.py at 2018-08-22 01:53:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.25 Mbit/s
95th percentile per-packet one-way delay: 531.601 ms
Loss rate: 1.16%
-- Flow 1:
Average throughput: 3.21 Mbit/s
95th percentile per-packet one-way delay: 417.408 ms
Loss rate: 0.69%
-- Flow 2:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 545.660 ms
Loss rate: 1.27%
-- Flow 3:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 677.531 ms
Loss rate: 3.23%
```
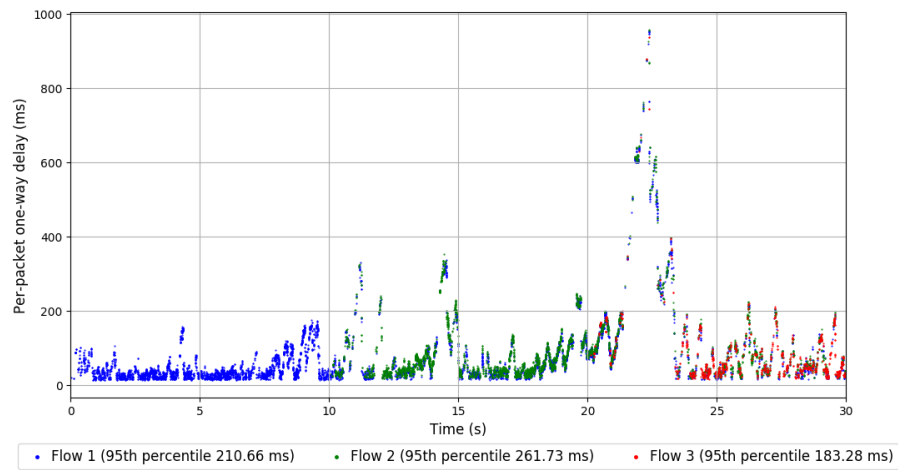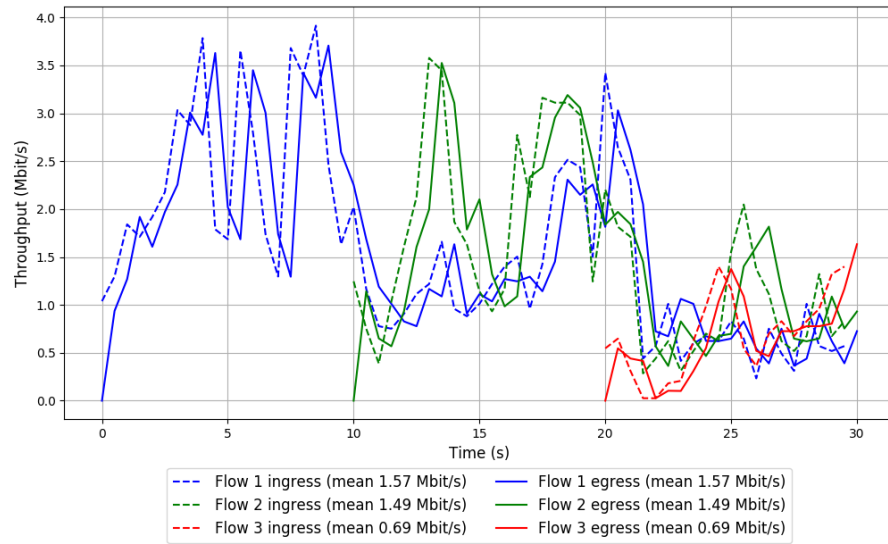
Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 3.24 Mbit/s) --- Flow 1 egress (mean 3.21 Mbit/s)
Flow 2 ingress (mean 2.13 Mbit/s) --- Flow 2 egress (mean 2.12 Mbit/s)
Flow 3 ingress (mean 1.98 Mbit/s) --- Flow 3 egress (mean 1.95 Mbit/s)

Flow 1 (95th percentile 417.41 ms)   Flow 2 (95th percentile 545.66 ms)   Flow 3 (95th percentile 677.53 ms)

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```
Run 1: Statistics of Copa

Start at: 2018-08-22 01:14:27
End at: 2018-08-22 01:14:57
Local clock offset: 1.552 ms
Remote clock offset: -60.512 ms


# Below is generated by plot.py at 2018-08-22 01:53:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.79 Mbit/s
95th percentile per-packet one-way delay: 225.560 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 1.57 Mbit/s
95th percentile per-packet one-way delay: 210.655 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 261.725 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 183.284 ms
Loss rate: 1.15%
```
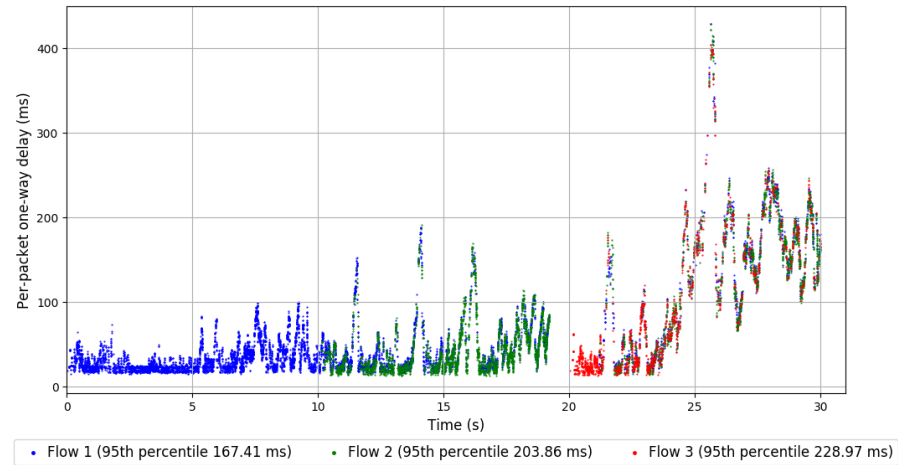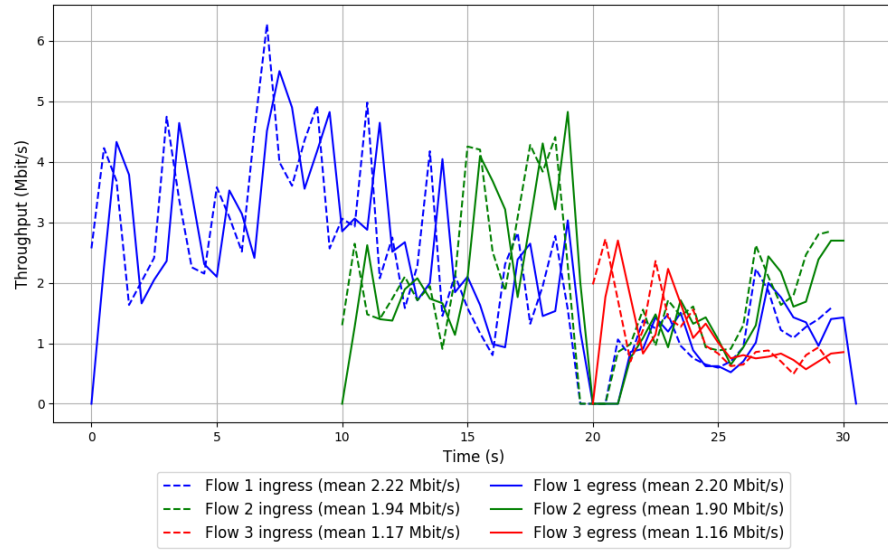
Run 1: Report of Copa — Data Link

```
Run 2: Statistics of Copa

Start at: 2018-08-22 01:33:02
End at: 2018-08-22 01:33:32
Local clock offset: 0.209 ms
Remote clock offset: -63.354 ms


# Below is generated by plot.py at 2018-08-22 01:53:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.85 Mbit/s
95th percentile per-packet one-way delay: 195.280 ms
Loss rate: 1.34%
-- Flow 1:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 167.409 ms
Loss rate: 0.89%
-- Flow 2:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 203.862 ms
Loss rate: 2.24%
-- Flow 3:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 228.966 ms
Loss rate: 0.92%
```
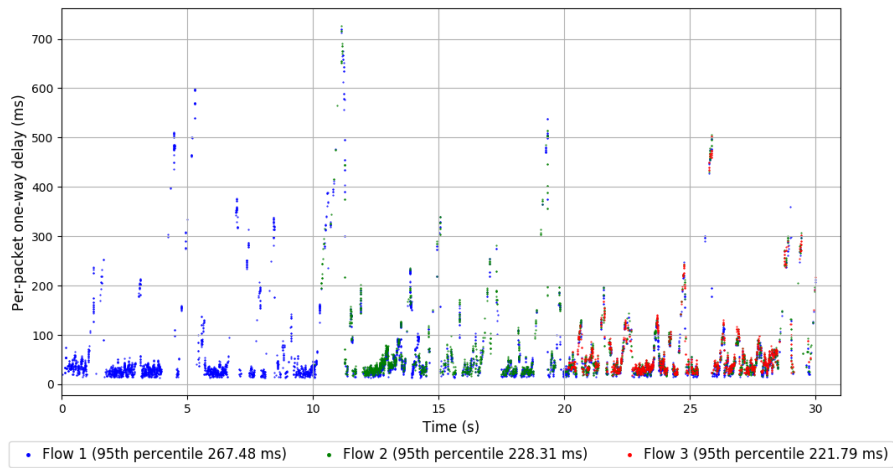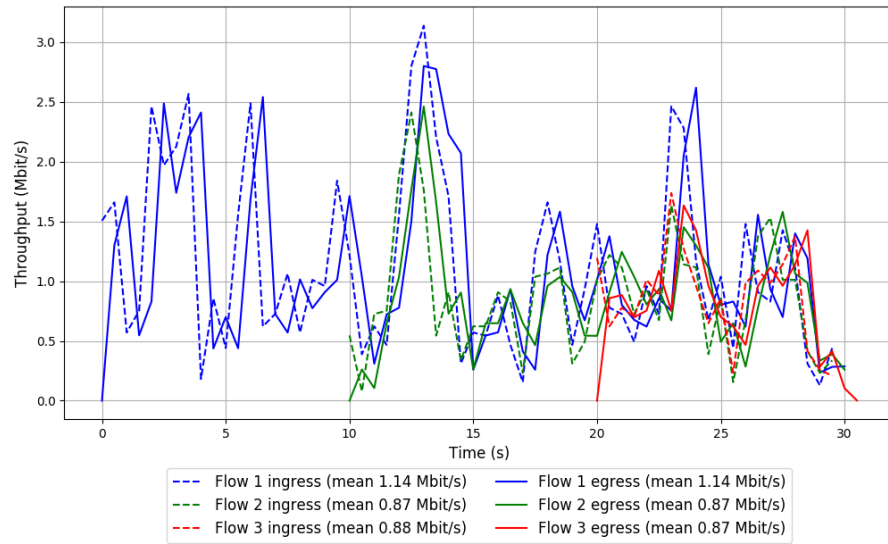
Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2018-08-22 01:51:40
End at: 2018-08-22 01:52:10
Local clock offset: 2.074 ms
Remote clock offset: -63.092 ms


# Below is generated by plot.py at 2018-08-22 01:53:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 243.102 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 267.476 ms
Loss rate: 0.25%
-- Flow 2:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 228.310 ms
Loss rate: 0.22%
-- Flow 3:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 221.794 ms
Loss rate: 0.60%
```
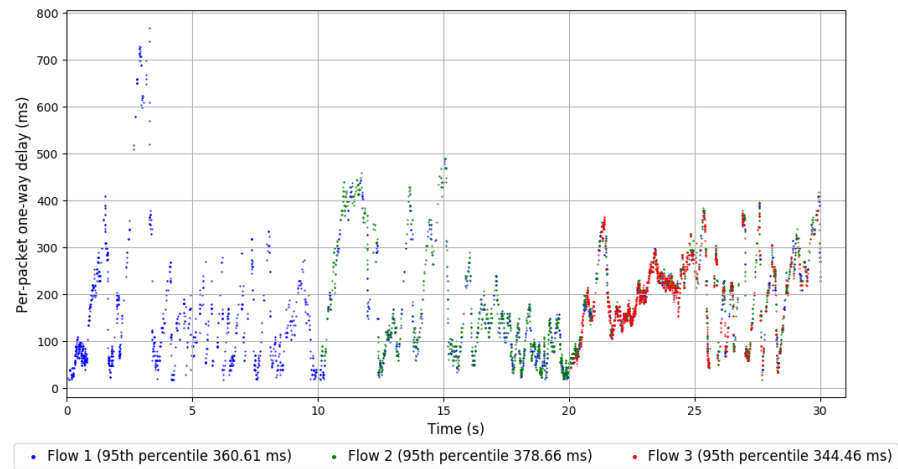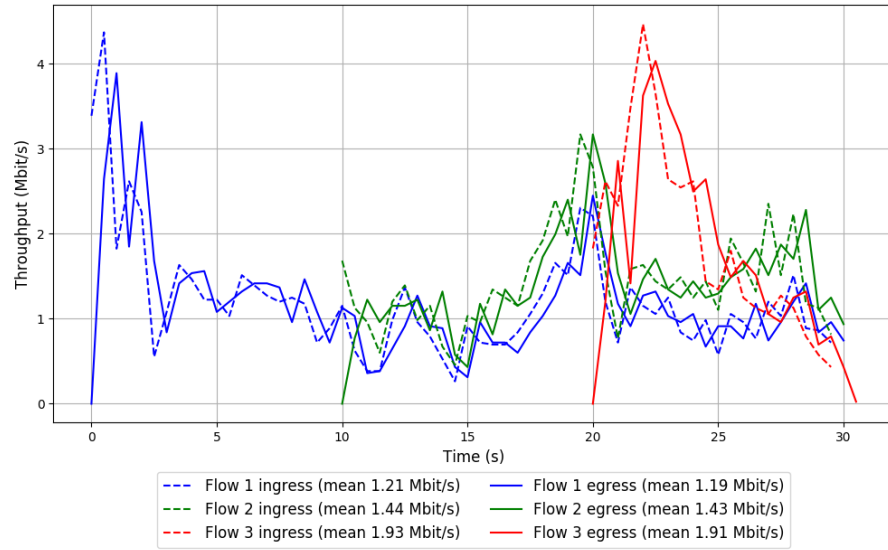
Run 3: Report of Copa — Data Link

- - - Flow 1 ingress (mean 1.14 Mbit/s) —— Flow 1 egress (mean 1.14 Mbit/s)
- - - Flow 2 ingress (mean 0.87 Mbit/s) —— Flow 2 egress (mean 0.87 Mbit/s)
- - - Flow 3 ingress (mean 0.88 Mbit/s) —— Flow 3 egress (mean 0.87 Mbit/s)

. Flow 1 (95th percentile 267.48 ms)   . Flow 2 (95th percentile 228.31 ms)   . Flow 3 (95th percentile 221.79 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2018-08-22 00:59:05
End at: 2018-08-22 00:59:35
Local clock offset: 2.285 ms
Remote clock offset: -61.274 ms


# Below is generated by plot.py at 2018-08-22 01:53:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 359.653 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 360.614 ms
Loss rate: 0.96%
-- Flow 2:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 378.661 ms
Loss rate: 1.21%
-- Flow 3:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 344.459 ms
Loss rate: 0.88%
```

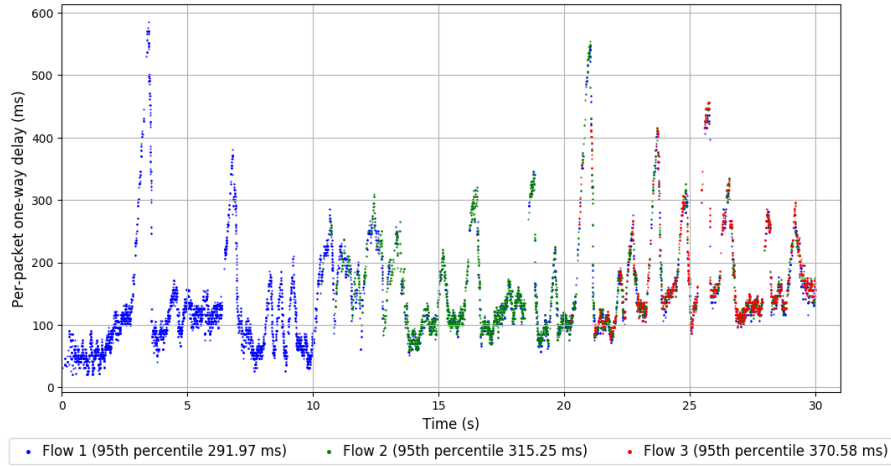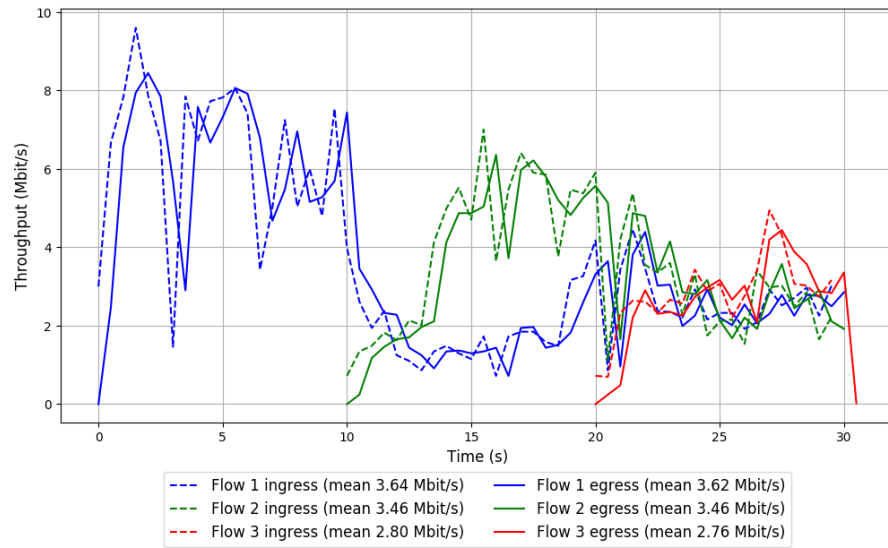Run 1: Report of TCP Cubic — Data Link

```
Run 2: Statistics of TCP Cubic

Start at: 2018-08-22 01:17:44
End at: 2018-08-22 01:18:14
Local clock offset: 0.768 ms
Remote clock offset: -60.624 ms


# Below is generated by plot.py at 2018-08-22 01:53:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.82 Mbit/s
95th percentile per-packet one-way delay: 310.865 ms
Loss rate: 0.80%
-- Flow 1:
Average throughput: 3.62 Mbit/s
95th percentile per-packet one-way delay: 291.968 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 3.46 Mbit/s
95th percentile per-packet one-way delay: 315.250 ms
Loss rate: 0.66%
-- Flow 3:
Average throughput: 2.76 Mbit/s
95th percentile per-packet one-way delay: 370.577 ms
Loss rate: 1.77%
```
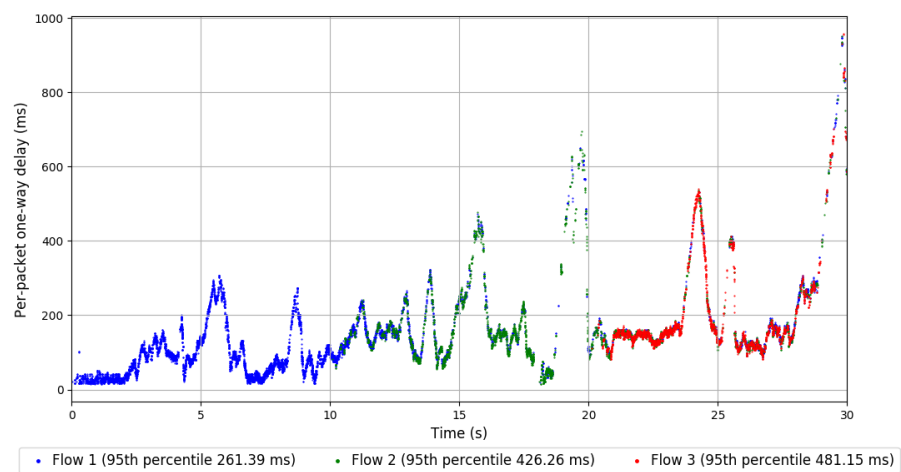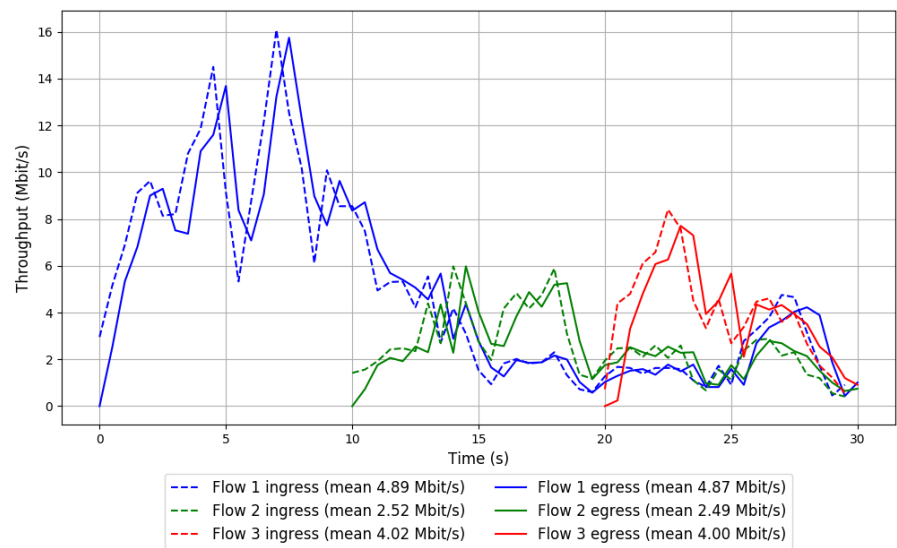
Run 2: Report of TCP Cubic — Data Link

- Flow 1 ingress (mean 3.64 Mbit/s) --- Flow 1 egress (mean 3.62 Mbit/s)
- Flow 2 ingress (mean 3.46 Mbit/s) --- Flow 2 egress (mean 3.46 Mbit/s)
- Flow 3 ingress (mean 2.80 Mbit/s) --- Flow 3 egress (mean 2.76 Mbit/s)

- Flow 1 (95th percentile 291.97 ms) • Flow 2 (95th percentile 315.25 ms) • Flow 3 (95th percentile 370.58 ms)

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```
Run 3: Statistics of TCP Cubic

Start at: 2018-08-22 01:36:19
End at: 2018-08-22 01:36:49
Local clock offset: 0.615 ms
Remote clock offset: -62.613 ms


# Below is generated by plot.py at 2018-08-22 01:53:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.83 Mbit/s
95th percentile per-packet one-way delay: 335.909 ms
Loss rate: 0.87%
-- Flow 1:
Average throughput: 4.87 Mbit/s
95th percentile per-packet one-way delay: 261.391 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 426.257 ms
Loss rate: 1.48%
-- Flow 3:
Average throughput: 4.00 Mbit/s
95th percentile per-packet one-way delay: 481.146 ms
Loss rate: 1.29%
```

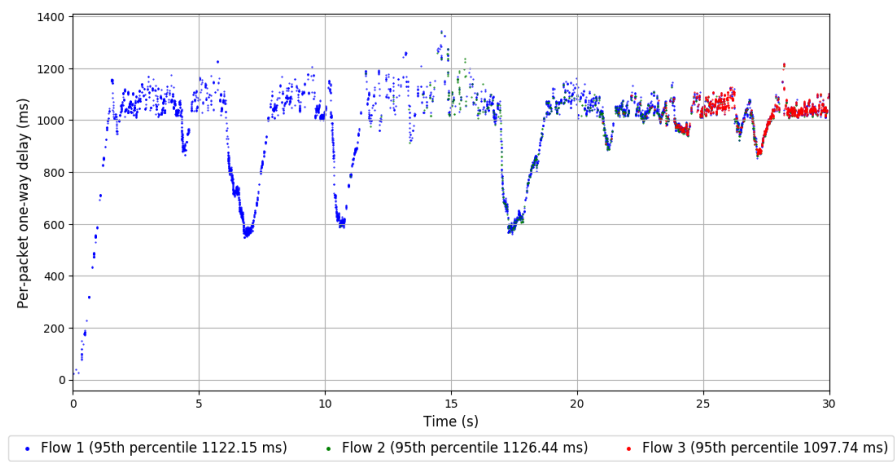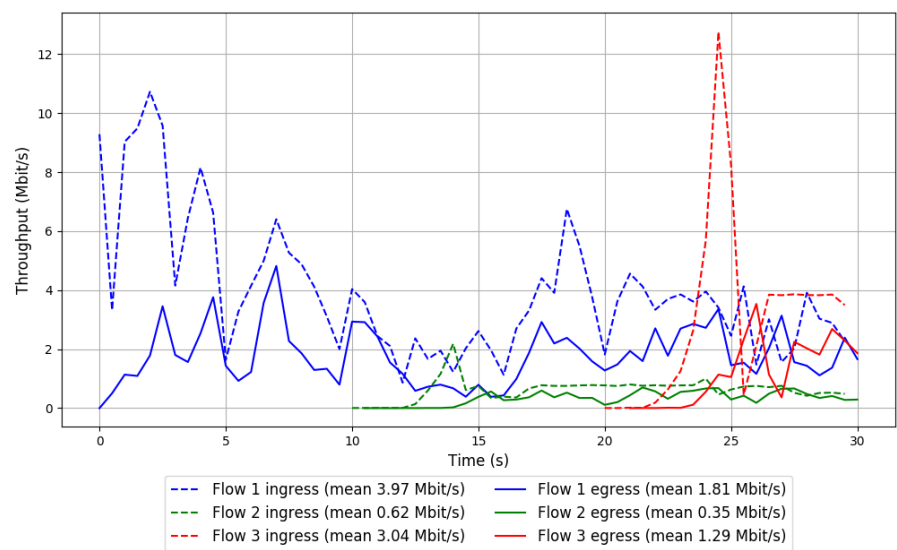Run 3: Report of TCP Cubic — Data Link

```
Run 1: Statistics of FillP

Start at: 2018-08-22 01:15:33
End at: 2018-08-22 01:16:03
Local clock offset: 1.528 ms
Remote clock offset: -60.557 ms

# Below is generated by plot.py at 2018-08-22 01:53:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 1116.506 ms
Loss rate: 55.12%
-- Flow 1:
Average throughput: 1.81 Mbit/s
95th percentile per-packet one-way delay: 1122.155 ms
Loss rate: 54.50%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 1126.438 ms
Loss rate: 45.05%
-- Flow 3:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 1097.738 ms
Loss rate: 61.69%
```

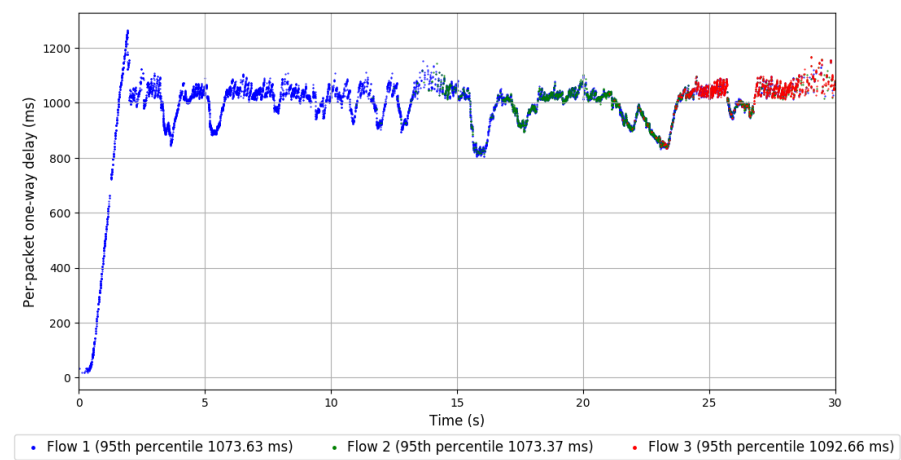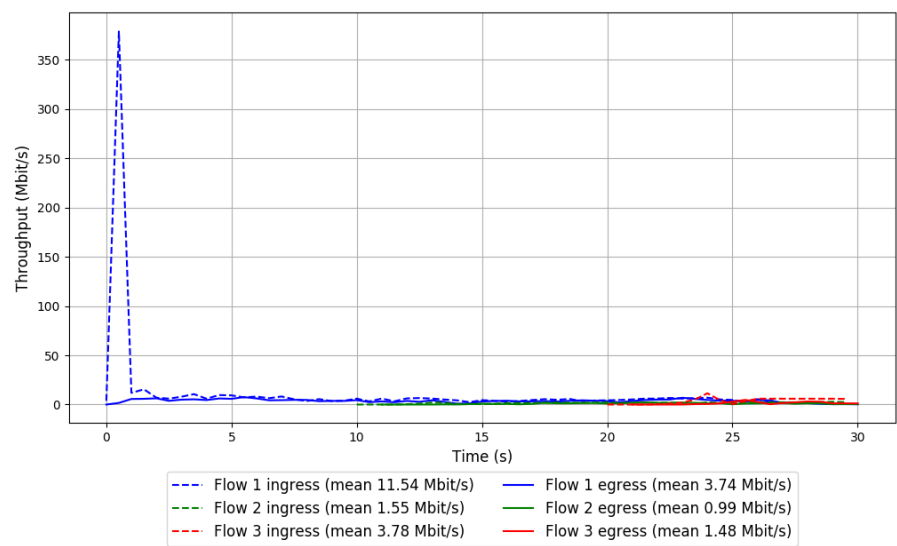Run 1: Report of FillP — Data Link

```
Run 2: Statistics of FillP

Start at: 2018-08-22 01:34:08
End at: 2018-08-22 01:34:38
Local clock offset: 1.46 ms
Remote clock offset: -62.511 ms


# Below is generated by plot.py at 2018-08-22 01:53:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.80 Mbit/s
95th percentile per-packet one-way delay: 1077.386 ms
Loss rate: 65.27%
-- Flow 1:
Average throughput: 3.74 Mbit/s
95th percentile per-packet one-way delay: 1073.627 ms
Loss rate: 67.64%
-- Flow 2:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 1073.371 ms
Loss rate: 39.34%
-- Flow 3:
Average throughput: 1.48 Mbit/s
95th percentile per-packet one-way delay: 1092.656 ms
Loss rate: 64.86%
```
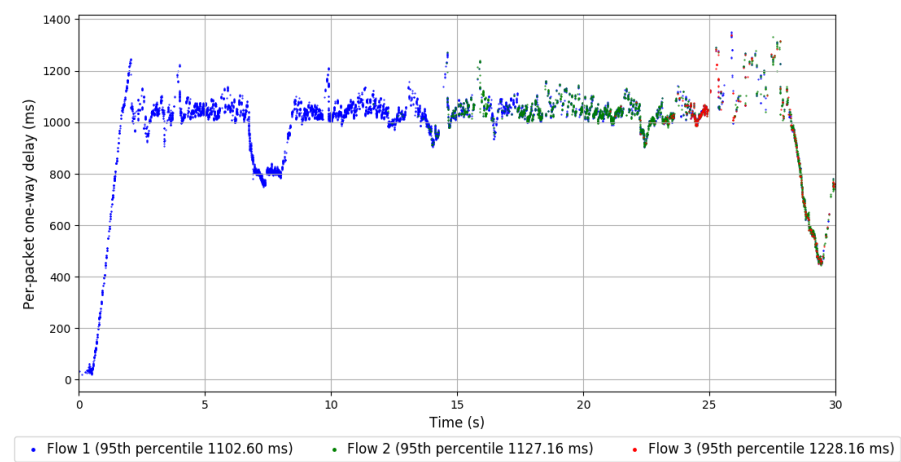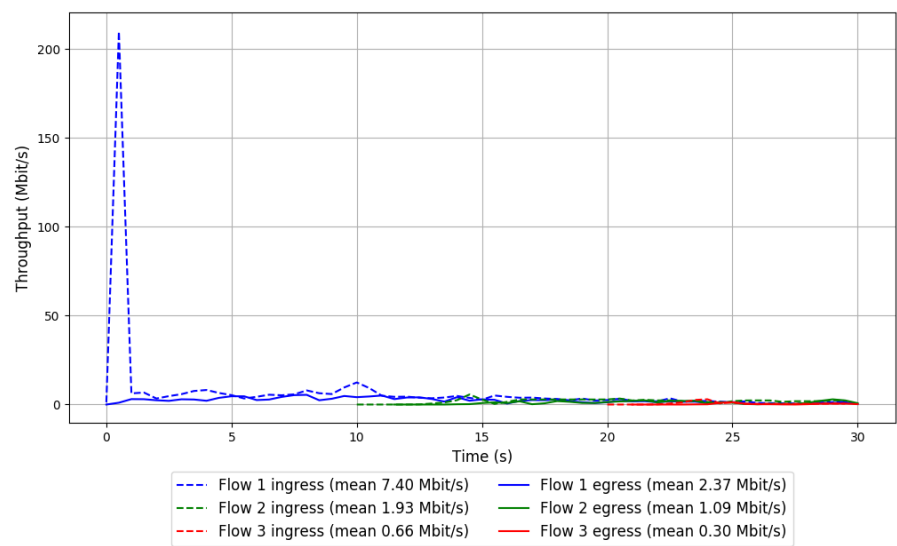
Run 2: Report of FillP — Data Link

Flow 1 ingress (mean 11.54 Mbit/s) — — — Flow 1 egress (mean 3.74 Mbit/s)
Flow 2 ingress (mean 1.55 Mbit/s) — — — Flow 2 egress (mean 0.99 Mbit/s)
Flow 3 ingress (mean 3.78 Mbit/s) — — — Flow 3 egress (mean 1.48 Mbit/s)

Flow 1 (95th percentile 1073.63 ms)   Flow 2 (95th percentile 1073.37 ms)   Flow 3 (95th percentile 1092.66 ms)

```
Run 3: Statistics of FillP

Start at: 2018-08-22 01:52:45
End at: 2018-08-22 01:53:15
Local clock offset: 2.611 ms
Remote clock offset: -62.915 ms


# Below is generated by plot.py at 2018-08-22 01:53:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.12 Mbit/s
95th percentile per-packet one-way delay: 1112.916 ms
Loss rate: 64.96%
-- Flow 1:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 1102.601 ms
Loss rate: 68.06%
-- Flow 2:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 1127.158 ms
Loss rate: 48.27%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 1228.156 ms
Loss rate: 58.40%
```
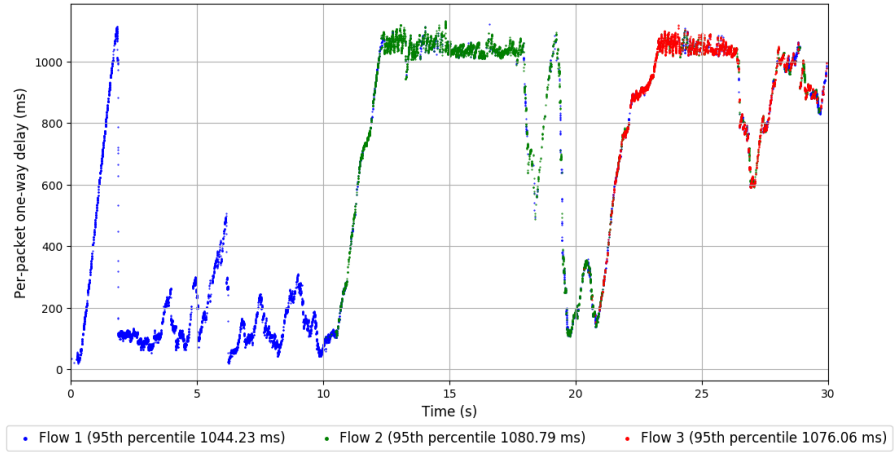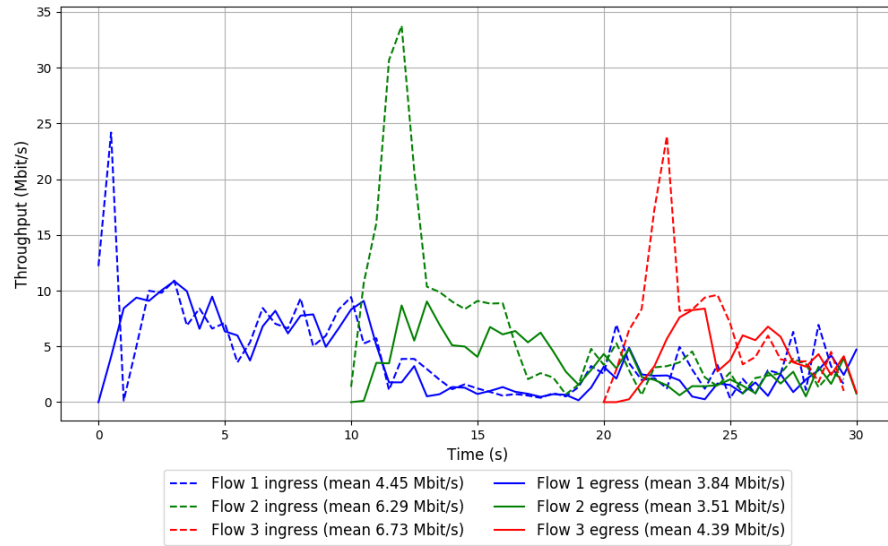
Run 3: Report of FillP — Data Link

Flow 1 ingress (mean 7.40 Mbit/s)   Flow 1 egress (mean 2.37 Mbit/s)
Flow 2 ingress (mean 1.93 Mbit/s)   Flow 2 egress (mean 1.09 Mbit/s)
Flow 3 ingress (mean 0.66 Mbit/s)   Flow 3 egress (mean 0.30 Mbit/s)

Flow 1 (95th percentile 1102.60 ms)   Flow 2 (95th percentile 1127.16 ms)   Flow 3 (95th percentile 1228.16 ms)

```
Run 1: Statistics of FillP-Sheep

Start at: 2018-08-22 01:05:40
End at: 2018-08-22 01:06:10
Local clock offset: 1.204 ms
Remote clock offset: -60.069 ms


# Below is generated by plot.py at 2018-08-22 01:53:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.56 Mbit/s
95th percentile per-packet one-way delay: 1069.665 ms
Loss rate: 30.50%
-- Flow 1:
Average throughput: 3.84 Mbit/s
95th percentile per-packet one-way delay: 1044.235 ms
Loss rate: 13.90%
-- Flow 2:
Average throughput: 3.51 Mbit/s
95th percentile per-packet one-way delay: 1080.790 ms
Loss rate: 44.85%
-- Flow 3:
Average throughput: 4.39 Mbit/s
95th percentile per-packet one-way delay: 1076.056 ms
Loss rate: 36.69%
```

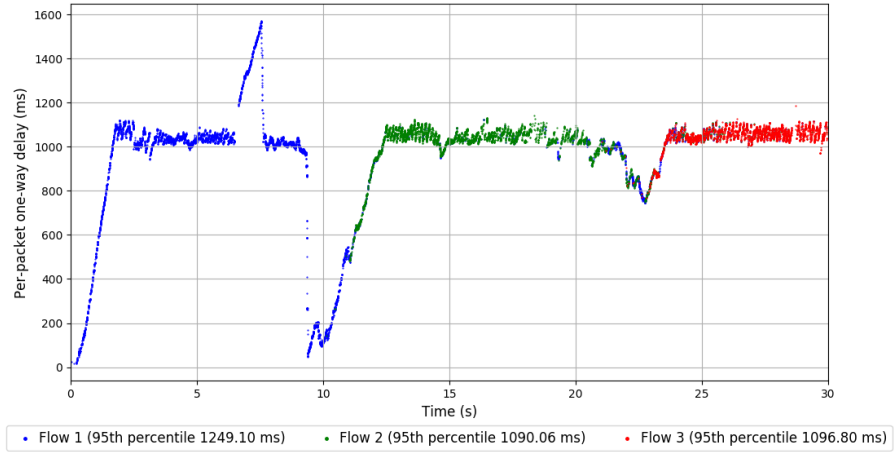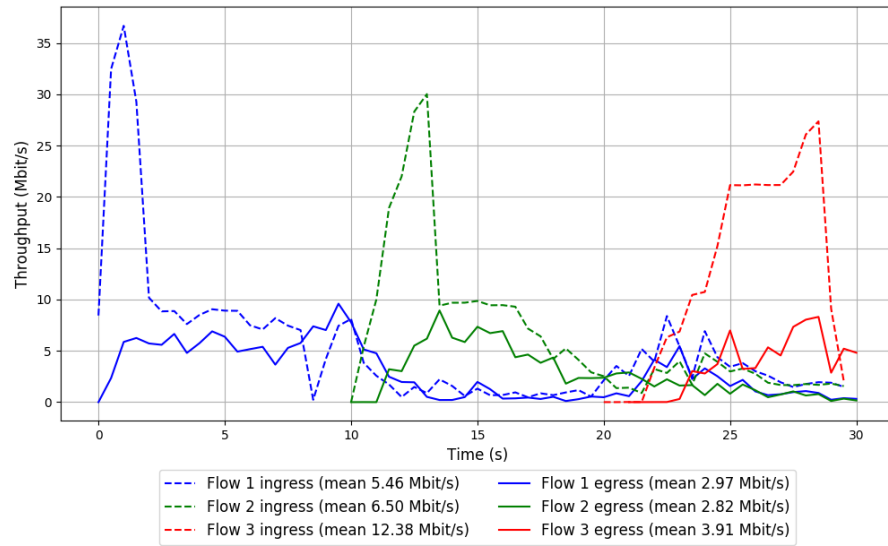Run 1: Report of FillP-Sheep — Data Link

```
Run 2: Statistics of FillP-Sheep

Start at: 2018-08-22 01:24:17
End at: 2018-08-22 01:24:47
Local clock offset: 1.505 ms
Remote clock offset: -62.165 ms


# Below is generated by plot.py at 2018-08-22 01:53:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.99 Mbit/s
95th percentile per-packet one-way delay: 1100.402 ms
Loss rate: 56.89%
-- Flow 1:
Average throughput: 2.97 Mbit/s
95th percentile per-packet one-way delay: 1249.099 ms
Loss rate: 45.76%
-- Flow 2:
Average throughput: 2.82 Mbit/s
95th percentile per-packet one-way delay: 1090.058 ms
Loss rate: 56.98%
-- Flow 3:
Average throughput: 3.91 Mbit/s
95th percentile per-packet one-way delay: 1096.799 ms
Loss rate: 71.58%
```

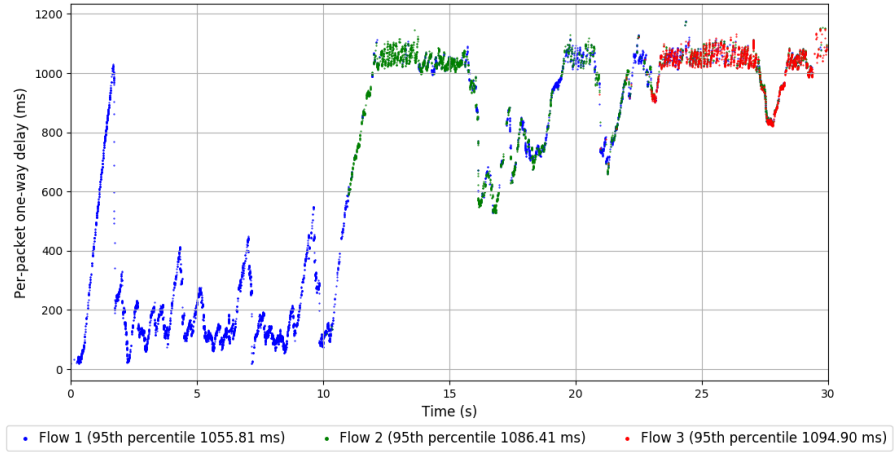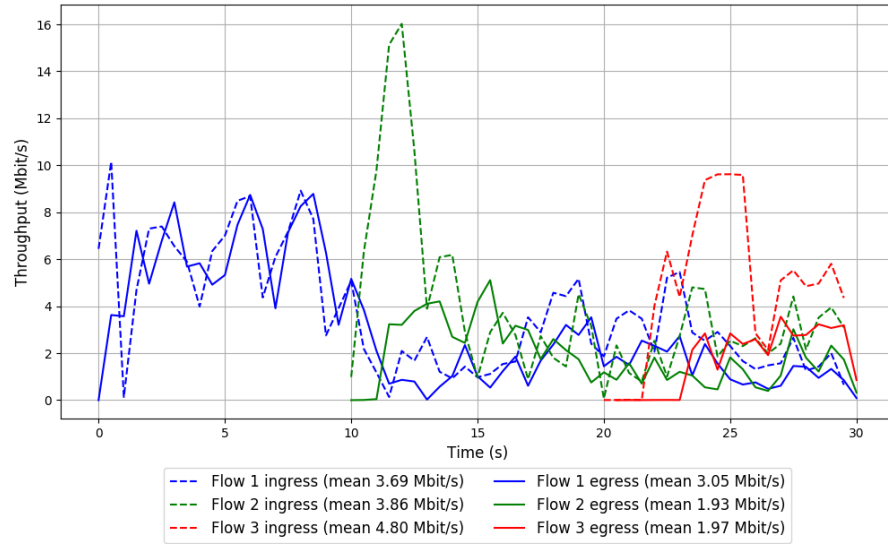Run 2: Report of FillP-Sheep — Data Link

```
Run 3: Statistics of FillP-Sheep

Start at: 2018-08-22 01:42:54
End at: 2018-08-22 01:43:24
Local clock offset: 1.111 ms
Remote clock offset: -63.378 ms


# Below is generated by plot.py at 2018-08-22 01:53:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.92 Mbit/s
95th percentile per-packet one-way delay: 1076.303 ms
Loss rate: 37.39%
-- Flow 1:
Average throughput: 3.05 Mbit/s
95th percentile per-packet one-way delay: 1055.809 ms
Loss rate: 17.34%
-- Flow 2:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 1086.407 ms
Loss rate: 50.36%
-- Flow 3:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 1094.899 ms
Loss rate: 62.88%
```

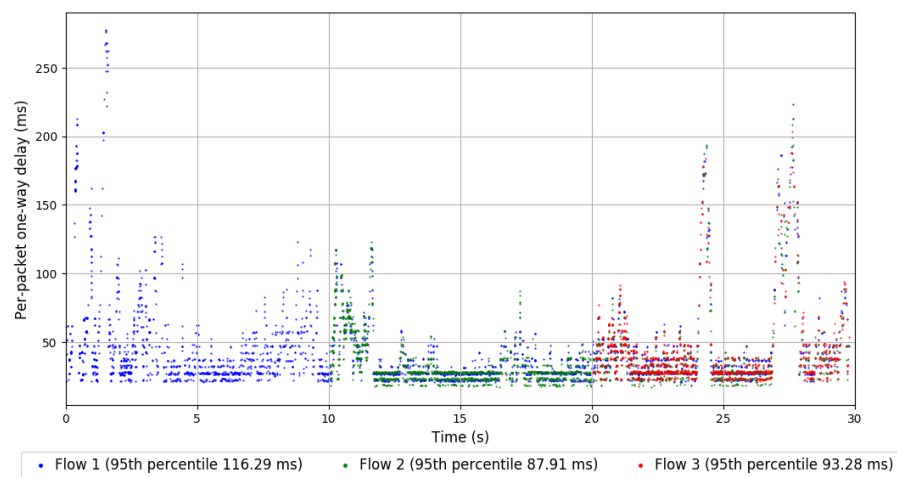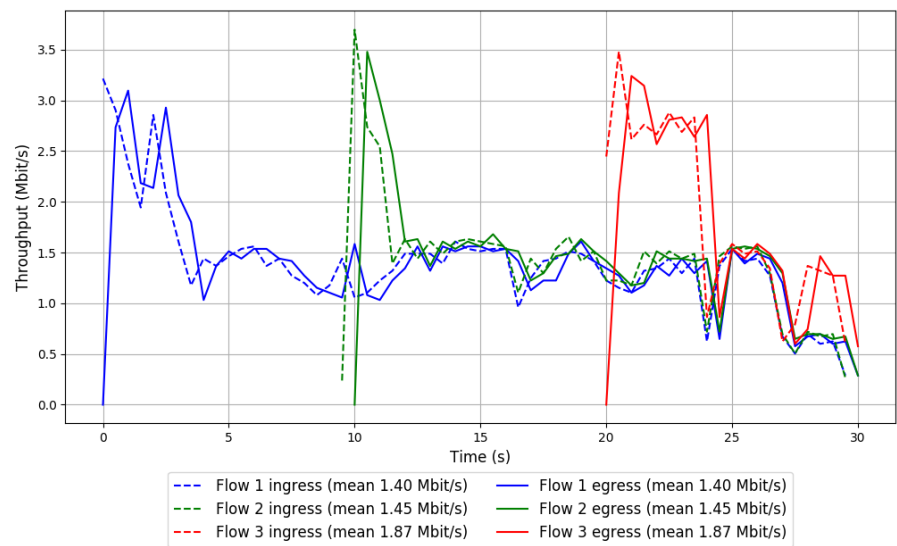Run 3: Report of FillP-Sheep — Data Link

```
Run 1: Statistics of Indigo

Start at: 2018-08-22 01:07:52
End at: 2018-08-22 01:08:22
Local clock offset: 0.368 ms
Remote clock offset: -60.999 ms


# Below is generated by plot.py at 2018-08-22 01:53:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.98 Mbit/s
95th percentile per-packet one-way delay: 102.725 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 116.293 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 87.906 ms
Loss rate: 0.13%
-- Flow 3:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 93.282 ms
Loss rate: 0.53%
```
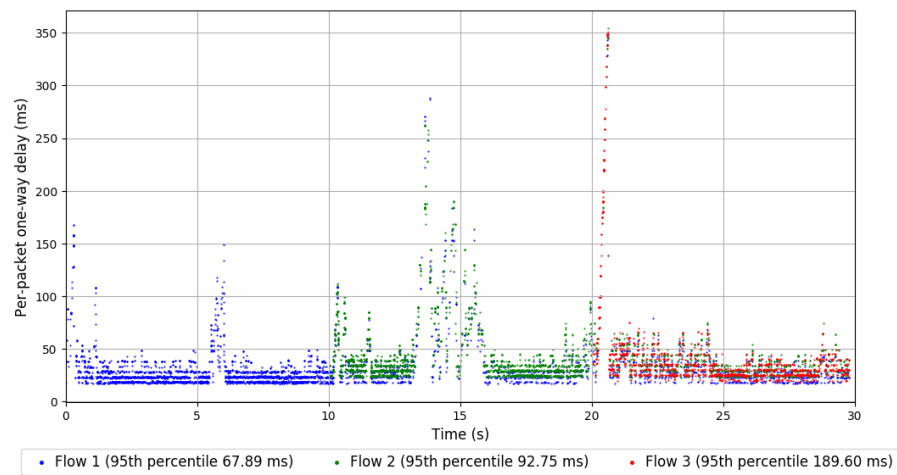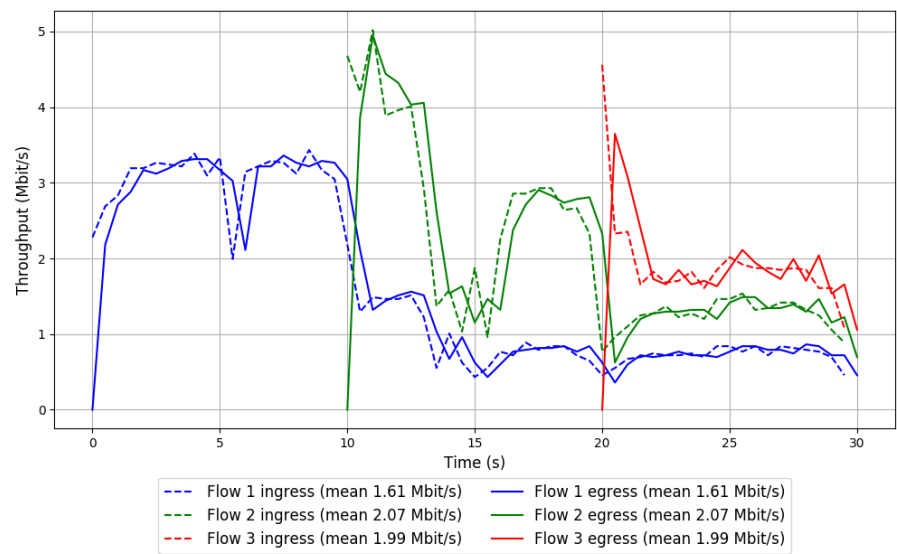
Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2018-08-22 01:26:29
End at: 2018-08-22 01:26:59
Local clock offset: -1.15 ms
Remote clock offset: -62.582 ms

# Below is generated by plot.py at 2018-08-22 01:53:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.63 Mbit/s
95th percentile per-packet one-way delay: 89.389 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 1.61 Mbit/s
95th percentile per-packet one-way delay: 67.890 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 92.747 ms
Loss rate: 0.23%
-- Flow 3:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 189.596 ms
Loss rate: 0.31%
```
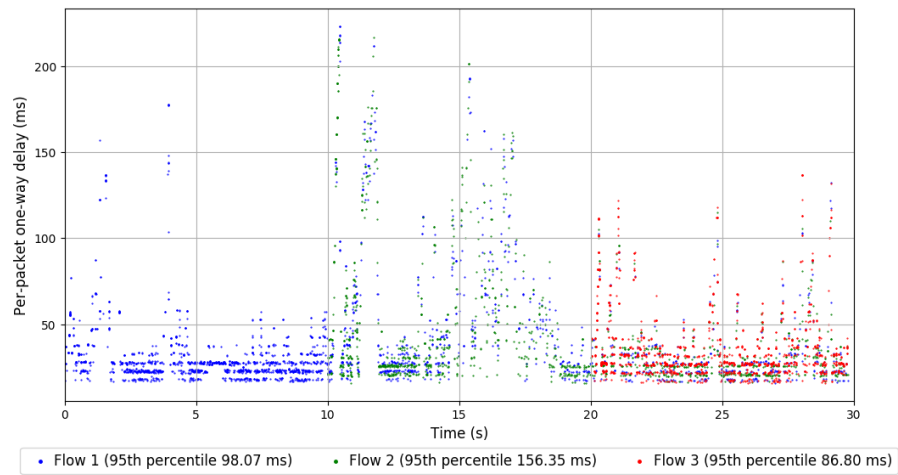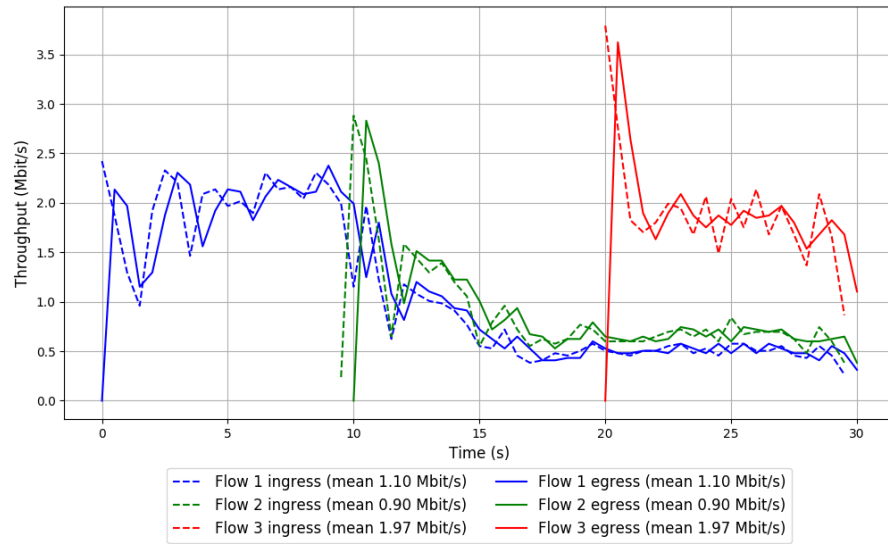
Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2018-08-22 01:45:06
End at: 2018-08-22 01:45:36
Local clock offset: 3.166 ms
Remote clock offset: -63.348 ms

# Below is generated by plot.py at 2018-08-22 01:53:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 112.627 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 98.066 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 156.349 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 86.804 ms
Loss rate: 0.00%
```
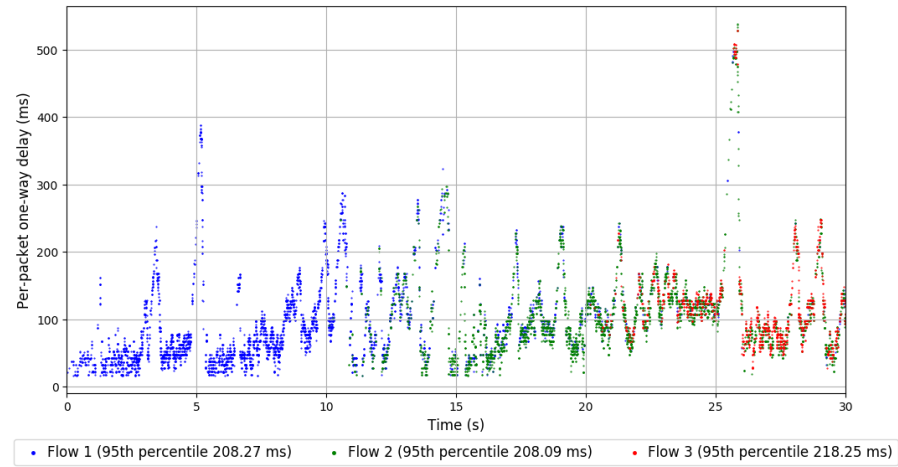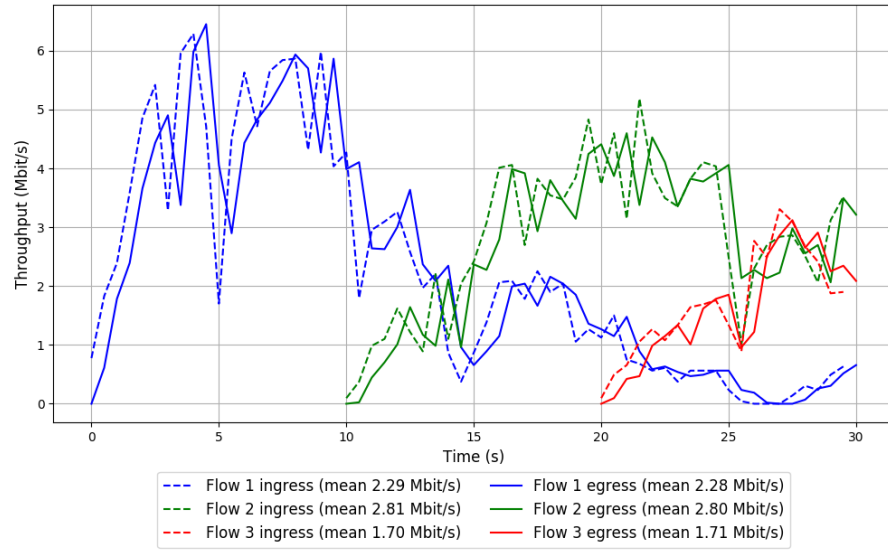
Run 3: Report of Indigo — Data Link

```
Run 1: Statistics of LEDBAT

Start at: 2018-08-22 01:11:11
End at: 2018-08-22 01:11:41
Local clock offset: 2.221 ms
Remote clock offset: -60.553 ms


# Below is generated by plot.py at 2018-08-22 01:53:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.70 Mbit/s
95th percentile per-packet one-way delay: 208.349 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 208.270 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 2.80 Mbit/s
95th percentile per-packet one-way delay: 208.085 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 218.247 ms
Loss rate: 0.55%
```
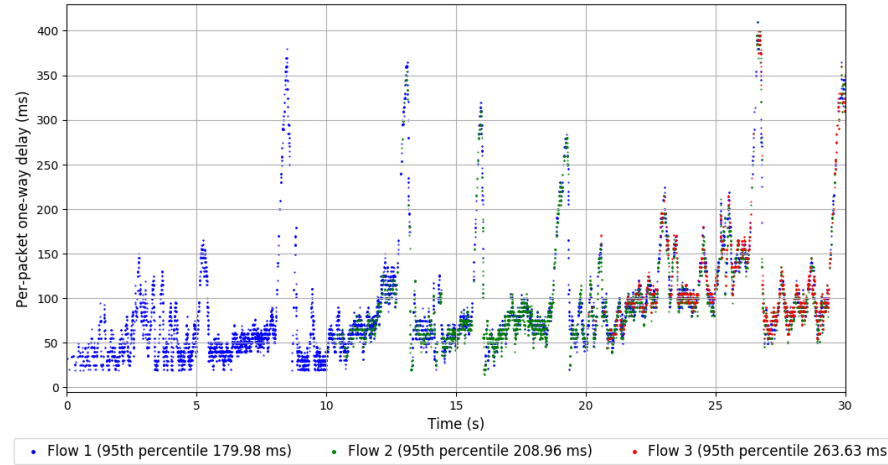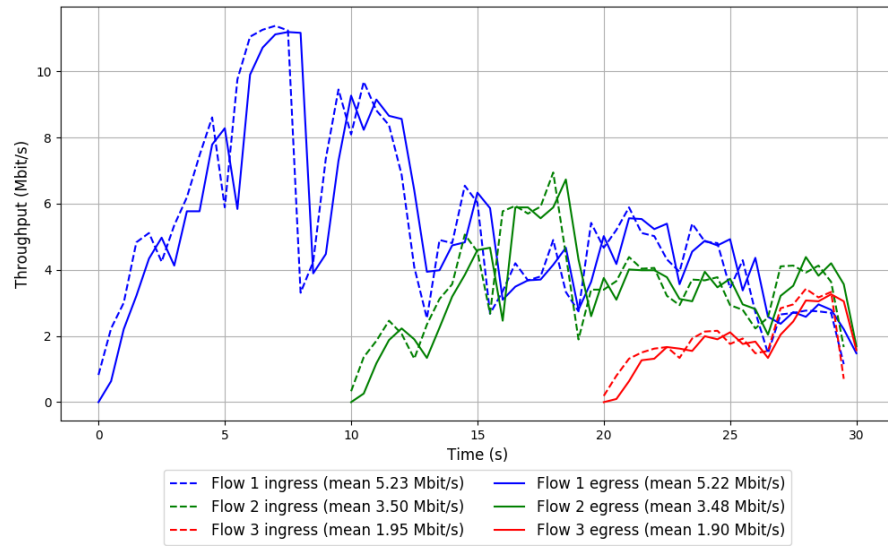
Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2018-08-22 01:29:46
End at: 2018-08-22 01:30:16
Local clock offset: 0.259 ms
Remote clock offset: -62.481 ms


# Below is generated by plot.py at 2018-08-22 01:53:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.16 Mbit/s
95th percentile per-packet one-way delay: 194.791 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 5.22 Mbit/s
95th percentile per-packet one-way delay: 179.983 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 3.48 Mbit/s
95th percentile per-packet one-way delay: 208.962 ms
Loss rate: 0.62%
-- Flow 3:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 263.632 ms
Loss rate: 0.56%
```

Run 2: Report of LEDBAT — Data Link

- - - Flow 1 ingress (mean 5.23 Mbit/s) —— Flow 1 egress (mean 5.22 Mbit/s)
- - - Flow 2 ingress (mean 3.50 Mbit/s) —— Flow 2 egress (mean 3.48 Mbit/s)
- - - Flow 3 ingress (mean 1.95 Mbit/s) —— Flow 3 egress (mean 1.90 Mbit/s)

- Flow 1 (95th percentile 179.98 ms)   • Flow 2 (95th percentile 208.96 ms)   • Flow 3 (95th percentile 263.63 ms)
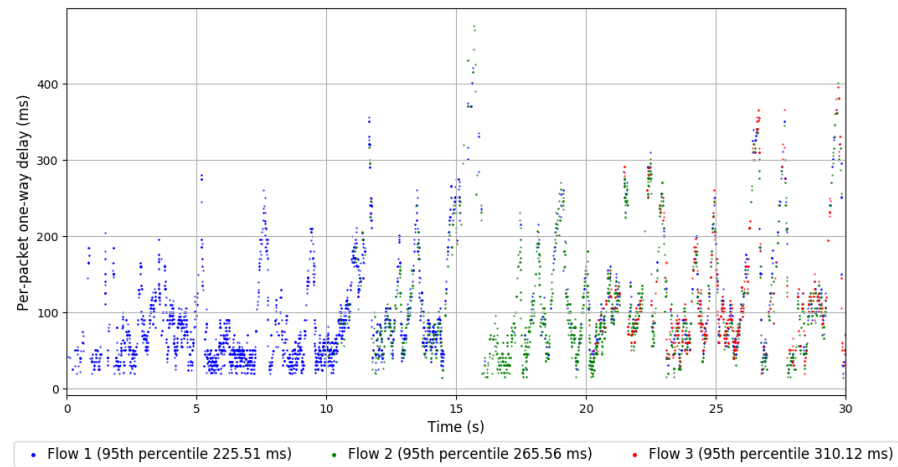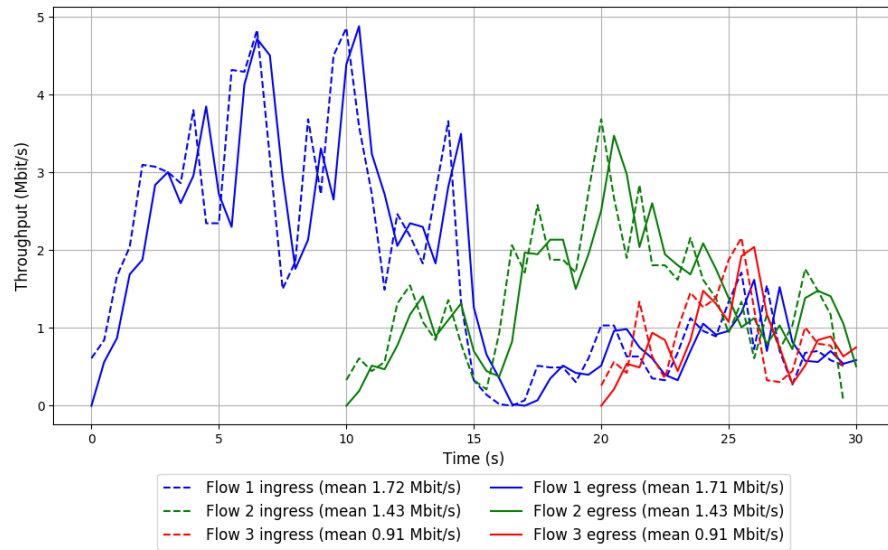
43

```
Run 3: Statistics of LEDBAT

Start at: 2018-08-22 01:48:24
End at: 2018-08-22 01:48:54
Local clock offset: 1.097 ms
Remote clock offset: -63.385 ms


# Below is generated by plot.py at 2018-08-22 01:53:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.96 Mbit/s
95th percentile per-packet one-way delay: 250.397 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 225.507 ms
Loss rate: 0.32%
-- Flow 2:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 265.558 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 310.124 ms
Loss rate: 0.52%
```

Run 3: Report of LEDBAT — Data Link

- - - Flow 1 ingress (mean 1.72 Mbit/s) —— Flow 1 egress (mean 1.71 Mbit/s)
- - - Flow 2 ingress (mean 1.43 Mbit/s) —— Flow 2 egress (mean 1.43 Mbit/s)
- - - Flow 3 ingress (mean 0.91 Mbit/s) —— Flow 3 egress (mean 0.91 Mbit/s)

• Flow 1 (95th percentile 225.51 ms) • Flow 2 (95th percentile 265.56 ms) • Flow 3 (95th percentile 310.12 ms)
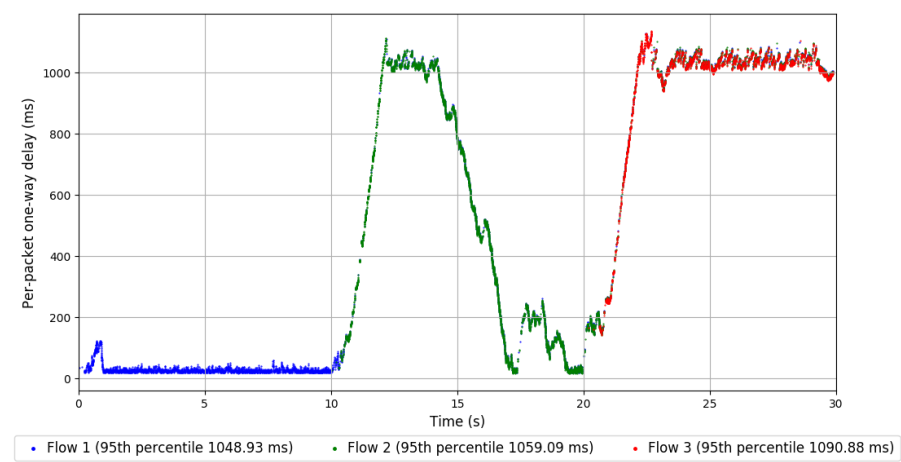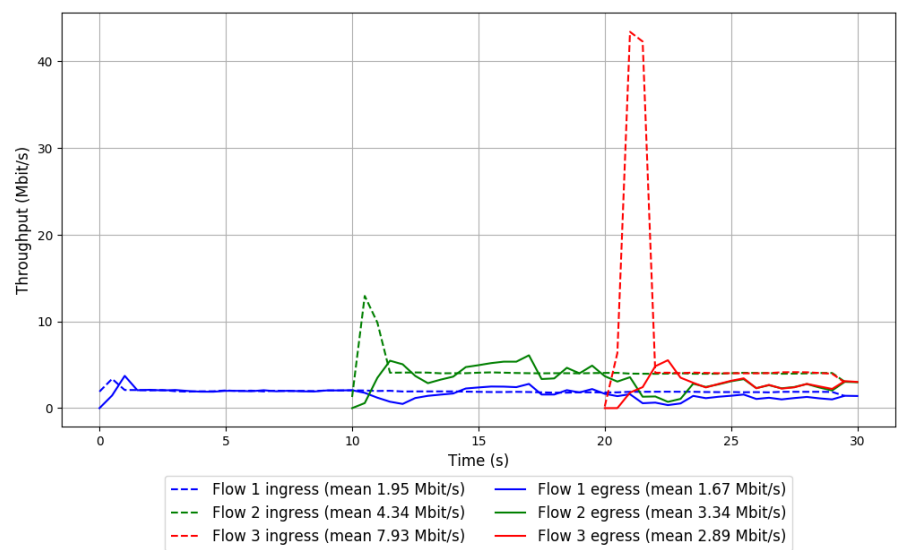
```
Run 1: Statistics of PCC-Allegro

Start at: 2018-08-22 00:57:59
End at: 2018-08-22 00:58:29
Local clock offset: 2.415 ms
Remote clock offset: -61.268 ms


# Below is generated by plot.py at 2018-08-22 01:53:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.83 Mbit/s
95th percentile per-packet one-way delay: 1062.782 ms
Loss rate: 35.23%
-- Flow 1:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 1048.931 ms
Loss rate: 14.22%
-- Flow 2:
Average throughput: 3.34 Mbit/s
95th percentile per-packet one-way delay: 1059.086 ms
Loss rate: 23.24%
-- Flow 3:
Average throughput: 2.89 Mbit/s
95th percentile per-packet one-way delay: 1090.880 ms
Loss rate: 64.09%
```

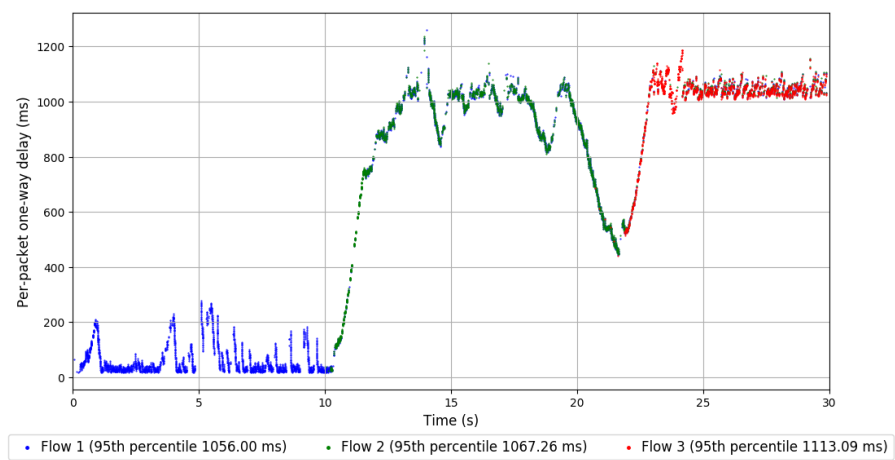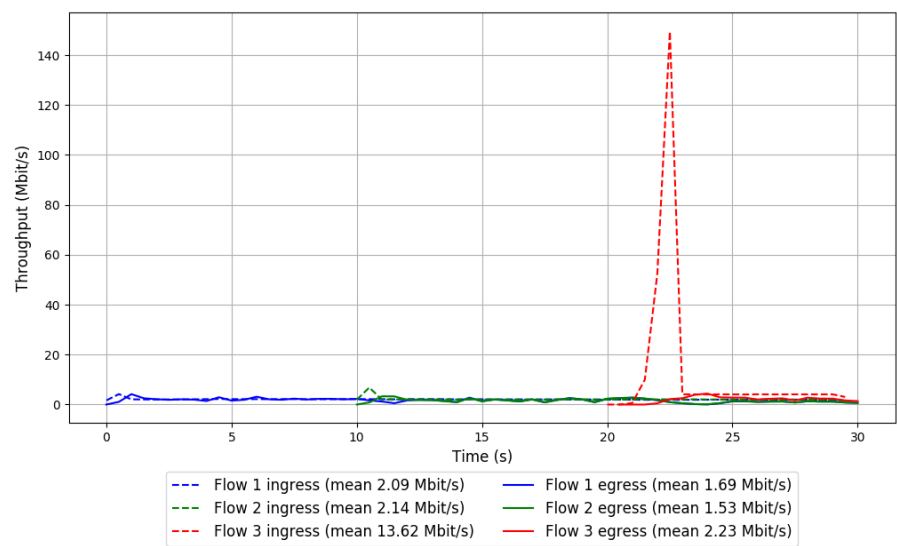Run 1: Report of PCC-Allegro — Data Link

```
Run 2: Statistics of PCC-Allegro

Start at: 2018-08-22 01:16:38
End at: 2018-08-22 01:17:08
Local clock offset: -0.445 ms
Remote clock offset: -61.262 ms


# Below is generated by plot.py at 2018-08-22 01:53:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.39 Mbit/s
95th percentile per-packet one-way delay: 1076.916 ms
Loss rate: 57.74%
-- Flow 1:
Average throughput: 1.69 Mbit/s
95th percentile per-packet one-way delay: 1055.997 ms
Loss rate: 19.33%
-- Flow 2:
Average throughput: 1.53 Mbit/s
95th percentile per-packet one-way delay: 1067.260 ms
Loss rate: 28.73%
-- Flow 3:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 1113.094 ms
Loss rate: 84.76%
```

Run 2: Report of PCC-Allegro — Data Link

Flow 1 ingress (mean 2.09 Mbit/s)   Flow 1 egress (mean 1.69 Mbit/s)
Flow 2 ingress (mean 2.14 Mbit/s)   Flow 2 egress (mean 1.53 Mbit/s)
Flow 3 ingress (mean 13.62 Mbit/s)   Flow 3 egress (mean 2.23 Mbit/s)

Flow 1 (95th percentile 1056.00 ms)   Flow 2 (95th percentile 1067.26 ms)   Flow 3 (95th percentile 1113.09 ms)
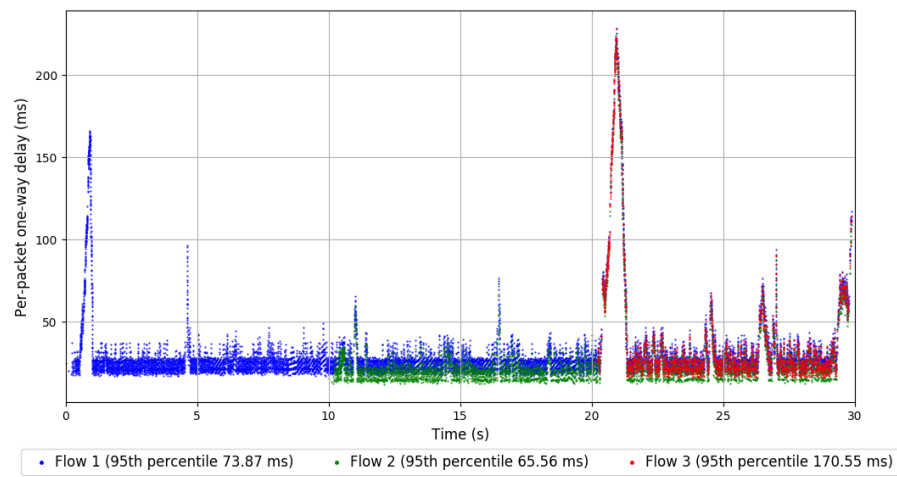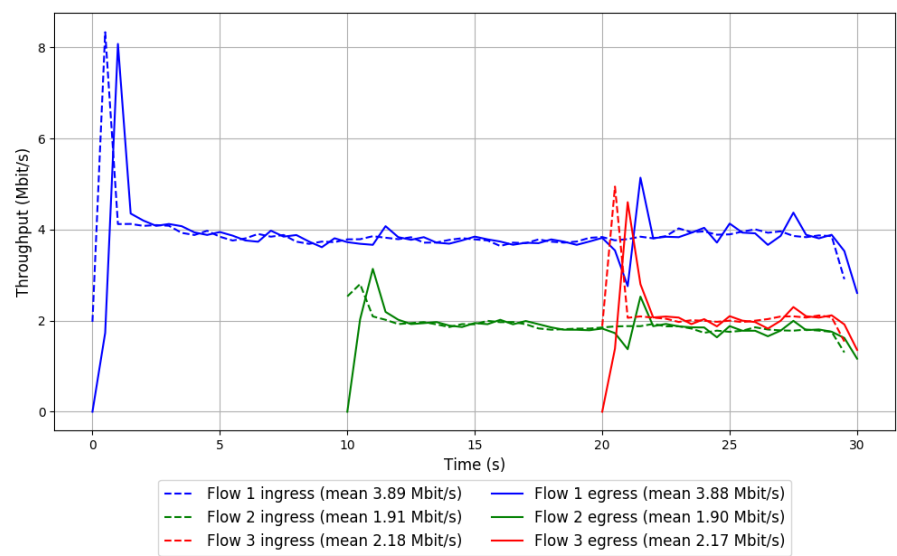
49

```
Run 3: Statistics of PCC-Allegro

Start at: 2018-08-22 01:35:14
End at: 2018-08-22 01:35:44
Local clock offset: 0.82 ms
Remote clock offset: -62.759 ms


# Below is generated by plot.py at 2018-08-22 01:53:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.86 Mbit/s
95th percentile per-packet one-way delay: 85.007 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 3.88 Mbit/s
95th percentile per-packet one-way delay: 73.874 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 65.559 ms
Loss rate: 0.45%
-- Flow 3:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 170.546 ms
Loss rate: 1.02%
```
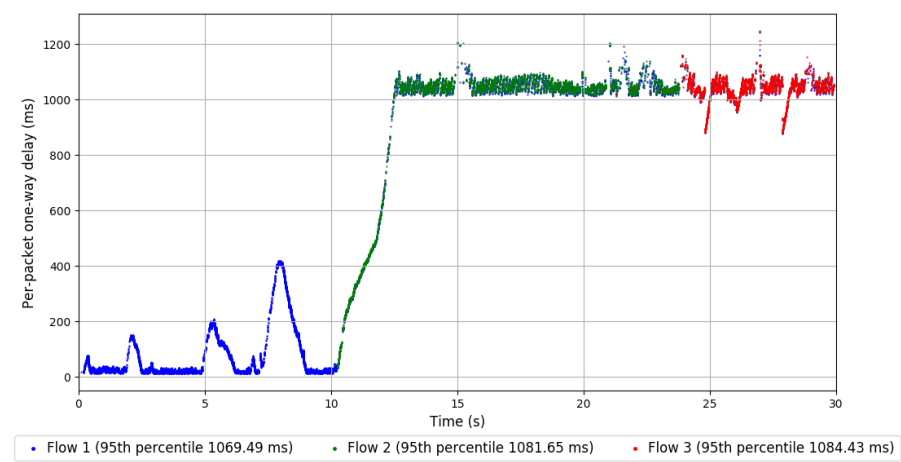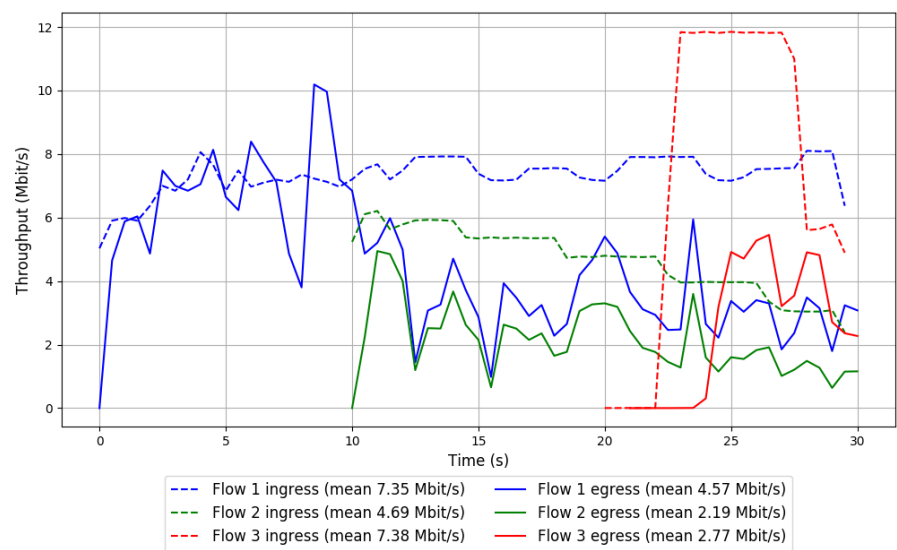
Run 3: Report of PCC-Allegro — Data Link

- - - Flow 1 ingress (mean 3.89 Mbit/s) ——— Flow 1 egress (mean 3.88 Mbit/s)
- - - Flow 2 ingress (mean 1.91 Mbit/s) ——— Flow 2 egress (mean 1.90 Mbit/s)
- - - Flow 3 ingress (mean 2.18 Mbit/s) ——— Flow 3 egress (mean 2.17 Mbit/s)

• Flow 1 (95th percentile 73.87 ms)   • Flow 2 (95th percentile 65.56 ms)   • Flow 3 (95th percentile 170.55 ms)

```
Run 1: Statistics of PCC-Expr

Start at: 2018-08-22 01:01:16
End at: 2018-08-22 01:01:46
Local clock offset: 2.236 ms
Remote clock offset: -61.006 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.82 Mbit/s
95th percentile per-packet one-way delay: 1075.653 ms
Loss rate: 47.13%
-- Flow 1:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 1069.490 ms
Loss rate: 37.84%
-- Flow 2:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 1081.648 ms
Loss rate: 53.25%
-- Flow 3:
Average throughput: 2.77 Mbit/s
95th percentile per-packet one-way delay: 1084.434 ms
Loss rate: 67.29%
```

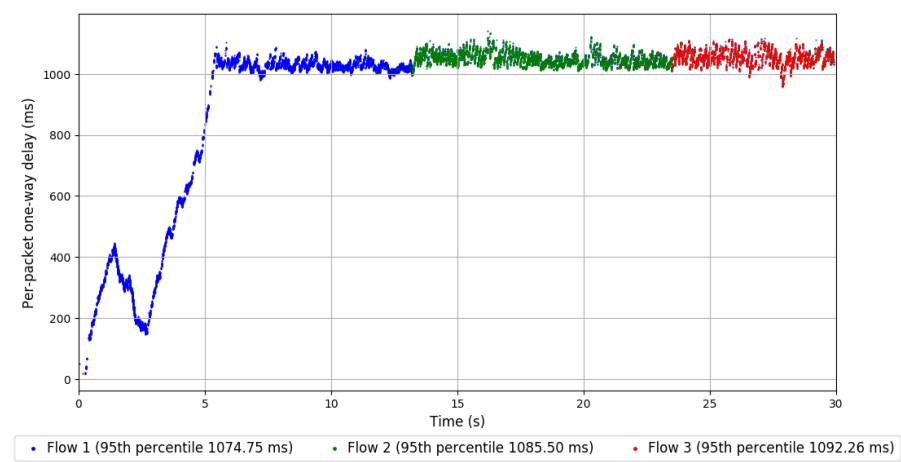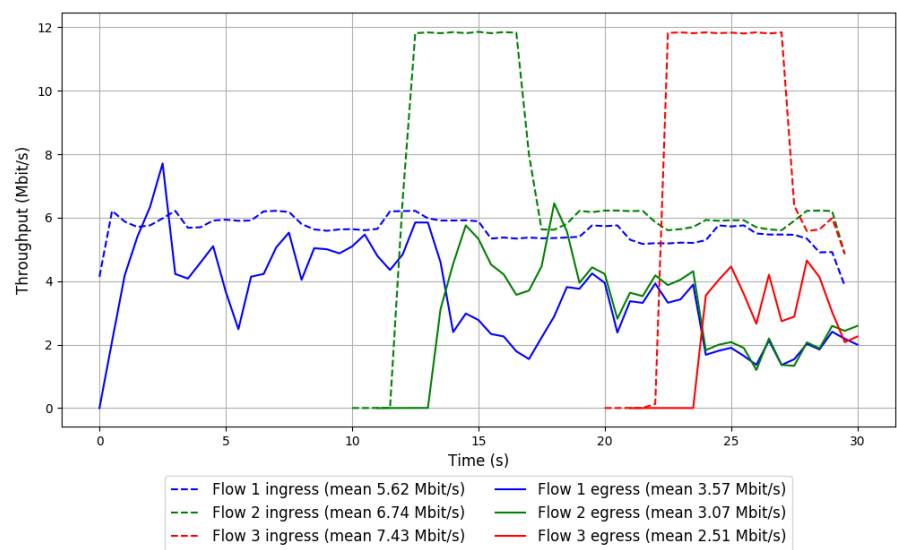Run 1: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 7.35 Mbit/s)   Flow 1 egress (mean 4.57 Mbit/s)
Flow 2 ingress (mean 4.69 Mbit/s)   Flow 2 egress (mean 2.19 Mbit/s)
Flow 3 ingress (mean 7.38 Mbit/s)   Flow 3 egress (mean 2.77 Mbit/s)

Flow 1 (95th percentile 1069.49 ms)   Flow 2 (95th percentile 1081.65 ms)   Flow 3 (95th percentile 1084.43 ms)

```
Run 2: Statistics of PCC-Expr

Start at: 2018-08-22 01:19:56
End at: 2018-08-22 01:20:26
Local clock offset: 0.393 ms
Remote clock offset: -61.93 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.25 Mbit/s
95th percentile per-packet one-way delay: 1082.170 ms
Loss rate: 50.32%
-- Flow 1:
Average throughput: 3.57 Mbit/s
95th percentile per-packet one-way delay: 1074.752 ms
Loss rate: 36.60%
-- Flow 2:
Average throughput: 3.07 Mbit/s
95th percentile per-packet one-way delay: 1085.496 ms
Loss rate: 56.83%
-- Flow 3:
Average throughput: 2.51 Mbit/s
95th percentile per-packet one-way delay: 1092.257 ms
Loss rate: 69.83%
```

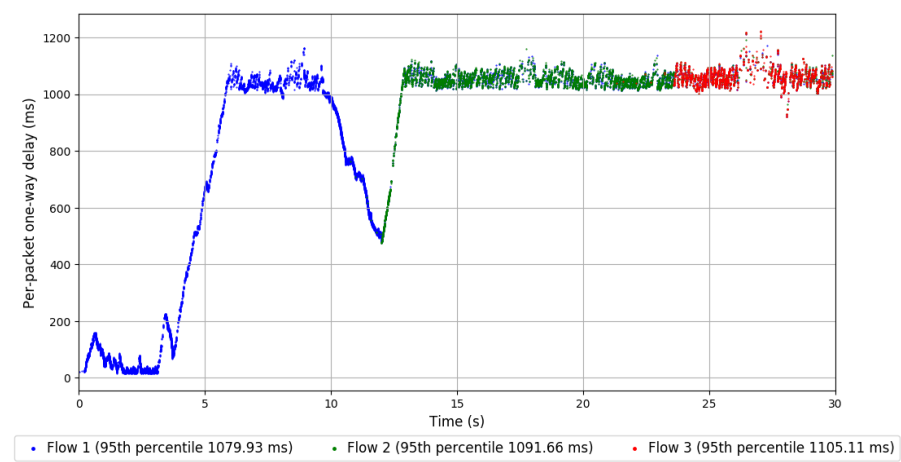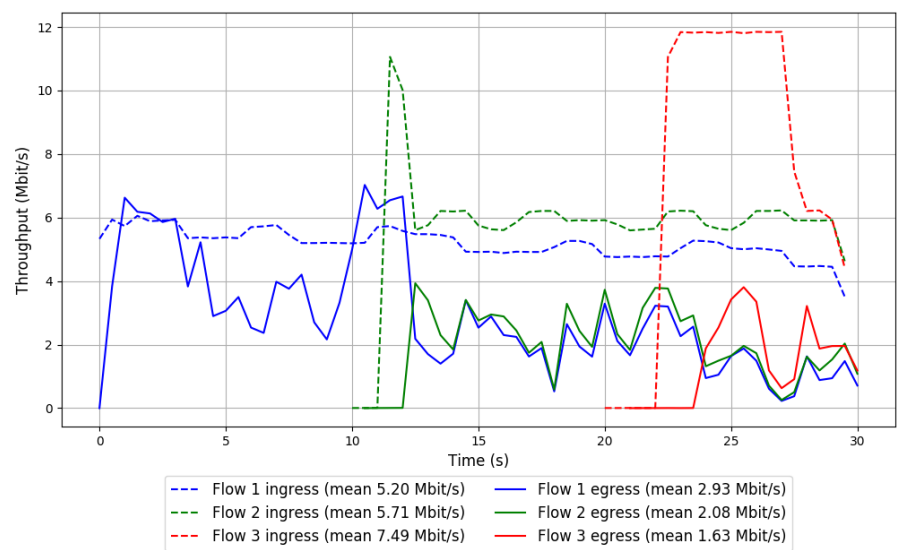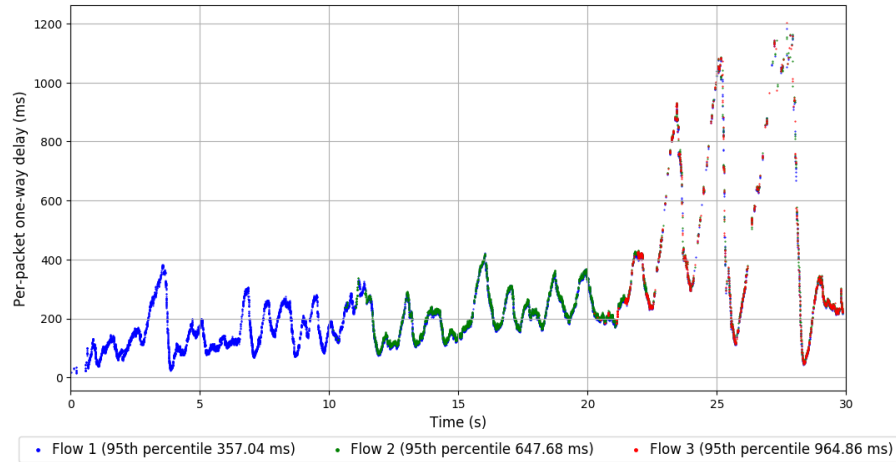Run 2: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 5.62 Mbit/s) --- Flow 1 egress (mean 3.57 Mbit/s)
Flow 2 ingress (mean 6.74 Mbit/s) --- Flow 2 egress (mean 3.07 Mbit/s)
Flow 3 ingress (mean 7.43 Mbit/s) --- Flow 3 egress (mean 2.51 Mbit/s)

Flow 1 (95th percentile 1074.75 ms) · Flow 2 (95th percentile 1085.50 ms) · Flow 3 (95th percentile 1092.26 ms)

```
Run 3: Statistics of PCC-Expr

Start at: 2018-08-22 01:38:31
End at: 2018-08-22 01:39:01
Local clock offset: 1.438 ms
Remote clock offset: -62.785 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.72 Mbit/s
95th percentile per-packet one-way delay: 1087.874 ms
Loss rate: 58.87%
-- Flow 1:
Average throughput: 2.93 Mbit/s
95th percentile per-packet one-way delay: 1079.929 ms
Loss rate: 43.77%
-- Flow 2:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 1091.660 ms
Loss rate: 65.08%
-- Flow 3:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 1105.114 ms
Loss rate: 81.10%
```

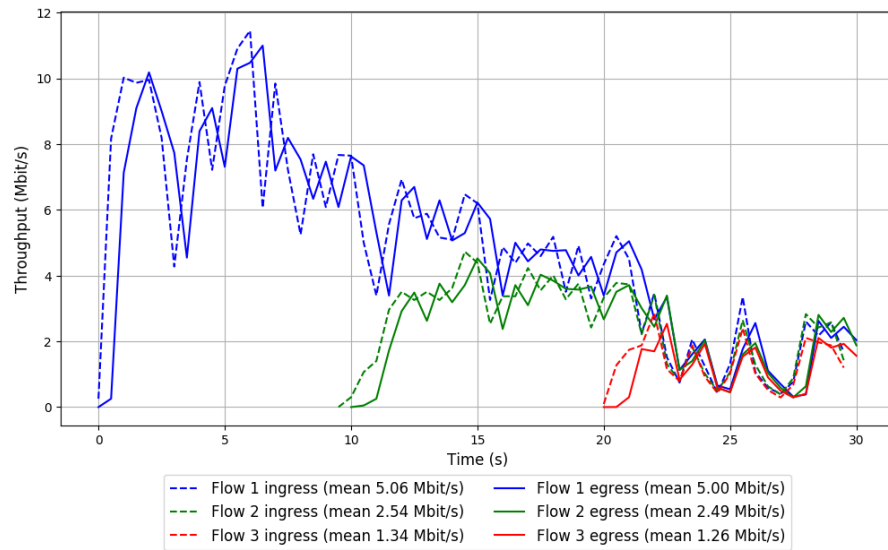Run 3: Report of PCC-Expr — Data Link

Flow 1 ingress (mean 5.20 Mbit/s)   Flow 1 egress (mean 2.93 Mbit/s)
Flow 2 ingress (mean 5.71 Mbit/s)   Flow 2 egress (mean 2.08 Mbit/s)
Flow 3 ingress (mean 7.49 Mbit/s)   Flow 3 egress (mean 1.63 Mbit/s)

Flow 1 (95th percentile 1079.93 ms)   Flow 2 (95th percentile 1091.66 ms)   Flow 3 (95th percentile 1105.11 ms)
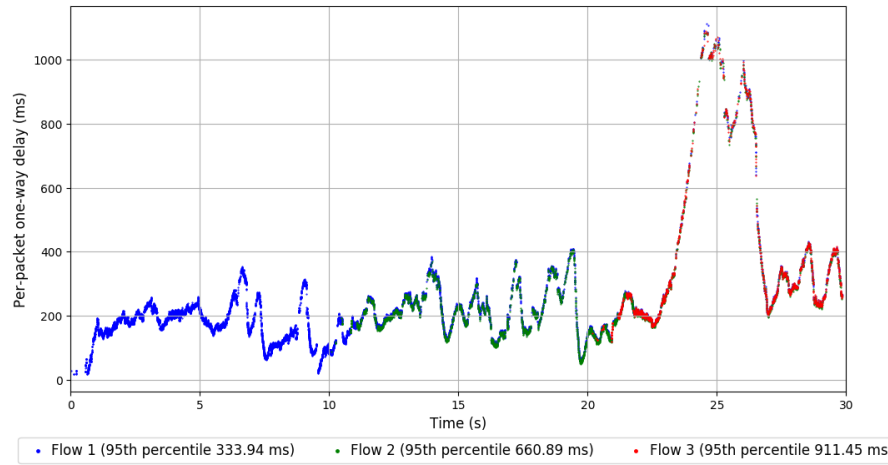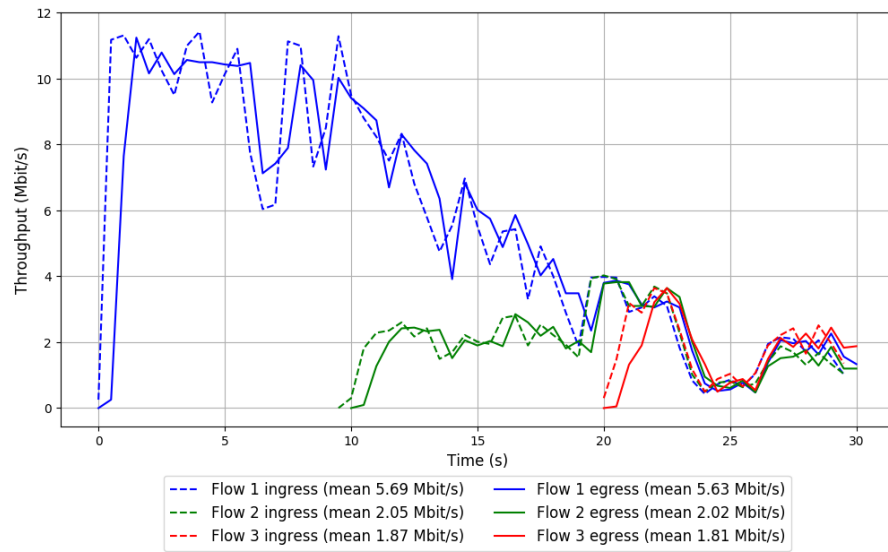
```
Run 1: Statistics of QUIC Cubic

Start at: 2018-08-22 01:00:10
End at: 2018-08-22 01:00:40
Local clock offset: 1.921 ms
Remote clock offset: -61.206 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.06 Mbit/s
95th percentile per-packet one-way delay: 426.112 ms
Loss rate: 1.62%
-- Flow 1:
Average throughput: 5.00 Mbit/s
95th percentile per-packet one-way delay: 357.039 ms
Loss rate: 0.94%
-- Flow 2:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 647.682 ms
Loss rate: 2.25%
-- Flow 3:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 964.864 ms
Loss rate: 7.11%
```
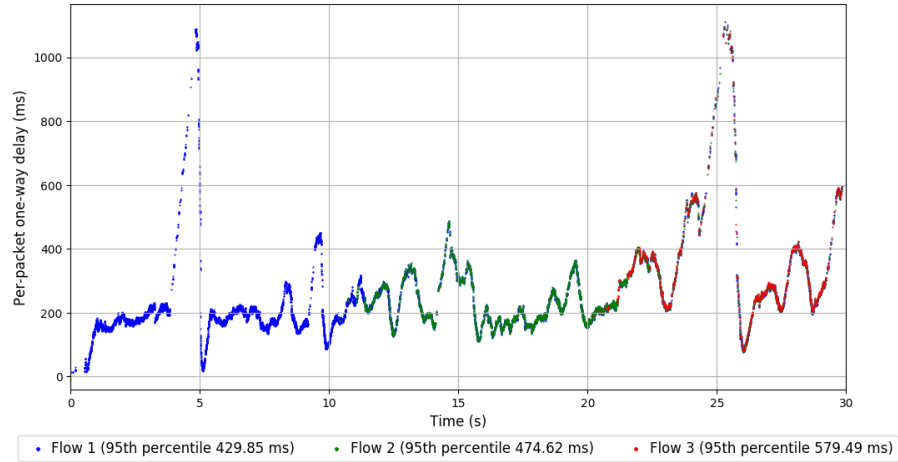
Run 1: Report of QUIC Cubic — Data Link

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-08-22 01:18:49
End at: 2018-08-22 01:19:19
Local clock offset: 1.548 ms
Remote clock offset: -60.96 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.56 Mbit/s
95th percentile per-packet one-way delay: 398.149 ms
Loss rate: 1.43%
-- Flow 1:
Average throughput: 5.63 Mbit/s
95th percentile per-packet one-way delay: 333.942 ms
Loss rate: 1.01%
-- Flow 2:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 660.886 ms
Loss rate: 1.84%
-- Flow 3:
Average throughput: 1.81 Mbit/s
95th percentile per-packet one-way delay: 911.450 ms
Loss rate: 4.38%
```
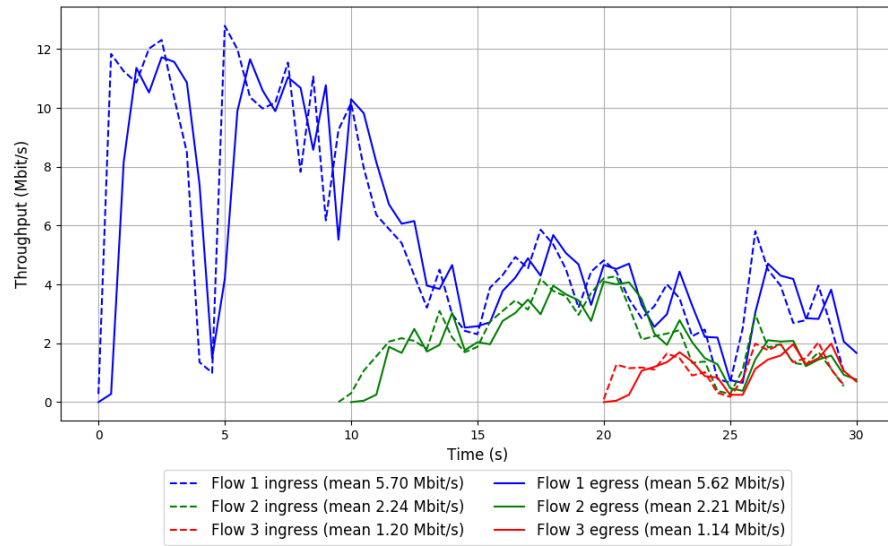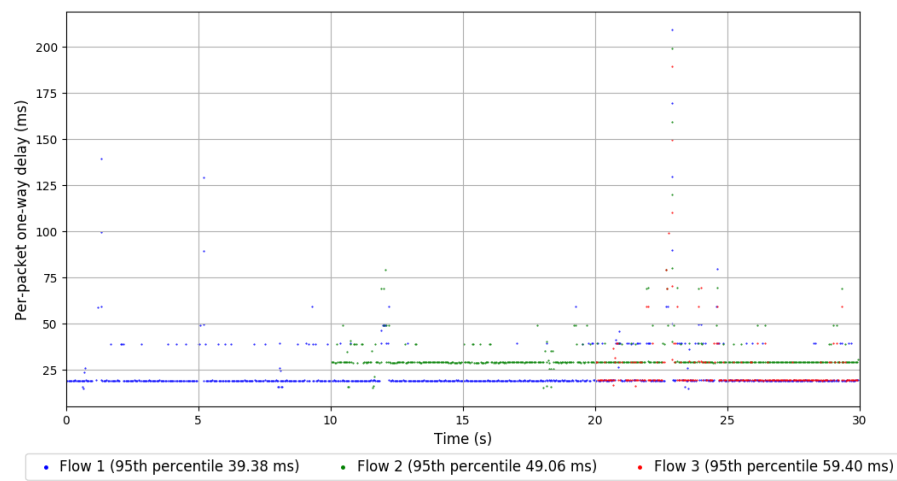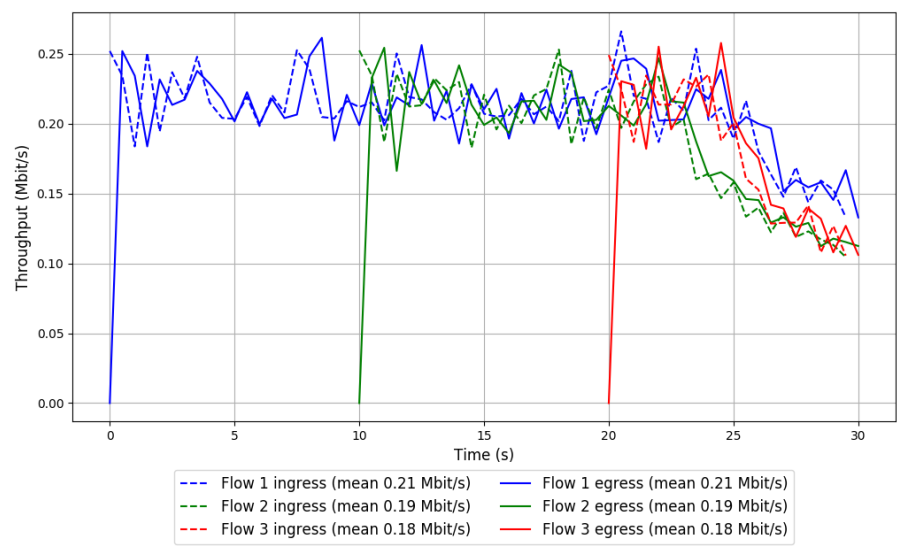
Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 5.69 Mbit/s) --- Flow 1 egress (mean 5.63 Mbit/s)
Flow 2 ingress (mean 2.05 Mbit/s) --- Flow 2 egress (mean 2.02 Mbit/s)
Flow 3 ingress (mean 1.87 Mbit/s) --- Flow 3 egress (mean 1.81 Mbit/s)

Flow 1 (95th percentile 333.94 ms) • Flow 2 (95th percentile 660.89 ms) • Flow 3 (95th percentile 911.45 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-08-22 01:37:25
End at: 2018-08-22 01:37:55
Local clock offset: 1.46 ms
Remote clock offset: -62.774 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.44 Mbit/s
95th percentile per-packet one-way delay: 444.093 ms
Loss rate: 1.74%
-- Flow 1:
Average throughput: 5.62 Mbit/s
95th percentile per-packet one-way delay: 429.854 ms
Loss rate: 1.33%
-- Flow 2:
Average throughput: 2.21 Mbit/s
95th percentile per-packet one-way delay: 474.617 ms
Loss rate: 1.96%
-- Flow 3:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 579.488 ms
Loss rate: 6.75%
```
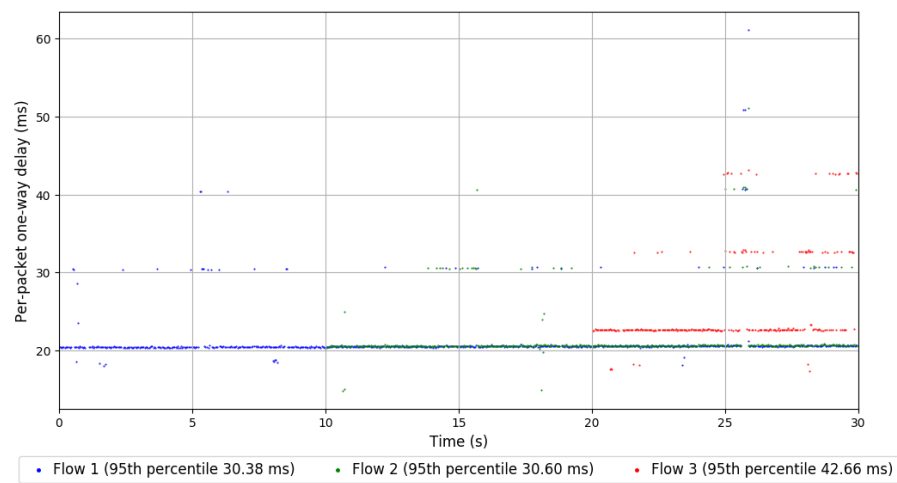
Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 5.70 Mbit/s)   Flow 1 egress (mean 5.62 Mbit/s)
Flow 2 ingress (mean 2.24 Mbit/s)   Flow 2 egress (mean 2.21 Mbit/s)
Flow 3 ingress (mean 1.20 Mbit/s)   Flow 3 egress (mean 1.14 Mbit/s)

• Flow 1 (95th percentile 429.85 ms)   • Flow 2 (95th percentile 474.62 ms)   • Flow 3 (95th percentile 579.49 ms)
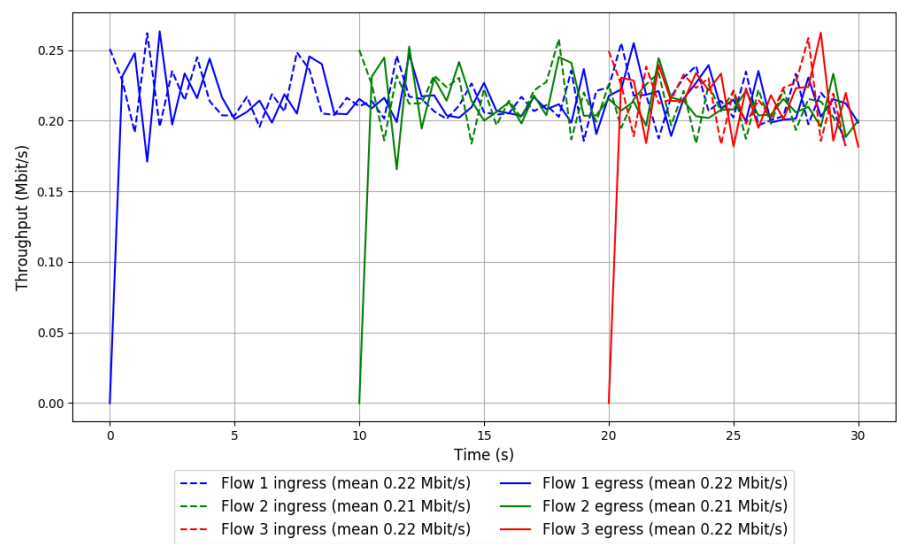
```
Run 1: Statistics of SCReAM

Start at: 2018-08-22 01:13:22
End at: 2018-08-22 01:13:52
Local clock offset: 3.345 ms
Remote clock offset: -60.781 ms

# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 40.055 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 39.375 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 49.061 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 59.400 ms
Loss rate: 0.25%
```

Run 1: Report of SCReAM — Data Link
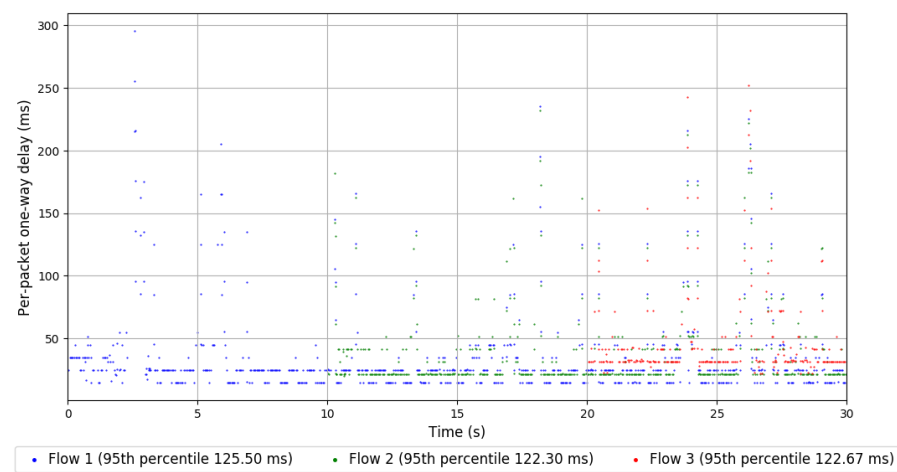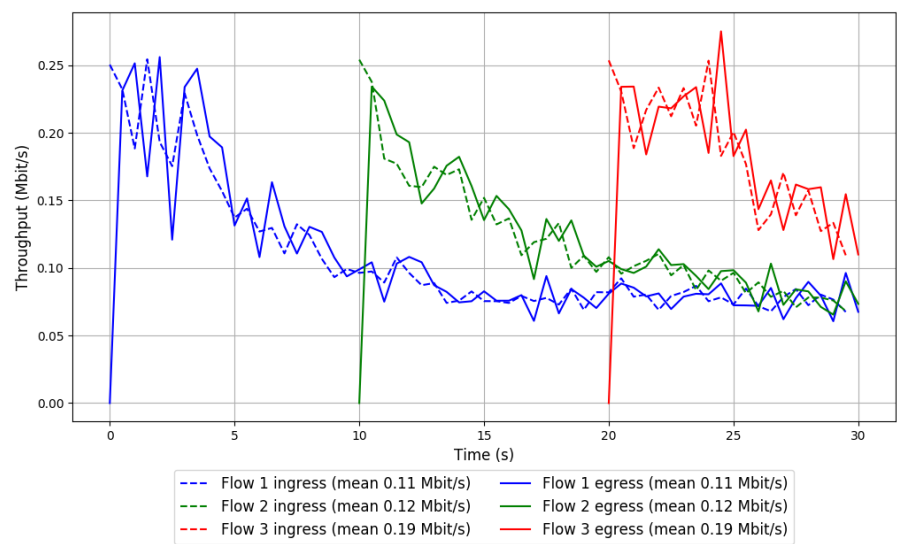

65

```
Run 2: Statistics of SCReAM

Start at: 2018-08-22 01:31:57
End at: 2018-08-22 01:32:27
Local clock offset: 0.392 ms
Remote clock offset: -63.449 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 30.764 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 30.383 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 30.603 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 42.660 ms
Loss rate: 0.35%
```
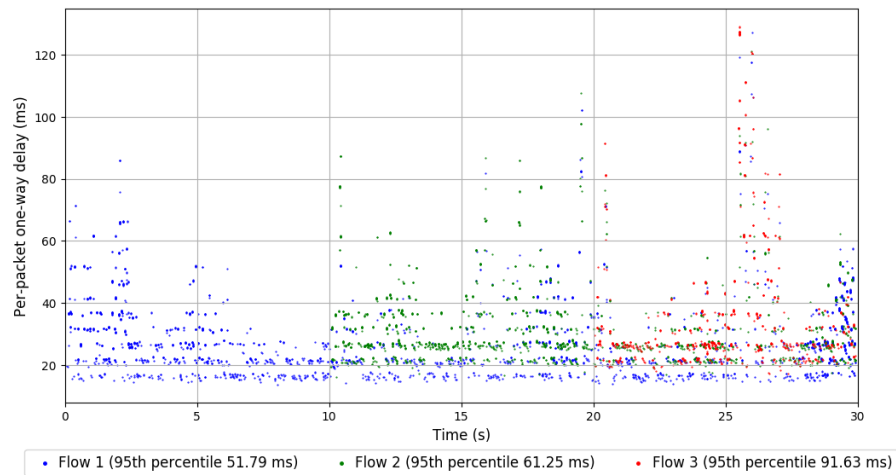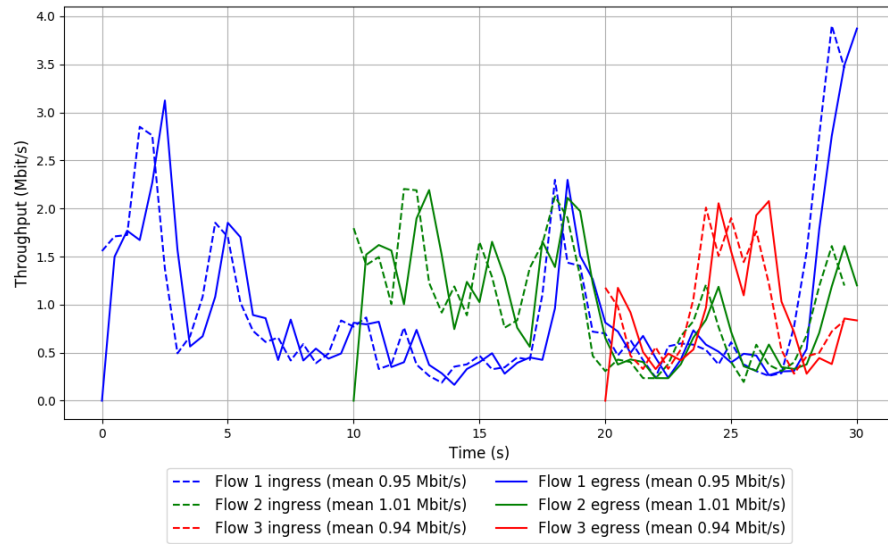
Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2018-08-22 01:50:34
End at: 2018-08-22 01:51:04
Local clock offset: 0.627 ms
Remote clock offset: -63.319 ms

# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 125.319 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 125.499 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 122.304 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 122.667 ms
Loss rate: 0.25%
```
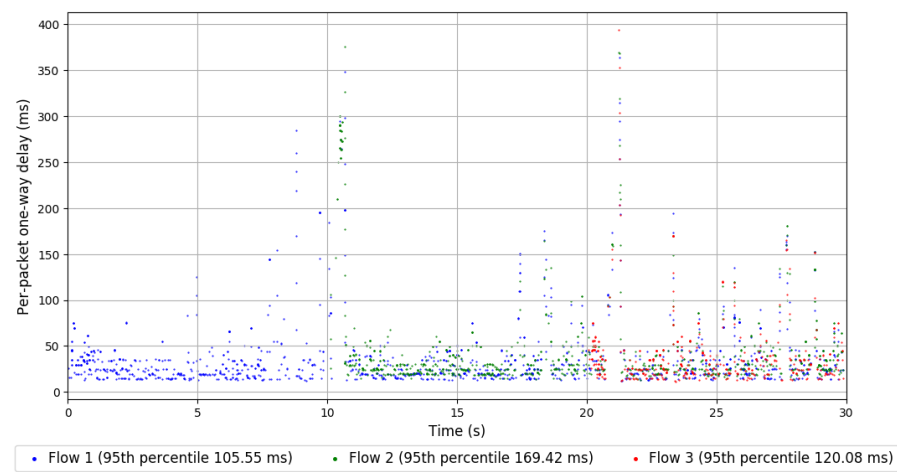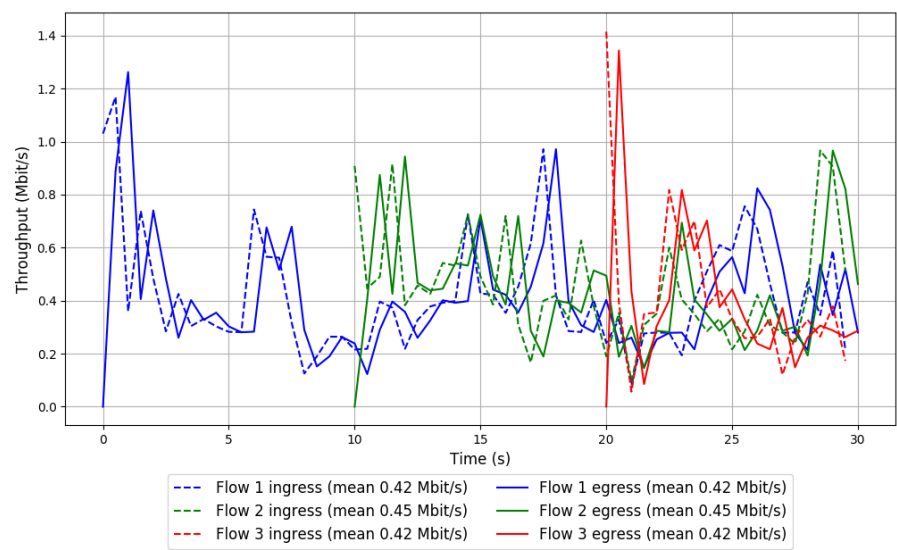
Run 3: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.11 Mbit/s)   Flow 1 egress (mean 0.11 Mbit/s)
Flow 2 ingress (mean 0.12 Mbit/s)   Flow 2 egress (mean 0.12 Mbit/s)
Flow 3 ingress (mean 0.19 Mbit/s)   Flow 3 egress (mean 0.19 Mbit/s)

Flow 1 (95th percentile 125.50 ms)   Flow 2 (95th percentile 122.30 ms)   Flow 3 (95th percentile 122.67 ms)

```
Run 1: Statistics of Sprout

Start at: 2018-08-22 01:03:28
End at: 2018-08-22 01:03:58
Local clock offset: 0.604 ms
Remote clock offset: -61.092 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 61.427 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 51.792 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 61.253 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 91.629 ms
Loss rate: 0.00%
```
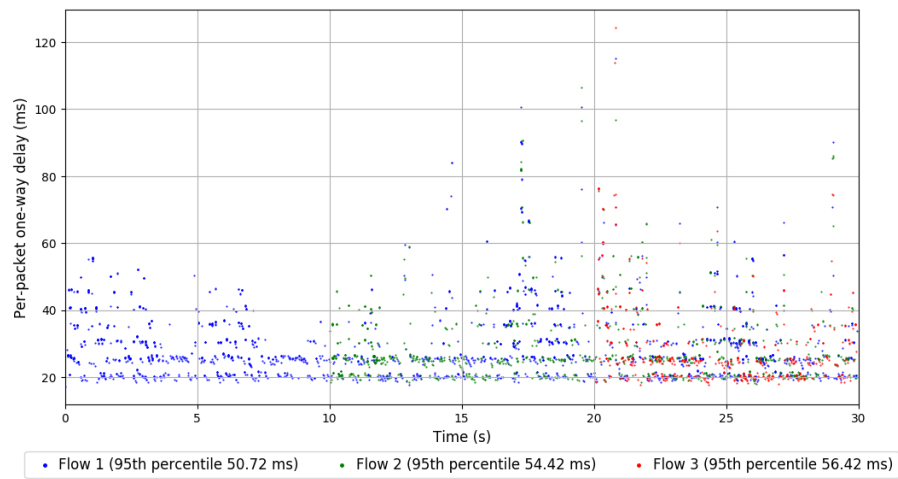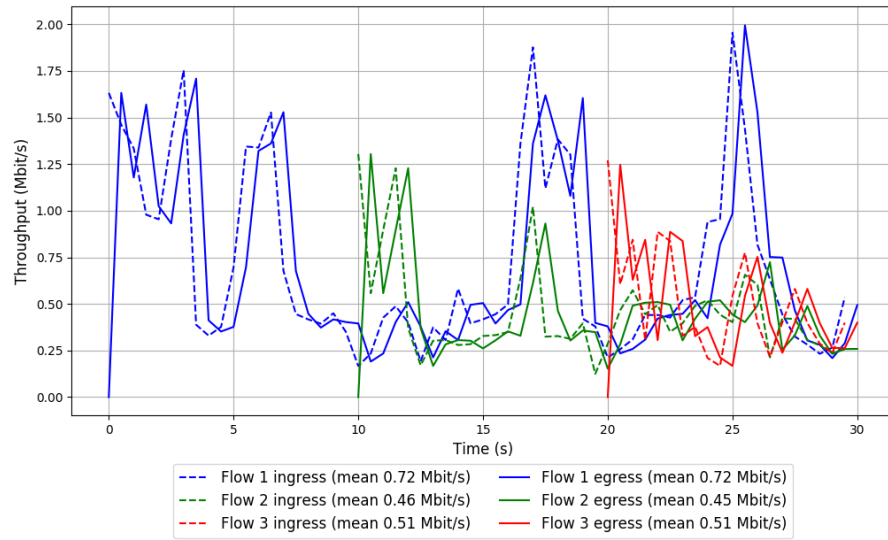
Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-08-22 01:22:07
End at: 2018-08-22 01:22:37
Local clock offset: 1.994 ms
Remote clock offset: -61.65 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 133.513 ms
Loss rate: 0.32%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 105.552 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 169.419 ms
Loss rate: 0.89%
-- Flow 3:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 120.076 ms
Loss rate: 0.02%
```
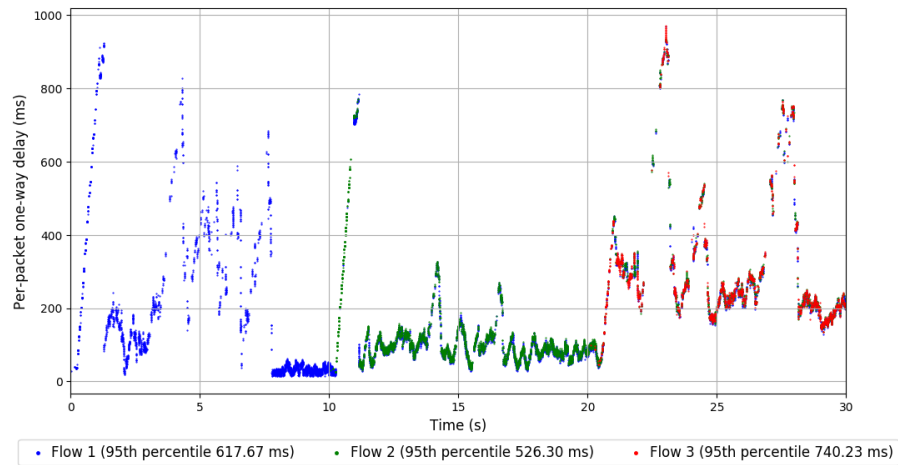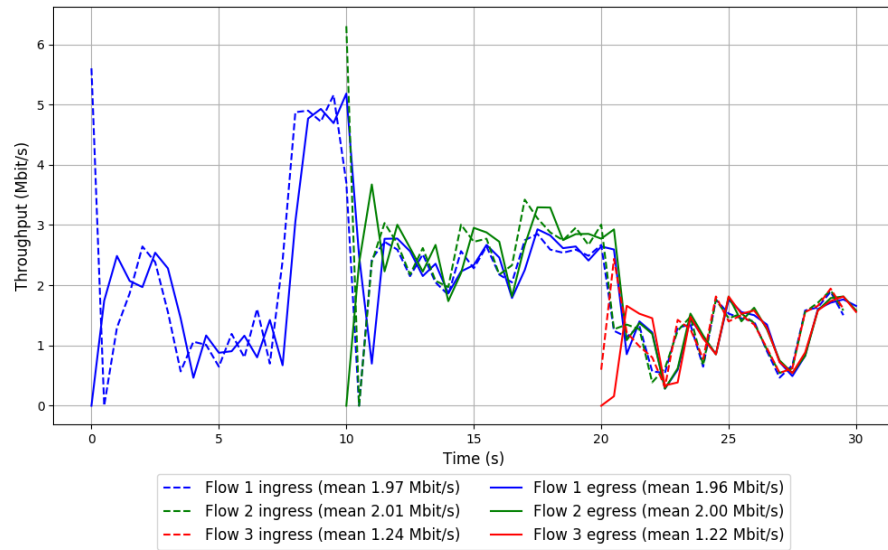
Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2018-08-22 01:40:42
End at: 2018-08-22 01:41:12
Local clock offset: 1.647 ms
Remote clock offset: -62.699 ms


# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 51.278 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 50.723 ms
Loss rate: 0.15%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 54.425 ms
Loss rate: 0.13%
-- Flow 3:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 56.425 ms
Loss rate: 0.00%
```

Run 3: Report of Sprout — Data Link

Flow 1 ingress (mean 0.72 Mbit/s) — Flow 1 egress (mean 0.72 Mbit/s)
Flow 2 ingress (mean 0.46 Mbit/s) — Flow 2 egress (mean 0.45 Mbit/s)
Flow 3 ingress (mean 0.51 Mbit/s) — Flow 3 egress (mean 0.51 Mbit/s)

Flow 1 (95th percentile 50.72 ms) • Flow 2 (95th percentile 54.42 ms) • Flow 3 (95th percentile 56.42 ms)
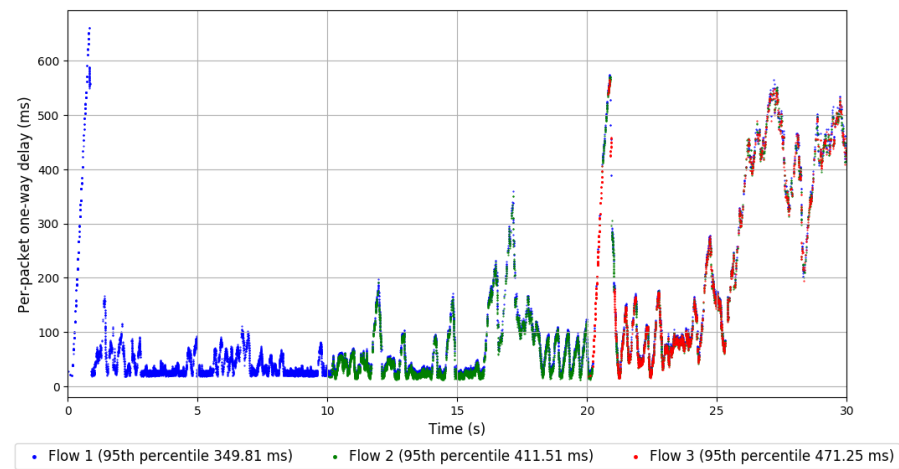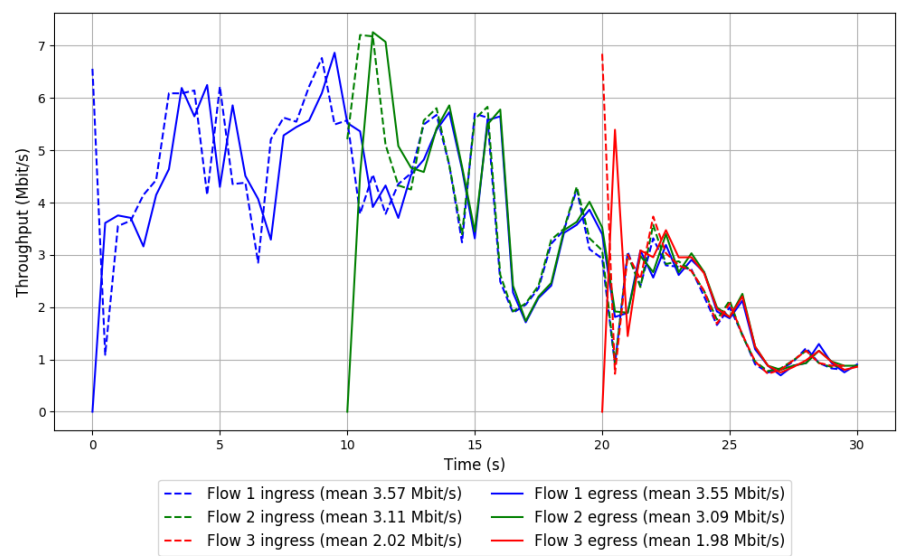
```
Run 1: Statistics of TaoVA-100x

Start at: 2018-08-22 01:08:59
End at: 2018-08-22 01:09:29
Local clock offset: 1.297 ms
Remote clock offset: -60.999 ms

# Below is generated by plot.py at 2018-08-22 01:54:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.69 Mbit/s
95th percentile per-packet one-way delay: 572.983 ms
Loss rate: 0.95%
-- Flow 1:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 617.670 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 526.301 ms
Loss rate: 0.89%
-- Flow 3:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 740.228 ms
Loss rate: 3.07%
```
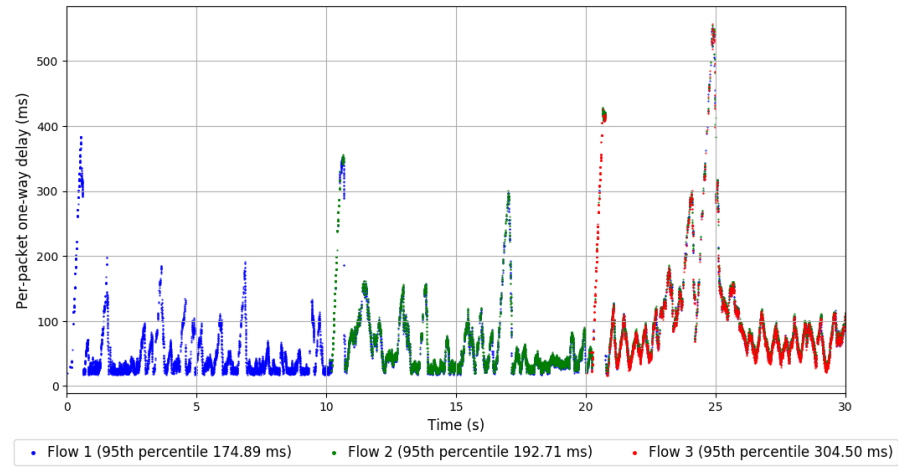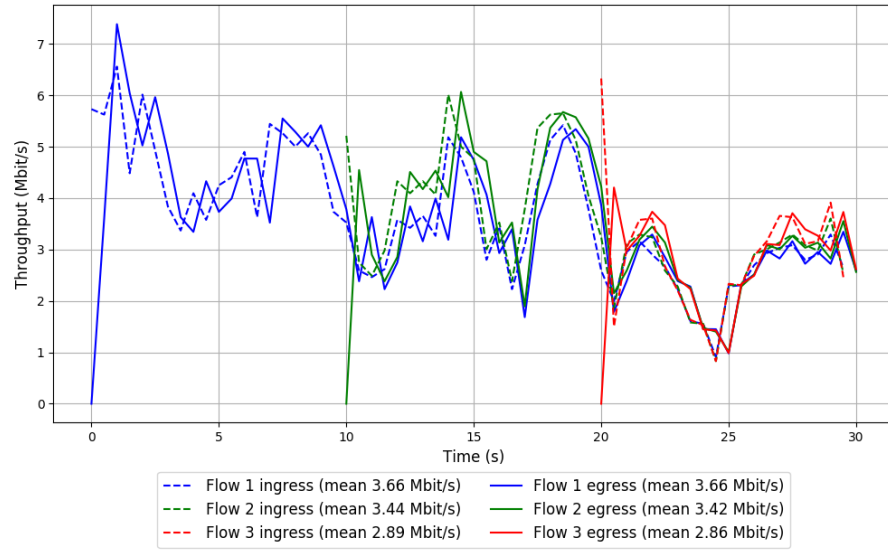
Run 1: Report of TaoVA-100x — Data Link

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

Start at: 2018-08-22 01:27:34
End at: 2018-08-22 01:28:04
Local clock offset: 1.833 ms
Remote clock offset: -61.999 ms

# Below is generated by plot.py at 2018-08-22 01:54:17
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.27 Mbit/s
95th percentile per-packet one-way delay: 422.664 ms
Loss rate: 0.74%
-- Flow 1:
Average throughput: 3.55 Mbit/s
95th percentile per-packet one-way delay: 349.807 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 3.09 Mbit/s
95th percentile per-packet one-way delay: 411.513 ms
Loss rate: 0.63%
-- Flow 3:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 471.248 ms
Loss rate: 2.14%
```
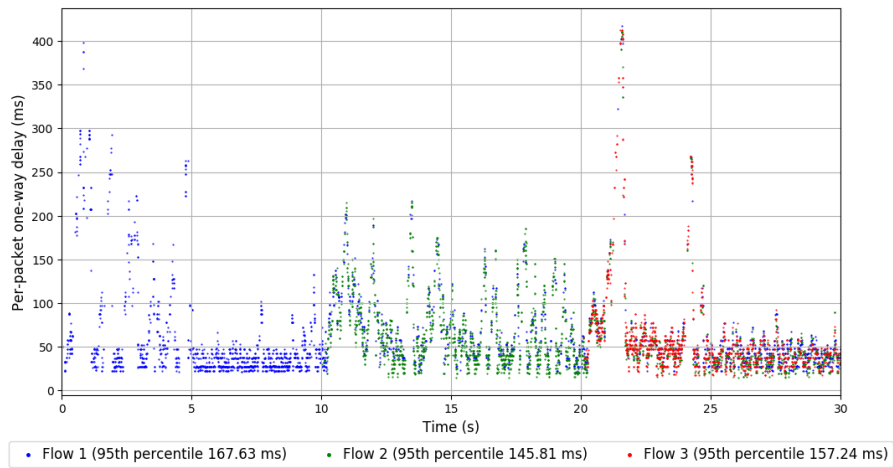
Run 2: Report of TaoVA-100x — Data Link

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

Start at: 2018-08-22 01:46:11
End at: 2018-08-22 01:46:41
Local clock offset: 0.857 ms
Remote clock offset: -63.193 ms

# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.88 Mbit/s
95th percentile per-packet one-way delay: 226.696 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 3.66 Mbit/s
95th percentile per-packet one-way delay: 174.888 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 3.42 Mbit/s
95th percentile per-packet one-way delay: 192.708 ms
Loss rate: 0.47%
-- Flow 3:
Average throughput: 2.86 Mbit/s
95th percentile per-packet one-way delay: 304.496 ms
Loss rate: 1.08%
```

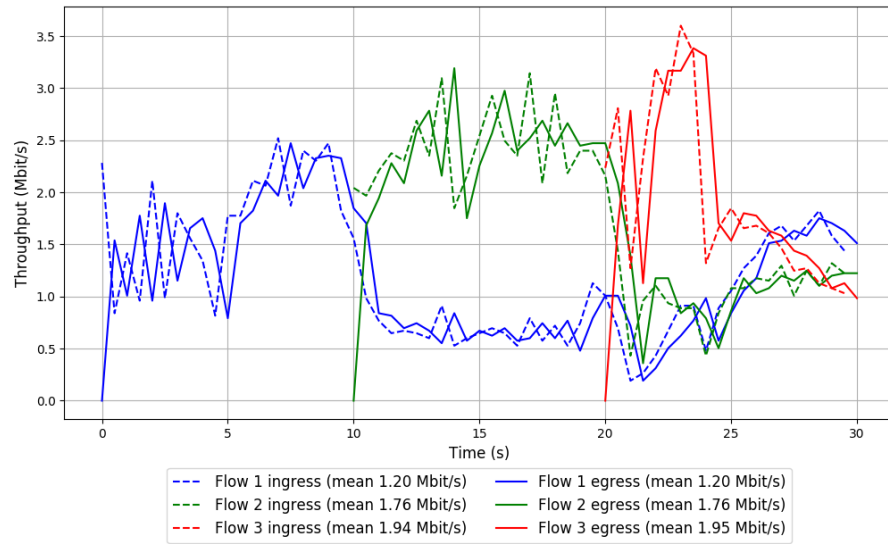# Run 3: Report of TaoVA-100x — Data Link

```
Run 1: Statistics of TCP Vegas

Start at: 2018-08-22 01:12:17
End at: 2018-08-22 01:12:47
Local clock offset: 2.315 ms
Remote clock offset: -60.936 ms


# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.01 Mbit/s
95th percentile per-packet one-way delay: 150.827 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 1.20 Mbit/s
95th percentile per-packet one-way delay: 167.629 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 145.807 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 157.241 ms
Loss rate: 0.37%
```

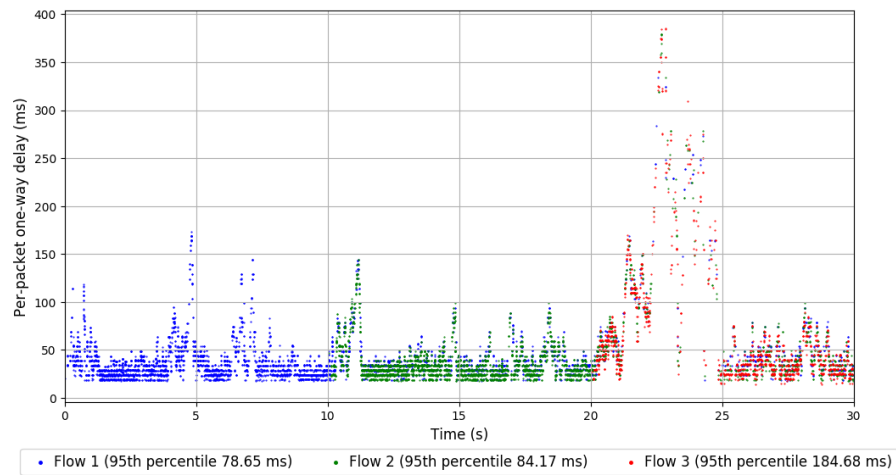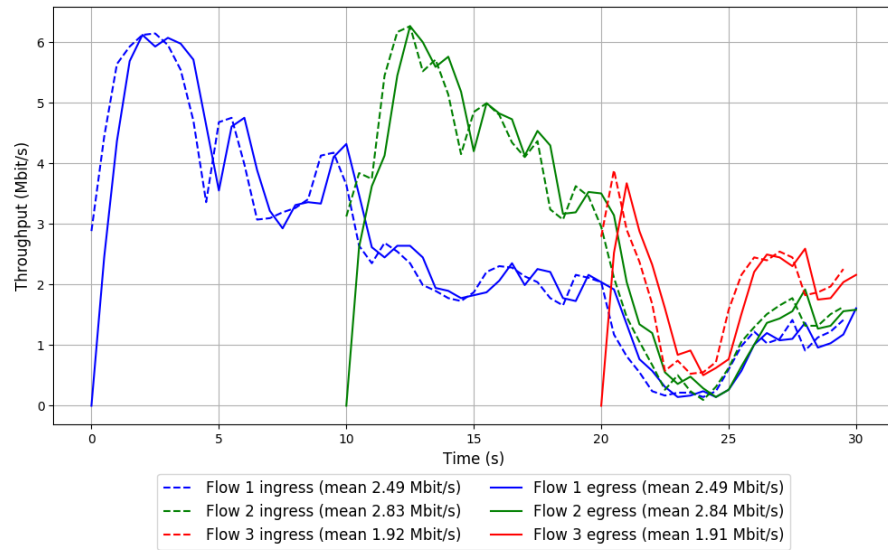Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2018-08-22 01:30:51
End at: 2018-08-22 01:31:21
Local clock offset: 1.359 ms
Remote clock offset: -62.552 ms


# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.02 Mbit/s
95th percentile per-packet one-way delay: 94.342 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 78.650 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 2.84 Mbit/s
95th percentile per-packet one-way delay: 84.174 ms
Loss rate: 0.11%
-- Flow 3:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 184.682 ms
Loss rate: 0.82%
```

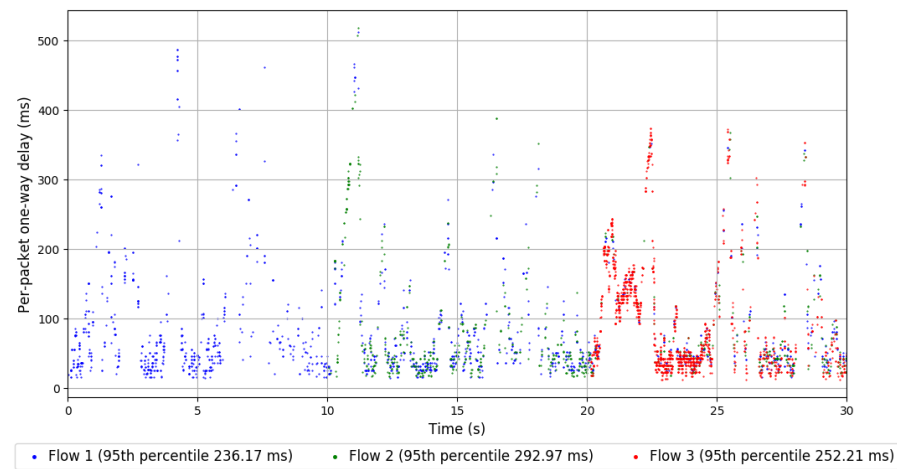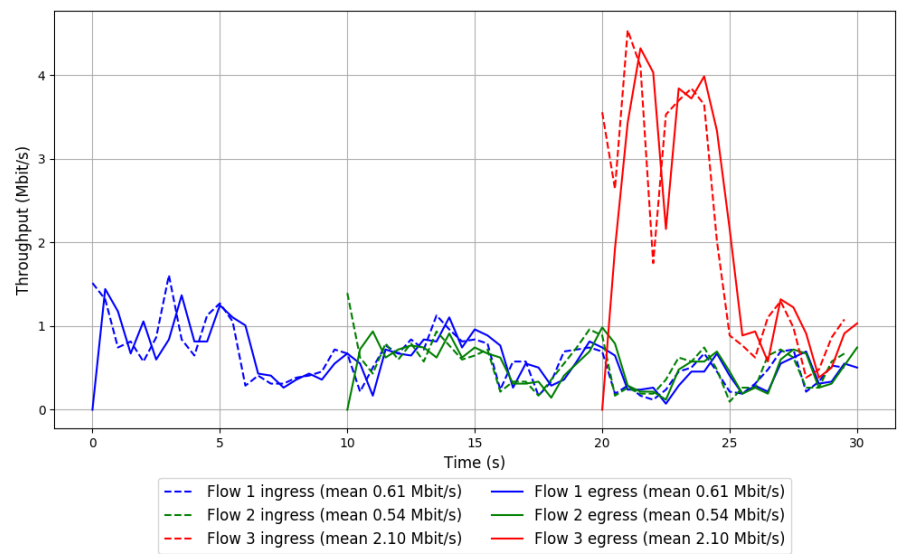Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-08-22 01:49:29
End at: 2018-08-22 01:49:59
Local clock offset: 2.319 ms
Remote clock offset: -64.803 ms


# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 267.623 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 236.169 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 292.974 ms
Loss rate: 0.34%
-- Flow 3:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 252.210 ms
Loss rate: 0.46%
```

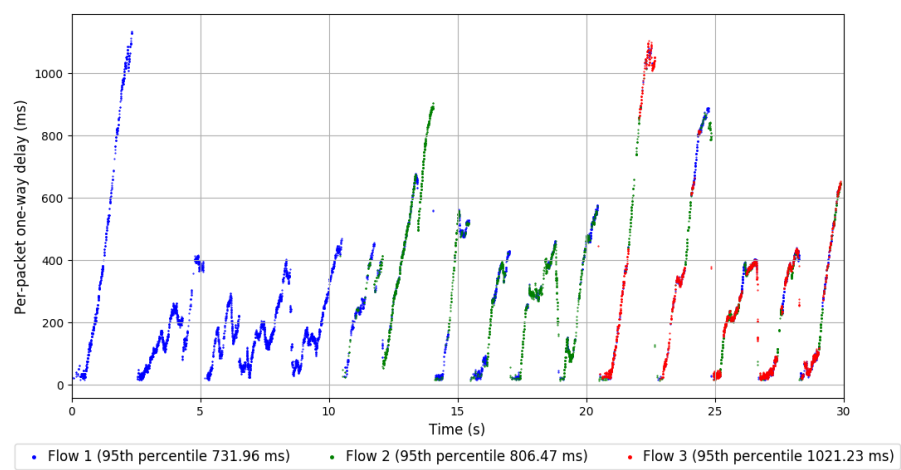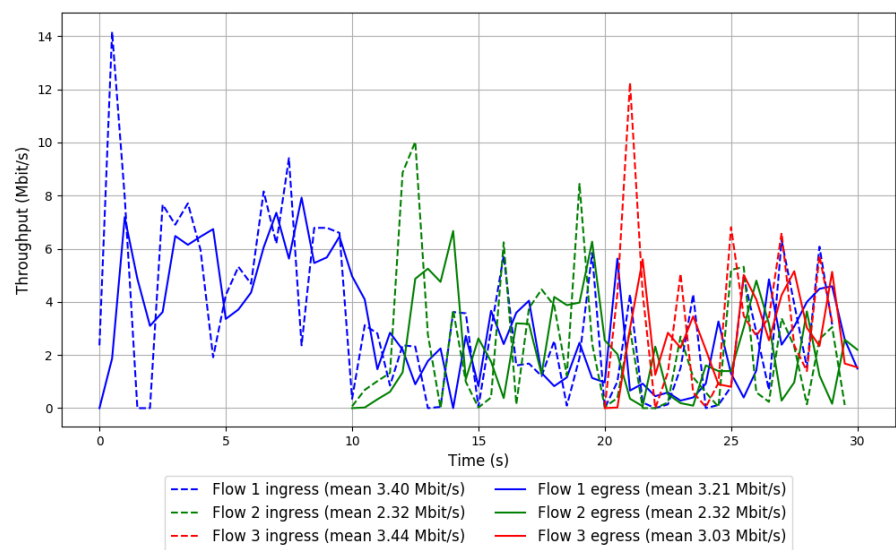Run 3: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: 2018-08-22 01:04:34
End at: 2018-08-22 01:05:04
Local clock offset: 2.126 ms
Remote clock offset: -61.622 ms

# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.68 Mbit/s
95th percentile per-packet one-way delay: 814.576 ms
Loss rate: 4.70%
-- Flow 1:
Average throughput: 3.21 Mbit/s
95th percentile per-packet one-way delay: 731.955 ms
Loss rate: 3.97%
-- Flow 2:
Average throughput: 2.32 Mbit/s
95th percentile per-packet one-way delay: 806.473 ms
Loss rate: 1.40%
-- Flow 3:
Average throughput: 3.03 Mbit/s
95th percentile per-packet one-way delay: 1021.226 ms
Loss rate: 11.66%
```
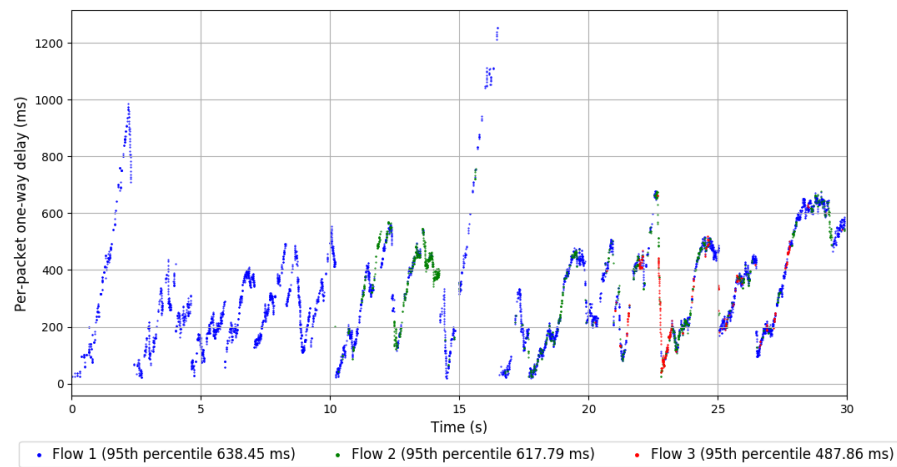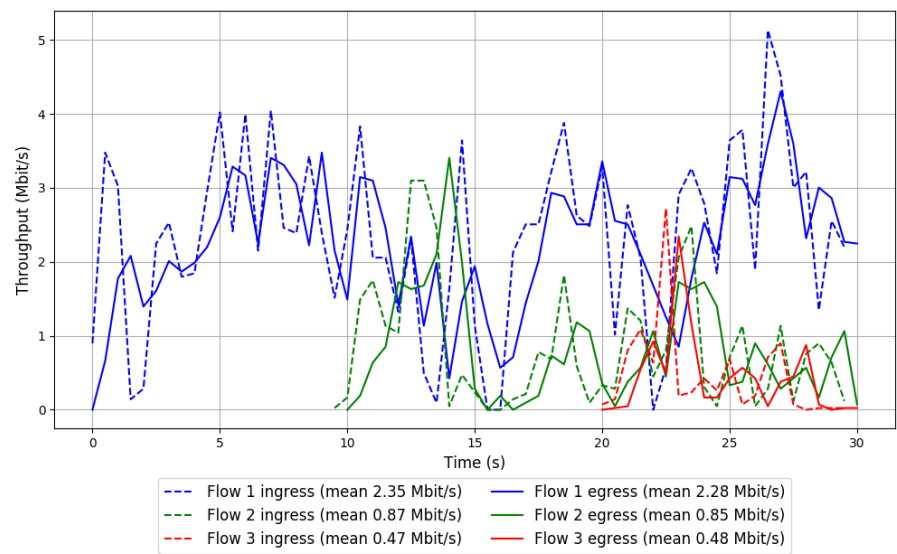
Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2018-08-22 01:23:12
End at: 2018-08-22 01:23:42
Local clock offset: -0.466 ms
Remote clock offset: -62.313 ms

# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.99 Mbit/s
95th percentile per-packet one-way delay: 636.140 ms
Loss rate: 2.89%
-- Flow 1:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 638.454 ms
Loss rate: 2.92%
-- Flow 2:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 617.789 ms
Loss rate: 3.22%
-- Flow 3:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 487.858 ms
Loss rate: 1.28%
```
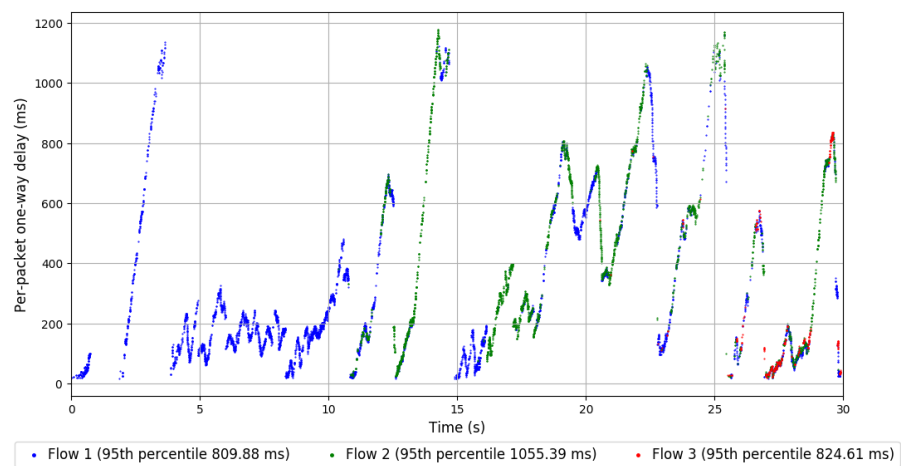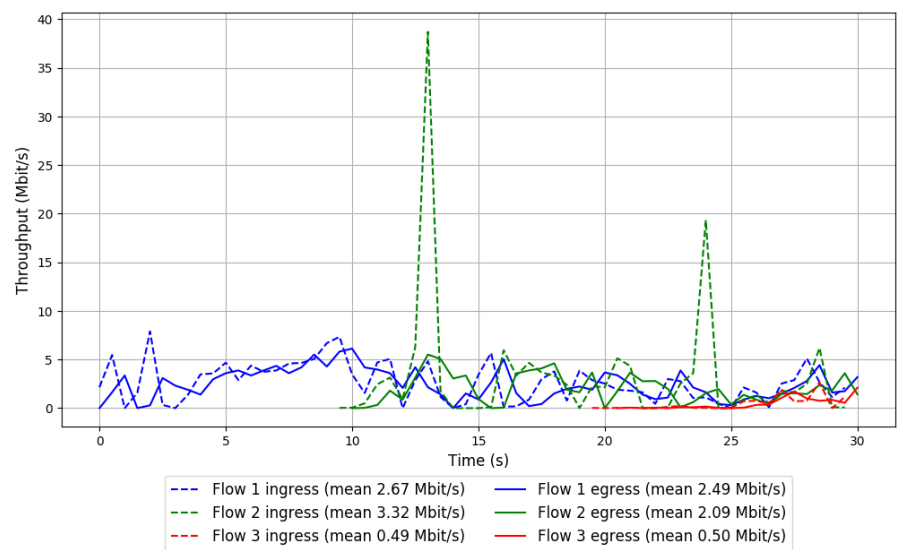
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2018-08-22 01:41:48
End at: 2018-08-22 01:42:18
Local clock offset: 0.085 ms
Remote clock offset: -62.766 ms

# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 950.689 ms
Loss rate: 20.40%
-- Flow 1:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 809.877 ms
Loss rate: 6.56%
-- Flow 2:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 1055.387 ms
Loss rate: 38.34%
-- Flow 3:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 824.606 ms
Loss rate: 3.69%
```

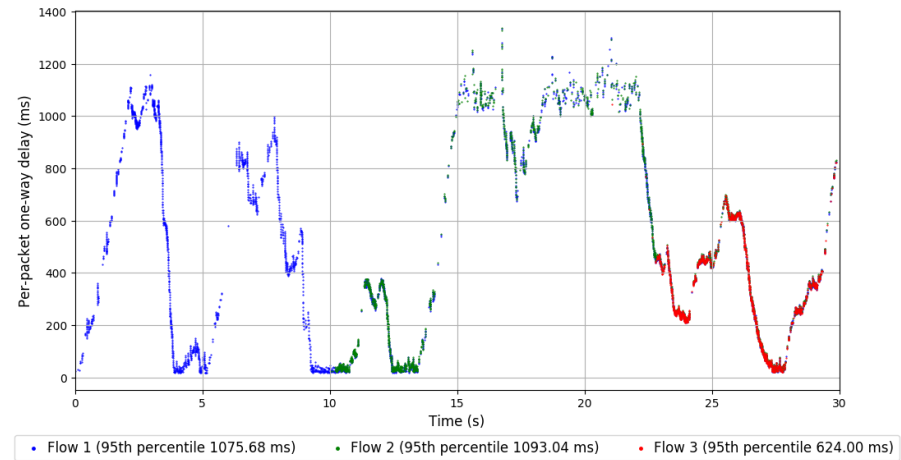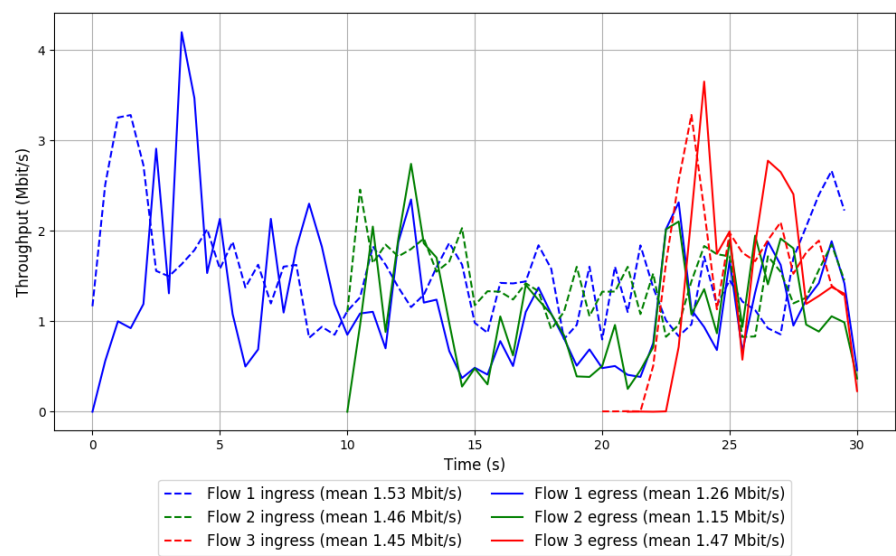## Run 3: Report of Verus — Data Link

```
Run 1: Statistics of PCC-Vivace

Start at: 2018-08-22 01:10:05
End at: 2018-08-22 01:10:35
Local clock offset: -0.042 ms
Remote clock offset: -60.383 ms


# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 1071.140 ms
Loss rate: 17.58%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 1075.685 ms
Loss rate: 17.91%
-- Flow 2:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 1093.035 ms
Loss rate: 21.13%
-- Flow 3:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 624.003 ms
Loss rate: 9.37%
```

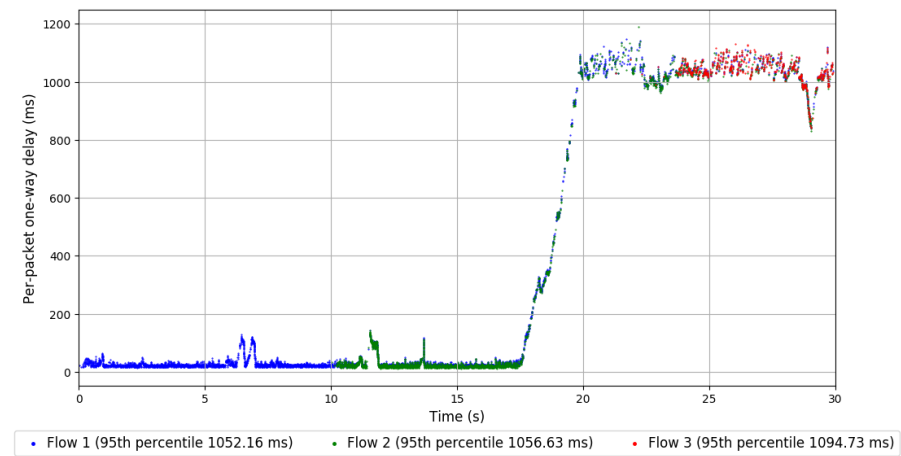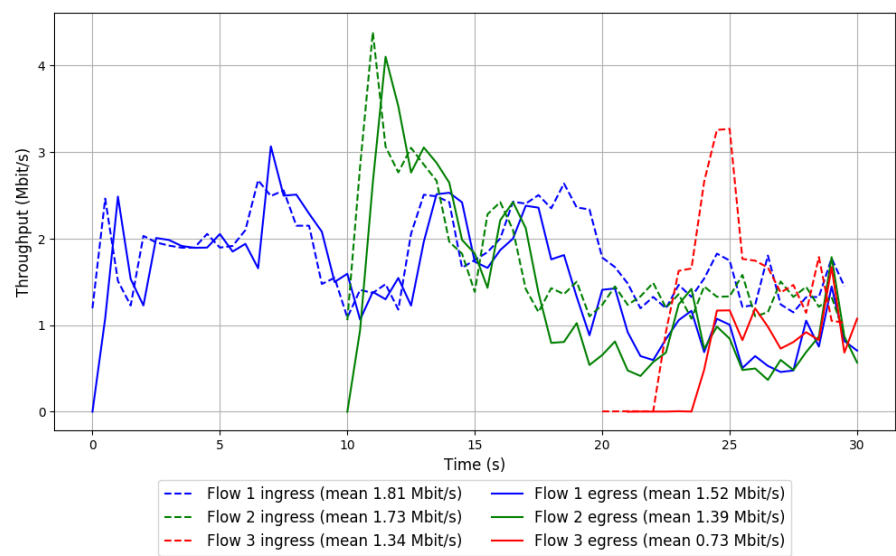Run 1: Report of PCC-Vivace — Data Link

```
Run 2: Statistics of PCC-Vivace

Start at: 2018-08-22 01:28:40
End at: 2018-08-22 01:29:10
Local clock offset: 1.762 ms
Remote clock offset: -62.794 ms


# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.66 Mbit/s
95th percentile per-packet one-way delay: 1063.976 ms
Loss rate: 22.03%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 1052.157 ms
Loss rate: 16.09%
-- Flow 2:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 1056.631 ms
Loss rate: 19.67%
-- Flow 3:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 1094.735 ms
Loss rate: 52.52%
```

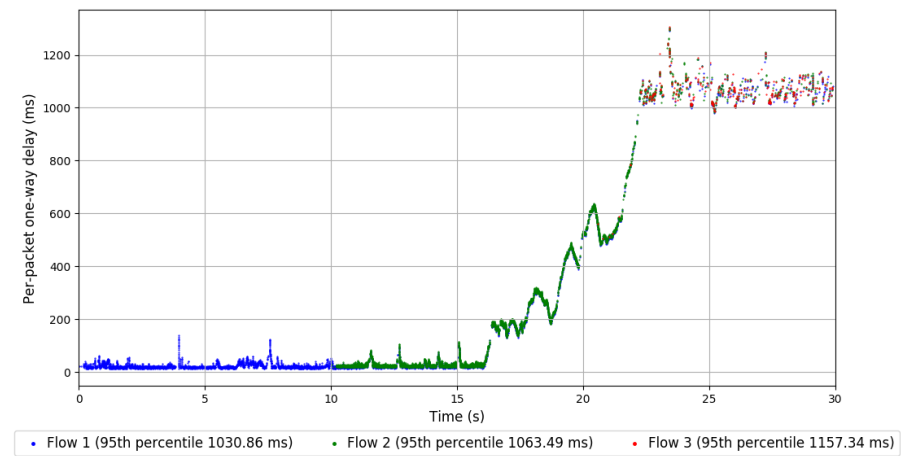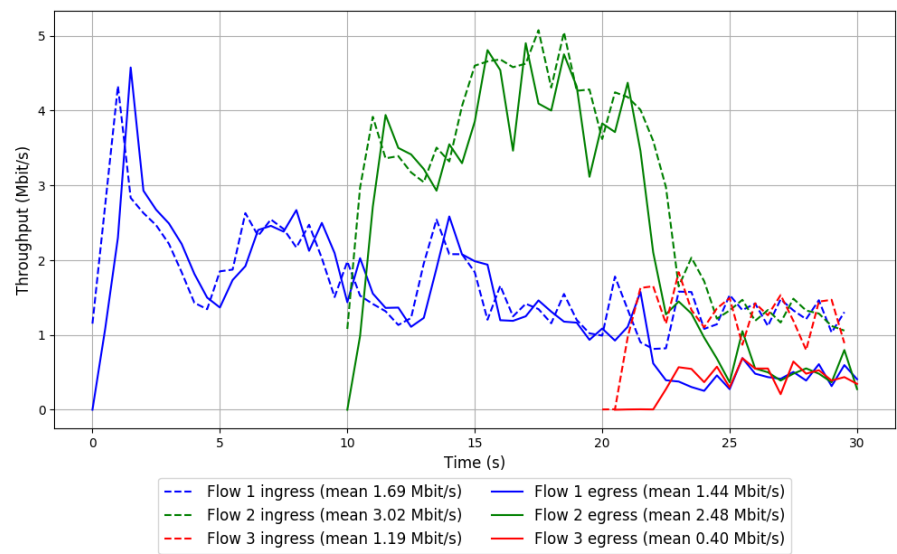Run 2: Report of PCC-Vivace — Data Link

```
Run 3: Statistics of PCC-Vivace

Start at: 2018-08-22 01:47:18
End at: 2018-08-22 01:47:48
Local clock offset: 3.237 ms
Remote clock offset: -63.479 ms


# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.21 Mbit/s
95th percentile per-packet one-way delay: 1067.595 ms
Loss rate: 21.60%
-- Flow 1:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 1030.858 ms
Loss rate: 15.08%
-- Flow 2:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 1063.488 ms
Loss rate: 18.01%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 1157.339 ms
Loss rate: 68.08%
```

Run 3: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 1.69 Mbit/s) --- Flow 1 egress (mean 1.44 Mbit/s)
Flow 2 ingress (mean 3.02 Mbit/s) --- Flow 2 egress (mean 2.48 Mbit/s)
Flow 3 ingress (mean 1.19 Mbit/s) --- Flow 3 egress (mean 0.40 Mbit/s)

Flow 1 (95th percentile 1030.86 ms) · Flow 2 (95th percentile 1063.49 ms) · Flow 3 (95th percentile 1157.34 ms)
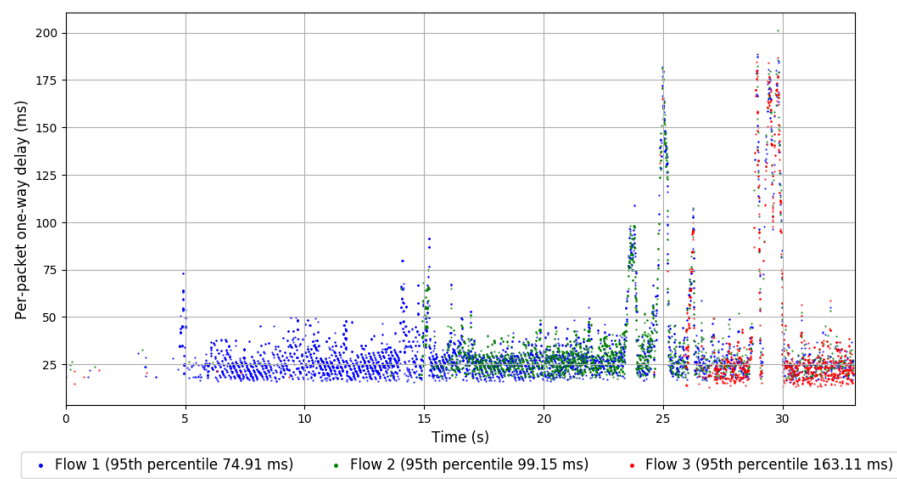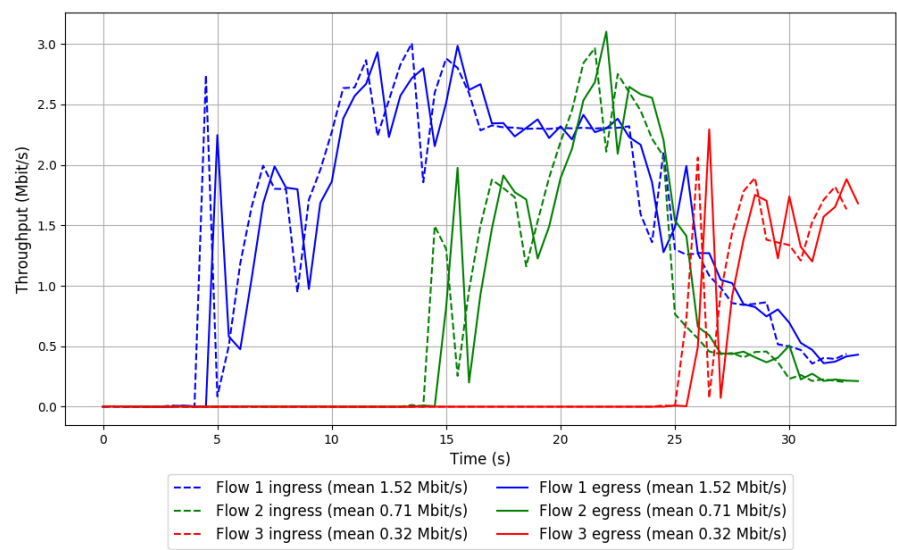
```
Run 1: Statistics of WebRTC media

Start at: 2018-08-22 01:02:22
End at: 2018-08-22 01:02:52
Local clock offset: 2.379 ms
Remote clock offset: -61.432 ms


# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.54 Mbit/s
95th percentile per-packet one-way delay: 102.736 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 74.908 ms
Loss rate: 0.03%
-- Flow 2:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 99.146 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 163.110 ms
Loss rate: 0.00%
```

Run 1: Report of WebRTC media — Data Link

Flow 1 ingress (mean 1.52 Mbit/s) --- Flow 1 egress (mean 1.52 Mbit/s)
Flow 2 ingress (mean 0.71 Mbit/s) --- Flow 2 egress (mean 0.71 Mbit/s)
Flow 3 ingress (mean 0.32 Mbit/s) --- Flow 3 egress (mean 0.32 Mbit/s)

Flow 1 (95th percentile 74.91 ms) ・ Flow 2 (95th percentile 99.15 ms) ・ Flow 3 (95th percentile 163.11 ms)
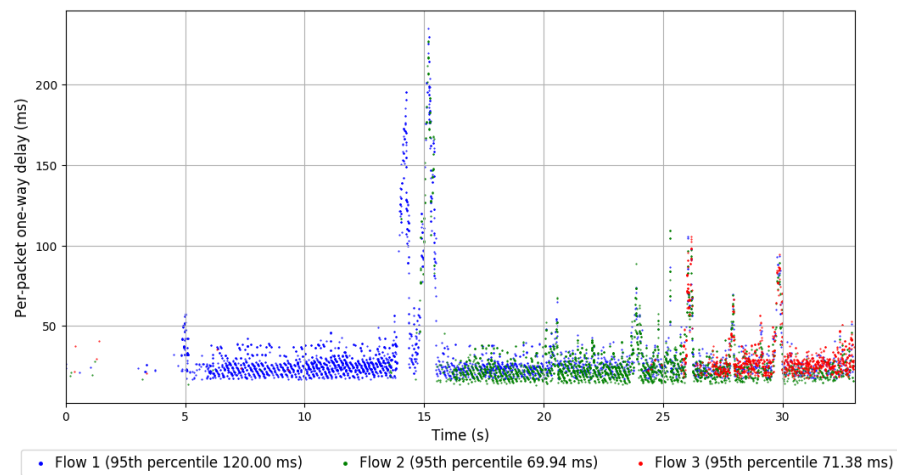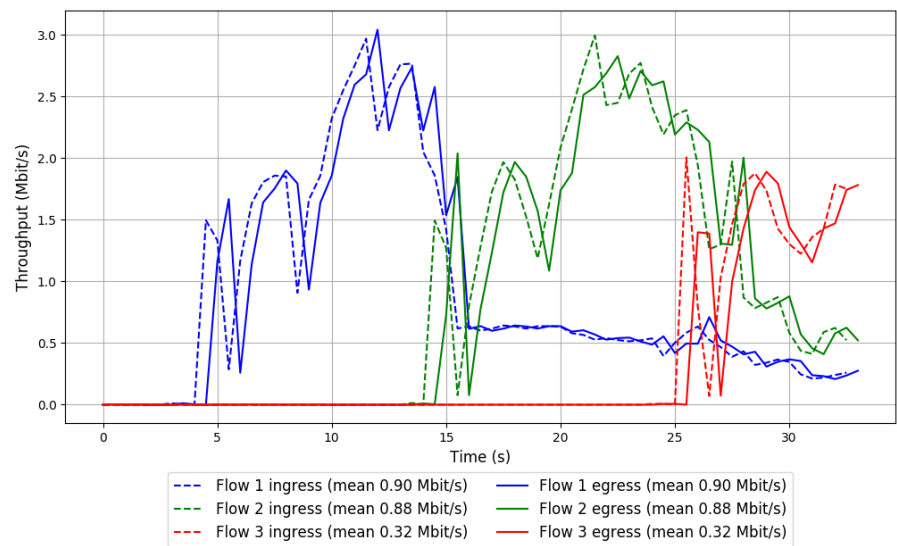
```
Run 2: Statistics of WebRTC media

Start at: 2018-08-22 01:21:02
End at: 2018-08-22 01:21:32
Local clock offset: 0.647 ms
Remote clock offset: -60.84 ms


# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 87.355 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 120.002 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 69.945 ms
Loss rate: 0.05%
-- Flow 3:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 71.375 ms
Loss rate: 0.07%
```

Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-08-22 01:39:37
End at: 2018-08-22 01:40:07
Local clock offset: 1.537 ms
Remote clock offset: -63.526 ms

# Below is generated by plot.py at 2018-08-22 01:54:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 129.727 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 103.122 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 162.900 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 116.587 ms
Loss rate: 0.14%
```

Run 3: Report of WebRTC media — Data Link